

EAST MEREENIE 30
WELL COMPLETION REPORT

BY T. O' SULLIVAN

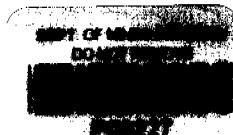
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SUMMARY

East Mereenie 30 (EM 30) is the thirty-eighth well in the Mereenie oil and gas field, Amadeus Basin. The well is situated 970m west of East Mereenie 28 on the south eastern flank of the Mereenie Anticline, within Petroleum Lease 5, Northern Territory (Figures 1 & 2).

AGL Petroleum (now SANTOS Petroleum) operated the project on behalf of the Mereenie Joint Venture. Drilling was performed by OD&E using Mereenie Rig 1, an OIME SL750. The well spudded in the Mereenie Sandstone on the 8th July 1992 at 17:30 hrs and reached a total depth of 1539m in the Pacoota P4 unit at 13:00hrs on the 6th August.

EM 30 is an oil development well. The objective was the Ordovician Pacoota P3-120/130 reservoir which is productive in East Mereenie 28 and is the most productive oil reservoir in the field. Net sand totalling 3.1 m and with an average of 7.3% porosity was interpreted from logs.

The well was deviated in order to intersect the top of the net sand in the P3-120/130 at an elevation of 684m sub-sea (2244' SS, 166' above the oil/water contact). The base of the P3 was intersected at 729m sub-sea (2392' SS), which resulted in the basal P3 sands (the secondary target), to be within the oil column.

During air drilling operations both the Lower Stairway Sandstone and the P1 unit of the Pacoota Sandstone were flow tested and produced gas at .85MMCFD and 2.47MMCFD respectively.

After logging, 5-1/2" production casing was run to TD. The well was completed using a 3-7/8" tubing conveyed perforating gun at 6 shots per foot. The intervals perforated were the P3-120/130 from 1445.5m to 1455.5m and the P3-230/250 from 1482.0m to 1489.0m. Although it was planned to fracture stimulate both zones, prefrac and stress tests indicated that the P3-230/250 not only had poor permeability but also that the induced fracture plane would be horizontal. Consequently, the fracture stimulation proposed for the basal P3 sands was abandoned. The P3-120/130 fracture stimulation proceeded according to plan.

Mereenie Rig 1 was released at 07:30 hours on 9 August 1992.

1.0 WELL DATA

NAME : East Mereenie 30

STATUS/DESIGNATION : Completed P3-120/130 oil development well

LOCATION - Geographical : Latitude : 24° 01' 34.5"S
Longitude : 131° 36' 24.0E

- AMG : Easting : 765 137.0
Northing : 7 340 401.9

- Wells : 970m from EM28 at 265°TN

ELEVATIONS : GL: 746.7 (2450')
KB: 752.8m (2470')

PERMIT : PL 5, Northern Territory

OPERATOR : Moonie Oil NL (through SANTOS Petroleum)

PARTICIPANTS : Moonie Oil NL 21.00%
Transoil NL 9.00%
Petromin NL 7.50%
International Oil Proprietary 6.25%

Magellan Petroleum NT Pty Ltd 20.00%
United Oil & Gas Co NT Pty Ltd 15.00%

Canso Resources Limited 15.00%
Farmout Drillers NL 6.25%

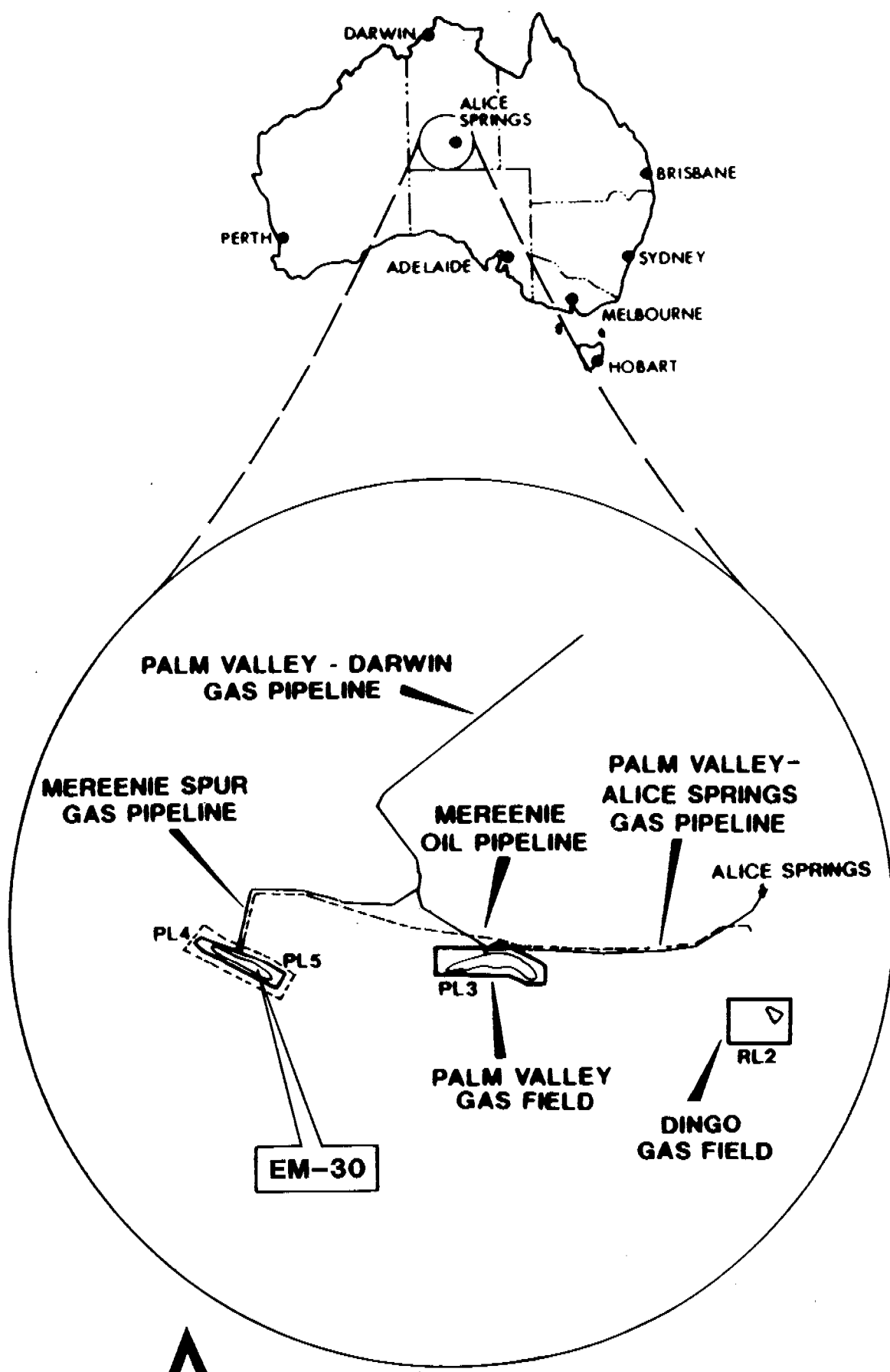
RIG : OIME SL-750 (Mereenie Rig 1)

DRILLING COMMENCED : 17:30hrs, 8 July 1992

TOTAL DEPTH REACHED : 13:00hrs, 6 August 1992

TOTAL DEPTH : 1539m

RIG RELEASED : 07:30hrs, 9 August 1992



PETROLEUM LEASES 4 & 5
 MEREENIE FIELD

EAST MEREENIE-30

LOCALITY MAP

AUTHOR : T.O'SULLIVAN
 DATE : MARCH 1993

FIGURE 1

MEREENIE OIL & GAS FIELD SHOWING LOCATION OF EM30



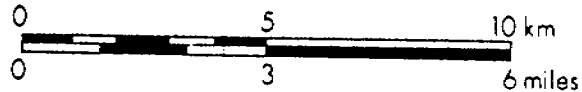
131° 30'

EM30

**PETROLEUM
LEASE 4**

**PETROLEUM
LEASE 5**

- Well suspended pending recompletion
- Plugged and abandoned with no show
- Plugged and abandoned with gas show
- Plugged and abandoned with oil show (Measured oil recovery in pipe)
- Completed gas well
- Completed oil well
- Oil well with gas show
- Plugged and abandoned with gas and oil show
- Gas well with oil show



AUTHOR: T. O'SULLIVAN

DATE: APRIL 1992

131° 30'

24°

24°

WM 1 WM 4 WM 6 WM 7 WM 3 WM 5 WM 2 M 1

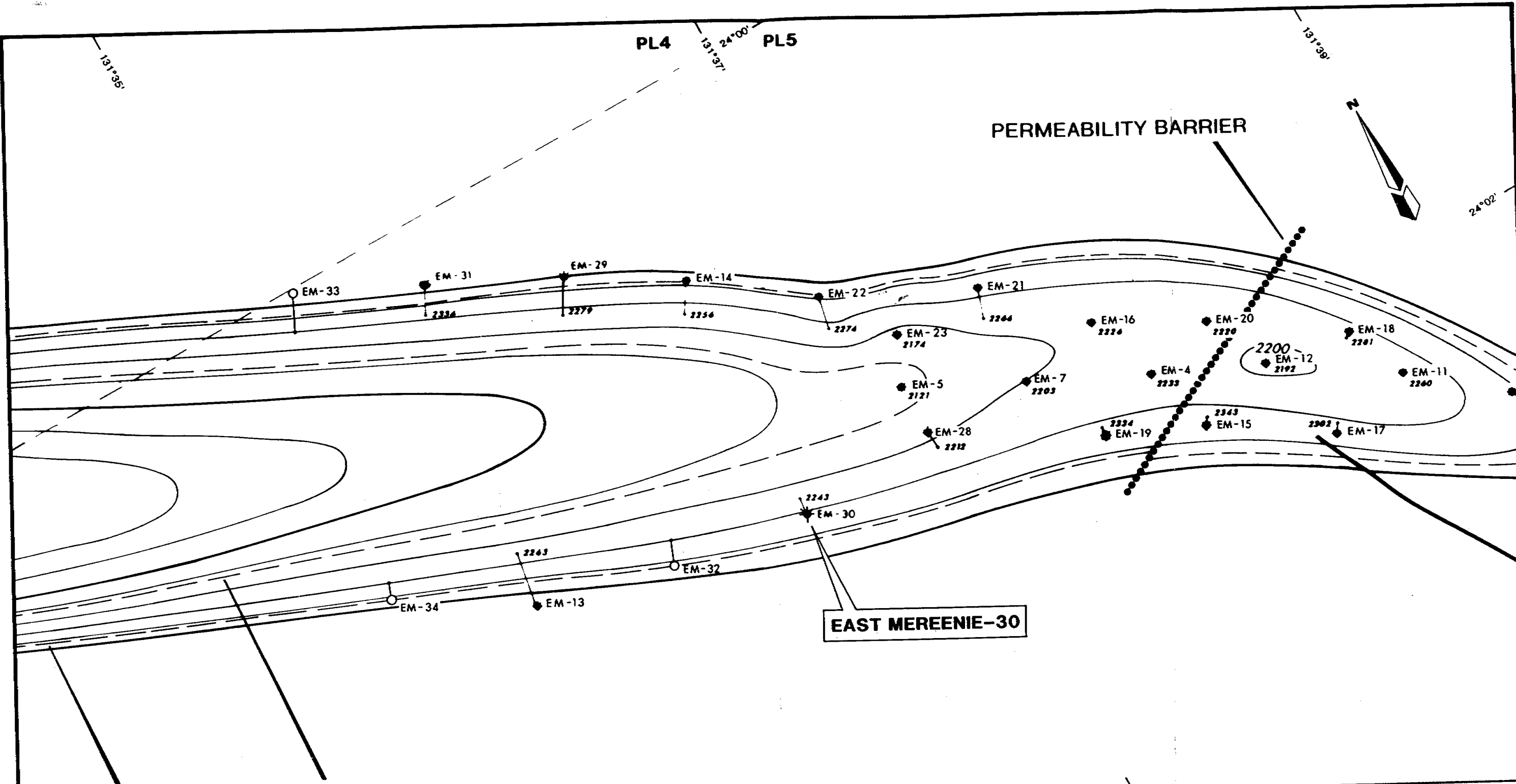
EM 1 EM 3 EM 29 EM 22 EM 21 EM 16 EM 20 EM 18 EM 11 EM 27 EM 9 EM 26 EM 8 EM 24 EM 6 EM 10 EM 25 EM 28 EM 13 EM 5 EM 7 EM 4 EM 19 EM 15 EM 17 EM 2 EM 12 EM 14 EM 15

17849 Z1
FIGURE 2

STRATIGRAPHY OF THE MEREENIE FIELD

AGE	ENVIRONS	GROUP	STRATIGRAPHY	LITHOLOGY	TECTONIC EVENT	HYDROCARBON OCCURENCES	
TERTIARY	CONTINENTAL		SURFICIAL SEDIMENTS				
DEVONIAN	L	PERTNJARA	PARKE SILTSTONE		Alice Springs Orogeny		
	M				Pertnjara Movement		
	E						
SILURIAN	AEOLIAN	LARAPINTA	MEREENIE SANDSTONE	A			
				B			
	SHALLOW MARINE			C			
				D			
ORDOVICIAN	ESTUARINE		CARMICHAEL SANDSTONE		Rodingan Movement		
	SHALLOW MARINE	M	STOKES FORMATION	UPPER			
				LOWER			
	INTERTIDAL	M	STAIRWAY SANDSTONE	UPPER			SMALL GAS FLOWS
				MIDDLE			SMALL GAS FLOWS
				LOWER			MINOR GAS PRODUCTION
	EUXINIC	E	HORN VALLEY SILTSTONE				
	INTERTIDAL		PACOOTA SANDSTONE	P1			OIL & GAS PRODUCTION
P2							
P3						OIL & GAS PRODUCTION	
P4					GAS FLOWS & OIL RECOVERY		
CAMBRIAN	L	PERTAOORRTA	GOYDER FORMATION				
	M		CLELAND SANDSTONE				
E				Petermann Ranges Orogeny			
PROT.	SHALLOW MARINE EVAPORITIC		BITTER SPRINGS FORMATION		Souths Range Movement Areyonga Movement		

FIGURE 3



EAST MEREENIE-30

OWC

GOC

PL 4 & 5 AMADEUS BASIN, NORTHERN TERRITORY
MEREENIE OIL & GAS FIELD
EAST MEREENIE-30
ON STRUCTURE CONTOURS TOP P3-120 RESERVOIR SAND
EASTERN NOSE AREA

0 0.5 1 1.5 2km

Author: T.O'Sullivan	Date: March 1993	Datum:
Drawn: TDL	C.I. 100m	Scale: 1:25000
Base No. 18976 VFM	ENCLOSURE	
DBase No. 18224 VFM		



2.0 SAMPLING LOGGING AND TESTING

2.1 Ditch cuttings

Table 1 shows the sampling intervals used when collecting ditch cuttings.

TABLE 1

EAST MEREENIE 30 - DITCH CUTTINGS SAMPLING INTERVALS

INTERVAL	FORMATIONS	SAMPLING INTERVAL
41 - 1100m	Mereenie SS - Lower Stairway	10m
1100 - 1539m	Lower Stairway - Pacoota P4 (TD)	3m

The various samples of ditch cuttings which were collected are listed below.

TABLE 2

EAST MEREENIE 30 - DITCH CUTTINGS SAMPLES

SAMPLE TYPE	STORED IN	DELIVERED TO
unwashed and dried	cloth bags	NT Department of Mines
washed and dried	cloth bags	
washed and dried	cloth bags	SANTOS Mereenie
washed and dried	Samplex trays	SANTOS Brisbane
washed and dried	Envelopes	Magellan Petroleum

All samples were described and examined for oil fluorescence. Lithological descriptions are presented in Appendix 1.

2.2 Geochemical Sampling

No samples were taken for geochemical analysis.

2.3 Mud Logging

East Mereenie 30 was drilled to 1308m with air/foam/mist and then to 1539m (TD) with KCl/polymer mud. The Mereenie Rig 1 mud logging shack was manned by a crew from Colin Higgins & Associates.

A hot wire total gas detector was run from the conductor (41m) to total depth (1539m). In addition, bit penetration rate, mud pump strokes and pit levels were

monitored. Cuttings were collected from 41m to total depth, described and checked for oil shows. A mudlog was prepared at a scale of 1:500 and is included as Enclosure 2.

Samples were also described by the wellsite geologist who was responsible for supervision of mud logging and wireline logging services. A composite log was prepared at a scale of 1:1000 and is included as Enclosure 1.

2.4 Conventional/Sidewall Cores

No conventional or sidewall cores were taken.

2.5 Wireline Logs

Wireline logs were run by Schlumberger. Table 3 lists the logging suite.

TABLE 3
EAST MEREENIE 30- WIRELINE LOGGING SUITE

RUN	LOG	INTERVAL
1	FMS4-GR	1196 - 891m
1	DLL-SP-CAL-MSFL	1193-917m
1	LDL-CNL-GR-CAL	1193-917m
1	GR	1193 - 0m
2	DLL-SP-CAL-MSFL-GR	1535 - 1196m
2	LDL-CNL-GR-CAL	1529 - 1196m
2	FMS4-GR	1539 - 1196m
2	AS-GR	1539 - 1196m

Run 1 was carried out when drilling had penetrated about 10m into the Horn Valley Siltstone. This was designed to provide an accurate pick for the top of the Horn Valley Siltstone, as well as strike and dip of the strata. This data enabled a refinement of the target position and an adjustment to the well trajectory.

Films and prints of the logs were provided at 1:200 and 1:500 scale. Magnetic tapes were also supplied. Enclosures 3 - 9 are 1:200 and 1:500 prints.

2.6 Velocity Survey

No velocity survey was carried out.

2.7 Deviation Surveys

The survey data are presented in the East Mereenie 30 Drilling Summary (Section 3).

Below the surface casing point (701m), East Mereenie 30 was intentionally deviated. Between surface and 701m the drift was measured with a Totco instrument which does not record the direction of drift. For the purpose of directional calculations, an azimuth of 14° was assumed over this interval.

2.8 Formation Testing

Gas first started flaring from the blooie line at approximately 1151m, within the Lower Stairway Sandstone. After penetrating a further 2m, drilling was stopped and the air compressors were shut down to allow gas to flow to surface. The results of this flow test and others in the P1 unit are presented in Table 4.

TABLE 4

EAST MEREENIE 30 - FLOW TEST RESULTS

DEPTH	STRATIGRAPHIC LEVEL	FLOW	ORIFICE	PRESSURE
1153m	Lower Stairway	.85MMCFD	1/2"	146psig
1261m	P1 down to upper P1-80	.79MMCFD	1/4"	580psig
1265m	P1 down to base P1-80	1.36MMCFD	1/2"	246psig
1272m	P1 down to base P1-80	1.37MMCFD	3/4"	101psig
1298m	P1 down to base P1-200	2.47MMCFD	3/4"	199psig

No drill stem tests were conducted in EM 30.

3.0 GEOLOGY

3.1 Stratigraphy

The stratigraphic sequence penetrated by East Mereenie 30 was very similar to that encountered by other wells in the field. It consists of aeolian, fluvial, lacustrine and shallow to moderately deep marine sediments composed of sandstones, siltstones, shales and minor carbonates of Devonian to early Ordovician age (Figure 3).

The well spudded in the base of the Mereenie Sandstone and reached a total depth of 1539m within the Pacoota Sandstone P4 unit. Tables 5 & 6 list the formation tops and thicknesses. (NOTE: MD = Measured Depth, TVD = True Vertical Depth, AMSL = Above Mean Sea Level)

TABLE 5

EAST MEREENIE 30 - STRATIGRAPHIC TABLE

(METRES)

FORMATION	DEPTH(m)			THICKNESS(m)	
	MD	TVD	AMSL	MEAS.	TRUE
Mereenie Sandstone	6	6	-748	519+	511+
Carmichael Sandstone	525	525	-229	73	72
U Stokes Siltstone	598	598	-156	253	251
L Stokes Siltstone	851	850	96	65	65
U Stairway Sandstone	916	914	161	60	60
M Stairway Sandstone	976	974	220	124	124
L Stairway Sandstone	1100	1096	342	68	67
Horn Valley Siltstone	1167	1163	409	68	68
Pacoota Sandstone P1	1236	1231	477	107	107
P2	1343	1336	583	68	68
P3	1411	1403	649	35	35
P3-120/130	1446	1438	684	82	81
P4	1493	1483	729	46+	45+
Total Depth	1539	1527	774		

MD = Measured Depth, TVD = True Vertical Depth, AMSL = Above Mean Sea Level

TABLE 6

EAST MEREENIE 30 - STRATIGRAPHIC TABLE

(FEET)

FORMATION	DEPTH(ft)			THICKNESS(ft)	
	MD	TVD	AMSL	MEAS.	TRUE
Mereenie Sandstone	20	20	-2453	1702+	1677+
Carmichael Sandstone	1722	1722	-751	239	236
U Stokes Siltstone	1962	1962	-511	830	823
L Stokes Siltstone	2792	2789	316	213	212
U Stairway Sandstone	3005	3000	527	196	195
M Stairway Sandstone	3201	3195	722	406	405
L Stairway Sandstone	3608	3596	1123	222	221
Horn Valley Siltstone	3830	3816	1343	223	223
Pacoota Sandstone P1	4053	4037	1564	351	350
P2	4404	4384	1914	224	223
P3	4628	4604	2131	269	267
P3-120/130	4744	4717	2244		
P4	4897	4865	2392	152+	151+
Total Depth	5049	5011	2538		

MD = Measured Depth, TVD = True Vertical Depth, AMSL = Above Mean Sea Level

3.2 Formation Dips

An FMS survey was run from 891m to 1539m. The dipmeter component of the FMS was processed on site and resulted in a computed structural dip of 10° with an azimuth of 192° relative to true north.

3.3 Well Objectives

East Mereenie 30 was the thirty-eighth well drilled in the Mereenie Oil and Gas Field. It was designed as a development well to produce oil from the Pacoota P3-120/130 sand, the most productive reservoir in the field. A secondary objective was to investigate the potential of the lower P3 sandstones.

The well is located 950m west of East Mereenie 28 on the south-eastern flank of the Mereenie Anticline (Figures 2 & 4). The primary drive mechanism at Mereenie is the expanding gas cap with only a weak water drive. EM30 was designed to intersect the P3-120/130 as low in the oil column as possible while still maintaining the lower P3 sands above the oil water contact. The top of the net sandstone in the P3-120/130 was intersected at 684.9m subsea which is 35.7m below the gas oil contact and the base of the P3 at 730.0m subsea which is 4.6m above the oil water contact.

EM 30 was also intended to test the overlying Pacoota P1 and Stairway Sandstone reservoirs, which are in the gas leg at this location. This was confirmed by the gas flows in both units during air drilling operations.

3.4 Petroleum Geology

Cuttings were described and checked for fluorescence from the top of the Mereenie Sandstone to total depth. A hot wire total gas detector was run over the same interval.

In East Mereenie 30 the Pacoota Sandstone gas/oil contact is at approximately 1409.6m (measured depth) and the oil/water contact at 1497.6m. Gas shows occurred throughout the Pacoota section and oil fluorescence was observed sporadically between 1409 and 1518m.

A brief description of the significant hydrocarbon indications is given below. East Mereenie 30 was drilled with air to 1308m then with mud to a total depth of 1539m. The rate of penetration log does not clearly define porous sandstone intervals in most places so the following discussion relies on a correlation of the ditch gas curve with the electric logs. Unless otherwise stated, the depths quoted are logger's measured depths. For sands which are known to be gas-saturated, if no gas was flowing to surface and flaring at the blooie line when the zone was being air-drilled it is inferred that the reservoir is tight.

Lower Stairway Sandstone (1100 - 1167m)

As in adjacent wells, the Lower Stairway Sandstone comprises three

lithostratigraphic units: an upper sandstone with interbedded siltstone; a middle siltstone unit; and a lower sand which has reservoir potential in some parts of the field particularly along the axis of the anticline and on the southern flank where EM30 is located. The Lower Stairway is gas saturated and a gas flow of .85MMCFD was recorded at 1153m.

Horn Valley Siltstone (1167 - 1236m)

The Horn Valley Siltstone is a euxinic siltstone/shale unit and has no reservoir potential.

Pacoota Sandstone (1236 - 1539m(TD))

No vegetation existed during the Ordovician and the climate was hot and dry. The Pacoota Sandstone was deposited in a transgressive series of marine to shoreline environments on the southwestern margin of a shallow epicontinental sea (Havord, 1988). It is the primary reservoir formation for the Mereenie Field and has been divided into four units.

P1 Unit (1236 - 1343m)

The P1 unit comprises interbedded sands, silts and shale deposited in a shallow marine to intertidal sand bar sequence. Clean sands were deposited as high energy sand shoals and bars.

Air drilling was used to drill the majority of the P1. A sustained flare was encountered at 1260m at the top of the P1-80 unit and a flow of .79MMCFD was recorded during an open hole flow test. At the base of the P1-80, another flow test was conducted and the flow had increased to a rate of 1.36MMCFD. Drilling continued with air to 1298m at the base of the P1-200 unit where there was a marked increase in flow rate. A flow of 2.47MMCFD was recorded which necessitated converting the drilling operations to mud. The mud drilled section in the lower P1 yielded gas peaks within the P1-280, P1-310 and P1-350 intervals with gas units of 56, 30 and 84 respectively.

P2 Unit (1343 - 1411m)

The P2 is a shallow to moderately deep marine unit comprising predominately siltstone and shale. The proportion of sandstone in the cuttings samples is high in this unit but is considered to be unrepresentative owing possibly to a majority of the siltstone and shale cuttings being very soft and dispersing into the mud.

Gas units tend to be confined to background gas in the P2 interval except near the base of the subunit where gas peaks of over 1000 units were recorded in a thin sandstone. 10 to 20 % bright white to yellowish green fluorescence was described but both crush cut and residue ring were absent

P3 Unit (1411 - 1493m)

The P3 Unit comprises interbedded sandstones and siltstones of a generally transgressive shoreline sequence including lagoon, barrier bar, and shoreface deposits. The main oil producing reservoirs in the field are the P3-120 and the P3-130 sandstones. Garside (1987) interprets the P3-120/130 units as a shoreface deposits.

Ditch gas peaks of more than 1300 units occur against a background of 20 units from the top of the P3 to 1440m. There is also 20% bright white to yellow green fluorescence with a very weak crush cut leaving a faint residue. Zero net pay was interpreted for this interval. (See Log Analysis Report, Appendix 3.)

The P3-120/130 reservoir (1442.0-1456.7m) yielded ditch gas up to 1790 units above a background of 20 units. Log analysis assigns 3.1 m net sand with an average 7.3 % porosity. Fluorescence ranges from 10 - 50% and is dull to moderately bright, solid to spotted and yellowish white, with a very slow streaming to diffuse cut leaving a thin film residue.

Yellowish white fluorescence , 30-50%, with a slow cut was recorded in the basal P3 sandstones. A slow crush cut with a thick yellow residue ring was also observed. Log analysis assigns .5 m net pay with an average porosity of 6.4 %

P4 Unit (1493 - 1539m(TD))

The P4 unit consists of a relatively homogeneous sandstone deposited in a shoreface to intertidal environment. The reservoir quality of the section penetrated in EM30 is poor, and except for the top 4m is within the water leg. No significant hydrocarbon fluorescence was observed within the unit.

REFERENCES

- Catsoulis, D 1986, Reservoir Characteristics and Sedimentology of The Stairway Sandstone Central Amadeus Basin Northern Territory, Unpublished B Sc Hons thesis University of Queensland Department of Geology and Mineralogy.
- Garside, IE 1987, Mereenie Field Facies Study Pacoota Sandstone, Unpublished AGL Petroleum Ltd report.
- Havord, PJ 1988, Mereenie Field Amadeus Basin Northern Territory Australia, Unpublished AGL Petroleum Ltd report.