DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept. Bk. No. 80/21

GEOCHEMICAL RECONNAISSANCE OF THE GAWLER RANGE VOLCANICS (YARDEA, GAIRDNER, TARCOOLA and PORT AUGUSTA).

GEOLOGICAL SURVEY

By

BRIAN J. MORRIS
GEOLOGIST
MINERAL RESOURCES SECTION

and

XAVIER P. SIBENALER
GEOLOGIST
GROUNDWATER and ENGINEERING SECTION

APRIL, 1980.

DM. No. 431/72

CONTENTS

PLANS

TABLES

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept. Bk. No. 80/21
DM. No. 431/72

GEOCHEMICAL RECONNAISSANCE OF THE GAWLER RANGE VOLCANICS (YARDEA, GAIRDNER, TARCOOLA and PORT AUGUSTA)

ABSTRACT

Reconnaissance rock chip sampling of the Gawler Ranges and some areas of altered granite on TARCOOLA has been completed.

The Gawler Range Volcanics show only trace amounts of molybdenum, silver and tin mineralization. In the Tarcoola area, significant amounts of tin in altered granite near Warna Rock Hole and high silver and lead values at Pinding Rocks are worthy of detailed exploration. Resampling of Mount Mitchell tin workings near Glenloth is also recommended.

INTRODUCTION

This report summarises geochemical exploration, concentrated on the Gawler Range Volcanics, carried out by the S. Aust. Dept. of Mines and Energy on YARDEA, GAIRDNER, TARCOOLA and part of PORT AUGUSTA.

Most of the rock chip sampling was carried out between May and July, 1972 by X.P. Sibenaler (Geologist) and R. Thornton and J. Hipper (Field Assistants). A follow up reconnaissance trip was completed in March, 1979 by B.J. Morris (Geologist) and B. Atterton (Field Assistant).

Samples collected in 1972 were analysed by semi-quantitative emission spectroscopy for copper (Cu), lead (Pb), zinc (Zn), tin (Sn), bismuth (Bi), silver (Ag), germanium (Ge), antimony (Sb), cobalt (Co), nickel (Ni), vanadium (V), tungsten (W), molybdenum (Mo), niobium (Nb), beryllium (Be), zirconium (Zr), palladium (Pd), tellurium (Te), thallium (Tl), lithium (Li), and boron (B).

Samples collected in 1979 were analysed by semi-quantitative emission spectroscopy for barium (Ba), cobalt (Co), chromium (Cr), manganese (Mn), molybdenum (Mo), nickel (Ni), vanadium (V), tungsten (W), lanthanum (La), yttrium (Y), silver (Ag), arsenic (As), bismuth (Bi), copper (Cu), lead (Pb), antimony (Sb), tin (Sn), zinc (Zn), gold (Au) and phosphorous (P). In addition, two samples were analysed for niobium (Nb), scandium (Sc), strontium (Sr), potassium (K), calcium (Ca) and magnesium (Mg) and two samples were fire assayed for gold.

Silcrete, calcrete or transported soils and alluvium cover much of the area, making soil sampling impracticable unless auger or rotary drilling is used to reach weathered bedrock.

PREVIOUS INVESTIGATIONS

Langsford (1972) reported on a geochemical survey on TARCOOLA that was designed to follow up investigations by exploration companies and Daly (1975) has summarised company exploration on TARCOOLA. Whitten, Wright and South (1976) reported on a geochemical survey on part of TARCOOLA and GAIRDNER.

GENERAL GEOLOGY

The oldest rocks are calc-silicate hornfels and associated metamorphosed basaltic or spilitic volcanics, with pillow structures, exposed northwest of Kokatha homestead, (Figure 2), and intruded by dykes and masses of Glenloth Granite (2 300 Ma). The Gawler Range Volcanics (Figures 1 and 2), an assemblage of dacite, rhyodacite and rhyolite, outcrop extensively. These volcanics erupted with the co-magmatic intrusion of the Hiltaba Granite (1 478 $\pm$ 38 Ma) during the final stages in the consolidation of the crystalline basement known as the Gawler Craton

(Blissett, 1978).

The Gawler Range Volcanics have been little deformed or metamorphosed since Proterozoic times, responding to earth movements by epeirogenic block faulting and jointing.

GEOCHEMICAL SURVEY

North of Tarcoola (Samples NT1-NT 14 and GR1-GR6, Table 1, Fig. 3).

The analytical results for both granite and Gawler Range Volcanics are not anomalous except for a granite outcrop, about 46 km north of Tarcoola, showing a vanadium content of up to 300 ppm compared to background value of 40 ppm for granite.

Pinding Rocks (Samples PR1-PR7 and B23-B25, Table 2, Fig. 3).

This is an area of granite with zones of greisen alteration and a porphyritic rhyodacite dyke. Anomalous amounts of Pb (1 000 ppm) and Ag (0.8 ppm) in greisen, Y (100 ppm) in micro-granite and Bi (10 ppm) and Ag (5 ppm) in vein quartz were recorded.

A detailed geochemical survey by Langsford (1972) located anomalous Cu, Pb, Zn, Bi, Ag and W in quartz-limonite veins cutting greisenised granite in a zone striking northwesterly, 3 km long and up to 1 km wide. Induced polarisation and shallow drilling were recommended.

Tarcoola Beds (Samples T2-T40, Table 3, Fig. 4).

Outcrop north and northwest of Tarcoola, was sampled with particular attention to basal conglomerate. A small anomalous area in conglomerate, with values of up to 10 000 ppm Cu, 1 000 ppm Pb, 10 ppm Ag and 30 ppm Mo, was detected about 0.2 km northwest of Tarcoola. This area also showed visible malachite in conglomerate.

TABLE 1

Assays Of Rock Chip Samples Located On Figure 3

(Concentration in parts per million - Detection limits in brackets) Amdel Repot AN 5996/72

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (20)	Sn (1)	Li (1)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Bi (1)	Ag (0.1)	B (3)	Co (5)	COMMENTS
NT. 1	G 5989/72	3	10	-	1	5	5	20	100	300	-	200	-	-	3	5	Granite
NT. 2	5990	5	10	-	1	10	5	30	300	250	20	250	-	-	3	5	"
" 3	5991	5	10	-	1	10	5	50	250	250	20	500	-	-	3	10	"
" 4	5992	5	20	-	1	5	5	10	80	250	20	400	-	-	3	5	"
" 5	5993	10	20	-	1	10	5	20	20	200	-	200	-	-	3	-	"
" 6	5994	5	10	-	1	3	5	10	30	200	-	300	-	-	3	5	"
" 7	5995	5	10	20	1	1	5	5	-	500	-	300	-	-	3	-	Porphyry
" 8	5996	10	20	-	1	3	5	5	-	50	30	200	-	-	3	-	Granite
" 9	5997	5	10	-	1	1	5	80	-	30	30	200	-	-	3	-	"
" 10	5998	5	10	-	1	3	5	10	-	30	30	200	-	-	3	-	"
" 11	5999	10	20	-	1	10	5	30	-	30	20	150	-	-	3	-	"
" 12	6000	10	20	-	1	1	5	20	-	10	30	300	-	-	3	-	"
" 13	6001	5	30	-	1	1	1	10	80	800	-	300	-	-	3	10	Porphyry
" 14	6002	5	30	40	1	3	3	50	-	250	-	300	-	-	3	-	"
GR. 1	G 5983/72	1	10	-	1	10	5	20	30	250	-	100	-	-	3	-	Granite from Gibralter Rocks
" 2	5984	1	10	-	1	15	5	5	20	250	-	100	-	-	3	-	" " " " "
" 3	5985	1	10	-	1	10	5	5	10	200	-	80	-	-	5	-	" " " " "
" 4	5986	1	10	-	1	5	5	10	10	200	-	200	-	-	3	-	" " " " "
" 5	5987	5	10	-	1	3	5	5	10	80	-	200	-	-	3	-	" " " " "
" 6	G 5988/72	3	15	-	1	5	5	10	10	250	-	80	-	-	3	-	" " " " "

(Mo(3), Pd(10), Ge(1), Sb(30), Te(20), and Td(1) were at or below detection).

TABLE 2

Assays of Rock Chip Samples, Pinding Rocks (located on Figure 3)

(Concentration in parts per million - Detection limits in brackets) Amdel Report AN 5996/72

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (20)	Sn (1)	Li (1)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Ag (0.1)	Bi (1)	Co (5)	B (3)	COMMENTS
PR. 1	G 5956/72	3	20	20	2	10	10	5	-	350	20	80	-	-	-	3	Granite-Pinding Rocks
" 2	5957	3	20	20	2	2	5	5	-	300	20	50	-	-	-	10	" " "
" 3	5958	3	40	20	1	2	10	5	-	300	20	50	-	-	-	10	" " "
" 4	5960	5	30	-	3	3	10	10	-	150	50	150	-	1	-	3	" " "
" 5	5960	10	10	-	1	20	35	15	20	250	-	150	-	-	5	10	Porphyritic Granite
" 6	5961	5	20	-	1	15	35	20	50	350	20	200	-	-	10	5	" "
" 7	G 5962/72	10	50	60	1	15	1	10	-	100	-	20	5	10	-	5	Quartz Vein

(Mo(3), Pd(10), Ge(1), Sb(30), Te(20), and Td(1) were at or below detection)

		Ba (200)	Cr (20)	Mn (10)	Mo (3)	Ni (5)	V (10)	La (100)	Y (10)	Ag (0.1)	Cu (1)	Pb (1)	Sn (1)	Zn (20)	Au (3)	P (100)	Amdel Report AC 3794/79
B23	A 1158/79	700	80	1000	3	200	50	150	24	-	10	50	-	30	-	5500	Porphyritic rhyodacite
B24	A 1159/79	-	100	500	-	200	-	-	100	--	7	100	2	-	-	400	Micro-granite dyke
B25	A 1160/79	500	80	3000	3	150	100	-	20	0.8	70	1000	-	100	-	400	Greisen.

(Co (5), W(50), As(50), Bi(1), and Sb(30) are at or below detection)

TABLE 3

Assays of Rock Chip Samples, Tarcoola Beds (located on Figure 4).

(Concentration in parts per million - Detection limits in brackets) Amdel Report AN 5996/72

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (20)	Sn (1)	Li (1)	Mo (3)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Bi (1)	Ag (0.1)	B (3)	COMMENTS
T 2	G 6004/72	20	20	-	1	3	3	20	5	250	30	1	300	1	2	5	Shale
3	6005	20	30	100	1	15	3	5	50	30	300	-	200	1	5	10	Granite?
4	6006	30	150	-	1	10	3	5	10	150	30	-	150	1	3	10	?
5	6007	50	50	30	1	3	-	3	30	20	40	-	150	1	2	-	Basal Conglomerate
6	6008	30	3	-	-	1	-	1	5	10	20	-	10	-	0.3	10	Ferruginous Conglomerat
7	6009	30	3	-	-	3	3	1	20	20	30	-	20	-	-	3	" "
8	6010	100	5	-	-	3	3	3	30	20	30	-	20	-	-	3	" "
9	6011	10	1	-	1	1	-	1	10	10	30	-	20	1	0.1	3	" "
10	6012	300	10	-	-	5	-	1	10	20	30	-	30	-	8	-	" "
11	6013	10000	3	30	1	1	-	3	10	10	30	1	20	1	10	3	Fe-rich conglomerate with Cu.
12	6014	100	10	30	-	10	-	1	10	-	50	-	30	-	-	3	Conglomerate
13	6015	300	100	-	-	1	3	1	10	20	30	-	80	-	3	5	Granite? Conglomerate?
14	6016	20	5	100	-	10	-	1	10	100	30	-	80	-	0.3	3	?
15	6017	20	10	-	1	10	-	5	10	50	30	-	50	1	0.2	30	Weathered shale.
16	6018	10	30	-	-	3	-	3	10	20	10	-	80	-	3	10	quartzite
17	6019	50	200	20	-	10	-	5	10	80	80	-	200	-	10	5	?
18	6020	50	1000	20	-	10	-	5	5	30	50	-	250	-	10	10	granitic rock
19	6021	30	1000	-	3	10	-	5	10	20	100	-	250	3	3	10	" " (pyritic)
20	6022	50	30	-	1	1	-	1	30	10	20	-	150	1	0.1	10	quartzite
21	6023	10	800	-	1	10	-	5	5	30	50	-	250	1	0.1	5	granitic rock
22	6024	20	1	-	-	1	-	-	20	-	10	-	10	-	-	3	sandstone
23	6025	10	10	20	-	1	-	-	20	-	30	-	30	-	0.1	3	granitised(?) Conglomerate
24	6026	15	15	80	-	5	-	1	20	10	300	-	250	-	0.5	3	" "
25	6027	3	5	-	-	3	-	3	20	50	250	-	300	-	0.1	5	?
26	6028	20	3	-	1	3	-	1	20	10	80	-	300	1	0.1	5	granitic rock
27	6029	20	30	-	1	15	30	1	10	50	30	10	250	1	5	3	conglomerate
28	6030	10	5	10	1	20	-	5	30	100	150	-	250	1	0.1	30	siltstone
29	6031	5	3	-	1	5	-	1	20	-	30	-	50	-	0.1	10	sandstone
30	G 6032/72	10	10	-	1	5	3	1	20	10	40	-	300	1	0.1	3	conglomerate
31	6033/	20	10	-	-	10	3	1	20	10	250	-	80	-	0.1	3	conglomerate
32	6034	10	10	-	-	5	-	3	10	20	30	-	300	-	0.1	30	sandstone
33	6035	5	20	-	1	10	-	5	10	100	80	-	250	-	2	10	siltstone

TABLE 3 (cont.)

Field	No.	Amdel No.	Cu	Pb	Zn	Sn	Li	Mo	Be	Ni	V	Mn	Nb	Zr	Bi	Ag	B	COMMENTS
T	34	G 6036	30	10	-	1	10	-	1	10	10	300	-	200	-	0.5	3	Conglomerate
	35	6037	20	5	-	1	5	3	1	20	10	300	-	200	-	0.1	-	"
	36	6038	20	20	-	1	5	3	1	10	30	30	-	150	-	0.1	3	"
	37	6039	15	30	-	1	10	3	5	10	20	30	-	200	-	0.1	5	granitic rock
	38	6040	30	40	-	1	5	10	3	20	20	30	-	100	-	0.1	3	ferruginous conglomerate
	39	6041	10	10	-	-	5	3	3	20	10	10	-	20	-	0.1	5	conglomerate
	40	G 6042/72	15	10	-	1	5	3	5	30	20	50	-	300	-	0.1	5	grantic rock.

(W(50), Pd(10), Ge(1), Sb(30), Te(20), Td(1), and Co(5) were at or below detection.)

Warna Rock Hole (Samples W1-W2 and 1-19, Table 4, Fig. 5)

In 1969-70, outcrops of granite with pods and veins of greisen were grid sampled (Whitten, Wright and South, 1976). The average tin content of greisen and granite was 200 ppm and 60 ppm respectively. Resampling of part of the area in 1972 did not confirm the high tin content with an average of only 30 ppm in greisen and 7 ppm in granite. There is a similar discrepancy in the results for Mo, Cu and Zn. Detailed geochemical sampling is recommended.

Kokatha (Samples G5935/72-G5955/72 and B14 and B15, Table 5, Fig. 6).

Contacts between Gawler Range Volcanics and Kokatha Granite did not reveal any anomalies. Outcrop of greisen, 900 m southeast of the contact, gave tin values ranging from 10-40 ppm. A sample of ignimbrite from a "volcanic vent" (Branch, 1978) and a sample of an amygdaloidal basalt both contained weakly anomalous amounts of Ag (0.2 ppm). The ignimbrite also contained a trace of Sn (2 ppm).

Hiltaba (Samples H1-H22 and B4-B5, Table 6 and Fig. 7 (northwest corner)).

Sampling was concentrated on the granite-Gawler Range Volcanic contact. No anomalous values were found in the granite while the volcanics contained upto 200 ppm Cu, 10 ppm Mo and 400 ppm V.

Gawler Range Volcanics (Samples 3-191 and B6-B13, Table 7, Figs. 7 and 8).

Only a few of the 197 samples on YARDEA and GAIRDNER contained high metal values, including upto 20 ppm Mo, 0.3 ppm Ag and 5 ppm Sn. Resampling did not reproduce the anomalous results of Day (1971) who reported up to 845 ppm Cu, 3 250 ppm Pb, 4 450 ppm Zn, 262 ppm Sn, 55 ppm W and 32 ppm Mo.

TABLE 4

Assays of Rock Chip Samples Located On Figure 5.

(Concentration in parts per million - Detection limits in brackets) Amdel Report AN 5996/72

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (20)	Sn (1)	Li (1)	Mo (3)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Bi (1)	Ag (0.1)	B (3)	COMMENTS
W 1	G 5963/72	10	20	-	3	10	3	5	5	-	200	50	150	-	-	3	Granite - Warna Well
W 2	5964	50	50	20	5	30	3	5	10	-	150	20	80	10	3	3	" " "
1	5965	20	20	20	40	50	-	3	30	-	1000	20	30	1	0.5	5	Greisen-Warna Rock Hole
2	5966	30	30	-	10	3	3	-	5	-	30	-	30	500	1	5	" " " "
3	5967	5	20	20	1	15	3	5	5	-	400	20	300	-	-	5	Granite " " "
4	5968	30	10	60	40	100	-	5	20	10	1200	20	100	50	0.5	10	Greisen " " "
5	5969	10	600	40	3	20	3	5	5	-	200	20	80	3	5	3	Granite " " "
6	5970	5	150	-	5	20	3	5	20	-	100	30	80	-	-	3	" " " "
7	5971	10	30	-	1	15	3	5	5	-	50	20	30	-	-	3	" " " "
8	5972	3	20	-	2	15	-	5	5	-	80	20	50	-	-	3	" " " "
10	5973	5	10	-	5	15	-	5	5	-	80	20	50	1	0.1	5	" " " "
11	5974	15	20	20	30	50	-	5	10	10	1000	20	50	-	0.1	3	Greisen " " "
12	5975	15	30	-	5	20	3	5	20	10	200	30	100	-	0.1	3	Granite " " "
13	5976	20	5	-	10	20	3	3	5	-	100	-	30	-	-	5	Greisen " " "
14	5977	20	1150	20	50	80	3	5	5	20	1200	20	150	30	-	5	" " " "
15	5978	20	200	20	10	15	3	5	30	10	20	20	80	1	1	10	Granite " " "
16	5979	5	10	-	5	20	3	10	20	10	200	20	80	-	-	5	" " " "
17	5980	3	20	20	3	10	3	5	10	-	100	50	250	-	-	5	" " " "
18	5981	20	100	20	50	20	3	5	5	-	350	20	80	20	8	3	" " " "
19	G 5982/72	5	20	-	1	10	3	5	5	-	100	30	200	-	-	3	" " " "

(Pd(10), Ge(1), Sb(30), Te(20), Td(1), and Co(5) were below detection)

TABLE 5

Assays of Rock Chip Samples - Kokatha Area (located on Figure 6)

(Concentration in parts per million - Detection limits in brackets) Amdel Report AN 5996/72

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (20)	Sn (1)	Li (1)	Mo (3)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Bi (1)	Ag (0.1)	B (3)	COMMENTS
1	G 5935/72	3	10	20	1	5	3	8	10	-	150	20	100	-	-	5	Granite
2	5936	3	15	20	1	1	3	8	10	10	100	20	100	-	-	3	"
3	5937	3	15	-	1	5	2	10	5	10	200	20	200	-	-	5	"
4	5938	3	10	20	1	3	3	8	5	-	150	20	150	-	-	5	"
5	5939	10	20	20	2	1	3	8	10	-	150	20	150	-	0.3	5	"
6	5940	3	20	20	1	5	3	8	10	-	150	20	150	-	-	3	"
7	5941	3	15	20	1	5	3	8	5	-	150	20	150	-	-	3	"
8	5942	3	10	30	1	5	10	8	50	-	150	20	150	-	-	5	"
	5943	20	30	-	1	30	3	1	10	-	30	20	10	-	0.1	3	Qtz vein in granite
	5944	20	10	-	1	20	3	3	10	-	50	20	20	-	-	5	" " " "
	5945	5	3	30	10	10	3	10	20	10	800	20	100	-	-	5	Greisen
	5946	10	5	30	20	15	3	10	10	10	250	20	80	30	0.1	5	"
	5947	5	8	50	30	20	3	10	20	20	600	20	80	3	-	30	"
	5948	3	3	-	40	1	3	5	5	-	200	20	100	1	-	3	"
	5949	5	8	-	3	5	3	5	20	-	200	20	100	-	-	5	Granite in greisen
	5950	3	20	30	3	1	10	10	5	-	200	20	200	1	-	20	Porphyry
a(																	) contact
	5951	3	20	-	1	1	-	10	10	-	50	20	100	-	-	5	granite)
	5952	10	10	20	1	15	-	10	5	-	250	20	200	-	-	10	Porphyry
b(																	) contact
	5953	3	10	-	1	3	-	10	5	-	200	20	100	-	-	3	granite)
	5954	3	10	30	1	3	3	10	5	-	400	20	300	-	-	10	Porphyry
c(																	) contact
	G 5955/72	3	15	20	3	1	-	10	5	-	250	20	80	-	-	5	granite)

W(50), Pd(10), Ge(1), Sb(30), Te(20), Tl(1), Co(5) were not detected.

		Ba (200)	Cr (20)	Mn (10)	Mo (3)	Ni (5)	V (10)	La (100)	Y (10)	Ag (0.1)	Cu (1)	Pb (1)	Sn (1)	Zn (20)	Au (3)	P (100)	Amdel Report AC 3794/79
B 14	A 1149/79	1000	150	700	-	200	80	50	55	0.2	25	60	2	40	-	500	Ignimbrite
B 15	A 1150/79	1500	20	1000	-	50	100	50	34	0.2	7	40	-	100	-	10000	Amygdaloidal basalt.

(Co(5), W(50), As(50), Bi(1) and Sb(30) are at or below detection)

TABLE 6

Assays of Rock Chip Samples - Hiltaba Area (located on Figure 7)

(Concentration in parts per million - Detection limits in brackets) Amdel Report AN 5996/72

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (20)	Sn (1)	Li (1)	Mo (3)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Ag (0.1)	B (3)	Co (5)	COMMENTS
H 1	G 5913/72	10	15	40	5	10	-	5	10	10	300	20	400	0.1	3	-	porphyry contact
2	5914	3	5	-	3	3	-	5	10	-	150	20	100	-	5	-	granite)
3	5915	5	8	40	1	8	-	5	10	10	400	20	300	0.1	3	-	porphyry contact
4	5916	3	15	-	2	1	-	5	5	-	50	20	80	-	5	-	granite)
5	5917	3	10	20	1	5	-	5	20	10	350	20	250	0.1	5	-	porphyry contact
6	5918	5	20	-	2	5	-	5	10	-	80	20	100	-	3	-	granite)
7	5919	5	30	30	2	3	3	8	20	10	300	20	200	0.1	3	-	porphyry contact
8	5920	3	5	20	2	1	3	5	5	-	100	20	100	0.1	5	-	granite)
9	5921	30	20	20	1	3	3	8	5	10	250	20	300	0.1	5	-	porphyry contact
10	5922	5	15	-	1	1	3	5	10	-	100	20	300	0.1	5	-	granite)
11	5923	200	15	30	1	10	3	8	10	20	400	20	300	-	5	-	porphyry contact
12	5924	5	8	-	3	1	3	1	5	-	50	20	100	-	5	-	granite)
13	5925	30	20	30	1	3	3	8	10	30	300	20	300	-	5	5	porphyry contact
14	5926	10	8	-	3	1	3	3	10	10	30	20	150	0.1	5	-	granite)
15	5927	3	10	20	1	5	10	8	50	400	350	20	300	-	5	-	porphyry contact
16	5928	5	20	-	3	1	3	3	5	10	50	20	100	-	5	-	granite)
17	5929	5	40	20	1	3	3	8	10	80	250	20	500	0.1	5	5	porphyry contact
18	5930	3	3	-	5	1	3	8	5	10	100	20	150	-	5	-	granite)
19	5931	10	15	20	1	3	3	8	5	-	150	20	150	-	5	-	granite
20	5932	1	15	20	1	1	3	20	5	10	80	20	150	-	5	-	granite
21	5933	3	15	20	1	10	3	10	5	-	150	20	150	-	5	-	granite
" 22	G 5934/72	3	10	-	1	10	3	5	5	-	50	20	100	-	3	-	granite

W(50), Pd(10), Ge(1), Sb(30), Te(20), Tl(1) and Bi(1) were not detected

		Ba (200)	Cr (20)	Mn (10)	Mo (3)	Ni (5)	V (10)	La (100)	Y (10)	Ag (0.1)	Cu (1)	Pb (1)	Sn (1)	Sn (20)	Au (3)	P (100)	Amdel Report AC3794/79
B 4	A 1139/79	1500	80	1000	-	100	80	100	40	0.3	10	40	1	-	-	1000	Dacitic ashflow
B 5	A 1140/79	-	70	300	-	70	-	50	22	0.1	5	40	1	-	-	400	Hiltaba granite

(Co(5), W(50), As(50), Bi(1) and Sb(30) are at or below detection)

TABLE 7

Assays of Roch Chip samples, Gawler Range Volcanics (located in figures 7 and 8)

(Concentration in parts per million - Detection limits in brackets) Amdel No AN 5996/72

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (20)	Sn (1)	Li (1)	Mo (3)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Bi (1)	Ag (0.1)	B (3)	Co (5)	COMMENTS
3	G 6043/72	3	20	20	1	5	3	5	10	10	500	20	400	--	-	3	-	Unless otherwis
4	6044	5	3	40	1	15	-	5	80	30	400	20	500	-	-	3	10	sstated all
5	6045	3	20	1	1	20	-	5	50	50	300	-	250	-	0.1	3	10	samples are of
6	6046	5	5	20	1	1	-	10	5	-	80	20	350	-	-	3	-	Gawler Range
7	6047	5	3	30	1	5	3	5	5	30	200	-	3500	-	-	3	-	Volcanic
8	6048	3	1	20	-	10	-	10	10	30	300	-	300	-	-	3	-	
9	6049	5	10	30	1	3	-	5	10	20	400	20	400	-	-	-	-	
10	6050	10	3	30	1	3	3	10	10	10	400	20	250	-	-	5	-	
11	6051	3	8	20	1	5	3	5	20	10	100	20	250	-	0.1	5	-	
12	6052	5	10	-	1	5	3	10	30	10	500	20	300	-	0.1	3	-	
13	6053	3	3	-	1	5	-	5	30	-	500	20	150	1	-	10	-	
14	6054	10	8	20	1	3	5	5	30	10	50	20	300	1	-	10	-	
15	6055	15	5	20	1	5	3	5	20	10	400	20	300	1	-	10	-	
16	6056	20	8	20	1	8	3	5	30	10	150	20	250	-	-	5	-	
17	6057	10	10	20	1	3	3	3	30	-	100	20	250	-	-	5	-	
18	6058	20	10	-	1	3	3	5	40	10	80	20	200	-	-	5	-	
19	6059	20	30	-	1	5	3	5	20	10	150	20	250	-	0.1	5	-	
20	6060	15	5	20	1	10	5	5	10	10	100	20	250	--	-	5	-	
21	6061	15	10	20	1	10	20	5	10	10	300	20	2250	-	-	3	-	
22	6062	5	50	100	1	5	3	5	5	-	250	20	250	1	0.3	5	-	
23	6063	5	15	20	1	3	3	5	5	30	250	20	250	-	-	3	-	
24	6064	15	30	20	1	1	3	5	20	20	100	20	200	-	-	5	-	
25	6065	5	40	30	1	5	-	5	10	-	80	20	100	-	0.1	5	-	
26	6066	50	10	20	1	8	3	5	30	10	50	20	350	-	-	3	-	
27	6067	5	10	-	1	3	20	5	20	10	30	20	200	-	-	3	-	
28	6068	10	20	-	1	10	-	5	20	20	50	20	250	-	0.1	10	-	
29	6069	5	5	-	1	5	-	3	10	10	50	-	200	-	0.1	5	-	
30	6070	5	20	-	1	5	-	5	20	-	30	-	200	-	-	5	-	
31	6071	10	30	-	1	5	-	5	20	10	100	20	300	-	-	5	-	
32	6072	20	8	20	1	5	-	5	50	30	250	20	500	-	-	5	-	
33	6073	20	10	20	1	30	-	5	10	50	1000	--	400	-	-	5	-	
34	6074	10	10	20	1	10	-	5	10	30	1000	-	300	-	0.1	3	-	
35	6075	15	5	20	1	5	-	5	5	20	800	20	300	-	-	3	-	

TABLE 7 (cont.)

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (20)	Sn (1)	Li (1)	Mo (3)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Bi (1)	Ag (0.1)	B (3)	Co (5)
33	G 6073/72	20	10	20	1	30	-	5	10	50	1000	-	400	-	-	5	-
34	6074	10	10	20	1	10	-	5	10	30	1000	-	300	-	0.1	3	-
35	6075	15	5	20	1	5	-	5	5	20	800	20	300	-	-	3	-
36	6076	20	5	-	1	3	-	5	5	30	500	20	400	-	0.1	5	-
37	6077	10	10	20	1	10	-	5	30	50	800	20	500	-	-	3	-
38	6078	15	15	20	1	20	-	5	30	50	800	20	400	-	0.1	5	-
39	6079	10	10	20	1	10	-	5	10	30	400	20	300	-	0.1	3	-
40	6080	10	3	20	1	10	-	5	10	30	500	20	300	-	0.1	3	-
42	6081	10	8	-	1	8	-	5	10	10	300	20	250	-	-	3	-
43	6082	30	10	20	1	8	-	5	10	20	300	20	250	-	-	3	-
44	6083	10	10	-	1	8	-	5	20	20	250	20	300	-	-	3	-
45	6084	10	10	-	1	3	3	5	5	-	200	20	300	-	-	3	-
46	6085	10	5	-	1	3	-	5	10	-	50	20	250	-	0.1	3	-
47	6086	10	10	-	1	20	3	5	20	100	800	-	400	-	0.1	3	20
48	6087 1	10	150	40	1	30	3	5	5	50	1000	-	300	-	-	3	20
49	6088	50	20	40	1	10	-	5	20	50	1000	-	300	-	0.1	3	20
50	6089	10	8	30	1	15	-	5	30	50	1000	-	400	-	0.1	5	20
51	6090	5	8	20	1	10	-	5	30	30	300	-	300	-	-	3	-
52	6091	3	5	20	1	10	-	5	10	40	300	20	500	-	-	3	-
53	6092	3	5	30	1	10	-	5	10	-	300	20	500	-	-	3	-
54	6093	3	3	20	1	10	-	5	10	10	400	20	500	-	-	3	-
55	6094	3	3	20	1	5	-	5	10	10	400	20	500	-	-	3	-
56	6095	3	3	20	1	5	-	5	10	10	300	20	250	-	-	3	-
57	6096	5	5	20	1	10	-	5	30	20	300	20	500	-	-	5	-
58	6097	3	5	20	1	5	-	5	10	20	200	-	500	-	-	3	-
59	5098	3	5	30	1	5	-	5	10	10	350	-	500	-	-	3	-
60	6099	10	5	30	1	5	-	5	20	10	300	-	400	-	-	3	-
61	6100	10	30	40	1	10	3	8	10	30	600	20	400	-	0.1	3	10
62	6101	5	25	40	1	10	3	8	10	20	400	20	400	-	0.1	5	10
63	6102	5	10	30	1	10	3	10	20	80	400	20	1000	-	0.1	3	10
64	6103	10	40	30	1	10	3	8	10	50	50	20	800	-	0.1	3	10
65	6104	5	20	20	1	8	-	10	5	50	300	20	500	-	0.1	10	5
67	6105	3	10	20	1	8	-	8	5	30	300	20	500	-	-	3	5
68	6106	10	20	30	1	15	-	8	10	30	350	-	400	-	0.1	3	10

TABLE 7 (Cont.)

Field No.	Amdel No.	Cu	Pb	Zn	Sn	Li	Mo	Be	Ni	V	Mn	Nb	Zr	Bi	Ag	B	Co
69	G 6107	5	25	20	1	20	3	3	30	80	250	-	300	-	0.1	3	10
70	6108	5	25	30	1	10	3	5	20	80	500	-	400	-	0.1	3	20
71	6109	5	25	30	1	15	-	8	20	80	350	-	500	-	0.1	3	20
72	6110	5	10	20	1	15	-	3	10	10	250	-	400	-	0.1	3	-
73	6111	10	20	40	1	10	-	3	30	30	250	-	300	-	0.1	3	5
74	6112	5	10	30	1	10	-	3	30	10	300	-	250	-	-	3	5
75	6113	3	10	20	1	8	-	3	5	-	300	-	200	-	0.1	3	-
80	6115	3	10	20	1	1	-	5	30	-	100	-	400	-	0.1	3	-
81	6116	3	5	20	1	1	-	5	10	10	100	-	500	-	0.1	3	-
82	6117	10	10	30	1	20	-	5	20	50	300	-	300	-	0.1	3	20
83	6118	5	15	20	1	1	-	5	5	20	350	-	500	-	0.1	3	-
84	6119	3	3	20	1	1	-	5	10	80	100	-	400	-	0.1	3	-
85	6120	3	3	20	1	30	-	5	10	30	250	-	200	-	0.1	3	5
86	6121	3	55	40	1	80	-	5	10	30	400	-	250	-	0.1	3	5
87	6122	20	10	30	1	10	-	5	10	50	350	-	250	-	0.1	3	10
88	6123	20	10	20	1	10	-	5	10	30	300	-	250	-	0.1	3	10
89	6124	20	10	20	1	10	-	5	20	80	300	-	300	-	0.1	3	10
90	6125	5	10	20	1	10	-	5	20	80	300	-	800	-	0.1	3	20
91	6126	5	20	-	1	5	-	5	20	20	200	-	200	-	0.1	3	-
92	6127	5	30	-	1	3	-	5	5	10	100	-	250	-	0.1	3	-
93	6128	10	5	-	1	1	3	5	10	80	150	-	300	-	0.1	3	-
94	6129	5	5	20	1	1	3	5	10	-	30	-	200	-	0.1	10	-
95	6130	3	5	-	1	3	-	5	10	-	30	-	250	-	0.1	5	-
96	6131	3	8	20	1	1	-	5	20	-	250	-	50	-	0.1	5	-
97	6132	20	8	20	1	1	-	5	30	10	250	-	500	-	0.1	5	-
98	6133	20	15	40	1	30	-	5	10	30	300	-	300	-	0.1	5	5
99	6134	10	20	40	1	20	3	5	30	30	500	-	250	-	0.1	5	10
100	6135	20	10	30	1	15	3	5	20	20	400	-	400	-	0.1	5	10
101	6136	5	20	40	1	10	3	5	30	50	500	-	300	-	0.1	3	10
102	6137	10	30	20	1	10	-	5	30	30	300	-	400	-	0.1	3	10
103	6138	5	15	20	1	10	3	5	30	30	500	-	300	-	0.1	3	10
104	6139	5	20	20	1	15	3	5	5	30	300	-	300	-	0.1	3	10
105	6140	5	50	20	1	5	3	5	30	30	300	-	400	-	0.1	3	10
106	6141	10	20	20	1	5	3	5	10	30	300	-	300	-	0.1	3	10
107	6142	5	30	20	1	20	3	5	20	50	300	-	300	-	0.1	10	10
108	6143	20	20	20	1	15	3	5	30	80	500	20	500	-	0.1	3	10
109	6144	20	20	30	1	15	3	5	20	50	800	20	300	-	-	3	10

TABLE 7

(cont.)

Field No.	Amdel No.	Cu.	Pb	Zn	Sn	Li	Mo	Be	Ni	V	Mn	Nb	Zr	Bi	Ag	B	Co
110	G 6145	20	10	20	1	10	3	5	10	30	1000	20	300	-	-	3	10
111	6146	5	5	20	1	15	-	5	20	50	400	20	200	-	-	5	10
112	6147	20	20	-	1	15	3	5	20	50	400	20	300	-	-	3	10
113	6148	10	10	-	1	15	3	5	10	30	400	20	200	-	0.1	5	-
114	6149	20	5	20	1	20	-	10	30	80	300	20	300	-	0.1	3	10
115	6150	20	8	20	1	20	-	10	20	50	500	20	200	-	0.1	3	10
116	6151	20	3	30	1	20	-	5	30	100	500	20	200	-	-	5	20
117	6152	20	20	20	1	15	-	5	10	50	500	20	300	-	0.1	3	5
118	6153	20	20	30	1	15	3	5	10	30	400	20	150	-	0.1	3	5
119	6154	20	10	30	1	15	3	10	10	80	800	20	500	-	0.1	3	10
120	6155	20	20	20	1	10	3	10	20	80	1000	20	500	-	0.1	3	10
121	6156	20	20	30	1	10	3	10	10	80	800	20	300	-	0.1	3	10
122	6157	30	20	30	1	15	3	10	10	80	800	20	500	-	0.1	3	10
123	6158	20	20	40	1	5	3	5	10	50	500	20	200	-	-	3	10
124	G 6159/72	20	30	20	1	5	3	25	20	30	500	20	300	-	0.1	3	10

(W(50), Pd(10), Ge(1), Sb(30), Te(20) and Tl(1) were not detected).

TABLE 7 (Cont.)

Amdel Report AN 202/73

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (1)	Sn (1)	Li (1)	Mo (3)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Bi (1)	Ag (0.1)	B (3)	Co (5)	COMMENTS
125	G 6848/72	10	30	20	3	5	3	3	20	5	500	20	400			5	5	Unless otherwise
126	6849	10	25	20	3	3	3	5	10	20	300	20	500			5	5	stated all the
127	6850	5	10		3	3	3	3	20	30	10	20	500			3		samples are chips
128	6851	3	50		3			5	5	10	50	20	400			5		taken from the
129	6852	5	40		3	1		5	30	15	50	20	300			5		Gawler Range
130	6853	10	15		3	10		3	5	30	30	20	300			5		Volcanics
131	6854	5	30	20	3	3	3	10	50	10	350	20	400			3	5	
132	6855	5	30		3	1	3	5	20	10	30	20	500			3	5	
133	6856	5	50	20	3	5	3	5	55	15	300	20	800			3	5	
134	6857	30	20	30	1	5	5	5	10	50	400	20	800			3	5	
135	6858	5	20	30	1	5	3	5	10	10	300	20	500			3		
136	6859	5	50	30	3	3	3	5	30	10	200	20	500			3	5	
137	6860	5	5		3	5	3	3	10	10	30		400			10		
138	6861	10	5		5	3		3	10	10	50		300			10		
139	6862	3	5		5	3		1	10	20	10		30			20		)Warrow Quartzite
140	6863	3	8		5	5		1	10	10	10		150			100		) " "
141	6864	3	8		1	3		1	10	10	10		50			10		Quartz vein
142	6865	3	30		1	10	10	5	10	10	30	20	150			3		
143	6866	3	30		1	10	10	5	10	10	150		200			3		)Buckleboo
144	6867	3	30		1	5	5	5	10	10	30	20	300			3		)
145	6868	3	60		1	1		5	5	10	1000	20	200			10		)granite
146	6869	3	15			10		3	20	100	200		300			3	10	
147	6870	3	30	40		20		5	30	100	80		500			10	10	
148	6871	10	30		3	3			5	20	10		10			3		
149	6872	15	20		5	5		1	5	10	15		30			10		)Warrow Quartzite
150	6873	15	20		5	1		1	5	10	10		30			5		)-minor pyrite
151	6874	30	8		3	5		1	5	10	10		30			10		)mineralization
151A	6875	30	15		10	1	10	1	30	10	10		100			5	10	
152	6876	3	30	20	1	3	10	10	10	10	300	20	800			10	5	
153	6877	3	30	20	1	10	3	10	30	50	300	20	800			10	5	
154	6878	5	50	20	1	10	3	10	5	50	1500	20	500			10	20	
155	6879	5	30	40	1	15	3	10	10	50	800	20	400			10	10	
156	6880	5	50	30	1	15	3	10	10	80	1000	20	400			10	10	
157	6881	5	30	30	1	5	10	10	40	100	800	20	500			10	20	

TABLE 7 (Con t.)

Field No.	Amdel No.	Cu	Pb	Zn	Sn	Li	Mo	Be	Ni	V	Mn	Nb	Zr	Bi	Ag	B	Co	COMMENTS
158	G 6882/72	3	20	20	1	1		10	30	100	150	20	400			5	5	
159	6883	3	20	20	1	3		10	5	10	150	20	400			5	5	
160	6884	5	40	30	1	5	3	10	10	100	400	20	400			5	10	
161	6885	5	30	20	1	20	3	10	20	80	500	20	400			5	10	
162	6886	5	30	30	1	10	3	10	30	50	500	20	400			10	20	
163	6887	10	30	20	1	20	3	10	20	100	500	20	500			5	10	
164	6888	15	30	30	1	20		10	10	50	500		300			20	20	
165	6889	10	20	30	1	20		10	10	50	400		300			10	20	
166	6890	10	30	30	1	20		10	10	50	300		200			3	20	
167	6891	20	50	30	1	20		10	10	100	1200	20	800			5	10	
168	6892	5	30	30	1	20		10	40	80	500	20	500			5	20	
169	6893	5	20	30	1	20		10	40	50	300		500			5	20	
170	6894	5	30	20	1	10	3	3	80	50	300	20	500				10	
171	6895	3	50	20	1	20		5	55	50	500	20	300				10	
172	6896	10	30	20	1	5		5	5	50	300	20	400				10	
173	6897	10	100	20	1	8	3	5	10	30	800	20	400			3	10	
174	6898	10	10	20	1	5	3	5	10	50	500	20	800			5	20	
175	6899	5	50	20	1	10		3	10	50	600	20	150			3	10	
176	6900	5	50		1	10	3	5	10	80	500	20	500			5	10	
177	6901	10	100	20	1	10		5	10	80	800	20	500			5	20	
178	6902	10	30	20	1	10		5	10	80	500	20	500			3	20	
179	6903	3	20	20	1	10	3	5	10	50	500		500			3	10	
180	6904	5	20	20	1	15		5	10	100	800		400			3	20	
181	6905	5	30	30	1	10		5	5	50	500		500			3	10	
182	6906	5	30	30	1	10		5	10	50	500		500			3	10	
183	6907	3	60	60	1	10		5	10	50	1000		500			3	10	
184	6908	3	40	40	1	8		5	15	30	500	20	500			3	10	
185	6909	3	40	30	1	5	3	5	5	30	500	20	500			3	10	
186	6910	5	15	30	1	10	3	5	15	30	400	20	500			3	10	
187	6911	3	20	20	1	10	3	5	5	30	400	20	400			3	5	
188	6912	5	30	30	1	15		5	5	100	500	20	400			3	10	
189	6913	5	30	30	1	15		5	10	80	400	20	500			3	30	
190	6914	5	30		1	8	3	5	20	50	300	20	800			3	30	
191	6915	3	40		1	8	3	5	10	30	300	20	500			3	10	

(GE(1), Sb(30), W(50), Pd(10), Te(20), Tl(1) were not detected).

TABLE 7 (cont.)

Field No.	Amdel No.	Ba (200)	Cr (20)	Mu (10)	Mo (3)	Ni (5)	V (10)	La (100)	Y (10)	Ag (0.1)	Cu (1)	Pb (1)	Sn (1)	Zn (20)	Au (3)	P (100)	COMMENTS
B6	A1141/79	1000	80	500	-	150	50	100	36	0.1	10	15	1	20	-	300	pink-brown dacite
B7	1142	800	80	300	-	150	-	100	46	0.1	15	7	1	20	--	500	porphyritic rhyodacite
B8	1143	1000	70	300	-	100	-	150	40	0.3	60	30	2	20	-	300	rhyodacite
B9	1144	1500	70	300	3	100	80	150	55	0.3	10	50	2	-	-	400	"
B10	1145	2000	100	100	3	150	10	50	28	0.3	10	20	1	20	-	500	porphyritic dyke
B11	1146	1000	50	3000	3	100	100	50	34	0.3	15	25	3	40	-	400	rhyodacite
B12	1147	10000	70	700	-	100	30	150	34	0.1	5	30	-	40	-	1500	red-brown dacite
B13	A1148/79	10000	30	700	-	50	80	100	34	0.4	15	20	1	-	-	800	" " "

(Co(5), W(50), As(50), Bi(1), and Sb(30) are at or below detection).

Uno Fault (Samples 197-293, Table 8, Fig. 9).

Anomalous metal values were located near the eastern limit of the Uno fault as defined on PORT AUGUSTA (Dalgarno, Johnson, Forbes and Thomson, 1968) bounded on the east by a "neck" of Gawler Range Volcanics and on the west by Burkitt Granite. Samples contained up to 500 ppm Cu, 3 000 ppm Pb and 100 ppm Zn. Follow up samples recorded values of up to 190 ppm Cu, 4 300 ppm Pb and 120 ppm Zn. Most of the anomalous samples are associated with minor granitic and rhyolitic intrusions which are localised around a quartz-barite vein (Olliver and Nichol, 1978) intruding the Corunna Conglomerate.

Ultima Dam (Samples B1-B3, Table 9, Fig. 7 (southeastern margin)).

This site was visited after an ironstone sample assayed by the S. Aust. Dept. of Mines and Energy for Mr. A. Eatts of Kimba showed traces of gold.

Three samples were collected from a small pit on quartz-ironstone veins in a 1 m wide shear zone in a brecciated quartz feldspar rock that is probably part of the Cleve Metamorphics. As only traces of gold (0.025 ppm and 0.06 ppm) were detected, no follow up work is recommended.

Muckanippie Gold Mine (Sample B16, Table 9, Fig. 10).

The mine consists of a 25 m deep vertical shaft and a 1 m deep pit on a 1 m wide quartz vein in granite (Langsford, 1972). A sample of quartz with limonitic boxworks from the dump contained 3 ppm Au, 3 ppm Mo, 3 ppm Ag, 300 ppm Cu and 30 ppm Bi.

Earea Dam (Samples B17-B19, Table 9, Fig. 10 (south-eastern corner)).

Amphibolite and granite from the Perseverance Gold Mine near Earea Dam contained trace amounts of Ag (0.8 and 0.3 ppm respectively) and the granite sample also contained 30 ppm Au, 6 ppm Sn and 3 ppm Mo.

TABLE 8

Assays of Rock Chip Samples, Un Fault (located on Figure 9)

(Concentration in parts per million - Detection limits in brackets) Amdel Report AN 202/73

Field No.	Amdel No.	Cu (0.5)	Pb (1)	Zn (1)	Sn (1)	Li (1)	Mo (3)	Be (1)	Ni (5)	V (10)	Mn (10)	Nb (20)	Zr (10)	Bi (1)	Ag (0.1)	B (3)	Co (5)	COMMENTS
192	G 6916/72	5	40	-	-	1	-	5	10	10	100	-	50	-	-	3	5	Burkitt Granite
193	6917	5	40	-	-	1	3	3	5	-	80	-	50	-	-	10	5	" "
194	6918	3	50	-	-	3	3	3	5	10	50	-	50	-	-	10	-	" "
195	6919	3	40	-	1	5	3	3	5	80	250	50	400	-	-	10	10	" "
196	6920	5	40	-	1	5	3	10	10	60	500	50	500	-	-	3	10	" "
197	6921	10	10	20	1	10	5	10	30	10	80	-	400	-	0.1	10	-	Iron rich metaqrt
198	6922	20	150-	30	-	3	5	5	5	300	30	-	300	-	0.1	5	-	" " "
199	6923	5	5	30	1	5	3	3	5	-	50	20	300	-	-	10	-	" " "
200	6924	5	3	30	1	10	-	3	5	-	20	-	300	-	-	10	-	Altered rhyolite
201	6925	10	20	100	1	10	10	3	5	-	30	-	300	-	-	3	-	" "
202	6926	5	30	-	1	3	3	3	5	10	150	20	500	-	-	3	-	" "
203	6927	5	10	20	1	3	3	3	20	20	30	20	500	-	-	5	-	" "
204	6928	20	150	-	1	5	5	5	10	10	50	-	10	-	5	3	-	" "
205	6929	30	200	-	1	5	3	3	10	50	80	-	10	-	3	3	-	Iron rich metaqrt
206	6930	5	20	-	1	5	5	3	10	10	250	20	800	-	-	3	-	" " "
207	6931	5	20	20	1	5	5	5	5	10	350	20	500	-	-	3	-	" " "
208	6932	5	5	30	1	8	-	5	5	10	30	-	200	-	0.1	3	-	" " "
209	6933	5	5	30	3	5	3	5	5	10	100	-	150	-	-	3	-	Altered rhyolite
210	6934	5	10	40	3	5	-	5	5	30	150	20	500	-	-	10	5	" "
211	6935	5	30	40	3	3	-	5	5	10	200	-	300	-	-	5	-	" "
212	6936	3	30	80	3	5	-	5	5	20	50	-	400	-	-	3	-	" "
213	6937	10	15	20	3	5	3	10	30	10	20	-	400	-	0.1	5	-	" "
214	6938	20	150	40	3	5	-	10	10	10	30	20	400	-	0.1	10	-	" "
215	6939	30	50	40	3	5	-	5	10	10	50	20	400	-	1	10	-	" "
216	6940	10	50	20	3	10	3	5	10	10	80	20	800	-	0.1	5	-	" "
217	6941	15	15	20	1	15	10	5	10	3	80	-	200	-	0.1	3	-	" "
218	6942	3	10	20	1	5	3	5	20	50	200	20	500	10	5	3	-	" "
219	6943	5	30	40	1	10	3	5	10	30	80	20	400	-	-	3	-	" "
220	6944	3	5	-	1	3	3	5	20	20	30	20	300	-	-	3	-	" "
221	6945	3	5	20	1	3	3	5	20	10	50	20	500	-	-	3	-	" "
222	6946	3	10	-	1	3	3	5	10	30	50	20	500	-	-	3	-	" "
223	6947	20	8		1	10	3	5	30	40	100	20	400			10		
224	G 6948/72	30	10	10	1	10	3	5	50	10	50		400		0.1	5		

TABLE 8 (Cont.)

Field No.	Amdel No.	Cu	Pb	Zn	Sn	Li	Mo	Be	Ni	V	Mn	Nb	Zr	Bi	Ag	B	Co	COMMENTS
225	G 6949/72	30	15	15	1	10	3	5	10	10	250	20	500		0.1	5	5	)Altered Rhyolite
226	6950	10	5	5	1	10		10	30	10	50	20	400			5	5	)
227	6951	5	30	30	1	3	3	1	5	10	100		200			3	3	granite float
228	6952	25	8	8	1	10			50	200	1200		30		0.1	3		basic intrusion
229	6953	5	30	30	1	3	5	10	5	10	80	20	800			3	50	
230	6954	5	10	10	1	5		10	5	10	30	20	400		0.1	3		altered Rhyolite
231	6955	20	100	100	1	1	5	10	10	10	400	20	500			5		
232	6956	15	8	8		1	5	3	10	10	350		10			3	50	quartz vein
233	6957	5	15	15	1	3	5	5	30	30	200		400			3		
234	6958	10	30	30	1	5	5	5	10	20	200	20	500			3		
235	6959	3	40	40	1	5	5	5	10	20	500	20	500			3	10	
236	6960	3	20	20	1	5	5	5	30	10	300	20	500			3	10	
237	6961	10	3	3	1	5	5	5	5	10	80	20	300			3	10	)
238	6962	5	5	5	1	5	5	5	20	10	30	20	300			5		)altered Rhyolite
239	6963	5	5	5	3	5	3	5	10	10	30	20	400			3		
240	6964	15	10	10	1	15			20	10	20		10		0.3	3		
241	6965	15	10	10		3			20	10	20		10			10		)
242	6966	5	1	1		1				10	10		10			3		)
243	6967	5	1	1		1			10	10	10		50			3		)
244	6968	5	1			5			30	10	20		10			3		)Corunna Conglom
245	6969	5	1			1			30	30	10		30			3		)
246	6970	10	3			5			5		10		10			3		)
247	6971	5	30			3			5	10	10		10			3		)
248	6972	3	20		1	10	10	10	5	20	400	20	500			3		
249	6973	5	30	20	1	10	5	10	30	50	500	20	400			3		
250	6974	5	20		1	10	10	10	30	30	400	20	800			5	5	
251	6975	15	10		1	10	3	10	5	30	200	20	500			3	5	
252	6976	3	40		3	10	3	10	10	20	250	20	500			3	5	
253	6977	3	40	20	3	10	3	10	10	10	400	20	500		0.1	3	5	
254	6978	3	30	20	3	5	3	10	10		100	20	500			3	5	
255	6979	3	10		3	5		10	20	10	100	20	500			3		
256	6980	3	30		1	10	10	10	20	30	250	20	800			3		
257	6981	3	30	20	1	20		10	20	30	800		500			3	10	
258	6982	5	30		5	5		10	10	5	80	20	500		0.1	3	10	
259	6983	20	20		3	1	3	5	20		80		500			3		
260	6984	5	20		3	1		5	20		30	20	500			3		
261	6985	3	20		3	3		5	20	10	50		500		0.1	3		
262	6986	3	40		2			5	10	10	100	20	400			3		
263	6987	3	50	20	2	3		8	5	50	100	20	300			5	5	altered Rhyolite

TABLE 8 (Cont.)

Field No.	Amdel No.	Cu	Pb	Zn	Sn	Li	Mo	Be	Ni	V	Mn	Nb	Zr	Bi	Ag	B	Co	COMMENTS
264	G 6988/72	5	50	200	2	10		8	20	30	500	20	500		3	5	5	
265	6989	200	200	1000	1	30	50	3	50	10	350		50			100	50	ironstone (gossan?)
266	6990	5	20	10	1	1		10	5	20	200	20	300		0.1	3	5	
267	6991	10	20		1	5	3	8	10	10	150	20	800			3	5	
268	6992	10	10		1	3	3	3	30	100	150		150			20	10	
269	6993	5	10	80	1	3	3	3	30	20	200		100			10	5	)Corunna Conglom
270	6994	30	15	20	1	10	3	3	40	80	250		100			10	10	)
271	6995	5	5	20	1	3		5	10	10	250	20	300			10	5	
272	6996	5	10		1	3	3	5	10	10	300	20	400			10	5	
273	6997	500	80			3	3		10		10				3	5		)quartz vein with minor
274	6998	10	10			1	5	3	5		10				0.3	3		mineralisation
275	6999	10	100	20		1	3	3	10	50	20		100		0.1	3		
276	7000	20	200	20		20	3	3	10	80	50		100		0.1	3		
277	7001	5	30			30	3	10	20	30	30		10		0.1	3		
278	7002	10	100	20		10	3	10	20	80	50		30		0.3	3		
279	7003	20	3000	100	1	15	3	1	5	10	10				10	3		Barite vein
280	7004	3	30		1	15	3	3	10	500	100	50	300		0.1	3	30	Burkitt granite
281	7005	20	150		1	10	3	1	10	200	150		200		0.1	3		
282	7006	20	80			30	10	1	5	50	150		150		0.1	3		)Corunna Conglom
283	7007	3	20	20	1	10		5	5	80	500	20	500			3		
284	7008	5	10	20	1	3		5	5	80	150	20	500			3	5	
285	7009	3	5	40	1	3		5	5	50	150	20	400		0.1	3	3	
286	7010	3	100	60	1	3		5	10	50	350	20	500			3	5	
287	7011	10	50	30	1	10		5	10	80	300	20	500			3	5	
288	7012	20	20	30	1	5	10	5	20	80	150	20	500			3	5	
289	7013	20	1000		1	15		1	10	30	30		50		2	3		)Corunna Conglom.
290	7014	20	400		1	15	3	1	20	50	50		20		3	3	5	)
291	7015	3	10		1	20	3	5	5	50	150	20	800			3	5	
292	7016	3	50	20	1	3		5	50	50	100	20	500			3	5	
293	G 7017/72	20	20		1	20			5	50	50	50	1000			3		Corunna Conglom.

Ge(1), Sb(30), W(50), Pd(10), Te(20), Tl(1) were not detected.

TABLE 9

Assays of Rock Chip Samples located on figures, 7, 8, 10 and 11.

(Concentrations in parts per million - Detection limits in brackets)

Field No.	Amdel No.	Fire Assay Au	COMMENTS
B1	A1128/79	0.025	vein quart & gossan
B2	A1129/79	0.060) Amdel Report AC 3818/79	gossanous ironstone.

		Ba (200)	Cr (20)	Mn (10)	Mo (3)	Ni (5)	V (10)	La (100)	Y (10)	Ag (0.1)	Cu (1)	Pb (1)	Sn (1)	Zn (20)	Au (3)	P (100)	Amdel Report AC 3794/79
B3	A1138/79	200	150	80	-	150	150	-	-	0.1	80	150	4	-	-	300	kaolinised qtz-feld spar rock.
* B16	A1151/79	-	300	80	3	200	10	-	-	3.0	300	25	-	20	3	100	quartz vein + gossan
B17	1152	-	70	1000	-	70	200	-	10	0.8	200	40	1	70	-	600	amphibolite
B18	1153	300	80	200	3	200	80	-	-	0.3	30	50	6	30	3	400	granite
B19	1154	700	150	200	3	300	50	-	-	0.3	70	30	2	-	-	400	granite
B20	1155	700	300	200	-	200	300	-	-	0.7	400	50	-	30	-	600	ironstone
B21	1156	200	70	100	-	80	70	-	-	0.1	10	10	-	-	-	500	basic dyke
B22	A1157/79	-	100	100	-	150	10	-	-	-	15	12	-	30	-	300	weathered ultrabasic
B26	A1161/79	200	70	200	-	100	-	100	-	0.3	15	60	50	-	-	500	vein quartz+greisen
B27	1162	500	100	300	-	150	10	50	-	0.3	20	50	70	-	-	300	greisen+vein quartz
B28	1163	1000	80	500	-	150	70	-	-	0.2	7	80	100	-	-	300	greisen
B29	1164	700	80	300	-	150	70	-	-	-	10	50	70	-	-	300	greisen
B30	1165	200	50	200	-	70	50	50	-	0.2	15	70	500	-	-	400	greisen
B31	1166	500	70	300	-	150	30	-	-	0.4	20	300	150	-	-	400	vein quartz+greisen
B32	1167	300	30	300	-	30	30	-	-	0.2	10	60	70	-	-	600	vein quartz
B33	1168	200	80	200	-	150	80	200	20	0.3	20	500	60	-	-	800	" "
B34	1169	-	70	70	-	80	10	-	-	0.6	15	40	8	-	-	600	" "
B35	1170	-	80	80	-	100	30	-	-	0.2	20	70	20	-	-	700	" "
B36	1171	700	50	300	-	70	30	-	-	0.2	15	50	100	-	-	600	vein quartz+greisen
B37	1172	500	70	300	-	70	30	-	-	0.3	15	800	100	-	-	700	weathered granite
B38	1173	-	80	70	-	100	-	300	-	0.4	70	200	20	20	-	800	" " +vein qtz
B39	1174	300	150	200	-	200	100	-	30	0.4	30	70	5	-	-	200	silcrete
B40	1175	700	100	80	-	150	80	-	10	0.2	20	50	-	20	-	200	weathered granite
B41	A1176/79	1000	70	500	-	80	80	300	50	0.5	15	200	-	80	-	400	granite

*Bi, 30 p.p.m. (Co(5), W(50), As(50), Bi(1) and Sb(30) are at or below detection)

TABLE 9

Amdel report AC 3853/79

Field No.	Amdel No.	Ba (200)	Co (5)	Cr (20)	Ni (5)	Sc (3)	Sr (50)	Ti (100)	V (10)	Y (10)	Zr (10)	Cu (1)	Pb (1)	Zn (10)	K (5)	Ca	Mg	COMMENTS
B42	A1177/79	400	100	400	300	5	150	1500	50	30	100	20	20	-	3000	5.95%	3.44%	weathered ultramafic
B43	A1178	-	50	300	100	4	100	300	30	-	20	10	10	20	200	18.9%	1.80%	" "

(Ce(300), La(100), Mo(3), Nb(20) and W(50) were at or below detection)

Granite from the tin workings at South Lake, detailed by Whitten, Wright and South (1976), contained traces of Sn (3 ppm), Mo (3 ppm) and Ag (0.3 ppm).

Glenloth Area (Samples B26-B41, Table 9, Figures 8 and 11).

Tin was discovered at Mount Mitchell in 1923, but no production is recorded. Details of the occurrence are given by Winton (1925). A series of rock chip samples from the workings contained up to 500 ppm Sn and 800 ppm Pb. The workings are on a 50 m wide, north-south trending greisen zone within Glenloth Granite. This area has been tested with 19 rotary percussion holes up to 50 m deep and reported on by Whitten, Wright and South (1976). It was concluded that the greisens were too low grade to be of economic significance. However, a drilling programme of 9 diamond drill holes reported on by Harvey and Whittle (1966) gave assays ranging from 1 700 ppm to 3 200 ppm Sn over widths of between 1.2 m and 11.9 m.

Due to the erratic distribution of cassiterite and conflicting results from two drilling programmes, it is recommended that the rock chip survey be repeated and these samples thoroughly pulverised to ensure that the analysis is representative of the material collected.

Lake Barry (Samples B20-B22 and B42-B43, Table 9 Fig. 10).

On Mineral Claim 1073, highly weathered rock of greenish friable material containing goldish coloured mica flakes is covered by gypsiferous soil. Trace element chemistry indicates a basic to ultrabasic composition (Table 10) for this chlorite, phlogopite, tremolite, feldspar and olivine rock (Daly, 1975). Detailed work by Kennecott Exploration (Aust.) Pty. Ltd. (Warne, 1971) indicates that no sulphide mineralization is present. Otter Exploration N.L. (Warne, 1972) also investigated

the "ultrabasic" for kimberlitic affinities but concluded that in the absence of rock fragments, diagnostic minerals and lack of carbonate, the nature of the body remains problematical.

TABLE-10

Trace Element Content of Lake Barry mafic/ultra-mafic.

Element	(1)	(2)	(3)
Sc	15	5	30
V	40	40	250
Cr	1 600	350	170
Co	150	75	48
Ni	2 000	200	130
Cu	10	15	87
Sr	1	125	465
Y	-	20	21
Zr	45	60	140
Nb	16	?(20)	19
Ba	0.4	250	300
La	-	?(100)	15
Pb	1	15	6
Ti	300	900	13 800
Ni/Co	13.3	2.7	2.7
Cr/Ni	0.8	1.75	1.3

All values are in parts per million. ?(20) - not detected, detection limit in brackets.

(1) Average ultra-basic composition from Turekian and Wedephohl (1961).

(2) Average composition of Lake Barry Samples

(3) Average basic composition from Turekian and Wedephohl (1961).

CONCLUSIONS

1. No further work is recommended at:
   - North of Tarcoola
   - Tarcoola Beds
   - Kokatha
   - Hiltaba
   - Gawler Range Volcanics
   - Uno Fault
   - Ultima Dam
   - Muckanippie Gold Mine
   - Earea Dam
   - Lake Barry

2. The following is recommended:
   - Pinding Rocks; Induced polarization and shallow drilling surveys as recommended by N.R. Langsford in 1972.
   - Warna Rock Hole; Detailed geochemical sampling of greisens for tin.
   - Glenloth Area; Resampling of Mount Mitchell tin workings with thorough sample preparation to ensure a representative sample is analysed.

BRIAN J. MORRIS
GEOLOGIST
MINERAL RESOURCES SECTION

XAVIER. P. SIBENALER
GEOLOGIST
GROUNDWATER and ENGINEERING SECTION

REFERENCES

BLISSETT, A.H., 1978. Gawler Range Excursion, October 16th to October 20th, 1978. S. Aust. Dept. of Mines and Energy. Report R.B. 78/130 (unpublished).

BRANCH, C.D., 1978. Evolution of the Middle Proterozoic Chandabooka Caldera, Gawler Range Acid Volcanic-Plutonic Province, South Australia. J. Geol. Soc. Aust., 25: 199-216.

DALGARNO, C.R., JOHNSON, J.E., FORBES, B.G., and THOMSON, B.P., 1968. PORT AUGUSTA map sheet. Geological Atlas of South Australia 1:250 000 series, Geol. Surv. S. Aust.

DALY, S., 1975. Notes on the TARCOOLA 1:250 000 Preliminary Geological Map. S. Aust. Dept. of Mines and Energy report R.B. 75/2 (unpublished).

DAY, A.A., 1971. Report on the Mineral Potential of the Lake Everard Prospect, S.M.L. 529, South Central South Aust., for K.K. Euler. S. Aust. Dept. of Mines and Energy open file Env. 1610 (unpublished).

HARVEY, T.V., and WHITTLE, A.W.G., 1966. Report on S.M.L. 83 for Australian Development N.L. S. Aust. Dept. of Mines and Energy open file Env. 650 (unpublished).

LANGSFORD, N.R., 1972. Geochemical Reconnaissance, TARCOOLA Report No. 1. Mineral Resour. Rev., S. Aust. 137: 112-122.

OLLIVER, J.G., and NICOL, D., 1978, Barite Deposits near Whyalla. Mineral Resour. Rev., S. Aust. 142: 90-100.

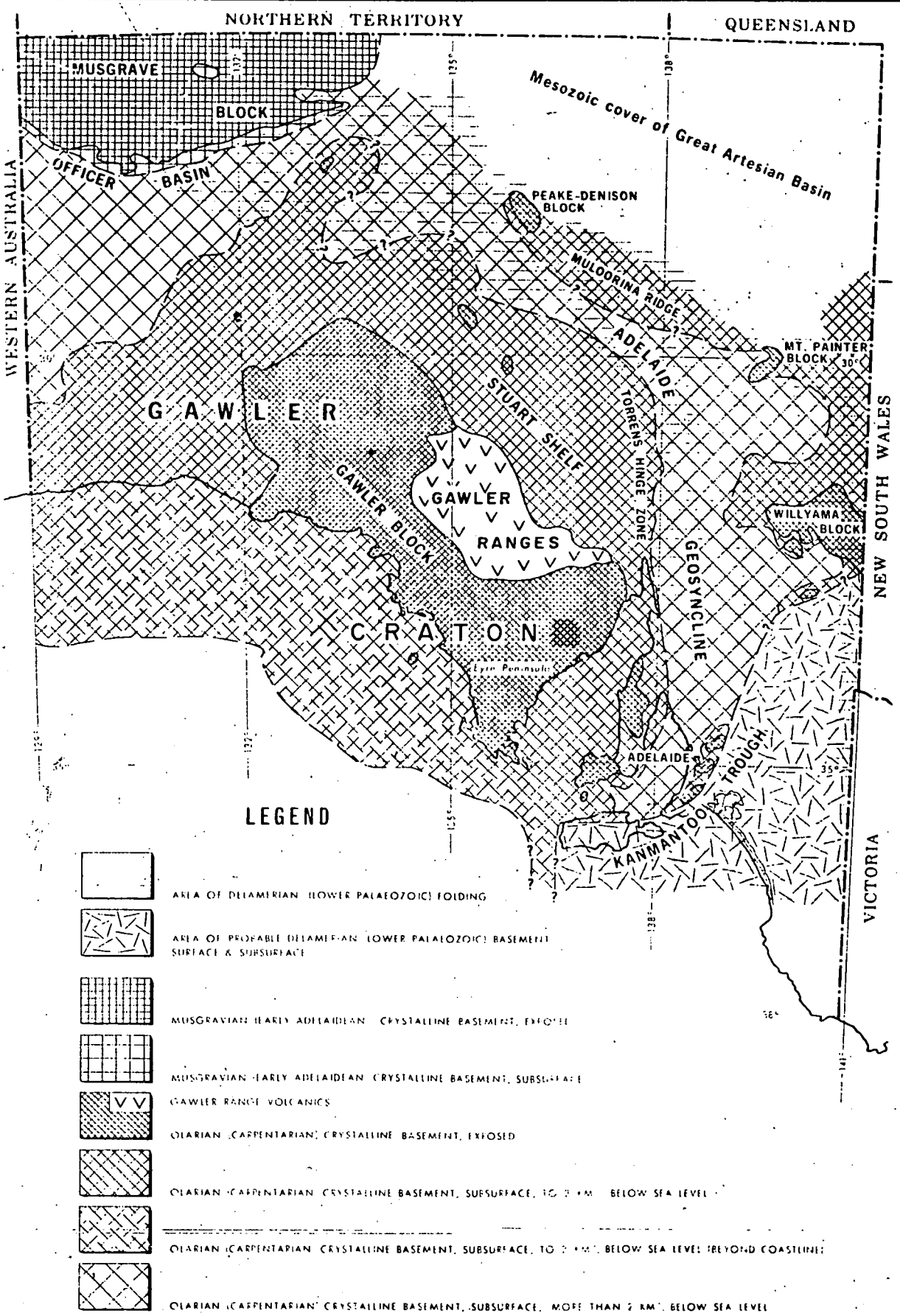
TUREKIAN, K.K., and WEDEPOHL, K.H., 1961. Distribution of the Elements in some Major Units of the Earth's Crust. Bull. geol. Soc. Am., 72: 175-192.

WARNE, S.B., 1971. Final Report, S.M.L. 491. Kennecott Expl. (Aust.) Pty. Ltd., S. Aust. Dept. of Mines and Energy, open file Env. 1510 (unpublished).

WARNE, S.B., 1972. Examination of Bore Hole Samples for Kimberlitic Affinities, Mulgathing Area S. Aust., Otter Expl. N.L., S.M.L. 643 and 644. S. Aust. Dept. of Mines and Energy open file Env. 1858 (unpublished).

WHITTEN, G.F., WRIGHT, R.G., and SOUTH, R., 1976. Geochemical Exploration in the Earea Dam, Glenloth Mining Fields. Grid F.5, Block 436. Mineral Resour. Rev., S. Aust. 144: 81-95.

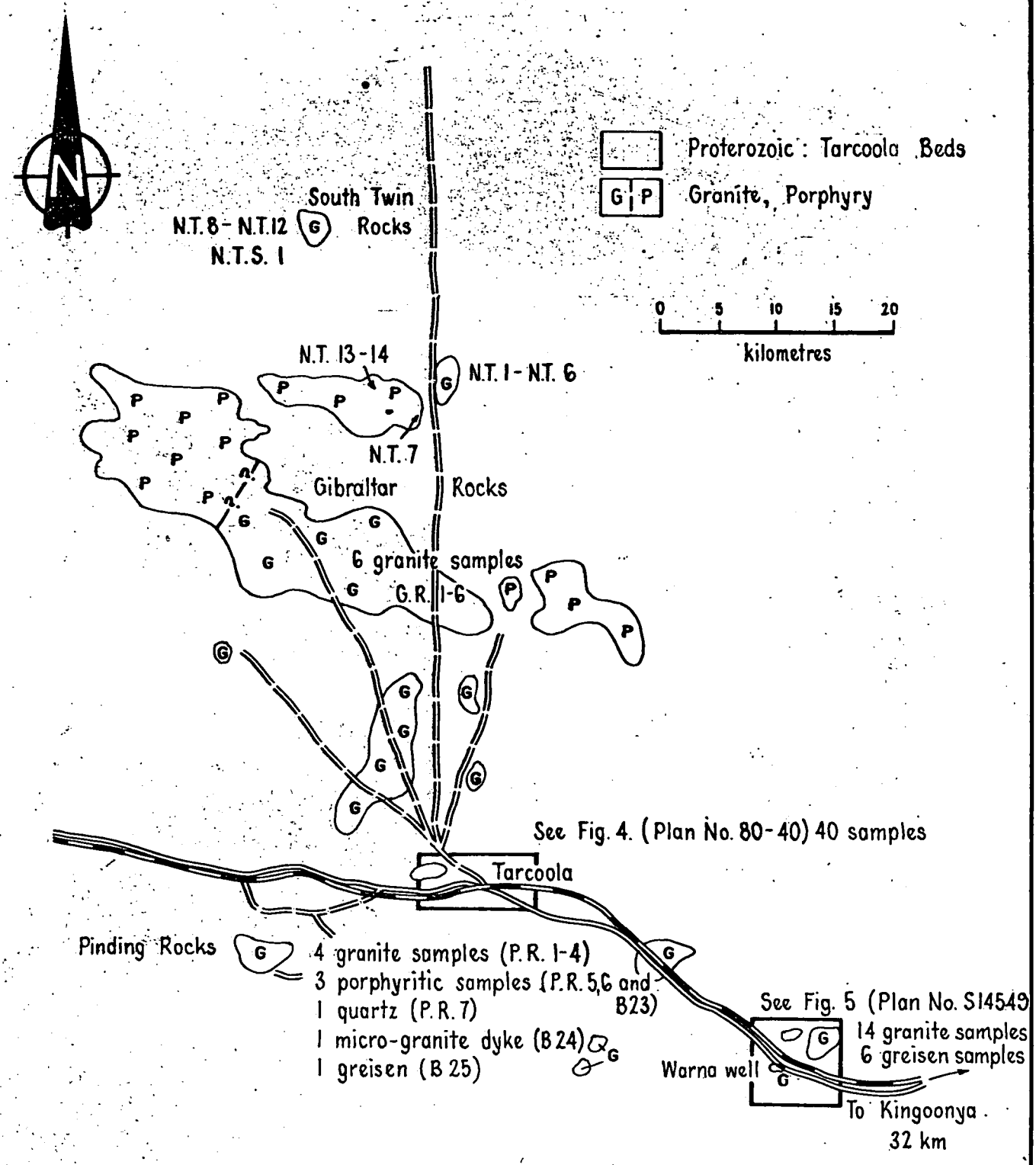
WINTON, L.J., 1925. Tin Occurrences at Glenloth. Min. Rev. Adelaide, 42: 83-84.



(Geology after B. P. Thomson 1969)

Fig. 1

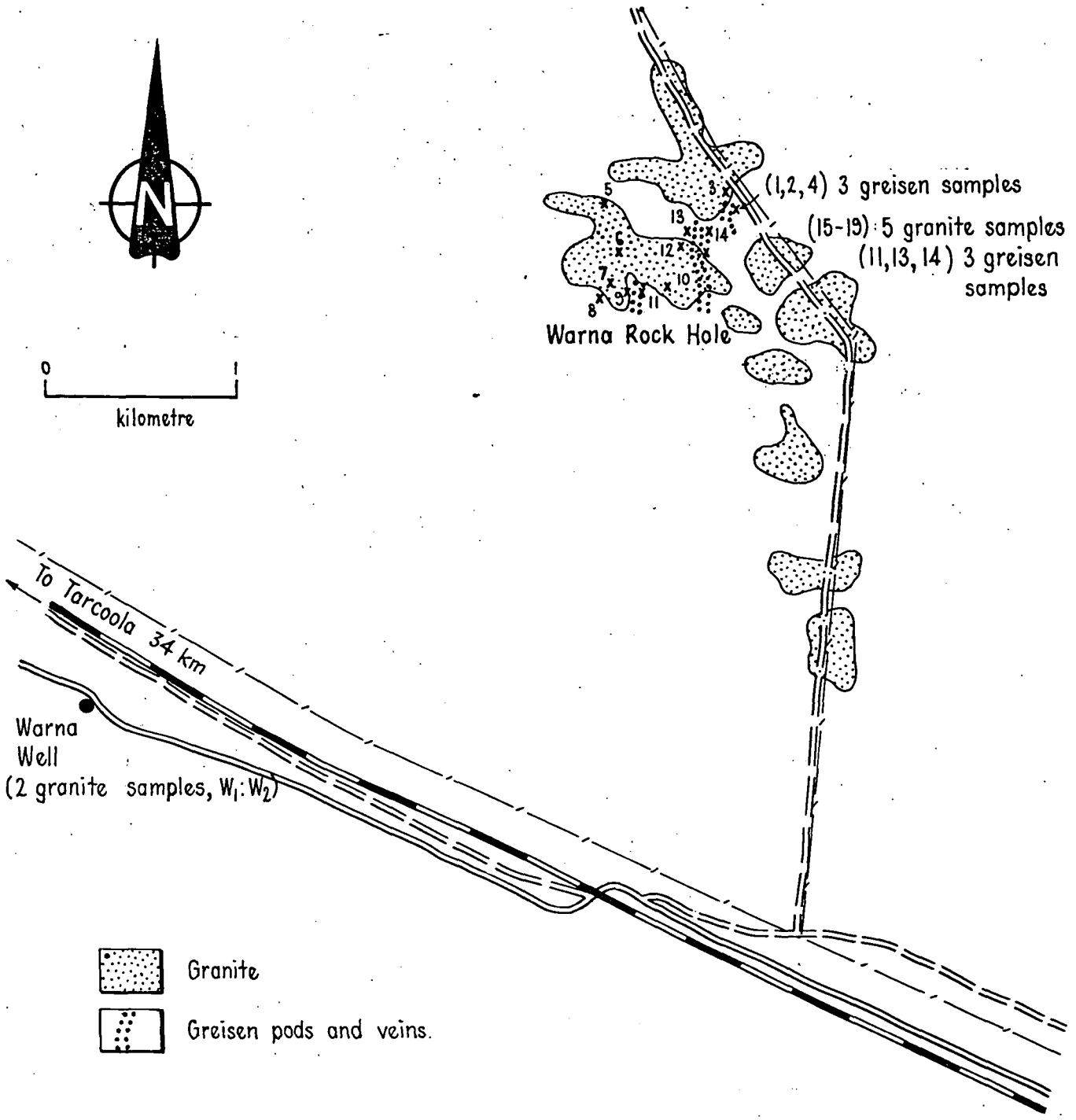
	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: As shown
COMPILED:	GEOCHEMICAL RECONNAISSANCE — GAWLER RANGE VOLCANICS	DATE: JAN. 1980
DRN: CKD:	TECTONIC PLAN OF SOUTH AUSTRALIA	PLAN NUMBER S 14547



Note : See Tables 1,2 (R.B. 80/21) for assay results

Fig. 3

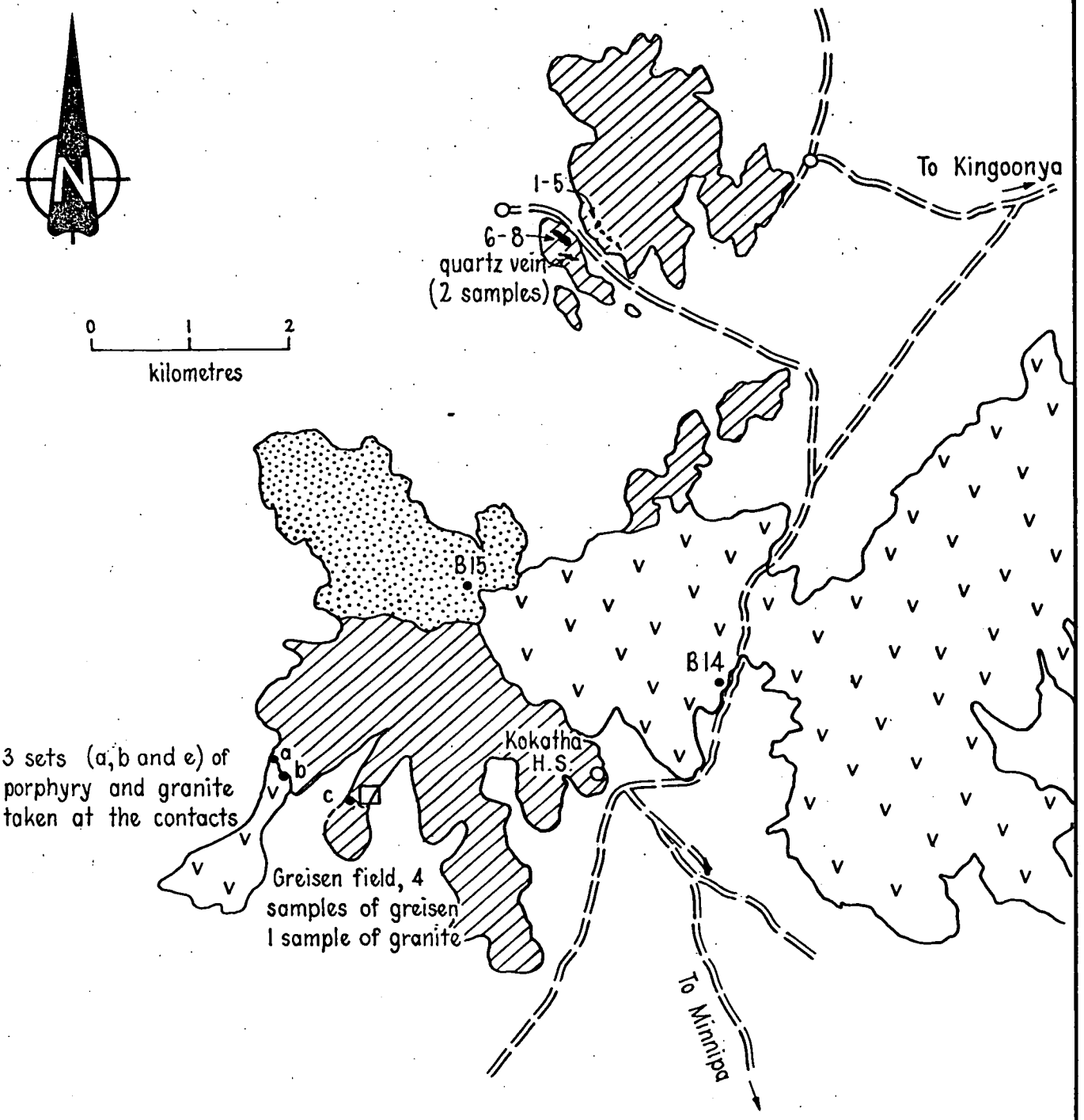
	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1:500 000
COMPILED: X. Sibenaler	GEOCHEMICAL RECONNAISSANCE – GAWLER RANGE VOLCANICS	DATE: 19th Dec. 1979
DRN: T.E. CKD:	TARCOOLA AREA	PLAN NUMBER
67	SAMPLE LOCATION PLAN	S14548



Note: See Fig. 3 (Plan. No. S 14548) for locations
See Table 4 (R.B. 80/21) for assay results
Geology after Australian Development N.L. 1966 S.M.L. 83 S.A.D.M.E. Env. 650

Fig. 5

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1:31680
COMPILED: X. Sibenaler	GEOCHEMICAL RECONNAISSANCE — GAWLER RANGE VOLCANICS	DATE: 18th DEC. 1979
DRN: T.E. CKD:	WARNA ROCK HOLE	PLAN NUMBER
	SAMPLE LOCATION PLAN	S 14549

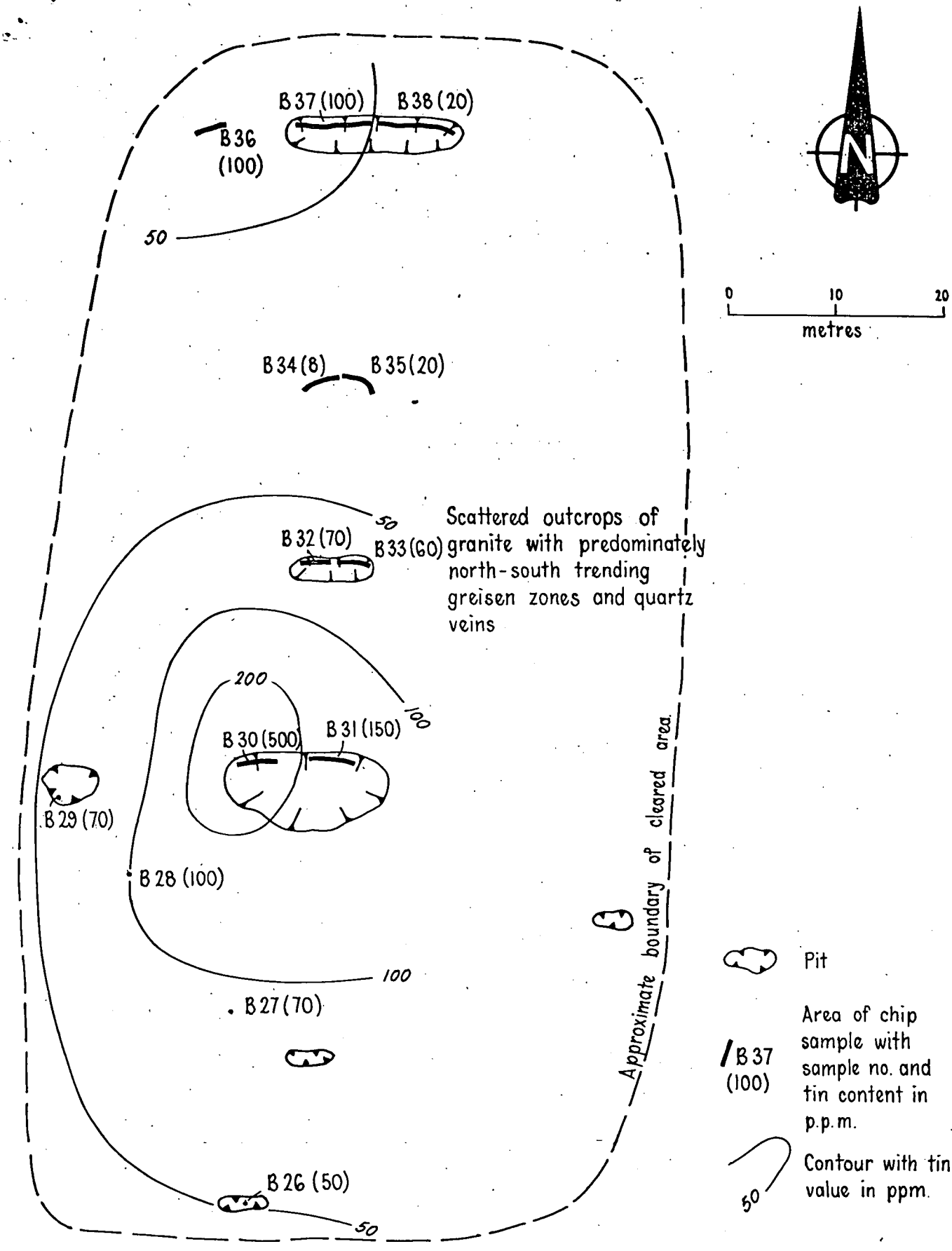


Note: See Fig. 8 (Plan No. 80-42) for locations

Geology after Asarco (Aust.) Pty. Ltd., 1969, SML 307 S.A.D.M.E. Env. 1184.

Fig. 6

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1:63 360
COMPILED: X. Sibenaler	GEOCHEMICAL RECONNAISSANCE — GAWLER RANGE VOLCANICS	DATE: 18th DEC. 1979
DRN: T. E. CKD:	KOKATHA AREA	PLAN NUMBER
BF	SAMPLE LOCATION PLAN	S 14550



Note : For location of workings see Fig. 8 (Plan No. 80-42)

Fig. 11

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1:500
COMPILED: X. Sibenaler	GEOCHEMICAL RECONNAISSANCE – GAWLER RANGE VOLCANICS	DATE: 19th DEC. 1979
DRN: T.E. CKD:	MOUNT MITCHELL TIN WORKINGS	PLAN NUMBER
	SAMPLE LOCATION PLAN AND ASSAY RESULTS	S 14551