EAST MEREENIE 31

WELL COMPLETION REPORT

BY A. PIPER

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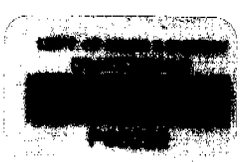

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ILLUSTRATIONS

SUMMARY

East Mereenie 31 (EM 31) is the thirty-ninth well to be drilled in the Mereenie oil and gas field, Amadeus Basin. The well is situated 912m west north-west of East Mereenie 29 on the north eastern flank of the Mereenie Anticline, within Petroleum Lease 5, Northern Territory (Figures 1 & 2).

AGL 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 Park Siltstone on the 29th October 1992 at 1800 hrs and reached a total depth of 1518m in the Pacoota P4 unit at 0315hrs on the 21st November.

EM 31 is an oil development well. The objective was the Ordovician Pacoota P3-120/130 reservoir which is productive in East Mereenie 29 and is the best reservoir in the field. Net sand totalling 10.5m and with an average of 8.2% porosity was interpreted from logs.

The well was deviated in order to intersect the top of the P3-120 at an elevation of 710m sub-sea (2330' SS, 120' above the oil/water contact). The actual intersection was 2m (7') below this target. (See Table 7.) Upon completion and fracture stimulation, EM 31 flowed oil with a water cut so the reservoir lies in an oil/water transition zone at this location.

The Stairway Sandstone is gas-saturated but tight. However flow tests at the P1-80 and P1-280 yielded 270MCFD and 1.8MMCFD of gas respectively.

After logging, 8 5/8" casing was run to TD. The well was completed using a 5" tubing conveyed perforating gun at 5 shots per foot. The perforated interval is 1469-1479.8m encompassing the P3-120/130.

Mereenie Rig 1 was released at 0300 hours on 25 November 1992.

1.0 WELL DATA

NAME	:	East Mereenie 31
STATUS/DESIGNATION	:	Completed P3-120/130 oil development well
LOCATION - Geographical	:	Latitude : 24° 00' 13.5"S Longitude : 131° 35' 35.2"E
- AMG	:	Easting : 763,803.1 Northing : 7,342,920.5
- Wells	:	912m from EM29 at 296°TN
ELEVATIONS	:	GL: 730.7m (2397') KB: 736.8m (2417')
PERMIT	:	PL 5, Northern Territory
OPERATOR	:	Moonie Oil NL (through AGL Petroleum, now Santos Ltd)
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	:	1800hrs, 29 October 1992
TOTAL DEPTH REACHED	:	0315hrs, 21 November 1992
TOTAL DEPTH	:	1518m
RIG RELEASED	:	0300hrs, 25 November 1992

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 31 - DITCH CUTTINGS SAMPLING INTERVALS

INTERVAL	FORMATIONS	SAMPLING INTERVAL
38 - 940m	Mereenie SS - Lower Stokes	10m
940 - 1318m	Upper Stairway - Pacoota P1	6m
1318 - 1518m	Pacoota P1 - Pacoota P3 (TD)	3m

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

TABLE 2

EAST MEREENIE 31 - 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	AGL Mereenie
washed and dried	Samplex trays	AGL 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 31 was drilled to 1342m with air and thence to 1518m (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 (38m) to total depth (1518m). The chromatographic gas composition was measured from 1106m - TD. In addition, bit penetration rate, mud pump strokes and pit levels were monitored.

Cuttings were collected from 38m 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 (A. Piper, Appendix 1) 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 31- WIRELINE LOGGING SUITE

RUN	LOG	INTERVAL
1	FMS-GR	1222 - 878m
2	GR	1491 - 76m
2	DLL-SP-CAL	1516 - 692m
2	MSFL	1503 - 918m
2	LDL-CNL-GR-CAL	1511 - 898m
2	BHC-GR	1518 - 910m

Run 1 was carried out when drilling had penetrated about 40m into the Horn Valley Siltstone. It was designed to provide an accurate pick for the top of the Horn Valley Siltstone and a strike and dip of the strata.

Films and prints of the logs were provided at 1:200 and 1:500 scale. Magnetic tapes were also supplied. Enclosures 3 - 7 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 31 Drilling Summary (Appendix 2).

Below the surface casing point (702m), East Mereenie was intentionally deviated. Between surface and 702m 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 207^{o}Mag was assumed over this interval by AGL and, Hofco Oilfield Services Pty Ltd (the directional drillers) assumed no deviation at all for the interval.

2.8 Formation Testing

Gas first started flaring from the blooie line at approximately 1278m, the top of the P1/80 sand. After penetrating a further 3m, drilling stopped and the air compressors were shut down to allow gas to flow to surface. Another flow test was carried out at 1342m where a large surge of gas was contributed from the P1/280 sand. The results of these tests are presented in Table 4.

TABLE 4

EAST MEREENIE 31 - FLOW TEST RESULTS

DEPTH	STRATIGRAPHIC LEVEL	FLOW	ORIFICE	PRESSURE
1281m	P1/80 sand	270MCFD	1/4"	170psig
1342m	P1/280 sand	1.8MMCFD	1/2"	312psig

No other open hole tests were conducted in EM 31.

3.0 GEOLOGY

3.1 Stratigraphy

The stratigraphic sequence penetrated by East Mereenie 31 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 comprising sands, silts, shales and minor carbonate of late Devonian to early Ordovician age (Figure 3).

The well spudded in the base of the Parke Siltstone and reached a total depth of 1518m at the extrapolated top of 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)

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TABLE 5

EAST MEREENIE 31 - STRATIGRAPHIC TABLE, METRES

FORMATION	DEPTH(m)			THICKNESS(m)	
	MD	TVD	AMSL	MEAS.	TRUE
Parke Siltstone	6	6	731	8+	8+
Mereenie Sandstone	14	14	723	524	506
Carmichael Sandstone	538	538	199	73	71
U Stokes Siltstone	611	611	126	245	240
L Stokes Siltstone	856	855	-118	76	76
U Stairway Sandstone	932	929	-193	59	59
M Stairway Sandstone	991	987	-250	135	135
L Stairway Sandstone	1126	1117	-380	60	59
Horn Valley Siltstone	1186	1174	-437	71	71
Pacoota Sandstone P1	1257	1243	-506	106	106
P2	1363	1345	-609	67	67
P3	1430	1411	-674	88	88
P3/120	1469	1449	-712		
Total Depth	1518	1497	-761		

TABLE 6

EAST MEREENIE 31 - STRATIGRAPHIC TABLE, FEET

FORMATION	DEPTH(ft)			THICKNESS(ft)	
	MD	TVD	AMSL	MEAS.	TRUE
Parke Siltstone	20	20	2397	26+	25+
Mereenie Sandstone	46	46	2371	1718	1660
Carmichael Sandstone	1764	1764	653	240	232
U Stokes Siltstone	2005	2005	413	804	789
L Stokes Siltstone	2809	2805	-388	249	248
U Stairway Sandstone	3058	3049	-632	194	193
M Stairway Sandstone	3251	3238	-821	444	443
L Stairway Sandstone	3695	3663	-1246	195	195
Horn Valley Siltstone	3890	3852	-1434	233	233
Pacoota Sandstone P1	4123	4077	-1660	349	349
P2	4472	4414	-1997	220	220
P3	4692	4628	-2211	289	287
P3/120	4819	4754	-2337		
Total Depth	4980	4912	-2495		

3.2 Formation Dips

An FMS survey was run from 1222m to 878m. The average structural dip over this interval is estimated to be 15^{o} towards the NNE.

3.3 Well Objectives

East Mereenie 31 was the thirty-ninth 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 best reservoir in the field.

The well is located 912m NW of East Mereenie 29 on the north-eastern flank of the Mereenie Anticline (Figures 2 & 4). EM 29 flowed oil at a disappointing rate from the P3-120/130 reservoir but became economic when stimulated by artificial fracturing. Fracture stimulation was also planned for EM 31. The primary drive mechanism is the expanding gas cap at Mereenie and there is minimal upwards water coning. Hence, the well was designed to reach the top of the P3-120 reservoir as near as practicable to the oil/water contact (see Table 7).

TABLE 7

WELL INTERSECTIONS WITH TOP OF P3-120 RESERVOIR

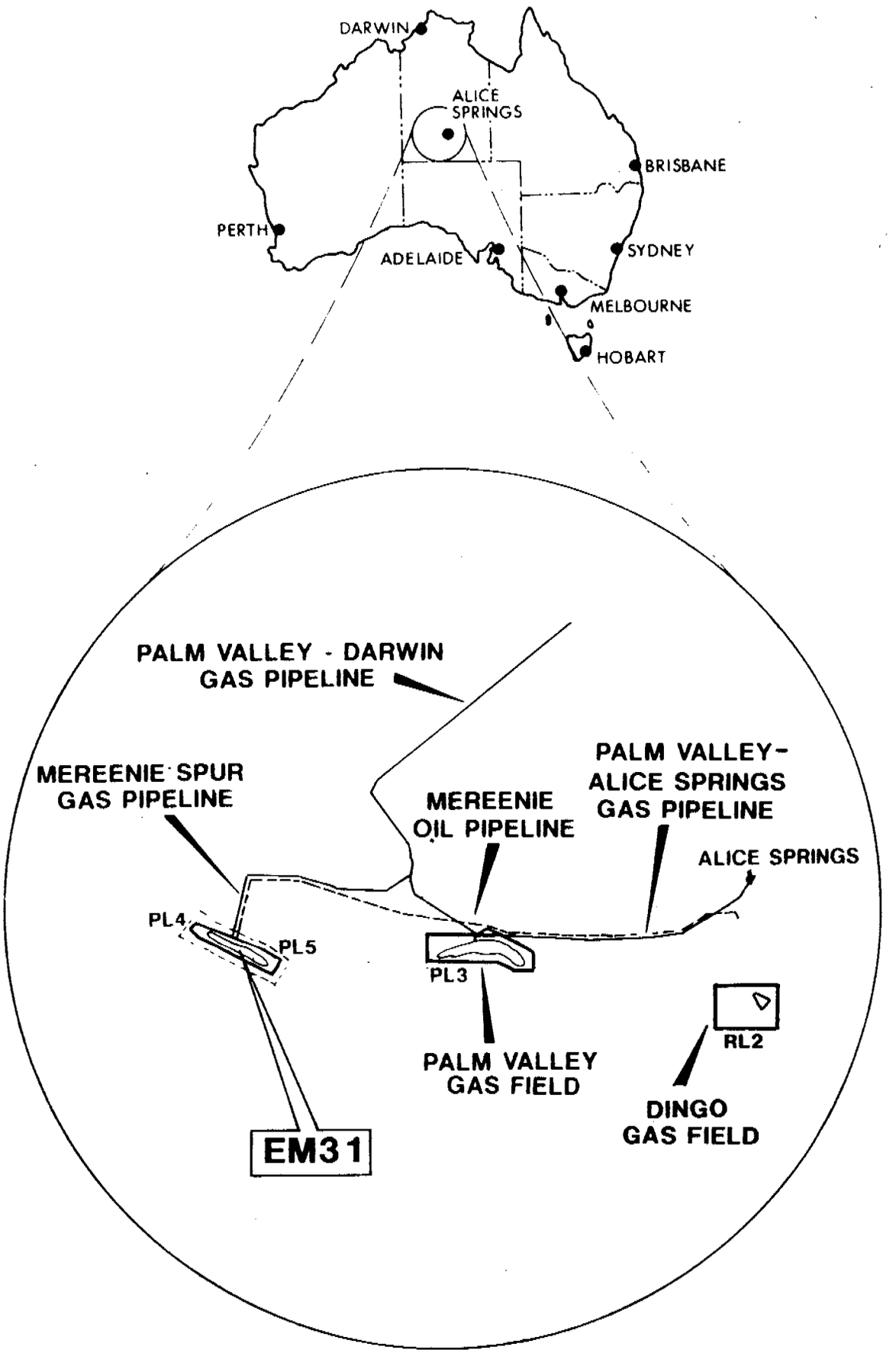
	EM 29 ACTUAL		EM 31 TARGET		EM 31 ACTUAL	
	SUB-SEA	BELOW/ ABOVE	SUB-SEA	BELOW/ ABOVE	SUB-SEA	BELOW/ ABOVE
GAS/OIL CONTACT	2130' 649m	149' 45m	2130' 649m	200' 61m	2130' 649m	207' 63m
TOP P3-120	2279' 695m	0' 0m	2330' 710m	0' 0m	2337' 712m	0' 0m
OIL/WATER CONTACT	2450' 747m	171' 52m	2450' 747m	120' 37m	2450' 747m	113' 35m

EM 31 was also intended to test the overlying Pacoota P1 and Stairway Sandstone reservoirs, which are in the gas leg at this location. In EM 29 the Stairway Sandstone was tight. However a flow test of the Pacoota P1-80 sand (air-drilled) in EM 29 produced gas at 0.88MCFD. After EM 29 was filled with mud a drill stem test over most of the P1 unit yielded 0.58MMCFD of gas.

3.4 Petroleum Geology

Cuttings were described and checked for fluorescence from the top of the Mereenie Sandstone to TD. A hot wire total gas detector was run over the same interval and an FID chromatograph from 1100m in the Middle Stairway Sandstone.
Traces of gas were recorded in the Lower Stairway Sandstone and the Horn Valley Siltstone. The Stairway is gas saturated but tight.

In East Mereenie 31 the Pacoota Sandstone gas/oil contact is at approximately 1404m (measured depth) and the oil/water contact at 1504m. Gas shows occurred throughout the Pacoota section and oil fluorescence was observed between 1345 and 1486m.



PETROLEUM LEASES 4 & 5

MEREENIE FIELD

EM31

LOCALITY MAP

AUTHOR: T. O'SULLIVAN

DATE: AUGUST, 1992

FIGURE 1

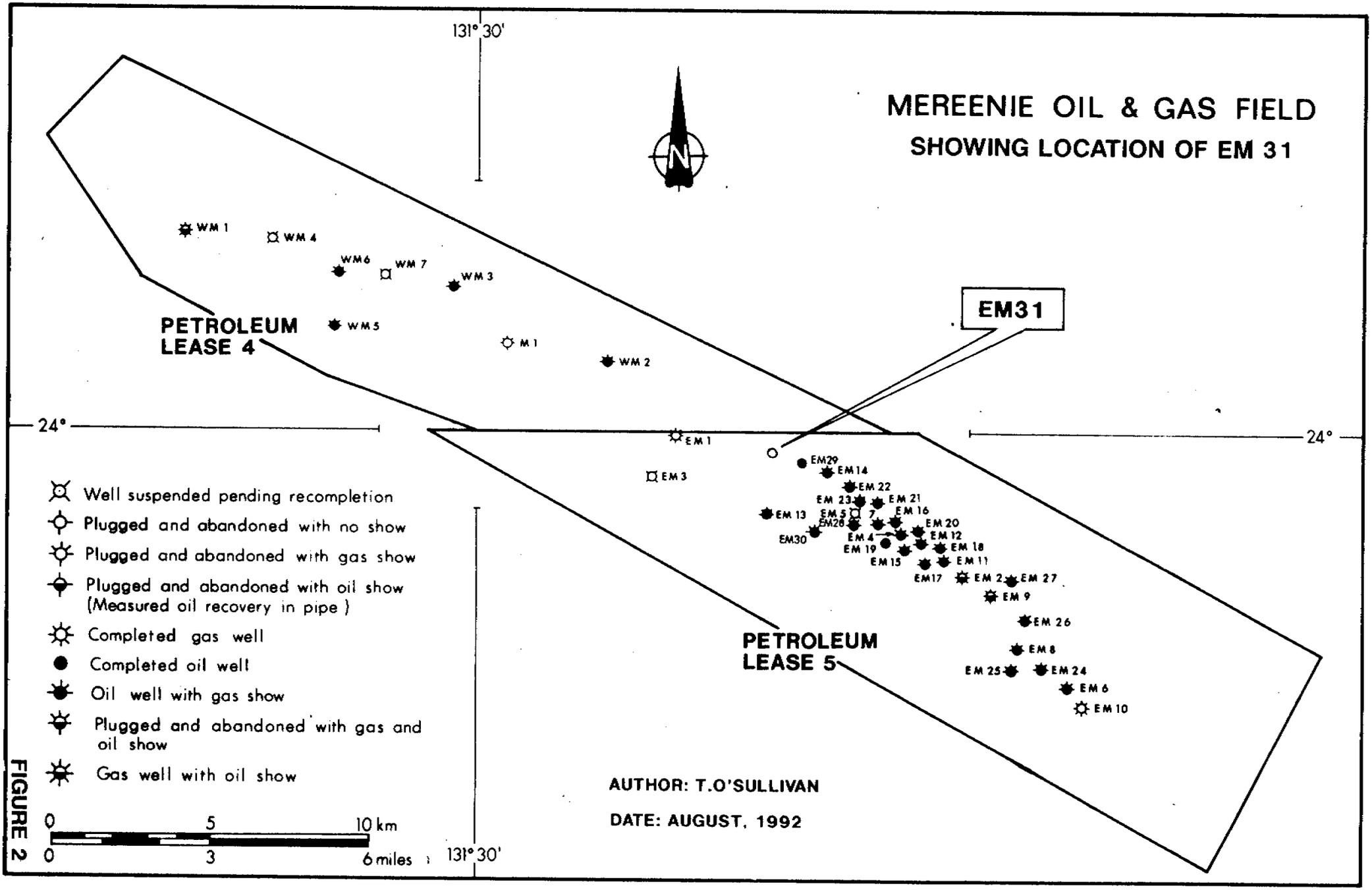

MEREENIE OIL & GAS FIELD
SHOWING LOCATION OF EM 31
131° 30'
24°
N
EM31
PETROLEUM LEASE 4
PETROLEUM LEASE 5
WM 1
WM 4
WM6
WM 7
WM 3
WM 5
M 1
WM 2
EM 1
EM 3
EM29
EM 14
EM 22
EM 23
EM 21
EM 13
EM 5
7
EM 16
EM26
EM 20
EM30
EM 4
EM 12
EM 19
EM 18
EM 15
EM 11
EM17
EM 2
EM 27
EM 9
EM 26
EM 8
EM 25
EM 24
EM 6
EM 10
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
0 5 10 km
0 3 6 miles
AUTHOR: T.O'SULLIVAN
DATE: AUGUST, 1992

FIGURE 2

STRATIGRAPHY OF THE MEREENIE FIELD

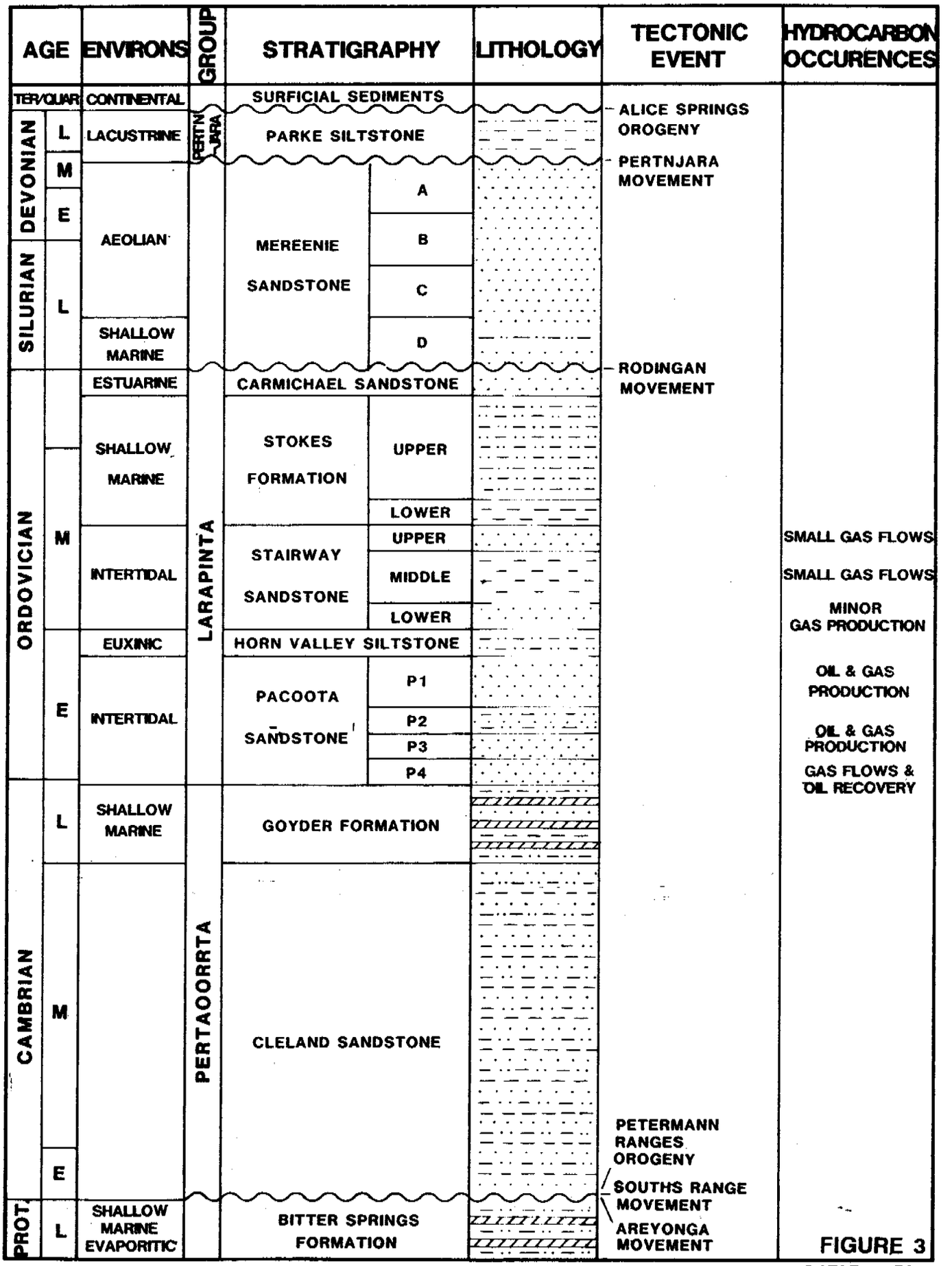
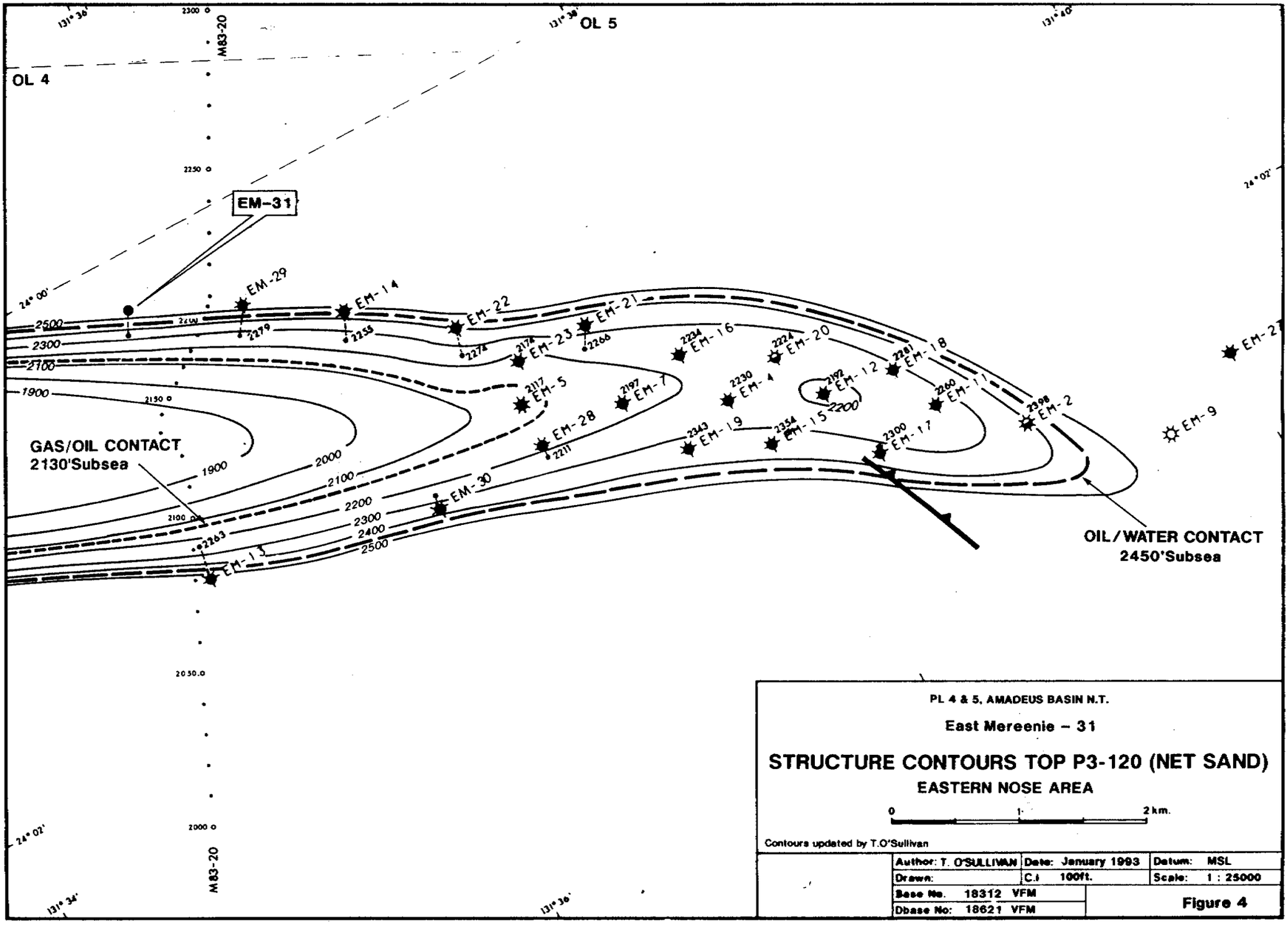


FIGURE 3

34787 - Z1



PL 4 & 5, AMADEUS BASIN N.T.

East Mereenie – 31

STRUCTURE CONTOURS TOP P3-120 (NET SAND)

EASTERN NOSE AREA

0 1 2 km.

Contours updated by T.O'Sullivan

Author: T. O'SULLIVAN	Date: January 1993	Datum: MSL
Drawn:	C.I 100ft.	Scale: 1 : 25000
Base No. 18312 VFM		Figure 4
Dbase No: 18621 VFM		

A brief description of the significant hydrocarbon indications is given below. East Mereenie 31 was drilled with air to 1342m then with mud to TD. 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 (1126 - 1186m)

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. The Lower Stairway is gas saturated and a small gas anomaly of 6/trace units (peak/background) originated from 1126 - 1129m (driller) in the upper unit. This indicates a thin sand with some suggestion of porosity/permeability, however porosities are generally very poor throughout the interval as confirmed by the absence of a flare at the blooie line while it was being drilled.

Horn Valley Siltstone (1186 - 1257m)

The Horn Valley Siltstone is a euxinic siltstone/shale unit and has no reservoir potential. The small ditch gas anomaly (4u/trace) recorded at 1222m does not correlate with a sand.

Pacoota Sandstone (1257 - 1518m(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. Three of these units were penetrated by East Mereenie 31 and are described below.

P1 Unit (1257 - 1363m)

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.

Compressed air was used to drill the majority of the P1. The flare on the blooie line ignited for the first time in the P1-80 sand at 1280m. A flow test at this point produced gas at 270MCFD. (See Section 2.8.) The microresistivity log reveals a series of porous stringers up to a metre thick between 1277m and 1287m. There was a sudden increase in the flare at 1340m where a second flow test yielded 1.8MMCFD of gas. Logs indicate a clean, porous 4m sand - the P1-280 Sand.

With this amount of gas flowing, it became too dangerous to strip the bottom hole assembly through the annular blow-out preventer so the hole was filled and drilled to TD with mud. The short mud-drilled section at the base of the P1 yielded three minor ditch gas peaks: 110/50u and 76/20u associated with thin porous streaks at 1351m and 1354m respectively. The third peak originated in the P1-350 Sand at the base of the P1 where several thin porous streaks produced a high of 98/20u.

The P1 is gas saturated but apart from these porous sands the section is tight. From 1345m to the base of the P1 there is a trace of fluorescence increasing to 10% in the P1-350 sand. It is dull to dim, yellow white fluorescence with a fast crush to streaming cut leaving a thin to moderate ring residue.

P2 Unit (1363 - 1430m)

The P2 is a shallow to moderately deep marine unit comprising predominately siltstone and shale. The proportion of sandstone in the cuttings samples increased from 50% at the top to 100% at the base but this is considered to be unrepresentative owing possibly to a majority of the siltstone and shale cuttings being very soft and dispersing into the mud.

A 70/30u ditch gas peak at 1394m (Driller) is associated with a thin sandy streak. The sample containing this sand showed 5% dull to dim yellowish white, solid fluorescence with a moderate crush cut and a thin film residue. A net 2m basal sand yielded 80/30u and traces of dull, spotted to solid, yellow white fluorescence with no visible crush cut and a faint film residue.

Apart from the basal sand and several porous streaks, this unit is tight. The level of the field-wide gas/oil contact is at approximately 1404m in EM 31 but because of the tight formation, the fluorescence extending up into the base of the P1 may indicate that a transition zone exists between the oil and gas legs at this location.

P3 Unit (1430 - 1518m(TD))

The P3 Unit comprises interbedded sands and silts 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 as a shoreface deposit and the P3-130 as a subaqueous sand wave (reworked barrier bar).

Ditch gas peaks of 60 - 94u occur against a background of 20u from the top of the P3 to 1445m. There is also 20% dull to dim, spotted to solid, yellowish white fluorescence with a very weak crush cut leaving a faint residue.

The P3-120/130 reservoir yielded ditch gas up to 112u over a background of 13u. Log analysis assigns 10.5m net sand with an average 8.2% porosity. Fluorescence ranges from 50 - 90% and is dull to moderately bright, solid to spotted and yellowish white, with a fast streaming to diffuse cut leaving a thin film residue.

A thin sand at 1483m had an associated ditch gas peak of 126/20u and 15% dull to moderately bright, solid to spotted light yellow fluorescence with an instant streaming cut and a moderate film residue. Below this there were no further gas or oil shows. The level of the field-wide oil/water contact is at approximately 1504m in EM 31. After fracture stimulation of the P3-120/130, the well produced oil with a water cut so it appears that the reservoir lies within the oil/water transition zone at East Mereenie 31.

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