

## 1. ENGINEERING DATA

### 1.1 Engineering Summary

**Chanin 1**, in EP18, Northern Territory, is located approximately 41km east-north-east of the Hi-Way Inn Motel at the junction of the Stuart and Carpentaria Highways (PetNTcw9404).

Drilling operations began with the setting of a 13 $\frac{3}{8}$ " conductor at 8.8m KB by Rockdril Rig 22 on the 26th June 1993.

Rockdril Rig 22 spudded **Chanin 1** at 0030 hours on 26th June 1993. A 12 $\frac{1}{4}$ " hole was drilled with air and an air hammer to 60.8m. After blowing the hole clean with air prior to a deviation survey, the hole packed off and returns were lost. Tight hole was encountered from 52m to 58m with a maximum overpull of 132,000 lbs.

The drill string was backed off under the rotary table so that a set of 4 $\frac{3}{4}$ " jars could be installed. Jarring continued on the fish until the jars failed. The 4 $\frac{3}{4}$ " jars were laid down and a set of 6" jars were picked up. A maximum overpull of 180,000 lbs was experienced and it became difficult to re-cock the jars. A tubing stinger was made up and run into the drill pipe/open hole annulus, washing and jetting down with foam to the top of the hammer. After circulating above the hammer the tubing and stinger were pulled out of the hole.

The drill string was finally pulled out of the hole and the hammer and jars laid down on 27th June 1993.

A 12 $\frac{1}{4}$ " bit was made up and run in the hole. Washing and reaming was required from 28m to 59m. Viscous sweeps were pumped and the hole circulated clean. A wiper trip was made and the drill string pulled out of the hole prior to running the 9 $\frac{5}{8}$ " casing.

Five joints of 9 $\frac{5}{8}$ " 36ppf J55 BTC casing were run in the hole to 59m and cemented in place with 80 sacks of class "A" neat cement at 15.6ppg. The top cementing plug was bumped to 700psi and the float held after releasing the pressure.

After waiting 4 hours on cement, the 13 $\frac{3}{8}$ " conductor was cut and laid out on 28th June 1993. The 9 $\frac{5}{8}$ " deep conductor was dressed off and the rotating head and blooie line installed. A top up cement job was pumped into the annulus using 15 sacks of Class "A" neat cement at 15.6ppg.

An 8 $\frac{1}{2}$ " bottom hole assembly was made up and run in the hole. The top plug and float shoe were drilled out and drilling continued to 75m, with reaming and washing required from 70m to 75m. Drilling continued to 122m, with sloughing occurring below 84m. Six joints of drill pipe were pulled out of the hole and replaced with drill collars, which were added to the drill string while running in the hole.

The drill string became hung up at 72m. Washing and reaming continued to 75m where circulation was lost. The drill string was worked in tight hole with a maximum overpull of 10,000lbs.

The drill string was pulled out of the hole to lay out the stabilisers, and then run back in the hole to 66m. Reaming and washing continued in tight hole at depths of 66m, 70m, 80m and 89m. Washing, reaming and working through bridges continued to 122m.

Drilling continued in the 8½" hole to 165m, then the drill string was pulled out of the hole to change the bottom hole assembly. The stabilisers were made up and run in the hole to 72m. Washing and reaming was again necessary to 165m. Drilling continued to 225m with a survey run at 122m (1°)

On 1st July, the drill string was pulled out of the hole laying down singles. Three joints were pumped out at 89m due to tight hole. An 8½" bottom hole assembly including 4¾" drill collars were made up and run in the hole, washing and reaming to 225m. The well was unloaded and drilling continued with air and foam to 233m where the drill string was pulled out of the hole for a bit change.

An 8½" bottom hole assembly and new 8½" bit was made up and run in the hole. It was worked through tight hole at 89m and reamed from 135m to 156m and 171m to 205m. Returns were lost while attempting to unload the hole at 233m, but drilling continued to 309m with intermittent returns. A drilling break was experienced from 271m to 277m with a four-fold increase in the ROP. A 30 barrel Hi-Vis pill was circulated using foam, to clean the hole. A 50 barrel Hi-Vis pill was spotted on bottom and a check trip was made to the 9⅝" shoe.

The drill string was pulled out of the hole to lay down the stabilisers and jars and a wiper trip was made prior to running 7" casing. A bridge was tagged at 84m and the drill string was pulled out of the hole to change the bottom hole assembly. The 6" drill collars were laid down and the drill pipe picked up and run in the hole for a clean out trip.

The drill string was worked through bridges at 80m, 91m, 100m, 109m and 119m. Washing and reaming was required from 165m to 309m. The hole was circulated clean with air/foam, then filled with water. A Hi-Vis pill was spotted and the drill string was pulled out of the hole to run the 7" casing.

Nine joints of 7" 29ppf BTC casing were run into the hole, rotating through bridges from 70m to 114m. At 118m casing became stuck and required circulating and washing to work free. Washing and circulating continued to 294.45 m.

Cementing lines and equipment were rigged up and the casing was cemented at 294.61m with 50 sacks of neat Class "A" cement at 15.6ppg. The top cementing plug was bumped to 1000psi, but the float did not hold when the pressure was released, so 500 psi was held on the casing while waiting on cement.

After waiting on cement for 4 hours the conductor was cut and the landing plate installed. The BOPs were nipped up and the blooie line and rotating head were installed. The BOPs were function tested and the choke manifold hooked up. The BOPs were tested to the required pressure.

On 7th July, a 6" bottom hole assembly (including and a new 6" bit) was made up and run in the hole. The cementing plugs, float collar, shoe track and float shoe were drilled out to 309m and the rat hole was cleaned out.

Drilling continued to 311m, the hole was circulated clean, and a leak off test was performed indicating the open hole could support a 16.5ppg Equivalent Mud Weight. The hole was unloaded and drilled to 315m with air/foam until the drill string was pulled out of the hole to rig up the 6" air hammer.

The air hammer was run in the hole to 315m and hammer drilling continued to 317m with pressure fluctuations up to 900psi. The hammer ceased drilling and was pulled out of the hole for inspection. The hammer screen was found to be blocked with scale and rust from the drillpipe and there was evidence of severe wear to the shank of the hammer.

A 6" bottom hole assembly and a 6" bit was picked up and run in the hole. Drilling continued with air to 368m. After a connection was made, reaming and working tight hole was required from 359m to 368m, but drilling continued (with a drilling break from 372m to 378m). A survey was conducted at 366m (2°).

On 10th July, the drill string was pulled out of the hole for a bit change. A new 6" bit was made up and run in the hole. Drilling continued with air to 949m where a sample was circulated with a foam sweep. The hole was blown dry and drilling continued with air/mist to 1328m at approximately 10m/hour, taking surveys as required.

The hole was circulated and conditioned after drilling into a water zone at 1328.5m. The drill string was pulled out of the hole for a bit change. A 6" bottom hole assembly and a new 6" bit was made up and run in the hole. Drilling continued with PHPA polymer mud to 1376m where the drill string was pulled out of the hole for another bit change. A new 6" bit was made up on the bottom hole assembly and run in the hole to 1365m where an attempt to circulate did not succeed. The drill string was pulled out of the hole to inspect the bit. The top of the float valve above the bit was found to be blocked with plastic coating, rust and scale from the inside of the drill pipe.

After cleaning the bit and bit sub and removing the float valve, the drill string was run in the hole to 1370m and washing and reaming continued to 1376m.

Drilling continued to a total depth (TD) of 1411m. A Hi-Vis pill was spotted on bottom and the hole circulated clean prior to running logs. Schlumberger rigged up and ran run 1 (DLL-SDT-MSFL-GR-Cal).

The LDL-CNL-GR tools hung up at 1038m while running in. The logging tools were pulled out of the hole and Schlumberger rigged down. A 6" bit was made up and run in the hole to 1405m without problems. Washing and reaming was required from 1405m to 1411m. A Hi-Vis pill was circulated and spotted. The drill string was pulled out of the hole. Schlumberger rigged up for and ran run 2, (LDL-CNL-GR), run 3 (DIT) and run 4 (Seismic SAT). The SAT tool hung up at 850m, the tool was then pulled out of the hole and changed to Seismic WST. The WST tool was run with no problems. The logging tools were pulled out of the hole and Schlumberger rigged down. Open ended drill pipe was run in the hole to 1358m and circulated to balance the mud prior to plugging back operations.

Cement plugs were set as follows:-

Plug #1	1358m - 1298m with 36 sx Class "A" neat cement at 15.6ppg
Plug #2	324m - 254m with 54 sx Class "A" neat cement at 15.6ppg

Plug 2 was tested with 4000 lbs weight after waiting 4 hours on cement. The well was displaced to inhibited water for corrosion protection. The BOPs and well head were nipped down in preparation for rig down.

A cement plug was set from surface to 45m using 25 sx Class "A" cement at 15.6ppg, and a marker plate fitted indicating the following:-

CHANIN # 1  
SPUD 26-6-93  
P/A 20-7-93  
TD 1411m

Rockdril Rig 22 was released at 0900 hours, 20th July 1993.

## 1.2 General Data

Well name:	<b>Chanin 1</b>
CRAE Drillhole No:	RD93MB25
Well Type:	Exploration Well
Operator:	Pacific Oil & Gas Pty. Limited
Title Holders:	Pacific Oil & Gas Pty. Limited 90% Omega Oil N.L. - 10%
Location:	Latitude: 16°14'11.6" South Longitude: 133°44'47.8" East AMG Zone 53 366 048 E 8 204 483 N 1:250 000 Sheet: Tanumbirini SE53-2 1:100 000 Sheet: Scarlet Hill 5665
Elevation:	Ground level (GL) 240m AHD Kelly bushing (KB) 244.9m AHD
Datum:	Unless otherwise stated the kelly bushing (KB) was used as a datum for all measurements in the well.
Total Depth:	1411m - Driller 1411m - Logger
Well Spudded:	26 June 1993 at 0300 hours
At Total Depth:	17 July 1993 at 1430 hours
Rig Release:	20-July 1993 at 0900 hours
Status:	Dry hole, plugged and abandoned
Drilling Rig:	Rockdril Rig 22
Hole Size:	12½" to 60.8m (Driller) 8½" to 309.0m (Driller) 6" to 1411m (Driller)

Casing: 13 $\frac{3}{8}$ " Surface conductor to 8.8m  
 9 $\frac{5}{8}$ " Deep conduction to 59.0m  
 7" Casing to 294.45m

Wireline Logs: DLL-MSFL-AS-GR-CAL from 1411m to casing shoe  
 GR to surface.

LDL-CNL-GR from 1411m to casing shoe.

DIL from 1411 to casing shoe.

Velocity Survey: A 14-level velocity survey was recorded.

### 1.3 Drilling Rig

Rockdril Contractors Rig 22, a Cooper 350, was used to drill **Chanin 1**. Specifications for this rig and associated plant are given in Appendix 1.

### 1.4 Service Companies

The following service companies were employed:

Independent Drilling Fluid Services	Mud engineering
Halliburton Drilling Systems	Mud logging
Schlumberger Seaco	Geophysical logging, Velocity survey
Australian DST	Testing

### 1.5 Hole Sizes

12 $\frac{1}{4}$ " to 60.8m (Driller)  
 Drilled with air hammer and rotary air.

8 $\frac{1}{2}$ " to 309.0m (Driller)  
 Drilled with rotary air.

6" to 1411.0m (TD) (Driller)  
 Drilled with rotary air to 948.0m, Air/mist to 1328.5m, rotary mud to 1411.0m.

### 1.6 Drilling Problems

Drilling problems were experienced drilling the Mullaman beds and the Tindall Limestone. Until these formations were behind casing, the hole frequently became tight and bridged off, requiring washing and reaming to re-enter the hole. The drill string became stuck in the hole on 26th June (Day 1), and required fishing to be retrieved (refer section 1.12). No other major problems were encountered drilling **Chanin 1** after the casing was in place.

### 1.7 Casing

13 $\frac{3}{8}$ "	Shoe at 8.8m (Driller)
Type:	Surface Conductor pipe
Range:	3
No. of joints	1

9 $\frac{5}{8}$ "	Shoe at 59.0m (Driller)
Grade:	J55
Weight:	36 ppf
Thread:	8 round
Range:	3
No. of joints:	5

Accessories:	Float shoe 3 centralisers
Cement used:	95 sacks, Class "A"
Cementation:	Pumped water pre-flush; released bottom plug; mixed and pumped cement at 15.6 ppg; release top plug; displace with 15.5 bbls of water; bumped plug with 700 psi; float held.
Top of cement:	Surface
Leak-off test	Not performed.
7"	Shoe at 294.45m (Driller)
Grade:	N80
Weight:	29 ppf
Thread:	LT + C
Range:	3
No. of joints:	25
Accessories:	Float collar Cement basket
Cement used:	50 sacks, Class "A"
Cementation:	Pumped water pre-flush; released bottom plug; mixed and pumped cement at 15.6 ppg; release top plug; displace with 35 bbls of water; bumped plug to 1000 psi and bled off (twice). Float failed to hold. Hold 500 psi on casing until cement set.
Leak-off test:	EMW 16.5 ppg
Remarks:	The casing had to be worked through a number of tight sections but was landed at the planned depth.

### 1.8 Drilling Fluids

The 12¼" and 8½" holes were drilled with air with an occasional Hi-Vis pill circulated to clean the hole. Tight zones and bridges were washed and reamed when encountered.

The 6" hole was air drilled to 948m. From 948m to 1328.5m, drilling proceeded with air/mist/foam. The hole was displaced with a PHPA mud when a water zone was encountered at 1328.5m, and then drilled to TD with mud. A full mud report from Independent Drilling Fluid Services is included as Appendix 2.

### 1.9 Water Supply

Both camp and rig water was supplied by a bore drilled on site prior to the arrival of Rockdril. The water bore was completed by Gorey and Cole Drilling Contractors. A submersible pump supplied the water from the bore to a plastic lined turkey nest at the edge of the lease. The Tindall Limestone was the aquifer exploited, and it produced an adequate supply of water via the bore and pump to the turkey nest throughout the whole operation. An analysis of this water is included in Appendix 8.

### 1.10 Drilling Bit and Bottom Hole Assemblies

12¼"	To 61m (Driller) IR Hammer bit Type DDTX Slick BHA Average penetration 11 metres/hour
12¼"	Wiper trip to 61m (Driller) Varel 1-1-7 Type L117 Slick BHA

- 8½" To 165m (Driller)  
 HTC 4-3-7  
 Type ATM 11H  
 Packed BHA  
 Bit, bit sub, shock sub, stabiliser, 1 x 6½" DC, stabiliser,  
 1 x 6½" DC, stabiliser, 10 x 6½" DC, cross over, 3 x 4¾" DC,  
 Jars, 2 x 4¾" DC.  
 Average penetration 4.8 metres/hour  
 Bit graded 3-3-I
- 8½" To 309m (Driller)  
 Smith 5-1-7X  
 Type F2  
 Slick BHA  
 Average penetration 3.5 metres/hour  
 Bit graded 2-2-I
- 6" To 315m (Driller)  
 Varel 5-1-7  
 Type V517  
 Slick BHA  
 Average penetration 3 metres/hour  
 Bit graded 1-1-I
- 6" To 317m (Driller)  
 IR Hammer  
 Type DDTE  
 Slick BHA  
 Hammer failed, worn shank
- 6" To 577m (Driller)  
 Varel 5-1-7 (re-run)  
 Type V517  
 Pendulum BHA  
 Bit, bit sub, 1 x 4¾" DC, stabiliser, 14 x 4¾" DC, Jars, 3 x 4¾" DC  
 Average penetration 5.3 metres/hour  
 Bit graded 4-5-⅙"
- 6" To 1328.5m (Driller)  
 Varel 5-3-7  
 Type V537  
 Pendulum BHA  
 Bit, bit sub, 1 x 4¾" DC, stabiliser, 14 x 4¾" DC, Jars, 3 x 4¾" DC  
 Average penetration 9.8 metres/hour  
 Bit graded 6-7-⅙"
- 6" To 1376m (Driller)  
 HTC 5-1-7  
 Type ATJ22  
 Pendulum BHA  
 Bit, bit sub, 1 x 4¾" DC, stabiliser, 14 x 4¾" DC, Jars, 3 x 4¾" DC  
 Average penetration 2.1 metres/hour  
 Bit graded 7-5-⅙"
- 6" To 1411.0m (Driller)  
 HTC  
 Type ATJ55  
 Pendulum BHA  
 Bit, bit sub, 1 x 4¾" DC, stabiliser, 14 x 4¾" DC, Jars, 3 x 4¾" DC  
 Average penetration 1.6 metres/hour  
 Bit graded 4-5-I

### 1.11 Deviation Record

Deviation surveys were carried out with a 14° Totco instrument. Results are presented in Table 1.

Table 1.  
Deviation Surveys - Chanin 1

Depth (metres)	Deviation
221	1°
366	2°
574	2°
1110	1°
1367	1°

### 1.12 Fishing Operations

The hole "packed off" on the drill string below 52m on the first day of drilling, through the weathered claystone of the Mullaman beds. The drill string was backed off below the rotary table and 4¾" Bowen jars were installed. The jars failed after some time, they were replaced with 6½" jars. The 6½" jars were unable to retrieve the fish until a tubing stinger was made up and run in the annulus to 30m. The stinger was then worked down to 46m (top of air hammer), and foam circulated. The pipe was freed and pulled out of the hole. The stinger was retrieved.

### 1.13 Cores

No cores were cut.

### 1.14 Wireline Logs

Schlumberger Seaco were contracted to run the following suite of tools:

Run 1.	DLL-MSFL-AS-GR-CAL	294.45-1411.0m, GR to surface
Run 2.	LDL-CNL-GR	294.45-1411.0m
Run 3.	DIL	294.45-1411.0m
Run 4.	WST	1328.0-44.9m

### 1.15 Formation Tests

No formation tests were conducted in Chanin 1.

### 1.16 Abandonment

The well was plugged and abandoned with cement plugs as follows:-

- (i) Plug No 1 was set from 1358-1298m with 36 sacks of Class "A" cement.
- (ii) Plug No 2 was set from 252-324m with 54 sacks of Class "A" cement. The plug was tested with 4000 lbs of weight after waiting 4 hours on cement.
- (iii) Surface Plug, was set from 45m to surface with 25 sacks of Class "A" cement.
- (iv) A marker plate was welded to the 7" casing stub.

### 1.17 Time Distribution

A full breakdown of drilling operations can be found in Appendix 4. Drilling operations commenced at 0030 hours, 26th June, 1993 and ceased at 0900 hours on 20th July 1993, a period of 23 days, 8.5 hours. Analysis of the time spent is presented on PetNTcw9427.

A time vs depth curve is presented on PetNTcw9431.



## 1.18 Well Costs

A summary of costs for the drilling of **Chanin 1** is given in Table 2. PetNTcw9428, 9429 and 9430 display the cement and mud chemical usage in **Chanin 1** in terms of price per unit, usage and expenditure.

Table 2.  
Drilling Cost Summary - **Chanin 1**

ITEM	COSTS \$A
Site preparation/Rehabilitation	24,409
Water Supply	21,989
Mobilisation/Demobilisation	127,250
Drilling	331,840
Casing	30,624
Cementing	3,564
Mud Supplies and Services	23,350
Geophysical Logging	59,669
Camp	42,566
Mudlogging Services	22,775
Drill Stem Testing	7,566
Communications	7,240
Freight	37,670
Travel & Accommodation	29,947
Vehicle Costs	7,691
Laboratory Analysis	2,535
Payroll & Benefits	-
CRA overheads	971
Consultants	65,230
Office Supplies	263
Insurance	7,500
<b>TOTAL</b>	<b>\$854,679</b>

## 2 GEOLOGICAL DATA

### 2.1 Geological Summary

**Chanin 1** was designed to test a seismically interpreted closure approximately 60km north of **Jamison 1**. The well is located near the northern margin of the Beetaloo Sub-basin and is updip of a significant hydrocarbon source region.

The primary reservoir objectives of the well were the "Jamison Sandstone" and the Moroak Sandstone Member of the McMinn Formation. Minor amounts of oil and gas were recovered from the "Jamison Sandstone" in **Jamison 1** and oil shows were encountered in the Moroak Sandstone in **Elliott 1**. Secondary reservoir objectives were sands within the lower "Hayfield Mudstone" and in the Kyalla Member of the McMinn Formation.

The well spudded in weathered kaolinitic claystones and siltstones of the Mullaman beds. A partially ferruginised sandstone is present at the base of the unit. This formation is Cretaceous in age, on which a ferruginous laterite has developed during the Tertiary Period. The base of the Mullaman beds was intersected at 76.5m.