NORTHERN TERRITORY GEOLOGICAL SURVEY

TECHNICAL REPORT

GS77/7

Diamond drilling investigations. Rosemary tin mine

~~DIAMOND DRILLING INVESTIGATIONS~~

~~LEWIS'~~ MANGANESE PROSPECT

Department of Mines and Energy

NORTHERN TERRITORY GEOLOGICAL SURVEY REPORT G.S. 77/7

DIAMOND DRILLING INVESTIGATIONS, ROSEMARY TIN MINE, N.T.

by

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CONTENTS

1. SUMMARY

Following an application for drilling assistance at the Rosemary Tin Mine in May, 1975, Mines Branch, Department of the Northern Territory, drilled five diamond drill holes, totalling 292 metres, between June and November, 1976.

Tin has been mined from a mineralized lode which has an outcrop length of about 400 metres. The lode trends 325°M and dips to the east at about 75°. At it's southern end the lode is terminated at a depth of 10 metres. The lode appears to be terminated by a joint or small fault which dips at about 40° to the east.

The diamond drilling programme indicates that the joint/fault - lode intersection plunges at a shallow angle to the north. Consequently only the northern end of the lode offers some (limited) depth potential (D.D.H. 5 intersected the lode, 0.8 metres wide averaging 0.6% Sn, at a vertical depth of 25 metres.) The programme also indicates that the lode does not occur again below the joint/fault plane.

The lode as outlined by drilling offers only limited tonneage potential and any plans for development should be limited to the northern end of the lode.

2. INTRODUCTION

An application for drilling assistance at ML 227A was made by the leaseholder M.R. Millwood in May, 1975. This application was subsequently approved. A drilling programme totalling 292 metres was carried out to test the depth extension of the mineralized lode over a strike length of about 400 metres. The drilling programme was commenced in June, 1976 and completed in November, 1976.

During the period 1975-76 plane table mapping of surface workings and environs, and mapping of underground workings were undertaken by Mines Branch officers.

3. LOCATION AND ACCESS

Map : McKinlay River 1:100 000 Topographic Sheet 5271 Series R621
Co-ordinates : Lat.13° 24' 30"
Long.131° 46' 20"
Universal Grid Reference: HL002162

Vehicle access from Darwin is by the Stuart Highway to the Fountainhead turn-off and then by gravel road via Mt. Wells. The turn-off to the mine is about 15 kilometres from Mt. Wells on the Mt. Harris road. A track leading south-east and then south from the turn-off for about 3 kilometres leads to the mine. The McKinlay River crossing 13 kilometres from Mt. Wells is impassable for much of the "wet" season.

4. PREVIOUS WORK

The Rosemary (or Touhys') tin prospect was discovered by the Touhy brothers in 1966. Between 1967 and 1970 the Touhy brothers worked the mine, concentrating their efforts on high grade sections of the lode. Production for this period was 8.53 tonnes of tin at an average grade of 1%.

../3

United Uranium N.L. was offered an option on the lease in 1967 and carried out an extensive channel sampling programme over the length of the lode. Making optimistic assumptions as to vertical extent and width of the lode, the company calculated maximum ore tonneages of 80,000 to 90,000 tonnes with recoverable grade ranging from 0.68% to 0.82% tin. The company did not take up the option.

Between 1968 and 1970 Mt. Masson Mining Pty. Ltd., later Mary River Mines Pty. Ltd., under an agreement with the leaseholders carried out extensive underground development in the form of two adits. Some ore from this development was crushed at the company battery at Mt. Harris but no production figures are available.

Development dirt stockpiled near the mine was trucked to Mt. Wells for crushing by W.E. Casey between 1972 and 1974. A total of 1058 tonnes of ore were crushed yielding 1.26 tonnes of tin at an average grade of 0.12% tin.

In 1975 the tenement was purchased by the present leaseholder M.R. Millwood. Mr. Millwood has been mining the southern section of the lode, stoping lode material above the southern development adit. Production from mining in 1976 was 6.5 tonnes of tin at average grade of 1.32% tin.

5. GEOLOGY

The Rosemary tin mine lies within sediments of the Lower Proterozoic Golden Dyke Formation. In the mine area these sediments consist of siltstone, shale and greywacke. The sediments strike north-north-west and dip to the east at about 40°. A contact with sediments of the Lower Proterozoic Burrell Creek Formation lies approximately 1 kilometre west of the mine while a large outcrop of dolerite lies immediately east of the mine area.

Mining to date has been confined to a mineralized lode within a shear zone trending 325° M. The lode outcrops intermittently over a strike length in excess of 400 metres, dips to the east at about 75° and has an average width of 0.5 metres. Taylor (1967) considered the lode to lie within a fault zone rather than a shear zone due to the presence of occasional brecciation on the walls of the lode. Since no evidence of displacement is evident at the surface or underground the term shear zone is preferred in this report.

At the southern end of the mine workings the lode is terminated at shallow depth (approximately 10 metres) by a joint or fault plane which dips to the east parallel to the bedding. This joint/fault plane can be seen in the southern development adit, as a zone of iron-enriched material, about 20 cm. thick, containing minor tin mineralization. The joint/fault plane -lode intersection plunges to the north at a shallow angle (less than 10°), as indicated by the increasing depth of the base of workings in a northern direction.

Tin mineralization occurs as very fine grained cassiterite; in panned samples the cassiterite is mid-brown to pinkish colour, and is not readily identifiable in hand specimens. The cassiterite is contained within orange - pink, limonitic clay material with fine grained quartz and chlorite, Taylor (1967) noted that some portions of the lode are more siliceous and these sections are commonly poorer in tin.

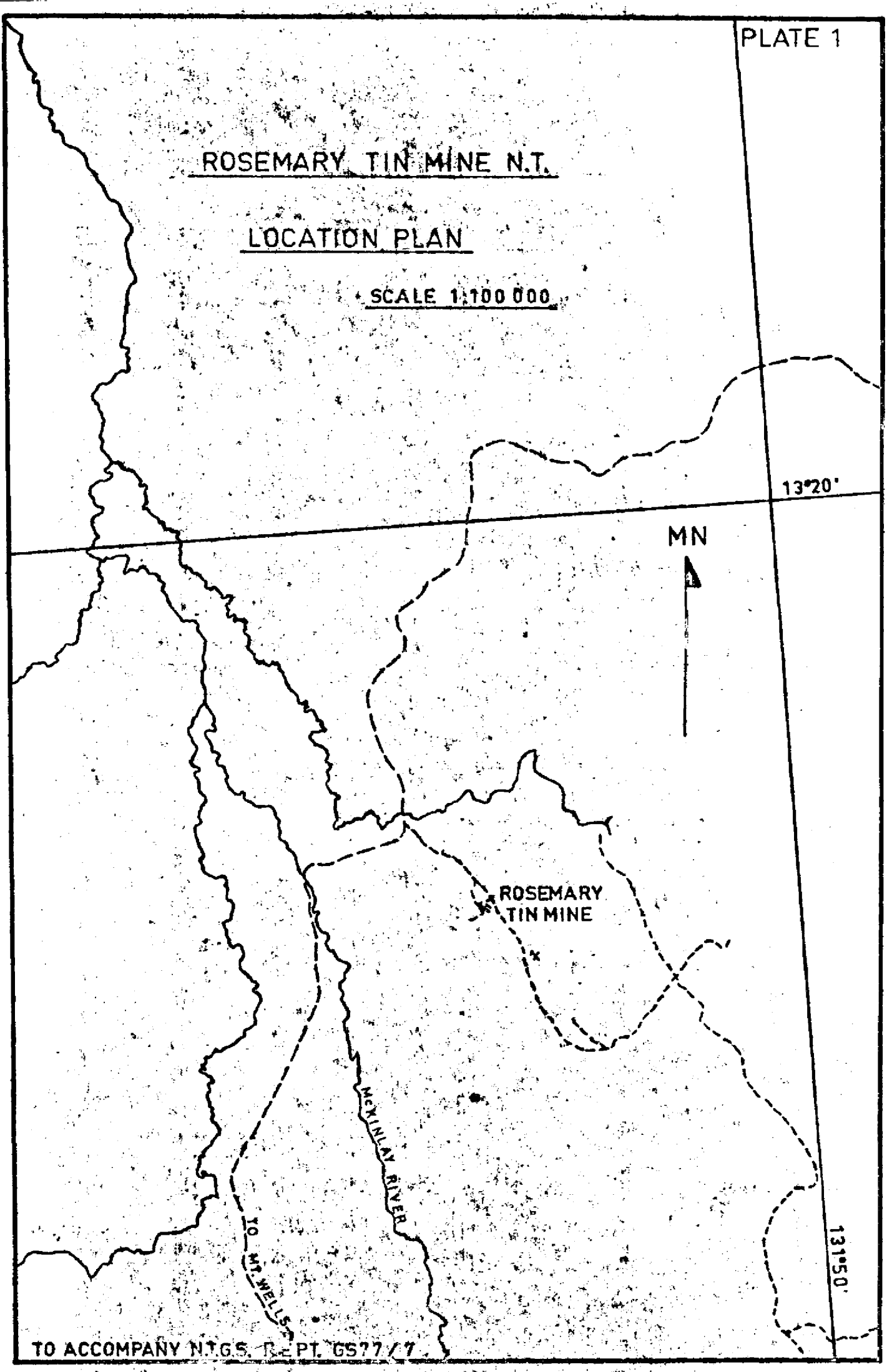
../4

PLATE 1

ROSEMARY TIN MINE N.T.

LOCATION PLAN

SCALE 1:100 000



TO ACCOMPANY N.T.G.S. R. PT. GS77/7

The lode is contained within siltstone, and has extensively impregnated and replaced the country rock in sections, while in other sections the siltstone / lode contact appears to be quite sharp.

A magnetic high is located over the mine area and this may indicate a granite cusp at shallow depth as has been inferred in the Mt. Masson area. Tin bearing fluids emanating from the granite are the probable source of the tin mineralization.

In the course of mapping the lease area,two other tin bearing occurrences have been noted, these are shown on plate 2. The first lies south-south-west of the lode and almost on the same line as the lode, it consists of minor diggings in quartz-hematite material. One sample taken at this point assayed 1.3% tin. The second occurrence lies to the east of Millwood's camp and has a similar strike direction to the main lode, channel samples taken from this lode are said to have given some interesting tin values.

At the top of the hill a little north of Millwood's camp there is an outcrop of ironstone caprock. This has a gossaneous appearance but samples taken from this outcrop have revealed no tin, gold or other base metal values.

6. DIAMOND DRILLING RESULTS

Five diamond drill holes totalling 292 metres were completed by the Mines Branch in 1976. (See Plate 2). Drilling conditions were not good due to the broken and friable nature of much of the subsurface material. Core recovery, particularly near projected lode zones was often poor and in some instances all core was lost (i.e. D.D.H. 4; 20.2 - 22.6m.) Where accessible, holes were surveyed with an acid tube. All core was geologically logged and 69 split core samples and 51 sludge samples were forwarded to the East Point Laboratories, Department of the Northern Territory for assay. All samples were assayed for tin and some samples were assayed for lead and arsenic.

D.D.H. 1 was designed to test the possibility that the lode might "make" again at depth, below the joint/fault plane. Argillaceous siltstones and below the oxidised zone, carbonaceous shales and siltstones were the main rock types encountered. There were no intersections of lode material. This hole has shown that the lode does not "make" again below the joint/fault plane at an economically workable depth.

D.D.H. 2 was designed to test the lode at a depth of 30 metres below the entrance to the southern development adit, the area where mining activity was concentrated in 1976. Argillaceous siltstone was the main rock type encountered. No indication of tin mineralization was present proving the lode is terminated at a depth of less than 30 metres below the entrance to the southern adit.

D.D.H. 3 was designed to test the lode at a depth of 15 metres in the flat area between the two development adits where no lode outcrop is developed. Siltstone was again the main rock type encountered. No lode intersections were noted in the course of logging. A sludge sample in the interval 0-3 metres assayed 3.5% tin but this was subsequently shown to be caused by a boulder of lode material which had been moved when the drill platform was being made. A sludge sample for the interval 15-18 metres assayed 0.2% tin.

../5

Several narrow iron-rich veins were encountered in this interval and it is probable that this represents the joint/fault plane. Assuming this is the joint/fault plane with a 40° dip to the east, the lode at this point would be terminated at a depth not exceeding 5 metres.

D.D.H. 4 was designed to test the lode below an open cut section of the lode where good tin values had been obtained by United Uranium N.L. in their channel sampling programme. (Plate 3). Mainly siltstone was again encountered, but many quartz veins were also encountered in this hole. Unfortunately no core was recovered from the intervals 20.2 - 22.6 metres and 39.7 - 40.5 metres. The former interval is a little above the projected lode position. No significant assay results were obtained.

Due to the core loss no conclusions can be reached as to the existance of the lode at depth at this site.

D.D.H. 5 was designed to test the lode at a depth of 25 metres below the northernmost workings on the lode. Siltstone was once again the dominant rock type. A lode zone was intersected between 39.5 and 40.0 metres, while the siltstone on the hanging wall side of the lode, between 38.8 and 39.5 metres was partly impregnated by, or replaced with, limonitic, clay lode material. The interval 39.2 - 39.6 metres assayed 0.29% tin while the interval 39.6 - 40.0 metres assayed 0.87% tin, for a weighted average over the 0.8 metre interval of 0.58% tin. From the surface to the intersection point the lode has a dip of 65° to the east.

7. CONCLUSIONS AND RECOMMENDATIONS

From diamond drilling results and mapping of surface and underground workings the following conclusions have been reached:-
- the lode is terminated at depth by a joint/fault plane. The line at the intersection of this plane and the lode plunges at a shallow angle (less than 10°) to the north.
- the lode does not "make" again at a workable depth below the joint/fault plane.
- the lode is unlikely to extend for more than 4 metres below the base of the current workings (at the entrance to the southern development adit)
- at the most northern workings the lode continues to a vertical depth of at least 25 metres and dips to the east at 65°.

From these conclusions it is recommended that any large scale development work should be concentrated on the northern end of the lode, assuming the lode is of a sufficiently high grade to be economically worked. Investigations in the form of pitting and sampling on the two other occurrences of tin mineralization in the lease area should be considered, in an effort to increase the limited tin reserves on the lease.

8. REFERENCES

Dodson, R.G., 1967 Resident Geologist - Northern Territory Annual Summary of Activities, January 1st 1967 - December 31st, 1967. Bur. Min. Resour. Aust. Rec. 1968/27 (unpubl.)

../6

Hays, J., 1960 The geology of the Mount Harris tinfield, Northern Territory. Bur. Min. Resour. Aust. Rec. 1960/2 (unpubl.)

Roarty, M.J., 1975 Notes on a visit to Touhys' Tin prospect, Mount Wells area, December, 1974. N.T. Geol. Surv. Rept. G.S. 76/16 (unpubl.)

Taylor, J., 1967 Sampling of Touhys' Tin prospect. United Uranium N.L. Co. Rept. C.R.67/38 (unpubl.)

Vanderplank, A., 1964 Investigation of a magnetic anomaly over Jessops and Mt. Masson Tinfields, N.T. Geol. Surv. Rept. G.S. 64/5 (unpubl.)

Walpole, B.P., Crohn, P.W., Dunn, P.R. and Randal, M.A. 1968 Geology of the Katherine - Darwin Region, Northern Territory Bur. Min. Resour. Aust. Bull. 82

APPENDIX I

Diamond Drill Hole Assays

Rosemary Tin Mine N.T.

D.D.H.'s 1 - 5

Sludge samples and selected split core samples were analyzed by the Atomic Absorption Spectrophotometer at the East Point Laboratory, Department of the Northern Territory, Darwin. All the results are given in parts per million (ppm). Detection limits are as follows:-

Sn	50 ppm
As	100 ppm
Pb	10 ppm

A minus sign (-) in front of a number means the value is less than the detection limit.

ROSEMARY TIN MINE D.D.H. 1

Sample type	Interval (metres)	Sn
Sludge	6.00 - 9.00	-100
	9.00 - 12.00	-100
	12.00 - 15.00	-100
	15.00 - 18.00	-100
	18.00 - 21.00	-100
	21.00 - 24.00	-100
	24.00 - 27.00	100
	27.00 - 30.00	-100
	30.00 - 33.00	-100
	33.00 - 35.00	-100
	35.00 - 38.00	130
	38.00 - 41.00	-100
	41.00 - 44.00	100
	44.00 - 47.00	130
	47.00 - 50.00	-100
	50.00 - 53.00	-100
	53.00 - 55.00	-100
Split Core	14.00 - 14.50	-100
	15.50 - 16.00	-100
	20.00 - 22.50	-100
	40.40 - 40.90	-100
	43.30 - 43.80	-100
	46.10 - 46.40	-100
	69.30 - 69.80	-100

ROSEMARY TIN MINE D.D.H. 2

Sample Type	Interval (metres)	Sn	As
Split core	3.35 - 6.00	-50	-100
	6.00 - 9.00	-50	-100
	9.00 - 11.25	-50	-100
	11.25 - 12.40	-50	-100
	12.40 - 12.50	-50	-100
	12.50 - 14.00	-50	-100
	14.00 - 17.00	-50	-100
	17.00 - 20.00	-50	-100
	20.00 - 23.00	-50	-100
	23.00 - 26.00	-50	-100
	26.00 - 30.00	-50	-100
	30.00 - 32.00	-50	-100
	32.00 - 35.00	-50	-100
	37.50 - 38.50	-50	-100
	38.90 - 39.70	-50	-100
	42.20 - 42.50	-50	-100
	46.20 - 46.80	-50	-100
	55.80 - 56.10	-50	-100
Sludge	24.15 - 25.10	-50	-100
	40.90 - 41.70	-50	-100

ROSEMARY TIN MINE D.D.H. 3

Sample Type	Interval (metres)	Sn	As	Pb
Sludge	0 - 3.00	35000	-100	
	3.00 - 6.00	750	-100	
	6.00 - 9.00	-50	-100	
	9.00 - 12.00	620	-100	
	12.00 - 15.00	280	-100	
	15.00 - 18.00	1940	-100	
	18.00 - 21.00	80	-100	
	21.00 - 24.00	-50	-100	
	24.00 - 27.00	80	-100	
	27.00 - 28.50	80	-100	
Split core	15.00 - 15.50	-50		55
	15.50 - 16.00	50		55
	16.00 - 16.50	-50		60
	16.50 - 17.00	-50		30
	17.00 - 17.50	-50		80
	17.50 - 18.00	-50		25
	24.20 - 24.80	170		750

ROSEMARY TIN MINE D.D.H. 4

Sample Type	Interval (metres)	Sn	As	Pb
Sludge	20.00 - 30.00	-50	-100	-
	30.00 - 31.00	200		3440
	31.00 - 32.00	90		2260
	32.00 - 33.00	-50		1840
	33.00 - 34.00	-50		940
	34.00 - 36.00	-50		600
	36.00 - 37.00	100		390
	37.00 - 38.00	60		340
	38.00 - 39.00	50		370
	39.00 - 40.00	-50		290
	40.00 - 41.00	-50		180
	41.00 - 42.00	90		180
	42.00 - 43.00	50		140
	43.00 - 45.00	110		
Split Core	5.30 - 5.40	-100		
	6.20 - 6.30	110		
	10.00 - 10.50	-100		
	11.70 - 12.20	-100		
	16.90 - 17.05	-100		
	19.00 - 19.60	-100		
	19.60 - 20.20	-100		
	22.60 - 23.90	-100		
	23.90 - 24.45	-100		
	24.45 - 24.75	-100		
	27.80 - 29.00	-100		
	29.00 - 29.40	-100		
	29.40 - 30.20	-100		
	30.20 - 30.60	-100		
	30.60 - 31.00	150		
	31.50 - 32.00	-100		
	33.80 - 34.10	-100		
	34.10 - 34.90	-100		

../2

ROSEMARY TIN MINE D.D.H. 4

Sample Type	Interval (metres)	Sn	As	Pb
Split Core	34.90 - 36.30	-100		
	36.30 - 37.75	-100		
	37.75 - 38.80	-100		
	38.80 - 39.70	-100		
	40.50 - 41.50	-100		
	41.50 - 42.20	-100		

ROSEMARY TIN MINE D.D.H. 5

Sample Type	Interval (metres)	Sn	Pb	As
Sludge	0 - 1.00	90		
	1.00 - 2.00	-50		
	2.00 - 3.00	-50		
	3.00 - 4.00	-50		
	9.00 - 10.00	-50		
	10.00 - 12.00	-50		
	12.00 - 14.00	-50		
	14.00 - 16.00	-50		
	16.00 - 18.00	120		
	18.00 - 20.00	65		
	20.00 - 22.00	-50		
	22.00 - 24.00	-50		
	24.00 - 26.00	50		
	26.00 - 28.00	-50		
	28.00 - 30.00	-50		
	30.00 - 32.00	-50		
	32.00 - 34.00	-50		
	34.00 - 36.00	-50		
Split Core	6.50 - 7.00	-100		
	12.00 - 12.50	-100		
	24.00 - 24.50	-100		
	24.50 - 25.00	-100		
	37.00 - 37.50	160		
	37.50 - 38.00	500		
	38.00 - 38.50	2250	65	
	38.80 - 39.20	500		
	39.20 - 39.60	2900	180	
	39.60 - 40.00	8700	335	
	40.00 - 40.50	-100		
	41.60 - 42.10	-100		
	42.70 - 43.00	-100		

APPENDIX II

GEOLOGICAL DRILL LOG SUMMARIES

ROSEMARY TIN MINE, N.T.

D.D.H.'s 1 - 5

ROSEMARY D.D.H. 1

Interval (metres)	
0 - 3.00	No core recovery.
3.0 - 14.8	Cream-grey mottled siltstone, friable and broken, some iron-filled fractures. Less mottled and more grey below 10m., also less broken. Narrow (4cm.) iron-rich vein at 14.40m.
14.8 - 20.0	Fawn argillaceous siltstone, fairly friable, some iron-filled fractures and veins. Fairly unbroken 14.80 - 18.00m. Fairly broken 18.00 - 20.00m. Iron-rich (hematite & limonite) zone 15.70 - 16.00m.
20.0 - 22.5	Light brown clay, very broken and friable.
22.5 - 40.4	Cream-fawn argillaceous siltstone, some limonite and some hematite filled fractures and veins. Fairly broken and more iron-staining between 25.00 and 26.3m. Some dark grey, less oxidised sections below 27.00m. Sandy band 26.50 - 27.00m. Fairly fractured 27.00 - 28.60m. Strongly fractured 31.00 - 40.40m.
40.4 - 40.9	Red-brown iron-rich silicified siltstone.
40.9 - 46.6	Fawn argillaceous siltstone, some iron-stained fractures and sections of iron enrichment. Very broken between 42.00 and 45.00m. Many iron-filled fractures and veins between 46.10 and 46.40m.
46.6 -	LIMIT OF OXIDISED ZONE
46.6 - 78.4	Dark grey carbonaceous siltstone/shale, minor fine mica flakes and slightly sulphury smell (possibly minor pyrite throughout) some coarse and finer beds for siltstone/shale nomenclature. Some narrow (less 8mm.) pyrite bands. Bedding at 12° to drill hole direction at 50m. i.e. approximately 35° to the east. Siltstone/shale is partly silicified below 58m. Bedding at 8° to drill hole direction at 64m. Below 58m. more pyrite bands with depth. 69.60 - 69.80m., strongly pyritic zone with trace chalcopyrite.
78.4 - 81.5	Cream argillaceous siltstone, moderately fractured, some mica flakes.
81.5 -100.0	Dark grey carbonaceous shale, some fractures, partly silicified, pyritic with some narrow pyrite bands.

ROSEMARY D.D.H. 2

0 - 3.35	No core recovery.
3.35 - 11.2	Fawn-light brown argillaceous siltstone, very broken and friable, iron-stained veins and fractures. Some narrow sandy bands.

../2

11.2	-	12.4	Yellow and white argillaceous shale, highly leached, friable and partly broken. Some iron-staining. Some coarse iron pebbles near 12.40m.
12.4	-	12.5	Iron-rich quartz vein.
12.5	-	21.0	Fawn argillaceous siltstone, some dark green layers between 13.5 and 14.0m. Siltstone is highly leached, friable and partly broken. Many narrow iron-filled veins and fractures.
21.0	-	23.0	Fawn-pink fine-grained sandstone, leached and oxidised, many iron-stained fractures. Some clay material.
23.0	-	32.4	Fawn-brown argillaceous siltstone, highly leached, friable and broken to about 30.5m. Many narrow iron-rich veins. Some white clayey (shale) bands. Generally less broken and harder material below 30.5m.
32.4	-	37.5	Dark grey carbonaceous shale, several narrow iron-stained bands. Bedding appears to be at 70° to drill direction. Shale is spotted in part (chiastolite?)
37.5	-	39.0	Grey-green siltstone, several narrow quartz veins and some iron-filled veins.
39.0	-	40.0	Dark grey-green shale with abundant iron staining and narrow iron-filled veins.
40.0	-	40.9	Cream argillaceous siltstone, highly leached, friable and broken. Some narrow iron-filled veins.
40.9	-	41.7	Dark grey carbonaceous shale.
41.7	-	44.45	Cream argillaceous siltstone, friable and broken with interbeds of grey shale. Quartz vein with pyrite 42.2 - 42.3m.
44.45	-	50.6	Cream-grey argillaceous siltstone, some iron-filled veins, some thin shaley bands, some narrow pyrite veins. Some large 5mm. spots in siltstone may be after pyrite. 46.3 - 47.0m., brecciated section with pyrite.
50.6	-	58.45	Mid grey-green partially silicified greywacke siltstone, some narrow shaley bands, spotted appearance throughout. Veins and disseminations of pyrite.

ROSEMARY D.D.H. 3

0	-	3.0	No core recovery.
3.0	-	9.0	Fawn and green argillaceous siltstone, highly weathered, broken and friable, fairly ferruginous. Iron-filled veinlets and fractures.
9.0	-	12.5	Broken quartz pebbles, some clay and silt material.
12.5	-	14.6	Mauve-brown siltstone, very broken and friable.
14.6	-	18.0	Cream siltstone, grading to mauve below 16.5m. Some narrow sandy bands, several iron-rich veins 1cm. thick between 16.2 and 16.4m. and between 17.0 - 17.5m.

../3

18.0	-	19.4	Light - mid brown claystone.
19.4	-	20.0	Fawn-brown siltstone.
20.0	-	22.5	Mid brown, fine-grained sandstone, many iron-rich fractures, friable in part.
22.5	-	23.8	Green and pink siltstone, with many iron-stained fractures and veinlets.
23.8	-	24.35	Iron-rich clay material, very broken.
24.35	-	24.6	Iron-rich quartz vein.
24.6	-	26.0	Fawn, broken siltstone material, some iron-filled veinlets.
26.0	-	28.45	Fawn siltstone, several iron-rich fractures and veinlets.

ROSEMARY D.D.H. 4

0	-	1.7	No core recovery.
1.7	-	3.4	Fawn - light brown argillaceous siltstone and shale, highly oxidised, very broken, some iron-staining.
3.4	-	6.2	Fawn and cream, oxidised shale, fairly broken.5.3 - 5.4m., Quartz vein.
6.2	-	6.4	Quartz vein.
6.4	-	19.0	Fawn and cream, argillaceous siltstone and shale, oxidised, fairly broken and fractured, some narrow veinlets of clay and iron-rich material along fractures. Light brown argillaceous siltstone 14.0 - 15.0m. Quartz vein between 16.9 and 17.05.
19.0	-	20.2	Broken siltstone and quartz vein material. Very poor core recovery.
20.2	-	22.6	No core recovery.
22.6	-	23.95	Quartz vein with iron-rich fractures and veinlets.
23.95	-	24.45	Cream argillaceous siltstone, iron-stained fractures.
24.45	-	26.0	Grey-fawn mottled sandstone, some iron-filled fractures, some veinlets of dark grey dolerite ? (less than 5cm thick) 24.45 - 24.65m, quartz vein.
26.0	-	27.8	Cream, fawn and red siltstone, many iron-stained fractures. 26.70 - 26.75m., quartz vein.
27.8	-	31.0	Interlayered quartz veins and broken siltstone material. Poor core recovery. Quartz veins are iron-stained with iron-rich material along fractures. Quartz veins at intervals as follows: 27.80 - 28.60m., 29.00 - 29.40m., 29.95 - 30.05m., and 30.40 - 30.60m.
31.0	-	34.35	Red siltstone, many iron-stained fractures, some orange-pink clay material along fractures. Some narrow bands of grey-cream siltstone.
34.35	-	39.7	Cream claystone (oxidised shale), many iron-stained fractures, several quartz veins. Very poor core recovery. Quartz veins at intervals as follows: 34.30 - 34.40m., 34.80 - 34.90m., 36.20 - 36.30m., and 38.80 - 39.70m.

../4

39.7	-	40.5	No core recovery.
40.5	-	41.4	Broken quartz fragments with limonite filled veins and iron-stained fractures. Very poor core recovery.
41.4	-	42.2	Cream claystone, with iron-stained fractures and veinlets, very broken and friable.
42.2	-	45.0	Cream - fawn claystone, some iron-stained fractures.

ROSEMARY D.D.H. 5

0	-	3.0	No core recovery
3.0	-	14.55	Red-brown and cream-grey argillaceous siltstone with minor shale. Several fractures filled with pink clay and iron-rich material. Minor quartz veins at 4.5 and 4.7m. Very broken and fractured between 7.7 and 11.6m., and between 13.0 and 14.55m.
14.55	-	15.8	Red-brown argillaceous siltstone (unbroken)
15.8	-	18.45	Cream - argillaceous siltstone and shale, oxidised and fairly fractured. Minor red-brown siltstone. Below 17m. much of the cream - grey siltstone is partly silicified.
18.45	-	19.6	Red-brown argillaceous siltstone (unbroken)
19.6	-	22.2	Grey partly silicified siltstone with minor interbeds of red-brown argillaceous siltstone. Moderate fracturing with fractures filled with iron and clay material.
22.2	-	29.7	Red-brown and grey argillaceous siltstone with minor interbeds of grey silicified siltstone. Moderate fracturing with fractures filled with iron and clay material. Brecciated quartz zones between 24.0 and 24.3m., and between 24.5 and 25.0m.
29.7	-	31.7	Brown argillaceous siltstone, solid and unbroken with few fractures.
31.7	-	36.0	Interbedded brown argillaceous siltstone and grey silicified siltstone. Moderately fractured and broken, with orange and pink clay coatings along fracture planes.
36.0		-	LIMIT OF OXIDATION ?
36.0	-	38.8	Light grey siltstone, slightly silicified, many iron-stained and iron and clay filled fractures. Most fractures at about 45° to drill direction. Small veins of iron and clay material about 2cm. thick at 37.1m. and 38.4m.
38.8	-	40.0	Replacement zone 38.8 - 39.5m. Partly replaced grey siltstone, abundant fractures and voids filled with brown and yellow limonite material and orange and pink clay. 39.5 - 40.0m. Totally replaced lode zone consisting of brown limonite and white, pink and orange clay material. No visible cassiterite.
40.0	-	42.75	Light grey siltstone as for 36.0 - 38.8m. Large limonite and clay vein about 7cm. thick at 42.0.
42.75	-	43.0	Yellow-brown limonitic clay material.
43.0	-	43.4	Light grey siltstone as for 36.0 - 38.8m.

../5

43.4 - 45.15	Grey siltstone, unbroken, partly chloritized, with narrow sandstone band between 43.6 and 43.8m. No fracturing evident.
45.15 -52.1	Cream, light brown and grey argillaceous siltstones and greywacke siltstones. Some thin shale bands. Some sections are fairly fractured with iron-staining along the fractures. Some sandier bands and some partly silicified sections. (Bedding at about 50° to drill hole direction at 51m.)
52.1 - 52.5	Light grey clay material, soft and friable.
52.5 - 60.0	Interbedded dark and light grey partly silicified siltstones and shales. Many iron-stained fractures, some narrow pyritic veins. 57.2 - 57.3m., pale yellow claystone. 58.2 - 58.25m; light grey claystone. Bedding 40° to drill hole direction at 53m. and 50° to drill hole direction at 59m.

APPENDIX III

D.D.H. SURVEY DETAILS AND CORE RECOVERY

ROSEMARY TIN MINE N.T.

D.D.H. 1

Depth 100 metres
Azimuth 70° M
Angle from horizontal 45°
No downhole survey

Interval (metres)	Core Recovery %	Interval (metres)	Core Recovery %	Interval (metres	Core Recovery %
0 - 3.00	0	16.85 - 18.00	83	33.30 - 35.90	62
3.00 - 6.35	63	18.00 - 19.45	41	35.90 - 40.40	46
6.35 - 7.40	95	19.45 - 22.45	10	40.40 - 40.90	85
7.40 - 9.10	70	22.45 - 23.75	85	40.90 - 42.80	76
9.10 - 10.20	80	23.75 - 24.80	95	42.80 - 43.85	82
10.20 - 12.20	85	24.80 - 26.15	70	43.85 - 45.05	98
12.20 - 14.80	75	26.15 - 28.60	95	45.05 - 46.60	99
14.80 - 16.40	50	28.60 - 31.40	65	46.60 - 100.00	95-100
16.40 - 16.85	85	31.40 - 33.30	63		

D.D.H. 2

Depth 58.8 metres
Azimuth 190°M
Angle from horizontal 50°
No downhole survey

0 - 3.35	0	14.80 - 15.15	65	37.35 - 38.90	75
3.35 - 4.40	90	15.15 - 19.45	70	38.90 - 40.00	65
4.40 - 5.70	80	19.45 - 20.00	75	40.00 - 41.70	90
5.70 - 6.60	65	20.00 - 22.60	98	41.70 - 42.80	60
6.60 - 7.20	85	22.60 - 24.05	95	42.80 - 44.45	70
7.20 - 8.25	45	24.05 - 25.15	10	44.45 - 46.00	90
8.25 - 9.55	70	25.15 - 26.80	85	46.00 - 47.40	85
9.55 - 11.20	85	26.80 - 30.05	75	47.40 - 54.40	100
11.20 - 12.05	95	30.05 - 34.40	90	54.40 - 55.30	90
12.05 - 13.50	40	34.40 - 36.00	95	55.30 - 58.45	100
13.50 - 14.80	80	36.00 - 37.35	85		

D.D.H. 3

Depth 28.5 metres
Azimuth 260°M
Angle from horizontal 60°
Acid tube at 28m. gave inclination of 62°

0 - 3.00	0	18.00 - 19.40	70	24.35 - 25.30	65
3.00 - 15.00	75	19.40 - 20.00	100	25.30 - 27.00	85
15.00 - 16.70	90	20.00 - 21.65	70	27.00 - 28.50	98
16.70 - 18.00	100	21.65 - 24.35	100		

../2

D.D.H. 4

Depth 45 metres
Azimuth 235°M
Angle from horizontal 60°
Acid tube at 44m. gave inclination of 61°

Interval (metres)	Core Recovery %	Interval (metres)	Core Recovery %	Interval (metres)	Core Recovery %
0 - 1.70	0	22.60 - 23.95	15	30.60 - 31.00	80
1.70 - 5.30	90	23.95 - 24.45	20	31.00 - 33.80	85
5.30 - 6.05	80	24.45 - 26.00	45	33.80 - 34.10	70
6.05 - 8.80	90	26.00 - 26.80	90	34.10 - 34.85	25
8.80 - 10.75	85	26.80 - 27.50	65	34.85 - 36.30	15
10.75 - 11.85	80	27.50 - 27.80	75	36.30 - 37.60	5
11.85 - 13.20	70	27.80 - 28.40	30	37.60 - 37.80	90
13.20 - 14.45	80	28.40 - 29.00	25	37.80 - 38.80	40
14.45 - 16.45	75	29.00 - 29.40	50	38.80 - 39.70	18
16.45 - 18.75	40	29.40 - 29.95	10	39.70 - 40.50	0
18.75 - 19.60	70	29.95 - 30.20	75	40.50 - 41.40	20
19.60 - 20.20	20	30.20 - 30.50	90	41.40 - 42.20	40
20.20 - 22.60	0	30.50 - 30.60	40	42.20 - 45.00	60

D.D.H. 5

Depth 60 metres
Azimuth 255°M
Angle from horizontal 55°
Acid tube at 59m. gave inclination of 55°

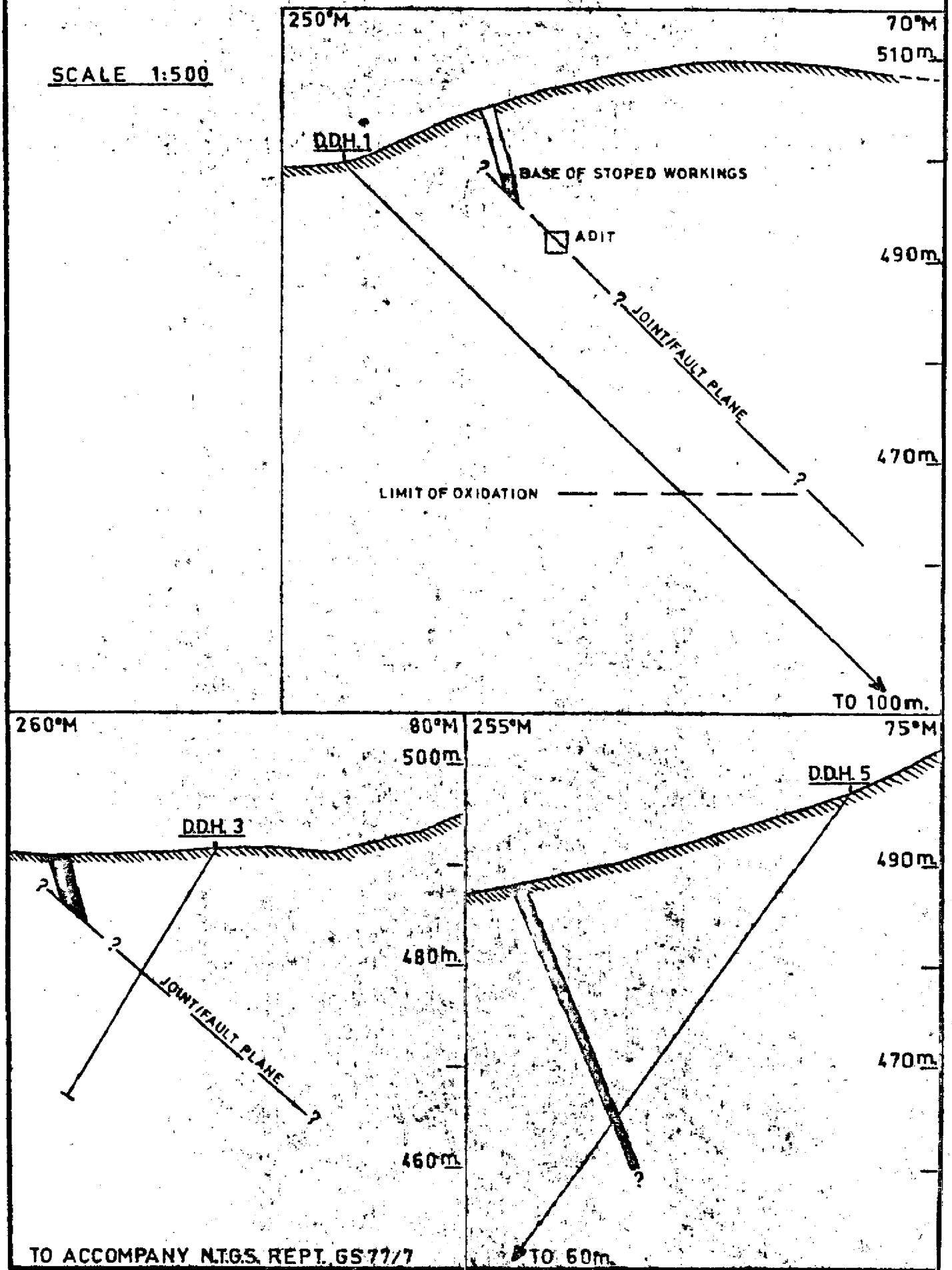
0 - 3.00	0	19.60 - 20.00	85	43.65 - 45.15	100
3.00 - 4.75	75	20.00 - 25.00	90	45.15 - 46.20	95
4.75 - 8.65	95	25.00 - 29.70	95	46.20 - 47.60	85
8.65 - 8.90	25	29.70 - 31.20	100	47.60 - 48.25	75
8.90 - 9.90	80	31.20 - 32.80	98	48.25 - 49.65	95
9.90 - 10.15	85	32.80 - 33.50	95	49.65 - 50.55	90
10.15 - 11.00	65	33.50 - 34.70	98	50.55 - 51.25	95
11.00 - 11.60	85	34.70 - 36.20	90	51.25 - 52.10	100
11.60 - 12.10	95	36.20 - 37.35	85	52.10 - 52.50	75
12.10 - 13.40	92	37.35 - 38.80	80	52.50 - 55.30	100
13.40 - 14.60	85	38.80 - 40.00	75	55.30 - 56.35	95
14.60 - 16.20	98	40.00 - 41.60	85	56.35 - 56.90	90
16.20 - 18.10	90	41.60 - 42.60	80	56.90 - 57.25	100
18.10 - 18.50	80	42.60 - 43.00	70	57.25 - 57.80	85
18.50 - 19.60	100	43.00 - 43.65	75	57.80 - 60.00	95

PLATE 4

ROSEMARY TIN MINE N.T.

DRILL SECTIONS—DDH's 1,3&5.

SCALE 1:500



TO ACCOMPANY N.T.G.S. REPT. GS 77/7

APPENDIX IV

SUMMARY OF TIN PRODUCTION

ROSEMARY TIN MINE, N.T.

Date		Miner	Ore (tonnes)	Concentrate (tonnes)	Tin Content (tonnes)	Tin %
20/7/67		Touhy	145.6	5.23	1.74	1.20
2/11/67		"	103.9	2.36	1.27	1.22
16/ 7/68		"	260.0	3.44	1.67	0.64
22/10/68		"	116.0	1.93	0.86	0.74
17/ 4/69		"	69.7	3.16	1.40	2.01
22/10/69		"	60.0	0.61	0.28	0.47
19/ 3/70		"	15.0	0.71	0.34	2.27
16/ 9/70		Ah Toy	97.0	1.41	0.97	1.00
9/10/72	*	Casey	308.0	0.55	0.36	0.12
31/ 7/73	*	"	575.0	1.38	0.59	0.10
23/ 5/74	*	"	175.0	0.56	0.31	0.18
26/ 5/76	*	Millwood	141.0	0.30	0.19	0.13
13/ 7/76		"	215.0	7.05	4.56	2.12
7/11/76		"	274.0	3.39	1.94	.71
	* Development dirt					
		Total	2555.2	32.08	16.48	0.64
	Total (excluding Development dirt)		1346.2	29.29	15.03	1.11

PLATE 2

ROSEMARY TIN MINE N.T.

SURFACE PLAN

SCALE 1:1000

20 10 5 0 10 20 40 60 80METRES

D.D.H. 5

D.D.H. 4

D.D.H. 1

DDH'S 2&3

MILLWOODS CAMP

W.B.

MN

HEMATITE - QUARTZ BRECCIA

SAMPLE POINTS (MILLWOOD)

DIP APPROX. 50°E / 340°

SILTSTONE STEEP E. DIP

BANDED SILTSTONE STEEP E. DIP

SILTSTONE RUBBLE

SILTSTONE RUBBLE

IRON-RICH CAP ON SILTSTONE

490 495 500 505 510 515 520 525 530 535

SAMPLE ASSAY
1·3"/5 n

REFERENCE

- VEHICLE TRACK
- 515 TOPOGRAPHIC CONTOUR (IN METRES REL.)
- SURFACE WORKING
- OUTLINE OF UNDERGROUND WORKINGS
- ADIT
- INTERSECTION OF LODE & JOINT PLANE
- CHANNEL SAMPLES
- DIP & STRIKE
- 20 VERTICAL SHAFT (DEPTH IN METRES)
- APPROX. OUTCROP BOUNDARY

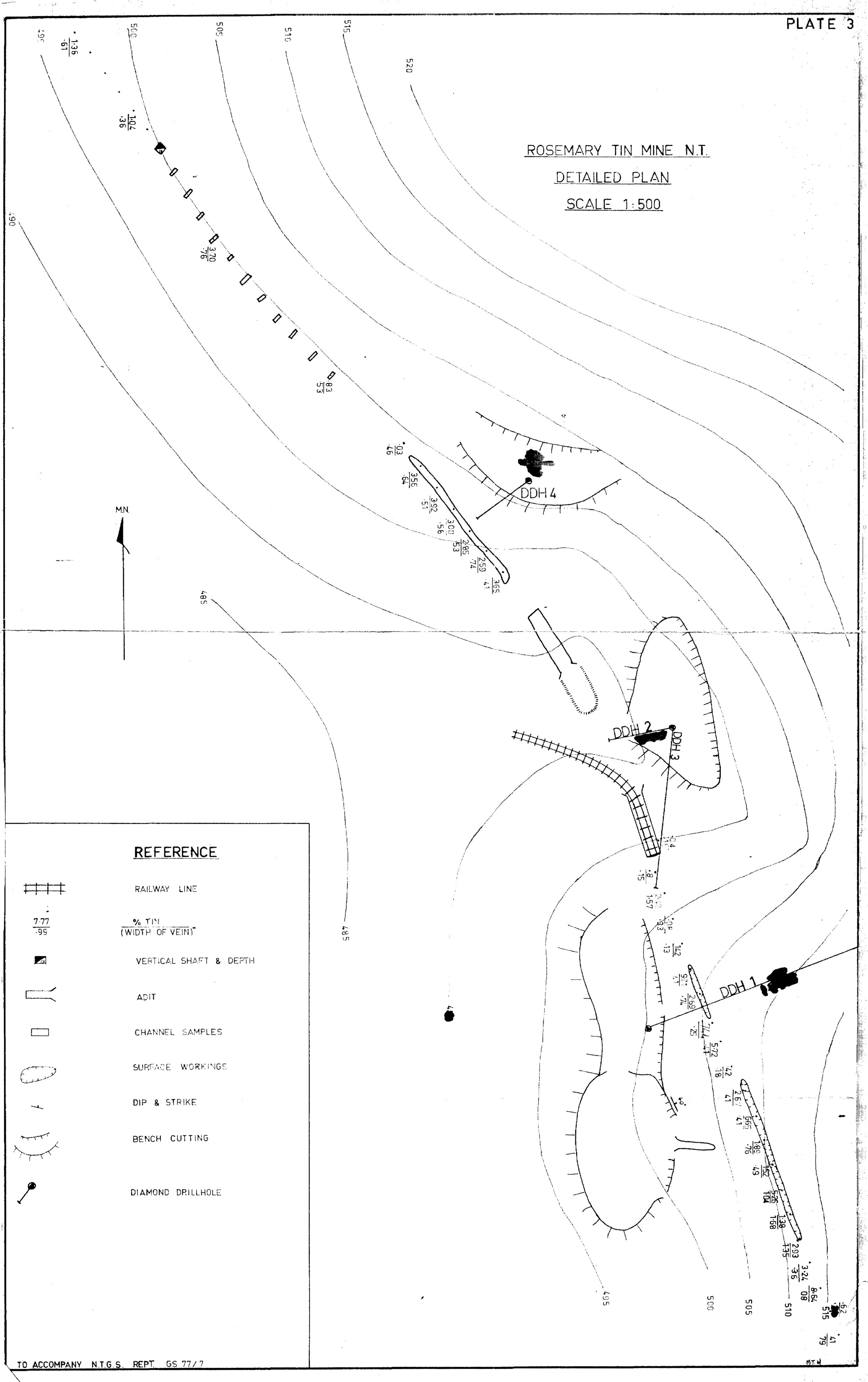
TO ACCOMPANY N.T.G.S. REPT. NO. GS 77/7

PLATE 3

ROSEMARY TIN MINE N.T.

DETAILED PLAN

SCALE 1:500



REFERENCE

- RAILWAY LINE
- 7·77 / ·99 — % TIN / (WIDTH OF VEIN)"
- VERTICAL SHAFT & DEPTH
- ADIT
- CHANNEL SAMPLES
- SURFACE WORKINGS
- DIP & STRIKE
- BENCH CUTTING
- DIAMOND DRILLHOLE

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