Esso

OIL and GAS DIVISION

WELL COMPLETION REPORT

OPAH - 1

GIPPSLAND BASIN, VICTORIA

ESSO AUSTRALIA LTD.

R.G. BELLIS

June, 1977

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ENCLOSURES

Structure Map on Top of Latrobe Group (Post Opah-1)

Geological Cross Section A-A' (Post Opah-1)

Opah-1 T.D. Curve

Opah-1 Sonic Calibration Curve

Well Completion Log - Opah-1

ATTACHMENT

Opah-1 Core Lab. Extended Service Well Report

ESSO AUSTRALIA LTD.

COMPLETION REPORT

I WELL DATA RECORD

Date June, 1977

LOCATION

WELL NAME	STATE	PERMIT or LICENCE	GEOLOGICAL BASIN	FIELD
OPAH - 1	VICTORIA	VIC/L5	GIPPSLAND VICTORIA, AUSTRALIA	N.F.W.C.

CO-ORDINATES	Lat.	Long.	X	Y	MAP PROJECTION	GEOGRAPHICAL DESCRIPTION
Surface	$38^{\circ}31'44.703''$S		611437mE		AMG	2.3 miles
Bottom Hole		$148^{\circ}16'42.470''$E		5734690mN	ZONE 55	SW of Mackerel - 4

ELEVATIONS & DEPTHS

ELEVATIONS		WATER DEPTH	TOTAL DEPTH	Avg.Angle
Ground			M.D. 8210'	Straight Hole
KB	83'	258'	T.V.D.	
RT	82'	PLUG BACK DEPTH	REASONS FOR P.B.	
Braden Head				
Top Deck Platform		410'	ABANDONMENT	

DATES

MOVE IN	RIG UP	SPUDDED
February 18, 1977	February 19, 1977	February 24, 1977
RIG DOWN COMPLETE	RIG RELEASED	PROD.UNIT - Start Rigging Up
March 27, 1977	March 27, 1977	

PROD.UNIT - Rig Down Complete	I.P. ESTABLISHED

MISCELLANEOUS

OPERATOR	PERMITTEE or LICENCEE	ESSO INTEREST	OTHER INTEREST
ESSO	ESSO - HEMATITE	50%	HEMATITE 50%

CONTRACTOR	RIG NAME	EQUIPMENT TYPE
AUSTRALIAN ODECO P/LTD.	OCEAN ENDEAVOUR	Semisubmersible drilling vessel

TOTAL RIG DAYS	DRILLING AFE NO.	COMPLETION NO.	TYPE COMPLETION
37.75	236 - 004		

LAHEE WELL CLASSIFICATION		
	Before Drilling	New field wildcat
	After Drilling	Unsuccessful wildcat with hydrocarbon shows.

R.G. BELLIS
Geologist

II (a) INITIAL PRODUCTION TESTS - Not applicable

II (b) FORMATION INTERVAL TESTS

FIT #1 7914' Mud Run
Hydrostatic 4050 psig

FIT #2 7912' Mud Run
Hydrostatic 4187.5 psig

FIT #3 7941' Tool Failure
Hydrostatic 4191.1 psig

FIT #4 8010'
Recovered 22000 cc mud filtrate and formation water

Opened main chamber for 9.20 min., shut in for 10.57 min;
13000ppm Cl^-, 44mg/l NO_3-, R_{rf} 0.285 @ 71°F

HP initial hydrostatic (psig) 4243.2
sampling (psig) 3488.6
final shut in (psig) 3498
final hydrostatic (psig) 4225

FIT #5 7941' Tight Test
HP initial hydrostatic (psig) 4189.6
sampling (psig) 0
final shut in (psig) 420 - shaped charge back pressure

FIT #6 7913' Mud Run
Hydrostatic 3850 psig

FIT #7 8124'
Recovered 20500 cc formation water and 1250 cc muddy water/sediment
Opened main chamber for 12.16 min., shut in for 22.15 min;
13000ppm Cl^-, 88mg/l NO_3-, R_{rf} 0.313 @ 68°F

HP initial hydrostatic (psig) 4218.13
sampling (psig) ~3446
final shut in (psig) 3463.1
final hydrostatic (psig) 4284.8

III PERFORATING RECORD (Prod. test, Completion, D.S.T.)

INTERVAL	HPF	TOTAL SHOTS	SERVICE COMPANY
659 - 61	4	8	Schlumberger for squeeze cement plug.

F.G. BELLIS
Geologist

IV CASING - LINER - TUBING RECORD

Type	Size	Weight	Grade	Thread	No. Joints	Amount	Depth
Pile Joint	20"	670 #	-	CC Pin	1	35.25	365
Cross Over	20"	129 #	X-52	JVxCC	1	44.60	410
Conductor Casing	20"	91 #	X-52	JV Pin	7	305.76	715
Float Shoe	20"	91 #	X-52	JV Pin	1	45.60	761
Casing Hanger	13-3/8"	-	-	-	1	2.30	333
Pup Joint	13-3/8"	54.5 #	K-55	BUTT	1	5.25	338
Surface Casing	13-3/8"	54.5 #	K-55	BUTT	63	2488.49	2827
Float Collar	13-3/8"	-	-	BUTT	1	1.70	2828
Float Joint	13-3/8"	54.5 #	K-55	BUTT	1	39.64	2868
Float Shoe	13-3/8"	-	-	BUTT	1	2.00	2870

V CEMENT RECORD

String	Conductor Casing	13-3/8" Surface Casing	
Type of Cement	Aust.'N' neat 3.5% Prehydrated Gel	Aust. 'N' neat	
Number of FT^3	1239	1334	
Average weight of slurry	13.8 ppg	15.6 ppg	
Cement Top	Seafloor	1348'	
Casing Tested with	500 psi	1500 psi	
Number of Centralizers	6	10	
Number of Scratchers	-	-	
Stage Collar etc.	-	-	
Remarks			

VI SUBSURFACE COMPLETION EQUIPMENT - not applicable

G.W. WEYBURY
Engineer

VII SAMPLES, CONVENTIONAL CORES, SW CORES

INTERVAL	TYPE	RECOVERED	INTERVAL	TYPE	RECOVERED
860' -5000'	5 sets of washed and dried and 1 set of unwashed cutting samples	20' intervals	90 sidewall cores were attempted, 89 were recovered. A detailed list and description is attached.		
5000'- 8200'		10' intervals			
860'- 8200'	1 set of composite canned cuttings sealed at 100' intervals				

VIII WIRELINE LOGS AND SURVEYS Incl. FIT)

Type & Scale	From To	Type & Scale	From To
ISF - Sonic, Run 1 2" & 5" = 100'	761 - 2904	FIT #1	7914'
		FIT #2	7912'
FDC-GR-Cal Run 1	761 - 2908	FIT #3	7941'
GR 2" & 5" = 100'	306 - 2908	FIT #4	8010'
		FIT #5	7941'
FDC/CNL/GR Run 2 2" & 5" = 100'	2866 - 8153	FIT #6	7913'
		FIT #7	8124'
ISF - Sonic Run 2 2" & 5" = 100'	2862 - 8146	See II (b) for detailed description of FIT's	
HDT Run 1	7600 - 8154	CST #1	8150 - 7880
		CST #2	7860 - 6650
Velocity survey shots	2923 - 8072 14 levels	CST #3	7870 - 2900

R.G. BELLIS
Geologist

PE906227

This is an enclosure indicator page.
The enclosure PE906227 is enclosed within the container PE902273 at this location in this document.

The enclosure PE906227 has the following characteristics:

ITEM_BARCODE = PE906227
CONTAINER_BARCODE = PE902273
NAME = Stratigraphic Table
BASIN = GIPPSLAND
PERMIT = VIC/L5
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Stratigraphic Table for Opah-1
REMARKS =
DATE_CREATED = 31/07/77
DATE_RECEIVED =
W_NO = W687
WELL_NAME = OPAH-1
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

IX (b)

Description of Lithologic Units

341 - 860	No samples were collected; gamma ray log indicates limestones.
860 - 1100	Skeletal limestone - mainly shell fragments, with planktonic and benthonic forams, bryozoa.
1100 - 1700	Calcareous siltstone - buff to light grey, firm to friable, saccharoidal texture, subangular to subrounded grains, minor glauconite.
1700 - 2220	Calcareous siltstone - Marl - buff, very calcareous, firm to friable, subangular to subrounded; siltstone consists of clear calcite, silt and minor very fine sand in a matrix of finer white carbonate clay, minor traces of glauconite and pyrite.
2220 - 5580	Calcarenite - light grey, very fine to fine grain size (rarely medium) friable to moderately firm saccharoidal texture, argillaceous matrix, trace glauconite and siltstone, minor micritic calcarenite - brown, firm to hard, poor porosity and permeability.
5580 - 6260	Calcarenite - light grey to grey brown, very fine to fine grained, argillaceous to very argillaceous, silty, very slightly glauconitic, soft to moderately firm, saccharoidal texture, poor permeability and porosity.
	Clay (Marl) - white to buff, slightly to very calcareous, silty to very fine grained sandy, very soft, unconsolidated.
6260 - 6840	Calcarenite - light grey-brown, fine to very fine grained, soft, pyritised, saccharoidal texture, poor permeability and porosity, silty, very fine grades to calcilutite.
6840 - 7000	Quartz - loose grains, medium grained, clear to milky to translucent, equant well rounded grains, no show.
	Calcarenite - light brown to light grey, fine to very fine grained, soft to firm, silty.
7000 - 7260	Calcarenite - light grey to light browny-grey, very fine grained, silty, argillaceous, soft to moderately firm, poor permeability and porosity.
	Marl - white to very light grey, calcareous, silty to very slightly sandy, unconsolidated to soft.
7260 - 7600	Calcareous claystone - very silty, grey green, grading to silty, very fine grained calcarenite, firm, trace pyrite.
	Marl - cream, very calcareous, very soft, silty.

IX (b) (Contd.)

7600 - 7910	Shale - light to medium grey, calcareous, silty to very silty, grading to siltstone in parts, firm, partly brittle, minor glauconite inclusion, trace pyritised.
	Marl - buff to cream, very soft, very calcareous, silty.
7910 - 7950	Sandstone - loose quartz grains, medium to coarse grain size, rounded and angular, grains generally clear to translucent, some tan to brown, some argillaceous matter, no fluorescence or cut. Unwashed sample shows no fluorescence but gives good strong cut with white fluorescence.
7950 - 8000	Calcareous siltstone - light grey to brown, firm to brittle, very calcareous, some grains partly pyritised.
	Sandstone - loose quartz grains, medium to coarse grained, rounded to subrounded, no fluorescence, no cut, unwashed sample gives moderate white to yellow cut with chlorothene.
8000 - 8050	Sandstone - loose quartz grains, medium to coarse grained, very clean, rounded to subrounded, clear to translucent, excellent permeability and porosity, no fluorescence, no cut.
8050 - 8160	Sandstone - loose quartz grains, medium to very coarse grains, mainly clear to translucent, rounded to subrounded, good porosity and permeability, no show.
	Calcareous siltstone - light brown to grey, firm, very calcareous, some glauconite inclusions.
8160 - 8200	Sandstone - loose quartz grains, mainly fine to medium rarely coarse, well sorted, subangular to subrounded, clear to translucent with some cloudiness, equant grains, no show.

X. GEOLOGICAL & GEOPHYSICAL ANALYSIS

(Pre-Drill Prognosis vs. Actual Results)

PRE-DRILL PROGNOSIS

Structure

The pre-drill concept of the Opah prospect was a small anticlinal feature lying to the southwest of the Mackerel-4 block on the East Kingfish-Mackerel trend. Evidence of progradation in the uppermost Latrobe section in the same direction as for Mackerel and Kingfish was seen on some seismic lines.

As mapped, Opah had fault closure to the north which changed to a fault scarp on the eastern flank. Closure in the west was by an erosional gully and to the south closure was created by the east-northeast trending syncline which separated Opah and Mackerel from the Kingfish-Albacore anticlinal trend just to the south.

No intra-Latrobe closure was mapped.

The predicted structural tops were:

AGE	FORMATION/HORIZON TOPS	SUBSEA DEPTH
PLIOCENE/MIOCENE	Gippsland Formation	- 265'
MIOCENE	Mid Miocene Marker	-7040'
EOCENE	Latrobe Group	-7860'
PALEOCENE	Upper L. balmei/Lower M. diversus "Coarse Clastics"	-7870'

Geophysics

Seismic velocities played a major part in the definition of the Opah prospect as it lies beneath the northern flank of the same Miocene channel system which caused severe velocity problems over East Kingfish, Bonita and Albacore. The channel has a general east-northeast trend and contains a high velocity fill.

The interval velocity approach was used to determine the structure of the Opah feature and the surrounding area of the top of Latrobe Group level. Results showed that Opah lay on the shoulder of a steep velocity gradient which dipped southward and was associated with the Miocene channel present in the shallower section. To the immediate north, outside the range of the channel, the velocity was constant.

Stratigraphy

The reservoir at Opah was predicted to consist of massive prograding sandstone units up to 150' thick as found at Mackerel and East Kingfish. These very clean sands of Lower M. diversus/Upper L. balmei age were thought to be of marine inter-deltaic origin. Thin shales which occur in the equivalent section as seen at Mackerel and East Kingfish were thought to occur between the major prograding units. At Opah, the Latrobe "Coarse Clastics" reservoir was expected to be overlain by a thin (about 10') section of Gurnard Formation and by typical sections of the Lakes Entrance and Gippsland Formations.

Opah-1 Objective

Opah-1 was drilled to test a low relief closure mapped on the top of the Latrobe Group immediately to the south west of the Mackerel oil field. A structure with 80 feet of relief with an area of 1840 acres at the oil-water contact was predicted.

RESULTS

Geophysics/Structure

Opah-1 came in 45 feet high to prediction. This error can be accounted for by a 0.5% change in the average velocity to the top of Latrobe Group from 9180 ft/sec to 9130 ft/sec. This velocity error is well within the limits of accuracy of the seismic tool.

The average velocity was revised to 9130 ft/sec using check shot times from the Opah-1 velocity survey and a revised depth map produced. The post-drill map still shows OPAH to be a closed structure at the top of the Latrobe Group with approximately 100 feet of closure over an area of 1160 acres.

Opah-1 intersected an unpredicted fine grained section at the top of Latrobe.

The uppermost section is interpreted as a sandy siltstone channel fill of P. asperopolus age. A well defined channel base (-7856') is seen both from the dipmeter results and by a sharp palynological time break.
However, the channel cannot be confidently mapped on seismic sections, although evidence does exist on some lines (e.g. G73A-631) for channelling at the top of Latrobe.

Directly beneath the channel fill a silty shale section of Upper L. balmei age was penetrated. This section is intepreted to be a facies change from the prograding marine inter deltaic sands seen at Kingfish-5 and Mackerel-4.

Beneath this section to T.D. predominantly marine sands with minor siltstones were encountered.

Hydrocarbons

Spotty, weak to moderate yellow/white fluorescence with weak to streaming white/yellow cut fluorescence was seen in the cuttings and sidewall cores between 7895' - 7945'. Gas chromotograph readings up to C6 were also recorded over this interval. From this information it is interpreted that the section contains oil.

However, five wireline formation interval tests failed to sample the oil zone as it was found to be tight.

From log analysis the oil zone is interpreted to have zero net productive oil sand.

APPENDIX 1

APPENDIX 1

Well Completion Report

OPAH - 1

SAMPLE DESCRIPTIONS

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
860-880'	15	Cement and shoe fragments
	85	Skeletal fragments - coral, shell, forams up to 0.6mm, white to light grey.
880-900	15	Cement
	85	Skeletal fragments - branch coral, shells, forams, bryozoans? pieces up to 3mm, white to light grey.
900-920	15	Cement
	85	Skeletal fragments - branch coral, shells, forams, white to light grey
920-940	100	Skeletal fragments - large amount of shell fragments, forams, corals, white to light grey, 0.5mm
	Tr	Cement
940-960	100	Skeletal fragments - large amount of shell fragments - white and mid-grey, forams, coral.
	Tr	Cement
960-980	100	Skeletal fragments - mainly shell fragments - white and mid-grey ribbed shells, forams - mainly "conch" shape, coral
	Tr	Cement
980-1000	100	Skeletal fragments - mainly shell fragments - white, ribbed, up to 1mm, forams, some coral
1000-1020	100	Skeletal fragments - mainly shells - white to light grey, ribbed generally, forams, minor coral.
1020-1040	100	Skeletal fragments - mainly shells - white, forams, coral.
1040-1060	60	Skeletal fragments - shells, forams, coral
	40	Calcareous siltstone - weakly consolidated, sugary texture, 0.2mm grains, white to buff, strongly calcareous
1060-1080	60	Calcareous siltstone - weakly consolidated, sugary texture, 0.2mm, white to buff, stongly calcareous
	40	Skeletal fragments - shells, corals, forams
1080-1100	70	Calcareous siltstone - firm, 0.2mm, white to buff, strongly calcareou
	30	Skeletal fragments - shells - ribbed, forams - coiled and "gastropod", coral
1100-1120	90	Calcareous siltstone (calcisiltite?) - firm, very calcareous, sugary texture, buff.
	10	Skeletal fragments - forams, shells, coral.
1120-1140	90	Calcareous siltstone - firm, buff, rounded to subrounded, 0.1mm grains
	10	Skeletal fragments - forams, corals, shells, bryozoans?
1140-1160	90	Calcareous siltstone - firm, buff, rounded to subrounded, 0.1-0.2mm
	10	Skeletal fragments - forams, corals, shells
1160-1180	90	Calcareous siltstone - firm, buff, rounded to subrounded grains, 0.1-0.2mm, sugary texture, very calcareous
	10	Skeletal fragments - forams, corals, shells

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
1180-1200	90	Calcareous siltstone - firm, buff, rounded to subrounded grains, 0.1-0.2mm, sugary texture, very calcareous
	10	Skeletal fragments - forams, corals, shells, bryozoans
1200-1220	60	Calcareous siltstone - firm, buff, rounded to subrounded grains, 0.1-0.2mm, sugary texture, very calcareous
	10	Skeletal fragments - forams, corals, shells, bryozoans
	30	Siltstone - mid-grey, firm, only very slightly calcareous
1220-1240	60	Siltstone - mid-grey, firm, very slightly calcareous
	20	Calcareous siltstone - buff, firm, very calcareous, sugary texture, 0.1-o.2mm
	20	Skeletal fragments - forams, shells, coral
1240-1260	90	Calcareous siltstone - buff to light grey, firm, very calcareous, sugary texture, 0.1-0.2mm
	10	Skeletal fragments - forams, shells, coral
	Tr	Siltstone - mid-grey, firm
1260-1280	90	Calcareous siltstone - buff to light grey, firm, breaks easily with slight pressure, subrounded grains, sugary texture, very calcareous
	10	Skeletal fragments - coral, shell, forams
1280-1300	100	Calcareous siltstone - buff to light grey, firm, subrounded grains, sugary texture, very calcareous
	Tr	Skeletal fragments
1300-1320	100	Calcareous siltstone - buff, firm to friable, subrounded to rounded, sugary texture, very calcareous
	Tr	Skeletal fragments - coral, forams
1320-1340	100	Calcareous siltstone - buff, firm to friable, subrounded to rounded, sugary texture, very calcareous
	Tr	Skeletal fragments - forams, shells, coral
1340-1360	100	Calcareous siltstone - buff to light grey, firm to friable, sugary texture, subrounded to rounded grains
	Tr	Skeletal fragments - forams, coral, shells
1360-1380	100	Calcareous siltstone - buff to light grey, firm, sugary texture, subrounded to rounded, very poor permeability and porosity
	Tr	Skeletal fragments - coral
1380-1400	100	Calcareous siltstone - buff to light grey, firm, sugary texture, subrounded to rounded, very poor permeability and porosity
1400-1420	100	As above
1420-1440	100	Calcareous siltstone - buff to light grey, firm to friable, sugary texture, subrounded to rounded grains, very poor permeability and porosity.
1440-1460	100	Calcareous siltstone - buff to light grey, firm to friable, sugary texture, subrounded to rounded grains, very poor permeability and porosity, very calcareous, 0.5mm argillaceous fragments
1460-1480	100	Calcareous siltstone - buff to light grey, firm to friable, sugary texture, subrounded to rounded carbonate grains, very poor permeability and porosity, very calcareous

SAMPLE DESCRIPTIONS

OPAII - 1

DEPTH	%	DESCRIPTION
1480-1500	100	As above, wholly carbonate (dissolves completely in HCl)
1500-1520	100	Calcareous siltstone - light grey, firm to friable, sugary texture, subrounded to rounded carbonaceous grains, very poor permeability and porosity, very calcareous
1520-1540	100	As above
1540-1560	100	Calcareous siltstone - light grey, firm to friable, sugary texture, subrounded carbonate grains, very calcareous
	Tr	Skeletal fragments - mainly forams
1560-1580	80	Calcareous siltstone - as above
	20	Siltstone - mid-grey, not calcareous, argillaceous grains, firm
	Tr	Skeletal fragments
1580-1600	90	Calcareous siltstone - light grey, firm to friable, sugary texture, subrounded carbonaceous grains, very calcareous
	10	Siltstone - mid to dark grey, firm, slightly calcareous
1600-1620	100	Calcareous siltstone - light grey, firm, sugary texture, subrounded carbonaceous grains
	Tr	Siltstone - mid to dark grey, firm, slightly calcareous
1620-1640	70	Calcareous siltstone - light grey, firm, sugary texture, subrounded carbonaceous grains, very poor permeability and porosity
	30	Siltstone - mid to dark grey, firm, non to slightly calcareous
1640-1660	70	Calcareous siltstone - buff to light grey, firm to friable, sugary texture, subangular to subrounded carbonate grains
	20	Siltstone - mid to dark grey, moderately firm, slightly calcareous
	10	Marl - buff, very soft, very calcareous
	Tr	Forams - quite abundant
1660-1680	50	Calcareous siltstone - light grey, moderately firm, sugary texture, subangular to subrounded carbonate grains, ? glauconite included
	50	Siltstone - mid to dark grey, firm, slightly calcareous
	Tr	Forams
1680-1700	90	Calcareous siltstone - buff to light grey, sugary texture, more clayey matrix, ? glauconite included, moderately firm
	10	Siltstone - mid to dark grey, firm, slightly calcareous
	Tr	Forams
1700-1720	90	Calcareous siltstone - buff, clay matrix, ? glauconite included, soft
	10	Siltstone - mid to dark grey, moderately firm
	Tr	Forams
		NOTE: Drill rate has slowed due to increase in clay
1720-1740	100	Calcareous siltstone/marl - firm granular pieces in predominantly "calcareous clay", buff, very calcareous, soft
	Tr	Siltstone - mid to dark grey, soft
	Tr	Forams
1740-1760	100	Marl - buff, very calcareous, soft, 0.1-0.2mm carbonaceous grain inclusion, forams

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
1760-1780	100	Calcareous siltstone/marl - buff, very calcareous, firm to soft, as above
	Tr	Forams
1780-1800	100	Calcareous siltstone/minor marl - buff, very calcareous, firm to friable, some ? glauconite included, subangular to subrounded.
	Tr	Forams
1800-1820	100	Calcareous siltstone/minor marl - as above
	Tr	Forams, coral ?
1820-1840	100	Calcareous siltstone/minor marl - buff to light grey, very calcareous, firm to friable, subangular to subrounded carbonaceous grains
	Tr	Coral, forams
1840-1860	100	Calcareous siltstone/marl - buff to light grey, very calcareous, firm to soft
	Tr	Forams
		Background gas 7 - 8 units, CH_4
1860-1880	90	Calcareous siltstone - hard and brittle mainly, some soft and marly, minor amounts of very fine sand grade grains. Buff to light grey
	10	Coarse skeletal fragments up to 2mm, mainly bryozoans and molluscs. Also some massive calcite
	Tr	Pyrite
1880-1900	90	Calcareous siltstone - as above
	10	Skeletal fragments - as above
1900-1920	90	Calcareous siltstone - as above
	10	Skeletal fragments - as above
1920-1940	85	Calcareous siltstone - mostly firm and friable but increasing content of soft marly fragments (up to 40% of the calcareous siltstone)
	15	Coarse skeletal grains, mainly bryozoans, molluscs and forams
	Tr	Pyrite
		9 - 10 units Background Gas
1940-1960	85	Calcareous siltstone - as above
	15	Skeletal framents - as above
1960-1980	90	Calcareous siltstone - as above, siltstone consists of clear calcite grains of silt and minor very fine sand in a matrix of finer white carbonate clay, minor traces of dark green mineral - probably glauconite. Sugary texture
	10	Skeletal grains - as above
1980-2000	90	Calcareous siltstone - as above
	10	Skeletal grains - as above
		Background Gas 4 - 6 units

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
2000-2020	95	Calcareous siltstone - buff to light grey, mainly firm and friable
	5	Skeletal fragments - as above
2020-2040	95	Calcareous siltstone - buff to light grey, mainly firm and friable to brittle, only minor amounts of marly material. Minor glauconite spread throughout the siltstone
	5	Skeletal fragments - bryozoans, molluscs and forams
	Tr	Pyrite
2040-2060	90	Calcareous siltstone - as above
	10	Skeletal fragments - as above
2060-2080	95	Calcareous siltstone - as above
	5	Skeletal fragments - as above
2080-2100	95	Calcareous siltstone - buff to light grey, silt and minor very fine sand size clear carbonate grains in a fine white carbonate matrix. Traces of glauconite and pyrite throughout the siltstone. Almost entirely firm and brittle, minor soft or friable grains. Tight
	5	Skeletal fragments - mainly forams, minor bryozoans and molluscs
2100-2120	95	Calcareous siltstone - as above
	5	Skeletal fragments - as above
2120-2140	95	Calcareous siltstone - firm and hard and brittle, as above
	5	Skeletal fragments - as above
2140-2160	95	Calcareous siltstone - as above
	5	Skeletal fragments - as above
2160-2180	95	Calcareous siltstone - firm to brittle, as above
	5	Skeletal fragments - as above
2180-2200	95	Calcareous siltstone - firm to brittle, as above
	5	Skeletal fragments - as above
2200-2220	95	Calcareous siltstone grading into very fine calcarenite - all textural characteristics as above except for slight increase in grain size. Brittle to friable to firm, light grey to buff, very poor porosity and permeability
	5	Skeletal fragments - mainly forams, minor molluscs, very minor bryozoans
		Background Gas 6 - 8 units
2220-2240	98	Calcarenite - very fine, as above
	2	Skeletal fragments - as above
	Tr	Pyrite
2240-2260	95	Calcarenite - very fine, as above
	5	Skeletal fragments - as above
	Tr	Pyrite
2260-2280	95	Calcarenite - very fine, as above
	5	Skeletal fragments - as above

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
2280-2300	98	Calcarenite - very fine, firm to hard, brittle to friable fracture, light grey to buff. Most grains in the calcarenite are very fine sand grade with minor silt grades. Matrix/cement consists of very fine carbonate. Sugary texture
	2	Skeletal fragments - mainly forams, minor molluscs, and bryozoans
	Tr	Pyrite
2300-2320	95	Calcarenite - very fine, as above
	5	Skeletal fragments - as above
2320-2340	98	Calcarenite - very fine, as above
	2	Skeletal fragments - as above
2340-2360	95	Calcarenite - very fine, firm, friable to brittle, light grey to buff
	5	Skeletal fragments - forams, bryozoans and molluscs, intraparticle porosity completely preserved
		Background Gas 6 - 10 units with a peak of 22 units
2360-2380	85	Calcarenite - very fine, firm, brittle to friable, light grey, minor traces of glauconite, tight. Fine white carbonate matrix/cement. Sugary texture
	15	Skeletal fragments - mostly forams and bryozoans or coral, minor molluscs including turreted gastropods
	Tr	Pyrite
2380-2400	90	Calcarenite - as above
	10	Skeletal fragments - as above
		Background gas peak - 21 units
2400-2420	90	Calcarenite - as above
	10	Skeletal fragments - as above
2420-2440	95	Calcarenite - as above
	5	Skeletal fragments - as above
2440-2460	90	Calcarenite - as above
	10	Skeletal fragments - as above
2460-2480	95	Calcarenite - as above
	5	Skeletal fragments - as above
	Tr	Pyrite
		Background gas - 5 units
2480-2500	90	Calcarenite - as above
	10	Skeletal fragments - as above
2500-2520	95	Calcarenite - as above
	5	Skeletal fragments - as above
2520-2540	95	Calcarenite - firm, brittle to friable, tight, light grey, very fine grained, sugary texture
	5	Skeletal fragments - mostly forams, some bryozoans and molluscs
	Tr	Pyrite

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
2540-2560	95	Calcarenite - as above
	5	Skeletal fragments - as above
2560-2580	98	Calcarenite - as above, firm to friable, some soft
	2	Skeletal fragments
	Tr	Pyrite
2580-2600	98	Calcarenite - as above
	2	Skeletal fragments - as above
2600-2620	98	Calcarenite - as above, firm to friable
	2	Skeletal fragments - as above
2620-2640	98	Calcarenite - as above
	2	Skeletal fragments - as above
	Tr	Pyrite
2640-2660	98	Calcarenite - very fine grained, light grey, firm to friable, sugary texture, low porosity and permeability. Matrix/cement of fine carbonate.
	2	Skeletal fragments - forams, bryozoans, etc. all intraparticle porosity is infilled by carbonate mud
	Tr	Pyrite
2660-2680	98	Calcarenite - as above
	2	Skeletal fragments - as above
2680-2700	95	Calcarenite - very fine, very firm, friable, light grey, tight
	5	Skeletal fragments - forams and bryozoans
2700-2720	95	Calcarenite - as above
	5	Skeletal fragments - as above
2720-2740	95	Calcarenite - as above, firm, friable to brittle, fracture
	5	Skeletal fragments - bryozoans and forams
2740-2760	95	Calcarenite - very fine grained, sugary texture, firm, friable to brittle, minor glauconite
	5	Skeletal fragments - forams, and fragments of bryozoans, and corals
	Tr	Pyrite
2760-2780	98	Calcarenite - as above
	2	Skeletal fragments - as above
2780-2800	100	Calcarenite - very fine, sugary texture, firm, friable to brittle, subrounded grains
	Tr	Skeletal fragments - forams, bryozoans
2800-2820	100	Calcarenite - very fine, sugary texture, firm, friable, low permeability and porosity, matrix of very fine carbonate
	Tr	Skeletal fragments - forams, bryozoans
2820-2840	100	Calcarenite - as above
	Tr	Skeletal fragments - as above
2840-2860	100	Calcarenite - very fine, sugary texture, firm, friable, low porosity and permeability, matrix/cement of very fine carbonate
	Tr	Skeletal fragments - forams (bryozoans)
2860-2880	100	Calcarenite - as above
	Tr	Skeletal fragments - as above

BELLIS/DAVIS

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
2880-2900'	100	Calcarenite - very fine, light grey, poor permeability and porosity, firm, brittle to friable, very fine carbonate matrix/ cement.
	Tr	Skeletal fragments - mainly forams
		NOTE: Set and cemented 13-3/8" casing at 2867'.
0800 - 3.3.77		FORD/ATKINS
2920-2940	80	Calcarenite - very fine to fine grained, light grey, poor permeabili and porosity, firm to friable, micritic matrix, rare skeletal fragments and forams.
	20	Cement cavings
2940-2960	90	Calcarenite - as above, rare aggregates as internal molds of gastropods, bivalves, etc.
	10	Cement cavings
2960-2980	90	Calcarenite - as above, common planktonic forams
	10	Cement cavings
2980-3000	90	Calcarenite - very fine to fine grained (rare to medium grained), light grey, firm to friable, trace glauconite, trace siltstone, micritic matrix. Forams, echinoid fragments, as above.
	10	Cement cavings
3000-3020	80	Calcarenite - as above
	10	Micritic limestone - dense, hard, homogeneous
	10	Cement cavings
3020-3040	70	Calcarenite - as above
	10	Micrite - as above, pearly lustre
	10	Fossil fragments (predominantly forams and echinoids)
	10	Cement cavings
3040-3060	80	Calcarenite - very fine to fine grained (rare to medium grained), light grey, firm to friable, trace glauconite, trace siltstone, micritic - argillaceous matrix
	10	Forams - as above, fossil fragments
	10	Micrite - dense, hard, homogeneous
	Tr	Cement cavings
3060-3080	100	Calcarenite - as above
	Tr	Micrite, fossil fragments, cement cavings
3080-3100	100	Calcarenite - as above
	Tr	Micrite, fossil fragments
3100-3120	90	Calcarenite - very fine to fine grained, light grey, firm to friable, poor permeability and porosity, argillaceous/micritic matrix, trace siltstone and glauconite, rarely fossiliferous
	5	Fossils - forams (planktonic > benthonic), echinoid and ? bryozoal fragments
	5	Micrite
3120-3140	85	Calcarenite - very fine to fine grained, light grey, friable, poor permeability and porosity, argillaceous/micritic matrix.
	Tr	Siltstone and pyrite/glauconite
	10	Fossils (forams, bryozoan fragments, echinoid spines)
	5	Micrite

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
3140-3160'	85	Calcarenite - very fine to fine, light grey, friable to hard, poor porosity and permeability.
	Tr	Siltstone and glauconite
	10	Fossils (planktonic > benthonic). Some bryozoan fragments
	5	Micrite - pearly to white
3160-3180	40	Argillaceous calcarenite - fine to very fine, brown, friable to firm, grading to micrite, homogenous
	40	Calcarenite - very fine to fine, light grey, friable to firm, as above
	Tr	Pyrite as grains and infilling forams
	10	Micrite - pearly
	10	Fossils - forams
3180-3200	50	Argillaceous calcarenite - very fine grained, brown to light to medium, homogenous, rarely containing foram fragments, micritic matrix.
	30	Calcarenite - fine grained, light grey to light brown, grains of glauconite and siltstone, argillaceous/micritic matrix
	10	Micrite - light grey to white
	10	Fossils - forams, mainly planktonic
3200-3220	70	Calcarenite - light grey, fine and medium grained, friable, containing silt, glauconite and pyrite
	10	Argillaceous calcarenite - brown to grey-brown, very fine grained, friable to medium homogeneous
	10	Micrite - pearly to white lustre
	10	Fossils - predominantly forams (planktonic > benthonic), rare echinoid spines
3220-3240	90	Calcarenite - light grey, very fine to fine grained, friable to moderately firm, traces siltstone, glauconite, pyrite, argillaceous
	5	Forams
	5	Micrite - as above
3240-3260	90	Calcarenite - as above
	5	Forams (planktonic > benthonic)
	5	Micrite - pearly white to buff-brown
3260-3280	100	Calcarenite - as above, argillaceous matrix increasing, micritic matrix clear.
	Tr	Forams, as above; micrite, as above
3280-3300	90	Calcarenite - light grey, very fine to fine grained (rare medium grain), friable to moderately firm, argillaceous matrix, trace glauconite, siltstone
	10	Micritic calcarenite - light grey to brown, firm to brittle, very fine grained, homogeneous
	Tr	Forams - as above
3300-3320	90	Calcarenite - as above, buff to light grey
	10	Micritic calcarenite - as above
	Tr	Forams (planktonic > benthonic) and echinoid fragments
3320-3340	90	Calcarenite - buff to light grey, very fine to fine grained, friable to moderately firm, argillaceous matrix, trace glauconite and siltstone
	10	Micritic calcarenite, light grey to brown, firm to brittle, very fine grained, homogeneous, slightly argillaceous
	Tr	Fossils - as above

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
3340-3360	100	Calcarenite - argillaceous matrix, as above
	Tr	Micritic calcarenite - as above
	Tr	Fossils - as above
3360-3380	90	Calcarenite - buff to light grey, very fine to fine grained, argillaceous matrix, moderately firm to friable, trace glauconite, tight. No show.
	10	Micritic calcarenite, light grey to brown, very fine grained, slightly argillaceous, firm to brittle
	Tr	Forams - planktonic > benthonic.
3380-3400	95	Calcarenite - as above, argillaceous matrix
	5	Micritic calcarenite - as above
	Tr	Forams - as above
3400-3420	100	Calcarenite - as above
	Tr	Micritic calcarenite - as above
	Tr	Forams
3420-3440	90	Calcarenite - buff to light grey, very fine to fine grained, argillaceous matrix, moderately firm to friable, trace glauconite, tight
	10	Micritic calcarenite - light grey-brown, very fine grains, slightly argillaceous, firm, grading to buff micrite
	Tr	Forams - planktonic > benthonic
3440-3460	90	Calcarenite - as above
	10	Micritic Calcarenite and micrite - as above
	Tr	Forams - as above
3460-3480	90	Calcarenite - as above
	10	Micritic calcarenite - as above, grading to micrite, pearly white to grey, weakly laminated
	Tr	Forams - as above
3480-3500	85	Calcarenite - buff to light grey, very fine to fine grained, argillaceous matrix, moderately firm to friable, trace glauconite, tight
	10	Micritic calcarenite grading to laminated micrite, as above
	5	Forams - predominantly planktonic, generally larger than above
3500-3520	90	Calcarenite - as above
	10	Micrite and micritic calcarenite - white to opaque amber coloured, moderately hard, dense, relatively homogeneous
	Tr	Forams
3520-3540	90	Calcarenite - as above
	10	Micrite - as above, grading to micritic calcarenite
	Tr	Forams - as above; Quartz sand, medium to coarse grained, loose, clear to translucent, as above
3540-3560	70	Calcarenite - white to buff to light grey, very fine to fine grained, argillaceous matrix, firm to friable, trace glauconite, tight
	10	Micrite - white to pale orange, slightly argillaceous, firm to moderately hard, homogeneous
	20	Quartz sand, clear to translucent, medium to very coarse grained, as above, well rounded, loose, no show.
3560-3580	70	Calcarenite - as above
	10	Micrite - as above
	20	Quartz sand - as above, coarse to very coarse grained, well sorted.

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
3580-3600'	90	Calcarenite - as above, slightly micritic in parts.
	10	Quartz Sand - as above, coarse to very coarse grained.
3600-3620	70	Calcarenite - buff to light grey, very fine to fine grained, argillaceous matrix, firm to friable, trace siltstone, glauconite, tight.
	20	Calcareous clay - grey, soft, washes through sieve
	10	Micrite - white to pale orange, firm to moderately hard
	Tr	Quartz Sand - as above
3620-3640	85	Calcarenite - as above, very fine grained to rare fine grained
	10	Clay - calcareous, as above
	5	Micrite - as above
3640-3660	70	Calcarenite - white to buff to grey, fine to very fine, argillaceous to micritic matrix, firm to friable, trace siltstone and glauconite
	10	Clay - calcareous, as above
	10	Micrite - light to buff to light brown, pearly lustre, firm to hard
	10	Fossils - predominantly forams, some bryozoan fragments
	Tr	Quartz grains - medium to coarse, well rounded and angular, clear to translucent.
3660-3680	70	Calcarenite - as above
	15	Micrite - as above
	10	Fossils - as above
	5	Quartz grains - euhedral, angular to sub-rounded, clear to translucent, rare, milky.
3680-3700	95	Calcarenite - light grey to buff, very fine grained (rare, fine grains), firm to friable, tight, trace glauconite, trace siltstone
	5	Micrite - white to light brown, rarely laminated, slightly argillaceous, moderately hard
	Tr	Forams - mainly planktonics
3700-3720	85	Calcarenite - as above
	10	Micrite - as above
	5	Quartz Sand - clear, loose, medium to coarse grains, no show
3720-3740	80	Calcarenite - as above
	20	Micrite - as above
	Tr	Forams - mainly planktonic
	Tr	Quartz Sand - as above
3740-3760	55	Calcarenite - light buff to light brown, light grey, fine grained, firm to friable, trace glauconite, minor siltstone, esp. as laminations
	30	Calcarenite - mid-brown, very fine grained, homogeneous, hard
	10	Micrite - white to yellow to brown, moderately hard
	5	Fossils - forams and bryozoan fragments
3760-3780	80	Calcarenite - light grey, fine grained with disseminated glauconite, friable to firm, argillaceous matrix.
	10	Micrite - buff to grey to light borwn, moderately firm
	10	Fossils - mainly planktonics
	Tr	Calcarenite - brown, very fine grained, as above
	Tr	Quartz - clear, translucent, sub-angular, medium grained.

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
3780-3800'	80	Calcarenite - as above
	10	Micrite - as above
	10	Fossils - as above
	Tr	Calcarenite - brown, as above
	Tr	Quartz - as above
	Tr	Glauconite as discrete fine grains
3800-3820	75	Calcarenite - buff to light grey, fine grained, disseminated glauconite, friable
	10	Calcareous Mud - light grey
	10	Micrite - light brown, moderately firm
	5	Fossils - planktonic forams
	Tr	Quartz grains - clear, milky, angular and sub-rounded, medium grain size.
3820-3840	50	Calcarenite - buff to light grey to mid-grey, fine grained, trace glauconite and fine to very fine quartz, friable to moderately firm
	35	Calcarenite - mid-brown, very fine grained, moderately firm to hard, homogeneous
	5	Fossils - forams
	10	Micrite - as above
	Tr	Quartz Grains - clear to translucent, sub-angular to sub-rounded, euhedral, medium to fine grained
	Tr	Calcareous Mud - as above
3840-3860	50	Calcarenite - as above, fine grained
	20	Calcarenite - brown, very fine grained, as above
	20	Calcareous Mud - light grey
	5	Micrite - white to buff, moderately firm
	5	Fossils - forams, rare echinoid spines
3860-3880	55	Calcarenite - as above
	20	Calcarenite - as above
	10	Calcareous Mud - light grey
	10	Micrite - as above
	5	Fossils - predominantly planktonic forams
3880-3900	45	Calcarenite - buff to light grey, fine grained, friable to firm, argillaceous matrix, only minor glauconite
	25	Calcilutite - very fine grained calcarenite, as above, medium to hard, brown
	20	Calcareous Mud - light grey, mainly homogeneous but some dark grey laminations, very soft
	5	Micrite - buff, firm
	5	Fossils - forams (planktonic mainly)
	Tr	Calcite Grains - clear, equidimensional
3900-3920	30	Calcarenite - as above
	20	Calcilutite - as above
	10	Micrite - as above
	20	Calcareous Mud
	20	Fossils - as above
	Tr	Quartz - clear, angular to sub-angular, medium grained
3920-3940	65	Calcarenite - buff to light grey, fine grained, spotted with glauconite and siltstone, friable to firm
	10	Calcareous Mud - light grey, very soft
	10	Calcilutite - brown, well indurated, homogeneous
	10	Micrite - light brown to pink, firm
	5	Fossils - forams, rare echinoid spines

SAMPLE DESCRIPTIONS

OPAII - 1

DEPTH	%	DESCRIPTION
3940-3960	30	Calcarenite - as above, friable
	10	Calcareous Mud - as above, laminations
	20	Calcilutite - as above
	15	Micrite - buff to light pink, pearly lustre
	25	Fossils - forams, esp. porcellanous forms, more abundant than previously
	Tr	Calcite - clear grains, loose
3960-3980	40	Calcarenite - as above
	20	Micrite - cream to buff
	10	Calcareous Mud - as above
	30	Fossils - forams, predominantly spherical tests
3980-4000	65	Calcarenite - light grey to buff, fine grained with glauconite and siltstone, friable to firm
	10	Calcareous Mud - light grey, very soft, homogeneous
	5	Calcilutite - brown, indurated
	10	Micrite - cream to light brown to pink, firm to hard, some buff to white banding
	10	Fossils - forams
	Tr	Clear Calcite - loose grains
4.3.77 4000-4020	60	Calcarenite - buff to light grey, fine grained, firm to friable, argillaceous matrix
	15	Calcareous Mud - light grey, very soft
	10	Micrite - light brown to cream (yellow)
	15	Fossils - forams, and echinoid spines
	Tr	Calcilutite - brown, hard
	Tr	Quartz - rare grains, clear, angular, medium
	Tr	Dark brown/black fragments - dull, firm, brittle, very fine grained
4020-4040	60	Calcarenite - as above
	10	Calcilutite - as above
	15	Fossils - as above, plus bryozoan fragments, pyrite
	Tr	Balck/brown fragments - as above, ? carbonaceous siltstone - coal
	Tr	Yellow to red chips, laminated
	10	Micrite - as above
	Tr	Quartz - clear, euhedral, angular, medium
		Tripping for bit change RIH w/ NB X3A
5.3.77 4040-4060	90	Calcarenite - light grey, very fine to fine grained, argillaceous matrix, friable to moderately firm, slightly glaucontic
	10	Micrite and calcilutite - as above
	Tr	Fossils - planktonic forams
4060-4080	90	Calcarenite - as above
	5	Micrite - cream to light brown, dense, hard
	5	Calcilutite - grey-brown, firm, brittle
4080-4100	100	Calcarenite - light grey-brown, very fine to fine grained, very argillaceous, soft, friable, slightly glauconitic, slightly silty, poor permeability and porosity
	Tr	Micrite, calcilutite, fossils - as above
4100-4120	90	Calcarenite - light grey-brown, as above
	10	Clay - light grey, calcareous, soft, unconsolidated
	Tr	Micrite, calcilutite, rare fossils

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
4120-4140	90	Calcarenite - light grey-brown, as above
	10	Calcareous Clay - as above
	Tr	Calcilutite, very rare forams
4140-4160	80	Calcarenite - light grey-brown, very fine to fine grained, very argillaceous, soft, friable, very slightly glauconitic, very slightly silty, poor permeability and porosity
	20	Calcareous Clay - unconsolidated, light grey
	Tr	Micrite and calcilutite
4160-4180	90	Calcarenite - as above
	10	Clay - as above
	Tr	Micrite, calcilutite, forams, echinoid fragments
4180-4200	90	Calcarenite - as above
	10	Clay - as above
	Tr	Micrite, forams
4200-4220	90	Calcarenite - light grey to light grey-brown, buff, very fine to fine grained, soft to moderately firm, very argillaceous, very slightly glauconitic, slightly silty
	10	Clay - light grey, calcareous, unconsolidated
	Tr	Calcite - clear crystalline ? secondary
	Tr	Micrite, forams
4220-4240	70	Calcarenite - as above
	30	Clay - as above
	Tr	Micrite, forams, crystalline calcite
4240-4260	100	Calcarenite - as above
	Tr	Clay, fossils - as above
4260-4280	90	Calcarenite - light grey to light grey-brown, very fine to fine grained, soft to moderately firm, very argillaceous, slightly glauconitic, poor permeability and porosity
	10	Clay - light grey, calcareous, very soft
	Tr	Calcilutite - light grey to translucent, firm, homogeneous
	Tr	Forams and fossil fragments
4280-4300	80	Calcarenite - as above
	20	Clay - calcareous, as above
	Tr	Calcilutite - as above; forams - as above
4300-4320	90	Calcarenite - as above
	5	Clay - as above
	5	Calcilutite - as above
4320-4340	80	Calcarenite - light grey to light grey-brown, very fine to fine grained, very argillaceous, soft to moderately firm, slightly glauconitic, slightly silty, poor permeability and porosity
	15	Clay - light grey, calcareous, unconsolidated
	5	Calcilutite - light grey to translucent, firm, homogeneous
4340-4360	80	Calcarenite - light grey-brown, very fine to fine grained, very argillaceous, soft to moderately firm, saccharoidal texture, slightly silty
	10	Clay - light grey, calcareous, unconsolidated
	10	Calcilutite - very light grey, very argillaceous, soft to firm, silty

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
4360-4380	90	Calcarenite - as above, very argillaceous, grading to silty/sandy calcilutite in parts
	10	Calcilutite - very light grey, argillaceous, soft to firm
	Tr	Clay, fossils - as above
4380-4400	100	Calcarenite - as above, less argillaceous, sugary texture
	Tr	Calcilutite, fossils, clay - as above
4400-4420	90	Calcarenite - light grey to brown, very argillaceous, firm to soft, fine to very fine grained
	10	Calcilutite - light grey, very soft
	Tr	Fossils (forams and bryozoan fragments); clay - as above
4420-4440	95	Calcarenite - as above
	5	Calcilutite - as above
	Tr	Fossils - as above
4440-4460	90	Calcarenite - light brown to light grey, fine to very fine grained, grading to calcilutite, very argillaceous, soft to firm
	10	Calcilutite - light grey, poorly consolidated
	Tr	Micrite - light buff to cream, moderately firm
	Tr	Fossils - forams
4460-4480	95	Calcarenite - light brown to grey, very silty, soft to firm, saccharoidal texture
	5	Calcilutite - light grey to dark grey, soft, wavy laminations
	Tr	Fossils - as above
4480-4500	95	Calcarenite - light brown to grey, fine grained, moderately to firm, silty
	5	Calcilutite - as above
	Tr	Fossils - forams
4500-4520	95	Calcarenite - as above, fine to very fine grained, soft to moderatel firm
	5	Calcilutite - as above
	Tr	Forams
4520-4540	95	Calcarenite - light brown, fine to very fine grained, moderately firm
	5	Calcilutite - light grey, dark grey laminations, soft
	Tr	Forams, recrystallised calcite
4540-4560	95	Calcarenite - buff to light brown, as above
	5	Calcilutite - as above
	Tr	Forams and recrystallised calcite
4560-4580	95	Calcarenite - as above
	5	Calcilutite - as above
	Tr	Forams
4580-4600	95	Calcarenite - as above, argillaceous
	5	Calcilutite - light grey, very soft
	Tr	Forams
4600-4620	100	Calcarenite - light brown to grey grading to light grey, calcilutite
	Tr	Forams

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
4620-4640	95	Calcarenite - buff to light grey-brown, fine to very fine grained, friable to firm, silty
	5	Calcilutite - light grey with dark grey laminations. Occurs as very thin interbeds to calcarenite
	Tr	Recrystallised calcite, forams
4640-4660	95	Calcarenite - as above
	5	Calcilutite - as above
	Tr	Calcite recrystallised
4660-4680	95	Calcarenite - as above
	5	Calcilutite
	Tr	Forams, recrystallised calcite
4680-4700	90	Calcarenite - as above
	10	Calcilutite - as above
	Tr	Recrystallised calcite
4700-4720	90	Calcarenite - as above
	10	Calcilutite - as above
	Tr	Calcite and forams
4720-4740	90	Calcarenite - cream, light grey and light brown, fine to very fine grained, silty, friable to firm
	10	Calcilutite - dark grey to light grey laminations, soft
	Tr	Fossils, calcite
4740-4760	95	Calcarenite - as above
	5	Calcilutite - as above
	Tr	Fossils (forams and echinoid spines), calcite
4760-4780	90	Calcarenite - as above, rare calcite veining
	10	Calcilutite - dark and light grey, soft
	Tr	Calcite (recrystallised, vein), and forams
4780-4800	90	Calcarenite - as above
	10	Calcilutite - as above
	Tr	Forams
4800-4820	90	Calcarenite - light brown to light grey, fine to very fine grained, friable to firm, saccharoidal texture, argillaceous
	10	Calcilutite - very fine, dark grey to light grey laminations, very soft
	Tr	Calcite and forams
4820-4840	90	Calcarenite - buff to light brown and light grey, fine to very fine grained, soft to firm
	10	Calcilutite - as above, platy to thin laminae between calcarenite beds
	Tr	Calcite and forams
4840-4860	95	Calcarenite - as above
	5	Calcilutite - as above
	Tr	Forams and calcite
4860-4880	95	Calcarenite - cream to buff to light brown and light grey, fine to very fine grained, silty, rare very fine indistinct banding. Hardness increases with colour change, cream soft, brown to grey firm.
	5	Calcilutite - as above
	Tr	Forams and vein calcite

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
4880-4900	85	Calcarenite - as above
	10	Calcilutite - as above
	5	Fossils - mainly spherical forams, rare echinoid spines
	Tr	Calcite
4900-4920	85	Calcarenite - as above, fine to very fine grained
	10	Calcilutite - as above
	5	Fossils - as above
	Tr	Calcite
4920-4940	90	Calcarenite - buff, light brown, light grey, fine to very fine grained, soft to firm, silty, weak laminations rarely displayed by silty particles
	10	Calcilutite - grey, very soft, thin platy laminae
	Tr	Calcite and forams
4940-4960	90	Calcarenite - as above
	10	Calcilutite - as above
	Tr	Fossils (forams and rare echinoid spines), calcite
4960-4980	95	Calcarenite - buff to light grey-brown, very fine to fine grained, slightly argillaceous, silty, friable to moderately firm, sugary texture, poor permeability and porosity
	5	Calcilutite - light to mid-grey, pearly lustre, wavy interlaminatior
	Tr	Forams
4980-5000	90	Calcarenite - as above
	10	Calcilutite - as above
	Tr	Forams - generally planktonic
		10' SAMPLES FROM 5000'
5000-5010	95	Calcarenite - as above
	5	Calcilutite - as above
	Tr	Fossils - as above
5010-5020	95	Calcarenite - slightly more argillaceous than above
	5	Calcilutite - as above
5020-5030	95	Calcarenite - cream to light grey, argillaceous, very fine to fine grained, slightly silty, soft to moderately firm poor, permeability and porosity
	5	Calcilutite - light to medium grey, laminated
5030-5040	85	Calcarenite - buff to light grey, very fine to fine grained, argillaceous, silty, soft to moderately firm, saccharoidal texture, poor permeability and porosity
	10	Clay - cream to buff, slightly calcareous, very soft
	5	Calcilutite - light to medium grey, laminated
5040-5050	85	Calcarenite - as above, very argillaceous
	10	Clay - as above
	5	Calcilutite - as above
5050-5060	95	Calcarenite - as above, buff to light grey-brown, very fine to fine grained, argillaceous, silty, saccharoidal texture
	5	Calcilutite - as above
	Tr	Forams - planktonics

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
5060-5070	95	Calcarenite - as above
	5	Calcilutite - as above
5070-5080	95	Calcarenite - as above, slightly more argillaceous
	5	Calcilutite - as above
	Tr	Forams - as above
5080-5090	95	Calcarenite - as above, argillaceous to very argillaceous
	5	Calcilutite - as above
5090-5100	80	Calcarenite - very argillaceous, as above
	15	Clay - buff to light grey, very soft, slightly calcareous
	5	Calcilutite - light to medium grey, laminated, soft to moderately firm, brittle
5100-5110	90	Calcarenite - buff to light grey-brown, very fine to fine grained, argillaceous, slightly silty, soft to moderately firm, saccharoidal texture
	5	Caly - as above
	5	Calcilutite - as above
5110-5118	80	Calcarenite - as above
	15	Clay - as above
	5	Calcilutite - as above
		CBU RT CB NB X3A
5120-5130	90	Calcarenite - buff to light grey-brown, very fine to fine grained, argillaceous, slightly silty, soft to moderately firm, saccharoidal texture, poor permeability and porosity
	5	Calcilutite - light to medium grey, laminated, soft to firm, relatively brittle.
	5	Forams and fossil fragments (echinoid spines and bryozoal fragments)
5130-5140	100	Calcarenite - as above
	Tr	Calcilutite - as above
	Tr	Calcilutite (Marl) - light blue-grey, silty, calcareous, very soft
	Tr	Forams - as above
5140-5150	70	Calcarenite - buff to light grey, very fine to fine grained, very argillaceous, silty, soft to moderately firm, poor permeability and porosity, no show.
	30	Clay - very light grey, calcareous, very soft to unconsolidated
	Tr	Calcilutite - light to medium grey, laminated, firm
5150-5160	90	Calcarenite - as above
	10	Clay - as above
	Tr	Calcilutite - as above, forams
5160-5170	100	Calcarenite - as above
	Tr	Clay, calcilutite, forams
5170-5180	95	Calcarenite - light grey to light grey-brown, very fine to fine grained, moderately to very argillaceous, silty, soft to moderately firm, saccharoidal texture, poor permeability and porosity
	5	Calcilutite - light to medium grey, laminated, firm, brittle
	Tr	Forams
5180-5190	95	Calcarenite - as above
	5	Calcilutite - as above
	Tr	Forams

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
5190-5200	100	Calcarenite - cream to light grey, very fine to fine grained, slightly to moderately argillaceous, silty, as above
	Tr	Calcilutite - as above, forams - as above
5200-5210	100	Calcarenite - as above
	Tr	Calcilutite and forams - as above
5210-5220	100	Calcarenite - cream, buff, light brown, fine to very fine grained, soft to firm, very fine grained, calcilutite laminations, argillaceous, silty
	Tr	Calcilutite - grey, very soft, dark grey to light grey, laminations
	Tr	Fossils - forams and rare echinoid spines
5220-5230	100	Calcarenite - as above
	Tr	Calcilutite - as above, forams
5230-5240	95	Calcarenite - as above
	5	Calcilutite - as above
	Tr	Fossils - forams, rare echinoid spines
5240-5250	90	Calcarenite - as above
	5	Calcilutite - as above
	5	Fossils - as above
5250-5260	100	Calcarenite - buff to light brown to light grey, fine to very fine grained, saccharoidal texture, argillaceous, silty, friable to firm
	Tr	Calcilutite - dark grey, light grey laminae, very soft
	Tr	Fossils - forams, rare echinoid spines
5260-5270	100	Calcarenite - as above
	Tr	Calcilutite - as above, fossils - as above
5270-5280	100	Calcarenite - as above
	Tr	Calcilutite - as above
	Tr	Fossils - as above
5280-5290	100	Calcarenite - buff, light brown to light grey, fine to very fine grained, soft to firm, silty, argillaceous matrix, saccharoidal texture
	Tr	Calcilutite, forams
5290-5300	100	Calcarenite - as above
	Tr	Calcilutite - as above, and fossils - as above
5300-5310	95	Calcarenite - as above
	5	Calcilutite - as abive
	Tr	Fossils - as above
5310-5320	100	Calcarenite - light brown to light grey, fine to very fine grained, as above
	Tr	Calcilutite - as above, fossils - as abive, calcite
5320-5330	95	Calcarenite - as above
	5	Fossils - forams
	Tr	Calcilutite - as above, calcite, vein
5330-5340	100	Calcarenite - as above
	Tr	Calcilutite - as above, fossils - as above, calcite - as above

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
5340-5350	100	Calcarenite - as above
	Tr	Calcilutite - as above, fossils - forams, calcite - as above
5350-5360	100	Calcarenite - as above, greater abundance of cream to buff coloured cuttings
	Tr	Calcilutite - as above, forams
5360-5370	95	Calcarenite - buff, light grey to light brown, very fine grained, friable to brittle
	5	Calcilutite - light grey, dark grey laminations, very soft
	Tr	Forams, vein calcite
5370-5380	100	Calcarenite - as above
	Tr	Calcilutite - as above
5380-5390	100	Calcarenite - buff, light brown to light grey, very fine grained, saccharoidal texture, soft to firm, argillaceous, silty
	Tr	Calcilutite - dark grey, light grey banding, thin, platy cuttings, very soft
5390-5400	100	Calcarenite - as above
	Tr	Calcilutite - as above
5400-5410	100	Calcarenite - as above
5410-5420	95	Calcarenite - buff, light brown to grey, fine and very fine grained soft to firm, argillaceous matrix, silty
	5	Fossils - forams
5420-5430	95	Calcarenite - as above
	5	Fossils - as above
	Tr	Calcite; clay - white, unconsolidated; calcilutite - light grey to dark grey laminae
5430-5440	95	Calcarenite - as above
	5	Forams - rare echinoid spines
	Tr	Calcite, calcilutite, as above
5440-5450	100	Calcarenite - as above
	Tr	Calcilutite, clay, fossils, all - as above
5450-5460	95	Calcarenite - as above
	5	Fossils - forams, echinoid spines
	Tr	Calcilutite, calcite
5460-5470	95	Calcarenite - light brown to light grey, fine and very fine grained soft to firm, argillaceous matrix
	5	Forams
	Tr	Calcilutite, vein calcite
5470-5480	100	Calcarenite - as above
	Tr	Forams, calcite, calcilutite - as above
5480-5490		Off location. Stopped drilling at 11.00am, resumed 1.05pm
5480-5490	90	Calcarenite - as above
	10	Fossils - forams

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
5490-5500	80	Calcarenite - buff, light brown, light grey, fine and very fine grained, soft to firm, silty, saccharoidal
	20	Fossils - forams, rare echinoid spines
	Tr	Calcilutite - dark grey to light grey laminae, very soft, Vein calcite; clay - white, unconsolidated
5500-5510	80	Calcarenite - as above
	20	Fossils - as above
	Tr	Calcite, calcilutite
5510-5520	90	Calcarenite - as above, rare glauconite
	10	Forams
	Tr	Calcilutite, vein calcite
5520-5530	90	Calcarenite - cream, light brown, light grey, fine and very fine grained, soft to moderately hard
	10	Forams
	Tr	Clay - white, unconsolidated; calcilutite - light grey, dark grey laminations
5530-5540	80	Calcarenite - as above, slightly argillaceous
	15	Fossils - mainly orbitulinid forams and rare echinoid spines
	5	Calcilutite - medium grey, laminated, slightly firm, brittle
5540-5550	95	Calcarenite - light grey, some buff, light grey-brown, very fine to fine grained, slightly to moderately argillaceous, silty, very slightly glauconitic, soft to firm, saccharoidal texture, poor permeability and porosity
	5	Forams and echinoid spines - as above
	Tr	Calcilutite - as above
5550-5560	80	Calcarenite - as above
	10	Fossils - as above
	10	Clay - white to cream, calcareous, very soft to unconsolidated
	Tr	Calcilutite - as above
5560-5570	70	Calcarenite - as above
	10	Fossils - as above
	20	Clay - as above
	Tr	Calcilutite - as above
5570-5580	70	Calcarenite - as above, light grey-brown
	25	Calcareous Clay - as above, some silty to very fine grained sandy
	5	Fossils - as above
	Tr	Calcilutite - as above
5580-5590	60	Calcarenite - light grey to grey-brown, very fine to fine grained, argillaceous to very argillaceous, silty, very slightly glauconitic, soft to moderately firm, saccharoidal texture, poor permeability and porosity
	40	Clay - white to buff, slightly to very calcareous, silty to very fine grained sandy, very soft, unconsolidated
	Tr	Forams, calcilutite
5590-5600	50	Calcarenite - as above
	50	Clay - as above
	Tr	Fossils and calcilutite

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
5600-5610	70	Calcarenite - as above
	30	Clay - as above
	Tr	Fossils and calcilutite
5610-5620	40	Calcarenite - light grey, light grey-brown, very fine to fine grained, argillaceous to very argillaceous, silty, soft to moderately firm
	60	Clay - white to buff, slightly to very calcareous, silty, sandy (very fine grained), very soft
	Tr	Calcilutite, forams
		Increased ROP w/ increased clay content. Revert to 20' samples
5620-5640	80	Calcarenite - as above, very fine grained
	20	Clay (Marl) - as above, washes through sieve
	Tr	Fossils, calcilutite - as above
5640-5660	70	Calcarenite - as above
	30	Clay - as above
	Tr	Calcilutite, fossils
5660-5680	80	Calcarenite - light grey, very fine grained (rare fine grains), slightly to moderately argillaceous, very slightly silty, soft to moderately firm, saccharoidal texture
	20	Clay - white to buff, calcareous, silty to slightly sandy, very soft
	Tr	Calcilutite, forams
5680-5700	80	Calcarenite - as above, very fine to fine grained
	20	Clay - as above
	Tr	Forams
5700-5720	60	Calcarenite - as above
	20	Clay - as above
	20	Forams - predominantly Orbitulinids
5720-5740	80	Calcarenite - light grey, very fine grained (rare fine grains), slightly argillaceous, slightly silty, soft to moderately firm, saccharoidal texture, poor permeability and porosity
	20	Clay (Marl) - white to buff, calcareous, silty, soft
	Tr	Forams
5740-5760	70	Calcarenite - as above
	20	Clay - as above
	10	Forams - small orbitulinids
5760-5780	60	Calcarenite - as above
	35	Clay - as above
	5	Forams
		N.B. Predominance of clay washing through seive
5780-5800	50	Clay (Marl) - buff to light grey, calcareous, slightly silty, very slightly sandy (very fine grained), soft to unconsolidated
	40	Calcarenite - light grey, very fine grained, argillaceous, silty, friable to moderately firm, saccharoidal texture, poor porosity and permeability
	10	Forams - small orbitulinids

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
5800-5820	30	Clay - as above (washes through seive)
	60	Calcarenite - as above
	10	Forams - as above
5820-5840	60	Clay - as above, white to light grey
	30	Calcarenite - as above
	10	Forams - as above
5840-5860	20	Clay - as above
	70	Calcarenite - as above
	10	Forams - as above
5860-5880	20	Clay - white to light grey, calcareous, slightly silty, very soft
	75	Calcarenite - light grey, very fine grained, argillaceous, silty, friable to moderately firm, saccharoidal texture, poor permeabilit and porosity
	5	Forams - orbitulinids
5880-5900	30	Clay (Marl) - as above
	70	Calcarenite - as above (? caved)
	Tr	Forams
5900-5920	10	Clay - as above
	80	Calcarenite - as above
	10	Forams - small orbitulinids
5920-5940	40	Clay (Marl) - as above becoming slightly more consolidated, white to very light grey
	60	Calcarenite - as above
5940-5960	20	Clay - as above
	80	Calcarenite (probably mostly caved) - as above
5960-5980	40	Clay (Marl) - white to very light grey, calcareous, silty, very fine grains of sand, unconsolidated to soft
	60	Calcarenite - buff to light grey-brown, very fine grained, argillaceous, slightly silty, friable, saccharoidal texture
	Tr	Forams
5980-6000	20	Clay (Marl) - as above
	70	Calcarenite - as above
	10	Forams
6000-6020	40	Clay (Marly) - white to cream, very soft, contains silt and sand particles
	50	Calcarenite - light grey, fine to very fine grained, moderately firm
	10	Forams
	Tr	Pyrite
6020-6040	60	Clay - as above
	40	Calcarenite - as above
	Tr	Forams - mainly orbitulinids
6040-6060	25	Clay - white, very poorly consolidated, most is probably washed away
	70	Calcarenite - light grey, fine grained (saccharoidal) and very fine grained
	Tr	Pyrite
	5	Forams - as above, rare echinoid spines

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
6060-6080	50	Clay (Marl) - white to cream, silty
	50	Calcarenite - as above
	Tr	Fossils - as above
6080-6100	50	Clay - as above
	50	Calcarenite - as above
	Tr	Fossils - as above
6100-6120	50	Clay (Marl) - as above
	50	Calcarenite - as above
	Tr	Fossils - as above
6120-6140	50	Clay - as above
	50	Calcarenite - light grey, as above
	Tr	Fossils
6140-6160	20	Clay (Marl) - white, very soft, silty and sandy
	70	Calcarenite - light grey, fine and very fine grained
	10	Fossils - forams, mainly orbitulinids
6160-6180	80	Calcarenite - as above
	10	Clay - as above
	10	Fossils - as above
	Tr	Vein calcite
6180-6200	80	Calcarenite - as above
	10	Clay - as above
	10	Fossils - as above
	Tr	Pyrite, massive, vein calcite
7.3.77		
6200-6220	85	Calcarenite - light grey, fine to very fine grained, soft to firm, poor porosity and permeability, pyritised
	10	Clay (Marl) - white, very soft
	5	Fossils - mainly orbitulinids and other forams, rare echinoid spines recrystallised calcite
	Tr	Pyrite (massive), calcilutite (vein)
6220-6240	60	Calcarenite - as above, abundant pyrite
	40	Clay (Marl) - as above
	Tr	Fossils
6240-6260	80	Calcarenite - as above
	15	Clay - as above
	5	Pyrite, massive, and enclosing calcite
	Tr	Forams
6260-6280	80	Calcarenite - as above
	10	Fossils - as above
	5	Clay - as above
	5	Pyrite - as above
6280-6300	80	Calcarenite - light grey-brown, fine and very fine grained, soft, pyritised, poor permeability and porosity, saccharoidal
	15	Clay (Marly) - white, unconsolidated
	5	Pyrite - as above

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
6300-6320	75	Calcarenite - as above
	10	Clay - as above
	10	Fossils - forams (mainly orbitulinids) and echinoid spines
	5	Pyrite - as above
	Tr	Vein calcite
6320-6340	90	Calcarenite - as above
	10	Fossils - as above
	Tr	Clay, pyrite, calcite
6340-6360	100	Calcarenite - light grey, fine to very fine grained, soft, silty
	Tr	Clay - as above, pyrite, calcite, forams
6360-6380	80	Calcarenite - as above
	20	Clay - as above
6380-6400	70	Calcarenite - buff to grey, soft to firm, silty, fine to very fine grained grading to calcilutite
	30	Clay - cream, very soft
	Tr	Fossils - as above, pyrite, vein calcite
6400-6420	90	Calcarenite - as above
	10	Clay - as above
	Tr	Forams - mainly orbitulinids, calcite
6420-6440	90	Calcarenite - as above
	5	Pyrite, massive and on calcite
	5	Forams - as above
	Tr	Clay - as above
6440-6460	75	Calcarenite - buff to light brown to light grey, fine grained, soft to firm, poor permeability and porosity, silty
	20	Forams - as above, plus echinoid spines
	5	Pyrite, massive and on calcite
	Tr	Calcite - vein
6460-6477	85	Calcarenite - as above
	10	Fossils - forams and rare echinoid spines
	5	Pyrite
	Tr	Calcite
		Stopped at 6477'. Tripping for new bit.
6480-6500	60	Calcarenite - buff to light brown to light grey, soft to firm, fine grained, saccharoidal texture, silty, poor permeability and porosit
	40	Clay (Marl) - white to cream, very soft
	Tr	Pyrite, fossils - as above, calcite
6500-6520	60	Calcarenite - as above
	20	Fossils - forams (mainly small orbitulinids) and rare pyritised gastropods
	20	Clay - as above
	Tr	Pyrite, calcite
6520-6540	60	Calcarenite - as above, fine and very fine grained
	30	Clay - as above
	10	Fossils - forams, as above
	Tr	Pyrite, calcite

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
6540-6560	80	Calcarenite - light brown to light grey, fine and very fine grained, soft to firm, saccharoidal, silty
	20	Fossils - mainly orbitulinids
	Tr	Clay - cream to light grey, pyrite, calcite, rare rounded quartz grains - fine grainsize
6560-6580	75	Calcarenite - as above
	20	Clay - as above
	5	Fossils - forams
	Tr	Pyrite, calcite
6580-6600	75	Calcarenite - as above
	20	Clay - as above
	5	Fossils - as above
	Tr	Pyrite, calcite
6600-6620	85	Calcarenite - light brown to light grey, fine and very fine grained, soft to firm, silty, saccharoidal
	15	Fossils - forams (mainly orbitulinids) and rare pyritised gastropods
	Tr	Pyrite, calcite and rare quartz grains - clear, subrounded
6620-6640	90	Calcarenite - buff, light brown to light grey, fine to very fine grained grading to calcilutite, soft to moderately firm, silty
	10	Fossils - forams, echinoid spines
	Tr	Pyrite, calcite
6640-6660	90	Calcarenite - as above
	10	Fossils - as above
	Tr	Calcilutite - light grey to dark grey laminae, calcite, vein
6660-6680	60	Calcarenite - as above
	30	Clay - white, calcareous, very soft but more consolidated than above
	10	Fossils - forams, calcite, pyrite
6680-6700	50	Calcarenite - as above
	45	Clay - cream, very soft, sample may be less well washed so clay more abundant
	5	Fossils - as above
	Tr	Calcite, vein
8.3.77		
6700-6720	80	Calcarenite - light brown to light grey, fine to very fine grained grading to calcilutite, soft to moderately firm, silty
	10	Clay - cream, soft, silt particles
	10	Fossils - forams and echinoid spines, pyritised
	Tr	Vein Calcite, pyrite, quartz - clear, subrounded, equidimensional
6720-6740	70	Calcarenite - as above, grading to calcilutite
	20	Clay - as above
	10	Fossils - as above, pyritised
	Tr	Pyrite, massive and on calcite, calcite
6740-6760	70	Calcarenite - as above
	20	Clay - as above
	10	Fossils
	Tr	Pyrite, calcite

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
6760-6780	75	Calcarenite - light brown to light grey, fine to very fine grained, grading to calcilutite, soft to firm
	10	Clay - as above
	10	Fossils - forams (mainly orbitulinids), echinoid spines
	5	Pyrite, in calcarenite, massive and replacing fossils
	Tr	Vein calcite
6780-6800	80	Calcarenite - as above
	10	Clay - as above
	10	Fossils - as above
	Tr	Pyrite, calcite, quartz - rare grains, fine grained, clear, equidimensional, subrounded to rounded
6800-6820	60	Calcarenite - as above
	30	Clay - as above
	10	Fossils - as above
6820-6840	65	Calcarenite - light brown to light grey, fine grained, saccharoidal, soft to firm, pyrite
	30	Clay (Marly) - white, very soft
	5	Fossils - mainly orbitulinids, rare gastropods
6840-6860	55	Calcarenite - as above
	45	Quartz - medium grained, clear to milky to translucent, equidimensional, typically well rounded, no show
	Tr	Fossils, pyrite, glauconite
6860-6880	70	Calcarenite - as above
	30	Quartz - as above, no show
	Tr	Calcite
6880-6900	50	Calcarenite- light brown to light grey, fine to very fine grained, soft to firm, silty
	50	Quartz - medium grained, well rounded, loose grains, clear, translucent, some frosted, no show
	Tr	Pyrite, calcite, forams, glauconite
6900-6910	40	Calcarenite - as above
	30	Quartz - as above, no show
	20	Micrite - cream to pink, soft
	10	Clay - cream, very soft, calcareous
6910-6920		NO SAMPLE
6920-6930	55	Calcarenite - as above
	35	Quartz - subangular to rounded, fine grained, clear, translucent, no show
	10	Micrite - as above
	Tr	Glauconite, pyrite, calcite, forams
6930-6940	45	Calcarenite - as above
	30	Clay - marly, cream, very soft
	20	Quartz - as above
	5	Fossils - mainly forams
	Tr	Pyrite
6940-6950	70	Calcarenite - light brown to light grey, very fine grained, argillaceous, silty, soft to firm, saccharoidal texture, poor permeabilit and porosity

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
6940-6950 Contd	25	Clay (Marl) - cream to light grey, calcareous, very soft
	5	Quartz Sand - as above, well rounded, fine to medium grained (rare coarse), clear, translucent, slightly frosted
6950-6960	50	Clay - as above
	50	Calcarenite - as above
	Tr	Sand - as above, orbitulinid forams
6960-6970	50	Calcarenite - light grey to light grey-brown, very fine grained, silty, argillaceous, soft to firm, poor permeability and porosity
	50	Clay (Marl) - very light grey, calcareous, silty, very soft
	Tr	Sand, forams
6970-6980	60	Calcarenite - as above
	40	Clay (Marl) - as above
	Tr	Sand, forams, pink micrite
6980-6990	50	Clay (Marl) - as above
	40	Calcarenite - as above
	10	Quartz sand - fine to medium grained, clear to translucent, as above rounded, loose, no show
	Tr	Forams, micrite, pyrite
6990-7000	50	Calcarenite - light grey to light grey-brown, very fine grained, silty, argillaceous, soft to moderately firm, poor permeability and porosity
	30	Quartz sand - as above, no show
	20	Clay (Marl) - very light grey, calcareous, silty, very soft
7000-7010	50	Calcarenite - as above
	50	Clay (Marl) - as above
	Tr	Quartz sand, pyrite, glauconite (granular), forams, micrite
7010-7020	30	Calcarenite - as above
	70	Clay (Marl) - as above
	Tr	Quartz sand, pyrite, glauconite, as above
7020-7030	65	Calcarenite - as above
	30	Clay (Marl) - white to very light grey, calcareous, silty to very slightly sandy, unconsolidated to soft, some slightly more consolidated than above
	5	Quartz sand - clear to translucent, fine to medium grained, loose
	Tr	Forams, pyrite, glauconite
7030-7040	50	Calcarenite - light grey to light browny-grey, very fine grained, silty, argillaceous, soft to moderately firm, poor permeability and porosity
	50	Clay (Marl) - as above
	Tr	Quartz sand, pyrite, forams
7040-7050	40	Calcarenite - as above
	60	Clay (Marl) - as above
	Tr	Quartz sand, pyrite, glauconite, forams
7050-7060	50	Calcarenite - as above
	50	Clay (Marl) - as above
	Tr	Forams, sand

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
7060-7070	50	Calcarenite - light grey to light grey-brown, very fine grained, argillaceous, silty, soft to firm, poor permeability and porosity
	50	Clay (Marl) - cream to buff, calcareous, silty, soft
	Tr	Quartz sand
7070-7080	70	Calcarenite - as above
	30	Clay (Marl) - as above
	Tr	Quartz sand, pyrite
7080-7090	60	Calcarenite - as above
	40	Clay (Marl) - as above, white to very light grey-brown
	Tr	Quartz sand, forams, glauconite
7090-7100	70	Calcarenite - light grey to light grey-brown, very fine grained, argillaceous, soft to firm, poor permeability and porosity
	30	Clay (Marl) - cream to buff, calcareous, silty, soft
	Tr	Quartz sand, forams
		Reverted to 20' samples due to lack of wash water
7100-7120	70	Calcarenite - as above
	30	Clay (Marl) - as above
	Tr	Quartz sand, forams, pyrite
7120-7140	50	Calcarenite - as above
	40	Clay - as above
	5	Forams - porcellanous forms
	5	Quartz sand - medium grained, clear to milky, no show
7140-7160	60	Calcarenite - light grey, very fine grained, argillaceous, silty, soft to firm
	30	Clay (Marl) - cream to light grey, silty, calcareous, soft
	10	Forams, echinoid spines, gastropod fragments
	Tr	Sand, pyrite, glauconite
7160-7180	80	Calcarenite - as above
	20	Clay (Marl) - as above
	Tr	Forams, pyrite, echinoid spine fragments
7180-7200	70	Calcarenite - as above, some light grey-green
	20	Clay (Marl) - as above
	10	Fossils - mostly forams, some echinoid and gastropod fragments
	Tr	Quartz sand, pyrite
7200-7220	80	Calcarenite - as above
	20	Clay (Marl) - as above
	Tr	Fossils - as above, quartz sand, pyrite
7220-7240	90	Calcarenite - light grey to light grey-green, very silty, slightly argillaceous, very fine grained, firm, grading to calcareous siltstone
	10	Clay (Marl) - white to very light grey, silty, calcareous, soft
	Tr	Quartz sand, forams, echinoid fragments, pyrite
		Some pyrite replacing $CaCO_3$ in fossils
7240-7260	85	Calcarenite - as above, calcareous siltstone
	5	Clay (Marl) - as above, very slightly sandy
	10	Fossils - forams and echinoid fragments, some pyritised
	Tr	Quartz sand, pyrite

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SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
7260-7280	90	Calcilutite - calcarenite - calcareous siltstone - grey to grey-gree very fine grained, argillaceous, silty, firm
	10	Claystone (Marl) - cream, silty, soft
	Tr	Forams, echinoid fragments, pyrite, quartz sand
7280-7300	80	Calcareous claystone - very silty grading to calcarenite - as above. Grey to grey-green, firm
	20	Claystone (Marl) - cream, silty, very slightly sandy, soft
	Tr	Quartz sand, forams, pyrite, glauconite, echinoid spine fragments
7300-7320	80	Calcareous claystone - silty, grading to calcarenite, as above
	20	Claystone (Marl) - as above
	Tr	Quartz sand, forams, pyrite, echinoid fragments
7320-7340	90	Calcareous claystone - very silty, grey-green, grading to silty, very fine grained calcarenite - as above, firm
	10	Claystone (Marl) - cream to light grey, very calcareous, silty, very soft
	Tr	Quartz sand, forams, echinoid fragments, pyrite
7340-7360	60	Calcareous claystone - very silty, grey-green, firm, grading to silty, very fine grained calcarenite, as above
	40	Claystone (Marl) - cream to buff, very calcareous, silty, very soft to slightly unconsolidated
	Tr	Forams, glauconite, pyrite
7360-7380	60	Calcareous claystone - light brown to grey, very silty, soft to firm, very fine grained grading to calcarenite fine grained
	40	Clay (Marl) - cream, very calcareous, very soft
	Tr	Pyrite, forams
7380-7400	70	Calcareous claystone - as above
	30	Clay - as above
	Tr	Pyrite, forams
7400-7420	70	Calcareous claystone grading to silty calcarenite - as above
	30	Calcareous clay - as above
	Tr	Pyrite, forams
7420-7440	70	Calcareous claystone - as above
	30	Clay (Marl) - as above
	Tr	Pyrite
		Rare quartz grains - well rounded, medium grained
7440-7460	70	Calcarenite grading to calcareous claystone - as above Buff, light brown to light grey, soft to moderately firm, silty, poor permeability and porosity
	30	Calcareous clay - as above, very soft
	Tr	Forams, pyrite
		Rare quartz grains - as above
7460-7480	70	Calcareous siltstone - light brown to light grey, soft to firm, poor permeability and porosity
	30	Clay - calcareous, as above
	Tr	Forams, pyrite
		Rare quartz grains - clear to translucent, well rounded

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
7480-7500	75	Calcarenite - as above
	20	Clay - as above
	5	Forams - as above (mainly orbitulinids), echinoid spines
	Tr	Quartz grains - medium size, pyrite
7500-7520	80	Calcareous siltstone - buff to light grey/brown, trace glauconite, soft to firm
	20	Calcareous Clay - cream, very soft
	Tr	Forams, quartz grains - as above, well rounded
7520-7540	90	Calcareous Siltstone - light to medium grey to grey-brown, very slightly sandy, soft to firm
	10	Clay (Marl) - as above
	Tr	Forams, echinoid fragments, pyrite, glauconite
7540-7560	90	Calcareous siltstone - light brown to grey, soft to moderately firm, poor permeability and porosity, rare grey-green
	10	Calcareous clay - cream, very soft to poorly consolidated
	Tr	Fossils - predominantly forams, rare echinoid spines. Quartz grains loose, medium grained, clear to translucent, well rounded
7560-7580	60	Calcareous Siltstone - as above
	40	Calcareous Clay - as above
	Tr	Fossils - as above, and quartz grains - as above
7580-7600	80	Calcareous Siltstone - light grey, argillaceous, trace pyrite, moderately firm
	20	Calcareous Clay (Marl) - cream to very light grey, silty, very slightly sandy, soft
	Tr	Forams, echinoid spine fragments, gastropod fragments - all showing some pyritisation
7600-7610	80	Shale - light to medium grey, calcareous, silty to very silty, grading to siltstone in parts, firm
	20	Claystone (Marl) - as above
	Tr	Fossils - as above; pyrite; loose quartz grains
7610-7620	95	Shale - as above, only slightly calcareous
	5	Claystone (Marl) - as above
	Tr	Fossils - forams and echinoid spines
7620-7630	90	Shale - as above, slightly to moderately calcareous, grading to siltstone in part
	10	Claystone (Marl) - cream to very light grey, silty, very slightly sandy, medium to very calcareous, soft
	Tr	Forams
7630-7640	80	Shale- as above grading to siltstone
	10	Calcarenite - white to very light grey, very fine to fine grained, slightly silty, friable to firm, saccharoidal texture poor to fair permeability and porosity
	10	Claystone (Marl) - as above
	Tr	Forams, pyrite

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
7640-7650	100	Shale - slightly calcareous, grading to siltstone, light brown-grey to grey-green, soft to firm, brittle
	Tr	Quartz - rounded grains, clear to translucent, medium grain size, Forams
7650-7660	100	Shale - light brown-grey to grey-green, slightly calcareous, firm to brittle, grading to siltstone
	Tr	Claystone - very calcareous, buff to light grey, very soft
	Tr	Quartz - rounded to subrounded grains, clear to translucent, medium grain size
	Tr	Forams
7660-7670	95	Shale - as above
	5	Claystone - as above
	Tr	Quartz - as above; forams; bryozoa
7670-7680	100	Shale - light brown to light grey, some green-grey, moderately to strongly calcareous, firm to brittle, minor glauconite inclusions, trace pyritised, tends to be silty with calcareous matrix/cement
	Tr	C laystone - buff, very calcareous, very soft
	Tr	Pyrite - silt size crystals
	Tr	Quartz - rounded to subrounded, clear to translucent, fine to medium grain size
	Tr	Forams
7680-7690	95	Shale - as above
	5	Calcareous claystone - as above
	Tr	Pyrite - as above; quartz grains - as above; forams
7690-7700	75	Shale - as above
	25	Calcareous claystone - buff, grading to calcareous siltstone, also buff, fine saccharoidal texture
	Tr	Forams
7700-7710	70	Shale - as above, soft to firm
	30	Marl (calcareous claystone) - as above
	Tr	Forams, pyrite, quartz
7710-7720	80	Shale - light grey to grey-green, moderately to strongly calcareous firm to brittle, silty
	20	Marl - buff, very calcareous, grading to calcareous siltstone
	Tr	Forams, pyrite, quartz
7720-7730	70	Calcareous Shale - siltstone, light grey-brown to grey-geen (glauconite), firm to brittle
	20	Calcareous clay (Marl) - buff to light grey, soft
	4	Forams
	Tr	Pyrite, quartz grains, rounded, clear to translucent, medium grain size
7730-7740	80	Shale - siltstone, as above
	10	Calcareous Clay - as above
	5	Pyrite - massive and on calcite
	5	Forams
	Tr	Quartz grains - loose, clear to translucent and milky, well rounded, medium grain size
7740-7750	90	Shale - siltstone, slightly calcareous, light brown to light grey, grey-green, firm
	10	Calcareous clay - buff, soft
	Tr	Pyrite, fossils, quartz - as above

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
7750-7760	80	Shale - siltstone, as above
	20	Calcareous clay - as above, grading to calcareous siltstone
	Tr	Pyrite, fossils - forams, quartz grains (rare)
7760-7770	60	Shale - siltstone, as above, slightly calcareous
	40	Calcareous clay (marl) and calcareous siltstone - very fine calcare nite, buff to light brown, soft
	Tr	Pyrite, forams; rare quartz grains - as above
7770-7780	60	Shale/siltstone - as above
	30	Calcareous clay - as above
	10	Fossils - forams
	Tr	Pyrite; rare quartz grains - clear to translucent, coarse, well rounded
7780-7790	50	Shale/siltstone - light brown to grey, grey to green, orange to brown, slightly calcareous, firm
	40	Calcareous clay - siltstone, buff to light brown, soft
	10	Forams
	Tr	Pyrite, quartz grains - as above
7790-7800	65	Shale/siltstone - light brown to grey, grey to green, slightly calc areous, firm
	35	Marl, calcareous siltstone - white to cream, silty, soft
	Tr	Pyrite - massive and as small crystals on calcite; fossils - fora- rare echinoid spines
7800-7810	70	Shale/siltstone - light brown-grey to grey-green, moderately calcareous, firm to brittle
	30	Marl - calcareous siltstone - white to cream, silty, soft
	Tr	Pyrite - as above
	Tr	Forams; quartz - rounded to subrounded, clear to translucent
7810-7820	80	Shale - light brown-grey some grey-green, moderately calcareous, firm to brittle, silty
	20	Marl - buff to cream, very soft, very calcareous
	Tr	Pyrite, forams
7820-7830	65	Shale/siltstone - as above
	30	Marl - as above
	5	Fossils - forams
	Tr	Pyrite, quartz grains (rare)
7830-7840	70	Shale/siltstone - light brown to light grey, grey-green, firm, slightly calcareous
	30	Marl - cream to buff, silty, soft
	Tr	Pyrite, fossils
7840-7850	65	Calcareous siltstone - as above
	30	Marl - as above
	5	Fossils - forams
	Tr	Pyrite - needles in siltstone
7850 -7860	60	Calcareous siltstone - as above
	30	Marl - as above
	5	Fossils - as above
	5	Pyrite - needles and massive
	Tr	Grains of glauconite (rare)

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
7860-7870	70	Siltstone - slightly calcareous, light brown, firm
	30	Marl - buff to cream, silty, soft
	Tr	Pyrite, forams, rare glauconite
7870-7880	70	Siltstone - slightly calcareous, firm, light brown to light grey, pyritised
	30	Marl - cream to buff, very soft to moderately firm
	Tr	Pyrite - massive, acicular and clusters of spherical crystals Glauconite, fossils, rare quartz grains - medium sized, clear to translucent, well rounded
7880-7890	80	Calcareous siltstone - light brown to light grey, firm, some slightl pyritised, calcareous
	20	Marl - as above
	Tr	Glauconite, pyrite, quartz grains - as above, forams
7890-7900	95	Calcareous siltstone - light brown to light grey, firm to soft, minor glauconite inclusions, rare pyrite inclusions
	Tr	Marl - as above
	Tr	Glauconite - dark green, rounded
	Tr	Pyrite, forams, some quartz grains
	5	Forams - small Globigerina, etc.
7900-7910	60	Calcareous siltstone - as above
	40	Siltstone - brown, soft, non calcareous
	Tr	Glauconite, pyrite, forams
	Tr	Quartz - angular, clear to translucent
		<u>NOTE:</u> Drilling break at 7906', drilled 5' in and circulated bottoms up - "Gurnard" Formation
7910-7920	100	Sandstone - loose quartz grains, medium to coarse grain size, rounded and angular, grains generally clear to translucent, some tan to brown, no fluorescence or cut on grains. <u>Unwashed</u> sample shows no fluorescence but gives good strong cut with white fluorescence.
	Tr	Pyrite, glauconite
7920-7930	100	Sandstone - loose quartz grains - as above; no fluorescence or cut but grains, unwashed sample shows no fluorescence but gives strong white cut
	Tr	Pyrite, glauconite
7930-7940	100	Sandstone - loose quartz grains, medium to coarse grain size, roundec to subrounded, clear to translucent, some slightly tan, no fluorescence or cut, unwashed sample gives strong white cut
	Tr	Glauconite
7940-7950	100	Sandstone - loose quartz grains - as above, strong white cut on bulk sample
	Tr	Glauconite, pyrite
	Tr	Calcareous siltstone - cavings
7950-7960	50	Sandstone - loose quartz grains, rounded to subrounded, clear to translucent, strong white to yellow cut on bulk sample, individual grains show no fluorescence
	50	Calcareous siltstone - light grey to brown, firm to brittle, very calcareous
	Tr	Pyrite, glauconite

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
7960-7970	70	Sandstone - loose quartz grains, rounded to subrounded, as above, bulk sample gives moderately white to yellow cut with chlorothene, medium to coarse grain size
	30	Calcareous siltstone - light grey to brown, firm to brittle, very calcareous
	Tr	Pyrite, glauconite
7970-7980	90	Sandstone - loose quartz grains, mainly rounded to subrounded, medium to coarse, with some argillaceous matter, clear to translucent, strongly white to yellow cut
	10	Calcareous siltstone - as above
	Tr	Glauconite, pyrite, forams
		NOTE: Circulated bottoms up at 7989'
7980-7990	90	Calcareous siltstone - light grey to light brown, firm to brittle, very calcareous, some grains partly pyritised
	10	Sandstone - quartz grains, loose, medium to coarse, rounded to subrounded, no fluorescence, no cut
	Tr	Pyrite, glauconite, forams
7990-8000	90	Calcareous siltstone - as above
	10	Sandstone - loose quartz grains - as above
	Tr	Pyrite, glauconite, forams
8000-8010	100	Sandstone - loose quartz grains, medium to coarse, very clean, rounded to subrounded, clear to translucent, excellent permeability and porosity, no fluorescence or cut
	Tr	Pyrite, calcareous siltstone - as above
		NOTE: Circulate up drilling break 30'/h to 150'/h
8010-8020	70	Sandstone - loose, medium to very coarse grains, rounded to subrounded, mainly clear to translucent with some white, no shows
	30	Calcareous siltstone - light brown to light grey, firm, very calcareous, minor glauconite inclusions
	Tr	Pyrite
8020-8030	90	Sandstone - as above
	10	Calcareous siltstone - as above
	Tr	Pyrite
8030-8040	100	Sandstone - as above, no shows
	Tr	Calcareous siltstone
	Tr	Pyrite, forams
8040-8050	80	Sandstone - loose quartz grains, medium to very coarse grains, mainly clear to translucent, rounded to subrounded, no show
	20	Calcareous siltstone - light brown to grey, firm, very calcareous, some glauconite inclusions
	Tr	Pyrite, forams
8050-8060	100	Sandstone - loose quartz grains, as above
	Tr	Pyrite
	Tr	Calcareous siltstone - as above
8060-8070	60	Sandstone - as above
	40	Calcareous siltstone - as above
	Tr	Pyrite, forams

SAMPLE DESCRIPTIONS

OPAH - 1

DEPTH	%	DESCRIPTION
8070-8080	50	Sandstone - loose quartz grains, clear to translucent, rare milky medium to coarse grains, subangular to well rounded, well sorted, streaming white/yellow cut, probably from cavings
	50	Calcareous siltstone - light brown to light grey, some grey-green, firm
	Tr	Pyrite, glauconite
8080-8090		As above
8090-8100	70	Sandstone - as above, fine to medium grain size mainly with a few coarse grains
	30	Calcareous siltstone - as above
	Tr	Glauconite, pyrite
8100-8110	95	Quartz grains - mostly clear, fine to medium, rare coarse to very coarse, mostly well sorted, subangular to well rounded, mainly subrounded, equant
	5	Calcareous siltstone - as above, scattered pale yellow cut under u.v. (with chlorothene)
	Tr	Glauconite, pyrite, forams, echinoid spines
8110-8120		As above, scattered pale yellow cut under u.v.
8120-8130	90	Sandstone - loose quartz grains, fine to medium, rare to coarse, moderately to well sorted, subangular to subrounded, scattered, pale yellow cut probably from cavings, very good porosity and permeability
	10	Calcareous siltstone - light brown to light grey, firm to brittle, moderately to very calcareous
	Tr	Glauconite
8130-8140	95	Sandstone - as above
	5	Calcareous siltstone - as above
	Tr	Glauconite
8140-8150	80	Sandstone - as above, rare coarse angular grains
	20	Calcareous siltstone - as above
	Tr	Pyrite
8150-8160	70	Sandstone - as above, no shows
	30	Calcareous siltstone - as above
	Tr	Glauconite
8160-8170	100	Sandstone - loose quartz grains, mainly fine to medium rarely coarse well sorted, subangular to subrounded, clear to translucent with some cloudiness, no shows, grains equant
	Tr	Calcareous siltstone - light grey to grey-green, firm to brittle, moderately to very calcareous
8170-8180		As above
8180-8190	100	Sandstone - as above
	Tr	Calcareous siltstone - as above
	Tr	Pyrite
8190-8200	100	Sandstone - as above, grains tending to fine grain size
	Tr	Calcareous siltstone - as above
	Tr	Pyrite
		T.D. 8205' KB

APPENDIX 2

APPENDIX 2

Well Completion Report

OPAH - 1

VELOCITY SURVEY

VELOCITY SURVEY

Well Opain-1

Basin Gippsland

INTRODUCTION

Esso personnel C.J. Carty

Contractor Velocity Data Pty. Ltd.

Supplied (1) Instruments

(2) Personnel

Seismic Observer Bruce Potter

Marine Shooter Ray Doyle

Dynamite –

(3) Seismic Souce

Gas Gun

Gas Pressures 2:1

Oxygen 90 psi

Propane 45 psi

(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 10/3/77

boarded (rig) Ocean Endeavour date 11/3/77

date of survey 13/3/77

casing depth 2862' K.B.

T.D. when shot 8210' K.B. FTD 8210' K.B.

water depth 348' K.B. K.B. 83'

SURVEY PROCEDURE

Weather: sea Strong current, moderate swell.

rig movement Slight

rig noise Slight

Hydrophones: number 2 time break, 1 moonpool

depth below sea level forty (40) ft

position 2 time break above gun

1 moonpool near riser

Shot Positioning and Charges:

marker buoys (number

(distance

(direction

charge depth forty (40) ft

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

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

number of misfires

amount of powder used ....lbs

Gas gun

Number of pops per level: Average 2 Some 3 amount of poweder dumped.......-.......lbs.

Well-phone positioning:

T-bar..

number of depths........14........................

Time: first shot........14.55 hrs......................

last shot........18.18 hrs......................

rig time........4½ hours........................

RESULTS

Quality of records (good........15........................
(fair.....13....................
(poor......6....................
(not used..1....................

Comparison of Interval Times with sonic log

/Δ/average........3.....microsec/foot

/Δ/max/...........9.2.....microsec/foot

CONCLUSION

Reliability of T-D curve....Good......................

COMMENTS

The survey went fairly smoothly. Noise levels were slight and the breaks on the records were good. All check shot times can be considered reliable.

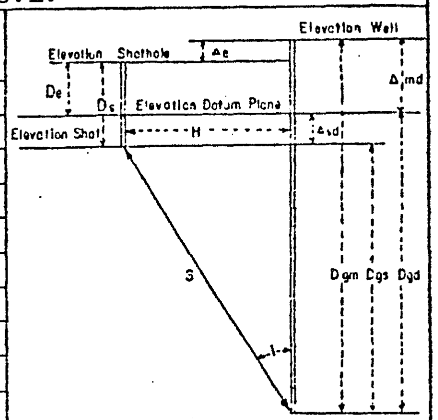
There is some doubt as to the offset of the gas gun from the well. As near as can be determined the gun went into the water 150 ft. from the riser. The strong current flowing beneath the rig forced the gun closer to the riser, reducing the offset to approx. 140 ft. (as used in all calculations). The moonpool hydrophone was also dragged away from the riser by the strong current and it is felt that the shot offset measured from these breaks (26 msec or 130 ft) is not a true measure of the offset of the gun from the riser.

There appear to be two breaks on the moonpool phone records. The shorter time is thought to be through the steel of the floatation tanks, and the longer time is the true water arrival.

Shothole Information:- Elevation, Distance & Direction from Well	Company	Well	Elevation (Derrick Floor)	Total Depth	LOCATION: Coordinates	Section, Township, Range	County	Area or Field
The gas gun was lowered into the water at an offset of 150' but currents reduced this to 140'.	ESSO EXPLORATION AUSTRALIA INC.	OPAH-1	83'	8210'				Gippsland

DATUM : M.S.L.

Record Number	Shothole Number	Time of Shot	Dgm	Ds	tus	tr	T Reading	T Polarity	T Grade	Dgs	H	TAN i	Cos i	Tgs	Δsd	Δsd/V	Tgd	Tgd Average	Dgd	ΔDgd	ΔTgd	VI Interval Velocity	Va Average Velocity
1		14.55	3006	35		28	.370	U	G	2888	140	N/A	N/A	.370	40	8	.378	.378	2923	613	.061	10049	7733
2		15.00	"	"		27	.370	D	G	"	"	"	"	.370	"	"	.378						
34		18.16	3619	"		26	.431	D	P	3501	"	"	"	.431	"	"	.439	.439	3536	719	.068	10574	8055
35		18.17	"	"		23	.432	D	G	"	"	"	"	.432	"	"	.440						
36		18.18	"	"		25	.431	D	G	"	"	"	"	.431	"	"	.439						
31		18.02	4338	"		26	.500	D	G	4220	"	"	"	.500	"	"	.508	.507	4255	668	.059	11322	8393
32		18.03	"	"		25	.499	D	G	"	"	"	"	.499	"	"	.507						
33		18.04	"	"		26	.499	D	G	"	"	"	"	.499	"	"	.507						
29		17.54	5006	"		26	.558	D	G	4888	"	"	"	.558	"	"	.566	.566	4923	538	.049	10980	8698
30		17.55	"	"		27	.558	D	G	"	"	"	"	.558	"	"	.566						
27		17.45	5544	"		24	.607	D	G	5426	"	"	"	.607	"	"	.615	.615	5461	368	.039	9436	8880
28		17.46	"	"		27	.607	D	P	"	"	"	"	.607	"	"	.615						
25		17.35	5912	"		25	.646	D	F	5794	"	"	"	.646	"	"	.654	.654	5829	515	.053	9717	8913
26		17.36	"	"		24	.646	D	F	"	"	"	"	.646	"	"	.654						
23		17.22	6427	"		26	.699	D	F	6309	"	"	"	.699	"	"	.707	.707	6344	460	.045	10222	8973
24		17.23	"	"		26	.698	D	F	"	"	"	"	.698	"	"	.706						
20		17.05	6887	"		25	.743	D	P	6769	"	"	"	.743	"	"	.751	.752	6804				9048
21		17.07	"	"		25	.744	D	F	"	"	"	"	.744	"	"	.752			173	.017	10176	
22		17.09	"	"		27	.744	D	G	"	"	"	"	.744	"	"	.752						
18		16.38	7060	"		26	.761	D	F	6942	"	"	"	.761	"	"	.769	.769	6977	447	.047	9511	9073
19		16.40	"	"		25	.760	D	F	"	"	"	"	.760	"	"	.768						
16		16.24	7507	"		25	.807	D	G	7389	"	"	"	.807	"	"	.815	.816	7424	349	.036	9694	9098
17		16.27	"	"		27	.808	D	F	"	"	"	"	.808	"	"	.816						
13		16.15	7856	"		26	.844	D	F	7738	"	"	"	.844	"	"	.852	.852	7773				9123
14		16.16	"	"		25	.844	D	F	"	"	"	"	.844	"	"	.852			42	.004	10500	
15		16.17	"	"		26	.844	D	F	"	"	"	"	.844	"	"	.852						
10		16.03	7898	"		26	.849	D	F	7780	"	"	"	.849	"	"	.857	.856	7815				9130
11		16.04	"	"		26	.848	D	F	"	"	"	"	.848	"	"	.856			94	.008	11750	
12		16.05	"	"		25	.847	D	P	"	"	"	"	.847	"	"	.855						
5		15.47	7992	"		26	.856	D	G	7874	"	"	"	.856	"	"	.864	.864	7909				9154
6		15.48	"	"		26	.856	D	G	"	"	"	"	.856	"	"	.864			163	.015	10867	
7		15.49	"	"		28	.856	D	G	"	"	"	"	.856	"	"	.864						
3		15.40	8155	"		25	–	D	NG	8037	"	"	"	–	"	"	–						
4		15.41	"	"		26	.872	D	P	"	"	"	"	.872	"	"	.880	.879	8072				9183
8		15.54	"	"		27	.869	D	P	"	"	"	"	.869	"	"	.877						
9		15.55	"	"		27	.871	D	G	"	"	"	"	.871	"	"	.879						



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 = $\frac{H}{D_{gs}}$
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 = $\frac{\Delta D_{gd}}{\Delta T_{gd}}$
Va = Average = $\frac{D_{gd}}{T_{gd}}$

Surveyed by: Velocity Data

Date: 13 March 1977

Weathering Data:

Casing Record 2862' K.B.

DWG. 1107/OP/3

VELOCITY SURVEY ERROR CHECK

[redacted]epth [redacted]el.S.L.	Av. Vertical Travel Time (check shots)	Ti Check Shots (sec.)	Ti Sonic Log (sec.)	△ (Millisecs.) $Ti_{Check} - Ti_{Sonic}$	Depth Interval (ft.)	Error (Microsec per ft.)
2923	.378					
3536	.439	.061	.060	+ 1	613	+ 1.6
3536	.439	.068	.0655	+ 2.5	719	+ 3.5
4255	.507					
4255	.507	.059	.0555	+ 3.5	668	+ 5.2
4923	.566					
4923	.566	.049	.049	0	538	0
5461	.615					
5461	.615	.039	.036	+ 3	368	+ 8.2
5829	.654					
5829	.654	.053	.0485	+ 4.5	515	+ 8.7
6344	.707					
6344	.707	.045	.043	+ 2	460	+ 4.3
6804	.752					
6804	.752	.017	.0185	- 1.5	173	- 8.7
6977	.769					
6977	.769	.047	.046	+ 1	447	+ 2.2
7424	.816					
7424	.816	.036	.035	+ 1	349	+ 2.9
7773	.852					
7773	.852	.004	.004	0	42	0
7815	.856					
7815	.856	.008	.0075	+ 0.5	94	+ 5.3
7909	.864					
7909	.864	.015	.0135	+ 1.5	163	+ 9.2
8072	.879					

VELOCITY DATA PTY. LTD.

P.O. Box 141, Kenmore, Queensland, 4069.
Telephone (072) 78 4860 (Office)
(072) 93 1514 (Field Operations)

DATE OF SURVEY 13 MARCH 77
CLIENT ESSO
WELL OPAH 1
BASS STRAIGHT, VIC

OBSERVERS REPORT

ENERGY SOURCE GAS GUN RECORDING INSTRUMENTS RS 44 LOGGER SCHLUMBERGER
GEOPHONES: WELL WLS 1000 REFERENCE PRESSURE SEA FLOOR 258' REFRACTION
REFERENCE SENSOR OFFSET 0' DEPTH 35' DRILL SHIP OCEAN ENDEAVOUR SHIP HEADING 235 TR.
WEATHER FINE SEAS MODERATE

KB DEPTH	REC # (~~BEARING~~)	CHARGE	SHOT DEPTH	SHOT LOCATION	SHOT OFFSET	AMPLIFIER GAIN * (input attn, gain control)		TIME	COMMENTS
* SHOT LOCATION, MID WAY BETWEEN PORT, AFT CAISONS ON RADIUS 65' FROM PORT CRANE. TOTAL OFFSET FROM MARINE RISER 151'									
3006'	1	15Sec.	40'	*	151'	20	10	1454	REV. TRACES on D.H, MOON POOL & TB 1.
"	2	"	40		"	"	"	1501	" " " MOON POOL & TB 1
8155'	3	"	"		"	"	"	1540	" " on TB 1 (also on all
"	4	"	"		"	"	"	1542	low gain. following shots)
7992'	5	"	"		"	"	"	1547	
"	6	"	"		"	"	"	1548	
"	7	"	"		"	"	"	1549	
8155'	8	"	"		"	"	"	1554	Re Shoot on Hi gain
"	9	"	"		"	"	"	1555	
7898'	10	"	"		"	"	"	1604	
"	11	"	"		"	"	"	1605	
"	12	"	"		"	"	"	1606	
7856'	13	"	"		"	"	"	1615	
"	14	"	"		"	"	"	1616	
"	15	"	"		"	"	"	1617	
7507'	16	"	"		"	"	"	1625	
"	17	"	"		"	"	"	1626	
7060'	18	"	"		"	"	"	1634	
"	19	"	"		"	"	"	1636	
6887'	20	"	"		"	"	"	1711	
"	21	"	"		"	"	"	1712	
"	22	"	"		"	"	"	1713	
6427'	23	"	"		"	"	"	1722	
"	24	"	"		"	"	"	1723	
5912'	25	"	"		"	"	"	1733	
"	26	"	"		"	"	"	1734	
5544'	27	"	"		"	"	"	1741	
"	28	"	"		"	"	"	1742	
5006'	29	"	"		"	"	"	1752	
"	30	"	"		"	"	"	1753	
4338'	31	"	"		"	"	"	1759	
"	32	"	"		"	"	"	1800	
"	33	"	"		"	"	"	1801	
3619'	34	"	"		"	"	"	1817	
"	35	"	"		"	"	"	1818	
"	36	"	"		"	"	"	1819	

NUMBER OF RECORDS 36 EXPLOSIVES USED: CAPS PRIMERS EXPLOSIVE
DEPART ~~BRISBANE~~ PERTH 12.10, 10th MARCH 77. RETURN ~~BRISBANE~~ PERTH OBSERVER BK Potter

OPAH-1

DATA USED IN CONSTRUCTION OF CALIBRATED SONIC

DEPTH (ft) K.B.	DEPTH (ft) M.S.L.	TIME SONIC (Secs)	TIME CHECKSHOTS (Secs)	$\Delta T = T_L - T_{CS}$ (msecs)
3006	2923	0.3950	0.378	+17.0
3619	3536	0.4550	0.439	+16.0
4338	4255	0.5205	0.507	+13.5
5006	4923	0.5760	0.566	+10.0
5544	5461	0.6250	0.615	+10.0
5912	5829	0.6610	0.654	+ 7.0
6427	6344	0.7095	0.707	+ 2.5
6887	6804	0.7525	0.752	+ 0.5
7060	6977	0.7710	0.769	+ 2.0
7507	7424	0.8170	0.816	+ 1.0
7856	7773	0.8520	0.852	0.0
7898	7815	0.8560	0.856	0.0
7992	7909	0.8635	0.864	- 0.5
8155	8072	0.8770	0.879	- 2.0

OPAH - 1

Well Velocity Record

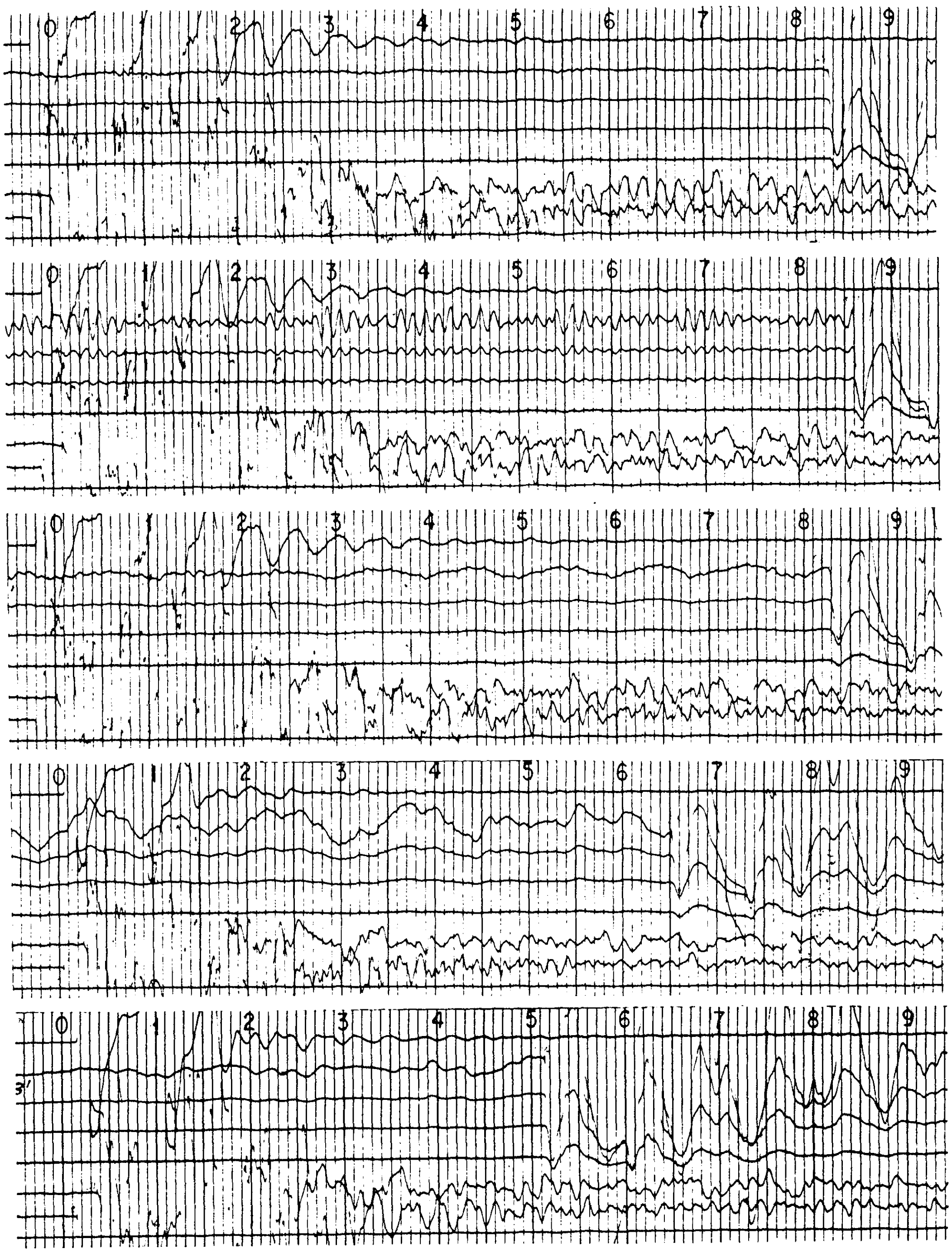
Rec. No. 6
7992' K.B.
15 sec. fill

Rec. No. 9
8155' K.B.
15 sec. fill

Rec. No. 10
7898' K.B.
15 sec. fill

Rec. No. 25
5912' K.B.
15 sec. fill

Rec. No. 32
4338' K.B.
15 sec. fill



Dwg. 1828/OP/2

APPENDIX 3

APPENDIX 3

Well Completion Report

OPAH - 1

FORMATION INTERVAL TESTS RECORD

F.I.T. RECORD

GEOLOGIST R.G. BELLIS

WELL: OPAH #1 F.I.T. No. 1 @ 7914 ft. (G.R. Depth) DATE 14/3/77

VALID TEST : ~~Yes~~/No

FIRING METHOD Standard CHOKE SIZES Single 20

TIMES : Tool Set 13.18.30 Tool Open ______ Min. Open ______ Full After ______

Shaped Charge Shot: ~~Yes~~/No at ______

Segregator Open ______ Mins. Open ______ Full After ______

Tool Closed 13.18 Tool Off 13.34.40

MUD DATA :

Rmf 0.657 @ 71 °F, Equiv. Cl^- 9500 ppm (Resistivity)

Cl^- 4000 ppm NO^-3 220 ppm (Titration)

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER

______	p.s.i. SURFACE PRESSURE	______	cc WATER
______	cft. GAS	10000	cc MUD
______	cc. OIL	______	cc SAND

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ °API @ ______ °F; Pour Point ______ °F

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ °F, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - MAIN CHAMBER

	Schlumberger	Amerada Agnew	Amerada ______	Hewlett Packard*
Sampling (psi)	4050			
Final Shut-in (psi)	4050			
Hydrostatic (psi)	4050			4324.0
Sampling Time (Min)	1.8			
Shut-in Time (Min)	5.2			

(*Corrected for Atmospheric pressure)

TEMPERATURES : (max recorded) 158 °F, 158 °F

MAX. DEPTH TOOL REACHED: 8201 Ft.

TIME SINCE CIRCULATION : 4.5 Hrs.

REMARKS : Mud run. Hydrostatic pressure measured by H.P. gauge is high (=10.5 mud, 9.8+ in hole). Could be caused by faulty connection on quartz crystal. Fault detected in FIT #2 and repaired.

F.I.T. SEGREGATOR REPORT

GEOLOGIST R.G. BELLIS

WELL : OPAH #1 F.I.T. No. 1 @ 7914 ft.(G.R. Depth) DATE 14/3/77

SEGREGATOR TYPE ______ NUMBER ______ DATE OPENED ______

RECOVERY - SEGREGATOR

______ p.s.i. SURFACE PRESSURE ______ cc WATER

______ cft. GAS ______ cc MUD

______ cc. OIL ______ cc SAND

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ ^oAPI @ ______ ^oF; Pour Point ______ ^oF

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ ^oF, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - SEGREGATOR

	Schlumberger	Amerada Agnew ___	Amerada ___	Hewlett Packard*
Sampling (psi)				
Final Shut-in (psi)				
Hydrostatic (psi)				
Sampling Time (Min)				
Shut-in Time (Min)				

(*Corrected for Atmospheric pressure)

REMARKS : Segregator not opened as mud run.

F.I.T. RECORD

GEOLOGIST R.G. BELLIS

WELL: OPAH #1 F.I.T. No. 2 @ 7912 ft. (G.R. Depth) DATE 14/3/77

VALID TEST : ~~Yes~~/No

FIRING METHOD Standard CHOKE SIZES Single 20

TIMES : Tool Set 18.08.07 Tool Open 18.10.26 Min. Open 1.34 Full After 1.34

Shaped Charge Shot: ~~Yes~~/No at

Segregator Open - Mins. Open - Full After -

Tool Closed 18.12.00 Tool Off 18.15.00

MUD DATA :

Rmf ~ 0.657 @ 71 °F, Equiv. Cl^- 9500 ppm (Resistivity)

Cl^- 4000 ppm NO^-3 220 ppm (Titration)

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER

-	p.s.i. SURFACE PRESSURE	-	cc WATER
-	cft. GAS	8000	cc MUD
-	cc. OIL		cc SAND

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ____ °API @ ____ °F; Pour Point ____ °F

____ Colour; ____ Fluorescent Colour

____ G.O.R.

WATER Rrf ____ @ ____ °F, Equiv. Cl^- ____ ppm (Resistivity)

Cl^- ____ ppm NO_3^- ____ ppm (Titration)

PRESSURES - MAIN CHAMBER

	Schlumberger	Amerada	Agnew Amerada	Hewlett Packard*
Sampling (psi)	-			-
Final Shut-in (psi)	-			-
Hydrostatic (psi)	4350			4187.5 psig
Sampling Time (Min)	1.5 mins			
Shut-in Time (Min)	-			

(*Corrected for Atmospheric pressure)

TEMPERATURES : (max recorded) 75 C °~~F~~, 77 C °~~F~~

MAX. DEPTH TOOL REACHED: 8070 Ft.

TIME SINCE CIRCULATION : 10 Hrs.

REMARKS : Mud had black oil scum and petroliferous odour. Sand samples collected at top of main chamber C-VC, yellow Fluorescence, strong white/pale yellow cut.

F.I.T. SEGREGATOR REPORT

GEOLOGIST R.G. BELLIS

WELL : OPAH #1 F.I.T. No. 2 @ 7912 ft.(G.R. Depth) DATE 14/3/77

SEGREGATOR TYPE ______ NUMBER ______ DATE OPENED ______

RECOVERY - SEGREGATOR

______ p.s.i. SURFACE PRESSURE ______ cc WATER

______ cft. GAS ______ cc MUD

______ cc. OIL ______ cc SAND

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ ^oAPI @ ______ ^oF; Pour Point ______ ^oF

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ ^oF, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - SEGREGATOR

	Schlumberger	Amerada	Agnew Amerada	Hewlett Packard*
Sampling (psi)				
Final Shut-in (psi)				
Hydrostatic (psi)				4187.5
Sampling Time (Min)				
Shut-in Time (Min)				

(*Corrected for Atmospheric pressure)

REMARKS : Segregator not opened as mud run.

F.I.T. RECORD

GEOLOGIST R.G. BELLIS

WELL: OPAH #1 F.I.T. No. 3 @ 7941 ft. (G.R. Depth) DATE 15/3/7 7

VALID TEST : ~~Yes~~/No

FIRING METHOD Standard CHOKE SIZES Single 20

TIMES : Tool Set 4.21.10 Tool Open 4.21.10 Min. Open ______ Full After ______

Shaped Charge Shot: ~~Yes~~/No at ______

Segregator Open - Mins. Open - Full After -

Tool Closed ______ Tool Off ______

MUD DATA :

Rmf ~ 0.657 @ 71 °F, Equiv. Cl^- 9500 ppm (Resistivity)

Cl^- 4000 ppm NO^-3 220 ppm (Titration)

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER

-	p.s.i. SURFACE PRESSURE		cc WATER
-	cft. GAS	21,500	cc MUD
-	cc. OIL		cc SAND

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ °API @ ______ °F; Pour Point ______ °F

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ °F, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - MAIN CHAMBER

	Schlumberger	Amerada Agnew	Amerada	Hewlett Packard*
Sampling (psi)	-			-
Final Shut-in (psi)	-			-
Hydrostatic (psi)	-			4191.1
Sampling Time (Min)	-			
Shut-in Time (Min)	-			

(*Corrected for Atmospheric pressure)

TEMPERATURES : (max recorded) 82 °F, 83 °F

MAX. DEPTH TOOL REACHED: 8078 Ft.

TIME SINCE CIRCULATION : 20.5 Hrs.

REMARKS : Tool failure - misrun.

F.I.T. SEGREGATOR REPORT

GEOLOGIST R.G. BELLIS

WELL : OPAH #1 F.I.T. No. 3 @ 7941 ft.(G.R. Depth) DATE 14/3/77

SEGREGATOR TYPE ______ NUMBER ______ DATE OPENED ______

RECOVERY - SEGREGATOR

______ p.s.i. SURFACE PRESSURE ______ cc WATER

______ cft. GAS ______ cc MUD

______ cc. OIL ______ cc SAND

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ ^{o}API @ ______ ^{o}F; Pour Point ______ ^{o}F

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ ^{o}F, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - SEGREGATOR

	Schlumberger	Amerada	Agnew Amerada	Hewlett Packard*
Sampling (psi)				
Final Shut-in (psi)				
Hydrostatic (psi)				
Sampling Time (Min)				
Shut-in Time (Min)				

(*Corrected for Atmospheric pressure)

REMARKS :

Segregator bypassed as seal failed.

F.I.T. RECORD

GEOLOGIST R.G. BELLIS

WELL: OPAH # 1 F.I.T. No. 4 @ 8010 ft. (G.R. Depth) DATE 15/3/77

VALID TEST : Yes/No

FIRING METHOD Standard CHOKE SIZES Single 20

TIMES : Tool Set 06.49.10 Tool Open 06.50.30 Min. Open 20·17 Full After 9·20

Shaped Charge Shot: Yes/No at

Segregator Open 07.10.47 Mins. Open 05.24 Full After ~ 1 sec.

Tool Closed 07.16.11 Tool Off 07.16.45

MUD DATA :

Rmf ~0.657 @ 71 °F, Equiv. Cl^- 9500 ppm (Resistivity)

Cl^- 4000 ppm NO^-3 220 ppm (Titration)

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER

-	p.s.i. SURFACE PRESSURE	22000	cc WATER
-	cft. GAS		cc MUD
-	cc. OIL		cc SAND

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	H_2S
Blender -	4300ppm	346ppm				-

OIL °API @ °F; Pour Point °F

Colour; Fluorescent Colour

G.O.R.

WATER Rrf 0.285 @ 71 °F, Equiv. Cl^- 22000 ppm (Resistivity)

Cl^- 13000 ppm NO_3^- 44mg/1 ppm (Titration)

PRESSURES - MAIN CHAMBER

	Schlumberger	Amerada Agnew	Amerada	Hewlett Packard*
Sampling (psi)	3500			3488.6
Final Shut-in (psi)	3500			3498
Hydrostatic (psi)	4200			4243.2
Sampling Time (Min)	9·20			
Shut-in Time (Min)	10·57			

(*Corrected for Atmospheric pressure)

TEMPERATURES : (max recorded) 185 °F, 180 °F

MAX. DEPTH TOOL REACHED: 8078 Ft.

TIME SINCE CIRCULATION : 23 Hrs.

REMARKS : Sample was honey brown with minor oil film. Strong sulphur smell.

F.I.T. SEGREGATOR REPORT

GEOLOGIST R.G. BELLIS

WELL : OPAH #1 F.I.T. No. 4 @ 8010 ft.(G.R. Depth) DATE 15/3/77

SEGREGATOR TYPE SFAB - 1L NUMBER 2909 DATE OPENED ______

RECOVERY - SEGREGATOR

______ p.s.i. SURFACE PRESSURE ______ cc WATER

______ cft. GAS ______ cc MUD

______ cc. OIL ______ cc SAND

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ °API @ ______ °F; Pour Point ______ °F

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ °F, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - SEGREGATOR

	Schlumberger	Amerada	Agnew	Amerada		Hewlett Packard*
Sampling (psi)	3500					—
Final Shut-in (psi)	3500					3497
Hydrostatic (psi)	4248					4225
Sampling Time (Min)	~1sec					
Shut-in Time (Min)	5·23					

(*Corrected for Atmospheric pressure)

REMARKS :

F.I.T. RECORD

GEOLOGIST R.G. BELLIS

WELL: OPAH # 1 F.I.T. No. 5 @ 7941 ft. (G.R. Depth) DATE 15/3/77

VALID TEST : Yes/~~No~~

FIRING METHOD Standard CHOKE SIZES Single 20

TIMES : Tool Set 10.00.06 Tool Open 10.02.19 Min. Open 7.04 Full After -

Shaped Charge Shot: Yes/~~No~~ at 10.25.20

Segregator Open - Mins. Open - Full After -

Tool Closed 10.09.23 Tool Off 10.59.00

MUD DATA :

Rmf 0.657 @ 71 °F, Equiv. Cl^- 9500 ppm (Resistivity)

Cl^- 4000 ppm NO^-3 220 ppm (Titration)

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER

_____ p.s.i. SURFACE PRESSURE _____ cc WATER

_____ cft. GAS _____ cc MUD

_____ cc. OIL _____ cc SAND

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL _____ °API @ _____ °F; Pour Point _____ °F

_____ Colour; _____ Fluorescent Colour

_____ G.O.R.

WATER Rrf _____ @ _____ °F, Equiv. Cl^- _____ ppm (Resistivity)

Cl^- _____ ppm NO_3^- _____ ppm (Titration)

PRESSURES - MAIN CHAMBER

	Schlumberger	Amerada	Agnew Amerada	Hewlett Packard*
Sampling (psi)	0			0
Final Shut-in (psi)	500			420
Hydrostatic (psi)	4110			4189.6
Sampling Time (Min)	6			
Shut-in Time (Min)	56.5			

(*Corrected for Atmospheric pressure)

TEMPERATURES : (max recorded) _____ °F, _____ °F

MAX. DEPTH TOOL REACHED: 8078 Ft.

TIME SINCE CIRCULATION : 27 Hrs.

REMARKS : Tight test. As zero sample pressure closed tool and waited 5 minutes for pressure B.U. - none. Fire shaped charge - recorded shaped charged back pressure waited for B.U. Thermometers lost in hole.

F.I.T. SEGREGATOR REPORT

GEOLOGIST R.G. BELLIS

WELL : OPAH # 1 F.I.T. No. 5 @ 7941 ft.(G.R. Depth) DATE 15/3/77

SEGREGATOR TYPE ______ NUMBER ______ DATE OPENED ______

RECOVERY - SEGREGATOR

______ p.s.i. SURFACE PRESSURE ______ cc WATER

______ cft. GAS ______ cc MUD

______ cc. OIL ______ cc SAND

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ ^{o}API @ ______ ^{o}F; Pour Point ______ ^{o}F

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ ^{o}F, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - SEGREGATOR

	Schlumberger	Amerada Agnew ______	Amerada ______	Hewlett Packard*
Sampling (psi)				
Final Shut-in (psi)				
Hydrostatic (psi)				
Sampling Time (Min)				
Shut-in Time (Min)				

(*Corrected for Atmospheric pressure)

REMARKS : Segregator bypassed.

F.I.T. RECORD

GEOLOGIST R.G. BELLIS

WEDPAH OPAH #1 F.I.T. No. 6 @ 7913 ft. (G.R. Depth) DATE 15/3/77

VALID TEST : X̶e̶s̶/No

FIRING METHOD Standard CHOKE SIZES Single 20

TIMES : Tool Set 16.12.00 Tool Open 16.14.00 Min. Open 3.00 Full After ______

Shaped Charge Shot: Y̶e̶s̶/No at ______

Segregator Open - Mins. Open - Full After -

Tool Closed 16.17.00 Tool Off 16.18.00

MUD DATA :

Rmf 0.657 @ 71 °F, Equiv. Cl^- 9500 ppm (Resistivity)

Cl^- 4000 ppm NO^-3 220 ppm (Titration)

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER

-	p.s.i. SURFACE PRESSURE		cc WATER
-	cft. GAS	7500	cc MUD
-	cc. OIL		cc SAND

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ °API @ ______ °F; Pour Point ______ °F

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ °F, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - MAIN CHAMBER

	Schlumberger	Agnew Amerada ______	Amerada ______	Hewlett Packard*
Sampling (psi)	3850			-
Final Shut-in (psi)	3850			-
Hydrostatic (psi)	3850			-
Sampling Time (Min)	1			
Shut-in Time (Min)				

(*Corrected for Atmospheric pressure)

TEMPERATURES : (max recorded) - °F, - °F

MAX. DEPTH TOOL REACHED: 8078 Ft.

TIME SINCE CIRCULATION : 32 Hrs.

REMARKS : Mud run due to seal failure. No temperatures as thermometers lost on FIT #5. Hewlett Packard gauge not run.

F.I.T. SEGREGATOR REPORT

GEOLOGIST R.G. BELLIS

WELL : OPAH #1 F.I.T. No. 6 @ 7913 ft.(G.R. Depth) DATE 15/3/77

SEGREGATOR TYPE ______ NUMBER ______ DATE OPENED ______

RECOVERY - SEGREGATOR

______ p.s.i. SURFACE PRESSURE ______ cc WATER

______ cft. GAS ______ cc MUD

______ cc. OIL ______ cc SAND

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ °API @ ______ °F; Pour Point ______ °F

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ °F, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - SEGREGATOR

	Schlumberger	Amerada Agnew ______	Amerada ______	Hewlett Packard*
Sampling (psi)				
Final Shut-in (psi)				
Hydrostatic (psi)				
Sampling Time (Min)				
Shut-in Time (Min)				

(*Corrected for Atmospheric pressure)

REMARKS : Segregator bypassed.

F.I.T. RECORD

GEOLOGIST R.G. BELLIS

WELL: OPAH # 1 F.I.T. No. 7 @ 8124 ft. (G.R. Depth) DATE 15/3/77

VALID TEST : Yes/~~No~~

FIRING METHOD Standard CHOKE SIZES Single 20

TIMES : Tool Set 05.33.13 Tool Open 05.34.53 Min. Open 34.31 Full After 736 secs 12.16 min

Shaped Charge Shot: ~~Yes~~/No at ____

Segregator Open 06.09.24 Mins. Open 22.06 Full After 6 secs.

Tool Closed 06.31.30 Tool Off 06.31.30

MUD DATA :

Rmf 0.657 @ 71 °F, Equiv. Cl⁻ 9500 ppm (Resistivity)

Cl⁻ 4000 ppm NO⁻3 220 ppm (Titration)

SAMPLE TAKEN AT END OF LAST CIRCULATION

RECOVERY - MAIN CHAMBER

-	p.s.i. SURFACE PRESSURE	20 500	cc WATER
-	cft. GAS	1250	cc MUDDY WATER
-	cc. OIL		cc ~~SAND~~ SEDIMENT

PROPERTIES - MAIN CHAMBER

GAS	C_1	C_2	C_3	C_4	C_5	H_2S
Muddy H20	1305					-
Clear H20	2611					-

OIL ____ °API @ ____ °F; Pour Point ____ °F

____ Colour; ____ Fluorescent Colour

____ G.O.R.

WATER Rrf 0.313 @ 68 °F, Equiv. Cl⁻ 21000 ppm (Resistivity)

Cl⁻ 13000 ppm NO_3^- 88mg/1 ~~ppm~~ (Titration)

PRESSURES - MAIN CHAMBER

	Schlumberger	Amerada	Agnew Amerada	Hewlett Packard*
Sampling (psi)	3425			3446 psig
Final Shut-in (psi)	3380		B.U. after ~~main chamber~~ full.	→ 3462.9 psig ~~3463.1 psig~~
Hydrostatic (psi) initial	4150			4218.13 psig
Sampling Time (Min)	12.16			
Shut-in Time (Min)				

(*Corrected for Atmospheric pressure)

TEMPERATURES : (max recorded) 165 °F, - °F

MAX. DEPTH TOOL REACHED: 8170 Ft.

TIME SINCE CIRCULATION : 5 Hrs.

REMARKS : Sample was honey brown water with some mud. Strong sulphur smell and segregator charge gas?'

F.I.T. SEGREGATOR REPORT

GEOLOGIST R.G. BELLIS

WELL : OPAH # 1 F.I.T. No. 7 @ 8124 ft.(G.R. Depth) DATE 15/3/77

SEGREGATOR TYPE SFAB NUMBER 2907 DATE OPENED ______

RECOVERY - SEGREGATOR

______ p.s.i. SURFACE PRESSURE ______ cc WATER

______ cft. GAS ______ cc MUD

______ cc. OIL ______ cc SAND

PROPERTIES - SEGREGATOR

GAS	C_1	C_2	C_3	C_4	C_5	H_2S

OIL ______ ^{o}API @ ______ ^{o}F; Pour Point ______ ^{o}F

______ Colour; ______ Fluorescent Colour

______ G.O.R.

WATER Rrf ______ @ ______ ^{o}F, Equiv. Cl^- ______ ppm (Resistivity)

Cl^- ______ ppm NO_3^- ______ ppm (Titration)

PRESSURES - SEGREGATOR

	Schlumberger	Amerada	Agnew ______	Amerada ______	Hewlett Packard*
Sampling (psi)	0				–
Final Shut-in (psi)	3380				3463.14
Hydrostatic (psi) final	4150				4284
Sampling Time (Min)	6 secs.				
Shut-in Time (Min)	22.00				

(*Corrected for Atmospheric pressure)

REMARKS :

ORAH #1 [redacted] PRESSURE RECORDS [redacted] FIT #1 [redacted] DEPTH 7014' [redacted]

Time	Pressure
	0432530
	0432770
13:14:06	0432460
13:14:05	0432510
13:14:04	0433300
13:14:04	0433230
13:14:04	0433250
13:14:03	0433250
13:14:03	0433170
13:14:03	0433220
13:14:02	0433290
13:14:02	0433770
13:14:01	0433060
13:14:01	0433360
13:14:01	0433270
13:14:00	0433330
13:14:00	0433180
13:14:00	0432650
13:13:59	0432330
13:13:58	0432350
13:13:57	0435390
13:13:56	0435190
13:13:50	0432510
	0432790
	0432620
	0434100
	0432750
	0432310
13:10:00	0431520
	0429950
	0428850
FIT #1	0428080
OPAH #1	0427720
	0426390
	0424580
	0427710
13:01:12	0428850
12:54:39	0428770
	0422560
12:47:00	0420690
14/3/77	↑ ke pui(?)

Time	Pressure
	0432480
	0432830
	0432400
Tool Set	0432460
	0432560
13:18:00	0432340
	0431780
	0431340
	0431660
	0431360
	0430200
13:17:00	0429580
	0430550
	0432260
	0433910
	0433560
	0433530
13:16:00	0433380
	0433280
	0433070
	0432780
	0432730
	0432340
13:15:00	0432700
	0432120
	0433700
	0432530
13:14:28	0432830
	0432930
	0432270
13:14:25	0433160
13:14:24	0433140
13:14:24	0433450
13:14:23	0433240
13:14:23	0433050
13:14:23	0433560
13:14:22	0433730
13:14:22	0433420
13:14:22	0433400
13:14:21	0433640
13:14:21	0433520
13:14:21	0432760
13:14:20	[illegible]

Time	Pressure
	0437440
13:25:50	0433630
	0433830
	0433370
	0433370
	0433670
	0433600
	0433840
	0434470
	0436950
13:25:00	0439480
	0436610
	0439170
	0435660
	0434890
	0435120
13:24:00	0435360
	0435900
	0435150
	0434820
	0434910
	0436030
13:23:00	0436890
	0434550
	0433890
	0434850
	0435190
	0434680
13:22:00	0434500
	0434530
	0433510
	0433380
	0433040
	0432640
13:21:00	0433230
	0433550
	0430300
	0430220
	0430360
	0430920
13:20:00	0432430
	0431700
	0431100
	0431540
	0431610
	0431760
13:19:00	0432200

Time	Pressure
	0290740
	0293710
	0295360
13:40:58	0324570
	0324270
	0325370
	0330750
	0334290
	0337240
	0337990
13:40:00	0340320
	0342960
	0344600
	0347050
	0348970
	0351790
13:39:00	0355680
	0357470
	0498730
	0494760
	0491670
	0488350
13:38:00	0485850
	0481360
	6086760
	9554630
	9554560
13:37:00	9554280
	0464230
13:36:00	0458060
	0450520
	6299610
	2908450
13:35:14	9451960
POH	6420160
	0442250
	0440710
Pull Tool	0438730
	0436950
13:34:00	0432920
13:33:10	3650770
13:31:00	0432430
13:30:00	0431750
13:29:00	0434700
13:28:00	0435330?
13:27:00	0435560?
	[illegible]
13:26:13	[illegible]

Tool set (marked at 1203030); Tool Open (marked at 0003220); 1sec samples.

OPAH #1
FIT # 2
14/3/77.

18:00:13
18:00:00

18:09:17

1197980
1201130
1178460
1227670
1204720
1195160
1173750
1203030
0418750
0416010
0416930
0417110
0418480
0418310
0418640
0417880
0419700
0420040
0419900
0421160
0421730
0422750
0422950
0423910
0424670
0426230
0424500
0426350
0430170
0463940
0436960
0432340
0433990
0471530
0481050
0450260
0455360
0439140
0439340
0421650
0417210
0416730

18:10:00

1160120
1165790
1167770
1166300
1167770
1167320
1166070
1166990
1165190
1168330
1165640
1065680
1176260
1113640
1152930
1171320
1113050
1027630
1116530
1170530
1048850
1160080
1037200
1154800
0998800
1169860
0950910
1151460
1164000
1065520
1092080
1168550
0986860
1170830
1028280
1093650
1170300
1176700
1208630
1180510
1186790
1184050
1205140

0415720
0415770
0416080
0416540
0416810
0416150
0415130
0416480
0416340
0416080
0415890
0416120
0415620
0414110
0250440
0113690
0061280
0003220
0051080
0508230
0481810
0588520
0532660
0580770
0645200
0852130
0510530
0519650
0518660
0501310
0469030
0472570
0497520
1116630
1108280
0756410
1135300
1137310
1142760
1140650
1145480
1145380
1026[illegible]

18:11:01

0416890
0416920
0417120
0416780
0417040
0417080
0417020
0417020
0416510
0416540
0621810
0582640
0416050
0688730
0416960
0417030
041[illegible]

OPAH # 1

PRESSURE RECORDS

FIT #3 DEPTH 8123'

	0417550	
	0415400	
	0414630	
	0418710	
	0419900	
	0422740	
	0424240	
	0421460	
	0426200	
04:10:00	0429530	
	0428990	
	0414070	
	0413680	
	0416790	
	0419930	
	0418060	
	0422620	
	0405200	
	0374230	
03:51:00	0343230	
	0312200	
	0308190	
	0296620	
	0269580	
	0237290	
	0204900	
	0177420	
	0152060	
03:36:00	0122580	
OPAH # 1	0084820	
	0065680	
	0047420	
	0031230	
03:30:00	0019380	
15/3/77	0011330	
FIT # 3	2941"	
RUN IN 3:27		

	0418690
	0418600
	0418680
04:20:00	0418750
	0418570
	0418530
	0418390
	0418580
	0418640
	0418560
	0418650
	0418400
	0418140
	0418100
	0418240
	0417820
	0417740
	0416950
	0416920
	0417020
	0417000
	0417270
	0417320
	0416750
	0417560
	0418230
	0418060
	0418290
	0418140
	0418320
	0418110
	0418030
	0418140
	0418050
	0418050
	0418320
	0418170
04:19:26	0417960
	0418270
	0418330
	0418150
	0416970
	0416840

04:21:23	0416930
	0416740
	0416480
	0416000
	0415960
	0415550
SEAL FAILURE	0414750
SET TOOL	0167840
OPEN TOOL	0164630
	0419110
04:21:00	0419480
	0419300
	0418590
	0419340
	0419010
	0418990
	0419330
	0419300
	0418600
	0418690
	0418250
	0418320
	0417930
	0418070
	0418600
	0418840
	0419080
	0418960
	0418350
	0418710
	0418800
	0418610
	0419300
	0418490
	0418750
	0418590

PAGE NO. 1 OPAH # 1 PRESSURE RECORDS FIT # 4 DEPTH 8010'

Time	Reading
06:49:00	0424440
	0424410
	0424590
	0424480
	0424350
	0424740
06:48:00	0424520
	0424610
	0424820
	0425890
	0427970
	0429330
	0427640
	0425560
	0427560
06:40:00	0426670
	0427480
	0426830
	0422540
	0418840
	0422020
	0427500
	0432490
	0438320
	0427220
	0409990
	0402800
06:21:00	0363000
	0322800
	0285960
	0253220
	0217440
06:11:37	0194510
06:11:35	0193960
	0183870
	0154660
	0127410
	0096560
03:03:24	0071440
	0069770
03:03:16	0069[illegible]

FIT # 4 8010
OPAH # 1
15/3/77

SET TOOL
6.49.10

Time	Reading
	0500220
	0500090
	0500080
06:50:00	0499140
	0499760
	0499460
	0499940
	0499020
	0498920
	0498700
	0498130
	0498690
	0498590
	0497650
	0499100
	0499450
	0491460
	0491870
	0492320
	0492040
	0492270
	0491920
	0491430
	0491770
	0492230
	0491400
	0491200
	0491960
	0492150
	0490680
	0490510
	0490750
	0490500
	0490890
	0490550
	0488770
	0488650
	0488110
	0488510
	0488490
	0488220
	0487340
	0487360
	0424320

6.50.30
OPEN TOOL

Time	Reading
	0349020
	0349080
	0348950
	0348850
	0348960
	0348830
	0348960
	0348740
	0348600
	0348460
	0348190
	0348300
	0348220
	0348420
	0325150
	0053850
	0041110
	0036670
	0503130
	0494090
	0494790
	0494490
	0493860
	0493180
	0502740
	0501870
	0502870
	0502040
	0502390
	0502500
	0502010
	0502920
	0502060
	0501860
06:51:00	0501590
	0500920
	0500240
	0501150
	0500050
	0501170
	0501010
	0501430
	0500900
	0500760
	0500540

Time	Reading
	0349120
	0349330
	0349340
	0349210
	0349270
	0349190
	0349130
	0349060
	0349210
	0349300
	0348970
	0349100
	0349160
	0349150
	0349150
	0349030
	0349200
	0349170
	0349030
	0349010
	0349150
	0349130
	0349180
	0349070
	0349140
	0349260
	0348940
	0349070
	0349180
	0349190
	0349050
	0349080
	0349150
	0349080
	0349170
	0349100
	0348920
	0349140
	0349110
	0349280
	0349070
	0349150
	0348980
	0349250
	0349180
	0349110
	0348890
	0349070

OPAH # 1 PRESSURE RECORDS FIT #4 DEPTH 8010'

0348550
0348640
0348670
0348800
0348730
0348650
0348800
0348700
0348640
0348640
0348790
0348710
0348860
0348790
0348560
0348900
0348770
0348830
0348660
0348780
0348770
0348740
0348710
0348760
0348740
0348770
0348680
0348730
06:52:00 0348940
0348940
0348870
0348870
0348990
0348800
0348830
0348710
0348980
0348830
0349030
0348910
0348900
0348820
0349170
0349310
0349320
0349160
0349240
0349300
0349260
0349200
0349130
0349030

0348950
0348690
0348700
0348640
0348680
0348730
0348630
0348560
0348710
0348590
0348850
0348730
0348790
0348540
0348720
0348510
0348880
0348810
0348930
0348780
06:53:00 0348760
0348830
0348760
0348760
0348880
0348770
0348660
0348650
0348720
0348610
0348690
0348920
0348730
0348850
0348610
0348860
0348700
0348790
0348840
0348720
0348810
0348690
0348690
0348680
0348500
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0348900
0348650
0348720
0348650

06:54:11
06:53:58

0348880
0348880
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0348670

06:57:20
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06:57:06
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06:56:10
06:55:51
06:55:31
06:55:11
06:54:51
06:54:31

0349300
0349280
0349480
0349200
0349070
0349000
0348990
0348650
0348930
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0348790
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0348990
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0348950
0348630
0348770
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0348420
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0348750
0348750
0348710

07:06:00	0350010	
	0349770	
	0349840	
	0349760	
	0349760	
	0349820	
07:05:00	0349970	
	0349780	
	0349700	
	0349840	
	0349630	
	0349650	
07:04:00	0349860	
	0349760	
	0349780	
	0349910	
	0349770	
	0349750	
07:03:00	0349820	
	0349770	
	0349740	
	0349800	
	0349570	
	0349970	
07:02:00	0349830	
	0349910	
	0349700	
	0349640	
	0349830	
	0349490	
07:01:00	0349630	
	0349630	
	0349780	
	0349670	
	0349290	
	0349210	
07:00:00	0349300	Tool full 6.59.50
	0349060	
	0349160	
	0349270	
	0349090	
	0349330	
06:59:00	0349240	
	0349050	
	0349370	
	0349220	
	0349170	
	0349140	
06:58:00	0349410	
	0349030	
	0349260	
	0349080	

	0349850	
	0349840	
	0349810	
	0349800	
	0349790	
	0349660	
07:13:00	0349660	
	0349640	
	0349770	
	0349710	
	0349650	
	0349730	
	0349830	
	0349730	
	0350010	
	0349790	
	0349640	
07:12:00	0349910	
	0349680	
	0349820	
	0349840	
	0349720	
	0349800	
07:11:00	0349630	
	0349590	Segragator open 7.10.47
	0349920	
	0349830	
	0349530	
	0349740	
07:10:00	0349720	
	0346970	
	0347020	
	0346680	
	0346980	
	0346520	
07:09:00	0347000	
	0346630	
	0349570	
	0349790	
	0349930	
	0349790	
07:08:00	0349670	
	0349700	
	0349780	
	0349960	
	0349840	
	0349890	
07:07:00	0349840	
	0349830	
	0349790	
	0349840	
	0349810	
	0349750	

07:19:50	0410590	
		POH.
	0415810	
07:17:27	0417490	
	0418690	
	0419170	
07:17:00	0419720	
	0419840	
	0420450	
	0421270	
	0422580	Tool closed 7.16.11
	0349700	
07:16:00	0350270	
	0349920	
	0349870	
	0349890	
	0349870	
	0349770	
07:15:00	0349880	
	0349800	
	0349770	
	0349760	
	0349850	
	0349840	
07:14:00	0349830	
07:13:50	0349770	
	0349860	
	0349870	
	0349370	
	0349820	
	0349800	
	0349720	
	0349870	
	0349850	
	0350010	
	0349780	
	0349750	
	0349750	

09:28:00	0426190
	0426950
	0427510
	0428180
	0429910
	0430400
09:26:00	0428500
	0429090
	0429710
	0430960
	0431720
	0429960
09:24:00	0430820
	0429620
	0427920
	0428210
	0428960
	0430280
09:22:00	0427600
	0428070
	0429350
	0433960
09:20:00	0489860
09:18:00	0423920
09:16:00	0387930
09:14:00	0353390
09:12:00	0315830
09:10:00	0281280
09:08:00	0241580
09:06:00	0198420
	0160930
	0121730
	0075400
08:58:38	0046790
	0036260

	0428320
	0429180
	0429430
	0426940
09:44:00	0423430
	0423140
	0423010
	0423320
	0421640
	0417870
09:42:00	0418280
	0418870
	0419390
	0419870
	0420160
	0420570
09:40:00	0421160
	0421720
	0422520
	0423340
	0421220
	0417720
09:38:00	0417900
	0418300
	0418710
	0419180
	0419700
	0419380
09:36:00	0419900
	0419790
	0419980
	0420870
	0421410
	0421990
09:34:00	0422880
	0424010
	0424670
	0425100
	0425370
	0425950
09:32:00	0426380
	0427060
	0427790
	0428140
	0428900
	0429580
09:30:00	0430210
	0430910
	0431730
	0432530
	0430150
	[illegible]

	0733790
	0712040
	0705030
10:00:11	0697850
	0741740
10:00:07	0838300
SET SEAL	0418960
	0418810
	0418480
10:00:00	0418800
	0418870
	0418670
	0419010
	0419280
	0419350
09:58:00	0419490
	0418430
	0418430
	0419630
	0420400
	0421130
09:56:00	0421260
	0421500
	0421990
	0422350
	0422470
	0423350
09:54:00	0424000
	0424470
	0425250
	0425080
	0423030
	0419910
09:52:00	0419650
	0420190
	0420450
	0420420
	0421110
	0421530
09:50:00	0421780
	0422360
	0422700
	0423140
	0423810
	0424360
09:48:00	0424380
	0424950
	0425140
	0425830
	0426260
	0426660
09:46:00	0427670
	[illegible]

	0733610
	0738160
	0738850
	0738320
	0737870
10:01:31	0739400
	0738880
	0737250
	0738950
	0739770
	0734750
	0741200
	0739970
	0745810
	0736930
10:01:11	0746870
	0752430
	0765810
	0757140
	0747130
	0745600
	0743290
	0749010
	0739570
10:00:53	0751670
	0773600
	0793250
10:00:50	0769090
	0795180
	0792170
	0791320
	0765140
	0743370
	0743770
	0750580
	0755730
	0759770
10:00:40	0758270
	0752790
	0742950
	0736310
	0730330
	0731520
	0734160
	0731520
	0728220
	0728720
10:00:30	0753660
	0739930
	0723920
	0724880
	0739020
	0718600
	0727580

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FIT # 5

7941'

Time	Note	Reading
		9999390
		9999380
		9999400
		9999370
		9999400
		9999330
10:03:11		9999300
		9999360
		3893420
	lost sig.	4938850
	lost sig.	4938720
	lost sig.	4938580
	lost sig.	4938460
	lost sig.	4938410
		9999280
		9999250
10:02:51		9999200
		9999200
		9999150
		9999190
		9999200
		9999150
		9999140
		9999220
		9999150
10:02:31		9999190
		9999210
		9999260
		9999310
		9999480
		9999710
		0000210
		0000780
	OPEN Tool.	0001180
		0759410
		0734930
10:02:11		0733250
		0734680
		0733310
		0730960
		0738180
		0733320
		0733840
		0759310
		0748800
		0751950
10:01:51		0736920
		0738470
		0734030
		0738220
		07350[illegible]

Time	Reading
	9999570
	9999590
	9999570
	9999530
10:04:20	9999590
	9999540
	9999540
	9999570
	9999570
	9999570
	9999550
	9999590
	9999520
	9999560
10:04:10	9999540
	9999510
	9999520
	9999530
	9999550
	9999570
	9999520
	9999500
	9999550
	9999500.
10:04:00	9999510
	9999540
	9999480
	9999570
	9999490
	9999520
	9999560
	9999520
	9999570
	9999480
10:03:50	9999470
	9999500
	9999480
	9999510
	9999490
	9999500
	9999440
10:03:43	9999560
	9999460
	9999470
	9999450
	9999410
	9999470
10:03:31	9999400
	9999460
	9999420
	9999380

Time	Reading
10:09:00	9999860
	9999750
	9999770
	9999750
	9999750
	9999760
10:08:00	9999760
	9999720
10:07:40	9999750
10:07:30	9999770
10:07:20	9999740
10:07:10	9999750
10:07:00	9999740
10:06:50	9999690
10:06:40	9999770
10:06:30	9999730
10:06:20	9999690
10:06:10	9999650
10:06:00	9999660
10:05:50	9999690
10:05:40	9999660
10:05:30	9999630
10:05:20	9999690
10:05:10	9999590
10:05:00	9999610
10:04:50	9999610
	9999580
	9999640
	9999570
	9999660
	9999600
	9999600
	9999570
	9999590
	9999570
10:04:40	9999670
	9999610
	9999600
	9999610
	9999580
	9999590
	9999600
	9999570
	9999550
	9999590
10:04:30	9999570
	9999550
	9999650
	9999630
	9999580
	99995[illegible]

Time	Note	Reading
10:25:31	Shaped Charge	0042110
10:25:20		0058280
10:25:00		9999960
10:24:40		9999940
10:24:20		9999960
10:24:00		9999960
10:23:40		9999920
10:23:20		9999930
10:23:00		9999940
10:22:40		9999930
10:22:20		9999920
10:22:00		9999970
10:21:40		9999930
10:21:20		9999960
10:21:00		9999910
10:20:40		9999960
10:20:20		9999910
10:20:00		9999970
10:19:40		9999960
10:19:20		9999900
10:19:00		9999920
10:18:40		9999900
10:18:20		9999990
10:18:00		9999940
10:17:40		9999940
10:17:20		9999980
10:17:00		9999940
10:16:40		9999950
10:16:20		9999890
10:16:00		9999950
10:15:40		9999940
10:15:20		9999940
10:15:00		9999930
10:14:40		9999910
10:14:20		9999940
10:14:00		9999950
10:13:40		9999960
10:13:20		9999960
10:13:00		9999980
10:12:40		9999970
10:12:20		9999920
10:12:00		9999920
10:11:40		9999930
10:11:20		9999940
10:11:00		9999900
10:10:40		9999910
10:10:20		99999[illegible]0
		9999910
		9999910
		999[illegible]

10:38:00	0039200
10:37:40	0039030
10:37:20	0039080
10:37:00	0038950
10:36:40	0038990
10:36:20	0038900
10:36:00	0038850
10:35:40	0038880
10:35:20	0038650
10:35:00	0038710
10:34:40	0038620
10:34:20	0038650
10:34:00	0038710
10:33:40	0038610
10:33:20	0038560
10:33:00	0038540
10:32:40	0038520
10:32:20	0038470
10:32:00	0038390
10:31:40	0038300
10:31:20	0038470
10:31:00	0038360
10:30:40	0038310
10:30:20	0038250
10:30:00	0038340
10:29:40	0038280
10:29:20	0038250
	0038250
10:28:56	0038100
10:28:50	0038310
10:28:40	0038350
10:28:30	0038260
10:28:20	0038400
10:28:10	0038370
10:28:00	0038480
10:27:50	0038420
10:27:40	0038500
10:27:30	0038350
10:27:20	0038530
10:27:10	0038450
10:27:00	0038520
10:26:50	0038590
10:26:40	0038660
10:26:30	0038780
10:26:20	0039020
10:26:10	0039120
10:26:00	0039520
10:25:50	0039880
10:25:40	0040060

10:54:00	9450490
10:53:40	9450490
10:53:20	9450490
10:53:00	0041380
10:52:40	9450490
10:52:20	0040960
10:52:00	[illegible]50490
10:51:40	0040950
10:51:20	0040800
10:51:00	0040810
10:50:40	0040740
10:50:20	0040610
10:50:00	0040580
10:49:40	0040500
10:49:20	0040640
10:49:00	0040450
10:48:40	0040430
10:48:20	0040410
10:48:00	0040330
10:47:40	0040240
10:47:20	0040180
10:47:00	0040180
10:46:40	0040130
10:46:20	0040130
10:46:00	0040080
10:45:40	0040020
10:45:20	0039960
10:45:00	0039890
10:44:40	0039830
10:44:20	0039810
10:44:00	0039760
10:43:40	0039810
10:43:20	0039830
10:43:00	0039670
10:42:40	0039730
10:42:20	0039610
10:42:00	0039570
10:41:40	0039650
10:41:20	0039430
10:41:00	0039540
10:40:40	0039500
10:40:20	0039370
10:40:00	0039330
10:39:40	0039370
10:39:20	0039210
10:39:00	0039240
10:38:40	0039230
10:38:20	0039220

↑ gauge malfunction

	9450490
11:01:32	9450490
11:00:00	9450490
10:57:00	9450490
10:55:40	9450490
10:55:20	9450490
10:55:00	9450490
10:54:40	9450490
10:54:20	9450490

05:25:30	4202010
05:25:10	4196170
[illegible]	[illegible]
05:24:30	4166680
05:24:10	4118940
05:23:50	4098830
05:23:30	4098650
05:23:10	4100520
05:22:50	4103580
05:22:30	4108310
05:22:10	4111740
05:21:50	4114580
05:21:30	4117620
05:21:10	4121670
05:20:50	4137150
05:20:30	4144610
05:20:10	4153130
05:19:50	4153320
05:19:30	4161780
05:19:10	4169160
05:18:50	4168660
05:18:30	4174700
05:18:10	4181930
05:17:50	4189970
05:17:30	4195780
05:17:10	4203850
05:16:50	4198620
05:16:30	4207770
05:16:10	4207400
05:15:50	4217450
05:15:30	4222320
05:15:10	4205850
05:14:50	4210250
05:14:30	4237740
05:14:10	4245990
05:13:50	4225860

tying into depth with GR

OPAH # 1
FIT # 7
8123'
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05:33:21	4595130
05:33:19	4597090
05:33:17	4598260
05:33:15	4599710
05:33:13	4611050
05:33:11	4634950
05:33:09	4622900
05:33:07	4218130
05:33:05	4218190
05:33:03	4218540
05:33:01	4218300
05:32:59	4218560
05:32:57	4218490
05:32:55	4218490
05:32:53	4218730
05:32:51	4219040
05:32:49	4218920
05:32:40	4219000
05:32:30	4219060
05:32:20	4218320
05:32:10	4218540
05:32:00	4220000
05:31:50	4223440
05:31:40	4224650
05:31:30	4217260
05:31:20	4215720
05:31:10	4217550
05:31:00	4217540
05:30:50	4217900
05:30:40	4217720
05:30:30	4218030
05:30:20	4218460
05:30:10	4218450
05:30:00	4218230
05:29:50	4213750
05:29:40	4219180
05:29:30	4218900
05:29:20	4219210
05:29:10	4218800
05:29:02	4218590
05:28:50	4218620
05:28:30	4219840
05:28:10	4225350
05:27:50	4231990
05:27:30	4236840
05:27:10	4244440
05:26:50	4251020
05:26:30	4250730
05:26:10	4230070
05:25:50	4218790

tool set (at 05:33:07)

05:35:05	3445350
05:35:03	3445530
05:35:01	3445730
05:34:59	3446270
05:34:57	3447830
05:34:55	3181480
05:34:53	4597860
05:34:51	4599440
05:34:49	4599500
05:34:47	4599270
05:34:45	4600470
05:34:43	4599840
05:34:41	4599040
05:34:39	4600460
05:34:37	4599380
05:34:35	4600440
05:34:33	4599450
05:34:31	4601080
05:34:29	4601720
05:34:27	4601230
05:34:25	4600280
05:34:23	4600290
05:34:21	4600730
05:34:19	4599740
05:34:17	4600630
05:34:15	4599860
05:34:13	4600770
05:34:11	4604010
05:34:09	4602530
05:34:07	4600970
05:34:05	4602710
05:34:03	4602200
05:34:01	4603650
05:33:59	4604280
05:33:57	4599440
05:33:55	4597230
05:33:53	4597940
05:33:51	4599460
05:33:49	4599910
05:33:47	4599860
05:33:45	4599410
05:33:43	4600250
05:33:41	4600690
05:33:39	4602120
05:33:37	4599550
05:33:35	4597280
05:33:33	4594290
05:33:31	4593410
05:33:29	4591320
05:33:27	4592610
05:33:25	4593320
05:33:23	[illegible]

open tool (at 05:34:55)

05:36:49	3445660
05:36:47	3445640
05:36:45	3445550
05:36:43	3445530
05:36:41	3445540
05:36:39	3445520
05:36:37	3445540
05:36:35	3445700
05:36:33	3445650
05:36:31	3445540
05:36:29	3445590
05:36:27	3445700
05:36:25	3445400
05:36:23	3445520
05:36:21	3445560
05:36:19	3445590
05:36:17	3445800
05:36:15	3445600
05:36:13	3445640
05:36:11	3445550
05:36:09	3445690
05:36:07	3445560
05:36:05	3445660
05:36:03	3445710
05:36:01	3445850
05:35:59	3445670
05:35:57	3445520
05:35:55	3445550
05:35:53	3445720
05:35:51	3445610
05:35:49	3445630
05:35:47	3445460
05:35:45	3445590
05:35:43	3445500
05:35:41	3445580
05:35:39	3445660
05:35:37	3445610
05:35:35	3445440
05:35:33	3445530
05:35:31	3445410
05:35:29	3445460
05:35:27	3445420
05:35:25	3445410
05:35:23	3445310
05:35:21	3445330
05:35:19	3445280
05:35:17	3445260
05:35:15	3445240
05:35:13	3445190
05:35:11	3445330
05:35:09	3445100
05:35:07	[illegible]

05:40:49	3445390	05:42:35	3445760	05:44:21	3446600	05:46:07	3447220
05:40:47	3445430	05:42:33	3445710	05:44:19	3446500	05:46:05	3447050
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tool full

3p..

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06:03:40	3461990	06:09:28 *full*	0285500	06:11:16	3462060	06:13:04	3462210
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06:03:20	3462000	06:09:24 *Open*	3462230	06:11:12	3461960	06:13:00	3462330
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06:00:49	3462060	06:08:10	3462000	06:10:24	3461960	06:12:12	3462130
06:00:47	3462120	06:08:00	3462270	06:10:22	3461960	06:12:10	3462150
06:00:45	3462280	06:07:50	3461980	06:10:20	3462050	06:12:08	3462320
06:00:43	3462030	06:07:40	3461950	06:10:18	3461890	06:12:06	3462140
06:00:41	3462230	06:07:30	3461970	06:10:16	3462010	06:12:04	3462010
06:00:39	3462060	06:07:20	3462020	06:10:14	3462050	06:12:02	3462110
06:00:37	3462220	06:07:10	3461980	06:10:12	3462170	06:12:00	3462010
06:00:35	3462110	06:07:00	3461920	06:10:10	3461940	06:11:58	3461890
06:00:33	3462250	06:06:50	3461970	06:10:08	3461950	06:11:56	3461940
06:00:31	3462220	06:06:40	3462110	06:10:06	3462040	06:11:54	3461850
06:00:29	3462150	06:06:30	3462250	06:10:04	3461950	06:11:52	3462140
06:00:27	3462090	06:06:20	3462160	06:10:02	3461920	06:11:50	3461950
06:00:25	3462190	06:06:10	3462180	06:10:00	3461830	06:11:48	3462000
06:00:23	3462050	06:06:00	3462090	06:09:58	3462060	06:11:46	3461850
06:00:21	3462060	06:05:50	3462100	06:09:56	3462000	06:11:44	3462000
06:00:19	3462290	06:05:40	3462300	06:09:54	3462070	06:11:42	3462020
				06:09:52	3462010	06:11:40	3461920

06:15:12	3463000	06:22:10	3462960					
06:15:10	3462800	06:22:00	3462740	06:30:50	3462930			
06:15:08	3462840	06:21:50	3462910	06:30:40	3462960			
06:15:06	3462710	06:21:40	3462900	06:30:30	3462700			
06:15:04	3463120	06:21:30	3463070	06:30:20	3462750			
06:15:02	3462630	06:21:20	3462800	06:30:10	3462910			
06:15:00	3462480	06:21:10	3463020	06:30:00	3462820			
06:14:58	3462720	06:21:00	3463140	06:29:50	3462660			
06:14:56	3462550	06:20:50	3463010	06:29:40	3462910			
06:14:54	3462740	06:20:40	3462900	06:29:30	3463070			
06:14:52	3462750	06:20:30	3462970	06:29:20	3462750			
06:14:50	3462680	06:20:20	3462840	06:29:10	3462820			
06:14:48	3462610	06:20:10	3462810	06:29:00	3462810			
06:14:46	3462790	06:20:00	3462810	06:28:50	3462810			
06:14:44	3462670	06:19:50	3462800	06:28:40	3463010			
06:14:42	3462520	06:19:40	3462980	06:28:30	3462810			
06:14:40	3462450	06:19:30	3462950	06:28:20	3462790	06:36:00	4075000	
06:14:38	3462560	06:19:20	3462920	06:28:10	3462830	06:35:50	4070360	
06:14:36	3462380	06:19:10	3463190	06:28:00	3462890	06:35:40	4067750	
06:14:34	3462600	06:19:00	3462860	06:27:50	3462700	06:35:30	4065060	
06:14:32	3462550	06:18:50	3462650	06:27:40	3462950	06:35:20	4348050	
06:14:30	3462610	06:18:40	3463210	06:27:30	3462710	06:35:10	4348050	
06:14:28	3462660	06:18:30	3462910	06:27:20	3462870	06:35:00	4348050	
06:14:26	3462520	06:18:20	3463090	06:27:10	3462850	06:34:50	4348050	
06:14:24	3462850	06:18:10	3462960	06:27:00	3462850	06:34:40	4348050	
06:14:22	3462520	06:18:00	3462940	06:26:50	3462830	06:34:30	4348050	
06:14:20	3462600	06:17:50	3462890	06:26:40	3462650	06:34:20	4103870	
06:14:18	3462400	06:17:40	3463080	06:26:30	3462850	06:34:10	4121740	
06:14:16	3462540	06:17:30	3462880	06:26:20	3462770	06:34:00	4141990	
06:14:14	3462470	06:17:20	3462690	06:26:10	3463000	06:33:50	4126270	
06:14:12	3462720	06:17:10	3462740	06:26:00	3463010			
06:14:10	3462400	06:17:00	3462740	06:25:50	3463070			
06:14:08	3462600	06:16:50	3462970	06:25:40	3462780			
06:14:06	3462680	06:16:40	3462950	06:25:30	3463060			
06:14:04	3462640	06:16:30	3462800	06:25:20	3463070			
06:14:02	3462410	06:16:20	3463040	06:25:10	3462650			
06:14:00	3462350	06:16:10	3462830	06:25:00	3462810	06:33:40	4175360	
06:13:58	3462480	06:16:00	3462750	06:24:50	3462950	06:33:30	4138610	
06:13:56	3462420	06:15:50	3462820	06:24:40	3462800	06:33:20	4141450	POH
06:13:54	3462320	06:15:40	3462660	06:24:30	3462940	06:33:10	4169930	
06:13:52	3462280	06:15:38	3462800	06:24:20	3462920	06:33:00	4213990	
06:13:50	3462480	06:15:36	3462930	06:24:10	3462730	06:32:50	4229530	
06:13:48	3462530	06:15:34	3462920	06:24:00	3463080	06:32:40	4239060	
06:13:46	3462250	06:15:32	3462910	06:23:50	3462880	06:32:30	4248160	
06:13:44	3462550	06:15:30	3462820	06:23:40	3462900	06:32:20	4262690	
06:13:42	3462550	06:15:28	3462930	06:23:30	3462720	06:32:10	427[illegible]660	
06:13:40	3462410	06:15:26	3462890	06:23:20	3462920	06:32:00	4280990	tool off
06:13:38	3462670	06:15:24	3462860	06:23:10	3462910	06:31:50	4282570	
06:13:36	3462500	06:15:22	3462850	06:23:00	3462840	06:31:40	4284840	
06:13:34	3462400	06:15:20	3462760	06:22:50	3462930	06:31:30	3463140	[illegible]
06:13:32	3462100	06:15:18	3462860	06:22:40	3462970	06:31:20	3463240	
06:13:30	3462440	06:15:16	3462440	06:22:30	3462990	06:31:10	3463140	
06:13:28	[illegible]	06:15:14	3462310	06:22:20	3463010	06:31:00	346[illegible]50	

APPENDIX 4

APPENDIX 4

Well Completion Report

OPAH - 1

WELL LOG ANALYSIS REPORT

by

R.B. KING

WELL LOG ANALYSIS REPORT

Form R167 6/70
Page 1

TO WELL FILE / c.c. B.R. Griffith
B.G. McKay

OPERATOR Esso Australia | WELL Opah #1 | DATE 14/3/77

STATE Victoria | ELEV. 83' K.B.

DEPTH INTERVAL	POROSITY ESTIMATE	WATER SAT. ESTIMATE	REMARKS
7910-18(8	14.5-17	35-38	Probably oil productive
7938-43(5	20.3-21.5	55-58	Probably water productive with possible oil cut.

Note: After examination of sidewall cores and a tight FIT it must be accepted that the above zones do not have sufficient permeability to be considered effective.

DEPTH INTERVAL	POROSITY ESTIMATE	WATER SAT. ESTIMATE	REMARKS
7992-97(5	14.5-17	85-100	Water productive
7997-8003(4	18.8-20	100	Water productive
8003-15(12	22.5-23.7	100	Water productive
			18/3/77
8015-22(7	20.6-21.8	100	Water productive
8022-33(11	23-24.3	100	Water productive
8033-40(7	20.6-21.8	100	Water productive
8040-45(5	21.8-23	100	
8056-63(7	20-21.3	100	
8089-93(4	19.5-20.6	100	
8097-8101(4	20-21.3	100	
8118-27(9	21.3-22.5	100	
8127-31(4	24.3-25.5	100	
8131-40(9	21.8-23	100	

ISF measured depths.

TESTS:

7 FIT's attempted

FORMATION:

Latrobe Group

LOGS:

ISF-SCT,
FDC-CNL-GR

COMMENTS:

This well has zero net oil sand.

BY R.B. King

APPENDIX 5

APPENDIX 5

APPENDIX 5

Well Completion Report

OPAH - 1

SIDEWALL CORE DESCRIPTIONS

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

PAGE 1 OF 7
ATT 90 REC 89
DATE 14.3.77
IES RUN NO 2 SWC RUN NO 1 (1-30)
WELL OPAH-1
GEOLOGIST R.G.BELLIS
SERVICE CO. SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	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	DISTR 14	INTEN 15	COLOR 16	CUT FLUOR. INTEN 17	COLOR 18	CUT RESIDUE QUAN 19	COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
1	8150	1	Sst	mica	-	wh-lt gy	friab.	f-vc	p	a-sr	<5%										NS	vg	
2	8124	1-1/8	Sst	mica, cl. cement	-	wh-lt gy	friab.	f-vc	p	sa-sr	~5%										NS	vg	
3	8106	7/8	Sandy slst	mica, qtz.	-	lt gy	firm	slt-vc	vp	sa-sr	30%										NS	vp	
4	8080	1	Silty sst.	mica, slt	-	gn-gy	friab.	slt-m	vp	sa-sr	15%										NS	f	Water in pore spaces
5	8070	3/4	Silty sst.	mica, slt, weak clay cement	-	gn-gy	friab.	slt-f	p	sa-sr	15%										NS	f	
6	8034	1	Sst	mica	-	cream lt gy	friab	vf-vc	p	sa-sr	<5%										NS	vg	
7	8016	3/4	Sst	mica, lithics	-	cream	v.fri. uncons	fine-pebbly	vp	a-sr	<5%										NS	vg	
8	7992	7/8	Sandy slst.	mica, wh. clay cement	v.sl	lt gy	firm	slt-vf	mod	sa	30%										NS	vp	
9	7980	5/8	Slst	sandy, mic. pyritic	-	lt gy	firm	fg-silt	p	sa-sr	20%										NS	nil	
10	7970	½	Slst	mica, lithics, clay cement.	sl	dk gy	firm	slt-vf	p	sa	40%										NS	Nil	Slight HC smell
11	7960	½	Sandy slst	mica, lithics, clay cement	-	dk gn	firm	slt-vf	p	sa	40%										NS	Nil	Slight fissility
12	7950	3/4	Slst	qtz, mica, pyrite, tr ? glauc.	v. sl	m.dk grey	firm	silt-fine	fair	sa-sr	30%										NS	nil	
13	7945	½	Slst	qtz, mica, tr pyr, cal frags.	mod in pt	grey	firm	silt-vf	fair	sa-sr	30%										NS	nil	

FORM R 257 3/72

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

PAGE 2 OF 4 | ATT 90 | REC 89 | DATE 14.3.77 | SWC RUN NO 1 | IES RUN NO 2

WELL UPAH-1 | GEOLOGIST R.G. BELLIS | SERVICE CO SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	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 13	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
14	7940	½	Slst	micaceous, clay choked	-	lt gy	firm	f-m	fair	sa-sr	30%										NS	nil	
15	7935	3/4	Dirty sst	qtz, mica, tr pyr, v. silty, muddy, tr glauc particles of quartz flour.	-	dk gy (mottled)	sl-fri	silt-med.	poor	a-sr	30%	-	5	sptty	wk	white-yellow	-	-			✓	nil	
16	7930	7/8	Sst	v.silty, muddy, oxidised appearance, mottled, qtz. flour.	sl	dk brn-grey	friab.	vc-vf	v.p.	a-r		-	5	Tr.	wk	?yell.	?Tr.	?yell.	-	-	✓	nil	
17	7925	7/8	Sandy slst.	dirty oxidised mica, qtz. flour	sl	dk bn-grey	hard	slt-vc	vp	a-r	40%	-	5	Tr.	weak	wh-yel	tr	yellow	tr	brown	✓	nil	Slight HC smell
18	7920	3/4	Dirty sst	qtz, mica, v. carb., v. silty, muddy matrix swelling clays.	v. sl.	bn-gy	sli-friab	silt-c.	p	a-sr	30%	tarry stain	tr-5	sptty	weak	yellow	rapid	yellow	mod	brown	✓	nil	oxidised appearance
19	7915	3/4	Silty sst	granular qtz(rd) in qtz ? fldsp silt matrix micac., carbonac, calc.	mod	v.dk gy	firm	silt-c.	p	a-r	30%	tarry stain	tr	sptty	mod.	yellow	str. streaming	br. yell. wh.	lt	yell.	✓	nil	oxidised appearance hydrocarbon odour
20	7910	7/8	Silty sst.	mica, oxid. lithics, qtz.flour.	v. sl	dk bn ol.gn	fri-firm	slt-vc	vp	a-r	30%	-	<5	tr	v.wk.	yell.	streaming	yell.	tr.	bn.	✓	nil	slight HC smell

FORM R 257 3/72

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL OPAH-1 GEOLOGIST R.G. BELLIS SERVICE CO. SCHLUMBERGER IES RUN NO 2 SWC RUN NO 1 DATE 14.3.77 ATT 90 REC 89 PAGE 3 OF 7

NO. 1a	DEPTH 1	REC 2	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
21	7907	1½	Silty sst	granular qtz & qtz flour silt/clay matrix, mica oxidised	mod	dk bn	firm	slt-c	p	a-r	30%	dark	5	sptty	mod.	wh-yel	streaming	br yel	lt.	bn	✓	nil	HC odours
22	7905	1¼	Dirty sst	qtz, silty, clay matrix occ. mica, tr glauc.	sli	bn-gy	friab	slt-c	p	sa-r.	30-40%	- strong odour	tr	sptty	weak	yel-wh	rapid	yell.	tr.	yel-bn.	✓	nil	
23	7902	1¼	Silty sst	slt, mica	sli.	gn-gy	hard	slt-f	vp	sa-r.	20%										NS	vp	
24	7900	1	Sandy slst.	mica, glauc. granular qtz qtz flour oxidised.	-	dk bn	firm	slt-c	p	a-r	45%	-	tr	sptty	mod.	wh-yel	str. streaming	yel-white	lt.	bn.	✓	nil	slight HC odour
25	7897	1¼	Silty sst.	mica, glauc. granular qtz qtz-flour, oxidised.	-	dk bn	firm	slt-c	p	a-r	45%	-	tr	sptty	weak	yell.	weak	yell.	-	-	✓	nil	slight HC odour
26	7895	3/4	sst.	silty, micac. clay choked sl. glauc(?) oxidised appearance.	mod	rd-bn	firm -fri.	f-c	p	sa-sr	40%	-	15	sptty	weak	yell.					✓	vp	
27	7893	1½	Slst	v.f.-silt grain qtz. glauc, mica clay cement silt/clay matrix.	mod	lt gn -gy	firm	slt-vf	mod	sa-sr	30%										NS	nil	
28	7890	1	Slst	slt-v.f. gran carb. clay choked calc, mica.	v	lt gy	firm	slt-vf	mod.	sa-sr	40%										NS	nil	

FORM R 257 3.72

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

ATT 90 REC 89 DATE 15.3.77

SWC RUN NO 1 (1-30) 2 (31-60)

IES RUN NO 2

WELL OPAH-1

GEOLOGIST R.G. BELLIS

SERVICE CO. SCHLUMBERGER

NO. 1a	DEPTH 1	REC 2	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
29	7885	1½	Calc. slst	silty, v.glauc., mica, qtz.	v.	m.gy.	firm	slt-vf	mod	sa-sr	30%										NS	Nil	
30	7880	1½	Calc. slst	glauc, mica clay	v.	buff-lt.gy.	firm	slt-vf	mod	sa-sr	30%										NS	Nil	
31	7860	1½	Clyst	silty	v	gn-gy	firm	-	-	-	80%												
32	7830	1	Clyst	silty	v	lt gy	hd-frm				70-80%												
33	7760	1½	Clyst	Sandy, silty	v	m gy	firm				80%												
34	7710	1¼	Clyst	silty	v	lt gy	hd-frm				70%												
35	7660	3/4	Slst	? mica	v	lt gy	hd-frm	slt	mod	-	50%												
36	7640	1½	Clyst	silty	v	m gy	sft				80-90%												
37	7590	1½	Clyst	Silty	v	lt gy	sft-fm				70%												
38	7540	1	Clyst	minor silt	v	gn-lt gy	firm				70%												
39	7490	1¾	Clyst	minor silt	v	m gy	firm				70												
40	7440	1	Clyst	minor silt, ? mica	v	lt gy	firm				70%												
41	7390	2	Shale	silt	v	m-dk gy	firm				60												slightly fissile
42	7320	2	Clyst	silt	v	lt gy	firm				70%												
43	7233	2	Shale	silt	v	m gy	firm				60%												slightly fissile
44	7210	2	Shale	silt	v	m.gy	firm				60%												slightly fissile
45	7162	1½	Shale	silt	v	m.gy	firm				60												fissile
46	7110	1¼	Shale	silt	v.	lt-m.gy	firm				60%												fissile

FORM R 257 3/72

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL ...... GEOLOGIST R.G. BELLIS SERVICE CO SCHLUMBERGER

IES RUN NO 2 SWC RUN NO 2(31-60) 3(61-90) ATT 90 DATE 16.3.77

PAGE ...... OF ...... REC 89

NO. 1a	DEPTH 1	REC 2	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	DISTR 14	INTEN 15	COLOR 16	CUT FLUOR. INTEN 17	COLOR 18	CUT RESIDUE QUAN 19	COLOR 20	SHOW 21	PROB PROD 22	REMARKS - GAS 23
47	7010	1¼	Shale	Silt	v	m. gy	firm				60%												fissile
48	6950	1½	Shale	silt,?Foram	v	m.gy.	firm				50%												fissile
49	6930	2	shale	silt	v	m.gy.	firm				50-												fissile
											60%												
50	6915	1¾	Shale	silt	v	m.gy.	firm				60%												fissile
51	6906	NR	—	—	—	—	—				--												Igniter did not fire
52	6898	1½	Shale	silt	v.	m-dk.	firm				60%												fissile
						gy																	
53	6891	1½	Clyst	sl. silty	v	m.gy	firm				70%												
54	6870	1	Clyst	sl. silty	v.	lt-m.	firm				70%												
						gy																	
55	6848	½	Shale	sl. silty	v.	m.gy	firm				70%												fissile
56	6830	½	Clyst	silt	v.	m.gy	firm				70%												
57	6810	½	Clyst	silt	v	lt-m.	firm				70%												
						gy																	
58	6754	½	Clyst	silt	v	m.gy	fm-hd				70%												
59	6710	½	Clyst	silt	v	m.gy	firm				60%												
60	6650	3/4	Clyst	silt	v	lt-m.	firm				60%												
						gy.																	
61	7870	1½	Shale	slt, ?mica	v	lt.gy	firm				60%												fissile
62	7850	1¾	Shale	slt,pyrit-	v	dk gy	firm				60%												fissile
				ised fossils																			
63	7780	1	Shale	slt, pyrit-	v	m.gy	firm				60%												fissile
				ised fossils																			
64	7515	1	Clyst	silt	v	lt gy	firm				60%												
65	7421	2	Shale	silt	v	dk gy	firm				60%												fissile

FORM R 257 3-72

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL OPAH-1
GEOLOGIST R.G. BELLIS
SERVICE CO SCHLUMBERGER
IES RUN NO 2
SWC RUN NO 3
DATE 16.3.77
ATT 90 REC 89

NO. 1a	DEPTH 1	REC 2	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
66	7340	1½	Shale	silt	v	m-dk	firm				60%												Fissile
						gy.																	
67	7267	1¾	Clyst	silt	v	dk gy	firm				60%												
68	7050	1¼	Shale	sl. silty	v	dk gy	firm				60%												fissile
69	6906	1¾	Shale	silt	v	m.gy	firm				60%												fissile
70	6610	1	Clyst	silt	v	lt-m	firm				60%												
						gy.																	
71	6500	1¼	Shale	silt	v	m.gy	firm				60%												fissile
72	6410	1	Slst	-	v	lt gy	firm	slt	mod	-	30-												
											40%												
73	6200	1	Clyst	silt	v	m-dk.	firm				60%												
						gy																	
74	6000	3/4	Clyst	silt	v	lt gy	firm				60%												
75	5798	1¼	Shale	slt, qtz.	v	dk gy	fm-hd				60%												fissile
76	5600	1	Clyst	silt	v	m.gy	firm				60%												
77	5394	½	Clyst	slt, qtz.	v	m.gy	firm				60%												
78	5200	½	Clyst	silt	v	gn-lt	firm				60%												
						gy																	
79	5000	½	Clyst	silt	v	buff-	firm				60%												
						lt gy																	
80	4805	½	Slst	-	v	gn-gy	firm	slt.	mod-g	-	50%												Sl. gas smell
81	4585	½	slst	-	v	gn-gy	firm	slt.	mod-g	-	50%												
82	4398	3/4	Clyst	silt	v	m.gy	firm				60%												
83	4196	3/4	Slst	v	v	gn-gy	firm	slt.	mod.	a	60%												
84	3982	1	Slst	-	v	lt gy	firm	slt.	mod.	a	40%												
85	3782	1	Slst-	-	v	lt gy	firm	slt-	mod.	a	40%												
			Calcn.					vf.															

FORM R 257 3.72

ESSO AUSTRALIA LTD.
SIDEWALL CORE DESCRIPTIONS

WELL OPAH-1
GEOLOGIST R.G. BELLIS
SERVICE CO. SCHLUMBERGER
IES RUN NO 2
SWC RUN NO 3
DATE 16.3.77
ATT 90 REC 89

NO. 1a	DEPTH 1	REC 2	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
86	3607	½	Calcn	silt	v	lt gn-gy	firm	vf-slt.	mod.	sa	40%												
87	3392	1¼	Slst	-	v	m. gy	firm	slt	mod	a	40%												
88	3192	3/4	Calcn	silt	v	m.gy	firm	vf-slt.	mod	sa	40%												
89	3011	1 1/8	Slst.	-	v	m.gy	firm	slt.	mod.	a	40%												
90	2900	1 1/8	Calcn	silt	v	m.gy	firm	vf-slt	mod	sa	40%												

FORM R 257 3/72

R.G. Bellis
14.3.77

OPAH-1

SWC Descriptions - CST#1

SWC No.	DEPTH (')	RECOVERED ('')	DESCRIPTION
1	8150	1	Sandstone - cream to light grey in colour, trace of muscovite flakes, very friable, fine grained to very coarse grain size, greater percentage of fine to medium quartz which is subrounded to rounded and equant. The coarse to very coarse grains are generally angular and equant; milky to translucent grains, some white (kaolinite ?) clay, very good porosity and permeability. No show.
2	8124	1-1/8	Sandstone - white to light grey, some very fine plates of muscovite, friable, fine to very coarse grain size, bimodal quartz 70% fine to medium grain size quartz - generally subrounded, milky to translucent, equant grains, 30% coarse to very coarse grain size - generally subangular equant grains, milky; white clay cement/matrix, fairly good porosity and permeability, no shows.
3	8106	7/8	Sandy Siltstone - light grey, firm, silty to very coarse grain size, mainly silt with some very coarse quartz grains - subangular, equant, clear to milky, minor muscovite and lithics, white clay cement/matrix, very low porosity and permeability, no show.
4	8080	1	Silty Sandstone - green-grey, minor muscovite, friable, silty to medium grain size, quartz grains equant, subangular to subrounded, milky to translucent grains, silt forms matrix, very weakly cemented, low porosity and poor permeability, no show.
5	8070	3/4	Silty Sandstone - green-grey, minor muscovite, friable, silty to fine grain size, quartz equant, subangular to subrounded, poorly sorted, milky grains, silty matrix, weak clay cement, low porosity and poor permeability, no show.
6	8034	1	Clean Sandstone - cream to light grey, minor muscovite, very friable, very fine to very coarse grain size, equant grains, bimodal quartz, 80% very fine to medium quartz - clear to translucent with approximately 20% coarse to very coarse generally angular quartz grains - milky, poorly sorted, minor clay cement/matrix, very good porosity and permeability, no show.
7	8016	3/4	Clean Sandstone - cream, very friable to unconsolidated, minor muscovite, minor well rounded lithic fragments, fine to pebble grain size, angular to subrounded grains, generally equant, clear to milky, fine white clay loosely cemented grains, very poorly sorted, generally the coarser grains are better rounded, very good porosity and permeability, no shows.
8	7992	7/8	Sandy Siltstone - light grey, minor muscovite plates, silt to very fine grain size, mainly subangular equant quartz grains, very minor lithics, clay cement/matrix, moderately well sorted, firm, very poor porosity and permeability, no show, very slightly calcareous.
9	7980	5/8	Silty Sandstone - light grey, firm, silt to fine grain size, poorly sorted, subangular to subrounded, slightly pyritic and oxidised, minor mica, granular quartz set in a matrix of silt with clay cement, very low porosity and permeability, no show.

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14.3.77

OPAH-1

SWC Descriptions - CST#1

SWC No.	DEPTH (')	RECOVERED ('')	DESCRIPTION
10	7970	½	Sandy Siltstone - dark grey, minor muscovite, silt to very fine grain size, mainly subangular equant grains, minor lithics, firm, clay cement/matrix, very poor porosity and no effective permeability, no show, slight hydrocarbon odour, slightly calcareous.
11	7960	½	Sandy Siltstone - dark green-grey, minor muscivite, lithics, silt to very fine grain size, firm, poorly sorted, quartz grains subangular, milky, equant, clay cement/matrix, very poor porosity and no effective permeability, no show, sample slightly fissile - tending toward sandy shale.
12	7950	3/4	Siltstone - medium grey, firm, silt to fine grain size, fair sorting, subangular to subrounded, very slightly calcareous, fine quartz grains in silty matrix, trace mica and pyrite, ? trace carbonaceous matter, nil effective porosity and permeability, no show.
13	7945	½	Siltstone - medium grey, firm, silt to very fine grain size, fair sorting, subangular to subrounded, moderately calcareous in parts, minor quartz, mica and ? pyrite, nil effective porosity and permeability, no show.
14	7940	½	Siltstone - medium grey to green-grey, predominantly silt size lithic grains with very fine quartz grains, some minor muscovite flakes, slightly calcareous, clay matrix/cement, quartz subangular to subrounded equant grains, no show, very low porosity, nil permeability.
15	7935	3/4	Sandstone - dark grey, about 65% very coarse angular quartz grains - clear to translucent, very poor sorting, about 35% silt and clay filling pore spaces between quartz grains, slightly calcareous, very poor porosity and permeability.
16	7930	7/8	Silty Sandstone - dark brown-grey, silt to very coarse grain size, extremely silty, oxidised mottled appearance, coarse to very coarse quartz grains set in a matrix of very fine quartz and silt. Very coarse grains to rounded, equant, clear to translucent; slightly calcareous, firm to friable, angular to rounded variation in grains, appears that shale rip ups in sample are oxidised, no effective porosity and permeability, weak fluorescence seen only in fractured quartz grains, no visible cut.
17	7925	7/8	Dirty Sandy Siltstone - dark brown-grey, hard, large amount oxidised clay/silt, quartz flour - white, milky, fractured, coarse quartz grains generally rounded, minor mica very poorly sorted, quartz flour approximately 5% rock trace yellow fluorescence, slow weak cut - yellow fluorescence, no effective porosity and permeability, slight hydrocarbon odour, slightly calcareous.
18	7920	3/4	Dirty Silty Sandstone - dark brown to grey, slightly friable, silt to coarse grain size, poor sorting, angular to subrounded, very slightly calcareous, very carbonaceous, very silty, mud /clay matrix/cement, tarry stain oxidised silt/clay coarse quartz tends to be rounded, clear to translucent, quartz flour - white - spotty weak yellow fluorescence, rapid streaming yellow cut leaving moderate brown residue, very poor porosity and permeability.

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14.3.77

OPAH-1

SWC Descriptions - CST#1

SWC No.	DEPTH (')	RECOVERED ('')	DESCRIPTION
19	7915	3/4	Dirty Sandy Siltstone - dark brown-grey, hard, brown oxidised clay/silt predominates, silt to very coarse/ pebbly grain size, very coarse/pebble quartz - rounded fairly equant, translucent, very fine to fine quartz flour - white, milky - trace yellow fluorescence, slow weak yellow cut, very poorly sorted, slightly calcareous, minor muscovite and lithics, no effective porosity and permeability, slight hydrocarbon odour.
20	7910	7/8	Dirty Silty Sandstone - dark brown to olive green, firm to friable, very slightly calcareous, silt to very coarse grain size, poorly sorted, angular to rounded, quartz grains are set in a matrix of oxidised clay/silt, quartz flour traces yellow fluorescence, trace slow yellow cut, nil effective porosity and permeability, slight hydrocarbon odour.
21	7907	1½	Silty Sandstone - dark brown, moderately calcareous, firm, clay/silt to coarse grain size, poorly sorted, angular to rounded grains, granular quartz, clear to bronze, quartz flour 5% spotty moderately intense yellow fluorescence, strong, streaming yellow cut leaving a light brown residue, slight hydrocarbon odour, silt/clay matrix, mottly oxidation, nil effective porosity and permeability.
22	7905	1¼	Dirty Silty Sandstone - brown to grey, friable, silt to coarse grain size, poorly sorted, angular to subrounded grains, slightly clacareous, clay matrix - oxidised, very silty, trace mica, glauconite, coarse quartz grains rounded, frosted, milky, quartz flour - white - spotty weak yellow/ white fluorescence, rapid streaming yellow cut leaving a trace of yellow-brown residue, very low porosity and permeability.
23	7902	1¼	Sandstone - dark green-grey, about 50% fine grain quartz, milky to translucent, subangular to rounded, equant grains, 50% silt, clay, limonite and glauconite. The limonite is in 2mm patches throughout the rock - ? oxidised pyrite. Minor glauconite - very fine, rounded grains, very poor porosity and nil permeability.
24	7900	1	Sandy siltstone - dark brown, firm, silt/clay to coarse grain size, poorly sorted, angular to rounded quartz grains, coarse quartz is rounded, generally frosted bronze colour, quartz flour, very fine quartz - trace spotty white/yellow fluorescence giving strong streaming yellow white cut and leaving a trace of brown residue, slight hydrocarbon odour, minor very fine glauconite grains, matrix of oxidised silt/ clay, minor mica, nil effective porosity and permeability.
25	7897	1¼	Silty Sandstone - dark brown, firm, silt/clay to coarse grain size, poorly sorted, angular to rounded quartz grains, medium to coarse quartz - frosted, milky; quartz flour - white, spotty weak yellow fluorescence, weak yellow cut, slight hydrocarbon odour, minor very fine glauconite, minor mica, matrix/cement of clay/silt oxidised to limonite etc, nil effective porosity and permeability.

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14.3.77

OPAH-1

SWC Descriptions - CST#1

SWC No.	DEPTH (')	RECOVERED (")	DESCRIPTION
26	7895	3/4	Silty Sandstone - greenish brown, firm to friable, moderately calcareous, silt to coarse grain size, poorly sorted, subangular to subrounded granular quartz, subrounded, milky, quartz flour approx. 5% spotty weak yellow fluorescence, very weak yellow cut, minor glauconite, mica, silt/clay matrix cement, oxidised giving mottly appearance, nil effective porosity and permeability.
27	7893	1½	Siltstone - light green-grey, moderately calcareous silt - very fine grain size, moderate sorting, subangular to subrounded equant grains, predominantly granular quartz, cemented by white clay, minor dirty silt and clay, glauconite, minor mica, nil effective porosity and permeability, no show.
28	7890	1	Calcareous Siltstone - light grey, very calcareous - cement/grains firm, silt to very fine grain size, moderate sorting, subangular to subrounded, mainly granular carbonate - milky - translucent, clay cement/matrix, minor mica, nil effective porosity and permeability, no show, minor quartz.
29	7885	1½	Calcareous Siltstone - medium grey, very calcareous, firm, silt - very fine grain size, moderate sorting, subangular to subrounded, very silty, mainly carbonate cement with silt matrix, glauconitic - up to medium grain size, minor quartz, nil effective porosity and permeability, no show.
30	7880	1½	Calcareous Siltstone - buff to light grey, very calcareous, firm, silt to very fine grain size, moderate sorting, subangular to subrounded, mainly carbonate cement with silt/clay matrix, glauconitic, minor mica, nil effective porosity and permeability, no show.

APPENDIX 6

APPENDIX 6

APPENDIX 6

Well Completion Report

OPAH - 1

FORAMINIFERAL SEQUENCE - OPAH - 1

by

DAVID TAYLOR

FORAMINIFERAL SEQUENCE

OPAH # 1

by DAVID TAYLOR
Consultant

Esso Australia Ltd.
Paleontology Report 1977/12 March 14, 1977

SUMMARY

The Opah # 1 well intersected a continuous marine sequence from early Oligocene or ?late Eocene to Pliocene without any evidence of depositional breaks. Canyon fill sedimentation occupied nearly 5000 feet of the 7000 feet sequence.

A possible early Eocene planktonic fauna comprising a single species, *Subbotina frontosa*, was found in the side wall core at 7970 feet.

INTRODUCTION

Ninety-nine samples were processed and examined from OPAH # 1 over the interval from 840 to 8070. Of these samples, seventy-five were side wall cores, with the remainder being rotary cuttings. Of the twelve side wall cores between 7895 and 8070, only that at 7970 contained foraminifera. All depths cited in this report and on accompanying sheets are in feet.

The following sheets accompany this report:-

Distribution Chart Sheet 1 - showing distribution of planktonic foraminifera and the basis of biostratigraphic breakdown.

Distribution Chart Sheet 2 - giving distribution of benthonic foraminifera.

Distribution Chart Sheet 3 - summarising the environmental analysis and presenting an environmental interpretation.

Biostratigraphic Data Sheet.

Three Sample Data Sheets.

BIOSTRATIGRAPHY

Depths of zonal boundaries are tabulated on the Distribution Chart Sheet 1 and the Biostratigraphic Data Sheet.

? EARLY EOCENE - 7970:- The side wall core at 7970 contained ten specimens of *Subbotina frontosa* which is referred to as *Globigerina frontosa* by Stainforth et al (1975, p.187-189) and as *Globigerina (Globigerina) boweri* by Jenkins (1971, p.138). On a worldwide basis, Stainforth et al (1975) give the range of this species as early to middle Eocene whilst Jenkins (1971) records it in the New Zealand *crater crater* and *primitiva* Zones, thus implying an identical early to mid Eocene range. McGowran (1973, fig.3) plots the range top of *S. frontosa* as being in the middle Eocene of the Gambier Embayment of the Otway Basin. In discussion, he (McGowran, l.c., p.50) states that "A junior synonym, *Globigerina boweri* Bolli, is identified by Jenkins (1971) but this older form may be *Subbotina patagonica* (Todd and Kniker).". However, *S. patagonica* from the Rivernook fauna (Paleocene/Eocene boundary in the Otway Basin), as illustrated by McGowran (1970, fig.3), are more highly spired than the form referred to as *S. frontosa* in Opah # 1 and as illustrated by Stainforth et al (1975, fig.51). Forms considered to be

S. frontosa are not present in the Rivernook fauna or its equivalent (= the *G. wilcoxensis* Zone of Jenkins, 1971) in New Zealand.
As no other planktonic foraminifera are associated with *S. frontosa* in Opah # 1, it is difficult to assess the exact age of the sample at 7970, but an Eocene, rather than Paleocene age is preferred on weighing up the scant evidence.

? LATE EOCENE - 7890 to 7885:- No foraminifera were found between 7970 and 7893 where there is a purely arenaceous fauna. In the side wall core at 7870, a sparse planktonic fauna contains *Subbotina angiporoides* and specimens probably assignable to *S. linaperta*. If the identification of *S. linaperta* is correct, then this fauna represents Zone K and the uppermost Eocene and is probably equivalent to the lower portion of the *G. brevis* Zone in New Zealand (Jenkins, 1974 and comment in Taylor, 1977).

EARLY OLIGOCENE - 7880 to 7850:- A typical J-2 fauna with *Globigerina brevis* and *Tenuitella gemma* was recorded in the side wall core at 7870 without *Subbotina linaperta*. This association is indicative of the early Oligocene. The side wall core at 7880, with *S. angiporoides* but without *S. linaperta*, is also considered to be within J-2. The highest appearance of *S. angiporoides* before the appearance of *Globorotalia opima opima* is considered to mark the top of the early Oligocene and Zone J-1 in the side wall core at 7850.

LATE OLIGOCENE - 7830 to 7590:- The top of the late Oligocene is placed immediately before the incoming of *Globigerina woodi connecta* in accordance with the views of Jenkins (1974). This event corresponds with the top of Zone H-2.

EARLY MIOCENE - 7540 to 6930:- The presence of *G. woodi connecta* at 7540 is taken as the base of the early Miocene and Zone H-1. This is confirmed by the occurrence of *Globorotalia kugleri* at 7490.
Zones G and F are present within this early Miocene interval. The top of the early Miocene is placed at 6930, where *Praeorbulina glomerosa curva* was present immediately before the evolutionary appearance of the "*Orbulina* form". The faunal association at 6930 represents Zone E-2. Zone E-2 is a very precise interval in Opah # 1, being represented at 6930 but not in the side wall cores at 6950 and 6915, thus it can be no more than 35 feet thick. It is easily recognisable and is now realized to be of immense correlateable value.

LATE MIOCENE - 6915 to between 2600 and 1800:- The base at 6915 (= Zone E-1) is clear because of the initial appearance of *Orbulina suturalis* but the top cannot be picked. It is impossible to recognise Zone B-2 (= late Miocene) from Zone B-1 (early Pliocene) because of the lack of side wall cores over the vital interval, the low diversity planktonic faunas present in the cuttings and the absence of such species as *Globorotalia conomiozea*. Because the late Miocene was represented as canyon fill sediment, planktonic diversity was low and specimen numbers fluctuated. As a result, the Zones D-2/D-1 boundary is vague and the Zones D-1/C boundary cannot be recognised. The top of Zone C is taken from the highest appearance of *Globorotalia mayeri* and cannot be considered as firm.

PLIOCENE - from between 2600 and 1800 to ? :- Only cuttings were available from the interval above 2600. The association of *Globorotalia puncticulata* and *G. crassaformis* at 1800 and 1700 is suggestive of Zone A-4. Such an association would represent the mid Pliocene according to Stainforth et al (1975). The association of *G. puncticulata* and *G. inflata* at 1400 indicates Zone A-3. Faunas above 1400 contain non-diagnostic species.

ENVIRONMENT

Data relating to this interpretation is shown on Distribution Chart Sheet 3, whilst benthonic foraminiferal distribution is plotted on Sheet 2.

The absence of any benthonic fauna over the interval between 8070 and 7895 indicates deleterious conditions such as low salinity and/or low oxygenation. The unique influx of the planktonic *Subbotina frontosa* at 7970 indicates a weak penetration of oceanic water into the Eocene marginal marine environment. The fact that only one planktonic species was represented portrays the lack of strength of this marine ingression.

The purely arenaceous Eocene fauna, in the fine quartz sandstone at 7893, is difficult to interpret. Such an assemblage could be representative of the extremes of either a lagoon or extremely deep water below the C.C.D.

The late Eocene to early Oligocene crystalline limestones at 7890, 7885 and 7880 were evidently deep water deposits as they contain mainly arenaceous benthonic foraminifera with numerically poor, low diversity planktonic faunas.

The Oligocene calcareous siltstones from 7760 to 7590 contain sparse benthonic faunaswhich were often dominated by *Bathysiphon* spp. Planktonic faunas fluctuated numerically, suggesting that there may have been fluctuations in the lysocline. A continental rise situation is envisaged but the paleodepth may not have been as extreme as today's continental rise (at 6000 feet). The worldwide depressed paleotemperatures in the late Oligocene (Savin et al, 1975) would have resulted in a considerable elevation of the C.C.D.

The early Miocene faunas were dominated by planktonic foraminifera with a sparse benthonic fauna which included such deep water species as *Planulina wullerstorfi* and *Karreriella bradyi*. The base of the slope is designated at 7267, because of the lowest appearance of *Euuvigerina mayni* which was apparently restricted to the Gippsland continental slope during the Miocene. Also the presence of fine to coarse quartz between 6930 and 6891 could imply the influence of down slope currents.

There was a sharp numerical decline in the planktonic fauna at the base of the mid Miocene. This was accompanied by an almost total absence of benthonic forms and the lithological change from calcareous siltstone to fine-grained micritic limestone between 6870 and 6848. High energy conditions are evident and it is postulated that the sediment was canyon fill on the lower continental slope. There were sporadic dissipations of the high energy currents as some planktonic faunas were numerically rich in Zone D-2. The lower/upper continental shelf transition was indicated by the deepest presence of *Cassidulina carinata* at 4805. Decrease in the depth of the slope was evidenced by the sudden dominance of sponge spicules at and above 3982. The sponge spicules were detrital derivatives from the shelf/slope break. Canyon fill sedimentation continued to 2100 (= late Miocene or early Pliocene).

Pliocene sedimentation above 2100 was on the continental shelf, with water depth gradually decreasing upwards, as is evidenced by the dominance of *Cibicides* spp. succeeded by a co-dominance with *Parrellina imperatrix* at and above 1100. The sediment is rich in bryozoa above 1500. The common presence of such adherent forms as *Discoanomalina mitchelli* and *Cibicides cygnorum* suggests extensive seaweed banks in the vicinity.

REFERENCES

JENKINS, D.G., 1971 - New Zealand Cainozoic planktonic foraminifera. *N.Z. Geol. Surv., Paleont. Bull.* 42.

______________ 1974 - Paleogene planktonic foraminifera of New Zealand and the Austral region. *J. Foram. Res.*, 4(4); 155-170.

McGOWRAN, B., 1970 - Late Paleocene in the Otway Basin: biostratigraphy and the age of key microfossils. *Trans Roy. Soc. South Aust.*, 94; 1-14.

______________ 1973 - Observation Bore No. 2, Gambier Embayment of the Otway Basin: Tertiary micropalaeontology and stratigraphy. *South Aust. Min. Resources Rev.*, 135; 43-55.

SAVIN, S.M. et al, 1975 - Tertiary marine paleotemperatures. *Geol. Soc. Amer.*, 86; 1499-1510.

STAINFORTH, R.M. et al, 1975 - Cenozoic planktonic foraminiferal zonation and characteristics of index forms. *Univ. Kansas Paleont. Contrib.*, Art. 62.

TAYLOR, D., 1977 - Foraminiferal sequence - Swordfish # 1. *Esso Aust., Paleont. Rep.* 1977/5.

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO: OPAH # 1 — *DATE:* 6.4.77

PREPARED BY: DAVID TAYLOR — *SHEET NO:* 1 of 3

DRAW:

DEPTH		*SAMPLE TYPE*	*SLIDES*	*ADDITIONAL INFORMATION*
840 to	860	RC		
1000	1020	RC		
1100	1120	RC		
1200	1220	RC		
1300	1320	RC		
1400	1420	RC		
1500	1520	RC		
1600	1620	RC		
1700	1720	RC		
1800	1820	RC		
1900	1920	RC		
2000	2020	RC		
2100	2120	RC		
2200	2220	RC		
2300	2320	RC		
2400	2420	RC		
2500	2520	RC		
2600	2620	RC		
2700	2720	RC		
2800	2820	RC		
2880	2900	RC		
	2900	SWC 90		
	3011	SWC 89		
	3192	SWC 88		
	3392	SWC 87		
	3607	SWC 86		
	3782	SWC 85		
	3982	SWC 84		
	4196	SWC 83		
	4398	SWC 82		
	4585	SWC 81		
	4805	SWC 80		
	5000	SWC 79		
	5200	SWC 78		
	5394	SWC 77		
	5600	SWC 76		
	5798	SWC 75		
	6000	SWC 74		
	6200	SWC 73		
	6410	SWC 72		
	6500	SWC 71		
	6610	SWC 70		

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO: OPAH # 1 *DATE:* 6.4.77

PREPARED BY: DAVID TAYLOR *SHEET NO:* 2 of 3

DRAW:

DEPTH	*SAMPLE TYPE*	*SLIDES*	*ADDITIONAL INFORMATION*
6650	SWC 60		
6710	SWC 59		
6754	SWC 58		
6810	SWC 57		
6830	SWC 56		
6848	SWC 55		
6870	SWC 54		
6891	SWC 53		
6898	SWC 52		
6906	SWC 69		
6915	SWC 50		
6930	SWC 49		
6950	SWC 48		
7010	SWC 47		
7050	SWC 68		
7110	SWC 46		
7162	SWC 45		
7210	SWC 44		
7233	SWC 43		
7267	SWC 67		
7320	SWC 42		
7340	SWC 66		
7390	SWC 41		
7421	SWC 65		
7440	SWC 40		
7490	SWC 39		
7515	SWC 64		
7540	SWC 38		
7590	SWC 37		
7640	SWC 36		
7660	SWC 35		
7710	SWC 34		
7760	SWC 33		
7780	SWC 63		
7830	SWC 32		
7850	SWC 62		
7860	SWC 31		
7870	SWC 61		
7880	SWC 30		
7885	SWC 29		
7890	SWC 28		
7893	SWC 27		

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO: OPAH # 1 — *DATE:* 6.4.77

PREPARED BY: DAVID TAYLOR — *SHEET NO:* 3 of 3

DRAW:

DEPTH		*SAMPLE TYPE*	*SLIDES*	*ADDITIONAL INFORMATION*
	7895	SWC 26		N.F.F.
	7897	SWC 25		N.F.F.
	7900	SWC 24		N.F.F.
	7907	SWC 21		N.F.F.
	7910	SWC 20		N.F.F.
	7925	SWC 17		N.F.F.
	7940	SWC 14		N.F.F.
	7950	SWC 12		N.F.F.
	7960	SWC 11		N.F.F.
7960	7970	RC		Downhole contamination
	7970	SWC 10		
7970	7980	RC		Downhole contamination
	7980	SWC 9		N.F.F.
7980	7990	RC		Downhole contamination
	8070	SWC 5		N.F.F.

N.F.F. = No foraminifera found

Form R 193 3/71

BASIN GIPPSLAND BY David Taylor

WELL NAME OPAH # 1 DATE 6-4-77 ELEV.

Foram Zonules

Epoch	Zonule	Highest Data	Quality	2 Way Time	Lowest Data	Quality	2 Way Time
MIOCENE	A				1700	3	
	Alternate						
	B	1800	3		2600	3	
	Alternate						
	C	2900	2				
	Alternate						
	D_1				5600	2	
	Alternate				5000	0	
	D_2	5798	0		6870	1	
	Alternate						
	E	6891	2		6930	0	
	Alternate	6898	0				
	F	6950	1		7162	0	
	Alternate	7010	0				
	G	7210	0		7390	0	
	Alternate						
	H_1	7421	1		7540	1	
	Alternate	7440	0				
	H_2	7590	1		7710	1	
	Alternate						
OLIGOCENE	I_1	7760	0		7830	0	
	Alternate						
	I_2						
	Alternate						
	J_1	7850	1		7860	1	
	Alternate						
	J_2	7870	0		7880	1	
	Alternate						
EOC.	K	7885	2				
	Alternate						
	Pre K	7970*	2				

* Contains 10 specimens of *Subbotina frontosa* which has a range from early to mid Eocene.

COMMENTS:

Note: If highest or lowest data is a 3 or 4, then an alternate 0, 1, 2 highest or lowest data will be filled in if control is available.

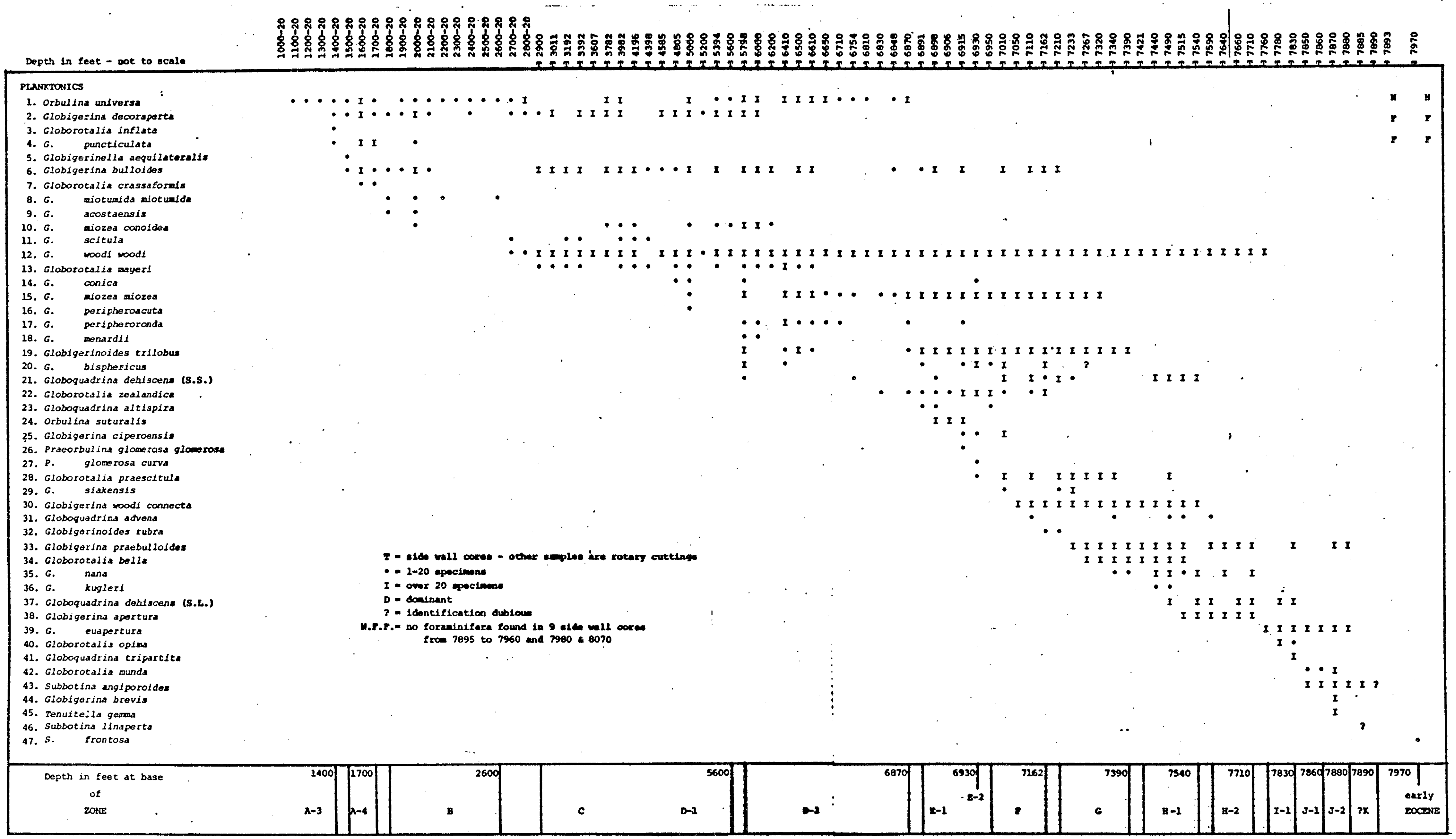
If a sample cannot be interpreted to be one zonule, as apart from the other, no entry should be made.

0 SWC or Core - Complete assemblage (very high confidence).
1 SWC or Core - Almost complete assemblage (high confidence).
2 SWC or Core - Close to zonule change but able to interpret (low confidence).
3 Cuttings - Complete assemblage (low confidence).
4 Cuttings - Incomplete assemblage, next to uninterpretable or SWC with depth suspicion (very low confidence).

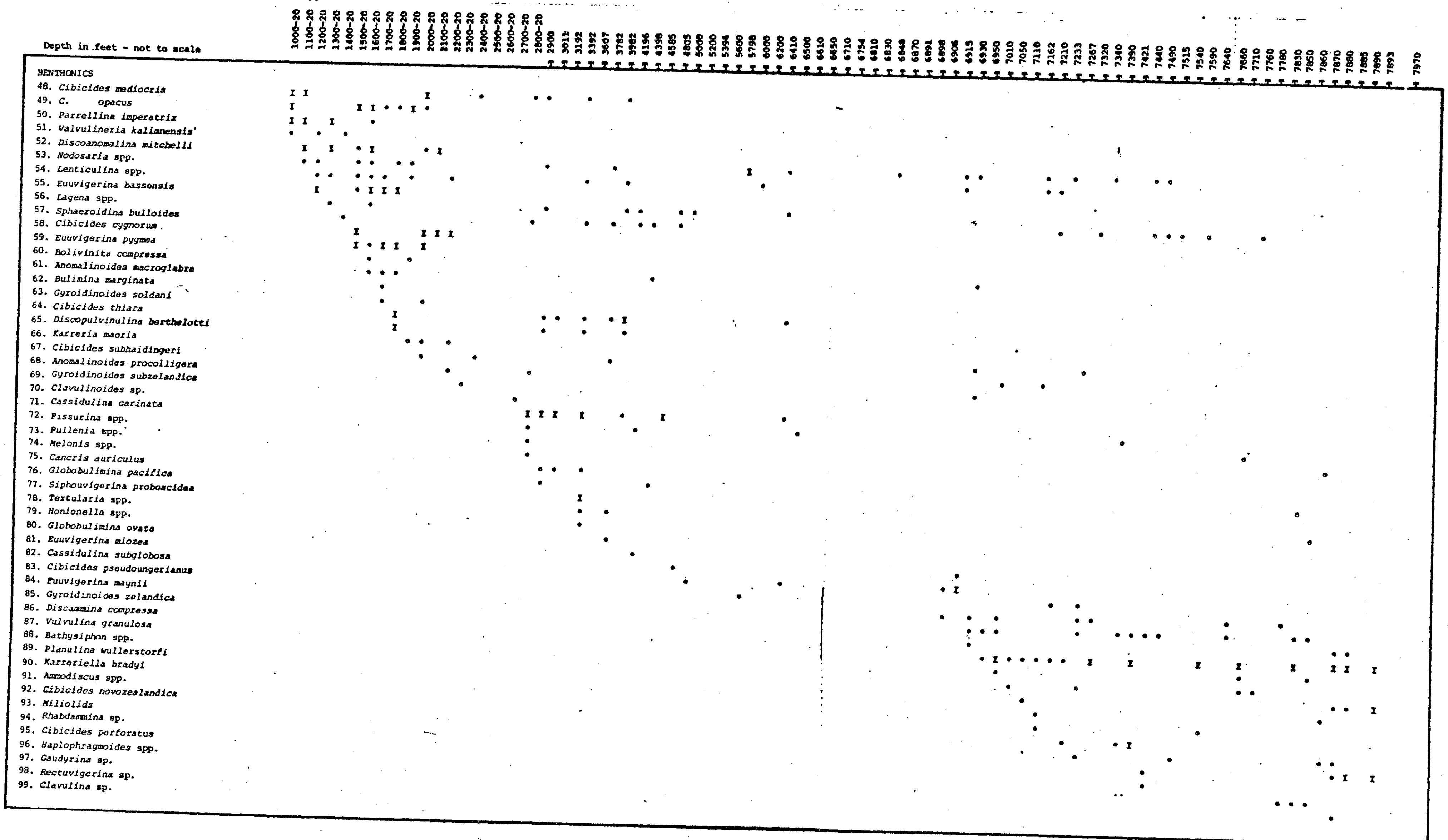
Date Revised ____________

By ____________

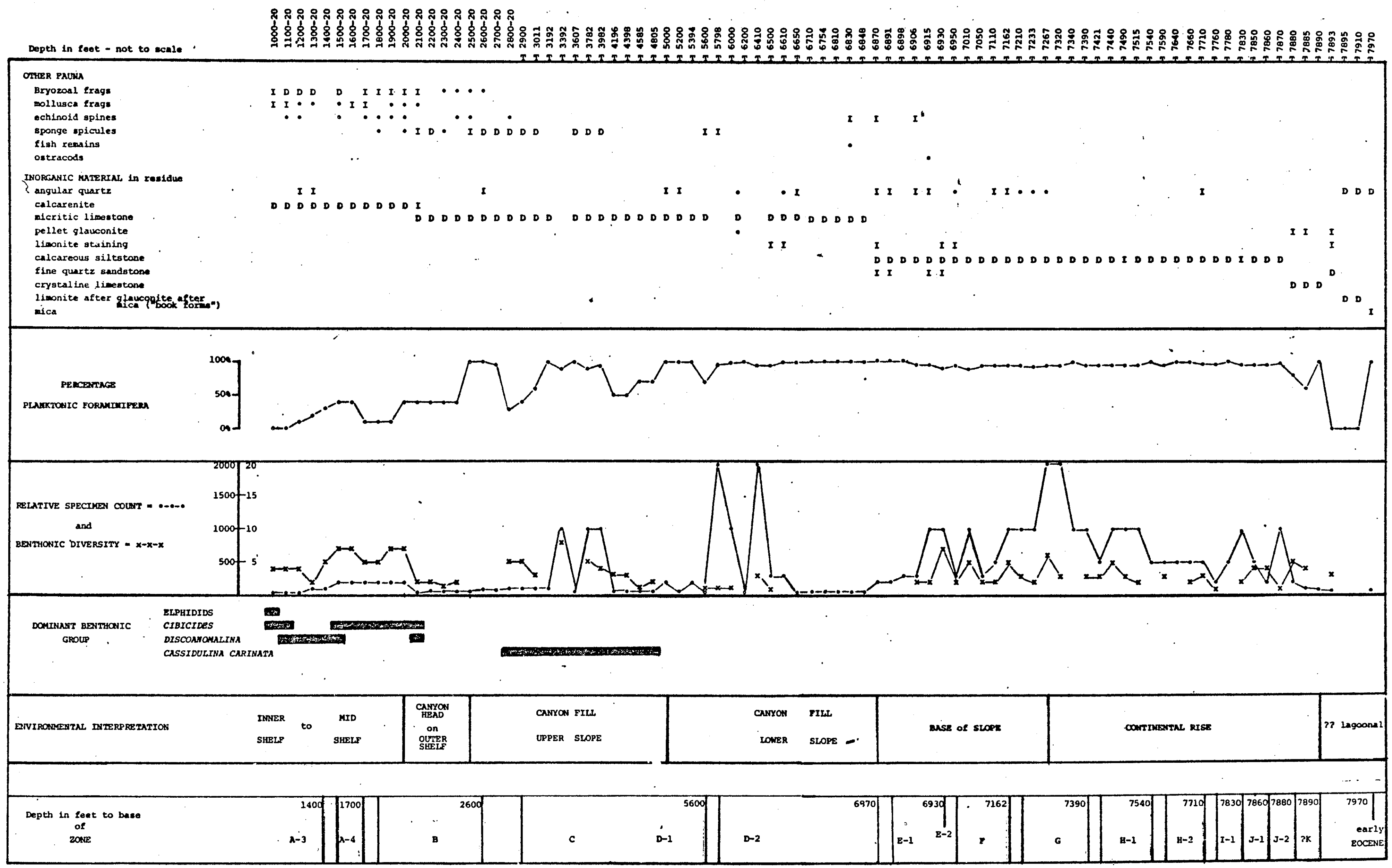
OPAH # 1


Depth in feet - not to scale
PLANKTONICS
1. Orbulina universa
2. Globigerina decoraperta
3. Globorotalia inflata
4. G. puncticulata
5. Globigerinella aequilateralis
6. Globigerina bulloides
7. Globorotalia crassaformis
8. G. miotumida miotumida
9. G. acostaensis
10. G. miozea conoidea
11. G. scitula
12. G. woodi woodi
13. Globorotalia mayeri
14. G. conica
15. G. miozea miozea
16. G. peripheroacuta
17. G. peripheroronda
18. G. menardii
19. Globigerinoides trilobus
20. G. bispherícus
21. Globoquadrina dehiscens (S.S.)
22. Globorotalia zealandica
23. Globoquadrina altispira
24. Orbulina suturalis
25. Globigerina ciperoensis
26. Praeorbulina glomerosa glomerosa
27. P. glomerosa curva
28. Globorotalia praescitula
29. G. siakensis
30. Globigerina woodi connecta
31. Globoquadrina advena
32. Globigerinoides rubra
33. Globigerina praebulloides
34. Globorotalia bella
35. G. nana
36. G. kugleri
37. Globoquadrina dehiscens (S.L.)
38. Globigerina apertura
39. G. euapertura
40. Globorotalia opima
41. Globoquadrina tripartita
42. Globorotalia munda
43. Subbotina angiporoides
44. Globigerina brevis
45. Tenuitella gemma
46. Subbotina linaperta
47. S. frontosa
T = side wall cores - other samples are rotary cuttings
• = 1-20 specimens
I = over 20 specimens
D = dominant
? = identification dubious
N.F.F.= no foraminifera found in 9 side wall cores from 7895 to 7960 and 7980 & 8070
Depth in feet at base of ZONE
1400 A-3
1700 A-4
2600 B
C
5600 D-1
D-2
6870 E-1
6930 E-2
7162 F
7390 G
7540 H-1
7710 H-2
7830 I-1
7860 J-1
7880 J-2
7890 ?K
7970 early EOCENE

OPAH # 1


Depth in feet - not to scale
1000-20
1100-20
1200-20
1300-20
1400-20
1500-20
1600-20
1700-20
1800-20
1900-20
2000-20
2100-20
2200-20
2300-20
2400-20
2500-20
2600-20
2700-20
2800-20
2900
3013
3192
3392
3667
3782
3982
4156
4398
4585
4805
5000
5200
5394
5600
5798
6000
6200
6410
6500
6610
6650
6710
6754
6810
6830
6848
6870
6891
6898
6906
6915
6930
6950
7010
7050
7110
7162
7210
7233
7267
7320
7340
7390
7421
7440
7490
7515
7540
7590
7640
7660
7710
7760
7780
7830
7850
7860
7870
7880
7885
7890
7893
7970
BENTHONICS
48. Cibicides mediocris
49. C. opacus
50. Parrellina imperatrix
51. Valvulineria kalimnensis
52. Discoanomalina mitchelli
53. Nodosaria spp.
54. Lenticulina spp.
55. Euuvigerina bassensis
56. Lagena spp.
57. Sphaeroidina bulloides
58. Cibicides cygnorum
59. Euuvigerina pygmea
60. Bolivinita compressa
61. Anomalinoides macroglabra
62. Bulimina marginata
63. Gyroidinoides soldani
64. Cibicides thiara
65. Discopulvinulina berthelotti
66. Karreria maoria
67. Cibicides subhaidingeri
68. Anomalinoides procolligera
69. Gyroidinoides subzelandica
70. Clavulinoides sp.
71. Cassidulina carinata
72. Fissurina spp.
73. Pullenia spp.
74. Melonis spp.
75. Cancris auriculus
76. Globobulimina pacifica
77. Siphouvigerina proboscidea
78. Textularia spp.
79. Nonionella spp.
80. Globobulimina ovata
81. Euuvigerina miozea
82. Cassidulina subglobosa
83. Cibicides pseudoungerianus
84. Euuvigerina maynii
85. Gyroidinoides zelandica
86. Discammina compressa
87. Vulvulina granulosa
88. Bathysiphon spp.
89. Planulina wullerstorfi
90. Karreriella bradyi
91. Ammodiscus spp.
92. Cibicides novozealandica
93. Miliolids
94. Rhabdammina sp.
95. Cibicides perforatus
96. Haplophragmoides spp.
97. Gaudyrina sp.
98. Rectuvigerina sp.
99. Clavulina sp.

OPAH # 1


Depth in feet - not to scale
1000-20 1100-20 1200-20 1300-20 1400-20 1500-20 1600-20 1700-20 1800-20 1900-20 2000-20 2100-20 2200-20 2300-20 2400-20 2500-20 2600-20 2700-20 2800-20 2900 3011 3192 3392 3607 3782 3982 4196 4398 4585 4805 5000 5200 5394 5600 5798 6000 6200 6410 6500 6610 6650 6710 6754 6810 6830 6848 6870 6891 6898 6906 6915 6930 6950 7010 7050 7110 7162 7210 7233 7267 7320 7340 7390 7421 7490 7515 7540 7590 7640 7660 7710 7760 7780 7830 7850 7860 7870 7880 7885 7890 7893 7895 7910 7970
OTHER FAUNA
Bryozoal frags
mollusca frags
echinoid spines
sponge spicules
fish remains
ostracods
INORGANIC MATERIAL in residue
angular quartz
calcarenite
micritic limestone
pellet glauconite
limonite staining
calcareous siltstone
fine quartz sandstone
crystaline limestone
limonite after glauconite after mica ("book forms")
mica
PERCENTAGE PLANKTONIC FORAMINIFERA
100%
50%
0%
RELATIVE SPECIMEN COUNT = •-•-•
and
BENTHONIC DIVERSITY = x-x-x
2000 20
1500 15
1000 10
500 5
DOMINANT BENTHONIC GROUP
ELPHIDIDS
CIBICIDES
DISCOANOMALINA
CASSIDULINA CARINATA
ENVIRONMENTAL INTERPRETATION
INNER SHELF to MID SHELF
CANYON HEAD on OUTER SHELF
CANYON FILL UPPER SLOPE
CANYON FILL LOWER SLOPE
BASE of SLOPE
CONTINENTAL RISE
?? lagoonal
Depth in feet to base of ZONE
1400 A-3
1700 A-4
2600 B
C
5600 D-1
6970 D-2
6930 E-1
E-2
7162 F
7390 G
7540 H-1
7710 H-2
7830 I-1
7860 J-1
7880 J-2
7890 ?K
7970 early EOCENE

APPENDIX 7

APPENDIX 7

Well Completion Report

OPAH - 1

PALYNOLOGICAL ANALYSIS OF OPAH - 1, GIPPSLAND BASIN

by

A.D. PARTRIDGE

PALYNOLOGICAL ANALYSIS

OPAH-1, GIPPSLAND BASIN

by

ALAN D. PARTRIDGE
ESSO AUSTRALIA LTD.

Esso Australia Ltd.
Palaeontological Report : 1977/15 June 20, 1977.

The presence of Late Eocene in this section in Opah-1 can be disputed as it is based on a doubtful identification of Subbotina linaperta in the sidewall core at 7890 feet. The presence of the Early Oligocene J2 zone cannot be disputed nor the correlation with Swordfish-1 as the same planktonic foraminiferal assemblage occurs in both wells. The conflict with the palynological data can be resolved if we consider that the base of the P. tuberculatus Zones lies within the J2 planktonic foraminiferal zone and not at the base of J1 as has been previously stated (Partridge 1976, figure 2). The implication of this to the geology of the Gippsland Basin is that fine grained Lakes Entrance Formation sedimentation commences slightly earlier than previously recognised (Partridge 1976, figure 7) and approximates even closer the Eocene-Oligocene boundary.

Barren Zone (sidewall cores from 7895 to 7925 feet).

The five sidewall cores processed in this interval yielded mainly flaky brown amorphous organic material and some black angular woody material but no palynomorphs. Lithologically, this section of brown to rare green silty sandstone with accessory glauconite and limonite is similar to the Gurnard Formation. It is unusual in being oxidised, which is the most likely reason for the absence of spore-pollen and dinoflagellates.

The section is reminiscent of the 130 feet of red to brown ferruginous shales and siltstones in Moray-1, between 5370 and 5500 feet (-5338 to -5470 feet subsea). Like Opah-1, the Moray-1 section lacks firm age dating. In Moray-1, the foraminiferal zone I-1 is identified down to 5360 feet. No foraminifera were identified in sidewall cores below this and new fauna observed in cuttings gave only an Eocene to Early Oligocene age. The section was also barren of palynomorphs except for a single sidewall core at 5490 feet which gave a Lower N. asperus age. In the Moray-1 well completion report, most of this section was correlated with the early Oligocene. It could just as likely be Middle to Late Eocene in age and correlated with the Gurnard Formation which is also the obvious correlation for this section in Opah-1.

Proteacidites asperopolus Zone 7930 to 7935 feet.

The two sidewall cores are assigned to the P. asperopolus Zone on the presence of Myrtaceidites tenuis, Conbaculites apiculatus and Santalumidites cainozoicus. The dinoflagellates identified supoort this age, especially the occurrence of Homotryblium tasmaniensis. Unfortunately, only a very low yield of fossils was recovered from the samples. The low yield particularly hampered the identification of the dinoflagellates present and consequently, the samples cannot be referred to any of the Early Eocene Wetzeliella zones nor closely compared with dinoflagellate assemblages from the age equivalent Flounder Formation.

Upper Lygistepollenites balmei Zone 7940 to 8150 feet (and Wetzeliella homomorpha Dinoflagellate Zone).

Less than 200 feet of Upper L. balmei Zone was intersected. The nine samples examined from this interval are assigned to the zone on the common occurrence of Lygistepollenites balmei and the presence of other index species such as Australopollis obscurus, Amosopollis dilwynensis, Camarozonosporites bullatus, Gambierina rudata and Polycolpites langstonii. All these species become extinct near the top of the L. balmei Zone. Indicator species for Upper subdivision of the L. balmei Zone present in the samples include Banksieaeidites elongatus, Cyathidites gigantis (fairly common), Malvacepollis diversus and Verrucosisporites kopukuensis. Two unusual occurrences are Bysmapollis emarciatus and Gephrapollenites cranwellae. Their presence in this interval extends the lower limits of their ranges from the Lower M. diversus Zone to the Upper L. balmei Zone.

The dinoflagellates present support the Upper L. balmei age. The presence of Wetzeliella homomorpha refers the section to the dinoflagellate zone bearing that name.

The 54 feet of siltstone between 7939 and 7993 feet from the upper part of this zone is anomalous and was unexpected compared with the sandy facies in the Upper L. balmei Zone in surrounding wells. The six sidewall cores examined from this unit all yielded good zone assemblages and are closely comparable with assemblages from the underlying section (7993-8210 feet), and from adjacent wells. The possibility that this upper unit could be stratigraphically younger and contain reworked L. balmei Zone assemblages is emphatically rejected based on the absence of the common marker species of the M. diversus or P. asperopolus Zones. The occurrences of Bysmapollis emarciatus and Gephrapollenites cranwellae in Opah-1 cannot be taken as evidence of reworking as both forms are very minor components of assemblages from younger zones. If they were reworked, the Opah-1 assemblages should contain the commoner M. diversus and P. asperopolus Zone indicator species as well.

Taylor (1977b) does however, record the planktonic foraminifera Subbotina frontosa from the sidewall core at 7970 feet within this upper section. The worldwide range of this species suggests that it does not extend below the Early Eocene. Further, the maximum possible age for the section based on this single planktonic species conflicts with the palynology which indicates a Late Paleocene age. This age for the palynological zones is derived by correlation with dinoflagellate assemblages in New Zealand, again dated by planktonic foraminifera. Considering that both the spore-pollen and dinoflagellate assemblages in this section in Opah-1 are represented by a number of species the age dating and correlation based on the palynology is considered more reliable than that of the single planktonic foraminifera species.

REFERENCES

Partridge, A.D., 1976, The Geological expression of Eustacy in the Early Tertiary of the Gippsland Basin: APEA J., v.16, pt.1, p.73-79.

Partridge, A.D., 1977, Palynological analysis Swordfish-1, Gippsland Basin : Esso Aust. Ltd. Palaeo. Rept., 1977/13.

Taylor, D., 1977a, Foraminiferal sequences Swordfish-1 : Esso Aust. Ltd. Palaeo. Rept., 1977/5.

Taylor, D., 1977b, Foraminiferal sequence Opah-1 : Esso Aust. Ltd. Palaeo. Rept., 1977/12.

SUMMARY

Twenty-one sidewall cores were processed for palynomorphs in Opah-1. Examination of the samples gave the subdivision of the Latrobe Group summarised on the following table :

Unit	Zone	Depth (in feet)	Age
Lakes Entrance Formation	P. tuberculatus	7870 to 7893	Early Oligocene
UNCONFORMITY at 7898			
Undated Unit ?Gurnard Formation	Barren Zone	7895 to 7925	?
Flounder Formation Equivalent	P. asperopolus	7930 to 7935	Early Eocene
UNCONFORMITY at 7939			
Latrobe Coarse Clastics	Upper L. balmei (W. homomorpha dinoflagellate Zone)	7940 to 8150	Late Paleocene
		TD : 8210	

DISCUSSION OF ZONES

All samples processed and examined are listed on Table 1. The species identified from the samples are given on the accompanying distribution charts. The basis for choosing the zone boundaries is discussed in the following :

Proteacidites tuberculatus Zone 7870 to 7893 feet.

The consistent presence of the spore Cyatheacidites annulatus in the five samples clearly refers this interval to the P. tuberculatus Zone. A number of undescribed dinoflagellates in the samples also support a P. tuberculatus Zone age which would correlate the section with the basal Lakes Entrance Formation in other wells. The grey calcareous siltstone lithology of the interval, and the E-log response would also indicate correlation with the Lakes Entrance Formation.

In contrast to this palynological data, the results from the study of foraminifera (Taylor 1977b) suggests that the interval between 7850 to 7893 feet contains both J2 and K zone faunas, which would make the section partially Late Eocene in age and also time equivalent to the youngest part of the Gurnard Formation in some other wells. This is best demonstrated by the data obtained from the recent well Swordfish-1 (Taylor 1977a, Partridge 1977). In this well, Early Oligocene (zone J2) and Late Eocene (zone K) faunas were identified over an interval of 45 feet at the top of the Gurnard Formation (in sidewall cores between 6560-6564 feet and 6571-6604 feet respectively). However, on palynology these same samples were referred respectively to the Upper N. asperus Zone and Middle N. asperus Zone.

TABLE - 1 : SUMMARY OF PALYNOLOGICAL ANALYSIS, OPAH-1, GIPPSLAND BASIN

SAMPLE AND DEPTH		ZONE	AGE	CONFIDENCE RATING	YIELD	DIVERSITY	REMARKS
SWC 61	7870'	P. tuberculatus	Early Oligocene	0	Moderate	Moderate	Cyatheacidites annulatus present
SWC 30	7880'	"	" "	0	Moderate	High	"
SWC 29	7885'	"	" "	0	Moderate	Moderate	"
SWC 28	7890'	"	" "	0	Moderate	Moderate	"
SWC 27	7893'	"	" "	0	Low	Moderate	"
SWC 26	7895'	Barren of Fossils					Only brown amorphous material of rounded shape recovered.
SWC 23	7902'	Barren					Nothing recovered
SWC 22	7905'	Barren of Fossils					Brown flaky material of indeterminant origin recovered.
SWC 18	7920'	Barren of Fossils					Angular woody material recovered
SWC 17	7925'	Barren of Fossils					Brown flaky and woody materials recovered.
SWC 16	7930'	P. asperopolus	Early Eocene	1	Low	Moderate	
SWC 15	7935'	P. asperopolus	Early Eocene	1	Very Low	Moderate	
SWC 14	7940'	Upper L.balmei	Late Paleocene	0	High	Moderate	W. homomorpha Dino. Zone
SWC 13	7945'	" "	" "	0	High	High	"
SWC 12	7950'	" "	" "	0	High	High	"
SWC 10	7970'	" "	" "	0	High	Moderate	"
SWC 9	7980'	" "	" "	0	High	High	"
SWC 8	7992'	" "	" "	0	High	High	"
SWC 5	8070'	" "	" "	0	Moderate	High	"
SWC 3	8106'	" "	" "	0	High	High	"
SWC 1	8150'	" "	" "	0	High	High	"

BASIN GIPPSLAND DATE JUNE 20, 1977

WELL NAME OPAH-1 ELEVATION K.B. +83 feet

AGE	PALYNOLOGIC ZONES	HIGHEST DATA Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time	LOWEST DATA Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time
OLIG-MIO.	P. tuberculatus	7870	0				7893	0			
EOCENE	U. N. asperus										
	M. N. asperus										
	L. N. asperus										
	P. asperopolus	7930	1				7935	1			
	U. M. diversus										
	M. M. diversus										
	L. M. diversus										
PALEOCENE	U. L. balmei	7940	0				8150	1			
	L. L. balmei										
	T. longus										
LATE CRETACEOUS	T. lilliei										
	N. senectus										
	C. trip./T.pach.										
	C. distocarin.										
	T. pannosus										
EARLY CRETACEOUS											
PRE-CRETACEOUS											

COMMENTS: Wetzeliella homomorpha Dino. Zone 7940-8150 feet (rating 1)

T.D. : 8210 feet

RATINGS:
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 spore and pollen or microplankton, or both.
4; CUTTINGS, NO CONFIDENCE, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If a sample cannot be assigned to one particular zone, then no entry should be made. Also, if an entry is given a 3 or 4 confidence rating, an alternate depth with a better confidence rating should be entered, if possible.

DATA RECORDED BY: A.D. Partridge DATE June, 1977

DATA REVISED BY: DATE

FORM No R 315 12/72

Well Name OPAH-1 Basin GIPPSLAND Sheet No. 1 of 4

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
PALYNOMORPHS / DEPTHS	7870	7880	7885	7890	7893	7895	7902	7905	7920	7925	7930	7935	7940	7945	7950	7970	7980	7992	8070	8106	8150
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													/	/	/		/	/		/	
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													A	/	A	/	A	/	A	A	A
L. florinii	/	/	/	/	/						/		/	/	/		/	/	/	/	/
M. diversus												/			/	/	/	/			
M. duratus																					
M. grandis																					
M. perimagnus																					

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

Well Name OPAH-1 Basin GIPPSLAND Sheet No. 2 of 4

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
PALYNOMORPHS / DEPTHS	7870	7880	7885	7890	7893	7895	7902	7905	7920	7925	7930	7935	7940	7945	7950	7970	7980	7992	8070	8106	8150
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 OPAH-1 **Basin** GIPPSLAND **Sheet No.** 3 **of** 4

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
PALYNOMORPHS / DEPTHS	7870	7880	7885	7890	7893	7895	7902	7905	7920	7925	7930	7935	7940	7945	7950	7970	7980	7992	8070	8106	8150
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.)																					
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																					
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					cf																
T. chnosus																					
T. helosus																					
T. scabratus																					
T. sectilis																					
V. attinatus																					
V. cristatus																					
V. kopukuensis													/	/			/				
C. subtilis				/																	
A. dilwynensis													/	/	/		/		/		

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

Well Name OPAH-1 Basin GIPPSLAND Sheet No. 4 of 4

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
PALYNOMORPHS \ DEPTHS	7870	7880	7885	7890	7893	7895	7902	7905	7920	7925	7930	7935	7940	7945	7950	7970	7980	7992	8070	8106	8150
Nema. balcombiana	/	/																			
Cycl. vieta	/			/																	
Ling. machaerophorum	/	/			/																
Dino. simplex	/	/	/		/																
H/kolp. rigaudae	/	/		/	/																
Oper. centrocarpum	/	/	/	/	/						/										
Spiniferites spp.	/	/	/	/	/									/		/		/			/
Cras. concinnia		/																			
Dino. mamilatus		/	/																		
Dino. scabroellipticus		/		/																	
Syst. placacantha			/																		
Spin. cingulata			/																		
Emsl. australiensis				/																	
Heter. paxilla											/										
Seno. compta											/										
Duos. nudum											/										
Lept. maculatum											cf										
Wetz. articulata											cf										
Defl. flounderensis											cf										
Homo. tasmaniense											/	/									
Reticulodinium sp.											/	/									
Cord. inodes											/	/							/		
Dyph. colligerum											cf					/			/		
Defl. medcalfi													/	/			/	A	/	A	A
Wetz. homomorpha													/		/				/	/	/
Prae. indentata														/			/		/		/
Spinidinium sp.																	/	/	/		
Defl. dilwynensis																			/	A	
Areoligera sp.											A	A									

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

APPENDIX 8

APPENDIX 8

APPENDIX 8

Well Completion Report

OPAH-1

SOURCE CHARACTERISTICS OF SAMPLES FROM OPAH-1, GIPPSLAND BASIN, AUSTRALIA

by

R. E. METTER

EXXON PRODUCTION RESEARCH COMPANY

SOURCE CHARACTERISTICS OF SAMPLES FROM OPAH-1, GIPPSLAND BASIN, AUSTRALIA

R. E. Metter

Reservoir Evaluation Division

July 1977

SOURCE CHARACTERTISTICS OF SAMPLES FROM OPAH-1,
GIPPSLAND BASIN, AUSTRALIA

By

R. E. Metter

SUMMARY AND CONCLUSIONS

Four canned cuttings samples from 7900 - 8200 ft. were analysed routinely for hydrocarbon source indications. The results are listed in Tables 1 thru 4 and in Figs. 1 thru 4. Also, 16 kerogen slides prepared from sidewall cores by Esso Australia were described by J.L. Morgan of EPR (Table 2). The slides covered the interval 7870 - 8150 ft.

The data suggest the following:

1. The cuttings are poor to marginal (at best) in source richness.

2. Kerogen materials indicate an "oilier" zone over the approximate interval 7895 - 7935 ft. The kerogen in the sample from 7930 ft. includes 90% of amorphous and finely disseminated materials (oil and gas-prone). This zone alone might account for the oil show reported between 7910 and 7943 ft.

3. Samples from 7870 to 7895 ft. and from below 7935 ft. are rated as gas-prone.

4. The maturity of the sampled interval is not clearly defined. Kerogen alterations of "1+" from 7970 ft. to 8150 ft. suggest the entire drilled section is immature. Heavy hydrocarbon data support this interpretation. However, cuttings gas wetness suggests that the samples below 7900 ft. are mature, and questionable kerogen alterations of "2+" from 7890 to 7945 ft. support this suggestion. The gas wetness could be explained by the reported oil show; the low kerogen alterations from below 7970 ft. could be explained by contamination.

PROCEDURES

Compositions and concentrations of hydrocarbon gases in the air spaces above the cuttings in the sample cans were determined by gas chromatography. Similar data were obtained on gases released from a standard mixture of cuttings and tap water after two minutes of agitation in a Waring Blender. Combined results on the air space gas plus the cuttings gas were calculated for each sample. Detailed results of the gas analyses are listed in Table 1.

Chips of reasonably uniform lithologies were picked by hand from the heterogeneous mixtures of chips in the original samples. These are described in Table 2. Routine gas chromatographic procedures were used for determining the light gasoline (C_4-C_7) contents, and the total organic carbon contents were determined with a Leco Analyser. These results are given in Tables 2 and 4. The "total organic matter" values were obtained by multiplying organic carbon percentages by 1.22.

Portions of about 120 grams were taken from each of the four cuttings samples and sent to GeoChem Laboratories for heavy (C_{15}+) hydrocarbon analyses. Results are given in Table 3 and gas chromatograms of the heavy saturate fractions are shown in Figs. 1 thru 4.

Esso Australia submitted 16 kerogen slides that had been prepared in Sydney. They were described by J.L. Morgan of EPR (Table 5).

DISCUSSION

The cuttings samples are rated as poor to marginal, at best, in source richness for the following reasons:

1. Total organic carbon values range only from .39 to .46% (Table 2).

2. Heavy hydrocarbon yields are low (Table 3).

3. Cuttings gas yields are very modest, except for the 8000 - ft. sample, which spans the reported oil show (Tables 1, 2).

The 7895 - 7935 ft. zone was interpreted as more oil prone because:

1. The kerogen included high percentages of amorphous material.

2. Cuttings gas from the 8000 ft. and 8100 ft. samples contained more than 60% C_2-C_4 in the total hydrocarbon gas. (This could be caused by passing through reservoired hydrocarbons, and an oil show was reported by Esso Australia in the interval 7910 - 7943 ft.)

Gas-prone samples were so rated on the basis of high percentages of "structured" (woody-coaly) materials in the kerogen (Table 5), gas chromatograms of heavy saturate fractions (Figs. 1-4), and low heavy hydrocarbons yields (Table 3).

The maturity of the samples is the least reliable interpretation in this study. The kerogen alteration values are suspect. The sidewall cores were described by Esso Australia as being sandstones and siltstones, and there can be serious contamination by drilling mud in such porous samples.

The problem of cavings apparently is important here. Mr Bill Threlfall was at EPR during this study and he happened to see the four cuttings samples. He felt rather strongly that all four consisted mainly of post-Eocene cavings.

TABLE 1A

C_1-C_4 HYDROCARBON ANALYSES - AIR SPACE AT TOP OF CANS

SAMPLE NUMBER	R	DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS) METHANE (C_1)	ETHANE (C_2)	PROPANE (C_3)	ISO-BUTANE (iC_4)	NORMAL BUTANE (nC_4)	WET (C_2-C_4)	TOTAL (C_1-C_4)	GAS COMPOSITION (PERCENT) TOTAL GAS C_2-C_4	C_1	C_2	C_3	iC_4	nC_4	WET GAS C_2	C_3	iC_4	nC_4
67800A	7	7900	4.61	1.80	11.66	12.91	9.31	35.79	46.40	88.5891	11.	5.	29.	32.	23.	5.	33.	36.	26.
67800B	7	8000	106.90	262.06	2276.58	2570.55	3866.95	8916.11	9083.02	98.1625	2.	2.	25.	28.	43.	2.	26.	29.	43.
67800C	7	8100	428.72	229.65	767.09	349.77	516.42	1932.93	2361.65	81.8466	18.	10.	33.	17.	22.	12.	40.	21.	27.
67800D	7	8200	196.22	122.88	741.89	563.56	694.78	2123.13	2319.35	91.5398	8.	5.	33.	24.	30.	6.	34.	27.	33.

TABLE 1B

C_1-C_4 HYDROCARBON ANALYSES - CUTTINGS ONLY

SAMPLE NUMBER	R	DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS) METHANE (C_1)	ETHANE (C_2)	PROPANE (C_3)	ISO-BUTANE (iC_4)	NORMAL BUTANE (nC_4)	WET (C_2-C_4)	TOTAL (C_1-C_4)	GAS COMPOSITION (PERCENT) TOTAL GAS C_2-C_4	C_1	C_2	C_3	iC_4	nC_4	WET GAS C_2	C_3	iC_4	nC_4
67800A	7	7900	1282.40	10.50	38.50	59.22	66.37	175.20	1457.66	12.0192	87.	1.	3.	4.	5.	6.	22.	34.	38.
67800B	7	8000	1114.27	17.70	372.58	1029.88	2463.84	3895.54	5010.21	77.7600	22.	0.	8.	21.	49.	0.	10.	26.	64.
67800C	7	8100	1030.18	31.80	166.30	184.72	361.08	743.20	1773.48	41.9116	58.	2.	11.	9.	20.	4.	25.	22.	4[illegible].
67800D	7	8200	1083.42	11.70	42.85	52.00	116.82	222.43	1305.35	17.2024	85.	1.	2.	3.	6.	5.	19.	23.	52.

TABLE 1C

C_1-C_4 HYDROCARBON ANALYSES - CUTTINGS AND AIR SPACE

SAMPLE NUMBER	R	DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS) METHANE (C_1)	ETHANE (C_2)	PROPANE (C_3)	ISO-BUTANE (iC_4)	NORMAL BUTANE (nC_4)	WET (C_2-C_4)	TOTAL (C_1-C_4)	GAS COMPOSITION (PERCENT) TOTAL GAS C_2-C_4	C_1	C_2	C_3	iC_4	nC_4	WET GAS C_2	C_3	iC_4	nC_4
67800A	7	7900	1287.07	12.38	56.19	72.74	75.66	210.99	1498.06	14.0842	86.	1.	3.	5.	5.	6.	24.	34.	36.
67800B	7	8000	1280.17	219.74	2657.12	3602.41	6332.79	12812.05	14093.22	90.9093	9.	2.	19.	26.	45.	2.	21.	28.	49.
67800C	7	8100	1458.90	266.84	973.39	503.49	877.50	2676.23	4135.13	64.7193	35.	6.	24.	14.	21.	10.	36.	21.	33.
67800D	7	8200	1878.14	134.58	784.74	615.64	811.60	2346.55	4224.70	55.5438	44.	3.	19.	15.	19.	6.	33.	26.	35.

Table 2 Descriptions of "Picked" Cuttings and Summary of Chemical Analyses

(Analyses by A. K. Everett, H. M. Fry)

Depth (ft.)	EPR. No.	Probable Age (Esso Aust.)	Gross Lithology *of Analyzed Samples	GSA Color Code	Total Organic Carbon (%)	Total Organic Matter (%)	C_4-C_7 Hydrocarbons (ppm)	C_{15}+ Hydrocarbons (ppm)	Total C_1-C_4 Hydrocarbon Gas (ppm)	% C_2-C_4 in HC Gas
7900	67806-A	Olig.	Shale, med. gray to med. lt. gray, sl. calc.	N5-N6	.45	.55	0.	39	1498	34.1
8000	67806-B	Paleoc.	As above	N5-N6	.46	.56	2.2	27	14,093	90.9
8100	67806-C	Paleoc.	As above, plus loose quartz grains	N5-N6	.39	.46	3.4	34	4135	64.7
8200	67806-D	Paleoc.	Shale, med. gray, sl. calc., with loose quartz grains	N5	.44	.54	1.8	37	4224	55.5

* Bill Threlfall was at EPR during these analyses. He happened to see the samples, and gave the opinion that almost all of the material in the cans consisted of cavings.

Table 3 Heavy (C_{15}+) Soluble Organic Matter

(Analysis by GeoChem)

Depth (ft.)	7900	8000	8100	8200
EPR No.	67806-A	67806-B	67806-C	67806-D
Total Organic Matter (%)	.55	.56	.48	.54
Soluble Organic Matter (ppm)	314	256	370	333
Composition of Soluble O.M. (%)				
Saturates	2.2	2.3	1.9	2.7
Aromatics	10.2	8.2	7.3	8.4
NSO's	25.5	25.4	17.0	22.2
Noneluted NOS's	4.8	2.7	5.7	6.0
Asphaltenes	57.3	61.3	68.1	60.7
Hydrocarbons				
ppm of rock	39	27	34	37
% of T.O.M.	.71	.48	.71	.69
C_{15}+ Source Rating	Poor to Marginal	Poor to Marginal	Poor to Marginal	Poor to Marginal

67806A OFF. AUSTRALIA, OPAH-1, 7900

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	0.0	0.00
ETHANE	0.0		1T2-DMCP	0.0	0.00
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	0.0	0.00	224-TMP	0.0	0.00
NBUTANE	0.0	0.00	NHEPTANE	0.0	0.00
IPENTANE	0.0	0.00	1C2-DMCP	0.0	0.00
NPENTANE	0.0	0.00	MCH	0.0	0.00
22-DMB	0.0	0.00			
CPENTANE	0.0	0.00			
23-DMB	0.0	0.00			
2-MP	0.0	0.00			
3-MP	0.0	0.00			
NHEXANE	0.0	0.00			
MCP	0.0	0.00			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	0.0	0.00			
33-DMP	0.0	0.00			
11-DMCP	0.0	0.00			
2-MHEX	0.0	0.00			
23-DMP	0.0	0.00			
3-MHEX	0.0	0.00			
1C3-DMCP	0.0	0.00			

TOTALS

ALL COMP	0
GASOLINE	0

67806B OFF. AUSTRALIA, OPAH-1, 8000

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	24.9	1.15
ETHANE	0.0		1T2-DMCP	43.6	2.25
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	0.0	0.00	224-TMP	0.0	0.00
NBUTANE	0.0	0.00	NHEPTANE	170.7	7.92
IPENTANE	228.0	10.58	1C2-DMCP	0.0	0.00
NPENTANE	275.0	12.76	MCH	261.3	12.12
22-DMB	4.0	0.19			
CPENTANE	0.0	0.00			
23-DMB	0.0	0.00			
2-MP	302.0	14.02			
3-MP	84.9	3.94			
NHEXANE	254.4	11.81			
MCP	153.6	7.13			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	172.9	8.02			
33-DMP	0.0	0.00			
11-DMCP	63.3	2.94			
2-MHEX	0.0	0.00			
23-DMP	29.0	1.34			
3-MHEX	57.7	2.68			
1C3-DMCP	24.7	1.15			

TOTALS

ALL COMP	2155.
GASOLINE	2155.

67806C OFF AUSTRALIA, OPAH-1, 8100

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	0.0		1T3-DMCP	42.1	[illegible]
ETHANE	0.0		1T2-DMCP	[illegible]	[illegible]
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	0.0	0.00	224-TMP	0.0	0.00
NBUTANE	0.0	0.00	NHEPTANE	[illegible]	[illegible]
IPENTANE	392.9	11.69	1C2-DMCP	0.0	0.00
NPENTANE	446.6	13.29	MCH	432.8	12.85
22-DMB	8.6	0.26			
CPENTANE	0.0	0.00			
23-DMB	0.0	0.00			
2-MP	360.4	10.73			
3-MP	150.6	4.48			
NHEXANE	436.4	12.99			
MCP	234.2	6.97			
22-DMP	0.0	0.00			
24-DMP	6.6	0.20			
223-TMB	0.0	0.00			
CHEXANE	262.3	7.81			
33-DMP	3.5	0.10			
11-DMCP	82.2	2.45			
2-MHEX	0.0	0.00			
23-DMP	56.5	1.68			
3-MHEX	80.3	2.39			
1C3-DMCP	41.9	1.25			

TOTALS

ALL COMP	3361
GASOLINE	3361

67806D OFF AUSTRALIA, OPAH-1, 8200

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCE.
METHANE	0.0		1T3-DMCP	30.0	1.63
ETHANE	0.0		1T2-DMCP	44.5	2.42
PROPANE	0.0		3-EPENT	0.0	0.00
IBUTANE	0.0	0.00	224-TMP	0.0	0.00
NBUTANE	0.0	0.00	NHEPTANE	132.0	7.18
IPENTANE	212.8	11.56	1C2-DMCP	0.0	0.00
NPENTANE	202.4	11.01	MCH	302.5	16.46
22-DMB	5.0	0.27			
CPENTANE	0.0	0.00			
23-DMB	0.0	0.00			
2-MP	199.8	10.87			
3-MP	85.6	4.66			
NHEXANE	223.7	12.17			
MCP	107.1	5.83			
22-DMP	0.0	0.00			
24-DMP	0.0	0.00			
223-TMB	0.0	0.00			
CHEXANE	123.5	6.[illegible]			
33-DMP	0.0	0.00			
11-DMCP	48.0	2.61			
2-MHEX	0.0	0.00			
23-DMP	34.5	1.88			
3-MHEX	43.2	2.35			
1C3-DMCP	31.5	1.71			

TOTALS

ALL COMP	1838.
GASOLINE	1838.

TABLE 4 LIGHT GASOLINES (C_4-C_7).

Table 5 Kerogen from Sidewall Cores on Slides Prepared by Esso Australia

(described by J.L. Morgan)

SWC No.	Depth (ft.)	EPR No.	Age (Esso Aust.)	Kerogen Alteration	Kerogen Preservation	(Types of Kerogen (% of Total on Slide) Amorphous	Structured	Mineral Charcoal	Kerogen Source Type
61	7870	67883-A	Oligocene	2-	v. poor	20	50	30	Gas, Oil
30	7880	67883-B	"	2(?)	v. poor	-	50	30	Gas, Cond.
29	7885	67883-C	"	2+	v. poor	-	50	30	Gas, Cond.
28	7890	67883-D	"	2+	poor	20	20	60	Gas, Oil
27	7893	67883-E	"	2+	v. poor	30	20	50	Gas, Oil
26	7895	67883-F	Uncertain	2+(?)	poor	90	Trace	Trace	Oil, Gas
17	7925	67883-G	"	2+(?)	v. poor	Trace	90	-	Gas, Cond.
16	7930	67883-H	Eocene	2+(?)	esp. poor	90	-	10	Oil
15	7935	67883-I	"	2+(?)	poor	90	10	-	Oil, Gas
14	7940	67883-J	Paleocene	2+	poor	20	70	10	Gas, Cond.
13	7945	67883-K	"	2+(?)	v. poor	10	80	10	"
10	7970	67883-L	"	1+	poor	10	80	10	"
8	7992	67883-M	"	1+	v. poor	10	80	10	"
5	8070	67883-N	"	1+	v. poor	10	80	10	"
3	8106	67883-O	"	1+	v. poor	10	80	10	"
1	8150	67883-P	"	1+	poor	-	80	20	"

ENCLOSURES

ENCLOSURES

PE902274

This is an enclosure indicator page.
The enclosure PE902274 is enclosed within the container PE902273 at this location in this document.

The enclosure PE902274 has the following characteristics:

```
     ITEM_BARCODE = PE902274
CONTAINER_BARCODE = PE902273
             NAME = Structure Map Top of Latrobe Group
                    (Post Opah 1)
            BASIN = GIPPSLAND
           PERMIT =
             TYPE = SEISMIC
          SUBTYPE = HRZN_CONTR_MAP
      DESCRIPTION = Structure Map Top of Latrobe Group
                    (Post Opah 1)
          REMARKS =
     DATE_CREATED = 1/07/77
    DATE_RECEIVED =
             W_NO = W687
        WELL_NAME = Opah-1
       CONTRACTOR = ESSO
     CLIENT_OP_CO = ESSO
```

(Inserted by DNRE - Vic Govt Mines Dept)

PE902275

This is an enclosure indicator page.
The enclosure PE902275 is enclosed within the container PE902273 at this location in this document.

The enclosure PE902275 has the following characteristics:

ITEM_BARCODE =	PE902275
CONTAINER_BARCODE =	PE902273
NAME =	Geological Cross Section A-A'
BASIN =	GIPPSLAND
PERMIT =	
TYPE =	WELL
SUBTYPE =	CROSS_SECTION
DESCRIPTION =	Geological Cross Section A-A' (Post Opah-1) Enclosure from WCR for Opah-1
REMARKS =	
DATE_CREATED =	1/07/77
DATE_RECEIVED =	
W_NO =	W687
WELL_NAME =	Opah-1
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE906228

This is an enclosure indicator page.
The enclosure PE906228 is enclosed within the container PE902273 at this location in this document.

The enclosure PE906228 has the following characteristics:

ITEM_BARCODE = PE906228
CONTAINER_BARCODE = PE902273
NAME = Sonic Calibration Curve
BASIN = GIPPSLAND
PERMIT = VIC/L5
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Sonic Calibration Curve for Opah-1
REMARKS =
DATE_CREATED = 30/04/77
DATE_RECEIVED =
W_NO = W687
WELL_NAME = OPAH-1
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE906229

This is an enclosure indicator page.
The enclosure PE906229 is enclosed within the container PE902273 at this location in this document.

The enclosure PE906229 has the following characteristics:

ITEM_BARCODE = PE906229
CONTAINER_BARCODE = PE902273
NAME = Time-Depth Curve
BASIN = GIPPSLAND
PERMIT = VIC/L5
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Time-Depth Curve (interpretative) for Opah-1
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W687
WELL_NAME = OPAH-1
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE601425

This is an enclosure indicator page.
The enclosure PE601425 is enclosed within the container PE902273 at this location in this document.

The enclosure PE601425 has the following characteristics:

ITEM_BARCODE = PE601425
CONTAINER_BARCODE = PE902273
NAME = Well Completion Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = COMPLETION_LOG
DESCRIPTION = Well Completion Log
REMARKS =
DATE_CREATED = 27/03/77
DATE_RECEIVED =
W_NO = W687
WELL_NAME = Opah-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)