

G E O L O G Y

PREVIOUS WORK

Geological:

The well location was picked on the surface expression of the East Plunging Anticlinal Nose. Estimates of the structural difference between this well and the East Mereenie No. 1 well (6½ miles to the north-east) varied from 800 to 2,000 feet.

The objective of the operator in this well was to prove either additional gas column over the approximately 1,100 feet discovered in East Mereenie No. 1 and/or prove the presence of an oil column. The test was correctly located to achieve these ends.

Geophysical:

As for Mereenie No. 1.

Drilling:

The nearest well is East Mereenie No. 1, six and one half miles to the north-east, which flowed 30 million cubic feet of gas per day. The East Mereenie No. 1 is waiting on calculated open flow tests.

Formations Penetrated:

Stratigraphic Table

K.B. 2357'

Formation	Depth in Hole	Subsea Depth	Thickness
Pertnjara	Surface		260'+
Upper Mereenie	260'	+2097'	1490'
Middle Mereenie	1750'	+607'	118'
Lower Mereenie	1868'	+489'	210'
Upper Stokes	2078'	+279'	764'
Lower Stokes	2842'	-485'	264'
Upper Stairway	3106'	-749'	178'
Middle Stairway	3284'	-927'	312'
Lower Stairway	3596'	-1239'	287'

Formation	Depth in Hole	Subsea Depth	Thickness
Horn Valley	3883'	-1526'	201'
Upper Pacoota	4084'	-1727'	838'
Lower Pacoota	4922'	-2565'	183'
Goyder	5105'	-2748'	70'
	Pertnjara (penetrated)		260'
	Mereenie		1818'
	Stokes		1028'
	Stairway		777'
	Horn Valley		201'
	Pacoota		1021'
	Goyder (penetrated)		70'

Detailed Stratigraphy:

Surface - 260' (penetrated thickness 260')

Pertnjara

Age: Palaeozoic (Devonian?)

Surface - 260'

Interbedded Shale and Siltstone; Shale is red, purple-brown, minor patches grey and green, siliceous, calcareous, grades to Siltstone in part, is sandy in part.

260' - 2078' (thickness 1818')

Mereenie Sandstone

Age: Palaeozoic (Ordovician)

260' - 1750' (thickness 1490')

Upper Mereenie

Description as for Mereenie No. 1

260' - 594'

Sandstone generally reddish grains varies from red through brown to clear quartz, generally fine to very fine grained, well sorted. Quartz is sub-angular to sub-rounded, cementing material is probably siliceous but is slightly calcareous. Several thin interbeds of red-brown, silty shale occur between 580' - 600'. Reddish-brown, fine to medium grained Sandstone 594' - 1460'; white, fine

grained, well sorted Sandstone 1460' - 1750'.

1750' - 1868' (thickness 118')

Middle Mereenie

Description as for East Mereenie No. 1.

1868' - 2078' (thickness 210')

Lower Mereenie

Description as for Mereenie No. 1. White-brown, fine to very fine grained Sandstone 1868' - 1910'. Rust-brown, fine to medium grained, medium sorted, Sandstone 1910' - 2078'.

2078' - 3106' (thickness 1028')

Stokes Shale

Age: Palaeozoic (Ordovician)

2078' - 2842' (thickness 764')

Upper Stokes

Description: As for Mereenie No. 1.

2842' - 3106' (thickness 264')

Lower Stokes

Description: As for Mereenie No. 1

3106' - 3883' (thickness 777')

Stairway Sandstone

Age: Palaeozoic (Ordovician)

3106' - 3284' (thickness 178')

Upper Stairway

Description: As for Mereenie No. 1. Phosphatic material is present as dark pellets (usually in finer grained material) throughout the Upper Stairway.

3284' - 3596' (thickness 312')

Middle Stairway

Description: As for Mereenie No.1. Phosphatic material very prevalent throughout section.

3596' - 3883' (thickness 287')

Lower Stairway

Description: As for Mereenie No. 1. Scattered minor porosity occurs through section in thin coarser grained Sandstones. Very good porosity is shown over interval

3800' - 3810' in medium, well rounded quartz Sandstone.

3883' - 4084' (thickness 201')

Horn Valley Shale

Age: Palaeozoic (Ordovician)

Description: As for Mereenie No. 1

4084' - 5105' (thickness 1021')

Pacoota Sandstone

Age: Palaeozoic (Ordovician)

4084' - 4922' (thickness 838')

Upper Pacoota

Description: As for East Mereenie No. 1. Generally the Pacoota Sandstone is similar to East Mereenie No. 1, however, there is an increase in Shale content in the upper section of the formation. The top of the Scolithid zone is at 4382' and the Glauconitic zone extends from 4580' to 4645'.

4922' - 5105' (thickness 183')

Lower Pacoota

Description: As for East Mereenie No. 1

5105' - 5175' (penetrated thickness 70')

Goyder Formation

Age: Palaeozoic (Cambrian)

Description: As for East Mereenie No. 1

RELEVANCE TO THE OCCURRENCE OF PETROLEUM

The most significant result of East Mereenie No. 2 well was the discovery of an oil column in the Pacoota Sandstone. The well established that approximately 355' of oil column exists in the reservoir section. This oil column, together with the high percentages of residual hydrocarbon material found in the Upper Pacoota, supports the view that a significant potential oil production zone is present in the Mereenie Anticline. The well established that the total gas column (taking 4,450' as the gas/oil contact) on the Mereenie Anticline is 1,072' thick.

The total gas column, together with 355' of oil column indicated a minimum of 1,427' of closure. The well further established the continuity of source and reservoir rocks throughout the area. However, local depositional environment conditions or secondary solution determine permeability within the Pacoota Sandstone. The well was cased to 5,072' and completed as a gas well. Preliminary flow rate after perforating was 2,500,000 cubic feet of gas per day.

Core analysis indicates minor permeable zones not recorded by the microlog. At a later date, if increased gas deliverabilities are needed, additional perforating should be done.

Open flow potential will be determined when equipment and personnel are available.

POROSITY AND PERMEABILITY
OF SEDIMENTS PENETRATED

No cores were cut in this well above the Pacoota Sandstone. Visual determination shows slight porosity in the Mereenie Sandstone and in minor zones through the Stairway Sandstone (most noticeably between 3,800' and 3,810').

Porosity and permeabilities were determined initially by visual observation of cores and cuttings, and recorded in sample descriptions. One foot core samples were sent to Core Laboratories in Brisbane and also to the Bureau of Mineral Resources in Canberra for analysis. These results are tabulated in Appendix A(ii) and A(iii).

These confirm that low permeabilities are present throughout most of the Upper Pacoota. Maximum porosity and permeability recorded from core analysis occur over the intervals:-

4156' - 4160'; 4180' - 4181'; 4189'; -4250'; 4710'; 4327' - 4329'; 4339' - 4342'; 4347' - 4348'; 4369'; 4377'; 4453'; 4495'; 4501'; 4752'; 4753'; 4957' - 4962'.

The zone 4752' - 4777' has consistently good porosity but generally low permeabilities. The low permeability is

due in part to an increase in argillaceous and asphaltic (hydrocarbon) material.

CASING AND WELLHEAD DATA

East Mereenie No. 2 was completed on 6th November, 1964, in the following manner.

Production Casing:

159 joints of 7" casing were run to 5,072' with Differential Fill-up collar at 5,038'. Shoe joint was not cleaned out.

Perforations:

The gas zone in the Upper Pacoota was perforated from the microlog with 4 shots/foot over each of the following intervals:-

4160' - 4164'
4182' - 4185'
4191' - 4193'
4332' - 4335'
4344' - 4346'
4360' - 4362'
4372' - 4376'
4379' - 4380'
4404' - 4408'
4412' - 4419'

Tubing:

131 joints of 2 $\frac{7}{8}$ " tubing were run open ended and landed at 4,037 feet.

Wellhead:

See attached drawing for wellhead details.