

MUSSEL 1 - WELL SUMMARY

Type of Well: Wildcat

Purpose of Well: Mussel 1 site was selected primarily to test the basal upper Cretaceous Waarre Sandstone in a structurally high position, being located on the southern up-dip side of a north dipping Lower Cretaceous fault block. Southern closure was anticipated, with tight Belfast Mudstone faulted against the prognosed Waarre Formation reservoir. A secondary target was the coincident minor structural high on the top of the Tertiary Eocene Sand.

Status: Plugged and abandoned.

Location: Latitude : ³⁸37° 57' 45.993" South
Longitude : 142° 46' 21.676" East
Shot-point 6063 on line E.O.31.

Lease: P.E.P. 40

Elevation: Rotary table ⁹⁷93 feet above M.S.L.

Water Depth: 280 feet

Spudded: August 18th, 1969, (On location August 16th, 1969).

Completed: September 16th, 1969.

Drilling Time: 30 days

Total Depth: Total drilled depth 8038 feet.
Top of fish abandoned in hole 7518 feet.

Casing: 30 inch at 420 feet
20 inch at 882 feet
13³/₈ inch at 2200 feet

Cement Plugs:

<u>Plug No.</u>	<u>Interval</u>	<u>Cement</u>	
1	7390-7508 feet	100 sacks	
2	6725-6936 feet	150 "	Top tagged
3	2023-2262 feet	225 "	" "
4	504-609 feet	75 "	

Cores: Three conventional cores were cut, with aggregate footage of 95 ft. and recovery of 26 ft. (27%). The interval 6881-6954 was continuously cored to investigate reservoir characteristics of the Waarre within a predominantly sandstone interval. Core number 3 was primarily designed for stratigraphic control.

MUSSEL - 1

- 2 -

Core	Interval	Recovery
1	6881 - 6903	17 ft.
2	6903 - 6954	0 ft.
3	7335 - 7357	9 ft.

In addition three runs were made with the C.S.T. gun, 70 S.W. cores being cut and 60 recovered.

Mudlogs:

The well was continuously monitored by Exploration Logging from 920 to 8038 feet (T.D.).

Electric Logs:

	Run	Interval
I.E.S.	1	822 - 2247 ft.
	2	2197 - 7332 ft.
	3	2197 - 7500 ft.
S.G.R.C.	1	882 - 2247
	2	2197 - 7500
Sonic	2	2197 - 7500
F.D.C.	1	2197 - 7332
C.D.M.	1	2197 - 7500

A velocity survey was run.

Hydrocarbons:

No significant hydrocarbon shows were encountered. Generalised gas detector readings were:

Interval	Drilling Mud					CO2	Hot Wire Cuttings
	Hot Wire	Chromatograph			C02		
		C1	C2	C3-C5			
920 - 5800ft	0 - 5	5-40	0	0	0-5	0-1	
5800 - 6860ft	2 - 10	80-500	0	0	0-5	0-1	
6860 - 7030ft	2 - 10	100-100,000	5-50	0	0	0-1	
7030 - 8083ft	2 - 5	50-1000	5-30	0	0	0-1	

Core Analysis:

The following results were obtained:

Sample Number	Depth Feet	Air Perm. m.d.	Porosity Percent	Oil Saturation	Water Saturation
1	6882	3300	25.2		
2	6883	1400	23.9		
3	6884	1447	24.4	0	90.3
4	6885	897	24.1		
5	6886	85	21.9		
6	6887	214	22.7	0	97.5
7	6888	117	22.5		
8	6889	169	23.6		
9	6890	79	22.6	0	75.5

MUSSEL - 1

3 of 5

- 3 -

Sample Number	Depth Feet	Air Perm. m.d.	Porosity Percent	Oil Saturation	Water Saturation
10	6891	93	21.2		
11	6892	340	23.0		
12	6893	293	20.7	0	76.4
13	6894	183	23.7		
14	6895	2	8.9		
15	6896	0	10.2	0	71.0
16	6897	1085	19.1		
17	6898	1650	25.5	0	94.2

Stratigraphy

<u>Formation</u>	<u>Age</u>	<u>Top (RT)</u>	<u>Subsea</u>	<u>Thickness</u>
	Recent to Upper Eocene			2950 ft.
Mepunga Fm.	Eocene	3230	3137	840
Rivernook SL.	Paleocene	4070	3977	182
Pebble Pt Fm.	Paleocene	4252	4159	342
Paaratte Fm.	Upper Cret.	4594	4501	2058
Belfast Mudst				
Flaxmans Fm.	Upper Cret.	6652	6559	184
Waarre Fm.	Upper Cret.	6836	6743	1202 +

920 - 2950 Limestone: light grey, light buff and pink brown; firm; fossiliferous with abundant biogenic detritus; variable trace chert.
Marl: white grey to light grey, soft to firm, very fine to fine, very fossiliferous, rare trace glauconite.

Mepunga Formation

3230 - 4070 Sand: clear, light brown and frosted, subrounded to sub angular, medium - very coarse grain quartz, trace pyrite.

Siltstone: light grey, moderate firm, very fossiliferous. Sand is the dominant lithology, siltstone forms 50% of total sample only occasionally towards base of interval.

Rivernook Shale

4070 - 4252 Siltstone: dark brown, soft - firm, clayey.

Pebble Pt. Formation

4252 - 4594 Siltstone: as above with abundant nodules, dark brown, very small, hard.

4236

Sand: as above, very fine to medium grain, clear to frosted quartz, poor sorting.

Paarratle/Belfast Mudstone

4594 - 6652 Siltstone: light to medium grey and dark grey, soft - firm gradational to shale.

Shale: light - medium grey, very soft, silty, sandy, trace glauconite.

Sandstone: light grey, fine - medium, well sorted, hard, tight.

Sand: very fine - medium grain, rounded - sub angular, clear and frosted quartz, variable pyrite aggregates.

Sandstone is a minor lithologic fraction and is rare below 5100 ft., sand is a minor lithologic fraction below 5000 ft. and does not occur below 5700 within this interval.

Flaxman's Beds

6652 - 6836 Siltstone and Shale as before with minor Sandstone and Sand as before, interbedded.

Waarre Formation

6836 - 8038 Sandstone: light grey, clear - cloudy (trace red at base of interval), fine - pebble and conglomeratic in part, sub angular - rounded quartz, variably unconsolidated or with calcareous, dolomitic or pyritic cement

Siltstone: as before, variable fossiliferous, pyrite glauconite.

Shale: as before, minor.

Coal: black, very minor.

Core 1 6881-6903 Cut 22ft. Rec. 17ft

6081 - 93 Sandstone: white to light grey, firm to medium grain, occasionally coarse, sub angular - subrounded, well sorted, friable, slight carbon trace, white weathered felspar and very minor lithies. Massive with occasional burrows and rare laminations.
Shale: black, micaceous, carbonaceous, pyrite, slightly fissile.

6893 - 98 Sandstone and Shale: thinly interbedded, wavy bedding, abundant sand filled burrows, occasional micro cross bedding.

Sandstone: quartzose, non calcareous, white - light grey, fine grain, angular - sub angular, well sorted, moderately friable, with occasionally thin-bedded. Sandstone: medium - coarse grain, sub angular - sub rounded, well sorted, friable - very friable, good visible porosity.

Shale beds: black, dense, poorly laminated, moderate fissile, micaceous carbonaceous, with coarse mica flakes

Core 2 6898-6903 No recovery

Core 3 7335-7357 Cut 22ft. Rec. 9ft

- 7335 - 36 Shale: medium - dark grey, massive, hard, moderate fissile, abundant fine mica.
- 7336 - 3603 ?Claystone: medium grey, hard, massive, with 10% clear fine - pebble quartz grains and 20% chlorite inclusions set in a dense clay matrix with minor dispersed pyrite; very dolomitic.
- 7336 - 7343 Carbonaceous Shale: medium - dark grey - black, massive - laminated, hard - very hard, mostly very fissile, with occasional fine silty laminae and with frequent wavy discontinuous thin Coal laminae, partly replaced by pyrite. Slight gas bleed
- 7343 - 44 Coal: dark brown - black, dull - vitreous; very brittle and fractured.
- 7344 - 7357 No recovery.

Pacific PL

MUSSEL No. 1

OIL and GAS DIVISION

15 JUL 1982

K.K. No.	Depth (m)	\bar{R}_{Vmax}	Range	N	Exinite Fluorescence (Remarks)
WANGERRIP GROUP					
PEMBER/RIVENOOK 1242m					
15358	1260 Ctgs	0.39	0.32-0.45	20	Rare dinoflagellates, cutinite and sporinite, yellow to orange. (Siltstone with minor limestone and sandstone. D.o.m. rare, V>E>I. Vitrinite phytoclasts typically small, some ?reworked coal. Sparse pyrite.)
PEBBLE POINT 1296m					
15359	1385 Ctgs	0.40	0.32-0.45	20	Rare dinoflagellates yellow to orange, rare sporinite in claystone, orange, rare resinite orange. (Claystone, siltstone, sandstone and limestone. D.o.m. rare to sparse, I>V>E. Phytoclasts small. Pyrite abundant.)
BELFAST MUDSTONE 1400m					
15360	1483 Ctgs	0.63 0.44	0.53-0.78 0.41-0.47	15 8	Rare sporinite, cutinite and resinite, orange. Rare dinoflagellates, yellow to orange. (Siltstone>sandstone, some limestone. D.o.m. sparse, I>E. Two populations are present which could be referred to vitrinite. In total abundance they approximately equal inertinite. Either mode may represent the maturation level at the horizon sampled. The higher mode may represent a weakly oxidized vitrinite population, or the lower mode may represent a cavings population. The reflectance found for 15359 suggests that the lower mode is more likely to be representative.)
SHERBROOK GROUP					
FLAXMAN FORAMTION 2010m					
15361	2013 Ctgs	0.50	0.40-0.55	23	Rare dinoflagellates, yellow, probably from the Belfast Mudstone. (Silty mudstone with minor sandstone and some limestone. D.o.m. sparse, I>E>?V. Much of the sample appears to be derived from the Belfast Mudstone. Thucholitic bitumen found, dull orange fluorescence on rim, rim reflectance 0.42%. Core is of low reflectance and is not zircon. Pyrite common.)
WARRE FORMATION 2084m					
15362	2102 Core	0.50	0.41-0.59	14	Sparse cutinite and sporinite yellow orange to orange. Rare fluorinite/resinite, green to yellow. (Sandstone with d.o.m. rare and siltstone abundant, I>E>V. Inertinite abundant, vitrinite rare, but vitrinite population well-defined.)
OTWAY GROUP 2225m					
15363	2238 Core	0.64	0.56-0.73	25	Sparse cutinite and rare sporinite, yellow to orange. Rare fluorinite/resinite, green to orange. (Siltstone with d.o.m. abundant, V>I>E. Vitrinite abundant, typically structured. Pyrite sparse.)
T.D. 2450m					