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MT. BISCHOFF TIN PROSPECT

EXPLORATION LICENCE 13/79

TASMANIA

REPORT ON STAGE 2B PROGRAMME

VOLUME 1 REPORT NO. 510

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SUMMARY

The Stage 2B Programme, between November 1979 and June 1980, was designed primarily to firm up the previously estimated reserves by closer spaced diamond drilling. Metallurgical studies were carried out on cores obtained during the drilling programme. Some exploration work was also done.

Exploration Licence 13/79 was maintained, and Authority to Prospect AP 5/80, covering the Fooks Lode area, was granted.

All drill holes were picked up by theodolite, and two regional grids were surveyed in the south-west and south-east corners of the Exploration Licence.

Surface samples were taken from the dolomite sulphide lode outcropping in Slaughteryard Face and Brown Face. The former averaged 1.04% Sn, and the latter 0.06% Sn.

A total of 3821 metres of diamond drilling was completed in 33 holes. Twenty-nine of the holes were designed to firm up the previously estimated reserves, detailing the dolomite sulphide lode to a 40 x 40 metre drill pattern, and the porphyry to an 80 x 80 metre drill pattern. The remaining four holes were drilled to test a "buried" dolomite horizon (approximately 150 metres below surface) about 100 metres south-west of the main

outcropping dolomite horizon. Two of the holes intersected significant values: 7.8 metres at 0.69% Sn and 0.5 metres at 6.38% Sn. The other two holes failed to strike dolomite.

The cores from 30 "old" diamond drill holes were reboxed and re-logged for a total of 3669.5 metres. All these holes had passed through the main dolomite horizon. The re-logging has standardized the geological nomenclature to conform with the recent drilling. Some core was assayed to roughly check previous results. Core recoveries were measured for each hole.

A total of 1154 samples were despatched for assay for tin by XRF systems. The samples comprised core, sludge, rock/chip, geochemical (hand auger) and bulk metallurgical. 32 core samples were quartered, and the quarters sent to separate laboratories. Of the 32 samples, 7 had assay variations in excess of 30%.

The samples in the mineralized horizons of dolomite sulphide lode and the porphyry rock types were also assayed for copper, lead, zinc, silver, tungsten and arsenic. The average grades obtained were (in ppm):

Rock Type	Cu	Pb	Zn	Ag	W	As	No. of Samples
Dolomite Sulphide Lode	560	160	2120	1.5	70	2490	95
Porphyry	330	190	720	2.2	40	830	171

Re-interpretation of the geological structure at Mt. Bischoff suggests that a graben-like structure exists traversing both the dolomite horizon and the quartz porphyries in a north-east - south-west (grid) direction. Six faults are postulated, with throws varying between 7 and 50 metres.

The detailed core logging has not yet finalized a stratigraphic column for the Mt. Bischoff sequence of rocks, mainly due to the depositional discontinuity of the sediments. Present interpretation indicates that the "buried" dolomite lies up to 100 metres stratigraphically below the main dolomite horizon.

Five main constituents have been categorized for the dolomite sulphide lode: pyrrhotite, pyrite, talc, serpentinite and quartz/carbonate. These constituents are generally thoroughly intermixed and sometimes irregularly banded. To some extent there is a zoning pattern for each of the predominant mineral constituents. The average visual mineralogical content of the +0.3% Sn dolomite sulphide lode is:

Carbonate/Quartz	41%
Talc/Serpentinite	35%
Pyrrhotite	21%
Pyrite	3%

For the porphyry tin mineralization, it was noted that nearly 70% of the tin content is accompanied by 5-15% pyrite.

Four sets of reserves have been calculated on a section by section basis. A 0.3% Sn cut-off was used for the dolomite sulphide lode, and 0.2% Sn, 0.3% Sn and 0.4% Sn cut-off for the porphyry. The following summary includes indicated and inferred ore:

Rock Type	Cut-off Grade % Sn	Tonnes	Grade % Sn	Contained Tin (tonnes)
Dolomite Sulphide Lode	0.3	1,299,000	1.06	13,770
Porphyry	0.2	3,259,000	0.47	15,320
Porphyry	0.3	2,433,000	0.54	13,140
Porphyry	0.4	1,490,000	0.67	9,980

The dolomite sulphide lode would be amenable to open pit mining at an overburden ratio of about 4 or 5:1. About 250,000 tonnes of porphyry ore would lie within the pit, and the rest would be mined by underground methods. An annual mining rate of 300,000 tonnes could be expected.

Approximate figures for ore mined, dilution, waste and ore left in pillars have been calculated for the 0.3% Sn cut-off grade for the dolomite sulphide lode and the porphyry:

	Tonnes	Grade % Sn	Contained Tin (Tonnes)
Ore Reserve (Geological)	3,732,000	0.72	26,825
Ore in Pillars & Waste	653,000	0.57	3,725
Ore mined	3,079,000	0.75	23,100
Dilution	717,000	0.10	745
Mill Feed	3,796,000	0.63	23,845

The metallurgical reports are summarized in Volume 2 of this report.

Two regional grids were laid in over airborne magnetic anomalies and subjected to ground magnetic surveys and geochemical hand augering: On the H. Brooks grid, in the south-west corner of the Exploration Licence, the Adelaidean/Cambrian contact was defined. No geochemical anomaly for tin was found. Moderate variable magnetic relief occurred over the Cambrian rocks, probably due to the magnetic lithologies within the Cambrian. One strong magnetic anomaly was recorded over Tertiary basalt, approximately coinciding with the extrapolated Adelaidean/Cambrian contact.

The majority of the Housego grid, in the south-east corner of the Exploration Licence, is covered by Tertiary basalt. Tin occurs in the area in a quartz-fluorite lode (Fooks Lode) and in deep leads under the basalt. Quartz porphyries strike under the basalt from the north-east. Mines Department drilling has indicated the presence of a (? Cambrian) dolomite horizon beneath the basalt near Fooks Lode. The ground magnetic survey has outlined a number of anomalies over the basaltic terrain. These anomalies are more likely to be due to the basalt cover, but may have a source at depth beneath the basalt.

1. INTRODUCTION

This report covers the exploration activity of the Stage 2B Programme, for which the budget was drawn up and agreed upon in October, 1979. Field work commenced in November, 1979 and was completed in June, 1980. The on-site personnel comprised two geologists, one technician and two field assistants.

The main objective of the programme was to firm up the previously estimated reserves (3,566,000 tonnes at 0.69%Sn) by closer spaced diamond drilling. An approximate 40 x 40 metre grid was used for the Dolomite Sulphide Lode reserves, and an 80 x 80 metre grid for the Porphyry. To supplement this new drilling information, all the "old" core in the dolomite horizon was re-logged and standardised with the current geological nomenclature.

Closely related to the drilling programme, metallurgical studies were carried out at AMDEL on large diameter (HQ) cores obtained within the two mineralized rock types. These studies were designed to obtain detailed mineralogy of the rock types and to test both gravity and flotation metallurgical techniques on them.

Some regional exploration work was done on areas covered by airborne magnetic anomalies remote from Mt. Bischoff itself.

Four exploratory diamond drill holes were put down about 100 metres to the south-west of the main dolomite horizon to test for mineralization in "buried" dolomite.

2. TENEMENTS

Exploration Licence 13/79, covering 20 square kilometers, was maintained, and regular 6 monthly re-applications for the area were submitted to the Tasmanian Department of Mines.

An application was made for an Authority to Prospect over the Fook's Lode area, SR 1965 No. 178, which was exempt from the Mining Act. Approval was given for an Authority to Prospect AP 5/80 covering 129.5 hectares over Fook's Lode commencing on 23rd June, 1980. The authority was issued subject to similar conditions which exist for Exploration Licences.

3. SURVEYING

A further 22 semi-permanent stations were established within the Mt. Bischoff grid area using a Wild T16 Theodolite. This brings the total of survey stations to 104. However, due to an accident to the vertical circle of the theodolite during the programme, stations 90 to 104 may not be accurate, especially in elevation.

The collars of all the diamond drill holes were picked up by theodolite. Because of the damage to the instrument, the following collars may not be accurate:

MBD27-MBD29A, MBD31-MBD46

Grids were laid in over two airborne magnetic anomalies. In each case the base lines were run with chain and theodolite, and the cross lines by tape and clinometer. The base line on the H. Brooks Grid was 1.2km long and the cross lines totalled 7.2km. The base line on the Housego Grid was 1.5km long and the aggregate of the cross lines 5.0km.

A Tropari instrument was used for down-hole surveys, with readings taken approximately 30 to 40 metres apart. Some holes were surveyed with an Eastman camera, and an acid-etch tube was used in one or two cases when the Tropari was malfunctioning.

4. SURFACE SAMPLING

Slaughteryard Face

The Dolomite Sulphide Lode was chip sampled on two lines, 20 metres apart. Each sample weighed about 4kg and covered 10 metres on each line. The chips were taken laterally within 1 metre of the line. The following results were obtained:

LINE NUMBER	FROM	TO	WIDTH (m)	%Sn
1040E	2110N	2180N	70	0.84
1060E	2110N	2180N	70	1.23

One sample was of low grade, 900 ppmm Sn, but the other samples assayed between 0.33% Sn and 3.26% Sn.

Brown Face

As a result of the surface rubble covering the Dolomite Sulphide Lode at the eastern end of Brown Face (Desert Face end), this rubble was penetrated by taking hand auger samples. Samples were taken every 5 metres along 4 lines. No samples were taken between 2155N and 2180N on line 1300E because the depth of rubble was too deep to penetrate a diamond drill pad that had been contructed. Assay results varied between 12 ppm Sn and 0.32% Sn. The averages for each line were:

LINE NUMBER	FROM	TO	WIDTH (m)	%Sn
1240E	2180N	2210N	35	0.05
1260E	2155N	2210N	60	0.08
incl	2160N		5	0.32
1280E	2140N	2210N	75	0.07
incl	2190N	2200N	*15	0.20
1300E	2140N	2220N	60	0.05

* Excludes 2155N to 2180N.

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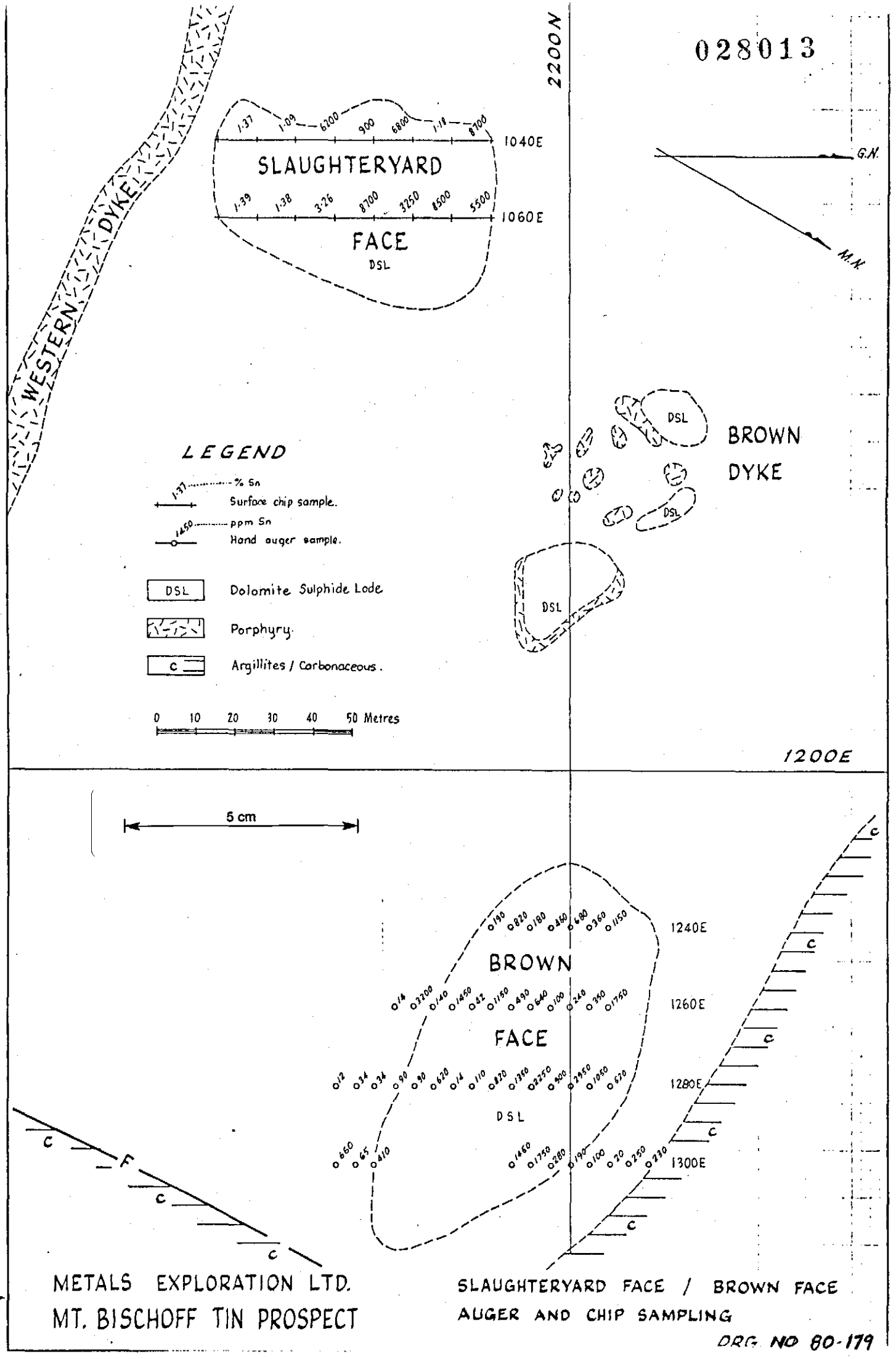

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SLAUGHTERYARD FACE / BROWN FACE
AUGER AND CHIP SAMPLING

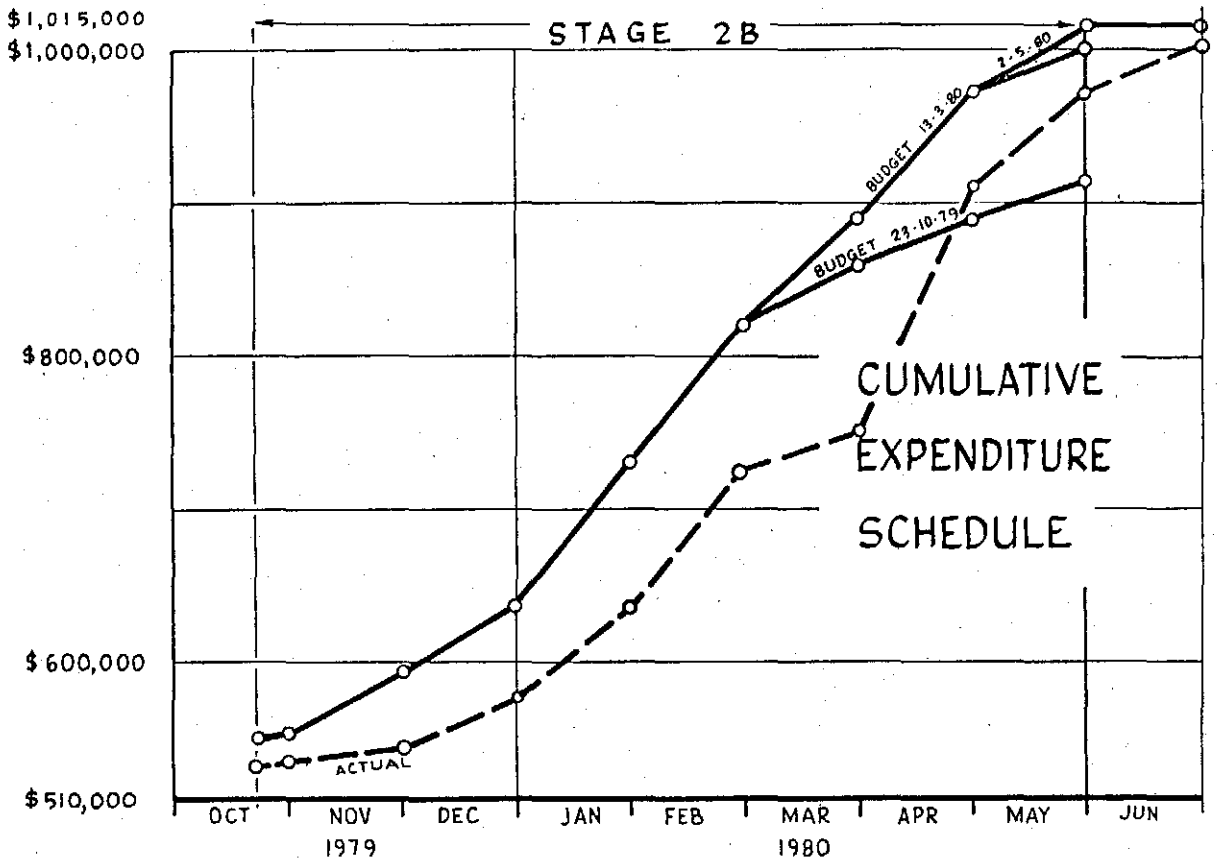
DRG NO 80-179

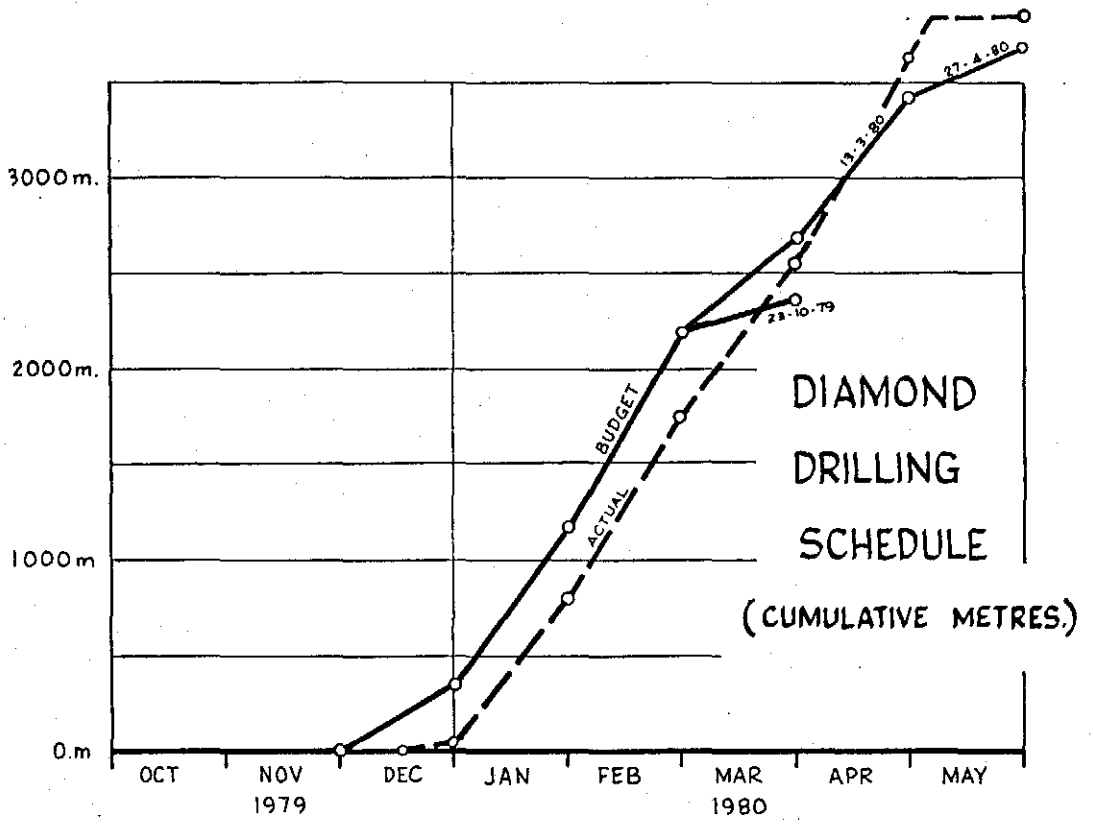
5. DIAMOND DRILLING

A total of 3821 metres of diamond drilling in 33 holes was completed in the Stage 2B Programme, bringing the cumulative metreage for Stage 1 and Stage 2 to 7290.5 metres. A Longyear F38 drill outfit was used on a two shift basis beginning on 15th December, 1979 and terminating on 5th May, 1980. Because of delays early in the programme due to rig availablity, a second drill was procured. This was a BBS1 outfit, on a one shift basis, and was on site between 8th January, 1980 and 7th March, 1980.

The first seven holes of the programme were drilled in HQ core size. Samples from these large diameter holes were later despatched for metallurgical studies. A breakdown of the drilling performed is as follows:

HOLE SIZE	PROGRAMMED (m)	ACTUAL (m)
Tricone	78	100.3
HQ	368	398.2
NQ	1414	1451.9
BQ	1820	1870.6
TOTAL	3680	3821





MT. BISCHOFF

STAGE 2B SUMMARY

as at 30 - 6 - 80

Rev 17 - 7 - 80

Drg. No. 79-342H

A small dam was constructed to conserve water for drilling, but during the summer months, supplementary water had to be pumped about 2km from the waterfall in the Waratah River.

Twenty-nine of the drill holes were designed to firm up the previously estimated reserves. Eleven of the holes had dolomite sulphide lode targets, eleven had porphyry targets and eight had combined dolomite sulphide lode and porphyry targets. By including the information from previous drilling, this programme detailed the dolomite sulphide lode to a 40 x 40 metre drill pattern, and the porphyry to an 80 x 80 metre drill pattern.

Significant intersections are shown below on a section by section basis:

Dolomite Sulphide Lode

SECTION (E)	LOCATION OF INTER-SECTION (N)	R.L OF CENTRE OF INTER-SECTION (m)	DDH (MBD)	ESTIMATED TRUE WIDTH (m)	GRADE %Sn	COMMENTS
940	1880	585	43	3.3	0.62	Dolomite
	1885	600	43	2.0	0.56	
	1940	605	23	4.9	0.64	
	1940	625	23	14.7	1.90	
	1970	640	22	1.5	0.55	
	1980	625	22	16.0	0.45	
980	1820	585	29	2.0	0.80	
	1825	545	29A	1.0	0.89	
	1825	560	29A	4.5	3.16	
	1825	585	29A	1.5	0.32	
	1825	600	29A	2.0	0.40	Faulted Dolomite
	1940	605	21	2.5	0.25	
	1940	630	21	6.3	0.36	
	1980	625	20	12.5	0.57	Partly Dolomite
	1985	615	20	3.5	0.36	
1020	1820	565	15	3.4	0.33	Transition to Porphyry
	1820	620	15	4.0	0.88	Faulted Dolomite
	1915	585	27	1.5	0.73	
	1920	595	27	8.5	0.60	
	1930	605	27	3.5	0.25	Dolomite
	1935	615	27	3.2	0.60	Dolomite
	1940	625	27	1.5	0.47	Dolomite
1060	1860	560	16	1.9	0.23	Dolomite
	1860	580	16	5.8	1.07	
	1860	615	16	9.0	1.08	
	1860	630	16	2.0	0.40	
	1950	630	19	0.8	0.76	
1100	1900	550	17	2.0	0.42	Dolomite
	1900	560	17	7.5	0.40	
	1900	620	17	10.0	0.37	
	1925	620	18	1.0	1.02	
	1930	615	18	19.5	2.37	
1140	1860	570	30	1.0	0.22	
1180	1860	575	35	0.7	0.21	Faulted Dolomite
	1900	625	31	13.0	0.49	Clayey

Porphyry

SECTION (E)	LOCATION OF INTER-SECTION (N)	R.L OF CENTRE OF INTER-SECTION (m)	DDH (MBD)	ESTIMATED TRUE WIDTH (m)	GRADE %Sn	COMMENTS
820	1680	525	44	9.0	0.21	
	1775	400	42	10.5	0.14	
860	1675	525	41	1.6	0.33	
	1790	500	25	30.0	0.56	
	1795	545	25	11.0	0.16	Probably not White Face Dyke
920	1840	550	24	9.7	0.12	Probably not White Face Dyke
	1890	495	26	17.4	0.24	
940	1860	545	43	6.2	0.39	Possibly not White Face Dyke
980	1825	575	29A	20.0	0.19	Includes 12.0m at 0.24%
1020	1820	580	15	19.5	0.17	
	1905	560	27	18.0	0.14	
1060	1860	595	16	29.0	0.30	
1100	1900	600	17	18.0	0.30	
	1925	620	18	1.6	0.25	Not White Face Dyke
	1985	545	28	17.0	0.21	
	2010	655	28	5.5	0.46	Not White Face Dyke
1180	1900	640	31	6.0	0.24	Not White Face Dyke
	1940	645	32	3.0	0.19	Only footwall intersected
	2060	510	36	14.0	0.17	Includes 4.5m at 0.30%
1260	2050	575	37	16.0	0.37	
1300	2090	540	38	18.5	0.20	
1340	2060	670	14	14.2	0.23	
1420	2055	660	39	13.5	0.38	
	2130	630	40	14.5	0.83	Probably Queen Dyke

The remaining four holes of the drilling programme were drilled to the south-west of the main outcropping dolomite zone. Three of the four holes were designed to intersect White Face Dyke prior to reaching the target dolomite (significant porphyry intersections are reported in the table above). MBD 41 was drilled to test the westerly extension of the "buried" dolomite (R.L. 475m, approximately 150 metres below surface) intersected in B18. MBD41 revealed a significant dolomite horizon 37.2 metres thick between 123.4 metres and 160.6 metres. Assay results within this zone were:

HOLE NO.	FROM	TO	WIDTH (m)	%Sn	ROCK TYPE
MBD41	123.4	126.7	3.3	0.31	Dolomite Sulphide Lode
	152.7	160.6	7.8	0.69	Altered dolomite

Hole MBD44 was drilled 40 metres to the west of MBD41 but did not strike the dolomite bed. The hole was terminated at a depth that would cater for the dolomite to dip west at up to 80°.

Hole MBD45 was collared 70 metres to the south west of MBD41. A thin, 0.5 metres, altered dolomite was intersected between 156.0 and 156.5 metres, and assayed 6.38% Sn.

MBD46 was sited about 40 metres south of the B18 dolomite intersection. This hole failed to strike dolomite.

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6. "OLD" CORE

Reboxing and re-logging of 3669.5 metres of old core was accomplished between November, 1979 and June, 1980. Thirty old diamond drill holes were selected for re-logging. All these holes passed through the main dolomite horizon. As well as the geological logging, core recoveries were recorded for all the holes.

The following holes were re-logged:

B1 to B7
B9, B10
B12 to B14
B17
B20 to B27
B32, B33
B44
B47
AAB1 to AAB5

The re-logging programme has standardized all the drilling information in the main dolomite horizon, and conforms with the recent drilling. The broad intercepts of the new logging are generally the same as in the old drill logs, and considerably more detail of the lode horizon is now known. One difference in interpretation is in hole B21: the intersection between 118.9 and 125.1, which was previously logged as a vein, has been re-interpreted as dolomite sulphide lode.

028021

173.6 metres of old core was split (or quartered) and assayed for tin. Part of this assaying was to roughly check previous results, but most was to contribute information in zones where there were no previous assay results.

The following comparative assaying was done:

HOLE NO.	FROM	TO	WIDTH (m)	MEL%Sn	COMSTAFF %Sn
B1	19.8	37.7	17.9	0.95	0.88
B3	17.7	45.7	28.0	0.05	Trace*
B22	43.7	45.6	1.9	0.06	0.19 *
B24	32.2	35.1	2.9	1.50	1.83

* MEL and Comstaff intercepts not exactly the same.

Significant results obtained from zones not previously assayed are:

HOLE NO.	FROM	TO	WIDTH (m)	%Sn	ROCK TYPE
B3	45.7	56.1	10.4	0.44	Dolomite Sulphide Lode
B10	67.1	70.1	3.0	0.14	Porphyry
B44	80.2	81.2	1.0	0.54	Dolomite Sulphide Lode

As a result of the significant dolomite intersection found in MBD41, 8 old holes that had been drilled in that vicinity were laid out and logged in summary form. The objective of this exercise was to try to correlate the stratigraphy and geological setting of the "buried" dolomite. The holes that were logged were:

B11
B15, B16
B18, B19
B28, B29
B37

(These holes have not been re-boxed.)

A total of 1936.6 metres of core was inspected in the south-west area.

The dolomite intersections in holes B15, B18, B19 and B28 were confirmed, and a short dolomitic intersection between 91.7 and 93.5 metres (1.8 metres wide) was found in hole B37. This hole is located about 300 metres south west of MBD41.

7. ASSAYING

A total of 1154 samples were despatched for assay during the programme, and a further 32 samples were sent for check assaying. The samples comprised:

New core (including some sludge samples)	835
Old core	87
Rock/chip	64
Geochemical (hand auger)	160
Metallurgical (bulk samples)	8

All the samples were analysed by XRF (B1 and B2) method for tin by AMDEL in Adelaide. 267 of the new core samples were also analysed for Cu, Pb, Zn, Ag, W and As. Analysis of the geochemical samples included Cu, Pb, Zn, Ni. The metallurgical samples were assayed for Sn, acid soluble Sn, S, Fe, F, Co_2, U, Hg, and a semi-quantitative spectrographic analysis was carried out for a further 47 elements.

The core samples were split, generally in 2 metre lengths, except in the HQ core size where they were quartered. The 32 check samples were also quartered, one quarter going to AMDEL, the other to Australian Laboratory Services Pty. Ltd. in Brisbane. A comparison of the results obtained by the two laboratories is as follows (in ppm Sn):

SAMPLE NUMBER	AMDEL QUARTER	AMDEL'S PULP BY ALS	ALS QUARTER	ALS'S PULP BY AMDEL
97240	190	200	175	160
97260	4050	3900	3800	3750
97281	18	10	20	22
97340	720	635	1000	1050
97360	120	120	105	120
97380	1450	1400	1000	900
97540	1600	1500	1400	1550
97560	1200	1200	1100	1000
97580	2000	2000	1100	960
97600	2600	2500	2800	2500
97620	190	185	1500	4850
97640	430	410	455	560
97660	2600	2700	2200	2150
97680	110	100	120	110
97700	1.46%	1.39%	1.70%	1.64%
97720	130	130	235	320
97740	9600	1.10%	1.02%	1.05%
97780	140	120	220	140
97800	110	145	115	120
97820	490	460	585	540
97840	6100	5900	8100	7000
97860	450	450	435	460
97880	5200		2800	
97900	300	300	350	330
97920	340		390	
97940	2150		2200	
97960	230		245	
97980	42		45	
98000	1750		1800	
98020	270		205	
98040	3350		2900	
98060	80		210	

It can be seen that, except for sample 97620, the sample pulp checks have a good correlation, indicating that the XRF systems in both laboratories agree fairly well. However, there are some discrepancies in the assay results for the individual quarters. Seven of the 32 samples have variations in excess of 30%. Some of this variation may be due to sample preparation (and possible contamination) in the laboratories, but it is more likely that the tin content of the two original quarters of core was disparate. This is fairly typical for tin mineralization. The percentage difference for the totals of the two sets of results is only 3.5% (AMDEL being slightly lower).

All the samples in the mineralized horizons of the dolomite sulphide lode and the porphyry rock types were analysed for Cu, Pb, Zn, Ag, W and As. There were 267 samples from holes MBD 14 to MBD 40. The averages for each hole are summarized in the following tables:

Dolomite Sulphide Lode Metal Grades

(in ppm)

HOLE NUMBER	Cu	Pb	Zn	Ag	W	As	NO. OF SAMPLES
MBD 15	130	70	950	1.3	20	160	4
MBD 16	490	180	2760	2.3	70	1170	9
MBD 17	380	170	6420	1.7	30	1340	11
MBD 18	1070	120	290	0.4	200	6020	13
MBD 19	550	40	1500	2.0	35	2000	1
MBD 20	440	130	670	4.3	50	4660	8
MBD 21	110	10	2600	0.3	30	860	3
MBD 22	660	20	150	-	80	280	10
MBD 23	420	80	390	0.4	40	90	11
MBD 27	250	30	100	-	20	270	9
MBD 29	510	30	720	0.5	50	310	2
MBD 29A	1080	1330	2900	8.5	210	16730	4
MBD 31	680	190	6430	1.3	50	1630	10
AVERAGE	520	180	1990	1.8	70	2730	95
WEIGHTED AVERAGE	560	160	2120	1.5	70	2490	95

Porphyry Metal Grades

(in ppm)

HOLE NUMBER	Cu	Pb	Zn	Ag	W	As	NO. OF SAMPLES
MBD 14	230	60	280	1.5	30	620	8
MBD 15	180	40	730	1.6	30	380	10
MBD 16	320	320	2330	7.5	30	590	17
MBD 17	380	60	260	1.0	30	990	10
MBD 24	390	100	550	3.4	20	550	8
MBD 25	250	120	1030	2.3	40	990	29
MBD 26	450	40	40	1.2	110	2230	9
MBD 27	480	30	170	0.7	30	920	10
MBD 28	540	140	280	1.7	70	620	12
MBD 29A	310	880	1610	3.4	20	1000	11
MBD 31	340	70	2060	1.7	30	280	3
MBD 36	320	30	190	0.2	30	1100	9
MBD 37	420	80	270	1.2	40	680	9
MBD 38	330	60	240	0.9	30	840	10
MBD 39	310	60	60	0.7	20	160	7
MBD 40	170	760	50	1.1	60	680	9
AVERAGE	340	180	630	1.9	40	790	171
WEIGHTED AVERAGE	330	190	720	2.2	40	830	171

The only other minerals of possible economic significance that are known to be contained in the mineralized horizons are fluorite (mostly contained in sellaite and topaz) and topaz.

The rock/chip samples have been dealt with in the Surface Sampling section.

For the geochemical (hand auger) samples see under Regional Exploration.

The assay results for the metallurgical samples are summarized in the accompanying tables (pages D1 and D2 taken from AMDEL's metallurgical reports). A comparison of the head assays of each sample with the calculated head assays from the individual 2 metre core samples is as follows:

SAMPLE NUMBER	ROCK TYPE	DRILL HOLE	INTERVAL (m)	HEAD ASSAY % Sn	CALCULATED HEAD ASSAY % Sn
97528	Porphyry	MBD 14	9.2-24.8	0.23	0.23
97529	Porphyry	MBD 15	43.3-55.8	0.26	0.23
97530	Porphyry	MBD 16	23.0-55.9	0.26	0.29
97531	Porphyry	MBD 17	15.9-31.9	0.33	0.36
97532	Dolomite	MBD 17	59.6-70.6	0.34	0.37
97533	Dolomite	MBD 18	5.7- 6.9 and 8.8-29.3	2.38	1.88
97534	Dolomite	MBD 20	18.7-32.3	0.61	0.53
97535	Dolomite	MBD 23	7.3-25.1 and 35.7-40.6	1.72	1.36

The specific gravity measurements were obtained using an Air Comparison Pycnometre on minus 1.7mm (minus 10 mesh) crushed material.

APPENDIX D

HEAD ASSAYS AND SPECIFIC GRAVITY MEASUREMENTS

Sample	Assay								Specific Gravity
	Sn %	Acid Soluble Sn %	S %	Fe %	F %	CO_2 %	U g/t	Hg g/t	
97528	0.23	0.02	9.70	3.65	6.00	<0.05	14	-	2.96
97529	0.26	0.02	11.6	6.50	7.30	1.55	15	-	3.01
97530	0.26	0.02	15.1	4.70	5.50	0.15	15	-	2.98
97531	0.33	0.02	15.1	4.85	5.70	0.10	14	-	3.00
97532	0.34	0.02	44.1	23.6	13.8	3.25	4	-	3.43
97533	2.38	0.09	72.3	31.9	11.1	1.75	4	-	3.78
97534	0.61	0.10	37.7	21.5	0.86	16.6	4	-	3.33
97535	1.72	0.02	37.7	21.0	8.25	4.05	4	-	3.38
PC1	0.24	0.02	10.5	5.00	6.20	1.25	14	0.14	3.03
PC2	0.29	0.02	14.9	4.65	5.90	0.10	16	0.05	3.04
SC1	1.40	0.05	53.0	27.4	12.8	3.10	<4	0.09	3.61
SC2	1.20	0.01	38.1	21.5	4.70	10.7	<4	0.07	3.40

Element	Semi-quantitative Spectrographic Analysis, g/t			
	PC1	PC2	SC1	SC2
Ba(200)	X	X	X	X
Be(1)	3	20	150	100
Ce(300)	X	X	X	X
Co(5)	X	X	X	15
Cr(20)	150	150	40	30
La(50)	X	X	X	X
Mn(10)	1,000	80	800	4,000
Mo(3)	6	3	X	X
Nb(20)	40	20	X	X
Ni(5)	30	30	X	5
Sc(3)	3	3	3	X
Sr(50)	X	X	X	X
Ta(100)	X	X	X	X
Th(100)	X	X	X	X
Ti(100)	200	200	100	100
V(10)	15	15	25	15

Element	Semi-quantitative Spectrographic Analysis, g/t			
	PC1	PC2	SC1	SC2
W(50)	50	50	100	200
Y(10)	100	80	30	20
Yb(1)	60	20	6	3
Zr(10)	100	80	150	150
Ag(0.1)	2.0	5.0	0.5	0.5
As(50)	1,500	2,000	3,000	X
Bi(1)	20	15	30	40
Cd(3)	X	X	40	X
Cu(1)	250	200	800	300
Ga(1)	30	40	60	30
Ge(1)	20	5	X	5
In(10)	X	X	10	X
Pb(1)	100	250	40	60
Sb(30)	X	X	X	X
Sn(1)	2,000	2,000	>10,000	10,000
Zn(20)	150	800	2,000	200
Au(3)	X	X	X	X
P(100)	X	X	X	X
Te(20)	X	X	X	X
Tl(1)	X	X	X	X
Li(1)	30	20	150	100
Na(50)	X	X	50	100
Cs(30)	X	X	X	X
K(5)	1,000	500	6,000	4,000
Pb(10)	30	20	300	200
B(3)	40	40	30	200
Al(100)	>10,000	>10,000	>10,000	>10,000
Ca(100)	8,000	300	10,000	>10,000
Fe(100)	>10,000	>10,000	>>10,000	>>10,000
Mg(100)	3,000	800	>10,000	>>10,000
Si(100)	>>10,000	>>10,000	>>10,000	>>10,000

Notes: Detection limits in brackets

X denotes not detected at limit quoted

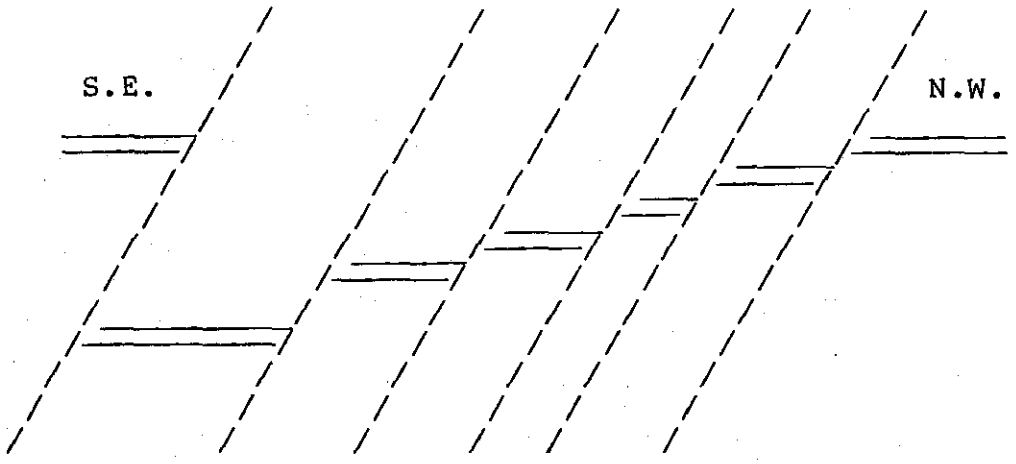
> denotes greater than

>> denotes much greater than

8. GEOLOGY

As a result of the increased information obtained from the drilling programme and the detailed core logging, some re-interpretation of the geological structure at Mt. Bischoff has been made. It now appears likely that a number of parallel faults exist, trending in a northeast-southwest (grid) direction. In the cores, these faults are represented by puggy clay zones or loss of core where the clay has been washed out during drilling. On the surface, the faults can best be seen in the off-sets in Western Dyke and the western boundary of the dolomite horizon.

Six (post porphyry intrusion) faults have been postulated, forming a graben-like structure. The boundary faults are some 300 metres apart and individual faults between 130 and 30 metres apart. The faults dip steeply to the southeast. The maximum throw is on the southeast boundary fault, where the northwest block is downfaulted by about 50 metres. Thereafter, towards the northwest, the blocks are successively uplifted (on the northwest side) by between 25 and 7 metres until the northwest boundary fault is reached. The geological correlation on either side of the graben remains the same. The faults are shown diagrammatically:



At this stage, the detailed core logging has not yet finalised a stratigraphic column for the Mt. Bischoff sequence of rocks. The only major marker bed is the dolomite horizon itself, however even that appears to be depositionally discontinuous. The clastic sediments (shales, siltstones and sandstones/quartzites) are laterally discontinuous and appear to have abrupt facies changes. They are frequently highly disrupted and have tectonic and/or pre-consolidation brecciation. South of the main dolomite horizon there are 3 or 4 fragmental angular tuffaceous horizons. These tuffs become thicker towards the south and generally lie some 30 to 80 metres above the "buried" dolomite. However, tuffs have also been encountered beneath both the "buried" dolomite and the main dolomite horizon. Unfortunately the tuffs, like the clastic sediments, are discontinuous and are difficult to use as marker beds. Present interpretation indicates that the "buried" dolomite lies up to 100 metres stratigraphically below the main dolomite horizon, but it is still possible that it is the same horizon.

As a result of the detailed core logging, the dolomite sulphide lode bodies have been catagorized into five main constituents:

Pyrrhotite rich
Pyrite rich
Talc rich
Serpentinite rich
Quartz/Carbonate rich

These constituents are generally thoroughly intermixed and sometimes irregularly banded. In some areas one mineral may occur as a massive body. Surrounding the dolomite sulphide lode, the dolomite is usually altered and recrystallized.

The accompanying plan shows a schematic distribution of the predominent mineral constituents in the dolomite sulphide lode. The lode itself occurs on the northern footwall of the dolomite horizon and on both the upper and lower contacts with the porphyry. Occasional small sporadic lenses are found in other areas of the dolomite. Above the porphyry dyke, the footwall lode consists mainly of talc/serpentinite and pyrrhotite. Progressing southwards, carbonate/quartz becomes the dominant mineral, except for one small talcy patch on the upper porphyry contact. Below the porphyry, the predominant mineral is carbonate/quartz, except for one patch of talc/serpentinite. Pyrite tends to occur preferentially to pyrrhotite, especially towards the east.

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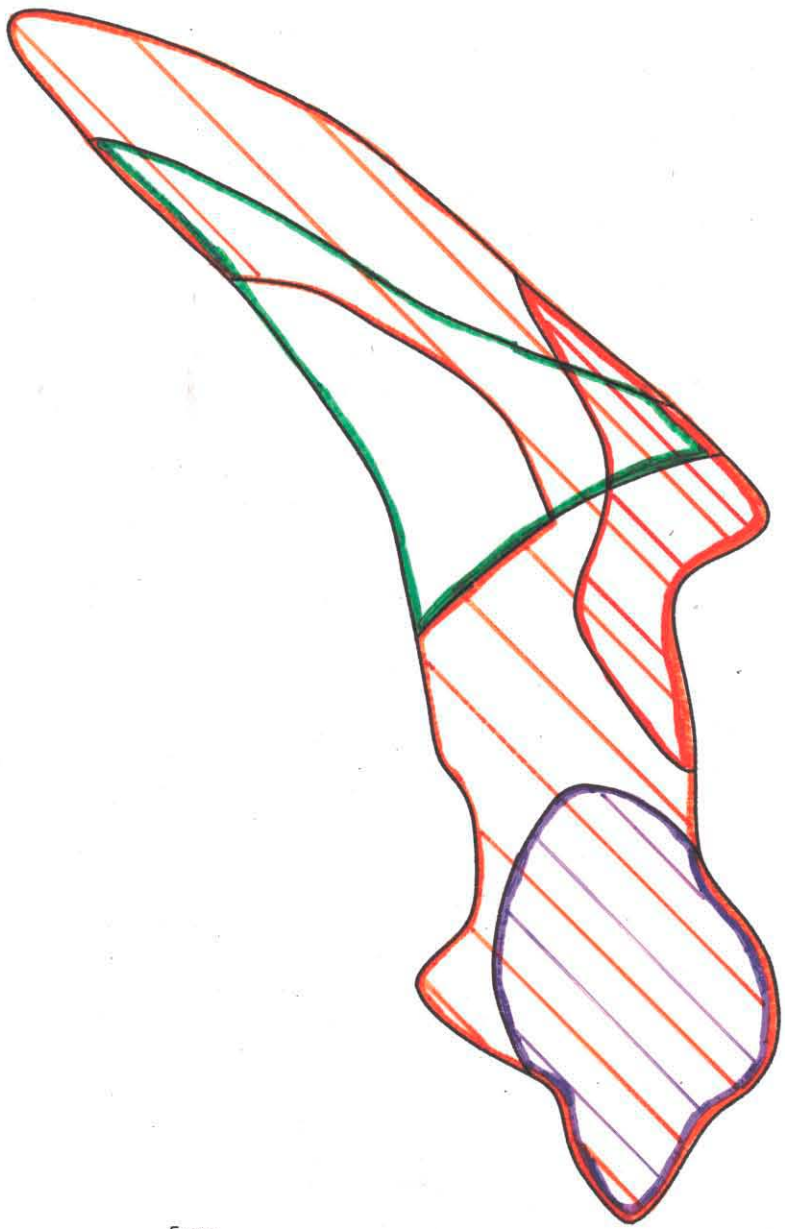
028034



5 cm

Talc / Serpentinite

Carbonate / Quartz

Pyrrhotite

Pyrite

METALS EXPLORATION LTD.
MT. BISCHOFF TIN PROSPECT

SCHEMATIC DISTRIBUTION OF DOMINANT MINERAL CONSTITUENTS IN DOLOMITE SULPHIDE LODE

BELOW PORPHYRY

SCALE 1:2000

A
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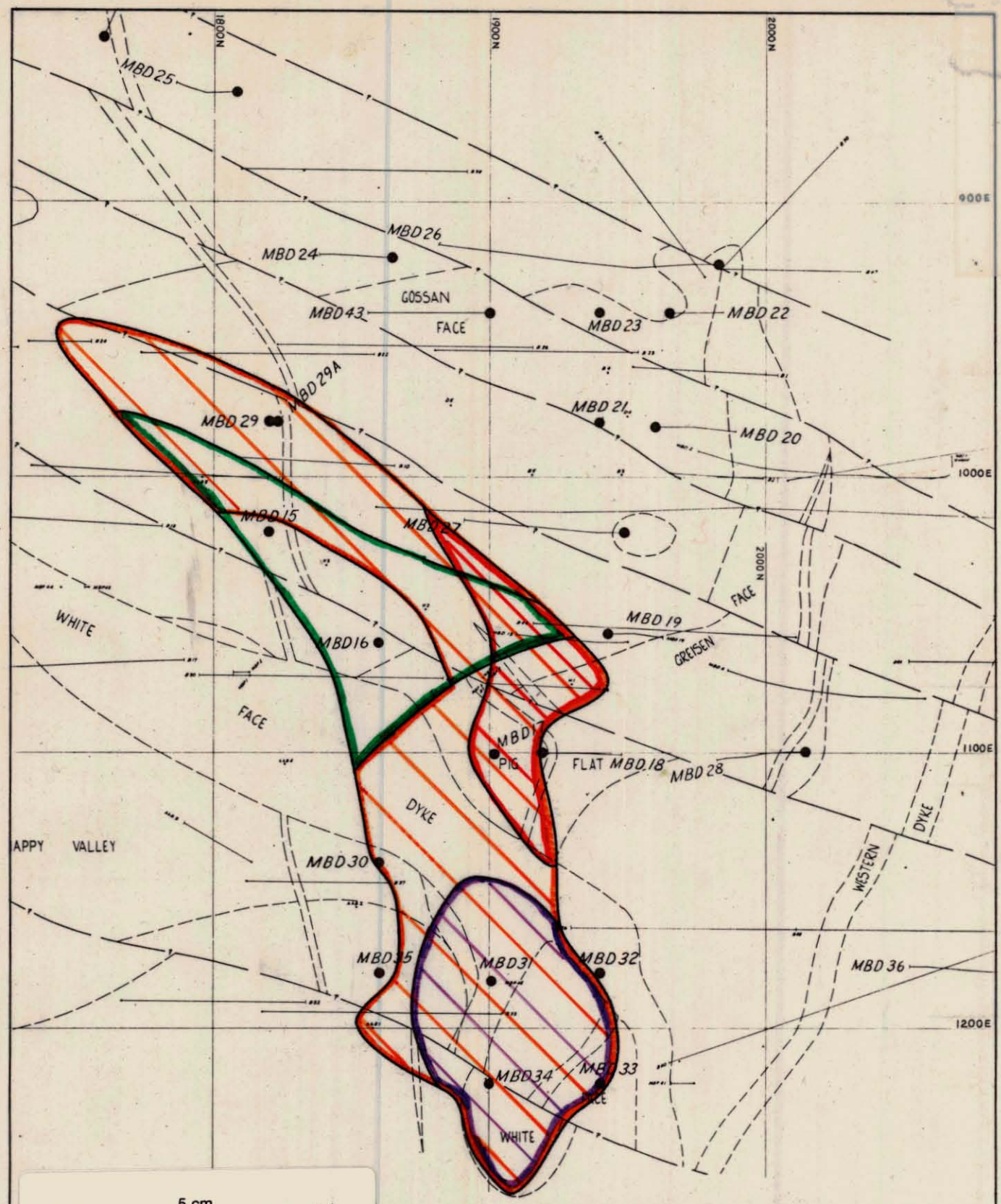


METALS EXPLORATION LTD.
MT. BISCHOFF TIN PROSPECT

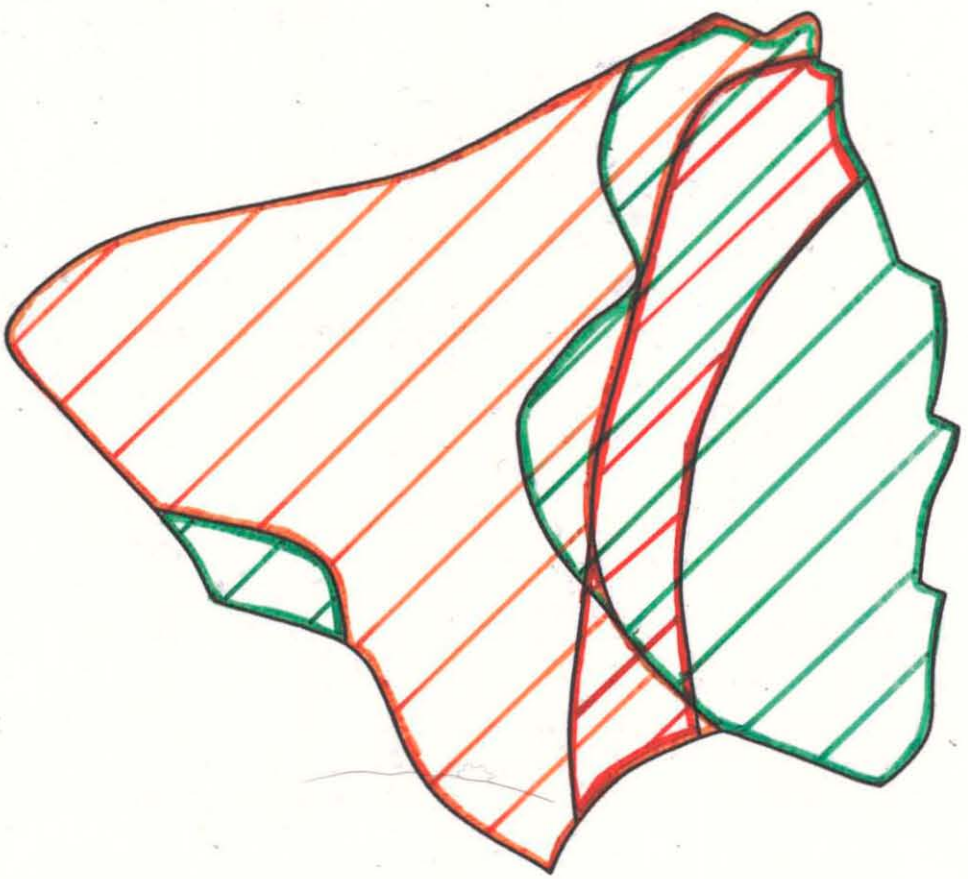
SCHEMATIC DISTRIBUTION OF
DOMINANT MINERAL CONSTITUENTS
IN DOLOMITE SULPHIDE LODE

BELOW PORPHYRY

028036

SCALE 1:2000

028035.
B.



5 cm

Talc / Serpentinite

Carbonate / Quartz

Pyrrhotite

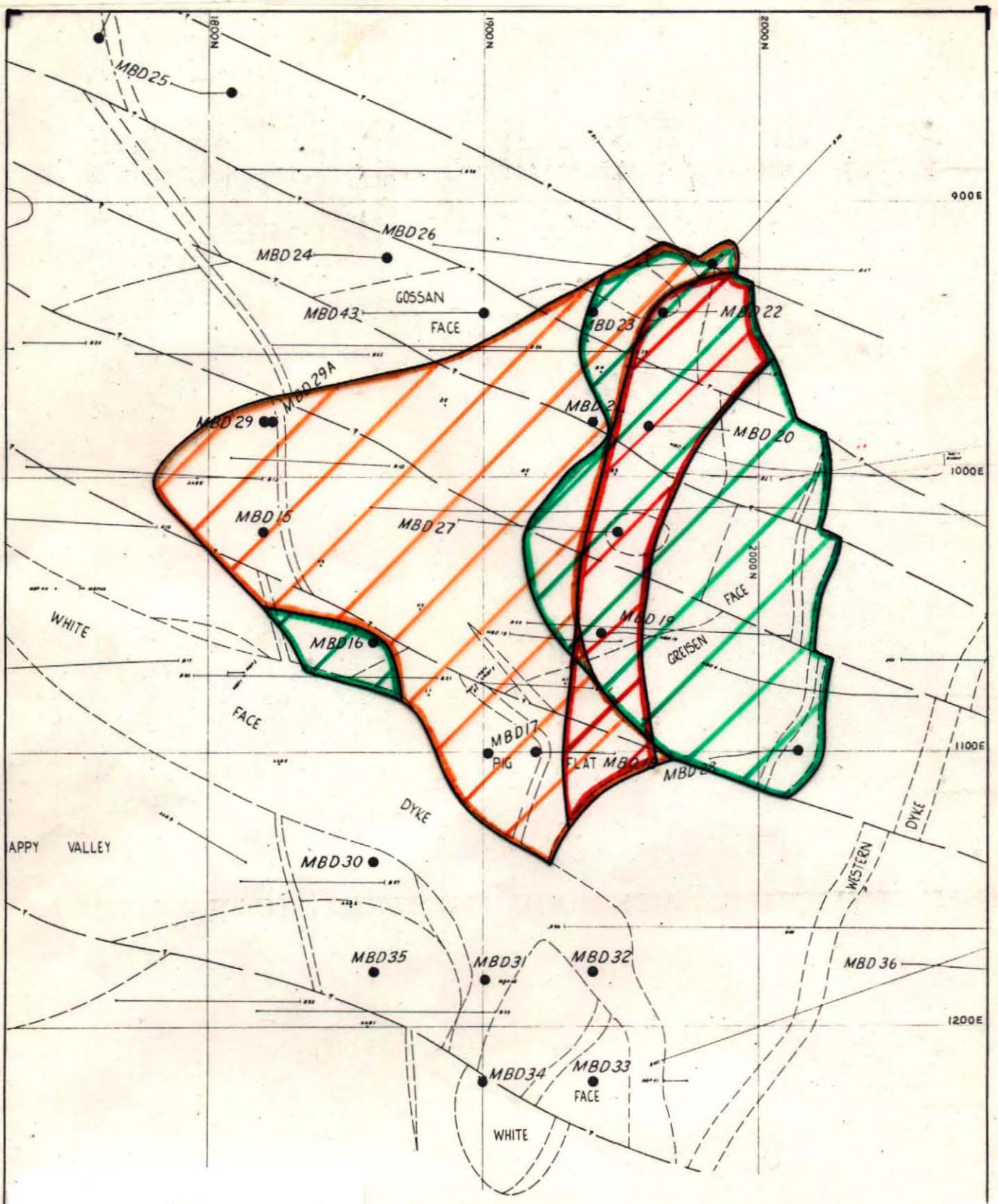
Pyrite

METALS EXPLORATION LTD.
MT. BISCHOFF TIN PROSPECT

SCHEMATIC DISTRIBUTION OF DOMINANT MINERAL CONSTITUENTS IN DOLOMITE SULPHIDE LODE ABOVE PORPHYRY

SCALE 1:2000

028035.
B.



METALS EXPLORATION LTD.
MT. BISCHOFF TIN PROSPECT

SCHEMATIC DISTRIBUTION OF DOMINANT MINERAL CONSTITUENTS IN DOLOMITE SULPHIDE LODE ABOVE PORPHYRY

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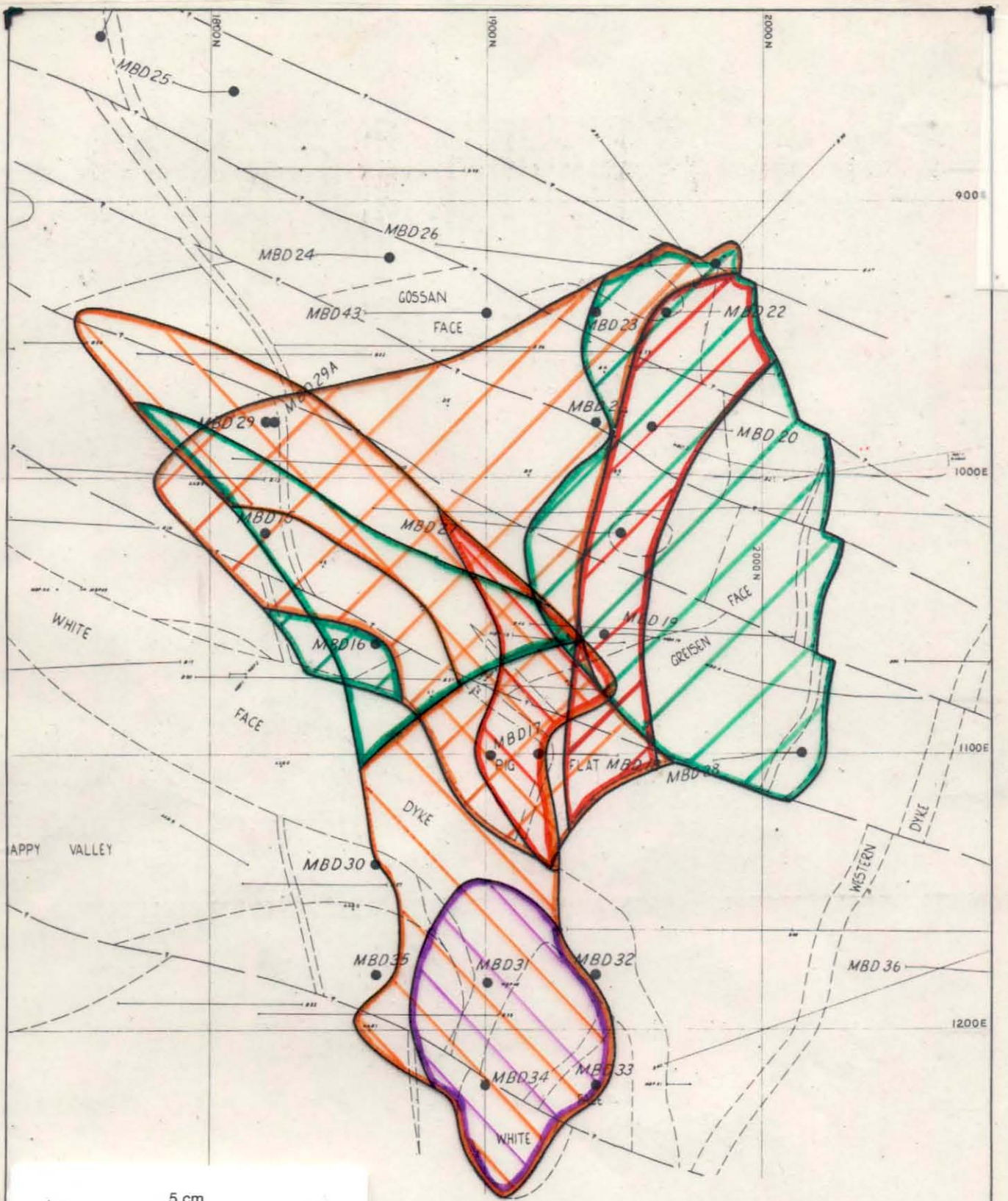
SCALE 1:2000

028033
B.

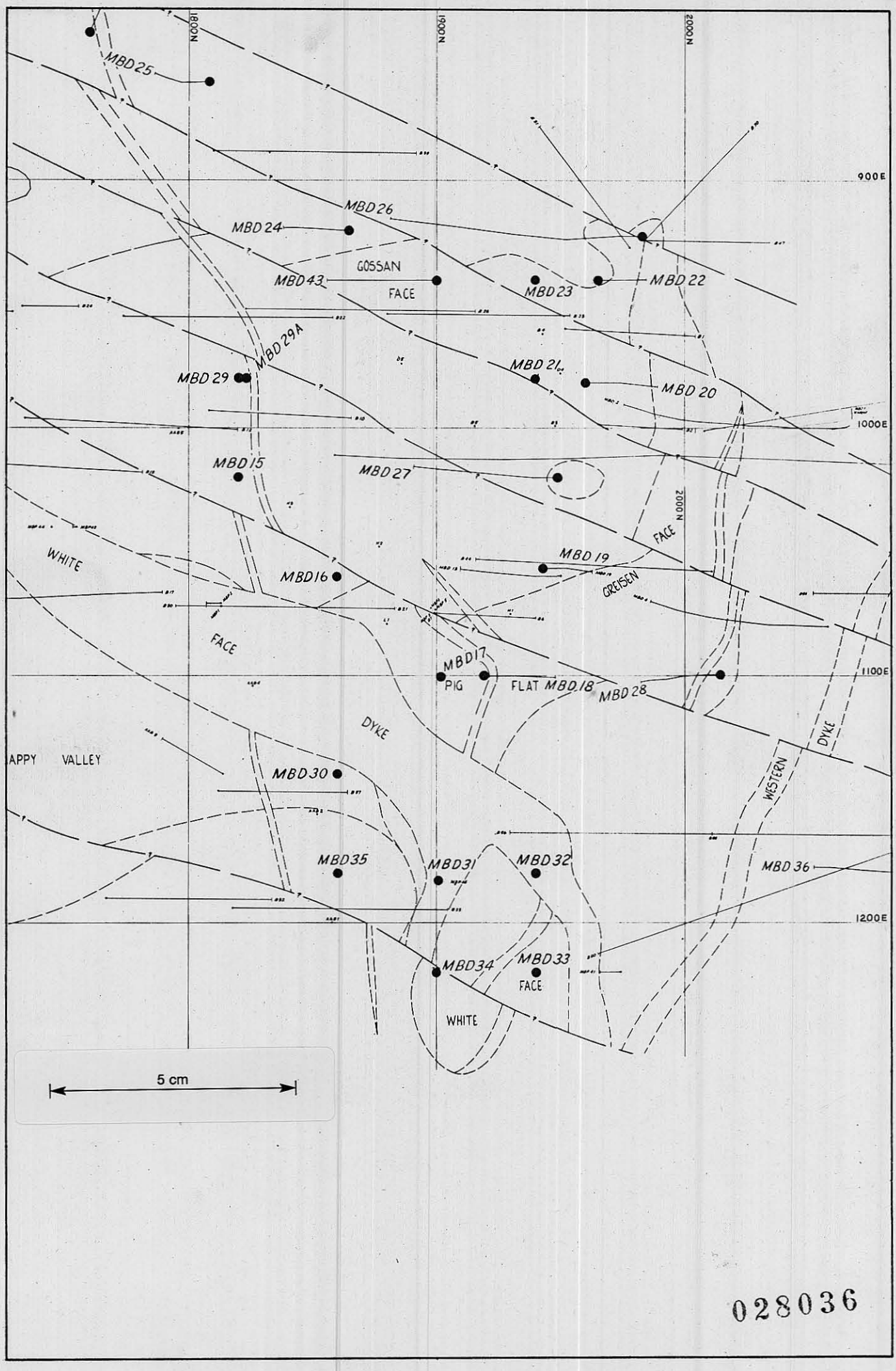


METALES EXPLORATION LTD.
MT. BISCHOFF TIN PROJECT

SCHEMATIC DISTRIBUTION OF DOMINANT MINERAL CONSTITUENTS IN DOLOMITE SULPHIDE LODE BELOW PORPHYRY

028036

SCALE 1:2000

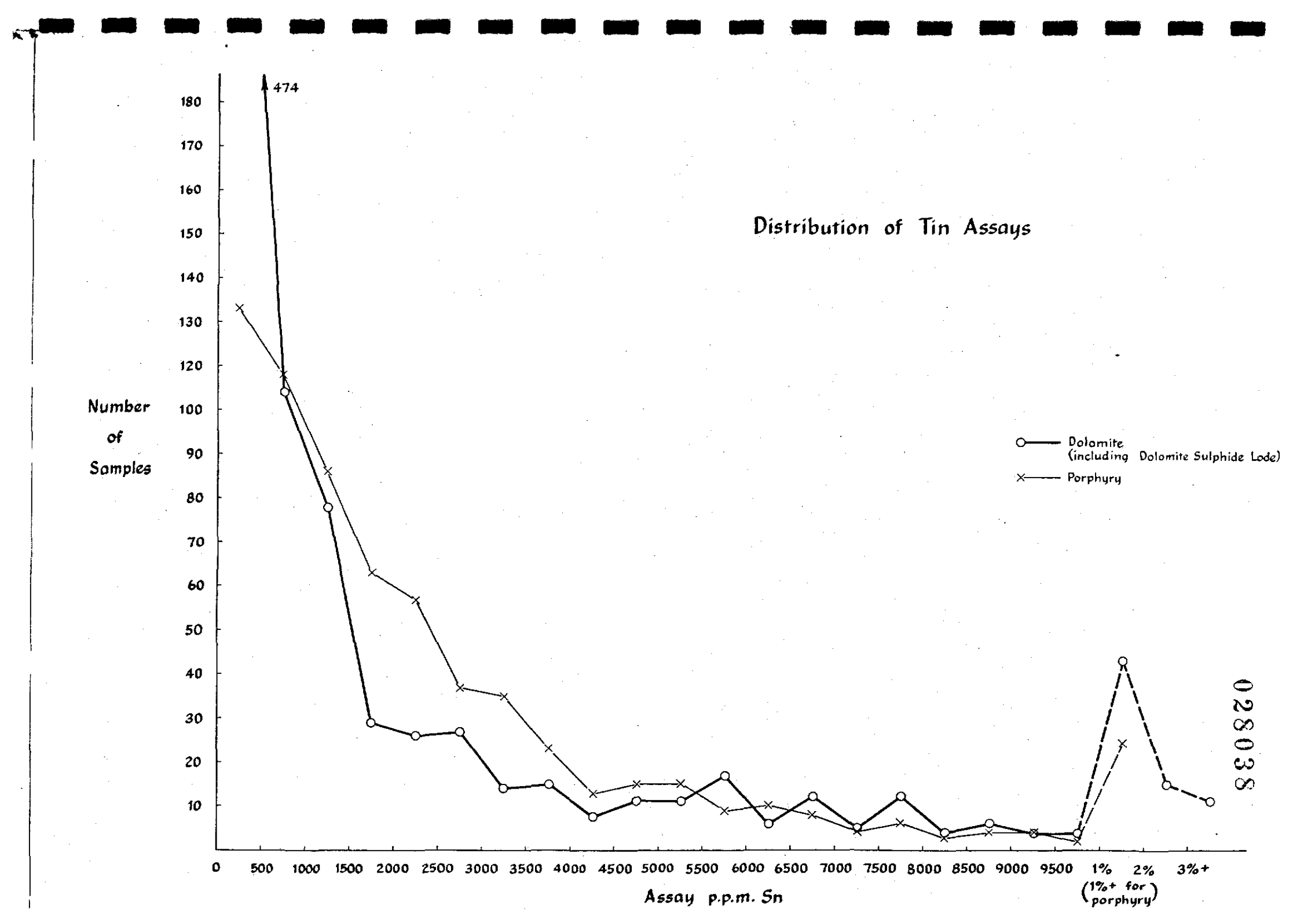

1800N
1900N
2000N
900E
1000E
1100E
1200E
MBD25
MBD26
MBD24
GOSSAN
FACE
MBD43
MBD23
MBD22
MBD29A
MBD29
MBD21
MBD20
MBD15
MBD27
2000N
FACE
WHITE
MBD19
GREISEN
MBD16
FACE
MBD17
PIG
FLAT
MBD18
MBD28
DYKE
DYKE
WESTERN
APPY VALLEY
MBD30
MBD35
MBD31
MBD32
MBD36
MBD34
MBD33
FACE
WHITE
5 cm

028036

Tin is present throughout the dolomite sulphide lode in amounts varying from almost barren to massive slugs. The accompanying graph shows the tin distribution in the dolomite (including the dolomite sulphide lode) and the porphyry rock types. For the dolomite there appears to be a natural background up to 1500 ppm Sn, and possibly a second cut-off at 3000 ppm Sn. The porphyry has a gradual curve with no natural cut-offs.

The chart below indicates the tin content in the various constituents of the dolomite sulphide lode:

GRADE % Sn	AVERAGE VISUAL DOMINANT ROCK TYPE CONTENT %				NO. OF SAMPLES
	PYRRHOTITE	PYRITE	TALC/ SERPENTINITE	CARBONATE/ QUARTZ	
0.3-0.5	15	2	23	60	48
0.5-0.75	14	3	39	44	57
0.75-1.00	18	4	39	39	23
1.00-1.25	21	-	37	42	19
1.25-1.50	30	10	30	30	10
1.50-2.00	45	-	55	-	11
2.00-3.00	25	-	50	25	16
3.00+	58	8	17	17	12
AVERAGE	28	4	36	32	196
WEIGHTED AVERAGE	21	3	35	41	196


Distribution of Tin Assays
Number of Samples
474
180
170
160
150
140
130
120
100
90
80
70
60
50
40
30
20
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
9500
1%
2%
3%+
(1%+ for porphyry)
Assay p.p.m. Sn
Dolomite (including Dolomite Sulphide Lode)
Porphyry
028038

The following generalizations can be drawn from the chart:

1. The lower grades of tin are more commonly associated with the carbonate/quartz rock types that are less altered.
2. Tin of all grades occurs in the talc/serpentinite rocks.
3. Tin content appears to increase with pyrrhotite content.

The average mineralogical content of the +0.3% Sn dolomite sulphide lode is:

Carbonate/Quartz	41%
Talc/Serpentinite	35%
Pyrrhotite	21%
Pyrite	3%

It should be noted that these figures are based on drill intersections and have not been weighted for volumes of influence.

Arithmetically, by taking the number of samples per grade category (e.g. 23 samples at 0.75-1.00%) and weighting their averages, the grade for the +0.3% Sn cut-off dolomite sulphide lode is 1.01% Sn. (A 4.0% Sn upper cut-off was used).

The detailed logging of the core included estimating the visual sulphide content (i.e. by area/volume) of all rock types. The following two tables show the sulphide contents relative to tin contents for both the dolomite sulphide lode and the porphyry rock types:

Dolomite Sulphide Lode

GRADE % Sn	VISUAL SULPHIDE CONTENT %					NUMBER OF SAMPLES
	0-5	5-10	10-20	20-40	40-70	
0.3-0.5	27	23	21	12	17	48
0.5-0.75	18	12	28	26	16	57
0.75-1.00	9	30	22	17	22	23
1.00-1.25	5	27	5	42	21	19
1.25-1.50	10	10	30	20	30	10
1.50-2.00	-	9	9	18	64	11
2.00-3.00	6	19	6	44	25	16
3.00+	-	-	8	25	67	12
AVERAGE	9	16	16	26	33	196
WEIGHTED AVERAGE	14	18	19	24	25	196

Porphyry*

GRADE % Sn	VISUAL SULPHIDE CONTENT %				NUMBER OF SAMPLES
	0-5	5-10	10-15	15-20	
0.2-0.3	21	40	21	18	67
0.3-0.4	-	39	48	13	46
0.4-0.5	5	52	29	14	21
0.5-0.6	17	22	50	11	18
0.6-1.0	12	44	12	32	25
1.0-3.0	23	23	23	31	13
AVERAGE	13	37	30	20	190
WEIGHTED AVERAGE	13	39	30	18	190

* Includes all MEL holes and re-logged old core.

It appears from the figures for the dolomite sulphide lode that the higher the pyrrhotite content, the higher the tin content. Also the table indicates that about half the lode contains more than 20% sulphides (nearly all as pyrrhotite).

The conclusions to be drawn from the porphyry table are that the tin content is not directly related to the sulphide content, but that the majority of the tin (nearly 70%) is contained in the 5-15% sulphide content range. Only 10% of the porphyry samples have pyrrhotite as the predominant sulphide present, the remaining 90% being pyrite with minor marcasite.

The average tin grades, calculated arithmetically, for the porphyry are:

0.2% Sn Cut-off	:	0.52% Sn
0.3% Sn Cut-off	:	0.66% Sn
0.4% Sn cut-off	:	0.85% Sn

More detail is still needed for final interpretation of the porphyry dyke structures. On the sections, the porphyries intersected in holes MBD 24 and MBD 43 have been interpreted as belonging to the relatively narrow east-west trending dyke, rather than the White Face Dyke. Also the porphyry intersection in MBD 40 is thought to be part of Queen Dyke, and not Stanhope Dyke. As a result, other structural interpretations can still be made for the dykes.

21 thin sections of core from Mt. Bischoff were prepared by Central Mineralogical Services of Adelaide. The thin sections were examined with petrological and stereobinocular microscopes. The results are appended to this volume.

9. RESERVES

Reserves have been calculated on a section by section basis. Average grades of drill intersections have been calculated for various cut-off grades. Reserve blocks have been assigned to each intersection and terminate half-way between intersections or, for drill indicated, 40 metres from the drill hole, whichever is the shorter distance. For the drill inferred category a maximum distance of 80 metres has been used (this applies to porphyry reserves only). Each block has a 20 metre width (i.e. half-way to the adjoining sections). The volumes for each block have been converted to tonnes by multiplying by the specific gravities:

Dolomite Sulphide Lode	:	S.G. of 3.5
Porphyry	:	S.G. of 3.0

A cut-off grade of 0.3% Sn has been used for the Dolomite Sulphide Lode reserves. It is estimated that using a 0.2% Sn cut-off or a 0.4% Sn cut-off would only vary the reserves by about 10% to 15%. For the porphyry reserves, figures have been calculated at 0.2%, 0.3% and 0.4% Sn cut-off, since the tonnage and grade variations are quite considerable.

All the reserve calculations are appended at the end of this report. The reserve blocks, referred to in the tables, are shown on the geological sections.

The calculated reserves are of a geological nature, and do not incorporate any mining criteria.

1. Dolomite Sulphide Lode Reserves

0.3% Sn Cut-off

Drill Indicated Ore Reserves	:	1,229,000 tonnes at 1.06% Sn
*Inferred Ore	:	70,000 tonnes at 1.05% Sn
Total	:	1,299,000 tonnes at 1.06% Sn
Contained tin	:	13,770 tonnes

* Slaughteryard Face

2. Porphyry Reserves

0.2% Sn Cut-off

Drill Indicated Ore Reserves	:	2,486,000 tonnes at 0.46% Sn
Drill Inferred Ore	:	773,000 tonnes at 0.48% Sn
Total	:	3,259,000 tonnes at 0.47% Sn
Contained tin	:	15,320 tonnes

0.3% Sn Cut-off

Drill Indicated Ore Reserves	:	1,824,000 tonnes at 0.54% Sn
Drill Inferred Ore	:	609,000 tonnes at 0.55% Sn
Total	:	2,433,000 tonnes at 0.54% Sn
Contained tin	:	13,140 tonnes

0.4% Sn Cut-off

Drill Indicated Ore Reserves	:	1,134,000 tonnes at 0.66% Sn
Drill Inferred Ore	:	356,000 tonnes at 0.69% Sn
Total	:	1,490,000 tonnes at 0.67% Sn
Contained tin	:	9,980 tonnes

3. Total Reserves

Dolomite Sulphide Lode Plus

Porphyry:		
0.2% Sn Cut-off	:	4,558,000 tonnes at 0.64% Sn
Contained tin	:	29,090 tonnes
Porphyry:		
0.3% Sn Cut-off	:	3,732,000 tonnes at 0.72% Sn
Contained tin	:	26,910 tonnes
Porphyry:		
0.4% Sn Cut-off	:	2,789,000 tonnes at 0.85% Sn
Contained tin	:	23,750 tonnes

No estimate has been made for reserves in the "buried" dolomite due to the limited information available.

The Queen porphyry Dyke has been mined in the past, in some places to below the main tunnel level (R.L. 635m). In the Stage 2A Programme it was intersected in diamond drill hole MBD 7 (8.1 metres at 0.02% Sn) at R.L. 550m. Of the percussion holes MBP 22 to MBP 32, only MBP 32 succeeded in obtaining a complete intersection of the dyke (15.5 metres at 0.34% Sn). Most of the other holes hit old workings. MBD 40, in the Stage 2B Programme is interpreted as having hit Queen Dyke (14.5 metres at 0.83% Sn) at R.L. 630m.

An estimated reserve for Queen Dyke is as follows:

Length	:	300 metres
Width	:	8 metres
Depth	:	RL 575 to RL635 i.e. 60 metres
S.G.	:	3.0
Tonnes	:	400,000
Grade	:	Unknown - say 0.5% Sn

A limited tonnage may be available as extensions to White Face/Stanhope Dykes at depth and to the east.

No figures have been estimated for vein-type deposits.

10. MINING

The following mining practice is envisaged for Mt. Bischoff:

Mining of the dolomite sulphide lode would be by open pitting, stockpiling the lower grade porphyry, which occurs within the pit, for treatment after the dolomite. An overburden ratio of about 4 or 5:1 is estimated for the pit, and about 250,000 tonnes of porphyry would lie within the pit boundary. The majority of the porphyry is not amenable to open pit mining and would be mined, using diesel trackless underground mining methods, from a decline from the pit bottom. An annual mining rate of 300,000 tonnes could be expected.

Due to the discontinuous nature of the dolomite sulphide lode in the open pit, and to minimize variation in metallurgical response, a stockpile of ore will be maintained to assure uniform mill feed. Overburden would be stripped sufficiently ahead of mining to expose 20 weeks of ore. Blasthole drilling would be kept well in advance of mining to provide adequate time for sampling assay and redesign of face firings as necessary. A 6 metre bench height is envisaged.

For the underground porphyry, the upper relatively flat sections would be accessed directly from the open pit. Assuming a room and pillar method is used, an inital 4.5 x 5.5 metre drive would be driven along the porphyry stike length, then stripped to 8 x 8 metres or orebody width. The pillar area between drives would then be stripped to give a total extraction of the order of 75%. The steeply dipping sections of the porphyry would utilize sub-level overhead benching. Sub-levels would be driven at 25 metre intervals and blocks drilled out to give an extraction rate of about 85%.

In order to estimate a grade of dilution, the assay values on either side of a drill intersection have been averaged. For the purpose of this exercise, all assays below 0.1% Sn were assumed to contain no recoverable tin. The following dilution grade estimates were determined:

Rock Type	Cut-Off Grade	Dilution Grade
Dolomite Sulphide Lode	0.3% Sn	0.06% Sn
Porphyry	0.2% Sn	0.09% Sn
Porphyry	0.3% Sn	0.14% Sn
Porphyry	0.4% Sn	0.22% Sn

To estimate the amount of dilution for the 0.3% Sn cut-off grade, the following basis has been used:

1. In the open pit, where the majority of a bench was ore, the bench was retained as ore and the waste volume used to calculate dilution. Where the bench showed more waste than ore, it was rejected as waste. The benches were arranged to accept dilutant material rather than reject ore.

2. A dilution due to drilling accuracy of 0.5 metres, and a dilution of 0.15 metres due to loading accuracy, were allowed, giving a 0.65 metre dilution addition on the footwall. On the hangingwall, dilution from benches was calculated as outlined in the previous paragraph.

3. The porphyry to be mined by underground methods had a band of 0.5 metres of waste added and 0.5 metres of ore lost each from 50% of the perimeter. It was assumed that sampling and blasting would allow a $\pm$ 1.0 metre tolerance on the ore/waste boundary, therefore, on average, 0.5 metres was lost or gained. In addition, a 5% dilution due to wall rock slabbing has been added.

The figures obtained from this exercise are as follows (for 0.3% Sn cut-off):

Rock Type	Ore Reserve (Geological)		Ore in Pillars and Waste		Ore Mined		Dilution		Mill Feed	
	Tonnes	% Sn	Tonnes	% Sn	Tonnes	% Sn	Tonnes	% Sn	Tonnes	% Sn
Dolomite Sulphide Lode (open pit)	1299000	1.06	39000	1.06	1260000	1.06	325000	0.06	1585000	0.86
Porphyry:										
Open Pit	267000	0.51	8000	0.51	259000	0.51	67000	0.14	326000	0.43
Underground	2166000	0.54	606000	0.54	1560000	0.54	325000	0.14	1885000	0.47
TOTAL TONNES	3732000	0.72	653000	0.57	3079000	0.75	717000	0.10	3796000	0.63
Contained Tin										
Dolomite Sulphide Lode (Open Pit)	13770		415		13355		195		13550	
Porphyry:										
Open Pit	1360		40		1320		95		1415	
Underground	11695		3270		8425		455		8880	
TOTAL CONTAINED TIN	26825		3725		23100		745		23845	

028048

11. METALLURGY

Metallurgical reports are contained in Volume 2.

12. REGIONAL EXPLORATION

H. Brooks Grid

This grid was laid in to cover airborne magnetic anomaly number 12 in the south-west corner of the Exploration Licence. Lines were cut 120 metres apart, and, in anomalous areas, 60 metres apart. A ground magnetic survey, using a Geometrics G-816 Magnetometer, was conducted over these lines. Readings were taken every 10 metres on each line. Geochemical hand auger samples were taken every 40 metres on the 120 metre spaced cross lines.

Geological logging of the hand auger samples indicates that the contact zone between the Adelaidean and Cambrian rocks extends for about 750 metres before being obscured by Tertiary basalt to the east. The Adelaidean consists of grey to black siltstones and micaceous quartzites. The Cambrian contains grey, green and pink greywackes, tuffs, siltstones, mudstones and minor chert. Except for the Tertiary basalt, outcrop is rare, being confined to gullies and road cuttings. The regional strike of the country is grid east-west, and the dips are to the south.

The geochemical hand auger samples were sieved to minus 80 mesh and analysed for tin, copper, lead, zinc and nickel. No anomalous zones were found for tin or lead, assay results generally being of the order of 10 ppm. Copper, zinc and nickel reflected the different backgrounds of the Adelaidean and Cambrian rock types, as geologically mapped. The Adelaidean had very low backgrounds compared to the Cambrian (of the order of 10:1). Slightly anomalous copper and zinc values, about twice background, were found at the base of the Cambrian over a strike length of about 250 metres. Higher nickel assays were recorded over the Tertiary basalt.

The ground magnetic results were interpreted by R.J. Smith of C.R.A.E. as follows:

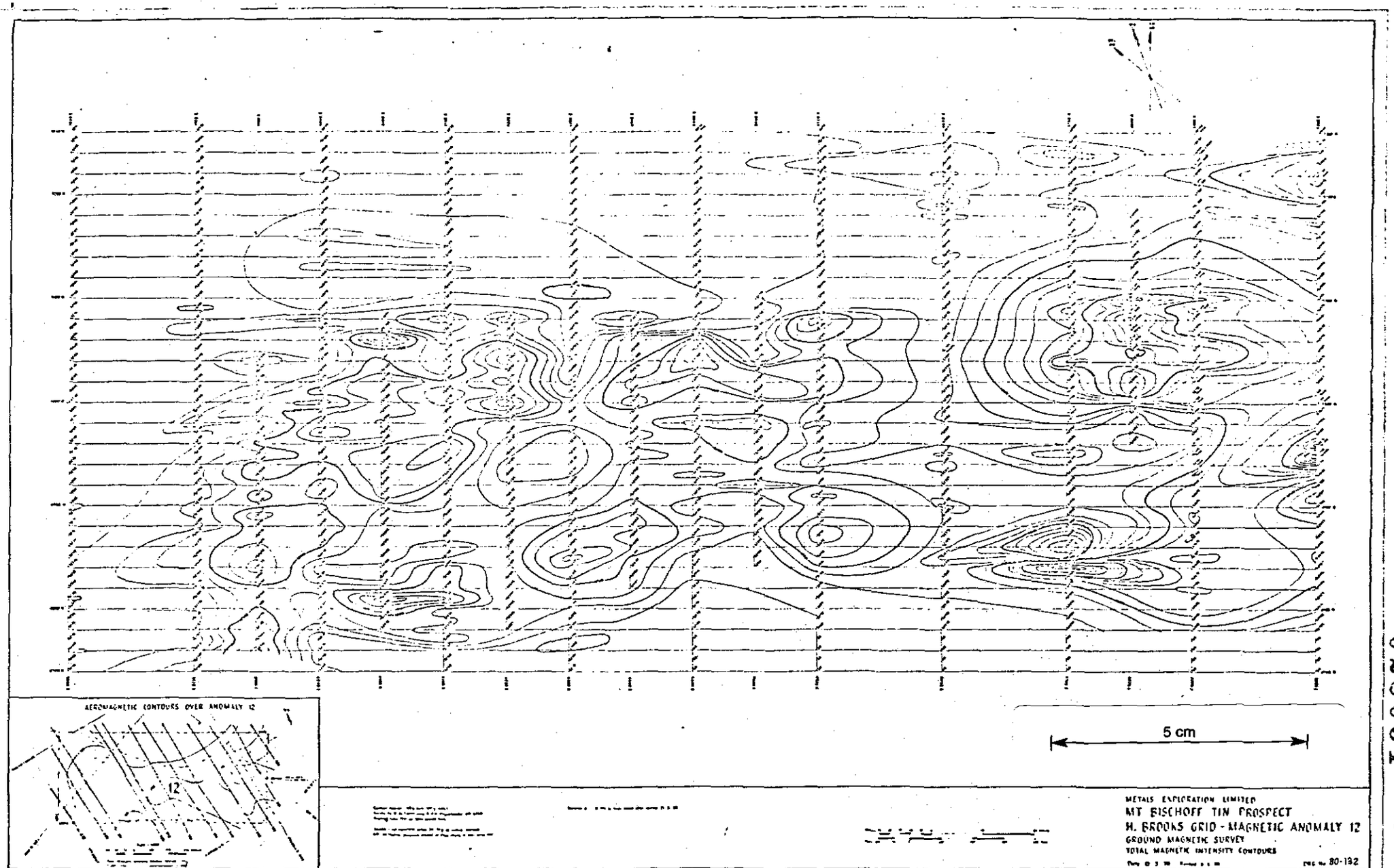
"The magnetic results were plotted as both profiles and contours. The magnetic contour map could be readily divided into three zones of different magnetic relief.

Zone A.

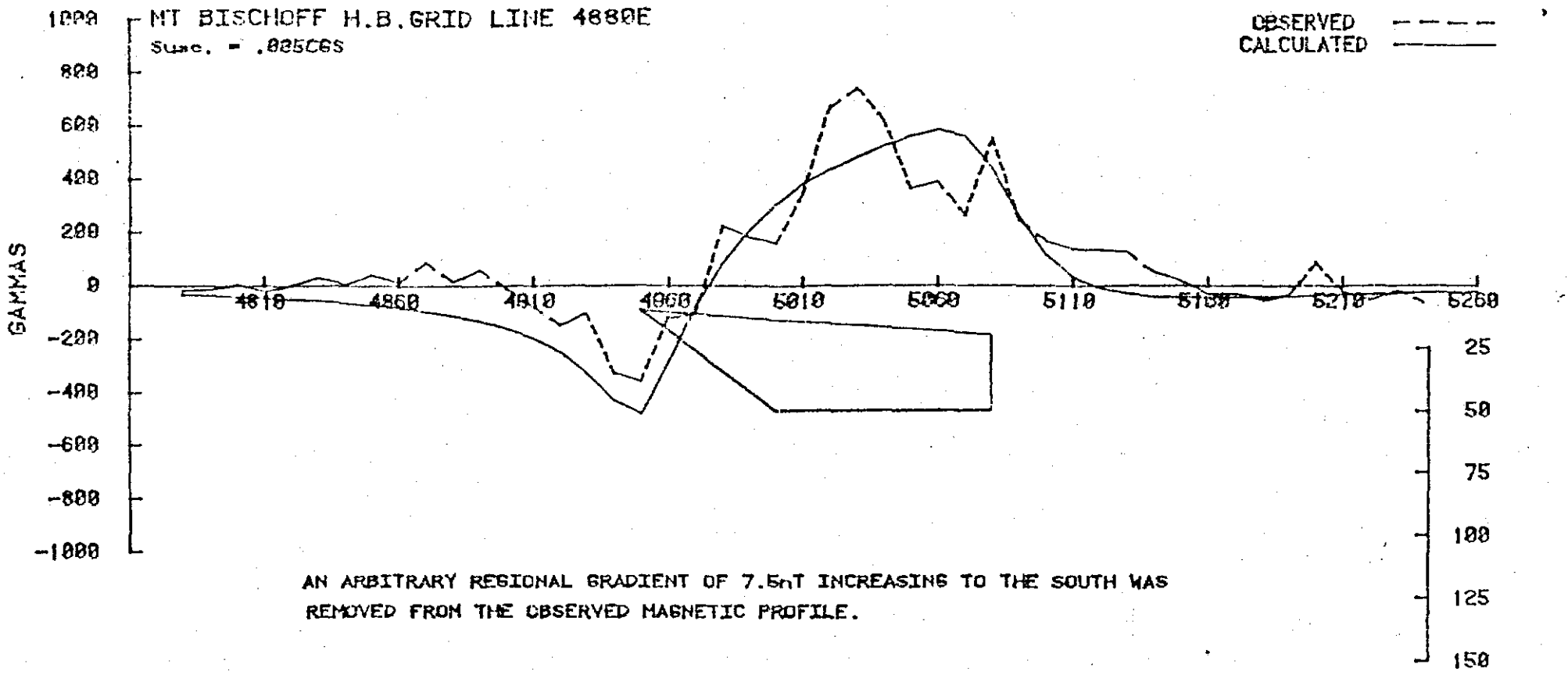
The most pronounced magnetic relief occurred east of line 4640E, coincident with basalt cover. Several anomalies were present with an amplitude in excess of 1000 nT. Generally, gradients were steep suggesting shallow sources however the magnetic pattern was distorted by surface cultural features which may have obscured sources at depth.

Zone B.

The mapped Cambrian greywacke, tuffs, etc. coincide with a zone of moderate magnetic relief. The area was generally south of 5100N and west of line 4640E. This zone contained variable magnetic relief with a maximum amplitude of several hundred nT (typically 500nT). There were no clearly defined, pronounced anomalies suggesting discrete bodies of mineralisation. There was some influence from surface cultural features but in general the observed magnetic response seemed likely to be due to magnetic lithologies within Cambrian.


AEROMAGNETIC CONTOURS OVER ANOMALY 12
12
5 cm
METALS EXPLORATION LIMITED
MT BISCHOFF TIN PROSPECT
H. BROOKS GRID - MAGNETIC ANOMALY 12
GROUND MAGNETIC SURVEY
TOTAL MAGNETIC INTENSITY CONTOURS
DWG No 80-132

028051 35A


MT BISCHOFF H.B.GRID LINE 4880E
Susc. = .005CGS
OBSERVED
CALCULATED
GAMMAS
1000
800
600
400
200
0
-200
-400
-600
-800
-1000
4810
4860
4910
4960
5010
5060
5110
5160
5210
5260
25
50
75
100
125
150
AN ARBITRARY REGIONAL GRADIENT OF 7.5nT INCREASING TO THE SOUTH WAS
REMOVED FROM THE OBSERVED MAGNETIC PROFILE.

028052

Fig. 1.

Zone C.

The area of mapped Pre Cambrian siltstones and quartzites, north of approximately 5100N was magnetically quiet and no sifnificant relief was observed.

Only one magnetic anomaly was detected which possibly indicates a significant magnetic body. This anomaly is located at 5000N to 5100N on lines 4760E to 4880E. It appears to coincide approximately with the Cambrian - Adelaidean contact, extrapolated to the east beneath basalt cover however it also coincides with the top of a hill (of basalt). The source could be either a magnetic body beneath a shallow basalt cover or a local thickening of the basalt. An attempt was made to model a possible source for the magnetic anomaly on line 4880E however the observed profile was distorted by surface culture and topography and difficult to fit precisely. A typical result is included as Fig. 1.

The modelling results are inconclusive but do suggest that the probable source is shallow (e.g. 10 - 20 metres or less) and has only limited depth extent. This would be consistent with a source within the basalt or, more probably, the basalt itself. A deeper source, beneath the basalt cannot be completely discounted but it is difficult to find any positive evidence to suggest it. The magnetic susceptibility used in the model is approximately 5 - 10 times greater than previous measured values on basalt samples however previous samples may have been weathered.

Some additional modelling will be tried on Line 4760E but it is extremely doubtful whether any more positive conclusion will be possible.

Conclusions

Ground magnetic survey results on the H.B. Grid at Mt. Bischoff have confirmed a magnetic anomaly previously located by a helicopter magnetic survey (Anomaly 12). The anomaly occurs in a basalt covered area and could be due to a local thickening of the basalt or a deeper source beneath the basalt.

No obvious, immediate target for drilling has been defined however some additional modelling will be tried in an attempt to better define the source."

Summarizing the above results, it can be seen that the geological setting for tin mineralization is favourable. The dolomites at Renison, and the limestones at Cleveland occur close to the same Adelaidean/Cambrian contact. However the geochemical survey failed to locate any tin anomalies associated with this contact, and the magnetic results had patchy anomalies apparently attributable to the magnetic lithologies within the Cambrian. The largest anomaly was located over Tertiary basalt cover, but coinciding approximately with the extrapolated Adelaidean/Cambrian contact. It is also approximately on strike with a porphyry dyke which outcrops about 1 kilometre north-east before being buried under basalt cover. The source of this anomaly is interpreted to be due either to a local thickening of the basalt, or a deeper source beneath the basalt.

Housego Grid

The Housego grid covered much of airborne magnetic anomalies 7 to 10, in the south-east corner of the Exploration Licence. As for the H. Brooks grid, lines were cut 120 metres apart, and a ground magnetic survey was run over the lines. Geochemical hand auger sampling was confined to the most northern 460 metres of line 10920E which extended north of the basalt cover. 18 samples were taken, either 20 or 40 metres apart.

The majority of the grid is covered by Tertiary basalts. Mines Department drilling at Fooks Lode shows the basalt as being up to 30 metres thick, with an average of 20 metres. At least one Tertiary deep lead lies beneath the basalt. Near Fooks Lode, at 10,140N, 9840E, a tin bearing deep lead is exposed. The gravels contain some small rounded pebbles of quartz porphyry. Besides the porphyries at Mt. Bischoff, other porphyry dykes outcrop to the north-east of Fooks Lode. The dykes strike south-west beneath the basalt cover. Further studies will be necessary to establish whether the deep lead emanates from Mt. Bischoff to the north, or from a source beneath the basalt to the south.

Cambrian rocks are exposed in the Waratah River valley at the western end of the grid, and have been intersected in the Mines Department drilling beneath the basalt cover. The exposed rocks consist of greywackes, siltstones, mudstones and rare chert, sometimes brecciated. In the diamond drill cores, dolomitic horizons have also been intersected. Of the 9 holes drilled, FL's 6, 8 and 9, situated towards the south-east of the drill pattern, intersected dolomite and dolomitic siltstone/shale. The following predominantly dolomitic intersections were made:

Hole Number	From	To	Width (m)
FL 6	58	147	89
FL 8	52	115	63
	128	158*	30+
FL 9	93	161*	68+

* End of drill hole

No assaying has been carried out on the dolomitic intersections.

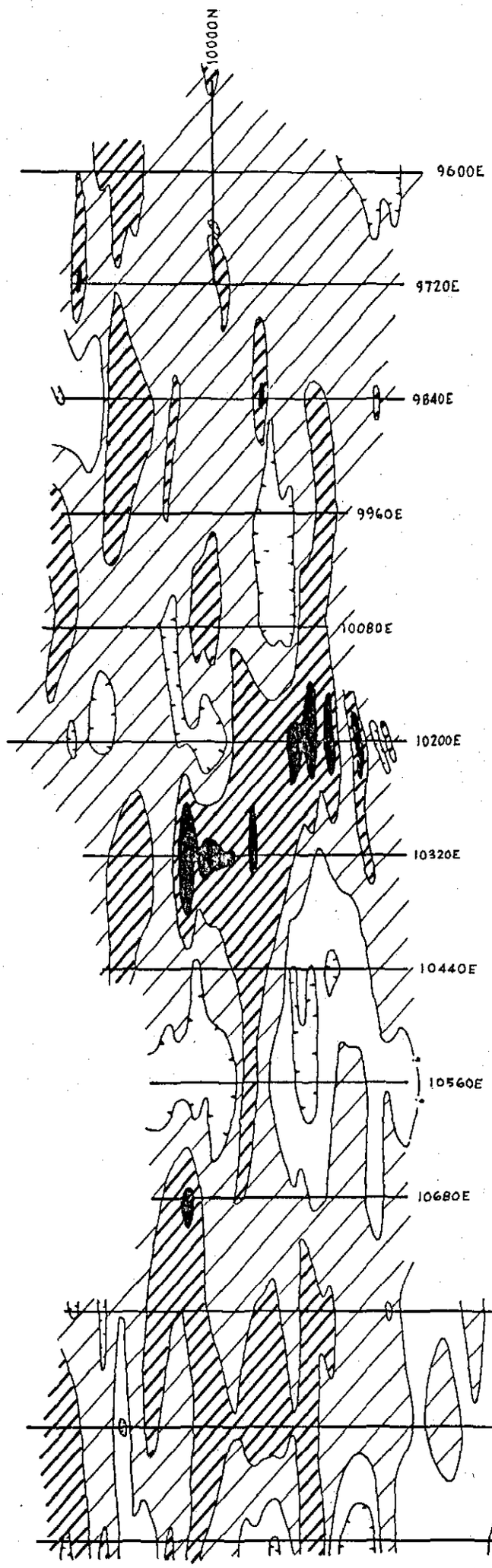
Precambrian siltstones, shales and quartzites were also found in the Mines Department drilling. In some cases the Mines Department core logs record that the Precambrian overlies the Cambrian, indicating that considerable faulting has taken place.

Fooks Lode itself is very similar to the quartz/carbonate fissure veins at Mt. Bischoff. Cassiterite occurs in association with abundant fluorite, sphalerite, pyrite and jamesonite. The lode is up to 300 metres long, strikes in an east-south-east direction and dips to the south. It has been drilled to 75 metres down dip and is up to 3 metres wide. Tin assays average about 1% Sn.

The geochemical hand auger samples, taken on line 10920E, produced one anomalous tin value of 140 ppm. However the sample came from where the grid line crossed Falls Creek, and is effectively a stream sediment sample. Virtually none of the samples came from the "C" horizon since it was too deep to be penetrated. The background copper, zinc and nickel values appear to relate more to Cambrian rocks than Precambrain.

The ground magnetic results were interpreted by M.F. Flis of C.R.A.E.:

028057



> 3000 γ

2500 - 2999 γ

2000 - 2499 γ

< 1990 γ

Contour interval 500 γ

Survey by R. de Cesare.

Readings every 10m on 120m spaced lines

METALS EXPLORATION LIMITED

MT. BISCHOFF TIN PROSPECT

HOUSEGO GRID

MAGNETIC ANOMALIES 7, 8, 9.

GROUND MAGNETIC SURVEY

TOTAL MAGNETIC INTENSITY CONTOURS

SCALE 1:6000 17-4-80

5 cm

"Results, in general, are typical of basaltic cover. Geologic noise caused by the variability of basalt thickness, chemistry and remnant magnetization dominates the zone east of line 9840 m E and south of approximately 10300 m N. In this area noise fluctuations in excess of 1500 nT are not uncommon. The discrete anomalies which are present are typically high amplitude and steep - indicative of shallow lying sources.

Areas containing no basaltic cover, on the other hand, are generally devoid of large scale geologic noise - 200 nT being about the maximum. Unfortunately, these areas are also devoid of any attractive anomalies, excepting the anomaly encountered on 10920 m E.

Modelling Results

An attempt was made to model the more coherent anomalies occurring in the basaltic area.

Line 10080 m E The anomaly occurring 10010 m N was modelled primarily because it coincides with a known dolomite occurrence and thin basalt cover. Although strong interference is quite evident, the model shown in Figure 1 was arrived at. The high susceptibility of the model, together with bore data suggest this is not basalt caused.

Line 10320 m E A low frequency anomaly centred on 10025 m N may be more typical of a source beneath basalt. The model, Figure 2, indicates a source at eighty metres depth - far deeper than the supposed basalt thickness. The two smaller modelled bodies reflect basaltic variations and their influence on the major anomaly.

Line 10440 m E A magnetic high trend can be traced across eight traverses in the centre of the grid. This trend may reflect either the axis of basalt thickening or a distinct flow within the basalt or a distinct lithology beneath the basalt. In most cases the anomaly is well within the noise envelope of the basalt, however it is persistant and distinct. Figure 3 shows the results of modelling this high. Once again, its high susceptibility suggests an alternative to a basaltic source, however the fit is not good and the model remains inconclusive.

Line 10920 m E This line is dominated by a relatively large response containing both high and low frequency signatures. Unfortunately, the anomaly, located at 10350 m N, occurs only a few metres north of the northern edge of the basalt and in an area of steep topographic relief. Modelling does not show an anomaly consistent with a flat lying basalt flow to the south - on the contrary it requires a flat lying body to the north (Figure 4). This line is, in fact, very poorly modelled and would require a great deal more information about the local geology. I suspect major remnant magnetism to be also involved.

Conclusion

The ground mag survey on the Housego grid established the existence of a number of interesting anomalies occurring over basaltic terrain. As magnetic response to basalt is both unpredictable and virtually impossible to model no great confidence can be put on modelled anomalies whose amplitude and shape fall within the limits of "basaltic noise". More intense coverage of an anomaly by ground mag could, however, add more weight to a subbasaltic interpretation as consistency and coherency are not attributes of geologic noise but are of a genuine response.

No targets can, at this stage, be recommended for drilling. Fill-in ground mag is advised for the anomaly modelled on line 10320 m E and 10920 m E."

It is obviously difficult to determine whether the ground magnetic anomalies on the Housego grid have their source in the Tertiary basalt or in the underlying rocks. Should the source belong to The Cambrian/Precambrian rocks then an attractive target exists since:

1. There are known sub-basaltic dolomitic host horizons;
2. There are sub-basaltic tin-bearing deep leads;
3. Fooks lode is a tin-fluorite vein similar to those at Mt. Bischoff;
4. Quartz porphyry dykes have a strike towards the basalt and the central magnetic anomaly.

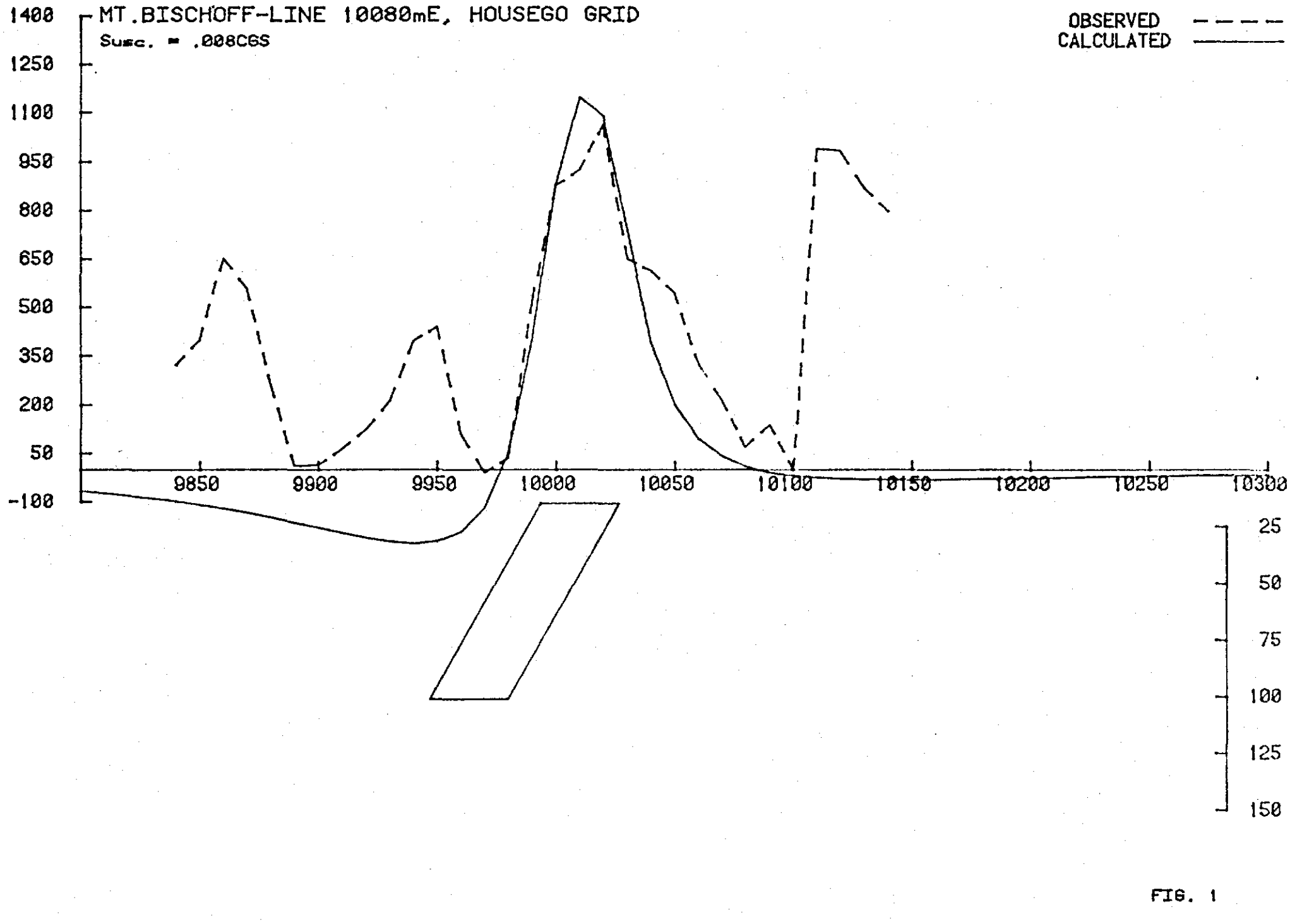

MT.BISCHOFF-LINE 10080mE, HOUSEGO GRID
Susc. = .008CGS
OBSERVED
CALCULATED
1400
1250
1100
950
800
650
500
350
200
50
-100
9850
9900
9950
10000
10050
10100
10150
10200
10250
10300
25
50
75
100
125
150

FIG. 1

028060

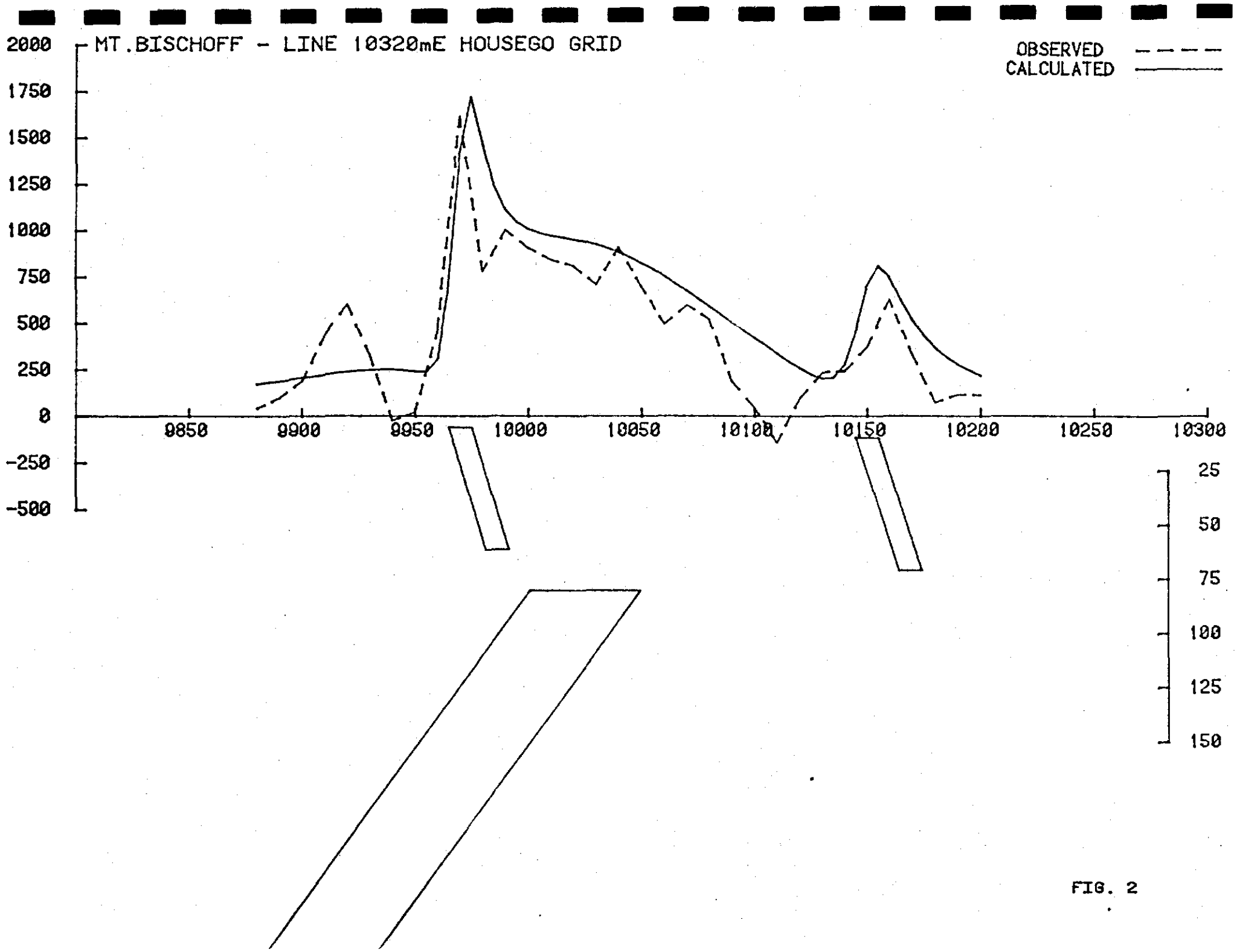
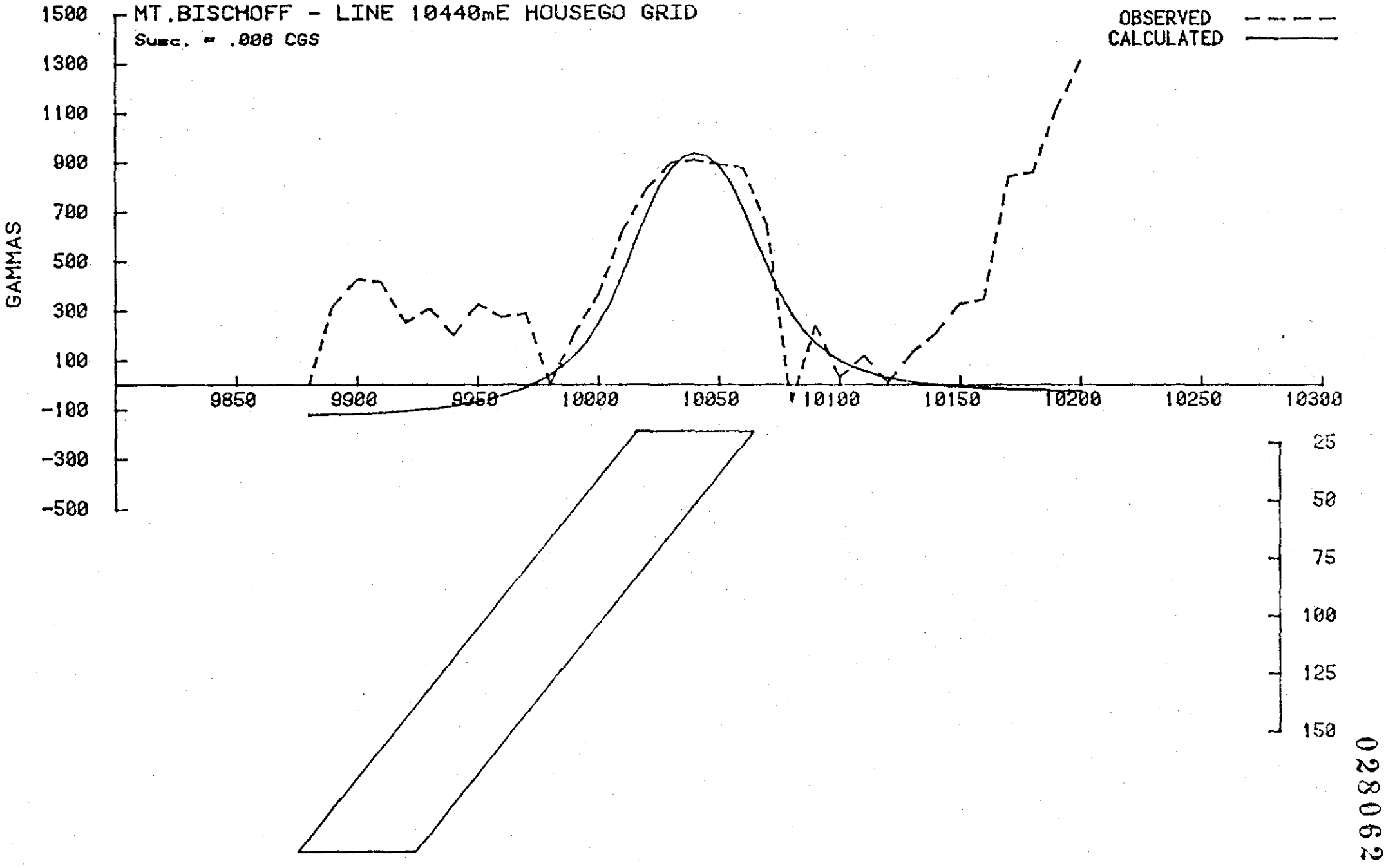

MT.BISCHOFF - LINE 10320mE HOUSEGO GRID
OBSERVED
CALCULATED
2000
1750
1500
1250
1000
750
500
250
0
-250
-500
9850
9900
9950
10000
10050
10100
10150
10200
10250
10300
25
50
75
100
125
150

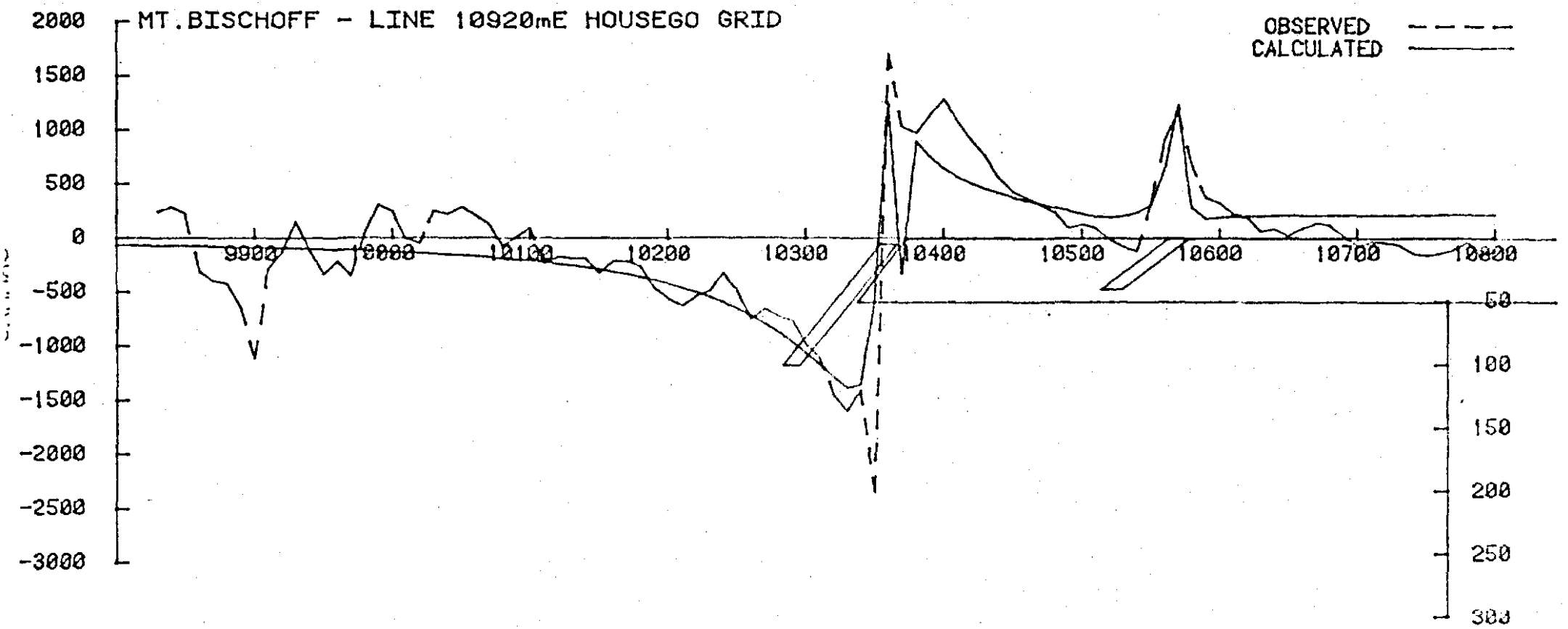
FIG. 2

028061


MT.BISCHOFF - LINE 10440mE HOUSEGO GRID
Susc. = .008 CGS
OBSERVED
CALCULATED
GAMMAS
1500
1300
1100
900
700
500
300
100
-100
-300
-500
9850
9900
9950
10000
10050
10100
10150
10200
10250
10300
25
50
75
100
125
150

028062

FIG. 3


MT.BISCHOFF - LINE 10920mE HOUSEGO GRID
OBSERVED
CALCULATED
2000
1500
1000
500
0
-500
-1000
-1500
-2000
-2500
-3000
9900
10000
10100
10200
10300
10400
10500
10600
10700
10800
50
100
150
200
250
300

028063

FIG. 4

13. APPENDICES

Reserve Calculations

Petrological Descriptions - CMS

Detailed List of Accompanying Plans

DOLOMITE SULPHIDE LODE RESERVES

Drill Indicated for 0.3% Sn Cut-off (S.G. 3.5)

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
940	A	MBD 43	56.4	0.56	3948	2211
	B	MBD 43	53.8	0.84	3766	3163
	C	MBD 23	492.2	1.90	34454	65463
	D	MBD 22	125.6	0.55	8792	4836
	E	MBD 23	220.5	0.64	15435	9878
	F	MBD 22	307.6	0.78	21532	16795
960	A	B 24	136.6	1.83	9562	17498
	B	B 24	527.0	0.91	36890	33570
	C	B 23	265.9	0.70	18613	13029
	D	B 4	86.9	1.29	6083	7847
	E	B 4	22.1	0.59	1547	913
	F	B 1	29.7	0.32	2079	665
	G	B 4	43.3	1.29	3031	3910
	H	B 1	332.6	1.24	23282	28870
980	A	MBD 29	38.1	0.80	2667	2134
	B	MBD 29A	109.7	3.16	7679	24266
	C	MBD 29A	75.4	0.89	5278	4697
	D	MBD 29A	198.1	3.16	13867	43820
	E	MBD 29A	58.7	0.32	4109	1315
	F	D 5	185.2	0.77	12964	9982
	G	MBD 21	73.2	0.36	5124	1845
	H	D 5	16.0	0.77	1120	862
	I	MBD 21	64.0	0.36	4480	1613
	J	MBD 20	338.3	0.72	23681	17050
	K	MBD 20	88.2	0.43	6174	2655
1000	A	B 12	83.6	0.51	5852	2985
	B	AAB5	174.0	0.34	12180	4141
	C	B12/ AAB5	203.4	0.68	14238	9682
	D	AAB5	165.0	0.47	11550	5429
	E	B10	456.5	1.43	31955	45696
	F	B10	293.8	1.43	20566	29409
	G	B10	395.5	1.43	27685	39590
	H	B 5	228.3	0.45	15981	7191
	I	B 5	255.4	1.05	17878	18772
	J	B 3	149.2	0.44	10444	4595
	K	B 3	104.0	0.44	7280	3203
	L	B 2	165.0	1.70	11550	19635
	M	B 2	88.1	0.47	6167	2898

Dolomite Sulphide Lode Reserves - Drill Indicated Cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1020	A	MBD 15	64.6	1.00	4522	4522
	B	MBD 15	134.1	0.33	9387	3098
	C	B 9	585.6	0.55	40992	22546
	D	B 9	76.4	0.55	5348	2941
	E	MBD 27	66.2	0.73	4634	3383
	F	B 9	82.3	0.55	5761	3169
	G	MBD 27	416.1	0.89	29127	25923
	H	MBD 27	59.4	0.60	4158	2495
1040	A	MBD 15/ MBD 16	72.3	0.90	5061	4555
	B	MBD 15/ MBD 16	212.4	0.90	14868	13381
	C	MBD 16	54.2	1.51	3794	5729
	D	MBD16,27/ MBD13,B9	641.8	1.11	44926	49868
	E	MBD 13/ MBD 27	280.2	1.29	19614	25302
1060	A	MBD 16	15.8	1.51	1106	1670
	B	MBD 16	104.0	1.51	7280	10993
	C	MBD 16	42.9	1.07	3003	3213
	D	MBD 16	122.0	1.07	8540	9138
	E	MBD 16	275.7	1.07	19299	20650
	F	MBD 13	354.8	1.69	24836	41973
	G	MBD 16	266.7	1.51	18669	28190
	H	MBD 13	47.5	1.58	3325	5254
	I	MBD 13	578.5	1.58	40495	63982
	J	MBD 13	65.5	0.66	4585	3026
1080	A	B 20	198.9	0.60	13923	8354
	B	B 21	255.4	0.36	17878	6436
	C	B 21	250.8	0.36	17556	6320
	D	B 21	472.3	1.47	33061	48600
	E	B 21	112.9	1.47	7903	11617
	F	B 6	135.6	0.63	9492	5980
	G	B 6	135.6	0.63	9492	5980
	H	B 6	198.9	0.74	13923	10303
	I	B 6	811.3	0.74	56791	42025
1100	A	MBD 17	148.7	0.53	10409	5517
	B	MBD 18	225.6	2.37	15792	37427
	C	MBD 18	730.7	2.37	51149	121223
	D	MBD 17	38.4	0.40	2688	1075
	E	MBD 17	71.8	0.40	5026	2010
	F	MBD 17	258.9	0.40	18123	7249

Dolomite Sulphide Lode Reserves - Drill Indicated Cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1120	A	MBD 18	64.1	2.37	4487	10634
	B	MBD 18	128.2	2.37	8974	21268
	C	MBD 17	141.0	0.40	9870	3948
	D	MBD 17	166.6	0.40	11662	4665
1140	A	MBD 17/ MBD 31	333.3	0.55	23331	12832
1160	A	MBD 31	328.2	0.65	22974	14933
1180	A	MBD 31	564.1	0.65	39487	25667
1200	A	MBD 31	461.5	0.65	32305	20998
TOTAL				1.06%	1229109	1302175

DOLOMITE SULPHIDE LODE RESERVES

Slaughteryard Face - Inferred

SECTION (E)	BLOCK	SURFACE CHIP SAMPLES	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1040	A		149.2	0.84	10444	8773
	B		311.9	0.84	21833	18340
1060	A		540.1	1.23	37807	46503
TOTAL				1.05%	70084	73616
TOTAL DOLOMITE SULPHIDE LODE RESERVES					1229109	1302175
					70084	73616
				1.06%	1299193	1375791

PORPHYRY RESERVES

Drill Indicated for 0.2% Sn Cut-off (S.G. 3.0)

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
820	a	MBD 44	236.9	0.31	14214	4406
	b	MBD 42	82.7	0.40	4962	1985
840	a	MBD 25	171.5	0.79	10290	8129
	e	MBD 44	176.2	0.31	10572	3277
860	a	MBD 25	499.4	0.79	29964	23672
	b	MBD 25	727.7	0.79	43662	34493
880	a	B 38	587.7	0.50	35262	17631
	b	B 38	433.5	0.50	26010	13005
900	a	B 38	529.6	0.50	31776	15888
	b	B 38	89.4	0.50	5364	2682
	c	MBD 26	122.9	0.45	7374	3318
920	a	MBD 26	292.7	0.45	17562	7903
	b	MBD 26	154.2	0.45	9252	4163
940	a	B 22	17.7	0.28	1062	297
	b	B 22	153.5	0.28	9210	2579
	c	B 26	135.7	0.41	8142	3338
	d	MBD 26	303.2	0.45	18192	8186
960	a	B 22	330.7	0.28	19842	5556
	b	B 26	61.0	0.41	3660	1501
	c	B 26	542.4	0.41	32544	13343
980	a	MBD 29A	120.7	0.30	7242	2173
	b	MBD 29A	163.1	0.30	9786	2936
	c	B 10	216.8	0.38	13008	4943
	d	B 26	241.9	0.41	14514	5951
	e	B 26	127.3	0.41	7638	3132
1000	a	AAB 5	79.1	0.52	4746	2468
	b	MBD 29A	72.3	0.39	4338	1692
	c	B 10	74.6	0.38	4476	1701
	d	B 10	194.4	0.38	11664	4432
	e	MBD 27/B9	266.7	0.56	16002	8961
1020	a	AAB 5	20.4	0.52	1224	636
	b	MBD 15	134.9	0.51	8094	4128
	c	B10	119.7	0.38	7182	2729
	d	MBD 27/B9	415.0	0.56	24900	13944

PORPHYRY RESERVES

Drill Indicated 0.2% Sn Cut-off Cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1040	a	MBD 15	58.8	0.51	3528	1799
	b	MBD 15	120.7	0.51	7242	3693
	c	MBD 16	346.4	0.41	20784	8521
	d	MBD 13	284.7	0.78	17082	13324
	e	MBD 27/B9	481.4	0.56	28884	16175
	f	MBD 27/B9	18.1	0.56	1086	608
1060	a	B20/B21	312.8	0.37	18768	6944
	b	MBD 16	62.6	0.41	3756	1540
	c	MBD 16	529.6	0.41	31776	13028
	d	MBD 13	1043.6	0.78	62616	48840
	e	MBD 13	62.2	0.78	3732	2911
	f	MBD 4	212.0	0.37	12720	4706
	g	MBD 4	61.7	0.37	3702	1370
1080	a	B20/B21	348.8	0.37	20928	7743
	b	MBD 16	350.1	0.41	21006	8612
	c	MBD 17	101.6	0.42	6096	2560
	d	MBD 17	259.0	0.42	15540	6527
	e	MBD 13	422.6	0.78	25356	19778
	f	MBD 28	455.1	0.36	27306	9830
	g	MBD 4	229.1	0.37	13746	5086
1100	a	B20/B21	192.1	0.37	11526	4265
	b	MBD 17	750.8	0.42	45048	18920
	c	MBD 17	73.7	0.42	4422	1857
	d	MBD 28	444.7	0.36	26682	9606
	e	MBD 4	106.2	0.37	6372	2358
1120	a	MBD 17	864.8	0.42	51888	21793
	b	MBD 28	455.9	0.36	27354	9847
1140	a	B 56	1167.7	0.70	70062	49043
	b	B 58	176.3	0.96	10578	10155
	c	B 58	223.7	0.96	13422	12885
1160	a	B 56	1267.0	0.70	76020	53214
	b	B 58	350.3	0.96	21018	20177
	c	B 58	112.0	0.96	6720	6451
	d	MBD 36	163.1	0.30	9786	2936

PORPHYRY RESERVES

Drill Indicated 0.2% Sn Cut-Off cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1180	a	B56/60	755.3	0.63	45318	28550
	b	B 58	259.9	0.96	15594	14970
	c	MBD 36	109.5	0.30	6570	1971
	d	MBD 36	134.1	0.30	8046	2414
1200	a	B 60	1086.0	0.51	65160	33232
	b	MBD 5	431.3	0.44	25878	11386
	c	MBD 5	328.5	0.44	19710	8672
1220	a	MBP 41	476.1	0.48	28566	13712
	b	B 60	559.9	0.55	33594	18477
	c	MBD 5	636.5	0.44	38190	16804
1240	a	MBP 41	478.6	0.48	28716	13784
	b	MBD 37	851.4	0.39	51084	19923
1260	a	MBD 37	1090.5	0.39	65430	25518
1280	a	MBD 37	623.4	0.39	37404	14588
	b	MBD 38	414.0	0.29	24840	7204
	d	MBP 38	118.0	0.29	7080	2053
	e	MBP 38	132.6	0.29	7956	2307
1300	a	MBP 35/38	274.9	0.33	16494	5443
	b	MBP 35/38	105.0	0.33	6300	2079
	c	MBD 38	592.2	0.29	35532	10304
1320	a	MBP 35	194.4	0.37	11664	4316
	b	MBD 14	163.1	0.28	9786	2740
	c	MBD 38	435.8	0.29	26148	7583
1340	a	MBP 33/34	152.0	0.40	9120	3648
	b	MBD 14	572.1	0.28	34326	9611
	c	MBD 3(u)	127.4	0.56	7644	4281
	d	MBD 3(u)	355.3	0.56	21318	11938
	e	MBD 3(l)	344.1	0.37	20646	7639
1360	a	MBP 33/34	357.5	0.40	21450	8580
	b	MBD 14	257.0	0.28	15420	4318
	c	MBD 3(u)	471.1	0.56	28266	15829
	d	MBD 3(u)	107.3	0.56	6438	3605
	e	MBD 3(l)	759.8	0.37	45588	16868

PORPHYRY RESERVES

Drill Indicated 0.2% Sn Cut-off cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1380	a	MBP 21/33 /34	321.0	0.37	19260	7126
	b	MBD 3(u)	491.4	0.56	29484	16511
	c	MBD 3(1)	233.8	0.37	14028	5190
1400	a	MBD 39	488.8	0.38	29328	11145
	d	MBP 21	176.0	0.24	10560	2534
1420	a	MBD 39	797.0	0.38	47820	18172
	c	MBP 21	180.0	0.24	10800	2592
1440	a	MBD 39	520.0	0.38	31200	11856
	c	MBP 20	152.0	0.22	9120	2006
1460	b	MBP 17	167.6	0.28	10056	2816
1480		MBP 17	594.0	0.28	35640	9979
1500		MBP 17	330.0	0.28	19800	5544
1520	NIL					
1540		MBP 14	120.0	0.41	7200	2952
1560		MBP 14	220.0	0.41	13200	5412
1580		MBP13/14	200.0	0.33	12000	3960
1600		MBP 13	180.0	0.28	10800	3024
1620		MBP12/13	210.0	0.24	12600	3024
		MBD 8	280.0	0.25	16800	4200
1640		MBP 12	260.0	0.22	15600	3432
		MBD 8	320	0.25	19200	4800
1660		MBP11/12	350.0	0.31	21000	6510
		MBD 8	280.0	0.25	16800	4200
1680		MBP 11	420.0	0.33	25200	8316
1700		MBP 11	385.0	0.33	23100	7623
TOTAL				0.46	2486154	1149553

PORPHYRY RESERVES

Drill Inferred for 0.2% Sn Cut-off (S.G. 3.0)

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
820	c	MBD 44	223.5	0.31	13410	4157
	d	MBD 42	147.5	0.40	8850	3540
840	b	MBD 25	74.7	0.79	4482	3541
	c	MBD 25/44	188.4	0.72	11304	8139
	f	MBD 25/42	229.1	0.76	13746	10447
860	c	MBD 25	104.0	0.79	6240	4930
	d	MBD 25	146.9	0.79	8814	6963
880	c	B 38	330.7	0.50	19842	9921
	d	B 38	152.0	0.50	9120	4560
900	d	B 38	152.0	0.50	9120	4560
920	c	B 38	174.3	0.50	10458	5229
	d	B 38	26.8	0.50	1608	804
940	NIL					
960	d	B 26	146.9	0.41	8814	3614
980	f	MBD 27/B9 /B 25	134.9	0.48	8094	3885
1000-1040	NIL					
1060	h	MBD 13/4	228.0	0.69	13680	9439
1080	NIL					
1100	f	MBD17/28	245.8	0.40	14748	5899
1120	c	MBD 17	520.7	0.42	31242	13122
	d	MBD 28	143.0	0.36	8580	3089
	e	MBD 28	93.9	0.36	5634	2028
	f	MBD 28	40.2	0.36	2412	868
1140	d	B 56/58	430.3	0.75	25818	19364
	e	B 58/ MBD 36	79.1	0.84	4746	3987
1160	e	B 56/58	458.1	0.75	27486	20615

PORPHYRY RESERVES

Drill Inferred for 0.2% Sn Cut-off cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1180	e	B 56/58/60	764.2	0.67	45852	30721
1200	d	B 60	549.7	0.51	32982	16821
	e	MBD 37	303.9	0.39	18234	7111
	f	MBD 5	435.8	0.44	26148	11505
1220	d	B 60	454.7	0.55	27282	15005
	e	MBD 37	332.6	0.39	19956	7783
	f	MBD 5	416.4	0.44	24984	10993
1240	c	B 60	262.2	0.55	15732	8653
	d	MBD 37	279.3	0.39	16758	6536
	e	MBD 5	527.4	0.44	31644	13923
1260	b	MBP 41	203.4	0.48	12204	5858
	c	MBD 37	382.1	0.39	22926	8941
	d	MBD 37	333.0	0.39	19980	7792
1280	c	MBD 37	183.2	0.39	10992	4287
1300	d	MBD 38	388.8	0.29	23328	6765
1320	d	MBD 14	55.9	0.28	3354	939
	e	MBD 14	96.1	0.28	5766	1614
	f	MBD 38	143.0	0.29	8580	2488
1340	f	MBD 14	165.4	0.28	9924	2779
1360	f	MBD 3(u)	114.5	0.56	6870	3847
1380	d	MBP 21/33/34	187.8	0.37	11268	4169
	e	MBD 3(u)	188.4	0.56	11304	6330
1400	b	MBD 39	171.1	0.38	10266	3901
	c	MBD 3(u)(1)	192.2	0.51	11532	5881
1420	b	MBD 39	350.0	0.38	21000	7980
1440	b	MBD 39	150.0	0.38	9000	3420

PORPHYRY RESERVES

Drill Inferred 0.2% Sn Cut-off cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1460	a	MBD 39	210.1	0.38	12606	4790
1480		MBP 17	220.0	0.28	13200	3696
1500-1540	NIL					
1560		MBP 14	80.0	0.41	4800	1968
1580		MBP 13/14	70.0	0.33	4200	1386
1600		MBP 13	60.0	0.28	3600	1008
1680		MBP 11	140.0	0.33	8400	2772
TOTAL				0.48	772920	374363

PORPHYRY RESERVES

Drill Indicated for 0.3% Sn Cut-off (S.G. 3.0)

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
840	a	MBD 25	171.5	0.79	10290	8129
860	a	MBD 25	499.4	0.79	29964	23672
	b	MBD 25	727.7	0.79	43662	34493
880	a	B 38	526.6	0.52	31596	16430
	b	B 38	395.5	0.52	23730	12340
900	a	B 38	452.0	0.52	27120	14102
	b	B 38	81.4	0.52	4884	2540
	c	MBD 26	90.4	0.55	5424	2983
920	a	MBD 26	182.1	0.55	10926	6009
	b	MBD 26	81.7	0.55	4902	2696
940	a	B 22	28.2	0.35	1692	592
	b	B 22	93.0	0.35	5580	1953
	c	B 26	96.8	0.41	5808	2381
	d	MBD 26	214.1	0.55	12846	7065
960	a	B 22	203.4	0.35	12204	4271
	b	B 26	61.0	0.41	3660	1501
	c	B 26	542.4	0.41	32544	13343
980	a	MBD 29A	30.5	0.39	1830	714
	b	MBD 29A	72.3	0.39	4338	1692
	c	B 10	165.5	0.38	9930	3773
	d	B 26	241.9	0.41	14514	5951
	e	B 26	127.3	0.41	7638	3132
1000	a	AAB5	79.1	0.52	4746	2468
	b	MBD 29A	72.3	0.39	4338	1692
	c	B 10	74.6	0.38	4476	1701
	d	B 10	194.4	0.38	11664	4432
	e	MBD27/B9	266.7	0.56	16002	8961
1020	a	AAB5	20.4	0.52	1224	636
	b	MBD 15	134.9	0.51	8094	4128
	c	B 10	119.7	0.38	7182	2729
	d	B 9 / MBD 27	415.0	0.56	24900	13944

PORPHYRY RESERVES

Drill Indicated 0.3% Sn Cut-off Cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1040	a	MBD 15	58.8	0.51	3528	1799
	b	MBD 15	106.2	0.51	6372	3250
	c	MBD 16	289.3	0.45	17358	7811
	d	MBD 13	284.7	0.78	17082	13324
	e	B 9 / MBD 27	481.4	0.56	28884	16175
	f	MBD 27/ B 9	18.1	0.56	1086	608
1060	a	B 21/ B 20	277.2	0.37	16632	6154
	b	MBD 16	55.4	0.45	3324	1496
	c	MBD 16	413.8	0.45	24828	11173
	d	MBD 13	972.7	0.78	58362	45522
	e	MBD 13	62.2	0.78	3732	2911
	f	MBD 4	212.0	0.37	12720	4706
	g	MBD 4	61.7	0.37	3702	1370
1080	a	B 20/ B 21	348.8	0.37	20928	7743
	b	MBD 16	305.5	0.45	18330	8249
	c	MBD 17	94.2	0.45	5652	2543
	d	MBD 17	241.8	0.45	14508	6529
	e	MBD 13	422.6	0.78	25356	19778
	f	MBD 28	392.1	0.43	23526	10116
	g	MBD 4	229.1	0.37	13746	5086
1100	a	B 20/ B 21	192.1	0.37	11526	4265
	b	MBD 17	646.3	0.45	38778	17450
	c	MBD 17	67.8	0.45	4068	1831
	d	MBD 28	309.6	0.43	18576	7988
	e	MBD 4	106.2	0.37	6372	2358
1120	a	MBD 17	817.3	0.45	49038	22067
	b	MBD 28	366.6	0.43	21996	9458
1140	a	B 56	1046.3	0.76	62778	47711
	b	B 58	176.3	0.96	10578	10155
	c	B 58	223.7	0.96	13422	12885

PORPHYRY RESERVES

Drill Indicated 0.3% Sn Cut-off Cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1160	a	B 56	1056.1	0.76	63366	48158
	b	B 58	350.3	0.96	21018	20177
	c	B 58	112.0	0.96	6720	6451
	d	MBD 36	107.4	0.35	6444	2255
1180	a	B 60/ B 56	641.8	0.66	38508	25415
	b	B 58	259.9	0.96	15594	14970
	c	MBD 36	90.4	0.35	5424	1898
	d	MBD 36	90.4	0.35	5424	1898
1200	a	B 60	901.3	0.55	54078	29743
	b	MBD 5	338.6	0.55	20316	11174
	c	MBD 5	239.3	0.55	14358	7897
1220	a	MBP 41	476.1	0.48	28566	13712
	b	B 60	559.9	0.55	33594	18477
	c	MBD 5	422.9	0.55	25374	13956
1240	a	MBP 41	478.6	0.48	28716	13784
	b	MBD 37	779.1	0.41	46746	19166
1260	a	MBD 37	972.6	0.41	58356	23926
1280	a	MBD 37	488.8	0.41	29328	12024
	b	MBD 38	305.5	0.37	18330	6782
1300	a	MBP 38	63.6	0.31	3816	1183
	b	MBP 38	63.6	0.31	3816	1183
	c	MBD 38	318.3	0.37	19098	7066
1320	a	MBP 35	150.7	0.49	9042	4431
	b	MBD 14	136.6	0.46	8196	3770
	c	MBD 38	331.8	0.37	19908	7366
1340	a	MBP33/34	92.6	0.46	5556	2556
	b	MBD 14	266.6	0.46	15996	7358
	c	MBD 3 (u)	103.9	0.56	6234	3491
	d	MBD 3 (u)	307.2	0.56	18432	10322
	e	MBD 3 (l)	291.4	0.45	17484	7868
1360	a	MBP 33,34	280.0	0.46	16800	7728
	b	MBD 14	201.1	0.46	12066	5550
	c	MBD 3 (u)	471.1	0.56	28266	15829
	d	MBD 3 (u)	99.3	0.56	5958	3336
	e	MBD 3 (l)	529.6	0.45	31776	14299

PORPHYRY RESERVES

Drill Indicated 0.3% Sn Cut-off Cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1380	a	MBP33/34	241.9	0.46	14514	6676
	b	MBD 3 (u)	491.4	0.56	29484	16511
	c	MBD 3 (1)	145.1	0.45	8706	3918
1400	a	MBD 39	407.3	0.45	24438	10997
1420	a	MBD 39	673.2	0.45	40392	18176
1440	a	MBD 39	327.6	0.45	19656	8845
TOTAL				0.54	1824390	983286

PORPHYRY RESERVES

Drill Inferred for 0.3% Sn Cut-off (S.G. 3.0)

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
840	b	MBD 25	74.7	0.79	4482	3541
	c	MBD 25	122.7	0.79	7362	5816
	d	MBD 25	96.0	0.79	5760	4550
860	c	MBD 25	104.0	0.79	6240	4930
	d	MBD 25	146.9	0.79	8814	6963
880	c	B 38	273.4	0.52	16404	8530
	d	B 38	119.8	0.52	7188	3738
900	d	B 38	115.3	0.52	6918	3597
920	c	B 38	128.0	0.52	7680	3994
	d	B 38	17.8	0.52	1068	555
940	NIL					
960	d	B 26	146.9	0.41	8814	3614
980	f	MBD27/B9/ B 26	134.9	0.48	8094	3885
1060	h	MBD 13/ MBD 4	228.0	0.69	13680	9439
1100	f	MBD 17/ MBD 28	198.9	0.44	11934	5251
1120	c	MBD 17	471.0	0.45	28260	12717
	d	MBD 28	119.7	0.43	7182	3088
	e	MBD 28	71.3	0.43	4278	1840
	f	MBD 28	28.0	0.43	1680	722
1140	d	B 56/ B 58	391.0	0.82	23460	19237
	e	B 58/ MBD 36	79.1	0.79	4746	3749
1160	e	B56 B58	392.6	0.82	23556	19316
1180	e	B 60/ B56/B58	725.4	0.75	43524	32643

PORPHYRY RESERVES

Drill Inferred 0.3% Sn Cut-off Cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1200	d	B 60	450.6	0.55	27036	14870
	e	MBD 37	236.7	0.41	14202	5823
	f	MBD 5	341.2	0.55	20472	11260
1220	d	B 60	454.7	0.55	27282	15005
	e	MBD 37	302.1	0.41	18126	7432
	f	MBD 5	338.0	0.55	20280	11154
1240	c	B 60	262.2	0.55	15732	8653
	d	MBD 37	254.6	0.41	15276	6263
	e	MBD 5	486.3	0.55	29178	16048
1260	b	MBP 41	180.8	0.48	10848	5207
	c	MBD 37	338.6	0.41	20316	8330
	d	MBD 37	262.2	0.41	15732	6450
1280	c	MBD 37	170.6	0.41	10236	4197
1300	d	MBD 38	280.1	0.37	16806	6218
1320	d	MBD 14	41.0	0.46	2460	1132
	e	MBD 14	81.3	0.46	4878	2244
	f	MBD 38	107.9	0.37	6474	2395
1340	f	MBD 14	124.3	0.46	7458	3431
1360	f	MBD 3(u)	114.5	0.56	6870	3847
1380	d	MBP33/34	155.3	0.46	9318	4286
	e	MBD 3(u)	188.4	0.56	11304	6330
1400	b	MBD 39	130.9	0.45	7854	3534
	c	MBD 3(u) (1)	192.2	0.51	11532	5881
1420	b	MBD 39	203.3	0.45	12198	5489
1440	b	MBD 39	61.0	0.45	3660	1647
1460	a	MBD 39	198.8	0.45	11928	5368
TOTAL				0.55	606510	334209

PORPHYRY RESERVES

Drill Indicated for 0.4% Sn Cut-off (S.G. 3.0)

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
840	a	MBD 25	171.5	0.79	10290	8129
860	a	MBD 25	393.3	0.90	23598	21238
	b	MBD 25	576.5	0.90	34590	31131
880	a	B 38	254.7	0.68	15282	10392
	b	B 38	176.5	0.68	10590	7201
900	a	B 38	214.5	0.68	12870	8752
	b	B 38	42.5	0.68	2550	1734
	c	MBD 26	17.9	0.55	1074	591
920	a	MBD 26	182.1	0.55	10926	6009
	b	MBD 26	81.7	0.55	4902	2696
940	c	B 26	81.4	0.56	4884	2735
	d	MBD 26	214.1	0.55	12846	7065
960	b	B 26	11.2	0.56	672	376
	c	B 26	216.8	0.56	13008	7284
980	c	B 10	62.6	0.60	3756	2254
	d	B 26	114.0	0.56	6840	3830
	e	B 26	67.0	0.56	4020	2251
1000	a	AAB 5	79.1	0.52	4746	2468
	b	MBD 29A	44.8	0.39	2688	1048
	c	B 10	24.4	0.60	1464	878
	d	B 10	87.6	0.60	5256	3154
	e	MBD 27/ B 9	266.7	0.56	16002	8961
1020	a	AAB 5	20.4	0.52	1224	636
	b	MBD 15	114.0	0.51	6840	3488
	c	B 10	80.5	0.60	4830	2898
	d	MBD 27/ B 9	415.0	0.56	24900	13944
1040	a	MBD 15	58.8	0.51	3528	1799
	b	MBD 15	106.2	0.51	6372	3250
	c	MBD 16	192.2	0.62	11532	7150
	d	MBD 13	284.7	0.82	17082	14007
	e	MBD 27/ B 9	481.4	0.56	28884	16175
	f	MBD 27/ B 9	18.1	0.56	1086	608

PORPHYRY RESERVES

Drill Indicated 0.4% Sn Cut-Off cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1060	b	MBD 16	17.9	0.62	1074	666
	c	MBD 16	263.7	0.62	15822	9810
	d	MBD 13	858.1	0.82	51486	42219
	e	MBD 13	44.7	0.82	2682	2199
	f	MBD 4	100.6	0.51	6036	3078
	g	MBD 4	33.5	0.51	2010	1025
1080	b	MBD 16	134.1	0.62	8046	4989
	c	MBD 17	67.5	0.49	4050	1985
	d	MBD 17	219.4	0.49	13164	6450
	e	MBD 13	365.2	0.82	21912	17968
	f	MBD 28	229.5	0.46	13770	6334
	g	MBD 4	109.3	0.51	6558	3345
1100	b	MBD 17	440.2	0.49	26412	12942
	c	MBD 17	55.9	0.49	3354	1643
	d	MBD 28	154.2	0.46	9252	4256
	e	MBD 4	62.6	0.51	3756	1916
1120	a	MBD 17	712.8	0.49	42768	20956
	b	MBD 28	174.3	0.46	10458	4811
1140	a	B 56	649.5	1.07	38970	41698
	b	B 58	136.8	1.17	8208	9603
	c	B 58	172.1	1.17	10326	12081
1160	a	B 56	692.7	1.07	41562	44471
	b	B 58	292.7	1.17	17562	20548
	c	B 58	62.6	1.17	3756	4395
1180	a	B 56/60	326.3	1.01	19578	19774
	b	B 58	183.2	1.17	10992	12861
1200	a	B 60	245.8	0.86	14748	12683
	b	MBD 5	338.6	0.55	20316	11174
	c	MBD 5	239.3	0.55	14358	7897
1220	a	MBP 41	259.2	0.56	15552	8709
	b	B 60	315.1	0.86	18906	16259
	c	MBD 5	422.9	0.55	25374	13956

PROPHYRY RESERVES

Drill Indicated 0.4% Sn Cut-Off cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1240	a	MBP 41	270.4	0.56	16224	9085
	b	MBD 37	451.4	0.49	27084	13271
1260	a	MBD 37	395.5	0.49	23730	11628
1280	a	MBD 37	214.5	0.49	12870	6306
	b	MBD 38	91.3	0.44	5478	2410
1300	c	MBD 38	163.1	0.44	9786	4306
1320	a	MBP 35	55.9	0.49	3354	1643
	b	MBD 14	64.8	0.46	3888	1788
	c	MBD 38	134.1	0.44	8046	3540
1340	a	MBP 33/34	65.3	0.48	3918	1881
	b	MBD 14	266.6	0.46	15996	7358
	c	MBD 3(u)	67.0	0.65	4020	2613
	d	MBD 3(u)	236.9	0.65	14214	9239
	e	MBD 3(l)	291.4	0.45	17484	7868
1360	a	MBP 33/34	196.6	0.48	11796	5662
	b	MBD 14	183.2	0.46	10992	5056
	c	MBD 3(u)	303.9	0.65	18234	11852
	d	MBD 3(u)	62.6	0.65	3756	2441
	e	MBD 3(l)	478.2	0.45	28692	12911
1380	a	MBP 33/34	139.6	0.48	8376	4020
	b	MBD 3(u)	341.3	0.65	20478	13311
	c	MBD 3(l)	121.0	0.45	7260	3267
1400	a	MBD 39	268.2	0.53	16092	8529
1420	a	MBD 39	357.5	0.53	21450	11369
1440	a	MBD 39	140.0	0.53	8400	4452
TOTAL				0.66	1,133,568	752642

PORPHYRY RESERVES

Drill Inferred for 0.4% Sn Cut-off (S.G. 3.0)

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
840	b	MBD 25	74.7	0.79	4482	3541
	c	MBD 25	122.7	0.79	7362	5816
	d	MBD 25	96.0	0.79	5760	4550
860	c	MBD 25	49.2	0.90	2952	2657
	d	MBD 25	58.1	0.90	3486	3137
880	c	B 38	71.5	0.68	4290	2917
	d	B 38	29.1	0.68	1746	1187
900	d	B 38	44.7	0.68	2682	1824
920	c	B 38	96.1	0.68	5766	3921
940	NIL					
960	d	B 26	24.6	0.56	1476	827
980	f	MBD 27/ B 9/B 26	116.2	0.56	6972	3904
1000-1040	NIL					
1060	h	MBD 13/4	140.8	0.79	8448	6674
1080	NIL					
1100	f	MBD 17/28	109.5	0.48	6570	3154
1120	c	MBD 17	402.2	0.49	24132	11825
	d	MBD 28	67.0	0.46	4020	1849
	e	MBD 28	31.3	0.46	1878	864
	f	MBD 28	13.4	0.46	804	370
1140	d	B 56/58	316.8	1.09	19008	20719
	e	B 58	43.4	1.17	2604	3047
1160	e	B 56/58	330.7	1.09	19842	21628
1180	e	B 56/58 B 60	424.6	1.04	25476	26495

PORPHYRY RESERVES

Drill Inferred for 0.4% Sn Cut-off cont'd

SECTION (E)	BLOCK	DDH	AREA (m^2)	GRADE (% Sn)	TONNES	TONNES X GRADE
1200	d	B 60	131.8	0.86	7908	6801
	e	MBD 37	118.4	0.49	7104	3481
	f	MBD 5	341.2	0.55	20472	11260
1220	d	B 60	263.4	0.86	15804	13591
	e	MBD 37	186.7	0.49	11202	5489
	f	MBD 5	265.7	0.55	15942	8768
1240	c	B 60	143.0	0.86	8580	7379
	d	MBD 37	156.4	0.49	9384	4598
	e	MBD 5	368.7	0.55	22122	12167
1260	b	MBP 41	11.2	0.56	672	376
	c	MBD 37	116.2	0.49	6972	3416
	d	MBD 37	55.1	0.49	3306	1620
1280	c	MBD 37	35.5	0.49	2130	1044
1300	d	MBD 38	149.7	0.44	8982	3952
1320	d	MBD 14	26.8	0.46	1608	740
	e	MBD 14	49.2	0.46	2952	1358
	f	MBD 38	67.0	0.44	4020	1769
1340	f	MBD 14	96.1	0.46	5766	2652
1360	f	MBD 3(u)	76.0	0.65	4560	2964
1380	d	MBP 33/34	120.7	0.48	7242	3476
	e	MBD 3(u)	133.5	0.65	8010	5207
1400	b	MBD 39	126.8	0.53	7608	4032
	c	MBD 3(u) (1)	192.2	0.51	11532	5881
1420	b	MBD 39	47.5	0.53	2850	1511
TOTAL				0.69	356484	244438

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Notes:

Thin-sections were prepared from the 21 core samples submitted, and examined with petrological and stereobinocular microscopes. Some rocks are described in relative detail and others partly by analogy.

The bulk of the suite comprises mildly (but variably) altered sediments, typically carbonaceous pelites with subordinate intercalated psammites and dolomitic carbonates. These rocks are incipiently regionally metamorphosed and generally thoroughly deformed. Alteration generally appears more or less contemporaneous with the deformation, but textural relationships may be confused by minor late stress and recrystallization. Alteration is generally of marginal hydrothermal to contact-metasomatic style with veining and replacements of ankeritic and sideritic carbonate (± fluorite, tourmaline, albite, minor quartz, sulphides).

More intensely altered rocks are characterised by mica (phogopite-hydro-muscovite)-topaz-tourmaline-fluorite (± sellaite, sulphide, carbonate, cassiterite) assemblages. Some of these rocks are recognisable as altered sediments, others as altered porphyries, and a few are rather featureless in terms of primary lithology. Tha general pattern here is of intense pneumatolytic greisening (porphyries) and related metasomatism (sediments).

Cassiterite, where present, is typically fine-grained and semi-opaque and thus not easily detected optically. Concelvably, cassiterite is more abundant than apparent in close examination of the various thin-sections. Thus, some specimens may warrant mineragraphic examination of the basis of assay data.

D. Cowan, B. Sc.

REPORT CMS 80/6/1

Petrological Descriptions

Mount Bischoff Drill Cores

98072

B 23
553m

(T.S. 32125)
This is a metasomatic rock with an irregular sub- to millimetric scale banding, crudely crustiform-like and closely analogous to the so-called "wrigglites" for example at Moina. The banding is inherited and is reminiscent of that in a stromatolitic limestone or, alternately, the contorted flow-banding semi-characteristic of obsidians. In this case, the primary rock type is obscure, although the metasomatic assemblage is consistent with an altered obsidian interpretation.

In thin-section, banding comprises an alternation of relatively clear and semi-opaque bands. Mineralogically, this is reflected in an alternation of semi-massive, fine-grained, random, apple-green schorl and cloudy sericite aggregates which represent degraded, microgranular topaz on the basis of corroded relics. Fine granular to bladed pyrrhotite is more or less pervasive. Sellaite is conspicuous throughout the sericitic bands and occurs with fluorite as an accessory in tourmaline aggregates.

Cassiterite is present as microscopic (<5 - 50μ, mean 10-15μ) inclusions in tourmaline. These are discrete to clustered and typically cloudy and semi-opaque. Distribution is crudely banded. Possibly, more cassiterite is present than the optically detectable minor traces.

98073

MDD 49
72.7m

(T.S. 32126)
This is a moderately altered and extensively deformed pelitic sediment. The rock grades from argillaceous siltstone through silty shale to massive shale with relict bedding on a fine millimetric scale. Clastic components are angular to subround quartz with relatively minor muscovite, sericitised feldspar and a sparse heavy mineral assemblage (tourmaline, zircon, leucoxenic semi-opaques). The "clay" fraction is weakly orientated sericite. This sediment is weakly carbonaceous. Deformation is of semi-plastic style and postdates the incipient slaty cleavage, which reflects no more than load- or burial-metamorphic conditions.

The rock is weakly, but pervasively, impregnated with siderltic carbonate in disseminated to frequent cloudy, microscopic clots, irregular anhedral, weakly poikilitic masses, and discontinuous veinle and films. Veinlets are weakly displaced and deformed by late sericiti microfractures. Rare grains of cloudy rutile represent a minor accessory alteration phase, along with minor traces of pyrite (?pyritised pyrrhotite). There is no detectable cassiterite.

98074

MBD 46
222.6 m

(T.S. 32127)
This is an incipientlyaltered carbonaceous psammopellite with affinities to 98073. In comparison, this sediment is relatively carbonaceous and is distinctly turbidite-like with weakly graded bedding. The area sectioned comprises a laminated argillaceous siltstone, locally grading into silty shale and with sporadic bands of fine-grained sandstone. Clastic components are splintery to subangular quartz, sericitised feldspar and muscovite in varying proportions. Sandy bands carry clastic pelite (shale, silty shale, typically carbonaceous) and rare felsitic rhyolite clasts (volcanomict lithic protoquartzite). Splintery, sericitised clastic feldspar grains are considered as abraded, reworked shards in part, and the rock has a certain reworked tuffaceous character.

Carbonaceous matter is more or less pervasive and is partly reorganised into microscopic films in response to incipient metamorphism. Minor traces of "syngenetic" pyrite are present.

Alteration is incipient only, with patchy development of semi-continuous, concordant to crosscutting veinlets of near-isotropic Mg-chlorite with accessory ankeritic carbonate. Finer films of chlorite and remobilised carbonaceous matter locally displace bedding.

98075

MBD 23
38.80 m.

(T.S. 32128)
This specimen can be classified as a phlogopite-sellaite rock and represents a greisen-type vein.

The fabric is random to crudely crustiform-banded in terms of the distribution of sellaite. Phlogopite is brownish-green in hand specimen, but colourless in thin-section and is generally extremely fine-grained and random, but with sporadic coarser flakes, rosettes and colloform-like "cross-fibre" zones. Sellaite occurs throughout in pale brown granules and clusters in irregular zones, sometimes in optical continuity with disseminatedclear, an- to euhedral grains and clusters. The brownish variety evidently has a certain rare earth component and may be selvedged by incipient yellow pleochroic haloes in adjacent phlogopite.

Accessories include sparsely disseminated patches of anhedral quartz and pleochroic (blue to colourless) anhedral beryl (to 2 mm), which is typically intergrown with coarse sellaite and mantled with phlogopite rosettes. Trace constituents are apatite, fine-grained ankeritic carbonate, fluorite, thinly disseminated pyrrhotite and rare spongy aggregates (to 1 mm) of dark red (high Fe-) sphalerite. There is no detectable cassiterite.

98076 (T.S. 32129)

MBD 23 This is a tourmaline-sellaite-fluorite rock with locally conspicuous
95.8m fine to extremely fine topaz and pale phlogopite. There are close analogies with 98072, with an irregular, wrigglite-like fabric somewhat deformed, segmented, healed and veined with tourmaline and elsewhere phlogopite. These aggregates gradeinto irregular zones of coarse fluorite with inclusions of sellaite and marginal selvedges of tourmaline. Overall, the rock reflects a complex pattern of metasomatism, veining and deformation. The primary lithology is obscure. Grain-sizings are widely variable, but generally fine.

Accessories include ankeritic carbonate (generally intergranular to fluorite) and sericite as a patchy replacement of the microgranular topaz. Minor fine-grained pyrite has developed as a late replacement of spongy aggregates and discontinuous films of pyrrhotite.

Cassiterite is thinly disseminated throughout as <10 - 100μ diameter grains, typically embedded in tourmaline. The sectioned area includes rare blebs (to 200μ) and discontinuous films of "sulphosalt" (probably stannite).

98077 (T.S. 32130)

MBD 45 This is a greisen-type quartz-sericite rock with conspicuous fluorite
156.4m and disseminated cassiterite. Accessory carbonaceous matter suggests a greisened (sericitised, silicified) sediment mode of origin, but there is no textural evidence to confirm this.

The rock consists largely of random sericite aggregates studded throughout with an- to subhedral quartz grains (mean 50μ). Random, sub-acicular green schorl is thinly disseminated throughout. There are frequent discontinuous veinlets of quartz and fluorite (with included schorl), which exhibit mutually crosscutting relationships with sporadic films of schorl. Carbonaceous matter occurs as an accessory phase in the various veinlets and as thinly disseminated clots.

Cassiterite comprises around 1 % of the area sectioned, as 20 - 150μ (mean 50μ) particles. These are more or less evenly distributed throughout the host rock, with a slight decrease in the veins and an incipient tendency to concentration in vein-marginal areas.

98078 (T.S. 32131)

MBD 45 This is a thoroughly deformed carbonaceous pelite. Relict features are
153.7m indicative of a more or less massive shale, intercalated with finely laminated silty shale and with sparse lenses of fine sandy silty shale. Clastic components are splintery to rounded quartz, with subordinate to minor sericitised feldspar and muscovite flakes. The "clay" fraction is weakly orientated sericite. There are affinities with 98073 and 98074.

Carbonaceous matter is pervasive, but is largely mobilised into a pervasive network of closely spaced, irregular microfractures. These postdate the incipient slaty cleavage, which is deformed semi-plastically and locally brecciated. More intensely deformed areas are veined and partly replaced by pale green, near-isotropic Mg-chlorite with minor associated sideritic carbonate. These features deform an earlier (?diagenetic) phase of discontinuous cherty quartz veining.

This rock carries minor traces of "syngenetic" pyrite. Small clots (mean 30μ) of isotropic, argillaceous material, thoroughly stained with carbonaceous matter, are present in places and have the appearance of microfossils, although rather featureless and indeterminate.

98079

MBD 44

127.4m

(T.S. 32132)
This thoroughly deformed carbonaceous pelite is very similar to 98078, to the extent that general features (e.g. clastic components) require no special comment.

Much of the area sectioned comprises a strongly carbonaceous shale, lenticularly laminated on a microscale. This zone is flanked by relatively incipiently carbonaceous shale and silty shale.

An incipient, but penetrative, slaty cleavage is evident, parallels bedding, and is thoroughly deformed. The relatively carbonaceous zone is complexly disharmonically microfolded, whereas the more competent, weakly carbonaceous pelite is pervaded by carbonaceous microfractures. Later, crosscutting fractures are healed with films (to 300μ) of sideritic carbonate. Deformation, overall, is semi-plastic to semi-brittle, reflecting varying degrees of competence, and is of distinctly tectonic character. Minor, post-siderite deformation is evident in localised segmentation of the veinlets.

This rock includes a minor carbonaceous quartzose fine sandstone component. Minor traces of "syngenetic" pyrite are present, and traces of pyritised pyrrhotite are associated with the siderite veining.

98080

MBD 41

118.2m

(T.S. 32133)
This closely fractured carbonaceous pelite can be categorised as a relatively massive silty shale with minor intercalated argillaceous siltstone. Recognisable clastic components are typical, with splintery to subangular quartz, (chloritised) feldspar and accessory mica flakes. Silty bands include sporadic felsic intermediate lava clasts and these enhance the weakly volcanomict nature of this pelitic sequence.

In contrast to the associated specimens, the clay fraction consists of essentially random kaolin-illite and near-isotropic chlorite in varying proportions, and this reflects a slightly different diagenetic/incipient metamorphic history. The essential absence of a slaty cleavage can be related to the pervasive chlorite which, typically, does not respond to re-orientation under sub-greenschist conditions.

Deformation is of typical semi-plastic to semi-brittle style, with deformed to microfractured bedding. Closely spaced, intersecting fractures are healed with films of carbonaceous matter. These show mutually crosscutting relationships with sporadic, discontinuous to semi-continuous veinlets (to 500μ) of chlorite, ankeritic carbonate and accessory quartz.

This rock includesrare microscopic patches of pyrite of syngenetic character.

98081
MBD 41
186.7m

(T.S. 32134)
This is a fine-grained carbonaceous dolomitic marble, essentially pure (that is, virtually entirely carbonate) anddevoid of metasomatic alteration features.

The bulk of the area sectioned consists of granular, weakly interlockin dolomite-ankerite (mean 50μ) with subtle variations in grainsize defining relict sub- to millimetric scale bedding laminations. Coarser-grained carbonate occurs in mildly displacive, concordant to irregular discontinuous zones, representing diagenetic veins and cavity fillings. These show mutually crosscutting relationships with sporadic intersecting planar to stylolitic, microscopic films of carbonaceous matter.

Traces of quartz are present as rare corroded grains of authigenic character. This rock is locally crudely schistose, but typically has a granular, non-directed fabric.

98082
MBD 41
186.0m

(T.S. 32135)
This is a fine-grained sericite-topaz-fluorite-sellaite rock and vague textural evidence indicates that it represents a brecciated and thoroughly greisened carbonaceous pelite.

Irregular aggregates of random sericite are interspersed with extremely fine-grained topaz, typically with intergrown coarse poikilit or elsewhere microgranular fluorite. Irregular veinlets of sericite and fine (mean 100μ) euhedral topaz occur sporadically. Sellaite is thinly disseminated throughout and occasional aggregates of pale phlogopite are interspersed with sericite. Dark red, semi-opaque sphalerite is common in single grains and spongy clots up to 1 mm diameter, and the rock is locally stained with fine to ultrafine green schorl.

Faint relict deformed and segmented "pelitic" bedding laminations are outlined by sparse, but semi-pervasive, relict traces of carbonaceous matter and can be compared with those in the relatively unaltered deformedpelites.

The secondary assemblage is closely analogous to that in, for example, 98072. Two varieties of fluorite are present, with an incipiently anisotropic, colourless phase (major) accompanied by subordinate pale mauve, isotropic material.

Cassiterite is very thinly disseminated throughout as microscopic ($\ll 20 - 75\mu$) cloudy particles.

98083

MBD 10

99.4m

(T.S. 32136)

This carbonaceous pelite has been thoroughly deformed and extensively albitised. General features are similar to the associated rocks, but in comparison, this sediment appears to have been a relatively labile phase. Problematically, much primary detail has been obliterated.

The rock consists essentially of randomly sorted (100μ - 3 mm), subangular to subround clasts in a relatively carbonaceous pelitic matrix. Clasts show weak relict silty clastic fabrics and are moderately dimensionally orientated. The gross fabric is soft-pebble conglomerate-like and reminiscent of a slump breccia, but confused by late-stage veining. In comparison with associated pelites, this rock appears to have been distinctly quartzofeldspathic and only weakly argillaceous. It may have been a subaqueous pelitic ash.

Veins range up to several millimetres in width and consist typically of crudely comb-structured, cloudy, poorly twinned albite with accessory fluorite and granular to chalcedonic quartz. There are occasional films of optically continuous fluorite with accessory green schorl and sporadic, microscopic pyrite films along fluorite cleavage traces. The rock, as a whole, is pervaded by fine subradiating albite clouded with "inherited" carbonaceous inclusions.

Cassiterite is thinly disseminated throughout the various veins as cloudy, semi-opaque particles sized in the 10 - 100μ range with sporadic clusters to 250μ diameter. Similarly, sized cassiterite is locally conspicuous in vein-marginal zones of the albitised host rock, and near-opaque, microscopic particles are sparsely disseminated throughout.

98084
MBD 10
100.6 m

(T.S. 32137)
This is a deformed and extensively metasomatised carbonaceous psammopelite. Relict features indicate a sub- to millimetric scale, planar to lenticular intercalation of silty shale and argillaceous quartzose siltstone with thin partings and sporadic semi-continuous, variably carbonaceous shale bands. The siltstone "grades" into fine sandy siltstone and, locally, silty fine sandstone. General features are closely analogous to, for example, 98074. Incomparison, the clastic component is relatively siliceous (i.e. relatively abundant quartz).

A weak, but more or less penetrative, slaty cleavage is variably deformed by intersecting microfractures healed with films of carbonaceous matter. These features postdate an earlie (?diagenetic) phase of quartz veinlets with disseminated fine-grained pyrite.

The "shale" (sericite) component is variably replaced by fine to ultrafine tourmaline (very pale green schorl, minor dravite). This phase is of distinctly metasomatic character and appears to have developed more or less contemporaneously with the semi-plastic to semi-brittle deformation. Ankeritic carbonate is a minor accessory alteration phase, as late poikilitic aggregates and crude crosscutting films.

98085
MBD 10
104.1m

(T.S. 32138)
This rock is a mildly altered carbonaceous protoquartzite and can be compared with the minor sand component in the carbonaceous pelites (e.g. 98074, 98084). The framework is incipiently bedded and poorly to moderately sorted in the silt to fine sand range and comprises largely angular to subangular quartz (approx. 80-85 %) with relatively minor, variably sericitised feldspar, thinly disseminated shale fragments (variably carbonaceous), accessory muscovite flakes and a sparse heavy mineral assemblage (leucoxenic semi-opaques, tourmaline, rare zircon). The matrix/cement consists of overgrowth quartz and intergranular quartz-sericite aggregates. Carbonaceous matter is pervasive along grain boundaries and in the matrix.

Intersecting microfractures are healed with films of carbonaceous matter and these features are intersected by sporadic, discontinuous veinlets of quartz and ankeritic carbonate. The minor argillaceous cement component is incipiently impregnated and replaced by pale tourmaline (sim. 98084). Disseminated talc flakes and patchy, remobilised carbonaceous matter are accessories in the veins (to 2 mm). There is no detectable cassiterite.

98086
MBD 15
75.5m

(T.S. 32139)
This is an incipiently sheared and variably carbonated sericitic pelite. The rock is weakly carbonaceous and is laminated on a millimetric scale with an alternation of slightly and relatively strongly silty shale. Clastic components are splintery to angular quartz, relatively minor sericitised feldspar, accessory muscovite flakes and a sparse heavy mineral assemblage (sim. 98085 etc.). The shale component is random to incipiently orientated sericite.

Rare metasomatic particles of pale schorl are present. Crosscutting to conformable veinlets of ankeritic to sideritic carbonate are pervasive with incipient replacement selvedges of carbonate penetrating the very weak slaty cleavage. These features grade into coarse-grained ankerite veins with incipiently stressed, crudely comb-structured marginal zones.

98087
MBD 15
55.8m

(T.S. 32140)
This rock can be classified as a topazised porphyry. The relict fabric is fine-grained (strictly a porphyritic rhyolite), although a minor chilled intrusive origin is likely.

The rock contains disseminated quartz grains of relict phenocrystal habit (inverted beta, to 1.5 mm), disseminated fluorite, microcrystalline topaz-sericite semi-pseudomorphs (to 1 mm) of phenocrystal feldspar, and occasional muscovite flakes which also appear phenocrystal. These features are enclosed in a microcrystalline groundmass of quartz (partly relict) and extensively sericitised topaz, with patchy fluorite and ankeritic carbonate. Irregular vug-like and crudely vein-like aggregates of quartz and fluorite with crude selvedges of pyritised pyrrhotite occur sporadically. Accessories include rare microscopic clots of ?stannite, isolated grains of green schorl, and rare cloudy microscopic clusters of near-opaque ?rutile. This phase is included in ankerite and may in fact be cassiterite (or, alternately, mask minor traces of cassiterite). The optical distinction is tenuous under these conditions.

98088
MBD 15
68.4 m

(T.S. 32141)
This isa tourmaline-muscovite-fluorite-ankerite rock of metasomatic character and with affinities to, for example, 98072.

The rock is crudely banded, consisting generally of pale bluish-green, semi-sericitic hydromuscovite and elsewhere of similar-coloured (but darker), random, fine to ultrafine, semi-massive schorl. The banding is enhanced by the distribution of poikilitic aggregates and clots of ankeritic carbonate and fluorite (brownish in thin-section due to

myriads of schorl and mica inclusions). Thin veinlets of clear to mauve fluorite and ankerite occur sporadically. Accessories include sparsely disseminated pyrite (in part after pyrrhotite), rare quartz, and minor sideritic carbonate which tends to mantle ankerite.

Sporadic carbonate-schorl aggregates (to 1 mm) have regular shapes suggestive of pseudomorphed prismatic feldspar. There is no relict phenocrystal quartz and the bulk of the rock is featureless in terms of relict features. However, it can be tentatively identified as a pneumatolytically altered ("autometasomatised") porphyry. There is no detectable cassiterite.

98089

MBD 15
60.2m

(T.S. 32142)
This is a banded muscovite-fluorite-topaz-carbonate rock of metasomatic character. There are affinities with 98089 (and, by inference, 98072 etc.), butthe relict banding in this case suggests an altered sediment mode of origin. The area sectioned includes a band of marginally altered (ankeritised) dolomite rock with the appearance of a microcrystalline marble.

The bulk of the rock comprises aggregates of very fine random, pale green hydromuscovite pervasively stained with microscopic fluorite granules with a weakly banded distribution. Marginal to the dolomite there is a 2-4 mm wide zone of crypto- to microcrystalline topaz rock, with the topaz partly altered to sericite-fluorite-sellaite aggregates. This zone has a semi-planar to weakly contorted relict "pelitic" banding with some evidence of grading, but is devoid of relict clastic features. The contact comprises a thin zone of poikilitic fluorite clouded with mica and carbonate inclusions.

Dark red to opaque (high Fe-) sphalerite is a relatively conspicuous accessory component, locally accompanied by fine-grained pyrite, typically in spongy lenses (and in part after pyrrhotite). The dolomitic marble is weakly stained with talc flakes of metamorphic character and is veined and marginally replaced by coarse ankerite. Minor traces of carbonaceous matter persist as "bedded" relics.

Sparse cassiterite occurs as discrete to weakly clustered, 5-75 μ (mean 30-40 μ), cloudy particles within the mica-fluorite bands. Distribution is distinctly banded, with the cassiterite comprising 5-10 % of a single 2 mm wide zone and virtually absent elsewhere.

98090 (T.S. 32143)
MBD 45 This rock is an incipiently sheared carbonaceous sericitic lithic
209.6m sandstone.

The framework is poorly sorted in the silt to medium sand range, weakl bedded on a millimetric scale, and comprises around 60-70 % of the area sectioned. Sericitic pelite clasts are the main clastic component with shales (often carbonaceous), subordinate silty shale, and minor siltstone. Angular to subrounded quartz is a rather subordinate framework component. Accessories include muscovite flakes, partly degraded alkali feldspars, chert fragments, felsitic "rhyolite" clasts and a sparse heavy mineral assemblage (mainly brown tourmaline). The rock is only weakly volcanomict and has a definite intraformationally reworked character.

The matrix consists of weakly orientated sericite, pervasively stained with carbonaceous matter and rarely with fine pyrite of syngenetic character. A late (post-cleavage) phase of semi-plastic deformation is evident and is analogous to that in the carbonaceous pelites. Minor quartz-chlorite-sericite-siderltic carbonate veining appears more or less contemporaneous with the deformation.

98091 (T.S. 32144)
MBD 45 This is a relatively weakly fractured and incipiently resheared
212.1m carbonaceous psammopelite. The bulk of the area sectioned comprises a laminated quartzose argillaceous (sericitic) siltstone with frequent thin carbonaceous shaly partings. There are sporadic bands of silty fine sandstone and silty shale. General features are closely analogous to the carbonaceous psammopelites described above and require no speci comment, except to note that bedding may be weakly graded and that clastic carbonaceous shale fragments are relatively conspicuous. The rock is very weakly pyritic (?syngenetic).

A weak slaty cleavage is mildly deformed and displaced by carbonaceous microfractures and sporadic irregular discontinuous veinlets (to 1.5 m of quartz, cloudy carbonate (ankeritic to sideritic) and chlorite. The veins include frequent patches of "coaly" carbonaceous matter and are weakly segmented by later microfractures and incipient movements along the slaty cleavage. Vein-quartz is weakly recrystallized and the coaly material partly granulated.

98092 (T.S. 32145)
MBD 45 This is an essentially unaltered carbonaceous pelite, distinctly
208.1m. pyritic, weakly sheared and incipiently crenulated.

Relict bedding is distinctly cyclic, with bands of incipiently graded silty shale (mean 1.5 mm) alternating with relatively wide zones of finely lenticularly laminated shale, silty shale and argillaceous quartzose siltstone. Quartz is the major clastic componen with minor muscovite, a little sericitised feldspar and a typical sparse heavy mineral component. The shale fraction comprises orientated sericite.

Framboidal pyrite is ubiquitous comprising around 5-10 % of the rock with a distinctly bedded distribution. Carbonaceous matter is pervasiv in minor amounts and occurs partly as microscopic spheres occasionally with framboidal pyritised cores. These features are reasonably interpreted as microfossils (similar, but unpyritised types occur in 98078) and are analogous to those at Mt. Isa and McArthur.

The weak slaty cleavage is incipiently, but pervasively, crenulated on a microscale. This postdates an incipient phase of quartz-carbonate chlorite veining. The rock, as a whole, is weakly stained with cloudy sideritic carbonate clots which appear, in part, to be pseudomorphous after diagenetic carbonate (?dolomite) rhombs.

D. Cowan, B. Sc.

VOLUME 4

Pocket No.	Scale	Plan Title	Drg. No.
1	1:2000	Surface Geological Interpretation	80-319
2	1:500	Surface Geological Interpretation Sheet 1	R80-271
3	1:500	Surface Geological Interpretation Sheet 2	R80-272
4	1:6000	Total Magnetic Intensity Contours and Geology	79-203
5	1:2000	H. Brooks Grid Magnetic Anomaly 12 Topography and Geology	R80-048
6	"	Total Magnetic Intensity Contours	R80-030A
7	"	Sn Geochemical Contours	80-055
8	"	Cu " "	80-056
9	"	Pb " "	80-058
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"	"	1120mE	80-293
"	"	1140mE	80-295
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"	"	1220mE	80-303
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Diagrammatic Cross Section		1700mN	80-322
"	"	1800mN	80-323
"	"	1900mN	80-324
"	"	2000mN	80-325

VOLUME 5 - PART 3

				Drg. No.
Interpreted Cross Section Showing Reserves				
1:500	1910mN	- 2390mN	1020mE	80-284
"	"	"	1040mE	80-286
"	"	"	1060mE	80-288
"	"	"	1080mE	80-290
"	"	"	1100mE	80-292
"	"	"	1120mE	80-294
"	"	"	1140mE	80-296
"	"	"	1160mE	80-298
"	"	"	1180mE	80-300
"	"	"	1200mE	80-302
"	"	"	1220mE	80-304
"	"	"	1240mE	80-306

VOLUME 5 - PART 4

				Drg. No.
Interpreted Cross Section Showing Reserves				
1:500	1910N	- 2390N	1260mE	80-308
"	"	"	1280mE	80-309
"	"	"	1300mE	80-310
"	"	"	1320mE	80-311
"	"	"	1340mE	80-312
"	"	"	1360mE	80-313
"	"	"	1380mE	80-314
"	"	"	1400mE	80-315
"	"	"	1420mE	80-316
"	"	"	1440mE	80-317
"	"	"	1460mE	80-318

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MT. BISCHOFF TIN PROSPECT

EXPLORATION LICENCE 13/79

TASMANIA

REPORT ON STAGE 2B PROGRAMME

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21st August, 1980.

Mr. J.E. Lynch,
Metals Exploration Ltd.,
20 Little Collins Street,
MELBOURNE Vic. 3000.

Dear Sir,

SUMMARY OF AMDEL REPORT

NO. 1350

BENEFICIATION OF MT. BISCHOFF TIN ORES

STAGE 11

This AMDEL report is the most detailed examination of the metallurgical fundamental characteristics of the Bischoff ores, conducted on meaningful samples, seen by the writer. The work has, under the circumstances of of a first approach, highlighted many factors, and has in an overall sense been well executed. Inside the guidelines of the agreed defined proposal (AMDEL proposal 5/0/3387), the testing executed, I believe, had one major failing, related to sulphide flotation discussed later in this summary.

During the course of the defined programme, some additions and modifications were undertaken by AMDEL, in some cases incurring additional cost. Major changes to the defined programme were as below.

(a) Due to size of sample, Sn grade and liberation size, additional sized fractions had to be concentrated on a shaking table, the concentrate

from which was super-panned to secure sufficient cassiterite for evaluations.

(b) The degree of elimination of sulphur from some tests was investigated by securement of additional assays.

(c) Twelve rougher cassiterite flotation tests (4 samples x 3 reagents) were executed by AMDEL following the desliming of the feed to sulphide flotation. Some additional parallel tests (2) on undeslimed feed were also undertaken. A comparison of results was then able to be made showing the effects of desliming on the performance of the flotation collectors P.T.A.A.; S.P.A.; and S3903. These tests were undertaken inside the framework of cost as defined in the "unconventional" testwork but obviously such tests apply to a "conventional" approach to the metallurgical development of these Bischoff ores.

The testing as reported for the four composite drill core samples, (refer section 2, page 2), has in summary shown the following.

1. The only mineral found, of economic significance was cassiterite.

Fluorite and topaz was found in fairly high concentrations and small studies should be undertaken to determine whether there is any cost justification to proceed to testing for extraction of these minerals.

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2. The composite D.D. samples metallurgically tested assayed the following.

Metallurgical Sample Tested	ASSAYS							
	Sn %	Acid Sol Sn %	S %	Fe %	F %	CO_2 %	U g/t	Hg g/t
SCI*	1.40	0.05	22.5	27.4	12.8	3.1	< 4	0.09
SC2	1.20	0.01	13.8	21.5	4.7	10.7	< 4	0.07
PCl	0.24	0.02	6.30	5.00	6.2	1.25	14	0.14
PC2	0.29	0.02	7.85	4.65	5.9	0.10	16	0.05

*For complete detail, as to position in ore body, length of core etc., represented by samples, please refer to Volume 1, page 19.

3. The ores, as defined by the samples are highly variable, in mineral composition and notably in the approximate, "liberation size of cassiterite", (refer Figure Bl). It appears that the actual size of cassiterite in the two sulphide ore samples SCl and SC2, is substantially different from each other and this similarly applies but to a much lesser degree to the two porphyry samples. This factor somewhat accounts for the reason why previous metallurgical tests and results applied to less meaningful samples

appear to be at variance. The degree of tin liberation versus particle size for the individual samples is broadly confirmed, by other metallurgical tests on the individual samples, under section 7.2 and section 7.3 of the AMDEL report.

4. The testing has demonstrated that a "saleable grade" concentrate derived by gravity concentration procedures is quite feasible.

Section 7.3 and section 7.4, confined to this subject, also clearly shows that the liberation of cassiterite in the coarser sizes (ie say plus 150 microns) prevents the production of satisfactory tin grades.

Tungsten, largely as scheelite, can be expected in gravity concentrates at low acceptable levels. The testing has shown that the arsenic and sulphur could be high in such concentrates, however, it is believed that the test conditions employed could be markedly improved securing gravity type concentrates containing substantially lower sulphur and arsenic contents.

Arsenic and sulphur appear to be the only elements for concern in the gravity produced concentrates (section 7.4). Stage grinding to minus 150 microns, of the rougher gravity concentrates, with subsequent sulphide flotation was employed in the testwork. This testwork produced final concentrates ranging 37.2%Sn to 66.6%Sn, such

concentrates being heavily contaminated by sulphides (including presumably arsenopyrite). Appendix K demonstrates this phase of the testing.

5. The elimination of sulphides, by sulphide flotation, prior to gravity concentration and cassiterite flotation tests, throughout the total AMDEL testing have been unsatisfactory.

Further testwork, prior to handling all important samples, should proceed to develop,

(a) Better procedures for suppression (with C.M.C. and other compounds) or flotation of ores containing talc. Tin losses and associated problems associated with sample SC2 should be referred to on pages F4; 12; E43 to E47.

(b) Develop sulphide flotation procedures that secure in sulphide froth products, 95+% of the sulphur in feeds. (refer (6) following). The sulphur elimination as reported, for a "traditional cassiterite concentration" approach, wherever it has been measured, in the AMDEL test programme has been poor, and obviously these unfloated sulphides can confuse the overall interpretation of results. The unsatisfactory rejection of sulphides, by sulphide flotation, reported in entirety where sulphur assays allow for such measurements, is given on pages, E27; E36; F1; F2; F3; F4; K1; K2; K3; K4.

6. By laboratory grinding (perhaps producing a non-commercial grind) and with the use of very expensive cassiterite flotation reagents P.T.A.A. and S.P.A., stage rougher cassiterite flotation concentrates of reasonable upgrading ratios and good recoveries have been obtained in the testwork. Extraordinarily high reagent consumption is not unexpected due to the particle size of cassiterite that was made to float into rougher concentrate. These factors have been known commercially for a significant time.

Upgrading of these rougher flotation concentrates by various artificial gravity concentration procedures were not successful, in my view.

Sizing analysis of the composite staged rougher flotation concentrate, clearly showed that the minus 8.7 micron fraction, page C3, was of flotation feed grade and sensibly should be removed prior to entering flotation.

Flotation tests, conducted on deslimed feeds (procedure important but not clarified in AMDEL report) produced, relatively, much higher grade flotation concentrates and with the use of less reagent (as could be expected).

Stage rougher cassiterite flotation tests, conducted in parallel, on partially deslimed feeds, clearly demonstrated a close similarity of performance using P.T.A.A. and S.P.A. and both these reagents were

much more selective than the significantly cheaper reagents S3903 and CA540.

No cleaning-upgrading flotation tests, to produce "commercial grade" flotation concentrates, were included in the defined test programme. Some good reasons for this could include

(a) Insufficient weight of material available for testing

(b) High cost involved with such testing

(c) The parameters of testing in this stage must be clearly defined by the Client, otherwise the duplication of cost, and confusion would eventuate. This comment obviously applies to whether a "conventional" or "non conventional" approach is to be made with the testing of the Bischoff ores.

The results of these stage rougher cassiterite flotation tests are again somewhat interpretable irrespective of whether in the ultimate, a "conventional" or "non conventional" metallurgical approach is adopted.

The reagent costs in the PC1 and PC2 samples tested outweighs the financial value of the stage rougher concentrates produced Cleaning of these rougher flotation concentrates by flotation plant procedures would lose substantial amounts of cassiterite having a particle size courser than about 20 microns.

Of the cassiterite recovered entirely by floation techniques, in the free world practise, a substantial proportion of such concentrate is nominally minus 20 microns (cassiterite size). Sizes of cassiterite coarser than about 20 microns, are more effectively and at lower cost recovered by gravity concentration procedures.

From the test results, I can see little or no reason why these Bischoff ores are not beneficiated in a normal metallurgical manner by the coupling of gravity concentration techniques, with flotation of cassiterite from deslimed feed (desliming cut point not defined as yet) to produce acceptable commercial grade of flotation concentrate.

With reference to the report recommendations, section 9, P22, I do not agree with any of the recommendations for the "Unconventional Treatment Procedure". The very broad recommendations given for the "Conventional Treatment Procedure" are fundamental to the project and agreed with in entirety.

The testwork as covered in the AMDEL report has been fairly well executed, on meaningful samples, to establish the simple fundamentals of the Bischoff ore types. Much more testing of these ores is required to secure more positive information as to procedural metallurgy with securement of information relative to concentrate grades and recovered head grades.
A suggested metallurgical test programme is the subject of another letter, this programme for reasons given earlier in this letter, will be based on a

"traditional conventional" approach to the concentration of cassiterite into commercially acceptable concentrates.

Yours faithfully,

Leonard Bollen.

028114

3/127/8

August 1980

METALS EXPLORATION LIMITED

AMDEL Report

No. 1350

BENEFICIATION OF MT BISCHOFF TIN ORES STAGE II

by

K.Y. Wong

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APPENDIX K: PRODUCTION OF HIGH GRADE TIN CONCENTRATES

SUMMARY

Background and Objectives

Following the Stage I beneficiation study of the Mt Bischoff tin ores completed in November 1979 (AMDEL Report OD 3437/79), Metals Exploration commissioned AMDEL to continue with the Stage II investigation. Project Proposal 5/0/3387 was prepared and submitted for consideration by the Client in January 1980. It was officially accepted in February 1980. The Stage II beneficiation study commenced on 12 February 1980.

During the course of investigation, there were various amendments and additions made to the originally proposed test programme. These were all instituted according to the instructions received from the Client. Three progress reports were issued for the investigation and these were dated 24 April, 11 June and 23 July 1980 respectively. Test results obtained during the intermediate stages of the Stage II investigation were presented in the progress reports together with a review of progress each time.

This Final Report contains all the test results which were previously submitted in the three progress reports and also the relevant discussions, conclusions and recommendations.

The primary objectives of the Stage II investigation were to establish the nature and mode of occurrence of tin minerals in the porphyry and sulphide-rich ore samples and to study their response to conventional and unconventional tin beneficiation processes.

Summary of Work Done

Eight drill core samples and four composites were prepared for investigation. Head assays were obtained for all head samples and ore-dressing mineralogy was conducted on the head samples of the four composites and Ore Sample No. 1 (Stage I). Additional size/assay analysis was carried out on both the feed and the flotation test products produced from the same size grind feed for Ore Sample No. 1. Unconventional tin beneficiation testwork using a front-end flotation treatment was conducted on the four Composites PC1, PC2, SC1 and SC2. Gravity upgrading performance was also studied in some of the tin flotation rougher concentrate produced. Conventional tin beneficiation testwork using a bulk sulphide pre-float followed by gravity treatment was conducted on the same four composites. The gravity concentrate products were also mineralogically studied to establish the processing performance and to identify the treatment problems. Attempts were also made to produce high grade tin concentrates by further concentrating the gravity concentrates using

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additional flotation and gravity cleaning procedures. Metallurgical balances were calculated from test results obtained.

Conclusions and Recommendations

The Stage II beneficiation study of Mt Bischoff tin ores gave the following findings:

(a) Porphyry composites PC1 and PC2 were considerably different from the sulphide composites SC1 and SC2 both in head grade and mineralogical composition.

(b) Intimate association of cassiterite with sulphides and non-opaque gangue existed in varying degree in all composite samples. SC1 was the worst case observed followed by PC1 and PC2. The best cassiterite liberation characteristics occurred in SC2 which had greater than 50% liberation in the -1.70 +0.25 mm size fraction.

(c) The unconventional 'front-end' tin flotation treatment was applicable to all four composite samples. A general ten-fold concentration was obtained in the tin rougher flotation concentrates with high recoveries. The tin rougher flotation recovery would largely depend on the reduction of tin losses in the sulphide pre-float and in the talc pre-float in the case of SC2. Tin collectors PTAA and SPA gave the best overall flotation performance in which a correlation of flotation time/collector dosage/feed grind size (both deslimed and un-deslimed) was established. The coarser feed grind size of 100% -150 µm gave similar flotation test results compared to those obtained for the finer feed grind size of 100% -75 µm. The results of limited testwork conducted with other tin collectors CA540 and S-3903 were not as promising and further study would be required to evaluate fully their flotation performance. Concentration by gravity methods was shown to be an effective means of up-grading the tin flotation rougher concentrate.

(d) The problem of mineral locking between cassiterite and other minerals present was revealed in the study of the conventional tin treatment of the four composite samples. Test results showed that an initial finer feed grind (probably around 150 μm) would be required for a more effective initial sulphide removal by flotation prior to gravity treatment. The overall tin extraction could be improved by middling retreatment and by recovering the very fine tin material using a 'tail-end' flotation circuit in conjunction with the gravity circuit. SC2 gave the best amenable results in the conventional beneficiation testwork followed by PC2 and PC1. SC1 appeared to be the most difficult sample to treat with this method. In attempting to produce high grade concentrates from the low grade gravity products, it was shown that a process involving further removal of sulphide by flotation with a finer grind feed, followed by superpanning, was effective. Final tin concentrates in excess of 45% Sn were obtained for all composite samples except for SC1 which gave a concentrate grade of 37.2% Sn.

It is recommended that the Stage III beneficiation study be conducted on the Mt Bischoff tin ores to establish the treatment method as follows:

Unconventional Treatment Procedure

(a) Detailed evaluation of other tin collectors such as CA540 and S-3903.

(b) Investigation of up-grading of the tin flotation rougher concentrate by flotation cleaning making use of a sufficiently large quantity of material to maintain cleaning pulp densities.

(c) Investigation of up-grading tin flotation rougher concentrate by gravity methods making use of classification as well as conventional means.

Conventional Treatment Procedure

(a) Examination of a more effective initial bulk flotation sulphide removal using a finer feed grind and with the use of an activator.

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(b) Evaluation of a full gravity beneficiation circuit including middling retreatment on the bulk sulphide flotation tail obtained in (a) above.

(c) Evaluation of flotation recovery of fine tin generated from the gravity circuit used in (b) above.

1. INTRODUCTION

Following the Stage I beneficiation study of the Mt Bischoff tin ores completed in November 1979 (AMDEL Report OD 3437/79), Metals Exploration commissioned AMDEL to continue with the Stage II investigation. Project Proposal 5/0/3387 was prepared and submitted for consideration by the Client in January 1980. It was officially accepted in February 1980. The Stage II beneficiation study commenced on 12 February 1980.

During the course of investigation, there were various amendments and additions made to the originally proposed test programme. These were all instituted according to the instructions received from the Client. Three progress reports were issued for the investigation and these were dated 24 April, 11 June and 23 July 1980 respectively. Test results obtained during the intermediate stages of the Stage II investigation were presented in the progress reports together with a review of progress each time.

This Final Report contains all the test results which were previously submitted in the three progress reports and also the relevant discussions, conclusions and recommendations.

The primary objectives of the Stage II investigation were to establish the nature and mode of occurrence of tin minerals in the porphyry and sulphide-rich ore samples and to study their response to conventional and unconventional tin beneficiation processes.

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2. MATERIAL EXAMINED AND SAMPLE PREPARATION

Eight drill core samples were received on 13 February 1980 for investigation. Description and weight of ore samples submitted are as follows:

Sample No.	Ore Type	Weight of Ore Sample kg	Composite Designation
97528	Porphyry	62.8	Porphyry Composite 1 (PC1)
97529	Porphyry	57.0	
97530	Porphyry	106.0	Porphyry Composite 2 (PC2)
97531	Porphyry	36.5	
97532	Sulphide	57.4	Sulphide Composite 1 (SC1)
97533	Sulphide	127.0	
97534	Sulphide	66.0	Sulphide Composite 2 (SC2)
97535	Sulphide	29.8	

The whole of each ore sample was stage crushed to minus 12.7 mm (½ inch) individually and a suitable portion was riffled out for further stage crushing to minus 1.70 mm (10 mesh BSS). The remaining portion of the minus 12.7 mm material of each ore sample is being kept in reserve at AMDEL.

The minus 1.70 mm material of each ore sample was riffled out into sub-samples for preparation of assay samples, mineralogical samples and for making up the four composites for testing. Each of the four composites designated above was made up of two ore samples and comprised equal weight of each.

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3. HEAD ASSAYS

The head assays and specific gravity measurements of the eight ore samples and the four composites are listed in Appendix A. In addition, semi-quantitative spectrographic analyses were conducted on the four composite head samples and the results obtained are also presented in Appendix A.

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4. MINERALOGY OF HEAD SAMPLES

Ore-dressing mineralogical examination was conducted on each of the four composite head samples, PC1, PC2, SC1 and SC2, to establish the nature and mode of occurrence of tin minerals and also their liberation characteristics. The findings of the mineralogical study are summarised as follows:

(a) PC1 and PC2 samples had a similar bulk mineralogy, consisting mainly of quartz, topaz with minor pyrite and iron oxides. PC1 also contained fluorite and muscovite.

(b) The mineralogical compositions of the SC1 and SC2 samples were different. SC1 consisted mainly of pyrrhotite, small amount of sellaite with minor muscovite, dolomite, siderite and quartz. SC2 consisted mainly of magnesite and dolomite, minor siderite with talc and pyrrhotite. Pyrite was present in both samples together with traces of other sulphides including chalcopyrite and sphalerite.

(c) Cassiterite was the major tin mineral in all composite samples. PC1 and PC2 had a small amount of stannite which was also present in trace amount in SC2. Traces of franckeite were also present in PC2 and SC2. Both stannite and franckeite accounted for only a negligible proportion of total tin content in all composite samples.

(d) An acid digestion (for removal of acid soluble tin minerals, sulphides and iron oxides) of two sized fractions (-500 +300 μm and -210 +105 μm) of sink products from heavy liquid separation (>4.0 sp.gr.) gave residues for all composite samples which contained only a small proportion of cassiterite. In all cases most of the tin in the residues reported in the original size range of the unleached fractions with the exception of SC1 samples where a considerable proportion of the tin reported in the finer fractions. The leached residues of SC1 contained more 'locked' cassiterite than the other three composite samples.

(e) In the minus 1.70 mm head materials of the four composite samples, the majority of the tin was distributed in the very coarse (+500 µm) and the very fine (-53 µm) size fractions. SC1 had the highest percentage (52%) of tin reporting in the -1.70 +0.50 mm size fraction practically all as tin mineral/non-opaque gangue composites.

(f) It was estimated that the 75% liberation size for tin minerals in PC1 was approximately 50 µm and for PC2 and SC1 approximately 30 to 40 µm. Sample SC2 showed the best liberation with the tin minerals reporting in the -105 +53 µm size fraction being 72% liberated. In all cases, cassiterite was mainly locked with non-opaque gangue, except for SC1 where locking with sulphides was also severe.

In addition, the mineralogical composition of Ore Sample No. 1 (Stage I) was also studied. Tin minerals present at a trace level were cassiterite and stannite and the sample consisted mainly of quartz with accessory topaz and traces of muscovite, pyrite, arsenopyrite, galena, fluorite and goethite. As a whole, the mineralogy of Ore Sample No. 1 was very similar to that of the porphyry composite samples PC1 and PC2.

The head mineralogy report is presented in Appendix B.

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5. ADDITIONAL BENEFICIATION TESTWORK FOR ORE SAMPLE No. 1

In continuation of the Stage I test series, the additional beneficiation testwork conducted on Ore Sample No. 1 was as follows:

(a) Size/assay analysis of the -1.70 mm head ore sample ground to 100% minus 75 µm.

(b) Two identical bench-scale batch flotation tests to produce a set of sulphide and tin rougher flotation concentrates for size/assay analysis and for mineralogical study. The grind size used for flotation tests was also 100% minus 75 µm.

5.1 Test Procedures and Results

A 500 g charge of minus 1.70 mm head Ore Sample No. 1 was stage ground to 100% minus 75 µm at 60% solids and the ground product sized and cyclosized to obtain fractions for tin assay. The size/assay result is presented in Appendix C.

Two identical bench-scale flotation tests were carried out on head Ore Sample No. 1 using the same grind size of 100% -75 µm to produce a set of sulphide and tin rougher flotation concentrates for size/assay analysis and mineralogical study. Details of the flotation tests with size/assay results and the findings of the mineralogical study on the test products are presented in Appendices C and D respectively.

5.2 Discussion

Size/assay analysis showed that for the 100% -75% µm flotation feed material, 29.3% of the total tin was contained in the +38 µm fraction which assayed 0.40% Sn. The rest of the tin (70.7%) was in the -38 µm fraction which assayed 0.32% Sn. The nominal minus 10 µm slime accounted for about 8.6% of the total tin in the grind size examined.

The overall tin recovery (in sulphide and tin rougher flotation concentrates) in Tests 5 + 6 was 84.0% which consisted of 22.3% and 61.7% recovered from the +38 and -38 µm fractions respectively. The absolute tin recoveries in the two sized fractions were 76.2 and 87.2% respectively.

Flotation test results showed that a very high degree of selectivity and concentration took place in the two coarsest size fractions (-75 +38 µm and cyclosizer Cone 1) during the tin rougher flotation stage. This flotation selectivity decreased very rapidly with finer grain size from cyclosizer Cones 2 to 5.

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Mineralogical examination of the sulphide and tin flotation rougher concentrates revealed the following.

Both liberated and locked tin minerals in the coarsest size fractions (-75 +38 µm and cyclosizer Cone 1) were recovered by flotation.

A majority of the stannite was recovered in the sulphide rougher concentrate and none was reported in the tin rougher concentrate.

Both cassiterite and stannite were reported in the sulphide rougher concentrate in a ratio of about 55% cassiterite to 45% stannite with a weighted average of 86% liberation for both minerals. Unliberated cassiterite and stannite were mainly locked with non-opaque gangue. The proportion of tin in cassiterite increased with finer grain size.

A majority of the cassiterite was concentrated in the two coarsest fractions (-75 +38 µm and cyclosizer Cone 1) of the tin rougher concentrate. Cassiterite in the -75 +38 µm fraction was about 67% liberated and a weighted average of about 96% liberation was estimated in the -38 µm (cyclosizes) fractions. Unliberated cassiterite was mainly locked with non-opaque gangue and to a much lesser degree with iron oxides. The proportion of non-opaque gangue increased markedly with decreasing grain size.

Identification of tin losses in flotation rougher tail was not included in the present mineralogical study. However it was assumed that this product contained the same proportion of cassiterite and stannite as the original head material. The mode of occurrence of these minerals has yet to be established.

6. UNCONVENTIONAL BENEFICIATION TESTWORK FOR COMPOSITES PC1, PC2, SC1 AND SC2

The treatment procedure used in this investigation was unconventional in that it applied a 'front-end' tin flotation process in dressing the tin ores. In a conventional tin treatment practice, the flotation process is generally used initially for sulphide removal and then for recovering the fine tin after gravity concentration of the coarser tin minerals.

The variables examined in the tin flotation tests were grind size, flotation time, collector dosage, collector, and deslimed feed. All flotation tests conducted were confined to rougher stages only. Flotation cleaning stages were not studied because insufficient quantity of rougher concentrates was produced in each test to allow for subsequent cleaning at a reasonably high pulp density. However, in a few tests the tin rougher concentrates were classified and then up-graded by superpanning.

6.1 Test Procedures and Results

Four series of 3, 14, 6 and 4 bench-scale batch flotation tests were carried out on Composite Samples PC1, PC2, SC1 and SC2 respectively. The variables examined in each test completed are summarised as follows:

Test PC1/F1 - Deslimed flotation feed using PTAA as collector

Test PC1/F2 - Deslimed flotation feed using SPA as collector

Test PC1/F3 - Deslimed flotation feed using S-3903 as collector

Test PC2/F1 - Standard test using old stock (Stage I) PTAA as collector

Test PC2/F2 - Standard test using new stock (Stage II) PTAA as collector

Test PC2/F3 - Standard test with coarser grind

Test PC2/F4 - Standard test with extended flotation time

Test PC2/F5 - Coarser grind with extended flotation time

Test PC2/F6 - Increase in collector dosage

Test PC2/F7 - Coarser grind with increase collector dosage

Test PC2/F8 - Up-grade tin flotation rougher concentrate (flotation feed 100% -75 μm) by superpanning

Test PC2/F9 - Standard test using CA540 as collector

Test PC2/F10 - Up-grade tin flotation rougher concentrate (flotation feed 100% -150 μm) by cyclosizing and superpanning

Test PC2/F11 - Standard test using SPA as collector

Test PC2/F12 - Deslimed flotation feed using PTAA as collector

Test PC2/F13 - Deslimed flotation feed using SPA as collector

Test PC2/F14 - Deslimed flotation feed using S-3903 as collector

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Test SC1/F1 - Standard test using PTAA as collector

Test SC1/F2 - Standard test with sulphide cleaner float

Test SC1/F3 - Deslimed flotation feed using PTAA as collector

Test SC1/F4 - Deslimed flotation feed using SPA as collector

Test SC1/F5 - Deslimed flotation feed using S-3903 as collector

Test SC1/F6 - Up-grade tin flotation rougher concentrate (flotation feed 100% -75 μm) by superpanning

Test SC2/F1 - Standard test using PTAA as collector and with talc pre-float

Test SC2/F2 - Deslimed flotation feed using PTAA as collector

Test SC2/F3 - Deslimed flotation feed using SPA as collector

Test SC2/F4 - Deslimed flotation feed using S-3903 as collector

Details of these flotation tests and results together with relevant comments made in each test are presented in Appendix E.

6.2 Discussion

6.2.1 Composite PC1

The average tin losses were about 3% in the -7 μm slime fraction of Tests PC1/F1 to F3 with a feed grind size of 100% -75 μm. Desliming at about 7 μm appeared to be acceptable for a minimal tin loss.

In the same three tests, the tin which reported in the sulphide rougher concentrate averaged about 9% which was higher than that of about 3 to 4% for the same product obtained for Ore Sample No. 1 previously. Cleaner flotation may reduce the tin losses in the sulphide product but the effect would depend on the proportion of cassiterite to stannite and their association with the other sulphide minerals present in PC1.

The plot of cumulative grade and recovery versus flotation time for Tests PC1/F1 to F3 as shown in Fig. 1 revealed that collector SPA gave the best tin flotation performance under the conditions used. A close to ten-fold concentration ratio (from 0.24 to 2.34% Sn) at 84.8% recovery was obtained in the tin flotation rougher concentrate for Test PC1/F2 using SPA as collector.

6.2.2 Composite PC2

Tests PC2/F1 and F2 showed very little difference in flotation performance when the new and old stock of PTAA was used as tin collector.

In the study of tin collector PTAA, results obtained in Tests PC2/F2 to F7 showed that a long flotation time was required for high recovery both in the case of fine (-75 μm) and coarse (-150 μm) feed grind. However, the flotation time was reduced considerably for a fine feed grind when

the collector dosage was increased to maintain the similar high recovery. For the coarse feed grind, high collector dosage and long flotation time were essential to achieve similar high recovery. It is interesting to note that the coarse grind feed produced an overall higher grade of tin flotation rougher concentrate. This may be seen as an indication that both free and composite cassiterite were floated selectively particularly in the middle of flotation time period examined. Some of these features can be seen in the plots of recovery and grade versus flotation time for Tests PC2/F2 to F7 in Figs 2 and 3 respectively.

The flotation performance of tin collectors CA540 and SPA used in Tests PC2/F9 and F11 respectively is also shown in Figs 2 and 3. Although only one sighter test was carried out with each collector, it can be seen that SPA exhibited similar flotation behaviour to that of the PTAA counterpart and it is probable that similar relationships of grind/flotation time/collector dosage would exist. For the collector CA540, a rather poor flotation selectivity was experienced with the conditions used in Test PC2/F9 in which a high tin recovery was obtained into a very low grade tin flotation rougher concentrate. This collector may have to be applied in very small amounts together with appropriate depressants in order to achieve flotation selectivity. Further testwork would be required to evaluate this collector under optimum conditions of application.

Tests PC2/F8 and F10 showed that it was feasible to up-grade the classified tin flotation rougher concentrate by superpanning. The finer grind feed (-75 μm) of Test PC2/F8 gave a -75 +38 μm tin flotation rougher concentrate of 43.1% Sn at 39.0% recovery which was up-graded by superpanning to 70.5% Sn at 30.2% (or 77.5% absolute) recovery. The same test gave a -38 μm tin flotation rougher concentrate of 1.61% Sn at 42.0% recovery and this was up-graded by superpanning to 29.2% Sn at 25.9% (or 61.7% absolute) recovery. In the case of the coarser grind feed (-150 μm) of Test PC2/F10, a -150 +38 μm tin flotation rougher concentrate which assayed 16.1% Sn at 49.09% recovery was up-graded by superpanning to 41.2% Sn at 31.1% (or 63.3% absolute) recovery. The same test also gave a -38 μm tin flotation rougher concentrate of 1.03% Sn at 34.2% recovery and this product consisted of an enriched cyclosizer Cone 1 fraction which assayed 37.7% Sn at 14.0% recovery (or 40.9% absolute).

The tin which reported in the sulphide rougher concentrate averaged about 0.33% Sn at 11% recovery in a series of 14 tests conducted on Composite PC2. This distribution figure was higher than that obtained for similar

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tests conducted on PC1 and Ore Sample No. 1. Flotation cleaning of the sulphide rougher concentrate as shown in Tests PC2/F8 and F10 did not appear effective in reducing the tin losses in this product. In addition, brief mineralogical examinations were conducted on some of the sulphide rougher concentrates produced and it showed that the stannite to cassiterite ratio was about 60-70% to 40-30% respectively. Thus, about 7 to 8% of the average of 11% tin reporting in the sulphide concentrates of PC2 was in the form of stannite. This stannite was about 65% liberated, the locked species being evenly locked with sulphides and non-opaque gangue. Cassiterite accounted for the remaining 4 to 3% of tin in this product and had the same locking characteristics as the stannite.

In Test PC2/F12, two stages of sulphide rougher flotation using SSBX as collector at natural pH removed about 56% of the sulphide materials in Composite PC2. The remaining sulphides did not appear to interfere with tin flotation and nearly all were reported in the tin rougher tail product. Additions of copper sulphate as an activator in the sulphide pre-float stages would probably remove some more sulphide minerals prior to the tin flotation stages. However, this may also increase the tin losses into the sulphide product.

In the desliming Tests PC2/F12 to F14, tin losses in the -7 μm slime were less than 3% which was similar to that obtained for testing PC1. The same series of tests showed that there was a marked increase in grade of the tin rougher concentrates from about 3% to 8-8.5% Sn using collectors PTAA and SPA respectively as a direct result of using deslimed flotation feed. The plot of cumulative grade and recovery versus flotation time for Tests PC2/F12 to F14 as shown in Fig. 4 revealed that collector SPA gave tin flotation performance as good as that of the PTAA counterpart but considerably better than that of S-3903 under the conditions used in these tests.

6.2.3 Composite SC1

Tin loss to the sulphide rougher concentrate was high and an average of 19.3% was obtained in a series of six flotation tests. This was reduced to 13.5% with flotation cleaning as shown in Test SC1/F2. Further rejection of tin would probably require a decrease in the overall sulphide removal at the same time prior to tin flotation. Removal of sulphides in the sulphide rougher flotation was up to 80.2% as calculated in Test SC1/F3, the rest of the sulphide reporting was mainly in the tin rougher tail product.

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SC1 responded well to similar flotation treatment used for PC1 and PC2 using a flotation feed of grind size 100% -75 μm. In Tests SC1/F1 and F2 the initial stage of tin rougher flotation produced a concentrate with close to a ten-fold increase in concentration with good recovery. In general, both tin rougher concentrate recovery and grade decreased rather rapidly with flotation time in all tests conducted. Some of these features can be seen in the plots of recovery and grade versus flotation time for Tests SC1/F1 to F5 as shown in Fig. 5. The same plots also showed that there was very little beneficial effect in using the deslimed flotation feed (-7 μm slime contained an average of about 1.2% tin). For the three collectors tested PTAA and SPA gave similar performance while S-3903 gave lower concentrate grades of similar recoveries. Flotation selectivity in using collector S-3903 may be improved when a suitable depressant is used in conjunction with it at the same time. Further testwork would be necessary to evaluate this collector under the optimum conditions of application.

Test SC1/F6 showed that it was also feasible to up-grade the classified tin flotation rougher concentrate produced from SC1 by super-panning. This test gave a -75 +38 μm tin flotation rougher concentrate of 6.92% Sn at 19.9% recovery and was up-graded by superpanning to 60.9% Sn at 13.6% (or 68.6% absolute) recovery. The same test gave a -38 μm tin flotation rougher concentrate of 5.27% Sn at 50.4% recovery and was up-graded to 65.0% Sn at 29.5% (or 58.6% absolute) recovery. These results indicate that high grade tin concentrates can be extracted from the +38 and -38 μm materials in the tin flotation rougher concentrates of SC1 by making use of the appropriate gravity treatment method.

6.2.4 Composite SC2

Tin losses in the talc rougher concentrate which assayed about 0.9% Sn averaged 11.6% in the series of four tests. Flotation cleaning may reduce some of these losses which were probably caused by mechanical entrainment. The talc depression method would probably not be suitable in this case because it could be detrimental to the subsequent sulphide and tin flotation stages.

Tin losses in the sulphide rougher concentrate, which assayed about 0.3% Sn, averaged 6.3% in a series of four tests and this was the lowest figure obtained among the four composite samples tested.

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SC2 also responded well to similar flotation treatment used for the other three composite samples. For a flotation feed of grind size 100% -150 μm Tests SC2/F1 to F3 showed that a high concentration and extraction similar to that observed in testing SC1 was obtained in the initial tin rougher flotation stages. This was even more pronounced when collector PTAA was used in the deslimed flotation feed of Test SC2/F2 as shown in Fig. 7 of the plots of recovery and grade versus flotation time for Tests SC2/F1 to F4. The same plots also showed that a very poor tin flotation performance was exhibited in using S-3903 as the tin collector. It may be that a different set of flotation conditions are required for collector S-3903 to be effectively used in tin flotation of SC2.

Tin distribution in the -7 μm slime of a grind size of 100% -150 μm averaged 0.5% in Tests SC2/F2 to F4. This was the lowest figure for the four composite samples tested and also an indication of the relatively coarse liberation characteristics of the tin minerals present in SC2.

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7. CONVENTIONAL BENEFICIATION TESTWORK FOR PC1, PC2, SC1 AND SC2

The conventional treatment procedure used in this investigation consisted of bulk sulphide flotation followed by gravity recovery of tin. Concentrate products obtained in processing were assayed and mineralogically examined to study the treatment response and to establish the nature and mode of occurrence of tin minerals present. Initially, direct superpanning was carried out on the classified bulk sulphide flotation tailing products of the four composite samples to secure a set of superpanner concentrates for further examination. However, the initial superpanner concentrates obtained were very small in quantities and insufficient for conducting both the chemical and mineralogical analyses. Thus, tabling was introduced to treat larger samples followed by superpanning to up-grade the table rougher concentrates for further examination. Attempts were also made to produce a high grade tin concentrate from the combined table/superpanner concentrates produced from each of the composite samples.

7.1 Bulk Sulphide Flotation

7.1.1 Test Procedures and Results

Approximately 16 kg each of the four minus 1.70 mm (10 mesh BSS) composite head samples were stage ground to minus 401 µm (44 mesh BSS) at 60% solids and floated in a 40-litre Agitair cell at 30% solids. Sulphide concentrate and tailing fractions were produced from each of the four composites. The flotation conditions used and results obtained in each test are given in Appendix F. Chemical analyses of the sulphide concentrates, middlings and tailings produced are also presented in the same Appendix.

Mineralogical examinations were conducted on the four bulk sulphide flotation concentrates and the report is presented in Appendix G.

7.1.2 Discussion

Removal of sulphides by the bulk sulphide flotation process used for the four composite samples was poor as shown by the total sulphur analyses in the four tests. The adverse flotation behaviour could be due to either the very coarse grind size feed used (100% -401 µm) and/or sulphide minerals having undergone some degree of oxidation during processing. Use of a finer grind size feed would certainly improve the sulphide flotation performance as shown in the series of flotation tests conducted in the unconventional beneficiation testwork described

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in the previous section. Any oxidised sulphides, particularly in the case of pyrrhotite, would probably respond to copper sulphate activation for better flotation recovery.

Tin loss in the bulk sulphide concentrates was generally low in all four tests. It is also indicated that the content of tin sulphide minerals was low. This may be due to using a very coarse size of flotation feed.

The sulphide recleaner concentrates obtained for PC1 and PC2 were very similar in mineralogical composition. They consisted of mainly pyrite, minor non-opaque gangue and traces of pyrrhotite, marcasite, arsenopyrite, covellite and sphalerite. The major tin mineral was stannite with a very small amount of cassiterite. Unliberated cassiterite (about 50 μm) was mainly locked with non-opaque gangue and only a very small portion was locked with sulphides.

The sulphide rougher concentrate obtained for SC1 consisted mainly of pyrrhotite, minor non-opaque gangue and pyrite, and traces of arsenopyrite, chalcopyrite and sphalerite. Both stannite and cassiterite were present. Stannite grains (up to about 100 μm) were associated with chalcopyrite while cassiterite grains (about 50 to 100 μm) were mainly locked with sulphides.

The sulphide rougher concentrate obtained for SC2 consisted mainly of talc (since talc was removed at the same time during bulk sulphide flotation and included in the sulphide product) with minor magnesite, muscovite, pyrite, dolomite and a trace of quartz, pyrrhotite, chalcopyrite and sphalerite. Both stannite and cassiterite were present. Stannite grains (up to about 100 μm) were either free or locked with sulphides and non-opaque gangue. Cassiterite grains (about 50 μm) were also present as free grains or locked with non-opaque gangue.

7.2 Superpanning

7.2.1 Test Procedures and Results

The middling and tailing products of the bulk sulphide flotation test on each composite sample (refer to Section 7.1 above) were combined in proportions by weight. A 500 g sub-sample was riffled out from each set, and then wet and dry sized to obtain 250, 150, 75, 53 and minus 53 μm fractions for superpanning tests. Each sized fraction was treated individually by superpanner to obtain a set of concentrate, middling and tailing products. All superpanner test products were assayed for total and acid soluble Sn for metallurgical calculations. Test results obtained are presented in Appendix H.

7.2.2 Discussion

The performance of superpanning tests conducted on the sulphide middling and tailing products of Composites PC1, PC2, SC1 and SC2 is shown in Figs 8 to 11 respectively. Some of the features observed in these plots are outlined below.

For PC1 and PC2 the tin distribution in the five sized fractions was very similar having the maximum and minimum occurring in -53 and -75 +53 µm fractions respectively. The superpanning recovery of tin for the two samples was also similar throughout the size range and the best was attained in the -150 +75 and -75 +53 µm fractions. The highest grade of superpanner concentrate was obtained in the -150 +75 µm (16.7% Sn) and -53 µm (13.4% Sn) for PC1 and PC2 respectively. PC2 showed a progressive improvement in superpanning concentration with the finer size fractions.

For SC1, the maximum tin distribution occurred in the +250 and -53 µm fractions while the minimum was in the -75 +53 µm fraction. The superpanning recovery of tin was very poor throughout the five sized fractions with this sample and the best, of 54.2% (absolute), was also attained in the -75 +53 µm fraction. The highest grade superpanner concentrates of 53.5 and 65.4% Sn were obtained in -75 +53 and -53 µm fraction respectively.

For SC2, the maximum and minimum tin distributions occurred in the +250 and -75 +53 µm fractions respectively. The highest superpanning recovery of tin was 83.4% (absolute) obtained in the -75 +53 µm fraction. The grade of superpanner concentrates obtained was generally much higher than that of the previous three samples throughout the five sized fractions. High grade superpanner concentrates in excess of 55% Sn were produced from 150 µm size downward.

7.3 Tabling/Superpanning

7.3.1 Test Procedures and Results

The middling and tailing products of the bulk sulphide flotation test on each composite sample (refer to Section 7.1 above) were combined in proportions by weight. A 10 kg sub-sample was riffled out from each set and then wet and dry sized to obtain 250, 150, 75, 53 and minus 53 µm fractions for tabling tests. Each sized fraction was individually treated on a laboratory Wilfley concentration table to produce concentrate, middling and tailing products. In addition, all the table concentrates

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obtained were treated individually by superpanner to secure a series of table/superpanner concentrates and tailings. All test products generated in this section of the testwork were assayed for total and acid soluble Sn for metallurgical calculations. Test results obtained are presented in Appendix I. These test products were also submitted for mineralogical examination and the report is presented in Appendix J.

7.3.2 Discussion

The performance of tabling/superpanning tests conducted on the sulphide middling and tailing products of Composites PC1, PC2, SC1 and SC2 is shown in Figs 12 to 15 respectively. Some of the features observed in these plots are outlined as follows.

Tin distributions in the five sized fractions of table feed were very similar to that of the superpanner feed used in the previous section for all composite samples. Test charges of 500 g and 10 kg samples were used to prepare the sized fractions for superpanner and table feeds respectively.

For PC1 and PC2, the overall tin recoveries obtained for tabling/superpanning test were very similar to those obtained in the superpanning tests. The table concentrate grade was generally low for all sized fractions. There was some improvement both in recovery and grade in table/superpanner concentrates of the finer sized fractions. The major contaminants of these concentrates were pyrite and non-opaque gangue with a very small amount of iron oxide and arsenopyrite. The liberation of cassiterite in table/superpanner concentrates for sized fractions +250 to -53 μm ranged from 42 to 45% and 55 to 90% for PC1 and PC2 respectively, with the cassiterite being mainly locked with non-opaque gangue and to a lesser extent with sulphides and iron oxides.

For SC1, the tin recoveries in table/superpanner concentrates were generally higher than those of the superpanning tests throughout the size range. However, the grade of these concentrates was considerably lower, particularly in the finer sized fractions. The major contaminants in the concentrates were pyrrhotite and non-opaque gangue with a small amount of pyrite, arsenopyrite, sphalerite and iron oxides. Liberation of cassiterite was very poor in the coarse sized fractions of the concentrates and it ranged from 6 to 86% for +250 to -53 μm sized fractions respectively. The cassiterite was locked mainly with sulphides and non-opaque gangue.

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For SC2, similar trends of grade and recovery of table/superpanner concentrates to those of SC1 was observed throughout the size range. In general, the table/superpanner concentrates were higher in recovery but lower in grade than for the superpanner concentrates. The major contaminants of the concentrates were also pyrrhotite and non-opaque gangue but with minor pyrite. Liberation of cassiterite in the coarse sized fractions was considerably better than for SC1 and it ranged from 64 to 88% for +250 to -53 µm sized fractions respectively. The cassiterite was mainly locked with non-opaque gangue and with sulphides to a much lesser extent.

Scheelite was detected as one of the tungsten minerals present in some of the table/superpanner concentrates for all four composite samples. Attempts were not made to identify other tungsten minerals which may be present.

7.4 Production of High Grade Tin Concentrates

7.4.1 Test Procedure and Results

Sub-samples of each set of size fractions of table/superpanner concentrates obtained in Section 7.3.1 testwork were riffled out and combined in proportions by weight. Attempts were made to produce a high grade tin concentrate from each set of these combined size fractions of table/superpanner concentrates for each of the four composite samples. Sulphide flotation followed by superpanning treatment of the flotation tailing products were used to carry out the up-grading testwork. Test products were submitted for analysis of total Sn and also total S for computation of a full tin and sulphur balance. The high grade tin concentrates produced were also chemically analysed for other elements of interest. Testwork and results are presented in Appendix K.

7.4.2 Discussion

The up-grading procedure which consisted of stage grinding to 100% -150 µm, flotation to remove sulphides followed by superpanning of the flotation tail product was successful in treating the combined table/superpanner concentrates from all composite samples.

High grade tin concentrates of >45% Sn were produced in all cases except for SC1 which gave a concentrate grade of 37.2% Sn. The highest grade of 66.6% Sn was obtained in SC2. The significant difference in tin mineralisation (nature and mode of occurrence) between SC1 and SC2 was highlighted in the results obtained in these up-grading tests.

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For PC1, the combined table/superpanner concentrates (+250 to -53 μm) used assayed 7.83% Sn at 49.5% recovery (of original head prior to bulk sulphide flotation stage) and this was concentrated to 12.9% Sn at 48.2% recovery (or 97.5% absolute) by flotation and further up-graded to 48.3% Sn at 34.5% recovery (or 69.8% absolute) by superpanning. The final tin concentrate assayed 10.2% S at 0.25% recovery (of original head) by calculation.

For PC2, the combined table/superpanner concentrates (+250 to -53 μm) used assayed 5.09% Sn at 61.0% recovery (of original head) and this was concentrated to 14.9% Sn at 57.2% recovery (or 93.7% absolute) by flotation and further up-graded to 50.0% Sn at 46.8% recovery (or 81.8% absolute) by superpanning. The final tin concentrate assayed 5.25% S at 0.19% recovery (of original head) by calculation.

For SC1, the combined table/superpanner concentrates (+250 to -53 μm) used assayed 7.39% Sn at 26.3% recovery (of original head) and this was concentrated to 25.9% Sn at 21.8% recovery (or 83.1% absolute) by flotation and further up-graded to 37.2% Sn at 17.0% recovery (or 77.8% absolute) by superpanning. The final tin concentrate assayed 12.2% S at 0.18% recovery (of original head) by calculation.

For SC2, the combined table/superpanner concentrates (+250 to -53 μm) used assayed 16.1% Sn at 60.8% recovery (of original head) and this was concentrated to 48.7% Sn at 54.8% recovery (or 90.2% absolute) by flotation and further up-graded to 66.6% Sn at 47.5% recovery (86.6% absolute) by superpanning. The final tin concentrate assayed 15.3% S at 0.12% recovery (of original head) by calculation.

The final tin concentrates of SC1 and SC2 contained 1.02 g/t and 0.69 g/t of Au respectively and also 0.68% and 0.35% of WO_3 respectively. The tungsten mineral was identified as scheelite as described in the mineralogical report of Appendix J.

8. CONCLUSIONS

The Stage II beneficiation study of Mt Bischoff tin ores gave the following findings:

(a) Porphyry composites PC1 and PC2 were considerably different from the sulphide composites SC1 and SC2 both in head grade and mineralogical composition.

(b) Intimate association of cassiterite with sulphides and non-opaque gangue existed in varying degree in all composite samples. SC1 was the worst case observed followed by PC1 and PC2. The best cassiterite liberation characteristics occurred in SC2 which had greater than 50% liberation in the -1.70 +0.25 mm size fraction.

(c) The unconventional 'front-end' tin flotation treatment was applicable to all four composite samples. A general ten-fold concentration was obtained in the tin rougher flotation concentrates with high recoveries. The tin rougher flotation recovery would largely depend on the reduction of tin losses in the sulphide pre-float and in the talc pre-float in the case of SC2. Tin collectors PTAA and SPA gave the best overall flotation performance in which a correlation of flotation time/collector dosage/feed grind size (both deslimed and un-deslimed) was established. The coarser feed grind size of 100% -150 μm gave similar flotation test results compared to those obtained for the finer feed grind size of 100% -75 μm. The results of limited testwork conducted with other tin collectors CA540 and S-3903 were not as promising and further study would be required to evaluate fully their flotation performance. Concentration by gravity methods was shown to be an effective means of up-grading the tin flotation rougher concentrate.

(d) The problem of mineral locking between cassiterite and other minerals present was revealed in the study of the conventional tin treatment of the four composite samples. Test results showed that an initial finer feed grind (probably around 150 μm) would be required

for a more effective initial sulphide removal by flotation prior to gravity treatment. The overall tin extraction could be improved by middling retreatment and by recovering the very fine tin material using a 'tail-end' flotation circuit in conjunction with the gravity circuit. SC2 gave the best amenable results in the conventional beneficiation testwork followed by PC2 and PC1. SC1 appeared to be the most difficult sample to treat with this method. In attempting to produce high grade concentrates from the low grade gravity products, it was shown that a process involving further removal of sulphide by flotation with a finer grind feed, followed by superpanning, was effective. Final tin concentrates in excess of 45% Sn were obtained for composite samples except for SC1 which gave a concentrate grade of 37.2% Sn.

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9. RECOMMENDATIONS

It is recommended that the Stage III beneficiation study be conducted on the Mt Bischoff tin ores to establish the treatment method as follows:

Unconventional Treatment Procedure

(a) Detailed evaluation of other tin collectors such as CA540 and S-3903.

(b) Investigation of up-grading of the tin flotation rougher concentrate by flotation cleaning making use of a sufficiently large quantity of material to maintain cleaning pulp densities.

(c) Investigation of up-grading tin flotation rougher concentrate by gravity methods making use of classification as well as conventional means.

Conventional Treatment Procedure

(a) Examination of a more effective initial bulk flotation sulphide removal using a finer feed grind and with the use of an activator.

(b) Evaluation of a full gravity beneficiation circuit including middling retreatment on the bulk sulphide flotation tail obtained in (a) above.

(c) Evaluation of flotation recovery of fine tin generated from the gravity circuit used in (b) above.

APPENDIX A

HEAD ASSAYS AND SPECIFIC GRAVITY MEASUREMENTS

Sample	Assay								Specific Gravity
	Sn %	Acid Soluble Sn %	S %	Fe %	F %	CO_2 %	U g/t	Hg g/t	
97528	0.23	0.02	6.60	3.65	6.00	<0.05	14	-	2.96
97529	0.26	0.02	6.85	6.50	7.30	1.55	15	-	3.01
97530	0.26	0.02	8.00	4.70	5.50	0.15	15	-	2.98
97531	0.33	0.02	8.15	4.85	5.70	0.10	14	-	3.00
97532	0.34	0.02	21.1	23.6	13.8	3.25	4	-	3.43
97533	2.38	0.09	25.0	31.9	11.1	1.75	4	-	3.78
97534	0.61	0.10	12.2	21.5	0.86	16.6	4	-	3.33
97535	1.72	0.02	14.7	21.0	8.25	4.05	4	-	3.38
PC1	0.24	0.02	6.30	5.00	6.20	1.25	14	0.14	3.03
PC2	0.29	0.02	7.85	4.65	5.90	0.10	16	0.05	3.04
SC1	1.40	0.05	22.5	27.4	12.8	3.10	<4	0.09	3.61
SC2	1.20	0.01	13.8	21.5	4.70	10.7	<4	0.07	3.40

Element	Semi-quantitative Spectrographic Analysis, g/t			
	PC1	PC2	SC1	SC2
Ba(200)	X	X	X	X
Be(1)	3	20	150	100
Ce(300)	X	X	X	X
Co(5)	X	X	X	15
Cr(20)	150	150	40	30
La(50)	X	X	X	X
Mn(10)	1,000	80	800	4,000
Mo(3)	6	3	X	X
Nb(20)	40	20	X	X
Ni(5)	30	30	X	5
Sc(3)	3	3	3	X
Sr(50)	X	X	X	X
Ta(100)	X	X	X	X
Th(100)	X	X	X	X
Ti(100)	200	200	100	100
V(10)	15	15	25	15

Element	Semi-quantitative Spectrographic Analysis, g/t			
	PC1	PC2	SC1	SC2
W(50)	50	50	100	200
Y(10)	100	80	30	20
Yb(1)	60	20	6	3
Zr(10)	100	80	150	150
Ag(0.1)	2.0	5.0	0.5	0.5
As(50)	1,500	2,000	3,000	X
Bi(1)	20	15	30	40
Cd(3)	X	X	40	X
Cu(1)	250	200	800	300
Ga(1)	30	40	60	30
Ge(1)	20	5	X	5
In(10)	X	X	10	X
Pb(1)	100	250	40	60
Sb(30)	X	X	X	X
Sn(1)	2,000	2,000	>10,000	10,000
Zn(20)	150	800	2,000	200
Au(3)	X	X	X	X
P(100)	X	X	X	X
Te(20)	X	X	X	X
Tl(1)	X	X	X	X
Li(1)	30	20	150	100
Na(50)	X	X	50	100
Cs(30)	X	X	X	X
K(5)	1,000	500	6,000	4,000
Pb(10)	30	20	300	200
B(3)	40	40	30	200
Al(100)	>10,000	>10,000	>10,000	>10,000
Ca(100)	8,000	300	10,000	>10,000
Fe(100)	>10,000	>10,000	>>10,000	>>10,000
Mg(100)	3,000	800	>10,000	>>10,000
Si(100)	>>10,000	>>10,000	>>10,000	>>10,000

Notes: Detection limits in brackets

X denotes not detected at limit quoted

> denotes greater than

>> denotes much greater than

APPENDIX B

MINERALOGY OF COMPOSITE HEAD SAMPLES PC1, PC2, SC1, SC2 AND ORE SAMPLE No. 1 (STAGE I)

B1. INTRODUCTION

Four composite head samples of Mt Bischoff ore (-1.70 mm) were submitted for mineralogical analysis. The samples consist of two porphyry composites (PC1 and PC2) and two sulphide composites (SC1 and SC2).

B2. PROCEDURE

A portion of each of the four samples was sized at 30, 52, 72, 150 and 300 mesh (500, 300, 210, 105 and 53 microns) to produce six size fractions. The five coarsest size fractions were separated in tetrabromoethane at a specific gravity of 2.96 and in Clerici's Solution at a specific gravity of 4.0. All of the heavy liquid separates as well as the -53 microns finest fraction were analysed for tin and the tin distribution between these products calculated. Polished sections (PS22414-53) were made of both the 2.96 to 4.0 and the >4.0 sp.gr. products. These polished sections were examined in reflected light.

A small portion of each composite head sample was finely ground and its bulk mineralogy determined by X-ray diffraction. Selected heavy liquid products were also examined by transmitted light in temporary oil mounts and under a stereobinocular microscope. Selected minerals were identified with the electron microprobe.

Both the relative proportions of the tin minerals as well as their liberation in the heavy products were determined by gross counting. The absolute amounts of these minerals were calculated from the tin assays assuming all of the tin occurs in these minerals.

For each sample the >4.0 sp.gr. heavy products of two size fractions (-500 +300 and -210 +105 microns) were digested to remove 'acid soluble' minerals including sulphides, iron oxides and acid soluble tin minerals. Only a small proportion of residue was left. Each of the -500 +300 µm residues was wet-screened at 300, 150, 75 and 53 µm and each of the -210 +105 µm residues was wet-screened at 150, 75 and 53 µm. After drying and weighing, each of the resulting size fractions was examined briefly microscopically and the whole fraction pulverised and analysed for tin.

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B3. TIN DISTRIBUTION IN SIZED HEAVY LIQUID PRODUCTS

The distribution of tin between the various heavy liquid products of all four samples is given in Tables B1 to B4. The tin in the two lighter products would represent tin in tin minerals which are locked with other gangue minerals to produce composite grains with a lighter specific gravity. The proportion of tin in the >4.0 sp.gr. products would represent tin occurring both as liberated tin minerals and as tin minerals locked with either other dense gangue minerals or with lighter gangue minerals such that the composite grains still have a high specific gravity.

The calculated head assays agree very well with the head assays, the maximum difference between the two assays of any sample being less than 5%.

B4. MINERALOGY

The mineralogy of these samples is summarised in Table B5, from which it can be seen that the two porphyry composite samples have a similar bulk mineralogy, consisting mainly of quartz and topaz with minor to accessory pyrite and iron oxides. Both fluorite and muscovite were noted in the PC1 but were not observed in PC2.

The two sulphide composite samples have a somewhat more variable mineralogy with SC1 consisting mainly of pyrrhotite with a smaller amount of sellaite and minor muscovite, dolomite, siderite and quartz. SC2 consists mainly of carbonates (magnesite and dolomite with minor siderite) along with talc and pyrrhotite. Pyrite is present in all samples, as are traces of other sulphides including chalcopyrite, sphalerite and other base metal sulphides.

In all samples the major tin mineral is cassiterite, although the porphyry composite samples have a small amount of stannite. Traces of franckeite were also noted in PC2 and the SC2 samples, as were traces of stannite in the SC2 sample. Except for the PC1 and PC2 samples, in which stannite contains approximately 2% of the tin, the stannite and franckeite in the samples make a negligible contribution to the total tin content. For the porphyry composite samples the quantitatively determined tin mineralogy as well as the proportions of tin in cassiterite and stannite are given in Table B6. The mineralogically determined proportion of tin and stannite is significantly lower than the proportion of acid soluble tin determined chemically and this discrepancy is difficult to reconcile. It should be stressed that both the mineralogical and chemical determinations of acid soluble tin gave relatively low values.

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The liberation of tin minerals in the heavy products is summarised in Tables B7 and B8 for cassiterite and stannite respectively. The data for stannite, in particular, are on a relatively small proportion of grains and should be considered a guide rather than a very accurate determination of the stannite liberation characteristics.

The results of acid digestion of two sized heavy products (>4.0 sp.gr.) are summarised below:

Sample	Size Fraction (µm)	Weight (g)		% Residue
		Original	Residue	
PC1	-500 +300	2.273	0.292	12.8
PC1	-210 +105	2.237	0.210	9.4
PC2	-500 +300	4.712	0.498	10.6
PC2	-210 +105	4.554	0.406	8.9
SC1	-500 +300	18.657	1.339	7.2
SC1	-210 +105	23.46	1.682	7.2
SC2	-500 +300	15.774	0.793	5.0
SC2	-210 +105	13.653	0.740	5.4

The residues of both the porphyry composite and sulphide composite samples contain only a small proportion of cassiterite which forms brownish coloured grains. The residues of the porphyry composite samples consist mainly of topaz, while the residues of the sulphide composite samples consist mainly of sellaite. All residues also contain a small amount of white precipitate.

The tin distribution results are given in Table B9 and show that most of the tin in the residues reports in the original size range of the unleached fractions, except for SC1 sample where a considerable proportion of the tin reports in the finer fractions.

Liberation of cassiterite in the various size fractions of the residues is approximately as follows:

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Size Fraction (μm)	Cassiterite Liberation, %			
	PC1	PC2	SC1	SC2
+300	30-40	20-30	10-20	30-40
-300 +150	50-70	50-70	30-50	70-90
-150 + 75	70-90	>90	70-90	>90
- 75 + 53	>90	>90	>90	>90
- 53	>90	>90	>90	>90

Unliberated cassiterite is locked with silicates; liberated silicates are the main diluents, as iron oxides and sulphides have been removed by the acid leaching.

B5. OVERALL TIN DISTRIBUTION AND LIBERATION

The overall distributions of tin including the proportion of liberated and locked tin and the proportion of tin and cassiterite and stannite are given in Table B10. In all of these samples cassiterite is the major, or only, tin-bearing phase.

The samples show variable liberation characteristics with SC2 showing the best liberation properties and SC1 showing the worst. Only the SC2 sample shows an approximate 75% liberation within the size fractions examined, with the -105 +53 microns size fraction being 72% liberated. The finest size fraction (-105 +53 microns) of the PC1 sample is 67% liberated and it is expected that this sample would show a 75% liberation at a size of approximately 50 microns. The other two samples PC2 and SC1 would show a 75% liberation at a size below 50 microns, probably around 30 to 40 microns.

A diagram illustrating the tin liberation as a function of particle size is shown in Fig. B1.

B6. MINERALOGY OF ORE SAMPLE NO. 1

Mineralogical analysis was also carried out on both the minus 1.70 mm and pulverised material of the Mt Bischoff Ore Sample No. 1 (Stage 1).

A portion of the pulverised sample was riffled out and examined by X-ray diffraction to determine its bulk mineralogy. A polished section (PS28680) was made of the minus 1.70 mm material and examined by reflected light microscopy to identify opaque minerals.

The sample consists mainly of quartz with accessory (possibly about 20%) topaz and traces (less than 5%) of muscovite, pyrite and fluorite.

The major opaque minerals are pyrite with a smaller amount of goethite. Tin minerals present at a trace level are cassiterite and stannite which generally form liberated grains between 0.05 and 0.15 mm in size. The pyrite generally forms anhedral to subhedral crystals up to 0.4 mm in size. The goethite forms patches and interstitial fillings up to 0.3 mm in size which typically exhibit collorofm textures. Traces of arsenopyrite and galena are also present. A single arsenopyrite crystal 1 mm long was noted and galena was observed only as fine intergrowths with goethite.

B7. PHOTOMICROGRAPHS

Photomicrographs showing typical textures are given in Plates B1 and B2.

TABLE B1: TIN DISTRIBUTION IN SAMPLE #01.

SIZE FRACTION (MICRONS)	SIZE FRACTION	WT %	IN SIZE FRACTIONS --- TIN ASSAY %	TIN DIST'N %	IN HEAD SAMPLE WT %	TIN DIST'N %	CUMULATIVE DATA WEIGHT %	ASSAY %	DIST'N %
+ [illegible]	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	> [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
- [illegible] + [illegible]	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	> [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
- [illegible] + [illegible]	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	> [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
- [illegible] + [illegible]	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	> [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
- [illegible] + [illegible]	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	< [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	> [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	< [illegible]	[illegible]	[illegible]	[illegible]					
[illegible]	< [illegible]	[illegible]	[illegible]	[illegible]					
	> [illegible]	[illegible]	[illegible]	[illegible]					
SAMPLE TOTALS..	SANDS	[illegible]	[illegible]	[illegible]					
	SLIMES	[illegible]	[illegible]	[illegible]					
	TOTAL	[illegible]	[illegible]	[illegible]					

CALCULATED HEAD ASSAY= .23 %

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TABLE B2: TIN DISTRIBUTION IN SAMPLE PC2.

SIZE FRACTION (MICRONS)	SPEC GRAV FRACTION	IN SIZE FRACTIONS WT %	TIN ASSAY %	TIN DISTN %	IN HEAD SAMPLE WT %	TIN DISTN %	CUMULATIVE DATA WEIGHT %	ASSAY %	DISTN %
+ 500.	< 2.96	69.3	.09	31.0	34.10	10.44	34.10	.09	10.44
	< 4.00	25.9	.26	37.7	12.77	12.72	12.77	.28	12.72
	> 4.00	4.8	1.25	31.3	2.37	10.55	2.37	1.25	10.55
	TOTAL	100.0	(.19)	100.0	49.23	33.71	49.23	.19	33.71
- 500. + 300.	< 2.96	66.4	.06	15.1	7.17	1.58	41.26	.08	12.02
	< 4.00	22.3	.25	23.7	2.40	2.48	15.17	.28	15.20
	> 4.00	11.3	1.47	61.1	1.22	6.39	3.59	1.32	16.94
	TOTAL	100.0	(.27)	100.0	10.79	10.45	60.02	.21	44.16
- 300. + 210.	< 2.96	54.3	.05	8.7	2.71	.52	43.97	.08	12.54
	< 4.00	21.3	.31	16.3	.90	.98	16.07	.28	16.17
	> 4.00	14.4	2.08	75.0	.61	4.50	4.20	1.43	21.44
	TOTAL	100.0	(.40)	100.0	4.21	5.99	64.24	.22	50.15
- 210. + 105.	< 2.96	69.2	.03	5.4	5.99	.75	49.96	.07	13.29
	< 4.00	14.9	.24	9.6	1.68	1.33	17.65	.28	17.50
	> 4.00	13.8	2.72	85.0	1.21	11.70	5.41	1.72	33.14
	TOTAL	100.0	(.44)	100.0	8.78	13.77	73.02	.25	63.92
- 105. + 53.	< 2.96	67.4	.02	2.4	5.84	.33	55.80	.07	13.62
	< 4.00	21.4	.10	4.7	1.85	.65	19.50	.26	18.15
	> 4.00	11.2	3.64	92.9	.97	12.62	6.38	2.01	45.76
	TOTAL	100.0	(.44)	100.0	8.67	13.60	81.69	.27	77.52
TOTALS FOR ABOVE SIZE FRACTIONS	< 2.96	66.3	(.07)	17.5					
	< 4.00	23.4	(.26)	23.4					
	> 4.00	7.8	(2.01)	59.0					
OVERALL TOTALS..	SANDS	81.7	(.27)	77.5					
	SLIMES	18.3	.35	22.5					
	TOTAL	100.0	(.29)	100.0					

CALCULATED HEAD ASSAY= .29 %

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TABLE B3: TIN DISTRIBUTION IN SAMPLE SC1.

SIZE FRACTION (MICRONS)	SPEC GRAV FRACTION	--- IN SIZE FRACTIONS --- WT %	TIN ASSAY %	TIN DISTN %	IN HEAD SAMPLE WT %	TIN DISTN %	CUMULATIVE DATA WEIGHT %	ASSAY %	DISTN %
+ 500.	< 2.96	12.9	.35	3.2	6.87	1.64	6.87	.35	1.64
	< 4.00	65.4	1.33	60.8	34.88	31.68	34.88	1.33	31.68
	> 4.00	21.7	2.37	36.0	11.58	18.75	11.58	2.37	18.75
	TOTAL	100.0 (	1.43)	100.0	53.33	52.08	53.33	1.43	52.08
- 500. + 300.	< 2.96	17.0	.54	8.0	2.01	.74	8.88	.39	2.38
	< 4.00	63.1	1.25	47.2	5.10	4.35	39.98	1.32	34.04
	> 4.00	40.0	1.28	44.2	4.73	4.14	16.32	2.05	22.93
	TOTAL	100.0 (	1.14)	100.0	11.84	9.23	65.18	1.38	61.31
- 300. + 210.	< 2.96	17.2	.55	8.2	.88	.39	9.76	.42	2.77
	< 4.00	33.3	1.33	32.4	1.70	1.55	41.68	1.32	37.59
	> 4.00	49.5	1.64	59.4	2.53	2.84	18.85	2.00	25.73
	TOTAL	100.0 (	1.37)	100.0	5.11	4.77	70.29	1.38	66.09
- 210. + 105.	< 2.96	4.5	.54	2.4	.45	.16	10.20	.42	2.94
	< 4.00	36.5	.95	34.0	3.61	2.34	45.29	1.29	36.93
	> 4.00	58.9	1.10	63.6	5.82	4.38	24.67	1.79	30.10
	TOTAL	100.0 (	1.02)	100.0	9.88	6.88	80.17	1.33	72.97
- 105. + 53.	< 2.96	15.4	.80	11.7	1.19	.65	11.39	.46	3.59
	< 4.00	25.8	.37	8.8	1.94	.49	47.23	1.25	40.42
	> 4.00	58.6	1.40	79.5	4.61	4.41	29.28	1.73	34.51
	TOTAL	100.0 (	1.05)	100.0	7.73	5.54	87.90	1.31	78.51
TOTALS FOR ABOVE SIZE FRACTIONS	< 2.96	13.2 (	.46)	4.5					
	< 4.00	53.7 (	1.28)	51.5					
	> 4.00	33.3 (	1.73)	44.0					
OVERALL TOTALS..	SANDS	87.0 (	1.31)	78.5					
	SLIMES	13.1	2.50	21.5					
	TOTAL	100.0 (	1.45)	100.0					

CALCULATED HEAD ASSAY= 1.44 %

028152

TABLE B4: TIN DISTRIBUTION IN SAMPLE SC2.

SIZE FRACTION (MICRONS)	SPEC GRAV FRACTION	IN SIZE FRACTIONS --- WT %	TIN ASSAY %	TIN DISTN %	IN HEAD SAMPLE WT %	TIN DISTN %	CUMULATIVE DATA WEIGHT %	ASSAY %	DISTN %
+ 500.	< 2.96	36.6	.19	7.2	20.06	3.26	20.06	.19	3.26
	< 4.00	40.5	1.19	48.7	22.21	22.03	22.21	1.19	22.03
	> 4.00	22.9	1.90	44.1	12.58	19.92	12.58	1.90	19.92
	TOTAL	100.0 (	.99)	100.0	54.84	45.21	54.84	.99	45.21
- 500. + 300.	< 2.96	35.6	.17	4.6	4.37	.62	24.43	.19	3.88
	< 4.00	29.6	1.08	24.4	3.65	3.28	25.85	1.17	25.31
	> 4.00	34.8	2.68	71.0	4.28	9.55	16.86	2.10	29.48
	TOTAL	100.0 (	1.31)	100.0	12.29	13.46	67.14	1.05	58.67
- 300. + 210.	< 2.96	34.9	.14	2.9	1.85	.22	26.29	.19	4.10
	< 4.00	25.3	.96	15.5	1.43	1.14	27.28	1.16	26.45
	> 4.00	39.7	3.34	81.6	2.16	6.01	19.01	2.24	35.48
	TOTAL	100.0 (	1.63)	100.0	5.43	7.36	72.57	1.09	66.03
- 210. + 105.	< 2.96	31.3	.10	1.7	2.61	.21	28.88	.18	4.31
	< 4.00	24.3	.70	9.7	2.07	1.20	29.34	1.13	27.65
	> 4.00	43.9	3.63	88.6	3.66	10.99	22.67	2.46	46.47
	TOTAL	100.0 (	1.78)	100.0	8.33	12.40	80.90	1.16	78.43
- 105. + 53.	< 2.96	31.1	.04	1.1	2.68	.19	31.56	.17	4.41
	< 4.00	20.7	.36	8.0	1.34	.52	30.69	1.10	28.17
	> 4.00	38.2	3.68	92.9	2.49	8.04	25.16	2.60	54.51
	TOTAL	100.0 (	1.58)	100.0	6.51	8.66	87.41	1.20	87.09
TOTALS FOR ABOVE SIZE FRACTIONS	< 2.96	36.1 (	.17)	5.1					
	< 4.00	35.1 (	1.10)	32.3					
	> 4.00	28.8 (	2.60)	62.6					
OVERALL TOTALS..	SANDS	87.4 (	1.20)	87.1					
	SLIMES	12.6	1.23	12.9					
	TOTAL	100.0 (	1.20)	100.0					

CALCULATED HEAD ASSAY= 1.20 %

028153

TABLE B5: MINERALOGY OF COMPOSITE HEAD SAMPLES

Sample	Tin Minerals*	Other Minerals*			
		Major (>20%)	Minor (~10%)	Accessory (~1%)	Trace (<0.5%)
Porphyry Comp. 1 (PC1)	Cassiterite Stannite	Quartz Topaz	Pyrite Siderite	Fluorite Muscovite Iron Oxides	Chalcopyrite Arsenopyrite Marcasite Pyrrhotite Covellite/chalcocite Sphalerite Galena
Porphyry Comp. 2 (PC2)	Cassiterite Stannite Franckeite	Quartz Topaz	Pyrite	Iron Oxides	Chalcopyrite Sphalerite Covellite/chalcocite Arsenopyrite Marcasite Galena Rutile
Sulphide Comp. 1 (SC1)	Cassiterite	Pyrrhotite Sellaite	Muscovite Dolomite Siderite Quartz	Fluorite Talc Iron Oxide Pyrite	Arsenopyrite Chalcopyrite Sphalerite Galena
Sulphide Comp. 2 (SC2)	Cassiterite Stannite Franckeite	Magnesite Dolomite Talc Pyrrhotite	Muscovite Siderite Sellaite Pyrite+	Quartz Fluorite	Chalcopyrite Sphalerite

*Listed in approximate order of decreasing abundance.

+A large proportion of this pyrite shows textures indicating it is a supergene replacement product of pyrrhotite.

028154

TABLE B6: TIN MINERALOGY OF THE PORPHYRY COMPOSITE HEAVY PRODUCTS

Sample	Size Fraction	Tin Minerals in Size Fractions				Mineralogical Distn. of Tin in			
		Volume %		Weight %		Size Fraction		Total Heavy Pr.	
		Cassit.	Stann.	Cassit.	Stann.	Cassit.	Stann.	Cassit.	Stann.
Porphyry Comp. 1 (PC1)	+500	100	-	100	-	100.0	-	20.8	-
	-500 +300	94	6	96	4	98.6	1.4	16.3	0.3
	-300 +210	90	10	93	7	97.6	2.4	9.6	0.3
	-210 +105	97	3	98	2	99.3	0.7	25.5	0.3
	-105 + 53	84	16	89	11	96.0	4.0	26.1	0.8
	Total Heavy Pr.	(93)	(7)	(95)	(5)	(98.0)	(2.0)	(98.3)	(1.7)
Porphyry Comp. 2 (PC2)	+500	100	-	100	-	100.0	-	23.0	-
	-500 +300	76	24	83	17	93.5	6.5	13.1	0.9
	-300 +210	92	8	95	5	98.1	1.9	9.6	0.2
	-210 +105	97	3	98	2	99.3	0.7	25.4	0.2
	-105 + 53	87	13	91	9	96.8	3.2	26.7	0.9
	Total Heavy Pr.	(93)	(7)	(95)	(5)	(98.0)	(2.0)	(97.8)	(2.2)

028155

TABLE B7: CASSITERITE LIBERATION IN HEAVY PRODUCTS (SP.GR. >4.0)

Sample	Size Fraction (µm)	% Lib. Cassit.	% Locked in Binary Grains With				% Locked in Ternary(+) Grains
			Non-op. Gangue	Fe-Ti Oxides	Pyrite	Pyrrhotite	
Porphyry Comp. 1 (PC1)	+500	-	92	-	-	-	8
	-500 +300	24	63	-	-	-	13
	-300 +210	43	44	3	3	-	7
	-210 +105	56	39	3	1	-	1
	-105 + 53	73	22	4	1	-	-
	Total Heavy Pr.	(42)	(50)	(2)	(1)	(-)	(5)
Porphyry Comp. 1 (PC2)	+500	-	90	-	-	-	10
	-500 +300	34	58	-	-	-	8
	-300 +210	51	43	2	1	-	3
	-210 +105	55	39	4	1	-	1
	-105 + 53	60	35	1	1	-	3
	Total Heavy Pr.	(40)	(54)	(1)	(1)	(-)	(4)
Sulphide Comp. 1 (SC1)	+500	6	26	-	2	2	64
	-500 +300	-	13	-	-	19	68
	-300 +210	5	27	-	1	25	42
	-210 +105	25	44	2	-	14	15
	-105 + 53	54	23	4	6	10	3
	Total Heavy Pr.	(13)	(27)	(1)	(2)	(9)	(48)

...2/

028156

TABLE B7: (Continued)

Sample	Size Fraction (µm)	% Lib. Cassit.	% Locked in Binary Grains With				% Locked in Ternary(+) Grains
			Non-op. Gangue	Fe-Ti Oxides	Pyrite	Pyrrhotite	
Sulphide Comp. 2 (SC2)	+500	22	60	-	-	-	18
	-500 +300	53	35	2	-	4	6
	-300 +210	57	35	1	-	3	4
	-210 +105	76	19	1	-	1	3
	-105 + 53	79	19	-	-	1	1
	Total Heavy Pr.	(51)	(39)	(1)	(-)	(1)	(8)

0281571

TABLE B8: STANNITE LIBERATION IN HEAVY PRODUCTS (SP.GR. >4.0) OF THE PORPHYRY COMPOSITE SAMPLES

Sample	Size Fraction (μm)	% Liberated Stannite	% Stannite Locked in Binary Grains With			% Stannite Locked in Ternary Grains (+)
			Non-op. Gangue	Pyrite	Sphalerite	
Porphyry Comp. 1 (PC1)	+500	-	-	-	-	-
	-500 +300	-	30	30	-	40
	-300 +210	50	25	15	-	10
	-210 +105	50	25	-	25	-
	-105 + 53	73	21	2	4	-
	Total Heavy Pr.	(50)	(25)	(10)	(5)	(5)
Porphyry Comp. 2 (PC2)	+500	-	-	-	-	-
	-500 +300	25	25	-	-	50
	-300 +210	26	40	-	30	4
	-210 +105	55	15	15	15	-
	-105 + 53	50	35	-	15	-
	Total Heavy Pr.	(40)	(30)	(5)	(15)	(10)

0281158

TABLE B9: TIN DISTRIBUTION IN THE LEACH RESIDUES OF THE >4.0 SP.GR. PRODUCTS OF TWO SIZE FRACTIONS OF THE HEAD SAMPLES

Sample	Size Fraction		Size Fractions of Leach Residue			Sn	
	BSS Mesh	μm	BSS Mesh	μm	Wt. %	Assay, %	Distn. %
PC1	-30+52	-500+300	+52	+300	26.7	39.5	62.9
			-52+100	-300+150	42.9	11.3	28.9
			-100+200	-150+75	13.0	5.70	5.1
			-200+300	-75+53	7.0	3.56	1.7
			-300	-53	8.4	2.78	1.4
			Total		100.0	(16.83)	100.0
PC1	-72+150	-210+105	+100	+150	23.8	58.8	36.9
			-100+200	-150+75	48.1	44.0	55.8
			-200+300	-75+53	1.1	19.5	0.6
			-300	-53	27.0	9.4	6.7
			Total		100.0	(37.9)	100.0
PC2	-30+52	-500+300	+52	+300	20.7	39.7	64.3
			-52+100	-300+150	31.4	8.68	21.3
			-100+200	-150+75	20.9	4.02	6.6
			-200+300	-75+53	12.1	3.54	3.3
			-300	-53	14.9	3.82	4.5
			Total		100.0	(12.8)	100.0
PC2	-72+150	-210+105	+100	+150	21.5	50.1	36.7
			-100+200	-150+75	54.4	37.6	54.9
			-200+300	-75+53	4.8	6.60	3.3
			-300	-53	19.3	4.60	5.0
			Total		100.0	(29.3)	100.0
SC1	-30+52	-500+300	+52	+300	9.8	14.6	14.2
			-52+100	-300+150	38.4	8.75	27.0
			-100+200	-150+75	32.4	7.60	19.2
			-200+300	-75+53	12.7	10.1	10.8
			-300	-53	6.7	21.1	28.9
			Total		100.0	(13.3)	100.0
SC1	-72+150	-210+105	+100	+150	9.1	12.7	11.7
			-100+200	-150+75	49.0	7.16	37.6
			-200+300	-75+53	17.6	8.46	15.1
			-300	-53	24.3	15.2	35.5
			Total		100.0	(9.85)	100.0
SC2	-30+52	-500+300	+52	+300	34.3	66.8	49.9
			-52+100	-300+150	41.9	41.5	37.7
			-100+200	-150+75	15.1	25.1	8.2
			-200+300	-75+53	4.7	24.3	2.5
			-300	-53	4.0	23.3	2.0
			Total		100.0	(46.2)	100.0
SC2	-72+150	-210+105	+100	+150	29.0	70.6	37.6
			-100+200	-150+75	53.1	54.5	53.2
			-200+300	-75+53	8.3	32.9	5.0
			-300	-53	9.6	23.6	4.2
			Total		100.0	(54.4)	100.0

TABLE B10: OVERALL TIN DISTRIBUTION IN COMPOSITE SAMPLES

Sample	Size Fraction (um)	Tin distribution in sample					Tin distribution in size fractions			
		% Locked in sp.gr. <4.0 products[1]	In heavy (sp.gr. >4.0) products[1]							
			Cassiterite[2]		Stannite[2]		Liberated Tin in		Total Liberated Tin	% Tin in Locked Tin Minerals
			Liberated	Locked	Liberated	Locked	Cassiterite	Stannite		
Porphyry Comp. 1 (PC1)	+500	30.8	-	7.4	-	-	-	-	-	100
	-500+300	4.6	1.4	4.4	-	0.1	13	-	13	87
	-300+210	1.5	1.5	1.9	0.1	-	30	1	31	69
	-210+105	1.7	5.1	4.0	-	0.1	47	-	47	53
	-105+53	0.6	6.8	2.5	0.2	0.1	67	2	69	31
	Total +53	39.2	14.8	20.2	0.3	0.3	20	-	20	80
	-53[3]	(-)	(20.3)	(3.4)	(0.9)	(0.1)	(83)	(3)	(86)	(14)
	Total Sample	39.2	35.6	23.6	1.2	0.4	36	1	37	63
Porphyry Comp. 2 (PC2)	+500	23.2	-	10.5	-	-	-	-	-	100
	-500+300	4.1	2.0	4.0	0.1	0.3	19	1	20	80
	-300+210	1.5	2.2	2.2	-	0.1	37	-	37	63
	-210+105	2.1	6.4	5.2	0.1	-	46	1	47	53
	-105+53	1.0	7.3	4.9	0.2	0.2	54	2	56	44
	Total +53	31.9	17.9	26.8	0.4	0.6	23	1	24	76
	-53[3]	(-)	(17.3)	(4.3)	(0.6)	(0.2)	(77)	(2)	(79)	(21)
	Total Sample	31.9	35.2	31.1	1.0	0.8	35	1	36	64
Sulphide Comp. 1 (SC1)	+500	33.3	1.1	17.7	-	-	2	-	2	98
	-500+300	5.1	-	4.1	-	-	-	-	-	100
	-300+210	2.0	0.1	2.7	-	-	2	-	2	98
	-210+105	2.5	1.1	3.3	-	-	16	-	16	84
	-105+53	1.1	2.4	2.0	-	-	44	-	44	56
	Total +53	44.0	4.7	29.8	-	-	6	-	6	94
	-53[3]	(-)	(16.6)	(4.9)	(-)	(-)	(77)	(-)	(77)	(33)
	Total Sample	44.0	21.3	34.7	-	-	21	-	21	79
Sulphide Comp. 2 (SC2)	+500	25.3	4.4	15.5	-	-	10	-	10	90
	-500+300	3.9	5.1	4.5	-	-	38	-	38	62
	-300+210	1.4	3.4	2.6	-	-	46	-	46	54
	-210+105	1.4	8.4	2.6	-	-	68	-	68	32
	-105+53	0.6	6.3	1.7	-	-	72	-	72	28
	Total +53	32.6	27.6	26.9	-	-	28	-	28	72
	-53[3]	(-)	(11.6)	(1.3)	(-)	(-)	(90)	(-)	(90)	(10)
	Total Sample	32.6	39.2	28.2	-	-	39	-	39	61

[1] From Tables E1-4. [2] Calculated from the heavy products tin mineralogy (Table E6) and the liberation of tin minerals in the heavy products (Tables E7 and E8).

[3] Calculated assuming the -53 micron fraction has all of its tin in tin minerals in the same proportions as the -105+53 micron size fraction. The liberation of the tin minerals was assumed to be half way between the liberation of the -105+53 micron size fraction and complete liberation.

0281160

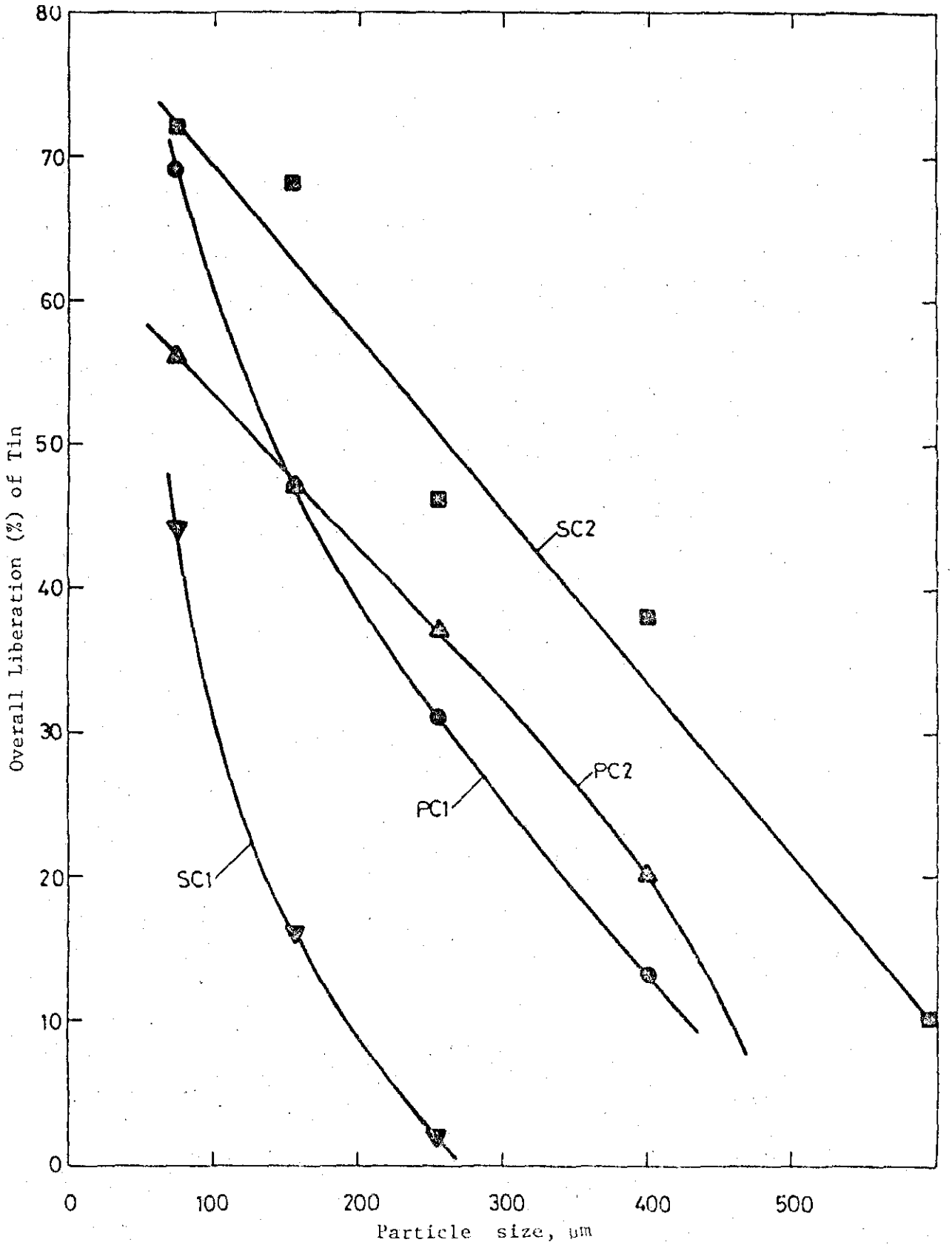
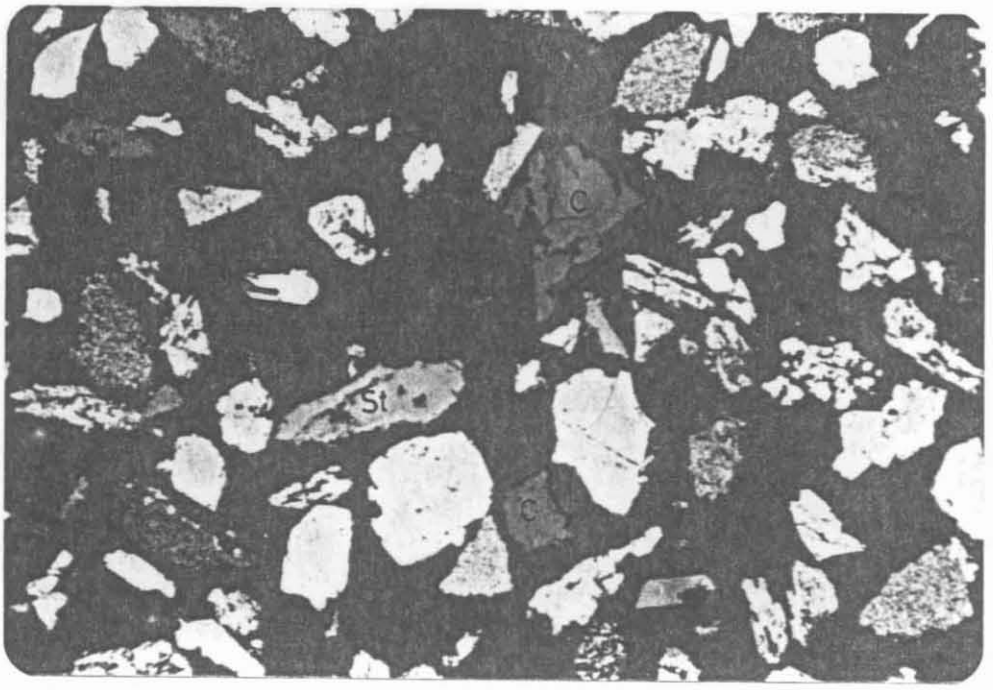
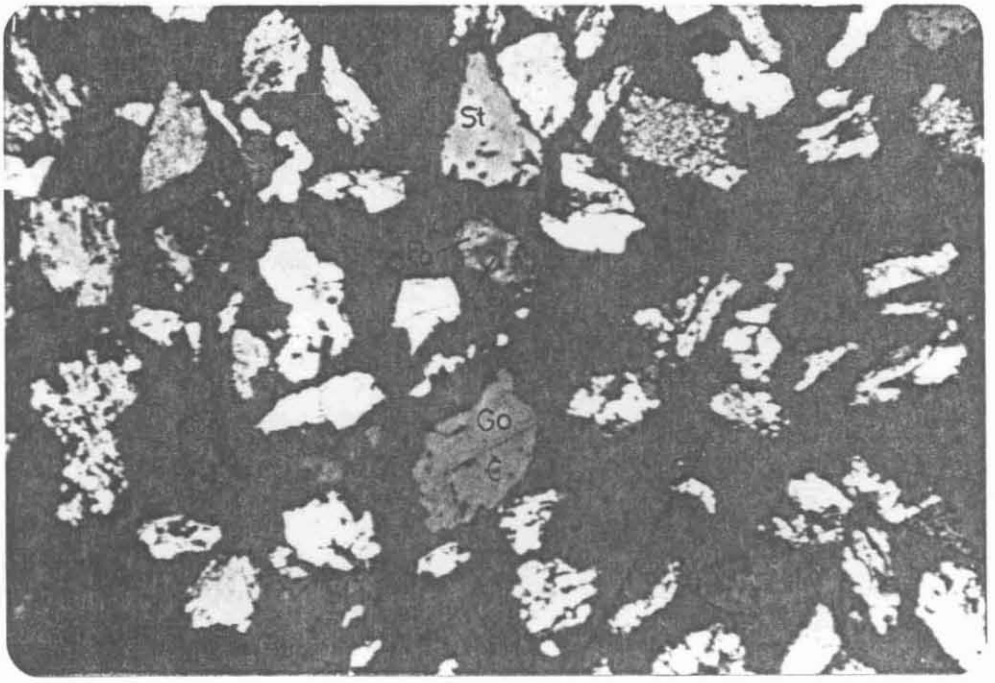


FIG. B1: TIN LIBERATION AS A FUNCTION OF PARTICLE SIZE IN THE FOUR HEAD SAMPLES



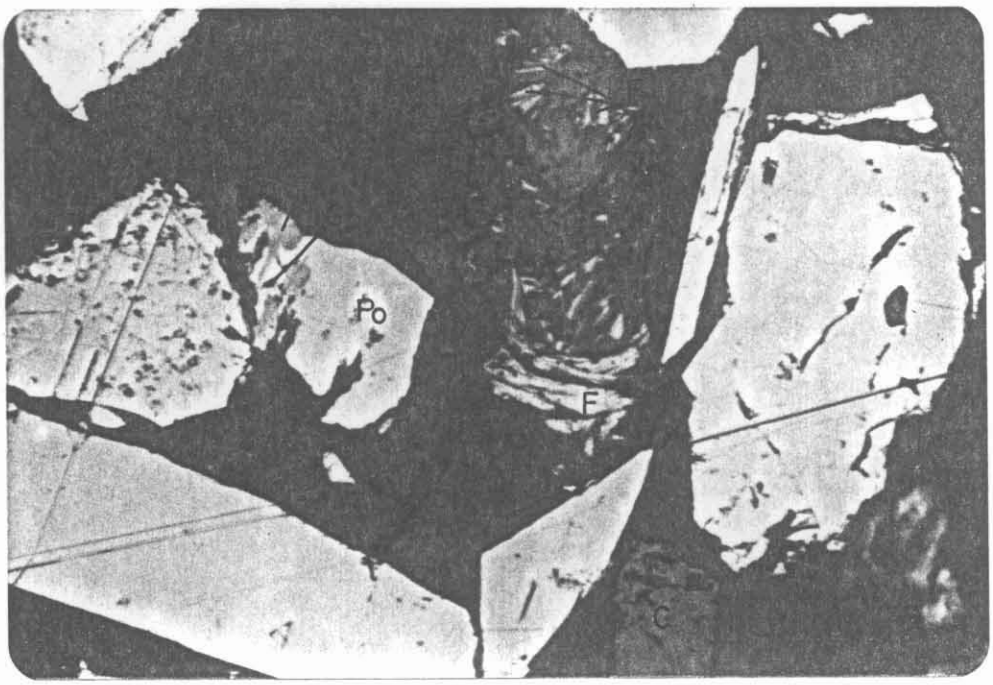
200 µm

a. Sample PC1; sp.gr. >4.0, -105 +53 µm; PS22423
Three cassiterite (C) grains consisting of two liberated and one locked with non-opaque gangue. Field also contains a liberated stannite grain (St).



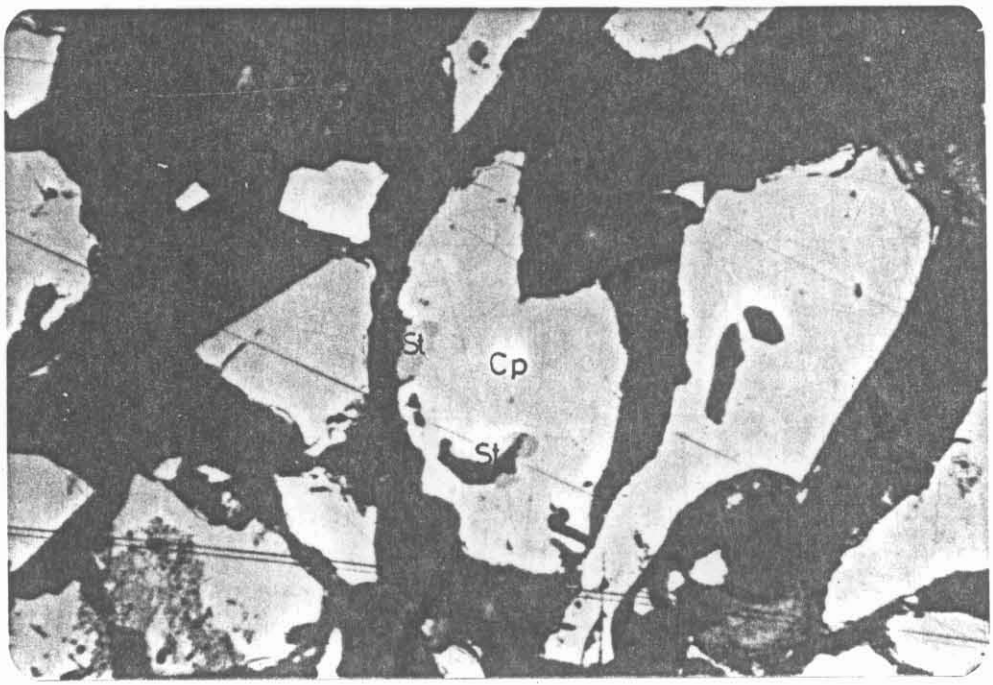
200 µm

b. Sample PC1; sp.gr. >4.0, -105 +53 µm; PS22423
Cassiterite (C) locked with goethite (Go). Field also contains a small cassiterite (C) grain included in a pyrrhotite (Po) and non-opaque intergrowth. Liberated stannite grain labelled St.



200 µm

a. Sample SC2; sp.gr. >4.0, -300 +210 µm; PS22451
Franckeite (F) locked with non-opaque gangue. Also a grain containing finely intergrown stannite (St) and chalcopyrite (Cp) locked with pyrrhotite (Po). Lower part of field contains a liberated grain of cassiterite (C).



200 µm

b. Sample SC1; sp.gr. >4.0, -210 +105 µm; PS22442
Stannite (St) locked with chalcopyrite (Cp) as an inclusion and marginal intergrowth.

APPENDIX C

SIZE/ASSAY ANALYSIS OF -75 μm FEED OF ORE SAMPLE NO. 1 AND FLOTATION TEST PROCEDURES AND RESULTS

Size/Assay Analysis of -75 μm Feed of Ore Sample No. 1

Size Fraction μm	Weight %	Assay % Sn	Distribution % Sn
-75 +38	25.12	0.40	29.27
-38 +36.6 (C1)	6.69	1.89	36.80
-36.6 +27.2 (C2)	8.81	0.29	7.45
-27.2 +19.1 (C3)	18.42	0.17	9.12
-19.1 +12.6 (C4)	15.47	0.14	6.31
-12.6 + 8.5 (C5)	7.05	0.12	2.46
- 8.5 (-C5)	18.44	0.16	8.59
Calc Head	100.00	0.34	100.00
Assay Head		0.35	

Flotation Test Procedures and Results on Ore Sample No. 1

Tests 5 + 6 (Continuing on from Stage 1):

Stage grind to 100% -75 μm at 60% solids (7½ min., 500 g charge); sulphide pre-float; stage tin rougher floats using PTAA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Rougher Float 1	2	5	6.3	0.01	-	-	0.04
Sulphide Rougher Float 2	2	5	6.3	0.01	-	-	0.02
Tin Rougher Float 1	5	5	5.0	-	0.10	0.14	0.01
Tin Rougher Float 2	5	5	5.0	-	0.10	0.04	0.01
Tin Rougher Float 3	5	5	5.0	-	0.10	0.05	0.01
Tin Rougher Float 4	5	5	5.0	-	0.10	0.04	0.01
Tin Rougher Float 5	5	5	5.0	-	0.10	0.04	0.01
Tin Rougher Float 6	5	5	5.0	-	0.20	0.06	0.01
Tin Rougher Float 7	5	5	5.0	-	0.20	0.06	0.01
Tin Rougher Float 8	5	5	5.0	-	0.30	0.07	0.01
Tin Rougher Float 9	5	5	5.0	-	0.30	0.07	0.01

Notes: PAX = Potassium Amyl Xanthate (Union Carbide)

PTAA = p-Tolyl Arsonic Acid (I.C.I.)

MIBC = Methyl Isobutyl Carbinol (Shell)

H_2SO_4 = Sulphuric Acid (Analab)

Adelaide tap water was used in all tests.

Flotation pulp density was maintained nominally at 35% solids in all tests.

Agitair LA500 equipment was used for conducting all flotation tests.

Stainless steel rod mill was used for grinding test charges.

British standard screens and a Warman cyclosizer were used for sizing analysis.

(b) Results

Test Product	Size Fractions µm		Cyclosizer	Weight %	Assay % Sn	Distribution % Sn
Sulphide Ro Conc	-75	+38		0.62	0.35	0.65
Sulphide Ro Conc	-38	+30	C1	0.44	0.35	0.46
Sulphide Ro Conc	-30	+22.3	C2	0.21	0.49	0.31
Sulphide Ro Conc	-22.3	+15.7	C3	0.24	0.55	0.40
Sulphide Ro Conc	-15.7	+10.3	C4	0.29	0.38	0.33
Sulphide Ro Conc	-10.3	+ 8.0	C5	0.20	0.45	0.27
Sulphide Ro Conc	- 8.0		-C5	1.47	0.34	1.51
(Sulphide Ro Conc)				(3.47)	(0.38)	(3.93)
Tin Rougher Conc	-75	+38		0.17	42.3	21.65
Tin Rougher Conc	-38	+32.5	C1	0.27	41.4	33.66
Tin Rougher Conc	-32.5	+24.2	C2	0.18	11.5	6.23
Tin Rougher Conc	-24.2	+17.0	C3	0.35	6.20	6.53
Tin Rougher Conc	-17.0	+11.2	C4	0.74	2.25	5.01
Tin Rougher Conc	-11.2	+ 8.7	C5	0.69	0.94	1.95
Tin Rougher Conc	- 8.7		-C5	5.55	0.30	5.01
(Tin Rougher Conc)				(7.95)	(3.34)	(80.04)
Tin Rougher Tail				88.58	0.06	16.03
Calc Head				100.00	0.33	100.00
Assay Head					0.35	

Note: C1 to C5 denotes cyclosizing product Conc 1 to Conc 5.

(c) Comments

(i) Overall tin recovery (in sulphide and tin rougher flotation concentrates) in Tests 5 + 6 (83.9%) was not as high as that obtained in Test 3 (97.1%) and Test 4 (93.8%) of Stage I. Reasons for the varying recoveries in these tests are not clear although conditions used in flotation were very similar.

(ii) More than half of the tin content of the Head Sample No. 1 ground to 100% -75 µm was reported in the two coarsest size fraction (-75 +38 µm and Conc 1 cyclosize) and this was successfully recovered by flotation as a high grade sized product in excess of 40% Sn.

APPENDIX D

MINERALOGICAL EXAMINATION OF SULPHIDE AND TIN ROUGHER CONCENTRATES OF FLOTATION TESTS 5 + 6 ON HEAD SAMPLE NO. 1 (STAGE I)

D1. INTRODUCTION

Size fractions of a sulphide rougher concentrate and a tin rougher concentrate of flotation tests 5 + 6 on Head Sample No. 1 (Stage I) were submitted for mineralogical examination to determine their mineralogical composition and the liberation characteristics of tin minerals.

Both the weight distributions and tin assays of all products, as well as the tin rougher tail were supplied. These data are reproduced in Table D1, together with the calculated tin distribution.

D2. PROCEDURE

Polished sections (PS22356-67) were made of each size fraction except for the -C5 size fraction and examined in reflected light to determine their mineralogy. The bulk mineralogy of each size fraction and the locking of cassiterite in cassiterite-rich size fractions {-75 +38, -38 +32.5(C1) and -32.5 +24.2(C2) size fractions of the tin rougher concentrate} were determined by point counting. The tin mineralogy and locking characteristics of tin minerals in the size fractions with lower tin contents were determined by gross counting.

Selected size fractions were examined with a binocular stereomicroscope and in temporary oil mounts by transmitted light microscopy.

D3. MINERALOGY

The bulk mineralogy of the rougher concentrates is given in Table D2. In the sulphide rougher concentrate both cassiterite and stannite are present and their relative proportions are given as stannite/cassiterite ratio (weight per cent). This ratio decreases at finer grain sizes. No stannite was observed in the tin rougher concentrate.

The sulphide rougher concentrate consists mainly of pyrite with a much smaller proportion of non-opaque gangue and accessory iron oxides (mainly goethite) and arsenopyrite. The proportions of non-opaque gangue and iron oxides increase with finer grain size at the expense of the pyrite content. Other sulphides present at trace levels are (in approximately decreasing abundance) covellite, chalcopyrite, sphalerite, galena and molybdenite.

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The non-opaque gangue consists mainly of topaz, quartz and possibly some feldspar.

The tin rougher concentrate shows a highly variable mineralogy through the size range, with the coarser size fractions having high cassiterite contents and the finer size fractions having low cassiterite contents. The proportion of non-opaque gangue increases markedly with decreasing grain size. The iron oxide content (mainly goethite) remains moderately constant at about 25% except for the finest size fraction which has a much lower iron oxide content. This product also contains metals fragments of iron or steel (listed as iron in Table D2) which are concentrated in the C2-C4 fractions. The non-opaque gangue in these products consists mainly of topaz, quartz and possibly some feldspar. Traces of zircon were observed in the coarser size fractions.

D4. TIN MINERAL LIBERATION

The liberation characteristics of the tin minerals in the sulphide rougher concentrate and tin rougher concentrate are given in Tables D3 and D4 respectively, which show that the tin minerals are well liberated throughout the size range. The sulphide rougher concentrate contains a relatively small proportion of cassiterite (by volume per cent) so the unliberated cassiterite grains were not further classified as to what mineral there were locked with. Most of unliberated cassiterite in the sulphide rougher concentrate is locked with non-opaque gangue, with only trace amounts locked with iron oxides. Virtually none of the cassiterite is locked with pyrite or other sulphides.

D5. MINERALOGICAL DISTRIBUTION OF TIN

The mineralogical distribution of tin in the test products is summarised in Table D5.

Even though the sulphide rougher concentrate has a relatively low cassiterite content, slightly more than half of the tin occurs in cassiterite. The proportion of tin in cassiterite increases with finer grain size.

TABLE D1: TIN DISTRIBUTION IN TEST PRODUCTS*

	Size Fraction (μm)	Cyclosizer Product	Weight Distribution, % Between Products	Weight Distribution, % Within Product	Tin Assay %	Tin Distribution, % Between Products	Tin Distribution, % Within Product
Sulphide Ro. Concentrate	-75 +38		0.62	17.9	0.35	0.65	16.6
	-38 +30	C1	0.44	12.7	0.35	0.46	11.8
	-30 +22.3	C2	0.21	6.0	0.49	0.31	7.9
	-22.3 +15.7	C3	0.24	6.9	0.55	0.40	10.1
	-15.7 +10.3	C4	0.29	8.4	0.38	0.33	8.4
	-10.3 + 8.0	C5	0.20	5.8	0.45	0.27	6.9
	- 8.0	-C5	1.47	42.3	0.34	1.51	38.3
	Total Product		3.47	100.0	(0.38)	3.93	100.0
Tin Ro. Concentrate	-75 +38		01.7	2.1	42.3	21.65	26.6
	-38 +32.5	C1	0.27	3.4	41.4	33.66	42.2
	-32.5 +24.2	C2	0.18	2.3	11.5	6.23	7.9
	-24.2 +17.0	C3	0.35	4.4	6.2	6.53	8.2
	-17.0 +11.2	C4	0.74	9.3	2.25	5.01	6.3
	-11.2 + 8.7	C5	0.69	8.7	0.94	1.95	2.5
	- 8.7	-C5	5.55	69.8	0.30	5.01	6.3
	Total Product		7.95	100.0	(3.34)	80.04	100.0
Tin Ro. Tail	Total Product		88.58	100.0	0.06	16.03	100.0

*Calculated Head Assay = 0.33% Sn
Assay Head = 0.35% Sn.

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TABLE D2

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TABLE D2 MINERALOGY OF ROUGHER CONCENTRATES

Size Fraction (μm)	Cyclosizer Product	Mineralogy of Sulphide Rougher Concentrate (Weight %)					
		Stannite and Cassiterite*	Pyrite	Arsenopyrite	Iron Oxides	Non-opaque Gangue	Stannite: Cassiterite Ratio*
-75 +38		1	97	1	-	1	9.7
-38 +30	C1	1	95	2	1	1	3.3
-30 +22.3	C2	2	92	1	1	4	2.2
-22.3 +15.7	C3	2	83	1	2	12	2.9
-15.7 +10.3	C4	1	71	1	5	22	1.5
-10.3 + 8.0	C5	2	62	1	5	30	1.3
- 8.0	-C5§	(1)	(63)	(1)	(5)	(30)	(1.3)
Total Product		(1)	(77)	(1)	(3)	(18)	(2.3)

		Mineralogy of Tin Ro. Concentrate (Weight %)				
		Cassiterite	Pyrite	Iron Oxides	Non-opaque Gangue	Iron
-75 +38		56	1	26	17	-
-38 +32.5	C1	52	2	22	20	4
-32.5 +24.2	C2	14	1	28	45	12
-24.2 +17.0	C3	9	1	21	50	19
-17.0 +11.2	C4	3†	1	23	58	15
-11.2 8.7	C5	1†	1	6	90	2
- 8.7	-C5§	(0.4)†	(0.6)	(6)	(91)	(2)
		(4)	(1)	(9)	(82)	(4)

*Tin mineral content calculated from tin assay assuming all tin is in stannite and cassiterite. The ratio of these two minerals was determined by gross counting.

†Cassiterite content of these size fractions calculated from tin assay assuming all tin is in cassiterite.

§Mineralogy of -C5 size fraction is assumed to be similar to the C5 size fraction except for the stannite or cassiterite content which was calculated from the tin assay.

TABLE D3: TIN MINERAL LOCKING IN SULPHIDE ROUGHER CONCENTRATE

Size Fraction (μm)	Cyclosizer Product	Stannite				Cassiterite	
		% Liberated	% Locked in Binary Grains With			% Liberated	% Locked
			Non-opaque Gangue	Iron Oxides	Pyrite		
-75 +38		80	19	-	1	62	38
-38 +30	C1	65	35	-	-	69	31
-30 +22.3	C2	67	33	-	-	74	26
-22.3 +15.7	C3	87	11	2	-	83	17
-15.7 +10.3	C4	97	3	-	-	93	7
-10.3 + 8.0	C5	95	5	-	-	100	-

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TABLE D4: CASSITERITE LOCKING IN TIN ROUGHER CONCENTRATE

Size Fraction (μm)	Cyclosizer Product	% Liberated	% Locked in Binary Grains Wit-	
			Non-opaque Gangue	Iron Oxides
-75 +38		67	31	2
-38 +32.5	C1	80	16	4
-32.5 +24.2	C2	73	26	1
-24.2 +17.0	C3	84	12	4
-17.0 +11.2	C4	94	4	2
-11.2 + 8.7	C5	98	2	-

TABLE D5: MINERALOGICAL DISTRIBUTION OF TIN IN THE TEST PRODUCTS

Test Product	Size Fractions (µm)		Cyclosizer	Tin Distribution (%) in Product					
				Tin in Cassiterite			Tin in Stannite		
				Liberated	Locked	Total	Liberated	Locked	Total
Sulphide Ro Concentrate	-75	+38		2.4	1.4	3.8	10.2	2.6	12.8
	-38	+30	C1	3.7	1.7	5.4	4.2	2.2	6.4
	-30	+22.3	C2	3.3	1.1	4.4	2.3	1.2	3.5
	-22.3	+15.7	C3	4.2	0.9	5.1	4.4	0.6	5.0
	-15.7	+10.3	C4	5.1	0.4	5.5	2.8	0.1	2.9
	-10.3	+ 8.0	C5	4.7	(-)	4.7	2.1	0.1	2.2
	- 8.0		-C5	(20.0)	(-)	(20.0)	(12.3)	(-)	(12.3)
	Total Product			(49.4)	(5.5)	(54.9)	(38.3)	(6.8)	(45.1)
Tin Ro Concentrate	-75	+38		17.8	8.8	26.6	-	-	-
	-38	+32.5	C1	33.8	8.4	42.2	-	-	-
	-32.5	+24.2	C2	5.8	2.1	7.9	-	-	-
	-24.2	+17.0	C3	6.9	1.3	8.2	-	-	-
	-17.0	+11.2	C4	5.9	0.4	6.3	-	-	-
	-11.2	+ 8.7	C5	2.4	0.1	2.5	-	-	-
	- 8.7		-C5	(6.3)	(-)	(6.3)	(-)	(-)	(-)
	Total Product			(78.9)	(21.1)	(100.0)	(-)	(-)	(-)
Tin Ro Tail	Total Product*			(-)	(98.0)	(98.0)	(-)	(2)	(2)
	Calculated Head			(65.0)	(32.9)	(97.9)	(1.5)	(0.6)	(2.1)

Test Product	Size Fractions (µm)		Cyclosizer	Tin Distribution (%) Between Products					
				Tin in Cassiterite			Tin in Stannite		
				Liberated	Locked	Total	Liberated	Locked	Total
Sulphide Ro Concentrate	-75	+38		0.09	0.06	0.15	0.40	0.10	0.50
	-38	+30	C1	0.14	0.07	0.21	0.16	0.09	0.25
	-30	+22.3	C2	0.13	0.04	0.17	0.09	0.05	0.14
	-22.3	+15.7	C3	0.17	0.03	0.20	0.17	0.03	0.20
	-15.7	+10.3	C4	0.20	0.02	0.22	0.11	(-)	0.11
	-10.3	+ 8.0	C5	0.18	(-)	0.18	0.08	0.01	0.09
	- 8.0		-C5	(1.03)	(-)	(1.03)	(0.48)	(-)	(0.48)
	Total Product			(1.94)	(0.22)	(2.16)	(1.49)	(0.28)	(1.77)
Tin Ro Concentrate	-75	+38		14.5	7.2	21.7	-	-	-
	-38	+32.5	C1	27.0	6.7	33.7	-	-	-
	-32.5	+24.2	C2	4.5	1.7	6.2	-	-	-
	-24.2	+17.0	C3	5.5	1.0	6.5	-	-	-
	-17.0	+11.2	C4	4.7	0.3	5.0	-	-	-
	-11.2	+ 8.7	C5	1.9	0.1	2.0	-	-	-
	- 8.7		-C5	(5.0)	(-)	(5.0)	(-)	(-)	(-)
	Total Product			(63.1)	(17.0)	(80.1)	(-)	(-)	(-)
Tin Ro Tail	Total Product*			(-)	(15.7)	(15.7)	(-)	(0.3)	(0.3)
	Calculated Head			(65.0)	(32.9)	(98.0)	(1.5)	(0.6)	(2.1)

*The rougher tail was not examined mineralogically. For this calculation it is assumed that this product contains the same proportion of cassiterite and stannite as the two concentrates and that all of the tin minerals are locked.

APPENDIX E

FLOTATION TEST PROCEDURES AND RESULTS OF COMPOSITES PC1, PC2, SC1 AND SC2

Test PC1/F1 - Stage grind to 100% -75 µm at 60% solids (8½ min., 500 g charge); deslime at 7 µm; sulphide pre-float; stage tin rougher float with PTAA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Additions kg/t			
	Time (min.)		pH	SSBX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.5	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.5	0.01	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.25	0.162	0.02
Tin Ro Float 2	5	5	5.0	-	0.25	0.034	0.01
Tin Ro Float 3	5	5	5.0	-	0.20	0.028	0.01
Tin Ro Float 4	5	5	5.0	-	0.20	0.026	0.01
Tin Ro Float 5	5	5	5.0	-	0.20	0.020	0.01
Tin Ro Float 6	5	5	5.0	-	0.20	0.020	0.01

(b) Results

	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		9.32	0.27	9.84
Tin Ro Conc 1	4.73	6.63	1.17	30.33
Tin Ro Conc 2	1.90			
Tin Ro Conc 3	1.19	2.62	4.42	45.27
Tin Ro Conc 4	1.43			
Tin Ro Conc 5	1.18	2.21	1.09	9.42
Tin Ro Conc 6	1.03			
(Tin Ro Conc 1 to 6)		(11.46)	(1.90)	(85.02)
Tin Ro Tail		73.41	0.01	2.87
Slime -7 µm		5.80	0.10	2.27
Calc Head		100.00	0.26	100.00
Assay Head			0.26	

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(c) Comments

(i) Results obtained in this test on Composite PC1 were similar to that obtained in Test PC2/F12 for PC2. However, the overall tin rougher concentrate grade was considerably lower in this case as a result of either lower head grade and/or some difference in mineral composition of the two porphyry composite samples.

(ii) Tin losses in -7 μm slime material of a grind size 100% -75 μm were small and were similar to that resulted from desliming similar ground material for PC2.

028176

Test PC1/F2 - Stage grind to 100% -75 µm at 60% solids (8½ min., 500 g charge); deslime at 7 µm; sulphide pre-float; stage tin rougher floats with SPA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	SPA	H_2SO_4/NaOH	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.6	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.6	0.01	-	-	0.02
Tin Ro Float 1	5	5	4.5	-	0.25	0.118/ -	0.02
Tin Ro Float 2	5	5	4.5	-	0.25	- /0.012	0.01
Tin Ro Float 3	5	5	4.5	-	0.20	- /0.012	0.01
Tin Ro Float 4	5	5	4.5	-	0.20	- /0.016	0.01
Tin Ro Float 5	5	5	4.5	-	0.20	- /0.020	0.01
Tin Ro Float 6	5	5	4.5	-	0.20	- /0.016	0.01

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		8.29	0.29	9.20
Tin Ro Conc 1	4.28	6.26	2.56	61.35
Tin Ro Conc 2	1.98			
Tin Ro Conc 3	0.54	1.10	2.60	10.95
Tin Ro Conc 4	0.56			
Tin Ro Conc 5	1.08	2.10	1.55	12.46
Tin Ro Conc 6	1.02			
(Tin Ro Conc 1 to 6)		(9.46)	(2.34)	(84.76)
Tin Ro Tail		73.86	0.01	2.83
Slime -7 µm		8.39	0.10	3.21
Calc Head		100.00	0.26	100.00
Assay Head			0.24	

(c) Comments

(i) Results obtained in this test using SPA as collector were similar to that obtained in Test PC1/F1 using the PTAA counterpart. A slightly higher grade of overall tin rougher concentrate was obtained in this test.

028177

Test PC1/F3 - Stage grind to 100% -75 µm at 60% solids (8½ min., 500 g charge); deslime at 7 µm; sulphide pre-float; stage tin rougher floats with S-3903 as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	S-3903	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.6	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.6	0.01	-	-	0.02
Tin Ro Float 1	5	5	4.5	-	0.01	0.182	0.02
Tin Ro Float 2	5	5	4.5	-	0.01	0.028	0.01
Tin Ro Float 3	5	5	4.5	-	0.01	0.022	0.01
Tin Ro Float 4	5	5	4.5	-	0.01	0.022	0.01
Tin Ro Float 5	5	5	4.5	-	0.01	0.016	0.01
Tin Ro Float 6	5	5	4.5	-	0.01	0.012	0.01

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		8.02	0.28	9.21
Tin Ro Conc 1	2.89	4.87	1.01	20.17
Tin Ro Conc 2	1.98			
Tin Ro Conc 3	2.60	5.11	1.34	28.08
Tin Ro Conc 4	2.51			
Tin Ro Conc 5	2.79	6.77	0.80	22.21
Tin Ro Conc 6	3.98			
(Tin Ro Conc 1 to 6)		(16.75)	(1.03)	(70.46)
Tin Ro Tail		66.36	0.06	16.33
Slime -7 µm		8.87	0.11	4.00
Calc Head		100.00	0.24	100.00
Assay Head			0.24	

(c) Comments

(i) Results obtained in this test using S-3903 as collector were inferior to that obtained in Tests PC1/F1 and F2 using PTAA and SPA respectively as collector.

(ii) Similar pattern of performance was observed in both series of flotation tests conducted on Composites PC1 and PC2 using the three collectors PTAA, SPA and S-3903 for comparison.

(iii) It appears that tin collectors PTAA and SPA are comparable while S-3903 is definitely inferior under the present conditions of application in flotation testing.

028179

Test PC2/F1 - Stage grind to 100% -75 µm at 60% solids (7½ min., 500 g charge); sulphide pre-float; stage tin rougher floats using old stock (Stage I) PTAA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Rougher Float 1	2	5	5.9	0.01	-	-	0.04
Sulphide Rougher Float 2	2	5	5.9	0.01	-	-	0.02
Tin Rougher Float 1	5	5	5.0	-	0.10	0.092	0.01
Tin Rougher Float 2	5	5	5.0	-	0.10	0.034	0.01
Tin Rougher Float 3	5	5	5.0	-	0.10	0.034	0.01
Tin Rougher Float 4	5	5	5.0	-	0.10	0.034	0.01
Tin Rougher Float 5	5	5	5.0	-	0.10	0.034	0.01
Tin Rougher Float 6	5	5	5.0	-	0.20	0.046	0.01
Tin Rougher Float 7	5	5	5.0	-	0.20	0.044	0.01
Tin Rougher Float 8	5	5	5.0	-	0.30	0.064	0.01
Tin Rougher Float 9	5	5	5.0	-	0.30	0.064	0.01

Notes: PTAA old stock (Stage I) = Solution TF100/10% Active (ex I.C.I.) used only in Test PC2/F1, Ore Sample No. 1/Tests 5 + 6.

PTAA new stock (Stage II) = Solid/75% Active (ex I.C.I./Mitsubishi) used in all other tests.

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		11.31	0.30	10.81
Tin Rougher Conc 1	1.11			
Tin Rougher Conc 2	0.58			
Tin Rougher Conc 3	0.58	3.05	1.75	17.00
Tin Rougher Conc 4	0.46			
Tin Rougher Conc 5	0.32			
Tin Rougher Conc 6	0.54	1.09	7.60	26.40
Tin Rougher Conc 7	0.55			
Tin Rougher Conc 8	0.69	1.29	7.90	32.53
Tin Rougher Conc 9	0.60			
(Tin Ro Conc)		(5.43)	(4.39)	(75.93)
Tin Ro Tail		83.26	0.05	13.26
Calc Head		100.00	0.31	100.00
Assay Head			0.29	

(c) Comments

(i) Porphyry Composite 2 (PC2) exhibited similar flotation response to that shown by Head Sample No. 1 (Stage I).

(ii) Tin reported (lost) in sulphide rougher concentrate was higher in PC2 (>10%) than in Head Sample No. 1 (<5%). This may be due to different nature in mineralogical composition of the two ore samples.

(iii) Tin reported (recovered) in tin rougher concentrate was lower in PC2 (<80%) than in Head Sample No. 1 (>90%) although concentrate grades (3-5% Sn) were similar.

(iv) Tin extraction improved from flotation Stages I to IX and at the end which tin minerals were still floating selectively.

028181

Test PC2/F2 - Stage grind to 100% -75 µm at 60% solids (7½ min., 500 g charge); sulphide pre-float; stage tin rougher floats using new stock (Stage II) PTAA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Rougher Float 1	2	5	6.1	0.01	-	-	0.04
Sulphide Rougher Float 2	2	5	6.1	0.01	-	-	0.02
Tin Rougher Float 1	5	5	5.0	-	0.10	0.104	0.01
Tin Rougher Float 2	5	5	5.0	-	0.10	0.060	0.01
Tin Rougher Float 3	5	5	5.0	-	0.10	0.056	0.01
Tin Rougher Float 4	5	5	5.0	-	0.10	0.044	0.01
Tin Rougher Float 5	5	5	5.0	-	0.10	0.044	0.01
Tin Rougher Float 6	5	5	5.0	-	0.20	0.076	0.01
Tin Rougher Float 7	5	5	5.0	-	0.20	0.076	0.01
Tin Rougher Float 8	5	5	5.0	-	0.30	0.120	0.01
Tin Rougher Float 9	5	5	5.0	-	0.30	0.120	0.01

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		11.75	0.35	12.40
Tin Rougher Conc 1	0.89			
Tin Rougher Conc 2	0.69			
Tin Rougher Conc 3	0.49	3.04	1.90	17.41
Tin Rougher Conc 4	0.51			
Tin Rougher Conc 5	0.46			
Tin Rougher Conc 6	0.71	1.36	5.80	23.74
Tin Rougher Conc 7	0.65			
Tin Rougher Conc 8	0.95	2.49	4.55	34.19
Tin Rougher Conc 9	1.54			
(Tin Rougher Conc)		(6.89)	(3.63)	(75.34)
Tin Rougher Tail		81.36	0.05	12.26
Calc Head		100.00	0.30	100.00
Assay Head			0.29	

(c) Comments

(i) Overall results were similar to that obtained in Test PC2/F1 and it showed very little difference in using the old and new stock of PTAA collector in the two tests.

028183

Test PC2/F3 - Stage grind to 100% -150 µm at 60% solids (4 min., 500 g charge); sulphide pre-float; stage tin rougher floats.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	5.6	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	5.6	0.01	-	-	0.02
Tin Rougher Float 1	5	5	5.0	-	0.25	0.132	0.01
Tin Rougher Float 2	5	5	5.0	-	0.25	0.100	0.01
Tin Rougher Float 3	5	5	5.0	-	0.20	0.080	0.01
Tin Rougher Float 4	5	5	5.0	-	0.20	0.074	0.01
Tin Rougher Float 5	5	5	5.0	-	0.10	0.040	0.01
Tin Rougher Float 6	5	5	5.0	-	0.10	0.040	0.01
Tin Rougher Float 7	5	5	5.0	-	0.10	0.040	0.01
Tin Rougher Float 8	5	5	5.0	-	0.10	0.040	0.01
Tin Rougher Float 9	5	5	5.0	-	0.10	0.040	0.01

(b) Results

Test Product	Weight %		Assay Sn %	Distribution Sn %
Sulphide Ro Conc		8.69	0.325	9.03
Tin Rougher Conc 1	1.34			
Tin Rougher Conc 2	1.29			
Tin Rougher Conc 3	1.01	4.99	1.86	29.67
Tin Rougher Conc 4	0.83			
Tin Rougher Conc 5	0.52			
Tin Rougher Conc 6	0.34	0.82	8.35	21.78
Tin Rougher Conc 7	0.48			
Tin Rougher Conc 8	0.37	0.86	7.10	19.49
Tin Rougher Conc 9	0.49			
(Tin Rougher Conc)		(6.67)	(3.33)	(70.94)
Tin Rougher Tail		84.64	0.074	20.03
Calc Head		100.00	0.31	100.00
Assay Head			0.29	

(c) Comments

(i) Coarse grind of 100% -150 µm gave a tin extraction of 5% lower than that of the finer grind of 100% -75 µm.

(ii) It appeared liberation of tin mineral at a grind size of 150 µm was only slightly poorer than that of 75 µm.

(iii) Extra tin losses in tailing could be due to either coarse free or composite grains tin mineral.

028185

Test PC2/F4 - Stage grind to 100% -75 μm at 60% solids (7½ min., 500 g charge); sulphide pre-float; stage tin rougher floats.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.2	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.2	0.01	-	-	0.02
Tin Rougher Float 1	5	5	5.0	-	0.25	0.080	0.02
Tin Rougher Float 2	5	5	5.0	-	0.25	0.028	0.01
Tin Rougher Float 3	5	5	5.0	-	0.20	0.012	0.01
Tin Rougher Float 4	5	5	5.0	-	0.20	0.016	0.01
Tin Rougher Float 5	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 6	5	5	5.0	-	0.10	0.012	0.01
Tin Rougher Float 7	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 8	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 9	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 10	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 11	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 12	5	5	5.0	-	0.10	0.010	0.01

028186

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		11.76	0.31	12.06
Tin Rougher Conc 1	0.98			
Tin Rougher Conc 2	1.33			
Tin Rougher Conc 3	1.00	4.83	2.24	35.79
Tin Rougher Conc 4	1.11			
Tin Rougher Conc 5	0.41			
Tin Rougher Conc 6	0.51	0.96	6.68	21.22
Tin Rougher Conc 7	0.45			
Tin Rougher Conc 8	0.47	0.85	5.68	15.97
Tin Rougher Conc 9	0.38			
Tin Rougher Conc 10	0.26	0.64	2.38	5.04
Tin Rougher Conc 11	0.38			
Tin Rougher Conc 12		0.63	2.72	5.67
(Tin Ro Conc)		(7.91)	(3.20)	(83.69)
Tin Ro Tail		80.33	0.016	4.25
Calc Head		100.00	0.30	100.00
Assay Head			0.29	

(c) Comments

(i) Tin recovery in tin rougher concentrate increased from 75.34% in Test PC2/F2 to 83.69% in Test PC2/F4 with an additional 3 stages of tin rougher flotation.

(ii) Overall tin recovery (sulphide + tin rougher concentrates) was up to 95.75% in Test PC2/F4 and this was similar to that obtained in flotation testing of Ore Sample No. 1 (Stage 1) with the exception of tin reported in the sulphide product was considerably lower in Ore Sample No. 1

028187

Test PC2/F5 - Stage grind to 100% -150 μm at 60% solids (4 min., 500 g charge); sulphide pre-float; stage tin rougher floats.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	5.6	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	5.6	0.01	-	-	0.02
Sulphide Ro Float 3	5	5	5.6	0.01	0.25	-	0.02
Tin Rougher Float 1	5	5	5.0	-	0.25	0.048	0.02
Tin Rougher Float 2	5	5	5.0	-	0.20	0.026	0.01
Tin Rougher Float 3	5	5	5.0	-	0.20	0.016	0.01
Tin Rougher Float 4	5	5	5.0	-	0.10	0.018	0.01
Tin Rougher Float 5	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 6	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 7	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 8	5	5	5.0	-	0.10	0.008	0.01
Tin Rougher Float 9	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 10	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 11	5	5	5.0	-	0.10	0.010	0.01
Tin Rougher Float 12	5	5	5.0	-	0.10	0.010	0.01

028188

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		11.60	0.345	10.83
Tin Rougher Conc 1	0.95			
Tin Rougher Conc 2	0.81			
Tin Rougher Conc 3	0.54	3.21	3.54	30.76
Tin Rougher Conc 4	0.49			
Tin Rougher Conc 5	0.42			
Tin Rougher Conc 6	0.28	0.60	8.24	13.39
Tin Rougher Conc 7	0.32			
Tin Rougher Conc 8	0.30	0.52	11.7	16.47
Tin Rougher Conc 9	0.22			
Tin Rougher Conc 10	0.23	0.62	7.06	11.85
Tin Rougher Conc 11	0.39			
Tin Rougher Conc 12		0.40	2.34	2.53
(Tin Ro Conc)		(5.35)	(5.18)	(75.00)
Tin Ro Tail		83.05	0.063	14.17
Calc Head		100.00	0.37	100.00
Assay Head			0.29	

(c) Comments

(i) Tin recovery in tin rougher concentrate increased from 70.94% in Test PC2/F3 to 75% in Test PC2/F5 with an additional 3 stages of tin rougher flotation. Accordingly, overall tin recovery (sulphide + tin rougher concentrates) was improved from 79.97% to 85.83% respectively.

(ii) Results obtained in Test PC2/F5 indicated that similar flotation performance was achieved in the coarse grind feed with longer flotation time to that in the finer grind feed with shorter flotation time.

(iii) Tin rougher concentrate grade of 5.18% Sn was higher than the normal grade of about 3% Sn obtained in the previous tests. The calculated tin head assay of this test was also higher and the assay of each individual test product was re-run for cross-checking and no variation detected.

Test PC2/F6 - Stage grind to 100% -75 µm at 60% solids (7½ min., 500 g charge); sulphide pre-float; stage tin rougher floats.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	5.7	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	5.7	0.01	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.25	0.100	0.02
Tin Ro Float 2	5	5	5.0	-	0.25	0.070	0.01
Tin Ro Float 3	5	5	5.0	-	0.20	0.056	0.01
Tin Ro Float 4	5	5	5.0	-	0.20	0.054	0.01
Tin Ro Float 5	5	5	5.0	-	0.20	0.052	0.01
Tin Ro Float 6	5	5	5.0	-	0.20	0.052	0.01
Tin Ro Float 7	5	5	5.0	-	0.20	0.052	0.01
Tin Ro Float 8	5	5	5.0	-	0.20	0.048	0.01
Tin Ro Float 9	5	5	5.0	-	0.20	0.052	0.01
Tin Ro Float 10	5	5	5.0	-	0.20	0.052	0.01
Tin Ro Float 11	5	5	5.0	-	0.20	0.048	0.01
Tin Ro Float 12	5	5	5.0	-	0.20	0.050	0.01

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		12.21	0.335	12.54
Tin Rougher Conc 1	1.22			
Tin Rougher Conc 2	0.95			
Tin Rougher Conc 3	0.36	3.60	5.98	66.01
Tin Rougher Conc 4	0.40			
Tin Rougher Conc 5	0.67			
Tin Rougher Conc 6	0.70	1.40	3.88	16.66
Tin Rougher Conc 7	0.70			
Tin Rougher Conc 8	0.48	1.17	0.41	1.47
Tin Rougher Conc 9	0.69			
Tin Rougher Conc 10	0.96	1.86	0.115	0.66
Tin Rougher Conc 11	0.90			
Tin Rougher Conc 12		1.18	0.070	0.25
(Tin Ro Conc)		(9.21)	(3.01)	(85.05)
Tin Ro Tail		78.58	0.01	2.41
Calc Head		100.00	0.33	100.00
Assay Head			0.29	

(c) Comments

(i) Sulphide rougher concentrates obtained in Tests PC2/F4 and F6 were very similar using PAX and SSBX respectively as collector.

(ii) Tin recovery in tin rougher flotation increased from 35.79% to 66.01% in the first five stages with additional 0.1 kg/t PTAA collector. The tin recovery was similar in both tests (83.69% in Test PC2/F4 and 85.05% in Test PC2/F5) after 12 stages of flotation and Test PC2/F6 was given an additional 0.8 kg/t of collector distributed over Stages 5 to 12. However, results obtained in Test PC2/F6 indicated that with an additional 0.5 kg/t of collector tin flotation time was reduced from 60 to 45% minimum without deleterious effect on tin recovery and grade.

(iii) Overall tin recovery (sulphide + tin rougher concentrates) was up to 97.59% in Test PC2/F6 as compared to 95.75% in Test PC2/F4. This was one of the best recovery figures obtained to date for all composite ore samples subjected to flotation treatment.

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Test PC2/F7 - Stage grind to 100% -150 μm at 60% solids (4 min., 500 g charge) sulphide pre-float; stage tin rougher floats.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	5.7	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	5.7	0.01	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.25	0.084	0.02
Tin Ro Float 2	5	5	5.0	-	0.25	0.066	0.01
Tin Ro Float 3	5	5	5.0	-	0.20	0.054	0.01
Tin Ro Float 4	5	5	5.0	-	0.20	0.052	0.01
Tin Ro Float 5	5	5	5.0	-	0.20	0.052	0.02
Tin Ro Float 6	5	5	5.0	-	0.20	0.052	0.01
Tin Ro Float 7	5	5	5.0	-	0.20	0.048	0.01
Tin Ro Float 8	5	5	5.0	-	0.20	0.050	0.01
Tin Ro Float 9	5	5	5.0	-	0.20	0.050	0.01
Tin Ro Float 10	5	5	5.0	-	0.20	0.052	0.01
Tin Ro Float 11	5	5	5.0	-	0.20	0.052	0.01
Tin Ro Float 12	5	5	5.0	-	0.20	0.050	0.01

028192

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		11.18	0.385	11.01
Tin Rougher Conc 1	1.22			
Tin Rougher Conc 2	0.71			
Tin Rougher Conc 3	0.42	2.92	3.94	29.42
Tin Rougher Conc 4	0.31			
Tin Rougher Conc 5	0.26			
Tin Rougher Conc 6	0.43	0.78	13.8	27.52
Tin Rougher Conc 7	0.35			
Tin Rougher Conc 8	0.37	0.83	7.56	16.05
Tin Rougher Conc 9	0.46			
Tin Rougher Conc 10	0.48	1.20	3.38	10.37
Tin Rougher Conc 11	0.72			
Tin Rougher Conc 12		0.88	0.82	1.85
(Tin Ro Conc)		(6.61)	(5.04)	(85.21)
Tin Ro Tail		82.21	0.018	3.78
Calc Head		100.00	0.39	100.00
Assay Head			0.29	

(c) Comments

(i) Results obtained in the coarser grind Test PC2/F7 were similar to that obtained in the finer grind Test PC2/F6 using identical flotation conditions. However, it appeared that tin recovery from a coarse grind flotation feed would benefit by a combination of longer flotation time and increase in collector addition. In the case of the finer grind flotation feed, similar performance was shown in using the condition of increase in either flotation time or collector addition but not necessarily both together.

(ii) Test PC2/F7 also gave a tin rougher concentrate grade higher than normal as happened in Test PC2/F5 and similarly an abnormally high calculated tin head assay was obtained as well. Test products were also re-assayed in this test for cross-checking and there was no variation detected.

028193

Test PC2/F8 - Stage grind to 100% -75 µm at 60% solids (7½ min., 500 g charge); sulphide rougher and cleaner floats; stage tin rougher floats on sulphide rougher and cleaner tails followed by superpanning on +38 and -38 µm tin rougher concentrates.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	5.8	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	5.8	0.01	-	-	0.02
Sulphide Cl Float	2	5	6.4	0.005	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.30	0.140	0.02
Tin Ro Float 2	5	5	5.0	-	0.30	0.044	0.01
Tin Ro Float 3	5	5	5.0	-	0.25	0.028	0.01
Tin Ro Float 4	5	5	5.0	-	0.25	0.024	0.01
Tin Ro Float 5	5	5	5.0	-	0.25	0.024	0.01
Tin Ro Float 6	5	5	5.0	-	0.25	0.024	0.01

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Sulphide Cl Conc	10.97	0.33	13.12
+38 µm Superpanner Tin Conc	0.12	70.5	30.21
+38 µm Superpanner Tin Tail	0.13	19.5	8.78
(+38 µm Tin Ro Conc 1 to 6)	(0.25)	(43.1)	(38.99)
-38 µm Superpanner Tin Conc	0.24	29.2	25.87
-38 µm Superpanner Tin Tail	6.95	0.64	16.11
(-38 µm Tin Ro Conc 1 to 6)	(7.19)	(1.61)	(41.98)
(Tin Ro Conc 1 to 6)	(7.44)	(3.01)	(80.97)
Tin Rougher Tail	81.59	0.02	5.91
Calc Head	100.00	0.28	100.00
Assay Head		0.29	
+38 µm and -38 µm Superpanner Tin Conc	(0.36)	(43.0)	(56.08)
+38 µm Tin Ro Conc and -38 µm Superpanner Tin Conc	(0.49)	(36.5)	(64.86)

(c) Comments

(i) Sulphide flotation cleaning did not improve rejection of cassiterite and consequently tin losses in sulphide concentrate product.

(ii) For a grind size of 100% -75 µm, tin recovery in tin rougher concentrate appeared satisfactory with 30 min. of flotation time (6 stages) and 1.60 kg/t of collector PTAA.

(iii) A very high grade tin product of 43.1% Sn was obtained in the +38 µm fraction of the tin flotation rougher concentrate (total concentrate assayed 3.01% Sn) and this material represented nearly half of the total tin recovered in the same overall concentrate. The same material also responded well to superpanning treatment giving rise a superpanner tin concentrate graded 70.5% Sn at 77.5% recovery within the size fraction.

(iv) On the other hand, the remaining half of the tin recovered in the -38 µm fraction of the tin flotation rougher concentrate was up-graded by superpanning from 1.61 to 29.2% Sn at 61.6% recovery within the size fraction.

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Test PC2/F9 - Stage grind to 100% -75 μm at 60% solids (7½ min., 500 g charge); sulphide pre-float; tin rougher float using CA540 as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	CA540	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	5.75	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	5.75	0.01	-	-	0.02
Tin Ro Float 1	5	5	6.10	-	0.10	-	0.02
Tin Ro Float 2	5	5	6.10	-	0.05	-	-

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Sulphide Ro Conc	11.29	0.32	11.99
Tin Ro Conc 1	57.33	0.48	81.78
Tin Ro Conc 2	25.20	0.06	5.02
(Tin Ro Conc)	(76.53)	(0.34)	(86.80)
Tin Ro Tail	12.18	0.03	1.21
Calc Head	100.00	0.30	100.00
Assay Head		0.29	

(c) Comments

(i) Collector CA540 appeared very non-selective as compared to PTAA in tin flotation of Composite PC2.

(ii) A high recovery of tin was obtained in this test but there was virtually no concentration achieved at all.

(iii) Flotation conditions used were one of the two alternatives recommended by the manufacturer, i.e. at natural pH without the use of depressant in rougher flotation.

028196

Test PC2/F10 - Stage grind to 100% -150 µm at 60% solids (4 min., 500 g charge); sulphide rougher and cleaner floats; stage tin rougher floats on sulphide rougher and cleaner tails followed by superpanning on +38 µm and cyclosizing on -38 µm fractions of the tin flotation rougher concentrate.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	PAX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	5.6	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	5.6	0.01	-	-	0.02
Sulphide Cl Float	2	5	6.2	0.005	-	-	0.04
Tin Ro Float 1	5	5	5.0	-	0.30	0.086	0.02
Tin Ro Float 2	5	5	5.0	-	0.30	0.034	0.01
Tin Ro Float 3	5	5	5.0	-	0.25	0.030	0.01
Tin Ro Float 4	5	5	5.0	-	0.25	0.030	0.01
Tin Ro Float 5	5	5	5.0	-	0.25	0.024	0.01
Tin Ro Float 6	5	5	5.0	-	0.25	0.024	0.01
Tin Ro Float 7	5	5	5.0	-	0.25	0.026	0.01
Tin Ro Float 8	5	5	5.0	-	0.25	0.024	0.01
Tin Ro Float 9	5	5	5.0	-	0.25	0.024	0.01
Tin Ro Float 10	5	5	5.0	-	0.25	0.024	0.01

028197

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Sulphide Cl Conc	9.008	0.35	11.23
+38 µm Superpanner Tin Conc	0.212	41.2	31.09
+38 µm Superpanner Tin Tail	0.802	6.30	18.00
(+38 µm Tin Ro Conc 1 to 10)	(1.014)	(13.6)	(49.09)
-38 +36.1 µm (C1) Tin Ro Conc	0.104	37.7	14.01
+26.8 µm (C2) Tin Ro Conc	0.103	12.0	4.41
+18.8 µm (C3) Tin Ro Conc	0.340	4.32	5.21
+12.4 µm (C4) Tin Ro Conc	1.086	1.03	3.98
+9.6 µm (C5) Tin Ro Conc	1.026	0.44	1.61
-9.6 µm (-C5) Tin Ro Conc	6.686	0.21	5.00
(-38 µm Tin Ro Conc 1 to 10)	(9.345)	(1.03)	(34.22)
(Tin Ro Conc 1 to 10)	(10.359)	(2.26)	(83.31)
Tin Ro Tail	80.633	0.019	5.46
Calc Head	100.00	0.28	100.00
Assay Head		0.29	

(c) Comments

(i) Sulphide flotation cleaning did not improve rejection of cassiterite and consequently tin losses in sulphide concentrate product.

(ii) For a grind size of 100% -150 µm, tin recovery in tin rougher concentrate appeared satisfactory with 50 min. of flotation time (10 stages) and 2.6 kg/t of collector PTAA (as compared to 30 min. and 1.6 kg/t of a finer grind 100% -75 µm in Test PC2/F8).

(iii) A tin product of 13.6% Sn and containing 58.9% of the tin recovered in the tin rougher concentrate was obtained in the +38 µm fraction. A superpanner concentrate of 41.2% Sn at 63.3% recovery within the size fraction was produced.

(iv) On the other hand, a tin product of 1.03% Sn containing 41.1% of the tin recovered in the tin rougher concentrate was obtained in the -38 µm fraction. A cyclosizing cone 1 product of 37.7% Sn at 40.9% recovery within the cyclosize fractions was produced and the result revealed that the tin enrichment took place in the coarsest fractions just below 38 µm.

028198

Test PC2/F11 - Stage grind to 100% -75 µm at 60% solids (7½ min., 500 g charge); sulphide pre-float; stage tin rougher floats with SPA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	SPA	H_2SO_4/NaOH	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	5.3	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	5.3	0.01	-	-	0.02
Tin Ro Float 1	5	5	4.5	-	0.25	0.042/ -	0.02
Tin Ro Float 2	5	5	4.5	-	0.25	- /0.032	0.01
Tin Ro Float 3	5	5	4.5	-	0.20	- /0.008	0.01
Tin Ro Float 4	5	5	4.5	-	0.20	- /0.008	0.01
Tin Ro Float 5	5	5	4.5	-	0.20	- /0.020	0.01
Tin Ro Float 6	5	5	4.5	-	0.20	- /0.020	0.01
Tin Ro Float 7	5	5	4.5	-	0.20	- /0.020	0.01
Tin Ro Float 8	5	5	4.5	-	0.20	- /0.020	0.01
Tin Ro Float 9	5	5	4.5	-	0.20	- /0.020	0.01

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		12.81	0.34	13.51
Tin Ro Conc 1	1.44			
Tin Ro Conc 2	0.60			
Tin Ro Conc 3	1.08	5.26	3.08	50.26
Tin Ro Conc 4	1.44			
Tin Ro Conc 5	0.70			
Tin Ro Conc 6	0.64	1.23	2.96	11.29
Tin Ro Conc 7	0.59			
Tin Ro Conc 8	0.67	1.30	2.52	10.16
Tin Ro Conc 9	0.63			
(Tin Ro Conc)		(7.79)	(2.97)	(71.71)
Tin Ro Tail		79.40	0.06	14.78
Calc Head		100.00	0.32	100.00
Assay Head			0.29	

(c) Comments

(i) Collector SPA exhibited similar flotation behaviour as to the PTAA counterpart under similar conditions applied to tin flotation of Composite PC2.

(ii) Good selectivity was achieved in this test but overall tin recovery was lower than that of a similar test using PTAA as the collector.

Test PC2/F12 - Stage grind to 100% -75 µm at 60% solids (7½ min., 500 g charge); deslime at 7 µm; sulphide pre-float; stage tin rougher floats with PTAA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.8	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.8	0.01	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.30	0.146	0.02
Tin Ro Float 2	5	5	5.0	-	0.30	0.042	0.01
Tin Ro Float 3	5	5	5.0	-	0.25	0.028	0.01
Tin Ro Float 4	5	5	5.0	-	0.25	0.024	0.01
Tin Ro Float 5	5	5	5.0	-	0.25	0.022	0.01
Tin Ro Float 6	5	5	5.0	-	0.25	0.020	0.01

(b) Results

Test Product	Weight %		Assay %		Distribution %	
			Sn	Total S	Sn	Total S
Sulphide Ro Conc		10.42	0.30	41.2	9.07	55.68
Tin Ro Conc 1	0.89	1.50	3.06	6.10	13.32	1.19
Tin Ro Conc 2	0.61					
Tin Ro Conc 3	0.42	0.80	12.1	5.25	28.10	0.54
Tin Ro Conc 4	0.38					
Tin Ro Conc 5	0.66	1.22	11.3	6.20	40.01	0.98
Tin Ro Conc 6	0.56					
(Tin Ro Conc 1 to 6)		(3.52)	(7.97)	(5.94)	(81.43)	(2.71)
Tin Ro Tail		80.30	0.03	3.40	6.99	35.41
Slime -7 µm		5.76	0.15	8.30	2.51	6.20
Calc Head		100.00	0.34	7.71	100.00	100.00
Assay Head			0.29	7.85		

(c) Comments

(i) Tin losses in -7 µm slime material of a grind size 100% -75 µm were small.

(ii) Two stages of sulphide rougher float using SSBX as collector at natural pH removed about 56% of the sulphide materials in Composite PC2; remaining sulphide did not appear to interfere with tin flotation and nearly all were reported in the tin rougher tail product.

(iii) As a result of desliming the flotation feed, the grade of the overall tin rougher concentrate was improved from about 3 to 8% while maintaining a recovery in excess of 80% after 6 stages of rougher flotation.

Test PC2/F13 - Stage grind to 100% -75 µm at 60% solids (7½ min., 500 g charge); deslime at 7 µm; sulphide pre-float; stage tin rougher floats with SPA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	SPA	H_2SO_4/NaOH	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.7	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.7	0.01	-	-	0.02
Tin Ro Float 1	5	5	4.5	-	0.25	0.106/ -	0.02
Tin Ro Float 2	5	5	4.5	-	0.25	- /0.016	0.01
Tin Ro Float 3	5	5	4.5	-	0.20	- /0.016	0.01
Tin Ro Float 4	5	5	4.5	-	0.20	- /0.020	0.01
Tin Ro Float 5	5	5	4.5	-	0.20	- /0.024	0.01
Tin Ro Float 6	5	5	4.5	-	0.20	- /0.028	0.01

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		10.39	0.33	10.53
Tin Ro Conc 1	0.81	1.32	3.56	14.43
Tin Ro Conc 2	0.51			
Tin Ro Conc 3	0.30	0.63	10.0	19.34
Tin Ro Conc 4	0.33			
Tin Ro Conc 5	0.33	0.70	16.6	35.67
Tin Ro Conc 6	0.37			
(Tin Ro Conc 1 to 6)		(2.65)	(8.54)	(69.44)
Tin Ro Tail		80.71	0.07	17.34
Slime -7 µm		6.25	0.14	2.69
Calc Head		100.00	0.33	100.00
Assay Head			0.29	

(c) Comments

(i) As a result of desliming the flotation feed, the grade of the overall tin rougher concentrate was also improved from about 3 to 8.5% using SPA instead of PTAA as collector.

(ii) Tin recovery was also maintained at about 70% after 6 stages of rougher flotation as compared with 9 stages used in Test PC2/F11 under similar conditions except for the desliming stage introduced in this test.

(iii) So far it appears that desliming of flotation feed is beneficial for tin flotation to achieve a better grade and recovery of tin rougher concentrate using either PTAA or SPA as collector.

Test PC2/F14 - Stage grind to 100% -75 µm at 60% solids (7½ min., 500 g charge); deslime at 7 µm; sulphide pre-float; stage tin rougher floats with S-3903 as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	S-3903	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.4	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.4	0.01	-	-	0.02
Tin Ro Float 1	2	5	4.5	-	0.01	0.130	0.01
Tin Ro Float 2	2	5	4.5	-	0.01	0.022	0.01
Tin Ro Float 3	2	5	4.5	-	0.01	0.022	0.01
Tin Ro Float 4	2	5	4.5	-	0.01	0.008	0.01
Tin Ro Float 5	2	5	4.5	-	0.01	0.008	0.01
Tin Ro Float 6	2	5	4.5	-	0.01	0.006	0.01

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		10.00	0.34	11.15
Tin Ro Conc 1	1.20	2.89	1.29	12.23
Tin Ro Conc 2	1.69			
Tin Ro Conc 3	2.20	4.34	1.84	26.20
Tin Ro Conc 4	2.14			
Tin Ro Conc 5	2.41	5.67	1.29	24.00
Tin Ro Conc 6	3.26			
(Tin Ro Conc 1 to 6)		(12.90)	(1.48)	(62.43)
Tin Ro Tail		71.41	0.10	23.43
Slime -7 µm		5.69	0.16	2.99
Calc Head		100.00	0.30	100.00
Assay Head			0.29	

(c) Comments

(i) Results obtained in this test using S-3903 as collector were considerably inferior compared to that obtained in Tests PC2/F12 and F13 with PTAA and SPA respectively as collector.

(ii) It appears that collector S-3903 is to be applied sparingly and perhaps in conjunction with suitable depressants in order to achieve selectivity but with decrease in recovery in flotation.

028205

Test SC1/F1 - Stage grind to 100% -75 µm at 60% solids (6 min., 500 g charge); sulphide pre-float; stage tin rougher floats.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	7.0	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	7.0	0.01	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.25	0.284	0.02
Tin Ro Float 2	5	5	5.0	-	0.25	0.142	0.01
Tin Ro Float 3	5	5	5.0	-	0.20	0.142	0.01
Tin Ro Float 4	5	5	5.0	-	0.20	0.134	0.01
Tin Ro Float 5	5	5	5.0	-	0.20	0.122	0.01
Tin Ro Float 6	5	5	5.0	-	0.20	0.110	0.01
Tin Ro Float 7	5	5	5.0	-	0.20	0.106	0.01
Tin Ro Float 8	5	5	5.0	-	0.20	0.100	0.01
Tin Ro Float 9	5	5	5.0	-	0.20	0.094	0.01
Tin Ro Float 10	5	5	5.0	-	0.20	0.090	0.01
Tin Ro Float 11	5	5	5.0	-	0.20	0.088	0.01
Tin Ro Float 12	5	5	5.0	-	0.20	0.078	0.01

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Sulphide Ro Conc	48.95	0.58	20.85
Tin Ro Conc 1	3.53	13.1	33.96
Tin Ro Conc 2	3.08	8.7	19.68
Tin Ro Conc 3	2.10	5.92	9.13
Tin Ro Conc 4	1.63	2.70	3.23
Tin Ro Conc 5	2.03	1.48	2.21
Tin Ro Conc 6	2.42	1.28	2.27
Tin Ro Conc 7	1.61	0.75	0.89
Tin Ro Conc 8	2.10	0.57	0.88
Tin Ro Conc 9	2.36	0.495	0.86
Tin Ro Conc 10	1.81	0.43	0.57
Tin Ro Conc 11	1.68	0.395	0.49
Tin Ro Conc 12	1.57	0.48	0.55
(Tin Ro Conc)	(25.92)	(3.93)	(74.72)
Tin Ro Tail	25.13	0.24	4.43
Calc Head	100.00	1.36	100.00
Assay Head		1.40	
(Tin Ro Conc 1 to 6)	(14.79)	(6.49)	(70.48)

(c) Comments

(i) Composite SC1 responded well to similar flotation treatment established for PC2.

(ii) Overall tin recovery (in sulphide + rougher concentrates) was up to 95.57% while tin recovery in tin rougher concentrate was 74.72% at 3.93% Sn grade.

(iii) Tin losses in the sulphide product was much higher for SC1 than PC2 and this reflected the nature of more extensive of locking between sulphide minerals and cassiterite in SC1.

028207

Test SC1/F2 - Stage grind to 100% -75 μm at 60% solids (6 min., 500 g charge); sulphide rougher and cleaner floats; stage tin rougher floats on sulphide rougher tail.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	7.2	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	7.2	0.01	-	-	0.02
Sulphide Cl Float 1	2	3	7.2	-	-	-	0.02
Sulphide Cl Float 2	2	5	7.2	0.005	-	-	0.02
Sulphide Cl Float 3	2	5	7.2	0.005	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.30	0.332	0.02
Tin Ro Float 2	5	5	5.0	-	0.30	0.192	0.01
Tin Ro Float 3	5	5	5.0	-	0.25	0.150	0.01
Tin Ro Float 4	5	5	5.0	-	0.25	0.136	0.01
Tin Ro Float 5	5	5	5.0	-	0.25	0.116	0.01
Tin Ro Float 6	5	5	5.0	-	0.25	0.116	0.01

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Sulphide Cl Conc	45.64	0.40	13.46
Sulphide Cl Tail	3.33	2.44	5.99
(Sulphide Ro Conc)	(48.97)	(0.54)	(19.45)
Tin Ro Conc 1	4.88	12.80	46.00
Tin Ro Conc 2	2.81	7.30	15.10
Tin Ro Conc 3	2.53	3.62	6.74
Tin Ro Conc 4	2.84	1.43	2.99
Tin Ro Conc 5	1.59	0.8	0.94
Tin Ro Conc 6	2.62	0.81	1.56
(Tin Ro Conc 1 to 6)	(17.27)	(5.76)	(73.33)
Tin Ro Tail	33.76	0.29	7.22
Calc Head	100.00	1.36	100.00
Assay Head		1.40	
(Sulphide Cl Tail + Tin Ro Conc 1 to 6)	(20.60)	(5.23)	(79.32)
(Tin Ro Conc 1 + 2)	(7.69)	(10.8)	(61.10)

028208

(c) Comments

(i) Tin losses in sulphide concentrate product improved with flotation cleaning in which an additional close to 6% (assayed 2.44% Sn) of the total tin was recovered.

(ii) Tin recovery in tin rougher concentrate (73.33%) was satisfactory with 30 min. flotation time and 1.6 kg/t of collector PTAA as compared to Test SC1/F1 of 60 min. and 2.6 kg/t at 74.72% recovery.

028209

Test SC1/F3 - Stage grind to 100% -75 µm at 60% solids (6 min., 500 g charge); deslime at 7 µm; sulphide pre-float; stage tin rougher floats with PTAA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.8	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.8	0.01	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.30	0.212	0.02
Tin Ro Float 2	5	5	5.0	-	0.30	0.142	0.01
Tin Ro Float 3	5	5	5.0	-	0.25	0.084	0.01
Tin Ro Float 4	5	5	5.0	-	0.25	0.116	0.01
Tin Ro Float 5	5	5	5.0	-	0.25	0.086	0.01
Tin Ro Float 6	5	5	5.0	-	0.25	0.080	0.01

(b) Results

Test Product	Weight %		Assay %		Distribution %	
			Sn	Total S	Sn	Total S
Sulphide Ro Conc		47.47	0.55	37.4	18.52	80.22
Tin Ro Conc 1	4.45	6.89	11.0	4.25	53.75	1.32
Tin Ro Conc 2	2.44					
Tin Ro Conc 3	6.66	8.17	3.24	8.75	18.77	3.23
Tin Ro Conc 4	1.51					
Tin Ro Conc 5	1.48	3.09	0.53	15.0	1.16	2.10
Tin Ro Conc 6	1.61					
(Tin Ro Conc 1 to 6)		(18.15)	(5.72)		(73.68)	
Tin Ro Tail		30.47	0.28	8.60	6.05	11.84
Slime -7 µm		3.91	0.63	7.30	1.75	1.29
Calc Head		100.00	1.41	22.1	100.00	100.00
Assay Head			1.40	22.5		

(c) Comments

(i) Tin losses in -7 µm slime material of a grind size 100% -75 µm were very small.

028210

(ii) Two stages of sulphide rougher float using SSBX as collector at natural pH removed about 80% of sulphide materials in Composite SC1; remaining sulphides did not appear to interfere with tin flotation and nearly all were reported in the tin rougher tail product.

(iii) The overall tin rougher flotation performance did not improve with the deslimed feed material used in this test as compared to that of Test SC1/F2 using straight feed of the same grind size. This observation is in contrast to that revealed in the similar series of desliming tests conducted on Composite PC2.

Test SC1/F4 - Stage grind to 100% -75 μm at 60% solids (6 min., 500 g charge); deslime at 7 μm; sulphide pre-float; stage tin rougher floats using SPA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	SPA	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.8	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.8	0.01	-	-	0.02
Tin Ro Float 1	5	5	4.5	-	0.25	0.280	0.02
Tin Ro Float 2	5	5	4.5	-	0.25	0.134	0.01
Tin Ro Float 3	5	5	4.5	-	0.20	0.134	0.01
Tin Ro Float 4	5	5	4.5	-	0.20	0.100	0.01
Tin Ro Float 5	5	5	4.5	-	0.20	0.082	0.01
Tin Ro Float 6	5	5	4.5	-	0.20	0.064	0.01

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		48.06	0.52	17.83
Tin Ro Conc 1	3.94	7.58	12.1	65.44
Tin Ro Conc 2	3.64			
Tin Ro Conc 3	2.44	4.82	1.90	6.54
Tin Ro Conc 4	2.38			
Tin Ro Conc 5	1.88	3.60	0.81	2.08
Tin Ro Conc 6	1.72			
(Tin Ro Conc 1 to 6)		(16.00)	(6.49)	(74.06)
Tin Ro Tail		32.90	0.29	6.81
Slime -7 μm		3.04	0.60	1.30
Calc Head		100.00	1.40	100.00
Assay Head			1.40	

(c) Comments

(i) Results obtained in this test using SPA as collector were similar to that obtained in the previous Test SC1/F3 with collector PTAA. The overall tin rougher concentrate grade was again slightly higher as observed when the two collectors were used in comparison in the previous series of tests.

Test SC1/F5 - Stage grind to 100% -75 µm at 60% solids (6 min., 500 g charge); deslime at 7 µm; sulphide pre-float; stage tin rougher floats using S-3903 as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	S-3903	H_2SO_4	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.8	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.8	0.01	-	-	0.02
Tin Ro Float 1	5	5	4.5	-	0.01	0.326	0.02
Tin Ro Float 2	5	5	4.5	-	0.01	0.224	0.01
Tin Ro Float 3	5	5	4.5	-	0.01	0.186	0.01
Tin Ro Float 4	5	5	4.5	-	0.01	0.116	0.01
Tin Ro Float 5	5	5	4.5	-	0.01	0.096	0.01
Tin Ro Float 6	5	5	4.5	-	0.01	0.074	0.01

(b) Results

Test Product	Weight %		Assay % Sn	Distribution % Sn
Sulphide Ro Conc		47.19	0.57	18.95
Tin Ro Conc 1	2.03	5.92	6.98	29.11
Tin Ro Conc 2	3.89			
Tin Ro Conc 3	6.37	12.51	4.04	35.60
Tin Ro Conc 4	6.14			
Tin Ro Conc 5	9.58	15.02	1.10	11.64
Tin Ro Conc 6	5.44			
(Tin Ro Conc 1 to 6)		(33.45)	(3.24)	(76.35)
Tin Ro Tail		16.84	0.31	3.67
Slime -7 µm		2.52	0.58	1.03
Calc Head		100.00	1.42	100.00
Assay Head			1.40	

(c) Comments

(i) Results obtained in this test using S-3903 as collector were so far the best among all the other tests using the same collector.

028213

(ii) The overall tin recovery of the rougher concentrate in this test was as high as that using collectors PTAA and SPA in Tests SC1/F3 and F4. However, the rougher concentrate grade was about half of that obtained in the previous tests.

(iii) This test revealed that collector S-3903 was applicable to tin flotation treatment of Composite SC1 but not for the other three composite ore samples using similar flotation conditions.

028214

Test SC1/F6 - Stage grind to 100% -75 µm at 60% solids (6 min., 500 g charge); deslime at 7 µm; sulphide pre-float; stage tin rougher floats; superpan +38 and -38 µm fractions of tin rougher concentrate.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	PTAA	H_2SO_4/NaOH	MIBC
	Conditioning	Flotation					
Sulphide Ro Float 1	2	5	6.9	0.01	-	-	0.04
Sulphide Ro Float 2	2	5	6.9	0.01	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.30	0.250	0.02
Tin Ro Float 2	5	5	5.0	-	0.30	0.132	0.01
Tin Ro Float 3	5	5	5.0	-	0.20	0.106	0.01
Tin Ro Float 4	5	5	5.0	-	0.20	0.114	0.01
Tin Ro Float 5	5	5	5.0	-	0.20	0.100	0.01
Tin Ro Float 6	5	5	5.0	-	0.20	0.088	0.01

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Sulphide Ro Conc	47.31	0.55	20.05
+38 µm Superpanner Conc	0.29	60.9	13.61
+38 µm Superpanner Tail	3.43	2.36	6.24
(+38 µm Tin Ro Conc 1 to 6)	(3.72)	(6.92)	(19.85)
-38 µm Superpanner Conc	0.59	65.0	29.55
-38 µm Superpanner Tail	11.81	2.29	20.84
(-38 µm Tin Ro Conc 1 to 6)	(12.40)	(5.27)	(50.39)
(Tin Ro Conc 1 to 6)	(16.12)	(5.66)	(70.24)
Tin Ro Tail	33.53	0.32	8.26
Slime -7 µm	3.04	0.62	1.45
Calc Head	100.00	1.30	100.00
Assay Head		1.40	
(+38 and -38 µm Superpanner Conc)	(0.88)	(63.6)	(43.16)
(+38 and -38 µm Superpanner Tail)	(15.24)	(2.31)	(27.08)

(c) Comments

Results obtained in this test revealed some interesting information as follows:

(i) No significant difference in tin concentration of the +38 and -38 μm materials of the flotation rougher concentration (in contrast to PC2 in Test PC2/F8 in which the +38 μm fraction was very high grade in tin).

(ii) A much larger portion of tin recovered in the flotation rougher concentrate was reported in -38 μm fraction (again in contrast to PC2 in Test PC2/F8 in which an even distribution in the two fractions was obtained).

(iii) High grade superpanner tin concentrate was obtained in both the +38 and -38 μm fractions of the tin flotation rougher concentrate (again in contrast to PC2 in Test PC2/F8 in which high grade superpanner tin concentrate was obtained in the +38 μm fraction only).

(iv) Good up-grading performance was obtained by superpanning the tin flotation rougher concentrate from 5.66% Sn at 70.24% recovery to 63.6% Sn at 43.16% recovery in a single pass for each of the +38 and -38 μm materials.

Test SC2/F1 - Stage grind to 100% -150 µm at 60% solids (4 min., 500 g charge); talc pre-float; sulphide rougher floats; stage tin rougher floats with PTAA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Talc Pre-float	2	5	7.3	-	-	-	0.04
Sulphide Ro Float 1	2	5	7.3	0.01	-	-	0.02
Sulphide Ro Float 2	2	5	7.3	0.01	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.30	0.800	0.02
Tin Ro Float 2	5	5	5.0	-	0.30	0.454	0.01
Tin Ro Float 3	5	5	5.0	-	0.25	0.344	0.01
Tin Ro Float 4	5	5	5.0	-	0.25	0.260	0.01
Tin Ro Float 5	5	5	5.0	-	0.25	0.260	0.01
Tin Ro Float 6	5	5	5.0	-	0.25	0.260	0.01

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Talc Conc	16.81	0.88	12.31
Sulphide Ro Conc	28.03	0.29	6.76
Tin Ro Conc 1	2.39	7.92	15.79
Tin Ro Conc 2	4.35	15.4	55.80
Tin Ro Conc 3	2.72	1.42	3.21
Tin Ro Conc 4	6.35	0.31	1.64
Tin Ro Conc 5	2.93	0.17	0.42
Tin Ro Conc 6	4.02	0.17	0.57
(Tin Ro Conc)	(22.76)	(4.09)	(77.43)
Tin Ro Tail	32.40	0.13	3.50
Calc Head	100.00	1.20	100.00
Assay Head		1.20	
(Tin Ro Conc 1 +2)	(6.74)	(12.8)	(71.59)

028217

(c) Comments

(i) Composite SC2 responded well to similar flotation treatment established for PC2.

(ii) Overall tin recovery (in talc + sulphide + tin rougher concentrates) was up to 96.50% while tin recovery in tin rougher concentrate was 77.43% at 4.09% grade.

(iii) Tin loss in the talc pre-float product was high but lower in the sulphide concentrate. Talc problems encountered in flotation only occurred in SC2 and pre-float appeared effective for removal majority of talc present which would otherwise be detrimental to subsequent sulphide and tin flotation.

(iv) Further study will be necessary to establish talc pre-float conditions such that tin losses could be minimised.

028218

Test SC2/F2 - Stage grind to 100% -150 µm at 60% solids (4 min., 500 g charge); deslime at 7 µm; talc and sulphide pre-floats; stage tin rougher floats with PTAA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	PTAA	H_2SO_4	MIBC
	Conditioning	Flotation					
Talc Pre-float	2	5	7.3	-	-	-	0.04
Sulphide Ro Float 1	2	5	7.6	0.01	-	-	0.02
Sulphide Ro Float 2	2	5	7.6	0.01	-	-	0.02
Tin Ro Float 1	5	5	5.0	-	0.30	0.60	0.02
Tin Ro Float 2	5	5	5.0	-	0.30	0.40	0.01
Tin Ro Float 3	5	5	5.0	-	0.25	0.30	0.01

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Talc Ro Conc	16.52	0.89	11.30
Sulphide Ro Conc	28.60	0.27	5.94
Tin Ro Conc 1	1.82	9.08	12.69
Tin Ro Conc 2	2.63	24.1	48.73
Tin Ro Conc 3	2.04	8.04	12.61
(Tin Ro Conc 1 to 3)	(6.49)	(14.8)	(74.03)
Tin Ro Tail	46.60	0.23	8.24
Slime -7 µm	1.79	0.36	0.49
Calc Head	100.00	1.30	100.00
Assay Head		1.20	

(c) Comments

(i) Tin losses in -7 µm slime material of a grind size 100% -150 µm were very small.

(ii) As a result of desliming flotation feed, the overall tin flotation rougher concentrate grade was improved from about 4% (Test SC2/F1) to 15% in this test while maintaining similar recovery after 3 stages of rougher flotation.

(iii) In the 2nd tin rougher flotation stage of this test, a very high grade concentrate of 24.1% Sn was obtained at a high recovery of 48.73%. So far, this was the best flotation selectivity observed in testing PTAA as collector.

Test SC2/F3 - Stage grind to 100% -150 μm at 60% solids (4 min., 500 g charge); deslime at 7 μm; talc and sulphide pre-floats; stage tin rougher floats with SPA as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	SPA	H_2SO_4	MIBC
	Conditioning	Flotation					
Talc Pre-float	2	5	7.3	-	-	-	0.04
Sulphide Ro Float 1	2	5	7.6	0.01	-	-	0.02
Sulphide Ro Float 2	2	5	7.7	0.01	-	-	0.02
Tin Ro Float 1	5	5	4.5	-	0.25	0.70	0.02
Tin Ro Float 2	5	5	4.5	-	0.25	0.50	0.01
Tin Ro Float 3	5	5	4.5	-	0.20	0.30	0.01

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Talc Ro Conc	16.47	0.93	11.32
Sulphide Ro Conc	27.10	0.30	6.00
Tin Ro Conc 1	3.47	11.96	30.68
Tin Ro Conc 2	7.81	5.46	31.47
Tin Ro Conc 3	5.45	2.84	11.43
(Tin Ro Conc 1 to 3)	(16.73)	(5.95)	(73.58)
Tin Ro Tail	37.75	0.31	8.64
Slime -7 μm	1.95	0.32	0.46
Calc Head	100.00	1.35	100.00
Assay Head		1.20	

(c) Comments

(i) Similar flotation response was observed in this test using SPA in place of PTAA as tin collector as in the previous test. However, the overall tin rougher concentrate grade was considerably lower in this test reflecting that SPA was somewhat less selective than PTAA under the present flotation conditions used.

Test SC2/F4 - Stage grind to 100% -150 µm at 60% solids (4 min., 500 g charge); deslime at 7 µm; talc and sulphide pre-floats; stage tin rougher floats with S-3903 as collector.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t			
	Time (min.)		pH	SSBX	S-3903	H_2SO_4	MIBC
	Conditioning	Flotation					
Talc Pre-float	2	5	7.3	-	-	-	0.04
Sulphide Ro Float 1	2	5	7.6	0.01	-	-	0.02
Sulphide Ro Float 2	2	5	7.7	0.01	-	-	0.02
Tin Ro Float 1	5	5	4.5	-	0.01	0.70	0.02
Tin Ro Float 2	5	5	4.5	-	0.01	0.50	0.01
Tin Ro Float 3	5	5	4.5	-	0.01	0.30	0.01
Tin Ro Float 4	5	5	5.5	-	0.02	0.20	0.01

(b) Results

Test Product	Weight %	Assay % Sn	Distribution % Sn
Talc Ro Conc	15.40	0.86	11.65
Sulphide Ro Conc	25.71	0.28	6.33
Tin Ro Conc 1	6.30	0.16	0.89
Tin Ro Conc 2	1.40	0.43	0.53
Tin Ro Conc 3	1.57	0.55	0.76
Tin Ro Conc 4	3.53	0.86	2.67
(Tin Ro Conc 1 to 4)	(12.80)	(0.43)	(4.85)
Tin Ro Tail	44.21	1.97	76.62
Slime -7 µm	1.88	0.33	0.55
Calc Head	100.00	1.14	100.00
Assay Head		1.20	

(c) Comments

(i) Results obtained in this test indicated that tin collector S-3903 did not appear to be effective in flotation treatment of Composite SC2 (in contrast to SC1 as in Test SC1/F5 in which a reasonable extraction was obtained). It may be the fact that a different set of flotation conditions are required for collector S-3903 to be effectively used in tin flotation of Composite SC2.

APPENDIX F

BULK SULPHIDE FLOTATION OF COMPOSITES PC1, PC2, SC1 AND SC2

Test PC1/BF - Stage grind to 100% -401 µm at 60% solids (10 min., 16 kg charge); stage sulphide rougher floats in 40 litre cell followed by cleaner and recleaner floats at higher densities.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t	
	Time (min.)		pH	PAX	MIBC
	Conditioning	Flotation			
Rougher Float 1	2	5	5.9	0.01	0.03
Rougher Float 2	5	5	-	0.01	-
Rougher Float 3	5	5	-	0.01	0.01
Rougher Float 4	2	5	-	0.01	-
Rougher Float 5	2	5	-	0.01	0.01
Rougher Float 6	5	5	-	0.01	-
Cleaner Float 1	-	7	5.8	-	-
Cleaner Float 2	2	5	-	0.01	-
Recleaner Float	-	7	6.0	-	-

(b) Results

Test Product	Weight %		Assay %				Distribution %			
			Sn	Acid Soluble Sn	Total S	Fe	Sn	Acid Soluble Sn	Total S	Fe
Sulphide Scav Con.		2.61	0.35	0.27	45.3	41.2	3.84	25.37	18.64	21.22
Sulphide Scav Tail	0.28									
Sulphide Cl Tail	4.44	97.39	0.235	0.02	5.30	4.10	96.16	73.43	81.36	78.78
Sulphide Ro Tail	92.67									
Calc Head		100.00	0.24	0.027	6.34	5.07	100.00	100.00	100.00	100.00
Assay Head			0.24	0.02	6.30	5.00				

028222

Test PC2/BF - Stage grind to 100% -401 µm at 60% solids (6 min., 16 kg charge); stage sulphide rougher floats in 40 litre cell followed by cleaner and recleaner floats at higher densities.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t	
	Time (min.)		pH	PAX	MIBC
	Conditioning	Flotation			
Rougher Float 1	2	5	5.9	0.01	0.03
Rougher Float 2	2	5	-	0.01	-
Rougher Float 3	2	5	-	0.01	-
Rougher Float 4	2	5	-	0.01	0.01
Rougher Float 5	2	5	-	0.01	-
Cleaner Float 1	-	5	5.3	-	-
Cleaner Float 2	2	5	-	0.01	-
Recleaner Float	-	5	5.5	-	-

(b) Results

Test Product	Weight %		Assay %				Distribution %			
			Sn	Acid Soluble Sn	Total S	Fe	Sn	Acid Soluble Sn	Total S	Fe
Sulphide Recl Conc		4.03	0.24	0.16	50.0	43.4	3.47	25.15	27.09	37.02
Sulphide Recl Tail	0.33									
Sulphide Cl Tail	4.53	95.97	0.28	0.02	5.65	3.10	96.53	74.85	72.91	62.98
Sulphide Ro Tail	91.11									
Calc Head		100.00	0.28	0.026	7.44	4.72	100.00	100.00	100.00	100.00
Assay Head			0.29	0.02	7.65	4.65				

028223

Test SC1/BF - Stage grind to 100% -401 µm at 60% solids (5 min., 16 kg charge); stage sulphide rougher floats in 40 litre cell followed by cleaner float at higher densities.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t	
	Time (min.)		pH	PAX	MIBC
	Conditioning	Flotation			
Rougher Float 1	2	5	6.8	0.01	0.03
Rougher Float 2	2	5	-	0.01	-
Rougher Float 3	2	5	-	0.01	-
Rougher Float 4	2	5	-	0.01	0.01
Rougher Float 5	2	5	-	0.01	-
Cleaner Float 1	-	5	6.4	-	-
Cleaner Float 2	2	5	-	0.01	-
Cleaner Float 3	2	5	-	0.05	0.01
Cleaner Float 4	2	5	-	0.05	0.01
Cleaner Float 5	2	5	-	0.05	0.01

(b) Results

Test Product	Weight %		Assay %				Distribution %			
			Sn	Acid Soluble Sn	Total S	Fe	Sn	Acid Soluble Sn	Total S	Fe
Sulphide Cl Conc	14.36	20.44	0.50	0.13	37.0	49.1	7.79	45.30	34.68	36.76
Sulphide Cl Tail	6.08									
Sulphide Ro Tail	79.56		1.52	0.04	17.9	21.7	92.21	54.50	65.32	63.24
Calc Head	100.00		1.31	0.058	21.8	27.3	100.00	100.00	100.00	100.00
Assay Head			1.40	0.05	22.5	27.4				

(c) Comments

Difficulties were experienced in floating coarse sulphide minerals in this composite sample; this happened particularly during the cleaning stage at higher pulp densities; thus sulphide cleaner concentrate and tail were recombined for assay purpose to assess the roughing performance instead.

028224

Test SC2/BF - Stage grind to 100% -401 µm at 60% solids (6½ min., 16 kg charge); stage sulphide rougher floats in 40 litre cell.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t	
	Time (min.)		pH	PAX	MIBC
	Conditioning	Flotation			
Rougher Float 1	2	5	6.7	0.01	0.03
Rougher Float 2	2	5	-	0.01	-
Rougher Float 3	2	5	-	0.01	-
Rougher Float 4	2	5	-	0.01	0.01
Rougher Float 5	2	5	-	0.01	0.01
Rougher Float 6	2	5	-	0.01	0.01

(b) Results

Test Product	Weight %	Assay %				Distribution %			
		Sn	Acid Soluble Sn	Total S	Fe	Sn	Acid Soluble Sn	Total S	Fe
Sulphide Ro Conc	14.95	0.385	0.05	11.1	13.7	5.02	46.78	11.65	9.52
Sulphide Ro Tail	85.05	1.28	0.01	14.8	22.0	94.98	53.22	88.35	90.48
Calc Head	100.00	1.15	0.016	14.2	21.5	100.00	100.00	100.00	100.00
Assay Head		1.20	0.01	13.8	21.5				

(c) Comments

Talc was observed to float along with sulphide in all the roughing stages; frothing was under control but it was impossible to obtain a clean sulphide concentrate without effective depression of talc minerals; thus no attempt was made to carry out further flotation cleaning in this test.

028225

Additional Chemical Analyses

Test Product	Assay		
	Cu %	Pb %	CO_2 %
PC1/BF Sulphide Recl Conc	0.35	0.06	-
PC2/BF Sulphide Recl Conc	0.27	0.16	-
SC1/BF Sulphide Ro Conc	0.29	0.01	-
PC1/BF Sulphide Ro Conc	0.17	0.02	-
PC1/BF Sulphide Recl, Cl, Ro Tail	-	-	1.85
PC2/BF Sulphide Recl, Cl, Ro Tail	-	-	0.45
SC1/BF Sulphide Ro Tail	-	-	3.70
SC2/BF Sulphide Ro Tail	-	-	15.8

Element	Semi-quantitative Spectrographic Analysis g/t			
	PC1 Sulphide Recl Conc	PC2 Sulphide Recl Conc	SC1 Sulphide Ro Conc	SC2 Sulphide Ro Conc
Ba(200)	X	X	X	X
Be(1)	X	2	50	40
Ce(300)	X	X	X	X
Co(5)	15	5	X	10
Cr(20)	50	20	40	50
La(50)	X	X	X	X
Mn(10)	400	30	150	2,500
Mo(3)	3	X	X	X
Nb(20)	X	X	X	X
Ni(5)	20	10	15	10
Sc(3)	X	X	X	X
Sr(50)	X	X	X	X
Ta(100)	X	X	X	X
Th(100)	X	X	X	X
Ti(100)	100	100	X	X
V(10)	X	X	X	X
W(50)	50	50	100	X
Y(10)	60	50	10	X
Yb(1)	7	5	2	X
Zr(10)	200	200	200	60
Ag(0.1)	15	30	2	2
As(50)	10,000	>10,000	>10,000	X
Bi(1)	100	100	100	80
Cd(3)	50	150	50	X

Element	Semi-quantitative Spectrographic Analysis g/t			
	PC1 Sulphide Recl Conc	PC2 Sulphide Recl Conc	SC1 Sulphide Ro Conc	SC2 Sulphide Ro Conc
Cu(1)	1,500	1,500	1,000	500
Ga(1)	8	8	20	40
Ge(1)	2	X	X	30
In(10)	10	10	10	X
Pb(1)	300	800	100	150
Sb(30)	200	500	70	X
Sn(1)	3,000	3,000	5,000	5,000
Zn(20)	8,000	>10,000	6,000	500
Au(3)	X	X	X	X
P(100)	X	X	X	X
Tl(20)	X	X	X	X
Ti(1)	X	X	X	X
Li(1)	7	2	30	100
Na(50)	X	X	X	100
Cs(30)	X	X	X	X
K(5)	300	150	1,500	3,000
Rb(10)	20	X	60	80

Notes: Detection limits in brackets

X denotes not detected at limit quoted

> denotes greater than

>> denotes much greater than

APPENDIX G

MINERALOGY OF BULK SULPHIDE CONCENTRATES

G1. INTRODUCTION

Four sulphide concentrate samples produced by bulk sulphide flotation were submitted for mineralogical analysis to obtain the following information:

(1) approximate mineralogical composition

(2) particle size for liberation of locked cassiterite from sulphides

(3) grain size of any economic minerals, and

(4) photomicrographs of typical mineral textures.

The following analytical data were supplied:

Sample	Total % Sn	Acid-soluble Sn %	Total S %	Fe %
PC1/BF Sulphide Recl Conc	0.35	0.27	45.3	41.2
PC2/BF Sulphide Recl Conc	0.24	0.16	50.0	43.4
SC1/BF Sulphide Ro Conc	0.5	0.13	37.0	49.1
SC2/BF Sulphide Ro Conc	0.385	0.05	11.1	13.7

G2. PROCEDURE

All samples, except for SC2/BF, were seen to consist of sulphides but Sample SC2/BF contains a high proportion of light gangue minerals. It was therefore decided to treat Sample SC2/BF in a different manner from the other three samples.

For Samples PC1/BF, PC2/BF and SC1/BF polished briquettes (PS22460-2) were made and examined in reflected light to estimate visually their mineralogy, grain size and locking characteristics of minerals of interest.

The bulk mineralogy of Sample SC2/BF was determined by X-ray diffraction analysis of a finely powered sub-sample. A portion of Sample SC2/BF was deslimed at nominally 10 μm by sedimentation and the +10 μm fraction separated in methylene iodide (sp.gr. = 3.3) to concentrate sulphides and tin minerals into the heavy product. Both density products and the -10 μm slimes were assayed for tin and the tin distribution between these products calculated.

028228

A polished briquette (PS22487) was made of the heavy product and examined in reflected light.

Photomicrographs were made of each concentrate showing typical textures of tin minerals.

G3. MINERALOGY

G3.1 PC1/BF and PC2/BF Sulphide Recleaner Concentrate

These two concentrates have very similar mineralogies, consisting mainly of pyrite and a smaller amount of non-opaque gangue with trace to accessory pyrrhotite, marcasite, arsenopyrite, covellite and sphalerite. A trace of galena was also noted in Sample PC2/BF. The covellite and sphalerite tend to form small grains approximately 0.05 mm and 0.1 to 0.15 mm in size respectively. The galena in Sample PC2/BF generally has a grain size similar to the sphalerite.

The major tin mineral in Samples PC1/BF and PC2/BF is stannite, with cassiterite being much less abundant. The stannite typically occurs as liberated grains up to 0.1 mm in size. The cassiterite forms small grains generally about 0.05 mm in size, some of which are locked with non-opaque gangue. Only a very small proportion of the cassiterite is locked with sulphides.

G3.2 SC1/BF Sulphide Rougher Concentrate

This concentrate consists mainly of pyrrhotite with a smaller proportion of non-opaque gangue and pyrite. Arsenopyrite, chalcopyrite and sphalerite occur at trace to accessory levels. The chalcopyrite has a maximum grain size of 0.1 mm and the sphalerite is generally slightly finer-grained. A single grain of an anisotropic copper sulphide mineral was noted intergrown with chalcopyrite. This mineral could be idaite or cubanite.

Both stannite and cassiterite are present in this sample. Most of the cassiterite is locked with sulphides (mainly pyrrhotite) or sulphides and non-opaque gangue as small grains with a liberation size of about 0.05 to 0.1 mm. Some cassiterite (possibly about 10%) is locked with very small (50 µm) marginal sulphide intergrowths and some cassiterite (possibly about 20%) is locked with non-opaque gangue as grains typically about 0.05 mm in size. Only minor liberated cassiterite was noted as very small grains below 0.05 mm in size. Stannite forms grains up to 0.1 mm in size which are commonly associated with chalcopyrite.

028229

G3.3 SC2/BF Sulphide Rougher Concentrate

This concentrate consists mainly of talc with accessory poorly crystalline magnesite, muscovite, pyrite, dolomite and a trace of quartz. The heavy product consists mainly of pyrite with a much smaller proportion of non-opaque gangue. Accessory pyrrhotite is present in the heavy product and at least a small percentage of the pyrite has colloform textures typical of supergene pyrite after pyrrhotite. Chalcopyrite occurs as an accessory mineral and sphalerite at trace levels. Both chalcopyrite and sphalerite are largely liberated and generally have a grain size between 0.05 and 0.1 mm.

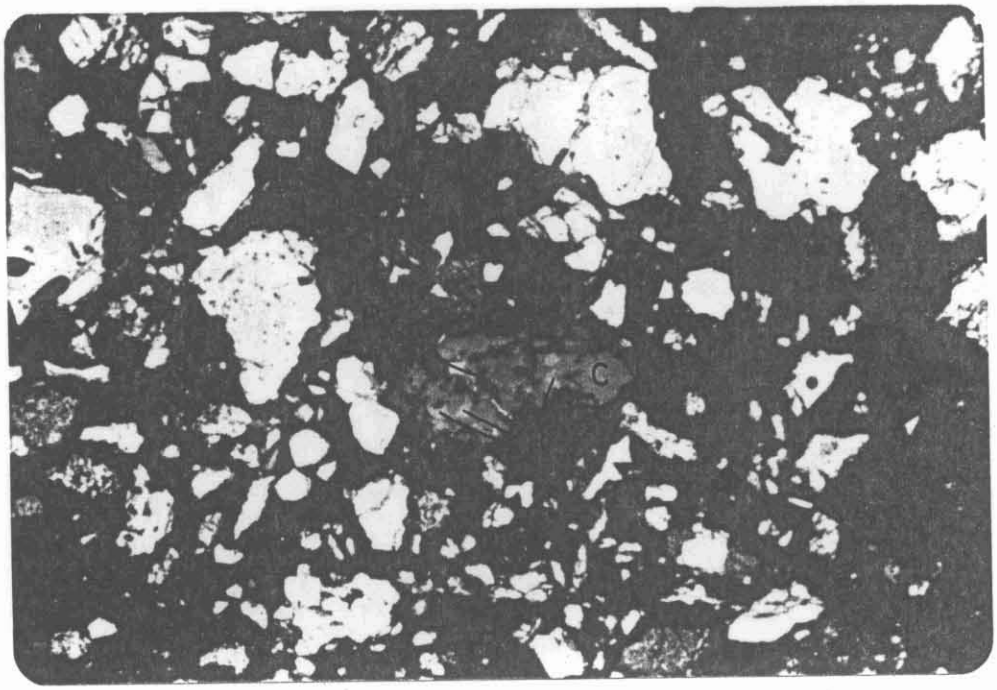
Both cassiterite and stannite occur in this sample. Most of the cassiterite consists of small grains about 0.05 mm in size which are liberated or are locked with non-opaque gangue. Only minor cassiterite is locked with sulphide. The stannite has a maximum grain size of 0.1 mm and forms liberated grains and grains locked with other sulphides (mainly pyrrhotite and chalcopyrite) and non-opaque gangue.

The results of the heavy liquid separation and tin assay are as follows:

Product	Weight %	Assay % Sn	Distribution % Sn
+10 µm; sp.gr. <3.3	67.6	0.205	36.4
+10 µm; sp.gr. >3.3	16.2	1.33	56.5
-10 µm	16.2	0.168	7.1
Total Sample	100.0	(0.38)	100.0

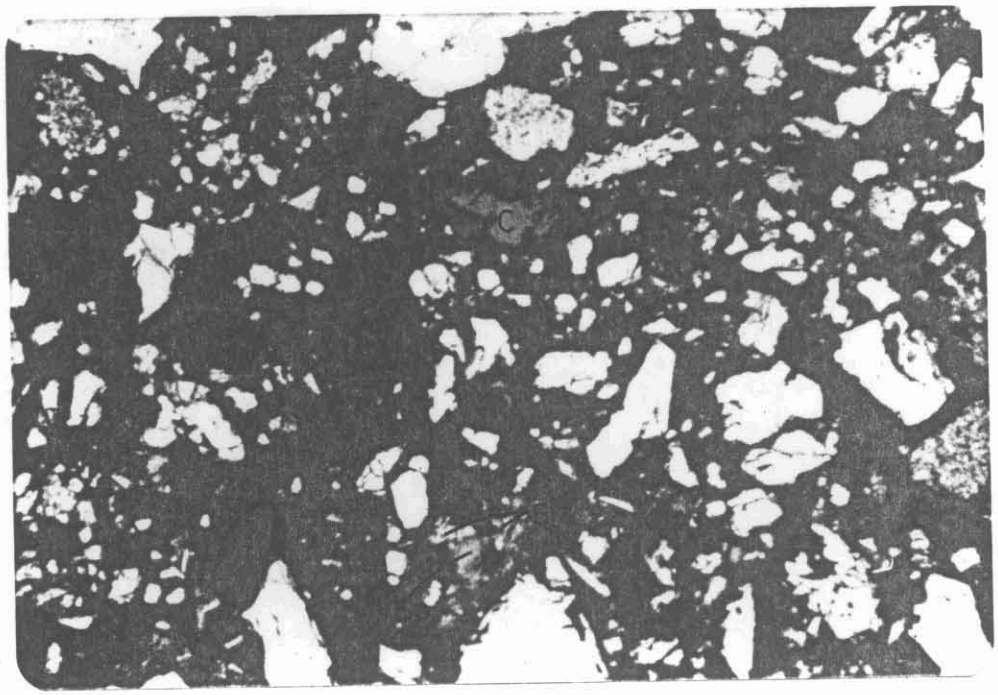
G4. PHOTOMICROGRAPHS

Photomicrographs showing typical textures are given in Plates G1 to G4.



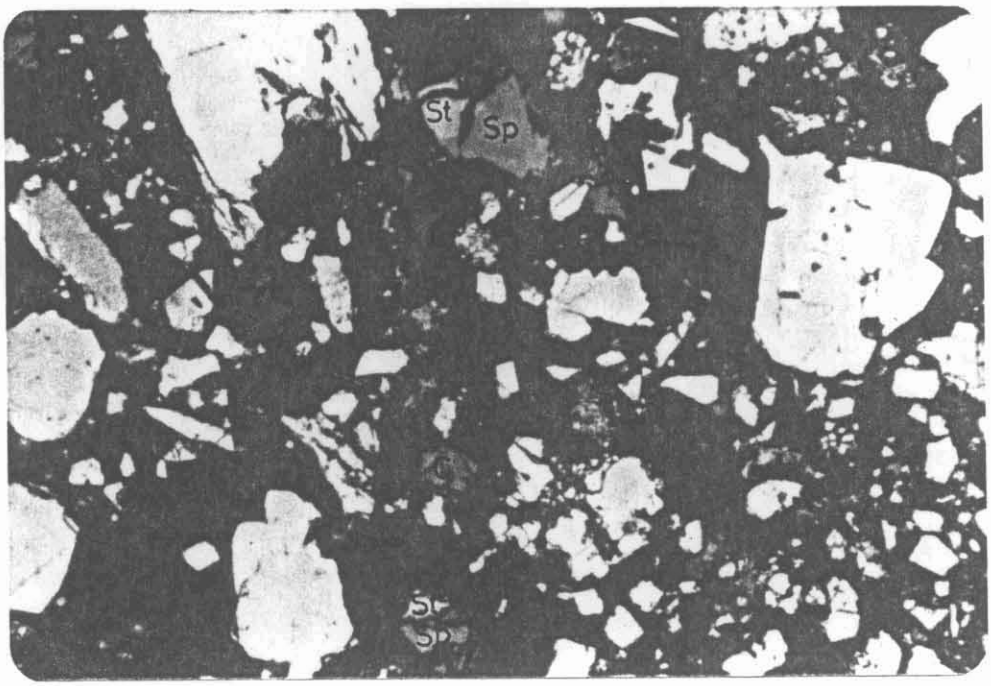
100 µm

a. Sample PC1/BF; PS22461
Cassiterite grain (C) containing intergrown rutile inclusions (R) and pyrite (Py) as a veinlet and inclusion. Yellow sulphide grains in this and other PC samples are mainly pyrite.



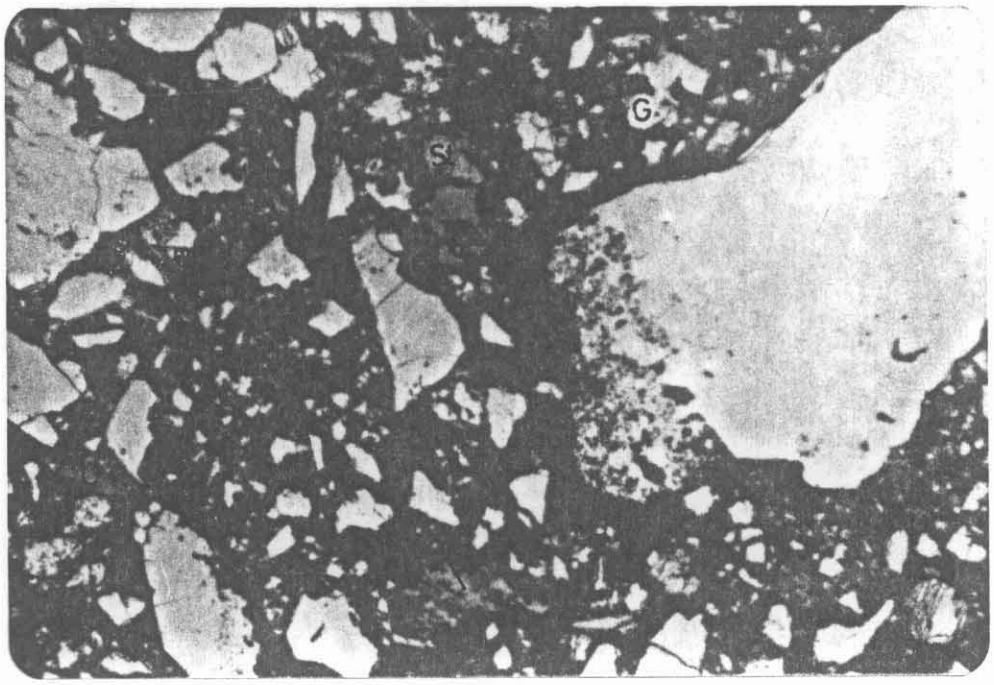
100 µm

b. Sample PC1/BF: PS22461
Cassiterite grain (C) locked with non-opaque gangue. Lower part of field contains a stannite (St) and sphalerite (Sp) intergrowth.



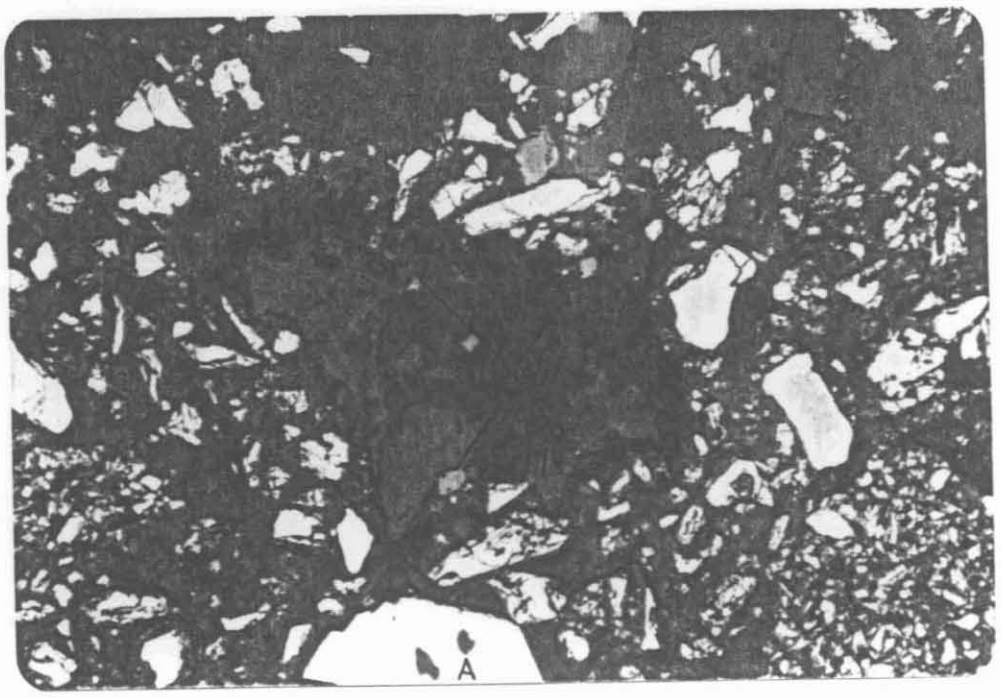
100 µm

a. Sample PC2/BF; PS22462
This field contains two grains of intergrown stannite (St) and sphalerite (Sp) and one cassiterite (C) grain.



100 µm

b. Sample PC2/BF: PS 22462
Two grains containing stannite (St) - one intergrown with sphalerite (Sp) and one intergrown with non-opaque gangue (N). Grain (C) is cassiterite and grain (G) is galena.



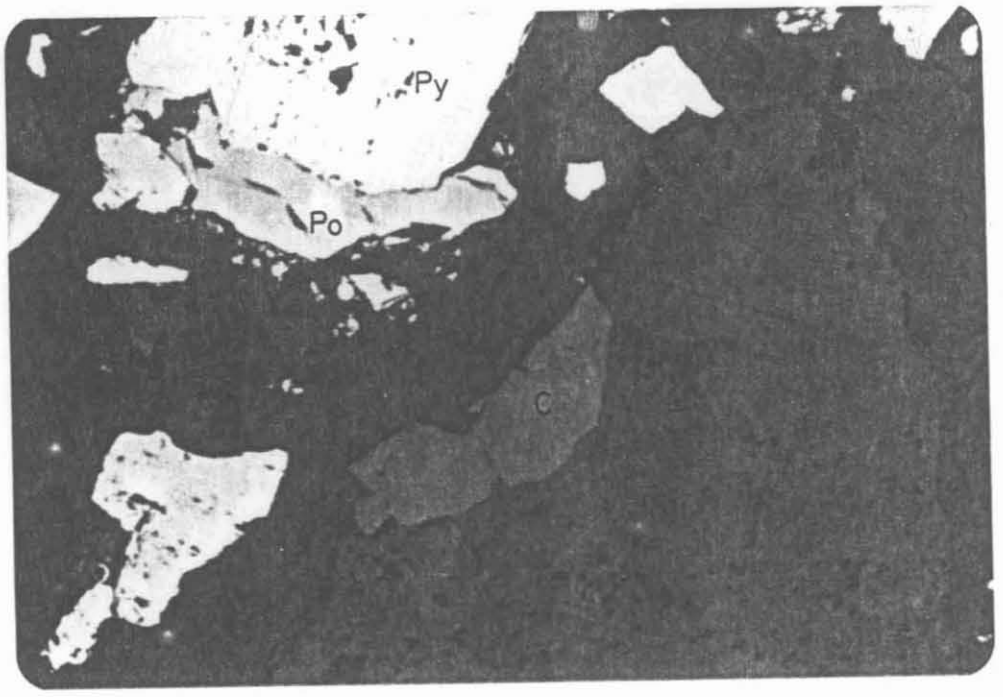
200 µm

a. Sample SC1/BF; PS22460
Cassiterite grains (C) included within non-opaque grain which also contains small pyrrhotite (Po) intergrowth. Angular grain (A) at bottom of field is arsenopyrite. Yellow sulphide grains are mainly pyrrhotite.



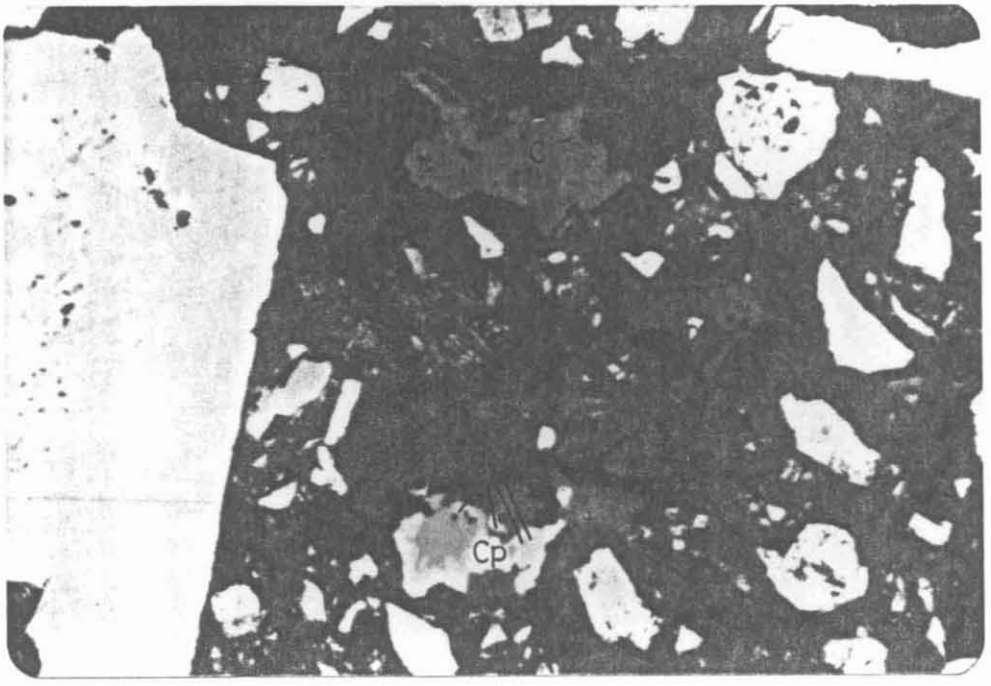
200 µm

b. Sample SC1/BF; PS22460
Cassiterite (C) intergrown with pyrrhotite (Po). Grain A is same arsenopyrite as in field a. Lower part of field has small liberated cassiterite (C) and stannite (St) grains. Yellow sulphide grains are mainly pyrrhotite.



100 µm

a. Sample SC2/BF; sp.gr. >3.3; PS22487
Cassiterite (C) intergrown with non-opaque gangue. Large grain at top consists of pyrite (Py) and pyrrhotite (Po).



100 µm

b. Sample SC2/BF; sp.gr. >3.3; PS22487
Cassiterite (C) locked with non-opaque gangue, and stannite (St) locked with chalcopyrite (Cp) and non-opaque gangue.

APPENDIX H

SUPERPANNER TESTS ON BULK SULPHIDE FLOTATION MIDDLING AND TAILING PRODUCTS OF COMPOSITES PC1, PC2, SC1 AND SC2

PCl/BF Sulphide Mid + Tail (0.235% Sn at 96.16% recovery of original head sample)

Size Fraction µm	Weight %	Assay %		Distribution %		Superpanning Test Product	Weight %		Assay %		Distribution %			
		Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn		Within Size Fraction	Between Size Fraction	Total Sn	Acid Soluble Sn	Within Size Fraction		Between Size Fraction	
											Total Sn	Acid Solb. Sn	Total Sn	Acid Soluble Sn
+250	26.44	0.16	0.02	17.19	32.69	Superpanner Conc	4.97	1.31	1.53	0.05	48.94	18.70	9.11	
						Superpanner Mid	4.32	1.14	0.325	0.04	9.03	13.00	1.69	
						Superpanner Tail	90.71	23.99	0.072	0.01	42.03	68.30	7.85	
						Calc Head	100.00	26.44	0.16	0.013	100.00	100.00	18.65	
-250 +150	20.68	0.245	0.02	20.58	25.59	Superpanner Conc	2.91	0.60	4.42	0.09	58.18	17.17	12.06	
						Superpanner Mid	5.86	1.21	0.675	0.06	17.89	23.04	3.72	
						Superpanner Tail	91.23	18.87	0.058	0.010	23.93	59.79	4.97	
						Calc Head	100.00	20.68	0.22	0.015	100.00	100.00	20.75	
-150 +75	14.58	0.34	0.02	20.14	18.05	Superpanner Conc	1.17	0.17	16.7	nd	63.40		12.91	
						Superpanner Mid	7.60	1.11	0.98	0.09	24.17		4.95	
						Superpanner Tail	91.23	13.30	0.042	0.02	12.43		2.54	
						Calc Head	100.00	14.58	0.31	0.02	100.00		20.40	
-75 +53	4.76	0.415	0.01	8.02	2.97	Superpanner Conc	2.19	0.104	15.3	nd	84.57		7.25	
						Superpanner Mid	17.05	0.812	0.245	0.01	10.54		0.90	
						Superpanner Tail	80.76	3.844	0.024	0.01	4.89		0.42	
						Calc Head	100.00	4.760	0.40		100.00		8.57	
-53	33.54	0.25	0.01	34.07	20.40	Superpanner Conc	1.16	0.39	8.35	nd	46.75		14.81	
						Superpanner Mid	3.76	1.26	0.835	0.01	15.16		4.78	
						Superpanner Tail	95.08	31.89	0.083	0.01	38.09		12.04	
Calc Head	100.00	0.25	0.016	100.00	100.00	Calc Head	100.00	33.54	0.21		100.00		31.63	
									0.22					
						Overall Calc Head		100.00					100.00	

Notes: nd = not determined due to insufficient sample.

Distribution figures for Acid Soluble Sn not completed due to incomplete assays within size fractions.

PC2/BF Sulphide Mid + Tail (0.28% Sn at 96.53% recovery of original head sample)

Size Fraction µm	Weight %	Assay %		Distribution %		Superpanning Test Product	Weight %		Assay %		Distribution %			
		Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn		Within Size Fraction	Between Size Fraction	Total Sn	Acid Solb. Sn	Within Size Fraction Total Sn	Within Size Fraction Acid Solb. Sn	Between Size Fraction Total Sn	Between Size Fraction Acid Solubl Sn
+250	18.45	0.18	0.02	11.38	17.96	Superpanner Conc	6.95	1.28	1.46	0.06	56.86	26.84	6.90	
						Superpanner Mid	5.16	0.95	0.35	0.05	10.12	16.60	1.23	
						Superpanner Tail	87.89	16.22	0.067	0.01	33.02	56.56	4.01	
						Calc Head	100.00	18.45	0.18	0.016	100.00	100.00	12.14	
-250 +150	18.35	0.275	0.03	17.30	26.83	Superpanner Conc	4.55	0.88	3.62	0.11	60.26	16.71	11.09	
						Superpanner Mid	9.79	1.80	0.515	0.08	18.44	26.13	3.42	
						Superpanner Tail	85.66	15.72	0.068	0.02	21.30	57.16	3.95	
						Calc Head	100.00	18.35	0.27	0.030	100.00	100.00	18.46	
-150 +75	17.87	0.345	0.03	21.12	26.10	Superpanner Conc	4.60	0.82	5.55	0.18	76.43	31.40	16.80	
						Superpanner Mid	10.69	1.91	0.42	0.09	13.43	36.48	2.96	
						Superpanner Tail	84.71	15.14	0.04	0.01	10.14	32.12	2.24	
						Calc Head	100.00	17.87	0.33	0.026	100.00	100.00	22.00	
-75 +53	7.22	0.34	0.03	8.41	10.56	Superpanner Conc	2.24	0.16	11.2	nd	72.10		6.61	
						Superpanner Mid	10.60	0.77	0.71	0.12	21.64		2.02	
						Superpanner Tail	87.16	6.29	0.025	0.01	6.26		0.58	
						Calc Head	100.00	7.22	0.35		100.00		9.21	
-53	38.11	0.32	0.01	41.79	18.55	Superpanner Conc	0.68	0.26	13.40	nd	33.57		12.86	
						Superpanner Mid	3.77	1.44	2.34	0.05	32.58		12.44	
						Superpanner Tail	95.55	36.41	0.096	0.01	33.86		12.90	
Calc Head	100.00	0.29	0.021	100.00	100.00	Calc Head	100.00	38.11	0.27		100.00		38.20	
						Overall Calc Head		100.00	0.27				100.00	

Notes: nd = not determined due to insufficient sample.

Distribution figures for Acid Soluble Sn not completed due to incomplete assays within size fractions.

SC1

GC1/BF Sulphide Rougher Tail (1.52% Sn at 92.21% recovery of original head sample)

Size Fraction µm	Weight %	Assay %		Distribution %		Superpanning Test Product	Weight %		Assay %		Distribution %			
		Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn		Within Size Fraction	Between Size Fraction	Total Sn	Acid Solb. Sn	Within Size Fraction		Between Size Fraction	
											Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn
+250	32.86	1.45	0.06	30.19	43.31	Superpanner Conc	5.95	1.96	2.52	0.07	10.40	6.87	3.23	
						Superpanner Mid	3.65	1.20	1.69	0.06	4.28	3.62	1.33	
						Superpanner Tail	90.40	29.70	1.36	0.06	85.32	89.51	26.40	
						Calc Head	100.00	32.86	1.44	0.061	100.00	100.00	30.96	
-250 +150	21.79	1.43	0.05	19.75	23.94	Superpanner Conc	5.89	1.28	3.42	0.06	14.31	6.87	2.86	
						Superpanner Mid	8.48	1.85	1.91	0.06	11.50	9.89	2.31	
						Superpanner Tail	85.63	18.66	1.22	0.05	74.19	83.24	14.88	
						Calc Head	100.00	21.79	1.41	0.051	100.00	100.00	20.05	
-150 +75	17.89	1.30	0.04	14.74	15.73	Superpanner Conc	2.41	0.43	14.2	0.20	25.83	13.65	3.99	
						Superpanner Mid	6.01	1.08	2.60	0.05	11.83	8.52	1.84	
						Superpanner Tail	91.58	16.38	0.90	0.03	62.34	77.83	9.63	
						Calc Head	100.00	17.89	1.32	0.035	100.00	100.00	15.46	
-75 +53	4.87	1.71	0.02	5.28	2.13	Superpanner Conc	1.64	0.08	52.5	nd	54.18		2.75	
						Superpanner Mid	10.07	0.49	2.98	0.04	18.88		0.95	
						Superpanner Tail	88.29	4.30	0.485	0.02	26.94		1.36	
						Calc Head	100.00	4.87	1.59		100.00		5.06	
-53	22.59	2.10	0.03	30.04	14.89	Superpanner Conc	0.65	0.15	65.4	nd	22.14		6.41	
						Superpanner Mid	3.50	0.79	15.9	0.04	28.97		8.20	
						Superpanner Tail	95.85	21.65	0.98	0.02	48.89		13.86	
Calc Head	100.00	1.58	0.046	100.00	100.00	Calc Head	100.00	22.59	1.92		100.00		28.47	
						Overall Calc Head		100.00	1.53				100.00	

Notes: nd = not determined due to insufficient sample.

Distribution figures for Acid Soluble Sn not completed due to incomplete assays within size fractions.

SC2

SC2/BF Sulphide Rougher Tail (1.28% Sn at 94.98% recovery of original head sample)

Size Fraction µm	Weight %	Assay %		Distribution %		Superpanning Test Product	Weight %		Assay %		Distribution %			
		Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn		Within Size Fraction	Between Size Fraction	Total Sn	Acid Solb. Sn	Within Size Fraction		Between Size Fraction	
											Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn
+250	28.47	1.28	0.02	26.36	37.88	Superpanner Conc	2.72	0.78	16.3	0.06	36.08	7.74	9.84	
						Superpanner Mid	2.79	0.79	2.92	0.02	6.62	2.65	1.79	
						Superpanner Tail	94.49	26.90	0.745	0.02	57.30	89.61	15.51	
						Calc Head	100.00	28.47	1.23	0.021	100.00	100.00	27.14	
-250 +150	21.81	1.59	0.02	25.07	29.03	Superpanner Conc	3.50	0.76	26.6	0.06	63.44	9.69	15.65	
						Superpanner Mid	2.79	0.61	2.44	0.03	4.64	3.86	1.15	
						Superpanner Tail	93.71	20.44	0.50	0.02	31.92	86.45	7.91	
						Calc Head	100.00	21.81	1.47	0.022	100.00	100.00	24.71	
-150 +75	16.87	1.84	0.01	22.44	11.25	Superpanner Conc	1.81	0.30	56.0	nd	58.60		13.01	
						Superpanner Mid	8.23	1.39	5.80	0.02	27.61		6.24	
						Superpanner Tail	89.96	15.18	0.265	0.01	13.79		3.11	
						Calc Head	100.00	16.87	1.73		100.00		22.36	
-75 +53	5.21	1.76	0.01	6.64	3.46	Superpanner Conc	2.06	0.11	66.0	nd	83.37		5.62	
						Superpanner Mid	8.36	0.43	1.75	<0.01	8.95		0.58	
						Superpanner Tail	89.58	4.67	0.14	0.01	7.68		0.51	
						Calc Head	100.00	5.21	1.63		100.00		6.71	
-53	27.64	0.975	0.01	19.49	18.38	Superpanner Conc	0.68	0.19	55.5	nd	42.37		8.16	
						Superpanner Mid	2.94	0.81	4.40	0.01	14.61		2.76	
						Superpanner Tail	96.38	26.64	0.395	0.01	43.02		8.15	
Calc Head	100.00	1.38	0.015	100.00	100.00	Calc Head	100.00	27.64	0.88		100.00		19.07	
						Overall Calc Head		100.00	1.29				100.00	

Notes: nd = not determined due to insufficient sample.

Distribution figures for Acid Soluble Sn not completed due to incomplete assays within size fractions.

APPENDIX I

TABLE/SUPERPANNER TESTS ON BULK SULPHIDE FLOTATION MIDDLING AND TAILING PRODUCTS OF COMPOSITES PC1, PC2, SC1 AND SC2

PCl/BF Sulphide Mid + Tail (0.235% Sn at 96.16% recovery of original head sample)

Size Fraction µm	Weight %	Assay %		Distribution %		Table/Superpanner Test Product	Weight %		Assay %		Distribution %			
		Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn		Within Size Fraction	Between Size Fraction	Total Sn	Acid Solb. Sn	Within Size Fraction		Between Size Fraction	
											Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn
+250	27.69	0.19	0.01	21.69	23.94	Table/Super. Conc	2.52	0.70	2.20	n.d.	37.17		6.91	
						Table/Super. Tail	15.32	4.24	0.27	0.03	27.68		5.14	
						(Table Conc)	(17.84)	(4.94)	(0.54)	-	(64.85)		(12.05)	
						Table Mid	71.58	19.82	0.067	0.01	32.10		5.96	
						Table Tail	10.58	2.93	0.043	<0.01	3.05		0.57	
						Calc Head	100.00	27.69	0.15		100.00		18.58	
-250 +150	18.93	0.235	0.01	18.33	16.33	Table/Super. Conc	1.68	0.32	6.28	n.d.	47.39		9.02	
						Table/Super. Tail	13.34	2.52	0.315	0.04	18.85		3.56	
						(Table Conc)	(15.02)	(2.84)	(0.98)	-	(66.24)		(12.58)	
						Table Mid	62.47	11.83	0.11	0.01	30.83		5.84	
						Table Tail	22.51	4.26	0.029	<0.01	2.93		0.56	
						Calc Head	100.00	18.93	0.22		100.00		18.98	
-150 +75	15.76	0.325	0.02	21.11	27.23	Table/Super. Conc	1.10	0.17	17.3	n.d.	62.20		13.20	
						Table/Super. Tail	23.79	3.75	0.34	0.04	26.30		5.72	
						(Table Conc)	(24.89)	(3.92)	(1.09)	-	(88.50)		18.92	
						Table Mid	14.73	2.32	0.15	0.02	7.18		1.56	
						Table Tail	60.38	9.52	0.022	0.01	4.32		0.94	
						Calc Head	100.00	15.76	0.31		100.00		21.42	
-75 +53	4.38	0.37	0.01	6.68	3.80	Table/Super. Conc	2.17	0.10	13.9	n.d.	87.59		6.24	
						Table/Super. Tail	37.49	1.64	0.07	0.01	7.62		0.52	
						(Table Conc)	(39.66)	(1.74)	(0.83)	-	(95.21)		(6.76)	
						Table Mid	27.45	1.20	0.029	<0.01	2.31		0.15	
						Table Tail	32.89	1.44	0.026	0.01	2.48		0.17	
						Calc Head	100.00	4.38	0.34		100.00		7.08	
-53	33.24	0.235	0.01	32.19	28.70	Table/Super. Conc	0.51	0.17	21.1	n.d.	47.42		16.10	
						Table/Super Tail	5.51	1.83	0.20	0.01	4.85		1.64	
						(Table Conc)	(6.02)	(2.00)	(1.97)	-	(52.27)		(17.74)	
						Table Mid	4.56	1.52	0.125	<0.01	2.50		0.85	
						Table Tail	89.42	29.72	0.115	0.01	45.23		15.35	
Calc Head	100.00	0.24	0.012	100.00	100.00	Calc Head	100.00	33.24	0.23		100.00		33.94	
						Overall Calc Head		100.00	0.22				100.00	

Notes: nd = not determined due to insufficient sample
Distribution figures for Acid Soluble Sn not completed due to incomplete assays within size fraction

PC2/BF Sulphide Mid + Tail (0.28% Sn at 96.53% recovery of original head sample)

Size Fraction µm	Weight %	Assay %		Distribution %		Table/Superpanner Test Product	Weight %		Assay %		Distribution %			
		Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn		Within Size Fraction	Between Size Fraction	Total Sn	Acid Solb. Sn	Within Size Fraction		Between Size Fraction	
											Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn
+250	20.41	0.22	0.01	15.04	12.48	Table/Super. Conc	4.29	0.88	2.12	0.08	47.99		6.51	
						Table/Super. Tail	14.69	3.00	0.31	0.04	24.03		3.25	
						(Table Conc)	(18.98)	(3.88)	(0.72)	-	(72.02)		(9.76)	
						Table Mid	38.32	7.82	0.086	0.01	17.39		2.35	
						Table Tail	42.70	8.71	0.047	<0.01	10.59		1.43	
						Calc Head	100.00	20.41	0.19		100.00		13.54	
-250 +150	17.11	0.29	0.02	16.61	20.93	Table/Super. Conc	5.44	0.93	3.32	n.d.	64.42		10.78	
						Table/Super. Tail	12.63	2.16	0.375	0.05	16.87		2.83	
						(Table Conc)	(18.07)	(3.09)	(1.26)	-	(81.29)		(13.61)	
						Table Mid	28.72	4.91	0.105	0.01	10.75		1.80	
						Table Tail	53.21	9.10	0.042	<0.01	7.96		1.33	
						Calc Head	100.00	17.11	0.28		100.00		16.74	
-150 +75	20.47	0.355	0.03	24.34	37.58	Table/Super. Conc	4.43	0.91	6.30	n.d.	79.34		20.01	
						Table/Super. Tail	16.46	3.37	0.265	0.06	12.40		3.12	
						(Table Conc)	(20.89)	(4.28)	(1.55)	-	(91.74)		(23.13)	
						Table Mid	31.99	6.55	0.057	0.01	5.18		1.30	
						Table Tail	47.12	9.64	0.023	<0.01	3.08		0.78	
						Calc Head	100.00	20.47	0.35		100.00		25.21	
-75 +53	5.40	0.365	0.02	6.61	6.61	Table/Super. Conc	4.51	0.24	7.34	n.d.	89.00		6.15	
						Table/Super. Tail	17.58	0.95	0.105	0.03	4.96		0.35	
						(Table Conc)	(22.09)	(1.19)	(1.58)	-	(93.96)		(6.50)	
						Table Mid	31.51	1.70	0.039	<0.01	3.30		0.23	
						Table Tail	46.40	2.51	0.022	0.01	2.74		0.19	
						Calc Head	100.00	5.40	0.37		100.00		6.92	
-53	36.61	0.305	0.01	37.40	22.40	Table/Super. Conc	0.96	0.35	16.2	n.d.	52.61		19.79	
						Table/Super. Tail	8.48	3.11	0.145	0.02	4.18		1.57	
						(Table Conc)	(9.44)	(3.46)	(1.77)	-	(56.79)		(21.36)	
						Table Mid	5.79	2.12	0.145	<0.01	2.85		1.07	
						Table Tail	84.77	31.03	0.14	0.01	40.36		15.16	
Calc Head	100.00	0.30	0.016	100.00	100.00	Calc Head	100.00	36.61	0.29		100.00		37.59	
						Overall Calc Head		100.00	0.29				100.00	

Notes: nd = not determined due to insufficient sample

Distribution figures for Acid Soluble Sn not completed due to incomplete assays within size fraction

SCI/BF Sulphide Rougher Tail (1.52% Sn at 92.21% recovery of original head sample)

Size Fraction µm	Weight %	Assay %		Distribution %		Table/Superpanner Test Product	Weight %		Assay %		Distribution %			
		Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn		Within Size Fraction	Between Size Fraction	Total Sn	Acid Solb. Sn	Within Size Fraction		Between Size Fraction	
											Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn
+250	34.82	1.44	0.04	32.18	48.38	Table/Super. Conc	4.97	1.73	2.42	n.d.	8.52		2.71	
						Table/Super. Tail	10.33	3.60	1.95	0.03	14.28		4.54	
						(Table Conc)	(15.30)	(5.33)	(2.10)	-	(22.80)		(7.25)	
						Table Mid	38.92	13.55	1.54	0.05	42.48		13.50	
						Table Tail	45.78	15.94	1.07	0.04	34.72		11.00	
						Calc Head	100.00	34.82	1.41		100.00		31.75	
-250 +150	21.40	1.37	0.03	18.82	22.30	Table/Super. Conc	7.89	1.69	3.20	n.d.	18.66		3.50	
						Table/Super. Tail	10.79	2.31	1.69	0.03	13.49		2.53	
						(Table Conc)	(18.68)	(4.00)	(2.33)	-	(32.15)		(6.03)	
						Table Mid	27.68	5.92	1.28	0.03	26.20		4.90	
						Table Tail	53.64	11.48	1.05	0.04	41.65		7.80	
						Calc Head	100.00	21.40	1.35		100.00		18.73	
-150 +75	18.96	1.33	0.02	16.18	13.17	Table/Super. Conc	9.23	1.75	6.70	n.d.	46.49		7.59	
						Table/Super. Tail	5.29	1.00	1.36	0.02	5.41		0.88	
						(Table Conc)	(14.52)	(2.75)	(4.76)	-	(51.90)		(8.47)	
						Table Mid	27.69	5.25	0.85	0.02	17.69		2.89	
						Table Tail	57.79	10.96	0.70	0.02	30.41		4.96	
						Calc Head	100.00	18.96	1.33		100.00		16.32	
-75 +53	3.12	1.79	0.01	3.58	1.08	Table/Super. Conc	10.41	0.32	13.2	n.d.	73.66		2.73	
						Table/Super. Tail	24.90	0.78	0.59	0.01	7.87		0.30	
						(Table Conc)	(35.31)	(1.10)	(4.31)	-	(81.53)		(3.03)	
						Table Mid	36.86	1.15	0.61	0.01	12.05		0.45	
						Table Tail	27.83	0.87	0.43	0.01	6.42		0.24	
						Calc Head	100.00	3.12	1.86		100.00		3.72	
-53	21.70	2.10	0.02	29.24	15.07	Table/Super. Conc	2.03	0.44	42.3	n.d.	40.81		12.04	
						Table/Super. Tail	7.69	1.67	1.27	0.01	4.65		1.37	
						(Table Conc)	(9.72)	(2.11)	(9.82)		(45.46)		(13.41)	
						Table Mid	4.52	0.98	1.61	0.01	3.47		1.02	
						Table Tail	85.76	18.61	1.25	0.02	51.07		15.05	
Calc Head	100.00	1.56	0.029	100.00	100.00	Calc Head	100.00	21.70	2.10		100.00		29.48	
						Overall Calc Head		100.00	1.55				100.00	

Notes: nd = not determined due to insufficient sample

Distribution figures for Acid Soluble Sn not completed due to incomplete assays within size fraction

SC2/BF Sulphide Rougher Tail (1.28% Sn at 94.98% recovery of original head sample)

Size Fraction µm	Weight %	Assay %		Distribution %		Table/Superpanner Test Product	Weight %		Assay %		Distribution %			
		Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn		Within Size Fraction	Between Size Fraction	Total Sn	Acid Solb. Sn	Within Size Fraction		Between Size Fraction	
											Total Sn	Acid Solb. Sn	Total Sn	Acid Solb. Sn
+250	31.79	1.18	0.01	28.55	31.79	Table/Super. Conc	7.57	2.41	8.04	0.01	49.39	7.57	15.07	2.36
						Table/Super. Tail	20.52	6.52	1.03	<0.01	17.16	20.52	5.22	6.40
						(Table Conc)	(28.09)	(8.93)	(2.92)	(0.01)	(66.55)	(28.09)	(20.29)	(8.76)
						Table Mid	29.21	9.29	0.775	0.01	18.38	29.21	5.60	9.12
						Table Tail	42.70	13.57	0.435	0.01	15.07	42.70	4.59	13.32
						Calc Head	100.00	31.79	1.23	0.01	100.00	100.00	30.48	31.20
-250 +150	19.82	1.55	0.01	23.37	19.82	Table/Super. Conc	5.77	1.14	18.9	0.02	70.29	10.87	16.76	2.24
						Table/Super. Tail	15.75	3.12	0.855	0.01	8.68	14.93	2.08	3.06
						(Table Conc)	(21.52)	(4.26)	(5.69)	(0.013)	(78.97)	(25.80)	(18.84)	(5.30)
						Table Mid	21.02	4.17	0.54	0.01	7.32	19.85	1.75	4.09
						Table Tail	57.46	11.39	0.37	0.01	13.71	54.35	3.28	11.18
						Calc Head	100.00	19.82	1.55	0.011	100.00	100.00	23.87	20.57
-150 +75	18.81	1.74	0.01	24.91	18.81	Table/Super. Conc	4.08	0.77	31.9	0.02	82.18	7.87	19.11	1.51
						Table/Super. Tail	15.19	2.86	0.715	0.01	6.86	14.59	1.59	2.81
						(Table Conc)	(19.27)	(3.63)	(7.32)	(0.012)	(89.04)	(22.46)	(20.70)	(4.32)
						Table Mid	23.17	4.36	0.265	0.01	3.87	22.26	0.90	4.28
						Table Tail	57.56	10.82	0.195	<0.01	7.09	55.28	1.64	10.62
						Calc Head	100.00	18.81	1.58	0.01	100.00	100.00	23.24	19.22
-75 +53	3.56	1.61	<0.01	4.36	3.56	Table/Super. Conc	5.47	0.20	26.4	<0.01	89.31	5.47	4.11	0.20
						Table/Super. Tail	2.50	0.09	0.32	<0.01	0.49	2.50	0.02	0.09
						(Table Conc)	(7.97)	(0.29)	(18.2)	(0.01)	(89.80)	(7.97)	(4.13)	(0.29)
						Table Mid	26.30	0.94	0.34	<0.01	5.53	26.30	0.25	0.92
						Table Tail	65.73	2.33	0.115	<0.01	4.67	65.73	0.21	2.28
						Calc Head	100.00	3.56	1.62	0.01	100.00	100.00	4.59	2.49
-53	26.02	0.95	<0.01	18.81	26.02	Table/Super. Conc	1.18	0.31	37.1	<0.01	49.93	1.18	8.95	0.30
						Table/Super. Tail	13.69	3.56	0.36	<0.01	5.63	13.69	1.00	3.49
						(Table Conc)	(14.87)	(3.87)	(3.27)	(0.01)	(55.56)	(14.87)	(9.95)	(3.79)
						Table Mid	5.24	1.36	0.495	<0.01	2.96	5.24	0.52	1.33
						Table Tail	79.89	20.79	0.455	<0.01	41.48	79.89	7.35	20.40
Calc Head	100.00	1.31	0.01	100.00	100.00	Calc Head	100.00	26.02	0.88	0.01	100.00	100.00	17.82	25.52
						Overall Calc Head		100.00	1.29	0.01			100.00	100.00

APPENDIX J

MINERALOGY OF TABLE/SUPERPANNER CONCENTRATES

J1. INTRODUCTION

Four sets of table/superpanner concentrate samples were received for mineralogical assessment. The samples represented concentrates obtained by tabling and superpanning various size fractions of the four composite after removal of the bulk of the sulphides by flotation. The tin contents of the samples were as follows:

Sample PC1/BF Sulphide Ro Tail + Mids/Table-Superpanner Conc

Size Fraction (μm)	Sn, %
+250	2.20
-250 +150	6.28
-150 + 75	17.3
- 75 + 53	13.9
- 53	21.1

Sample PC2/BF Sulphide Ro Tail + Mids/Table-Superpanner Conc

Size Fraction (μm)	Sn, %
+250	2.12
-250 +150	3.32
-150 + 75	6.30
- 75 + 53	7.34
- 53	16.2

Sample SC1/BF Sulphide Ro Tail/Table-Superpanner Conc

Size Fraction (μm)	Sn, %
+250	2.42
-250 +150	3.20
-150 + 75	6.70
- 75 + 53	13.2
- 53	42.3

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Sample SC2/BF Sulphide Ro Tail/Table-Superpanner Conc

Size Fraction (μm)	Sn, %
+250	8.04
-250 +150	18.9
-150 + 75	31.9
- 75 + 53	26.4
- 53	37.1

J2. PROCEDURE

Representative polished sections (PS22545-22564) were prepared of each size fraction and point-counted and/or gross-counted to quantify the mineral proportions and the locking characteristics of cassiterite.

Portions of the -250 +150 μm and -75 +53 μm fractions were acid-leached to remove 'acid-soluble tin' minerals, sulphides and iron oxides using separate attacks with nitric and hydrochloric acids. The residues were weighed and sized - using 150, 75 and 53 μm screens for the residues of the -250 +150 μm fractions and a 53 um screen for the residues of the -75 +53 μm fractions. The various size fractions of the residues were examined briefly under a stereobinocular microscope and then analysed for tin (using the whole of the size fraction). The distribution of tin with particle size in the residues was calculated.

J3. MINERALOGICAL COMPOSITIONS OF THE TABLE/SUPERPANNER CONCENTRATES

The mineralogical compositions of the various size fractions of the superpanner concentrates as determined by point-counting are given in Table J1.

An estimate was made of the cassiterite/stannite ratio and in all cases this was greater than 10 and in most cases greater than 30. Cassiterite is thus the dominant tin-bearing mineral in the table/superpanner concentrates.

J4. LIBERATION OF CASSITERITE IN THE TABLE/SUPERPANNER CONCENTRATES

Table J2 summarises the liberation and locking characteristics of cassiterite in the table/superpanner concentrates. Liberation increases progressively down the size range and unliberated cassiterite is mainly locked with non-opaque gangue in all samples except SC1/BF, where substantial proportions are also locked with sulphide.

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J5. CHARACTERISTICS OF THE LEACH RESIDUES

The results of the acid digestion of the two size fractions of the table/superpanner concentrates are summarised below:

Sample	Size Fraction (μm)	Weight (g)		% Residue
		Original	Residue	
PC1/BF	-250 +150	2.466	0.432	17.5
PC1/BF	- 75 + 53	1.687	0.564	33.4
PC2/BF	-250 +150	3.505	0.691	19.7
PC2/BF	- 75 + 53	3.258	1.481	45.5
SC1/BF	-250 +150	3.486	0.327	9.4
SC1/BF	- 75 + 53	3.495	1.970	56.4
SC2/BF	-250 +150	3.426	0.827	24.1
SC2/BF	- 75 + 53	1.562	0.551	35.3

Examination of the residues shows that they consist of cassiterite and silicates (mainly colourless or white). Iron oxides and sulphides are not present.

The distributions of weight and tin in the size fractions of the residues are summarised in Table J3. Examination of these size fractions indicates that in the -150 μm fractions cassiterite is essentially liberated whereas in the +150 μm fractions cassiterite liberation is 40 to 80%, the main locking of cassiterite being with attachments and intergrowths of silicates. The cassiterite forms equant crystal fragments or crystal aggregates and does not show any marked development of elongate, prismatic form. The colour of cassiterite in the PC samples is mainly dark brown to yellow-brown whereas the colour of cassiterite in the SC samples is mainly reddish-orange.

It can be seen from Table J3 that most of the cassiterite in the residues reports in the size range of the original material.

J6. TUNGSTEN MINERALOGY OF MT BISCHOFF TIN ORES

Due to the rather high tungsten contents of the table/superpanner concentrates, some Mt Bischoff ore samples were examined for the possible presence of scheelite.

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Scheelite is fluorescent and thus easily detectable under ultra-violet light even when present only at very low concentrations. Other tungsten minerals (e.g. wolframite) are not fluorescent and would be much more difficult to detect at low concentrations. Unfortunately, no table/superpanner concentrates were available for examination since all the samples had been used for previous tests but the polished sections (PS22545-64) were examined with ultra-violet light. The heavy products of the composite head samples were also examined by ultra-violet light.

Scheelite was detected either in the polished sections of some table/superpanner concentrates or in the heavy products of the head samples for all four Composites (PC1, PC2, SC1, SC2). It is interesting to note that the most scheelite was detected in the heavy products of SC2 (a total of seven scheelite grains in all heavy products) which gives the lowest tungsten assay of the four table/superpanner concentrates. Only two scheelite grains were noted in the heavy products of PC1 and no scheelite was detected in the heavy products of SC1 and PC2, although scheelite was detected in the polished sections of some table/superpanner concentrates of these samples.

It may be concluded that at least some of the tungsten in these samples occurs in scheelite but it is possible that other less easily detectable tungsten minerals are present and could make a significant or even major contribution to the tungsten content of these samples.

TABLE J1: MINERALOGY (WEIGHT %) OF TABLE/SUPERPANNER CONCENTRATES

Sample	Size Fraction		Cassiterite	Stannite	Pyrite	Pyrrhotite	Arsenopyrite	Sphalerite	Iron Oxides	Non-Opaque Gangue
	BSS Mesh	µm								
PC1/BF	+ 60	+250	3	<1	63	1	1	-	1	31
	- 60 +100	-250 +150	5	<1	66	1	3	-	3	22
	-100 +200	-150 + 75	21	<1	56	1	7	-	2	13
	-200 +300	- 75 + 53	19	<1	62	-	4	-	4	11
	-300	- 53	30	<1	44	-	1	-	4	21
PC2/BF	+ 60	+250	1	<1	65	-	3	1	-	29
	- 60 +100	-250 +150	6	<1	75	-	1	-	1	16
	-100 +200	-150 + 75	3	<1	62	-	1	-	3	30
	-200 +300	- 75 + 53	10	1	51	-	1	1	1	35
	-300	- 53	27	1	30	-	1	-	2	39
SC1/BF	+ 60	+250	3	-	2	81	8	1	-	5
	- 60 +100	-250 +150	3	-	2	79	7	1	-	8
	-100 +200	-150 + 75	9	-	5	55	4	1	2	24
	-200 +300	- 75 + 53	16	-	5	24	1	1	2	51
	-300	- 53	69	-	1	6	1	2	2	19
SC2/BF	+ 60	+250	13	-	14	67	-	-	-	6
	- 60 +100	-250 +150	27	-	22	44	-	-	-	7
	-100 +200	-150 + 75	41	-	21	16	1	-	1	20
	-200 +300	- 75 + 53	32	-	12	26	1	-	1	28
	-300	- 53	55	-	9	19	-	-	1	16

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TABLE J2: CASSITERITE LIBERATION IN TABLE/SUPERPANNER CONCENTRATES

Sample	Size Fraction		% Liberated Cassiterite	% Cassiterite Locked with		
	BSS Mesh	µm		Sulphides	Iron Oxides	Non-opaque Gangue
PC1/BF	+60	+250	42	3	12	43
	- 60 +100	-250 +150	52	9	-	39
	-100 +200	-150 + 75	64	4	3	29
	-200 +300	- 75 + 53	80	3	3	14
	-300	- 53	85	-	3	12
PC2/BF	+60	+250	55	6	6	33
	- 60 +100	-250 +150	66	8	4	22
	-100 +200	-150 + 75	71	5	6	19
	-200 +300	- 75 + 53	82	-	7	11
	-300	- 53	90	1	5	4
SC1/BF	+60	+250	6	60	2	32
	- 60 +100	-250 +150	35	43	1	21
	-100 +200	-150 + 75	44	25	3	28
	-200 +300	- 75 + 53	54	10	-	36
	-300	- 53	86	3	1	10
SC2/BF	+60	+250	64	6	-	30
	- 60 +100	-250 +150	70	2	-	28
	-100 +200	-150 + 75	67	2	2	29
	-200 +300	- 75 + 53	79	1	1	19
	-300	- 53	88	1	-	11

TABLE J3: TIN DISTRIBUTION IN THE LEACH RESIDUES OF THE TABLE/SUPERPANNER SIZE FRACTIONS

Sample	Original Size Fraction BSS Mesh	Original Size Fraction µm	Size Fractions After Leaching BSS Mesh	Size Fractions After Leaching µm	Wt. %	Sn Assay, %	Sn Distn, %
PC1/TF	-60+100	-250+150	+100	+150	60.7	48.7	86.3
			-100+200	-150+75	20.4	17.4	10.3
			-200+300	-75+53	5.0	9.50	1.4	
			-300	-53	13.9	4.82	2.0
				Total	100.0	(34.3)	100.0
PC1/BF	-200+300	-75+53	+300	+53	91.6	49.2	97.4
			-300	-53	8.4	14.2	2.6
				Total	100.0	(46.3)	100.0
PC2/BF	-60+100	-250+150	+100	+150	64.2	24.3	87.8
			-100+200	-150+75	21.3	7.7	7.7
			-200+300	-75+53	4.3	6.90	1.7
			-300	-53	10.2	4.84	2.8
				Total	100.0	(17.8)	100.0
PC2/BF	-200+300	-75+53	+300	+53	86.9	16.17	94.4
			-300	-53	13.1	5.10	5.6
				Total	100.0	(14.9)	100.0
SC1/BF	-60+100	-250+150	+100	+150	40.9	47.0	56.4
			-100+200	-150+75	40.9	24.1	28.9
			-200+300	-75+53	9.1	23.1	6.2
			-300	-53	9.1	31.9	8.5
				Total	100.0	(34.1)	100.0
SC1/BF	-200+300	-75+53	+300	+53	90.7	21.7	89.9
			-300	-53	9.3	23.7	10.1
				Total	100.0	(21.9)	100.0
SC2/BF	-60+100	-250+150	+100	+150	89.9	72.1	92.1
			-100+200	-150+75	8.0	60.3	6.8
			-200+300	-75+53	1.4	32.8	0.7
			-300	-53	0.7	35.3	0.4
				Total	100.0	(70.3)	100.0
SC2/BF	-200+300	-75+53	+300	+53	93.8	65.6	94.8
			-300	-53	6.2	68.8	5.2
				Total	100.0	(65.6)	100.0

APPENDIX K

PRODUCTION OF HIGH GRADE TIN CONCENTRATES

Test PC1/HG - 55.5 g of combined table/superpanner concentrates (+250 to -53 µm in proportion by weight) used for testing; stage dry grind to 100% -150 µm; stage sulphide floats at highest density possible; superpanning sulphide flotation tail.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t	
	Time (min.)		pH		
	Conditioning	Flotation		SSBX	MIBC
Sulphide Ro Float 1	2	5	5.9	0.01	0.04
Sulphide Ro Float 2	2	5	5.9	0.01	0.02
Sulphide Ro Float 3	2	5	5.9	0.01	0.02
Sulphide Ro Float 4	2	5	5.9	0.01	0.02

(b) Results

Test Product	Weight %	Assay %		Distribution %	
		Sn	Total S	Sn	Total S
Sulphide Ro Conc	44.01	0.43	42.4	2.55	60.23
Superpanner Tin Conc	10.72	48.3	10.2	69.77	3.53
Superpanner Tin Tail	45.27	4.54	24.8	27.68	36.24
(Sulphide Ro Tail)	(55.99)	(12.9)	(22.0)	(97.45)	(39.77)
Calc Head	100.00	7.42	31.0	100.00	100.00

028252

Test PC2/HG - 173.8 g of combined table/superpanner concentrates (+250 to -53 µm in proportion by weight) used for testing; stage dry grind to 100% -150 µm; stage sulphide floats at highest density possible; superpanning sulphide flotation tail.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t	
	Time (min.)		pH		
	Conditioning	Flotation		SSBX	MIBC
Sulphide Ro Float 1	2	5	4.0	0.01	0.04
Sulphide Ro Float 2	2	5	4.0	0.01	0.02
Sulphide Ro Float 3	2	5	4.0	0.01	0.02
Sulphide Ro Float 4	2	5	4.0	0.01	0.02

(b) Results

Test Product	Weight	Assay %		Distribution %	
		Sn	Total S	Sn	Total S
Sulphide Ro Conc	67.97	0.47	45.9	6.28	89.99
Superpanner Tin Conc	8.32	50.0	5.25	81.80	1.26
Superpanner Tin Tail	23.71	2.56	12.8	11.92	8.75
(Sulphide Ro Tail)	(32.03)	(14.9)	(10.8)	(93.72)	(10.01)
Calc Head	100.00	5.09	34.7	100.00	100.00

028253

Test SC1/HG - 289.1 g of combined table/superpanner concentrates (+250 to -53 µm in proportion by weight) used for testing; stage dry grind to 100% -150 µm; stage sulphide floats at highest density possibly; superpanning sulphide flotation tail.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t	
	Time (min.)		pH		
	Conditioning	Flotation		SSBX	MIBC
Sulphide Ro Float 1	2	5	6.0	0.02	0.04
Sulphide Ro Float 2	2	5	6.0	0.02	0.02
Sulphide Ro Float 3	2	5	6.0	0.02	0.02
Sulphide Ro Float 4	2	5	6.0	0.02	0.02

(b) Results

Test Product	Weight %	Assay %		Distribution %	
		Sn	Total S	Sn	Total S
Sulphide Ro Conc	76.28	1.64	35.4	16.93	93.69
Superpanner Tin Conc	15.46	37.2	5.25	77.82	2.82
Superpanner Tin Tail	8.26	4.7	12.2	5.25	3.49
(Sulphide Ro Tail)	(23.72)	(25.9)	(7.67)	(83.07)	(6.31)
Calc Head	100.00	7.39	28.8	100.00	100.00

028254

Test SC2/HG - 289.8 g of combined table/superpanner concentrates (+250 to -53 µm in proportion by weight) used for testing; stage dry grind to 100% -150 µm; stage sulphide floats at highest density possible; superpanning sulphide flotation tail.

(a) Flotation Conditions and Reagents

Stage	Conditions			Reagent Addition kg/t	
	Time (min.)		pH		
	Conditioning	Flotation		SSBX	MIBC
Sulphide Ro Float 1	2	5	5.9	0.02	0.04
Sulphide Ro Float 2	2	5	5.9	0.02	0.02
Sulphide Ro Float 3	2	5	5.9	0.02	0.02
Sulphide Ro Float 4	2	5	5.9	0.02	0.02

(b) Results

Test Product	Weight %	Assay %		Distribution %	
		Sn	Total S	Sn	Total S
Sulphide Ro Conc	70.08	2.24	39.4	9.73	93.93
Superpanner Tin Conc	20.98	66.6	1.99	86.60	1.42
Superpanner Tin Tail	8.94	6.64	15.3	3.67	4.65
(Sulphide Ro Tail)	(29.92)	(48.7)	(5.97)	(90.20)	(6.07)
Calc Head	100.00	16.1	29.4	100.00	100.00

028255

Additional Chemical Analyses

Element	Assay Result			
	PC1/HG Superpanner Tin Conc	PC2/HG Superpanner Tin Conc	SC1/HG Superpanner Tin Conc	SC2/HG Superpanner Tin Conc
Acid Soluble Sn %	0.05	0.13	0.05	0.03
CO_2 %	0.55	0.45	0.10	0.05
Fe %	nd	nd	10.4	3.90
Bi g/t	nd	nd	19	3
Cu g/t	nd	nd	120	4
Pb g/t	nd	nd	55	20
Zn g/t	nd	nd	305	115
TiO_2 %	nd	nd	0.035	0.025
WO_3 %	nd	nd	0.68	0.35
As g/t	nd	nd	700	<100
Sb g/t	nd	nd	<40	<40
Ag g/t	nd	nd	1.0	1.0
Au g/t	nd	nd	1.02	0.69

Notes: nd = not determined due to insufficient sample.

Element	Semi-quantitative Spectrographic Analysis g/t	
	PC1/HG Superpanner Tin Conc	PC2/HG Superpanner Tin Conc
Ba(200)	X	X
Be(1)	1	2
Ce(300)	500	800
Co(5)	10	X
Cr(20)	80	80
La(50)	250	400
Mn(10)	3,000	600
Mo(3)	10	6
Nb(20)	X	X
Ni(5)	200	50
Sc(3)	X	X
Sr(50)	X	X
Ta(100)	X	X
Th(100)	X	X
Ti(100)	6,000	10,000
V(10)	50	80
W(50)	10,000	>10,000
Y(10)	250	1,500
Yb(1)	60	100
Zr(10)	250	400
Ag(0.1)	5	20
As(50)	4,000	4,000
Bi(1)	25	25
Cd(3)	X	X
Cu(1)	100	1,000
Ga(1)	60	60
Ge(1)	2	3
In(10)	60	30
Pb(1)	400	800
Sb(30)	30	30
Sn(1)	>>10,000	>>10,000
Zn(20)	250	60
Au(3)	30	5
P(100)	X	X
Te(20)	X	X
Tl(1)	X	X
Al(100)	>10,000	>10,000
Ca(100)	1,000	200

Element	Semi-quantitative Spectrographic Analysis g/t	
	PC1/HG Superpanner Tin Conc	PC2/HG Superpanner Tin Conc
Fe(100)	>>10,000	>10,000
Mg(100)	1,500	500
Si(100)	>>10,000	>>10,000

Notes: Detection limits in brackets

X = not detected at limit quoted

> = greater than

>> = much greater than.

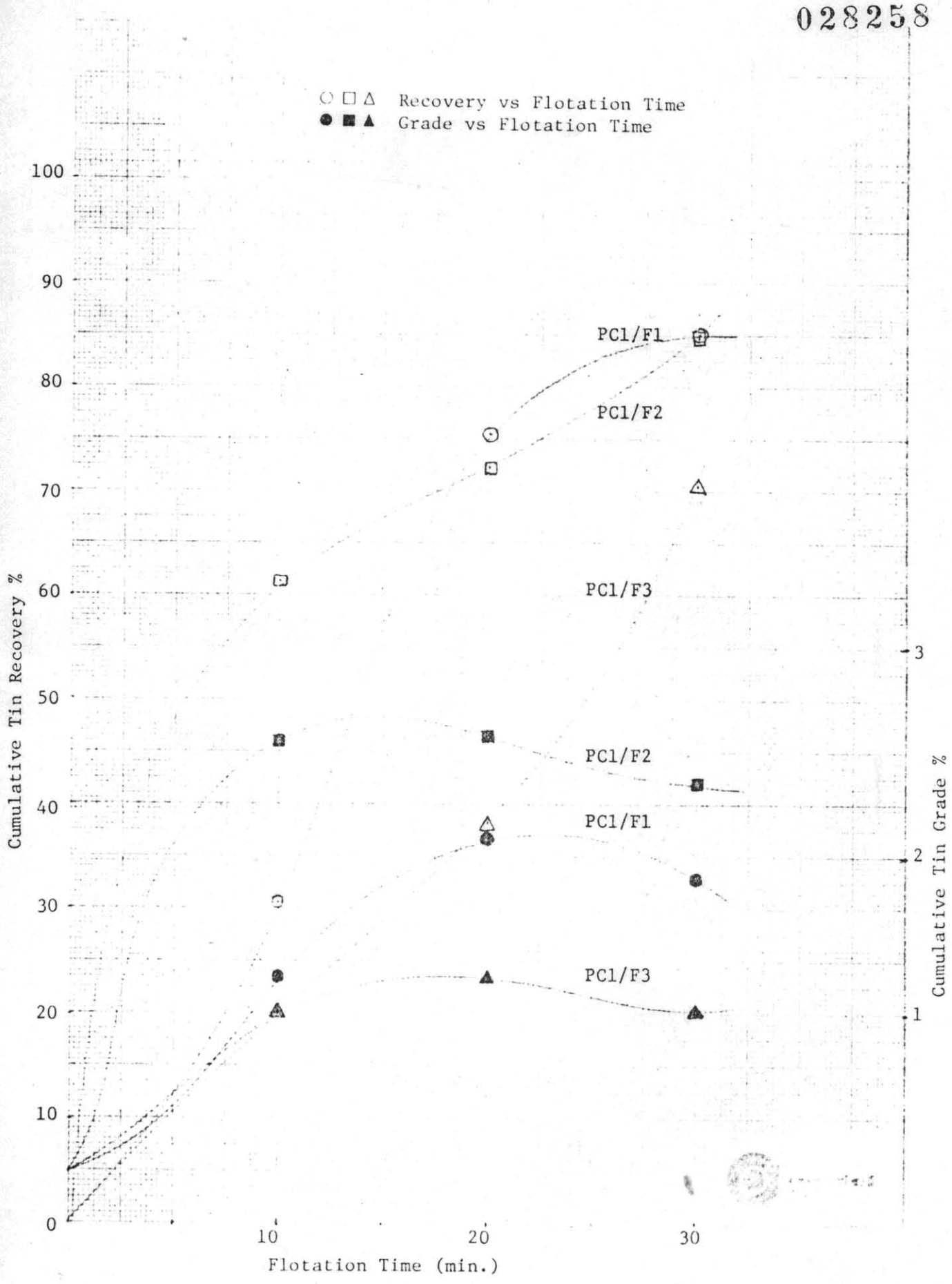


FIG. 1: CUMULATIVE TIN GRADE AND RECOVERY VS FLOTATION TIME FOR TESTS PC1/F1 TO F3

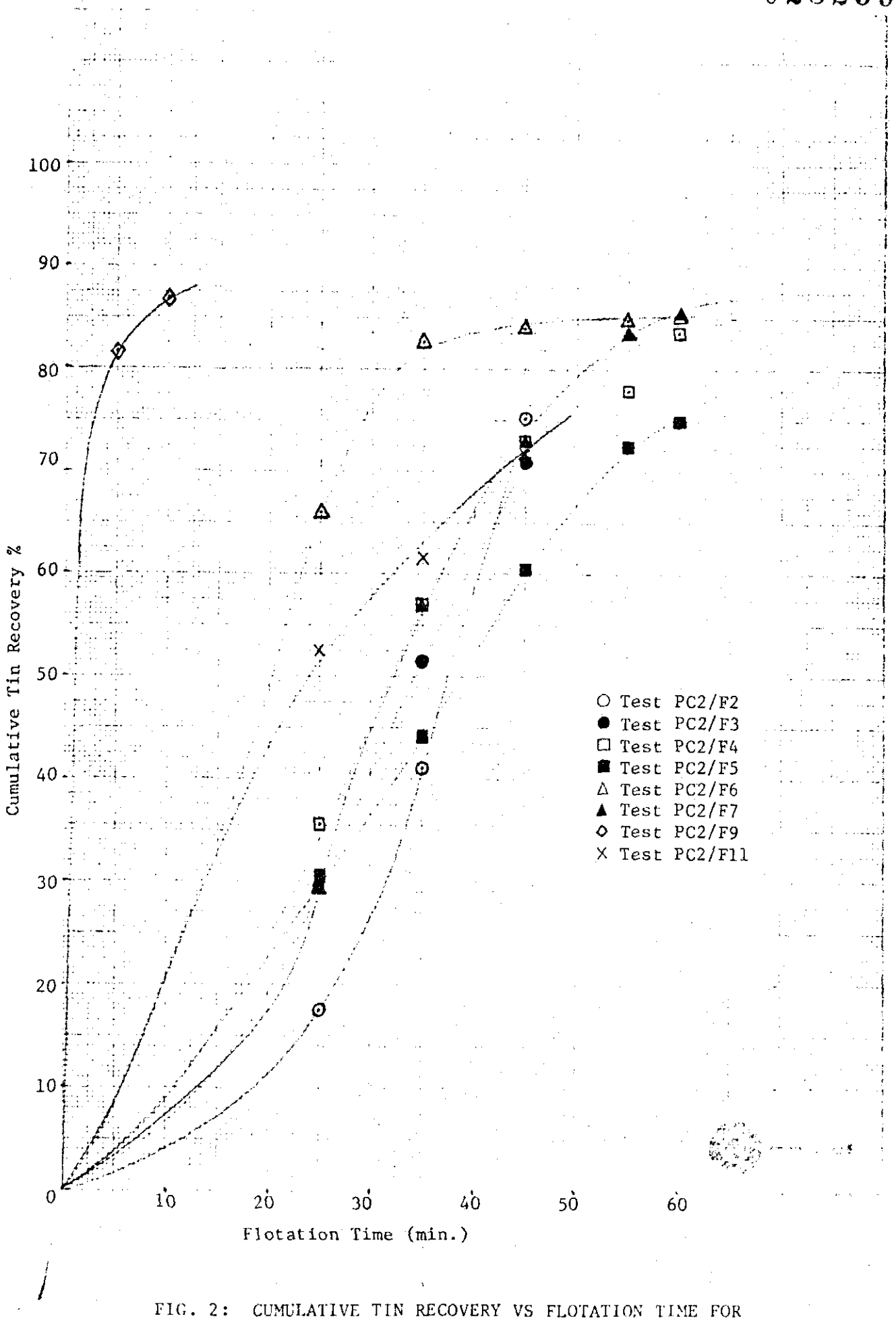


FIG. 2: CUMULATIVE TIN RECOVERY VS FLOTATION TIME FOR TESTS PC2/F2-F7, F9, F11

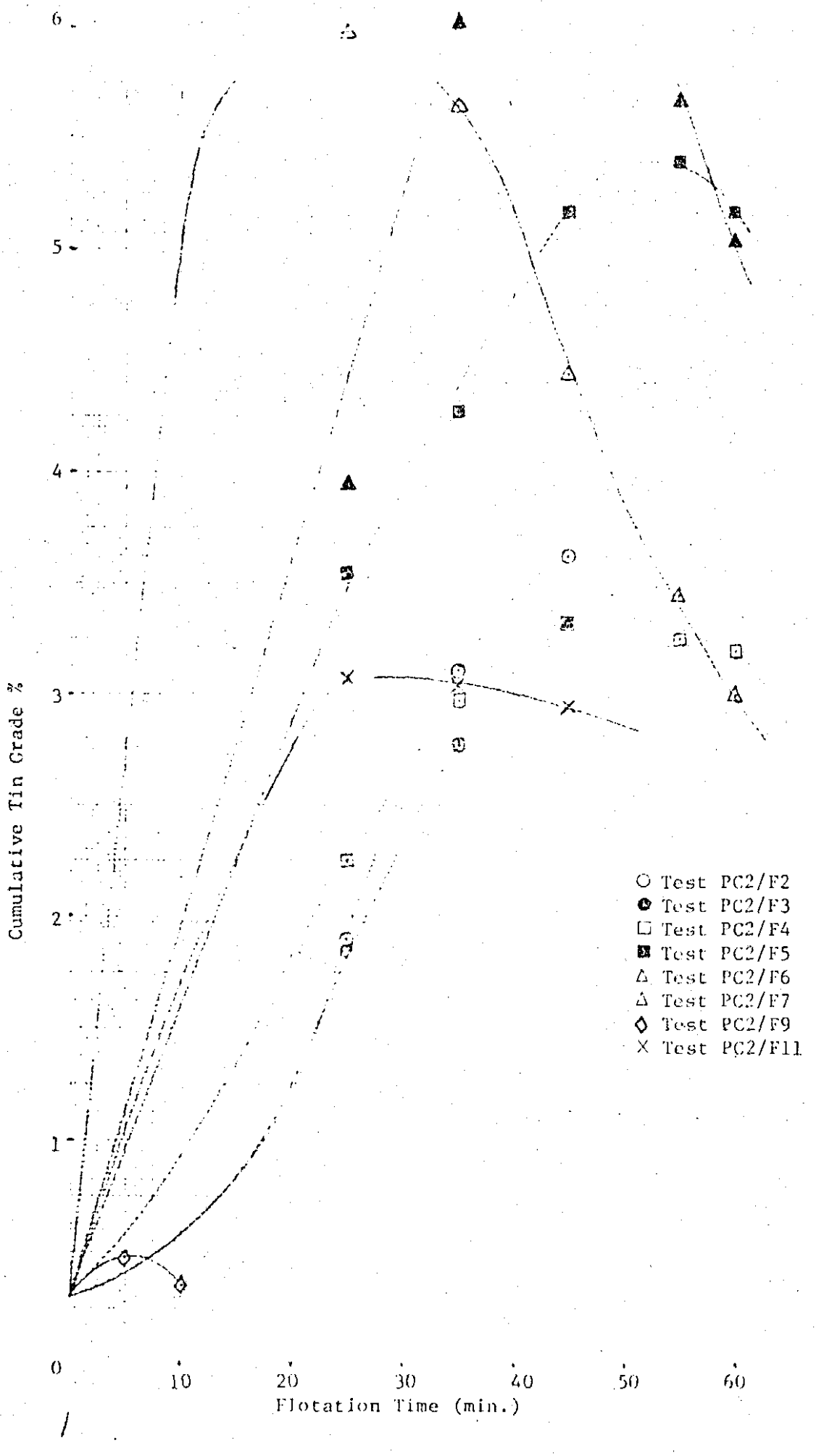


FIG. 3: CUMULATIVE TIN GRADE VS FLOTATION TIME FOR TESTS PC2/F2-F7, F9, F11

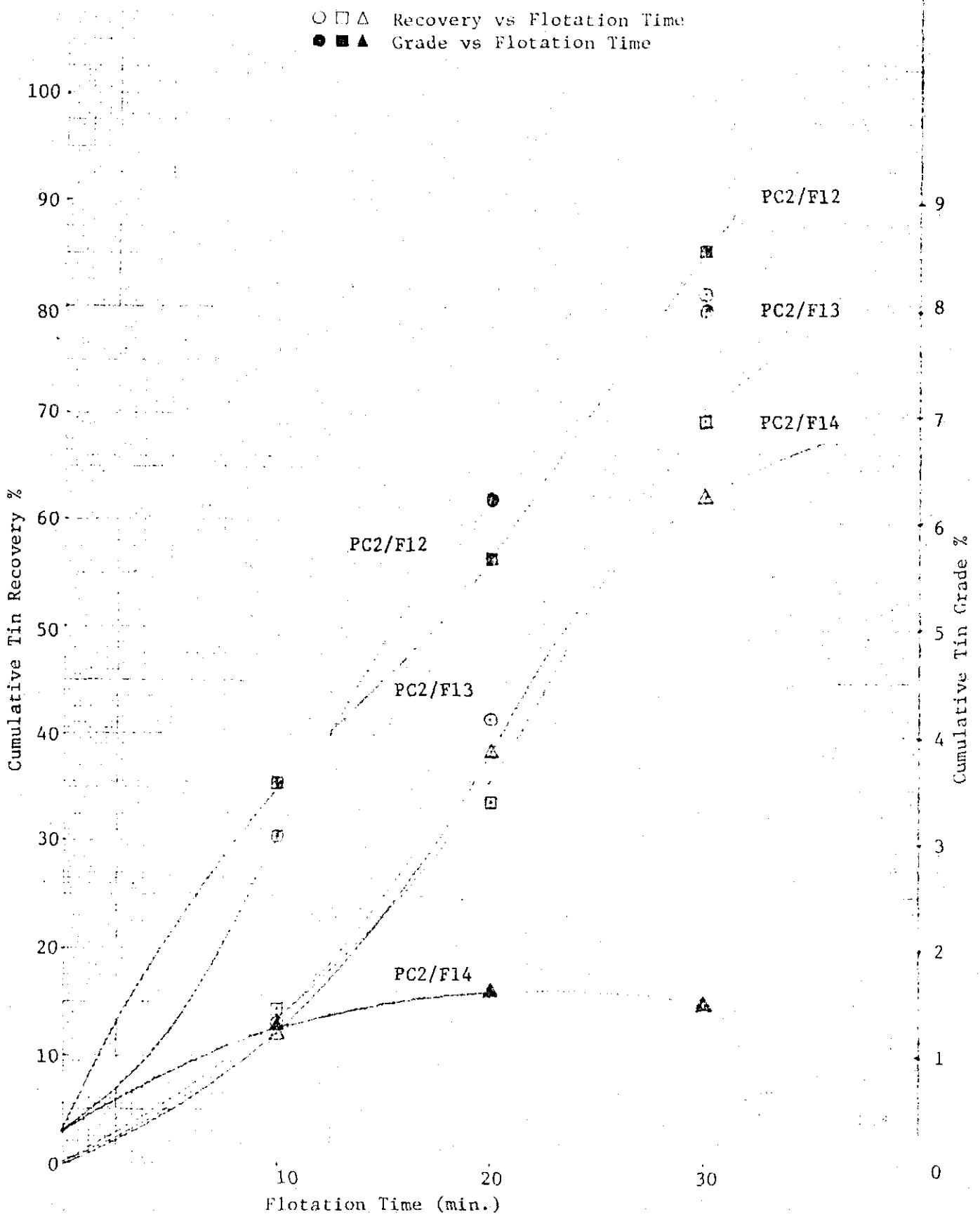


FIG. 4: CUMULATIVE TIN GRADE AND RECOVERY VS FLOTATION TIME FOR TESTS PC2/F12 TO 14

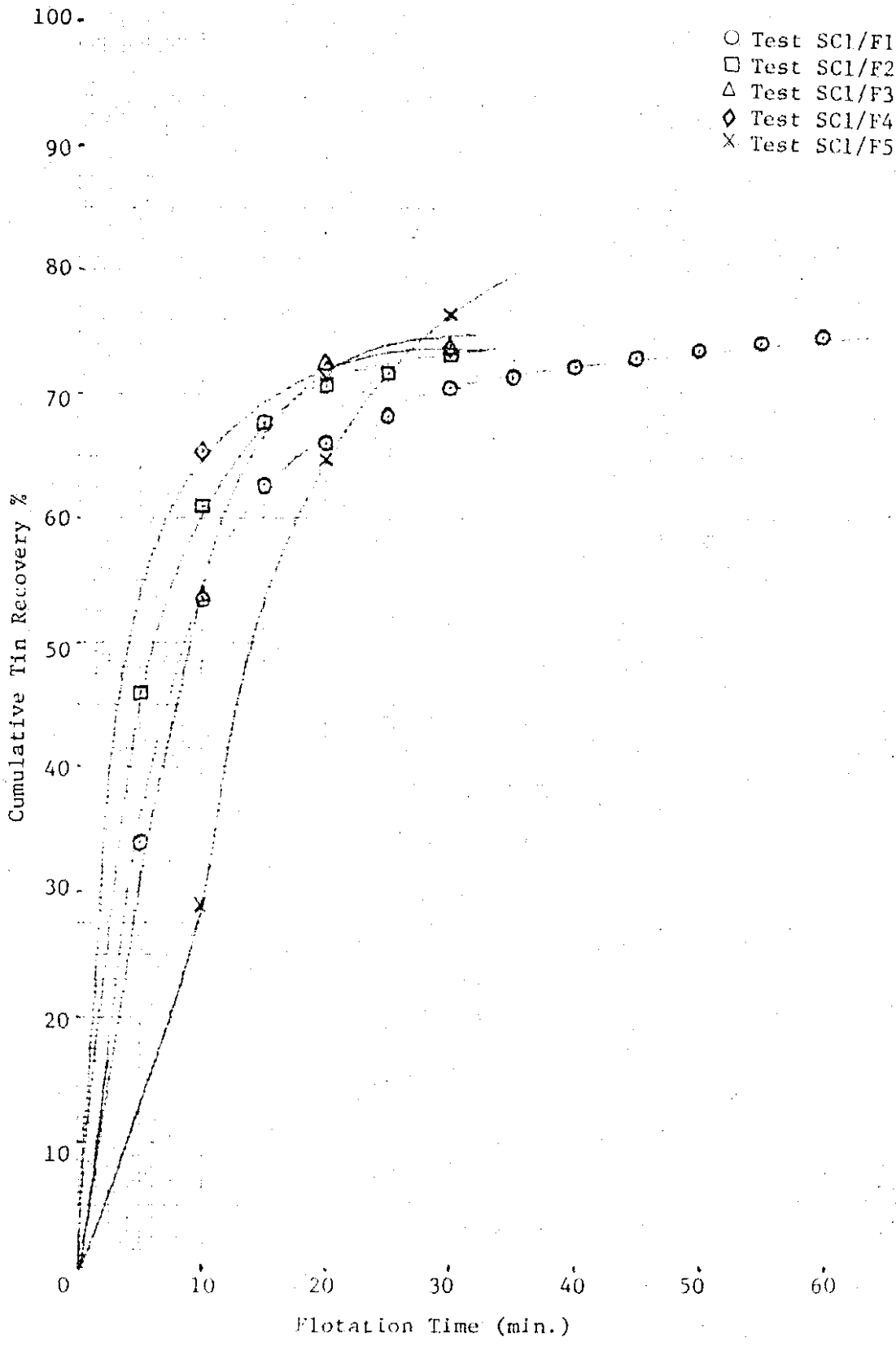


FIG. 5: CUMULATIVE TIN RECOVERY VS FLOTATION TIME FOR TESTS SC1/F1 TO F5

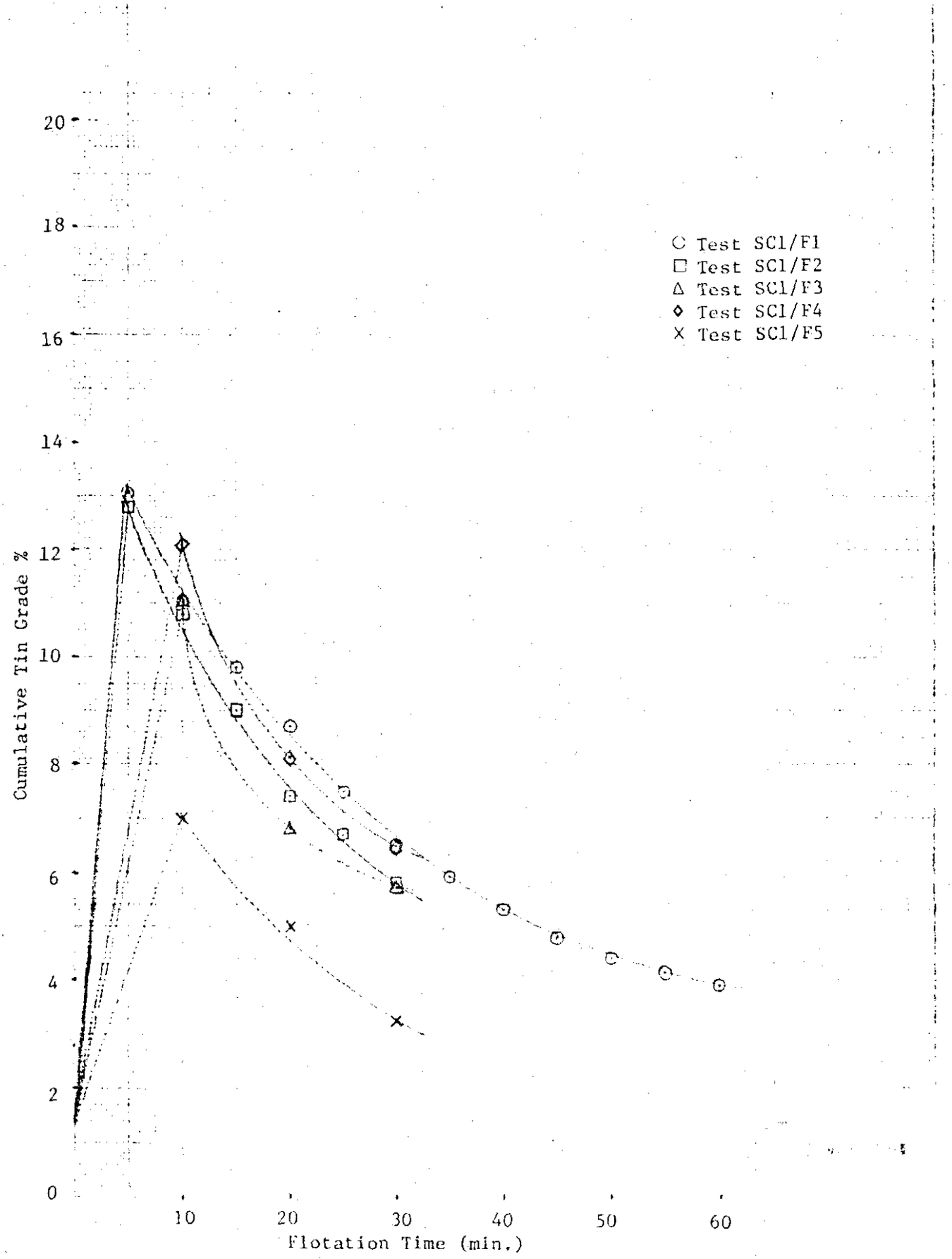


FIG. 6: CUMULATIVE TIN GRADE VS FLOTATION TIME FOR TESTS SC1/F1 TO F5

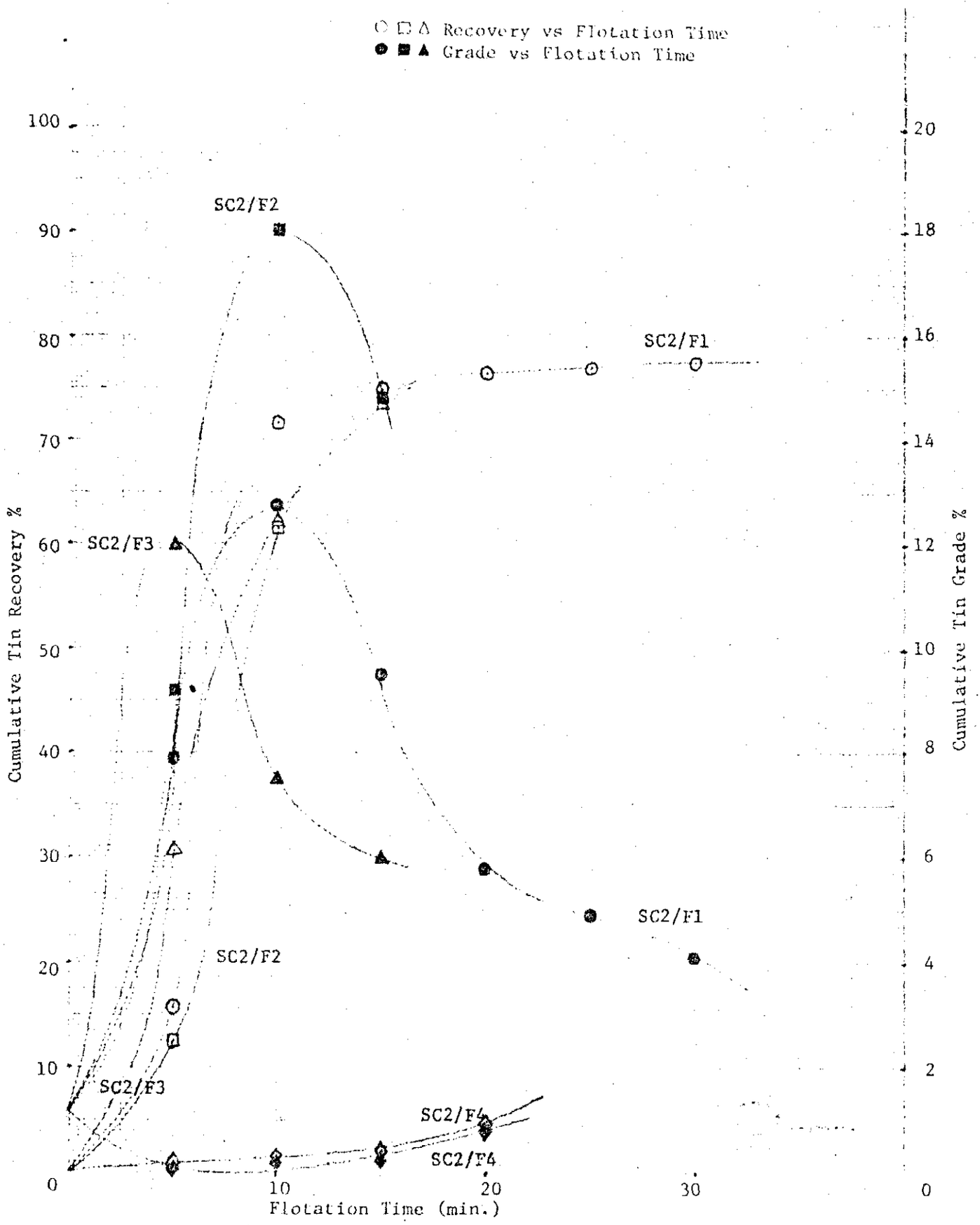


FIG. 7: CUMULATIVE TIN RECOVERY AND GRADE VS FLOTATION TIME FOR TESTS SC2/F1 TO F4

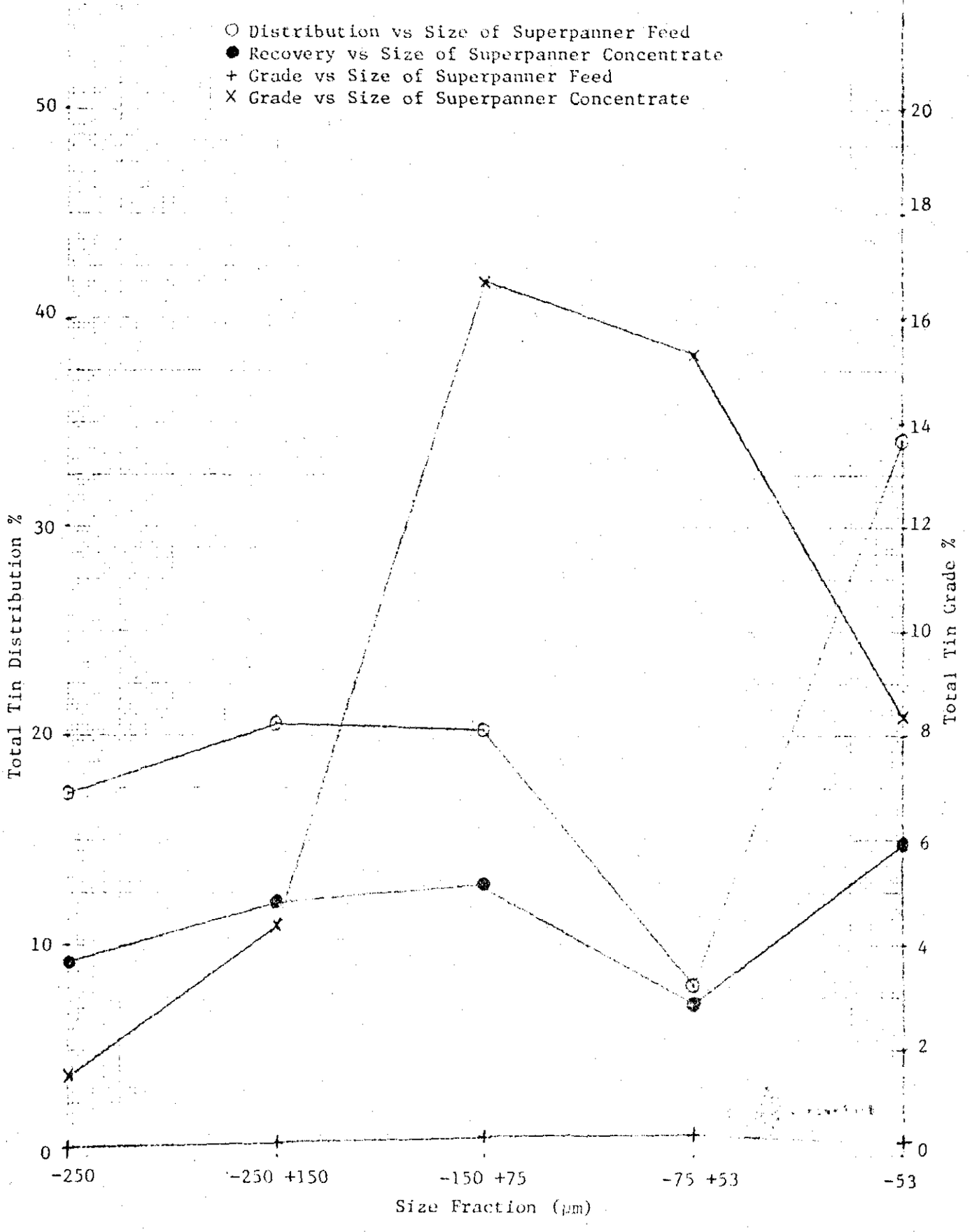


FIG. 8: PERFORMANCE OF SUPERPANNER TEST ON PC1/BF SULPHIDE MID + TAIL

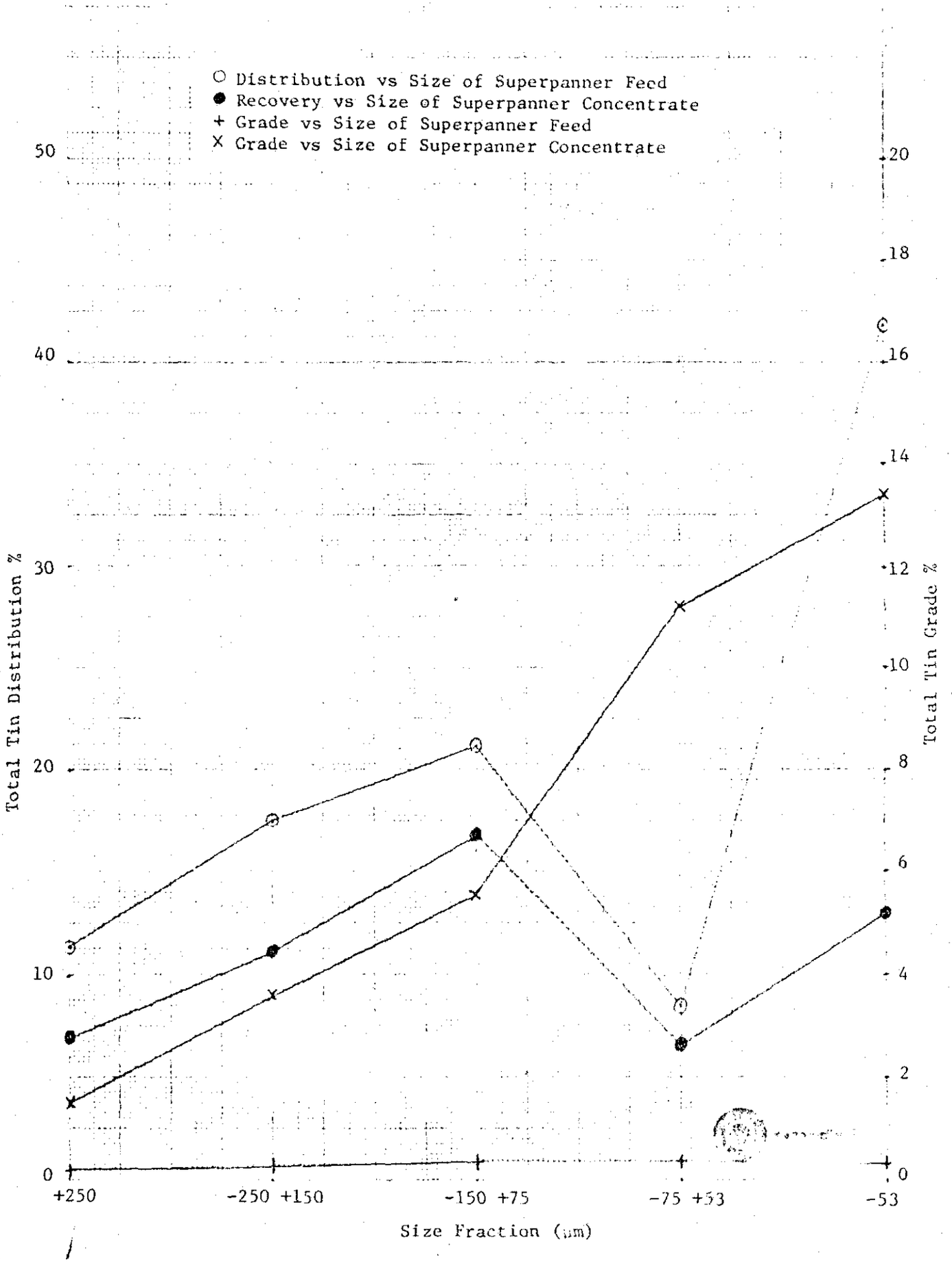


FIG. 9: PERFORMANCE OF SUPERPANNER TEST ON PC2/BF SULPHIDE MID + TAIL

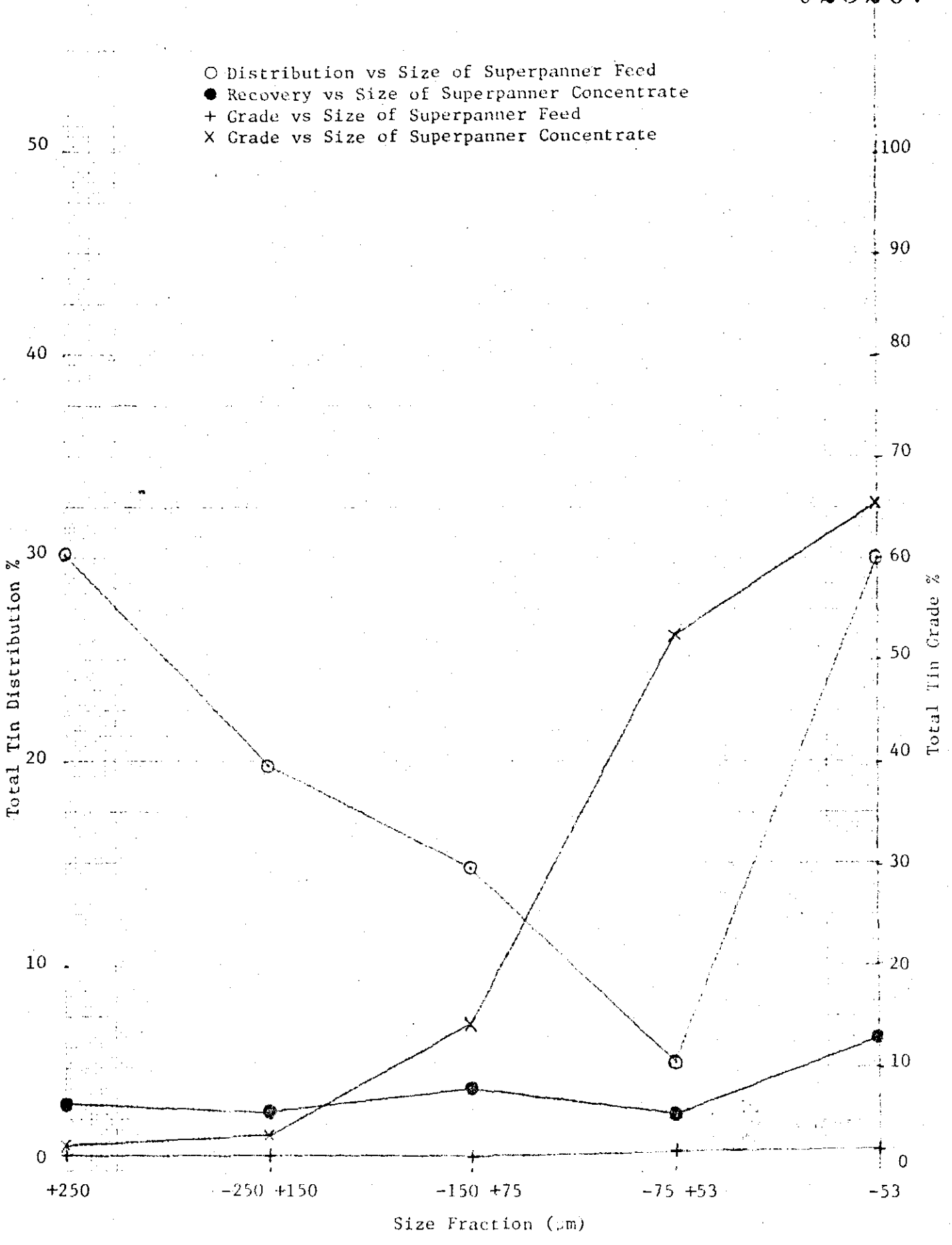


FIG. 10: PERFORMANCE OF SUPERPANNER TEST ON SC1/BF SULPHIDE RO TAIL

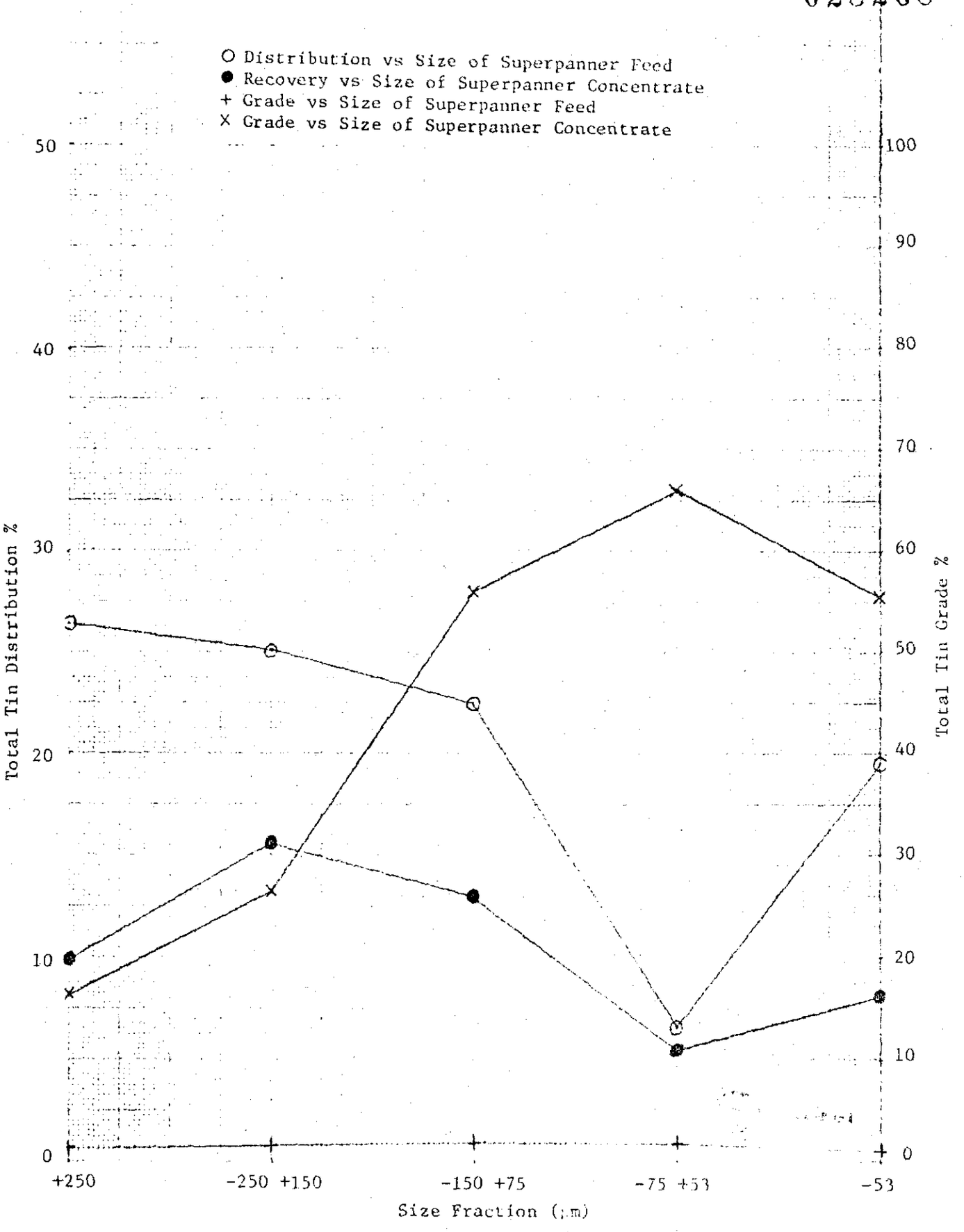
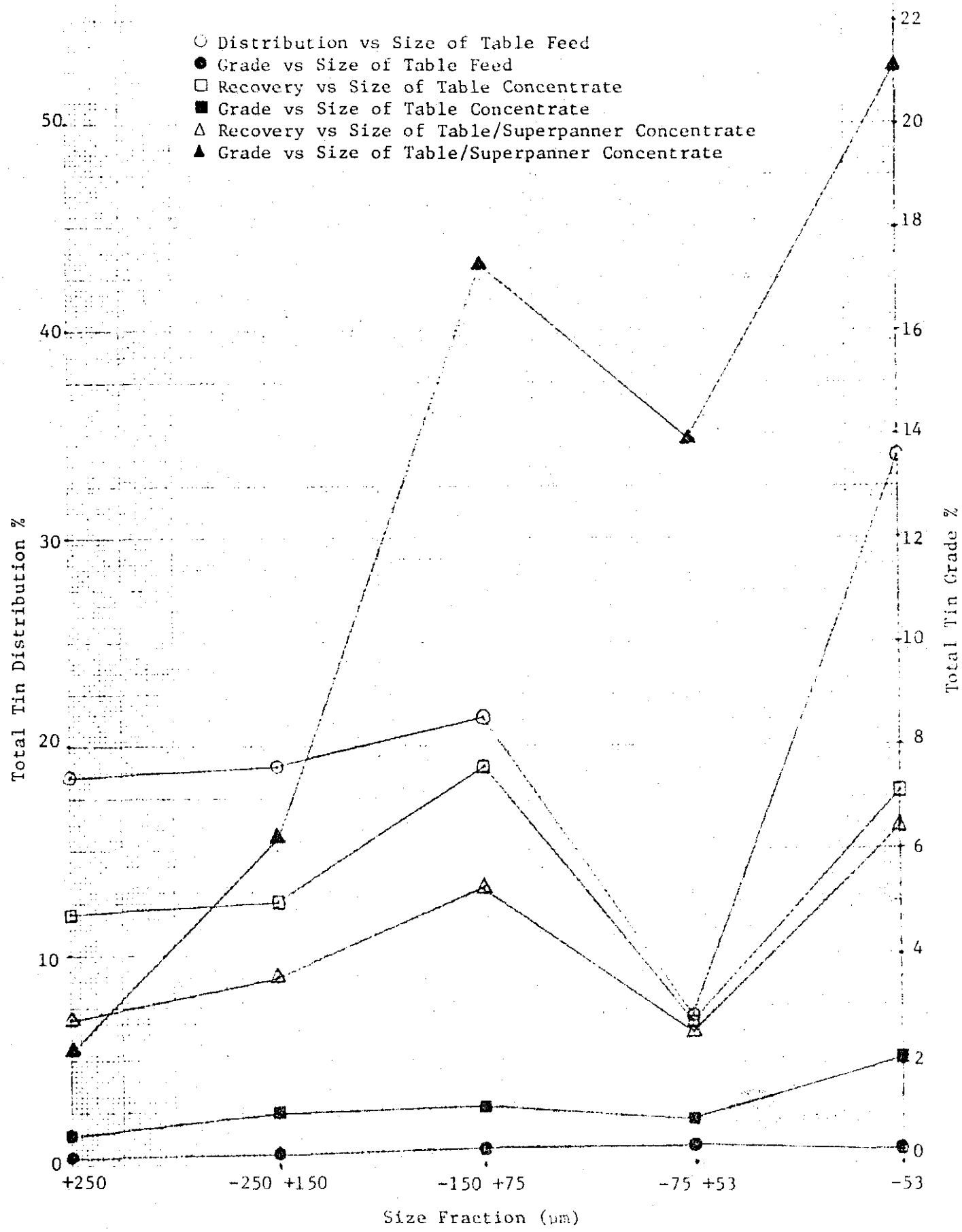


FIG. 11: PERFORMANCE OF SUPERPANNER TEST ON SC2/BF SULPHIDE RO TAIL



FIG/ 12: PERFORMANCE OF TABLE/SUPERPANNER TEST ON PCI/BF SULPHIDE MID + TAIL

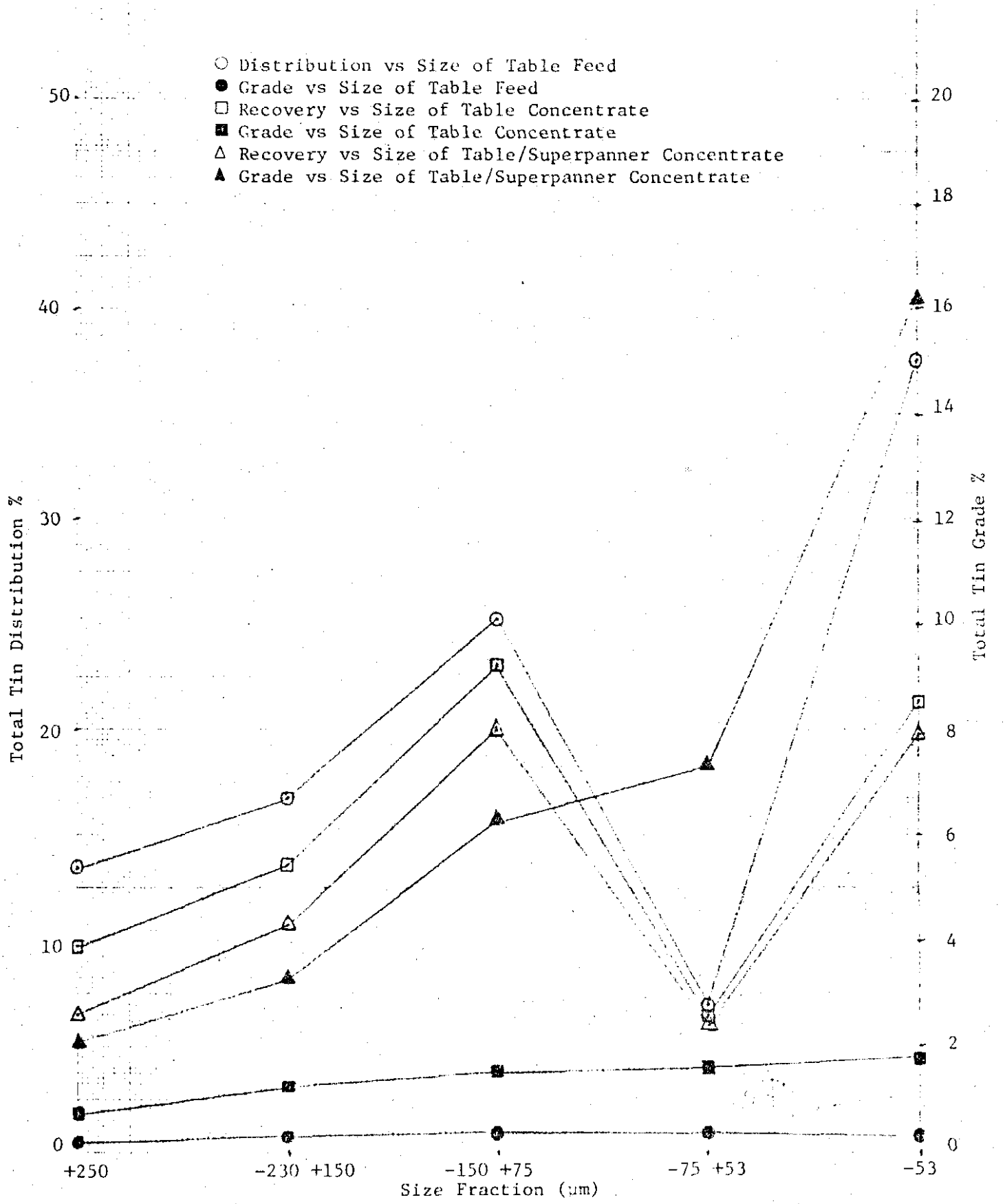


FIG. 13: PERFORMANCE OF TABLE/SUPERPANNER TEST ON PC2/BF SULPHIDE MID + TAIL

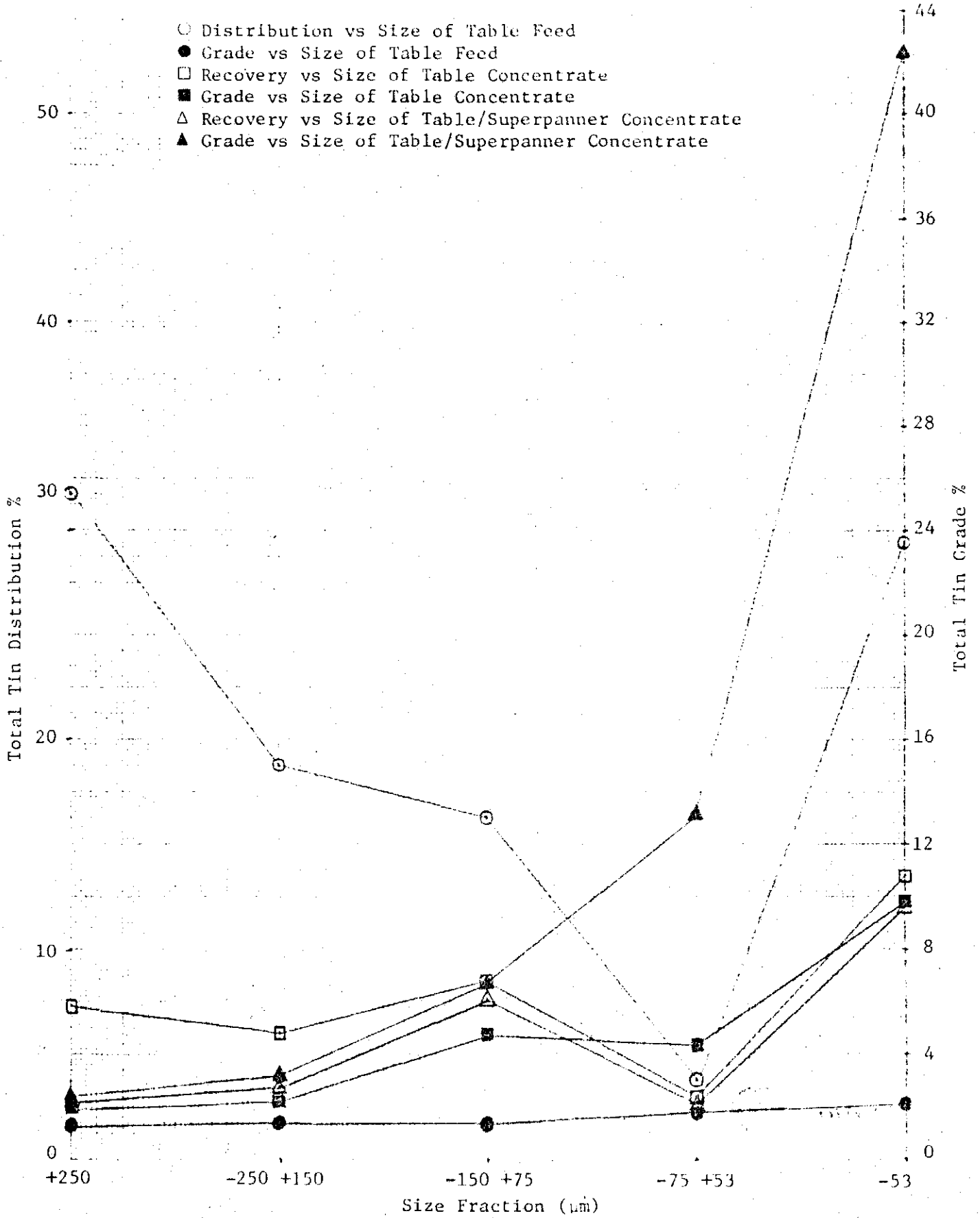


FIG. 14: PERFORMANCE OF TABLE/SUPERPANNER TEST ON SCI/BF SULPHIDE RO TAIL

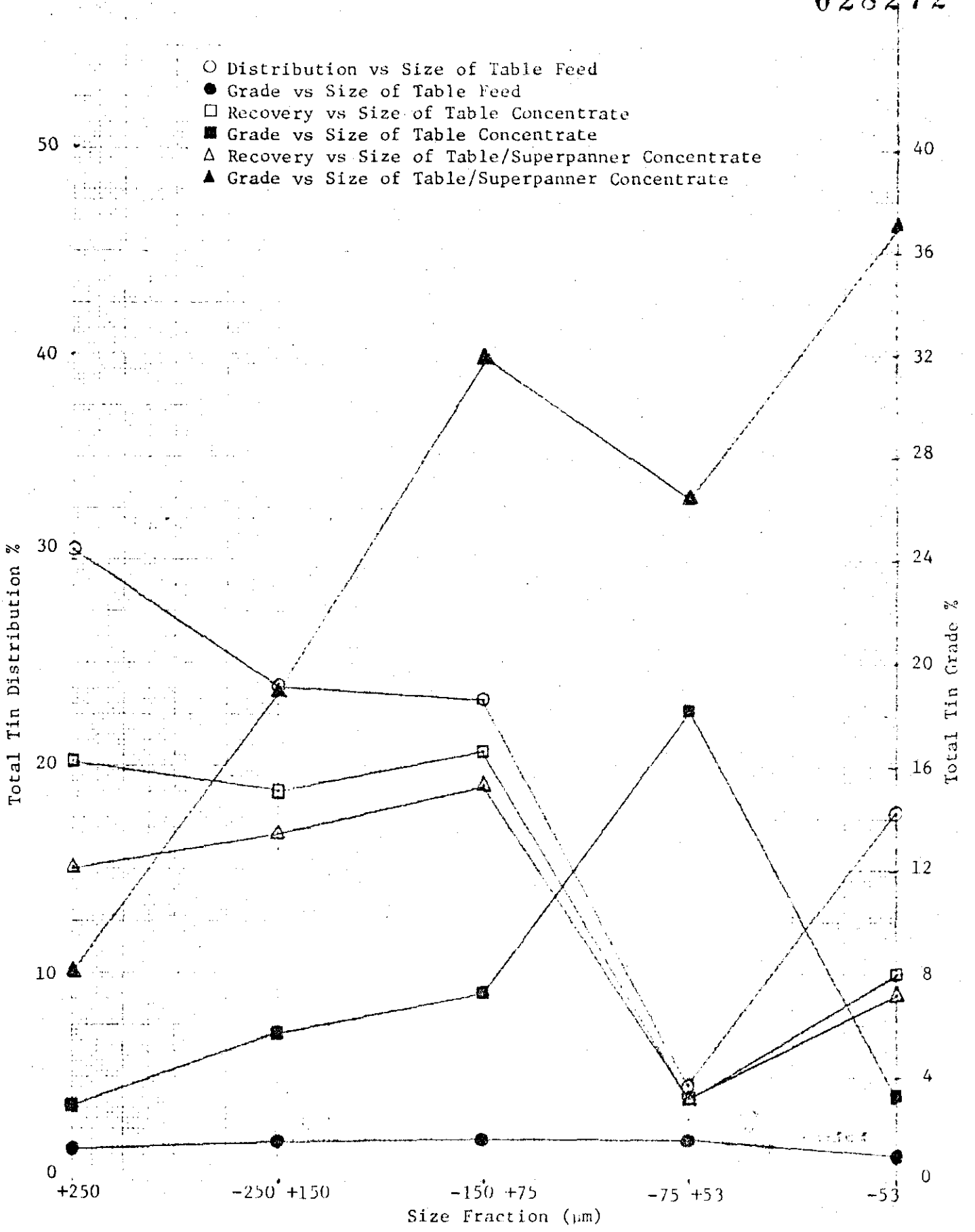


FIG. 15: PERFORMANCE OF TABLE/SUPERPANNER TEST ON SC1/BF SULPHIDE RO TAIL

028273

MT. BISCHOFF TIN PROSPECT

EXPLORATION LICENCE 13/79

TASMANIA

REPORT ON STAGE 2B PROGRAMME

VOLUME 3

DISTRIBUTION: Copy No. 1 Department of Mines, Tasmania
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15th August, 1980

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028274

VOLUME 3

Diamond Drill Logs - "OLD" CORE

B1 to B7

B9, B10

B12 to B14

B17

B20, B21

B22 to B27

B32, B33

B44

B47

AAB1 to AAB5

REPORT No. 510

028275

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B1

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1952 mN	* 960 mE	* 648 m
(2) old	1000 ft.N	−1195 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

333°	magnetic
003°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3	1:100 000 Sheet No. 8015	State Tasmania

Mineral Tenement (1980): E.L. 13/79 — Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Inclination at collar: 45°

Total length: 74·676 m

Date drilled:

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY	LOGGED BY	LOGGED BY
A. JANNINK		
FROM 0 TO 74·7	FROM TO	FROM TO
DATE 26 NOV 79	DATE	DATE

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B1

Log sheet 1 of 2

028270

Depth	Description	Sample	Structural	Mineralisation	Notes
0	0-1.2 No Core				
4	1.2-8.8 CLAYEY DOLOMITE (7.6) Pale grey / brown. Very soft. Very broken. Mainly clay material Probably oxidized shaley dolomite	2		No sulphides	0
8	8.8-19.8 DOLOMITE (11.0) Cream white / Light grey Mainly massive, structureless with rare brecciation Rare thin carbonate stringers Dolomite becomes recrystallized towards base	2		No Sulphides	0
12	14.2-19.8 25% talc and carbonate content Talc is apple to dark green often in small spherical developments from 2mm to 10mm rarely 100mm Carbonate is white in irregular replacement of dolomite up to 100mm		←16.5: +15mm vein, 15°, vuggy py trace qtz, po, arsenopyrite (oxidized)	po>>py trace sp In blebs and disseminated in talc / carbonate, rarely disseminated in dolomite	1%
16					
20	19.8-48.2 DOLOMITE SULPHIDE LODE (28.4) 19.8-27.4 50-70% silver/bronze pyrrhotite 30-50% Light to dark green/grey talc with lesser white/grey carbonate Virtually massive pyrrhotite, partly mottled appearance 25.0-25.7 Limonitic and highly oxidized	4/6		pyrrhotite Trace py, fluorite, weak trace cp, sp Massive	50-70%
24					
28	27.4-32.6 50-70% pale grey/cream talc 30-50% pyrrhotite, silver/bronze colour Mottled and irregularly banded appearance	6/4		po trace py, sp Banded and disseminated	30-50%
32	32.6-33.5 70% white/grey carbonate minor quartz 30% silver/bronze pyrrhotite minor pyrite Mottled and irregularly banded appearance	8/4		po>>py disseminated	30%
36	33.5-36.5 70% green/grey talc 30% pyrrhotite - up to 50% in parts Some banding and foliation otherwise mottled appearance	6/4		po Banded and disseminated	30%
40	36.5-39.2 50% silver/bronze pyrrhotite 50% dark grey/green talcy serpentinite Pyrrhotite varies from 10% to 80% in irregular blebs, disseminated and massive	4/7		po minor py, cp massive, disseminated and in blebs	50%
44	39.2-48.2 70% pale blue/green and cream talc 30% silver/bronze pyrrhotite varying from 10% to 50% Minor carbonate at start Generally mottled appearance with some irregular banding towards base	6/4	←42.2: 10mm vein, 25°, carbonate	po disseminated and banded Strong cp at 39.3	30%
48	48.2-51.2 SILTSTONE minor QUARTZITE (3.0) Pale grey, slight greenish tinge in places. Silicified, hard. Poor to no bedding. Slight disruption Gradual change to	10/11	←49.7: 13mm vein, 35°, po minor py	po and py Disseminated and occasional blebs	1-2%
52	51.2-55.5 SILTSTONE minor SILTY SHALE (4.3) Pale grey, slight greenish tinge in places Moderately bedded, folded, some disruption Numerous thin irregular carbonate stringers	10/9	←51.6: +30mm vein, 10°, carbonate, qtz, sp, minor po, py, fluorite ← Bedding 55°, variable ← 53.7: +20mm vein, <5°, carbonate, sp, qtz, py, po	po>>py In veinlets, stringers, disseminated and along bedding (up to 7% in places)	3%
56	55.5-61.9 QUARTZITE minor SILTSTONE (silicified) (6.4) Pale grey, hard, Poorly bedded, minor brecciation Minor carbonate veinlets	11/10	← ? Bedding 65° ←60.1: agg 30-40mm veins, qtz, carbonate trace fluorite, cassiterite	po>>py Finely disseminated, along bedding, in blebs and stringers po>>py Disseminated, in stringers minor blebs	7-10% 1-2%
60					
	61.9-62.5 TUFF Pale grey/green matrix with white, orange and black fragments up to 2mm diameter	12	←62.5 Contact 25°	py	Weak Trace
64	62.5-66.2 SILTSTONE and SILTY SHALE (3.7) Pale to medium grey Moderately well bedded, disrupted, folded	10/9	← Bedding 60°	po>py In stringers, disseminated minor blebs	2%
68	66.2-68.1 TUFF (1.9) Pale grey matrix with white, orange, grey and black fragments. Rare siltstone interbeds	12	←66.2 Contact 40° ←68.1 Contact 65°	po and py Mainly in first metre. Disseminated	1-2%
72	68.1-74.7 QUARTZITE with lesser SILTSTONE (6.6) Pale to medium grey, hard. Interbedded. Quartzite tends to Fine Grained Sandstone. Moderately to poorly bedded, brecciated (especially in upper part), some disruption.	11/10	← Bedding 25° ←71.1: agg 120mm vein, 65°, carbonate, qtz, py minor sp trace po ← Bedding 60°	po and py Disseminated, in stringers, occasional blebs	<1%
76	END OF HOLE 74.7m				

5 cm

Drill Advance	Drill Recovery	Core Recovery	Drill Log Depth	Graphic Log	Structural and Vein Information	Mineralisation	Notes

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
inserted about 15 mm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT BISCHOFF
Logged by: A. JANNINK date 26/11/80

HOLE No. B1
LOG SHEET 2 OF 2
from 0 m. to 74.7 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
96428		19.8	21.8	2.0	3300									
29		21.8	23.8	"	310									
30		23.8	25.8	"	3200									
31		25.8	27.8	"	1.86%									
32		27.8	29.0	1.2	1.32%									
33		31.7	33.7	2.0	1.63%									
34		33.7	35.7	"	2.12%									
35		35.7	37.7	"	3700									
36		37.7	39.7	"	680									
37		39.7	41.7	"	100									
38		41.7	43.7	"	75									
39		43.7	45.7	"	16									
96440		45.7	48.2	2.5	12									

Notes :— XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B1

SAMPLE TYPE : DRILL CORE FROM 19.8 TO 48.2

1282

028278

REPORT No. 510

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B2

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	1965·35 m N	998·49 m E	644·22 m
(2) old	1085 ft. N	−1075 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar

333°	magnetic
003°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3	1:100 000 Sheet No. 8015	State Tasmania

Inclination at collar: 55°

Total length: 59·741 m

Mineral Tenement (1980): E.L. 13/79

Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled:

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8	1963-64	: Mt. Costigan Mines Pty. Ltd.
B9 to 38, B44 and B46 to 60	1964-68	: Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)
AAB1-5,8	1970	: Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 59·7 — DATE 29 NOV 79

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B2

Log sheet 1 of 2

			0	0 - 4.3 No CORE			
4.5	4.2	93	4.3	4.3 - 8.8 DOLOMITE and RECRYSTALLIZED DOLOMITE (4.5) 70% former, 30% latter Dolomite is cream/white/grey, with very thin (<1mm) stringers. Some brecciation, otherwise structureless. Partial alteration has produced white carbonate, apple green talc, minor dark serpentinite and quartz. Some zones up to 30cm are totally replaced.	2/3	po > py Disseminated Content varies from barren in dolomite to 7-10% in BSL	2-3%
			8				
0.5	0.5	12	8.8	8.8 - 9.3 SILTSTONE Medium grey, brecciated, tuffaceous at base	10	← Bedding 40°	py > py Disseminated	2%
0.4	0.4	100	9.3	9.3 - 12.1 DOLOMITE (2.8) Pale grey, massive, occasional thin carbonate stringers 9.3 - 9.5 Dolomite Sulphide lode Dark green talc and white carbonate/quartz with minor dolomite. Mottled appearance	2	py > py Disseminated po Disseminated	2-3% <1%
1.7	1.7	100	12				
6.0	0.8	13	12.1	12.1 - 31.7 DOLOMITE SULPHIDE LODE (19.6) 12.1 - 13.1 75% Carbonate/quartz (white to colourless) with minor pale green talc 25% Silver/bronze pyrrhotite Mottled appearance minor irregular banding 13.1 - 25.9 75% Cream to pale brown and green talc 25% bronze/silver pyrrhotite, minor pyrite Mottled and disseminated appearance Very broken and oxidized core. Poor recovery	8/4		po Disseminated and locally massive	25%
			16				
7.8	1.5	19	20		6/4		po minor py Disseminated	25%
			24				
2.8	2.8	100	25.9	25.9 - 26.9 50-60% Carbonate/quartz (white to cream) with minor pale green to cream talc 40-50% bronze/silver pyrrhotite Mottled appearance	8/4		po trace py Massive and disseminated	40-50%
0.9	0.9	100	26.9	26.9 - 31.7 Carbonate/quartz, pale grey to white, with minor green to cream talc Mottled appearance with minor irregular banding	8		po >> py trace cp varying from 1-10% Disseminated	5%
3.6	3.6	100	28					
			32					
2.2	2.2	100	31.7	31.7 - 34.3 DOLOMITE (2.6) Pale grey, massive, featureless	2		po trace sp Disseminated minor veinlets 3% at start, barren at base	<1%
0.9	0.9	100	34.3	34.3 - 42.0 SILTSTONE minor SILTY SHALE (7.7) Medium to pale grey, slightly greenish Moderately to poorly bedded, much disrupted, some brecciation 35.0 - 35.1 Pale grey dolomite with some thin pyrrhotite veining 38.0 - 38.3 Slightly tuffaceous with small (<1mm) black and yellow fragments	10/9	↙ 34.9 + 30mm vein, qtz, carbonate, py ↙ 35.0 Contact 40° ← Bedding 45° ← Bedding 60°	py > po & Disseminated, in stringers, veins, and po in blebs. 41.5 - 42.0 2% po	<1%
2.4	2.4	100	36					
2.5	2.5	100	40					
0.6	0.6	100	42					
1.5	1.5	100	42.0	42.0 - 43.9 QUARTZITE (1.9) Pale to medium grey. Massive, slightly bedded. Slightly feldspathic and ? tuffaceous	11	↙ 42.0 Contact 55° ← Bedding 70° ↙ 43.9 Contact 70°	po Disseminated, in blebs and veinlets	<1%
3.3	3.3	100	44					
12	12	100	43.9	43.9 - 55.9 SILTSTONE with lesser SILTY SHALE and minor QUARTZITE (12.0) Medium grey. Moderately bedded, much disrupted, some brecciation, minor folding.	10/9	← Bedding 60°	py > po In stringers, minor finely disseminated	1%
2.5	2.5	100	48				po > py In stringers (especially running along bedding), blebs, minor veins	
3.0	3.0	100	52	51.8 50cm tuffaceous breccia zone with fragments up to 1cm. Stamped zone		← Bedding 75° ← 52.7: 60mm vein, 70°, qtz minor carbonate, py ↙ 55.7: 20mm vein, 55°, wispy py, minor carbonate, qtz		3-5%
1.0	1.0	100	56					
5.4	5.4	100	55.9	55.9 - 59.7 QUARTZITE minor SILTSTONE (3.8) Interbedded. Medium to pale grey, siltstone slightly darker. Massive apart from silty sections Frequent thin pyrrhotite veins	11/10	← Bedding 65°	po Finely disseminated, in veins and stringers, in blebs along bedding Varying from 5 to 10%	7%
			60	END OF HOLE 59.7m				

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
inserted about 95mm

GRAPHIC LOG
STRUCTURAL AND VEIN INFORMATION
MINERALISATION
NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT BISCHOFF
Logged by: A. JANNINK date 29/11/80

HOLE No. 82
LOG SHEET 2 OF 2
from 0 m to 59.7 m

REPORT No. 510

028280

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B3

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1948 m N	* 999 m E	* 644 m
(2) old	1040 ft. N	−1055 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar

	magnetic
	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3	1:100 000 Sheet No. 8015	State Tasmania

Inclination at collar: VERTICAL

Mineral Tenement (1980): E.L. 13/79 — Holder (1980): Metals Exploration Ltd.

Total length: 61.874 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled:

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8	1963-64	: Mt. Costigan Mines Pty. Ltd.
B9 to 38, B44 and B46 to 60	1964-68	: Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)
AAB1-5,8	1970	: Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY	LOGGED BY	LOGGED BY
A. JANNINK		
FROM 0 TO 61.9	FROM ____ TO ____	FROM ____ TO ____
DATE 8 DEC 79	DATE ____	DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B3

Log sheet 1 of 2

028281

Depth	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
0	0-?5.5 No CORE				
4					
8	?5.5-19.7 DOLOMITE (14.2) Pale grey and cream, usually massive and featureless. Minor brecciation, minor recrystallization. Occasional very fine black (?Fe-Mn) stringers			po > py Disseminated, often barren	<1%
12		2			
16	14.0-14.2 Dolomite Sulphide Lode: Quartz/Carbonate with minor dolomite and pyrrhotite/pyrite 15.1-15.3 Dolomite Sulphide Lode: 50% pyrite, 10% pyrrhotite, 40% quartz/carbonate with minor talc 15.7-15.9 Dolomite Sulphide Lode: 70% quartz/carbonate, minor dolomite, 30% pyrite minor pyrrhotite 17.5-17.8 Dolomite Sulphide Lode: Quartz/carbonate, minor dolomite trace pale green talc. 18.3-18.9 Dolomite Sulphide Lode: Green/grey talc, trace quartz/carbonate			po > py Disseminated and blebs po > py Disseminated often barren py >> po Massive po > py Disseminated often barren py > po Disseminated po > py Disseminated often barren po Disseminated po > py Disseminated often barren	10% <1% 60% <1% 30% <1% 1% <1%
20	19.7-56.1 DOLOMITE SULPHIDE LODE (36.4) 19.7-24.2: Grey green talc with minor carbonate/quartz	6/8		po Disseminated	1%
24	24.2-29.2: Cream/white quartz/carbonate, minor grey dolomite, minor cream/green talc, sulphides increase with depth. Mottled appearance, some brecciation 27.3 Some sandy dolomite	8	← Bedding 25°	po > py Disseminated, in blebs, in stringers py and po Disseminated to blebs/Massive	3-5% 25%
28	29.2-37.2: 60% bronze/silvery pyrrhotite 40% cream to grey/green talc Massive to disseminated with very minor irregular banding	4/6		po with 1% py, trace cp Massive to disseminated	60%
32					
36	37.2-39.7: Mixture of carbonate/quartz, (colourless to white) Serpentinite (dark green to grey) and lesser talc (cream to apple green) and pyrrhotite. Mottled appearance 39.7-40.8: 80-90% creamy talc 10-20% pyrrhotite minor pyrite Disseminated, rare banding	8/7/6/4 6/4		po >> py trace cp Disseminated po minor py Disseminated, rare banding	10-20% 10-20%
40	40.8-45.6: 70% bronze pyrrhotite 30% white carbonate/quartz with lesser apple green to grey/green talc and minor dark serpentinite Massive or mottled appearance	4/8		po trace py, cp Varies from 50% to 90% Massive in places	70%
44	45.6-52.4: 70-80% cream to grey/green talc with trace dark grey serpentinite and white quartz/carbonate 20-30% bronze pyrrhotite Generally mottled with occasional irregular banding	6/4	← 48.8: 60mm slug of arsenopyrite minor po	po Disseminated	20-30%
48					
52	52.4-54.4: 80% Dark green to black serpentinite with lesser grey/green and cream talc minor white carbonate 20% bronze pyrrhotite Mottled appearance on a serpentinous matrix 54.4-56.1: Dark grey to black serpentinite, minor cream talc and carbonate blotches. Some thin (<1mm) carbonate stringers.	7/4 7		po trace py Disseminated, slightly banded py > po Disseminated, in blebs. Varies from 0 to 10%	20% 20 2-3%
56	56.1-57.9 QUARTZITE / SILICEOUS SILTSTONE (1.8) Pale grey, fairly massive; poorly bedded, minor brecciation	11/10	← Bedding 85°	py > po py in thin veins, po disseminated	<1%
60	57.9-61.9 SILTSTONE (4.0) Slightly greenish grey. Moderately to poorly bedded, minor disruption. Rare veins and stringers	10	← Bedding 45° ← Bedding 20°	po trace py Disseminated, partly along bedding, also in stringers, some blebs. py in veins only	3-5%
64	END OF HOLE 61.9m				

5 cm

Drill Log Depth	Core Loss	Core Recovery	Drill Log Depth	Core Loss	Core Recovery
70	1.5	21	4		
7.3	6.5	89	8		
3.4	3.4	100	12		
0.6	0.6	100	16		
0.9	0.9	100			
2.1	1.3	62	20		
2.9	2.0	69			
2.3	1.5	65	24		
1.5	1.5	100			
1.5	1.5	100	28		
3.0	3.0	100			
2.1	2.1	100	32		
0.9	0.9	100			
3.1	3.1	100	36		
1.5	1.5	100			
1.5	1.5	100	40		
3.0	3.0	100			
1.2	1.2	100	44		
4.9	4.9	100	48		
1.2	1.2	100			
1.8	1.8	100	52		
1.8	1.8	100			
2.1	2.1	100	56		
4.0	4.0	100	60		
			64		

Depth from-to: ROCK UNIT capital letters, underlined Depth: Detailed rock description and notes indented about 15mm	Graphic Log	Structural and Vein Information Attitude: Angle between fracture and core axis	Mineralisation	Notes

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project	MT. BISCHOFF	HOLE No.	B3
Logged by	A. JANNINK	date 8/12/79	LOG SHEET 2 OF 2 from 0 m. to 61.9 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
96400		17.7	19.7	2.0	110									
1		19.7	23.7	"	150									
2		23.7	25.7	"	10									
3		25.7	27.7	"	8									
4		27.7	29.7	"	120									
5		29.7	31.7	"	6									
6		31.7	33.7	"	55									
7		33.7	35.7	"	75									
8		35.7	37.7	"	290									
9		37.7	39.7	"	110									
410		39.7	40.7	1.0	3800									
11		40.7	43.7	3.0	180									
12		43.7	45.7	2.0	480									
13		45.7	47.7	"	3850									
14		47.7	49.7	"	6000									
15		49.7	51.7	"	5300									
16		51.7	53.7	"	560									
17		53.7	56.1	2.4	6100									

Notes :— XRF B. Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B3

SAMPLE TYPE : DRILL CORE FROM 17.7m TO 56.1

28820

REPORT No. 510

028283

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B4

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 1943 m N	* 962 m E	* 645 m
(2) old	970 ft.N	−1180 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar
- magnetic
- grid (1)
- grid (2)
- grid (3)
- true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Inclination at collar VERTICAL

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 60·350 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8	1963-64	: Mt. Costigan Mines Pty. Ltd.
B9 to 38, B44 and B46 to 60	1964-68	: Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)
AAB1-5,8	1970	: Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK FROM 0 TO 60·4 DATE 18 DEC 79

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B4

Log sheet 1 of 3

028284

0-4.3
Lumps of vuggy quartz, dolomite and pyrite

4.3-27.8 (23.5) **DOLOMITE**

Cream to pale grey (especially with depth) Mainly massive, featureless, bit fairly brecciated. Frequent very fine (<1mm) irregular carbonate stringers and, at depth, thin tale stringers. Occasional carbonate, minor quartz, irregular blotchy veins and in-fillings in brecciation.

po, py, sp as sparse individual grains

←13.2: 20mm vein, 60°, py minor sp

Weak Trace

po, py, sp, minor marcasite Disseminated and in blebs, stringers. Varies from 0 to 3%

1%

24.1: 60mm Quartz/carbonate lesser pyrrhotite, tale, pyrite
24.7: 50mm Talc lesser quartz/carbonate
25.3: 80mm irregular patch of carbonate trace sphalerite
26.7-27.0: Talcose dolomite and carbonate

27.8-55.4 (27.6) **DOLOMITE SULPHIDE LODE**

27.8-28.6 Creamy white quartz/carbonate, minor grey dolomite and pale green tale. Irregular blotchey appearance
28.6-31.0 Pale green serpentinite with lesser grey/black tale and white quartz/carbonate. Partly irregularly banded, partly blotchey. Broken core, oxidized + weathered
31.0-33.8 Carbonate/quartz (grey/white and colourless), minor grey/black, cream and light green tale and pyrrhotite Generally blotchey with rare irregular banding

33.8-35.4 : 70% creamy tale
30% bronze pyrrhotite
Generally mottled appearance
35.4-37.5: 90% Cream and dark green/grey tale
10% Bronze pyrrhotite
Fairly massive tale

37.5-38.9 Grey/white quartz/carbonate, minor grey dolomite and apple green tale
Rare irregular banding otherwise blotchey
38.9-40.5 Dark grey/green minor creamy tale
Massive and featureless

40.5-43.7: 60% carbonate/quartz (pale grey, white, colourless) with minor apple green talcy serpentinite
40% bronze pyrrhotite
Disseminated and mottled appearance

43.7-46.9: 50% bronze pyrrhotite
35% pale green/grey tale discrete from
15% apple to dark green serpentinite
Mottled and disseminated with minor irregular banding

46.9-52.0: 75% dark to apple green serpentinite, in parts talcy. 25% bronze pyrrhotite.

←30.7: 30mm vein, 50°, vuggy py minor q+z

po disseminated	2%
po trace py, cp Disseminated, occasionally massive	25%
po trace py, cp In blebs and disseminated with rare banding po varies from 2% to 35% 31.4-31.8 2% sp disseminated	15%
po trace py Disseminated and in irregular blebs. Varies from 10% to 50%	30%
po Irregularly disseminated varying from 3% to 30%	10%
po Irregularly disseminated	5%
po Disseminated	1-2%
po trace py, cp Disseminated and massive, up to 70% in places	40%
po trace py, cp Mottled and disseminated	50%
see page 3	25%

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15mm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT BISCHOFF
Logged by: A. JANNINK date 18/12/79

HOLE No. B4
LOG SHEET 2 OF 3
from 0 m. to 48 m.

028285

DRILL ADVANCE	LOST CORE ZONE	% RECOVERY ESTIMATE	CORE LENGTH RECOVERED	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
1.8				Trace carbonate Blotchey and mottled appearance	48					po trace cp In blebs and disseminated	25%	
1.7												
1.2	1.0	100	18				7/4					
3.1	3.3			52.0 - 53.3: 75% cream to pale grey talc 25% pyrrhotite Mottled appearance	52		6/4			po Disseminated and in blebs	25%	
				53.3 - 53.9: Dark green/black talcy serpentinite with minor quartz/carbonate. Blotchey appearance			7			No sulphides	–	
2.1	2.1	100		53.9 - 55.4: 85% cream to pale grey talc with minor white carbonate increasing with depth 15% pyrrhotite with lesser pyrite			6/8/4			po > py Disseminated py increases with depth	15%	
0.9	0.8	89		55.4 - 60.35 SILTSTONE (4.95) Medium pale grey to greenish grey in parts Siltstone tends towards Quartzite. Slight silty Shale towards base. Moderately to poorly bedded, some brecciation	56		10		↖ 55.4 Contact ? 40° ← Bedding 45°	po >> py Disseminated, minor stringers and veinlets	3-5%	
2.1	2.0	95		END OF HOLE 60.35m	60							

64 68 72 76 80 84 88 92 96

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 18/12/79

HOLE No. B4
LOG SHEET 3 OF 3
from 48 m. to 60.35 m.

REPORT No. 510

028280

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. **B5**

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	1915·24 m N	999·14 m E	643·40 m
(2) old	945 ft. N	−1000 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar
- ____ magnetic
- ____ grid (1)
- ____ grid (2)
- ____ grid (3)
- ____ true

1:250 000 Sheet No. SK55-3 | 1:100 000 Sheet No. 8015 | State Tasmania

Mineral Tenement (1980): E.L. 13/79 | Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Inclination at collar: VERTICAL

Total length: 68·275 m

Date drilled:

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8	1963-64	: Mt. Costigan Mines Pty. Ltd.
B9 to 38, B44 and B46 to 60	1964-68	: Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)
AAB1-5,8	1970	: Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK FROM 0 TO 68·3 DATE 19 JAN 80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B5

Log sheet 1 of 2

028287

Depth	Description	Core	Graphic Log	Structural and Vein Information	Mineralisation	Notes
0	0-0.6 NO CORE	0				
0.6	0.6-29.0 DOLOMITE (28.4) Pale grey/cream. Massive and featureless, rare brecciation. Rare fine black (?Fe-Mn) stringers. Rare talc developments up to 50mm.	4			Very rare specs of po, sp	
6.1	6.1-6.5: Dolomite Sulphide Lode. Pale green talc minor white carbonate and purple fluorite. Trace sphalerite, pyrrhotite. 7.8-8.8 Partly recrystallized dolomite with carbonate and minor talc.	8				Nil
12.9	12.9-13.2: Dolomite Sulphide Lode. Pale green talc minor carbonate trace pyrrhotite and sphalerite. 13.7-13.9: Recrystallized Dolomite with trace pale green talc	12	2	← 12.3-12.5: Agg 20mm erratic carbonate veins		
19.8	19.8-20.4: Dolomite Sulphide Lode. Pale grey quartz/carbonate with lesser green/grey talc	20			py >> po Disseminated	5-10%
				← ? Bedding 60°	Very rare specs of po, sp	
		24				Nil
29.0	29.0-33.5 DOLOMITE SULPHIDE LODE (4.5) 29.0-30.6: Pale grey quartz carbonate minor dark green talcy serpentinite. Mottled, slightly banded. Minor pale grey dolomite. 30.6-31.4: Pale to dark green talcy serpentinite, minor carbonate. Irregularly banded. 31.4-32.3: as for 29.0-30.6. 32.3-33.5: as for 30.6-31.4	28	8/7		py and po, trace fluorite, sp. In blebs and banded	10%
			7/8		po >> py. Irregular bands and in blebs	20%
		32	8/7			
			7/8			
33.5	33.5-44.6 DOLOMITE (11.1) Pale grey, massive and featureless with rare brecciation. 36.6-36.8: Dolomite Sulphide Lode. Green talcy serpentinite and white quartz/carbonate. Mottled appearance	36			Rare specs of py	Nil
					py >> po in blebs	15%
			2		Rare specs of py	Nil
	40.7-41.5: Recrystallized Dolomite	40				
					po blebs, disseminated	10%
	41.9-42.7: Dolomite Sulphide Lode. Pale green talc with minor quartz/carbonate. Mottled appearance				Rare specs of py	Nil
					po > py blebs, disseminated	20%
		44			Rare specs of py	Nil
44.6	44.6-46.35 DOLOMITE SULPHIDE LODE (1.75) 70% Cream/grey to light brown talc. 30% Bronze/silver pyrrhotite. Mottled appearance		6/4		po >> py. In blebs and disseminated	30%
46.35	46.35-51.6 SILTSTONE/QUARTZITE (5.25) Pale to medium grey, hard. Poorly bedded, generally featureless. Rare veins	48	10/11	← Bedding 45°	po and py. Disseminated, in rare veins	<1%
51.6	51.6-53.6 SILTSTONE and SILTY SHALE (2.0) Medium grey Siltstone interbedded with dark grey/black Shale. ? Tuffaceous with small (<1mm) orange/yellow fragments. Poorly bedded	52	10/9		py. Especially in shale as blebs, minor disseminations	2%
53.6	53.6-68.3 SILTSTONE/QUARTZITE minor SILTY SHALE (14.7) Pale/medium grey with occasional greenish tinge. Poorly bedded, minor disruption, rare brecciation. Generally featureless. Occasional thin veinlets (<2mm) of carbonate, pyrrhotite, pyrite rare fluorite	56	10/11	← Bedding 45°	po > py. In stringers, veinlets and disseminated	1%
		60		← 62.1: 35mm vein, 50°, qtz, carbonate, py, arsenopyrite, fluorite minor sp		
		64				
	END OF HOLE 68.3m	68				
		72				

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined. Depth : Detailed rock description and notes indented about 15mm	GRAPHIC LOG	STRUCTURAL AND VEIN INFORMATION	MINERALISATION	NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION DRILL LOG Scale 1:100

Prospect or project: MT. BISCHOFF

Logged by: A. JANNINK date 19/1/80

HOLE No. B5

LOG SHEET 2 OF 2

from 0 m to 68.3 m

REPORT No. 510

028288

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B6

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 1899 m N	* 1075 m E	* 627 m
(2) old	1025 ft. N	−765 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar

333°	magnetic
003°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Inclination at collar 45°

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 57.607 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8	1963-64	Mt. Costigan Mines Pty. Ltd.
B9 to 38, B44 and B46 to 60	1964-68	Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)
AAB1-5,8	1970	Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK FROM 0 TO 57.6 DATE 23 JAN 80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

RE LOGGED

Company managing exploration programme (1980)
Metals Exploration Ltd.

HOLE No. B6
Log sheet 1 of 2

028289

DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Detailed rock description and notes (indented about 15 mm)	GRAPHIC LOG (SEE LEGEND ON SHEET)	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and CORE AXIS)	MINERALISATION	NOTES
0-8.9 PYRITIC SAND (8.9) Sand composed of quartz, lesser feldspar and pyrite. Appears to be Quartz Porphyry origin	0 4 1/5 8		Py Loose in sand 10-20%	
8.9-23.5 DOLOMITE SULPHIDE LODE (14.1) 8.9-10.2: 50% bronze pyrrhotite 50% grey/white/colourless carbonate/quartz Mottled appearance 10.2-11.4: Cream/white carbonate/quartz with minor medium green talcy serpentinite at start, and pyrite. Mottled. 11.4-12.1: 60% cream/white carbonate/quartz with minor pale green talc and 40% bronze pyrrhotite. Mottled 12.1-12.8: Pyrrhotite, massive, with minor quartz/carbonate 12.8-23.0: Tray of core out of order: approximate contents: 40% Cream/white quartz/carbonate 30% Dark green talcy serpentinite 20% Bronze pyrrhotite 10% Pale green/brown talc Mottled appearance, rare irregular banding 23.0-23.5: 60% carbonate/quartz (white) 40% bronze/silver pyrrhotite	4/8 8/7 8/4 12 19 8/7/4 20 8/4		po minor py trace sp Mottled to massive 50% py trace po Disseminated + blebs 10-15% po minor py trace cp Mottled 40% po trace py, cp 95% po minor py, sp, trace cp Disseminated and banded sp up to 5% in places 20% po minor py 40%	
23.5-31.5 QUARTZ PORPHYRY (8.0) Cream/white matrix 10% quartz phenocrysts, minor feldspar phenocrysts up to 2-3 mm. 10-15% disseminated pyrite occasional pitting 27.9-28.3: Dull grey massive marcasite with brecciated quartz fragments 31.1-31.5: Dull green-grey massive marcasite with brecciated white/colourless quartz.	26 28 !		py trace po, marcasite, weak trace cp Disseminated 10-15% Marcasite minor Py. Massive 90% py trace po, marcasite, weak trace cp Disseminated 10-15% Marcasite minor py. Massive 80%	
31.5-55.6 DOLOMITE SULPHIDE LODE (24.1) 31.5-32.2: Massive silver/bronze pyrrhotite with trace quartz/carbonate, pyrite 32.2-32.7: 70% pyrrhotite 30% bronze quartz/carbonate 32.7-33.4: Massive silver/bronze pyrrhotite, trace quartz/carbonate 33.4-44.6: 60% silver/bronze pyrrhotite 40% white carbonate/quartz Intermixed and mottled 44.6-45.6: 60% white/colourless quartz/carbonate with minor cream/light brown talc; 40% bronze pyrrhotite. Mostly mottled some irregular banding 45.6-46.8: Pale green/cream talc with minor quartz/carbonate and pyrrhotite. Mottled, partly irregularly banded 46.8-47.1: Massive silver/bronze pyrrhotite with trace talc 47.1-47.7: as for 45.6-46.8 47.7-52.1: Dark grey/green talcy serpentinite, massive and featureless	32 4 7/8 4 36 4/8 43 47 8/4 6 4 6 48		Massive pyrrhotite, trace py 95% Massive pyrrhotite 70% Massive pyrrhotite 95% po trace py, cp, fluorite Mottled. Up to 90% po in places 60% po mottled and banded 40% po partly banded, mostly in blebs 5-10% po massive 95% po banded and in blebs 5%	
52.1-52.4: Dolomite, pale grey, featureless 52.4-52.9: Grey/cream recrystallized dolomite minor dark grey/green talc 52.9-55.6: Dark grey/green talcy serpentinite with lesser banded bronze pyrrhotite.	7 52 2 3 7/4		po>py in thin veinlets, stringers occasional blebs 1-2% po in thin stringers <1% po, sp minor py disseminated 5% po banded sometimes in blebs and patches 20%	
55.6-57.6 SILICEOUS SILTSTONE/QUARTZITE (2.0) Pale to medium grey with slight greenish tinge Poorly bedded, rare brecciation. Hard END OF HOLE 57.6 m	56 10/11 60		po>py In stringers and veinlets <1%	

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 23 / 1 / 80

HOLE No. B6
LOG SHEET 2 OF 2
from 0 m. to 57.6 m.

REPORT No. 510

028290

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION

DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B7

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 1899 mN	* 1075 mE	* 627 m
(2) old	1025 ft.N	−765 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

_____ magnetic
_____ grid (1)
_____ grid (2)
_____ grid (3)
_____ true

1:250 000 Sheet No. SK55-3 | 1:100 000 Sheet No. 8015 | State Tasmania

Inclination at collar VERTICAL

Mineral Tenement (1980) E.L. 13/79 | Holder (1980) Metals Exploration Ltd.

Total length 48·768 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY	LOGGED BY	LOGGED BY
A. JANNINK		
FROM 0 TO 48·8	FROM ____ TO ____	FROM ____ TO ____
DATE 2 FEB 80	DATE	DATE

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B7

Log sheet 1 of 2

028291

DRILL ADVANCE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED	LOST CORE ZONE	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION (Visual estimate)	NOTES
22	71 / 15.7		0-6.1 PYRITIC SAND (6.1) Mainly white quartz and quartz porphyry sand with some medium to dark green ?serpentinous sand, lesser pyrite sand	0 4		1/5			py sand	10-20%	
			6.1-33.8 QUARTZ PORPHYRY (27.7) 6.1-9.0: White matrix with 15-20% phenocrysts of quartz up to 3mm and 10-15% phenocrysts of feldspar up to 2mm usually <1mm and less feldspar for first 2m	8					py, weak trace sp Disseminated with crystals up to 3mm Trace cassiterite below 9m	10%	
			9.0-13.0: Grey/white matrix with 25% quartz phenocrysts usually 2mm wt up to 10mm. Rare feldspar phenocrysts Slight pitting of core	12							
			13.0-23.0: Cream/white matrix with 25% quartz phenocrysts as above and 10-20% slightly orange coloured feldspar phenocrysts to 2mm	16					py trace arsenopyrite disseminated	5%	
			16.4-17.1 } Very white matrix with some red colouration 17.5-17.8 } around felspars with pyrite intergrowths						py >> marcasite trace arsenopyrite, weak trace po Disseminated and blebs up to 8mm 18.5-21.7 trace cassiterite with 40mm slug of +5% cassiterite at 20.0m	10%	
				20							
4.2	62 / 2.6		23.0-26.7: Grey/white matrix, slightly pitted with 20% quartz phenocrysts and 0-5% feldspar phenocrysts	24					py trace arsenopyrite disseminated	5%	
1.1	100 / 1.1		26.7-29.7: As for 13.0-23.0	28					py >> marcasite trace arsenopyrite disseminate	5-10%	
8.7	51 / 4.4		29.7-33.8: As for 23.0-26.7	32					py disseminated	5%	
1.2	8 / 0.1		33.8-37.2 PYRITIC SAND (3.4) Pyritic sand with fragments of silicified light green siltstone with layered quartz-chert-like appearance. Poor recovery	36		5/10			py sand	50%	
8.5	12 / 1.0		37.2-48.6 PUGGY CLAY FAULT ZONE (11.4) Brown, some grey, puggy clay with fragments of silicified light green siltstone with layered quartz-chert-like appearance, and some green serpentinite and brown/grey brecciated dolomite	40 44		F					
3.1	13 / 0.4		48.6-48.8 QUARTZ PORPHYRY (0.2) White matrix with 10% quartz phenocrysts and rare feldspar phenocrysts	48					po >> py disseminated	10%	
			HOLE ABANDONNED 48.8m	52							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date: 2/2/80

HOLE No. B7
LOG SHEET 2 OF 2
from 0 m. to 48.8 m.

REPORT No. 510

028292

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B9

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	1858·90 m N	1011·03 m E	629·95 m
(2) old	800 ft. N	−875 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar

333°	magnetic
003°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3	1:100 000 Sheet No. 8015	State Tasmania

Mineral Tenement (1980): E.L. 13/79 — Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Inclination at collar: 55°

Total length: 562·051 m

Date drilled:

Details of down hole location-survey methods: Trepari and acid tube (=E)

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mag.	DIP
0	333°	55°
91·440	—	E 56·5
152·400	—	E 61·5
198·120	328	51
276·758	332	52
365·760	332·5	51
453·542	333·5	52
502·920	330·5	48
548·640	334	44

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 562·1 — DATE 8 APR 80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B9

Log sheet 1 of 6

0-22.5 No Core

22.5-32.4 **DOLOMITE** (7.9)
Grey/white, massive and recrystallized. Rare overcrystallization.
22.5-23.0: Some Unevitite staining of ? cavity-in material

Py in thin (<1cm) stringers and veinlets especially at top and bottom <1%

30.4-46.2 **DOLOMITE SULPHIDE LODE** (9.9)
30.4-32.5: Half cream coloured quartz/carbonate, half dark green tremolite with cream dolomite at 31.2m. Irregularly banded and mottled.
32.4-34.5: 60% cream/white carbonate, 30-40% coarse pyrrhotite and 20-30% dark to medium green slightly talcy tremolite. Irregularly banded, sometimes concentratedly, some mottled.
34.5-35.7: 60% pale green to light brown talc matrix, 25% cream/white quartz & carbonate/quartz, 5% talc/tremolite mottled appearance
35.7-36.4: Dolomite, pale grey semi recrystallized
36.4-37.2: Talc matrix, 20% cream/white carbonate/quartz
37.2-37.8: Dolomite, pale grey, fine banded, occasional talc/green
37.8-46.2: 50% Cream/white quartz/carbonate
30% pyrrhotite and pyrite
20% green talcy tremolite
Irregular mottled appearance

Py > po and sp. pyrrhite Zonegularly banded and disseminated 10%
Po minor Py + pyrrhite Zonegularly banded 20-60%
Po and Py disseminated 5%
Py > Po minor sp disseminated in recrystallized dol. 5%
Py > Po trace sp 40%
No Sulphides –
Po and Py > minor sp diseased and coarsely 30%

46.2-62.7 **DOLOMITE** (1.9)
Pale grey, slightly brecciated with 10% recrystallized dolomite and pale green talc. Talc developed along thin fractures

Po disseminated <1%

62.2-66.6 **SILTSTONE minor QUARTZITE** (at start) (2.2)
Pale/medium grey, poorly bedded, disrupted, some brecciation. Occasional qtz-quartz/carbonate/fluorite veins to 5cm. Contact hazy to

Po core, in thin stringers <1%

66.6-67.6 **SILTSTONE minor SILTY SHALE** (18.0)
Pale to medium grey; shale has slight greenish tinge.
Moderately to poorly bedded, slightly disrupted, minor brecciation. Minor quartz/carbonate/py, py, po, fluorite veins
67.6-68.7: Trifaceous with very fine (<1cm) angular orange fragments
68.7-68.9: Slightly trifaceous with fine black and orange fragments
68.9-82.4: Siltstone sometimes grades towards Quartzite

Py > Py Disseminated, in stringers and veins <1%
Py > Py Disseminated, in blebs, veinlets and stringers 2-3%
Py > Py In blebs, disseminated, rare stringers <1%
Py > Py In blebs, disseminated, occasional stringers, veinlets 3-5%
Py > Py In thin (<1cm) stringers, veinlets, evenly disseminated <1%

Gradual change to

82.4-91.6 **SILTSTONE and SILTY SHALE** (19.0)
Pale/medium grey with slight greenish tinge in places.
Moderately to well bedded, disrupted, folded, some brecciation.
Some thin (<1cm) carbonate stringers

Py > Py In thin stringers, veinlets, rare blebs, disseminated <1%

91.6-91.6 **QUARTZITE** (8.2)
Pale to medium grey, slightly reddish tinge towards base
Strongly brecciated in parts, siliceous matrix
Occasional carbonate/fluorite veins

Py > Py Finely disseminated, rare blebs, stringers up to 10% in places 5%

96.4-98.5: Quartzite interbedded with: Siltstone and Silty Shale - much disrupted

91.6-93.6 **SILTSTONE, SILTY SHALE minor QUARTZITE** (3.8)
Interbedded. Quartzite towards base.
Pale to medium grey.
Moderately bedded, disrupted, brecciated.
Near-east thin irregular carbonate stringers

Py, Py In blebs and veinlets <1%
92.6: 200mm vein, qtz-carbonate, minor Py, Sphalerite, trace Po Py, Py In blebs, disseminated, lesser blebs, stringers, veinlets 2-3%

93.4-100.8 **QUARTZ PORPHYRY** (97.4)
93.4-96.4 Cream/white matrix with pink and brown staining; 10% quartz phenocrysts to 2mm, rare small (<1cm) feldspar phenocrysts
96.4-101.7 Core missing

93.4: Contact irregular at 30° Py trace fluorite disseminated 15%

101.7-106.0: Grey/white, slightly orange matrix with 20% quartz phenocrysts to 3mm, and 5-10% feldspar phenocrysts to 1-2mm (sometimes absent).

Py and Po disseminated
Trace cassiterite 15-20%

106.0-108.2: Grey and pale orange matrix with 50% quartz and feldspar phenocrysts to 2mm

Py minor marcasite, trace arsenopyrite disseminated
Trace cassiterite 5-10%

108.2-112.5: Grey/orange matrix with 20% quartz phenocrysts to 3mm and 10% feldspar phenocrysts to 2mm

Py > Py disseminated 20%

112.5-117.4: Grey/white, lesser orange matrix with 20% quartz phenocrysts to 2mm occasionally to 4mm, 5-10% feldspar phenocrysts to 2mm.

111.1: 20mm vein, 25° Py, marcasite minor qtz, Po

Py, marcasite trace Po disseminated, some blebs
Trace cassiterite, especially at start 10-15%

5cm

DEPTH from-to : ROCK UNIT (capital letters, underlined)
Depth - Detailed rock description and notes
material about 75 m.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
HOLE No. B7
LOG SHEET 2 OF 6
from 0 m to 120 m
Logged by A. JAMIESON date 8/4/80

Depth	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
120	(Quartz Porphyry continued - for description see previous page)			See previous page	10-15%
126				py, marcasite, minor sporadic po disseminated, rare blebs to 10mm 126.6-127.2: 5-5% cassiterite crystals to 1mm 127.2-130.0: trace cassiterite	
128					
132					5-10%
136				136.1: Trace "tourmaline" fleecite 137.2: Trace sp 139.0-139.9: 2% sulphides 139.0-140.3: trace cassiterite	
140					
146				146.0-146.9: trace fleecite	
148	147.6-189.6: Grey/white matrix, some orange matrix after 159m, with 10-15% quartz phenocrysts generally <2mm, and <5% feldspar phenocrysts			py, marcasite disseminated and 1% cassiterite with crystals to 5mm	2%
				py, marcasite disseminated	10%
152				py, marcasite, disseminated, rarely up to 5% 151.1-152.8: 0.5% cassiterite 152.5-152.2: 5% cassiterite 154.2-156.1: minor cassiterite, trace fleecite	1-2%
156				py, marcasite, disseminated 156.1-158.4: trace cassiterite	5-10%
160				py disseminated	2%
164				py, marcasite, sporadic traces of po, disseminated 158.4-163.5: weak trace cassiterite	5-10%
168					
172			172.5-172.6: Very broken core	py, marcasite and po, trace arsenopyrite, disseminated. Occasionally up to 20% Pb po between 178.5-181.3	
176			178.5-179.75: vein, py, sp, minor arsenopyrite, qtz	176.7: 5-5mm crystal of cassiterite	10%
180	180.9-184.4: Core out of order				
188				py, marcasite rare po disseminated	5-10%
188	189.6-190.8: white matrix with 5-10% quartz phenocrysts and up to 5% feldspar phenocrysts generally 1mm			py, marcasite disseminated	10%
192	190.8-200.9 QUARTZITE/SILICIFIED SILTSTONE (10.1) minor Silty Shale Pale to medium grey; Shale is medium/dark, slightly greenish grey. Poorly bedded; disrupted, brecciated. Occasional irregular quartz, carbonate, pyrite, pyrrhotite veins			po >> py finely disseminated, occasionally along? bedding, in veinlets, occasional blebs	5-10%
196		11/10	197.2: 23mm vein, 55°, qtz, carbonate, py, arsenopyrite, minor po Bedding 60°		
200			200.9: 50mm vein, 70°, qtz, py minor po, arsenopyrite		
204	200.9-206.0 SILTSTONE and SILTY SHALE (5.1) Interbedded. Medium grey, slightly brownish. Moderately to well bedded, much disrupted, slightly brecciated. Some quartz/carbonate/fleecite/pyrite veins	10/9	202.5: 70mm vein, 65°, py, po, marcasite, fleecite, qtz 202.6: 20mm vein, 60°, py, qtz, arsenopyrite minor fleecite 202.6: 22mm vein, 25°, qtz, minor fleecite trace po, py 204.1: aggregate 20mm veins, py, marcasite, qtz, po, arsenopyrite	po > py in thin stringers and veins	3%
208	206.0-206.9 QUARTZ HEMITITE (0.9) white matrix, 10% quartz, 10% feldspar phenocrysts to 1mm	.1	206.0 Contact 60° 206.9 Contact irregular ~55°	py, marcasite disseminated	15%
209	206.9-210.8 SILTSTONE and SILTY SHALE (3.9) Interbedded. Medium grey with green/brown tinge. Moderately to well bedded, much disrupted, some brecciation. Rare thin quartz, pyrite, pyrrhotite veins	10/9	Bedding 55°	po >> py in thin stringers, especially along bedding, blebs, occasional veins	3%
212	210.8-243.6 QUARTZITE/SILICIFIED SILTSTONE (32.6) Rare Silty Shale Pale to medium grey, slight brownish tinge in places Moderately to poorly bedded, disrupted, partly brecciated Occasional quartz, pyrite veins		215.0: 10mm vein, 65°, py, qtz, po, marcasite, carbonate	po >> py finely disseminated, slightly banded, in stringers and minor veins	3-5%
216			Bedding 60°		
220			221.0-222.4: 90% po, 10% py, marcasite, arsenopyrite, vein 222.4-222.8: po, py, marcasite, arsenopyrite, carbonate, sp	py finely disseminated, in stringers and veins. Varies between 1% and 5%	
224		11/10	223.6: 30mm vein, 40°, qtz, carbonate, minor sp		
228			Bedding 40°		3%
232			232.6: 100mm vein, 60°, qtz, carbonate, arsenopyrite minor py trace sp		
236			235.1: 90mm vein, 25°, qtz, fleecite, minor arsenopyrite, trace po 236.2: 14mm vein, 35°, qtz minor fleecite Bedding 35°		
240					

5 cm

Depth from-to: ROCK UNIT capital letters, underlined Depth: Detailed rock description and notes Indented about 10mm	Graphic Log	Structural and Vein Information	Mineralisation	Notes

METALS EXPLORATION LIMITED

MINERAL EXPLORATION DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 8/4/80

HOLE No. 89
LOG SHEET 3 OF 6
from 120 m to 240 m

Depth	Description	Sample	Structure	Mineralisation	Notes
224	(Quartzite/Silicified Siltstone – for description see previous page) 242.8: Small vein-like patch of Quartz Porphyry 242.2: Small irregular 20mm patch of Quartz Porphyry	11/10	← Bedding 50°	For description see previous page	3%
226	243.4-244.1 QUARTZ PORPHYRY (0.7) White matrix, 5% quartz phenocrysts, rare feldspar 4.1mm 244.1-258.7 SILICIFIED SILTSTONE and QUARTZITE/ (14.6) FINE GRAINED SANDSTONE rare SHALE Pale to medium grey with occasional red and brown tinge Moderately to poorly bedded, disrupted, minor brecciation Occasional quartz, carbonate, pyrite veins and thin stringers. 244.3-244.6: Well bedded Silty Shale Some fine black mineral ? tourmaline. Slightly feldspathic	1 10/11	243.4 Contact irregular ~15° 244.1 Contact irregular ~25° ← 245.6: 12mm vein, 60°, py, moreasite, carbonate ← 246.0: 15mm vein, 15°, moreasite, trace qtz, carbonate ← Bedding 55° ← Bedding 25°	py trace arsenopyrite Disseminated py trace po in thin stringers, veins, occasionally disseminated (along bedding). Varies between 0 and 3%	20% 1%
258	258.7-262.6 QUARTZITE (3.9) Pale grey with light brown tinge Fairly massive, poorly bedded, hard. Minor thin carbonate stringers	11		No sulphides	–
262	262.6-269.4 SILTSTONE and SILTY SHALE (6.8) Pale to medium grey Moderately to well bedded, some disruption and folding Frequent very thin (<1mm) irregular carbonate stringers	10/9	← Bedding 65°	py in occasional blebs	<1%
269	269.4-270.4 QUARTZ PORPHYRY (1.0) White matrix with 10% quartz, rare feldspar phenocrysts to 2mm	1	269.4 Contact 50° 270.4 Contact, irregular, 20°	py minor moreasite and 2% fluorite, trace tourmaline	20%
270	270.4-284.0 SILTSTONE (13.6) Pale grey, fairly broken. Poorly bedded, slight disruption. Minor quartz, carbonate, pyrite veins and occasional carbonate stringers	10	← Bedding 30°	py in blebs, minor stringers and veins	1%
284	284.0-285.3 QUARTZ PORPHYRY (1.3) Cream/white matrix – slightly greenish near contacts 10% quartz and 15% feldspar phenocrysts to 2mm	1	284.0 Contact 70° 285.3 Contact 60°	py, moreasite, disseminated 2% fluorite disseminated	10%
285	285.3-318.5 SILTSTONE with lesser SILTY SHALE (33.2) and interbedded QUARTZITE/FINE GRAINED SANDSTONE Siltstone and Silty Shale are medium to pale grey with slight green tinge (oxidised to a chocolate brown colour in places); Quartzite is pale grey. Moderately bedded, disrupted, folded, minor brecciation. Variable bedding angles Rare quartz, carbonate, pyrite veins Gradual change to	10/9/11	← 285.3-291.0 Bedding <5° ← 289.7: 18mm vein, 20°, qtz, carbonate, arsenopyrite, trace fluorite ← Bedding 35° ← Bedding 80° ← 298.1: 12mm vein, 25°, fluorite, qtz, carbonate ← Bedding 15° ← 301.8: 25mm vein, 60°, py, moreasite, qtz, minor sp ← Bedding <5° ← 309.7: 50mm vein, 25°, qtz, carbonate, py, trace po, ?cuprite ← Bedding <5° ← Bedding 60°	py up to 5% in small patches. Finely disseminated in Quartzites, in minor veins, blebs. Frequently barren. Weak trace po after 308m	<1%
318	318.5-338.7 SILTSTONE lesser SILTY SHALE (20.2) Medium grey. Moderately bedded, partly disrupted, some folding → variable bedding angles Rare quartz, carbonate, pyrite veins. Minor thin carbonate stringers	10/9	← Bedding 60° ← Bedding 20° ← Bedding 40° ← ~~Bedding 60°~~ ← Bedding 65° ← 337.3: 20×10mm po bleb ← Bedding 35°	py and po py in veins and stringers, po in blebs and stringers.	<1%
338	338.7-342.5 SILTSTONE lesser SILTY SHALE (3.8) Minor QUARTZITE Medium to pale grey with slight green tinge Moderately bedded, disrupted, brecciated Occasional quartz, carbonate, pyrite, pyrrhotite veins	10/9/11	339.2: 10mm vein, 25°, vuggy qtz, py ← Bedding 60° ← 341.4: 100mm vein, 75°, py, qtz minor po trace gl	po >> py in veins, stringers and blebs	2-3%
342	342.5-352.7 QUARTZ PORPHYRY (10.2) White matrix. 10% quartz phenocrysts to 2mm <5% feldspar phenocrysts to 2mm	1	342.5 Contact irregular 352.7 Contact 45°	po >> py trace cp, arsenopyrite, some fluorite Disseminated	15%
352	352.7-386.7 SILTSTONE and SILTY SHALE (36.0) Pale to medium greenish grey Moderately bedded, much disrupted, folded and brecciated Occasional quartz, carbonate, pyrite, pyrrhotite veins Some thin irregular carbonate stringers	10/9	← 355.0: 20×(6.5)mm po bleb ← Bedding 20°	po >> py po in blebs, stringers, veins; py in veins up to 5% in places	2-3%

5 cm

Field Description	Lithology	Lithology Description	Geology	Graphic Log	Structural and Vein Information	Mineralisation	Notes
DEPTH from-to : ROCK UNIT capital letters, underlined Depth : Detailed rock description and notes Indented about 15 mm							

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project	MT. BISCHOFF	HOLE No.	B9
Logged by	A. JANNINK	date	8/4/80
LOG SHEET	4 OF 6	from	240 m to 360 m

Depth	Description	Structural	Mineralisation	Notes
360	(Siltstone and Silty Shale - for description see previous page)	← 360.5: 15x(<20) po blebs	(For description see previous page)	
362		← 362.6: 16mm vein, 60°, fluorite		
364				
366		← 369.3: 25mm vein, 35°, po, qtz, trace py, arsenopyrite ← 15x(<20) po blebs		2-3%
372				
374		← Bedding 45°		
376		← 378.0: 25mm vein, 65°, qtz, py, po	py >> po in stringers, veins, po in blebs	
380	380.2 - 386.7: less green colour, more red/brown tinge	380.0: 12mm vein, 35°, qtz, py, marcasite ← Bedding 20° ← 380.7: 15mm vein, 20°, py, minor qtz, fluorite, trace po, sp 381.5-382.3: vein, 60°, qtz, py, sp, fluorite, arsenopyrite, carbonate		2-3%
384		← 385.6: 38mm vein, 40°, qtz, py, minor sp, carbonate		
386	Gradual change to 386.7 - 392.9 SILTSTONE, SILTY SHALE and QUARTZITE (6.2) Interbedded. Pale to medium grey, some greenish tinge. Moderately bedded, disrupted, brecciated Rare quartz, carbonate, pyrite veins Rare thin carbonate stringers Quartzite leads towards Fine Grained Sandstone	← Bedding 80°	py in veins, stringers, rare blebs, finely disseminated especially in quartzite	1%
392	392.9 - 439.8 SILTSTONE and SILTY SHALE (46.9) Pale greenish grey. Moderately to well bedded, much disrupted, brecciated, folded. Occasional to rare quartz, pyrite, pyrrhotite veins Some thin irregular carbonate stringers	← 392.4: 20mm vein, 40°, qtz, minor py, trace arsenopyrite ← Fold axis ← Bedding 55° ← 398.0-398.2: vein, 50°, py, qtz, minor marcasite, po, arsenopyrite	po >> py po in stringers and blebs up to 30x10mm, and, towards base, along bedding py in veinlets, occasional blebs	2-3%
400				
404		← 405.5: 10mm vein, 60°, qtz, minor py, po ← Bedding 20°		
408		← 410.8: 10mm vein, 35°, vuggy qtz, carbonate, py		
412		← Bedding 50°	po trace py along bedding up to 5mm wide, in stringers and blebs up to 30x8mm	
416		← 415.2: 55mm vein, 35°, arsenopyrite minor qtz, py, marcasite, trace po, sp ← Bedding 75° ← 417.2: 15mm vein, 60°, arsenopyrite minor qtz, py, marcasite, trace po, sp		5-10%
420		← Bedding 56° ← 420.9: 10mm vein, py, minor qtz, trace po	po >> py in stringers and blebs, py in veinlets	
424		← Bedding 60°		2%
428		← 471.4: 12mm vein, 10°, qtz, minor fluorite, py, sp	po rare py along bedding, in stringers, blebs up to 5mm wide	
432		← 434.7: 35mm vein, 60°, py, qtz, minor arsenopyrite, po, sp ← Bedding 70°		5%
440	439.8 - 476.3 SILTSTONE minor FINE GRAINED (36.5) SANDSTONE and SILTY SHALE Medium to pale grey Moderately bedded, disrupted, folded, minor brecciation Occasional quartz veins Minor thin irregular carbonate stringers	← 440.5: 30mm vein, 30°, vuggy py, minor marcasite, qtz, arsenopyrite ← Bedding 35°	po > py in stringers and blebs	
444				2-3%
448	448.4-448.6: Breccia zone: quartz, siltstone, minor pyrite, pyrrhotite, arsenopyrite; contacts ~60° and ~25°	← 447.9: 10mm vein, 20°, carbonate, qtz, trace py, sp ← Bedding 55°		
452			py >> po in stringers, veinlets, occasional blebs	
456		← Bedding 40° ← 460.4: 12mm vein, 65°, qtz, py		
460				1%
464		← 465.2: 20mm vein, 35°, py, qtz ← Core very broken		
468		← Bedding 60°		
472				
476	476.3 - 484.0 SILTSTONE and SHALE (7.7) Siltstone is pale grey, Shale is medium/dark grey. Interbedded with stripey appearance. Well bedded, folded, minor disruption. Rare quartz veins. Occasional thin carbonate stringers	← Bedding 65°	py in stringers and veinlets	<1%
480				

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined Depth : Detailed rock description and notes indented about 75 mm	GRAPHIC LOG	STRUCTURAL AND VEIN INFORMATION	MINERALISATION	NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 8/4/80

HOLE No. 89
LOG SHEET 5 OF 6
from 260 m to 480 m

DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Detailed rock description and notes (indented about 15mm)	GRAPHIC LOG	STRUCTURAL AND VEIN INFORMATION	MINERALISATION	NOTES
Siltstone and Shale for description see previous page	10/9	← Bedding 70°	for description see previous page	<1%
484.0-534.6 SILTSTONE with minor SILTY SHALE and occasional FINE GRAINED SANDSTONE (50.6) Pale to medium grey, slight green/brown tinge. Moderately bedded, much disrupted, minor brecciation. Much folded to give variable core angles. Occasional quartz veins and carbonate stringers		←484.0: 50 cm brecciated vein, 60° qtz, py minor po ←490.5: approx 0.12m vein, 15° qtz, minor carbonate, py, arsenopyrite, trace po ← Bedding 40°	py>po in stringers, veinlets, blebs po>>py finely disseminated, in blebs and stringers	<1% 3-5%
446.3-449.3: Mainly Fine Grained Sandstone / Quartzite			py>>po disseminated	1-2%
		← Bedding 65°	po>py finely disseminated, in stringers, occasional veins	
Rare fine Grained Sandstone after 512.0	10/9	← Bedding 60°		2-3%
520.3-520.9: Yellow/grey tuffaceous band		← Bedding 70° Contacts 75°	po and py finely disseminated, in stringers and veins. Occasional pockets of 3-5% po	
522.3-522.5: Yellow/grey tuffaceous band		Contacts 70°		1%
		← Bedding 70°		
		←528.5: aggregate 10cm veins, qtz, trace fluorite, py, po		
		← Bedding 70°		
534.6-546.3 QUARTZITE and SILTSTONE (11.7) Interbedded. Pale to medium grey. Moderately to poorly bedded, slightly disrupted, minor brecciation. Quartzite is sometimes slightly tuffaceous, also sometimes tends towards medium grained sandstone. Occasional quartz veins	11/10	←540.6: 10cm vein, 15° py, qtz, trace arsenopyrite ← Bedding 65°	po>>py finely disseminated. Varies between 0 and 7%	2-3%
546.3-551.4 SILTSTONE, QUARTZITE minor SILTY SHALE (5.1) Interbedded. Pale greenish grey. Moderately to well bedded. Minor disruption and brecciation. Rare quartz veins	10/11	←547.1: 50 cm qtz breccia zone minor py trace po ← Bedding 65°	po>py po in stringers and disseminated, py in stringers and veinlets	<1%
551.4-562.4 QUARTZITE minor SILTSTONE (11.0) Pale to medium grey, sometimes with a dendritic appearance. Poorly bedded, poorly brecciated. Quartzite is sometimes slightly tuffaceous, also sometimes tends towards medium grained sandstone. Occasional quartz veins	11/10	← Bedding 70° ←555.4: 10mm vein, 30° qtz carbonate minor py ←556.4: 12 mm vein, 60° arsenopyrite minor py, qtz ←557.7: 10mm vein, 20° arsenopyrite, qtz, py	py and po in stringers, veinlets and disseminated	<1%
END OF HOLE 562.4m				

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINCK date 8/4/80

HOLE No. 89
LOG SHEET 6 OF 6
from 480 m. to 562.4 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn ppm	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95500		352·9	355·0	2·1	46		75	12	22	<1	10			
1		355·0	357·5	2·5	85		40	5	15	<1				
2		357·5	360·0	2·5	150		270	8	22	<1				
3		360·0	361·5	1·5	46		120	8	15	<1				
4		361·5	362·5	1·0	46		65	5	12	<1				
5		362·5	365·0	2·5	48		55	5	12	<1	<10			
6		365·0	367·5	2·5	38		55	8	15	<1				
7		367·5	370·0	"	250		140	8	15	<1				
8		370·0	372·5	"	46		200	10	15	<1				
9		372·5	375·0	"	46		230	5	10	<1				
10		375·0	377·5	"	30		240	5	8	<1	15			
11		377·5	380·0	"	34		280	12	8	<1				
12		380·0	382·5	"	580		370	50	80	1				
13		382·5	385·0	"	2050		270	8600	3·8%	15				
14		385·0	387·5	"	210		160	460	1250	2				
15		387·5	389·0	"	85		65	55	55	<1	25			
16		389·0	390·3	1·3	50		60	38	48	<1				
17		390·3	392·5	2·2	75		48	75	80	<1				
18		392·5	395·0	2·5	85		140	80	50	<1				
19		395·0	397·5	"	90		70	40	55	<1				
20		397·5	400·0	"	230		500	70	150	1	30			
21		400·0	402·5	"	150		45	35	20	<1				
22		402·5	405·0	"	50		50	30	20	<1				
23		405·0	407·5	"	110		65	18	35	<1				
24		407·5	410·0	"	34		32	8	22	<1				
25		410·0	412·5	"	55		80	10	18	<1	10			
26		412·5	415·0	"	38		70	18	15	<1				
27		415·0	417·5	"	150		210	90	170	1				
28		417·5	~420·0	"	80		48	28	18	<1				
95529		~420·0	~422·5	"	42		38	15	35	<1				

Notes:— W & Sn by XRF B1 METHOD.
Cu, Pb, Zn, Ag by AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. BDA

SAMPLE TYPE : DRILL CORE FROM 352·9 TO ~422·5

02829

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn ppm	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95530		~422·5	~425·0	2·5	28		28	5	20	<1	<10			
31		~425·0	~427·5	"	36		28	8	20	<1				
32		~427·5	~430·0	"	110		48	5	15	<1				
33		~430·0	432·5	"	760		95	30	25	<1				
34		432·5	435·0	"	500		180	20	12	<1				
35		435·0	437·5	"	85		75	18	22	1	<10			
36		437·5	440·0	"	60		48	15	35	1				
37		440·0	442·5	"	70		80	10	18	1				
38		442·5	445·0	"	50		100	18	20	1				
39		445·0	447·5	"	38		55	25	12	1				
40		447·5	450·0	"	1050		110	160	1300	2	20			
41		450·0	452·5	"	65		45	25	48	1				
42		452·5	455·0	"	40		40	22	15	1				
43		455·0	457·5	"	34		25	25	20	1				
44		457·5	460·0	"	26		30	20	25	1				
45		460·0	462·5	"	160		50	35	65	1	<10			
46		462·5	464·8	2·3	42		70	45	110	1				
47		464·8	465·7	·9	170		200	80	520	1				
48		465·7	467·6	1·9	60		100	50	65	1				
49		467·6	~469·3	1·7	60		45	32	40	1				
50		~469·3	~471·3	2·0	32		20	40	60	1	<10			
51		~471·3	473·4	2·1	38		25	45	25	1				
52		473·4	475·0	1·6	55		35	140	35	1				
53		475·0	477·5	2·5	40		30	45	240	1				
54		477·5	480·0	"	34		48	22	10	1				
55		480·0	482·5	"	34		50	35	100	1	<10			
56		482·5	485·0	"	42		65	32	25	1				
57		485·0	487·5	"	70		80	25	12	1				
58		487·5	490·0	"	75		50	12	12	1				
95559		490·0	492·5	"	50		38	8	22	1				

Notes :— W, Sn, by XRF BI METHOD.
Cu, Pb, Zn, Ag AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. 89B

SAMPLE TYPE : DRILL CORE FROM ~422·5 TO 492·5.

0289

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95560		492·5	495·0	2·5	44		40	15	22	1	<10			
61		495·0	497·5	"	160		30	18	22	1				
62		497·5	500·0	"	120		30	10	18	1				
63		500·0	502·5	"	80		95	15	18	1				
64		502·5	~505·0	"	95		110	5	18	1				
65		~505·0	507·5	"	85		35	5	15	1	<10			
66		507·5	510·0	"	75		30	<5	18	1				
67		510·0	512·5	"	110		45	5	18	1				
68		512·5	515·0	"	75		25	18	22	1				
69		515·0	517·5	"	70		70	5	18	1				
70		~517·5	520·0	"	80		110	5	18	1	25			
71		520·0	522·5	"	120		50	15	30	1				
72		522·5	525·0	"	140		50	15	35	1				
73		525·0	527·5	"	85		65	15	30	1				
74		527·5	530·0	"	1100		35	12	70	1				
75		530·0	532·5	"	220		55	5	22	1	15			
76		532·5	535·0	"	90		60	5	12	1				
77		535·0	537·5	"	120		55	5	18	1				
78		537·5	540·0	"	100		80	25	15	1				
79		540·0	542·5	"	370		200	48	300	1				
80		542·5	545·0	"	140		60	5	18	1	15			
81		545·0	547·5	"	75		100	5	22	1				
82		547·5	550·0	"	130		50	5	20	1				
83		550·0	552·5	"	70		48	<5	28	1				
84		552·5	555·0	"	90		28	5	32	1				
85		555·0	557·5	"	100		40	12	75	1	<10			
86		557·5	560·0	"	130		50	3000	50	2				
87		560·0	562·4	2·4	160		90	20	22	<1				

Notes:— W, Sn by XRF Bi METHOD.
Cu, Pb, Zn, Ag by AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B9<

SAMPLE TYPE : DRILL CORE FROM 492·5 TO 562·4.

02830

REPORT No. 510

028301

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MT. BISCHOFF TIN

HOLE No. B10

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	1807·87 m N	993·03 m E	625·38 m
(2) old	625 ft. N	−835 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar

333°	magnetic
003°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3	1:100 000 Sheet No. 8015	State Tasmania

Inclination at collar 55°

Total length 101·498 m

Mineral Tenement (1980) E.L. 13/79 — Holder (1980) Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY	LOGGED BY	LOGGED BY
A. JANNINK		
FROM 0 TO 101·5	FROM TO	FROM TO
DATE 19 APR 80	DATE	DATE

RE LOGGED

Company managing exploration programme (1980)
Metals Exploration Ltd.

HOLE No. B10
Log sheet 1 of 2

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97097		67.1	70.1	3.0	1400									
94400		82.30	83.82	1.52	1.14%									

Notes :— Sn by XRF B2 Method

XRF B1 Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B10

SAMPLE TYPE : DRILL CORE FROM 67.1 TO 70.1
82.30 83.82

028302

028303

Depth from-to: ROCK UNIT	Depth: Detailed rock description and notes	Graphic Log	Structural and Vein Information	Mineralisation	Notes
0–9.8	0–9.8 No Core				
9.8–11.6	9.8–11.6 DOLOMITE pale grey, fine-grained				
11.6–11.9	11.6–11.9 RECRYSTALLIZED DOLOMITE (~14.5) Cream, grey, light brown, carbonate/quartz/dolomite mottled and brecciated	3		pyrite with 1-2% sp disseminated throughout	10-20%
11.9–18.6	11.6–11.9 DOLOMITE grey and brown, slightly brecciated	2			Nil
18.6–27.9	11.9–18.6 RECRYSTALLIZED DOLOMITE (6.7) Cream, grey, light brown. Brecciated appearance with recrystallized carbonate and quartz, minor dolomite (grey and chocolate brown. Poor recovery	3		py trace sp in blebs and stringers	1-2%
27.9–~42.6	18.6–27.9 DOLOMITE SULPHIDE LODE (9.3) 80% quartz/carbonate - light brown to cream; 10% talc - dark green; 10% pyrite; Mottled and foliated appearance; Poor recovery	8		py trace sp disseminated and banded; at 22.0m: 250mm massive py	10%
27.9–~42.6	27.9–~42.6 RECRYSTALLIZED DOLOMITE (~14.5) Light brown/grey. Brecciated appearance with recrystallized carbonate and quartz and occasional lumps of dolomite. Poor recovery	3		py disseminated and in blebs	<1%
~42.6–46.0	~42.6–46.0 DOLOMITE SULPHIDE LODE (~3.6) Brown, friable and porous; 60% quartz grains; 40% pyrite and limonite; Poor recovery (200mm recovered)	8/4.5		py, limonite; friable intermixed with quartz	40%
46.0–67.2	46.0–67.2 DOLOMITE SULPHIDE LODE (11.2) 46.0–47.4: 70% bronze pyrrhotite; 30% light brown carbonate/quartz with minor talc; Virtually massive pyrrhotite; 47.4–56.4: 50% cream coloured carbonate/quartz; 40% pale to dark green, some light brown talc, slightly serpentinous; 10% pyrite with minor pyrrhotite; Generally mottled appearance with rare irregular banding	4/8; 8/6		po massive; py minor po trace sp disseminated and blebs	70%; 10%
	56.2–56.6: core very oxidized with increase in pyrrhotite content to 10% at expense of talc content			py and po trace sp disseminated and blebs	20%
	56.4–57.4: 80% bronze/silver pyrrhotite; 20% white quartz/carbonate; Virtually massive pyrrhotite with slight banding; 57.4–58.6: 70% white quartz/carbonate; 30% blebbles of bronze pyrrhotite; 58.6–61.0: 60% bronze/silver pyrrhotite interlayered with 40% grey/white quartz/carbonate; Irregular banding throughout	4/8; 8/4; 4/8	57.9 > 58.2 = 0.5mm crystals of cassiterite	po massive; po trace py, cassiterite blebbley; po massive and banded	80%; 30%; 60%
	61.0–62.5: 60% grey/white quartz/carbonate interlayered with 40% bronze/silver pyrrhotite. Irregular banding throughout; 62.5–67.2: 60% pale to dark green talcy serpentinite; 30% light brown to white carbonate/quartz; 10% bronze pyrrhotite; occurs both mottled and irregularly banded	8/4; 7/4/8		po banded; po>>py mottled and banded	40%; 10%
67.2–92.2	67.2–92.2 QUARTZ PORPHYRY (25.0) 67.2–69.0: white fine grained matrix with 5-10% quartz phenocrysts and 5% feldspar phenocrysts up to 1mm, usually very fine; 69.0–81.7: cream/white matrix with larger phenocrysts 10-15% quartz phenocrysts up to 5mm and 5-10% feldspar phenocrysts up to 1mm.	1	70.0–71.1: No core; 71.2–71.6: 50% po>py with qtz, carbonate; 76.8–79.3: much lost core	po>>py disseminated with some blebs to 10mm; po>>py trace sp, fluorite disseminated in crystals up to 2mm	15%; 10%
	81.7–83.9: Dark altered zone with sugary texture mainly of quartz, feldspar		82.2–83.9: No core	po>py disseminated and with 100mm aggregate of massive po	5%
	83.9–92.2: Cream/white matrix with 5% quartz phenocrysts usually to 3mm occasionally to 5mm, and up to 5% feldspar phenocrysts to 2mm		84.7, 86.8: 20mm py; 85.3–86.9: No core; 87.5: 60mm py; 89.9–92.2: No core	po>py trace fluorite disseminated and in splebbles up to 5mm	10%
92.2–92.8	92.2–92.8 TRANSITION ZONE Cream brown mixture of porphyry quartzite and shale. Mainly qtz matrix	1/11		py in occasional blebs	1%
92.8–101.5	92.8–101.5 SILTSTONE with lesser QUARTZITE (8.7) and rare silty shale. Medium to pale grey, slightly greenish tinge. Moderately to poorly bedded, disrupted, some brecciation. Rare quartz veins. Numerous thin (<1mm) carbonate stringers	10/11	Bedding 50°; Bedding 60°	py and po in thin stringers and veinlets	<1%
	END OF HOLE 101.5m				

5 cm

DEPTH from-to: ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes
indented about 15mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 19/4/80

HOLE No. 810
LOG SHEET 2 OF 2
from 0 m to 101.5 m

REPORT No. 510

028304

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. **B12**

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 1734 m N	* 996 m E	* 621 m
(2) old	400 ft. N	− 710 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Mineral Tenement (1980): E.L. 13/79

Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

W.C. Bearing from collar

333°	magnetic
003°	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar: 55°

Total length: 154·229 m

Date drilled:

Details of down hole location-survey methods: Acid tube

Results of down hole location-survey

LENGTH FROM COLLAR	W.C. BEARING type mag.	DIP
0	333°	55°
30·480	—	55·5
91·440	—	56
152·400	—	58·3

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 154·2 — DATE 28 APR 80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B12

Log sheet 1 of 3

0 – 46.0 No Core

46.0 – 113.0 RECRYSTALLISED DOLOMITE
(47.0) Cream to light brown, some chocolate brown. Mainly carbonate, some quartz and brown ? silicate and some pockets of dolomite. Very brecciated – especially dolomite sections, sometimes with hard 3Fe-Mn black mineral infilling the cracks

Very poor core recovery

Pg, tr. fluorite sporadic

Trace

113.0 – 237.5 DOLOMITE
(61.5) Pale grey and cream coloured fine dolomitic marble with small cream coloured and partly recrystallized breccia blocks generally <5mm diameter
Marble otherwise fracturelass
Minor carbonate irregular veining

Very poor core recovery

Nil

237.5 – 385 QUARTZ PORPHYRY
(147) 237.5 – 249.1: grey-white / cream marble, finely fine quartz, 5-10% quartz phenocrysts to 3mm and 5% feldspar phenocrysts to 5mm. Trace tourmaline, moderately, shattered and pitted
249.1 – 283.5: as for 237.5 – 249.1 but coarser grained quartz phenocrysts to 5mm

283.5 – 314: grey/light green marble with 10% quartz phenocrysts to 3mm and generally <5% feldspar phenocrysts to 2mm. 3-5% black tourmaline

314 – 340: as for 283.5 – 314 but 10-15% feldspar phenocrysts, and minor tourmaline

340 – 382.1: as for 283.5 – 314 but 10% feldspar phenocrysts to 3mm and trace tourmaline

Pg > Pg trace fluorite disseminated, sp up to 3mm

3-5%

Pg sp disseminated

2-5%

sp and fluorite sporadic

Trace

sp trace fluorite, Pg disseminated, sp up to 2mm

2%

Pg disseminated

5-10%

382.1 – 386.2 TRANSITION ZONE
(4.1) Grey/green flaky porphyry with quartz phenocrysts and some tourmaline. Some unaltered porphyry intermixed

Nil

386.2 – 425.8 DOLOMITE SULPHIDE LODE
(42.6) 50% white carbonate/quartz
30% light brown to green talc
10% grey unaltered dolomite
10% pyrite
Throughout blocky, partly mottled appearance

382.2 – 428: core a.a. of above, intercepts 3mm Centrelift log

Pg in blebs and irregularly banded

10%

425.8 – 514.9 DOLOMITE
(54.1) Cream and pale grey
Most brecciated with medium to pale bluish grey matrix and cream to white pieces of dolomite ranging in size between 2cm and 20cm
Occasional small pockets (up to 20cm) of recrystallized dolomite throughout
Many thin (usually <1cm) dark carbonate stringers
Occasional grains and facets of sphalerite
454: 100cm of Dolomite Sulphide lode:
70% carbonate/quartz, 30% talc. 3mm ad mottled
464.2: as for 454
464.8: 10cm thin of light blue/green talc
471.7: 100cm band of quartz, carbonate minor sphalerite (possibly an irregular vein)

minor sp as specks and smears

Nil

Pg mainly in thin stringers, some disseminated

Trace

707 – 725: 5% carbonate content in veins up to 10cm and in thin mottles and stringers

Nil

773: 1cm dark irregular talc band

Pg in stringers and disseminated

<1%

815 – 820: two or three 1-2cm dark talc bands with minor Pg trace py

855: 1cm dark irregular talc bands

Nil

919 – 923: fracture of dolomite and light green to grey talc, interlayered and patchy. Trace pyrite minor fluorite

926 – 927: 80cm grey green irregular qtz vein

Pg, Pg, sp disseminated, in stringers and veinlets

Trace

969 – 1023 DOLOMITE SULPHIDE LODE
(54) 969 – 977: 80% dark green to black tremolitic 20% pale green to white carbonate/quartz, 10% light to dark green talc, 10% unaltered dolomite at start, 10% pyrite
Mottled appearance
977 – 1023: Black tremolitic massive and fracturelike with minor carbonate mostly in thin (<1cm) stringers

Pg/py/sp minor sp mottled ad disseminated

10%

Pg in blebs and stringers

1%

1023 – 1036 SILTSTONE / QUARTZITE
(13) Medium grey, hard, silicified. Poorly bedded, partly brecciated.
1023 – 1032: Numerous thin carbonate stringers and some carbonate / graphitic veins

1024: 2 veins, 45° 3cm, 65° carbonate, sp, 1cm 923 – 53: fluorite, talc
1028: 10cm vein, 60°, qtz, fluorite, Pg, sp minor carbonate

Pg/py, sp in stringers, veins mostly disseminated

1%

Pg disseminated

Trace

1036 – 1246 SILTSTONE and SILTY SHALE
(18.6) Interbedded, medium grey
Moderately well bedded, much discrepted, minor brecciation
Rare quartz/carbonate veins
Numerous thin (<1cm) carbonate stringers
1060 – 1070: Some Quartzite interbedded
1080 – 1185: well bedded with slightly striping appearance

Bedding 60°

Pg disseminated, especially in Quartzite

2%

Pg and py in stringers, veinlets py occasionally in blebs

Trace

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes
material about 75 cm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF

Logged by: A. JANNINK date 28/4/80

HOLE No. B 12

LOG SHEET 2 OF 3

from 0 m to 120 m

028306

DRILL ADVANCE	LOST CORE ZONE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm.)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS.)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
2.7	2.7	100	Siltstone and Silty Shale For description see previous page	120		10/9		122.0: +120 mm vein, qtz, carbonate + brecciated shale 121-124 Core very broken 123.3-124.6: agg 10-15mm veins, irregular, along core, carbonate minor py	py and po For description see previous page	Trace	
4.6	4.6	100	124.6-135.0 (10.4) SILTSTONE with lesser QUARTZITE and SILTY SHALE Medium grey. Poorly bedded, much disrupted and brecciated Numerous carbonate/quartz veins in upper portion (to 130.3) Numerous thin (<1mm) irregular carbonate stringers	124 128				Bedding 55°	py in veins		
1.1	1.1	100	130.7-132.5: Predominantly shaley and folded to give variable core angles	132		10		129.3: 20mm vein, 40°, carbonate 130.2-130.3: carbonate/shale breccia		Weak Trace	
5.9	5.7	100						133.1: 15mm vein, 20°, po, py, carbonate			
5.2	5.2	100	135.0-147.5 (12.5) QUARTZITE with lesser Siltstone and Silty Shale Medium to dark grey Poorly bedded, disrupted, with some brecciation Occasional quartz/carbonate/fluorite/pyrite veins. Minor thin (<1mm) irregular carbonate stringers	136 140		11		141.1: 20 mm vein, 20°, qtz, carbonate, minor py, fluorite	py disseminated and in veins. Some cubic crystals as disseminated	2%	
									py > po in blebs and disseminated	10-15%	
5.5	5.5	100		146					py > po in blebs and disseminated	2-3%	
			146.8-146.9: Tuffaceous sandstone with small (<2mm) black angular fragments						py disseminated	<1%	
5.1	5.1	100	147.5-154.2 (6.7) SILTSTONE, SHALE and QUARTZITE Intermixed, Medium and pale (especially the Quartzite) grey. Moderately bedded, much disrupted, folded, and brecciated. Quartzite has dendritic appearance Rare quartz veins Rare carbonate stringers	148 152		10/9/11		147.6: 10 mm irregular vein, py Bedding 65°	py ≫ po disseminated and in blebs	1%	
2.5	2.5	100	END OF HOLE 154.2m	156							
				160							
				164							
				168							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 28/4/80

HOLE No. B 12
LOG SHEET 3 OF 3
from 120 m. to 154.2 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95477		~6.0	~6.7m	0.7	34		32	170	2.7%	5				
78		~6.7	~7.5	0.8	55		180	140	9600	2				
95480		~7.5	~10.0	2.5	310		85	38	2000	2	10			
81		~10.0	12.5	2.5	1250		400'	1400	4900	5				
82		12.5	15.5	3.0	80		25	28	3000	1				
83		110.9	112.5	1.6	14		25	5	80	<1				
84		112.5	116.27	3.77	14		15	5	45	<1				
85		116.27	117.5	1.23	18		30	5	50	<1	<10			
86		117.5	119.4	1.9	38		15	5	110	<1				
87		119.4	122.5	3.1	22		12	5	42	<1				
88		122.5	125.0	2.5	48		15	15	60	1				
89		125.0	127.5	"	18		15	10	45	1				
90		127.5	130.0	"	30		25	8	42	1	15			
91		130.0	132.5	"	16		15	8	32	1				
92		132.5	135.0	"	48		18	12	150	<1				
93		135.0	137.5	"	46		42	10	38	<1				
94		137.5	140.0	"	350		35	10	350	1				
95		140.0	141.12	1.12	880		110	50	190	1	<10			
96		141.12	142.5	1.38	4450		580	75	130	3				
97		142.5	145.0	2.5	540		160	15	65	1				
98		145.0	148.3	3.3	1100		110	15	80	1				
95588		148.3	150.0	1.7	65		20	10	30	1				
89		150.0	152.5	2.5	60		38	15	80	1				
95590		152.5	154.23	1.73	26		145	55	85	2	10			

Notes:— Sn & W by XRF Bi METHOD.
Cu, Pb, Zn, Ag by AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B12.

SAMPLE TYPE : DRILL CORE FROM ~ 6.0 TO 154.23.

0280-1

REPORT No. 510

028308

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MT. BISCHOFF TIN

HOLE No. **B13**

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1661 mN	* 1011 mE	* 622 m
(2) old	215 ft.N	-555 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

333°	magnetic
003°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Inclination at collar 45°

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 167.945 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Acid tube (= E)

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mag.	DIP
0	333°	45°
99.060	—	E 44°

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK FROM 0 TO 167.9 DATE 1 MAY 80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

RE LOGGED

Company managing exploration programme (1980)

Metals Exploration Ltd.

HOLE No. B13

Log sheet 1 of 3

0-9.8 No Core

9.8-48.8 DOLOMITE
(39.0) Cream/white and grey.
Generally brecciated appearance with grey dolomite infilling cracks and as matrix for cream/white breccia blocks.
Monotonous and massive
Rare thin (<3mm) carbonate/quartz veins

← 18.0: 20mm pitted vein, qtz minor py

Nil

24.0-26.4: Occasional recrystallized dolomite with small crystals of quartz, carbonate and dark ?fluorite

2

Py in thin infilled cracks between breccia block — Weak Trace

Py disseminated — 1-2%

Py, ? cassiterite — Weak Trace

Py, sp disseminated — Weak Trace

Py disseminated — 1%

30.7-31.3: Dolomite Sulphide Lode: cream quartz/carbonate and medium green serpentinite. Mottled appearance
31.3-31.9: Recrystallized Dolomite with quartz/carbonate
31.9-35.5: Slightly recrystallized dolomite with quartz/carbonate

35.5-36.5: Dolomite Sulphide Lode: 4% dark green serpentinite, 15% cream quartz/carbonate, 5% apple green talc. Mottled appearance.
36.5-48.8: Some thin (<1mm) black irregular stringers of ?Fe/Mn, and minor quartz/carbonate recrystallization

Nil

48.8-81.2 Carbonaceous SHALES and SILTSTONES
(32.3) Interbedded black carbonaceous shales and medium grey siltstones. Occasional Fine Grained Sandstone:
Moderately to well bedded, much disrupted folded, with some brecciation
Very rare quartz/carbonate veins

Very rare trace of py in stringers

← Bedding 45°

9c/10

← Bedding 55°

Nil

67.6-81.2: more Siltstone than Shale

← Bedding 30°

← Bedding 20°

81.2-98.8 FINE GRAINED SANDSTONE
(17.6) Medium and dark grey
up to 5% very fine (<0.5mm) feldspar content
Moderately to well bedded with bands of dark carbonaceous sandstone and lighter non-carbonaceous sandstone
Some disruption and brecciation
Rare quartz/carbonate veins and stringers

py and po disseminated

← Bedding 5°

11s

<1%

← Bedding 5°

98.8-106.1 SILTSTONE and SHALE
(7.3) Medium to dark grey, slightly carbonaceous. Minor Fine Grained Sandstone
Moderately bedded, folded, some disruption, minor brecciation.
Rare quartz/carbonate veins
Occasional thin (<1mm) carbonate stringers

py disseminated and in stringers

10/9

← Bedding 30°

1%

106.1-126.6 SILTSTONE
(20.5) Minor Fine Grained Sandstone and Shale
Medium to dark grey
Moderately bedded, minor disruption and brecciation, some folding.
Occasional quartz/sphalerite veins and thin carbonate stringers

po > py finely disseminated and in stringers

2.3%

← Bedding 25°

10

Nil

← Bedding 40°

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 1/5/80

HOLE No. B13
LOG SHEET 2 OF 3
from 0 m to 120 m

028310

Siltstone
For description see previous page

← 120.9: 13 mm vein, 10°, carbonate, qtz, py minor po, sp

← Bedding 30°

126.6-132.3 SILTSTONE and FINE GRAINED SANDSTONE
(5.7) Minor Carbonaceous Shale
Interbedded, Medium to dark grey
Moderately bedded, disrupted, some folding
Rare quartz veins, rare carbonate stringers

← Bedding 35°

po and py in veinlets

132.3-157.9 SILTSTONE with lesser SHALE
(25.6) Dark grey, slightly carbonaceous
Moderately bedded, disrupted
Minor Fine Grained Sandstone
Rare quartz/carbonate veins
Occasional thin carbonate stringers

Very rare trace of py, po in stringers

← Bedding 45°

← Bedding 25°

← 147.2: average 10mm irregular vein, carbonate minor fluorite

← Bedding 50°

← Bedding 45°

← Bedding 40°

157.9-167.9 FINE GRAINED SANDSTONE and SILTSTONE
(10.0) Medium grey
Poorly bedded, much disrupted and brecciated
Occasional quartz/pyrite veins and stringers

py and po (especially 165-167.9) in veins, disseminated and occasional blebs

← 162.3: agg 20mm in 2 irregular veins, qtz, carbonate, talc, sericite, py minor po

← Bedding 55°

← 166.7: 20mm vein, 20°, carbonate minor qtz, fluorite

END OF HOLE 167.9m

5 cm

DRILL ADVANCE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED / LOST CORE ZONE	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
3.1	100 3.1		120						Nil	
3.1	100 3.1		124		10					
3.0	100 3.0		128		10/11				Weak Trace	
6.1	100 6.1		132							
3.0	100 3.0		136							
3.1	100 3.1		140		10/9				Nil	
3.0	100 3.0		144							
3.1	100 3.1		148							
3.0	100 3.0		152							
3.4	100 3.4		156							
3.2	100 3.2		160							
3.2	100 3.2		164		11 5/10				1%	
			168							

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date: 1/5/80

HOLE No. B13
LOG SHEET 3 OF 3
from 120 m. to 167.9 m.

REPORT No. 510

028311

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MT. BISCHOFF TIN

HOLE No. **B14**

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1661 mN	* 1011 mE	* 622 m
(2) old	215 ft.N	−555 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

333°	magnetic
003°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Inclination at collar 70°

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 167.640 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8	1963-64	: Mt. Costigan Mines Pty. Ltd.
B9 to 38, B44 and B46 to 60	1964-68	: Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)
AAB1-5,8	1970	: Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK FROM 0 TO 167.6 DATE 4 MAY 80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

RE LOGGED

Company managing exploration programme (1980)
Metals Exploration Ltd.

HOLE No. B14
Log sheet 1 of 3

0 – 10.0 No Core

~10.0 – 22.9 **DOLOMITE**
(~12.9) Cream/white and grey
Generally brecciated appearance with grey dolomite infilling cracks and as matrix for cream/white breccia blocks.
Moderately hard and massive
Some thin black (<0.5cm) irregular stringers @ 7#/m
Rare thin carbonate/quartz veins

22.8 – 22.9 : Dark grey Amygdaloidal dolomite, partly carbonate. Mottled appearance

22.9 – 23.2 : NO CORE – FRACT (CONTINUED LOG)

23.2 – 29.8 : **SILTSTONE, FINE GRAINED SANDSTONE and SHALE** (6.6)
Interbedded in about equal proportions
Medium to dark grey to black carbonaceous (especially Shales). Slightly micaceous
Moderately bedded, but core very broken, some disruption, brecciation
Rare quartz/carbonate veins
Frequent thin (<1cm) irregular carbonate stringers

Gradual change to

29.8 – 44.6 **SILTSTONE and SHALE**
(14.8) occasional Fine Grained Sandstone
Medium to dark grey to black carbonaceous
Very broken core
Moderately bedded, disrupted, brecciated
Rare quartz veins and carbonate stringers

44.6 – 47.3 **QUARTZITE**
(2.7) tending towards Fine Grained Sandstone
Medium grey, massive, featureless
Occasional thin quartz veins (<2cm)

47.3 – 58.1 **SILTSTONE and SHALE**
(10.8) with minor Fine Grained Sandstone
Medium to dark grey, only slightly carbonaceous
Moderately bedded, disrupted
Occasional quartz/carbonate/quartz veins, especially after 51.6m
Core very broken after 51.5m

58.1 – 59.6 **DOLERITE SILL/DIKE** (1.5) Dark brown/black, 30% pale green biotite, 25% clear quartz/carbonate, 5% pyrite. Mottled appearance

59.6 – 64.3 **DOLOMITE**
(4.7) Grey/white
Brecciated appearance with grey dolomite infilling cracks and as matrix for white breccia blocks
Occasional recrystallization of dolomite to carbonate/quartz

64.3 – 135.0 **SILTSTONE and SILTY SHALE**
(60.7) Medium to dark grey
Moderately to poorly bedded, mostly disrupted and folded to give contorted core angles, some brecciation
Slightly carbonaceous
Occasional to rare quartz and carbonate veins and stringers
Core generally broken 64.3 – 81.0m

80.6 – 85.6 : Siltstone predominates over Silty Shale

116.01 : 100cm bedded Sandstone

105.0 – 122.5 : More Shaley, well bedded and less disrupted

DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth Detailed rock description and notes (material about 75 mm)	GRAPHIC LOG	STRUCTURAL AND VEIN INFORMATION (all broken things (joints, faults and veins) type, angle)	MINERALISATION	NOTES
0 – 10.0 No Core				
~10.0 – 22.9 DOLOMITE (~12.9) Cream/white and grey. Generally brecciated appearance with grey dolomite infilling cracks and as matrix for cream/white breccia blocks. Moderately hard and massive. Some thin black (<0.5cm) irregular stringers @ 7#/m. Rare thin carbonate/quartz veins. 22.8 – 22.9 : Dark grey Amygdaloidal dolomite, partly carbonate. Mottled appearance. 22.9 – 23.2 : NO CORE – FRACT (CONTINUED LOG)	2		Py mottled	Nil
23.2 – 29.8 : SILTSTONE, FINE GRAINED SANDSTONE and SHALE (6.6) Interbedded in about equal proportions. Medium to dark grey to black carbonaceous (especially Shales). Slightly micaceous. Moderately bedded, but core very broken, some disruption, brecciation. Rare quartz/carbonate veins. Frequent thin (<1cm) irregular carbonate stringers. Gradual change to	10/9	25.0 – 25.1 : Patch of coquinoid with lesser carbonate, minor py 26.7 : weak bore py Bedding 10°	Py finely disseminated, occasionally in stringers	1-2%
29.8 – 44.6 SILTSTONE and SHALE (14.8) occasional Fine Grained Sandstone. Medium to dark grey to black carbonaceous. Very broken core. Moderately bedded, disrupted, brecciated. Rare quartz veins and carbonate stringers	10/9	Bedding 30° Bedding 60°	Py disseminated preferentially in Sandstone, with Siltstone/Shale usually barren.	<1%
44.6 – 47.3 QUARTZITE (2.7) tending towards Fine Grained Sandstone. Medium grey, massive, featureless. Occasional thin quartz veins (<2cm)	11		Py in veins	Weak Trace
47.3 – 58.1 SILTSTONE and SHALE (10.8) with minor Fine Grained Sandstone. Medium to dark grey, only slightly carbonaceous. Moderately bedded, disrupted. Occasional quartz/carbonate/quartz veins, especially after 51.6m. Core very broken after 51.5m	10/9	Bedding 5° Bedding 85° 54.6 : 2cm vein, 70° carbonate, py 57.0 : 17cm vein, 70° carbonate, py 57.7 : 10cm vein, 5° carbonate	Py disseminated, especially in short Sandstone sections Py >> po in veins, some disseminated, 1-2% and blebs	Trace
58.1 – 59.6 DOLERITE SILL/DIKE (1.5) Dark brown/black, 30% pale green biotite, 25% clear quartz/carbonate, 5% pyrite. Mottled appearance	7/6/8		Py minor Sp, trace Sp disseminated	5%
59.6 – 64.3 DOLOMITE (4.7) Grey/white. Brecciated appearance with grey dolomite infilling cracks and as matrix for white breccia blocks. Occasional recrystallization of dolomite to carbonate/quartz	2		Py minor Sp disseminated and in vein veins	1% Nil
64.3 – 135.0 SILTSTONE and SILTY SHALE (60.7) Medium to dark grey. Moderately to poorly bedded, mostly disrupted and folded to give contorted core angles, some brecciation. Slightly carbonaceous. Occasional to rare quartz and carbonate veins and stringers. Core generally broken 64.3 – 81.0m		67.2 : 15cm vein, 55° py minor sph, cpy Bedding 25° Bedding 90° 74.2 : 15cm vein, 65° carbonate, sepiolite, sph, trace po Bedding 30° Bedding 5°	Py >> Po in veins, Po also as rare blebs	Trace
80.6 – 85.6 : Siltstone predominates over Silty Shale	10/9	Bedding 60° Bedding 65° 111.2 : 22cm vein, 65°, sph, py Bedding 60° Bedding 35°	Py disseminated in patches, often barren, and in veins	<1%
116.01 : 100cm bedded Sandstone 105.0 – 122.5 : More Shaley, well bedded and less disrupted				

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. ZISCHOFF
Logged by: A. JANNINK date: 4/5/80

HOLE No. 84
LOG SHEET 2 OF 3
from 0 m. to 130 m.

028313

	Siltstone and Silty Shale for description see previous page 123.5-124.0: Numerous thin (<0.5mm) carbonate stringers Gradual Change to	120 124	10/9	← Bedding 65°	py for description see previous page	<1%
21.3	125.0-138.9 SILTSTONE, FINE GRAINED SANDSTONE (13.9) Lesser SILTY SHALE Similar to 64.3-125.0. but includes Fine Grained Sandstone. Medium to dark grey Moderately to poorly bedded, much disrupted and folded, some brecciation. Occasional quartz/carbonate veins. Minor carbonate stringers	128 132 136	10/11	← Bedding 50° 136.2: 10mm vein, 60°, qtz minor po ← Bedding 45°	py >> po in veins py disseminated and in blebs	Trace 5%
100 21.3	138.9-142.8 SILTY SHALE with lesser SILTSTONE (3.9) Medium to dark grey Moderately to well bedded, much disrupted and folded Very shattered and broken core, highly oxidized	140	9	← Bedding 55°	py >> po disseminated and in blebs	2%
	142.8-167.6 SILTSTONE, FINE GRAINED SANDSTONE (24.8) and SILTY SHALE Interbedded. Fine Grained Sandstone predominates towards base Shale and Siltstone are medium to dark grey, Sandstone is medium to pale grey. Shale is slightly carbonaceous. Moderately bedded, much disrupted and brecciated Occasional quartz veins, especially at start	144 148 152 156	10/11/9	← Bedding 40° ← Bedding 70°	py >> po disseminated, especially in Sandstone, and in blebs py and po disseminated and in thin veinlets	2-3% 1%
100 15.5		160 164		← Bedding 35° ← Bedding 45°		
	END OF HOLE 167.6m	168				

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15mm

DRILL ADVANCE | % RECOVERY ESTIMATE | CORE LENGTH RECOVERED | LOST CORE ZONE | DRILL LOG DEPTH TAG | DEPTH POINTER | GRAPHIC LOG (SEE LEGEND ON SHEET 1) | DEPTH POINTER | STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS) | MINERALISATION | PERCENT MINERALISATION Visual estimate | NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 4/5/80

HOLE No. B14
LOG SHEET 3 OF 3
from 120 m. to 167.6 m.

REPORT No. 510

028314

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. **B17**

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	*1697 mN	*1069 mE	*620 m
(2) old	Approx 400 ft.N	Approx −480 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

330·5°	magnetic
000·5°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3	1:100 000 Sheet No. 8015	State Tasmania

Mineral Tenement (1980): E.L. 13/79 — Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Inclination at collar: 55°

Total length: 170·993m

Date drilled:

Details of down hole location-survey methods.

Tropari

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C BEARING type mag.	DIP
0	330·5°	55°
30·480	329·5	55
91·440	327	57
152·400	328·5	60

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY	LOGGED BY	LOGGED BY
A. JANNINK		
FROM 0 TO 171·0	FROM ___ TO ___	FROM ___ TO ___
DATE 21 MAY 80	DATE	DATE

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B17
Log sheet 1 of 3

0-53.6 DOLOMITE
(53.6) Cream / white / light grey
Generally brecciated appearance with grey dolomite infilling cavities and as matrix to breccia blocks.
Pervasive and massive
Some thin (<0.5cm) black irregular stringers of ? Fe/Mn
Occasional patches of recrystallized dolomite usually less than 20cm, in banded form

Py: 5p in thin veinlets, disseminated, and in recrystallized dolomite

22.0-27.0 : About 25% recrystallized dolomite

2

Py-marcasite vein 1p, bank 20%

←30.6: 30cm Py-marcasite bank

Py minor sp in thin veinlets

Trace

Very rare specs Py 1p in recrystallized dolomite

Nil

53.6-58.3 DOLOMITE SULPHIDE LODE
(4.7) 60% pyrite, 40% cream to white carbonate/quartz
5% green biotite ? Fe bearing pyroxenite
Massive and blocky appearance

5/8

← Core cut @ angle; centreline intercepts

Pyrite minor 2p trace 1p matrix to and blocky

55%

58.3-81.0 DOLOMITE
(22.7) Cream/white/light grey
Generally brecciated appearance with grey dolomite infilling cavities and as matrix to breccia blocks.
Pervasive and massive.
Some thin (<0.5cm) black irregular stringers of ? Fe/Mn
Occasional patches of recrystallized dolomite usually less than 20cm in bands from
60.6-61.0 : Dolomite sulphide lode: 60% quartz/carbonate, 40% pyrite
61.0-67.0 : About 50% recrystallized dolomite to carbonate/quartz

67.0-81.0 : partially recrystallized dolomite

2/3

Py accessory specs

Py-minor 2p, trace arsenopyrite 60%

←62.2: approx 10cm Py
←62.8: approx 10cm Py
←63.8: approx 20cm Py
←66.2: approx 10cm Py

Py minor sp disseminated mainly in recrystallized dolomite

<1%

Py >> Po weak trace sp in veinlets and specs

Weak Trace

80.6-80.8: a few small specs Py green lode

81.0-93.0 RECRYSTALLIZED DOLOMITE
(12.0) white and grey with lesser original dolomite and <5% pale green talc pockets
90.6-90.8: Dolomite/Sulphide lode, 60% talc, 40% carbonate, 20% dolomite

3

Py > Py disseminated

2-3%

93.0-93.6 SILTSTONE and SHALE Grey to black, disrupted, poorly bedded

10/9

← Bedding 5°

Py minor Py, irregular splashes of Py 30cm

10%

93.6-95.6 RECRYSTALLIZED DOLOMITE
(1.8) white and grey with lesser original dolomite and <5% pale green talc pockets
95.1-95.6 : 10-20% talc and 10-20% pyrite

3

Py > Py disseminated

2-3%

95.6-101.6 SILTSTONE and SHALE
(6.2) Dark grey to black
Disrupted, poorly bedded
Occasional thin stringers

10/9

← Bedding 5°

Py>> Po in stringers, blebs, minor disseminated mainly concentrated in 1 foot and last 1 metre

1-2%

101.6-103.6 DOLOMITE SULPHIDE LODE
(2.0) 60% black irregularities, 20% grey carbonate/quartz, 20% grey dolomite 10% light green talc, 10% pyrite/pyrrhotite
Massive appearance. 102.0-102.6: dolomite is predominant

7/8/9

Py: marcasite > Po matrixed

10%

103.6-106.7 SILTSTONE, FINE GRAINED SANDSTONE with less SHALE
(62.1)
Medium to dark grey
Moderately to well bedded, with banded appearance of silt/sand interbeds (especially 103.0-106.0)
Minor disruption and brecciation
Occasional to rare quartz/pyrite veins
Some thin carbonate stringers

10/11

← Bedding 20°

← Bedding 65°

Py disseminated and in stringers

<1%

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes
indented about 10 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
BP CORE ANGLE Alpha, Beta and other data entry

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNICAN date: 21/5/80

HOLE No. B17
LOG SHEET 2 OF 3
from 0 m to 120 m

Siltstone, Fine Grained Sandstone with lesser Shale
For description see previous page

← Bedding 40°

Py
for description see previous page
<1%

← Bedding 55°

Py>>Po
in stringers, disseminated (especially Po) and veins
2%

← Bedding 65°

Py>Po
in stringers and veinlets
Trace

135.0-166.7: Considerable disruption and brecciation

← 136.0: 10cm vein, 15° qtz, Po minor Py

← 141.3: 65cm vein, 65° Py minor qtz, tr Po
← 141.6: 25cm vein, 40°, Py
← Bedding 40°

Py>Po
in stringers and veins, minor disseminated
1-2%

- Broken core

Py
in veins and stringers
Trace

166.7-169.4 QUARTZITE/FINE GRAINED SANDSTONE
(2.7) Medium to pale grey
Partly massive, partly bedded and partly brecciated

11 ← Bedding 35°

Py
disseminated
1%

169.4-171.0 FINE GRAINED SANDSTONE, SHALE
(2.6) and lesser SILTSTONE
Sandstone is pale grey, rarely a Quartzite, Shale is black, carbonaceous, Siltstone is medium grey.
Very brecciated, with sandstone blocks in black shale matrix.
Much disruption with moderate variable bedding
Rare veins and stringers

11/10

Py
disseminated in sandstone blocks - locally up to 5%
1%

167.7-171.0: Well bedded with slightly stringy appearance and more Siltstone present

← Bedding 35°

Py
disseminated sometimes along bedding
2-3%

END OF HOLE 171.0m

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
HOLE No. 817
Logged by: A. JANNINK date 21/5/80
LOG SHEET 3 OF 3
from 12.0 m to 171.0 m

REPORT No. 510

028317

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. **B20**

COLLAR LOCATION

Grid name (* = ADOPTED)	PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1813 mN	* 1072 mE	* 625 m
(2) old	807 ft.N	−642 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

150·5°	magnetic
180·5°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Inclination at collar 80°

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 114·452 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Acid tube

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mag	DIP
0	150·5°	80°
30·480	—	80·5
60·960	—	80·5
114·300	—	80·5

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK FROM 0 TO 114·6 DATE 21 MAY 80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

RE LOGGED

Company managing exploration programme (1980)

Metals Exploration Ltd.

HOLE No. B20

Log sheet 1 of 2

028318

0-26.5 QUARTZ PORPHYRY
(26.5) 0-26.1: Cream to pale green matrix with 10% colourless quartz phenocrysts to 2mm and 15-20% white, occasionally pink and green, feldspar phenocrysts to 3mm; minor black tourmaline needles and clots and pitted

26.1-27.1: Core slightly pitted

27.1-30.5: as for 26.1-27.1 but increase in white quartz phenocrysts to 15%

30.5-32.1: No clear matrix, now an admixture of quartz with rock (now feldspar)

32.1-32.5: white and cream matrix with 15% quartz phenocrysts to 5mm and 5-10% orange altered feldspar phenocrysts

Py and tp disseminated

<1%

26.1-94.1: 10-20mm angled fg carbonate stringers with py

fg, marcasite tone fluorite disseminated, crystals to 5mm 2.6-9.6: 2% fg
Trace carbonate after the fg frequently replaced feldspar

5%

fg > marcasite tone fluorite disseminated. Crystals to 5mm Trace carbonate usually intergrown with fg.
41.6-47.1 marcasite > fg and trace sphalerite

10%

marcasite > fg trace sphalerite disseminated in up to 5x5cm patches

15%

fg and marcasite tone fluorite sphalerite disseminated

2-5%

marcasite > fg trace fluorite disseminated up to 5x2cm as replacement of feldspar

5-10%

24.5-50.7 TRANSITION ZONE: PORPHYRY/DOLOMITE SULPHIDE ORE
(2.2) Mottled mixture of quartz porphyry and dark blue/green/black fluorite rich serpentinite. Rock generally has a porphyritic texture

24.5: Contact at 60° fg, marcasite

1/7

fg disseminated throughout

5-10%

28.7-33.0 DOLOMITE SULPHIDE ORE
(6.3) 28.7-32.1: Light green to cream altered talc with minor dark serpentinite and white quartz/carbonate. Massive, but slightly inequigranular
32.1-32.6: Pale brown talc/carbonate with 10% quartz porphyry intervened in places. Mottled and sometimes porphyritic texture

6

6/8/1

fg trace sp disseminated and irregularly banded

10%

32.6-32.8: 5% fluorite

32.8-98.1 DOLOMITE
(65.1) Pale grey to white
Rare patches of brecciation.
Generally massive and recrystallised
Occasional patches of recrystallisation which contain some pyrite and marcasite

fg
Disseminated and in vein veinlets/stringers, also in blebs in recrystallised dolomite

<1%

38.6-39.8: Recrystallised dolomite

fg: Accessories 20%
fg:
Disseminated and in vein veinlets/stringers, also in blebs in recrystallised dolomite

2

42.8-43.3: Recrystallised dolomite

58.6-58.8: Recrystallised dolomite with talc beads
58.8-98.1: Partial recrystallisation and some brecciation

<1%

64.5-98.1: A few fine black specs and seams of Py/Mp

2/3

98.1-116.6 SILTSTONE minor SHALE and QUARTZITE
(16.5) Medium grey
Poorly bedded, disrupted, folded.
Occasional quartz/pyrite/fluorite veins
Numerous fine carbonate stringers
Core out of order and broken

fg
in veins and blebs

<1%

10/8/1

98.6 to end of hole:
Core out of order

Contact from Geoff's log

Bedding 75°

END OF HOLE 116.6m

5cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes
Indented about 25 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. Jamieson date: 21/5/82

HOLE No. B 20
LOG SHEET 2 OF 2
from 0 m. to 116.6 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
96000		96.9	98.50	1.6	180		25	70	900	<1	25			
1		98.50	100.75	2.25	120		10	120	480	<1				
2		100.75	103.00	"	70		15	30	170	<1				
95891		103.00	105.00	2.0	26		15	12	160	<1				
92		105.00	106.00	1.0	26		30	20	140	<1				
93		106.00	107.50	1.5	36		15	15	110	<1				
94		107.50	110.00	2.5	26		15	15	110	<1				
95		110.00	112.50	2.5	12		18	80	400	<1	<10			
96		112.50	114.60	2.1	8		40	15	130	<1				

Notes:— XRF Bi Method. - Sn.
W by XRF Bi Method.
Cu, Pb, Zn, Ag by AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B 20

SAMPLE TYPE : DRILL CORE FROM 96.9 TO

02831

REPORT No. 510

028320

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B21

COLLAR LOCATION

	Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1)	M.E.L.	* 1813 mN	* 1072 mE	* 625 m
(2)	old	ft.N	ft.E	
(3)	Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

330·5° magnetic
000·5° grid (1)
grid (2)
grid (3)
true

1:250 000 Sheet No.	1:100 000 Sheet No.	State
SK55-3	8015	Tasmania

Inclination at collar: 60°

Mineral Tenement (1980): E.L. 13/79 — Holder (1980): Metals Exploration Ltd.

Total length: 140·665 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled:

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 140·7 — DATE 22 MAY 80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B21
Log sheet 1 of 3

0-6.5 No Core

6.5-7.9 RECRYSTALLIZED DOLOMITE
(1.4) Cream to light brown, partly recrystallized, carbonate and quartz veggy in places, featureless, rare brecciation

7.9-50.6 QUARTZ PORPHYRY
(42.7) 7.9-13.3: white to pale green matrix with 5-10% quartz phenocrysts to 2mm and 10% mostly orange feldspar phenocrysts to 3mm.
Triangular tourmaline (1%) throughout
Slightly pitted

13.3-15.7: Grey/white matrix with 10-20% quartz phenocrysts to 3mm and 5-10% feldspar (orange) to 2mm

15.7-17.4: as for 13.3-15.7 but 10% milk white feldspar phenocrysts

17.4-28.6: Cream/white, occasionally orange, matrix with 10-15% quartz phenocrysts to 4mm and 5-10% feldspar phenocrysts usually <2mm and usually orange colour

28.6-29.5: White, slightly pitted; feldspars are unaltered and white in colour
29.5-42.1: As for 17.4-28.6

42.1-50.6: Milky white matrix with 5-10% quartz phenocrysts to 3mm and up to 5% orange feldspar phenocrysts generally <2mm

50.6-54.1 RECRYSTALLIZED DOLOMITE
(3.5) Cream and white. Fairly massive with slightly mottled appearance, otherwise structureless. Rare thin stringers of pale talc
54.1-53.4: Dolomite Sulphide Lode: Quartz/carbonate with 10% pyrite (semi-disseminated) and trace pale talc

54.1-58.5 DOLOMITE SULPHIDE LODE
(4.4) 54.1-55.7: Light brown carbonate/quartz with 10% pyrite. Generally mottled with minor irregular banding
55.7-54.1: Apple green intimately mixed serpentinite and quartz/carbonate. Generally mottled with minor irregular banding
54.9-58.5: As for 54.1-55.7 but more banded

58.5-63.2 RECRYSTALLIZED DOLOMITE
(4.7) Cream and white. Fairly massive with slightly mottled appearance, otherwise structureless. Rare thin stringers of pale talc

63.2-65.2 DOLOMITE SULPHIDE LODE
(2.0) 90% decreasing to 40% after 64.2m, pyrite, remainder is cream quartz/carbonate

65.2-71.1 RECRYSTALLIZED DOLOMITE
(5.9) Cream and white, slightly brecciated. Fairly massive with slightly mottled appearance. Rare thin stringers of pale talc

Gradual change to

71.1-76.0 DOLOMITE
(4.9) Grey/white dolomite with only occasional recrystallized patches.
Generally massive with thin dark grey/black partings

76.0-89.3 DOLOMITE SULPHIDE LODE
(13.3) 76.0-77.7: 70% grey/light green talc, 20% pyrite, 10% cream quartz/carbonate. Talc matrix with disseminated pyrite with thin carbonate veins
77.7-81.0: white quartz/carbonate. Massive but slightly mottled appearance
71.6-71.5: 80% dark talc

81.0-82.0: 50% black baby serpentinite, with minor pale green talc, 50% pyrohotite. Mottled appearance
82.0-88.3: Pale grey/green to cream coloured talc with minor carbonate and 15% pyrohotite or pyrite

88.7-96.0: Decomposed core

-6.8: 50mm limonite gossan

-48.0-52.6: Poor core recovery and very broken

-55.0: 4-6mm carbonate

| | | |

Dolomite Sulphide Lode
For description see previous page

| | | |

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95171		98·6	100·0	1·4	20		10	5	35	1				
72		100·0	102·5	2·5	16		5	<5	25	1				
73		102·5	105·0	"	22		18	5	22	1				
74		105·0	107·5	"	36		38	10	28	1				
75		107·5	110·0	"	20		18	5	25	1				
76		110·0	112·5	"	20		30	8	28	1				
77		112·5	115·0	"	16		8	5	25	1				
78		115·0	117·5	"	23		12	5	32	1				
79		117·5	120·0	"	32		18	5	28	1				
80		120·0	122·5	"	1000		100	55	100	2				
81		122·5	125·0	"	75		48	5	210	1				
82		125·0	127·95	2·95	34		40	5	15	1				
83		132·6	135·0	2·4	50		25	5	75	1				
84		135·0	137·5	2·5	20		25	5	48	1				
85		137·5	140·66	3·16	14		30	5	30	2				

Notes:— Sn & W XRF B1 method.
Cu, Pb, Zn, Ag by AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B21

SAMPLE TYPE : DRILL CORE FROM 98·6 TO 140·66.

0283233

028324

REPORT No. 510

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. **B22**

COLLAR LOCATION

Grid name (* = ADOPTED) — Rectangular space co-ordinates: PLANAR CO-ORDINATES — ELEVATION

(1) M.E.L.	* 1774 mN	* 955 mE	* 621 m
(2) old	455 ft.N	−925 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Mineral Tenement (1980): E.L. 13/79

Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

W.C. Bearing from collar

330·5° magnetic

000·5° grid (1)

_____ grid (2)

_____ grid (3)

_____ true

Inclination at collar 60°

Total length 147·218 m

Date drilled

Details of down hole location-survey methods.

Acid tube

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C BEARING type mag.	DIP
0	330·5°	60°
30·480	—	52·5
60·960	—	55·5
121·920	—	54·5

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8	1963-64	: Mt. Costigan Mines Pty. Ltd.
B9 to 38, B44 and B46 to 60	1964-68	: Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)
AAB1-5,8	1970	: Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 147·2 — DATE 24 MAY 80

LOGGED BY _____ — FROM _____ TO _____ — DATE _____

LOGGED BY _____ — FROM _____ TO _____ — DATE _____

RE LOGGED

Company managing exploration programme (1980)

Metals Exploration Ltd.

HOLE No. B22

Log sheet 1 of 3

0 - 31.4 Core Missing

Constuff core log indicates very poor recovery

31.4-43.7 DOLOMITE
(12.3) Cream/white to pale grey
Massive, monotonous, some brecciation
Minor thin dark dolomitic stringers
Minor recrystallization towards base

Py > Po
in stringers and disseminated

<1%

43.7-45.6 DOLOMITE SULPHIDE LODE
(1.9) 50% pyrite, 50% quartz/carbonate intermixed

Py
mottled to massive

5/8

50%

45.6-47.6 No Core
(2.0)

47.6-66.1 QUARTZ PORPHYRY
(18.5) 47.6-50.2: Milky cream/white matrix with 5% quartz phenocrysts to 2mm and 5% orange and green feldspar phenocrysts to 2mm
50.2-58.0: white matrix with 10% quartz phenocrysts to 3mm and 10% orange, minor green, feldspars to 2mm

55% sp, 2-3% py trace fluorite disseminated

5-8%

py, minor sp, trace fluorite cassiterite disseminated

sp especially at 52.0m

5-10%

←54.8: 60mm py minor sp

58.0-66.1: as for 50.2-58.0 but 10-15% quartz phenocrysts to 5mm and 5-10% feldspar phenocrysts usually <2mm

1

py trace cassiterite disseminated

10-15%

66.1-75.2 SILTSTONE and SILTY SHALE
(9.1) Medium to dark grey with occasional slight green tinge
Poorly bedded, much disrupted
Some quartz/carbonate veins and carbonate stringers

←68.1: cpp 6mm vein, carbonate

10/9

←71.7: cpp 50mm vein, carbonate minor fluorite, sp

Nil

75.2-90.3 FINE GRAINED SANDSTONE with lesser SILTSTONE and SHALE
(15.1) Medium to dark grey; sandstone is medium grey, shale/siltstone has some green tinge
Sandstone is usually well, and finely, bedded, otherwise mostly disrupted, brecciated and poorly bedded
Rare veins, occasional carbonate stringers

←Bedding 20°

←Bedding 80°

11/10/9

←Bedding 40°

Py
in stringers and veins

Trace

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15mm

GRAPHIC LOG | STRUCTURAL AND VEIN INFORMATION | MINERALISATION | NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 24/5/80

HOLE No. S 22
LOG SHEET 2 OF 3
from 0 m to 94 m

Depth	Description	Sample	Graphic log	Structural and vein information	Mineralisation	Notes
84	Fine Grained Sandstone lesser Siltstone and Shale For description see previous page	84	11s/10/9	← 84.8: 100mm vein, 30°, sp, qtz, carbonate ← 87.1: 10mm vein, 30°, carbonate	py see previous page ~~py disseminated~~ py>> po in stringers, veins, some disseminated	Trace 20% <1%
88						
90.3-97.0	SILTSTONE / SILTY SHALE (6.7) Pale grey Very evenly grained, almost massive Rare bedding Brecciated and disrupted in places Rare veins and stringers	92	10/9	← Bedding 35°	py in stringers and blebs	<1%
96	Gradual change to					
97.0-106.7	FINE GRAINED SANDSTONE / SILTSTONE (9.7) Pale grey Fairly evenly grained but more brecciated and disrupted than previously Rare dark grey/green Shale Occasional veins and stringers	100	11s/10	← Bedding 55° ← 104.6: agg 20mm veins, 10°, carbonate, minor qtz, trace sp	py in stringers, rarely disseminated	<1%
104	Gradual change to					
106.7-118.9	SILTSTONE, FINE GRAINED SANDSTONE (12.2) and lesser SHALE Pale to dark grey (Shales especially dark grey) Poorly bedded, much disrupted and brecciated Occasional veins Some stringers	108	10/11s	← Bedding 30° 112.4: 40mm vein, 55°, py minor qtz, carbonate trace fluorite, po 112.5: 20mm vein, 25°, carbonate minor qtz, fluorite 112.6: 20mm vein, 45°, carbonate, py, po, qtz trace sp 117.0-117.3: Vein, 25°, sp, lesser carbonate, fluorite minor mo ← Bedding 20°	py > po disseminated, along bedding in breccia blocks, in stringers and veins po in blebs	1-2%
112						
116						
118.9-125.1	DOLOMITE SULPHIDE LODE (6.2) 118.9-121.7: 70% pyrite, 150% cream carbonate/quartz, 10% black serpentinite, 5% green talc. Massive py, slightly pitted, mottled, rare irregular banding. First 250mm has spotted carbonate/talc appearance 121.7-122.8: 50% cream quartz/carbonate, 30% pyrite, 10% black serpentinite, 10% pale green talc. Mainly mottled appearance At 122.7: 15mm silicified Siltstone band - bedding 40° 122.8-123.3: Quartzite/silicified Siltstone, medium to pale grey 123.3-125.1: 50% white/cream quartz/carbonate, 20% pale green talc, 10% black serpentinite, 10% pyrite, 10% silicified Siltstone Mottled, spotty and spidery appearance.	120	5/8	← 118.9: Contact irregular ~35° ← Banding 40°	py weak trace po massive py minor po mottled py finely disseminated py minor po mottled	70% 30% 5% 10%
124			8/6	125.1: Contact ?50°		
125.1-129.4	SILTSTONE / SILTY SHALE (4.3) Pale grey Very evenly grained. Well bedded. Moderate disruption and brecciation, especially at start Some quartz/carbonate veins and stringers Similar to 90.3-97.0	128	10/9	← Bedding 55°	py>> po finely disseminated and in stringers and veins (especially at start)	1-2%
129.4-133.8	QUARTZITE / FINE GRAINED SANDSTONE (4.4) Minor Siltstone and Shale Medium to pale grey, slightly dendritic appearance. Much brecciated and disrupted. Some thin veins and stringers	132	11	132.4-132.6: vein, py minor qtz, carbonate, po trace arsenopyrite 133.3: 25mm vein, 20°, py, carbonate, qtz, fluorite trace po 133.7: 32mm vein, 50°, py, qtz, trace fluorite, carbonate	py finely disseminated and in stringers, veins	2-3%
133.8-147.2	SILTSTONE with lesser SHALE (13.4) Medium to pale greenish grey Siltstone with thin dark carbonaceous Shale bands up to 2mm thick. Stripey appearance Well bedded with minor folding. Disrupted and brecciated (especially 133.8-138.3) Some quartz veins to 138.3, thereafter rare Some carbonate stringers throughout	136	10/9c	← 135.5: 12mm vein, py ← Bedding 60° ← Bedding 60°	py rare po in veins and stringers to 138.3, then mostly finely disseminated along bedding	1-2%
140						
144						
148	END OF HOLE 147.2m					
152						
156						
160						
164						
168						

5 cm

Dip	Azimuth	Depth from-to	Rock unit	Graphic log	Structural and vein information	Mineralisation	Notes
90	2.7	8.0					
100	3.1	3.0					
100	3.0	3.0					
100	2.6	2.6					
100	0.5	0.5					
100	3.0	3.0					
100	3.1	3.1					
100	3.0	3.0					
80	8.8	11.0					
100	3.0	3.0					
100	3.1	3.1					
100	3.6	3.6					
100	3.1	3.1					
100	2.3	2.3					
82	1.4	1.7					
100	6.1	6.1					
100	4.1	4.1					
77	2.7	3.5					

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 24/5/80

HOLE No. B 22
LOG SHEET 3 OF 3
from 84 m. to 147.2 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98122		31.4	33.4	2.0	1050									
23		33.4	35.4	"	70									
24		35.4	37.4	"	14									
25		37.4	39.4	"	14									
26		39.4	41.4	"	440									
27		41.4	43.7	2.3	75									
28		43.7	45.6	1.9	640									
95186		~66.1	~70.0	3.9	210		40	20	430	1				
87		70.0	72.5	2.5	800		20	300		2				
88		72.5	75.0	"	36		25	15	95	1				
89		75.0	77.5	"	12		18	5	50	1				
90		77.5	80.0	"	12		70	12	48	2				
91		80.0	82.5	"	38		38	12	95	2				
92		82.5	85.0	"	1350		98.0	950	1.0%	14				
93		85.0	87.5	"	100		50	45	230	1				
94		87.5	90.0	"	40		38	42	1350	1				
95		90.0	92.5	"	28		22	18	260	1	<10			
96		92.5	95.0	"	65		22	12	190	1				
97		95.0	97.5	"	44		25	22	190	1				
98		97.5	100.0	"	100		130	2360	1850	3				
99		100.0	102.5	"	480		90	210	160	2				
95400		102.5	105.0	"	100		25	25	140	<1	<10			
1		105.0	107.5	"	55		18	12	100	<1				
2		107.5	110.0 APP	"	340		45	22	200	<1				
3		110.0 APP	112.5 APP	"	190		160	80	630	2				
4		112.5 APP	115.0 APP	"	660		95	1900	4000	8				
5		115.0 APP	117.5 APP	"	760		140	21000	3.6%	32	<10			
6		117.5 APP	120.0	"	1850		140	170	1350	1				
7		120.0	122.83	2.83	240		350	48	110	<1				

Notes:— Sn by XRF Bi Method.

Cu, Pb, Zn, Ag by AAS

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B22

SAMPLE TYPE : DRILL CORE FROM 31.4 TO 45.6

02838

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95408		122.83	125.0	2.17	470		90	15	520	<1				
95499		125.0	126.5	1.5	200		55	22	140	<1				
95409		126.5	130.0	3.5	46		42	40	410	<1				
10		130.0	133.5	"	2950		490	60	170	2	10			
11		133.5	135.0	1.5	1600		170	45	680	<1				
12		135.0	137.5	2.5	310		80	25	210	<1				
13		137.5	140.0	"	16		30	12	35	<1				
		140.0	142.5	"	8		28	10	35	<1				
15		142.5	145.0	2.5	18		28	5	25	<1	<10			
16		145.0	147.22	2.22	26		22	5	22	<1				

Notes:— W and Sn by XRF B. Method.

Cu, Pb, Zn, Ag by HAS

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B22 B.

SAMPLE TYPE : DRILL CORE FROM 122.83 TO 147.22

028328

REPORT No. 510

028329

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MT. BISCHOFF TIN

HOLE No. B23

COLLAR LOCATION

	Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1)	M.E.L.	* 1880 mN	* 954 mE	* 632 m
(2)	old	ft.N	ft.E	
(3)	Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

330·5° magnetic
000·5° grid (1)
grid (2)
grid (3)
true

1:250 000 Sheet No.	SK55-3	1:100 000 Sheet No.	8015	State	Tasmania

Inclination at collar 45°

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 104·242 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK FROM 0 TO 104·2 DATE 25 MAY 80

LOGGED BY ... FROM ... TO ... DATE ...

LOGGED BY ... FROM ... TO ... DATE ...

RE LOGGED

Company managing exploration programme (1980)
Metals Exploration Ltd.

HOLE No. B23
Log sheet 1 of 2

0-12.8 No Core

12.8-51.2 DOLOMITE
(38.4) Pale grey/white/cream
Generally massive and massive, occasionally mottled and sparkly appearance due to partial recrystallization
Rare small patches of total recrystallization.
Some dark grey dolomite veining
Rare stringers (<1cm) and veins (fluorite)

33.1-33.8: Recrystallized dolomite with trace cavities

38.0-44.0: Pale grey/white massive dolomite

51.2-65.4 DOLOMITE SULPHIDE LODE
(14.2) 51.2-55.1: 55% white to dark green ? fluorite rich coarse-grained to very hard, 30% cream/white carbonate and 20% pyrobutite. Irregularly banded, partly mottled

55.1-57.9: 60% cream carbonate/quartz, 35% bronze pyrobutite, 5% pyrite. Irregularly and discontinuously banded

57.9-62.7: 50% cream carbonate/quartz, 25% white to dark green ? fluorite rich coarse-grained to very hard, 25% pyrobutite. Irregularly and discontinuously banded, some mottled zones

Gradual change to
62.7-63.6: 40% carbonate/quartz, 40% green ? fluorite rich coarse-grained to very hard, 20% pyrobutite
63.6-64.2: 60% cream carbonate/quartz, 30% cream/white quartz carbonate, 5% pyrite, 5% pyrobutite. Mottled appearance
64.2-65.4: massive black pyrobutite, minor quartz/carbonate especially as stringers and veins, minor green talc

65.4-67.6 DOLOMITE SULPHIDE LODE and SILTSTONE
(2.2) 65.4 black pyrobutite, 25% pale grey/green Siltstone showing little clastic texture, no distinct boundaries.
Some carbonate/quartz mostly in veins and stringers

67.6-68.9 DOLOMITE SULPHIDE LODE
(1.3) 67.6-68.1: 60% pyrite, 40% quartz, 20% carbonate
68.1-68.9: 60% pyrite, 40% quartz/carbonate with minor dark green talc
Virtually massive pyrite with disseminated quartz/carbonate

68.9-71.8 SILTSTONE and QUARTZITE
(2.9) Pale to medium grey
Partly bedded, disrupted
Rare quartz veins

71.8-92.7 SILTSTONE and SILTY SHALE
(21.9) Pale to medium grey, slightly greenish
Occasional pockets of quartzite
Poorly bedded, disrupted, minor brecciation
Occasional quartz veins

92.6-93.7: well bedded

93.7-96.2 TUFF Pale grey fine grained tuff with occasional white quartz and dark fragments. Medium bedded. Tuffaceous appearance

96.2-97.5 SILTSTONE locally SILTY SHALE
(1.3) Pale grey
well bedded, minor disruption
Rare thin pyrite veins
Some thin carbonate stringers

97.5-97.9 TUFF As for 93.7-96.2

97.9-98.6 SILTSTONE and SILTY SHALE
As for 96.2-97.5

98.6-98.9 TUFF
As for 93.7-96.2 but some veins fragments, fragments up to 2cm

98.9-104.2 SILTSTONE locally SILTY SHALE
(5.0) Pale grey
well bedded, some disruption and faulting
Rare quartz veins
Numerous carbonate/pyrobutite stringers

END OF HOLE 104.2 m

Fg 1% sp. fluorite
Rare thin fg stringers
Rare fg 1% sp disseminated
Rare fluorite veins to 2cm

Nil

124.6-127.8: Numerous thin fluorite veins with fg on edges
127.6: 15cm vein, sp

144.4: 10cm vein, 50° fluorite

po minor fg: fluorite in discontinuous disseminated bands 20%

10% po, 5% fg, bronze coalitrite replace to 2cm, discontinuously banded 40%

po minor fluorite irregularly banded, some mottled 25%

fg 1% mottled 10%

fg and fp disseminated in stringers and veins 5%

fg 1% in veins and stringers, disseminated 5%

676-681: Decomposed and broken core

fg massive 40%
fg minor po massive 60%

694.9: Content 20°

po and fg disseminated 1-2%

po and fg disseminated and in blebs 1-2%

fg 1% as blebs and in veins

Bedding 65°

779: 10cm vein, 60° qtz, minor po trace fluorite

782.2: 15cm vein, 60° fg minor fluorite

Bedding 40°

881.7: 50cm vein, 60° qtz, fg

Weak Trace

884: 50cm vein, 60° actinolite, qtz, minor fluorite trace po

Bedding 60°

917: Content 35°

962: Content obscure with ?

Bedding 75°

po and fg as blebs, in fg veins, rarely disseminated 1%

975: Content 30°

962: Content irregular with ?

962: Content 60°

Bedding 60°

fg disseminated 1-2%

fg 5% locally disseminated along bedding in stringers mostly along bedding 5%

fg 1% locally disseminated along bedding in stringers mostly along bedding fg in blebs and veins 1%

Bedding 70°

6 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth - Detailed rock description and notes
underlined ABOUT 45 mm

GRAPHIC LOG 20 cm/100 ft

STRUCTURAL AND VEIN INFORMATION
BT = Bedding, F = Foliation, Fracture, Joint, Vein, Contact, Schistosity, Cleavage, Lineation

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNICK date 25/5/85

HOLE No. B23
LOG SHEET 2 OF 2
from 0 m to 104.2 m

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98129		12.8	14.8	2.0	310									
30		14.8	16.8	"	130									
31		16.8	18.8	"	480									
32		18.8	20.8	"	220									
33		20.8	22.8	"	180									
34		22.8	24.8	"	190									
35		24.8	26.8	"	560									
36		26.8	28.8	"	800									
37		28.8	30.8	"	140									
38		30.8	32.8	"	280									
39		32.8	34.8	"	210									
140		34.8	36.8	"	160									
41		36.8	38.8	"	370									
42		38.8	40.8	"	130									
43		40.8	42.8	"	18									
44		42.8	44.8	"	42									
45		44.8	46.8	"	120									
46		46.8	48.8	"	110									
47		48.8	51.2	2.4	160									
95828		75.9	77.5	2.6	95		28	12	60	2				
29		77.5	80.0	2.5	70		35	660	1.1%	6				
30		80.0	82.5	"	60		30	100	530	2	10			
31		82.5	85.0	"	160		60	15	180	2				
32		85.0	87.5	"	14		15	<5	35	2				
33		87.5	90.0	"	540		48	130	90	6				
34		90.0	92.5	"	22		18	<5	30	1				
35		92.5	95.0	"	44		20	5	50	1	10			
36		95.0	97.5	"	20		60	5	25	2				
37		97.5	100.0	"	370		70	28	200	2				

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B23A

SAMPLE TYPE : DRILL CORE FROM 12.8 TO 100.00

0283331

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
958338		100.0	102.5	2.5	900		130	18	75	2				

Notes :— Sn by XRF Bi Method.

Cu, Pb, Zn, Ag by AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B23 B

SAMPLE TYPE : DRILL CORE FROM 100.00 TO 102.5

028332

REPORT No. 510

028333

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B24

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 1733 m N	* 951 m E	* 620 m
(2) old	350 ft. N	−870 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar

* 330·5°	magnetic
000·5°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Inclination at collar 80°

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 126·111 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Acid tube

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type	DIP
0	?	80°
30·480	—	77·5°
60·960	—	77·5
121·920	—	74

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK
FROM 0 TO 126·1
DATE 26 MAY 80

LOGGED BY ____
FROM ____ TO ____
DATE ____

LOGGED BY ____
FROM ____ TO ____
DATE ____

RE LOGGED

Company managing exploration programme (1980)
Metals Exploration Ltd.

HOLE No. B24
Log sheet 1 of 3

028334

Depth	Description	Graphic log	Structural and vein information	Mineralisation	Notes
0	0-3.0 No Core				
4	3.0-19.8 RECRYSTALLIZED DOLOMITE (16.8) Poor recovery. Light brown Weathered, pitted, usually massive, sometimes mottled	3		py and po in stringers and disseminated	2%
20	19.8-22.0 No Core				
24	22.0-32.2 DOLOMITE (10.2) Grey/white Very brecciated Partly recrystallized White/cream angular blocks in grey matrix Monotonous and massive	2			Nil
32	32.2-35.1 DOLOMITE SULPHIDE LODE (2.9) 60% cream/white quartz/carbonate 40% pyrite Mottled appearance, pitted	8/5		py trace arsenopyrite Mottled Minor visible cassiterite throughout	40%
35	35.1-54.3 QUARTZ PORPHYRY (19.2) 35.1-40.0: milky white matrix with 10% quartz phenocrysts, small at first then up to 3mm, and 5-10% feldspar phenocrysts, orange coloured usually <2mm	1		py minor sp (after 36.5m) disseminated	5%
				sp trace fluorite disseminated	1%
40	40.0-45.6: Pale grey, sometimes greenish tinge, sugary matrix, with 10-15% quartz phenocrysts to 3mm and 10% orange and white feldspar phenocrysts to 5mm			sp disseminated	Trace
44	45.6-47.7: Grey/white milky matrix otherwise similar to 40.0-45.6			sp disseminated	1%
				py minor sp (1%) disseminated	5%
48	47.7-52.6: as for 40.0-45.6			sp disseminated	Trace
52	52.6-54.3: Milky white matrix with 5-10% quartz phenocrysts to 3mm and 5% feldspar phenocrysts usually <2mm		54.3 Contact ~80°	py, marcasite, trace fluorite disseminated	5%
	54.3-54.7 SILTSTONE/QUARTZITE medium grey, poorly bedded, disrupted	10/11	54.7 Contact ~25°	po faintly disseminated	5%
56	54.7-62.9 DOLOMITE SULPHIDE LODE (8.2) 54.7-56.5: 95% greenish pyrite/marcasite, 5% light brown quartz/carbonate. Massive, weathered, pitted 56.5-58.7: 60% quartz/carbonate, black and light brown, 40% pyrite/marcasite with pitted patches up to 90% over 200mm lengths. High fluorite content	5		py/marcasite massive 55.5-56.0 visible cassiterite	95%
		8/5		py/marcasite and fluorite banded	40%
60	58.7-62.9: 80% quartz/carbonate, light brown and grey, tending towards recrystallized dolomite, 10-20% pyrite, rest is fluorite. Brecciated and mottled appearance Last 200mm contains minor serpentinite	8/3/5		py minor po, fluorite mottled and disseminated	20%
	62.9-63.7 RECRYSTALLIZED DOLOMITE Dark grey matrix with cream/white breccia block	3			Nil
64	63.7-84.4 SILTSTONE with lesser SHALE (20.7) and minor QUARTZITE Medium to dark grey, hard, silicified, tends towards Quartzite in places Moderately bedded, mostly disrupted Occasional to rare quartz/carbonate veins Minor thin carbonate stringers Shale is slightly carbonaceous	10/9/11	65.3: +30mm vein, carbonate 70.2: 50mm irregular vein, 50°, carbonate, fluorite, py trace sp Bedding 60° 78.8: 10mm vein, 45°, sp, trace qtz, carbonate 79.2: 25mm vein, 30°, fluorite minor qtz, carbonate	py and po mostly disseminated Frequently barren	<1%
84					

5 cm

Symbol	Description
	DEPTH from-to : ROCK UNIT capital letters, underlined Depth : Detailed rock description and notes indented about 15mm.
	GRAPHIC LOG
	STRUCTURAL AND VEIN INFORMATION
	MINERALISATION
	NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 26/5/80

HOLE No. B24
LOG SHEET 2 OF 3
from 0 m to 84 m

028335

	Siltstone, lesser Shale, minor Quartzite – see previous page	84		py and po see previous page	<1%
1.3 / 1.3 / 100	84.4-85.4 (1.0) QUARTZITE/FINE GRAINED SANDSTONE and SILTSTONE Medium grey, well bedded, interbedded, slightly ? tuffaceous		10/9/11 11/10	← Bedding 40°	py disseminated 1-2%
3.0 / 3.0 / 100	85.4-107.0 (21.6) SILTSTONE with lesser SILTY SHALE and minor QUARTZITE Medium to dark grey, hard, silicified, tends towards Quartzite in places. More Shale content than in 63.7-84.4 Moderately bedded, mostly disrupted Occasional to rare quartz/carbonate veins Minor thin carbonate stringers Shale is slightly carbonaceous	88			py, po disseminated and in veinlets, stringers
3.0 / 3.0 / 100	92.4-95.8: Increase in Quartzite content to 30-40%	92		← Bedding 45°	
4.0 / 2.8 / 70		96	10/9	← Bedding 80° ← 96.7: 28mm vein, 40°, qtz, carbonate trace arsenopyrite, po	Trace
1.8 / 0.8 / 44		100			
6.4 / 6.4 / 100		104			
	107.0-109.3 (2.3) FINE GRAINED SANDSTONE and SILTSTONE Interbedded. Medium grey Moderately bedded but mostly disrupted No veins, rare carbonate stringers	108	11S/10	← Bedding 35°	po, py disseminated Weak Trace
2.3 / 2.3 / 100	109.3-114.0 (4.7) QUARTZITE Pale to medium grey Massive, featureless	112	11		po, py disseminated Weak Trace
3.0 / 3.0 / 100	114.0-126.1 (12.1) SILTSTONE, SILTY SHALE and QUARTZITE Medium to dark grey. Shale is slightly carbonaceous Moderately bedded but mostly disrupted, some brecciation Rare quartz veins or carbonate stringers 117.7-118.1: Massive Quartzite	116		← Bedding 50°	py and po mostly disseminated in quartzite
3.1 / 3.1 / 100		120	10/9/11		<1%
3.1 / 2.6 / 84		124		← Bedding 45°	
3.0 / 2.8 / 93	END OF HOLE 126.1m	128			
		132			

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15mm.

DRILL ADVANCE | % RECOVERY ESTIMATE OR CORE LENGTH RECOVERED | LOST CORE ZONE | DRILL LOG DEPTH TAG | DEPTH POINTER | GRAPHIC LOG (SEE LEGEND ON SHEET 1) | DEPTH POINTER | STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS) | MINERALISATION | PERCENT MINERALISATION Visual estimate | NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 26/5/80

HOLE No. B24
LOG SHEET 3 OF 3
from 84 m. to 126.1 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98148		22.0	24.0	2.0	220									
49		24.0	26.0	"	70									
150		26.0	28.0	"	85									
51		28.0	30.0	"	115									
52		30.0	32.2	2.2	290									
53		32.2	35.1	2.9	1.50%									

Notes :— Sn by XRF B1 Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B24

SAMPLE TYPE : DRILL CORE FROM 22.0 TO 35.1

028336

REPORT No. 510

028337

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. **B25**

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 1729 m N	* 953 m E	* 621 m
(2) old	350 ft. N	−870 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

1:250 000 Sheet No. SK55-3 | 1:100 000 Sheet No. 8015 | State Tasmania

Mineral Tenement (1980): E.L. 13/79 | Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

W.C. Bearing from collar

150·5°	magnetic
180·5°	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar: 52°

Total length: 122·377 m

Date drilled:

Details of down hole location-survey methods: Acid tube

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mag.	DIP
0	150·5°	52°
30·480	—	45
60·960	—	45
121·920	—	47

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8	1963-64	: Mt. Costigan Mines Pty. Ltd.
B9 to 38, B44 and B46 to 60	1964-68	: Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)
AAB1-5,8	1970	: Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 122·4 — DATE 4 JUN 80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B25

Log sheet 1 of 3

028338

0-9.1 RECRYSTALLIZED DOLOMITE
(9.1) Poor recovery. Light brown weathered, pitted, usually massive sometimes mottled
Minor Dolomite Sulphide Lode in first 3.1 metres

Py disseminated and in blebs 5%
Py disseminated <1%

9.1-31.1 DOLOMITE
(22.0) Partly Recrystallized
Cream/white to grey.
Much brecciated with cream/white breccia blocks and grey matrix.
Monotonous and massive
Some thin black ? Fe/Mn irregular stringers

Py, Sp in veinlets and disseminated
Weak Trace

31.0-31.1: Dolomite Sulphide Lode
60% carbonate/quartz, 35% talc, 5% pyrite, sphalerite

31.1-36.1 FINE GRAINED SANDSTONE/QUARTZITE
(5.0) Minor SILTSTONE
Medium to pale grey
Moderately bedded
Slightly ? buffaceous at start with small black and yellow specs
Minor Siltstone in centre of run.
Rare quartz veins or carbonate stringers

Bedding 45°
36.3: +20mm vein, carbonate minor fluorite
Nil

36.1-48.5 QUARTZ PORPHYRY
(12.4) 36.1-37.0: Green/grey milky matrix with 5% quartz and 5% orange feldspar phenocrysts to 2mm. Trace triangular tourmaline
37.0-68.5: pale grey, slightly greenish, matrix with 10-15% quartz and 10-15% feldspar phenocrysts to 3mm (rarely up to 5mm). Feldspars are white, orange, occasionally green

36.1: Contact irregular ~ 90°
Sp disseminated Weak Trace
Py, Sp, Fluorite disseminated
Weak Trace

46.3-79.5: Core out of order and some lost

48.5: Contact 60° (Constaff)

Constaff intercept

48.5-58.8 SILTSTONE lesser SHALE minor QUARTZITE
(10.3) Medium grey; Shale is partly black and carbonaceous.
Poorly bedded, disrupted.
Minor quartz veins, frequent carbonate stringers

Bedding 30°-60° (Constaff)
Py in stringers and veins minor disseminated
1%

Constaff intercept

58.8-61.3 QUARTZITE minor SILTSTONE
(2.5) Pale to medium grey
Poor to no bedding

Py disseminated
Trace

Constaff intercept

61.3-88.8 SILTSTONE lesser FINE GRAINED SANDSTONE
(27.5) Minor SHALE
Medium grey, Shale is black and carbonaceous
Moderately bedded, folded, disrupted
Sandstone is sometimes in equal proportion to Siltstone
Rare veins or stringers

Py in veins and stringers
Weak Trace

79.5-88.8: Much disrupted and poorly bedded.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
inserted about 15 mm

GRAPHIC LOG
STRUCTURAL AND VEIN INFORMATION
MINERALISATION
NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 4/6/80
HOLE No. B25
LOG SHEET 2 OF 3
from 0 m to 84 m.

028339

DRILL ADVANCE	LOST CORE ZONE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION (Visual estimate)	NOTES
3.1		100	Siltstone lesser Fine Grained Sandstone minor Shale For description see previous page	84				py For description see previous page		weak Trace	
1.2		100				10/11S/qc					
1.8		100	Gradual change to 88.8 - 122.4 SILTSTONE and FINE GRAINED SANDSTONE	88							
3.1		100	(33.6) Medium grey Generally well bedded with occasional thin stripey appearance. Minor disruption and folding Minor dark carbonaceous shale Rare quartz veins or carbonate stringers Increase in Siltstone towards base	92				py in stringers and veinlets			
3.0		100				← Bedding 50					
0.6		100		96							
2.5		100									
2.4		63		100		← Bedding 40° ← Bedding 25°					
1.7		100									
1.7		82		104		10/11S				Trace	
2.7		100									
0.3		100		108							
3.0		100				← Bedding 55°					
3.1		100		112							
2.7		100									
0.3		100		116		← Bedding 50°					
2.1		100	119.6-122.4: mainly disrupted								
			END OF HOLE 122.4m	120							
				124							
				128							
				132							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF

Logged by: A. JANNINK date: 4/6/80

HOLE No. B25
LOG SHEET 3 OF 3
from 84 m. to 122.4 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98104		18.6	20.6	2.0	500									
5		20.6	22.6	"	250									
6		22.6	24.6	"	240									
7		24.6	26.6	"	80									
8		26.6	28.6	"	36									
9		28.6	31.1	2.5	540									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B25

SAMPLE TYPE : DRILL CORE FROM 18.6 TO 31.1

028340

REPORT No. 510

028341

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. **B26**

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 1823 mN	* 952 mE	* 631 m
(2) old	ft.N	ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

1:250 000 Sheet No. SK55-3 | 1:100 000 Sheet No. 8015 | State Tasmania

Mineral Tenement (1980): E.L. 13/79 | Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

W.C. Bearing from collar

330·5°	magnetic
000·5°	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar: 52°

Total length: 153.619 m

Date drilled:

Details of down hole location-survey methods: Acid tube

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mag.	DIP
0	330·5°	52°
30.480	—	52·5°
60.960	—	54°
121.920	—	52·5°

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 153·6 — DATE 5 JUN 80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B26

Log sheet 1 of 3

0-15.2 RECRYSTALLIZED DOLOMITE
(15.2) Poor recovery
Mainly cream/white recrystallized dolomite with some pieces of green talcose dolomite

Py>Po
in blebs

2%

15.2-25.1 RECRYSTALLIZED DOLOMITE/DOLOMITE
(9.9) Cream/white and pale grey
Generally brecciated with white or grey matrix
Moderate and massive
Minor carbonate veins to 5mm
Rare rusty black FeS/Mn incrystor stringers

sp
disseminated

Trace

21.7-22.2: Minor light brown talc development

23.5-24.1: Grey massive dolomite

25.1-28.1 RECRYSTALLIZED DOLOMITE
(3.0) Grey and cream. Vuggy on Dolomite Sulphide beds
Mod brecciated
10% beds of pale green/grey talc up to 20mm wide

Py
disseminated and in blebs

<1%

28.1-36.0 RECRYSTALLIZED DOLOMITE/DOLOMITE
(7.9) Pale grey and white
Mod brecciated, matrix grey material
Some pockets of green talc in mottled zones
Vuggy on Dolomite Sulphide beds in places

Py>Po
disseminated and in stringers

1%

36.0-36.9 DOLOMITE SULPHIDE LOSE 36.0-36.3: black SPHALERITE/GALENA/PYRITE/PYRRHOTITE/MARMATITE 36.3-36.9: DOLOMITE

Py (abt 5, 36.0-36.9 20%)
slightly banded

5%

36.9-38.0 QUARTZITE
(1.1) Medium to pale grey, massive, disrupted

Contact Incognitor

Nil

38.0-66.6 SILTSTONE later FINE GRAINED SANDSTONE
(28.6) Medium grey, slight greenish tinge
Well bedded and thinly bedded to 40°, thereafter moderately bedded and mostly disrupted, some brecciation.
Sandstone is slightly leftwards in places
Rare veins or stringers

Bedding 60°

Nil

65.5-68.9: Broken core with minor Shale present

Py
in veinlets

Trace

Bedding 60°

Py>Py
mainly finely disseminated, in stringers, rare blebs

Bedding 5°

1-2%

Bedding 25°

Altered and brecciated on either side of vein: Possible Fault

66.6-72.9 SHALEY SILTSTONE
(6.3) Pale grey, rather muddy appearance
Mod disrupted and brecciated
Occasional thin veins and stringers

Py/Py
disseminated

<1%

72.9-73.9 DOLOMITE SULPHIDE LOSE SPHALERITE (with talc, etc/calcite)

72.1: Contact 60°

Py in stringers and disseminated

Rare

72.9-74.0 SHALEY SILTSTONE minor QUARTZITE
(1.1) Pale grey
Mod disrupted and brecciated
Occasional veins and stringers

72.1: Contact 60°

74.0: 10 mm vein, 15° pyrrotite, carbonate, minor gtz trace Py

Py>Py
disseminated and in veinlets
(especially 74.0-75.0)

2-5%

74.0-85.5 QUARTZITE with minor SILTSTONE
(9.5) Pale grey, Massive
Disrupted and brecciated, especially after 78.0m
Some veins (usually <5mm) of sphalerite with lesser Pyrite between 78.5 and 83.5
Quartzite is slightly feldspathic

Py>Py
disseminated and in veinlets

<1%

83.5: 20mm vein, 25° Sp, Py, minor carbonate

85.2: 10mm vein, 20° Py, Sp, carbonate

Gradual change to

85.5-98.2 SILICIFIED SILTSTONE/QUARTZITE
(12.7) Pale to medium grey
Very patchy bedded, mostly disrupted and brecciated
Rare veins and stringers
Minor Shale laminations

Bedding 50°

Py>Py
in blebs, veinlets

<1%

88.7: 40mm vein, 30° Py lesser Sph, Sp, trace Po

Po and Py
finely disseminated

2%

Po and Py
in pockets and disseminated

<1%

98.2-128.0 QUARTZ PORPHYRY
(29.8) 98.2-100.7: Milky white matrix, with 5% quartz phenocrysts, to 2mm and 5% orange feldspar phenocrysts to 1mm
100.7-125.6: Sugary grey/white matrix with 10-15% quartz phenocrysts to 4mm and 5-10% white and yellow feldspar phenocrysts to 2mm
Minor pitting of core in places

98.2: Contact 60°

Py, marcasite
disseminated

10-15%

Py, minor marcasite, rare trace Po
disseminated
locally up to 20%

100.0-128.0: Rare calcite, sporadic, sometimes associated with Py

10%

128.76 blob of arsenopyrite

117.3-117.5: white bleached and pitted zone

5cm

DEPTH from-to : ROCK UNIT (capital letters, underlined)
Depth : Detailed rock description and notes
(material about 75 m.m)

Graphic LOG

STRUCTURAL AND VEIN INFORMATION
(all to scale) (Angle between Vein and core axis)

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. ZISCHOFF

HOLE No. B 26

Logged by: A. JANNINK date 5/6/86

LOG SHEET 2 OF 3
from 0 m to 120 m

028343

DRILL ADVANCE	LOST CORE ZONE	% RECOVERY or ESTIMATE	CORE LENGTH RECOVERED	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (see legend on sheet 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
0.9		100	0.9	Quartz Porphyry For description see previous page	120					py, marcasite, rare trace po for description see previous page	10%	
5.2		100	5.2	125.4-128.0: As for 98.2-100.7	124		1					
1.1		100	1.1						128.0: Contact irregular, 30° (Constaff)	py disseminated	10%	
1.9		100	1.9	128.0-133.7 SILTSTONE, FINE GRAINED SANDSTONE (5.7) minor SHALE Medium greenish grey Very well bedded, interbedded, with stripey appearance. Minor folding and brecciation Occasional veins and stringers 131.0-131.3: Massive Quartzite	128		10/11			py ≫ po disseminated, especially along bedding, in stringers and veins	5%	
4.6		100	4.6		132							
~~1.5~~		~~100~~	~~1.5~~	~~133.7-133.8 QUARTZ PORPHYRY~~			1		133.7 and 133.8: Contacts irregular ~ 80°	~~py > po trace fluorite~~	~~3-5%~~	
3.1		100	3.1	133.8-141.4 SILTSTONE with thin interbeds of SHALE (7.6) Shale is carbonaceous Medium to pale greenish grey well bedded with stripey appearance Minor folding, disruption and brecciation Occasional interbeds of Fine Grained Sandstone Minor stringers and veins	136		10/9c			py in stringers, veins, along bedding	1-2%	
3.0		100	3.0	Gradual change to	140							
2.8		100	2.8	141.4-148.3 FINE GRAINED SANDSTONE/QUARTZITE (6.9) with lesser interbeds of SILTSTONE Pale grey, well bedded. Massive quartzite up to 0.3m long Minor disruption in places Rare veins, occasional stringers	144		11s/10		← Bedding 65° ← Bedding 60° ← 146.0: 45mm vein, 40°, vuggy py, trace qtz, arsenopyrite, po	po > py in stringers and disseminated	1%	
6.1		100	6.1	Gradual change to	148							
3.0		100	3.0	148.3-153.6 SILTSTONE with lesser interbeds of (5.3) FINE GRAINED SANDSTONE Pale grey. Moderately well bedded, slight disruption Rare veins, occasional stringers	152		10/11s		← Bedding 45°	po > py in stringers, blebs and disseminated	1%	
				END OF HOLE 153.6m	156							
					160							
					164							
					168							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF

Logged by: A. JANNINK date: 5/6/80

HOLE No. B26
LOG SHEET 3 OF 3
from 120 m to 153.6 m

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98110		12.2	15.2	2.0	1400									
11		15.2	17.4	2.2	26									
12		17.4	19.4	2.0	20									
13		19.4	21.4	"	110									
14		21.4	23.4	"	30									
15		23.4	25.4	"	36									
16		25.4	27.4	"	38									
17		27.4	29.4	"	44									
18		29.4	31.4	"	370									
19		31.4	33.4	"	220									
120		33.4	36.0	2.6	920									
21		36.0	36.9	0.9	1360									

Notes :— Sn by XRF Bi Method

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B26

SAMPLE TYPE : DRILL CORE FROM 12.2 TO 36.9

028344

028345

REPORT No. 510

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B27

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1812 m N	* 1147 m E	* 617 m
(2) old	ft. N	ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar

330.5°	magnetic
000.5°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Inclination at collar 58°

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 99.365 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.
Acid tube

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mag.	DIP
0	330.5°	58°
30.480	—	57.5
* 98.146	—	58.5

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American. Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 99.4 — DATE 5 JUN 80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

RE LOGGED

Company managing exploration programme (1980)
Metals Exploration Ltd.

HOLE No. B27
Log sheet 1 of 2

Depth	Description	Graphic Log	Mineralisation	Notes
0–10.5	0–10.5 No Core 3 pieces of dolomite			
10.5–38.5	10.5–38.5 DOLOMITE (28.0) Pale grey/white with small white breccia blocks. Monotonous and massive Rare thin black irregular stringers of ? Fe/Mn Rare carbonate veins to 5mm 19.6–21.3: Some recrystallized dolomite 21.3–22.6: No core recovered 25.6–26.0: No core recovered 25.8–36.1: Some recrystallized dolomite with minor fluorite, pyrite, sphalerite	2	py in veins, stringers and blebs throughout 25.0–26.5: Weak trace sp 4–29.9: 10mm vein, 45°, py	<1%
38.5–40.8	38.5–40.8 RECRYSTALLIZED DOLOMITE (2.3) Close to Dolomite Sulphide Lode Pale grey/cream, brecciated in places, otherwise mottled	3	py trace sp disseminated	2%
40.8–41.5	40.8–41.5 DOLOMITE SULPHIDE LODE (0.7) 50% pyrite 50% quartz/carbonate intermixed	5/8	py intermixed + disseminated	50%
41.5–44.9	41.5–44.9 RECRYSTALLIZED DOLOMITE (3.4) Close to Dolomite Sulphide Lode Pale grey, cream Brecciated in places, otherwise mottled	3	py trace cassiterite in blebs and disseminated	2-5%
44.9–51.2	44.9–51.2 DOLOMITE (6.3) White/pale grey Generally structureless, minor brecciation Rare thin black irregular stringers of ? Fe/Mn Occasional thin carbonate veins to 3mm	2	py disseminated	1-2%
51.2–51.8	51.2–51.8 No core recovered			
51.8–75.9	51.8–75.9 RECRYSTALLIZED DOLOMITE (24.1) Close to Dolomite Sulphide Lode Poor recovery, mostly small pebbles with ? some contamination. Pale grey, cream Brecciated in places, otherwise mottled	3	py in blebs and disseminated 75.7: Trace cassiterite	2-5%
75.9–79.9	75.9–79.9 No core recovered 78.3–79.9: Cavity			
79.9–85.3	79.9–85.3 QUARTZITE (5.4) Pale grey, hard Massive, structureless Slightly silty at base	11		Nil
85.3–86.6	85.3–86.6 No core recovered			
86.6–92.8	86.6–92.8 QUARTZ PORPHYRY (6.2) 86.6–87.8: Cream/light green fine grained matrix with 1–2% quartz phenocrysts to 2mm. Trace tourmaline 87.8–92.8: Pale grey/green matrix with <1% quartz phenocrysts to 2mm and up to 10% feldspar phenocrysts generally 1mm. Rather aplitic looking	1	fluorite disseminated py/marcasite sporadic, disseminated	1% Weak Trace
92.8–93.0	92.8–93.0 QUARTZITE pale grey, hard, massive	11		Nil
93.0–94.4	93.0–94.4 Core missing Constant log: Dark grey argillite with carbonate and fluorite veining. Minor py min. angles indistinct 99.4m HOLE ABANDONNED (Collapsed at 68.9m)			

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 5/6/80

HOLE No. B 27
LOG SHEET 2 OF 2
from 0 m. to 93.0 m

REPORT No. 510

028347

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. **B32**

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1767 mN	* 1190 mE	* 613 m
(2) old	830 ft.N	−175 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

330·5° magnetic
000·5° grid (1)
grid (2)
grid (3)
true

1:250 000 Sheet No. SK55-3 | 1:100 000 Sheet No. 8015 | State Tasmania

Inclination at collar 60°

Mineral Tenement (1980) E.L. 13/79 | Holder (1980) Metals Exploration Ltd.

Total length 140·818 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled

Details of down hole location-survey methods.

Acid tube

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mag.	DIP
0	330·5°	60°
30·480	—	61·5
91·440	—	61·5
121·920	—	61·5

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK FROM 0 TO 140·8 DATE 6 JUN 80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

RE LOGGED

Company managing exploration programme (1980)

Metals Exploration Ltd.

HOLE No. B32

Log sheet 1 of 3

028348

Depth	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
0	0.-20.7 No core				
20.7	20.7-22.6 DOLOMITE (1.9) Pale grey/white. Mostly massive, partly brecciated. Fine dark dolomite stringers throughout	2		py and sp as scattered crystals	Weak Trace
22.6	22.6-27.7 No Core - Cavity				
27.7	27.7-31.4 DOLOMITE (3.7) as for 20.7-22.6			py and sp as scattered crystals	Weak Trace
29.5	29.5-29.7: Recrystallized dolomite	2		py in veinlets	2-5%
31.2	31.2-31.4: Recrystallized dolomite				Nil
31.4	31.4-33.2 No Core - Cavity			sp and py scattered	10%
33.2	33.2-81.1 DOLOMITE (47.9) Pale grey, cream, white. Brecciated, monotonous and massive. Some dark grey dolomite veining. Occasional patches up to 50mm of smokey grey quartz				Nil
	34.1-34.3: recrystallized dolomite			5% sp 5% py 2% scattered	8%
	35.1-36.9: No Core - Cavity				
	57.7-67.5: Occasional thin seams and patches of talc (<1% of core)	2		57.4: Trace py, sp	Nil
	72.0-72.1: Recrystallized dolomite			py in blebs	2-3%
				py in blebs and stringers some disseminated	<1%
	76.5-76.6: Irregular patch of Dolomite Sulphide Lode 40% talc, 40% serpentinite, 20% quartz/carbonate. Mottled				
	77.4-77.6: Irregular patch of Dolomite Sulphide Lode 60% quartz/carbonate, 15% serpentinite, 15% talc, 10% pyrite. Mottled			py minor sp mottled	10%
	80.3-80.5: Recrystallized dolomite			py in blebs and stringers	Trace
81.1	81.1-81.9 QUARTZITE (0.8) Medium grey, slightly greenish, massive, structureless	11	81.1-81.2: slightly serpentinous brecciation zone		Nil
	81.9-86.5 SILTSTONE and FINE GRAINED SANDSTONE/QUARTZITE (4.6) Minor black carbonaceous shale. Greenish medium grey; moderately to poorly bedded, disrupted. Minor veins and stringers	10/11s		py in veins and stringers	<1%

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDES & Angles between Feature and Core Axis

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 6/6/80

HOLE No. B32
LOG SHEET 2 OF 3
from 0 m. to 84 m.

Depth	Description	Graphic log	Structural and vein information	Mineralisation	Notes
86	Siltstone and Fine Grained Sandstone For description see previous page	10/11s	← Bedding 60°	Py for description see previous page	<1%
88	86.5-108.0 SILTSTONE minor SILTY SHALE (21.5) Slightly greenish medium to pale grey siltstone with dark partly carbonaceous shale Moderately to poorly bedded, much disrupted, partly brecciated. Minor veins and stringers	10/9c		Py in veins and stringers	<1%
92					
96			← 98.3: 18mm vein, 70°, vuggy py, qtz	Py in veins and stringers	
100	99.0-108.0: Bedding improves to moderate but still some disruption present		← Bedding 55°		Trace
104			← Bedding 50°		
108	Gradual change to 108.0-128.1 SILTSTONE, FINE GRAINED SANDSTONE/ QUARTZITE and SILTY SHALE (20.1) Medium grey, Quartzite is pale grey, Shale is black and carbonaceous. Moderately bedded, partly disrupted Occasional veins and stringers	10/11s/9c	← 108.7: 20mm vein, 70°, vuggy py minor po ← Bedding 35°	Py disseminated especially in quartzites, in stringers and veins	<1%
112					
116			← Bedding 35°		
120	119.0-128.1: Brecciated and folded		← Bedding 10°	Py in blebs, stringers, minor veins and disseminated	1-2%
124			← Bedding 80°		
128	128.1-134.1 SILTSTONE and SILTY SHALE (6.0) Medium, slightly greenish, grey, shale is slightly carbonaceous Finely bedded, laminated, some disruption, folding and brecciation. Minor brecciated Sandstone towards base Minor veins and stringers	10/9c	← Bedding 85°	Py in veins and stringers	1%
132			← Bedding 45°		
	134.1-135.3 No Core - Cavity				
136	135.3-139.2 QUARTZITE/FINE GRAINED SANDSTONE (3.9) Medium to pale grey Slightly feldspathic and tuffaceous for first 0.4m thereafter brecciated and fairly massive Rare stringers	11s	← Bedding 60°	Py on stringers	<1%
140	139.2-140.8 SILTSTONE (1.6) Medium to pale grey, poorly bedded, brecciated. Some quartz/pyrite veins	10	← 139.4: +30mm vein, py ← Bedding 70° ← 140.5: +20mm vein, py, qtz trace flourite	Py in veins and along breccia fractures	2-5%
	HOLE ABANDONNED at 140.8m				
144					
148					
152					
156					
160					
164					
168					

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15mm

GRAPHIC LOG 1 SEE LEGEND PROJECT

STRUCTURAL AND VEIN INFORMATION
ATTITUDE: Angle between fracture and core axis

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 6/6/80

HOLE No. B 32
LOG SHEET 3 OF 3
from 84 m. to 140.8 m.

REPORT No. 510

028350

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. **B33**

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1818 mN	* 1194 mE	* 630 m
(2) old	ft.N	ft.E	
(3) Aust. Nat. Grid	2692 780 ft.E	1069 770 ft.N	

W.C. Bearing from collar

* 330·5°	magnetic
000·5°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Mineral Tenement (1980): E.L. 13/79

Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Inclination at collar: 50°

Total length: 125·425 m

Date drilled:

Details of down hole location-survey methods.

Acid tube

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mag	DIP
0	—	50°
60·960	—	44·5
121·920	—	46

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 125·4 — DATE 6 JUN 80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. B33 : Log sheet 1 of 3

028351

0 – 4.9	No Core				
4.9 – 12.5	SLUDGE (7.6) Mainly fine pale grey/white quartz sand with minor specs of black clay. Slightly micaceous. Probably Fine Grained Sandstone/Quartzite with minor Siltstone/Shale	8	11/10/9 ?	Py	Weak Trace
12.5 – 12.8	QUARTZITE pale and medium grey lumps	11			Nil
12.8 – 18.9	SLUDGE (6.1) 50% fine pale grey/white quartz sand, 50% black clay, slightly micaceous. Probably Fine Grained Sandstone / Quartzite and Siltstone/Shale	10	11/10/9 ?	Py	<1%
18.9 – 19.2	QUARTZITE pale grey, micaceous, some lumps, massive	11		Py disseminated	<1%
19.2 – 21.3	SLUDGE (2.1) Mainly grey carbonate with some quartz and pyrite. Probably Quartz/Carbonate Dolomite Sulphide Lode	20	8 ?	Py	5%
21.3 – 23.6	DOLOMITE SULPHIDE LODE (2.3) Grey-green, very pitted and weathered. 50% pyrite, 50% quartz/carbonate		5/8	Py intermixed	50%
23.6 – 23.8	FAULT white talcy puggy clay	24	F		Nil
23.8 – 33.8	QUARTZ PORPHYRY (10.0) Milky white bleached matrix with 2-5% quartz and 5% feldspar phenocrysts generally less than 2mm. Similar to 827 86.6-92.8	28	1	← 25.0: 20mm timber from underground workings. Py disseminated at start and finish, otherwise barren	Weak Trace
33.8 – 35.2	DOLOMITE SULPHIDE LODE (1.4) Light brown carbonate/quartz with sphalerite, galena mottled	32	8	sp (+? smithsonite), gl lesser Py mottled	5-10%
35.2 – 40.7	SLUDGE (5.5) 35.2-37.6: Light brown quartz sand minor carbonate. Also 200mm core (broken) of 50% quartz/carbonate and 50% pyrite. Probably Dolomite Sulphide Lode. 37.6-40.7: Similar to 35.2-37.6 but less sulphide. Probably Dolomite Sulphide Lode or Recrystallized Dolomite	36	8/5	Py trace cassiterite, ilmenite	10%
		40		Py weak trace cassiterite	5%
40.7 – 49.4	RECRYSTALLIZED DOLOMITE (8.7) 40.7-42.4: Light brown and white, mottled, 4 small pieces only. 42.4-43.4: Light brown and white, mottled, partly vuggy with quartz crystals and pyrite minor galena (possibly case-in material from higher up hole. 43.4-46.6: Light brown, mottled + sludge of light brown quartz minor carbonate sand	44	3		Nil
				Py minor gl	5-10%
				Py	Trace
				Py trace sp in blebs	2-5%
	46.6-47.9: Light brown and white mottled quartz/carbonate with 20-30% pyrite. Close to Dolomite Sulphide Lode. Sludge as above			Py in blebs	20-30%
	47.9-49.4: As for 46.4-47.9 but less pyrite	48		Py trace sp in blebs	5%
49.4 – 52.1	No Core Recovered	52			
52.1 – 77.4	DOLOMITE SULPHIDE LODE (25.3) 52.1-54.0: 90% pyrite, 10% quartz/carbonate, pitted, otherwise massive. 54.0-55.2: 70% Light brown quartz/carbonate and 30% pyrite. Sludge is dark brown quartz/carbonate with 40% pyrite.	5		Py massive	90%
	55.2 – 56.9 No core Recovered	56	8/5	Py	30-60%
	56.9 – 61.0: Dark grey/green sludge only; 50% pyrite and 50% quartz/carbonate	60	5/8	Py in sludge	50%
	61.0 – 62.5: Brown limonitic quartz/carbonate with lesser talc, and 30% pyrite – in places massive	64	8/5	Py mottled and massive	30%
	62.5 – 65.7: Sludge only: 60% pyrite (dark grey/green) and 40% quartz/carbonate		5/8	Py sludge	60%
	65.7 – 70.3: 40% dark grey/green pyrite, 30% quartz/carbonate and 30% yellow green talc	68	5/8/6	Py	40%
	70.3 – 71.2: 200mm oddly cored dark grey siliceous siltstone and lighter grey quartzite. Possible case-in material. Sludge is 60% dark grey/green pyrite, 40% quartz/carbonate		5/8 ?	Py sludge	60%
	71.2 – 73.3: Sludge: dark grey/green some yellow/green 40% pyrite, 30% quartz/carbonate 30% talc	72	5/8/6	Py sludge	40%
	73.3 – 75.7: Sludge: medium to pale grey, clayey and talcy may be siltstone, very weathered, with contamination from above.		? 6/10	Py sludge	5%
	75.7 – 76.2: No core or sludge	76			
	76.2 – 77.4: as for 73.3 – 75.7		? 6/10	Py sludge	5%
77.4 – 82.5	SILTSTONE / FINE GRAINED SANDSTONE (5.1) Pale grey. Moderately to well bedded, minor disruption at start. Rare veins or stringers	80	10/11S ← Bedding 65°	Py in patches, disseminated	<1%
	Fine Grained Sandstone/Quartzite lesser Siltstone. For description see next page	88	11S	Py for description see next page	Trace

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15mm

GRAPHIC LOG SEE LEGEND ON SHEET 3

STRUCTURAL AND VEIN INFORMATION
ATTITUDES brings between Planars and core axis

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 6/6/86

HOLE No. B 33
LOG SHEET 2 OF 3
from 0 m. to 94 m

82.5-95.6 FINE GRAINED SANDSTONE/QUARTZITE (13.1) with lesser SILTSTONE
Pale grey, slightly dendritic appearance in places
Moderately to poorly bedded, minor disruption
Slightly feldspathic in places
Minor veins and stringers
← Bedding 55°
← Bedding 65°
Py . disseminated, especially at start, thereafter almost barren
Trace

95.6-100.2 SILTSTONE minor FINE GRAINED SANDSTONE (4.6) Interbedded, medium grey
Poorly bedded, much disrupted, some brecciation
Minor veins
Frequent carbonate stringers
Py in blebs, on stringers
Trace

100.2-115.1 SILTSTONE and SHALE (14.9) Medium to dark grey, slightly carbonaceous
Generally poorly bedded, much disrupted and brecciated
Rare veins
Frequent carbonate stringers
100.2-102.2: Core very broken
105.0-106.5: Minor Fine Grained Sandstone interbedded
108.0-112.0: well bedded, less disrupted or brecciated, with striped appearance. Folded
← Bedding 80°
112.0-115.1: Disruption and folding increases
← Bedding 10°
Py in stringers
Trace

115.1-117.6 QUARTZITE (2.5) Pale to medium grey. Massive
No veins or stringers
Py disseminated
1%

117.6-120.9 SILTSTONE and QUARTZITE (3.3) Medium grey
Poorly bedded, brecciated
One vein, no stringers
117.7-118.0: vein, vuggy py, minor qtz trace carbonate
py disseminated
1%

120.9-125.4 QUARTZITE (4.5) Pale to medium grey
Massive, featureless, slightly brecciated
Occasional veins
No stringers
120.9: +20cm vein, qtz, py, vuggy
122.8-123.0: vein, py, qtz, vuggy
Py disseminated and in veins
2-3%

END OF HOLE 125.4m

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes indented about 15mm
GRAPHIC LOG
STRUCTURAL AND VEIN INFORMATION
ATTITUDES: Angle between fracture and core axis
MINERALISATION
NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 6/6/80
HOLE No. B 33
LOG SHEET 3 OF 3
from 84 m to 125.4 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95417		77·4	80·0	2·6	200		25	15	380	1				
18		80·0	81·23	1·23	85		18	5	400	<1				
19		81·23	85·0	3·77	100		30	5	270	<1				
20		85·0	87·5	2·5	32		25	5	140	<1	20			
21		87·5	90·0	"	22		28	5	170	1				
22		90·0	92·5	"	20		28	5	200	1				
23		92·5	95·0	"	20		25	5	200	<1				
24		95·0	97·5	"	50		18	15	380	1				
25		97·5	100·0	"	720		100	310	1300	3				
26		100·0	102·5	"	40		42	25	250	1				
27		102·5	105·0	"	46		22	5	220	1				
28		105·0	107·5	"	34		32	<5	250	1				
29		107·5	110·0	"	22		32	<5	260	1				
30		110·0	112·5	"	34		25	10	120	1	<10			
31		112·5	115·4	2·9	75		75	18	170	1				

Notes:— Sn & W by XRF Bi method.
Cu, Pb, Zn, Ag, by AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B33

SAMPLE TYPE : DRILL CORE FROM 77·4 TO 102·5

028353

REPORT No. 510

028354

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. B44

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 2011 m N	* 1058 m E	* 632 m
(2) old	1309 ft.N	−972 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station. COLLAR IS UNDERGROUND IN MAIN TUNNEL

W.C. Bearing from collar

153°	magnetic
183°	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar HORIZONTAL

Total length 95·250 m

Date drilled

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK FROM 0 TO 95·3 DATE 7 JUN 80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

RE LOGGED

Company managing exploration programme (1980)
Metals Exploration Ltd.

HOLE No. B44
Log sheet 1 of 2

028355

0-13.3 SLATESTONE minor SILTY SHALE
(12.3) Rare small patches of Quartzite
Medium to pale grey, slight greenish tinge
Poorly bedded, mostly disrupted (plastically looking)
Occasional veins
Numerous pyrobitumite stringers

← 0.2-1.10cm vein, 5° carbonate, minor py, pyrrotite
← 0.7-1.6cm vein, 30° carbonate, py minor sph, py

py trace py
disseminated, in stringers, minor veins, blebs

3-5%

Gradual change to

13.3-17.6 QUARTZITE minor SLATESTONE
(4.3) Quartzite dark fawn-pale fine grained sandstone
Pale grey, poorly bedded, moderately disrupted
Minor veins
Frequent pyrobitite stringers

← Bedding 20°
← 12.7: 6cm vein, 60°, sph, py

py
disseminated, in stringers and veins

3-5%

17.6-23.6 SLATESTONE with less QUARTZITE/
(5.8) FINE GRAINED SANDSTONE
Pale grey, mostly slight greenish tinge in places
Moderately to poorly bedded, minor disruption
Rare veins
Frequent pyrobitite stringers

← Bedding 40°

py
disseminated and in stringers

3%

23.1-23.6: 20% py

23.6-36.1 DOLOMITE SULPHIDE LODE
(12.7) 23.6-25.6: 70% white quartz/carbonate, 20% pale patchy grey/green talc, 10% pyrobitite. Mottled
25.6-27.2: 5% pyrobitite, 95% green/grey to light brown talc, 10% white quartz/carbonate. Mottled

py
mottled

10%

27.2-28.5: 70% quartz/carbonate, 30% pyrobitite bronze talc. Mottled

py trace sp
mottled

5%

28.5-29.4: Grey/green talc with minor quartz/carbonate patchy mottled

py
mottled and banded

30%

29.4-31.4: 80-90% quartz/carbonate and dolomite 10-20% pyrobitite. Minor green talc towards base Mottled, slightly banded

nil

31.4-32.1: Recrystallized dolomite/pale grey, pyrobitite, massive

py trace py
mottled and banded

10-20%

32.1-32.6: White/light brown quartz/carbonate with minor pale green talc. Mottled and slightly banded

py
disseminated

2%

32.6-34.1: 60% pyrobitite, 40% light brown talc usually spherical within pyrobitite

py
mottled and banded

2-5%

34.6-36.1: 70% quartz/carbonate, 30% pyrobitite. Mottled

py minor py
massive

60%

py minor py
mottled

30%

36.1-37.4 RECRYSTALLIZED DOLOMITE
(2.3) Grey/white, massive, generally bedcorelike
Rare small (<5mm) splashes of green talc

py
disseminated

1%

37.4-53.8 DOLOMITE SULPHIDE LODE
(13.9) 37.4-43.4: 80% white/cream quartz/carbonate 15% pyrobitite, 5% pyrrotite. Mottled appearances

15% py, 5% py
mottled.
Varies from 5% to 55%

20%

43.4-44.2: massive pale grey/green talc, slightly banded

44.2-44.9: 40% pyrobitite, 60% light brown to grey/green talc. Mottled

py
disseminated

1%

44.9-48.1: as for 44.2-44.9 but 70% pyrobitite and 30% talc

py minor py
mottled

60%

py minor py
mottled

70%

48.1-52.1: white quartz/carbonate with trace green/grey and light brown talc. Mottled

py
disseminated

5%

52.1-52.3: Very broken + shattered : ? fault zone
70% light brown talc, 30% sulphides

20% py, 10% py

30%

53.3-53.8 RECRYSTALLIZED DOLOMITE pale grey/white massive

py
disseminated

trace

53.8-56.6 DOLOMITE SULPHIDE LODE
(2.8) 53.8-54.0: 80% light brown to grey/green talc, 20% sulphides mottled
54.0-54.6: Recrystallized dolomite with minor carbonate stringers
54.6-56.6: 90% grey/green and light brown talc, 10% white quartz/carbonate in patches, 10% sulphides. Mottled

15% py 5% py
disseminated, mottled

20%

5% py 5% py
disseminated

10%

56.6-59.1 DOLOMITE
(2.5) Partly recrystallized
Pale grey/white. Slightly brecciated
Occasional carbonate veins to 2cm

py
in veins/stringers

vein trace

59.1-64.4 DOLOMITE SULPHIDE LODE
(5.3) White/light brown quartz/carbonate with up to 10% green/grey talc in patches and 10% recrystallized dolomite in patches up to 20cm long. Partly mottled, but some irregular banding
Some blue ? fluorite colouring

py
usually disseminated
Varies from 1% to 20%

5%

64.4-95.3 DOLOMITE
(30.9) Occasionally recrystallized
Pale grey, white, cream
Minor brecciation, mostly massive and structureless
Some dark grey dolomitic veining
Rare thin bleds ? fe/mn limonitic stringers
Rare splashes of pale green talc
64.3-66.7: Dolomite Sulphide Lode: 70% quartz/carbonate and 30% pyrite. Mottled

py > py
disseminated and in veins

<1%

py minor py massive

80%

py > py
disseminated and in veins

<1%

<1%

80.2-81.2: Dolomite Sulphide Lode: Light brown quartz/carbonate with trace light green talc and 20% pyrite. Mottled

← 81.2: Contact 35°
← 81.2: Contact 40°

py minor py
disseminated, mottled

20%

py > py
disseminated and in veins

<1%

87.8-88.1: Dolomite Sulphide Lode: 80% massy pyrite 20% quartz/carbonate. Almost massive pyrite

← 87.8 Contact 65°

py minor py massive

80%

py > py
disseminated and in veins

<1%

END OF HOLE 95.3m

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mt. BISCHOFF

HOLE No. B 44

LOG SHEET 2 OF 2

Logged by A. JANNINK date 7/6/82

from 0 m to 95.3 m

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98168		80.2	81.2	1.0	5400									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. B44

SAMPLE TYPE : DRILL CORE FROM 80.2 TO 81.2

0283356

REPORT No. 510

028357

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION

DIAMOND DRILL LOG

Prospect, area, project or mine. MT. BISCHOFF TIN

HOLE No. B47

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 1984 mN	* 924 mE	* 632 m
(2) old	1055 ft.N	-1325 ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar

331°	magnetic
001°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Inclination at collar HORIZONTAL

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 50.597 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station. COLLAR IS UNDERGROUND

Date drilled

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY	LOGGED BY	LOGGED BY
A. JANNINK		
FROM 0 TO 50.6	FROM ____ TO ____	FROM ____ TO ____
DATE 7 JUN 80	DATE	DATE

RE LOGGED

Company managing exploration programme (1980)

Metals Exploration Ltd.

HOLE No. B47

Log sheet 1 of 2

028358

Depth	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
0	0-3.0 SILTSTONE/QUARTZITE (3.0) Medium to pale grey Poorly bedded, disrupted, slightly brecciated Slightly serpentinous in parts, especially last 200mm Some veins and stringers		← 1.7: 50mm? vein, 30°, carbonate, talc minor py	py in veins	<1%
4	3.0-13.1 DOLOMITE SULPHIDE LODE (10.1) 3.0-7.2: 60% light brown/cream talc, 40% pyrrhotite, minor quartz/carbonate in first 100mm Pyrrhotite is disseminated through talc matrix	6/4	← 3.0 Contact 70°	po disseminated up to 80% in places minor py in first 100mm	40%
8	7.2-13.1: 40% pyrrhotite disseminated through 40% white quartz/carbonate, often in small breccia pieces within, 20% patchy light brown talc Mottled and slightly banded appearance	4/8/6		po disseminated throughout	40%
12					
16	13.1-18.3 SILTSTONE minor FINE GRAINED SANDSTONE (5.2) /QUARTZITE Quartzite increases with depth Medium to pale grey Poorly bedded, much disrupted Minor stringers	10/11		po > py on stringers and disseminated	<1%
20	18.3-36.3 Core Missing: From Comstaff Log Light Grey SILICEOUS ARGILLITE and dark grey siliceous argillite or shale	10	← Bedding 55° ← Bedding 30°		Nil
24	(20.4-36.3) Mid grey SILICEOUS ARGILLITE with a little interbedded very fine grained Quartzite	10/11	← Bedding 50°-60° ← Bedding 25° ← Bedding 35°	py in joints and veinlets	Trace
28					
32					
36					
40	36.3-~43.6 QUARTZITE (~7.3) Pale to medium Huey/grey. Hard Poor to no bedding, disrupted and brecciated Rare veins, minor stringers	11		py disseminated, minor in stringers	1%
44	~43.6-50.6 SILTSTONE with lesser QUARTZITE/ (~7.0) FINE GRAINED SANDSTONE Medium to pale grey. Moderately to poorly bedded, partly disrupted. Occasional veins, rare stringers	10/11	~44.1: 50mm breccia zone, qtz with siltstone minor py ~49.8: 60mm breccia zone, qtz with siltstone minor py trace cassiterite	py in veins and stringers	1%
48					
52	END OF HOLE 50.6m				
56					
60					
64					
68					
72					
76					
80					
84					

5 cm

Drill Log Symbol	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
8.2	6.4	89			
3.1	2.7	87			
8.0	5.5	69			
28.0					
7.1	5.7	80			
1.2	0.9	75			
3.4	1.5	44			
2.7	1.1	41			

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15mm

Drill Log Symbol	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
8.2					
3.1					
8.0					
28.0					
7.1					
1.2					
3.4					
2.7					

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date: 7/6/80

HOLE No. B 47
LOG SHEET 2 OF 2
from 0 m. to 50.6 m.

REPORT No. 510

028359

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. AAB 1

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	1858·0 m N	1200·0 m E	642·9 m
(2) old	ft. N	ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar

_____ magnetic
_____ grid (1)
_____ grid (2)
_____ grid (3)
_____ true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Inclination at collar VERTICAL

Mineral Tenement (1980) E.L. 13/79

Holder (1980) Metals Exploration Ltd.

Total length 99·365 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled: Jul.-Aug. 1970

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 99·4 — DATE 8 JUN 80

LOGGED BY _____ — FROM _____ TO _____ — DATE _____

LOGGED BY _____ — FROM _____ TO _____ — DATE _____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. AAB 1 : Log sheet 1 of 2

028360

0 – 8.0 QUARTZITE
(+8.0) Pale grey, finely bleached to white
Slightly micaceous
Poor to no bedding, some brecciation
Core very broken
Very minor siltstone present
9 / 11 / Nil

8.0 – 14.0 SILTY SHALE minor SILTSTONE
(6.0) Only 0.5m recovered, rest is Sludge
Medium grey, b well bedded, minor disruption and brecciation
Sludge 80% medium grey Shale and 20% pale white sand
Bedding 45°-60°
9/10 / Nil

14.0 – 19.1 QUARTZITE
(+5.1) Pale to medium grey
Slightly micaceous
No bedding, some brecciation
Very broken core
Some thin quartz veins
11 / P3 disseminated and in veins / 1-2%

19.1 – 21.2 SILTSTONE and QUARTZITE
(2.0) Medium to pale grey. Very broken core
Poor to no bedding, some brecciation
Rare quartz veins
10/11 / P3 in veins and disseminated in quartzite / <1%

21.2 – 38.5 SILTSTONE minor QUARTZITE / FINE GRAINED SANDSTONE
(17.3)
Core totally shattered into pieces usually <10cm
Pale grey
Probably well bedded, some patches of brecciation
Minor veins, no stringers
Occasional poss clay fault breccia zone
26.1: Black ? carbonaceous zone with vuggy quartz and some pyrite
Becomes slightly shaley towards base.
← Bedding 80°
P3
Trace
← 28.2-28.5: cream milky white quartz vein

38.5 – 88.7 QUARTZ VEIN minor white
38.7 – 46.6 DOLOMITE SULPHIDE LODE
(7.9)
white/cream quartz/carbonate with average 10-15% pyrite, locally up to 25%. Mottled appearance
38.7-46.6 close to completely silicified Dolomite
38.7-46.2: Vuggy with crystalline quartz, calcite and galena
46.0-46.6: very broken and brecciated
P3 - up to 1% sp, trace fluorite disseminated
10-15%
8/5
46.6-56.6: Pyrite content increases to 30-40%
P3 up to 1% sp, trace fluorite disseminated
30-40%
48.2: Contact log gives start of porphyry at 48.8. Recovery of core between 48.8 and 56.7 is 0.9m with 0.8m of Dolomite Sulphide Lode and 0.1m of Porphyry
56.0-56.6: 10-20% galena and Sphalerite

~56.6 – 68.6 QUARTZ PORPHYRY
(+8.0)
Milky white bleached matrix with 2-5% quartz and 5% feldspar phenocrysts generally <2mm
Trace tourmaline
Similar to 8.27: 61.6-62.8 and 8.33: 23.0-33.3
P3 Trace fluorite disseminated
1 / 1-2%

~66.6 – 70.0 Pentrelle FAULT ZONE
(~3.4)
Poor recovery
Sugary quartz with 10% pyrite in sludge.
One piece of pitted quartz with pyrite and trace of poggy clay breccia
F
P3
10%

70.0 – 73.0 QUARTZITE
(+3.0)
Pale grey. Poorly bedded towards base, otherwise massive
Slightly foliaceous and folded at 70.6
11 / ← Bedding 30° / Nil

73.0 – 88.7 SILTSTONE / FINE GRAINED SANDSTONE / QUARTZITE
(15.7)
Pale to medium grey, slightly greenish
Moderately to well bedded, some disruption and brecciation
Rare veins or stringers
← Bedding 40°
10/11 / Nil
82.0 – 88.7: Poorly bedded with more disruption

88.7 – 99.4 SILTSTONE and SHALE
(10.7)
Siltstone is medium grey, shale is black
Slightly carbonaceous. Slight greenish tinge
Moderately and faintly bedded, much disrupted and brecciated
Became less shaley with depth
Occasional veins, mainly carbonate stringers
92.0 – 97.0: well bedded with less disruption
← Bedding 45°
← 96.6: 15cm vein, 50°, P3, minute, trace py
← Bedding 45°
P3 in stringers and veins
10/11 / weak Trace

END OF HOLE 99.4m

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes
inserted about 20 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. J. Armstrong date: 8/6/90

HOLE No. AAB1
LOG SHEET 2 OF 2
from 0 m to 99.4 m

REPORT No. 510

028361

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. AAB 2

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	* 1852 m N	* 1156 m E	* 631 m
(2) old	ft. N	ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Mineral Tenement (1980): E.L. 13/79

Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

W.C. Bearing from collar

_____ magnetic

_____ grid (1)

_____ grid (2)

_____ grid (3)

_____ true

Inclination at collar: VERTICAL

Total length: 92.050 m

Date drilled: Aug.-Sep. 1970

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 92.1 — DATE 8 JUN 80

LOGGED BY _____ — FROM _____ TO _____ — DATE _____

LOGGED BY _____ — FROM _____ TO _____ — DATE _____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. AAB 2

Log sheet 1 of 2

028362

Depth	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
0–9.8	0–9.8 Pieces of bleached dolomite, milky white quartz and rare siltstone	0			
9.8–46.0	9.8–46.0 DOLOMITE (36.2) white and cream coloured, very bleached and weathered. Chalk-like appearance. Very broken, otherwise massive and featureless except for some brecciation. 13.1: 100 to 200mm bend of grey/green talc in broken core. 14.0: 300 to 400mm bend of grey/green talc in broken core with some sphalerite. 15.7–16.2: bend of grey/green talc in broken core. 20.0–46.0: Core is solid and no longer porous and bleached. Very brecciated in places, grey/white cream usually with grey matrix. Occasional thin black stringers of ? Fe/Mn. 27.1–33.0: Recrystallized Dolomite (close to Dolomite Sulphide Lode). Mottled appearance. 32.6–33.7: Recrystallized Dolomite. 38.7–39.9: No core recovered. At 44.7: 2 pieces of quartz porphyry 100mm. Probably in incorrect place in core tray. Gradual change to	2	← Bending 70°	py. sp disseminated. py minor sp disseminated and in stringers. py and sp in blebs and disseminated especially at base.	Weak Trace. <1%. 5%
46.0–56.3	46.0–56.3 RECRYSTALLIZED DOLOMITE (10.3) Poor recovery. Light brown/cream/grey/white. Brecciated in places, massive in places, mottled in places. Becomes almost Dolomite Sulphide Lode towards base	3		py. sp disseminated, on veins and stringers. py disseminated up to 20% in places.	Trace. 5%
56.3–63.2	56.3–63.2 QUARTZ PORPHYRY (6.9) Milky pale greenish grey matrix with 2-5% quartz and 2-5% feldspar phenocrysts usually <2mm. Lower contact uncertain due to poor recovery between 62.9–69.0 (only 1.0m recovered)	1		py disseminated up to 10% at start	2.5%
~63.2–69.0	~63.2–69.0 FAULT ZONE (cream/light brown puggy clay)	F			Nil
~63.5–69.0	~63.5–69.0 Probably DOLOMITE SULPHIDE LODE (~5.5) Sludge/sand composed of 50% pyrite and 50% sugary quartz and ? carbonate. Pitted appearance. One piece of core: 40–60% quartz/carbonate and 40–60% pyrite disseminated. Some pebbles of quartz porphyry are probably contamination from above	5/8		py in sludge/sand and disseminated	50%
69.0–77.1	69.0–77.1 FAULT ZONE (8.1) Light brown Limonitic puggy clay, slightly talcy feeling. No solid core	F			Nil
77.1–85.4	77.1–85.4 SILTSTONE/QUARTZITE/FINE GRAINED SANDSTONE (8.3) Medium to pale grey, slightly greenish colour. Generally poorly bedded, disrupted and brecciated. Rare veins, occasional stringers	10/11	← Bedding 25°	py on veins	Trace
85.4–92.1	85.4–92.1 QUARTZITE/FINE GRAINED SANDSTONE (6.7) Medium grey. Moderately to poorly bedded, generally massive. Slightly tuffaceous and feldspathic in places. Minor Siltstone. Rare veins or stringers	11	← Bedding 15°. ← 96.0: 10mm vein, 70°, 3%, py. Minor carbonate. ← Bedding 50°	py in veins and stringers	Trace
	END OF HOLE 92.1m				

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth · Detailed rock description and notes
metres about 70mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTE

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date: 8/6/80

HOLE No. AA82
LOG SHEET 2 OF 2
from 0 m to 92.1 m

REPORT No. 510

028363

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MT. BISCHOFF TIN

HOLE No. AAB3

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1814 m N	* 1140 m E	* 617 m
(2) old	ft. N	ft. E	2020.9 ft
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar

180°	magnetic
210°	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. SK55-3	1:100 000 Sheet No. 8015	State Tasmania

Inclination at collar 75°

Mineral Tenement (1980) E.L. 13/79 — Holder (1980) Metals Exploration Ltd.

Total length 109.423 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled: Oct. 1970

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8 — 1963-64 : Mt. Costigan Mines Pty. Ltd.

B9 to 38, B44 and B46 to 60 — 1964-68 : Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)

AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY	LOGGED BY	LOGGED BY
A. JANNINK		
FROM 0 TO 109.4	FROM ____ TO ____	FROM ____ TO ____
DATE 9 JUN 80	DATE	DATE

RE LOGGED

Company managing exploration programme (1980)
Metals Exploration Ltd.

HOLE No. AAB 3
Log sheet 1 of 2

028364

Depth	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
0–9.4	Probably DOLOMITE (9.4) Very broken and poor recovery Orange weathered/decomposed clayey chalk	0–9.4: ? 2			
9.4–12.6	Probably DOLOMITE (3.2) Pale grey/~~white~~ medium grey sugary quartz and ? carbonate	9.4–12.6: ? 2		py	Trace
12.6–102.4	DOLOMITE (89.8) Pale grey/white/cream Generally massive, sometimes highly brecciated Minor grey dolomite veins Rare thin (<3mm) carbonate veins Rare thin (<1mm) black ?Fe/Mn stringers, irregular. Rare thin irregular pyrite stringers 16.8–19.0: Occasional small patches (up to 300mm) of recrystallized dolomite	12.6–102.4: 2	← Bedding 15° ← Bedding 65° ← Bedding 30°	py and sp in thin stringers and disseminated py and sp in thin stringers and disseminated Rare specs of py	<1% Trace
27.6:	10mm grey/green talc band				Nil
72.6:	15mm vein, 55°, qtz, py, carbonate				
76.1:	5mm Dolomite Sulphide lode: quartz/carbonate with 5% pyrite. Mottled			py as disseminated specs Rare specs of py	Trace Nil
99.3–100.2:	Some selective replacement and partial replacement, of small breccia blocks by pale green talc. 1–2% of rock is replaced			py disseminated	5%
102.4–109.4	SILTSTONE/QUARTZITE (7.0) Medium grey Poorly bedded, much disrupted Quartzite is slightly tuffaceous 102.4–102.7: Contact is partly replaced by black serpentinite Rare veins, occasional stringers	102.4–109.4: 10/11	← Bedding 40°	py disseminated and in stringers	2-5%
	END OF HOLE 109.4m				

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined Depth: Detailed rock description and notes Interval about 15 mm	GRAPHIC LOG	STRUCTURAL AND VEIN INFORMATION	MINERALISATION	NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project	MT. BISCHOFF	HOLE No.	AABS
Logged by	A. JANNINK	date 9/6/86	LOG SHEET 2 OF 2 from 0 m to 109.4 m

REPORT No. 510

028365

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. AAB4

COLLAR LOCATION

Grid name (* = ADOPTED)	Rectangular space co-ordinates: PLANAR CO-ORDINATES		ELEVATION
(1) M.E.L.	* 1826 m N	* 1104 m E	* 623 m
(2) old	888·18 ft. N	−3437·8 ft. E	
(3) Aust. Nat. Grid	ft. E	ft. N	

W.C. Bearing from collar
- ____ magnetic
- ____ grid (1)
- ____ grid (2)
- ____ grid (3)
- ____ true

1:250 000 Sheet No. SK55-3

1:100 000 Sheet No. 8015

State Tasmania

Mineral Tenement (1980): E.L. 13/79

Holder (1980): Metals Exploration Ltd.

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Inclination at collar: VERTICAL

Total length: 96·317 m

Date drilled: Sept. 1970

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type.	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

B1 to 8	1963-64	: Mt. Costigan Mines Pty. Ltd.
B9 to 38, B44 and B46 to 60	1964-68	: Property held by Comstaff Pty. Ltd. (joint venture by Mt. Costigan and Broken Hill South); project managed by Mines Exploration Pty. Ltd (= B.H.S.)
AAB1-5,8	1970	: Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	} Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY	LOGGED BY	LOGGED BY
A. JANNINK		
FROM 0 TO 96·3	FROM ____ TO ____	FROM ____ TO ____
DATE 9 JUN 80	DATE	DATE

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. AAB 4

Log sheet 1 of 2

028366

Depth	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
0	0-~8.5 QUARTZ PORPHYRY (~8.5) Milky white and pale grey matrix. Very pitted, probably at expense of sulphides and feldspars. 10-20% quartz phenocrysts to 6mm and 5-10% feldspar phenocrysts to 3mm.			Py disseminated <0.5% cassiterite disseminated	
6	5.1-8.5: Lumps of porphyry and some siltstone - probably caved-in material	1	← ~4.6: 50mm piece of timber		5-10%
8	~8.5-14.9 RECRYSTALLIZED DOLOMITE (~6.4) Pale grey to white. Large proportion is smokey grey quartz. Poor recovery. Brecciated	3			Nil
12	14.9-93.1 DOLOMITE (78.2) Pale grey/white/cream. Partly recrystallized. Strongly brecciated, especially at start and finish, with darker grey matrix and cream and white breccia blocks. Otherwise massive. Some thin dolomitic stringers. Minor carbonate veins. Minor thin black irregular 3Mm/Mm stringers			Py disseminated specs and in veins	Trace
16					
20					
24					
28	29.9-30.2: Recrystallized Dolomite			Py disseminated and in blebs	5%
32				Py disseminated specs and in veins	Trace
35				Py minor sp. disseminated and in veins	1%
40				Py disseminated specs and in veins	Trace
44					
48		2			
52					
56					
60	61.5-62.0: 10 irregular vein-like makes of Dolomite Sulphide Lode: aggregate 0.5m: 90% quartz/carbonate, 10% pyrite. Thicknesses vary between 5mm and 20mm			Py in Dolomite Sulphide Lode only	3%
64					Nil
68	Recrystallization of dolomite gets less with depth			Py in veins	1%
72					Nil
76				Py disseminated in pockets of recrystallized dolomite	1%
80	78.1: 40mm vein-like of Dolomite Sulphide Lode: 90% quartz/carbonate, 5% pyrite, 5% pyrrhotite. Mottled. 78.9-80.2: Recrystallized dolomite			Py disseminated	5%
84				Rare specs of Py and Sp	Nil
88				Py, Sp in veins	Trace
92	89.7-90.5: Dolomite Sulphide Lode: mainly quartz/carbonate with minor black serpentinite and some blue ? fluorite staining				Nil
			93.1 Contact irregular ~65°		
96	93.1-95.9 SILTSTONE minor SILTY SHALE (2.8) Medium to dark greenish grey. Poorly bedded, much disrupted. Rare veins or stringers	10/9		Py in stringers and disseminated	<1%
100	95.9-96.3 QUARTZITE Pale greenish grey, massive, slight to fluorescent	11			Nil
104	END OF HOLE 96.3m				
108					
112					
116					
120					
124					
128					
132					
136					
140					
144					
148					
152					
156					
160					
164					
168					
172					
176					
180					
184					
188					
192					
196					
200					

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG — STRUCTURAL AND VEIN INFORMATION — MINERALISATION — NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project	MT. BISCHOFF
Logged by	R. JANNINK date 9/6/80
HOLE No.	AA84
LOG SHEET	2 OF 2
from	0 m to 96.3 m

REPORT No. 510

028367

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine: MT. BISCHOFF TIN

HOLE No. AAB 5

COLLAR LOCATION

Grid name (* = ADOPTED) | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) M.E.L.	1796·03 m N	1000·22 m E	625·4 m
(2) old	ft.N	ft.E	
(3) Aust. Nat. Grid	ft.E	ft.N	

W.C. Bearing from collar: magnetic; grid (1); grid (2); grid (3); true

1:250 000 Sheet No. SK55-3 | 1:100 000 Sheet No. 8015 | State Tasmania

Inclination at collar: VERTICAL

Mineral Tenement (1980): E.L. 13/79 | Holder (1980): Metals Exploration Ltd.

Total length: 96·317 m

Cadastral location and details: Crown land, northerly of Waratah and south of Mt. Bischoff trig. station.

Date drilled: Jun-Jul 1970

Details of down hole location-survey methods.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type	DIP

SUMMARY OF "B" AND "AAB" DRILLING (Simpson D.C. 1976, Cominco Explor. report)

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AAB1-5,8 — 1970 : Property held by Comstaff P.L. (Mt. Costigan, B.H.S., A.A.A.); project managed by Australian Anglo American Pty. Ltd.

LEGEND FOR GRAPHIC LOG COLUMN

symbol		
qv	Quartz vein	
1	Porphyry	
2	Dolomite	
3	Recrystallised dolomite	
4	Pyrrhotite rich	Dolomite sulphide lode
5	Pyrite rich	
6	Talc rich	
7	Serpentinite rich	
8	Quartz/carbonate rich	
9/c	Shale/carbonaceous	
10	Siltstone	
11/s	Quartzite/sandstone	
12	Tuff	
F	Fault	

LOGGED BY A. JANNINK — FROM 0 TO 96·3 — DATE 10 JUN 80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

RE LOGGED

Company managing exploration programme (1980): Metals Exploration Ltd.

HOLE No. AAB 5

Log sheet 1 of 2

028368

0-6.9 DOLOMITE
(6.9) Pale grey/cream
Slightly brecciated, otherwise massive
Some grey dolomite veins
Some irregular quartz/carbonate veining throughout

6.9-8.2 DOLOMITE SULPHIDE LODE
(1.3) 80% white/light brown quartz/carbonate, 20% pyrite/marcasite. Mottled, central part slightly talcy

8.2-15.8 DOLOMITE (RECRYSTALLIZED) DOLOMITE
(7.6) Pale grey/cream
Mostly brecciated, partly bituminized looking
Some carbonate/quartz veins

12.4-13.8: Dolomite Sulphide lode: quartz/carbonate with lesser blonde serpentinite and 10% pyrite
14.8-15.2: Dolomite Sulphide lode: quartz/carbonate with trace talc and 5% pyrite
15.5-15.8: Dolomite Sulphide lode: quartz/carbonate

15.8-44.5 DOLOMITE
(28.7) Cream/pale grey
Slightly brecciated in places otherwise massive
Some dark grey dolomite stringers giving slightly dendritic appearance
Minor recrystallization
Occasional to rare veins

30.0-44.5: mostly pale grey and less recrystallization

38.2-38.4: Dolomite Sulphide lode: quartz/carbonate with minor green talc, slightly blonish ? fluorite - mica in places. Irregularly banded
38.4-39.1: Dolomite Sulphide Lode: 55% quartz/carbonate slightly blonish ? fluorite rich, 40% apple to dark green talc/serpentinite, 5% pyrite. Irregularly banded

42.2: 10cm of Dolomite Sulphide Lode: 50% quartz/carbonate 50% green talcy serpentinite.

44.5-44.9 DOLOMITE SULPHIDE LODE
(2.4) 70% dark green to black talcy serpentinite matrix with 15% pyrite disseminated and 15% carbonate/quartz disposed in patches

44.9-51.6 QUARTZ PORPHYRY
(6.7) 44.9-50.1: white milky matrix with 10-20% quartz phenocrysts to 5mm and rare feldspar phenocrysts. Occasional pyrite/quartz veins

50.1-51.6: Yellow/white matrix with 15% quartz phenocrysts to 5mm and 10% orange feldspar phenocrysts usually ≤ 2mm

51.6-52.1 TRANSITION ZONE Porphyry and Dolomite Sulphide lode

52.1-54.4 DOLOMITE SULPHIDE LODE
(2.3) 60% black serpentinite matrix with 20% pyrite disseminated and slightly banded and 20% quartz/carbonate disposed as a patches

54.4-54.9 RECRYSTALLIZED DOLOMITE, pale/dark grey mottled.

54.9-85.6 DOLOMITE
(30.7) Pale grey
Partly brecciated, otherwise massive
Some small patches of recrystallized dolomite and pale green talc (latter especially 60.0-62.0
Some veins and stringers of quartz/carbonate dolomite, talc and ? Fe/Mn rich irregular stringers
58.6-58.6: Dolomite Sulphide lode: quartz/carbonate with trace serpentinite and pyrite. Mottled
67.0-67.2: Dolomite Sulphide lode: quartz/carbonate with lesser talc. Mottled and banded. Central seam is dolomite

67.7-68.1: Aggregate 20cm of Dolomite Sulphide lode Pale grey/green talc, black serpentinite and minor quartz/carbonate

68.5-70.0: Very brecciated

70.2-70.3: Dolomite Sulphide lode: pyrite with minor quartz/carbonate

78.0-78.5: Recrystallized dolomite

78.1: 60mm vein-like talc/serpentinite along core

82.2-82.4: Dolomite Sulphide lode: quartz/carbonate with lesser green talc. Trace sphalerite, pyrite
82.4-82.8: Dolomite Sulphide lode: quartz/carbonate with lesser green talc. 2% pyrite

85.6-86.9 DOLOMITE SULPHIDE LODE
(1.3) 60% black serpentinite, 30% white/cream quartz/carbonate with blebs of pyrite talcy, trace grey/green talc, 10% pyrite. Mottled

86.9-87.7 TRANSITION ZONE Dolomite Sulphide Lode to Island/Siltstone

87.7-88.5 SILTSTONE
(1.2) Medium to pale grey, partly bedded, much disrupted. Mammoth with carbonate stringers

88.5-91.5 QUARTZITE/FINE GRAINED SANDSTONE/
(3.0) SILTSTONE
Pale to medium grey, slightly coffeeroxx
Moderately bedded, minor disruption
Rare stringers

91.5-94.3 SILTSTONE/ARGILLACEOUS SHALE
(2.8) Medium to pale grey, slightly green tinge
Well and finely bedded, slightly striping appearance
Rare disruption
Shale is slightly carbonaceous
Numerous thin carbonate stringers usually along bedding

END OF HOLE 94.3m

0-6.9	2		Tr in veins. Trace
6.9-8.2	8/5		Tr/marcasite disseminated over mottled at base. Trace to Tr/5 Trace coalescing at base — 20%
8.2-15.8	2/3		Tr trace sp in veins and blebs, minor disseminated — 1-2%
12.4-13.8			Tr disseminated — 10%
14.8-15.2			Tr disseminated — 5-10%
15.5-15.8			Tr disseminated — 5%
15.8-44.5	2		Tr in veins and disseminated. Trace
38.2-38.4			Tr/marcasite and fluorite — 5%
38.4-39.1			Tr in veins and disseminated. Trace
42.2		← 42.2 Contact 75°	Tr disseminated and veinlets — 10%
44.5-44.9	7/6/8		Tr in veins and disseminated. Trace
44.9-51.6	1		Tr trace Tr disseminated — 15%
51.6-52.1	1/7	Gradual change porphyry to Dolomite	Tr over Tr disseminated — 10-15%
52.1-54.4	7/6/8		Tr over Tr disseminated — 10-15%
54.4-54.9	3		Tr over Tr disseminated — 10-15%
54.9-85.6	2	← Bedding 65°	Tr Alteration — 1-2%
67.7-68.1			Tr trace Tr disseminated and banded — 20%
68.5-70.0			Tr Alteration — 2%
70.2-70.3			Tr in veins, stringers, minor disseminated. Trace
78.0-78.5			Tr trace Tr disseminated — 5%
78.1			Tr in veins, stringers, minor disseminated. Trace
82.2-82.4			Tr Alteration — 5%
82.4-82.8			Tr in veins, stringers, minor disseminated. Trace
85.6-86.9	7/8	←	Tr in Dolomite Sulphide lode — 3-5%
86.9-87.7	7/8/10	← 87.2: 20cm vein/60°, Phenolts minor carbonate/qtz	Tr veins, stringers, minor disseminated. Trace
87.7-88.5	10		Tr/marcasite, veinlets coalescing — 90%
88.5-91.5	11/10	← Bedding 60°	Tr in veins, stringers, minor disseminated. Trace
91.5-94.3	10/9	← Bedding 60° ← Bedding 65°	Tr trace Tr disseminated — 2-3%
			Tr in veins, stringers, minor disseminated. Trace
			Tr/galena disseminated and in stringers — 1-2%
			Tr disseminated along bedding. Weak Trace

5cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
Interval about 15m

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MT. BISCHOFF
Logged by: A. JANNINK date 16/6/80

HOLE No. MABS
LOG SHEET 2 OF 2
from 0 m to 94.3 m

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95840		0.0	0.7	.7	80		10	20	90	<1				
41		0.7	2.5	1.8	14		75	30	220	<1				
42		2.5	5.0	2.5	160		8	12	660	<1				
43		5.0	6.3	1.3	130		2	10	590	<1				
44		8.1	9.1	1.0	500		15	80	890	<1				
45		9.5	12.3	2.8	720		45	60	610	<1				
46		13.0	13.8	.8	1750		70	32	1800	<1				
95897		14.1	14.7	.6	1350		22	12	370	<1				
95847		15.3	15.5	1.9	100		20	12	480	<1				
		15.8	17.5											
48		17.5	20.0	2.5	12		2	10	120	<1				
49		20.0	21.5	2.2	4		2	12	370	<1				
		21.8	22.5											
50		22.5	25.00	2.5	210		48	110	2800	3				
51		25.0	27.50	"	28		5	280	600	3				
52		27.5	30.0	"	55		2	65	220	2				
53		30.0	31.85	1.85	18		2	22	180	2				
54		32.23	33.20	.47	48		2	100	780	2				
55		33.50	34.60	1.1	110		18	45	560	2				
95898		35.20	36.00	0.80	30		10	38	1600	2				

Notes:— W & Sn by XRF Bi Method

Cu, Pb, Zn, Ag by AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. AAB 5

SAMPLE TYPE : DRILL CORE FROM 0.0 TO 36.00

A

0283369

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95556		36.50	39.50	3.0	6		20	25	1800	2				
57		39.50	42.50	"	16		28	18	1750	2				
58		42.50	44.50	2.0	360		65	60	920	3				
59		47.20	47.50	0.30	980		120	70	1200	<1				
60		54.90	56.30	1.4	55		12	18	160	<1	120			
61		56.80	57.80	1.0	80		12	48	1700	<1				
62		58.00	58.10	0.50	110		12	220	2100	<1				
		58.20	58.60											
95899		59.10	60.00	0.90	<4		2	28	35	<1				
63		60.00	62.50	2.5	20		5	60	250	<1				
64		62.50	64.20	2.3	12		8	32	700	<1				
		64.40	66.00											
65		65.00	66.30	2.1	38		10	25	1300	<1	<10			
		66.70	67.50											
66		68.40	70.10	1.70	30		10	38	770	<1				
67		70.30	72.50	2.2	4		8	22	230	<1				
68		72.50	75.00	2.5	<4		5	20	48	<1				
69		75.00	76.10											
		76.20	76.40	2.30	4		10	120	1700	<1				
		76.50	77.50											

Notes :— Sn by XRF B. Method

Cu, Pb, Zn, Ag by AAS.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. AAB5

SAMPLE TYPE : DRILL CORE FROM 36.50 TO 77.50

B

0283370

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
95870		77.50	78.00	2.2	14		8	42	1100	<1	10			
		78.30	80.0											
71		80.00	80.80	1.7	4		5	55	120	<1				
		81.10	82.00											
72		82.50	83.10	1.4	55		20	880	5000	1				
		83.30	84.10											
73		84.20	85.60	1.4	8		10	60	630	<1				
74		87.30	90.00	2.7	46		18	15	270	<1				
75		90.00	92.50	2.5	12		12	18	120	<1	<10			
76		92.50	95.00	2.5	14		20	10	38	<1				
77		95.00	96.30	1.3	18		20	10	32	<1				

Notes :—

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. AAB5

SAMPLE TYPE : DRILL CORE FROM 77.50 TO 96.30

028371

028372

OPEN FILE

MT. BISCHOFF TIN PROSPECT

EXPLORATION LICENCE 13/79

TASMANIA

REPORT ON STAGE 2B PROGRAMME

VOLUME 3

DISTRIBUTION: Copy No. 1 Department of Mines, Tasmania
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A. Jannink
15th August, 1980

028373

VOLUME 3

Diamond Drill Logs

MBD 14 to MBD 32

028374

% RECOVERY	CORE SIZE INT.	FIELD ROCK NAME and general discription over interval marked	ADOPTED INTERVAL (m cm) & ADOPT LENGTH FROM COLLAR m. cm	GRAPHIC LOG	MARKERS (▼) BRACKETS ⊢	OBSERVATIONS Commence with length from collar, other point (relates to marker) or 'from' to (relates to brackets)		% MINERALIZATION (visual est. mode)
						Attitude of bedding or foliation Attitude & spacing of joints, Attitude, width & discription of sheared zones. [Attitude = angle of structure to long core axis]	MINERALIZATION	

SUMMARY DRILL LOG MBD 14

Veins over 50 mm

Mineralisation excluding veins over 50 mm

TRICONE TO 3m - NO CORE	0-3	0			
GREY SILTSTONES with interbedded PYRITIC BLACK SHALES and 'TUFF' bands - clasts of siltstone in fg matrix, well bedded	3·61 20 (16·20)		← Bedding 50°	Finely disseminated and banded laminae to 1 mm in black shale beds	1%
QUARTZ-FELSPAR PORPHYRY Mottled creamy-grey matrix Qtz phenocrysts to 5 mm, rounded white and translucent. Feldspar variable proportion 5-15% weathered. Core is highly fractured and the upper 5 m is weathered, silicified, bleached and stained with Fe oxides	9 20 - 24 84 (15·64)	10	Undulose contact, 80°	Badly pitted, Fe sulphides removed by weathering. Brown Fe oxide staining Py, as fine grained aggregates to 5 × 3 mm, some disstinct grains. Variable concentration 5-25%	2-3% 15%
GREY SILTSTONES, SILTY SHALES with minor interbedded BLACK SHALES. Siltstones massive, finely laminated or bedded 1-2 cm. Black shales decrease with depth. Some brecciation and minor folding	24 84 - 37·4 (12·56)	10/9/C	contact 50°, some pyrite Bedding 35°	Py, bedded, disseminations in black shales, silty shales. Some small veinlets of Py to 2 mm and sparse qtz-marcasite-Py-sp veins to 25 mm.	2-3%
MASSIVE GREY SILTSTONES AND IMPURE BLUISH-GREY QUARTZITES. Hard, silicified, brecciated, with poorly defined bedding.	37·4 - 49·4 (12·0)	40 10/11	Gradual change ← Bedding 35° ← Bedding 75°	Py, trace po as blebs, veinlets and stringers. Sparse qtz-Py-marcasite veinlets to 15 mm.	2%
GREY SILTSTONES, SILTY SHALES and interbedded black pyritic shales See 24·84 - 37·4, black shales more constant 1-2 cm thick.	49·4 - 59·7 (10·3)	50 10/9/C	Gradual change ← Bedding 50° ← Bedding 60°	Py disem in selected siltstone beds and as bedded laminae to 2 mm with black shales. Minor qtz-Py-wisps stringers.	3%
MASSIVE GREY SILTSTONES AND IMPURE BLUISH GREY QUARTZITES. As for 37·4 - 49·4.	59·7 - 76·80 (17·10)	60 10/11 70	Gradual change. ← Bedding 35° ← Bedding 70° ← Bedding 55°	Py as thin laminae and stringers, rare fine disseminations. Some thin qtz-Py veins (to 2 mm) and qtz-Py-marcasite-sp-po veins to 10 mm.	3%
GREY SILTS, SILTY SHALES, BLACK SHALES	76·8 - 80 (3·2+)	10/9/C	76·8 - 77·49 Vein zone - Py marcasite, minor sp to 120 mm. Term sulphides 5-10% in fracture veins		
END OF HOLE 80·0					

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
96418		7.2	9.2	2.0	340									
19		9.2	11.2	"	1200		40	32	14	1	25	250		
420		11.2	13.2	"	4250		260	45	20	3	35	740		
21		13.2	15.2	"	5000		420	120	180	2	45	920		
22		15.2	17.2	"	1250		320	40	310	1	25	1350		
23		17.2	19.2	"	1950		250	42	470	1	20	310		
24		19.2	21.2	"	2100		310	80	300	2	30	1000		
25		21.2	23.2	"	2250		180	50	200	1	30	360		
26		23.2	24.84	1.64	220		55	12	720	1	10	40		
27		24.84	26.84	2.0	40									

Notes :— XRF Bi Method

Quartered Drill Core

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 14

SAMPLE TYPE : DRILL CORE FROM 7.2m TO 26.84

028376

REPORT No.

PAGE 1

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. Mt. BISCHOFF

HOLE No. MBD14

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	2060.08 N	541340.08 E	688.98
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	mA.H.D.

W.C. Bearing from collar

	magnetic
	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Inclination at collar VERTICAL

Mineral Tenement EL 13/79 Holder METALS EXPLORATION LTD

Total length 80m

Cadastral location and details
CROWN LAND / PRIVATE

Commenced: 15 / 12 / 79
Completed: 10 / 1 / 80

Drilling contractor LONGYEAR AUSTRALIA Pty LTD.

Rig type LONGYEAR F 38

Details of down hole location - survey methods.
TROPARI.

Purpose of drilling and anticipated lengths to targets.
HQ To intersect tin mineralisation in 'Stanhope' porphyry dyke 17m-34m. BQ drilling to 80m to establish whether 'White Face' porphyry dyke continues underneath the Stanhope dyke.

Core size and non-coring (NC)

TRICONE	0	TO	3
HQ	3	TO	33m
BQ	33	TO	80m
		TO	
		TO	
		TO	

Results of down hole location - survey.

LENGTH FROM COLLAR	W.C. BEARING type AZIMUTH	DIP
41.0m	108°	87°
78.5m	223° 30'	85°

Comments on drilling. 3m HW Casing left in hole

Legend for graphic log column (see drill log for Hole No. _____)

'DERWENT' PENCIL No.		FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY C.C. BROADBENT	LOGGED BY	LOGGED BY
FROM 0 TO 80m	FROM TO	FROM TO
DATE 11-1-80	DATE	DATE

Company managing exploration programme.
METALS EXPLORATION Ltd.

HOLE No. MBD14
Log sheet 1 of 2

Preliminary Design for Form Aug. 78

028377

TRICONE DRILLED TO 3.0 m - NO CORE.

3.00 - 9.20 m INTERGEODED SILTSTONES AND CARBONACEOUS SHALES WITH TUFFS

3.5-4.0 dark grey siltstones with thin black pyritic shale beds. Brecciated fabric - soft sediment disruption?

5.4-5.9 Tuff, sub angular/rounded clasts of shale and siltstone to 8 mm in pale grey f.-g. matrix.

5.9-6.0 Siltstones, shales as above.

6.17-6.52 Tuff, as above - weakly bedded

6.52-7.92 Siltstones, black shales as above.

7.42-9.20 Mixture tuff and siltstones, shales interbedded in a brecciated fabric to 10 cm.

Overall quite well fractured - thin white clay filled fracture planes at ≤ 60° LCA - but not broken up.

9.20m - 24.84m QUARTZ-FELSPAR PORPHYRY.

Matrix - pale grey and finely crystalline when unweathered.

Phenocrysts: Quartz 10-15%, occasionally 25%, as rounded grains 1mm - 5mm or sparse well formed crystals.

: Felspar 10%-15%, variable 5-25% as rounded grains to 5 mm. Some alteration to hard chiefly yellowish mineral; elsewhere decomposed to soft white clay, increased concentration and finer grained in last 0.8 m

: Fe sulphides: Py as disc. blebs and grains to 2mm, and as indistinct fine gr. aggregates to 5 mm. Concentration variable due to removal of material by weathering. Some are po.

23.7-24.84 Ground mass acquires a greenish yellow coloration, qtz decreases to 5%, felspar increases to 25-30% and grain size decreases.

24.84-29.40 SILTSTONES, SILTY SHALES AND CARBONACEOUS SHALES, interbedded 1:2 cm.

Light grey quartzose siltstones with dark grey clay rich siltstones and silty shales and thin black shales (maybe (45 cm) Minor contortion and folding, weakly brecciated and faintly fractured.

29.4 - 37.4 FINELY BEDDED SILTSTONE/SILTY SHALE

Some minor black pyritic shales.

Dark grey in colour, in places almost black and carbonaceous - Finely laminated (1-2mm) alternating clay rich/silt rich layers. Minor contortion and folding.

33.2-37.0 Black shales/carbonaceous beds locally abundant.

37.38-49.42 SILTSTONES AND QUARTZITES.

Thinly bedded dark grey clay rich siltstones with hard bluish grey quartzites to 2 m. Bedding is poorly defined in quartzites - extensive brecciation, soft sediment deformation and minor folding in the siltstones.

49.42 - 59.71 SILTSTONES, SILTY SHALES AND CARBONACEOUS SHALES.

As for 24.84 - 29.4

59.71 - 76.80 SILTSTONES AND QUARTZITES.

As for 37.38 - 49.42, finely fractured

76.8 - 80.0 (EOH) SILTSTONES, SILTY SHALES AND CARBONACEOUS SHALES.

As for 24.84 - 29.4 but Quite well bedded and only weak disruption and contortion.

END OF HOLE 80.0 m

Veins > 10 mm	Min. alteration (Excluding veins > 10 mm)
←36° Bedding 50°	Py, bedded laminae, and as veinlets and stringers < 2mm; concentrated in black shales as dissem. cubic crystals to coarse fine grained aggregates. In tuffs as rounded grains to 2mm and fine grained interstitial aggregates. Sparse qtz-carbonate-py veinlets to 3mm
←66 m Weak foliation in tuff, 45°	
←7.5m bedding 50°	
←9.1m to 15 mm qtz-py vein, 60° ←Contact widens 30° (closed)	
Upper 2 m extensively weathered - bleached to pale cream colour with zones of brown limonitic material surrounding vugs of grey porphyry with pitted sulphides. Weathering has proceeded along fracture planes; has extent and severity decreases from 11 m to 7 m with the rock is well fractured and broken, with soft black py and some white mica on fracture planes, but not bleached or stained by limonite.	9.2-11.4 Py, trace po, sp, marcasite and rare cassiterite, ep, mica, fluorite. Originally 10-15%, weathered.
	11.4-12.2 py, trace po, sp, ep, fluorite, rare cassiterite to 1mm.
	12.2-15.0 py, marcasite, trace sp and cassiterite. Bleaching and removal of mineral by weathering along fractures & mainly staining surrounding bleached zones. Originally ≈ 10-15%.
	15-17.0 py, pitted, trace sp, marcasite. Rare grains cassiterite.
	17.0-21.5 py, trace po in f.-g. aggregates. No visible cassit.
	21.5-23.7 As above-grains cassiterite.
	23.7-24.84 py decreases abruptly at 23.7 m, trace sp, fluorite.
←Contact 80°	
	28.84-29.4 Py, disseminated 5% in siltstones, bedded laminae to 2-3 mm in black shales and as small blebs, veinlets and stringers.
←Bedding 35°, 24.3 m	
←28.0 m Bedding 60°	
←29.4 m Bedding 60°	
←30.7 Vuggy qtz-py-arseno vein, 12 mm, 30°	Py as small blebs and stringers, locally disseminated along bedding planes.
←31.4m Fold axis, 90°	
←32.7 m Bedding 60°	
←33.5 m 25 mm py-marcasite-qtz-carbonate - trace arseno vein, 60°.	33.2 m - 37.4 m py, as fine disseminations and sparse bedded laminae in black shales. Minor qtz-py veinlets and stringers.
Gradual change to	
	37.38-49.42 Py, veinlet trace po, as blebs, veins, stringers, especially in thinly bedded intervals. Finely disseminated in quartzites. Rare qtz, carbonate veinlets
←43.2m Vuggy qtz-py-marcasite vein, 15 mm, 25°	
←45.6 Qtz-py-marcasite-sp-carb vein in broken core, 10 mm, 80°	
←46.6 Bedding 75°	
Gradual change to.	
←47.6 Bedding 70°	Py, trace po. Bedded disseminations in siltstones and silty shales (locally 5-10%) Bedded laminae py to 2mm associated with black shales. Sparse qtz-py-marcasite-arseno veinlets and stringers.
←51.6 Bedding 50°	
←58.4 m Bedding 60°	
Gradual Change to	
←62.5 Bedding 35°	59.71-76.80 py, trace marcasite. Bedded laminae to 2mm, finely disseminated in quartzites. Some sparse veins qtz-py-carbonate at ≤ 30° LCA.
←66.7 Bedding 70°	76.80-80.0 Trace py in veinlets and stringers
←70.4 Bedding 55°	68.4-76.80 Py, as bedded laminae, finely disseminated in places. Some sparse qtz-py veinlets.
←74.3 10 mm Qtz-py-marcasite-sp-py vein, 15°	
←75.3 Bedding 35°	
←76.4 15 mm Qtz-py-marcasite vein, 55°	76.80-78.0 py, marcasite, arseno, trace sp, gn, as veinlets and stringers to 5 mm.
←77.7 m 120 mm massive py, marcasite, arseno base sp, gn	78.0-80.0 Py, trace marcasite as veinlets, stringers and thin bedded laminae.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDES = Angle between fracture and CORE AXIS

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mt Bischoff
Logged by: G. BRADBEER date 11/1/80
written up 13/5/80

HOLE No. MBD 14
LOG SHEET 2 OF 2
from 0.0 m to 80.0 m

028378

...H CORE ...ERED ...mm	% RECOVERY	LOST CORE ZONE	FIELD ROCK NAME and general discription over interval marked	ADOPTED INTERVAL (m cm) & ADOPT LENGTH FROM COLLAR m. cm	GRAPHIC LOG	BRACKETS & MARKERS (▼)	OBSERVATIONS Commence with length from collar, either point (relates to marker) or from to (relates to brackets) Altitude of bedding or foliation, Altitude & spacing of joints, Altitude, width & discription of sheared zones, [Altitude = angle of structure to long core axis]	MINERALIZATION

SUMMARY DRILL LOG MBD 15

				Veinsover 50mm	Mineralisation (excluding veins over 50mm)
			TRICONE TO 3m No Core	0-3m	0		
			3-6.5 Very weathered and broken - dolomite and py in sticky black clay. GREY SILICEOUS DOLOMITE. Patches mottled grey white due to recrystallisation - some separation of calcite and qtz. More pure creamy coloured dolomite in patches up to 5x5cm. Highly brecciated, angular - subangular fragments separated by dark grey stained fractures	3-25.65) (22.65)	2	Poor recovery 3-10m or 35%. 12.8-14.6 Cavity.	Py, trace fluorite, siderite, arsenic in bl... clay. Py, trace marcasite, sp, weak trace fluorite as veins, blebs and stringers. Occasional clots qtz-carbonate-sp-py-fluorite to 5x5 cm.
			DOLOMITE SULPHIDE LODE and unaltered dolomite. talc/serpentinite ≥ qtz-carbonate	25.65-28.8 (3.15)	6/7/5		Py, marcasite, fluorite, sp, arsenic, blebs, ...
			GREY SILICEOUS DOLOMITE. Fractured and weakly altered to talc/serpentinite along fractures	28.8-35.33 (6.53)	2/3	10cm massive qtz, 25cm carbonate, py, sp surrounding vuggy fracture	sp, trace py as blebs in brecciated cavities
			QUARTZ-FELSPAR PORPHYRY. Matrix pale creamy grey. Qtz as rounded to-bid grains to 3mm 10% Felspar cream with yellowish alteration, indistinct outlines to 2-3mm, 3-10%. Well jointed and broken 10-40° HA. Greenish upper and lower f gr selvedges (1m)	35.33-55.82 (20.49)	1	Contact Broken, 80° Contact indistinct and ragged.	Py, marcasite (blebs and grains to 6mm) trace sp, fluorite. Weak trace arsenic, cassiterite. Py, marcasite, fluorite and trace cassit... Py, marcasite, sp, fluorite, pure f... cassiterite. Some weak qtz-carbonate, py-arsenic-fluorite vein...
			TRANSITION BETWEEN PORPHYRY AND DOLOMITE F gr. porphyritic texture - smoky grey and yellow	55.82-59.30 (3.48)			FLUORITE phenocrysts up to 10%, py, sp, ... cassiterite
			59.3-60.90 Dolomite Sulphide lode 60.9-65.2 GREY DOLOMITE with QTZ, CALCITE	59.3-65.2 (5.9)	2/8	Undulose contact, 15°	py, fluorite, trace arsenic, sp, fluor... sp, py as scarce blebs in brecciated cavities
			Recrystallised DOLOMITE. Brecciated with remnant pieces of grey siliceous dolomite surrounded by pure crystalline dolomite	65.2-72.6 (7.4)	3/2	20cm	Trace sp, py and purple and bl... crystalline fluorite in cavities
			INTERBEDDED MOTTLED GREEN SERPENTINITE (altered dolomite) and SILTSTONE	72.6-77.8 (5.2)	7/10	Brecciated - dolomite veins to 30mm in zones up to 0.5m.	Dolomite veining: Sulphides scarce to absent - trace sp, flu...
			77.80-80.0 MASSIVE SILTSTONES	77.3-80.0	10	Bedding 50°	

END OF HOLE 80.0 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97700		3.0	5.0	2.0	1.46%		250	95	1000	2	35	85	1.64%	Re checks of check Assay
1		5.0	7.0	"	3000		130	170	2100	1	30	150		
2		7.0	9.0	"	800									
3		9.0	11.0	"	740									
4		11.0	12.8	1.8	340									
5		14.6	16.6	2.0	65									
6		16.6	18.6	"	140									
7		18.6	20.6	"	4									
97708		20.6	22.6	2.6	65									
09		22.6	23.9	1.3	10									
96441		24.0	26.0	2.0	150									
42		26.0	28.0	"	240									
43		28.0	30.0	"	42									
44		30.0	32.0	"	22									
45		32.0	34.0	"	230									
46		34.0	35.28	1.28	400									
47		35.28	37.28	2.0	640		140	28	810	1	15	75		
48		37.28	39.28	"	520		110	10	1300	1	15	10		
49		39.28	41.28	"	640		150	22	2800	1	30	55		
450		41.28	43.28	"	920		200	20	720	1	45	360		
51		43.28	45.28	"	5100		280	70	120	3	70	800		
52		45.28	47.28	"	1000		190	20	1600	2	25	620		
53		47.28	49.28	"	1750		240	46	100	2	30	230		
54		49.28	51.28	"	1950		200	10	110	2	40	580		
55		51.28	53.28	"	2550		130	95	120	3	35	460		
56		53.28	55.82	2.54	1700		140	75	180	1	15	95		
57		55.82	57.82	2.0	2750		16	X	240	1	25	170		

Notes :— Sn by XRF B1 Method

X means less than detection limit

Results above 1.00% B2 Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 15

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 57.82

02819

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
96458		57.82	59.82	2.0	3750		110	10	470	1	<10	220		
59		59.82	61.82	"	760									
460		61.82	63.82	"	16									
61		63.82	65.82	"	16									
62		65.82	67.82	"	8									
63		67.82	69.82	"	4									
64		69.82	71.82	"	55									
65		71.82	72.92	1.10	500									
66		72.92	74.92	2.0	60									
67		74.92	76.92	"	60									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 15

SAMPLE TYPE : DRILL CORE FROM 57.82 TO 76.92

02838

028381

REPORT No.

PAGE 1

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. Mt BISCHOFF

HOLE No. MBD 15

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES			ELEVATION
(1) MBJV	1819·97	N	1019·99 E	624·31
(2)		N	E	
(3) Aust. Map Grid PRECISE / APPROX.		mE	mN	mA.H.D.

1: 250 000 Sheet No. BURNIE SK 55-3

1: 100 000 Sheet No. HELLYER 8015

State TASMANIA

Mineral Tenement EL 13/79

Holder METALS EXPLORATION LTD.

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
_____ magnetic
_____ grid (1)
_____ grid (2)
_____ grid (3)
_____ true

Inclination at collar VERTICAL

Total length 80·0m

Commenced: 8· / 1 / 80

Completed: 15 / 1 / 80

Drilling contractor
LONGYEAR AUSTRALIA

Rig type
BBS 1

Details of down hole location-survey methods.
TROPARI.

Purpose of drilling and anticipated lengths to targets.
HQ to intersect tin mineralisation in 'White Face' porphyry dyke 32m-46m and to subsequently delineate the 'dolomite sulphide lode' horizon beneath. Original length of hole 60m, extended to 80m.

Core size and non-coring (NC)

TRONE	0	TO	3m
HQ	3	TO	80·0m
		TO	
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type AZIMUTH	DIP
41·0m	085	89°
80·0m	292	90°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. _____)

'DERWENT' PENCIL NO | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY G.C. BROADSENT
FROM 0 TO 80m
DATE 17·1·80

LOGGED BY _____
FROM _____ TO _____
DATE _____

LOGGED BY _____
FROM _____ TO _____
DATE _____

Company managing exploration programme.
METALS EXPLORATION LTD.

HOLE No. MBD 15.
Log sheet 1 of 1

Preliminary Design for Form Aug 78

028282

DEPTH from-to : ROCK UNIT	GRAPHIC LOG	STRUCTURAL AND VEIN INFORMATION	MINERALISATION	NOTES
		Veins etc over 10 mm	Mineralisation excluding veins over 10 mm.	
TRICONE TO 3 m - NO CORE	0			
3.00 - 7.45 RECRYSTALLISED DOLOMITE, faulted. Possibly some medium 3.0 - 3.3 m. Grey, weakly mottled dolomite and creamy coloured recrystallised dolomite as rounded clasts surrounded by calcite, qtz and other minerals with intervals of black [illegible] material (decomposed sulphides?). Faulted and sheared - soft chalky textures in places.	4	3	py, marcasite, fluorite, trace arsenic; dickson as blebs and grains and in veinlets with carbonates and qtz. Bleaching and decomposed original percentage difficult to estimate	2-3%
7.15 - 35.33 DOLOMITE WITH CALCITE AND QUARTZ. Hard grey fine grained dolomite in a strongly brecciated fabric. Occasional patches dark grey, almost black, grading into bleached portions with a strong breccia fabric. Extensively fractured - fine grey fractures in dolomite have superimposed [illegible] disruption due to later faulting. Calcite and qtz occur interstitially between breccia clasts and along fractures; patches up to 5 x 6 cm. Fine yellowish clay films on fracture surfaces; steer 20 m some talcose alteration (see below)	8	2/3 Gradual Change to	7.15 - 25.6 py, trace marcasite, fluorite, sp in small veins, blebs and stringers. Occasional 5-6 cm patches of intergrowth py, marcasite, fluorite, sp with qtz and carbonates.	2-3%
Cavity 12.8 - 14.6 m.	12			
20.45 - 25.6 Major greenish talcose and dark grey/serpentinous alteration along fracture planes, otherwise as above.	20			
25.6 - 26.7 Increased talcose alteration with some sulphides etc.	24	3	25.6 - 26.7 py, fluorite, marcasite, qtz, serpentine, talc, sp, micro and zeolite in breccia zone.	10%
26.7 - 27.8 Grey/cream unaltered dolomite, talc and serpentinite along fractures.		2/3	26.1 - 27.5 py, minute trace sp as veinlets + stringers.	1%
27.8 - 28.8 greyish green talc/dark grey serpentinite with minor unaltered dolomite.	28	6/1	27.8 - 28.8 py, fluorite, marcasite trace sp, qtz	5%
28.8 - 35.33 Grey unaltered dolomite, thin films talc etc as for 20.4 - 25.6.	32	2/3 ~350 mm vuggy dolomite - qtz - calcite - py + sp - cassit (?)	28.8 - 35.33 py, marcasite, trace sp, fluorite, in veinlets and stringers with qtz and carbonates, 1-2%.	2-3%
35.33 - 55.82 QUARTZ FELSPAR PORPHYRY. Matrix pale grey with a faint yellowish tinge near margins. Hard, finely crystalline and well jointed, minor qtz fluorite deposition on some joint faces. Phenocrysts: qtz, rounded, turbid grains to 5 mm, 10% smaller near margins < 3 mm. Felspar - mod (altered) yellowish white to 3 mm 3-10% Some purple fluorite to 1%, 2 mm, occurs patchily throughout.	36	1 Contact undulose and broken @ 80°	35.33 - 37.8 py, marcasite as rounded aggregates to 8 mm. Fluorite, qtz to 1%, rare grains cassit., Some minor carbonate - qtz - py - fluorite - py veins veining to 5 mm.	15%
	40		37.8 - 41.8 py, marcasite, trace sp, fluorite, arseno, rare cassit. Rounded grains to 3 mm. Some rare veining as above 37.1 - 37.8.	7-10%
	44		41.8 - 44.4 py, trace sp, arseno, rare cassit? fluorite (deep purple) to 3 mm, finely disseminated.	20-25%
	48	~ 44.4 to 10 cm massive py/marcasite with fluorite, qtz, carbonate, sepiolite, py, arseno, ? trace qtz-carbonate selvedge - inclusion of dolomite?	44.4 - 47.3 py/marcasite as fgr aggregates and clots to 15 mm. Trace sp Dickson fluorite to 10% by volume thin py-marcasite-qtz-carbonate-fluorite-sp veins.	15%
	52		47.3 - 48.9 py/marcasite, trace dissem, sp and cassit as fine gr aggregates.	30%
			48.9 - 50.0 py/marcasite, fluorite trace sp	1%
	56		50.0 - 54.40 py/marcasite veinlets 10-25% Abundant purple brown and green fluorite (to 3%) trace sp. Some weak carbonate - fluorite veining, sections of groundmass are stained purple brown. Above veins due to fine fluorite. Rare v fine cassit.	15%
54.4 - 55.82 Decrease in size of phenocrysts, matrix yellowish cream Qtz 5% Felspar 7-10%. 55.8 - Sample No 98081 taken for petrology	60	~ 54.4 m 12 mm fluorite - qtz - carbonate vein, 15°	54.40 - 55.8 py/marcasite fluorite trace sp, tourmaline, and sparse carbonate - qtz - fluorite veining	7-10%
55.82 - 57.28 'Aplitic looking' PORPHYRY. Mainly dark creamy grey, fgr to aphanitic with small phenocrysts of qtz and felspar to 3 mm. Felspar 3-5%, qtz 2-3%, Fluorite 2-5%.	56	1 Contact undulose and indistinct, with abundant purple fluorite.	Fluorite, py, marcasite, pyrite trace sp and tourmaline.	3%
57.28 - 58.34 DOLOMITE SULPHIDE LODE Soft dark mottled grey (fluorite rich) sepiolite (?) with some unroded recrystallised dolomite clasts. Some white phenocrysts to 3 mm. Felspar?	7	0.6 m 100 mm zone of carbonate - fluorite - qtz veins 30° 58.0 Sample No 98088 taken for petrology Contact ragged	Fluorite, dickson veining to 10% py/marcasite + sp = 1%	10%
58.34 - 59.30 MIXED WHITE fluorite, PORPHYRY and DOL Mixture of the above two rock types 75.82 - 58.34 on a 10 cm scale. Some greenish black sepiolite with a little talc	7/1	Contact uneven, 15°	py, marcasite, ? fluorite dark brown qtz mce creen, sp filling fractures	7%
59.30 - 60.90 DOLOMITE SULPHIDE LODE Green talc / grey sepiolite and recrystallised carbonate / qtz. surrounding clasts of grey dolomite. Alteration gradually diminishes to 60.90, after which it is confined to discrete fracture zones	60	7/6/3/2 6.60 2 m sample No 98089 taken for petrology Gradual Change.	py, marcasite, fluorite, trace arseno, sp, intergrown and disseminated, locally 20%	15%
60.4 - 65.2 DOLOMITE WITH QTZ AND CALCITE As for 20.45 - 25.6, above	64	2/3	trace sp, py as blebs and grains in brecciation fractures. Some qtz-carbonate veining.	1%
65.2 - 72.6 RECRYSTALLISED DOLOMITE Grossly brecciated fabric - embayed, angular pieces of dark grey silicified dolomite encased in banded, creamy coloured almost pure recrystallised dolomite. Some weak alteration of remnant dolomite clasts to talc/sepiolite.	68	Gradual transition to 3	Trace sp, fluorite interstitially and in vugs in banded dolomite. rare grains py.	<1%
	72	72.6 200 mm DSL, py, qtz, fluorite, talc/serpentinite, ?cassit dolomite. Gradual Change to		
72.6 - 77.0 INTERBEDDED ALTERED DOLOMITE AND SILTSTONE. Brecciated, with clasts of bedded siltstone interbedded with an unusually textured altered dolomite. The matrix is soft greenish black waxy sepiolite with rare cross cutting pale grey non penetrative zones of carbonate enrichment to 2 mm thick. These carbonate veinlets have poor bedding in the siltstone and are closely spaced (< 10 mm spacing). The siltstones are dark grey, clay rich, medium soft and thinly bedded/brecciated	76	7/10 Sample No 98090 taken for petrology. 75.6 Bedding (siltstone) 80°	Weak trace sp, fluorite and sparse dolomite veining.	
77.0 - 80.0 SILTSTONES, thinly bedded Dark grey clay rich siltstones, thinly bedded and weakly sericitic (?). Brecciated - soft sediment deformation and later fracturing / microfaulting. The later fracture planes have coatings of soft green talcose material.	80	Gradual Change to 10 77.3 Bedding 60° 77.4 10 mm dolomite vein, 10°. 78.6 200 mm Breccia zone - pure creamy white dolomite veining. 79-79.5 50 cm Breccia zone as for 78.6	Dolomite veining with minor qtz, calcite and trace fluorite	2-3%
END OF HOLE 80.0 m.				

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 19 mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION DRILL LOG
Scale 1:100

Prospect or project: Mt Bischoff.
Logged by: C. BROADBENT date 17/1/80
Written [illegible] 13/5/80

HOLE No. MBD 15
LOG SHEET 2 OF 2
from 0.0 m. to 80.0 m.

SUMMARY DRILL LOG MBD 16

			Veins over 50 mm	Mineralisation (excluding veins over 50 mm)	
TRICONE TO 3 m - No Core		0			
CORE BADLY BROKEN - fragments of grey pyrr. DOLOMITE and sparse green talc/serpentine fragments	3 - 9.60 (6.60)	2/7	Poor core recovery to 29.5 m ≈ 40%	Fragments of Py, fluorite and green serpentine/talc.	5%
PUGGY FAULT ZONE - crushed and shattered - light brown friable silty clay with intervals of sticky black laminated clay with fragments of dolomite	9.6 - 20.0 (10.4)	10 F		Fragments of py, fluorite and rare arsen	1-2%
DOLOMITE SULPHIDE LODE/serpentine/talc (pyr - carbonate)	20.0 - 23.0 (3.0)	20 7/5	21.3 - 23 shattered by faulting	Remnant patches Py, trace arsen, sp fluorite	2%
QUARTZ-FELSPAR PORPHYRY. Creamy white matrix, alternating with pinkish cream. Phenocrysts - qtz white and turbid, rounded grains in variable proportions 5 - 30% - Felspar - white, soft and weathered, showing variable alteration to buff and yellowish hues. 5 - 15% up to 2 mm. Well jointed/fractured, crushed zones throughout due to faulting. In places percentage of qtz/felspar increases to almost 50% 'sugary' texture.	23.0 - 55.97 (32.97)	30 1 40 50	Broken contact 50° (?) ← Fault zone, core shattered and broken. ← Contact 60°	Py, with marcasite rims in more unweathered portions. Pitted by weathering, concentrations variable 1% - 30% on a scale of 0.5 - 2.5 m. Accessory sp, fluorite, arsen and rare cassiterite as small discrete grains. Some sparse qtz-py-arsen veinlets.	10-15%
Faulted and shattered DOLOMITE SULPHIDE LODE - Banded serpentine/talc.	55.97 - 62.20 (6.23)	7/5 60		Weathered py, arsen, schorl tourmaline and finely disseminated fluorite	10%
QUARTZ FELSPAR PORPHYRY. Qtz 25% Felspar	62.20 65.5 (3.3)	1	← Contacts broken.	Py (pitted) trace sp, fluorite.	2%
Variably altered GREY SILICEOUS DOLOMITE. Brecciated, with weak alteration to talc-serpentinite along later fracturing. Margins of fractures commonly bleached/recrystallised to dolomite-calcite-qtz	65.5 - 82.5 (17.0)	70 2/3 80	← 50 cm massive talc/serpentinite with py marcasite, sp, arsen. ← 25 cm py, marcasite, arsen, sp 90% qtz-carbonate and talc 30°.	Sp, py trace marcasite, arsen Scattered blebs and grains, and thin fracture fillings with qtz talc-serpentinite and fluorite.	1%
Thinly Bedded SILTSTONES AND SILTY SHALES. Upper 3 m greenish and silicified with interleaved altered dolomite. Dark grey, well bedded, with some brecciation and contortion. Beds 1-5 cm.	82.5 - 100.0 (17.5+)	90 10/9 100	← Gradual Change. ← Bedding 60° ← Bedding 55° ← Bedding 70° ← Bedding 65° ← Bedding 75°	py, py, finely disseminated some sparse thin qtz-carbonate-fluorite veinlets	2%
END OF HOLE 100.0					

028383

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
96469		3.0	5.0	2.0	580									
70		5.0	7.0	"	4000									
71		7.0	9.0	"	720									
72		9.0	11.0	"	640									
73		11.0	13.0	"	620									
74		13.0	15.0	"	4550		85	85	4200	1	45	65		
75		15.0	17.0	"	560		85	330	4400	1	55	180		
76		17.0	19.0	"	5900		460	160	5400	2	65	1250		
77		19.0	21.0	"	2.14%		640	160	3500	2	95	620		
78		21.0	23.0	"	2.14%		660	360	5100	3	80	230		
79		23.0	25.0	"	740		300	140	290	1	75	1200		
480		25.0	25.6	0.6	680		360	33	110	1	40	560		
81		25.6	28.1	2.5	1.52%		410	255	5800	2	60	860		
82		28.1	30.1	2.0	760		120	320	7500	2	20	140		
83		30.1	32.1	"	210		48	290	320	1	15	25		
84		32.1	34.1	"	1150		170	840	1.30%	8	30	980		
85		34.1	36.1	"	520		270	220	790	10	10	370		
86		36.1	38.1	"	6700		430	760	2200	21	60	580		
87		38.1	40.1	"	5600		560	350	1700	21	30	960		
88		40.1	42.1	"	2450		530	180	1000	12	30	1750		
89		42.1	44.1	"	3400		390	90	330	8	30	1350		
490		44.1	46.1	"	2350		320	150	900	9	35	370		
91		46.1	48.1	"	430		230	300	3100	7	15	90		
92		48.1	50.1	"	500		260	660	1500	9	25	110		
93		50.1	52.1	"	660		200	640	450	9	15	95		
94		52.1	54.1	"	2000		210	140	360	4	10	35		
95		54.1	55.9	1.8	2000		240	70	200	2	25	490		
96		55.9	57.9	2.0	1.26%		640	100	330	1	110	3050		
97		57.9	58.2	0.3	1.25%		670	100	630	1	65	2500		
96498		58.2	59.5	1.3	7500		560	180	860	8	50	1400		

Notes :— Sn by XRF BI Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT A

ASSAY SUMMARY SHEET HOLE NO. MBD 16

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 59.5

028384

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
96499		59.5	62.2	2.7	9700		590	115	780	2	75	1250		
97260		62.2	65.5	3.3	2900									
97710		65.5	67.5	2.0	170									
11		67.5	69.5	"	30									
12		69.5	71.5	"	28									
13		71.5	74.0	2.5	1150									
97209		74.0	76.0	2.0	120									
210		76.0	77.88	1.88	190									
11		77.88	79.88	2.0	2360									
97714		79.8	82.5	2.7	660									

Notes :— Sn by XRFB. Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT B

ASSAY SUMMARY SHEET HOLE NO. MBD16

SAMPLE TYPE : DRILL CORE FROM 59.5 TO 825

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	SLUDGE	m	m	m	SPLIT	SLUDGE								
	97201	17.0	20.0	3.0		1.52%								
	2	20.0	21.5	1.5		1.41%								
	3	21.5	23.0	"		8600								
	4	59.5	62.5	1.5		9800								
	5	62.5	65.5	3.0		7000								
	6	65.5	68.5	3.0		5200								
	7	68.5	71.5	"		3300								
	8	71.5	74.5	"		5000								

Notes :—

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT C

ASSAY SUMMARY SHEET HOLE NO. MBD16

SAMPLE TYPE : DRILL CORE FROM 17.0 TO 74.5

SLUDGE

028387

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. Mt Bischoff

HOLE No. MBD 16

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1859.90 N	1059.85 E	635.90
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SIC 55-3

1:100 000 Sheet No. HELLYER 8015

State TASMANIA.

Mineral Tenement EL 13/79

Holder METALS EXPLORATION LTD.

Cadastral location and details

CROWN LAND / PRIVATE

W.C. Bearing from collar

_____ magnetic

_____ grid (1)

_____ grid (2)

_____ grid (3)

_____ true

Inclination at collar 90°

Total length 100.00 m

Commenced: 15 / 1 / 80

Completed: 22 / 1 / 80

Drilling contractor LONGYEAR AUST

Rig type BBS 1

Core size and non-coring (NC)

HQ NC	0	TO 3.0
HQ	3.0	TO 58.2
BQ	58.2	TO 100.0
		TO
		TO
		TO

Details of down hole location-survey methods.

TROPARI.

Purpose of drilling and anticipated lengths to targets.

To investigate dolomite mineralisation from 0-32 m, the white fine porphyry dyke 25-49 m and further dolomite 49-110 m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Azimuth (Mag)	DIP
50.0 m	094	89°
98.5 m	233	88°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. _____)

'DERWENT' PENCIL NO | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY	LOGGED BY	LOGGED BY
G. BROADBENT		
FROM 0 TO 100.0 m	FROM TO	FROM TO
DATE 22.1.80	DATE	DATE

Company managing exploration programme.

METALS EXPLORATION LTD

HOLE No. MBD-16

Log sheet 1 of 2

TALCONE TO 3.0m - NO CORE.

3.0 – 9.60 DOLOMITE weakly recrystallised and fractured.
Flaggy bedded and broken – fragments & washed grey sediment. Weathered – chalky textured dolomite and minor clay. Intervals – subpebble fragments. Some pieces are lightly mottled and recrystallised with minor calcite and qtz and weak talcose alteration.

9.60 – 72.0.0 DRIFT PUG (DOLOMITE/CLAY mixed)
Inconsistent blocks and broken ground with pale grey clay matrix. Fragments & pieces of dolomite and rock QTZ.

9.6 – 12.3 Pale khaki grey sediment with pale grey clay matrix, crushed rock to 2-3 mm. Fragments strong grey dolomite & rock/qtz/talc

12.3 – 14.2 Soft friable grey – brown clay with dolomite fragments and pieces of a hard pinkish brown finely crystalline bearing material – the carbonate?

14.2 – 19.5 Laminated black clay with white and brownish grey friable partings.

17.5 – 19.6 Black and brown friable clay with a greenish talc/hydrosilicate impurity

19.6 – 30.0 Black laminated clay with a dying texture and some broken dolomite fragments

30.0 – 33.0 DOLOMITE SULPHIDE HOSE, weathered.
Highly fractured – fragments & finely interbedded greenish grey hard "saprolitic" and porous cryptic brown. Some minor qtz and veinlet dolomite.
23.5 – 33.9 fine grained 5% py.

33.0 – 58.9 QUARTZ – FELSPAR PORPHYRY.
33.0 – 33.6 F.G. creamy white matrix rounded phenocrysts of qtz to 3mm, 5% felspar & 1% blk textured ser. breccia.
33.6 – 35.6 Fine grained white matrix, pink and pinkish brown 33% – 34.6 (uncertain) 1) Qtz 10% (rounded grains to 3mm), Felspar 5-8% (some yellowish alteration & felspars)
35.6 – 38.2 Fault zone. Bowness / gouge with quartz grains friable and leached.

38.2 – 38.8 Broken with small ragged zones. Fine grained light brownish grey stained massive Qtz < 1mm 5-7%, Felspar < 2mm 5-7%, porous 10-15%.
38.8 – 51.6 Matrix now as yellowish green colour, fine grained and finely textured. Qtz 10% rounded grains to 1mm. Felspar soft and weathered weakly altered 15-20%.
51.6 – 52.6 Strong grey white fine grained with minor brownish grey staining. Qtz 10% felspar = 5% weakly altered Phenocrysts rare some up to 5 mm, average 2-3. Well textured, with some coarse crystal white mica on joint faces.

58.9 – 62.2 (?) DOLOMITE SULPHIDE LODE, Fractured.
Hard green unstained 'saprolite' finely interbanded (2 mm) with fe sulphides and a little pale green talc in irregular patches. The banding is defined and patterned / wrinkled texture. Highly jointed by weathering (removal of py?) and fractured and broken – most of the rock mass is a friable brown/black powder interlaced with fragments of the above.

62.2 – 65.5 QUARTZ FELSPAR PORPHYRY.
Heavy core loss – some pieces of pinkish cream porphyry with a "sugary" texture – phenocrysts 40% Qtz – as rounded grains to 5mm, 25% felspar weakly altered, 2-10%

65.5 – 76.0 DOLOMITE
Brecciated and fractured, with core losses to 68m
Some brecciation appears to be pre-faulting – fine dark grey dolomitic matrixes opposite clasts of pale grey fine grained dolomite. Later fracturing has thin films of baking material along shear planes, and also mobilisation of qtz and carbonates to 5mm thin veinlets.
Evidence of fracturing decreases with depth – core is more competent and recovery increases

76.0 – 77.9 ALTERED DOLOMITE
Finely notched recrystallised creamy white dolomite with talcose alteration – "shiny limestone" planes. The contact 25° is almost vertical grey talc and sepiolite with a little pyrite.

77.9 – 82.5 DOLOMITE
As for 65.5 – 76.0

82.5 – 100.0 THINLY BEDDED SILTSTONES AND SHALES.
(82.5 – 83.5 greenish and pinkish, some thin dolomitic (?) laminae
Finely bedded clay and siltstone, dark grey – in colour (exactly near contact). Quite well bedded with minor soft sediment recirculation and some minor folding and distortion. Scale of bedding 1-2 cm.
The shale beds are rather thin (4.5 mm) and become progressively darker in colour towards the bottom of the hole, until they are black and carbonaceous.

END OF HOLE 100.0 m.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 10 cm.

GRAPHIC LOG | STRUCTURAL AND VEIN INFORMATION | MINERALISATION | NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT GISCHOFF
Logged by: G. BROADBENT date: 21/5/80

HOLE No. MB016
LOG SHEET 2 OF 2
from 0 m to 100.0 m

028389

% RECOVERY	FIELD ROCK NAME and general discription over interval marked	ADOPTED INTERVAL (m cm) & ADOPT LENGTH FROM COLLAR m cm	GRAPHIC LOG	BRACKETS & MARKERS (▼)	OBSERVATIONS Commence with length from collar, either point (relates to marker) or from to (relates to brackets) — Attitude of bedding or foliation, Attitude & spacing of joints, Attitude, width & discription of sheared zones. [Attitude = angle of structure to long core axis]	MINERALIZATION
	SUMMARY DRILL LOG MBD 17				Veins over 50 mm	Mineralisation (excluding veins over 50 mm)
	Coring commenced 0 m; upper 20-30 cm mullock.					
	DOLOMITE SULPHIDE LODE. Weathered and badly broken. Porous mottle dolomite and sepentine fragments	0-3 - 6.10 (5.8)	7/5	0	Poor Recovery <50% to 20.0 m - washed, fractured and broken.	Py (pitted), Fluorite, trace arsenic (?)
	ALTERED DOLOMITE. Core broken and washed out - pink, heavy mineral with recrystallised dolomite.	6.1 - 11.0 (4.9)	F	10		Py, marcasite, sp, fluorite in sludge sample.
	FAULT ZONE - yellow and black pugs 11.00-13.90 dolomite fragments. 13.90-16.75 siltstone	11.0 - 16.75 (5.75)	F			Sparse Py-qtz-fluorite-sp-cp fragments (veins?)
	QUARTZ-FELSPAR PORPHYRY. Matrix pinkish brown. Phenocrysts variable, up to 50% - sugary texture. Qtz - 10-25%, rounded grains to 5mm. Felspar - 3-15%, altered to brownish material otherwise creamy white and weathered. Max 3m. Faulted and broken.	16.75 - 36.1 (19.35)	1	20, 30	← Contact Broken. ← Small black pug zone - fault.	Py, pitted in more fractured intervals rims of marcasite where unweathered. Weak trace cp, cassiterite and arsenic. Sp occurs sporadically. Some qtz-py-cassiterite veining. Proportion of sulphides variable 5-30%; blebs and fgr. aggregates.
	FAULT PUG ZONE. 36.10-39.6 Black puggy clay, laminated. 39.6-45.3 Recovery poor - siltstone and dolomite fragments	36.1 - 45.3 (9.2)	F	40	← Contact Broken - 40°?	Sparse fragments of pyrite.
	GREY SILICEOUS DOLOMITE Brecciated, with fine dark grey fractures. Some minor recrystallisation to dolomite-calcite-qtz along fractures. Very thin talc-sepentinite along late fractures	45.3 - 60.00 (14.70)	2	50	← Contact Broken. ← Zone of alteration to talc/serpentinite with clasts of dolomite, qtz, calcite, Sp, Py 2%. 10 cm Py-sp-arsenic-fluorite-tourmaline 40°	Sp trace py weak trace arsenic, cp, as blebs and irregular masses along brecciation fractures
	DOLOMITE SULPHIDE LODE Angular fragments of altered dolomite surrounded by bands talc/sepentinite, dolomite, qtz, calcite and sulphides	60.0 - 70.35 (10.35)	3	60	← Undulose contact, 80°	Po > Py, trace sp, fluorite, cp arsenic, marcasite in contorted bands. Other sulphides distributed unevenly in Po. Upper 1.5 m 20%
	GREY SILICEOUS DOLOMITE As above, with altered intervals. 76.15-78.43 DOLOMITE SULPHIDE LODE (talc/serpentinite)	70.35 - 79.36 (9.01)	2	70	← Gradual Change.	Po >> Py, fluorite, trace sp, arsenic.
	SERICITIC SILTSTONES AND SILTY SHALES Hard, silicified contorted.	79.36 - 83.1 (3.74)	10/9	80	← Gradual Change. ← Bedding 45°	Py, trace Po as thin veinlets and blebs in small fracture zones.
	END OF HOLE 83.1			90		

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97142		0.0	2.0	2.0	3500		260	105	2500	1	10	600		
43		2.0	4.0	"	5400		590	210	7700	4	50	1750		
44		4.0	6.0	"	6900		400	350	2600	3	60	1950		
45		6.0	8.0	"	480		85	155	7200	3	210	80		
46		8.0	10.0	"	2450		220	1150	6000	5	10	820		
47		10.0	12.0	"	540									
48		12.0	13.9	1.9	270									
97100		13.9	15.9	2.0	920									
01		15.9	17.9	"	1650		490	150	95	2	25	200		
2		17.9	19.9	"	2550		410	34	80	1	25	100		
3		19.9	21.9	"	3000		360	34	50	1	35	520		
4		21.9	23.9	"	6100		510	35	26	1	85	2100		
5		23.9	25.9	"	3100		250	36	20	1	40	860		
6		25.9	27.9	"	5600		490	40	42	21	45	1250		
7		27.9	29.9	"	4600		330	160	210	1	35	3250		
8		29.9	31.9	"	1550		350	48	130	1	15	1150		
9		31.9	33.9	"	900		270	36	570	1	15	330		
110		33.9	36.1	2.2	740		260	30	1400	1	20	70		
11		36.1	38.1	2.0	450									
12		38.1	39.6	1.5	170									
13		39.6	41.6	2.0	100									
14		41.6	43.6	"	100									
15		43.6	45.3	1.7	70									
16		45.3	47.3	2.0	20									
17		47.3	49.3	"	14									
18		49.3	51.3	"	55									
19		51.3	53.3	"	65									
120		53.3	55.3	"	28									
21		55.3	57.3	"	10									
97122		57.3	60.07	2.77	44									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT A

ASSAY SUMMARY SHEET HOLE NO. MBD17

SAMPLE TYPE : DRILL CORE FROM 00 TO 60.07

02839

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97123		60.07	62.07	2.0	2850		280	X	2.20%	1	25	440		
24		62.07	64.07	"	4550		460	X	190	<1	55	2600		
25		64.07	66.07	"	2100		590	X	600	<1	15	3300		
26		66.07	68.07	"	3650		370	X	6200	1	40	920		
27		68.07	70.11	2.04	6900		560	X	320	<1	60	1400		
28		70.11	72.11	2.0	600									
29		72.11	74.11	"	290									
130		74.11	76.11	"	95									
31		76.11	78.63	2.52	4150		330	X	1.50%	1	50	840		
32		78.63	80.63	2.0	170									
33		80.63	82.63	"	28									

Notes :— Sn by XRF Bi Method.

X means less than detection limit

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT B

ASSAY SUMMARY SHEET HOLE NO. MBD 17

SAMPLE TYPE : DRILL CORE FROM 60.07 TO 82.63.

028391

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	SLUDGE	m	m	m	SPLIT	SLUDGE								
	97134	2.5	3.5	1.0		4650								
	35	6.1	7.1	"		2950								
	36	7.5	8.5	"		1950								
	37	9.0	10.0	"		1500								
	38	10.0	11.0	"		2450								
	39	11.0	12.0	"		4100								
	140	12.0	13.0	"		4200								
	41	13.0	14.0	"		3700								

028392

Notes:— SLUDGE by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT C

ASSAY SUMMARY SHEET HOLE NO. MBD 17

SAMPLE TYPE : DRILL CORE FROM 2.5 TO 14.0

SLUDGE

028393

REPORT No.

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MT BISCHOFF

HOLE No. MBD 17

COLLAR LOCATION

Grid name — Rectangular space co-ordinates

	PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1901.59 N	1100.44 E	626.39
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 Holder METALS EXPLORATION LTD.

Cadastral location and details CROWN LAND/PRIVATE

W.C. Bearing from collar
- magnetic
- grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar VERTICAL

Total length 83.1 m

Commenced: 11 / 1 / 80
Completed: 17 / 1 / 80

Drilling contractor LONGYEAR AUST PTY LTD

Rig type F 38

Details of down hole location-survey methods. TROPARI

Purpose of drilling and anticipated lengths to targets. To intersect tin mineralisation in white Face porphyry Dyke from 13-53 m, and to investigate possible tin mineralisation in dolomite below the dyke (53-66 m)

Core size and non-coring (NC)

HQ	0	TO 83.1 m
		TO
		TO
		TO
		TO
		TO

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Azimuth	DIP
39.0	291	89°
81.0	315	88°

Comments on drilling. Bad ground - faulted and broken, poor core recovery in places.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No.	FIELD ROCK NAME, ETC

Symbols and abbreviations for drilling notes column.

LOGGED BY G. BROADBENT	LOGGED BY	LOGGED BY
FROM 0 TO 83.1	FROM TO	FROM TO
DATE 24 1 80	DATE	DATE

Company managing exploration programme. METALS EXPLORATION LTD

HOLE No. MBD17
Log sheet 1 of 2

028394

0-0.3 overburden and natural surface.
0.3 - 6.10 FAULTED DOLOMITE SULPHIDE LODE.
Badly broken core - some friable weathered porous granular dolomite fragments with fluorite and hard green serpentinite fragments with soft crumbly brown pugging matrix.

6.10 - 11.0 RECRYSTALLISED DOLOMITE, FAULTED
Fragments of pale grey recrystallised dolomite with a hard, heavy pinkish mineral (Mn carbonate?)

11.00 - 13.90 FAULTED DOLOMITE?
Ochreous yellow silty pug with some sparse dolomite fragments. Some mineral white fibrous material - tremolite?

13.90 - 16.75 FAULT PUG WITH SILTSTONE AND SHALE FRAGMENTS.
Fine grained black weakly foliated fault pug with shiny fracture surfaces and some hard grey siltstone and minor shale fragments

16.75 - 36.10 QUARTZ FELSPAR PORPHYRY
Matrix pinkish-brown due to weathering, extensively fractured and broken, with minor orange-brown Fe oxide staining and bleached portions and some pitting by weathering.
Vfpp 20-30cm fine grained - Qtz up to 2mm, 10%; Felspar brownish and altered, some removed by weathering; Fe sulphides (Py-marcasite) 10%, max 2 mm.
Phenocrysts: Qtz - milky white and translucent to 5mm 10-20%
Felspr - mostly altered to hard brownish translucent mineral, some white and weathered to soft white clay, up to 4 mm, some well formed, variable 10-20%.

25.75 - 29.04

27.5 - 28.10 LOST CORE ZONE.

29.04 - 30.33 matrix grey-brown, weathered, qtz greyish white to 4mm, 15%, Felspar < 2 mm, 30%

30.33 - 33.5 qtz > Felspar, total 25%, matrix brownish grey and pitted.

33.5 - 36.1 Creamy coloured matrix with some brownish patches. Qtz and felspar decrease in size and abundance in belt 0.75 m to max 2mm, 10-15%. Some patchy greenish yellow alteration of matrix in lower 0.75 m.

36.10 - 39.6? FAULT PUG WITH SILTSTONE AND SHALE FRAGMENTS
As for 13.90 - 16.75

39.67 - 45.30? FAULTED THINLY BEDDED SILTSTONES AND SHALES
Very broken core - washed fragments with poor recovery. Fragments of grey finely bedded siltstones and shales (clay rich) with brownish-grey micaceous siltstones

45.30 - 60.00 DOLOMITE, weakly altered.
Medium hard fine grained grey dolomite, brecciated, with fine dark grey fractures. Some minor recrystallisation along fronts parallel to the more penetrative fracture zones, and thin films of talc/serpentinite along shear (?) planes.
45.3 - 47.1 highly fractured, shattered and bleached to an ochreous yellow-grey colour. Soft and crumbly.
47.1 - 50.00 Zone of later brecciation and weak alteration - large sub-angular clasts of grey dolomite in a greenish matrix of talcose dolomite. Margins of dolomite clasts are bleached white and occasionally altered to green talcy material, particularly when there are sulphides in close proximity.

55.5 - 60.0 Medium grey dolomite with black mineral along brecciation fractures and a gradual increase in talc-serpentinite alteration towards base of interval.

60.00 - 70.35 DOLOMITE SULPHIDE LODE
Angular corroded fragments of altered and recrystallised dolomite (greenish talcose in places with minor grey qtz and dark grey serpentinite) surrounded by finely bedded greenish grey talc and serpentinite with lesser qtz and carbonates. Abundant sulphides - po, Py - to 20% as blebs and granular aggregates concordant with banding

70.02 - 70.35 Some hard blue 'serpentinite' with finely disseminated fluorite.

70.35 - 76.15 DOLOMITE - weakly altered.
70.35 - 70.45 Brecciated fine grained grey dolomite, weakly recrystallised along some brecciation fractures
70.45 - 71.67 Dark greenish grey talc and serpentinite surrounding corroded clasts of hard pale grey dolomite.
71.67 - 76.15 As for 60.00 - 70.35, above.

76.15 - 78.43 DOLOMITE SULPHIDE LODE
Dark green and grey talc with grey serpentinite and minor patches of white recrystallised dolomite and calcite with a little qtz. Mottled bronze fleck due to pyrrhotite

78.43 - 79.36 INTERBEDDED CARBONATE and SERPENTINITE SHALES.
Massive green finely serpentinite interbedded with greenish sericitic shales.

79.36 - 83.10 SILTSTONES AND SHALES.
Thinly bedded greenish grey sericitic clay rich siltstones, silty shales. Bedding destroyed in places - disconformable bedding 1-2 cm. Minor fracturing and micro-faulting, and some small discrete breccia zones 1-2 cm.

END OF HOLE 83.1 m

0				0-0.3 m, 0.3-6.10 Py, marcasite, fluorite, trace arsenic, rare sp in pores and filled fragments to 5 cm.	20%
4	5/4/F				
8	3/F	← Broken contact.		6.1 - 11.0 trace Py, marcasite, sp, Fluorite in shudge envelope	
12	2/F	← Broken contact.		11.0 - 13.90 sparse fragments of dolomite below Py-Qtz-Fluorite - sp, rare cp	
16	F/6	← Broken contact.		13.90 - 16.75 - Mineralisation not apparent.	
20	1	← Broken contact.		16.75 - 24.0 Py, marcasite and Py grains, trace sp, arsenopyrite, trace cp and pyrrhotite brown fluorite. Cassiterite variable from nil to strong trace over a few cm, arsenopyrite similar. The Fe sulphides vary from 10-30% and are more or less pitted and weathered. Some qtz, sp and cassiterite on joint faces.	15%
24				24.0 - 25.75 Pyrrhotite, marcasite rare, trace arsenopyrite, Qtz vuggy. Pitted and weathered	7-15%
28				25.75 - 29.04 Py, marcasite, trace arsenopyrite, sp, fluorite, weak trace cp and cassiterite	20%
32				29.04 - 30.33 pitted Py trace arsenopyrite, sp. Some removed by weathering.	10%
				30.33 - 33.50 Py, weak trace arsenopyrite, sp, some rare grains fluorite towards bottom of interval	10-15%
		← Small black peggy fault zone 32.2 m.			
36				33.5 - 36.1 Py, marcasite, trace arsenopyrite, sp, fluorite. Less weathered than above, finer grained (sulphides mainly < 2 mm)	15%
	F/0/1	← Contact broken, 40°?		36.1 - 39.6 As for 13.90 - 16.75	
40	10/9/F			39.6 - 45.3 Sparse pyritic siltstone and shale fragments	1
44					1%
48		← Contact Broken.			
52	2/F	← 46.6 65 mm Py-Qtz-carbonate, Sp-trace cp, arsenopyrite, 70°		45.2 - 47.1 Sp, Py, fluorite trace arsenopyrite as blebs and irregular massive strong fractures with Qtz, carbonates	1%
	2/F/6			47.1 - 50.0 SP, Py as blebs, bullets and stringers with qtz, carbonates and fluorite	2%
	2/(3)			50.0 - 55.5 Sp, Py, fluorite, trace arsenopyrite blebs, stringers etc with qtz, carbonates minor talc/serpentinite	1-2%
56	2/3		50.85 - 51.15 30 cm zone Py-Sp-fluorite, arsenopyrite, pyrrhotite veining with talc/serpentinite 50.55 - 50.95 barren Sp-Py-arsenopyrite-qtz talc-serpentinite veins	55.5 - 60.0 Trace Sp, pyrrhotite, Py, arsenopyrite	1%
60	4/8/7	← Contact 80°		60.0 - 60.5 Py, Sp, trace Po, fluorite	15-20%
64				60.5 - 61.5 Py, Po, Sp, trace arsenopyrite, Sp, fluorite abundant, 5%	20-25%
68				61.5 - 70.02 Po >> Py, trace marcasite, Sp, arsenopyrite, rare Sp. Fluorite abundant 5-10%. Sulphides irregularly distributed, ranging from 10% in more massive talcy portions to 90-95% Some rare fine grained black cassiterite is visible in the lighter coloured portions.	60-70%
72		← Gradual change from 70.0 - 70.35		70.02 - 70.35 fluorite, Py, Po, Sp, arsenopyrite	20-25%
	2			70.35 - 70.45 trace Sp, Py, Po	1%
	3/6			70.45 - 71.67 Py, Sp, trace Po	2%
	2			71.67 - 76.15 Sp, Py, weak trace Py as blebs and grains along fractures.	1%
76		← Contact irregular			
	6/1/4	← Contact irregular		76.15 - 78.43 Po >> Py, fluorite trace Sp, arsenopyrite Blebs and grains to 5 x 4 mm	30-40%
80	7/0/4	← Gradual bedded transition ≈ 45°		78.43 - 79.36 Po, stream in talcy matrix, Py, Sp with fluorite veining	2%
	10/1	← 81.7, Bedding 45°		79.36 - 83.10 Py, finely disseminated in some siltstone beds and as very fine veinlets and stringers, occasional blebs to 2-3 mm	1%
84					

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15 mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDES = angle between fracture and core axis

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mount Bischoff
Logged by: G. BROADBENT date 23/1/80
Written up 21/5/80

HOLE No. MBD17
LOG SHEET 2 OF 2
from 0 m. to 83.1 m.

028395

MBD.18

% RECOVERY	FIELD ROCK NAME and general description over interval marked	ADOPTED INTERVAL (m cm) & ADOPT LENGTH FROM COLLAR m cm	GRAPHIC LOG	OBSERVATIONS (commence with [illegible] or other [illegible] relates to marker) or from to relates to [illegible])		
				[illegible]	[illegible]	
	SUMMARY DRILL LOG MBD 18.			Veins over 50 mm	Mineralisation (excluding veins over 50 mm)	
	TRICONE to 2·3m.		0			
	GREENISH GREY SILTSTONES AND GREY SANDSTONE	2·3-5·65 (3·35)	10/11/5	← FAULTED		
	DOLOMITE SULPHIDE LODE	5·65-6·10 (1·05)	5		py, marcasite, pv, fluorite, sp, arrow, cp	←
	QUARTZ-FELSPAR PORPHYRY	6·10-8·65 (2·15)	1	← broken contact.	py, marcasite, fluorite, trace cassiterite	20%
	DOLOMITE SULPHIDE LODE. Bronze coloured due to po 50-70% qtz-dolomite-calcite intergrown, minor talc/serpentinite. Weakly foliated. Lower 0·7m bluish grey talc/serpentinite with fluorite and qtz-carbonate.	8·65-28·4 (19·55)	10 / 14 / 8 / 20	← 25°, sharp contact; 10·35-10·69 qtz porphyry with irregular contacts	Po >>> Py, trace sp and dark brown fluorite. Fine grained cassiterite is visible in isolated patches up to 10% otherwise sparsely disseminated. Sulphides are disseminated and intergrown with qtz-carbonate. Lower 0·7m fluorite rich, sulphide 5% total 15%	60%
	WEAKLY ALTERED DOLOMITE	28·4-31·6 (3·2)	2 30	← Gradual change.	Weak trace py, ? cassiterite in fractures	1%
	TRANSITION ALTERED DOLOMITE / SILTSTONES	31·6-33·65 (2·05)	3 10	← 100mm py, marcasite, talc, dolomite, sp	py, pv, dissem, veinlets with qtz	←
	QUARTZ FELSPAR PORPHYRY. Hard white f.g. matrix, qtz 5-7%, felsp 7%	33·65-39·30 (5·65)	1	← irregular, 30°; irregular 35°	Py with marcasite rims, strong trace sp, weak trace arsen.	15-20%
	BRECCIATED GREENISH SILTSTONES	39·3-40·10 (0·8)	10 40		py, pv, sp, dissem, stringers	7%
	END OF HOLE 40·1 m.					

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
50		3.1	4.1	1.0	780									
51		4.1	5.7	1.6	460									
52		5.7	6.7	1.0	1.02%		1900	80	110	1	240	3700		
53		6.7	8.8		2450		6000	70	110	1	160	2400		
54		8.8	10.2	1.4	1.60%		1100	90	50	1	180	3100		
55		10.2	10.6	0.4	1300		450	14	55	<1	80	580		
56		10.6	12.6	2.0	8600		1300	70	34	2	300	1.60%		
57		12.6	14.6	"	9200		1200	75	38	<1	140	7500		
58		16.6	16.6	"	5700		1300	15	35	<1	130	1.28%		
59		16.6	18.6	"	1.86%		920	130	34	<1	110	2200		
160		18.6	20.6	"	3.58%		1100	100	75	<1	240	5100		
61		20.6	22.6	"	5.10%		1100	260	20	<1	290	2.90		
62		22.6	24.6	"	2.90%		1200	180	16	<1	210	6200		
63		24.6	26.6	"	3.90%		1200	190	16	<1	300	7400		
64		26.6	27.6	1.0	4.28%		1000	360	35	<1	250	3300		
65		27.6	28.3	0.7	2850		140	23	3200	21	40	44		
66		28.3	30.3	2.0	120									
67		30.3	32.3	"	90									
68		32.3	33.7	1.4	310									
69		33.7	35.7	2.0	480									
170		35.7	37.7	"	940									
71		37.7	39.3	1.6	200									
72		39.3	40.1	0.8	2700									

Notes :—

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT A

ASSAY SUMMARY SHEET HOLE NO. MBD 18

SAMPLE TYPE : DRILL CORE FROM 3.1 TO 40.1

063820

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	SLUDGE	m	m	m	SLUDGE	GROUND								
	97191	1.0	2.0	1.0	1.24%									
	92	2.0	2.3	0.3	5400									
	97313	3.85	4.1	0.25	1850									
	14	5.5	6.0	0.5	1.01%									

Notes:— Sludge by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT B.

ASSAY SUMMARY SHEET HOLE NO. MBD18

SAMPLE TYPE : DRILL CORE FROM 1.0 TO 6.0

SLUDGE

028397

028398

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD18

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1919.32 N	1100.05 E	626.86m
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
- magnetic
- grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 45/360

Total length 40.1 m

Commenced: 18/1/80

Completed: 20/1/80

Drilling contractor: LONGYEAR Aust Pty Ltd.

Rig type: L 38

Details of down hole location-survey methods.
TROPARI

Purpose of drilling and anticipated lengths to targets.
To intersect the mineralisation in dolomite 0-23m Planned depth of hole 40.0m.

Core size and non-coring (NC)

		TO
TRICONE	0	TO 2.3m
HQ	2.3	TO 40.1
		TO
		TO
		TO

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C BEARING type Mag Grid	DIP
37.0m	332°	44°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY G. BROADBENT	LOGGED BY	LOGGED BY
FROM 0 TO 40.1m	FROM TO	FROM TO
DATE 26/1/80	DATE	DATE

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD18
Log sheet 1 of 2

028399

TRICONE TO 2.3 m - NO CORE.

2.3 - 5.65 SILTSTONES AND SANDSTONES

Siltstones hard, greenish grey and thinly bedded - sericitic and silicified. The sandy beds are slightly softer, more porous and occasionally friable - removal of sulphides by weathering?
The sandstones are also micaceous, grey in colour and more highly fractured.
Overall, highly fractured and faulted 4 m - 5.6 m.

10/11/S — Very weak trace py disseminations. — 1

F — Broken contact.

5.65 - 6.70 DOLOMITE SULPHIDE LODE

Weathered and sulphide rich with granular qtz, carbonates and minor finely banded hard green serpentinite

4/8 — Broken contact — 5.65 - 6.70 py, marcasite, py, blue and purple fluorite, strong trace cassit (?), trace sp, arsen, cp — 50%

6.70 - 8.85 QUARTZ FELSPAR PORPHYRY

Hard white fine grained matrix
Qtz - subhedral clear grains 1-2 mm, 10%
Felspar - variable 1-10%, max size 2 mm; altered, hard brownish and greenish rounded or well formed grains.

1 — 30 mm carbonate - fluorite; py-sp vein on contact. Contact 25° — 6.7 - 8.85 marcasite, pyrite as distinct blebs and grains to 3 mm with up to 1% green or dark brownish purple fluorite. Some fine grained patches of sulphide to 10 mm. Weak trace f.gr. cassiterite — 20%

8.85 - 10.35 DOLOMITE SULPHIDE LODE

Bronze coloured due to pyrrhotite. Grey and white clear qtz and granular calcite matrix irregular patches and intergrown throughout

4/8 — ← Contact 25° — po >>> py, fluorite, strong trace fine granular cassiterite which is almost 1% in sections up to 5 cm; trace arsen, marcasite, sp, cp — 60%

10.35 - 10.69 QUARTZ FELSPAR PORPHYRY. As for 6.7 - 8.85 m

1 — marcasite, py, fluorite — 15%

10.69 - 28.38 DOLOMITE SULPHIDE LODE

10.69 - 27.71 m.
Bronze coloured due to pyrrhotite. Weakly foliated, with irregular patches and thin discontinuous lenses of grey and white qtz, carbonates and rare patches of talcy carbonates. Some thin black serpentinite veinlets and flecks and films around carbonates.
Distribution of sulphides 40 - 95% on a scale of a few cm., average 50-70%

4/8 — Contact 30°. — 10.69 - 19.8 po >>> py / marcasite, granular clear fluorite in cavities and strong trace v fine gr black cassiterite, trace arsen, sp, cp. Overall, granular, blebby texture with fluorite and cassiterite appearing to be interstitial and the minor sulphides intergrown with po (? exsolved?) Py occurs as grains within po or as thin films surrounding po grains. — 60%

19.8 - 27.71 As above, but Py diminishes to a trace; po >>> fluorite, trace arsen, cp, py, sp. Cassit occurs patchily, in places up to 5% for a few cm - very fine grained, some grain aggregates to 5 mm.

6/7 — Contact undulose, 40° — 27.71 - 28.38 py, po, abundant purple fluorite, trace sp. — 10%

27.71 - 28.38 Bluish grey talc and grey serpentinite with minor f.gr carbonates, minor qtz and fluorite with corroded clasts of recryst. dolomite.

28.38 - 31.60 RECRYSTALLISED DOLOMITE

Clasts of weakly mottled pale grey and cream dolomite with talcose alteration adjacent to brecciation fractures - grey green talc/serpentinite to 5 mm, patches to 10 mm along fracture planes. Some dark grey recrystallised dolomite and qtz
29.98 - 30.28 - 30 cm massive greenish talcy serpentinite with qtz and a little fluorite, po.

3 — Gradual Change. — 28.38 - 31.60 Weak trace py, sp along fracture planes as blebs, some disseminations in dolomite.

31.6 - 32.90 INTERBEDDED ALTERED DOLOMITE / SILTSTONE

Dolomite, completely altered to soft black talcy serpentinite, interbedded with brownish grey siltstone. Bedding has indistinct outlines and is brecciated and disrupted.

10/7 — 31.7 100 mm py, marcasite, talc, dolomite, trace sp. — Gradual Change. — 31.60 - 32.90 py, po disseminations as grains to 2 mm in serpentinite; as thin veinlets with qtz and finely disseminated in dolomite — 7-10%

32.90 - 33.65 SILTSTONES and SHALES, thinly bedded. Hard greenish grey sericitic siltstones and dark grey thin chalk beds, brecciated and disrupted.

10/9 — ← 33.4 Bedding 90° — 32.90 - 33.65 py, po in veinlets and stringers, weakly disseminated — 1-2%

33.65 - 39.30 QUARTZ FELSPAR PORPHYRY

Matrix hard, fine grained and creamy white, well fractured. Phenocrysts are mostly < 2 mm; Qtz - clear, well formed 1-2 mm, 5-7%
Felspar - brownish alteration, some grains white and unaltered < 1.5 mm, variable 5-10%.

Contact irregular, 30° — 1 — 33.65 - 39.30 py with marcasite rims, strong trace sp as discrete grains and aggregates.
33.6 - 34.6 trace arsen, fluorite
34.6 - 36.6 weak trace cassiterite, fluorite
Overall, sulphides are variable 5 - 30%, as discrete grains and fine grained aggregates to 5 mm; the central portion has sulphide rich patches - fine grained disseminated sulphide to 10 cm, 30%.
Minor qtz - py - marcasite - sp - arsen - fluorite veining 25-30° — 15-20%

Contact irregular

39.30 - 40.10 SILTSTONES AND SHALES.

As for 32.90 - 33.65, but more brecciation and disruption

10/9 — Py, trace po, sp in veinlets and stringers < 5 mm, also py/po finely disseminated — 7%

END OF HOLE 40.10 m.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15 mm.

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mount Bischoff
Logged by: G. BROADBENT date: 26 / 1 / 80.

HOLE No. MBD 18
LOG SHEET 2 OF 2
from 0 m. to 40.10 m

028400

MBD-19.

RECOVERY	FIELD ROCK NAME and general discription over interval marked	ADOPTED INTERVAL (m cm) & ADOPT LENGTH FROM COLLAR m cm	GRAPHIC LOG	MARKERS (#)	OBSERVATIONS (Commence with angle from core axis & direction of core axis relative to marker) Attitude of bedding or foliation & fracture & spacing of joints, attitude & width & alteration of sheared zones. [Attitude = angle & structure to long core axis.]	MINERALIZATION	MINERALIZATION
	SUMMARY DRILL LOG MBD 19.				Veins over 50 mm	Mineralisation (excluding veins over 50 mm.)	
	TRICONE TO 3m - No Core.	0 - 3.0 m	0				
	DOLOMITE WITH QUARTZ AND CALCITE. Mottled dark grey siliceous dolomite with patchy creamy white dolomite. Mottling is due to partial recrystallisation	3.0 - 15.75 (12.75)	2 3/10		← Gradual Change.	Po ? Py. trace sp, altered. Concentrated along fracture zones in intervals → 5.95 - 8.7m, 12.9 - 13.65m, together with sepiolite/talc, qtz, calcite	3-5%
	DOLOMITE SULPHIDE LODE	15.75 - 16.93 (1.15)	4			Po, Pyrrhotite trace, altered, Py 5%	30%
	ALTERED DOLOMITE. Recrystallised - dolomite, white calcite and qtz.	16.93 - 21.05 (4.12)	3 2/0		← 25°, irregular	Po >> Py. disseminated aggregates and blebs along brecciation cracks.	10%
	DOLOMITE SULPHIDE LODE. qtz-carbonate / talc/serpentinite } mixed on a metre scale	21.05 - 27.10 (6.05)	7/8/4		← Gradual Change.	Po >> Py. trace sp and altered. Variable proportions 10 - 70%, dissem.	40%
	THINLY BEDDED SERICITIC SILTSTONES AND GREY MASSIVE SANDSTONES. Hard, greenish siltstones with grey quartzites (Silicified). Brecciated and mineralized.	27.10 - 39.2 (12.10)	30 10/11		← Gradual Change (interbedded) ← Bedding 70° ← Bedding 45° ← Bedding 75°	Trace Po, Py. Shaley dissem in sandstones small blebs in siltstones	<1%
	END OF HOLE 39-2.		40				

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97173		3.0	5.0	2.0	640									
74		5.0	7.0	"	34									
75		7.0	9.0	"	65									
76		9.0	11.0	"	22									
77		11.0	13.0	"	8									
78		13.0	15.0	"	10									
79		15.0	15.87	0.87	55									
180		15.87	16.72	0.85	7600		550	40	1500	2	35	2000		
81		16.72	18.72	2.0	980									
82		18.72	21.2	2.48	1000									
83		21.2	23.2	2.0	140									
84		23.2	25.2	2.0	170									
85		25.2	27.1	1.9	12									
86		27.1	29.1	2.0	44									
87		29.1	31.1	"	32									
SLUDGE														
97193		0.0	3.0	3.0	5300									

Notes :— Sn by XRF Bi Method

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 19

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 31.1

02840 01

028402

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 19

COLLAR LOCATION

	Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	1943.15 N	1056.99 E	641.60
(2)		N	E	
(3) Aust. Map Grid PRECISE / APPROX.		mE	mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3. | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL. 13/79 Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND/ PRIVATE

W.C. Bearing from collar
- magnetic
- grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 60°/360

Total length 39.2 m.

Commenced: 20 / 1 / 80

Completed: 22 / 1 / 80

Drilling contractor: LONGYEAR AUST PTY LTD

Rig type: LONGYEAR 38

Core size and non-coring (NC)

TRICONE	0	TO 3.0 m
HQ	3.0	TO 39.20
		TO
		TO
		TO
		TO

Details of down hole location-survey methods.
TROPARI.

Purpose of drilling and anticipated lengths to targets.
To investigate mineralisation in dolomite horizon 0 - 48m;
planned depth of hole 60 m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mag / Azimuth	DIP
37.70m	338°	59°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY C. BROADBENT	LOGGED BY	LOGGED BY
FROM 0 TO 39.2m	FROM TO	FROM TO
DATE 26.1.80	DATE	DATE

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 19
Log sheet 1 of 2

028403

DRILL ADVANCE	LOST CORE ZONE	CORE LENGTH OR RECOVERED	% RECOVERY ESTIMATE	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm.)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
1.2	0.5	0.4	33	TRICONE TO 3.0 m – NO CORE	0				Mineralisation Including veins over 10 mm.	Mineralisation Excluding veins over 10 mm		
0.5		0.4	80	3.0 – 15.75 Recrystallised DOLOMITE Mottled grey/white siliceous dolomite, extensively brecciated, with patches of creamy coloured recrystallised dolomite, grey and white qtz and calcite concentrated along fracture zones (up to 5 cm in size). Some very fine fractures are coated with black (?) serpentine.	4		3			3-5.95 po, py as blebs along fracture zones; pyveinlets	1%	
1.5		1.4	93							5.95 – 8.7 po>>py as granular aggregates with traces sp, arsen in qtz – calcite veining etc.	10%	
1.4		1.4	100		8					8.7 – 12.9 trace po, py with qtz, calcite.	<1%	
9.1		9.1	001						←11.0 50mm po, qtz calcite, py, talc, arsen vein, 60°. ←11.4 30mm serpentinite vein surrounded by dissem po, py, sp, arsen 100mm, 60°			
9.1		9.1	001		12							
1.1		1.1	001							12.9 – 13.65 po>py, trace sp, arsen with calcite, qtz, fluorite.	15%	
5.1		5.1	001							13.65 – 15.75 trace po, py with qtz, calcite	<1%	
5.1		5.1	001						←14.5 40mm qtz, calcite, fluorite, po vein, 45°			
9.1		9.1	001		16				← Contact indistinct, gradual over 10 cm.			
9.1		9.1	001	15.75 – 16.93 DOLOMITE SULPHIDE LODE. Banded bronze pyrrhotite, hard bluish green fluorite rich serpentinite, greenish talc with patches grey qtz white carbonates and dark grey serpentinite. 'Wriglitic' texture.			4/6/7/8			15.75 – 16.93 po>>fluorite (finely dissem) trace, arsen, py, sp. Granular texture – in places massive po to 10 cm.	50-60%	
9.1		9.1	001	16.93 – 21.05 RECRYSTALLISED DOLOMITE. Creamy white recryst. dolomite with qtz and calcite surrounding clasts of hard faintly mottled pale grey dolomite. Occasional patches of greenish black talcy serpentinite and greenish talcose haloes about fine fracturing. Finely fractured and quite well broken, with yellow clay on greasy feeling fracture surfaces.	20		3		? Contact irregular, 25°	16.93 – 20.02 po>>py as blebs and discontinuous aggregates to 15 × 8 mm along hair fine brecciation cracks. Trace sp.	10%	
5.1		5.1	001	20.02 – 21.05 Relatively unaltered grey dolomite, brecciated, with minor qtz-recrystallised carbonate veining and thin stringers of talc/serpentinite			2/3		Gradual Change over 10 cm.	20.02 – 21.05 po, trace py, sp, arsen in larger fractures	1%	
9.1		5.1	100	21.05 – 27.10 DOLOMITE SULPHIDE LODE Bronze coloured due to pyrrhotite with patchy greyish green talc/grey serpentinite and grey qtz/white carbonate intervals. Occasional large corroded clasts of remnant grey and white dolomite to 10 cm. Fluorite is variable from trace to 10%, and is bottle green and finely dissem.			4/6/7/8			21.05 – 22.6 po, trace arsen, cp, py granular, variable 15 – 90%. Fluorite finely dissem, variable trace to 10%.	40%	
5.1		5.1	100	22.6 – 26.6 grey-green talc and almost black serpentinite weakly foliated – interlaminated with bronze pyrrhotite.	24					22.6 – 23.3 py, po, trace sp, arsen (weathered & pitted), fluorite	10%	
9.1		9.1	001				4/6/7			23.3 – 26.6 po, minor py, trace cp, arsen, sp. Massive & granular, interleaved with talc/serpentinite.	70%	
5.1		5.1	001	26.6 – 27.1 talcy carbonates & qtz in a mottled grey/white matrix with a little creamy coloured crystalline dolomite			8/5			26.6 – 27.1 py>po trace sp, arsen	10%	
0.1		0.7	001	27.10 – 39.2 THINLY BEDDED SILTSTONES WITH SANDSTONES. Thinly bedded greenish sericitic siltstones with minor dark grey shales and hard grey fine grained quartzites. The quartzite beds may be very fine grained (quartzose siltstones) or as beds to >1.1 m. Brecciated and disrupted – soft sediment deformation with later fracturing.	28		10/11/9		← Gradual change (bedded, 45°)	27.1 – 28.4 po as rare blebs to 1 cm, sparse qtz-carbonate-py-po stringers	1%	
9.1		9.1	001	27.10 – 28.4 Thinly bedded greenish and grey siltstones, minor black shales and rare thin serpentinite beds to 2 cm.						28.4 – 29.1 very rare fine grains py		
5.1		5.1	001	28.4 – 29.1 Massive hard grey fine grained silt rich quartzite.					← 30.1 Bedding 70°	29.1 – 33.9 trace dissem po, rare thin veinlets py	<1%	
5.1		5.1	001	29.1 – 38.1 Interbedded greenish clay rich sericitic siltstones and dark grey quartzose siltstones. Brecciated – soft sediment disruption, later microfaulting.	32				← 32.4 Bedding 50°			
5.1		5.1	001							33.9 – 38.1 po finely dissem in grey siltstones, some small blebs to 2 × 3 mm, rarely dissem in shaley beds. Sparse py-qtz-fluorite-carbonate-po veinlets to 5 mm.	1%	
5.1		5.1	001		36				← 35.4 Bedding 45°			
5.1		5.1	001	38.1 – 39.2 Massive grey sandstone – hard and silicified, with some thin greenish siltstone laminae					← 38.0 Bedding 75° ← 39.0 Bedding 50°	38.1 – 39.2 trace py (weak)	<< 1%	
				END OF HOLE 39.20 m.	40							
					44							
					48							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mount Bischoff
Logged by: G. BROADBENT date: 26/1/80
Written out: 22/5/80.

HOLE No. MBD 19
LOG SHEET 2 OF 2
from 0 m. to 39.2 m.

028404

MBD 20

FIELD ROCK NAME and general discription over interval marked	ADOPTED INTERVAL (m cm) & ADOPT LENGTH FROM COLLAR m cm	GRAPHIC LOG	BRACKETS MARKERS (▼)	OBSERVATIONS (Commence with length from collar, other point relates to marker) or from to relates to brackets. Attitude of bedding or foliation, Attitude & spacing of joints, Attitude, width & discription of sheared zones. [Attitude = angle of structure to long core axis]	MINERALIZATION	% MINERALIZATION (visual estimate)
SUMMARY DRILL LOG MBD 20				Veins over 50mm	Mineralisation (excluding veins over 50 mm)	
TRICONE TO 1.5 m - No Core	0-1.5	0				
DOLOMITE WITH QTZ AND CALCITE. Grey siliceous dolomite, more or less recrystallised (dolomite-calcite-qtz) or altered to talc-serpentinite in zones. 9.55-11.45 recrystallised with talcose carbonates and qtz. 11.45-12.86 talc/serpentinite and qtz calcite, sulphides 10%. 19.1-22.76 - Recrystallised along fractures. 24.8-27.8 totally recrystallised, talcy.	1.5-27.8 (26.3)	10 2/3 20 3		Core fractured and broken, fine yellow fractures 0-40° LLA. ← 300mm fault zone, shattered.	Po >> py, sp, fluorite variable, do not usually exceed 10%. More barren portions mainly sp, <1%. Most sulphides are localised along fractures as blebs and grains, fluorite with carbonate as discrete grains or finely dissem. to talc/serpentinite.	3-5% 10%
DOLOMITE SULPHIDE LODE. Completely altered to talc serpentinite, in places almost massive. Sulphide(po) concentrations variable on a scale of 2m or less, range from 20-90%, banded	27.8 41.3 (13.5)	30 4/7 40		Gradual Change	po >> py, trace cp, arsenic, sp. Fluorite locally abundant. Sulphide intervals of 2 m or less with concentrations 90-20% and in between. Where py occurs, have trace marcasite.	50%
GREENISH SILTSTONES AND GREY QUARTZITES	41.3-44.10	10/11		Gradual Change (interbedded)	po, trace py sp; dissem, blebs and grains	7-10%
END OF HOLE 44.1 m		50				

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97188		1.5	3.5	2.0	190									
89		3.5	5.5	"	580									
90		5.5	7.5	"	410									
97194		7.5	9.5	2.0	240									
95		9.5	11.5	"	130									
96		11.5	13.5	"	960									
97		13.5	15.5	"	55									
98		15.5	17.5	"	90									
99		17.5	19.18	1.68	55									
97300		19.18	21.18	2.0	8900		360	40	44	<1	110	15		
1		21.18	22.38	1.20	320		550	X	18	1	40	40		
2		22.38	24.38	2.0	480		55	X	12	<1	25	X		
3		24.38	26.38	"	3600		38	28	25	<1	<10	10		
4		26.38	27.84	1.46	9000		46	20	14	<1	30	X		
5		27.84	29.84	2.0	1.27%		540	50	42	1	25	390		
6		29.84	31.84	"	4250		530	X	18	1	25	390		
7		31.84	33.84	"	300									
8		33.84	35.84	"	140									
9		35.84	37.84	"	200									
10		37.84	39.84	"	1050									
11		39.84	41.3	1.46	6900		1400	890	5200	31	160	3.64%		
12		41.3	43.3	2.0	740									

Notes :— Sn by XRF Bi Method.

X means less than detection limit

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 20

SAMPLE TYPE : DRILL CORE FROM 1.5 TO 43.3m.

0284 03

028406

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 20

COLLAR LOCATION

Grid name | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) MBJV	1959.96 N	981.95 E	644.26	
(2)	N	E		
(3) Aust. Map Grid (PRECISE / APPROX.)	mE	mN	mA.H.D.	

W.C. Bearing from collar

	magnetic
360	grid (1)
	grid (2)
	grid (3)
	true

1:250 000 Sheet No. BURNIE SK 55-3	1:100 000 Sheet No. HELLYER 8015	State TASMANIA

Mineral Tenement EL 13/79 Holder METALS EXPLORATION LTD

Cadastral location and details (CROWN LAND / PRIVATE)

Inclination at collar 50° / 360

Total length 44.9 m

Commenced: 22 / 1 / 80

Completed: 25 / 1 / 80

Drilling contractor: LONGYEAR AUSTRALIA LTD

Rig type: LONGYEAR 38

Details of down hole location-survey methods.

TROPARI

Purpose of drilling and anticipated lengths to targets.

To investigate mineralisation in the dolomite horizon from 0-46 m. Original (planned) depth of hole 50 m.

Core size and non-coring (NC)

TRICONE	0	TO 1.5 m.
HQ	1.5	TO 44.9m.
		TO
		TO
		TO
		TO

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Mag / Azimuth	DIP
43.40	336°	49°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No. | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY	LOGGED BY	LOGGED BY
G.BROADBENT		
FROM 0 TO 44.9m	FROM TO	FROM TO
DATE	DATE	DATE

Company managing exploration programme.

METALS EXPLORATION LTD

HOLE No. MBD20

Log sheet 1 of 2

DRILL ADVANCE	LOST CORE ZONE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm.)	DEPTH POINTER	DRILL LOG DEPTH TAG	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	MINERALISATION Visual estimate %	NOTES
			TRICONE TO 1.5 m - NO CORE.	0							
5.0		5.1	**1.5 - 24.8 DOLOMITE, weakly recrystallised.** (frequently hard and siliceous.) Very brecciated - grey dolomite clasts showing a greater or lesser degree of recrystallisation / remobilisation of dolomite along fracture planes. Margins of clasts commonly have coatings of creamy white dolomite, with sparse patches of qtz and calcite at intersections of cracks. Surrounding these remobilised zones are haloes of faintly mottled crystalline dolomite, with or without a core of fine grained unaltered grey dolomite. Some fine highly irregular dark coloured stylolite-like sutures occur which cut across early brecciation fractures. Two generations of brecciation? - early fine dark fracturing has the recrystallisation as described above overprinted - new brecciation, or reactivation of old planes of weakness?	4		3/2.		3.0-6.8 Py, trace sp, weak trace marcasite with py as blebs in fracture zones	1%
5.1		5.1									
5.1		5.1									
1.1		1.1									
6.0		6.0									
0.1		0.1		8					6.8-8.6 po, sp, Py trace arsen, fluorite, dissem in recrystallised carbonates, with qtz.	5-7%
9.0		9.0							8.6-9.55 trace py, sp as for 3.0->6.8 m.	1%
0.7		0.7	3.0-9.55 core extensively fractured and broken, only weakly recrystallised, with minor talc/serpentine alteration along late fractures.			3/6			9.55-11.45 po, finely dissem and as blebs to 10x5 mm, trace py, sp.	5-7%
9.1		9.1									
6.0		6.0	9.55-11.45 Strongly altered and recrystallised, with talcose carbonate patches (greenish-white) and some black serpentinite.	12		7			11.45-12.34 trace po as blebs concentrated along foliation direction	<1%
8.0		8.0	11.45-12.35 Massive foliated greasy black talcy serpentinite.			3/6			12.34-12.86 Py > Po, fluorite	10%
1.3		1.3	12.35-12.86 Coarsely granular talcose dolomite with serpentine, qtz and calcite			2/3			12.86-19.1 qtz-po-sp-fluorite as rare irregular patches up to 5x10 cm.	1-2%
0.1		0.1	12.86-19.1 Hard grey dolomite, weak recrystallisation and carbonate deposition along fractures with minor talcose films on later fractures.							
7.1		7.1		16						
9.0		9.0	19.1-19.9 Recrystallised dolomite, mottled pinkish cream/grey/white with qtz, calcite and a little talc.			3/4			19.1-19.9 po, py, trace sp, arsen	35-40%
9.1		9.1	19.9-20.5 Brecciated fine grained grey dolomite.	20		2			19.9-20.5 trace po, py	<1%
9.1		9.1	20.5-22.36 Brecciated, talcy recrystallised dolomite as for 9.55-11.45, with zones of fine grained unaltered dolomite to 10 cm.			3/2/4		← 22.2 - Small fault; broken core 22-24 m	20.5-22.36 Po, Py, fluorite, trace sp	30%
5.1		5.1								
5.1		5.1	22.36-24.8 Slightly bleached grey weakly recryst dolomite as for 12.86-19.1 m			2/3.			22.36-24.8 po, sp, trace py as blebs and grains	1%
5.1		5.1		24				Gradual Change.		
5.1		5.1	**24.8 - 27.8 RECRYSTALLISED DOLOMITE.** Mottled grey-white - coarsely crystalline (1-2 mm) with some patches of white calcite and quartz. Increasing talcose and serpentinous material towards base of interval			3		Gradual Change	24.8-27.8 po, sp, trace py as blebs to 6x5 mm and finely disseminated. Trace fine grained black cassiterite? and clear / brownish fluorite.	10%
1.1		1.1		28						
9.1		9.1	**27.8 - 41.3 DOLOMITE SULPHIDE LODE** 27.8-29.37 dark greeny-black talcy serpentinite with bands of bronze pyrrhotite and sparse patches qtz/carbonates.			4/6/7			27.8-29.37 po, trace py, cp, arsen, fluorite. Some small fine grained ?cassiterite aggregates, <2 mm.	20%
9.1		9.1	29.37-29.9 Virtually massive po - 95%, with small patches talc and serpentinite to 3x1 cm.						29.37-29.9 po, trace cp, py, arsen	95%
9.1		9.1	29.9-30.7 Weakly foliated po with green and grey talc and black serpentinite.						29.9-30.7 po, trace py, cp, arsen	60%
9.1		9.1	30.7-31.2 Massive talc serpentinite with 2% sulphides						30.7-31.2 po, as small blebs.	2%
7.1		7.1	31.2-31.9 Granular qtz-calcite-dolomite and hard bluish green serpentinite (fluorite rich?)						31.2-31.9 po, trace py, weak trace cp and rare arsen	30-40%
7.1		7.1	31.9-34.35 Almost massive po (85%), with scattered greyish green talc patches	32					31.9-34.35 po >> py, trace cp, rare grains arsen	85%
5.1		7.1	34.35-34.95 Dark green talcy serpentinite with pyrrhotite. 50%						34.35-34.95 po, trace py, cp, sp	50%
5.1		7.1	34.95-35.95 Mottled pale greenish grey talcy carbonates and qtz with 40% granular sulphides.			8/6/4			34.95-35.95 po, py, trace arsen, cp	40%
5.1		5.1	35.95-37.1 Weakly foliated talcy serpentinite with 20% sulphides	36		8/6			35.95-37.1 po, trace py	20%
5.1		7.1	37.1-38.6 greenish talcy carbonates and greyish serpentinite with qtz and recrystallised dolomite, 20% sulphides			8/6/7			37.1-38.6 po >> py, trace arsen with some dark fluorite	20%
5.1		7.1	38.6-40.8 Black serpentine and dark green talc weakly foliated with pyrrhotite rich bands (60% po)	40		4/6/7			38.6-40.8 po, trace py, weak trace sp, cp and arsen	60%
9.0	80	9.0	40.8-41.3 Sulphides 70% with qtz and granular talcy carbonates - vein?			9V?		Contact marked by coarsely granular sulphides = vein? - irregular	40.8-41.3 Py, Po, Ga (20%), fluorite, sp, arsen, trace cp, marcasite	70%
2.1		1.1	**41.3 - 44.90 SILTSTONES, thinly bedded, with QUARTZITES** 41.3-42.70 Interbedded serpentinite (altered dolomite) and greenish sericitic siltstones, minor shales, serpentinites decreasa in thickness and abundance with depth. Brecciated - soft sediment?			10/11			41.3-44.90 po, py, dissem in siltstones, and with minor sp in altered dolomites. Some minor qtz-carbonate veinlets.	5-10%
7.1		9.1	42.70-44.90 Hard greenish grey (thinly bedded, 1-2 cm) clay rich sericitic siltstones with very hard bluish grey quartzites to 0.5 m. Brecciated and disrupted - beds discontinuous where thinly bedded - soft sediment disruption.	44						
9.0	80	9.0	END OF HOLE 44.90 m.							

5 cm

0284 07

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mount Bischoff
Logged by: G. BROADBENT date: 28/1/80
Written out 22/5/80

HOLE No. MBD 20
LOG SHEET 2 OF 2
from 0 m. to 44.9 m.

MBD-21

028408

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS INST. MIN. METALL. - 1976

INTERVAL	DEPTH from-to : ROCK UNIT / Depth : Description and notes	GRAPHIC LOG	MINERALISATION
0-3.0 (3.0m)	TRICONE TO 3m - NO CORE.		
3-9.34 (6.34)	3.0-9.34 DOLOMITE. Faintly mottled grey/white due to weak recrystallisation. Brecciated - most extensive recrystallisation is along brecciation fractures. Gradual change	2/3	Sp, trace py, po as blebs in recrystallised patches. < 1%.
9.34-15.71 (6.37)	9.34-15.71 DOLOMITE SULPHIDE LODE. Incomplete alteration - clasts of grey dolomite surrounded by qtz, carbonates, minor talc/serpentine. 11.5m-12.2 unaltered. Gradual Change	8/2/5	py, fluorite, sp. trace po, arseno; dissem and weakly banded. 10-15% 11.5-12.2 < 1%
15.71-38.5 (22.79)	15.71-38.5 DOLOMITE, weakly recrystallised. Brecciated - clasts of weakly mottled grey/white siliceous dolomite with more extensive recrystallisation along fractures, and occasional thin films of talc + serpentinite. Some intervals of creamy white recrystallised dolomite up to 1m thick. Gradual Change over 3m.	3	Sp, py as blebs in mottled grey/white recrystallised dolomite. Some sparse dolomite - fluorite - calcite - qtz - py - po veining. Concentration of mineralisation variable 0-5%, average 2%.
38.5-40.86 (2.36)	38.5-40.86 DOLOMITE SULPHIDE LODE serpentinite / talc.	7/4	po, py, marcasite, trace fluorite, minor carbonate - fluorite - po - py - arseno veining. 15-20%.
40.86-44.0 (3.14)	40.86-44.0 SERICITIC SILTSTONES WITH QUARTZITES 50° greenish, hard silicified and brecciated quartzites Gradual Change	10/11	po > py, small blebs and stringers, some py-marcasite-sp-po-qtz veinlets. 2-3%.
44.0-51.53 (7.53)	44.0-51.53 QUARTZITES minor SILTSTONE Brecciated, very hard and bluish grey, some brownish haloes about fractures. Massive qtzites to 3m separated by thin siltstone beds (<10cm) 50°	11/10	py, po, dissem (3%). Dolomite - fluorite - po-sp veining. TOTAL 10%.
51.53-54.35 (2.82)	51.53-54.35 DOLOMITE SULPHIDE LODE talc > serpentinite	4/6	po, trace py, weak trace cp, 50%.
54.35-59.20 (4.85)	54.35-59.20 QUARTZITES minor SILTSTONE 45° Brownish grey brecciated qtzites, fine grained and very hard with thin beds dumped grey siltstone. 40°	11/10	po, py, dissem. along bedding planes, and as veinlets and stringers 5-7%.
59.2-63.8 (4.6)	59.2-63.8 DOLOMITE SULPHIDE LODE Greenish grey talc, minor black serpentinite and qtz-carbonate	6/4	po >> py, trace fluorite, weakly silicified blebs and grains 40%.
63.8-71.0	63.8-71.0 QUARTZITES, minor SILTSTONES 45° As for 44.0-51.53 and 54.35-59.20	11/10	py, po dissem along bedding planes, in small veinlets & stringers with sparse qtz, carbonates. 5%.
	END OF HOLE 71.0 m		

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 10.4.80.

HOLE No. MBD 21
Sheet of

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97705		3.0	5.0	2.0	32									
6		5.0	7.4	2.4	10									
97315		7.4	9.4	2.0	30									
16		9.4	11.4	"	4650		160	40	6300	1	45	95		
17		11.4	13.4	"	1600		90	X	1100	21	15	70		
18		13.4	15.7	2.3	4400		55	X	400	21	15	2400		
19		15.7	17.7	2.0	120									
20		23.3	25.3	"	36									
21		25.3	27.3	"	80									
22		27.3	30.2	2.9	28									
23		34.4	36.4	2.0	14									
24		36.4	38.4	"	120									
25		38.4	40.9	2.5	2500									
26		40.9	42.9	2.0	26									
97817		49.5	51.5	2.0	960									
18		51.5	53.5	"	1100									
19		53.5	57.5	"	270									
20		57.4	59.2	1.8	490								540	Pulp check
21		59.2	61.2	2.0	<4									
22		61.2	63.7	2.5	14									
23		63.7	65.7	2.0	290									

Notes :— Sn by XRF Bi Method.

X means less than detection limit

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 21

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 65.7.

028410

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 21

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES				ELEVATION
(1) MBJV	1940.06 N	N	980.07	E	644.73 m
(2)		N		E	
(3) Aust. Map Grid PRECISE / APPROX.		mE		mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA.

Mineral Tenement EL 13/79 Holder METALS EXPLORATION PTY LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
_____ magnetic
_____ grid (1)
_____ grid (2)
_____ grid (3)
_____ true

Inclination at collar 90°

Total length 71.0 m

Commenced: 26/1/80
Completed: 7/3/80

Drilling contractor: LONGYEAR AUST PTY LTD

Rig type: LONGYEAR BBS 1

Core size and non-coring (NC)

TRIONE	0	TO 3.0
NQ	3.0	TO 71.0
		TO
		TO
		TO
		TO

Details of down hole location-survey methods.
TROPARI every 40 m.

Purpose of drilling and anticipated lengths to targets.
To investigate the nature of the dolomite horizon - 0-57.0m
Scheduled depth 60.0 m

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C BEARING type Hemisph Magnetic	DIP
44.0 m	226	89°
66.5 m	306	88°

Comments on drilling. 0-46.1 m drilled 26.1.80 - 28.1.80, then hole extended 46.1-71.0m from 6.3.80 to 7.3.80

Legend for graphic log column (see drill log for Hole No. _____)
'DERWENT' PENCIL NO. | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY	LOGGED BY	LOGGED BY
C. BROADBENT	C. BROADBENT	
FROM 0 TO 46.1 m	FROM 46.1 TO 71.0	FROM TO
DATE 29.1.80	DATE 11.3.80	DATE

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 21
Log sheet 1 of 2

028411

TRICONE TO 3.0m - NO CORE.

3.0 - 9.35 DOLOMITE, weakly recrystallised

Pale creamy grey dolomite, with mottled grey white crystalline zones surrounding fracture zones.

Brecciation - thin discontinuous dark grey stained fractures occasionally with thin infillings of pinkish cream recrystallised dolomite

- later (?) large penetrative fractures with crystalline creamy white dolomite, and patchy white calcite and quartz.

Trace Sp, Py, Po as blebs concentrated along brecciation fractures and disseminated in recrystallised dolomite. <1%

Contact Broken

9.35 - 11.45 DOLOMITE SULPHIDE LODE.

Mottled white/green - buff of patchy recrystallised carbonates, greyish quartz and minor dark green serpentinite surrounding blebs of bleached and recrystallised pale grey dolomite. Slightly foliated by weathering

Py, Fluorite, sp, po, trace arsen disseminated as blebs and grains, Sulphides weakly conformable to banding. 10-15%

Contact 80°

11.45 - 12.17 DOLOMITE, weakly recrystallised. As for 3.0 - 11.34

Contact Irregular

trace sp, Py, Po <1%

12.17 - 15.71 DOLOMITE SULPHIDE LODE

Recrystallised - qtz carbonates, some talcose alteration and some hard dark blueish grey ? serpentinite. Weakly banded as for 9.35 - 11.45; altered material surrounding mostly granular qtz/carbonates

~120 mm dolomite-fluorite-calcite-qtz vein, 80°

Fluorite, purple, brownish and colourless with Py, Po inter-grown and sp. Dolomite-calcite-qtz veinlets. Fluorite is highly disseminated as large crystals, intergrowths are granular and distinct in qtz/carbonate as along banding 15-20%

Contact 40°

15.71 - 38.5 DOLOMITE, recrystallised

15.71 - 21.45 Grey fine grained hard dolomite with dolomite-calcite-fluorite-qtz veining 10 10 cm, irregular thicknesses and variable directions. The dolomite has sporadic white and pale grey distinct crystal outlines and the matrix appears to be very finely crystalline. Finely textured dark grey staining along brecciation cracks.

16.15 - 17.45 - Breccia zone - clasts of siliceous grey dolomite enclosed in colaform masses of creamy dolomite with a little qtz and fluorite in cavities.

15.71 - 21.45 Fluorite interstitially in dolomite-qtz veining, also trace Py, sp as blebs and grains 1%

21.45 - 26.2. Distinctly mottled creams and greys, quite coarsely crystalline with colloform banded crystalline dolomite, calcite, qtz-fluorite etc in patches and veins to 10 cm

21.45 - 24.4 Trace fluorite, Po, Sp as above.

24.4 - 26.2 traces fluorite Po Sp, Py as above

26.2 - 30.2 As for 21.45 - 26.2, with minor weak talcose and serpentinous films along some fracture planes - films up to 2 mm thick

Py, Po, fluorite, sp trace arsen, Go? as blebs and aggregates in grains concentrated in up to 15 V 10 mm patches of 20% sulphides 1-2%

30.2 - 35.0 As for 15.71 - 21.45, sparse dolomite veins.

30.2 - 35.0 trace Py, Sp, Po <1%

35.0 - 38.5 As for 21.45 - 26.2, minor talcose (greenish) patches of carbonates and some corroded crestings of fine grained grey siliceous dolomite

35.0 - 38.5 Po, Py, fluorite, sp, qtz disseminated in more crystalline patches. 3%

Irregular Contact - gradual change

38.5 - 40.86 DOLOMITE SULPHIDE LODE

38.5 - 39.1 Blueish green talc with some grey green serpentinite

39.1 - 40.86 Massive greenish black serpentinite variably silicified

35 - 50° LCA, with talcose patches

38.5 - 39.1 Po, Py, marcasite, fluorite 39.1 - 40.86 Po > Py, fluorite, minor qtz - carbonate - fluorite - Po - Py veining. Sulphides concentrated in talcose patches in serpentinite. 20%

~60.3 25 mm Py - Sp - arsen - fluorite vein 60°

Gradual Change over 10 cm 45°

10%

40.86 - 44.0 SERICITIC SILTSTONES WITH QUARTZITES

Hard greenish grey sericitic clay rich siltstones with thinly bedded dark grey quartzose siltstone and massive brecciated blueish grey quartzites to 0.75 m. Very brecciated and deformed - soft sediment deformation and later fracturing.

~61.2 m Bedding 50°

44.0 - 44.10 Po, Py, as thin veinlets and stringers and as fine grained qtz-pyrite veining to 1 mm in quartzites. 2%

Sparse Py - marcasite - Po - Sp - arsen veinlets

44.0 - 51.53 QUARTZITE, minor SILTSTONE

Very hard thinly grey quartzites to 3 m thick with thin grey siltstone beds (to 10 cm). Quartzites are brecciated, medium grained and have weak bedding lamination in spots <10 cm intervals. Brecciation fractures sometimes have brownish haloes to 5 mm. The siltstones are brecciated and disrupted, but some are quite well bedded - minor microfaulting.

~46.3 Bedding 45°

~48.4 Bedding 15°

~49.5 10 mm dolomite-fluorite-Po vein, 45°

~49.9 60 mm dolomite-qtz-sp-pyrite-fluorite-Po-Py vein, 60° (@ to bedding?)

Contact 50°

44-51.53 Dolomite-fluorite-Po-Py-Sp veining to 5 mm, small blebs and stringers Po, Py and finely disseminated Py, Po in quartzites (0.3%) 10%

51.53 - 54.35 DOLOMITE SULPHIDE LODE

Mottled brownish-green Po coat talc with minor patchy greenish black serpentinite.

53.6 - 54.3 massive, weakly foliated, blueish serpentinite

Po >> Py, wisps trace sp in grain aggregates, to 10 cm.

53.6 - 54.3 Po, Py, disseminated in veinlets with fluorite 5-10%

Contact 45°

54.35 - 59.20 QUARTZITES, minor SILTSTONES.

Very hard fine grained faintly brownish grey quartzites with thin interbeds of dark grey grey green siltstone.

Brecciated and fractured - some dark brown haloes around fine fractures in quartzites, bedding directions unreliable.

~54.9 Bedding 12°

54.35 - 54.8 Po, Py, disseminated along bedding and in small irregular veins and stringers in brecciation cracks. Minor dolomite veinlets. 5-7%

~58.0 15 mm dolomite-fluorite-Po vein, 35°

Contact 40°

59.2 - 63.8 DOLOMITE SULPHIDE LODE.

Greenish grey talc with minor serpentinite, Mostly massive or weakly foliated, some small intervals with contorted banding and grey qtz, calcite carbonates, some pure white ? magnesite in centres of serpentinite/talc, sulphide, qtz etc banding.

Po >> Py, trace fluorite as patchy aggregates of blebs and grains separated by talc 1-2 cm or scattered along fine irregular banding. 40%

Contact 45°

63.8 - 71.0 QUARTZITES, minor SILTSTONES.

63.8 - 67.6 blueish grey quartzites and grey siltstones as for 44.0 - 51.53.

63.8 - 71.0 Py, Po, disseminated in quartzites and in small veinlets and stringers with occ qtz, carbonates. 5%

67.6 - 71.0 faintly brownish fine grained grey quartzites with siltstones as for 54.35 - 59.20, above.

END OF HOLE 71.0 m.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15 mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mount Bischoff
Logged by: G. BRADBENT
date: 11/3/80 (written up 23.5.80)

HOLE No. 21
LOG SHEET 2 OF 2
from 0.0 m to 71.0 m

028412

PAGE
MBD. 22

FIELD ROCK NAME and general discription over interval marked	ADOPTED INTERVAL (m cm) & ADOPT LENGTH FROM COLLAR m cm	GRAPHIC LOG	BRACKETS & MARKERS (▼)	OBSERVATIONS Commence with length from collar, either point (relates to marker) or from to (relates to brackets) Attitude of bedding or foliation Attitude & spacing of joints, Attitude, width & discription of sheared zones, [Attitude = angle of structure to long com. axis]	MINERALIZATION	% MINERALIZATION (visual estimate)
SUMMARY DRILL LOG MBD 22				Veins over 50 mm	Mineralisation (excluding veins over 50 mm)	
TRICONE - 1.0m, No Core.	0-1.0.	0				
HARD GREY QUARTZITE. Well Fractured	1.0-3.0 (2.0)	11		← Broken contact.	Very finely dissem? py, weathered	1%
DOLOMITE SULPHIDE LODE serpentinite (talc	3.0-4.5 (1.5)	7/5			py, fluorite, trace po, sp, cassiterite(?)	15-20%
GREY SILICEOUS DOLOMITE. Brecciated and weakly recrystallised. Some thin siliceous siltstone bands	4.5-11.62 (7.12)	2	10	← Broken contact. ← Bedding 50°	Sp, trace po associated with weak recrystallisation, some weak qtz-carbonate - fluorite - py veining	3-5%
DOLOMITE SULPHIDE LODE. 11.6-16.8 Banded talc-serpentinite, with patches of qtz-carbonate to 50cm. 16.8 → 29 Talc-serpentinite, massive, weakly foliated - po varies 30-40% 29-32.6 Carbonates - qtz - talc - serpentine not obviously foliated, sulphides (po) 50%	11.62-32.67 (21.05)	6/7/4	20	← Contact irregular. ← Foliation in po 55° ← Foliation in po 80° ← Foliation in po 50°	po, fluorite (variable), py, trace arsenic, sp, cp disseminated within po as irregular blebs. to 1-2mm. Py occurs on the margins of po grains, and as small stockwork-type accumulations within po. Sulphides are weakly banded in talc-serpentinite host rock.	35% 70% 50%
		4/6				
		4/8	30			
SERICITIC SILTY SHALES AND GREY QUARTZITES Hard, greenish shales qtzites brecciated and contorted.	32.61-36.7 (4.03)	9/11		← Contact intermeddled, transitional 40° Carbonate - fluorite - talc - py - po - sp - arsenic breccia zones to 200 mm.	Dissem po, py carbonate - fluorite - talc - py spo - sp arsenic veining in shattered zones.	10%
END OF HOLE 36.7m.			40			

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97345		1.0	3.0	3.0	230									
46		3.0	4.7	1.7	5500		230	35	940	<1	30	330		
47		4.7	6.7	2.0	46									
48		6.7	8.7	"	60									
49		8.7	10.7	"	95									
50		10.7	11.6	.9	75									
51		11.6	13.6	2.0	1.21%		300	50	220	<1	40	30		
52		13.6	15.6	"	5900		430	8	140	<1	45	65		
53		15.6	17.6	"	6600		780	X	35	<1	140	800		
54		17.6	19.6	"	6600			55	10	<1	85	300		
55		19.6	21.6	"	2400		690	X	22	<1	70	250		
56		21.6	23.6	"	2100		500	10	10	<1	240	420		
57		23.6	25.6	"	740		950	X	16	<1	30	70		
58		25.6	27.6	"	2250		1100	8	12	<1	15	140		
59		27.6	29.6	"	2100		530	15	65	<1	60	370		
60		29.6	31.6	"	120								120	Re check of check Ass
61		31.6	32.7	1.1	110									
62		32.7	34.7	20	520									
63		34.7	36.7	"	2900									

Notes :— Sn by XRF B, Method.

X Means less than detection limit

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 22

SAMPLE TYPE : DRILL CORE FROM 1.0 TO 36.7

0228411

028414

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 22

COLLAR LOCATION

Grid name — Rectangular space co-ordinates

	PLANAR CO-ORDINATES		ELEVATION
(1)	1964·91 N	939·94 E	642·97 m.
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 5015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar

	magnetic
360	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar 55°

Total length 36·7 m

Commenced: 30 / 1 / 80

Completed: 31 / 1 / 80

Drilling contractor: LONGYEAR AUST PTY LTD

Rig type: LONGYEAR B35 1

Core size and non-coring (NC)

TRICONE	0	TO 1·0
NQ	1·0	TO 36·7
		TO
		TO
		TO
		TO

Details of down hole location-survey methods.
TROPARI every 30 m.

Purpose of drilling and anticipated lengths to targets.
To investigate mineralisation in the dolomite horizon (planned intersection 0 - 36 m); planned depth of hole 40 m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Azimuth	DIP
36·6 m	309	60°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY S. BROADBENT	LOGGED BY	LOGGED BY
FROM 0 TO 36·7 m	FROM TO	FROM TO
DATE 31·1·80	DATE	DATE

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 22
Log sheet 1 of 2

028415

TRICONE TO 1.0 m - NO CORE.

2.0	0.6	3%	1.0–3.0 QUARTZITE. Medium grey, hard, speckled quartzite, well fractured and broken (core losses). Some Fe oxide staining on fracture planes, bedding not visible.	11	Broken Contact.	1.0–3.0 – non mineralised, weathered – possibly originally 1–2% Fe sulphide. Some dark spots may be ultrabasic py.	
1.7	1.2	7%	3.0–4.50 DOLOMITE SULPHIDE LODE. Weakly banded matrix – alternating dark green Serpentinite, greenish talcy carbonates with granular grey qtz intergrown throughout. Minor creamy white dolomite and calcite.	8/7/5		3.0–4.5 py, colourless fluorite, trace po, sp. Pitted by weathering.	15–20%
3.1	3.0	97%	4.5–8.80 DOLOMITE, weakly recrystallised. Grey siliceous granular dolomite with fine dark grey stained brecciation fractures. Later mobilisation of carbonates and qtz has produced irregular zones of creamy coloured dolomite, minor qtz and calcite with weakly mottled recrystallised selvedges 1–2 cm. Some unusual highly irregular stylolitic sutures with fronts of pinkish material and coatings of f.gr sulphides or Mn oxide?	2/3.	↑ Broken Contact ← Contact 50°	4.5–8.8 Fluorite, trace sp, rare po in veining and irregular crystallic patches remobilised carbonates and qtz.	3%
1.0	0.1	10%					
6.5	0.5	10%	8.8–9.3 SILTSTONES AND SILTY SHALES, Palechive green, silicified, thinly bedded and brecciated.	9/10	←90 Bedding 60°	—	
1.7	1.5	88%	9.3–11.62 DOLOMITE, weakly recrystallised. As for 4.5–8.8, but the dolomite has some fine dark laminations which resemble fine bedding. Some minor talcose and serpentinous alteration (of recrystallised material) which increases towards lower contact.	3/2	← Contact 55° ←10.4 ?Bedding 50° Fine laminations in dolomite – bedding? 50–60°	9.3–11.62. sp, trace po and carbonate–fluorite–qtz veining as for 4.5–8.8.	3%
3.0	3.2	100	11.62–32.67 DOLOMITE SULPHIDE LODE. 11.62–16.85 Finely banded 'wrigittic' texture – delicate, irregular and almost dendritic greenish talc and greyish serpentinite with qtz and carbonate occurring patchily – a hard fine grained carbonate, possibly magnesite, is occasionally part of the fine banding. Some serpentinite is a drab greyish green and talcy. The serpentinite banding appears to be weakly concentric about granular qtz–carbonate rich patches. Bronze coloured po occurs finely dissem along the banding and as irregular patches to 3×1 cm in the qtz–carbonate.	6/7/4	← Contact Irregular.	11.62–16.85 po, colourless fluorite, trace py, cassit, sp and rare arseno. ga. Sulphides follow banding, variable 20–90% on a scale of a few tens of cm. Fluorite is sparsely dissem throughout, locally making talc/serpentinite hard by being finely disseminated.	30–40%
3.0	2.8	100	16.85–29.4 Bronze coloured due to pyrrhotite, with greenish grey talc, minor serpentinite. Does not show fine 'wrigittic' banding of previous interval – massive talc to 2cm alternating with blebs and masses of po to 3–4 cm with a weakly foliated appearance.	4/6/7	←19.5 Weak foliation in po, 55°	16.85–27.6 po » py. py occurs along fractures and on margins of po grains. Po varies 30–90% and is weakly foliated – intercalated with talc/serpentinite on ≈ 1 cm scale. Trace cp, arseno and some fine grained cassiterite. Cp and arseno are intergrown with po, cassit is interstitial and mostly < 1mm.	60–70%
3.0	3.0	100			←23.4 Foliation in sulphide 80°		
3.0	3.0	100	25.5–27.6 Some interstitial qtz, to 10%.		←27.1 Sulphide foliation, 50°		
3.0	3.0	100	27.6–29.4 po > py, dissem in serpentinite as blebs and grains, minor fluorite				20%
3.0	3.0	100	29.4–32.67 Bronze coloured pyrrhotite with weakly banded olive green, pale bluish green and grey talc with thin serpentinite alternating with patchy granular grey qtz and carbonates. Some corroded, bleached dolomite as screstones towards base of interval.	4/6/7/8		29.4–32.67 po » py, fluorite weak trace cp, arseno. Finely dissem/granular to 2mm.	50%
					Contact 40°, interbedded.		
3.0	2.9	100	32.67–36.7 m. SILTY SHALES AND QUARTZITES. Hard silicified greenish grey shales interbedded with speckled grey quartzites up to 0.5 m thick. Extensively brecciated – soft pebble conglomerate structure in thinly bedded shales and siltstones – with later fracturing and dolomitic veining.	9/11/(10)	←34.0 200 mm breccia zone – talc – serpentinite – dolomite – fluorite – py–sp–po.	32.67–36.7 dolomite – fluorite – qtz – po – py – sp – talc veining to 8 mm, with larger breccia zones. Minor dissem py, po.	10%
1.7	1.8	100			←35.8 20 mm dolomite–talc–fluorite–py–sp–po. 15–20° ←36.3 200 mm breccia zone as above. ←36.6 50 mm py–dolomite–fluorite–sp Breccia zone.		
			END OF HOLE 36.7 m.				

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15 mm.

GRAPHIC LOG SEE LEGEND ON SHEET 1 | STRUCTURAL AND VEIN INFORMATION ATTITUDE = Angle between feature and LONG CORE AXIS | MINERALISATION | NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date: 31/1/80
written up 23/5/80

HOLE No. MBD 22
LOG SHEET 2 OF
from 0 m. to 36.7 m.

028416

MBD 23

RECOV.		FIELD ROCK NAME and general description over interval marked	ADOPTED INTERVAL (m cm) & ADOPT LENGTH FROM COLLAR m cm	GRAPHIC LOG	MARKERS (M) BRACKETS &	OBSERVATIONS Commence with length from collar or other point (relates to marker) (from to (relates to brackets)		% MINERALIZATION (visual estimate)
						Attitude of bedding or foliation Attitude & spacing of joints, Attitude, width & description of sheared zones. [Attitude = angle of structure to long core axis]	MINERALIZATION	

SUMMARY DRILL LOG MBD 23

Veins over 50mm.

Mineralisation (excluding veins over 50)

TRICONE TO 3m - No Core	0-3.0		0		
GREY SILICEOUS-DOLOMITE. Core broken, with soft brown Fe oxides in fracture zones	3.0-7.2 (4.2)	2		Sulphides absent, presumably weathered	0
DOLOMITE SULPHIDE LODE. 7.2-13.2 Talcy qtz-carbonate with minor black serpentinite. 13.2-16.7 Dark green talc, minor serpentine 16.7-23 Alternating carbonate-talc-qtz and talc-serpentinite on a mm-cm scale. Fine contorted irregular banding.	7.2-23.0 (15.8)	8/40 6/14 8/6/36/12	Eastern Contact.	Po » Py, trace cp, sfalc, sp. Sulphides have similar concentrations 10-90% Fluorite variable trace → 5%. 7.2-9.5 Patches of fine py disseminated cassiterite in qtz-carbonate 2% 16.7-23 Fluorite up to 2.5%	70% 10-15% 15% 15-20%
GREY SILICEOUS DOLOMITE. Hard, grey, silicified with weak alteration along fine fractures to talc-serpentine, with some minor recrystallisation. Some bands show stronger talcy alteration	23.0-35.7 (12.7)	2/3 30	Contact indistinct. Finely fractured 40-50° LCA. Some crushed zones to 30 cm - minor faulting.	Sp, fairly minor po and py as blebs Sparse calcite - fluorite - qtz - py - sp - po veins. Increasing mineralisation towards base.	2-3%
DOLOMITE SULPHIDE LODE. Bluish green talcy serpentinite with minor carbonates	35.7-40.5 (4.8)	7/6/5 48	Gradational Contact	Fluorite, py, po. Fluorite blue, green colourless and brown, diffuse. Sulphides disseminated	20-25%
SERICITIC SILTY SHALES AND SILTSTONES	40.5-44.0 (3.5)	9/10	Interbedded, 60°	Po, minor Py blebs and stringers qtz-carbonate veinlets	1-2%
END OF HOLE 44.0 m.			50		

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97327		3.0	7.3	4.3	360									
28		7.3	9.3	2.6	2.76%		910	110	166	<1	35	70		
29		9.3	11.3	2.0	5.65%		670	230	65	<1	100	80		
330		11.3	13.3	"	1.09%		240	30	250	<1	35	X		
31		13.3	15.3	"	5100		400	X	42	<1	15	X		
32		15.3	17.3	"	1.52%		330	55	150	<1	55	20		
33		17.3	19.3	"	8700		600	55	180	<1	50	30		
34		19.3	21.3	"	1.40%		500	95	85	1	40	120		
35		21.3	23.1	1.8	1.31%		410	25	630	<1	50	230		
36		23.1	25.1	2.0	2200									
37		25.1	27.1	"	1000									
38		27.1	29.1	"	450									
39		29.1	31.1	"	800									
340		31.1	33.9	2.8	720								1050	Re check of check Assay
41		33.9	35.7	1.8	2700		130	150	1600	2	30	90		
42		35.7	37.8	2.1	6900		300	50	550	1	50	270		
43		37.8	40.6	2.8	6000		150	50	600	<1	25	10		
44		40.6	42.6	2.0	560									

Notes :— Sn by XRF Bi Method.

X mean less than detection limit

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 23

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 42.6.

028418

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-23

Prospect, area, project or mine. Mount Bischoff

HOLE No. MBD 23

COLLAR LOCATION

Grid name | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) _____ 1939·92 N 939·97 E 642·28 m.

(2) _____ _____ N _____ E _____

(3) Aust. Map Grid (PRECISE / APPROX.) _____ mE _____ mN _____ m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
_____ magnetic
— grid (1)
_____ grid (2)
_____ grid (3)
_____ true

Inclination at collar 90°

Total length 44·0 m

Commenced: 29 / 1 / 80
Completed: 29 / 1 / 80

Drilling contractor LONGYEAR AUST PTY LTD

Rig type LONGYEAR BBS 1

Core size and non-coring (NC)

TRICONE	0	TO 3·0 m
NQ	3·0	TO 44·0
		TO
		TO
		TO
		TO

Details of down hole location-survey methods.
TROPARI every 40m.

Purpose of drilling and anticipated lengths to targets.
To investigate possible mineralisation in the dolomite horizon 0–29m. Planned depth of hole 40·0 m.

Comments on drilling. Very fast.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Azimuth (Mag.)	DIP
43·0	024	89°

Legend for graphic log column (see drill log for Hole No. _____)

'DERWENT' PENCIL NO | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY G. BROADBENT FROM 0 TO 44·0m. DATE 31/1/80

LOGGED BY _____ FROM _____ TO _____ DATE _____

LOGGED BY _____ FROM _____ TO _____ DATE _____

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 23
Log sheet 1 of 2

028419

TRICONE TO 3.0 m - NO CORE.

3.0-7.28 DOLOMITE.

Grey fine grained medium hard dolomite, very fractured and broken with soft brown Fe oxides lining fracture planes.

3.0-7.28 Non-mineralised, (possibly removed by weathering.)

Broken contact.

7.28-23.1 DOLOMITE SULPHIDE LODE

7.28-9.85 Almost massive brownish po - 70% with granular qtz - carbonate matrix and some thin carbonate veining. Some soft greenish grey talcy patches

Contact 20°

9.85-13.2 Carbonate-qtz matrix with pale greenish grey talcose alteration and small patches of black (often talcy) serpentinite to 5 cm.

13.2-16.7 pale greenish grey talcy matrix with minor corroded carbonates and granular grey quartz. Serpentinite (black) occurs as small elongated patches, possibly marking fracture planes.

16.7-23.1 Alternating talcy carbonates and quartz with dark green and grey talc/serpentinite. Finely banded 'unglitic' texture in talc serpentinite; the carbonate/qtz patches appear to be a recrystallised breccia. Alternating intervals of the above to 1m, the greenish intervals are roughly twice as abundant as the mottled grey carbonate qtz intervals. Purple and colourless fluorite occurs patchily with carbonates etc, and there is a hard speckled bluish grey material in irregular patches in the talc/serpentinite intervals. It is roughly carbonatic to banding-serpentinite /chondrodite? or a tourmaline?

7.28-9.85 po » py, trace cp, asso. sp. Cassiterite occurs as fine grained aggregates to 5×3 mm - 2%, concentrated 8.9-9.8 m. Py is concentrated along margins of po grains, small $CO_3^=$ veins. — 70%

9.85-13.2 po, py, cassiterite, trace cp. Granular, disseminated - the cassiterite occurs as fine grained aggregates intergrown with qtz, carbonates, to 6×5 mm, 3-4%. Some rare grains asso. interstitially in po aggregates. (also cp) — 15%

13.2-16.7 po, minor py, blebby, granular texture, intergrown with carbonate/qtz patches — 15%

16.7-23.1 po, py, fluorite, strong trace cassiterite, trace cp, sp, asso. Po occurs as disem blebs, grains and massive aggregates to 10 cm, some sections have an unusual 'herringbone' structure - en echelon elongated blebs to 10×2 mm. Fluorite is granular, interstitial, or as grains to 6 mm in carbonates. Cassiterite as h.gr. aggregates to 2×3 mm, most noticeable in carbonate/qtz patches. — 15-20%

Contact indistinct, 40°

23.1-35.7 DOLOMITE weakly recrystallised

Medium hard grey dolomite, very brecciated - early fine dark grey stained fractures < 1 mm and later shearing marked by talcose alteration along fracture planes with attendant weakly recrystallised mottled cream and grey nebules to 2 cm. Well fractured, minor faulting - crushed dolomite zones to 20 cm; fine fractures with thin talcy films as above occur every 5-10 cm on average, 40°-50° to CA. Some creamy white irregular veins dolomite-calcite-qtz to 10 mm

23.1-33 sp, trace po, py, as blebs within calcite-dolomite-fluorite-qtz veining — 2-3%

23.7-24.2 Altered zone - talc-serpentine-carbonate-qtz-fluorite-py-sp, trace po

27.7-28.2 recrystallised zone - pinkish dolomite, calcite-qtz-fluorite-sp, po, py. Minor talc and a heavy hard pinkish carbonate (Mn?)

←31.6 35 mm py-sp vein with blebs talc.

33.1-34.35 DSL - banded blue green and grey green talc, serpentine carbonate-qtz-fluorite surrounding corroded clasts of recryst. dolomite

irregular contacts

33.1-34.35 py, fluorite, trace po in fractures and cavities or finely dissem. in banding — 15%

←34.8

34.35-35.7 sp, fluorite, po, py as above 23.1-33.1 — 2-3%

Contact graduational and irregular.

35.7-40.52 DOLOMITE SULPHIDE LODE.

35.7-31.2 Hard dark green f.gr finely banded serpentinite with talcose patches and small patches of hard dark bluish grey 'fluorite rich serpentinite' (?). Minor patches carbonates, qtz. The whole is finely and irregularly banded 'unglitic'.

37.2-40.52 Greenish white talcose carbonates, interspersed with bluish dark green 'serpentinite'. Some patches creamy white recryst. dolomite surrounding pale blue, purple, brownish and colourless fluorite up to 15×12 mm. Samples 98075 and 98076 taken for petrological study / thin section.

←35.8 ... sample no 98075

35.7-37.2 po, py, fluorite. Sulphides granular, fluorite finely dissem. — 20-25%

←38.8 Sample no 98076

37.2-40.52 py > po ≥ fluorite. dissem as blebs and grains throughout, some aggregates po to 30×20 mm; py to 15×10 mm; fluorite to 12×15 mm (enclosed by dolomite.) — 20%

40.52-44.0 SILTSTONES AND SILTY SHALES

Hard, greenish grey and sericitic shale beds with darker grey siltstones. Thinly bedded, very brecciated and disrupted (soft sediment deformation?) with later minor fracturing and thin veining.

←Contact 40°, bedded.

40.52-44.0 po, py as blebs and fine stringers in sparse veinlets with qtz, fluorite, carbonates — 1-2%

END OF HOLE 44.0 m.

5 cm

DRILL ADVANCE	LOST CORE ZONE	% RECOVERY ESTIMATE — OR — CORE LENGTH RECOVERED	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Detailed rock description and notes (indented about 15 mm.)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
2.0		40		4							
0.8											
3.0		27									
0.8											
3.0		31		8		4/8/6					
3.1											
3.0		100		12		8/6/4					
2.9											
3.0		100		16		6/8/4					
3.0											
3.0		100				8/6/7/4					
2.8											
3.0		100		20							
3.2											
2.0		100		24		3/2					
2.0											
1.0		100									
1.0											
1.2		100									
1.2											
1.8		100		28							
2.0											
2.6		100									
2.5											
3.1		100		32							
3.0											
						6/7/8		irregular contacts	33.1-34.35 py, fluorite, trace po in fractures and cavities or finely dissem. in banding — 15%		
						3			34.35-35.7 sp, fluorite, po, py as above 23.1-33.1 — 2-3%		
3.1		100		36		7/6					
3.1											
3.1		100				8/6/7					
3.1											
3.1		100		40		10/9					
3.0											
				44							
				48							

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mount Bischoff.
Logged by: G. BROADBENT date: 31/1/80

HOLE No. MBD23
LOG SHEET 2 OF 2
from 0 m. to 44.0 m.

Written up 23/5/80

028420

MBD-24

FIELD ROCK NAME and general description over interval marked	ADOPTED INTERVAL (m cm) & ADOPT LENGTH FROM COLLAR m. cm	GRAPHIC LOG	BRACKETS & MARKERS (▼)	OBSERVATIONS Commence with length from collar either point (relates to marker) or from to (relates to brackets) Altitude of bedding or foliation Altitude & spacing of joints, Altitude, width & description of sheared zones. [Altitude = angle of structure to long cont. axis]	MINERALIZATION	% MINERALIZATION (visual estimate)
SUMMARY LOG MBD 24				Veins over 50 mm.	Mineralisation (excluding veins over 50 mm.)	
TRICONE to 3.0 m - No Core	0-3.0	0				
MASSIVE BRECCIATED SILTSTONES with THINLY BEDDED BLACK SHALES. Highly brecciated - soft pebble conglomerate texture with black carbonaceous shale in interstices. Fractured and broken by later shearing. Overall the rock mass is a very dark grey, fairly soft. Bedding is difficult to determine due to soft sediment disruption and occasional (?) resedimentation.	3.0-59.3 (56.3)	10 10/9/c 20 30 40 50		3-20 m very fractured and broken - fine anastomosing fractures filled with yellow clay every 1 cm at all angles to core. 20-38 Yellow fractures decrease in abundance to every few cm and become sparse after 35 m. ← Bedding 40° ← Bedding 45°	Py, po, as rare blebs and grains to 5×6 mm. Some finely dissem py, po in silts - bedded, local enrichments. Sparse carbonate - qtz - fluorite - Fe sulphide veins up to	2-3%
MASSIVE SILTSTONES AND QUARTZITES. Medium - dark greys, hard, silicified. The siltstones are argillaceous, and have a faint greenish tinge - sericitic? Brecciated - soft sediment disruption. Some thin pale grey quartzose siltstones	59.3-80.47 (11-17)	60 10/11 70 80		Gradual Transition to ← Bedding 50° ← Bedding 25° ← Bedding 12° ← 120 mm py, sp, arsen with qtz/carbonates 45° ← Small fault pug 10 cm.	Rare disseminations of py, po. Sparse carbonate - py qtz - fluorite sulphide veining up to 10 mm	2%
QUARTZ-FELSPAR PORPHYRY. Matrix f.g., pinkish cream. Phenocrysts up to 40% (rock has a 'sugary' texture) Qtz 5-30%, turbid, white up to 6×5 mm Felspar 7-15%, strongly altered to pinkish brown (some grains indistinct) to 3 mm.	80.47-91.28 (16-81)	90		← Contact irregular, 40°. Well jointed and fractured	Py, trace marcasite, sp, arsen, rare granular cassiterite - 1 mm. Fluorite variable up to 1%. Sulphides occur as discrete blebs and grains (Py has marcasite rims), or as dark grey f.g. aggregates to 6×4 mm. Concentration variable 5-25%	15-20%
BRECCIATED SILTSTONES AND SHALES (See 3.0-59.2) Hard silicified	91.28-101.0 (2.72)	10/9/c 100		← Contact 45° (Broken core)	Minor carbonate, fluorite, sp, py, po veinlets	1%
END OF HOLE 101 m.		110				

SAMPLE NO. SPLIT CORE	SAMPLE NO GROUND CORE	FROM m	TO m	INTER-VAL m	Sn SPLIT	Sn GROUND	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
97222		56.5	58.5	2.0	24									
23		58.5	61.4	2.9	24									
97212		78.5	80.5	2.0	3250									
13		80.5	82.5	"	600		170	30	940	2	10	260		
14		82.5	84.5	"	720		630	210	490	5	20	2250		
15		84.5	86.5	"	800		360	40	490	4	35	220		
16		86.5	88.5	"	920		410	90	780	4	210	410		
17		88.5	90.5	"	1150		460	150	740	4	10	420		
18		90.5	92.5	"	720		250	44	330	2	25	170		
19		92.5	94.5	"	2700		360	85	130	3	30	400		
220		94.5	97.3	2.8	1600		420	30	500	3	15	260		
21		97.3	99.3	2.0	90									

0281421

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 24

SAMPLE TYPE : DRILL CORE FROM 56.5 TO 99.3

REPORT No. 028422

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-24

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 24

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1864·31 N	920·05 E	631·08
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD.

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
- ____ magnetic
- 180 grid (1)
- ____ grid (2)
- ____ grid (3)
- ____ true

Inclination at collar 75°

Total length 101 m

Commenced: 25 / 1 / 80

Completed: 28 / 1 / 80

Drilling contractor: LONGYEAR AUST PTY LTD

Rig type: LONGYEAR 38

Core size and non-coring (NC)

TRICONE	0	TO 3·0
NQ	3·0	TO 51·0
BQ	51·0	TO 101·0 m.
		TO
		TO
		TO

Details of down hole location-survey methods.
TROPARI every 30 m.

Purpose of drilling and anticipated lengths to targets.
To investigate possible tin mineralisation in 'White Face' porphyry dyke 81-105 m. Planned depth of hole 110 m.

Comments on drilling.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type if not mag	DIP
30·0	154°	75°
60·0	152° 30'	73°
98·5	148° 30'	75°

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No. | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY S BRADDENT | FROM 0 TO 101·0 m | DATE 30/1/80

LOGGED BY ____ | FROM ____ TO ____ | DATE ____

LOGGED BY ____ | FROM ____ TO ____ | DATE ____

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 24
Log sheet 1 of 2

028423

TRICONE TO 3.0m - NO CORE.

3.0 - 59.3 BRECCIATED SILTSTONES over BLACK SHALES

Very dark grey, almost black clay rich siltstones brecciated with thin (1-5mm) interlacing layers and laminae of black shale & 5mm. The extent of brecciation is such that bedding directions are difficult to measure. Some intervals have small dark grey quartzose siltstone clasts in a matrix of crushed almost black siltstone as above.

10/4

0-20 m very fractured and broken - fine conformable yellow clay filled fractures at 45 angles LCA, approx 1 per cm spacing.

←13.4m 30mm qtz-carbonate/pyr micro-vein-chlorite-pyr-py vein in broken core.

20.0-36 Fracturing begins to decrease - wider spacing (long last run not increasing) and core less broken.

←24.1 Bedding 40°

←26.2 Bedding 20°

←26.6 10mm carbonate-qtz vein 45°

←35.2 10 mm carbonate-qtz-chlorite vein, 30°.

38 - Silkhamish fracturing decreases - some minor zones of broken core but in separated by long intervals of undisturbed material.

←47.2 Bedding 45°

←58.4 35mm carbonate-talc-chlorite-py-qtz vein, 45°.

Mineralisation - veins >10 mm.

Mineralisation - veins <10 mm.

3.0-26.4m py, PO as occasional blebs to 0.5 mm concentrated in some breccia clasts and mostly very finely disseminated in altered matrix. Some fine irregular Py/po stringers 45 to vein and spaced thin Py-qtz-carbonate veinlets to 3 mm, with varying angles LCA.

2.0%

26.0-28.4 increased Py as bedded disseminated in siltstone beds with mineralisation as above.

3%

28.4-53.0 Py, disseminated in more dense siltstone beds, in zones veinlets and stringers 1-2 cm thick, carbonates

1-2%

53-59.3 py, disseminated in siltstone & stringers. Some zones carbonate-qtz veinlets

2-3%

brecciated zones -

57-59.3 Some smaller pale grey/whitish rounded clasts of an almost crystalline appearing material in a dark grey matrix - dolomite? or a bleached siltstone? Mostly 5-10 mm but 15.2-15.8 is 200 mm - irregular network just mostly 40-70° LCA. The interval 53-59.3 m is heavily silicified and resistive - dark greenish grey.

59.3-80.47 SILTSTONES and QUARTZITES, some black shales

Thinly bedded mid-dark grey thinly bedded clay rich siltstones alternating with finely laminated hard dark grey quartzites. Some minor thin (cm) pale grey quartzose siltstones interbedded with quartzites and rare thin discontinuous black shale laminae interbedded with the siltstones.

Highly brecciated and deformed - mainly silt sediment disruption? - with occasional well bedded intervals.

10/11

Gradual Change to

←66.6 Bedding 30°

←70.7 10 mm dolomite vein, 45°

←72.5 Bedding 28°

←75.2 Bedding 12°

carbonate
C-78.2 130 mm qtz-chlorite-carbon
D 80.5 thin qtz-chlorite vein, 45°
E Contact 80.47 irregular

59.3-77.0 Trace diseem Py - some zones carbonate-qtz-fg chlorite

1%

77.0-80.47 py increased to 1% - increased qtz-carbonate veinlets up mixing

2-3%

80.47-93.20 QUARTZ FELDSPAR PORPHYRY

80.47-81.7 Mainly pale buff colour and hard "Porcellanite" Felspar crystals to 1-2 mm, 7-10%, also to 5 mm, 1-2%.

81.7 - 93.15 Mainly pale pinkish cream, finely recrystalline.

Previously abundant 40-50% Qz, large rounded grains to 5 or 6 mm

Felspar - altered, hard pale pinkish brown colouration and perm translucent as small grains (now 3 mm) as some ill defined aggregates. 10-15%

Overall porphyry has a "sugary" texture and is well jointed.

80.47-81.7 Py trace of crystals, some more thinly veinlets + 1% thinly veinlets

1%

81.7-82.9 Py 1% as ↑

2%

82.9-83.9 Py 2% as ↑

2%

83.9-84.9 Py, crystals more disseminated, with some thinly fractured grains 1% into crystals mins.

10%

84.9-85.10 py crystals visible trace up - some with fluorite fg 5 crystals on 1-2 cm aggregates

10-15%

85.0-90.1 Py, some trace up, Fluorite, few veinlets across trace py-qtz veining.

10-15%

90.1-93.5 Py, trace of crystals, some trace thinly and rare f-g Fluorite

15-20%

93.5-95.15 Py, trace up decreasing concentration towards base.

10%

95.15-97.65 Py, disseminated

3%

95.65-97.28 Py, some trace, dark thinly 1% veinlets, some fluorite and zones of more veinlets

10%

97.28-101.0 Py, crystals disseminated and in stringers. Many carbonate-fluorite-qtz-py veining

15%

97.28-101.0 SILTSTONES AND SHALES

Brecciated, as for 53-57 m in interval 0-58.3 m

95.15-97.65 Dark fine grained grey sandstone - vesicular!

95.65-97.28 Matrix gradually changes to a fine grained pinkish colour and processing and reduction in pink/red abundance. Also, well formed pore sites and pore to 1 mm, 5-10% Felspar laminae not altered over 3 mm 5-10%

97.28-101.0 SILTSTONES AND SHALES

Brecciated, as for 53-57 m in interval 0-58.3 m

END OF HOLE 101.0 m.

Contact 45°

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF

HOLE No. MBD 24

LOG SHEET 2 OF 2

from 0 m to 101.0 m

Logged by G. BROADBENT

date 30/1/90

Entered on 2/2/90

MBD. 25

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10mm)	MINERALISATION	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH NO. 9 AUSTRALAS. INST. MIN. METALL. - 1976

028424

3.0m.	TRICONE TO 30m - NO CORE.		
3.0-48.9 (45.9)	3.0-48.9 DARK GREY SILTSTONES BLACK CARBONACEOUS SHALES and minor SANDSTONES. Siltstones mostly clay rich and dark grey, some light grey quartzose beds. Variable proportions of fine grained carbonaceous shale, locally as abundant as the siltstone, but overall less. The sandstones are medium grey and occur as massive beds to 1.5m. Quite well bedded - the siltstones and black shales are thinly bedded, with minor folding, and intervals of brecciation (soft sediment disruption). 26.4-30.6 Interbedded siltstone and quartzite, hard and silicified, brecciated. Gradual Change	Py & PO, disseminated in silty beds, occasionally as blebs to 2 x 1.5 cm. Sporadic py-qtz-dolomite-fluorite-po-sp-arseno veining TOTAL 2-3%, locally 5%	
48.9-62.0 (13.1)	48.9-62.0 MASSIVE SILTSTONES WITH MINOR SANDSTONES AND SILTY SHALE Medium grey, brecciated, with dark grey silty shales and thin quartzite beds.	Py, disem., some blebs to 10x5mm, sparse qtz-carbonate-py-sp veining. TOTAL 2-3%	
62.0-66.0 (4.0)	62.0-66.0. SERICITIC SILTSTONES with minor QUARTZOSE SILTSTONES	py-fluorite-qtz-carbonate veining, 1%	
66.0-88.6 (22.6)	66.0-88.6 QUARTZ FELSPAR PORPHYRY. Contact 40° Matrix creamy white, fine grained, in places slightly pinkish. Phenocrysts - Qtz - clear, cloudy rounded grains to 6mm, ranging from 7-10% to 20% in central portion Felspar - brownish creams (alteration), some zoning, max size 3mm, variable 1-10%.	py, trace fluorite, sp, v. rare trace tourmaline and rare cassiterite. 10-15% as discrete grains to 3mm, some py is as fine grained irregular aggregates. Lower 2m mineralisation 1-3%.	
88.6-90.2 (1.6)	88.6-90.2 SILTSTONE and DARK GREY SHALES, thinly bedded and brecciated. 40°	Qtz veining, 1%	
90.2-93.6 (3.4)	90.2-93.6 QUARTZ FELSPAR PORPHYRY, Qtz 3-5%, Felspar 7-10% 40°	Py, trace sp, tourmaline, marcasite, 5-7%.	
93.6-98.9 (5.3)	93.6-98.9 THINLY BEDDED SILTSTONES. 15° Dark grey clay rich alternating with minor brownish and pale grey quartzose beds.	Py, qtz, in veinlets and disem 20%	
98.9-101.7 (2.8)	98.9-101.7 QUARTZ FELSPAR PORPHYRY. 85°	Py, some qtz veining - 20%.	
101.7-104.8 (3.1)	101.7-104.8 SILICIFIED SILTSTONES AND SILTY SHALES 65°	Disem Py, Py-carbonate qtz-fluorite veinlets 2-3%	
104.8-138.6 (33.8)	104.8-138.6 QUARTZ FELSPAR PORPHYRY. 85° Matrix faintly greyish cream, fine grained and very hard. Qtz - rounded turbid grains to 4mm 15%, locally 10-20%. Felspar - creamy white, intergrown with groundmass, some brownish alteration, 10-15%.	Py, trace marcasite(?), brown and green fluorite, sp, cassiterite. Rare arseno. TOTAL 15%. Py as fgr. aggregates, distinct grains to 5mm, variable 5-25%, average 15%. Cassiterite, fluorite variable, cassiterite locally 3% (116-118) as rounded grains, scattered throughout.	
138.6-143.3 (4.7)	138.6-143.3 SILTSTONES with GREY SILTY SHALES and BLACK PYRITIC SHALES 65°	Py, thin bedded laminae, finely disem, averages 3-5%	
143.3	END OF HOLE.		

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD. EXPLORATION DEPARTMENT

SUMMARY DRILL LOG

Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G BROADBENT

Date: 5-3-80

HOLE No. MBD 25

Sheet of

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97224		64.0	66.0	2.0	290									
25		66.0	68.0	"	1950		240	46	240	2	20	660		
26		68.0	70.0	"	1500		250	70	280	1	20	65		
27		70.0	72.0	"	800		210	60	450	1	25	80		
28		72.0	74.0	"	2300		240	85	310	2	15	75		
29		74.0	76.0	"	3400		220	75	290	2	25	85		
230		76.0	78.0	"	1200		250	40	95	2	10	840		
31		78.0	80.0	"	2400		290	140	85	2	15	1050		
32		80.0	82.0	"	580		280	80	160	2	<10	270		
33		82.0	84.0	"	2200		240	90	25	2	15	100		
34		84.0	86.0	"	960		190	120	700	4	20	20		
35		86.0	88.0	"	380		33	95	830	1	<10	10		
36		88.0	88.7	0.7	320		42	130	4800	1	20	10		
37		88.7	89.9	1.2	60									
38		89.9	91.9	2.0	170									
39		91.9	93.7	1.8	320									
240		93.7	95.7	2.0	190								160	Re check of check Sn
41		95.7	97.7	"	170									
42		97.7	98.9	1.2	960									
43		98.9	100.9	2.0	3450									
44		100.9	101.7	0.8	1050									
45		101.7	103.7	"	290									
46		103.7	104.7	"	350									
47		104.7	106.7	"	3300		250	70	90	1	15	250		
48		106.7	108.7	"	2850		280	55	50	2	40	180		
49		108.7	110.7	"	6000		320	190	65	3	30	560		
250		110.7	112.7	"	3300		340	150	210	3	20	150		
51		112.7	114.7	"	4400		430	250	160	4	<10	2400		
52		114.7	116.7	"	1.62%		240	120	60	1	75	260		
53		116.7	118.7	"	1.67%		270	170	260	2	90	1850		

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 25 A

SAMPLE TYPE : DRILL CORE FROM 64.0 TO 118.7

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97254		118.7	120.7	2.0	6000		350	50	30	2	240	6000		
55		120.7	122.7	"	9400		340	210	5000	5	120	5300		
56		122.7	124.7	"	7000		390	310	150	5	50	3900		
57		124.7	126.7	"	1.16%		330	200	70	2	60	2700		
58		126.7	128.7	"	1600		300	48	60	2	35	1100		
59		128.7	130.7	"	340		330	130	120	4	15	260		
260		130.7	132.7	"	4050		270	95	670	2	30	210	3750	Re check of check Sn
61		132.7	134.7	"	840		140	120	6000	2	<10	240		
62		134.7	136.7	"	230		100	180	8000	2	<10	100		
63		136.7	138.6	1.9	1000		180	100	430	3	15	120		
64		138.6	140.6	2.0	140									

0284209

Notes:— Sn by XRF Bi Method

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 25B

SAMPLE TYPE : DRILL CORE FROM 118.7 TO 140.6.

028427

REPORT No.

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-25

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 25

COLLAR LOCATION

Grid name — Rectangular space co-ordinates

		PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	1807.77 N	860.07 E	619.08
(2)		N	E	
(3) Aust. Map Grid PRECISE / APPROX.		mE	mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 Holder METALS EXPLORATION LTD

Cadastral location and details CROWN LAND / PRIVATE

W.C. Bearing from collar
- magnetic
- 180° grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 80°

Total length 144.3 m

Commenced: 29 / 1 / 80

Completed: 3 / 2 / 80

Drilling contractor LONGYEAR AUST PTY LTD

Rig type LONGYEAR 38

Details of down hole location-survey methods.
TROPARI every 40 m.

Purpose of drilling and anticipated lengths to targets.
To intersect the mineralisation in White Face Porphyry dyke 71-99 m. Planned depth of hole 110 m.

Core size and non-coring (NC)

TRKONE	0	TO	3.0 m
NQ	3.0	TO	51.0
BQ	51.0	TO	144.3
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Azimuth	DIP
42.5 m	149	81°
91.5 m	167	82°
142.5 m	172°	82°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No.	FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY S BROADVENT FROM 0 TO 144.3 m. DATE 8-2-80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme. METALS EXPLORATION LTD

HOLE No. MBD 25

Log sheet 1 of 3

TRICONE TO 30m - NO CORE.

30-260 INTERBEDDED SILTSTONES AND BLACK SHALES
30-33.4 light grey, grey with siltlaces and minor pale grey quartzose siltstones. Distributed intervals with bedding completely obliterated (later intrusive disruption), to 2 or 3m, alternate with well bedded intervals that have suffered only minor contortion and some flaking.

33.4-35.6 Mainly interbedded sheets of pale grey siltstone to 30 x 15 mm in a contorted rather fissile/shaley matrix of almost black siltstone and shale.

260-377 INTERBEDDED SILTSTONES AND QUARTZITES
Mainly medium grey quartzites 1-10cm interbedded with dark grey shaly rich siltstones. Extensively disrupted and brecciated - the siltstones form discontinuous lenses, often strongly foliated in places (the foliation is strongly brecciated - like fabric with isolated irregular clasts of quartzites and siltstone.

360-377 Gradual decrease in proportion of quartzites - thickly bedded sandy siltstones/shaley rich siltstones black and greenish grey in colour (reducing?), minor disruption and some quartzite beds to 5 cm.

377-689 INTERBEDDED SILTSTONES and SANDSTONES
As for 5.3-264 with the addition of some medium grey fine grained sandstones to 0.8m

689-760 Gradually becomes better bedded, black shales increase in abundance and siltstones begin to acquire a greenish tinge

689-820 INTERBEDDED SILTSTONES AND QUARTZITES
As for 264-377

820-1102 THINLY BEDDED SILTSTONES
Hard greenish grey siltstone (rock) siltstones with minor interbedded pale grey quartzose siltstones.
Disrupted and finely fractured by later shearing - carbonate and shiny black slickensides.

1102-1328 QUARTZ FELSPAR PORPHYRY
1102-1117 Matrix creamy white, fine grained, fourth-banded quartz to 2 mm, mostly 1-3 mm, 3-10% / Felspar - black and bronzed/brown - altered, with some reddish weathered cores, max 2mm, 5-10%
1117-1164 Matrix creamy white, with a faint pinkish cast. Well jointed and better 30° over 8.5m intersected with
Phenocrysts: Silica, clear or white and rounded/rounded grains to 6 mm, occasional 5-10cm patches of almost pure silica in groundmass, 20%
Felspar - brownish cream altered. Rounded grains to 2 mm, some extremely hard must have rather indistinct outlines. Variable percentage 1-10%

1164-1328 Matrix becomes creamy white finely crystalline. Phenocrysts decrease - qtz max 5 mm, 3%, Felspar to 2 mm 2-7%
1213-1256 Matrix acquires a greenish tint. Quartz decreases to max 3 mm, 1%, Felspar max 2 mm 1-10%, altered and bronzed.

1328-1407 SILTSTONES minor SHALES.
Dark grey finely bedded clay rich siltstones with dark grey shale beds - consistently disrupted with minimal deformation.

1407-1554 QUARTZ FELSPAR PORPHYRY
1407-1426 Fine gr. greenish matrix, qtz 1-2%, felspar 1-10%
1426-1513 Fine grained grey fragmental matrix, qtz 1-2%, felspar 5-10%
1513-1554 Pale grained greenish cream matrix well fractured
Other - well formed to 5 mm, 10-15%
Felspar - fine grained greenish grey with indistinct margins, 5%

1554-1687 SILTSTONES minor SHALES.
1554-1656 dark grey siltstones as for 264-1011m

1656-1689 Pale greenish grey (sericitic) thinly bedded siltstones with minor shales, disrupted and fractured.

1689-1815 QUARTZ FELSPAR PORPHYRY
Chloritic matrix fine grained matrix with pinkish and greyish patches, cryptocrystalline, highly fractured, up to 10mm/m
Phenocrysts: Silica - fine grained, rounded, max 4 mm, 15%, with rounded large grains to 8 mm, 15%
Felspar - white, some brownish, altered, up to 2 mm, variable 1-10%, average 3-5%

1815-1878 SILTSTONES AND DARK SHALES.
1815-1857 Dark/dark brownish grey siltstones - thinly bedded, clay rich siltstones and shaley shales. Still fractured and broken, chloritized with some veins (recrystallized qtz?)
1857-1878 Greenish grey finely bedded siltstones and shales, minor disruption and later fracturing.

1878-2138 QUARTZ FELSPAR PORPHYRY
1878-1959 Matrix very siliceous - grey, hard grey fine grained and almost translucent
Phenocrysts - Silica - rounded bluish grains to 4 mm, 15-20%
- Felspar - 1 creamy white, irregularly shaped aggregates finely intergrown with groundmass, probably related to a soft greenish brown material. Variable 10-25%, average 10-15%
Some patches up to 15 cm have a fine grained white matrix with discrete grains up to 3mm, 10%, felspar 15-20%, and pyromorphite 10-15%.

1959-2138 Quartz veining / brecciation / recrystallization & possible epithermal alteration. Irregular veins and breccia veins

(continued next page...)

DEPTH from-to : ROCK UNIT (capital letters, underlined)
Depth: Detailed rock description and notes indented about 15 mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATT=TOTAL CORE RECOVERY, RQD=ROCK QUALITY DESIGNATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mount Gischoff
Logged by: L. GRADDENT date: 4/2/80

HOLE No. MGP 25
LOG SHEET 2 OF 3
from 0 m to 124.0 m

Continued from previous page.

125.9 - 138.58 Change in character of porphyry
Matrix creamy white, finely crystalline
Phenocrysts: Qtz - rounded and embedded grains to 4mm, average 2mm, 15%
Felspar - altered to hard brownish material (topaz?), distinct grains to 2mm 7-10%.

121.3-122 weak trace fine brownish black cassiterite

122-123 weak trace cassiterite, fluorite 3%, arsen 1%

123-124.8 trace cassiterite, fluorite, arsen.

124.8-125.9 cassiterite almost 1%, grains to 2mm.

125.9-138.58 Muscovite 10% as well defined blebs and grains to 5x7mm. Trace sp, brown fluorite and weak trace finely disseminated brownish black cassiterite. Concentrations variable 5-25%, sp locally reaches 5-10% for a few cm. 10-15%

138.58-144.30 SILTSTONES AND SHALES thinly bedded

Dark grey clay rich siltstones, thinly interbedded with lighter grey quartzose siltstones and thin black shale beds with pyrite laminae. Some of the more massive siltstone beds leave thin sandy intervals 1-2cm. Well bedded, with minor soft sediment disruption and minor fracturing/microfaulting. Upper 1-1.5 m is hard and silicified.

Contact 65°

← 140.3 Bedding 60°

← 141.5 Bedding 35°

← 142.5 Bedding 70°

← 143.5 Bedding 50°

138.58-144.30 py as thin bedded laminae with black shales and finely disseminated in some shale and siltstone beds. Some very thin py stringers to 1mm and sparse qtz-py veinlets. 3-5%

END OF HOLE 144.3 m.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes indented about 15 mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDES • angle between fracture and CORE AXIS

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF

Logged by: G. BRADBENT. date: 8/2/80

Written up 4/6/80

HOLE No. MBD 25
LOG SHEET 3 OF 3
from 120 m. to 144.3 m.

MBD-26

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS. INST. MIN. METALL. - 1976

028430

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT / Depth : Description and notes	MINERALISATION
0	0-3.5 (3.5)	TRICONE TO 3.5 m - NO CORE	
	3.5-10.6 (7.1)	3.5-10.6 DOLOMITE SULPHIDE LODE. Carbonate - qtz with minor talcose alteration and serpentinite	Py, marcasite, minor po trace sp, cp, arseno fluorite. TOTAL 30-40%
20	10.6-30.4 (19.8)	10.6-30.4 SILICIFIED SILTSTONE AND SILTY SHALE 30° Hard, silicified and greenish grey, brecciated and contorted. Thinly bedded with occasional thin intercalations of talc/serpentinite and grey dolomite. Sparse thin quartzite beds near bottom of interval.	Py, sp, po in thin carbonate veinlets up to 3mm. TOTAL: 2-3%. Occasional blebs py, po to 10x6 mm
	30.4-33.4 (3.0)	30.4-35.4 DOLOMITE SULPHIDE LODE 40°	po >> py, fluorite, trace sp, ga TOTAL 40-50%
40	33.4-45.9 (12.5)	33.4-45.9 SILICIFIED SERICITIC SILTSTONE AND SILTY SHALE 35° As for 10.6-30.4, but dolomite/DSL intercalations and quartzites scarce to absent. 60°	po >> py, blebs to 40x10mm, dissem. Carbonate - fluorite - po - fg - qtz veinlets } 3-5%
	45.9-47.0 (1.1)	45.9-47.0 DOLOMITE SULPHIDE LODE	Py, fluorite trace po, sp 15-20%
60	47.0-80.4 (33.4)	47.0-80.4 SILICIFIED SERICITIC SILTSTONE AND SILTY SHALE. As for 33.4-45.9. Finely fractured - yellow clay filled anastomosing fine fractures every few cm. 65.0 → 80.4 Decreased proportion of shaley beds - more massive hard greenish grey siltstones.	Py, po, dissem. and as blebs, some minor carbonate - fluorite - qtz - py veining 1-2%
80		Gradual Change	
	80.4-120.4 (40.0)	80.4-86.8 MASSIVE SILTSTONES AND QUARTZITES Hard silicified quartzose sandstones and siltstones, grey to bluish grey. 86.8-106.6 GREY SILTSTONES, SILTY SHALES AND QUARTZITES. Medium grey quartzose and clay rich siltstones, shales faintly greenish with bluish grey quartzite bands to 0.5m. Brecciated - some thinly bedded with minor disruption. 106.6-120.4 Some siltstone beds are a pinkish brown (tourmalinised?) interbedded with soft greenish siltstones. Some thin dark grey shale laminae near base of interval.	Py > Py, dissem in more qtzose siltstone and sandstone beds. Some py - qtz - fluorite - carbonate VEINING TOTAL 3-5%.
100		Gradual Change	
120	120.4-146.6 (26.2)	120.4-146.6 MASSIVE QUARTZOSE SANDSTONES AND SILTSTONES Very hard, pale grey and silicified fine grained quartzite with some thinly bedded siltstone or massive brecciated quartzose siltstone with quartzite bands to 0.75m.	Py, po, dissem and in thin stringers } 1-2% Some weak qtz - py - carbonate veining
140		Gradual Change	
	146.6-160.0 (13.4)	146.6-160.0 INTERBEDDED SILTY SHALES, SILTSTONES and minor PYRITIC BLACK SHALES. Medium grey silty shales, with thin pyritic black shale laminae separated by lighter grey siltstones. Well bedded.	Py, as thin bedded laminae, dissem in siltstones and thin veinlets and stringers 3-5%
160		Gradual Change	
	160.0-178.8 (18.8)	160.0-178.8 SILTSTONES, SILTY SHALES AND QUARTZITES. As for 86.8-106.6.	Py > po thin bedded laminae, veinlets and stringers with qtz - carbonate, fluorite - sp - ga Some blebs po to 30x10mm. TOTAL 5%. 176.6-178.8 py, po, dissem, veinlets 15%
180	178.8-196.18 (17.38)	178.8-196.2 QUARTZ FELSPAR PORPHYRY 75° White f.gr. matrix near margins, faintly greyish in centre Phenocrysts: qtz - rounded grains to 2mm, 10-15% Felspar - creamy white with some weak brownish alteration 7%, variable 2-10%.	Py, po, irregular grains and f.gr aggregates 15-20%. Trace sp, weak trace cassiterite, fluorite, tourmaline.
200	196.2-208.1 (11.9)	196.2-208.1 INTERBEDDED SILTY SHALES, QUARTZOSE SILTSTONES and minor BLACK SHALES WITH PYRITE. As for 146.6-160.0	Py, trace po near contact, thinly bedded, dissem. and thin stringers 3-5%.
		END OF HOLE 208.1 m.	
220			

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 5.3.80

HOLE No. MBD 26
Sheet of

AMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97364		4.5	6.5	2.0	120									
65		6.5	8.5	"	20									
66		8.5	10.5	"	660									
67		10.5	12.5	"	220									
68		12.5	14.5	"	100									
69		16.6	17.0	0.4	600									
70		28.6	30.6	2.0	1200									
71		30.6	31.6	1.6	1600									
72		31.6	33.5	1.9	1100									
73		33.5	35.5	2.0	370									
74		45.8	47.1	1.3	240									
97375		176.8	178.8	2.0	5800									
76		178.8	180.8	"	1950		400	20	85	1	35	820		
77		180.8	182.8	"	2150		450	18	100	<1	65	760		
78		182.8	184.8	"	980		400	24	24	1	60	3100		
79		184.8	186.8	"	440		480	28	34	1	25	2600		
380		186.8	188.8	"	1450		510	30	32	2	110	3450	900	Re check of check assays.
81		188.8	190.8	"	2500		470	26	28	1	35	2750		
82		190.8	192.8	"	1850		530	34	32	1	350	3500		
83		192.8	194.8	"	9200		430	110	32	2	250	1200		
84		194.8	196.2	1.4	720		420	55	36	2	40	1900		
85		196.2	198.2	2.0	85									
SLUDGE														
97729		0.0	1.5	1.5	720									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 26

SAMPLE TYPE : DRILL CORE FROM 4.5 TO 198.2

028431

REPORT No. 028432

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-26

Prospect, area, project or mine: MOUNT BISCHOFF

HOLE No. MBD26

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1983.14 N	922.53 E	655.55 m
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA.

Mineral Tenement: EL 13/79 | Holder: METALS EXPLORATION LTD.

Cadastral location and details: CROWN LAND / PRIVATE

W.C. Bearing from collar

	magnetic
180°	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar: 60°

Total length: 208.1 m

Commenced: 4 / 2 / 80

Completed: 10 / 2 / 80

Drilling contractor: LONGYEAR AUST PTY LTD

Rig type: LONGYEAR 38

Details of down hole location-survey methods.

TROPARI every 40 m. Readings at 162 m and 201 m were taken inside barrel - piece of core had jammed in bit.

Purpose of drilling and anticipated lengths to targets.

To investigate any possible westwards extension of the main dolomite horizon, and to determine the extent of mineralisation in 'White Face' porphyry dyke 71-99 m. Planned depth of hole 110 m.

Core size and non-coring (NC)

TRIPONE	0	TO	3.5 m.
NQ	3.5	TO	60.0
BQ	60.0	TO	208.1
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type AZIMUTH (Magnetic)	DIP
39.0	146°	58°
80.0	156°	58°
121.0	157°	61°
162.0	153°30'	63°
201.0	110°	64°

Comments on drilling. NQ casing lost - originally 51.0 m, but recovered upper 30 m. 30 m - 51 m still in hole.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC.
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Symbols and abbreviations for drilling notes column.

LOGGED BY	LOGGED BY	LOGGED BY
R. BROADBENT		
FROM 0 TO 208.1 m	FROM ____ TO ____	FROM ____ TO ____
DATE 14-2-80	DATE ____	DATE ____

Company managing exploration programme: METALS EXPLORATION LTD

HOLE No. MBD 26

Log sheet 1 of 3

TRICONE TO 33.2 - NO CORE

35-10-58 DOLOMITE SULPHIDE LODE

32-9-8 Very broken + badly worn blocks + fragments of creamy coloured dolomite and badly broken manganiferous carbonates and ~ 5-8% sulphides. Recognisable carbonates and gossy gangue in a granular formation; weakly banded (grey + white) + shows evidence of having been recrystallised dolomite. Take returns as small unoriented pebbles 1 to 3 cm; some carbonates are soft, (pale greenish cream) due to hydrous alteration.

Mild fracturing - weathered, with some brown Fe oxides deposited on fracture planes.

Some minor inclusions of host + clast inclusions with chalcopyrite

10-58-30 1/2 SILTSTONES AND SHALES

Hard, weakly silicified greenish grey siltstones and thin shale beds. The more clay rich beds are almost black/grey. Mostly welded and extensively recrystallised with minor carbonates and hematite. (fracturing)

Near the upper contact there are some small pockets of impure black shaly material, with minor recrystallised dolomite, typically unoriented, which decrease in size and abundance over 2.83 m.

Some small "bleached" or dolomitised pale grey lenses.

The ground contact up to 50 x 60 m. more throughout generally ~ 30° LCA.

214-227.2 minor black grey quartzites and fine grained silicified quartzose siltstones.

227.2-230.42 Altered dolomitic to 30 cm interbedded with siltstones and shales. Mostly recrystallised, some minor silicate and replacement dolomite.

30-11-58 DOLOMITE SULPHIDE LODE

Mottled brownish white + pale and cinnamon pale. Recrystallised white dolomite with minor limonite and impurities (mn) near margins (50-100 cm) for distributed irregularly along fractures/granular fabrics. Pale dolomite as blebs and grains locally minor

33-11-58 SILTSTONES AND SILTY SHALES

Hard + silicified with greenish grey + dirty grey and brecciated. See 10-58-31 m above, interbedded dolomitic material similar to above.

35-11-58 DOLOMITE SULPHIDE LODE

Cream + strong pale to dolomite, variably recrystallised (particularly by minor granular recrystallised carbonates and greenish grey minerals with pale/pale green.

37.05-80.4 SILTSTONES MINOR SILTY SHALES

37-65 As for 33-11-58 m, shales gradually decrease 60-65 m. Mild fracturing + fine weathering fractures lined with yellow clay, pervasive thin veins, 30° to CA.

65-80.4 Shales decrease gradually - thinly bedded, dark grey finely greenish grey silty shales

770-80.4 patches of brownish alteration in siltstones, spaces sandy beds.

80.4-86.5 SILTSTONES AND QUARTZITES

Very hard, blueish and brownish grey quartzites and finely greenish quartzose and clay rich siltstones. Quartzites in beds to 0.75 m with thinly interbedded siltstones to 1 m.

Strongly + well recrystallised + weakly fractured.

86.5-106.6 SILTSTONES AND SILTY SHALES

Medium grey siltstones thinly interbedded with lesser finely greenish grey silty siltstones 1-2 cm wide.

Relatively unaltered + clasts of hard blueish grey pyrite siltstone in contorted finely greenish grey siltstone matrix + interacting with less interacted (bedding not recognisable) darker/pale laminae to 1-2 cm.

Some more hard blueish grey quartzose beds to 20 cm, brownish.

Fairly fractured - thin clay filled fractures 30° LCA.

106.6-120.37 SILTSTONES AND QUARTZITES minor unity

METABASIC

106.6-111 Very hard pinkish brown (porcellanitic?) siltstones interbedded 1-2 cm with pale green siltstone + clay rich siltstones and some thin pale laminae. The quartzites occur as massive beds to 30 cm very hard and blueish grey.

Quite well bedded minor interaction, veining and deformity.

111-120.37 As above, but quartzites/siltstones do not have the pinkish brown hue - pale grey and not as hard.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined Depth : Detailed rock description and notes indented about 15 mm	GRAPHIC LOG	STRUCTURAL AND VEIN INFORMATION alternate lines between fracture and vein data entry	MINERALISATION	NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project	Mount Burkett
Logged by	G. GREENSTREET date 14/1/86
HOLE No.	MBD 26
LOG SHEET	2 OF 3
from	0 m to 120.0 m

SEE PREVIOUS PAGE

120.37–128.1 QUARTZITE, minor SILTSTONES

Very hard, pale grey quartzite, massive beds 40 cm-1 m, with thin (2-5cm) beds 5-10 cm. Some thinly bedded siltstone / mudstone intervals to 1.5 m.
Disrupted and brecciated, otherwise quite massive and featureless.

Contact Change, Bedding 60°

120-37-128-1 90 very hard, pale grey quartzite, massive beds 40 cm-1 m, with thin (2-5cm) beds 5-10 cm. Some thinly bedded siltstone / mudstone intervals to 1.5 m. Disrupted and brecciated, otherwise quite massive and featureless. 1-2%

128.1–166.6 MASSIVE SILTSTONES WITH QUARTZITES

Medium grey, sometimes siltstones with intervals of pale grey extremely hard quartzite to 1 m thick. Some calcareous siltstone and grey silty shale beds, not usually abundant in the quartzose siltstones. Bedding is quite well defined with occasional sandy or clayey rich beds to 1 cm. Some disruption and later fracturing.

Contact Change

128.1–166.6 Pg, 2-3% chlorite along bedding and fracturing, sometimes coarse and in thin stringers cutting brecciation cracks. Some specks of Py, 1% carbonate included to 3 mm. 1-2%

@ 130.4 Bedding 25°
@ 132.8 Bedding 45°
@ 136.6 Bedding 60°
@ 139.5 Bedding 30°
@ 141.6 Bedding 25°
@ 142.1 Bedding 20°

166.6–160.0 SILTSTONES AND SHALES, INCREASINGLY

Medium grey, clayey with siltstones / silty shales. Siltstone separated by fine beds of shale and silty siltstone with bedding (cycle laminae) and light grey quartzose siltstones up to 1 cm. Some quartz vein and blebs, grey quartzite 10 cm to 0.5 cm.
Very well bedded for intervals up to 3 m - shifting, fine-scale and disrupted intervals to 1 m.
Minor fracturing at low angles to core, often coinciding with clayey shale, making coring difficult as the core is rubble mush.

Contact Change, Bedding 35°

@ 150.1 Bedding 30°
@ 156.5 Bedding 30°
@ 157.3 Small fold, axis 0°
@ 158.6 Bedding 35°

166.6-160.0 Pg, 1-2% bedded laminae and in veinlets, strongest with the carbonate. Chlorite, up to 1% Py, 1% Cpy. Some very fine-grained Py in pockets, to 1 mm in rarely as much as 5 mm to 10 mm. 3-5%

160.0–128.6 SILTSTONES AND SHALES WITH QUARTZITE

As for 166.6-160.0 with the addition of brownish grey very hard quartzites to about 40% of the interval, up to 15 cm.
Bedded and indurated, some sections are badly broken due to fracturing and coring or bad cycles, etc.

@ 160.4 Bedding 60°.
@ 165.4 Bedding 25°
@ 166.3 to 30 cm carbonate - Py - cpy blebs - 1% Py, 1% Cpy, 1% Cpy, 25°.
@ 169.6 Bedding 70°
@ 171.5 Bedding 45°
@ 173.3 20 mm Py - carbonate - carbonate - 1% Py, 1% Cpy, 30°
@ 174.5 Bedding 70°

160.0–128.6 Pg, po disseminated and in veinlets, strongest with the carbonate. Chlorite, up to 2% Py. 3-5%

175.8–176.36 Increased brecciation and fracturing/jointing, core is hard and shattered.

176.6–178.86 Pg, po disseminated and in veinlets, strongest with the carbonate. Chlorite, up to 2% Py. 3-5%

178.86–180.48 QUARTZ FELDSPAR PORPHYRY

178.86–180.48 White finely crystalline matrix with 4% phenocrysts to 5 mm, (1-2%) feldspar, with indistinct outlines to 1.5 cm, (1%).
180.48–180.3 Creamy weathered very fine grained, almost translucent matrix with some light yellow rock, porphyry to 10 cm.
Phenocrysts: Qtz - rounded grains to 5 mm, 10%
Fdspr - creamy white irregular to 5 mm, some blocky, some brownish alteration, 10%

178.86–180.48 Pg, 1% as scattered blebs and grains, to 2 mm, or as fine grained dark grey aggregates, trace up to 1 cm base Py. 1-2%

180.3–192.4 Pale grey, almost translucent massive - very siliceous.
Phenocrysts - 10% as rounded to sub-rounded grains to 5 mm, 15%
Fdspr - fine grained, creamy weathered and weakly altered 7-10%

180.48–180.6 20 mm Py - Cpy - chlorite - qtz vein 15°
@ 181.9 10 mm Py - qtz - carbonate - Py - minor Cpy, 15°

180.3–192.4 Pg, 2% as irregular grains and fine grained aggregates to 2 cm, and as fine grained dark grey aggregates, trace up to 1 cm base Py. 1-2%

192.4–198.18 As for 180.48–180.3, and qtz 15%.
Patches of grey translucent groundmass material as for 180.3–192.4 persist until 196.85 m.

192.4–196.28 As above, with grey, fine-coarse, white fluorite, Py disseminated to trace. 1-2%

196.28–198.18 Py, trace fluorite, pink fine - coarse in 50% groundmass, very minor content. 2-4%

198.18–205.1 SILTSTONES AND SHALES

Fairly bedded, dark grey siltstones, silty shales, and thin black/grey shales with pyritic laminae as for 166.6-160.0 m.
The upper 2 m is hard and relatively unbroken.

@ 196.6 Bedding 15°
@ 197.4 Bedding 20°
@ 200.2 Bedding 70°
@ 202.3 Small fold, axis 85°, plunge 45°
@ 202.6 Bedding 35°
@ 204.1 Bedding 40°
@ 204.3 Fold, axis 35°, plunge 5°
@ 204.6 Bedding 5°

198.18-205.1 Pg, 2% as bedded laminae to 1 mm thick, as in some adjacent holes, and in quite thin veinlets with qtz, carbonate. 3%

END OF HOLE 205.1 m

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
Indented about 9 mm

GRAPHIC LOG PLOTTED

STRUCTURAL AND VEIN INFORMATION
BOTTOM HOLE ANGLE MEASURED TO CORE AXIS UNLESS STATED

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mount Bischoff
Logged by: G.HANCOCK date: 4/2/80

HOLE No. MBD 26
LOG SHEET 3 OF 3
from 120.0 m to 205.1 m

Written on: Lithos

MBD-27

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH NO.9 AUSTRALAS. INST. MIN. METALL. - 1976

028435

0	0-3.0 (3.0)	TRICONE TO 3.0m - NO CORE	
	3.0-9.9 (6.9)	LOST CORE 3-7.4 ; 7.6-9.9. 7.4-7.6 DOLOMITE SULPHIDE LODE - carbonates, qtz, with hard bluish green talc/serpentinite, granular texture.	po, py, fluorite 10% in recovered fragments 7.4-7.6.
10	9.9-19.0 (9.1)	9.9-19.0 GREY DOLOMITE WITH QUARTZ AND CALCITE. Brecciated and weakly recrystallised, some minor talcose alteration. qtz and carbonates occur as infillings around angular fragments in brecciated zones. 60° →	po, py as blebs along fractures with recryst. carbonates. <1%.
20	19.0-49.0 (30.0)	19.0-49.0 MIXED GREY DOLOMITE/DOLOMITE SULPHIDE LODE. Dolomite > DSL. Intervals of mottled grey dolomite (to 5m) separated by talcy qtz-carbonate or talc/serpentinite DSL 0.3-3.0m. Overall DSL 30%, some finely banded, or coarsely crystalline granular/massive carbonate or serpentinite 90° →	Dolomite: blebs po, py trace sp along fractures, and thin veinlets, stringers 1%. DSL: po > py, fluorite, trace arsen, sp, weak trace cp in varying proportions and amounts % mineralisation varies 5-25%, average 10-15%. Overall: total ≈ 5%
50	49.0-67.7 (18.7)	49.0-67.7 DOLOMITE SULPHIDE LODE. Pale green and dark green talc with dark green and grey serpentinite, with minor qtz and carbonates. Some banding with carbonates and sulphides, irregular, elsewhere almost massive talc & serpentinite with some? phlogopite lining cavities and enveloping interstitial qtz and fluorite. Bedded, 45° →	po, fluorite, trace py, weak trace cp, varying amounts of fine grained dark? kassiterite (trace). Percent mineralisation fluctuates <1% to 50% on a scale of a few cm, and overall over a few metres: 49-54m 10% 54-56.7 50% 56.7-58.7 15% 58.7-63.7 40% 63.7-66.7 5-7% 66.7-67.7 30%
70	67.7-86.3 (18.6)	67.7-86.3 SERICITIC SILTSTONES, SILTY SHALES. Greenish grey siltstones with minor grey quartzose siltstones (massive) to 0.5m and thinly interbedded greenish shale beds. Brecciated and contorted - clasts of siltstone and shale in a poorly structured matrix. Some thin intercalations of talc and serpentinite near upper contact. Hard, silicified. 55° →	py > po, thin veinlets and stringers, disseminations } 7-10% fluorite - carbonate - qtz - py - po - cp veining 82.1-84.2 Vein? py > po, serpentine, inclusions of sediments, trace cp, arsen 80% sulphides
90	86.3-104.8 (18.5)	86.3-104.8 QUARTZ FELSPAR PORPHYRY Matrix white, F.gr near margins, faintly greyish in central portion Phenocrysts: qtz - rounded, turbid, to 6mm, 10% near margins, 15-20% in central portion. Felspar - creamy white ill defined patches, small well formed phenocrysts to 1-2mm, some minor alteration. 5-7% near margins, 2-3% in central portion 70° →	py ≥ po, alternating intervals to 2m of po > py, py > po. Sulphides as distinct rounded grains to 4mm, and diffuse fine grained aggregates. Trace cassiterite, fluorite, sp, weak trace arsen. 20%.
110	104.8-120.3 (15.5)	104.8-120.3 SERICITIC SILTSTONES, SILTY SHALES AND QUARTZOSE SILTSTONES. As for 67.7-86.3, except that below 109 m gradually becomes less greenish, some almost black carbonaceous shale intervals appear. Increased siltstone, sandstone towards bottom of hole, decrease in shale beds.	104.8-109.4 py > po, thin veinlets and stringers, disseminations in siltstone beds. 5-7%. Some rare blebs po to 2×3 cm. 109.4-120.30 as above, but less sulphides and some sparse carbonate-qtz-fluorite-py veinings 3-5%
120		END OF HOLE 120.3m.	

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING.

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 5.3.80.

HOLE NO. MBD 27
Sheet of

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97387		7.4	7.6	0.2	2650									
88		9.9	11.1	1.2	370									
89		11.1	13.1	2.0	100									
90		15.2	17.2	2.0	250									
91		17.2	19.0	1.8	60									
92		19.0	21.0	2.0	4700									
93		21.0	23.0	"	600									
94		23.0	25.0	"	1250									
95		25.0	27.0	"	1050									
96		27.0	29.0	"	900									
97		29.0	31.0	"	5600		38	50	45	<1	<10	<10		
98		31.0	33.0	"	6300		30	70	290	<1	15	X		
99		33.0	35.0	"	310									
97536		35.0	37.0	"	1000									
37		37.0	39.0	"	1350									
38		39.0	41.0	"	320									
39		41.0	43.0	"	3400									
40		43.0	45.0	"	1600								1550	Re check of check Assay
41		45.0	47.0	"	640									
42		47.0	49.0	"	50									
43		49.0	51.0	"	7000		320	55	2190	<1	50	620		
44		51.0	53.0	"	7900		140	65	110	<1	25	55		
45		53.0	55.0	"	1.19%		190	60	140	<1	10	15		
46		55.0	57.0	"	1200		420	X	50	<1	<10	35		
47		57.0	59.0	"	2000		180	X	14	<1	<10	15		
48		59.0	61.0	"	26		410	X	22	<1	10	25		
49		61.0	63.0	"	70		340	X	26	<1	<10	X		
50		63.0	65.0	"	7300		220	30	75	<1	25	1700		

Notes:— Sn by XRF B. Method.

X means less the detection limit

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 27A

SAMPLE TYPE : DRILL CORE FROM 7.4 TO 65.0

028430

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97551		65.0	67.8	2.8	160									
52		67.8	69.8	2.0	50									
53		82.06	84.2	2.14	30									
54		84.2	86.2	2.0	130									
55		86.2	88.2	"	500		240	24	120	<1	25	40		
56		88.2	90.2	"	1100		250	28	60	<1	15	40		
57		90.2	92.2	"	450		440	9	130	<1	10	520		
58		92.2	94.2	"	2200		760	125	920	4	85	4000		
59		94.2	96.2	"	780		530	5	75	<1	20	340		
60		96.2	98.2	"	1200		240	11	140	<1	25	270	1000	Re check of check Assay
61		98.2	100.2	"	3850		600	34	46	<1	90	320		
62		100.2	102.2	"	1800		450	18	110	3	55	540		
63		102.2	104.2	"	800		430	36	50	<1	20	2900		
64		104.2	104.8	0.6	500		330	11	30	<1	15	270		
65		104.8	106.8	2.0	370									

Notes :— Sn by XRF Bi Method

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 27B

SAMPLE TYPE : DRILL CORE FROM 65.0 TO 106.8

028431

REPORT No. 028438

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-27

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 27

COLLAR LOCATION

	Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	1949·17 N	1020·01 E	643·68
(2)		N	E	
(3) Aust. Map Grid PRECISE / APPROX.		mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK55-3

1:100 000 Sheet No. HELLYER 8015

State TASMANIA

Mineral Tenement EL 13/79

Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar

	magnetic
180	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar 60°

Total length 120·3m

Commenced: 11 / 2 / 80

Completed: 15 / 2 / 80

Drilling contractor LONGYEAR AUSTRALIA PTY LTD

Rig type LONGYEAR 38

Core size and non-coring (NC)

TRICONE	0	TO	3·0
NQ	3·0	TO	71·0
BQ	71·0	TO	120·3
		TO	
		TO	
		TO	

Details of down hole location-survey methods.
TROPARI Every 40 m.
40·5 m reading inside casing

Purpose of drilling and anticipated lengths to targets.
To investigate main dolerite horizon (~41 m) and then to determine nature of any tin mineralisation in White Face porphyry dyke (103-123). Planned depth of hole 130 m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type: Azimuth Magnetic	DIP
40·5 m	155°	61°
79·5 m	122°	62°
118·5 m	156°	61°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY	FROM	TO	DATE
C. BROADBENT	0	120·3m	21·2·80

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 27
Log sheet 1 of 4

028439

DRILL ADVANCE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED	LOST CORE ZONE	DEPTH from-to : ROCK UNIT (capital letters, underlined) — Depth : Detailed rock description and notes, indented about 15 mm.	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
4.5	7	0.3	TRICONE TO 3.0 m – NO CORE. 0–7.4 m LOST CORE – DSL?	0							
				4		?				?	
3.0	23	0.7	7.4–7.6 recrystallised carbonates and qtz with hard mottled bluish green 'serpentinite' ('Fluorite rich'), granular, crystalline texture, some green talcy? material. 7.6–9.9 Lost core.	8	8/7	?			7.4–7.6 po, py, fluorite, as blebs and grains	10% ?	
3.0	30	2.9	9.9–18.99 GREY DOLOMITE WITH QTZ AND CALCITE Mottled greys – weakly recrystallised dolomite, extensively fractured and brecciated. Disrupted angular fragments of dolomite with grey corroded margins, cemented by a matrix of recrystallised creamy coloured dolomite, white calcite and minor qtz. Some sparse greenish patches due to incipient talcose alteration.	12	3				9.9–18.99 po, py as rare blebs along fractures and in recrystallised carbonates	< 1%	
0.8	1.0	1.4									
1.5	1.4	1.6		16							
1.7	1.6	94									
2.0	1.8	90						Contact 60°			
1.2	1.2	100	18.99–22.06 DOLOMITE SULPHIDE LODE. Mottled whites and greens – recrystallised carbonates and qtz with greenish talcose alteration, patches of grey serpentinite and a hard bluish green 'serpentinite' material. The alteration appears to have proceeded along brecciation fractures	20	8			Contact irregular, 50°	18.99–22.06 po >> py as blebs to 2 mm. Fluorite disseminated throughout 3–5%. Trace arsco as blebs to 10 × 8 mm	15–20%	
1.8	1.8	100	22.06–23.2 RECRYSTALLISED DOLOMITE. Weakly recrystallised grey dolomite, brecciated, with thin films black serpentinite along fractures		3/2			Contact 20°	22.06–23.2 po as blebs along fractures and thin stringers	1–2%	
3.0	3.0	100	23.2–41.10 MIXED DOLOMITE/DOLOMITE SULPHIDE LODE. Dolomite > DSL. Intervals of weakly mottled recrystallised dolomite, fractured and brecciated, with recrystallised carbonates and thin films talc and serpentinite along fractures. Dolomite Sulphide lode – intervals of recrystallised carbonates and quartz partially replaced by greenish grey talc or dark grey serpentinite, frequently showing delicate, contorted banding ('wriglitic' texture). Clasts of corroded grey dolomite to 10 × 8 cm are commonly included. Distribution is as follows:	24	3/6/6?				23.2–41.10 Mineralisation in Dolomite intervals: po, trace py and sp as blebs along fracture planes, 1%, variable from trace to 2%. Mineralisation in DSL intervals: po >> py, fluorite trace arsco, sp, rare cp. po as blebs and grains along 'wriglitic' banding and as irregular masses to 8 × 5 cm. py intergrown with po, blebs to 2 × 3 mm. Fluorite is patchily distributed – up to 5% in some intervals and trace amounts in others. The other sulphides occur sporadically as blebs and grains. Overall, mineralisation is variable 5–25%, averages 10–15%.	5%	
3.0	3.0	100	Dolomite: 23.55–23.75 m; 24.2–24.45; 25.4–26.5; 27.05–28.0; 28.45–30.85; 31.20–33.8; 34.1–36.8; 37.3–37.85; 38.15–41.10 Dolomite Sulphide Lode: 23.2–23.55 m, 20°; 23.75–24.2 m.; 24.45–25.4; 26.5–27.05, 65°; 28.0–28.45, 45°; 30.85–31.20; 33.8–34.1, 30°; 36.8–37.3, 70°; 37.85–38.15, 80°	32							
3.0	3.0	100									
0.9	0.9	100		36							
1.6	1.6	100									
3.1	3.1	100									
3.1	3.1	100	41.10–43.15 DOLOMITE SULPHIDE LODE. Recrystallised carbonates and quartz as above with minor talcose alteration, weak serpentinite etc.	40	3/6/7			Contact 80°	41.10–43.15 po >> py, fluorite 1–2%, trace sp, rare grains arsco.	10–15%	
3.1	3.1	100	43.15–48.98 RECRYSTALLISED DOLOMITE As for 22.06–23.2 m, with some yellowish green talcose patches to 10 cm.	44	3/6			Contact 80°	43.15–48.98. trace po, sp as blebs along fracture planes	1–2%	
2.4	2.4	100		48							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: Mount Bischoff
Logged by: G. Broadbent date: 6/6/80

HOLE No. MBD 27
LOG SHEET 2 OF 4
from 0 m. to 48.0 m.

028440

CONTINUED FROM PAGE 2

48

48·98 - 67·70 DOLOMITE SULPHIDE LODE

48·98 - 54·5 Pale greens (talc) and dark greys (serpentine) almost massive. Upper 2 m is finely banded with streaks of minor recrystallised carbonates and some corroded clasts of recrystallised dolomite.

From 50 - 54·5 almost massive pale green, weakly foliated talc alternating with dark grey, almost black, talcy serpentinite 0·5 → 1·5 m. Some ? cavity fillings with borders of fine white mica and fluorite / recrystallised dolomite/qtz centres.

52

54·5 - 56·78 Mottled bronze / white / green due to po, carbonates and qtz and talc/serpentinite. Coarsely granular texture.

55

56·78 - 58·7 Granular carbonates and quartz with some talcose alteration surrounding corroded clasts of weakly altered / recrystallised pale grey, f. gr. dolomite

58·7 - 63·75 Mottled greens, greys with bronze po. Mainly grey talcy serpentinite with minor talcose carbonates and some interstitial ? grey quartz. Small patches of sea-green talc to 3 x 5 cm occur throughout.

59

63·75 - 65·08 Mottled dark grey-green talcy serpentinite with some finely banded ? white magnesite and other carbonates in discrete zones 20-30 cm.

65·08 - 66·73 Dolomite, brecciated and recrystallised. Faintly mottled grey/white and weakly altered to pale greenish talcy material along fractures.

66·73 - 67·70 Grey serpentinite, intergrown with talcose carbonates and small patches of grey qtz. Lower 50 cm is massive black serpentinite

68

67·70 - 82·08 SILTSTONES, MINOR SILTY SHALES.

Khaki-greenish grey clay rich thinly bedded siltstones and silty shales with medium grey (quartzose) siltstone intervals to 0·5 m (also thinly bedded) and some sparse hard bluish grey fine grained quartzite beds to 5 cm.

Disrupted and contorted - soft sediment disruption ? - followed by later fracturing and minor shearing. Some intervals have a slump-breccia like fabric, with clasts of siltstone and shale in a poorly structured matrix.

72

76

88

92

96

48·98 - 54·5 po, fluorite, weak trace cp, patchily interleaved with talc and serpentinite, variable <1% - 50% on a scale of a few tens of centimetres. Fluorite is interstitial and commonly associated with a white micaceous mineral. Trace of fine black cassiterite?

54·5 - 56·78 po >> py, weak trace cp, and interstitial colourless fluorite 1-2%. Granular texture, intergrown with carbonates etc.

56·78 - 58·7 po > py, trace mercasite. Blebs and grains - py is as rims on po grains or lining small fractures.

58·7 - 63·75 po >> py, as interconnected blebs and grains locally 70%

63·75 - 65·08 po, py disseminated as blebs and following banding where it occurs. Some blebs py to 5 x 1 cm

65·08 - 66·73 py in patches to 4 x 3 cm, minor po as blebs concentrated along fractures

66·73 - 67·70 po > py, patchily disseminated.

67·70 - 82·8 po > py, as thin veinlets and stringers and finely dissem in some of the more qtzose siltstone fragments. Carbonate - qtz - py - fluorite - po - sp veining to 5 mm, almost 30%.

82·08 - 84·2 DOLOMITE SULPHIDE LODE? or VEIN?

Virtually massive sulphides - py, po, cp, asseo, sp with inclusions of silicified sediments and some black, grey green serpentinite

82·08 - 84·2 py >> po, vuggy, pitted with a trace cp, asseo and sp, mainly intergrown with py and po

84·20 - 86·28 SILTSTONES, minor SILTY SHALES.

As for 67·70 - 82·08, very brecciated and disrupted, hard sericitic and silicified

84·20 - 86·28 po, py as blebs to 6 mm and finely dissem in siltstone clasts.

86·28 - 104·83 QUARTZ FELSPAR PORPHYRY.

86·28 - 92·0 Matrix white and finely crystalline

Phenocrysts ; qtz - rounded colourless grains to 6 mm, some subhedral, 10%

; Felspar - creamy white with yellowish-brown alteration of the larger grains. Mostly 1-2 mm, 5-7%.

Upper 50 cm is fine grained, with reduced proportions and size of phenocrysts.

86·28 - 92·0 py, minor po, trace sp, weak trace asseo and dark fluorite with some grains cassiterite.

The sulphides occur as rounded grains with distinct margins to 3 x 4 mm; other minerals finely dissem.

92·0 - 102·4 Matrix acquires a faintly greyish colouration

Phenocrysts : Qtz increases to 15-20%, well formed clear phenocrysts to 2 mm

Felspar decreases to 2-3%, patchy distribution.

92·0 - 102·4 py = po as fine grained clots and aggregates. Alternating intervals po > py and py > po. Trace asseo, sp, rare grains pale green fluorite and black cassiterite to 1·5 mm

DRILL ADVANCE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED	LOST CORE ZONE	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
3·1	3·0	100									
3·0	3·1	100									
3·1	3·1	100									
3·1	3·1	100									
3·1	3·0	97									
0·9	0·9	100									
2·4	2·4	100									
3·0	2·8	93									
3·0	3·0	100									
3·0	3·0	100									
2·5	2·5	100				9V ? 5/4/7 ?		Contact 60°	90%		
0·5	0·5	100				10/9.		Contact 55°	2%		
3·0	3·0	100				1			15-20%		
3·0	3·0	100									
2·6	2·7	~							20%		

METALS EXPLORATION LIMITED	MINERAL EXPLORATION DRILL LOG Scale 1:100	Prospect or project: Mount Bischoff	HOLE No. MBD 27	
		Logged by: G. Broadbent date: 21/2/80	LOG SHEET 3 OF 4	from 48·0 m. to 96·0 m.

028441

Continued from previous page...

DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
See previous page.	1		See previous page.		
102.4 – 104.83 White finely crystalline matrix with phenocrysts etc as for 86.28 – 92.0 (page 3).			102.4 – 104.83 py, trace po, weak trace sp, rare visible and fluorite. Fe sulphides occ as disshiet grains to 2-3 mm.	15%	
		← Contact 70°			
104.83 – 109.4 SILTSTONES minor SILTY SHALES. See 67.70 – 82.08 for description (page 3). Upper 1-1.5 m silicified, brecciated and fractured.	10/9	← 105.4 Bedding 55°	104.83-109.4 py>po as thin veinlets and stringers and finely dissem. Some rare blebs po to 2×3 cm.	5%	
		←108.0 Bedding 50°			
		Gradual Change			
109.4 – 120.3 THINLY BEDDED SILTSTONES / SHALES with minor QUARTZITES. The clay rich siltstone beds (and the shale beds) gradually become less green, darker grey with some shaly carbonaceous intervals (thinly bedded, to 1.5 m). Also, some pale grey quartzose siltstone beds to 2 cm are apparent, together with some massive bluish grey quartzite beds to 0.5 m particularly towards the bottom of the hole. Disrupted and weakly brecciated (esp quartzites)	10/j/(c)/(ii)	← 111.7 Bedding 35°	109.4 – 120.30 py>po in thin veinlets and stringers and finely dissem. Some sparse carbonate-qtz-fluorite-py-marcasite-po veinlets to 3-4 mm.	3-5%	
		← 115.2 Bedding 35°			
		←117.3 30 mm qtz-carbonate vein, 45°			
END OF HOLE 120.3 m.					

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project

Logged by date / /

HOLE No. MBD 27
LOG SHEET 4 OF 4
from 96 m. to 120.3 m.

MBD-28

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH NO.9 AUSTRALAS. INST. MIN METALL. - 1976

028442

0	0-4.0 (4.0)	TRICONE TO 4.0m - NO CORE.	
	4-12.6 (8.6)	4-4.3 DOLOMITE SULPHIDE LODE, weathered. 4.3-12.6 QUARTZ FELSPAR PORPHYRY. Fgr. yellowish cream matrix, qtz 10%, Felspar 7%. 60°	4.3-12.6 po, trace sp, cassiterite. Some thin qtz-sp-cassiterite veinlets 20° LCA. TOTAL 15%.
	12.6-16.9 (4.3)	12.6-16.9 DOLOMITE SULPHIDE LODE. qtz, serpentinite, talc, carbonates	po>py, intergrown with granular matrix, 50%.
20	16.9-25.7 (8.8)	16.9-25.7 SERICITE SILTSTONES with THINLY BEDDED SERICITIC SILTY SHALES and QUARTZITES. 65° Hard, greenish grey and silicified, quartzites medium greyo	P, p as bedded disseminations; fine stringers with qtz-fluorite, blebs 5%.
	25.7-34.8 (9.1)	25.7-34.8 MASSIVE SILTSTONES and SANDSTONES. Hard, grey, silicified :-quartzites. Brecciated. 33.5-34.8 a 'TUFF' - resedimented clasts & siltstone etc. Gradual Change	py>po, dissem, blebs and stringers 3-5%. Minor qtz-carbonate veining with sulphides.
40	34.8-106.8 (72.0)	34.8-106.8 SERICITE SILTSTONES, QUARTZOSE SILTSTONES and SANDSTONES Thinly bedded greenish grey siltstones with fine shale laminae. Brecciated and contorted. Thinly bedded siltstones and quartzose siltstones (<3cm), minor contortion and folding Massive grey quartzite beds (silt-size and sand-size), brecciated, intervals to 3 m separating 10m intervals of either of the above.	po>py, dissem, also blebs and stringers, veinlets with carbonates, qtz, fluorite 5-7% Sparse qtz-carbonate-fluorite-sulphide veins to 50 mm 25-30° LCA.
60			
80			
100		98.4-106.8 Very hard quartzites with thin silky shale bands.	98.4-106.8 po>py, dissem in qtzites; as veinlets, stringers 15%.
	106.8-130.0 (23.2)	106.8-130.0 QUARTZ FELSPAR PORPHYRY. 50° Fine grained, white and greyish white matrix, Phenocrysts: qtz - rounded, turbid, to 6mm, 10-15% locally 20% Felspar - small, white, with brownish alteration; <2mm, 1-2%	py, po, alternating py>po, po>py intervals to 4m. Trace amounts fluorite, sp and weak trace cassiterite. Some minor qtz-py veining at margins. TOTAL 15%, variable 5-20%
120			
	130.0-133.7 (3.7)	130.0-132.6 QUARTZITES, MINOR SILTSTONES 70° 132.6-133.7 QUARTZ FELSPAR PORPHYRY	30° po>py, dissem, veinlets, stringers 10% py, marcasite, po, fluorite 5%
	133.7-136.8 (3.1)	133.7-136.8 Thinly Bedded SILTSTONES AND SILTY SHALES 67°	py>po, thin veinlets, stringers with qtz, fluorite 15%.
140	136.8-145.4 (8.6)	136.8-145.4 QUARTZ FELSPAR PORPHYRY. 55° Greyish white fgr matrix, qtz 10%, Felspar 1-2%, altered.	py, po, trace sp, arsenopyrite, fluorite. Some qtz-fluorite-sp-arsenopyrite veining. Weak trace cassiterite TOTAL 25%.
	145.4-157.5 (12.1)	145.4-157.5 SILTSTONES AND SHALES WITH MASSIVE QUARTZITES Pale grey, well bedded, with thin shale laminae and bedded laminae of pyrite. Quartzites are brecciated and silicified to 3m.	py (po near contacts) py is in fine bedded laminae, dissem in qtzites, stringers 3-5%.
160		END OF HOLE 157.5m.	

5 cm

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 5.3.80.

HOLE No. MBD 28
Sheet of

AFTER TYPING THIS SHEET FROM WILL BE PHOTO-REDUCED TO A4 SIZE

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97566		4.0	4.3	0.3	1050									
67		4.3	6.3	2.0	4450									
68		6.3	8.3	"	4900									
69		8.3	10.3	"	3100									
70		10.3	12.6	2.3	5800									
71		12.6	14.6	2.0	260									
72		14.6	16.6	"	14									
73		16.6	17.0	0.4	32									
74		17.0	19.0	2.0	50									
75		104.8	106.8	2.0	2550									
76		106.8	108.8	"	2350		470	60	55	2	25	340		
77		108.8	110.8	"	1450		500	140	22	<1	440	2750		
78		110.8	112.8	"	1100		440	5	16	<1	35	370		
79		112.8	114.8	"	2450		320	13	16	<1	55	640		
80		114.8	116.8	"	2000		350	17	22	<1	30	260	960	Re-check of check Assay
81		116.8	118.8	"	2550		460	24	36	<1	20	440		
82		118.8	120.8	"	840		450	4	20	<1	10	120		
83		120.8	122.8	"	1150		550	10	20	<1	15	280		
84		122.8	124.8	"	960		500	11	14	<1	40	170		
85		124.8	126.8	"	2400		440	26	16	<1	70	160		
86		126.8	128.8	"	4600		500	180	55	2	45	700		
87		128.8	130.0	1.2	3850		1500	1200	3100	16	60	1150		
88		130.0	132.7	2.7	2900									
89		132.7	133.7	1.0	2100									
590		133.7	135.7	2.0	430									
91		135.7	136.8	1.1	250									
92		136.8	138.8	2.0	1200									
93		138.8	140.8	"	520									
94		140.8	142.8	"	1050									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 28 A

SAMPLE TYPE : DRILL CORE FROM 4.0 TO 142.8

028443

SAMPLE NO. SPLIT CORE	SAMPLE NO GROUND CORE	FROM m	TO m	INTER-VAL m	Sn SPLIT	Sn GROUND	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
97595		142.8	145.4	2.6	1250									
96.		145.4	147.4	2.0	450									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 28B

SAMPLE TYPE : DRILL CORE FROM 142.8 TO 147.4

0284414

REPORT No. 028445

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD28

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 28

COLLAR LOCATION

Grid name — Rectangular space co-ordinates

	PLANAR CO-ORDINATES			ELEVATION
(1) MBJV	2014·20	N	1099·85 E	662·15
(2)		N	E	
(3) Aust. Map Grid (PRECISE / APPROX.)		mE	mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3

1:100 000 Sheet No. HELLYER 8015

State TASMANIA

Mineral Tenement EL 13/79

Holder METALS EXPLORATION LTD

Cadastral location and details (CROWN LAND/ PRIVATE)

W.C. Bearing from collar

- magnetic
- 180° grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 75°

Total length 157·5 m

Commenced: 16 / 2 / 80

Completed: 23 / 2 / 80

Drilling contractor: LONGYEAR AUST PTY LTD

Rig type: LONGYEAR 38

Core size and non-coring (NC)

TRICONE	0	TO	4·0 m
NQ	4·0 m	TO	51·0 m
BQ	51·0	TO	157·50
		TO	
		TO	
		TO	

Details of down hole location-survey methods.

TROPARI every 40 m.

Purpose of drilling and anticipated lengths to targets.

To investigate the nature of mineralisation in 'White Face' porphyry clyke. 116-141 m Planned depth of hole 150 m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Azimuth (Magnetic)	DIP
40·0 m	147°	78°
81·5 m	141°	77°
119·5	146°	80°
155·50	140°	82°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. _____)

'DERWENT' PENCIL NO. — FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY J.GOODACRE — FROM 0 TO 157·5 — DATE 28·2·80

LOGGED BY _____ — FROM _____ TO _____ — DATE _____

LOGGED BY _____ — FROM _____ TO _____ — DATE _____

Company managing exploration programme.

HOLE No. MBD 28

Log sheet 1 of 3

TRICONE TO 4.0m - NO CORE

4.0-4.3 DOLOMITE/DOLOMITIC SULPHIDE LODE; faulted and weathered

4.3-12.6 QUARTZ FELSPAR PORPHYRY

4.8-5.1 Fine grained medium grey-brown matrix, qtz 7-10% fsp. Felspar, some Some unusual blue (fluorite) crystals; ? phenocrysts 5-15%

5.1-7.91 Fine grained yellowish pale grey matrix

Phenocrysts: Qtz - to 3mm, 10%
Felspar, altered - greenish and yellowish silt defined outlines 17%.

Contact 35°

7.8-12.6 pale greenish-grey matrix
Qtz - to 3mm, 10%
Felspar - altered to soft greenish talcy? material and harder yellowish grains with indistinct margins, 7%

12.60-16.46 DOLOMITE SULPHIDE LODE

Mottled brownish-grey - pyrrhotite, qtz and grey sericite/chlorite
Weakly foliated, some thin irregular textures of black and green sericite and greenish talc ~ 30° to c.a. Minor patches of yellowish tobacco carbonates.
14.55-14.94 py>po

16.46-25.7 THINLY BEDDED SILTSTONES, SILTY SHALES WITH QUARTZITES.

Hard greenish grey clay rich siltstones with thin shale beds. Some thin pale grey quartzose siltstone beds to 1cm. Hard grey fine grained quartzites to 0.5m become progressively more abundant towards the base of the interval.

Quite well bedded, minor disruption and carbonation with later fracturing which has been healed by Fe sulphides and qtz. The greenish (sericitic) colouration decreases with depth - progressively more towards base.

25.7-34.85 SILTSTONES AND QUARTZITES

Dark grey thinly interbedded quartzose siltstones, silty rich siltstones and sandstone beds (0.5-3cm) in intervals to 2m, with brecciated blueish grey quartzites to 0.5m. Some minor brownish sandstone beds to 5cm.

Quite disrupted, with some minor folding and carbonation and later weak fracturing and brecciation.

34.85-45.0 THINLY BEDDED SILTSTONES, SHALES, minor QUARTZITES

Greenish grey clay rich siltstones with thin khaki-green shale laminae and small quartzite beds to 0.5m. Quite hard, sericitic and weakly silicified, excessively disrupted, minor carbonation. Sparse intervals of finely laminated (<2mm) siltstones/silty shales to 1m.

45.0-50.7 THINLY BEDDED SILTSTONES, SILTY SHALES WITH QUARTZITES.

As for 25.7-34.85, Quartzite beds up to 2m thick

50.7-98.4 THINLY BEDDED SILTSTONES SHALES, minor QUARTZITES, vertific.

As for 34.85-45.0, quite well bedded with minor disruption and carbonation. Well fractured and veined.

7/9 1
- Contact 40°.

4-4.3 - weathered
4.3-5.1 po as clusters to 1cm, strong trace sp and minor trace arsp 7-10%
5.1-7.81 po, trace sp, trace grains black cassiterite. Rounded grains to 2mm - some interstitial ragged grains. Minor qtz-sp-cassiterite veinlets 15%
7.81-12.6 po, trace sp to 3mm, 10%. py-po-fluorite-qtz-cassiterite veining to 8mm, 5%. 20°ca 15%

- Contact 40°
- 12.7 Small fault zone
- 13 Small fault zone
- 13.3 Small fault zone.

12.6-14.55 po>py, as almost massive granular aggregates to 10cm in sericitic and dissem blebs and grains in qtz-carbonate veining
14.55-14.94 py>po, pitted, almost massive from 14.2m to 14.9m. 60-90%
80-90%

- Contact 65° apparently bedded.

- 17.4 Bedding 70°
- 19.2 Bedding 55°
- 22.0 Bedding 65°
- 22.8 65mm vuggy py-marcasite-qtz-fluorite vein, 80°
- 23.9 30mm vuggy py-carbonate-fluorite-qtz vein, 55°
- 25.1 Bedding 55°

Gradual Change

16.94-25.7 po>py. Po dissem in more gtzose siltstones and quartzites. Py mainly in thin veinlets and stringers with qtz, fluorite, carbonates etc. 5%

- 26.5 Bedding 65°
- 27.8 Small fold. axis 40°, plane 80°
- 29.1 Bedding 50°

25.7-34.85 po>py. Po finely dissem and in small veinlets and stringers. Py mainly finely dissem in some siltstone beds. Sparse qtz-py-po-fluorite veining. 3-5%

Gradual Change.

- 33.5 65mm vuggy py-carbonate-fluorite vein, 50°
- 36.2 Bedding 70°
- 37.4 Bedding 45°
- 40.2 Bedding 25°

34.85-50.7 po>py, finely dissem as blebs to 5x5mm in thin veinlets and stringers and concentrated as siltstone breccia clasts where very disrupted. Sparse vuggy py-carbonate-fluorite-qtz veining. 7-10%

Gradual Change

- 45.4 Bedding 60°
- 49.1 Bedding 65°

50.7-81.0 po>py, finely dissem along bedding and as thin veinlets and stringers. Some thin bedded laminae py, py to 1mm in shale beds. Carbonate-fluorite-py-qtz-po veining. 5-7%

- 52.5 Bedding 60°
- 55.4 Bedding 60°
- 57.1 10mm vuggy py-carbonate-fluorite vein, 40°
- 57.6 10mm py-carbonate-qtz-sp vein 30°
- 58.5 Bedding 65°
- 58.9 15mm py-qtz-sp-fluorite vein, 30°
- 61.2 Bedding 42°
- 65.3 Bedding 50°
- 67.8 Bedding 60°
- 69.2 Bedding 35°
- 72.9 Bedding 50°
- 76.4 Bedding 60°
- 76.7 55mm qtz-py-fluorite-sp vein, 40°
- 79.2 Bedding 70°
- 82.4 10mm carbonate-sp vein, 10°

81-98.4 py>>po as finely bedded laminae and veinlets po is finely dissem in these beds. 5-7%

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes indented about 25mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDE = Angle between Plane and CORE AXIS

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G.BROADBENT date 28/2/80
Prepared 7/4/80

HOLE No. MBD 28
LOG SHEET 2 OF 3
from 0.0 m. to 84.0 m.

50·7-98·4 Continued from previous page.—

-56·0 Bedding 55°

-86·1 Bedding 48°

-91·4 Bedding 65°

-94·3 Bedding 35°

-95·2 10 mm wiggly py-sp-carbonate -qtz vein, 15°

-97·3 Bedding 60°

See page 2.

98·4-106·81 QUARTZITES minor SILTSTONES

Very hard bluish grey massive quartzites separated by thin greenish clay rich siltstone beds to 5 cm. Contorted and brecciated - silt sediment disruption with later fracturing.

11/10

-99·8 15mm wiggly py-po-qtz vein, 50°

-102·2 Bedding 70°
-102·3 Fold axis 15°

Contact 50°, irregular

98·4-106·81 po>pg. Po as thin veinlets and stringers and finely disseminated throughout quartzites (stone is faintly brownish due to po). Pg is as irregular blebs and in veinlets with qtz, fluorite, carbonate, sp, muscovite.

10-15%

106·81-130·0 QUARTZ FELSPAR PORPHYRY

1

106·81-110·75 Matrix: white, finely crystalline. Phenocrysts: Qtz - rounded grains to 2 mm, 10% Felspar - sparse white, glassy crystals with indistinct margins to 4 mm, brownish alteration, 1-2%. Well fractured and broken.

106·81-110·75 po>pg, as fg. aggregates to 3·5 cm. Sparse po, pg as qtz veinlets.

20%

mottled

110·75-111·9 Matrix pale grey and fine grained with dark grey finely disseminated sulphides to 3 cm. Qtz to 2 mm, 10% Felspar, yellowish and white to 2 mm, 3% Felspar - yellowish and brownish fine grained patches to 5 mm, 2-5%.

110·75-111·9 po>pg, as fg. aggregates to 3·5 cm. Sparse po, pg as qtz veinlets.

20%

111·9-114·9 Matrix creamy coloured pale white, finely crystalline. Qtz - rounded clear grains to 6 mm, 10% Felspar - yellowish and brownish fine grained patches to 5 mm, 2-5%.

111·9-114·9 pg>po, as diffuse blebs and grains to 3 mm. Pg has muscovite rims. Rare trace cp.

5-7½

Minor grey staining and pitting by weathering. Patches are grey as for 110·75-111·9.

114·9-130·0 Matrix pale greyish-white, fine. Phenocrysts: Qtz - rounded grains to 5 mm variable proportions 5-30%, average 10%. Felspar - minor yellowish grains with indistinct margins to 2 mm 1-2%.

114·9-130·0 po=pg, as irregularly distributed greyish fine grained aggregates to 6 mm. Trace muscovite, rare grains cassiterite and cp.

15%

126-130·0 trace fg blebs cassiterite.

129·3-130·0 Grain size diminishes, core becomes well fractured and broken with minor qtz-py-po-fluorite veining.

Contact 70°, undulose.

130·0-132·65 QUARTZITES minor SILTSTONES

Dark, occasionally brownish grey hard quartzites with minor thin grey clay rich siltstone beds to 5 mm. Disrupted and fractured.

11/10

130·0-132·65 po>pg as thin stringers and veinlets healing fractures and finely disseminated.

10-15%

Contact 30°

132·65-133·7 QUARTZ FELSPAR PORPHYRY

Similar to qtz matrix, phenocrysts < 2 mm, 8% yellowish felspar < 1·5 mm, 2%

1

132·65-133·7 pg, muscovite rare po and green fluorite.

7-10%

133·7-136·81 THINLY BEDDED SILTSTONES, SHALES

Well bedded greenish shales with hard dark grey siltstones, finely stratabedded over 1-5 cm scale, minor loose fragments seen. Disrupted and brecciated, well fractured.

10/9

Contact 45°, 8 mm bqv, 1 cm oxidized brecciated + 2 cm either side.

-134·1 Bedding 62°

133·7-136·81 pg>po as thin veinlets and stringers, or finely disseminated. Minor qtz-py-po-fluorite veining.

15%

-135·9 50 mm sp, carbonate, qtz, fluorite -py-insoluble vein, 35°

Contact 25°

136·81-145·36 QUARTZ FELSPAR PORPHYRY

1

136·81-138·5 Matrix white, finely crystalline. Qtz as rounded and subedral grains to 3 mm, 10% Felspar sparse brownish phenocrysts to 10 mm, 1-2%.

136·81-138·5 po>pg, finely disseminated in phenocrysts to 3 mm. Minor po-py-fluorite veinlets.

20%

138·5-141 Matrix pale greyish white, fine grained. Qtz - rounded grains to 3 mm 10% Felspar - yellowish and brownish alteration to 5 mm, 3-5%

138·5-141 po>pg, as fg. aggregates to 6 mm. Sparse qtz-po-pg veining

25%

141-145·36 Matrix white, fine grained, phenocrysts as for 136·5-141 m.

141-145·36 po>pg, fine grained aggregates to 8 mm. Trace qtz and minor qtz-po-pg-fluorite veining. Sulphides become more distinct grains to 4 mm in lower 2 m.

25%

Contact 50°

145·36-157·50 THINLY BEDDED SILTSTONES AND SHALES with QUARTZITES

As for 50·7-98·4 but not calcitic. Pale grey, hard and silicified, minor disruption and brecciation in quartzite beds.

10/11/9

-145·5 Bedding 70°

145·36-151·5 Pg, po in thin veinlets and stringers, finely disseminated pyrites and chalcocite. Some welded laminae of qtz-pg to 1 mm in thicker beds.

5%

-148·4 Bedding 55°

-152·5 Bedding 65°

151·5-157·5 pg, minor po, finely disseminated in thin veinlets and stringers

2-3%

-154·6 Bedding 65°

-156·0 Bedding 70°

END OF HOLE 157·50 m.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15 mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project MOUNT BISCHOFF

Logged by G. BRADBURY date 25 / 2 / 80

HOLE No. MBD 28

LOG SHEET 3 OF 3

from 98·0 m. to 157·5 m.

PENONG 7/6/80

REPORT No. 028448

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-29.

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD29

COLLAR LOCATION

Grid name — Rectangular space co-ordinates

	Grid name	PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	1820·15 N	979·85 E	625·46
(2)		N	E	
(3) Aust. Map Grid PRECISE / APPROX.		mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3

1:100 000 Sheet No. HELLYER 8015

State TASMANIA

Mineral Tenement EL 13/79

Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
- magnetic
- grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 90°

Total length 44m

Commenced: 22 / 2 / 80

Completed: 25 / 2 / 80

Drilling contractor LONGYEAR AUST PTY LTD.

Rig type LONGYEAR 38

Core size and non-coring (NC)

TRICONE	0 TO	40m
NQ	40 TO	44m
	TO	
	TO	
	TO	
	TO	

Details of down hole location-survey methods.
Not surveyed - hole lost at 44m

Purpose of drilling and anticipated lengths to targets.
To investigate value of dolomite 0-43m, White Face porphyry dyke 43m-59m, possible DSL target 59-81m Planned depth of hole 90m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type	DIP

Comments on drilling. NQ rod string bogged in due to insufficient conditioning of hole; broke at 13m while pulling, leaving 15m NQ rods, broke and bit down hole. Hole abandoned moved 3m north on line 480 E and started MBD 29A.

Legend for graphic log column (see drill log for Hole No. _____)

'DERWENT' PENCIL No		FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY G BROADBENT FROM 0 TO 44·0m DATE 7/6/80

LOGGED BY _____ FROM _____ TO _____ DATE _____

LOGGED BY _____ FROM _____ TO _____ DATE _____

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 29
Log sheet 1 of 2

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97615		3.0	5.0	2.0	80									
16		5.0	7.0	"	200									
17		7.0	9.0	"	90									
18		9.0	11.0	"	16									
19		11.0	13.0	"	400									
6620		13.0	15.0	"	140								4850	pulp check Sn
21		15.0	17.0	"	2000									
22		17.0	19.0	"	960									
23		19.0	21.0	"	30									
24		21.0	23.0	"	120									
25		23.0	25.0	"	1450									
26		25.0	27.0	"	1550									
27		27.0	29.0	"	430									
28		29.0	31.0	"	180									
29		31.0	33.0	"	150									
30		33.0	35.0	"	60									
31		35.0	37.0	"	42									
32		37.0	40.28	3.28	75									
33		40.28	41.0	0.72	5700		240	15	970	41	15	240		
34		41.0	42.2	1.2	9500		780	50	960	1	80	370		
35		42.2	44.0	1.8	900									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 29A

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 44.0

028449

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
977789		4.0	5.1	1.1	180									
90		5.1	6.6	1.5	170									
91		6.6	8.1	"	230									
92		8.1	9.6	"	2250									
93		9.6	11.1	"	2500									
94		11.1	12.6	"	2500									
95		12.6	14.1	"	1600									
96		14.1	15.0	0.9	1800									
97		15.0	17.1	2.1	2750									
98		17.1	18.6	1.5	1850									
99		18.6	19.0	0.4	1400									
97597		19.1	20.6	1.5	980									
98		21.6	23.1	2.0	1100									
99		27.6	30.6	2.0	1200									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 29 B

SAMPLE TYPE : DRILL CORE FROM 4.0 TO 30.6

SLUDGE

0230

028451

TRICONE TO 4.0m - NO CORE.

4.0 - 19.8? RECRYSTALLISED DOLOMITE?

Highly faulted and broken - recovery very poor. Fragments of mottled grey, brown and cream recrystallised and sheared dolomite in a matrix of dark brown, friable, fault pug. Dolomite mostly coarsely crystalline. Some fragments 14-17 m are almost entirely cellular pyrite, sp or a hard, dense pinkish (Mn?) carbonate.

4.0	50	50		3	4.0-19.8? % difficult to estimate due to poor recovery. Between 5.0 and 8.0 m there is 0.5 m of relatively intact recryst. dolomite with 30% sp and 3-5% py. Otherwise - sp, py, trace fluorite, marcasite, rare arsen in fragments. Some py is massive, porous and pitted, most of the mineralisation appears to be concentrated along brecciation fractures with recryst. carbonate, qtz.	10%
3.0	37	1.1				
3.0	13	0.4				
3.0	16	0.5				
3.0	10	0.3				
3.0	16	0.5				
3.0	96	2.9		3/2	?19.8-33.6 trace sp, weak trace py, fluorite; concentrated sporadically within carbonate-qtz veining.	<1%
3.0	50	1.5				
3.0	66	2.0				
3.0	23	0.7				
3.0	40	1.2				
3.0	60	1.8				
3.0	100	3.0				

Contact Broken.

?19.8 - 40.28 DOLOMITE WITH QUARTZ AND CALCITE.

Pale creams and greys with patches of grey quartz and white carbonates. Recrystallisation is quite extensive - segregation of creamy coloured dolomite and patches of grey quartz in patches to 5 x 3 cm which are intergrown with fine grained(?) plastic dolomite.

Some minor stockwork-like zones of recryst. dol., carbonate, qtz, fluorite to 10 cm; these have been disrupted and broken by later shearing.

Overall highly brecciated - early fine dark grey non penetrative fractures in unaltered dolomite, which apparently have been the loci for later recrystallisation and deposition of remobilised qtz, carbonates, etc. The whole has then been faulted and sheared, producing brecciated zones to 0.5 m - rounded dolomite fragments, etc, in a matrix of pale brown sheared material.

27 - 40.28 Increasing recrystallisation, lesser late brecciation and faulting.

-326-326°3 20 cm DSL - weakly foliated py, grey sepentinised grey qtz, 70° to py, 45°.

40.28 - 42.18 DOLOMITE SULPHIDE LODE

Mottled metallic greens (py), whites, greys and greens. Recrystallised and brecciated dolomite with abundant grey qtz veins, brecciation fractures. Coarsely granular texture with greenish serpentinite rich intervals

40.28 - 42.18 py, marcasite, fluorite, trace po, sp as fine grained cassiterite. Granular aggregates and veining — 40%

← Contact irregular, 90°

← Contact irregular ± 90°

42.18 - 44 QUARTZ FELSPAR PORPHYRY

42.18 - 43.2 Patches of finely crystalline greenish green matrix with 2% qtz, trace felspar and 2-3% fluorite, alternating with hard white porphyry as below: 43.2 - 44 Mottled creamy grey high matrix with subhedral qtz to 3 mm, 7%, altered yellowish/brownish felspar to 5%, 1-3 mm.

42.18 - 43.2 py, fluorite, trace po disseminated in hybrid porphyry or as discrete aggregates and grains — 15-20%

43.2 - 44 py, marcasite, po, trace sp, fluorite and tourmaline — 15-20%

END OF HOLE 44.0 m.

↑ Distinct grains and phenocrysts to 4 x 5 mm, some blebs to 7 x 5 cm.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15 mm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date: 7/6/80

HOLE No. MBD 29
LOG SHEET 2 OF 2.
from 0 m. to 44.0 m.

MBD 29A.

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS. INST. MIN. METALL. - 1976

028452

0-4.0 (4.0m)	TRICONE TO 4.0 m - NO CORE		
4.0-39.5 (35.5m)	4.0-39.5 DOLOMITE, recrystallised and faulted. Brecciated fabric - mottled creams, whites, yellows and greys in rock fragments contained in muggy yellow and brown matrix (later faulting). Intact rock frags and short runs of core to 3m have been more or less recrystallised - segregation of qtz, calcite, dolomite, with some rare thin films of talc/serpentinite along fracture planes. Some short intervals of DSL to 2.8m - talc/serpentinite matrix, weakly foliated at 22-24.8m, 39.2-39.5m, and as sparse fragments in crushed zones. 4.0-42.4 - fault zone - intervals of fault pug, with runs of broken core to 3m (mostly <1m), washed rock fragments		4-14.9 py, sp, trace fluorite, rare galena in fragments, relict py in fault pug. Blebs and grains concentrated along brecciation fractures and in cavities, 10%. 14.9-17.1 as above, core not so weathered and broken - 50%. 17.1-22 As for 4-14.9, 10%. 22-24.8 (DSL) py, sp, fluorite, granular blebs, veins, stringers, 10-15%. 24.8-35.0 sp, py, blebs etc, <1%. 35.0-39.5 py, sp, fluorite (?) cassiterite in interstices of brecciated dolomite, 15%
39.5-61.1 (21.6)	39.5-61.1 QUARTZ-FELSPAR PORPHYRY. Broken. Matrix creamy white, fine grained, some fine fracturing. b ow 42.4m. Phenocrysts - qtz - rounded grains to 6x5mm, 15%; felspar - creamy white with some greenish and brownish alteration to 1.5mm, 5-7%. 47.5-51.6 - inclusion of dolomite? - qtz, carbonates, serpentinite, talc in irregular patches, well fractured and veined by carbonate, qtz, fluorite etc.		Py, trace fluorite, weak trace cassiterite, arseno. sp. Py rounded distinct grains to 4mm, others as small discrete grains, some intergrown with py to 1.5m 10-15%. 47.5-51.6 py > fluorite, trace sp as granular aggregates and vein fillings, 20-25%. 57.2-61.1 Stockworks of dolomite, fluorite, py, sp veins in addition to porphyry mineralisation as above TOTAL 40-50%.
61.1-65.5 (4.4)	61.1-65.5 DOLOMITE SULPHIDE LODE. 65° Bronze coloured due to po, grey qtz-carbonate gangue.		Py, po, fluorite, trace arseno, ga, sp, cp. Fine grained and granular, 70%.
65.5-78.9 (13.4)	65.5-78.9 DOLOMITE, brecciated and recrystallised. 40° Creamy rounded fragments of dolomite with some talcose alteration, with grey qtz. and white and cream carbonates as infillings of brecciation fractures. 0.7m massive sulphides on contact.		Py, sp. Fluorite, weak trace arseno. Sulphides as blebs along brecciation fractures, granular aggregates. Fluorite as cavity filling. TOTAL 2-3%, variable 0-5%.
78.9-89.0 (10.1)	78.9-89.0 SILTSTONES AND BLACK SHALES, minor QUARTZITE. Brecciated and silicified - siltstones dark grey, locally massive or as rounded clasts in contorted black shale matrix. Some siltstones faintly greenish - sericitic?		py > po, dolomite, fluorite. po as blebs to 2cm, finely dissem; py dissem or in dolomite - fluorite - qtz veins and stringers. TOTAL 5-7%.
	END OF HOLE 89.0m.		

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, (1:500) 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 12.3.80

HOLE No. MBD 29A
Sheet of

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97636		4.0	8.0	4.0	170									
38		8.0	10.0	2.0	1550									
39		10.0	12.0	"	540									
40		12.0	14.0	"	430								560	Pulp check Sn
41		14.0	16.0	"	1200									
42		16.0	18.0	"	1700									
43		18.0	20.0	"	1550									
44		20.0	22.0	"	920									
45		22.0	24.0	"	3950									
46		24.0	26.0	"	680									
47		26.0	28.0	"	740									
48		28.0	30.0	"	400									
49		30.0	32.0	"	220									
650		32.0	34.0	"	95									
51		34.0	36.0	"	420									
52		36.0	38.0	"	260									
53		38.0	39.5	1.5	3200									
54		39.5	41.5	2.0	1000		160	3860	840	3	<10	700		
55		41.5	43.5	"	3850		220	260	140	1	25	230		
56		43.5	45.5	"	2400		250	100	110	2	30	310		
57		45.5	47.5	"	3850		250	90	50	2	10	330		
58		47.5	49.5	"	1350		610	620	5100	6	30	350		
59		49.5	51.5	"	1300		820	300	3600	8	50	170		
6660		51.5	53.5	"	2600		270	110	160	1	35	230	2150	Pulp Check
61		53.5	55.5	"	1300		230	760	640	2	10	320		
62		55.5	57.5	"	1650		270	480	340	2	10	7500		
63		57.5	59.5	"	600		95	640	860	3	10	470		
64		59.5	61.1	2.6	1600		260	2500	6500	7	<10	320		
65		61.1	63.1	2.0	4.99%		930	350	100	1	210	1.41%		
66		63.1	65.1	2.0	2.68%		850	190	36	<1	200	2.10%		

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 29A

SAMPLE TYPE : DRILL CORE FROM 4.0 TO 65.1

0284 53

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97667		65.1	66.5	1.4	1.24%		840	180	480	1	160	1.02%		
68		66.5	68.5	2.0	390									
69		68.5	70.5	"	520									
670		70.5	72.5	"	940									
71		72.5	74.0	1.5	240									
72		74.0	74.5	0.5	600									
73		75.8	77.8	2.0	450									
74		77.8	78.8	1.0	8900		1700	4600	1.10%	32	280	2.16%		
75		78.8	80.8	2.0	1000									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 29A

SAMPLE TYPE : DRILL CORE FROM 65.1 TO 80.8.

028454

028455

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-39A

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 39A

COLLAR LOCATION

Grid name | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) MBJV	1823·13 N	950·10 E	625·52
(2)	N	E	
(3) Aust. Map Grid (PRECISE / APPROX.)	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD.

Cadastral location and details (CROWN LAND / PRIVATE)

W.C. Bearing from collar
- magnetic
- — grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 90°

Total length 89·0 m

Commenced: 25 / 2 / 80
Completed: 1 / 3 / 80

Drilling contractor: LONGYEAR AUST PTY LTD

Rig type: LONGYEAR 33

Core size and non-coring (NC)

TRIGONE	0	TO 3·5 m
HQ	3·5	TO 39·0
NQ	39·0	TO 89·0 m
		TO
		TO
		TO

Details of down hole location-survey methods.
TROPARI every 40 m.

Purpose of drilling and anticipated lengths to targets.
Drilled as substitute hole for MBD 24, which was lost at depth 46 m. Purpose: to investigate nature of dolomite horizon 0-43 m, White Face porphyry dyke 43-59 m and further dolomite 59-81 m. Planned depth approximately 90 m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type: Azimuth (mag. or -)	DIP
445 m	280	87°
865 m	295°	89°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. _____)
'DERWENT' PENCIL NO | FIELD ROCK NAME, ETC

Symbols and abbreviations for drilling notes column.

LOGGED BY G. BRADBENT | FROM 0 TO 890 m | DATE 9.3.80
LOGGED BY _____ | FROM _____ TO _____ | DATE _____
LOGGED BY _____ | FROM _____ TO _____ | DATE _____

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 39A
Log sheet 1 of 3

028456

TRICONE TO 4.0m - NO CORE.

4.0-14.7 FAULTED Recrystallised DOLOMITE

Puggy fault zone - ochreous yellow-whites, browns and black crushed rock with fragments grey dolomite, recrystallised dolomite and calcite and quartz. Minor fragments green serpentinite - some serpentinous alteration is visible in runs of relatively intact core.

14.7-17.1 DOLOMITE SULPHIDE LODE

Coarsely granular recrystallised dolomite, calcite and grey quartz with grossly brecciated structure. Abundant py, well fractured and sheared with small puggy zones.

17.1-?22 FAULTED recrystallised DOLOMITE

As for 4.0-14.7

?22-24.8 DOLOMITE SULPHIDE LODE, faulted.

Green and grey talcy serpentinite, almost massive, weakly foliated with some recrystallised dolomite along fractures and as small cobbles to 5-10 cm. Shattered and brecciated.

24.8-25.4 (?)PORPHYRY Mottled creamy white f.gr. matrix, small brown phenocrysts to 1 mm, 2-3%

25.4-35.0 DOLOMITE, recrystallised.

Mottled grey white weakly recrystallised dolomite with thin grey serpentinite films along fracture planes
Some short intervals (infillings of breccia zones) of banded creamy white recrystallised dolomite and other carbonates to 10 cm.
Brecciated, with intervals of dolomite clasts in a soft friable matrix to 30 cm. (The original unaltered dolomite has fine, dark grey stained, non penetrative, brecciation fractures)

35.0-39.5 RECRYSTALLISED DOLOMITE.

Brecciated and recrystallised - white and grey coarsely crystalline dolomite with calcite and grey quartz. Recrystallisation has proceeded along fractures - colloform textured carbonates etc surrounding clasts of coarsely crystalline impure dolomite.

39.2-39.5 Hard bluish fluorite rich talc/serpentinite with dolomite-sp veins

39.5-61.1 QUARTZ FELSPAR PORPHYRY.

39.5-41.6 Pale grey fine grained matrix
Phenocrysts: Qtz, rounded grains to 2 mm, 7%
Felspar: sparse, poorly defined creamy coloured grains to 1 mm, <10%.

41.6-48.2 Matrix - creamy white, finely crystalline
Phenocrysts: qtz as subhedral-rounded grains to 6x5 mm, 15%
: Felspar - creamy white with brownish or greenish alteration to 1.5 mm, 5-7%.

Fine fractures occur in discrete zones to 5 cm, spaced by 0.5 runs of unbroken core - well broken, pitted by weathering 47.5-48.2.

DRILL ADVANCE	LOST CORE ZONE	CORE LENGTH RECOVERED	% RECOVERY ESTIMATE OR MEASURE	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
4.0		3.1	78	48				← 47.8 30 mm band of hard blue talc/serpentinite/fluorite, 35°	47.5-48.2 pitted by weathering.		
1.0		1.0	100					41.6-48.2 py, strong trace fluorite, trace cassiterite, arsen, sp. Py occurs as distinct grains to 4 mm and finely dissem around fine fracture planes. Fluorite, cassit, sp, arsen as grains to 1.5 mm		10-15%	
1.9		1.9	100	47							
0.7		0.7	100								
1.0		1.0	100								
0.8		0.6	86								
0.9		0.8	100					41.6-42.4 Faulted and very broken.	41.6-48.2 py, fluorite, trace arsen and rare cassiterite. Py as f.gr aggregates 10%, fluorite small phenocrysts 5-7%	15%	
0.4		0.4	100					← Contact Grouted			
1.6		0.4	25	32				39.5-42.4 Faulted and very broken.	39.5-41.6 py, fluorite, trace arsen and rare cassiterite. Py as f.gr aggregates 10%, fluorite small phenocrysts 5-7%	15%	
0.4		0.3	75					÷39.6, dolomite vein, 20 mm			
0.3		0.3	23				3/2(F)		25.4-35.0 trace sp, py as blebs and grains along fracture planes. Sparse thin carbonate. Qtz-fluorite veining	<1%	
1.2		1.2	100	28							
0.8		0.8	67								
1.2		0.8	67								
1.3		1.3	100								
0.3		0.3	100					← Contact Broken	24.8-25.4 non mineralised	—	
0.8		0.8	100				1?/F				
0.4		0.4	100								
0.9		0.9	100								
0.6		0.6	100					← Contact Broken	22-24.8 Py, trace sp, fluorite. Pitted py in rock fragments as small blebs, veins, stringers.	10-15%	
0.7		0.7	100	24			7/6/F				
0.7		0.7	47								
1.5		0.7	47								
0.7		0.5	71								
0.5		0.5	100								
0.5		0.5	100								
1.2		0.5	100								
0.5		0.4	80								
1.1		0.9	82								
0.6		0.4	67								
0.6		0.4	67								
0.6		0.6	100								
0.4		0.4	67								
1.0		0.4	40	20							
1.0		0.4	40								
2.0		0.9	45								
1.5		0.9	60								
1.1		0.9	82	16			3/F	4.0 Fault zone to 14.7m.	4.0-14.7 py, sp, trace fluorite, rare grains galena. as resistant fragments, concentrated mainly in recrystallised dolomite Original percentage difficult to estimate - possibly 2-3%	10%	
1.1		0.9	82	12							
0.5		0.5	100								
1.2		0.5	100								
0.5		0.5	100								
0.5		0.5	100								
0.8		0.8	100								
0.7		0.5	71								
1.5		0.8	53								
1.5		0.7	47								
1.5		0.7	47								
0.9		0.4	100								
0.4		0.4	100								
0.8		0.8	100								
1.2		0.8	67	8							
0.3		0.3	100								
0.6		0.6	100								
0.4		0.4	100								
1.6		0.4	25								
0.6		0.5	83								
0.6		0.6	100								
1.5		1.5	100								
0.8		0.8	100								
0.9		0.9	100								
1.0		1.0	100								
0.8		0.8	100								
1.3		1.3	100								
0.3		0.3	100								
1.5		1.5	100								
0.4		0.4	100								
0.8		0.8	100								
1.2		0.8	67	4							
0.3		0.3	100								
0.6		0.6	100								
0.4		0.4	100								
1.6		0.4	25								
0.6		0.5	83								
0.6		0.6	100								
1.5		1.5	100								
0.8		0.8	100								
0.9		0.9	100								
1.0		1.0	100								
0.8		0.8	100								
1.3		1.3	100								
0.3		0.3	100								
1.5		1.5	100								
0.4		0.4	100								
0.8		0.8	100								
1.2		0.8	67	0							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G.BROADBENT date: 9/3/80

HOLE No. MBD 29A
LOG SHEET 2 OF 3
from 0 m. to 48.0 m.

Continued from page 2

48.2 - 51.6 ? DOLOMITE SULPHIDE LODE INCLUSION

Granular recrystallised dolomite, grey qtz and calcite, magnesite(?) with dark greenish blue hard ?serpentinite in thin zones and irregular patches of pale grey talc.

Extensively veined with carbonates, fluorite, qtz and py.

51.6 - 61.1 As for 41.6 - 48.2, extensively sheared and veined.

57.2 - 61.1. Stockwork of dolomite / pale brown sp? veins

61.1 - 65.50 DOLOMITE SULPHIDE LODE

Mottled brassy yellowish green / grey due to pyrite and granular recrystallised qtz and carbonates.

Some finely banded carbonates and fluorite with a hard bluish mineral in lower 2.5 m, and some bronze pyrrhotite.

65.5 - 78.87 RECRYSTALLISED DOLOMITE.

See 35.0 - 39.2 m on page 2.

Some yellowish and greenish talcose alteration assoc. with post - recrystallisation shearing - patches up to 5 cm with fractures.

69 - 72 Recrystallised carbonates are vuggy, with minor blue fluorite in cavities.

75.9 - 78.4 Dark grey recrystallised dolomite with thin films of almost black material on brecciation fractures. Some weak greenish talcose alteration

78.4 - 78.87 Almost massive py, which extends into upper 20 cm of siltstones and shales.

78.87 - 89.0 SILTSTONES AND BLACK SHALES, MINOR QUARTZITES

Brecciated and weakly silicified. Sub angular clasts of grey siltstone in an almost black clay rich siltstone matrix. Some faintly greenish, disrupted intervals of clay rich siltstones, quite well bedded, with quartzite beds to 0.5 m and thin pale grey siltstone beds (quartzose) to 1 cm.

Finely fractured near contact - thin clay films along fractures - extent of broken zone decreases with depth.

END OF HOLE 89.0 m.

Depth	Drill advance	Core length recovered	% recovery estimate or core length recovered	Lost core zone	Drill log depth tag	Depth pointer	Graphic log	Depth pointer	Structural and vein information	Mineralisation	Visual estimate mineralisation %	Notes
48	3.0	2.5	80				8/7		← Contact indistinct, 35°	48.2 - 51.6 py > fluorite, trace sp'. Py as granular aggregates, and in veins with qtz, carbonates, fluorite. Fluorite is finely disseminated throughout and in veining. (7-10%)	20-25%	
	0.1	0.1	100						← 50.4 small fault			
	0.7	0.7	100						← 50.9 200mm massive py, marcasite, carbonate, fluorite.			
	1.3	1.3	100						- Contact indistinct.			
51	1.8	1.8	100				1			51.6 - 58.4 py, fluorite, trace sp, cassiterite. Rounded dissem grains to 3 mm. Dolomite - fluorite - qtz - sp - py veining, increasing towards base.	10-15%	
	3.2	3.2	100						← 56.4 80 mm mineralised zone - fluorite 20%, Py 20%, arsen 10%, carbonates 15%.			
									← 57.2 - 58.4 dolomite breccia zone, 10% porphyry, 10% dolomite veins, trace fluorite, sp at 30° to CA.			
54									← 58.8 0.5 m dolomite vein, 40°.	58.4 - 61.1. Mineralisation as for 51.6 - 58.4, with 30% dolomite - fluorite - sp - py veining (stockworks)	40-50%	
	3.1	3.1	100						← Contact irregular, 65°.			
57	0.9	0.9	100				5/8			61.1 - 63.0 py >> po, fluorite 5%, cassiterite as b.g. aggregates 3%, trace ga, arsen, sp, cp.	10%	
							8/4		← Contact 40°	63 - 65.5 po >> py, fluorite 3-5%, cassiterite 1-2%, trace ga, sp, arsen, cp. Fine granular aggregates, blebs po to 2 mm.	10%	
	3.0	3.0	100				3			65.5 - 69.0 Fluorite, weak trace py, sp in brecciation cavities with recryst. carbonates	1-2%	
60	3.0	3.0	100							69.0 - 75.9. Weak trace fluorite, py, sp as above, 65.5 - 69.0		
	3.0	3.0	100						Breccia zone - small fault.			
63	0.5	0.5	100									
	1.3		0									
	1.2	1.2	100							75.9 - 78.4 py, trace arsen as blebs and grains in breccia infillings	3-5%	
66	3.0	3.0	100				5/8		← Gradual change through massive py.	78.4 - 79.1 Vuggy, Py, trace marcasite, arsen, cassiterite? Py		
	3.0	3.0	100						← 79.0 Bedding 60°	79.1 - 89.0 py > po, Py finely dissem in siltstones and as irregular blebs to 3 x 7 mm. Po as sparse rounded blebs to 2 cm. Carbonate - fluorite - py veining, some rare irregular masses to 7 x 6 cm - breccia zones? Veining decreases away from upper contact.	5-7%	
69	3.0	3.0	100						← 81.6 Bedding 30°			
	3.0	3.0	100						← 83.5 Bedding 45°			
72	3.0	3.0	100						← 86.4 Bedding 65°			
	3.0	3.0	100						← 88.9 10 mm dolomite - sp vein, 80°			
75												
78												
81												
84												
87												
90												
93												
96												

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF

Logged by: G. BROADBENT date: 9/3/80

Proposed 8/6/80

HOLE No. MBD 29A

LOG SHEET 3 OF 3

from 48.0 m. to 89.0 m.

MBD 30

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS. INST. MIN. METALL. - 1976

028458

INTERVAL	DEPTH from-to : ROCK UNIT / Depth : Description and notes	MINERALISATION
0-3.0 (3.0)	TRILONE TO 3m - NO CORE.	
3-53.2 (50.2)	DOLOMITE WITH QUARTZ AND CALCITE.	3-9.5 Recovery < 1%, impossible to estimate
	3.0-9.5 Recovery < 1% - some fragments of creamy coloured dolomite, some grey shale and pinkish weathered porphyry (overburden?). Possible originally DSL? (at least in part)	
	9.5-53.2 Pale grey dolomite with bleached creamy coloured sections (weathered) to 1.5m. Minor recrystallisation - segregation of white carbonates and qtz in small ill defined grains to 2mm occurs in patches to 10 cm. Small zones are brecciated, angular fragments with dark grey margins cemented with carbonates and qtz. Later fracturing - broken core, locally reduced to rubble.	9.5-23.7 Finely disseminated py, trace po in brecciation fractures. Py, sp in blebs, mostly 2-3 mm, sometimes 3×2 cm, concentrated in breccia zones. Total 3-5%.
	23.7-49.0 FAULT ZONE - very broken and shattered core - dolomite fragments < 5 cm, porous and chalky with patches of soft white puggy matrix still intact. Recoveries poor - 20%	23.7-53.2 Weathered - weak trace py in some fragments.
	49-68.0 Pieces of core to 30-40 cm, separated by small faults/puggy zones - large core losses.	
	68.0-95.0 Broken core, but recoveries quite good.	
53.2-73.6 (14.8)	53.2-68.0 FAULTED DOLOMITE SULPHIDE LODE with some minor fine grained porphyry (70.5-71.0, 71.9-73.6m)	Py, trace po, weak trace arsco, sp. Pyrite is disseminated and intergrown with qtz-carbonate, pitted and porous. Po occurs intergrown with py. Sp as blebs 2-3 mm, rarely 20×10 mm. Arsco in well formed xtls 1-2 mm. Total 20-30%
	53.2-62 Core very weathered and broken - greyish weathered rock fragments and soft puggy material. Mostly recrystallised carbonates and qtz with minor greenish talcose alteration, some fragments relatively unaltered dolomite	
	62-68 Fragments soft grey talc, carbonates, qtz	
	68-70.5 Recrystallised creamy yellow carbonates + dolomite - calcite with some magnesite and qtz	68-70.5 Py etc TOTAL 5%.
	70.5-73.6 Mixture - f.gr porphyry as below, alternating with qtz-carbonate DSL - sad sepentinite rich (?)DSL.	70.5-73.6 Fluorite, py trace sp 3-5%.
73.6-82.9 (9.3)	73.6-82.9 MASSIVE SILTSTONES with minor SILTY SHALES.	Trace py, carbonate, qtz, fluorite in small veinlets, weathered < 1%.
	Siltstones, grey, hard and silicified, with fine contorted bedding laminations and brecciation. Shales are dark grey, thinly interbedded. Core is well fractured but recovery good. Rare inclusions of micro-porphyry as below, to 15 cm.	
82.9-93.3 (10.4)	82.9-93.3 'Aplitic looking' QUARTZ FELSPAR PORPHYRY. Broken contact 25° →	Fluorite, trace py. Fluorite as small dark purple and brown phenocrysts to 2 mm. Py as rare phenocrysts, and in thin veinlets. TOTAL 1-2%.
	Fine grained yellowish and greenish grey matrix, weakly banded. Phenocrysts - Qtz 3-5%, well formed to 2 mm. Felspar - variable 0-10%, 1-2 mm creamy white phenocrysts with poorly defined outlines. Some are brownish and altered.	
	Irregular contact, 75° →	
93.3-95.0 (1.7)	93.3-95.0 FINE GRAINED QUARTZITE Hard, dark grey, well bedded. Bedding 40° →	Py, qtz thin veinlets, finely disseminated py 3%.
	END OF HOLE 95.0m	

5 cm

ALTER TYPING THIS SIZED FROM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG

Scale 1:1000, (1:500) 1:250 (Also reduced to A4)

Prepared by: G BROADBENT
Date: 4/3/80

HOLE No. MBD 30
Sheet of

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97265		34.0	36.0	2.0	50									
66		36.0	38.0	"	60									
67		38.0	40.0	"	28									
68		40.0	42.0	"	24									
69		42.0	44.0	"	85									
270		44.0	46.0	"	75									
71		46.0	48.0	"	48									
72		48.0	50.0	"	240									
73		50.0	52.0	"	180									
74		52.0	54.0	"	110									
75		54.0	56.0	"	2150									
76		56.0	58.0	"	1200									
77		58.0	60.0	"	210									
78		60.0	62.0	"	14									
79		62.0	64.0	"	18									
280		64.0	66.0	"	46									
81		66.0	68.0	"	18								22	Re check of Check Ass.
82		68.0	70.0	"	46									
83		70.0	71.9	1.9	50									
84		71.9	73.9	2.0	85									
85		80.9	82.9	2.0	70									
86		82.9	84.9	"	110									
87		84.9	86.9	"	90									
88		86.9	88.9	"	100									
89		88.9	90.9	"	120									
90		90.9	93.5	2.6	100									
91		93.5	95.0	1.5	32									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 30A

SAMPLE TYPE : DRILL CORE FROM 34.0 TO 95.0

028459

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97725		3.5	5.0	1.5	400									
26		5.0	6.5	1.5	2350									
27		6.5	8.0	"	4050									
28		8.0	9.5	"	4550									

Notes :—

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 30B

SAMPLE TYPE : DRILL CORE FROM 3.5 TO 9.5

SLUDGE

028160

REPORT No. 028461

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-30

Prospect, area, project or mine: MOUNT BISCHOFF

HOLE No. MBD30

COLLAR LOCATION

Grid name | Rectangular space co-ordinates

	Grid name	PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	1859.96 N	1139.93 E	626.69
(2)		N	E	
(3)	Aust. Map Grid PRECISE / APPROX.	mE	mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA.

Mineral Tenement: EL 13/79. | Holder: METALS EXPLORATION LTD.

Cadastral location and details: CROWN LAND/PRIVATE

W.C. Bearing from collar
- magnetic
- — grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar: 90°

Total length: 95.0 m

Commenced: 1 / 2 / 80

Completed: 11 / 2 / 80

Drilling contractor: LONGYEAR AUST PTY. LTD.

Rig type: LONGYEAR BBS 1

Details of down hole location-survey methods: TROPARI every 30 m.

Purpose of drilling and anticipated lengths to targets: To investigate nature of dolomite horizon and any possible tin mineralisation 0-70 m. Planned depth of hole 80 m.

Core size and non-coring (NC)

TRICONE	0	TO	3.0
NQ	3.0	TO	95.0 m
		TO	
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type: Magnetic	DIP
32.5 m	111	90°
62.5 m	359°	90°
92.5 m	271° 30'	81°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No.		FIELD ROCK NAME, ETC
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Symbols and abbreviations for drilling notes column.

LOGGED BY	LOGGED BY	LOGGED BY
G. BROADBENT		
FROM 0 TO 95.0 m	FROM ____ TO ____	FROM ____ TO ____
DATE 19.2.8	DATE ____	DATE ____

Company managing exploration programme: METALS EXPLORATION LTD.

HOLE No. MBD 30

Log sheet 1 of 3

028462

TRICONE TO 3.0m - NO CORE.

3.0 - 9.5 DOLOMITE ?

Recovery minimal - some fragments of creamy coloured dolomite and some pieces of pinkish cream weathered porphyry (probably mudlock).

9.5 - 53.2. DOLOMITE WITH QUARTZ AND CALCITE.

FAULTED

Pale grey dolomite where unweathered, with yellowish and brownish tints due to weathering. Highly fractured, crumbly intervals to 1.5 m, often with substantial core losses - faulting.

The rock has suffered minor recrystallisation (pre-faulting) - some segregation of qtz and calcite in small ill defined patches to 2mm, and remobilisation/recrystallisation of qtz and carbonates along an earlier generation of brecciation fractures; patches of grey quartz and white carbonates to 5x6 cm.

26 - 27.7 Lost core zone.

DRILL ADVANCE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED	LOST CORE ZONE	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
5.0	4	0.2	TRICONE TO 3.0m - NO CORE.								
			3.0 - 9.5 DOLOMITE ? Recovery minimal - some fragments of creamy coloured dolomite and some pieces of pinkish cream weathered porphyry (probably mudlock).	4		2/3/F		9 - 9.5 Originally fault pug - shattered and bleached.	3.0 - 9.5 trace py, in sparse recryst dolomite fragments.	< 1%	
1.5	33	0.5		8							
1.5	100	1.5	9.5 - 53.2. DOLOMITE WITH QUARTZ AND CALCITE. FAULTED Pale grey dolomite where unweathered, with yellowish and brownish tints due to weathering. Highly fractured, crumbly intervals to 1.5 m, often with substantial core losses - faulting. The rock has suffered minor recrystallisation (pre-faulting) - some segregation of qtz and calcite in small ill defined patches to 2mm, and remobilisation/recrystallisation of qtz and carbonates along an earlier generation of brecciation fractures; patches of grey quartz and white carbonates to 5x6 cm.					9.5 - 18.5 Well fractured and sheared. core is well broken and sometimes soft and porous.	9.5 - 53.2 py, sp, rare grains po in remobilised carbonates, as blebs to 2x3mm and in thin veinlets. Original percentage difficult to estimate, probably between 1 and 3%. Concentration variable 0 - 10% over intervals 10m - 0.5 m. After 23.7 mineralisation estimation very difficult.	10%	
1.5	100	1.5		12							
1.1	100	1.1									
2.2	100	2.2		16							
1.2	92	1.1									
1.7	41	0.7		20				18.5 - 23.7 Very brecciated and broken, intervals of puggy material increase with depth.			
1.3	100	1.3									
2.2	95	2.1		24				23.7 - 49.0 Fault pug - recovery very poor, mainly washed dolomite fragments < 5 cm.			
0.8	38	0.3									
1.0	40	0.4									
1.0	40	0.4									
1.0	10	0.1									
				28							
1.7	0										
1.3	8	0.1									
0.5	100	0.5									
4.5	40	1.8		32							
1.0	20	0.2									
1.5	7	0.3		36							
1.5	27	0.4									
1.3	46	0.6									
0.7	43	0.3		40							
1.3	31	0.4									
1.7	0										
0.5	33	0.2									
1.2	33	0.4									
0.9	33	0.3		44							
1.1	100	1.1									
0.5	80	0.4									
0.9	11	0.1		48							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF

Logged by: G. BROADBENT date: 19/2/80

HOLE No. MBD 30

LOG SHEET 2 OF 3.

from 0 m. to 48.0 m.

028463

See Previous Page.

DRILL ADVANCE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED	LOST CORE ZONE	DEPTH from-to : ROCK UNIT (capital letters, underlined) — Depth : Detailed rock description and notes (indented about 15mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
5.0	40			48							
2.1	50							49 - ?53.2 Recovery improves marginally; shattered and broken core with lesser puggy material.			
9.1	44										
1.7	59			52							
			?53.2 - 58.0 FAULTED DOLOMITE SULPHIDE LODE.			8/4		← Broken Contact.			
3.0	27		53.2 - 62? Fragments of granular qtz - carbonate; some are slightly greenish and talcose. Matrix of grey and white soft puggy material with a silty texture, friable. Quite pyrite rich in intervals to 3m. vuggy, cellular pieces of remnant py with qtz - carbonate - talc.			8/6/5/F		53.2 - 58 Fault pug - high core losses.	53.2 - 68.0 pitted py, trace remnant arsco, sp and rare po. Intergrown with qtz, carbonates, pitted, with soft black material in interstices. Sp occurs rarely as blebs to 2 x 1 cm, mostly small blebs intergrown with py. Trace clear fluorite, as rare interstitial grains. Po is pitted and generally surrounded by weathered py. Originally total mineralisation < 10%.	30%
0.8				56							
2.0	25										
0.5	60							58 - 63 Slightly better recovery, still puggy and shattered.			
0.6	100										
1.0	90			60							
1.0	90										
0.9	50										
0.9	57		62 - 68 Fragments soft grey talcose carbonates, intergrown with qtz								
0.3	33										
0.4	27			64							
0.2	46										
0.3	18							From 68m onwards, puggy material decreases - core is well fractured and broken, but not as shattered. ← Contact Broken.			
0.6	75			68							
0.4	75		68 - 68.4 SILTSTONES. fragments of greenish-grey silicified siltstones			10		← Contact Broken.	Non Mineralised		1
0.3	50		68.4 - 70.5 RECRYSTALLISED DOLOMITE			3			68.4 - 70.5 py, trace sp as blebs and thin veinlets.		5-10%
0.2	67		Recrystallised creamy yellow dolomite fragments with minor qtz - calcite and pure white ? magnesite					← Contact Broken.			
1.5	100										
0.3	100										
1.0	90										
0.9	71		70.5 - 71.0 QUARTZ FELSPAR PORPHYRY. Hard greenish matrix, felspar 7%			1		← Contact Broken.	70.5 - 71.0 Non Mineralised		—
1.7	75		71.0 - 71.9 DOLOMITE SULPHIDE LODE. Granular qtz - carbonate with minor py, fluorite	72		8		← Contact Broken.	71.0 - 71.9 py, trace sp, some fluorite as blebs and grains to 3mm		10%.
0.4	100		71.9 - 73.6? HYBRID PORPHYRY / DOLOMITE SULPHIDE LODE? Soft black sepentinous (?) matrix alternating with hard medium grey fine grained material. Small creamy white felspar and purplish brown fluorite to 2mm, 3-5%. Sepentinous material is weakly foliated			7/1.		← Contact Broker.	71.9 - ? 73.6 Strong trace fluorite		1%.
0.3	100		73.6 - 82.9 MASSIVE SILTSTONES, minor SHALES. Grey, hard and silicified. Some finely bedded shales, and intervals of siltstone have finely laminated bedding < 2mm alternating clay rich siltstones/silty shales. Some medium grey quartzose siltstones to 2cm, some of which are slightly sandy. Extensively disrupted and broken by later fracturing.	76		10/(9).		← 79.1 Bedding 150 ← 81.0 Bedding 20° ← 82.3 15cm greyish microporphyry, 30°	76.6 - 82.9 trace pitted py, sparse thin carbonate - qtz veinlets.		< 1%.
0.4	100										
0.3	100										
0.2	100										
0.3	100										
0.4	100										
0.6	100										
0.4	100										
0.5	100			80							
0.9	100		82.9 - 93.3 'Aplitic - looking' QUARTZ FELSPAR PORPHYRY.			1		← Contact broken, 25° from fragment	82.9 - 93.3 Fluorite as dark purple or brown phenocrysts to 1.5mm, weak trace py to 2mm. Minor thin stringers py, fluorite, rare sp.		1-2%
0.9	89		82.9 - 86.6 Pale yellowish / grey matrix with poorly defined colour banding - flow structure?	84							
0.8	100/100		82.9 - 93.3 Phenocrysts: Qtz - well formed, to 2mm, 3-5% Felspar - small creamy white phenocrysts to 2mm, usually with diffuse outlines. Concentration variable from 0 - 20% over tens of cm, average 5-7%.								
0.7	100		86.6 - 91.0 Matrix slightly greenish medium grey, mottled and weakly banded.								
0.7	100			88							
0.7	100										
0.5	100										
0.6	100										
0.8	88										
1.4	93		91.0 - 93.3 Pale yellowish / grey matrix as for 82.9 - 86.6.	92							
3.0	100							← Contact irregular ≒ 75°			
3.0	100		93.3 - 95.0 FINE GRAINED QUARTZITE. Hard dark grey well bedded quartzite, slightly micaceous. Scale of bedding 1-2cm, minor disruption and brecciation, well fractured.			11		← 93.8 Bedding 50° ← 94.7 Bedding 30°	93.3 - 95.0 py as thin veinlets and stringers with qtz, some finely dissem.		3%.
			END OF HOLE 95.0 m.	96							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date 19/2/80

HOLE No. MBD 30
LOG SHEET 3 OF 3
from 48.0 m. to 95.0 m.

MBD-31

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capitals, letters, underlined) Depth : Description and notes (inserted about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH NO.9 AUSTRALAS. INST. MIN METALL. 1976

028464

0	(1.5m)	TRICONE TO 1.5m - NO CORE.	
5	(6.0m)	1.5-7.5 QUARTZ FELSPAR PORPHYRY Brownish-grey fine grained matrix, well fractured and broken, with bleaching and removal of material by weathering. Qtz - rounded and irregular turbid phenocrysts to 6 x 5 mm. Felspar not apparent - possibly removed by weathering? Broken contact →	Pyrite, porous and pitted, some grains up to 3mm. TOTAL 10%
10	(9.5m)	7.5-17 FAULTED DOLOMITE SULPHIDE LODE. Very faulted and broken - recovery 25-30%. Mostly residual pyrite, with qtz grains in a matrix of sticky black clay. Some intervals of fine grained ochreous grey pug with very little sulphide - faulted weathered dolomite? Some rare fragments of weathered porphyry (apophyses?) Broken contact →	Py 40-50%, porous, pitted, in almost massive fragments
20	(9m)	17-26 FAULT ZONE Laminated black puggy clay with minor intercalations of fault breccia - clasts of pale grey dolomite and bluish green (?) serpentine with pyrite fragments in a brownish or black puggy matrix. The laminated clay has a banding of silt and clay size grains 1-5mm, and a shiny parting along the fine grained laminations Broken Contact →	Py in fragments in breccia zones 2-3%.
25	(8m)	26-34.0 Weakly altered DOLOMITE. Some fragments DSL in top 4m, with heavy pinkish	Py in upper 4m as porous aggregates
	(1.5)	LOST CORE ZONE	?
30	white	altered dolomite, lower 4m is brecciated unmineralised washed dolomite fragments, some in a matrix of soft white pug. Recovery poor Broken contact →	with quartz intergrown. TOTAL 10%.
35	(8.5)	34 - 38.3 Brecciated grey siltstones, sandstones and silty shales. Quartzose Siltstones, sandstones are hard and silicified, medium grey. More clay rich siltstones and shales are a darker grey and softer. Very fractured and broken - core reduced to rubble. 38.3 - 41.0 Grey quartzite? - weakly banded 50 CCA with sparse 1-2mm cavities. Well fractured and broken. 41 - 42.5 Friable soft white fine grained fault pug. Originally siltstone? →	Nil - possibly removed by weathering.
45	(9.5m)	LOST CORE ZONE. - SILTSTONES AND QUARTZITES? Sludge samples - grey qtzite fragments and white qtz grains with some minor grains Py.	Trace Py in sludge samples.
50	(1.0)	52-53.0 GREY SILTSTONES AND SILTY SHALES Bedding 25° Bedding 30° →	Trace thinly bedded Py
55		END OF HOLE 53.0m. The interval 7.5-52m has been badly crushed and broken by faulting, with attendant removal of diagnostic mineral assemblages by a combination of cataclasis and subsequent weathering. Total core recovery: 30%	
60			

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD. EXPLORATION DEPARTMENT

SUMMARY DRILL LOG Scale 1:1000, 1:500, 1:250

Prepared by: G. BROADBENT. Date 11/3/82

HOLE No. MBD 31

Sheet of

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
977292		1.5	3.5	2.0	2350		470	65	70	2	30	360		
93		3.5	5.5	"	410		290	100	5200	2	20	210		
94		5.5	7.5	"	4300		310	55	910	1	25	260		
95		7.5	9.5	"	1.02%		1200	85	26	1	70	5300		
96		9.5	11.5	"	860		930	4	550	<1	<10	540		
97		11.5	13.5	"	410		850	14	1600	<1	<10	820		
98		13.5	15.5	"	1.42%		500	90	1500	<1	80	1350		
99		15.5	17.5	"	3350		540	440	9800	3	65	9400		
976600		17.5	19.5	"	3600		920	740	2.50%	7	75	9160	2500	Re check of check assay
01		19.5	21.5	"	5900		520	170	1.20%	1	55	800		
2		21.5	23.5	"	3450		430	100	7100	<1	40	600		
3		23.5	25.5	"	5100		410	120	4200	1	60	1750		
4		25.5	27.5	"	2850		430	40	2500	<1	10	320		
5		29.0	30.4	1.4	1000									
6		30.4	32.0	1.6	130									
7		32.0	34.0	2.0	85									
8		34.0	36.0	"	290									
9		36.0	37.8	1.8	330									
10		39.3	41.0	2.7	1000									
11		41.0	42.5	1.5	65									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 31A

SAMPLE TYPE : DRILL CORE FROM 1.5 TO 42.5

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97732		7.0	8.5	1.5	2.76%									
33		8.5	9.5	1.0	3.22%									
34		9.5	11.0	1.5	5900									
35		11.0	12.5	"	2150									
36		12.5	14.0	"	4300									
37		14.0	15.5	"	1.28%									
38		15.5	17.0	"	7700									
39		17.0	18.5	"	9300									
740		18.5	20.0	"	9600								1.05	pulp check
41		20.0	21.5	"	9100									
42		21.5	23.0	"	7900									
43		23.0	24.5	"	8700									
44		24.5	26.0	"	8100									
45		26.0	27.5	"	4600									
46		27.5	29.0	"	5700									
47		29.0	30.5	"	4500									
48		30.5	31.5	"	2550									
49		32.0	33.5	"	4000									
750		33.5	35.0	"	1150									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 31 B

SAMPLE TYPE : DRILL CORE FROM 70 TO 35.0

SLUDGE

028466

028467

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD·31

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 31

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1900·82 N	1182·75 E	642·85
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 85-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA.

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
- magnetic
- — grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 90°

Total length 53·0 m.

Commenced: 12 / 2 / 80
Completed: 17 / 2 / 80

Drilling contractor LONGYEAR AUST PTY LTD

Rig type LONGYEAR BBS 1

Details of down hole location-survey methods.
TROPARI every 50 m.

Purpose of drilling and anticipated lengths to targets.
To investigate possible tin mineralisation in dolomite 7-45 m.
Planned depth of hole 50 m.

Core size and non-coring (NC)

TRICONE	0	TO	1·5 m
NQ	1·5	TO	53·0 m
		TO	
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type	DIP
50·5 m	058°	89°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No.	FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY S. BROADBENT FROM 0 TO 53 m DATE 22 2 80
LOGGED BY ____ FROM ____ TO ____ DATE ____
LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 31
Log sheet 1 of 2

028468

TRICONE TO 1.5 m - NO CORE.

1.5-7.5 QUARTZ FELDSPAR PORPHYRY.

Porous granular grey fine grained matrix, weathered. With fractured and faulted clasts, mostly crumbling, bleached and brighter zones dividing 50% porous, relatively coherent fine intervals of porphyry.

Phenocrysts - Quartz - rounded and irregular phenocrysts to 6-8 mm, 20%

Feldspar - not apparent, either removed by weathering or altered to resemble quartz.

1 | 1.5-7.5 pitted and porous pg. as discrete grains to 4 mm, also trace sp. completely leached out pockets to 1cm size. | 10%

7.5-17.0 FAULTED DOLOMITE SULPHIDE ORE?

Faulted and broken. Residual pyrite with lesser quartz and carbonate fragments in a matrix of pyritic black clay. Some intervals of coherent grey fine grained pyritic rubble with very little sulphide.

An examination of sludge samples reveals residual pyrite, grey quartz and sparse carbonate fragments.

14 m - 20 cm piece of fine grained qtz porphyry.

8 | 8/F/15 | 7.5-8.2 Faulted and sheared - subsequent weathering has removed diagnostic mineral assemblages, making identification doubtful. Overall recovery in core over 80%.

12 | 7.5-17.0 pg. 40-50% as porous pitted fragments. Some sparse fluorite grains and heavy black carbonate? in sludge samples. | 40-50%

16 | ∠ Contact Broken

17.0-26.0 FAULT PUG

Fine grained laminated black pyritic clay, soft, friable, with occ. shiny fracture interbedded with reddish laminae to 5 mm - more silty and brittle. Some fragments of brecciated hard greenish serpentinite and crumbly carbonates with pyrite in - pyritic matrix - originally carbonate sulphide lode?

F/17 | 17.0-26.0 residual pg: trace fluorite and ? carbonate (2-3% in sludge samples) some porous pyritic fragments of pg with the dolomitic/serpentinous fragments. | 3%

20 | ∠ Contact Broken

24

26.0-34.0 FAULTED DOLOMITE ?

Intensely veinly recrystallized dolomitic fragments with soft white pyritic matrix.

27.5-29.0 LOST CORE ZONE.

Some coarse greenish serpentinite fragments in upper 4 m one fragment of a hard heavy pinkish brown carbonate as found in other faulted dolomite sequences at 32.5 m.

3/F ? | 26.0-30.4 fragments pg with recrystallized qtz fragments | 10%

28 | NC | 27.5-29.0 NO CORE.

26.0-30.4 Soft matrix

30.4-34.0 Weathered-transitional

32

34.0-38.3 SILTSTONES, SANDSTONES, minor SHALES

Siltstone and quartzite fragments with soft grey pyritic/clastic fragments, apparently once quite well bedded.

Some coarse greenish serpentinite? fragments - once clastic(?) noticed from bottom of dolomite!

Pitted and porous due to weathering of pyr(?) - Fe sulphates

11 ? / 10/11/9 | 34.0-38.3 No mineralisation - fine weathered.

36

37.8-38.3 LOST CORE ZONE.

N.C.

37.8-38.3 NO CORE

38.3-41.0 QUARTZITE ?

Banded grey to pink hard rock with small holes to 1.5 mm. Quite similar to microporphyry in MBD 23, but appears to be clastic rather than crystalline.

11 ? / 1 ? | 38.3-41.0 No mineralisation - weathered.

40

41.0-42.5 FAULT PUG - ? SILTSTONE or ? PORPHYRY

Friable fine grained soft white pyrite.

F/10? | 41.0-42.5 Unmineralized - leached.

42.5-52.0 LOST CORE ZONE.

Sludge samples have fragments of fine grained grey siltstones, greywackes, and residual qtz grains with a trace of pyrite.

44 | N.C. (10/11?) | 42.5-52.0 No core, trace pg in sludge samples. | <1%

48

52

52.0-53.0 SILTSTONES AND SILTY SHALES

Well bedded pale grey, fissile siltstones and dark grey/green siltstones, shales 1-2 mm.

10/9 | ∠ 52.0 Bedding 25° ∠ 52.0 Bedding 30° | 52.0-53.0 Trace highly oxidized pg in shaley beds | <1%

END OF HOLE 53.0 m.

56

60

64

68

72

76

80

84

88

92

96

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth . Detailed rock description and notes indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISENOFF

Logged by: C. BROADBENT date: 22/2/84

HOLE No. MBD 31

LOG SHEET 2 OF 2

from 0 m. to 53.0 m.

Received 8/5/84

MBD 32

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10 mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS. INST. MIN. METALL. - 1976

028469

Depth	Interval	Description	Mineralisation
0	~~0-3.0~~ (3m)	TRICONE DRILLED - NO CORE.	
	~~3.0-7.31~~ (4.31m)	3.0-7.31 QUARTZ FELSPAR PORPHYRY. Matrix off-white and fine grained, with some pale grey patches. Qtz -11 % as phenocrysts to 7×4mm, mostly 2×3mm Felspar - creamy white and altered, 3-5%. Bleached by weathering along fractures, with deposition of brown Fe oxides on fronts parallel to bleaching. 6.3-7.3 Finer grained Qtz 10%, Felsp. 1%	py, trace sp and rare f.gr ?cassiterite. Py is pitted and weathered to ?haematitic reddish Fe oxides. Some places bleached and completely removed. Occurs as discrete rounded grains and f.gr. aggregates to 4mm. 6.3-7.3 reduced in size to 2mm. TOTAL 10%.
	~~7.31-30.0~~ (22.69)	7.31 - 30.0 MASSIVE SILTSTONES AND SANDSTONES with minor SILTY SHALE LAMINAE. Massive, poorly bedded, brecciated (soft sediment disruption) Bedding difficult to determine. The core is a medium grey and medium hard, with occasional very hard bluish grey silicified intervals. Badly fractured and broken by two sets of intersecting fractures, reduced to rubble for runs of 2-3m. Some micro faulting visible in unbroken core - displacements < 1 cm. 19 - 30.0 Fracturing decreases - core is less broken, but still well jointed. 24.7 - 30.0 Siltstones acquire a distinct bedding lamination - thinly interbedded glauose and darker grey clay rich siltstones with some faintly greenish silty shales. Some thin bedded clay laminae (<1mm). Minor brecciated intervals, some weak folding and contortion. Sandstone beds become smaller, < 1m. Contact 75° Bedding 40° → Bedding 40° → Bedding 55° → Bedding 35° → Bedding 30° →	py, some qtz as irregular veinlets and stringers. Some lining fracture surfaces. Some blebs and fine disseminations in sandstone beds. Fracture surfaces are lined with fine black puggy clay - weathered py? TOTAL 1-2%. 17.5 - 20.6 2% pyrite in dendritic f.gr. aggregates surrounding fine fractures. 24.7 - 30.0 Some sparse qtz - py veinlets near top of interval, otherwise barren.
30		END OF HOLE 30.0 m.	

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 28.2.80

HOLE No. MBD 32
Sheet of

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97612		3.0	5.0	2.0	2000									
13		5.0	7.3	2.3	1800									
14		7.3	9.3	2.0	1000.									
SLUDGE														
97781		0.0	3.0	3.0	5000									

Notes :— Sn by XRF Bi method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 32

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 9.3

0438

REPORT No. 028471

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-32

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 32

COLLAR LOCATION

Grid name | Rectangular space co-ordinates

	PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1939.99 N	1180.06 E	645.59
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND/ PRIVATE

W.C. Bearing from collar
- magnetic
- — grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 90°

Total length 30.0 m.

Commenced: 18/2/80
Completed: 20/2/80

Drilling contractor LONGYEAR AUST PTY LTD

Rig type LONGYEAR BB-1

Details of down hole location-survey methods.
Acid-etch (TROPARI wet-unsuccessible).

Purpose of drilling and anticipated lengths to targets.
To investigate possible tin mineralisation in 'White Face' porphyry Dyke 8.26 m and in dolomite 0-3.0 m. Planned depth of hole 30.0 m.

Core size and non-coring (NC)

TRICONE	0	TO	3.0 m.
NQ	3.0	TO	30.0 m.
		TO	
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type —	DIP
29.5		90°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No.	FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY G. BROADBENT FROM 0 TO 30.0 m. DATE 24/2/80
LOGGED BY ____ FROM ____ TO ____ DATE ____
LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme. METALS EXPLORATION LTD

HOLE No. MBD 32
Log sheet 1 of 2

028472

DRILL ADVANCE	LOST CORE ZONE	% RECOVERY ESTIMATE	CORE LENGTH RECOVERED	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
1.5		100	1.5	TRICONE TO 3.0 m - NO CORE.								
0.8		100	0.9	3.0 - 7.31 QUARTZ FELSPAR PORPHYRY. Matrix greyish white and finely crystalline, with some sparse light grey silicified patches. Bleached and pitted, with weathering fronts of brownish Fe oxides surrounding fracture planes. Phenocrysts: Qtz - rounded grains 1 x 7 x 4 mm, 15%; Felspar - hard, brownish and altered 3-5%. 6.3-7.3 Qtz - max 2 mm, 10%; Felspar - max 2 mm, < 10%.	4		1			3-6.3 m pitted py, trace sp as rounded grains and irregular f.gr. aggregates to 4 mm. Some removed by weathering.	10%	
2.8		100	2.7						← Contact 75°	6.3-7.31 py, trace sp, tourmaline?, originally 15-20%, 2 mm. max	10%	
0.8		100	0.8	7.31 - 24.7 MASSIVE SILTSTONES AND QUARTZITES. Grey quartzose sandy siltstones, massive and poorly bedded with occasional silty shale beds < 2 cm. Quartzites are hard, bluish grey and brecciated, up to 0.7 m thick. Extensively fractured and sheared - two sets of intersecting fractures < 40° LCA, pitted by weathering (removal of Fe sulphides?). Minor microfaulting and soft sediment brecciation. Some f.gr black puggy material on joint surfaces	8		10/11		← 9.0 Bedding 40°	7.31-17.5 py, sparse disseminations and in irregular thin veinlets and stringers with qtz.	1-2%	
0.5		100	0.5						← 11.6 Bedding 30°			
0.7		75	0.7									
0.4		75	0.3									
8.0		100	9.0		12							
6.0		100	6.0									
2.1		100	2.1									
0.7		100	0.7									
0.5		100	0.5									
0.7		100	0.7									
0.4		100	0.4		16							
0.6		100	0.6									
0.4		100	0.4									
0.2		100	0.2									
9.0		100	9.0	17.5 - 20.6 dark grey dendritic staining due to clots of finely disseminated sulphides, 2%.						17.5-20.0 py in fine grained dendritic aggregates in sandstones. Thin veinlets and stringers as above	2-3%	
8.0		100	8.0									
9.0		100	9.0		20				19 - 30.0 Core is less broken and fractured - partings along bedding, joints every few cm.			
5.1		100	5.1						← 20.75 Bedding 40°	20.0 - 24.7. As for 7.31-17.5 m, above.	1-2%	
7.0		100	7.0									
1.2		100	1.2									
0.9		100	0.9									
1.2		100	1.2		24				Gradual Change to.			
1.0		100	1.0	24.7 - 30.0 THINLY BEDDED SANDSTONES, SILTSTONES AND SILTY SHALES. Grey quartzose sandstone and siltstone beds to 10 cm, with interbedded faintly greenish grey clay rich siltstones and silty shales to 2 cm. Well bedded, with some minor folding and contortion and small intervals of soft sediment disruption to 0.5 m. Sparse thin yellowish bedded clay laminae to 1 mm - ? also pyrite? Fracturing decreases towards bottom of hole - fine clay filled fractures < 1 mm, approx. 40-50° LCA.	28		10/11/9		← 24.8 Bedding 55°	24.7-30.0, sparse thin qtz-py veinlets, mostly near top of interval.		
2.1		100	2.1						← 26.5 Small fold - axis 55°, plane 60°			
1.7		100	1.7						← 26.8 Bedding 35°			
0.5		100	0.5						← 28.9 Bedding 50°			
				END OF HOLE 30.0 m.	32							
					36							
					40							
					44							
					48							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: C. BROADBENT date: 24/2/80
Prepared 8/6/80

HOLE No. MBD 32
LOG SHEET 2 OF 2
from 0 m. to 30.0 m.

028473

OPEN FILE

MT. BISCHOFF TIN PROSPECT

EXPLORATION LICENCE 13/79

TASMANIA

REPORT ON STAGE 2B PROGRAMME

VOLUME 3

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15th August, 1980

028474

VOLUME 3

Diamond Drill Logs

MBD 33 to MBD 46

MBD-33

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (indented about 10 mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS
0	0-4.4m (4.4m)	0-4.4m DOLOMITE SULPHIDE LODE Core recovery poor - 5%. Fragments of pitted and porous residual pyrite with soft black clay in interstices. Some residual qtz grains in sludge sample and sand from core barrel.				Py, residual cellular structure and in sand from core barrel, sludge sample 90% (?)		
10	4.4m-30.0m (25.6m)	4.4m → 30.0m (end of hole) MASSIVE QUARTZOSE SILTSTONES AND SANDSTONES with THIN SHALE LAMINAE. Medium greys. Bedding defined by thin shale bands (<1cm) 4.4-15.6 Brecciated - soft sediment disruption, followed by extensive fracturing / microfaulting on two sets of planes ÷20° and 30° LCA which reduces the core to rubble. The massive beds have poorly defined bedding - rather featureless. Some are bluish grey and silicified - very hard. 15.6-30.0 Rock type identical to above, except that massive siltstone beds have a well defined bedding lamination - clean quartzose siltstones alternating with slightly darker grey siltstones on a scale of <2cm. Bedding 40° → Massive sandstones are featureless, and in intervals 10 cm → 2 m. Core is not quite so broken - decreased density of fractures, main parting is along shale beds with occasional small puggy fault zones (<10cm) Bedding 35° → and runs of broken core to 0.5m. Bedding 40° → Bedding 80° → Bedding 30° → Bedding 35° →				Py, trace PO, qtz. Finely disseminated in some sandstone beds, and in thin veinlets and stringers with qtz. Po occurs as rare blebs below 15.6m. Py pitted - some removal of material by weathering TOTAL: 1-2%		
20								
30		END OF HOLE 30.0m						

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

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METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, (1:250) (when reduced to A4)

Prepared by: G. BROADBENT
Date: 28-2-80

HOLE No. MBD 33
Sheet of

028476

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD.33

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 33

COLLAR LOCATION

Grid name | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1)	MBJV	1939.33 N	1220.06 E	649.00
(2)		N	E	
(3) Aust. Map Grid (PRECISE / APPROX.)		mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3
1:100 000 Sheet No. HELLYER 8015
State TASMANIA

Mineral Tenement EL 13/79
Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
- ____ magnetic
- — grid (1)
- ____ grid (2)
- ____ grid (3)
- ____ true

Inclination at collar 90°

Total length 30.0 m.

Commenced: 21 / 2 / 80
Completed: 22 / 2 / 80

Drilling contractor LONGYEAR AUST (TAS) LTD

Rig type LONGYEAR BBS 1

Core size and non-coring (NC)

NQ	0	TO 3.0 m.
		TO
		TO
		TO
		TO
		TO

Details of down hole location-survey methods.
TROPARI @ 30 m.

Purpose of drilling and anticipated lengths to targets.
To investigate nature and mineralisation of any extension to the main dolomite horizon 0-30.0 m. Planned depth of hole 40.0 m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Az-mith	DIP
29.5 m.	214°	90°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC.
____	☐	
____	☐	
____	☐	
____	☐	
____	☐	
____	☐	
____	☐	
____	☐	
____	☐	
____	☐	
____	☐	
____	☐	

Symbols and abbreviations for drilling notes column.

LOGGED BY	LOGGED BY	LOGGED BY
G. BROADBENT		
FROM 0 TO 30.0m.	FROM ____ TO ____	FROM ____ TO ____
DATE 23.2.80	DATE	DATE

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 33
Log sheet 1 of 2

026477

DRILL ADVANCE	% RECOVERY or ESTIMATE	CORE LENGTH RECOVERED	LOST CORE ZONE	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
3.0	7	0.2		Commenced coring 0.0 m. - recovery abysmal **0-4.4 DOLOMITE SULPHIDE LODE.** Fragments of pitted and porous residual py with soft black clay in interstices. (Originally po rich?). Sludge samples - trace qtz and rare grains carbonate with pyrite and black clayey material. Highly faulted and fractured, weathered.	0	F	5/8?					0-4.4 pitted residual pyrite 80% of recovered core and in sludge sample 3.0-4.5.	80%
1.5	13	0.2			4							
1.5	93	1.4		**4.4 - 15.6 MASSIVE SILTSTONES AND QUARTZITES.** Grey quartzose siltstone beds, occasionally sandy, massive and poorly bedded, with occasional silty shale beds < 2 cm. The quartzites are hard, bluish grey and brecciated to 0.5 m thick. Bedding is not well defined due to soft sediment disruption and brecciation, but a pronounced parting along shale beds Core is extensively sheared and broken, with two sets of intersecting shear-planes at 20° and 30° to C.A. and small puggy zones to 10 cm. Gradually becomes less disrupted with depth.	8		10/11					4.4-15.6. py as fine disseminations surrounding brecciation fractures - some beds have a 'spotted' appearance. Some sparse py stringers in zones up to 10 cm across.	1-2%
0.2	100	0.2										
0.8	100	0.8										
1.0	100	1.0										
1.1	100	1.1										
1.4	100	1.4			12				←11.0 Bedding 50°			
1.5	100	1.5										
1.0	100	1.0										
1.0	100	1.0										
1.6	100	1.6							←15.6 Bedding 40°			
1.3	100	1.3		**15.6 - 30.0 THINLY BEDDED SILTSTONES, SILTY SHALES WITH QUARTZITES.**	16		10/11/9		Gradual change over 1-2 m.	15.6-21.5 py, finely disseminated along bedding and in thin veinlets and stringers	1-2%	
1.3	100	1.3		As above, but massive siltstones are now quite well bedded, with a greater proportion of silty shales and a smaller proportion of quartzites. Gradually becomes darker grey and more carbonaceous with depth, less brecciated and fractured - mainly small puggy fault zones to 10 cm with short runs of broken core.					←18.5 Bedding 50°			
0.9	100	0.9			20				←19.6 Bedding 55°			
1.0	100	1.0										
1.4	100	1.4								21.5-30. py as above, some rare blebs po to 5mm		
1.4	100	1.4							←22.6 Bedding 40°			
0.8	100	0.8							←23.3 Bedding 80°		1%.	
1.2	76	0.6			24							
0.9	76	1.0							←25.5 Bedding 30°			
0.5	100	0.5										
0.8	100	0.8										
0.6	100	0.6			28				←28.0 Bedding 35°.			
1.2	100	1.2										
1.0	100	1.0										
				END OF HOLE 30.0 M.	32							
					36							
					40							
					44							
					48							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF

Logged by: G. BROADBENT date: 23/2/80

Prepared. 8/6/80

HOLE No. MBD 33
LOG SHEET 2 OF 2
from 0 m. to 30.0 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97098		0.0	4.4	4.4	130									
99		4.4	6.4	2.0	2150									
SLUDGE 97730		3.0	4.5	1.5	55									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 33

SAMPLE TYPE : DRILL CORE FROM 0.0 TO 6.4

0284-18

MBD-34

PTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10 mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS. INST. MIN. METALL. - 1976

028479

Depth	Interval	Description	Mineralisation
0	~~0-3.0~~ (3.0)	TRICONE TO 3.0m - NO CORE.	
	~~3.0-14.2~~ (11.2)	3.0-14.2 DOLOMITE SULPHIDE LODE, FAULTED. 3.0-30.0 Core highly fractured and broken - recoveries 20-30% 3.0-14.2. Residual cellular pyrite, with some granular qtz and rare fluorite in a matrix of puggy black clay. 13-14.2 some fragments greenish serpentinite/talc. (9) Broken contact	Py, trace fluorite, some vuggy carbonates 13.0m. Py is crystalline, porous and pitted, 70%
10			
	~~14.2-20.7~~ (6.5)	14.2-?20.70 GREY DOLOMITE (FAULTED) Recovery <20% Fragments unaltered grey dolomite in a matrix of stiff brown and black puggy clay. Broken contact	Py as blebs and grains, some small cellular fragments. Minor vuggy qtz-carbonate fragments. TOTAL 3%.
20	~~20.7-60.0~~ (39.3)	20.70 -60.0 MASSIVE SILTSTONES AND SANDSTONES. 20.7 -30.0 Recovery < 30%, LOST CORE 22.0 -24.0. Washed fragments grey silicified siltstones with some faintly greenish dark grey siltstones and minor shales and bluish grey quartzites. Some rare clasts almost black carbonaceous siltstone surrounded by greenish sericitic siltstone.	20.7-32.1 Mineralisation NIL.
30		30.0-42.0 Recovery slightly better - broken core separated by small puggy zones.	32.1-39.5 sparse veinlets py, carbonates qtz 1%
40		39.5-60.0 Massive dark grey sandstones, brecciated, with faintly greenish grey siltstone intervals and rare thin carbonaceous? shale laminae. Some sandstones are hard, silicified, bluish grey quartzites. 42.0-60.0 Core is fractured and broken, but recovery 90-100%	39.5-60.0 po, py, dissem. in some beds and as small blebs to 2mm. Py occurs in small veinlets and stringers with qtz and rare po. TOTAL: 2-3%.
50			54.5-57.1 py, po, dissem and as veinlets and stringers in quartzite 7%.
60		END OF HOLE 60.0m.	

5 cm

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 5.3.80.

HOLE No. MBD 34
Sheet of

THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

028480

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD. 34

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD34

COLLAR LOCATION

Grid name — Rectangular space co-ordinates

	PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1899.77 N	1220.02 E	646.75
(2)	N	E	
(3) Aust. Map Grid (PRECISE / APPROX.)	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar

	magnetic
–	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar 90°

Total length 60 m.

Commenced: 23 / 2 / 80

Completed: 27 / 2 / 80

Drilling contractor: LONGYEAR AUST PTY LTD

Rig type: LONGYEAR 38S1

Details of down hole location-survey methods.
TROPARI every 30 m

Purpose of drilling and anticipated lengths to targets.
To investigate a possible extension of the main dolomite horizon at 31-63 m. Planned depth of hole 70 m.

Core size and non-coring (NC)

TRICONE	0	TO 3.0
NQ	3.0	TO 33.6
BQ	33.6	TO 60.0
		TO
		TO
		TO

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Azimuth	DIP
35.5	200°	88°
	226°	87°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)
'DERWENT' PENCIL No. | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY N. BROADBENT
FROM 0 TO 60.0 m.
DATE 28.2.80

LOGGED BY
FROM TO
DATE

LOGGED BY
FROM TO
DATE

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 34
Log sheet 1 of 2

028481

TRICONE TO 3.0 m - NO CORE.

3.0 - 14.2 DOLOMITE SULPHIDE LODE

Highly fractured and broken - residual cellular pyrite in a matrix of sticky black clay. Some grey granular qtz intergrown with py and rare fragments of porous green serpentinite.

11.5 - 13.6 Sparse fragments siliceous and vuggy recrystallised carbonates and qtz.

13.0 - 14.2 Fragments of soft dark grey waxy serpentinite

F 8/15

7/6/5/F

c. 3.0 Fault zone - core recovery very poor, ground very friable and broken

c. Broken ground.

3.0 - 14.2 py: rare grains present in selvage samples. Py is pitted and porous, intergrown with qtz, carbonates and ground black clay filling interstices. Original percentage difficult to estimate - possibly some po has been weathered out.

10%

14.2 - ?20.70 FAULTED DOLOMITE

Fragments of bleached fine grained grey dolomite in a matrix of stiff brown and black puggy clay. Some minor pieces of recrystallised carbonates, and one piece of heavy pinkish brown Fe or Mn? carbonate.

18.3 - 18.6 Lost core zone.

2/F

14.2 - 20.7 Py as blebs etc in recrystallised qtz, carbonates. Some pieces porous py to 3 x 2 x 2 cm

2-3%

20.70 - 39.5 MASSIVE SILTSTONES, MINOR QUARTZITES

22 - 24 m LOST CORE ZONE.

20.70 - 39.5 Washed fragments of hard grey siltstone with some faintly greenish dark grey clay rich siltstones. Quartzite beds v hard, bluish grey and fine grained to 0.5 m, brecciated.

Extensively faulted to 30 m, brecciated and sheared 30 - 39.5 m. Some intervals of coarse ?soft sediment disruption - siltstone clasts in a contorted matrix of dark grey clay rich siltstones.

10/11

N.C.

10/11

20.70 - 32.1 Weathered - no mineralisation

32 - 24 No Core.

24 - 32.1 See above

30m - 42 m Core recovery improves, extensively broken with small puggy zones

32.1 - 39.5 py as thin films on fracture planes, with minor carbonates, qtz

1%

39.5 - 60.0 MASSIVE SANDSTONES / SILTSTONES

Dark grey finely silty bioturbated sandstones with intervals of quite well bedded siltstones / sandstones. The thinly bedded intervals are mainly silty sandstones / fine siltstones / interbedded beds to 20 cm, with some sparse clay rich greenish grey siltstones.

Some rare thin black carbonaceous laminae appear with increasing depth and greenish tinge to clay rich siltstones gradually disappears.

5/10

c. 42.8 Bedding 10°

c. 44.6 Bedding 20°

c. 47.5 Bedding 25°

c. 49.7 Bedding 33°

c. 52.0 Bedding 35°

c. 54.1 Bedding 55°

11

c. 59.5 Bedding 45°

39.5 - 54.5 py / py / siltstone in some beds, mm to small blebs to 2 mm. Sparse qtz - py veining stringers and veins

2-3%

54.5 - 57.1 py, py finely disseminated in veinlets with qtz, minor carbonates

7%

57.1 - 60.0 py, finely disseminated in sparse qtz, carbonate veinlets

1-2%

54.5 - 57.1 Very hard dark bluish grey greenish

57.1 - 60.0 Increased proportion of clay rich siltstones, dark grey, thinly bedded with minor disruption and contortion.

1/16

END OF HOLE 60.0 m.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDE of logs between fractures and veins CORE AXIS

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT GIBSON

HOLE No. MGD 34

LOG SHEET 2 OF 2

Logged by G. BROUGHENT date 28/2/90

from 0 m to 60.0 m

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97717		3.0	5.0	2.0	800									
18		5.0	7.0	"	460									
19		7.0	9.0	"	380									
20		9.0	11.0	"	130								320	pulp check.
21		11.0	13.0	"	370									
22		13.0	15.0	"	190									
23		15.0	17.0	"	55									
24		17.0	19.0	"	65									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 34A

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 19.0

02818

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97769		3.0	4.5	1.5	2050									
70		4.5	6.0	"	700									
71		6.0	7.5	"	300									
72		7.5	9.0	"	230									
73		9.0	10.5	"	310									
74		10.5	12.0	"	1200									
75		12.0	13.6	1.6	1350									
76		13.5	15.0	1.5	1050									
77		15.0	16.5	"	780									
78		16.5	18.0	"	700									
79		18.0	19.5	"	940									

028488

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 34B

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 19.5

SLUDGE

MBD 35

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (inserted about 10 mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH NO.9 AUSTRALAS INST. MIN. METALL. - 1976

028484

0	0-3.0 (3.0m)	TRICONE TO 3.0m - NO CORE.		
	3.0-49.8 (46.8m)	3.0-49.8 QUARTZITES AND THINLY BEDDED SILTSTONES. Highly faulted and fractured - fragments of light grey massive quartzite, thinly bedded siltstone and rare dark grey shale in a matrix of grey puggy clay. Some quartzites have sparse flakes of white mica, also some dark grey dendritic staining along fracture paths. 3-20.5 Max length of core 20-30 cm, broken by fractures 20 and 50° LCA, and puggy clay. Recovery poor. 20.5-27.1 recovery better, 90%. not as shattered. 27.1-45.2 Dark grey puggy clay, some fragments qtzite etc. 45.2-49.8 Mottled cream-white and brown-black puggy clay - faulted dolomite?		Sparse remnant pg, qtz as thin veinlets and stringers < 1%.
20				
40				
	49.8-67.6 (17.8m)	49.8-67.6 DOLOMITE, faulted. Creamy white, soft, friable in places bleached and patches of brown to black laminated puggy clay with dolomite fragments. Originally brecciated fabric, virtually unaltered clasts of dolomite separated by fine dark grey fractures. Some minor recrystallisation and rare fragments serpentinite/talc.	Broken.	Weathered - originally probably < 1%.
60				
	67.6-70.5 (2.9)	67.6-70.5 QUARTZ FELSPAR PORPHYRY Fine grained Qtz 1% Felspar 2-3%	Broken	Pg, trace fluorite, sp to 2mm 1-2%.
	70.5-85.0 (14.5)	70.5-85.0 SILTSTONES AND QUARTZITES, minor SHALES. Siltstones greenish grey and sericitic, sometimes quartzose, thinly bedded and brecciated, with intervals of dark grey fine grained quartzite, - non micaceous 70.5-74.7 Puggy grey clay with rock fragments 74.7-85.0 Highly broken, bedding and fracturing low angles LCA.	Broken	70.5-74.7 Sparse Grays pg, qtz 74.7-85.0 pg, qtz as thin veinlets and irregular stringers, 1% - locally 5%.
80				
		END OF HOLE 85.0m.		
100				

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD. EXPLORATION DEPARTMENT

SUMMARY DRILL LOG

Scale 1:1000, (1:500) 1:250 (where reduced)

Prepared by: G. BROADBENT

Date: 12.3.80.

HOLE No. MBD 35

Sheet of

028485

REPORT No.

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD 35

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 35

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1860.04 N	1179.97 E	640.91
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details CROWN LAND/PRIVATE

W.C. Bearing from collar
- magnetic
- — grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 90°

Total length 85.0 m

Commenced: 28 / 2 / 80
Completed: 5 / 3 / 80

Drilling contractor LONGYEAR AUST PTY LTD

Rig type LONGYEAR BBS 1

Details of down hole location-survey methods.
TROPARI every 40 m

Purpose of drilling and anticipated lengths to targets.
To investigate possible tin mineralisation in extensions to main dolomite horizon 0-74 m. Planned depth of hole 80 m

Core size and non-coring (NC)

TRICONE	0	TO	3.0 m
NQ	3.0	TO	85.0 m
		TO	
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type mA/mwh	DIP
40.0	210°	88°
85.0	310°	88°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No.	FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY G. BROADBENT FROM 0 TO 85.0 m DATE 10/3/80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme. METALS EXPLORATION LTD.

HOLE No. MBD 35
Log sheet 1 of 3

028486

TRICONE TO 3.0 m - NO CORE.

3.0 - 49.8 m. SANDSTONES and THINLY BEDDED SILTSTONES.

Highly faulted and fractured - rock fragments < 20 cm in a matrix of grey puggy clay. The sandstones are light grey in colour, quartzose and fine grained. Lesser fragments of dark grey clay rich siltstones and rare silty shales, thinly bedded. Some sandstone fragments are micaceous - small flakes of white mica visible throughout and concentrated on fracture surfaces. Sandstone beds probably originally massive to 1-2 m, with some soft sediment disruption and brecciation pre-faulting; sparse intervals of siltstone appear to be well bedded with only minor disruption.

33.8 - 49.8 Dark grey puggy clay, with occasional fragments of sandstone, quartzite and siltstone.

DRILL ADVANCE	CORE LENGTH RECOVERED	% RECOVERY ESTIMATE OR LOST CORE ZONE	DRILL LOG DEPTH TAG
1.0	0.3	30	
1.2	0.6	50	
1.5	0.3	20	
0.6	0.2	67	
0.1	0.1	100	
1.0	0.3	30	
0.4	0.3	75	
0.7	0.7	100	
0.5	0.5	100	
1.5	0.2	13	
0.8	0.7	88	
1.2	0.4	33	
1.0	0.8	80	
1.5	0.5	33	
1.5	0.6	40	
0.7	0.4	57	
0.8	0.8	100	
0.9	0.6	67	
0.6	0.6	100	
1.2	0.9	75	
0.7	0.7	100	
0.4	0.4	100	
0.8	0.7	88	
0.6	0.6	100	
1.2	0.9	75	
0.7	0.7	100	
1.0	0.6	60	
0.8	0.1	13	
0.6	0.6	100	
0.8	0.6	75	
1.1	0.8	72	
0.8	0.3	38	
0.8	0.5	63	
0.5	0.4	80	
0.8	0.6	75	
1.2	0.6	50	
1.3	1.2	92	
1.6	0.8	50	
1.4	0.8	57	
0.8	0.3	38	
0.8	0.5	63	
1.6	0.8	50	
1.5	0.9	60	
1.6	0.2	13	
1.3	1.2	92	
1.6	0.9	56	

GRAPHIC LOG	STRUCTURAL AND VEIN INFORMATION	MINERALISATION	NOTES
11/5/10	0-20.5 Highly faulted and sheared - rock fragments in a puggy clay matrix. Two sets of intersecting shear planes - one 15-20°, the other 30°, which have a line of intersection ≥ 40° NCA.	3.0-49.8 - Weathered, trace remnant py-qtz veining	<1%
	<18.6 Bedding 45°		
	20.5-27.1 Improved recovery - less fault pug material.		
	<21.9 Bedding 350		
	27.1 - 33.8 As for 0-20.5, rock fragments to 20 cm in puggy matrix		
	33.8-49.8 Fault pug.		

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date: 10 / 3 / 80
Prepared 8/6/80

HOLE No. MBD 35
LOG SHEET 2 OF 3
from 0 m. to 48.0 m.

028487

DRILL ADVANCE	% RECOVERY ESTIMATE	CORE LENGTH RECOVERED	LOST CORE ZONE	DEPTH from-to: ROCK UNIT (capital letters, underlined) / Depth: Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (see legend on sheet 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
1.5	93	1.4		See previous page		84			← Contact Broken.			
0.8	75	0.6		?49.8-?67.6 FAULTED DOLOMITE.			2/3/F		49.8-67.6 Recovery poor - fragments of dolomite in a pale brown or brown/black puggy clay matrix.	49.8-67.6 Weathered - no mineralisation		
1.0	30	0.3		49.8-67.0 Soft porous creamy white bleached dolomite fragments in a buff-coloured or brown/black puggy clay matrix. Some sparse fragments of grey quartz and dense grey recrystallised carbonates to 5cm, unmineralised.		52						
1.4	29	0.4										
1.1	18	0.2										
0.5	80	0.4										
1.2	100	1.2										
1.6	100	1.6				56						
1.6	31	0.5										
0405	2520	0.1 0.1				60						
0.9	56	0.5										
1.0	40	0.4										
1.2	75	0.9										
1.5	0					64						
1.0	50	0.5										
1.3	0	0										
0.4	75	0.3		67.0-67.6 Hard dark bluish green serpentinite(?) fragments in black clay matrix - DSL?			??		← Contact Broken.			
1.2	92	1.1		?67.6-?70.5 QUARTZ FELSPAR PORPHYRY		89	1		67.6-70.5 Not as puggy - highly fractured and broken.	67.6-70.5 py, hematite, trace sp. Small well formed grains to 2mm	1-2%	
1.0	100	1.0		Matrix - fine grained, yellowish cream, slightly greyish near margins.								
0.8	62	0.5		Qtz - small subhedral phenocrysts < 2mm, 1%								
0.8	62	0.5		Felspar - rounded, weathered grains to 2mm, 2-3%					← Contact Broken.			
1.6	6	0.1		70.5 - 85.0 SILTSTONES WITH QUARTZITES		72	10/11		70.5-78.6 Grey puggy clay with small fragments siltstone, quartzite	70.5-74.7 trace py, qtz as fragments derived from broken up thin veins	<1%	
0.9	100	0.9		Thinly bedded pale grey quartzose siltstones with faintly greenish dark grey clay rich siltstones and rare shale laminae. Quartzite, are medium grey in colour, non micaceous, and very hard; beds to 1m.								
0.6	100	0.6		Extensively brecciated, with minor silt-sediment disruption in siltstones (displaced by later fracturing).								
0.4	50	0.2										
0.6	83	0.5				76						
0.6	50	0.3										
0.6	50	0.3										
0.4	50	0.2										
1.7	6	0.1										
0.3	75	0.3							74.7 - 78.6 Severe core losses.	74.7 - 85.0 py, qtz as irregular veinlets and thin stringers and 'sweat-veins'.	1%	
0.3	62	0.2							← 75.3 Bedding 25°			
0.9	100	0.9										
0.4	100	0.4				80						
0.3	80	0.3							78.6 - 85.0 Highly fractured and sheared, little puggy material.			
0.9	92	1.2							← 81.1 Bedding 10°			
0.8	75	0.6				84			← 83.5 Bedding 35°.			
1.1	82	0.9										
				END OF HOLE 85.0 m.		88						
						92						
						96						

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF.
Logged by: C. BROADBENT date: 10 / 3 / 80
Prepared 8/6/80

HOLE No. MBD 35
LOG SHEET 3 OF 3
from 48 m. to 85.0 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97802		3.0	5.0	2.0	150									
3		5.0	7.0	"	14									
4		7.0	9.0	"	10									
5		9.0	11.0	"	10									
6		11.0	13.0	"	20									
7		13.0	15.0	"	18									
8		15.0	17.0	"	26									
9		17.0	19.0	"	28									
8.10		19.0	21.0	"	22									
11		21.0	23.0	"	30									
12		23.0	25.0	"	36									
13		25.0	27.0	"	90									
14		27.0	29.0	"	440									
15		29.0	31.0	"	180									
16		31.0	32.5	1.5	270									
97676		32.5	34.5	2.0	210									
77		34.5	36.5		130									
78		36.5	38.5	"	120									
79		38.5	40.5	"	80									
80		40.5	42.5	"	110								110	pulp check
81		42.5	44.5	"	1150									
82		44.5	46.5	"	300									
83		46.5	48.5	"	100									
84		48.5	50.5	"	34									
85		50.5	54.3	3.8	75									
86		54.3	56.3	2.0	100									
87		56.3	58.3	"	350									
88		58.3	60.3	"	520									
89		60.3	62.3	"	250									
90		62.3	63.3	"	6800									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 35 A

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 63.3

0288

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97691		64.7	65.7	1.0	2050									
92		67.0	67.5	0.5	660									
93		67.5	69.5	2.0	320									
94		69.5	70.4	0.9	300									
95		70.4	72.4	2.0	5300									
96		72.4	74.4	"	3550									
97		74.4	76.4	"	60									
98		76.4	78.4	"	36									
99		78.4	80.4	"	100									
97800		80.4	82.4	"	110								120	Pulp check.
1		82.4	85.0	2.6	170									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 35B

SAMPLE TYPE : DRILL CORE FROM 64.7 TO 85.0

0284869

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97780		3.0	4.5	1.5	140								140	pulp check
81		4.5	6.5	2.0	360									
82		6.0	7.5	1.5	410									
83		7.5	9.0	"	240									
84		10.0	11.5	"	190									
85		11.5	13.0	"	250									
86		13.0	14.5	"	95									
87		14.5	16.0	"	80									
88		16.0	17.5	"	270									

0284690

Notes:— Sn by XRF B. Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 35c

SAMPLE TYPE : DRILL CORE FROM 3.0 TO 17.5

SLUDGE

MBD·36

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH NO.9 AUSTRALAS. INST. MIN METALL. - 1976

028491

0-3·0 (3·0)	TRICONE TO 3 m - NO CORE			
3·0-176·5 (173·5m)	3·0 - 176·5 THINLY BEDDED SILTSTONES AND SHALES ALTERNATING WITH QUARTZITES. Medium grey clay rich or quartzose siltstones with thin silty shale beds, sometimes sericitic. Well bedded. Scale of individual beds < 5 cm with brecciated intervals and some folding and contortion. The quartzites range from small fine-grained beds interleaved with the siltstones etc as above to massive, rather featureless brown or greyish, medium grained, often well fractured and broken; intervals from 50 cm to 20 metres, with very minor siltstones. 3 - 87·0 Thinly bedded siltstones, well fractured in upper 30 m. Gradually become more sericitic with depth; the quartzose beds are hard and silicified. Minor quartzites (< 2m) towards bottom of interval. 87 - 109·3 Massive quartzites as above 109·3 - 132·8 As for 3 - 87·0, some 'quartzose' siltstones faintly brownish grey, others bluish grey and very hard (silicified); shales are greenish and sericitic. 132·8 - 140·8 Massive brownish grey quartzites 140·8 - 176·5 As for 109·3 - 132·8, brownish 'quartzose' siltstones not common - mostly bluish grey fine grained quartzites (coarse gr. siltstones) with thin greenish silty shale beds etc.	10/9/11	3·0 - 37·0 py, qtz, po as thin veinlets and stringers, some with cassiterite, 1%. 37·0 - 38·0, 0·5 m py - qtz - CO_3^{2-} - gr. fluorite - arsen - sl vein, 40° 38·0 - 73·0 Thin bedded laminae py, po in siltstones, dissem in qtzites and rare qtz - carbonate - py - cassit. - veins. 2 - 3% 73·0 - 132·6 py, po, dissem in quartzites, veinlets etc with qtz, fluorite, muscovite, cl. 5 - 7%. Some small stockwork-type fracture zones to 10 cm with blebby py, qtz etc 132·6 - 140·8 py > po, dissem py in qtzites, po as veinlets with qtz, carbonates, 7 - 10%. 140·8 - 176·5 py, thin bedded laminae, fairly dissem, veinlets etc with qtz 3 - 5%
176·5 - 194·5 (18·0m)	176·5 - 194·5 QUARTZ FELDSPAR PORPHYRY. Matrix: fine grained, pinkish cream. Rock is well fractured and pitted by weathering. Phenocrysts: fine rounded to subhedral grains to 6mm, 15 - 20%. Feldspar - after 186·5 m, soft white weathered grains, 3% irregular, 75%	1		pitted py as discrete grains to 4mm, trace remnant cassiterite, weak trace of sl 7% (most removed by weathering, originally > 10%)
194·5 - 206·9 (12·4m)	194·5 - 206·9 THINLY BEDDED SILTSTONES + SHALES, MINOR QUARTZITES. As for 3·0 - 87·0, weakly sericitic.	10/9/11	py, thin bedded laminae, and in small irregular veinlets with qtz, 5%.
	END OF HOLE 206·90		

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD. EXPLORATION DEPARTMENT

SUMMARY DRILL LOG

Scale (1:1000), 1:500, 1:250 (when plotted to A4)

Prepared by: G BROADBENT

Date: 26·3·80

HOLE NO. MBD 36

Sheet of

028492

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-36

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 36

COLLAR LOCATION

Grid name | Rectangular space co-ordinates: PLANAR CO-ORDINATES | ELEVATION

(1) MGJV — 2117.21 N — 1179.82 E — 685.92

(2) ____ — ____ N — ____ E — ____

(3) Aust. Map Grid (PRECISE / APPROX.) — ____ mE — ____ mN — ____ m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
____ magnetic
180° grid (1)
____ grid (2)
____ grid (3)
____ true

Inclination at collar 70°

Total length 206.9 m.

Commenced: 2 / 3 / 80

Completed: 12 / 3 / 80

Drilling contractor
LONGYEAR AUST PTY LTD

Rig type
LONGYEAR 38

Core size and non-coring (NC)

TRIGGS	0	TO	3.0 m.
NQ	3.0	TO	71.0 m.
BQ	71.0	TO	206.9 m.
		TO	
		TO	
		TO	

Details of down hole location-survey methods.
TROPARI every 40 m.

Purpose of drilling and anticipated lengths to targets.
To investigate Nn mineralisation in 'Stack pc' pegmatite sheet 160-195 m. Planned depth of hole 200 m.

Comments on drilling.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type 12 mth.	DIP
37.1	133	71
73.1	152	75
106.0	212°	73
136.0	153°30'	71
168.0	155°	71°
206.0 m.	152°	71°

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC
____	☐	____
____	☐	____
____	☐	____
____	☐	____
____	☐	____
____	☐	____
____	☐	____
____	☐	____
____	☐	____
____	☐	____
____	☐	____
____	☐	____

Symbols and abbreviations for drilling notes column.

LOGGED BY	LOGGED BY	LOGGED BY
L. BROADBENT	____	____
FROM 0 TO 206.9m	FROM ____ TO ____	FROM ____ TO ____
DATE 21.3.80	DATE ____	DATE ____

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 36
Log sheet 1 of 4

TRILONE TO 30 m. NO CORE.

3.0-13.7 THINLY BEDDED SILTSTONES, SILTSHALES

Pale grey (bleached) thinly bedded quartzose and clay rich siltstones with sparse grey quartzite beds to 20 cm. Scale of bedding 1-2 cm individual beds. Minor disruption and folding/contortion, with later bleaching. The rock is permeated by fine yellow clay filled fractures at a high angle to c.a.

- 5.0 Bedding 30°
- 7.2 Bedding 70°
- 10.4 Bedding 45°
- 11.2 Small Fold - axis 35°, plunge 55°
- Carbonate fracture

10/9

2.0-13.7 py.qtz as thin veinlets and stringers, porous and pitted by weathering.

<1%

13.7-19.3 QUARTZITES, minor SILTSTONES.

Massive bed thinly grey or faintly brownish grey (immature rich?) fine grained quartzites divided by thin pale grey clay rich siltstone beds < 5 cm, in intervals to 20-30 cm.

- Gradual change to

11/(10)

13.7-19.3 py.qtz, rare veinlets in thin quartzites and stringers.

1%

19.3-73.0 THINLY BEDDED SILTSTONES AND SILTSHALES with minor QUARTZITES

19.3-32.0 Pale grey thinly bedded quartzose siltstones, clay rich siltstones and thin quartz beds, gradually becoming darker interval with depth, finally greenish and sericitic, medium hard with some thin fine grained very hard black grey quartzite beds to 30 cm. The Quartzite beds are slightly sericitic grey black, brownish grey and up to 2m thick - Soft sediment disruption and brecciation, poorly bedded.

Overall, soft, sediment disruption and brecciation in zones to 5 m, separated by well bedded, only slightly deformed, intervals.

- 21.6 Bedding 55°
- 23.8 Bedding 70°
- 25.4 Small Fold - axis 75°, plane to
- 26.2 Bedding 25°
- 28.5 Bedding 45°
- 31.2 Bedding 60°

10/8/11

19-37.05 Increased veining with minor py, fluorite, sericite, qtz.

2-3%

32.0-73.0 As for 19.3-32.0, but increasing more and more greenish and sericitic (clay rich beds) and darker in colour to maximum greenish greys. Minor (almost) laminated

After 38.0 m some bedding, pyrite/po appears

- 33.0 Bedding 70°
- 34.3 100 mm qtz-py-fluorite-po veinlet, 80°
- 35.9 10 mm qtz-py-fluorite-po sericitic vein, 25°

9V

- 40° } py-qtz-chlorite-fluorite gritty sericite-qtz vein.
- 40°

37.05-38.0 Sec 16th

10/9/11

- 38.4 Bedding 70°

38.1-73.0 Py/po as thin bedded laminae 1-2 mm, often in greyish, 5 mm rare thin qtz-py-carbonate veinlets

2-5%

- 41.3 Bedding, 75°
- 41.4 20 mm chlorite qtz py-fluorite sericitic vein, 35°
- 50.0 Bedding 60
- 53.1 Bedding 80°
- 53.4 15 mm qtz-carbonate-py-po breccia vein, 40°
- 54.7-55.1 Small drag folds - axis 70°, plunge 85°
- 55.4 Bedding 75°
- 58.3 Bedding 70°
- 61.3 Bedding 60°
- 64.0 10 mm carbonate-fluorite-qtz vein, 45°
- 64.8 Bedding 60°
- 67.5 Bedding 65°
- 70.4 Sericitic 65°
- 70.6 10 mm py-qtz vein 30°
- 72.4 Bedding 50° - Gradual change to

73.0-87.0 THINLY BEDDED SILTSTONES, SHALES, WITH QUARTZITES

Thinly bedded (<5 cm) greenish grey sericitic clay rich siltstones and minor jumbles with an increased proportion of massive, disrupted, hard pale brownish grey fine to medium grained quartzites, to 1-5 m thick

10/11/9

73.0-109.3 Py, po, blebby in quartzites, as rare blebs to 2 x 3 mm, but as thin veinlets, stringers and beaded laminae in many sections/fractures.

Sparse py-arsenopyrite-qtz-fluorite veining.

5-7%

- 76.7 Bedding 75°
- 79.4 Bedding 60°
- 79.9 10 mm py vein, 55°
- 82.0 Bedding 70°

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDE ANGLE between feature and LONG CORE AXIS

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: C. BROADBENT date 21/3/80

HOLE No. MBD 36
LOG SHEET 2 OF 4
from 0 m to 94.0 m

Prepared 5/6/80

See previous page for description.

165.50 mm qtz-py-cc-chl vein, 30°

Gradual Change to

See previous page for description.

81-109.3 QUARTZITES, minor SILTSTONES

(As for 137-167.3)

Massive hard pale grey and brownish grey quartzites to 2.5 m separated by thin intervals of greenish-grey sericitic siltstones.

Massive and featureless, with some disruption and minor recrystallisation.

90

91/16

92

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028495

DRILL ADVANCE	% RECOVERY ESTIMATE OR CORE LENGTH RECOVERED	LOST CORE ZONE	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
0.6	100		See previous page.					1665-168.1 cont. Small fractures etc. ≠ to CA.	See previous page.		
0.9	100							← 168.8 Bedding 60°			
2.7	100			169				← 170.0 2cm py-Mn-carb-qtz vein, 55°			
								← 171.0 Bedding 75°			
1.8	78			172							
0.7	71							171.4 Bedding 80°			
0.7	71	R20						172.2-177.1 Broken core with small puggy zones 1-2cm apart every 0.5m			
0.5	71	0.5 broken									
0.7	86		176.50 - 194.55 QUARTZ FELSPAR PORPHYRY				1				
0.7	83		176.5 - 186.8 Upper 20 cm fine grained and greenish grey Matrix: pinkish cream, finely crystalline. Well fractured and sheared (mostly <45° to CA), pitted by weathering. Phenocrysts: Qtz - subhedral and rounded grains to 4 mm, 15-20%. Felspar - hard, brownish and altered, phenocrysts to 3 mm, some well formed. 3-5%.						Contact irregular, approx 75°	176.5-186.8 pitted py in discrete rounded grains to 4 mm, trace sp, cassiterite. Original concentration of sulphides ≈ 15%.	7%	
0.8	83			180							
0.2	100										
0.5	100										
1.0	100										
0.5	100										
1.0	97										
0.6	80			184							
0.4	100										
0.7											
0.6	100										
0.7	100										
0.7	100		186.8 - 194.55 Not so broken or pitted by weathering. Matrix has faintly greyish mottling - siliceous patches to 15 cm. 'Qtz' rounded grains to 5 mm, 15-20% Felspar - 50% altered to hard brownish ?topaz, otherwise soft, white and weathered. Max grain size 2-3 mm, TOTAL 3%	188						186.8-194.55 Py, trace sp as distinct grains to 4 mm, and also as diffuse fine grained aggregates to 5m in the greyish portions of the matrix. Pitted and weathered.		
1.4	100										
1.3	100										
2.0	100			192							
0.5	100										
0.9	100										
0.7	100		Inclusions of sediments in 30 cm above contact.								
1.6	94		194.55 - 206.90 THINLY BEDDED SILTSTONES AND SHALES (minor ARGILLITES)	196			10/9/11	< 195.0 Bedding 70°	194.55-206.90 py as thin bedded laminae and in small stringers and blebs	3-5%	
0.9	94		Medium grey thinly bedded (1-2 mm) quartzose and clay rich siltstones, minor shales. Some bluish grey fine grained quartzites to 0.5 m thick. Well bedded, minor disruption, core is broken by partings along bedding planes.								
0.9	100							< 198.4 Bedding 70°			
1.2	100			200							
1.0	100							< 200.5 Bedding 50°			
1.3											
1.7											
1.4	100										
1.0	100							< 203.0 Bedding 50°			
0.3	100			204							
1.1	73										
0.9	100							< 205.7 Bedding 75°			
1.3	100										
			END OF HOLE 206.9 m.	208							
				212							
				216							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF

Logged by: C. BROADBENT date: 21 / 3 / 80

Proposed 9/6/80

HOLE No. MBD 36

LOG SHEET 4 OF 4

from 168.0 m. to 206.9 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97835		35.8	38.0	2.2	8400.									
97824		174.5	176.5	2.0	65									
25		176.5	178.5	"	2400		260	65	630	<1	35	60		
26		178.5	180.5	"	3750		330	20	170	<1	25	55		
27		180.5	182.5	"	3150		310	65	190	<1	20	160		
28		182.5	184.5	"	600		350	24	150	1	15	740		
29		184.5	186.5	"	460		340	26	160	<1	<10	4100		
30		186.5	188.5	"	540		330	15	90	<1	25	2550		
31		188.5	190.5	"	1350		290	16	85	<1	55	900		
32		190.5	192.5	"	1450		330	22	95	<1	45	1200		
33		192.5	194.5	"	1450.		300	40	150	1	10	75		
34		194.5	196.5	"	260									

0284496

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 36

SAMPLE TYPE : DRILL CORE FROM 35.8 TO 196.5.

MBD.37

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10 mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS INST. MIN. METALL. - 1976

028497

Depth	Interval	Description	Graphic Log	Mineralisation
0	0-3.0(3.0)	0-3.0 TRICONE DRILLED - NO CORE		
	3.0-71.0 (68.0)	3.0-71.0 THINLY BEDDED SILTSTONES and SILTY SHALES with interbedded MASSIVE QUARTZITES Greys, medium hard siltstones, some pale grey and quartzose, grading into fine sandstones, others clay rich and darker grey. Thinly bedded (< 5cm), quartzose beds are silicified, some soft sediment brecciation and later contortion, minor folding and disruption. Hard grey fine → medium grained massive brecciated quartzites to 8.0 m. separate intervals of siltstones etc. to 10m. The quartzites have sparse thin contorted siltstone and rare shale laminae. Core is well fractured and broken, particularly near top of interval. - two sets of intersecting fractures 20-40° LCA with opposite senses, and partings along bedding planes.	10/11/9	3.0-17.5 py, qtz. Py finely dissem in qtzites, with qtz as stringers + blebs along small fracture zones. TOTAL 2-3%. 17.5-71.0 py, dissem as above, also in veinlets etc with qtz, and as sparse thin bedded laminae. 3%. 50.5-58.5. As above; 3-5%.
	71.0-72.3	71.0-72.3 QUARTZ - FELSPAR PORPHYRY. Qtz 5-7%, Felsp 1-2% (50°)	1	py, trace sp. 7-10%.
	72.3-102.4 (30.1m)	72.3-102.4 QUARTZITES and THINLY BEDDED SILTSTONES (55°) Hard grey quartzites, with minor quartzose siltstones, brecciated. As for 3-71.0m, some are a pale brownish grey-tourmaline rich? (Gradual Change)	11/10	py, qtz, marcasite in thin veinlets and stringers. py is finely dissem. in qtzites. TOTAL 3-5%.
	102.4-108.1	102.4-108.1 THINLY BEDDED SILTSTONES, SILTY SHALES, MINOR QUARTZITES As for 3.0-71.0, but weakly sericitic	10/9/11	py as thin bedded laminae + stringers with qtz, marcasite. 3-5%.
	108.1-125.8 (17.7)	108.1-125.8 QUARTZ FELSPAR PORPHYRY (70°) Matrix f.gr., brownish cream in colour, well fractured and porous due to removal of sulphides + felspar by weathering. Phenocrysts: Qtz to 7x6 mm, 20% Felspar - not apparent; altered or removed by weathering. (30°)	1	py. pitted + weathered, with some marcasite rims. Discrete grains to 4 mm and f.gr. aggregates to 5x3 mm. 10-15%. Weak trace arseno, sp.
	125.8-135.0 (9.8m)	125.8-135.0 THINLY BEDDED SILTSTONES, MINOR QUARTZITES, sparse SILTY SHALES. As for 102.4-108.1.	10/11	py. qtz in veinlets, stringers and irregular blebs, some dissem in quartzites. 5-7%.
		END OF HOLE 135.0 m.		

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale (1:1000), 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 26.3.80

HOLE No. MBD 37
Sheet of

028498

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD-37

Prospect, area, project or mine. MOUNT BISCHOFF.

HOLE No. MBD37

COLLAR LOCATION

	Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	2094.42 N	1260.06 E	683.26 m
(2)		N	E	
(3) Aust. Map Grid PRECISE / APPROX.		mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA.

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
- ____ magnetic
- 180° grid (1)
- ____ grid (2)
- ____ grid (3)
- ____ true

Inclination at collar 70°

Total length 135 m.

Commenced: 13 / 3 / 80
Completed: 17 / 3 / 80

Drilling contractor
NORMAC AUST PTY LTD

Rig type
LONGYEAR 38

Core size and non-coring (NC)

TRICONE	0	TO	3.0 m
NQ	3.0	TO	53.8
BB	53.8	TO	135.0 m
		TO	
		TO	
		TO	

Details of down hole location-survey methods.
TROPARI every 30 m.

Purpose of drilling and anticipated lengths to targets.
To intersect possible tin mineralisation in 'Smithope' porphyry dyke 93-113 m. Planned depth of hole: 120 m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type: MAGNETIC	DIP
32.0 m	325	68°
72.5 m	168° ?	68°
102.5 m	154° 30'	65°
132.5 m	079° ?	69°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No.		FIELD ROCK NAME, ETC

Symbols and abbreviations for drilling notes column.

LOGGED BY S. BRANDENT	LOGGED BY	LOGGED BY
FROM 0 TO 135.0 m	FROM ____ TO ____	FROM ____ TO ____
DATE 23.3.80	DATE	DATE

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 37
Log sheet 1 of 3

028499

TRICONE TO 3.0 m - NO CORE

3.0 - 32.0 THINLY BEDDED SILTSTONES, SHALES minor QUARTZITES

Grey recessive rock thinly bedded (1-2 cm) quartzose and clay rich siltstones with silty shale laminae (to 5 mm). Intervals of siltstone to 2 m are separated by hard grey brecciated quartzites, poorly bedded to 2 m. Well fractured and broken - three sets of intersecting fractures at low angles (CA, combined with a pulpy shiny shaley seam. Proportion of shales increases with depth, with some thin bedded pyrite laminae after 17.5 m.
Well bedded, with minor disruption and alteration.

10/11/89

3.0-17.5 pg, thinly dissem. and as blebs along shale laminae zones, mm widths.

2-3%

8.2 Bedding 70°

11.1 Bedding 55°

14.2 Bedding 65°

14.5 Bedding 55°

17.5-32.0 pg dissem. in clayey and qz changes with qtz. Some bedding laminae of pg in shale beds.

3%

18.3 Bedding 65°

21.9 Bedding 70°

25.2 Bedding 60°

25.8 Bedding 60°

28.3 Bedding 50°

30.0 Bedding 50°

Gradual change

32-50.5 SILTSTONES and QUARTZITES

Thinly bedded quartzose siltstones (pale grey, hard) with minor interbedded clay rich siltstones.
Hard grey brecciated quartzites with fine dark shaley staining along brecciation fractures.
Quartzites to 2.0 m thick, dominated by short intervals of poorly bedded siltstones, minor disruption and post sedimentary recrystallisation.

10/11

32.0-50.5 pg, thinly dissem. in quartzose siltstones and quartzites, minor mm widths and stringers with qtz.

2-3%

33.4 Bedding 55°

35.4 Bedding 70°

38.0 35mm ±1000 pg vein - minor vein, 45° to 33.4 bedding 70°

42.4 Bedding 65°

44.8 Bedding 45°

47.6 Bedding 65°

Gradual Change

50.5 Bedding 55°

50.5-58.5 pg as above in 5 mm thinly dissem. in some siltstone beds and as thin veinlets and stringers.

3-5%

50.5-65.6 pg, finely dissem. and as thin veinlets and stringers.

2-3%

50.5-65.8 THINLY BEDDED SILTSTONES and SHALES

Finely grey siltstone/clay rich siltstones with thin shaley beds, well bedded on 1-2 cm scale with pale grey quartzose differences. Some spine silty shale beds are very dark grey, classic black and carbonaceous.
Spine thin bedded yellowish clay laminae in shaley siltrocks - decomposed bedded pg?
Well bedded, minor disruption and later fracturing.

10/11

53.4 Bedding 55°

56.5 Bedding 70°

59.4 Bedding 15°

62.9 15 mm ±2000 pg vein, 60° to 65.6 Bedding 55°

65.8-71.00 QUARTZITES - with SILTSTONES

See 32-50.5 for description, the quartzites are not so silicified - well fractured and slightly weathered

1/11/89

65.6 Bedding 60°

65.8-71.00 pg, finely dissem. and as thin veinlets and stringers with minor qtz

2-3%

Cemented 50°

71.00-72.30 QUARTZ VEIN BRECCIA

Pale grained buff coloured massive, weakly banded 2.00 cm. Clay rounded grains 1-2 mm. 5-10% fine pyrite, altered boundary, clay rich

1/11

Cemented 60°

71.00-72.30 pg, minor as some grained aggregates, irregularly distributed pockets to blebby in mass

5-10%

72.30-102.4 SILTSTONES with QUARTZITES

Thinly bedded pale grey quartzose siltstones with minor clay rock greasier grey siltstones.
Hard brown quartzites to 2 m, brecciated and disrupted.
The siltstone is generally massive or brownish tinge with depth - recrystallised rock?
Minor late sediment disruption with later fracturing - some minor 1-2 cm pyrite zones scattered sporadically throughout.

10/11

73.0 Grading 70°

76.8 Bedding 70°

79.2 Bedding 70°

82.5 Bedding 75°

72.30-102.4 pg/moderate qtz veinlets and irregular stringers to 5 mm. Spine finely dissem. pg in quartzites.

3-5%

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15 m.m.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date 23/3/90
Prepared 10/3/90

HOLE No. MBD 37
LOG SHEET 2 OF 3
from 0 m. to 82.6 m.

See previous page.

See previous page.

α 85.5 Bedding 55°

α 88.4 Bedding 35°

α 91.2 Bedding

α 94.3 Bedding 75°

α Shear Bedding 55°

α 97.5 Bedding 70°

Gradual change

α 102.6 Bedding 60°

α 104.7 Bedding 60°

Contact 70°

102.4 - 108.13 THINLY BEDDED SILTSTONES AND BLACK SHALES.

Faintly grenaceous dark grey siltstones thinly interbedded with grey and black shale laminae.
Well bedded, minor brecciation and soft sediment disruption.

10/9/86

102.4 - 108.13 Pg / thinly laminar to siltstone, as thinly bedded laminae 1-4mm in dark shales. Sparse thin 1/4 - 1/2 mm cherty veinlets and stringers.

3-5%

106.13 - 125.79 QUARTZ FELSPAR PORPHYRY

106.13 - 108.78 Matrix fine grained and strongly sericitised. Rare well formed to 2.5 mm (10%) Felspar - pink. Mainly 1mm to 5mm

106.78 - 124.7 Matrix - fine grained with coarse grey/pink patches. Mostly brownish 1-4mm due to weathering, well bedded and altered Pg weathering.

Phenocrysts 7 Qtz - as rounded grains to 7x6mm, mostly 2-3 mm, 20-25%.

Felspar - sporadic pink grains in groundmass NOT has possibly been removed by weathering, or altered, and resembles qtz grains.

Overall Vol. - a fairly resistive - abundant phenocrysts.

105.13-105.78 Pg moderate ash content (2mm) to 2.5mm

108.78-124.7 Pg / thinly and sporadically with minor recurrence in discrete zones to 4 mm.

110 - 124.7 Pg occurs mainly as small 1cm grained aggregate to 5 x 3 mm, hence could be pseudo. Pebbles and unconsolidated fragments 20-25%?

Sparse qtz-py vein/stringers in fault zones

3-5%

10-15%

124.7 - 125.15 As for 106.13 - 108.78.

125.15 - 125.79 Matrix greenish grey fine grained; Qtz to 2.5 mm, 1%; Felspar 5% visible and weathered to 1 cm, 30%

124.7-125.15 Pg minor recurrence

125.15-125.79 Thinly stone like recurrence

1%

Contact rugged and indistinct 30°

125.79 - 135.0 THINLY BEDDED SILTSTONES/SHALES, MINOR QUARTZITES.

Medium greyish siltstone near contact otherwise pale silt, some beds locally carbonate (effervescent) some pale grey quartzose siltstones to 2cm occur sporadically throughout; occasionally dusky and pale brownish grey. Quartzites are light brownish grey, massive and brecciated to 0.5 m thick; cherty here.

Rocks well bedded, with disrupted and contorted intervals to 0.5 m, and minor shattering, core is well broken, mainly along bedding planes.

10/6/86

α 127.7 Bedding 70°

α 130.7 Bedding 60°

α 132.0 Bedding 65°

α 134.7 Bedding 65°

125.79-135.0 Pg thinly laminar along bedding with occ thin veinlets and stringers with qtz.

3%

133.3-135.0 Pg. thinly laminar / mainly in veinlets < 5mm with qtz and in stringer zones.

5%

END OF HOLE 135.0 m.

DEPTH from-to : ROCK UNIT capital letters, underlined
.Depth : Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG — STRUCTURAL AND VEIN INFORMATION — MINERALISATION — NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BOSANSKY date: 23/2/86

HOLE No. MBD 37
LOG SHEET 3 OF 3
from 84.0 m. to 135.0 m.

Prepared 19/6/86

SAMPLE NO. SPLIT CORE	SAMPLE NO GROUND CORE	FROM m	TO m	INTER-VAL m	Sn SPLIT	Sn GROUND	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
97836		71.0	72.3	1.3	3500									
37		106.1	108.1	2.0	260									
38		108.1	110.1	"	1150		290	80	96	2	20	32		
39		110.1	112.1	"	3450		490	100	190	3	30	600		
840		112.1	114.1	"	6100		360	55	170	<1	130	410	7000	Pulp check.
41		114.1	116.1	"	3800		570	60	220	1	45	700		
42		116.1	118.1	"	4650		400	20	290	1	30	920		
43		118.1	120.1	"	3350		430	50	200	<1	60	960		
44		120.1	122.1	"	3550		490	85	240	2	30	1400		
45		122.1	124.1	"	3500		590	110	390	2	20	1350		
46		124.1	125.8	1.7	2400		200	65	620	<1	20	220		
47		125.8	127.8	2.0	50									

0285011

Notes :—

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 37

SAMPLE TYPE : DRILL CORE FROM 71.0 TO 127.8.

MBD. 38

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10 mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS. INST. MIN. METALL. - 1976

028502

Depth	Interval	Description	Graphic log	Mineralisation
0	0-4.0 (4.0m)	0-4.0 TRICONE DRILLED - NO CORE.		
	4.0-22.4 (18.4m)	4.0-22.4 DOLOMITE SULPHIDE LODE Mottled greens - talc and serpentinite with bronze coloured po. Some minor granular grey quartz and small patches(?) tremolite/actinolite. Overall texture is weakly banded, po alternating with talc/serpentinite etc in contorted irregular bands, some cross cutting fracturing/veining.	4/6/7 7/6/4	po, py, fluorite, trace arsenic in varying proportions and abundance. 0-7.5, 60-70% 7.5-11.0, 20%. 11.0-12.2, 90% 12.2-17.4, 10% 17.4-22.4, 30-40%
20	22.4-76.9 (54.5)	22.4-76.9 THINLY BEDDED GREY SILTSTONES, MASSIVE QUARTZITES. Siltstones mid grey, occasionally brownish grey, and qtzose or darker grey and clay rich, faintly sericitic in places. Well bedded, with frequent brecciated intervals and minor folding/contortion. The quartzites are massive and occasionally well bedded, sometimes alternating with qtzose siltstones. Hard and thinly/brownish greys, brecciated, with dark dendritic staining about fractures. Some thin dark grey silty shale laminae occur rarely in siltstones. 27-38.4 Rare thin 'tuffaceous' beds < 2 cm. Core is well fractured and broken.	10/11	22.4-38.4 py, finely dissem in qtzites, in veinlets & stringers with qtz 1-2%. 38.4-54.7 py, qtz as above 1% 54.7-76.9 As above, 2%, locally 7%
40				
60				
	76.9-79.0	76.9-79.0 QUARTZ FELSPAR PORPHYRY qtz 3-5%, weathered. 40°	1	trace py (weathered)
80	79.0-129.5 (50.5m)	79.0-129.5 THINLY BEDDED SILTSTONES AND SANDSTONES, QUARTZITES. 50° As for 22.4-76.9, quartzites decrease with depth, some rare thin black shale beds appear with depth. Not so brecciated as above, but well fractured to 115 m. Clay rich siltstones are faintly greenish and sericitic.	10/11/5	79.0-114.6 py, dissem and as blebs, in veinlets with qtz and rare cassiterite. 1-2% 114.6-129.5 py, dissem, veining with qtz, $CO_3^=$ marcasite, sp and cassiterite. Some rare large blebs po. 7%.
100				
120				
	129.5-143.6 (14.1)	129.5-143.6 THINLY BEDDED SILTSTONES SHALES AND SANDSTONES. Mid grey quartzose siltstones & sandstones, clay rich siltstones dark greenish greys, minor shales (almost black and carbonaceous) Most beds < 2 cm thick, weakly brecciated.	10	129.5-143.6 py, qtz, $CO_3^=$ as veinlets and stringers, some dissem py. 2-3%.
140				
	143.6-164.1 (20.6)	143.6-164.1 QUARTZ FELSPAR PORPHYRY. 40° Matrix fine grained and pale grey. Fractured and stained brownish grey by weathering. Qtz - subhedral/rounded turbid grains to 6 mm, 15% Felspar - altered, some removed by weathering? 7-10% 45°	1	py, marcasite, as fine grained aggregates (marcasite as rims around py). Rare grains cassiterite. Variable concentrations (some removed by weathering), average 10%.
160				
	164.1-172.5 (7.6m)	164.1-172.5 THINLY BEDDED SILTSTONES As for 129.5-143.6.	10	164.1-172.5 As for 129.5-143.6.
		172.5m END OF HOLE.		
180				
200				
220				

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale (1:1000), 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 1.4.80.

HOLE No. MBD 38
Sheet of

REPORT No. 028503

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD·38

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 38

COLLAR LOCATION

Grid name — Rectangular space co-ordinates

	PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	2164·69 N	1300·15 E	678·37
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA.

Mineral Tenement EL 13/79. Holder METALS EXPLORATION LTD

Cadastral location and details CROWN LAND/PRIVATE

W.C. Bearing from collar
- magnetic
- 180° grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 60°

Total length 172·5 m

Commenced: 18 / 3 / 80

Completed: 25 / 3 / 80

Drilling contractor LONGYEAR AUST PTY LTD

Rig type LONGYEAR 38

Details of down hole location-survey methods.
TROPARI every 30 m.

Purpose of drilling and anticipated lengths to targets.
To investigate any possible tin mineralisation in 'Brown Face' Dolomite sulphide lode (0-10·0 m), and any possible extensions of tin mineralisation in 'Stockope' porphyry dyke 121-146 m. Planned depth of hole 160·0 m.

Core size and non-coring (NC)

TRICONE	0	TO	4·0
NQ	4·0	TO	49·5 m
BQ	49·5	TO	172·5
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type Azimuth	DIP
30·0	146° 30'	60°
72·0	147°	61°
102·0	146°	65°
135·0	146° 30'	63°
171·0	150°	61°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No.	FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY G. BROADBENT FROM 0 TO 172·5 m DATE 26·3·80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme. METALS EXPLORATION LTD

HOLE No. MBD 38

Log sheet 1 of 3

Depth	Description	Date	Structural and vein information	Mineralisation	Notes
0	TRACING TO 4.0 m - NO CORE				
0	4.0-21.8 DOLOMITE SILTSTONE LENSE. 10-8.7 pale greenish grey rock, 2 dark green/black sepentinite. Minor granular grey rock, 1 cm. Sand and pale pebble fabric, 10° outside mass with clearly some lateral (?) mesoscale/microscale at 8.2 m - green and black, alternating with more massive sepentinite etc.	10/6/7	4.0-5.0 pa, clearly, trace pg in granular aggregates to 20 cm. Sepentinite pg. trace rock, sepentinite to 10 cm.	10-20%
8	8.7-16.1 hard granular black-green sepentinite with soft greenish grey talcy patches and small interstitial patches of grey quartz.	7/6/11	7.8-8.7 pa in thin bands, minor and granular aggregates. Minor bands with pg.	20%
			8.7-8.8 pa, trace pg in irregular patches and blebs to 5 cm.	20%
12			11.0-14.5 pa, trace pg in 10 cm. Mostly granular lateral	10%
			13.2-16.1 pa, trace pg, pale blebs and grains to 2.0 cm. Granular rectum.	10%
16	16.1-21.8 Greenish grey talc, and grey and apple green sepentinite with granular pyrite, minor pyrite in a mostly banded matrix.	6/7/5	16.1-17.4 pa, trace pg, minor granular.	10%
			17.4-21.8 pg, pale, and pale silicate aggregates, pa, increasingly pyrite.	20-40%
20			Contact irregular	
2	21.8-22.6 DOLOMITE, pale grey, brecciated and broken.		21.8-22.6 trace pg	<1%
	22.6-27.0 SILTSTONES AND QUARTZITES. Medium grey, faintly sericitic (?) clayey silt, sometimes massive and faintly laminated to 2 m. Thin beds very hard, black grey quartzites to 30 cm, which decrease towards base of interval. Minor silt reduced disruption and later fracturing.	10/6	22.6-27.0 pg, finely disseminated in quartzites, and in thin veinlets and stringers with clay and sparse carbonate.	2-3%
26			25.2 Bedding 45°	
			Gradual change	
28	27.0-36.4 THINLY BEDDED SILTSTONES, some QUARTZITES. Thinly bedded faintly greenish clay rich siltstones, minor hard black grey, sandy beds to 10 cm. The 'quartzites' siltstone beds become slightly brownish (somewhat rich?) with depth. Disrupted, with minor contortion of beds and some later fracturing and brecciation. Some sparse hollerman beds <2 cm occur infrequently.	10/10	27.7 Bedding 65°	27.0-36.4 pg, finely disseminated in sparse thin, 1-2 cm veinlets.	1-2%
			28.4 Bedding 70°		
			30.0 Bedding 60°		
			35.4 Bedding 65°		
36	Cavity 36.3-36.0 m.				
40	36.4-76.9 SILTSTONES AND QUARTZITES. Thinly bedded siltstones - mostly grey and clay rich, some beds pale brown and quartzose - intervals to 5 m. Sepentinite, minor grey quartzite beds, mostly 0.5-1.0 m thick, occasional intervals to 5 m of 50/50 quartzite/siltstone. Minor silt-reduced disruption and brecciation, overall well bedded.	10/11	36.4-76.9 pg, finely disseminated in some quartzites, in sparse veinlets with quartz.	1%
			40.5 Bedding 70°		
			43.4 Bedding 55°		
			46.1 Bedding 40°		
			49.6 Bedding 50°		
			52.9 Bedding 60°		
			58.0 Bedding 65°	54.7-76.9 pg, finely disseminated in sparse veinlets with clay, locally may be 7% for 1-2 m.	2%
			58.1 Bedding 75°		
			61.1 Bedding 80°		
			64.6 Bedding 75°		
			67.4 Bedding 45°		
			70.2 Bedding 60°		
			75.5 Bedding 40°		
			76.2 Bedding 50°		
			Contact 60°		
1	76.9-79.0 QUARTZ FELSPAR PORPHYRY. Mostly pale greenish brown, well fractured and pitted by weathering. Clay - rounded grains to 2 mm, 3-5% felspar - rich - weathered?		76.9-79.0 Trace pg (removed by weathering - 10-15% veinlets in rock)	<1%
			Contact 50°		
80	79.0-116.6 SILTSTONES AND QUARTZITES. See 38.6-79.6 for description. Core fractured and broken 79.0-85.0 - some small pyrite zones, 245-250° LCA.	10/11	79.0-116.6 pg, disseminated in quartzites as grains to 1 mm. Some rare pg - weathered veins.	1-2%
			81.3 Bedding 50°		
			84.8 Bedding 45°		
			87.4 Bedding 60°		
			90.0 Bedding 55°		
			93.6 Bedding 70°		
			96.3 Bedding 70°		
			100.1 Bedding 75°		
			103.6 Bedding 70°		
			106.4 Bedding 70°		
			110.6 Bedding 70°		
116	116.6-121.7 THINLY BEDDED SANDSTONES AND SILTSTONES. Scale of bedding <2 cm - have faintly black medium grey fine grained quartzites separated by dark grey mostly sericitic greenish grey clay rich siltstones. This white clay laminae separate individual beds originally pyrite bearing? Weakly brecciated, with thin white clay and carbonate fillet fractures, apart from this very well bedded.	11/10	116.6-121.7 pg, finely disseminated in fleshy and as thin veinlets and stringers with pb, metallic carbonates. Sparse pale blebs pa.	3-5%
			115.5 Bedding 65°		
			117.0 Bedding 85°		
			118.3 Bedding 80°		

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
Dip, Bedding, Vein, Fracture, Fault, Fold, Lineation, Cleavage

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION DRILL LOG
Scale 1:100

Prospect or project: MOUNT BOLHOFF
Logged by: G. FRIEDMANN date 26/3/80

HOLE No. MBD38
LOG SHEET 2 OF 3
from ... m to 120.0 m

Reproduced 16/6/80

Depth	Core	Recovery	Geology	Structural & Vein Information	Mineralisation	Notes
120	146-121-7 See previous page.			146-121-7 See previous page.		
124	121-7 - 129-5 CHARNOCKITES / para SILTSTONES Hard grey massive quartzitic beds separated by thin beds of grey clayey rich siltstone Recorded in inner core sediment determination.	4/10	Gradual Change c 122-8 15 mm wispy Pg-minerals - orthoclase vein, 60° c 123-6 Bedding 20°	121-7 - 129-5 Pg-microcline-qtz veinlets, also disseminated Pg in quartzites. Some irregular stringers Pg. qtz to 5x4 cm.	7%	
128			c 126-8 Bedding 70°			
132	129-5 - 142-6 THINLY BEDDED SILTSTONES and SHALES with QUARTZITES Dark grey finely laminated siltstone/clayey rock, rationally with thinly bedded quartzose siltstone/clayey rock siltstone and quartzite beds (hard, pegmatoid grey) to 0-5 m wide. Minor disruption and brecciation - core sediment determination with later minor sandstone.	10/11/19	Gradual Change c 129-6 Bedding, 65° c 132-2 Bedding, 65° c 134-4 Bedding 70° c 138-6 Bedding 70° c 142-1 Bedding 50° c Contact 40°	129-5 - 142-6 Pg-qtz-mc veinlets and irregular stringers, also thinly bedded cm. Pg. qtz quartzite beds. Minor qtz-carbonate veinlets.	2-3%	
136						
140						
144	143 - 143-6 Hard and silicified.					
148	143-6 - 163-9 QUARTZ FELSPAR PORPHYRY 143-6 - 144-2 Pinkish greenish grey, 5% ±2 mm, 8%, Felspar 3-5% 144-2 - 146-5 Mainly aphanitic, faintly pinkish light cream with fractures and broken, spotted by weathering Qtz - 10-15%, rounded and bipyramidal grains to 4 mm. Felspar altered, to 2 mm, white and brownish 2-5% 146-5 - 157-4 Mainly very fine grained and pale grey with a mottled appearance Phenocrysts rare, fractured and rounded, to 6 mm, 1-2% - Felspar - altered to white brownish fractured grains to 2 mm, 7-10%. 149-8 - 157-4 Fractured and weathered.			143-6 - 144-2 Trace veinlets, some pyrite 144-2 - 146-5 Pg. trace microcline in thinner veinlets grains and Pg-qtz aggregates to 6x3 mm some patches to 35x2 cm.	c 1%	
152					10-15%	
156				146-5 - 149-8 Pg. microcline, trace veinlets Pg and microcline occur as long grained aggregates to 6x5 mm.	15-20%	
160	157-4 - 160-0 Highly pinkish light cream mottled 20% - rounded grains to 4 mm, 10-15% Felspar - to 2 mm, altered 2-3%.			149-8 - 157-2 pitted Pg. weathering - Pg. microcline, trace veinlets	10-15%	
164	160-0 - 163-5 Highly pinkish light cream mottled 20% - rounded grains to 4 mm, 10-15% Felspar - to 2 mm, altered 2-3% 163-5 - 163-9 Specimen 1 qz veinlets, as for 143-6 - 144-2.			151-2 - 157-4 Pg. microcline pitted and weathered, trace veinlets	10%	
168	163-9 - 172-5 THINLY BEDDED SILTSTONES AND SHALES with QUARTZITES See 129-5 - 143-6 for description.	16/11/19	c Contact 45°	157-4 - 158-7 Pg. weathered and pitted, trace veinlets, sulphides 1-2%	1-2%	
172	END OF HOLE 172-5 m.			158-7 - 160-0 pitted Pg as fine grained aggregates to 6x4 mm. Some weathering into completed mosaic.	5-7%	
176				160-0 - 163-5 Pg. trace microcline as rounded grains and some fine grained aggregates to 6x4 mm. Rare grains weathered, white mica qz	10-12%	
180				163-5 - 163-9 trace veinlets, microcline	1%	
184				163-9 - 172 Pg-qtz-carbonate veinlets and stringers, PB also thinly distributed in quartzite and quartzose siltstones	3-5%	
188						
192						
196						
200						
204						

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG as SAFETY

STRUCTURAL AND VEIN INFORMATION
ATTITUDES 3 digits (strike/dip) fracture and core axes

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: CLIENT GEOLOGIST date 26 / 3 / 20

HOLE No. M&D 38
LOG SHEET 3 OF 3
from 120·0 m to 172·5 m

Prepared 10/6/20

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97848		4.0	6.0	2.0	50									
49		6.0	8.0	"	x									
50		8.0	10.0	"	x									
51		10.0	12.0	"	x									
52		12.0	14.0	"	16									
53		14.0	16.0	"	14									
54		16.0	18.0	"	x									
55		18.0	20.0	"	8									
56		20.0	21.2	1.2	x									
57		21.2	23.1	1.9	38									
97858		76.9	79.0	2.1	620.									
59		141.6	143.6	2.0	65									
60		143.6	145.6	"	450		230	50	720	<1	15	85	160	Pulp check
61		145.6	147.6	"	4350		400	40	80	<1	120	1950		
62		147.6	149.6	"	2950		500	28	42	<1	45	820		
63		149.6	151.6	"	1550		460	26	130	<1	15	1000		
64		151.6	153.6	"	2700		400	60	150	1	65	1650		
65		153.6	155.6	"	520		300	30	220	2	<10	940		
66		155.6	157.6	"	340		160	180	390	3	10	490		
67		157.6	159.6	"	340		260	40	180	2	<10	1250		
68		159.6	161.6	"	5400		340	60	100	<1	30	80		
69		161.6	164.2	2.6	1250		260	25	340	1	15	150		
70		164.2	166.2	2.0	180									

0285506

Notes:— Sn by XRF Bi Method.

x — means less than detection limit

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 38A

SAMPLE TYPE : DRILL CORE FROM 4.0 TO 166.2

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97881		0.0	4.0	4.0	1250									
82		4.0	6.0	2.0	2300									
83		6.0	7.5	1.5	12									
84		18.0	19.5	1.5	10									
85		19.5	21.0	"	32									

028507

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 38 B

SAMPLE TYPE : DRILL CORE FROM 0.0 TO 21.0

SLUDGE

MBD. 39

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No. 9 AUSTRALAS. INST. MIN. METALL. - 1976

028508

0-3.0 (3.0m)	TRICONE TO 3.0m - NO CORE.			
3.0-20.4 (17.4m)	3.0 - 20.4 QUARTZITES AND SILTSTONES, minor SHALES. Quartzites medium grey, brecciated, up to 1m thick, some sand-size beds in thinly bedded siltstones. The siltstones are finely bedded, dark and light greys in intervals up to 2m alternating with the quartzites. Overall well fractured and broken, with minor soft-sediment brecciation and contortion, some small puggy faults < 5cm. 40° →	11/10		3.0-16.0 py. finely disseminated in stringers and veinlets with qtz. 2%. 16.0-20.4 As above + some thinbedded py laminae 1-2%.
20.4-22.4 (2.0)	20.4-22.4 QUARTZ FELSPAR PORPHYRY. 40° →	1		py, marcasite, trace sp. 10%.
22.4-42.3 (19.9m)	22.4-42.3 QUARTZITES AND SILTSTONES, minor SHALES. As for 3.0-20.4, slightly more brecciation and contortion and some rare black shales with more clay rich siltstones	11/10		22.4-26.4 py, qtz, veinlets, bedded laminae 3-5% 26.4-39.5 py, finely dissem, minor qtz-py veining 1%.
	32.5-34.8 Some mottled grey 'TUFF' beds to 8cm thick, bedded	10/12		
		11/10		39.5-42.3 Increased qtz-py veining. 5%
42.3-56.1 (13.8)	42.3-56.1 QUARTZ FELSPAR PORPHYRY. 60° → Matrix is creamy white and fine grained where unweathered, but highly fractured - bleached and stained grey-brown and orange browns (limonite) from subsequent weathering. Qtz - rounded and subhedral phenocysts to 5mm, 7-10% Felspar - altered to hard brownish mineral or weathered. Originally 5-7%? 65° →	1		py. pitted and weathered, occasionally with thin marcasite rims as rounded grains to 4mm or fine aggregates. Variable concentrations 3-15%. Some minor qtz-py veining. Trace calcite 50.4-51.3m.
56.1-66.0 (9.9m)	56.1-66.0 QUARTZITES and SILTSTONES As for 3.0-20.4	11/10		py + qtz + marcasite - arsen - sp - rare calcite veining, stringers + blebs. Some dissem py in qtzites and thin bedded laminae in siltstones 10%.
	END OF HOLE 66.0m.			

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING.

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, (1:500), 1:250

Prepared by: G. BROADBENT
Date: 10.4.80

HOLE No. MBD 39
Sheet of

028509

REPORT No.

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION DIAMOND DRILL LOG

MBD·39

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 39

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	2081.24 N	1420.14 E	701.24
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details CROWN LAND/PRIVATE

W.C. Bearing from collar

	magnetic
180	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar 60°

Total length 66 m

Commenced: 25 / 3 / 80

Completed: 27 / 3 / 80

Drilling contractor LONGYEAR AUST PTY LTD

Rig type LONGYEAR 38

Details of down hole location-survey methods.

TROPARI every 30 m.

Purpose of drilling and anticipated lengths to targets.

To intersect tin mineralisation in 'Stockpile' porphyry dyke 35-52 m. Planned depth of hole 60 m

Core size and non-coring (NC)

TRICONE	0	TO	3.0 m
NQ	3.0	TO	66.0 m
		TO	
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type [illegible]	DIP
31.5 m	140°	61°
64.5 m	140°30'	63°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No. | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY A. BROADBENT FROM 0 TO 66.0 m DATE 1/4/80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme. METALS EXPLORATION LTD

HOLE No. MBD 39

Log sheet 1 of 2

028510

TRICONE TO 30 m - NO CORE

3·0 - 16·0 QUARTZITES with thinly bedded SILTSTONES/minor SHALES

Medium grey quartzites to 1m thick; brecciated with dark grey staining along fine fractures.
The siltstones are dark grey, thinly bedded 1-2 cm with some medium grey quartzose siltstones and rare grey silty shale laminae to 5 mm. Intervals up to 0·75 m thick separate the quartzite beds.
Well bedded, only minor disruption; on the core it is well broken by late fractures and small pugging zones 60-70° UCA. The upper 4·2 m is weathered and bleached.

11/10/4
- 5·7 Bedding 30°
- 6·6 Bedding 70°
- 9·2 Bedding 65°
- 11·9 Bedding 40°
- 14·3 Bedding 45°
- Gradual Change.

3·0 - 16·0 Pg, very finely disseminated pyrrhotite beds and as thin irregular stringers and veinlets with qtz. 2%

15·0 - 20·4 THINLY BEDDED SILTSTONES/SHALES.

Dark grey thinly bedded clay rich siltstones and minor silty shales 1-2 cm, with some finely laminated (1-2 mm) siltstone/silty shale beds.
Well bedded, fractured and broken in a similar fashion to 3·0 - 16·0, above.

10/9
- 16·5 Bedding 20°
- 17·7 Bedding 65° (lower 40°)

16·0 - 20·4 Pg, as thin veinlets and stringers, specs bedded laminae and evenly finely disseminated in siltstone beds. 1-2%

20·4 - 22·45 QUARTZ FELSPAR PORPHYRY

Fine grained greyish cream matrix pitted and weathered with Fe oxide staining and bleaching about fracture planes.
Qtz - rounded grains to 5 mm, 10%; Felspar - small white laths to 2 mm, 15%

1
- Contact Broken - 40° from horizontal

20·4 - 21·2 Pg with associate zones to 3 mm, trace ? sp. 10%
21·2 - 22·4 As for 20·4 - 21·2, but mostly obscured by weathering. 1%

22·45 - 26·4 THINLY BEDDED SILTSTONES/SHALES

See 16·0 - 20·4 for description.

10/9
- 22·8 Bedding 65°

22·45 - 26·4 Pg as thin veinlets and stringers, specs bedded laminae and finely disseminated in siltstone beds. 3-5%

26·4 - 42·3 QUARTZITES with thinly bedded SILTSTONES/minor SHALES

Medium grey quartzite beds to 1m thick, massive but disrupted and brecciated, intervals of thinly bedded dark grey clay rich siltstones/medium grey quartzose siltstones and rare dark grey silty shale laminae, some of which are black and carbonaceous.
Not as fractured - a greater proportion of core retains disruption and brecciation.

11/10/9
- 26·7 Bedding 60°
- 29·5 Bedding 50°
- 32·5 Bedding 50°

10/12
- 34·8 Bedding 40°

11/10
- 37·4 Bedding 60°
- 40·8 Bedding 55°
- Contact undulose, 60°

33·5 - 34·8 Medium grained 'buff' beds to 8 cm interbedded with dark grey clay rich siltstones.

26·4 - 39·6 Pg, finely disseminated in quartzite and in specs veinlets with qtz. 1%

39·5 - 42·3 Pg, finely disseminated as above, a greater proportion of qtz - Pg veining 5%

42·3 - 56·09 QUARTZ FELSPAR PORPHYRY

42·3 - 45·3 Matrix pinkish grey, fractured, and bleached by weathering with some deposition of brown limonite.
Qtz - subrounded, to 8 mm, 7-10%
Felspar - removed by weathering, originally 5%?

1
- Contact undulose, 60°

42·3 - 45·3 pitted pg with thin associate veins, some trace cassiterite.
Originally 10-15%? - holes in matrix to 2·3 mm 3-5%

45·3 - 50·4 Matrix mottled brown & grey (weathered), pale creamy colour and fine grained where unweathered.
Qtz - rounded pale grey phenocrysts to 5 mm, 10%.
Felspar - altered to hard brownish material, well formed to 3 mm, 5-7%.
Overall, fractured and bleached by weathering.

45·3 - 50·4 Pg pitted to 5 mm, with associate veins in large grains in the less weathered portions. Weak trace sp - cassiterite. 10-15%

50·4 - 53·1 Matrix white, fine grained, minor pitting and weathering. Qtz to 5 mm, 15%, Felspar - trace, brownish ground.

50·4 - 51·8 trace - constant - considerable

51·3 - 53·1 Pg, minor - constant trace - considerable. Banded veins, some irregular, some ground aggregates to 3 mm 7-10%

53·1 - 56·09 Matrix mushy grey colour, gradually becoming less granulated, towards base of interval.
Qtz - rounded, to 4 mm, 7-10%
Felspar - weathered, 2-3%

53·1 - 56·09 Pg, pitted and weathered, strong trace - constant 53·1 - 54 m. Pg in patchy fine grained aggregates to 20 x 3 mm, some banded veins, much brecciated. 10%

56·09 - 66·0 QUARTZITES with thinly bedded SILTSTONES

Medium grey and brownish grey hard quartzites in massive, brecciated beds to 2·3 m. Siltstones are thinly bedded, mostly dark grey and clay rich, and weakly sericitic in places.
Extensively fractured and brecciated to 63 m with some minor silt sedimentary disruptions.
The shearing was been healed by thin pg-qtz veins.

- 56·7 90 mm wispy Pg, minor - constant sp - qtz - associate pelvic fill
- 62·3 10 mm wispy Pg - minor - constant vein, 140°
- 63 m Bedding 60°
- 65·8 Bedding 65°

56·09 - 59·0 Pg, absent - constant, and in numerous small qtz-pg veinlets which host brecciation fragments (?Q) 10%

END OF HOLE 66·0 m.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 15 mm

GRAPHIC LOG as in MINUTE

STRUCTURAL AND VEIN INFORMATION
ATTITUDES : Angle between fracture and core axis

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date 1/4/80
Project: 9/6/80

HOLE No. MBD 39
LOG SHEET 2 OF 2
from 0 m to 66·0 m

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
997871		20.4	22.5	2.1	1800									
72		40.3	42.3	2.0	320									
73		42.3	44.3	"	2000		300	55	98	1	25	160		
74		44.3	46.3	"	3700		190	96	36	<1	15	25		
75		46.3	48.3	"	2650		270	50	65	1	20	70		
76		48.3	50.3	"	4050		350	55	28	1	25	150		
77		50.3	52.3	"	4500		320	70	50	<1	30	140		
78		52.3	54.3	"	7400		340	100	65	1	30	140		
79		54.3	56.1	0.8	2200		450	65	95	1	25	360		
80		56.1	58.1	2.0	5200								0.28%	check assay

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 39

SAMPLE TYPE : DRILL CORE FROM 20.4 TO 58.1

0285511

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (insertes about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS. INST. MIN. METALL. - 1976

028512 MBD-40

0-4.0 (4.0m) TRICONE TO 4.0 m - NO CORE.

4.0-25.6 (21.6m) 4.0-25.6 THINLY BEDDED SILTSTONES WITH QUARTZITES.

Pale greys - fractured, and bleached by subsequent weathering, gradually becomes darker with depth. Well bedded, fine grained, sandstones / quartzose siltstones, medium hard and silicified, alternate with soft medium grey argillaceous siltstones.
Minor disruption and contortion, followed by later fracturing ≈40° LCA.

22.5-25.6 some sparse black carbonaceous shale beds. Gradational change.

10/11

10/9/c

4.0-16.5 rare qtz - cassiterite veinlets <2mm thick.

16.5-22.5 trace py in sparse veinlets & stringers.

22.5-25.6 Py as thin bedded laminae, veinlets and stringers 3-5%.

25.6-74.6 (49.0m) 25.6-74.6 QUARTZITES WITH THINLY BEDDED SILTSTONES

As for 4.0-25.6, but qtzites are harder, and less well bedded - mostly massive and brecciated, up to 4 m thick -, and separated by intervals of thinly bedded clay rich siltstones. Well fractured, some limonitic material on fracture planes

11/10

25.6-32.7 py, qtz as veinlets, some dissem/g along bedding planes. 1-2%.

32.7-60.5 as for 25.6-32.7, weathered, <1%

Quartzites decrease in abundance towards base of interval, some minor shales appear.

60.5-69.5 as for 25.6-32.7, 1-2%.

69.5-74.6 Some sparse bedded laminae py; also dissem, and in veinlets etc with qtz 3-5%

70° →

74.6-93.1 (18.7m) 74.6-93.1 QUARTZ FELSPAR PORPHYRY.

Matrix fine grained, bleached white, or stained greyish brown by weathering or orange brown by limonite. Very fractured and broken, pitted by weathering.
Qtz - rounded colourless grains to 4mm, 15-20%.
? Felspar - altered, hard faintly brownish phenocrysts, locally 10%, overall 1-2%
Core losses 82.6-91.5 m, and an inclusion of weathered thinly bedded siltstone from (?) 88.7 → ? 91.5 m

1

10/1

residual py, rare cassiterite in pitted veinlets. Original Fe sulphides in porphyry almost totally removed by weathering (originally ≈10-15%) now <1%. trace rounded cassiterite 78.1-79.5.

83.5 irregular mass (?) cassiterite 2×3 cm in qtz vein

91.5-93.1 trace fgr. cassiterite

55° →

93.1 (22.3) 93.1-115.4 THINLY BEDDED SILTSTONES WITH QUARTZITES

As for 4.0-25.6, quartzites not so well bedded, hard and bluish grey.
Core well fractured and broken low angles LCA.

10/11

py, marcasite, qtz in stringers & veinlets
Some dissem. blebs py in qtzites. 3-7%.

5 cm

115.4 END OF HOLE 115.4 m.

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING.

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, (1:500), 1:250 (when reduced to A4)

Prepared by: G BROADBENT
Date: 10.4.80.

HOLE No. MBD 40
Sheet of

028513

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD.40

Prospect, area, project or mine. MT BISCHOFF

HOLE No. MBD40

COLLAR LOCATION

Grid name — Rectangular space co-ordinates

		PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	2170·50 N	1419·99 E	702·37
(2)		N	E	
(3) Aust. Map Grid (PRECISE / APPROX.)		mE	mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA.

Mineral Tenement: EL 13/79 — Holder: METALS EXPLORATION LTD

Cadastral location and details (CROWN LAND / PRIVATE):

W.C. Bearing from collar

150°	magnetic
180°	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar −60°

Total length 115·4 m.

Commenced: 27 / 3 / 80

Completed: 31 / 3 / 80

Drilling contractor: LONGYEAR AUSTRALIA P/L

Rig type: LONGYEAR 38

Core size and non-coring (NC)

TRICONE	0	TO 4·0m
NQ	4·0m	TO 49·2m
BQ	49·2	TO 115·4m
		TO
		TO
		TO

Details of down hole location-survey methods.
TROPARI

Purpose of drilling and anticipated lengths to targets.
To intersect tin mineralization in Stanhope Porphyry Dyke ... 90 - 105m
Planned depth of hole 110m.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type MAG AZIMUTH	DIP
31·0m	138	57
74·5m	146·5	62
114·5m	146·0	62

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No	FIELD ROCK NAME, ETC

Symbols and abbreviations for drilling notes column.

LOGGED BY G.C. BROADBENT — FROM 0 TO 115·4 — DATE 10-4-80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD40
Log sheet 1 of 2

028514

TRICONE TO 40.0m - NO CORE.

40-23.50 THINLY BEDDED SILTSTONES with QUARTZITES

Pale grey - brown-grey, bleached by weathering. Silt thinly bedded grey mud siltstones in intervals to 1.5m alternating medium hard grey fine grained quartzites.

Fairly fractured at approx 10° with a small proportion of zones to 1cm in the larger, more persistent fractures.

40-43.5 more thin qtz - rich siltstone units in broken core.

43.5-23.5 sparse pyrite (partly oxidised) in veinlets and crystals. Pyrite altered by weathering.

22.5-25.6 THINLY BEDDED SILTSTONES and QUARTZITES

Medium grey clay rich siltstones thinly interbedded with pale grey quartzose siltstones and very dark grey thinly bedded shale beds are less than 5cm with bedded with discrete breccia to 1 to 2cm.

Gradual Change.

22.5-25.6 pyrite as thin bedded laminae with shaley beds; fairly abrupt to sand siltstone beds and as small irregular stringers

25.6-60.0 QUARTZITES WITH THINLY BEDDED SILTSTONES

Hard bluish grey quartzites as massive brecciated, beds varying in thickness from 1cm to 1.5m.

The siltstones are clay rich and thinly bedded (<3cm) with rare shaley laminae <5mm. Some quite pale grey quartzose beds to 1cm. Overall, alternating zones of siltstone in varying proportions divide the quartzite beds (thickness 10cm to 2m.

Well bedded with only minor disruption and cementation but extensive later shearing - well jointed, with occasional small pugging zones to 5cm at 30-35°

25.6-32.7 pg, fairly abrupt to quartzites and in the irregular stringers with the 3cm+ isolated qtz pyrite veins to 2.5 cm.

32.7-60.00 As above, weathered - stained brown

Fe oxide stains with clay along fractures

60.0-60.5 THINLY BEDDED SILTSTONES, minor SHALES, WITH QUARTZITES

As above, 25.6-60.0m, but siltstones thinly bedded, with spare shale beds) greater than sandstones

60.0-61.5 Pg in thin veinlets and stringers and finely pyritic in quartzite beds, joints and unconformities with minor Fe oxide staining

61.5-74.6 Pg as thin veinlets and stringers, often in zones, mainly beds and as rare thin bedded laminae < 2mm in the more shaley sections.

71.5-74.6 Hard, fractured and well bedded and broken.

74.60-93.7 QUARTZ FELSPAR PORPHYRY

74.6-82.6 Very fractured and broken - greyish - Brownish or totally bleached pitted fairly crystalline matrix with orange-brown limonitic Fe oxide stains surrounding fractures and the white totally bleached portions.

Phenocrysts - Qtz - rounded euhedral grains to 4 mm (5-10%)
Feldspar - altered to buff limonite tepee(?) up to 3 mm - Variable concentrations - locally 10%, average 1-2%

74.6-82.6 pitted pg as stringer zones to 5 mm, zones totally consumed by weathering. Qtz-pyrite veins to 10 mm at 60° to axis of core.

79.4-79.8 Strong brecciation, rounded black inclusions to 4 mm.

82.6-91.5 Intervals of weathered pugging siltstone to 2m, with high core losses.

82.6-91.5 thinner qtz veins, pyrite almost totally removed by weathering.

91.5-93.1 Fractured, but still highly weathered and pitted. Decrease in size and abundance of phenocrysts
- Qtz - max 3 mm - 7%
Feldspar - weathered, trace pitted white grains.

91.5-93.1 pitted pg with sulphoid quartz veins to 15 mm and a trace black conductive (?) in veinlets and as small irregular vein zones.

93.7 - 112 THINLY BEDDED SILTSTONES, minor SHALES WITH QUARTZITES

Thinly bedded pale grey clay rich siltstones in some places fairly greenish and resistive, with interbedded quartzite beds 0.5-0.9 m.

Some minor soft sediment disruption with later extensive shearing and minor faulting at low angles to core axis.

93-112 Pg - mainly as veinlets and stringers in small irregular vein zones.

112 - 115.4 MASSIVE QUARTZITE

Very hard bluish grey massive quartzites - individual beds to 2.0 m divided by thin siltstone beds 4 cm. Well fractured and broken

RESIDUAL Pg-rich veining with minor blebby disseminated Pg.

END OF HOLE 115.4 m

5cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
underlined about 15 cm.

GRAPHIC LOG | STRUCTURAL AND VEIN INFORMATION | MINERALISATION | NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: CLIFFORD HUNT date 2/4/80

HOLE No. MBD 60
LOG SHEET 2 OF 2
from 0 m to 115.4 m

Printed 30/6/80

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	As	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97900		72.6	74.6	2.0	300								330	Pulp check.
1		74.6	76.6	"	2200		65	820	20	1	25	620		
2		76.6	78.6	"	5200		70	760	14	2	30	600		
3		78.6	80.6	"	6000		65	1750	28	1	50	1450		
4		80.6	82.6	"	2.18%		150	1050	50	<1	110	1000		
5		82.6	84.6	"	8000		100	410	32	2	70	250		
6		84.6	86.6	"	1.08%		180	400	65	1	75	490		
7		86.6	88.6	"	1.02%		210	420	75	<1	85	600		
8		88.6	90.6	"	7500		270	1050	100	1	70	860		
9		90.6	93.1	2.5	3850		320	150	30	2	45	210		
10		93.1	95.1	2.0	580									

Notes:— XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 40

SAMPLE TYPE: DRILL CORE FROM 72.6 TO 95.1

028515

MBD-41

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH NO.9 AUSTRALAS. INST. MIN. METALL. - 1976

028516

INTERVAL	DEPTH from-to : ROCK UNIT / Depth : Description and notes	GRAPHIC LOG	MINERALISATION
0-3.0	TRICONE DRILLED TO 3.0 m - NO CORE.		
3.0-62.95 (59.95)	**3.0-62.95 SILTSTONES, BLACKSHALES, minor SANDSTONES.** Dark grey clay rich siltstones, (some almost black and carbonaceous) with medium grey quartzose siltstones which sometimes grade into fine grained sandstones. The black shales occur as fine laminae / thin beds to 0.5cm dividing siltstone beds. Very brecciated - sub-angular → rounded siltstone clasts in a cemented matrix of finely bedded siltstone and blackshale. Some sparse well bedded intervals of siltstone to 2m thick occur. Well fractured and broken, some minor fault zones to 1m. Contact 30°	10/9c	3.0-19.6 Finely disseminated py, concentrated in some siltstone beds and clasts, also as blebs to 5mm 3-5%. Abundant dolomite-fluorite-qtz-py-sepeolite-marcasite-phlogopite-sp-ga veining TOTAL: 7%. 19.6-22.4 Vein zone, as above, but total 10-15% 22.4-62.95 disseminated py, some blebs py, marcasite and rare po. Sparse veining as above. TOTAL 3%.
62.95-86.8 (23.85)	**62.95-86.8 QUARTZ FELSPAR PORPHYRY** Matrix greyish cream in colour, finely crystalline, in places greenish and brownish grey. Qtz - subhedral → rounded grains to 4mm 10-15%. Felspar - variable, some alteration to hard brownish cream mineral (esp. near margins) 2-15%. Highest proportion and least alteration in central 13m (10-15%) Contact 40°	1	62.95-66.5 py marcasite, sp. Minor qtz-py-fluorite veining. TOTAL 10%. 66.5-71.3 sp, trace py, weak qtz-py veining 2-3% 71.3-81.9 py, marcasite, sp, fluorite, wisps and rare amethyst 10-15%. sp locally > py 81.9-86.8 py, sp, marcasite; dolomite-fluorite-qtz-py-po veining 30-40° CA 2-3%.
86.8-123.45 (33.65)	**86.8-123.45 SILTSTONES, BLACK SHALES.** As for 3.0-62.95 116.4-123.45 As above, but lighter greys and weakly sericitic. Contact 70°	10/9c	86.8-104.1 py as rounded blebs to 5mm and heavily disseminated in some siltstone beds. qtz-py-marcasite-carbonate-fluorite-sepeolite-pyrite mica-chlorite(?) veining. TOTAL 7%, 10% in 2.5m adjacent to contact. 104.1-116.4 As for 86.8-104.1, but only 2-3% 116.4-123.45 py, marcasite, po as blebs, some finely disseminated. Veining as above TOTAL: 5-7%.
123.45-126.6	123.45-126.6 DOLOMITE SULPHIDE LODE. serpentinite, minor talcy patches	7/6	po, py, trace sp, fluorite 35%
126.6-147.5 (20.9)	**126.6-147.5 DOLOMITE** (contact irregular, 30°) Fine grained, pale grey and brecciated (dark grey staining along fine brecciation fractures) Some weak talcose and serpentinous alteration along brecciation fractures - irregular patches with bleached haloes ~2cm. Gradual Change	2	sp, po, fluorite, white mica as irregular infillings in brecciation cavities. Minor dolomite-qtz veining. TOTAL 1%, sparse intervals 10-15% up to 0.4m thick.
147.5-160.6 (13.1)	**147.5-160.6 RECRYSTALLISED DOLOMITE** Mottled pale greys and creams, with abundant purple fluorite in places. Brecciated and well fractured, minor talcose etc alteration along fracture planes. Contact irregular	3	147.5-150.1 py, cp, fluorite, marcasite, po 2-3% 150.1-160.6 fluorite, py, marcasite, po, sp as blebs and patches to 10cm, intergrown throughout. Patches fluorite to 30cm thick TOTAL 15-20%.
160.6-199.55	**160.6-199.55 SILTSTONES, BLACK SHALES, MINOR SANDSTONES** 160.6-185.7 As for 3.0-62.95, with the addition of some quartzose sandstone beds to 1m thick. Well fractured and broken - fine clay filled fractures 185.7-199.55 As above, but well bedded, with only minor brecciation and contortion. Siltstones and shales thinly bedded (< 2cm). Some thinly laminated siltstone / silty shale intervals to 1m.	10/9c/12/5	160.6-166.5 py as disseminated blebs to 3mm, also finely disseminated. Fine dol-calcite-qtz-fluorite veining TOTAL 7-10%. 166.5-185.7 py, finely disseminated, rare blebs and thin stringers. Sparse qtz-carbonate-py veining TOTAL 2-3%. 185.7-200.00 Py etc as above, with the addition of some thin bedded py laminae to 3mm. TOTAL 3%, locally 5-7%
199.55-200.00	199.55-200.00 'TUFF' +0.45m * END OF HOLE 200.00 m.	12	

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD. EXPLORATION DEPARTMENT

SUMMARY DRILL LOG

Scale (1:1000), 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT

Date: 7/5/80

HOLE No. MBD 41

Sheet of

028517

REPORT No.

METALS EXPLORATION LTD. & SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

MBD·41

Prospect, area, project or mine. Mount Bischoff

HOLE No. MBD 41

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1700.44 N	859.99 E	608.54
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79. Holder METALS EXPLORATION LTD.

Cadastral location and details CROWN LAND/PRIVATE

W.C. Bearing from collar
- magnetic
- 180 grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 75°

Total length 200.0 m.

Commenced: 1 / 4 / 80
Completed: 5 / 4 / 80

Drilling contractor LONGYEAR (AUST) PTY LTD.

Rig type LONGYEAR 38.

Details of down hole location-survey methods.
TROPARI every 40m.

Purpose of drilling and anticipated lengths to targets.
To intersect the possible continuation of a 'new' dolomite horizon as extrapolated from intersections obtained in previous diamond drill holes (B18, B19, B15 etc) and to investigate the southwestwards extension of 'White Face' porphyry dyke.

Core size and non-coring (NC)

TRICONE	0	TO	3.0
NQ	3.0	TO	89.0
BQ	89.0	TO	200.0
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type AZIMUTH	DIP
38.5	177°	73°
80.5	172°	75°
120.5	143°	73°
159.5	137°	74°
198.5	126°	76°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL No.	FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY G. BROADBENT FROM 0 TO 200.0m DATE 14/4/80 | LOGGED BY ____ FROM ____ TO ____ DATE ____ | LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme. METALS EXPLORATION LTD

HOLE No. MBD41
Log sheet 1 of 3

TRICONE TO 50.0m - NO CORE

50-102.5 THINLY BEDDED SILTSTONES WITH MINOR SANDSTONES AND SHALE BANDS

Dark grey clayey rock siltstones with thin black and dark grey shale laminae and sparse medium grey cemented siltstones / fine sandstones to 5 mm max. Extensively disrupted and deformed - soft pebbly conglomerate fabric with rounded - sub angular clasts of siltstone in a carbonated and deformed matrix

50.0-52.5 Matrix fine grained and pale greenish grey. Clasts 10-20%, Feldspar 10-15%, partially altered.

52.5-71.5 Pale brownish grey due to weathering, clay of oxidised siltstones grains 0.5mm - 4mm, 10-15% Feldspar 71.5-71.8 Matrix greyish green, finely crystalline, clasts 10-15% Feldspar, partially altered 1-5%.

71.8-82.6 Matrix grey siltstone and semi brecciated (As at above) Feldspar 2 yr. (clasts), white and scattered 20%

82.6-83.5 As for 71.5-71.8.

83.5-85.5 Matrix fine grained and pale greenish grey/brownish grey. Clasts mainly siltstone grains 0.5-4mm, 10-15% Feldspar to 6mm, mostly 0.5-2mm, partially altered, 10-15%

85.5-86.9 Matrix white, finely crystalline, lesser proportion of phenocrysts - total 10-15%.

86.8-123.5 SILTSTONES AND CARBONACEOUS ZONES

Dark greyish with brecciated black shales to 1 cm thick. Extensively disrupted with shears of and grey quartzose siltstone and thicker grey clay rich siltstone in an intensely altered blackish thinly siliceous matrix.

86.8-123.5 As above, but lighter greyish in colour - finely bleached and weakly siliceous.

U82 Sample 48020 taken for rock cutting and petrological

50-52.5 Bedding 90°

52.5 Bedding 90°

52.5-53.5 10 mm dolomite-fluorite-pyrite-chlorite ± chlorite-sericite-quartz-calcite veins, 90° to core axis

53.5 Bedding 45°

53.5-54.5 10 mm dolomite-fluorite-pyrite-chlorite-sericite-quartz-calcite veins, 45°

54.5 10 mm dolomite-fluorite-pyrite vein, 60°

54.5-55.5 Bedding 45°

55.5-56.5 10 mm pyrite-marcasite-calcite ± fluorite veins, 60°

56.5-57.5 10 mm dolomite-fluorite-pyrite-chlorite ± pyrite-calcite veins, 15° to core axis

57.5-58.5 10 mm pyrite-fluorite-quartz-calcite veins, 15°

58.5-62.5 Bedding 30°

62.5-63.5 Bedding 30°

63.5 Bedding 70°

63.8 10 mm dolomite-fluorite-carbonate-pyrite-galena veins, 30°

64.9-65.2 50 mm dolomite-pyrite-fluorite veins with inclusions of basalt

65.2-65.8 Minor fault zone - broken core and gouge zones to 5 cm.

65.8 Contact 30°

65.8-66.8 Minor fault zone - broken core and gouge zones to 5 cm, apparently later disruption of the 65.2-65.8 fault.

66.8-67.5 Bedding 70°

67.5-68.5 Bedding 70°

68.5-69.5 Bedding 70°

69.5-70.5 Bedding 70°

70.5-71.5 Bedding 70°

71.5-72.5 Bedding 70°

72.5-73.5 Bedding 70°

73.5-74.5 Bedding 70°

74.5-75.5 Bedding 70°

75.5-76.5 Bedding 70°

76.5-77.5 Bedding 70°

77.5-78.5 Bedding 70°

78.5-79.5 Bedding 70°

79.5-80.5 Bedding 70°

028519

3.0	100	3.0	120			See page 2 for description.		See page 2 for description.	
						← 122.1 10 mm fluorite-pyrrhotite-sepentinite vein, 90°.			
3.0	100	3.0	120			← Contact 70°			
				122.5-126.6 DOLOMITE SULPHIDE LODE. Soft mottled greyish green serpentinite with some minor talcy patches. Overall massive, granular texture with some weak irregular banding in sulphides. The lower 1.6 m exhibits a gradually increasing proportion of patches of grey qtz and resided rounded/corroded dolomite. Brecciated fabric.	126	7/4/9/5	122.5-125. po > py, trace sp, fluorite. Disseminated, in perpendicular veinlets and grains, some weak foliation.	30%
2.6	96	2.5	100					125-126.6. py > po, trace sp, fluorite. As for 122.5-125.	30%
						← Contact irregular, 30°			
2.4	92	2.6	104	126.6-142.9 DOLOMITE; brecciated and weakly recrystallised	127	2 (a)	126.6-142.9 traces sp, po and fluorite as irregular infillings in brecciation cavities. Some minor qtz-recrystallised dolomite and carbonate veining	1%	
				Pale grey, fine grained, extensively brecciated and disrupted - fine dark grey stained non-penetrative fractures separate angular (occasionally rounded) pieces of dolomite. Some minor talcose (green) and serpentinous (black) alteration along some shear planes - small irregular patches and thin films < 1 cm with 1-2 cm bleached haloes in the unaltered dolomite						
2.7	108	2.7	108	Well fractured and broken, particularly where talcose	132				
1.2	48	0.4	16						
2.1	84	2.1	84	136.7m. Sample 98081 taken for thin sectioning and petrology.	136				
2.1	84	2.1	84						
3.1	124	3.1	124		149				
						← Contact irregular			
1.9	76	1.9	76	142.9-144.1 DOLOMITE SULPHIDE LODE. Grey recrystallised carbonates and qtz with greenish ? serpentinite. Mottled creams/dark greens - granular, brecciated, texture	144	8/9	142.9-144.1 Fluorite, py, sp, po as interstitial blebs and finely disseminated.	20%	
						← Contact irregular.			
3.1	124	3.0	120	144.1 - 145.9 DOLOMITE. Pale grey brecciated, unaltered dolomite as above 126.6-142.9 m.		2	144.1-145.9 traces sp, po and fluorite as blebs and interstitial grains to 10 x 8 mm.	1%	
						← Contact irregular.			
1.8	72	1.5	60	145.9 - 160.6 ALTERED AND RECRYSTALLISED DOLOMITE. Pale grey finely crystalline dolomite, highly disrupted and brecciated, with a distinct greenish colouration in some intervals due to abundant finely disseminated fluorite. The extent of alteration and recrystallisation increases with depth - the last 8-10 m consists of a mosaic of intergrown sericite, topaz, fluorite and sellaite (sample 98082), with varying amounts of recrystallised carbonates and qtz with fluorite and green schorl.	146	8/3	145.9-146.3 Fluorite > py, sp, po	20%	
						146.3-147.5 traces sp, po and fluorite to 5 x 3 mm.	1%	
						147.5-150.1 py, sp, fluorite, trace po; disseminated as blebs and grains	2-3%	
3.0	120	3.0	120			150.1-150.8 Vuggy massive purple and green fluorite/gangue	90%	
						150.8-158.5 py/marcasite, fluorite, trace po, sp as blebs and patches to 10 cm, concentrated along brecciation fractures.	15-20%	
2.8	112	2.8	112	153.0 sample 98082 taken for thin sectioning and petrology.	153				
3.1	124	3.1	124		157				
3.1	124	3.1	124		161	← 159.1 Small fault zone - 0.5 m broken core, some muggy material.	158.5-160.6 py, as rounded blebs to 8 mm, some interstitial finely disseminated fluorite. Concentrations locally variable 5-40%.	10-15%	
						← Contact irregular + well fractured.			
				160.6 - 199.55 THINLY BEDDED SILTSTONES AND BLACK SHALES with MINOR SANDSTONES.		10/9/16			
3.0	120	3.0	120	Dark grey clay rich siltstones with some sandy beds to 1.5 m, and contorted beds of black shale to 1 cm. Extensively disrupted and deformed - 'soft pebble conglomerate' fabric. The sandstones are quartzose, with minor shale fragments and some ? Feldspar grains.	165		160.6-166.5 py, as disseminated blebs and finely disseminated in siltstones and shales. Minor fine dolomite-carbonate-qtz veining	7-10%	
3.0	120	3.0	120						
3.0	120	3.0	120		169				
3.0	120	3.0	120				166.5-185.7 py, finely disseminated throughout, as rounded blebs from disruption of pyritic beds, and in thin stringers with qtz, carbonates.	2-3%	
3.0	120	3.0	120		173				
3.0	120	3.0	120		177				
3.0	120	3.0	120		181				
3.0	120	3.0	120		185				
3.0	120	3.0	120		189	← 182.6 Bedding 30°			
3.0	120	3.0	120		193				
3.0	120	3.0	120	185.7 - 199.55 Not as brecciated - minor disruption, thinly bedded siltstones (quartzose and also darker grey clay rich beds) separated by black shale beds. Some intervals have a 'stripey' appearance with only minor contortion. Sparse sandstone beds to 0.5 m. Thickness of individual siltstone beds < 5 cm, mostly less.		← 185.8 Bedding 45°	185.7-199.55 py, disseminated as above, also in thin bedded laminae associated with black shale, or heavily concentrated in scattered thin quartzose siltstone beds. (up to 40-50% of an individual bed, beds may be 2-7 mm thick)	3%	
3.0	120	3.0	120		197	← 188.0 Bedding 35°			
3.0	120	3.0	120			← 190.5 Bedding 50°			
1.5	60	1.5	60		201				
3.1	124	3.1	124			← 193.8 Bedding 50°			
						← 195.0 50 mm dolomite-fluorite-sulphide veins, 30°.			
3.0	120	3.0	120		205	← 195.7 Bedding 55°			
						← 198.6 Bedding 70°			
1.4	108	1.4	108			← Contact irregular.			
				199.55-200.00 TUFF fine grained, with small black shale clasts.	209	12	199.55-200.0 py, disseminated throughout	5-7%	
				END OF HOLE 200.0 m.					

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes
indented about 19 mm

GRAPHIC LOG | STRUCTURAL AND VEIN INFORMATION | MINERALISATION | NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date: 14/4/80

HOLE No. MBD 41
LOG SHEET 3 OF 3
from 120.0 m to 200.0 m

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97947		19.6	22.4	2.8	2250									
979911		61.0	63.0	2.0	400									
12		63.0	65.0	"	390									
13		65.0	67.0	"	420									
14		67.0	69.0	"	190									
15		69.0	71.0	"	180									
16		71.0	73.0	"	1000									
17		73.0	75.0	"	860									
18		75.0	77.0	"	320									
19		77.0	79.0	"	1150									
930		79.0	81.0	"	340								390	check Assay
21		81.0	83.0	"	400									
22		83.0	85.0	"	540									
23		85.0	86.8	1.8	3300									
24		86.8	88.8	2.0	420									
25		121.4	123.4	2.0	300									
26		123.4	125.4	"	3200									
27		125.4	126.7	1.3	3650									
28		126.7	128.7	2.0	110									
29		128.7	130.7	"	140									
930		130.7	132.7	"	24									
31		132.7	134.7	"	70									
32		134.7	136.7	"	26									
33		136.7	138.7	"	14									
34		138.7	140.7	"	8									
35		140.7	142.7	"	55									
36		142.7	144.7	"	860									
37		144.7	146.7	"	410									

Notes :— Sn by XRF Fusion Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET. HOLE NO. MBD 41A

SAMPLE TYPE : DRILL CORE FROM 19.6 TO 146.7

028520

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97938		146.7	148.7	2.0	140									
39		148.7	150.7	"	1450									
940		150.7	152.7	"	2150								0.22%	check Assay
41		152.7	154.7	"	3700									
42		154.7	156.7	"	6600									
43		156.7	158.7	"	6.45%									
44		158.7	160.6	1.9	1.1%									
45		160.6	162.6	2.0	310									

T 28521

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET. HOLE NO. MBD 41 B

SAMPLE TYPE : DRILL CORE FROM 146.7 TO 162.6

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10 mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS. INST. MIN. METALL. – 1976

028522

MBD-42

0	0-3.0	TRICONE TO 30m - NO CORE.		
	3.0-72.7 (69.7m)	3.0-72.7 SILTSTONES AND BLACK SHALES, MINOR SANDSTONES Dark grey clay rich siltstone, medium grey quartzose siltstone, brecciated, with discontinuous lenses and clasts of black shale. Some clasts are contorted and rounded - 'soft pebble conglomerate' texture. Well fractured - rock is permeated by fine white clay filled fractures 40-60° CA, with small faults at 5-7m intervals. The sandstones are dark grey, silt rich and massive to 1m thickness. 40-55 m weakly sericitic and silicified	10/9c/11s	3.0-11.0 py. qtz. in stringers & veinlets 1% 11.0-51.7 py, finely disem in siltstones and sandstones 3-5%. Some py-marcasite-carbonate-qtz-fluorite-sp-arsen veining TOTAL 7% 49.8-51.7 Vein zone, 15%, most veins = 30-40° CA 51.7-72.7 As above, 2-3%.
20				
40				
60		Contact Broken. (small fault)		
	72.7-74.5	72.7-74.5 QUARTZ FELSPAR PORPHYRY.	1	py sp dol-fluorite-py-qtz veining 5-7%
	74.5-86.2	74.5-86.2 SILTSTONES, BLACK SHALES, MINOR SANDSTONES Contact 70°		
80		As for 3.0-72.7m	10/9c/11s	py, finely disem. and in stringers and veinlets with carbonates-qtz-fluorite-marcasite TOTAL 5%.
	86.2-87.6	Contact irregular 60°		
	87.6-112.2 (24.6)	86.2-87.6 QUARTZ FELSPAR PORPHYRY.	1	py, trace black tourmaline 2-5%
		87.6-112.2 SILTSTONES, BLACK SHALES, MINOR SANDSTONES. Contact irregular		
100		As for 3.0-72.7, but sandstones are silicified - quartzites. Proportion of sandstones increases towards base of interval.	10/9c/11	87.6-112.2 py, disem and in thin stringers and stockworks to 10 cm with qtz, carbonates. TOTAL 5%.
		Gradual Change		
	112.2-126.0 (13.8)	112.2-126.0 SANDSTONES, SILTSTONES and BLACK SHALES	11/s/10c/9c	112.2-123 sparse carbonate-qtz py veining, a little disem py. 1%
120	126.0-126.7	126.0-126.7 'TUFF' Contact 45°	q	123-126.0 py, some veining 5%
	126.7-144.0 (17.3)	126.7-144.0 SANDSTONES, SILTSTONES and BLACK SHALES. Contact bedded 60°	11/s/10/9c	py. disem in qtzose beds, veinlets with qtz, carbonates, marcasite. 3%.
140		As for 112.2-126.0. some siltstones finally greenish and sericitic.		
		Gradual Change		
	144.0-182.0 (162.0m)	144.0-182.0 SILTSTONES and BLACK SHALES. Well bedded dark grey clay rich and pale grey quartzose siltstones with black shale beds < 0.5 cm and some thin pyrite laminae to 2 mm. Some minor folding and contortion and small brecciated zones to 2 m.	10/9/c	144-161 py as bedded laminae to 2 mm, finely disem in some siltstone beds; in stringers with qtz, carbonates, marcasite. Some small breccia zones to 10 cm and qtz-dol veining. 3-5%. 161-182 As for 144-161, 2-3%.
160				
180		Gradual Change		
	182.0-189.48 (7.48m)	182-189.48 QUARTZITES, SILTSTONES and SHALES Pale grey qtzites, hard and silicified, siltstones mostly qtzose and weakly sericitic. Contact 55°	11/10/9	py, disem in qtzites and as thin veinlets and stringers. Sparse dolomite-qtz-py-marcasite veining. 3%
	189.48-215.0 (25.52)	189.48-215.0 QUARTZ FELSPAR PORPHYRY. Matrix: white, finely crystalline with some faintly greyish very fine grained portions. Qtz - subhedral grains to 2-3 mm. 10-15%. Felspar - altered to hard brownish mineral, scattered variably throughout 0-5%. Average size < 2 mm. 1% Contact 30°	1	py, as distinct grains with marcasite rims to 2 or 3 mm. Sp variable (trace-5%) Weak trace ? cassiterite, fluorite and some minor qtz-carbonate-py-sp veining TOTAL 10-15%.
200				
220	215.0-226.5 (11.5m)	215.0-226.5 SILTSTONES, minor BLACK SHALES and QUARTZITES Upper 4 m hard brecciated quartzites 219.6-226.5 Siltstones thinly bedded with black shales, minor contortion and brecciation.	11/10 10/9/c	189.48-215.0 As for 144-161. 2-3%.
		END OF HOLE 226.5 m.		
240				

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY – COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale (1:1000), 1:500, 1:250

Prepared by: G BROADBENT
Date: 7/5/80

HOLE NO. MBD 42
Sheet of

028523

REPORT No.

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD42

COLLAR LOCATION

	Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	1759.94 N	840.01 E	606.68
(2)		N	E	
(3) Aust. Map Grid PRECISE / APPROX.		mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79. Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
- magnetic
- grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar VERTICAL

Total length 226.5 m.

Commenced: 6 / 4 / 80
Completed: 12 / 4 / 80

Drilling contractor LONGYEAR (AUST) PTY LTD

Rig type LONGYEAR 38.

Core size and non-coring (NC)

TRICONE	0	TO	3.0
NQ	3.0	TO	80.0
BQ	80.0	TO	226.5
		TO	
		TO	
		TO	

Details of down hole location-survey methods.
TROPARI every 40 m.

Purpose of drilling and anticipated lengths to targets.
To intersect a further continuation of the dolomite body intersected in MBD 41.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type AZIMUTH	DIP
40	263	83°
80	264	82°
120	320	82°
160	301	83°
200	309	84°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY C. BROADBENT FROM 0 TO 226.5m DATE 17/4/80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme.
METALS EXPLORATION LTD.

HOLE No. MBD42
Log sheet 1 of 4

TRICONE TO 3.0 m - NO CORE

3.0-72.7 SILTSTONES AND BLACK SHALES, MINOR SANDSTONES.

Very disrupted by soft sediment deformation - clasts of medium grey quartzose siltstone, dark grey clay rich siltstone with discontinuous leases and clasts of dark grey silty shale. The sandstones are dark grey, medium hard, disrupted and brecciated, and up to 1 m thick. Well fractured - the rock is permeated by thin white clay filled fractures at 40-60° LCA, with small puggy or broken zones every 5 or 6 m.

10/14/92

6.9 25 mm vuggy py-sp-carbonate -qtz vein 35°

7.1 60 mm py-sp-carbonate-ga-qtz vein, 40°.

12.5 Bedding 50°

18.8 Bedding 55°

33.7 Bedding 40°

36.3 Bedding 35°

41.1 Bedding 60°

47.7 Bedding 35°

49.2 150 mm py-qtz-fluorite -marcasite-sp-arsen vein, 65°

50.3 50 mm py-qtz-fluorite -marcasite-sp-arseno vein, 65°

50.7 20 mm irregular py-dolomite -fluorite-marcasite vein

51.1 300 mm py-marcasite-sp -ga-dolomite-fluorite-qtz veins, 15°

51.7 20 mm py-marcasite-sp-ga -fluorite-qtz vein, 15°

56.8 20 mm carbonate-fluorite -qtz-py-sp vein, 45°

69.3 150 mm breccia zone - dolomite-sp-ga-fluorite veins @ 40°

69.9 30 mm irregular dolomite -chlorite-? serpentine -sp vein, 15°.

70.5-72.9 Fault zone, sheared and crumbly.

Contact Broken.

Contact 70°

10/14/92

76.4 20 mm carbonate-qtz-sp-ga-py vein, 65°

3.0-11.0 py. qtz in thin stringers and irregular veinlets 1%

11.0-51.7 py, finely disem in siltstones and sandstones and in sparse thin veins with qtz. Py-marcasite-carbonate-qtz veining locally increases proportion of mineralisation to 10%. 3-5%

51.7-72.7 py, finely disem in siltstones and sandstones and in veinlets with qtz, carbonate, rarely sp, ga. 2-3%

72.7-74.5 QUARTZ FELSPAR PORPHYRY.

Matrix pale grey, finely crystalline
Phenocrysts: Qtz: rounded grains 1-3 mm, 10%
Felspar: yellowish, partially altered to 2 mm, 1-2%

72.7-74.5 py, sp, disem throughout as rounded grains to 3 mm. Slightly pitted. Weak dolomite-py-qtz-fluorite veining. Fluorite 1% disem. 1-2%

72.7-86.2 SILTSTONES AND BLACK SHALES WITH SANDSTONES.

See 0-72.7, above, for description.

74.5-86.2 py, finely disem and as thin veinlets and ringers
Sparse carbonate-qtz-fluorite-py-marcasite-sp veining. 3-5%

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: Q. BROADBENT date 17/4/80

HOLE No. MBD 42
LOG SHEET 2 OF 4
from 0.0 m to 84.0 m

See page 2.

Depth	Description	Sample	Notes	Mineralisation	Notes
84			← Contact 60°, irregular.	See page 2.	
	86.2-87.6 QUARTZ FELSPAR PORPHYRY. Matrix pale grey, finely crystalline. Qtz - rounded grains 1-3 mm, 5-7%. Felspar - well formed, to 2 mm, yellowish and partially altered, 1-2%	1		86.2-87.6 py, as rounded grains to 3 mm, trace f.g. ? tourmaline.	5-7%
88	87.6-112.2 SILTSTONES WITH BLACK SHALES, MINOR SANDSTONES. See 0-72.7 m for description.	10/11/9c	← Contact irregular.	87.6-112.2 py, carbonates, qtz in thin stringers and small stockworks. Py is also finely dissem throughout the siltstones and sandstones.	5%
92					
96			← 98.4 10 mm dolomite vein, 20°		
100			← 101.4 10 mm dolomite - qtz vein, 5°		
104			← 106.1 140 mm vuggy dolomite - qtz - sp - fluorite - cassiterite vein, 60°		
108			← 108.5 Bedding 60°		
			← 110.2 Bedding 50° ← 110.6 45 mm vuggy dolomite vein with inclusions of sediment, 45°		
112			Gradual Change.		
	112.2-126.05 SANDSTONES WITH SILTSTONES AND MINOR SHALES. Sandstones concentrated in intervals up to 5 m thick, separated by 3-5 m intervals of thinly bedded grey siltstones with thin black shale laminae. The sandstones are quartzose, with small clasts of black shale, and are weakly micaceous in places. Disrupted and brecciated, siltstones gradually increase in abundance towards the base of the interval.	11/10/9c	← 112.8 Bedding 80°	112.2-123 py, sparsely dissem. and in thin veinlets with carbonates, qtz.	1%
116			← 116.2 Bedding 55°		
120			← 119.0 Bedding 55°		
124			← 123.3 Bedding 50°	123-126.05 py, finely dissem and in veinlets and stringers with qtz, carbonates, fluorite	3-5%
			← 125.9 Bedding 35°		
	126.05-126.7 TUFF Coarse grained - felspar grains and shale clasts to 2 mm in a f.g. weakly foliated pale grey matrix.	12	← Contacts 45°, bedded.	126.05-126.7 Non mineralised.	–
	126.7-144.0 SILTSTONES AND BLACK SHALES, minor SANDSTONES. 126.7-128.1 Pale khaki-green sericitic siltstones with black shale laminae. 128.1-144 Thinly bedded siltstones and shales, medium to dark grey or almost black in color. Sandstones are qtzose, medium grained mid-grey in colour and up to 0.9 m thick. Overall, quite well bedded, with some minor disruption and folding.	10/11/9c	← 128.0 Bedding 45°	126.7-128.1 py as blebs in shale beds, minor carbonate veining.	1-2%
128			← 129.2 30 mm qtz-py-vein	128.1-144 py, finely dissem in qtzose beds and as sparse thin bedded laminae. Minor thin qtz-py-carbonate stringers	2-3%
132			← 131.7 Bedding 55°		
136			← 136.4 Bedding 50°		
140			← 139.3 Bedding 50°		
			← 142.2 Bedding 70°		
144			Gradual Change.		
	144.0-189.48 SILTSTONES AND BLACK SHALES. Thinly bedded (1-2 cm) medium - dark grey clay rich and quartzose siltstones with minor shale interbeds, often associated with thin bedded pyritic laminae. Well bedded - 'stripey' appearance, with some minor contortion, disruption and folding.	10/9/c	← 144.8 Bedding 80°	144-161 py, trace marcasite as thin bedded laminae < 1.5 mm, minor veinlets and stringers; with occasional qtz - carbonate veinlets.	3-5%
148			← 147.0 Bedding 55°		
152			← 150.1 Bedding 65°		
156			← 153.0 Bedding 65°		
160			← 156.0 Bedding 65°		
			← 158.8 Bedding 60°		
164			← 161.6 Bedding 60°	161-182.0 As above 144-161, slightly lower proportions.	1-2%
			← 163.7 Bedding 80°		
168			← 166.5 Bedding 80°		
	167-189 Slightly increased soft sediment deformation and some folding, still well bedded.				

5 cm

Sample	Depth from-to	Rock unit	Graphic log	Structural and vein information	Mineralisation	Notes
3.0	3.0	100				
3.0	3.0	100				
2.7	2.7	100				
3.1	3.1	100				
3.1	3.1	100				
3.1	3.1	100				
1.7	1.7	100				
1.3	1.3	100				
2.0	2.0	100				
3.1	3.1	100				
3.9	3.9	100				
2.3	2.3	100				
2.2	2.2	100				
1.5	1.5	100				
1.9	1.9	100				
3.1	3.1	100				
1.0	1.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
1.5	1.5	100				
1.5	1.5	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				
3.0	3.0	100				

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes indented about 75 mm

GRAPHIC LOG — STRUCTURAL AND VEIN INFORMATION — MINERALISATION — NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date 17/4/80

HOLE No. MBD 42
LOG SHEET 3 OF 4
from 84.0 m to 168.0 m

Depth	Description	Graphic log	Structural and vein information	Mineralisation	Notes
168	See page 3 for description	10/9/c		See page 3 for description.	
			←169.3 Bedding 60°		
172			←172.2 Bedding 65°		
			Minor fold axes at 175.2, 175.3, 176.0 and 176.4 at ≤90° LCA.		
171			←176.5 Bedding 70°		
180			←179.5 Bedding 55°		
			←181.3 Bedding 65°		
	182-185.9 Pale grey fine grained quartzite beds to 0.8m thick, interspersed with weakly silicified siltstones and shales as above.	11/10/9c		182.0-189.48 py, finely disseminated in quartzose beds, minor bedded laminae, and sparse thin veinlets with dolomite-sp-marcasite	3-5%
184	185.9-189.48 Siltstones and shales are medium hard and weakly silicified.	10/9c			
			←187.3 Bedding 60°		
188			←188.6 50cm stringer of greenish porphyry.		
			←189.3 Bedding 60°		
	189.48-215.0 QUARTZ FELSPAR PORPHYRY.		Contact 55°		
	189.48-201.5 Matrix - hard, white and finely crystalline with some very fine grained semi translucent greyish patches. (silica rich)			189.48-192.9 py with marcasite rims, trace sp, some scattered grains black ?tourmaline in upper 50cm. Weak trace fine grained black cassiterite as small rounded grains < 0.5m. Weak qtz-CO_3^{2-}-py-sp veining throughout.	10-15%
192	Phenocrysts: Qtz - subhedral, with minor doubly terminated crystals. Grain size to 2-3mm, 10-15%.			192.9-194.1 py, as above 5-7% sp 3-5%.	10-15%
	Felspar - hard and altered; pale brownish colour with an erratic distribution throughout. Grain size to 1-2mm, 1-2%.			194.1-194.8 As above 189.48-192.9	10-15%
				194.8-196.3 py, marcasite in fine grained aggregates or distinct rounded grains to 3mm. Trace sp, fluorite.	15%
196				196.3-198.5 py, with marcasite rims on distinct grains to 2-3mm. Trace sp and rare f.gr. cassiterite	10-15%
200				198.5-201.5 py, minor marcasite weak trace sp and rare grains cassiterite.	15-20%
	201.5-202.8 As above, but felspar 2-3%			201.5-202.8 py, minor marcasite, trace sp, rare cassit. Mostly as rounded grains to 3x4mm	7-10%
	202.8-205.6 As above, 189.48-201.5			202.8-205.6 py, marcasite, trace sp. Mostly as dark grey very fine grained aggregates and blebs to 2x1cm.	15-20%
204	205.6-207 Highly siliceous - 'sugary' texture pale grey, translucent groundmass with phenocrysts qtz and ?topaz to 1-2mm, 25-20%.			205.6-207.0 py, marcasite, trace cassiterite. Finely disseminated throughout	15%
	207-215.0 As above, 189.48-201.5			207.0-209.2 py, marcasite, trace sp as distinct grains to 3mm, or patchy fine grained aggregates to 2x1cm. Concentration variable 7-20%.	10-15%
208				209.2-211.8 py, marcasite, trace sp. Finely disseminated, most grains less than 1.5-2mm	10-15%
212				211.8-215.0 py, marcasite, trace sp, weak trace cassiterite, rare grains fluorite, arseno	15%
			30cm py-fluorite qtz vein on contact, 30°.		
216	215.0-219.6 QUARTZITES, minor SILTSTONES. Faintly brownish medium grey massive quartzites with minor thinly bedded silicified siltstones. Quartzites are very hard and brecciated.	11/10	Contact 30°	215.0-219.6 py, disseminated in quartzites and in veinlets and stringers with qtz, carbonate and fluorite.	5%
			215.4 irregular stringer of greenish white porphyry, 10x5cm		
			Gradual Change		
220	219.6-226.5 SILTSTONES AND BLACK SHALES. Thinly bedded medium grey qtzose and clay rich siltstones with thin black shale laminae. Brecciated, with some soft sediment disruption and contortion, but bedding directions are still measurable.	10/9/c		219.6-226.5 py, trace marcasite in thin qtz-carbonate veinlets or finely disseminated, and in thin bedded laminae with shale beds.	2-3%
			←221.1 Bedding 65°		
224			←223.5 Bedding 65°		
			←225.5 Bedding 65°		
	END OF HOLE 226.5m.				
228					
232					
236					
240					
244					
248					
252					

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15mm

GRAPHIC LOG — STRUCTURAL AND VEIN INFORMATION — MINERALISATION — NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date 17/4/80

HOLE No. MBD 42
LOG SHEET 4 OF 4
from 168.0 m to 226.5 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
97946		49.0	51.7	2.7	2600									
97948		72.7	74.5	1.8	500									
97949		86.1	87.6	1.5	450									
97995		187.5	189.5	2.0	280									
96		189.5	191.5	"	1550									
97		191.5	193.5	"	1250									
98		193.5	195.5	"	380									
99		195.5	197.5	"	1850									
98000		197.5	199.5	"	1750								0.18%	check Assay
1		199.5	201.5	"	1450									
2		201.5	203.5	"	1800									
3		203.5	205.5	"	1150									
4		205.5	207.5	"	3400									
5		207.5	209.5	"	540									
6		209.5	211.5	"	1200									
7		211.5	213.5	"	920									
8		213.5	215.0	1.5	1750									
9		215.0	217.0	2.0	3950									

Notes :— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET. HOLE NO. MBD 42

SAMPLE TYPE : DRILL CORE FROM 49.0 TO 217.0

02852-1

MBD. 43

028528

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH No.9 AUSTRALAS INST. MIN METALL. - 1976

INTERVAL	DEPTH from-to : ROCK UNIT / Depth : Description and notes	GRAPHIC LOG	MINERALISATION
0-36.1 (36.1m)	**0 - 36.1 DOLOMITE, weakly recrystallised.** Fine grained pale grey and cream dolomite with weak recrystallisation along brecciation fractures. Some segregation of qtz and carbonates into open space fillings. Well fractured - yellowish clayey material lining fracture planes and puggy zones. (Recovery poor to 18.2m) Fine grained grey dolomite with fine dark grey brecciation fractures alternates with the faintly mottled pale cream and grey recrystallised dolomite as above.	2/3	0-12.2 py-sp-fluorite as blebs along fractures, irregular veins with qtz and carbonates and patches to 30mm. 3-5% 12.2-19.9 trace sp in qtz-carbonate veining < 1% 19.9-36.1 sp, py with qtz, carbonates in veins 1-2%.
	Contact 70°		
36.1-37.2	36.1-37.2 DOLOMITE SULPHIDE LODE.	7/8	fluorite, py, po, sp, some cassit? 10%
37.2-46.6 (9.4)	37.2-46.6 DOLOMITE, weakly recrystallised. Contact Broken As for 0-36.1	2/3	As for 12.2-19.9, < 1%
	Gradual Change		
46.6-51.8 (5.2m)	46.6-51.8 Recrystallised DOLOMITE. Dark grey recrystallised carbonates and qtz with white calcite and creamy dolomite surrounding embayed clasts of bleached dolomite.	3/2	sp, py, fluorite as blebs and grains to 5mm 3-5%.
51.8-93.6 (41.8)	51.8-93.6 SILTSTONES AND QUARTZITES. Contact Broken (fault zone) Khaki green and pale grey clay rich siltstones - sericitic? with some brownish quartzose siltstones, thinly bedded (mostly < 2cm). The quartzites are hard, bluish or brownish grey, some well bedded altering qtzose siltstones and sandstones, and occur in intervals 30cm - 2m, separated by siltstone intervals. Brecciated and disrupted, with later fine fracturing 80-60° CA Some sparse greenish shale beds 60m - 75m.	10/11	51.8-58.5 py, po disseminated as blebs, stringers and veinlets 1-2%. Some minor dolomite-qtz-fluorite-py-sp veining. TOTAL 5%. 58.5-93.6 py, trace po, disseminated and in veinlets, Some carbonate-py-fluorite-qtz-sp-po-marcasite-ga veining. TOTAL 2-3%
	79.5-89.2 Quartzites > siltstones.	11/10	
		10/11	
	Contact 65°		
93.6-101.25 (7.65)	93.6-101.25 QUARTZ FELSPAR PORPHYRY. Matrix - finely crystalline, in places pale grey and 5cm translucent, or yellowish cream Qtz - subhedral - rounded grains to 4mm 10-15% Felspar - yellowish or greenish due to alteration, 2mm or less, 3-5%.	1	py, marcasite, trace po, arsenopyrite, fluorite and sp, cassiterite. Variable concentrations and proportions 3-35%, average 20%. Some weak qtz-py-cassiterite-sp veining (1%)
101.25-112.5 (11.25)	101.25-112.5 SILTSTONES and QUARTZITES. Contact irregular, 30° As for 51.8-93.6	10/11	101.25-103.5 py, trace marcasite, disseminated in blebs and stringers 7% 103.5-112.5 py, disseminated blebs, stringers. Some sparse qtz-carbonate-fluorite-py veining. TOTAL 2-3%.
	END OF HOLE 112.5 m		

5 cm

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

FIELD COPY - COPY TO BE SENT TO MELBOURNE FOR TYPING

METALS EXPLORATION LTD. EXPLORATION DEPARTMENT

SUMMARY DRILL LOG

Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT Date: 7/5/80.

HOLE No. MBD 43.

Sheet of

REPORT No. 028529

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD43

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1899.82 N	940.44 E	632.99
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	mA.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD.

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar

	magnetic
180°	grid (1)
	grid (2)
	grid (3)
	true

Inclination at collar 65°

Total length 112.5m

Commenced: 13 / 4 / 80

Completed: 17 / 4 / 80

Drilling contractor: LONGYEAR (AUST) PTY LTD

Rig type: LONGYEAR 38

Details of down hole location-survey methods.
TROPARI and ACID ETCH

Purpose of drilling and anticipated lengths to targets.
To investigate possible tin mineralisation in 'White Face' porphyry dyke, and to delineate the main dolomite horizon.

Core size and non-coring (NC)

		TO
NQ	0.0	TO 63.0
BQ	63.0	TO 112.5
		TO
		TO
		TO

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type AZIMUTH	DIP
25	68°	150
112.5	66°	ACID ETCH.

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)
'DERWENT' PENCIL No. | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY	FROM	TO	DATE
C. BROADBENT	0	112.5m	24/4/80

Company managing exploration programme.
METALS EXPLORATION LTD.

HOLE No. MBD43
Log sheet 1 of 2

028530

0-19.9 DOLOMITE, weakly recrystallized.
Mottled pale grey and creams with some coagregation of qtz and calcite.
Extensively disrupted and brecciated - early recrystallization has proceeded along brecciation fractures with some LOST CORE 3.0 - 5.2m. deposition of qtz and recrystallized dolomite, calcite in open spaces.
Later fracturing has broken the core to a rubbly mixed variety are highly broken, with yellowish grey clay on shear surfaces.

LOST CORE 16.8-18.0m.

19.9 - 22.9 DOLOMITE
Grey fine grained rather structureless dolomite, extensively brecciated, with medium to grey staining of brecciation fractures.

22.9 - 32.1 DOLOMITE, weakly recrystallized.
Alternating intervals pale grey weakly recrystallized dolomite and slightly darker grey fine grained unaltered dolomite on a 0.5' - 1.5' m scale.
Extensively brecciated and disrupted - the dark grey brecciation fractures, some of which have poorly defined haves & recrystallization to 3-5 mm. in the unaltered dolomite.
Well fractured and sheared (post recrystallization) - small silicate breccia zones thro-out core

32.1 - 37.2 DOLOMITE SULPHIDE LODE (opposite)
Grey recrystallized dolomite with stringers, small pockets and veins of massive pyrite, chalcopyrite and sphalerite (1-2 mm).
37.2 - 46.6 DOLOMITE, weakly recrystallized.
See 22.9-32.1 for description.

46.6 - 51.8 Recrystallized DOLOMITE
Dark grey recrystallized carbonates and qtz with patches of white calcite and dolomite.
The recrystallization has apparently proceeded along brecciation fractures - some variegation of pale grey bleaching, but otherwise relatively unaltered dolomite.
48.5-51.0 minor siliceous alteration - some bands of baby carbonate to 30 cm.

51.8 - 99.6 SILTSTONES minor QUARTZITES.
Thinly bedded (mostly <2cm) khaki green/grey sericitic clay rich siltstones. Extensively disrupted by soft-sediment deformation with later minor brecciation and fracturing. Some folding. Some siltstones are quartzose, hard and blocky or ironstained grey in colour; these may be interbedded with or grade into, greywacke intervals up to 1m thick.
(The greywacke beds show alternation of silty sand and sandy silt beds on a 1-2 cm scale)
Fine white clay filled fractures, some with Fe-sulphides and carbonates permeate the rock at 30-60° tca.

72.9-73.6 Some bedded baby material with qtz-calcitic dolomite?

72.9m Sample No 98093 taken for thin sectioning and petrology.

79.5 - 80.2 Quartzites > siltstones

86 - 93.6 Hard and weakly silicified siltstones and quartzites.

93.6 - 101.25 QUARTZ FELSPAR PORPHYRY
Mainly finely crystalline, in places siliceous and almost glassy; pale yellowish or greyish cream in colour.
The first 50cm is white and fine grained, with weakly altered felspar 5%, qtz 3%.
93.1 - 98.2 Phenocrysts: qtz, subhedral grains to 4mm, turbid and colourless, 10%
Felspar, altered - hard yellowish or greenish brown, grains to 3mm, variable 1-7%
98.2 - 101.25 White finely crystalline groundmass, in some places faintly greyish and translucent.
Phenocrysts: Qtz rounded and subhedral grains to 4mm, 10%
Felspar, weakly altered, to 2mm, 3-5%.
Decrease in qtz eyes and phenocryst abundance in last 50cm.

101.25 - 112.50 SILTSTONES minor QUARTZITES.
See 51.8-93.6m for description.

END OF HOLE 112.5m.

	0.10-12.2	py-spFluorite-qtz as irregular veins and patches	3-5%	
10.2-12.0 Fault zone - core badly broken + crushed.				
	12.2-19.9	Sparse qtz-carbonate-sp veining	<1%	
Faulted and broken - shear at low angles to core.				
Gradual Change.				
	19.9-22.9	qtz-carbonate-base sp-py veining	1-2%	
Gradual change.				
	22.9-32.1	qtz-carbonate-trace sp-py veining and lenses, irregular patches in brecciation cracks.	1-2%	
Contact 70°				
Contact irregular.	32.1-32.5	Chalcopy-py-sp-fp veins, associated w/ altered and quartz dolomite along cracks	10%	
	32.5-46.6	trace py-sp	<1%	
		Fluorite as lenses and irregular patches in brecciation cracks.		
Gradual Change.				
48.5-52.m - FAULT ZONE.	46.6-51.8	Sp-py. Fluorite as blebs in recrystallized areas with qtz and recrystallized carbonates. 48.8-51.0 5-15% Sp.	3-5%	
Contact broken				
51.5-52.0 dolomite-fluorite-sp vein, 35°	51.8-52.5	py, trace sp	3-5%	
52.7 Bedding 15°		Blebs along bedding and as blebs and stringers		
52.8-53.2 15 mm dolomite vein with sediment inclusions, 35°		1-3% dolomite-qtz-fluorite-py-sp veining.		
53.2-53.7 70 mm dolomite-sp-qtz-fluorite-qtz vein, 30°	52.5-73.6	py, trace sp		
53.7-53.9 30 mm dolomite-fluorite-py-marcasite-qtz-sp-py vein, 45°		Along diffuse along bedding and as veinlets and stringers. Some dolomite-qtz-fluorite-py-sp veining.		
53.9-54.0 10 mm dolomite-py-sp veinlet				
63.0 30 mm carbonate-fluorite-py-qtz-sp-py vein, broken core.				
64.6-64.8 25 mm qtz-sp-carbonate-fluorite-sp-py vein, 45°				
73.3-73.8 30 mm breccia zone dolomite-fluorite with sediment inclusions, 30°	73.6-93.6	py, trace sp Along diffuse along bedding and as veinlets and stringers. Some dolomite-qtz-fluorite-py-sp veining.		
73.5 Bedding 50°				
82.0 30 mm dolomite-sp-fluorite-py vein, 35°				
82.4 20 mm sp-dolomite-qtz-marcasite vein, 10°				
84.8 30 mm dolomite-sp-py-fluorite vein, 20°				
85.3 10 mm dolomite-sp breccia vein, 10°				
86.6-86.8 20 mm qtz-marcasite-dol-py-qtz vein, 20°				
87.2 10 mm dol-sp-qtz vein, 25°				
89.7m 200 mm wispy py-sp-qtz-dolomite vein, 20°				
90.7 Bedding 15°				
Contact 65°				
	93.6-94.8	py, marcasite, trace sp	15%	
	94.8-95.0	py, marcasite, trace sphal, fluorite and base qtz-carbonate	3-5%	
	95.0-98.2	py, marcasite > py, trace sphalerite, arsen-py, trace chalcopyrite as fine grained aggregates to 2mm, occasionally coarser to 5-10%. Some sparse qtz-py, marcasite-carbonate veining.	25%	
	98.2-101.25	py, marcasite, trace arsen-py, chalcopyrite as fine grained aggregates and disrupted veins and grains to 2 or 3 mm.	20-25%	
Contact irregular, 30°				
	101.25-103.0	py, trace marcasite, finely veined and in thin stringers and small blebs	1%	
103.4 Bedding 35°				
	103.5-112.5	py, siltsam and in fine stringers, sparse qtz-carbonate-fluorite-py veining	2%	
108.3 Bedding 55°				

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes
underlined about 75 m

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: C. BRODBENT date 26/4/60

HOLE No. MBD 43
LOG SHEET 2 OF 2
from 00 m to 112.5 m

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98010		1.1	3.0	2.0	470									
98011		5.2	7.2	"	980									
12		7.2	9.2	"	520									
13		9.2	11.2	"	420									
14		11.2	13.2	"	210									
15		13.2	14.8	1.6	160									
16		16.1	18.1	2.0	10									
17		18.1	20.1	"	30									
18		20.1	22.1	"	110									
19		22.1	24.1	"	180									
20		24.1	26.1	"	270								205	check assay
21		26.1	28.1	"	180									
22		28.1	30.1	"	330									
23		30.1	32.1	"	X									
24		32.1	34.1	"	18									
25		34.1	36.1	"	150									
326		36.1	37.2	1.1	65									
27		37.2	39.2	2.0	5600									
28		39.2	41.2	"	14									
29		41.2	43.2	"	12									
030		43.2	45.2	"	16									
31		45.2	47.2	"	10									
32		47.5	48.5	1.3	130									
33		48.5	50.5	2.0	8400									
34		50.5	51.8	1.8	2850									
35		51.8	53.8	2.0	90									
36		91.6	93.6	"	180									

Notes:— Sn by XRF B. Method

X - means less than 4

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT A

ASSAY SUMMARY SHEET HOLE NO. MBD 43

SAMPLE TYPE : DRILL CORE FROM 1.1 TO 93.6

028531

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98037		93.6	95.6	2.0	2150									
38		95.6	97.6	"	6400									
39		97.6	99.6	"	3400									
40		99.6	101.2	1.6	3350								0.29%	check Assay
98041		101.2	103.2	2.0	880									

Notes — Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 43

SAMPLE TYPE : DRILL CORE FROM 93.6 TO 103.2

B

0285332

MBD·44

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Description and notes (indented about 10mm)	POINTER	GRAPHIC LOG	POINTER	MINERALISATION	ASSAYS AVAILABLE	BULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED.), MONOGRAPH NO.9 AUSTRALAS. INST. MIN. METALL. - 1976

028533

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT / Depth : Description and notes	GRAPHIC LOG	MINERALISATION
0	0-3.0	TRICONE TO 3.0m - NO CORE.		
20	3.0-74.7 (71.7m)	3.0-74.7 SILTSTONES WITH BLACK SHALES, minor SANDSTONES Dark grey clay rich siltstones, some black and carbonaceous, with minor medium grey quartzose siltstones and thin irregular bands black shale (< 1 cm) Dark grey sandstone beds to 20 cm occur infrequently. 11.2-32.0 Bleached zone with minor faulting. Overall, very brecciated and disrupted - soft sediment disruption? Later fracturing and minor faulting has locally reduced the core to rubble - elsewhere easily broken.	10/9/c	3.0-32.8 py as blebs and thin contorted laminae (originally bedded?) and also finely dissem in coarser siltstones and the sandstone beds. Some qtz-carbonate-fluorite 'serpentinite' -py-sp-talc veining. TOTAL 3-5%. 32.8-42.0 As above, with the addition of trace po as blebs, finely dissem. 42.0-74.7 As for 32.8-42.0, but higher percentage of mineralisation ≈ 7%.
40				
60		Contact 45° →		
80	74.7-86.9 (12.2m)	74.7-86.9 QUARTZ FELSPAR PORPHYRY Matrix creamy coloured or pale grey in central portion. Qtz - rounded or euhedral grains 1-4 mm, 15% Felspar - yellowish and altered, variable 1-5%, locally 15%.	1	py, marcasite rims, trace fluorite, sp, weak trace cassiterite. Some minor qtz-py-fluorite-sp veining < 5mm. TOTAL 10-15%.
		Contact 55° →		
100	86.9-163.0 (56.1)	86.9-163.0 SILTSTONES and BLACK SHALES. As for 8.0-74.7 m. 93.8-94.5 qV, 25° →	10/9/c	86.9-94.6 As for 42-74.0 3-5% 94.6-115 py, thin stringers and veinlets with marcasite and qtz, some finely dissem. TOTAL 2%.
120				115-135 py, marcasite, some rare grains po as blebs, stringers and weakly dissem. Minor qtz-carbonate-fluorite-py-sp-po TOTAL 5%.
140				135-176.5 py, marcasite as blebs and concentrated in siltstone clasts. Sparse dolomite-qtz-py-fluorite-sp veining. TOTAL 2%.
160		Gradual Change →		
180	163.0-176.5 (13.5m)	163.0-176.5 SILTSTONES and BLACK SHALES with SANDSTONES. As for 30-74.7, with the addition of 1m+2.5m sandstone beds, weakly silicified. Gradual Change →	10/11/9/c	
	176.5-187.5 (11.0m)	176.5-187.5 FINELY BEDDED SILTSTONES. Finely laminated, bedding < 2mm - clay rich dark grey siltstones, some carbonaceous. Minor contortion, little brecciation. Gradual Change →	10/c	176.5-187.5 py finely dissem throughout, sparse stringers and veinlets with qtz, carbonate 3%
200	187.5-202.3 (14.8)	187.5-202.3 SILTSTONES and BLACK SHALES with SANDSTONES. Grey argillaceous siltstones with black shale beds (< 2cm), very well bedded and interacted with hard grey speckled quartzites to 30 cm. Some minor contortion and disruption. Gradual Change →	10/11/9/c	187.5-202.3 Py, dissem in shales and some siltstones and as bedded laminae in siltstones and shales. Rare qtz/carbonate-py veinlets TOTAL 2%.
	202.3-208.4 (6.1m)	202.3-208.4 FINELY BEDDED SILTSTONES As for 176.5-187.5 Gradual Change →	10/c	Py as blebs to 2x3mm, finely dissem throughout and in small veinlets. TOTAL 2-3%
210	208.4-251.0 (42.6)	208.4-251.0 SILTSTONES AND BLACK SHALES with SANDSTONES Combinations of grey clay rich siltstone, some medium grey quartzose siltstone, massive qtzose sandstone beds to 2m and thin black shale beds < 1cm. Well bedded, only minor brecciation and fracturing.	10/9/c 10/9/k/11/s	208.4-251 Py, dissem in sandstones and qtzites, as thin veinlets and stringers, with occasional qtz, carbonates in veinlets and as thin bedded laminae in siltstones and shales. TOTAL 3-5%, variable 2-7%
220				
250			10/9/c	
260		5 cm	11/10/sc 10/9/c 11/10/9c	
		END OF HOLE 251 m.		

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G. BROADBENT
Date: 7/5/80

HOLE NO. MBD 44
Sheet of

REPORT No. 028534

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 44

COLLAR LOCATION

	Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	1700.08 m N	819.99 E	600.94
(2)		N	E	
(3) Aust. Map Grid PRECISE / APPROX.		mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND / PRIVATE

W.C. Bearing from collar
- magnetic
- 180° grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 75°

Total length 251.0 m

Commenced: 18 / 4 / 80
Completed: 22 / 4 / 80

Drilling contractor LONGYEAR (AUST) PTY LTD

Rig type LONGYEAR 38

Core size and non-coring (NC)

TRICONE	0	TO	3.0 m
NQ	3.0	TO	87.0
BQ	87.0	TO	251.0
		TO	
		TO	
		TO	

Details of down hole location-survey methods.
TROPARI every 40 m.

Purpose of drilling and anticipated lengths to targets.
To intersect a possible continuation of the dolomite body intersected in MBD 41.

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type AZIMUTH	DIP
39.5	148° 30'	75°
81.0	148°	75°
129.0	148°	77°
168.0	145°	77°
210.0	150°	79°
249.5	147°	80°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)
'DERWENT' PENCIL NO. | FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY G. BROADBENT FROM 0 TO 251.0m DATE 27/4/80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme.
METALS EXPLORATION LTD.

HOLE No. MBD 44
Log sheet 1 of 4

028535

TRICONE TO 2.0 m - NO CORE.

3.0 - 74.7 SILTSTONES AND BLACK SHALES

Dark grey clay rich siltstones with minor medium grey clay rich siltstones and thin black shale laminae. Thinly bedded 1-2 cm, extensively disrupted and contorted - rounded clasts of siltstone enclosed by contorted more shaley material - soft sediment disruption. Some rare dark grey sandstone beds to 20cm with finely disem. pg occur sporadically. Well fractured and broken, with fine white anastomosing clay filled fractures.
4.5 - 6.7 - minor fault zone

10/9/c

3.0 - 11.2 pg as blebs and thin, contorted, originally bedded, laminae. Sparse irregular qtz-carbonate ± sp, talc and ? serpentine. Some pg is finely disem in more pyroxene beds. 2-3%

11.2 - 15.9 Bleached and ? sericitic - greenish coloured siltstone interbedded with black shales. Well fractured and broken, weakly silicified.

11.2-15.9 pg, minor as above 1%

6.12.0 irregular 3.0 mm carbonate - serpentine - fluorite - pg stockwork sub parallel to LCA.

15.9 - 20.8 Fault zone? Bleached, yellowish and greenish, well fractured and broken.

15.9-20.8 sparse dolomite-qtz-serpentine veining. 1%

6.17.6 Bedding 55°

20.8 - 22.3 Bleached and weakly sericitic, as for 11.2-15.9.

20.8-22.3 pg, minor po disem as blebs and grains. 1%

22.3-32.8 pg as blebs, thin contorted laminae or finely disem in qtz rich beds. Sparse qtz-pg-carbonate-talc-serpentine(?) veinlets and stringers. 2-3%

6.25.6 28 mm carbonate - qtz - fluorite - serpentine vein, 50°.

6.27.2 Bedding 60°

32.0 - 60.0 m slightly less disruption and brecciation - highly contorted bedding in intervals to 2m, with totally disrupted intervals in between.

32.8-42.0 pg, rare grains po, as blebs and grains resulting from the disruption of pg-rich beds, and finely disem in the coarser grained beds. Minor qtz-pg-carbonate-po-serpentine(?) veins. 2-3%

6.41.3 Bedding 35°

42.0-71.0 As above 32.8-42.0, some blebs pg with minor marcasite to 2x1 cm. 5-7%

6.47.2 50 mm sp-qtz-pg-carbonate-fluorite 'phlogopite' vein in broken core, ≒ 40°.

6.52.5 Bedding 25°

6.58.1 Bedding 40°

60.0 - 74.7 Very disrupted and brecciated 'soft pebble conglomerate' like fabric, bedding directions impossible to measure.

71.0-74.7 pg, finely disem and as blebs and grains to 1 cm. Also qtz-pg-carbonate-sp-? chlorite veins. 7%

Contact broken, ≒ 45°

74.7 - 86.9 QUARTZ FELSPAR PORPHYRY

74.7-77.3 Matrix creamy white, finely crystalline
Phenocrysts: Qtz - subhedral and rounded grains 1-4mm, 10%.
Felspar - yellowish cream, partially altered as fine grained aggregates 2-5%, variable 2-25%.

74.7-86.9 well jointed and broken, with some thin veins parallel to joint directions.

74.7-77.3 pg with marcasite rims as distinct grains to 5 mm (some with felspar shaped outline) trace cassit, weak trace sp, fluorite. Weak pg-qtz-sp-cassit veining. 15%

77.3-80.9 Matrix finely crystalline greyish cream with semi-translucent highly siliceous patches
Qtz - turbid rounded grains to 4mm, 15-20%
Felspar - hard yellowish fine grained aggregates to 2mm, 1%.

77.3-80.9 pg as fg. aggregates to 4x5 mm - small 'clots' in groundmass, trace purple and colourless fluorite, rare grains cassit. Weak qtz-pg-fluorite-sp-cassit. veining. 10%

80.9-86.9 As for 74.7-77.3, some minor greyish siliceous patches associated with finely disem sulphides.

80.9-86.9 pg, with marcasite rims as distinct grains to 5x4 mm, trace cassit, weak trace sp, fluorite and sparse qtz-pg-fluorite-sp veins. 15%

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDES RANGE BETWEEN TADPOLE AND LONG CORE AXIS

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: C. BROADBENT date 27/4/90

HOLE No. 44
LOG SHEET 2 OF 4
from 0.0 m. to 86.0 m.

See previous page for description.

86.9-163.0 SILTSTONES AND BLACK SHALES, sparse SANDSTONES.

See 3.0-74.7 for description.

93.8-94.5 po-py-marcasite-qtz-carbonate-fluorite vein with sediment inclusions. 80-90% sulphides.

10/9/c

← Contact 55°

← 25°

9V

← 25°

10/9/c

← 100.0 15 mm carbonate vein with sediment inclusions, 25°

← 101.3 Bedding 50°

← 113.5 Bedding 60°

← 124.8 50 mm qtz-py-carbonate-?chlorite-?serpentinite-po-sp vein, 50°

← 129.2 30 mm py-qtz-marcasite-?serpentinite-?chlorite-fluorite-sp-po vein, 45°.

← 149.8 30 mm dolomite breccia zone, 25°

← 151.9 40 mm dolomite-fluorite breccia zone, 35°

Gradual Change

163.0-176.5 SILTSTONES AND BLACK SHALES WITH SANDSTONES

Thinly bedded siltstones and shales, disrupted and brecciated, with 1.0-1.5 m weakly silicified grey sandstone beds gradually increasing in abundance with depth. The sandstones are quartzose, with some beds having f.gr shale clasts, giving them a weakly tuffaceous appearance.

10/11/9c

← 163.6 10 mm dolomite breccia zone, 15°.

163.8 15 mm dolomite-qtz vein, 30°.

See previous page for description.

86.9-89.0 py, rare grains po, finely disseminated as blebs and grains to 8 mm. Minor qtz-py-carbonate-po veins. 2-3%

89.0-94.6 As above, 86.9-89.0 5-7%

94.6-115 py, disseminated in coarser grained beds, mainly as very thin stringers and veinlets, occasionally with some carbonate, marcasite and qtz. 3%

115-135 py, marcasite, rare po in blebs and grains or thin veinlets and stringers. Sparse py-marcasite-qtz-carbonate-fluorite stringers and 'sweat-outs' 3-5%

135-176.5 py, disseminated as blebs, veins and stringers. Veining is more dolomitic in character - carbonate-py-qtz-sp-fluorite assemblages. 2%

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date 27/4/80

HOLE No. 44
LOG SHEET 3 OF 4
from 86.0 m. to 168.0 m.

See previous page for description.

172.2 10 cm 'TUFF' bed, brecciated. Feldspar and black shales clasts to 1·5 mm in a grey, fine matrix. Upper and lower contact angles 45° and 70° respectively.
172.9-173.0 massive sandstone unit.

176·5 - 187·5 FINELY LAMINATED SHALEY SILTSTONE

Dark grey, in places almost black and carbonaceous, soft and weathered. Very well bedded - finely laminated on a scale of 1-2 mm, with thin discontinuous shaley leases in a silty matrix. Some minor folding and contortion; the parting along bedding planes is black, shiny and almost graphitic.
Finely fractured, but not extensively broken.

187·5 - 192·9 THINLY BEDDED SILTSTONES WITH QUARTZITES, MINOR BLACK SHALES.

Mid grey clay rich siltstones, lesser pale grey quartzose siltstones, well bedded, interclated with hard grey speckled quartzites to 30 cm.
Well bedded, with minor contortion and disruption, well fractured.

192·9 - 202·3 QUARTZITES WITH THINLY BEDDED SILTSTONES, MINOR BLACK SHALES.

Hard grey speckled quartzites (originally 'tuffaceous?') up to 1·5 m thick, separated by thinly bedded dark grey clay rich siltstones with minor thin medium grey quartzose siltstone beds (< 1 m) and occasional thin black shale beds.
Well bedded, some minor contortion and disruption and later fracturing.

202·3 - 208·4 FINELY LAMINATED SHALEY SILTSTONE

Dark greys, very finely laminated on a 1-2 mm scale, with thin discontinuous shaley leases separated by silty laminae. Some intervals are dark grey, almost black and carbonaceous, to 0·75 m thick.
Minor soft sediment disruption and contortion.

208·4 - 218·9 THINLY BEDDED SILTSTONES AND BLACK SHALES. (Individual beds to 3-5 cm)

Dark grey clay rich siltstones/, separated by thin black shale beds with minor thin pyritic laminae.
Well bedded, with minor brecciated intervals to 0·5 m some micro folding and faulting - mainly soft sediment disruption.

218·9 - 231·9 THINLY BEDDED SILTSTONES AND BLACK SHALES WITH SPARSE SANDSTONE BEDS.

As above, 208·4 - 218·9 m, with the addition of some sparse pale grey quartzose siltstone/sandstone beds to 10 cm.

231·9 - 239·9 FINELY LAMINATED SHALEY SILTSTONE

See 176·5 - 187·5 and 202·3 - 208·4 for description.

237·9 - 239·9 Some sparse qtzose siltstone/f. gr. sandstone beds to 20 cm.

239·9 - 241·9 QUARTZITES WITH SILTSTONES AND BLACK SHALES.

See 192·9 - 202·3 for description.

241·9 - 246·5 THINLY BEDDED SILTSTONES AND BLACK SHALES.

Pale grey qtzose siltstones with mid grey clay rich siltstones and thin black carbonaceous shale laminae. Thinly bedded on a 1-2 cm scale - well bedded, with a 'stripey' appearance.

246·5 - 249·7 QUARTZITES WITH THINLY BEDDED SILTSTONES AND BLACK SHALES.

Hard grey quartzites, separated by thinly bedded siltstones as for 192·9 - 202·3.

249·7 - 251·0 THINLY BEDDED SILTSTONES AND BLACK SHALES. See 241·9 - 246·5 for description.

END OF HOLE 251·0m.

176·5		10/9/c			See previous page for description.			
	177·2							
		11/10c	178·1 Bedding 65°					
	179·5	10/9/c	179·2 Bedding 45°					
180		10/c	178·8 Bedding 35°		176·5-181·5 pg, finely disseminated throughout and in sparse stringers and veinlets with qtz, carbonates.	3%		
182			181·8 Bedding 80°					
184			185·6 Bedding 50°					
			Gradual Change					
188		10/11 (9a)	188·9 Bedding 45°		181·5-192·9 py, finely disseminated in sandstones and as thin bedded laminae in siltstones and shales. Minor qtz-carbonate-py stringers and veinlets.	3%		
192			191·8 Bedding 50°					
			Gradual Change.					
196		11/10/(9a)	195·8 Bedding 35°		192·9-202·3 py, finely disseminated in quartzites and siltstones, some sparse bedded laminae and thin qtz-carbonate-py veinlets and stringers.	3%		
200			201·5 Bedding 65°					
			Gradual Change.					
204		10/c	205·2 Bedding 55°		202·3-208·4 py, finely disseminated along bedding, and as veinlets and stringers with qtz, carbonates. Some irregular patches of dissem. py (10-30%) to 3×2 cm.	2-3%		
208			208·0 Bedding 60°					
		10/9/c	208·4 55 cm qtz-py breccia zone, 50°.		208·4-222·4 py, finely disseminated in some siltstones and as thin bedded laminae with black shales. Some irregular stringers and veinlets qtz, py, rare carbonates.	2-3%		
212			211·9 Bedding 65°					
		10/9/c/11	214·5 Bedding 70°					
			217·5 Bedding 75°					
220			221·4 Bedding 65°					
224			224·8 Bedding 45°		222·4-227·9 py, qtz etc as above 208·4-222·4 m	5-7%		
228			228·5 Bedding 60°		227·9-231·9 py, qtz, etc as above 208·4-222·4 m	2-3%		
			231·7 Bedding 55°					
232		10/c	233·1 Bedding 80°		231·9-239·9 py, finely disseminated along bedding and in sparse veinlets with qtz, carbonates.	3-5%		
236			239·5 Bedding 55°					
240		11/10/9c			239·9-241·9 py, mostly disseminated in qtzites, some sparse fine stringers.	2-3%		
			Gradual Change.					
		10/9c	242·5 Bedding 65°		241·9-246·5 py, mostly disseminated in qtzose siltstone beds, also as veinlets and stringers with qtz, carbonates. Some very finely disseminated py in clay rich siltstones	3-5%		
244			245·2 Bedding 90°					
			Gradual Change					
248		11/10/9c	249·2 Bedding 70°		246·5-249·7 py, finely disseminated in qtzites and as veins to 1 cm. Some fine diffuse stringers and veinlets with qtz-carbonates	3%		
			Gradual Change					
252		10/9/c	250·9 Bedding 65°		249·7-251·0 py, mostly disseminated in siltstones and as minor veinlets.	3-5%		

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
underlined about 75 m.m.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDE = Angle between Feature and LONG CORE AXIS

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: A. BROADBENT date 27/6/80

HOLE No. 44
LOG SHEET 4 OF 4
from 168·0 m to 251·0 m

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98093		8.0	10.0	2.0	840									
94		10.0	12.0	"	310									
95		12.0	14.0	"	80									
96		14.0	16.0	"	140									
97		16.0	18.0	"	16									
98		18.0	20.0	"	26									
99		20.0	22.0	"	44									
98100		22.0	24.0	"	120									
98042		72.7	74.7	"	48									
43		74.7	76.7	"	2200									
44		76.7	78.7	"	720									
45		78.7	80.7	"	2750									
46		80.7	82.7	"	3400									
47		82.7	84.9	2.2	1900									
48		84.9	86.9	2.0	85									
49		93.8	94.5	0.7	3450									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 44

SAMPLE TYPE : DRILL CORE FROM 8.0 TO 93.8

028538

MBD-45

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Description and notes (indented about 10mm)	WRITER	GRAPHIC LOG	WRITER	MINERALISATION	ASSAYS AVAILABLE	PULKED ASSAYS

FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D.A. BERKMAN & W.R. RYALL (ED), MONOGRAPH NO.9 AUSTRALAS. INST. MIN. METALL. - 1976

028539

0	0-3.0	TRICONE TO 3.0m - NO CORE.		3.0-27.36
	3.0-27.36 (24.36)	3.0-27.36 SILTSTONES AND BLACK SHALES dark grey clay rich siltstones and minor mid grey quartzose siltstones surrounded by irregular lenses and contorted beds of black shale and siltstone. Very brecciated - soft sediment disruption Well fractured - puggy fault zone 10-8-41-6m Contact 45°	10/9/c F	py in thin stringers and veinlets and dissem in some siltstone beds. Weak qtz-carbonate-py veining. TOTAL 3%
20	27.36-53.00	27.36-53.00 QUARTZ FELSPAR PORPHYRY. Matrix grey and finely crystalline, greyish cream near margins Qtz - rounded grains to 6mm, mostly 1-3mm 10% Felspr - soft, white, and weathered. some well formed grains to 6mm, mostly 2-3mm. 15%. Finely fractured and quite weak (easily broken in places), weathered. Contact 60°	1	27.36-31.9 py. trace fluorite, sp. 2% 31.9-49.1 trace sp, fluorite, rare qtz-carbonate-fluorite veining. 49.1-53.0 py, trace sp, fluorite and ? tourmaline 2-3%.
40	53.00-60.3 (7.3m)	53.00-60.3 SILTSTONES, minor SANDSTONES dark grey siltstones with sandstone beds to 20cm. Brecciated Gradual Change	10/11/s	53.0-60.3 py, qtz-carbonate-fluorite-sp-'sepiolite' in veins and stringers to 20cm TOTAL 3-5%
60	60.3-73.0 (12.7m)	60.3-73.0 SILTSTONES AND BLACK SHALES As for 0-27.36 Gradual Change	10/9/c	60.3-73 decrease in dolomitic veining, py dissem in siltstones and as thin stringers 2-3%.
	73.0-88.0 (15.0m)	73.0-88.0 SILTSTONES AND BLACK SHALES WITH SANDSTONES Thinly bedded, brecciated siltstones and black shales with hard blueish grey quartzite beds up to 1.5m thick. Some quartzites are weakly micaceous. Well fractured and broken. Gradual Change	10/11/9/c	73-88 py, marcasite, dissem and in stringers and veinlets ± qtz, carbonate. 3-5%
80	88.0-97.8 (9.8m)	88.0-97.8 QUARTZITES AND SILTSTONES. As for 73.0-88.0, but quartzites > siltstones Gradual Change	11/10/c	88-97.8 py. dissem in qtzites and veinlets, stringers as above 2-3%
100	97.8-133.0	97.8-133.0 SILTSTONES AND BLACK SHALES. 97.8-103.5 As for 0-27.36. 103.5-120 SILTSTONES, FINELY LAMINATED. Dark grey, clay rich. Brecciated, finely bedded (< 2mm) with rare thin qtzose siltstones to 5mm and very thin black shale laminae.	10/9/c 10	97.8-120 py increases to 3-5%
120		120-133.0 As for 0-27.36.	10/9/c	120-85 py as thin veinlets and dissem, sparse blebs and stringers qtz, carbonate, minor veining 2%
		Gradual Change		
140	133.0-155.97	133.0-155.97 SILTSTONES AND BLACK SHALES WITH SANDSTONES. As for 73.0-88.0	10/11/9/c	133-150.6 py, trace po, as blebs and dissem. Minor qtz-py-po-fluorite-carbonate-sp-cp veining. 5% 0.5m vein as described at 149.9-150.6, 30°
		149.9-150.6 qV, 30°	qV	150.6-155.97 py, marcasite, trace po, much veining. Mean 7%
	155.97-156.5	Contact 80°(?) 155.97-156.5 DOLOMITE, RECRYSTALLISED	3	155.97-156.5 fluorite 15% py, ? cassiterite to 1-2%
160	156.5-181.0 (24.5)	156.5-181.0 SILTSTONES, minor SANDSTONES Very brecciated, thinly bedded siltstones some carbonaceous with dark grey, sometimes weakly micaceous, sandstones to 30cm Contact 25° Gradual Change	10/c/11/c	156.5-170.2 py dissem and in veins with fluorite-dolomite-qtz-py-po-sp-marcasite-wood. Abundance & mins decreases with depth. 5-7%. 170.2-181.0 - py, dissem and minor veining as above. 2-3%
180	181.0-190.9 (9.9m)	181.0-190.9 SILTSTONES, finely laminated. As for 103.5-120	10/c	181.0-190.9 py, finely dissem and in veinlets with qtz. < 1%
	190.9-201.1 (10.2)	190.9-201.1 SILTSTONES with BLACK SHALES As for 0-27.36	10/9/c	190.9-201.1 py, dissem in siltstones 1-2%
200	201.1-208.5 (7.4m)	201.1-208.5 SILTSTONES, finely laminated. As for 103.5-120, but only minor disruption and contortion of beds.	10	201.1-208.5 py, very finely dissem and as thin laminae and blebs to 2x1 cm. 3%
	208.5-210.9	208.5-210.9 TUFFS, SANDSTONES and SILTSTONES	12/11/c	208.5-210.9 py, dissem in tuffs and siltstones, 3%
	210.9-218.9 (8.0m)	210.9-218.9 SILTSTONES, SANDSTONES, minor BLACK SHALES Well bedded thin siltstone and shale (< 1cm) in intervals to 1m with pale grey sandstones to 20cm.	10/11/9/c	210.9-218.9 py, dissem and in sparse qtz, carbonate stringers. 1-2%.
220	218.9-224.2 (5.3)	218.9-224.2 TUFF with SANDSTONES and SILTSTONES Coarse grained tuff, grades into sandstones, separated by siltstones	12/11/s/10	218.9-224.2 py, with qtz, py, marcasite stringers, 1%.
	224.2-249.0	224.2-249.0 SILTSTONES and BLACK SHALES with SANDSTONES As for 210.9-218.9, minor faulting, well bedded with only minor contortion. Sandstone content decreases 239-249 (ECH)	10/11/9/c	224.2-249 py, dissem, along bedding, some thin bedded laminae with carbonate-py-sp marcasite veining. TOTAL 5%.
240		5 cm		
		END OF HOLE 249.0m		

AFTER TYPING THIS SIZED FORM WILL BE PHOTO-REDUCED TO A4 SIZE

METALS EXPLORATION LTD. — EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, 1:250 (when reduced to A4)

Prepared by: G.BROADBENT
Date: 8/5/80.

HOLE NO. MBD 45
Sheet of

REPORT No. 028540

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 45

COLLAR LOCATION

Grid name	Rectangular space co-ordinates PLANAR CO-ORDINATES		ELEVATION
(1) MBJV	1640.38 N	820.18 E	609.69
(2)	N	E	
(3) Aust. Map Grid PRECISE / APPROX.	mE	mN	m A.H.D.

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA.

Mineral Tenement EL 13/79 Holder METALS EXPLORATION LTD

Cadastral location and details
CROWN LAND/ PRIVATE

W.C. Bearing from collar
- magnetic
- 180° grid (1)
- grid (2)
- grid (3)
- true

Inclination at collar 75°

Total length 249.0m.

Commenced: 23/4/80

Completed: 27/4/80

Drilling contractor: LONGYEAR (AUST) PTY LTD

Rig type: LONGYEAR 38.

Details of down hole location-survey methods.
EASTMAN every 40m.

Purpose of drilling and anticipated lengths to targets.
To intersect a continuation of the dolomite horizon intersected in holes B18, B19, B15 and MBD 41.

Core size and non-coring (NC)

TRICONE	0	TO	3.0
NQ	3.0	TO	56.0
BQ	56.0	TO	249.0
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type AZIMUTH	DIP
40	208°	75°40'
79	152°	76°20'
121	149°	78°30'
160	133°	78°
202	122°	78°
244	105°	79°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY C. BROADBENT FROM 0 TO 249.0m DATE 8/5/80

LOGGED BY ____ FROM ____ TO ____ DATE ____

LOGGED BY ____ FROM ____ TO ____ DATE ____

Company managing exploration programme.
METALS EXPLORATION LTD

HOLE No. MBD 45
Log sheet 1 of 4

028541

Depth	Description	Sample	Notes	Mineralisation	Notes
0	TRICONE TO 3.0 m - NO CORE.				
4	3.0-27.36 SILTSTONES AND BLACK SHALES. Very disrupted and brecciated - rounded clasts of dark grey siltstone surrounded by discontinuous irregular lenses of siltstone and shale. Rare clasts pale grey quartzose siltstones and sandy siltstones. Well fractured, with some minor bleaching of irregular patches along small fracture zones.	10/9e	3.0-10.8 Well fractured and broken - fine anastomosing clay filled fractures at variable angles to LCA.	3.0-10.8 py, in thin stringers and veinlets to 5mm, also dissem in some siltstone and sandstone clasts. Minor qtz-carbonate-py stringers and 'sweat-outs' to 3x1cm.	3-5%
8					
12			10.8-17.4 Fault zone - core losses with grey puggy material and rubbly fragments siltstone	10.8-17.4 As above, but weathered and leached.	1-2%
16					
20	17.4-19.8 Bleached zone associated with faulting - pale grey, soft and weathered.		17.4-27.36 Well fractured and broken, some bleaching in upper 2m, incidence of fine fracturing decreases with depth.	17.4-19.8 py, minor qtz in thin veinlets, some dissem. py.	1%
24			← 20.9 Bedding 25°	19.8-27.36 py in thin stringers and veinlets to 5mm, dissem in some beds and in sparse qtz-carbonate stringers and veinlets.	3-5% 2-3%
28	27.36-53.00 QUARTZ FELSPAR PORPHYRY. 27.36-29.2 Finely crystalline groundmass, greyish cream in colour. Phenocrysts: qtz as subhedral grains to 2mm, 3-5%; felspar, very small (1.5mm max.), yellowish cream in colour, weathered, 3-5%	1	← Contact 45°	27.36-29.2 py, as rounded blebs and grains to 2.5mm; trace fluorite, sp, ? tourmaline	2-3%
32	29.2-31.9 Increase in phenocryst size and abundance - qtz - rounded-subhedral, to 6mm, mostly 1-3mm, 10%. Felspar - well formed grains to 6x4mm, soft and weathered with some weak alteration, 15-20%. 31.9-35.7 As above 29.2-31.9, but highly fractured and sheared - greenish grey matrix with fine, yellowish, pervasive, fracture planes. The rock has a granular, crumbly fabric.			29.2-31.9 traces sp, fluorite, as ? grains replacing felspar.	1%
36	35.7-49.1 Matrix dark, faintly greenish grey. Phenocrysts: Qtz - clear rounded grains to 6mm, 10-15%. Felspar - white + pale cream, weathered, well formed grains to 5x3mm with some weak alteration - small inclusions of hard pale brown ? topaz. 15%			31.9-49.1 Trace ? sp, fluorite, rare qtz-carbonate-fluorite veining < 3mm.	1%
40					
44					
48	49.1-53.00 Matrix fine grained, creamy-grey, with qtz, felspar as for 27.36-29.2			49.1-53.00 py, as rounded blebs and grains to 3mm, trace fluorite, ? sp and rare needles ? tourmaline in last 50cm.	2-3%
52					
56	53.00-60.30 MASSIVE SILTSTONES, MINOR SANDSTONES. Dark grey sandy siltstone beds, rather structureless, with some minor thinly bedded intervals and sparse micaceous sandstone beds to 20-30cm. Minor soft-sediment disruption, with extensive later fracturing and shearing to 57.4m + some bleaching. Well broken to 62.7m.	10/11	← 54.80 10mm dolomite-chlorite-fluorite-white mica-py vein, 10°. ← 55.7 200mm dolomite-fluorite-py-sp breccia zone, 30°	53.0-57.4 py, qtz, carbonate-fluorite-? chlorite veining: - minor stockworks and some stringers.	3-5%
60			} 57.6-58.1 Puggy fault zone.	57.4-60.3 py, dissem in siltstones and sandstones and in stockwork-type stringers. Sparse dolomite-fluorite-sp veining.	3-5%
64	60.3-88.0 THINLY BEDDED SILTSTONES, MINOR SHALES. Dark grey clay rich siltstones, occasional sandy beds and thin black shale beds. Extensively disrupted and contorted, with some quite well bedded intervals up to 2m thick separated by brecciated and disrupted material.	10/9e/10	} 62.2-62.7 Small fault zone.	60.3-88.0 py, dissem along bedding and in thin irregular stringers along brecciation paths. dolomite-fluorite-py-sp veins become rare with depth.	2-3%
68	66-73 Brecciation and disruption decreases.		← 67.8 Bedding 50°		
72			← 71.3 30mm carbonate-talc-fluorite-qtz-mica vein, 30°		
76	73-88.0 Very disrupted and brecciated, with minor qtzose siltstones and sandstones, some of which are yellowish/greenish due to finely disseminated py. 74.7-75.5 Thinly bedded sandstones/siltstones.		← 72.9 Bedding 30° ← 74.9 Bedding 25°		3-5%
80					
84					2-3%

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined. Depth : Detailed rock description and notes indented about 15mm.	GRAPHIC LOG	STRUCTURAL AND VEIN INFORMATION	MINERALISATION		NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION DRILL LOG Scale 1:100

Prospect or project: MOUNT BISCHOFF

Logged by: G. BROADBENT date 8/5/80

HOLE No. MBD45

LOG SHEET 2 OF 4

from 0.0 m to 84.0 m

028542

Depth	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
84	See previous page for description			See previous page	2-3%
88			Gradual Change.		
88.0 - 97.8	MASSIVE QUARTZITES WITH SILTSTONES. Pale grey quartzite beds to 1.5 m, brecciated and disrupted; separated by thinly bedded dark grey clay rich siltstones. Some quartzites are weakly micaceous, with white mica on bedding planes. Well fractured, with fine anastomosing clay filled fractures.	11/10c		88.0 - 97.8 py, as thin irregular stringers along breccia paths, and heavily dissem in some fine siltstone breccia clasts. The quartzites have very fine py disseminated throughout 1-2%.	2-3%
92					
96			Gradual Change		
97.8 - 103.5	THINLY BEDDED SILTSTONES with BLACK SHALES. Dark grey clay rich siltstones, very disrupted and intermingled with black shale beds in a soft pebble conglomerate like fabric. Originally thinly bedded 1-2cm	10/9c		97.8 - 120.0 py, finely dissem throughout, and in thin stringers and irregular veinlets with qtz.	3-5%
100			Gradual Change.		
103.5 - 120.0	SILTSTONES. Soft dark grey clay rich siltstones with occasional mid grey quartzose beds and some rare black shale laminae. Highly brecciated and disrupted by soft sediment deformation	10	← 105 Bedding 45°		
104					
108					
112					
116			? 115.8-116.1 massive sp-dolomite -ga breccia zone with sediment inclusions, 45°		
120			← 119.6 100 mm vuggy py-sp-dolomite -marcasite-cassit vein, 35°		
120.0 - 133.0	THINLY BEDDED SILTSTONES WITH BLACK SHALES. See 97.8 - 103.5 for description	10/9c		120 - 133.0 py as thin veinlets and stringers, finely dissem and in sparse blebs and stringers with qtz and rare carbonates.	1-2%
124			← 124.2 133 mm f.gr bluish fluorite-carbonate-py-qtz vein 40°		
128					
132			Gradual change		
133.0 - 155.97	THINLY BEDDED SILTSTONES AND SHALES WITH MINOR SANDSTONE BEDS. Thinly interbedded grey clay rich siltstones, and silty sandstone beds with black shale laminae. Disrupted and brecciated - soft sediment deformation and contortion. Sandstone beds to 30 cm thick, generally with alternating silty/sandy intervals on a 1-2cm scale.	10/11/9c	← 133.0 150 mm brecciated and bleached zone with po, py, carbonate, fluorite, 10-15%. ← 134.2 Bedding 50°	133.0 - 149.9 py, po as blebs and veinlets, minor bedded laminae and in veinlets and stringers with qtz, carbonates and fluorite.	3-5%
136					
140			← 140.3 30 mm qtz-carbonate-py-sp vein, 35°		
144			← 144.7 20 mm py-carbonate-fluorite-sp vein, 35°		
148					
149.9 - 150.6	fluorite-py-carbonate-sp-qtz-po-arseno-sp vein, 30°.		← 30°		
152			← 30° ← 150.8 40 mm breccia zone - ga fluorite-carbonate-sp-py, 50° ← 151.2 10 mm py-qtz-carbonate vein, 35°	150.6 - 155.97 py, marcasite, trace po, mainly in veinlets and small stockworks adjacent to large veins and the dolomite.	5-7%
	152.5 - 155.97 Bleached portions - pale grey, soft, zones to 0.5 m.				
156			← 155.7 50 mm dolomite-fluorite-mica-chlorite vein, 80° ← 158.4 10 mm fluorite-carbonate-white mica vein, 35° ← Contact obscured by vein at 80°		
155.97 - 156.5	ALTERED DOLOMITE pale grey, very brecciated and extensively altered and recrystallised - fluorite, qtz, dissem throughout.	3	← Contact 25°	155.97 - 156.5 fluorite, trace sp and 1-3% cassiterite dissem throughout	15-20%
156.5 - 190.9	THINLY BEDDED SILTSTONES AND SHALES WITH SANDSTONES. See 133.0 - 155.97 for description.	10/11/9c	← 157.3 20 mm carbonate-fluorite-mica vein, 70° ← 157.5 100 mm massive vuggy dolomite and fluorite, irregular.	156.5 - 158.2 Stockwork of carbonate-fluorite-py-mica veins	10%
160				158.2 - 164 py, minor po dissem, and in decreasingly abundant carbonate-fluorite veins	1-2%
164				164-170.2 py, with minor marcasite, po, in large blebs or finely dissem as blebs, grains to 0.5 mm, some thin veinlets, stringers.	3%
168					

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15 mm.

GRAPHIC LOG — STRUCTURAL AND VEIN INFORMATION — MINERALISATION — NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date: 8/5/80

HOLE No. MBD 45
LOG SHEET 3 OF 4
from 84.0 m. to 168.0 m.

028543

See previous page for description.

See previous page for description.

170.2-181.0 pg, as thin veinlets and finely disseminated in some siltstone beds 2-3% (high concentrations in some breccia clasts) Sparse pg-carbonate-qtz-chlorite veins 42mm. 3%

181.0-190.9 pg, finely disseminated in sparse veinlets with qtz. <1%

190.9-201.1 SILTSTONES WITH MINOR BLACK SHALES

Thinly bedded siltstones - mostly medium-dark greys and clay rich, with some thin pale grey quartzose beds. The black shale laminae are thin (<2mm), and concentrated in small zones to 10 cm thick.
Very disrupted and brecciated by soft-sediment deformation.
Weakly fractured, with soft black ?graphitic material on partings at variable angles to LCA.

191.5 -> extent & disruption and brecciation decreases gradually

Gradual Change

190.9-201.1 pg. disseminated in qtzose siltstone beds, irregularly distributed in some breccia clasts. 1-2%

201.1-208.5 FINELY LAMINATED SHALEY SILTSTONES.

Finely bedded 1-2mm, pale-medium grey siltstone laminae with irregular shale lenses to 1mm thick and occasional pale grey quartzose siltstone beds to 1 cm thick.

201.1-208.5 pg. very finely disseminated throughout and as thin veinlets and stringers, some rare blebs to 2x1 cm on thin discontinuous bedded laminae. 3%

208.5-210.9 INTERBEDDED TUFFS, SANDSTONES AND SILTSTONES.

Coarse grained (clasts to 2mm) tuff bed 209.1-210.0, with thin tuff beds to 20 cm on either side which grade into sandstones. Sandstones are pale grey with small (<1mm) black shalestones, to 30 cm thick, divided by thin clay rich siltstone beds.

208.5-210.9 pg. finely disseminated in tuffs and siltstones. Weak qtz-carbonate-pg veining. 3%

210.9-218.9 THINLY BEDDED SILTSTONES, SANDSTONES AND BLACK SHALES.

Pale grey sandstones (probably tuffaceous in part) with well defined bedding laminations, up to 10-15 cm thick beds interspersed with thinly bedded grey clay rich siltstones, pale grey quartzose siltstones and black shale beds.
occasional
Well bedded, with disrupted and contorted intervals up to 1.5 m thick.

210.9-218.9 pg, weakly disseminated along bedding and in stringers with qtz, carbonates. 1-2%

218.9-221.2 TUFF

Clasts of black shale, grey siltstone and white ?feldspar to 2mm in a pale grey fine grained shaley matrix. Alternating coarse grained / fine grained in intervals 1-2 cm, disrupted and brecciated.

218.9-224.2 pg. finely disseminated throughout and in thin stringers with qtz, pg, marcasite. 1-2%

221.2-221.9 THINLY BEDDED SILTSTONES, clay rich and interbedded

221.9-222.7 TUFF Fine grained tuff as above gradually becomes fine grained with depth - overturned?

222.7-223.5 THINLY BEDDED SILTSTONES, MINOR SANDSTONES
Thinly bedded siltstones with some minor tuffaceous sandstone beds to 2cm

223.5-224.2 TUFF

224.2-249.0 THINLY BEDDED SILTSTONES, SANDSTONES WITH MINOR SHALES.

See 210.9-218.9 for description.

224.2-232.5 pg. disseminated along bedding, concentrated in some siltstone beds. Sparse irregular veins/stringers qtz, rare carbonates, pg, marcasite, sp., which increase in abundance with depth. 3%

232.5-240 carbonate-pg-sp-marcasite-qtz-chlorite-talc-serpentinite veining, also some disseminated pg and sparse bedded laminae of pg. 5%

239 -> EOH. Sandstone content gradually decreases with depth.

240.0-249.0 pg, disseminated along bedding, some bedded laminae. Veinlets/stringers of qtz, carbonate-pg-marcasite etc diminish with depth. 3%

243.7-245.2 Finely laminated shaley siltstone as for 201.1-208.5.

END OF HOLE 249.0 m.

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth: Detailed rock description and notes indented about 15 mm

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDES = Angle between fracture and CORE AXIS

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF 1
Logged by: C. BROADBENT date 8/5/80

HOLE No. MBD 45
LOG SHEET 4 OF 4
from 168.0 m. to 249.0 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98051		25.4	27.4	2.0	18									
52		27.5	29.5	"	200									
53		29.5	31.5	"	140									
54		31.5	33.5	"	60									
55		33.5	35.5	"	46									
56		35.7	37.5	1.8	80									
57		37.5	39.5	2.0	110									
58		39.5	41.5	"	75									
59		41.5	43.5	"	70									
60		43.5	45.5	"	80								210	check Assay
61		45.5	47.5	"	75									
62		47.5	49.5	"	85									
63		49.5	51.5	"	160									
64		51.5	53.0	1.5	250									
65		53.0	55.0	2.0	85									
66		149.9	151.0	1.1	4600									
67		156.0	156.0	2.0	130									
68		156.0	156.5	0.5	6.38%									
69		156.5	158.5	2.0	340									
70		237.2	237.6	0.4	1.44%									

Notes:— Sn by XRF Bi Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET HOLE NO. MBD 45

SAMPLE TYPE : DRILL CORE FROM 25.4 TO 237.6

028544

028545 MBD 46

DEPTH	INTERVAL	DEPTH from-to : ROCK UNIT (core, etc., graphic) Depth : Description and notes inserted hour 10 min	GRAPHIC LOG	MINERALISATION	BULKED ASSAYS

NOTES: 1. FOR ABBREVIATIONS SEE "FIELD GEOLOGIST'S MANUAL", D A BERKMAN & W R KNALL (EDS), MONOGRAPH No 9 AUSTRALAS INST MIN METALL - 1976
2 ATTITUDE OF BEDDING, VEIN, ETC IS ANGLE BETWEEN PLANAR STRUCTURE AND LONG AXIS OF CORE 3. LENGTH IS GIVEN AS METRES OR MILLIMETRES

0		TRICONE TO 30m - NO CORE		
	1.5	30 - 10.5 SILTSTONES AND SANDSTONES Thinly bedded, highly fractured and bleached by weathering 5.2m to 11.0m - small fault	10/11/s	3.0 - 10.5 No mineralisation - weathered
	5.5	10.5 - 16.00 TUFF Coarse grained agglomerate with siltstone and shale clasts to 5mm and ? feldspar to 3mm	12	10.5 - 16.0 Trace py as small interst al grains.
	5.8	16.00 - 21.8 SILTSTONES / SILTY SHALES Finely laminated 1-2mm. Small fault zone 16-17.9m	10/9	16.0 - 21.8 Trace finely disem. py
	1.2	21.8 - 23.00 TUFF	12	21.8 - 23.0 Trace py as veinlets and stringers
	10.2	23.0 - 33.2 THINLY BEDDED SILTSTONES AND SHALES WITH SANDSTONES Thinly bedded siltstones interbedded with weakly micaceous sandstones and shales	10/11/9c	23.0 - 33.2 Trace py in thin veinlets and stringers.
	1.1	33.2 - 34.3 TUFF	12	
40	7.7	34.3 - 42.0 SILTSTONES, MINOR SHALES Dark grey clay rich siltstones with thin black shale beds. Disrupted, converted and well fractured.	10/11c	34.3 - 42.0 py, qtz in stringers and veinlets with minor finely disem. py 2-3%
	13.17	42.0 - 55.17 SILTSTONES, MINOR SANDSTONES AND SHALES Thinly bedded dark grey clay rich siltstones and mid grey fine grained sandstones to 5 cm. Fractured and broken to 45.0m; disrupted and contorted - soft sediment deformation.	10/11/9c	42.0 - 55.17 Py, finely disem in siltstones and sandstones, sparse qtz py - carbonate veining. TOTAL 1-2%
	2.13	55.17 - 58.1 TUFF Fine grained and sheared at approx 60°	12	55.17 - 58.1 Sparse qtz-carbonate py veining.
	11.5	58.1 - 69.6 THINLY BEDDED SILTSTONES, SHALES with SANDSTONES Very disrupted - clasts of siltstone in a highly contorted matrix of dark grey clay rich siltstone and shale with intervals of sandstone to 5.5cm.	10/11/9c	58.1 - 69.6 py, in thin veinlets and stringers with sparse qtz, carbonates or finely disem. TOTAL 3%
80	32.1	69.6 - 101.7 SILTSTONES, minor SHALES Thinly bedded siltstones and shales with rare sandstone beds to 10 cm. Bedding is contorted and disrupted, in places totally unrecognisable for 3-4m.	10/9c	69.6 - 101.7 py, finely disem, as thin bedded laminae to 2mm and in sparse veinlets with qtz. TOTAL 3-5%.
	2.0	101.7 - 104.3 SANDSTONES and SILTSTONES.	11/5/10	101.7 - 104.3 py finely disem and in thin stringers 2-3%
	10.8	104.3 - 115.1 SILTSTONES Thinly bedded grey clay rich siltstones with lesser pale grey quartzose siltstones	10	104.3 - 115.1 py, very finely disem and as thin veinlets and irregular stringers
120	10.2	115.1 - 125.3 SANDSTONES AND SILTSTONES As for 42.0 - 55.17, sandstone beds to 1.2m thick.	11/5/10	115.1 - 125.3 py, patchily disseminated, minor bluish grey fluorite / carbonate veining. TOTAL 3-5%
	58.4	125.3 - 183.7 SILTSTONES minor BLACK SHALES Dark grey siltstones, some sandy beds to 5cm. Thinly bedded, with thin laminae of black shale (to 3mm) dividing siltstone beds to 10 cm. Some thinly bedded / laminated siltstone / silty shale intervals (as for 160 - 21.8m) up to 0.5 m thick.	10/(9c)	125.3 - ? py, as blebs ranging in size 1mm - 20 x 10 mm and in veinlets with carbonate, qtz, fluorite, po, cp. TOTAL 3-5%. 148.5 - 150.3 stockwork py-qtz-carbonate-fluorite-po-cp in veins 7% @ 35-40° 153.0 - 177.8 py, trace po as blebs and finely disem. Sparse carbonate-qtz veinlets. 1-2% 177.8 - 184.6 carbonate-qtz/py veining and blebs disem. py.
160	2.9	183.7 - 186.6 QUARTZITES, minor SILTSTONES	11/10	184.6 - 192.0 - py finely disem and in carbonate-qtz veining, 3-5%
	23.0	186.6 - 209.6 SILTSTONES lesser BLACK SHALES minor SANDSTONES Very disrupted and brecciated - as for 58.1 - 69.6m, but less sandstones.	10/9c/11	186.4 40 cm carbonate-fluorite-py-qtz-cp-qtz vein, 25°. 192.0 - 209.6 py, in veins and stringers with carbonate-qtz-fluorite-po-cp - 3-5%.
200	2.1	209.6 - 211.7 QUARTZITE massive and brecciated	11	209.6 - 211.7 py, disem, minor veining of qtz-carb 3-5%
	1.53	211.7 - 213.0 as for 186.6 - 209.6		211.7 - 213.0 as for 186.6 - 209.6
	7.25	213.0 - 220.25 SILTSTONES and BLACK SHALES Finely laminated 1-2m minor disruption and contortion	10/9c	213.0 - 220.25 py, as sparse veinlets and stringers and finely disem. 2%.
	1.4.95	220.25 - 225.2 THINLY BEDDED SILTSTONES AND SHALES, minor SANDSTONES	10/9c/9b	220.25 - 234.6 py, disem, along bedding and in thin veinlets and stringers with qtz and carbonates. 1-2%.
	9.4	225.2 - 234.6 THINLY BEDDED SANDSTONES AND SILTSTONES . See 42.0 - 55.17 m for description.	11/10	
	8	234.6 - 242.3 THINLY BEDDED SILTSTONES, minor SANDSTONES AND BLACK SHALES	10/11/9c	234.6 - 242.3 py, finely disem and in sparse veinlets. 2-3%.
	2.9	242.3 - 245.2 SILTSTONES, finely laminated	10/9	As for 213.0 - 220.25, 2%
	3.8	245.2 - 250.0 THINLY BEDDED SILTSTONES AND MINOR SHALES	10/9c	py as veinlets, stringers, thin bedded laminae and finely disseminated 2%

END OF HOLE 250.0m

METALS EXPLORATION LTD.
EXPLORATION DEPARTMENT

SUMMARY DRILL LOG
Scale 1:1000, 1:500, 1:250

Prepared by: G BROADBENT
Date : 17/6/80

HOLE NO. MBD 46
Sheet of

REPORT No. 028546

METALS EXPLORATION LTD.
& SUBSIDIARY COMPANIES

MINERAL EXPLORATION
DIAMOND DRILL LOG

Prospect, area, project or mine. MOUNT BISCHOFF

HOLE No. MBD 46

COLLAR LOCATION

Grid name — Rectangular space co-ordinates

		PLANAR CO-ORDINATES		ELEVATION
(1)	MBJV	1600·32 N	920·07 E	632·76
(2)		N	E	
(3) Aust. Map Grid (PRECISE / APPROX.)		mE	mN	mA.H.D.

W.C. Bearing from collar
- ____ magnetic
- — grid (1)
- ____ grid (2)
- ____ grid (3)
- ____ true

1:250 000 Sheet No. BURNIE SK 55-3 | 1:100 000 Sheet No. HELLYER 8015 | State TASMANIA

Mineral Tenement EL 13/79 | Holder METALS EXPLORATION LTD

Inclination at collar VERTICAL

Total length 250·0m.

Cadastral location and details (CROWN LAND / PRIVATE)

Commenced: 29 / 4 / 80
Completed: 5 / 5 / 80

Drilling contractor: LONGYEAR (AUST) PTY LTD.

Rig type: LONGYEAR 38

Details of down hole location-survey methods.
EASTMAN every 40m.

Purpose of drilling and anticipated lengths to targets.
To intersect a possible continuation of the dolomite horizon intersected in holes B15, B18, B19 and MBD41.

Core size and non-coring (NC)

TRICONE	0	TO	3·0
NQ	3·0	TO	69·00
BQ	69·0	TO	250·0
		TO	
		TO	
		TO	

Results of down hole location-survey.

LENGTH FROM COLLAR	W.C. BEARING type AZIMUTH	DIP
160	288°	84°
202	301°	85°
244	330°	84°

Comments on drilling.

Legend for graphic log column (see drill log for Hole No. ____)

'DERWENT' PENCIL NO.		FIELD ROCK NAME, ETC.

Symbols and abbreviations for drilling notes column.

LOGGED BY C. BROADBENT — FROM 0 TO 250·0m — DATE 11/5/80

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

LOGGED BY ____ — FROM ____ TO ____ — DATE ____

Company managing exploration programme.
METALS EXPLORATION LTD.

HOLE No. MBD 46
Log sheet 1 of 4

TRICONE TO 2.0 m - NO CORE

2.0 - 10.8 SILTSTONES WITH SANDSTONES.
Thinly bedded dirty rich siltstones with sandstones to 20 cm thick. Sediments are pale grey, fine grained and possibly weakly bituminous.
Originally well bedded, but highly broken and bleached by faulting and subsequent weathering.

- 2.0 - 2.4 Bedding 35°
- 5.2 - 11.0 FAULT ZONE core highly broken, some muggy material, soft and bleached.
- Contact broken

2.0 - 10.2 Weathered - non mineralized. —

10.2 - 16.00 TUFF
Coarse grained agglomeratic of black, grey and brownish siltstone and shale fragments with white and cream ? feldspar phenocrysts in a fine grained, faintly greenish pale grey matrix.
Rock fragments and 'feldspar' to 2 mm, 30-40% of the rock.
Rather structureless, some disruption and brecciation.

- 12
- Contact irregular, 35°

10.2 - 16.00 Trace fg as fine rounded stratified grains < 1 mm, unaltered. 1%

16.00 - 21.8 FINELY LAMINATED SHALEY SILTSTONES
Pale grey finely bedded laminated (1-2 mm) siltstones with intercalated discontinuous silty shale leaves 1-2 mm thick.
Well bedded to 17.9 m, then brecciated and disrupted. Well fractured and bleached, soft and crumbly - faulted.

- 10/12
- 17.1 Bedding 60°
- 16.10 - 17.6 FAULT ZONE minor muggy material.
- 17.9 - 21.8 Faulted, recovered poor, rock is soft crumbly and bleached.
- Contact broken.

16.00 - 21.8 Trace dissem. fg, pitted and unaltered. 1%

21.8 - 23.00 TUFF Fine grained siltstone shale and ? feldspar agglomerate (now clay fine 1/4 mm) in a fine grained grey pasty matrix.

- 12
- Gradual change with sandstone beds.

21.8 - 23.0 Trace fg as fine interstitial grains, unaltered. 1%

23.0 - 33.2 THINLY BEDDED SILTSTONES AND SHALES WITH SANDSTONES.
See 2.0 - 10.8 for description.
Well bedded to 28.8 m, then highly broken and bleached by faulting - soft, almost muggy intervals to 30 m - to 33.2 m.

- 10/12
- 23.2 - 23.8 Bedding 5°
- 23.8 - 25.5 Bedding 20°
- Contact broken.

23.0 - 33.2 Trace fg in veinlets and stringers, pitted and unaltered. <1%

33.2 - 34.2 TUFF Fine grained siltstone, shale and ? feldspar agglomerate as for 21.8 - 23.00, well bedded and fractured.

- 12
- Contact broken.

33.2 - 34.2 Trace interstitial fg. 1%

34.2 - 42.00 SILTSTONES, MINOR SHALES
Dark grey, almost black clay rich siltstones thinly interbedded with black shales.
Quite fairly bedded, in places almost laminated (as for 11.00 - 21.8), with thin black ? graphitic partings along bedding planes.
Highly fractured and broken, decreasing with depth. Minor alteration and soft-sediment disruption.

- 10/12
- 34.9 Bedding 35°
- Gradual Change

34.2 - 42.00 fg, 10% in siltstones and sandstones, minor qtz-pyrrhotite veining, and thin fg stringers and irregular blebs. 2-3%

42.00 - 55.17 SILTSTONES AND SANDSTONES, MINOR BLACK SHALES.
Thinly interbedded dark grey clay rich siltstone and mid grey silty sandstone beds on a 1 - 5 m scale.
Disrupted and contorted, with some well bedded intervals.
Fractured and badly broken to 45 m, then fracturing decreases.

- 10/11/12
- 42.5 - 42.8 Fold zone - contorted bedding, and angles 45°.
- 49.9 Bedding 45°
- 50.9 Bedding 60°
- 54.9 Bedding 50°
- Contact 60°

42.00 - 55.17 fg, thinly disem in siltstones and sandstones, minor qtz-pyrrhotite veining, and thin fg stringers and irregular blebs. <2%

55.17 - 58.1 TUFF
1-2 mm thick shale clasts, grey/pk siltstone clasts and pink/pk feldspathic fragments in a pale greenish grey fine matrix (redox?).
Clasts sub-, weakly foliated 65° - cleaving? some clasts are almost intrusive - alteration? or depositional?

- 12
- Contact irregular, 55°

55.17 - 58.1 trace minor qtz - sulphide - fg veining <1%

58.1 - 69.6 SILTSTONES AND SHALES, MINOR SANDSTONES.
Very brecciated and disrupted. Dark grey, almost black massive mixture of siltstones and shales with rounded clasts of mid grey stone siltstone, dark grey clay rich siltstone and grey sandstone to 2-3 cm.

- 10/11/12
- Gradual Change

58.1 - 69.6 fg, in thin veinlets and stringers along brecciation, pattle, disem, in siltstone and sandstone clasts.
Rare qtz-sulphide - fg veinlets. 3%

69.6 - 101.7 SILTSTONES AND SHALES, MINOR SANDSTONES
As above, 58.1 - 69.6, with a reduced proportion of sandstone clasts.
Slightly lesser disruption, intervals of disrupted and contorted material to 2 m alternate with totally disrupted material to 10 m.

- 10/12
- 73.6 Bedding 10°
- 76.3 10 mm muggy fg-magnetite vein, 30°.
- 88.4 Bedding 60°

69.6 - 101.7 fg, as bedded laminae, fairly disem, Rare irregular qtz-sulphide - fg - sp stockworked to 5 cm, 30-60° 3-5%

99.8 - 101.7, thinly bedded siltstones, dark grey and not as contaminated.

- 101.1 Bedding 50°

101.7 - 104.3 SANDSTONES WITH SILTSTONES
Dark grey, disrupted and brecciated Sandstone beds to 30 cm interbedded with thinly bedded siltstones.

- 11/12
- Gradual change
- 102.7 Bedding 55°

101.7 - 104.3 fg, fairly disem in sandstone and siltstone beds, some fine stringers with qtz, sulphide. 2-3%

104.3 - 115.1 SILTSTONES.
Medium grey thinly bedded clay rich and quartzose siltstones with some more sandy beds to 30 cm.
Quite well bedded with occasional thin shale laminae < 1 mm dividing siltstone beds.
Minor disruption and contortion, well fractured with some muggy zones 1-2 m.

- 10
- Gradual change
- 107.2 Bedding 35°
- 107.9 - 110.1 Fault zone - broken core and thin muggy intervals 40° ca.
- Minor fabric 111-113 - soft sediment deformation.
- 113.0 - 13 mm dolomite - fluorite - qtz - py - sp vein, 30°
- 15 mm dolomite - fluorite - qtz - py vein, 50°
- Gradual change.

104.3 - 115.1 fg, very fairly disem in siltstone beds, as thin fines along fracture planes, and occasional irregular stringers and blebs. 3%

115.1 - 125.3 SANDSTONES AND SILTSTONES.
Massive disrupted and brecciated sandstone beds to 1-2 m, grey and quartzose, alternating with thinly bedded clay rich and quartzose siltstones.
Highly disrupted and brecciated by soft-sediment deformation.

- 11/12
- 122.5 Bedding 30°

115.1 - 125.3 fg, fairly disem in some sandstone and siltstone beds, also as thin veinlets and stringers. Weak thick green fuchsite - carbonate stringers. 3-5%

5 cm

DEPTH from-to : ROCK UNIT (capital letters, underlined) Depth : Detailed rock description and notes (lithology, colour, ff etc.)

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF
Logged by: G. BROADBENT date: 11 / 5 / 80

HOLE No. MBD 46
LOG SHEET 2 OF 4
from 0.0 m to 125.0 m

028548

Depth	Description	Graphic Log	Structural and Vein Information	Mineralisation	Notes
120	See previous page for description	11/3/10		See previous page for description.	
124					
128	125.3 - 183.7 SILTSTONES, minor BLACK SHALES, SANDSTONES Dark grey siltstones, thinly bedded and sandy in places. Disrupted and brecciated, but bedding directions are still measurable. Black shales are mostly thin laminae (1-5mm) dividing siltstone beds; in places they are finely laminated 1-2mm. Well fractured - fractures have been healed by py± carbonates and qtz	10/9/11	←130.4 Bedding 40°	125.3 - 148.5 py, mainly as blebs 1mm → 20×10mm and thin stringers and veinlets. Some rare blebs po with py. Minor carbonate-fluorite-py qtz-po-sp veining	3%
132			←132.3 20mm carbonate-qtz-py-po vein, 50°		
136			←136.1 Bedding 45°		
140			←139.5 40mm qtz-py-carbonate-po-fluorite-sp vein, 35° ←140.1 Bedding 25° ←141.1 8-30mm irregular qtz-py-carbonate-po-sp vein, 35° ←141.7 - 142.2 Bedding < 5°		
144			←144.9 30mm py-po-carbonate-qtz vein, 40° ←145.7 Bedding 50°		
148			←147.9 Broad open fold, axis 90° LCA ←148.8 45mm fluorite-carbonate-py-arsenic-sp-po vein, 35° ←149.4 Bedding 40°	148.5 - 150.3 As above, with 5% veining; py-qtz-carbonates trace fluorite, po, sp, ga	7%
152			←150.3 30mm py-qtz-fluorite-sp-ga vein, 60° ←153.3 Bedding 55°	150.3 - 177.8 py, as blebs veinlets and stringers, trace po as rare blebs to 5×2cm. rare thin carbonate-qtz-py stringers.	1-2%
156	157.0 → Disruption and contortion gradually increases - bedding directions unreliable due to minor faulting and soft sediment disruption.		←157.0 Bedding 35°		
160			←161.3 fold - plane 60°, axis 90° ←162.7 Bedding 25°		
164			←168.2 Bedding 55°		
172			←171.9 Bedding 30° ←174.5 Bedding 50°		
176	177.8 - 184.6 Finely fractured - thin white clay filled partings at low angles LCA.			177.8 - 184.6 Increased carbonate-qtz-py stringers and some blebby dissem. py po gradually disappears.	3%
180			Gradual Change		
184	183.7 - 186.6 QUARTZITES, minor SILTSTONE Hard grey massive quartzites, disrupted and brecciated, up to 0.9m thick, separated by thinly bedded qtzose and clay rich siltstones	11/10	←186.4 40mm carbonate-fluorite-py-ga-qtz vein, 25°	184.6 - 192.00 py, as veinlets, stringers and dissem heavily in siltstone clasts or as blebs in shales. Weak qtz-py-stringers.	5%
188	186.6 - 209.6 SILTSTONES WITH BLACK SHALES, SANDSTONES. Pale grey siltstone clasts (quartzose) in a contorted black shale/siltstone matrix, with grey sandy siltstone beds to 30 cm thick. Occasional sandstone beds to 1.5m thick, some of which are weakly micaceous. Extensively disrupted and deformed - soft sediment deformation.	10/9/11	Gradual Change ←188.8 Bedding 20°		
192				192.0 - 213.0 py in stringers and veinlets with qtz, carbonates, some rarely finely dissem. 193.7 → some rare po, confined to veins > 5mm.	3-5%
196			←195.8 20mm carbonate-chlorite-fluorite-po-qtz vein, 20°		
200			←202.2 Bedding 50°		
204					

5 cm

DEPTH from-to : ROCK UNIT capital letters, underlined
Depth : Detailed rock description and notes
indented about 15mm.

GRAPHIC LOG

STRUCTURAL AND VEIN INFORMATION
ATTITUDE - Angle between fracture and core axis

MINERALISATION

NOTES

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISHOFF
Logged by: G. GROADBENT date 11 / 5 / 80

HOLE No. MBD 46
LOG SHEET 3 OF 4
from 120.0 m. to 204.0 m.

DRILL ADVANCE	CORE LENGTH RECOVERED	% RECOVERY ESTIMATE OR LOST CORE ZONE	DEPTH from-to : ROCK UNIT (capital letters, underlined) / Depth : Detailed rock description and notes (indented about 15 mm.)	DRILL LOG DEPTH TAG	DEPTH POINTER	GRAPHIC LOG (SEE LEGEND ON SHEET 1)	DEPTH POINTER	STRUCTURAL AND VEIN INFORMATION (ATTITUDE = Angle between feature and LONG CORE AXIS)	MINERALISATION	PERCENT MINERALISATION Visual estimate	NOTES
3.0	3.0	100	See previous page for description.	204		10/9c/11s		← 205.6 Bedding 60°	See previous page for description.		
3.0	3.0	100	209.6 - 211.7 Hard grey brecciated quartzite bed - massive, with some disruption.	208		11		← 208.6 15 cm carbonate - fluorite - py - po stockwork, 20% veins. ← 209.7 15 mm qtz-py vein, 75° ← 209.8 Bedding 40°			
3.0	3.0	100		212		10/9c/11s		← 212.1 15 mm py-po-qtz vein, 65° Contact bedded, 45°			
3.0	3.0	100	213.0 - 220.3 FINELY LAMINATED SHALEY SILTSTONES. Finely bedded / laminated 1-2 mm medium grey clay rich siltstone with thin discontinuous shale lenses <1-2 mm. Overall medium grey and weakly carbonaceous, with some almost black carbonaceous intervals to 10 cm thick. Minor disruption and contortion	216		10/9/c		← 215.8 Bedding 45°	213.0 - 220.3 py. as sparse veinlets, stringers with qtz, carbonates or very finely dissem.	2%	
3.0	3.0	100		220				← 219.6 Bedding 55° Gradual Change			
3.0	3.0	100	220.3 - 225.2 SILTSTONES AND BLACK SHALES, minor SANDSTONES. Thinly bedded 1-2 cm, mid grey clay rich and pale grey quartzose siltstones, some of which grade into sandstones. Some very small tuffaceous beds 1-2 cm. Very well bedded - 'stripey' appearance, with only very minor soft sediment disruption.	224		10/9c/11s		← 222.6 Bedding 65° ← 225.0 20 mm carbonate - fluorite-py - talc - mica vein, 85°	220.3 - 225.2 py. dissem. along bedding and in thin veinlets and stringers with qtz, carbonates.	2-3%	
2.5	3.4	100	225.2 - 234.6 THINLY BEDDED SANDSTONES AND SILTSTONES. Well bedded mid grey speckled quartzose sandstones with thin dark silty laminae along bedding planes. The sandstones are frequently micaceous along bedding planes. Intervals of sandstone to 1.5 m are separated by thinly bedded siltstones with rare black shale laminae. Well fractured and broken by a set of shear planes at low angles to core.	228		11s/10/(9)		← Contact bedded, 60° ← 228.8 Bedding 70°	225.2 - 234.6 py. finely dissem 1-2%, with rare thin qtz-carbonate veinlets and pyrite stringers.	2%	
2.3	1.4	100									
1.2	1.2	100									
2.7	2.7	100		232				← 232.4 Bedding 65°			
2.8	2.8	100						Gradual Change.			
3.1	3.1	100	234.6 - 243.3 THINLY BEDDED SILTSTONES AND BLACK SHALES, MINOR SANDSTONES. See 220.3 - 225.2 for description.	236				← 236.2 Bedding 55°	234.6 - 243.3 py. finely dissem in sporadic patches within some sandstone and siltstone beds. Minor qtz-py 'sweatouts' and veinlets.	2-3%	
3.1	3.1	100		240				← 240.4 Bedding 55°			
3.0	3.0	100						Contact irregular, 45°			
3.0	3.0	100	243.3 - 246.2 FINELY LAMINATED SHALEY SILTSTONES. As for 213.0 - 220.3.	244		10/c		← 243.4 Bedding 65° ← 246.0 Bedding 55°	243.3 - 246.2 py finely dissem. along bedding laminations, weak qtz-carbonate veinlets and stringers.	2-3%	
3.0	3.0	100	246.2 - 250.0 THINLY BEDDED SILTSTONES AND BLACK SHALES. Dark grey, almost black clay rich siltstones, silty shales, separated by black shale beds <2 mm thick, with pyrite laminae. Very well bedded - 'stripey' appearance, some weak disruption of beds.	248		10/9/c		Contact irregular. ← 248.1 Bedding 40° ← 249.3 30 mm irregular py-marcasite - sp-po-qtz stockwork, 70°	246.2 - 250.0 py, as veinlets and small irregular stringers, and thin bedded laminae to 2 mm with black shales. Some siltstone beds have very finely dissem. py-	3%	
2.0	2.0	100	END OF HOLE 250.0 m.	252							

5 cm

METALS EXPLORATION LIMITED

MINERAL EXPLORATION
DRILL LOG
Scale 1:100

Prospect or project: MOUNT BISCHOFF

Logged by: G. BROADBENT date: 11 / 5 / 80

HOLE No. MBD 46
LOG SHEET 4 OF 4
from 204.0 m. to 250.0 m.

SAMPLE NO.	SAMPLE NO	FROM	TO	INTER-VAL	Sn	Sn	Cu	Pb	Zn	Ag	W	Au	Check Sn	Bulked Assays
SPLIT CORE	GROUND CORE	m	m	m	SPLIT	GROUND								
98071		186.4	187.1	0.7	6100								6100	check assay

Notes :— Sn by XRF 6. Method.

METALS EXPLORATION LTD - MT BISCHOFF TIN PROSPECT

ASSAY SUMMARY SHEET. HOLE NO. MBD-46

SAMPLE TYPE : DRILL CORE FROM 186.4 TO 187.1

028550

028551

OPEN FILE

MT. BISCHOFF TIN PROSPECT

EXPLORATION LICENCE 13/79

TASMANIA

REPORT ON STAGE 2B PROGRAMME

VOLUME 4

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028552

VOLUME 4

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1.	1:2000	Surface Geological Interpretation	80-319
2.	1:500	Surface Geological Interpretation Sheet 1	R80-271
3.	1:500	Surface Geological Interpretation Sheet 2	R80-272
4.	1:6000	Total Magnetic Intensity Contours and Geology	79-203
5.	1:2000	H. Brooks Grid Magnetic Anomaly 12 Topography and Geology	R80-048
6.	"	Total Magnetic Intensity Contours	R80-030A
7.	"	Sn Geochemical Contours	80-055
8.	"	Cu " "	80-056
9.	"	Pb " "	80-058
10.	"	Zn " "	80-057
11.	"	Ni " "	80-059
12.	"	Housego Grid - Magnetic Anomalies 7-10 Topography and Geology	80-320
13.	"	Total Magnetic Intensity Contours	80-321

80-1498 6/10 (1)

028553

METALS EXPLORATION LIMITED
MT BISCHOFF TIN PROSPECT

MT BISCHOFF MINE AREA

SURFACE GEOLOGICAL INTERPRETATION PLAN

Scale 1:2000

5 cm

MBD 45 MBD 44 MBD 42 MBD 41 MBD 25 MBD 46 MBD 24 MBD 26 MBD 43 GOSSAN FACE MBD 23 MBD 22 MBD 29A MBD 29 MBD 21 MBD 20 MBD 15 MBD 27 WHITE FACE MBD 19 FACE GREESON MBD 16 MBD 17 PIG FLAT MBD 18 MBD 28 DYKE HAPPY VALLEY MBD 30 MBD 35 MBD 31 MBD 32 MBD 34 MBD 33 FACE WHITE

SLAUGHTERYARD FACE

WESTERN DYKE

MBD 36 MBD 37 BROWN FACE MBD 38 STANHOPE DYKE MBD 14 DESERT FACE MBD 39 MBD 40 QUEEN DYKE

M.E.L. GRID NORTH (330°)
ADOPT. MAG. NTH.

Porphyry
Dolomite
Dolomite Sulphide Lode
Siltstones, Shales, Quartzites
Fault
Interpreted Geological Contact

50 0 50 100 150
METRES
200 0 100 200 300 400
FEET

Drg. No. 80-319

GOSSAN FACE

WHITE FACE

HAPPY VALLEY

PIG FLAT

DYKE

GREISEN

WESTERN DYKE

M.E.L. GRID NORTH (550° M) GN

ADOPTED MAGNETIC NORTH MN

SHEET 1

SHEET 2

DEVONIAN

- Quartz vein.
- Porphyry.

PRE-CAMBRIAN

- Dolomite.
- Recrystallised dolomite.

PRE-CAMBRIAN

- Dolomite sulphide lode - pyrrhotite rich.
- Dolomite sulphide lode - pyrite rich.
- Dolomite sulphide lode - talc rich.
- Dolomite sulphide lode - serpentinite rich.
- Dolomite sulphide lode - quartz/carbonate rich.
- Shale / carbonaceous.

PRE-CAMBRIAN

- Siltstone.
- Quartzite / sandstone.
- Tuff.

F Fault interpreted.

Interpreted geological contact.

10 0 10 20 30 40 50 METRES

50 0 50 100 150 FEET

METALS EXPLORATION LIMITED
MOUNT BISCHOFF TIN PROSPECT

MOUNT BISCHOFF MINE AREA

SURFACE GEOLOGICAL INTERPRETATION PLAN

SHEET 1

028554

SCALE 1:500

DATE 8-8-80 REVISED

DRG. NO. R80-271

(2)

80-1198 6/10

1900 N
2000 N
2100 N
2200 N
1100 E
1200 E
1300 E
1400 E
1500 E
FACE
GREISEN
SLAUGHTERYARD FACE
FLAT
PIG
WHITE
WESTERN
DYKE
FACE
DYKE
STANHOPE DYKE
BROWN FACE
DESERT FACE
QUEEN
MBD 27
B44
MBD 13
MBD 19
MBD 4
H1
B6
MBD 17
MBD 18
MBD 28
B54
B56
B58
MBD 36
B57
B59
MBD 31
MBP 45
B33
MBD 32
B60
MBD 33
MBP 41
MBP 40
MBP 39
MBP 42
MBD 37
MBP 38
MBP 36, 37
B48
MBD 38
B35
MBP 35
MBD 7
MBD 14
MBP 34
MBP 33
MBD 3
MBP 21
MBD 39
MBD 40
MBP 20
MBP 18, 19.
MBP 17
MBP 16
MBP 22
MBP 23
MBP 24
MBP 26
MBP 27
MBP 25
MBP 29
MBP 28
MBP 31
MBP 30
MBP 32
5412 500 N
5412 250 m N
5412 750 N
5412 000 N
5412 250 N
5412 500 N
5412 750 N
5413 000 N
5413 250 N
5413 500 N
375 550 E
375 600 E
375 650 E
375 700 E
375 750 m E
375 800 E
5 cm

M.E.L GRID NORTH (330° M)
G.N.
ADOPTED MAGNETIC NORTH
M.N.

SLAUGHTERYARD FACE

BROWN FACE

DESERT FACE

WESTERN DYKE

QUEEN DYKE

B54 B55 B57 B59

MBD 36 MBD 37 MBD 38 MBD 7 MBD 5 MBD 14 MBD 3 MBD 39 MBD 40

MBP 46 MBP 47 MBP 38 MBP 36,37 MBP 35 MBP 34 MBP 33 MBP 21 MBP 18,19. MBP 17 MBP 16 MBP 22 MBP 25 MBP 24 MBP 26 MBP 27 MBP 29 MBP 28 MBP 31 MBP 30 MBP 32

375550 E 375570 E 375590 E 375610 E 375630 E 375650 E 375670 E 375690 E 375710 E 375730 E 375750 m E

N 5275 N 5275200 N 5275400 N 5275600 N

2100 N 2200 N 2300 N 2400 N

1100 E 1200 E 1300 E 1400 E

SHEET 1
SHEET 2

DEVONIAN
- qv Quartz vein.
- 1 Porphyry.

PRE-CAMBRIAN
- 2 Dolomite
- 3 Recrystallised dolomite
- 4 Dolomite sulphide lode - pyrrhotite rich.
- 5 Dolomite sulphide lode - pyrite rich.
- 6 Dolomite sulphide lode - talc rich.
- 7 Dolomite sulphide lode - serpentinite rich
- 8 Dolomite sulphide lode - quartz/carbonate rich.
- 9/c Shale / carbonaceous.
- 10 Siltstone.
- 11/s Quartzite / sandstone.
- 12 Tuff.

F—— Fault - interpreted.
— — Interpreted geological contact.

10 0 10 20 30 40 50 METRES
50 0 50 100 150 FEET

METALS EXPLORATION LIMITED
MOUNT BISCHOFF TIN PROSPECT

MOUNT BISCHOFF MINE AREA

SURFACE GEOLOGICAL INTERPRETATION PLAN

SHEET 2

028555

SCALE 1:500

DATE 8·8·80 REVISED

DRG. NO. R80-272

5cm

(3)

80-1498 (G.S 10)

5440 000 mN
5441 000 mN
5442 000 mN
5443 000 mN
5444 000 mN
5445 000 mN
375000 mE
376000 mE
377000 mE
378000 mE
379000 mE

2000 N
3000 N
4000 N
3000 E
4000 E

WARATAH RIVER

NO RECOVERY CONTROL IN THIS AREA

1 2 3 4 5 6 7 8 9 10 11 12

REFERENCE

SURVEY BOUNDARY
MAGNETIC LOW
MAGNETIC HIGH
CONTOUR VALUE IN GAMMAS
CONTOUR INTERVAL – 10 GAMMAS

RECENT — Alluvium
TERTIARY — Basalt / Gravels
DEVONIAN — Quartz porphyry
CAMBRIAN — Greywackes and mudstone; Basic rocks
PROTEROZOIC — Dolomite / Mineralized Dolomite; Quartzite, siltstone and shales / Carbonaceous

THE DATA HAS BEEN ADJUSTED FOR DIURNAL VARIATION WITH AN ADOPTED VALUE OF 62255 GAMMAS AT THE DIURNAL BASE STATION AT WYNYARD AERODROME 40°59'51" SOUTH & 145°43' 34" EAST. THE SENSOR HEIGHT WAS 2 METRES. THE DATUM FOR THE TOTAL MAGNETIC INTENSITY CONTOURS IS THE INTERNATIONAL GRID REFERENCE FIELD 1979·25

SURVEY SPECIFICATIONS

AIRCRAFT ..... BELL 206 B
MAGNETOMETER ..... VARIAN 4937 A PROTON PRECESSION USING TOWED BIRD CONFIGURATION WITH 37m CABLE
DIURNAL RECORDER ..... GEOMETRICS G826 PROTON PRECESSION MAGNETOMETER WITH RUSTRAK RECORDER & CRYSTAL CLOCK
ALTIMETER ..... BONZER TRN-70
ANCILLIARY EQUIPMENT ..... GEOEX INTERVALOMETER, GEOEX DIGITAL AQUISITION SYSTEM
CENTURY 444 6 CHANNEL ANALOGUE LIGHT BEAM RECORDER
VINTEN 16 mm GROUND TRACKING CAMERA
READING INTERVAL ..... 1·0 SECOND
NOMINAL AIRCRAFT SPEED ..... 60 KNOTS
NOMINAL AIRCRAFT SURVEY ALTITUDE ..... 90 METRES
SENSOR CLEARANCE 75 METRES

100 50 0 100 200 300 400 500 metres
SCALE IN METRES

1:6000

LOCATION



5 cm

GEOEX 028556 PTY. LTD.

METALS EXPLORATION N.L.

MT. BISCHOFF AREA – TAS.

AEROMAGNETIC TOTAL INTENSITY CONTOURS AND GEOLOGY

SURVEYED MARCH '79 — APPROVED J.E HAIGH
DRAWN R.G.Z. — PROJECT Nº 79187 — SHEET Nº 1

M.E.L. DRG. NO. 79-203A

80-1498 (6,5,10)