DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

REPT BK NO 91/35

GEOLOGICAL INVESTIGATIONS LAKE LABYRINTH GOLDFIELD SOUTH AUSTRALIA

GEOLOGICAL SURVEY

by

P P CRETTENDEN

SENIOR TECHNICAL OFFICER

MINERAL RESOURCES

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DEPARTMENT OF MINES AND ENERGY
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ABSTRACT

Gold was discovered west of Lake Labyrinth, 38 km east-northeast of Tarcoola in 1912. Production totals 5206.4 grams of gold bullion from 146.3 tonnes of ore with average head grade of 35.6 g/t gold bullion.

Gold was won from shear zones and ferruginous quartz veins within Archaean Kenella Gneiss. Sub-vertical shear zones and quartz veins strike east-west and vary in width from 0.15m to 0.6m.

Soil sampling on a grid which covered the main workings revealed two anomalous zones greater than 0.01 ppm gold. The peak value was 0.074 ppm gold 200m east of the main workings. Limited rock chip sampling from accessible underground workings and grab samples of mullock heaps produced peak values of 0.61 ppm gold for underground samples and 22 ppm gold for surface samples.

Multi-element geochemistry has shown a correlation of gold with Cu, Pb, Zn and As.

INTRODUCTION

Lake Labyrinth Goldfield has been mapped and sampled as part of an ongoing program to evaluate gold occurrences in South Australia.

Lake Labyrinth Goldfield was visited by R L Wildy, (the then Chief Geologist, Mineral Resources), C M Horn (then Principal Geologist) and the author on 9 September 1987. Three samples were collected and submitted to AMDEL for analysis.

On 6 May 1988 the main goldfield workings were stadia surveyed by R A Boord (Geologist), M W Flintoft (Technical Assistant) and the author. Seven grab samples from mullock heaps were collected and submitted to AMDEL for analysis.

On 20 October 1988, a ground magnetometer survey and soil sampling were carried out on a 50m x 20m grid over an area 750m along strike and 200m across strike, and accessible workings mapped and sampled by C M Horn (Principal Geologist), M W Flintoft, S J Ewen, S J Mathews (Technical Assistants), J F Allender (Consultant) and the author. All samples were submitted to Analabs for analysis.

LOCATION AND ACCESS

Lake Labyrinth Goldfield is 22 km north of the Earea Dam Goldfield, 38 km east-northeast of Tarcoola and 2 km west of the west end of Lake Labyrinth (Fig 1). The goldfield is on Wilgena Pastoral lease, north out of hundreds (NOOH) within the Far North Planning Area. A small group of workings are located 2 km south-southwest of the main workings (southern workings) see Fig 2.

Access to Lake Labyrinth Goldfield is via well defined station tracks from either Wilgena Homestead or Fergusson Railway Siding on the Kingoonya - Tarcoola Road. Access from Fergusson is via a gate in the vermin proof fence (VPF) 1.0 km east of the railway crossing. A track follows the west side of a fence in a northerly direction for 10.6 km thence 0.3 km east to Warna Tank. A track is then followed north for 2.1 km at which point

the track passes through an east-west fence. A track on the west side of a north-south fence is then followed north for 6.4 km to Company Well No. 3. At Company Well No. 3 the route is through the north-south fence and along a track on the south side of an east-west fence a distance of 3.6 km east to the southern workings which are 0.25 km south of the fence (Fig 1). Approximately 5.6 km along the east-west fence from Company Well No 3 a VPF is encountered and this is followed on a track along the western side a distance of 1.6 km north. The main workings are 1.1 km west of the VPF track.

Access from Wilgena Homestead is via a track 1.2 km northeast across the railway line at Wilgena Siding, thence 0.4 km to the VPF. A track is then followed northeast for 4.4 km to Welcome Well then east for 8.3 km to Company No. 1 Tank, then 6.6 km northeast to Company No. 3 well (Fig. 1).

GEOMORPHOLOGY

Broad low rounded hills rising above gently undulating sandy plains are the predominant landform of the area. Lake Labyrinth, a large salt lake, occupies an east-west depression 2 km east of the goldfield.

The main workings are situated on the southern slope of outcropping Kenella Gneiss, with recent alluvium and colluvium lapping the perimeter of the low rounded hill.

CLIMATE AND VEGETATION

Climatic conditions in the Lake Labyrinth region are characterised by low, unreliable and generally warm to hot, arid conditions. Annual rainfall is about 170-180mm, which often falls as summer storms, but generally shows no distinct seasonal pattern (Laut et al., 1977). Temperatures show high diurnal and

seasonal variation and the area experiences warm to hot summers and short, mild to cold winters.

Low open woodland of mulga (Acacia aneura) with a saltbush-bluebush understorey is the dominant vegetation cover. Low samphire and heath surround salt lakes and pans. Extensive sheep grazing of the region has changed the original structure of the vegetation cover.

MINERAL TENURE

The Lake Labyrinth Goldfield is currently under application for an Exploration Licence (EL).

P A Leech and Overland Enterprises Pty Ltd pegged Mineral Claim 444 over the northern workings and Mineral Claim 445 over the southern workings on 2/3/74 and these were cancelled on 15/4/75.

HISTORICAL REVIEW AND PRODUCTION

Lake Labyrinth Goldfield was discovered in 1912, by the Western Exploration Syndicate headed by prospector H Fabian.

A 16.8m shaft with drives 6.1m east and 7m west was sunk on a gold carrying quartz reef (Gee, 1913a). Eleven tonnes of ore were treated at Tarcoola Battery for a return of 644.6 grams of gold bullion (Gee, 1913b). Gee (1916) states several prospecting pits had been sunk on outcrop of two parallel reefs 15.2m apart. Two shafts had been sunk to depths of 12.2m and 17.1m on a quartz and weathered granite zone varying in width from 0.15-0.6m. At 12.2m depth drives had been developed east and west.

In 1933 the Woorong Syndicate pegged several claims in the Lake Labyrinth area. A new shaft was developed to a depth of 6.1m on a broken and irregular ferruginous quartz and weathered granite with little pyrite and some free gold. The syndicate also carried out prospecting on the southern workings where loose stones containing gold were found in the topsoil. A trench 7.6m by 3m was developed on northwest-southeast striking vein. Northwest of the trench a 2.4m pit was sunk on the same vein. Several other pits were sunk on quartz veins in the area (Winton, 1934).

Battery returns indicate the area was active for the periods 1913-1915, 1932-1934 and 1940.

Total recorded production from Lake Labyrinth area was 146.3 tonnes of ore returning 5206.4 grams of gold bullion, an average of 35.6 g/t Au bullion. Some parcels of significantly higher grade ore were recorded with values ranging from 14.1 g/t to 101.8 g/t Au bullion. Table 1 lists production, gold bullion and ore grade figures from six monthly battery returns.

TABLE 1

RETURNS FOR SIX MONTHLY PERIODS

JUNE 1913 - JUNE 1940

TARCOOLA BATTERY

PERIOD ENDING	ORE (TONNES)	GOLD BULLION (GRAMS)	AVERAGE GRADE (GRAMS/ TONNE, AU BULLION)
LAKE LABYRINTH			
30/6/13	11.18	644.61	57.66
30/12/13	NO	PRODUCTION	
30/6/14	NO	PRODUCTION	
30/12/14	NO	PRODUCTION	
30/6/15	28.96	755.67	26.09
30/12/15	25.40	358.39	14.11
1916-1931	NO PRODUCTION		
30/6/32	16.00	468.55	29.28
31/12/32	4.57	201.26	44.04
1933	NO PRODUCTION		
30/6/34	5.59	141.65	25.34
30/12/34	7.52	199.06	26.47
30/6/35	NO PRODUCTION		
BELLBIRD			
31/12/35	6.96	708.56	101.80
30/6/36	12.70	673.44	53.03
31/12/36	7.98	482.16	60.42
30/6/37	NO PRODUCTION		
LADY NORMA			
31/12/37	10.16	375.31	36.94
30/6/38	4.22	117.48	27.84
30/12/38	NO PRODUCTION		
1939	NO PRODUCTION		
SPRINGFIELD (LADY NORMA)			
30/6/40	5.08	80.22	15.79
	146.32	5 206.36	

PREVIOUS INVESTIGATIONS

Miller, G.C., 1981(a). EL 554. Aeromagnetic survey, gravity survey, rock chip and soil sampling east of VPF. 2 rock chip samples collected west of VPF. No anomalous gold.

Miller, G.C., 1981(b). EL 594. 6 rock chip samples collected at southern workings. Highest assay 0.03 ppm gold. Aeromagnetic, ground magnetic and gravity surveys, rock chip and soil sampling, mainly east of lake Labyrinth.

CRA Expl., 1986-1989. EL 1315, Geological Mapping, aeromagnetic and radiometric surveys, ground magnetic and gravity surveys west end of Lake Labyrinth and South Lake. Six rock chip samples collected around west end of Lake Labyrinth all <0.05 ppm Au. Two diamond drill holes centred on anomaly 5 km NW of Goldfield (Sugden, 1986a,b, Palmer, 1988).

REGIONAL GEOLOGY

Regional Geology compiled from portions of TARCOOLA (Daly, 1985) and KINGOONYA (Cowley et al, in prep) 1:250 000 map sheets is shown on Fig 2.

Lake Labyrinth Goldfield occurs in the eastern Gawler Craton within Archaean Kenella Gneiss, a pinkish-red, quartz-microcline- plagioclase- garnet- biotite gneiss.

Proterozoic, undifferentiated, grey, quartz-microcline-biotite gneissic granite and Hiltaba Suite, pinkish-red, biotite-poor, quartz-orthoclase-plagioclase granite adamellite crop out north of Lake Labyrinth Goldfield.

The Archaean and Proterozoic at Lake Labyrinth Goldfield are in fault contact as marked by a major northwest-southeast striking quartz vein.

Jurassic Algebuckina Sandstone crops out north and south of the goldfield, and is capped on local highs south of the goldfield by poorly sorted fine grained to pebbly quartz sand which is usually silcreted.

Archaean, Proterozoic and Jurassic units are overlain by Quaternary sands, clays, gypsiferous sandy clays and calcrete.

SITE GEOLOGY

The Lake Labyrinth workings are within Archaean Kenella Gneiss beneath a 2m capping of Quaternary, reddish brown, clayey fine to coarse grained quartz sand cemented by plate carbonate. (Fig. 3).

A major fault (Fig. 2A) infilled with quartz separates the Kenella Gneiss and undifferentiated grey, quartz- microcline-biotite gneissic granite to the north. The quartz vein strikes 290°-295° and dips steeply northeast and is up to 18m wide near survey station A. This quartz vein appears to be displaced by minor faulting, 580m southeast and 200m northwest along strike from station A (Fig. 3).

The main mine workings are on narrow ferruginous quartz veins and sheared gneiss varying in thickness from 0.15 to 0.61m (Winton, 1934), striking approximately east-west with a steep northerly dip. The southern workings are on a 10cm wide ferruginous quartz vein striking 018° and dipping vertically.

SADME INVESTIGATIONS

Lake Labyrinth Goldfield was stadia surveyed following reconnaissance sampling. A ground magnetic survey and soil sampling were undertaken on a 50m x 20m grid over an area 750m x 200m, sub-parallel to the quartz vein. Data are plotted on 1:2500 plans which accompany this report (Figs 3,5,6 and 7). A sketch plan of the southern working at 1:500 also accompanies this report (Fig 4).

Two reconnaissance samples of ferruginous quartz veins were collected from the southern workings and one from the northern workings. Multielement geochemistry was carried out on these samples, indicating high Cu, Pb, Zn and As associated with anomalous Au. A further 7 grab samples from mullock dumps and 143, - 80 mesh soil samples were collected and assayed for Au, Cu, Pb, Zn, Ag, Co, Cr and Ni.

The only accessible shaft near station A (Shaft A, Fig. 3) was mapped and sampled by C M Horn and J F Allender.

Assay results are listed in Appendices A,B and C.

MINE GEOLOGY

MAIN WORKINGS

All but one shaft were inaccessible at the time of mapping. Sub-surface information is based on earlier reports which record narrow ferruginous quartz veins striking east-west with a steep northerly dip (Winton, 1934).

Shaft A (Fig. 3) 5m deep with a drive at 020° for 9m, was the only shaft mapped. The drive was terminated in a shear within Kenella Gneiss, striking at 110° and dipping 78° south. Within the 2m shear zone ferruginous quartz veins were present.

Shafts B and C (Fig. 3) appear to be developed on a narrow ferruginous quartz vein up to 5cm wide striking approximately east and west.

Shaft D, 5.3m deep at the north-west end of the workings was developed on sheared and altered Kenella Gneiss with ferruginous quartz veining.

Rock samples from these workings returned grades up to 22 g/t Au (Appendix B).

SOUTHERN WORKINGS

Winton (1934) reports northwest-southeast striking ferruginous quartz veins dipping 80° northeast exposed in a prospecting trench and varying in width from 10cm-25cm. Several other quartz veins were located with grades varying from 3.9 g/t to 24.9 g/t Au.

During an inspection in 1987 Shafts A and B (Fig. 4) appeared to be sunk on a 10cm wide ferruginous quartz vein striking 018° dipping vertically and containing pyrite. Shaft C (Fig. 4) was sunk on sheared gneiss 0.9m wide. Samples from these veins returned grades of 9.6 g/t and 1.0 g/t Au respectively (Appendix C).

SOIL SAMPLING

A total of 143 soil samples were collected on a 50m x 20m grid over a 750m x 200m area. The samples comprised the -80 micron portion of a shallow soil grab sample. The samples were assayed for Cu, Pb, Zn, Ag, As and Au.

Anomalous gold values appear both north and south of the vein. Near the main workings two anomalous gold zones appear. One north of the quartz vein, 350 m along strike of the vein by 60m wide. The other south of the vein is 400m along strike and up to 90m wide. Anomalous gold is also apparent at the northwest end of the grid. Results comprise Appendix C.

GEOPHYSICS

A ground magnetic survey was carried out over the soil sample grid.

Limited data indicate a north-south magnetic structure west of the main workings. This possibly relates to an interpreted fault which has displaced the massive quartz vein (Fig. 3, 5).

A magnetic low is apparent south and sub-parallel to the massive quartz, which also corresponds to anomalous gold values. Fifty metres north and parallel to the quartz vein there is a magnetic high zone with anomalous gold values flanking the southern margin.

Other magnetic highs are south of the main workings and at the northwest end of the grid.

CONCLUSIONS AND RECOMMENDATIONS

A total of 146.3 tonnes of ore treated at Tarcoola Government battery yielded 5206.4 grams of gold bullion, averaging 35.6 g/t Au bullion.

Gold has been won from ferruginous quartz veining within shear zones in Kenella Gneiss. Subvertical veins of the northern workings strike approximately east-west and appear to dip steeply north. At the southern workings vertical veins strike at 018° and vary in thickness from 10cm-25cm.

Multi-element geochemistry showed high Cu, Pb, Zn, and As associated with anomalous gold.

Soil sampling outlined two gold anomalies greater than 0.01 ppm in the vicinity of the main workings and three smaller zones at the northwest of the grid.

Magnetic lows and flanks of a magnetic high correspond to areas of anomalous gold.

Additional geochemical sampling and follow up drilling is recommended to further assess this area.

P P CRETTENDEN

SENIOR TECHNICAL OFFICER

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APPENDIX A

MULTI-ELEMENT GEOCHEMISTRY

EXTRACTED FROM AMDEL REPORT AC 841/88

MULTI ELEMENT GEOCHEMISTRY

A414/87 Southern workings - 10cm ferruginous quartz from bottom of shaft.

A415/87 Southern workings - chip sample across 90 cm wide altered gneiss zone, from bottom of shaft.

A416/87 Northern workings - chip across 1m face in shallow it with narrow ferruginous quartz veins in sheared and altered gneiss. Slightly.

SAMPLE NUMBER	ELEMENT DETECTION LIMIT (PPM)	Ba (200)	Be (1)	Sc (3)	Sr (50)	Ti (100)	Ge (1)	Sn (1)	Bi (1)	Ga (1)	In (10)	Sb (30)	Au (0.002)	Pt (0.002)	Pd (0.002)
A414/87				3		600	2		40	10					
A415/87		300		15	150	3000		1	2	20					
A416/87		1500		15	100	1000	1	1		10					

SAMPLE NUMBER	ELEMENT DETECTION LIMIT (PPM)	Cu (2)	Pb (5)	Zn (2)	Co (5)	Ni (5)	Cr (10)	Fe (5)	Mn (5)	Cd (1)	Ag (1)	As (50)	Mo (1)	V (20)
A414/87		83	2080	150	48	6	<10	3.74%	36	<1	8	140	11	<20
A415/87		56	580	135	38	13	<10	2.61%	64	<1	<1	110	6	<20
A416/87		29	115	31	42	9	<10	1.32%	47	<1	<1	60	7	<20

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APPENDIX B

ROCK CHIP SAMPLE GEOCHEMISTRY

RESULTS EXTRACTED FROM

AMDEL REPORT AC 3518/88

ANALABS REPORT 185.0.06.02673

ROCK CHIP SAMPLES

GRAB SAMPLES FROM MULLOCK DUMPS

A699/88	-	quartz and K Feldspar vein
A700/88	-	ferruginous quartz stockwork
A701/88	-	host rock, dump material. Gneiss?
A702/88	-	ferruginous quartz vein
A703/88	-	quartz vein
A704/88	-	host rock, dump material. Gneiss?
A705/88	-	host rock, dump material. Gneiss?

UNDERGROUND SAMPLES FROM SHAFT A

A1970/88	-	chip sample across shear at north end of crosscut contains some ferruginous quartz veining
A1971/88	-	face sample, grab. Siliceous sheared gneiss containing FeO, minor quartz stringers
A1972/88	-	chip of gneiss with small quartz stringers along west wall of crosscut. Sample over 7m interval
A1973/88	-	breccia - 30 cm wide

GRAB SAMPLES

A1974/88	-	ore stockpile - shaft
A1975/88	-	quartz vein 100m west of shaft
A1976/88	-	sheared and chloritic gneiss with minor quartz veining
A1977/88	-	chalcedony? siliceous float material

AMDEL REPORT AC 3518/88

SAMPLE	Cu	Pb	Zn	Ag	Au	As
A699/88	68	170	34	1	2700	24
A700/88	11	18	22	1	4700	9
A701/88	98	330	280	1	440	76
A702/88	36	2950	48	28	22000	240
A703/88	8	850	28	1	9500	18
A704/88	6	220	14	<1	380	24
A705/88	6	6	62	<1	160	7
UNITS	ppm	ppm	ppm	ppm	ppb	ppm
SCHEME	AAS1	AAS1	AAS1	AAS2	AAS9	XRF1

ANALABS REPORT 185.006.02673

SAMPLE NUMBER	Bi	Au	As	Au	Au:R
A1970-88	1	0.061	6	-	-
A1971-88	<1	0.026	2	-	-
A1972-88	<1	0.004	2	-	-
A1973-88	<1	0.021	3	-	-
A1974-88	<1	>0.100	12	6.75	6.47
A1975-88	1	0.027	<1	-	-
A1976-88	<1	0.063	8	-	-
A1977-88	<1	0.010	2	-	-
DETECTION	1	0.001	1	0.02	0.02
UNITS	PPM	PPM	PPM	PPM	PPM
METHOD	102	334	114	329	329

SAMPLE NUMBER	Ag	Co	Cr	Cu	Ni	Pb	Zn
A1970-88	0.5	10	60	25	30	115	60
A1971-88	0.5	<5	325	35	15	5	15
A1972-88	0.5	5	50	10	10	10	30
A1973-88	0.5	5	30	15	5	45	25
A1974-88	3.0	5	200	50	15	1855	85
A1975-88	0.5	<5	450	5	10	15	5
A1976-88	0.5	5	55	25	15	360	165
A1977-88	0.5	5	870	20	10	25	10
DETECTION	0.5	5	5	5	5	5	5
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
METHOD	101	101	101	101	101	101	101

APPENDIX C

SOIL SAMPLE GEOCHEMISTRY

RESULTS EXTRACTED FROM

ANALABS REPORT 185.006.02673

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	7 OF 23

TUBE No.	SAMPLE No.		Bi	Au	Au:R	As	Au	Au:R	Wt	
1	A1491-88		–	0.001	–	1	–	–	–	
2	A1492-88		–	<0.001	–	1	–	–	–	
3	A1493-88		–	0.002	–	<1	–	–	–	
4	A1494-88		–	<0.001	–	1	–	–	–	
5	A1495-88		–	<0.001	–	1	–	–	–	
6	A1496-88		–	<0.001	–	1	–	–	20	
7	A1497-88		–	0.001	–	1	–	–	25	
8	A1498-88		–	0.001	–	1	–	–	25	
9	A1499-88		–	0.001	–	1	–	–	30	
10	A1500-88		–	0.009	–	1	–	–	–	
11	A1501-88		–	<0.001	–	1	–	–	–	
12	A1502-88		–	0.001	–	1	–	–	–	
13	A1503-88		–	<0.001	–	1	–	–	25	
14	A1504-88		–	0.025	–	2	–	–	25	
15	A1505-88		–	0.002	–	1	–	–	–	
16	A1506-88		–	<0.001	–	1	–	–	–	
17	A1507-88		–	<0.001	–	2	–	–	25	
18	A1508-88		–	<0.001	–	1	–	–	–	
19	A1509-88		–	<0.001	–	1	–	–	–	
20	A1510-88		–	<0.001	–	1	–	–	–	
21	A1511-88		–	<0.001	–	2	–	–	25	
22	A1512-88		–	0.003	–	1	–	–	20	
23	A1513-88		–	0.001	–	2	–	–	–	
24	A1514-88		–	0.001	–	2	–	–	25	
25	A1515-88		–	0.006	–	2	–	–	–	

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

ANALABS

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	8 OF 23

TUBE No.	SAMPLE No.		Bi	Au	Au:R	As	Au	Au:R	Wt	
1	A1516-88		–	0.001	–	1	–	–	–	
2	A1517-88		–	0.004	–	2	–	–	25	
3	A1518-88		–	0.006	–	3	–	–	–	
4	A1519-88		–	0.004	–	1	–	–	25	
5	A1520-88		–	0.001	–	2	–	–	–	
6	A1521-88		–	0.040	–	1	–	–	15	
7	A1522-88		–	0.011	–	2	–	–	–	
8	A1523-88		–	0.003	–	2	–	–	–	
9	A1524-88		–	0.002	–	1	–	–	–	
10	A1525-88		–	0.022	–	4	–	–	–	
11	A1526-88		–	0.021	–	4	–	–	–	
12	A1527-88		–	0.002	–	1	–	–	–	
13	A1528-88		–	0.002	–	2	–	–	25	
14	A1529-88		–	0.003	–	3	–	–	20	
15	A1530-88		–	0.010	–	2	–	–	15	
16	A1531-88		–	0.004	–	2	–	–	–	
17	A1532-88		–	0.003	–	1	–	–	–	
18	A1533-88		–	0.002	–	2	–	–	25	
19	A1534-88		–	0.002	–	2	–	–	–	
20	A1535-88		–	0.002	–	2	–	–	20	
21	A1536-88		–	0.005	–	2	–	–	~~20~~ 20	
22	A1537-88		–	0.020	–	2	–	–	15	
23	A1538-88		–	0.011	–	2	–	–	20	
24	A1539-88		–	0.006	–	1	–	–	–	
25	A1540-88		–	0.006	–	2	–	–	–	

Results in ppm unless otherwise specified
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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	9 OF 23

TUBE No.	SAMPLE No.		Bi	Au	Au:R	As	Au	Au:R	Wt	
1	A1541-88		–	0.001	–	2	–	–	–	
2	A1542-88		–	0.001	–	1	–	–	–	
3	A1543-88		–	0.006	–	2	–	–	–	
4	A1544-88		–	0.007	–	2	–	–	–	
5	A1545-88		–	0.014	–	2	–	–	–	
6	A1546-88		–	0.005	–	4	–	–	–	
7	A1547-88		–	0.012	–	2	–	–	–	
8	A1548-88		–	0.007	–	2	–	–	–	
9	A1549-88		–	0.012	–	4	–	–	–	
10	A1550-88		–	0.004	–	2	–	–	–	
11	A1551-88		–	0.014	–	2	–	–	–	
12	A1552-88		–	0.042	–	1	–	–	–	
13	A1553-88		–	0.015	–	2	–	–	–	
14	A1554-88		–	0.008	–	2	–	–	–	
15	A1555-88		–	0.004	–	2	–	–	–	
16	A1556-88		–	0.006	–	1	–	–	–	
17	A1557-88		–	0.004	–	2	–	–	–	
18	A1558-88		–	0.004	–	2	–	–	25	
19	A1559-88		–	0.015	–	3	–	–	20	
20	A1560-88		–	0.004	–	2	–	–	–	
21	A1561-88		–	0.013	–	3	–	–	–	
22	A1562-88		–	0.018	–	2	–	–	25	
23	A1563-88		–	0.008	–	2	–	–	–	
24	A1564-88		–	0.014	–	3	–	–	25	
25	A1565-88		–	0.004	–	2	–	–	–	

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	10 OF 23

TUBE No.	SAMPLE No.		Bi	Au	Au:R	As	Au	Au:R	Wt	
1	A1566-88		–	0.002	–	2	–	–	–	
2	A1567-88		–	0.001	–	1	–	–	–	
3	A1568-88		–	0.001	–	3	–	–	–	
4	A1569-88		–	<0.001	–	3	–	–	–	
5	A1570-88		–	0.003	–	2	–	–	–	
6	A1571-88		–	0.011	–	3	–	–	20	
7	A1572-88		–	0.015	–	3	–	–	–	
8	A1573-88		–	0.011	–	2	–	–	–	
9	A1574-88		–	0.005	–	2	–	–	–	
10	A1575-88		–	0.007	–	2	–	–	–	
11	A1576-88		–	0.007	–	1	–	–	–	
12	A1577-88		–	0.018	–	3	–	–	–	
13	A1578-88		–	0.003	–	2	–	–	20	
14	A1579-88		–	0.002	–	1	–	–	25	
15	A1580-88		–	0.005	–	2	–	–	25	
16	A1581-88		–	0.007	–	1	–	–	–	
17	A1582-88		–	0.002	–	1	–	–	–	
18	A1583-88		–	0.009	–	2	–	–	–	
19	A1584-88		–	0.009	–	3	–	–	–	
20	A1585-88		–	0.002	–	2	–	–	–	
21	A1586-88		–	0.003	–	2	–	–	–	
22	A1587-88		–	0.001	–	2	–	–	–	
23	A1588-88		–	0.001	–	2	–	–	–	
24	A1589-88		–	<0.001	–	1	–	–	–	
25	A1590-88		–	0.003	–	2	–	–	20	

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	11 OF 23

TUBE No.	SAMPLE No.		Bi	Au	Au:R	As	Au	Au:R	Wt	
1	A1591-88		–	0.002	–	2	–	–	25	
2	A1592-88		–	0.001	–	2	–	–	25	
3	A1593-88		–	0.003	–	2	–	–	–	
4	A1594-88		–	0.005	–	2	–	–	–	
5	A1595-88		–	0.004	–	2	–	–	–	
6	A1596-88		–	0.074	–	1	–	–	–	
7	A1597-88		–	0.002	–	2	–	–	–	
8	A1598-88		–	0.002	–	1	–	–	–	
9	A1599-88		–	<0.001	–	1	–	–	–	
10	A1600-88		–	0.001	–	2	–	–	–	
11	A1601-88		–	<0.001	–	1	–	–	–	
12	A1602-88		–	0.001	–	1	–	–	–	
13	A1603-88		–	0.001	–	2	–	–	25	
14	A1604-88		–	0.020	–	2	–	–	–	
15	A1605-88		–	0.023	–	2	–	–	25	
16	A1606-88		–	0.026	–	1	–	–	25	
17	A1607-88		–	0.010	–	1	–	–	20	
18	A1608-88		–	0.003	–	2	–	–	–	
19	A1609-88		–	0.001	–	1	–	–	20	
20	A1610-88		–	<0.001	–	1	–	–	–	
21	A1611-88		–	0.002	–	2	–	–	–	
22	A1612-88		–	<0.001	–	1	–	–	–	
23	A1613-88		–	0.002	–	2	–	–	–	
24	A1614-88		–	0.001	–	1	–	–	–	
25	A1615-88		–	0.004	–	2	–	–	25	

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	12 OF 23

TUBE No.	SAMPLE No.		Bi	Au	Au:R	As	Au	Au:R	Wt	
1	A1616-88		—	0.012	—	1	—	—	—	
2	A1617-88		—	0.008	—	3	—	—	—	
3	A1618-88		—	0.004	—	2	—	—	—	
4	A1619-88		—	0.007	—	2	—	—	—	
5	A1620-88		—	0.006	—	3	—	—	—	
6	A1621-88		—	0.014	—	3	—	—	—	
7	A1622-88		—	0.025	—	2	—	—	—	
8	A1623-88		—	0.004	—	2	—	—	—	
9	A1624-88		—	0.007	—	2	—	—	25	
10	A1625-88		—	0.006	—	3	—	—	—	
11	A1626-88		—	0.010	—	3	—	—	—	
12	A1627-88		—	0.009	—	2	—	—	—	
13	A1628-88		—	0.014	—	2	—	—	20	
14	A1629-88		—	0.031	—	2	—	—	—	
15	A1630-88		—	0.010	—	2	—	—	—	
16	A1631-88		—	0.002	—	1	—	—	—	
17	A1632-88		—	<0.001	—	2	—	—	—	
18	A1633-88		—	0.001	—	2	—	—	—	
19	A1634-88		—	SNR	—	SNR	—	—	SNR	
20	A1635-88		—	SNR	—	SNR	—	—	SNR	
21	A1636-88		—	SNR	—	SNR	—	—	SNR	
22	A1637-88		—	SNR	—	SNR	—	—	SNR	
23	A1638-88		—	SNR	—	SNR	—	—	SNR	
24	A1639-88		—	SNR	—	SNR	—	—	SNR	
25	A1640-88		—	0.007	—	5	—	—	—	

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	7 OF 23

TUBE No.	SAMPLE No.		Ag	As	Co	Cr	Cu	Ni	Pb	Zn
1	A1491-88		0.5	—	5	10	15	10	10	45
2	A1492-88		0.5	—	5	15	15	10	10	40
3	A1493-88		0.5	—	5	10	15	10	10	35
4	A1494-88		0.5	—	5	10	15	10	10	40
5	A1495-88		0.5	—	5	10	15	10	10	40
6	A1496-88		0.5	—	5	10	15	10	10	40
7	A1497-88		0.5	—	5	10	15	10	15	45
8	A1498-88		0.5	—	5	10	15	10	10	40
9	A1499-88		0.5	—	5	10	15	15	10	45
10	A1500-88		0.5	—	5	10	15	10	10	35
11	A1501-88		0.5	—	5	10	15	10	10	40
12	A1502-88		<0.5	—	5	10	15	15	15	45
13	A1503-88		<0.5	—	5	10	15	10	10	45
14	A1504-88		<0.5	—	10	15	20	15	40	60
15	A1505-88		<0.5	—	5	10	15	15	20	40
16	A1506-88		<0.5	—	5	10	10	10	5	35
17	A1507-88		<0.5	—	5	10	15	15	5	40
18	A1508-88		<0.5	—	5	10	15	15	10	40
19	A1509-88		0.5	—	5	10	15	10	5	35
20	A1510-88		<0.5	—	5	10	10	10	5	30
21	A1511-88		<0.5	—	10	10	20	15	10	45
22	A1512-88		<0.5	—	5	10	15	15	10	45
23	A1513-88		<0.5	—	5	10	15	10	10	35
24	A1514-88		<0.5	—	5	10	15	15	20	35
25	A1515-88		<0.5	—	5	15	15	15	10	40

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	8 OF 23

TUBE No.	SAMPLE No.		Ag	As	Co	Cr	Cu	Ni	Pb	Zn
1	A1516-88		<0.5	–	5	15	15	15	10	40
2	A1517-88		<0.5	–	10	10	20	15	15	55
3	A1518-88		<0.5	–	5	10	20	15	15	50
4	A1519-88		0.5	–	5	15	15	15	10	45
5	A1520-88		<0.5	–	5	10	15	15	10	45
6	A1521-88		<0.5	–	5	10	25	15	15	50
7	A1522-88		0.5	–	5	10	20	15	10	55
8	A1523-88		0.5	–	10	10	20	20	30	60
9	A1524-88		0.5	–	5	10	15	15	10	50
10	A1525-88		0.5	–	5	10	15	15	10	60
11	A1526-88		0.5	–	5	10	15	15	25	45
12	A1527-88		<0.5	–	5	10	15	15	10	40
13	A1528-88		0.5	–	5	10	15	15	15	45
14	A1529-88		0.5	–	5	10	15	15	15	45
15	A1530-88		0.5	–	5	10	15	15	15	45
16	A1531-88		0.5	–	5	15	15	15	10	45
17	A1532-88		0.5	–	5	10	15	15	10	40
18	A1533-88		<0.5	–	5	10	15	15	5	40
19	A1534-88		0.5	–	5	10	15	20	10	40
20	A1535-88		<0.5	–	5	10	15	15	5	40
21	A1536-88		0.5	–	5	10	15	15	10	40
22	A1537-88		0.5	–	5	10	20	15	10	40
23	A1538-88		<0.5	–	5	10	20	15	10	50
24	A1539-88		0.5	–	5	10	15	15	10	40
25	A1540-88		0.5	–	5	10	20	15	10	40

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SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	9 OF 23

TUBE No.	SAMPLE No.		Ag	As	Co	Cr	Cu	Ni	Pb	Zn
1	A1541-88		<0.5	-	5	10	20	15	15	40
2	A1542-88		0.5	-	5	10	15	15	10	35
3	A1543-88		<0.5	-	5	10	15	15	20	45
4	A1544-88		<0.5	-	5	10	15	15	20	50
5	A1545-88		0.5	-	5	10	15	15	15	65
6	A1546-88		<0.5	-	5	10	10	10	5	60
7	A1547-88		<0.5	-	10	10	20	15	5	55
8	A1548-88		0.5	-	5	10	15	15	10	50
9	A1549-88		<0.5	-	10	5	30	15	5	45
10	A1550-88		<0.5	-	5	10	15	15	10	45
11	A1551-88		0.5	-	5	15	20	15	10	40
12	A1552-88		0.5	-	5	10	20	15	15	50
13	A1553-88		0.5	-	5	10	20	15	10	50
14	A1554-88		0.5	-	5	10	20	15	10	45
15	A1555-88		0.5	-	5	15	20	15	10	50
16	A1556-88		0.5	-	5	15	15	15	5	35
17	A1557-88		0.5	-	5	15	15	15	5	50
18	A1558-88		0.5	-	5	15	15	15	10	55
19	A1559-88		0.5	-	5	10	20	15	20	50
20	A1560-88		0.5	-	5	10	20	15	10	50
21	A1561-88		0.5	-	5	15	20	15	10	45
22	A1562-88		<0.5	-	5	15	20	15	10	45
23	A1563-88		0.5	-	5	10	15	15	10	50
24	A1564-88		<0.5	-	5	10	20	15	10	50
25	A1565-88		0.5	-	5	15	15	10	5	35

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SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	10 OF 23

TUBE No.	SAMPLE No.		Ag	As	Co	Cr	Cu	Ni	Pb	Zn
1	A1566-88		<0.5	–	5	10	15	15	10	45
2	A1567-88		0.5	–	5	10	15	15	5	45
3	A1568-88		<0.5	–	5	10	20	15	10	50
4	A1569-88		<0.5	–	10	10	20	15	10	45
5	A1570-88		<0.5	–	10	10	20	20	10	55
6	A1571-88		<0.5	–	10	10	25	20	10	55
7	A1572-88		<0.5	–	10	10	20	20	10	55
8	A1573-88		<0.5	–	10	10	20	15	15	55
9	A1574-88		<0.5	–	5	10	15	15	10	40
10	A1575-88		<0.5	–	5	10	15	15	5	45
11	A1576-88		<0.5	–	5	10	15	10	5	45
12	A1577-88		0.5	–	5	10	15	15	5	45
13	A1578-88		<0.5	–	5	10	10	10	5	50
14	A1579-88		<0.5	–	5	15	15	10	10	45
15	A1580-88		<0.5	–	5	10	15	10	10	40
16	A1581-88		0.5	–	5	10	15	15	10	40
17	A1582-88		<0.5	–	5	10	15	15	5	40
18	A1583-88		<0.5	–	5	10	15	15	5	40
19	A1584-88		<0.5	–	10	15	20	20	10	55
20	A1585-88		<0.5	–	5	10	15	15	5	45
21	A1586-88		<0.5	–	5	10	20	15	10	45
22	A1587-88		<0.5	–	5	10	15	15	5	40
23	A1588-88		0.5	–	5	10	15	15	10	45
24	A1589-88		0.5	–	5	10	15	15	5	40
25	A1590-88		<0.5	–	5	10	20	20	5	50

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SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	11 OF 23

TUBE No.	SAMPLE No.		Ag	As	Co	Cr	Cu	Ni	Pb	Zn
1	A1591-88		<0.5	–	5	10	20	15	5	45
2	A1592-88		<0.5	–	5	10	20	15	10	50
3	A1593-88		<0.5	–	5	10	24	15	10	45
4	A1594-88		<0.5	–	10	10	30	15	10	55
5	A1595-88		<0.5	–	5	10	20	15	25	45
6	A1596-88		<0.5	–	5	10	20	15	5	55
7	A1597-88		<0.5	–	5	15	10	10	5	35
8	A1598-88		<0.5	–	5	10	15	10	5	45
9	A1599-88		<0.5	–	5	10	10	15	5	45
10	A1600-88		<0.5	–	5	10	15	15	5	50
11	A1601-88		<0.5	–	5	10	10	10	5	40
12	A1602-88		0.5	–	5	10	15	15	5	45
13	A1603-88		0.5	–	5	10	15	15	5	40
14	A1604-88		<0.5	–	5	10	15	20	5	45
15	A1605-88		<0.5	–	10	15	20	25	5	45
16	A1606-88		<0.5	–	5	10	25	15	5	45
17	A1607-88		<0.5	–	5	10	25	15	5	50
18	A1608-88		<0.5	–	5	10	20	15	5	50
19	A1609-88		<0.5	–	5	10	20	15	5	50
20	A1610-88		<0.5	–	5	10	15	15	5	45
21	A1611-88		<0.5	–	5	15	20	15	10	40
22	A1612-88		<0.5	–	5	10	15	10	10	40
23	A1613-88		0.5	–	5	10	15	15	10	75
24	A1614-88		0.5	–	5	10	15	10	10	35
25	A1615-88		<0.5	–	5	10	15	10	30	30

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	185.0.06.02673	08/12/88	12/03/313	12 OF 23

TUBE No.	SAMPLE No.		Ag	As	Co	Cr	Cu	Ni	Pb	Zn
1	A1616-88		0.5	–	5	15	20	15	15	35
2	A1617-88		<0.5	–	5	15	15	15	10	35
3	A1618-88		0.5	–	5	10	15	15	10	50
4	A1619-88		0.5	–	5	10	20	20	10	40
5	A1620-88		0.5	–	5	10	15	15	10	40
6	A1621-88		0.5	–	5	10	15	15	10	35
7	A1622-88		0.5	–	5	15	15	20	10	35
8	A1623-88		0.5	–	5	10	15	15	10	40
9	A1624-88		<0.5	–	5	10	20	20	10	35
10	A1625-88		<0.5	–	10	10	15	15	10	30
11	A1626-88		<0.5	–	10	10	20	15	15	35
12	A1627-88		0.5	–	10	10	15	15	10	30
13	A1628-88		0.5	–	10	10	15	15	10	35
14	A1629-88		<0.5	–	10	10	15	15	15	35
15	A1630-88		0.5	–	5	10	15	15	30	35
16	A1631-88		<0.5	–	5	10	10	10	5	25
17	A1632-88		0.5	–	5	10	15	10	10	40
18	A1633-88		0.5	–	5	10	15	15	5	35
19	A1634-88		SNR	–	SNR	SNR	SNR	SNR	SNR	SNR
20	A1635-88		SNR	–	SNR	SNR	SNR	SNR	SNR	SNR
21	A1636-88		SNR	–	SNR	SNR	SNR	SNR	SNR	SNR
22	A1637-88		SNR	–	SNR	SNR	SNR	SNR	SNR	SNR
23	A1638-88		SNR	–	SNR	SNR	SNR	SNR	SNR	SNR
24	A1639-88		SNR	–	SNR	SNR	SNR	SNR	SNR	SNR
25	A1640-88		0.5	–	10	10	25	20	20	50

Results in ppm unless otherwise specified
T = element present, but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

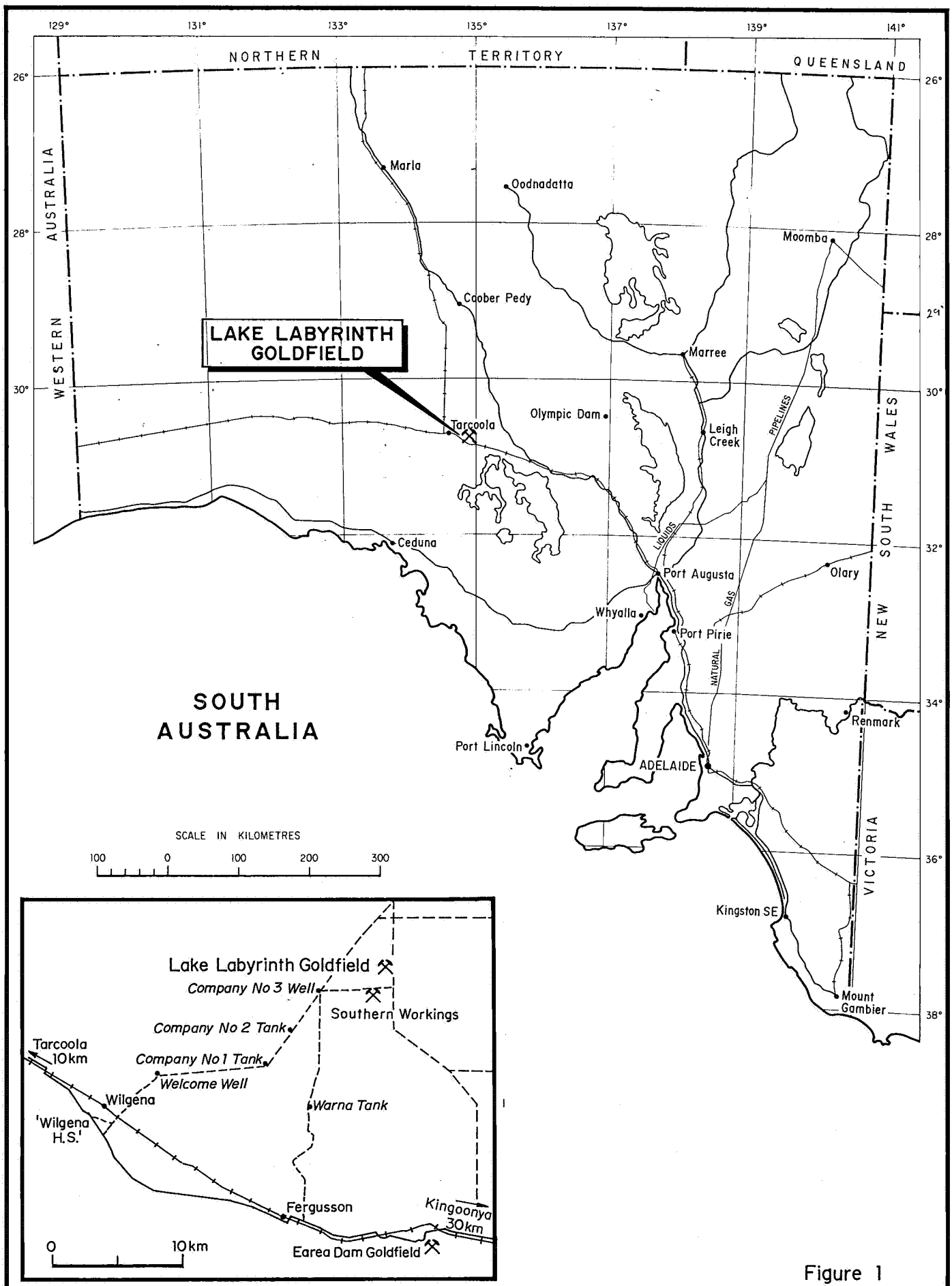


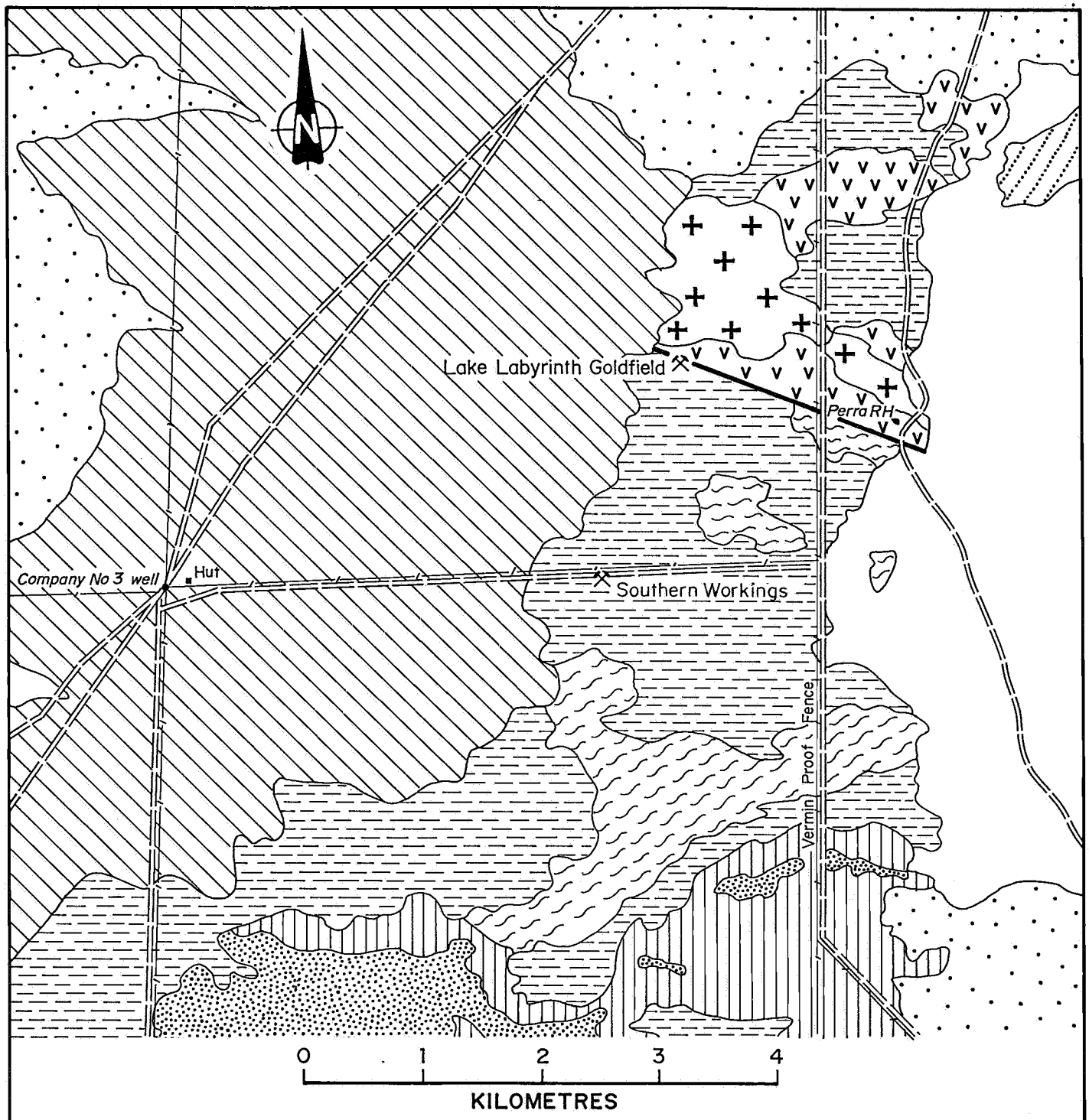
Figure 1

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

LAKE LABYRINTH GOLDFIELD
LOCALITY PLAN

COMPILED P.P.C.	C.D.O. DATE
DRAWN A.F.	SCALE
DATE 21-12-90	PLAN NUMBER S 21885
CHECKED	

S777



QUATERNARY

Pale-orange, poorly sorted, fine to coarse grained, alluvial quartz sand.

Pale orange to reddish-brown, clayey, fine to medium grained quartz sand forming prominent seif dunes.

Reddish brown, clayey, fine grained quartz sand, partly indurated by iron oxide.

Gypsum dunes, pinkish white, powdery, locally cemented by massive crystalline gypsum. Saline & gypsiferous sandy lacustrine clay.

Clayey, fine to coarse grained quartz sand cemented by tough pinkish-white platy calcrete.

TERTIARY

Poorly sorted, fine grnd to pebbly qtz sand with polished qtz granules, silcrete fragments, abun. Adelaidean quartzite boulders and cobbles.

JURASSIC

ALGEBUCKINA SANDSTONE: White, kaolinitic, qtz arenite, with c.grnd to gritty qtz grains and abundant vein quartz and quartzite pebbles.

PROTEROZOIC

HILTABA SUITE: Pinkish-red, biotite-poor, quartz-orthoclase-plagioclase granite - adamellite.

Undifferentiated grey, quartz-microcline-biotite, gneissic granite with phenocrysts of microcline and subordinate plagioclase.

KENELLA GNEISS: Pinkish-red, quartz-microline-plagioclase-garnet-biotite gneiss.

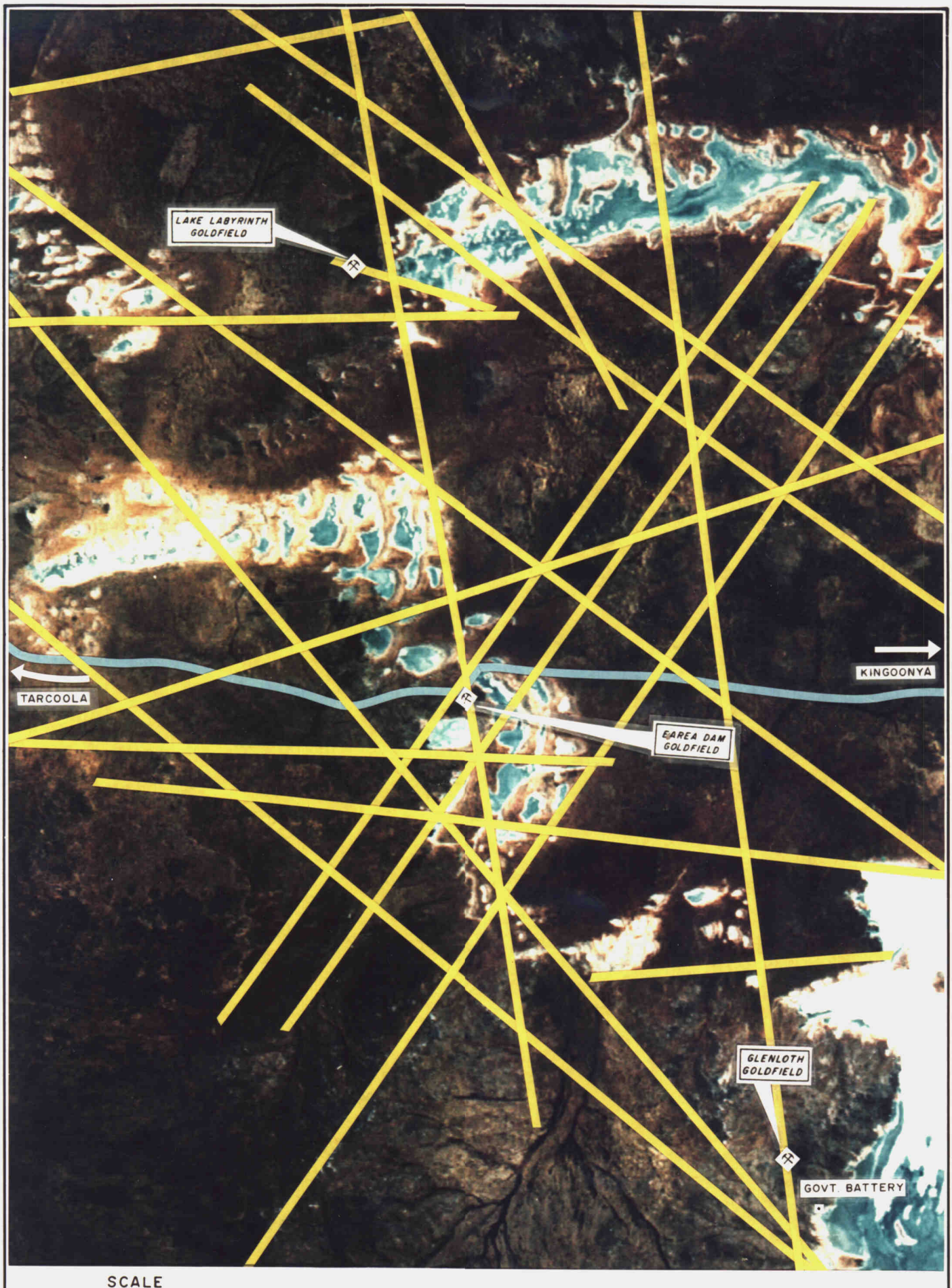
Figure 2

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

LAKE LABYRINTH GOLDFIELD
REGIONAL GEOLOGY

COMPILED P.P.C.	C D O DATE
DRAWN A.F./M.R.	SCALE 1:50000
DATE 20-12-90	PLAN NUMBER S21886
CHECKED	

5177



SCALE
5 0 5 KILOMETRES

Figure.....2.A

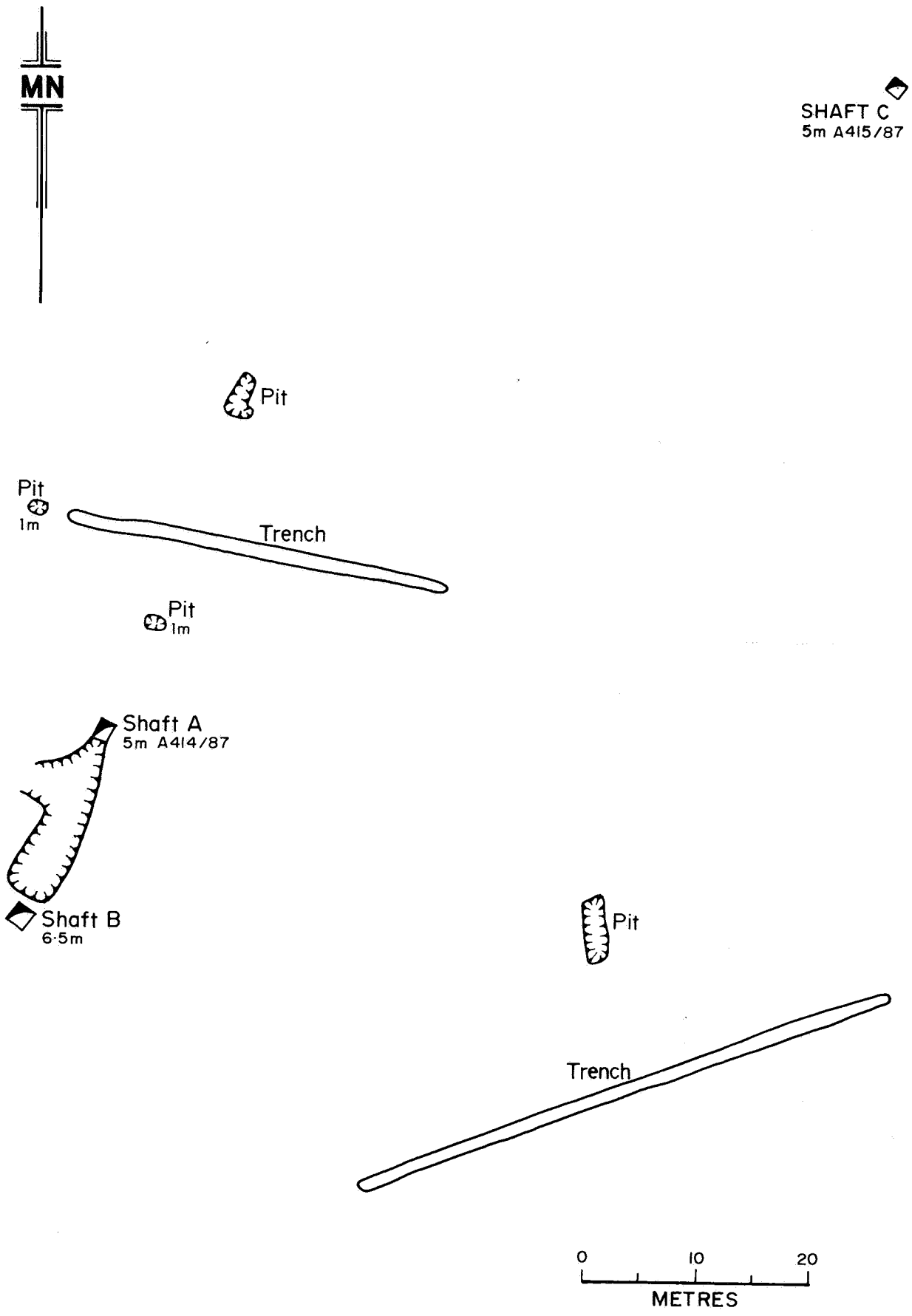
DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

EAREA DAM GOLDFIELD

ML 5342 & 5361
LANDSAT MSS: 100-81
MAJOR LINEAMENTS

COMPILED P.C.	C D O DATE
DRAWN	SCALE As Shown
DATE Sept. 1989	PLAN NUMBER
CHECKED	S 21045

4657



LAKE LABYRINTH GOLDFIELD
SKETCH PLAN OF SOUTHERN WORKINGS

FIG. 4

SADME S21887

496300mE
6607400mN

497000

497600mE

6606800mN

A1975/88 * A1612/88 A1638/88 A1974/88 Shaft D Stn B 141·7 142 140 138 A1622/88 A1623/88 A1976/88 * A1977/88 A1491/88 A1502/88 A1523/88 A1524/88 A1545/88 A1546/88 A1557/88 A1578/88 A1579/88 A1600/88 A1601/88 134 136 138 FAULT? Stn A 140·0 Shaft A A1970-73/88 * (underground) A703,4/88 * A705/88 * Shaft B A416/87 * A1501/88 A1512/88 A1513/88 A1534/88 A1535/88 A1556/88 A1567/88 A1568/88 A1589/88 A1590/88 A1611/88 Shaft C A701/88 * A699/88 * A702/88 * A700/88 * FAULT?

MN

0 100 200 300
SCALE IN METRES

QUATERNARY — Reddish brown clayey, fine-to-coarse quartz sand

PROTEROZOIC — Undifferentiated grey, quartz-microcline-biotite gneissic granite

ARCHAEAN — KENELLA GNEISS: Pinkish-red, quartz microcline-plagioclase-garnet-biotite gneiss

Massive white quartz

Shaft, pit, costean

• A1578/88 Soil sample location

Stn B △141·7 Survey station with elevation

A1970/88 * Rock chip sample location

Stadia survey by P.P.Crettenden, SFB 813, 814

Datum: AHD (approx.)

Grid: AMG (approx.)

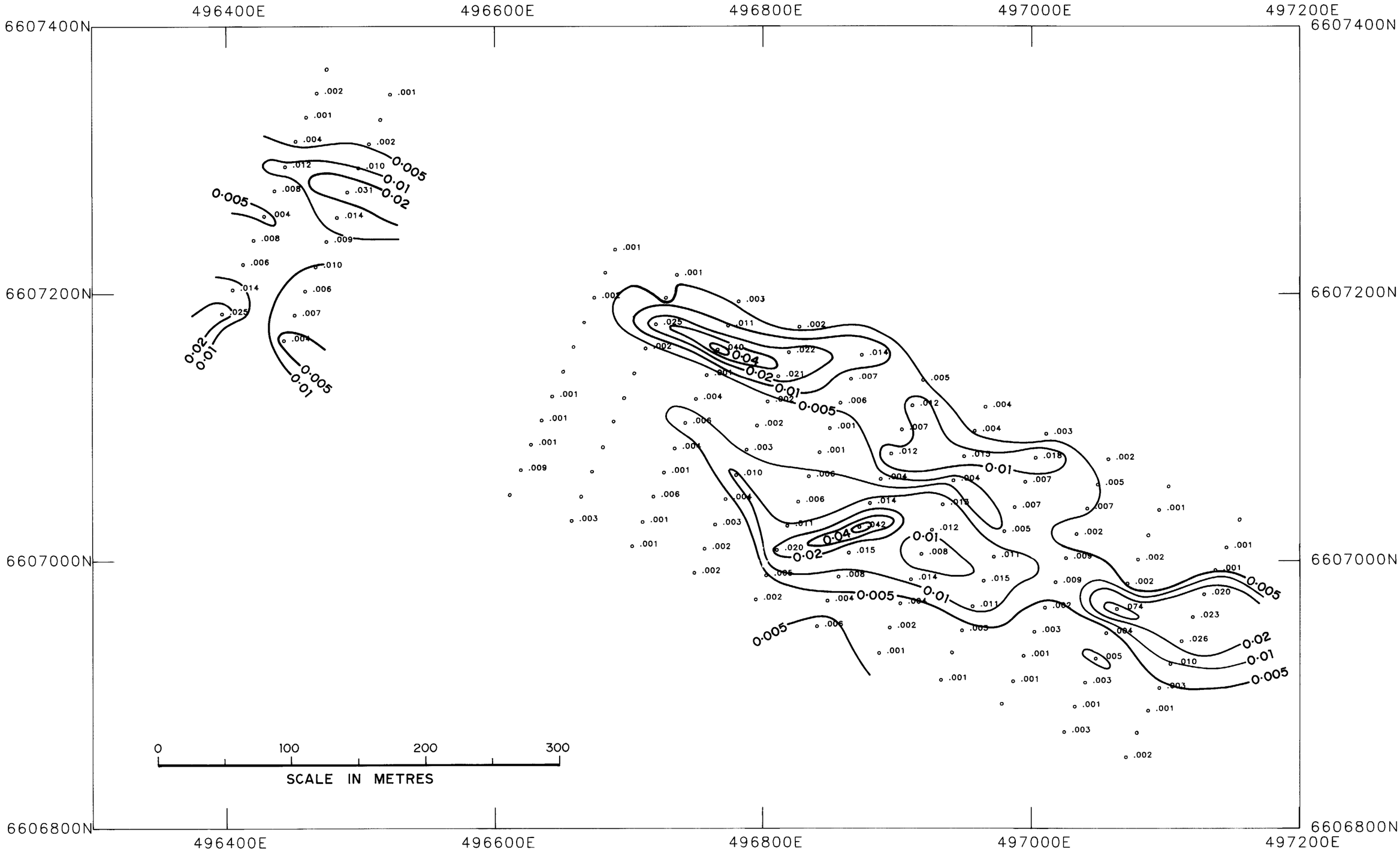
LAKE LABYRINTH GOLDFIELD - NORTHERN WORKINGS

GEOLOGY AND SOIL SAMPLE LOCATIONS

Figure 3

SADME 91-2

5777



Soil sample location below detection limit (·001 ppm)

.001 Soil sample location with gold assay in ppm

Figure 5

LAKE LABYRINTH GOLDFIELD - NORTHERN WORKINGS

GOLD ASSAYS

SADME 91-3

5/77

496400E 496600E 496800E 497000E 497200E

6607400N

6607200N

6607000N

6606800N

0 100 200 300

SCALE IN METRES

° Ag Pb
As Zn
Cu _____ Sample location with assay results in ppm

·o _____ Results below detection level

LAKE LABYRINTH GOLDFIELD - NORTHERN WORKINGS

SOIL SAMPLE RESULTS

Ag As Cu Pb Zn

Figure 6

SADME 91-4

5177

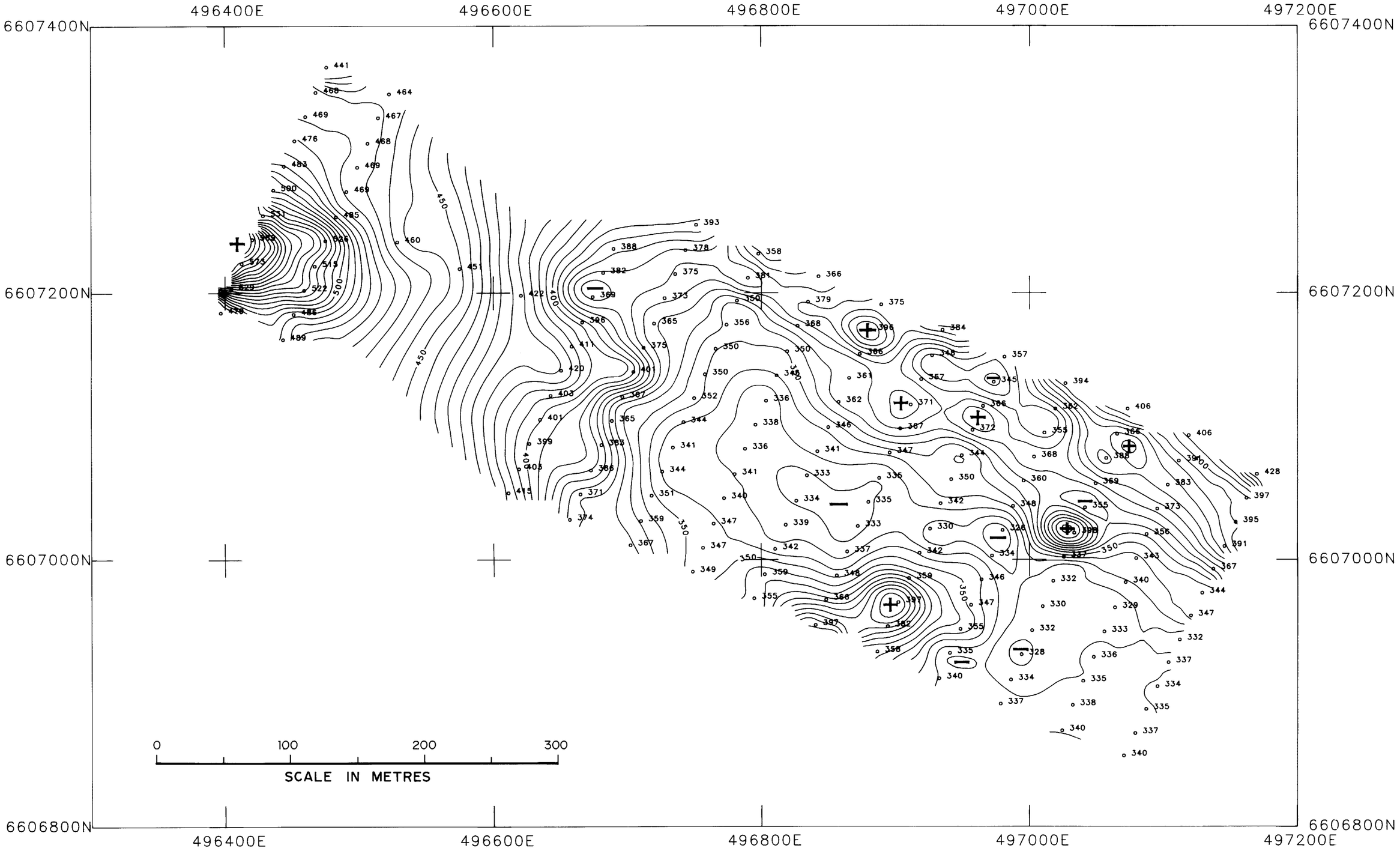


Figure 7

LAKE LABYRINTH GOLDFIELD - NORTHERN WORKINGS

GROUND MAGNETIC SURVEY

SADME 91-5

5177