DEPARTMENT OF MINES AND ENERGY

GEOLOGICAL SURVEY

SOUTH AUSTRALIA

REPORT BOOK 93/4

TARCOOLA - TALLARINGA BEDROCK DRILLING 1991 SUMMARY REVIEW

(See Envelope 08541)

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Tarcoola - Tallaringa Bedrock Drilling 1991 - Summary

R S ROBERTSON, B J MORRIS, J K JANZ, P W HILL AND P P CRETTENDEN

Archaean, Early and Mid Proterozoic rocks of the northwest Gawler Craton have features which suggest good prospectivity for base metals, precious metals and other commodities. However outcrop is poor and there has been relatively little exploration in the region. A report by Youles (1991) summarised previous exploration and highlighted prospective areas of part of the northwest Gawler Craton.

In late 1991, SADME carried out an extensive program of regional reverse circulation drilling to bedrock on parts of the TARCOOLA, BARTON and TALLARINGA 1:250 000 map areas. 501 holes totalling 16 872 m (ave 33.7 m) were drilled on traverses mainly along existing tracks at intervals of between 2.0 km and 0.5 km. Ground magnetic surveys were also carried out along all traverses, with coverage totalling 668.2 km in 45 traverses. Concurrent with the drilling program, LANDSAT TM imagery covering the study area was processed and briefly assessed. This work resulted in the siting of a diamond drillhole on a possible hydrothermal alteration zone. An airborne GEOSCAN multispectral scanning survey was also carried out over part of TARCOOLA including this site.

The rotary drilling program showed substantial anomalous base metal and gold values including the following:

- **Gold in Archaean Mulgathing Complex rocks. Anomalous values tend to be associated with paragneisses and banded iron formation rocks and there is a concentration of anomalous holes in the Woomera Tank to West Well area. Best value was 700 ppb Au over 10 m at Woomera Tank. Several other holes have values in the 50-300 ppb range.**
- **Ni, Cr (Pt, Pd) and Cu, Zn in Mulgathing Complex mafic rocks (meta volcanics?), mafic gneisses and gneisses.**
- **Numerous elevated Cu & Zn values (maximum 2935 ppm Cu, 1660 ppm Zn) in an Early Proterozoic (?) intermediate to basic intrusive complex (the 'Muckanippie anorthosite complex'). Similar Cu and Zn anomalies were also obtained in granitic and pegmatitic rocks on the southern margin of the anorthosite complex.**
- **Cu, Zn, Pb, As and Au anomalies in Mid Proterozoic Gawler Range Volcanics. Maximum values obtained were 320 ppm Cu, 785 ppm Zn, 980 ppm Pb, 630 ppm As, 57 ppb Au. Highest Pb and Zn values were on a magnetic high southeast of Birthday Quarry.**

INTRODUCTION

This report is a summary of an extensive rotary drilling program and geological investigations carried out by SADME Mineral Resources Branch in 1991 on part of the northwest Gawler Craton. All results from this program are contained in Part A of the Northwest Gawler Craton data package (Tarcoola - Tallaringa Bedrock Drilling Project-Envelope No. 8541).

Favourable Archaean and Proterozoic host rocks in a region of structural complexity highlight the northwest Gawler Craton as a potentially significant mineral province. Exploration has been hampered in the past by poor exposure and complex geology.

In October 1990 I P Youles, Consultant Geologist, undertook a review for SADME of all previous exploration within the TARCOOLA 1:250 000 map area to generate new targets and concepts for future exploration. The review report was completed in March 1991 and is included in the data package (Youles, 1991).

Following ground reconnaissance in April 1991 an extensive regional bedrock rotary drilling program was approved by the Minister of Mines and Energy. Drilling commenced at the end of July 1991 and was completed in late November 1991.

In all, 501 rotary/reverse circulation (RC) holes totalling 16 872 metres (ave. 33.7 m) were drilled on Moonbi, Mobella, Mulgathing, Carnding and Bulgunnia 1:100 000 map sheets. A further 36 holes totalling 1 444 metres were drilled on Kingoonya 1:100 000 sheet in a separate program not covered by this report.

Prior to drilling, ground magnetic surveys were carried out on all traverses. Profiles of these traverses together with additional traverses not drilled are included in the data package.

In April 1991, Mineral Resources Branch commenced a project involving the processing of LANDSAT TM imagery covering the Mulgathing, Carnding, Bulgunnia, Moonbi and Mobella 1:100 000 map sheets. False colour composite images were prepared to show maximum lithological and structural information. A brief assessment of these images resulted in the siting of a diamond drillhole (Gibraltar 1) on a possible hydrothermal alteration zone in the southern part of Carnding.

A report on this work, a log of the drillhole and geophysical log are contained in Part A of the data package.

In January 1992 an airborne GEOSCAN multispectral scanning survey was carried out over parts of the area covered by the drilling program on TARCOOLA including the Gibraltar 1 site. Data from the survey is held on tape by SADME.

Concurrent with the rotary bedrock drilling program, Regional Geology Branch undertook diamond drilling in the Mt Christie area (five holes) on Mulgathing and at Lake Harris on the GAIRDNER 1:250 000 map area (two holes) investigating Archaean greenstone bodies. Results from the diamond drilling program are contained in Part B of the data package (Archaean Metabasic Diamond Drilling Project).

GEOLOGICAL SETTING

The area investigated comprises the northern half of the TARCOOLA 1:250 000 geological sheet (Daly, 1985) and parts of the TALLARINGA sheet (Benbow, 1986) and BARTON sheet (Rankin and Benbow 1989).

Archaean

Archaean supracrustal rocks of the Mulgathing and Sleaford Complexes are the oldest rocks of the Gawler Craton (Parker, 1987; 1990(a)). The poorly outcropping Mulgathing Complex comprises granitic orthogneiss, paragneiss, banded iron formation, calcsilicate gneiss, migmatite and metabasic. Mulgathing Complex is now known to occur extensively on the Mulgathing, Moonbi, Mobella and Carnding 1:100 000 sheet areas drilled in this program. Similarities to the Yilgarn Block of Western Australia have been reinforced by the confirmation of the presence of greenstones in the 1991 drilling programs.

The Mulgathing Complex has undergone regional granulite facies metamorphism and intense, multiphase deformation during the Sleafordian Orogeny (Archaean - earliest Proterozoic).

Early Proterozoic

Wilgena Hill Jaspilite (iron formation, chert and quartzite), tentatively assigned to the Early Proterozoic Hutchison Group, outcrops at one locality in the east of the study area and probably occurs more extensively in the subsurface on Bulgunnia. Hutchison Group rocks host base metal mineralisation elsewhere on the Gawler Craton, most notably at Menninnie Dam (Higgins, et al., 1990).

Early Proterozoic gneissic granitoids and basic dykes of the Lincoln Complex intrude Mulgathing Complex on Mulgathing, Moonbi and Mobella. These rocks were intruded during, and weakly to intensely deformed by the Early Proterozoic Kimban Orogeny.

Prior to the drilling program, a few outcrops of diorite on Carnding had been assigned to the Muckanippie Diorite (Daly, 1985). Drilling has shown this diorite to be a component of an intrusive complex occurring extensively in the subsurface in

the area. Lithologies include anorthosite, gabbro, diorite, pyroxenite, mafic rich syenite, quartz monzonite and granodiorite. This complex is here informably termed the 'Muckanippie anorthosite complex'.

Rankin and Benbow (1989) suggested that gabbro-monzodiorite and ultramafic bodies on BARTON are equivalent to Muckanippie Diorite and that intrusion of these bodies took place during the waning phases of the Kimban Orogeny. Some intermediate to basic rocks encountered during this drilling program on Mobella, Moonbi and possibly Mulgathing may be of similar age. Muckanippie Diorite hosts minor gold mineralisation at the Malbooma Mine on Carnding.

Middle Proterozoic

Middle Proterozoic Gawler Range Volcanics, a relatively undeformed sequence of felsic lavas and pyroclastics, outcrop extensively on Carnding and Bulgunnia. Granite and adamellite of the Mid-Proterozoic Hiltaba Suite intrude Muckanippie Diorite and Gawler Range Volcanics and are considered to be comagmatic with the Gawler Range Volcanics (Blissett & Radke, 1979). South of the study area, Hiltaba Suite granite and Mid Proterozoic Tarcoola Formation host gold mineralised quartz veins at the Tarcoola Goldfield. The Olympic Dam mineralised breccias lie within granite of similar age.

Almost flat-lying Mid Proterozoic Pandurra Formation sandstone is found in drillholes on the eastern margin of the study area on Bulgunnia.

Phanerozoic

Younger sediments obscure basement rocks over much of the area. Permian sediments infill the Mulgathing Trough and other basins on Mulgathing, Mobella and Moonbi. Jurassic Algebuckina Sandstone occurs extensively particularly on Bulgunnia and Carnding. Tertiary sand and lignite is found on Moonbi, Mobella and Mulgathing. Shallow Quaternary sand and clay cover most of the area investigated.

All basement rocks have been affected by deep, multiphase Tertiary(?) weathering and silicification.

Structure

The study area lies within the Christie and Wilgena Subdomains of the Gawler Craton. The Christie Subdomain is bounded to the northwest by the Karari Fault Zone, a northeast trending intracratonic shear zone containing proto- to ultra-mylonite fabrics. The shear zone was possibly active during the Early Proterozoic, Early Palaeozoic, Permian and Tertiary (Rankin et al, 1989). Mulgathing and Lincoln Complex rocks contain other zones of intense mylonite development that appear to have formed late in the Kimban Orogeny.

Sets of major sub-parallel faults and lineaments trending northwest, northeast and, to a lesser extent, north-south cut the area. These features tend to form boundaries to the Early and Mid Proterozoic intrusives and extrusives. The Permian Mulgathing Trough is partially controlled by the northwest trending fault set. In the east, areas of Pandurra Formation occurrence in the subsurface are bounded by northwest and northeast trending fault zones. Hutchison Group metasediments occurring on Bulgunnia are confined to an area between two major northeast trending faults. Drillholes sited adjacent to one of these, the Bulgunnia fault zone, intersected granitic breccia and acid volcanics thought to be prospective for Olympic Dam style mineralisation (Daly, 1988).

Several of the northwest and northeast trending lineaments are visible as major features on satellite imagery and on the TARCOOLA 1:250 000 geological map. Some of these faults and lineaments appear to be major, deep seated fractures which could be important controls on mineralisation.

EXPLORATION TARGETS

The study area has potential for a number of different styles of base metal, precious metal, rare earth and other mineralisation.

Stratiform/Stratabound Mineralisation

Banded iron formations and mafic/ultramafic rocks of the Christie Gneiss within the Archaean Mulgathing Complex exhibit similarity with the Yilgarn Block in Western Australia and are considered prospective for stratiform/stratabound gold and base metal deposits.

Copper, lead and zinc sulphide deposits associated with cordierite - anthophyllite rock types in metamorphic terrains have been described from Canada, Finland and India (Youles, 1991). Cordierite and/or anthophyllite rock types (in some cases associated with alteration and minor sulphides) are recorded in the Mulgathing Complex.

Volcanogenic Massive Sulphides

West Australian deposits of this type within Archaean rocks include Teutonic Bore, Golden Grove and Scuddles. Scuddles is within an arcuate greenstone foldbelt. Supracrustal rocks are bounded by intrusive granitoid batholiths and mineralisation is within felsic and intermediate volcaniclastic sediments and lavas. Metavolcanic rocks of the Mulgathing Complex have potential for this style of mineralisation.

The Mid Proterozoic Gawler Range Volcanics, particularly the Ealbara Rhyolite, contain scattered sulphides and anomalous Cu, Pb and Zn and are also prospective for volcanogenic sulphide deposits.

Archaean? Precambrian Banded Gneissic Rocks

The Rampura - Agucha Pb-Zn deposit in India is an example of base metals within Archaean parametamorphites, migmatite and basic intrusives which have been subjected to polyphase deformation and metamorphism similar to the Mulgathing Complex. Host rocks for Rampura - Agucha include garnet-biotite gneiss, granite gneiss, amphibolites, calc-silicate rocks and pegmatites (Gandhi, 1983).

Nickel-Copper-Iron Sulphide Deposits

Ultramafics in the Yilgarn Block of Western Australia host nickel deposits eg Kambalda, Mt Keith, Widgiemooltha, Redross and Agnew. Mafic and ultramafic(?) rocks have been shown to be far more extensive on the northwest Gawler Craton than previously recognised and the Mt Christie region on the Mulgathing sheet is considered prospective for nickel/copper deposits.

Platinum Group Elements

Komatiite hosted mineralisation, eg Kambalda, may also contain PGE concentrations. Other examples include dunite intrusives at Mt Keith, Agnew and Forrestania. Komatiite with spinifex textures has been intersected in diamond drillholes at Lake Harris and in addition to the nickel, chromium and gold potential the area is considered prospective for PGE's.

Carbonatite Mineralisation

Carbonatite complexes have been found to contain economic deposits enriched in one or more of the following elements: P, Ti, F, Fe, Cu, Zr, Nb, Ba, Th, U and rare earth elements. It is believed that carbonatites normally evolve from immiscible fluids that separate from alkali rich, usually ultrabasic, primary magmas.

The Palabora Carbonatite Complex which intrudes the Archaean of northeastern Transvaal (South Africa) hosts large copper, phosphate and vermiculite deposits with by-product magnetite, Au, Ag, PGE, Zr and U.

At Mt Weld, 250 km northeast of Kalgoorlie, a circular Proterozoic carbonatite has been emplaced into an Archaean greenstone belt in the north-eastern Yilgarn block. This body contains potentially economic phosphate, rare earths, Nb, Ta, Zr and Ti.

In the western half of the TARCOOLA sheet anomalous Nb, Ba, Zr and P may indicate the presence of carbonatites with potential for the discovery of rare earth deposits.

Gold in Archaean Granitoid Intrusives

In Canada magnetic felsic intrusives of Archaean age often host gold deposits. Felsic rocks of the Skirmish Hill and Palgrave volcanic associations in Western Australia host minor gold deposits considered to be of epigenetic origin.

The northwest Gawler Craton and in particular the western part of TARCOOLA and the BARTON and TALLARINGA 1:250 000 map sheets are target areas for this style of mineralisation.

Shear Zone Related Gold Mineralisation

Gold mineralisation in the Canadian Abitibi Greenstone belt is known to be associated with major breaks or corridors or occurs along the corridor border.

Within the Yilgarn Block of Western Australia, particularly the Eastern Goldfields area, gold mineralisation is also associated with major shear zones or cross linking shears in Archaean greenstone belts.

Langsford, (1972) identified anomalous copper in a northeast striking shear zone in the Mt Christie - Coates Hill area of the Mulgathing sheet. Shear zones containing sheared gneiss and basic/ultramafic rocks, metasediments and quartz veins were also identified in the Chilarski Rise area.

Diamonds

Kimberlite fields are commonly believed to lie upon linear or arcuate crustal fracture zones or lineaments which provide channels for the ascent of mantle-derived magmas. Lamproites are emplaced in a variety of tectonic settings but often occur along the margins of cratons. The Argyle and Ellendale lamproites are found in Proterozoic mobile belts surrounding the Archaean Kimberley Craton in Western Australia (Mitchell, 1991).

The northwest Gawler Craton features a number of fracture zones and lineaments, including the Karari Fault, which are considered favourable for the location of kimberlitic/lamprophyric intrusions. To the east on the KINGOONYA 1:250 000 map sheet two microdiamonds have been recovered from loam samples (Cowley and Martin, 1991).

SADME INVESTIGATIONS

Ground Magnetic Surveys

Ground magnetic traverses were carried out, mostly along existing tracks and fencelines. Coverage totalled 668.2 line km in 45 traverses varying in length from 3.0 to 42.0 km. Readings were taken at 25 m intervals using an Overhauser GSM 19 Memory Magnetometer. Most traverses were pegged at 500 m intervals and GPS readings taken to provide location data. Diurnal drift was checked by either repeat readings every hour or by base station monitoring. Ground magnetic traverses are summarised in Appendix 2.

Rotary/RC Drilling

Drilling was mostly by reverse circulation with air and water using 'air core' bits down to hard basement rock. Air only reverse circulation was used ocasionally. Bottom hole diamond coring was carried out in a few holes. Downhole hammering was sometimes necessary to penetrate hard silcrete. RC drilling usually produced substantial rock fragments or 'cores' from the base of the hole and samples from the majority of holes were submitted for petrography.

Holes were drilled along traverses at intervals varying between 2 km and 500 m. Ground magnetic profiles were often used to position drillholes on features of interest. Holes were also drilled on grids at Blackfellow Hill, Aristarchus Rise and Lake Barry to assist the Archaean Metabasic Diamond Drilling Project. Holes drilled on each 1:100 000 map sheet area are summarised below:-

Map Area	Hole Nos.	Metreage
TARCOOLA 1:250 000		
Bulgunnia	BUL 1-81	3 026.3
Carnding	CAR 1-131	4 149.0
Mulgathing	MUL 1-217	6 957.3
BARTON 1:250 000		
Mobella	MOB 1-40	1 646.0
TALLARINGA 1:250 000		
Moonbi	MOO 1-32	1 093.0
TOTALS	501 holes	16 871.6m
	Average depth	33.68 m

Representative logging samples of drill cuttings were collected at 2 m intervals and placed in plastic jars. Bulk samples for geochemical analyses were collected usually wherever holes intersected basement or suspected weathered basement. Intervals for geochemical samples varied according to thickness of basement penetrated and lithology. One sample from the base of each hole was analysed for 28 elements and whole rock silicates. Other samples were analysed for either 9 or 16 elements. Surface soil samples were also taken at each drillsite for comparison with basement geochemistry.

Check analyses of selected anomalous and background samples are detailed in Janz (1992).

Magnetic susceptibility measurements of cuttings were taken at 2 m intervals. Cutting were also scanned with a scintillometer in the field. Where radiometric readings were above background, uphole samples were analysed for U & Th in addition to the bottom hole samples.

Where traverses crossed basement outcrop areas, rock chip sampling was carried out instead of drilling. Rock chip samples were analysed as for the bottom hole samples.

Lithological descriptions, summaries of petrography magnetic susceptibility measurements, geochemical sample intervals and number and selected analytical results are all included on the log sheets in the data package. Rock chip sample descriptions and analyses are also included with the drill logs.

Drillhole numbers, depths and locations are summarised in Appendix 3.

Results - Rotary/RC Drilling

Selected drill intervals with elevated geochemical analyses or other features of interest are summarised below:

Table 1
Northwest Gawler Craton Rotary Drilling

- Selected Anomalous Intervals

Drillhole	Interval (m)	Analyses (ppm except Au Pt Pd ppb)	Rock type
MUL 10	24 - 28	Cu 440 Ni 230 Cr 270	Amphibolite (retrogressed metagabbro)
MUL 13	44 - 48	Ni 1120 Cr 690 As 82	Biotite plagioclase gneiss.
MUL 26	36 - 44	Zn 790 Ni 370	Schistose amphibolite with quartz-carbonate veining & pyrite.
	44 - 50	Zn 320 Ni 360 Au 5	
MUL 41	14 - 22	Zn 370	Metagabbro.
	22 - 30	Zn 290 Co 420 Au 4	
MUL 45	40 - 44	Au 12	Schist with vein quartz
MUL 46	26 - 30	Zn 400 Cu 100 Ni 250	Schistose amphibolite
MUL 47	22 - 24	Au 15	Plagioclase biotite rock with carbonate
MUL 49	42 - 44	Ni 700 Cr 360 Au 3 Pt 5	Weathered schist
MUL 50	20 - 30	Au 700 Cu 115 Zn 155 Ni 175	Weathered quartz-feldspar gneiss (0-40 m) and uralitised, pyroxene-porphyritic microdiorite, gradational to lamprophyre (40-49m)
	30 - 36	Au 70	
	36 - 40	Au 12	
	40 - 44	Au 22 Ni 230 Cr 340	
MUL 66	36 - 40	Au 220	Quartz - amphibole - magnetite-pyroxene gneiss - 'banded iron formation'
	40 - 44	Au 15	
	44 - 47	Au 28	
MUL 68	36 - 40	Au 240 As 68 Ni 280 Zn 180	Garnet gneiss with ferruginous layers - 'banded iron formation'.
MUL 71	34 - 38	Au 8	Gneiss

MUL 75	24 - 28	Ni 430	Zn 220			Biotite-tremolite-talc schist & biotite plagioclase-quartz diorite (36-37m).
	28 - 32	Ni 720	Zn 270	Au 360		
MUL 77	42 - 44	Au 100				Quartz-plagioclase - biotite - sillimanite gneiss
MUL 78	34 - 40	Au 13				Limonitic gneiss and garnetiferous granulite.
MUL 81	2 - 4	Zn 440				Silcrete/ferricrete breccia above weathered gneissic basement
MUL 89	8 - 12	Ni 700				Weathered pyroxenite
	12 - 20	Ni 645				
	20 - 25	Ni 505				
MUL 95	2 - 4	Zn 960				Limonitic clay above mylonitic leucogranite.
MUL 130	Surface	Au 9				Quartz and ironstone on surface
MUL 132	26 - 30	Zn 565	Ni 255			Dk grey-green clay, limonite boxworks weathered basement?
	34 - 36	Zn 515	Pb 390	Ni 265		
	36 - 38	Zn 475	Au 24			
MUL 134	40 - 44	Au 200				Quartz-biotite-garnet-cordierite-sillmanite-plagioclase-orthoclase.
MUL 141	30 - 34	Zn 305	Cu 395			Quartz-biotite-plagioclase-garnet sillimanite gneiss.
MUL 142	36 - 40	Au 7				Limonitic biotite-feldspar-amphibole gneiss.
MUL 151	46 - 48	Au 28				Quartz-mica schist.
MUL 158	34 - 36	Cu 210	Zn 290	Au 3		Mafic bearing quartz-monzonite gneiss.
MUL 161	10 - 11	Ba 8100	Ce 1750			Quartz-syenite gneiss.
MUL 165	46 - 48	Cu 160	Ni 240	Au 15		Brecciated tonalitic augen gneiss.
	50 - 52	Au 10				
MUL 166	76 - 78	Cr 980	Zn 220	Ni 320		Layered tonalite and mica schist.
	82 - 83	Ba 4050	Ce 750			
MUL 169	18 - 20	Cr 3900				
	58 - 66	Cr 998	Zn 240	Ni 613		Biotite schist.
MUL 173	36 - 38	Au 12				Quartz-biotite schist and garnet gneiss.
MUL 177	72 - 78	Cr 1693	Zn 128	Ni 890		Pyroxene glimmerite (lamprophyre)
	72 - 74	Au 8				

MUL 178	44 - 46	Au 20					Cummingtonite-garnet-quartz-magnetite gneiss - 'banded iron formation'.
MUL 182	26 - 28	Zn 210	Ni 250				Mylonitic augen gneiss of biotite -tonalite composition.
	30 - 32	Au 11	Ni 230				
MUL 183	10 - 28	Cr 1150	Ni 283				Biotite-amphibole gneiss.
	28 - 48	Cr 1102	Ni 512	Au 7			
MUL 186	24 - 26	Cr 880	Ni 210				Quartz-feldspar-biotite gneiss and altered fine grained basalt.
MUL 194	34 - 37	Au 17	As 15				Quartz-biotite-garnet gneiss.
MUL 196	20 - 23	Au 12					Quartz-plagioclase-biotite-garnet gneiss.
MUL 197	10 - 18	Ni 340	Cr 1440				Tremolite-phlogopite rock-altered pyroxenite or glimmerite (lamprophyre)
	18 - 20	Ni 930	Cr 1120	As 74			
	20 - 22	Ni 530	Cr 630	As 52	Cu 430	Zn 330	
	28 - 30	Ni 600	Cr 710				
MUL 206	8 - 10	Cu 210	Zn 210	Ni 390	Cr 1380		Mylonitised amphibolite.
	12 - 14	Cu 130	Zn 250	Ni 2650	Cr 490		
	14 - 16	Ni 1080	Cr 690				- Aristarchus Grid
MUL 207	6 - 8	Ni 2200	Cr 370	Cu 105			Feldspathic hornblende harzburgite
	8 - 10	Ni 1540	Au 3	Pt 10	Pd 13		- Aristarchus Grid
MUL 208	4 - 10	Ni 4850	Cr 520				Interlayered altered peridotite & gneiss
	14 - 18	Ni 3750	Cr 400	Zn 190	Au 3		- Aristarchus Grid
	28 - 32	Ni 550	Cr 1040				
	32 - 33	Ni 440	Cr 1000	Ag 48	Cd 26	Au 5	
MUL 211	4 - 8	Pb 270					Granitic gneiss
	8 - 10	Zn 260					- Aristarchus Grid
MUL 217	30 - 36	Ni 680					Mafic gneiss
	42 - 46	Ni 610					
MOO 16	24 - 28	Cu 100	Cr 390	Ni 155	Zn 220		Quartz-feldspar pegmatite
MOO 29	28 - 34	Cu 125	Au 11				Clay above weathered biotite schist
MOB 2	30 - 36	Cu 163	Cr 953	Zn 225	Ni 587		Biotite-feldspar schist
	36 - 40	Au 7					
MOB 7	44 - 48	Pb 145	Au 6				Biotite schist and quartz-plagio-clase-biotite schist with pyrite, marcasite and trace chalcopyrite
	48 - 50	Cu 190					
MOB 8	42 - 44	Zn 210	Au 2				Biotite amphibolite
MOB 16	24 - 28	Au 22					Boulder beds in Permian Boorthanna Fm.

MOB 21	34 - 40	Ni 500	Zn 225			Altered feldspathic biotite pyroxenite
	44 - 49	Ni 240	Au 5	Pt 3.6	Pd 5.0	Albitised, uralitised syenite.
MOB 24	32- 36	Ni 435	Pt 6.4	Pd 4.4		Schistose basic granulite and garnetiferous gneiss
MOB 25	30 - 33	Ni 530	Zn 215	Pt 5.6	Pd 7.9	Quartz-feldspar-biotite protomylonitic gneiss
MOB 26	54 - 58	Ni 315	Au 4	Pt 3.0	Pd 3.1	Brecciated quartz-plagioclase-biotite-garnet gneiss
MOB 32	30 - 32	Ni 1205	Zn 225			Altered metagabbro
	32 - 34	Ni 935	Zn 165	Pt 8.1	Pd 3.1	
MOB 35	28 - 34	Au 9				Quartz-feldspar-garnet granofels with biotite, cordierite? and orthopyroxene
MOB 40	60 - 64	Zn 135	Ni 315	Au 7		Weathered micro-gabbronorite
	68 - 71	Ni 200	Au 23	Pt 3.2	Pd 3.2	
CAR 8	12 - 16	Cu 220	Zn 225			Leuco - adamellite
	16 - 20	Cu 155	Zn 275	Pt 2.9	Pd 2.1	
CAR 11	48 - 50	Au 53				Syenite with quartz, carbonate and limonite veins
CAR 12	18 - 26	Zn 300				Feldspathic pyroxenite
CAR 23	30 - 38	Au 9				Fine grained diorite
CAR 34	52 - 55	Cu 383	Zn 265			Altered gabbro
CAR 39	30 - 36	Cu 910	Zn 555			Diorite, leucocratic granite and pegmatite.
CAR 40	28 - 29	Cu 460	Zn 270			Anorthosite gabbro.
CAR 45	24 - 28	Cu 920	Zn 680			Altered anorthosite.
	28 - 32	Cu 360	Zn 925			
	32 - 36	Cu 560	Zn 410			
CAR 47	54 - 56	Cu 770	Zn 470			Granodiorite with altered mafic patches.
CAR 48	12 - 16	Cu 2935	Zn 1660			V. weathered biotite-hornblende granodiorite with altered mafic patches.
CAR 49	16 - 18	Cu 1545	Zn 830			Mafic quartz monzonite.
	22 - 26	Cu 1390	Zn 850			
	46 - 48	Cu 1100	Zn 645	Au 6		
CAR 52	24 - 28	Cu 665	Zn 415			Weathered ferruginous granite.
CAR 59	16 - 22	Cu 1585	Zn 930			V. weathered altered tremolite rich pyroxenite?

CAR 62	14 - 20 40 - 41	Cu 860 Zn 165	Zn 485 Ni 450	Pb 75	Au 2.0	Pt 3.6 Pd 2.5		Chlorite-carbonate-albite schist derived from basalt or dolerite.
CAR 64	24 - 26	Ni 545	Au 2.00	Pt 2.79	Pd 3.3			Quartz - plagioclase - biotite - gneiss or foliated quartz diorite.
CAR 67	18 - 22	Cu 125	Zn 425					Altered anorthosite.
CAR 68	12 - 16	Ce 400	La 163	Nb 85				Quartz syenite with calcsilicate patches.
CAR 69	2 - 24							Dolomite-phlogopite-microcline-tremolite carbonatite? and granitic rock intermixed.
CAR 75	0 - 14 14 - 16	Cu 215 Cu 140	Zn 191 Ni 300	Ni 1030 Pt 4.47	Cr 745 Pd 2.6			Altered anorthosite
CAR 76	18 - 20	Cu 2445	Zn 1510					Foliated tonalite
CAR 78	34 - 35	Cu 180	Zn 190	Au 3	Pt 3.5	Pd 6.5		Hematitic porphyritic microgranite.
CAR 79	36 - 37	Cu 2400	Zn 1435					Hematitic, brecciated granodiorite.
CAR 80	18 - 22	Cu 430	Zn 255					Hematitic adamellite and weathered basalt dyke?
CAR 82	16 - 20	Cu 950	Zn 512					Quartz syenite
CAR 84	22 - 24	Zn 225	Au 53					Altered pegmatite with basic dyke.
CAR 86	50 - 54	Cu 2035	Zn 1300					Altered pegmatite.
CAR 94	30 - 32	Cu 915	Zn 510					Acid volcanic
CAR 98	44 - 46	Pb 135	Au 3					Granite with limonite and pyrite in fractures.
CAR 99	4 - 8 8 - 10 10 - 12	Pb 110 Zn 230 Au 4	As 10					Brecciated, hematitic granite.
CAR 107	8 - 9	Au 7	Pb 100					Hematitic, porphyritic microgranite.
CAR 110	2 - 6	As 17	Au 4					Hematitic rhyolite.
CAR 116	8 - 14 14 - 20 26 - 32 32 - 36	As 630 As 270 As 68 Au 8	Pb 165					Silicified, brecciated, sericitised granite.
CAR 119	24 - 30 38 - 44	Ni 340 Ni 305	Cu 270	Au 5	Pt 5.1			Meta-pyroxenite. Lake Barry grid
CAR 120	24 - 30	Ni 365						Albitised syenite.

	34 - 38	Ni 285	Au 4	Pt 6	Pd 6			Lake Barry grid
CAR 121	8 - 14	Ni 765						Hornblende microgranodiorite.
	20 - 24	Ni 645						Lake Barry grid
CAR 122	2 - 6	Ni 765						Meta-pyroxenite with
	36 - 40	Pt 6.2	Pd 3.1					feldspar-pyrite veining.
	50 - 54	Pt 5.6	Pd 7.2					Lake Barry grid
CAR 126	22 - 26	Ni 670	Zn 135					Anorthosite
	34 - 36	Ni 200	Au 4	Pt 3.8				Lake Barry grid
BUL 13	60 - 62	Zn 250						Granite
BUL 14	32 - 38	Cu 180	Zn 440					Amphibolite (metamorphosed quartz
	38 - 42	Zn 310						dolerite).
BUL 16	Surface	As 14	Au 10	V 320				Ironstone gravel
BUL 22	34 - 35	Pb 620						Rhyolite
BUL 31	50 - 54	Cr 130	Ni 130	Zn 145	As 38	Au 4		Basaltic andesitic tuff.
BUL 41	64 - 74	Cu 285	Zn 380	Ni 170				Weathered mafic? rock
	74 - 79	Cu 220	Zn 195	Pt 4.3	Pd 2.1			
BUL 48	48 - 53	Cu 100	Pb 980	Zn 785				Yellow & green clay-weathered basement?
BUL 49	60 - 62	Zn 185	Au 12	Ni 130				Pyritic porphyritic rhyolite and
	62 - 66	Zn 335	Au 8	Ni 155	Pb 135			altered, pyritic volcanic rock.
	66 - 74	Zn 260	Au 6	Pb 220				
BUL 50	54 - 56	Cu 155	Zn 155					Trachyte
BUL 52	44 - 48	Zn 255	Cu 100					Altered trachytic tuff with minor pyrite.
BUL 59	4 - 6	Cu 320	Zn 175					Rhyolite.
BUL 68	12 - 14	Au 23						Clay over uralitised anorthositic gabbro.
BUL 72	12 - 16	Pb 230	Zn 105					Metagabbro.
	16 - 22	Pb 270	Zn 280					
	28 - 29	Zn 800						
BUL 73	22 - 26	Zn 340	Ni 965					Altered quartz diorite.
BUL 75	32 - 34	Zn 470						Brecciated graphitic pegmatite.
BUL 77	36 - 38	Au 9	Zn 300					Unmetamorphosed limestone.
BUL 78	28 - 31	Au 13						Limonitic quartzose grit.
BUL 79	26 - 30	Au 57	Zn 245					Clay, limestone, chert.
BUL 80	62 - 68	Zn 655	Ni 315					Clay above quartz sericite schist.

DISCUSSION

Highest gold value obtained in the program was 700 ppb Au in the 20-30m interval in hole MUL 50 at Woomera Tank. Host rock is Mulgathing Complex weathered ferruginous quartz-feldspar gneiss bordering pyroxene porphyritic microdiorite, gradational to lamprophyre. Other elevated values were obtained in both rock types.

As a follow up, splits from the logging samples taken at 2m intervals from MUL 50 were also analysed. These results are in Appendix 1. The presence of a substantial gold anomaly was confirmed with the 24-26m interval returning 1.18 ppm Au although the average for the 20-30m interval was lower at 282 ppb.

An association of elevated gold values with Mulgathing Complex paragneisses and particularly 'banded iron formation' is apparent. Anomalous Au values occur in gneissic banded magnetite rich rocks in holes MUL 66 (Au 220 ppb), 68 (240 ppb) and 178 (20 ppb). Holes MUL 134 (200 ppb), 151 (28 ppb), 173 (12 ppb) and 194 (17 ppb) are in paragneiss and schist close to 'banded iron formation'. Other holes with anomalous gold in paragneiss, schist and orthogneiss include MUL 75 (360 ppb), 77 (100 ppb), 165 (15 ppb) and CAR 11 (53 ppb).

There is a concentration of holes with anomalous Au values (MUL 50, 66, 68, 71, 75, 77, 78, 132, 134) in the Woomera Tank to West Well area on Mulgathing, particularly in and near 'banded iron formation' rocks. This area was also identified by Youles (1991) as prospective for gold and base metals.

Mulgathing Complex rocks produced elevated Ni, Cr, sometimes with anomalous Pt and Pd in mafic rocks and gneisses (eg MUL 10, 13, 49, 89, 132, 169, 183, MOB 21, 24). Anomalous Cu and Zn values also occur in mafic (metavolcanic?) and other rock types (eg MUL 26, 41, 46, 95, 141, CAR 8) suggesting the possibility of volcanogenic mineralisation. Holes MUL 177, 197 have high Ni, Cr, Zn, Cu, As values in pyroxene glimmerite, a member of the lamprophyre clan.

Highest Cu and Zn values in the program were obtained in the centre of the Carnding sheet. Maximum values were 2935 ppm Cu and 1660 ppm Zn in mafic rich granodiorite in CAR 48. Many holes returned values in the 200-2000 ppm Cu and Zn range (eg CAR 34, 39, 40, 45, 47, 49, 52, 59, 62, 64, 67, 75, and 76). Anomalous holes occur across a large area from Honeysuckle Bore in the northwest to Bradman Outstation and east of Pegler Bore and south of Lake Barry. Host rocks are Early Proterozoic(?) acid and intermediate to basic intrusives tentatively assigned to the Muckanippie anorthosite complex (previously the Muckanippie Diorite). Lithologies containing anomalous values include anorthosite, diorite, gabbro, pyroxenite, mafic rich granodiorite and quartz monzonite, granite and tonalite. Localities near Honeysuckle Bore (the 'Muckanippie' anomaly) and east of Pegler Bore were also identified by Youles as features of interest on regional gravity and magnetics.

Holes CAR 78, 79, 80 and 94 around Butler Well and CAR 82 and 86 east of Snake Rocks Bore also contained anomalous Cu and Zn with similar metal ratios to the values in the anorthosite complex (eg. CAR 79-Cu 2400 ppm, Zn 1435 ppm; CAR 86-Cu 2035 ppm, Zn 1300 ppm). Host lithologies here are granite, granodiorite, pegmatite and syenite thought to be part of the Mid Proterozoic Hiltaba Suite. Many of the rocks in holes in these areas are characterized by brick red colouration due to fine hematite content. Hiltaba Suite granitic rocks also intrude the anorthosite complex to the north and there may be confusion between these and some of the more acid lithologies of the complex.

Hole CAR 68, east of Satisfaction Bore, contained anomalous Ce, La and Nb values in quartz-syenite with calc-silicate patches. These elements are known to be enriched in some carbonatites. CAR 69, the next hole to the east, intersected dolomite-phlogopite-microcline-tremolite rock, possibly a carbonatite, intermixed with granitic rock. The association of these two holes suggests the presence of a significant carbonatite intrusive body or bodies in this area.

CAR 84 near Dorothy Well contained 53 ppb Au in very weathered pegmatite cut by a possible basic dyke. CAR 116 near Neills Bore contained anomalous As (max 630 ppm) in a silicified, brecciated, sericitised granite.

On the Bulgunnia sheet anomalous Pb (maximum 980 ppm). Zn (785 ppm) Cu (155 ppm) and Au (12 ppb) occur in holes BUL 48, 49, 50 and 52 sited on a magnetic high south-southeast of Birthday Quarry close to the major Bulgunnia Fault Zone. This anomaly and a nearby gravity high were

suggested as targets by Youles. Host rocks are pyritic and ferruginous rhyolite, trachyte and trachytic tuff of the Gawler Range Volcanics.

Gawler Range Volcanic rhyolite also hosts anomalous metal values in BUL 22 (620 ppm Pb) and BUL 59 (320 ppm Cu, 175 ppm Zn).

Holes BUL 68-73 along the Tarcoola-Alice Springs Railway near Carnes Siding intersected basic rocks - gabbro, anorthositic gabbro and diorite-tonalite which may be part of the Muckanippie complex. As on Carnding the basic rocks are interspersed with granite and pegmatite. Some of these holes returned anomalous metal values although of a different nature to the Cu-Zn anomalism on Carnding. BUL 68 contained 23 ppb Au, BUL 72 800 ppm Zn and 270 ppm Pb and BUL 73 340 ppm Zn and 965 ppm Ni.

Several holes near the Bulgunnia Fault zone intersected porphyritic rocks possibly subvolcanic equivalents of the Gawler Range Volcanics (eg. BUL 56, 57, 37, 11, 12).

A series of holes south of Johns Outstation and near Giffen Well found intermediate to basic rocks with similarities to some lithologies in the Muckanippie anorthosite complex BUL 32, 33 and BUL 9 intersected monzodiorite and quartz monzodiorite adjacent to banded iron formation of the Wilgena Hill Jaspilite (?Hutchison Group). BUL 14 and 15 intersected amphibolite (metamorphosed quartz dolerite) and altered biotite-pyroxene syenite respectively. BUL 14 showed anomalous Cu (180 ppm) and Zn (440 ppm).

As well as BUL 7 and 34 which intersected Wilgena Hill Jaspilite banded iron formation, possible Hutchison Group metasediments were found in BUL 80 (quartz sericite schist 665 ppm Zn, 315 ppm Ni) and BUL 81 (micaceous quartzite) defining a zone of (?)Hutchison Group rocks approximately parallel to the Bulgunnia Fault Zone.

BUL 79 contained 57 ppb Au and 470 ppm Zn in a cherty, limonitic limestone of uncertain age. Hole BUL 50 intersected a possible horneblende-plagioclase lamprophyre (spessartite).

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APPENDIX I

MUL 50 - RESAMPLING AND ANALYSIS

Sample No 5637 RS...	Sample Interval (m)	Cu ppm	Pb ppm	Zn ppm	Au ppb	As ppm	Fe %	Ni ppm	Pt ppb	Pd ppb
1556	0-2	15	10	15	7	12	0.49	15	1	1
1557	2-4	<5	10	90	3	6	0.35	10	<1	<1
1558	4-6	5	10	20	2	7	0.28	10	<1	1
1559	6-8	160	15	60	3	19	4.38	60	1	1
1560	8-10	115	5	260	2	11	2.90	45	<1	1
1561	10-12	165	5	40	2	11	2.94	30	1	1
1562	12-14	40	5	30	2	7	1.59	15	1	1
1563	14-16	35	5	60	2	6	2.26	20	1	1
1564	16-18	100	10	95	2	13	4.55	45	4	4
1565	18-20	65	10	50	2	9	2.88	30	3	2
1566	20-22	75	20	115	1	8	3.69	50	3	1
1567	22-24	120	5	130	1	9	3.95	115	2	1
1568	24-26	200	5	165	1180	10	5.71	210	4	13
1569	26-28	90	5	125	220	8	3.48	175	1	4
1570	28-30	70	5	115	10	7	3.41	220	2	2
1571	30-32	55	10	75	3	7	3.49	90	1	<1
1572	32-34	60	10	120	320	8	3.29	95	<1	2
1573	34-36	50	10	65	13	7	2.89	70	1	1
1574	36-38	35	10	50	6	8	2.25	55	1	<1
1575	38-40	40	10	60	11	8	2.51	85	1	<1
1576	40-42	100	20	125	9	15	5.15	220	4	5
1577	42-44	70	20	120	8	15	4.96	310	3	4
1578	44-46	50	10	100	3	19	5.34	320	4	4
1579	46-48	55	10	100	2	16	4.91	270	4	3
1580	48-50	50	20	95	4	15	3.04	220	4	3

MUL 50 Log and original analyses - Next Page

HOLE NO: MUL 50

100 000 SHEET NO: 5637

TRAVERSE: Woomera Tank to West Well 666 9 N STATION: 26 875 m W

LOCATION: (AMG)
363 900 mE
6 667 000 mN

DATE DRILLED: 8/8/91

DRILLING METHOD: RC with water

LOGGED BY: RSR

TOTAL DEPTH: 49 m

Depth Interval (m)	Description	MS	Sample Interval (m)	Sample No-RS	Selected Analyses (ppm except Au, Pt ppb) Cu / Cr	Pb / Ba	Zn / Nb	Ni / As	Au / Pt
	Surface - f.g. sandy silt with calcrete float			660					
0-2	As above & grey feldspathic quartzite - silicified	.10	0-8,R	661	34 / 42	10 / -	30 / -	16 / <3	4 / -
2-4	White clay with qutz. & weath. fspar.	.06							
4-6		.04							
6-8	Off white weath. qutz. fspar. rock	.07							
8-10	Brown clay/silt, qutz., yellow-brown & red-brown ferruginous silcrete	.10	8-20,R	662	80 / 80	10 / -	65 / -	22 / 4	1 / -
10-12		.10							
12-14	Qtz fragments & r.b. silic ferrug.gneiss	.09							
14-16		.10							
16-18	Brown clay with m. to c.g. qtz	.13							
18-20		.10							
20-22	Brown clay & weath ferrug. qutz. fspar gneiss	.09	20-30,R	663	115 / 175	15 / -	155 / -	175 / <3	700 / - -
22-24		.14							
24-26		.16							
26-28		.13							
28-30	Brown qtz fspar gneiss, schist & green nontronite.	.13							
30-32	Brown qtz., weath. fspar, mica, chlorite?	.10	30-36,R	664	64 / 100	10 / -	100 / -	94 / <3	70 / - -
32-34		.12							
34-36	Greenish, poorly banded qutz-fspar. gneiss with some chlorite?	.10	36-40,R	665	38 / 72	10 / -	68 / -	78 / 4	12 / - -
36-38	As above								
38-40	Pet. description:- retrogressed quartzofeldspathic gneiss with altered biotite and probable sphene. Semipeltic.	.09	38-40,P	1802					
40-42	Dark green mafic rock with white fspar phenocrysts	.19	40-44,W	666	78 / 340	20 / 1040	115 / 5	230 / 6	22 / <5
42-44		.30							
44-46	Dark green mafic rock	.33	44-46,R	667	45 / 520	15 / -	66 / -	240 / 5	2 / - -
46-48	As above with f.g. mica	.27	46-49,R	668	54 / 420	20 / -	74 / -	190 / 7	3 / - -
48-49	As above Pet. description:- uralitised, pyroxene-porphyritic micro-diorite, gradational to lamprophyric rock. EOH 49 m.	.22	48-49,P	1801					

G03418.RSR

See next page for summary log

Summary Depth to basement 1m

0-1	Q	Sandy silt
1-40	APm	Quartz feldspar gneiss - weathered
40-49	APmβ	Pyroxene - porphyritic microdiorite - partly weathered (gradational to lamprophyre).

APPENDIX 2
GROUND MAGNETIC TRAVERSE SUMMARY

SHEET NAME - NO.	LINE NO.	INTERVAL (M)		TOTAL LENGTH (Km)
MOONBI - 5538	3077 E	5 500 N	- 10 000 N	4.50
	3220 E	00 N	- 28 000 N	28.00
	3320 E	3 000 N	- 45 000 N	42.00
				74.50
MOBELLA - 5537	6760 N	00 E	- 13 000 E	
		25 000 E	- 36 000 E	24.00
	6580 N	00 E	- 18 200 E	18.20
	6450 N	19 050 W	- 00 E	
		00 E	- 6 975 E	26.025
				68.225
MULGATHING - 5637				
	6669 N	28 000 W	- 10 000 W	18.00
	6639 N	14 800 W	- 00 E	
		00 E	- 14 100 E	28.90
	6790 N	00 E	- 11 100 E	11.10
	6740 N	00 E	- 10 000 E	10.00
	6600 N	00 E	- 6 150 E	6.15
	6545 N	00 E	- 15 200 E	15.20
	6530 N	00 E	- 33 000 E	33.00
	6460 N	00 E	- 3 000 E	3.00
	6420 N	00 E	- 22 000 E	22.00
	6440 N	00 E	- 3 625 E	3.625
	6370 N	00 E	- 12 200 E	12.20
	6300 N	00 E	- 24 350 E	24.35
	3800 E	00 E	- 9 000 E	9.00
	3790 E	00 E	- 9 675 E	9.675
	3973 E	00 E	- 9 500 E	9.50
	3710 E	00 E	- 12 450 E	12.45
	40 30 E	1 000 E	- 8 500 E	7.50
				235.65

CARNDING -5737	6725 N	500 E	- 7 000 E	6.50
	6670 N	0 E	- 7 700 E	7.70
	6620 N	600 E	- 8 000 E	7.40
	6540 N	00 E	- 12 000 E	12.00
	6485 N	00 E	- 41 650 E	41.65
	6430 N	00 E	- 7 800 E	7.80
	6415 N	00 E	- 20 000 E	20.00
	6305 N	00 E	- 12 850 E	12.85
	6550 N	00 E	- 11 000 E	11.00
	4220 E	23 500 S	- 00 N	
		00 N	- 5 000 N	28.50
	4335 E	00 N	- 23 000 N	23.00
	4328 E	1 000 N	- 4 000 N	3.00
	4380 E	1 000 N	- 5 200 N	4.20
	4040 E	00 N	- 7 000 N	7.00
	4360 E	00 N	- 17 000 N	17.00
				209.60
BULGUNNIA - 5837	4542 E	00 N	- 30 000 N	30.00
	4570 E	00 N	- 6 300 N	6.30
	4642 E	6 000 S	- 00 N	
		00 N	- 2 500 N	8.50
	4716 E	6 450 N	- 14 000 N	7.55
	4810 E	00 N	- 17 200 N	17.20
	4820 E	00 N	- 5 000 N	5.00
	6385 N	375 E	- 6 000 E	5.625
				80.175
			GRAND TOTAL	668.15

APPENDIX 3

Drillhole Summary

NORTHWEST GAWLER CRATON DRILLHOLE LOCATIONS

HOLE NO	LINE	INTERVAL	DEPTH	LATITUDE	LONGITUDE	EASTING	NORTHING	ZONE
CAR 1	4040E	250N	38.0	30 19 01.92	134 01 12.36	405 790.31	6 645 647.162	53
CAR 2		1000N	28.0	30 18 39.00	134 01 02.76	405 527.81	6 646 350.511	53
CAR 3		2000N	19.0	30 18 37.92	134 01 02.70	405 525.92	6 646 383.744	53
CAR 4		3300N	42.0	30 17 29.74	134 00 30.59	404 650.00	6 648 475.000	53
CAR 5		5500N	7.0	30 16 20.52	134 00 01.02	403 841.26	6 650 599.057	53
CAR 6	6620N	500E	40.0	30 09 53.46	134 02 38.94	407 960.77	6 662 550.342	53
CAR 7		1500E	36.0	30 09 56.46	134 03 12.06	408 847.45	6 662 465.384	53
CAR 8		2700E	21.0	30 09 58.08	134 03 57.60	410 065.97	6 662 425.562	53
CAR 9		5000E	30.0	30 10 01.98	134 05 21.66	412 315.38	6 662 323.699	53
CAR 10		6000E	44.0	30 10 02.10	134 05 57.42	413 271.91	6 662 327.604	53
CAR 11		5500E	50.0	30 10 02.40	134 05 39.54	412 793.73	6 662 314.580	53
CAR 12		4500E	28.0	30 10 02.28	134 05 04.38	411 853.25	6 662 310.762	53
CAR 13		6500E	40.0	30 10 00.00	134 06 13.80	413 709.53	6 662 395.700	53
CAR 14		7500E	40.0	30 10 05.16	134 06 49.02	414 652.82	6 662 244.226	53
CAR 15			17.0	30 10 45.42	134 06 26.12	414 050.00	6 661 000.000	53
CAR 16	6550N	250E	19.0	30 13 56.58	134 06 33.00	414 280.05	6 655 117.101	53
CAR 17		800E	2.0	30 13 54.54	134 06 54.54	414 855.32	6 655 184.391	53
CAR 18		2000E	22.0	30 13 53.64	134 07 20.52	415 549.56	6 655 217.474	53
CAR 19		2500E	8.0	30 13 57.60	134 07 49.20	416 317.12	6 655 101.459	53
CAR 20		3500E	35.0	30 13 46.32	134 08 35.52	417 552.63	6 655 458.084	53
CAR 21		4300E	30.0	30 13 45.30	134 09 06.24	418 373.57	6 655 495.635	53
CAR 22		5500E	44.0	30 13 40.68	134 09 49.26	419 522.48	6 655 646.363	53
CAR 23		6500E	41.0	30 13 38.34	134 10 27.24	420 537.20	6 655 725.809	53
CAR 24		7500E	31.0	30 13 35.28	134 11 04.68	421 537.34	6 655 827.221	53
CAR 25		9000E	28.0	30 13 35.82	134 11 04.26	421 526.23	6 655 810.517	53
CAR 26		10000E	26.0	30 13 32.46	134 12 36.48	423 990.68	6 655 931.334	53
CAR 27		11000E	37.0	30 13 32.46	134 13 15.00	425 020.38	6 655 938.432	53
CAR 28		12000E	28.0	30 13 33.92	134 14 51.64	426 000.00	6 655 900.000	53
CAR 29		13000E	22.0	30 13 27.84	134 14 26.76	426 937.68	6 656 093.612	53
CAR 30	4220E	5000N	62.0	30 06 18.00	134 11 14.64	421 707.65	6 669 289.678	53
CAR 31		4250N	54.0	30 06 18.84	134 11 14.88	421 714.26	6 669 263.866	53
CAR 32		3000N	35.0	30 07 22.20	134 11 16.20	421 763.46	6 667 313.756	53
CAR 33		2200N	67.0	30 07 22.80	134 11 15.60	421 747.53	6 667 295.173	53
CAR 34		1500N	55.0	30 08 12.60	134 11 17.34	421 805.00	6 665 762.546	53
CAR 35		1000N	53.0	30 08 28.32	134 11 18.30	421 834.13	6 665 278.830	53
CAR 36		20N	55.0	30 09 00.06	134 11 18.12	421 836.26	6 664 301.764	53
CAR 37		1000S	80.0	30 09 34.86	134 11 19.02	421 867.96	6 663 230.708	53
CAR 38		1950S	52.0	30 10 05.52	134 11 19.62	421 890.72	6 662 287.032	53
CAR 39		2500S	79.0	30 10 22.98	134 11 20.34	421 913.81	6 661 749.707	53
CAR 40		3500S	29.0	30 10 56.04	134 11 21.72	421 957.95	6 660 732.300	53
CAR 41		5000S	39.0	30 11 43.86	134 11 21.60	421 965.22	6 659 260.255	53
CAR 42		5500S	23.0	30 12 00.66	134 11 21.48	421 965.69	6 658 743.085	53
CAR 43		6500S	25.0	30 12 33.66	134 11 23.64	422 030.67	6 657 727.669	53
CAR 44		7500S	31.0	30 13 05.34	134 11 23.22	422 026.38	6 656 752.394	53
CAR 45		8250S	50.0	30 13 31.14	134 11 23.58	422 041.66	6 655 958.269	53
CAR 46	4335E	23000N	74.0	30 07 36.00	134 17 03.60	431 062.29	6 666 951.172	53
CAR 47		21350N	56.0	30 08 25.14	134 16 40.50	430 453.75	6 665 434.652	53
CAR 48		20800N	37.0	30 08 43.02	134 16 33.90	430 280.66	6 664 883.151	53
CAR 49		20100N	50.0	30 09 03.54	134 16 25.26	430 053.53	6 664 250.034	53
CAR 50		18000N	42.0	30 10 10.14	134 16 18.66	429 890.06	6 662 198.818	53
CAR 51		15950N	16.0	30 11 16.44	134 16 40.98	430 499.98	6 660 161.756	53
CAR 52	4328E	3600N	43.0	30 10 34.44	134 18 07.38	432 802.53	6 661 469.002	53

CAR 53		3200N	33.0	30 10 43.62	134 18 05.94	432 765.74	6 661 186.186	53
CAR 54		2800N	22.0	30 10 57.84	134 18 04.98	432 742.75	6 660 748.307	53
CAR 55		2150N	17.0	30 11 19.56	134 18 03.30	432 701.93	6 660 079.443	53
CAR 56		1850N	11.0	30 11 30.84	134 18 03.42	432 707.27	6 659 732.240	53
CAR 57		1150N	47.0	30 11 51.90	134 17 58.02	432 566.86	6 659 083.080	53
CAR 58	4335E	13000N	34.0	30 12 53.04	134 17 00.54	431 041.75	6 657 191.490	53
CAR 59	4380E	4900N	50.0	30 10 51.78	134 21 27.06	438 145.89	6 660 966.645	53
CAR 60		4000N	59.0	30 11 19.14	134 21 25.50	438 108.92	6 660 124.215	53
CAR 61		3000N	39.0	30 11 51.42	134 21 23.70	438 066.40	6 659 130.300	53
CAR 62		2300N	41.0	30 12 15.54	134 21 26.40	438 142.78	6 658 388.245	53
CAR 63		1850N	28.0	30 12 29.16	134 21 23.10	438 056.92	6 657 968.495	53
CAR 64		1100N	26.0	30 12 52.92	134 21 16.14	437 874.99	6 657 236.059	53
CAR 65	4335E	11000N	26.0	30 13 57.78	134 17 03.78	431 140.90	6 655 199.183	53
CAR 66	6540N	0E	16.0	30 14 27.90	134 14 03.30	426 323.00	6 654 240.608	53
CAR 67		1000E	29.0	30 14 38.76	134 14 39.96	427 305.04	6 653 912.861	53
CAR 68		2000E	16.0	30 14 49.38	134 15 14.82	428 238.87	6 653 592.099	53
CAR 69		3000E	24.0	30 14 57.42	134 15 52.92	429 258.71	6 653 351.238	53
CAR 70		4000E	12.0	30 15 03.72	134 16 29.40	430 234.88	6 653 163.567	53
CAR 71		5000E	9.0	30 15 09.48	134 17 01.32	431 089.04	6 652 991.666	53
CAR 72		7100E	5.0	30 15 20.70	134 18 19.08	433 169.21	6 652 659.179	53
CAR 73	4335E	6500N	10.0	30 16 22.86	134 17 13.14	431 419.09	6 650 734.828	53
CAR 74		5750N	24.0	30 16 49.14	134 17 14.40	431 457.82	6 649 926.072	53
CAR 75		5080N	16.0	30 17 06.18	134 17 23.34	431 699.95	6 649 403.031	53
CAR 76		4500N	20.0	30 17 22.14	134 17 32.82	431 956.27	6 648 913.321	53
CAR 77		3500N	29.0	30 17 49.44	134 17 52.86	432 496.81	6 648 076.276	53
CAR 78		2900N	35.0	30 17 07.42	134 18 05.95	432 850.00	6 647 525.000	53
CAR 79		2500N	37.0	30 18 17.58	134 18 12.00	433 013.39	6 647 213.199	53
CAR 80		1500N	23.0	30 18 47.88	134 18 20.58	433 248.27	6 646 281.887	53
CAR 81		500N	70.0	30 19 19.32	134 18 26.52	433 412.82	6 645 315.047	53
CAR 82	6485N	1900E	20.0	30 18 13.26	134 05 56.28	413 361.15	6 647 207.920	53
CAR 83		4000E	27.0	30 18 37.08	134 07 07.68	415 273.99	6 646 489.628	53
CAR 84		6000E	47.0	30 18 40.74	134 08 24.84	417 335.71	6 646 392.764	53
CAR 85		8000E	32.0	30 18 29.28	134 09 39.66	419 331.43	6 646 760.492	53
CAR 86		10000E	56.0	30 18 50.04	134 10 42.18	421 005.93	6 646 133.646	53
CAR 87		12000E	22.0	30 19 52.44	134 11 05.76	421 649.49	6 644 217.316	53
CAR 88		13475E	26.0	30 20 32.88	134 11 27.18	422 230.35	6 642 976.536	53
CAR 89		14025E	14.0	30 20 35.70	134 11 46.74	422 753.22	6 642 893.441	53
CAR 90		16000E	32.0	30 20 28.26	134 13 03.06	424 789.36	6 643 136.718	53
CAR 91		17000E	64.0	30 20 22.14	134 13 35.28	425 648.36	6 643 331.012	53
CAR 92		19000E	78.0	30 20 11.16	134 14 51.96	427 693.52	6 643 682.780	53
CAR 93		21025E	49.0	30 20 05.58	134 16 02.28	429 570.05	6 643 866.839	53
CAR 94		22970E	32.0	30 20 03.60	134 17 16.26	431 545.07	6 643 940.369	53
CAR 95		26000E	7.0	30 19 15.84	134 19 13.44	434 665.18	6 645 429.747	53
CAR 96		27300E	2.0	30 00 00.00	134 00 00.00	403 549.50	6 680 782.279	53
CAR 97	4360E	6500N	9.0	30 26 36.00	134 19 58.56	435 949.91	6 631 887.469	53
CAR 98		7400N	46.0	30 24 06.00	134 20 00.12	435 964.32	6 636 505.186	53
CAR 99		8700N	13.0	30 23 23.82	134 20 04.86	436 083.17	6 637 804.357	53
CAR 100		9500N	5.0	30 23 00.18	134 20 08.28	436 170.17	6 638 532.603	53
CAR 101		10500N	40.0	30 22 27.18	134 20 12.84	436 285.92	6 639 549.152	53
CAR 102		11500N	2.0	30 21 57.84	134 20 28.86	436 708.26	6 640 454.816	53
CAR 103		12500N	18.0	30 21 26.52	134 20 46.56	437 175.17	6 641 421.669	53
CAR 104		13500N	19.0	30 20 58.44	134 21 03.24	437 615.50	6 642 288.608	53
CAR 105		14500N	22.0	30 20 36.24	134 21 29.82	438 321.25	6 642 976.024	53
CAR 106		15500N	11.0	30 20 05.94	134 21 15.00	437 920.26	6 643 906.493	53
CAR 107	6485N	30000E	9.0	30 19 16.74	134 21 15.30	437 919.65	6 645 421.045	53
CAR 108		30500E	18.0	30 19 00.06	134 21 18.48	438 001.66	6 645 934.981	53
CAR 109		31000E	31.0	30 18 46.08	134 21 29.76	438 300.47	6 646 367.029	53
CAR 110		31500E	14.0	30 18 37.50	134 21 45.96	438 731.65	6 646 633.581	53

CAR 111		32000E	3.0	30	18	24.48	134	21	58.86	439 073.95	6 647 036.298	53
CAR 112		33000E	5.0	30	17	58.68	134	22	18.66	439 598.40	6 647 833.424	53
CAR 113		35500E	4.0	30	17	27.96	134	23	37.62	441 702.45	6 648 790.521	53
CAR 114		37500E	15.0	30	16	41.52	134	24	26.94	443 012.50	6 650 227.003	53
CAR 115		38500E	15.0	30	16	17.76	134	24	52.02	443 678.79	6 650 961.862	53
CAR 116		39500E	37.0	30	15	52.56	134	25	13.74	444 255.16	6 651 740.547	53
CAR 117		40500E	52.0	30	15	22.50	134	25	24.60	444 540.65	6 652 667.333	53
CAR 118	10150E	10950N	26.0	30	16	23.71	134	16	22.34	430 062.00	6 650 700.000	53
CAR 119	10820E	10850N	50.0	30	16	27.00	134	16	47.51	430 735.00	6 650 603.000	53
CAR 120	10750E	10660N	38.0	30	16	33.42	134	16	44.73	430 662.00	6 650 405.000	53
CAR 121	10750E	10580N	55.0	30	16	35.69	134	16	44.71	430 662.00	6 650 335.000	53
CAR 122	10700E	10500N	59.0	30	16	38.35	134	16	42.89	430 613.79	6 650 252.904	53
CAR 123	10500E	10500N	43.0	30	16	38.35	134	16	35.40	430 413.83	6 650 251.628	53
CAR 124	10320E	10692N	50.0	30	16	32.19	134	16	28.79	430 236.00	6 650 440.000	53
CAR 125	10500E	10300N	14.0	30	16	44.85	134	16	35.40	430 415.10	6 650 051.640	53
CAR 126	10650E	10350N	36.0	30	16	43.21	134	16	41.03	430 565.00	6 650 103.000	53
CAR 127	6430N	2000E	6.0	30	20	40.44	134	22	47.22	440 388.48	6 642 858.234	53
CAR 128		4000E	41.0	30	20	36.96	134	24	06.18	442 496.05	6 642 976.682	53
CAR 129		5000E	43.0	30	20	37.92	134	24	47.94	443 611.16	6 642 952.956	53
CAR 130		6400E	15.0	30	20	37.44	134	25	41.82	445 049.62	6 642 975.078	53
CAR 131		7500E	9.0	30	20	37.74	134	26	29.22	446 315.20	6 642 972.150	53
TOTAL			4149.0									
BUL 1	4810E	17000N	37.0	30	16	02.04	134	43	32.82	473 623.44	6 651 559.012	53
BUL 2		15800N	53.0	30	16	24.36	134	44	07.08	474 540.44	6 650 874.137	53
BUL 3		14700N	59.0	30	16	36.84	134	44	43.50	475 514.35	6 650 492.206	53
BUL 4		13530N	53.0	30	17	02.40	134	45	04.80	476 085.14	6 649 706.688	53
BUL 5		12500N	23.0	30	17	29.10	134	45	24.60	476 615.84	6 648 885.964	53
BUL 6		11500N	16.0	30	17	54.90	134	45	43.74	477 128.79	6 648 092.880	53
BUL 7		10800N	10.3	30	18	10.44	134	46	03.60	477 660.24	6 647 615.631	53
BUL 8		11000N	19.0	30	18	06.12	134	45	56.64	477 474.07	6 647 748.226	53
BUL 9		10500N	50.0	30	18	13.56	134	46	11.52	477 871.97	6 647 520.023	53
BUL 10		10000N	41.0	30	18	18.48	134	46	26.94	478 284.13	6 647 369.404	53
BUL 11		9700N	40.0	30	18	24.48	134	46	38.34	478 588.98	6 647 185.315	53
BUL 12		9000N	43.0	30	18	42.12	134	46	49.14	478 878.48	6 646 642.888	53
BUL 13		8000N	64.0	30	19	15.60	134	46	42.78	478 710.63	6 645 611.985	53
BUL 14		7000N	47.0	30	19	41.97	134	46	34.83	478 500.00	6 644 800.000	53
BUL 15		6500N	43.0	30	19	57.00	134	46	38.82	478 607.38	6 644 337.412	53
BUL 16		6000N	76.0	30	20	08.52	134	46	50.58	478 922.07	6 643 983.417	53
BUL 17		5000N	68.0	30	20	37.86	134	47	04.68	479 300.27	6 643 080.999	53
BUL 18		3500N	83.0	30	21	15.72	134	47	29.88	479 975.21	6 641 916.854	53
BUL 19	4820E	0N	83.0	30	25	39.36	134	48	47.16	482 051.63	6 633 805.070	53
BUL 20		3000S	18.0	30	27	14.16	134	49	15.96	482 824.50	6 630 888.152	53
BUL 21		2000S	53.0	30	26	42.72	134	49	06.36	482 566.93	6 631 855.540	53
BUL 22		1900N	35.0	30	24	34.32	134	48	28.74	481 556.87	6 635 806.321	53
BUL 23		1300N	39.0	30	24	56.28	134	48	36.36	481 761.31	6 635 130.687	53
BUL 24	4716E	13650N	40.0	30	16	31.98	134	42	17.94	471 625.10	6 650 632.401	53
BUL 25		13000N	49.0	30	16	53.22	134	42	16.80	471 596.34	6 649 978.520	53
BUL 26		12000N	35.0	30	17	28.56	134	42	14.94	471 549.48	6 648 890.566	53
BUL 27		11075N	40.0	30	18	01.20	134	42	13.68	471 518.44	6 647 885.762	53
BUL 28		10500N	7.0	30	18	20.40	134	42	13.08	471 503.96	6 647 294.711	53
BUL 29		10000N	8.0	30	18	37.50	134	42	12.66	471 494.12	6 646 768.313	53
BUL 30		9000N	25.0	30	19	11.34	134	42	11.10	471 455.18	6 645 726.547	53
BUL 31		8000N	55.0	30	19	43.02	134	42	08.04	471 376.02	6 644 751.164	53
BUL 32		7850N	49.0	30	19	54.30	134	42	08.82	471 397.76	6 644 403.998	53
BUL 33		7500N	41.0	30	20	03.48	134	42	08.70	471 395.29	6 644 121.412	53
BUL 34		7100N	10.0	30	20	18.36	134	42	07.92	471 375.67	6 643 663.323	53
BUL 35		6500N	46.0	30	20	39.30	134	42	06.96	471 351.73	6 643 018.681	53
BUL 36	4642E	2500N	25.0	30	19	17.40	134	37	33.00	464 029.13	6 645 518.052	53

BUL 37		2000N	29.0	30 19 34.68	134 37 34.50	464 070.93	6 644 986.271	53
BUL 38		1000N	38.0	30 20 06.78	134 37 36.78	464 135.07	6 643 998.369	53
BUL 39		0N	19.0	30 20 39.12	134 37 36.84	464 139.94	6 643 002.883	53
BUL 40	4642	800S	19.0	30 21 05.34	134 37 37.92	464 171.43	6 642 195.871	53
BUL 41		2000S	79.0	30 21 47.04	134 37 37.32	464 159.64	6 640 912.203	53
BUL 42		3000S	42.0	30 22 19.68	134 37 38.10	464 183.76	6 639 907.541	53
BUL 43		3650S	40.0	30 22 41.04	134 37 39.90	464 233.97	6 639 250.191	53
BUL 44		5300S	32.0	30 23 34.44	134 37 39.72	464 234.56	6 637 606.402	53
BUL 45	4570E	6360N	32.0	30 20 38.45	134 33 31.89	457 600.00	6 643 000.000	53
BUL 46		4600N	11.0	30 21 36.90	134 33 26.22	457 455.71	6 641 200.218	53
BUL 47		4000N	41.0	30 21 55.38	134 33 24.78	457 419.49	6 640 631.211	53
BUL 48		2500N	53.0	30 22 45.66	134 33 27.00	457 484.79	6 639 083.707	53
BUL 49		2250N	74.0	30 22 54.54	134 33 26.82	457 481.06	6 638 810.341	53
BUL 50		2000N	56.0	30 23 01.02	134 33 30.84	457 589.12	6 638 611.289	53
BUL 51	6385N	3350E	47.0	30 23 02.10	134 33 28.14	457 517.19	6 638 577.763	53
BUL 52		2575E	53.0	30 22 57.84	134 33 00.12	456 768.88	6 638 705.952	53
BUL 53	4570E	1500N	28.0	30 23 17.40	134 33 29.58	457 557.46	6 638 106.943	53
BUL 54	6385N	2000E	44.0	30 22 58.98	134 32 37.26	456 158.93	6 638 668.419	53
BUL 55	4542E	3000N	40.0	30 23 51.72	134 31 32.58	454 439.54	6 637 037.861	53
BUL 56		6250N	12.0	30 22 00.18	134 31 39.30	454 604.54	6 640 472.084	53
BUL 57		10250N	14.0	30 19 46.80	134 31 47.70	454 811.74	6 644 578.757	53
BUL 58		11000N	6.0	30 19 22.98	134 31 49.44	454 855.17	6 645 312.181	53
BUL 59		13500N	6.0	30 17 58.44	134 31 54.96	454 991.85	6 647 915.109	53
BUL 60		15000N	24.0	30 17 08.40	134 31 56.28	455 020.76	6 649 455.587	53
BUL 61		16500N	18.0	30 16 22.20	134 31 56.58	455 022.92	6 650 877.746	53
BUL 62		18000N	38.0	30 15 35.52	134 31 56.76	455 021.82	6 652 314.665	53
BUL 63		19000N	10.0	30 15 00.78	134 31 57.30	455 031.86	6 653 384.085	53
BUL 64		19500N	29.0	30 14 43.20	134 31 58.80	455 069.72	6 653 925.394	53
BUL 65		20500N	24.0	30 14 12.72	134 31 58.50	455 057.85	6 654 863.590	53
BUL 66		21600N	34.0	30 13 29.32	134 32 04.02	455 200.00	6 656 200.000	53
BUL 67		22500N	17.0	30 13 00.84	134 31 59.52	455 076.04	6 657 076.291	53
BUL 68		22900N	40.0	30 12 46.20	134 31 58.20	455 038.90	6 657 526.789	53
BUL 69		23500N	55.0	30 12 29.10	134 32 04.32	455 200.36	6 658 053.825	53
BUL 70		24500N	24.0	30 11 57.54	134 32 04.02	455 188.37	6 659 025.260	53
BUL 71		26000N	29.0	30 11 09.30	134 32 00.72	455 094.06	6 660 509.800	53
BUL 72		26500N	29.0	30 10 51.78	134 31 59.88	455 069.39	6 661 049.000	53
BUL 73		27500N	34.0	30 10 17.16	134 32 00.78	455 089.09	6 662 114.754	53
BUL 74		28500N	11.0	30 09 42.60	134 32 01.14	455 094.37	6 663 178.599	53
BUL 75		29000N	40.0	30 09 25.26	134 32 00.72	455 080.95	6 663 712.302	53
BUL 76		30000N	35.0	30 08 51.60	134 32 01.32	455 092.77	6 664 748.469	53
BUL 77	6420N	1500E	38.0	30 20 40.80	134 38 36.12	465 722.79	6 642 956.261	53
BUL 78		2500E	31.0	30 20 38.10	134 39 15.00	466 760.57	6 643 042.587	53
BUL 79		3600E	30.0	30 20 38.88	134 39 52.98	467 774.65	6 643 021.622	53
BUL 80		4600E	77.0	30 20 39.48	134 40 34.32	468 878.41	6 643 006.360	53
BUL 81	6395N	00E	61.0	30 22 29.88	134 38 16.08	465 198.48	6 639 596.850	53
TOTAL			3026.3					
MUL 1	6545N	0E	41.0	30 13 55.98	133 30 35.28	356 600.91	6 654 532.033	53
MUL 2		500E	14.0	30 13 58.20	133 30 54.72	357 121.49	6 654 470.483	53
MUL 3		400E	29.0	30 13 55.44	133 30 50.40	357 004.90	6 654 553.945	53
MUL 4		1100E	50.0	30 13 56.46	133 31 12.18	357 587.55	6 654 530.133	53
MUL 5		2000E	32.0	30 13 54.58	133 31 46.34	358 500.00	6 654 600.000	53
MUL 6		3000E	67.0	30 13 55.02	133 32 26.58	359 575.91	6 654 600.157	53
MUL 7		4150E	33.0	30 13 49.01	133 33 09.65	360 725.00	6 654 800.000	53
MUL 8		5000E	17.0	30 13 50.46	133 33 42.78	361 611.18	6 654 766.480	53
MUL 9		6000E	20.0	30 13 51.42	133 34 23.28	362 694.24	6 654 750.557	53
MUL 10		7000E	29.0	30 13 31.20	133 34 51.00	363 427.51	6 655 382.317	53
MUL 11		7850E	95.0	30 13 47.28	133 35 27.78	364 416.93	6 654 899.499	53
MUL 12	6530N	2500E	67.0	30 14 51.04	133 41 22.60	373 925.00	6 653 050.000	53

MUL 13		4000E	59.0	30 14 32.10	133 42 18.04	375 400.00	6 653 050.000	53
MUL 14		4800E	43.0	30 14 51.89	133 42 18.64	376 225.00	6 653 050.000	53
MUL 15		5500E	41.0	30 14 52.14	133 43 13.90	376 900.00	6 653 050.000	53
MUL 16		6000E	21.0	30 14 52.32	133 43 32.60	377 400.00	6 653 050.000	53
MUL 17		7000E	37.0	30 14 54.31	133 44 09.99	378 400.00	6 653 000.000	53
MUL 18		8000E	23.0	30 14 54.72	133 44 53.01	379 550.00	6 653 000.000	53
MUL 19		8650E	2.0	30 14 59.22	133 45 17.46	380 204.94	6 652 868.691	53
MUL 20		9820E	23.0	30 15 00.78	133 46 05.22	381 481.94	6 652 834.569	53
MUL 21		10350E	20.0	30 14 59.88	133 46 22.14	381 933.85	6 652 867.165	53
MUL 22		10625E	17.0	30 14 55.50	133 46 31.62	382 185.77	6 653 004.734	53
MUL 23		11075E	8.0	30 14 53.94	133 46 48.00	382 623.05	6 653 057.464	53
MUL 24		12000E	17.0	30 14 54.96	133 47 22.44	383 543.86	6 653 035.900	53
MUL 25		13000E	50.0	30 14 58.74	133 47 59.34	384 531.32	6 652 929.986	53
MUL 26		14000E	56.0	30 14 56.80	133 48 35.61	385 500.00	6 653 000.000	53
MUL 27		15000E	23.0	30 15 01.68	133 49 16.38	386 591.28	6 652 861.017	53
MUL 28		16000E	24.0	30 14 59.52	133 49 48.72	387 454.93	6 652 936.437	53
MUL 29		17000E	8.0	30 14 56.52	133 50 21.00	388 316.71	6 653 037.631	53
MUL 30		18000E	13.0	30 15 08.34	133 50 56.22	389 261.71	6 652 683.328	53
MUL 31		19000E	22.0	30 15 35.34	133 51 24.72	390 031.75	6 651 859.834	53
MUL 32		22000E	28.0	30 16 36.48	133 52 55.08	392 465.01	6 650 001.696	53
MUL 33		23000E	44.0	30 16 59.58	133 53 24.42	393 255.89	6 649 298.264	53
MUL 34		24000E	24.0	30 17 12.64	133 53 39.02	393 650.00	6 648 900.000	53
MUL 35		24650E	17.0	30 17 25.79	133 53 57.59	394 150.00	6 648 500.000	53
MUL 36		25000E	23.0	30 17 37.68	133 54 17.40	394 682.68	6 648 139.120	53
MUL 37		25200E	47.0	30 17 41.76	133 54 19.56	394 741.59	6 648 014.076	53
MUL 38		26000E	32.0	30 17 59.22	133 54 44.16	395 403.90	6 647 482.897	53
MUL 39		27000E	34.0	30 18 26.16	133 55 09.90	396 099.38	6 646 660.134	53
MUL 40		28000E	50.0	30 18 42.36	133 55 44.94	397 040.02	6 646 170.297	53
MUL 41		28800E	50.0	30 18 57.75	133 55 58.25	397 400.00	6 645 700.000	53
MUL 42		30000E	31.0	30 19 25.80	133 56 34.80	398 384.20	6 644 845.513	53
MUL 43	3973E	1000N	21.0	30 18 21.96	133 56 18.84	397 939.59	6 646 806.799	53
MUL 44		2000N	41.0	30 17 53.88	133 56 33.00	398 309.77	6 647 674.748	53
MUL 45		3000N	44.0	30 17 26.58	133 56 56.64	398 933.48	6 648 521.016	53
MUL 46		4000N	41.0	30 17 01.74	133 57 19.68	399 541.96	6 649 291.369	53
MUL 47		4700N	50.0	30 16 42.12	133 57 32.22	399 871.45	6 649 898.425	53
MUL 48		6000N	43.0	30 16 09.30	133 58 00.60	400 620.53	6 650 915.674	53
MUL 49	6669N	28000E	44.0	30 07 13.56	133 34 33.90	362 825.10	6 667 002.512	53
MUL 50		26875E	49.0	30 07 14.08	133 35 14.06	363 900.00	6 667 000.000	53
MUL 51		26000E	19.0	30 07 11.04	133 35 47.58	364 796.03	6 667 104.511	53
MUL 52		25000E	36.0	30 07 12.60	133 36 26.58	365 840.37	6 667 069.268	53
MUL 53		24000E	31.0	30 07 09.06	133 37 00.78	366 754.33	6 667 189.376	53
MUL 54		23000E	59.0	30 07 09.54	133 37 40.08	367 806.29	6 667 187.292	53
MUL 55		12000E	32.0	30 08 56.85	133 43 55.87	377 900.00	6 664 000.000	53
MUL 56		13000E	26.0	30 08 46.56	133 43 20.04	376 937.95	6 664 306.169	53
MUL 57		13350E	26.0	30 08 42.59	133 43 08.39	376 625.00	6 664 425.000	53
MUL 58		14100E	14.0	30 08 33.84	133 42 39.06	375 837.10	6 664 685.414	53
MUL 59		15000E	47.0	30 08 19.68	133 42 12.48	375 120.97	6 665 113.266	53
MUL 60		16000E	41.0	30 07 59.52	133 41 38.70	374 210.01	6 665 723.579	53
MUL 61		17000E	44.0	30 07 42.66	133 41 04.44	373 287.27	6 666 232.081	53
MUL 62		18000E	71.0	30 07 28.02	133 40 30.90	372 384.50	6 666 672.389	53
MUL 63		19000E	64.0	30 07 06.78	133 40 01.38	371 586.88	6 667 317.063	53
MUL 64	3710E	10000N	37.0	30 08 20.64	133 39 41.46	371 080.43	6 665 037.050	53
MUL 65		8200N	20.0	30 09 15.84	133 39 43.98	371 167.79	6 663 338.508	53
MUL 66		7320N	48.5	30 09 42.18	133 39 42.72	371 143.59	6 662 527.234	53
MUL 67		6700N	21.0	30 10 04.20	133 39 48.42	371 304.02	6 661 851.135	53
MUL 68		5800N	47.0	30 10 32.22	133 39 44.28	371 203.40	6 660 987.237	53
MUL 69		4500N	41.0	30 11 19.62	133 39 41.76	371 153.14	6 659 527.228	53
MUL 70		3650N	14.0	30 11 59.55	133 39 48.58	371 350.00	6 658 300.000	53

MUL 71	6639N	14750W	42.0	30 09 08.82	133 42 25.38	375 483.28	6 663 604.422	53
MUL 72		14250W	23.0	30 09 24.90	133 42 35.28	375 753.74	6 663 112.402	53
MUL 73		13500W	53.0	30 09 40.20	133 42 47.40	376 083.30	6 662 645.059	53
MUL 74		12500W	35.5	30 09 48.56	133 43 28.10	377 175.00	6 662 400.000	53
MUL 75		12000W	37.0	30 09 55.26	133 43 40.56	377 510.55	6 662 197.400	53
MUL 76		11500W	35.0	30 09 58.50	133 43 57.72	377 970.69	6 662 102.770	53
MUL 77		11000W	44.0	30 10 01.20	133 44 15.00	378 433.84	6 662 024.780	53
MUL 78		10500W	46.0	30 10 03.96	133 44 33.78	378 937.13	6 661 945.367	53
MUL 79		10300W	53.0	30 10 05.10	133 44 40.92	379 128.51	6 661 912.377	53
MUL 80		9950W	49.0	30 10 10.98	133 44 52.38	379 437.04	6 661 734.735	53
MUL 81		9800W	40.0	30 10 13.20	133 44 56.64	379 551.74	6 661 667.644	53
MUL 82		9650W	44.0	30 10 14.88	133 45 02.16	379 699.96	6 661 617.545	53
MUL 83		9500W	38.0	30 10 15.24	133 45 07.14	379 833.29	6 661 607.922	53
MUL 84		9000W	32.0	30 10 20.10	133 45 23.40	380 269.85	6 661 463.063	53
MUL 85		7500W	17.0	30 10 28.44	133 46 16.44	381 691.32	6 661 221.706	53
MUL 86		7000W	14.0	30 10 33.60	133 46 33.90	382 160.03	6 661 067.883	53
MUL 87		6000W	23.0	30 10 45.12	133 47 09.00	383 102.62	6 660 723.289	53
MUL 88		5000W	26.0	30 10 53.04	133 47 45.24	384 074.46	6 660 489.761	53
MUL 89		4500W	25.0	30 10 56.28	133 48 04.56	384 592.23	6 660 395.467	53
MUL 90		4000W	53.5	30 10 58.14	133 48 23.82	385 107.94	6 660 343.615	53
MUL 91		3000W	34.0	30 11 02.40	133 49 02.22	386 136.30	6 660 223.182	53
MUL 92		2000W	15.0	30 11 05.52	133 49 33.96	386 986.15	6 660 135.914	53
MUL 93		1000W	49.0	30 11 14.04	133 50 10.62	387 969.27	6 659 883.690	53
MUL 94	6639N	500E	23.0	30 11 18.54	133 50 50.40	389 034.52	6 659 755.977	53
MUL 95		2000E	5.0	30 11 29.52	133 51 39.36	390 347.24	6 659 431.137	53
MUL 96		3000E	17.0	30 11 27.00	133 52 17.04	391 354.12	6 659 518.742	53
MUL 97		4000E	34.0	30 11 22.14	133 52 51.48	392 273.65	6 659 677.437	53
MUL 98		5500E	10.0	30 11 17.58	133 53 47.58	393 772.55	6 659 832.446	53
MUL 99		6500E	29.0	30 11 10.56	133 54 23.22	394 723.59	6 660 057.738	53
MUL 100		8000E	32.0	30 10 56.46	133 55 13.98	396 076.97	6 660 504.733	53
MUL 101	6600N	500E	1.5	30 11 23.52	133 56 17.76	397 790.49	6 659 687.754	53
MUL 102		1000E	38.0	30 11 24.00	133 56 31.92	398 169.30	6 659 676.500	53
MUL 103		3000E	16.0	30 11 27.48	133 57 43.08	400 073.24	6 659 586.878	53
MUL 104		4000E	5.0	30 11 27.36	133 58 17.58	400 995.80	6 659 598.939	53
MUL 105		3500E	24.0	30 11 28.08	133 58 0.60	400 541.93	6 659 572.667	53
MUL 106		1975E	16.0	30 11 29.64	133 57 59.34	400 508.67	6 659 524.339	53
MUL 107		5000E	40.0	30 11 30.90	133 58 51.90	401 914.56	6 659 498.213	53
MUL 108		6000E	16.0	30 11 33.00	133 59 27.12	402 856.97	6 659 441.951	53
MUL 109		6500E	25.0	30 11 34.02	133 59 47.28	403 396.35	6 659 415.315	53
MUL 110	4030E	2000N	35.0	30 06 37.14	133 59 10.98	402 344.42	6 668 545.652	53
MUL 111		3000N	35.0	30 06 12.84	133 58 48.30	401 730.75	6 669 288.276	53
MUL 112		4000N	26.0	30 05 47.94	133 58 25.56	401 115.22	6 670 049.323	53
MUL 113		4500N	14.0	30 05 35.82	133 58 14.88	400 825.98	6 670 419.842	53
MUL 114		5000N	7.0	30 05 23.52	133 58 03.48	400 517.40	6 670 795.721	53
MUL 115		6025N	12.0	30 04 57.42	133 57 40.74	399 901.37	6 671 593.643	53
MUL 116		7000N	3.0	30 04 32.58	133 57 20.40	399 349.86	6 672 353.332	53
MUL 117	6740N	10000E	13.0	30 03 54.54	133 56 48.78	398 492.51	6 673 516.554	53
MUL 118		8500E	13.0	30 03 56.34	133 55 49.26	396 899.33	6 673 446.353	53
MUL 119		7000E	19.0	30 03 56.70	133 54 55.02	395 447.11	6 673 421.590	53
MUL 120		6000E	13.0	30 03 46.20	133 54 19.20	394 484.90	6 673 735.674	53
MUL 121		4500E	17.0	30 03 36.36	133 53 27.60	393 100.29	6 674 025.270	53
MUL 122		3000E	19.0	30 03 27.60	133 52 34.20	391 667.72	6 674 280.974	53
MUL 123		1500E	17.0	30 03 19.80	133 51 40.80	390 235.37	6 674 506.942	53
MUL 124		50E	22.0	30 03 10.80	133 50 47.40	388 802.58	6 674 769.666	53
MUL 125	6790N	500E	9.0	30 01 23.16	133 51 01.86	389 156.54	6 678 087.092	53
MUL 126		2000E	37.0	30 01 21.60	133 51 55.02	390 580.09	6 678 149.318	53
MUL 127		4000E	26.0	30 01 20.40	133 53 05.40	392 465.04	6 678 204.781	53
MUL 128		5500E	48.0	30 01 19.20	133 53 58.80	393 895.15	6 678 255.560	53

MUL 129		8000E	3.0	30 01 17.70	133 55 26.52	396 244.52	6 678 324.066	53
MUL 130		10000E	2.0	30 01 16.20	133 56 37.20	398 137.45	6 678 387.869	53
MUL 131	3800E	8400N	40.0	30 10 20.52	133 44 54.60	379 499.65	6 661 441.702	53
MUL 132		8000N	40.0	30 10 36.00	133 44 55.20	379 520.93	6 660 965.332	53
MUL 133		7600N	30.0	30 10 57.67	133 45 01.62	379 700.00	6 660 300.000	53
MUL 134		7000N	44.0	30 11 07.62	133 45 00.60	379 676.04	6 659 993.507	53
MUL 135		6000N	39.0	30 11 39.00	133 45 04.80	379 798.95	6 659 028.716	53
MUL 136		4950N	42.0	30 12 14.40	133 45 07.20	379 875.08	6 657 939.641	53
MUL 137		4000N	29.0	30 12 45.66	133 45 05.52	379 840.71	6 656 976.817	53
MUL 138		4500N	7.0	30 12 28.98	133 45 04.08	379 796.57	6 657 489.885	53
MUL 139	6440N	3500E	14.0	30 19 37.92	133 44 17.76	378 704.65	6 644 271.273	53
MUL 140		2900E	17.0	30 19 38.94	133 43 55.02	378 097.71	6 644 233.101	53
MUL 141		2500E	43.0	30 19 39.36	133 43 42.72	377 769.37	6 644 216.495	53
MUL 142		1500E	44.0	30 19 39.60	133 43 07.20	376 820.86	6 644 198.434	53
MUL 143		500E	13.0	30 19 39.78	133 42 35.10	375 963.66	6 644 183.177	53
MUL 144		0E	11.0	30 19 40.80	133 42 15.00	375 427.22	6 644 145.657	53
MUL 145	3790E	8100N	37.0	30 19 41.40	133 41 50.40	374 770.47	6 644 119.662	53
MUL 146		7500N	41.0	30 19 57.00	133 42 03.00	375 112.46	6 643 643.265	53
MUL 147		6000N	44.0	30 20 36.60	133 42 34.20	375 959.52	6 642 433.667	53
MUL 148		4500N	29.0	30 21 13.80	133 43 01.80	376 709.45	6 641 296.806	53
MUL 149		4400N	26.0	30 21 16.80	133 43 04.20	376 774.57	6 641 205.174	53
MUL 150		3350N	32.0	30 21 42.00	133 43 24.00	377 311.94	6 640 435.344	53
MUL 151		2550N	53.0	30 21 56.34	133 43 43.97	377 850.00	6 640 000.000	53
MUL 152		2000N	48.0	30 22 15.00	133 43 49.80	378 012.10	6 639 427.156	53
MUL 153		1575N	29.0	30 22 04.83	133 44 22.26	378 875.00	6 639 750.000	53
MUL 154		500N	20.0	30 22 52.20	133 44 18.00	378 777.63	6 638 290.341	53
MUL 155		200N	40.0	30 23 00.60	133 44 25.80	378 988.69	6 638 034.059	53
MUL 156	6370N	12000E	34.0	30 23 27.60	133 44 22.20	378 901.86	6 637 201.779	53
MUL 157		10100E	29.0	30 23 26.40	133 43 09.60	376 963.84	6 637 216.981	53
MUL 158		8800E	56.0	30 23 25.80	133 42 19.80	375 634.52	6 637 220.339	53
MUL 159		7950E	59.0	30 23 25.20	133 41 48.60	374 801.62	6 637 229.260	53
MUL 160		7260E	43.0	30 23 24.60	133 41 22.20	374 096.81	6 637 239.600	53
MUL 161		6850E	12.5	30 23 24.60	133 41 07.20	373 696.47	6 637 234.959	53
MUL 162		5500E	35.0	30 23 24.60	133 40 18.00	372 383.37	6 637 219.635	53
MUL 163		4000E	56.0	30 23 23.40	133 39 22.80	370 909.68	6 637 239.197	53
MUL 164		2500E	35.0	30 23 22.80	133 38 30.00	369 500.26	6 637 240.856	53
MUL 165		1700E	59.0	30 23 22.80	133 38 01.80	368 747.61	6 637 231.802	53
MUL 166		600E	83.0	30 23 21.60	133 37 18.00	367 578.16	6 637 254.579	53
MUL 167	6420N	22500E	71.0	30 18 18.00	133 43 31.20	377 433.58	6 646 717.741	53
MUL 168		21020E	41.0	30 18 43.20	133 42 45.00	376 208.28	6 645 928.022	53
MUL 169		19500E	67.0	30 18 49.20	133 41 52.20	374 800.10	6 645 727.221	53
MUL 170		17990E	32.0	30 19 04.20	133 41 01.80	373 459.28	6 645 249.908	53
MUL 171		16700E	30.0	30 19 06.00	133 40 22.80	372 418.28	6 645 182.363	53
MUL 172		15200E	8.0	30 19 32.40	133 39 37.80	371 225.98	6 644 355.497	53
MUL 173		14000E	41.0	30 19 51.60	133 38 58.80	370 191.45	6 643 752.061	53
MUL 174		12500E	26.0	30 20 04.80	133 38 11.40	368 930.49	6 643 330.544	53
MUL 175		11480E	18.0	30 20 13.80	133 37 32.40	367 892.37	6 643 040.900	53
MUL 176		10750E	27.0	30 20 22.20	133 37 07.20	367 222.58	6 642 774.121	53
MUL 177		10000E	79.0	30 20 28.80	133 36 43.20	366 584.19	6 642 563.107	53
MUL 178		9260E	51.0	30 20 29.40	133 36 15.00	365 831.40	6 642 535.393	53
MUL 179		8000E	13.0	30 20 31.80	133 35 28.80	364 598.64	6 642 446.250	53
MUL 180		7000E	17.0	30 20 33.60	133 34 52.80	363 638.04	6 642 378.851	53
MUL 181		6000E	9.0	30 20 35.40	133 34 16.20	362 661.42	6 642 311.164	53
MUL 182		5000E	41.0	30 20 37.80	133 33 40.20	361 701.06	6 642 225.121	53
MUL 183		3980E	48.0	30 20 39.00	133 33 03.00	360 708.20	6 642 175.527	53
MUL 184		3000E	46.0	30 20 42.00	133 32 28.20	359 780.15	6 642 071.252	53
MUL 185		2700E	50.0	30 20 41.40	133 32 18.60	359 523.57	6 642 086.423	53
MUL 186		2000E	28.0	30 20 42.60	133 31 51.60	358 803.08	6 642 040.162	53

MUL 187		1025E	5.0	30 20 45.16	133 31 18.68	357 925.00	6 641 950.000	53
MUL 188	6460N	330E	31.0	30 18 24.60	133 30 48.60	357 065.17	6 646 266.813	53
MUL 189		650E	22.0	30 18 29.40	133 30 56.40	357 275.46	6 646 121.763	53
MUL 190	10100E	11200N	1.0	30 19 17.40	133 31 45.60	358 608.86	6 644 661.112	53
MUL 191	10500E	10900N	37.0	30 19 26.40	133 32 00.60	359 013.07	6 644 389.218	53
MUL 192	11000E	10800N	44.2	30 19 30.00	133 32 19.20	359 511.27	6 644 284.796	53
MUL 193	11400E	10600N	42.0	30 19 36.18	133 32 33.49	359 895.41	6 644 099.343	53
MUL 194	11400E	10100N	37.0	30 19 52.02	133 32 34.38	359 925.40	6 643 612.090	53
MUL 195	6300N	1500E	12.0	30 26 51.66	133 31 04.32	357 689.35	6 630 661.459	53
MUL 196		3000E	23.0	30 26 54.12	133 31 59.34	359 157.96	6 630 604.866	53
MUL 197		4500E	31.0	30 26 48.48	133 32 52.74	360 580.13	6 630 796.896	53
MUL 198		5800E	36.0	30 26 49.32	133 33 40.02	361 841.62	6 630 787.161	53
MUL 199		7500E	26.0	30 26 48.36	133 34 42.48	363 507.33	6 630 837.795	53
MUL 200		9000E	13.0	30 26 48.06	133 35 37.44	364 973.23	6 630 865.367	53
MUL 201		10000E	47.0	30 26 52.68	133 36 12.48	365 909.66	6 630 734.719	53
MUL 202		11000E	41.0	30 27 09.96	133 36 42.90	366 727.61	6 630 212.720	53
MUL 203		13000E	16.0	30 27 39.66	133 37 48.36	368 484.67	6 629 319.660	53
MUL 204	10300E	10300N	61.0	30 25 02.88	133 37 03.39	367 226.21	6 634 131.743	53
MUL 205		10400N	43.0	30 25 00.44	133 37 05.86	367 291.32	6 634 207.640	53
MUL 206		10480N	16.0	30 24 59.13	133 37 08.56	367 362.84	6 634 248.910	53
MUL 207		10500N	10.6	30 24 58.00	133 37 08.34	367 356.43	6 634 283.533	53
MUL 208		10520N	33.0	30 24 58.30	133 37 09.71	367 370.76	6 634 299.812	53
MUL 209		10600N	32.0	30 24 55.56	133 37 10.81	367 421.53	6 634 359.422	53
MUL 210		10750N	19.0	30 24 48.91	133 37 22.64	367 734.73	6 634 567.989	53
MUL 211		10925N	12.0	30 24 48.79	133 37 20.15	367 668.21	6 634 571.026	53
MUL 212		11000N	2.0	30 24 45.81	133 37 20.71	367 681.96	6 634 662.999	53
MUL 213	3320E	11400N	37.0	30 01 02.94	133 30 56.46	356 857.62	6 678 338.156	53
MUL 214		9000N	20.0	30 01 04.80	133 32 36.00	359 525.11	6 578 315.742	53
MUL 215		3000N	44.0	30 01 08.88	133 35 53.34	364 813.48	6 678 255.531	53
MUL 216	6580N	18000E	59.0	30 11 59.94	133 30 25.02	356 279.77	6 658 100.885	53
MUL 217	4040E	7000N	46.0	30 15 35.22	133 59 40.98	403 293.47	6 651 988.837	53
TOTAL			6957.3					
MOB 1	6450N	6000E	38.0	30 19 15.00	133 29 54.60	355 643.21	6 644 696.171	53
MOB 2		5000E	40.0	30 19 14.40	133 29 18.60	354 681.44	6 644 701.877	53
MOB 3		4000E	8.0	30 19 13.80	133 28 41.40	353 687.61	6 644 707.069	53
MOB 4		3000E	22.0	30 19 13.80	133 28 05.40	352 726.07	6 644 694.130	53
MOB 5		2020E	74.0	30 19 13.80	133 27 31.80	351 828.64	6 644 681.977	53
MOB 6		1015E	34.0	30 19 14.40	133 26 56.40	350 883.38	6 644 650.621	53
MOB 7	6760N	0E	52.0	30 02 32.28	133 07 43.80	319 590.13	6 675 040.765	53
MOB 8		200E	44.0	30 02 27.00	133 07 48.48	319 712.83	6 675 205.378	53
MOB 9		1800E	13.0	30 02 10.20	133 08 41.16	321 115.60	6 675 745.597	53
MOB 10		3050E	57.0	30 02 08.28	133 09 27.48	322 355.48	6 675 824.759	53
MOB 11		4000E	66.0	30 02 03.36	133 09 59.70	323 216.18	6 675 990.100	53
MOB 12		6050E	56.0	30 02 01.02	133 11 13.44	325 190.44	6 676 093.616	53
MOB 13		8125E	62.0	30 02 06.42	133 12 26.52	327 150.77	6 675 958.203	53
MOB 14	6760N	26000E	28.0	30 02 13.80	133 23 25.20	344 798.43	6 675 993.293	53
MOB 15		27000E	26.0	30 02 10.44	133 24 01.08	345 758.09	6 676 110.213	53
MOB 16		32100E	38.0	30 02 08.76	133 26 54.66	350 406.98	6 676 225.950	53
MOB 17		34000E	59.0	30 02 18.18	133 27 58.98	352 133.77	6 675 959.170	53
MOB 18	6580N	16000E	53.0	30 11 58.56	133 29 13.56	354 368.24	6 658 118.149	53
MOB 19		14000E	30.0	30 11 58.44	133 29 14.46	354 392.25	6 658 122.163	53
MOB 20		12000E	36.0	30 11 55.20	133 26 51.00	350 554.47	6 658 170.281	53
MOB 21		10000E	49.0	30 11 53.46	133 25 35.46	348 533.60	6 658 196.124	53
MOB 22		8000E	61.0	30 11 51.60	133 24 20.40	346 525.48	6 658 225.469	53
MOB 23		6000E	40.0	30 11 50.04	133 23 06.54	344 549.56	6 658 245.665	53
MOB 24		4000E	36.0	30 11 47.70	133 21 57.60	342 704.84	6 658 291.409	53
MOB 25		2500E	33.0	30 11 46.56	133 20 56.40	341 067.62	6 658 302.901	53
MOB 26		0E	58.0	30 11 44.34	133 19 24.66	338 613.13	6 658 335.406	53

MOB 27	6450N	18550E	83.0	30 19 10.20	133 14 49.20	331 457.82	6 644 497.126	53
MOB 28		17050E	52.0	30 19 11.40	133 15 43.20	332 900.78	6 644 482.370	53
MOB 29		15050E	32.0	30 19 10.74	133 16 58.80	334 919.81	6 644 533.436	53
MOB 30		13550E	34.0	30 19 12.06	133 17 55.08	336 423.70	6 644 515.440	53
MOB 31		12050E	38.0	30 19 13.08	133 18 51.00	337 917.82	6 644 506.331	53
MOB 32		11050E	34.0	30 19 13.08	133 19 24.96	338 824.90	6 644 519.771	53
MOB 33		10050E	29.0	30 19 14.16	133 20 05.28	339 902.35	6 644 502.379	53
MOB 34		9050E	29.0	30 19 13.02	133 20 41.22	340 861.80	6 644 551.524	53
MOB 35		7550E	44.0	30 19 13.02	133 21 36.18	342 329.79	6 644 572.840	53
MOB 36		5550E	30.0	30 19 14.28	133 22 54.00	344 408.91	6 644 563.893	53
MOB 37		4050E	17.0	30 19 13.92	133 23 48.36	345 860.70	6 644 595.589	53
MOB 38		3050E	16.0	30 19 13.86	133 24 25.80	346 860.69	6 644 611.520	53
MOB 39		1550E	24.0	30 19 13.86	133 25 21.54	348 349.48	6 644 632.319	53
MOB 40		250E	71.0	30 19 13.86	133 26 30.18	350 182.83	6 644 657.651	53
TOTAL			1646.0					
MOO 1	3220E	25000N	40.0	29 34 46.50	133 10 28.74	323 195.81	6 726 396.864	53
MOO 2		23000N	16.0	29 35 30.36	133 11 14.28	324 442.40	6 725 065.796	53
MOO 3		21000N	3.0	29 36 04.80	133 12 12.12	326 015.13	6 724 029.739	53
MOO 4		19000N	11.0	29 36 50.04	133 13 03.66	327 423.19	6 722 658.380	53
MOO 5		18000N	7.0	29 37 12.30	133 13 29.34	328 124.50	6 721 983.686	53
MOO 6		15000N	36.0	29 38 20.58	133 14 48.12	330 275.43	6 719 913.890	53
MOO 7		13000N	47.0	29 39 05.94	133 15 40.44	331 703.49	6 718 538.659	53
MOO 8		12400N	13.0	29 39 20.04	133 15 57.12	332 158.52	6 718 111.307	53
MOO 9		10800N	26.0	29 39 55.68	133 16 37.62	333 263.88	6 717 030.365	53
MOO 10		9500N	11.0	29 40 32.04	133 16 55.92	333 772.52	6 715 918.311	53
MOO 11		8000N	29.0	29 41 16.80	133 17 03.90	334 007.49	6 714 543.525	53
MOO 12		6100N	21.0	29 42 02.22	133 17 42.24	335 058.72	6 713 160.479	53
MOO 13		5000N	37.0	29 42 43.80	133 18 09.12	335 799.98	6 711 891.042	53
MOO 14		3600N	28.0	29 43 02.28	133 18 45.00	336 772.53	6 711 336.245	53
MOO 15		2000N	17.0	29 43 40.62	133 19 24.24	337 844.14	6 710 171.275	53
MOO 16		0N	30.0	29 44 27.30	133 20 13.74	339 194.88	6 708 753.433	53
MOO 17	3320E	45000N	44.0	29 48 37.38	133 15 39.72	331 949.00	6 700 945.938	53
MOO 18		43000N	50.0	29 49 23.10	133 16 29.76	333 313.56	6 699 558.581	53
MOO 19		41000N	86.0	29 50 09.24	133 17 22.62	334 753.67	6 698 159.263	53
MOO 20		38000N	47.0	29 51 15.48	133 18 38.52	336 820.84	6 696 150.064	53
MOO 21		37000N	34.0	29 51 39.00	133 19 05.88	337 565.66	6 695 436.727	53
MOO 22		35200N	34.0	29 52 21.66	133 19 56.76	338 950.03	6 694 143.265	53
MOO 23		33000N	49.0	29 53 10.62	133 20 54.60	340 523.58	6 692 658.374	53
MOO 24		31000N	50.0	29 53 57.42	133 21 49.62	342 020.13	6 691 238.697	53
MOO 25		29000N	49.0	29 54 43.20	133 22 45.72	343 544.81	6 689 850.642	53
MOO 26		27000N	44.0	29 55 29.22	133 23 40.14	345 024.17	6 688 454.373	53
MOO 27		25000N	35.0	29 56 14.16	133 24 36.06	346 542.91	6 687 091.725	53
MOO 28		23000N	30.0	29 56 59.58	133 25 30.24	348 014.84	6 685 713.465	53
MOO 29		21000N	44.0	29 57 43.92	133 26 22.68	349 439.30	6 684 367.636	53
MOO 30		19000N	34.0	30 58 27.72	133 27 14.40	352 360.98	6 572 201.729	53
MOO 31		17000N	56.0	30 59 13.44	133 28 10.80	353 876.64	6 570 814.690	53
MOO 32		15000N	35.0	30 59 58.80	133 29 06.12	355 363.10	6 569 438.142	53
TOTAL			1093.0					
GRAND TOTAL			16871.6					

APPENDIX 4

Land and Data Package Release

- Information

DATA PACKAGE

NORTHWEST GAWLER CRATON

A. TARCOOLA - TALLARINGA BEDROCK DRILLING

- Summary of drilling project
- TARCOOLA 1:250 000 Sheet - Exploration Review
- Drill traverse location plans (5 X 1:100 000 sheets)
- Magnetic traverse location plans (5 X 1:100 000 sheets)
- Geological logs, assay data, petrological reports
- Ground magnetic profiles
- Preliminary remote sensing assessment
- Previous drillhole location plans (5 X 1:100 000 sheets)
  (Geological logs, assay data and magnetic data are also available on disc at $25 for each data set).

B. ARCHAEAN METABASIC DIAMOND DRILLING

- Summary of drilling project
- Archaean Geology of South Australia
- Location plans for diamond drillholes
- Geological and geophysical logs
- Geochemistry, petrology and interpretation
- Detailed ground magnetic colour images and interpretation
- Ground magnetic technical specifications
- Regional aeromagnetic maps
  (Raw data for each ground magnetic image are also available at $200 per grid).

PRICE $900

Due for release in February 1992

INFORMATION SERVICES BRANCH
S.A. Department of Mines and Energy
PO Box 151, EASTWOOD, 5063

NORTHWEST GAWLER CRATON DRILLING DATA PACKAGE

I wish to order the data package, please find enclosed a cheque for $900.00 payable to Department of Mines and Energy.

NAME: .....

ORGANISATION: .....

ADDRESS: .....

.....

J00451

LAND AND DATA PACKAGE RELEASE NORTHWEST GAWLER CRATON, SOUTH AUSTRALIA

1. DATA PACKAGE

Favourable Archaean and Proterozoic host rocks in a region of structural complexity highlight the Northwest Gawler Craton as a potentially significant mineral province. However a paucity of Precambrian outcrop has to date deterred exploration activity leaving the region largely unexplored.

In order to promote private sector exploration the Department undertook extensive drilling of the area during 1991.

Two complementary programs were undertaken as follows:

- TARCOOLA-TALLARINGA BEDROCK DRILLING

Regional rotary drill traverses comprising 501 holes totalling 16 874 m have tested the nature and distribution of shallow Precambrian basement in the region, and areas with significant base and precious metal potential have been defined. An additional diamond-drillhole tested a possible alteration zone and intersected fractured and altered volcanics with minor sulphides. Ground magnetic surveys were undertaken over all drill traverses.

Basement lithologies include Archaean Mulgathing Complex quartzo-feldspathic gneiss, schist, basic and mafic rich lithologies and banded iron formation and Early Proterozoic granitic gneiss, mylonite and basics. Mafic lithologies were more common than anticipated.

Preliminary results include:

- 10 m at 700 ppb gold near Woomera Tank in quartz-feldspar gneiss near the margins of an amphibolite body. Several other gold values in the 20-240 ppb range have been recorded.
- Elevated copper and zinc values (max. 3 000 ppm Cu and 1 650 ppm Zn) associated with intermediate to basic intrusives were encountered in a number of holes east of Lake Barry.
- Elevated gold values to the 200 ppb range in Archaean banded iron formation.

- ARCHAEAN METABASIC DIAMOND DRILLING

This project was designed to obtain fresh samples of Archaean basic and ultrabasic rocks which either do not crop out or crop out poorly. All holes were sited on imaged ground magnetic data. Five diamond-drillholes were completed in the Mount Christie area and intersected pyroxenite, norite, gabbro and peridotite.

At Lake Harris, two diamond-drillholes intersected komatiite with spinifex textures in the upper part of the flow and cumulate textures near the base. Downhole geological, geophysical and geochemical logs easily differentiate the upper and lower units. Geochemical similarities with Western Australian komatiites are striking.

Many Archaean komatiites host world-class gold and nickel deposits and their discovery in SA has outlined a new Archaean greenstone terrane highly prospective for nickel, chromium and gold.

On present evidence, the komatiite at Lake Harris has a strike length of at least 6 km and is greater than 600 m thick. However, existing aeromagnetic data are relatively poor and new data may well outline a much greater extent and/or similar bodies elsewhere.

2. LAND PACKAGES

Concurrent with the data package release land areas are now available for exploration as shown on the attached plan.

Interested parties are invited to lodge exploration licence applications together with the appropriate fee ($146.30) in each case for any part of the available areas or additional areas. An Exploration Licence application form is attached.

All applications must be lodged with the Department by 31 March 1992. Successful applicants will be notified as soon as possible after the closing date in order to effect granting of exploration licences by May 1992.

Additional information regarding the land and data package release may be obtained by contacting the following personnel.

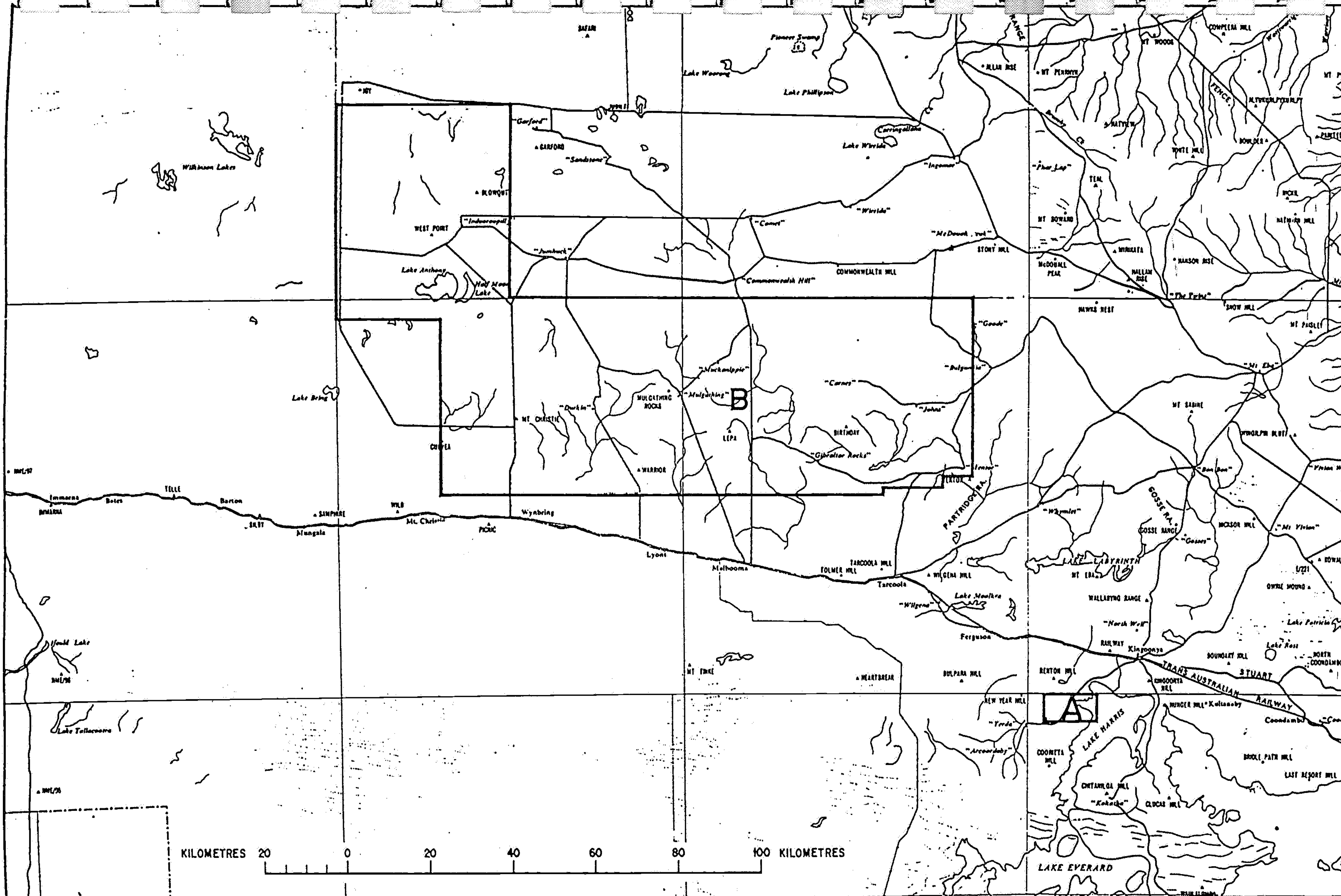
- Ian Faulks, ph. 08 - 274 7507 (EL Applications)
- Ric Horn, ph. 08 - 274 7574, Warwick Newton, ph. 08 - 274 7640 or Stuart Robertson, ph. 08 - 274 7579 (TARCOOLA-TALLARINGA BEDROCK DRILLING)
- John Parker, ph. 08 - 274 7615 or Sue Daly, ph. 08 - 274 7684 (ARCHAEAN METABASIC DIAMOND DRILLING)

3. DISPLAY OF DRILL SAMPLES

Between 2 and 20 March 1992 all diamond drill core and selected bottom hole samples (from the bedrock drilling program) will be on display and available for inspection at the Core Library, Conyngham Street, Glenside.

Phone Brian Logan, Core Library Supervisor, on 08 - 79 9574 to arrange an inspection.

J00451



AREAS AVAILABLE FOR EXPLORATION

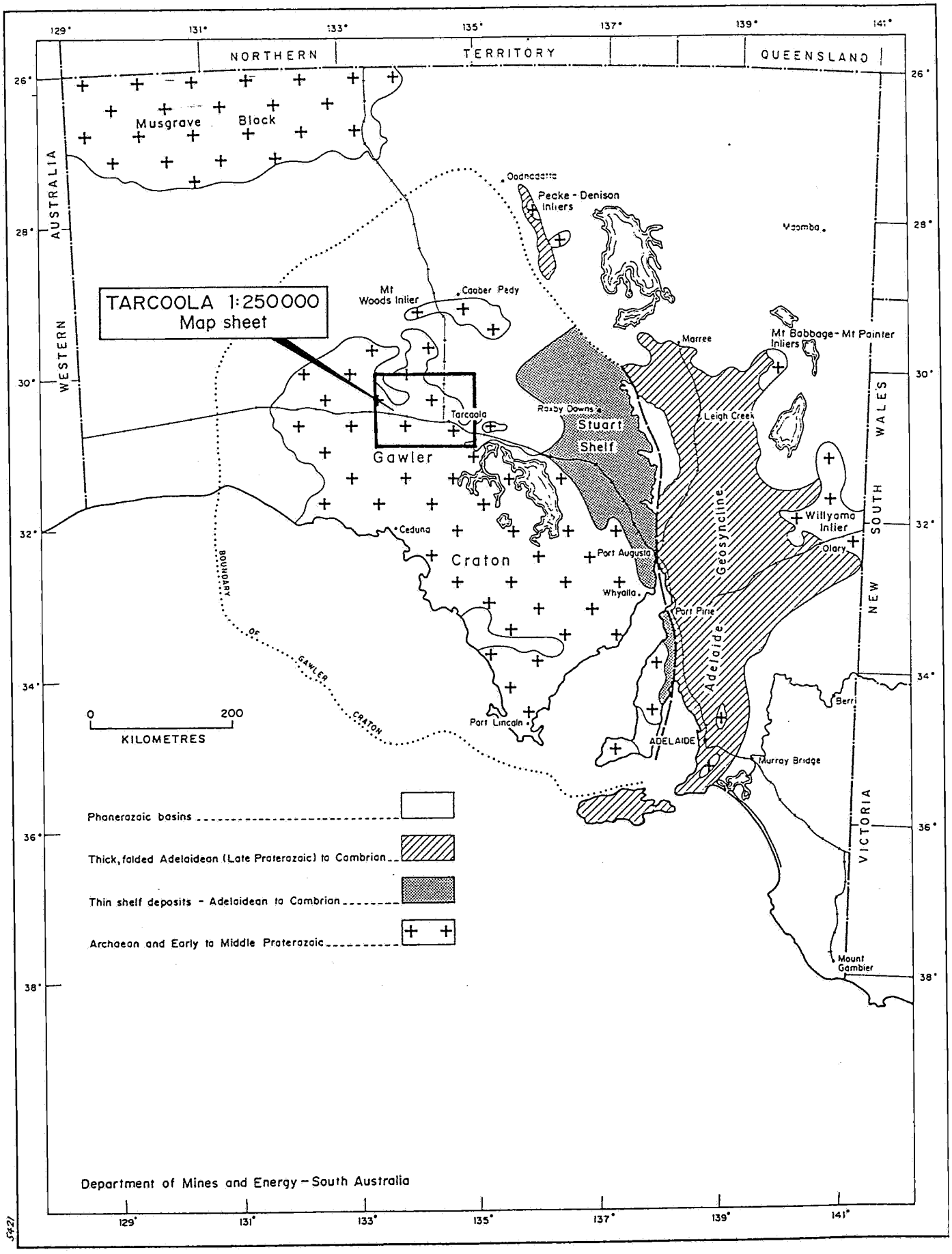
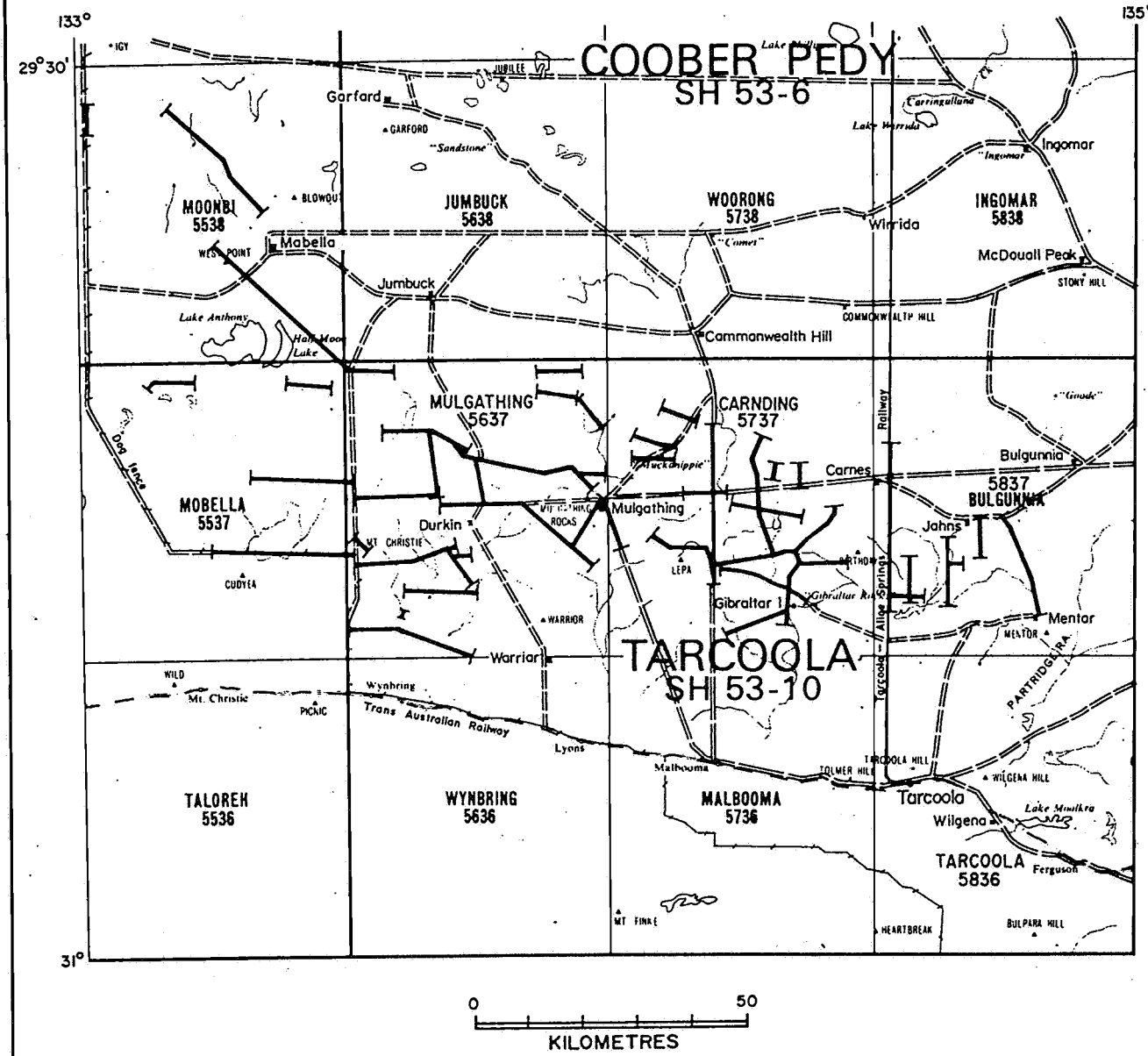


Figure 1. Locality plan showing Tarcoola 1:250000 map sheet

S 22629



TARCOOLA-TALLARINGA BEDROCK DRILLING PROGRAM

GROUND MAGNETIC AND DRILLHOLE TRAVERSES

Figure 2

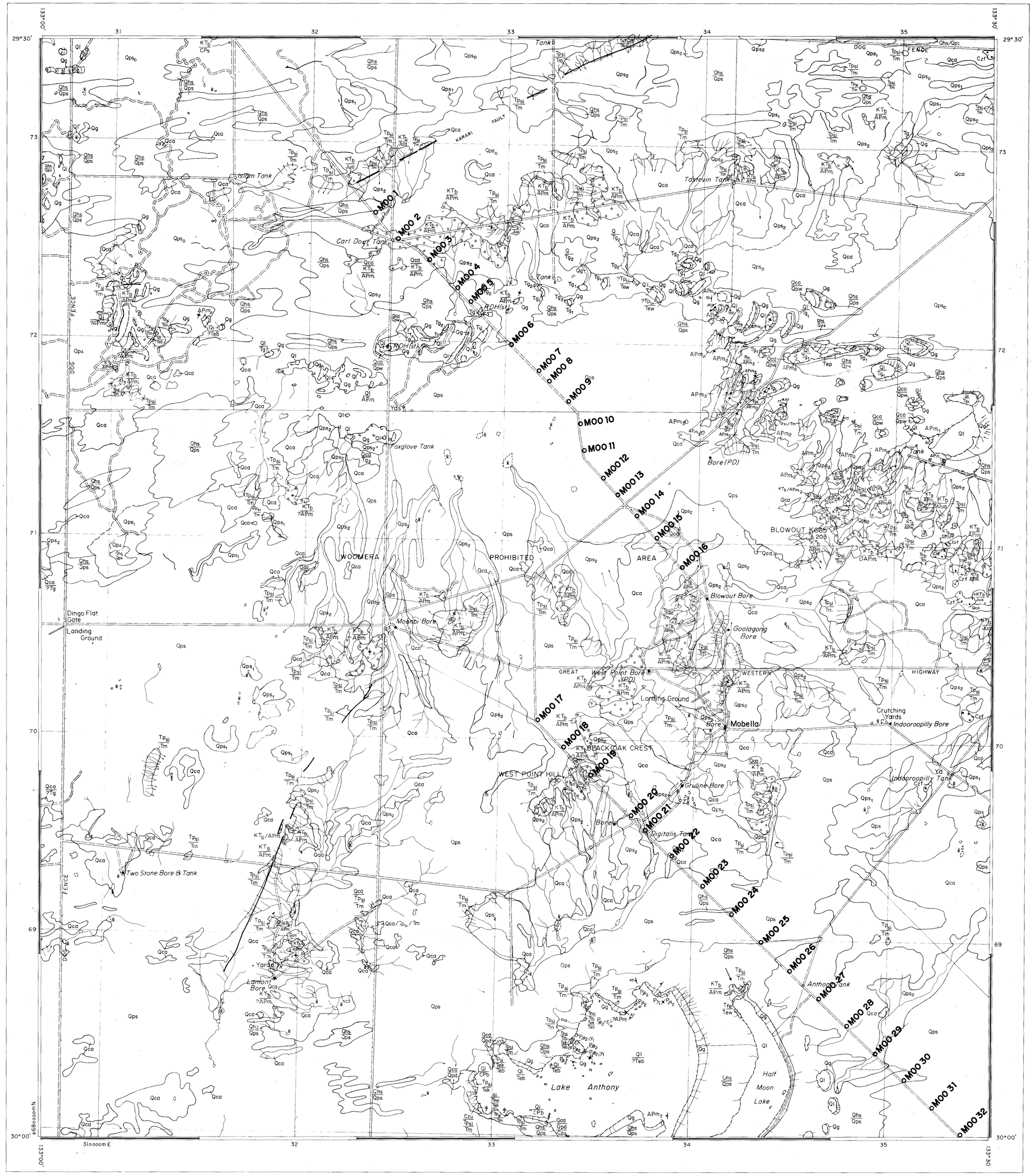
SADME S 22697

5517

MOONBI

GEOLOGICAL SURVEY OF SOUTH AUSTRALIA
DEPARTMENT OF MINES AND ENERGY ADELAIDE

AUSTRALIA 1:100 000 — SHEET 5538 — ZONE 53



HEAD STATION, OUT STATION, HUT
NATIONAL ROUTE NUMBER — 23
HIGHWAY OR MAIN ROAD
SECONDARY ROAD
TRACK
TRACK ALONG BOUNDARY FENCE
RAILWAY AND STATION
RAILWAY AND SIDING
MAJOR ROAD BRIDGE, RAILWAY BRIDGE
BOUNDARY FENCE
INTERNAL FENCE
VERMIN PROOF, DOG FENCE — V.P.F. D.F.
POWER TRANSMISSION LINE
MINERAL FEATURES
MINOR MINERAL OCCURRENCE, PROSPECT — •U
MINE, ALLUVIAL WORKINGS
OPEN CUT, QUARRY
YARD
TRIG-STATION, ASTRONOMICAL STATION
IDENTIFIED HILL OR MOUNTAIN, CAIRN, PILE
SPOT ELEVATION — •73
CONTOURS, DEPRESSION CONTOURS — 100 10
ESCARPMENT
EMBANKMENT
SAND DUNE
DRAINAGE
RIVER, CREEKS
BRAIDED STREAM WITH FLOOD CHANNEL
FLOOD PLAIN BOUNDARY
CLAYPAN, SALTPAN (PLAYA LAKE), SWAMP
BORE, WELL
TANK
ARTESIAN BORE
SPRING
WATERHOLE
DAM

1:100 000 SHEET INDEX

MURNAROO	CARNADINNA	TALLARINGA
	TALLARINGA	
DELISSER	WILKINSON	MOONBI

DEPARTMENT OF MINES AND ENERGY

SCALE 1:100 000

KILOMETRES 2 1 0 2 4 6 8 10 12 KILOMETRES

UNIVERSAL TRANSVERSE MERCATOR PROJECTION.
HORIZONTAL DATUM: AUSTRALIAN GEODETIC GRID 1966.
GRID LINES ARE 10000-METRE INTERVALS OF THE AUSTRALIAN MAP GRID.

Compiled from material supplied by Aust. Army Survey Corps.

Prepared by the Drafting Branch for use within the SA Department of Mines and Energy.

LOCALITY PLAN

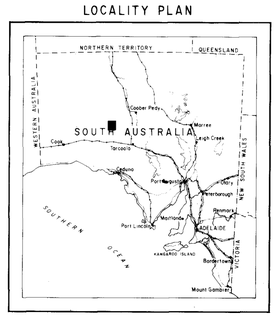


Figure 3

TARCOOLA-TALLARINGA BEDROCK DRILLING PROGRAM

DRILLHOLE LOCATIONS

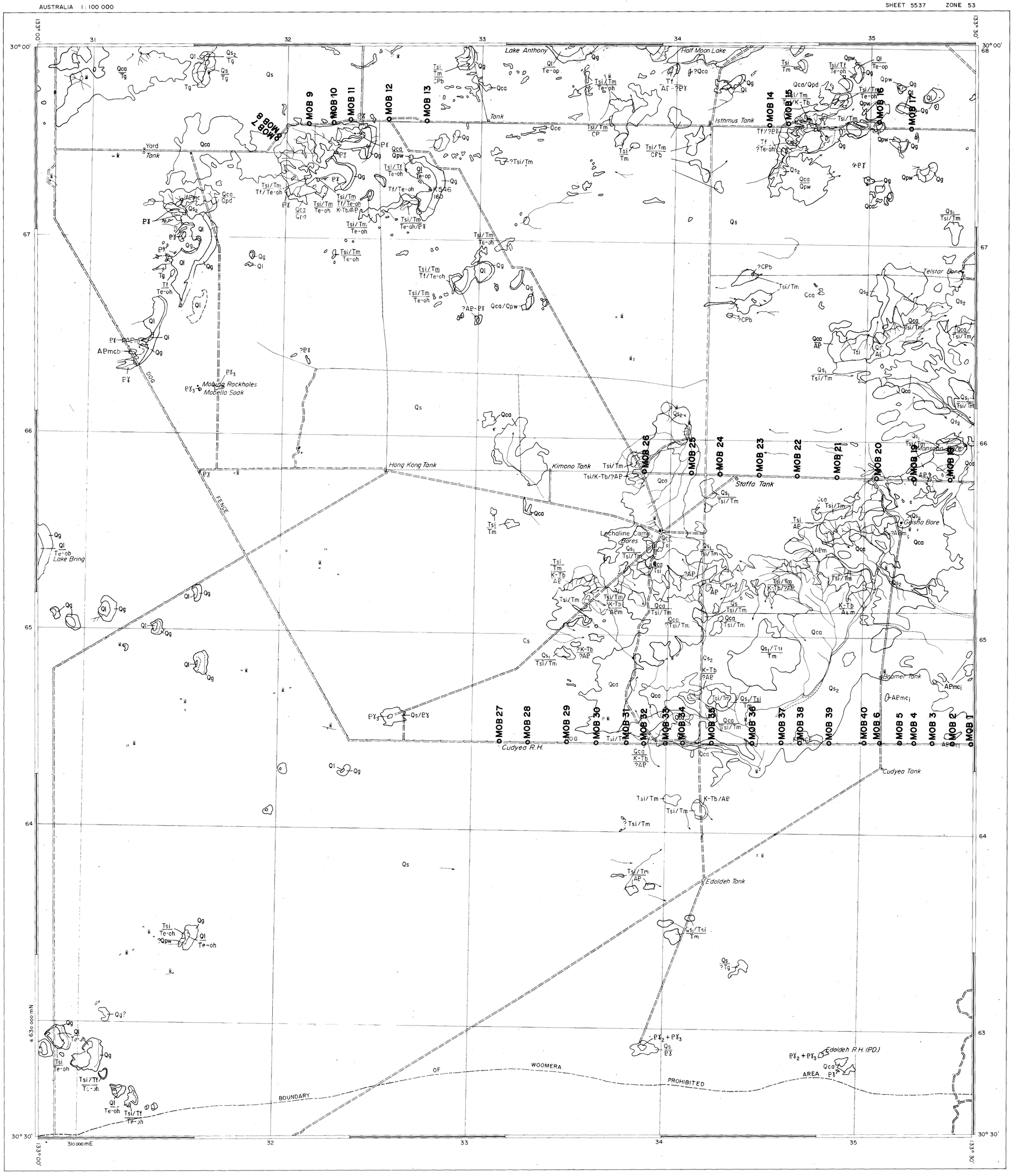
MOONBI SHEET 5538

92-1

MOBELLA

GEOLOGICAL SURVEY OF SOUTH AUSTRALIA
DEPARTMENT OF MINES AND ENERGY ADELAIDE

AUSTRALIA 1:100 000 — SHEET 5537 — ZONE 53



1:100 000 SHEET INDEX

IMMARNA	LAKE BRING	MOBELLA
	BARTON	
PIDINGA	BARTON	TALOREH

DEPARTMENT OF MINES AND ENERGY

SCALE 1:100 000

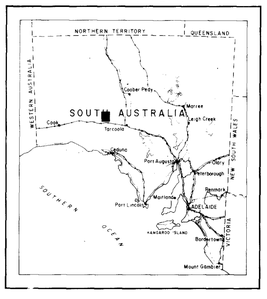
KILOMETRES 2 1 0 2 4 6 8 10 12 KILOMETRES

UNIVERSAL TRANSVERSE MERCATOR PROJECTION.
HORIZONTAL DATUM: AUSTRALIAN GEODETIC GRID 1966.
GRID LINES ARE 10000-METRE INTERVALS OF THE AUSTRALIAN MAP GRID.

Compiled from material supplied by Aust. Army Survey Corps.

Prepared by the Drafting Branch for use within the SA Department of Mines and Energy.

LOCALITY PLAN



- HEAD STATION, OUT STATION, HUT
- NATIONAL ROUTE NUMBER (23)
- HIGHWAY OR MAIN ROAD
- SECONDARY ROAD
- TRACK
- TRACK ALONG BOUNDARY FENCE
- RAILWAY AND STATION
- RAILWAY AND SIDING
- MAJOR ROAD BRIDGE, RAILWAY BRIDGE
- BOUNDARY FENCE
- INTERNAL FENCE
- VERMIN PROOF, DOG FENCE (V.P.F. D.F.)
- POWER TRANSMISSION LINE
- MINERAL FEATURES
  - MINOR MINERAL OCCURRENCE, PROSPECT (U)
  - MINE, ALLUVIAL WORKINGS
  - OPEN CUT, QUARRY
- YARD
- TRIG-STATION, ASTRONOMICAL STATION
- IDENTIFIED HILL OR MOUNTAIN, CAIRN, PILE
- SPOT ELEVATION (73)
- CONTOURS, DEPRESSION CONTOURS (100, 10)
- ESCARPMENT
- EMBANKMENT
- SAND DUNE
- DRAINAGE
  - RIVER, CREEKS
  - BRAIDED STREAM WITH FLOOD CHANNEL
  - FLOOD PLAIN BOUNDARY
- CLAYPAN, SALTPAN (PLAYA LAKE), SWAMP
- BORE, WELL
- TANK
- ARTESIAN BORE
- SPRING
- WATERHOLE
- DAM

Figure 4

TARCOOLA–TALLARINGA BEDROCK DRILLING PROGRAM

DRILLHOLE LOCATIONS

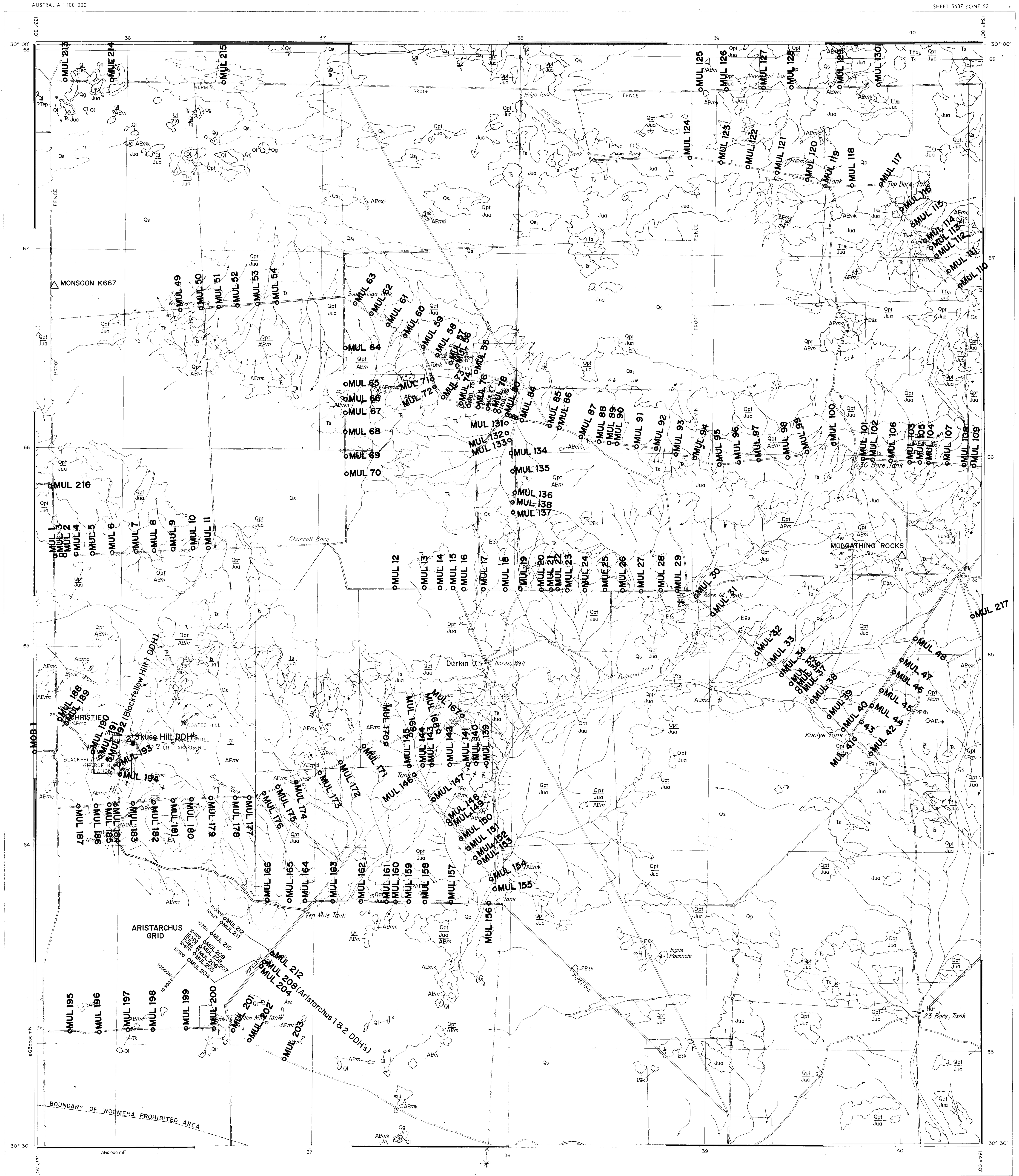
MOBELLA SHEET 5537

92-3

MULGATHING

GEOLOGICAL SURVEY OF SOUTH AUSTRALIA
DEPARTMENT OF MINES ADELAIDE

AUSTRALIA 1:100 000 — SHEET 5637 ZONE 53



1:100,000 SHEET INDEX

MULGATHING 5637	CARNDING 5737	BULGUNNIA 5837
	TARCOOLA	
WYNBRING 5636	MALBOOMA 5736	TARCOOLA 5836

SCALE 1:100 000

KILOMETRES 2 1 0 2 4 6 8 10 12 14 KILOMETRES

MILES 1 0 2 4 6 MILES

TRANSVERSE MERCATOR PROJECTION
HORIZONTAL DATUM: AUSTRALIAN GEODETIC DATUM 1966
GRID LINES ARE 10 000 METRE INTERVALS OF THE AUSTRALIAN MAP GRID, ZONE 53

Planimetric information prepared by Department of Mines, South Australia, using slotted template assembly method. Aerial photography flown by Department of Lands, South Australia. Based on survey control established by Department of Lands, South Australia.

LOCALITY

Figure 5

TARCOOLA-TALLARINGA BEDROCK DRILLING PROGRAM

DRILLHOLE LOCATIONS

MULGATHING SHEET 5637

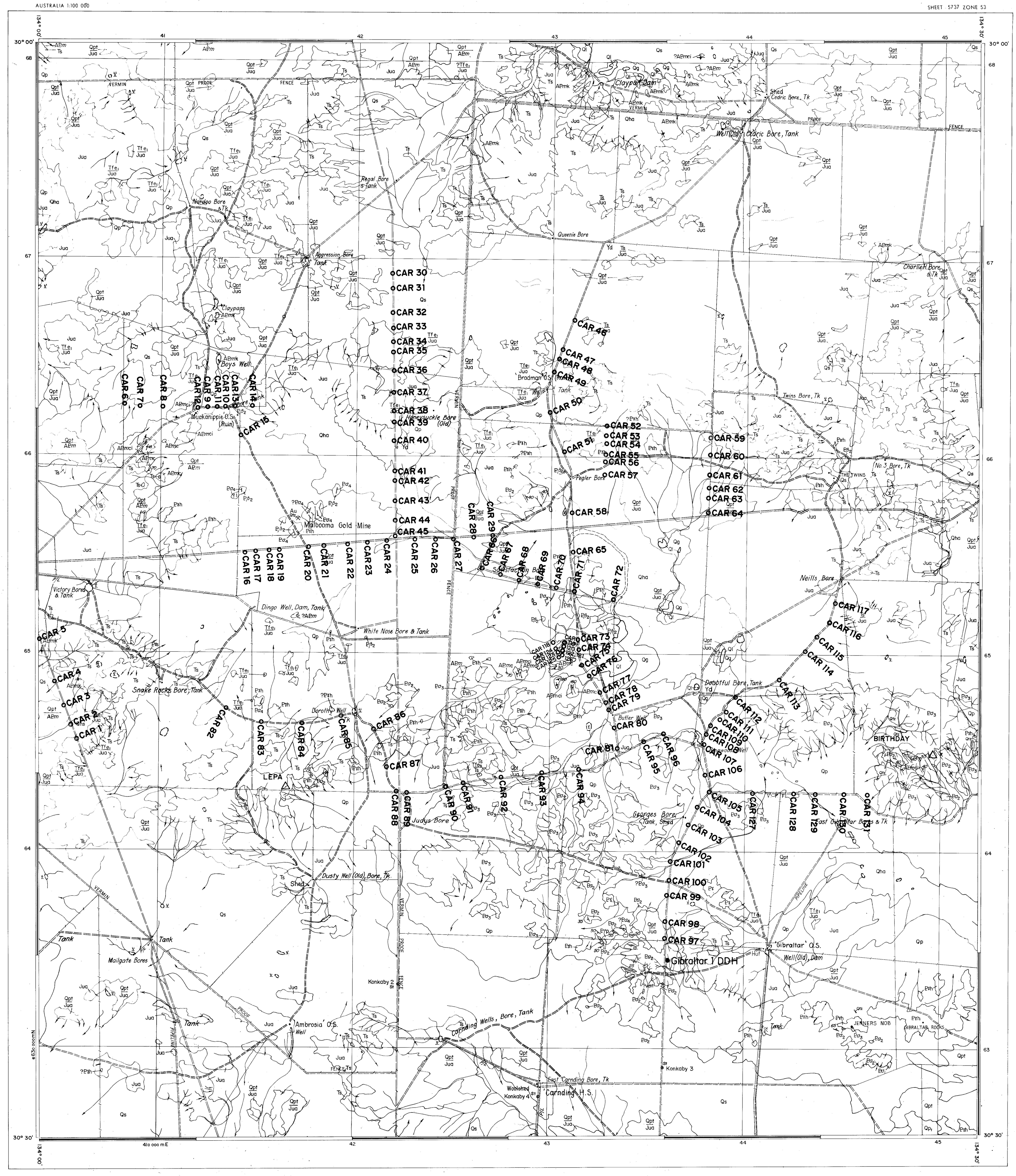
92-5

CARNDING

GEOLOGICAL SURVEY OF SOUTH AUSTRALIA
DEPARTMENT OF MINES ADELAIDE

AUSTRALIA 1:100 000

SHEET 5737 ZONE 53



1:100,000 SHEET INDEX

MULGATHING 5637	CARNDING 5737	BULGUNNIA 5837
	TARCOOLA	
WYNBRING 5636	MALBOOMA 5736	TARCOOLA 5836

SCALE — 1:100,000

KILOMETRES 2 1 0 2 4 6 8 10 12 14 KILOMETRES

MILES 1 0 2 4 6 MILES

TRANSVERSE MERCATOR PROJECTION
HORIZONTAL DATUM: AUSTRALIAN GEODETIC DATUM 1966
GRID LINES ARE 10,000 METRE INTERVALS OF THE AUSTRALIAN MAP GRID, ZONE 53.

Planimetric information prepared by Department of Mines, South Australia, using slotted template assembly method. Aerial photography flown by Department of Lands, South Australia. Based on survey control established by Department of Lands, South Australia.

LOCALITY

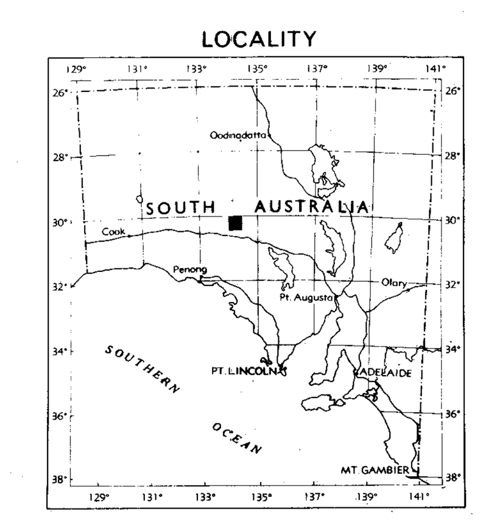


Figure 6

TARCOOLA–TALLARINGA BEDROCK DRILLING PROGRAM

DRILLHOLE LOCATIONS

CARNDING SHEET 5737

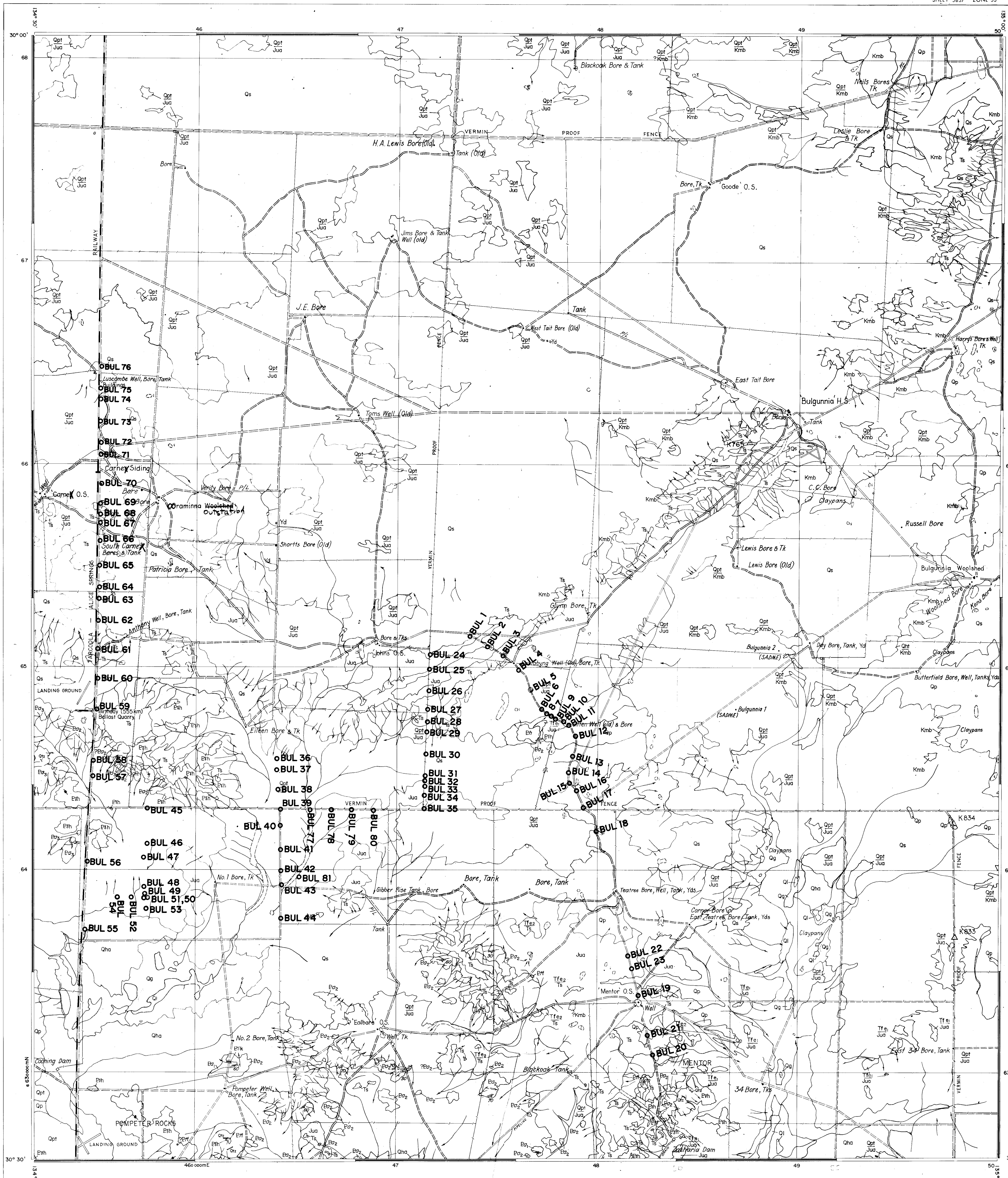
92-7

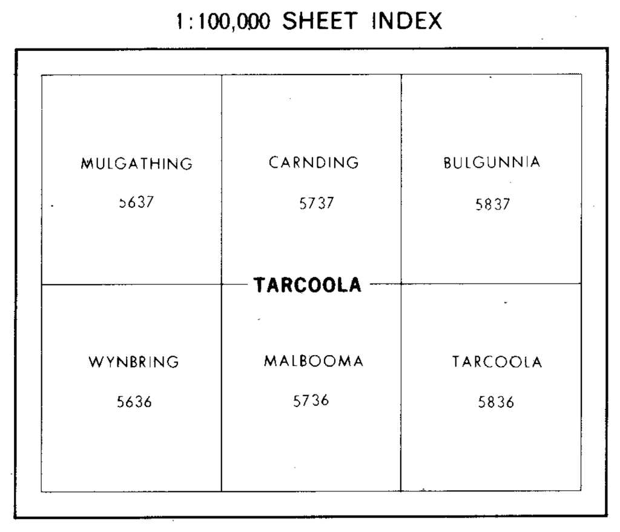
BULGUNNIA

GEOLOGICAL SURVEY OF SOUTH AUSTRALIA
DEPARTMENT OF MINES ADELAIDE

AUSTRALIA 1:100 000

SHEET 5837 ZONE 53





SCALE 1:100,000

KILOMETRES 2 1 0 2 4 6 8 10 12 14 KILOMETRES

MILES 2 1 0 2 4 6 MILES

TRANSVERSE MERCATOR PROJECTION
HORIZONTAL DATUM: AUSTRALIAN GEODETIC DATUM 1966
GRID LINES ARE 10,000 METRE INTERVALS OF THE AUSTRALIAN MAP GRID, ZONE 53.

Planimetric information prepared by Department of Mines, South Australia, using slotted template assembly method.
Aerial photography flown by Department of Lands, South Australia.
Based on survey control established by Department of Lands, South Australia.

LOCALITY

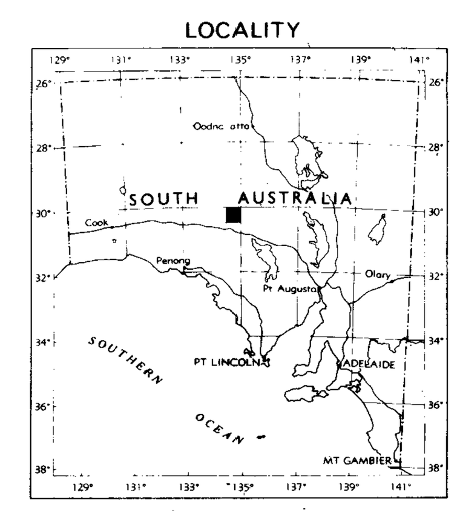


Figure 7

TARCOOLA-TALLARINGA BEDROCK DRILLING PROGRAM

DRILLHOLE LOCATIONS

BULGUNNIA SHEET 5837

92-9