WCR
FORTESCUE-4
(W721)

ESSO EXPLORATION AND PRODUCTION
AUSTRALIA INC.

# WELL COMPLETION REPORT

# FORTESCUE-4

# GIPPSLAND BASIN



ESSO AUSTRALIA LTD.

MAY, 1979.

# CONTENTS



Petrographic + XRD analysis (Amdel) see technical data

ESSO AUSTRALIA LTD.

COMPLETION REPORT

1. WELL DATA RECORD



LOCATION

| WELL NAME | STATE | PERMIT or LICENCE | GEOLOGICAL BASIN | FIELD |
|---|---|---|---|---|
| FORTESCUE-4 | VICTORIA | VIC/L5 | GIPPSLAND | FORTESCUE |

| CO-ORDINATES | MAP PROJECTION | GEOGRAPHICAL LOCATION |
|---|---|---|
| LATITUDE 38° 24' 57.88"S<br>LONGITUDE 148° 16' 35.48"E<br>X 611,442mE<br>Y 5,747,232mN | AMG<br>ZONE 55 | Fortescue-2 2.1km SW<br>West Halibut-1 1.5 km NE<br>Halibut Platform 3.9km ENE |

ELEVATIONS & DEPTHS

| ELEVATIONS | WATER DEPTH | TOTAL DEPTH Average Angle |
|---|---|---|
| KB 25 m AMSL<br>RT | 68 METRES | MEASURED DEPTH 2602 METRES |
| | PLUG BACK DEPTH<br>113 METRES | REASONS FOR PLUGGING BACK<br>ABANDONMENT |

DATES

| MOVE IN | RIG UP | SPUDDED |
|---|---|---|
| 17 MARCH 1979 | 17 MARCH 1979 | 18 MARCH 1979 |
| RIG DOWN COMPLETE | RIG RELEASED | PRODUCTION UNIT - RIG UP |
| 12 APRIL 1979 | 12 APRIL 1979 | N/A |

| PRODUCTION UNIT - RIG DOWN | INITIAL PRODUCTION ESTABLISHED |
|---|---|
| N/A | N/A |

MISCELLANEOUS

| OPERATOR | LICENCEE | ESSO INTEREST |
|---|---|---|
| ESSO AUSTRALIA LTD | HEMATITE PETROLEUM PTY. LTD<br>ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC. | 50%<br>OTHER INTEREST 50% |

| CONTRACTOR | RIG NAME | EQUIPMENT TYPE |
|---|---|---|
| ODECO | OCEAN ENDEAVOUR | SEMI-SUBMERSIBLE |

| TOTAL RIG DAYS | DRILLING AFE NO. | COMPLETION NO. | TYPE COMPLETION |
|---|---|---|---|
| 25.63 | 239-002 | N/A | N/A |

| LAHEE WELL CLASSIFICATION | | |
|---|---|---|
| | Before Drilling | STEPOUT WELL |
| | After Drilling | SUCCESSFUL OUTPOST |

## 2. CASING - LINER - TUBING RECORD

| Type | Size | Weight | Grade | Thread | No. Joints | Depth |
|---|---|---|---|---|---|---|
| PILE JOINT | 24" | 670 | x52 | CC | 1 | |
| CROSS OVER | 20" | 129 | x52 | CC-JV | 1 | |
| CONDUCTOR CASING | 20" | 94 | x52 | JV | 8 | |
| FLOAT JOINT | 20" | 94 | x52 | JV | 1 | 228m |
| SURFACE CASING | 10 3/4" | 45.5 | K-55 | BUTT | 63 | |
| CROSS OVER | 13 3/8"x 10 3/4" | 45.5 | K-55 | BUTT | 1 | 858m |
| | | | | | | |

## 3. CEMENT RECORD

| String | 20" | | 10 3/4" | | |
|---|---|---|---|---|---|
| Type of Cement | CLASS N | | CLASS N | | |
| | +12% Gel | +2% $CaCl_2$ | Neat | 1% $CaCl_2$ | |
| Slurry Volume - Sacks | 650 | 350 | 680 | 200 | |
| Slurry Density | 12.1ppq 1.45q/cc | 15.6ppq 1.87q/cc | 15.6ppq 1.87q/cc | 15.6ppq 1.87q/cc | |
| Cement Top | Seafloor | | 475m | | |
| Casing Tested | - | | 1500 psi 10,340 kpa | | |
| Number of Centralizers | 6 | | 8 | | |
| Number of Scratchers | | | | | |
| Stage Collar | | | | | |
| Remarks | | | | | |

## 4. CEMENT PLUGS

| Plug | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Cement Type | Class N +0.5% HR12 | Class N +0.5% HR12 | Class N Neat | Class N Neat |
| Slurry Volume | 125 sacks | 290 sacks | 240 sacks | 424 sacks |
| Slurry Density | | | | |
| Cement Base | 2572 | 2490 | 889 | 178 |
| Cement Top | 2500 | 2330 | 765 | 113 |
| Remarks | | | EZ-SV Retainer Set 828m | EZ-SV Retainer set 161m |

## 5. SAMPLES, CONVENTIONAL CORES, SIDEWALL CORES.

| INTERVAL | TYPE | INTERVAL | TYPE |
|---|---|---|---|
| | CUTTINGS SAMPLES | | CONVENTIONAL CORES |
| | 5 sets washed phis | 1. 2390-2402.4m | Rec 12.4m 100% |
| | 1 set unwashed bag samples | 2. 2402.4-2411.4m | Rec 9.0m 100% |
| 240-1220m | 10m intervals | 3. 2411.4-2425.2m | Rec 13.8m 100% |
| 1220-2600m | 5m intervals | 4. 2425.2-2438.8m | Rec 12.4m 91% |
| 240-2600m | 30m intervals | 5. 2438.8-2451.4m | Rec 8.3m 66% |
| | unwashed canned cutting samples | 6. 2451.4-2464.6m | Rec 10.17m 76% |
| | SIDEWALL CORES | | |
| 2598-930 | 2 Runs<br>Shot 81 rec 77 | | |

## 6. WIRELINE LOGS AND SURVEYS

| Type & Scale | From To | Type & Scale | From To |
|---|---|---|---|
| ISF-SONIC | | | |
| 1:200 Run 1 | 874m - 229.5m | Velocity | 2598 - 930 |
| 1:500 Run 2 | 2597.5m - 854m | Survey | 14 levels |
| FDC - GR Run 1<br>1:200<br>1:500 | 874m - 229.0m<br>GR - Seafloor | | |
| FDC-CNL-GR<br>1:200 Run 2<br>1:500 | 2597.5m - 854m | | |
| DLL<br>1:200 Run 1<br>1:500 | 2597.5m - 2293m | | |
| HDT<br>1:100 Run 1 | 2599.5m - 855m | | |
| RFT 7 Runs | 20 seats<br>sec RFT summary Part 7 | | |
| CST Run 1 | 2598m - 930 m<br>shot 51 rec 48 | | |
| Run 2 | 2598m - 930m<br>shot 30 rec 29 | | |

SUMMARY OF FORMATION TEST PROGRAMME

FORTESCUE-4



| TEST | SEAT | DEPTH (METRES) K.B. | CHAMBER | RECOVERY (LITRES) | | | | | HEWLETT-PACKARD FORMATION PRESSURE | | HEWLETT-PACKARD HYDROSTATIC PRESSURE | | HORIZONTAL PERMEABILITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | OIL | COND. | GAS | FORMATION WATER | FILTRATE | MPag | Psig | MPag | Psig | millidarcys | |
| RFT1 | 1 | 2450 | 1 | 0.50 l(Frothy oily emulsion) | | | | 21.00 l | 23.24 | 3371 | 27.73 | 4022 | | Schlumberger Gauge pressure |
| RFT2 | 2 | 2563 | | | | | | | 25.53 | 3557.5 | | | | |
| | 3 | 2551 | | | | | | | 24.41 | 3540.1 | | | | |
| | 4 | 2538 | | | | | | | 24.26 | 3518.8 | | | | |
| | 5 | 2508 | | | | | | | 23.97 | 3477.1 | | | | |
| | 6 | 2498.5 | | | | | | | 23.88 | 3464.1 | | | | |
| | 7(i) | 2482.5 | | | | | | | - | - | | | | |
| | 7(ii) | 2482.3 | | | | | | | 23.71 | 3438.2 | | | | |
| | 8 | 2462 | | | | | | | 23.63 | 3426.6 | | | | |
| | 9 | 2445.5 | | | | | | | 23.46 | 3403.2 | | | | |
| | 10 | 2436 | | | | | | | 23.39 | 3392.2 | | | | |
| | 11 | 2445.5 | 1 | film | | | | 20.60 l | 23.46 | 3402.0 | 27.95 | 4053.1 | | |
| | 12 | 2450 | 2 | film | | | | 2.10 l | 23.50 | 3407.8 | 27.99 | 4059 | | |
| RFT3 | 13 | 2449.5 | 1 | film | | | | 21.50 l | 23.50 | 3408.6 | 27.99 | 4059.4 | 1139 | Segregator sample |
| RFT4 | 14 | 2443 | 1 | 8.30 l | | 95.7 l | | 10.20 l | 23.43 | 3398.5 | 27.87 | 4042.2 | ? | Segregator sample |
| RFT5 | 15(i) | 2476 | | | | | | | - | - | | | | "Tight" Sand |
| | 15(ii) | 2476.5 | | | | | | | 23.71 | 3438.1 | | | | |
| | 16 | 2469.5 | | | | | | | - | - | | | | "Tight" Sand |
| | 17 | 2470 | | | | | | | 23.65 | 3430 | | | | |
| | 18 | 2433.5 | 1 | trace | | | | 21.50 l | 23.36 | 3388.1 | 27.69 | 4016.2 | 405 | Segregator opened |
| RFT6 | 19 | 2438 | 1 | 1.50 l | | 2.8 l | | (20.80 l) | 23.44 | 3394.9 | 27.73 | 4022.4 | 716 | Watermix of Formation and Filtrate. |

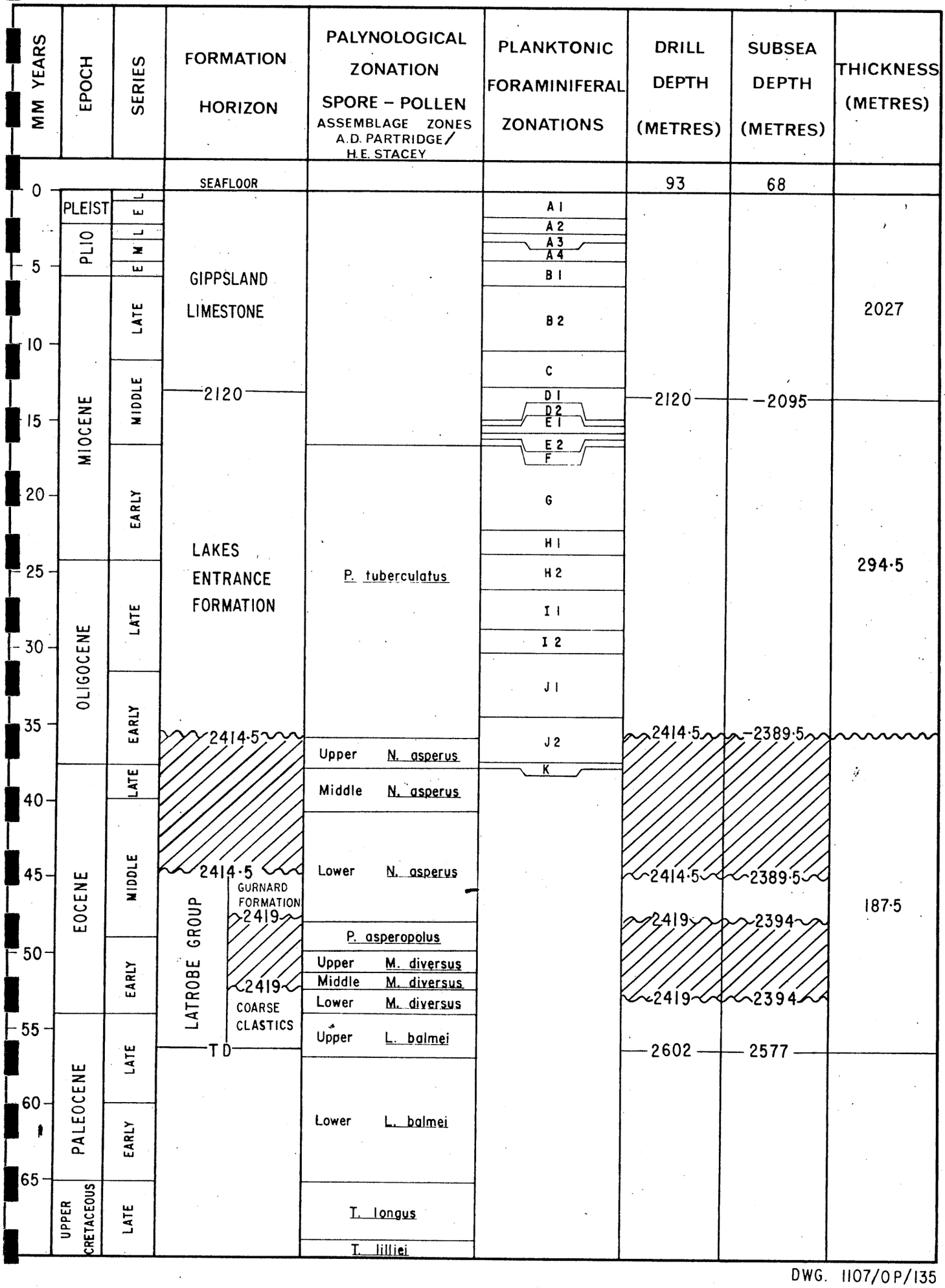
## SUMMARY OF FORMATION TEST PROGRAMME

## FORTESCUE-4

| ST | SEAT | DEPTH (METRES) K.B. | CHAMBER | RECOVERY (LITRES) OIL | COND. | GAS | FORMATION WATER | FILTRATE | HEWLETT-PACKARD FORMATION PRESSURE MPag | Psig | HEWLETT-PACKARD HYDROSTATIC PRESSURE MPag | Psig | HORIZONTAL PERMEABILITY millidarcys | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 20 | 2427 | Segregator trace | | | | 2.200 | | 23.40 | 3394.1 | | | | |
| T7 | 21 | 2423.5 | | | | | | | - | - | | | | "Tight" Sand |
| | 22 | 2424.5 | | | | | | | - | - | | | | "Tight" Sand |
| | 23 | 2432.5 | 1 | 2.35 l | | 22.7 | | (18.25 l) | 23.37 | 3388.9 | 27.65 | 4010.1 | 1732 | Formation/Filtrate Mix. Segregator Sealed. |

# FORTESCUE – 4

## STRATIGRAPHIC TABLE




DWG. 1107/0P/135

DESCRIPTION OF LITHOLOGICAL UNITS

FORESCUE-4

GIPPSLAND LIMESTONE (93m to 2120m KB)

240m to 800m — CALCARENITE GRADATIONAL TO AND INTERBEDDED WITH CALCISILTITE AND CALCILUTITE:

Calcarenite - white to pale grey, friable to firm, dominantly fine to medium grained, grading to granule size and to silt size, subangular to sub-rounded grains, moderate to poorly sorted, abundant fossil fragments, bivalve, forams, bryozoa, coral, poor to good visible intergranular porosity, rare fine carbonaceous flecks, glauconitic in part. Towards bottom of section rock contains 10 - 20% clay size and silt size calcareous matrix.

Calcisiltite - pale grey to buff grey, firm to hard, brittle, gradational to calcarenite, contains abundant medium to coarse grained fossil fragements, forams, coral stems, bivalve shell debris etc., trace carbonaceous flecks, trace glauconite, locally contains upto 10% calcareous clay matrix.

Calcilutite - pale grey to buff grey, very soft, soluble, contains abundant forams, dominant lithology 480m to 620m.

Section also contains trace amounts of quartz occuring as loose, clean, rounded to angular grains.

800m to 1770m — MAINLY CALCISILTITE WITH LOCALLY DOMINANT MARL. GRADATIONAL NEAR BASE OF SECTION TO CALCAREOUS SILTSTONE WITH LOCALLY ABUNDANT MARL AND LIMESTONE:

Calcisiltite- light grey to medium light grey to brown grey, firm to very firm, trace carbonaceous flecks, rare glauconite, trace forams, rare coral stems, trace shell debris, trace white vein calcite, rare pyrite, some crystalline calcite filling fractures and fossil fragments, rare mica, gradational in part to calcarenite.

Marl - medium light grey, very soft to firm, silty, occasional forams, trace pyrite, main lithology 900m - 1030m.

Siltstone - medium light grey to light brown to grey brown, firm, very calcareous grading to calcisiltite, trace carbonaceous flecks, trace glauconite, common forams.

Limestone - sparry, cream to light brown, hard, crystalline, trace pyrite, very fine grained, contains some white calcite veins, main lithology 1750m to 1770m.

1770m to 2120m — CALCISILTITE GRADING TO CALCAREOUS SILTSTONE. INTERBEDS OF MARL. SECTION GRADES TO CALCAREOUS MUDSTONE NEAR BASE:

Calcisiltite - medium light grey, firm, abundant forams, trace carbonaceous flecks, main lithology from 1775m-1790m.

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Marl - white to light grey, soft, silty, trace pyrite, trace carbonaceous flecks, main lighology 1820m-1850m and 1860m-1875m.

Calcareous Siltstone - medium light grey to pale brown, firm, very calcareous, trace carbonaceous flecks, common forams, trace glauconite, trace pyrite, main lithology 1850-1860m and 1875m-2080m.

Calcareous Mudstone - medium light grey to yellow brown, firm, very silty, very calcareous, trace carbonaceous flecks, trace glauconite, common forams, main lithology 2080m-2120m.

LAKE ENTRACE FORMATION (2120m - 2414.5m KB)

2120m to 2414.5m CALCAREOUS MUDSTONE GRADING WITH DEPTH TO CALCAREOUS SHALE:

2120m to 2290m Mudstone - medium light grey to yellow brown, firm, very silty, calcareous to very calcareous, trace carbonaceous flecks, trace glauconite, trace pyrite, trace to common forams, fissile in part.

2290m to 2414.5m Shale - medium light grey, olive grey brown, silty, calcareous, firm, fissile, trace forams, trace glauconite, trace pyrite, grades to calcareous mudstone.

LATROBE GROUP (2414.5m to 2602m +KB)

GURNARD FORMATION (2414.5m to 2419m KB)

2414.5m to 2419.5m GLAUCONITIC FORAMINIFERAL SHALE GRADING TO SANDSTONE:

Glauconitic Foraminiferal Shale - medium grey, dark green, very glauconitic, in part glauconite altered to limonite, abundant silt size forams, in part replace by glauconite and limonite, locally very abundant, minor carbonaceous material, towards base of section shale contains medium grained to very coarse grained subangular to rounded clear to milky quartz grains.

Sandstone - medium grey, firm to very firm, very fine to fine grained, well sorted, subangular to subrounded quartz, non calcareous, abundant mica, trace pyrite, trace glauconite.

LATROBE COARSE CLASTICS (2419m to 2602m + KB)

2419m to 2602m INTERBEDDED SANDSTONE AND SILTSTONE WITH MINOR SHALE AND THIN COAL SEAMS

Sandstone - light to medium grey, green grey, minor yellow, very fine to very coarse grained to granule size, friable to firm, subangular to well rounded, quartz, minor pyritized sandstone, micaceous in part, rare glauconite.

Siltstone - dark brown to dark grey, hard, fissile, micaceous, carbonaceous, common pyrite, common very fine grained quartz.

Shale - brown grey to dark grey to black, hard, micaceous, fissile, carbonaceous to coaly, silty in part.

# GEOLOGICAL AND GEOPHYSICAL ANALYSIS

## STRATIGRAPHY

| AGE | UNIT/ HORIZON | DEPTH (m) PREDICTED KB | DEPTH (m) ACTUAL KB | DEPTH (m) ACTUAL SUBSEA | THICKNESS (m) |
|---|---|---|---|---|---|
| Pliocene/ Miocene | Gippsland Limestone | 94 | 93 | -68 | 2027 |
| Miocene/ Oligocene | Lakes Entrance Formation | | 2120 | -2095 | 296.5 |
| Eocene | Latrobe Group | 2395 | 2414.5 | -2389.5 | 187.5+ |
| Paleocene | Top M-1.3.1 | 2495 | 2523 | -2498 | |
| | Total Depth | | 2602 | -2577 | |

## GEOLOGICAL ANALYSIS

Fortescue-4 was drilled primarily to provide a control point from which mapping of the reservoir units in the well could provide correlations between the north, central and southern fault blocks of the Fortescue field. Secondly the well was designed to evaluate the reservoir potential of the field, confirm the structural interpretation of the top of Latrobe Group, and to determine the oil/water contact within the central fault block.

The Latrobe Group section intersected consisted of deltaic, nearshore marine, barrier and back barrier sediments. These can be correlated with West Halibut-1 to the north and Fortescue-2 to the south. (See geological cross-section A - A enclosed.)

The lower section of the Lakes Entrance Formation as well as the Gurnard Formation and the upper hydrocarbon bearing units of the Latrobe Group were fully cored. The oil/water contact was intersected at 2444.5 (M.D.) in the "estuarine" FM-1.3 unit, proving a gross oil column of 25.5m.

At 2463.5m the FM-1.4 unit was encountered, formation pressure data indicated that this unit is a hydraulic barrier which prevents fluid communication between the sands above and below, thus forming the base seal for the Fortescue Field.

Below the seal units M-1.1-1 to M-1.4.1 of the Halibut field were defined by drilling samples and log interpretation.

## GEOPHYSICAL ANALYSIS

At depth the Fortescue-4 unit tops proved to be 0.8% deeper than predicted. This minor error was found to be due largely to a discrepency between seismic times and observed well times, and to a lesser extent to a deviation in velocity from that predicted. This error is regarded as being well within the anticipated range.

The necessary adjustments to the Top of Latrobe Seismic Marker maps have been made and are presented within this report.

# 1. CUTTINGS SAMPLE DESCRIPTIONS

APPENDIX 1

CUTTINGS SAMPLES DESCRIPTION

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 240m-250m | 90% | Calcarenite - white, consolidated to friable grains, subangular to subrounded, coarse, moderately well sorted, visual porosity poor to good. Numerous shell fragments, numerous forams. |
| | 10% | Calcite - crystalline, microcrystalline, cream/white. |
| | | Trace Quartz - clear,angular. Heavily contaminated with cement. |
| 250m-260m | 90% | Calcarenite - white, pale grey, part consolidated to friable grains, subangular to subrounded, moderate to coarse, moderately well sorted, visual porosity fair, shell fragments. |
| | 10% | Microfauna (forams and bryozoans) common. |
| | | Calcite - As above. |
| 260m-270m | 90% | Calcarenite - As above. |
| | 10% | Calcite - As above. |
| 270m-280m | 90% | Calcarenite - As above. |
| | 10% | Calcite - As above. |
| 280m-290m | 100% | Calcarenite - off white, subangular to subrounded, consolidated to loose, poorly sorted, good visual porosity - numerous shell fragments and microfauna. |
| | | Trace Calcite - white microcrystalline, clear crystalline. |
| 290m-300m | 100% | Calcarenite - As above. |
| | | Trace Calcite - As above. |
| 300m-310m | 100% | Calcarenite - white, loose, medium grain size, moderately well sorted, poor visual porosity, subrounded to subangular grains. Large shell fragments, and numerous microfauna fragments. |
| | | Trace Calcite - white, microcrystalline. |
| | | Trace Quartz - clear, glassy, angular, isolated grains. |
| 310m-320m | 50% | Calcarenite - As above. |
| | 50% | Calcisiltite - pale grey, brittle, angular, medium to fine grain, carbonaceous specks visible - little visual porosity Large fragments of bivalve shells and numerous microfauna forams, bryozoa - coral fragments. |
| | | Trace Calcite - As above. |
| | | Trace Quartz - isolated clear grains, as above. |
| 320m-330m | 70% | Calcarenite - white, off-white, consolidated, friable, medium grain size, moderately well sorted, poor to good visual porosity, subrounded grains. |

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| DEPTH | % | DESCRIPTION |
|---|---|---|
| 320m-330m | | Continued/..... |
| | 30% | Calcisiltite - grey, buff to grey, fine grained, well sorted, brittle, angular, carbonaceous inclusions, possibly glauconitic - minute grains. |
| | | Trace Calcite - As above. |
| 330m-340m | 50% | Calcarenite - As above. |
| | 40% | Calcisiltite - As above. |
| | 10% | Calcite - white brittle crystalline. |
| | | Trace Calcite - isolated clear grains, rounded and angular. |
| 340m-350m | 40% | Calcarenite - As above. |
| | 40% | Calcisiltite - As above. |
| | | Trace Calcite - As above. |
| | | Trace Quartz - rounded,clear, glassy grains, minute pock marking on surfaces. |
| | 20% | Shell Fragments - large fragments of bivalves, bryozoa colonies, microfossils. Constitute significant constituent of rock - possible shell bed? |
| 350m-360m | 50% | Calcarenite - white, medium grained, subrounded, moderate to well sorted, consolidated, friable, moderate visual porosity. |
| | 50% | Calcisiltite - fine grained, well sorted, brittle, angular, carbonaceous specks. |
| | | Trace Quartz - isolated grains, as above. |
| | | Trace Fossil Fragments -as above, but smaller percentage. |
| 360m-370m | 90% | Calcarenite - white, medium grained size, moderately to well sorted, subrounded grains, good porosity, consolidated - loose. |
| | 10% | Calcisiltite - grey, fine grained, brittle, hard, angular, carbonaceous inclusions. |
| | | Trace abundant bivalve shell fragments - microfauna, as above. |
| 370m-380m | 70% | Calcarenite - As above. |
| | 30% | Calcisiltite - As above. |
| | | Trace Calcite - white/yellow, brittle, crystalline. |
| | | Trace Quartz Grains - isolated, rounded, slightly yellowed. |
| 380m-390m | 70% | Calcarenite - As above. |

3/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 380m-390m | | Continued/..... |
| | 20% | Calcisiltite - As above. |
| | 10% | Calcite - white, clear, crystalline - microcrystalline, fibrous in part. |
| | | Trace Quartz - isolated, rounded and angular grains, clear to yellowish. |
| 390m-400m | 80% | Calcarenite - As above, medium to coarse grains, carbonaceous specks appearing, visual porosity, poor. |
| | 20% | Calcisiltite - As above. |
| | | Trace Calcite - As above, fibrous in part. |
| 400m-410m | 50% | Calcarenite - As above. |
| | 40% | Calcisiltite - As above. |
| | 10% | Calcite - clear, white, crystalline, microcrystalline. |
| | | Trace Quartz - isolated grains, rounded, subrounded, clear to white. |
| 410m-420m | 50% | Calcarenite - medium to coarse grains - white, subrounded, moderately well sorted, good to poor visible porosity, consolidated and friable carbonaceous specks, slightly glauconitic (?). |
| | 50% | Calcisiltite - grey, buff/grey, medium to fine grained, well sorted, hard, brittle. |
| | | Trace Calcite - white, as above. |
| 420m-430m | 70% | Calcarenite - As above. |
| | 20% | Calcisiltite - As above. |
| | 10% | Calcilutite - pale grey/buff, very soft, mostly washed out of sample, % age difficult to estimate. Forams and other microfauna common. |
| 430m-440m | 70% | Calcarenite - pale grey/white, medium grain size, poorly sorted, subrounded grains, consolidated, loose, poor visual porosity, hard. |
| | 10% | Calcisiltite - As above. |
| | 20% | Calcilutite - buff, grey, very soft, very soluble. |
| | | Trace Quartz - yellowing, angular, glassy, isolate grains, |
| 440m-450m | 70% | Calcarenite - As above. |
| | 10% | Calcisiltite - As above. |
| | 20% | Calcilutite - buff/grey, very soft, very soluble. |

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| DEPTH | % | DESCRIPTION |
|---|---|---|
| 450m-460m | 60% | Calcarenite - As above. |
| | 10% | Calcisiltite - As above. |
| | 30% | Calcilutite - buff/ grey, very soft, very soluble, appears increasingly important continent. |
| 460m-470m | 60% | Calcarenite - off white, medium to coarse grain size, poorly sorted, subrounded grains, consolidated to loose, increasingly muddy cement. Lutite masks character of other components. |
| | 40% | Calcilutite - buff to grey, very soft, soluble, tends to wash out of sample. Forams, bryozoas and then micro-fauna common. |
| 470m-480m | 60% | Calcarenite - As above. |
| | 40% | Calcilutite - As above. |
| 480m-490m | 50% | Calcarenite - As above. |
| | 50% | Calcilutite - grey to buff grey, soft, soluble, becoming more glutinous. |
| 490m-500m | 50% | Calcarenite - As above. |
| | 50% | Calcilutite - As above. |
| 500m-510m | 40% | Calcarenite - white, medium grain size, subrounded grains, moderate to well sorted, consolidated, hard, brittle. |
| | 60% | Calcilutite - buff to grey, very soft to very soluble, becoming increasingly glutinous and sticky. Fossil shell fragments and microfauna abundant. |
| 510m-520m | 40% | Calcarenite - As above. |
| | 60% | Calcilutite - As above. |
| 520m-530m | 40% | Calcarenite - moderate grain size, white, moderately well sorted, rounded to subrounded grains, unconsolidated to possibly slightly gluaconitic in part. |
| | 60% | Calcilutite - grey to buff grey, very soft, very soluble, sticky - much off sample washed out. Abundant forams. |
| 530m-540m | 40% | Calcarenite - As above. |
| | 60% | Calcilutite - As above. |
| 540m-550m | 30% | Calcarenite - As above, unconsolidated. |
| | 70% | Calcilutite - grey, soft, very soluble, sticky, glutinous. Containing numerous forams. |
| 550m-560m | 30% | Calcarenite - As above. |
| | 70% | Calcilutite - As above. |

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| DEPTH | % | DESCRIPTION |
|---|---|---|
| 560m-570m | 20% | Calcarenite - As above. |
| | 50% | Calcilutite - pale buff, soft, very soluble, glutinous, sticky. Contains numerous forams - other microfauna. |
| 570m-580m | 30% | Calcarenite - As above. |
| | 70% | Calcilutite - As above. |
| 580m-590m | 70% | Calcarenite - As above. |
| | 30% | Calcilutite - As above. |
| 590m-600m | 40% | Calcarenite - off white to grey, medium to coarse grained, unconsolidated, moderate to well sorted, subrounded, - possibly glauconitic. |
| | 60% | Calcilutite - buff, soft, soluble, sticky, containing abundant microfauna. |
| 600m-610m | 40% | Calcarenite - As above. |
| | 60% | Calcilutite - As above. |
| 610m-620m | 40% | Calcarenite - As above. |
| | 60% | Calcilutite - As above. |
| 620m-630m | 60% | Calcarenite - pale grey, medium to fine grained, subangular to subrounded grains. Consolidated, hard, brittle to poorly sorted. Glauconitic in part (?). |
| | 40% | Calcilutite - buff, soft, soluble, sticky, with large numbers of forams. |
| 630m-640m | 100% | Calcarenite - pale grey, medium to coarse grain, subangular to subrounded, glauconitic in part, fossils, forams. |
| 650m-660m | 100% | Calcarenite - As above.<br>Trace Calcilutite |
| 660m-670m | 70% | Calcarenite - As above. |
| | 30% | Calcilutite - As above.<br>J.D. ALDER |
| 670m-680m | 100% | Calcarenite - light grey, medium to fine grained, soft to firm, poorly sorted, trace glauconite, trace pyrite, trace hard, subangular, granule to pebble, sparry calcite fragments. Fossil fragments very common, mainly consisting of forams, shell debris, coral stems and echinoid spines. Contains about 10-20% white carbonate clay. |
| 680m-690m | 100% | Calcarenite - As above.<br>Some fossils show pyrite and glauconite replacement.<br>20/3/79<br>J.D. ALDER |
| 690m-700m | 80% | Calcarenite - As above. |

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 690m-700m | | Continued/..... |
| | 19% | Fossil fragments - loose, granule - pebble size, angular to subrounded, shell fragments, forams, coral debris, forams |
| | 1% | Quartz - rounded to subangular, clear to polished, granular. |
| 700m-710m | 100% | Calcarenite - As above, generally becoming finer, fine to very fine grains in 20% clay and silt matrix. |
| 710m-720m | 100% | Calcarenite - As above. |
| 720m-730m | 100% | Calcarenite - As above, trace carbonaceous flecks. |
| 730m-740m | 100% | Calcarenite - As above. |
| 740m-750m | 100% | Calcarenite - As above. |
| 750m-760m | 100% | Calcarenite - light grey, firm, very fine grained, grading to silt, moderately sorted, trace pyrite, trace carbonaceous flecks. Fossil fragments common forams, coral stems and shell debris. |
| 760m-770m | 100% | Calcarenite - As above. |
| 770m-780m | 100% | Calcarenite - grading to calcisiltite, very fine grained, as above. |
| 780m-790m | 50% | Calcarenite - As above. |
| | 50% | Calcisiltite - light grey, firm, occasionally very fine grained sand. Trace pyrite, trace carbonac eous flecks, approximately 10% calcareous clay matrix, fossil forams and shell debris common, granule size. |
| 790m-800m | 30% | Calcarenite - As above. |
| | 70% | Calcisiltite - As above. |
| 800m-810m | 20% | Calcarenite - As above. |
| | 80% | Calcisiltite - As above. |
| 810m-820m | 100% | Calcisiltite - light grey to medium light grey, firm, trace calcarenite, very fine grained, sand to granule size fossil fragments, forams, coral stems, shell debris. Trace carbonaceous flecks, trace glauconite. |
| 820m-830m | 100% | Calcisiltite - As above. |
| 830m-840m | 100% | Calcisiltite - As above, trace sparry limestone. |
| 840m-850m | 100% | Calcisiltite - As above. |
| 850m-860m | 100% | Calcisiltite - As above. |
| 860m-870m | 100% | Calcisiltite - light to medium light grey, firm, trace fine grain sand. Trace carbonaceous flecks, trace pyrite. Trace glauconite, trace sparry limestone, fragments, forams, coral stems and shell debris common. |

7/.....

LITHOLOGICAL DESCRIPTIONS — J.D. ALDER

FORTESCUE-4 — 20/3/79

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 870m-880m | 100% | Calcisiltite - light to medium light grey, firm, trace fine grain sand, trace round, coarse to granule quartz, subrounded to rounded, clear to polished. Trace carbonaceous flecks. Trace fossil fragments, coral and forams. |
| 880m-890m | 100% | Calcisiltite - As above. |
| 890m-900m | 100% | Calcisiltite - As above. |
| 900m-910m | | Sample poor quality very high clay content washes away in sieves. |
| | 50% | Calcilutite - medium light grey, firm, trace carbonaceous flecks, trace glauconite forams and coral stems both loose and inbedded in siltstone fragments. |
| | 50% | Marl - soft, light grey, silt size grains, common in soft clay. |
| | | 22/3/79 |
| 910m-920m | 40% | Calcisiltite - As above. |
| | 60% | Marl - As above. |
| 920m-930m | 40% | Calcisiltite - As above. |
| | 60% | Marl - As above. |
| | | Trace Sparry Limestone - dark grey, hard. |
| 930m-940m | 30% | Calcisiltite - As above. |
| | 70% | Marl - As above. |
| | | Trace Sparry Limestone. |
| | | Trace Quartz - granule, rounded, clear. |
| 940m-950m | 30% | Calcisiltite - medium light grey, grading in places to pale brown, firm, trace carbonaceous flecks, forams, and coral stems common. |
| | 70% | Marl - soft, light grey, silty, sample quality very poor as large quantity of clay washing through sieves. |
| 950m-960m | 30% | Calcisiltite - As above. |
| | 70% | Marl - As above. |
| 960m-970m | 50% | Calcisiltite - As above. |
| | 50% | Marl - As above. |
| | | Trace Quartz - granular, subrounded to rounded, clear. |
| | | Trace Sparry Limestone - hard, medium grey to brownish grey. |
| 970m-980m | 30% | Calcisiltite - As above. |
| | 70% | Marl - As above. |

8/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 980m-990m | 30% | Calcisiltite - As above. |
| | 70% | Marl - As above. |
| 990m-1000m | 40% | Calcisiltite - As above. |
| | 60% | Marl - As above. |
| 1000m-1010m | 50% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks, forams, abundant occasional coral stems and shell debris. |
| | 50% | Marl - soft, light grey, silty, sample tends to be poor due to quantity of material washed through sieves.<br>Trace Sparry Limestone - grey brown, hard, crystalline.<br>Trace Quartz - granular, clear to polished, subrounded to rounded. |
| 1010m-1020m | 50% | Calcisiltite - As above. |
| | 50% | Marl - As above. |
| 1020m-1030m | 50% | Calcisiltite - As above. |
| | 50% | Marl - As above.<br>Trace Sparry Limestone - white to grey brown, hard, crystalline. |
| 1030m-1040m | 60% | Calcisiltite - As above. |
| | 40% | Marl - As above. |
| 1040m-1050m | 70% | Calcisiltite - As above. |
| | 30% | Marl - As above, occasional forams showing pyrite replacement. |
| 1050m-1060m | 70% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks, occasionally becoming cemented into a hard micritic limestone. |
| | 30% | Marl - soft, light grey, silty, trace Sparry Limestone - grey to brown to white, hard, crystalline, calcite, forams, abundant,occasional coral stems. |
| 1060m-1070m | 95% | Calcisiltite - As above. |
| | 5% | Marl - As above.<br>Trace Quartz - clear, subrounded to rounded, granular, polished. |
| 1070m-1080m | 100% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks. Trace clear calcite crystals. Occasional calcite veins. Trace Sparry Limestone - As above, forams abundant. |
| 1080m-1090m | 100% | Calcisiltite - As above. |

9/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 1090m-1100m | 100% | Calcisiltite - As above. |
| 1100m-1110m | 100% | Calcisiltite - As above. |
| 1110m-1120m | 100% | Calcisiltite - medium light grey to grey to brown, firm to very firm, trace carbonaceous flecks, trace white calcit occasionally cemented into a hard micrite. Trace Sparry Limestone, forams common. |
| 1120m-1130m | 100% | Calcisiltite - As above. |
| 1130m-1140m | 100% | Calcisiltite - medium light grey to brown, grey, firm to very firm, trace carbonaceous matter, trace white calcite, occasionally becoming cemented into a hard micritic limestone. |
| 1140m-1150m | 100% | Calcisiltite - As above. |
| 1150m-1160m | 100% | Calcisiltite - As above. |
| 1160m-1170m | 100% | Calcisiltite - As above. |
| 1170m-1180m | 100% | Calcisiltite - As above. |
| 1180m-1190m | 100% | Calcisiltite - medium light grey to brown, grey, firm to very firm, trace carbonaceous flecks, very rare glauconitic grain, trace white calcite grains, occasional forams, some showing pyrite replacement, trace Quartz - angular to subrounded, clear. |
| 1190m-1200m | 75% | Calcisiltite - As above. |
| | 25% | Sparry Limestone - hard, light brown to pale brown, crystalline, massive. |
| 1200m-1210m | 100% | Calcisiltite - As above. |
| 1210m-1220m | 100% | Calcisiltite - As above. |
| | | 23/3/79 |
| 1220m-1225m | 100% | Calcisiltite - As above. |
| 1225m-1230m | 100% | Calcisiltite - As above. |
| 1230m-1235m | 100% | Calcisiltite - medium light grey to grey brown, firm to very firm, trace carbonaceous flecks, trace white calcite grains, trace forams. Very rare coral stem or echinoid spine. |
| 1235m-1240m | 100% | Calcisiltite - As above. |
| 1240m-1245m | 100% | Calcisiltite - As above. |
| 1245m-1250m | 100% | Calcisiltite - As above, trace Sparry Limestone - light brown,crystalline, hard. |
| 1250m-1255m | 100% | Calcisiltite - As above. |
| 1255m-1260m | 100% | Calcisiltite - As above. |

10/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 1255m-1260m | 100% | Continued/..... |
| | | Trace Calcarenite - light grey, firm, very glauconitic, trace shell debris. |
| 1260m-1265m | 100% | Calcisiltite - As above. |
| | | Trace Quartz - rounded to subrounded, clear, granule, loose grains. |
| 1265m-1270m | 100% | Calcisiltite - As above. |
| 1270m-1275m | 100% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks, trace white calcite grains, trace forams and rare coral stems or echinoid spines, trace shell debris. |
| 1275m-1280m | 100% | Calcisiltite - As above. |
| 1280m-1285m | 70% | Calcisiltite - As above. |
| | 30% | Sparry Limestone - yellow grey to pale brown, hard, crystalline, occasionally showing a slight micritic texture in part. |
| 1285m-1290m | 95% | Calcisiltite - As above. |
| | 5% | Sparry Limestone - As above. |
| 1290m-1295m | 100% | Calcisiltite - As above. |
| 1295m-1300m | 100% | Calcisiltite - As above. |
| 1300m-1305m | 100% | Calcisiltite - As above. |
| 1305m-1310m | 100% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks, trace white calcite grains, trace forams, coral stems. Trace Quartz - clear, rounded granules. |
| 1310m-1315m | 100% | Calcisiltite - As above. |
| 1315m-1320m | 100% | Calcisiltite - As above. |
| 1320m-1325m | 100% | Calcisiltite - As above. |
| 1325m-1330m | 100% | Calcisiltite - As above. |
| 1330m-1335m | 100% | Calcisiltite - As above. |
| 1335m-1340m | 100% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks. Trace white and vein calcite. Trace Quartz - clea rounded granules, trace Sparry Limestone - crystalline, pal brown, trace coral stems, forams. |
| 1340m-1345m | 100% | Calcisiltite - As above. |
| 1345m-1350m | 100% | Calcisiltite - As above. |
| 1350m-1355m | 100% | Calcisiltite - As above. |
| 1355m-1360m | 100% | Calcisiltite - As above. |

11/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 1360m-1365m | 100% | Calcisiltite - As above. |
| 1365m-1370m | 100% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks, trace white and vein calcite, trace Quartz - clear, loose, granule, rounded forams common with traces of coral and shell debris. |
| 1370m-1375m | 100% | Calcisiltite - As above. |
| 1375m-1380m | 100% | Calcisiltite - As above. |
| 1380m-1385m | 100% | Calcisiltite - As above. |
| 1385m-1390m | 100% | Calcisiltite - light grey to light brown to medium light grey, trace carbonaceous flecks, white and crystalline calcite common, trace forams and coral stems, rare trace glauconite. |
| 1390m-1395m | 100% | Calcisiltite - As above. |
| 1395m-1400m | 100% | Calcisiltite - As above. |
| 1400m-1405m | 100% | Calcisiltite - As above. |
| 1405m-1410m | 100% | Calcisiltite - As above. |
| 1410m-1415m | 100% | Calcisiltite - As above. |
| 1415m-1420m | 100% | Calcisiltite - As above. |
| 1420m-1425m | 100% | Calcisiltite - medium light grey, trace glauconite, trace pyrite, occasional white calcite grains, trace forams. |
| 1425m-1430m | 100% | Calcisiltite - As above.<br>Trace carboanceous flecks. |
| 1430m-1435m | 100% | Calcisiltite - As above.<br>Trace Sparry Limestone - hard, massive, crystalline, pale brown. |
| 1435m-1440m | 100% | Calcisiltite - As above. |
| 1440m-1445m | 100% | Calcisiltite - As above. |
| 1445m-1450m | 100% | Calcisiltite - medium to light grey, trace glauconite, trace carbonaceous flecks, occasional white calcite grains, trace Sparry Limestone, hard, massive crystalline, pale brown, trace forams. |
| 1450m-1455m | 100% | Calcisiltite - As above. |
| 1455m-1460m | 100% | Calcisiltite - As above. |
| 1460m-1465m | 100% | Calcisiltite - As above. |
| 1465m-1470m | 100% | Calcisiltite - As above. |
| 1470m-1475m | 100% | Calcisiltite - medium light grey, trace glauconite, trace |

12/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 1470m-1475m | 100% | Continued/..... carbonaceous flecks, trace forams and coral debris. |
| 1475m-1480m | 100% | Calcisiltite - medium light grey, firm, trace glauconite, trace carbonaceous flecks, grains tend to be rounded, rare trace pyrite, rare mica flakes, trace forams and coral debris. |
| 1480m-1485m | 100% | Calcisiltite - As above. |
| 1485m-1490m | 100% | Calcisiltite - As above. |
| 1490m-1495m | 100% | Calcisiltite - As above. |
| 1495m-1500m | 100% | Calcisiltite - As above. |
| 1500m-1565m | 100% | Calcisiltite - medium light grey, firm, trace glauconite, trace carbonaceous flecks, trace forams and coral debris, tends to be less cemented and soft than previously. |
| 1505m-1510m | 95% | Calcisiltite - As above. |
| | 5% | Marl - light grey, soft, very silty. |
| 1510m-1515m | 90% | Calcisiltite - As above. |
| | 10% | Marl - As above. Forams becoming more common. |
| 1515m-1520m | 95% | Calcisiltite - As above. |
| | 5% | Marl - As above. |
| 1520m-1525m | 90% | Calcisiltite - As above. |
| | 10% | Marl - As above. |
| 1525m-1530m | 90% | Calcisiltite - As above. |
| | 10% | Marl - As above. |
| 1530m-1535m | 100% | Calcisiltite - medium light grey, firm, trace glauconite, trace carbonaceous flecks, forams and coral debris common often filled with crystalline calcite. |
| 1535m-1540m | 100% | Calcisiltite - As above, trace Marl - As above. |
| 1540m-1545m | 100% | Calcisiltite - As above. |
| 1545m-1550m | 95% | Calcisiltite - As above. |
| | 5% | Marl - light grey, soft, silty. |
| 1550m-1555m | 100% | Calcisiltite - medium light grey, firm, trace glauconite, trace carbonaceous flecks, forams and coral. |
| 1555m-1560m | 90% | Calcisiltite - medium light grey, firm, trace glauconite, trace carbonaceous flecks, forams, and coral debris. |
| | 10% | Marl - light grey, soft, silty. |

13/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 1560m-1565m | 90% | Calcisiltite - As above. |
| | 10% | Marl - As above. |
| 1565m-1570m | 90% | Calcisiltite - As above. |
| | 10% | Marl - As above. |
| 1570m-1575m | 95% | Calcisiltite - As above. |
| | 5% | Marl - As above. |
| 1575m-1580m | 100% | Calcisiltite - medium light grey, firm, trace glauconite, trace carbonaceous matter, forams, trace marl - trace clear accular mineral (gypsum?). |
| 1580m-1585m | 100% | Calcisiltite - As above. |
| 1585m-1590m | 100% | Calcisiltite - As above. |
| 1590m-1595m | 100% | Calcisiltite - As above. |
| 1595m-1600m | 100% | Calcisiltite - medium light grey, firm, trace glauconite, trace carbonaceous matter, forams, trace marl. |
| 1600m-1605m | 100% | Calcisiltite - As above. |
| 1605m-1610m | 100% | Calcisiltite - As above. |
| 1610m-1615m | 100% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks, trace forams. |
| 1615m-1620m | 100% | Calcisiltite - As above. Some crystalline calcite grains, present with the calcisiltite. |
| 1620m-1625m | 100% | Calcisiltite - As above. |
| 1625m-1630m | 100% | Calcisiltite - As above. |
| 1630m-1635m | 100% | Calcisiltite - As above, trace Gypsum? |
| 1635m-1640m | 100% | Calcisiltite - medium light grey, trace brown, firm, trace carbonaceous flecks, trace forams and indeterminate debris. |
| 1640m-1645m | 100% | Calcisiltite - As above, trace Calcarenite - white to green glauconitic. |
| 1645m-1650m | 100% | Calcisiltite - As above. |
| 1650m-1655m | 90% | Calcisiltite - medium light grey, trace brown, firm, trace carbonaceous flecks, trace forams, trace gypsum? |
| | 10% | Calcarenite - glauconitic, pyritic, hard. |
| 1653m-1660m | 95% | Calcisiltite - As above. |
| | 5% | Calcarenite - As above. |
| 1660m-1665m | 100% | Calcisiltite - As above. |

14/.....

LITHOLOGICAL DESCRIPTIONS — J.D. ALDER

FORTESCUE-4 — 23/3/79

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 1665m-1670m | 100% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks, trace glauconite, trace pyrite, forams common, some showing pyrite replacement. Trace Calcarenite - as as above. Trace Gypsum? |
| 1670m-1675m | 100% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks, trace glauconite, trace pyrite, forams. |
| 1675m-1680m | 100% | Calcisiltite - As above. |
| 1680m-1685m | 100% | Calcisiltite - As above. |
| 1685m-1690m | 100% | Calcisiltite - As above. Trace Siltstone - pale brown, very calcareous. |
| 1690m-1695m | 80% | Calcisiltite - As above. |
| | 20% | Siltstone - pale brown to red brown, firm, trace carbonaceous flecks, trace glauconite, forams common. |
| 1695m-1700m | 50% | Calcisiltite - medium light grey, firm, trace glauconite, trace carbonaceous flecks, forams. |
| | 50% | Marl - light grey, soft, silty. |
| 1700m-1710m | 50% | Calcisiltite - As above. |
| | 50% | Marl - As above. |
| | | 24/3/79 |
| 1710m-1720m | 70% | Marl - light grey, soft, forams common, carbonaceous flecks |
| | 20% | Calcisiltite - As above. |
| | 10% | Siltstone - medium light grey to grey brown, very calcareou |
| 1720m-1730m | 30% | Marl - As above. |
| | 20% | Calcisiltite - As above. |
| | 50% | Siltstone - As above. |
| 1730m-1740m | 10% | Marl - As above. |
| | 70% | Calcisiltite - As above. |
| | 20% | Siltstone - As above. |
| 1740m-1750m | 10% | Marl - As above. |
| | 50% | Calcisiltite - As above. |
| | 40% | Siltstone - As above. |
| 1750m-1760m | 20% | Calcisiltite - medium light grey, firm, trace glauconite, trace carbonaceous flecks, forams. |
| | 80% | Limestone - sparry, hard, crystalline, cream to light brown trace pyrite, some white calcite veins, very fine grained. |

15/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 1760m-1770m | 40% | Calcisiltite - As above. |
| | 60% | Limestone - sparry, as above. |
| | | Trace Gypsum? |
| 1770m-1780m | 40% | Sparry Limestone - As above. |
| | 30% | Calcisiltite - As above. |
| | 30% | Siltstone - fine, medium light grey to light brown, very calcareous. |
| 1780m-1790m | 50% | Calcisiltite - medium light grey, firm, trace carbonaceous flecks, forams. |
| | 50% | Siltstone - medium light grey to pale brown, firm, carbonaceous flecks, very calcareous. |
| 1790m-1795m | 100% | Siltstone - medium light gey to pale brown, firm, trace carbonaceous flecks, trace glauconite, very calcareous, forams common. |
| | | Trace Calcisiltite and trace Marl - as above. |
| 1795m-1800m | 100% | Siltstone - As above, trace pyrite. |
| 1800m-1805m | 100% | Siltstone - As above. |
| 1805m-1810m | 100% | Siltstone - As above. |
| 1810m-1815m | 70% | Siltstone - medium light grey to pale brown, firm, trace carbonaceous flecks, trace glauconite, very calcareous forams. |
| | 30% | Marl - soft, white to light grey. |
| 1815m-1820m | 100% | Siltstone - As above. Trace Marl - As above. |
| 1820m-1825m | 50% | Siltstone - As above. |
| | 50% | Marl - As above. |
| 1825m-1830m | 50% | Siltstone - As above. |
| | 50% | Marl - As above. |
| 1830m-1835m | 50% | Siltstone - As above. |
| | 50% | Marl - As above. |
| 1835m-1840m | 70% | Marl - soft, white to light grey, trace carbonaceous flecks. |
| | 30% | Siltstone - medium light grey to brown, firm, very calcareous, trace carbonaceous flecks, trace glauconite, forams common. |
| 1840m-1845m | 50% | Siltstone - As above. |
| | 50% | Marl - As above. |

16/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 1845m-1850m | 50% | Siltstone - As above. |
| | 50% | Marl - As above. |
| 1850m-1855m | 70% | Siltstone - As above. |
| | 30% | Marl - As above. |
| 1855m-1860m | 60% | Siltstone - medium light grey, firm, very calcareous, trace carbonaceous flecks, trace glauconite forams common. |
| | 40% | Marl - soft, white to light grey, silty, trace carbonaceous flecks. |
| 1860m-1865m | 60% | Marl - As above. |
| | 40% | Siltstone - As above. |
| 1865m-1870m | 60% | Marl - As above. |
| | 40% | Siltstone - As above. |
| 1870m-1875m | 70% | Marl - As above. |
| | 30% | Siltstone - As above. |
| 1875m-1880m | 30% | Marl - As above. |
| | 70% | Siltstone - As above. |
| 1880m-1885m | 50% | Marl - soft, white to light grey, silty, trace carbonaceous flecks. |
| | 50% | Siltstone - medium light grey, soft to firm, very calcareou trace carbonaceous flecks, trace glauconite, forams. |
| 1885m-1890m | 50% | Marl - As above. |
| | 50% | Siltstone - As above. |
| 1890m-1895m | 60% | Siltstone - As above. |
| | 40% | Marl - As above. |
| 1895m-1900m | 60% | Siltstone - As above. |
| | 40% | Marl - As above. |
| 1900m-1905m | 80% | Siltstone - As above. |
| | 20% | Marl - As above. |
| 1905m-1910m | 90% | Siltstone - medium light grey, soft to firm, very calcareou trace carbonaceous flecks, trace glauconite, forams common. |
| | 10% | Marl - soft, white to light grey, silty, trace pyrite, trace carbonaceous flecks. |
| 1910m-1915m | 80% | Siltstone - As above. |
| | 20% | Marl - As above. |

17/.....

LITHOLOGICAL DESCRIPTIONS — J.D. ALDER

FORTESCUE-4 — 24/3/79

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 1915m-1920m | 80% | Siltstone - medium light grey, firm, very calcareous, carbonaceous flecks, trace pyrite, fossiliferous, mainly forams. |
| | 20% | Marl - light grey, soft, silty. |
| 1920m-1925m | 90% | Siltstone - As above. |
| | 10% | Marl - As above. |
| 1925m-1930m | 90% | Siltstone - As above. |
| | 10% | Marl - As above. |
| 1930m-1935m | 100% | Siltstone - medium light grey, firm, very calcareous, carbonaceous flecks, pyrite, vein of a white acicular mineral - gypsum? fossiliferous, mainly forams. |
| 1935m-1940m | 90% | Siltstone - As above. |
| | 10% | Marl - soft, light grey. |
| 1940m-1945m | 90% | Siltstone - As above. |
| | 10% | Marl - As above. |
| 1945m-1950m | 90% | Siltstone - As above. |
| | 10% | Marl - As above. |
| 1950m-1955m | 100% | Siltstone - medium light grey, firm, very calcareous, carbonaceous flecks, pyrite, fossiliferous - forams. |
| 1955m-1960m | 100% | Siltstone - As above. |
| 1960m-1965m | 100% | Siltstone - As above. |
| 1965m-1970m | 100% | Siltstone - As above. |
| 1970m-1975m | 100% | Siltstone - As above. |
| 1975m-1980m | 100% | Siltstone - medium light grey, firm, very calcareous, carbonaceous flecks, pyrite, fossiliferous - forams. |
| 1980m-1985m | 100% | Siltstone - As above. |
| 1985m-1990m | 100% | Siltstone - As above. |
| 1990m-1995m | 90% | Siltstone - medium light grey, firm, very calcareous, carbonaceous flecks, pyrite, fossiliferous - forams. |
| | 10% | Mudstone - yellow brown, to olive grey, firm, very silty, very calcareous, trace carbonaceous flecks, forams common. |
| 1995m-2000m | 90% | Siltstone - As above. |
| | 10% | Mudstone - As above, forams becoming less common. |
| 2000m-2005m | 90% | Siltstone - As above. |
| | 10% | Mudstone - As above. |

18/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 2005m-2010m | 90% | Siltstone - As above. |
| | 10% | Mudstone - As above. |
| 2010m-2015m | 80% | Siltstone - As above. |
| | 20% | Mudstone - As above. |
| 2015m-2020m | 80% | Siltstone - medium light grey to medium grey, firm, very calcareous, carbonaceous flecks, pyrite, occasional forams. |
| | 20% | Mudstone - yellow brown to medium light grey, very silty, firm, very calcareous, trace carbonaceous flecks. |
| 2020m-2025m | 80% | Siltstone - As above. |
| | 20% | Mudstone - As above. |
| 2025m-2030m | 90% | Siltstone - As above. |
| | 10% | Mudstone - As above. |
| 2030m-2035m | 60% | Siltstone - medium light grey to medium grey, firm, very calcareous, trace carbonaceous flecks, pyritic, occasional forams. |
| | 40% | Mudstone - yellow brown to medium light grey, firm, very silty, very calcareous. Trace carbonaceous flecks, trace glauconite, trace gypsum? |
| 2035m-2040m | 70% | Siltstone - As above. |
| | 30% | Mudstone - As above. |
| 2040m-2045m | 60% | Siltstone - As above. |
| | 40% | Mudstone - As above. |
| 2045m-2050m | 70% | Siltstone - As above. |
| | 30% | Mudstone - As above. |
| 2050m-2055m | 70% | Siltstone - As above. |
| | 30% | Mudstone - As above. |
| 2055m-2060m | 75% | Siltstone - medium light to medium grey, firm, very calcareous, trace carbonaceous flecks, pyrite, occasional forams. |
| | 25% | Mudstone - yellow brown to medium light grey, firm, very silty, very calcareous, trace carbonaceous flecks, trace glauconite. |
| 2060m-2065m | 75% | Siltstone - As above. |
| | 25% | Mudstone - As above. |
| 2065m-2070m | 70% | Siltstone - As above. Pyrite decreased to only trace. |

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 2065m-2070m | 30% | Mudstone - As above. |
| 2070m-2075m | 60% | Siltstone - As above. |
| | 40% | Mudstone - As above. Pyrite common, as loose aggregates. |
| 2075m-2080m | 60% | Siltstone - As above. |
| | 40% | Mudstone - As above. |
| 2080m-2085m | 40% | Siltstone - medium light grey, firm, very calcareous, trace carbonaceous flecks, pyrite, occasional forams. |
| | 60% | Mudstone - yellow brown to medium light grey, firm, very silty, very calcareous. Trace carbonaceous flecks. |
| 2085m-2095m | 30% | Siltstone - As above. |
| | 70% | Mudstone - As above. |
| | | 25/3/79 |
| 2095m-2105m | 100% | Mudstone - yellow brown to medium light grey, firm, very silty, very calcareous, trace carbonaceous flecks, trace glauconite, pyrite common, fossiliferous - forams. |
| 2105m-2110m | 100% | Mudstone - As above. |
| 2110m-2115m | 100% | Mudstone - As above. |
| 2115m-2120m | 100% | Mudstone - As above. |
| 2120m-2125m | 100% | Mudstone - As above. |
| 2125m-2130m | 100% | Mudstone - yellow brown to medium light grey, firm, very silty, very calcareous, trace carbonaceous flecks, trace glauconite, trace pyrite, forams common. |
| 2130m-2135m | 100% | Mudstone - As above. |
| 2135m-2140m | 100% | Mudstone - As above. Glauconite has mottled green areas within the mudstone. |
| 2140m-2145m | 100% | Mudstone - As above. |
| 2145m-2150m | 100% | Mudstone - As above. |
| 2150m-2155m | 100% | Mudstone - As above. |
| 2155m-2160m | 100% | Mudstone - As above. |
| 2160m-2165m | 100% | Mudstone - yellow brown to medium light grey with green mottling, firm, very silty, very calcareous, trace carbonaceous flecks, pyritic, trace glauconite, forams. |
| 2165m-2170m | 100% | Mudstone - As above. |
| 2170m-2175m | 100% | Mudstone - As above. |
| 2175m-2180m | 100% | Mudstone - As above. |

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| DEPTH | % | DESCRIPTION |
|---|---|---|
| 2180m-2185m | 100% | Mudstone - As above. |
| 2185m-2190m | 100% | Mudstone - As above. |
| 2190m-2200m | 100% | Mudstone - yellow brown to medium light grey with green mottling, firm, silty, calcareous,trace carbonaceous flecks. Trace pyrite, trace glauconite, fissile in part, forams. |
| 2200m-2210m | 100% | Mudstone - As above. |
| 2210m-2220m | 100% | Mudstone - As above. |
| 2220m-2230m | 100% | Mudstone - As above. |
| 2230m-2240m | 100% | Mudstone - As above. |
| 2240m-2250m | 100% | Mudstone - As above. |
| | | J.D. ALDER 25/3/79 |
| 2250m-2255m | 100% | Mudstone - medium light grey to olive grey to grey brown, some green mottling, firm, calcareous, silty, pyritic in part, trace glauconite, trace forams, fissile in part. |
| 2255m-2260m | 100% | Mudstone - As above. |
| 2260m-2265m | 100% | Mudstone - As above. |
| 2265m-2270m | 100% | Mudstone - As above. |
| 2270m-2275m | 100% | Mudstone - As above. |
| 2275m-2280m | 100% | Mudstone - As above. |
| 2280m-2285m | 100% | Mudstone - medium light grey to olive grey to grey brown, some green mottling, firm, calcareous, silty, pyritic in part, trace glauconite, trace forams, fissile in part. |
| 2285m-2290m | 100% | Mudstone - As above. |
| 2290m-2295m | 100% | Shale - medium light grey, olive grey to brown, some green mottling, grading to mudstone, silty, calcareous, fissile, firm, pyritic in part, trace glauconite, trace forams. |
| 2295m-2300m | 100% | Shale - As above. |
| 2300m-2305m | 100% | Shale - As above. |
| 2305m-2310m | 100% | Shale - As above. |
| 2310m-2315m | 100% | Shale - As above. |
| 2315m-2320m | 100% | Shale - As above. |
| 2320m-2325m | 100% | Shale - medium light grey to olive grey to grey brown with some green mottling, silty, calcareous, fissile, firm, pyritic in part, trace glauconite, trace forams. |

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LITHOLOGICAL DESCRIPTIONS — J.D. ALDER

FORTESCUE-4 — 25/3/79

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 2325m-2330m | 100% | Shale - As above. |
| 2330m-2335m | 100% | Shale - As above. |
| 2335m-2340m | 100% | Shale - As above. |
| 2340m-2345m | 100% | Shale - medium light grey to olive grey to grey brown with some green mottling, silty, calcareous, fissile, firm, pyritic in part, trace glauconite, trace forams. |
| 2345m-2350m | 100% | Shale - As above. |
| 2350m-2355m | 100% | Shale - As above. |
| 2355m-2360m | 100% | Shale - As above. |
| 2360m-2365m | 100% | Shale - As above. |
| 2365m-2370m | 100% | Shale - As above. |
| 2370m-2375m | 100% | Shale - medium light grey to olive grey to grey brown, silty, calcareous, fissile, firm, pyritic, trace glauconite, trace forams. |
| 2375m-2380m | 100% | Shale - As above. |
| 2380m-2385m | 100% | Shale - As above. |
| 2385m-2390m | 100% | Shale - As above. |

G.M. KJELLGREN
30/3/79

| | | |
|---|---|---|
| 2465m-2470m | 10% | Quartz - loose, predominantly milky, coarse to very coarse granule sized,mainly very coarse grained,subrounded to rounded. |
| | 20% | Coal - black, rarely dark brown and friable, bright, hard and brittle, pyritic. |
| | 70% | Sandstone - light grey to grey brown, quartzose, finely carbonaceous and rarely pyritic, friable, tending subfissile. Grades to very fine grained Sandstone in part.<br><br>Cavings of light grey Glauconitic Foraminiferal Rock - abundant glauconite and calcareous forams. |
| 2470m-2475m | 60% | Quartz - loose, medium to very coarse grained with some granules, subrounded to rounded, commonly fractured, clear to milky to light orange, occasionally pyrite overgrowths and cement. |
| | 40% | Sandstone - As above, very micaceous and carbonaceous, subfissile and very friable, associated with some minor coaly matter.<br><br>Many cavings of foram rock, loose skeletal debris - commonly benthonics and light grey glauconite sandstone, and coal. |
| 2475m-2780m | 70% | Quartz - As above. |

22/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 2475m-2480m | | Continued/..... |
| | 30% | Sandstone - As above. |
| | | Many cavings of Glauconitic Sandstone - constitutes approximately 50% or more of sample. |
| 2480m-2485m | 50% | Quartz - As above. |
| | 50% | Sandstone - As above. |
| | | Trace Sandstone - white, very fine grained and well sorted, carbonaceous, friable. |
| | | Cavings - As above. |
| | | P. ELZE |
| 2485m-2490m | 20% | Quartz |
| | 80% | Sandstone |
| | | Trace Pyrite, Sandstone - light brown grey, moderately well sorted, some mica, carbonaceous fragments. |
| | | Cavings - As above. |
| 2490m-2495m | 20% | Quartz |
| | 80% | Sandstone |
| | | Grey brown fine grained sandstone, trace Siltstone - light grey, micaceous, trace pyrite, carbonaceous material. (coal fragments cavings?). |
| | | Cavings - light grey, rock containing forams and glauconite. |
| 2495m-2500m | 80% | Quartz |
| | 20% | Sandstone |
| | | Medium brown Sandstone - micaceous, trace pyrite, coal fragments - cavings - some foram rock. |
| | | Cavings - As above. |
| 2500m-2505m | 95% | Quartz |
| | 5% | Sandstone |
| | | Predominantly well sorted, subrounded to subangular, trace pyrite and carbonaceous matter. Quartz - milky and clear. Mineral fluorescence - calcite. Cavings (foram-calcareous rock) minor. |
| 2505m-2510m | 95% | Quartz |
| | 5% | Sandstone - As above, Sandstone and very minor cavings, carbonaceous and foram - calcareous chips. |

23/.....

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 2510m-2515m | 90% | Quartz |
| | 10% | Sandstone |
| | | Sandstone - light grey brown, trace pyrite, minor calcareous foraminiferous rock cavings? Brown residual shows instant streaming milky cut, fluorescence yellow (single grain of possibly caving origin?). |
| 2515m-2520m | 85% | Quartz |
| | 15% | Siltstone |
| | | Sandstone - grey brown, micaceous, mineral fluorescence, minor calcareous foram rock - probably cavings. Quartz - subrounded to subangular, pyrite on Quartz. |
| 2520m-2525m | 70% | Quartz |
| | 30% | Siltstone |
| | | Siltstone - medium brown, micaceous, carbonaceous material. |
| | | Cavings - As above. Pyrite and coaly traces. |
| 2525m-2530m | 60% | Quartz |
| | 40% | Siltstone |
| | | Siltstone - dark brown, micaceous. Cavings - as above, some carbonaceous inbeds in siltstone, trace pyrite and coals. |
| 2530m-2535m | 80% | Quartz |
| | 20% | Siltstone |
| | | Siltstone - brown grey, pyritic, micaceous. Cavings - calcareous foram rocks, trace carbonaceous material. Quartz - subrounded, clear to milky. |
| 2535m-2540m | 70% | Quartz |
| | 30% | Siltstone/Fine Sandstone |
| | | Siltstone - As above. |
| | | Fine Sandstone - medium brown, well sorted, some micaceous and pyritic traces. Pyrite also associated with some large quartz grains. Some fracturing of quartz both milky and clear. Cavings still visible. |
| 2540m-2545m | 80% | Quartz |
| | 20% | Siltstone |
| | | Brown to grey, micaceous, pyritic. Quartz - poorly sorted, subangular, grain size range from fine to very coarse. Trace Pyrite. |

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LITHOLOGICAL DESCRIPTIONS — P. ELZE

FORTESCUE-4 — 30/3/79

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 2545m-2550m | 70% | Quartz - loose grains, clear to white, very coarse to medium, very coarse grains are rounded, medium grains, subrounded to subangular. Occasionally contain inclusions. Smooth or slightly etched. Pyrite encrusted. |
| | 20% | Siltstone - medium brown, subfissile, micaceous, carbonaceous flecks, trace pyrite. |
| | 10% | Coal - bright banded, fissile, pyritic. |
| 2550m-2555m | 80% | Quartz - As above. |
| | 15% | Siltstone - As above. |
| | 5% | Coal - As above. |
| | | V.ZIOLKOWSKI 31/3/79 |
| 2555m-2560m | 65% | Sandstone - loose quartz grains, white, moderately sorted, coarse to very coarse, subrounded to rounded, smooth to slightly frosted, minor inclusions, pyrite coated. Minor inclusions. |
| | 25% | Siltstone - medium brown, moderate, firm, sandy, micaceous, minor carbonaceous flecks, subfissile, trace pyrite. |
| | 5% | Coal - black, fissile to subconchoidal, pyritic, bright. |
| 2560m-2565m | 25% | Sandstone - loose grains. As above. |
| | 15% | Siltstone - As above. |
| | 60% | Coal - black, hard, shaley to bright and bright banded, dull to vitreous, pyritic. |
| 2565m-2570m | 75% | Sandstone - quartz grains, clear and milky, poorly sorted, ranging from medium to granule, grains frosted, pyrite traces. |
| | 25% | Siltstone - grey brown, micaceous, fine carbonaceous laminae, some fine sand layers. |
| | | Trace coal and pyrite. |
| 2570m-2575m | 90% | Sandstone - poorly sorted, subangular to subrounded, medium to granule grain size, milky and clear, pyrite dusting. |
| | 10% | Siltstone - grey brown, micaceous, some carbonaceous traces, pyrite traces also contain inclusions of fine to very fine sands. |
| | | Trace Coal - Cavings? |
| 2575m-2580m | 70% | Sandstone - As above, except grains tend to be more rounded |
| | 30% | Siltstone - light grey brown, micaceous, trace pyrite, very fine sands and trace coals. |

25/.....

LITHOLOGICAL DESCRIPTIONS — V. ZIOLKOWSKI

FORTESCUE-4 — 31/3/79

| DEPTH | % | DESCRIPTION |
|---|---|---|
| 2580m-2585m | 50% | Sandstone - As above. |
| | 50% | Siltstone - As above. |
| 2585m-2590m | 60% | Sandstone - As above. |
| | 40% | Siltstone - grey brown, siltstone interlayered with fine sands, pyritic, mica rich, some carbonaceous and coaly fragments, also some calcareous fraction. |
| 2590m-2595m | 20% | Sandstone - loose grains, quartz, coarse to very coarse, smooth, clear or minor inclusions, pyrite coating. |
| | 40% | Siltstone - medium brown, micaceous, sandy, carbonaceous flecks, fissile, firm, tending to carbonaceous shale. |
| | 40% | Coal - black, bright and bright banded, conchoidal fracture, pyritic. |
| 2595m-2600m | 60% | Sandstone - As above. |
| | 20% | Siltstone - As above. |
| | 20% | Coal - As above. |
| | | Total Depth: 2602.5 metres |

# 2. SIDEWALL CORE DESCRIPTIONS

APPENDIX 2

SIDEWALL CORE DESCRIPTIONS

# SIDEWALL CORE DESCRIPTIONS

## FORTESCUE-4

| SWC NO. | DEPTH (m) | RECOVERED (mm) | DESCRIPTION |
|---|---|---|---|
| 1 | 2598 | 20 | Siltstone - dark grey brown, firm, fissile, micaceous, minor sandstone stringers, grades to shale, trace pyrite, calcareous mineral fluorescence, no cut. |
| 2 | 2593 | 20 | Siltstone - dark grey brown, firm, massive. Thin isolated very fine sand lenses. Trace pyrite, and large mica flakes. No fluorescence or cut. |
| 3 | 2585.5 | 20 | Sandstone - light grey with medium brown streaks. Silty, subfissile with discontinuous silt streaks. Quartz angular to subangular, clear to pale yellow, pyrite encrusted. Clay (20%) impregnated, tight, silty layers, very micaceous, fissile. Trace calcite. No fluorescence or cut. |
| 4 | 2581 | 20 | Silt Laminated Sandstone:<br>Sandstone - light grey, very fine grained, moderately friable, flat bedded to massive, quartz angular to subangular, clear to pale brown. Clay matrix, large mica flakes common, trace pyrite, Tight.<br><br>Siltstone - dark brown continuous layers, subfissile, micaceous and pyritic. No fluorescence or cut. |
| 5 | 2573.5 | 30 | Shale - dark grey, soft, fissile, clayey. Trace pyrite. No fluorescence or cut. |
| 6 | 2568 | 35 | Shale - very dark brown, soft, fissile, carbonaceous, micaceous. Trace pyrite. No fluorescence or cut. |
| 7 | 2559.5 | 15 | Siltstone - dark grey, subfissile, dark carbonaceous material. Trace mica and pyrite, very clayey, slightly calcareous. No fluorescence or cut. |
| 8 | 2554.3 | 25 | Shale - as with sample 6 - slightly more silty. No fluorescence or cut. |
| 9 | | | NO RECOVERY |
| 10 | 2544.2 | 25 | Sandstone - medium grey, massive, fine to very fine grained, poorly sorted, quartz, angular to subangular, clear, minor pyrite encrusting minor pale brown staining. Clayey matrix. Poor visual porosity. No fluorescence or cut. |
| 11 | 2531.5 | 40 | Shale - very dark brown, soft to moderately firm, subfissile, trace pyrite and mica, carbonaceous. No fluorescence or cut. |
| 12 | 2525.6 | 25 | Shale - as above, but with rare coarse grained quartz clasts. |
| 13 | 2520 | 20 | Siltstone - sandy, medium to light grey, soft, massive to subfissile, carbonaceous layers, very micaceous, pyritic. Quartz, very fine grained. Trace calcite, no fluorescence or cut. |

2/....

SIDEWALL CORE DESCRIPTIONS

FORTESCUE-4

| SWC NO. | DEPTH (m) | RECOVERED (mm) | DESCRIPTION |
|---|---|---|---|
| 14 | 2512 | 20 | Sandstone - light grey, massive, fine to very fine grained. Some very coarse grained well rounded quartz grains. Quartz, subangular to subrounded, poorly sorted, clear to milky, some brown stained patches, small silty tracings, micaceous, trace pyrite. No fluorescence or cut. |
| 15 | 2501 | 25 | Sandstone - light grey, massive to flat bedded, fine to medium grained. Quartz grains, rounded to subrounded, poor to moderately sorted, clear to frosted, minor mica, trace pyrite. Minor silty layers, dark brown, pyritic. Poor to moderate visual porosity. No fluorescence or cut. |
| 16 | 2494.8 | 35 | Silt laminated Sandstone - light to medium grey with dark brown streaks, subfissile with discontinuous silty beds. Quartz, subrounded to subangular moderately sorted, yellow and clear, some red staining, mica flakes common, pyrite encrusted. Tight, clay (30%) impregnated. Silty layers micaceous, subfissile, trace calcite. Mineral flourescence (yellow spots - dull) - no cut. |
| 17 | 2492.5 | 30 | Sandstone - medium brown, flat bedded, very fine sand, friable, poorly sorted. Quartz, rounded to subangular, clear to pale brown, clayey approximatel 20% matrix. Tight. Trace carbonaceous material and pyrite as well as calcite. No fluorescence or cut. |
| 18 | 2489.5 | 20 | Siltstone - medium grey, soft, subfissile with minor fine grained sandy lenses. Micaceous, carbonaceous and containing traces of pyrite. Traces of carbonate - Dolomite from staining. Spotty dull yellow fluorescence (mineral) - no cut. |
| 19 | 2486 | 25 | Sandstone - light to medium grey, friable, fine to medium grained poorly sorted. Quartz rounded to subrounded, clear to frosted. Some mica (biotite). Trace pyrite, calcite. Poor visual porosity, minor patchy brown staining. No fluorescence or cut. |
| 20 | 2481 | 15 | Silt laminated Sandstone - light grey with dark brown siltstone/mica laminae, poorly sorted. Quartz - subrounded, frosted. Poor visual porosity. Trace pyrite carbonate. No fluorescence or cut. |
| 21 | 2478.7 | 30 | Silt laminated Sandstone - light grey with thin dark brown laminae, semi friable, discontinuous flat or flaser bedded, moderately sorted sands, very fine grained. Quartz rounded to subangular clear to pale yellow brown. Matrix is clay rich 20% - light, siltstone layers are pyritic micaceous, grade to shale. No fluorescence or cut. |

3/....

# SIDEWALL CORE DESCRIPTIONS

## FORTESCUE-4

| SWC NO. | DEPTH (m) | RECOVERED (mm) | DESCRIPTION |
|---|---|---|---|
| 22 | 2474 | 15 | Siltstone - dark grey, friable, micaceous, small fragments of black organic matter (carbonaceous) some fine quartz grains, well rounded, occur in small lens shaped pods. No fluorescence or cut. |
| 23 | 2470 | 25 | Siltstone - as above. |
| 24 | 2465 | 20 | Siltstone - very dark grey, sub-fissile, moderately firm, very micaceous. Trace carbonaceous material, trace pyrite. No fluorescence or cut. |
| 31 | 2451.5 | 10 | Sandstone - as 30, with dark grey carbonaceous bands, moderate visual porosity. Moderate bluish-white spotty fluorescence. Moderate yellow white slowly streaming cut. Very pale brown cut residue. |
| 25 | 2448.5 | 30 | Sandstone - light grey, friable, fine to medium grained, poorly sorted. Quartz angular to sub-rounded, no visible staining, moderate visual porosity. Trace mica and pyrite. Bright bluish-white patchy fluorescence, yellow white, intermediate streaming cut. Strong petroliferous odour. Pale yellow to brown cut residue. |
| 32 | 2446 | 25 | Sandstone - as above. |
| 26 | 2445 | 25 | Granular Conglomerate - medium grey, quartzose poorly sorted, grain size range from granules to medium, quartz clear to frosted, rounded to sub-rounded. Clay patches to 10%, trace pyrite, moderate visible porosity. Very faint yellow-white fluorescence patchy, no cut. |
| 33 | 2444 | 5 | Granular Conglomerate - medium grey quartzose poorly sorted, medium to granular grains, sub-angular to rounded, friable, brown/black staining Trace pyrite and mica. Trace carbonate. Faint spotty blue to white fluorescence. Very slow yellow white to milky point streaming, pale brown cut residue. |
| 27 | 2443 | 15 | Granular Conglomerate - as above but with weak blue white spotty fluorescence and no cut. |
| 28 | 2438.5 | 20 | Sandstone - medium grey, semi-friable, quartz, clear and milky, moderately well sorted fine sand, subangular, trace mica and pyrite. Moderate to good visual porosity. Some brown staining. Moderate spotty bluish white fluorescence weak pale yellow very slowly streaming cut. Very pal brown crush cut. |
| 29 | 2424 | 20 | Sandstone - as above but no visible staining and no fluorescence or cut. |
| 30 | 2422 | 20 | Sandstone - medium grey, poorly sorted, very fine to medium grainsize, angular to subrounded, clear and milky quartz, semi-friable, brown staining. Trace mica and pyrite. Good visual porosity. Weak spotty yellow white fluorescence, very slow streaming, weak milky cut. Very pale brown cut residue. |

4/....

# SIDEWALL CORE DESCRIPTIONS

## FORTESCUE-4

| SWC NO. | DEPTH (m) | RECOVERED (mm) | DESCRIPTION |
|---|---|---|---|
| 34 | 2420 | 30 | Siltstone - dark grey brown, friable, large subrounded quartz clasts in siltstone and clay (25%) matrix. Clast grain size variation from medium to very coarse, Trace mica, calcareous material, carbonaceous material and some pyrite. No fluorescence or cut. |
| 35 | 2418 | 30 | Sandstone - medium grey, poorly sorted, very fine to medium grain size, subangular to subrounded. Silty matrix, moderate to poor visual porosity. Trace pyrite, mica and black organic matter. Calcite - semi-friable. No fluorescence or cut. |
| 36 | 2416 | 15 | Sandstone - as above. |
| 37 | 2414 | 30 | Siltstone - light to medium grey, calcareous (20%) clay, siltstone matrix some fine to very fine quartz clasts, predominantly clear and frosted, traces of pyrite, mica and black carbonaceous material. No fluorescence or cut. |
| 38 | 2412 | 35 | Siltstone - calcareous, medium brown to grey, firm, sub-fissile, very fine grained, clear quartz grains, siltstone sized microfossils, trace pyrite, trace mica. Carbonaceous flecks, very calcareous. No fluorescence or cut. |
| 39 | 2410 | 35 | As above. |
| 40 | 2408.1 | 35 | Mudstone - calcareous, dark green to grey, firm, fissile, trace mica, trace pyrite, clay approximately 50%. No fluorescence or cut. |
| 41 | 2406 | 35 | Calcareous Mudstone - as above. Clay approximately 60%. No fluorescence or cut. |
| 42 | 2388 | 33 | Calcareous Sandstone - fissile, firm, medium grey, patchy pyrite. Silt sized microfossils. Trace silt sized quartz. Clay approximately 60%. No fluorescence or cut. |
| 43 | 2386 | 40 | Calcareous Mudstone - as above. Clay approximately 50%. |
| 44 | 2385 | 40 | Calcareous Mudstone - as above. Clay approximately 40%. |
| 45 | 2383 | 35 | Calcareous Mudstone - light grey, firm, subfissile, silt size microfossils, trace pyrite, rare carbonaceous flecks. |
| 46 | 2381 | 20 | Calcareous Mudstone - as above. Clay approximately 40%. |
| 47 | 2341 | 20 | Calcareous Mudstone - as above. |
| 48 | 2313 | 25 | Calcilutite - argillaceous, subfissile, silt sized microfossils, trace pyrite, trace mica. Clay approximately 30%. |
| 49 | 2281.5 | 30 | Calcilutite - as above. |

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SIDEWALL CORE DESCRIPTIONS

FORTESCUE-4

| SWC NO. | DEPTH (m) | RECOVERED (mm) | DESCRIPTION |
|---|---|---|---|
| 50 | 2249.1 | 25 | Calcilutite - as above, very pyritic. |
| 51 | 2220 | 35 | Calcisiltite - grey brown, very fine grained with very fine matrix, quartz grains, poorly sorted (very fine to medium). Clay approximately 20%. |
| 52 | 2190 | 35 | Calcisiltite - as above |
| 53 | 2160 | 40 | Calcisiltite - as above. |
| 54 | 2130 | 30 | Calcisiltite - as above. |
| 55 | 2100 | 25 | Calcisiltite - as above, black carbonaceous fragments (organic). |
| 56 | 2070 | 25 | Calcisiltite - as above, trace pyrite. |
| 57 | 2040 | 35 | Calcisiltite - as above. |
| 58 | 2010 | 25 | Calcisiltite - as above. |
| 59 | 1980 | 20 | Calcisiltite - as above. |
| 60 | 1950 | 25 | Calcisiltite - as above. |
| 61 | 1920 | 25 | Calcisiltite - few quartz grains, some clay and calcareous matrix, trace pyrite, carbonaceous material, light grey brown. |
| 62 | 1890 | 25 | Calcisiltite - as above. |
| 63 | 1860 | 25 | Calcisiltite - as above. |
| 64 | 1830 | 25 | Calcisiltite - as above. |
| 65 | 1800 | 30 | Calcisiltite - as above. |
| 66 | 1770 | 30 | Calcisiltite - as above. |
| 67 | 1740 | 30 | Calcisiltite - as above. |
| 68 | 1710 | 30 | Calcisiltite - as above. |
| 69 | 1650 | 25 | Calcisiltite - as above, very soft, friable. |
| 70 | | | NO RECOVERY AT 1590m. |
| 71 | 1530 | 20 | Calcisiltite - as above. |
| 72 | | | NO RECOVERY |
| 73 | 1410 | 30 | Calcisiltite - as above. |
| 74 | 1350 | 25 | Calcisiltite - as above. |
| 75 | 1290 | 20 | Calcisiltite - as above. |
| 76 | 2130 | 20 | Calcisiltite - as above. |
| 77 | 1179 | 20 | Calcisiltite - as above. |
| 78 | 1110 | 20 | Calcisiltite - as above. |

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# SIDEWALL CORE DESCRIPTIONS

## FORTESCUE-4

| SWC NO. | DEPTH (m) | RECOVERED (mm) | DESCRIPTION |
|---|---|---|---|
| 79 | 1050 | 15 | Calcisiltite - as above. |
| 80 | 990 | 10 | Calcisiltite - as above. |
| 81 | 930 | 10 | Calcisiltite - as above. |

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DATE 11/4/79
SWC RUN NO 1
IES RUN NO 2

**ESSO AUSTRALIA LTD.**
SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-4
GEOLOGIST G.M.Kjellgren, V. Ziolkowski, P. Elze
SERVICE CO Schlumberger

| NO. | DEPTH | REC | ROCK TYPE | MODIFIERS | CAL | COLOR | INDUR DEG | GRAIN SIZE | SRTG | RND | DISS CLAY | STAIN | FLOURESCENCE | | | | CUT FLUOR. | | CUT RESIDUE | | SHOW | PROB PROD | REMARKS - GAS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | % | DISTR | INTEN | COLOR | INTEN | COLOR | QUAN | COLOR | | | |
| 1a | 1 m | 2mm | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | RK | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1 | 2598 | 20 | Silt- | Pyrite | sl. | dark | firm | silt | | | | | | | | | | | | | | | |
| | | | stone | mica | | grey brown | | | | | | | | | | | | | | | | | |
| 2 | 2593 | 20 | Silt- | Pyrite | - | dark | firm | silt | | | | | | | | | | | | | | | |
| | | | stone | mica | | grey brown | | | | | | | | | | | | | | | | | |
| 3 | 2585.5 | 20 | Sand- | Pyrite | sl. | light | fri- | very | poor | sa | 20% | | | | | | | | | | | | |
| | | | stone | mica | | grey | able | fine to | | | | | | | | | | | | | | | |
| | | | | | | | | fine | | | | | | | | | | | | | | | |
| 4 | 2581 | 20 | Sand- | Pyrite | - | light | fri- | fine | med- | a- | | | | | | | | | | | | | |
| | | | stone | | | grey | able | | ium | sa | | | | | | | | | | | | | |
| | | | Silt- | Mica | | dark | firm | silt | | | 25% | | | | | | | | | | | | |
| | | | stone | | | brown | | | | | | | | | | | | | | | | | |
| 5 | 2573.5 | 30 | Shale | Pyrite | - | dark | soft | | | | | | | | | | | | | | | | |
| | | | | Carbonac- | | grey brown | | | | | | | | | | | | | | | | | |
| | | | | eous | | | | | | | | | | | | | | | | | | | |
| 6 | 2568 | 35 | Shale | Pyrite | - | dark | soft | | | | | | | | | | | | | | | | |
| | | | | Carbonac- | | grey brown | | | | | | | | | | | | | | | | | |
| | | | | eous | | | | | | | | | | | | | | | | | | | |
| 7 | 2559.5 | 15 | Silt- | Pyrite | sl. | dark | firm | | | | 25% | | | | | | | | | | | | |
| | | | stone | Mica | | grey | | | | | | | | | | | | | | | | | |
| 8 | 2554.3 | 25 | Shale | Pyrite | - | dark | soft | | | | | | | | | | | | | | | | |
| | | | | Carbonac- | | | | | | | | | | | | | | | | | | | |
| | | | | eous | | grey | | | | | | | | | | | | | | | | | |
| 9 | | - | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | |
| 10 | 2544.2 | 25 | Sand- | Pyrite | - | medium | fri- | very | poor | a- | 20% | | | | | | | | | | | | |
| | | | stone | | | grey | able | fine to | | sa | | | | | | | | | | | | | |
| | | | | | | | | fine | | | | | | | | | | | | | | | |
| 11 | 2531.5 | 40 | Shale | Pyrite Mica | - | very | soft | | | | | | | | | | | | | | | | |
| | | | | Carbonac- | | dark | to | | | | | | | | | | | | | | | | |
| | | | | eous | | brown | firm | | | | | | | | | | | | | | | | |
| 12 | 2525.6 | 25 | Shale | Pyrite Mica | - | very | soft | | | | | | | | | | | | | | | | |
| | | | | Carbonac- | | dark | to | | | | | | | | | | | | | | | | |
| | | | | eous | | brown | firm | | | | | | | | | | | | | | | | |

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DATE 11/4/79

SWC RUN NO 1

IES RUN NO 2

**ESSO AUSTRALIA LTD.**

SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-4

GEOLOGIST G.M.Kjellgren, V. Ziolkowski, P. Elze

SERVICE CO Schlumberger

| NO. | DEPTH | REC | ROCK TYPE | MODIFIERS | CAL | COLOR | INDUR DEG | GRAIN SIZE | SRTG | RND | DISS CLAY | STAIN | FLOURESCENCE % | FLOURESCENCE DISTR | FLOURESCENCE INTEN | FLOURESCENCE COLOR | CUT FLUOR. INTEN | CUT FLUOR. COLOR | CUT RESIDUE QUAN | CUT RESIDUE COLOR | SHOW | PROB PROD | REMARKS - GAS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1a | 1 m | 2 mm | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | RK | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 13 | 2520 | 20 | Silt- | Pyrite | sl. | light | soft | | | | | | | | | | | | | | | | |
| | | | stone | Mica | | to medium | | | | | | | | | | | | | | | | | |
| | | | | | | grey | | | | | | | | | | | | | | | | | |
| 14 | 2512 | 20 | Sand- | Pyrite | - | light | fri- | very | poor | sa- | | | | | | | | | | | | | |
| | | | stone | Mica | | grey | able | fine to | | sr | | | | | | | | | | | | | |
| | | | | | | | | very coarse | | | | | | | | | | | | | | | |
| 15 | 2501 | 25 | Sand- | Mica | - | light | fri- | fine | poor | sr- | | | | | | | | | | | | | |
| | | | stone | Pyrite | | grey | able | to medium | to moder- | r | | | | | | | | | | | | | |
| | | | | | | | | | ate | | | | | | | | | | | | | | |
| 16 | 2494.8 | 35 | Sand- | Mica | - | light | fri- | fine | mod- | sa- | | | | | | | | | | | | | |
| | | | stone | Pyrite | | grey | able | to medium | er- ate | sr | | | | | | | | | | | | | |
| | | | Silt- | | sl. | dark | firm | silt | | | 30% | | | | | | | | | | | | |
| | | | stone | | | brown | | | | | | | | | | | | | | | | | |
| 17 | 2492.5 | 30 | Sand- | Carbonaceous | sl. | medium | fri- | very | poor | sr- | 20% | | | | | | | | | | | | |
| | | | stone | Pyrite | | brown | able | fine to | | r | | | | | | | | | | | | | |
| | | | | | | | | fine | | | | | | | | | | | | | | | |
| 18 | 2489.5 | 20 | Silt- | Carbonaceous | sl. | medium | soft | - | - | - | - | - | <5 | spotty | dull | yellow | miner- | | | | no show | | |
| | | | stone | mica, pyrite | | grey | | | | | | | | | | | al | | | | | | |
| 19 | 2486 | 25 | Sand- | Mica | sl | light | fri- | fine | poor | sr- | | | | | | | | | | | | | |
| | | | stone | Pyrite | | grey | able | to medium | | r | | | | | | | | | | | | | |
| 20 | 2481 | 15 | Sand- | Mica | sl. | light | fri- | fine | poor | sr | | | | | | | | | | | | | |
| | | | stone | Pyrite | | grey | able | to medium | | | | | | | | | | | | | | | |
| | | | Silt- | Mica | sl. | dark | soft | | | | | | | | | | | | | | | | |
| | | | stone | | | brown | | | | | | | | | | | | | | | | | |
| 21 | 2478.7 | 30 | Sand- | Mica | sl. | light | fri- | very | medium | sr- | | | | | | | | | | | | | |
| | | | stone | Pyrite | | grey | able | fine | | r | | | | | | | | | | | | | |
| | | | Silt- | Mica | sl. | dark | firm | | | | | | | | | | | | | | | | |
| | | | stone | Pyrite | | grey | | | | | | | | | | | | | | | | | |

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IES RUN NO 1 SWC RUN NO

IES RUN NO 2

**ESSO AUSTRALIA LTD.**

SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-4

GEOLOGIST G.M.Kjellgren, V. Ziolkowski, P. Elze

SERVICE CO Schlumberger

| NO. | DEPTH | REC | ROCK TYPE | MODIFIERS | CAL | COLOR | INDUR DEG | GRAIN SIZE | SRTG | RND | DISS CLAY | STAIN | FLOURESCENCE % | FLOURESCENCE DISTR | FLOURESCENCE INTEN | FLOURESCENCE COLOR | CUT FLUOR. INTEN | CUT FLUOR. COLOR | CUT RESIDUE QUAN | CUT RESIDUE COLOR | SHOW | PROB PROD | REMARKS - GAS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1a | 1 m | 2 mm | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | RK | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 22 | 2474 | 15 | Silt- | Mica | - | dark | fri- | silt | | | | | | | | | | | | | | | |
| | | | stone | Carbonaceous | | grey | able | | | | | | | | | | | | | | | | |
| 23 | 2470 | 25 | Silt- | Mica | - | dark | fri- | silt | | | | | | | | | | | | | | | |
| | | | stone | Carbonaceous | | grey | able | | | | | | | | | | | | | | | | |
| 24 | 2465.5 | 20 | Silt- | Mica | - | very | firm | silt | | | | | | | | | | | | | | | |
| | | | stone | Carbonaceous Pyrite | | dark grey | | | | | | | | | | | | | | | | | |
| 31 | 2451.5 | 10 | Sand- | Mica Pyrite | - | medium | fri- | very fine | poor | a- | - | brown | <5 | spotty | dull | yellow | dull | blue | medium | light | oil | | Faint petroliferous odour. |
| | | | stone | | | grey | able | to medium | | sr | | | | | | to white | | to white | | brown | | | |
| 25 | 2448.5 | 30 | Sand- | Mica Pyrite | - | light | fri- | fine | poor | a- | - | - | <5 | spotty | bright | blue | dull | yellow | medium | yellow | oil | | Petroliferous odour |
| | | | stone | | | grey | able | to medium | | sr | | | | | | to white | | to white | | to brown | | | |
| 32 | 2446 | 25 | Sand- | Mica Pyrite | - | medium | fri- | very fine | poor | a- | - | brown | <5 | spotty | dull | blue | dull | yellow | medium | light | oil | | Faint petroliferous odour. |
| | | | stone | | | grey | able | to medium | | sr | | | | | | to white | | to white | | brown | | | |
| 26 | 2445 | 25 | Gran- ule | Pyrite | - | medium | very | medium | poor | sr- | .. | - | <5 | spotty | faint | yellow | - | - | - | - | - | | Flushed? |
| | | | to Con- | | | grey | fri- able | to gran- | | r | 10 | | | | | to white | | | | | | | |
| | | | glomerate | | | | | ule | | | | | | | | | | | | | | | |
| 33 | 2444 | 5 | Gran- ule to | Pyrite Mica | sl. | medium | fri- | medium | poor | sa- | - | dark | <5 | spotty | faint | blue | dull | milky | medium | pale | oil | | |
| | | | Con- glomerate | | | grey | able | to granule | | r | | brown | | | | to white | | | | brown | | | |
| 27 | 2443 | 15 | Gran- ule to | Pyrite Mica | sl | medium | fri- | medium | poor | sa- | - | dark | <5 | spotty | faint | blue | - | - | - | - | - | | |
| | | | Con- glomerate | | | grey | able | to granule | | r | | brown | | | | to white | | | | | | | |
| 28 | 2438.5 | 20 | Sand- | Pyrite Mica | - | medium | fri- | fine | weak | sa | - | brown | 5 | spotty | dull | blue | faint | pale | medium | pale | oil | | |
| | | | stone | | | grey | able | | | | | | | | | to white | | yellow | | brown | | | |
| 29 | 2424 | 20 | Sand- | Pyrite Mica | - | medium | fri- | fine | weak | sa | - | - | - | - | - | - | - | - | - | - | - | | |
| | | | stone | | | grey | able | | | | | | | | | | | | | | | | |
| 30 | 2422 | 20 | Sand- | Pyrite Mica | - | medium | fri- | very fine | poor | a- | - | brown | <5 | spotty | faint | yellow | faint | milky | medium | very | oil | | |
| | | | stone | | | grey | able | to medium | | sr | | | | | | to white | | | | pale brown | | | |
| 34 | 2420 | 30 | Silt- | Mica Pyrite | sl. | dark | fri- | silt | - | - | 25 | | | | | | | | | | | | |
| | | | stone | carbonaceous | | grey brown | able | | | | | | | | | | | | | | | | |

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GEOLOGIST G.M.Kjellgren, V. Ziolkowski, P.Elze ATT 81 REC 78

SERVICE CO Schlumberger DATE 11/4/79

IES RUN NO 2 SWC RUN NO 1

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

| NO. | DEPTH | REC | ROCK TYPE | MODIFIERS | CAL | COLOR | INDUR DEG | GRAIN SIZE | SRTG | RND | DISS CLAY | STAIN | FLOURESCENCE % RK | FLOURESCENCE DISTR | FLOURESCENCE INTEN | FLOURESCENCE COLOR | CUT FLUOR. INTEN | CUT FLUOR. COLOR | CUT RESIDUE QUAN | CUT RESIDUE COLOR | SHOW | PROB PROD | REMARKS - GAS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1a | 1 m | 2 mm | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 35 | 2418 | 30 | Sand-stone | Mica Pyrite Carbonaceous | sl | medium grey | fri-able | very fine to medium | poor | sa-sr | - | | | | | | | | | | | | |
| 36 | 2416 | 15 | Sand-stone | As above. | | | | | | | | | | | | | | | | | | | |
| 37 | 2414 | 30 | Silt-stone | Pyrite Mica Carbonaceous | Mod | light grey | fri-able | silt | - | - | 20 | | | | | | | | | | | | |
| 38 | 2412 | 35 | Silt-stone | Mica Pyrite Carbonaceous | Mod | grey to brown | firm | silt | - | - | | | | | | | | | | | | | |
| 39 | 2410 | 35 | Silt-stone | As above | | | | | | | | | | | | | | | | | | | |
| 40 | 2408.1 | 35 | Mud-stone | Mica Pyrite | very | green grey | firm | - | - | - | 50 | | | | | | | | | | | | |
| 41 | 2406 | 35 | Mud-stone | Mica Pyrite Silty | very | medium grey | firm | - | - | - | 60 | | | | | | | | | | | | |
| 42 | 2388 | 35 | Mud-stone | Mica Pyrite Silty | very | medium grey | firm | - | - | - | 60 | | | | | | | | | | | | |
| 43 | 2386 | 40 | Mud-stone | pryite mica micritic fos-siliferous carbonaceous | very | medium grey | firm | very fine to silt-stone | - | - | 50 | | | | | | | | | | | | |
| 44 | 2385 | 40 | Mud-stone | | very | medium grey | firm | very fine to silt-stone | - | - | 40 | | | | | | | | | | | | |
| 45 | 2383 | 35 | Mud-stone | | very | medium grey | firm | very fine to siltstone | - | - | 40 | | | | | | | | | | | | |

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DATE 11/4/79

IES RUN NO 2 SWC RUN NO 1

**ESSO AUSTRALIA LTD.**

SIDEWALL CORE DESCRIPTIONS

WELL FORTESCUE-4

GEOLOGIST G.M. Kjellgren, V. Ziolkowski, P. Elze

SERVICE CO Schlumberger

| NO. 1a | DEPTH 1 m | REC 2mm | ROCK TYPE 3 | MODIFIERS 4 | CAL 5 | COLOR 6 | INDUR DEG 7 | GRAIN SIZE 8 | SRTG 9 | RND 10 | DISS CLAY 11 | STAIN 12 | FLOURESCENCE % RK | FLOURESCENCE DISTR 14 | FLOURESCENCE INTEN 15 | FLOURESCENCE COLOR 16 | CUT FLUOR. INTEN 17 | CUT FLUOR. COLOR 18 | CUT RESIDUE QUAN 19 | CUT RESIDUE COLOR 20 | SHOW 21 | PROB PROD 22 | REMARKS - GAS 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | 2381 | 20 | Mud-stone | | very | medium grey | firm | very fine to siltstone | - | - | 40 | | | | | | | | | | | | |
| 47 | 2341 | 20 | Mud-stone | | very | medium grey | firm | very fine to siltstone | - | - | 40 | | | | | | | | | | | | |
| 48 | 2312 | 25 | Mud-stone | | very | Medium grey | firm | very fine to siltstone | - | - | 30 | | | | | | | | | | | | |
| 49 | 2281.5 | 30 | Mud-stone | | very | medium grey | firm | very fine to siltstone | - | - | 30 | | | | | | | | | | | | |
| 50 | 2249.1 | 25 | Mud-stone | | very | medium grey | firm | very fine to siltstone | - | - | 30 | | | | | | | | | | | | |
| 51 | 2220 | 35 | Lime-stone | | very | light grey brown | firm | silt-stone | - | - | 20 | | | | | | | | | | | | |
| 52 | 2190 | 35 | Lime-stone | | very | light grey brown | firm | silt-stone | | | | | | | | | | | | | | | |
| 53 | 2160 | 40 | Lime-stone | | very | light grey brown | firm | silt-stone | | | | | | | | | | | | | | | |
| 54 | 2130 | 30 | Lime-stone | | very | light grey brown | firm | silt-stone | | | | | | | | | | | | | | | |
| 55 | 2100 | 25 | Lime-stone | | very | light grey brown | firm | silt-stone | | | | | | | | | | | | | | | |

FORM R 257 3.72

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DATE 11/4/79

SWC RUN NO 1

IES RUN NO 2

SERVICE CO SCHLUMBERGER

GEOLOGIST G.M. Kjellgren V. Ziolkowski P. Elze

WELL FORTESCUE-4

**ESSO AUSTRALIA LTD.**

SIDEWALL CORE DESCRIPTIONS

| NO. | DEPTH | REC | ROCK TYPE | MODIFIERS | CAL | COLOR | INDUR DEG | GRAIN SIZE | SRTG | RND | DISS CLAY | STAIN | FLOURESCENCE % RK | FLOURESCENCE DISTR | FLOURESCENCE INTEN | FLOURESCENCE COLOR | CUT FLUOR. INTEN | CUT FLUOR. COLOR | CUT RESIDUE QUAN | CUT RESIDUE COLOR | SHOW | PROB PROD | REMARKS - GAS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1a | 1 m | 2mm | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 56 | 2070 | 25 | Lime-stone | | Very light grey | | firm | silt-stone | | | | | | | | | | | | | | | |
| 57 | 2040 | 35 | Lime-stone | Argillaceo-us | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |
| 58 | 2010 | 25 | Lime-stone | argillace-ous | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |
| 59 | 1980 | 20 | Lime-stone | argillace-ous | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |
| 60 | 1950 | 25 | Lime-stone | argillace-ous | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |
| 61 | 1920 | 25 | Lime-stone | argillace-ous | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |
| 62 | 1890 | 25 | Lime-stone | argillace-ous | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |
| 63 | 1860 | 25 | Lime-stone | argillace-ous | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |
| 64 | 1830 | 25 | Lime-stone | argillace-ous | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |
| 65 | 1800 | 30 | Lime-stone | argillace-ous | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |
| 66 | 1770 | 30 | Lime stone | argillace-ous | very light grey brown | | firm | silt-stone | | | | | | | | | | | | | | | |

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**ESSO AUSTRALIA LTD.**

SIDEWALL CORE DESCRIPTIONS

IES RUN NO 2 SWC RUN NO 1

WELL FORTESCUE-4

GEOLOGIST C.M. Kiellgren V. Ziolskowski, P Elze

SERVICE CO Schlumberger

| NO. | DEPTH | REC | ROCK TYPE | MODIFIERS | CAL | COLOR | INDUR DEG | GRAIN SIZE | SRTG | RND | DISS CLAY | STAIN | FLOURESCENCE % | FLOURESCENCE DISTR | FLOURESCENCE INTEN | FLOURESCENCE COLOR | CUT FLUOR. INTEN | CUT FLUOR. COLOR | CUT RESIDUE QUAN | CUT RESIDUE COLOR | SHOW | PROB PROD | REMARKS - GAS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 a | 1 m | 2 mm | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | RK | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 67 | 1740 | 30 | Lime- | argillace- | very | light | firm | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | | stone | | | | | | | | | | | | | | | |
| 68 | 1710 | 30 | Lime- | argillace- | very | light | firm | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | | stone | | | | | | | | | | | | | | | |
| 69 | 1650 | 25 | Lime- | argillace- | very | light | very | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | soft | stone | | | | | | | | | | | | | | | |
| 70 | | NO RECOVERY | | | | | | | | | | | | | | | | | | | | | |
| 71 | 1530 | 20 | Lime- | argillace- | very | light | very | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | soft | stone | | | | | | | | | | | | | | | |
| 72 | | NO RECOVERY | | | | | | | | | | | | | | | | | | | | | |
| 73 | 1410 | 30 | Lime- | argillace- | very | light | very | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | soft | stone | | | | | | | | | | | | | | | |
| 74 | 1360 | 25 | Lime- | argillace- | very | light | very | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | soft | stone | | | | | | | | | | | | | | | |
| 75 | 1290 | 20 | Lime- | argillace- | very | light | very | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | soft | stone | | | | | | | | | | | | | | | |
| 76 | 1230 | 20 | Lime- | argillace- | very | light | very | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | soft | stone | | | | | | | | | | | | | | | |
| 77 | 1170 | 20 | Lime- | argillace- | very | light | very | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | soft | stone | | | | | | | | | | | | | | | |
| 78 | 1110 | 20 | Lime- | argillace- | very | light | very | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | soft | stone | | | | | | | | | | | | | | | |
| 79 | 1050 | 15 | Lime- | argillace- | very | light | very | silt- | | | | | | | | | | | | | | | |
| | | | stone | ous | | grey brown | soft | stone | | | | | | | | | | | | | | | |

FORM R'257 3-72

WELL FORTESCUE-4

GEOLOGIST G.M. Kjellgren V. Ziolskowski, P Elze

SERVICE CO Schlumberger

**ESSO AUSTRALIA LTD.**
SIDEWALL CORE DESCRIPTIONS

IES RUN NO 2 SWC RUN NO 1



ATT 81 REC 78

DATE 11/4/79

FORM F 257 3-72

| NO. 1a | DEPTH 1 m | REC 2 mm | ROCK TYPE 3 | MODIFIERS 4 | CAL 5 | COLOR 6 | INDUR DEG 7 | GRAIN SIZE 8 | SRTG 9 | RND 10 | DISS CLAY 11 | STAIN 12 | FLOURESCENCE % RK | FLOURESCENCE DISTR 14 | FLOURESCENCE INTEN 15 | FLOURESCENCE COLOR 16 | CUT FLUOR. INTEN 17 | CUT FLUOR. COLOR 18 | CUT RESIDUE QUAN 19 | CUT RESIDUE COLOR 20 | SHOW 21 | PROB PROD 22 | REMARKS - GAS 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 990 | 10 | Lime-stone | argillace-ous | very | light grey brown | very soft | silt-stone | | | | | | | | | | | | | | | |
| 81 | 930 | 10 | Lime-stone | argillace-ous | very | light grey brown | very soft | silt-stone | | | | | | | | | | | | | | | |

# 3. CONVENTIONAL CORE DESCRIPTIONS

APPENDIX 3

CONVENTIONAL CORE DESCRIPTIONS

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



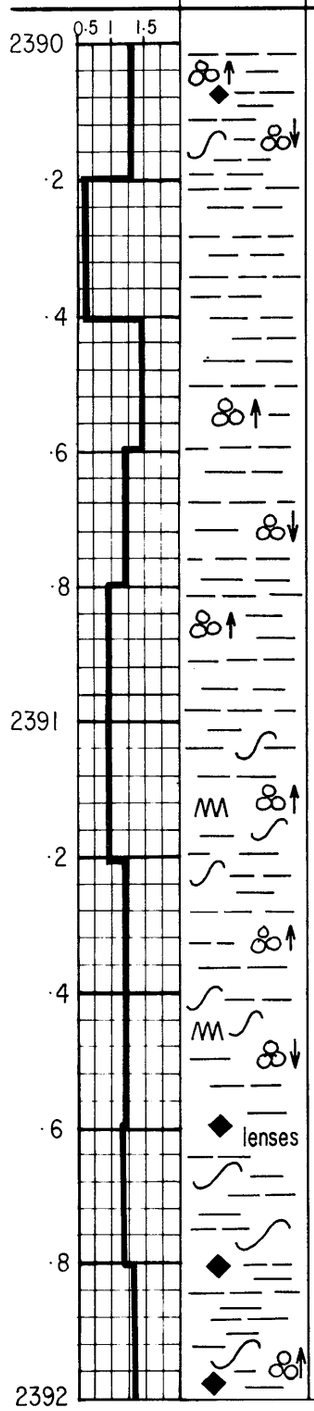
WELL FORTESCUE-4

SCALE 1:10

CORE No. 1

Interval Cored 2390-2402.4m Cut 12.4m Recovered 12.4m (100 %) Fm. Lakes Entrance

Bit Type C22 Bit Size 8.47" in., Desc by G.M.KJELLGREN J.D.ALDER Date 26/3/79




REMARKS

SHALE - Calcareous, silty claystone, medium grey to olive grey and mottled. Glauconitic, pyritic - occurring as aggregates and fine needles. Minor mica and carbonaceous flecks. Colour mottling due to subhorizontal micaceous lenses.

Shale is firm to hard and brittle with dominant subhorizontal cleavage. (Slabbing tends to shatter core.) Fossiliferous - mainly forams up to 2mm diameter. Pyrite, glauconite and fossils tend to be confined to individual horizons and found only in traces in other horizons.

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 2 of 7

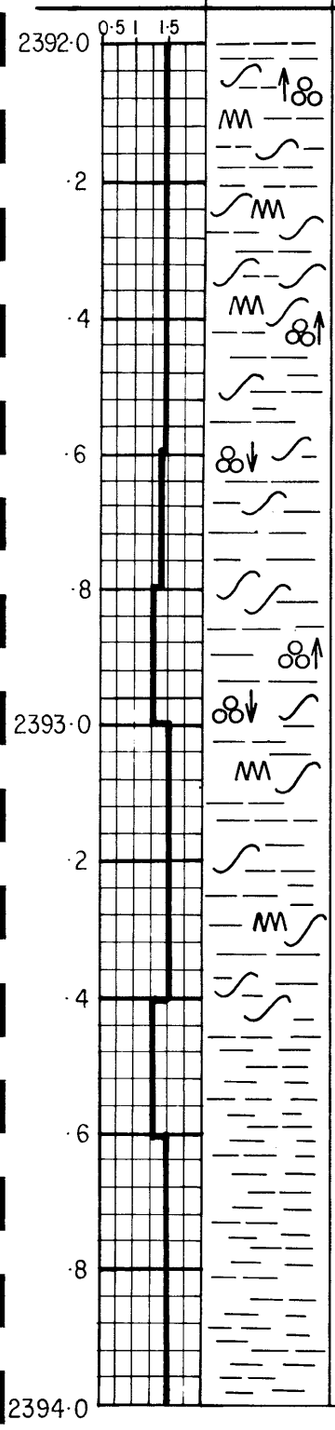
WELL FORTESCUE-4

SCALE 1:10

CORE No. 1

Interval Cored 2390-2402.4m Cut 12.4m Recovered 12.4m (100 %) Fm. Lakes Entrance

Bit Type C22 Bit Size 8.47" in., Desc by G.M.KJELLGREN J.D.ALDER Date 26/3/79




REMARKS

Shale grading Silty Shale glauconite common up to 2mm in diameter. Glauconite irregularly concentrated. Pyrite in aggregates and veins. Fossiliferous - mainly forams - irregularly concentrated.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



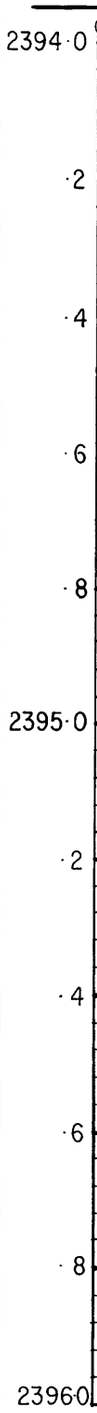
WELL FORTESCUE-4

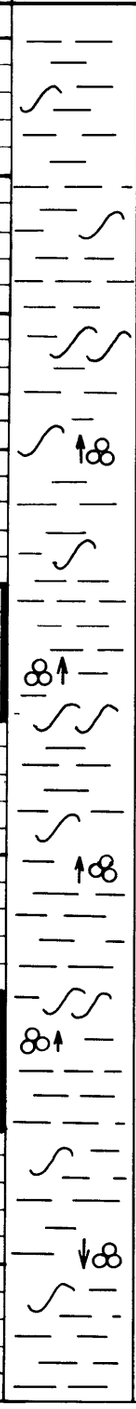
SCALE 1:10

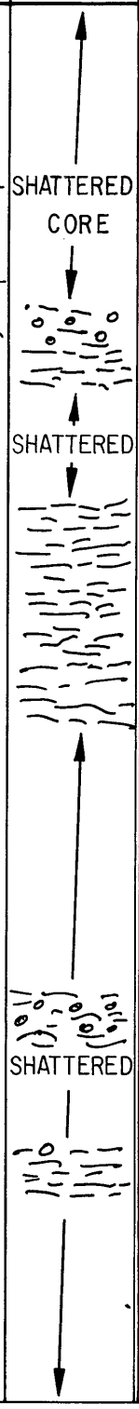
CORE No. 1

Interval Cored 2390-2402.4m Cut 12.4m Recovered 12.4m ( 100 %) Fm Lakes Entrance

Bit Type C22 Bit Size 8.47" in., Desc by G.M.KJELLGREN J.D.ALDER Date 26/3/79




ENVIRONMENT: SHALLOW MARINE

FACIES

TEXTURE: SILTY CLAYSTONE

TEXTURAL CHANGE

CONTACTS

COLOR: Mottled Lt.— med. OLIVE GREY - Lt.— med. green — where finely glauconitic.

OIL STN

CEMENT

POROSITY

REMARKS

GLAUCONITIC SHALE - calcareous, silty claystone, fissile, firm to hard, brittle, medium grey to olive green mottled. Glauconitic, pyritic, fossiliferous in fine discontinuous irregular laminae, minor amounts of mica and carbonaceous matter.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



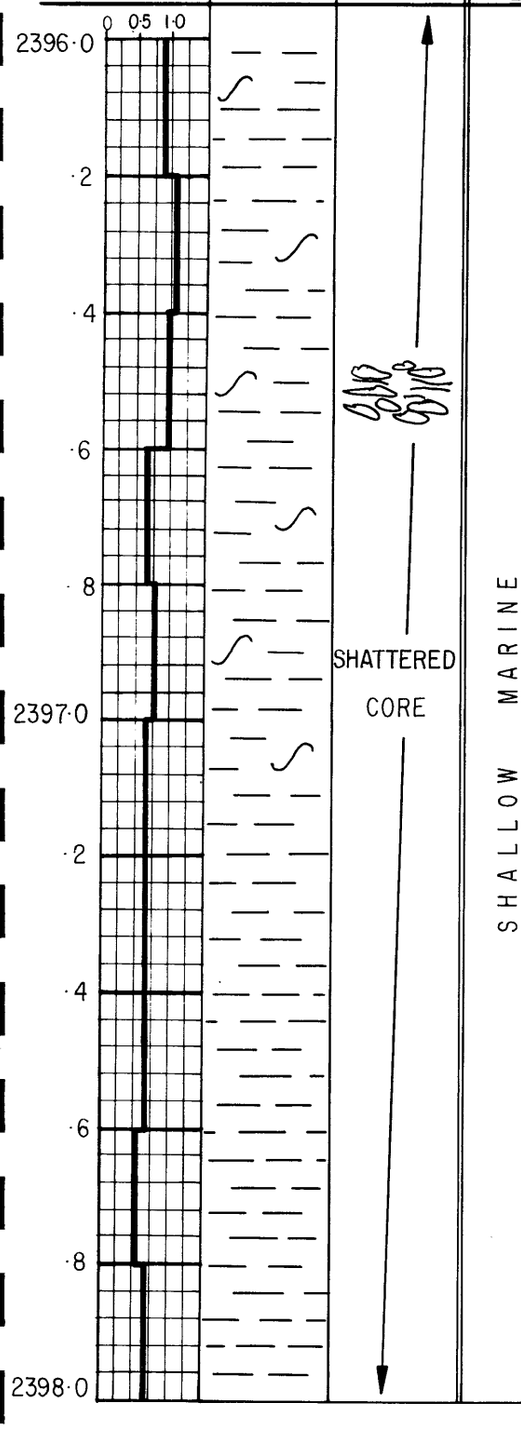
WELL FORTESCUE - 4

SCALE 1:10

CORE No. 1

Interval Cored 2390-2402.4m Cut 12.4m Recovered 12.4m ( 100 %) Fm. Lakes Entrance

Bit Type C22 Bit Size 8.47" in., Desc by G.M.Kjellgren J.D.Alder Date 26/3/79




Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



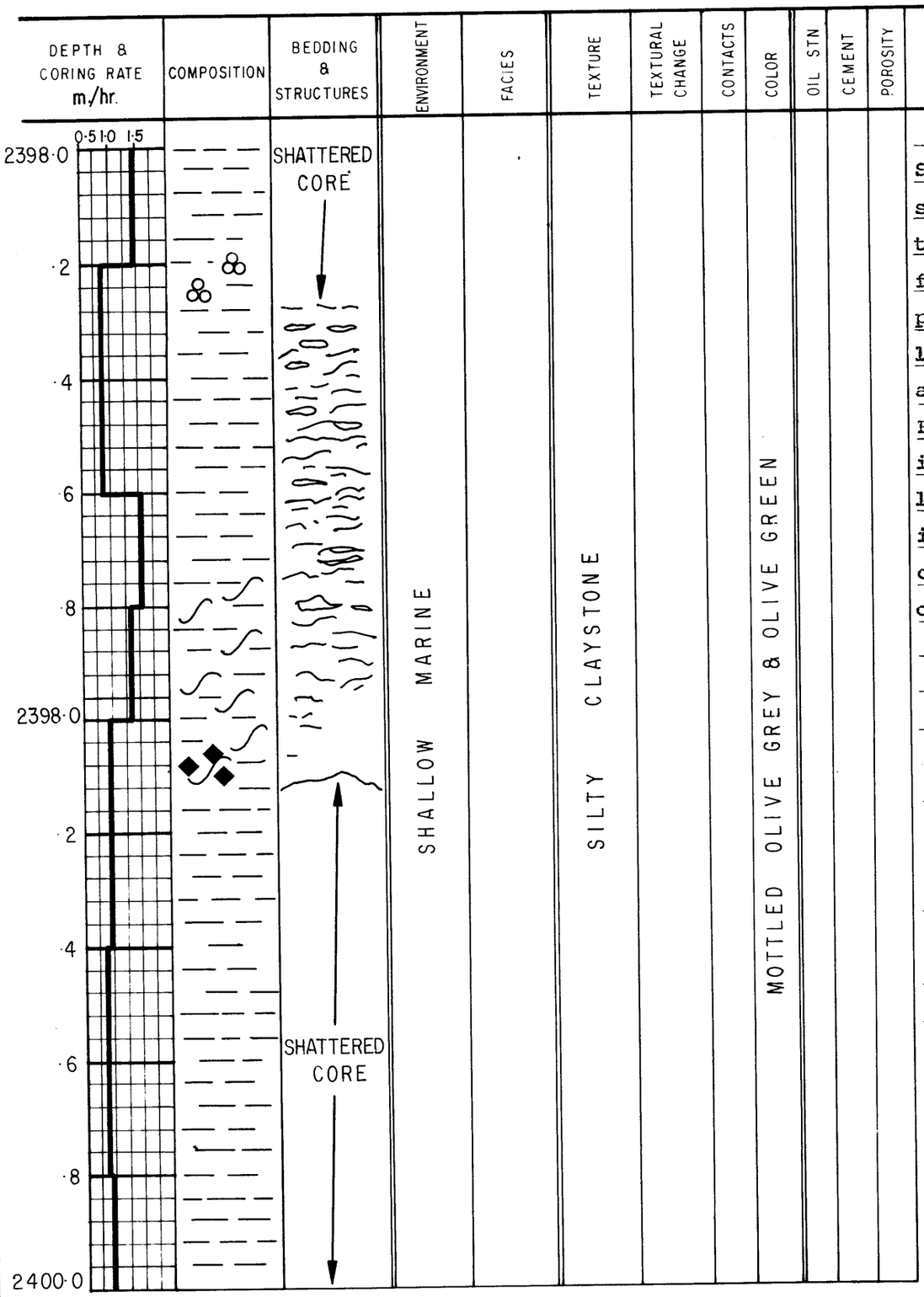
WELL FORTESCUE – 4

SCALE 1:10

CORE No. 1

Interval Cored 2390–2402.4m Cut 12.4m Recovered 12.4m ( 100 %) Fm. Lakes Entrance

Bit Type C22 Bit Size 8.47" in., Desc by G.M.KJELLGREN J.D.ALDER Date 26/3/79




REMARKS

SHALE – calcareous, silty claystone, firm to hard, brittle, fissile. Glauconitic, pyritic – pyrite as large nodular aggregates at 2399m. Fossiliferous. Beds tend to be irregular, discontinuous, lenses varying greatly in mineral and fossil content. Minor amounts of mica.

Dwg 1107/CP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 6 of 7

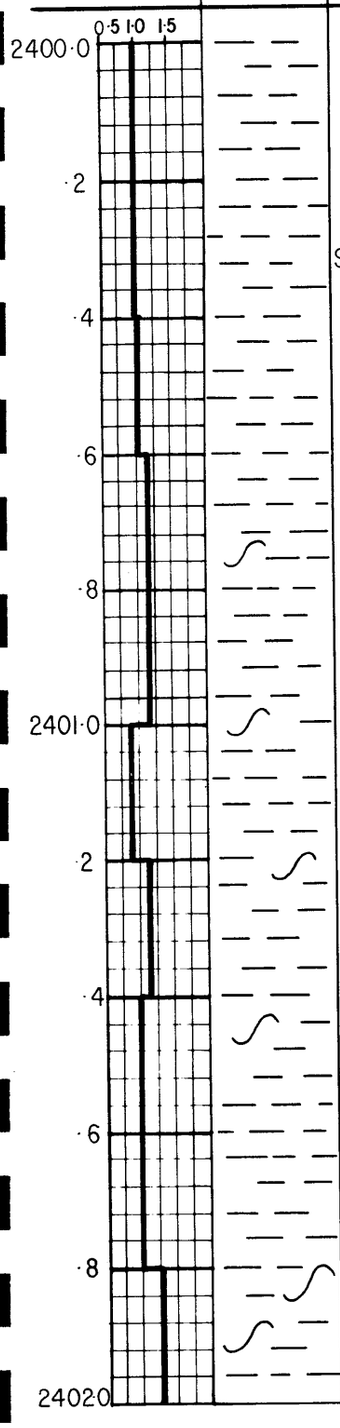
WELL FORTESCUE-4

SCALE 1:10

CORE No. 1

Interval Cored 2390-2402.4m Cut 12.4m Recovered 12.4m ( 100 %) Fm. Lakes Entrance

Bit Type C22 Bit Size 8.47" in., Desc by G.M.KJELLGREN J.D.ALDER Date 26/3/79




REMARKS

SHALE - calcareous, silty claystone, fissile, firm to hard, highly mottled, medium grey-olive to green-brown. Glauconitic, pyritic, fossiliferous, minor amounts of mica and carbonaceous flecks.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



WELL FORTESCUE-4

SCALE 1:10

CORE No. 1

Interval Cored 2390-2402.4m Cut 12.4m Recovered 12.4m ( 100 %) Fm. Lakes Entrance

Bit Type C22 Bit Size 8.47" in., Desc by J.D.ALDER G.M.KJELLGREN Date 26/3/79

| DEPTH & CORING RATE m./ hr. | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2402·0 0 ·2 ·4 | | SHATTERED CORE | SHALLOW MARINE | | | | | | | | | |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

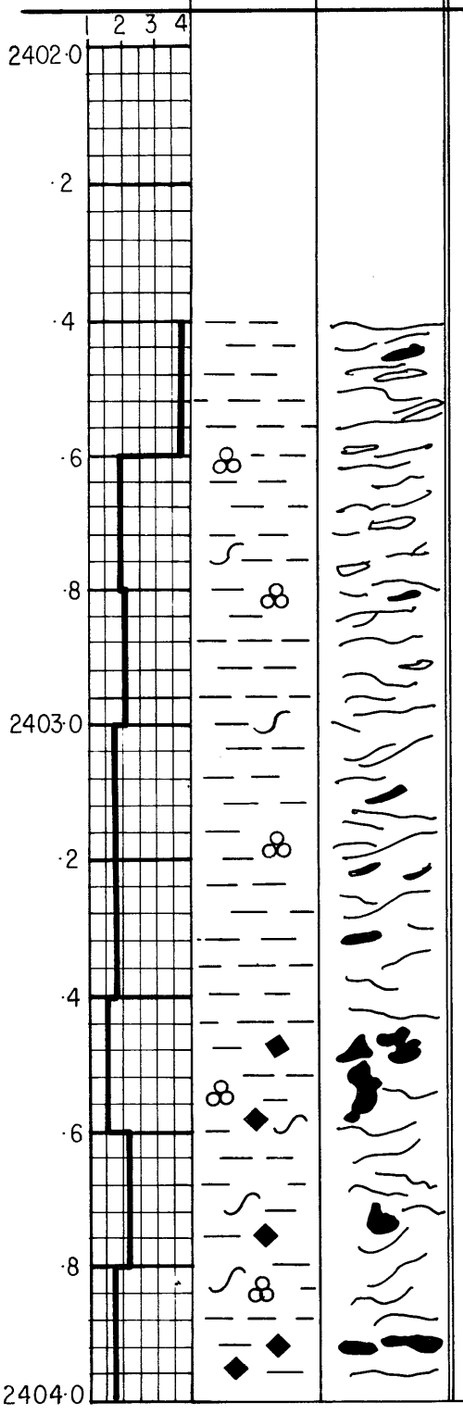
WELL FORTESCUE-4

SCALE 1:10

CORE No. 2

Interval Cored 2402.4-2411.4m Cut 9.0m Recovered 9.0m (100 %) Fm.

Bit Type C20 Bit Size 8.47" in., Desc by J.D.ALDER G.M.KJELLGREN Date 27/3/79




SHALE - mottled medium olive-grey to olive-brown. Common pyrite, minor carbonaceous matter, glauconite and mica. Shale is hard and brittle with dominant subhorizontal cleavage. Beds and laminae are irregular and lensoid. Pyrite nodules.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 2 of 5

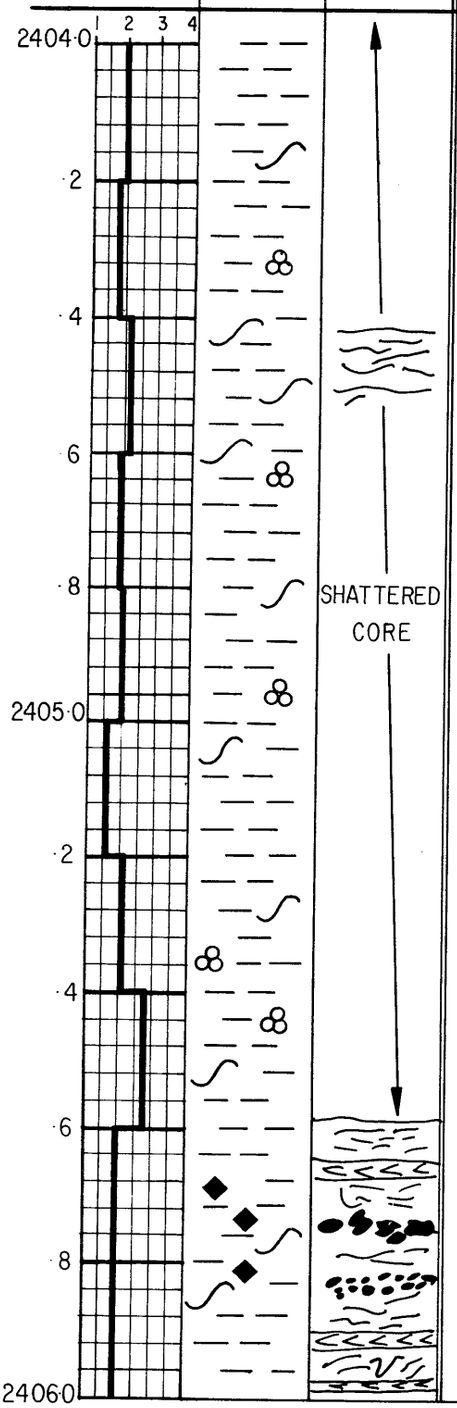
WELL FORTESCUE-4

SCALE 1:10

CORE No. 2

Interval Cored 2402.4-2411.4m Cut 9.0m Recovered 9.0m (100 %) Fm.

Bit Type C20 Bit Size 8.47" in., Desc by J.D.ALDER G.M.KJELLGREN Date 27-3-79




REMARKS

FORAMINIFERAL SHALE: Motted medium olive brown to olive green, common pyrite, minor carbonaceous matter, glauconitic and micaccous. Abundant foraminifera. Pyrite nodules along selected bedding planes. Some horizontal burrows.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



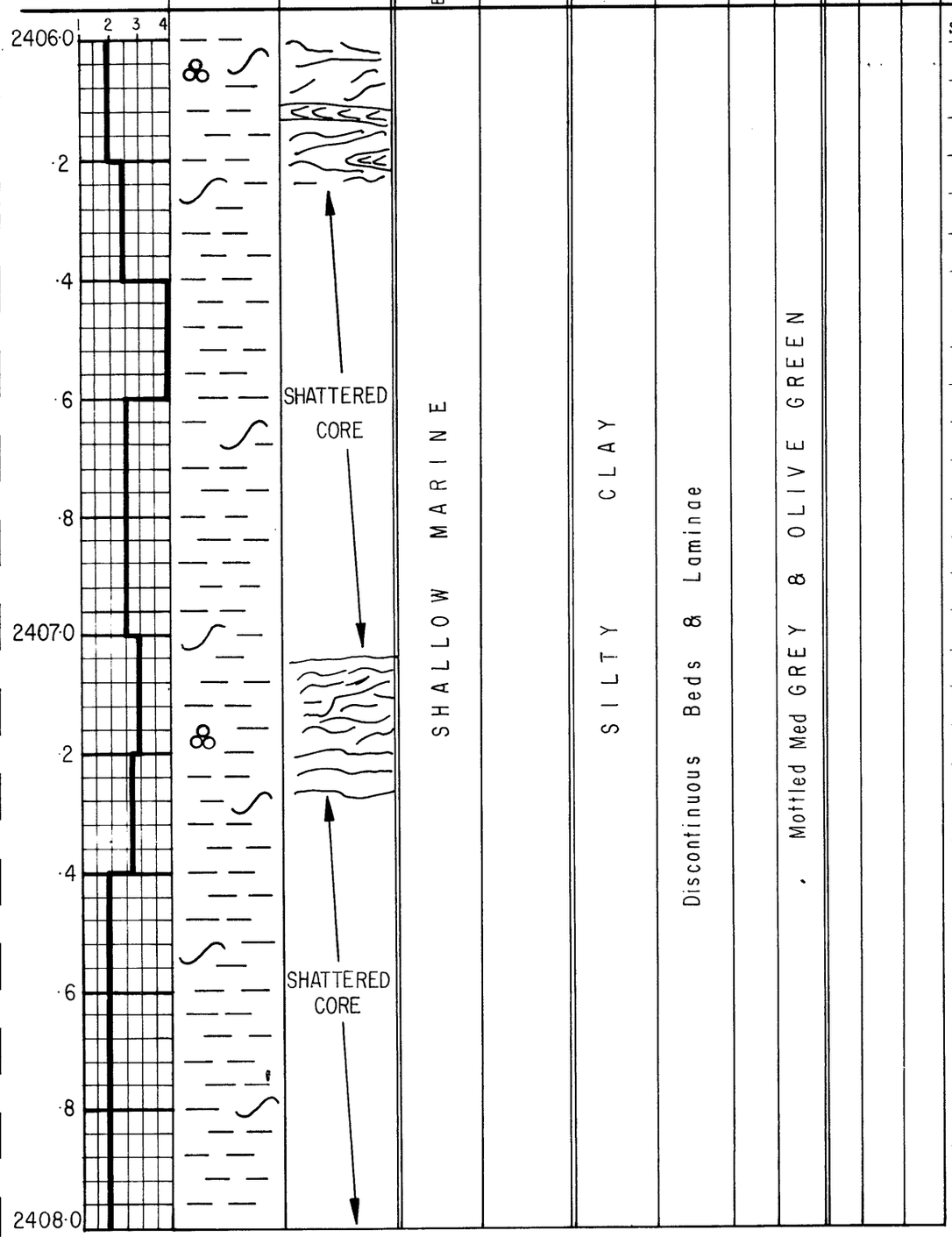
WELL FORTESCUE-4

SCALE 1:10

CORE No. 2

Interval Cored 2402.4-2411.4m Cut 9.0m Recovered 9.0m ( 100%) Fm.

Bit Type C20 Bit Size 8.47" in., Desc by J.D.ALDER G.M.KJELLGREN Date 27-3-79




Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



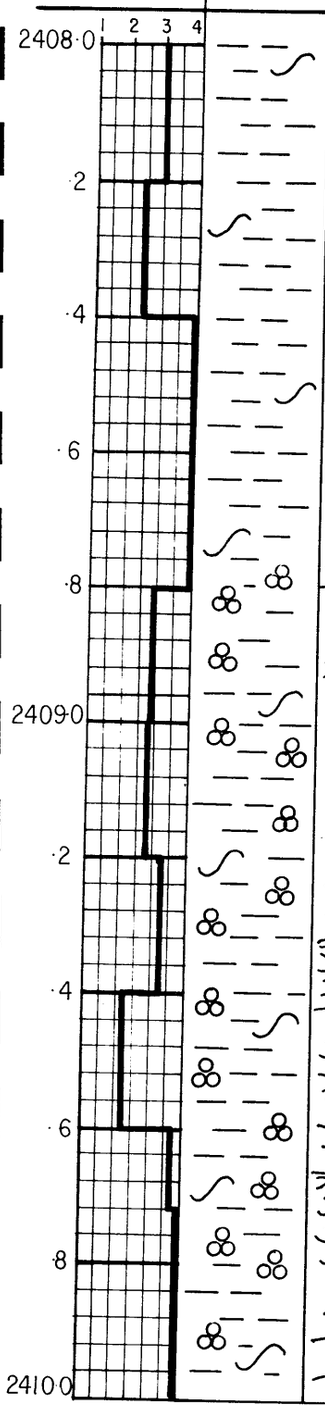
WELL FORTESCUE-4

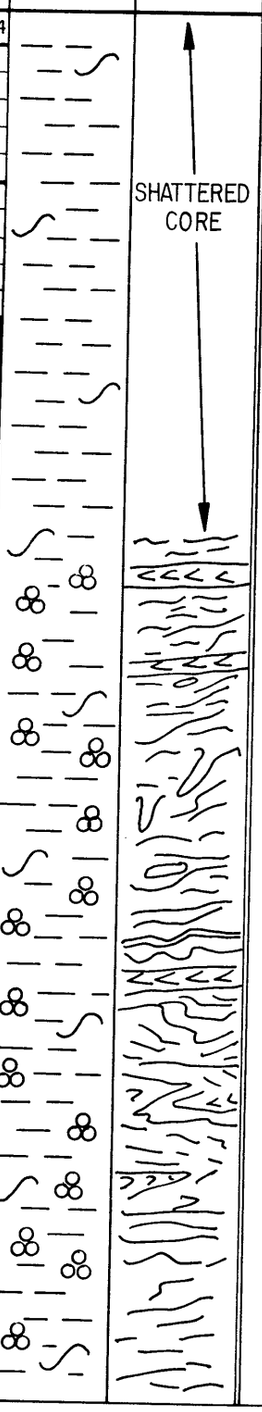
SCALE 1:10

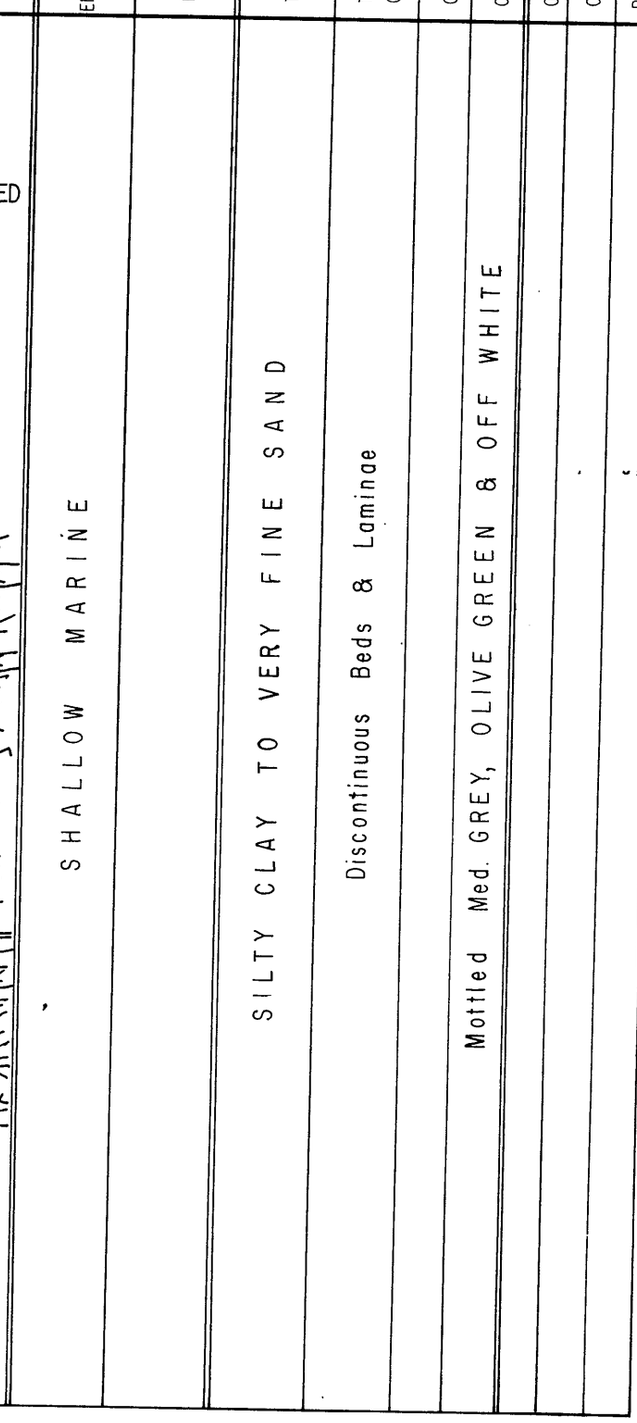
CORE No. 2

Interval Cored 2402.4-2411.4m Cut 9.0m Recovered 9.0m (100 %) Fm.

Bit Type C20 Bit Size 8.47" in., Desc by J.D. ALDER G.M.KJELLGREN Date 27.3.79




REMARKS

FORAMINIFERAL LIMESTONE White to cream, light grey, clayey, composed of up to 90% forams. Silt sized, usually recrystalised, occasionally replaced by glauconite and pyrite. Calcareous cement, pyrite, carbonaceous matter. Larger clasts up to 5mm comprising iron rich carbonate(?) Inter bedded with shale as above.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



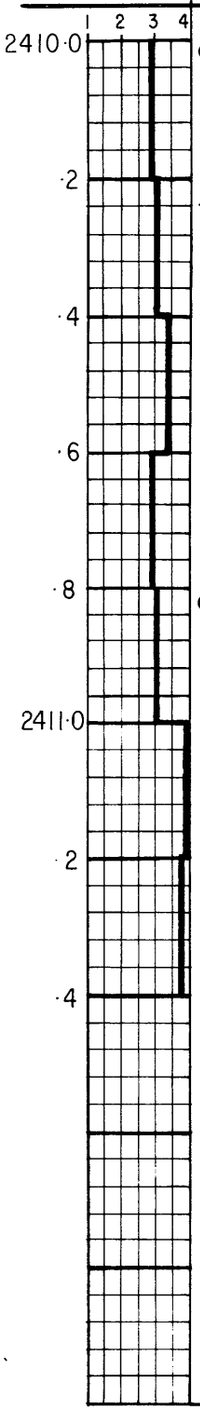
WELL FORTESCUE-4

SCALE 1:10

CORE No.

Interval Cored 2402.4-2411.4m Cut 9.0m Recovered 9.0m (100 %) Fm.

Bit Type C20 Bit Size 8.47" in., Desc by J.D. ALDER G.H.KJELLGREN Date 27.3.79




| COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SHATTERED CORE | SHALLOW MARINE | | SILTY CLAY to Very Fine SAND | Discontinuous Lenses & Laminae | | Mottled Med. GREY OLIVE GREEN & Off WHITE | | | | |
| | SHATTERED CORE | | | | | | | | | | |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

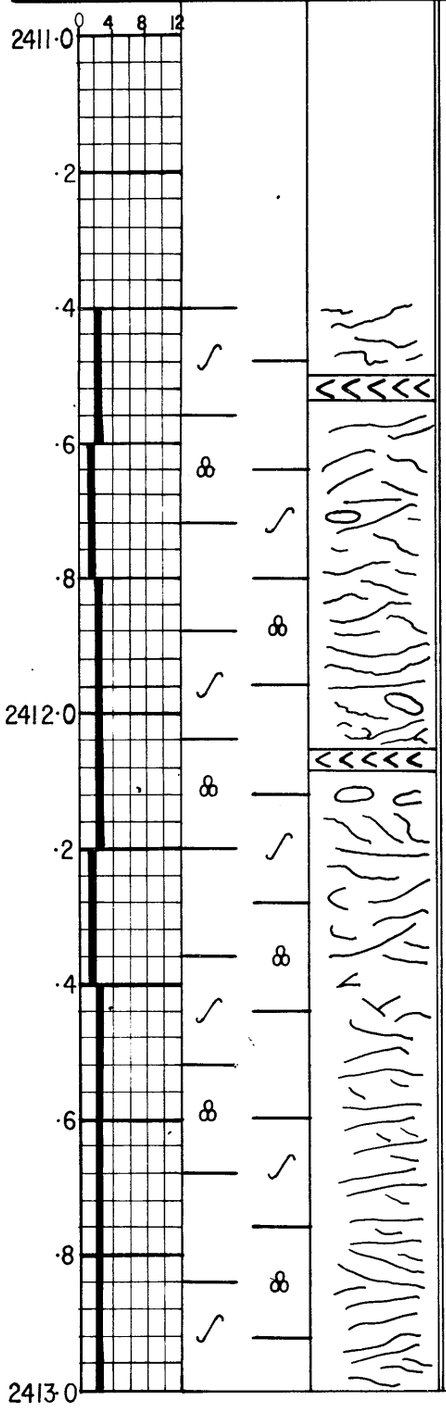
# CORE DESCRIPTION

WELL FORTESCUE - 4 SCALE 1:10

CORE No. 3

Interval Cored 2411.4-2425.2m Cut 13.6m Recovered 13.8m (100%) Fm. LAKES ENTRANCE & LATROBE GP

Bit Type C20 Bit Size 8.47" in., Desc by J.D. ALDER G.M. KJELLGREN Date 27-3-79




| DEPTH & CORING RATE | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MARINE | | CLAY | LAMINAE | | Olive Grn. & Mott'd med. grey | | | | GLAUCONITIC FORAMINIFERAL SHALE medium to dark grey, abundant silt sized forams often recrystal-ised and replaced by glauconite. Glauconite common up to 2mm. Common carbonaceous matter, minor pyrite. Hard with sub horizontal cleavage. |
| | | | SHALLOW | | SILTY | DISCONTINUOUS | | | | | | ARGILLACEOUS FORAMINIFERAL LIMESTONE Light medium grey, abundant forams up to 0.5mm interbedded with brown grey clay, glauconite abundant, trace pyrite, minor carbonaceous matter. Few dark brown micro structures. Bioturbated Horizontal Burrows common. |

NOTE: 3 SEAL PEEL SAMPLES TAKEN AND 5 NON-SEAL PEEL SAMPLES TAKEN AFTER SLABBING FOR CORE ANALYSIS.

ESSO AUSTRALIA LTD.

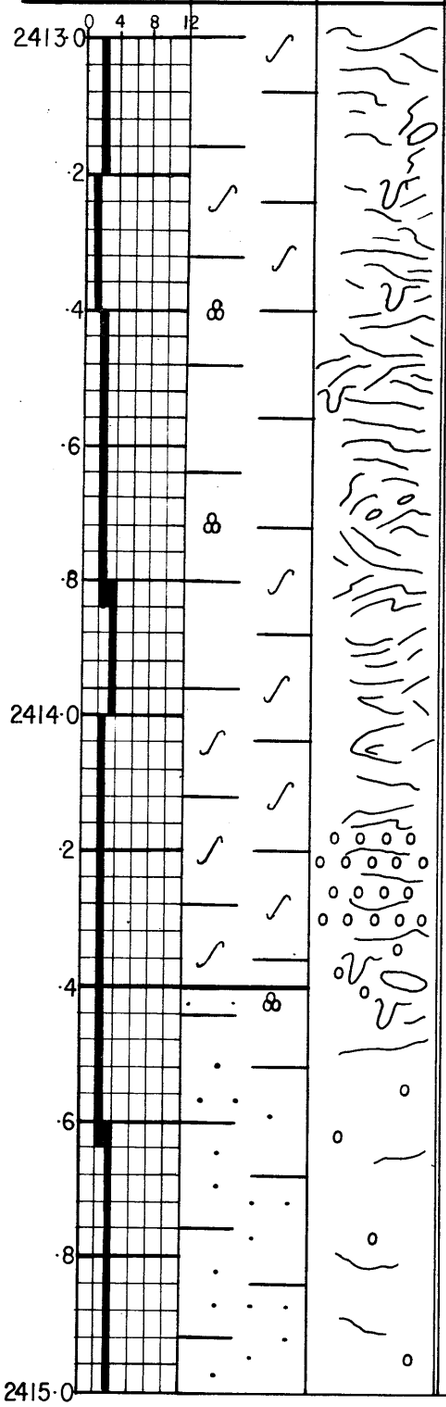
# CORE DESCRIPTION

WELL FORTESCUE-4 SCALE 1:10

CORE No. 3

Interval Cored 2411.4-2425.2m Cut 13.8m Recovered 13.8m (100 %) Fm LAKES ENTRANCE & LATROBE

Bit Type C20 Bit Size 8.47" in., Desc by J. D. ALDER G.M. KJELLGREN Date 27-3-79




| ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY |
|---|---|---|---|---|---|---|---|---|
| MARINE | | CLAY | LAMINAE | | Olive grn. & Mott'd med.-drk. gry. | | | |
| SHALLOW | | SILTY | DISCONTINUOUS | | Mott'd drk. gry. yell. brn. | | | |

GLAUCONITIC FORAMINIFERAL SHALE medium grey with abundant glauconite crystaline aggregates, abundant foraminifers, trace pyrite minor carbonaceous matter.

GLAUCONITIC LIMONITIC SHALE medium grey abundant glauconite, glauconitic has been oxidised to a gold yellow limonite, in part it has completely replaced the glauconite. Larger fossils have been completely replaced by both glauconite and limonite. Minor dark brown skeletal debris. Rare, medium grained clear quartz grains, minor carbonaceous matter.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

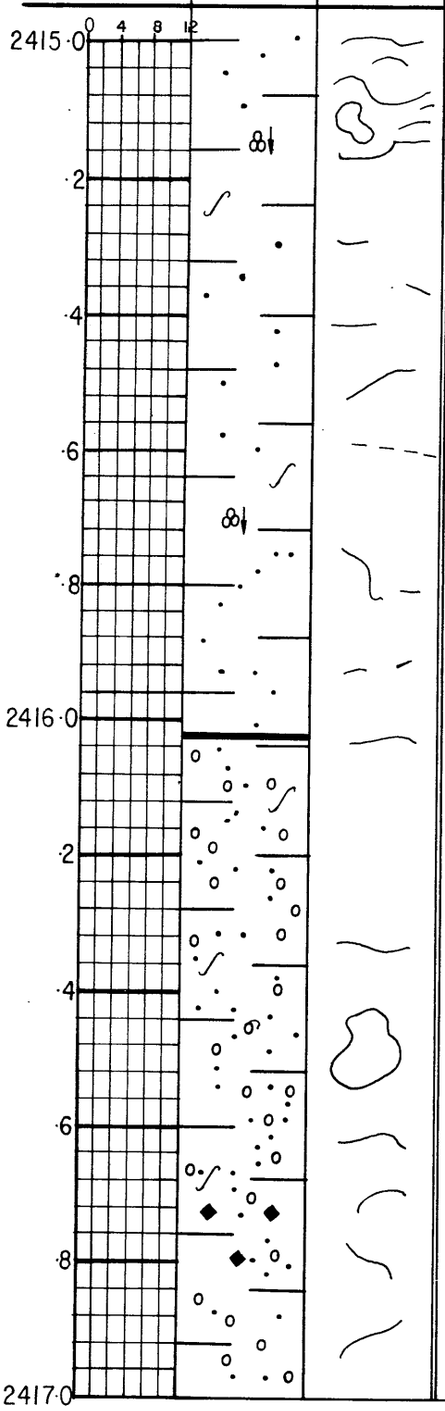
WELL FORTESCUE - 4

SCALE 1:10

CORE No. 3

Interval Cored 2411.4-2425.2m Cut 13.8m Recovered 13.8m ( 100%) Fm. LAKES ENTRANCE & LATROBE

Bit Type C20 Bit Size 8.47" in., Desc by J.D. ALDER G.M. KJELLGREN Date 27-3-79




REMARKS

LIMONITIC SHALE

as above, foraminifers becoming less common, medium to very coarse quartz grains becoming more abundant down section. Glauconite becoming rare.

TOP OF LATROBE

GURNARD FM

NOTE: PROBABLE TOP OF LATROBE AT 2416 metres

GURNARD FM 2416 to 2417.7 metres

TOP COARSE CLASTICS AT 2417.7 metres

HYDROCARBON BLEEDING AND SHOWS BEGIN AT 2417.8metres.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

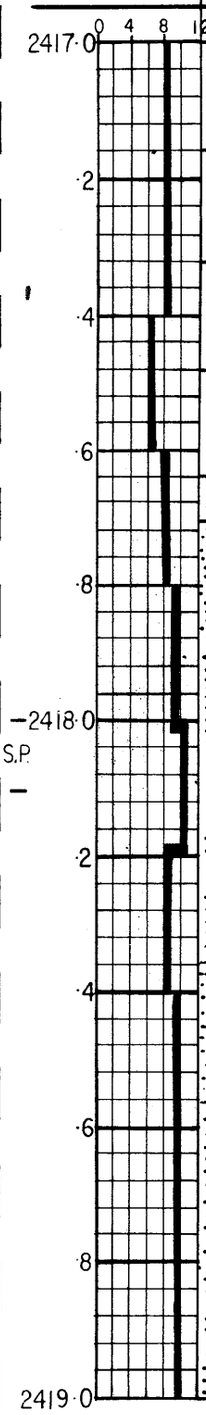
# CORE DESCRIPTION

WELL FORTESCUE - 4 SCALE 1:10

CORE No. 3

Interval Cored 2411.4-2425.2m Cut 13.8m Recovered 13.8m ( 100 %) Fm. LATROBE

Bit Type C20 Bit Size 8.47" in., Desc by J.D. ALDER G.M. KJELLGREN Date 27-3-79




| DEPTH & CORING RATE | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MARINE | | SILTY to SANDY CLAY | Massive - bedding indistinct or totally destroyed | g | Olive grn.- Mott'd med. gry. | | | POOR | GLAUCONITIC SHALE Dark green to grey very glauconitic minor pyrite grading to very pyritic with pure pyrite in places, foramin- inifers. Common medium to very coarse grained, to sub- angular to rounded, coral to milky quartz Calcareous at top non- calcareous at bottom, firm to hard. |
| | | | SHALLOW | | SILTY CLAY | | | | | | VERY POOR | |
| | | | | | | | S | | | | POOR | TOP COARSE CLASTICS |
| | | | MARINE | | FINE SAND & SILT | Laminae | | | OIL OOZING | | FAIR - POOR | SANDSTONE Medium to grey quartzose very fine to fine grain coral to milky well sorted abundant mica trace glauconite and pyrite. Part of the sandstone is tight with more pyrite cement and darker grey, less flourescence Even homogenous bright blue white flourescence immediate even streaming blue white cut, thick white flourescence cut residue. |
| | | | | | | Beds and Laminae | SLUMPED and | Med.- lt. gry | | | VERY POOR | |
| | | | NEARSHORE | | | | | | | | | |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

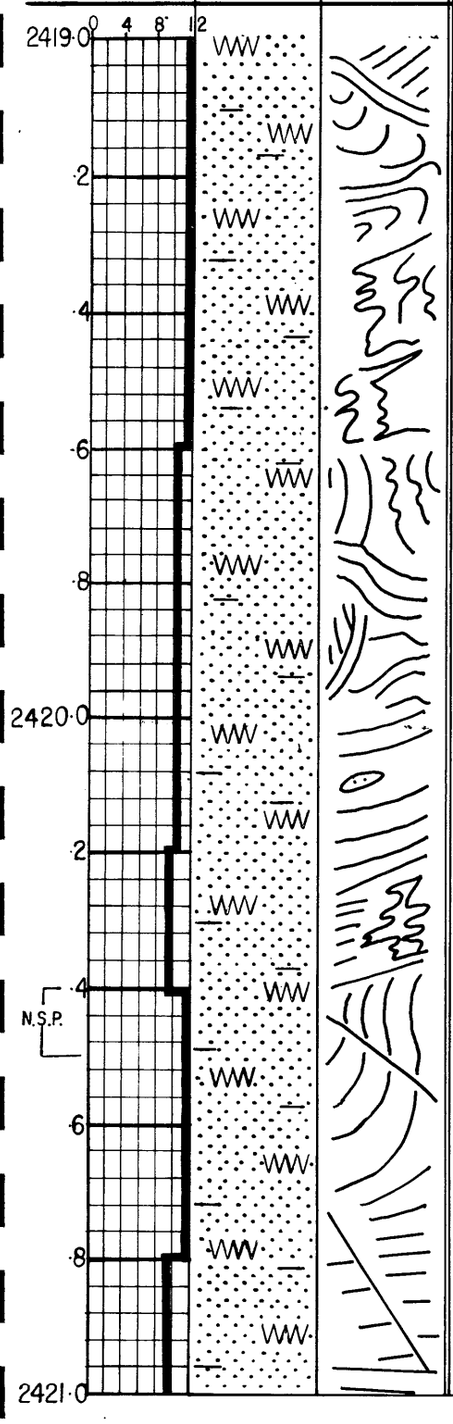
WELL FORTESCUE - 4

SCALE 1:10

CORE No. 3

Interval Cored 2411.4-2425.2m Cut 13.8m Recovered 13.8m (100 %) Fm. LATROBE

Bit Type C20 Bit Size 8.47" in., Desc by J.D. ALDER G.M. KJELLGREN, Date 27-3-79




| DEPTH & CORING RATE | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MARINE NEARSHORE | | FINE SAND & SILT | Fine laminae and beds. Slumped and contorted | | lt.-med. gry. | | | VERY POOR | SANDSTONE<br>as above.<br><br>Small isolated very fine grain fluorscent sand lense. |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

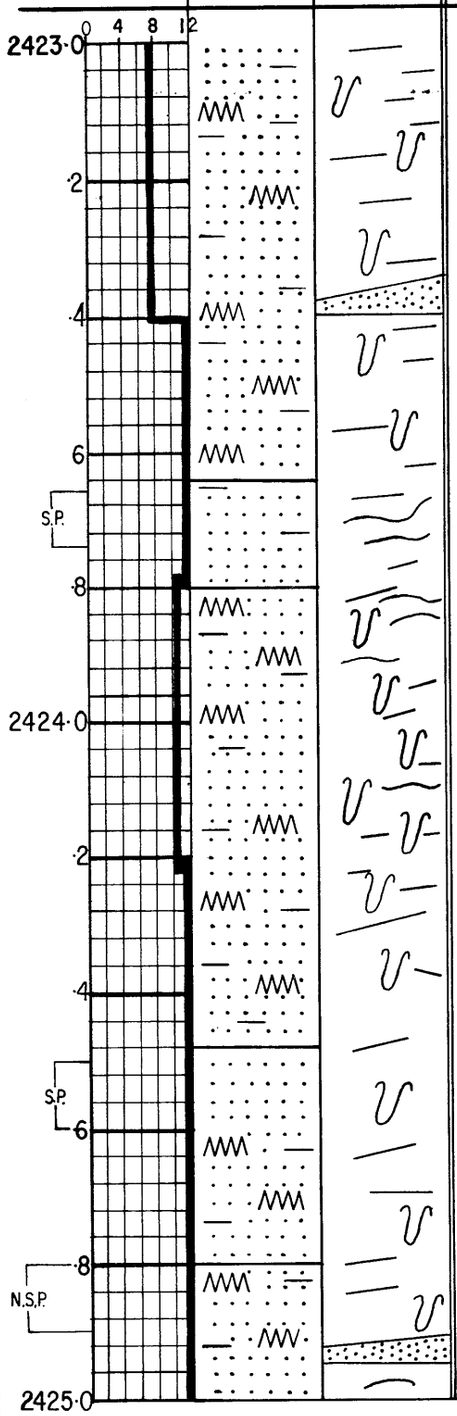
# CORE DESCRIPTION

WELL FORTESCUE - 4 SCALE 1:10

CORE No. 3

Interval Cored 2411.4-2425.2m Cut 13.8m Recovered 13.8m ( 100 %) Fm. LATROBE

Bit Type C20 Bit Size 8.47" in., Desc by J.D. ALDER G.M. KJELLGREN Date 27-3-79




SANDSTONE

as above. Tends to be more pyritic and carbonaceous or micaceous in part. Tight darker laminae are more pyritic and micaceous.

Bluish white moderate even fluoresence. Strong white slowly streaming cut. Instant strong white crush cut, thin pale brown cut residue

Strong bluish white fluoresence. Strong white moderately streaming cut. Instant strong white crush cut. Thin pale yellow to brown.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

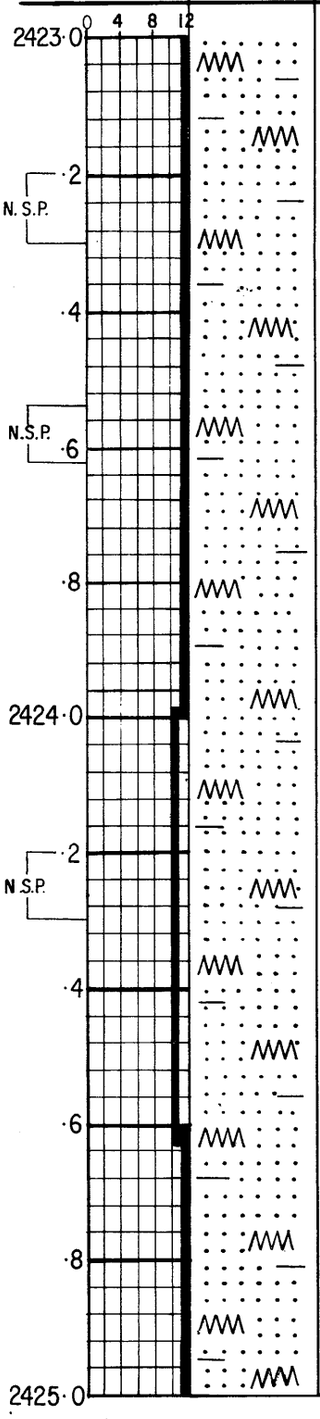
# CORE DESCRIPTION

WELL FORTESCUE - 4 SCALE 1:10

CORE No. 3

Interval Cored 2411.4-2425.2m Cut 13.8m Recovered 13.8m ( 100 %) Fm. LATROBE

Bit Type C20 Bit Size 8.47" in., Desc by J.D. ADLER G.M. KJELLGREN Date 27-3-79




| DEPTH & CORING RATE | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MARINE | | SILT & SAND | Laminae | | | | PATCHY OIL BLEEDING | POOR | SANDSTONE<br>as above |
| | | | NEARSHORE | | FINE | Bioturbated | | Med.-lt.gry. | | | POOR - VERY POOR | No fluorescence.<br>Weak, very slow milky cut.<br>No residue. |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

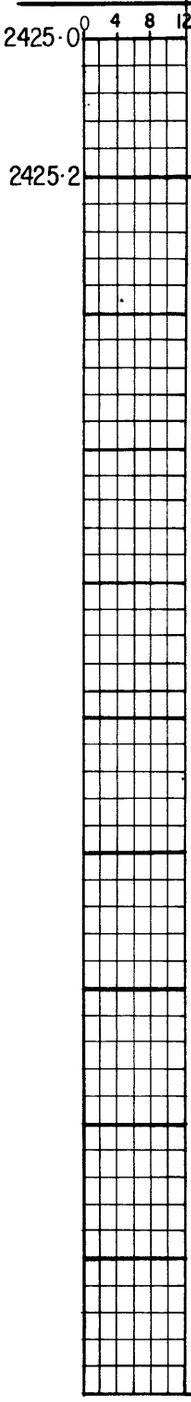
# CORE DESCRIPTION

WELL FORTESCUE - 4 SCALE 1:10

CORE No. 3

Interval Cored 2411.4-2425.2m Cut 13.8m Recovered 13.8m (100 %) Fm. LATROBE

Bit Type C20 Bit Size 8.47" in., Desc by J.D. ALDER G.M. KJELLGREN Date 27-3-79




| DEPTH & CORING RATE | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2425·0 – 2425·2 | | | NEARSHORE MARINE | | FINE SAND & SILT | Laminae | | | | | VERY POOR | |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



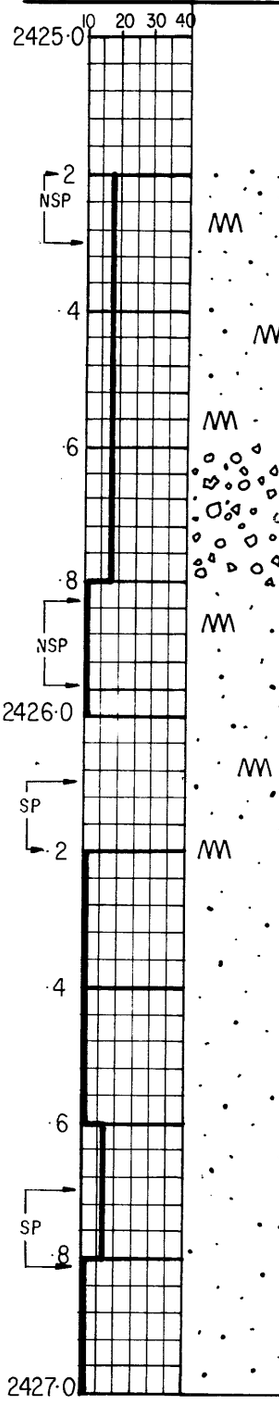
WELL FORTESCUE-4

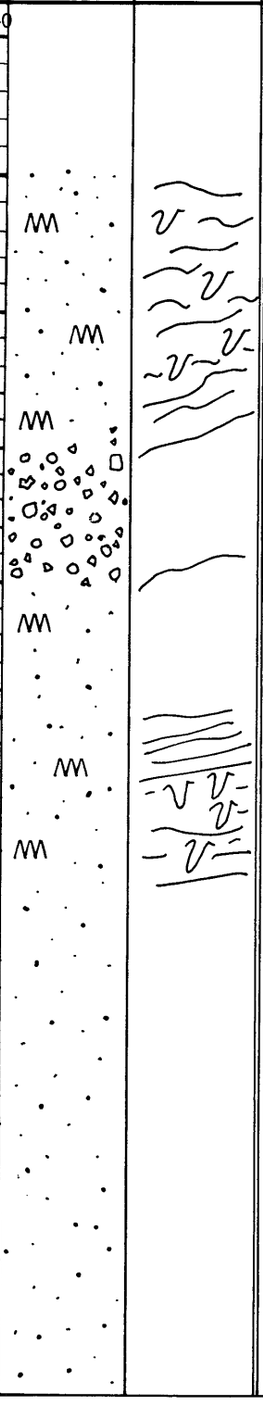
SCALE 1:10

CORE No. 4

Interval Cored 2425.2-2438.8m Cut 13.6m Recovered 12.4m ( 91 %) Fm. Latrobe

Bit Type C20 Bit Size $8\frac{15}{32}$" in., Desc by J.D.Alder Date 28-3-79







ENVIRONMENT

FACIES

| TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY |
|---|---|---|---|---|---|---|
| Fine SAND | Bioturbated Laminae | | Mottled Lt. GREY—GREY GREEN | | | LOW |
| GRANULAR | Massive Beds | | Lt. GREY | | | GOOD |
| Fine to Med SAND | Laminae | | Lt.— Med. GREY | | | LOW to GOOD |
| | Very minor Bed defenition due to grain size | | | | | |

REMARKS

SANDSTONE - light grey to green grey, quartzose fine grained, angular to subrounded, moderately well sorted, clear to milky grains, trace mica, trace carbonaceous matter, very fine laminae consisting of 100% mica and carbonaceous matter; sandstone is friable to hard, low visual porosity, bright even blue white fluorescence; Petroliferous odour; immediate bright milky cut.

10 seal - peel samples.

11 non-seal - peel samples - taken for P & K analysis.

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 2 of 7

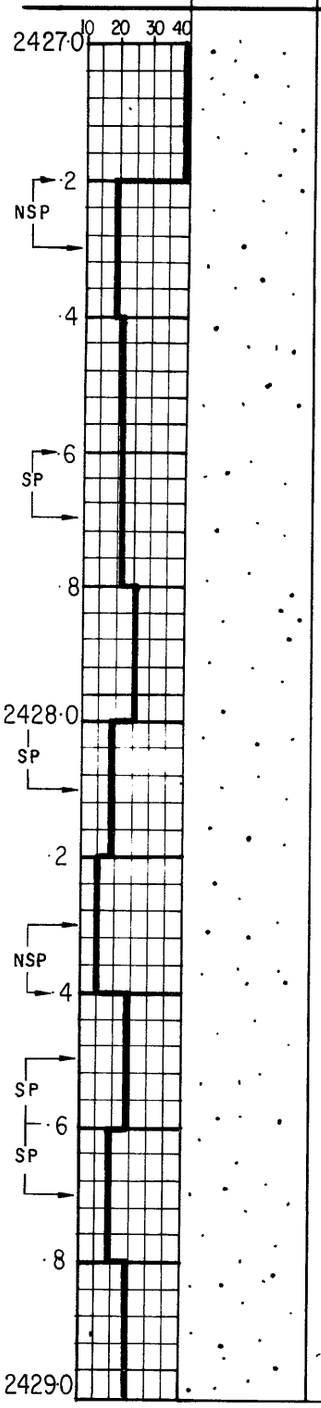
WELL FORTESCUE—4

SCALE 1:10

CORE No. 4

Interval Cored 2425.2-2438.8m Cut 13.6m Recovered 12.4m ( 91 %) Fm. Latrobe

Bit Type C20 Bit Size 8 15/32" in., Desc by J.D. Alder Date 28-3-79




COMPOSITION

BEDDING & STRUCTURES

ENVIRONMENT

FACIES

TEXTURE: FINE GRANULAR SAND

TEXTURAL CHANGE: Massive with minor grading & Cross Beds defining Bedding Planes.

CONTACTS

COLOR: Lt GREY — YELLOW BROWN

OIL STN.

CEMENT

POROSITY: GOOD to HIGH in coarser beds

REMARKS

SANDSTONE - light grey quartzose fine to granular, moderately well sorted (poor in coarser beds). Very friable, angular to sub-rounded, clear, milky to smokey grains, good to high visual porosity. Even bright fluorescence (coarse beds tend to be slightly flushed) petroliferous ordour; immediate bright milky cut.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION



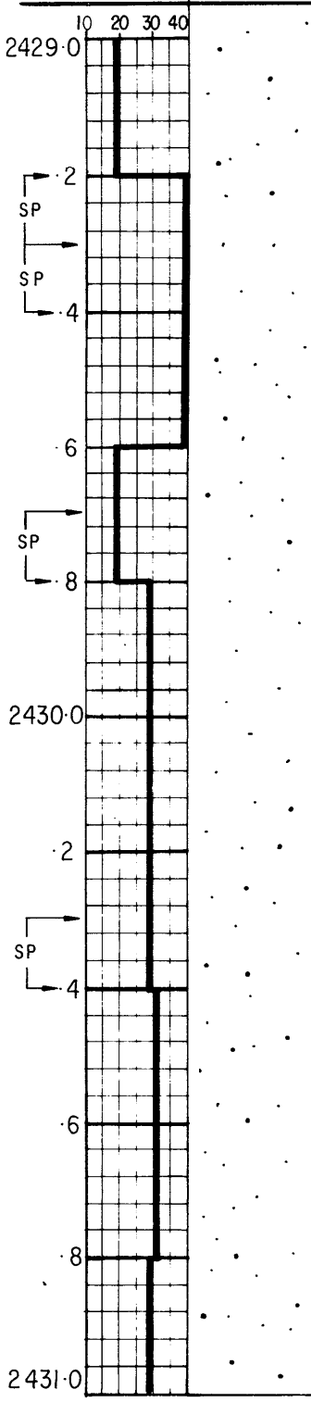
WELL FORTESCUE-4

SCALE 1:10

CORE No. 4

Interval Cored 2425.2-2438.8m Cut 13.6m Recovered 12.4m ( 91 %) Fm. Latrobe

Bit Type C20 Bit Size $8^{15}/32$" in., Desc by J.D. Alder Date 28-3-79




| DEPTH & CORING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FINE to medium SAND | Massive with minor Graded & Cross Bedded Units | | Light GREY to YELLOW BROWN. | | | GOOD | SANDSTONE - yellow brown, fine to medium grain, quartzoze, friable, subangular to subrounded, well sorted, clear to smokey grains. Good visual porosity, trace mica. Bright even fluorescence, petroliferous ordour, immediate bright milky cut. |
| | | | | | | Bioturbated Laminae. | 9 | Mottled Light— Medium GREY | | | LOW | SANDSTONE - as above, dark laminae are carbonaceous, micaceous stringers defining bedding planes. Fluorescence confined to sand laminae. Slow streaming bright milky cut. |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 4 of 7

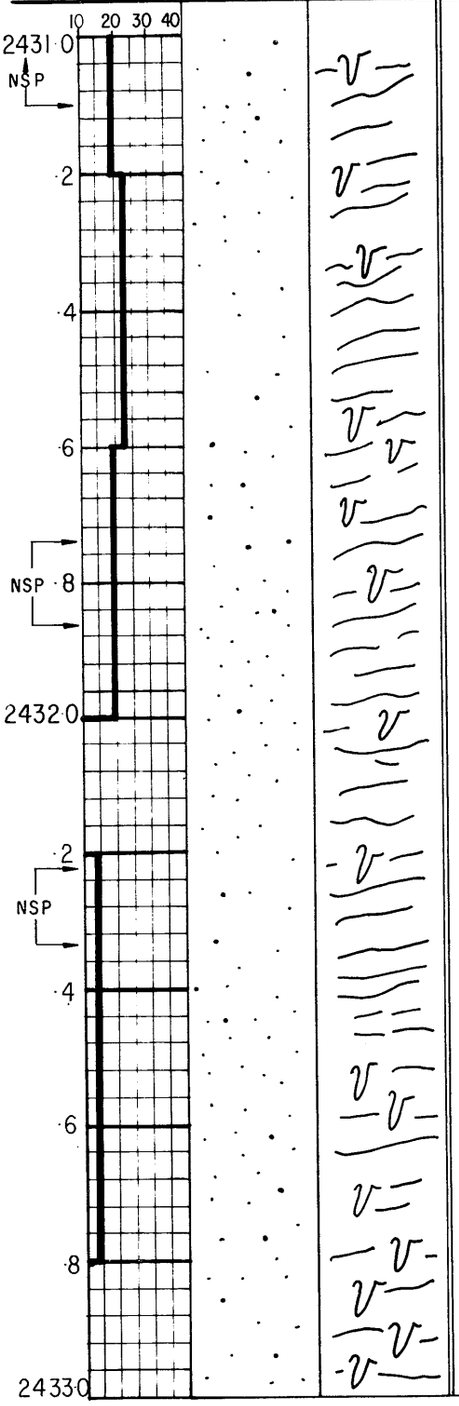
WELL FORTESCUE-4

SCALE 1:10

CORE No. 4

Interval Cored 2425.2-2438.8m Cut 13.6m Recovered 12.4m ( 91 %) Fm. Latrobe

Bit Type C20 Bit Size $8^{15}/32$" in., Desc by J.D. Alder Date 28-3-79




SANDSTONE - light grey to green grey, quartzose, fine grained, angular to subrounded, moderately well sorted, clear to milky grains, trace mica, trace carbonaceous matter friable to hard. Low visual porosity. Even bright blue white fluorescence. Petroliferous odour, immediate bright milky cut. Dark laminae streaks micaceous, carbonaceous. Trace pyrite.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 5 of 7

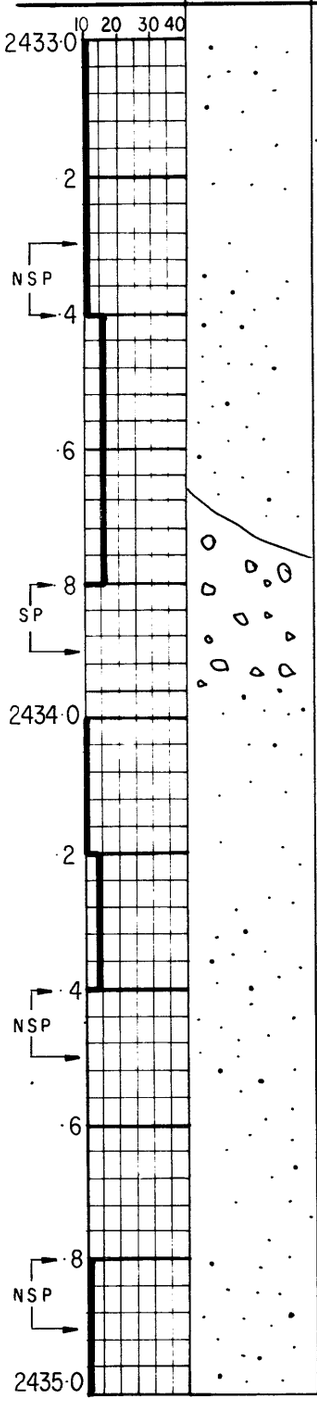
WELL FORTESCUE-4

SCALE 1:10

CORE No. 4

Interval Cored 2425.2-2438.8m Cut 13.6m Recovered 12.4m ( 91 %) Fm. Latrobe

Bit Type C20 Bit Size $8\frac{15}{32}$ in., Desc by J.D. Alder Date 28-3-79




| DEPTH & CORING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FINE TO MEDIUM SAND | Bioturbated Laminae separated by undisturbed fine Laminae. | | | | | | SANDSTONE - medium light grey to yellow brown, quartzose, friable, fine to granular, subangular to subrounded, poorly sorted, fair to good visual porosity. Bright even fluorescence petroliferous odour. Immediate bright milky cut. |
| | | | | | GRANULAR | Bioturbated & Laminae. Very Indistinct to Absent. | 5 S | Medium Light GREY — YELLOW BROWN | | | LOW to MODERATE FAIR to GOOD | |
| | | | | | FINE TO MEDIUM SAND | | | | | | LOW to MODERATE | SANDSTONE - light grey to green grey, quartzose fine grained, angular to subrounded, moderately well sorted, clear to milky grains, trace mica, friable, trace carbonaceous flecks. Low visual porosity. Even bright fluorescence Immediate bright milky cut. Petroliferous odour. |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 6 of 7

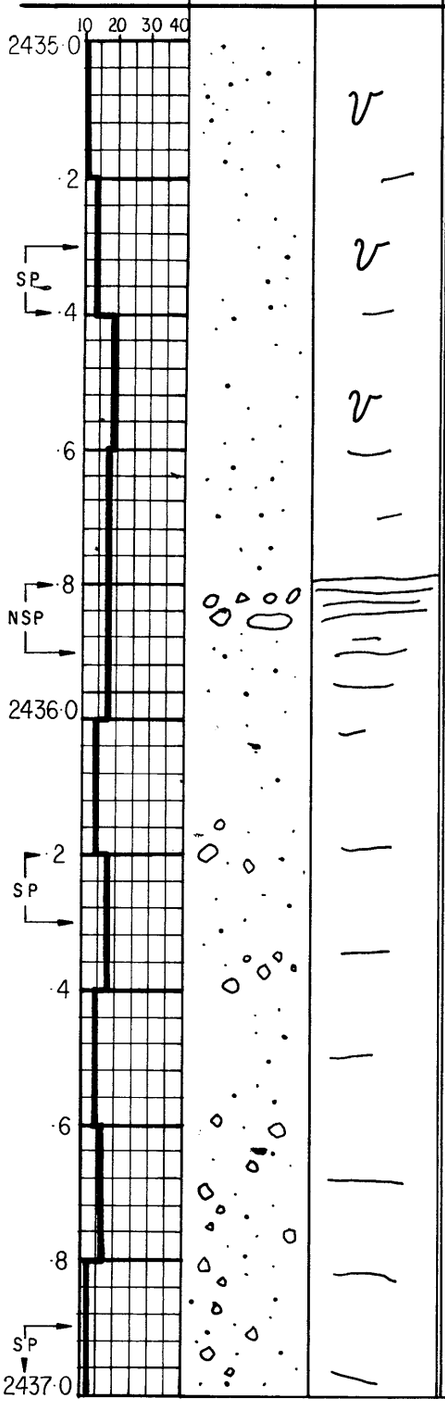
WELL FORTESCUE-4

SCALE 1:10

CORE No. 4

Interval Cored 2425.2-2438.8 Cut 13.6m Recovered 12.4m (91 %) Fm. Latrobe

Bit Type C20 Bit Size 8 15/32 in., Desc by J.D. Alder Date 28-3-79




COMPOSITION

BEDDING & STRUCTURES

ENVIRONMENT

FACIES

TEXTURE: FINE TO MEDIUM SAND / FINE TO GRANULAR SAND

TEXTURAL CHANGE: Undefined / Bedding

CONTACTS

COLOR: Light GREY to YELLOW BROWN

OIL STN.

CEMENT

POROSITY: LOW to MODERATE / GOOD to HIGH

REMARKS

SANDSTONE - medium dark grey to yellow brown, quartzose, very friable to unconsolidated, fine to granular, subangular to rounded, poorly sorted, clear to smokey grains. High visual porosity. Dull even fluorescence with bright spots tends to be flushed out in areas of very high porosity and at core edge. Petroliferous odour, immediate bright milky cut.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

WELL FORTESCUE-4



SCALE 1:10

CORE No. 4

Interval Cored 2425.2-2438.8m Cut 13.6m Recovered 12.4m ( 91 %) Fm. Latrobe

Bit Type C20 Bit Size 8 15/32" in., Desc by J.D. Alder Date 28-3-79

| DEPTH & CORING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 20 30 40<br>2437·0<br>SP<br>·2<br>·4<br>·6<br>·8<br>2438·0<br>·2<br>·4<br>·6<br>·8<br>2439·0 | | | | | FINE to GRANULAR | MASSIVE | | Light GREY | ◐ | | HIGH | |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 1 of 7

WELL FORTESCUE-4

SCALE 1:10

CORE No. 5

Interval Cored 2438.8-51.4m Cut 12.6m Recovered 8.3m ( 66 %) Fm. Latrobe

Bit Type C18 Bit Size 8.47" in., Desc by G.M. Kjellgren, P. Elze, V. Ziolkowski Date 28-3-79

| DEPTH & CORING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 6 12 18 | | | | | | | | | | | | |
| 2438·0 | | | | | | | | | | | | |
| ·2 | | | | | | | | | | | | |
| ·4 | | | | | | | | | | | | |
| ·6 | | | | | | | | | | | | |
| ·8 | | | | | | | | | | | | Presumed loss of core in top section - consists of essentially a very coarse grained sandstone to granule conglomerate - friable and easily washed away. Based on lithology at base of core # 4 and top of this core. |
| 2439·0 | | | | | | | | | | | | |
| ·2 | | | | | | | | | | | | |
| ·4 | | | | | | | | | | | | |
| ·6 | | | | | | | | | | | | |
| ·8 | | | | | | | | | | | | |
| 2440·0 | | | | | | | | | | | | |

NOTE: 18 seal peel samples.

(NOTE: Subsequent correlation with electrical and gamma ray logs indicates that core loss was from bottom not top.)

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

WELL FORTESCUE-4



SCALE 1:10

CORE No. 5

Interval Cored 2438.8-51.4m Cut 12.6m Recovered 8.3m ( 66 %) Fm. Latrobe

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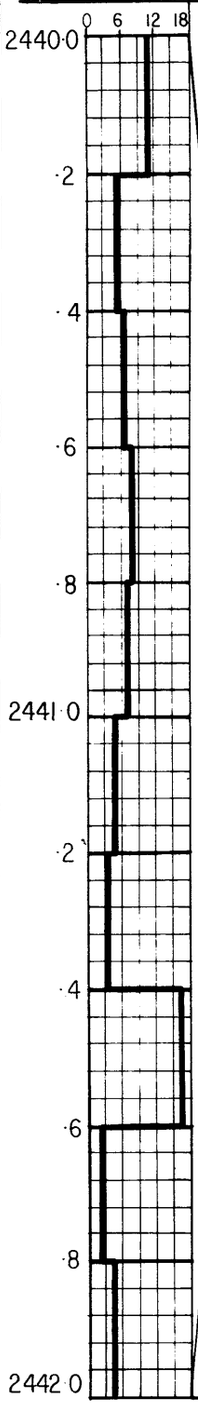
| DEPTH & CORING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|




Dwg 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

WELL FORTESCUE-4



SCALE 1:10

CORE No. 5

Interval Cored 2438.8-51.4m Cut 12.6m Recovered 8.3m ( 66 %) Fm. Latrobe

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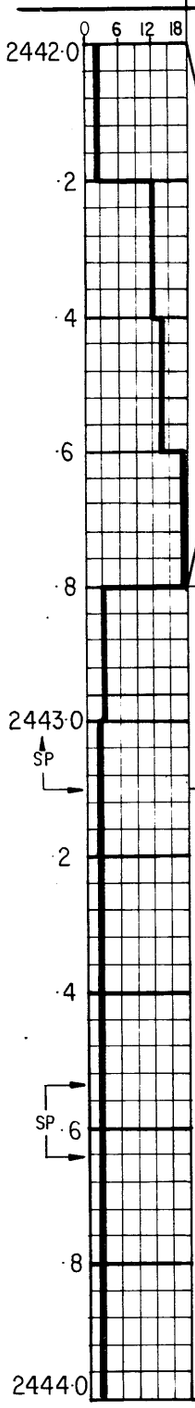



| DEPTH & CORING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | CONGLOMERATE - light to medium grey, very friable, granular, phenoclasts of quartz 2 to 4mm subrounded to well rounded, minor pyrite coating. Matrix of coarse sand, angular to subangular, clear to white, trace mica. Moderate yellow white fluorescence. Streaming milky cut. |
| | | H | | PROXIMAL OVERBANK CHANNEL | Massive Med. Sandstone. Granular Conglom. | development of Flat Beds | S | Medium GREY Lt to Med. GREY | | | GOOD | SANDSTONE - medium to dark grey quartzose, moderate to fine grained, friable sandstone, subangular to angular |
| | | H | | | Very Fine Sandstone. Fine Grained Sandstone. | development of Flazers & Wavy Beds defined by Micaceous Layers. | G | | | | GOOD | clear quartz, pyrite encrusted matrix, good visual porosity. Trace glauconite, mica. |
| | | | | | | | G | GREY BROWN | | | MODERATE | Bright yellow even fluorescence, immediate streaming milky cut. |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 4 of 7

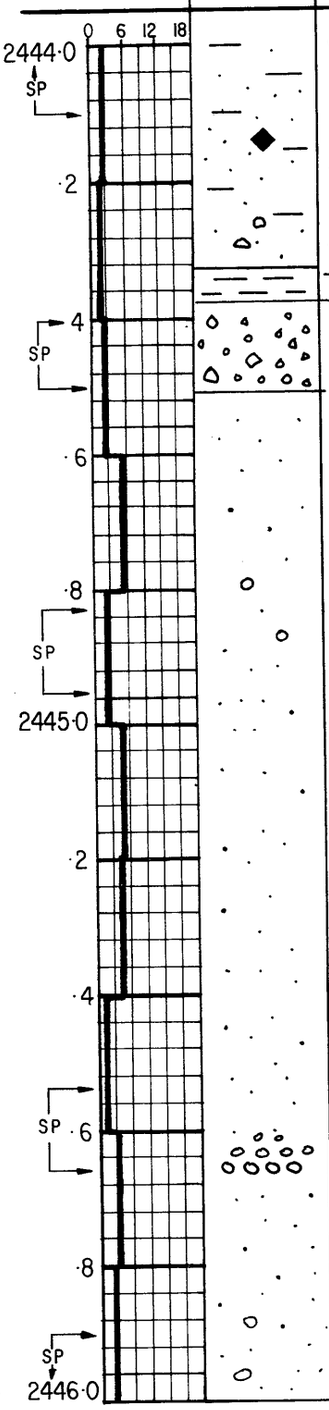
WELL FORTESCUE-4

SCALE 1:10

CORE No. 5

Interval Cored 2438.8-51.4m Cut 12.6m Recovered 8.3m ( 66 %) Fm. Latrobe

Bit Type C18 Bit Size 8.47" in., Desc by G.M. Kjellgren P. Elze V. Ziolkowski Date 28.3.79




| DEPTH & CORING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | BRAIDED STREAM CHANNEL | PROXIMAL OVERBANK | Fine to Med. Sdstone | Minor Current Ripples | G | Lt. GREY BROWN | | | | SANDSTONE - pebbly grey to brown, fine to medium grain size, poorly sorted, shale interlaminated beds. Bright yellow even fluorescence. Immediate streaming milky cut. |
| | | | | | Med. Sdstone Shale - Sdstone | Flat Beds | S | Dk GREY | | | | |
| | | | | | Granular Conglom. | Mass. Sdstone | S | Med. GREY | | | | |
| | | | | | Medium Sandstone | Massive Sandstone | | Medium BROWN GREY | | | GOOD | SANDSTONE - quartzitic, medium brown grey, moderately friable, well sorted, grains subangular to subrounded, clear traces of pyrite and mica. Visual porosity to moderate. Bright yellow fluorescence, immediate milky streaming cut. |
| | | | | | Coarse to V. Coarse Sdstone | Massive Sandstone | S | | | | | SANDSTONE - massive, medium brown grey, quartzose, coarse to very coarse grains, subangular to subrounded moderate to good visual porosity. Trace mica and pyrite. |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 5 of 7

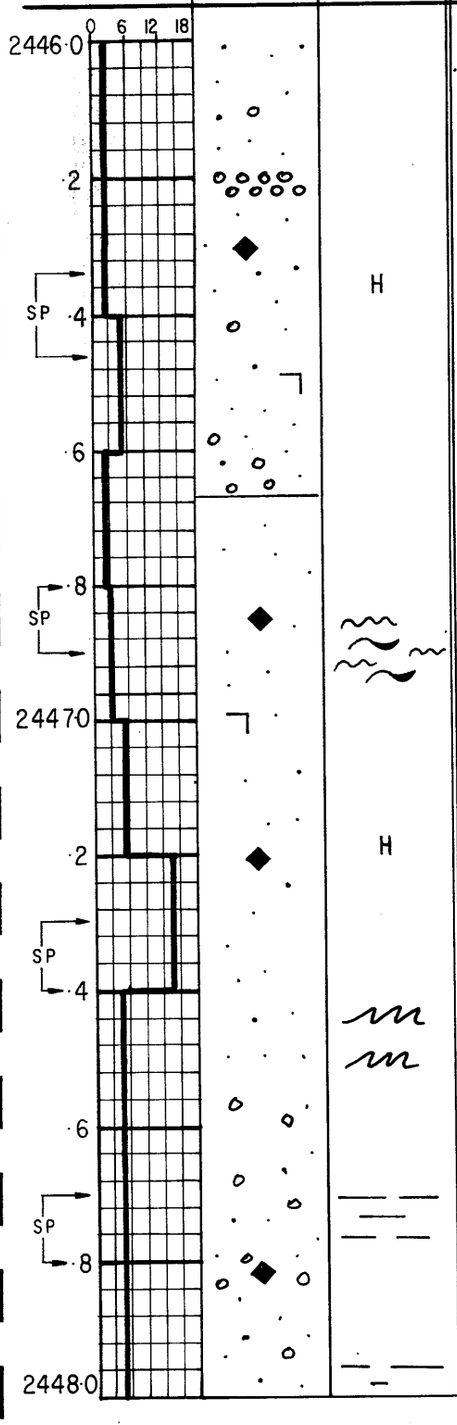
WELL FORTESCUE-4

SCALE 1:10

CORE No. 5

Interval Cored 2438.8-51.4m Cut 12.6m Recovered 8.3m (66 %) Fm. LATROBE

Bit Type C18 Bit Size 8.47" in., Desc by G.M. KJELLGREN P. ELZE V. ZIOLKOWSKI Date 28.3.79




| ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| BRAIDED STREAM | CHANNEL PROXIMAL OVERBANK | Fine to Medium Sandstone | Massive & Minor Inclined Bedding | S | Medium BROWN GREY | Oil Staining | | GOOD | SANDSTONE - quartzose light brown to medium brown grey moderate friable massive sub-angular to subrounded, clear and milky quartz to pyrite coating on some quartz grains. Visible porosity moderate, poorly sorted traces mica and glauc-onite, bright yellow even fluorescent instant-aneous milky streaming cut. |
| | CHANNEL | Coarse to V. Coarse Sdstone | Massive to Wave & Flazers | G | GREY BROWN | | | GOOD | SANDSTONE - quartzose grey to green, moderate friable, medium to fine sand milky and clear quartz, well sorted with moderate to good visible porosity oil staining is visible throughout this section trace pyrite and mica. |
| | | | Massive to Minor Flat Beds | S | | | | | SANDSTONE As above but for lack of visible staining and slightly coarser grain size - flushing may account for lack of oil staining. |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

WELL FORTESCUE-4

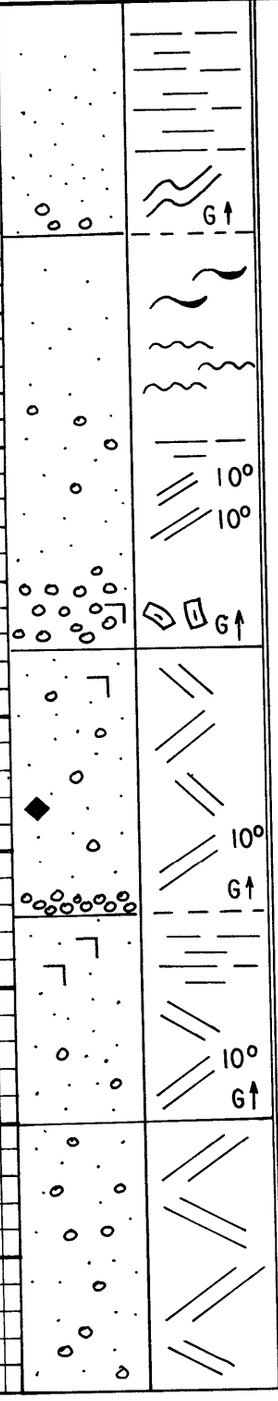
SHEET 6 of 7

SCALE 1:10

CORE No. 5

Interval Cored 2438.8-51.4m  Cut 12.6m  Recovered 8.3m (66 %) Fm. LATROBE

Bit Type C18  Bit Size 8.47" in., Desc by G.M. KJELLGREN, P. ELZE, V. ZIOLKOWSKI  Date 28.3.79


| ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY |
|---|---|---|---|---|---|---|---|---|
| BRAIDED STREAM | PROXIMAL OVERBANK | Coarse to Fine Sandstone | Flat Beds | G S | Lt. BROWN GREY | | | |
| | | Med. to Fine Sandstone | Cross Bedded | G | | | | |
| | | V. Coarse Granule Sandstone | Massive | G S | Medium BROWN | | | |
| | CHANNEL | V. Coarse Granule Sandstone | Cross Bedded | G S | | | | GOOD |
| | | Fine Granule Conglom. | Flat Mass. Bedded | G S | Light to Medium BROWN | | | |
| | | V. Coarse Granule Conglom. & Coarse Sandstone | Cross Bedded | S | | | | |

REMARKS

SANDSTONE quartzose, grainsize ranging from medium to very coarse, friable sub-angular to sub-rounded grains. Quartz predominantly milky. Trace zircon, mica and pyrite. Strong yellow white even fluorscent instantaneous streaming white cut.

QUARTZOSE PEBBLY SANDSTONE (INTERBED MICACEOUS SILTSTONE)
Light brown, poorly sorted, friable sub-rounded, no visible staining.
SILTSTONE - Dark brown biotite to rich with quartz phonoclasts to pebble size.
N.B. Repetition of fining upwards sequence.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

WELL FORTESCUE-4

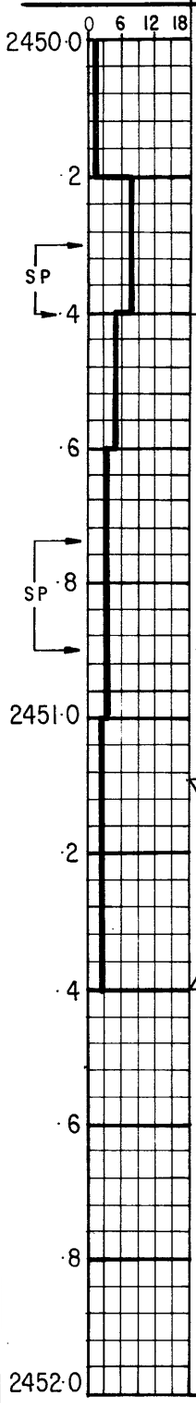
SHEET 7 of 7

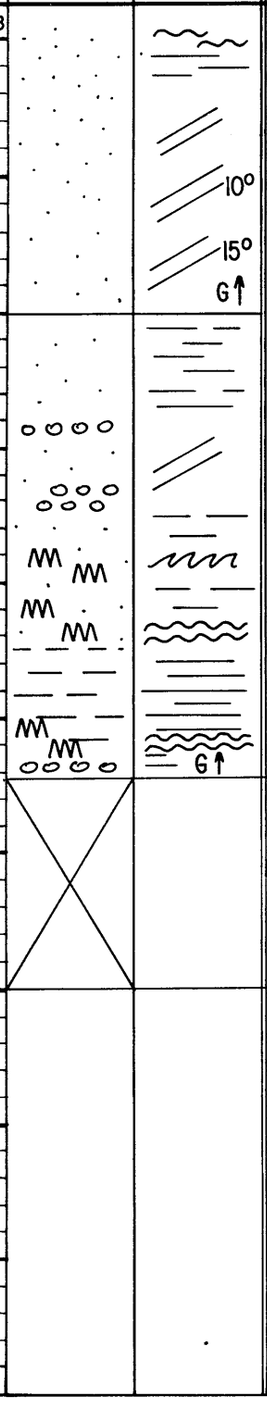
SCALE 1:10

CORE No. 5

Interval Cored 2438.8-51.4m Cut 12.6m Recovered 8.3m ( 66 %) Fm. LATROBE

Bit Type C18 Bit Size 8.47" in., Desc by G.M. Kjellgren P. Elze V. Ziolkowski Date 28.3.79




| ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN. | CEMENT | POROSITY |
|---|---|---|---|---|---|---|---|---|
| BRAIDED STREAM (SWAMP) | CHANNEL | Fine to Medium Sandstone | | G | Medium BROWN | ◕ | | MODERATE |
| | | Med. to Coarse Sandstone | | | | | | |
| | DISTAL OVERBANK | Fine to Med. Sdstone & Minor Granule Conglomerate | | S | | | | |
| | | Interbedded Silt & V. Fine Sdstone | | S | | ⊕ | | POOR |
| | | Shale | | | | | | |
| | | Silt & V. Coarse Sandstone | | | | | | |

REMARKS

SANDSTONE - Quartzose medium brown in colour friable contains thin micaceous rich bands, to well sorted, fine to coarse grain size sub-angular, moderate visible porosity traces pyrite. Strong yellow/white even fluorescence instant streaming milky cut. Petro - odour

HARD FINELY LAMINATED SILT/SHALE - plant fragments to minor spotty fluorescence. No cut.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 1 of 7

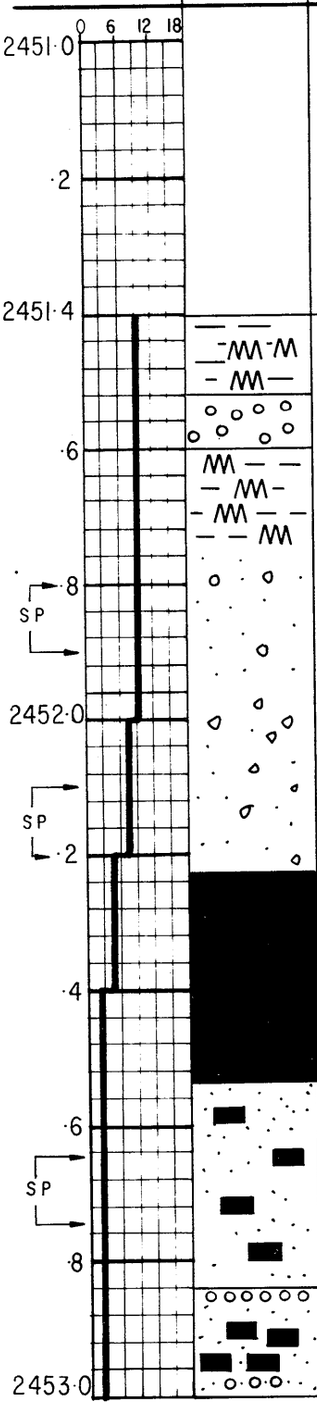
WELL FORTESCUE-4

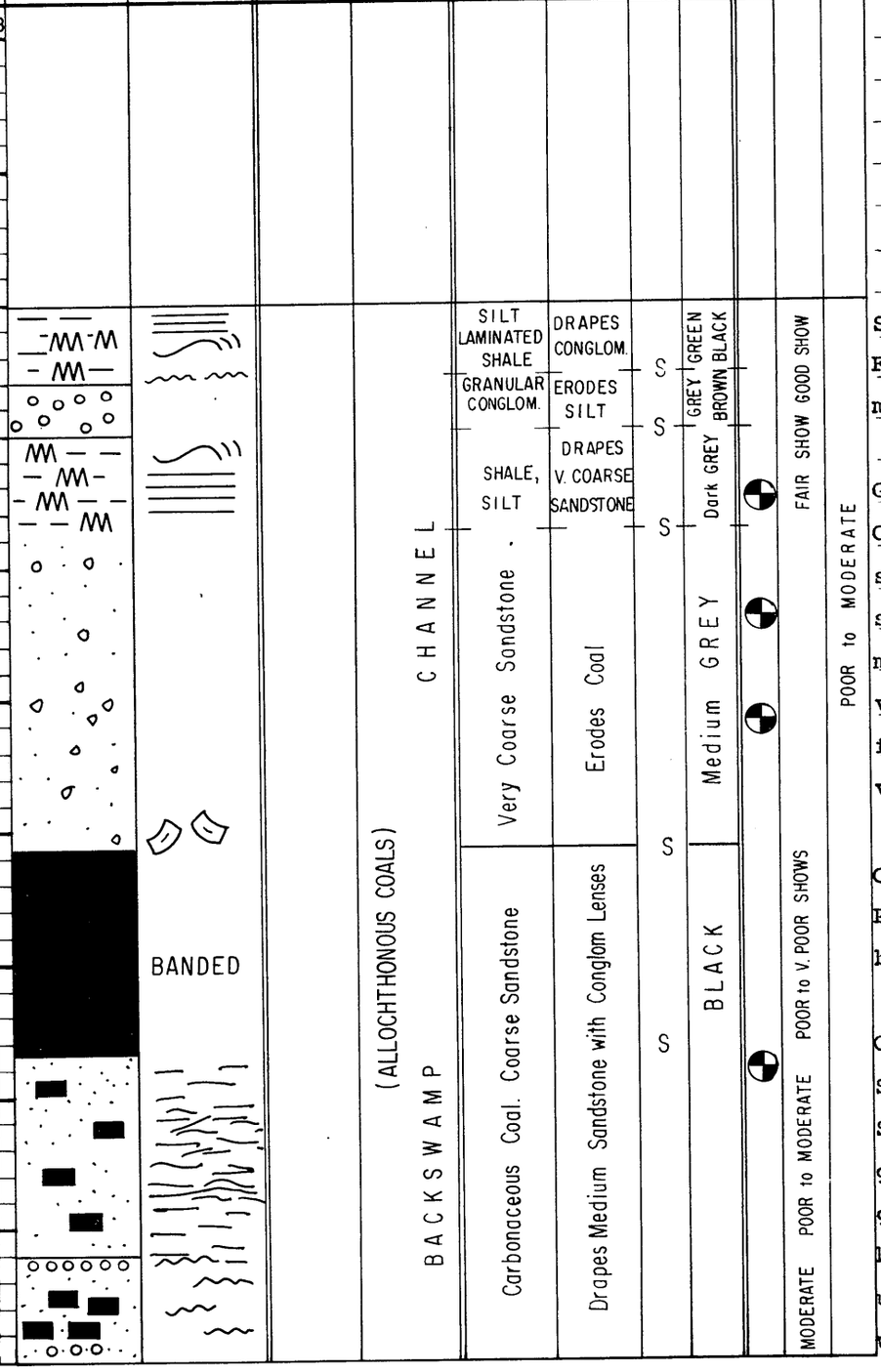
SCALE 1:10

CORE No. 6

Interval Cored 2451.4-64.6m Cut 13.2m Recovered 10.17m ( 76 %) Fm LATROBE

Bit Type C2.2 Bit Size 8.47" in., Desc by G.M.KJELLGREN V. ZIOLKOWSKI P. ELZE Date 30/3/79




REMARKS

SHALE, Carbonaceous, Fine Silty Layers, micaceous.

GRANULE CGL to VERY COARSE SANDSTONE, poorly sorted, friable, contains shaley and carbonaceous material trace pyrite very fine dull yellow fluorescence. Instant very light milky cut.

COAL

Predominantly bright and banded.

COAL INTERBEDDED WITH SANDSTONE

SANDSTONE: light brown grey, fine to medium grain size subangular brown staining. Residual hydrocarbons. Very weak scattered dull yellow fluorescence. Slowly stream pale yellow yellow cut.

SANDSTONE - Quartzose, fine to granule. Brown residue. NO FLUORESENCE NO CUT.

NOTE: TEN(10) seal peel samples taken

NOTE: Possible OWC about 2451.5 to 2452 metres

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 2 of 7

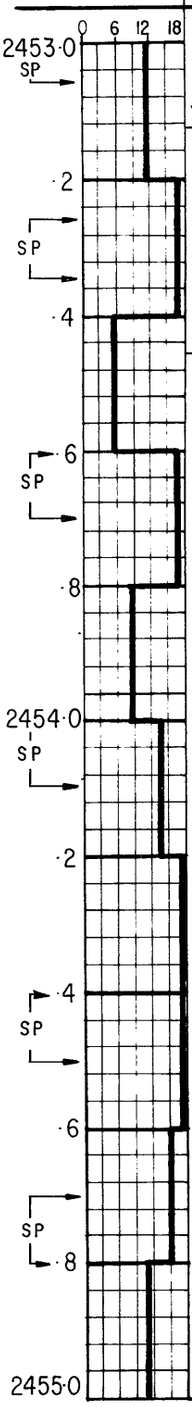
WELL FORTESCUE-4

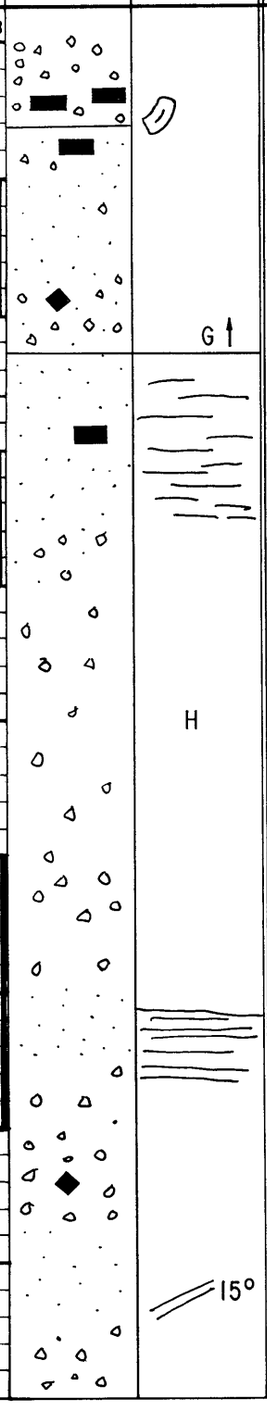
SCALE 1:10

CORE No. 6

Interval Cored 2451.4 -646m Cut 13.2m Recovered 10.17m ( 76 %) Fm. LATROBE

Bit Type C22 Bit Size 8.47" in., Desc by G.M. KJELLGREN P. ELZE V. ZIOLKOWSKI Date 30.3.79




| ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY |
|---|---|---|---|---|---|---|---|---|
| BRAIDED STREAM | CHANNEL | Granule Conglomerate. Very Coarse Sand. Medium Sandstone Med. Sstone to Granule Conglom. | Erodes Medium Sandstone | S | Medium BROWN | ORANGE BROWN to DARK BROWN Residuum. Staining Quartz & Granules & Filling Pores. | | GOOD to MODERATE POOR |

REMARKS

SANDSTONE, Quartzose fine. Subangular semi friable. Carbonaceous tracings.

SANDSTONE, Medium grained to very coarse quartz well rounded to sub-angular trace pyrite orange to brown staining common, minor clay.

CONGLOMERATE, GRANULE Very friable, poor sorted, well rounded quartz phenoclasts. Matrix sandy. Orange/brown staining.

M.F.D. (illegible)

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 3 of 7

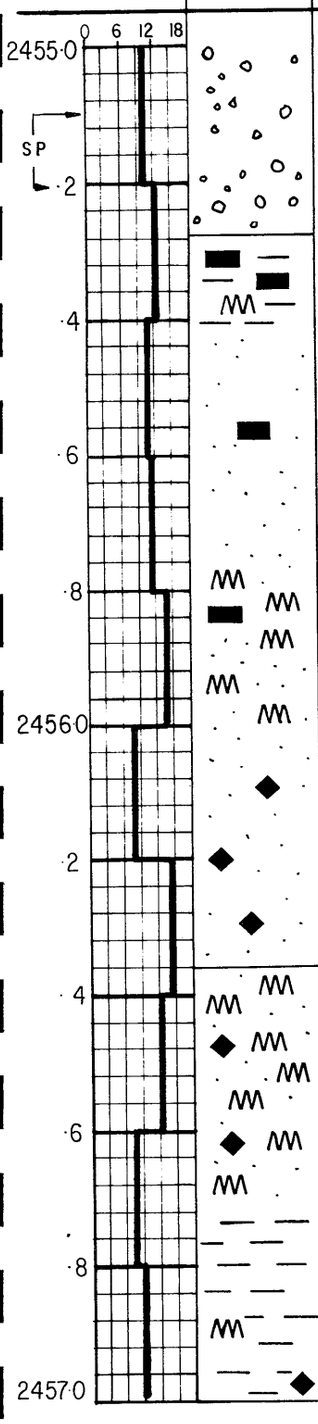
WELL FORTESCUE-4

SCALE 1:10

CORE No. 6

Interval Cored 2451.4-2465m Cut 13.2m Recovered 10.17m ( 76 %) Fm. LATROBE

Bit Type C22 Bit Size 8.47" in., Desc by G.M. KJELLGREN P. ELZE V. ZIOLKOWSKI Date 30/3/79




| DEPTH & CORING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LAGOONAL | CHANNEL. | Silt & Minor Very Fine Sandstone | Grade to Shale | G | Med. to Dark GREY | | | | SHALE, COALY, HARD Fissile, occasional bright COAL LENSES Plantstems. |
| | | | | PROXIMAL LAGOONAL FACIES | Medium Sandstone Sandy Siltstone Med. Sstone to Coaly Shale | Erodes Siltstone Grades to Med. Sandstone Erodes Siltstone Erodes Coaly Shale | S G | GREY BROWN Light GREY Med. GREY GREY BLACK GREY BROWN. | | Very Poor Show | | SANDY SILTSTONE, Carbonaceous fissile, micaceous. Numberous carbonaceous streaks |
| | | | | | | | S | | | | | SANDSTONE: Moderate friable, moderate sorted organic rich silty layers. Angular to subangular, clayed tight. Micaceous. Minor yellow spotty fluorscence slow white streaming cut. |
| | | | | | | | S | | | | | SILTY SHALE, hard micaceous, fissile pyritic. |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 4 of 7

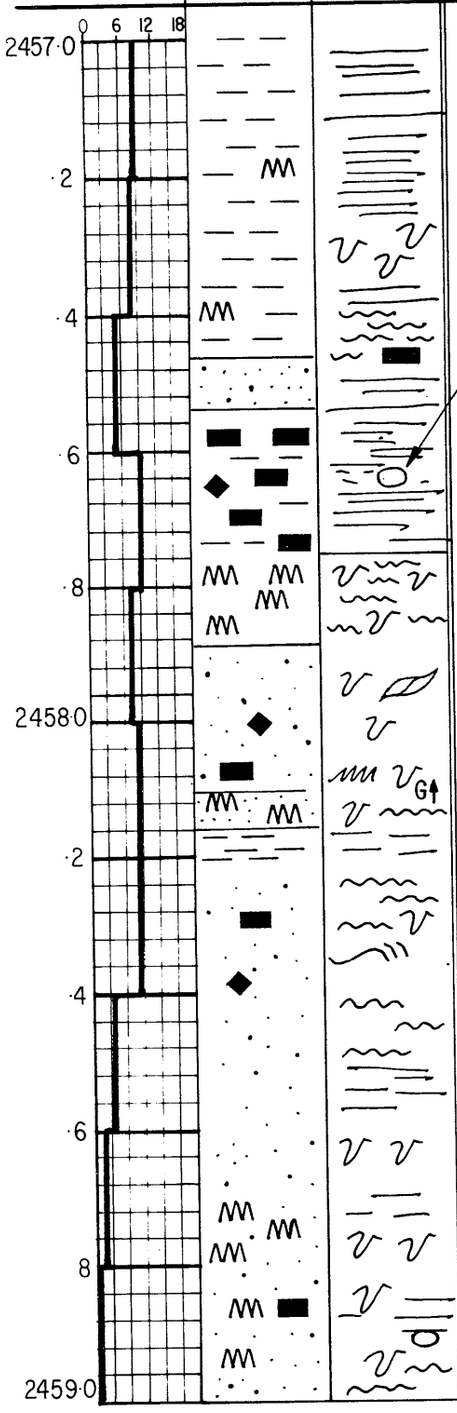
WELL FORTESCUE-4

SCALE 1:10

CORE No. 6

Interval Cored 2451.4-64.6m Cut 13.2m Recovered 10.17m ( 76 %) Fm. LATROBE

Bit Type C22 Bit Size 8.47" in., Desc by G.M. KJELLGREN P. ELZE V. ZIOULKOWSKI Date 30.3.79




| ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY |
|---|---|---|---|---|---|---|---|---|
| LAGOONAL | PROXIMAL LAGOONAL | Very Fine to Silt. Very Fine Sandstone. Minor Coarse Sandstone. Shale. Fine Sandstone. Siltstone. Coaly Shale. Coarse Sdstone. Shale with Minor Silt. | Drapes on Sandstone<br>Grades to Shale | S<br>S<br>G | Light GREY to Med. BROWN. GREY. Lt BROWN. Lt GREY. Dark BROWN. BLUE GREY. | ⊕ Patchy Lt. BROWN Residum & Staining | | |

REMARKS

SANDSTONE: Moderate friable fine grained, well sorted. Quartz grains sub-angular to sub-rounded. Pyrite coated. Patchy light brown staining. numberous coaly fragments.

SANDSTONE as above, solid black residue infills pores. No fluoresence, however instantaneous white streaming cut. Bright yellow white crush cut, red/brown cut residue.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

SHEET 5 of 7

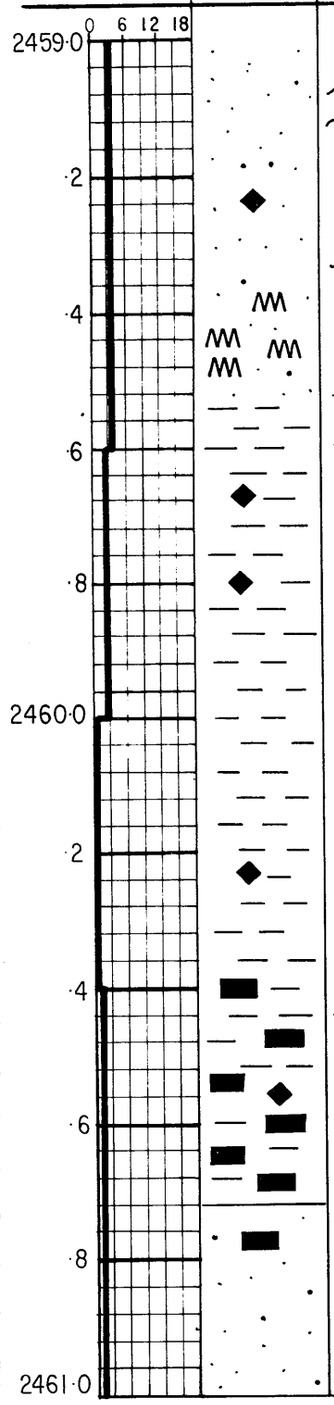
WELL FORTESCUE-4

SCALE 1:10

CORE No. 6

Interval Cored 2451.4-64.6m Cut 13.2m Recovered 10.17m ( 76 %) Fm. LATROBE

Bit Type C22 Bit Size 8.47" in., Desc by G.M. KJELLGREN P ELZE V. ZIOULKOWSKI Date 30.3.79




| ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY |
|---|---|---|---|---|---|---|---|---|
| LAGOONAL | CHANNEL DISTAL LAGOONAL | Carbonaceous Shale becoming Coaly at Base. | Drapes on Sandstone | G | GREY BLACK to Dark BROWN | Residue Infilling Pores | | |
| | | | | S | GREY BROWN | | | GOOD |

REMARKS

SANDSTONE As above however more micaceous. Residue in pores. No cut No fluorescence.

SILTSTONE, carbonaceous very hard, fissile fine grained.

SHALE Carbonaceous black very hard fissile. Micaceous pyritic.

SANDSTONE. Quartzose well sorted, friable coarse, sub-angular. Good visible porosity traces pyrite and clay.

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

WELL FORTESCUE-4



SCALE 1:10

CORE No. 6

Interval Cored 2451.4-64.6m Cut 13.2m Recovered 10.17m ( 76 %) Fm. LATROBE

Bit Type C22 Bit Size 8.47" in., Desc by G.M. KJELLGREN P. ELZE V. ZIOULOWSKI Date 30.3.79

| DEPTH & DRILLING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 6 12 18 | | | | | | | | | | | | |
| 2461·0 | | 10° | LAGOONAL | PROXIMAL CHANNEL | Siltstone & Med-Coarse Sdstone | | S | Lt. GREY to Dk.BROWN Med. BROWN | | | | SILTSTONE |
| ·2 | | | | | | | | | | | | Micaceous, silt to |
| ·4 | | G | | LAGOONAL | V. Fine Sandstone | | | | | | | fine sand, dark carbon- |
| ·6 | | | | | | | | | | | | aceous bands. Slightly |
| ·8 | | | | | | | | | | | | friable. |
| 2462·0 | | | | | | | | | | | | |
| ·2 | | | | | | | | | | | | |
| ·4 | | | | | | | | | | | | |
| ·6 | | | | | | | | | | | | |
| ·8 | | | | | | | | | | | | |
| 2463·0 | | | | | | | | | | | | |

Dwg. 1107/OP/87

ESSO AUSTRALIA LTD.

# CORE DESCRIPTION

WELL FORTESCUE-4



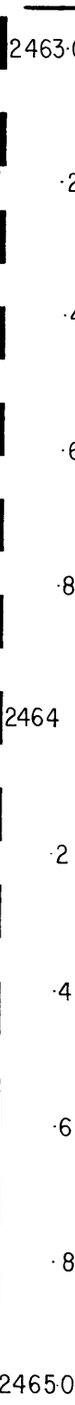
SCALE 1:10

CORE No. 6

Interval Cored 2451.4-64.6m Cut 13.2m Recovered 10.17m ( 76 %) Fm. LATROBE

Bit Type C22 Bit Size 8.47" in., Desc by G.M. KJELLGREN, P. ELZE, V. ZIOULSOWSKI Date 30.3.79

| DEPTH & CORING RATE m/hr | COMPOSITION | BEDDING & STRUCTURES | ENVIRONMENT | FACIES | TEXTURE | TEXTURAL CHANGE | CONTACTS | COLOR | OIL STN | CEMENT | POROSITY | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 6 12 18 | | | | | | | | | | | | |



# CORE DESCRIPTIONS

## FORTESCUE-4

## CORE-1

| DEPTH | DESCRIPTION |
|---|---|
| | 2390m-2402.4m |
| 2396.0m | Shale - calcareous silty Claystone, firm, fissile, trace glauconite, trace pyrite, trace mica, trace carbonaceous flecks, occasional forams. |
| 2397.0m | Shale - As above. |
| 2398.0m | Shale - As above, glauconitic, pyritic, fossiliferous - forams. |
| 2399.0m | Shale - calcareous silty Claystone, fissile, firm, brittle, glauconitic, very pyritic - pyrite as large nodular aggregates, trace mica, bedding planes defined by variations in mineral and fossil content, trace of amber mineral present, very fossiliferous, mainly forams. |
| 2400.0m | Shale - calcareous silty Claystone, fissile, firm, brittle, trace glauconite, trace pyrite, trace mica, occasional forams. |
| 2401.1m | Shale - calcareous silty Claystone, fissile, firm, highly mottled, medium grey to olive green to brown, glauconite and pyrite common, trace mica, trace carbonaceous flecks, trace of amber mineral, occasional forams present. |
| 2402.2m | Shale - As above. |
| 2390.0m | Shale - calcareous silty Claystone, medium grey fissile, firm, trace pyrite, trace mica, trace glauconite,very fossiliferous, mainly forams. |
| 2391.1m | Shale - calcareous silty Claystone, fissile, medium grey to olive grey, glauconitic, pyritic - pyrite occurring as small needles, also clear amber colour mineral common as 1mm diameter pellets, trace mica, very fossiliferous, mainly forams. |
| 2392.1 | Shale - As above, pyrite in granular aggregates and 2mm wide vein only a few forams present. |
| 2393.0m | Shale - As above, very glauconitic, very little pyrite present, fossiliferous, mainly forams. |
| 2394.0m | Shale - calcareous silty Claystone, fissile, firm, medium grey, trace glauconite, trace pyrite - mainly as needle like crystals, trace mica, trace forams. |
| 2395.0m | Shale - calcareous silty Claystone, fissile, firm, medium grey to olive green, glauconitic, pyritic - both needles and aggregate veins - possible burrow infilling. Trace mica, trace of amber mineral also present, occasional forams. |

CORE DESCRIPTIONS

G.M. KJELLGREN

FORTESCUE-4

27/3/79

CORE-2

| DEPTH | DESCRIPTION |
|---|---|
| | 2402.4m-2411.4m KB. |
| 2402.5m | Shale - mottled medium olive to brown to olive grey, common pyrite, minor carbonaceous matter, glauconite and mica. Minor calcareous foraminifera. Shale is hard and brittle with dominant sub-horizontal cleavage. |
| 2403.5m | Shale - As above, grading to:<br>Clayey Foraminiferal Rock - white to cream to light grey, composed of up to 90% forams (mainly benthonics?) silt sized, usually recrystallised, and occasionally replaced with some glauconite and pyrite, calcareous cement, remainder of rock is olive brown clay, pyrite, carbonaceous matter. |
| 2404.6m | Foraminiferal Shale |
| 2405.5m | Foraminiferal Rock - clayey, as above. |
| 2406.5m | Shale - As above. |
| 2407.1m | Clayey Foraminiferal Rock - As above. |
| 2408.5m | Shale - As above, few forams, common pyrite, glauconite and carbonaceous matter. |
| 2409.1m | Clayey Foraminiferal Rock - As above.<br>Larger casts, up to 5mm, comprising dark brown iron rich carbonate (?) replacing pelecypoda and other grastropods. |
| 2410.4m | Clayey Foraminiferal Rock - medium brown to grey, grading more clayey as with above. |
| 2411.4m | Shale - with abundant forams inpart, where lighter grey. |

CORE DESCRIPTIONS

FORTESCUE-4

CORE-3

| DEPTH | DESCRIPTION |
|---|---|
| | 2411.4m-2425.2m |
| 2418.0m | Sandstone - medium grey, quartzose, very fine to fine grained, clear to milky, colour masked with overall light orange oil staining, abundant mica - clear, medium brown and green, well sorted, subangular to subrounded, trace glauconite and pyrite. Sandstone is firm to very firm, non-calcareous. Part of the Sandstone is tight with some more pyrite cement and darker grey, typically less fluorescent. Even homogeneous bright blue to white fluorescence, immediate even streaming blue to white cut, thick white fluorescent residue cut. |
| 2421.65m | Sandstone - As above, quick pyritic and similarly carbonaceous or finely micaceous in part (medium to dark brown). |
| 2422.5m | Sandstone - As above, with some occasional medium grained quartz. Tight zone of lesser fluorescence are typically more pyritic and micaceous. |
| 2411.6m | Glauconitic Foraminiferal Shale - medium to dark grey, abundant silt-size benthonic forams, often recrystallised and replaced by glauconite, glauconite common, up to 2mm, common carbonaceous matter, minor pyrite. Hard with some sub-horizontal cleavage. |
| 2412.6m | Clayey Foraminiferal Rock - light to medium grey, abundant forams up to 0.5mm interbedded with some brown to grey clay, glauconite abundant, trace pyrite, minor carbonaceous matter. Few dark brown homogeneous rounded micro structures (?). |
| 2413.4m | Glauconitic Foraminiferal Shale - As above, but with some common pyrite, rare dark brown carbonate clasts of coprolitis (?) or "Turribella" - like forams. |
| 2414.45m | Glauconitic Foraminiferal Shale - medium grey with some abundant glauconite crystalline aggregates, the unusual aspect of this rock is that approximately 50% of the glauconite has been oxidised to a gold-yellow limonite, in part it has completely replaced the glauconite, larger benthonics have been replaced both by glauconite and limonite or have infillings of such. Minor dark brown carbonate skeletal debris, rare medium grained, subangular to subrounded, clear quartz crystalline, minor carbonaceous matter. |
| 2415.5m | As above, but more limonite, both replacing glauconite in the groundmass (replacing pyrite?). |
| 2416.65m | Limonite Shale - As above, forams less common, usually as moulds or lemonish and rare glauconite casts, rare in green quartz grains, occasionally very coarse grained, glauconite becoming rare. |
| 2417.2m | Glauconitic Shale - dark green to grey, very glauconitic, minor pyrite, grading in this sample to a wholly pyritic - minor glauconite rock, few forams, generally as glauconite casts. Common medium to very coarse grained, subangular to rounded, clear to milky quartz. Calcareous, very firm to hard where pyritic. |
| 2417.5m | Glauconitic Shale - medium to dark grey to brown, very glauconitic, pyritic. Common, medium to very coarse grained, subangular to rounded, clear to milky quartz grains, non-calcareous, very firm to hard, very rare forams. |
| 2417.75m | Very Fine Sandstone - medium to dark grey quartzose, glauconitic, carbonaceous. Quartz - very fine grained, angular to subrounded, moderate to well sorted, very slight, dull to yellow fluorescence, no visible cut. |

# CORE DESCRIPTIONS

## FORTESCUE-4

## CORE-4

| DEPTH | DESCRIPTION |
|---|---|
| | 2425.5m-2438.2m |
| 2426.2m | Sandstone - light grey to green grey, quartzose, fine grained, angular to subrounded, moderate to well sorted, clear to milky grains, trace mica, trace carbonaceous matter (very fine laminae 100% mica). Friable to hard. Low visual porosity. Even bright blue white fluorescence. Petroliferous odour, instantaneous bright milky cut. Spotty heavy bright yellow white residue. |
| 2427.0m | Sandstone - light grey, quartzose, friable, very fine to medium grained, moderately sorted, angular to subrounded clear grains, trace mica, low visual porosity. Even bright blue white fluorescence. Petroliferous odour. Immediate streaming bright milky cut. Even heavy bright yellow white residue. |
| 2428.0m | Sandstone - light grey, quartzose, fine to granular, poorly sorted, very friable, angular to rounded, clear and milky grains, some smokey, high visual porosity. Dull even fluorescence with bright spotty fluorescence, petroliferous odour, immediate streaming. Bright milky cut, bright residual ring. |
| 2428.7m | Sandstone - yellow brown quartzose, friable, fine to coarse grains, moderate to well sorted, subangular to subrounded, clear and milky grains Even bright fluorescence. Petroliferous odour, immediate bright milky cut. Good visual porosity. |
| 2430.7m | Sandstone - yellow brown, fine to medium grained quartzose, friable, subangular to subrounded, well sorted, clear to smokey grains. Good visual porosity, trace mica, bright even fluorescence, petroliferous odour, immediate bright milky cut. |
| 2431.0m | Sandstone - as at 2426.0m.<br>Bright even fluorescence along sand beds. CArbonaceous, micaceous, laminae common. No visual porosity. Slow streaming bright milky cut. |
| 2432.0m | Sandstone - As above, bioturbated. |
| 2433.7m | Sandstone - medium light grey to yellow brown quartzose, friable, fine to granular, subangular to rounded, poorly sorted, clear to smokey grains, fair to good visual porosity. Bright even fluorescence slightly flushed at edge of core. Petroliferous odour instantaneous bright milky cut. |
| 2434.0m | Sandstone - As at 2432m.<br>Some micaceous/carbonaceous. Blebs and stringers. |
| 3435.0m | Sandstone - As above, fine grained, low visual porosity, bright even fluorescence, slow streaming milky cut. |
| 2436m | Sandstone - As above, micaceous laminae, pyritic. |
| 2436.4m | Sandstone - medium dark grey to yellow brown quartzose, very friable, fair to granular, subangular to rounded, poorly sorted, clear to smokey grains, high visual porosity, dull even bright spotty fluorescence, tends to be flushed out in areas of very high porosity and core edge. Petroliferous odour. Immediate streaming bright milky cut. |
| 2436.9m | Sandstone - As above, tend to be even coarser grained and more unconsolidated. |

FORTESCUE-4

CORE-5

| DEPTH | DESCRIPTION |
|---|---|
| 2442.8m | Conglomerate - light to medium grey, granular, very friable phenoclasts consist quartz granules, 2-4mm, subrounded to wellrounded, frosted, minor pyrite coating. Matrix predominantly coarse sand sized quartz, angular to subangular, clear to white, trace of pyrite and mica, minor brown staining on quartz grain. Good visual porosity.<br><br>Moderate - finely disseminated yellow to white fluorescence, immediate streaming green to white cut. Strong sweet odour. |
| 2443.1m | Sandstone - medium to dark grey, quartzitic, very friable, coarse to medium grains, moderately sorted, occasional granule sized quartz, subangular to angular quartz grains, clear, pyrite encrusted, massive, good visual porosity, trace glauconite, minor coarse staining, minor carbonaceous, micaceous lenses.<br><br>Moderate, yellow to white fluorescence, spotted, immediate streaming milky cut. Petroliferous odour. |
| 2444.0m | Sandstone - quartzitic, medium grey, moderately friable, medium grained, well sorted, subangular, clear quartz grains, pyrite encrusted. Mica present in minor amounts - forms small lenses. Good visual porosity, restricted to coarser quartz zones. Some light brown staining. Subfissile.<br><br>Bright yellow even fluorescence. Immediate milky streaming cut. Petroliferous odour. |
| 2444.4m | Shale - Very Fine Sandstone - very dark brown, hard, fissile, consists predominantly of biotite with minor carbonaceous flecks.<br><br>Shale - no fluorescence or cut. Conglomerate. Bright yellow to white fluorescence. Cut - immediate milky streaming. Petroliferous odour.<br><br>Sandstone - quartzitic, light grey, firm, very fine grained quartz, subangular, clear grains, trace pyrite, micaceous, subfissile, tight. Minor light brown staining. Thin conglomeratic lazers containing quartz phenoclasts up to 6mm infilled with sandy matrix and showing common brown staining also present. |
| 2444.85m | Sandstone - pebbly to quartzitic, poorly sorted, pale grey brown, very friable, subfissile, quartz phenoclasts (30%) up to 10mm, well rounded, milky to blue grey, minor dusting of pyrite, matrix 70% consists of coarse to medium quartz grains, angular to subangular, clear. Trace pyrite, trace mica. Pale brown staining common, visual porosity moderate<br><br>Bright yellow fluorescence (even). Immediate milky streaming. Petroliferous odour. |
| 2445.4m | Sandstone - quartzitic, medium brown grey, moderate to friable, moderate to well sorted, subfissile, medium grain size. Quartz grains subangular to subrounded, clear. Trace mica, trace pyrite, moderate to good visual porosity. Very minor pale yellow brown stain.<br><br>Bright yellow even fluorescence. Instantaneous milky streaming cut. Petroliferous odour. |
| 2446.0m | Sandstone - quartzitic, very light brown grey, moderately friable, poorly sorted, coarse grained with occasional granules. Massive Quartz granules (20%) well rounded up to 6mm, clear to milky, trace pyrite coating. Coarse grained quartz, subangular to subrounded, clear. Trace pyrite. Visual porosity moderate. Pale brown stain common. Occasional coarse mica flakes. Trace glauconite. |

2/.....

CORE DESCRIPTIONS

FORTESCUE-4

CORE-5

| DEPTH | DESCRIPTION |
|---|---|
| 2446.0m | Bright yellow even fluorescence. Instantaneous milky streaming cut. Petroliferous odour. |
| 2446.2m | Granule Conglomerate, quartzose, light grey brown to friable. Poorly sorted. Coarse fraction well rounded fine fraction subangular. Coarse fraction up to 10mm fine fraction to 2mm, both consisting of milky and clear quartz. Trace pyrite and mica. Visible porosity - good. Some oil staining visible particularly in coarser section - Grain size shows progressive gradation fine grain to pebble size.<br><br>Slightly effervescent in acid. |
| 2446.9m | Quartzose Sandstone - grey to green, moderately friable. Medium to firm sand, angular grains to .5mm. Milky quartz as well as clear, well sorted with moderate visible porosity, trace pyrite and mica. Oil staining can be seen throughout.<br><br>Moderate, yellow white, even fluorescence.<br>Instant streaming white cut fluorescence, petroliferous odour, yellow brown cut residue. |
| 2447.5m | Quartzose Sandstone - very coarse sand, grey brown, subangular quartz, sand friable, poorly sorted with moderate visible porosity, trace pyrite on major quartz grains. No visible staining.<br><br>Weak spotty yellow white fluorescence. Instantaneous, streaming milky cut. Very pale light brown cut residue. |
| 2448.1m | Quartzose Sandstone - light grey, brown, medium grained sandstone with phenoclasts are going to very coarse sand size, friable. The finer fraction is angular while the phenoclasts are subrounded. Trace muscovite and pyrite. Visible porosity appears moderate. No visible staining.<br><br>Strong yellow white even fluorescence. Instantaneous, streaming white cut. Very pale yellow brown cut residue. |
| 2448.75m | Quartzose Sandstone - grey brown. Grain size ranging from medium to very coarse. Friable, subangular to subrounded. Poorly sorted. No visible stains. Trace muscovite and pyrite. Visible porosity moderate. Quartz predominantly milky.<br><br>Strong white even fluorescence. Instant streaming milky cut. |
| 2448.8m | Quartzose Pebbly Sandstone/Siltstone<br><br>Pebbly Sandstone - light grey brown, poorly sorted, friable, subrounded, no visible oil staining. Trace pyrite and muscovite.<br><br>Micaceous Siltstone - dark brown, biotite inclusions with phenoclasts of quartz ranging to pebble size.<br><br>Moderate yellow white spotty fluorescence. Instant streaming milky cut. |
| 2449.3 | Sandstone - quartzitic, medium grain, friable, quartz sandstone - grey brown in colour, subangular grains, predominantly of milky quartz. Grain size ranges grades from medium to coarse with phenoclasts up to granule size. Minor oil staining. Trace pyrite, flakey mica.<br><br>Moderate yellow white, even along bedding planes, fluorescence. Moderate to slow streaming milky cut, minor effervescence in acid. |

3/.....

CORE DESCRIPTIONS

FORTESCUE-4

CORE-5

| DEPTH | DESCRIPTION |
|---|---|
| 2449.7m | Sandstone - quartzitic, light brown grey, fine to moderately sorted, moderately friable, medium grained with occasional very coarse quartz. Angular to subangular, pyrite, occasional discreet mica flakes, minor orange staining, moderate visual porosity.<br><br>Strong yellow white even fluorescence in between micaceous layers. Immediate milky streaming cut. Petroliferous odour. |
| 2450.3m | Sandstone - quarzitic, light brown grey, very friable, massive, well sorted, coarse grained, angular to subangular quartz grains, clear, trace pyrite, trace mica, pale brown staining common, very good visual porosity.<br><br>Strong yellow white even fluorescence. Instantaneous streaming milky cut. Petroliferous odour. |
| 2450.65m | Sandstone - quartzitic, light grey, very friable, subfissile, contains thin micaceous rich bands, well sorted, fine to medium grained, sub-agnular quartz grains, clear, trace pyrite, patchy pale brown staining, moderate visual porosity.<br><br>Strong yellow white even fluorescence in Sandstone - none in mica bands. Instantaneous streaming milky cut. Petroliferous odour. |
| 2450.9m | Shale - micaceous, very hard, fissile, predominantly consists of biotite with minor plant fragments and minor quartz.<br><br>Very minor yellow spotty fluorescence. No cut, no odour. |

CORE DESCRIPTIONS

FORTESCUE-4

CORE-6

| DEPTH | DESCRIPTION |
|---|---|
| 2451.5m | Shale - black carbonaceous, fine silty in beddings, micaceous, laminated, fissile - coaly. |
| | No fluorescence. |
| 2451.75m | Sandstone - quartzose, grey, poorly sorted, larger grains subrounded, smaller grains, subangular, dirty, contains shaley and carbonaceous material. Grain size range - very coarse to fine. Trace pyrite, no visible staining (flushed?). Visual porosity, poor to moderate, friable. |
| | Very fine spotted dull yellow fluorescence. Instant, very bright milky cut. |
| 2452.06m | Sandstone - As above, except grain size ranges only to coarse and sample is more consolidated. Porosity - moderate. |
| | Very scattered fine yellow to white spotty fluorescence. Weak pale yellow white streaming cut. |
| 2452.6m | Coal/Sandstone Interbeds. Sandstone (quartz) - light brown grey, fine to medium grain size, subangular quartz fragments, some quartz staining observed. Coal - finely laminated. Visual porosity in Sandstone, poor to moderate. Small spots of residual hydrocarbon observed. |
| | Very weak scattered dull yellow fluorescence. Very weak to weak, slowly streaming pale yellow cut. Very slow pale yellow, streaming crush cut. |
| 2452.95m | Sandstone - quartzose, brown grey, grain size range from fine to granule granule clasts rounded finer grains, subangular. Pyrite - trace. Brown residuum. Visual porosity moderate, friable. |
| | No fluorescence, no cut. |
| 2453.22 | Sandstone - As above. |
| | No fluorescence, no cut. |
| 2453.59m | Sandstone - quartzose, light brown grey, fine grain size. No staining, subangular, moderately consolidated. Some carbonaceous bands with mica inclusions. |
| | No fluorescence, no cut. |
| 2454.1m | Sandstone - quartzose, medium brown grey, very friable, massive, poorly sorted, medium to very coarse. Very coarse quartz grains, well rounded, milky to blue grey, pyrite coated. Medium grained quartz, angular to subangular, clear. Orange brown staining is common. Some black lithic fragments. Minor clay. Poor to moderate visual porosity. |
| | No fluorescence, no cut. |
| 2454.5m | Conglomerate, granule - medium grey, very friable, poorly sorted. Quartz grains rounded to wellrounded in coarse fraction, frosted, pyrite coated. Matrix consists of medium sand side. Orange brown stain common. Good visual porosity. |
| | No fluorescence, no cut. |
| 2455.06m | Sandstone - quartzose, medium brown grey, very friable as above. Brown staining common, visual porosity poor. |
| | No fluorescence, no cut. |

2/.....

CORE DESCRIPTIONS

FORTESCUE-4

CORE-6

| DEPTH | DESCRIPTION |
|---|---|
| 2455.35m | Shale - coaly, hard, black, fissile, occasional bright coal lenses, plant stems common. |
| | No fluorescence, no cut. |
| 2455.8m | Siltstone - carbonaceous, medium grey, fissile, micaceous, contains numerous carbonaceous streaks, plant stems common. |
| | No fluorescence, no cut. |
| 2456.22m | Sandstone - light to medium grey, moderate, friable, moderately sorted, flat bedded, contains organic rich discontinuous silty layers, quartz grains, angular to subangular, tight clay filled matrix. Patchy light brown staining, micaceous. |
| | Minor yellow spots. Slow white streaming (sample possibly contaminated?) |
| 2456.57m | Siltstone - As above. |
| | No fluorescence, no cut. |
| 2456.9m | Siltstone - grey black, very fine grained, very hard, micaceous, fissile abundant plant fragments, pyrite common. |
| | No fluorescence, very slow cut, trace show. |
| 2457.44m | Siltstone - As above, interbedded with resinous coaly layers. |
| | No fluorescence. |
| 2457.9m | Sandstone - light medium grey, moderately friable, fine grained, well sorted, flat bedded. Quartz grains subangular to subrounded, pyrite coated, clear to white, patchy light brown staining. Numerous coaly fragments. Micaceous, minor clay cement. Poor visual porosity. |
| | No fluorescence, very slow cut - trace show. |
| 2458.48m | Sandstone - medium grey, as above, pale brown staining. Solid black residue infilling pore spaces. |
| | No fluorescence. Instantaneous bright yellow white streaming cut. Bright yellow white streaming crush cut. Red brown residue. (Possibly due to solution of solid residue from pore spaces). |
| 2459.06m | Sandstone - As above, slightly more micaceous, black solid residue in pore spaces. |
| | No fluorescence, no cut, no crush cut. |
| 2459.6m | Siltstone - carbonaceous, very hard, fissile, very fine grained, micaceous, some plant fragments. |
| | No fluorescence. |
| 2460m | Shale - carbonaceous, grey black, very hard, fissile, micaceous, minor plant fragments. |
| | No fluorescence. |
| 2460.63m | Sandstone - Quartzose, well sorted, grey brown, friable coarse grain size, good visible porosity, subangular. Trace pyrite and clay. |
| | No fluorescence, no cut. |

3/.....

FORTESCUE-4

CORE-6

| DEPTH | DESCRIPTION |
|---|---|
| 2461.14m | As previous sample with more mica (biotite?). |
| 2461.42m | Siltstone - quartz rich, micaceous, grey,silt to fine sand size grains, some rare quartz phenoclasts to very coarse size, dark bands of carbonaceous material pervade the sample - very well consolidated. |

# 4. CORE ANALYSIS

APPENDIX 4

CORE ANALYSIS REPORT

CL-511-1

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS



# CORE ANALYSIS RESULTS

Company ESSO AUSTRALIA LTD | Formation | File WA-CA-40
Well FORTESQUE # 4 | Core Type | Date Report 17 April 1979
Field FORTESQUE | Drilling Fluid | Analysts DS
County AUSTRALIA State WA Elev. Location BASS STRAIT

## Lithological Abbreviations

SAND-SD, SHALE-SH, LIME-LM | DOLOMITE-DOL, CHERT-CH, GYPSUM-GYP | ANHYDRITE-ANHY, CONGLOMERATE-CONG, FOSSILIFEROUS-FOSS | SANDY-SDY, SHALY-SHY, LIMY-LMY | FINE-FN, MEDIUM-MED, COARSE-CSE | CRYSTALLINE-XLN, GRAIN-GRN, GRANULAR-GRNL | BROWN-BRN, GRAY-GY, VUGGY-VGY | FRACTURED-FRAC, LAMINATION-LAM, STYLOLITIC-STY | SLIGHTLY-SL/, VERY-V/, WITH-W/

| SAMPLE NUMBER | DEPTH ~~FEET~~ m. | PERMEABILITY MILLIDARCYS KL | POROSITY PER CENT | RESIDUAL SATURATION PER CENT PORE OIL | RESIDUAL SATURATION PER CENT PORE TOTAL WATER | Calc Grain Density | SAMPLE DESCRIPTION AND REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | 2418.1 | 0.8 | 13.5 | 17.3 | 62.1 | 2.66 | SST: lt-med gy, fine grn, mod hd, mod-well sort, no vis mtx, sil cmtd, ang-sub ang, tr carb & mica, spotty blu wht flu, steaming yel cut. |
| 2 | 2420.5 | <0.1 | 11.7 | | | 2.71 | SST: no flu or cut. |
| 3 | 2421.75 | 0.4 | 13.1 | 7.3 | 81.9 | 2.70 | SST: lt-med gy, silty-vf grn, hd, mod-well sort, si cmt, subang-ang, carb silty lams, tr mica, patchy crm flu, slow cut. |
| 4 | 2422.6 | 0.7 | 12.9 | 5.7 | 82.6 | 2.70 | SST: A/A, med dk gy. |
| 5 | 2422.9 | <0.1 | 10.9 | | | 2.75 | SST: A/A, med dk gy, no fl or cut. |
| 6 | 2423.3 | 0.1 | 12.9 | | | 2.71 | SST: A/A, med dk gy, some cly mtx, no flu or cut. |
| 7 | 2423.65 | <0.1 | 11.9 | | | 2.70 | SST: dk gy-blk, silm-vf gr mod hd, well sort, minor cly mtx, sil cmtd, ang-sub ang, tr carb silty lams & mica, no flu or cut. |
| 8 | 2424.3 | <0.1 | 11.1 | | | 2.71 | SST: A/A. |
| 9 | 2425.3 | <0.1 | 10.1 | | | 2.71 | SST: A/A, hd. |
| 10 | 2425.95 | 314 | 22.9 | | | 2.62 | SST: lt gy-buff, med grn, mod hd, mod sort, minor calcite cmt, ang-subang, t carb lams & mica, yel flu, streaming milky yell cut. |
| 11 | 2426.2 | 1.2 | 11.4 | 20.1 | 76.8 | 2.64 | SST: lt-dk gy, f-med grn, well sort, sil cmt, ang-su ang, tr py, carb & mica, b wht flu instant yell cut. |
| 12 | 2426.8 | 187 | 19.3 | 21.2 | 49.3 | 2.62 | SST: lt gy-buff, f-crse, occ pebbles, poor sort, minor calcite cmt, tr py mica & carb, flu and cut A/A. |

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS



# CORE ANALYSIS RESULTS

Company ESSO AUSTRALIA LTD  Formation  File WA-CA-40
Well FORTESQUE # 4  Core Type  Date Report 17 April 1979
Field FORTESQUE  Drilling Fluid  Analysts DS
County AUSTRALIA State WA Elev. Location EASS STRAIT

## Lithological Abbreviations

SAND-SD, SHALE-SH, LIME-LM; DOLOMITE-DOL, CHERT-CH, GYPSUM-GYP; ANHYDRITE-ANHY, CONGLOMERATE-CONG, FOSSILIFEROUS-FOSS; SANDY-SDY, SHALY-SHY, LIMY-LMY; FINE-FN, MEDIUM-MED, COARSE-CSE; CRYSTALLINE-XLN, GRAIN-GRN, GRANULAR-GRNL; BROWN-BRN, GRAY-GY, VUGGY-VGY; FRACTURED-FRAC, LAMINATION-LAM, STYLOLITIC-STY; SLIGHTLY-SL/, VERY-V/, WITH-W/

| SAMPLE NUMBER | DEPTH XXXX m. | PERMEABILITY MILLIDARCYS KL | POROSITY PER CENT | RESIDUAL SATURATION PER CENT PORE OIL | RESIDUAL SATURATION PER CENT PORE TOTAL WATER | Calc Grain Density | SAMPLE DESCRIPTION AND REMARKS |
|---|---|---|---|---|---|---|---|
| 13 | 2427.3 | 139 | 19.6 | | | 2.62 | SST: A/A. |
| 14 | 2427.7 | 99 | 17.6 | 22.4 | 52.3 | 2.63 | SST: lt gy-buff, crse-v/cr grn, firm, poor sort, sil cmtd, ang-subrnd, tr mica py, flu and cut A/A. |
| 15 | 2427.9 | 96 | 12.4 | 23.9 | 56.9 | 2.63 | SST: A/A, v/crse-pebbly. |
| 16 | 2428.1 | 895 | 23.2 | 4.6 | 68.0 | 2.61 | SST: lt brn, med-crse, fir -mod hd, mod-well sort, si ty mtx, calcitecmt, subrnd-subang, blu wht flu, fast yell cut. |
| 17 | 2428.4 | 704 | 23.1 | | | 2.61 | SST: A/A, minor pebbles. |
| 18 | 2428.6 | 630 | 22.1 | 7.5 | 69.3 | 2.61 | SST: A/A, crse grn. |
| 19 | 2428.7 | 825 | 21.5 | 6.0 | 75.8 | 2.60 | SST: A/A, crse grn. |
| 20 | 2429.3 | 397 | 21.8 | 7.8 | 72.5 | 2.60 | SST: A/A, crse grn, friabl |
| 21 | 2429.4 | 435 | 21.4 | 6.0 | 73.1 | 2.61 | SST: A/A, crse grn, friabl |
| 22 | 2429.8 | 302 | 23.1 | 5.4 | 74.7 | 2.60 | SST: A/A, crse grn, firm-mod hd. |
| 23 | 2430.4 | 636 | 22.9 | 5.6 | 77.0 | 2.59 | SST: A/A, med-crse, friabl -firm. |
| 24 | 2431.1 | 39 | 16.6 | | | 2.62 | SST: med gy, vf-f grn, hd, mod sort, sil cmtd, subang tr carb & mica lams, patch cream flu, fast yell cut. |
| 25 | 2431.85 | 40 | 17.0 | | | 2.61 | SST: A/A. |
| 26 | 2432.35 | 87 | 19.9 | | | 2.63 | SST: A/A, blu wht flu, fas yell cut. |
| 27 | 2432.9 | 12 | 16.0 | 22.0 | 59.2 | 2.62 | SST: lt gy, fine-med grn, mod hd, A/A. |
| 28 | 2433.4 | 0.9 | 11.5 | | | 2.61 | SST: med gy, vf-f, hd, A/A |
| 29 | 2433.9 | 249 | 24.0 | 16.5 | 58.3 | 2.61 | SST: med gy, crse-pebbly, mod hd, poor sort, cly mtx calcite cmt, subang-ang, t chlorite flu & cut A/A. |
| 30 | 2434.5 | 241 | 22.3 | | | 2.62 | SST: med gy, med grn, mod sort, sil cmt, subang, tr chlorite. |

CL-511-1

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS



# CORE ANALYSIS RESULTS

Company ESSO AUSTRALIA LTD  Formation  File WA-CA-40
Well FORTESQUE # 4  Core Type  Date Report 17 April 1979
Field FORTESQUE  Drilling Fluid  Analysts DS
County AUSTRALIA State WA Elev. Location BASS STRAIT

## Lithological Abbreviations

SAND-SD, SHALE-SH, LIME-LM
DOLOMITE-DOL, CHERT-CH, GYPSUM-GYP
ANHYDRITE-ANHY, CONGLOMERATE-CONG, FOSSILIFEROUS-FOSS
SANDY-SDY, SHALY-SHY, LIMY-LMY
FINE-FN, MEDIUM-MED, COARSE-CSE
CRYSTALLINE-XLN, GRAIN-GRN, GRANULAR-GRNL
BROWN-BRN, GRAY-GY, VUGGY-VGY
FRACTURED-FRAC, LAMINATION-LAM, STYLOLITIC-STY
SLIGHTLY-SL/, VERY-V/, WITH-W/

| SAMPLE NUMBER | DEPTH ~~FEET~~ m. | PERMEABILITY MILLIDARCYS KL | POROSITY PER CENT | RESIDUAL SATURATION PER CENT PORE OIL | RESIDUAL SATURATION PER CENT PORE TOTAL WATER | Calc Grain Density | SAMPLE DESCRIPTION AND REMARKS |
|---|---|---|---|---|---|---|---|
| 31 | 2434.9 | 83 | 19.0 | | | 2.61 | SST: A/A, f-med grn, tr silty carb lams, no chlorit |
| 32 | 2435.4 | 105 | 20.1 | 18.4 | 52.8 | 2.62 | SST: med gy, vf-f, hd, mod-well sort, sil cmt, subang-subrnd, tr carb, mica, blu wht flu fast yell cut. |
| 33 | 2435.9 | 131 | 21.5 | | | 2.60 | SST: A/A, med gy, vf-f, hd. |
| 34 | 2436.3 | 270 | 20.6 | 18.9 | 55.7 | 2.62 | SST: A/A, f-pebbly, mod h poor sort, minor calcite. |
| 35 | 2437 | 109 | 19.0 | 2.4 | 78.4 | 2.59 | SST: A/A, med-pebbly, v/fr able, poor sort, calcite smtd. |
| 36 | 2437.1 | 356 | 21.1 | 2.1 | 69.8 | 2.61 | SST: med gy-brn, med-pebbl v/friable, poor sort, calcite cmt, subang-subrnd tr coal, blu wht flu, slow wht cut. |
| 37 | 2443.1 | 597 | 15.9 | 5.7 | 84.8 | 2.62 | SST: A/A, minor cly mtx. |
| 38 | 2443.65 | 49 | 17.0 | 15.9 | 53.0 | 2.64 | SST: med gy, fine grn, hd, well sort, cly mtx, sil cm subang-subrnd, tr carb & mica, blu wht flu instant wht cut. |
| 39 | 2444.1 | 159 | 21.8 | 18.4 | 50.0 | 2.64 | SST: A/A, med to occ pebbl poor sort, tr mica. |
| 40 | 2444.5 | 280 | 23.5 | 12.5 | 56.6 | 2.60 | SST: med gy, med grn, firm friable, well sort, calcit cmt, subang, tr carb & mic blu wht flu, fast yel cut. |
| 41 | 2444.95 | 72 | 21.6 | 17.4 | 52.2 | 2.63 | SST: A/A, lt gy, firm-mod hd, sil cmt. |
| 42 | 2445.65 | 353 | 21.0 | 18.2 | 49.6 | 2.62 | SST: med gy, med pebbly, h poor sort, sil cmt, ang-su rnd, tr carb & mica, yell flu, fast wht cut. |
| 43 | 2446 | 274 | 21.4 | 19.6 | 47.0 | 2.61 | SST: A/A. |

CL-511-1

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS



# CORE ANALYSIS RESULTS

Company ESSO AUSTRALIA LTD | Formation | File WA-CA-40
Well FORTESQUE # 4 | Core Type | Date Report 17 Rpril 1979
Field FORTESQUE | Drilling Fluid | Analysts DS
County AUSTRALIA State WA Elev. Location BASS STRAIT

## Lithological Abbreviations

SAND-SD, SHALE-SH, LIME-LM | DOLOMITE-DOL, CHERT-CH, GYPSUM-GYP | ANHYDRITE-ANHY, CONGLOMERATE-CONG, FOSSILIFEROUS-FOSS | SANDY-SDY, SHALY-SHY, LIMY-LMY | FINE-FN, MEDIUM-MED, COARSE-CSE | CRYSTALLINE-XLN, GRAIN-GRN, GRANULAR-GRNL | BROWN-BRN, GRAY-GY, VUGGY-VGY | FRACTURED-FRAC, LAMINATION-LAM, STYLOLITIC-STY | SLIGHTLY-SL/, VERY-V/, WITH-W/

| SAMPLE NUMBER | DEPTH xxxx m. | PERMEABILITY MILLIDARCYS KL | POROSITY PER CENT | RESIDUAL SATURATION PER CENT PORE: OIL | TOTAL WATER | Calc Grain Density | SAMPLE DESCRIPTION AND REMARKS |
|---|---|---|---|---|---|---|---|
| 44 | 2446.45 | 432 | 21.1 | 18.0 | 41.2 | 2.62 | SST: A/A, f-pebbly, mod hd-hd. |
| 45 | 2446.9 | 212 | 20.9 | 23,9 | 42.8 | 2.61 | SST: A/A, fine grn, hd, mod sort, silty carb lams. |
| 46 | 2447.4 | 252 | 23.7 | 20.8 | 43.4 | 2.63 | SST: A/A, med grn, mod hd, mod sort, some calcite cmt, tr carb, blu wht flu, fast wht cut. |
| 47 | 2447.8 | 185 | 19.2 | 7.1 | 51.1 | 2.61 | SST: med gy, med pebbly, hd por sort, cly mtx, calcite cmt, ang-subrnd, carb & mic flu and cut A/A. |
| 48 | 2448.2 | 421 | 19.9 | 21.8 | 51.7 | 2.61 | SST: A/A. |
| 49 | 2448.65 | 303 | 19.6 | 15.8 | 62.2 | 2.61 | SST: A/A, med-crse grn, poor sort, sil cmtd, minor cly. |
| 50 | 2449.1 | 303 | 22.5 | 12.4 | 59.0 | 2.61 | SST: A/A, subang. |
| 51 | 2449.5 | 374 | 22.5 | 17.2 | 50.5 | 2.61 | SST: med gy, crse-pebbly, mod hd, poor sort, sil cmtd subang-subrnd, silty carb lams, blu wht flu, fast yell cut. |
| 52 | 2449.95 | 340 | 21.9 | 11.6 | 65.8 | 2.61 | SST: A/A, med crse grn, mod sort, calcite cmt. |
| 53 | 2450.4 | 240 | 23.2 | 13.9 | 51.7 | 2.61 | SST: A/A, med grn, firm-mod hd, minor calcite. |
| 54 | 2450.9 | 600 | 24.1 | 2.9 | 61.6 | 2.61 | SST: A/A, med grn, mod hd-hd, sil cmtd, subang, sub-rnd, patchy yell wht flu, fast wht cut. |
| 55 | 2451.9 | 523 | 14.3 | 3.2 | 95.4 | 2.66 | SST; med-gy brn, v crse grn, v/friable, poor sort, cly mtx, calcite cmtd, ang-subrnd, carb, tr py. v/pat-chy flu, no cut. |
| 56 | 2452.2 | 245 | 15.3 | 1.5 | 93.4 | 2.66 | SST: A/A No flu or cut. |
| 57 | 2452.75 | 192 | 21.3 | 4.1 | 76.2 | 2.61 | SST: brn, med-crse& pebbly, mod hd-hd, poor sort, carb cly mtx, calcite cmtd, ang-subrnd, no flu or cut. |

CORE LABORATORIES, INC.
*Petroleum Reservoir Engineering*
DALLAS, TEXAS



# CORE ANALYSIS RESULTS

Company ESSO AUSTRALIA LTD | Formation | File WA-CA-40
Well FORTESQUE # 4 | Core Type | Date Report 17 April, 197
Field FORTESQUE | Drilling Fluid | Analysts DS
County AUSTRALIA State WA Elev. Location BASS STRAIT

## Lithological Abbreviations

SAND-SD, SHALE-SH, LIME-LM, DOLOMITE-DOL, CHERT-CH, GYPSUM-GYP, ANHYDRITE-ANHY, CONGLOMERATE-CONG, FOSSILIFEROUS-FOSS, SANDY-SDY, SHALY-SHY, LIMY-LMY, FINE-FN, MEDIUM-MED, COARSE-CSE, CRYSTALLINE-XLN, GRAIN-GRN, GRANULAR-GRNL, BROWN-BRN, GRAY-GY, VUGGY-VGY, FRACTURED-FRAC, LAMINATION-LAM, STYLOLITIC-STY, SLIGHTLY-SL/, VERY-V/, WITH-W/

| SAMPLE NUMBER | DEPTH ~~FEET~~ m. | PERMEABILITY MILLIDARCYS KL | POROSITY PER CENT | RESIDUAL SATURATION PER CENT PORE: OIL | RESIDUAL SATURATION PER CENT PORE: TOTAL WATER | Calc Grain Density | SAMPLE DESCRIPTION AND REMARKS |
|---|---|---|---|---|---|---|---|
| 58 | 2453.06 | 158 | 11.2 | 0 | 97.0 | 2.61 | SST: A/A, v/crse-pebbly, v/friable, cly mtx. |
| 59 | 2453.35 | 406 | 14.1 | 0.4 | 89.3 | 2.61 | SST: A/A, crse-pebbly, calcite cmtd, subang-subrnd. |
| 60 | 2453.7 | 181 | 18.6 | 0 | 90.0 | 2.61 | SST: brn, med-pebbly, v/friable, poor sort, calcite cmtd, subang, subrnd, carb & mica, no flu or cut. |
| 61 | 2453.1 | 992 | 14.4 | 0 | 97.1 | 2.62 | SST: A/A cly mtx. |
| 62 | 2454.5 | 1800 | 15.6 | 0 | 94.3 | 2.63 | SST: A/A, cly mtx. |
| 63 | 2454.8 | 1373 | 16.9 | 0 | 97.0 | 2.67 | SST: A/A, cly mtx, tr mica |
| 64 | 2455.2 | 760 | 19.6 | 0 | 96.4 | 2.61 | SST: brn, crse grn v/occ pebbles, mod hd-hd, poor sort, calcite cmtd, ang-subang, tr mica & carb, no flu or cut. |

# 5. PALYNOLOGY REPORTS

APPENDIX 5

PALYNOLOGY REPORT

# A PALYNOLOGICAL ANALYSIS OF

# FORTESCUE-4, GIPPSLAND BASIN.

by

H.E. STACY

Esso Australia Ltd
Paleontology Report 1979/14

May 10, 1979.

INTRODUCTION:

Twenty-one sidewall cores and seventeen samples from conventional cores were processed and examined for palynology. Palynomorph yield ranged from good to very poor, with eight samples so poor that stratigraphic determinations could not be made. Reprocessing of several of the poor yield samples did not improve the recovery enough that, in any case, additional stratigraphic information was obtained.

Zones and lithological/facies subdivisions of the basal Lakes Entrance Formation and Latrobe Group is summarized below. All samples examined are summarized in Table 1 and individual species occurrence is noted on the accompanying distribution sheets.

SUMMARY:

| UNIT/FACIES | ZONE | DEPTH (in metres) |
|---|---|---|
| LAKES ENTRANCE<br>Marl | P. tuberculatus | 2411.6 - 2416.65 |
| | UNCONFORMITY | |
| GURNARD FORMATION<br>Glauconitic Sandstone | Lower N. asperus | 2417.2 - 2417.75 |
| | UNCONFORMITY | |
| LATROBE GROUP<br>Coarse Clastics | Lower M. diversus | 2422 - 2498.8 |
| | Upper L. balmei | 2501 - 2598 |
| | | 2602m T.D. |

GEOLOGICAL COMMENTS:

1. This well is similar in stratigraphic sections and stratigraphic thickness to Fortescue-2.

2. A thin layer of Gurnard of less than 5 metres thickness is present between the Oligocene Lakes Entrance and the Lower Eocene Latrobe. Of this amount, only one-half a metre can be confirmed by palynology (the presence of Areosphaeridium dictyoplokus). Other samples from this interval (2418 to 2420 metres) did not yield stratigraphically restricted species.

.../2

3. Based on the presence of Deflandria dartmoria and Tetracolporites multistrixus from near the top of the M. diversus interval and the lack of any species believed to be restricted to Middle M. diversus sediments or younger, the Latrobe section is not believed to extend stratigraphically above the Lower part of the Malvacipollis diversus Zone.

4. Apectodinium hyperacantha was found in the basal M. diversus sample and in the uppermost L. balmei assemblage (2501m) and again in the sample from 2573.5 metres. Although A. hyperacantha was not found in the samples between 2500m and 2573.5m, other dinoflagellates were present in many of them, therefore, the A. hyperacantha Zone is considered to extend from 2498.8 to 2573.5 metres.

5. Cyathidites gigantus was found in the bottom sample (2598m), therefore it is believed that this well did not penetrate below the Upper part of the L. balmei section.

DISCUSSION OF ZONES:

Upper Lygistepollenites balmei Zone: 2501m - 2598m

The presence of Lygistepollenites balmei, Australopollis obscurus and Gambierina rudata all demonstrate that the enclosing sediments are stratigraphically below the Malvacipollis diversus Zone. The scattered occurrence of Cyathidites gigantis, Apectodinium homomorpha, Proteacidites grandis, and P. incurvatus are considered proof that these beds are no older than Upper L. balmei zone.

Lower Malvacipollis diversus Zone: 2422m to 2498.8m

The lack of stratigraphically older species, such as Lygistepollenites balmei, Australopollis obscurus and Gambierina rudata, as well as the presence of Proteacidites lapis, P. grandis, Malvacapollis diversus and Tricolpites gilli place these sediments in the Lower Eocene M. diversus zone. The presence of Deflandria dartmooria and Tetracolporites multistrixus indicate that only the lower part of the M. diversus zone is represented in this well section.

Lower Nothofagidites asperus Zone: 2417.2m to 2417.75m

The three samples attributed to this zone did not yield very large floras, but in each case, a number of specimens of Areosphaeridium dictyoplokus, the dinoflagellate marker for this zone, was found. The four samples between the lowest occurrence of definite Lower N. asperus markers (2417.75m) and the top of a recognizable M. diversus assemblage (2422m) are barren of diagnostic fossils, and this section cannot be assigned to any stratigraphic interval with confidence.

Proteacidites tuberculatus Zone: 2411.6m to 2416.65m

There is no doubt that the section between 2411.6m and 2414m is in the P. tuberculatus zone. Cyathidites annulatus, Protoellipsodinium simplex, Pyxidinospsis pontus and other post Eocene species are found in these samples. Below 2414 metres, however, the delineation is not as good. Recovery was very poor, even from reprocessed samples and fossils consisted mostly of long ranging, stratigraphically undiagnostic species. The assemblage obtained from the core sample at 2416.65 metres contained both Cyathidites annulatus and Protoellipsodinium simplex, markers for the P. tuberculatus zone, and specimens of Areosphaeridium dictyoplokus, the index of the Lower N. asperus zone. The sample is carried as from the P. tuberculatus zone (with a 2 rating), making the assumption that the presence of A. dictyoplokus is the result of reworking. Out of place fossils, also considered reworked was found in several of the shallower, P. tuberculatus, samples. Proteacidites pseudomoides, P. pachypolus and Areosphaeridium dictyoplokus were encountered in the flora from 2413.4m and Cyathidites splendens, Proteacidites recavus and P. crassus were present in the assemblage from the top sample at 2411.6m.

## REFERENCES

Stacy, H.E. 1979, Paleontological Analysis of Fortescue-2, Gippsland Basin, ESOA Paleo. Rept. 1979/4.

# PALYNOLOGY DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: 25m GL: 68m

WELL NAME: FORTESCUE-4 TOTAL DEPTH: 2602m

| AGE | PALYNOLOGICAL ZONES | HIGHEST DATA | | | | | LOWEST DATA | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Preferred Depth | Rtg | Alternate Depth | Rtg | Two Way Time | Preferred Depth | Rtg | Alternate Depth | Rtg | Two Way Time |
| NEOGENE | *T. pleistocenicus* | | | | | | | | | | |
| | *M. lipsis* | | | | | | | | | | |
| | *C. bifurcatus* | | | | | | | | | | |
| | *T. bellus* | | | | | | | | | | |
| | *P. tuberculatus* | 2411.6 | 1 | | | | 2416.65 | 2 | 2414 | 1 | |
| PALEOGENE | Upper *N. asperus* | | | | | | | | | | |
| | Mid *N. asperus* | | | | | | | | | | |
| | Lower *N. asperus* | 2417.2 | 1 | | | | 2417.75 | 1 | | | |
| | *P. asperopolus* | | | | | | | | | | |
| | Upper *M. diversus* | | | | | | | | | | |
| | Mid *M. diversus* | | | | | | | | | | |
| | Lower *M. diversus* | 2422 | 2 | 2425.2 | 1 | | 2498.8 | 1 | | | |
| | Upper *L. balmei* | 2501 | 1 | | | | 2598 | 1 | | | |
| | Lower *L. balmei* | | | | | | | | | | |
| LATE CRETACEOUS | *T. longus* | | | | | | | | | | |
| | *T. lilliei* | | | | | | | | | | |
| | *N. senectus* | | | | | | | | | | |
| | U. *T. pachyexinus* | | | | | | | | | | |
| | L. *T. pachyexinus* | | | | | | | | | | |
| | *C. triplex* | | | | | | | | | | |
| | *A. distocarinatus* | | | | | | | | | | |
| EARLY CRET. | *C. paradoxus* | | | | | | | | | | |
| | *C. striatus* | | | | | | | | | | |
| | *F. asymmetricus* | | | | | | | | | | |
| | *F. wonthaggiensis* | | | | | | | | | | |
| | *C. australiensis* | | | | | | | | | | |
| PRE-CRETACEOUS | | | | | | | | | | | |

COMMENTS: A. hyperacantha zone extends from 2498.8 to 2573.5m.

CONFIDENCE RATING:
- 0: SWC or Core, Excellent Confidence, assemblage with zone species of spores, pollen and microplankton.
- 1: SWC or Core, Good Confidence, assemblage with zone species of spores and pollen or microplankton.
- 2: SWC or Core, Poor Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.
- 3: Cuttings, Fair Confidence, assemblage with zone species of either spores and pollen or microplankton, or both.
- 4: Cuttings, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If an entry is given a 3 or 4 confidence rating, an alternative depth with a better confidence rating should be entered, if possible. If a sample cannot be assigned to one particular zone, then no entry should be made, unless a range of zones is given where the highest possible limit will appear in one zone and the lowest possible limit in another.

DATA RECORDED BY: HOWARD STACY DATE: MAY 8, 1979

DATA REVISED BY: _____ DATE: _____

# TABLE 1

## SUMMARY OF PALEONTOLOGICAL ANALYSES, FORTESCUE-4, GIPPSLAND BASIN

| SAMPLE | DEPTH (m) | DEPTH (ft) | ZONE | AGE | CONFIDENCE RATING | YIELD | DIVERSITY | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| Core 3 | 2411.6 | 7912 | P. tuberculatus | Oligocene | 1 | Low | Moderate | |
| SWC 38 | 2412* | 7913.4 | P. tuberculatus | Oligocene | 0 | Low | Moderate | |
| Core 3 | 2412.6 | 7915.4 | P. tuberculatus | Oligocene | 0 | Fair | Moderate | |
| Core 3 | 2413.4* | 7918 | P. tuberculatus | Oligocene | 2 | Low | Moderate | |
| SWC 37 | 2414 | 7920 | P. tuberculatus | Oligocene | 1 | Low | Poor | |
| Core 3 | 2414.45* | 7921.4 | Indeterminate | - | - | Very Low | Very Poor | Almost barren |
| Core 3 | 2415.5* | 7925 | P. tuberculatus | Oligocene | 2 | Low | Moderate | |
| SWC 36 | 2416 | 7926.5 | Indeterminate | - | - | Very Low | Very Poor | |
| Core 3 | 2416.65* | 7928.6 | P. tuberculatus | Oligocene | - | Low | Moderate | C. annulatus, P. simplex, A. dictyoplokus |
| Core 3 | 2417.2* | 7930.4 | Lower N. asperus | Middle Eocene | 1 | Low | Moderate | A. dictyoplokus |
| Core 3 | 2417.5 | 7931.4 | Lower N. asperus | Middle Eocene | 1 | Low | Poor | A. dictyoplokus |
| Core 3 | 2417.75 | 7932.3 | Lower N. asperus | Middle Eocene | 1 | Low | Moderate | Mostly plant fragments, A. dictyoplokus |
| Core 3 | 2418* | 7933 | Indeterminate | - | - | Barren | - | Barren |
| SWC 35 | 2418 | 7933 | Indeterminate | - | p | Very Low | Very Poor | Almost barren. |
| Core 3 | 2419.6 | 7938.3 | Indeterminate | - | - | Very Low | Poor | |
| SWC 34 | 2420* | 7939.6 | Indeterminate | - | - | Low | Poor | |
| SWC 30 | 2422 | 7946 | Lower M. diversus | Early Eocene | 2 | Fair | Moderate | |
| Core 4 | 2425.2 | 7956.7 | Lower M. diversus | Early Eocene | 1 | Fair | High | D. dartmooria, D. flounderensis |
| Core 4 | 2431 | 7975.7 | Lower M. diversus | Early Eocene | 2 | Fair | Poor | |
| Core 5 | 2444.4 | 8019.7 | Lower M. diversus | Early Eocene | 1 | Good | High | D. dartmooria, D. flounderensis |
| Core 5 | 2449.7 | 8037 | Indeterminate | - | - | Low | Very Poor | Almost barren. |
| Core 6 | 2451.5 | 8043 | Lower M. diversus | Early Eocene | 1 | Good | Moderate | |
| Core 6 | 24601 | 8070.2 | Lower M. diversus | Early Eocene | 1 | Good | Moderate | |
| SWC 24 | 2465.3 | 8088.3 | Lower M. diversus | Early Eocene | 1 | Good | Moderate | |
| SWC 23 | 2470.5 | 8105.3 | Lower M. diversus | Early Eocene | 1 | Good | High | |
| SWC 22 | 2474 | 8116.8 | Lower M. diversus | Early Eocene | 1 | Good | Moderate | |
| SWC 21 | 2478.7 | 8132.2 | Lower M. diversus | Early Eocene | 1 | Good | High | |
| SWC 16 | 2498.8 | 8198.2 | Lower M. diversus | Early Eocene | 1 | Good | High | A. hyperacantha |
| SWC 15 | 2501 | 8205.4 | Upper L. balmei | Paleocene | 1 | Fair | Moderate | A. hyperacantha |
| SWC 13 | 2520 | 8267.7 | Indeterminate | - | | Very Low | Very Poor | Almost barren |
| SWC 12 | 2525.6 | 8286 | Upper L. balmei | Paleocene | 1 | Good | High | |
| SWC 11 | 2531.5 | 8305.4 | Upper L. balmei | Paleocene | 1 | Fair | Moderate | |
| SWC 10 | 2544.2 | 8347 | Upper L. balmei | Paleocene | 1 | Low | Poor | |
| SWC 5 | 2573.5 | 8443.2 | Upper L. balmei | Paleocene | 2 | Good | High | A. hyperacantha |
| SWC 4 | 2581 | 8467.8 | Upper L. balmei | Paleocene | 2 | Good | High | |
| SWC 3 | 2585.5 | 8492.5 | Upper L. balmei | Paleocene | 1 | Good | Moderate | |
| SWC 2 | 2593 | 8507.2 | Upper L. balmei | Paleocene | 2 | Fair | Moderate | |
| SWC 1 | 2598 | 8523.6 | Upper L. balmei | Paleocene | 1 | Poor | Low | |

* Reprocessed Samples.

Well Name FORTESCUE-4 Basin GIPPSLAND Sheet No. 1 of 8

| SAMPLE TYPE * | C | S | C | C | S | C | C | S | C | C | C | C | C | S | C | S | S | C | C | C | C | C | C | S | S | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTHS / PALYNOMORPHS | 2411.6 | 2412 | 2412.6 | 2413.4 | 2414 | 2414.45 | 2415.5 | 2416 | 2416.65 | 2417.2 | 2417.5 | 2417.75 | 2418 | 2418 | 2419.6 | 2420 | 2422 | 2425.2 | 2431 | 2444.4 | 2449.7 | 2451.5 | 2460.1 | 2465.3 | 2470.5 | 2474 | 2487.7 | 2498.8 |
| *A. qualumis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *A. acutullus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *A. luteoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *A. oculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *A. sectus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *A. triplaxis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *A. obscurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *B. disconformis* | | | | | | | | | | | | | | | | | / | | | | | | | | | | | |
| *B. arcuatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *B. elongatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *B. mutabilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *B. otwayensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *B. elegansiformis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *B. trigonalis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *B. verrucosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *B. bombaxoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *B. emaciatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. bullatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. heskermensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. horrendus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. meleosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. apiculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. leptos* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. striatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. vanraadshoovenii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. orthoteichus/major* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *C. annulatus* | | | / | | | | / | | / | | | | | | | | | / | | | | | | / | | | | |
| *C. gigantis* | | | | | | | | | | | | RW | | | | | | / | | | | | | / | | | | |
| *C. splendens* | RW | | RW | | | | | | | | | | | | | | / | / | | | | | | / | / | / | | |
| *D. australiensis* | | | / | | | | | | | | | | | | | | / | / | | | | | | | | | | |
| *D. granulatus* | | | | | | | / | | / | | | / | | | | / | / | / | | | | | / | | / | | / | |
| *D. tuberculatus* | | | | | | | | | | | | | | | | | / | | | | | | | | | | | |
| *D. delicatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *D. semilunatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *E. notensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *E. crassiexinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *F. balteus* | | | | / | | | | | | | | | | | | | | | | | | | | | | | | |
| *F. crater* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *F. lucunosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *F. palaequetrus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *G. edwardsii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *G. rudata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *G. divaricatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *G. gestus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *G. catathus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *G. cranwellae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *G. wahooensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *G. bassensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *G. nebulosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *H. harrisii* | / | / | / | / | / | / | / | | / | / | | / | | / | | / | / | / | / | / | / | / | / | / | / | | / | / |
| *H. astrus* | | | | | | | | | / | | | | | | | | | | | | | | | | | | | |
| *H. elliottii* | | | | | | | | | | | | / | | | | | | | | | | | / | | | | | |
| *I. anguloclavatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *I. antipodus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *I. notabilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *I. gremius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *I. irregularis* | | | | | | | / | | / | | | | | | | | | | | | | | | | | | | |
| *J. peiratus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *K. waterbolkii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *L. amplus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *L. crassus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *L. ohaiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *L. bainii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *L. lanceolatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *L. balmei* | | | | | | | | | | | | | | | | RW | | | | | | | | | | | | |
| *L. florinii* | | | / | / | | | / | | / | | | | | | | | | / | | / | | / | / | / | / | | / | |
| *M. diversus* | | | | | | | | | | | | RW | | | RW | | | / | | / | | / | / | / | / | | / | |
| *M. duratus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *M. grandis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *M. perimagnus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

*C= core; S= sidewall core; T= cuttings.

Well Name FORTESCUE-4 Basin GIPPSLAND Sheet No. 2 of 8

| SAMPLE TYPE * | C | S | C | C | S | C | C | S | C | C | C | C | C | S | C | C | S | S | C | C | C | C | C | C | S | S | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTHS / PALYNOMORPHS | 2411.6 | 2412 | 2412.6 | 2413.4 | 2414 | 2414.45 | 2415.5 | 2416 | 2416.65 | 2417.2 | 2417.5 | 2417.75 | 2418 | 2418 | 2419.6 | 2420 | 2422 | 2425.2 | 2431 | 2444.4 | 2449.7 | 2451.5 | 2460.1 | 2465.3 | 2470.5 | 2474 | 2487.7 | 2498.8 |
| *M. subtilis* | | | | / | | | | | | | | / | | | | | | | | | | / | / | | | | / | |
| *M. ornamentalis* | | | | | | | / | | | | | | | | | | | | | | | | | | | | | |
| *M. hypolaenoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *M. homeopunctatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *M. parvus/mesonesus* | | | | | | | / | | | | | | | | | | | | | | | | | | | | | |
| *M. tenuis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *M. verrucosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *M. australis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *N. asperus* | | | / | | | | | | | | | | | | | | | | | | | | | | | | | |
| *N. asperoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *N. brachyspinulosus* | | / | | / | | / | / | / | / | / | | | | | | / | | | | | | / | | | | | / | |
| *N. deminutus* | | | | | | | / | | | / | | | | | | | | | | | | | | | | | | |
| *N. emarcidus/heterus* | | | / | | | | / | | / | | | | | | | | | | | | | | | | | | | |
| *N. endurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *N. falcatus* | / | / | | / | | / | / | | | | | | | | | | | | | | | | | | | | | |
| *N. flemingii* | | | | / | | | / | | / | | / | | | | | | | / | | / | | / | | / | | | / | |
| *N. goniatus* | | | | | | | / | | | | | | | | | | | | | | | | | | | | | |
| *N. senectus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *N. vansteenisii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *O. sentosa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. ochesis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. catastus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. demarcatus* | | | | | | | / | | | | | / | | | | | | | | | | | | | | | | |
| *P. magnus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. polyoratus* | | | | | | | | | | | | | | | | | / | | | / | | / | / | / | | | / | / |
| *P. vesicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. densus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. velosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. morganii/jubatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. mawsonii* | | | | | | | / | | | | | | | | | | | / | | | | | | | / | / | / | |
| *P. reticulosaccatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. verrucosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. crescentis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. esobalteus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. langstonii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. reticulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. simplex* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. varus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. adenanthoides* (Prot.) | | | | | | | | | | | | RW | | | | | | / | | / | | / | / | / | / | / | / | / |
| *P. alveolatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. amolosexinus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. angulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. annularis* | | | | RW | | | | | | | | | | | | | / | / | | / | | / | / | / | / | | / | |
| *P. asperopolus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. biornatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. clarus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. cleinei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. confragosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. crassis* | RW | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. delicatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. formosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. grandis* | | | | | | | | | | | | RW | | | | Rw? | | / | / | / | | / | / | / | / | / | / | / |
| *P. grevillaensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. incurvatus* | | | | | | | | | | | | | | | | | | / | | | | | | | | | | |
| *P. intricatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. kopiensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. lapis* | | | | | | | | | | | | | | | | | | / | | | | / | / | / | / | | | / |
| *P. latrobensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. leightonii* | | | | | | | | | | | | | | | | | | cf. | | | | | | | | | | |
| *P. obesolabrus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. obscurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. ornatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. otwayensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. pachypolus* | | | | RW | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. palisadus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. parvus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. plemmelus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. prodigus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. pseudomoides* | | | | RW | | | | | | | | | | | | | | / | / | / | | / | | | / | | | / |
| *P. recavus* | RW | | | | | | | | | | | | | | | | | | | | | | | | | | | |

*C= core; S= sidewall core; T= cuttings.

Well Name FORTESCUE-4 Basin GIPPSLAND Sheet No. 3 of 8

| SAMPLE TYPE * | C | S | C | C | S | C | C | S | C | C | C | C | C | S | C | S | S | C | C | C | C | C | C | S | S | S | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTHS / PALYNOMORPHS | 2411.6 | 2412 | 2412.6 | 2413.4 | 2414 | 2414.45 | 2415.5 | 2416 | 2416.65 | 2417.2 | 2417.5 | 2417.75 | 2418 | 2418 | 2419.6 | 2420 | 2422 | 2425.2 | 2431 | 2444.4 | 2449.7 | 2451.5 | 2460.1 | 2465.3 | 2470.5 | 2474 | 2487.7 | 2498.8 |
| *P. rectomarginis* | | | | | | | RW | | | | | | | | | | | | | | | | | | | | | |
| *P. reflexus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. reticulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. reticuloconcavus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. reticuloscabratus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. rugulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. scitus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. stipplatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. tenuiexinus* | | | | | | | | | | | | | | | | | | | | / | | / | / | | | | / | |
| *P. truncatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. tuberculatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. tuberculiformis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. tuberculotumulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *P. xestoformis* (Prot.) | | | | | | | | | | | | RW | | | | | | | | | | | | | | | | |
| *Q. brossus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *R. boxatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *R. stellatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *R. mallatus* | | | | | | | | | | | | / | | | | | | | | | | / | | | | | | |
| *R. trophus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *S. cainozoicus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *S. rotundus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *S. digitatoides* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *S. marlinensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *S. rarus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *S. meridianus* | | | | | | | | | | | | / | | | | | / | / | | / | | | / | | / | / | | |
| *S. prominatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *S. uvatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | / |
| *S. punctatus* | | | | | | | / | | / | | | | | | | | | | | | | | | | | | | |
| *S. regium* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. multistrixus (CP4)* | | | | | | | | | | | | | | | | | | / | | | | | | | | | / | / |
| *T. textus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | cf. |
| *T. verrucosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. securus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. confessus (C3)* | | | | | | | | | | | | | | | | | | | | / | | / | / | | / | | / | |
| *T. gillii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. incisus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. longus* | | | | | | | | | | | | | | | | | | | | | | / | | | | | | |
| *T. phillipsii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. renmarkensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. sabulosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. simatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. thomasii* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. waiparaensis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. adelaidensis (CP3)* | | | | | | | | | | | | | | | | | / | / | | | | | | | | | / | |
| *T. angurium* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. delicatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. geraniodes* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. leuros* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. lilliei* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. marginatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. moultonii* | | | | | | | | | | | | / | | | | | | | / | | | | | | | | | |
| *T. paenestriatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. retequetrus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. scabratus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. sphaerica* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. magnificus (P3)* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. spinosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. ambiguus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. chnosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. helosus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. scabratus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *T. sectilis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *V. attinatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *V. cristatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *V. kopukuensis* | | | | | | | | | | | | | | | | | | / | | | | | | | | | | |

*C = core; S = sidewall core; T = cuttings.

· Well Name FORTESCUE-4 Basin GIPPSLAND Sheet No. 4 of 8

| SAMPLE TYPE * | C | S | C | C | S | C | C | S | C | C | C | C | C | S | C | S | C | S | C | C | C | C | C | C | S | S | S | S | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTHS / PALYNOMORPHS | 2411.6 | 2412 | 2412.6 | 2413.4 | 2414 | 2414.45 | 2415.5 | 2416 | 2416.65 | 2417.2 | 2417.5 | 2417.75 | 2418 | 2418 | 2419.6 | 2420 | 2422 | 2425.2 | 2431 | 2444.4 | 2449.7 | 2451.5 | 2460.1 | 2465.3 | 2470.5 | 2474 | 2487.7 | 2498.8 |
| *Cleistosphaeridium* sp. | / | | | | | / | | | | | | | | | | | | | | | | | | | | | | |
| *H'kolpoma rigaudae* | / | / | / | | | / | | | / | | | | | | | | | | | | | | | | | | | |
| *Apteodinium australiense* | / | | | | | | | | / | | | | | | | | | | | / | | | | | | | | |
| *N'sphaeropsis divirgens* | / | | / | | | | | | / | | | | | | | | | | | | | | | | | | | |
| *Protoellip. simplex* | / | / | / | | / | / | | | / | | | | | | | / | | | | | | | | | | | | |
| *Spiniferites ramosus* | / | | / | | | | | | / | | | | | | | | | | | / | | | | | | | | |
| *Impagidinium sp.* | / | | / | | | | | | / | | | | | / | | | | | | | | | | | | | | |
| *Operc. centrocarpum* | | / | / | | / | / | / | | / | / | / | | | / | | / | | / | | / | | | | | | | | |
| *Dinosphaere sp.* | | / | / | / | / | | | | / | | | | | | | / | | | | | | | | | | | | |
| *Areosphaeridium arcuatum* | | | / | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dyphes colligerum* | | | / | | | | | | | | | | | | | | | / | | | | | | | | | | |
| *System. placacantha* | | | / | | | | / | | / | | | | | | | | | | | | | | | | | | | |
| *Cordosphaeridium inodes* | | | / | | | | | | | | | | | | | | | / | | | | | | | | | | |
| *N'sphaeropsis balcombiana* | | | / | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Areosph. diktyoplokus* | | | | RW | | | | | RW | / | / | / | | | | | | | | | | | | | | | | |
| *Deflandria sp.* | | | | / | | | | | | | | / | | | | | | | | | | | | | | | | |
| *Impag. maculatum* | | | | | / | | | | | | | | | | | / | | | | | | | | | | | | |
| *Impag. victorianum* | | | | | / | | | | | | | | | | | | | | | | | | | | | | | |
| *Lingul. machaerophorum* | | | | | / | | / | | | | | | | | | | | | | | | | | | | | | |
| *Pyxid. pontus* | | | | | / | / | | | | | | | | | | | | | | | | | | | | | | |
| *Tect. scabroellipticus* | | | | | | / | | | | | | | | | | / | | | | | | | | | | | | |
| *Tect. pellitum* | | | | | | | / | | | | | | | | | | | | | | | | | | | | | |
| *Defl. flounderensis* | | | | | | | | | / | / | | | | | | | | / | | / | | | | | | | | |
| *Tect. ovatum* | | | | | | | | | / | | | | | | | | | | | | | | | | | | | |
| *Thalas. peligica* | | | | | | | | | / | | / | | | | | | | | | | | | | | | | | |
| *Apectod. homomorpha (s.sp.)* | | | | | | | | | | | | / | | | | | | / | | / | | | | | | | | |
| *Paral. indentata* | | | | | | | | | | | | | | / | | | / | / | | | | | | | | | | |
| *Apectod. homomorpha (1.sp)* | | | | | | | | | | | | | | | | | | / | | | | / | | | | | | / |
| *Apectod. hyperacantha* | | | | | | | | | | | | | | | | | | / | | / | | | | | | | | / |
| *Deflandrea dartmooria* | | | | | | | | | | | | | | | | | | / | | / | | | | | | | | |
| *Deflandrea obliquipes* | | | | | | | | | | | | | | | | | | / | | | | | | | | | | |
| *Aireiana verrucosa* | | | | | | | | | | | | | | | | | | / | | | | | | | | | | |
| *Tubiosph. filosa* | | | | | | | | | | | | | | | | | | / | | | | | | | | | | |
| *Lejenunia sp.* | | | | | | | | | | | | | | | | | | | | / | | | | | | | | |
| *Spinidinium sp.* | | | | | | | | | | | | | | | | | | | | / | | | | | | | | |

*C=core; S=sidewall core; T=cuttings.

Well Name FORTESCUE-4 Basin GIPPSLAND Sheet No. 5 of 8

| SAMPLE TYPE * | S | S | S | S | S | S | S | S | S | S |
|---|---|---|---|---|---|---|---|---|---|---|
| DEPTHS / PALYNOMORPHS | 2501 | 2520 | 2525.6 | 2531.5 | 2544.2 | 2573.5 | 2581 | 2585.5 | 2593 | 2598 |
| *A. qualumis* | | | | | | | | | | |
| *A. acutullus* | | | | | | | | | | |
| *A. luteoides* | | | | | | | | | | |
| *A. oculatus* | | | | | | | | | | |
| *A. sectus* | | | | | | | | | | |
| *A. triplaxis* | | | | | | | | | | |
| *A. obscurus* | | | / | | | / | / | | / | |
| *B. disconformis* | | | | | | / | | | | |
| *B. arcuatus* | | | | | | | | | | |
| *B. elongatus* | | | | | | | | | | |
| *B. mutabilis* | | | | | | | | | | |
| *B. otwayensis* | | | | | | | | | | |
| *B. elegansiformis* | | | | | | | | | | |
| *B. trigonalis* | | | | | | | | | | |
| *B. verrucosus* | | | | | | | | | | |
| *B. bombaxoides* | | | | | | | | | | |
| *B. emaciatus* | | | | | | | | | | |
| *C. buliatus* | | | | | | | | | | |
| *C. heskermensis* | | | | | | | | | | |
| *C. horrendus* | | | | | | | | | | |
| *C. meleosus* | | | | | | | | | | |
| *C. apiculatus* | | | | | | | | | | |
| *C. leptos* | | | | | | | | | | |
| *C. striatus* | | | | | | | | | | |
| *C. vanraadshoovenii* | | | | | | | | | | |
| *C. orthoteichus/major* | | | | | | | | | | |
| *C. annulatus* | | | | | | | | | | |
| *C. gigantis* | | | / | | | | / | | / | |
| *C. splendens* | / | / | / | / | / | / | / | / | / | / |
| *D. australiensis* | | | | | | | | | | |
| *D. granulatus* | | | / | | | / | | | / | / |
| *D. tuberculatus* | | | | | | | | | | |
| *D. delicatus* | | | | | | | | | | |
| *D. semilunatus* | | | | | | | | | | |
| *E. notensis* | | | | | | | | | | |
| *E. crassiexinus* | | | | | | | | | | |
| *F. balteus* | | | | | | | | | | |
| *F. crater* | | | | | | | | | | |
| *F. lucunosus* | | | | | | | | | | |
| *F. palaequetrus* | | | | | | | | | | |
| *G. edwardsii* | | | / | | | | | | | |
| *G. rudata* | | | / | / | | | | | | |
| *G. divaricatus* | | | | | | | | | | |
| *G. gestus* | | | | | | | | | | |
| *G. catathus* | | | | | | | | | | |
| *G. cranwellae* | | | | | | | | | | |
| *G. wahooensis* | | | | | | | | | | |
| *G. bassensis* | | | | | | | | | | |
| *G. nebulosus* | | | | | | | | | | |
| *H. harrisii* | / | | / | / | | / | / | | | |
| *H. astrus* | | | | | | | | | | |
| *H. elliottii* | | | | | | | | | | |
| *I. anguloclavatus* | | | | | | | | | | |
| *I. antipodus* | | | | | | | | | / | |
| *I. notabilis* | | | | | | | | | | |
| *I. gremius* | | | | | | | | | | |
| *I. irregularis* | | | | / | | | | | | |
| *J. peiratus* | | | | | | | | | | |
| *K. waterbolkii* | | | | | | | | | | |
| *L. amplus* | | | | | | | | | | |
| *L. crassus* | | | | | | | | | | |
| *L. ohaiensis* | | | | | | | | | | |
| *L. bainii* | | | | | | | | | | |
| *L. lanceolatus* | | | | | | | | | | |
| *L. balmei* | / | | / | / | / | / | / | / | / | / |
| *L. florinii* | / | | / | / | | / | / | / | | / |
| *M. diversus* | | | | | | | | | | |
| *M. duratus* | | | | | | | | | | |
| *M. grandis* | | | | | | | | | | |
| *M. perimagnus* | | | | | | | | | | |

*C=core; S=sidewall core; T=cuttings.

Well Name FORTESCUE-4 Basin GIPPSLAND Sheet No. 6 of 8

| PALYNOMORPHS \ DEPTHS | SAMPLE TYPE * | S 2501 | S 2520 | S 2525.6 | S 2531.5 | S 2544.2 | S 2573.5 | S 2581 | S 2585.5 | S 2593 | S 2598 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *M. subtilis* | | | | / | | | | | | | |
| *M. ornamentalis* | | | | | | | | | | | |
| *M. hypolaenoides* | | | | | | | | | | | |
| *M. homeopunctatus* | | | | | | | | | | | |
| *M. parvus/mesonesus* | | | | | | | | | | | |
| *M. tenuis* | | | | | | | | | | | |
| *M. verrucosus* | | | | | | | | | | | |
| *M. australis* | | | | | | | | | | | |
| *N. asperus* | | | | | | | | | | | |
| *N. asperoides* | | | | | | | | | | | |
| *N. brachyspinulosus* | | | | / | | | | / | | | |
| *N. deminutus* | | | | | | | | | | | |
| *N. emarcidus/heterus* | | | | | | | | | | | |
| *N. endurus* | | | | | | | | | | | |
| *N. falcatus* | | | | | | | | | | | |
| *N. flemingii* | | | | / | | | / | | | | |
| *N. goniatus* | | | | | | | | | | | |
| *N. senectus* | | | | | | | | | | | |
| *N. vansteenisii* | | | | | | | | | | | |
| *O. sentosa* | | | | | | | | | | | |
| *P. ochesis* | | | | | | | | | | | |
| *P. catastus* | | | | | | | | | | | |
| *P. demarcatus* | | | | | | | | | | | |
| *P. magnus* | | | | | | | | | | | |
| *P. polyoratus* | | | | / | | | / | | | | |
| *P. vesicus* | | | | | | | | | | | |
| *P. densus* | | | | | | | | | | | |
| *P. velosus* | | | | | | | | | | | |
| *P. morganii/jubatus* | | | | | | | | | | | |
| *P. mawsonii* | | | | | | | / | / | | / | |
| *P. reticulosaccatus* | | | | | | | | | | | |
| *P. verrucosus* | | | | | | | | | | | |
| *P. crescentis* | | | | | | | | | | | |
| *P. esobalteus* | | | | | | | | | | | |
| *P. langstonii* | | | | | | | | | | | |
| *P. reticulatus* | | | | | | | | | | | |
| *P. simplex* | | | | | | | | | | | |
| *P. varus* | | | | | | | | | | | |
| *P. adenanthoides* (Prot.) | | | | / | / | / | | | | / | |
| *P. alveolatus* | | | | | | | | | | | |
| *P. amolosexinus* | | | | | | | | | | | |
| *P. angulatus* | | | | | | | | | | | |
| *P. annularis* | | | | | | / | / | / | | / | |
| *P. asperopolus* | | | | | | | | | | | |
| *P. biornatus* | | | | | | | | | | | |
| *P. clarus* | | | | | | | | | | | |
| *P. cleinei* | | | | | | | | | | | |
| *P. confragosus* | | | | | | | | | | | |
| *P. crassis* | | | | | | | | | | | |
| *P. delicatus* | | | | | | | | | | | |
| *P. formosus* | | | | | | | | | | | |
| *P. grandis* | / | | / | | | | | | | | |
| *P. grevillaensis* | | | | | | | | | | | |
| *P. incurvatus* | / | | | | | | / | | | | |
| *P. intricatus* | | | | | | | | | | | |
| *P. kopiensis* | | | | | | | | | | | |
| *P. lapis* | | | | / | | | | | | | |
| *P. latrobensis* | | | | | | | | | | | |
| *P. leightonii* | | | | | | | | | | | |
| *P. obesolabrus* | | | | | | | | | | | |
| *P. obscurus* | | | | | | | | | | | |
| *P. ornatus* | | | | | | | | | | | |
| *P. otwayensis* | | | | | | | | | | | |
| *P. pachypolus* | | | | | | | | | | | |
| *P. palisadus* | | | | | | | | | | | |
| *P. parvus* | | | | | | | | | | | |
| *P. plemmelus* | | | | | | | | | | | |
| *P. prodigus* | | | | / | | | | | | | |
| *P. pseudomoides* | | | | | | | / | | | | |
| *P. recavus* | | | | | | | | | | | |

*C = core; S = sidewall core; T = cuttings.

Well Name FORTESCUE-4 Basin GIPPSLAND Sheet No. 7 of 8

| SAMPLE TYPE * | S | S | S | S | S | S | S | S | S | S |
|---|---|---|---|---|---|---|---|---|---|---|
| DEPTHS / PALYNOMORPHS | 2501 | 2520 | 2525.6 | 2531.5 | 2544.2 | 2573.5 | 2581 | 2585.5 | 2593 | 2598 |
| *P. rectomarginis* | | | | | | | | | | |
| *P. reflexus* | | | | | | | | | | |
| *P. reticulatus* | | | | | | | | | | |
| *P. reticuloconcavus* | | | | | | | | | | |
| *P. reticuloscabratus* | | | | | | | | | | |
| *P. rugulatus* | | | | | | | | | | |
| *P. scitus* | | | | | | | | | | |
| *P. stipplatus* | | | | | | | | | | |
| *P. tenuiexinus* | | | / | | | | | | / | |
| *P. truncatus* | | | | | | | | | | |
| *P. tuberculatus* | | | | | | | | | | |
| *P. tuberculiformis* | | | | | | | | | | |
| *P. tuberculotumulatus* | | | | | | | | | | |
| *P. xestoformis* (Prot.) | | | | | | | | | | |
| *O. brossus* | | | | | | | | | | |
| *R. boxatus* | | | | | | | | | | |
| *R. stellatus* | | | | | | | | | | |
| *R. mallatus* | | | | | | / | | / | | |
| *R. trophus* | | | | | | | | | | |
| *S. cainozoicus* | | | | | | | | | | |
| *S. rotundus* | | | | | | | | | | |
| *S. digitatoides* | | | | | | | | | | |
| *S. marlinensis* | | | | | | | | | | |
| *S. rarus* | | | | | | | | | | |
| *S. meridianus* | | | | | | / | | | / | |
| *S. prominatus* | | | | | | | | | | |
| *S. uvatus* | | | | | | | | | | |
| *S. punctatus* | | | | | | / | / | | | |
| *S. regium* | | | | | | | | | | |
| *T. multistrixus (CP4)* | | | / | | | | | / | | |
| *T. textus* | | | | | | | | | | |
| *T. verrucosus* | | | | | | | | | | |
| *T. securus* | | | | | | | | | | |
| *T. confessus (C3)* | | | | | | | | | | |
| *T. gillii* | | | / | | | | | | | |
| *T. incisus* | | | | | | | | | | |
| *T. longus* | | | | | | | | | | |
| *T. phillipsii* | | | / | | | | | | | |
| *T. renmarkensis* | | | | | | | | | | |
| *T. sabulosus* | | | | | | | | | | |
| *T. simatus* | | | | | | | | | | |
| *T. thomasii* | | | | | | | | | | |
| *T. waiparaensis* | | | | | | | | | | |
| *T. adelaidensis (CP3)* | | | | | | | | | | |
| *T. angurium* | | | | | | | | | | |
| *T. delicatus* | | | | | | | | | | |
| *T. geraniodes* | | | | | | | | | | |
| *T. leuros* | | | | | | | | | | |
| *T. lilliei* | | | | | | | | | | |
| *T. marginatus* | | | | | | | | | | |
| *T. moultonii* | | | | | | | | | | |
| *T. paenestriatus* | | | | | | | | | | |
| *T. retequetrus* | | | | | | | | | | |
| *T. scabratus* | | | | | | | | | | |
| *T. sphaerica* | | | | | | | | | | |
| *T. magnificus (P3)* | | | | | | | | | | |
| *T. spinosus* | | | | | | | | | | |
| *T. ambiguus* | | | | | | | | | | |
| *T. chnosus* | | | | | | | | | | |
| *T. helosus* | | | | | | | | | | |
| *T. scabratus* | | | | | | | | | | |
| *T. sectilis* | | | | | | | | | | |
| *V. attinatus* | | | | | | | | | | |
| *V. cristatus* | | | | | | | | | | |
| *V. kopukuensis* | | | / | / | | / | / | | / | |

*C= core; S= sidewall core; T= cuttings.

Well Name FORTESCUE-4 Basin GIPPSLAND Sheet No. 8 of 8

| SAMPLE TYPE * | S | S | S | S | S | S | S | S | S | S |
|---|---|---|---|---|---|---|---|---|---|---|
| DEPTHS / PALYNOMORPHS | 2501 | 2520 | 2525.6 | 2531.5 | 2544.2 | 2573.5 | 2581 | 2585.5 | 2593 | 2598 |
| *Cleistosphaeridium sp.* | | | | | | | | | | |
| *H'kolpoma rigaudae* | | | | | | | | | | |
| *Apteodinium australiense* | | | | | | | | | | |
| *N'sphaeropsis divirgens* | | | | | | | | | | |
| *Protoellip simplex* | | | | | | | | | | |
| *Spiniferites ramosus* | | | | | | | | | | |
| *Impagidinium sp.* | | | | | | | | | | |
| *Operc. centrocarpum* | | | | | | | | | | |
| *Dinosphaere sp.* | | | | | | | | | | |
| *Areosphaeridium arcuatum* | | | | | | | | | | |
| *Dyphes colligerum* | | | | | | | | | | |
| *System. placacantha* | | | / | | | | | | | |
| *Cordosphaeridium inodes* | | | | | | | | | | |
| *N'sphaeropsis balcombiana* | | | | | | | | | | |
| *Areosph. diktypolokus* | | | | | | | | | | |
| *Deflandria sp.* | | | | | | | | | | |
| *Impag. maculatum* | | | | | | | | | | |
| *Impag. victorianum* | | | | | | | | | | |
| *Lingul. machaerophorum* | | | | | | | | | | |
| *Pyxid. pontus* | | | | | | | | | | |
| *Tect. scabroellipticus* | | | | | | | | | | |
| *Tect. pellitum* | | | | | | | | | | |
| *Defl. flounderensis* | | | | | | | | | | |
| *Tect. ovatum* | | | | | | | | | | |
| *Thalas. peligica* | | | | | | | | | | |
| *Apectod. homomorpha (s.sp.)* | | | | / | | / | | / | | / |
| *Paral. indentata* | | | | | | | | | | |
| *Apectod. homomorpha (l.sp)* | / | | / | | | | | | | |
| *Apectod. hyperacantha* | / | | | | | / | | | | |
| *Deflandrea dartmooria* | | | / | | | | | | | |
| *Deflandrea obliquipes* | | | | | | | | | | |
| *Airelana verrucosa* | | | | | | | | | | |
| *Tubiosph. filosa* | | | / | | | | | | | |
| *Lejununia sp.* | | | | | | | | | | |
| *Spinidinium sp.* | | | | | | | | | | / |

*C=core; S=sidewall core; T=cuttings.

# 6. LOG ANALYSIS

# APPENDIX 6

# LOG ANALYSIS

# FORTESQUE NO. 4

## LOG ANALYSIS

## I. SUMMARY

| Interval | Average Ø | Average SW | Comments |
|---|---|---|---|
| 2422.5 - 2424.5 | 5.6% | ? | low permeability; probable high Sw |
| 2426.5 - 2430.5 | 9.2% | ? | low permeability; probable marginal → high SW |
| 2431 - 2436.5 | 19.8% | 30% | 5.5m net pay |
| 2436.5-2439.0 | 13.7% | 57% | Shaly; marginal permeability 2m net pay |
| 2440 - 2444.5 | 18.3% | 47% | 3.5m net pay |
| 2444 - 2456 | 19.4% | 84% | probable transition zone; marginal → high SW |
| 2496 - 2500 | 16.4% | 100% | Water Saturated |
| 2502 - 2510 | 21.7% | 100% | Water Saturated |
| 2534 - 2540 | 21.1% | 100% | Water Saturated |
| 2562 - 2566 | 17.9% | 100% | Water Saturated |

A total of 12m of net pay is determined.

An oil/water contact is picked at 2444.0 m.

## II. GENERAL

(1) Logs Available

| | |
|---|---|
| ISF-SONIC-GR-MSFL | 854 - 2598 m |
| CNL-FDC | 854 - 2599 m |
| DLL | 2295 - 2597 m |

(2) Mud Properties

| | | | |
|---|---|---|---|
| Rm | = | .306 @ 21°C | (approx 22,000 ppm NaCl eq.) |
| Rmf | = | .24 @ 21°C | (approx 28,000 ppm NaCl eq.) |
| Rmc | = | .56 @ 21°C | |

(3) Temperature Data

| | | | |
|---|---|---|---|
| DLL: | 94°C | - | 8.5 hrs |
| ISF: | 103°C | - | 12 hrs |
| CNL-FD: | 108°C | - | 19 hrs |

A B.H.T. of 118°C @ 2599m is calculated (245°F).
This implies a formation temperature of 112°C (233°F) @ 2450m.

Rmf @ 112°C = .078 ohm-m
Rm @ 112°C = .095 ohm-m

(4) Hole Conditions

Hole conditions are excellent, over the zones of interest. Thin mudcakes (< ¼") are present over the zone of the permeable sands.

Invasion diameter is estimated at 30" or less in the hydrocarbon zones. Higher invasion is likely in the water zones (possibly up to 70").

(5) Formation Tests

Recoveries from RFT runs were as follows:

| | | | |
|---|---|---|---|
| 2427m | | 2,200cc | Formation water/filtrate |
| 2432.5 | (mc) | 2,350cc | Oil |
| | | 18,250cc | Formation water/filtrate |
| 2433.5m | (mc) | 21,500cc | Filtrate |
| | (SEG) | 1,250cc | Filtrate/Oil Scum |
| 2438m | | 1,500cc | Oil |
| | | 20,800cc | Formation water/filtrate |
| | | .1 cu.ft. | Gas |
| 2443m | | 7,300cc | Oil |
| | | 3.38 cu.ft. | Gas |
| | | 10,200cc | Filtrate |
| 2445.5m | | 20,600cc | Filtrate - oily scum |
| 2449.5m | | 21,500cc | Filtrate - oily scum |
| 2450m | | 2,100cc | Filtrate - oily scum |

(6) Rw

An Rw of .06 ohm-m has been used in the calculation of Sw. This figure was derived from Fortesque No. 2 and corresponds to a formation water salinity of approximately 35,000 ppm NaCl eq.

(7) Log Quality

(2-3%) Neutron porosities appear to be anomolously low. This appears to be due to a fault in the function former and will be corrected during playback of the field tape.

An anomoly also occurs in the resistivity suite in water zones where RIL < RMSFL and RLLO > RMSFL. The cause of this is not yet certain but is likely to be a result of the combination of deep invasion, low resistivities and small contrast between Rmf and Rw. In this interpretation, however Sw values have been calculated using the induction log for consistency with other wells in the field.

## III. INTERPRETATION TECHNIQUES

(1) Vsh has been calculated from the Gamma-Ray and from Neutron-density crossplots.

(2) Porosity has been estimated from the density log after corrections for shale and hydrocarbon effects were made. Because of the lack of a valid neutron log through the section, the hydrocarbon corrections made were slightly more empirical than would normally be the case. Recalculations of Ø should be made when a valid neutron log is available.

(3) Water Saturation - values were calculated using the "Indonesian" shaly sand equation. Formation factor values were calculated using the Humble equation. Rt was estimated directly from the Induction Log.

Sw values calculated from the Induction Log and the Laterologs agree well in the hydrocarbon zones but vary significantly in the water zones due to the much higher laterolog resistivities.

for H. GORDON.

# 7. VELOCITY SURVEY REPORT

APPENDIX 7

VELOCITY SURVEY REPORT

# VELOCITY SURVEY

Well ..... FORTESCUE #4

Basin ..... GIPPSLAND

## INTRODUCTION

Esso personnel ..... J. HUGHES

Contractor ..... VELOCITY DATA PTY LTD

Supplied (1) Instruments

(2) Personnel

Seismic Observer J. LARSEN

Marine Shooter G. ATKINSON

Dynamite .....

(3) Seismic Souce

Gas Gun

Gas Pressures .....

Oxygen 90 p.s.i.

Propane 50 p.s.i.

(3) Licenced Shooting Boat

name .....

date loaded .....

date released .....

Agent .....

.....

amount of powder ..... lbs

size of cans ..... lbs

number of cans .....

number of caps .....

number of boosters .....

Personnel and Instruments

assembled at SALE ..... date 30.3.1979

boarded (rig) OCEAN ENDEAVOUR ..... date 31.3.1979

date of survey ..... 1.4.1979

casing depth ..... 10.3/4" @ 857.8m

T.D. when shot ..... 2602.5m ..... FTD 2602.5m

water depth ..... 68m

## SURVEY PROCEDURE

Weather: sea ..... 1.5m swell, light rain.

rig movement ..... SLIGHT

rig noise ..... MODERATE

Hydrophones: number ..... THREE

depth below sea level ..... 12.2 ..... metres

position ..... TWO ON GAS GUN

ONE IN MOON POOL

Shot Positioning and Charges:

marker buoys (number .....

(distance .....

(direction .....

charge depth ..... metres

number of shots ..... charge size ..... lbs.

number of shots ..... charge size ..... lbs.

number of misfires .....

Gas gun amount of powder used ..... lbs

Well phone positioning:

No. of depths ..... 14 .....

Time: first shot ..... 0800 hours ...
last shot ..... 1116 hours ...
rig time ... 3 hours 40 minutes ...

RESULTS

Quality of results (good ..... 30 .....
(fair ..... 9 .....
(poor ..... 3 .....
(not used ..... There is no record 18.

Comparison of Interval Times with Sonic log

/△/average ..... 11.8 ..... microsec/metre
/△/max ..... 25.3 ..... microsec/metre

CONCLUSION

Reliability of T-D curve ..... Fair .....

COMMENTS

This was the first survey using the RS-49W digital well survey system. 18 traces are displayed on each record with:-

| | | |
|---|---|---|
| Traces 1 and 2 | - | Time break phones |
| Traces 3,4 and 5 | - | Moon pool phone (varying gains) |
| Trace 6 | - | Not used. |
| Traces 7 through to 18 | - | Well geophone with varying gains (10 db steps). |

The equipment functioned well with only a minor problem where the tape identification indicator was incrementing in a random manner instead of steps of 1. This was probably caused by interference from the high voltage line to the gas gun. The rigs 110V power supply was only operating at 90V which was too low for the gas panel to function properly so Schlumberger's 110V power supply was used. Records 17, 20 and 24 showed a problem with the time breaks. The timing lines are unevenly spaced and it is possible that the time break is triggering the timing line and causing the uneven spacing.

The survey was interrupted between 0830 and 0905 by the arrival of a helicopter. The survey was completed at 1130 hours when the tool came out of the hole.

Shothole information:- Elevation, Distance & Direction from Well

Company: ESSO EXPLORATION AUSTRALIA INC.

Well: FORTESCUE #4

Elevation (Derrick Floor): 25m

Total Depth: 2602.5 metres

LOCATION

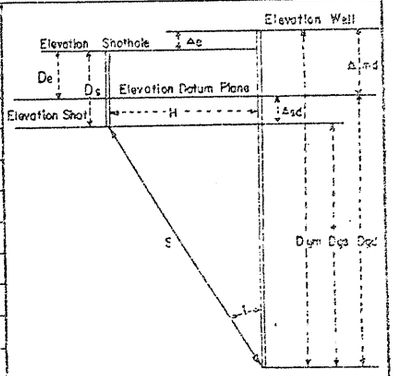
Coordinates: LAT 38°24'57.88"S LONG 148°16'35.48"E DATUM : SEA LEVEL

Section, Township, Range: GIPPSLAND BASIN

County: FORTESCUE FIELD

Area or Field:

| Record Number | Shothole Number | Time of Shot | Dgm | Ds | tus | tr | * T Reading | Polarity | Grade | Dgs | H | TAN i | Cos i | Tgs | Δsd | Δsd/V | Tgd | Tgd Average | Dgd | Δ Dgd | Δ Tgd | Vi Interval Velocity | Va Average Velocity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 0800 | 630 | | | | .275 | D | F | 592.8 | 47.2 | .0796 | .9968 | .274 | 12.2 | .008 | .282 | .282 | 605 | | | | 2144 |
| 2 | 15 | 0805 | 630 | | | | .276 | D | F | | | | | | | | | | | 255 | .084 | 3024 | |
| 40 | 58 | 1113 | 885 | | | | .359 | " | G | | | | | | | | | | | | | | |
| 41 | 00 | 1114 | 885 | | | | .359 | " | G | 847.8 | " | .0557 | .9985 | .358 | " | " | .366 | .366 | 860 | | | | 2347 |
| 42 | 66 | 1115 | 885 | | | | .360 | " | G | | | | | | | | | | | | | | |
| 43 | 00 | 1116 | 885 | | | | .359 | " | F | | | | | | | | | | | 177 | .059 | 2994 | |
| 3 | 14 | 0817 | 1052 | | | | .418 | " | G | | | | | | | | | | | | | | |
| 4 | 20 | 0818 | 1062 | | | | .418 | " | G | 1024.8 | " | .0461 | .9989 | .418 | " | " | .426 | .426 | 1037 | | | | 2437 |
| 5 | 23 | 0820 | 1062 | | | | .418 | " | G | | | | | | | | | | | 191 | .060 | 3179 | |
| 37 | 00 | 1103 | 1253 | | | | .479 | " | G | | | | | | | | | | | | | | |
| 38 | 54 | 1104 | 1253 | | | | .478 | " | G | 1215.8 | " | .0388 | .9992 | .478 | " | " | .486 | .486 | 1228 | | | | 2529 |
| 39 | 55 | 1104 | 1253 | | | | .478 | " | G | | | | | | | | | | | | | | |
| 6 | 25 | 0829 | 1420 | | | | .527 | " | G | 1382.8 | " | OFFSET DOES | | .527 | " | " | .535 | .535 | 1395 | 167 | .049 | 3404 | 2609 |
| 7 | 00 | 0830 | 1420 | | | | .527 | " | G | | | NOT AFFECT TIME | | | | | | | | | | | |
| 34 | 37 | 1052 | 1550 | | | | .563 | " | G | | | | | | | | | | | 130 | .036 | 3608 | |
| 35 | 40 | 1053 | 1550 | | | | .563 | " | G | 1512.8 | " | " | " | .563 | " | " | .571 | .571 | 1525 | | | | 2672 |
| 36 | 45 | 1054 | 1550 | | | | .561 | " | F | | | | | | | | | | | | | | |
| 31 | 27 | 1042 | 1684 | | | | .603 | " | G | | | | | | | | | | | 134 | .040 | 3348 | |
| 32 | 29 | 1043 | 1684 | | | | .603 | " | G | 1646.8 | " | " | " | .603 | " | " | .611 | .611 | 1659 | | | | 2716 |
| 33 | 32 | 1044 | 1684 | | | | .604 | " | F | | | | | | | | | | | | | | |
| 28 | 00 | 1035 | 1830 | | | | .651 | " | G | | | | | | | | | | | 146 | .048 | 3040 | |
| 29 | 24 | 1036 | 1830 | | | | .651 | " | G | 1792.8 | " | " | " | .651 | " | " | .659 | .659 | 1805 | | | | 2740 |
| 30 | 26 | 1037 | 1830 | | | | .651 | " | G | | | | | | | | | | | | | | |
| 25 | 10 | 1024 | 1990 | | | | .704 | " | G | | | | | | | | | | | 160 | .053 | 3018 | |
| 26 | 12 | 1025 | 1990 | | | | .704 | " | G | 1952.8 | " | " | " | .704 | " | " | .712 | .712 | 1965 | | | | 2761 |
| 27 | 16 | 1026 | 1990 | | | | .705 | " | G | | | | | | | | | | | | | | |
| 22 | 95 | 1007 | 2146 | | | | .756 | " | F | | | | | | | | | | | 156 | .052 | 2999 | |
| 23 | 01 | 1008 | 2146 | | | | .756 | " | F | 2108.8 | " | " | " | .756 | " | " | .764 | .764 | 2121 | | | | 2777 |
| 24 | 00 | 1008 | 2146 | | | | .754 | " | V.P | | | | | | | | | | | | | | |
| 19 | 80 | 0946 | 2299 | | | | .807 | " | G | 2261.8 | " | " | " | .807 | " | " | .815 | .815 | 2274 | | | | |
| 20 | 85 | 0948 | 2299 | | | | .808 | " | V.P | | | | | | | | | | | 153 | .051 | 2999 | 2791 |
| 21 | 90 | 0949 | 2299 | | | | .807 | " | G | | | | | | | | | | | | | | |
| 8 | 34 | 0915 | 2416 | | | | .846 | " | G | | | | | | | | | | | | | | |
| 9 | 36 | 0916 | 2416 | | | | .844 | " | G | | | | | | | | | | | 117 | .038 | 3078 | |
| 10 | 39 | 0917 | 2416 | | | | .845 | " | G | 2378.8 | " | " | " | .845 | " | " | .853 | .853 | 2391 | | | | 2804 |
| 11 | 42 | 0917 | 2416 | | | | .845 | " | G | | | | | | | | | | | 79 | .024 | 3291 | |




Dgm = Geophone depth measured from well elevation

Dgs = " " " " shot "

Dgd = " " " " datum "

Ds = Depth of shot

De = Shothole elevation to datum plane

H = Horizontal distance from well to shotpoint

S = Straight line travel path from shot to well geophone

tus = Uphole time at shotpoint

T = Observed time from shotpoint to well geophone

tr = " " " to reference geophone

Δe = Difference in elevation between well & shotpoint

Δsd = " " " " shot & datum plane

Δsd = Ds - De

Dgs = Dgm - Ds ± Δe ; tan i = $\frac{H}{Dgs}$

Tgs = cos i T = Vert. travel time from shot elev. to geophone

Tgd = Tgs ± $\frac{\Delta sd}{V}$ = " " " " datum plane " "

Dgd = Dgm - Δmd

Vi = Interval velocity = $\frac{\Delta Dgd}{\Delta Tgd}$

Va = Average = $\frac{Dgd}{Tgd}$

Surveyed by: J. HUGHES

Date: 1-4-1979

Weathering Data :

Casing Record 20" @ 227.9m

10.3/4" @ 857.8m

DWG. 1107/0P/3

* THESE TIMES HAVE BEEN CORRECTED 0.004 SEC. FOR PHASE SHIFT WITH THE DIGITAL EQUIPMENT.

Shothole information:- Elevation, Distance & Direction from Well

Company: ESSO EXPLORATION AUSTRALIA INC.

Well: FORTESCUE #4

Elevation (Derrick Floor): 25m

Total Depth: 2602.5 metres

LOCATION

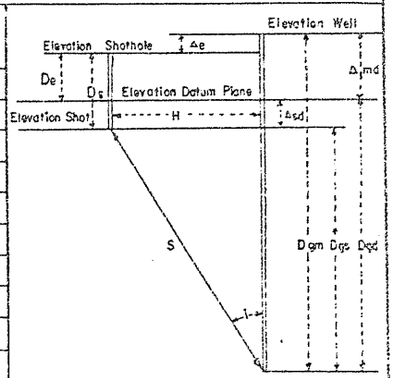
Coordinates: LAT. 38°24'57.88"S LONG.148°16'35.48"E

Section, Township, Range: DATUM : SEA LEVEL

County: GIPPSLAND BASIN

Area or Field: FORTESCUE FIELD

| Record Number | Shothole Number | Time of Shot | Dgm | Ds | tus | tr | * T Reading | Polarity | Grade | Dgs | H | TAN i | Cos i | Tgs | Δsd | Δsd/V | Tgd | Tgd Average | Dgd | ΔDgd | ΔTgd | Vi Interval Velocity | Va Average Velocity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 60 | 0936 | 2495 | | | | .870 | D | F | | | | | | | | | | | | | | |
| 16 | 62 | 0937 | 2495 | | | | .869 | " | F | 2457.8 | 47.2 | OFFSET DOES | | .869 | 12.2 | .008 | .877 | .877 | 2470 | 79 | .024 | 3291 | 2817 |
| 17 | 67 | 0938 | 2495 | | | | .869 | " | V.P | | | NOT AFFECT TIME | | | | | | | | | | | |
| 12 | 44 | 0926 | 2598 | | | | .896 | " | G | | | | | | | | | | | 103 | .027 | 3814 | |
| 13 | 48 | 0927 | 2598 | | | | .897 | " | G | | | | | | | | | | | | | | |
| 14 | 50 | 0928 | 2598 | | | | .896 | " | G | 2560.8 | " | " | " | .896 | " | " | .904 | .904 | 2573 | | | | 2847 |




Dgm = Geophone depth measured from well elevation

Dgs = " " " " shot "

Dgd = " " " " datum "

Ds = Depth of shot

De = Shothole elevation to datum plane

H = Horizontal distance from well to shotpoint

S = Straight line travel path from shot to well geophone

tus = Uphole time at shotpoint

T = Observed time from shotpoint to well geophone

tr = " " " to reference geophone

Δe = Difference in elevation between well & shotpoint

Δsd = " " " " shot & datum plane

Δsd = Ds-De

Dgs = Dgm- Ds± Δe ; $\tan i = \frac{H}{Dgs}$

Tgs = cos i T= Vert. travel time from shot elev. to geophone

Tgd = $Tgs \pm \frac{\Delta sd}{V}$ = " " " " datum plane " "

Dgd = Dgm- Δmd

Vi = interval velocity = $\frac{\Delta Dgd}{\Delta Tgd}$

Va = Average = $\frac{Dgd}{Tgd}$

Surveyed by: J. HUGHES

Date: 1-4-1979

Weathering Data:

Casing Record 20" @ 227.9m
10.3/4" @ 857.8m

* THESE TIMES HAVE BEEN CORRECTED 0.004 SEC. FOR PHASE SHIFT WITH THE DIGITAL EQUIPMENT.

DWG. 1107/OP/3

FORTESCUE # 4

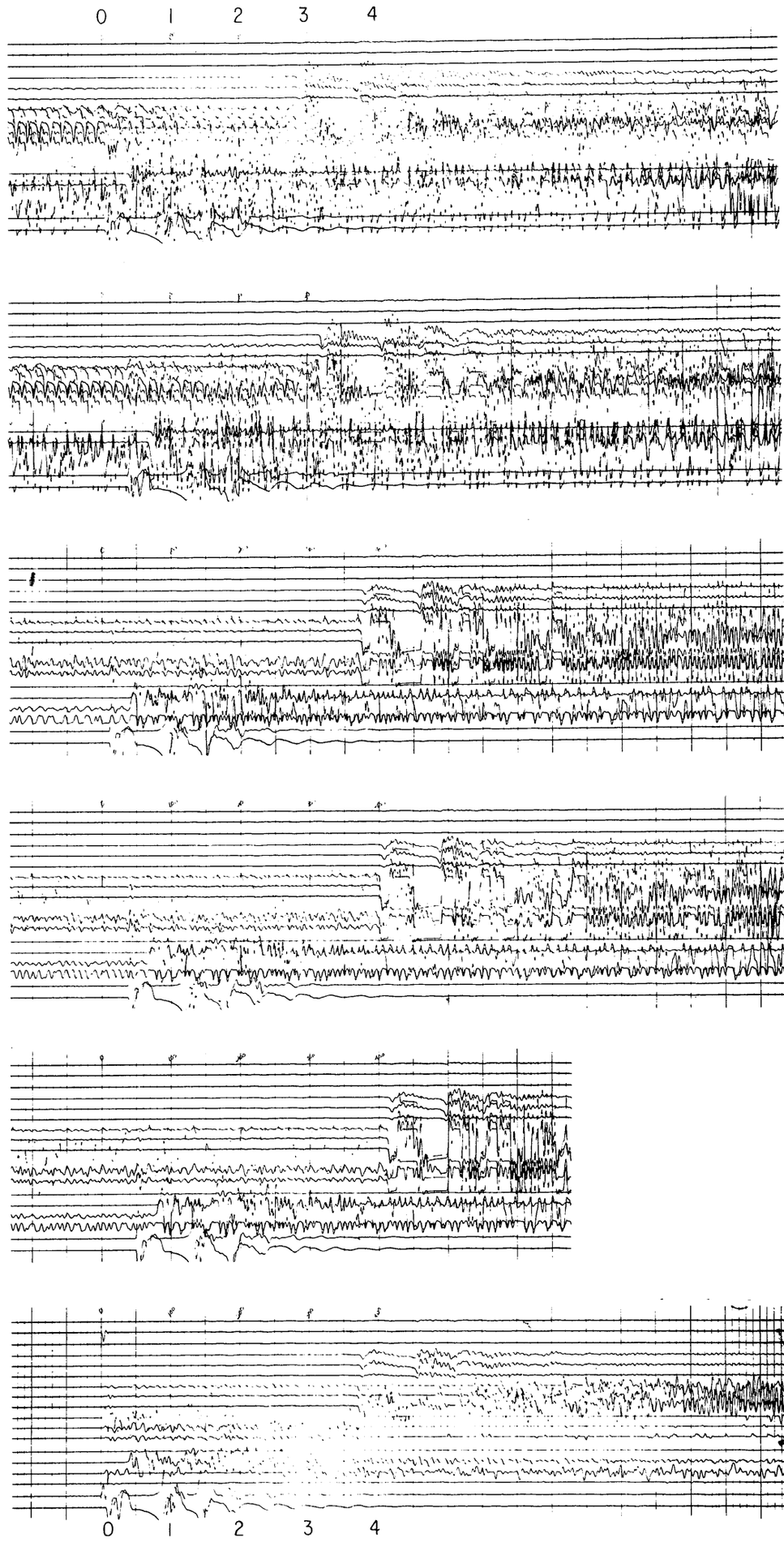
VELOCITY SURVEY ERROR CHECK

| Depth Rel. S.L. | Av. Vertical Travel Time (check shots) | Ti Check Shots (sec.) | Ti Sonic Log (sec.) | Δ (Millisecs.) Ti Sonic — Ti Check | Depth Interval (m) | Error (Microsec. per m) |
|---|---|---|---|---|---|---|
| 605 | 0.282 | 0.084 | 0.083 | - 1 | 255 | 3.9 |
| 860 | 0.366 | | | | | |
| 860 | 0.366 | 0.059 | 0.0585 | - .5 | 177 | 2.8 |
| 1037 | 0.426 | | | | | |
| 1037 | 0.426 | 0.060 | 0.058 | - 2 | 191 | 10.5 |
| 1228 | 0.486 | | | | | |
| 1228 | 0.486 | 0.049 | 0.0465 | - 2.5 | 167 | 15.0 |
| 1395 | 0.535 | | | | | |
| 1395 | 0.535 | 0.036 | 0.035 | - 1 | 130 | 7.7 |
| 1525 | 0.571 | | | | | |
| 1525 | 0.571 | 0.040 | 0.0375 | - 2.5 | 134 | 18.7 |
| 1659 | 0.611 | | | | | |
| 1659 | 0.611 | 0.048 | 0.046 | - 2 | 146 | 13.7 |
| 1805 | 0.659 | | | | | |
| 1805 | 0.659 | 0.053 | 0.051 | - 2 | 160 | 12.5 |
| 1965 | 0.712 | | | | | |
| 1965 | 0.712 | 0.052 | 0.049 | - 3 | 156 | 19.2 |
| 2121 | 0.764 | | | | | |
| 2121 | 0.764 | 0.051 | 0.052 | + 1 | 153 | 6.5 |
| 2274 | 0.811 | | | | | |
| 2274 | 0.811 | 0.038 | 0.037 | - 1 | 117 | 8.5 |
| 2391 | 0.853 | | | | | |
| 2391 | 0.853 | 0.024 | 0.022 | - 2 | 79 | 25.3 |
| 2470 | 0.877 | | | | | |
| 2470 | 0.877 | 0.027 | 0.028 | + 1 | 103 | 9.7 |
| 2573 | 0.904 | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# FORTESCUE – 4

WELL VELOCITY RECORD

1/4/79




Dwg: 1932/OP/2

# FORTESCUE – 4

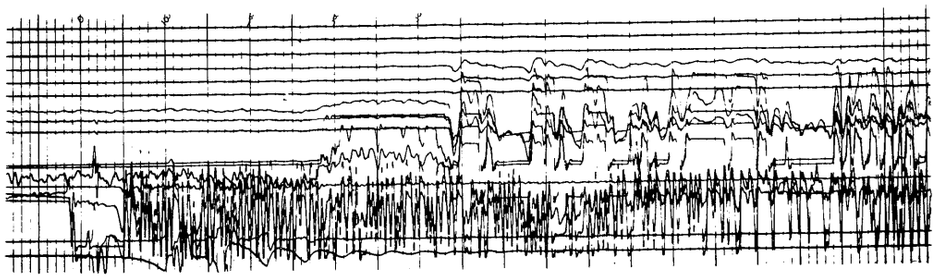
WELL VELOCITY RECORD

1/4/79

0 1 2 3 4 5

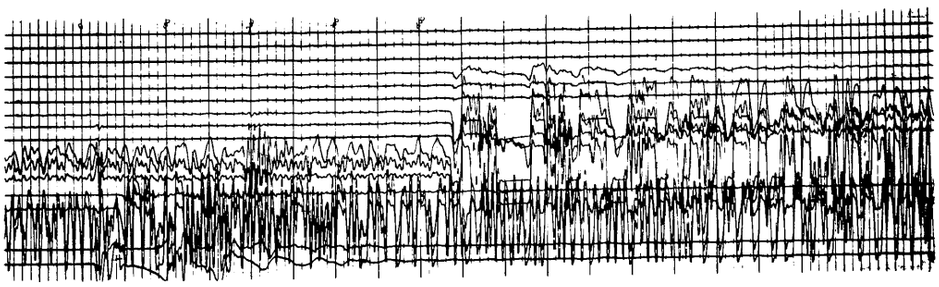
Rec. No. 3

1062 m. K.B.



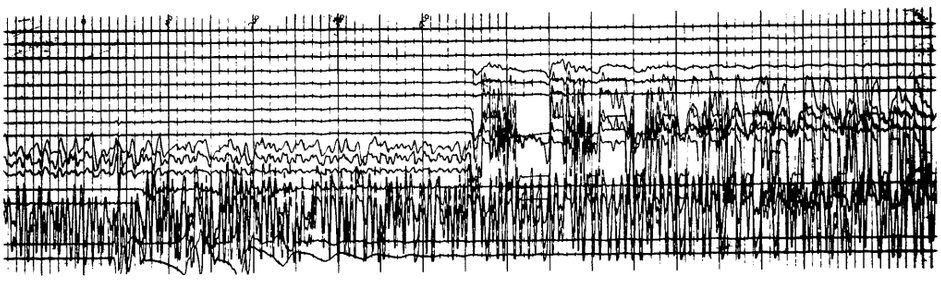
Rec. No. 4

1062 m. K.B.



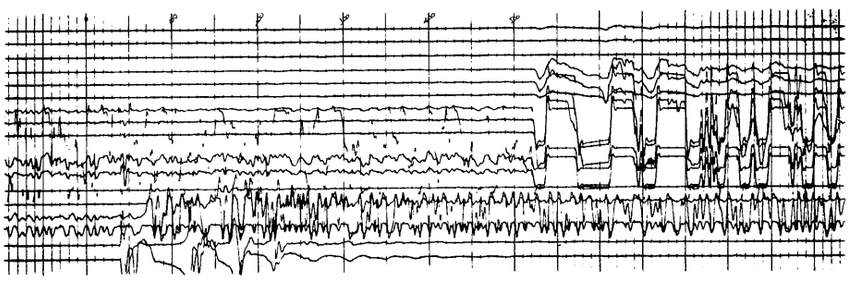
Rec. No. 5

1062 m. K.B.



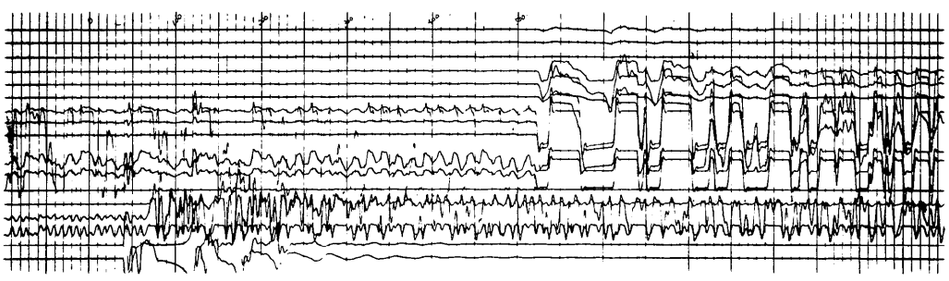
Rec. No. 37

1253 m. K.B.



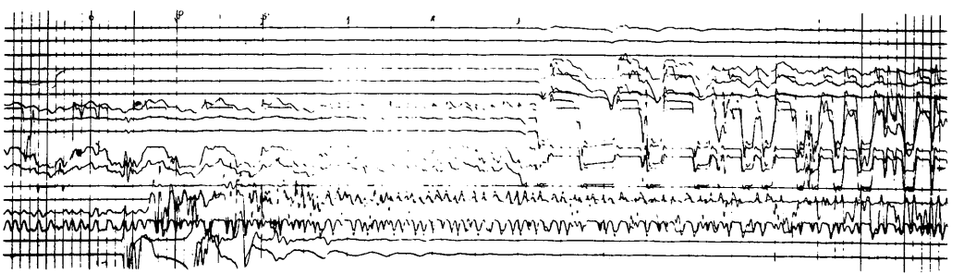
Rec. No. 38

1253 m. K.B.



Rec. No. 39

1253 m. K.B.



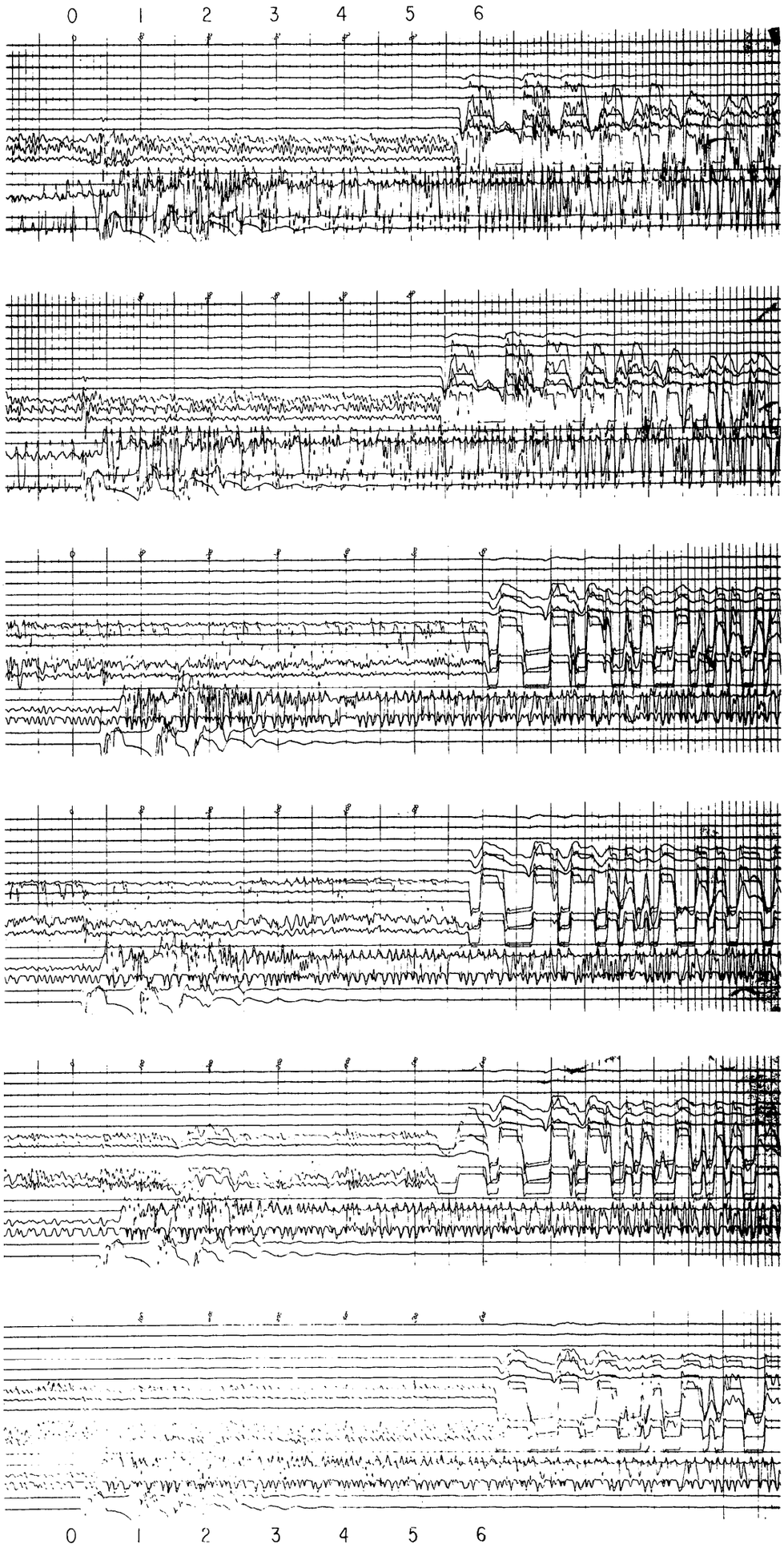
0 1 2 3 4 5

Dwg 1932/OP/3

# FORTESCUE – 4

WELL VELOCITY RECORD

1/4/79

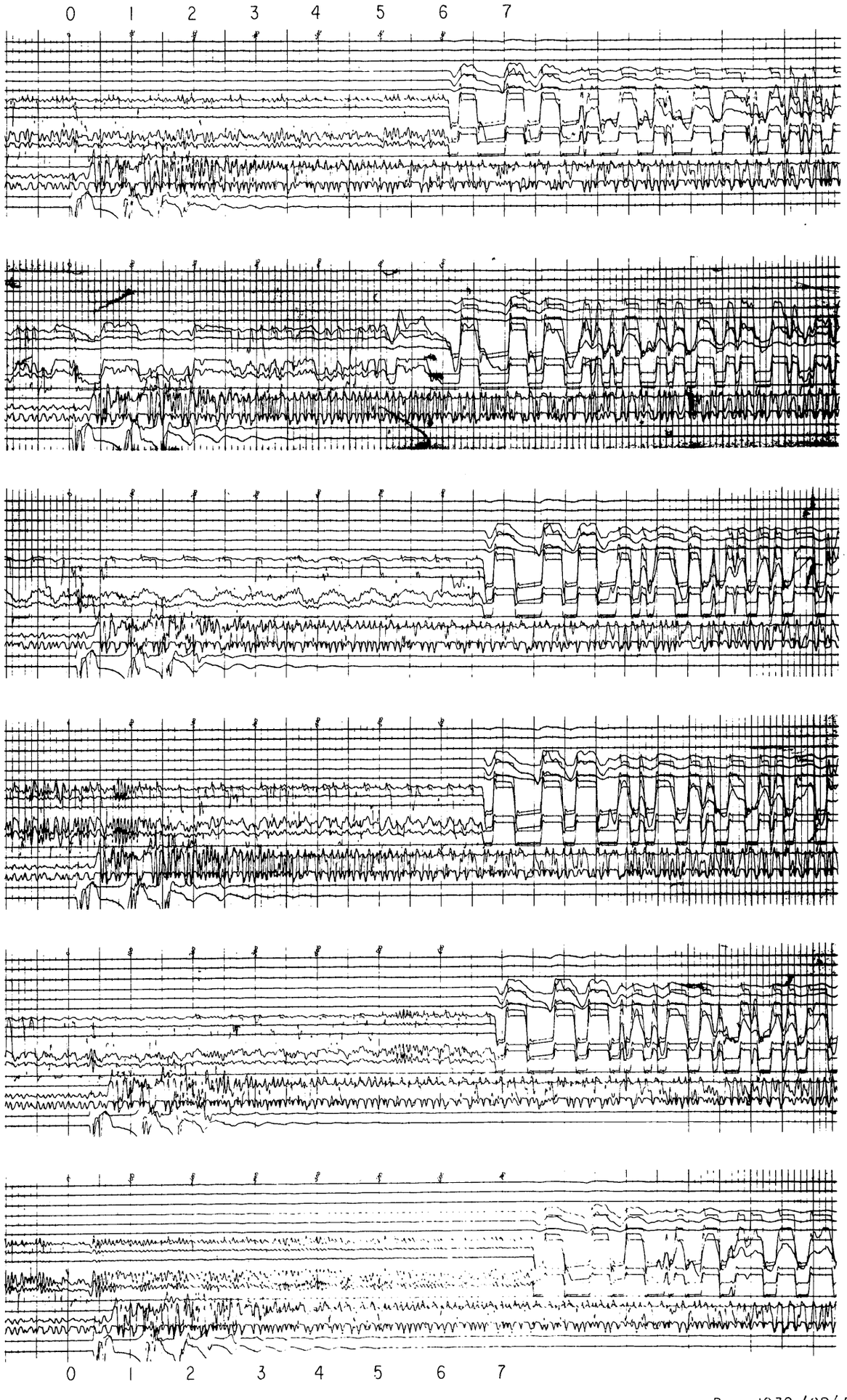



Dwg. 1932/OP/4

# FORTESCUE – 4

WELL VELOCITY RECORD

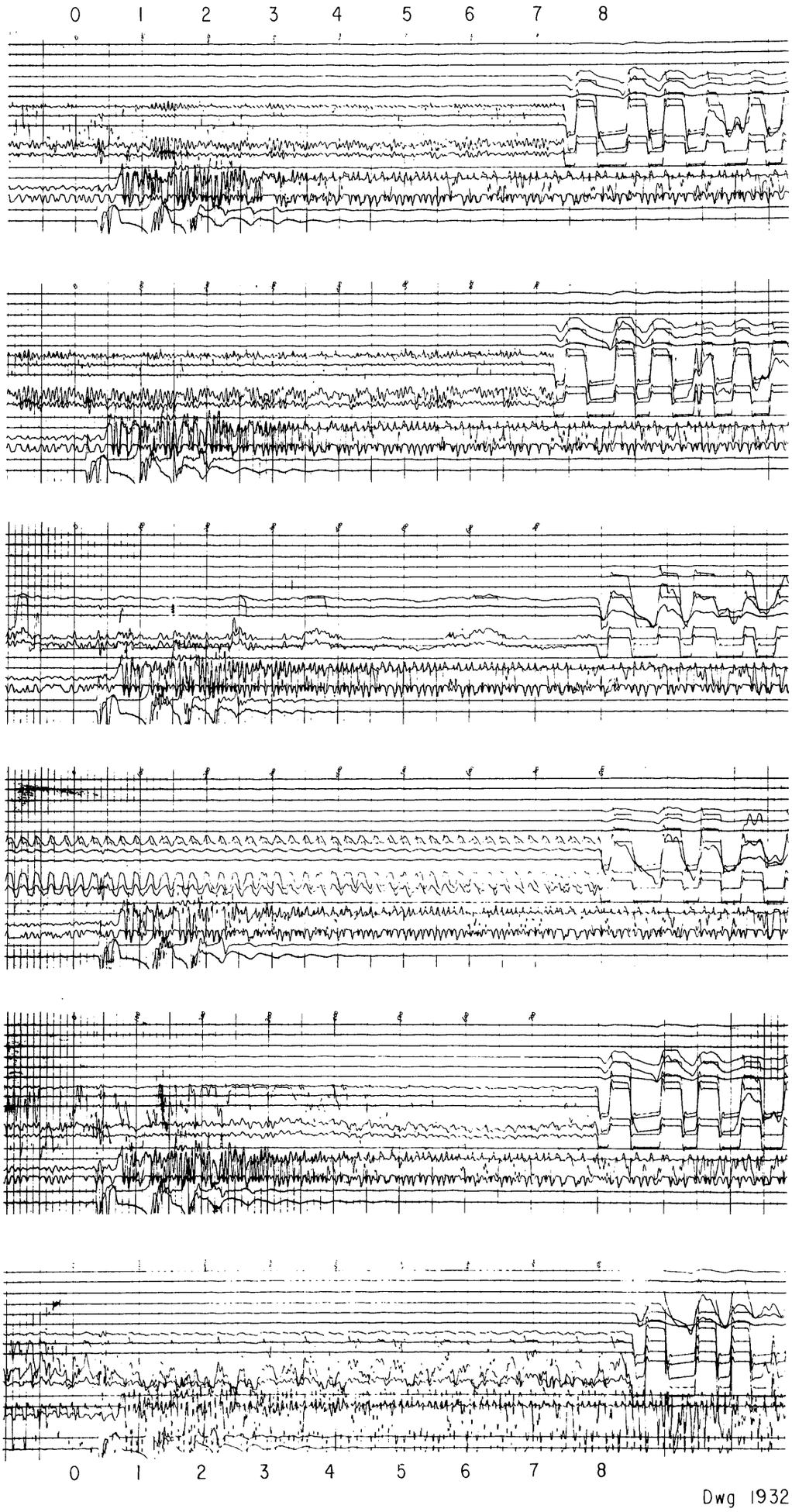
1/4/79




Dwg 1932/OP/5

# FORTESCUE – 4

WELL VELOCITY RECORD 1/4/79

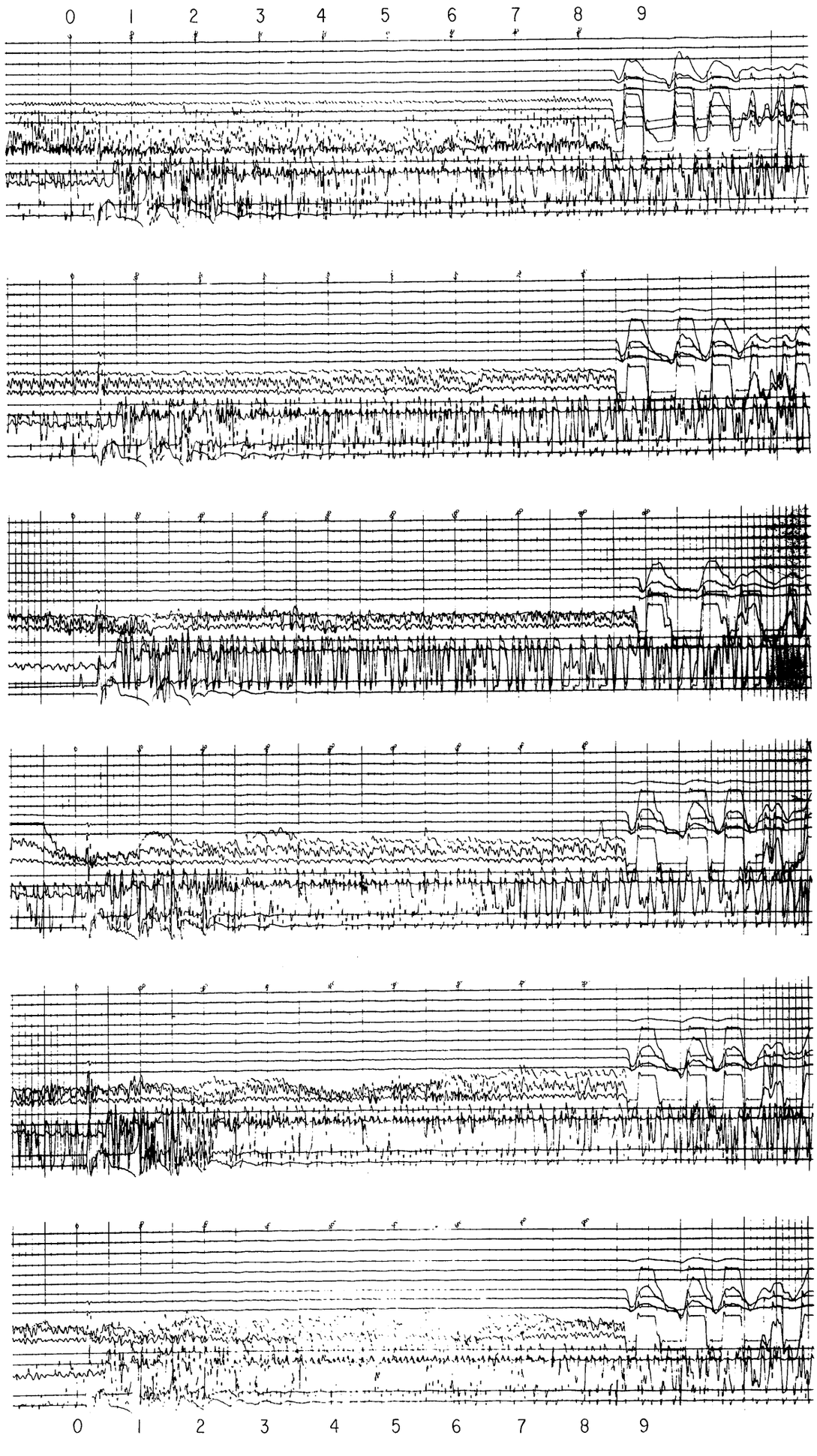



Dwg 1932/OP/6

# FORTESCUE – 4

WELL VELOCITY RECORD

1/4/79



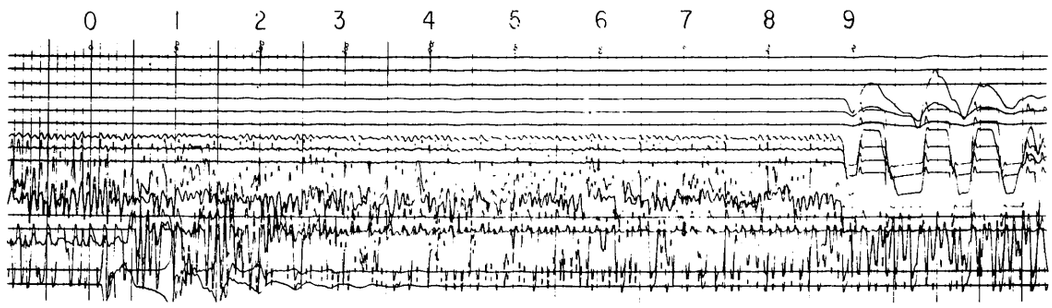

Dwg. 1932/OP/7

# FORTESCUE – 4

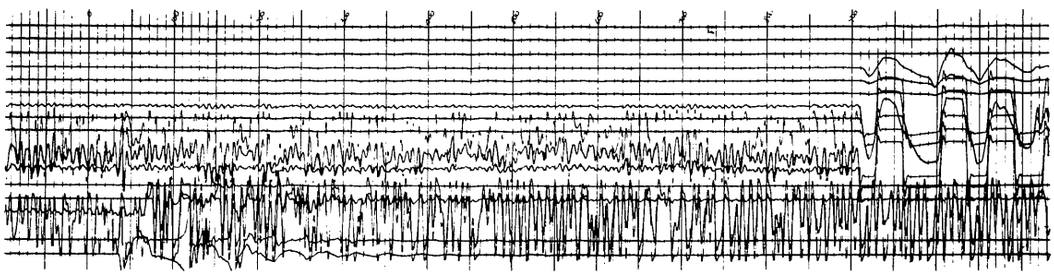


WELL VELOCITY RECORD 1/4/79

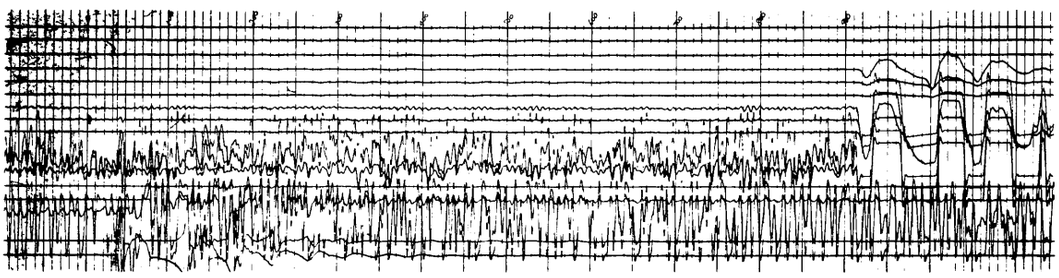
Rec. No 15
2495 m. K.B.



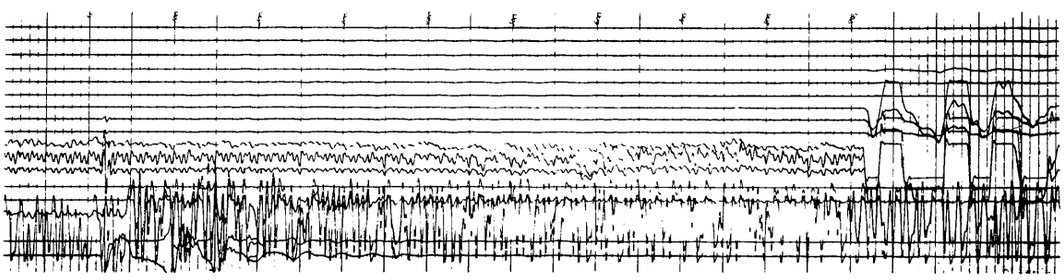

Rec. No. 16
2495 m. K.B.



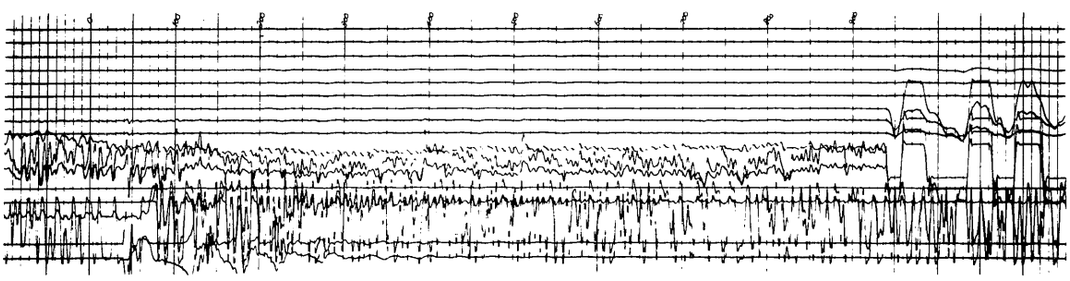
Rec. No. 17
2495 m. K.B



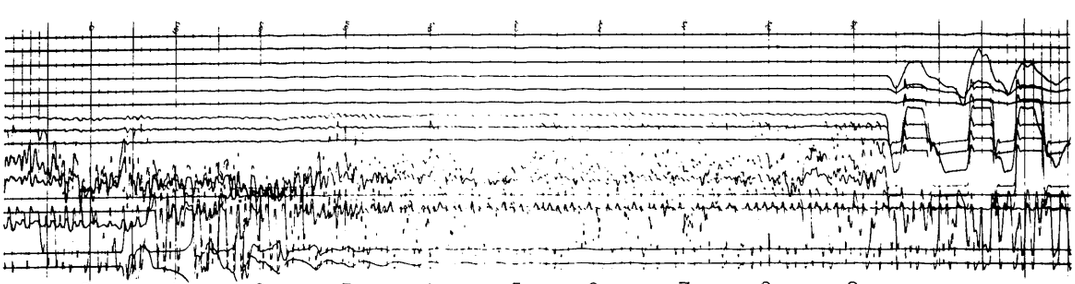
Rec No. 12
2598 m. K.B.



Rec. No. 13
2598 m. K.B



Rec. No. 14
2598 m. K.B.




Dwg 1932/OP/8

# 8. REPEAT FORMATION TESTER REPORT

APPENDIX 8

REPEAT FORMATION TESTER REPORT

# MEMORANDUM

SYDNEY April 19, 1979

YOUR REF

OUR REF. 6232 Fortescue JG:sr

SUBJECT Fortescue-4
RFT Test Results

C.N. Curnow

c.c. D.G. Battersby
A.J. Mebberson
A.J. Rigg

This memo contains our interpretation of the results of the RFT tests carried out in Fortescue-4. We have examined the discontinuities exhibited on the pressure vs depth plot and have checked the fluid recoveries against the position of the OWC. We have also examined main chamber pressure build-ups to determine permeabilities.

The following points are noted from our investigations.

1. The pressure difference at the discontinuity is approximately 16 psi (Figure 1). This discontinuity indicates the presence of a "seal" acting as a hydraulic barrier between the Fortescue field and the lower sands, similar to the situation observed in West Halibut-1 and Fortescue-2 and -3.

2. The oil and aquifer pressure gradients intersect at approximately 2419.5m ss (Figure 1) which is consistent with the OWC seen on logs.

3. Clean oil was discovered down to 2418m ss but shows of oil scum were seen in fluids recovered down to 2425m ss. The presence of this oil scum below the OWC is as yet unexplained.

4. Seat No. 20 at 2427m did not fit the expected pressure trend. Attempts were made at two other depths (2423.5m and 2424.5m) to determine the reliability of this data point but both failed due to the 'tightness' of the formation. A possible explanation for the existence of this point is the presence of a minor seal in the M-1.0.0 sand yielding two pressure trends. A similar pressure discontinuity in the oil zone was seen in Fortescue-3 (Figure 2). However, the anomaly as seen in Fortescue-4 is supported by only one pressure seat and is therefore not as convincing as the Fortescue-3 situation.

5. Six pressure build-ups were recorded in the M-1.0.0 sand. Of these, four were successful showing permeabilities in the range 290 to 1732 md.

D.A. Collins

D.A. Collins

Attach.

TABLE 1

PRESSURE BUILD-UP ANALYSIS

| RUN NO. | SEAT NO. | DEPTH (m) | | PERMEABILITY | HORNER EXTRAPOLATED PRESSURE |
|---|---|---|---|---|---|
| | | MDKB | Subsea | (md) | (psig) |
| 3 | 13 | 2449.5 | 2424.5 | 1139 | 3409.5 |
| 4 | 14 | 2443 | 2418 | ? | ? |
| 5 | 18 | 2433.5 | 2408.5 | 405 | 3389.9 |
| 6 | 19 | 2438 | 2413 | 716 | 3395.9 |
| 7 | 23 | 2432.5 | 2407.5 | 1732 | 3389.6 |

TABLE 2

FORTESCUE-4 RFT PRESSURES

| RUN NO. | SEAT NO. | DEPTH (m) | | PRETEST PRESSURES (psig) |
|---|---|---|---|---|
| | | MDKB | Subsea | |
| 1 | 1 | 2450 | 2425 | - |
| 2 | 2 | 2563 | 2538 | 3557.5 |
| | 3 | 2551 | 2526 | 3540.1 |
| | 4 | 2538 | 2513 | 3518.8 |
| | 5 | 2508 | 2483 | 3477.1 |
| | 6 | 2498.5 | 2473.5 | 3464.1 |
| | 7 (i) | 2482.5 | 2457.5 | - |
| | 7 (ii) | 2482.5 | 2457.5 | 3438.2 |
| | 8 | 2462 | 2437 | 3426.6 |
| | 9 | 2445.5 | 2420.5 | 3403.2 |
| | 10 | 2436 | 2411 | 3392.2 |
| | 11 | 2445.5 | 2420.5 | 3402.0 |
| | 12 | 2450 | 2425 | 3407.8 |
| 3 | 13 | 2449.5 | 2424.5 | 3408.6 |
| 4 | 14 | 2443 | 2418 | 3398.5 |
| 5 | 15 (i) | 2476 | 2451 | - |
| | 15 (ii) | 2476.5 | 2451.5 | 3438.1 |
| | 16 | 2469.5 | 2444.5 | - |
| | 17 | 2470 | 2445 | 3430 |
| | 18 | 2433.5 | 2408.5 | 3388.1 |
| 6 | 19 | 2438 | 2413 | 3394.9 |
| | 20 | 2427 | 2402 | 3394.1 |
| 7 | 21 | 2423.5 | 2398.5 | - |
| | 22 | 2424.5 | 2399.5 | - |
| | 23 | 2432.5 | 2407.5 | 3388.9 |

Notes: (1) The RFT pressure gauge appeared to stick during Seat No. 7(i)

(2) "Tight" sand was encountered at Seats 15(i), 16, 21 and 22.

# REPEAT FORMATION TESTER RECORD

PART 1

WELL: ~~FORESCUE-4~~

RUN #: 1 GEOLOGIST/S: G.M. Kjellgren DATE: 2 April, 1979

## PRETESTS

| | NO. | DEPTH | PRESSURE | REMARKS |
|---|---|---|---|---|
| SEAT #: | 1 | 2450 m | 3371psi=23.24 MPag | Schlumberger Gauge Pressures |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |

## SAMPLES

| | CHAMBER 1 ( 22.165 l.) | CHAMBER 2 ( l.) |
|---|---|---|
| | SEAT #: 1 DEPTH: 2450 m | SEAT #: DEPTH: m |
| Hydrostatic Initial | 4022 psi = 27.73 MPag | MPag |
| Pretest | 3371 psi = 23.24 MPag | MPag |
| Flowing Press. Initial | MPag | MPag |
| Flowing Press. Final | MPag | MPag |
| Sampling Range | MPag | MPag |
| Final Shut-in | 3366psi = 23.21 MPag | MPag |
| Hydrostatic Final | 4026psi = 27.76 MPag | MPag |
| Formation Press. (Horner) | N/A MPag | MPag |

## TEMPERATURE

Maximum Recorded: 92.2 °C Time Since Circulation: 8.30 Hrs

Depth Tool Reached: m Circulation Stopped: 22:30 Hrs 1/4/79

Formation Temperature (Horner): °C

## REMARKS

Calibration Pressure: MPag Calibration Temperature: °C

Hewlett-Packard Gauge #: 319

Mud Weight: 1.14 S.G. Calculated Hydrostatic: MPag

RFT Choke Size: 0.51mm

NOTE: Malfunction in H.P. Gauge. Schlumberger gauge pressures measured.

REPEAT FORMATION TESTER RECORD PART 2

RECORDING TIMES

| | CHAMBER 1 ( 22.165 l.) | CHAMBER 2 ( l.) |
|---|---|---|
| | SEAT #: 1 DEPTH: 2450 m | SEAT #: DEPTH: m |
| Tool Set: | 07:20:44 | |
| Pretest Open: | 07:20:44 | |
| Time Open: | 00:02:17 | |
| Chamber Open: | 07:23:01 | |
| Chamber Full: | | |
| Fill Time: | | |
| Start Build-up: | | |
| Finish Build-up: | 07:54:33 | |
| Build-up Time: | 00:31:32 | |
| Seal Chamber: | 07:54:33 | |
| Tool Retract: | 07:55:34 | |
| Total Time: | 00:34:50 | |

RECOVERY

| | | |
|---|---|---|
| Surface Pressure: | 0 MPag | MPag |
| Gas: | l. | l. |
| Oil: | Frothy Emulsion - 0.50 l. | l. |
| Water: | l. | l. |
| Others: | 21.00 l. | l. |

PROPERTIES

Gas Composition — Moderate petrol/sulfrous odour

| | | |
|---|---|---|
| $C_1$ (ppm) | | |
| $C_2$ | | |
| $C_3$ | | |
| $iC_4/nC_4$ | | |
| $C_5$ | | |
| $C_6+$ | | |
| $CO_2/H_2S$ | | |
| Oil Properties | °API @ °C | °API @ °C |
| Colour: | light to medium yellow brown | |
| Fluorescence: | bright bluish white | |
| G.O.R.: | | |
| Water Properties | | |
| Resistivity: | 0.250 Ω @ 20 °C | Ω @ °C |
| NaCl Equivalent: | 27000 ppm | ppm |
| $Cl^-$ Titrated: | 18500 ppm | ppm |
| $NO_3^-$: | 132 ppm | ppm |
| Est. Water Type: | Filtrate | |

REMARKS

Mud Properties: Rmf Resistivity: 0.260 Ω @ 17 °C

NaCl Equiv.: ppm $Cl^-$ Titrated: 18,600 ppm $NO_3^-$: 145 ppm

# REPEAT FORMATION TESTER RECORD — PART 1

WELL: FORTESCUE-4

RUN #: 2 GEOLOGIST/S: G.M. Kjellgren, P. Elze DATE: 2 April, 1979.

## PRETESTS

| | NO. | DEPTH | PRESSURE | REMARKS |
|---|---|---|---|---|
| SEAT #: | 2 | 2563 m | 3557.5psi=24.53 MPag | |
| SEAT #: | 3 | 2551 m | 3540.1psi-24.41 MPag | |
| SEAT #: | 4 | 2538 m | 3518.8psi=24.26 MPag | |
| SEAT #: | 5 | 2508 m | 3477.1psi=23.97 MPag | |
| SEAT #: | 6 | 2498.5 m | 3464.1psi=23.88 MPag | |
| SEAT #: | 7(i) | 2482.5 m | 0 psi = 0 MPag | tight test |
| SEAT #: | 7(ii) | 2482.3 m | 3438.4psi=23.71 MPag | |
| SEAT #: | 8 | 2462 m | 3426.6psi=23.63 MPag | |
| SEAT #: | 9 | 2445.5 m | 3403.2psi=23.46 MPag | |
| SEAT #: | 10 | 2436 m | 3392.2psi=23.39 MPag | |
| | 11 | 2445.5 | 3402.0psi=23.36 | |
| | 12 | 2450 | 3407.8psi=23.50 | |

| | CHAMBER 1 ( 22.165 l.) | CHAMBER 2 ( 2.225 l.) |
|---|---|---|
| | SEAT #: 11 DEPTH: 2445.5 m | SEAT #: 12 DEPTH: 2450 m |
| Hydrostatic Initial | 4053.1psi = 27.95 MPag | 4059psi = 27.99 MPag |
| Pretest | 3402.0psi = 23.46 MPag | 3407.8psi = 23.50 MPag |
| Flowing Press. Initial | 1891.9psi = 13.04 MPag | 2756.1psi = 19.00 MPag |
| Flowing Press. Final | 3219.9psi = 22.20 MPag | 3104.8psi = 21.41 MPag |
| Sampling Range | MPag | MPag |
| Final Shut-in | 3402.3psi = 23.46 MPag | 3408.1psi = 23.50 MPag |
| Hydrostatic Final | 4053.0psi = 27.94 MPag | 4060.1psi = 27.99 MPag |
| Formation Press. (Horner) | MPag | MPag |

## TEMPERATURE

Maximum Recorded: 99.4 °C Time Since Circulation: Hrs

Depth Tool Reached: m Circulation Stopped: 22:30 Hrs 1/4/79

Formation Temperature (Horner): °C

## REMARKS

Calibration Pressure: MPag Calibration Temperature: °C

Hewlett-Packard Gauge #: 319

Mud Weight: 1.14 S.G. Calculated Hydrostatic: MPag

RFT Choke Size: 0.51mm

REPEAT FORMATION TESTER RECORD PART 2

RECORDING TIMES

| | CHAMBER 1 ( 22.165 l.) | CHAMBER 2 ( 2,225 l.) |
|---|---|---|
| | SEAT #: 11 DEPTH: 2445.5 m | SEAT #: 12 DEPTH: 2450 m |
| Tool Set: | 18:07:43 | 19:13:14 |
| Pretest Open: | 18:07:43 | 19:13:14 |
| Time Open: | 00:04:57 | 00:04:59 |
| Chamber Open: | 18:12:40 | 19:18:13 |
| Chamber Full: | 18:28:00 | 19:19:25 |
| Fill Time: | 00:15:20 | 00:01:12 |
| Start Build-up: | 18:28:00 | 19:19:25 |
| Finish Build-up: | 18:28:37 | 19:19:48 |
| Build-up Time: | 00:00:37 | 00:00:23 |
| Seal Chamber: | 18:33:30 | 19:31:01 |
| Tool Retract: | 18:33:30 | 19:31:01 |
| Total Time: | 00:25:47 | 00:17:47 |

RECOVERY

| | | |
|---|---|---|
| Surface Pressure: | 8 psi = 0.06 MPag | 320 psi = 2.21 MPag |
| Gas: | l. | l. |
| Oil: | very thin light brown oil film | Thin light brown frothy oily scum |
| Water: | l. | l. |
| Others: | 20.60 l. | 2.100 l. |

PROPERTIES

| | | |
|---|---|---|
| | Definite faint to moderate hydrocarbon odour, fluorscence and cut. | Strong petrol odour. Strong, bright bluish white fluorescence. |
| Gas Composition | | |
| $C_1$ (ppm) | | |
| $C_2$ | | |
| $C_3$ | | |
| $iC_4/nC_4$ | | |
| $C_5$ | | |
| $C_{6+}$ | | |
| $CO_2/H_2S$ | | |
| Oil Properties | °API @ °C | °API @ °C |
| Colour: | | |
| Fluorescence: | | |
| G.O.R.: | | |
| Water Properties | | |
| Resistivity: | 0.234 Ω @ 21 °C | 0.261 Ω @ 21 °C |
| NaCl Equivalent: | ppm | ppm |
| $Cl^-$ Titrated: | 18,500 ppm | 18,500 ppm |
| $NO_3^-$: | 133 ppm | 138 ppm |
| Est. Water Type: | Filtrate | Filtrate |

REMARKS

Mud Properties: Rmf Resistivity: 0.260 Ω @ 17 °C

NaCl Equiv.: ppm $Cl^-$ Titrated: 18,600 ppm $NO_3^-$: 145 ppm

# REPEAT FORMATION TESTER RECORD — PART 1

WELL: FORESCUE-4

RUN #: 3 GEOLOGIST/S: G.M. Kjellgren/P. Elze DATE: 2 April, 1979

## PRETESTS

| | NO. | DEPTH | PRESSURE | REMARKS |
|---|---|---|---|---|
| SEAT #: | 13 | 2449.5 m | 3408.6psi= 23.50MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |

## SAMPLES

CHAMBER 1 ( 22.165 l.) CHAMBER 2 (2.225 l.)

SEGREGATOR

SEAT #: 13 DEPTH: 2449.5m SEAT #: 13 DEPTH: 2449.5 m

| | | |
|---|---|---|
| Hydrostatic Initial | 4059.4 psi = 27.99 MPag | 4059.4 psi = 27.99 MPag |
| Pretest | 3408.6 psi = 23.50 MPag | - MPag |
| Flowing Press. Initial | 2443.4 psi = 16.85 MPag | 3059.7 psi = 21.10 MPag |
| Flowing Press. Final | 3107.0 psi = 21.43 MPag | 3171.9 psi = 21.87 MPag |
| Sampling Range | MPag | MPag |
| Final Shut-in | 3408.7 psi = 23.50 MPag | 3408.7 psi = 23.50 MPag |
| Hydrostatic Final | 4059.1 psi = 27.99 MPag | 4059.1 psi = 27.99 MPag |
| Formation Press. (Horner) | 3409.5 psi = 23.51 MPag | MPag |

## TEMPERATURE

Maximum Recorded: 101 °C Time Since Circulation: Hrs

Depth Tool Reached: m Circulation Stopped: 22:30 Hrs1/4/79

Formation Temperature (Horner): °C

## REMARKS

Calibration Pressure: MPag Calibration Temperature: °C

Hewlett-Packard Gauge #: 319

Mud Weight: 1.14 S.G. Calculated Hydrostatic: 4055.9 psi = 27.96 MPag

RFT Choke Size: 0.51 mm

# REPEAT FORMATION TESTER RECORD — PART 2

## RECORDING TIMES

| | CHAMBER 1 ( 1.) | CHAMBER 2 ( 2.225 1.) |
|---|---|---|
| | SEAT #: 13 DEPTH: 2449.5 m | SEAT #: 13 DEPTH: 2449.5 m |
| Tool Set: | 23:48:34 | |
| Pretest Open: | 23:48:34 | |
| Time Open: | 00:06:08 | |
| Chamber Open: | 23:54:42 | 00:17:18 |
| Chamber Full: | 00:09:38 | 00:17:54 |
| Fill Time: | 00:14:56 | 00:00:36 |
| Start Build-up: | 00:09:38 | 00:17:54 |
| Finish Build-up: | 00:10:53 | 00:18:03 |
| Build-up Time: | 00:01:15 | 00:00:09 |
| Seal Chamber: | 00:16:15 | 00:25:10 |
| Tool Retract: | - | 00:26:01 |
| Total Time: | - | 00:38:33 |

## RECOVERY

| | | |
|---|---|---|
| Surface Pressure: | 0 psi = 0 MPag | Sealed Segregator MPag |
| Gas: | - l. | l. |
| Oil: | Thin light brown film l. | l. |
| Water: | l. | l. |
| Others: | 21.50 l. | l. |

## PROPERTIES

| | | |
|---|---|---|
| Gas Composition | | |
| $C_1$ (ppm) | | |
| $C_2$ | | |
| $C_3$ | | |
| $iC_4/nC_4$ | | |
| $C_5$ | | |
| $C_6+$ | | |
| $CO_2/H_2S$ | | |
| Oil Properties | °API @ °C | °API @ °C |
| Colour: | | |
| Fluorescence: | | |
| G.O.R.: | | |
| Water Properties | | |
| Resistivity: | 0.265 Ω @ 24 °C | Ω @ °C |
| NaCl Equivalent: | - ppm | ppm |
| $Cl^-$ Titrated: | 18,600 ppm | ppm |
| $NO_3^-$: | 155 ppm | ppm |
| Est. Water Type: | Filtrate | |

## REMARKS

Mud Properties: Rmf Resistivity: 0.260 Ω @ 17 °C

NaCl Equiv.: ppm $Cl^-$ Titrated: 18,600 ppm $NO_3^-$: 145 ppm

# REPEAT FORMATION TESTER RECORD — PART 1

WELL: FORTESCUE=4

RUN #: 4 GEOLOGIST/S: P. Elze DATE: 3 April, 1979

## PRETESTS

| | NO. | DEPTH | PRESSURE | REMARKS |
|---|---|---|---|---|
| SEAT #: | 14 | 2443 m | 3398.5 psi=23.43 MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |

## SAMPLES

| | CHAMBER 1 ( 22.165 1.) | SEGREGATOR CHAMBER 2 ( 2.225 1.) |
|---|---|---|
| | SEAT #: 14 DEPTH: 2443 m | SEAT #: 14 DEPTH: 2443 m |
| Hydrostatic Initial | 4042.2 psi = 27.87 MPag | - MPag |
| Pretest | 3398.5 psi = 23.43 MPag | - MPag |
| Flowing Press. Initial | 514.2 psi = 3.54 MPag | 1337.5 psi = 3.54 MPag |
| Flowing Press. Final | 1981.2 psi = 13.66 MPag | 1898.0 psi = 13.66 MPag |
| Sampling Range | MPag | MPag |
| Final Shut-in | 3398.2 psi = 23.43 MPag | 3398.7 psi = 23.43 MPag |
| Hydrostatic Final | 4038.3 psi = 27.84 MPag | 4038.3 psi = 27.84 MPag |
| Formation Press. (Horner) | MPag | MPag |

## TEMPERATURE

Maximum Recorded: 98.9 °C Time Since Circulation: Hrs

Depth Tool Reached: m Circulation Stopped: 22.30 Hrs 1/4/79

Formation Temperature (Horner): °C

## REMARKS

Calibration Pressure: 23.52 MPag Calibration Temperature: 96.6 °C

Hewlett-Packard Gauge #: 319

Mud Weight: 1.16 S.G. Calculated Hydrostatic: 4045 psi = 27.89 MPag

RFT Choke Size: 0.51 mm

Note: Chamber 2 (Segregator) sealed and packed for analysis.

# REPEAT FORMATION TESTER RECORD — PART 2

## RECORDING TIMES

| | CHAMBER 1 ( 1.) | CHAMBER 2 ( 1.) |
|---|---|---|
| | SEAT #: 14 DEPTH: 2443 m | SEAT #: 14 DEPTH: 2443 m |
| Tool Set: | 04:32:59 | |
| Pretest Open: | 04:32:59 | |
| Time Open: | 41:58 | |
| Chamber Open: | 04:38:23 | 05:18:46 |
| Chamber Full: | 04:57:08 | 05:20:32 |
| Fill Time: | 19:31 | 01:46 |
| Start Build-up: | 04:57:98 | 05:20:32 |
| Finish Build-up: | 05:14:50 | 05:31:11 |
| Build-up Time: | 17:58 | 10:39 |
| Seal Chamber: | 05:14:57 | 05:31:11 |
| Tool Retract: | - | 05:32:31 |
| Total Time: | - | |

## RECOVERY

| | | |
|---|---|---|
| Surface Pressure: | 100 psi = 0.69 MPag | Segregator Sealed MPag |
| Gas: | 3.4 $ft^3$ = 96.3 l. | l. |
| Oil: | 8.30 l. | l. |
| Water: | 10.20 l. | l. |
| Others: | 0.50 l. | l. |

## PROPERTIES

| | | |
|---|---|---|
| Gas Composition | | |
| $C_1$ (ppm) | | |
| $C_2$ | | |
| $C_3$ | | |
| $iC_4/nC_4$ | | |
| $C_5$ | | |
| $C_6+$ | | |
| $CO_2/H_2S$ | | |
| Oil Properties | 45 °API @ 15.6 °C | °API @ °C |
| Colour: | Very dark brown | |
| Fluorescence: | bright bluish white | |
| G.O.R.: | | |
| Water Properties | | |
| Resistivity: | Ω @ °C | Ω @ °C |
| NaCl Equivalent: | ppm | ppm |
| $Cl^-$ Titrated: | 16,400 ppm | ppm |
| $NO_3^-$: | 105 ppm | ppm |
| Est. Water Type: | Filtrate | |

## REMARKS

Mud Properties: Resistivity: 0.260 Ω @ 17 °C

NaCl Equiv.: ppm $Cl^-$ Titrated: 18,600 ppm $NO_3^-$: 145 ppm

# REPEAT FORMATION TESTER RECORD

PART 1

WELL: FORTESCUE-4

RUN #: 5 GEOLOGIST/S: _____ DATE: 3 April, 1979

## PRETESTS

| | NO. | DEPTH | PRESSURE | REMARKS |
|---|---|---|---|---|
| SEAT #: | 15(i) | 2476 m | - MPag | Tight |
| SEAT #: | 15(ii) | 2476.5 m | 3438.1 psi=23.71 MPag | |
| SEAT #: | 16 | 2469.5 m | - MPag | Tight |
| SEAT #: | 17 | 2470 m | 3430psi=23.65 MPag | |
| SEAT #: | 18 | 2433.5 m | 3388.1psi=23.36 MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |

## SAMPLES

CHAMBER 1 ( 22.165 l.) CHAMBER 2 ( 2.225 l.)

SEAT #: 18 DEPTH: 2433.5m SEAT #: 18 DEPTH: 2433.5 m

| | | |
|---|---|---|
| Hydrostatic Initial | 4016.2 psi = 27.69 MPag | MPag |
| Pretest | 3388.1 psi = 23.36 MPag | MPag |
| Flowing Press. Initial | 1394.8 psi = 9.62 MPag | MPag |
| Flowing Press. Final | 1664.7 psi = 11.48 MPag | MPag |
| Sampling Range | MPag | MPag |
| Final Shut-in | 3388.4 psi = 23.36 MPag | 3388.2 psi = 23.36 MPag |
| Hydrostatic Final | 4015.9 psi = 27.69 MPag | MPag |
| Formation Press. (Horner) | 3389.9 psi = 23.37 MPag | MPag |

## TEMPERATURE

Maximum Recorded: 193 °C Time Since Circulation: 18.5 Hrs

Depth Tool Reached: _____ m Circulation Stopped: 11:30 Hrs 3/4/79

Formation Temperature (Horner): _____ °C

## REMARKS

Calibration Pressure: 23.44 MPag Calibration Temperature: 84.0 °C

Hewlett-Packard Gauge #: 319

Mud Weight: 1.17 S.G. Calculated Hydrostatic: _____ MPag

RFT Choke Size: 0.051 mm

# REPEAT FORMATION TESTER RECORD — PART 2

## RECORDING TIMES

| | CHAMBER 1 ( 22.165 l.) | CHAMBER 2 ( 2.225 l.) |
|---|---|---|
| | SEAT #: 17 DEPTH: 2433.5 m | SEAT #: 17 DEPTH: 2433.5 m |
| Tool Set: | 19:14:52 | |
| Pretest Open: | 19:14:52 | |
| Time Open: | 9:00 | |
| Chamber Open: | 19:23:52 | 20:08:57 |
| Chamber Full: | 19:42:57 | 20:10:21 |
| Fill Time: | 19:05 | 1:24 |
| Start Build-up: | 19:42:57 | 20:10:21 |
| Finish Build-up: | 20:08:57 | 20:20:45 |
| Build-up Time: | 26:00 | 10:34 |
| Seal Chamber: | 20:08:57 | 20:20:45 |
| Tool Retract: | | 20:20:45 |
| Total Time: | | 1:05:51 |

## RECOVERY

| | | SEGREGATOR |
|---|---|---|
| Surface Pressure: | 170 psi = 1.17 MPag | 0 MPag |
| Gas: | l. | l. |
| Oil: | Rim of dark brown oil emulsion l. | l. |
| Water: | 21.50 l. | 1.25 l. |
| Others: | - l. | l. |

## PROPERTIES

| | | |
|---|---|---|
| Gas Composition | | |
| $C_1$ (ppm) | | |
| $C_2$ | | |
| $C_3$ | | |
| $iC_4/nC_4$ | | |
| $C_5$ | | |
| $C_6+$ | | |
| $CO_2/H_2S$ | | |
| Oil Properties | °API @ °C | °API @ °C |
| Colour: | | |
| Fluorescence: | Bright bluish-white | Bright bluish-white |
| G.O.R.: | | |
| Water Properties | | |
| Resistivity: | 0.278 Ω @ 18 °C | 0.295 Ω @ 19 °C |
| NaCl Equivalent: | ppm | ppm |
| $Cl^-$ Titrated: | 18400 ppm | 18400 ppm |
| $NO_3^-$: | 135 ppm | 127 ppm |
| Est. Water Type: | Filtrate | Filtrate |

## REMARKS

Mud Properties: Resistivity: 0.296 Ω @ 17 °C

NaCl Equiv.: ppm $Cl^-$ Titrated: 18600 ppm $NO_3^-$: 145 ppm

REPEAT FORMATION TESTER RECORD PART 1

WELL: FORTESCUE-4

RUN #: 6 GEOLOGIST/S: _____ DATE: 4 April, 1979

PRETESTS

| | NO. | DEPTH | PRESSURE | REMARKS |
|---|---|---|---|---|
| SEAT #: | 19 | 2438 m | 3395.9psi=23.41 MPag | |
| SEAT #: | 20 | 2427 m | 3394.1psi=23.40 MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |
| SEAT #: | | m | MPag | |

SAMPLES

SEGREGATOR

| | CHAMBER 1 ( 22.165 l.) | CHAMBER 2 ( 2.225 l.) |
|---|---|---|
| | SEAT #: 19 DEPTH: 2438 m | SEAT #: 20 DEPTH: 2427 m |
| Hydrostatic Initial | 4022.4 psi = 27.73 MPag | 4005.2 psi = 27.62 MPag |
| Pretest | 3395.9 psi = 23.41 MPag | 3394.1 psi = 23.40 MPag |
| Flowing Press. Initial | 489.4 psi = 3.37 MPag | 1794.8 psi = 12.37 MPag |
| Flowing Press. Final | 1192.2 psi = 8.22 MPag | 2188.9 psi = 15.09 MPag |
| Sampling Range | MPag | MPag |
| Final Shut-in | 3394.9 psi = 23.41 MPag | 3390.9 psi = 23.38 MPag |
| Hydrostatic Final | 4022.9 psi = 27.74 MPag | 4006.0 psi = 27.62 MPag |
| Formation Press. (Horner) | 3395.9 psi = 23.41 MPag | MPag |

TEMPERATURE

Maximum Recorded: 89.4 °C Time Since Circulation: 18.5 Hrs

Depth Tool Reached: 2470 m Circulation Stopped: 11:30 Hrs 3/4/79

Formation Temperature (Horner): _____ °C

REMARKS

Calibration Pressure: 23.49 MPag Calibration Temperature: 89.7 °C

Hewlett-Packard Gauge #: 319

Mud Weight: 1.17 S.G. Calculated Hydrostatic: _____ MPag

RFT Choke Size: _____

REPEAT FORMATION TESTER RECORD PART 2

RECORDING TIMES

| | CHAMBER 1 ( 22.165 l.) | CHAMBER 2 ( 2.225 l.) |
|---|---|---|
| | SEAT #: 19 DEPTH: 2438 m | SEAT #: 20 DEPTH: 2427 m |
| Tool Set: | 23:47:02 | 01:02:45 |
| Pretest Open: | 23:47:02 | 01:02:45 |
| Time Open: | 05:13 | 06:48 |
| Chamber Open: | 23:52:15 | 01:09:33 |
| Chamber Full: | 00:12:38 | 01:10:58 |
| Fill Time: | 20:23 | 01:25 |
| Start Build-up: | 00:12:38 | 01:10:58 |
| Finish Build-up: | 00:40:30 | 01:21:10 |
| Build-up Time: | 27:52 | 10:12 |
| Seal Chamber: | 00:40:30 | 01:21:10 |
| Tool Retract: | 00:41:30 | 01:21:30 |
| Total Time: | 53:08 | 18:25 |

RECOVERY

| | | | | |
|---|---|---|---|---|
| Surface Pressure: | 120 psi = 0.83 | MPag | Segregator Opened | MPag |
| Gas: | 2.80 | l. | | l. |
| Oil: | 1.500 | l. | | l. |
| Water: | 20.800 | l. | 2.200 | l. |
| Others: | | l. | | l. |

PROPERTIES

| | | |
|---|---|---|
| Gas Composition | | |
| $C_1$ (ppm) | Insufficient for analysis | |
| $C_2$ | | |
| $C_3$ | | |
| $iC_4/nC_4$ | | |
| $C_5$ | | |
| $C_6+$ | | |
| $CO_2/H_2S$ | | |
| Oil Properties | 43.2 °API @ 15.6 °C | °API @ °C |
| Colour: | Very dark brown black | |
| Fluorescence: | bright blue white | |
| G.O.R.: | | |
| Water Properties | | |
| Resistivity: | 0.278 Ω @ 17 °C | 0.265 Ω @ 17 °C |
| NaCl Equivalent: | ppm | ppm |
| $Cl^-$ Titrated: | 20,000 ppm | 20,000 ppm |
| $NO_3^-$: | 44 ppm | 8 ppm |
| Est. Water Type: | Formation/Filtrate | Formation |

REMARKS

Mud Properties: Resistivity: 0.297 Ω @ 17 °C

NaCl Equiv.: ppm $Cl^-$ Titrated: 18,600 ppm $NO_3^-$: 145 ppm

REPEAT FORMATION TESTER RECORD PART 1

WELL: ~~FORTESCUE-4~~

RUN #: 7 GEOLOGIST/S: _____ DATE: 3 April, 1979

PRETESTS

| | NO. | DEPTH | PRESSURE | REMARKS |
|---|---|---|---|---|
| SEAT #: | 21 | 2423.5 m | _____ MPag | Tight |
| SEAT #: | ~~22~~ | 2424.5 m | _____ MPag | Tight |
| SEAT #: | 23 | 2432.5 m | 3388.5psi=23.36 MPag | |
| SEAT #: | | m | _____ MPag | |
| SEAT #: | | m | _____ MPag | |
| SEAT #: | | m | _____ MPag | |
| SEAT #: | | m | _____ MPag | |
| SEAT #: | | m | _____ MPag | |
| SEAT #: | | m | _____ MPag | |
| SEAT #: | | m | _____ MPag | |

SAMPLES

| | CHAMBER 1 ( 22.165 l.) | | CHAMBER 2 ( 2.225 l.) | |
|---|---|---|---|---|
| | SEAT #: 23 | DEPTH: 2432.5 m | SEAT #: 23 | DEPTH: 2432.5 m |
| Hydrostatic Initial | 4010.1 psi = 27.65 | MPag | | MPag |
| Pretest | 3388.5 psi = 23.36 | MPag | | MPag |
| Flowing Press. Initial | 1602 psi = 11.05 | MPag | 1747.1 psi = 12.05 | MPag |
| Flowing Press. Final | 1908.1 psi = 13.16 | MPag | 1812 psi = 12.49 | MPag |
| Sampling Range | | MPag | | MPag |
| Final Shut-in | 3388.9 psi = 23.37 | MPag | 3389.5 psi = 23.37 | MPag |
| Hydrostatic Final | | MPag | 4008.7 psi = 27.64 | MPag |
| Formation Press. (Horner) | 3388.6 psi = 23.37 | MPag | | MPag |

TEMPERATURE

Maximum Recorded: 94.4 °C Time Since Circulation: _____ Hrs

Depth Tool Reached: 2461 m Circulation Stopped: _____ Hrs

Formation Temperature (Horner): _____ °C

REMARKS

Calibration Pressure: 23.37 MPag Calibration Temperature: 91.2 °C

Hewlett-Packard Gauge #: 319

Mud Weight: 1.17 S.G. Calculated Hydrostatic: _____ MPag

RFT Choke Size: 0.51 mm

# REPEAT FORMATION TESTER RECORD — PART 2

## RECORDING TIMES

| | CHAMBER 1 ( 22.165 l.) | CHAMBER 2 ( 2.225 l.) |
|---|---|---|
| | SEAT #: 23 DEPTH: 2432.5 m | SEAT #: ____ DEPTH: ____ m |
| Tool Set: | 06:06:13 | |
| Pretest Open: | 06:06:13 | |
| Time Open: | 04:30 | |
| Chamber Open: | 06:10:43 | 06:57:04 |
| Chamber Full: | 06:27:34 | 06:58:43 |
| Fill Time: | 17:09 | 01:39 |
| Start Build-up: | 06:27:34 | 06:58:43 |
| Finish Build-up: | 06:56:06 | 07:07:00 |
| Build-up Time: | 28:32 | 08:17 |
| Seal Chamber: | 06:56:06 | 07:07:00 |
| Tool Retract: | | 07:07:00 |
| Total Time: | | 01:01:13 |

## RECOVERY

| | | | | |
|---|---|---|---|---|
| Surface Pressure: | 120 psi = 0.83 | MPag | Segregator Sealed | MPag |
| Gas: | 22.7 | l. | | l. |
| Oil: | 2.350 | l. | | l. |
| Water: | 18.250 | l. | | l. |
| Others: | | l. | | l. |

## PROPERTIES

| | | |
|---|---|---|
| Gas Composition | | |
| $C_1$ (ppm) | 64,768 | |
| $C_2$ | 43,868 | |
| $C_3$ | 61,337 | |
| $iC_4/nC_4$ | 13,579/14,484 | |
| $C_5$ | 2,850 | |
| $C_6+$ | - | |
| $CO_2/H_2S$ | - | |
| Oil Properties | 44.3 °API @ 15.6 °C | °API @ °C |
| Colour: | Dark brown black | |
| Fluorescence: | bright blue white | |
| G.O.R.: | 52.1 | |
| Water Properties | | |
| Resistivity: | Ω @ °C | Ω @ °C |
| NaCl Equivalent: | ppm | ppm |
| $Cl^-$ Titrated: | 21,200 ppm | ppm |
| $NO_3^-$: | 39 ppm | ppm |
| Est. Water Type: | Formation/Filtrate | |

## REMARKS

Mud Properties: Resistivity: 0.296 Ω @ 17 °C

NaCl Equiv.: ____ ppm $Cl^-$ Titrated: 18,600 ppm $NO_3^-$: 145 ppm

# ENCLOSURES

PE902714

This is an enclosure indicator page.
The enclosure PE902714 is enclosed within the container PE902713 at this location in this document.

The enclosure PE902714 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE | = PE902714 |
| CONTAINER_BARCODE | = PE902713 |
| NAME | = Structure Map Top of Latrobe Seismic Marker |
| BASIN | = GIPPSLAND |
| PERMIT | = |
| TYPE | = SEISMIC |
| SUBTYPE | = HRZN_CONTR_MAP |
| DESCRIPTION | = Structure Map Top of Latrobe Seismic Marker (enclosure 2 of WCR) for Fortescue-4 |
| REMARKS | = |
| DATE_CREATED | = 31/05/1979 |
| DATE_RECEIVED | = |
| W_NO | = W721 |
| WELL_NAME | = Fortescue-4 |
| CONTRACTOR | = ESSO |
| CLIENT_OP_CO | = ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

PE902715

This is an enclosure indicator page.
The enclosure PE902715 is enclosed within the container PE902713 at this location in this document.

The enclosure PE902715 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE | = PE902715 |
| CONTAINER_BARCODE | = PE902713 |
| NAME | = Time Structure Map Top of Latrobe Seismic Marker |
| BASIN | = GIPPSLAND |
| PERMIT | = |
| TYPE | = SEISMIC |
| SUBTYPE | = HRZN_CONTR_MAP |
| DESCRIPTION | = Time Structure Map Top of Latrobe Seismic Marker (enclosure 1 of WCR) for Fortescue-4 |
| REMARKS | = |
| DATE_CREATED | = 31/05/1979 |
| DATE_RECEIVED | = |
| W_NO | = W721 |
| WELL_NAME | = Fortescue-4 |
| CONTRACTOR | = ESSO |
| CLIENT_OP_CO | = ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

PE905988

This is an enclosure indicator page.
The enclosure PE905988 is enclosed within the container PE902713 at this location in this document.

The enclosure PE905988 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE | PE905988 |
| CONTAINER_BARCODE | PE902713 |
| NAME | Structural Cross-Section A-A' |
| BASIN | GIPPSLAND BASIN |
| PERMIT | VIC/L5 |
| TYPE | WELL |
| SUBTYPE | CROSS_SECTION |
| DESCRIPTION | Sructural Cros Section A-A' (enclosure from WCR) for Fortescue-4 |
| REMARKS | |
| DATE_CREATED | 31/05/79 |
| DATE_RECEIVED | |
| W_NO | W721 |
| WELL_NAME | FORTESCUE-4 |
| CONTRACTOR | |
| CLIENT_OP_CO | ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC |

(Inserted by DNRE - Vic Govt Mines Dept)

PE902716

This is an enclosure indicator page.
The enclosure PE902716 is enclosed within the container PE902713 at this location in this document.

The enclosure PE902716 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE | = PE902716 |
| CONTAINER_BARCODE | = PE902713 |
| NAME | = Sonic Calibration Curve |
| BASIN | = GIPPSLAND |
| PERMIT | = |
| TYPE | = WELL |
| SUBTYPE | = VELOCITY_CHART |
| DESCRIPTION | = Sonic Calibration Curve (enclosure 5 of WCR) for Fortescue-1 |
| REMARKS | = |
| DATE_CREATED | = 01/06/1979 |
| DATE_RECEIVED | = |
| W_NO | = W721 |
| WELL_NAME | = Fortescue-4 |
| CONTRACTOR | = ESSO |
| CLIENT_OP_CO | = ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

PE904950

This is an enclosure indicator page.
The enclosure PE904950 is enclosed within the container PE902713 at this location in this document.

The enclosure PE904950 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE | = PE904950 |
| CONTAINER_BARCODE | = PE902713 |
| NAME | = Time Depth Curve |
| BASIN | = GIPPSLAND |
| PERMIT | = VIC/L5 |
| TYPE | = WELL |
| SUBTYPE | = VELOCITY_CHART |
| DESCRIPTION | = Fortescue 4 Time Depth Curve. Enclosure 4 from WCR. |
| REMARKS | = |
| DATE_CREATED | = 31/05/79 |
| DATE_RECEIVED | = |
| W_NO | = W721 |
| WELL_NAME | = Fortescue-4 |
| CONTRACTOR | = Esso Exploration and Production Australia INC. |
| CLIENT_OP_CO | = Esso Australia LTD. |

(Inserted by DNRE - Vic Govt Mines Dept)

PE601412

This is an enclosure indicator page.
The enclosure PE601412 is enclosed within the container PE902713 at this location in this document.

The enclosure PE601412 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE | = PE601412 |
| CONTAINER_BARCODE | = PE902713 |
| NAME | = Well Completion Log |
| BASIN | = GIPPSLAND |
| PERMIT | = |
| TYPE | = WELL |
| SUBTYPE | = COMPLETION_LOG |
| DESCRIPTION | = Well Completion Log (enclosure 6 of WCR) for Fortescue-4 |
| REMARKS | = |
| DATE_CREATED | = 12/04/1979 |
| DATE_RECEIVED | = |
| W_NO | = W721 |
| WELL_NAME | = Fortescue-4 |
| CONTRACTOR | = ESSO |
| CLIENT_OP_CO | = ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)