

I N T R O D U C T I O N

Gosse's Bluff No. 1 is the fifth wildcat well drilled in the Amadeus Basin of the Northern Territory by Exoil (N.T.) Pty. Limited and its partners. The well was drilled on Oil Permit 43 issued by the Northern Territory of Australia to Magellan Petroleum (N.T.) Pty. Ltd. The operation was supervised by Exoil under a farmout agreement with Magellan. Partners with Exoil in the venture were Transoil (N.T.) Pty. Ltd. and Farmout Drillers N.L. Magellan was a 50% operating participant from 2,500 feet to 4,000 feet. The well was drilled in Gosse's Bluff, a unique circular surface structure 98 miles west of Alice Springs, to test Lower Ordovician marine rocks predicted at shallow depth, and with source and reservoir potential already proven in the area by previous drilling,

W E L L H I S T O R Y

GENERAL DATA:-

Well Name and Number: Gosse's Bluff No. 1

Location: 23°49'15" South; 132°18'0" East

Map Reference F53 - 13 Hermannsburg

Name and Address of Tenement Holder:

Magellan Petroleum (N.T.) Pty. Ltd.,
4th Floor,
Bowman House,
Edward and Adelaide Streets,
BRISBANE. QUEENSLAND.

Details of Petroleum Tenement:

Permit to Explore O.P. 43, Northern Territory

Area: 9,918 square miles

District: Alice Springs

Total Depth: 4,535 feet Driller

Date Drilling Commenced: 24th February, 1965

Date Drilling Completed: 27th March, 1965

Date Well Abandoned: 28th March, 1965

Date Rig Released: 28th March, 1965

Drilling Time in Days to Total Depth: 32

Elevation: Ground 2,439.5' a.s.l.

Kelly Bushing 2,453'

Status: Dry and abandoned

Cost:

DRILLING DATA:

Name and Address of Drilling Contractor:

Oil Drilling and Exploration Limited,
93 York Street,
SYDNEY. NEW SOUTH WALES.

Drilling Plant:

Make: National Ideal

Type: T32

Rated Capacity with 4½" drill pipe: 7,500 feet

Motors: (3) Cummins N.H. 1,600, 200 h.p.

Mast:

Make: Ideco

Type: Junior Fullview

Rated Capacity: 490,000 lbs.

Pumps:

Make: Ideco Ideal

Type: C-250 C-250

Size: 7¼" x 15" 7¼" x 15"

Motors: G.M.C. Twin 671
300 h.p. G.M.C.

Air Drilling Equipment from 106 feet to 2,074 feet:

<u>Unit</u>	<u>Make</u>	<u>Type</u>	<u>Size</u>	<u>Motors</u>
Compressor	Holman	Rotary	600 c.f.m.	-
Compressor	Ingersoll-Rand	Reciprocating	600 c.f.m.	-
Compressor	Chicago-Pneumatic	Reciprocating	500 c.f.m.	-
Injection Pump	Aldrich	Triplex HS-3B	1" x 2½"	Wisconsin 30 h.p.

<u>Unit</u>	<u>Make</u>	<u>Type</u>	<u>Size</u>	<u>Motors</u>
<u>From 2,074' to 3,674':</u>				
Compressor	Ingersoll-Rand	HHE-3 stage	1,500 c.f.m. 300 p.s.i.	Waukesha 405 h.p.
Injection Pump	Aldrich	Triplex H.S.3B	1" x 2½"	Wisconsin 30 h.p.

From 3,674' to 4,535':

Compressors (3)	Gardner-Denver	WEK	500 c.f.m. 300 p.s.i.	G.M.C. Twin 471
Boosters (2)	Gardner-Denver	RDX	1500 c.f.m. 1500 p.s.i.	Waukesha 148 DKU
Injection Pump	-	Triplex	-	G.M.C.

Blow Out Preventor Equipment:

Make:	Hydril	Shaffer	Shaffer
Type:	G.K.	E.F. Double Gate	Rotating
Size:	12"	12"	12"
Series:	900	900	900

Hole Sizes and Depths:

17½" hole from surface to 106' K.B.

12¼" hole from 106' to 1,019'

8¾" hole from 1,019' to 4,520'

7¹³/₁₆" hole from 4,520' to 4,535'

Casing Details:

Size:	13¾"	9⅝"
Weight:	48 lb./ft.	36 lb./ft.
Grade:	H-40	J-55
Setting Depth:	106'	1,019'

Casing Cementing Details:

Size:	13¾"	9⅝"
Setting Depth:	106'	1,019'
Cement Used:	90 sacks	120 sacks
Cemented to:	surface	-
Method used:	rig pump	rig pumps, plug

Drilling Fluid:

17½" hole was mud drilled from surface to 106 feet.

The mud used was gel-base, 9.0 lbs. per U.S. gallon weight and 35 sec. (Marsh) viscosity. 12¼" hole was drilled from

106 feet to 1,019 feet and 8 $\frac{1}{4}$ " hole from 1,019 feet to 1,306 feet with air. Below 1,306', moisture entering the hole necessitated a change to mist drilling. The hole was mist drilled from 1,306 feet to total depth. While mist-drilling, a solution of water, foaming agent (Tolfoam) and corrosion inhibitor was continuously injected at the rate of seven to twelve barrels per hour.

The following mud and additives were used:-

Supercol	3,400 lbs.
Bi-Chromate	1,940 lbs.
Caustic	1,898 lbs.
Tol-Foam	500 $\frac{1}{4}$ gals.

Water Supply:

Four bores totalling 1,555 feet were drilled for water for Exoil by Geophysical Associates using a Mayhew 1,000 rig. Two of three bores inside the bluff were dry and the third found a negligible quantity of salt water. The fourth, one mile outside the bluff encountered a small amount of water insufficient for the operation.

Water was hauled by truck from this bore, and a dam 12 miles from the wellsite. An adequate water supply was maintained throughout the operation.

Perforation and Shooting Record:

No perforation or shooting was done in this well.

Plugging back and squeeze cementation jobs:

The following plugs were run when the well was abandoned:-

<u>Plug No.</u>	<u>Interval</u>	<u>Cement(sacks)</u>	<u>Felt At</u>
1	2920' - 3120'	80	2960'
2	950' - 1050'	40	946'
3	Surface - 70'	25	-

The plugs were run using the rig pumps, and were displaced with water.

Fishing Operations:

No time was lost fishing.

Side-tracked Hole:

No side-tracking was required.

Logging and Testing - Ditch Cuttings:

Drill cuttings were caught from the end of the blooey line while air drilling and mist drilling, at ten foot intervals while drilling and five foot intervals while coring. Cuttings during air drilling were packaged as they came from the blooey line. While mist drilling, samples were screened, washed and dried before packaging.

Four cuts were made of all cuttings, one for Exoil, one for Magellan Petroleum, one for the Bureau of Mineral Resources, Canberra, and one for the Northern Territory Administration in Alice Springs.

Coring:

In accordance with subsidy requirements for stratigraphic drilling, cores were cut for stratigraphic information at three-hundred foot intervals to 1,540 feet (cores Nos. 1-5). Between 1,540 feet and 3,086 (cores Nos. 6-8) this interval was extended to five hundred feet by agreement with the Bureau of Mineral Resources. Cores 9 and 10 were cut because of nil recovery from Core No. 8 and 6" recovery from Core No. 9. Cores 11 and 12 were cut over the 500 foot interval at bit changes, also by agreement with the Bureau of Mineral Resources.

Cores were also to be taken when hydrocarbon shows, porosity, and permeability were encountered. The only show occurred during the cutting of Core No. 9.

Coring equipment consisted of a Hughes Tool Co. 20 foot type "J" core barrel and Hughes hard formation core heads, and a 60' x 6 $\frac{1}{4}$ " Christensen core barrel with 7 $\frac{13}{16}$ " diamond core head. Cores 10 and 12 were cut with the diamond core barrel in an attempt to improve recoveries.

Core recoveries in this well were below normal due to the steeply dipping, broken nature of the section. Recovered portions of cores showed extreme dips, abundant fracturing and shearing, and were in all cases badly broken up. Several means were tried to improve recoveries, including diamond

coring, and coring longer and shorter intervals. Little success was achieved due to the nature of the formations.

The following table lists cores cut and their recovery.

<u>Core No.</u>	<u>Interval</u>	<u>Amount</u>		<u>% Recovered</u>
		<u>Cored</u>	<u>Recovered</u>	
1	319' - 329'	10'	1'	10
2	616' - 626'	10'	2'	20
3	1019' - 1029'	10'	3'	30
4	1222' - 1232'	10'	4'	40
5	1530' - 1540'	10'	4"	3.3
6	2064' - 2074'	10'	5'	50
7	2537' - 2547'	10'	1'	10
8	3086' - 3092'	6'	Nil	-
9	3092' - 3104'	12'	6"	4.2
10 (diamond)	3124' - 3132'	8'	5'	62.5
11	3848' - 3858'	10'	6"	5
12 (diamond)	4520' - 4535'	15'	1'6"	10
Total footage cored:		121'		
Total footage recovered:		23'10"		
Percentage recovered:		19.7%		

Side-wall Samples:

No side-wall cores were shot in this well.

Electrical and other logging:

The following logs were run by Welex with no mud in the hole:-

Induction Log - Run 1 : 104' - 986'

Run 2 : 1018' - 4480'

Gamma-ray Log - Run 1 : Surface - 3075'

Logs were run on 2" = 100' and 5" = 100' scales. The gamma-ray sonde failed to reach bottom due to bridging hole.

Drilling Time and Gas Log:

Rate of penetration was recorded on a geolograph, and is plotted on the composite log as minutes per five-foot interval.

As the hole was drilled with air and mist below surface casing, the conventional mud gas detector was not used on the well. Drilling an open hole provided a continuous test of formations drilled throughout the operation. A pilot light placed at the end of the blowey line at all times while drilling and coring provided near-instantaneous detection of hydrocarbons encountered.

A Corelab hot-wire gas detector was available on site in the event that mud drilling was required.

Formation Testing:

No conventional drill-stem tests were required, for the reasons cited above.

Deviation Surveys:

Deviation was a major drilling problem occasioned by the extremely steep (overtuned?) dips of beds. Surveys were therefore run at closely spaced intervals and reduced drilling weights were used to avoid sharp changes in deviation.

Surveys were taken using a Lane Wells "Sure-Shot" instrument run inside the drill-pipe on a sand line at connections.

The table below lists all surveys taken:-

170' - 1°	1680' - 5°	2870' - 7¼°*
300' - 1¾°	1822' - 6°	2924' - 7¼°*
465' - 1¾°	1850' - 6¼°	3074' - 6¾°
616' - 2¼°	1890' - 5¾°	3120' - 7¼°
737' - 3°	1920' - 6°	3160' - misrun
890' - 2½°	1985' - 6°	3190' - 6¼°
1170' - 3½°	2060' - 5¾°	3310' - 5½°
1220' - 4½°	2105' - 6°	3370' - 7°
1320' - 5°	2121' - 6½°	3400' - 6°
1340' - 5¼°	2200' - 6¼°	3460' - 5°
1380' - 5¼°	2326' - 7°	3521' - 4½°
1410' - 6°	2340' - 7°	3600' - 4¼°
1440' - 5°	2375' - misrun	3725' - 4¼°
1470' - 6°	2410' - 7¼°*	3835' - 3°
1500' - 5°	2507' - 7¼°*	3930' - 3½°
1530' - 6°	2580' - 7¼°*	4100' - 3¾°
1580' - 5°	2699' - 7¼°*	4264' - 2°

* Survey instrument recorded a maximum of 7¼° - deviation is thus 7¼° or more.

Temperature Surveys:

No temperature surveys were run in the well.