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UNION CORPORATION (AUSTRALIA) PTY. LIMITED

ANNUAL REPORT

STANLEY REWARD TIN PROSPECT,
E.L. 53/70, WESTERN TASMANIA

N.J.W., AUGUST, 1983

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UNION CORPORATION (AUSTRALIA) PTY. LIMITED. N.J.W. AUGUST, 1983

ANNUAL REPORT

STANLEY REWARD TIN PROSPECT, E.L. 53/70 - WESTERN TASMANIA

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UNION CORPORATION (AUSTRALIA) PTY. LIMITED

ANNUAL REPORT

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N.J.W., AUGUST, 1983

ANNUAL REPORTSTANLEY REWARD TIN PROSPECT, E.L. 53/70 - WESTERN TASMANIA1. ATTACHED

- Appendix 1 - "Magnetic Interpretation of Selected Lines from Stanley Reward tin Prospect". Geospex Associates Pty. Ltd., 1983.
- Appendix 2 - Diamond and Percussion Drillhole Logs and Geochemical Data - GSR 10, 11, 12 and 13.
- Appendix 3 - "Mineralogy and Petrology of Four Drill Core Samples. UCT 2189, 2191, 2192 and 2194". Report No. 19/83, Minpet Services, 1983.
- Appendix 4 - Some Aspects of Structure and Stratigraphy - GSR 10.
- Appendix 5 - Miscellaneous Rock and Core Sample Analyses.
- Appendix 6 - Summary of Sample Preparation and Analytical Techniques and Laboratories.
- Appendix 7 - *Integrated Interpretation of Drilling and Magnetic Data from Stanley Reward Tin Prospect*
- Appendix 8 - *Report on the Mineralogical Investigation of Tin-bearing Samples from the Stanley Reward Tin Prospect, Tasmania.*
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- Plan 4 - Diamond Drillhole GSR 12 (L5400N), Magnetics and Interpretation. Scale 1:500
- Plan 5 - Diamond Drillhole GSR 13 (L5200N), Geophysics, Geochemistry and Interpretation, Scale 1:500
- Plan 6 - Geology, General Features and Rock Sample Localities West of Stanley Reward Gossan, Scale 1:50,000

2. INTRODUCTION

Union Corporation (Australia) Pty. Limited and CSR Limited have entered a joint venture to explore Exploration Licence 53/70 in North-western Tasmania. The agreement was signed on 18th January, 1983, and exploration commenced shortly thereafter.

Work carried out during 1983 has been restricted to the Stanley Reward - Livingstone Creek area, and comprised:

- a follow-up ground magnetic survey on CSR's grid
- computer modelling of the magnetic data
- four diamond drillholes, largely sited to test magnetic anomalies.

3. MAGNETICS

A proton precession magnetometer was used on the established CSR grid from L5200N to L6500N (see Plan 1, attached). Readings were taken at 100 x 20 metre intervals. An interpretation based on interactive computer modelling on selected lines indicates several significant magnetic sources (see Appendix 1, attached) several of which are discussed later.

All core was tested with a magnetic susceptibility instrument at approximately one metre intervals where possible.

4. DIAMOND AND PERCUSSION DRILLING AND RESULTS

The location of drillholes is shown on Plan 1, attached. The purpose of each drillhole and results with regard to the geology, significant geochemical analyses and magnetics are discussed below. Logs and analytical data are attached in Appendix 2.

For discussion on some aspects of structure, and stratigraphy see Appendix 4, attached. A summary of sample preparation and analytical techniques is included in Appendix 6, attached.

4.1. GSR 10 (L6100N/5163W)

4.1.1. Purpose

The hole was planned to test the main magnetic anomaly between the Livingstone Creek and Stanley Reward gossans. Some favourable electrical conductivity and bedrock geochemical responses, especially tin, also occur (see Plan 2, attached).

The magnetic interpretation shows a deep magnetic source which dips steeply west.

4.1.2. Results

4.1.2.1 Geology

The interpretative geological cross section shows a shallow north east dipping succession of retrogressively metamorphosed carbonates and quartzitic and pelitic sediments beneath a button grass plain. The rocks are tentatively assigned to the Success Creek Group. Variable grade contact metamorphism and metamorphic zoning appears to have been generated by the Meredith Granite which intrudes the sequence from the east.

The uppermost sequence of quartzite/calcareous siltstone (qsc) was possibly intruded by granitic veins and dykes. Leucocratic and porphyritic granite/adamellite (Dg-Meredith Granite) has intruded close to the contact between quartzite/calcareous siltstone (qsc) and carbonate skarn/calc-silicate hornfels zones (cs). The latter zone consists of 33.3 metres of variably weathered, ferruginised actinolite with calc-silicate hornfels and minor ferruginised plagioclase-hornblende. Accessory minerals include garnet, quartz, specularite, and chlorite (see thin and polished section descriptions of core samples UCT 2189, 2191 and 2192, Appendix 3, attached). Detailed scanning for the location of cassiterite and tin sulphides was unsuccessful. This zone contains the greatest concentration of tin of 0.41 per cent. Also, it may represent an outer zone of a metamorphic aureole of the granite. Zoning appears to be near normal to bedding. Adjacent and closer to the granite is a diopside zone (css).

The underlying succession of calc-silicate skarn (css) comprises 16 metres of mostly epidotised diopside hornfels. It is intruded by irregular veins of vermiculite (after biotite) which commonly have narrow alteration zones. (see thin and polished section description of core sample UCT 2194, Appendix 3, attached).

Pelitic hornfels (ph), in which bedding and possibly slump structures occur, underlies calc-silicate

skarn (css). Some narrow sections contain virtually massive magnetite. Pelitic hornfels (ph) is intruded by granite/adamellite (Dg) which is leucocratic, porphyritic with minor biotite and trace pyrite.

4.1.2.2 Geochemistry

The only significant tin occurrence in both parent and daughter drillholes occurs in carbonate skarn/calc-silicate hornfels (cs), that is from 75.6 to 116.5 metres. Values vary between 0.24 and 0.68 per cent tin. *(NH₄I - between 0.15 and 0.44 per cent tin). The complete section carries 0.41 per cent tin (NH₄I - 0.28 per cent tin) over a true width of 33.3 metres which includes a 0.3 metre section of 540 parts per million (ppm) tin of plagioclase-hornblende. The greatest concentration of tin is a 6.4 metres section of 0.68 per cent tin (NH₄I - 0.44 per cent tin) subjacent to the upper granite/sediment contact. Composite samples from 83 to 103 metres and 103 to 111 metres contain 0.37 and 0.33 per cent tin respectively (see Appendix 5, attached). The approximate equivalent section of carbonate skarn (cs) in parent and daughter drillhole between 103 and 116.5 metres contains 0.4 and 0.29 per cent tin (NH₄I - 0.24 and 0.18 per cent tin) respectively.

The remainder of core of various rock types carries less than 35 ppm tin. A 2.1 metre section at 101.2 metres carries 0.08 per cent tungsten and a 6 metre section contains 0.06 per cent zinc at 110.5 metres. A one metre section of dark brown hard clay in quartzitic/calcareous siltstone (qsc) contains 0.13 per cent zinc. Granite/adamellite (Dg) analyses are 65ppm tin or less.

The results of the ammonium iodide sublimation technique for tin, which may be specific for tin in cassiterite, vary between 59 and 82 per cent of the total tin analyses as determined by XRF. The average is 70 per cent.

4.1.2.3 Magnetics

The source of the magnetic anomaly appears to be associated with variably high magnetic susceptibilities in several altered rock types between 75 and 152 metres. The upper sections of carbonate skarn/calc-silicate hornfels (cs) and pelitic hornfels (ph) are most magnetically responsive.

4.2 GSR 11 (L5164N/4869W)

4.2.1 Purpose

GSR 11 tested the depth extent of the Stanley Reward Gossan (cs).

4.2.2. Results

4.2.2.1 Geology and Geochemistry

Although the texture of the gossan (cs) is largely 'knobby' and massive, conceivably it dips to the west (see Plan 3, attached). The uppermost section

*The results of the ammonium iodide (NH₄I) sublimation analyses are shown in brackets after corresponding XRF results.

of the hole possibly comprises a sill-like tongue of granite/adamellite (Dg) which overlies quartzitic sediments (qs) variably intruded by granite/adamellite (Dg). Tin values tend to increase from 20 ppm at 30 metres to 0.08 per cent at 35 metres, that is toward the lowermost granite contact. Between 35 and 38.5 metres there is a soft zone of no core recovery. There is no evidence to suggest that the down dip extension of the Stanley Reward Gossan (cs) occurs in this interval. The gossan (cs) appears to be a xenolith of skarn in granite.

4.3 GSR 12 (L5400N/5176W)

4.3.1. Purpose

The drillhole was planned to test a magnetic anomaly the source of which is interpreted by Geospex (pers. comm.) to be centred at 5260W below the button grass flat. The depth to the top of the source is 45 metres and the dip estimation is vertical or steep, east (see Plan 4, attached). The anomaly possibly is situated at a stratigraphically favourable position at which the Mt. Bischoff and recently explored Queen Hill and St. Dizier carbonate-replacement/tin sulphide deposits occur in western Tasmania, that is at the top of the Oonah Formation and close to its contact with the Success Creek Group (see Plan 6, attached).

4.3.2 Results

4.3.2.1 Geology and Geochemistry

The monotonous sequence of essentially quartzitic sandstone and siltstone appears to be part of the Lower Succession of the Oonah Formation as described by Brown (1982). Magnetite- and pyrite-bearing bands and laminations occur between about 50 and 150 metres below which hornfels predominates. A magnetic, sulphide-rich and carbonate-bearing breccia zone between 78.58 and 79.65 metres carries 0.04 per cent tin and 0.1 per cent copper. A 0.4 metre interval at 146.4 metres of pyritic quartz-muscovite analysed 0.29 per cent zinc.

4.3.2.2 Magnetics

The source of the magnetic anomaly is considered to be magnetite-bearing bands and laminations in quartzitic sandstone/siltstone. Possibly narrow, magnetic and massive sulphide-bearing brecciated sections also contribute.

4.4 GSR 13 (L5200N/5051W)

This hole was planned to test interpretative magnetic sources of several anomalies and bedrock geochemical anomalies, in particular zinc, tin and copper (see Plan 5, attached). Favourable resistivity responses also occur.

4.4.1 Results

4.4.1.1 Geology and Geochemistry

Granite/adamellite (Dg) intrudes a subhorizontal sequence of quartzitic sandstone and siltstone (qs)

which appears to be sparsely calcareous. The highest value of tin of 160ppm occurs close to the granite/sediment contact between 30 and 37 metres. It is considered that, within the granite mass, iron-bearing xenoliths may occur near the trace of the drillhole evidence for which is suggested by orange stains in fractures below 83 metres.

4.4.1.2 Magnetics

The magnetic susceptibility profile shows high measurements towards the granite/sediment contact. The narrow and steeply west-dipping anomaly may reflect this contact.

The magnetic sources east of the granite/sediment contact were not intersected.

5. PROSPECTING WEST OF STANLEY REWARD GOSSAN

CSR outlined numerous narrow, high amplitude magnetic anomalies close to the granite contact and near the eastern edge of E.L. 53/70.

The sources of the anomalies appear to be magnetically susceptible pelitic hornfels which occur largely as float. Analyses are of a very low order, for example tin values are 10ppm or less (see Appendix 5, Plan 6, attached).

6. CONCLUSIONS

- 1) The source of the main magnetic anomaly between the Livingstone Creek and Stanley Reward gossans appears to be magnetically susceptible, contact metamorphosed carbonate and pelitic rocks.
- 2) The carbonate rocks in part are metamorphosed carbonate skarn/calc-silicate hornfels which contains 0.41 per cent total tin over a true width of 33 metres.
- 3) The Stanley Reward Gossan has limited depth extent and may be a xenolith of skarn in granite.
- 4) The source of the magnetic anomaly in the Onah Formation appears to be magnetite-bearing bands and laminations in a sandstone/siltstone sequence and also possibly a narrow, brecciated, sulphide-rich zone of 0.13 per cent copper and minor tin.
- 5) The narrow, steeply west dipping interpretative source on L5200N appears to be magnetically responsive and altered rocks adjacent to the granite/sediment contact. The magnetic sources east of the granite/sediment contact were not intersected.

7. RECOMMENDATIONS

It is recommended that :

- 1) More detailed examinations be carried out to determine the mode of occurrence of tin in the carbonate-skarn/calc-silicate hornfels section in GSR 10 which carries 0.41 per cent tin.
- 2) A re-interpretation based on computer modelling of the magnetic data obtained in drillholes be implemented.
- 3) Upon receipt of results of 1 and 2 an assessment of all data be made with a view to possible further diamond drilling.
- 4) Consideration be given to more detailed evaluation of the narrow, sulphide-rich brecciated zone in GSR 12 possibly by detailed geophysical surveys as a first step.



N.J. WINNALL

REFERENCE

BROWN, A.V., 1982

-

"Preliminary map and rock descriptions for the 'Regional geology of the Dundas - Mt. Lindsay - Mt. Ramsay area', western Tasmania". Tas. Dept. Mines Pub. No. 1982/46.

APPENDIX 1

MAGNETIC INTERPRETATION OF SELECTED LINES

from

STANLEY REWARD TIN PROSPECT

for

UNION CORPORATION (AUSTRALIA) PTY LIMITED

9th February, 1983

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2 PLANS + FIGURES

1.0 INTRODUCTION

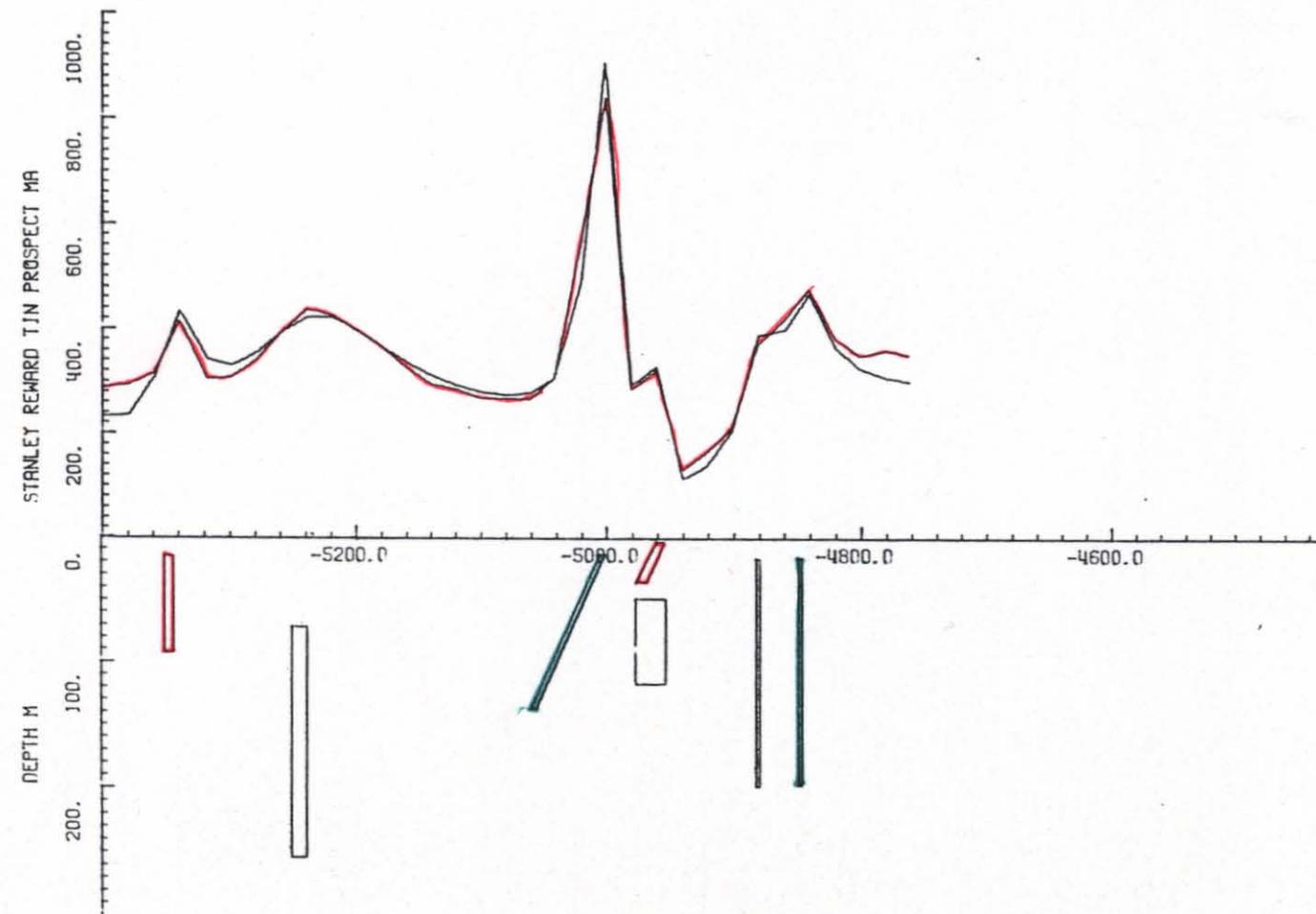
Selected lines of magnetic data from the Stanley Reward Tin Prospect, E.L. 53/70 in Western Tasmania were chosen for detailed magnetic modelling. Anomalies 5800N and 6100N are over the Meredith Granite and Line 5200 N is over the Stanley Reward Gossan.

A geophysical interpretation of these lines was carried out using interactive computer modelling on the Geospex Associates computer system. Results from the modelling were plotted and are presented in this report.

2.0 INTERPRETATION PROCEDURE

A brief description of the interpretation procedure is given to complete the description of the results. The modelling procedure is based on a method of drawing geological cross-sections on a computer graphics screen and computing the theoretical magnetic response of the geological section. This response is compared with the field magnetic data and the section modified until a good match is achieved between the field data and theoretical results. Once a good match is achieved, the section is assumed to be a reasonable representation of the subsurface distribution of magnetic properties. The results of the modelling and geological cross-section are then plotted.

STANLEY REWARD TIN PROSPECT



UNION CORPORATION (AUST) P/L

LINE 5200 N

PROJECT: FIG. NO. 3.1

DATE: 07-FEB-83

504014

Certain assumptions must be applied in this interpretation. The magnetic anomalies must have a long strike length when compared with their depth and no remanent magnetization is present within the magnetic source rocks. In general the former requirement is satisfied over all the lines. However, it is not possible to predict the influence of remanent magnetization on the results without laboratory measurements on samples of the source rocks.

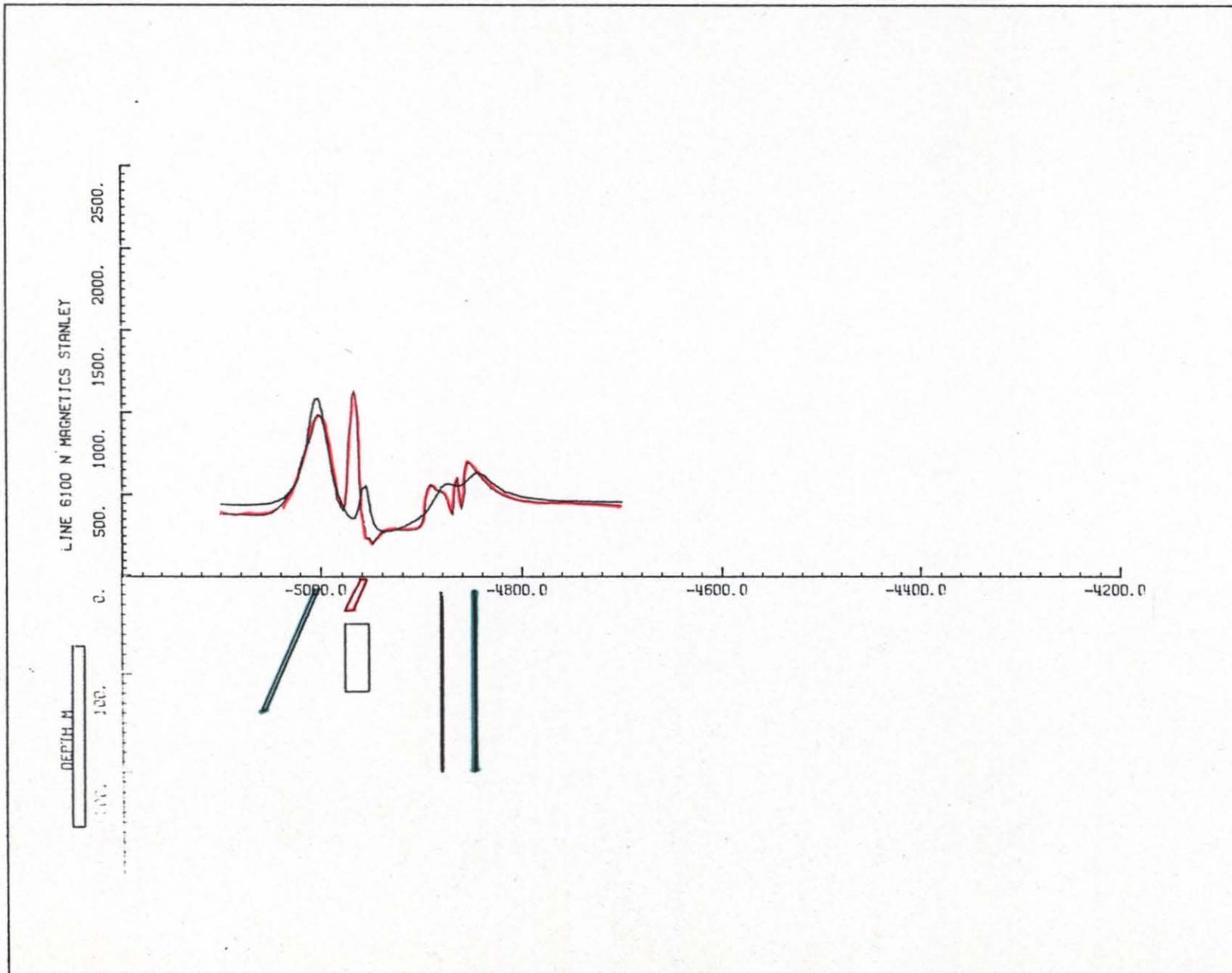
Field data profiles selected for the interpretation were input to the computer using an interactive digitizer tablet. Only the data points recorded on the profiles were actually digitized.

3.0 INTERPRETATION RESULTS

Good model comparisons were achieved for each of the three lines within the limits of the data resolution. Lines 5800 and 6100 give extremely good matches with the field data. Results from each of these lines are discussed in the following sections.

3.1 Line 5200 N

Many narrow magnetic anomalies are present on Line 5200N, most of which are related to shallow magnetic source rocks. The field data and model results are illustrated in Fig. 3.1.



STANLEY REWARD
TIN PROSPECT

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LINE 5200 N

PROJECT: FIG. NO. 3.2

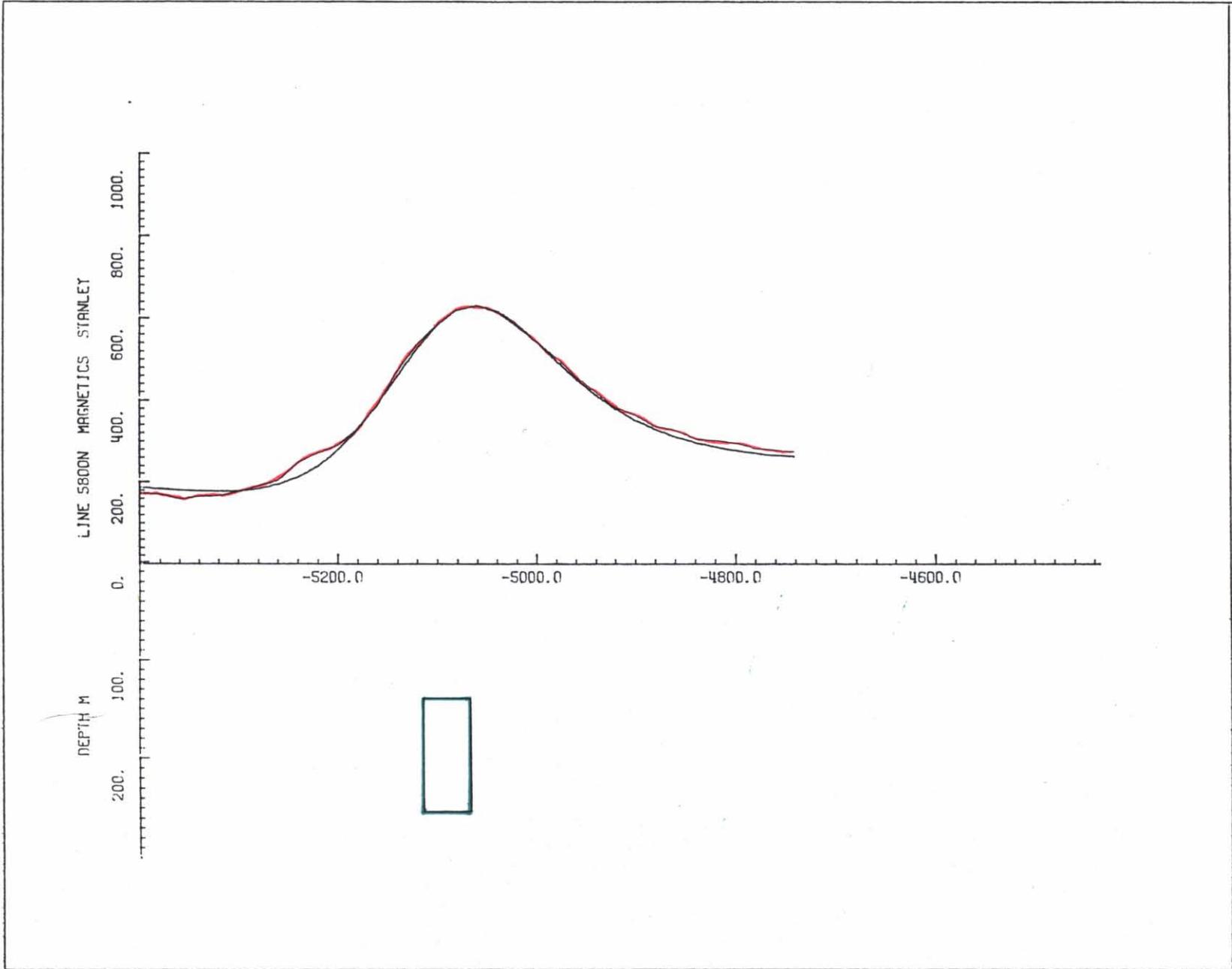
DATE: 07-FEB-65

504016

The main anomaly at 5000W is modelled as a narrow steeply dipping sheet like source rock with a steep dip to the west. Although, there are few data points over this anomaly, the shallow western flank of this anomaly indicates that this is a valid dip estimate. This statement is made assuming that no remanent magnetization is present in the source rocks and that there is no interference from an anomaly which may be offset to the south-east of line 5200N. The approximate depth to the top of the anomaly source is 13 metres.

To the right of the above anomaly at 4960W is another anomaly with an estimated source depth of 5 metres. This estimate is approximate only due to the wide data spacing. Other shallow anomalies are modelled at depths of approximately 15 metres. A deeper source at 5240W is located in the Onah quartzite at an approximate depth of 50 metres. A second deep source at 4960W is modelled to explain the strong negative anomaly. This model is remanently magnetized in the opposite direction to the Earth's normal magnetic field. It is also possible that the negative could be caused by a strong magnetic source situated to the north west of line 5200N but not evident on line 5400N.

An earlier survey of this line shown on PLAN 7 (Bull. No. 134) provides more detail but does not show the actual data points. For the sake of comparison, this line of data was also digitized and the same model section was used to display the



STANLEY REWARD
TIN PROSPECT

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LINE 5800 N

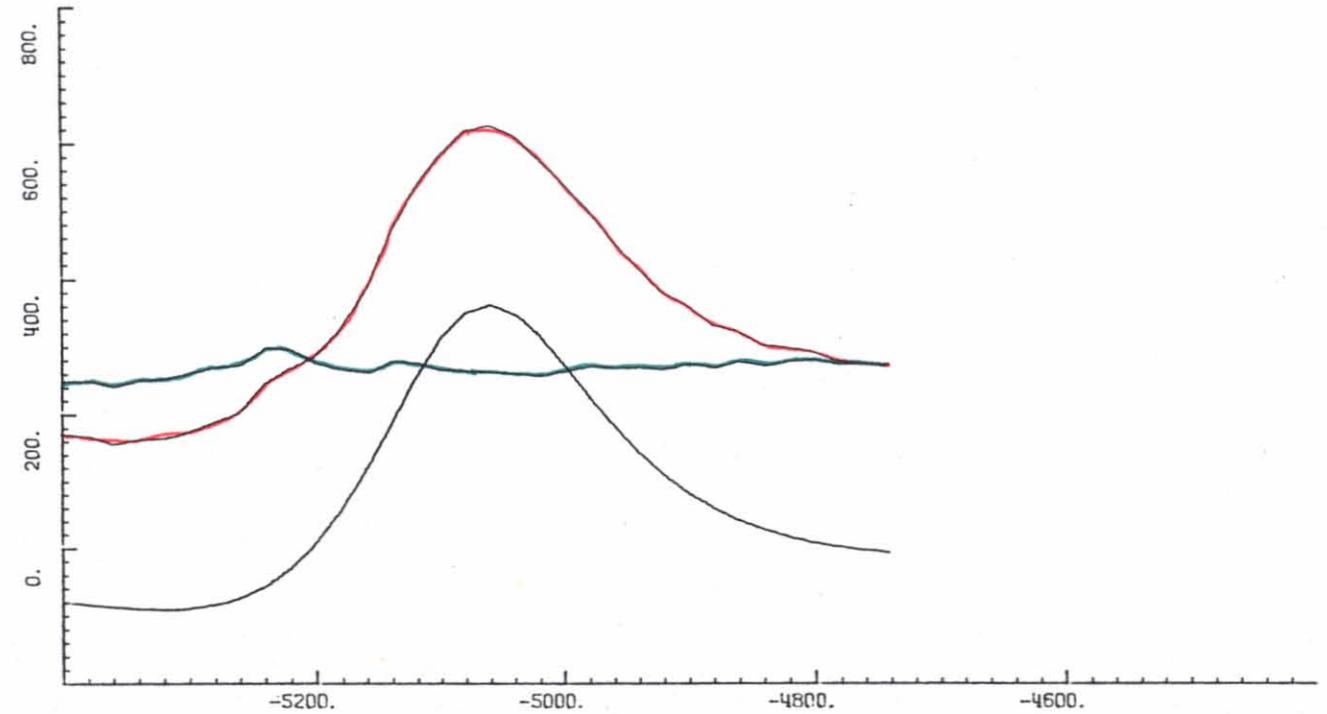
PROJECT: FIG. NO. 3.3 DATE: 07-FEB-83

504018

STANLEY REWARD
TIN PROSPECT

2 MAG
3 MODD
5 DIFF

VGRAPH OPTION - NO 1



UNION CORPORATION (AUST) P/L

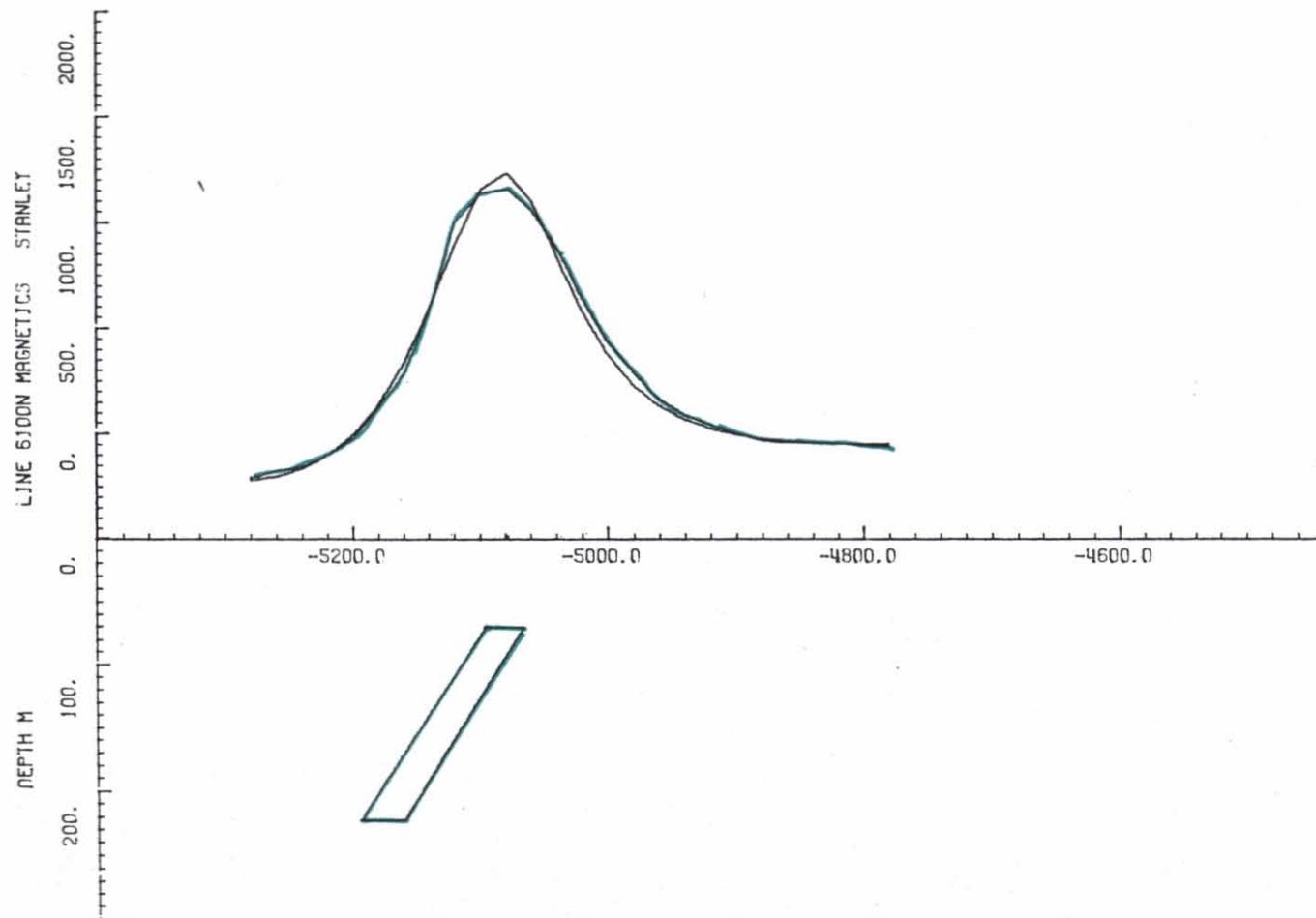
LINE 5800 N

PROJECT: FIG. NO. 3.4

DATE: 07-FEB-83

504019

STANLEY REWARD
TIN PROSPECT



UNION CORPORATION (AUST) P/L

LINE 6100 N

PROJECT: FIG. NO. 3.5

DATE: 07-FEB-85

504020

simulated magnetic response (Fig. 3.2). A good match is achieved with the main anomaly. However, the minor anomalies show some displacement and are wider than those encountered in the field data. This is caused primarily by the wider data spacing of the later survey and indicates that the actual source rocks are much shallower. This would be 5 metres or less.

3.2 Line 5800 N

Results of the magnetic modelling for this line are shown in Fig. 3.3. The model result shows an excellent match between the field data and model. A single magnetic source with vertical sides is shown at a depth of 140 metres. The quality of this comparison suggests that there is little or no remanent magnetization in this source rock as there was no need to modify the direction of magnetization to achieve a good fit.

Fig. 3.4 displays the field data (red), model results (black) and difference (green). The difference between the two curves is very small except for a minor anomaly on the western flank.

3.3 Line 6100 N

A good model comparison (Fig. 3.5) was also achieved for line 6100N. In this case the magnetic source rocks are shallower and dipping steeply to the west. The depth in this case is

approximately 70 metres. Since this anomaly is on the same trend as that of 5800N, then the assumption of little or no remanent magnetization should also apply. However, caution must be used if the dip information is to be relied upon. Dip estimations from magnetics can be grossly in error if significant remanent magnetization is present.

4.0 CONCLUSIONS

Interpretation of magnetic anomalies from 3 lines over the Stanley Reward Tin Prospect revealed magnetic source rocks varying in depth from 5 to 140 metres. There appears to be no strong evidence for remanent magnetization in these results. For this reason estimates of dip direction may be more reliable than normal. However, care must be exercised when it is necessary to rely on these dip estimates. Depth estimates are far less influenced by remanence.



D.A. PRATT M.Sc. Ph.D.

Geospex Associates Pty Ltd

GEOSPEX ASSOCIATES PTY LTD

GEOPHYSICAL CONSULTANTS
PO. Box 107, Campsie, N.S.W., 2194
Telephone (02) 59 5273

14th February, 1983

Mr J.V. Smart,
Chief Geologist,
Union Corporation (Aust.) Pty. Limited,
55 Macquarie Street,
SYDNEY, N.S.W. 2000

Dear John,

Re: STANLEY REWARD TIN PROSPECT

Here are the interpretation plots for line 6500 N and two stacked profile maps.

The magnetic modelling is basically in agreement with the interpreted section for line 6500 N. This applies to both model attempts. Fig. 3.6 is the closest I could get without changing the dip of the Earth's natural magnetic field. Fig. 3.7 is the result of modelling after allowing for a remanent magnetic component within the magnetic source rocks. Both models are similar in appearance. As you can see the depth extent of both models is very shallow. The greatest depth I could model was less than 30 metres.

These statements are based on coarse sampling of the anomaly but probably wont change with a finer measurement interval.

The stacked profiles were helpful for placing the trends in perspective. The steep west dip interpreted on line 6100 N could be influenced by the shallow parallel feature mapped on lines 5900 N and 6000 N. If the interference were removed the model would probably produce a near vertical dip similar to line 5800 N. Please note the minor anomaly trend to the east of the major trend.

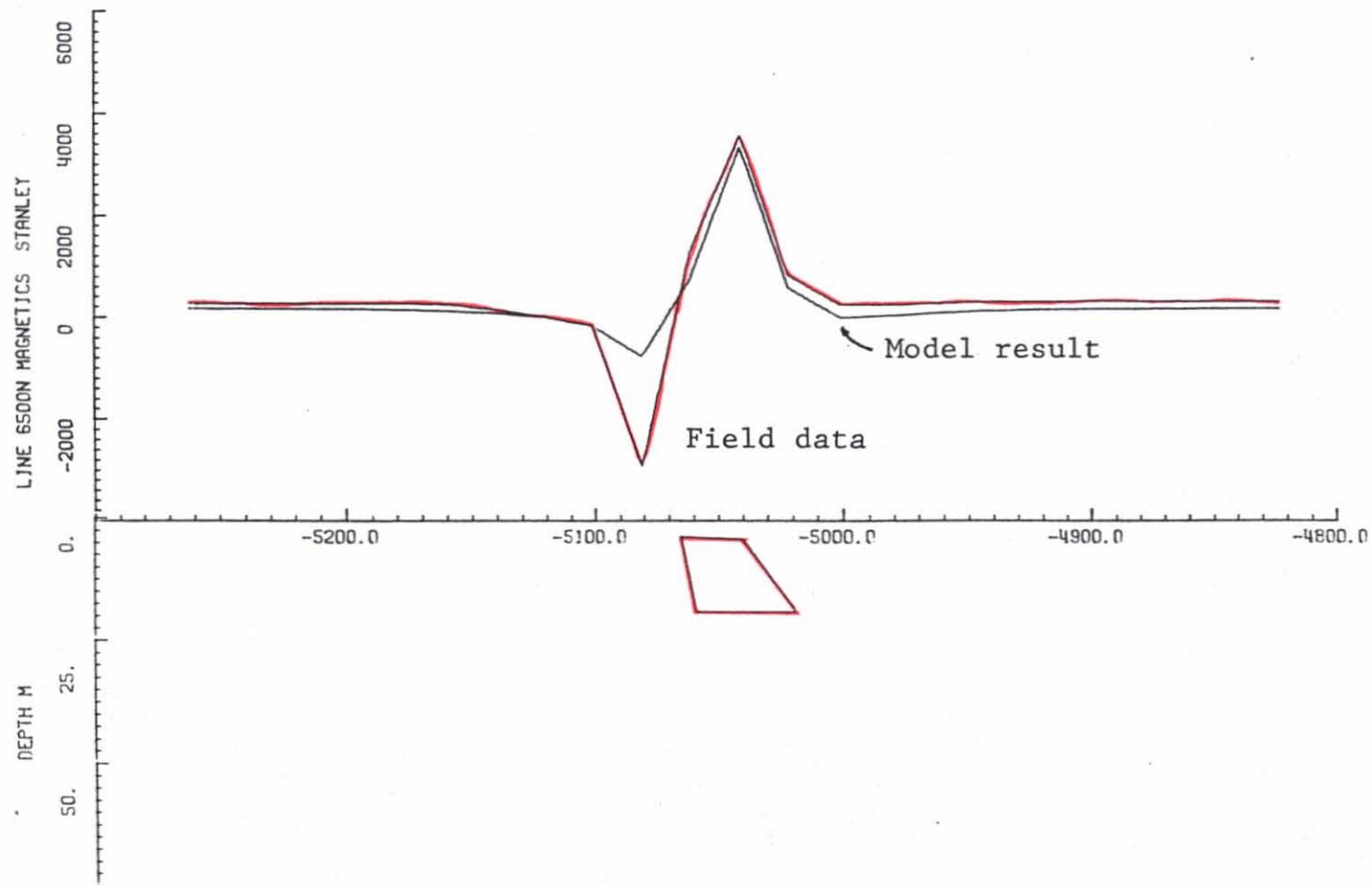
I hope these results assist with the planning for your drilling program.

Regards,



D.A. PRATT

STANLEY REWARD
TIN PROSPECT



UNION CORPORATION (AUST) P/L

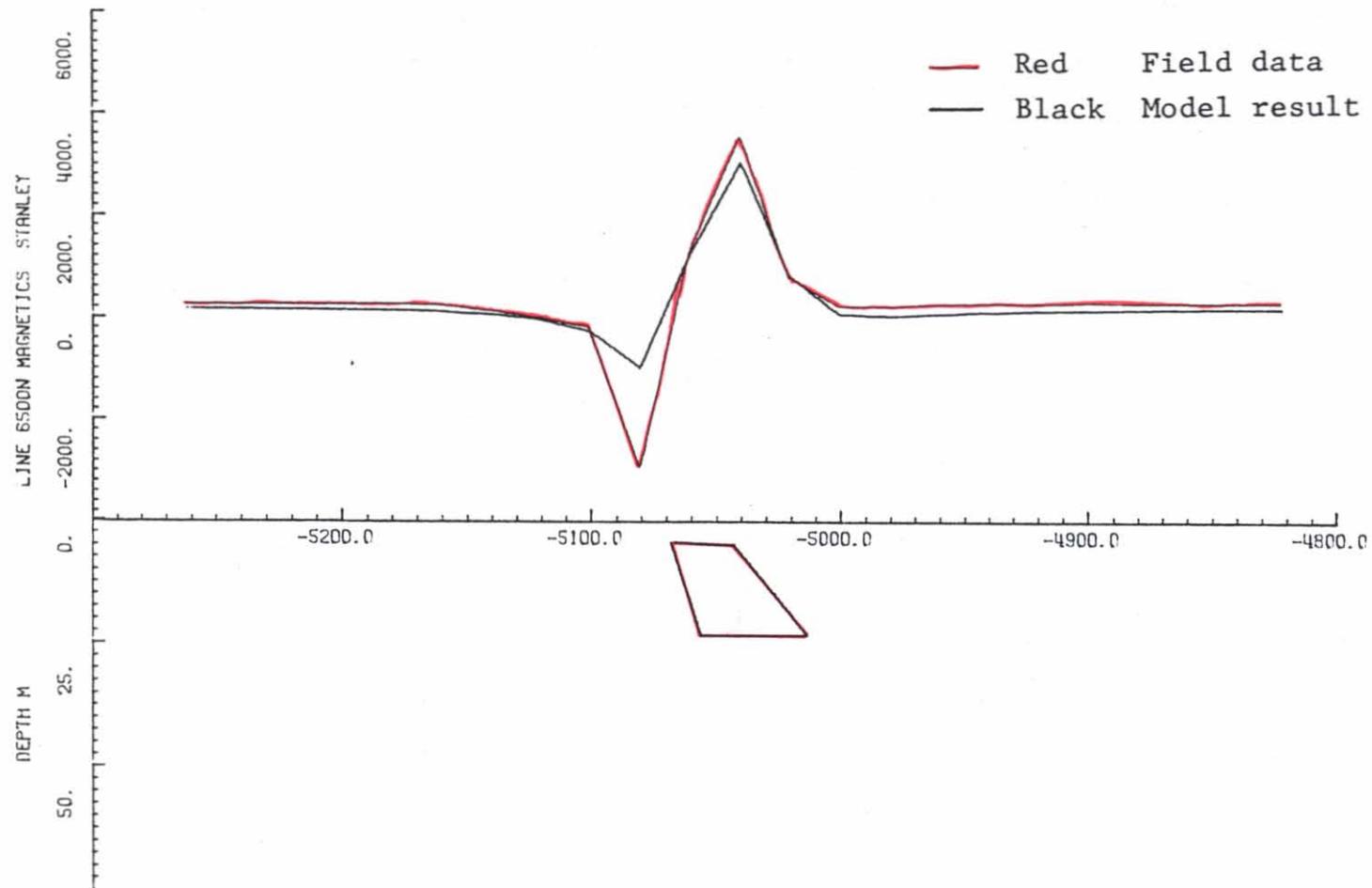
LINE 6500 N
NORMAL MAGNETIC FIELD

PROJECT: FIG. NO. 3.6

DATE: 14-FEB-82

504024

STANLEY REWARD
TIN PROSPECT



UNION CORPORATION (AUST) P/L

LINE 6500 N

REMANENT MAGNETIZATION

PROSPECT NO. 3.7

DATE: 11-19-87

504025

APPENDIX 2

DEPTH		GEOLOGICAL DESCRIPTION	CORE DIP
m.	cm.		
		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP	
0	00	Percussion drilling to 12m., sampled at 2 metre intervals	
			<u>QUARTZITIC SEDIMENTS</u> Mainly dark to pale grey; some micaceous; abundant sand and grit.
12	00	NO drilling. Highly fractured, broken and weathered core to 75.3m.	
13	20	50% core recovery to 15.5m.	
13	60	10cm breccia zone (?granitic matrix), fault/fracture, goethite in vugs	
		Calcerous layers, ?bedding, maximum carbonate content 40%	
15	50	42% core recovery to 19.5m.	
16	00	Breccia, fault/fracture?	
17	40	Narrow (8mm) brecciated zone, fine grained ?granitic matrix.	
19	50	12% core recovery to 24.7m. Quartzitic sediments becoming less calcareous toward granite contact at 56.4m.	
24	70	2% core recovery to 28m.	
			<u>QUARTZITE-CALCAREOUS SILTSTONE</u> Recovered core is variously weathered, mostly hard, grey quartzite; several hornfelsed zones; generally massive with leached and cellular calcareous sections and bedded layers; irregular quartz ± carbonate veins; brecciated zones and possible detrital carbonate occur; ?some microgranite veins and dykes.
			?Bedding 38°

DRILL HOLE NO. GSR 10 (PARENT LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

HOLE) COLLAR CO-ORDS. L6100N/5163W

COLLAR R.L. - AZIMUTH 047°m ANGLE -60°

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.				
STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP					
25	00			<u>QUARTZITE-CALCAREOUS SILTSTONE</u>	
				Recovered core is variously weathered, mostly hard, grey quartzite; several hornfelsed zones; generally massive with leached and cellular calcareous sections and bedded layers; irregular quartz ± carbonate veins; brecciated zones and possible detrital carbonate occur; ?some microgranite veins and dykes.	
28	00		13% core recovery to 29.5m.		
29	50		Dark and medium brown clay with minor muscovite, ?franklinite, several quartzitic fragments, 60% core recovery to 30.5m.		
30	50		Fine pyritic fragment (1cm) at 30.7m.		
30	70		17% core recovery from 30.5 to 34m.		
34	00		15% core recovery to 38m.		
38	00		13% core recovery to 43.2m.		
38	10		BQ drilling		
43	20		10% core recovery to 49.3m.		
44	30				
49	30		13% core recovery to 56.4m.		
50	00				

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP		
50	00		<u>QUARTZITE-CALCAREOUS SILTSTONE</u> Recovered core is variously weathered, mostly hard, grey quartzite; several hornfelsed zones; generally massive with leached and cellular calcareous sections and bedded layers; irregular quartz ± carbonate veins; brecciated zones and possible detrital carbonate occur; ?some microgranite veins and dykes.		
56	40		Indistinct contact Coarse phenocrysts (1cm) of quartz and feldspar (highly weathered) 3% core recovery to 64.5m.		
64	50		19% core recovery to 72m.		
72	00		55% core recovery to 75.3m.		
74 75	90 00		Clayey zone between 74.9 and 75.1 metres		

COMPANY UNION CORPORATION (AUSTRALIA) PTY. LIMITED.

DRILL HOLE NO. GSR 10 (PARENT LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA HOLE)

COLLAR CO-ORDS. L6100N/5163W

COLLAR R.L. - AZIMUTH 047°m ANGLE -60°

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP		
75	10		Indistinct contact, broken core	<u>GRANITE/ADAMELLITE</u>	? 10°
75	30		Sharp, flat undulating lower contact	Leucocratic, porphyritic, fine to medium grained, minor biotite	
75	60		13% core recovery to 83.5m.	<u>QUARTZITE</u>	
77	50		Iron oxide in vuggy 2mm vein Rounded fragments	Grey, massive, partly calcareous and ferruginised	
78	50			<u>FERRUGINISED CARBONATE SKARN/ CALC-SILICATE HORNFELS</u>	
79	50		Minor radiating prisms	Highly weathered, fine to medium grained, red and yellow brown, earthy; fine, fibrous silver grey aggregates of actinolite; abundant goethite and limonite; largely massive	
81	00		Minor radiating prisms and sericite		
81	50		Minor biotite		
83	50		Broken and fractured contact 20% core recovery to 86.5m.	<u>CARBONATE SKARN/CALC-SILICATE HORNFELS</u>	
86	50		11% core recovery to 92.5m.	Heavily limonitised and goethised calc-silicate (ex carbonate), radiated actinolite and minor diopside; coarse radiating needles up to 4 cm long; abundant cellular (gossanous) structures, some possibly related to weathered out garnet; brown, metallic lustre in part; numerous ferruginised (limonitised), partly infilled vugs; variably weathered	
89	95		UCT 2189, thin and polished section, see Appendix 3		
92	50		8% core recovery to 98.5m.		
98	50		13% core recovery to 101.2m.		
100	00				

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DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP		
100	00			<u>CARBONATE SKARN/CALC-SILICATE HORNFELS</u>	
101	20		93% core recovery to 103.03m.	Heavily limonitised and goethised calc-silicate (ex carbonate), radiated actinolite and minor diopside; coarse radiating needles up to 4cm long; abundant cellular (gossanous) structures, some possibly related to weathered out garnet; brown metallic lustre in part; numerous ferruginised (limonitised), partly infilled vugs; variably weathered	+10°
102	20		UCT 2191, thin and polished section, see Appendix 3.		
102	75		Partial infilling of vug by goethite		
103	03		UCT 2192, thin and polished section, see Appendix 3		
103	17		UCT 2192, thin and polished section, see Appendix 3		
103	32		UCT 2192, thin and polished section, see Appendix 3		
104	50		Flat, sharp contact		
			24% core recovery between 103.32 to 110.5m.	<u>PLAGIOCLASE-HORNBLLENDE</u> Highly ferruginised (limonitised); partly gossanous (cellular); red brown, fine to medium grained, porphyritic; minor ?calc-silicate patches; pyritised	
				<u>CARBONATE SKARN/CALC-SILICATE HORNFELS</u> Heavily limonitised and goethised calc-silicate (ex carbonate), radiated actinolite and minor diopside; coarse radiating needles up to 4cm long; abundant cellular (gossanous) structures, some possibly related to weathered out garnet; brown, metallic lustre in part; numerous ferruginised (limonitised), partly infilled vugs; variably weathered.	
110	50		28% core recovery to 116.5m.		
116	50		Broken core at contact		
116	60		Irregular minor blebs of carbonate	<u>CALC-SILICATE SKARN</u> Fine grained diopside largely altered to fine, green epidote; irregular veins of grey brown vermiculite with altered margins of pale green brown clinzoisite and tremolite and minor idocrase; some mottled grey green quartzite; minor quartz ±carbonate veins; trace pyrite	
			23% core recovery between 116.5 and 119.8m.		
118	60		Fine network of carbonate veins		
119	57		UCT 2194, thin and polished section, see Appendix 3		
119	80		UCT 2194, thin and polished section, see Appendix 3		
120	40		70% core recovery to 123.1m Fragment of coarse biotite		
123	10		End of hole		

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DRILL HOLE NO.GSR 10 (PARENT HOLE) LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L6100N/5163W

COLLAR R L - AZIMUTH 047°m ANGLE -60°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
			2245				30	<10	<4	4	<5	16	
3	00		2246				120	<10	<4	12	5	24	
5	00		2247				100	10	<4	14	10	24	
7	00		2248				95	10	<4	14	5	24	
9	00		2249				220	15	4	26	10	28	
11	00		2250				130	15	<4	16	<5	32	
			2251				<4	<10	4	4	10	300	
15	50		2252				<4	<10	<4	10	110	320	
19	50		2253				<4	<10	<4	28	140	290	
24	70		2254				<4	<10	4	4	15	100	

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DEPTH		GEOL. SECT. 50 cm. per div	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
			2254				<4	<10	4	4	15	100	
28	00												
			2255				<4	<10	<4	4	<5	75	
29	50												
			2256				100	15	<4	26	140	300	
30	50												
			2257				<4	<10	<4	2	5	75	
34	00												
			2258				<4	<10	<4	4	10	38	
38	00												
			2259				<4	<10	4	4	5	44	
43	20												
			2260				<4	<10	<4	4	<5	44	
49	30												
			2261				<4	<10	6	4	<5	42	

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)							CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn		
			2261				<4	<10	6	4	<5	42		
56	40													
			* 2262				14	45	<4	24	20	70		
64	50													
			* 2263				<4	25	<4	10	20	46		
72	00													
			* 2264				65	35	<4	18	20	70		

* whole core submitted for analysis

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DRILL HOLE NO. GSR 10 (PARENT HOLE) LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L6100N/5163W

COLLAR R L - AZIMUTH 047°m ANGLE -60°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
75	30		2264				65	35	<4	18	20	70	
75	60		2265				350	15	<4	20	130	100	
			2266	1.03	7.9	6.39	6800	230	6	18	20	360	36°
							4400	(NH ₄ I sublimation)					
83	50												
			2267	0.6	3	2.43	2850	120	12	8	<5	190	36°
							2300	(NH ₄ I sublimation)					
86	50												
			2268	0.66	6	4.85	2800	760	<4	8	5	160	36°
							2290	(NH ₄ I sublimation)					
92	50												
			2269	0.48	6	4.85	2850	600	<4	8	5	170	36°
							2040	(NH ₄ I sublimation)					
98	50												
			2270	0.351	2.7	2.18	5100	370	<4	26	<5	330	36°
							3710	(NH ₄ I sublimation)					

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DRILL HOLE NO. GSR 10 (PARENT LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

HOLE) COLLAR CO-ORDS. L6100N/5163W

COLLAR R L - AZIMUTH 047°m

ANGLE -60°

DEPTH		GEOLOGICAL SECTION 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
101	20		2270	0.351	2.7	2.18	5100	370	<4	26	5	330	36°
							3710	(NH ₄ I sublimation)					
			2271	1.953	2.1	1.70	3450	780	<4	65	25	350	36°
							2640	(NH ₄ I sublimation)					
103	03		2272	0.29	0.29	0.23	540	250	8	90	50	210	36°
103	32						410	(NH ₄ I sublimation)					
			2273	1.72	7.18	5.81	3900	470	6	32	10	280	36°
							2450	(NH ₄ I sublimation)					
110	50												
			2274	1.68	6	4.85	4000	180	4	55	5	600	36°
							2440	(NH ₄ I sublimation)					
116	50		2275				120	<10	<4	2	5	750	
119	80		2276				46	<10	<4	95	15	570	
123	10		End of hole										
						SUMMARY							
						0.41 per cent tin (XRF)(NH ₄ I sublimation 0.23 per cent tin) between 75.6 and 116.5 metres (?true width 33.31m.)							

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DRILL HOLE NO. GSR 10 (DAUGHTER HOLE) LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L6100N/5163W

COLLAR R.L. - AZIMUTH 047°m ANGLE -60°

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP AND MEREDITH GRANITE		
100	00				
103	00		AQ drilling		
			57% core recovery to 106.5m.	<u>CARBONATE SKARN/CALC-SILICATE HORNFELS</u> Heavily limonitised and goethised calc-silicate (ex carbonate) radiated actinolite and minor diopside, coarse radiating needles up to 4 cm long; abundant cellular (gossanous) structures, some possibly weathered out garnet; brown, metallic lustre in part; numerous ferruginised (limonitised), partly infilled vugs; variably weathered	
106	50		38% core recovery to 110.9m.		
110	90		Several brecciated quartzitic fragments.		
111	90		Breccia, quartzitic		
115	80		Cream coloured sediments, ?greywacke, over 10cm, some sericite toward contact		
116	10		Broken and fractured core at contact	<u>CALC-SILICATE SKARN</u> Fine grained diopside largely replaced by fine, green epidote; irregular veins of grey brown vermiculite with altered margins of pale green brown clinozoisite and tremolite and minor idocrase; some grey green mottled quartzite and pelitic hornfels; numerous quartz ± carbonate veins; trace pyrite and some zones of minor disseminated sulphides.	
117	50		83% core recovery to 120m.		
118	60		Quartz-carbonate vein		
	00		Possible base of weathered zone		
			Quartz-carbonate vein, 118m.		
120	00		95% core recovery to 121.34m.		
120	40		Blebs of carbonate in darker tremolite/clinozoisite zone		
121	34		Foliation		Foliation 40°
			Mostly siliceous sediments, mottled green grey quartzite, to 128.77m, veined by vermiculite, minor coarse muscovite		
122	34		30% core recovery between 121.34 and 128.77m.		
125	00				

DRILL HOLE NO. GSR 10 (DAUGHTER LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA HOLE)

COLLAR CO-ORDS. L6100N/5163W

COLLAR R.L. - AZIMUTH 047°m ANGLE -60°

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP AND MEREDITH GRANITE		
125	00			<u>CALC-SILICATE SKARN</u> Fine grained diopside replaced by fine, green epidote; irregular veins of grey brown vermiculite with altered margins of pale green brown clinozoisite and tremolite and minor idocrase;	
128	77		15cm quartz vein	some grey green mottled quartzite and pelitic hornfels; numerous quartz ± carbonate veins; trace pyrite and some zones of minor disseminated sulphides.	
130	20		Darker grey, siliceous, altered (to?epidote and ?diopside) sediments, some weathered zones 63% core recovery between 128.77 and 130.20m. Grey quartzite to 132.3m.		
132	30		90% core recovery to 136.18m.		
133	20		Foliation, fine carbonate veining		Foliation 10°
134	50		Feldspar porphyroblasts		
136	18		Zone of unsorted, angular inclusions (or detritus) of quartz (2%), carbonate (?feldspar), carbonate-bearing finer matrix, (?greywacke) to 137.52m, pale green quartzite, pyritic, to 138.5m.		Contact 25°
137	52				Contact 42°
138	50		Sharp contact, some sections of virtually massive, fine magnetite close to contact	<u>PELITIC HORNFELS</u> Fine grained, dark grey; quartz, biotite, ?chlorite, muscovite; variably porphyroblastic, fine and coarse; irregular minor quartz ± biotite veining; trace sulphides (pyrite); some sedimentary structures (slumping, bedding); probable fine magnetite; cherty in part.	
141	00		Bedding, silty layers 88% core recovery between 138.5 and 143.5m.		Bedding 35° 40° 42° 30° 31° 28°
143	50		Virtually 100% core recovery to 144.96m.		
144	70		Intermediate pyroclastic?		
144	90		Bedding, silty layers		Bedding 49°
144	96		Sulphides (py, ?po, maximum 3%), disseminated clusters, some in layers to 146.03. Minor fragments of core lost		
145	90		Virtually 100% core recovery to 147.29m		
146	03		Quartz-tourmaline pegmatite vein to 147.29m., separated by 7cm. dark sediment		
146	95		83% core recovery to 152.5m.		
147	29				
150	00				

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DRILL HOLE NO. GSR 10 (DAUGHTER HOLE) LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L6100N/5163W

COLLAR R.L. - AZIMUTH 047°m ANGLE -60°

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP AND MEREDITH GRANITE		
150	00		<u>PELITIC HORNFELS</u> Fine grained, dark grey; quartz, biotite, ?chlorite, muscovite; variably porphyroblastic, fine and coarse; irregular minor quartz ± biotite veining; trace sulphides (pyrite); some sedimentary structures (slumping, bedding); probable fine magnetite; cherty in part.		Contact 23°
151	70		Coarse ?chlorite Specks of andalusite		
152	50		<u>GRANITE ADAMELLITE</u> Leucocratic, medium grained, porphyritic with quartz and feldspar phenocrysts, biotite flecks throughout, trace sulphides (pyrite)		
156	25				
160	02		End of hole		

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DRILL HOLE NO. GSR 10 (DAUGHTER HOLE) LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L6100N/5163W

COLLAR R L - AZIMUTH 047°m ANGLE -60°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)							CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn		
103	00		2277	1.995	3.5	2.83	3250	260	4	65	5	260	36°	
							2140 (NH ₄ ! sublimation)							
106	50		2278	1.672	4.4	3.56	3250	210	6	170	<5	410	36°	
							1920 (NH ₄ ! sublimation)							
110	90		2279	0.884	5.2	4.21	2350	240	8	100	20	610	36°	
							1500 (NH ₄ ! sublimation)							
116	10		2280				95	<10	<4	2	5	480		
120	00		2281				34	<10	<4	2	<5	620		
121	34		2282				30	<10	<4	18	<5	210		
125	00													

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DRILL HOLE NO. GSR 10 (DAUGHTER HOLE) LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L6100N/5163W

COLLAR R L - AZIMUTH 047°m ANGLE -60°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
			2282				30	<10	<4	18	<5	210	
128	77		2283				42	<10	<4	38	10	160	
130	20		2284				32	<10	<4	14	<5	55	
132	30		2285				22	<10	<4	6	<5	660	
136	18		2286				4	<10	<4	6	<5	75	
137	52		2287				60	<10	<4	140	<5	50	
138	50		2288				26	<10	<4	10	<5	48	
143	50		2289				18	<10	<4	4	<5	48	
144	96		2290				12	<10	<4	2	<5	65	
146	03		2291				4	<10	<4	2	<5	75	
146	95		2292				12	<10	<4	2	<5	36	
147	29		2293				14	<10	<4	2	5	65	

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DRILL HOLE NO. GSR 10 (DAUGHTER HOLE) LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L6100N/5163W

COLLAR R L - AZIMUTH 047⁰_m ANGLE -60⁰

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
			2293				14	<10	<4	2	5	65	
152	50												
			2294				<4	<10	<4	2	10	22	
156	25												
			2295				<4	<10	<4	2	5	20	
160	02		End of hole										
							SUMMARY						
							0.29 per cent tin(XRF) (NH ₄) sublimation						
							0.18 per cent tin) between 103 and 116.1						
							metres(? true width 10.59 metres)						

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DRILL HOLE NO. GSR 11 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5164N/4869W

COLLAR R.L. - AZIMUTH 032°m ANGLE -70°

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.				
STANLEY REWARD TIN PROSPECT -GSR 11 PERCUSSION/DIAMOND BOREHOLE - SUCCESS CREEK GROUP AND MEREDITH GRANITE					
2	00		Percussion borehole to 35m., sampled at 2 metre intervals. Few chips recovered, mostly mud and fine sediment	<u>GRANITE/ADAMELLITE</u> Light grey, claggy clay; some ?remnant granitic texture	
4	00				
6	00				
8	00		Fawn grey		
10	00		Abundant orange brown mud		
12	00		Granite fragments, fractured with sericite		
14	00		Minor mudstone/shale fragments Fawn coloured mud to 35m.	<u>SILTSTONE-MUDSTONE- QUARTZITE</u> Metamorphosed sandstones and fine sediments; some granitic dykes and veins?	
16	00		Shale and indurated sandstone fragments, dark grey quartzite		
18	00		Mudstone and quartzite, some red brown granitic component to 22m.		
20	00		Some sericite in granite		
22	00		Quartzitic sediments with granitic fragments to 28m.		
24	00				
25	00				

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DRILL HOLE NO. GSR 11 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5164N/4869W

COLLAR R. L. - AZIMUTH 032°m ANGLE -70°

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.				
25	00		STANLEY REWARD TIN PROSPECT - GSR 11 PERCUSSION/DIAMOND BOREHOLE - SUCCESS CREEK GROUP AND MEREDITH GRANITE		
26	00		Quartzite fragments recovered only	<u>SILTSTONE-MUDSTONE-QUARTZITE</u> Metamorphosed sandstones and fine sediments; some granitic dykes and veins?	
28	00		Fragments include mudstone, quartzite and minor granite		
30	00		Vein quartz and sericitised granite also occur with mudstone and quartzite		
32	00		Same as 30 to 32m. interval without granite, to 35m.		
34	00				
35	00		Start NQ core drilling		
			No core recovery to 38.5m. No change in drilling water colour between 35 and 38.5m.		
38	50		Sugary, cream coloured indurated, massive sandstone, 20cm section. 21% core recovery to 41.35m. Well bedded, dark grey siltstone with sandy interbeds, highly weathered, spottiness developed. Thin layer of andalusite crystals		Bedding 27°
41	35		Contact broken and fractured Base of weathered zone at contact	<u>GRANITE/ADAMELLITE</u> Fresh, leucocratic, medium grained, porphyritic, phenocrysts of quartz and feldspar (3cm wide); minor biotite fairly evenly distributed throughout as <3mm flecks; trace and zones of sulphides; several fractures iron stained; some quartz veining	
43	35		Virtually full core recovery to 66.1m. (End of hole). Minor fragments lost.		
47	30				

DRILL HOLE NO. GSR 11 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5164N/4869W

COLLAR R. L. - AZIMUTH 032°m ANGLE -70°

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION	CORE DIP
m.	cm.			
50	00	Aplitic zone	<u>GRANITE/ADAMELLITE</u> Fresh, leucocratic, medium grained, porphyritic; phenocrysts of quartz and feldspar (3cm wide); minor biotite fairly evenly distributed throughout as <3mm flecks; trace and zones of sulphides; several fractures iron stained; some quartz veining	Vein 70°
50	60			
52	35	3mm tourmaline vein, red brown staining		
55	84			
56	71	7mm tourmaline-sulphide (py) vein		Vein 75°
62	65	Broken core at fracture		Fracture 70°
62	80	Broken core at fracture, vugs with euhedral quartz		60° Vein
63	33	Several 1mm tourmaline veins		70°
64	20	Irregular, 1cm wide tourmaline-sulphide (py) vein		
66	10	End of hole		

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DRILL HOLE NO. GSR 11 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5164N/4869W

COLLAR R L - AZIMUTH 032° ANGLE -70°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH			ASSAY VALUES (ppm)							CORE DIP		
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn				
0	00		2195				80	10	<4	16	15	32				
2	00		2196				55	20	<4	8	20	30				
4	00		2197				28	10	<4	14	20	32				
6	00		2198				<4	<10	<4	6	15	26				
8	00		2199				<4	15	<4	8	10	20				
10	00		2200				16	50	<4	50	10	65				
12	00		2201				12	45	<4	55	15	75				
14	00		2202				8	70	<4	70	10	90				
16	00		2203				14	100	<4	42	10	55				
18	00		2204				<4	40	<4	42	10	60				
20	00		2205				<4	30	<4	36	10	55				
22	00		2206				10	35	<4	36	10	55				
24	00		2207				20	60	<4	50	15	70				

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DATE AUGUST, 1983

DRILL HOLE NO. GSR 11

LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS.

L5164N/4869W

COLLAR R L

AZIMUTH

032°m

ANGLE -70°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
26	00		2207				20	60	<4	50	15	70	
			2208				6	40	<4	44	10	65	
28	00												
			2209				20	35	<4	40	10	65	
30	00												
			2210				420	55	<4	60	10	75	
32	00												
			2211				450	55	<4	55	5	80	
34	00												
			2212				780	75	<4	65	10	75	
35	00												
			No core recovered between 35 and 38.5 metres										
38	50												
			2296				<4	<10	<4	6	<5	90	
41	35												
			2297				<4	<10	4	6	<5	20	
43	35												
			2298				<4	<10	4	4	<5	28	
47	30												
			2299				<4	<10	<4	2	10	28	

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DATE AUGUST, 1983

DRILL HOLE NO. GSR 11 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5164N/4869W

COLLAR R L - AZIMUTH 032°m ANGLE -70°

DEPTH		GEOLOGICAL SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
50	00												
			2299				<4	<10	<4	2	10	28	
52	35												
			2300				<4	10	<4	2	10	24	
55	84												
			2301				4	<4	<10	10	15	20	
62	00												
			2302				<4	<4	<10	60	35	38	
66	10		End of hole										

DRILL HOLE NO. GSR 12

LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS.

L5400N/5176W

COLLAR R. L.

-

AZIMUTH

225°m

ANGLE -50°

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - OONAH FORMATION (LOWER SUCCESSION)		
0	00		Percussion drilling to 9.5m., sampled at 2m. intervals	<u>SANDSTONE-SILTSTONE</u> Pale grey to grey; mostly quartzitic; often laminated and banded; very thinly bedded;	
2	00		Gravel, mud and chips recovered	occasionally micaceous, some thin micaceous bands; sulphides, largely pyrite, occur in fractures, veinlets and disseminations	
4	00			?associated with bedding; some hornfels particularly coarse silty bands; minor quartz veining; cleavage parallel to bedding?	
6	00		Possible granite dyke or vein, fine, even grained texture with sandstone-siltstone chips		
8	00		Mud, gravel, siltstone and numerous white vein quartz chips		
9	50				
10	00		NO drilling, core fragmented and weathered		
			Irregular, fine massive pyrite, 1cm wide, at 10m.		
11	40		54% core recovery to 21.1m. Lenticular fine grained quartzite fragment, 1cm wide, 11.4m.		
12	90		Fine pyrite, dendritic patterns		
14	60		Irregular, fine pyrite veinlets, ?bedding controlled, // cleavage?		Bedding 38°
15	15		2cm wide zone of fine aggregates of pyrite, ?bedding controlled, // cleavage?		Bedding 38°, 35°
21	10		11% core recovery to 26.5m.		
21	50		Sludge sample (sandy dark grey) also collected (UCT 2220) ?microgranite Fracture/fault and sediment slumping at 21.5m.		
25	00				

DRILL HOLE NO. GSR 12 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5400N/5176W

COLLAR R.L. - AZIMUTH 225°m ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - OONAH FORMATION (LOWER SUCCESSION)		
25	00		<u>SANDSTONE-SILTSTONE</u> Pale grey to grey; mostly quartzitic; often laminated and banded; very thinly bedded; occasionally micaceous, some thin micaceous bands; sulphides, largely pyrite, occur in fractures, veinlets and disseminations		
26	50		Two micaceous quartzite fragments recovered to 29.5m. with sludge (sandy dark grey) sample UCT 2221, ?microgranite		
29	50		12% core recovery to 32.4m. No sludge sample		
30	30		BQ drilling		
32	40		Minor chips and fragments lost to 34m., broken core		
34	00		Several fragments recovered to 35m. Sludge sample UCT 2223 collected (fine, light brown sediment)		
35	00		69% core recovery to 41.5m		Bedding 40°
35	60		2mm wide pyrite layer parallel to bedding, ?cleavage		Bedding 45°
36	90		7mm layer of coarse, dotted andalusite		
37	02		Slump structures?		
41	00		6% core recovery to 49.5m.		
41	50		Grinding		
49	50		Breccia, ?fault		Bedding 40°
49	90		43% core recovery to 57.7m.		

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - OONAH FORMATION (LOWER SUCCESSION)		
50	00		Some narrow (up to 1cm) magnetite, ± pyritic bands and laminations	<u>SANDSTONE-SILTSTONE</u> Pale grey to grey; mostly quartzitic; often laminated and banded; very thinly bedded; occasionally micaceous, some thin micaceous bands; sulphides, largely pyrite, occur in fractures, veinlets and disseminations ?associated with bedding; some hornfels particularly coarse silty bands; minor quartz veining; some darker quartzitic bands contain magnetite, ±pyrite; cleavage parallel to bedding?	Bedding 37°
57	70		69% core recovery to 65.7m.		
63	00		Graded bed, facing uphole		Bedding 40°
63	30				
65	70		65% core recovery to 70m.		
70	00		6% core recovery to 73.3m.		
73	30		73% core recovery to 77.25m.		
73	90		Kink bands		
75	00				

DRILL HOLE NO. GSR 12 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5400N/5176W

COLLAR R.L. - AZIMUTH 225°m ANGLE -50°

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - OONAH FORMATION (LOWER SUCCESSION)		
75	00		<u>SANDSTONE-SILTSTONE</u> Pale grey to grey; mostly quartzitic; often laminated and banded; very thinly bedded; occasionally micaceous, some thin micaceous bands; sulphides, largely pyrite, occur in fractures, veinlets and disseminations ?associated with bedding; some hornfels particularly coarse silty bands; minor quartz veining; some darker quartzitic bands contain magnetite, ±pyrite; cleavage parallel to bedding?		
77	25		Sulphide zones (py) as stringers and heavy disseminations, virtually no loss of core to 78.58m. Brecciation evident, cherty		Foliation 20°
78	00				
78	58		Sulphide-rich zone(py, ?po, cpy) to 79.65m., as irregular veins and blebs and disseminations.		
79	45		20-30% sulphide from 79.45 to 79.65m., breccia with quartz ±carbonate veins (?fault), probable magnetite. 2 x 10 cm carbonate(50%) zones at 78.9 and 79.2m.		
79	65				
80	00				
81	55		Breccia at 80 and 81.55m (±py) Irregular pyrite stringers 81.75m.		
81	75				
83	45		Breccia and micro-faults, irregular quartz veins		Bedding 40°
83	90				
85	00		88% core recovery to 90.1m. Numerous bands and laminations of fine magnetite generally less than 1cm wide, either massive or as variable disseminations in pale grey quartzitic bands also with fine pyrite, to 89.5m		
87	50		Breccia with fine py, ?cpy with quartz in irregular veins		
88	50		Breccia, ?fault, similar to 87.5m. Micro-faults		Bedding 45°
89	30		Slump structures		
89	50				
90	10		Some fragments and minor chips lost to 92.5m.		
90	30		Irregular 1cm wide py vein, altered margins ?andalusite, 90.3m.		
90	60		90.6m. - thin bands (0.5-1mm) of red brown weathered, leached sulphides (py, ±muscovite), parallel to bedding, to 105.5m, frequency ± 1 band per cm		
91	60				
92	50		91.60m. - 1mm wide pyrite vein parallel to core axis 92.50m. - 9% core recovery to 95.3m.		
95	30		Dark grey, speckled (andalusite) quartzite with minor stringers of pyrite		
95	80		Breccia, up to 5% pyrite with vein quartz.		Bedding
96	15				
97	00		Minor chips lost to 100m.		55°
97	10		Cross bedding, facing uphole?		
97	90				Bedding 65°
99	00		Some hornfels		
100	00				

DRILL HOLE NO. GSR 12 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5400N/51.76W

COLLAR R.L. - AZIMUTH 225°m ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - OONAH FORMATION (LOWER SUCCESSION)		
100	00		87% core recovery to 105.5m.	SANDSTONE- SILTSTONE Pale grey to grey; mostly quartzitic; often laminated and banded; very thinly bedded; occasionally micaceous, some thin micaceous bands; sulphides, largely pyrite, occur in fractures, veinlets and disseminations ?associated with bedding; some hornfels particularly coarse silty bands; minor quartz veining; some darker quartzitic bands contain magnetite, ±pyrite; cleavage parallel to bedding?	Bedding 60°
101	60		8mm pyrite vein, irregular		
101	70		Steep pyritic stringer		
102	10		Fragmented core		
103	22		50% py over 3cm, quartz-py stringers		
103	60		Slumping?, 2% py, steep quartz vein, magnetic		
104	70		Breccia		
104	90		Minor chips lost to 183.9m		
105	50		except where noted		
112	20		Breccia with irregular quartz patches, ?slumping		
112	80		Bedding near parallel to core areas		
113	60		Breccia Flourescent yellow mineral, ?mica, occurs sporadically as detritus in coarser and often darker bands and laminations and in veins, to ±160 m.		
116	80		Breccia		
117	40		Graded bedding, facing downhole		
118	45		Pyrite, steep irregular veins and bands parallel to bedding, zone of generally greater pyrite content	Bedding 35°	
119	60		Zone darkens to 120.44m., ?altered, some porphyroblasts		
120	44		Faulted contact		
125	00				

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - OONAH FORMATION (LOWER SUCCESSION)		
125	00		<u>SANDSTONE-SILTSTONE</u> Pale grey to grey; mostly quartzitic; occasionally micaceous; laminations and bands with magnetite ±pyrite becoming less frequent to ±150m, very thinly bedded; very minor irregular pyrite in veins and fractures and in bedding; hornfels more evident; cleavage parallel to bedding?		Bedding 35°
130	00				
132	25		1.5cm network of pyrite		
132	50		Possible slump and convolute structures, ?turbidites		
133	50		Convolute bedding?		
137	40		Breccia		
138	00		14% core recovery to 140.5m.		
140	50				
141	50		Spotting, biotite		
146	10		Slumping/convolute structures		
146	40	Broken core, 12% recovery to 146.8m., ?sphalerite			
146	80	Core broken at contact			
149	70	2 x 0.5cm pyrite blebs			
150	00				

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - OONAH FORMATION (LOWER SUCCESSION)		
150	00		<u>SANDSTONE-SILTSTONE</u> Pale grey to grey; mostly quartzitic; usually massive, some hornfels; irregular pyrite veinlets; some porphyroblasts		Bedding 35°
151	60				
152	80		Weathered broken core		
154	00		Breccia, irregular quartz- pyrite vein Spotting, biotite, 154.2m.		
154	20				
155	30		59% core recovery to 165.3m. Weathered and broken core to 157m.		
157	00				
159	60				
160	50				
165	30		Yellow brown weathered zone 65% core recovery to 171.8m.		
168	40		Irregular pyrite veinlets		
170	60		Darker, finer grained zone with numerous porphyroblastic (andalusite) zones Probable base of weathered zone, 172m.		
171	10				
171	80				
172	00				
175	00				

DRILL HOLE NO. GSR 12 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5400N/5176W

COLLAR R. L. - AZIMUTH 225°m ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - OONAH FORMATION (LOWER SUCCESSION)		
175	52		<u>SANDSTONE-SILTSTONE</u> Pale grey to grey; mostly quartzitic; usually massive, some hornfels; irregular pyrite veinlets; some porphyroblasts		
183	90		End of hole		

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 DRILL HOLE NO. GSR 12 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA
 COLLAR CO-ORDS. L5400N/5176W
 COLLAR R L - AZIMUTH 225°m ANGLE -50°

DEPTH		GEOLOGICAL SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH			ASSAY VALUES (ppm)						CORE DIP	
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn		
			2215				30	<10	<4	12	5	75		
2	00													
			2216				14	<10	<4	22	15	390		
4	00													
			2217				24	<10	<4	44	40	500		
6	00													
			2218				24	10	<4	50	60	500		
8	00													
			2219				120	<10	<4	26	25	130		
9	50													
			2303				<4	<10	<4	16	15	85		
21	10													
			2304				8	<10	<4	18	20	55		
			Sludge sample											
			2220				10	20	<4	50	40	110		

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
25	00		2305				4	<10	<4	65	35	190	
			Sludge sample										
			2221				12	25	<4	44	35	85	
29	50		2306				<4	<10	<4	18	25	100	
32	40		2307				<4	<10	<4	34	50	100	
34	00		2308				<4	<10	<4	14	50	160	
35	00		2223	(Sludge sample)			24	25	<4	55	50	130	
			2309				12	<10	<4	22	40	120	
			2310				8	<10	<4	24	30	110	
49	50		2311				<4	<10	<4	18	5	60	

COMPANY UNION CORPORATION (AUSTRALIA) PTY. LIMITED

DRILL HOLE NO. GSR 12 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5400N/5176W

COLLAR R L - AZIMUTH 225°m ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
			2311				<4	<10	<4	18	5	60	
57	70		2312				6	<10	<4	20	5	60	
65	70		2313				<4	<10	<4	20	25	50	
70	00		2314				4	<10	<4	18	60	110	
73	30		2315				6	<10	<4	42	20	32	

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COMPANY UNION CORPORATION (AUSTRALIA) PTY. LIMITED

DRILL HOLE NO. GSR 12 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5400N/5176W

COLLAR R L - AZIMUTH 225°m ANGLE -50°

DEPTH		GEOLOGICAL SECTION 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
			2315				6	<10	<4	42	20	32	
77	25		2316				22	<10	<4	180	20	65	
78	58		2317				400	<10	<4	1000	5	55	
79	65												
			2318				24	<10	<4	34	30	45	
85	00												
			2319				4	<10	<4	90	75	150	
90	10		2320				16	<10	<4	46	30	70	
92	50		2321				10	<10	<4	42	75	160	
95	30		2322				12	<10	<4	48	85	450	
95	80		2323				<4	<10	<4	65	100	110	
96	15		2324				<4	<10	<4	34	45	70	
100	00												

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COMPANY UNION CORPORATION (AUSTRALIA) PTY. LIMITED

DRILL HOLE NO. GSR 12 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5400N/5176W

COLLAR R L - AZIMUTH 225°m ANGLE -50°

DEPTH		GEOL. SECT.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
100	00	50 cm. per div.											
			2325				22	<10	<4	75	45	180	
105	50	X 2 X 00											
			2326				4	<10	<4	32	15	34	
111	60												
			2327				12	<10	<4	24	25	38	
118	45												
			2328				6	<10	<4	70	40	40	
120	44												
			2329				8	<10	<4	40	60	110	
125	00												

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DRILL HOLE NO. GSR 12

LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS.

L5400N/5176W

COLLAR R L -

AZIMUTH 225°m

ANGLE -50°

DEPTH		GEOLOGICAL SECTION 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
125	00		2329				8	<10	<4	40	60	110	
128	00		2330				6	<10	<4	22	75	150	
138	00		2331				12	<10	<4	20	25	24	
140	50		2332				<4	<10	<4	28	50	85	
146	40		2333				28	10	6	55	60	2900	
146	80			2335				10	<10	<4	50	45	110
150	00												

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DRILL HOLE NO. GSR 12

LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS.

L5400N/5176W

COLLAR R L -

AZIMUTH

225°m

ANGLE -50°

DEPTH		GEOLOGICAL SECTION 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
150	00		2335				10	<10	<4	50	45	110	
155	30		2336				10	10	<4	26	25	65	
165	30		2337				<4	10	<4	20	30	60	
171	80		2338				8	15	<4	18	25	70	
175	00												

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DRILL HOLE NO. GSR 13

LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS.

L5200N/5051W

COLLAR R. L.

AZIMUTH

047°m

ANGLE -50°

DEPTH		GEOLOGICAL DESCRIPTION	CORE DIP
m.	cm.		
		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP AND MEREDITH GRANITE	
		<p>Percussion drilling to 23.5m, sampled at approximately 4 metres intervals</p> <p><u>SEDIMENTS</u> Mainly light brown, medium to fine grained sand, minor vein quartz, siltstone and mud, mica</p>	
4	00		
8	00		
12	00		
16	00		
20	00	<p><u>SANDSTONE-SILTSTONE</u> Pale grey, fine to medium grained, largely quartzitic; minor cellular and irregular vugs, probably related to bedding, ? carbonate</p>	
23	50	<p>Start NQ drilling</p> <p>Fractured, weathered and broken core</p> <p>25% core recovery to 26.5m.</p>	?Bedding
25	00		28°

DRILL HOLE NO. GSR 13 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5200N/5051W

COLLAR R.L. - AZIMUTH 047° ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.				
			STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP AND MEREDITH GRANITE		
25	00			<u>SANDSTONE SILTSTONE</u> Pale grey, fine to medium grained, largely quartzitic; minor cellular and irregular vugs, probably related to bedding, ? carbonate	
26	50		88% core recovery to 27.9m. Consolidated mud; gravel and rounded pebbles to 27.9m.		
27	90		Zones of competent quartzite 57% core recovery to 30m.		
30	00		16% core recovery to 37m.		
37	00		25% core recovery to 39.8m. Some competent quartzitic zones, mostly brown weathered Vug filled by nodular quartz, 37.5m.		
37	50				
39	80		Breccia		
40	50		Core broken at contact, ferruginised contact, some sericite 40.50m. - Vein quartz fragments 9% core recovery between 39.8 to 44.5m.	<u>GRANITE/ADAMELLITE</u> Leucocratic, porphyritic, fine to medium grained, minor biotite, trace pyrite	
44	50		Sludge sample only to 55.5m., light grey, sandy in part		
50	00				

DRILL HOLE NO. GSR 13 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5200N/5051W

COLLAR R. L. - AZIMUTH 047.0m ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP AND MEREDITH GRANITE		
50	00		<p><u>GRANITE/ADAMELLITE</u> Leucocratic, porphyritic, fine to medium grained, minor biotite, trace pyrite</p>		
55	50		<p>3cm core recovered Sludge sample to 71.5m., light grey with muscovite</p>		
71	50		<p>45% core recovery to 77.5m.</p>		
75	00				

DRILL HOLE NO. GSR 13 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5200N/5051W

COLLAR R.L. - AZIMUTH 047°m ANGLE -50°

DEPTH		GEOLOG. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP AND MEREDITH GRANITE		
75	00	[Red shaded core section]	<u>GRANITE/ADAMELLITE</u> Leucocratic, porphyritic, fine to medium grained, minor biotite, trace pyrite		
77	50		Aplitic zone to 78.8m., fine biotite		
78 79	80 00		Largely fresh granite/adamellite to EOH 160m.		
83	90		Orange staining in fractures	Fracture 45°	
94 95	70 00		Aplitic zone to 95m. BQ drilling		
97	20		No core recovery to 102.8m. No sludge sample collected		
100	00				

DRILL HOLE NO. GSR 13 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5200N/5051W

COLLAR R.L. - AZIMUTH 047°m ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP AND MEREDITH GRANITE		
100	00		<u>GRANITE/ADAMELLITE</u> Leucocratic, porphyritic, fine to medium grained, minor biotite, trace pyrite		
102	80		Weathered core 78% core recovery to 107m.		
107	00				
115	70		Red brown staining in fracture	Fracture 52°	
119	00		Rectangular massive biotite inclusion (1 x 2cm)		
124	30		Probable base of weathered zone		
125	00				

DRILL HOLE NO. GSR 13 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5200N/5051W

COLLAR R.L. - AZIMUTH 047°m ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	GEOLOGICAL DESCRIPTION		CORE DIP
m.	cm.		STANLEY REWARD TIN PROSPECT - SUCCESS CREEK GROUP AND MEREDITH GRANTE		
150	00		GRANITE/ADAMELLITE Leucocratic, porphyritic, fine to medium grained, minor biotite, trace pyrite		
152	80		Orange staining in fracture	Fracture 40°	
154	20		Orange staining in fractures	Fracture 70°	
160	00		End of hole		

COMPANY UNION CORPORATION (AUSTRALIA) PTY. LIMITED

DRILL HOLE NO. GSR 13 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5200N/5051W

COLLAR R L - AZIMUTH 047°m ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)							CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn		
			2225				20	<10	<4	8	15	10		
4	00													
			2227				8	<10	<4	4	20	12		
8	00													
			2229				26	<10	<4	6	20	12		
12	00													
			2231				14	<10	<4	8	20	16		
16	00													
			2233				20	<10	<4	8	20	18		
20	00													
			2235				24	<10	<4	10	20	18		
23	50													
			2340				16	<10	<4	8	30	42		

SAMPLED BY N.J. WINNALL

DATE AUGUST, 1983

COMPANY UNION CORPORATION (AUSTRALIA) PTY. LIMITED

DRILL HOLE NO. GSR 13 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5200N/5051W

COLLAR R L - AZIMUTH 047°m ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
25	00		2340				16	<10	<4	8	30	42	
26	50		2341				44	25	<4	70	55	440	
27	90		2342				<4	<10	4	8	30	65	
30	00		2343				160	15	<4	110	25	460	
37	00		2344				50	15	4	130	20	420	
39	80		2345				14	15	<4	42	15	220	
44	50		2237 (Sludge sample)				22	<10	<4	34	15	120	
50	00												

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DATE AUGUST, 1983

COMPANY UNION CORPORATION (AUSTRALIA) PTY. LIMITED

DRILL HOLE NO. GSR 13 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5200N/5051W

COLLAR R L - AZIMUTH 047°m ANGLE -50°

DEPTH		GEOLOGICAL SECTION 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)							CORE DIP		
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn				
50	00															
			2237 (Sludge sample)				22	<10	<4	34	15	120				
55	50															
			2238 (Sludge sample)				12	<10	<4	22	10	55				
71	50															
			2346				<4	<10	4	16	10	44				
75	00															

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DATE AUGUST, 1983

COMPANY UNION CORPORATION (AUSTRALIA) PTY. LIMITED

DRILL HOLE NO. GSR 13

LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS.

L5200N/5051W

COLLAR R L

AZIMUTH

047°m

ANGLE -50°

DEPTH		GEOL. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)						CORE DIP
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn	
75	00	[Red shaded area]	2346				<4	<10	4	16	10	44	
77	50		2347				8	10	<4	4	15	20	
78	80												
		[Red shaded area]	2348				<4	<10	<4	2	10	10	
97	20	[White area]	No sludge sample collected										
100	00												

SAMPLED BY N.J. WINNALL

DATE AUGUST, 1983

DEPTH		GEOLOGICAL SECTION 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)							CORE DIP	
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn			
100	00														
			No sludge sample collected												
102	80		2349				<4	<10	<4	2	10	10			
107	00														
			2350				<4	<10	<4	2	10	14			
125	00														

DRILL HOLE NO. GSR 13 LOCATION STANLEY RIVER, E.L. 53/70, WESTERN TASMANIA

COLLAR CO-ORDS. L5200N/5051W

COLLAR R L - AZIMUTH 47°m ANGLE -50°

DEPTH		GEOLOG. SECT. 50 cm. per div.	SAMPLE NO. UCT	SAMPLE WIDTH (m)			ASSAY VALUES (ppm)							CORE DIP	
m.	cm.			Rec	Rep	True	Sn	W	Mo	Cu	Pb	Zn			
150	00		2352				<4	<10	<4	2	10	10			
160	00			End of hole											

APPENDIX 3

NOTE : Samples collected from -

DIAMOND DRILLHOLE NO. GSR 10 (PARENT HOLE)

<u>SAMPLE NO</u> <u>UCT</u>	<u>DEPTH</u> <u>(m)</u>
2189	89.95
2191	102.2
2192	103.17
2194	119.57

MINPET SERVICES

659 Botany Road
ROSEBERY, NSW

REPORT NO 19/83

MINERALOGY AND PETROLOGY OF
FOUR DRILL CORE SAMPLES
UCT 2189, 2191, 2192 and 2194

(Prepared for Mr J.V. Smart, Union Corporation
(Australia) Pty Ltd)

June, 1983

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2. SUMMARY	2
3. MICROSCOPY	3

APPENDIX

Submission Form No 0580, from Mr J.V. Smart, Union Corporation (Australia) Pty Ltd

1. INTRODUCTION

Four samples of mainly oxidised and ferruginised drill-core were submitted for petrographic determination of rock types and mineragraphic determination of tin minerals. Thin and polished sections were prepared - the latter were also useful (more so than thin-sections) for the determination of gossanous leach textures and confirmation or otherwise of the presence of tin minerals.

2. SUMMARY

No cassiterite or stannite are observed in thin or polished sections prepared from UCT 2189, 2191, 2192 and 2194.

Specimens UCT 2189 and 2191 are heavily ferruginised and weathered calc-silicate hornfels rocks, containing an abundance of elongate ferruginised actinolite aggregates and interstitial diopside - the latter as partly fresh crystals and locally garnet areas as dodecahedral leached textures in pale yellow or reddish limonite. Very little if any quartz is seen.

Specimen UCT 2192 is very heavily ferruginised but examination by strong condensed light indicates the dense limonitised structures more clearly, many limonite stained and leached feldspar phenocrysts are noted, interstitial finer chloritised hornblende and a large amount of pyrite which from the bulbous shapes are likely to have added authigenic overgrowths at a late stage. Traces of jarosite could also be present.

Specimen UCT 2194 shows little ferruginous alteration, is a part-epidotised diopside hornfels rock and contains veins of vermiculite (after biotite) which have added a later stage of alteration to the rock.

The apparent absence of tin minerals (tin assay 0.3%) is puzzling since as a resistate element tin has only limited scope for incorporation in minerals other than cassiterite or stannite such as biotite (UCT 2194). A zinc test was made on a polished slab of UCT 2194. No cassiterite is present.

3. MICROSCOPICAL EXAMINATION OF DRILL-CORE

.. Sample No : 2502/UCT 2189

Petrographic Description : A leached and limonitised carbonate skarn rock showing an abundance of relict ferruginised actinolite, garnet gossan forms and some islands of "fresh" diopside crystals.

Mineralogy : Now largely formless limonite and crystalline goethite. Pre-weathering : actinolite > diopside, now leached, pale yellow limonitic and fresh relict > garnet > quartz

Texture : Now mainly fibrous sheafs of limonitised actinolite needles. The needle widths vary from ~0.02 to 0.08 mm and each needle has a spinal ridge of opaque limonite which at grain margins becomes orange-yellow granular translucent limonite or goethite. Oblique patterns of actinolite cut across the main radiate groupings. Between the actinolite prisms (up to 1 mm in length) are large prisms of diopside intergrowths showing characteristic prismatic cross cleavages that are leached into pale yellow skeletal cleavage patterns.

Limonite relicts of garnet (to 0.1 mm) are commonly separated by fine short laths of actinolite (now goethite). Also present are dodecahedral structures of leached garnet with narrow zoning patterns. Fresh twinned diopside is present (to 0.5 x 0.4 mm) flanked by the leached ferruginised garnet and dense goethite (after short staple actinolite?). Traces of quartz crystals fill in spaces between actinolite. Elsewhere limonite stained diopside (shows clinopyroxene cleavages) occurs as masses (to 0.8 mm width) hemmed in between sheafs of ferruginised actinolite. Much of the fabric has been leached out leaving a limonitised actinolite framework.

Polished Section Examination : Goethised actinolite needles are abundant but after extensive scanning no cassiterite or stannite are seen.

.. Sample No : 2503/UCT 2191

Petrographic Description : Retrograde altered then weathered ferruginised diopside hornfels rock.

Mineralogy : Now present - goethite (denser than limonite)
Pre-oxidation - hornfels - actinolite > diopside, and garnet.

Texture : Strongly goethitised needle clusters of actinolite to 20 mm prism length and similarly ferruginised diamond shaped and massive cross-sections of actinolite comprise the major part of this section. The characteristic actinolite prismatic cross cleavages are most distinct showing as darker limonite partitions in a translucent orange limonite background of relict granular diopside, equally limonitised and orange coloured and some colloform cavity filling limonite (after weathering - leaching). Fine needle clusters of pseudomorphed actinolite are present in decussate groups. Some cross dodecahedral patterns in a clear red limonite background could be garnet nesting between patterns of prismatic actinolite. Abundant vacant spaces in the section testify to later weathering leach processes in addition to the colloform cavity filling structures and scattered specularite (after pyrite shapes ?)

Polished Section Examination : Goethitised needles of actinolite are noted. No cassiterite or stannite are apparent even after extensive scanning.

.. Sample No : 2504/UCT 2192

Petrographic Description : Porphyritic andesite - flow banded, pyritised

Mineralogy : Now entirely hematized and limonitized except for residual clay in feldspar shapes and chlorite and clay in hornblende shapes. Plagioclase, hornblende and pyrite were the major minerals, jarosite is a possible minor component.

Texture : Consists of abundant goethitized pyrite - euhedral to granular (~0.7 mm and smaller) and fairly abundant goethitized feldspar (?) phenocrysts (3 to 4 mm). These appear to follow a flow banding texture so that original rock has all the characters of an altered porphyritic lava though all feldspar and other primary minerals have been leached and replaced by exotic granular limonite, chlorite and clay. Phenocrysts are parallel to or oriented up to 45° to flow banding (90° to core axis). Groundmass appears to contain chloritized hornblende shapes (0.02 to 0.10 mm) with rims of iron oxide particles and pale subhedral feldspar (0.04 to 0.2 mm). Abundant fine microlites (0.005 x 0.001 mm) are seen scattered through patches of pale yellow limonite.

Polished Section Examination : Goethitized specularite after pyrite as massive aggregates or single grains to 0.2 mm and pale limonitized feldspar pseudomorphs. No cassiterite or specularite are present.

.. Sample No : 2505/UCT 2194

Petrographic Description : Skarn rock shows alteration of diopside hornfels to epidote and tremolite: clinozoisite: vermiculite rock. Veined by vermiculite.

Mineralogy*: Zone 1, Diopside > idocrase → epidote. Fracture fill : vermiculite (after biotite)

Zone 2, Clinozoisite and tremolite → vermiculite# (after biotite).

Texture : Fine granular epidote on one side of the thin section with grains approximately 0.08 has replaced much of the original diopside of skarn rock. Pale green diopside ~0.3 mm shows strongly marked prismatic cleavages and is distributed in decussate fashion throughout the finer anhedral, granular epidote alteration product. Veins (to 0.1 mm) of brown vermiculite cross fibres cut across the altered skarn and broaden out on one side of section to diffuse into and grossly replace the rock groundmass. A selvage of 8 mm width of clinozoisite and tremolite occurs between the diopside with epidote and vermiculite "vein", and idocrase as crystals 0.2 x 0.2 mm occur as a narrow zone between the diopside with epidote, and the clinozoisite with tremolite alteration zones.

Polished Section Examination : Section was scanned extensively for cassiterite and stannite but neither mineral was seen. The only highly reflective minerals occurring are goethite and traces of pyrite, as scattered minute grains. Cassiterite if present should have been obvious in this section though the mineral could have been pulled during section preparation.

Refractive Indices : # checked are 1.536 and 1.540; birefringence is low to moderate; with straight extinction; faintly pleochroic in brown.

* In hand specimens :
Zone 1 - light
Zone 2 - dark

APPENDIX 4

SOME ASPECTS OF STRUCTURE AND STRATIGRAPHY -
DIAMOND HOLE GSR 10

1. STRUCTURE

The north east direction of the dips of bedding in CSR diamond drillholes SRD 5, 7, 8 and 9 (see figure 1 over page), which were drilled within a kilometre south east of the Stanley Reward Gossan into Success Creek Group rocks, agree with regional dips but may be shallower.

Two sequences in GSR 10 exhibit measurable bedding dips. These are quartzite/calcareous siltstone (qsc) and particularly pelitic hornfels (ph) which dip at 38° and an average of 36° respectively (as measured from perpendicular to the core axis). Measurement of the orientation of core was not possible. As a result the sequences appear to have either shallow, north east or steep, south west dips as depicted in the simplified sketches below (figures 2, 3 and 4).

The interpretation of a uniform, shallow, north east dipping and facing sequence (see figures 2 and 3 below) is favoured because:-

- a) there is good agreement with data from CSR's diamond drillholes;
- b) regionally the Success Creek Group dips and faces north east;
- c) the interpretation shows an angular landscape surface between the Success Creek Group and Oonah Formation, a feature which is observed between the two at Pieman River (Brown, 1982).

In this case, the steeply west dipping magnetic anomaly is probably related to magnetically susceptible skarn and pelitic rocks which have been metamorphosed and possibly zoned. Metamorphic zoning parallel to the main Meredith granite/sediment contact and virtually normal to the strike of altered carbonate beds, occurs at the Mt. Lindsay tin-skarn deposit situated nearby. An interpretation of GSR 10 based on this scheme is shown on Figure 2 and also on Plan 2 attached.

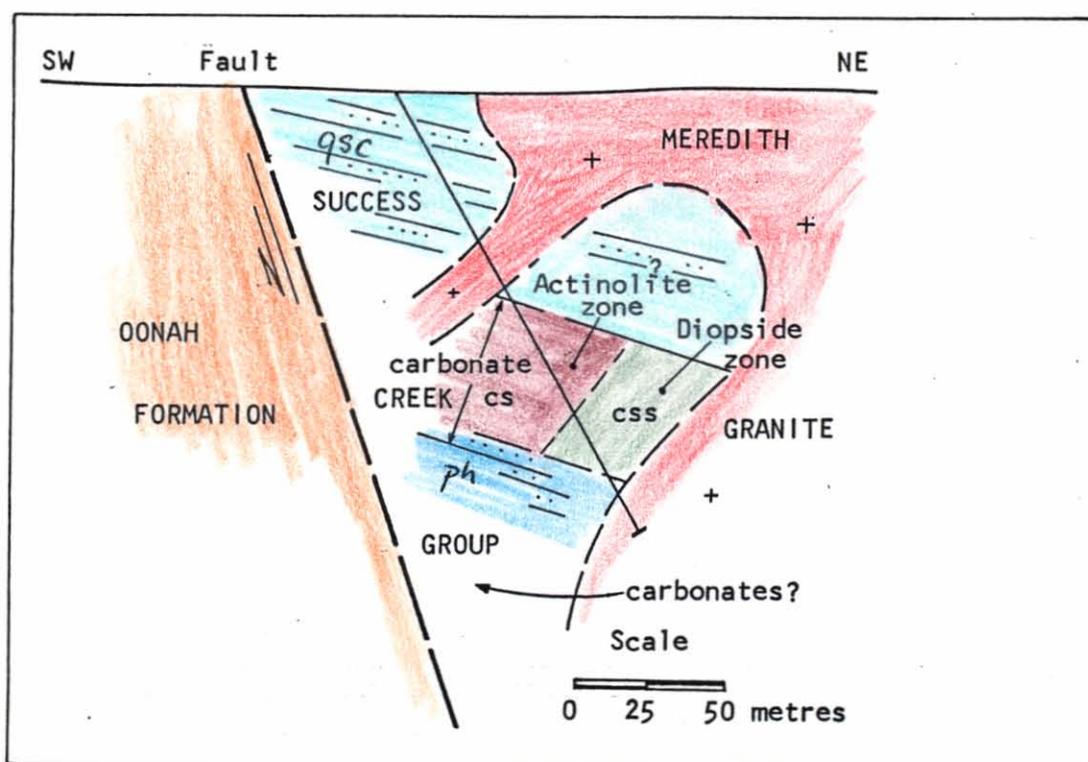


Figure 2. GSR 10 - simplified section showing a shallow, north east dipping interpretation based on zoning of the skarn.

← 5 cm →

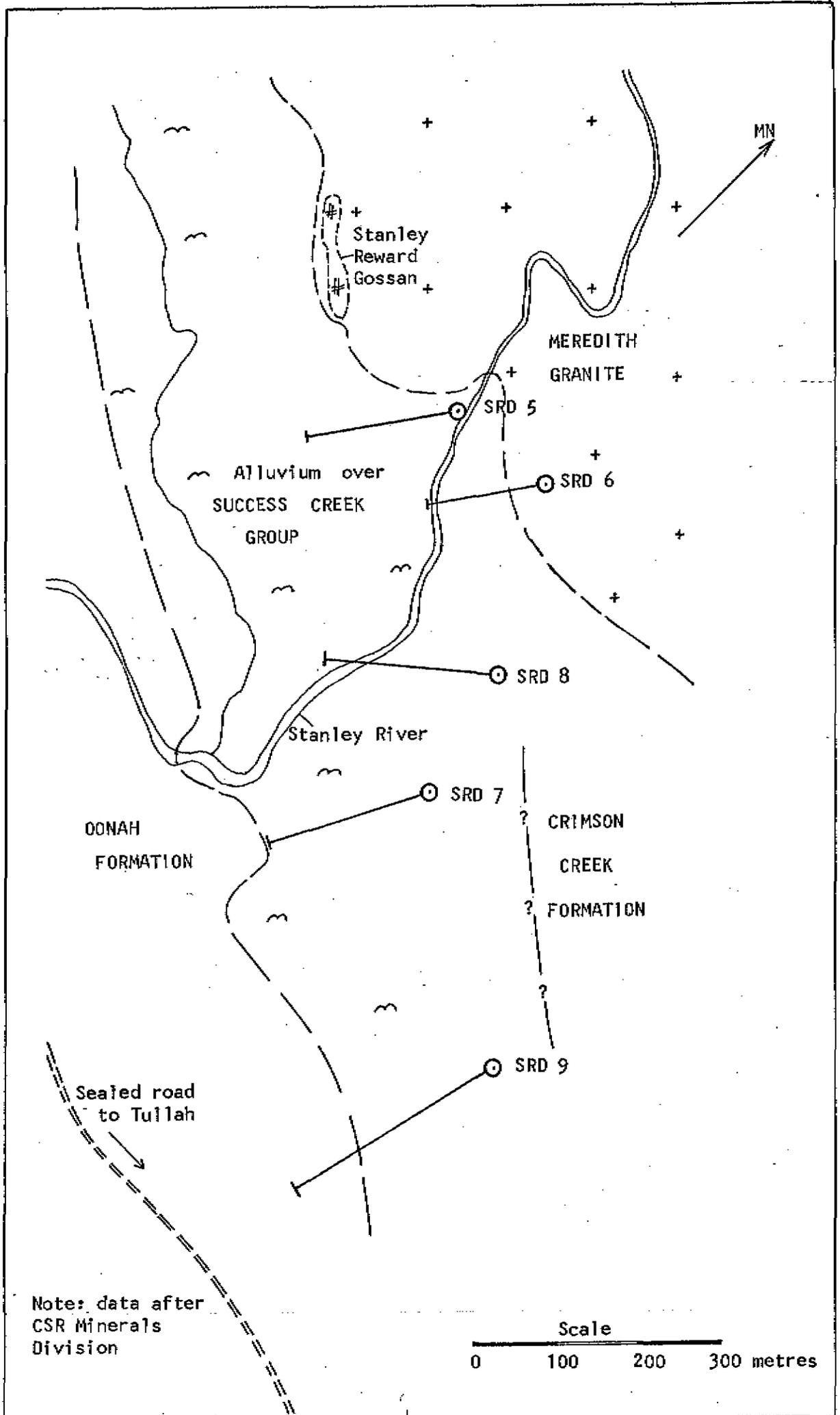


Figure 1. Localities of CSR diamond drillholes south of Stanley Reward Gossan.

5 cm

In Figure 3 a shallow, north east dipping sequence is also interpreted but *cs*, which is stratigraphically underlain by *css*, abuts the granite. Granite sills may have intruded parallel to bedding. Possibly the extent of the skarn is limited and limestone/dolomite may occur further away from the granite/sediment contact.

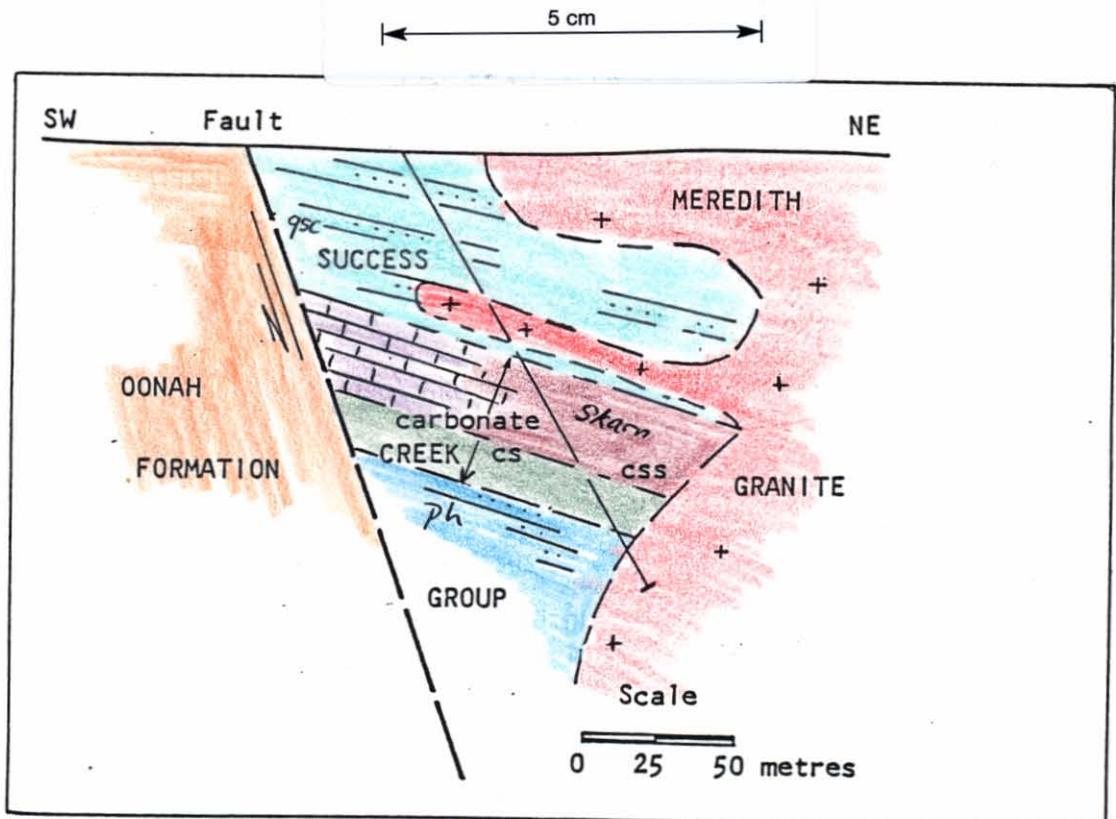


Figure 3. GSR 10 - simplified section showing a further shallow, north east dipping interpretation.

However, a steep south west dip of the sequence (see figure 4) agrees well with the dip of the magnetic source as interpreted by Geospex. Bedding virtually parallels metamorphic zoning. In a regional context the bedding dip is anomalous but the deformation associated with a major regional fault structure between the Success Creek Group and Oonah Formation and the intrusion of granite may have locally tilted the sequence steeply to the west. Based on regional geological evidence the contact between the Oonah Formation and the Success Creek Group is considered to be a faulted unconformity (Brown, 1982) the plane of which roughly parallels bedding in the isoclinally folded Oonah Formation and may follow close to the western edge of the button grass plain. Regionally the fault may be a continuation of the Federal Bassett fault structure which is closely associated with mineralisation at the Renison Bell tin mine.

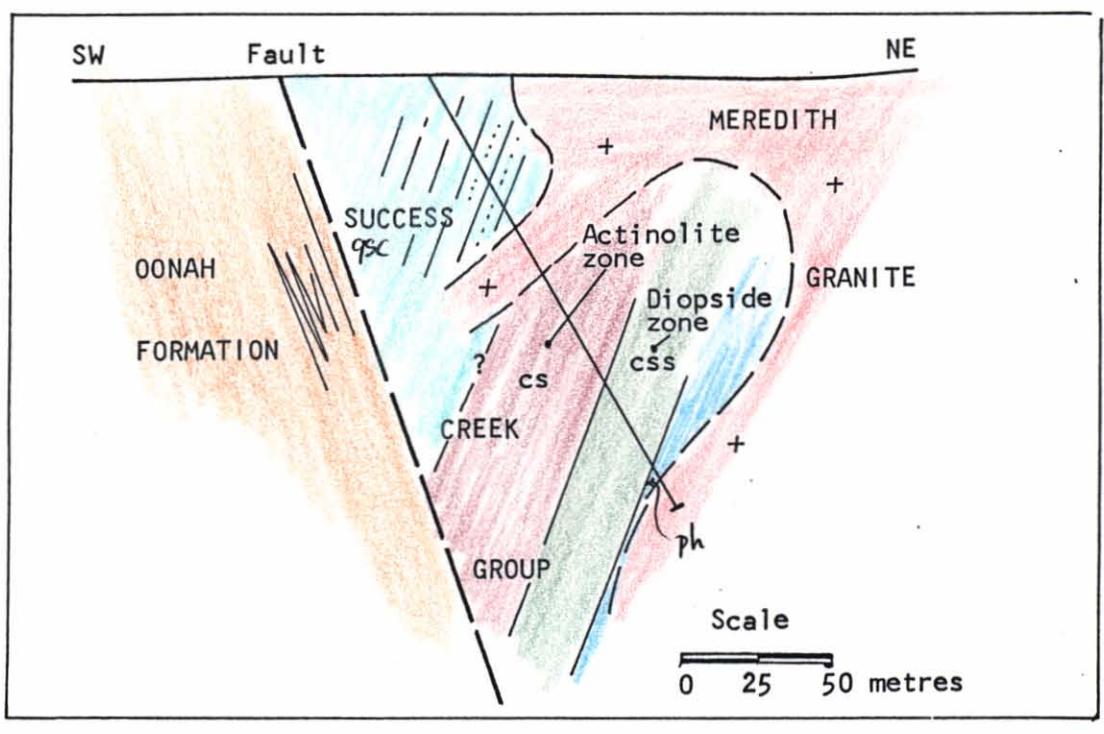
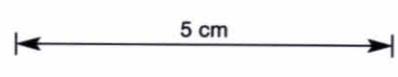
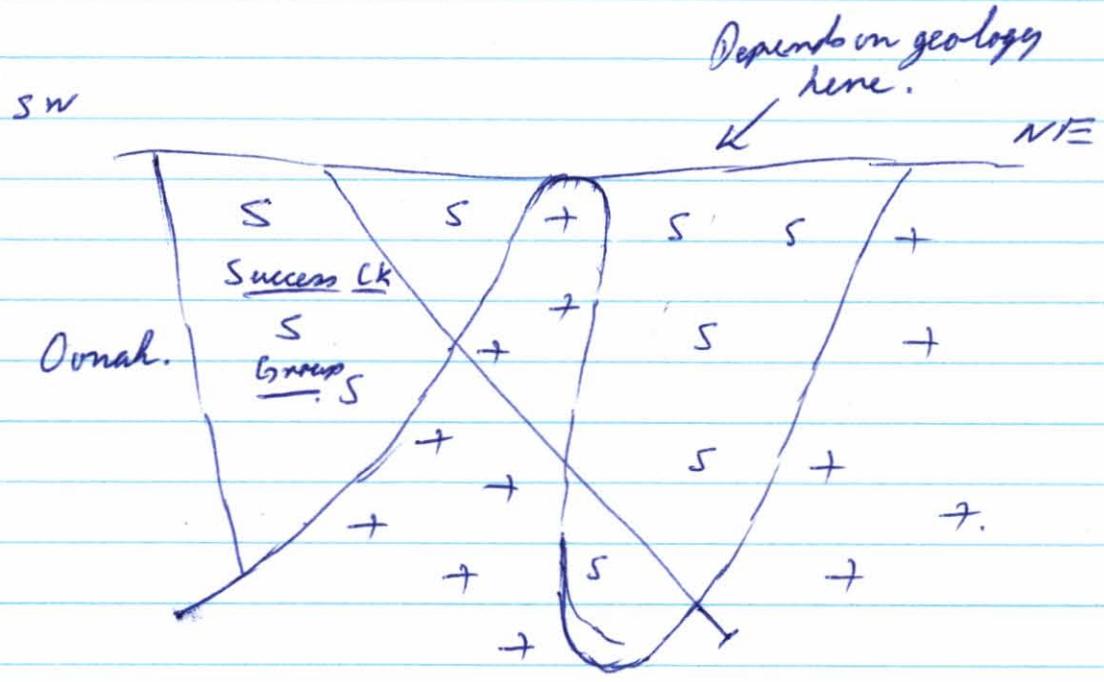


Figure 4. GSR 10 - simplified section showing steep, south west dipping interpretation.

Further interpretation of GSR 10.



A trough of Success Creek Group sediments within the Meredith Granite. This is consistent with the interpretation at Stanley Preward (Plate 3).

Peter Collins
23/1/83.

APPENDIX 5

MISCELLANEOUS ROCK AND CORE SAMPLE ANALYSES

<u>SAMPLE NO</u> (UCT Prefix)	<u>ROCK TYPE</u>	<u>Sn</u>	<u>W</u>	<u>Mo</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>	<u>F</u>	<u>Aq</u>
		(ppm unless otherwise stated)							
2178	Siltstone-shale, quartz stringers, minor iron oxides. L5700N/5237W	<5	<10	<4	<2	25	40		
2179	Quartz-tourmaline. L5435N/5280W	<5	10	<4	<2	<5	<2		
2180	Siltstone-shale, quartz ± carbonate veins, brecciated, minor iron oxides. L5300N/5215W	<5	10	<4	2	30	20		
2181	Hornfels, quartz veinlets. L4600N/4130W	<5	<10	<4	2	30	35		
2182	Hornfels, magnetic. L4604N/4075W	<5	<10	<4	65	30	30		
2183	Granite/adamellite, minor biotite. 80m. north of UCT 2182	<5	10	<4	10	10	5		
2184	Hornfels, magnetic. L4600N/4250W	10	<10	<4	155	50	80		
2185	Hornfels, magnetic, hematite in fractures. L4500N/4241W	5	<10	4	85	35	45		
2186	Hornfels, magnetic, sheared. L4200N/4490W	<5	<10	<4	60	30	75		
2187	Hornfels, limonite stained, hematite in fractures. L4200N/4478W	<5	<10	4	115	50	100		
2188	Hornfels, magnetic, pyritic. ML20/280N	<5	<10	4	145	40	35		
2190	Carbonate skarn, ferruginised actinolite, composite sample between 83 and 103 metres, GSR 10 (Parent Hole).	0.37%	760	2	24	7	86	270	1

504094

SAMPLE NO (UCT Prefix)	ROCK TYPE	Sn	W	Mo	Cu	Pb	Zn	F	Ag
		(ppm unless otherwise stated)							
2193	Carbonate skarn, ferruginised actinolite, composite sample between 103 and 111 metres, GSR 10 (Parent Hole).	0.33%	480	3	59	9	102	320	1
2222	Quartz vein. L4500N/5323W	6	10	<4	14	5	8		
2224	Granite/adamellite, porphyritic, iron-stained. L5200N/4950W	<4	<10	<4	14	35	14		

NOTE :

For sample localities see :-

Plan 1 - UCT 2178 to 2180 and 2224

Plan 2 - UCT 2190 and 2193

Plan 6 - UCT 2181 to 2188 (approximate position only)

Source of Geochemical Data

<u>Sample No</u> (UCT Prefix)	<u>Laboratory</u>
2178-2188	Australian Laboratory Services Pty. Ltd.
2190 and 2193	SGS Australia Pty. Ltd.
2222 and 2224	Australian Mineral Development Laboratories.

APPENDIX 6

Summary of Sample Preparation and Analytical Techniques
and Laboratories

Australian Mineral Development Laboratories (Amdel) carried out virtually all analyses of drillcore. SGS Australia Pty. Ltd. (SGS) and Australian Laboratory Services Pty. Ltd. (ALS) carried out a small number of analyses as noted and tabulated in Appendix 5, attached.

Core and rock samples were prepared by crushing and pulverising by disc mill to approximately 60 mesh prior to riffing (Amdel). SGS and ALS crushed, split and pulverised the samples.

Geochemical analyses were carried out by X-ray fluorescence (XRF) for tin, tungsten and molybdenum and by acid digest/atomic absorption spectrometry (AAS) for copper, lead, zinc and silver. Selected pulps of GSR 10 core were also analysed by Amdel for tin by ammonium iodide (NH₄I) sublimation method. Fluorine analysis was carried out by carbonate fusion and measurement by specific ion electrode.

of M.	A.O.	C.G.	E.O.	D. State
				Register
Received	10 OCT 1983			E & A
Amended				
DEPT. OF MINES				
REF. No. 10,507/83				

APPENDIX 7

INTEGRATED INTERPRETATION OF DRILLING
AND MAGNETIC DATA

FROM

STANLEY REWARD TIN PROSPECT

FOR

UNION CORPORATION (AUSTRALIA) PTY. LIMITED

6th October, 1983

Geospex Associates Pty.Ltd.

83-2050

~~10/10/83~~

APPENDIX 7

INTEGRATED INTERPRETATION OF DRILLING AND MAGNETIC DATA

from

STANLEY REWARD TIN PROSPECT

for

UNION CORPORATION (AUSTRALIA) PTY LIMITED

6th October, 1983

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3.4 Line 5400 N	7
4.0 CONCLUSIONS	8

1.0 INTRODUCTION

Magnetic data from selected lines over the Stanley Reward Tin Prospect were reinterpreted in conjunction with drilling data from lines 6100N and 5400N. Magnetic susceptibility measurements on the drill core were used to constrain the computer model interpretation. Geological constraints from the drilling information were supplied by Union Corporation.

A geophysical interpretation of these lines was carried out using interactive computer modelling on the Geospex Associates computer system. Results from the modelling were plotted and are presented in this report.

2.0 INTERPRETATION PROCEDURE

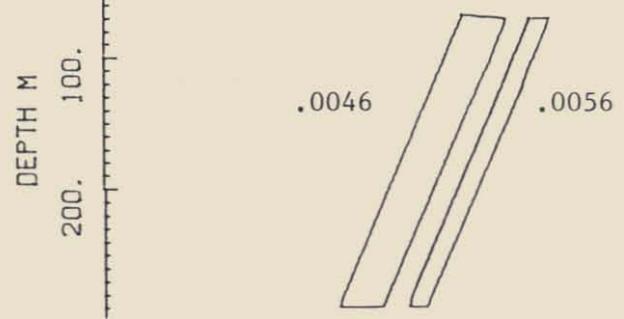
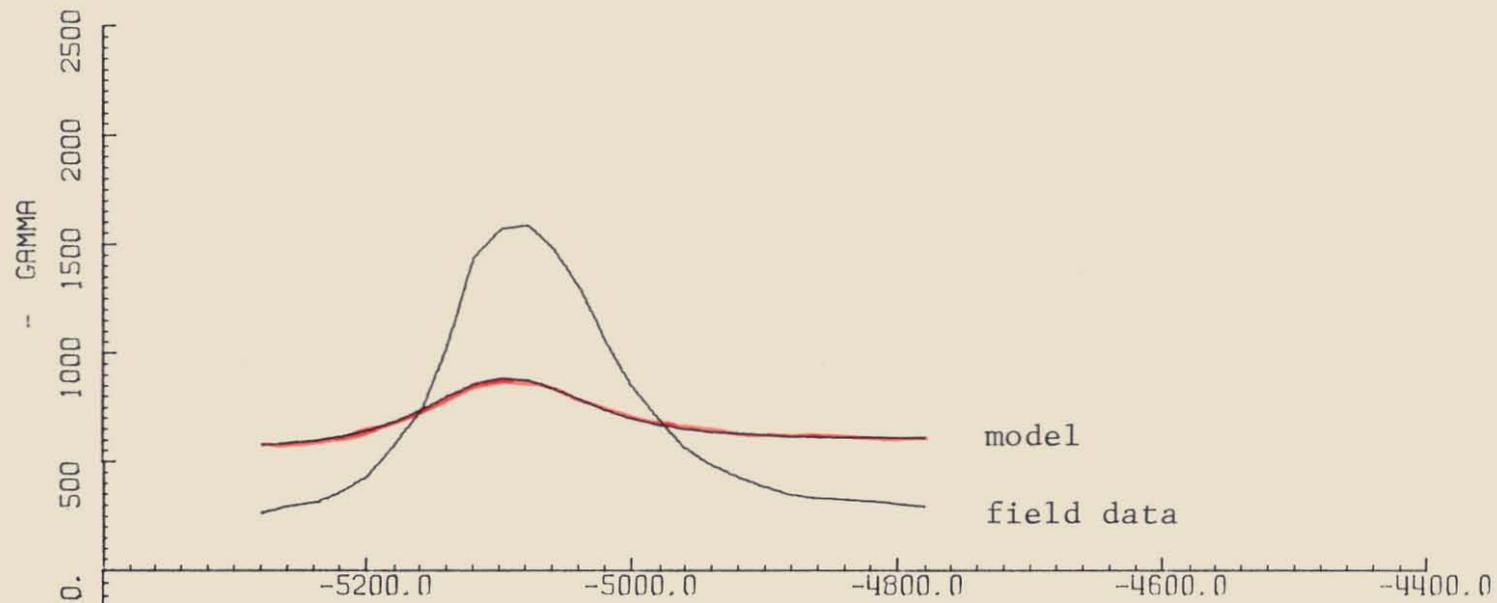
A brief description of the interpretation procedure is given to complete the description of the results. The modelling procedure is based on a method of drawing geological cross-sections on a computer graphics screen and computing the theoretical magnetic response of the geological section. This response is compared with the field magnetic data and the section modified until a good match is achieved between the field data and theoretical results. Once a good match is achieved, the section is assumed to be a reasonable representation of the subsurface distribution of magnetic properties. The results of the modelling and geological cross-section are then plotted.

Certain assumptions must be applied in this interpretation. The magnetic anomalies must have a long strike length when compared with their depth and no remanent magnetization is present within the magnetic source rocks. In general the former requirement is satisfied over all the lines. However, it is not possible to predict the influence of remanent magnetization on the results without laboratory measurements on samples of the source rocks.

Field data profiles selected for the interpretation were input to the computer using an interactive digitizer tablet. Only the data points recorded on the profiles were actually digitized.

Manual measurements of core magnetic susceptibility were supplied for drill hole data from holes GSR-10 on line 6100N and GSR-12 on Line 5400N. This information was used to constrain the shape of the anomalous magnetic zones.

LINE 6100N MAGNETICS STANLEY REWARD TIN PROSPECT



STANLEY REWARD
TIN PROSPECT

UNION CORPORATION (AUST) P/L

OLINE 6100 N
INITIAL MODEL

PROJECT: FIG. NO. 37 DATE: 16-03-67

504104

3.0 INTERPRETATION RESULTS

Interpretation results are presented for lines:

6100 N
5800 N
5600 N
5400 N

The drilling information from line 6100N is used to assist with the interpretation of both line 5800N and line 5600N.

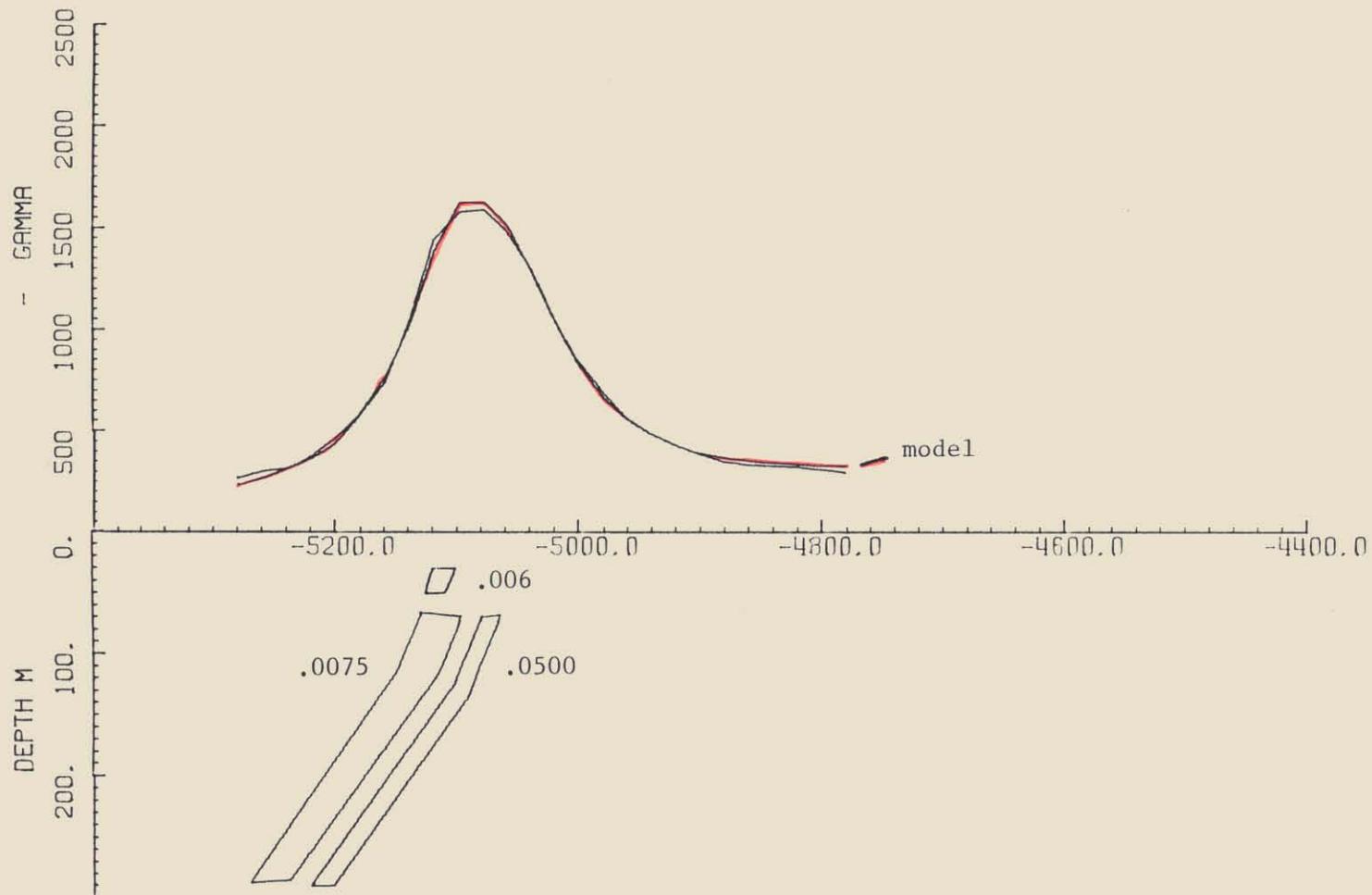
3.1 Line 6100 N

Approximately seventy different models were examined in the interpretation of line 6100N and the most significant results are discussed in this report. Intermediate results that were plotted are supplied as background information but not discussed in the report.

Drilling data indicates that there are two discrete zones of anomalous magnetic susceptibility. The first zone has an average susceptibility of .0046 c.g.s. units (.057 SI) and the second zone 0.0056 c.g.s. units (.076 SI). Since the Geospex modelling package operates in c.g.s. units, these units will be used in this report.

Fig. 3.1 shows the initial model that complies with the drilling information and parallels the model used in our previous report (Pratt, 1993a). It is obvious that the amplitude of the model curve is insufficient to explain the field anomaly. A good match

LINE 6100N MAGNETICS STANLEY REWARD TIN PROSPECT



STANLEY REWARD TIN PROSPECT

UNION CORPORATION (AUST) P/L

OLINE 6100 N

PARALLEL MODEL

PROJECT: 115, 110

DATE: 15-05-60

504106

was only achieved by:

- changing susceptibilities,
- changing dip of lower section of models,
- adding a small, shallow magnetic source.

This model result is shown in Fig. 3.2. This model complies with the drilling location of anomalous magnetic rocks, but not their susceptibilities. The wider, low susceptibility zone corresponds to the ironstone/carbonate zone and has a modelled susceptibility of .0075 c.g.s. units. This is not significantly higher than the measured average of .0046. This difference could be attributed to alteration of the magnetite in the weathering zone. The second zone is interpreted to be the magnetite rich skarn along the granite contact. However, the model susceptibility of .050 is considerably higher than the average measured value of .0056 c.g.s. units.

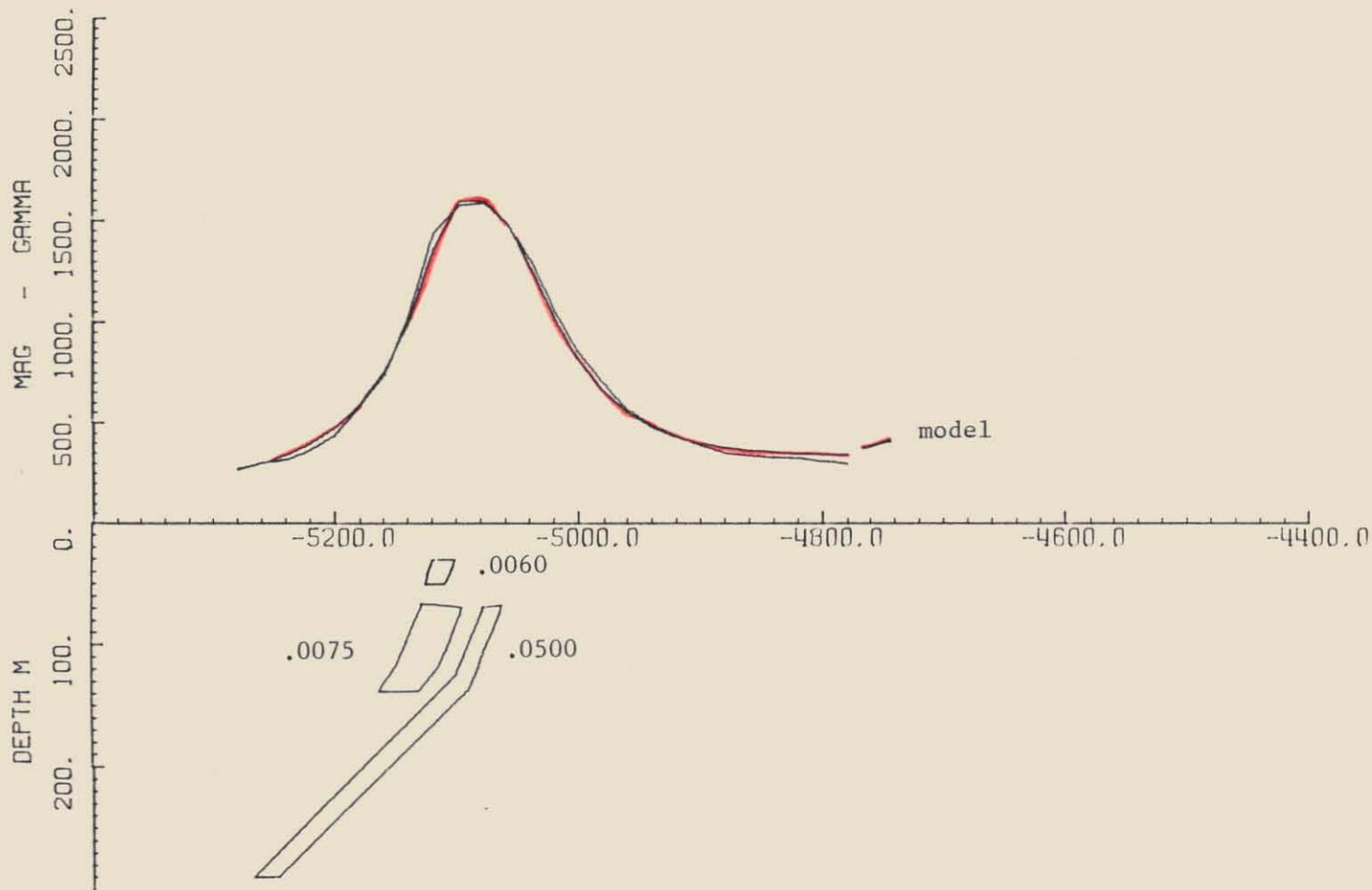
This discrepancy in magnetic properties could be caused by two factors:

- remenant magnetization
- variable magnetic properties.

In the former case, a remenant component equal to 10 times that of the Earth's natural induced magnetic field would be expected to produce a dramatic change in the direction of the net magnetic field inside the skarn. As there is no obvious evidence from the modelling for such a change, then the importance of remanence must be downgraded. However, it is recommended that at least five skarn samples be sent for laboratory measurement of both susceptibility and remenant magnetization. This will assist with the clarification of this problem.

LINE 6100N MAGNETICS STANLEY REWARD TIN PROSPECT

STANLEY REWARD
TIN PROSPECT



UNION CORPORATION (AUST) P/L

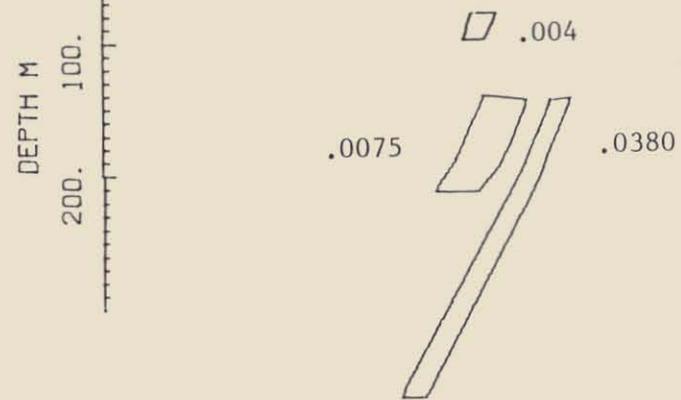
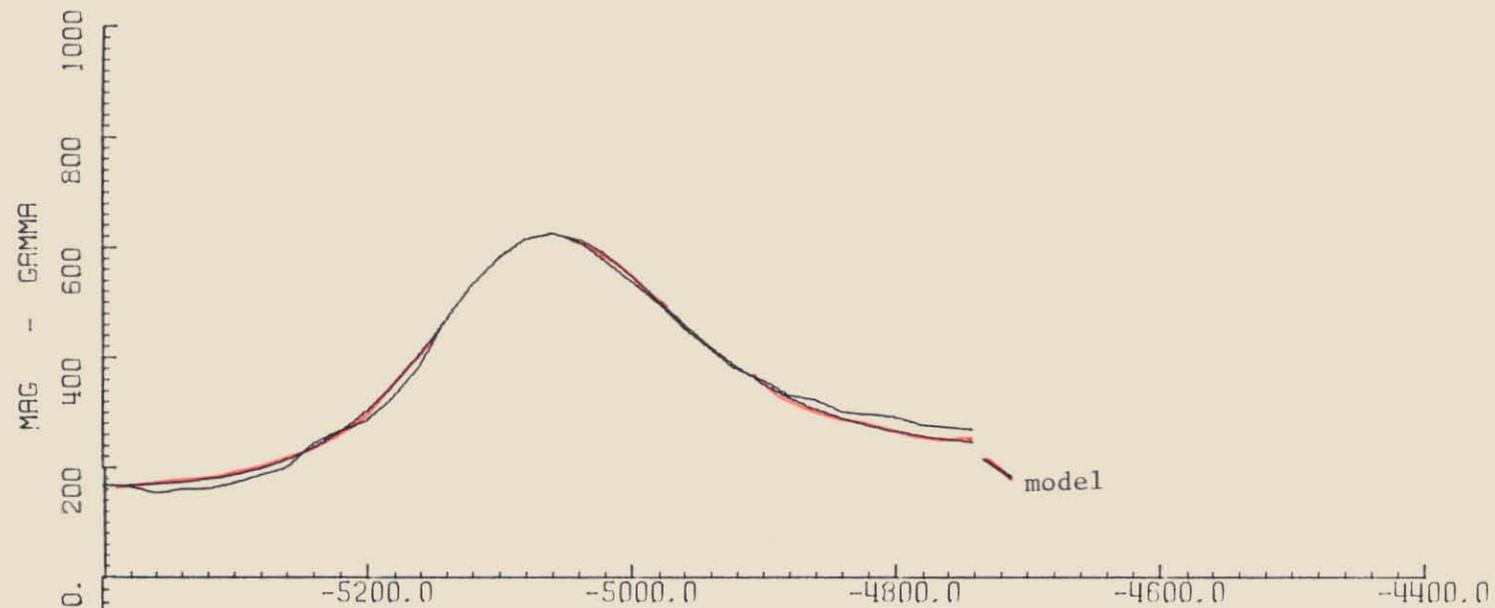
LINE 6100 N
GEOLOGICAL MODEL

PROJECT: FIG. NO. 111

DATE: 16-DEC-61

504108

LINE 5800N MAGNETICS STANLEY REWARD



STANLEY REWARD TIN PROSPECT

UNION CORPORATION (AUST) P/L

LINE 5800 N
GEOLOGICAL MODEL

PROJECT: 119, No. 32

DATE: 15/05/61

504109

It is highly probable that the discrepancy is caused by highly variable magnetic properties within the skarn and the drill hole failed to adequately sample the contact. A thin section from one part of the skarn indicated 7 per cent magnetite which would produce a susceptibility of at least .020 c.g.s. units.

This discrepancy indicates that the drill hole has not properly tested the skarn which could mean:

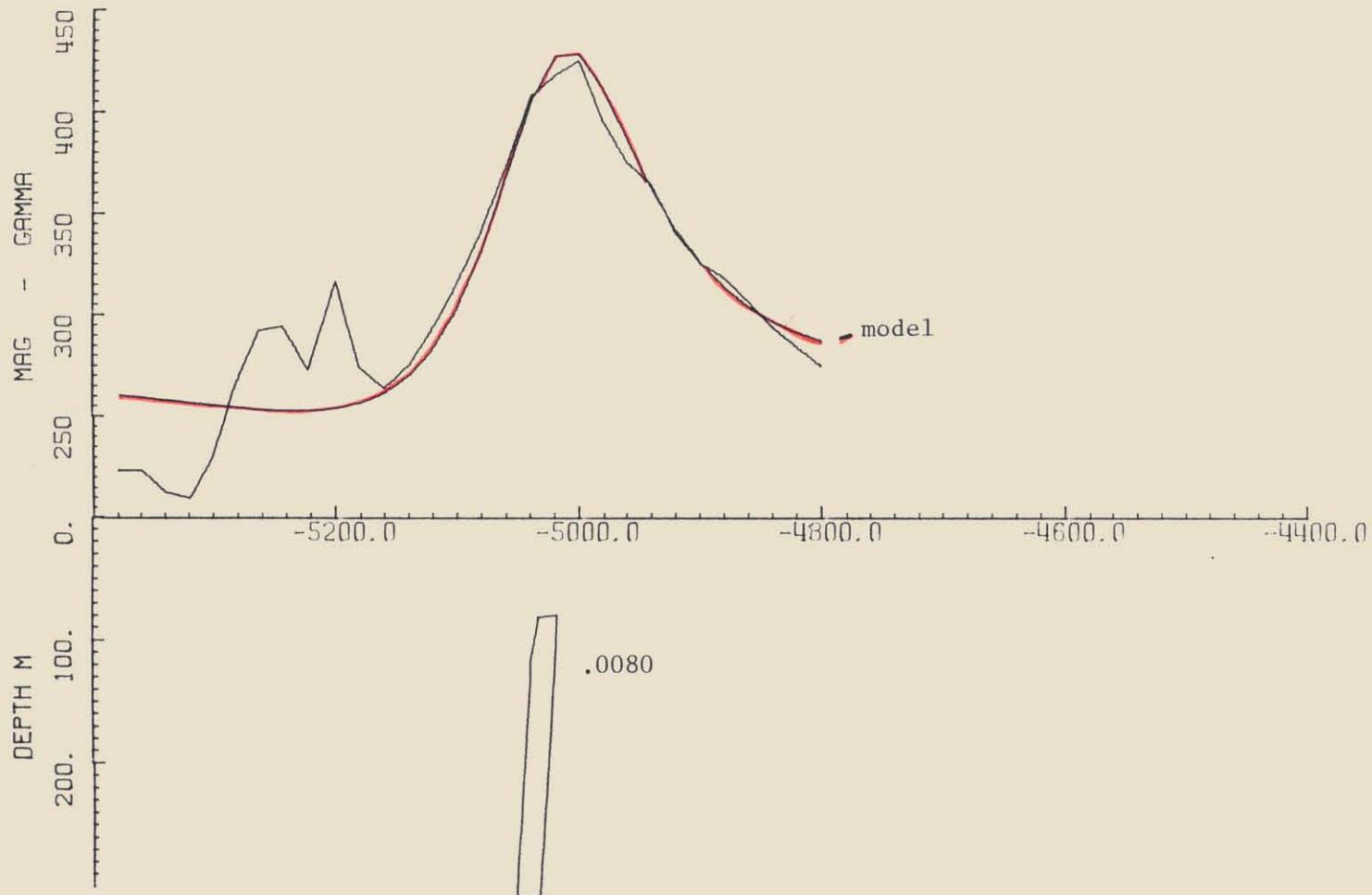
- (a) wider skarn section above and below the hole intersection,
- (b) increased magnetite concentration above and below the hole intersection.

At the request of Mr J. Smart, a modification was made to this model which would be more consistent with the limits of the carbonate unit. The low susceptibility model was shortened and the dip of the skarn changed to a shallower west dip. The result of this model is shown in Fig. 3.3 and exhibits a match which is equal to that of Fig 3.2.

3.2 Line 5800 N

Line 5800N has no drilling control and so it was decided to use the model from Line 6100N to see if it could match the magnetic anomaly with little or no adjustment. Fig. 3.4 shows the result of this modelling. The depth has been increased to 140 metres, the skarn susceptibility is lowered to .038 and the dip is steepened. However, the quality of this match indicates that the geological environments are similar on both lines. The change in susceptibility could be caused by the limited strike extent of

LINE 5600 N MAGNETICS STANLEY REWARD TIN PROSPECT



STANLEY REWARD TIN PROSPECT

UNION CORPORATION (AUST) P/L

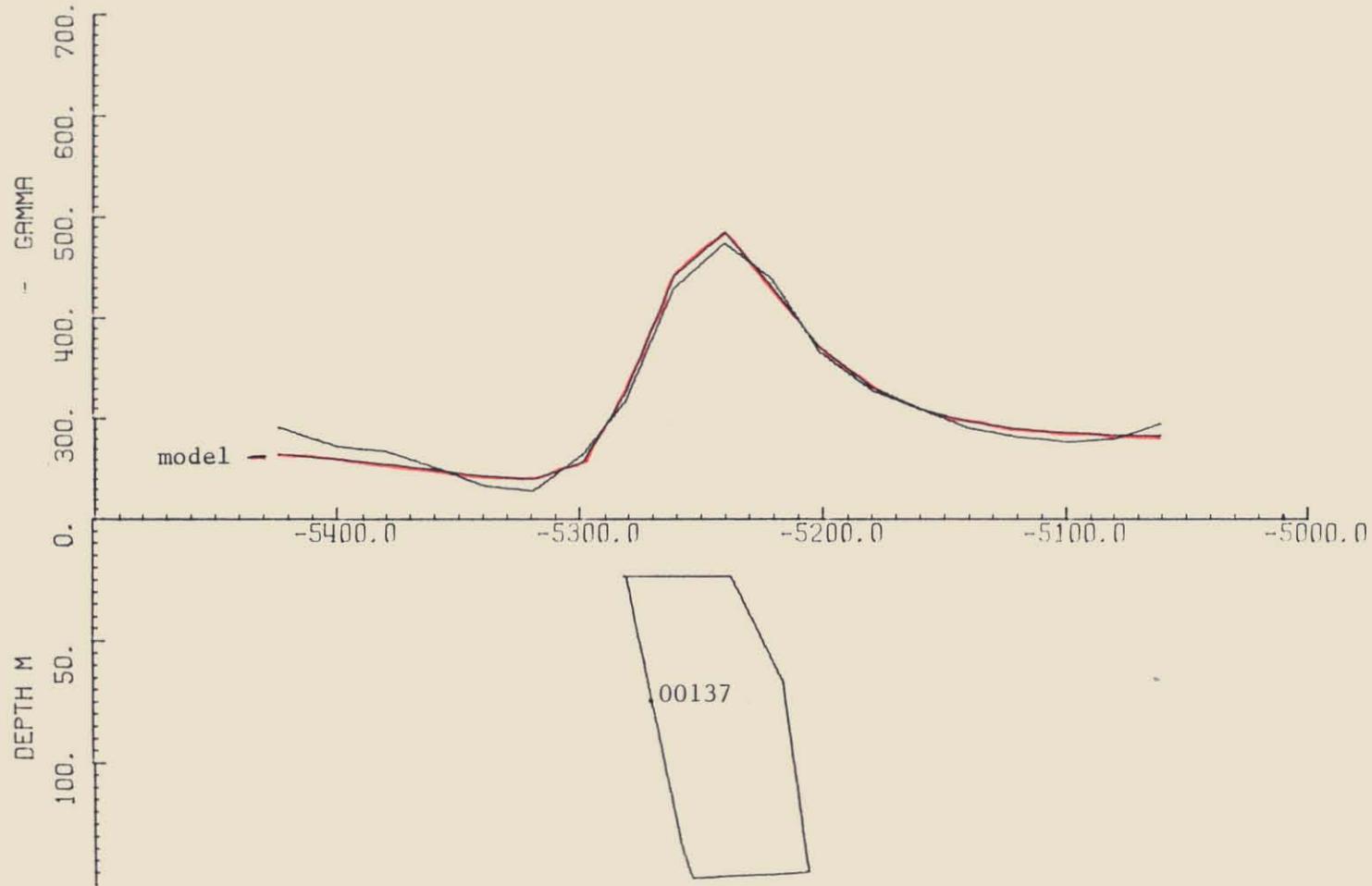
LINE 5600 N
GEOPHYSICAL MODEL

PROJECT: 534, No. 33

DATE: 16-8-60

504111

LINE 5400 N MAGNETICS STANLEY REWARD TIN PROSPECT



STANLEY REWARD
TIN PROSPECT

UNION CORPORATION (AUST) P/L

LINE 5400 N
GEOLOGICAL MODEL

PROJECT: 724. 48. 34

DATE: 15-03-61

504112

the contact zone.

3.3 Line 5600 N

Line 5600N has no drilling control and a similar approach was applied to the magnetic anomaly interpretation for this line. The geological model for Line 6100N proved to be totally unsatisfactory for this line where the main magnetic anomaly can be modelled as a single source. The near vertical attitude of the model suggests that it could be related to the skarn. However, the low susceptibility (.008) suggests low magnetite concentrations or a substantial thinning (not modelled) of the skarn deposit. As such, this model indicates a significant change in the geological environment from line 5800N to 5600N.

3.4 Line 5400 N

Drill hole GSR 12 intersected approximately 100 metres of section with anomalously high magnetic susceptibility. The locations of these intersections and the average susceptibility of 0.00011 were used to constrain the interpretation. Unfortunately, the susceptibility from the drilling is low by a factor of 12. This discrepancy can only be explained by remanent magnetization or a meter which was read in c.g.s. units rather than S.I. units as specified. Fig. 3.6 shows the result of modelling with a susceptibility of .00137 c.g.s. units. Unless the magnetite content increases above the drill hole, this magnetic property discrep-

ancy is difficult to explain.

4.0 CONCLUSIONS

Drilling data and core susceptibility measurements have helped to constrain the position of the interpreted magnetic source material and improve the geological significance of the magnetic models. Unfortunately there are large discrepancies between the field measurements of core susceptibility and those computed from the model results. The difference is approximately a factor of 10 which can only be explained by changing the field measurement units from SI to c.g.s. or the influence of remanence. The latter case is difficult to justify because there is no significant evidence for a change in the Earth's natural field direction.

It is recommended that core samples from both drill holes GSR-10 and GSR-12 be submitted for laboratory measurement of susceptibility and remanent magnetization. Five samples should be selected from the magnetite skarn in GSR-10 and five from various locations in the magnetic section of hole GSR-12. The measurement units of the field susceptibility meter should also be checked and if possible calibrated against a known specimen.



D.A. PRATI M.Sc. Ph.D.

Geospex Associates Pty Ltd

Received	11	11	1983	Registrar
Answered				E & H
DEPT. OF MINES				
REF. No. 10,507/83				

APPENDIX B

GOLD URANIUM AND PLATINUM DIVISION
 GENCOR GEOLOGY DEPARTMENT - SPRINGS

C.H.M. 27.9.1983

BULLETIN NO. 2503.

UNION CORPORATION (AUSTRALIA) PTY. LIMITED

REPORT ON THE MINERALOGICAL INVESTIGATION OF TIN-BEARING
SAMPLES FROM THE STANLEY REWARD TIN PROSPECT, TASMANIA.

83-2050

~~Ref 3/3~~

GOLD URANIUM AND PLATINUM DIVISION
GENCOR GEOLOGY DEPARTMENT - SPRINGS

C.H.M. - 27.9.1983.

BULLETIN NO. 2503.

UNION CORPORATION (AUSTRALIA) PTY. LIMITED

REPORT ON THE MINERALOGICAL INVESTIGATION OF TIN-BEARING
SAMPLES FROM THE STANLEY REWARD TIN PROSPECT, TASMANIA.

1. ATTACHED

Attached is a copy of an article 'Geochemical Exploration For Tin - Recent Research Results' by P.J. Eadington.

2. INTRODUCTION

The Mineralogical Section (Springs) recently offered to assist Union Corporation (Australia) Pty. Limited to have electron-microprobe studies carried out on Sn-bearing drillhole samples of the Stanley Reward Prospect. The project was initiated by Mr. J.V. Smart (Chief Geologist, Union Corporation, Australia) who despatched the samples to us after consultation with the Australian Mineral Development Laboratories (Amdel). This laboratory was approached originally to do the investigation, but quoted an unacceptably high cost per sample.

The objective of the investigation was to determine the mode of occurrence of Sn in the ironstone samples, or how it occurred in the precursor rocks. It was reported that no cassiterite had been recognised, but some 'boxworks' (thought to be after pyrite) were found. This observation raised the possibility that stannite might have been the source of the Sn. The original rock (pre-weathering/ferruginisation) was described as probably an 'actinolite-diopside-garnet' skarn.

3. SAMPLES

Table 1 details the information on the samples received. Core recovery was extremely poor and the depths from which the samples were collected are only estimates.

TABLE 1: SCHEDULE OF CORE SAMPLES FROM BOREHOLE GSR 10 FOR ELECTRON-MICROPROBE STUDY.

SAMPLE NO.	REPRESENTING INTERVAL, m	RECOVERY, %	DESCRIPTION	ASSAYS, % Sn *		SAMPLING	POLISHED SECTION NO.
				A	B		
2266	75,6 - 83,5	13	Earthy limonite after carbonate skarn	0,68	0,44	Broken core; 6 random fragments	1
2268	86,5 - 92,5	11	Ferruginised and weathered calc-silicate hornfels	0,28	0,23	Sampled at: 89,0 m 89,5 m 90,0 m	2 3 4
2270	98,5 - 101,2	13	Massive ironstone	0,51	0,37	Quarter core from only solid section	5a to 5e
2273	103,3 - 110,5	24	Massive ironstone	0,39	0,25	Sampled at: 107,0 m 110,0 m	6 7a, 7b
2274	110,5 - 116,5	28	Massive ironstone	0,40	0,24	Sampled at: 113,0 m 114,5 m 116,5 m	8a to 8c 9a, 9b 10a, 10b

* Determined by: A. X-ray fluorescence
B. Ammonium iodide sublimation

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4. EXPERIMENTAL METHODS

Nineteen representative polished sections were prepared for the mineralogical investigation (see last column - Table 1). These sections were examined microscopically and all potential Sn-bearing phases, as well as selected fields on each section, were marked with a diamond scribe. The electron microprobe at the Rand Afrikaans University was used to analyse these minerals, and to scan the selected fields for tin. The sections were then re-examined by reflected-light microscopy. Photomicrographs were taken during the investigation.

Ten core samples (one from each depth, corresponding to the polished section numbers as given in Table 1) were pulverised for X-ray diffractometry in order to identify or confirm the main mineral phases present. All remaining core and material was retained for reference purposes.

In addition to the above procedures, a heavy medium separation of heavy minerals was attempted on sample 2266. Two grain-size fractions (i.e. larger and smaller than 500 μm) were treated using tetrabromoethane (TBE: relative density at 20 C, 2,96 to 2,97) as the liquid medium. Two polished grain mountings of each of the sink fractions were prepared and examined in the same way as the solid core sections.

5. RESULTS

Mineralogically, the samples are chiefly composed of martite (hematite and magnetite), goethite (with varying Al content), and ferruginised Al-rich silicates (also giving the goethite diffraction pattern). This was found during the microscopic examination and confirmed by X-ray diffraction. Traces of Fe-rich SiO_2 (possibly ferruginised quartz veins) were encountered, while pseudomorphs after pyroxene, garnet and amphibole are common in some samples.

No cassiterite was found during the initial microscopic investigation, but the presence thereof was revealed during the subsequent scanning of the samples with the electron microprobe. A photomicrograph showing the occurrence of cassiterite in goethite/Fe-Al-silicate is shown in Figure 1. Figure 2 is a secondary-electron image of the same collection of grains, and Figures 3 to 6 show the elemental distributions of Sn, Fe, Al, and Si, respectively, for the field. An average of 12 quantitative analyses on cassiterite grains is given in Table 2.

TABLE 2: MICROPROBE ANALYSIS OF CASSITERITE

OXIDE	MASS %	STANDARD DEVIATION
SnO ₂	88,3	4,66
Fe ₂ O ₃	11,6	4,14
Al ₂ O ₃	0,3	0,22
TOTAL	100,2	0,78

Because of the type of main constituents present in the drillhole samples, all material subjected to heavy-medium separation with TBE, collected as sink fractions. Any possible cassiterite could thus not be separated from the magnetite, hematite and goethite.

6. DISCUSSION

As was mentioned in section 5, no cassiterite was observed during the initial microscopic investigation, but once they were identified with the aid of the electron microprobe, it was possible to subsequently recognise the cassiterite grains under the microscope. Reasons for not recognising any cassiterite at first are that the individual grains are extremely fine (2 to 6 μm on average, and maximum size about 10 μm , except for occasional groups of acicular crystals up to 30 μm), and that they have an appearance similar to that of the background goethite/ferruginised silicate, although the cassiterite grains are somewhat darker (Fig. 1). Darker cassiterites normally have higher Fe- and W-contents compared to that of pure SnO₂ (Uytenbogaardt and Burke, 1971, p.208) but only small amounts of Fe plus a trace of Al (and no W) was found in the cassiterite grains during the current study (Table 2). It is possible that some of the Fe and Al in the microprobe analyses were contributed by the underlying host material as the cassiterite grains in Figures 4 and 5 appear relatively free of these elements.

Skarns of the rock type investigated here form by the contact-metamorphic addition of SiO₂ and Fe to carbonate rocks resulting in the formation of calc-silicates, quartz veins, and iron oxides and/or sulphides. Iron is 'often accommodated in silicates such as andradite garnet and hedenbergite pyroxene, but its main mass is in the form of magnetite. Hematite, pyrite, arsenopyrite, and pyrrhotite are lesser, though sometimes important, iron minerals' (Stanton, 1972, p.619).

It is not known whether the precursor rock contained sulphides (although it possibly could have), as possible sulphides would have been oxidised during weathering of the original rock. Boxworks or pseudomorphs after pyrite may well be present, but the majority of textures of this kind are those derived from pyroxene cross-sections (typical 90° cleavage) and amphibole (length- and cross-sections of actinolite). The original rock might have been an actinolite-hedenbergite (rather than diopside) - andradite skarn, but during oxidation the magnetite underwent partial martitisation (alteration to hematite), and the bulk of the matrix was changed to goethite. Minor cassiterite (probably originally present, but resistant to weathering) was retained as fine grains in residual clusters or aggregates.

Eadington (1983, p.15) reports that 'tin in skarns is largely lattice bound in calc-silicate minerals and any minor cassiterite that may occur is fine grained. Often skarn Sn mineralisation contains 0.1% to 1% tin in a body of 10 million - 90 million tonnes'. He further states that 'certain mineral assemblages are unlikely to contain cassiterite Sn mineralization in economic grades,' and points out that 'rocks dominated by magnetite, andradite or grossular garnet, and diopside-hedenbergite crystallize at too high a temperature for Sn to be concentrated as cassiterite'. A copy of mentioned citation is attached as an appendix for reference, as the current study seemingly presents a similar case.

7. CONCLUSIONS

It is concluded that:-

- (a) The tin occurs as clusters of individual grains of cassiterite up to 30 μm with an average of about 5 μm .
- (b) They occur in host material that has been hardened by weathering/ferruginisation.
- (c) Good recovery of Sn is unlikely as liberation of the clusters (with reference to favourable breaking directions) would be difficult.

8. RECOMMENDATION

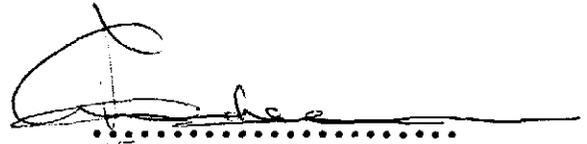
As the conclusions above are based on observations in one bore-hole core only, the lateral variation in the nature of Sn-mineralisation is unknown. It is recommended that other drillhole cores are also examined, paying special attention to the size of cassiterite grains and their modes of occurrence, and degree of weathering of the host rock.

9. REFERENCES

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STANTON, R.L. (1972). Ore Petrology, McGraw-Hill, New York, 713 p.

UYTENBOGAARDT, W. and BURKE, E.A.J. (1971). Tables for microscopic identification of ore minerals, Elsevier, Amsterdam, 430 p.



C. H. McLAREN

/AS

Fig. 1



Fig. 2

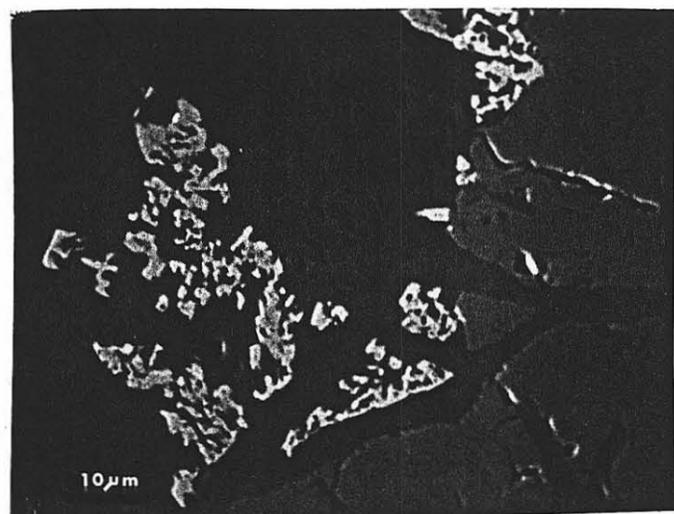


Fig. 3

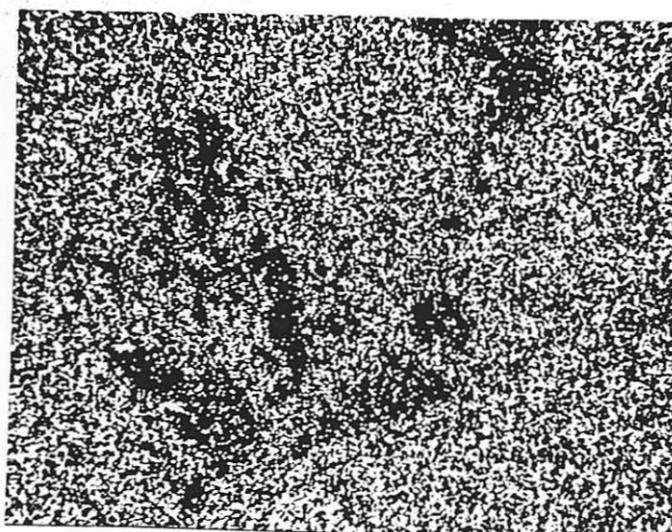
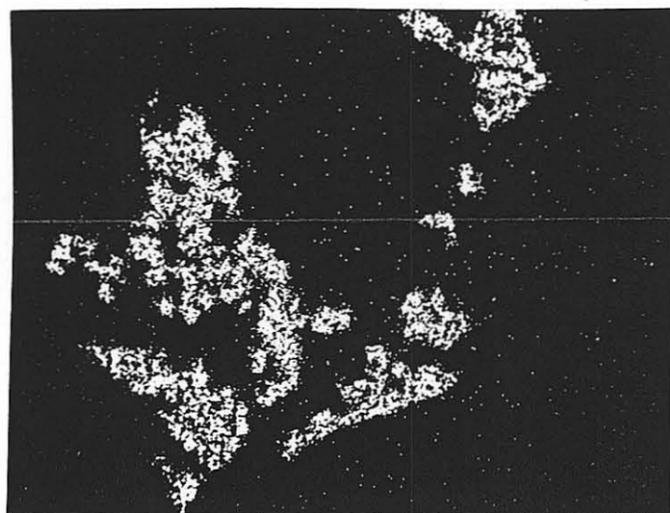


Fig. 4



Fig. 5

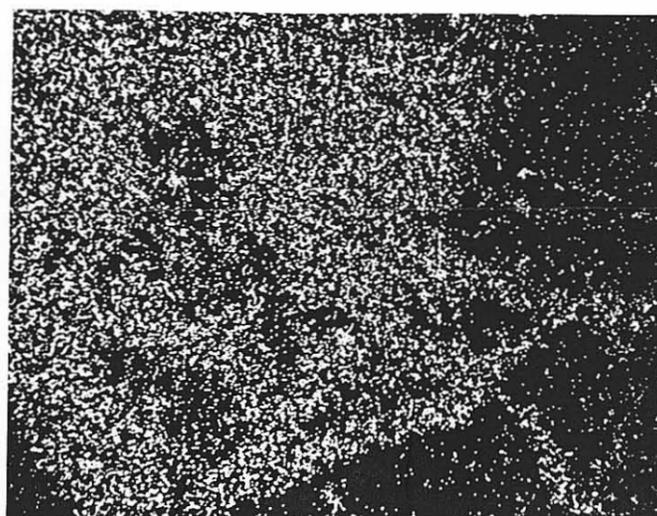


Fig. 6

Figure 1. Photomicrograph of cassiterite (ct) occurring in ferruginised silicate/goethite (go). Hematite (hm) is replacing magnetite (mt) by martitisation.

Figure 2. Secondary-electron image showing the distribution of cassiterite (same field as Fig. 1).

Figure 3. Elemental distribution of Sn.

Figure 4. Elemental distribution of Fe.

Figure 5. Elemental distribution of Al.

Figure 6. Elemental distribution of Si.

5 cm

APPENDIX

S2.3 GEOCHEMICAL EXPLORATION FOR TIN - RECENT RESEARCH RESULTS

P.J. Eadington

S2.3.1 INTRODUCTION

Cassiterite, because of its resistance to weathering, is a classic mineral for detecting and tracing mechanical dispersion trains in drainage systems by stream sediment and soil sampling, Taylor (1979), Levinson (1974, 1980). However, as the most obvious stream sediment and soil anomalies are detected, the search for more subtle indicators of cassiterite mineralization can introduce difficulties that are only now becoming apparent. This paper evaluates mineralogical and geochemical research in the Division of Mineralogy that has a bearing on Sn specialization of granites, Sn skarns and carbonate replacement deposits. Analytical methods for the determination of Sn are also evaluated.

S2.3.2 THE MINERALOGY OF TIN IN GRANITES AND TIN SPECIALISATION

The search for new Sn provinces or districts has led to a re-examination of possible Sn specialization in granitic rocks and whether specialization is a pre-requisite to mineralization. Levinson (1980) and Juniper and Kleeman (1979) note several regional studies indicating that Sn-mineralized granites have higher Sn concentrations (20-35 ppm) than barren granites (less than 10 ppm). However, more detailed studies in the New England area of NSW (Flinter, 1982a) and in North Queensland (Sheraton and Black, 1973) show that the distinction is more subtle. Although some samples of Sn-mineralized granites have high Sn concentrations, the variance (or standard deviation) is increased and there is considerable overlap with the range of Sn concentrations observed in unmineralized granites (Table 1). The difference in the means for mineralized and unmineralized granites is often less than the precision inherent in sampling and chemical analysis (Sheraton and Black, 1973). Thus, while high Sn concentrations (for example, 2x the average background concentration) are an indication of a Sn-mineralized granite, low values are inconclusive. The problem of variance arises from the occurrence of Sn in leucocratic granitic rocks as an accessory mineral such as cassiterite. A single grain of cassiterite 1 mm in diameter in a 1 kg sample of granite represents a whole-rock tin content of 3.6 ppm. A sub-sample of 100 g taken for pulping would yield an apparent tin content of 36 ppm if the cassiterite grain was included in the sub-sample, and zero if it was excluded.

The distribution of cassiterite in granites commonly has directional properties and this needs to be taken into account in sampling. In leucocratic granitic rocks cassiterite usually occurs in fissures and joints (Flinter, 1982b), many of which are hairline cracks not readily apparent in the field. Channel samples oriented normal to the macroscopic joint direction are preferable to samples of equant dimensions.

In mesocratic granitic rocks cassiterite occurs with quartz, fluorite, and topaz in small pods (microdomains) that are distributed randomly through the rock (Flinter, 1982b). In such cases, a sample of regular shape and ample size is required if both cassiterite-bearing macrodomains and barren granite are to receive due weighting. Chip samples are too small to indicate the Sn concentration in the bulk rock since they are

Table 1. Whole-rock Sn assays (Sn_R), cassiterite contents, and known mineralization for granitic rocks in the New England Fold Belt, N.S.W.

Granite Type	Pluton	Range of ⁽⁶⁾ Contents (ppm) Sn_R	Trace Cassiterite	Tin Deposits	
Aluminous Mesoadamellites (S-type)	Tobermory	<1 - 2	0/4 ⁽⁴⁾	None known	
	Copeton	<1 - 2	0/6	None known	
Calcic Mesoadamellites ⁽¹⁾ (I-type) Hornblende-bearing	Wards Mistake	<1 - 6	7/50	Yes	
	Carraí Granodiorite	<1 - 10	3/27	Yes	
	Botumburra Range	<1 - 6	0/15	None known	
	Rockisle	<1	0/5	None known	
	Mt. Dural	<1 - 4	4/19	Yes	
	Tingha	<1 - 20 5 - 28 ⁽⁵⁾	13/39	Yes	
	Bendemeer	4	0/1	None known	
	Moonki	3 - 6	0/3	None known	
	Walcha Road	2 - 4	0/4	None known	
	Calcic Leucoadamellites ⁽²⁾ (I-type and A-type) Mostly biotite-bearing	Oban River	1 - 3	1/3	Yes
Daisy Plains		<1	0/3	Yes	
Petrol		<1	0/2	None known	
Gilgai-Howell ⁽³⁾		1 - 10			
		8 - 30 ⁽⁵⁾	1/8	Yes	
Round Mountain		<1 - 6	0/2	Yes	
Bolivia Range		4	0/1	Yes	
Mt. Jonblee		3	0/1	Yes	
Petries Sugarloaf		1	0/1	None known	
Stanthorpe		3 - 4	0/3	None known	
Ruby Creek ⁽³⁾		4 - 15 ⁽⁵⁾			
6		0/3	Yes		
Mole Granite ⁽³⁾	2 - 6				
	21 - 47 ⁽⁵⁾	1/4	Yes		

- (1) Except for Carraí Granodiorite (4) 3/27 means three out of 27 (1kg) samples contained cassiterite in heavy concentrates.
 (2) Except for Mole Granite
 (3) A-type granites (Kleeman, 1982) (5) Neutron activation analysis (Juniper & Kleeman, 1979).
 (6) Tin determined by optical emission spectrography using Tennant's buffer.

unduly influenced by the inclusion or absence of cassiterite-bearing microdomains. Bulking chip samples across an outcrop may help to overcome this problem.

The variance in Sn concentrations of samples of mesocratic granitic rocks (5-25% ferromagnesian minerals) is lowered by the occurrence of lattice-bound Sn in hornblende (to 80 ppm) and biotite (to 250 ppm). Ferromagnesian minerals may contain nearly fifty percent of the Sn in the whole rock (Hesp, 1971) and are uniformly distributed.

Petrological categorization of granitic rocks as a basis for establishing Sn specialization has had mixed success. In New England, Sn mineralization occurs with varying intensity in a range of granite types Flinter (1982a), (Table 1). This does not reconcile with established concepts such as the uniquely specialized Sn granite of Rattigan (1964) — a high silica biotite-bearing leucogranite with a high whole-rock Sn concentration — and A-type granite of Loiselle & Wones (1979), or the two-fold classification into potentially Sn-mineralized S-type granites and unmineralized I-type granites (White et al., 1977). In New England, S-type granites have lower Sn contents than I-type granites (Table 1) suggesting that in this instance pre-enrichment of Sn in the crust, for example as palaeoplacers, has not been a factor in producing Sn-mineralized granites.

Gradational petrological indicators, such as the colour index, differentiation index, K/Rb ratio, and Li and F contents, appear to be better discriminants of potential Sn-mineralized granites (Levinson 1974, 1980) than clear-cut categories, but this may be because a more flexible interpretation of these data is possible.

The essential requirements for potential Sn-mineralized granites may be deduced from the hydrothermal geochemistry of Sn (Eadington, 1982). Given that Sn originates from granite magmas (Taylor, 1979), the granites will have a low water content and high halogen to water ratio. These magmas will rise to a high level in the crust promoting unmixing of a halide-rich aqueous phase. (Halide-rich brines readily dissolve cassiterite and unmixing promotes scavenging of Sn from the granite magma.) They will be leucocratic since ferromagnesian minerals that crystallize early can remove Sn from the melt. They will belong to an ilmenite-series rather than a magnetite-series granite (Ishihara, 1977), since ilmenite-series granites crystallize at a low oxygen fugacity which is required for the concentration of cassiterite by circulating hydrothermal solutions. At high oxygen fugacities (such as in magnetite-series granites) cassiterite will remain dispersed. High oxygen fugacities also increase the Fe^{3+}/Fe^{2+} ratio of ferromagnesian minerals which enhances the tendency for the occurrence of lattice bound Sn (Hesp, 1971; Eadington and Kinealy, in prep.). This 'description' includes A-type granites and Rattigan's (1964) 'tin granite' but also other granites outside these categories.

2.3.3 SKARNS AND CARBONATE REPLACEMENT DEPOSITS

One aim of geochemical exploration by chemical analysis is to detect anomalies that would not be found by traditional prospectors, for instance, where the grain size of cassiterite is very fine. Anomalies derived from skarn Sn mineralization are of this type. Tin in skarns is largely lattice bound in calc-silicate minerals, such as andradite and hornblende, and any minor cassiterite that may occur is fine grained. Often skarn Sn mineralization contains 0.1% to 1% tin in a body of 10 million - 90 million tonnes, so the geochemical anomaly may be substantial even though panning may not produce an obvious cassiterite concentrate.

It can be shown from hydrothermal geochemistry that certain mineral assemblages are unlikely to contain cassiterite Sn mineralization in economic grades (Fig. 1). Rocks dominated by magnetite, andradite or grossular garnet, and diopside-hedenbergite crystallize at too high a temperature for Sn to be concentrated as cassiterite. On the other hand carbonate replacement ores are important sources of cassiterite, but these are usually formed at low temperatures and contain cassiterite with pyrrhotite or pyrite (Fig. 1) and gangue that includes carbonate minerals. Carbonate minerals react to form calc-silicate minerals at about 400-450°C which is an important marker in Sn exploration (Fig. 1). Oxide (non-prospective) and sulphide (prospective) skarns will have different magnetic and electrical properties and give rise to ground water of different pH and chemical composition.

The importance of pyrrhotite-cassiterite carbonate replacement ores requires that carbonate rocks be explored for Sn. However, questions such as cassiterite content and recovery should be considered at an early stage of exploration by using mineralogical studies and discriminatory chemical analyses.

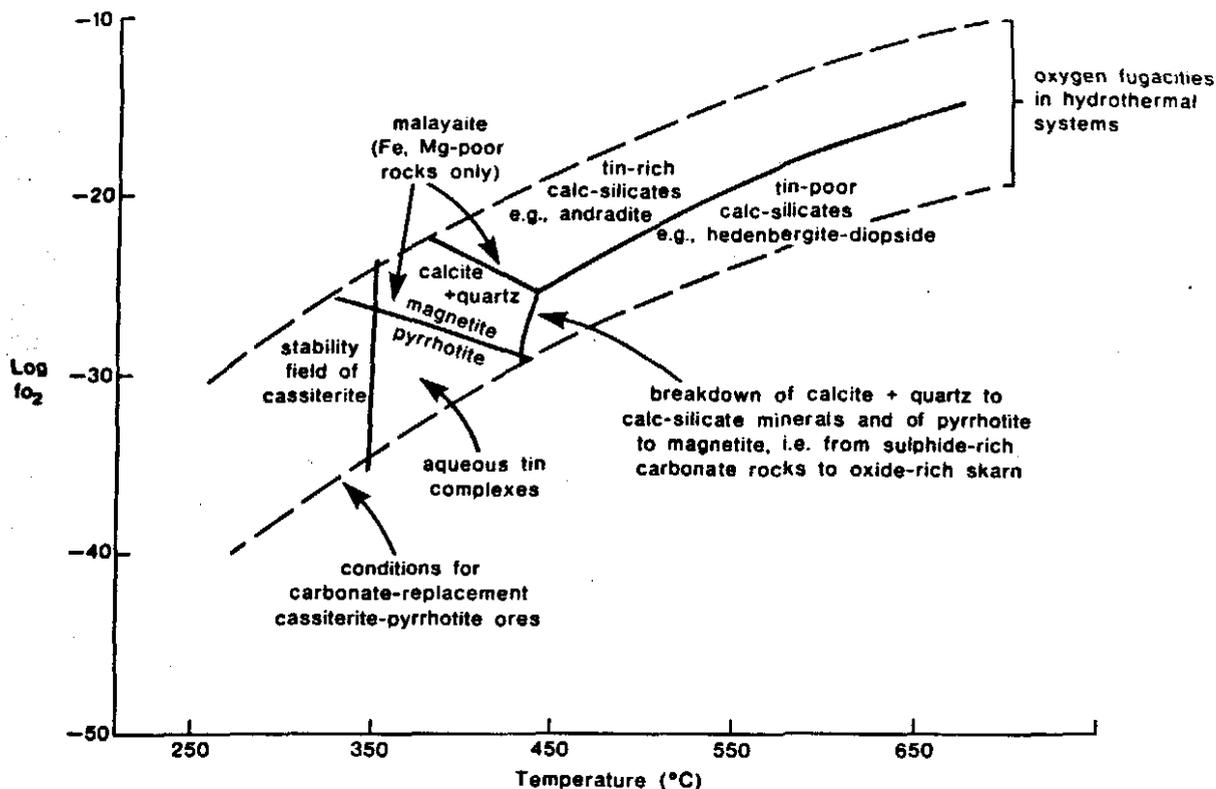


Figure 1. Selected mineralogical phase boundaries relevant to stanniferous skarns. The cassiterite and magnetite-pyrrhotite stability fields are for pH 7 to 9 and total sulphur concentration of 0.1 (applicable to calcite-pyrrhotite-magnetite-bearing rocks). At the oxygen fugacities that pertain in hydrothermal systems, bracketed here by the haematite/magnetite (upper) and iron/wüstite (lower) buffers, iron sulphide-rich carbonate rocks react to magnetite-rich calc-silicate rocks by a series of reactions near 400 C.

S2.3.4 CHEMICAL ANALYTICAL METHODS FOR TIN

Tin has oxidic, lithophile, and chalcophile affinities. In mesocratic granitic rocks and skarns it frequently occurs in a variety of minerals, rock-forming and accessory minerals and as cassiterite. It is useful, therefore, to have techniques of chemical analysis for determining the mineralogical residence of Sn. However, the presence of cassiterite and lattice-bound Sn together presents many problems in chemical analysis. Cassiterite does not dissolve in the usual mineral acids or common laboratory fluxes that are used to dissolve silicate minerals (Hall, 1980). NH_4I volatilization was developed as a rapid method to analyse for cassiterite but it doesn't dissolve silicate minerals. It has been supplanted in exploration by XRF analysis and is now generally reserved for estimating the cassiterite (+ stannite) content of rocks once anomalies have been detected. Although the NH_4I fusion does not dissolve silicate minerals, it can extract Sn from them (Fig. 2) possibly due to solid state reactions involving, for example, magnetite (Eadington & Kinealy, in prep.). The extraction is temperature dependent and the optimal temperature for NH_4I volatilisation of $500^{\circ}C$ should not be exceeded by more than 50 to $100^{\circ}C$ if the cassiterite content of skarn rocks is being determined. Extraction of Sn from rock-forming minerals is not a problem for cassiterite in granites or siltstones and the importance of

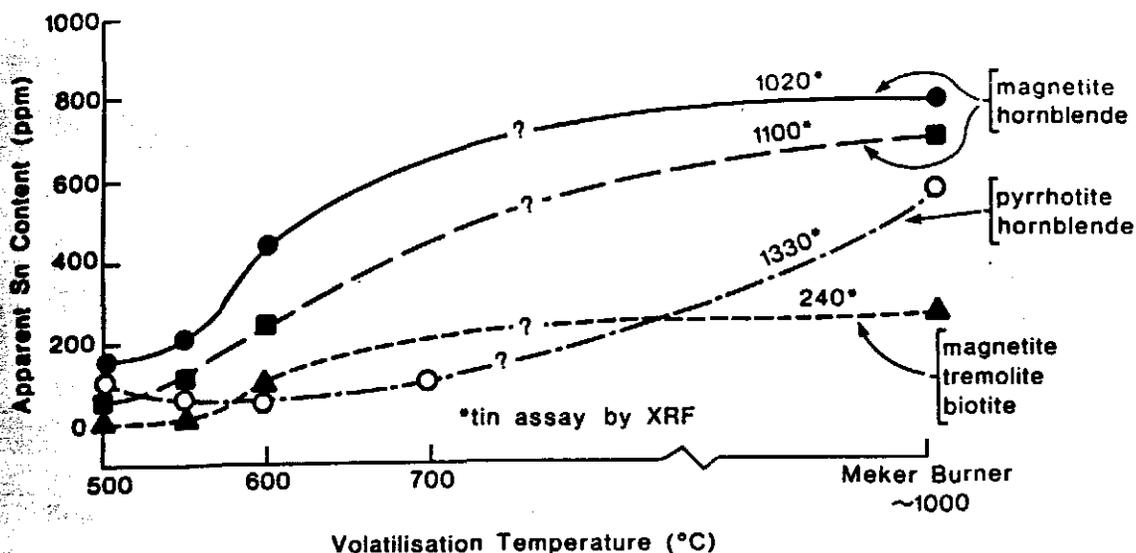


Figure 2. Increasing yield of NH_4I volatilized tin from skarn rocks as a function of temperature. (*, Sn assay by XRF).

temperature, when analysing skarn rocks, may be overlooked in some laboratories.

In XRF analysis the pressed powder technique using standards with a matrix similar to the samples is suitable for granites or siliceous sediments. However, in magnetite skarns, ironstones over Sn mineralization in tropical regions, or rocks with high sulphide mineral contents, this method cannot compensate for the large variations in mass absorption coefficient due to changing iron content. The method will result in errors that may be as high as 100%. This could be sufficient to create false anomalies or obscure real anomalies. For samples such as these, determination of the mass absorption coefficient, either by direct measurement or by computation from the major element composition, is required on each sample. Sometimes Sn is determined on fused discs to avoid matrix corrections (and for simultaneous determination of the major elements). Care is required since, as indicated above, the flux may not completely dissolve cassiterite.

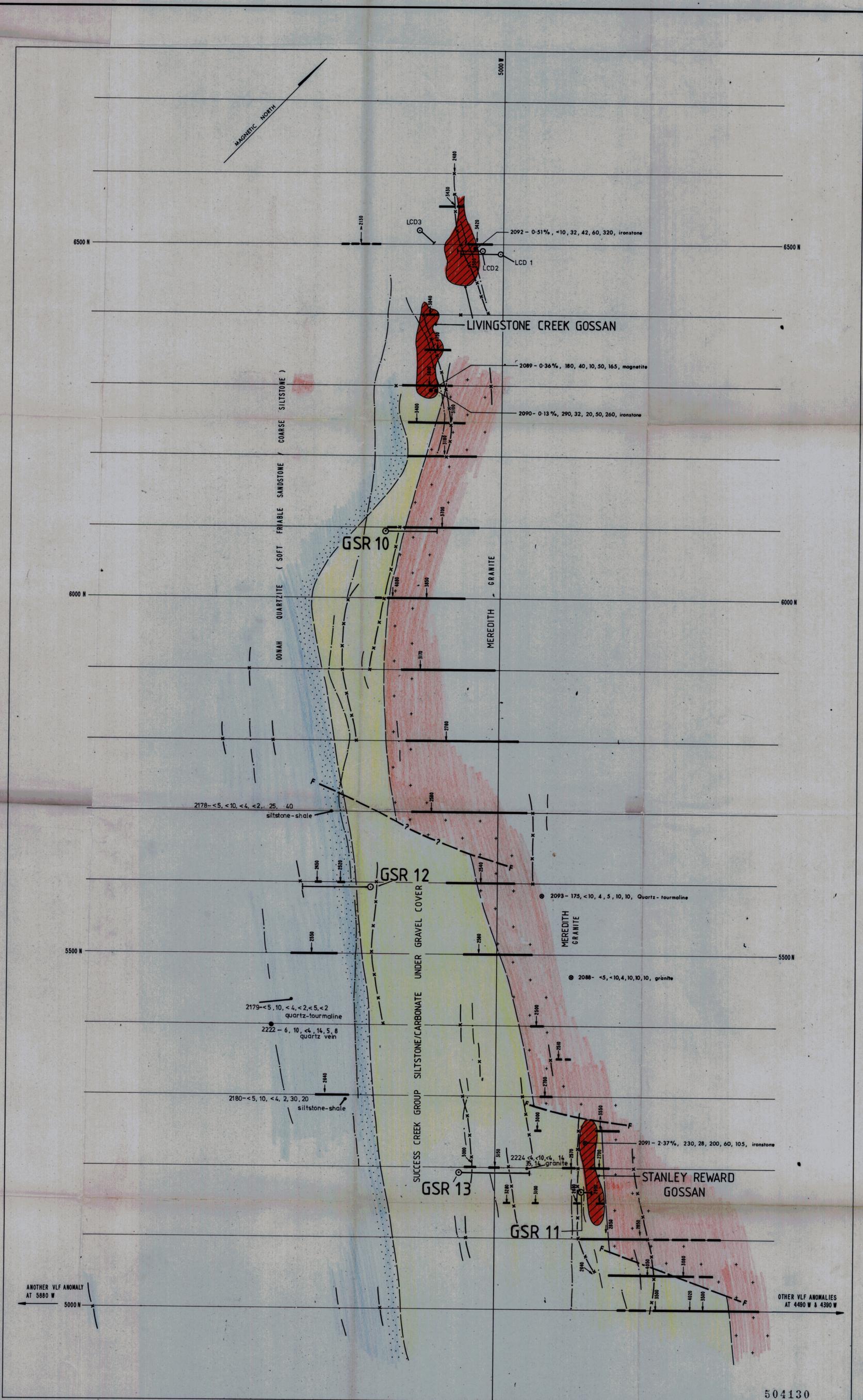
In AAS analysis detection limits remain a problem. The hydride method and selection of certain spectral lines improves sensitivity but severe matrix interference is introduced that may eliminate any advantage.

In short, many problems remain in the chemical analysis of Sn in geological materials. Some problems have not been overcome or even fully evaluated. Certain analytical procedures for Sn may not be of sufficient quality to justify advanced techniques of data analysis.

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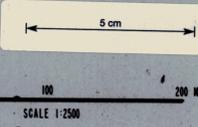
504130

REFERENCE

● Grab sample locality with sample number, analysis and rock type
 2089 - 0.36%, 180, 40, 10, 50, 165, magnetite.
 (Sn) (W) (Mo) (Cu) (Pb) (Zn)
 Analysis in ppm unless otherwise stated

○ Grab sample locality - position approximate

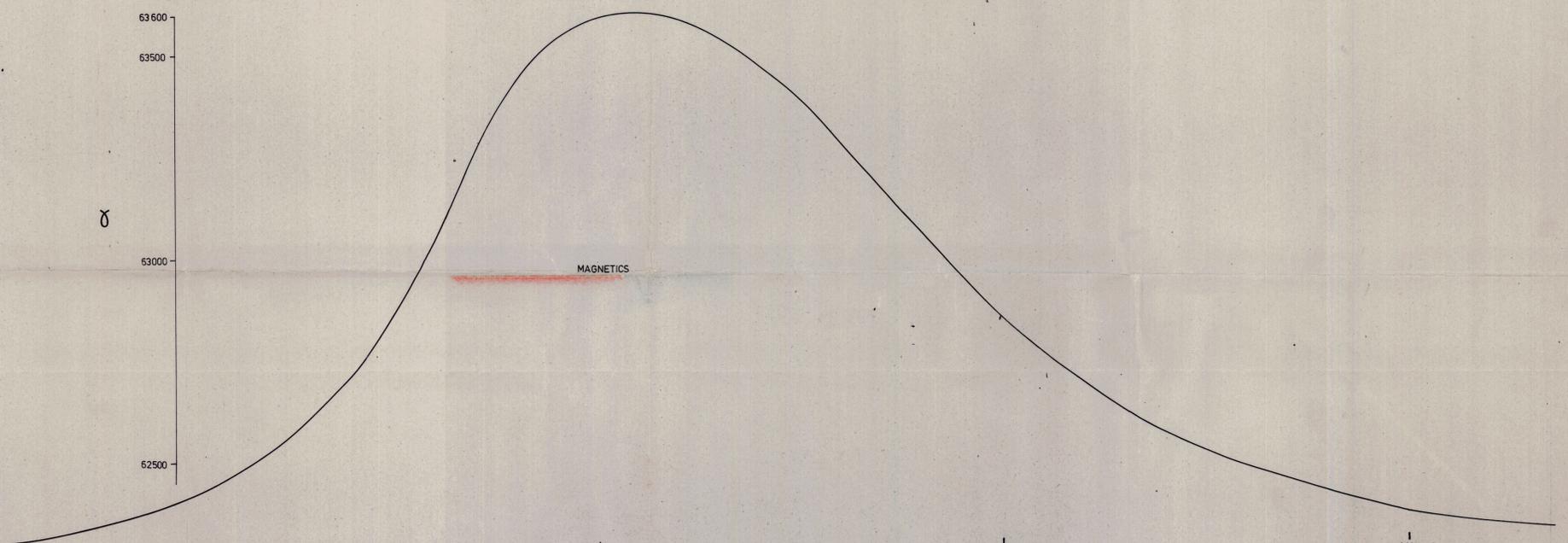
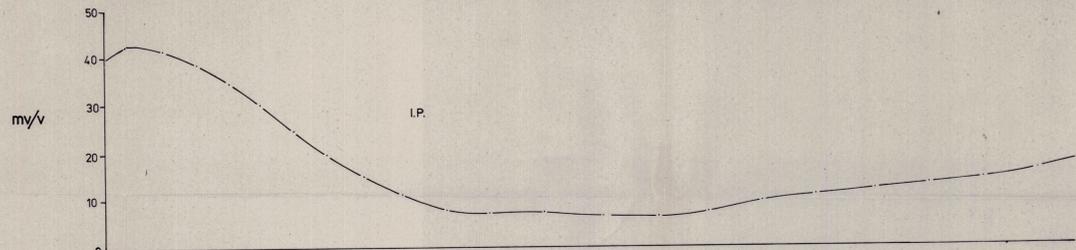
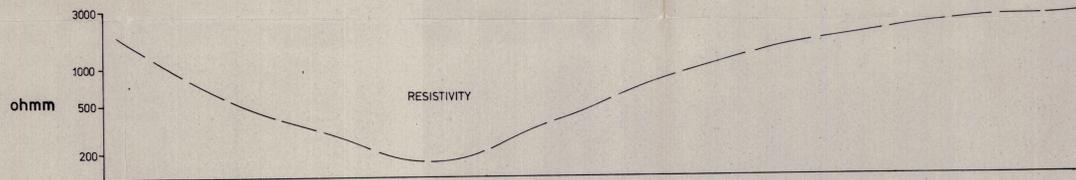
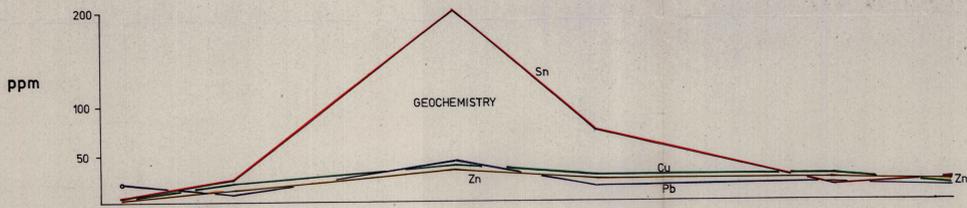
- 4000 Peak value in nT (add 60K)
- Magnetic Anomaly (approx. half width)
- I.P. Chargeability Anomaly
- V.L.F. - E.M. Anomaly
- Fault
- Geological boundary
- Gossan
- GSR 10 Diamond Drill Hole, with number



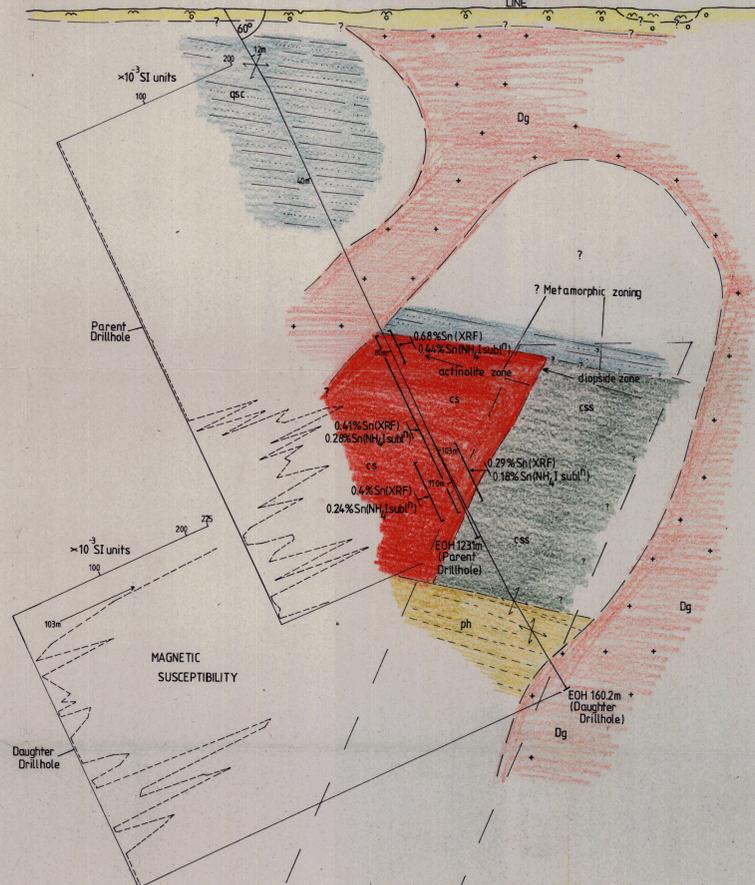
Note: Data after CSR Limited Minerals Division

83-2050

UNION CORPORATION (AUSTRALIA) PTY LIMITED		
STANLEY REWARD TIN PROSPECT - E.L. 53/70 WESTERN TASMANIA		
DIAMOND DRILLHOLE AND ROCK SAMPLE LOCALITIES AND GEOPHYSICAL TRENDS		
PLAN 1	NJW	AUGUST, 1983



SOUTH WEST 5200W COLLAR COORDINATES L 6100N / 5163W Button grass plain 5100W BASE LINE NORTH EAST 5000W 4900W



LEGEND

- Alluvium
 - Gravels and wash
 - Granite / Adameite (Devonian)
 - Quartzite/calcareous siltstone
 - Carbonate skarn/calc-silicate hornfels
 - Calc-silicate skarn
 - Pelitic hornfels
- } SUCESS CREEK GROUP (Eocambrian)

REFERENCE

- Geological contact, interpretative
- Bedding dip in core
- Magnetic source, interpretative (Geospex)
- Magnetic Susceptibility
- Drillcore analyses as per cent tin (method - XRF or ammonium iodide sublimation(NH₄I sub^l))

CSR DATA

- Gradient E.I.P chargeability (millivolts/volt, M3 slice on IPRB receiver)
- I.P. Resistivity (ohm metres)
- Bedrock geochemistry: Tin (red), Copper (green), Lead (blue), Zinc (yellow)

BOREHOLE SURVEY DATA

DEPTH (m)	ANGLE OF DECLINATION	APPARATUS
0	60°	Inclinometer
40	66°	Acid/test tube
80	66°	Acid/test tube
110	64°	Acid/test tube
160	760°	Acid/test tube

50m

SCALE 1:500

0 10 20 30 40 50 metres

NOTE: PLANE OF SECTION 047°m (Grid East)

UNION CORPORATION (AUSTRALIA) PTY LIMITED

STANLEY REWARD TIN PROSPECT - E.L. 53 / 70
WESTERN TASMANIA 504131

DIAMOND DRILLHOLE
GSR 10 (L 6100 N)
GEOPHYSICS, GEOCHEMISTRY
AND INTERPRETATION
82-2050

PLAN No 2

NJW

AUGUST, 1983

62600
62400
62200

8

MAGNETICS

STANLEY REWARD GOSSAN

UCT 2091 Sn W Mo Cu Pb Zn (ppm)
2.37% 230 28 200 60 105

SOUTH WEST

COLLAR COORDINATES
L5164N / 4869W

Mullock heaps

NORTH EAST

LEGEND

-  Overburden, gravel
 -  Granite / Adamellite (Devonian)
 -  Quartzitic sediments
 -  Carbonate skarn
- } SUCCESS CREEK GROUP (Eocambrian)

REFERENCE

-  Geological contact interpretative
-  Bedding dip in core
-  Vein with core dip
- UCT 2091 • Grab sample with analysis

NOTE: Magnetic Susceptibility of core $< 0.32 \times 10^{-3}$ SI units

0.08 per cent tin, 34 to 35 metres

Tourmaline-sulphide veins

EOH 66.1m

5 cm

SCALE 1:500

0 10 20 30 40 50 metres

NOTE: PLANE OF SECTION 032°m

DRILLHOLE SURVEY DATA

DEPTH (m)	ANGLE OF DECLINATION	APPARATUS
0	70°	Inclinometer
50.3	77°	Acid test tube
66	?	UCA Survey Instrument did not settle - no readings.

UNION CORPORATION (AUSTRALIA) PTY LIMITED

STANLEY REWARD TIN PROSPECT - E.L. 53/70
WESTERN TASMANIA

PERCUSSION / DIAMOND DRILLHOLE

GSR 11

(STANLEY REWARD GOSSAN)
MAGNETICS AND INTERPRETATION

83-2050

504132

PLAN No 3

NJW

AUGUST, 1983

62500
62400
62300
62200

SOUTH WEST

5360W

5300W

5260W

5200W

5100W

Bedding Dip projected
60m north

Bedding
dip

Quartz vein,
(UCT 2222, Sn-6, W-10, Mo-4,
Cu-14, Pb-5, Zn-8 (ppm))

Button grass flat

COLLAR COORDINATES
L 5400N / 5176W

NORTH EAST

Button grass plain

Bedding dips

50°

$\times 10^{-3}$ SI units

LEGEND

-  Alluvium
-  Gravel
-  Sandstone-siltstone, often laminated and banded (OONAH FORMATION - LOWER SUCCESSION - Late Pre Cambrian)

REFERENCE

-  Bedding dip in core
-  Magnetic Susceptibility
-  Magnetic source, interpretative (Geospex)
-  Grab sample, with number and analysis
-  Direction of facing



SCALE 1:500

0 10 20 30 40 50

NOTE: PLANE OF SECTION 047°m (Grid East)

MAGNETICS

MAGNETIC
SUSCEPTIBILITY

0.04 per cent tin, 0.1 per cent copper,
breccia, 1.07 metres

0.4 metres of
0.29 per cent zinc
in quartz-muscovite
(pyritic)

EOH 183.9m

DRILLHOLE SURVEY DATA

DEPTH (m)	ANGLE OF DECLINATION	APPARATUS
0	50°	Inclinometer
50	60°	Acid test tube
100	59°	Acid test tube
150	54°	Acid test tube
183	43°	UCA Survey Instrument

(Azimuth 213°)

UNION CORPORATION (AUSTRALIA) PTY LIMITED

STANLEY REWARD TIN PROSPECT - E.L. 53 / 70
WESTERN TASMANIA

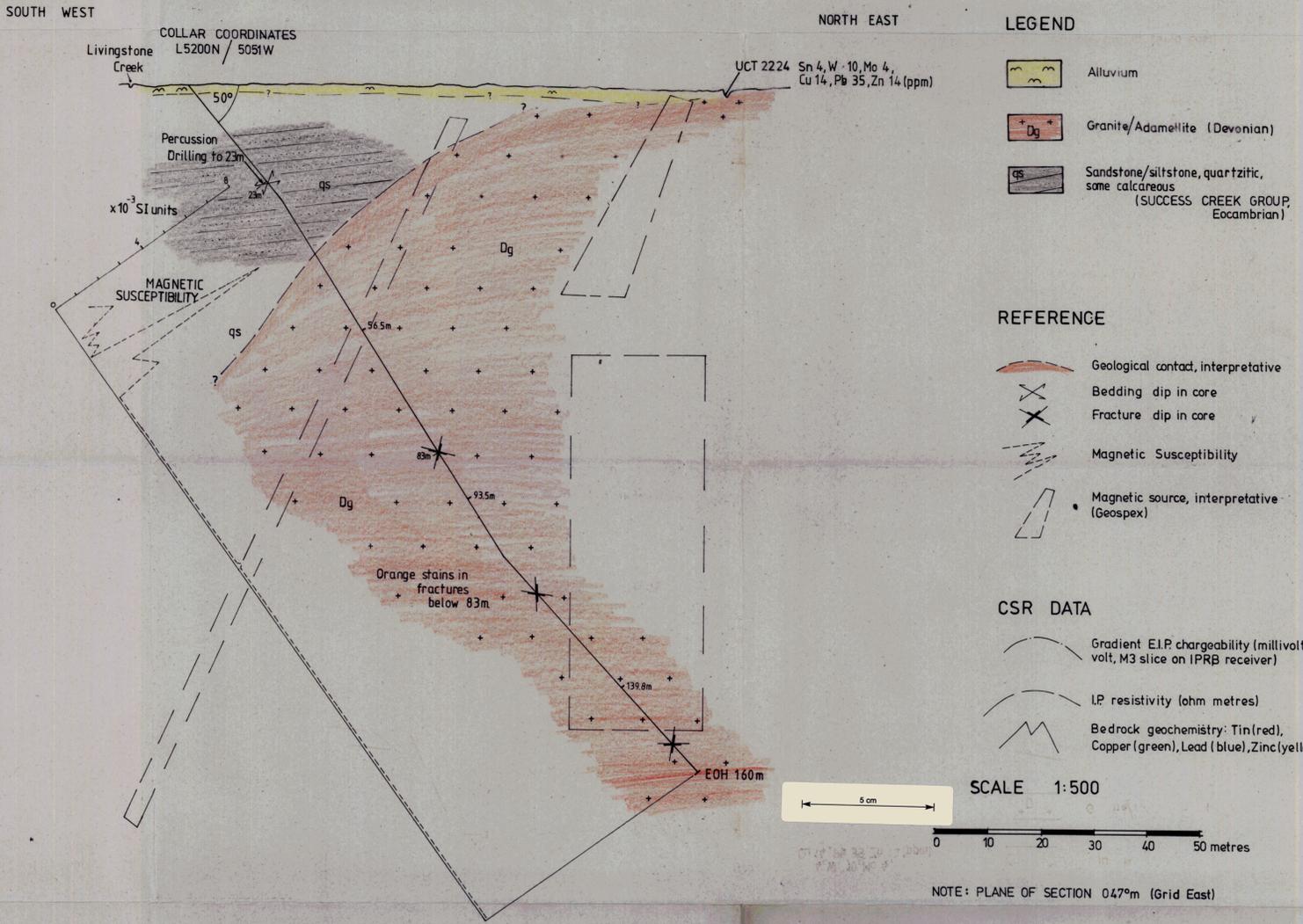
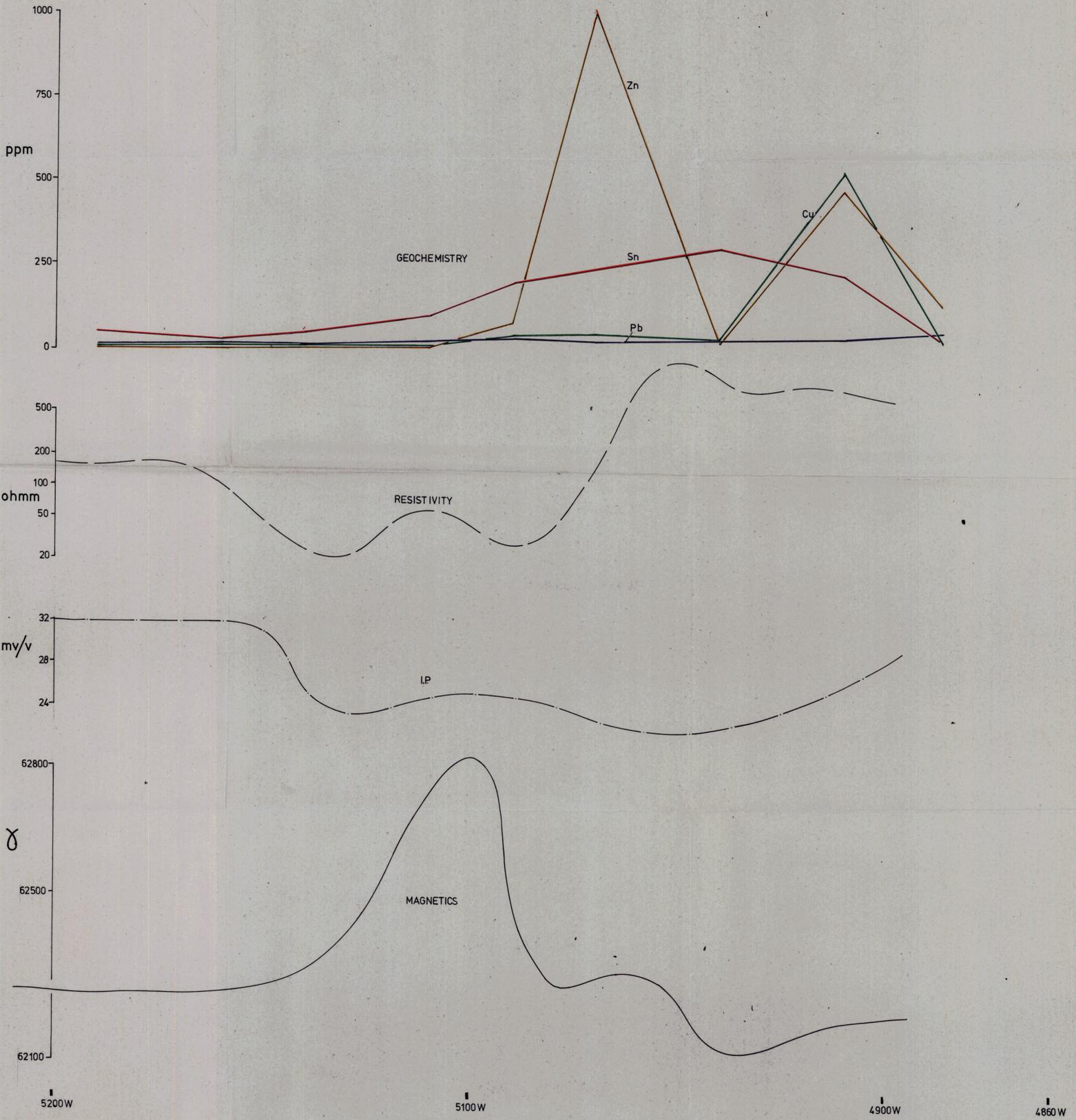
DIAMOND DRILLHOLE
GSR 12 (L 5400 N)
MAGNETICS AND INTERPRETATION.

83-2080 504133

PLAN No 4

NJW

AUGUST, 1983



DRILLHOLE SURVEY DATA		
DEPTH (m)	ANGLE OF DECLINATION	APPARATUS
0	50°	Inclinometer
56.5	57°	Acid test tube
93.5	58°	UCA Survey Equip.
139.8	47°	UCA Survey Equip.

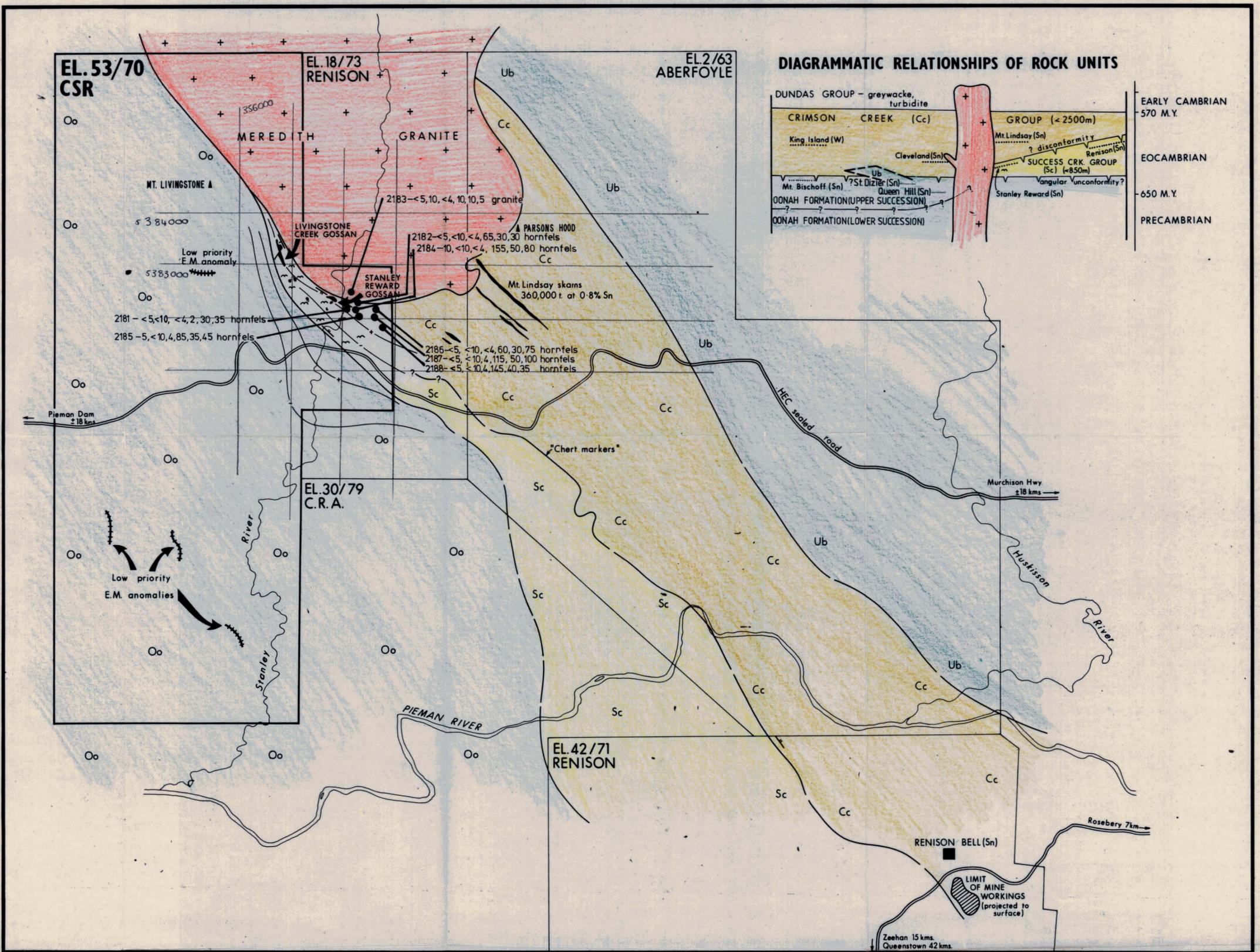
UNION CORPORATION (AUSTRALIA) PTY LIMITED

STANLEY REWARD TIN PROSPECT - E.L. 53/70
WESTERN TASMANIA

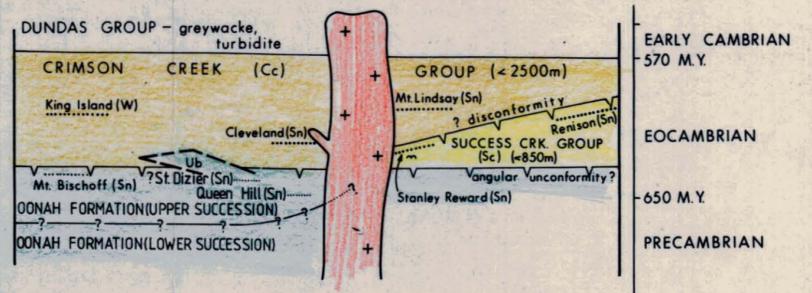
DIAMOND DRILLHOLE
GSR 13 (L 5200N)
GEOPHYSICS, GEOCHEMISTRY
AND INTERPRETATION

83-2050 504134

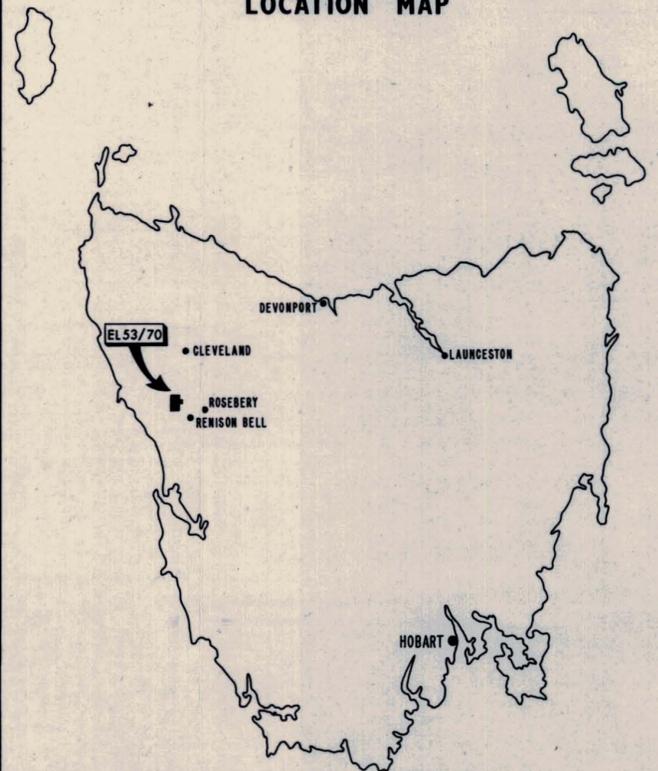
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DIAGRAMMATIC RELATIONSHIPS OF ROCK UNITS



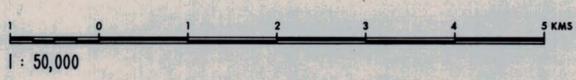
LOCATION MAP



LEGEND

- QUATERNARY
 - Alluvium
- DEVONIAN
 - Adamellite
- CAMBRIAN
 - Ub - Serpentine and associated rocks
 - Cc - Crimson Creek Grp. - siltstone, tuff, greywacke
- PRECAMBRIAN
 - Sc - Success Creek Grp. - siltstone, mudstone, carbonate
 - Oo - Oonah Formation (? Lower Succession) - distal turbidites

SCALE



KEY

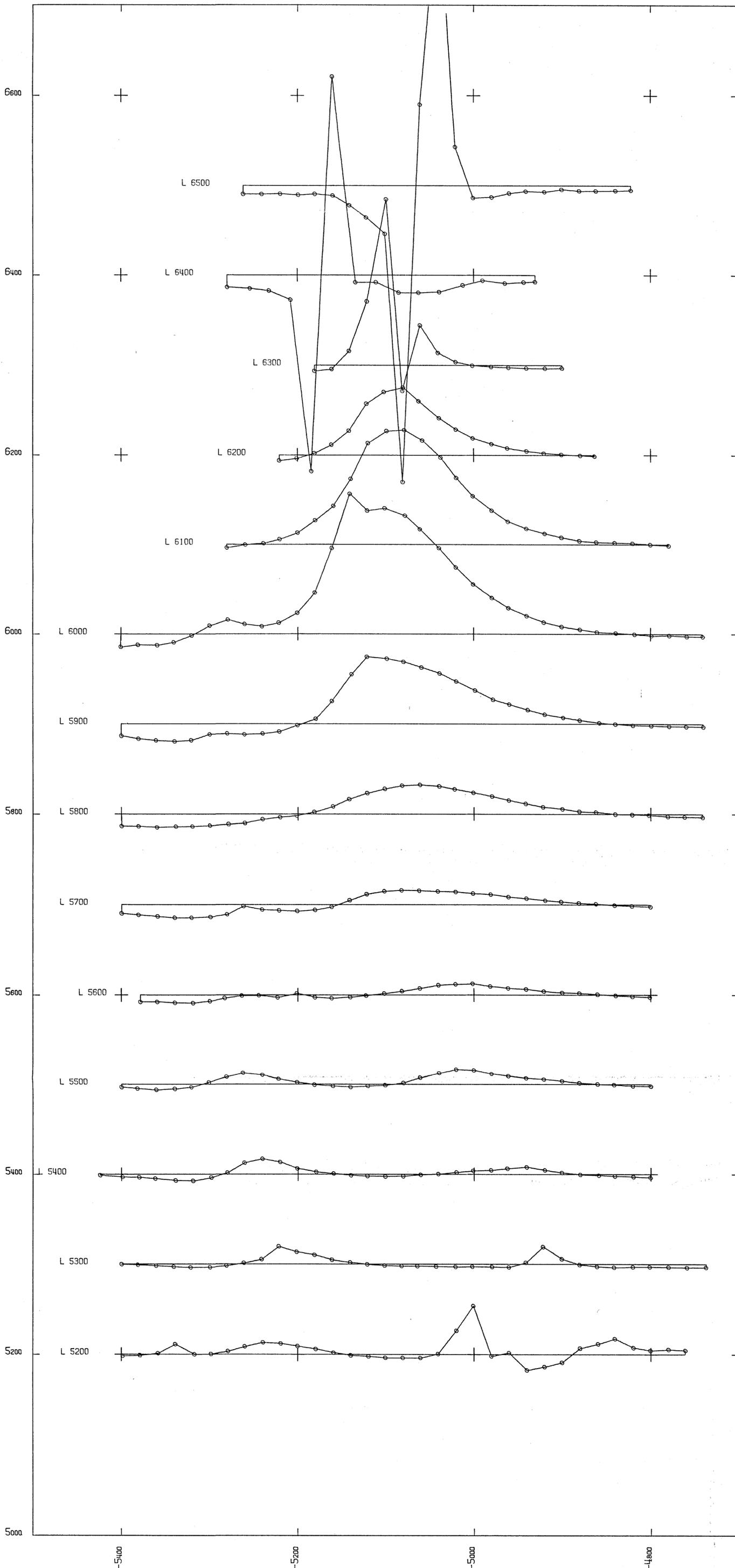
- Geological contact; approximate
- Dip and strike; steep, shallow
- Skarn
- Magnetic anomaly; 'high', 'low'
- E.M. anomaly
- Stratigraphic position of mineral deposit; W-tungsten, Sn-tin
- Exploration Licence boundary
- Sealed road
- Grab sample locality with sample number, analysis (ppm) and rock type

UNION CORPORATION (AUSTRALIA) PTY LIMITED

STANLEY REWARD TIN PROSPECT - EL. 53/70
WESTERN TASMANIA

GEOLOGY, GENERAL FEATURES
AND ROCK SAMPLE LOCALITIES
WEST OF STANLEY REWARD
GOSSAN 83-2050

STANLEY REWARD TIN PROSPECT



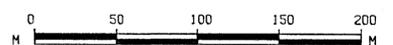
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BASE LEVEL = 62300 NT

5 cm

SCALE

1:2500



504136

UNION CORPORATION (AUST.) PTY LIMITED

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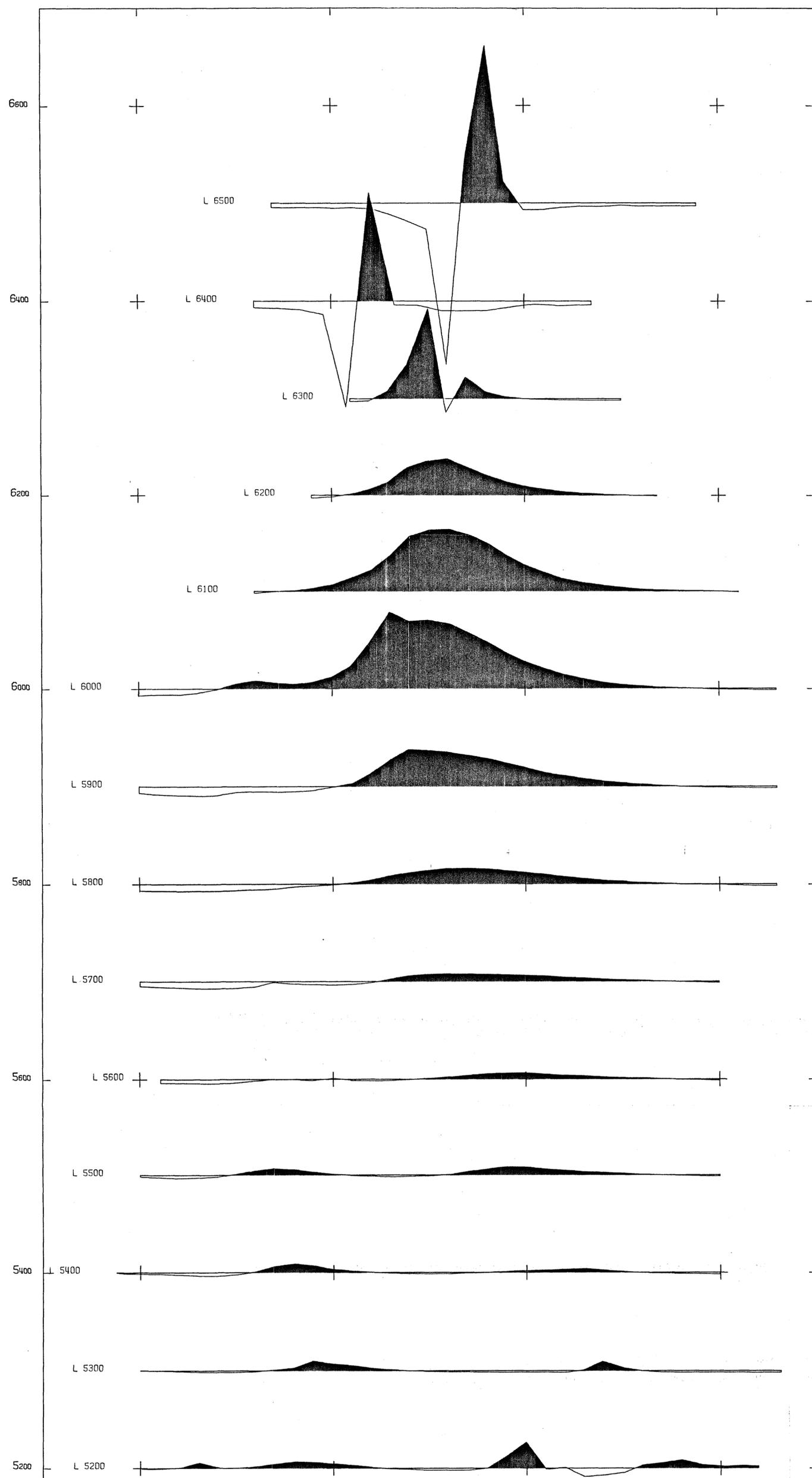
TOTAL MAGNETIC INTENSITY

83-2050

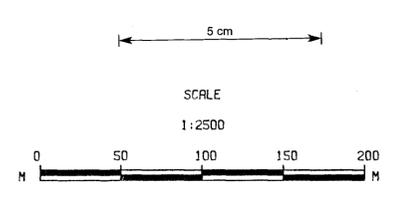
PROJECT:

DATE: 13-FEB-83

STANLEY REWARD TIN PROSPECT



VERTICAL SCALE = 500 NT/CM
BASE LEVEL = 62300 NT



504137

UNION CORPORATION (AUST.) PTY LIMITED

STACKED PROFILES

TOTAL MAGNETIC INTENSITY