

DEPT. NAT. RES & ENV



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INTERSTATE OIL LIMITED

I.O.I. WOOLSTHORPE NO.1 WELL

WELL COMPLETION REPORT

October, 1968

I.O.L. WOOLSTHORPE NO.1 WELL

OTWAY BASIN, VICTORIA

WELL COMPLETION REPORT

by

R.B. Leslie (Interstate Oil Ltd.)

and

B.H. Sell (Mines Administration Pty. Ltd.)

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I. SUMMARY

(1) Drilling

I.O.L. Woolsthorpe No. 1, located approximately 17 miles north of Warrnambool in south-western Victoria, was drilled to a total depth of 6,467 feet with a Brewster N-4 rig by Richter Bawden Drilling Pty.Ltd. for the Operator, Interstate Oil Limited.

Drilling commenced on 18th May, 1968 and was completed on 12th June, 1968. The well was continued beyond the 5,000 feet programmed depth to ensure complete penetration of the target zone.

Three conventional cores were cut and 30 sidewall cores were taken. Induction-Electric, Micro and Sonic-Gamma Ray logs and Continuous Dipmeter were run and one Drill Stem Test was carried out.

The well was plugged back and abandoned as a dry hole on 13th June, 1968.

(2) Geological

I.O.L. Woolsthorpe No. 1 was located on the northern hinge zone of the Otway Basin to test permeable sands in the Lower Cretaceous, Otway Group sequence in a position of suspected stratigraphic wedgeouts.

The sequence penetrated consisted of 139 feet of Recent to Pleistocene basalt and sub-basaltic sands, 890 feet of Tertiary sediments, 5,350 feet of Mesozoic sediments and 77 feet of basalt of probable Jurassic age.

From 1,040 to 4,790 feet the Lower Cretaceous, Otway Group sediments comprised dominantly siltstones, shales and fine grained tight lithic sandstones. A possible equivalent to the quartzose Heathfield Sand was encountered between 3,524 and 3,550 feet, immediately above a significant change in dipmeter readings.

The interval 4790 to 5980 feet consisted mainly of permeable sandstones, considered to be equivalent to the Basal Sandstone of F.B.H. Pretty Hill No. 1. These sandstones were water saturated but exhibited patchy blue-white fluorescence toward the top of the interval.

The interval 5980 to 6390 feet comprised mainly siltstone and shale considered to be correlative to the ? Jurassic interval intersected in the lower section of Planet-Casterton No. 1. The basalt from 6390 feet to total depth is considered equivalent to the interbedded dolerites encountered in Planet-Casterton No. 1 and also equivalent to the "Basement Complex" in F.B.H. Pretty Hill No. 1.

The well achieved its objective by penetrating and testing good quality reservoir sands in the lower portion of the Otway Group sequence and has demonstrated the apparent widespread distribution of these sands.

II. INTRODUCTION

I.O.L. Woolsthorpe No. 1 was the first of a series of three wells drilled along the northern margin of the Otway Basin in the general area to the north of the Port Campbell Embayment.

Significant but non-commercial flows of wet gas and minor showings of oil have been encountered within the Eumeralla and Geltwood Beach Formations of the Otway Group. Most of these hydrocarbon indications have been obtained in wells drilled in the Port Campbell area which occupied the axial zone of the depositional trough during Otway Group sedimentation and consequently lacked clean sand development.

It was postulated that permeable sands would be present within the Otway Group near the northern margin of the basin and that these sands would be sealed off by mudstones and siltstones within the upper portion of the Otway Group sequence. Seismic data indicated significant wedging-out of the Otway Group toward the northern margin.

In addition to being positioned on the northern hinge zone of the basin I.O.L. Woolsthorpe No. 1 was situated close to the axis of the north-south trending Warrnambool structural ridge as defined by gravity and seismic surveys. Its purpose was to investigate the development and test the fluid content of the postulated permeable Otway Group sandstones.

III. WELL HISTORY

(1) General data

- (i) Well name and number: I.O.L. Woolsthorpe No.1
- (ii) Name and address of Operator: Interstate Oil Limited,
95 Collins Street,
Melbourne, Vic. 3000
- (iii) Name and address of Joint Tenement Holders:

Frome-Broken Hill Company Pty. Ltd.,
31 Queen Street,
Melbourne, Vic. 3000

and

Shell Development (Australia) Pty. Ltd.,
155 William Street,
Melbourne, Vic. 3000

I.O.L. Woolsthorpe No.1 was drilled by Interstate Oil Ltd. (a partner in Frome-Broken Hill Company Pty. Ltd.) as a sole risk operation under the provisions of the relevant Joint Venture and Partnership Agreements.

- (iv) Petroleum tenement: Petroleum Exploration Permit No.5
- (v) District: Portland (1:250,000)
- (vi) Location: Latitude: 38°08'08" South
Longitude: 142°29'47" East
- (vii) Elevation: Ground 400' A.S.L.
K.B. 411' A.S.L. (datum for
depth measurement)
- (viii) Total Depth: 6,467 ft. Driller
6,430 ft. Schlumberger
- (ix) Date drilling commenced: 18.5.68.
- (x) Date total depth reached: 12.6.68.
- (xi) Date well abandoned: 13.6.68.
- (xii) Date rig released: 14.6.68.
- (xiii) Drilling time in days to total depth: 26
- (xiv) Status: Plugged and abandoned.

| | | |
|--------|-----------------|---------|
| Plugs: | 4750 - 4950 ft. | 95 sax. |
| | 1200 - 1350 | 42 sax. |
| | 500 - 550 | 50 sax. |
| | 0 - 20 | 10 sax. |

Top plug was hand mixed.

The first three plugs were set by conventional displacement.

- (xv) Total Cost:

(2) Drilling Data

- (i) Name and address of Drilling Contractor: Richter Bawden Drilling Pty. Ltd.,
Perry House,
Elizabeth Street,
Brisbane 4000

III. WELL HISTORY (contd.)

(2) Drilling Data (contd.)

(ii) Drilling Plant:

Make: Brewster
 Type: N-4
 Rated Capacity: 6000 ft. with 4 $\frac{1}{2}$ " D.P.
 : 7500 ft. with 3 $\frac{1}{2}$ " D.P.

Motors:
 Make: General Motors
 Type: Twin 6-71 Model 12103
 B.H.P. 356

(iii) Mast:

Make: Lee C Moore
 Type: 126 ft. cantilever
 Rated Capacity: 386,000 lbs.

(iv) Pumps:

Make: Oilwell
 Type: 214P (2)
 Size: 7 $\frac{1}{4}$ " x 14"

Pump Motors:

Make: General Motors
 Type: Twin 6-71 Model 12103
 B.H.P. 356

(v) Blowout Preventer Equipment:

Make: (1) Regan; (1) Cameron
 Size: 10" ; 12"
 Type: Type K; Type SS
 Series (A.P.I.): 900 ; 900

Operating Unit: Payne accumulator
 Model NSSUA-80-3

(vi) Hole sizes: 12 $\frac{1}{4}$ " Surface to 545 ft.
 8 $\frac{3}{4}$ " 545 to T.D.

(vii) Casing and Cementing

Details: Size: 9 $\frac{5}{8}$ "
 Weight: 36 lbs/ft.
 Grade: J55
 Range: 2
 Setting Depth: 525 ft.

A Larkin guide shoe was run on the bottom of the first joint of casing, with a Larkin float collar between the first and second joints. Three B.J. centralizers were run - one six feet above the shoe, one at the top of the second joint, and one at the top of the third joint. No scratchers were used. Top and bottom B.J. plugs were used.

Quantity of Cement Used: 227 sacks + 440 lbs.
 CaCl₂

Cement to: Surface
 Method Used: Plug

(viii) Drilling Fluid:

Type: Fresh water bentonite
 Average Weight: 9.5 lbs/gal.

III. WELL HISTORY (contd.)

(2) Drilling Data (contd.)

(viii) Drilling Fluid (contd.)

Treatment: The mud weight was kept at about the above figure by dumping and adding water. Fluid loss was controlled by adding C.M.C., and viscosity by treating with Q-Broxin and LoVis. pH was maintained at about 9.5 by addition of caustic soda.

Average Weekly Analysis:

| Week Ending | Weight | Viscosity | Fluid Loss | Filter Cake | Sand | pH |
|-------------|--------|-----------|------------|-------------|-------|-----|
| 25.5.68 | 9.5 | 68 | 7 | 2/32 | 1/2 | 9.7 |
| 1.6.68 | 9.4 | 70 | 6.5 | 2/32 | 1/2 | 9.5 |
| 8.6.68 | 9.4 | 60 | 6.0 | 2/32 | 1/2 | 9.5 |
| 13.6.68 | 9.5 | 75 | 6.0 | 2/32 | 1 1/4 | 9.5 |

Total Mud Materials Consumed:

| | | | | | |
|--------------|----------------|----------|--------------|----------|--------------|
| Bentonite | 204 x 100 lbs. | Myrtan | 30 x 50 lbs. | C.M.C. | 45 x 56 lbs. |
| Super-Col | 12 x 50 lbs. | LoVis | 22 x 50 lbs. | Barytes | 9 x 100 lbs. |
| Cellucol | 132 lbs. | Unical | 7 x 50 lbs. | Diesel | 1200 gals. |
| Caustic Soda | 1405 lbs. | Q-Broxin | 45 x 50 lbs. | Pipe-Lax | 1 bbl. |

(ix) Water Supply: Water was carted from a creek about three miles from the wellsite.

(x) Perforation and Shooting Record: No perforating was carried out.

(xi) Plugging Back and Squeeze Cementation Jobs:

| Plug No. | Length of Plugs | Sacks of Cement | Tested |
|----------|---------------------|-----------------|-------------------------------|
| 1 | 4750-4950 (200 ft.) | 95 | No. Conventional displacement |
| 2 | 1200-1350 (150 ft.) | 42 | No. " " |
| 3 | 500- 550 (50 ft.) | 50 | Yes. Top @ 510' |

No squeeze cementation jobs were performed.

(xii) Fishing Operations: At 5,113 the drill pipe became stuck, probably due to differential pressure on the drill collars where they rested against the permeable sandstones below 4,800 feet. The string was freed by spotting diesel oil and Magcobar "Pipe-Lax" around the collars.

(xiii) Side-tracked Hole: Nil.

(3) Formation Sampling

(i) Ditch Cuttings: Cuttings were collected from the shale shaker, washed through a coarse sieve and retained and washed in a fine sieve. Samples were collected at 30 feet intervals from surface to 1,110 feet and thereafter at 10 feet intervals except while coring, when five feet samples were taken. The washed samples were dried, split four ways and placed in labelled polythene bags. The cuttings are stored at the following locations:

III. WELL HISTORY (contd.)

WOOLSTHORPE-1

(3) Formation Sampling (contd.)

(i) Ditch cuttings (contd.)

- (A) Bureau of Mineral Resources,
Core and Cuttings Laboratory,
Collie Street,
Fyshwick, Canberra, A.C.T.
- (B) Department of Mines,
Core Laboratories,
Cook Street,
Port Melbourne, Vic.
- (C) Interstate Oil Limited,
95 Collins Street,
Melbourne, Vic.
- (D) Shell Development (Aust.) Pty. Ltd.,
155 William Street,
Melbourne, Vic.

(ii) Coring

| Core No. | Interval Cored | Feet Cored | Recovery feet | % |
|----------|----------------|------------|------------------|----|
| 1 | 4790 - 4799 | 9 | 8'6" | 94 |
| 2 | 4860 - 4883 | 23 | 11'6" | 50 |
| 3 | 5708 - 5727 | 19 | 13'6" | 71 |

4 inches of every 2 feet of core was sent to (A) above, two 4 inch samples of Core 2 were sent to Core Laboratories (Australia) Pty. Ltd. Brisbane and the remainder of the core is stored at (B) above.

(iii) Side-wall Sampling

30 cores were attempted using a Schlumberger gun with hard formation core heads.

24 cores were accepted as tabulated below:

| Depth | Recovery | Depth | Recovery | Depth | Recovery |
|-------|----------|-------|----------|-------|----------|
| 4300 | 1" | 5005 | 1" | 6130 | 0.75" |
| 4362 | 0.75" | 5040 | 2" | 6230 | 0.75" |
| 4515 | 1.25" | 5178 | 1.25" | 6260 | 0.75" |
| 4642 | 1.5" | 5275 | 1.25" | 6380 | 1.25" |
| 4750 | 1.5" | 5380 | 2" | 6398 | 0.5" |
| 4841 | 0.75" | 5495 | 0.75" | 6400 | 0.75" |
| 4932 | 0.75" | 5900 | 1.5" | 6418 | 1.5" |
| 4970 | 1.5" | 6090 | 0.75" | 6428 | 1.25" |

Following lithological description the side-wall cores were used for petrographic and palynological determinations.

III. WELL HISTORY (contd.)

WOOLSTHORPE-1

11/50

(4) Logging and Surveys

(i) Electrical and other logging - Schlumberger

| | | |
|---------------------------------|-----------|------------|
| Induction-Electric log (2 runs) | 525-6137, | 5900-6429 |
| Sonic log-Gamma Ray | 525-6132 | |
| Microlog | 900-1350, | 4300-4450, |
| | | 4700-6138 |
| Continuous Dipmeter | 526-6136 | |

(ii) Penetration Rate and Gas Logs.

Penetration Rate: Drilling times for each 10 feet were taken from the geograph. The penetration rate was plotted in minutes per 5 feet on the composite log.

Gas Log: Casing shoe to T.D. A continuous record of mud gas was kept using a Core Laboratories hot wire detector.

(iii) Deviation surveys: A TOTCO 8° double recorder was used at intervals not greater than 500'. Results are tabulated below; see also continuous dipmeter results.

| Depth | Deviation | Depth | Deviation |
|----------|-----------|----------|-----------|
| 100 ft. | 1/2° | 4005 ft. | 3° |
| 200 ft. | 0° | 4100 ft. | 4 1/2° |
| 300 ft. | 1/4° | 4300 ft. | 5 1/2° |
| 545 ft. | 1/4° | 4500 ft. | 6° |
| 945 ft. | 0° | 4545 ft. | 6° |
| 1500 ft. | 1/2° | 4695 ft. | 5° |
| 2000 ft. | 7/8° | 4860 ft. | 4° |
| 2500 ft. | 1 1/4° | 5077 ft. | 3° |
| 3000 ft. | 2 1/4° | 5672 ft. | 1° |
| 3250 ft. | 2 3/4° | 6170 ft. | 1 1/2° |
| 3500 ft. | 1 1/2° | 6347 ft. | 4° |
| 3819 ft. | 2° | | |

(iv) Temperature surveys: None

(v) Other well surveys: None

(5) Testing

(i) Formation Testing: One drill stem test was run.

| Interval Tested | Type of test | Results |
|-----------------|---|--|
| 5920 - 6140 | Dual packer, conventional. bottom hole. | Good air blow, dead in 1 hour. No gas to surface. Recovered 5750 feet salty water, muddy at top. |

(ii) Production Testing: None.

IV. GEOLOGY

(1) General

The target zones in I.O.L. Woolsthorpe No. 1 were sands within the Lower Cretaceous Otway Group. It was anticipated that permeable sandstones would be developed near the basin margin, especially at the base of the Otway Group sequence.

The well encountered a dominantly sandstone section between 4,790 feet and 5,980 feet containing soft, friable quartz sandstones with porosities up to 28% and permeability locally of several darcys. Recovery of salty formation water during the drill stem test suggests the sands may be effectively sealed in an updip position.

This sandstone interval is correlated with the 'Basal Sandstone' of the F.B.H. Pretty Hill No. 1 well which was located approximately 21 miles to the west-southwest of I.O.L. Woolsthorpe No. 1. In this report the interval is referred to informally as "Pretty Hill Sandstone".

I.O.L. Woolsthorpe No. 1 and F.B.H. Pretty Hill No. 1 each reached total depth in igneous rock which was tentatively considered to be ? Cambrian diabase and represent economic basement. Recent petrographic studies suggest the igneous rock is an altered basalt of probable Jurassic age and probably equivalent to the interbedded dolerite encountered in the lower part of Planet-Casterton No. 1.

Between the base of the "Pretty Hill Sandstone" and the ? Jurassic basalt I.O.L. Woolsthorpe No. 1 encountered a siltstone and shale interval which was not present in F.B.H. Pretty Hill No. 1. This interval is considered equivalent to the interval 7,267 feet to 7,852 feet in Planet Casterton No. 1 and is referred to informally in this report as "Casterton Beds".

The correlation between I.O.L. Woolsthorpe No. 1 and F.B.H. Pretty Hill No. 1 is illustrated in the cross section included as Enclosure No. 2.

Enclosure No. 1 shows the location of I.O.L. Woolsthorpe No. 1 in relation to structure contours of a seismic horizon considered to represent basement.

(2) Stratigraphic Table - Woolsthorpe No. 1

| <u>Age</u> | <u>Rock Unit</u> | <u>Top</u> (feet below K.B.) | <u>Thickness</u> (feet) |
|-----------------------------------|-------------------------------|------------------------------------|----------------------------|
| Recent to Pleistocene | Newer Volcanics | 11 | 109 |
| 1/4 Pleistocene to ? Pliocene | ? Whaler's Bluff Formation | 120 | 30 |
| <u>Unconformity</u> | | | |
| Upper Miocene to Oligocene | Heytesbury Group | 150 | 890 |
| Upper Miocene | Port Campbell Limestone | 150 | 430 |
| Lower Miocene | Gellibrand Marl | 580 | 350 |
| Upper Oligocene | Clifton Formation | 930 | 110 |
| <u>Unconformity</u> | | | |
| Lower Cretaceous to ? Jurassic | Otway Group | 1,040 | (+)5,427 |
| Lower Cretaceous | Eumeralla Formation | 1,040 | 2,510 |
| ? <u>Disconformity</u> | | | |
| Lower Cretaceous to ? Jurassic | Geltwood Beach Formation | 3,550 | 1,240 |
| Lower Cretaceous to ? Jurassic | "Pretty Hill Sandstone" | 4,790 | 1,190 |
| ? Jurassic | "Casterton Beds" | 5,980 | (+) 487 |

base on drilling log.

T.D. 6,467



(3) Lithologic Description

Newer Volcanics

(Recent to ? Pleistocene)

Surface - 120 feet :

Basalt, black weathering to dark brown, reddish and orange.

? Whaler's Bluff Formation

(? Pleistocene)

120 - 150 feet :

Sandstone, yellow brown, fine to coarse grained, poorly sorted with clay matrix. Quartz, chert and lithic grains with some shell fragments.

Heytesbury Group

(Upper Miocene - Oligocene)

150 - 580 feet :

Port Campbell Limestone (Upper Miocene)

Limestone, grey white to blue grey, yellow brown and brown grey. Abundant fossils and shell debris, coquinitic in part. Some glauconite and lithics including well rounded fragments of dark igneous rock. Sandy in part.

580 - 930 feet :

Gellibrand Marl (Lower Miocene)

Marl, blue grey, silty, very fossiliferous, minor glauconite.

Mudstone, blue grey, ^f fossiliferous, minor glauconite.

930 - 1,040 feet :

Clifton Formation (Upper Oligocene)

Limestone, white, buff and brown, fossiliferous, quartz and chert grains.

Sandstone, well rounded, individual quartz grains, medium to coarse, colourless to yellow brown.

Otway Group

(Lower Cretaceous to ? Jurassic)

1,040 - 3,550 feet :

Eumeralla Formation (Lower Cretaceous)

- 1,040 - 1,310 feet : Sandstone, white to pale grey, grey to grey green, fine to medium grained, lithic, quartzose, tight. "Salt and pepper" texture with red and green lithic grains. Micaceous, carbonaceous, argillaceous and in part calcareous.
- Siltstone, light to medium grey, quartzose lithic, argillaceous, micaceous, carbonaceous, calcareous in part.
- Shale, grey, silty in part. Minor coal
- 1,310 - 1,340 feet : Sandstone, coarse, pebbly, conglomeratic, with clean subrounded quartz grains.
- 1,340 - 3,524 feet : Siltstone, grey-white, grey, grey green, grey brown, quartzose, argillaceous, lithic micaceous, carbonaceous.
- Shale, grey, grey green, silty, argillaceous and brown carbonaceous.
- Minor sandstone, light grey, fine grained, quartzose, lithic, argillaceous, micaceous, carbonaceous and in part calcareous.
- Traces coal and pyrite.
- 3,524 - 3,550 feet : Sandstone, coarse, well rounded individual quartz grains. (Possible Heathfield Sand equivalent.)
- 3,550 - 4,790 feet : Geltwood Beach Formation
(Lower Cretaceous to ?Jurassic)
- 3,550 - 4,355 feet : Siltstone, Grey, greenish grey, quartzose, argillaceous, micaceous, lithic, partly carbonaceous, grading to very fine grained sandstone.
- Shale, grey brown, brownish black to dark grey, carbonaceous, silty in part.
- Minor sandstone, white to light grey, tight, fine grained, well sorted, quartzose, lithic, argillaceous, micaceous, carbonaceous in part, some calcareous cement. Traces coal and pyrite.

4,355 - 4,420 feet : Sandstone, white to light grey, medium to coarse grained, sub-angular to sub-rounded, individual quartz grains, poorly sorted with some white clay matrix, porous in part.

4,420 - 4,790 feet : Siltstone, grey, greyish brown and bluish green, lithic, quartzose, micaceous, carbonaceous, argillaceous.

Shale, grey, grey green and brownish, argillaceous, carbonaceous, silty in part.

Minor sandstone, white to greenish white and pale grey, fine to medium grained, quartzose, lithic, tight, micaceous, well sorted in part.

Some recrystallisation from 4,770 to 4,790 feet with interlocking welded quartz grains.

4,790 - 5,980 feet : "Pretty Hill Sandstone"
(Lower Cretaceous to ?Jurassic)

4,790 - 4,835 feet : Sandstone, medium grey, medium grained to coarse in part, sub-angular to well rounded, poorly sorted, quartzose, lithic, argillaceous.

Shale, dark grey, carbonaceous, micaceous, silty in part.

Siltstone, medium grey, quartzose, argillaceous, micaceous, carbonaceous, grading to shale.

4,835 - 4,875 feet : Sandstone, light greenish grey, fine to medium grained, subangular to subrounded, poorly sorted, quartzose, lithic with blue-green clay matrix.

Sandstone, white to greenish, fine to medium grained, subangular to subrounded, well sorted in part, dominantly quartzose with minor lithics and rare mica, white clay matrix.

Minor shale, dark grey to green, carbonaceous, micaceous, and siltstone, grey green, quartzose, lithic, argillaceous, micaceous.

4,875 - 4,975 feet : Sandstone, white, medium to coarse, subangular to subrounded, generally well sorted, friable, dominantly quartz with traces garnet and mica, kaolin matrix, porosity and permeability fair to good, patchy to spotty blue-white to yellow fluorescence.

Shale, interbeds 4,925 to 4,935 feet.

4,975 - 5,005 feet : Siltstone, grey to greenish, quartzose, lithic, argillaceous, carbonaceous, slightly micaceous.

Shale, grey and greenish, silty.

5,005 - 5,075 feet : Sandstone, white, medium to coarse, subangular to subrounded, well sorted, dominantly quartz, traces garnet, rose quartz, mica, white clay cement, friable, porous in part.

5,075 - 5,190 feet : Siltstone, grey green to dark grey, lithic, micaceous, argillaceous, quartzose, carbonaceous.

Shale, dark grey to brownish black, carbonaceous and grey green, argillaceous, silty in part.

Sandstone interbeds at 5,104 feet and 5,160 to 5,170 feet, white, fine to medium grained, well sorted, quartzose, argillaceous, lithic, micaceous, calcareous.

5,190 - 5,255 feet : Sandstone, white, medium to coarse, subangular to well rounded individual quartz grains, porous; also sandstone, white, fine to medium grained, well sorted, argillaceous, lithic, quartzose, calcareous in part, porous to tight.

5,255 - 5,360 feet : Siltstone, light to dark grey, carbonaceous, quartzose, grading to fine grained sandstone.

Shale, brownish black, carbonaceous.

Sandstone interbeds 5,300 to 5,325 feet and at 5,345 feet, white, fine to medium grained, argillaceous, quartzose, lithic, micaceous, carbonaceous, porous to tight.

5,360 - 5,980 feet : Sandstone, white to greenish grey, coarse, clean individual quartz grains, well sorted, subangular, minor coloured quartz grains and garnet, porous; also sandstone, white to greenish grey, fine to medium grained, fairly well sorted, quartzose, lithic, micaceous, tight with clay matrix to slightly porous. Minor spotty blue white to yellow fluorescence in Core No. 3.

Siltstone interbeds 5,405 to 5,410 feet, 5,690 to 5,710 feet, and 5,910 to 5,915 feet, grey, quartzose, lithic, argillaceous, micaceous, carbonaceous.

5,980 - 6,467 feet : "Casterton Beds" (?Jurassic)
(Total depth)

5,980 - 6,390 feet :

Siltstone, grey, grey-green and greyish black, quartzose, micaceous, carbonaceous, argillaceous, grading into very fine grained sandstone.

Shale, grey to dark grey and brownish, carbonaceous, silty in parts.

Sandstone interbed 6,150 to 6,170 feet, greenish-grey, medium grained, quartzose, lithic, tight. Minor coal.

6,390 - 6,467 feet : Basalt, weathered, porphyritic with light to dark grey and green phenocrysts in light grey green matrix. ?Serpentinised with some calcite veining.
(T.D.)

V. REFERENCES

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Unpublished Report for Frome-Broken Hill Company Pty. Ltd.

A P P E N D I C E SAPPENDIX I: Petrological Report

Preliminary Petrographic Description of sidewall cores of volcanics from 6398 - 6428 feet in Interstate's Woolsthorpe No. 1 well by J.B. Hocking, Department of Mines, Victoria.

APPENDIX II: Palaentological Report

Report on Tertiary Foraminiferal Sequence - Interstate's Woolsthorpe No. 1 well, Otway Basin, Victoria by David J. Taylor.

APPENDIX III: Palynological Report

Palynological Report on Interstate's Woolsthorpe No. 1 well, 4300 to 6380 feet by Dr. M.E. Dettmann, University of Queensland.

APPENDIX IV: Water Analysis

Analysis of water from D.S.T. No. 1 5920 - 6140 feet in I.O.L. Woolsthorpe No. 1 well by State Laboratories, Melbourne.

APPENDIX V: Core Descriptions and Analyses

- (a) Core descriptions by B.H. Sell and D.A. Short, Mines Administration Pty. Limited.
- (b) Description of sidewall samples from I.O.L. Woolsthorpe No. 1 well by Shell Development (Australia) Pty. Ltd.
- (c) Core analyses on two samples by Core Laboratories Australia Limited.
- (d) Core Analyses by Petroleum Technology Laboratory, Bureau of Mineral Resources Geology and Geophysics, Canberra.

APPENDIX VI: List of Schlumberger LogsAPPENDIX VII: Details of Drill Stem Testing

PRELIMINARY PETROGRAPHIC DESCRIPTION OF SIDE-
WALL CORES OF VOLCANICS FROM 6398-6428 FEET
IN INTERSTATE'S WOOLSTHORPE 1 WELL

Samples:

Sidewall cores, taken at depths of 6,398, 6,400, 6,418 and 6,428 feet respectively, from Interstate's Woolsthorpe 1 well, Otway Basin.

Submitted by:

Mr. R.B. Leslie, Interstate Oil Ltd., In June, 1968.

Thin Section Nos.:

9421 (for 6,398 ft.), 9420 (for 6,400 ft.), 9419 (for 6,418 ft.), and 9418 (for 6,428 ft.) - V.M.D. collection.

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1. Thin Section Descriptions

The specimen from 6,418 feet is the least altered and is therefore described in the most detail: -
6,418 Feet: The rock appears to be an igneous extrusive, and is inequigranular-porphyritic and hypocristalline.

The phenocrysts are quite variable in size, and range up to 3 mm. length. They appear to comprise more than 30% of the thin-section. The phenocrysts often have partially modified hexagonal, octagonal, or rhombic outlines, but may also be anhedral. Where relatively fresh, they consist of colorless augite or pale green pigeonite. However, alteration is prevalent in which case the most common products are green, green brown, or colorless serpentine and chlorite minerals. These may in turn be replaced by calcite. Although the partial alteration of the pyroxene to the above-named products can be witnessed, one must not overlook the possibility that some at least of the altered phenocrysts were originally olivine.

The groundmass has an overall dark brown coloration which appears to be due to the presence of volcanic glass charged with dusty iron ore. The major crystalline constituent of the groundmass is plagioclase feldspar, of unknown composition, which is represented by randomly orientated elongate laths of up to 0.3 mm. length. There are also colourless pyroxene crystals of comparable size to the feldspars.

Opaque minerals seem to be restricted to minute subhedral crystals of leucoxene that are dispersed throughout the thin-section, though not abundantly. An additional feature of this particular sample is the presence of amygdules of calcite and, more commonly, colorless to very pale green spherulitic serpentine.

The remaining three thin-sections are fundamentally similar to that from 6,418 feet, but some differences have been noted:-

6,398 Feet: Alteration is more advanced than at 6,418 feet. There is no fresh pyroxene and, instead, carbonate replacement is quite pronounced. In addition, there are a few irregularly-shaped pockets filled with secondary minerals, namely calcite, zeolite, and serpentine.

6,400 Feet: This specimen is even further subdivided by pockets and by veins of the type described above. Rare pyrite is encountered along thin cracks.

6,428 Feet: This specimen differs most from that at 6,418 feet, although the differences are largely a function of the degree and nature of alteration. Phenocryst and groundmass replacement by chlorite and serpentine is considerable, although fresh pyroxenes of groundmass dimensions are not uncommon. Calcite is rare. Plagioclase feldspar is also rare - or, in actual fact, largely unrecognisable - due to severe alteration, and the dark brown glassy material is likewise very uncommon. Serpentine mineral is prevalent as a vein filling, far more so than at 6,398 or 6,400 feet. Yet another difference is the presence of rare ilmenite crystals in addition to those of leucoxene.

2. Conclusions

2.1 Rock Classification: (?OLIVINE) BASALT. The classification must be regarded as tentative, since the plagioclase feldspar composition is unknown and also the presence of olivine could not be positively established.

2.2 Stratigraphic Implications: A preliminary petrographic examination of other volcanics from the Otway Basin, and also the Gippsland Basin, indicates that those from Woolsthorpe 1 bear a noticeable likeness to the following, each of which the present writer has provisionally classified as 'basalts':

(i) Cores 20 and 21 from Planet's Casterton 1 well, dated radioactively as Middle Jurassic or Lower Cretaceous,

(ii) Cores 22 and 23 from Frome-Broken Hill's Pretty Hill 1 well, originally assigned a Cambrian age but which are now felt to be otherwise, and

(iii) Core 4 from Arco-Woodside's Duck Bay 1 well, East Gippsland, which is regarded on stratigraphic evidence to be either Permian or Jurassic (and more probably the latter) - this sample, termed a 'meta-basalt' by K.G. Bowen, is quite similar to the 6,428 feet sample from Woolsthorpe 1.

3.

Consequently, even though petrography is not a direct key to age, this preliminary evidence suggests that the Woolsthorpe 1 basalts represent a Mesozoic extrusive.

J.B. HOCKING,
Geologist,
Sedimentary Basin Studies Section,
Department of Mines, Victoria.

August 1968
(revised September 1968)

TERTIARY FORAMINIFERAL SEQUENCE - INTERSTATE'S WOOLSTHORPE-1
OTWAY BASIN - VICTORIA

Summary:-

150' - 570' upper Miocene - inner shelf - littoral
 570' - 930' lower Miocene - continental shelf - transgressive
 930' - 1020' upper Oligocene - shallow marine - transgressive
 1020' - 1040' ? Oligocene - brackish - marginal marine -
 initial marine
 1040' lower Cretaceous

Introduction:

Rotary cutting samples were examined from 150' to 1020'. Down hole contamination appeared to be negligible.

The sequence extended from Oligocene (at 1020') to upper Miocene. An initial brackish water sand was recognised in cutting sample 1020' - 1050' which is probably oligocene in age. Woolsthorpe-1 contains a Tertiary sequence typical of the northern margins of the Otway Basin and the absence of Eocene, Paleocene and upper Cretaceous sediment was to be anticipated.

UPPER MIOCENE 150' - 570'

The first fauna (down-hole) was encountered in sample 150' - 180' which consisted of worn bryozoal fragments, a sparse planktonic foraminiferal fauna of Orbulina universa and Globigerina praebulloides. The benthonic fauna was dominated by miliolids. Many of the bryozoal fragments are encrusted by Acerulina inhaerens, suggesting that the fragments were washed into a semi-littoral environment. Other benthonic fauna includes Cibicides opacus, C. subhaidingeri and Notorotalia clathrata. Biostratigraphic zonation is difficult because of the absence of Globorotalia spp., probably due to the shallow origin of the sediment. An upper Miocene rather than a Pliocene age is favoured.

The fauna described above persists to 390', with the suggestion that sedimentation below 240' was on the inner continental shelf (water depth 100' by analogy with recent faunas on southern Australia shelf). The benthonic fauna are more diverse with a number of arenaceous species including Ammosphaeroidina sphaeroidiniformis, Clavulinoides victoriensis, Pseudoclavulinoides rudis and Textularia spp. Elphidium arenea was first noted at 360' which can be correlated with Zonule D of Taylor's (1966) Gippsland scheme.

At 390' there is a marked increase in number and specific diversity of the planktonic fauna. Orbulina suturalis, Globigerinoides bisphericus, G. glomerosus and G. trilobus indicate Taylor's Zonule E at the base of the upper Miocene. It is noted that a two-fold division of the Miocene is now used by the author. The benthonic fauna is similar to that below 240' apart from a large population of Cibicides victoriensis at 540'.

LOWER MIOCENE 570' - 930'

Orbulina spp. were absent in the samples below 570' and specimens of Globigerinoides bisphericus were almost indistinguishable from G. trilobus. The benthonic fauna includes Cibicides perforatus and Astrononion centroplax. The overall faunal aspects indicate the lower Miocene. Unworn bryozoa become more frequent and sea-weed adherent foraminifera are common (e.g. Carpentaria rotaliformis). By analogy with the recent, the water depth would have been between 200' and 300', thus deeper than in the upper Miocene.

UPPER OLIGOCENE 930' - 1020'

The top of the Oligocene was taken as the highest appearance of Globigerina euapertura. Shallow water benthonic species such as Calcarina mackayi, Eponides repandus, Cibicides perforatus, miliolids and Gaudryina spp. were common. The bryozoal fragments were well worn with a smoothed iron oxide coating. The biofacies is identical with that of the upper Oligocene Clifton Formation of the Princetown area. Unfortunately Globorotalia spp. were absent (as for the whole sequence) so that precise zonation cannot be achieved.

? OLIGOCENE 1020' - 1040'

Directly above the lower Cretaceous Otway Group the cutting sample contained well rounded sand and a number of very coarsely arenaceous specimens of Haplophragmoides sp. ?. The nature of these specimens imply a brackish water environment. Zonation is not possible, but as there is no apparent sedimentation break with the overlying sediments an Oligocene age is suggested. After all, the basal unit of the Clifton Formation is often a non-calcareous sand.

CONCLUSIONS

The Woolsthorpe-1 Tertiary sequence shows:-

- (i) Paleocene and Eocene sedimentation did not reach the site or were removed by erosion in late Eocene times. Whatever the mechanism it is obvious that the lower Cretaceous Otway Group was structurally high in Oligocene time.

- (ii) Shallow marine influence reached the site by late Oligocene and the transgression reached its peak in lower Miocene with continental shelf deposition. However the site was isolated from oceanic currents as is evident by the absence of Globorotalia spp.
- (iii) Maximum transgression was in the lower Miocene with gradual regression during the upper Miocene.

David Taylor

1st September, 1968.

PALYNOLOGICAL REPORT ON INTERSTATE WOOLSTHORPE NO.1WELL, 4300 FEET - 6380 FEET

BY

DR. M.E. DETTMANN

Twelve samples of sidewall cores taken from between 4300 feet and 6380 feet in Interstate Woolsthorpe No.1 well were submitted for palynological analyses by Shell Development (Australia) Pty. Ltd. All samples yielded plant microfossils in concentrations varying from abundant to sparse. The plant material includes spores, pollen grains, and wood and cuticular fragments. In addition forms possibly of aquatic (Chlorophyceae) origin are of rare occurrence in samples at 4515 feet, 5178 feet, and 6230 feet; microplankton were not encountered in the residues.

The plant material was extracted from the enclosing sediments by use of hydrofluoric acid and zinc bromide (Dettmann 1967), followed in some cases by exposure of the residue for one to two minutes to ultrasonic vibration. The preservation quality of the plant microfossils extracted from the samples is documented in Table 1. From this it is evident that the plant material exhibits little variation in preservation quality throughout the section examined.

Analyses of the spore-pollen floras has provided evidence that the section studied is mostly, if not all, of Lower Cretaceous age. Sediments between 4300 feet and 6230 feet yielded the index of the Dictyotosporites speciosus Zone (Dettmann and Playford 1968) to which a Neocomian - early Albian age is assigned (Evans and Hawkins 1967), and the lowest sample from 6380 feet provided a restricted microflora that is of lowermost Cretaceous or possibly of late Jurassic age.

The microfloral assemblages recovered from the sediments are documented below with reference to their qualitative and quantitative content; the quantitative estimates are expressed in the following terms:- Ab (abundant) - numerical representation of a particular species totals at least 5% of total microflora, C (common) - numerical representation of a species forms 1-5% of total microflora, and R (rare) - numerical representation of a species is less than 1% of total microflora.

MICROFLORAL ASSEMBLAGES AND AGE DETERMINATIONS

A. 4300 feet - 6230 feet4300 feet

Abundant spores and pollen grains extracted from the sample constitute the following diverse assemblage:

| | | |
|---------|--|----|
| Spores: | <u>Arcellitites</u> cf. <u>hexapartitus</u> (Dijkstra) | R |
| | <u>Aequitriradites</u> <u>spinulosus</u> (Cookson & Dettman) | C |
| | <u>Baculatisporites</u> <u>comaumensis</u> (Cookson) | C |
| | <u>Cicatricosporites</u> <u>australiensis</u> (Cookson) | Ab |
| | <u>C. ludbrookii</u> Dettmann | C |
| | <u>Contignisporites</u> <u>cooksonii</u> (Balme) | C |
| | <u>C. multimuratus</u> Dettmann | R |
| | <u>Couperisporites</u> <u>tabulatus</u> Dettmann | R |
| | <u>Crybelosporites</u> <u>punctatus</u> Dettmann | R |
| | <u>Cyathidites</u> <u>australis</u> Couper | Ab |
| | <u>C. minor</u> Couper | Ab |
| | <u>Dictyotosporites</u> <u>speciosus</u> Cookson & Dettmann | R |
| | <u>Foraminisporis</u> <u>asymmetricus</u> (Cookson & Dettmann) | R |
| | <u>F. dailyi</u> (Cookson & Dettmann) | R |
| | <u>F. wonthaggiensis</u> (Cookson & Dettmann) | R |
| | <u>Klukisporites</u> <u>scaberis</u> (Cookson & Dettmann) | R |
| | <u>Lycopodiumsporites</u> <u>austroclavatidites</u> (Cookson) | R |

| | | |
|---------|---|----|
| | <u>Pilosporites notensis</u> Cookson & Dettmann | C |
| | <u>Rouseisporites reticulatus</u> Pocock | R |
| Pollen: | <u>Araucariacites australis</u> Cookson | R |
| | <u>Classopollis</u> cf. <u>classoides</u> Pflug | C |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |
| | <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson | |

4515 feet

Spores and pollen grains occur abundantly in the sample and form the following diverse assemblage:

| | | |
|-----------------|--|----|
| Spores: | <u>Aequitriradites spinulosus</u> (Cookson & Dettmann) | C |
| | <u>A. verrucosus</u> (Cookson & Dettmann) | R |
| | <u>Baculatisporites comaumensis</u> (Cookson) | Ab |
| | <u>Ceratosporites equalis</u> Cookson & Dettmann | R |
| | <u>Cicatricosisporites ludbrookii</u> Dettmann | R |
| | <u>Cooksonites variabilis</u> Pocock | R |
| | <u>Cyathidites australis</u> Couper | Ab |
| | <u>C. minor</u> Couper | Ab |
| | <u>Cyclosporites hughesi</u> (Cookson & Dettmann) | R |
| | <u>Dictyotosporites speciosus</u> Cookson & Dettmann | R |
| | <u>Foraminisporis dailyi</u> (Cookson & Dettmann) | R |
| | <u>Januasporites spinulosus</u> Dettmann | R |
| | <u>Kraeuselisporites linearis</u> (Cookson & Dettmann) | R |
| | <u>Leptolepidites verrucatus</u> Couper | R |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | R |
| | <u>L. circolumenus</u> Cookson & Dettmann | R |
| | <u>Pilosporites notensis</u> Cookson & Dettmann | C |
| | <u>Trilobosporites purverulentus</u> (Verbitskaya) | R |
| | <u>Rouseisporites reticulatus</u> Pocock | R |
| Pollen: | <u>Alisporites grandis</u> (Cookson) | C |
| | <u>Araucariacites australis</u> Cookson | R |
| | <u>Classopollis</u> cf. <u>classoides</u> Pflug | C |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |
| | <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson | C |
| | <u>Podosporites microsaccatus</u> (Couper) | R |
| Incertae Sedis: | Gen. et sp. indet. Forma A Eisenack & Cookson 1960 | R |

4750 feet

The residue contains abundant wood fragments and rare spores and pollen grains. Species identified include:

| | |
|---------|--|
| Spores: | <u>Cyathidites australis</u> Couper |
| | <u>C. minor</u> Couper |
| | <u>Cooksonites variabilis</u> Pocock |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) |
| Pollen: | <u>Araucariacites australis</u> Cookson |
| | <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson |

4841 feet

Plant material extracted from the sample includes the following rarely occurring spores and pollen grains:

| | |
|---------|--|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) |
| | <u>Cyathidites australis</u> Couper |
| | <u>Dictyotosporites speciosus</u> Cookson & Dettmann |
| | <u>Klukisporites scaberis</u> (Cookson & Dettmann) |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) |
| | <u>Neoraistrickia truncata</u> (Cookson) |
| Pollen: | <u>Araucariacites australis</u> Cookson |
| | <u>Alisporites similis</u> (Balme) |
| | <u>Microcachryidites antarcticus</u> Cookson |

5005 feet

Spores and pollen grains occur abundantly in the residue which also contains much wood and cuticular matter. The following species were observed:

| | | |
|---------|--|----|
| Spores: | <u>Aequitriradites spinulosus</u> (Cookson & Dettmann) | R |
| | <u>Baculatisporites comaumensis</u> (Cookson) | C |
| | <u>Ceratosporites equalis</u> Cookson & Dettmann | R |
| | <u>Couperisporites tabulatus</u> Dettmann | R |
| | <u>Cooksonites variabilis</u> Pocock | R |
| | <u>Contignisporites cooksonii</u> (Balme) | R |
| | <u>Cyathidites australis</u> Couper | C |
| | <u>C. minor</u> Couper | Ab |
| | <u>Dictyotosporites speciosus</u> Cookson & Dettmann | R |
| | <u>Klukisporites scaberis</u> (Cookson & Dettmann) | R |
| | <u>Leptolepidites verrucatus</u> Couper | C |
| | <u>L. major</u> Couper | R |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | C |
| | <u>L. eminulus</u> Dettmann | R |
| | <u>L. nodosus</u> Dettmann | R |
| | <u>Murospora florida</u> (Balme) | R |
| | <u>Neoraistrickia truncata</u> (Cookson) | R |
| | <u>Matonisporites cooksoni</u> Dettmann | R |
| | <u>Sestrosporites pseudoalveolatus</u> (Couper) | R |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | Ab |
| Pollen: | <u>Alisporites grandis</u> (Cookson) | C |
| | <u>A. similis</u> (Balme) | R |
| | <u>Araucariacites australis</u> Cookson | C |
| | <u>Classopollis</u> cf. <u>classoides</u> Pflug | C |
| | <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson | Ab |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |

5178 feet

Abundant spores and pollen grains were extracted from the sample which also includes much wood and cuticular material. The following species were identified:

| | | |
|-----------------|--|----|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | Ab |
| | <u>Coronatispora telata</u> (Balme) | R |
| | <u>Couperisporites tabulatus</u> Dettmann | R |
| | <u>Cyathidites australis</u> Couper | Ab |
| | <u>C. minor</u> Couper | Ab |
| | <u>Dictyotosporites complex</u> Cookson & Dettmann | R |
| | <u>D. speciosus</u> Cookson & Dettmann | R |
| | <u>Cyclosporites hughesi</u> (Cookson & Dettmann) | R |
| | <u>Foraminisporis dailyi</u> (Cookson & Dettmann) | R |
| | <u>Leptolepidites verrucatus</u> Couper | C |
| | <u>L. major</u> Couper | R |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | Ab |
| | <u>L. circolumenus</u> Cookson & Dettmann | R |
| | <u>L. nodosus</u> Dettmann | R |
| | <u>Murospora florida</u> (Balme) | R |
| | <u>Neoraistrickia truncata</u> (Cookson) | C |
| | <u>Osmundacidites wellmanii</u> Couper | R |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C |
| Pollen: | <u>Alisporites grandis</u> (Cookson) | C |
| | <u>Araucariacites australis</u> Cookson | C |
| | <u>Classopollis</u> cf. <u>classoides</u> Pflug | C |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |
| | <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson | Ab |
| Uncertae Sedis: | <u>Schizosporis reticulatus</u> Cookson & Dettmann | R |

5275 feet

Good concentrations of the following species of spores and pollen grains occur in the residue:

| | | |
|---------|--|----|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | C |
| | <u>Ceratosporites equalis</u> Cookson & Dettmann | R |
| | <u>Couperisporites tabulatus</u> Dettmann | R |
| | <u>Cyathidites australis</u> Couper | C |
| | <u>C. minor</u> Couper | Ab |
| | <u>Dictyotophyllidites crenatus</u> Dettmann | C |
| | <u>Dictyotosporites complex</u> Cookson & Dettmann | R |
| | <u>D. speciosus</u> Cookson & Dettmann | R |
| | <u>Foraminisporis dailyi</u> (Cookson & Dettmann) | R |
| | <u>Ischyosporites punctatus</u> Cookson & Dettmann | R |
| | <u>Leptolepidites verrucatus</u> Couper | R |
| | <u>L. major</u> Couper | R |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | C |
| | <u>Klukisporites scaberis</u> (Cookson & Dettmann) | R |
| | <u>Neoraistrickia truncata</u> (Cookson) | C |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C |
| Pollen: | <u>Alisporites similis</u> (Balme) | R |
| | <u>Araucariacites australis</u> Cookson | C |
| | <u>Classopollis</u> cf. <u>classoides</u> Pflug | C |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |
| | <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson | Ab |

5495 feet

Fairly preserved spores and pollen grains occur commonly in the residue and include the following forms:

| | | |
|---------|--|----|
| Spores: | <u>Aequitriradites spinulosus</u> (Cookson & Dettmann) | R |
| | <u>Baculatisporites comaumensis</u> (Cookson) | Ab |
| | <u>Ceratosporites equalis</u> Cookson & Dettmann | C |
| | <u>Cicatricosisporites australiensis</u> (Cookson) | R |
| | <u>Couperisporites tabulatus</u> Dettmann | R |
| | <u>Cyathidites australis</u> Couper | C |
| | <u>C. minor</u> Couper | Ab |
| | <u>Dictyotosporites speciosus</u> Cookson & Dettmann | R |
| | <u>Leptolepidites verrucatus</u> Couper | C |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | R |
| | <u>L. circolumenus</u> Cookson & Dettmann | R |
| | <u>Neoraistrickia truncata</u> (Cookson) | C |
| | <u>Pilosporites notensis</u> Cookson & Dettmann | R |
| Pollen: | <u>Alisporites grandis</u> (Cookson) | C |
| | <u>A. similis</u> (Balme) | R |
| | <u>Araucariacites australis</u> Cookson | C |
| | <u>Classopollis</u> cf. <u>classoides</u> Pflug | C |
| | <u>Cycadopites nitidus</u> (Balme) | C |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |
| | <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson | Ab |

5900 feet

Spores and pollen grains are of rare occurrence in the residue which contains little other plant material. Species observed include:

| | |
|---------|---|
| Spores: | <u>Klukisporites scaberis</u> (Cookson & Dettmann) |
| Pollen: | <u>Araucariacites australis</u> Cookson |
| | <u>Classopollis</u> cf. <u>classoides</u> Pflug |
| | <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson |

6090 feet

A small residue containing spores and pollen grains and some wood and cuticular material was extracted from the sample. Spore-pollen species observed include:

| | | |
|---------|--|----|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | Ab |
| | <u>Ceratosporites equalis</u> Cookson & Dettmann | R |
| | <u>Cyathidites australis</u> Couper | C |
| | <u>C. minor</u> Couper | Ab |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | C |
| | <u>L. eminulus</u> Dettmann | R |
| Pollen: | <u>Alisporites grandis</u> (Cookson) | C |
| | <u>Araucariacites australis</u> Cookson | C |
| | <u>Microcachrydites antarcticus</u> Cookson | Ab |
| | <u>Podocarpidites cf. ellipticus</u> Cookson | Ab |

6230 feet

The sample yielded abundant spores and pollen grains intermixed with wood and cuticular material. Species identified include:

| | | |
|-----------------|--|----|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | Ab |
| | <u>Ceratosporites equalis</u> Cookson & Dettmann | C |
| | <u>Cicatricosisporites ludbrookii</u> Dettmann | R |
| | <u>Contignisporites cooksonii</u> (Balme) | R |
| | <u>Coronatispora telata</u> (Balme) | R |
| | <u>Cyclosporites hughesi</u> (Cookson & Dettmann) | R |
| | <u>Cyathidites australis</u> Couper | Ab |
| | <u>C. minor</u> Couper | Ab |
| | <u>Dictyotosporites complex</u> Cookson & Dettmann | R |
| | <u>D. speciosus</u> Cookson & Dettmann | R |
| | <u>Foveotriletes parviretus</u> (Balme) | C |
| | <u>Foraminisporis dailyi</u> (Cookson & Dettmann) | R |
| | <u>Janusporites spinulosus</u> Dettmann | R |
| | <u>Klukisporites scaberis</u> (Cookson & Dettmann) | R |
| | <u>Leptolepidites verrucatus</u> Couper | C |
| | <u>L. major</u> Couper | R |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | C |
| | <u>L. circolumenus</u> Cookson & Dettmann | C |
| | <u>L. eminulus</u> Dettmann | R |
| | <u>L. facetus</u> Dettmann | R |
| | <u>L. nodosus</u> Dettmann | R |
| | <u>Murospora florida</u> (Balme) | R |
| | <u>Lycopodiacidites asperatus</u> Dettmann | R |
| | <u>Neoraistrickia truncata</u> (Cookson) | C |
| | <u>Sestrosporites pseudoalveolatus</u> (Couper) | R |
| | <u>Velosporites triquetrus</u> (Lantz) | R |
| Pollen: | <u>Alisporites similis</u> (Balme) | C |
| | <u>Araucariacites australis</u> Cookson | C |
| | <u>Classopollis cf. classoides</u> Pflug | C |
| | <u>Microcachrydites antarcticus</u> Cookson | Ab |
| | <u>Podocarpidites cf. ellipticus</u> Cookson | Ab |
| | <u>Tsugaepollenites dampieri</u> (Balme) | R |
| Incertae Sedis: | <u>Schizosporis reticulatus</u> Cookson & Dettmann | R |

Sediments between 4300 feet and 6230 feet yielded microfloras that contain Dictyotosporites speciosus. The horizons are accordingly referred to the Dictyotosporites speciosus Zone to which Dettmann and Playford (1968) assigned a Neocomian - Upper Aptian age on the basis of the zones occurrence in Oodnadatta No.1 well, South Australia. Evans and Hawkins (1967) question Ludbrook's (1966) designation of the Aptian/Albian boundary in the Oodnadatta well and indicate that in Queensland upper horizons of the zone are of Lower Albian age.

In Woolsthorpe No.1 well, horizons between 4515 feet and 6230 feet are referred to the Cyclosporites hughesi Subzone of the D. speciosus Zone on the basis of the association of D. speciosus and C. hughesi.

According to Evans and Hawkins (1967), the C. hughesi Subzone is of Neocomian - Aptian age. The uppermost sample investigated at 4300 feet failed to yield diagnostic criteria of either the C. hughesi or Crybelosporites striatus Subzones.

Microfloras recovered from the D. speciosus Zone in Woolsthorpe No.1 well are composed of spores and pollen grains and lack microplankton. Types assigned by some authors to the Acritarcha but believed by others to have derived from the Chlorophyceae occur rarely at 4515 feet, 5178 feet, and 6230 feet. These types are Schizosporis reticulatus (for affinity see Brenner 1963) and gen et sp. indet. Form A of Eisenack and Cookson 1960 (see Evans 1966).

B. 6380 feet

Spores and pollen grains are of common occurrence in the residue and include the following species:

| | | |
|---------|---|----|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | Ab |
| | <u>Ceratosporites equalis</u> Cookson & Dettmann | C |
| | <u>Coronatispora telata</u> (Balme) | R |
| | ? <u>Crybelosporites stylosus</u> Dettmann | R |
| | <u>Cyathidites australis</u> Couper | Ab |
| | <u>C. minor</u> Couper | Ab |
| | <u>Leptolepidites verrucatus</u> Couper | R |
| | <u>L. major</u> Couper | R |
| | <u>Lycopodiumsporites circolumenus</u> Cookson & Dettmann | C |
| | <u>L. austroclavatidites</u> (Cookson) | R |
| | <u>Neoraistrickia truncata</u> (Cookson) | R |
| | <u>Osmundacidites wellmanii</u> Couper | C |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | R |
| Pollen: | <u>Alisporites grandis</u> (Cookson) | R |
| | <u>A. similis</u> (Balme) | C |
| | <u>Araucariacites australis</u> Cookson | C |
| | <u>Classopollis</u> cf. <u>classoides</u> Pflug | C |
| | <u>Cycadopites nitidus</u> (Balme) | R |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |
| | <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson | R |
| | <u>Perinopollenites</u> sp. | C |
| | <u>Tsugaepollenites dampieri</u> (Balme) | R |

The microflora contains an abundance of cyatheaceous and osmundaceous spores and of the gymnospermous Microcachryidites antarcticus. These features are characteristic of Australian late Jurassic and early Cretaceous microfloras. A late Jurassic - early Cretaceous age is supported by the presence of Coronatispora telata and Lycopodiumsporites circolumenus. A single doubtful specimen of Crybelosporites stylosus was observed, but other forms diagnostic of the Crybelosporites stylosus Zone (of late Jurassic - Valanginian age) were not encountered.

CONCLUSIONS

Horizons between 4300 feet and 6230 feet in Woolsthorpe No.1 well are referable to the Neocomian - Lower Albian Dictyosporites speciosus Zone; the Cyclosporites hughesi Subzone (Neocomian - Aptian) of this zone was recognized in samples from between 4515 feet and 6230 feet, and the sample at 4300 feet provided insufficient data for subzonal assignment. The lowest sample (6380 feet) investigated contains a late Jurassic or early Cretaceous microflora, but zonal attribution is precluded by the absence of diagnostic species.

The fair to poorly preserved microfloras extracted from the Woolsthorpe well are composed chiefly of spores and pollen grains and occasional forms that may have derived from the Chlorophyceae were also observed.

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9th September, 1968

Mary E. Dettmann,
Department of Geology,
University of Queensland,
St. Lucia, Queensland.

EXPLANATION OF TABLE 1

Preservation and zonal attribution of plant microfossil assemblages in Interstate Woolsthorpe No.1 well, 4300 feet - 6380 feet.

Abbreviations:

Yield expresses frequency of spores and pollen in the palynological residues as follows:-

- Ab = abundant
- C = common
- Sp = sparse

Colour and preservation. Spores, pollen, wood, and cuticle present in the residues are denoted by their colour (col.) and quality of preservation (pres.) thus:-

- DY = dark yellow
- Br = brown
- Bl = black
- fair = fair
- poor = poor

Spore-pollen zones are those defined by Dettmann and Playford (1968).

TABLE 1

| Depth (feet) | Yield | Spore-Pollen | | Wood | | Cuticle | | Spore-Pollen Zone | |
|-----------------|-------|--------------|---------------|-------|---------------|---------|---------------|----------------------------------|---------------|
| | | Col. | Pres. | Col. | Pres. | Col. | Pres. | | |
| 4300 | Ab | DY-Br | fair | Br-Bl | fair- poor | DY-Br | fair | Dictyosporites speciosus Zone | ? |
| 4515 | " | " | " | " | " | " | " | | ----- |
| 4750 | Sp | " | " | " | " | " | fair- poor | | |
| 4841 | " | " | " | " | " | " | | | |
| 5005 | Ab | " | " | " | " | " | | | Cyclosporites |
| 5178 | " | " | " | " | " | " | | | hughesi |
| 5275 | C | " | " | " | " | " | | | Subzone |
| 5495 | " | " | " | " | " | " | | | |
| 5900 | Sp | " | " | " | " | - | - | | |
| 6090 | " | " | fair- poor | " | " | DY | fair- poor | | |
| 6230 | Ab | " | " | " | " | " | " | | |
| 6380 | C | DY | " | " | " | " | " | ?Crybelosporites stylosus Zone | |

Chemical Branch
Mines Department
Chemical Laboratories -
Departments of
Agriculture, Health,
and Mines, Victoria.
An. JL,FF, 17/6

State Laboratories,
Macarthur Street,
MELBOURNE. 3000

24th June, 1968.

Report on Sample No. 917/68

U.W.R.S. 5772

Sample : Water from oil bore
Locality : Parish : Woolsthorpe
Sender : Interstate Oil Limited,
95 Collins Street,
MELBOURNE.

Particulars:

No. 917
U.W.R.S. 5772
Bore Woolsthorpe No.1 Well
Date 10.6.68
Depth (feet) From D.S.T. No.1 interval 5920'
to 6140'
Aquifer type "Pretty Hill Sand" Basal portion
of Otway Group, Lower Cretaceous.
Position 5 miles North East of Woolsthorpe
on Woolsthorpe to Hexham Road,
adjacent to northern corner of
allot. 4A Section 7.
38° 08' 08" South
142° 29' 47" East

Results:

Parts per million

| | |
|--|----------------------|
| Total solids in solution | 21,000 |
| Chloride (Cl) | 11,940 |
| Carbonate (CO ₃) | Nil |
| Bicarbonate (HCO ₃) | 455 |
| Sulphate (SO ₄) | 40 |
| Nitrate (NO ₃) | Nil |
| Calcium (Ca) | 698 |
| Magnesium (Mg) | 60 |
| Sodium (Na) | 6,925 |
| Potassium (K) | 116 |
| Iron-Total (Fe) | 71 |
| Iron-Soluble (Fe) | n.d. |
| Silicate (SiO ₃) | 28 |
| Total hardness (as CaCO ₃) | 1,992 |
| pH | 7.0 |
| E.C. at 25°C. | 30,200 micromhos/cm. |
| Specific Resistance at 16.8°C. | 39 ohmcm. |

John C. Kennedy per C.M.G.
Senior Chemist,
Mines Department

CORE DESCRIPTIONSI.O.L. WOOLSTHORPE NO. 1

by

B.H. Sell and D.A. Short

Mines Administration Pty. Limited.

Equipment : Hughes "J" type 20ft. barrel cutting a $3\frac{3}{8}$ " diameter core.

CORE No. 1

Interval : 4790' - 4799'

Recovery : 8'6" or 94%

4790'-4795'

5 ft. Sandstone: Medium grey, mostly medium grained with minor coarser grained, fairly hard. It is irregularly current bedded at 20°-30°. Grains are mostly clear quartz with minor reddish siliceous, and grey green argillaceous lithic fragments. The matrix is light grey, kaolinitic and abundant. Porosity is low. Grains are sub-angular to well rounded but poorly sorted.

4795'-4798'6"

3'6" Siltstone - shale: siltstone medium grey, quartzose, lithic, argillaceous, micaceous, carbonaceous, grading to shale dark grey, carbonaceous, micaceous, silty in part.

Several slickensided intervals are present, especially in the shaley sections.

Overall dip: Appears to be approximately 50

Signs of oil/gas: Nil

CORE No. 2

Interval : 4860' - 4883'

Recovery : 11'6" or 50%

4860'-4862'

2 ft. Sandstone: Greenish grey to green, fine to medium grained, fairly hard, poorly bedded to massive. It is composed of quartz, greenish lithic fragments, and minor weathered feldspar and mica in an abundant bluish green clay matrix. Porosity and permeability are very poor. Grains are sub angular to rounded, poorly sorted.

4862'-4864'

2 ft. Shale: dark grey to greenish, carbonaceous and micaceous at the top, grading to silty, micaceous at the base of the interval. Much of the interval is slickensided and broken. Probably several feet of core was lost in this section as it came out of the barrel in pieces too small to recover.

4864'-4865'

1 ft. Siltstone: grey green quartzose, lithic, argillaceous, slightly micaceous.

- 4865'-4866' 1 ft. Sandstone: Light greenish grey, fine grained, fairly hard, poorly bedded. It is composed of quartz, lithic fragments and a trace of mica in a whitish clay matrix - tight.
- 4866'-4868' 2 ft. Sandstone: white to greenish fine to medium grained irregularly bedded. There is a shaley parting at 4866'9" and several shale clasts (up to 3"). The sandstone is dominantly quartzose, with minor lithic grains and rare mica in a white clay matrix. Grains are sub-angular to rounded and well sorted in part. Porosity is poor to fair.
- 4868'-4871'6" 3'6" Sandstone: white, medium to coarse grained, soft to very soft and crumbly. Except for a suggestion of current bedding at 4869 ft., the sandstone is poorly bedded to massive. It is composed of quartz (mostly clear) minor lithic fragments and a trace of mica, in a fairly abundant kaolinitic matrix. Grains are sub-angular to rounded, and generally well sorted. Porosity and permeability are fair to very good.
- Overall dip: Indeterminable - possibly 5° - 8°
- Signs of oil/gas: Patchy to spotty blue white to yellowish fluorescence - about 5% of all the soft sands.
- CORE No. 3 Interval : 5708'-5727'
Recovery : 13'6" or 71%
- 5708'-5712' 4 ft. Sandstone: greenish grey, medium to coarse grained extremely soft and friable, massive. It is composed of quartz, minor lithic fragments, rare garnet and mica, in a white clay matrix. Although there is a considerable amount of clay, the porosity and permeability appear very good. Grains are sub-angular to rounded, well sorted.
- 5712'-5714' 2 ft. Sandstone: greenish grey, fine to medium grained, fairly hard. Its composition is similar to the sandstone 5708-5712, but it is more argillaceous and tight.
- 5714'-5721'6" 7 ft. 6 ins. Sandstone as for 5708'-5712'
Most of the 5'6" not recovered was in the barrel but as loose sand.
- Overall Dip: Indeterminable
- Signs of oil/gas: Trace of blue white to yellow fluorescence

I.O.L. WOOLSTHORPE - 1 WELLSidewall Sample Descriptions

by

Shell Development (Australia) Pty. Ltd.

| <u>Depth</u> | <u>Description</u> |
|--------------|--|
| 4300' | <u>Claystone</u> , light grey, micaceous, feldspathic, silty. |
| 4362' | <u>Quartz Sandstone</u> , porous, white, medium to coarse grained, well sorted, angular to sub-rounded. |
| 4515' | <u>Siltstone</u> , dark grey, micaceous, soft. |
| 4642' | <u>Siltstone</u> , grading to <u>Claystone</u> , medium to dark grey, micaceous, soft. |
| 4750' | <u>Claystone</u> , dark grey, slightly micaceous, firm, massive. |
| 4841' | <u>Quartz Sandstone</u> , slightly porous, white, locally abundant white clay cement, fine to coarse grained, locally pebbly, angular to subrounded, soft, very friable, lithic. |
| 4932' | <u>Sub-lithic Sandstone</u> , dense, white to light grey, well sorted, fine grained, quartzose, feldspathic, trace of green lithics, clay matrix. |
| 4970' | <u>Quartz Sandstone</u> , light grey-white, dense, fine to medium grained, well sorted, angular to sub-rounded, red and grey lithics, feldspathic, white clay cement. |
| 5005' | <u>Siltstone</u> , banded light and dark grey, sandy, micaceous, carbonaceous |
| 5040' | <u>Quartz Sandstone</u> , slightly porous to dense, locally porous, white, medium grained, well sorted, sub-angular to rounded, feldspathic, lithic, trace garnet, locally white clay cement, very friable, abundant rose quartz. |
| 5178' | <u>Claystone</u> , silty, dark grey, massive. |
| 5275' | <u>Siltstone</u> , banded light to dark grey, carbonaceous, grades into very fine grained <u>sandstone</u> , silty. |
| 5380' | <u>Quartz Sandstone</u> , slightly porous to dense, white, fine to medium grained, well sorted, angular to sub-rounded, lithic, feldspathic, white clay cement, green to dark grey lithics, rose quartz, locally very porous and very friable. |
| 5495' | <u>Quartz Sandstone</u> , dense to slightly porous, white, fine to medium grained, well sorted, abundant white clay cement, rose quartz, very friable, local yellow staining of quartz. |
| 5900' | <u>Quartz Sandstone</u> , dense to slightly porous, white, medium grained, very well sorted, feldspathic, rose quartz and garnet, local white clay cement, few dark lithic grains, locally grades into coarse grained, well sorted, very porous. |
| 6090' | <u>Claystone</u> , silty, dark brown, massive. |
| 6130' | <u>Siltstone</u> , dark grey, slightly carbonaceous, with white to light grey, very fine grained <u>sandstone</u> layers, silty, grades into very silty sandstone, dark grey. |

| <u>Depth</u> | <u>Description</u> |
|--------------|---|
| 6230' | <u>Siltstone</u> , dark grey, micaceous, massive. |
| 6260' | <u>Siltstone</u> , as for 6230' |
| 6380' | <u>Claystone</u> , dark grey to black, fissile, probably faulted. |
| 6398' | <u>Volcanic</u> , light grey - green, light grey matrix with light to dark grey crystalline phenocrysts 1 to 3 m.m. across. |
| 6400' | <u>Volcanic</u> , weathered crystalline groundmass with dark green phenocrysts. |
| 6418' | <u>Volcanic</u> |
| 6428' | <u>Volcanic</u> , possibly serpentinitised along shears in core, porphyritic, intermediate to basic volcanic. |

CORE LABORATORIES AUSTRALIA LTD.

Petroleum Reservoir Engineering
BRISBANE, AUSTRALIA

40/50

Company Mines Administration Pty. Ltd. Formation _____ Page 1 of 1
Well Interstate Woolsthorpe No. 1 Cores _____ File AP-1-168
Field _____ Drilling Fluid _____ Date Report 7 JUNE 1968
Country Victoria State Australia Elevation _____ Analysts NF
Location _____ Remarks _____

CORE ANALYSIS RESULTS

(Figures in parentheses refer to footnote remarks)

| SAMPLE NUMBER | DEPTH FEET | PERMEABILITY MILLIDARCYS | | POROSITY PERCENT | RESIDUAL SATURATION | | PROBABLE PRODUCTION | REMARKS |
|---------------|------------|--------------------------|----------|------------------|---------------------|--------------------|---------------------|--------------------------------|
| | | HORIZONTAL | VERTICAL | | OIL % VOLUME | TOTAL WATER % PORE | | |
| 1 | 4868 | 54 | - | 22.3 | * 0.0 | 79.8 | WATER | Sandstone, Wh, Med grn, Argil. |
| 2 | 4871 | 9784 | - | 22.3 | * 0.0 | 82.1 | WATER | Sandstone, Wh, Cse grn, Argil. |

* NOTE: Distinct Blue-white fluorescence appeared in spots and patches throughout both samples. Test showed the presence of live-oil, however the quantity was too small to be measured.

NOTE:

- (*) REFER TO ATTACHED LETTER.
(1) INCOMPLETE CORE RECOVERY—INTERPRETATION RESERVED.

(2) OFF LOCATION ANALYSES—NO INTERPRETATION OF RESULTS

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc., and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

4/50

Petroleum Technology Laboratory, Bureau of Mineral Resources, Geology and Geophysics, Canberra
CORE ANALYSIS RESULTS

NOTE: (i) Unless otherwise stated, porosities and permeabilities were determined on two plugs (V&H) cut vertically and horizontally to the axis of the core. Ruska porosimeter and permeameter were used with air and dry nitrogen as the saturating and flowing media respectively. (ii) Oil and water saturations were determined using Soxhlet type apparatus. (iii) Acetone test precipitates are recorded as Neg., Trace, Fair, Strong or Very Strong.

WELL NAME AND NO. WOOLSTHORPE No. 1

DATE ANALYSIS COMPLETED 21st June, 1968.

| Core No. | Sample Depth | | Lithology | Average Effective Porosity (% Bulk Vol. two plugs) | Absolute Permeability (Millidarcy) | | Average Density (gm/cc.) | | Fluid Saturation (% pore space) | | Core Water Salinity (p.p.m. NaCl) | Acetone Test | Fluorescence of freshly broken core |
|----------|--------------|---------|-----------------------|--|------------------------------------|------|--------------------------|--------------|---------------------------------|-----|-----------------------------------|--------------|-------------------------------------|
| | From | To | | | V | H | Dry Bulk | Appar. Grain | Water | Oil | | | |
| 1A | 4792'1" | 4792'5" | sandstone | 11 | 13 | 1.4 | 2.47 | 2.76 | 44 | NIL | N.D. | Neg. | NIL |
| 1B | 4794' | 4794'4" | " | 12 | NIL | NIL | 2.42 | 2.73 | 68 | NIL | N.D. | Neg. | NIL |
| 1C | 4796'1" | 4796'5" | siltstone & sandstone | 13 | N.D. | NIL | 2.52 | 2.90 | 61 | NIL | N.D. | Neg. | NIL |
| 1D | 4798'2" | 4798'6" | shale & sandstone | 13 | NIL | 3 | 2.53 | 2.89 | 58 | NIL | N.D. | Neg. | NIL |
| 2A | 4861'11" | 4862'3" | siltstone & sandstone | 12 | NIL | NIL | 2.41 | 2.41 | 93 | NIL | N.D. | Neg. | NIL |
| 2B | 4863'9" | 4864' | " | 13 | N.D. | N.D. | 2.42 | 2.78 | 84 | NIL | N.D. | Neg. | NIL |
| 2C | 4865'11" | 4866'3" | sandstone | 17 | NIL | 2 | 2.23 | 2.69 | 88 | NIL | N.D. | Neg. | speckled whitish-blue |
| 2D | 4867'10" | 4868'1" | " | 21 | N.D. | 21 | 2.12 | 2.68 | 73 | NIL | N.D. | Neg. | whitish-blue |

Remarks: - Core samples were received in a sealed condition.

General File No. 62/399
 Well File No. 62/2019

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CORE ANALYSIS RESULTS

NOTE: (i) Unless otherwise stated, porosities and permeabilities were determined on two plugs (V&H) cut vertically and horizontally to the axis of the core. Ruska porosimeter and permeameter were used with air and dry nitrogen as the saturating and flowing media respectively. (ii) Oil and water saturations were determined using Soxhlet type apparatus. (iii) Acetone test precipitates are recorded as Neg., Trace, Fair, Strong or Very Strong.

WELL NAME AND NO. WOOLSTHORPE No. 1

DATE ANALYSIS COMPLETED 28th June 1968.

| Core No. | Sample Depth | | Lithology | Average Effective Porosity (% Bulk Vol. two plugs) | Absolute Permeability (Millidarcy) | | Average Density (gm/cc.) | | Fluid Saturation (% pore space) | | Core Water Salinity (p.p.m. NaCl) | Acetone Test | Fluorescence of freshly broken core |
|----------|--------------|---------|-----------|--|------------------------------------|------|--------------------------|--------------|---------------------------------|-----|-----------------------------------|--------------|-------------------------------------|
| | From | To | | | V | H | Dry Bulk | Appar. Grain | Water | Oil | | | |
| 3A | 5710'0" | 5710'4" | Sandstone | 28 | N.D. | N.D. | 1.90 | 2.63 | 88 | NIL | N.D. | Neg. | NIL |
| 3B | 5712'3" | 5712'7" | " | 21 | 3 | N.D. | 2.13 | 2.69 | 69 | NIL | N.D. | Neg. | NIL |
| 3C | 5714'1" | 5714'4" | " | 21 | N.D. | 32 | 2.12 | 2.69 | 98 | NIL | N.D. | Neg. | NIL |
| 3D | 5716'1" | 5716'4" | " | 25 | N.D. | 184 | 1.98 | 2.64 | 79 | NIL | N.D. | Neg. | NIL |
| 3E | 5718'1" | 5718'4" | " | 21 | N.D. | 54 | 2.14 | 2.71 | 94 | NIL | N.D. | Neg. | NIL |
| 3F | 5721'1" | 5721'4" | " | 25 | N.D. | N.D. | 1.97 | 2.62 | 93 | NIL | N.D. | Neg. | NIL |

Remarks: - Core samples were received in a sealed condition.

General File No. 62/399
Well File No. 68/2019

44/50

CORE ANALYSIS RESULTS

NOTE: (i) Unless otherwise stated, porosities and permeabilities were determined on two plugs (V&H) cut vertically and horizontally to the axis of the core. Ruska porosimeter and permeameter were used with air and dry nitrogen as the saturating and flowing media respectively. (ii) Oil and water saturations were determined using Soxhlet type apparatus; (iii) Acetone test precipitates are recorded as Neg., Trace, Fair, Strong or Very Strong.

WELL NAME AND NO. WOOLSTHORPE No. 1

DATE ANALYSIS COMPLETED 27th August, 1968.

| Core No. | Sample Depth | | Lithology | Average Effective Porosity (% Bulk Vol. two plugs) | Absolute Permeability (Millidarcy) | | Average Density (gm/cc.) Dry Bulk | Fluid Saturation (% pore space) Water | Core Water Salinity (p.p.m. NaCl) | Acetone Test | Fluorescence of freshly broken core |
|----------|--------------|---------|------------------------------|--|------------------------------------|------|-----------------------------------|---------------------------------------|-----------------------------------|--------------|-------------------------------------|
| | From | To | | | V | H | | | | | |
| 3A | 5710'1" | 5710'4" | sandstone, medium-grained | | 3701 | 3405 | | | | | |
| 3B | 5712'3" | 5712'7" | sandstone, very fine-grained | | 4 | 204 | | | | | |
| 3C | 5714'1" | 5714'4" | sandstone, fine-grained | | 4 | 294 | | | | | |
| 3D | 5716'1" | 5716'4" | " | | 698 | 1353 | | | | | |
| 3E | 5718'1" | 5718'4" | sandstone, very fine-grained | | 46 | 37 | | | | | |
| 3F | 5721'1" | 5721'4" | sandstone, medium-grained | | 104 | 4909 | | | | | |

Remarks: - All samples mounted in wax.

General File No. 62/399
Well File No. 62/2019

I.O.L. WOOLSTHORPE NO. 1 WELLList of Schlumberger Logs

| <u>Log</u> | <u>Run No.</u> | <u>Date</u> | <u>Interval Logged</u> | <u>Scale (ins/100 ft.)</u> |
|-------------------------|--------------------|-------------|----------------------------|--------------------------------|
| Induction - Electric | 1 | 8/6/68 | 525' - 6137' | 1 & 5 |
| | 2 | 12/6/68 | 5900' - 6429' | 1 & 5 |
| Sonic/Gamma Ray/Caliper | 1 | 9/6/68 | 525' - 6132' | 1 & 5 |
| Microlog/Caliper | 1 | 9/6/68 | { 900' - 1350' | 1 & 5 |
| | | | { 4300' - 4450' | |
| | | | { 4700' - 6138' | |
| Continuous Dipmeter | 1 | 9/6/68 | 526' - 6136' | 2 & 5 |

LOG INTERPRETATION

by

SCHLUMBERGER SEACO INC.WOOLSTHORPE #1

Logs available: Induction Electrical
 Microlog Caliper
 Sonic Gamma Ray Caliper

930-1000: These sands are 100% fresh water saturated with porosities ranging from 27% to 40%. The Gamma Ray indicates that a certain amount of clay or shale may be present.

4360-4370: The Gamma Ray and Microlog indicate shale laminations within this sand.

| | | | | |
|----|---|-------------|------------|-------------------------------|
| SP | = | 35 | 45 | $\frac{R_{mf}}{R_{wo}} = 3.5$ |
| Rw | = | .35 at 137° | | |
| Rt | = | 6 | $R_t = 2.$ | $R_{wo} = \frac{.7}{3.5}$ |
| F | = | 20 | | |
| Ø | = | 20% | | |
| Sw | = | 108% | | = .2 |

The sand sequence from 4830 to 6000 contains numerous shale free members as indicated by the Microlog and Gamma Ray. The SP deflection is fairly uniform in magnitude, so we assume the formation water resistivity is uniform throughout this section. Again we use a sonic resistivity plot to analyse the formation.

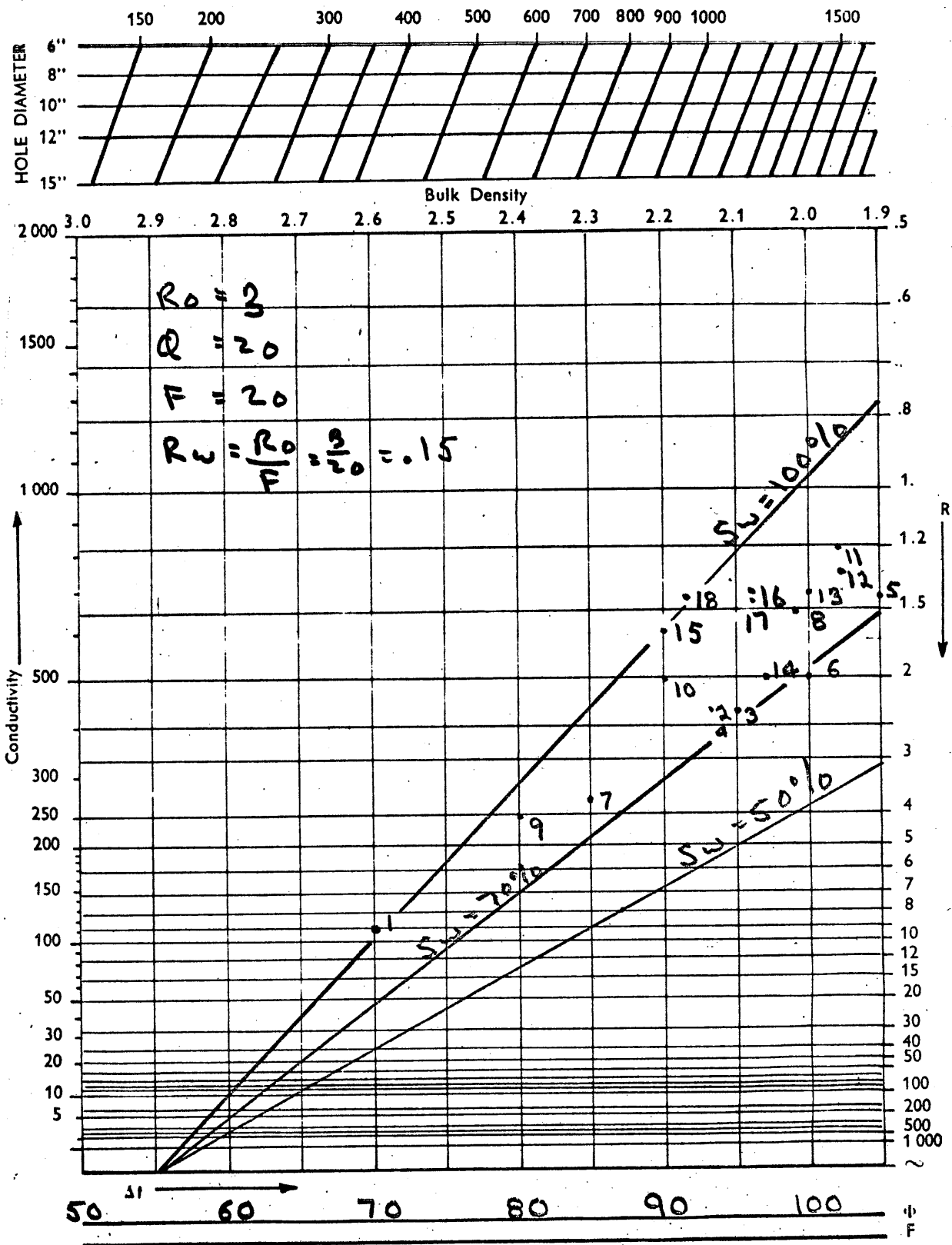
Ø is determined from the sonic assuming sufficient compaction to use $C \Delta T SH = 100$. V_m of 18,000 is determined from the Sonic-Induction plot along with $R_w = 0.15$ at BHT. Water saturation values were also obtained from the plot and tabulated in table 1.

T A B L E 1

| <u>Point</u> | <u>Depth</u> | <u>R IL</u> | <u>△ T</u> | <u>Ø</u> | <u>Sw</u> |
|--------------|--------------|-------------|------------|----------|-----------|
| 1 | 4840 | 9 | 70 | 11 | 100 |
| 2 | 4886 | 2.2 | 93 | 28 | 73 |
| 3 | 4920 | 2.2 | 95 | 29 | 70 |
| 4 | 4970 | 2.2 | 93 | 28 | 70 |
| 5 | 5036 | 1.4 | 105 | 37 | 72 |
| 6 | 5068 | 2.0 | 100 | 33 | 69 |
| 7 | 5195 | 3.3 | 85 | 22 | 75 |
| 8 | 5233 | 1.4 | 99 | 32 | 80 |
| 9 | 5318 | 4.0 | 80 | 18 | 85 |
| 10 | 5370 | 2.0 | 90 | 26 | 85 |
| 11 | 5392 | 1.2 | 102 | 35 | 80 |
| 12 | 5457 | 1.3 | 102 | 35 | 78 |
| 13 | 5600 | 1.4 | 100 | 33 | 79 |
| 14 | 5678 | 2.0 | 97 | 31 | 73 |
| 15 | 5770 | 1.6 | 90 | 26 | 100 |
| 16 | 5806 | 1.3 | 96 | 30 | 85 |
| 17 | 5887 | 1.4 | 96 | 30 | 84 |
| 18 | 5920 | 1.4 | 92 | 27 | 100 |

GRID FOR SONIC — RESISTIVITY OR FD — RESISTIVITY PLOTS

PGT — (A or B) LIQUID FILLED HOLES



$$F = \frac{.62}{\psi^{2.15}}$$

WOOLSTHORPE #1

I.O.L. WOOLSTHORPE NO. 1 WELLDetails of Drill Stem Testing

One open hole drill stem test was carried out during the drilling of the well.

Drill Stem Test No. 1:

Date: 9th/10th June, 1968

Interval Tested: 5920 to 6140 feet.

Reason for Test: To determine formation pressure, permeability and obtain a sample of formation fluid from the "Pretty Hill Sandstone".

Well Depth: 6140 feet.

Hole Conditions: Open hole, 8 $\frac{3}{4}$ ".

Type of Test: Dual packer, bottom hole.

Drillpipe/Collar Size: 4 $\frac{1}{2}$ " and 3 $\frac{1}{2}$ " D.P.
6 $\frac{1}{2}$ " O.D. 2 $\frac{3}{4}$ " I.D. Collars.

Packers: 7 $\frac{3}{4}$ ", set at 5914 and 5920 feet.

Choke Size: $\frac{1}{2}$ " bottom, $\frac{3}{4}$ " adjustable top.

Water Cushion: Nil.

Tail Pipe Data: 2.5' bullnose, 1.0' x/o sub,
178.83' drill collars, 1.0' x/o sub,
5.0' perforated tail pipe, 4.75'
recorder sub, 1.0' perforated
tail pipe, 4.75' recorder sub,
20.0' perforated tail pipe,
1.0' packer. Total 219.83'.

Calculated Pressure
of Mud Column: 3,000 p.s.i.

Duration of Test: Set Packer at 2215 hours.
Opened Tools at 2216 $\frac{1}{2}$ hours for 67 minutes.
Tool could not be rotated for shut-in due
probably to large amount of sand in tool.
Released Packer at 2323 $\frac{1}{2}$ hours.

Results: Good initial puff increasing to strong
air blow. Died after 45 minutes.
No gas to surface. Recovered 5750 feet
of salty water, muddy for top 1,000 feet,
then clear. (See Appendix IV for water
analysis).

WOOLSTHORPE - 1

2.

| | | |
|--------------------|---------------------|----------------------|
| Pressure Readings: | Initial Hydrostatic | 3112 p.s.i. (top) |
| | | 3110 p.s.i. (bottom) |
| | Final Hydrostatic | 3090 p.s.i. (top) |
| | | 3100 p.s.i. (bottom) |
| | Initial Flow | 2073 p.s.i. (top) |
| | | 2501 p.s.i. (bottom) |
| | Final Flow | 2550 p.s.i. (top) |
| | | 2547 p.s.i. (bottom) |

No Shut-in.

(See Enclosure 4 for copies of pressure charts.)

Conclusions:

The sandstone interval tested is permeable and contains salty water.

APPENDIX 8:
Seismic Survey
(added by DNRE 11/11/99)

PE907865

This is an enclosure indicator page.
The enclosure PE907865 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907865 has the following characteristics:

- ITEM_BARCODE = PE907865
- CONTAINER_BARCODE = PE902884
 - NAME = Seismic Section Line OPX-86A-35
 - BASIN = OTWAY
 - PERMIT = PEP 5
 - TYPE = SEISMIC
 - SUBTYPE = SECTION
- DESCRIPTION = Seismic Section Line OPX-86A-35
(enclosure from appendix 8 of
WCR--Seismic Survey) for Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 31/05/86
- DATE_RECEIVED =
 - W_NO = W520
 - WELL_NAME = Woolsthorpe-1
 - CONTRACTOR = Pheonix Oil and Gas NL
 - CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE907866

This is an enclosure indicator page.
The enclosure PE907866 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907866 has the following characteristics:

- ITEM_BARCODE = PE907866
- CONTAINER_BARCODE = PE902884
 - NAME = Bouguer Gravity Map
 - BASIN = OTWAY
 - PERMIT = PEP 5
 - TYPE = SEISMIC
 - SUBTYPE = HRZN_CNTR_MAP
- DESCRIPTION = Bouguer Gravity Contour Map, Southwest
Victoria also showing Surface Geology
(enclosure from appendix 8 of
WCR--Seismic Survey) for Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 30/04/68
- DATE_RECEIVED =
- W_NO = W520
- WELL_NAME = Woolsthorpe-1
- CONTRACTOR = Frome-Broken Hill Co Pty Ltd
- CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE907868

This is an enclosure indicator page.
The enclosure PE907868 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907868 has the following characteristics:

- ITEM_BARCODE = PE907868
- CONTAINER_BARCODE = PE902884
- NAME = Seismic Map
- BASIN = OTWAY
- PERMIT = PEP 5
- TYPE = SEISMIC
- SUBTYPE = HRZN_CNTR_MAP
- DESCRIPTION = Seismic Map Koroit Area, Southwest
Victoria, Time:Near Top Otway Group,
1:100000, (enclosure from appendix 8 of
WCR--Seismic Survey) for Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 30/04/68
- DATE_RECEIVED =
- W_NO = W520
- WELL_NAME = Woolsthorpe-1
- CONTRACTOR =
- CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE907869

This is an enclosure indicator page.
The enclosure PE907869 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907869 has the following characteristics:

- ITEM_BARCODE = PE907869
- CONTAINER_BARCODE = PE902884
- NAME = Seismic Map
- BASIN = OTWAY
- PERMIT = PEP 5
- TYPE = SEISMIC
- SUBTYPE = HRZN_CNTR_MAP
- DESCRIPTION = Seismic Map Koroit Area, Southwest
Victoria, Time:Near Basement, 1:100000,
(enclosure from appendix 8 of
WCR--Seismic Survey) for Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 30/04/68
- DATE_RECEIVED =
- W_NO = W520
- WELL_NAME = Woolsthorpe-1
- CONTRACTOR =
- CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE907870

This is an enclosure indicator page.
The enclosure PE907870 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907870 has the following characteristics:

- ITEM_BARCODE = PE907870
- CONTAINER_BARCODE = PE902884
- NAME = Seismic Map
- BASIN = OTWAY
- PERMIT = PEP 5
- TYPE = SEISMIC
- SUBTYPE = HRZN_CNTR_MAP
- DESCRIPTION = Seismic Map Port Campbell Embayment,
Otway basin, Regional Structure
Contours, Approximate Basement Surface,
1:100000, (enclosure from appendix 8 of
WCR--Seismic Survey) for Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 30/04/68
- DATE_RECEIVED =
- W_NO = W520
- WELL_NAME = Woolsthorpe-1
- CONTRACTOR =
- CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE907867

This is an enclosure indicator page.
The enclosure PE907867 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907867 has the following characteristics:

- ITEM_BARCODE = PE907867
- CONTAINER_BARCODE = PE902884
 - NAME = Seismic Map
 - BASIN = OTWAY
 - PERMIT = PEP 5
 - TYPE = SEISMIC
 - SUBTYPE = HRZN_CNTR_MAP
- DESCRIPTION = Seismic Map Port Campbell Embayment,
Otway basin, Structure Contours Top of
Otway Group (enclosure from appendix 8
of WCR--Seismic Survey) for
Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 30/04/68
- DATE_RECEIVED =
- W_NO = W520
- WELL_NAME = Woolsthorpe-1
- CONTRACTOR =
- CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE907871

This is an enclosure indicator page.
The enclosure PE907871 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907871 has the following characteristics:

- ITEM_BARCODE = PE907871
- CONTAINER_BARCODE = PE902884
- NAME = Reflection Var Seismic Section
- BASIN = OTWAY
- PERMIT = PEP 5
- TYPE = SEISMIC
- SUBTYPE = SECTION
- DESCRIPTION = Reflection Var Seismic Section, Line
206, S.P.4736-4753 (enclosure from
appendix 8 of WCR--Seismic Survey) for
Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 30/04/68
- DATE_RECEIVED =
- W_NO = W520
- WELL_NAME = Woolsthorpe-1
- CONTRACTOR =
- CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE907872

This is an enclosure indicator page.
The enclosure PE907872 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907872 has the following characteristics:

- ITEM_BARCODE = PE907872
- CONTAINER_BARCODE = PE902884
 - NAME = Reflection Var Seismic Section
 - BASIN = OTWAY
 - PERMIT = PEP 5
 - TYPE = SEISMIC
 - SUBTYPE = SECTION
- DESCRIPTION = Reflection Var Seismic Section, Line
193, S.P.4316-4332 (enclosure from
appendix 8 of WCR--Seismic Survey) for
Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 30/04/68
- DATE_RECEIVED =
 - W_NO = W520
 - WELL_NAME = Woolsthorpe-1
 - CONTRACTOR =
 - CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE907873

This is an enclosure indicator page.
The enclosure PE907873 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907873 has the following characteristics:

- ITEM_BARCODE = PE907873
- CONTAINER_BARCODE = PE902884
 - NAME = Reflection Var Seismic Section
 - BASIN = OTWAY
 - PERMIT = PEP 5
 - TYPE = SEISMIC
 - SUBTYPE = SECTION
- DESCRIPTION = Reflection Var Seismic Section, Line
181, S.P.3419-3459 (enclosure from
appendix 8 of WCR--Seismic Survey) for
Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 30/04/68
- DATE_RECEIVED =
 - W_NO = W520
 - WELL_NAME = Woolsthorpe-1
 - CONTRACTOR =
 - CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 1:
Structure Contour Map

PE907874

This is an enclosure indicator page.
The enclosure PE907874 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907874 has the following characteristics:

- ITEM_BARCODE = PE907874
- CONTAINER_BARCODE = PE902884
 - NAME = Reflection Contour Map
 - BASIN = OTWAY
 - PERMIT = PEP 5
 - TYPE = SEISMIC
 - SUBTYPE = HRZN_CNTR_MAP
- DESCRIPTION = Reflection Contour Map, Horizon 'D',
Basement Configuration (enclosure 1
from WCR) for Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 31/07/68
- DATE_RECEIVED =
 - W_NO = W520
 - WELL_NAME = Woolsthorpe-1
 - CONTRACTOR = Shell Development (Aust.) Pty Ltd
 - CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 2:
Cross Section

PE902885

This is an enclosure indicator page.
The enclosure PE902885 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE902885 has the following characteristics:

- ITEM_BARCODE = PE902885
- CONTAINER_BARCODE = PE902884
 - NAME = Well Correlation Section
 - BASIN = OTWAY
 - PERMIT = PEP 5
 - TYPE = WELL
 - SUBTYPE = CORRELATION
- DESCRIPTION = Correlation Section Pretty Hill-1 to
Woolsthorp-1, structure and
stratigraphy based on seismic and well
data (enclosure 2 from WCR) for
Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 30/09/68
- DATE_RECEIVED =
- W_NO = W520
- WELL_NAME = Woolsthorpe-1
- CONTRACTOR =
- CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 3:
Composite Well Log

PE605047

This is an enclosure indicator page.
The enclosure PE605047 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE605047 has the following characteristics:

ITEM_BARCODE = PE605047
CONTAINER_BARCODE = PE902884
 NAME = Composite Well Log, sheet 1 of 2
 BASIN = OTWAY
 PERMIT = PEP 5
 TYPE = WELL
 SUBTYPE = COMPOSITE_LOG
DESCRIPTION = Composite Well log, Sheet 1 of 2
 (enclosure 3 from WCR) for
 Woolsthorpe-1
REMARKS =
DATE_CREATED = 14/06/68
DATE_RECEIVED =
 W_NO = W520
 WELL_NAME = Woolsthorpe-1
CONTRACTOR =
CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE605048

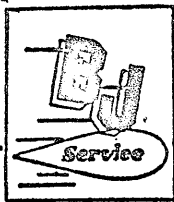
This is an enclosure indicator page.
The enclosure PE605048 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE605048 has the following characteristics:

- ITEM_BARCODE = PE605048
- CONTAINER_BARCODE = PE902884
 - NAME = Composite Well Log, sheet 2 of 2
 - BASIN = OTWAY
 - PERMIT = PEP 5
 - TYPE = WELL
 - SUBTYPE = COMPOSITE_LOG
- DESCRIPTION = Composite Well log, Sheet 2 of 2
(enclosure 3 from WCR) for
Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 14/06/68
- DATE_RECEIVED =
 - W_NO = W520
 - WELL_NAME = Woolsthorpe-1
 - CONTRACTOR =
 - CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 4:
DST Results



DRILL-STEM TEST DATA

| | | | |
|-------------|------------------------|-------------|------------------------|
| Well Name | WOOLSTHORPE | Test No. | ONE |
| Well Number | ONE | Zone Tested | FRATTY HILLS SANDSTONE |
| Company | INTERSTATE OIL LIMITED | Date | 9.6.68 |
| Comp. Rep. | B.H. SELL | Tester | STEPHENS. |

Recorder No. 2014 Clock Range 12 Hr. Recorder No. 2121 Clock Range 12 Hr.
 Depth 5942 Depth 5948
 Initial Hydro Mud Press 3112 Initial Hydro Mud Press 3110
 Initial Shut-in Press ---- Initial Shut-in Press ----
 Initial Flow Press 2073 Initial Flow Press 2501
 Final Flow Press 2550 Final Flow Press 2547
 Final Shut-in Press ---- Final Shut-in Press ----
 Final Hydro Mud Press 3090 Final Hydro Mud Press 3100
 Temperature 1880 Tool Open Before I.S.I. 67 Mins.
 Mud Drop NIL Initial Shut-in -- Mins.
 Mud Weight 9.5 Viscosity 70 Flow Period -- Mins.
 Fluid Loss 600 Final Shut-in -- Mins.
 Interval Tested 5920 6140 Surface Choke Size None
 Net Pay Tested 50' Bottom Choke Size 1/2
 Top Packer Depth 5914 Main Hole Size 8 3/4
 Bottom Packer Depth 5920 Rat Hole Size None
 Total Depth 6140 Feet of Rat Hole ----
 Drill Pipe Size 4 1/2 - 3 1/2 Wt. 16.6 - Type of Test Dual Conventional
 Drill Collar I.D. 2 3/8 Ft. Run 298 13.3 Cushion Amount—Type 7 3/8
 Anchor Size 4 1/2 X 2 3/8 - 6 1/2 X 2 3/8 Rubber Size
 Recovery—Total Feet 5750
 Recovered 300 Feet of Mud
 Recovered 900 Feet of Muddy Water
 Recovered 4550 Feet of Fairly Clean Water
 Recovered Feet of

REMARKS:

Good strong blow - Pried completely in one hour, tried unsuccessfully to close shut in tool - String would not rotate with excessive torque. Closed retaining valve and pulled tools.

TESTING TOOLS

INTERSTATE OIL LIMITED WOOLSTHORPE NO 1 DST NO 1 9.6.68

| | | |
|--------------|----------------|-------------------------------|
| SIT NO 1 | 2.50 | BULL NOSE |
| HMV NO 5 | 1.00 | 3½IF/ 4½FH XO SUB |
| JARS NO 5017 | 178.83 | 6 DRILL COLLARS |
| REC NO 2014 | 1.00 | 4½FH/ 3½IF XO SUB |
| REC NO 2121 | 5.00 | PERF. TAIL PIPE |
| | 4.75 | RECORDER NO 2121 at 5948 |
| | 1.00 | PERF. TAIL PIPE |
| | 4.75 | RECORDER NO 2014 at 5942 |
| | 20.00 | PERF. TAIL PIPE |
| | 1.00 | PACKER |
| TOTAL DEPTH | 6140.00 | |
| total T/P | <u>219.83</u> | 219.83 TOTAL TAIL PIPE |
| | | 11.00 PACKERS |
| BIM PKR at | <u>5920.17</u> | 1.75 S/J |
| | | 4.97 JARS |
| | | 7.15 HYD TOOL |
| | | 5.21 SHUT IN TOOL |
| | | 1.00 3½IF/ 4½ REG DP XO SUB |
| | <u>250.91</u> | <u>TO TOP OF TESTING TOOL</u> |
| | 119.22 | 4 DRILL COLLARS |
| | | 1.00 PUMP OUT SUB |
| | | 1.36 4½FH/ 3½IF XO SUB |
| | 2978.88 | 33 STDS 3½IF D.P. |
| | | 1.64 3½IF/ 4½FH XO SUB |
| | <u>2820.09</u> | 31 STDS & DBL 4½ FH D.P. |
| | 6173.10 | <u>TOTAL TOOLS</u> |
| | <u>6140.00</u> | <u>TOTAL DEPTH</u> |
| | <u>33.10</u> | <u>FEET UP UNSET</u> |

PE907875

This is an enclosure indicator page.
The enclosure PE907875 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907875 has the following characteristics:

- ITEM_BARCODE = PE907875
- CONTAINER_BARCODE = PE902884
- NAME = DST Photographs
- BASIN = OTWAY
- PERMIT = PEP 5
- TYPE = WELL
- SUBTYPE = DST
- DESCRIPTION = DST Photographs (enclosure 4 from WCR)
for Woolsthorpe-1
- REMARKS =
- DATE_CREATED = 9/06/68
- DATE_RECEIVED =
- W_NO = W520
- WELL_NAME = Woolsthorpe-1
- CONTRACTOR =
- CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 5:
Wireline Logs (in box)

ENCLOSURE 6:
Cross Section – Port Campbell Embayment
(added by DNRE 11/11/99)

PE907876

This is an enclosure indicator page.
The enclosure PE907876 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907876 has the following characteristics:

ITEM_BARCODE = PE907876
CONTAINER_BARCODE = PE902884
NAME = Correlative Cross Section
BASIN = OTWAY
PERMIT = PEP 5
TYPE = WELL
SUBTYPE = CORRELATION
DESCRIPTION = Correlative Cross Section Across Port
Campbell Embayment, Victoria,
(enclosure 6 from WCR) for
Woolsthorpe-1
REMARKS =
DATE_CREATED = 31/05/68
DATE_RECEIVED =
W_NO = W520
WELL_NAME = Woolsthorpe-1
CONTRACTOR =
CLIENT_OP_CO = Interstate Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 7:
Well Velocity Data Sheet
(added by DNRE 11/11/99)

PE907877

This is an enclosure indicator page.
The enclosure PE907877 is enclosed within the
container PE902884 at this location in this
document.

The enclosure PE907877 has the following characteristics:

ITEM_BARCODE = PE907877
CONTAINER_BARCODE = PE902884
NAME = Well velocity Data Sheet
BASIN = OTWAY
PERMIT = PEP 5
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Pretty Hill-1 Well Velocity Data Sheet
(enclosure 7 from WCR) for
Woolsthorpe-1
REMARKS =
DATE_CREATED = 30/11/66
DATE_RECEIVED =
W_NO = W520
WELL_NAME = Woolsthorpe-1
CONTRACTOR =
CLIENT_OP_CO = Shell Development (Aust.) Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)