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DEPARTMENT OF MINES
SOUTH AUSTRALIA

REPT. BK. No. 72/93

EXPLANATORY NOTES FOR THE POOLOWANNA 1:250 000 SHEET

Compiled

A.F. WILLIAMS
GEOLOGIST
REGIONAL MAPPING DIVISION

and

B.C. YOUNGS
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22nd May, 1972.

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ABSTRACT

The Poolowanna 1:250 000 sheet area is about 1 000 km north of Adelaide in the extreme north of the South Australian portion of the Great Artesian Basin. The area mapped includes much of the southern portion of the Simpson Desert. The oldest exposed rocks are unnamed Pleistocene fluviatile sediments outcropping on the eastern side of the area. French Petroleum Company (Australia) Mokari no. 1 drilled a few kilometres to the west on DALHOUSIE, intersected Tertiary (159 m), Cretaceous (1 157 m), Jurassic (533 m), Permian (450 m) and Ordovician rocks (132 m). The only other sediments on POOLOWANNA are the Recent dune and playa lake deposits.

Geophysical surveys were carried out on the Poolowanna map area in the early sixties but no drilling was undertaken. These surveys have indicated approximate north-south structural trends which are similar to those in the Pedirka Basin to the west.

INTRODUCTION

The Poolowanna map area (hereafter referred to as POOLOWANNA) lies in the extreme north of the state between latitudes 26° and 27° south and longitudes 136°30' and 138° east. Its northern boundary is the South Australian-Northern Territory border. Adjacent sheets are DALHOUSIE, NOOLYEANA, PANDIE PANDIE and SIMPSON DESERT SOUTH (see fig.1).

POOLOWANNA is completely uninhabited and would include some of the most desolate and inhospitable country in Australia. It is covered entirely by sand dunes and playa lakes and is part of the Simpson Desert. There are no pastoral leases on the area. The nearest towns are Birdsville, 110 km from the northeast corner, and Oodnadatta, 120 km from the southwest corner. Easiest access is by way of a seismic track from Dalhousie Ruins which crosses the sheet from west to east running through Poeppel's Corner (the junction of the Northern Territory, Queensland and South Australian borders).

The average rainfall for POOLOWANNA is less than 130 mm. Average maximum temperatures in surrounding areas (Charlotte Waters and Marree) range from about 20°C in winter to 35°C in summer. However, higher maximums would be expected in the desert.

POOLOWANNA was visited by G. Krieg in 1971 during a helicopter mapping survey of the Lake Eyre, Simpson Desert and Dalhousie areas. Most outcrops of Pleistocene rocks on the map area were examined. These occur on the southeast corner of the sheet. RC9 photography (at a scale of 1:84 600) was available for mapping purposes from the Department of Lands.

PREVIOUS WORK

Part of the map area was first explored by Lindsay in 1885 who travelled from Dalhousie Station to what is now Poeppel's Corner and back. Winnecke (1884) had previously journeyed through GASON and PANDIE PANDIE to Poeppel's Corner and then on to Queensland. The first actual crossing of the desert was by Colson who traversed it in 1936 along the South Australian-Northern Territory border from Blood's Creek to Birdsville and returned slightly south of the border. Madigan, after making aerial flights across the desert in 1929, crossed it to the north of POOLOWANNA with a scientific team in 1939 and named it the Simpson Desert (see Madigan 1944, 45, 46a, 46b; Crocker 1946a; Carrol, 1944).

With the advent of oil exploration in the Great Artesian Basin in the late fifties and early sixties, Santos took up O.E.L. 20 and 21 (now P.E.L. 5 and 6) which included POOLOWANNA, and later formed a partnership with Delhi Petroleum. Gravity and aeromagnetic surveys were carried out in the initial stages of exploration prior to the signing of a farmout agreement with the French Petroleum Company (Australia) (hereafter referred to as F.P.C.(A.)), now Total Exploration Australia P.L. F.P.C.(A.) included the northwestern areas of the sheet in their Poolowanna Seismic Survey (Drayton, 1967) and ceased working in the area in 1966 after drilling four dry wells to the west. Also at this time mapping was carried out throughout the western Great Artesian Basin by company geologists. Structural contour maps of seismic reflectors ("Z", "P" and "C" horizons) and depths to magnetic basement contours have been drawn up by both private companies and the Petroleum Exploration Division of the South Australian Department of Mines. At the time of writing of these notes this Division was preparing a state map of Bouguer Gravity anomalies (B. Milton, Seismic Geophysics) and a subsurface study of the Pedirka Basin (B. Youngs, Petroleum Geology).

Much has been written on the geology of the Great Artesian Basin which is relevent to POOLOWANNA (see selected bibliography).

Adjacent maps currently in preparation are DALHOUSIE, PANDIE PANDIE and NOOLYEANA. SIMPSON DESERT SOUTH in the Northern Territory is also in preparation (Mond, Bureau of Mineral Resources, pers. comm., 1971). Subdivision of the surface on POOLOWANNA is based on the surface stratigraphy of OODNADATTA (Freytag et al., 1967). Photointerpreted maps have been prepared by F.P.C.(A.) in 1963 and Gregory in 1970.

PHYSIOGRAPHY

POOLOWANNA is occupied entirely by the sand dunes and playas of the Simpson Desert. The dunes trend north-northwesterly and are asymmetric, generally being steeper on the eastern side (this depends on the latest wind direction). The top few metres of the dunes are usually mobile, the lower portions being fixed by vegetation. They are usually not more than 20 m high. Surface elevations across the desert show a gentle lowering of the dune base towards the centre. There is no external drainage on POOLOWANNA as all surface water flows into the playas and claypans in the interdunal corridors. The playas usually have a salt or gypsum crust and are moist below this making them treacherous to vehicles.

Vegetation in the desert includes canegrass (Spinifex paradoxus) spinifex (Triodia basedowii), saltbush (Atriplex spp.), mulga (Acacia aneura), gidgee (Acacia gambagei) and needlewood (Hakea leucoptera).

TABLE I - Stratigraphy (surface and subsurface)

AGE	UNIT	SYMBOL	THICKNESS (METRES)	LITHOLOGY	REMARKS
CAINOZOIC – QUATERNARY – Recent	Lake Sediments	Qrl	0 - 0.5	Fine, orange to brown sands and clays with salt and gypsum crusts.	In playa lakes.
CAINOZOIC – QUATERNARY – Pleistocene Recent	Aeolian Sand	Qrs	10 - 30	Orange brown, fine to medium grained, quartz sand of sub-parallel dunes and clayey sand of inter-dunal flats. Plant remains and carbonate in-filled root cavities near base.	Dunes usually asymmetric - steeper on east side. Trend north-northwesterly. Simpson Sand of Firman (1970). May include older dune material.
CAINOZOIC – QUATERNARY – Plio-Pleistocene	Unnamed fluviatile sediments	Qps	2 - 5	Multicoloured, cross-bedded channel sands and clays with occasional vertebrate remains.	Probably includes Katipiri Sand and Tirari Formation.
	In subsurface only (information derived from F.P.C. (A.) Mokari no. 1 and D.S. Pandieburra no. 1				
CAINOZOIC – TERTIARY – Lower - Upper	Unnamed	T	159	Sandstones, sandy limestones and clays overlying red and yellow, poorly consolidated sandstone, very coarse to conglomeratic at the base with some thin streaks of grey clay.	Lower sandstones may be equivalent to Eyre Formation on INNAMINCKA (Wopfner, 1972). This includes Macumba Sandstone on OODNADATTA, and Murnpeowie Formation on MARREE.

AGE		UNIT	SYMBOL	THICKNESS (METRES)	LITHOLOGY	REMARKS
CRETACEOUS	Albian-Cenomanian	Winton	Kuw	458	Grey, silty, carbonaceous claystone with fine to medium grained sandstone lenses and layers. Thin coal seams near the base.	Fluviatile and paludal deposit. Gradational change from Oodnadatta Formation where environment changed from marine to non-marine.
	Albian	Oodnadatta Formation	Klo	385	Grey silty carbonaceous shale and thin lenses of sandstone and siltstone, rare glauconitie. Dark grey calcareous shale near base - Wooldridge Limestone Member - fossiliferous on eastern side.	Thickness approximate. Basal Coorikiana Sandstone Member difficult to recognise on logs because it is probably a shaly facies similar in lithology to upper part of the Bulldog Shale and the lower part of the Oodnadatta Formation.
	Neocomian	Bulldog Shale	Klb	189	Dark grey fossiliferous shale with argillaceous siltstone lenses - some glauconite and pyrite.	
		Cadna-owie Formation	Klc	48	Shale with intercalations of fine grained, calcareous glauconitic sandstone in western areas - much sandier facies to east.	

AGE			UNIT	SYMBOL	THICKNESS (METRES)	LITHOLOGY	REMARKS
MESOZOIC	JURASSIC	Lower-Upper	Algebuckina Sandstone	Jua	563	Undifferentiated; poorly consolidated, medium to coarse quartz sandstone with some interbedded micaceous shale and rare coal seams towards the base. Becomes more shaly to the east.	Good aquifer in this part of basin - not utilized though. Terrestrial fresh water sequence.
PALAEOZOIC	PERMIAN	Lower	Purni Formation and Crown Point Formation	P	451	Undifferentiated: coals, shales, siltstones and sandstones in upper section with congolmerates, sandstones and shales in lower section.	Target zone as possible source of hydrocarbons.
	ORDOVICIAN	Lower	Unnamed	O	132	Grey green shales with stringers of fine sandstone.	

STRATIGRAPHY

The oldest outcropping sediments on POOLOWANNA are the Pleistocene fluviatile deposits exposed on the edges of playa lakes on the east side of the map area. The rest of the area is covered by the dunes of the Simpson Desert. There is no subsurface geological information on POOLOWANNA itself. However, data are available from several oil wells drilled in surrounding portions of the western Great Artesian Basin. These wells are *Delhi Santos Pandieburra no. 1 (1963) on PANDIE PANDIE, Amerada McDills no. 1 (1965) on McDILLS and F.P.C.(A.) Witcherrie no. 1 (Magnier, 1964a) Purni no. 1 (Magnier, 1964b), Mt. Crispe no. 1 (Jacque, 1966a) and Mokari no. 1 (Jacque, 1966b) on DALHOUSIE and Poonarunna no. 1 (Magnier and Cooper, 1964) on NOOLYEANA (see locations on fig. 1). All wells penetrated Cainozoic and Mesozoic sediments. F.P.C.(A.) Mokari no. 1 is only about 6 km west of POOLOWANNA.

TABLE II: FORMATION TOPS AND THICKNESS F.P.C.(A.) MOKARI NO. 1 (Well Completion report modified from nomenclature of Whitehouse, 1955).

FORMATION	TOP (METRES)	THICKNESS (METRES)
Recent to Tertiary	0	159.5
Winton Formation	159.5	455.7
Oodnadatta Formation	615.2	385.2
Wooldridge Limestone Member	969	7.6
Bulldog Shale	1000.4 approx.	188.5 approx.
Cadna-owie Formation	1188.9	47.9
Algebuckina Sandstone	1236.8	563.3
Permian	1800.1	451.1
Ordovician	2251.2	132.1
TOTAL DEPTH	2383.2	

* Hereafter referred to as D.S.

		SOUTH AUSTRALIA		NORTHERN TERRITORY	QUEENSLAND			
		POOLOWANNA—adapted from Wopfner et. al. 1970 (J-K) and Freytag 1966 (K)		Wells et. al. 1966	Whitehouse 1955—modified for use in well completion reports		Exon, 1966 (J) and Vine et al., 1967 (K)	
CRETACEOUS	Cenomanian	NEALES RIVER GROUP	Winton Formation	eroded		Winton Formation	MANUKA SUB GROUP	Winton Formation
								Mackunda Formation
			Oodnadatta Formation			Tambo Formation	WILGUNYA SUB GROUP	Allaru Mudstone
			Wooldridge Limestone M.					Toolebuc Limestone
			Coorikiana Sandstone M.	Rumbalara Shale		Roma Formation		Wallumbilla Formation
			Bulldog Shale					
	Neocomian		Cadna-owie Formation	De Souza Sandstone	BLYTHESDALE GROUP	Transition Beds		"Hooray Sandstone"
JURASSIC	Upper		Algebuckina Sandstone			Mooga Sandstone		
						Fossil Wood Beds		Westbourne Formation
						Gubberamunda Sandstone		Adori Sandstone
	Lower-Upper		Undifferentiated	No deposition		Walloon Coal Measures		Birkhead Formation
						Hutton Sandstone		Hutton Sandstone

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Table 3. Part of Mesozoic nomenclature and Correlation– POOLOWANNA (adapted from Fig 65 after Wopfner in Parkin, 1969)

MESOZOIC

Nomenclature for the Mesozoic on POOLOWANNA is the same as that used on OODNADATTA (Freytag et al., 1967). For correlation with the Northern Territory and Queensland, see Table 3.

Jurassic

Disconformably above the Permian in F.P.C.(A.) Mokari no. 1 are about 530 m of medium to coarse quartz sandstones and some thin interbedded fissile shales. Occasional coal seams are present near the base. The sequence has been left undifferentiated in section where the name Algebuckina Sandstone (Sprigg, 1958a) has been ascribed to it.

The Jurassic sequence undergoes facies changes to the east where it becomes more shaly.

Cretaceous

The base of the Cretaceous in F.P.C.(A.) Mokari no. 1 is marked by a thin (48 m) sequence of shale and fine grained calcareous sandstone.

Above the Cadna-owie Formation in Mokari no. 1 (Jacque, 1966b) are two dark grey shale sequences separated by a slightly calcareous marly unit. These two sequences in the well completion report have been correlated with the Roma and Tambo Series of Whitehead (1955) and the marly unit is equated with the Toolebuc Limestone in Queensland (Vine et al., 1967). The Toolebuc Limestone is correlated with the Wooldridge Limestone Member of the Oodnadatta Formation (Freytag, 1966).

Conformably overlying the Oodnadatta Formation is the Winton Formation which is characterized by coal beds and feldspathic sandstones reflecting a change in environment from marine to non marine.

CAINOZOIC

Tertiary

Mokari no. 1 intersected about 150 m of Tertiary and Quaternary rocks. The lower 65 m of the sequence is composed of coarse quartz sandstones and conglomerates with some clays near the top and are equated with the Lower Tertiary Eyre Formation on INNAMINCKA. Similar quartz sandstones overly the Winton Formation in D.S. Pandieburra no. 1 and F.P.C.(A.) Poonarunna no. 1.

Above this sequence are sands, clay and sandy limestones of probable Upper Tertiary age. No surface equivalents of these are exposed on POOLOWANNA.

Quaternary

The oldest outcropping sediments are the unnamed (?) Pleistocene channel sands and clays which outcrop (outcrops exaggerated on map) around the edges of the deflated playa lakes on the east side of POOLOWANNA. Surface expression of these deposits is shown as traces of the old meanders and channels in the interdunal corridors. These deposits include the Katipiri Sands and the Tirari Formation (Stirton et al., 1961). Similar deposits commonly contain vertebrate remains on NOOLYEANA, LAKE EYRE and KOPPERAMANNA.

Overlying most of these deposits on POOLOWANNA are the longitudinal north-northwesterly trending dunes of the Simpson Desert. These dunes are separated by elongate playa lakes containing fine aeolian sand and clay and are often covered by a thin crust of salt and gypsum on the eastern part of the map sheet. The dunes are composed of fine to medium grained quartz sand and vary in colour from orange brown in the southern portions of the sheet to brownish red in the northern portions. Dune height rarely exceeds 20 m although large dunes are found to the east. Dune frequency varies from 5 to 6 per km west of the map area to 3 or 5 per km on central POOLOWANNA. Interdunal corridors contain clayey sand and occasionally fragments of limestone which appear to be infilled root cavities, which have weathered out of the lower portions of the dune.

This calcareous section of the dune is thought to be part of an ancestral dune system (Wopfner and Twidale, 1967).

Age of the dunes is uncertain but it is suggested (Crocker, 1946a; Heath and Wopfner, 1963) that they formed during the arid period which closely followed the end of the Pleistocene about 8 to 10 000 years ago. Folk (1971) considers the dunes of the Simpson Desert have been developed under the presently existing wind regime and that they are not relics from a Pleistocene period of shifted wind belts.

STRUCTURE

The subsurface structure of POOLOWANNA is known entirely from geophysical surveys, a summary of which is presented below.

(a) Aeromagnetic and Gravity Results

POOLOWANNA lies in the western portion of the Mesozoic Great Artesian Basin and the southeastern edge of the Permian Pedirka Basin underlies the northwest of the area (fig. 1).

The interpretation of depths to magnetic basement by Compagnie Generale de Geophysique (C.G.G.) (fig. 2) shows a northeast trending basement ridge at 2 000 m in the northeastern portion of the area under consideration. This is flanked to the south and west by a region of deeper basement, 3 000 m. The greatest depths to the basement on POOLOWANNA occur in the northwest beneath the Permian Pedirka Basin and there is a gradual rise away from the Palaeozoic basin towards Poeppel's Corner.

Fig. 3 shows an area of gentle gravity gradients on POOLOWANNA and this conforms with the pattern for the Great Artesian Basin to the east. Bouguer gravity values decrease towards the northeast and a minimum of -30 milligals is reached along the central northern border of the area. The aeromagnetic and gravity results do not indicate the likely existence of any extensive, deep Palaeozoic sedimentary basins similar to those further west and southwest but small pockets of Palaeozoic rocks could be preserved as a result of downfaulting to the east of fault F6 (fig. 4, "Z" horizon), the presence of which is also indicated on the aeromagnetic and gravity maps (figs. 2 and 3). The negative anomaly along the Northern Territory border indicates an area of low density rocks and may be caused by a pocket of remnant Permian or older sedimentary strata. The one elongate area of relatively shallow basement in the northeast could in fact be composed of a series of shallower areas separated by deeper pockets infilled with Upper Palaeozoic (Devonian and Permian) sediments. Both the -30 and -25 milligal anomalies in the eastern half of POOLOWANNA (fig. 3) lie on the downthrow side of the fault interpreted from the three geophysical methods. It is possible that these strata could be Upper Palaeozoic in age as such sediments are relatively unconsolidated, undeformed and therefore low density.

(b) Seismic Results

The "Z" horizon in the Pedirka Basin was defined as the first marker with a horizontal velocity greater than 5 000 m/s (Laherrere and Drayton, 1965) and in this region it is the deepest seismic horizon to have been recorded. Over much of the Pedirka Basin it represents a Palaeozoic horizon beneath the Devonian. Elsewhere in the South Australian portion of the Great Artesian Basin the term "Z" horizon has been used in a different sense, i.e. the unconformity at the base of the Permian (Hall, 1968). It is now defined as the pre-Permian unconformity and will only coincide with the C.G.G. horizon in areas where Devonian sediments are absent. This is the case on nearly all of POOLOWANNA (fig. 4). The plan shows two northwest trending faults in a highly folded area which increases in depth from 1 900 m in the southwest to over 3 000 m at fault F6 and in the northwest.

The Devonian "F" reflector was identified in the northwest of the area and marks the eastern end of a Devonian sedimentary basin which extended into the Pedirka and Amadeus Basins (fig. 3). This corresponds to Hall's "Z" horizon.

Three "P" horizons have been mapped in the Pedirka Basin by F.P.C.(A.) and these are believed to represent Lower Permian sandstones (P), the top of the Upper Purni coal beds (P1) and Lower Jurassic sediments (P2) (F.P.C.(A.), 1963). The "P" horizon was not mapped on POOLOWANNA but the possible Permian pinch-out was located from the "P1" horizon; the pinchout, according to F.P.C.(A.), is shown in fig. 4.

Structural trends of the "P1" and "P2" are similar to those of the "C" horizon (see tectonic sketch with map) and show a general north-south alignment of the contours with small basins and ridges throughout (Youngs, 1972). At all levels there is a gradual deepening southeastwards towards the central parts of the Great Artesian Basin.

GEOLOGICAL HISTORY

Proterozoic sediments were deformed by a number of Precambrian earth movements and subjected to long periods of erosion during the late Proterozoic and early Palaeozoic. The Poolowanna area was a relatively stable platform during the Lower Palaeozoic and may have received either none or thin Cambrian sediments. Ordovician strata were deposited in a marine environment, deformed by the late Ordovician Rodingan earthmovement and greatly eroded during the Silurian period. The Devonian Mereenie Sandstone and Finke Group areas of terrestrial deposition may have extended over the region or at least into the northwest. Devonian deposition took place under hot, arid conditions and was brought to an end by the Alice Springs (Kanimblan) Orogeny.

Temperatures dropped in Carboniferous times and glaciers developed in the newly-formed mountainous areas during the late Carboniferous and early Permian. The Crown Point Formation was deposited on to a variety of Proterozoic and Palaeozoic surfaces in a continental glacial and peri-glacial environment. A short period of erosion, during which the climate became warmer, followed this and the Purni Formation sediments were deposited under terrestrial freshwater conditions.

Probably no deposition occurred during the Triassic when epeirogenic movements initiating the downwarp of the Great Artesian Basin commenced. Jurassic terrestrial sands and shales were deposited in the gradually sinking basin and were overlain by marine Cretaceous shales and siltstones which accumulated as the sea transgressed from the northeast. The regression of this sea during the Albian is marked by the presence of the terrestrial Winton Formation. Tectonic movements in late Cretaceous and early Tertiary times resulted in uplift, weathering and erosion of the Winton Formation.

Further fluviatile sediments (Eyre Formation - Wopfner, 1972) were deposited in early Tertiary times and these, together with the Cretaceous sediments, underwent deep weathering including much silicification near the surface (Wopfner and Twidale, 1967). Terrestrial sedimentation continued in late Tertiary times with deposition of sands, clays and sandy limestones (in F.P.C.(A.) Mokari no. 1). Towards the end of the Tertiary and during the Pleistocene, fluviatile sediments were deposited in the structurally low area now occupied by the Simpson Desert. A change to arid climate followed with the subsequent development of a gypsiferous weathering profile during late Pleistocene times and later the extensive dune system of the desert. Young tectonism, as evidenced by recent earthquakes (Bolt, 1958) and features such as Recent mound springs.

and north-south groove structures on Lake Eyre (Wopfner and Twidale, op. cit.) led to deflation of the playa lakes, in particular Lake Eyre, the main source of material for the Simpson Desert.

ECONOMIC GEOLOGY

Hydrogeology

Although water supplies of up to 2 million litres per day are available at depth (1 200 m+) in the artesian aquifers (Lower Cretaceous and Jurassic sands), the country is unsuitable for pastoral uses because of lack of feed and thus no water bores have been sunk. F.P.C.(A.) Mokari no. 1 aquifers were cased off for this reason. The only surface water on POOLOWANNA occurs in claypans after rain and may last not much longer than a few weeks before evaporating.

Petroleum

Geophysical exploration for petroleum was carried out over POOLOWANNA in the early 1960's but results proved disappointing. Early potential targets were Lower Palaeozoic sediments but then emphasis was shifted to the Permian after gas was discovered in the Cooper Basin, south-east of POOLOWANNA. The Permian sediments were mapped and later drilled but although good porosities were indicated, the geological history suggests conditions suitable for the entrapment of hydrocarbons did not exist (Drayton, 1967).

22nd May, 1972

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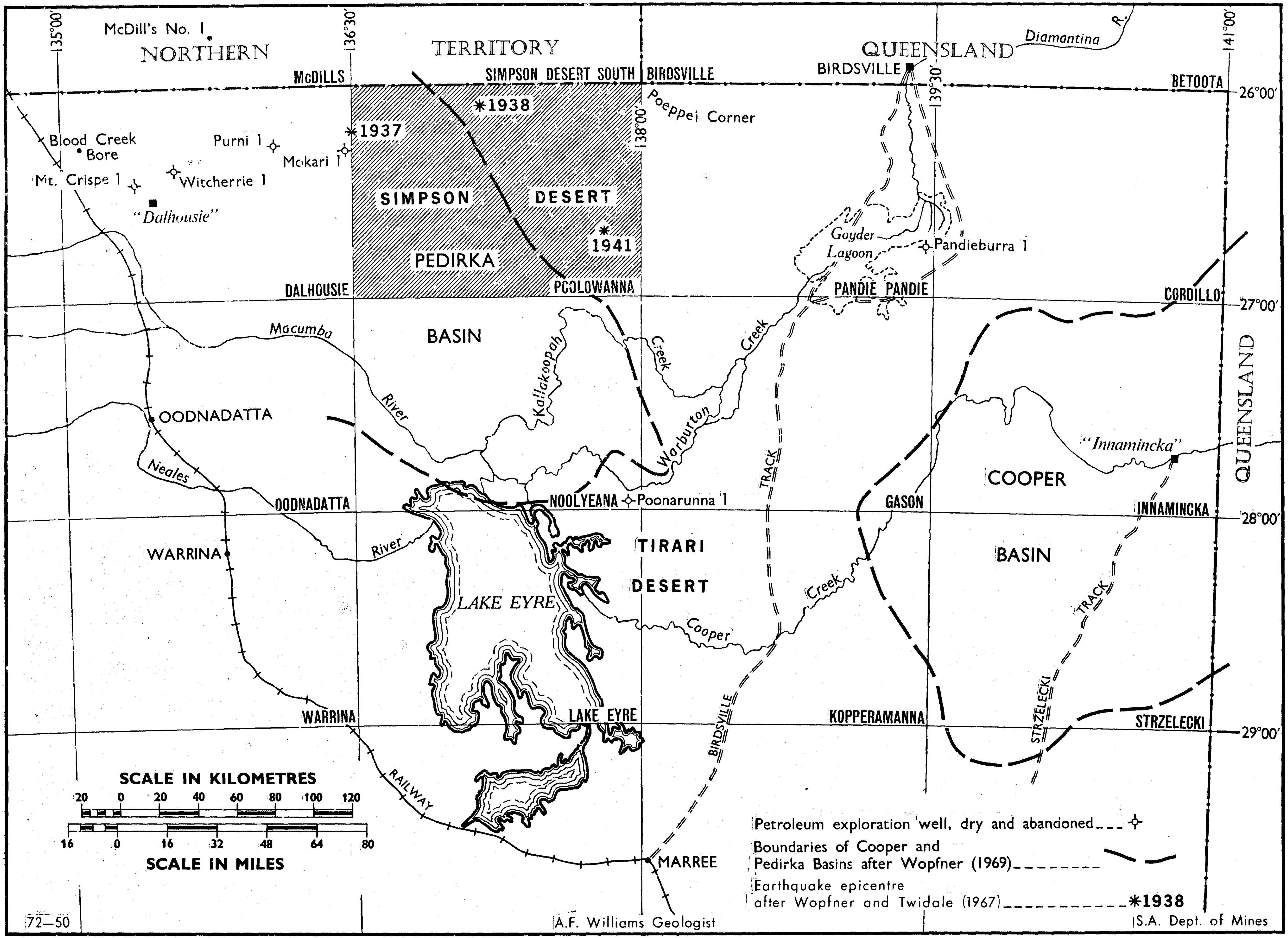


McDill's No. 1
NORTHERN
TERRITORY
QUEENSLAND
Diamantina R.
135°00'
136°30'
138°00'
139°30'
141°00'
26°00'
27°00'
28°00'
29°00'
McDILLS
SIMPSON DESERT SOUTH
BIRDSVILLE
BIRDSVILLE
BETOOTA
Poeppei Corner
*1938
*1937
Blood Creek Bore
Purni 1
Mokari 1
Mt. Crispe 1
Witcherrie 1
"Dalhousie"
SIMPSON
DESERT
*1941
PEDIRKA
Goyder Lagoon
Pandieburra 1
DALHOUSIE
POOLOWANNA
PANDIE PANDIE
CORDILLO
Macumba
River
BASIN
Kallakoopah
Creek
Warburton
Creek
OODNADATTA
Neales
OODNADATTA
River
NOOLYEANA
Poonarunna 1
TRACK
"Innamincka"
COOPER
GASON
INNAMINCKA
QUEENSLAND
WARRINA
TIRARI
DESERT
BASIN
LAKE EYRE
Creek
Cooper
TRACK
WARRINA
LAKE EYRE
KOPPERAMANNA
STRZELECKI
STRZELECKI
BIRDSVILLE
RAILWAY
SCALE IN KILOMETRES
20 0 20 40 60 80 100 120
16 0 16 32 48 64 80
SCALE IN MILES
MARREE
Petroleum exploration well, dry and abandoned
Boundaries of Cooper and Pedirka Basins after Wopfner (1969)
Earthquake epicentre after Wopfner and Twidale (1967)
*1938
72—50
A.F. Williams Geologist
S.A. Dept. of Mines

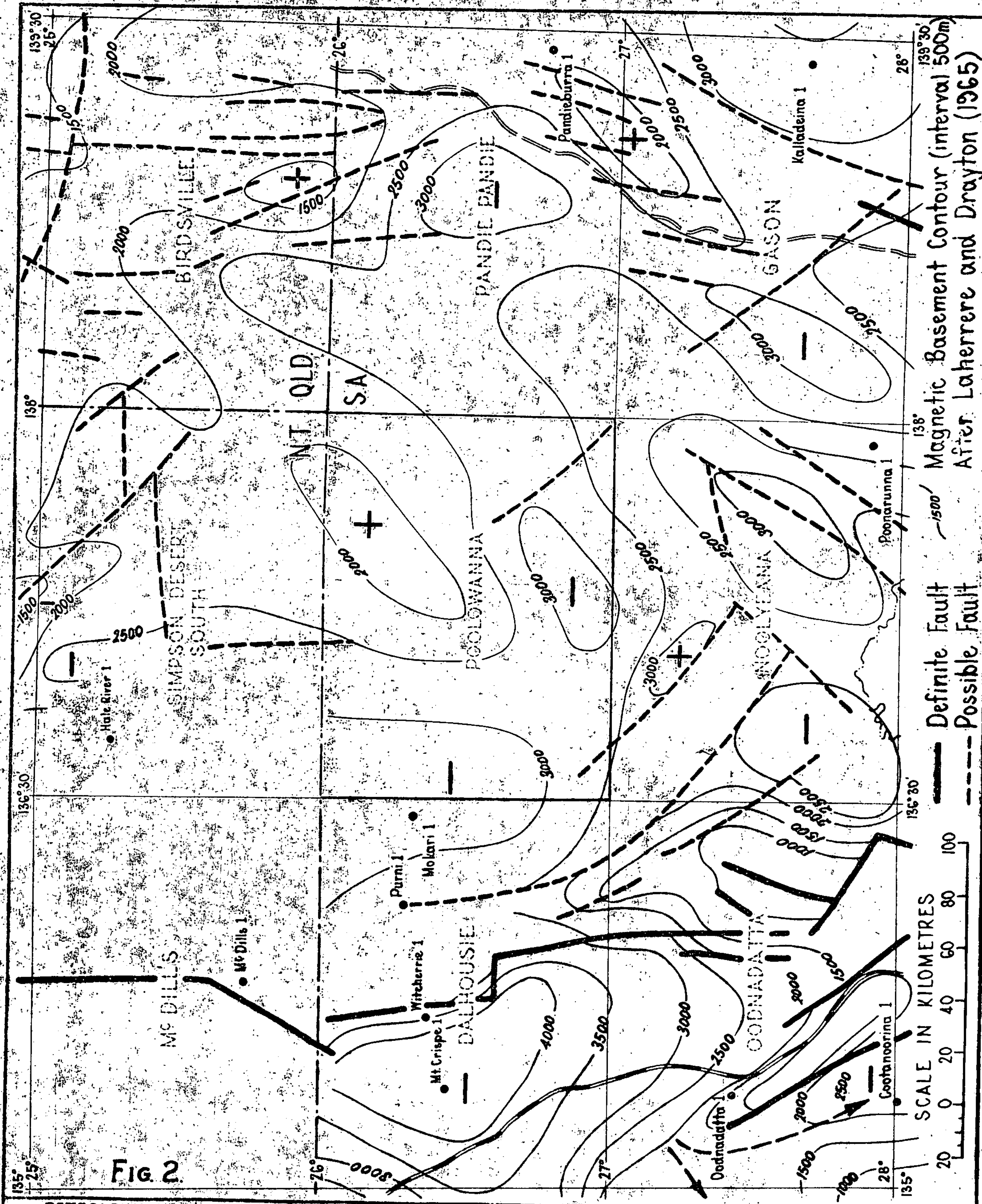


FIG. 2

PETROLEUM GEOLOGY SECTION

Compiled: B. Youngs

Drn. R.H. Ckd.

DEPARTMENT OF MINES — SOUTH AUSTRALIA

POOLOWANNA 1:250 000

SUBSURFACE STRUCTURE & STRATIGRAPHY

MAGNETIC BASEMENT CONTOURS

Scale: As shown

Date: 11 Feb 1972

Drg. No. **S9696** BC

1M–2,70 A1810

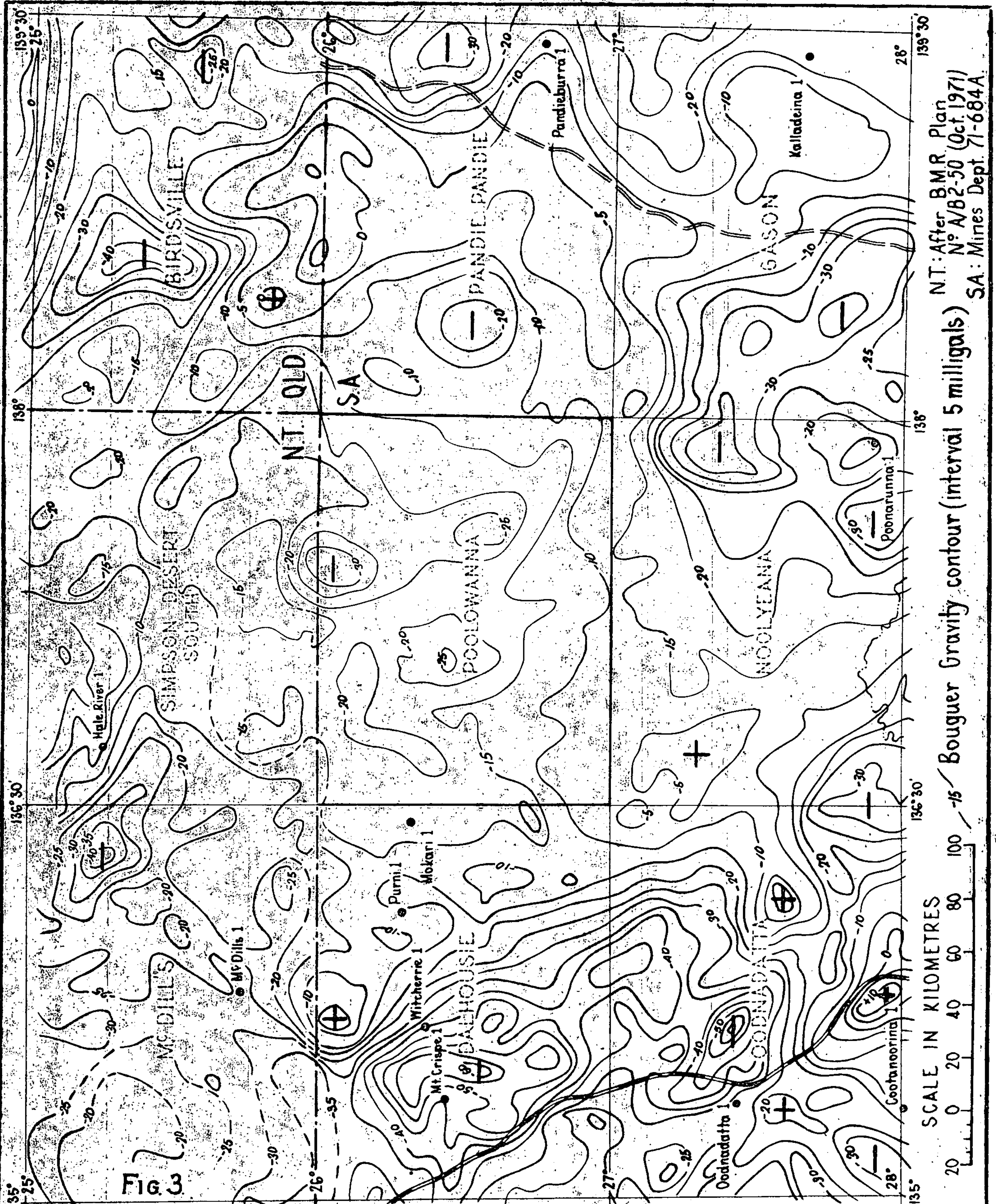
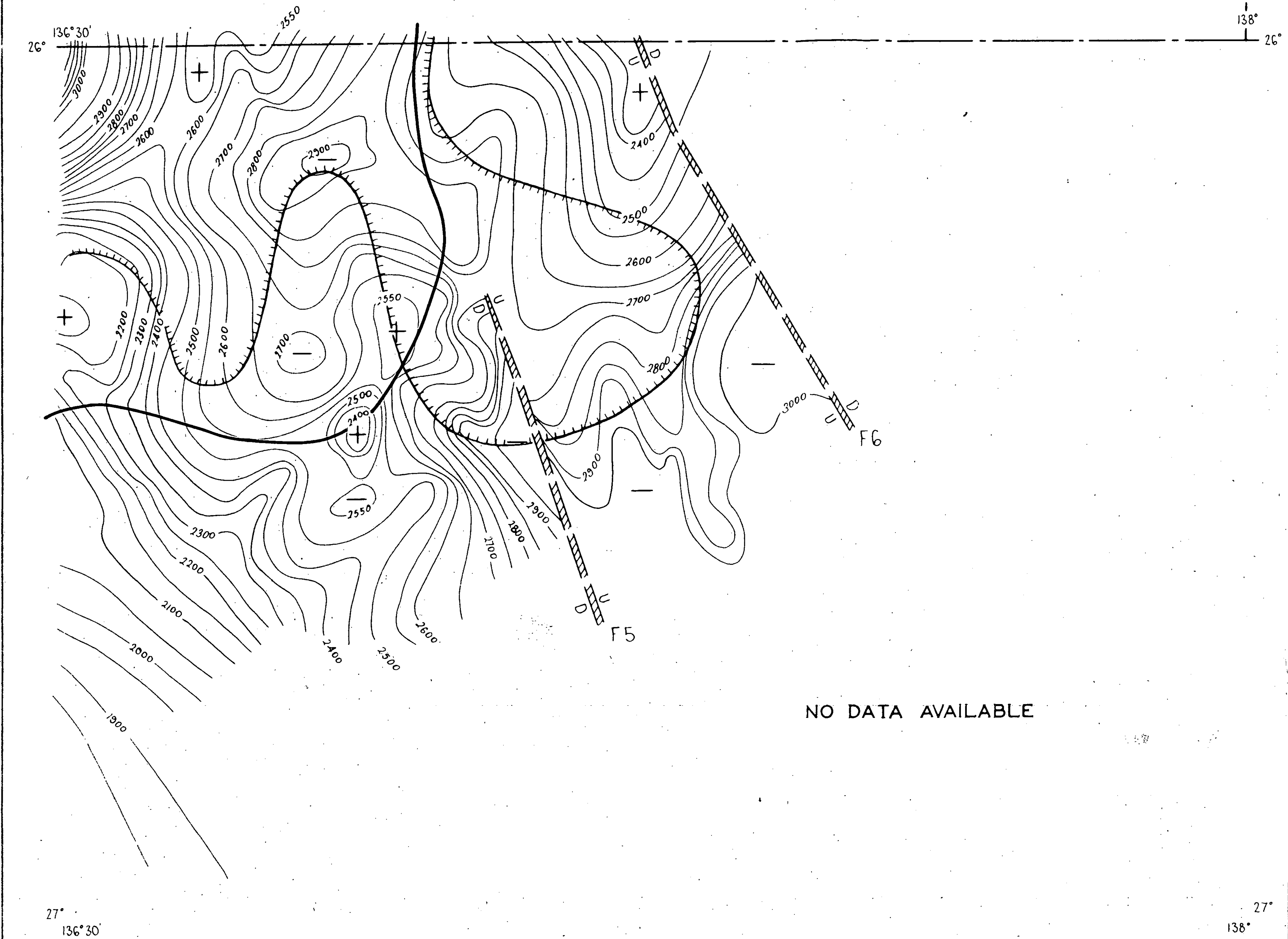


FIG. 3

PETROLEUM GEOLOGY SECTION	**DEPARTMENT OF MINES — SOUTH AUSTRALIA**	Scale: As shown
Compiled: B. Youngs	POOLOWANNA 1:250 000	Date: 11 Feb 1972
Drn: R.H. Ckd:	SUBSURFACE STRUCTURE & STRATIGRAPHY	Drg. No.
	PRELIMINARY BOUGUER ANOMALIES	S9697 BC

1M-2.70 A1810



Approximate limit of Devonian Finke Group reflector (from Drayton, 1967)

Approximate limit of Permian Reflector (from Drayton, 1967)

Contour Interval 50 metres
Depths below sea level
After FPC(A), 1965

SCALE IN KILOMETRES
10 0 10 20 30 40 50 60

FIG. 4.

PETROLEUM GEOLOGY SECTION	DEPARTMENT OF MINES – SOUTH AUSTRALIA	Scale: As shown
Compiled: B Youngs	POOLOWANNA 1:250 000	Date: 14 Feb 1972
Drn: R.H. Ckd.	DEPTH TO Z HORIZON & LIMITS OF UPPER PALAEOZOIC REFLECTORS	Drg. No. 72-214 BC