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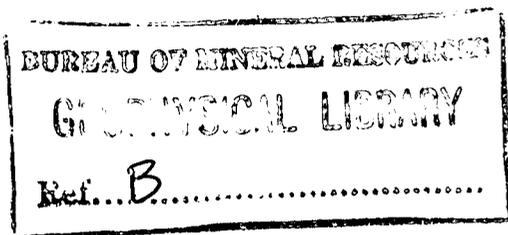
COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS



RECORD No. 1963/19



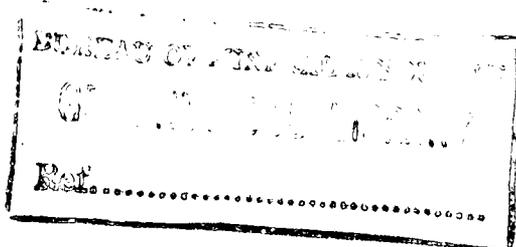
MOUNT HUNTER NO. 1 (AOG) WELL LOGGING, NSW 1962

by

A. Radeski and F. Jewell

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus or statement without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

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CONTENTS

	<u>Page</u>
SUMMARY	
1. INTRODUCTION	1
2. EQUIPMENT AND OPERATIONS	1
3. GEOLOGY	1
4. INTERPRETATION OF GAMMA-RAY LOG	2
5. CONCLUSIONS	3
6. REFERENCES	3

ILLUSTRATIONS

- Plate 1. Locality map (Drawing No. I56/B6-1)
- Plate 2. Gamma-ray log and lithologic log, 50 ft to 1 in. (I56/B6-2)
- Plate 3. Gamma-ray log and lithologic log, 100 ft to 1 in. (I56/B6-3)

SUMMARY

The gamma-ray log of Mount Hunter No. 1 Well situated in the south-western part of the Sydney Basin, is used in conjunction with the ditch-sample log to define the depths to the lithologic units. Permian coal measures were struck at 2113-ft depth, assuming that the top coal seam represents the top of the coal measures. The coal seams show low radioactivity, but the radioactivity of some of the sandstones is equally low.

1. INTRODUCTION

Mount Hunter No. 1 Well is located near Camden, NSW at approximately longitude 150°38'48"E, latitude 34°3'33"S. The location of the well is shown on Plate 1. It was logged by A. Radeski of the Bureau of Mineral Resources, Geology and Geophysics on 8th February 1962, at the request of the Australian Oil and Gas Corporation Ltd.

The well was drilled by percussion methods and was cased to 1730 ft. The ditch-sample log was supplemented by eleven cores taken about every 300 ft in depth. Several gas shows were encountered at depths below 800 ft.

2. EQUIPMENT AND OPERATIONS

A Failing Logmaster was used to obtain gamma-ray logs of the hole. Two logs were made, the first on a depth-scale of 100 ft/in and the second on a depth-scale of 50 ft/in. On the first log, the time constant of the equipment was set to 1 sec and the sensitivity to 0.01 mr/hr per inch of chart. The hole was logged at a speed of 30 ft/min. On the second log the time constant was 5 sec and the logging speed 15 ft/min.

3. GEOLOGY

The bore is located in the south-western part of the Sydney Basin where Wianamatta shales crop out. The following stratigraphic succession is found in the northern part of the basin (BMR, 1960).

	<u>Unit</u>	<u>Max. thick- ness (ft)</u>	<u>Lithology</u>
Triassic	Wianamatta Group	850	shale, calcareous sandstone
	Hawkesbury Sandstone	1000	cross-bedded glistening flaggy white sandstone, fossiliferous shale
	Narrabeen Group	2290	shale, red and green shale, sandstone, conglomerate
Permian	Newcastle Coal Measures	1500	shale, sandstone, conglomerate, coal seams
	Tomago Coal Measures	2000	shale, sandstone, coal seams
	Maitland Group 'Upper Marine series'	6300	claystone, shale, sandstone, calcareous in part.
	Greta Coal Measures	300	fine conglomerate, sandstone, shale and coal seams.
	Dalwood Group 'Lower Marine Series'	5900	claystone, shale, sandstone, conglomerate, with limestone and basic volcanics

In the western part of the basin, west of the Mount Hunter No. 1 Well, the equivalents of the Dalwood Group and the Greta Coal Measures are absent, and the Upper Coal Measures and the 'Upper Marine Series' are thinner; here the stratigraphic succession in the Permian is as follows (McElroy, 1962).

<u>Unit</u>	<u>Max. thickness</u> (ft)	<u>Lithology</u>
Lithgow Coal Measures	820	sandstone, conglomerate, coal seams
Capertee Group 'Upper Marine Series'	1000	sandstone, massive conglomerate

In bores (Mulgoa No. 1 and 2, Dural No. 1 and 2, Balmain Shaft and Bore, Kurrajong, Kulnina, and in the present well) the lower part of the coal sequence has been tentatively correlated with the Tomago Coal Measures (McElroy, 1962, p.10) and the Lithgow Coal Measures regarded as equivalent to the Newcastle Coal Measures.

Ferruginous chocolate-coloured shales are characteristic of the top of the Narrabeen Group. The sandstone of the Narrabeen Group and Hawkesbury Sandstone are similar, but shale beds are more numerous in the Narrabeen.

4. INTERPRETATION OF GAMMA-RAY LOG

The gamma-ray log is shown on Plate 2 at a depth-scale of 50 ft/in with the lithologic log and the stratigraphic succession modified to conform to the depths indicated for the various beds by the gamma-ray log. Plate 3 shows the gamma-ray log on a depth scale of 100 ft/in.

The sandstones and conglomerates are less radioactive than the shales, and the coal seams also have very low radioactivity, which is well shown by the top seam at depths of 2113 to 2126 ft. Reference to the lithologic log is required to distinguish the coal seams from those clean sandstones that are as weakly radioactive as the coal, e.g. the white sandstone beds between depths of 2759 and 2823 ft.

The coal measures generally show higher radioactivity than the Triassic rocks because of their high shale content, the increase beginning at about 2025 ft. There is no basis for distinguishing between Newcastle (or Lithgow) and Tomago Coal Measures from the gamma-ray log, but the log does show a generally reduced radioactivity below the white sandstones, i.e. below a depth of 2823 ft.

The marked decrease in gamma-ray count about a depth of 1730 ft is due to the shielding effect of the casing. The higher count above a depth of 189 ft corresponds to the shales of the Wianamatta Group. On the other hand, the chocolate-coloured shale is not a good radioactive marker and the Hawkesbury/Narrabeen contact cannot be distinguished on the gamma-ray log. The top of the Narrabeen Group, after the Australian Oil and Gas Corporation's interpretation, corresponds to the top of the shale bed at 743 ft.

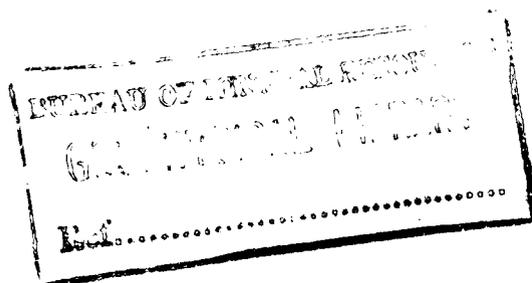
The sandstones below a depth of 3334 ft are highly calcareous and do not show any marked change in radioactivity as compared with the sandstones above this depth; the gamma-ray log therefore does not show any boundary that may represent the top of the Upper Marine Series.

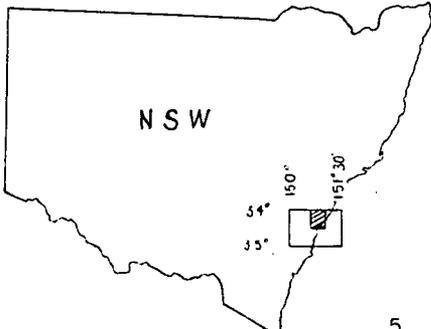
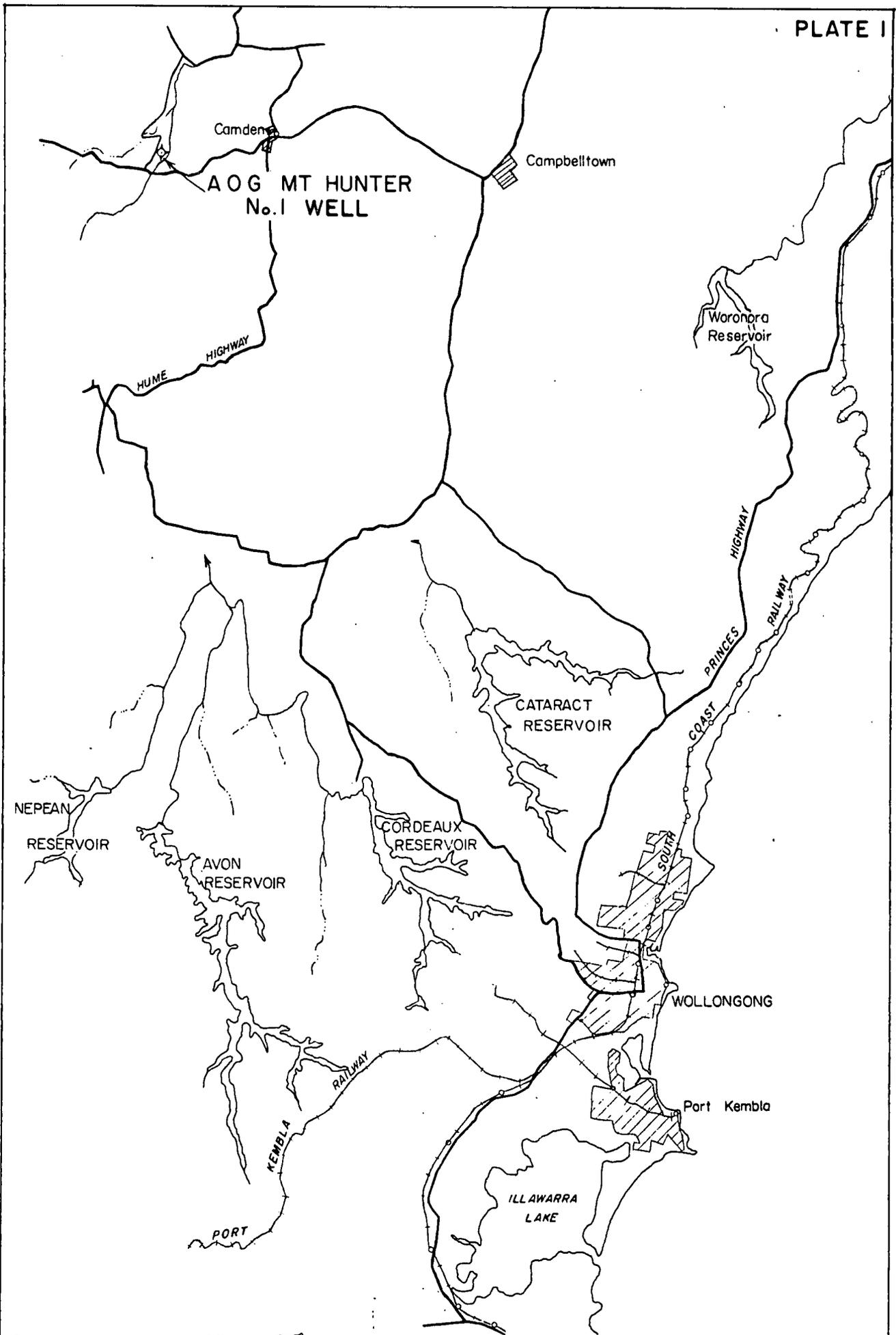
5. CONCLUSIONS

The formation changes are not well defined by the gamma-ray log, apart from the Wianamatta/Hawkesbury contact at 189-ft depth. The coal seams show characteristically low radioactivity, but might be confused with clean sandstones in the absence of the lithologic log. An increase in radioactivity, corresponding to higher shale content, is apparent below a depth of 2025 ft, but the top of the Permian coal measures has been taken as the top of the shallowest coal seam at a depth of 2113 ft.

6. REFERENCES

- | | | |
|---------------|------|---|
| BMR | 1960 | Summary of oil-search activities in Australia and New Guinea to June, 1959.
<u>Bur. Min. Resour. Aust. Rep.41A</u> |
| McELROY, C.T. | 1962 | 1:250,000 geological series Sydney, NSW.
<u>Bur. Min. Resour. Aust.</u>
<u>Explanatory Notes Sheet I/56-5</u>
(2nd edition). |





AOG MOUNT HUNTER
No 1 WELL
LOCALITY MAP



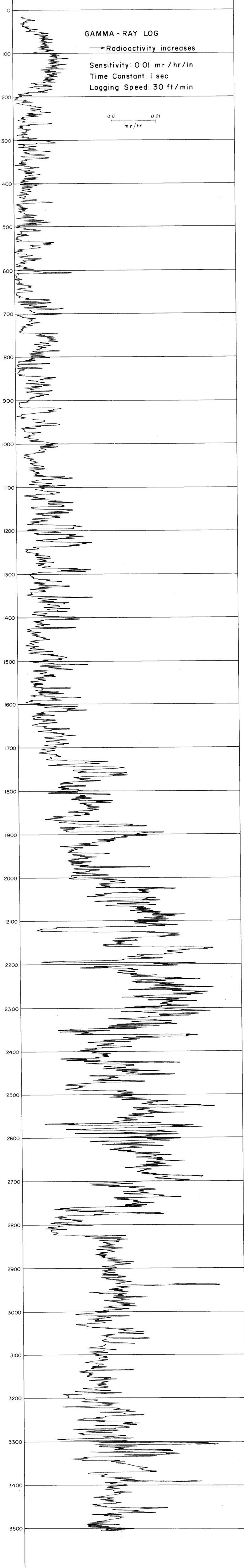
REFERENCE TO AUSTRALIA
STANDARD MAP SERIES:
WOLLONGONG

COMPANY AUSTRALIAN OIL AND GAS CO.	COORDINATES:
AREA SOUTH SYDNEY BASIN P.E.L. 13	N 150° 38' 48" E
WELL MOUNT HUNTER No. 1 STATE N.S.W.	S 34° 03' 33" S
	ELEVATION:
	N.F. 285
	K.B.
	G.L. 282

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	8-2-62		Nature	DRY HOLE	
First Reading	3500		Density		
Last Reading	10		Viscosity	@ °F	@ °F
Footage Logged	3490		Resistivity	@ °F	@ °F
Bottom (Driller)	3512		Res. BHT	@ °F	@ °F
Casing (From Log)	-		pH		
Casing (Driller)	1730		Circ. Temp.		
Casing Size	13" - 50' 9"		B.H. Temp.		
Bit Size:	9 5/8" - 1065'				
Bit Size:	6 5/8" - 1730'				
			Logged by	A. RADESKI	
			Witnessed by	J. STUNTZ	

REMARKS DEPTHS REFERRED TO DERRICK FLOOR

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TO ACCOMPANY RECORD No 1963/19