

**SANTOS GROUP - MAGELLAN PETROLEUM NT P/L - UNITED  
OIL AND GAS CO NT P/L**

**COMPILED FOR**

**SANTOS LIMITED**

(A.C.N. 007 550 923)

**EAST MEREENIE 37**

**WELL COMPLETION REPORT**

PR95/18

Prepared By:  
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(Consultant)  
DECEMBER, 1995

# EAST MEREENIE 37

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**LOCATION MAP**

765000

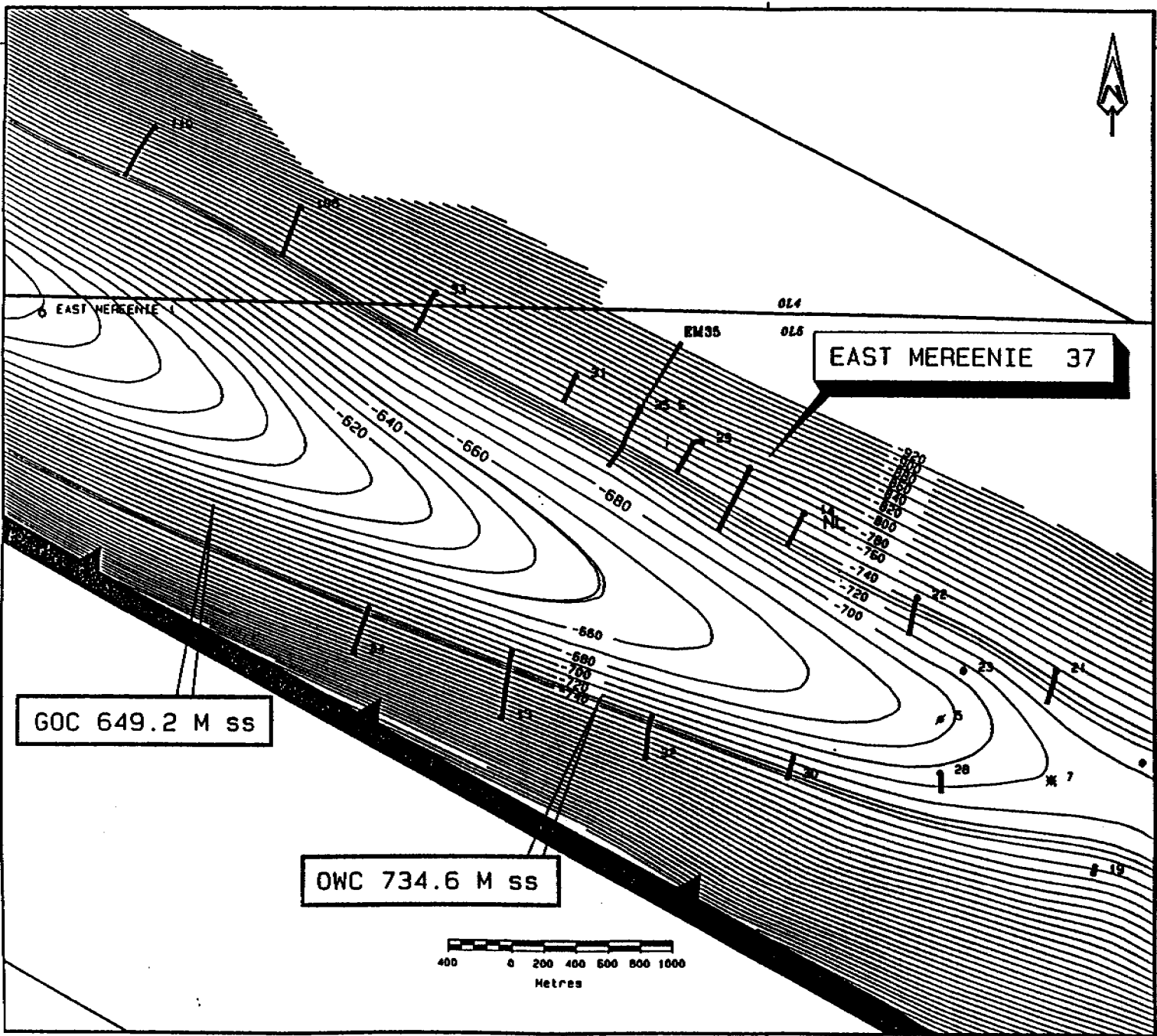
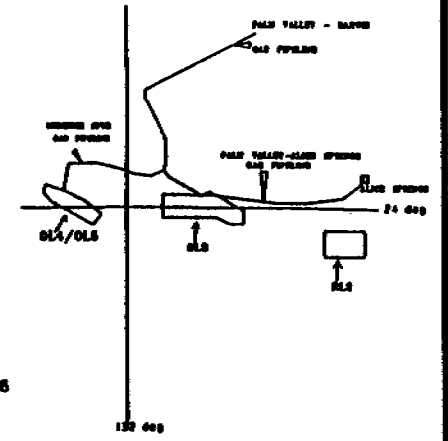
7345000

# Santos

### LEGEND

- LO      ✱ SCQ      ✱ SCQC
- ◇ ABDH   ✱ SUG      ♂ SCW
- ◆ ABJ      ✱ SUGO   ✱ SCGI
- ⊕ ABOS   ✱ SUO      ✱ SUGI
- ⊕ ABOS   ✱ SUGG   ✱ SCWI
- ⊕ ABS      ✱ SUGC   ✱ SUWI
- △ OBW      ● SCO

6/6 NET SAND / NET PAY  
 10 M CONTOUR INTERVAL  
 LOCATION MAP



OL4 & OL5	
MEREENIE FIELD	
TOP RESERVOIR STRUCTURE	
P3-230/250	
PACCOOTA SANDSTONE	
8-May-95	
LAYER NAME: P3_2301000	PROJECT NAME: nero
HIP: 84/056	DRAFTED: TOS
AUTHOR:	signed:
APPROVED:	signed:

765000

7340000

**WELL DATA CARD**

WELL: EAST MEREENIE 37		WELL CATEGORY DEV \ SWQU WELL INTENT: OIL		SPUD: 27/05/95 TD REACHED: 18/06/95	
				RIG RELEASED: 23/06/95 CMPLT: 23/06/95	
LAT: 24° 00' 31.36" S LONG: 131° 36' 14.27" E				RIG: MEREENIE RIG 1 (OIME SL 750)	
SEISMIC STATION: SP 1098, LINE M82-05				STATUS: CASSED AND COMPLETED OIL WELL	
ELEVATION GND: 724.36 m KB 730.46 m				REMARKS: PERFORATED 1530-1535 M,	
BLOCK/LICENCE: OIL LEASE 5, NORTHERN TERRITORY				1536.6- 1540.7 M AND 1544.6-1549.2 M	
TD	1600 m (Logr Ext)	1600	m (Drir)		
PBTD	m (Logr)	1592.7	m (Drir)		
TYPE STRUCTURE: ANTICLINE		CASING SIZE	SHOE DEPTH	TYPE	
TYPE COMPLETION: CASSED AND COMPLETED		16"	23.47 m (D)	CONDUCTOR	
		10 3/4"	690.78 m (D)	H40 R3 40.5#	
			691.00 m (L)		
ZONE (S): P3 - 230/250, P3 -190		5 1/2"	1592.70 m (D)	L80 R3 17#	

AGE	FORMATION OR ZONE TOPS	DEPTH (m)		THICKNESS TST (metres)	HIGH (H) LOW (L)
		LOGGER (MD- KB)	SUBSEA (TVD)		
DEVONIAN	PARKE SILTSTONE	6	+725.0	12.4	0
L. SILURIAN TO DEVONIAN	MEREENIE SANDSTONE	19.0	+712.1	508.3	15.1 H
LATE ORDOVICIAN	CARMICHAEL SANDSTONE	541.0	+190.1	71.3	12.1 H
MID TO LATE ORDOVICIAN	UPPER STOKES FORMATION	614.2	+117.0	237.7	11.0 H
MID ORDOVICIAN	LOWER STOKES FORMATION	857.3	-122.7	76.8	12.4 H
MID ORDOVICIAN	UPPER STAIRWAY	934.8	-194.1	62.2	12.9 H
	SANDSTONE				
MID ORDOVICIAN	MIDDLE STAIRWAY SST	999.0	-249.6	108.8	13.4 H
MID ORDOVICIAN	LOWER STAIRWAY SST (2)	1115.8	-345.6	54.3	13.5 H
MID ORDOVICIAN	LOWER STAIRWAY SST (1)	1174.3	-394.1	27.2	11.9 H
EARLY ORDOVICIAN	HORN VALLEY SILTSTONE	1203.4	-418.5	70.9	11.5 H
EARLY ORDOVICIAN	PACOOKA SST P1 UNIT	1278.6	-483.0	106.5	9.1 H
EARLY ORDOVICIAN	P1-40 SAND	1278.6	-483.0	16.3	
EARLY ORDOVICIAN	P1-60 SAND	1295.8	-497.6	5.3	
EARLY ORDOVICIAN	P1-80 SAND	1301.4	-502.3	4.9	
EARLY ORDOVICIAN	P1-110 SAND	1306.6	-506.7	13.4	
EARLY ORDOVICIAN	P1-120/180 SAND	1320.8	-518.8	12.0	
EARLY ORDOVICIAN	P1-200 SAND	1333.5	-529.5	9.9	
EARLY ORDOVICIAN	P1-210 SAND	1344.0	-538.4	5.4	
EARLY ORDOVICIAN	P1-240 SAND	1349.7	-543.3	15.5	
EARLY ORDOVICIAN	P1-280 SAND	1366.1	-557.1	4.9	
EARLY ORDOVICIAN	P1-310 SAND	1371.3	-561.5	14.6	
EARLY ORDOVICIAN	P1-350 SAND	1386.8	-574.6	4.3	
	TOTAL DEPTH	1600.0	-759.8		

LOG INTERPRETATION (Interval Averages)						PERFORATIONS (6 shots/ft)				
INTERVAL(m)	Ø %	SW %	INTERVAL(ft)	Ø %	SW %	FORMATION		INTERVAL		
P1-80 (2.74 m)	5.8	39.7	P3-10 (4.88 m) *	5.7	29.5	P3-190		1530-1535 M		
P1-110 (0.31 m)	4.1	22.9	P3-90 (0.46 m)	6.5	58.4	P3- 230/250		1536.6-1540.7 M		
P1-200 (2.44 m)	5.1	22.5	P3-120/130 (7.72 m)	7.0	34.1	P3- 230/250		1544.6-1549.2 M		
P1-280 (1.22 m)	4.4	20.2	P3-150 (4.12 m)	7.2	42.2	CORES				
P1-310 (1.37 m)	5.1	28.0	P3-190 (4.88 m)	8.3	37.6	FORM	NO.	INTERVAL	CUT	REC
P1-350 (1.68 m)	5.8	37.3	P3-230/250 (2.44 m)	7.9	51.8	NONE CUT				
P1 = Gas pay			* = gas. Rest =Oil							

LOG	RUN	INTERVAL	BHT/TIME	LOG	RUN	INTERVAL	BHT/TIME
GR	1/1	1222m-30m	47° C/7 4H 45 M	SP		1563m-691m	
FMS4		1232m-882m		NGS		1573m-930m	
GPIT		1232m-691m		LDL		1583m-930m	
				CNL		1583m-930m	HLDL-CNL to 1270m
DLL	2/1	1595m-691m	57 °C / 9 H°	PEF		1583m-930m	
MSFL		1589m-930m		FMS 4	2/2	1600m-1270m	61° C /17 H
GR		1575m-691m		GR		1588m-1200m	
CAL		1563m-691m		GPIT		1598m-1200m	

AGE	FORMATION OR ZONE TOPS	DEPTH (m)		THICKNESS TST (metres)	HIGH (H) LOW (L)
		LOGGER (MD- KB)	SUBSEA (TVD)		
(CONTINUED)					
EARLY ORDOVICIAN	PACOOTA SST P2 UNIT	1391.4	-578.5	67.3	4.5 H
EARLY ORDOVICIAN	PACOOTA SST P3 UNIT	1462.7	-639.5	84.1	1.5 H
EARLY ORDOVICIAN	P3- 10 SAND	1462.7	-639.5	19.8	
EARLY ORDOVICIAN	P3 -70 SAND	1483.5	-657.4	6.2	
EARLY ORDOVICIAN	P3 -90 SAND	1490.0	-663.0	7.8	
EARLY ORDOVICIAN	P3 -120/130 SAND	1498.2	-670.2	15.6	1.2 L
EARLY ORDOVICIAN	P3 -150 SAND	1514.5	-684.4	10.5	2.4 L
EARLY ORDOVICIAN	P3 -190 SAND	1525.4	-693.9	10.2	
EARLY ORDOVICIAN	P3 - 230/250 SAND	1536.0	-703.2	14.0	2.2 L
EARLY ORDOVICIAN	PACOOTA SST P4 UNIT	1550.5	-716.0	47.7+	1.0 L
	TOTAL DEPTH	1600.0	-759.8		

LOG INTERPRETATION (Interval Averages)						PERFORATIONS (6 shots/ft)				
INTERVAL(m)	Ø %	SW %	INTERVAL(ft)	Ø %	SW %	FORMATION		INTERVAL		
						CORES				
						FORM	NO.	INTERVAL	CUT	REC

LOG	RUN	INTERVAL	BHT/TIME	LOG	RUN	INTERVAL	BHT/TIME

FORMATION TESTS										
	INTERVAL (metres)	FORMATION	FLOW (mins)	SHUT IN (mins)	BOTTOM GAUGE IP/FP (psia)	SIP	MAX SURF PRESS (psia)	FLUID TO SURF (mins)	TC/ BC	REMARKS
1 (UN)	1379-691 m	PACOOKA P1	75	120	N/A	1180	566	0	1/2"	OPEN HOLE FLOW TEST. GAS AT 3.12 MMCFD.

**SUMMARY:**

EAST MEREENIE 37 IS SITUATED 348 METRES SOUTH EAST OF EAST MEREENIE 29, 440 METRES NORTH WEST OF EAST MEREENIE 31 AND 800 METRES SOUTH EAST OF EAST MEREENIE 35 ON THE NORTH EASTERN FLANK OF THE MEREENIE ANTICLINE IN THE AMADEUS BASIN, NORTHERN TERRITORY, WITHIN OIL LEASE NO. 5.

EAST MEREENIE 35 WAS THE FIRST OF FORTY SEVEN WELLS DRILLED IN THE MEREENIE OIL AND GAS FIELD TO SUCCESSFULLY TARGET THE P3 - 230/250 SAND AS A PRIMARY OBJECTIVE. RESERVOIR QUALITY SANDSTONE HAD BEEN INTERSECTED IN THE ADJACENT WELLS HOWEVER THE UNIT WAS IN THE WATER LEG IN THOSE WELLS AS THEY WERE TARGETING THE P3 - 120/130 RESERVOIR. EM 35 WAS DEVIATED UPDIP TO INTERSECT THE OBJECTIVE IN THE OIL LEG. IT IS CURRENTLY (POST FRAC) PRODUCING 480 BOPD FROM THE P3-230/250 RESERVOIR.

EAST MEREENIE 36 (THE FIRST STEP-OUT TO EM 35) WAS THE SECOND WELL TO SUCCESSFULLY TARGET THE P3-230/250 RESERVOIR AT A LOCATION 880 METRES NORTH WEST OF EM 35. EM 36 WAS CASED AND COMPLETED AS A P3-230/250 OIL WELL AND IS FLOWING (PRE-FRAC) AT APPROXIMATELY 200 BOPD.

EAST MEREENIE 37 WAS DESIGNED AS A STEP-OUT TO THE SOUTH EAST OF EM 35 AND THE P3-230/250 OIL RESERVOIR WAS THE PRIMARY TARGET. SECONDARY TARGETS WERE THE P3-120/130 SAND (OIL), P3-190 SAND (OIL) AND THE PACOOKA P1 AND LOWER STAIRWAY FORMATION (GAS). EM 37 WAS DEVIATED UPDIP (TO 207.5 ° (T)) TO INTERSECT THE TOP OF THE P3-230/250 SAND AT A PROGNOSSED DEPTH OF -701 M (TVD SS). FORMATION TOPS TO THE TOP OF THE P3 WERE INTERSECTED HIGH TO PROGNOSIS AND ADJUSTMENTS WERE MADE TO THE TRAJECTORY AFTER INTERSECTING THE UPPER STOKES SILTSTONE 11.0 M HIGH TO PROGNOSIS AND AFTER LOGGING AT 1245 METRES WHERE THE TOP HORN VALLEY SILTSTONE WAS CALCULATED TO BE 11.5 M HIGH TO PROGNOSIS. THE TOP OF THE P3-230/250 SAND WAS INTERSECTED 2.2 M LOW TO PROGNOSIS AT -703.2 M. THIS PLACES THE SAND BETWEEN THE FIELD GOC OF -649.2 M AND THE FIELD OWC OF 734.6 M.

THE P3-90, P3-120/130, P3-150 AND P3-190 SANDS ARE ALSO WITHIN THE OIL WINDOW AND OIL PAY IS INDICATED FOR ALL FOUR SANDS. (SEE PAGE 1 OF WELLCARD FOR PAY SUMMARY). THE P3-10 SAND IS INTERPRETED TO CONTAIN 4.88 M GAS PAY.

OPEN HOLE FLOW TESTING OF THE P1 CONFIRMED THE PRODUCTIVITY OF THIS UNIT WITH A FLOW OF 3.12 MMCFD. BASED ON GAS WHILE DRILLING, MOST OF THE PRODUCTION IS ASSIGNED TO THE P1-280 SAND WITH CONTRIBUTIONS FROM THE P1-80, P1-110 AND P1-200. FURTHER GAS PAY IS CALCULATED FOR THE P1-310 AND P1-350 SANDS.

THE WELL WAS COMPLETED ON 23/06/1995 WITH TCP AT 6 SPF OVER THE INTERVALS 1530-1535 M, 1536.6-1540.7M AND 1544.6-1549.2 M COVERING THE P3-190 AND P3-230/250 SANDS. EXTENDED FLOW TESTING IS BEING CARRIED OUT TO DETERMINE PRE-FRAC POTENTIAL. AT 30/06/1995 THE WELL WAS FLOWING AT APPROXIMATELY 130 BOPD.

AUTHOR: A J BEECH

DATE: SEPTEMBER, 1995



**WELL HISTORY**

## 1. GENERAL DATA

Well Name:	East Mereenie 37	
Well Classification:	QNTBU Oil Development	
Interest Holders::	Canso Resources Limited*	15.00%
	Farmout Drillers NL*	6.25%
	Moonie Oil NL*	21.00%
	Transoil No Liability*	9.00%
	Petromin No Liability*	7.50%
	Santos Exploration Pty Ltd*	6.25%
	(*SANTOS Group = 65.00%)	
	Magellan Petroleum NT Pty Ltd	20.00%
	United Oil and Gas Co NT Pty Ltd	15.00%
Participating Interests:	SANTOS Group	65.00%
	Magellan Petroleum NT Pty Ltd	20.00%
	United Oil and Gas Co NT Pty Ltd	15.00%
Block:	Mereenie	
License:	OL 5, Northern Territory.	
Operator:	SANTOS Limited	
Surveyed Surface		
Location:	Latitude: 24°00' 31.36" South	
(ANS)	Longitude: 131° 36' 14.27" East	
	AMG Northing: 7342349.48	
	Easting: 764896.5	
Bottom Hole Location:	Departure North: -352.1 metres	
	Departure East: -188.4 metres	
Surveyed Elevation:	Ground Level: 724.36 m	
(AHD)	Kelly Bushing: 730.46 m	
Seismic Location:	SP 1098, Line M82-05	
Seismic Survey:	1982	
	1993	
Total Depth (Measured)	Driller:	1600 m
	Logger (Extrapolated):	1600 m
Total Depth (TVD)	Logger (Extrapolated):	1490.9 m
Status:	Cased and completed oil well (Pacoota P3-230/250 and P3-190 sands).	

## 2. DRILLING DATA

Date Drilling Commenced: 27th May 1995.  
 Date Drilling Completed: 18th June 1995.  
 Date Rig Released: 23rd June 1995.  
 Date Completed:: 23rd June 1995.  
 Contractor: ODE (Australia)  
 Rig: Mereenie Rig 1 (OIME SL-750)

## 3. DRILLING SUMMARY

(a) Drilling Summary (All Depths Driller's KB)

East Mereenie 37 was spudded at 2300 hours on the 27th of May, 1995.

Tables I and II below, summarise the major drilling operations in this hole. More comprehensive summaries are appended to this report (Appendix VII: Drilling Record and Summary; Appendix VIII: Casing and Completion Summary).

**TABLE I: CASING, HOLE AND CEMENT DETAILS**

<b>BIT SIZE (")</b>	<b>DEPTH (m)</b>	<b>CASING SIZE (")</b>	<b>CASING DEPTH (m)</b>	<b>JOINTS</b>	<b>CASING TYPE &amp; CEMENT</b>
17 1/2"	30 m	16"	23.47 (D)	3	Spiral Conductor
13 9/16" 13 1/2"	302 m 692 m	10 3/4"	690.78 (D) 691.00 (L)	58	H40, 40.5 lb/ft 300sx Class A and 50 sx Class A top up.
9 7/8" 8 1/2"	1267 m 1600 m	5 1/2"	1592.7 (D)	133	L80 LTC R3, 17 lb/ft 700sx Class G + 1.0% HALAD 322.

**TABLE II: SUMMARY OF DRILLING FLUID SYSTEMS**

<b>INTERVAL (m)</b>	<b>DRILLING FLUID</b>	<b>REMARKS</b>
0 - 30 m	Air	10 3/4" Casing @ 691' (L) 2.3% NaCl Water for logging at 1245 m
30 m - 692 m	Air - Mist - Foam	
692 m - 1245 m	Air - Mist - Foam	
1245 m - 1465 m	Air - Mist - Foam	
1465 m - 1600 m	NaCl- Polymer	

(b) Lost Time

No lost time was recorded during the drilling of East Mereenie 37.

(c) Water Supply

Drilling make up water was trucked from a bore located 4 km east of the rigsite. Resistivity was greater than 10 Ohm.M @ 75°F.

(d) Mudlogging Services

The Mereenie Rig 1 Mudlogging unit was manned by a crew provided by Colin Higgins and Associates. Samples were collected, washed and described at 10 m intervals from 50 m to 930 m and then at 3 m intervals from 930 m to T.D. at 1600 m (Lithological descriptions are presented in Appendix I). All samples were checked for oil shows using ultraviolet fluorescence. Gas levels and compositions were monitored from surface to TD using total gas and F.I.D chromatograph detectors. In addition bit penetration rate, mud pump strokes and mud pit levels were monitored.

**TABLE III: CUTTING SAMPLES TYPE AND DISTRIBUTION**

<b>SAMPLE TYPE</b>	<b>STORED IN</b>	<b>DELIVERED TO</b>
Washed and dried	Samplex trays	Santos Petroleum
Washed and dried	Envelope	Magellan Petroleum
Washed and dried	Envelope	NT Department of Mines

(e) Open Hole Hydrocarbon Flow Testing

Gas first started flowing from the blooie line as a continuous flare at 1300 m in the Pacoota Sandstone P1 unit. At 1465m the air/foam was displaced with mud. One open hole flow test was conducted in the basal Pacoota P1 Sandstone and included the P1- 280 Sand. Test 1 flowed 3.12 MMCFD through a 1/2" choke from the interval 691 m to 1379 m. Refer to Appendix III for test details.

(f) Coring

No full hole cores were cut.

(g) Electric Logging

Two suites of electric logs were run as detailed below:

**TABLE IV: ELECTRIC LOGGING SUMMARY**

SUITE	LOG	INTERVAL	BHT/ HOURS - REMARKS
1/1	GR	1222 m - 30 m	47.0° C / 4 hours 45 mins Dipmeter component processed on-site and GPIT data acquired to surface casing shoe at 691 m.
	FMS4	1232 m - 882 m	
	GPIT	1232 m - 691 m	
2/1	DLL	1595 m - 691 m	57 ° C / 9 hours Pacoota and Stairway intervals only  CALI with LDL  Pacoota interval only
	MSFL	1589 m - 930 m	
	GR	1575 m - 691 m	
	CAL	1563 m - 691 m	
	LDL	1583 m - 930 m	
	CNL	1583 m - 930 m	
	Hi Res LDL-CNL	1583 m - 1270 m	
	PEF	1583 m - 930 m	
	SP	1563 m - 691 m	
NGS	1573 m - 930 m		
2/2	FMS4	1600 m - 1270 m	Pacoota interval only 61 ° C / 17 hours
	GR	1588 m - 1200 m	
	GPIT	1598 m - 1200 m	

(h) Geothermal Gradient

Temperature data from electric logging runs at East Mereenie 37 enabled an extrapolated BHT of 65.8° C to be calculated. A geothermal gradient of 2.86° C per 100 m was calculated using this BHT and assuming a surface temperature of 20 °C (see Appendix IV).

(i) Directional Survey Data

East Mereenie 37 was deliberately deviated updip (azimuth 208 (T)) to intersect the top of the targeted P3-230/250 Sand at -701.0 metres TVD subsea. The horizontal distance to the target was prognosed as 439 metres. After intersecting the top of the Upper Stokes Siltstone 10.9 m high to prognosis the horizontal distance to target was revised to 390 m to 206° (T). After logging at 1245 metres the top Horn Valley Siltstone was calculated to be 12.1 metres high to prognosis and the horizontal distance to the target revised to 370 metres to 197° (T). The P3- 230/250 Sand was intersected at - 703.2 metres TVD subsea, 2.2 metres low to prognosis. Directional drilling and deviation control were provided by Hofco Oilfield Services.

Directional Survey Data are presented in Appendix VI and on the Composite Log (Enclosure I).

(j) Velocity Survey

No velocity data were acquired at East Mereenie 37.

(k) Casing and Completion Summary

5 1/2" production casing was run with the shoe set at 1592.7 m. The well was completed with TCP at 6 SPF over the intervals 1530 -1535 m, 1536.6 - 1540.7 m and 1544.6 - 1549.2 m. At 30th June 1995 the well was flowing 130 BOPD.

**GEOLOGY**

## 1. **PRE-DRILLING SUMMARY** (Well Proposal - East Mereenie 37)

East Mereenie 37, a QNTBU (Queensland and Northern Territory Business Unit) Oil Development well was the forty ninth well drilled in the Mereenie Oil and Gas Field in the Amadeus Basin, Northern Territory. It was located 348 metres south east of East Mereenie 29, 440 metres north west of East Mereenie 14 and 800 metres south east of East Mereenie 35, on the northeastern flank of the Mereenie Anticline, Northern Territory, within Oil Lease No. 5.

East Mereenie 35 was the first well in the Mereenie Field to successfully target the P3 - 230 / 250 sand as a primary objective. Reservoir quality sandstone was intersected in the adjacent wells however the unit was in the waterleg in both wells as they were targeting the P3 - 120 / 130 oil reservoir. East Mereenie 35 was deviated updip to intersect the objective in the oil leg. It is currently (post frac) producing 480 BOPD from the P3-230/250 reservoir.

East Mereenie 36 was the second well to target the P3-230/250 Reservoir and the location was chosen as a step-out to East Mereenie 35. Secondary targets were the P3-190 (oil), the P3-120/130 (oil), Lower Stairway Sandstone (gas) and P1 Sandstone (gas). It was located 880 metres north west of East Mereenie 35. The well was successful and was cased and completed from the P3-230/250 reservoir and is currently (pre -frac) flowing at approximately 200 BOPD. Log pay is also mapped for the P3-120/130 , P3-190 and P1-280 sands.

East Mereenie 37 was designed as a step-out 800 metres south east of East Mereenie 35 and was targeting the same reservoirs as East Mereenie 35 and 36.

## 2. **DRILLING RATIONALE** ( after East Mereenie 37 Well Proposal)

East Mereenie 37 was designed to target the top of the Pacoota P3-230/250 reservoir (net sand) at a true vertical depth (TVD) of -701.0 metres (subsea), 51.8 metres below the field gas-oil contact. The base of the target was prognosed at -715.0 metres (subsea) , 20.0. metres above the water leg.

East Mereenie 37 was to be spudded into the Parke Siltstone and be deviated updip to intersect the top of the target P3-230/250 sand at the true vertical depth of -701.0 metres (subsea). Proposed total depth was 1632 metres, 45 metres into the Pacoota P4 unit. Although the horizontal distance to the target was prognosed as 439 metres to 208°, this distance was only approximate and subject to revision after intersection of the Stokes Siltstone. A further revision of the target depth was to be made after the intermediate logging run, covering the top of the Horn Valley Siltstone.

Where possible, both the Lower Stairway Sandstone and the P1 unit of the Pacoota Sandstone were to be air drilled, to allow for the monitoring of open hole gas flow rates from these units and to assist in the appraisal of gas reserves at Mereenie Field.

A successful well at East Mereenie 37 would impact on field development. Additional target areas of the P3-230/250 and P3-190 units are the eastern nose, the western saddle, the western nose and on the northern flank where both these units and the P3-120/130 can be targeted in multiple completions. Additional drilling options being evaluated include re-entry and sidetracking of existing well bores upon exhaustion of their current producing zone (P3-120/130).



P3-230/250

Reservoir quality sandstones have been demonstrated by the oil flows East Mereenie 35 and 36.

P3-190

The P3-190 reservoir was prognosed to be in the oil leg and 40 m below the field GOC. The net oil map indicates that sand quality deteriorates north west of East Mereenie 35 in the direction of East Mereenie 36 and net pay of 4 to 5 metres was expected.

P3-120/130

The P3-120/130 was prognosed to be intersected in the oil leg, 20 m below the GOC. The frac of the P3-230/250 reservoir was expected to grow upwards into the P3-120/130 (and the P3-190) and hence some oil from these units would be accessed.

### 3. RESULTS OF DRILLING

#### (a) Stratigraphy

East Mereenie 37 was spudded in the Parke Siltstone and reached a total measured depth of 1600 metres in the upper Pacoota Sandstone P4 unit. The following table lists the formations intersected, together with subsea elevations and thicknesses. All depths are Logger's Depths.

**TABLE V: EAST MEREENIE 37 STRATIGRAPHY**

AGE	FORMATION OR ZONE TOPS	DEPTH (m)		THICKNESS
		LOGGER (MD- KB)	SUBSEA (TVD)	TST (metres)
Devonian	Parke Siltstone	6	+725.0	12.4
L. Silurian To Devonian	Mereenie Sandstone	19.0	+712.1	508.3
Late Ordovician	Carmichael Sandstone	541.0	+190.1	71.3
Mid To Late Ordovician	Upper Stokes Formation	614.2	+117.0	237.7
Mid Ordovician	Lower Stokes Formation	857.3	-122.7	76.8
Mid Ordovician	Upper Stairway Sandstone	934.8	-194.1	62.2
Mid Ordovician	Middle Stairway Sst	999.0	-249.6	108.8
Mid Ordovician	Lower Stairway Sst (2)	1115.8	-345.6	54.3
Mid Ordovician	Lower Stairway Sst (1)	1174.3	-394.1	27.2
Early Ordovician	Horn Valley Siltstone	1203.4	-418.5	70.9
Early Ordovician	Pacoota Sst P1 Unit	1278.6	-483.0	106.5
Early Ordovician	P1-40 Sand	1278.6	-483.0	16.3
Early Ordovician	P1-60 Sand	1295.8	497.6	5.3
Early Ordovician	P1-80 Sand	1301.4	-502.3	4.9
Early Ordovician	P1-110 Sand	1306.6	-506.7	13.4
Early Ordovician	P1-120/180 Sand	1320.8	-518.8	12.0

**TABLE V: EAST MEREENIE 37 STRATIGRAPHY - Continued**

AGE	FORMATION OR ZONE TOPS	DEPTH (m)		THICKNESS
		LOGGER (MD- KB)	SUBSEA (TVD)	TST (metres)
Early Ordovician	P1-200 Sand	1333.5	-529.5	9.9
Early Ordovician	P1-210 Sand	1344.0	-538.4	5.4
Early Ordovician	P1-240 Sand	1349.7	-543.3	15.5
Early Ordovician	P1-280 Sand	1366.1	-557.1	4.9
Early Ordovician	P1-310 Sand	1371.3	-561.5	14.6
Early Ordovician	P1-350 Sand	1386.8	-574.6	4.3
Early Ordovician	Pacoota Sst P2 Unit	1391.4	-578.5	67.3
Early Ordovician	Pacoota Sst P3 Unit	1462.7	-639.5	84.1
Early Ordovician	P3- 10 Sand	1462.7	-639.5	19.8
Early Ordovician	P3 -70 Sand	1483.5	-657.4	6.2
Early Ordovician	P3 -90 Sand	1490.0	-663.0	7.8
Early Ordovician	P3 -120/130 Sand	1498.2	-670.2	15.6
Early Ordovician	P3 -150 Sand	1514.5	-684.4	10.5
Early Ordovician	P3 -190 Sand	1525.4	-693.9	10.2
Early Ordovician	P3 - 230/250 Sand	1536.0	-703.2	14.0
Early Ordovician	Pacoota Sst P4 Unit	1550.5	-716.0	47.7+
	<b>Total Depth</b>	<b>1600.0</b>	<b>-759.8</b>	

Cuttings samples were collected, washed, and described at 10 metre intervals from 50 metres to 930 metres, and thereafter at 3 metre intervals from 930 metres to 1600 metres (Total Measured Depth - Logger Extrapolated).

The stratigraphic sequence penetrated by East Mereenie 37 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 sandstones, siltstones, and minor carbonates of Devonian to Early Ordovician age. For detailed lithological descriptions refer to Appendix I.

(b) Stratigraphic Prognosis (Logger's Depths)

East Mereenie 37 is located at Shot Point 1098, Line M82-05. Well control was provided by East Mereenie 31, 33 and 35.

East Mereenie 37 was deviated in order to intersect the top of the Pacoota P3-230/250 oil reservoir at an elevation of -701.0 metres (subsea). The actual intersection was at -703.2 metres, 2.2 metres low to the proposed target depth.

Actual versus prognosed formation tops and thicknesses for East Mereenie 37 are tabled below:

**TABLE VI: ACTUAL VERSUS PROGNOSSED DEPTHS AND THICKNESSES  
EAST MEREENIE 37**

FORMATION	PROG. DEPTH SS (TVD) metres	ACTUAL DEPTH SS (TVD) metres	ACTUAL VERSUS PROG. metres	PROG. TST metres	ACTUAL TST metres	ACTUAL VERSUS PROG metres
Parke Siltstone	+725.0	+725.0	0	33+	12.4+	
Mereenie Sandstone	+697.0	+712.1	15.1 H	506	508.3	+2.3
Carmichael Sandstone	+178.0	+190.1	12.1 H	71	71.3	+0.3
Upper Stokes Siltstone	+106.0	+117.0	11.0 H	240	237.7	-2.3
Lower Stokes Siltstone	-135.0	-122.7	12.4 H	76	76.8	+0.8
Upper Stairway Sandstone	-207.0	-194.1	12.9 H	61	62.2	+1.2
Middle Stairway Sandstone	-263.0	-249.6	13.4 H	110	108.8	-1.2
Lower Stairway Sandstone (2)	-359.0	-345.6	13.5 H	54	54.3	+0.3
Lower Stairway Sandstone (1)	-406.0	-394.1	11.9 H	27	27.2	+0.2
Horn Valley Siltstone	-430.0	-418.5	11.5 H	72	70.9	-1.1
Pacoota Sandstone						
P1 Unit	-492.0	-483.0	9.1 H	106	106.5	+0.5
P2 Unit	-583.0	-578.5	4.5 H	67	67.3	+0.3
P3 Unit	-641.0	-639.5	1.5 H	85	84.1	-0.9
Top P3-120/130	-669.0	-670.2	1.2 L	13	15.6	+2.6
Base P3-120/130	-682.0	-684.4	2.4 L			
Top P3-230/250	-701.0	-703.2	2.2 L	14	14.0	0
P4 Unit	-715.0	-716.0	1.0 L	45+	+47.7	
<b>TOTAL DEPTH:</b> (Logger Extrapolated)	-750.0	-759.8				

- (c) Hydrocarbon Summary (Logger's Depths - all KB depths quoted are Measured Depths, all subsea depths are relative to True Vertical Depth)

Total gas was recorded from 50 metres to total depth (1600 metres) using a hot wire total gas detector. One unit of gas is equal to 200 ppm methane equivalent. Chromatographic analysis was determined using an FID gas chromatograph, and these values are quoted as percentages (C1 - C4). Ditch cuttings were collected at 10 metre intervals from 50 metres to 930 metres, and then at 3 metre intervals from 930 metres to 1600 m (TD). All samples were washed, described, and checked for fluorescence using ultraviolet light.

Surface to top Upper Stairway Sandstone (6.0 metres to 934.8 metres)

Total background gas from the surface to 894.9 metres was too small to be measured. No gas flaring was evident during drilling or after tripping. Sandstones within this interval are interpreted as water saturated.

Upper Stairway Sandstone (934.8 metres to 999.0 metres)

The Upper Stairway Sandstone is comprised predominantly of sandstone with minor interbedded siltstone and rare dolomite. The unit generally has no reservoir potential in the Mereenie Field, with no gas shows recorded in East Mereenie 37. Gas throughout the formation was too small to be measured while air/mist drilling, with no gas flaring recorded. No hydrocarbon fluorescence was observed in the Upper Stairway Sandstone. Log derived pay for a 4m basal sandstone (Ave Porosity 8.3%, Ave Sw 46.3%) has been excluded because of the lack of gas while drilling.

Middle Stairway Sandstone (999.0 metres to 1115.8 metres)

The Middle Stairway Sandstone consists predominantly of siltstone with minor thinly interbedded sandstones and rare dolomite. The unit is slightly sandier towards the base. In the Mereenie Field the formation is gas saturated but tight, with no reservoir potential. Except for trip gas of 6 units at 1050 metres, no gas shows were recorded in the Middle Stairway Sandstone while air/mist drilling. No gas flaring was evident while drilling or after tripping. No hydrocarbon fluorescence was recorded.

Lower Stairway Sandstone (2) (1115.8 metres to 1174.3 metres)

The Lower Stairway Sandstone in East Mereenie 37 consists predominantly of sandstone with occasional siltstone interbeds. The only gas recorded was a small peak of less than 1 unit at 1146 metres. Log analysis calculates 1.4m possible gas pay for the interval 1146.2 to 1149.5m. This has been excluded due to the absence of gas while drilling. Severe hole breakout is indicated on the MSFL and nuclear logs over this sand.

Lower Stairway Sandstone (1) (1174.3 metres to 1203.4 metres)

This lower unit consisting predominantly of sandstone with thinly interbedded siltstone. It has some reservoir potential in certain areas of the field, and as such the unit was listed as a secondary objective the well.

In East Mereenie 37 there were no significant gas shows recorded while air/mist drilling through the Lower Stairway Sandstone (1). The Lower Stairway Sandstone is interpreted to be gas saturated but with no reservoir quality sandstones.

Horn Valley Siltstone (1203.4 metres to 1278.6 metres)

The Horn Valley Siltstone is a euxinic siltstone unit with thin interbeds of fossiliferous limestone and minor sandstone. The unit in the Mereenie Field has no reservoir potential. Gas was first recorded on a connection at 1248 metres and again at 1258 metres. The maximum recorded was 12 units (100% C1). From 1260 to the top of the Pacoota Sandstone at 1278.6 metres gas values while drilling were less than 1 unit.

Pacoota Sandstone (1278.6 metres to 1600 metres total depth)

No vegetation existed during the Ordovician period, with a hot and dry climate prevalent. The Pacoota Sandstone was deposited in a transgressive series of marine to shoreline environments on the southwestern margin of a shallow epicontinental sea (after Havord, 1988). It is the primary reservoir formation for the Mereenie Field and has been divided into four lithostratigraphic units, designated P1 through P4. Three of these units and 47.7 metres (measured thickness) of the fourth were intersected in East Mereenie 37. These units and associated hydrocarbon shows are described below.

P1 Unit (1278.6 metres to 1391.4 metres)

The P1 unit consists of interbedded sandstones and siltstones deposited in a shallow marine to intertidal sand bar sequence. Clean sands were deposited as high energy sand shoals and bars. The unit lies within the gas zone in East Mereenie 37, and this along with proven reservoir quality (the P1-280 sand) necessitated listing the P1 unit as a secondary objective of the well.

From 1278.6 to 1296 metres gas remained at less than 5 units. From there it increased rapidly to 250 units (88/11/1) by 1300 metres and there was a continuous flare at the blooie line.

At 1366 metres there was an increase in total gas, rising to a maximum of 1200 units (51:19:14:7:8) as the P1-280 sand was penetrated. An open hole flow test (OHT 1) which included the P1-280 Sand was run at 1379 metres and resulted in a flow of 3.12 MMCFD. Log evaluation calculates 1.22 metres of net gas pay within the P1-280 sand (1368.1 metres to 1370.1 metres). Average porosity is 4.4% and average  $S_w = 20.2\%$ .

Air/mist drilling continued to the base of the P1 unit at 1391.4 metres, with a steady strong gas flare and no additional significant gas influxes recorded. Total gas values of 1200 units (51:19:14:7:8) were recorded. No hydrocarbon fluorescence was recorded.

Gas recordings while drilling suggest that most of the gas flow of OHT 1 was from the P1-280 sand with minor contributions from the P1-80, P1-110 and P1-200 sands. Log evaluation indicates gas pay for these sands and for the P1-310 and P1-350 sands. The table below details the results of log interpretation.

**TABLE VII: PACOOTA P1 LOG ANALYSIS SUMMARY**

INTERVAL (m)	GROSS SAND (m)	NET PAY (m)	AVE VSH (%)	AVE POR (%)	AVE SW (%)	REMARKS
<b>P1-80</b> 1302.1-1305.6	2.74	2.74	8.0	5.8	39.7	Gas (4% Porosity cut off)
<b>P1-110</b> 1307.4-1307.6	0.31	0.31	8.0	4.1	22.9	Gas (4% Porosity cut off)
<b>P1-200</b> 1338.2-1340.2	2.44	2.44	3.9	5.1	22.5	Gas (4% Porosity cut off)
<b>P1-280</b> 1368.1-1370.1	1.22	1.22	4.7	4.4	20.2	Gas (4% Porosity cut off)
<b>P1-310</b> 1379.2-1380.3	1.37	1.37	3.5	5.1	28.0	Gas (4% Porosity cut off)
<b>P1-350</b> 1389.1-1389.9	1.68	1.68	8.0	5.8	37.3	Gas (4% Porosity cut off)

P2 Unit (1391.4 metres to 1462.7 metres)

The P2 unit is a shallow to moderately deep marine unit consisting of predominantly thinly interbedded siltstone and sandstone, with occasional episodes of better sand development (in the mid and basal sections of the unit). The P2 unit in general has no sands of reservoir quality.

Air/mist drilling continued to 1465 metres in the upper P3 unit, with a continuous steady strong gas flare. Gas values 1200 units (51:19:14:7:8) were recorded in the interval, but with no further gas influxes interpreted. Scattered log pay in the Pacoota P2 Unit has been excluded on the basis of insufficient thickness..

P3 Unit (1462.7 metres to 1545.0 metres)

The P3 unit consists of sandstone with generally thinly interbedded siltstone, deposited in a predominantly fluvial environment. The main oil producing reservoir in the Mereenie Field is the P3-120/130 sand. East Mereenie 37 was the third of 49 wells to target the P3-230/250 Sand.

It was intersected at 1536 metres (-703.2 metres TVD subsea), 2.2 metres low to prognosis and 54 metres below the field gas oil contact of 649.2 metres.

After the change to mud at 1465 metres gas values decreased to 40 units. Fluorescence was first observed at the top of the P3 Unit. The table below details this fluorescence and associated gas shows for the P3 Unit.

**TABLE VIII: PACOOTA P3 UNIT HYDROCARBON SHOWS**

INTERVAL	FLUORESCENCE	GAS	REMARKS
1465-1502 m	30%, dull bluish white, patchy with occasional bright pinpoints, very weak crush cut to no visible cut, weak trace residue.	40 decreasing to 5 units 71/22/7	
1502-1514 m	50%, as above.	40 units 76/17/7	P3-120/130 Sand
1514-1530 m	30%, as above	6 to 40 units 73/20/7	P3-150 and top P3-190 Sands
1530-1552 m	50%, dull, bluish white, patchy with occasional bright yellow white pinpoints, no cut to very weak crush cut, trace residue.	40 units 71/18/11	Base P3-190 and P3-230/250 Sands.
1552-1584 m	25% decreasing to trace, generally as above but no cut and no residue.	5 units decreasing to Trace 78/16/6/tr	P4

Oil pay is interpreted in the primary objective P3-230/250 Sand (2.44m). No water is indicated and the base of the pay is interpreted to be approximately 22 metres above the field OWC of -737 metres TVD. A further 17.2 metres is interpreted in the Upper P3 Sandstone section. Table VIII presents the results of electric log interpretation for the Pacoota P3. The P3-190 sand and two intervals within the P3-230/250 were perforated and at 30/06/1995 the pre-frac flow rate was approximately 130 BOPD.

**TABLE IX: LOG INTERPRETATION SUMMARY PACOOTA P3**

<b>INTERVAL metres</b>	<b>NET PAY metres</b>	<b>AVERAGE VSH (%)</b>	<b>AVERAGE POROSITY (%)</b>	<b>AVERAGE SW (%)</b>	<b>REMARKS</b>
<b>P3-10</b> 1463.0-1472.3	4.88	13.3	5.7	29.5	Gas Pay
<b>P3-90</b> 1491.4 -1491.7	0.46	19.2	6.5	58.4	Oil Pay
<b>P3-120/130</b> 1498.7-1512.7	7.72	9.5	7.0	34.1	Oil Pay
<b>P3-150</b> 1516.8-1524.6	4.12	12.7	7.2	42.2	Oil Pay
<b>P3-190</b> 1530.4-1535.1	4.88	12.1	8.3	37.6	Oil Pay
<b>P3-230/250</b> 1544.9 -1548.9	2.44	12.1	7.9	51.8	Oil Pay

**P4 Unit (1545.0 metres to 1590.0 metres Total Depth)**

The P4 unit is interpreted to be a shallow marine, shoreface to nearshore sand, deposited in a high energy environment. In the Mereenie Field, the P4 unit consists of a massive, dominantly clean quartzose sandstone with minor interbedded siltstone.

47.7 metres (measured thickness) of P4 unit was penetrated in East Mereenie 37 , with a lithology of mainly clean, poor porosity quartzose sandstones and trace medium to dark grey siltstones. Background total gas within the unit ranged from trace to 5 units (82:14:4), with no significant total gas peaks recorded. No hydrocarbon fluorescence was recorded. Log evaluation indicates generally poor porosity sandstones with no interpreted net pay.

**4. SUMMARY**

East Mereenie 37, a QNTBU Oil Appraisal Well, was the forty-ninth well drilled in the Mereenie Oil and Gas Field in the Amadeus Basin, Northern Territory (OL 5). The well is located at SP 1098, Line M82-05, midway between East Mereenie 29 and 14 on the northeastern flank of the Mereenie Anticline. The primary objective of East Mereenie 37 was the Pacoota Sandstone (P3 Unit, 230/250 sand) for oil production. Reservoir quality sandstone was intersected in the adjacent wells however the unit was in the water leg in both wells as they were targeting the P3-120/130 reservoir. Secondary objectives of the well were the Lower Stairway Sandstone and Pacoota Sandstone P1 unit for economic gas accumulations.

Santos Petroleum operated the project on behalf of the Mereenie Joint Venture. Drilling was performed by OD&E leasing Mereenie Rig 1, an OIME SL750. East Mereenie 37 was spudded in the Parke Siltstone on the 27th of May 1995, reaching a total depth of 1600 metres (Logger) in the Pacoota Sandstone P4 unit on the 18th of June 1995.

East Mereenie 37 was designed as a step-out to the south east of East Mereenie 35 and the P3-230/250 oil reservoir was the primary target. Secondary targets were the P3-120/130 sand (oil), P3-190 sand (oil) and the Pacoota P1 and Lower Stairway Formation (gas). East Mereenie 37 was deviated updip (to 207.5 ° (t)) to intersect the top of the P3-230/250 sand at a prognosed depth of -701 m (TVD SS). Formation tops to the top of the P3 were intersected high to prognosis and adjustments were made to the trajectory after intersecting the Upper Stokes Siltstone 11.0 m high to prognosis and after logging at 1245 metres where the top Horn Valley Siltstone was calculated to be 11.5 m high to prognosis. The top of the P3-230/250 sand was intersected 2.2 m low to prognosis at -703.2 m. This places the sand between the field GOC of -649.2 m and the field OWC of -734.6 m.

The P3-90, P3-120/130, P3-150 and P3-190 sands are also within the oil window and oil pay is indicated for all four sands. (see Page 1 of Wellcard or Appendix II for Pay Summary). The P3-10 sand is interpreted to contain 4.88 m gas pay.

Open hole flow testing of the P1 confirmed the productivity of this unit with a flow of 3.12 MMCFD. Based on gas while drilling, most of the production is assigned to the P1-280 sand with contributions from the P1-80, P1-110 and P1-200. Further gas pay is calculated for the P1-310 and P1-350 sands.

The well was completed on 23/06/1995 with TCP at 6 spf over the intervals 1530-1535 m, 1536.6-1540.7m and 1544.6-1549.2 m covering the P3-190 and P3-230/250 sands. Extended flow testing is being carried out to determine pre- frac potential. At 30/06/1995 the well was flowing at approximately 130 BOPD.

## 5. REFERENCES

- |                                 |  |
|---------------------------------|--|
| Geology Operations,<br>1995     | <u>East Mereenie 37 Log Analysis</u> , SANTOS Ltd.,<br>(unpublished).                                    |
| Havord, P.J., 1988              | <u>Mereenie Field (Amadeus Basin, Northern Territory, Australia)</u> , AGL Petroleum Ltd. (unpublished). |
| Queensland Exploration,<br>1994 | <u>East Mereenie 37 Well Proposal</u> , SANTOS Ltd.,<br>(unpublished).                                   |