COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Petroleum Search Subsidy Acts

PUBLICATION No. 62

SUMMARY OF DATA AND RESULTS

OTWAY BASIN, VICTORIA

Flaxmans No. 1 Well

OF

FROME-BROKEN HILL COMPANY PROPRIETARY LIMITED

Issued under the Authority of the Hon. David Fairbairn
Minister for National Development
1965

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

MINISTER: THE HON. DAVID FAIRBAIRN, D.F.C., M.P.

SECRETARY: SIR HAROLD RAGGATT, C.B.E.

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

DIRECTOR: J. M. RAYNER

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ASSISTANT DIRECTOR: M. A. CONDON

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Canberra, A.C.T.

FOREWORD

Under the Petroleum Search Subsidy Act 1959-1961, agreements relating to subsidized operations provide that the information obtained may be published by the Commonwealth Government six months after the completion of field work.

The growth of the exploration effort has greatly increased the number of subsidized projects and this increase has led to delays in publishing the results of operations.

The detailed results of subsidized operations may be examined at the offices of the Bureau of Mineral Resources in Canberra and Melbourne (after the agreed period) and copies of the reports may be purchased.

In order to make the main results of operations available early, short summaries are being prepared for publication. These will be grouped by area and date of completion as far as practicable. Drilling projects and geophysical projects will be grouped separately. In due course, full reports will be published concerning those operations which have produced the more important new data.

This Publication contains a summary of data and results of the drilling operation undertaken at Flaxmans No. 1 in the Otway Basin, Victoria. The information has been abstracted by the Petroleum Exploration Branch of the Bureau of Mineral Resources from the well completion report furnished by Frome-Broken Hill Company Proprietary Limited.

J.M. RAYNER
DIRECTOR

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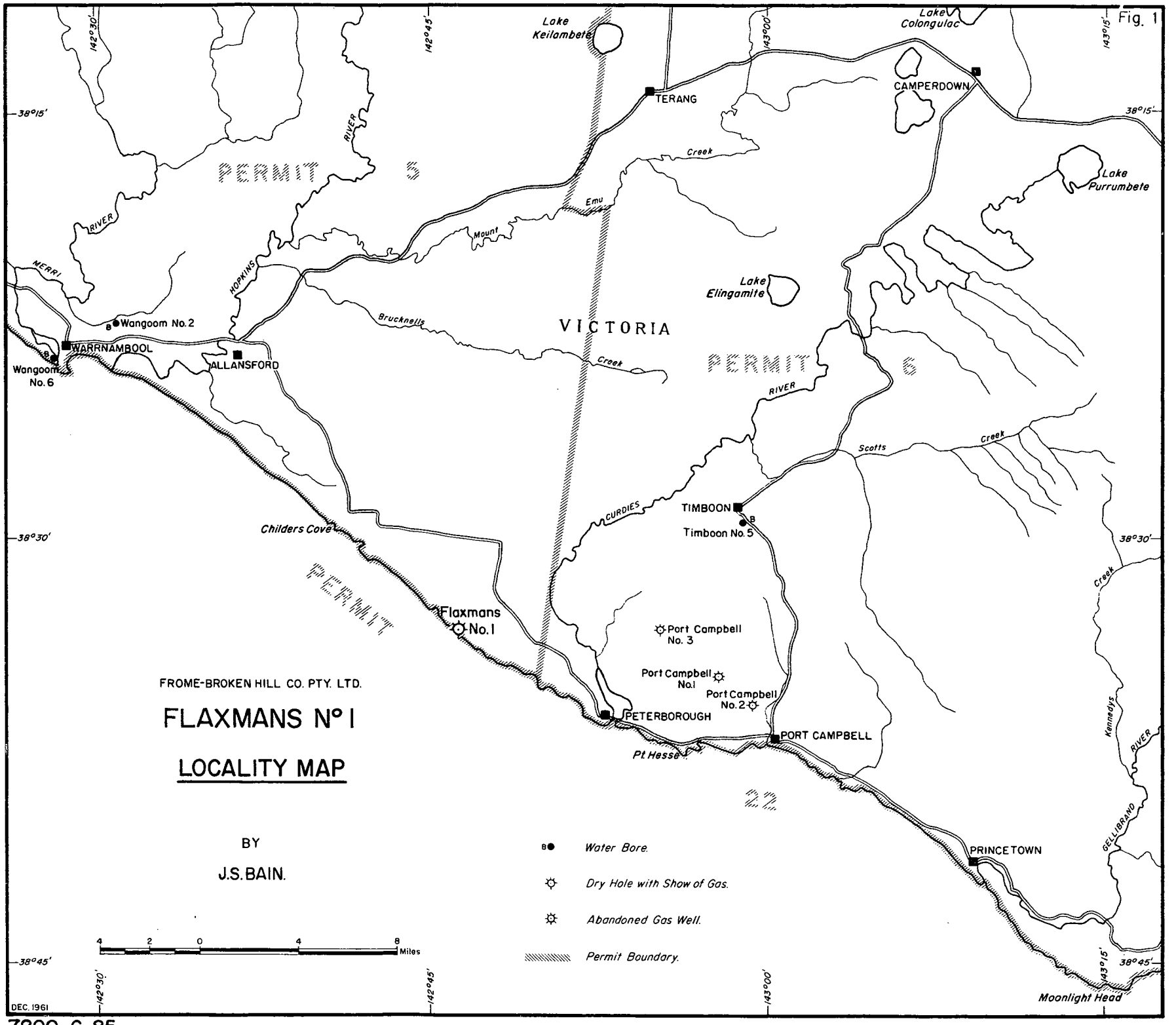
Fig. 1
Lake Keilambete
Lake Colongulac
TERANG
CAMPERDOWN
142°30'
142°45'
143°00'
143°15'
38°15'
38°30'
38°45'
PERMIT 5
PERMIT 6
PERMIT 22
RIVER
Creek
Emu
Mount
MERRI
HOPKINS
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Moonlight Head
FROME-BROKEN HILL CO. PTY. LTD.
FLAXMANS N° 1
LOCALITY MAP
BY
J.S. BAIN.
Water Bore.
Dry Hole with Show of Gas.
Abandoned Gas Well.
Permit Boundary.
4 2 0 4 8 Miles
DEC. 1961

7200-G-85

FLAXMANS NO. 1

SUMMARY OF DATA AND RESULTS*

SUMMARY

Flaxmans No. 1 Well was located within the south-eastern part of the Otway Basin, approximately 20 miles south-east of Warrnambool, on the Victorian coast. The well was drilled by Oil Drilling and Exploration Limited for Frome-Broken Hill Company Proprietary Limited, to a total depth of 11,528 feet. Drilling commenced on 3rd May, 1961 and was completed on 25th August, 1961. A full programme of logging, testing, and coring was undertaken.

The well penetrated Miocene-Oligocene sediments to a depth of 2008 feet, Eocene-Upper Cretaceous to 4833 feet, Upper Cretaceous to 6490 feet, Middle Cretaceous to 6876 feet, Lower Cretaceous to 7330 feet, and Lower Cretaceous - (?) Jurassic Otway Group sediments to total depth of 11,528 feet.

Flaxmans No. 1 was drilled to test the hydrocarbon potential of the Tertiary and Mesozoic sediments in a closed seismic structure. Sixteen drillstem tests and ten production tests were undertaken but the maximum yield of 250 Mcf/D of gas from the interval 10,842 to 11,528 feet could not be maintained and the well was plugged and abandoned. Other possible reservoirs tested in the well yielded only small amounts of petroliferous gas, probably from solution in formation water.

The stratigraphic drilling operation at Flaxmans No. 1 was subsidized under the Petroleum Search Subsidy Act 1959, from 4833 feet to total depth.

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* Abstracted from: Well Completion Report, Flaxmans No. 1, South-west Victoria, by J.S. Bain, Frome-Broken Hill Company Proprietary Limited, December, 1961.

WELL HISTORY

General Data

Well name and number:	Flaxmans No. 1
Location:	Latitude 38°33'S. Longitude 142°46'E.
Name and address of Tenement Holder:	Frome-Broken Hill Company Proprietary Limited, 95 Collins Street, Melbourne, Victoria.
Details of Petroleum Tenement:	Petroleum Exploration Permit No. 5, issued by the State of Victoria.
Total Depth:	11,528 feet
Date drilling commenced:	3rd May, 1961
Date drilling completed:	25th August, 1961
Date well abandoned:	8th November, 1961
Date rig released:	8th November, 1961
Elevation (ground):	206 feet
Elevation (R.T.):	221 feet (datum for depths)
Status:	Dry hole; plugged and abandoned
Cost:	£287,400

Drilling Data

Drilling Plant:

Make:	National-Ideal
Type:	55

Hole sizes and depths:

25"	to	76 feet
17"	to	1045 feet
12 1/4"	to	7000 feet
8 3/4"	to	11528 feet (T.D.)

Casing details:

Size (in.):	13 3/8	9 5/8	5 1/2
Weight (lb./ft):	48	36	17
Grade:	H.40	J.55	N.80
Setting depth (ft):	1038	6996	11,528

Logging and Testing

Ditch Cuttings:

Interval:	Ten feet from surface to total depth
Coring:	Thirty-five cores were cut using a Hughes "J" Type core barrel with both hard formation and soft formation cutter heads. 474 feet were cored and 339 feet 10 inches (72%) recovered. Nine additional cores were taken with Reed PDD-BR wire line coring equipment. 64 feet 6 inches were cored and 39 feet 9 inches (61%) recovered. A total of 538 feet 6 inches was cored and 379 feet 7 inches (70%) recovered.
Sidewall Cores:	None
Electric and other logging: (Schlumberger):	
Electrical Log:	1038-11518 feet (8 runs)
Laterolog:	1038-11514 feet (9 runs)
Microlog:	1038-11520 feet (10 runs)
Sonic Log:	6994-10121 feet (1 run)
Continuous Dipmeter:	3550-10694 feet (3 runs)
Gamma Ray Log:	4500- 7500 feet (1 run)
Temperature Log:	0-10326 feet (2 runs)
Cement Bond Log:	1000- 6996 feet (1 run)
Velocity Survey:	Two surveys were run, the first at total depth of 7000 feet and the second at total depth of 10,000 feet. Shots were taken at formation breaks and at selected intervals in the open hole.
Drilling Time Log:	A Geolograph Continuous Time Depth Recorder was used during drilling; time taken for each foot penetrated was recorded. A Drilling Time Log was drawn up from the Geolograph charts.
Formation Testing:	Sixteen drillstem tests and ten production tests were carried out. Production Test No. 1 conducted over the interval 10,842 to 11,528 feet produced free petroliferous gas at a maximum flow rate of 250 Mcf/D with a small amount of condensate of 51.2° A.P.I. gravity at 60°F. Production could not be sustained. No significant fluid was recovered in the remainder of the tests.

GEOLOGY

Stratigraphy

The stratigraphic sequence encountered in Flaxmans No. 1 Well is shown in the Table below:

Age	Formation	Depth Intervals (feet)	Thickness (feet)
Miocene-Oligocene	Heytesbury Group	15- 2008	1993+
Eocene-Upper Cretaceous	Wangerrip Group	2008- 4833	2825
Upper Cretaceous	Paaratte Formation	4833- 5570	737
Upper Cretaceous	Belfast Mudstone	5570- 6490	920
Middle Cretaceous	Flaxmans Beds	6490- 6876	386
Lower Cretaceous	Waarre Formation	6876- 7330	454
Lower Cretaceous - (?) Jurassic	Otway Group	7330-11528 (T.D.)	4198 +

Heytesbury Group (Miocene-Oligocene): 15 to 2008 feet (1993 feet +)

Light grey to tan, porous, fossiliferous limestone to 520 feet, followed by medium to blue-grey marl, becoming silty and glauconitic towards base.

Wangerrip Group (Eocene-Upper Cretaceous): 2008 to 4833 feet (2825 feet)

Dominantly medium to coarse-grained, light grey quartz sand and sandstone interbedded with medium to dark grey, micaceous siltstone and minor dolomite. Glauconitic towards base.

Paaratte Formation (Upper Cretaceous): 4833 to 5570 feet (737 feet)

Light grey, fine to coarse-grained sandstone interbedded and lensed with dark grey, micaceous and carbonaceous siltstone and mudstone; dolomitic bands towards base. Glauconitic in parts.

Belfast Mudstone (Upper Cretaceous): 5570 to 6490 feet (920 feet)

Dark grey, dense, micaceous, glauconitic mudstone; very fossiliferous with some plant remains. Ankerite concretions and stringers.

Flaxmans Beds (Middle Cretaceous): 6490 to 6876 feet (386 feet)

Limonitic sandstone and chloritic greywacke with limonite pellets and some quartz grains. Glauconitic and carbonaceous in parts, with some pyrite.

Waarre Formation (Lower Cretaceous): 6876 to 7330 feet (454 feet)

Light grey, porous, quartz sandstone ranging from fine-grained to conglomeratic, interbedded with dark grey, carbonaceous, micaceous, pyritic siltstone and mudstone. Coal band from 7246 to 7270 feet.

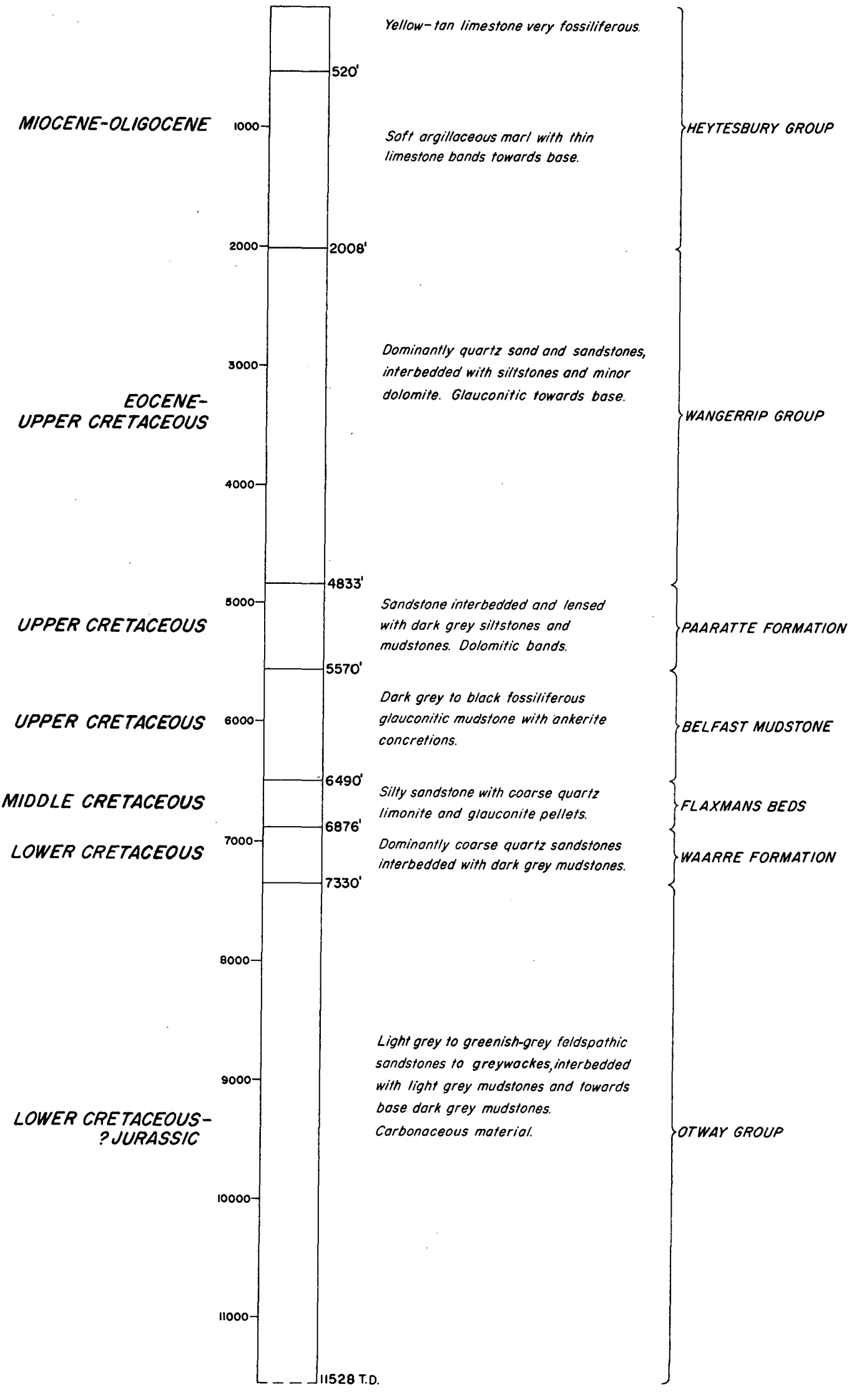
Fig. 2

FROME-BROKEN HILL CO. PTY. LTD.

FLAXMANS N° 1

STRATIGRAPHIC COLUMN AFTER DRILLING

SCALE: 1 INCH = 1000 FEET



By J.S. BAIN
DEC. 1961

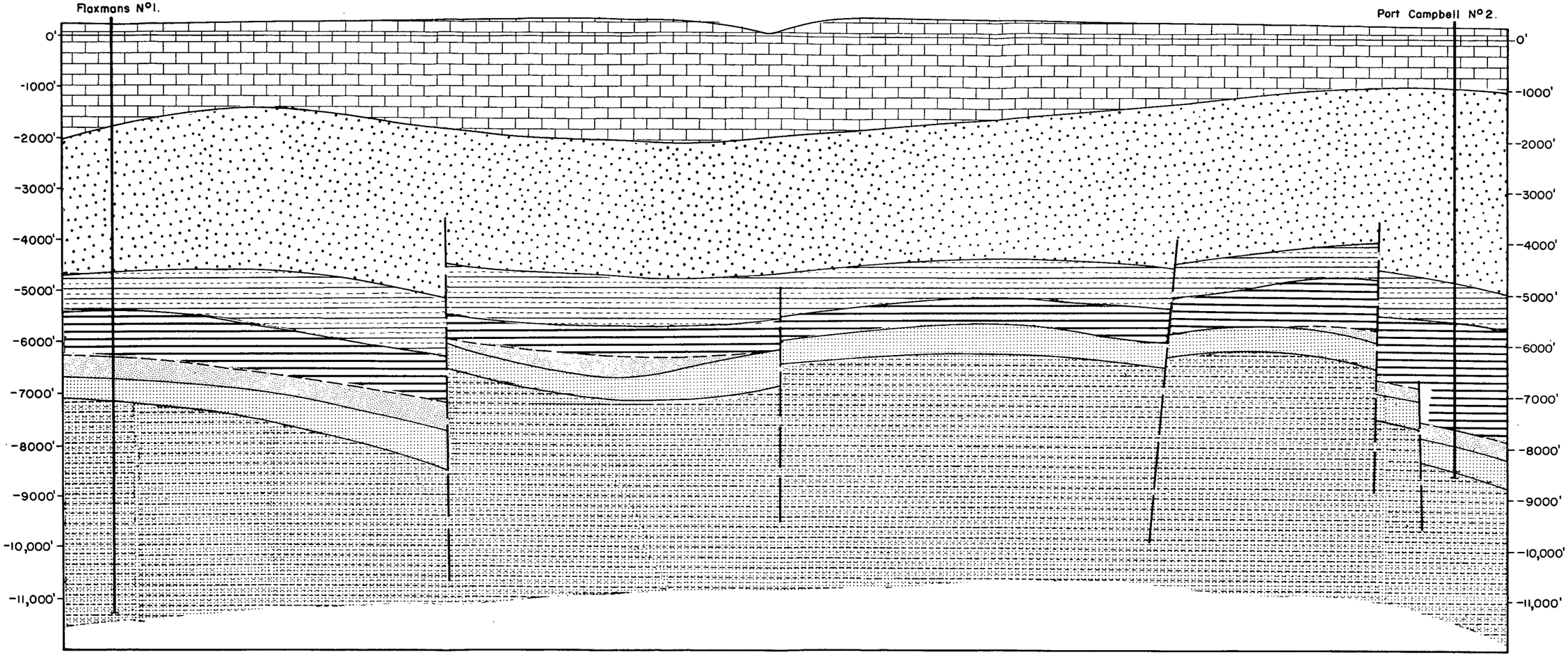
7200-G-85

FROME-BROKEN HILL CO. PTY. LTD..

Fig. 3

GEOLOGICAL CROSS SECTION
BETWEEN PORT CAMPBELL N°2 and FLAXMANS N° 1

By J. S. BAIN and S. BENEDEK



LEGEND

Miocene — Oligocene.	Heytesbury Group.	*Upper Cretaceous*	Belfast Mudstone.
Eocene — Upper Cretaceous.	Wangerrip Group.	*Middle Cretaceous.*	Flaxmans Beds.
Upper Cretaceous.	Paaratte Formation.	*Lower Cretaceous.*	Waarre Formation.
Lower Cretaceous — Jurassic	Otway Group.		

SCALE: VERTICAL 1 Inch = 2,000 Feet.
HORIZONTAL 1 Inch = 1 Mile.

7200-G-85

Dec. 1961.

Otway Group (Lower Cretaceous - (?) Jurassic): 7330 to 11,528 feet (4198 feet+)

Light grey to greenish-grey, fine-grained, feldspathic sandstone and greywacke interbedded with grey to dark grey, carbonaceous, micaceous, mudstone and siltstone. Coal fragments present.

The lithology of the section cut in Flaxman No. 1 Well was similar to that of the Port Campbell structure, formation correlations being made without undue difficulty.

A correlation between Port Campbell Nos 2 and 3 and Flaxmans No. 1 wells is summarized below. Figures in brackets refer to the depths of the various horizons below sea level (all depths in feet).

	Flaxmans No. 1	Port Campbell No. 2	Port Campbell No. 3
Thickness of Heytesbury Group	1993	1214	1519
Top of Wangerrip Group	2008 (-1787)	1230 (-948)	1534 (-1324)
Thickness of Wangerrip Group	2825	3770	2369
Top of Paaratte Formation	4833 (-4612)	5000 (-4718)	3913 (-3703)
Thickness of Paaratte Formation	737	810	317
Top of Belfast Mudstone	5570 (-5349)	5810 (-5528)	4230 (-4020)
Thickness of Belfast Mudstone	920	2100	378
Top of Flaxmans Beds	6490 (-6269)	7910 (-7628)	Not present
Thickness of Flaxmans Beds	386	200	-
Top of Waarre Formation	6876 (-6655)	8110 (-7828)	4608 (-4398)
Thickness of Waarre Formation	454	404	202
Top of Otway Group	7330 (-7109)	8514 (-8232)	4810 (-4600)
Thickness of Otway Group	4198 +	332 +	722+

Structure

The Flaxmans structure was delineated by a seismic survey of the area between Port Campbell and Warrnambool and by a marine seismic survey along the coast between these two places.

Flaxmans No. 1 was drilled on the north-east trending Curdie Vale feature which has structural and fault closure on the north. Closure on the south was confirmed in the upper formations by the marine seismic survey and is assumed to be present in the deeper horizons. Dips determined from both the seismic surveys and the well, indicate that the well was probably situated a little to the north of the crest of the structure. Cores within the Otway Group showed evidence of fracturing and some minor faulting, and although no large scale fault appeared to be penetrated, it may be that the well was in close proximity to a major fault.

Relevance to Occurrence of Petroleum

Testing in Flaxmans No. 1 showed the sands of the Waarre Formation and Paaratte Formation to be water saturated with some minor dissolved gas; although the gas was wet,

there was no appreciable production from these zones. Core No. 25 (6902-6913 feet) exhibited fluorescence and hydrocarbon odour but this was probably associated with the dissolved gas.

Three cores within the Otway Group (Nos 28, 34 and 43) exhibited fluorescence and gave fairly good cuts with solvents. Core No. 43 (11,225-11,235 feet) had a thin slickensided calcite surface on the top of the core with oil-stained quartz crystals within a vug on this surface. Similar oil-stained quartz crystals were seen in the cuttings from 10,928 feet and were probably also associated with calcite in vugs. Most of the cores within the Otway Group were tight and had no effective permeability apart from fractures. The strong gas flow noted while drilling at 11,388 feet was assumed to come from fracture porosity. Fractures with calcite in-filling were present in the lower Otway Group sediments and often associated with intervals from which gas was indicated on the gas detector. The fractured nature of this reservoir was substantiated by Core No. 43 as mentioned above.

On test, the lower zone from 10,842 to 11,528 feet, yielded free petroliferous gas with a small amount of 51.2° A.P.I. gravity condensate. Preliminary flow tests indicated a volume of approximately 250 Mcf/D of gas. However, flow pressures on this zone decreased to zero during extended flow periods and an accurate estimate of volume was not possible. From the tests, it was deduced that the fractures within the interval 10,842 to 11,528 feet were a part of, or in communication with, a reservoir of only very limited size.

Other tests carried out within the Otway Group yielded a slight amount of solution gas, but no appreciable formation water, and confirmed views that sands within the Otway Group in Flaxmans No. 1 Well were tight and unproductive.

Porosity and Permeability of Sediments Penetrated

In general, sands of the Otway Group showed low porosity and no effective permeability. The tight nature of the sands was confirmed on testing.

Sands of the Waarre Formation appeared to be generally dirtier than their equivalents in the Port Campbell area and this was confirmed by analyses on Core No. 25 which showed a porosity of 22.1 to 22.9% and permeabilities varying from 126 to 139 millidarcys horizontal and 112 to 250 millidarcys vertical. This is in marked contrast to the 23.6% porosity and 4840 millidarcys permeability evident within the Waarre sands in Port Campbell No. 3.

The Paaratte Formation and Wangerrip Group contained sands with porosities and permeabilities similar to their equivalents in the Port Campbell area.

Contribution to Geological Concepts resulting from Drilling

Flaxmans No. 1 Well added considerably to the knowledge of the geology of the Otway Basin.

The Belfast Mudstone and Waarre Formation were found to have a fairly wide areal extent in the eastern part of the basin from Port Campbell to Warrnambool. It is also apparent that the Flaxmans Beds are present in the deeper part of the basin separating the Waarre Formation from the Belfast Mudstone. It appears that no major unconformities are present from the Otway Group through the Waarre Formation and Flaxmans Beds up into the Belfast Mudstone in the Flaxmans No. 1 Well.

It is apparent that the Otway Group sediments in the deeper part of the basin are not so attractive as reservoirs as where the Otway Group is relatively high. This feature is substantiated by the tight and dirty nature of the sands at Flaxmans No. 1 compared with some of the sands in the Otway Group on the Port Campbell structure and also from bores on the Warrnambool "high". None of the Otway Group sediments in Flaxmans No. 1 appear to be likely source rocks, lithologically, and if they are also of a freshwater nature, their chances as sources are further decreased. The source of the petroliferous gas, recovered from the bottom part of the hole, is not known.

REFERENCES

BAIN, J.S., and BENEDEK, S., 1961: Well Completion Report, Port Campbell No. 3, Victoria. Frome Report 7200-G-80, May, 1961 (Unpubl.).

BAKER, G., 1944: The geology of the Port Campbell District. Proc. Roy. Soc. Vic., 56, (N.S.Pt.1).

FROME-BROKEN HILL COMPANY PTY LTD, 1964: Port Campbell No. 1 and No. 2 Wells, Victoria. Bur. Min. Resour. Aust. Petrol. Search Subs. Acts Publ. 18.

WEEGAR, A.A., 1960: Notes on the geology of the Otway Basin, South-west Victoria. Frome Report 7200-G-66, July, 1960 (Unpubl.).

WEEGAR, A.A., 1961: Notes on the factors governing possible oil and gas occurrence in the Otway Basin. Frome Report 7200-G-83, June, 1961 (Unpubl.).

ADDITIONAL DATA FILED IN THE BUREAU OF MINERAL RESOURCES

The following additional data relating to Flaxmans No. 1, have been filed in the Bureau of Mineral Resources, Canberra, and are available for reference:

(i)	Well Completion Report, by J.S. Bain	23 pp.
	Appendix 1: Palaeontological reports, by M.F. Glaessner, I.C. Cookson, and P.R. Evans	19 pp.
	Appendix 2: Analyses of fluid samples	4 pp.
	Appendix 3: Core descriptions	11 pp.
	Appendix 4: Formation testing	8 pp.
	Appendix 5: Detailed lithological description	10 pp.
	Appendix 6: Hole deviation	2 pp.

(ii) Daily drilling reports for period 3rd May, 1961 to 8th November, 1961.

(iii) Well logs including the following:

(a) Electrical Log

Run 1, 1038- 2819 feet (1", 5" = 100 ft)
Run 2, 2619- 4362 feet (1", 5" = 100 ft)
Run 3, 4162- 6344 feet (1", 5" = 100 ft)
Run 4, 6143- 6903 feet (1", 5" = 100 ft)
Run 5, 6702- 6989 feet (1", 5" = 100 ft)
Run 6, 6996- 9449 feet (1", 5" = 100 ft)
Run 7, 9249-11231 feet (1", 5" = 100 ft)
Run 8, 10050-11518 feet (1", 5" = 100 ft)

(b) Laterolog

Run 1, 1038- 2816 feet (1", 5" = 100 ft)
Run 2, 2610- 4357 feet (1", 5" = 100 ft)
Run 3, 4157- 5390 feet (1", 5" = 100 ft)
Run 4, 5190- 6335 feet (1", 5" = 100 ft)
Run 5, 6135- 6900 feet (1", 5" = 100 ft)
Run 6, 6699- 6984 feet (1", 5" = 100 ft)
Run 7, 6994- 7658 feet (1", 5" = 100 ft)
Run 8, 7456- 9447 feet (1", 5" = 100 ft)
Run 9, 9247-11514 feet (1", 5" = 100 ft)

(c) Microlog

Run 1, 1038- 2815 feet (1", 5" = 100 ft)
Run 2, 2615- 4357 feet (1", 5" = 100 ft)
Run 3, 4157- 5391 feet (1", 5" = 100 ft)
Run 4, 5190- 6343 feet (1", 5" = 100 ft)
Run 5, 6140- 6900 feet (1", 5" = 100 ft)
Run 6, 6140- 6986 feet (1", 5" = 100 ft)
Run 7, 6994- 7660 feet (1", 5" = 100 ft)
Run 8, 6994- 8135 feet (1", 5" = 100 ft)
Run 9, 7934- 9446 feet (1", 5" = 100 ft)
Run 10, 9242-11520 feet (1", 5" = 100 ft)

(d) Sonic Log

Run 1, 6994-10121 feet (1", 5" = 100 ft)

(e) Continuous Dipmeter

Composite log, Runs 1 to 3 (1.2" = 100 ft)

Run 1, 3550- 5700 feet
Run 2, 3550- 5704 feet
Run 3, 6992-10694 feet

(f) Gamma Ray Log

Run 1, 4500- 7500 feet (1", 5" = 100 ft)

(g) Temperature Log

Run 1, 0- 6546 feet (1", 5" = 100 ft)
Run 2, 9950-10326 feet (1" = 100 ft)

(h) Cement Bond Log

Run 1, 1000- 6996 feet (1", 5" = 100 ft)

(iv) Illustrations with Well Completion Report, Flaxmans No. 1:

(a) Stratigraphic column before drilling.

(b) Geological cross section between Port Campbell No. 3 and proposed Flaxmans No. 1 Well

(c) Geological cross section between Port Campbell No. 3 and Flaxmans No. 1 Well.

COMPOSITE WELL LOG

COMPANY FROME - BROKEN HILL CO. PTY. LTD..

PETROLEUM TENEMENT P.E.P. N°5 VICTORIA WELL NUMBER FLAXMANS N° 1

STATE VICTORIA 4 MILE SHEET COLAC BASIN OTWAY WELL STATUS ABANDONED

LOCATION– LAT. 38° 33's LONG. 142° 46' E.
ELEVATION– REFERENCE PT. (RT.) 221' A.S.L.
GROUND 206' A.S.L.

DATE SPUDDED 3 MAY 1961
DATE DRILLING STOPPED 25 AUGUST 1961
DATE RIG OFF 8 NOVEMBER 1961
TOTAL DEPTH DRILLER 11,528 feet
E LOG 11,518 feet

HOLE SIZE

IN.	FROM	TO
25"	Surface	76'
17"	76'	1,045'
12¼"	1,045'	7,000'
8¾"	7,000'	11,528'

CASING

IN.	WT.	GR.	DEPTH	CMT.	CMT'D TO
13⅜"	48 lbs	H.40	1,038'	591 sx	Surface
9⅝"	36lbs	J.55	6,996'	1,237 sx	1,180'
5½"	17lbs	N.80	11,528–6,942'	1,303 sx	10,842'–10,262', 9,719'–7,906'

WELL HEAD FITTINGS : 13⅜" & 9⅝" casing cut and riser capped with lead.
DRILLED BY : OIL DRILLING & EXPLORATION LTD.
LOGGED BY: SCHLUMBERGER CEMENTED BY: O.D.E.
DRILLING METHOD. ROTARY. MUD LOGGING BY: F.B.H.

ELECTRIC LOG DATA

RUN NUMBER	1	2	3	4	5	6	7	8
DATE	11 May '61	19 May '61	3 Jun '61	12 Jun '61	20 Jun '61	23 Jul '61	17 Aug '61	24 Aug '61
FOOTAGE LOGGED	1781'	1743'	2182'	760'	287'	2453'	1982'	1468'
LOGGED FROM	2819'	4362'	6344'	6903'	6989'	9449'	11231'	11518'
LOGGED TO	1038'	2619'	4162'	6143'	6702'	6996'	9249'	10050'
TOTAL DEPTH-ELECTRIC LOG	2820'	4363'	6345'	6904'	6990'	9450'	11232'	11519'
TOTAL DEPTH-DRILLER	2827'	4667'	6375'	6913'	7000'	9448'	11235'	11517'
CASING SHOE – ELECTRIC LOG	1038'					6996'		
CASING SHOE – DRILLER	1038'	1038'	1038'	1038'	1038'	6996'	6996'	6996'
BIT SIZE	12 ¼"	12 ¼"	12¼"=5546' 8¾"=6375'	8¾"	12¼"	8 ¾"	8¾"	8¾"
MUD-KIND	Natural	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite	Bentonite & Barites
–TREATMENT	Water	Myrtan	Myr/Caus	Myr/Caus	Myr/Caus	Myr/Caus	Myr/Caus	Myr/Caus
WATER LOSS ccs/30min.		21	7·5	12	9·5	8·5	10·5	10·5
WEIGHT lbs/gal.	10·5	10·1	9·7	9·9	10·2	9·8	9·7	11·6
VISCOSITY (Marsh) Sec.	40	32	53	78	145	48	65	38
pH			9	8	8	9	10	8
RESISTIVITY ⌒ m^2/m & TEMP °F	2·8 @ 60°	1·8 @ 70°	1·3 @ 78°	1·28 @ 70°	1·34 @ 77°	1·64 @ 73°	1·03 @ 106°	1·86 @ 65°
RESISTIVITY at B.H.T.	1·75 @ 98°	1·05 @ 120°	0·64 @ 156°	0·52 @ 159°	0·65 @ 160°	0·66 @ 182°	0·47 @ 224°	0·54 @ 228°
MAX. RECORDED TEMPERATURE	98°	120°	158°	159°	160°	182°	224°	228°
ELECTRODE SPACING	16"	16"	16"	16"	16"	16"	16"	16"
SYMMETRICAL	64"	64"	64"	64"	64"	64"	64"	64"
	18' 8"	18' 8"	18' 8"	18' 8"	18' 8"	18' 8"	18' 8"	18' 8"
NON-SYMMETRICAL								
RECORDED BY	J.WHITE	J.WHITE	J. WHITE	J. WHITE	J.WHITE	J.WHITE	J. WHITE	R.LEHMANN

RADIOMETRIC LOG DATA

TYPE OF LOG	GammaRay		
RUN NUMBER	1		
DATE	5 Nov '61		
TOTAL DEPTH – DRILLER	11528'		
TOP OF LOGGED INTERVAL	4500'		
BOTTOM OF LOGGED INTERVAL	7500'		
TYPE OF FLUID IN HOLE	Brine		
FLUID LEVEL	Surface		
MAXIMUM RECORDED TEMERATURE			
NEUTRON SOURCE, STRENGTH & TYPE			
SOURCE SPACING – IN			
LENGTH OF MEASURING DEVICE			
O.D. OF INSTRUMENT – IN	3⅝"		
TIME CONSTANT – SECS.	4		
LOGGING SPEED – FT/MIN.	25		
STATISTICAL VARIATION – IN			
SENSITIVITY REFERENCE			
RECORDED BY	J. WHITE		

CASING RECORD

RUN NO.	SIZE – IN	WT – IN	INTERVAL – FT TO			
1	9⅝"	36	Surface	6996'		
1	5½"	17	6942'	11528'		

PERFORATIONS

All perforations made with Schlumberger shaped charge, 3"@4" guns at density of 4 shots 1 ft.

FROM	TO
11, 380'	11, 368'
11,366'	11, 372'
11,341'	11, 351'
11, 230'	11, 236'
11, 219'	11, 225'
11, 178'	11, 184'
11, 090'	11, 096'
10,949'	10, 959'
10,922'	10, 928'
10,837'	10, 847'
10, 120'	10, 130'
10,000	10,010'
9,900'	9,910'
9,780'	9,790'
9, 720'	9,730'
9,240'	9,258'
8,518'	8,528'
8,462'	8,480'
6, 875'	6, 881'

CEMENT PLUGS

FROM	TO	SACKS
K Retainer set at 10,500 feet as bridge plug		
K. Retainer set at 8,300 feet as bridge plug		
6792'	6942'	46
Surface	150'	50

WELL SYMBOLS

- Gas show, slight
- Gas show, strong
- Oil show, slight
- Oil show, strong
- Oil and Gas show
- Fluorescence
- Circulation loss, partial, and s.g. mud
- Circulation loss, complete, and s.g. mud
- Flow into well, and s.g. mud.
- Blowout
- Core, interval, number, and recovery
- Sidewall core
- Perforated interval
- Formation test interval, and number (O.H. / in csg.)
- Plugged interval

FOSSILS

- Macro
- Micro
- Plant
- Spore, pollen

LITHOLOGIC REFERENCE

- Conglomerate
- Quartz sandstone
- Limonitic sandstone & Chloritic greywacke
- Siltstone
- Mudstone
- Limestone
- Dolomite
- Marl
- Coal

LITHOLOGY BY: *J.S. BAIN, S. BENEDEK, & R.B. LESLIE.*
COMPILED BY: *J. S. BAIN.*

OTHER BORE-HOLE LOGS

TEMPERATURE 1,000'-6,546' Runs 1 & 2; 9,950'-10,326' Run 3.
MICRO LOG & MICRO-CALIPER 1,038'-11,520' Runs 1 thru 10.
VELOCITY Surface – 7,000'; Surface – 10,000'; Runs 1 & 2.
LATEROLOG 1,038'–11,514' Runs 1 thru 9.
SONIC LOG 6,994'– 10,121' Run 1.
CONTINUOUS DIPMETER 3,550'-3752'; 4,700'-5,704'; Runs 1&2: 6,992'-10,694 Run 3.
CEMENT BOND LOG 1,000'-6,996 Run 2.

PLATE I
SHEET 2

FLAXMANS No. 1

& REMARKS

DRILLING RATE (Mins / 10 feet) 40 30 20 10

LITHOLOGY % age of cuttings

DEPTH

DEVIATION AZ MAG

CASING & PLUGS

DIPS Visual Measured

SPONTANEOUS POTENTIAL millivolts

CORES & SPECIFIC GRAVITY

DETAILED LITHOLOGY

RESISTIVITY —ohms m^2/m

0 16" Short Normal 20

20 200

0 64" Long Normal 20

20 200

RESISTIVITY —ohms m^2/m

0 18'8" Lateral 20

20 200

GAMMA RAY Micrograms Ra-eq./ metric ton

Radiation intensity increases

0 1 2 3 4 5 6

MUD GAS DETECTION (Atlas Gas Detector)

0 50 100

120%

FORMATION TEST and other RESERVOIR ENGINEERING DATA

STRATIGRAPHIC COLUMN

RUN No 2

RUN No 3

Micrograms Ra-eq/metric ton

0 1 2 3 4 5 6

D.S.T. Packer failed to hold.

D.S.T. ½" B.C. Open 16m. Fair blow till seat failed. Rec 655 ft G.C.M. and 920ft G.C.M.W. Sal 12,600ppm. Rw = 0·33 at 65° F. I.F.P. 1030. F.F.P. 1030. I.H.P. 2410. F.H.P. 2310

UPPER CRETACEOUS — EOCENE
PAARATTE FORMATION WAITEMATA GROUP

PLATE I
SHEET 3

FLAXMANS No. 1

BIT TYPES & REMARKS | DRILLING RATE (Mins / 10 feet) 40 30 20 10 | LITHOLOGY %age of cuttings | DEPTH | DEVIATION AZ MAG. | CASING & PLUGS | DIPS Visual Measured

SPONTANEOUS POTENTIAL millivolts — 10 — + —

CORES & SPECIFIC GRAVITY | DETAILED LITHOLOGY

RESISTIVITY —ohms m^2/m
0 16" Short Normal 20
20 200
0 64" Long Normal 20
20 200

RESISTIVITY —ohms m^2/m
0 18'8" Lateral 20
20 200

GAMMA RAY Micrograms Ra-eq./ metric ton
Radiation intensity increases →
0 1 2 3 4 5 6

MUD GAS DETECTION (Atlas Gas Detector)
0 50 100

FORMATION TEST and other RESERVOIR ENGINEERING DATA

STRATIGRAPHIC COLUMN

8¾" Sec S-6
8¾" Sec S-4-J
7⅞" HTC soft
8¾" Sec S-4-J
8¾" Sec S-6-J
7⅞" HTC soft
8¾" Sec S-3-J
8¾" Sec S-4-J
8¾" Reed hard
8¾" Sec S-6
8¾" Reed PRD-2
7⅞" HTC soft
7⅞" HTC HF
8¾" Sec M4L
7⅞" HTC HF
8¾" Sec M4L
8¾" HTC W7R
8¾" Sec H7W
6¾" HTC J-H.F.
8¾" Sec H7L
8¾" Sec H7L
6¾" HTC J-H.F.
8¾" Sec M4L
8¾" Sec H7W
8¾" HTC-J HF
8¾" Globe MH3C
8¾" Globe MH3 C
HTC J HF
8¾" Sec M3
HTC JHF
8¾" HTC OWV
HTC OW
HTC J HF
HTC JHF
8¾" Sec S6
HTC HFJ
8¾" Sec S-4J
8¾" Sec M3
HTC J HF
8¾" Sec S6

5600 5700 5800 5900 6000 6100 6200 6300 6400 6500 6600 6700 6800 6900 7000 7100 7200 7300 7400 7500 7600 7700 7800 7900 8000 8100 8200 8300 8400 8500 8600 8700 8800 8900 9000

Heulandite

RUN No. 4
RUN No. 5
RUN No. 6

SCALE 0 25 50 0 25 50 / 0 250 500 0 250 500 CHANGE

These readings possibly related to fracture porosity?

SP shifted 30mv.

D.S.T. 16 — Open 174m. Good blow—v. good. Gts 54m. Fp 3psi. S.I. 90m. Rec 6861 ft G.C.W. of which 5490ft is form water. Sal 13,300ppm. Rw 0·335 at 62°F. I.F.P. 500. F.F.P. 2900. I.S.I.P. 2900. I.H.P.=F.H.P=3200.

D.S.T. 11 — ⅜" B.C Open 50m. Good blow steady. Gts 22m. Rec 240ft G.C.M. 1350ft G.C.M.W. 4564ft G.C.W. 100ft G.C.M. Total fluid rec 97·5bbls. Sal 12,600 ppm. Rw=0·33 at 66°F. I.F.P. 2375. F.F.P. 2750. I.H.P. 3600. F.H.P. 3375.

D.S.T. 10 — ⅜" B.C. Open 33m. Weak blow dying. S.I. 6m. Rec 120' D.M. Rm=1·62 at 57°F. (same as mud) Zone tight. I.F.P. 0. F.F.P. 50. I.S.I.P. 300. F.S.I.P. 480. I.H.P. 4010. F.H.P. 4020.

D.S.T. 12 — ⅝" B.C. Open 96m. Good blow. Gts 50m. Packer seat failed. Rec 3650ft GCW. Sal 25,600ppm (same as fluid in hole.)

D.S.T. 15 — ⅝" B.C. Open 272m. Fair blow. Gts 200m. S.I. 168m. Surface S.I.P. —14psi. Swb 1bbl from 7560ft. Rec 1465 S.L.G.C.W. Sal. bottom sample 19,600ppm. I.F.P. 475. F.F.P. 675. I.S.I.P. 700. F.S.I.P. 825. I.H.P. 3800 = F.H.P.

CRETACEOUS — UPPER — MIDDLE
BELFAST MUDSTONE
CRETACEOUS — ? JURASSIC
FLAXMANS FORMATION — WAARRE FORMATION
LOWER — GROUP

PLATE I
SHEET 4

FLAXMANS No. 1

BIT TYPES & REMARKS | DRILLING RATE (Mins / 10 feet) 40 30 20 10 | LITHOLOGY % age of cuttings | DEPTH | DEVIATION AZ MAG | CASING & PLUGS | DIPS Visual Measured

SPONTANEOUS POTENTIAL millivolts (10)

CORES & SPECIFIC GRAVITY | DETAILED LITHOLOGY

RESISTIVITY —ohms m²/m: 0 16" Short Normal 20 | 20 200 | 0 64" Long Normal 20 | 20 200

RESISTIVITY —ohms m²/m: 0 18'8" Lateral 20 | 20 200

GAMMA RAY Micrograms Ra-eq./ metric ton — Radiation intensity increases — 0 1 2 3 4 5 6

MUD GAS DETECTION (Atlas Gas Detector) 0 50 100

FORMATION TEST and other RESERVOIR ENGINEERING DATA

STRATIGRAPHIC COLUMN

RUN No 7

RUN No 8

Gas Cut Mud 300%

Gas Cut Mud 140%

Calibration of instrument in doubt.

Gas Cut Mud 350%

Gas Cut Mud 120%

Strong Gas Cut Mud 170%

Increase Mud wt from 10 to 11·5. 175%

Gas Cut Mud 200%

Gas Cut Mud 140%

D.S.T. ⑪ Disc did not break and tubing leaked.

D.S.T. ⑫ Tubing leaked.

D.S.T. ⑬ 5/8" B.C. Open 142m. Gd blow decreasing. Rec 950ft sl GCW. Sal 26,500 (same as H_2O in hole.) I.F.P. 325. F.F.P. 475. I.H.P. 4250. F.H.P. 4200.

D.S.T. ⑨ 5/8" B.C. Tool opened with v. violent shaking of string. No blow at surface. Rec 3000ft GCM. Sal 14,200 ppm.

P.T. ⑩ Swb 4·5bbls to 1100ft. Packer failed to hold.

D.S.T ⑩ 5/8" B.C. Open 85m. v weak blow—died. No form fluid rec.

D.S.T. ⑥ 5/8" B.C. Open 368m. SI blow to faint before swb. Swb 10bbls mud. Gas at surface. Initial surface pressure 500-600psi dropped to nil on 3/4" adj choke in 10m when packer failed.

D.S.T. ⑤ 3/8" B.C. Packer failed to hold.

P.T. ① 2" B.C. Wl prod packer. Swab well in. Flow and shut in well intermittently. FP's dropping to zero when flowed on all chokes. S.I.P's dropping during testing from 1425psi to 900 psi. Small amt condensate. 51·2°A.P.I. at 60°F. No formation water. Approx Gas vol 250 McF/24hrs. in early stages — probably decreasing. Pulled test when obstruction in tubing noted.

P.T. ② Prod packer. Swb well to 9500 ft without fluid rise. Broke sandline — Pulled test.

P.T. ③ Prod packer. Swb well to 7700ft. No fluid rise Pulled test.

P.T. ④ Swb to 7425 ft (24 bbls H_2O approx) No fluid rise. Pulled test.

P.T. ⑤ Swb to 10,725ft No fluid visc. Pulled test.

P.T. ⑥ Swb 62bbls H_2O. Packer failed.

P.T. ⑦ Swb 11·5bbls H_2O. Packer failed.

P.T. ⑧ Swb 14bbls H_2O. Packer failed.

D.S.T. ⑦ Disc not broken. Tubing leak.

D.S.T. ⑧ Weak blow — died. Swb 9½ bbls GCW when sandline parted. Pulled test.

P.T. ⑨ Swb 27bbls H_2O to 9400ft when sandline broke. No fluid rise. Pulled test.

CRETACEOUS — ? JURASSIC

OTWAY GROUP

LOWER OTWAY GROUP

T.D. 11,528 feet.
Dry and Abandoned 8 November 1961.