NORTHERN TERRITORY GEOLOGICAL SURVEY REPORT GS 79/3

DIAMOND DRILLING INVESTIGATIONS 1978, TEACUP TIN MINE, BURRUNDIE AREA, N.T.

by

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1. SUMMARY

Following an application for drilling assistance at the Teacup Tin Mine in October 1977, the Drilling Section, Department of Mines and Energy, drilled four diamond drill holes, totalling 190 metres, between June and July 1978.

Tin has been mined on a limited scale, from a mineralised quartz lode which varies in apparent thickness from 0.3 and 1.0 metres, within an open pit. Mineralized quartz and hematite-quartz breccia floaters are found roughly along the line of the lode over approximately 170 metres. A second line of gossan floaters lies some 40 metres NW of the main lode.

The diamond drilling programme tested at depth both the main lode and the line of gossan floaters. Marginal tin intersections were obtained from two holes which tested the main lode, while intersections on the line of gossan floaters to the NW showed no increase in tin or copper/lead/zinc values in the sulphide zone from those obtained from the surface gossans.

In view of the limited size and tonnage potential of the main lode no further diamond drilling is justified.

2. INTRODUCTION

An application for drilling assistance at MLs 390B and 1314-1317B was made by one of the leaseholders, C.E. Casey, in October 1977. A drilling programme of 200 metres was subsequently approved. Diamond drilling was carried out between June and July 1978 and consisted of four holes totalling 190 metres.

During the period November 1977 to July 1978 plane table mapping and sampling of surface workings and environs were undertaken by officers of the Northern Territory Geological Survey.

3. LOCATION AND ACCESS

Map: Pine Creek 1:100,000 Topographic Survey Sheet 5270

Co-ordinates: Lat. $13^{o}35'00"$

Long. $131^{o}42'40"$

Universal Grid Reference : GK 934969

Vehicle access from Darwin is by the Stuart Highway to the Fountain head turn-off then by gravel road to Burrundie Siding. Heading south along the gravel Burrundie-Pine Creek road the mine is to the immediate right of the road some 5 kilometres from Burrundie Siding after crossing Knights Creek. Flooded creeks may make the road impassable for short periods during the 'wet' season.

4. GEOLOGY

The bulk of the mine area lies within a body of diorite which intrudes strongly sheared silstone and greywacke of the Lower Proterozoic Burrell Creek Formation (as mapped by B.M.R. in 1954).

Mining to date has been confined to an open pit some 40 x 15 metres in areal extent and apparently has been concentrated on a narrow, near vertical quartz lode. The lode has been obscured by collapse of weathered diorite but appears to consist mainly of quartz with coarse muscovite, tourmaline and both coarse and fine grains of cassiterite with some minor sulphides.

Within the open pit the lode strikes 25° magnetic and although mildly contorted, appears to strike in a similar overall direction to the north and south of the open pit. Folding or slumping of the lode at shallow depth within the pit area has caused the lode to dip at about 50° NW for a short distance giving a first impression of a widening of the lode to about 3 metres. However, detailed geological examination and drilling results show the lode maintains a relatively constant width and again reverts to a near vertical attitude at depth (D.D.H.3 - Plate 3).

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In the course of mapping and rock sampling the presence of two other lode systems roughly parallel to the main lode was inferred. Of these a sporadic line of limonitic, gossanous rubble some 40 metres NW of, and parallel to the main lode gave some encouraging copper, lead, zinc and tin values.

5. DIAMOND DRILLING RESULTS

Four diamond drill holes totalling 190 metres were completed by the Department's Drilling Section. Core recovery was effectively 100% apart from some near surface sections of the highly weathered diorite or "diorite material". All drill core was geologically logged and 19 split core samples were forwarded to the East Point Laboratories, Department of Transport and Works. The samples were assayed for tin, gold, silver, lead, zinc and copper. The drill holes encountered only one main rock type, diorite, over their entire lengths.

D.D.H. 1 was inclined at 45^{o} on a bearing of 115^{o} magnetic, to test the main lode at depth to the north of the open pit. Intersections of diorite with quartz veining and some sulphides were made between 22.50 and 22.80 metres, between 29.85 and 30.15 metres and between 35.20 and 36.15 metres. The main lode was intersected between 34.35 and 34.90 metres and consisted of a quartz

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vein with pyrite, arsenopyrite, minor cassiterite and trace chalcopyrite. The interval 34.5-34.9 metres assayed 0.38% tin and 0.6% copper with traces of gold and silver. (Results, Appendix I)

D.D.H. 2 was sited at the same location as D.D.H. 1 but was inclined at 45° on a bearing of 295° magnetic to test the gossan to the NW of the main lode. The target was intersected between 32.0 and 32.6 metres and consisted of diorite with much quartz veining. Sulphide mineralisation was associated with the quartz and consisted of pyrite and arsenopyrite with trace galena. Assay values over the target intersection were of the same order as surface values in gossan samples and are not encouraging.

D.D.H. 3 was inclined at 45° on a bearing of 115° magnetic to test the main lode at depth to the south of the open pit. The main lode system was intersected between 23.0 and 23.9 metres confirming that the lode reverts to a near vertical attitude below the open pit. The lode consisted of two quartz veins, one between 23.0 and 23.5 metres with green chlorite and minor cassiterite and the second between 23.75 and 23.9 metres with limonitic boxworks, abundant pyrite, minor chalcopyrite and some yellow chlorite material. A value of 2.8% tin was obtained in the first vein over the interval 23.25-23.50 with a weighted average value over a one metre interval between

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23 and 24 metres of just less than 0.8%, and a weighted average grade of 1.1% tin over a 0.75 metre interval between 23.25 and 24.0 m.

D.D.H. 4 was sited at the same location as D.D.H. 3 but was inclined at 45° on a bearing of 295° to again test the gossan to the NW of the main lode. There were no significant lode intersections in this hole.

6. CONCLUSIONS AND RECOMMENDATIONS

Diamond drilling and rock sampling have confirmed the continuity at depth and along strike of the main lode. The lode has been shown to be of a relatively constant width and to be generally near vertical in attitude. Marginal tin values have been obtained from most samples of the lode.

Diamond drilling of a gossanous lode system to the NW of the main lode has indicated that this lode is narrow and discontinuous at depth with only above background tin and base metal values.

While the main lode may be marginally economic if mined on a gouging scale, drilling results have given no encouragement that the lode either widens and/or becomes richer with depth. Consequently further drilling costs would probably outweigh any future returns and as such no further drilling is recommended.

7. REFERENCE

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

APPENDIX I

Diamond Drill Hole Assays

Teacup Tin Mine, N.T.

D.D.H.'s 1-4

Split core samples were analysed using the Atomic Absorption Spectrophotometer at the East Point Laboratory of the Department of Transport and Works. All the results are given in micrograms per gram. (ug/g).

Detection limits are as follows:

Sn	100 ug/g
Au	0.2 ug/g
Ag	1 ug/g
Cu	5 ug/g
Pb	2 ug/g
Zn	5 ug/g

A minus sign (-) preceding a number denotes the value is less than the detection limit.

Hole	Interval (metres)	Sn	Au	Ag	Cu	Pb	Zn
D.D.H.1	22.50-22.80	200	-0.2	-1	150	30	170
	29.85-30.15	-100	-0.2	2	60	25	120
	34.35-34.50	-100	-0.2	-1	1080	35	160
	34.50-34.70	3800	-0.2	20	5600	650	200
	34.70-34.90	3800	1.8	8	6800	350	260
	34.90-35.40	-100	-0.2	-1	60	30	1000
	35.40-35.90	-100	-0.2	4	750	200	270
	35.90-36.25	1300	-0.2	4	800	110	130
D.D.H.2	32.00-32.30	-100	-0.2	4	1000	800	1050
	32.30-32.60	-100	-0.2	4	200	400	1500
D.D.H.3	23.00-23.25	-100	-0.2	-1	30	20	180
	23.25-23.50	2.8%	-0.2	-1	1680	140	360
	23.50-23.80	1400	-0.2	-1	90	60	700
	23.80-24.00	3100	-0.2	10	700	1060	1000
	24.00-24.40	200	-0.2	-1	180	500	3100
D.D.H.4	19.45-20.65	-100	-0.2	-	50	30	100
	20.65-21.00	-100	-0.2	-	-5	30	140
	21.00-21.30	-100	0.2	-	-5	30	140
	23.60-23.80	-100	0.2	-	220	50	50

APPENDIX II

Geological Drill Log Summaries

Teacup Tin Mine, N.T.

D.D.H.'s 1-4

Teacup D.D.H.1

Interval (metres)	
0-19.00	Broken, friable oxidised grey-brown diorite.
19-22.50	Mid grey diorite.
22.50-22.80	Quartz veins
22.80-29.85	Mid grey diorite, a few quartz veins up to 2cm thick.
29.85-30.15	Alternation zone with diorite and much quartz material.
30.15-34.35	Mid-grey diorite with minor quartz veins, diorite contains disseminated chalcopyrite, pyrite and arsenopyrite near its contact with the quartz vein immediately below.
34.35-34.90	Quartz vein with pyrite, arsenopyrite, minor cassiterite and trace chalcopyrite.
34.90-35.20	Mid grey diorite.
35.20-36.15	Mid grey diorite with quartz veins to 20 cm thick containing abundant sulphides (mainly pyrite).
36.15-40.00	Mid grey diorite. 38-38.1 m Quartz vein with pyrite and chalcopyrite. 38.6-38.7 m Quartz vein with minor pyrite.

Teacup D.D.H.2

Interval (metres)	
0-16.00	Broken, friable, oxidised grey-brown diorite with minor quartz veins.
16.00-32.00	Mid grey diorite. 24-24.5m.Coarse "pegmatitic" phase containing pink orthoclase with fine grained, dark green pyroxene and sericite.
32.00-32.60	Sulphide zone, consisting of diorite with many veins and veinlets containing abundant pyrite, arsenopyrite and trace galena.
32.60-60.00	Mid grey diorite. 43.2-44.1 Dark grey mafic phase with minor quartz material. 54.0-54.4 Barren quartz vein.

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Teacup D.D.H.3

Interval (metres)	
0-22.60	Broken, friable, oxidised grey-brown diorite.
22.60-23.00	Broken mid grey diorite.
23.00-23.50	Quartz vein with green chlorite, minor cassiterite.
23.50-23.75	Mid grey diorite with some quartz material.
23.75-23.90	Quartz vein with limonite boxworks, abundant pyrite, minor chalcopyrite and some yellow chlorite material.
23.90-24.40	Mid grey diorite with some quartz material.
24.40-37.30	Mid grey diorite with a few narrow quartz veins less than 1 cm thick. 27.9-28 m Quartz vein with green chlorite.
37.3 -39.85	Dark grey amphibolite consisting of chlorite, hornblende, pyroxene? and sericite?

Teacup D.D.H.4

Interval (metres)	
0- 1.40	Dark red-brown clay material.
1.40- 3.80	Mid brown clay material and completely broken, weathered diorite.
3.80-15.30	Grey-green friable, weathered diorite, minor quartz fragments at 11.7 m.
15.30-19.45	Grey coarse grained diorite, minor pyrite.
19.45-20.65	Highly altered and broken dark green-brown mafic material with much coarse biotite.
20.65-21.30	Altered material consisting of coarse plagioclase, some microcline, dark grey chlorite, some brown mica, minor quartz and some pyrite and pyrrhotite?
21.30-23.20	Grey coarse grained diorite.
23.20-23.80	Altered material as for 20.65-21.30 m, sulphides restricted to a narrow 2 cm thick quartz vein.
23.80-50.00	Grey coarse grained diorite.

APPENDIX III

Rock Sample Assays

Teacup Tin Mine N.T.

Sample No.	Sn (ug/g)	Cu (ug/g)	Pb (ug/g)	Zn (ug/g)
1	1200	1040	480	45
2	-50	40	75	18
3	-50	410	85	160
4	70	650	390	35
5	140	330	10000	350
6	260	1450	3050	350
7	-50	930	680	280
8	-50	45	2350	32
9	-50	30	770	45
10	410	3200	6000	2050
11	410	850	910	390
12	220	820	5600	330
13	1100	1000	3400	210

APPENDIX IV

Petrographic Description

(AMDEL)

Teacup D.D.H.4 - 18.1 m

Rock Name:

Hybridized diorite

Hand Specimen:

A greenish-grey coloured rock with a medium grain size which contains disseminated dark mica flakes up to a few millimetres in size. Michrochemical tests (staining with sodium cobaltinitrite after a hydrofluoric acid etch) show that the rock contains a small amount of potash feldspar.

Thin Section:

This rock is comprised mainly of altered plagioclase crystals intergrown with mafic minerals. The plagioclase crystals have been almost completely altered to finely divided sericite-clay leaving only marginal remnants which suggest that the original plagioclase was somewhat zoned with more calcic cores and sodic margins. The plagioclase crystals generally exhibit euhedral and subhedral shapes and a few of the smaller crystals have altered cores with unaltered margins.

The mafic minerals are comprised of clinopyroxene (augite), a pale green, weakly pleochroic amphibole, and biotite. The augite tends to form subhedral, concentrically zoned crystals which at least locally show marginal alteration to pale green amphibole. Amphibole is also disseminated through the rock as individual, anhedral crystals. The biotite forms well developed flakes with an intensely pleochoric, dark brown colour. The rock contains many basal cross sections of biotite which contain crystallographically oriented, acicular inclusions which are most likely a titanium mineral such as rutile or anatase. Locally the biotite also shows incipient development of a marginal reaction rim comprised of opaque to transluscent, finely granular material.

The rock also contains patches rich in granular quartz which also contain minor amounts of intergrown potash feldspar. Locally the quartz has a granophyric texture containing myrmekitic inclusions of what appear to be sericitized or partially sericitized feldspar. Calcite is also intergrown with the granular quartz as angular, interstitial fillings which were identified by staining with an alizarin red-S solution.

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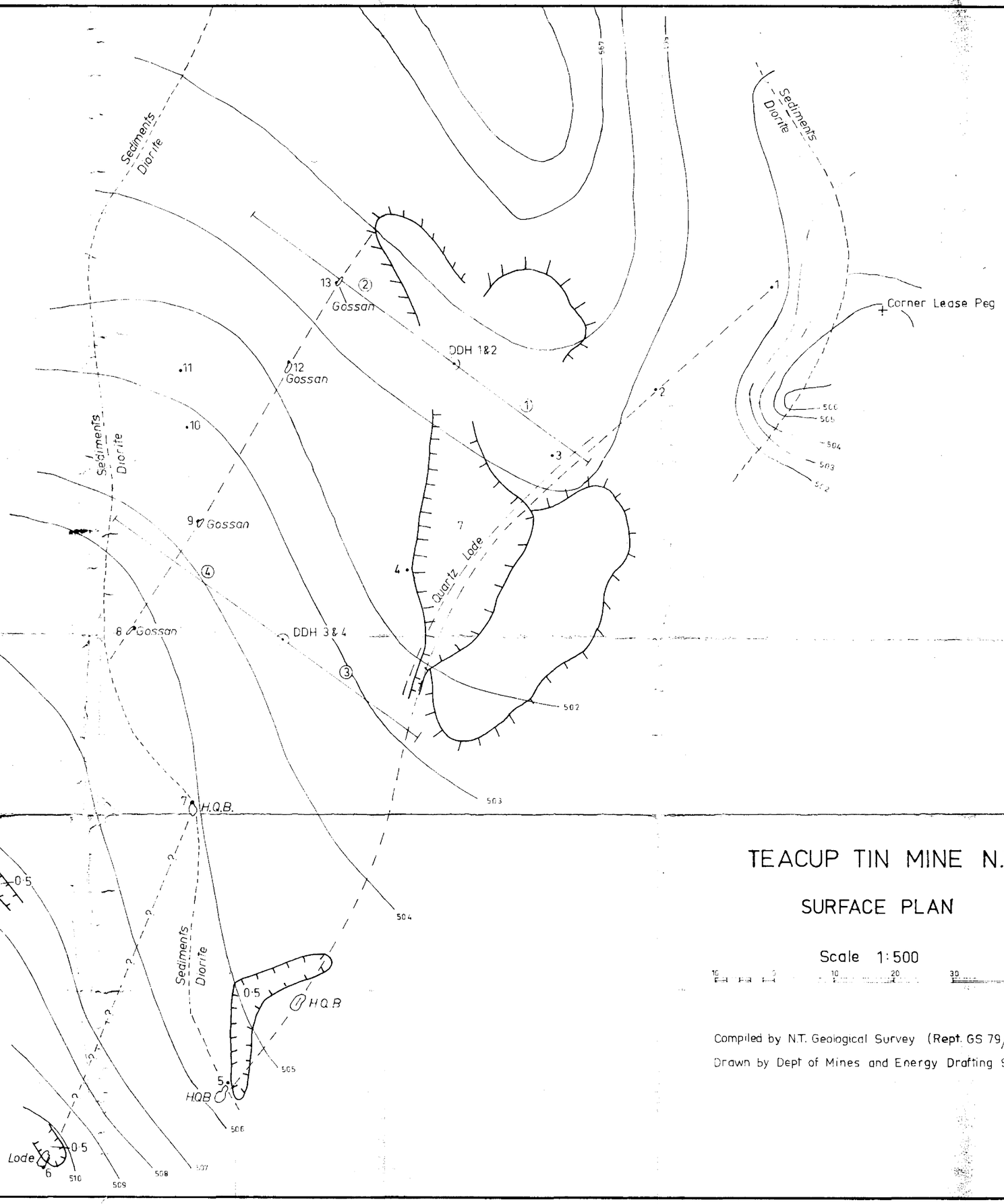
Apatite is disseminated through the rock as large (up to 0.5mm long), euhedral crystals. Minor epidote is also disseminated through the rock as angular, interstitial fillings and grains. Traces of zircon form small disseminated crystals, Minor opaques form anhedral grains and granular aggregates.

This is an unusual rock with a moderately melanocratic character containing a range of mafic minerals. It has been termed a hybridized diorite to indicate its somewhat unusual mineralogy including abundant clinopyroxene and biotite along with areas which could represent late-stage differentiates consisting largely of quartz which locally has a granophyric texture and is intergrown with smaller amounts of feldspar and calcite. Another feature of this rock is the presence of large, accessory apatite crystals.

PLATE 2


Sediments
Diorite
Gossan
DDH 1&2
DDH 3&4
Corner Lease Peg
Quartz Lode
HQB
N
MAGNETIC NORTH
REFERENCE
Topographic Contour (Relative Elevation in Metres)
Geological Contact
Indicated Trend of Lode Systems
Pits and Costeans (with depth in Metres)
Mullock Heap
Sample Point
TEACUP TIN MINE N.T.
SURFACE PLAN
Scale 1:500
10 0 10 20 30 40 50 Metres
Compiled by N.T. Geological Survey (Rept. GS 79/3)
Drawn by Dept of Mines and Energy Drafting Section Sep 79
G 79/14C

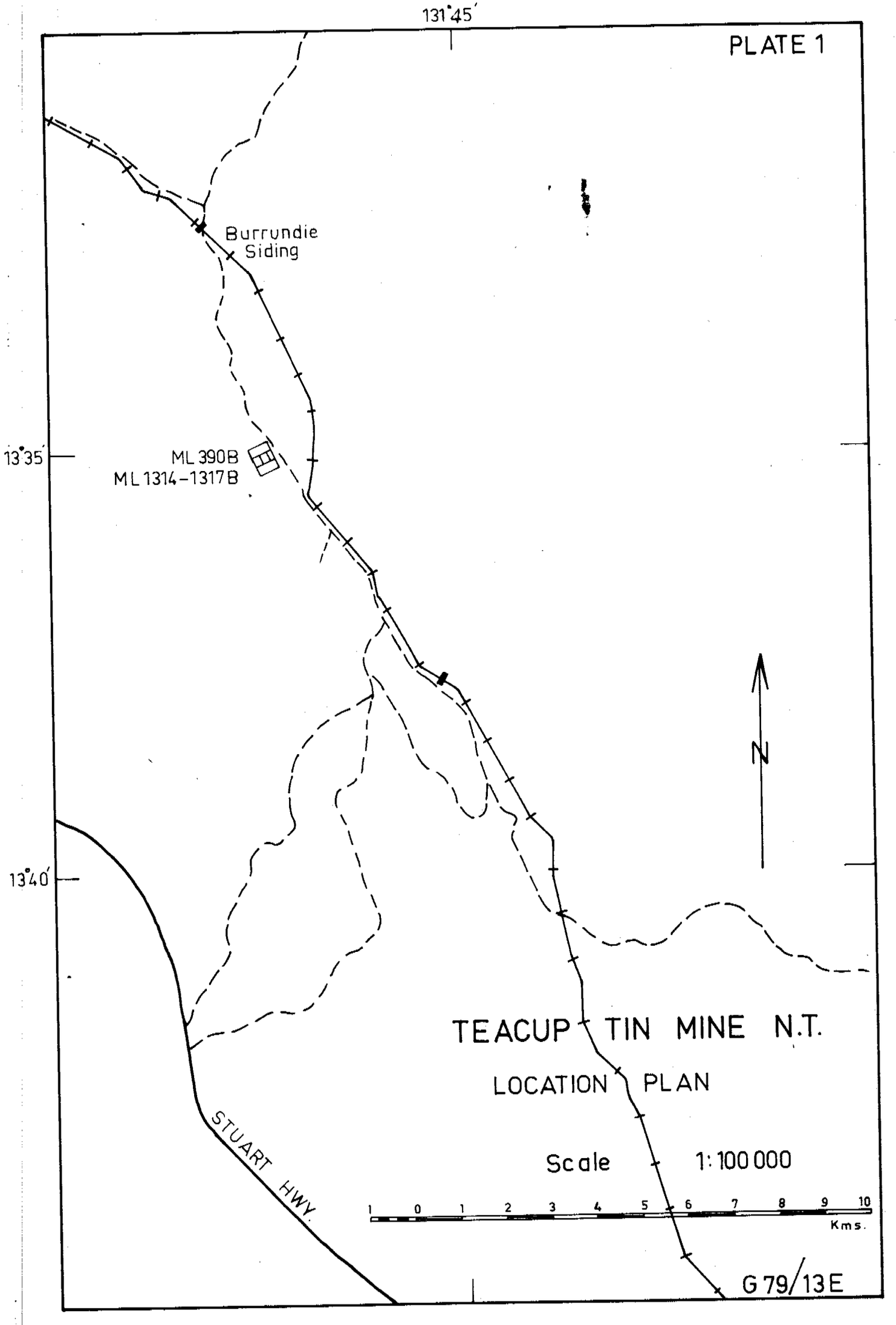
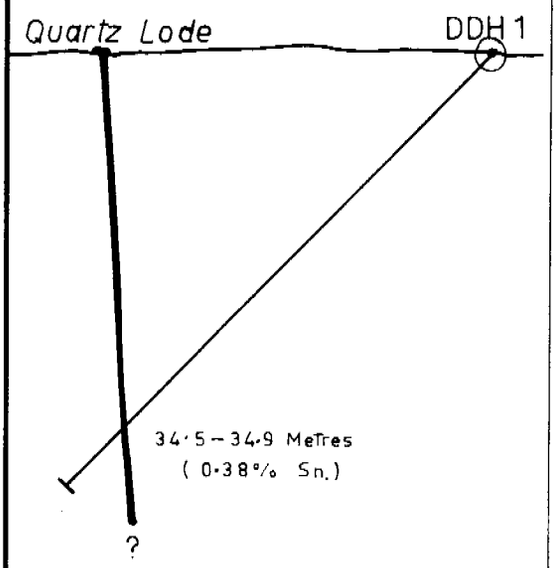
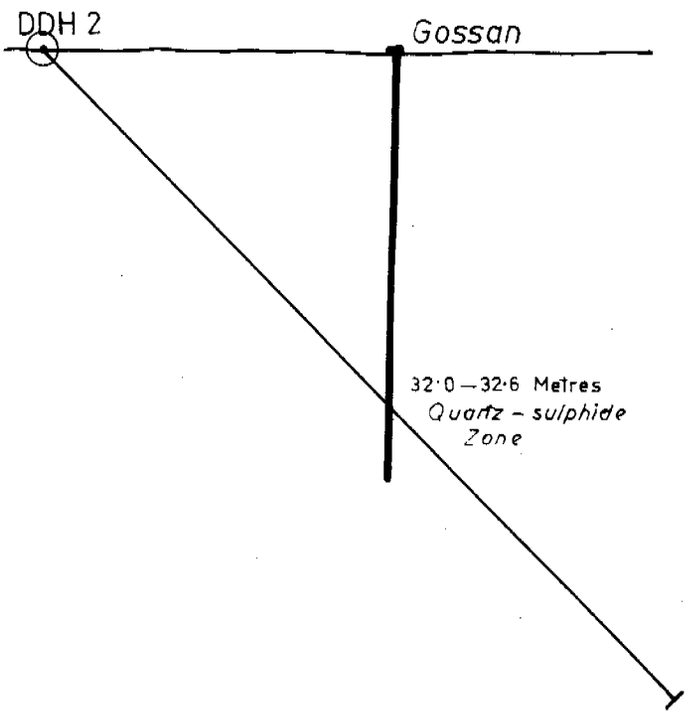
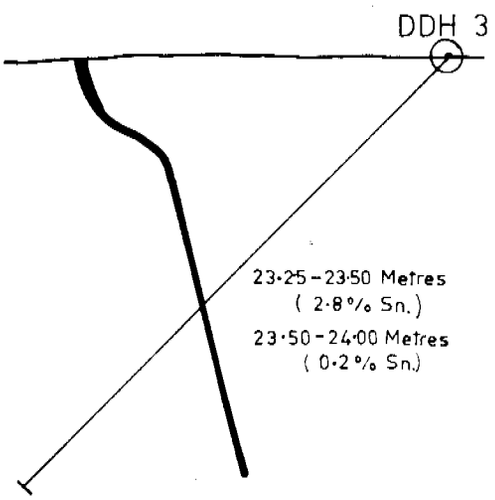
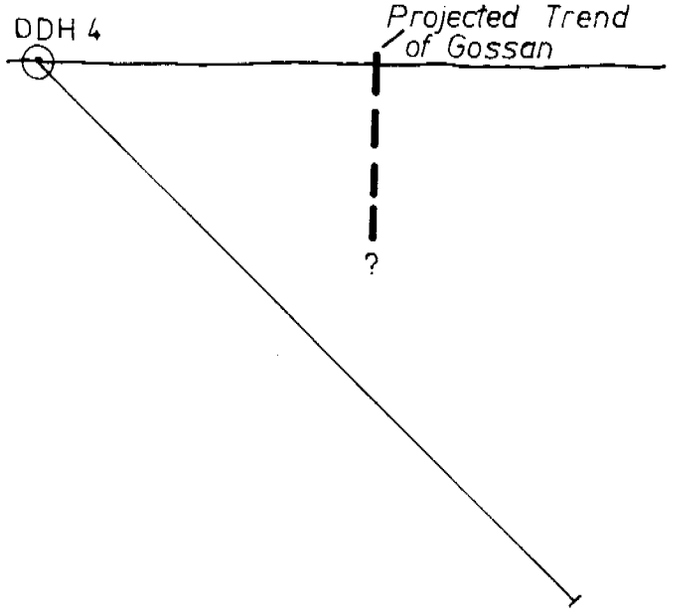

131°45'
PLATE 1
Burrundie
Siding
13°35'
ML 390B
ML 1314-1317B
13°40'
N
TEACUP TIN MINE N.T.
LOCATION PLAN
Scale 1:100 000
1 0 1 2 3 4 5 6 7 8 9 10
Kms.
STUART HWY.
G 79/13E

PLATE 3





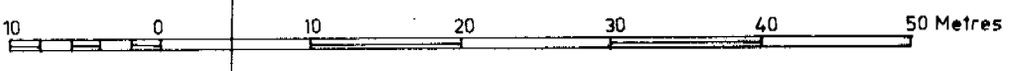




TEACUP TIN MINE N.T.

DRILL SECTIONS

Scale 1:500



To Accompany N.T.G.S. Rept. GS 79/3

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