

W 759



# BALEEN - 1

## WELL COMPLETION REPORT

PERMIT Vic/P11  
1982



OIL and GAS DIVISION

13 SEP 1982

BALEEN No. 1

WELL COMPLETION REPORT

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Hudbay Oil (Australia) Ltd.

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1.0

WELL HISTORY

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1.0

WELL HISTORY

1.1

General Data

1.1.1 Name and Address of Operator:-

Hudbay Oil (Australia) Ltd.,  
256 Adelaide Terrace,  
PERTH W.A. 6000

1.2

Participants

Beach Petroleum N.L.,  
G.P.O. Box 1280L,  
MELBOURNE VIC. 3000

Gas & Fuel Exploration N.L.,  
171 Flinders Street,  
MELBOURNE VIC. 3000

Hudbay Oil (Australia) Ltd.,  
256 Adelaide Terrace,  
PERTH W.A. 6000

1.3

Petroleum Title

Vic/P-11, Victoria

1.4

District:- Melbourne

1.5

Location: Refer to location diagram, Figure 1

Latitude: 38<sup>0</sup> 00' 36.63" S

Longitude: 148<sup>0</sup> 26' 8.40" E

Easting 626032

Northing 5792068

1.6

Water Depth	-	54.9 m below Mean Spring Low Water
Total Depth	-	1030 m below R.T., reached on 16 November, 1981
Rotary Table	-	9.45 m above Mean Spring Low Water
Spud Date	-	4 November, 1981
Rig Release Date	-	30 November, 1981
Rig on Location	-	3 November, 1981
Drilling Unit	-	Petromar "North Sea" (Drillship)

1.7

Well Status on Rig Release

Plugged and Abandoned Gas Discovery



## 1.8 Drilling Summary

The drillship "Petromar North Sea" departed the West Seahorse No 1 location at 1400 hours, 3rd November 1981, enroute to the Baleen No 1 location. The rig arrived at the proposed location at 2000 hours, 3 November 1981.

The eight anchors were run out into position, the rig pulled over location and the anchor chains tensioned up. The temporary guide base was run indicating water depth of 54.9m. (Rotary table to seabed of 64m.) The 36" hole was spudded at 2045 hours, 4 November, 1981 and was drilled to 71m. A 26" bit was then run and used to drill to 225m. The hole was displaced to high viscosity mud, a wiper trip made to the guide base, and the hole was re-filled with mud.

The 20" casing was then run and landed with the shoe at 209.05m. This casing was fitted with a 20-3/4" wellhead housing integral with a 30" pile joint, 30" wellhead housing and permanent guide base. The casing string was cemented in place, and the 20-3/4" BOP and 22" marine riser were run and latched to the 20-3/4" wellhead. The 20" casing was pressure tested to 500 psi.

A 17½" bottom hole assembly was made up, the 20" casing shoe drilled out and new hole drilled to 228m. A formation leak-off test was run indicating formation strength of 1.73 SG. The 17½" bit was pulled, a 12¼" bit and bottom hole assembly run, and 12¼" hole drilled to 577m without incident. An attempt was made to log but the tools hung up at 406m. The 12¼" bit was run back to bottom, a wiper trip made, and logging re-attempted. The DIT/BHCS/GR, FDC/CNL/GR/CAL and one sidewall core gun completed.

A conditioning trip was made and then 9-5/8" casing run and landed with the shoe at 566.08m. A 13-5/8" wellhead housing was adapted to run with this casing. The 9-5/8" casing was cemented in place and the 20-3/4" BOP and marine riser pulled. After waiting on weather the 13-5/8" BOP stack was run on the 22" marine riser. The BOP was latched to the 13-5/8" wellhead housing, casing was pressure tested to 2500 psi and the BOP fully tested.

An 8½" bit and bottom hole assembly were made up and run into the hole. The casing shoe was drilled out and 3m new hole drilled to 580m. A formation leak-off test was conducted indicating formation strength of 1.98 SG. The 8½" hole was drilled ahead to 663m with occasional stops to circulate up cuttings samples. A small kick was experienced at 663m with indicated surface drill pipe pressure of 450 psi. Kill mud was mixed to 1.54 SG, the well killed, and then mud weight reduced to 1.50 SG due to mud losses to the formation. The 8½" hole was continued to 1030m without further incident. A wiper trip was made prior to electric logging. The DLL/MSFL/GR, FDC/CNL/GR, BHCS/GR, HDT and velocity survey logs were completed. Two runs were made with an RFT tool for pressures and fluid samples, followed by two sidewall core guns.

A cement plug was set in the 8½" open hole to cover the interval 875 - 775m. A 7" casing liner was then run and landed with the shoe at 760m and with the liner hanger at 451.36m. The liner was cemented, the liner packer set and excess slurry reversed out of the hole. The 13-5/8" BOP stack was then pulled, the lower rams changed from 4½" to 3½" pipe rams, the stack re-run and pressure tested.

A 7" casing scraper was run to the top of soft cement at 721m, and KCL polymer mud spotted from 716 - 666m (over the proposed perforating zone). The CBL/VDL/GR log was run indicating top of cement around the 7" casing at 608m. A pressure test indicated the liner lap was leaking; hence, drill pipe was run, a 50 sack cement slurry plug spotted across the liner hanger and then squeezed to the liner lap.

An 8½" bit was used to drill out the cement from 430 - 461m. A 6" bit drilled out cement from 461 - 471m, the casing was then pressure tested to 2200 psi and KCL polymer mud re-spotted at 715m.

The interval 700 - 706m was perforated at 13 shots/m. and DST tools picked up from DST No 1. The tools were run on 3½" Hydril tubing and the packer set at 685m. The test consisted of an initial flow period of 8 minutes, initial shut in of 57 minutes, final flow period of 10 hours 15 minutes and final shut in of 1 hour 17 minutes. Flow stabilized at about 1.8 mmscf/d on a 1" choke.

The test tools were pulled and a bridge plug run and set at 690m. The plug was pressure tested to 2200 psig. A 6" bit and casing scraper were run to 680m and KCL/Polymer mud spotted from 680 - 630m.

The interval 662 - 670m was perforated at 13 shots/metres after two gun failures. The DST tools were picked up for DST No 2. After running to bottom the tools were pulled due to a malfunction of the packer. The packer was eventually set at 648m. The test consisted of an initial flow period of 6 minutes, initial shut in of 39 minutes, final flow period of 300 minutes and final shut in period of 205 minutes. Final flow stabilized at about 6.3 mmscf/d on a 1" choke.

A 7" bridge plug was set at 652m and pressure tested to 2000 psig. An initial attempt to set a 17.5 sack cement plug on top of the bridge plug was unsuccessful, and a 30 sack plug was finally set. A surface cement plug of 80 sacks was set to cover the interval 165 - 100m. The BOP stack and riser were then pulled. A mechanical cutter was used to cut the 9-5/8" casing at 74.9m with the 13-5/8" wellhead housing and 9-5/8" casing stub subsequently recovered. The 20" casing was cut at 73.4m and the 20-3/4" wellhead housing with 20" casing stub similarly recovered. The temporary guide base then was pulled.

Anchors were pulled and the drilling vessel departed the Baleen No 1 location at 0600 hours, 30 November 1981.

Geological Summary (Enclosure 1)

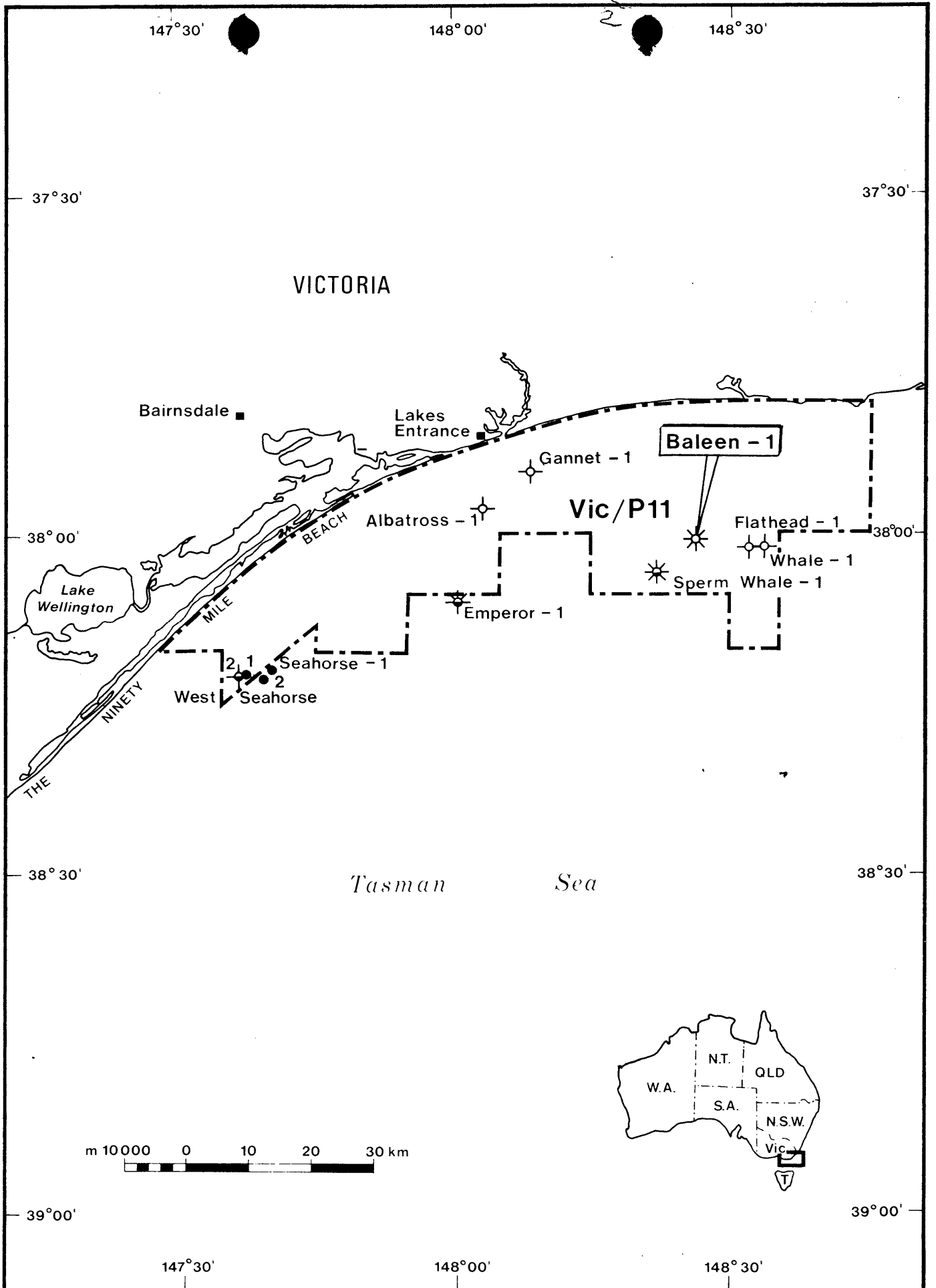
The Baleen No.1 well was drilled to test a structure formed by arching into a major east-west, high angle reverse fault. The structure consists of two culminations separated by a minor saddle. Closure was mapped at two horizons, designated "Top Latrobe" and "Top Strzelecki". Due to standard drilling practice, sampling commenced below the 20 inch casing shoe, set at 209 metres.

The interval 209-653 metres consisted of coarse-grained calcarenites, grading through calcisiltites and calcilutites, calcareous and glauconitic claystones. Based on palaeontological evidence this sequence has been dated from Upper Eocene to Pliocene.

A major lithological change occurred at 653 metres and continued to 707 metres. Three distinct zones within this interval were interpreted from wireline log responses and petrological studies. Two iron oxide/carbonate rich sandstone-siltstone bands were separated by a glauconitic, micaceous sandstone/siltstone/claystone sequence. These zones were interpreted as being Upper Eocene in age.

From 707-1030 metres the well penetrated a monotonous sequence of sandstones, argillaceous in part, siltstones, claystones and minor coals. Log interpretations suggest that this interval may have been weathered from 707 to 850 metres. Lithic fragments occurred throughout this interval. Palynological studies showed the interval to be of Lower Cretaceous age.

Drill Stem Tests proved movable hydrocarbons in two zones. DST No.1 over the interval 700-706 metres flowed 1.8 MMcf/d of dry gas. DST No.2 over the interval 662-670 metres flowed 6.3 MMcf/d of dry gas and formation permeabilities were calculated to be 747 md and 56 md respectively. The well bottomed in sediments of Lower Cretaceous age at a total depth of 1030 metres.




Scale	 <b>Hudbay Oil (Australia) Ltd.</b> <b>LOCATION MAP</b> <b>BALEEN - 1</b>	Date April 1982
Drawn by H.O.A.L.		Drawing N° <b>A4-GP-487</b>

Figure 1

OIL and GAS DIVISION

13 SEP 1982

2.0

DRILLING

(Pages 6 - 22)

2.0 DRILLING

2.1 Drilling Operations

2.1.1 Drilling Data Summary

- (i) Drilling Contractor: Petromarine Drilling (Aust) Pty Ltd  
Office Suite 1-5  
1st Floor, Stratham House  
49 Melville Parade  
SOUTH PERTH WA 6151
- (ii) Drilling Vessel: 'Petromar North Sea' drillship,  
rated to drill to 4570m with 5"  
drill pipe, maximum water depth 183m.
- (iii) Power Supply: - Four Caterpillar D399B T.A. diesel  
engines, each driving a GE-606 D.C.  
Generator.  
  
- Three Caterpillar 379TA diesel  
engines, each driving a 350 KW  
A.C. Generator.  
  
- One 100 KW emergency generator  
driven by one GM 6-71 diesel engine.
- (iv) Derrick: Pyramid special design 146 ft x 56 ft  
x 34 ft base, gross nominal capacity  
of 454 tonnes.
- (v) Blow Out Preventor  
Equipment: - 20-3/4" x 2000 psi W.P. Cameron  
double gate type 'U' with 20-3/4"  
Hydril 2000 MSP annular.  
  
- 13-5/8" x 5000 psi W.P. Cameron  
Triple gate type 'U' with 13-5/8"  
Hydril 5000 psi W.P. type 'GL' annular.
- (vi) Mud Pumps: Two National 12-P-160 Triplex single  
acting pumps each driven by two GE  
752 HP electric motors.

### 2.1.1 Drilling Data Summary (Continued)

- (vii) Drawworks: National Type 1625 DE powered by two GE 752 Traction motors with a 60" RC Parkersburg Hydromatic brake with over-running clutch, grooved drum to handle 1½" - 6 x 19 IWRC drilling line.
- (viii) Rotary Table: National C-375 - 37½" independently driven by one GE 752 electric motor complete with master bushing and pin type kelly drive bushing.
- (ix) Heave Compensator: One Western Gear single cylinder Heave Compensator with minimum 20 ft stroke and minimum capacity of 400,000 lbs in working mode and 1,000,000 lbs in latched mode.

### 2.1.2 General Well Data

- (i) Location: Latitude 38 deg 00 min. 36.630 sec South  
Longitude 148 deg 26 min. 08.400 sec East  
UTM Coordinates :-  
    Northing 5792068 metres  
    Easting 626032 metres  
            (CM 147 deg)
- The final location is 23 metres at a bearing of 207.7 deg from the proposed location.
- (ii) Datum: Unless otherwise stated all depths are relative to Rotary Table, which for this rig is 9.45m above Mean Sea Level. Water Depth at the location was measured as 54.89m at Mean Springs Low Water.
- That is: RT - MSL = 9.45m  
          RT - Seabed = 64.34m  
          Water Depth = 54.89m



## 2.1.2 General Well Data (Continued)

### (iii) Dates

Commenced move to location -  
1400 hours, 3 November 1981.

Arrived at location -  
2000 hours, 3 November 1981.

Spudded -  
2045 hours, 4 November 1981.

Reached Total Depth -  
1500 hours, 16 November 1981.

Last Anchor bolstered, and  
ready to move off -  
0600 hours, 30 November 1981.

Drilling Time, Spud to Total Depth -  
11 days, 18.25 hours.

### (iv) Hole Size and Casing Details:

- Hole:	Size	36"	26"	17½"	12¼"	8½"
	Depth (m)	71	225	228	577	1030
- Casing:	Size	30"	20"	-	9-5/8"	7"
	Depth (m)	68	209	-	566	760
	API Grade	5L/'B'	5LX/X-52	-	5AC/K55	5AC/N80
	Weight	305	94	-	40	29

## 2.2 Daily Operations Record

### 2.2.1 Daily Drilling Operations Summary

See attached Figure 2.

# DAILY DRILLING OPERATIONS SUMMARY

WELL BALEEN NO 1

DATE	DEPTH	OPERATION
4/11/81	-	Rig departed West Seahorse No 1 location at 1400 hours, 3 November 1981, en route to Baleen No 1 location. Arrived at location at 2000 hours, 3 November 1981. Ran six anchors.
5/11/81	86m	Ran remaining two anchors, soaked anchors for 5½ hours, pulled rig over location and tensioned up. (Final ships heading 205 deg Mag.) Ran temporary guide base, (water depth 54.89m). Spudded with 36" bit at 2045 hours, 4 November 1981. Drilled 36" hole 64 - 71m, spotted 30 bbl Hi-vis mud on bottom. Ran 26" bit, drilled 71 - 86m.
6/11/81	225m	Drilled 26" hole 86 - 225m. Displaced hole with 550 bbls mud. Surveyed. Pulled out to guide base, ran in to 225m - no fill. Pumped 380 bbls mud and pulled out. Positioned permanent guide base in moonpool. Commenced running 20" casing.
7/11/81	225m	Completed running 20" casing, landed same with shoe at 209.05m. Displaced casing to seawater, cemented casing (details per Cementing Report). Rigged up and ran 20-3/4" BOP stack and 22" marine riser. Latched BOP to wellhead, pressure tested casing and blind rams to 500 psig, rams to 1000 psig, manifold to 2000 psig. Made up 17½" bottom hole assembly, commenced drilling out cement and shoe.
8/11/81	390	Completed drilling out cement and shoe. Drilled new hole 225 - 228m. Ran leak-off test - formation strength 1.73 SG. Changed from 17½" bit to 12½" bit. Drilled 228 - 249m. Surveyed - misrun. Drilled 249 - 267m. Surveyed. Drilled 267 - 390m. String parted at saver sub - fished string, laid out drill pipe and collars for inspection. Drilled 390 - 428m.
9/11/81	577m	Drilled 390 - 428m. Surveyed. Drilled 428 - 577m. Pulled out to log. Made one run with DIT/BHCS/GR, unable to pass 406m. Run in hole with 12½" bit to TD, no fill, worked pipe 245 - 264m. Made wiper trip to shoe, RIH, 3m fill. POOH. Logged DIT/BHCS/BR to 572m. FDC/CNL/GR/CAL.
10/11/81	577m	Completed logging FDC/CNL/GR/CAL. Took one SWC gun. Made up 9-5/8" casing hanger and running tool. RIH with 12½" bottom hole assembly, washed 554 - 577m. Reamed and washed 544 - 577m. Conditioned mud and hole. Pulled out to run casing. Ran 9-5/8" casing to land casing with shoe at 566.08m.
11/11/81	577m	Circulated casing volume. Cemented 9-5/8" casing (see cementing report for details). Retrieved landing string. Pulled 22" marine riser and 20-3/4" BOP stack, racked back BOP stack. Moved 13-5/8" BOP to moonpool and secured rig due to deteriorating weather conditions.
12/11/81	577m	Waiting on weather.
13/11/81	577m	Waited on weather. Ran 13-5/8" BOP and 22" marine riser. Ran test plug, tested casing to 2500 psi, tested BOP stack. Pulled test plug and ran wear bushing. Made up 8½" bit, picked up 6½" drill collars, RIH and tagged top of cement at 522m.
14/11/81	663m	Drilled out cement, float collar and shoe, clean to bottom, drilled 577 - 580m. Completed leak off test indicating formation strength of 1.98 SG. Drilled 8½" hole 580 - 596m, circulated up sample. Drilled 596 - 625m, circulated up sample. Drilled 625 - 644m, circulated up sample. Drilled 644 - 653m, circulated up sample. Drilled 653 - 663m - pit gain - shut in well. Measured shut in drill pipe pressure 450 psi, mixed kill mud to 1.54 SG. Killed well with 1.54 SG mud, displaced riser to heavy mud. Opened pipe rams on BOP - losing mud. Reduced mud weight to 1.50 SG.
15/11/81	826m	Drilled 663 - 753m. Surveyed. Changed bits, picked up two 8½" stabilizers and RIH. Reamed 683 - 704m. Washed 704 - 753m. Drilled 753 - 826m.
16/11/81	956m	Drilled 826 - 938m. Pulled out to change bits - tight hole 735 - 690m (11.3 tonne overpull). Changed bits, RIH to 927m, washed 927 - 938m - no fill. Drilled 938 - 956m.
17/11/81	1030m	Drilled 956 - 1030m. Made wiper trip to shoe. Circulated and conditioned hole and mud. Rigged up Schlumberger (Line jumped sleeve - damaged bridle line - repaired same). Logged DLL/MSFL/GR, commenced FDC/CNL/GR.
18/11/81	1030m	Completed FDC/CNL/CNL/GR log, logged BHCS/GR, and HDT. Ran velocity survey (- after repairing survey tools). Made two runs into hole with RFT tool for pressure and fluid samples. Picked up CST gun.

## DAILY DRILLING OPERATIONS SUMMARY

WELL BALEEN NO 1 (Continued)

DATE	DEPTH	OPERATION
19/11/81	775m (PBSD)	Ran CST gun No 1 - 4 bullets lost. Ran CST run No 2 - full recovery. Ran into hole with 8½" bit to TD - no fill. Circulated and conditioned mud. Ran into hole with open ended drill pipe to 875m. Set cement plug 875 - 775m with 123 sacks cement (see abandonment report). Pulled up 4 stands, reversed out drill pipe. Pulled out of hole. Worked on drilling compensator.
20/11/81	735m (Landing Collar)	Completed work on drilling compensator. Made up 7" shoe, collar, hanger, packer, seal assembly, cement plug and liner hanger running tool. Ran 25 joints of 7" casing to set with shoe at 760m, liner hanger at 451.36m. Circulated volume of liner and running string with mud. Set hanger, backed out running tool. Cemented liner with 193 sacks Class 'G' cement (see cementing report). Set liner packer. Pulled back one single, reversed out drill pipe contents - slight cement contamination throughout entire reverse circulation. Pulled out of hole laying down drill pipe and 6½" drill collars. Retrieved wear bushing. Nippled down and pulled 13-5/8" BOP stack.
21/11/81	735m	Continued pulling BOP stack, landed on dolly. Changed out upper pipe rams to 3½" rams, tested pipe rams to 5000 psig, lower annular to 2500 psig, upper annular to 1500 psig. Repaired high pressure manifold on blue control pod, function tested BOP on both pods. Changed AX ring. Ran BOP stack, landed on wellhead. Ran test plug on 5" DP, pressure tested lower pipe rams to 2500 psig, lower annular to 2000 psig, upper annular to 1500 psig. Ran 3½" DP and test plug, tested upper pipe rams to 2500 psig. Ran 13-5/8" wear bushing. Ran 6" bit and casing scraper, picked up 4-3/4" drill collars and 3½" hydril tubing.
22/11/81	721m	Ran 7" casing scraper to 721m. Circulated and conditioned mud. Worked scraper 682 - 693m. Spotted 6 bbls polymer mud from 716 - 666m. Made trip to wellhead with fluted hanger to check space-out for subsea test tree. Ran CBL-VDL-GR over 7" casing liner. Attempted pressure test of casing - no test. Established injection rate to formation - 1100 psig at 0.25 bbl/min. Picked up 6 joints 3½" drill pipe, ran in on 5" drill pipe to 466m, spotted 50 sacks Class 'G' plus 2% calcium chloride from 466 - 429m. Pulled 2 stands, reversed out drill pipe, hung off on lower pipe rams, squeezed cement to liner overlap. POOH.
23/11/81	721m	Made up 8½" bit and bottom hole assembly, tagged cement at 430m. Drilled out cement 430 - 461m (top of liner). POOH. Ran 6" bit, RIH to 461m, drilled out cement 461 - 471m. Pressure tested casing to 2200 psig. Ran in hole to 715m, spotted 6 bbls polymer mud from 715 - 665m. POOH. Rigged up Schlumberger and perforated 700 - 706 m at 13 s/m at 90 deg phasing. Made up DST tools and started in with 3½" - PH6 tubing.
24/11/81	721m	Completed running into hole with DST string. Rigged up surface equipment, pressure tested surface lines. Set packer at 685m, landed test string. Latched SPRO tool. Opened tools for DST No 1, initial flow period of 8 minutes. Closed in tools for 57 minutes, opened tools for second flow period of 10 hours 15 minutes, Shut in for 1 hour 17 minutes. Pulled SPRO tool.
25/11/81	721m	Unseated packer, circulated annulus free of gas, pulled test string. Rigged up Schlumberger, ran and set bridge plug at 690m after third run in hole. (top slips lost and setting tool misfire). Pressure tested bridge plug to 2200 psig. Ran 6" bit and 7" casing scraper to 680m, spotted KCL polymer mud 680 - 630m. Rigged up Schlumberger, perforated 667 - 670m. Rigged up Schlumberger, perforated 667 - 670m (second gun failed). Reloaded perforating gun, perforated 664 - 667m (third piggy-back gun failed).
26/11/81	721m	Repaired perforating gun, perforated 662 - 670m with 13 s/m. Made up DST string and ran into hole externally pressure testing connections to 9000 psig. Made up and pressure tested surface equipment. Attempted to set packer multiple times - no success. Rigged down surface equipment and pulled test string. Repaired packer. Changed pressure charts and rewound clocks. Ran in with test string externally pressure testing connections.
27/11/81	721m	Rigged up and pressure tested surface equipment. Set packer at 648m, latched SPRO tool. Opened well for initial flow of 7 minutes, closed in for 38 minutes, opened for second flow of 300 minutes, closed in for 140 minutes. Unseated packer, reverse circulated well free of gas. Pulled out test string.
28/11/81	721m	Laid out 3½" tubing and 3½" drill pipe. Rigged up Schlumberger and set 7" bridge plug at 652m. Pressure tested plug to 2000 psi. Ran in with 3½"/5" drill pipe to 652m, spotted 17.5 sacks cement plug (average slurry 1.87 SG). Pulled up to 600m, reverse circulated unbalanced cement plug out of drill pipe. Ran into 651m, spotted 30 sacks cement plug (average slurry 1.87 SG). Pulled out to 165m, circulated hole to seawater. Spotted 80 sacks cement plug (average

# DAILY DRILLING OPERATIONS SUMMARY

WELL BALEEN NO 1 (Continued)

DATE	DEPTH	OPERATION
28/11/81 (Continued)		slurry 1.87 SG). Pulled up to 100m, reverse circulated. POOH. Rigged down diverter, unlatched BOP, nipped down slip joint.
29/11/81	-	Pulled 13-5/8" BOP stack, stowed same. Removed rig floor. WOW to offload cutting tools from workboat. Made up casing cutting tools, RIH, cut 9-5/8" casing at 74.92m. Made up 13-5/8" running tool, RIH attempted to screw into wellhead, running string started to back off. POOH, re-torqued tool joints, RIH. Stabbed wellhead, screwed into 13-5/8" housing and pulled same. Ran casing cutters, stabbed in after second attempt, cut 20" casing at 73.42m. Pulled cutting tools. Made up 20" running tool, RIH.
30/11/81	-	<p>Screwed into 20-3/4" housing, pulled wellhead housing and permanent guide base, stowed same. Made up 'J' tool, RIH. Retrieved temporary guide base and hung same in moonpool. Pulled anchors.</p> <p><u>NOTE:</u>                      Underway from Baleen location to Whale No 1 location at 0600 hours, 30 November 1981.</p>

## 2.2.2 Bottom Hole Assembly Record

36"/26" Hole: 64 - 225m

- Bit, bit sub, 15 x 8" DC's, Cross Over  
Total Length = 54.91m

17½" Hole: 225 - 228m

- Bit, bit sub, 15 x 8" DC's, Cross Over  
Total Length = 134.18m

12¼" Hole: 228 - 577m

- Bit, bit sub, 15 x 8" DC's, Cross Over,  
11 joints HWDP  
Total Length = 236.15m

8½" Hole: 577 - 758m

- Bit, bit sub, 12 x 6½" DC's, Cross Over,  
1 joint HWDP, Jars, 11 joints HWDP  
Total Length = 226.30m

753 - 1030m

- Bit, bit sub, 2 x 6½" DC's, Stab, 1 x 6½" DC's,  
Stab, 9 x 6½" DC's, Cross Over, 1 joint HWDP,  
Jars, 11 joints HWDP  
Total Length = 229.00m

## 2.2.3 Bit Record

(See attached Bit Record Figure 3.)

## 2.2.4 Time Breakdown Analysis

(See attached Time Breakdown Analysis as Figure 4.)

## 2.2.5 Well History Chart

(See attached Well History Chart as Figure 5.)

2.3 Casing Record

2.3.1 Casing Details

(See Casing and Tubing Tally per Figures 6, 7, 8.)

2.3.2 Cementation Details

(See Casing, Running Reports per Figures 9, 10, 11.)

BIT NO.	SIZE	MAKE	TYPE	JETS	SERIAL NO.	DEPTH IN (M)	DEPTH OUT (M)	HRS	M/HR	WT (TONNES)	RPM	PUMP PR. (KPA)	PUMP VOL. (L/MIN)	T B G			FORMATION/REMARKS
														T	B	G	
RR1/HO	36"/26"	HTC	OSC-3AJ	3x26	RB269/7850	64	71	4	1.75	4.5	50/60	1400	1170	2	1	I	Seabed
RR2	26"	HTC	OSC-3AJ	NONE	LJ320	71	225	14.5	10.6	4.5-9	60/100	3450	2930	-	-	-	Seabed
3	17½"	HTC	OSC-3AJ	3x24	KX789	225	228	3	1.0	2.2-4.5	50	6200	-	-	-	-	-
4	12¼"	HTC	J1	2x18, 1x14	AFD 63	228	390	7	23.2	13.6-18.1	80	9650	2290	1	1	1	Pulled to change DC's
RR4	12¼"	HTC	J1	2x14, 1x18	AFD 63	390	577	9	20.8	4.5-13.6	95	9310	2290	2	2	I	-
5	8½"	HTC	JD3	2x12, 1x10	TH576	577	753	13½	13.0	11.3	80	8790	2100	6	2	I	Sandstone/S.S./Clay
6	8½"	HTC	J4	2x12, 1x10	JR100	753	938	22	8.4	11.3	80	8270	2100	6	2	I	Silty Sandstone
7	8½"	HTC	J4	2x12, 1x10	JR220	938	1030	11	8.3	11.3	80	7930	2100	4	2	I	Sandstone/S.S./Clay

WELL NAME: BALEEN NO 1 LOCATION: GIPPSLAND BASIN VICTORIA RT-SB/00 64 m.  
RIG: PETROMAR NORTH SEA CONTRACTOR: PETROMARINE DRILLING (AUST) PTY LTD HOAL DRLG SPVSR. H SHIRE/B MCELHINNEY  
SPUD DATE: 4 NOVEMBER 1981 COND. CSG: 73 m SURF. CSG: 209 m INTER. CSG: 566 m SEC. INTER. CSG: 760 m  
DATE AT TD: 16 NOVEMBER 1981 PUMP NO 1: NATIONAL 12-P-160 PUMP NO 2: NATIONAL 12-P-160 PUMP POWER: 1600 HP  
MUD TYPE: SW/GEL, SW/POLYMER TOOL JTS: Size - 4½" Type - I.F. O.D. 6-3/8"  
DRILL COLLARS: No. - O.D. - 8"/6½" I.D. - 2-7/8"/2¼" Length -

Scale  
N.T.S.  
Drawn by  
A. Clark

Hudbay Oil (Australia) Ltd.  
BIT RECORD  
BALEEN - 1

Date  
March 1982  
Drawing No  
A4-DR-558

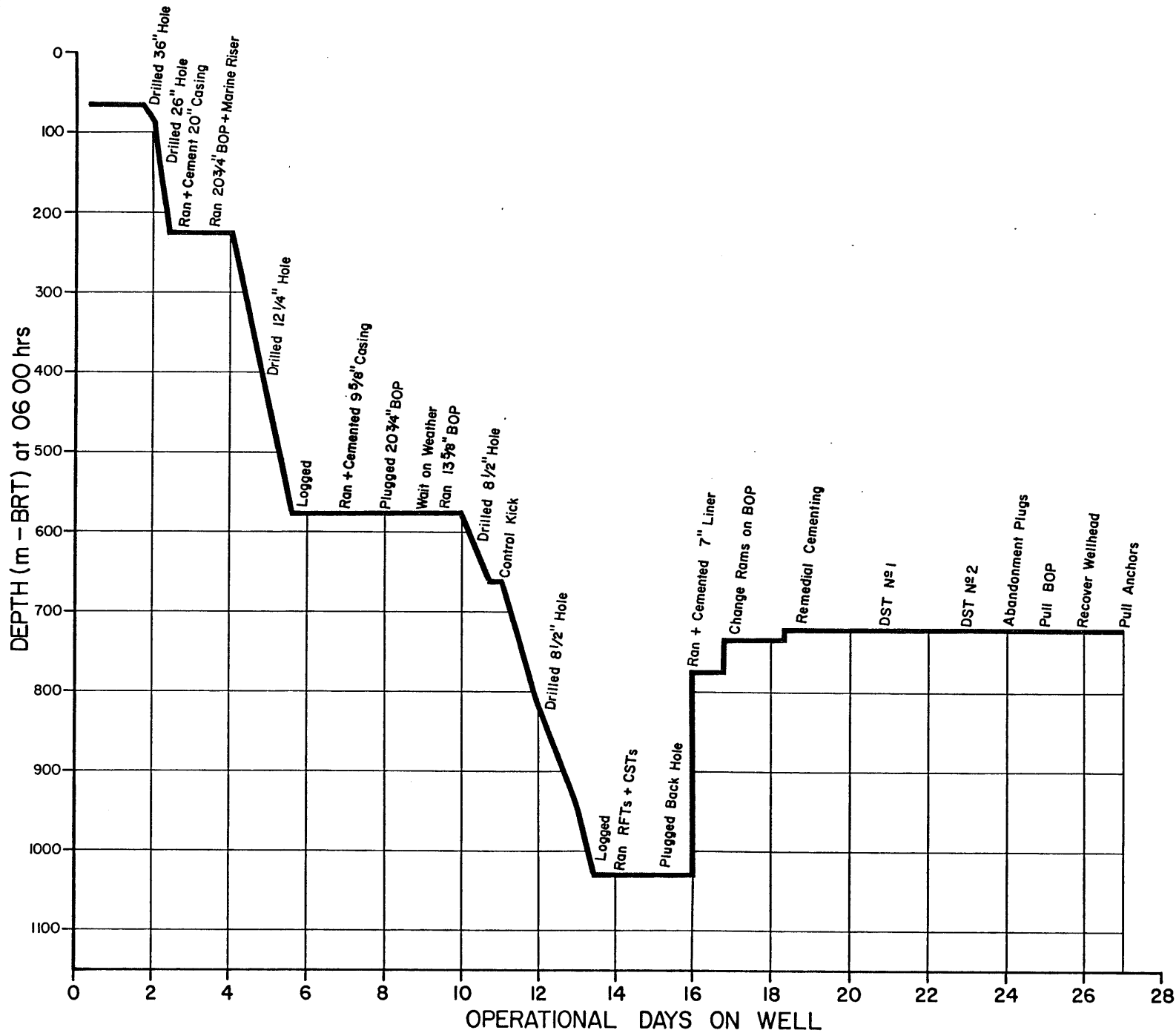
TIME ANALYSIS (Hours)	SECTION OF HOLE								Total	%
	Moving/ Anchoring Hole	36"/26"	17 1/2" Hole	12 1/2" Hole	8 1/2" Hole	6" Hole	Comp/Test			
<b>DRILLING:</b>										
Moving to/from Location	6 1/2							6 1/2	1.02	
Anchor Handling	20 1/2						18	38 1/2	6.02	
Drilling		18 1/2		16	47			81 1/2	12.73	
Round Trips plus Surface Operations		6 1/2		6 1/2	19 1/2		2 1/2	35	5.47	
Reaming, Cond. Hole, Cond. Trips		6 1/2	N	8	16	N		30 1/2	4.77	
Running, Pulling and Cementing Casing		10	0	20	21	0	14 1/2	65 1/2	10.23	
Running, Pulling Subsea Equipment		2	T	10	-	T	31 1/2	43 1/2	6.80	
Testing Wellhead and BOP's				3 1/2	3		4	10 1/2	1.64	
Plugging Back, Abandonment, Completion			D			D	39	39	6.09	
Curing Lost Circulation			R			R		-	-	
Fishing and Washouts			I	12		I		12	1.88	
Well Control			L		11	L		11	1.72	
Surveys		1/2	L	1 1/2	1	L		3	0.47	
Downtime: Weather			E		39 1/2	E	4 1/2	44	6.88	
Mechanical Surface			D			D	7	7	1.09	
Mechanical Subsea							3	3	0.47	
Others -- Remedial Cement Squeeze							23	23	3.59	
									-	
									-	
<b>EVALUATION:</b>										
Circulating Samples					2			2	0.31	
Hole Cond, Trips for Coring, Logging, Testing				6 1/2			19 1/2	26	4.06	
Coring								-		
Electric Logging				11	34		16	61	9.52	
Wireline Flow Testing					6 1/2			6 1/2	1.02	
Drill Stem and Production Testing							71 1/2	71 1/2	11.17	
Downtime: Logging							4 1/2	4 1/2	0.70	
Flow Testing							15	15	2.34	
Others										
<b>OTHERS</b>										
Total Time	27	44	-	95	200 1/2		273 1/2	640	100.00	
% Downtime	0.00	0.00		0.00	19.7		20.84	(26d 16hrs)		

Author: A.I.  
 Drawn: A. Clark  
 Date: March 1982

WELLS TIME BREAKDOWN ANALYSIS  
 BALEEN - 1  
 Hudday Oil (Australia) Ltd.

Scale: N.T.S.  
 Drawing No: A4-DR-559  
 Figure 4





NOTE: Total Time on Well 26 d 16 hrs

Vic/P 11 <b>WELL HISTORY CHART</b> BALEEN - 1	
Authors: A. Eisenbarth	Scale
Drawn: C. Clarke	Drawing No
Date: June 1982	<b>A3-DR-92</b>

Figure 5

Casing and Tubing Tally  
(METRIC)

Well Name and No. BALEEN NO 1 Date 5 NOVEMBER 1981 Casing Size 20"  
Weight 94 lb/ft Grade X52 Connection CIW 'CC' Joints Run \_\_\_\_\_

Joint No.	Length of joint (m)	Total in (m) Hole	Joint No.	Length of Joint (m)	Total in (m) Hole	Joint No.	Length of Joint	Total in Hole
	.		Carried Forward			Carried Forward		
01	13.20	Shoe Jt	41	.		81	.	
02	12.51		42	.		82	.	
03	12.51		43	.		83	.	
04	12.52		44	.		84	.	
05	12.51		45	.		85	.	
06	12.51		46	.		86	.	
07	12.52		47	.		87	.	
08	12.57		48	.		88	.	
09	12.52		49	.		89	.	
10	12.52		50	.		90	.	
Sub tot	125.89		Sub tot	.		Sub tot	.	
11	12.52		51	.		91	.	
12	10.13	Pile Jt to Top of 20" Hse	52	.		92	.	
13	.		53	.		93	.	
14	.		54	.		94	.	
15	.		55	.		95	.	
16	.		56	.		96	.	
17	.		57	.		97	.	
18	.		58	.		98	.	
19	.		59	.		99	.	
20	.		60	.		100	.	
Sub tot	22.65		Sub tot	.		Sub tot	.	
21	.		61	.				
22	.		62	.				
23	.		63	.				
24	.		64	.				
25	.		65	.				
26	.		66	.				
27	.		67	.				
28	.		68	.				
29	.		69	.				
30	.		70	.				
Sub tot	.		Sub tot	.				
31	.		71	.				
32	.		72	.				
33	.		73	.				
34	.		74	.				
35	.		75	.				
36	.		76	.				
37	.		77	.				
38	.		78	.				
39	.		79	.				
40	.		80	.				
Sub tot	.		Sub tot	.				

TALLY SUMMARY	
Group No. Ending	Length (Forward)
10	125.89
20	22.65
30	.
40	.
50	.
60	.
70	.
80	.
90	.
100	.
TOTAL	148.54
Tally By	_____
Checked By	_____

REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Operator's Representative J B McElhinney  
 Figure 6

Casing and Tubing Tally  
(METRIC)

Well Name and No. BALEEN NO 1 Date 9TH NOVEMBER 1981 Casing Size 9-5/8"  
Weight 40 lb/ft Grade K55 Connection BTC Joints Run \_\_\_\_\_

Joint No.	Length of joint (m)	Total in Hole (m)	Joint No.	Length of Joint (m)	Total in Hole (m)	Joint No.	Length of Joint	Total in Hole																										
FS	0.45																																	
01	11.37		Carried Forward			Carried Forward																												
FC	0.34		41	12.08		81	.																											
02	11.42		42	11.86		82	.																											
03	11.85		43	3.96	Pup X/Over	83	.																											
04	11.80		44	0.37	13-5/8" Hsg	84	.																											
05	11.71		45	4.53		85	.																											
06	11.74		46	.		86	.																											
07	11.72		47	.		87	.																											
08	11.77		48	.		88	.																											
09	12.08		49	.		89	.																											
10	11.70		50	.		90	.																											
Sub tot	117.95		Sub tot	32.80		Sub tot	.																											
11	11.66		51	.		91	.																											
12	12.07		52	.		92	.																											
13	11.74		53	.		93	.																											
14	11.89		54	.		94	.																											
15	12.00		55	.		95	.																											
16	12.08		56	.		96	.																											
17	11.77		57	.		97	.																											
18	11.76		58	.		98	.																											
19	11.98		59	.		99	.																											
20	11.85		60	.		100	.																											
Sub tot	118.80		Sub tot	.		Sub tot	.																											
21	11.73		61	.		<table border="1"> <thead> <tr> <th colspan="2">TALLY SUMMARY</th> </tr> <tr> <th>Group No. Ending</th> <th>Length (Forward)</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>117.95</td> </tr> <tr> <td>20</td> <td>118.80</td> </tr> <tr> <td>30</td> <td>117.95</td> </tr> <tr> <td>40</td> <td>118.55</td> </tr> <tr> <td>50</td> <td>32.80</td> </tr> <tr> <td>60</td> <td>.</td> </tr> <tr> <td>70</td> <td>.</td> </tr> <tr> <td>80</td> <td>.</td> </tr> <tr> <td>90</td> <td>.</td> </tr> <tr> <td>100</td> <td>.</td> </tr> <tr> <td>TOTAL</td> <td>506.05</td> </tr> </tbody> </table>			TALLY SUMMARY		Group No. Ending	Length (Forward)	10	117.95	20	118.80	30	117.95	40	118.55	50	32.80	60	.	70	.	80	.	90	.	100	.	TOTAL	506.05
TALLY SUMMARY																																		
Group No. Ending	Length (Forward)																																	
10	117.95																																	
20	118.80																																	
30	117.95																																	
40	118.55																																	
50	32.80																																	
60	.																																	
70	.																																	
80	.																																	
90	.																																	
100	.																																	
TOTAL	506.05																																	
22	12.07		62	.																														
23	11.67		63	.																														
24	11.81		64	.																														
25	11.74		65	.																														
26	11.79		66	.																														
27	11.82		67	.																														
28	11.95		68	.																														
29	11.74		69	.																														
30	11.63		70	.																														
Sub tot	117.95		Sub tot	.																														
31	12.08		71	.																														
32	11.76		72	.																														
33	11.77		73	.																														
34	11.67		74	.																														
35	12.02		75	.																														
36	11.90		76	.																														
37	11.80		77	.																														
38	11.75		78	.																														
39	11.94		79	.																														
40	11.86		80	.																														
Sub tot	118.55		Sub tot	.																														

REMARKS Rotary Table to Seabed = 64.34 m (at MISLW)  
 Seabed to top 13-5/8" hsg = 4.31  
 RT to top 13-5/8" hsg = 60.03  
 13-3/8" Csg length as above = 506.05  
 Casing shoe depth = 566.08  
 TD of 12 1/4" hole = 577.44  
 Distance csg off bottom = 11.36m

Centralizers on joints no 1, 3, 5, 7, 9, and 11

Operator's Representative A Eisenbarth

Casing and Tubing Tally  
(METRIC)

Well Name and No. BALEEN NO 1 Date 19 NOVEMBER 1982 Casing Size 7"  
Weight 29 lb/ft Grade N-80 Connection BTC Joints Run 25

Joint No.	Length of joint (m)	Total in Hole (m)	Joint No.	Length of joint (m)	Total in Hole (m)	Joint No.	Length of Joint	Total in Hole
Shoe	0.75							
01	12.10		Carried Forward			Carried Forward		
Collar	0.29		41	.		81	.	
02	11.91		42	.		82	.	
03	12.11		43	.		83	.	
04	12.02		44	.		84	.	
05	11.95		45	.		85	.	
06	12.00		46	.		86	.	
07	12.11		47	.		87	.	
08	11.81		48	.		88	.	
09	11.93		49	.		89	.	
10	11.93		50	.		90	.	
Sub tot	120.91		Sub tot	.		Sub tot	.	
11	11.98		51	.		91	.	
12	12.18		52	.		92	.	
13	11.84		53	.		93	.	
14	12.04		54	.		94	.	
15	11.92		55	.		95	.	
16	12.02		56	.		96	.	
17	12.03		57	.		97	.	
18	11.78		58	.		98	.	
19	11.55		59	.		99	.	
20	12.05		60	.		100	.	
Sub tot	119.39		Sub tot	.		Sub tot	.	
21	11.78		61	.				
22	11.70		62	.				
23	11.69		63	.				
24	12.10		64	.				
25	11.95		65	.				
26	.		66	.				
27	.		67	.				
28	.		68	.				
29	.		69	.				
30	59.22		70	.				
Sub tot	.		Sub tot	.				
31	.		71	.				
32	.		72	.				
33	.		73	.				
34	.		74	.				
35	.		75	.				
36	.		76	.				
37	.		77	.				
38	.		78	.				
39	.		79	.				
40	.		80	.				
Sub tot	.		Sub tot	.				

TALLY SUMMARY	
Group No. Ending	Length (Forward)
10	120.91
20	119.39
30	59.22
40	.
50	.
60	.
70	.
80	.
90	.
100	.
TOTAL	299.52
Tally By	J B McElhinney
Checked By	

REMARKS The above 7" casing was run and hung off on TIW liner hanger  
(Refer to casing, running report).

HUDBAY OIL (AUSTRALIA) LIMITED

Casing, Running Report

Well Name and No. **BALEEN NO 1**

Date **6 NOVEMBER 1982**

Casing Size **20"**

HOLE	Size	26"			
	Depth (m)	225			
CASING	Size	20"			
	Depth (m)	209.05m			

MUD: Type **SW/Spud Mud** s.g. **1.04** Vis. **100+** YP **-** WL **-**

Power Tong Torque **CIW 'CC' Connectors** ft/lbs.

Fill up Points **Every three joints**

Calc. Displ. (m<sup>3</sup>) **160 bbl** Pump Strokes **Howco Unit**

**350** psi **psi**

CASING INFORMATION

		Depth (mRT)
TD		225m
OFF BOTTOM		15.95
Shoe (make and type)	<b>Weatherford</b> Landed at	209.05m
Length Shoe		13.20 195.85m
<b>10 Joints. Grade X52 wt. 94 lb/ft ID.19.124 ins.</b>		125.21 70.64m
Landing Collar (make and type)		
Hanger or Suspension joint (make and type)	<b>CIW Combination 30"/20" Hsg</b>	10.13 60.51m
Top Hanger or Suspension joint		
Landing String	<b>20" R/T, 20 ft Pup, 1 Std HWDP, 1 x 10 ft Pup, 1 Std HWDP</b>	64.54
metres above R.T. at Zero Tide		
Less tide of		
metres up from R.T.		4.03m

DETAILED CASING AND CEMENTING REPORT

Casing landed on TGB and volume of string circulated prior to cementing with;

Fill of: 1036 sks of Class 'G' cement + 0.5% Thix set 'A' plus 0.25% Thix set 'B' (700 lbs and 350 lbs respectively.)  
Mixed with 247 bbls of drill water at average density of 1.53 S.G.

Tail of: 300 sks of Class 'G' cement  
Mixed with 36 bbls of drill water at density of 1.89 S.G.

Cement was displaced to 9m above the shoe using HOWCO unit pumping 160 bbls. final displacement pressure 350 psi. During displacement returns were lost, so pumping was stopped on three occasions of 15 minutes each, so as to allow Thix Set mix to set up. Pressure was gradually increasing as final displacement was reached, indicating that the loss zone could have been plugged.  
Float Shoe held.

Operators Representative **J B McElhinney**

HUBBAY OIL (AUSTRALIA) LIMITED

Casing, Running Report

Well Name and No. BALEEN NO 1

Date 10 NOVEMBER 1982

Casing Size 9-5/8"

HOLE	Size	36"	26"	12 1/4"		
	Depth (m)		225	577.44		
CASING	Size	30"	20"	9-5/8"		
	Depth (m)		209.05	566.08		

MUD: Type Seawater/Gel/Poly s.g. 1.05 Vis. 42 YP 9 WL 12.8

Power Tong Torque Maximum \_\_\_\_\_ ft/lbs. Minimum \_\_\_\_\_ ft/lbs.

Fill up Points

Calc. Displ. (m<sup>3</sup>) 18.92 (119 lbs) Pump Strokes Displaced by Hall

\_\_\_\_\_ psi \_\_\_\_\_ psi

CASING INFORMATION

TD	577.44
OFF. BOTTOM	11.36
Shoe (make and type) Weatherford Lamb	Landed at 566.08
Length Shoe	0.45
	565.63
1 Joints. Grade K55 wt. 40 lb/ft ID. 8.835 ins.	11.37
	554.26
Landing Collar (make and type) Weatherford Lamb	0.34
	553.92
41 Joints, Gr. K55, Wt. 40 lb/ft, I.D. = 8.835	485.03
	68.89
1 Pup, Gr. K55, Wt. 40 lb/ft, I.D. = 8.835	3.96
	64.93
1 Crossover, 13-3/8" BTC Box x 9-5/8" BTC pin.	0.37
	64.56
Hanger or Suspension joint (make and type) Vetco 13-5/8" Wellhead Housing	4.53
Top Hanger or Suspension joint	60.03
Landing String Vetco 13-5/8" Housing, Running tool	0.44
	59.59
7 Joints 5" Gr. 'G' Drill Pipe	64.05
	- 4.46
metres above R.T. at Zero Tide	
Less tide of	0:25
metres up from R.T.	4.21m

DETAILED CASING AND CEMENTING REPORT

Casing landed with shoe at 566.08m, casing and landing string volume was circulated with mud. Pumped 15 bbl Halliburton CS-2 spacer. Rectify problems with water in fuel and centrifugal pump motor.

Mixed and pumped 360 sks Class 'A' cement slurry mixed with 93 bbls fresh mix water containing 2.5% prehydrated bentonite and 0.75% CFR-2, average slurry density 12.8 ppg, pumping pressure steady at 200 psi.

Followed with 300 sks Class 'A' tail slurry mixed with 36 bbls seawater and 0.1% HRL, average slurry density 15.8 ppg, pump pressure steady at 200 psi.

Released drill pipe dart, no indication that dart dropped from cementing head, opened cement head to release, pumped 3.6 bbls seawater, dart seated on top plug and sheared out at 3500 psi. Pumped casing volume of mud plus 70% of shoe joint - no bump. Displacement pump pressures increased gradually from 275 psi to 725 psi. Bled off line at pump with 1/2 bbl mud return - floats holding. Backed out running tool. Full mud returns throughout job.

Commenced pumping spacer fluid at 0808 hours, blended gel slurry at 0820 hours, neat cement slurry at 0913 hours and displacement mud at 0948 hours. Displacement completed at 1030 hours.

Operators Representative A Eisenbarth

HUDBAY OIL (AUSTRALIA) LIMITED

Casing, Running Report

Well Name and No. **BALEEN NO 1** Date **19 NOVEMBER 1982** Casing Size **7" Liner**

HOLE	Size	36"	26"	12½"	8½"	
	Depth (m)		225	577.44	1030	
CASING	Size	30"	20"	9-5/8"	7"	
	Depth (m)		209.05	566.08	760.0	

MUD: Type **SW/Gel/Polymer** s.g. **1.44** Vis. **54** YP **16** WL **7.2**

Power Tong Torque Maximum **-** ft/lbs. Minimum **-** ft/lbs.

Fill up Points **Every 5 jts plus every stand drill pipe**

Calc. Displ. (m³) **23 bbls DP + 34 bbls 7" Liner** Pump Strokes **Displaced by HOWCO**

**1000** psi pumping **Did not bump plug**

CASING INFORMATION		Strap (m)	Depth (m BRT)
TD	<b>Plugged back to 775m</b>		775.00
OFF BOTTOM	<b>15m</b>		760.00
Shoe (make and type)	<b>TIW Float Shoe</b>	Landed at	760.00
Length Shoe		<b>0.75</b>	759.25
	<b>2 Joints. Grade N80 wt. 29 lb/ft ID. 6.184 ins.</b>	<b>24.01</b>	735.24
Landing Collar (make and type)	<b>TIW Latch down collar</b>	<b>0.29</b>	734.95
	<b>23 Joints N80 x 29 lb/ft 7" Liner BTC</b>	<b>274.47</b>	460.48
Hanger or Suspension joint (make and type)	<b>TIW Hydro-set with extension</b>	<b>4.71</b>	455.77
Top Hanger or Suspension joint	<b>TIW Type 'S' Packer</b>	<b>4.41</b>	451.36
Landing String	<b>Running tool above liner</b>	<b>2.09</b>	449.27
	<b>12 Jts HWDP</b>	<b>101.04</b>	348.23
	<b>12 Stds DP + SGL</b>	<b>348.23</b>	0
	<b>+ 5 ft Pup</b>	<b>1.52</b>	-1.52
metres above R.T. at Zero Tide			<b>1.52</b>
Less tide of <b>0.25</b>			<b>1.27</b>
metres up from R.T.			

DETAILED CASING AND CEMENTING REPORT

**RIH with 7" liner on Drill Pipe to shoe setting depth of 760m (Top of Liner at 451.36m).**

**Circulated volume of Liner and Drill Pipe.**

**Dropped ball and set liner slips. Unlatched running tool and circulated to ensure packer not set.**

**Cemented liner: 5 bbls drill water ahead, mixed and pumped 193 sks cement 'G' + 0.75% CFR-2 + 19 Halad 22A at 1.94 S.G. with 20 bbls mix water.**

**Dropped dart and launched wiper plug after pumping 24 bbls mud. Pumped a further 35 bbls, did not bump plug. Shut down to avoid pumping cement out of liner.**

**(Calculated displacement 57 bbls total.)**

**Bled off pressure - no flow back.**

**Set liner Hanger packer with 30,000 lbs weight.**

## 2.4 Mud System

### 2.4.1 Mud Report Summary

#### 36" Hole to 71m, 26" Hole to 225m:

The 36" hole was drilled with a 36" hole opener and 26" bit to 71m, 30 bbls of spud mud was spotted on bottom. The hole opener was removed and 26" hole was then drilled to 225 metres.

Seawater was used to drill the hole, flushing with 15 bbls to 30 bbls spud mud each connection. At casing point 550 bbls of flocculated spud mud was displaced into the hole and the bit pulled to the Temporary Guide Base. After resting the hole for a brief period the bit was run back to bottom and although there was no fill a further 350 bbls of spud mud displaced. The 20" casing was run and cemented, returns being intermittent during cementing.

Leaky valves gave problems on two occasions, the first with a loss of 25 bbls of spud mud and on the second occasion the valve on the overboard line leaked and 260 bbls seawater diluted the spud mud. The valve on the overboard line was replaced.

Further problems with leaking valves persisted throughout this well.

#### 12¼" Hole to 577m:

After running and testing the BOP stack satisfactorily, the cement was drilled out using seawater. A 17½" bit was used to drill 3m to 225m prior to displacing to mud. A leak off test showed an equivalent to 1.72 SG formation strength. The hole was drilled ahead with a 12¼" bit to 390m where the drill string twisted off at the kelly saver sub. This was fished successfully and the drill pipe and collars laid out and new drill collars and drill pipe picked up. The mud had been made up of salvage mud from the previous interval with added prehydrated gel which gave a funnel viscosity range



#### 2.4.1 Mud Report Summary

##### 12¼" Hole to 577m:(Continued)

throughout of 39 to 44 seconds, a PV range of 5 to 10 cps and a yield point range of 8 to 11 lbs/100 sq ft. As the remainder of the hole to 577m was drilled, Dextrid 0.5 lb/bbl, Q-Broxin 1.6 lb/bbl and minor amounts of Mon Pac were used to reduce the filtrate down to 12 cc and control rheology. The desander and desilter were run continuously whilst drilling to control the mud weight. At casing point, Schlumberger logs were run, the hole was tight at 250m and the logs would not go below 406m. A wiper trip was then made which showed no drag, and logs were successfully re-run after conditioning the hole and mud. A further wiper trip was required with reaming from 554m to 577m before the 9-5/8" casing was run and cemented without problems.

##### 8½" Hole to 1030m:

While waiting on weather the mud in the active tanks was contaminated by approximately 100 bbls seawater increase; this mud was conditioned on drilling out.

After drilling the cement, the mud was treated with Sodium Bicarbonate and a leak off test performed at 580m, equivalent to 1.98 SG. The mud was further treated with Q-Mix and Mon Pac to raise the viscosity slightly, and Dextrid and Q-Broxin added to reduce filter cake and fluid loss. A gas kick was taken at 663m with the mud weight at 1.04 SG and with only a 10 bbl increase in pit volume. It was caught by the increased flow rate across the shakers. Shut in drill pipe pressure was 450 psi and shut in casing pressure 480 psi. Whilst weighting mud up to 1.54 SG, the kick was circulated out to avoid exceeding fracture gradient at the shoe, as casing pressure was building up. However, on displacing to 1.54 SG this was found to exceed the fracture gradient and 107 bbls of mud was lost before mud weight could be reduced to 1.47, then to 1.44 SG.

#### 2.4.1 Mud Report Summary

##### 8½" Hole to 1030m: (Continued)

It can be calculated from later flow testing that some of the gas had entered the drill string at the initial kick. However, the mud weight was maintained at 1.44 SG for the remainder of the hole including testing as this gave an overbalance at 633m of 310 psi static, and 190 psi overbalance in the event of riser disconnect.

On the bit trip at 938m the hole gave 25000 lbs overpull at 690 - 735m. The mud was treated with Q-Broxin 0.95 lb/bbl and Dextrid 0.66 lb/bbl, and the tight spot reamed on the trip in with bit no. 7. At Total Depth a wiper trip was made, seawater (50 bbls) leaked in to the active system, the mud conditioned, and Schlumberger logs run.

On successfully completing the suite of logs, the hole was plugged back to 775m and the 7" liner was then run to 760m and cemented.

##### Testing:

After displacing the riser and changing the rams on the BOP's to 3½", the 7" casing scraper was run and the mud conditioned to 1.44 SG. Some 240 bbls of mud was accidentally pumped over by the rig personnel, then the packing gland on the mixing pump leaked another 75 bbls into the active system. The mud was conditioned and 6 bbls solids free KCl polymer mud made from (after pilot testing) 55 lb/bbls salt (27 lb/bbl KCl) 0.5 lb/bbl Dextrid, and 0.3 lb/bbl X-C Polymer. However, at this point a CBL log showed no cement at the overlap and a pressure test confirmed this. The overlap was squeezed and later 70 bbls mud was lost due to a leaking gate valve when testing burners by pumping water through them.

#### 2.4.1 Mud Report Summary (Continued)

##### Testing:

After cleaning out the cement and conditioning mud a further KCl Polymer plug was spotted 715 - 665m and Schlumberger perforated the interval 700 - 706m. The packer was run and the first zone tested.

After circulating the hole free of gas at the conclusion of the test, a bridge plug was set at 685m and a further casing scraper run. A further KCl Polymer slug, 6 bbls, was set on bottom and the zone 662 - 670m perforated. After two attempts to set the packer the second zone was tested. On finishing testing and the hole circulated clean of gas, a bridge plug was set at 652m and tested to 2,000 psi. A cement plug was set at 652m, the first was not balanced and flowed out, and was reset with no problems, after conditioning mud which had been water contaminated during the setting of the first plug. The pipe was pulled to 165m, the mud displaced to seawater and the second cement plug set.

About 300 bbls mud was salvaged (sand traps, desander, degasser and slug tank were dumped due to water contamination) and stored as kill mud for the next well Whale No. 1.

#### 2.4.2 Mud Engineering

All mud and chemicals used in the mud system on Baleen No 1 were supplied by Baroid (Australia) Ltd.

Engineers involved in the programme were:

Evan Hill  
Alan Searle  
Dave Parry

#### 2.4.3 Mud Record

(As per Mud Properties Form Figure 12.)

HUBBAY OIL (AUSTRALIA) LIMITED  
Mud Properties

WELL BALEEN NO 1

MUD COMPANY: BAROID (AUST) LTD

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Specific gravity</li> <li>2. Viscosity (sec)</li> <li>3. A.P.I. Water Loss (ml)</li> <li>4. Cake Condition</li> <li>5. A.P.I. Cake (millimetre)</li> <li>6. Sand (%)</li> <li>7. Chloride (ppm x 1000)</li> <li>8. pH</li> <li>9. Solids (%)</li> </ol> | <ol style="list-style-type: none"> <li>10. Plastic Viscosity (cp @ 50°C)</li> <li>11. Yield Point (lb/100ft.<sup>2</sup>)</li> <li>12. Gels (lb/100ft.<sup>2</sup> 10 sec/10 min)</li> <li>13. Ca Hardness (epm)</li> <li>14. Pf</li> <li>15. Mf</li> <li>16. Oil %</li> <li>17. "N" Factor</li> <li>18. Bentonite (lbs/bbl)</li> </ol> |
|---|---|

Date	Depth 0600 hrs (metres)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
4/11	71	1.04	100+																
5/11	225	1.04	100+																
6/11	225	1.04	100+																
7/11	390	1.03	39	30		2.5	0.25	6500	10	4	5	11	6/-	320	0.08				
8/11	450	1.04	41	17.6		1.5	0.25	7500	10	4	8	8	3/7	160	0.1				
	577	1.04	44	12.4		1.5	0.2	9000	9.5	5	10	10	4/8	300	0.1				
9/11		1.05	42	12.8		1.5	0.2	9000	9	5	8	9	3/7	320	0.08				
10/11		1.05	42	12.8		1.5	0.2	9000	9	5	8	9	3/7	320	0.08				
11/11		1.05	42	12.8		1.5	0.2	9000	9	5	8	9	3/7	320	0.08				
12/11		1.04	37	30		1.5	0.2	8000	8.5	4	5	4	1/2	520	0.02				
13/11	598	1.04	35	25.5		2.5	0.1	6000	11.5	3	5	6	3/4	80	0.6				
	660	1.04	43	11.6		1	-	-	11	-	6	8	3/10	-	-				
	663	1.54	46	-		-	-	-	-	-	-	-	-	-	-				
14/11	663	1.49	42	16		2.5	Tr	7500	9	15	17	13	4/14	320	0.03				
	750	1.47	49	12.6		2	0.75	8000	9	15	16	18	8/20	280	0.05				
15/11	798	1.44	50	9.8		1.5	1	8000	9.5	16	15	18	13/29	240	0.03				
	931	1.44	45	12.0		1.5	2	10000	9	17	15	15	5/19	280	0.05				
16/11	949	1.41	47	13.8		2	1	9000	9	17	13	15	5/15	320	0.03				
	988	1.43	46	9.4		2	1.5	9000	9	17	14	12	4/13	280	0.04				
	1030	1.44	48	10.6		2	2	8000	9	17	15	15	6/14	240	0.03				
17/11	1030	1.44	48	10.6		2	2	8000	9	17	15	15	6/14	240	0.03				
18/11	775	1.39	54	9.2		3	2	9000	9.2	14	15	12	11/15	20	0.6				
19/11	760	1.44	55	7.2		2	2.5	9000	9.9	16	20	16	4/14	20	0.8				
21/11	760	1.34	36	6.6		1	2	8000	10	12	9	7	1/5	20	0.4				
22/11	760	1.44	47	7.0		1	2	9000	10	16	17	16	4/15	20	0.5				
23/11	721	1.44	46	7.0		1	2.5	9000	10	17	16	15	3/13	16	0.6				
24/11	721	1.44	55	8.4		2	2.5	9000	10	17	22	17	6/20	14	0.8				
25/11	721	1.44	50	8.8		2	2.5	9500	9.8	17	20	16	6/18	16	0.8				
26/11	721	1.44	49	8.8		2	2.5	9500	9.8	17	19	16	6/18	16	0.8				
27/11	721	1.44	53	9.0		2	2.5	9500	-	17	21	19	6/12	16	0.7				

#### 2.4.4 Materials Consumption and Costs

Mud and mud chemicals consumption on this well were as follows:

<u>Material</u>	<u>Unit</u>	<u>Quantity</u>	<u>Cost</u>
Bentonite	100 lb	651	10,090.50
Barite	100 lb	4367	37,992.90
Dextrid	50 lb	88	4,540.80
Monpac	25 kg	12	1,458.00
Q-Broxin/FCL	25 kg	73	1,762.95
Cellogen	25 kg	6	729.00
Caustic Soda	23 kg	42	745.50
Lime	25 kg	6	40.50
Soda Ash	40 kg	15	217.50
Soda Bicarb	40 kg	20	429.80
Coat 888	50 lb	5	116.00
Total Cost =			\$58,122.95

The above costs include 200 sacks of barites used in the temporary guide base and 22 sacks bentonite used for cementing.

#### 2.4.5 Mud Equipment Description

##### Mud Pumps:

Two National 12-P-160 triplex single acting, each equipped with independently driven centrifugal pumps, each powered by two GE 752 electric motors.

##### Mud Mixing Pumps:

Ingersoll Rand MIR 150 with 75 HP electric motors, 2 each on active tank and 2 each on reserve tanks.

##### Shale Shaker:

Brandt Dual Tandem separator.

##### Desander:

Demco 6 cone x 6" rated at 1050 GPM with a 6" x 8" Mission Centrifugal pump powered by 75 HP electric motor.

#### 2.4.5 Mud Equipment Description (Continued)

Desilter:

Demco 12 cone x 4", rated at 1080 GPM, with Ingersoll Rand centrifugal pump powered by a 75 HP electric motor.

Adjustable Choke:

Swaco Super adjustable choke, 10,000 psi WP, complete with control panel.

Trip Tank:

25 bbl capacity, with high low level switch actuated motor for transfer pump.

Active Tank:

One 552 bbl capacity tank.

Reserve Tanks:

Four tanks, total 2608 bbls capacity.

## 2.5 Flow Testing

### 2.5.1 Flow Testing Summary

Two drill stem tests were run on this well.

The first drill stem test was run over the interval 700 - 706m RT. The interval was perforated with a 4 inch casing gun at 4 shots per foot with a 90 degree phasing.

Three downhole gauges were used to record pressures and temperatures during the test and a Surface Pressure Read Out (SPRO) Unit was used to provide a continuous surface monitor of the downhole conditions.

An initial 7 minute flow period on a  $\frac{1}{2}$  inch choke was followed by a 63 minute initial shut in period. Gas was observed at surface 4 minutes into the initial flow period and the final bottomhole flowing pressure was 413 psig. The final shut in bottomhole pressure at the end of the initial shut in period was 1079.9 psig. The final flow period lasted for 616 minutes. 135 minutes into the final flow period, the choke size was increased from  $\frac{1}{2}$  inch to 1 inch. The gas flow rate stabilized at 1.84 MMcf/D at a bottomhole flowing pressure of 177 psig. The well was shut in and after one minute the pressure was 1077.2 psig. The final shut in pressure was 1079.4 psig after 76 minutes.

The second drill stem test was run over the interval 662 - 670m RT. The interval was perforated with a 4 inch casing gun at 4 shots per foot with a 90 degree phasing.

Three downhole gauges were used to record pressures and temperatures during the test and a Surface Pressure Read Out (SPRO) unit was used to provide a continuous monitor of the downhole conditions.

An initial 7 minute flow period was followed by a 38 minute initial shut in. The final flowing period lasted 300 minutes and was followed by a final shut in of 140 minutes. During the final flow period, the well flowed gas on a ½ inch choke at 3.5 - 4.0 MMcf/D at a bottomhole pressure of 817 psig and at rates of 5.8 to 6.3 MMcf/D on a 1 inch choke at 670 psig. The final measured shut in pressure was 1068.3 psig.

#### 2.5.2 Flow Data

The flow data as reported by Flopetrol is attached as Appendix A1 to this report.

#### 2.5.3 Pressure Data

The pressure data as reported by Dowell Schlumberger is attached as Appendix A2 to this report.

#### 2.5.4 Interpretation and Analysis

##### DST No 1 - Interval 700-706m RT

- Flowed 1.8 MMcf/D of dry gas on a 1 inch choke at a wellhead pressure of 80 psig and a flowing bottomhole pressure of 176 psig.
- Has a formation pressure of 1080 psig as measured by the SPRO gauge at 671m RT.
- Has excellent formation permeability of 747 md.
- Has severe formation damage near the wellbore as indicated by the calculated skin of +1235.
- Did not indicate any reservoir depletion during the test.

##### DST No 2 - Interval 662-670m RT

- Flowed 6.3 MMcf/D of dry gas on a 1 inch choke at a wellhead pressure of 263 psig and a flowing bottomhole pressure of 670 psig.
- Has a formation pressure of 1075 psig as measured by the SPRO gauge at 631m RT.
- Has a formation permeability of 56 md.
- Has relatively severe formation damage near the wellbore as indicated by a skin factor of +18.5.



DST No 2 - Interval 662-670m RT (Continued)

- Did not indicate any reservoir depletion during the test.

From the DST analysis, the two zones appear to be in pressure communication.

2.6 General Data

2.6.1 Positioning Report

(See Positioning Report per Figure 13, and Appendix A3.)

2.6.2 Downhole Surveys

A Totco 0-8 deg. Inclinator was used for all downhole surveys in this well:

<u>Depth</u> (m)	<u>Deviation</u> (deg)	<u>Depth</u> (m)	<u>Deviation</u> (deg)
225	Misrun	1030	1/2
267	1		
577	0		
753	1		

2.6.3 Plug Back and Squeeze Cementation Record

- (i) Prior to running the 7" liner, the 8½" open hole was plugged back by spotting a cement plug at 875m. This plug consisted of 123 sacks of Class 'G' cement slurry at average 15.8 ppg slurry weight without additives. The plug was sized to cover the interval 875 - 775m. The plug was not tagged.
  
- (ii) A CBL log was run over the length of 7" casing liner and indicated the top of cement at approximately 608m. Pressure testing of the 7" casing liner then indicated a leak was present - this was correctly interpreted as a liner overlap leak. An injection rate of ¼ bbl/min was established past the packer. Drill pipe was run in to 966m and 50 sacks of Class 'G' cement slurry with 2 percent CaCl<sub>2</sub> was spotted with slurry weight of 15.8 ppg. A total of 2½ bbls slurry was squeezed away at up to 2200 psi pressure. After drilling out the cement inside the casing, another pressure test to 2200 psi confirmed a good seal.

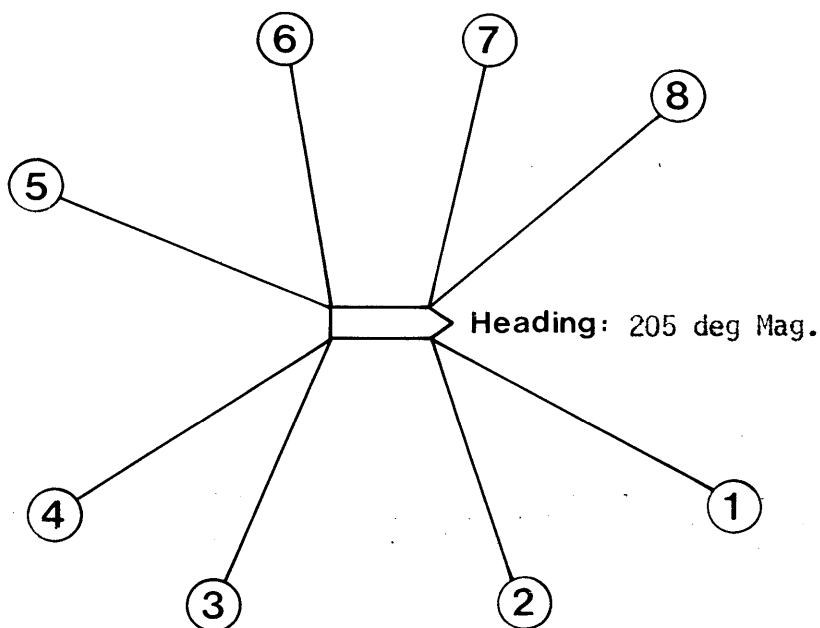
Proposed Location: 038 deg 00 min 36.01 sec South Latitude:  
 148 deg 26 min 08.74 sec East Longitude:  
 Actual Location: 038 deg 00 min 36.630 sec South Latitude:  
 148 deg 26 min 08.400 sec East Longitude:

Distance and Bearing from Actual to Proposed: Actual location was 23 metres at 207.7 deg. True from the proposed location.

Survey Method: Trisponder survey, position confirmed by JMR-4 satellite receiver.

Checked By: Racal-Decca Survey Ltd

Anchor Pattern: 30 deg/60 deg pattern from bow and stern



Remarks Commenced running anchors at 2230 hours 3 November 1981, completed 5½ hours soaking, relaying of No. 4 and 5 anchors and final tensioning at 1700 hours 4 November 1981. (18½ hours.) All anchors run out to 1800 - 2000 ft radius. Occasional re-tensioning was required during the programme to maintain position over the wellhead.

Author: A. Eisenbarth	 Hudbay Oil (Australia) Ltd. <b>POSITIONING</b> <b>BALEEN - 1</b>	Date June 1982
Drawn by H.O.A.L.		Drawing N° <b>A4-DR-531</b>

Figure 13

#### 2.6.4 Fishing Operations

The only fishing operation on this well occurred when the kelly saver sub parted. An overshot was made up and the string retrieved in 2 hours. The drill collars were laid down for inspection.

#### 2.6.5 Side Tracked Hole

No side tracked hole occurred on this well.

#### 2.6.6 Formation Leak Off Tests

(i) 20" casing set at 209m:

Open hole = 209 - 225m

New hole = 225 - 228m

Fluid in hole = Seawater (8.45 ppg)

Indicated Formation Strength = 14.4 ppg equivalent

(ii) 9-5/8" casing set at 566m:

Open hole = 566 - 577m

New hole = 577 - 580m

Fluid in Hole = Mud (8.7 ppg)

Indicated Formation Strength = 16.5 ppg equivalent

(iii) 7" casing set at 760m:

Casing shoe not drilled out.

#### 2.7 Abandonment Report

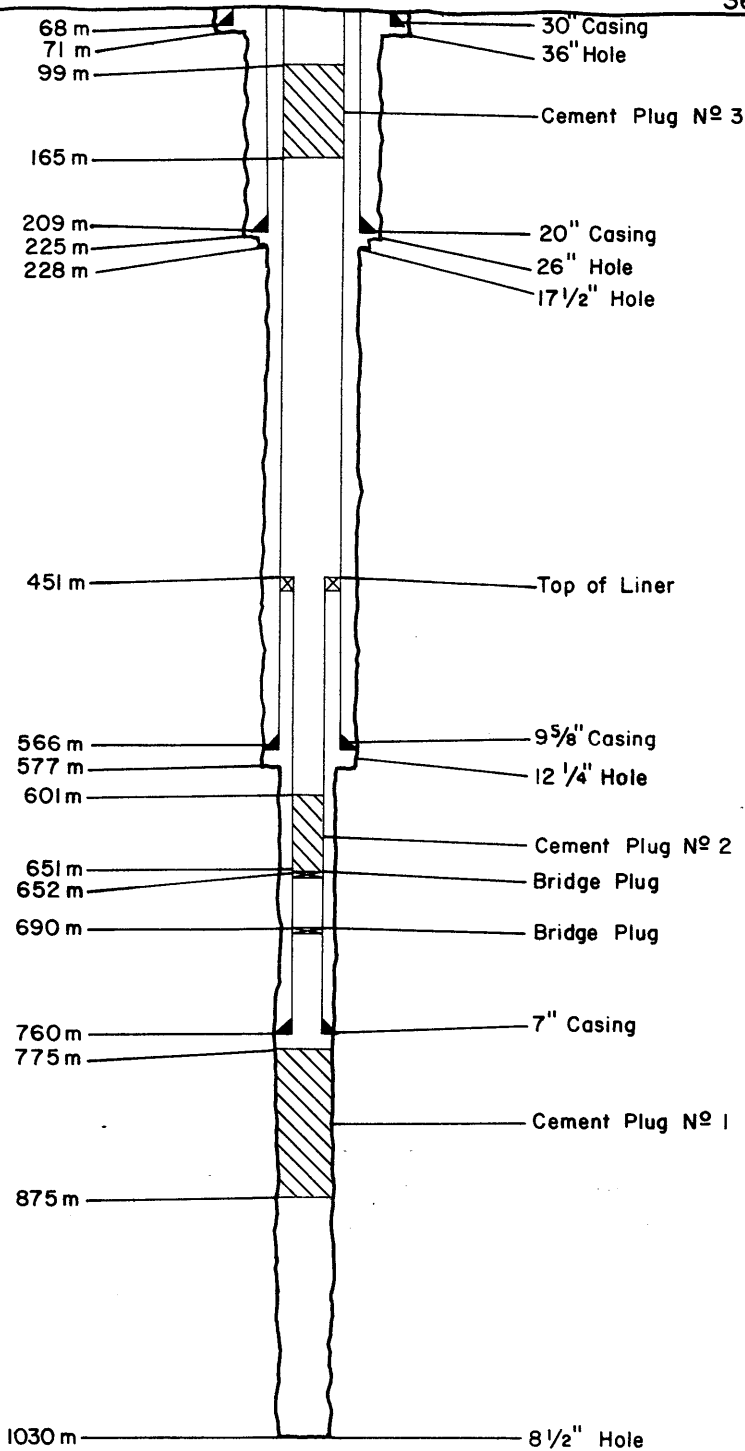
(See As Abandoned Schematic per Figure 14.)

## 2.8 Recommendations for Future Drilling Programmes

The major problem encountered during drilling and evaluation of this well was the significant formation damage indicated by the production tests. This damage was deduced as directly a result of the type of mud system employed during the drilling phase. As a result of this information the following two wells (i.e. Whale No 1 and Sperm Whale No 1) were drilled with an inhibitive brine polymer mud system. This new mud system had minimal solids content and was in itself fully acid soluble.

Sea Level

Seabed 64.34m



- NOTES:
1. Cement Plug N<sup>o</sup>1 - 123 Sks. Class 'G' Neat, 15.8 PPG. 875m - 775m.
  2. Cement Plug N<sup>o</sup>2 - 30 Sks. Class 'G' Neat, 15.8 PPG. 651m - 601m.
  3. Cement Plug N<sup>o</sup>3 - 80 Sks. Class 'B' Neat, 15.6 PPG. 165m - 99m
  4. DST N<sup>o</sup>1 Perforations 706 m - 700m
  5. DST N<sup>o</sup>2 Perforations 670 m - 662m

Author:  
A. Eisenbarth

Hudbay Oil (Australia) Ltd.

Date:  
June 1982

Drawn:  
C. Clarke

**BALEEN - 1**  
**AS ABANDONED**

Drawing N<sup>o</sup>:  
**A4-DR-533**

Figure 14

APPENDIX A1

W E L L   T E S T I N G   R E P O R T

No. 231181261181

# FLOPI TROL

DIVISION : N.T.D.

BASE : PERTH

REPORT N°: 231181261181

## Well Testing Report

Client : HUBBAY OIL

Field : BALEEN

Zone : 1

ZONE: 2

Well : # 1

Date: 23.11.81 TO 24.11.81

25.11.81 TO 26.11.81



## INDEX

- 1 \_ TEST PROCEDURE \_
- 2 \_ MAIN RESULTS \_
- 3 \_ OPERATING AND MEASURING CONDITIONS \_
- 4 \_ SURFACE EQUIPMENT DATA \_
- 5 \_ WELL COMPLETION DATA \_
- 6 \_ SEQUENCE OF EVENTS \_
- 7 \_ WELL TESTING DATA \_

N° DOP 101

Flop petrol chief operator  
Name : K. RUSSELLClient representative  
Name : B McELHINNEY / R. BRUMIDGE

- TEST PROCEDURE -

D.S.T. # 1

- 1) SCHLUMBERGER RUN IN HOLE WITH 4" CASING GUN (90° PHASING, 4 SHOTS PER FOOT) AND PERFORATE INTERVAL 700 - 706 M.
- 2) PACKER RUN IN AND SET AT 688 METERS.
- 3) TEST STRING RUN IN HOLE CONSISTING OF DOWELL P.C.T., 3½" HYDRIL PH6 TUBING, FLOPETROL SUB SURFACE SAFETY VALVE, "E.Z. TREE".
- 4) SURFACE EQUIPMENT RIGGED UP AND PRESSURE TESTED.
- 5) WELL WAS OPENED AND PRODUCING DRY GAS FOR AN INITIAL FLOW OF APPROXIMATELY 10 MINUTES. THE WELL WAS THEN SHUT IN TO OBSERVE BUILD-UP FROM THE SPRO GAUGE.

ON OPENING AGAIN THE WELL WAS CLEANED UP ON ½" CHOKE WHICH WAS LATER INCREASED TO 1" FIXED.

USING THE LARGER CHOKE, RATES WERE OBTAINED THROUGH THE SEPARATOR IN THE REGION OF + 1.80 MMSCF/D WITH NO FLUIDS PRODUCED.

A FINAL BUILD UP WAS AGAIN MONITORED USING THE SPRO SYSTEM THEN THE WELL WAS KILLED.

---

D.S.T. # 2

MIS-RUN. UNABLE TO SET POSI-TEST PACKER.

- TEST PROCEDURE -  

- 1) SCHLUMBERGER RUN IN HOLE WITH 4" CASING GUN, 90° PHASING 4 SHOTS PER FOOT, AND PERFORATE INTERVALS 662 - 670 METERS.
  
- 2) POSI-TEST PACKER SET AT 648.13 METERS.
  
- 3) TEST STRING RUN IN HOLE CONSISTING OF DOWELL P.C.T., 3½" PH6 TUBING, FLOPETROL SUB SURFACE SAFETY VALVE, "E.Z. TREE".
  
- 4) SURFACE EQUIPMENT RIGGED UP AND PRESSURE TESTED.
  
- 5) WELL WAS OPENED, WITH PRESSURE INCREASING RAPIDLY, FOR A 5 MINUTE PRE-FLOW, FOLLOWED BY A BUILD-UP OF 40 MINUTES.

FOLLOWING THIS THE WELL WAS THEN FLOWED FOR CLEAN UP ON ½" CHOKE GIVING AN ESTIMATED FLOW RATE OF ± 3.5 MMSCF/D.

THE FLOW WAS THEN SWITCHED THROUGH THE SEPARATOR GIVING RATES OF 4.020 MMSCF/D.

AFTER 30 MINUTES FLOWING THROUGH THE SEPARATOR THE CHOKE WAS INCREASED TO 1" FIXED AND RATES OBTAINED IN THE REGION OF ± 6.3 MMSCF/D.

A FINAL SHUT IN FOLLOWED AND THEN THE WELL WAS KILLED.

---

## - MAIN RESULTS -

D.S.T. # 1

 Tested interval:            SANDSTONE            Perforations:            700 - 706 METERS.

OPERATION	DURATION	BOTTOM HOLE PRESSURE	WELL HEAD PRESSURE	OIL PROD. RATE	GAS PROD. RATE	G.O.R
Units	MIN	PSIG	PSIG	B.O.P.D.	MMSCF/D	
INITIAL OPENING ON ½" FIXED CHOKE	8		MAX. RECORDED 280	-	ESTIMATED @ ± 1.6	-
SHUT-IN P.C.T.	50			-	-	
WELL FLOWING ON ½" FIXED CHOKE	142		330	-	ESTIMATED @ ± 1.6	-
INCREASE CHOKE TO 1" FIXED AND FLOW THROUGH SEPARATOR	489		81	-	1.809	-

 Depth of bottom hole measurements :            671.3 METERS            Reference :            RT

 Temperature :            111.5°C            at :            671.3 MTR            depth

 Separator gas gravity (air : 1) at choke size :            .575 @ 1" FIXED CHOKE

 STO gravity at choke size :            -

 BSW :            -            Water cut :            -

### REMARKS AND OTHER OPERATIONS

RATES SHOWN AVERAGED.  
 WELL PRODUCED NO FLUIDS ALTHOUGH SLIGHT TRACES OF MUD DURING CLEAN UP.  
 TRACE OF CONDENSATE IN P.C.T. TOOL WHEN RIGGED DOWN ON SURFACE.

## MAIN RESULTS

D.S.T. #            2ATested interval:            SANDSTONE            Perforations:            662 - 670 METERS

OPERATION	DURATION	BOTTOM HOLE PRESSURE	WELL HEAD PRESSURE	OIL PROD.RATE	GAS PROD.RATE	G.O.R
Units	MIN	-	PSIG	-	MMSCF/D	-
INITIAL OPENING ON ½" FIXED CHOKE	5		580			
SHUT - IN P.C.T.	40					
WELL FLOWING ON ½" FIXED CHOKE	45		667		ESTIMATED @ ± 3.5MM	
FLOW THROUGH SEPARATOR ON ½" FIXED	30		676		4.020	
INCREASE CHOKE TO 1" FIXED FLOW THROUGH SEPARATOR	210		263		6.349	

Depth of bottom hole measurements :            631            Reference :            RTTemperature :            at :            depthSeparator gas gravity (air : 1) at choke size :            .575 @ 1" FIXED CHOKESTO gravity at choke size :           BSW :            Water cut :           REMARKS AND OTHER OPERATIONS

## OPERATING AND MEASURING CONDITIONS

### A - TYPE OF GAUGE

#### BOTTOM HOLE :

Pressure : SPRO + J 200  
 Temperature : SPRO + MAXI. THERMOMETER

#### WELL HEAD :

Pressure : FOXBORO D.W.T., PRESSURE GAUGE  
 Temperature : GLASS ROD THERMOMETER

#### SEPARATOR :

Pressure : BARTON  
 Temperature : GLASS ROD THERMOMETER

### B - PRODUCTION RATE CONDITIONS AND SOURCES

#### OIL PRODUCTION RATE

- Tank  Floco  
 Meter  Rotron  
 Dump  \_\_\_\_\_  
 \_\_\_\_\_

#### Reference conditions

- Separator  
 Atmospheric  
 pressure 60°F

#### Shrinkage measurement

- With tank  
 With shrinkage  
 tester

#### GAS PRODUCTION RATE

- Orifice meter  
 \_\_\_\_\_

#### Standard conditions

14.73 PSI @ 60°F

#### WATER PRODUCTION RATE

- Tank  
 Meter  
 \_\_\_\_\_

### C - WELL DATA

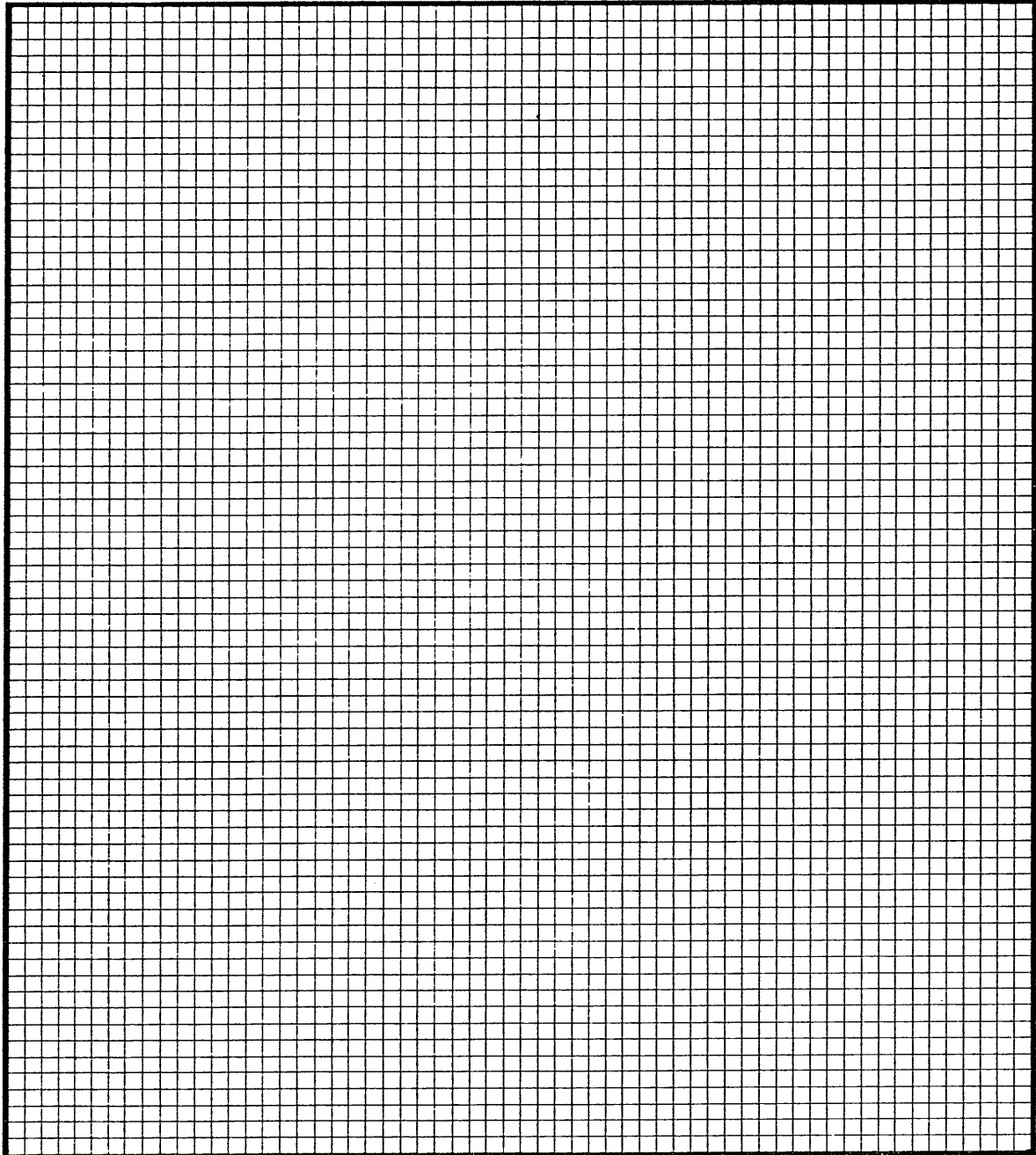
#### WELL STATE DURING SURVEY :

Well producing through : tubing / ~~drill pipe~~ casing  
 Main casing size 7" set at \_\_\_\_\_ Total well depth \_\_\_\_\_  
 Tubing size 3½ HYD set at \_\_\_\_\_ Packer \_\_\_\_\_ set at \_\_\_\_\_  
 Perforations :  
 - Zone \_\_\_\_\_ From \_\_\_\_\_ to \_\_\_\_\_ From \_\_\_\_\_ to \_\_\_\_\_  
 - Zone \_\_\_\_\_ From \_\_\_\_\_ to \_\_\_\_\_ From \_\_\_\_\_ to \_\_\_\_\_  
 -

#### WELL STATE BEFORE TEST : EXPLORATION

- Well closed since \_\_\_\_\_  
 Well flowing since \_\_\_\_\_ Producing zone \_\_\_\_\_  
 Choke size \_\_\_\_\_

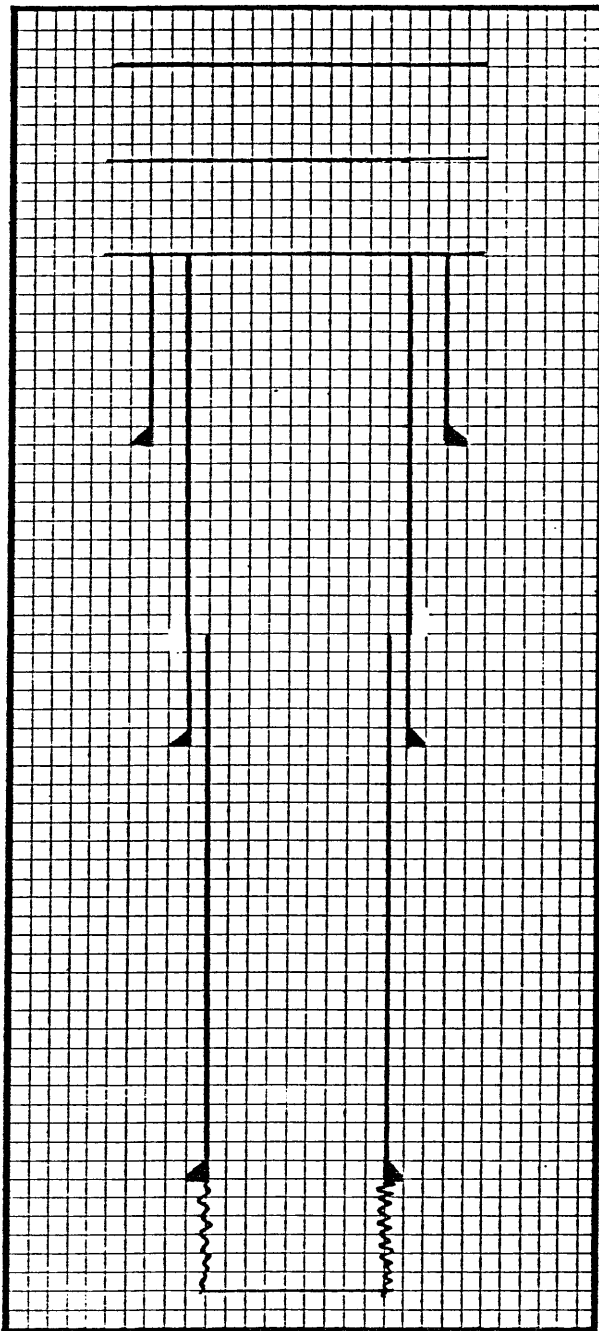
- SURFACE EQUIPMENT LAYOUT -           



REMARKS :

REFER TO HUBBAY DRAWING NO. A4-DR-276.

## - WELL COMPLETION DATA -



RT

SEA LEVEL 9.5 METERS

SEA BED 54.9 METERS

20" CASING SET @  
209 METERS.

TOP OF 7" LINER @  
451 METERS.

9 5/8" CASING SET @  
564 METERS.

SHOE OF 7" LINER @  
760 METERS.

T.D. 1030 METERS.

REMARKS :

N.T.S.            FLOR TEST STRING DATA REFER TO DOWELL SCHLUMBERGER REPORT.



Base : PERTH

Client : HUBBAY

Field : BALEEN

Well : # 1

Section : **6**

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Report N°: 231181261181

## - SEQUENCE OF EVENTS -

DATE	TIME	OPERATION
23.11.81		<u>D.S.T. # 1</u>
		PERFORATIONS = 706 - 700 METERS.
		POSI-TEST PACKER SET @ = 688 METERS.
		CUSHION - NONE.
	1640	PRESSURE ANNULUS TO OPEN P.C.T. OCCASIONAL BUBBLES FOLLOWED BY GOOD INCREASE IN PRESSURE.
	1642	SWITCH FLOW TO FLARE LINE (DRY GAS FLOWING).
	1646	TRACES OF MUD.
	1648	PRESSURE BLED OF ANNULUS TO CLOSE P.C.T.
	1738	PRESSURE ANNULUS TO OPEN P.C.T.
	1740	OPEN TO BURNER ON $\frac{1}{2}$ " FIXED CHOKE.
	1741	TRACES OF MUD TO SURFACE.
	1755	H2S = 0 PPM.
	1800	GAS SP. GRAVITY = 0.58
	1835	H2S = 0 PPM.
	1845	GAS SP. GRAVITY = 0.578.
	1900	H2S = $\emptyset$ PPM.
	2000	INCREASE TO 1" ADJ. CHOKE.
	2003	CHANGE TO 1" FIXED CHOKE.
	2100	SWITCH FLOW THROUGH SEPARATOR.
	2130	START TO TAKE SPEARATOR READINGS, LINE BORE 4.026", ORIFICE PLATE = 2.000 ", PRESSURE $\pm$ 50 PSIG.
24.11.81	0300	START TO TAKE FIRST GAS SAMPLE FROM SEPARATOR. BOTTLE NO A-11977.
	0320	FINISH TAKING GAS SAMPLE FROM SEPARATOR.
	0325	BOTTLE NO. A-8526.
	0345	FINISH TAKING SECOND GAS SAMPLE FROM SEPARATOR.

N° DOP 107

# FLOPETROL

Section : **6**

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## \_ SEQUENCE OF EVENTS \_ (Continuation)

DATE	TIME	OPERATION
24.11.81	0359	BY PASS SEPARATOR.
	0406	BLEED DOWN ANNULUS TO CLOSE P.C.T. CLOSE IN CHOKE MANIFOLD MONITORING BUILD-UP WITH S.P.R.O.
	0530	UNLATCH S.P.R.O. AND PULL OUT OF HOLE.
	0555	SCHLUMBERGER HUNG-UP AT 128 METERS.
	0600	SHEAR REVERSE OUT SUB AND REVERSE CIRCULATE.
	0614	MUD SAMPLE, WITH "BLOOM" OF CONDENSATE TAKEN AND MARKED AS FIRST RETURNS FROM REVERSE OUT.
	0635	OPEN LOWER RAMS AND CIRCULATE.
	0705	FINISH CIRCULATING.
	0710	FLUSH THROUGH SURFACE LINES THEN ATTEMPT TO FREE SCHLUMBERGER
	0855	S.P.R.O. LATCH ON SURFACE.
	0900	START TO RIG DOWN FLOWHEAD.
	1000	E.Z. TREE ON SURFACE THEN LAYED DOWN.
		END OF D.S.T. # 1
25.11.81		<u>D.S.T. # 2.</u>
		PERFORATIONS 662 - 670 METERS.
		POSI-TEST PACKER @ 648.13 METERS.
		CUSHION - NONE.
	1245	E.Z. TREE RUN IN HOLE.
	1340	RIGGING UP FLOWHEAD FOLLOWED BY SCHLUMBERGER.
	1645	ATTEMPT TO SET PACKER - UNABLE.
	1900	START TO PULL OUT OF HOLE.
	2000	E.Z. TREE ON SURFACE.
		D.S.T. # 2 IS MISS RUN.

N° DOP 108



<b>FLOPETROL</b>	Client : <u>          </u> HUBBAY	<b>- WELL TESTING DATA SHEET -</b>	Section : <b>7</b>
	Field : <u>          </u> BALEEN		Page : <u>          </u> 01
Base : <u>          </u> PERTH	Well : <u>          </u> # 1	Report N°: <u>          </u> 23118126118	

DATE - TIME		PRESSURE AND TEMPERATURE MEASUREMENTS						PROD. RATES AND FLUID PROPERTIES					GOR	
Time	Cumul	BOTTOM HOLE		WELL HEAD		SEPARATOR		OIL OR CONDENSATE			GAS			
		Temp.	Pressure	Tg.temp	Tg.press.	Cg.press.	Temp.	Press.	Rate	Gravity	BSW	Rate		
HR MIN	MIN			F	PSIG						MMSCF/D	Air = 1		Units
23.11.81					<u>D.S.T. # 1</u>									
1640	0		PRESSURE ANNULUS		TO OPEN	P.C.T.	TOOL.							
1641	1				200									
1642	2				300									
1642	-		OPEN WELL		TO BURNER ON 1/2" FIXED	CHOKE	(DRY GAS)							
1643	3				290									
1644	4				280									
1645	5				260									
1646	6				280						TRACES OF MUD TO SURFACE			
1647	7				130									
1646	8				80						P.C.T. CLOSED.			

<p><u>LIQUID FLOW RATE MEASURING CONDITIONS :</u></p> <p>NO LIQUIDS PRODUCED.</p>	<p>TESTED INTERVAL : <u>          </u> 706 - 700 METERS.</p> <p>DEPTH REFERENCE : <u>          </u> RT</p> <p>DEPTH OF B.H.MEASUREMENTS : <u>          </u></p>
---	---

DATE - TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR			
		BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS		H2S			
Time	Cumul	Temp.	Pressure	Tg. temp	Tg. press.	Cg. press.	Temp.	Press.	Rate	Gravity	BSW	Rate	Gravity	PPM			Units
HR	MIN			C	PSIG								Air=1				
1648																	
23/11/81																	
1648	0																
1738	50				20												
1738	0	PRESSURE ANNULUS TO OPEN P.C.T.															
1739	1				200												
1740	2				310												
1740	-	OPEN WELL TO BURNER ON $\frac{1}{2}$ " FIXED CHOKE															
1741	3				350				TRACES OF MUD TO SURFACE.								
1742	4				365												
1743	5				360												
1744	6				350												
1745	7				335												
1750	12				360												
1755	17				385									0			
1800	22			18	370								0.58				
1805	27			18	350												
1810	32			18	350												

# FLOPETROL

## \_WELL TESTING DATA SHEET\_(Continuation)

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Section : 7





**FLOPETROL****\_WELL TESTING DATA SHEET\_(Continuation)**Page : 05  
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Section : 7

DATE - TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR		DOWNSTREAM		H2S
Time	Cumul	BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS		GOR	PRESS.	PPM	Units	
		Temp.	Pressure	Tg.temp	Tg.press.	Cg.press.	Temp.	Press.	Rate	Gravity	BSW	Rate	Gravity					
HR MIN	MIN			OC	PSIG		OC	PSIG	B.O.P.D.	API		MMSCF/D	Air=1					
2030	30									@ 60								
23.11.81																		
2035	35			18	81													
2040	40			18	83												0	
2045	45			18	81													
2050	50			18	80													
2055	55			18	80													
2100	60			18	76													
2100	-	SWITCH FLOW THROUGH SEPARATOR.																
2115	45			18	80								0.58					
2130	90			18	80		18	50	-			1.869						
2145	105			18	82		17	50	-			1.869			66			
2200	120			18	85		17	50	-			1.906			65			
2215	135			18	82		17	50	-			1.908			66			
2230	150			18	85		17	50	-			1.883			65			
2245	165			18	90		17	50	-			1.908			67			
2300	180			18	87		17	50	-			1.933			67			
2315	195			18	86		17	50	-			1.921			66			



# FLOPETROL

## \_WELL TESTING DATA SHEET\_(Continuation)

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Section : 7

DATE - TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR	C/M	
Time HR MIN	Cumul MIN	BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS		GOR	DOWN STREAM PRESS.	Units
		Temp.	Pressure	Tg. temp °C	Tg. press. PSIG	Cg. press.	Temp. °C	Press. PSIG	Rate	Gravity	BSW	Rate MMSCF/D	Gravity Air=1			
0300	430															
	2411.81															
0300	-	START TO TAKE GAS SAMPLE FROM SEPARATOR.														
0315	445			18	82		17	50	-			1.798			64	
0330	460			18	81		17	50	-			1.811			61	
0345	475			18	81		17	50	-			1.837			60	
0345	-	FINISH TAKING GAS SAMPLES FROM SEPARATOR.														
0359	489			18	81		17	50				1.837			60	
0359	-	BY PASS SEPARATOR.														
0406	496	BLEED DOWN ANNULUS TO CLOSE P.C.T. VALVE., FOR FINAL BUILD UP.														
0406	0															
0530	84	UNLATCH FROM SPRO AND PULL OUT OF HOLE.														
0555	109	SCHLUMBERGER "HUNG UP" AT 128 METERS.														
0600	114	REVERSE OUT SUB-SHEARED														
1015	-	E.Z. TREE ON SURFACE.														
		END OF D.S.T. # 1														

**FLOPETROL****\_WELL TESTING DATA SHEET\_(Continuation)**Page : 06  
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DATE - TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR	C/M			
Time	Cumul	BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS		GOR	DOWN	H2S	Units	
		Temp.	Pressure	Tg.temp	Tg.press.	Cg.press.	Temp.	Press.	Rate	Gravity	BSW	Rate	Gravity		STREAM	PPM		
HR MIN	MIN			°C	PSIG		°C	PSIG				MMSCF/D	Air=1		PSIG			
2315																		
23.11.81																		
2300	210			18	87		17	50	-			1.896			65			
2345	225			18	83		17	50	-			1.876	.575		66			
2400	240			18	85		17	50	-			1.876			66			
24.11.81																		
0015	255			18	83		17	50	-			1.863	.575		65			
0030	270			18	83		17	50	-			1.863			65			
0045	285			18	83		17	50	-			1.837			65			
0100	300			18	83		17	50	-			1.824			64			
0115	315			18	84		17	50	-			1.837			65			
0130	330			18	85		17	50	-			1.837			67			
0145	345			18	82		17	50	-			1.837			64			
0200	370			18	82		17	50	-			1.808			64			
0215	385			18	80		17	50	-			1.808			63			
0230	400			18	83		17	50	-			1.781			64			
0245	415			18	80		17	50	-			1.808			63			
0300	430			18	84		17	50	-			1.795	.575		64			



# FLOPETROL

## \_WELL TESTING DATA SHEET\_(Continuation)

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Section : 7

DATE - TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR		
Time	Cumul	BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS			H2S	Units
		Temp.	Pressure	Tg. temp	Tg. press.	Cg. press.	Temp.	Press.	Rate	Gravity	BSW	Rate	Gravity			
HR	MIN	MIN		°C	PSIG							Air=1		PPM		
1005	5															
26.11.	81															
1005	-			BLEED DOWN ANNULUS TO CLOSE P.C.T.												
1005	0															
1045	40															
1045	0			PRESSURE ANNULUS TO OPEN P.C.T. AND FLOW TO BURNER ½" CHOKE												
1046	1				620											
1047	2				635											
1048	3				620											
1049	4				615											
1050	5				610											
1050	-			SWITCH FLOW THROUGH ½" ADJ. CHOKE.												
1051	6			CHANGE BACK TO ½" FIXED - NO CHANGE IN PRESSURE.												
1052	7				610											
1053	8			17	625											
1054	9			17	635											
1055	10			17	630											
1056	11			17	630											

(FLOW RATE ESTIMATED @ ± 3.5 MMSCF/D).



**FLOPETROL****\_WELL TESTING DATA SHEET\_(Continuation)**Page : 11  
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DATE - TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR				
Time HR MIN	Cumul MIN	BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS		H2S PPM		Units		
		Temp.	Pressure	Tg. temp °C	Tg. press. PSIG	Cg. press.	Temp. °C	Press. PSIG	Rate	Gravity	BSW	Rate MMSCF/D	Gravity Air=1					
1200																		
26.11.	81																	
1215	15			18	242		13	90				5.855						
1230	30			18	242		13	90				5.883	.578					
1245	45			19	247		14	90				5.901						
1300	60			19	247		14	90				5.929						
1310	70			START TO TAKE GAS SAMPLE # 1 FROM SEPARATOR (BOTTLE NO. A-11939)														
1315	75			19	249		13	95				6.054						
1326	86			FINISH TAKING GAS SAMPLE # 1.														
1330	90			19	250		13	96				6.139						
1330	-			START TO TAKE GAS SAMPLE # 2 FROM SEPARATOR (BOTTLE NO. A-11954)														
1345	105			19	251		14	97				6.155						
1347	107			FINISH TAKING GAS SAMPLE NO. 2														
1400	120			19	252		14	98				6.198						
1415	135			19	255		14	99				6.284	.575					
1430	150			19	257		14	100				6.311						
1445	165			19	257		14	100				6.311						
1500	180			19	260		14	100				6.340						



# FLOPETROL

DIVISION : N.T.D.  
BASE : PERTH  
REPORT N°: 231181261181

## Well Testing Report Annexes —

Client = HUBBAY OIL  
Field = BALEEN      Well = # 1  
Zone = NO. 1      Date = 23.11.81 TO 24.11.81  
ZONE: NO. 2      25.11.81 TO 26.11.81



## INDEX of ANNEXES

- 1 - BOTTOM HOLE PRESSURE AND TEMPERATURE MEASUREMENT -
  - 1.1 - B.H. gauge calibration -
  - 1.2 - B.H. pressure calculation -
  - 1.3 - B.H. temperature calculation -
  
- 2 - LIQUID PRODUCTION RATE MEASUREMENT -
  - 2.1 - Measurements with tank -
  - 2.2 - Measurements with meter -
  
- 3 - GAS PRODUCTION RATE MEASUREMENT -
  
- 4 - SAMPLING SHEETS -
  - 4.1 - Bottom hole sampling -
  - 4.2 - Surface sampling -
  
- 5 - CHARTS AND MISCELLANEOUS -

## - GAS PRODUCTION RATE MEASUREMENT by orifice meter -

Reference is made to the rules and coefficients given in AGA gas measurement Committee Report No.3 for orifice metering.

### a) EQUATIONS -

$$Q = C \sqrt{hw \times Pf}$$

- Q : Production rate at reference conditions.
- C : Orifice flow coefficient.
- hw: Differential pressure in inches of water.
- Pf : Flowing pressure in psia.

$$C = F_u \times F_b \times F_g \times Y \times F_{tf} \times F_{pv}$$

- F<sub>u</sub> : Unit conversion factor in desired reference conditions.
- F<sub>b</sub> : Basic orifice factor (Q in Cu.ft / hour).
- F<sub>g</sub> : Specific gravity factor.
- Y : Expansion factor
- F<sub>tf</sub> : Flowing temperature factor.
- F<sub>pv</sub> : Supercompressibility factor (estimated).

### Remarks

F<sub>m</sub>: Manometer factor is equal one since only bellows type meters are used.  
 F<sub>r</sub> : Reynolds factor is considered to be one.

UNITS	TABLE OF F <sub>u</sub> FACTOR			
	REFERENCE CONDITIONS			
	60°F 14.73 psia	0°C 760mmHg*	15°C 760mmHg *	15°C 750mmHg *
Cu.ft / hour	1	0.9483	1.0004	1.0137
Cu.ft / day	24	22.760	24.009	24.329
m <sup>3</sup> / hour	0.02832	0.02685	0.02833	0.02870
m <sup>3</sup> / day	0.6796	0.6445	0.6799	0.6889

\* Mercury at 32°F

### b) METER DATA -

Meter type :            DANIEL            Flange taps - Pf taken down/up stream  
 Flow recorder type:            BARTON            ID of meter tube :            4.026"

### c) SPECIFIC GRAVITY SOURCE -

Sampling point :            GAS OUPPLET LINE            Gravimeter type :            KIMRAY

### d) SUPERCOMPRESSIBILITY FACTOR F<sub>pv</sub> -

All coefficients are taken from AGA NX 19 manual for natural gas free of air, CO<sub>2</sub> and H<sub>2</sub>S .More accurate values could only be determined by laboratory measurement.

**FLOPETROL**
 Client :    HUDBAY OIL     
 Field :    BALEEN     
 Well :    # 1   
**- GAS PRODUCT. RATE MEASUREMENT -**Section : ANNEX **3**Base :    PERTH   Page :    01     
Report N : 231181261181

DATE - TIME		Flowing	P <sub>f</sub>	h <sub>w</sub>	$\sqrt{h_w \times P_f}$	Orifice	Gas	F <sub>b</sub>	F <sub>g</sub>	Y	F <sub>tf</sub>	F <sub>pv</sub>	C	Gas production	Cumulative
Time	Interval	Temp.	absolute	"of wat.		diameter	gravity							rate : Q	Production
HR MIN	MIN	°F	psia			Inches	(air = 1 )							MMSCF/D	MMSCF
					D.S.T. # 1										
23.11.81															
1738	0														
		WELL OPENED TO BURNER ON 3/8" FIXED CHOKE													
2000	142														
		CHANGE TO 1" FIXED CHOKE													
2100	202														
		SWITCH FLOW THROUGH SEPARATOR													
2130	232													ESTIMATED	.575
2145	15	64	65	75	69.82	2.00	.58	842.12	1.3153	1.0071	.9962	1.004	26767.55	1.869	.594
2200	15	63	65	78	71.20	"	.58	"	"	1.0074	.9962	1.004	26775.14	1.906	.614
2215	15	63	65	78	71.20	"	"	"	"	1.0074	.9971	1.004	26801.33	1.908	.634
2230	15	63	65	76	70.29	"	"	"	"	1.0072	.9971	1.004	26796.26	1.883	.654
2245	15	63	65	78	71.20	"	"	"	"	1.0074	.9971	1.004	26801.33	1.908	.674
2300	15	63	65	80	72.11	"	"	"	"	1.0075	"	"	26806.40	1.933	.694
2315	15	63	65	79	71.66	"	"	"	"	"	"	"	26803.86	1.921	.714
2330	15	63	65	77	70.75	"	"	"	"	1.0073	"	"	26798.80	1.896	.734

F<sub>u</sub> =    24   Recorder ranges : P<sub>f</sub> =    1000 PSIG     
h<sub>w</sub> =    200" W.C.    Temp. =    0 - 240°F   TESTED INTERVAL :    SANDSTONE     
PERFORATIONS :    706 - 700 METERS.





# FLOPETROL

## GAS PRODUC. RATE MEASUREMENT-(Continuation)

Page : 04  
Report N° 231181261181

Section: ANNEX 3

DATE - TIME		Flowing	P <sub>f</sub>	h <sub>w</sub>	$\sqrt{h_w \times P_f}$	Orifice	Gas	F <sub>b</sub>	F <sub>g</sub>	Y	F <sub>tf</sub>	F <sub>pv</sub>	C	Gas production	Cumulative
Time	Interval	Temp.	absolute	"of wat.		diameter	gravity							rate : Q	Production
HR MIN	MIN	OF	psia			Inches	(air = 1)							MMSCF/D	
26.11.81					D.S.T. NO.	2 A									
1045	0	WELL OPENED TO BURNER ON ½"				FIXED CHOKE									
1130	45	SWITCH FLOW THROUGH SEPARATOR													
1145	15	START TO TAKE READINGS.													
1145	0	48	75	68	71.41	2.750	.578	1746.7	1.3153	1.0042	1.0117	1.005	56293.80	4.020	
1200	15	48	75	68	71.41	"	"	"	"	"	"	"	56293.80	4.020	
1200	-	INCREASE TO 1" FIXED CHOKE													
1215	15	55	105	104	104.50	2.750	.578	1746.7	1.3153	1.0046	1.0045	1.007	56028.31	5.855	
1230	15	55	105	105	105.00	"	"	"	"	"	"	"	56030.81	5.883	
1245	15	57	105	106	105.50	2.750	.578	"	"	1.0047	1.0027	1.007	55931.32	5.901	
1300	15	57	105	107	106.00	"	"	"	"	"	"	"	55933.81	5.929	
1310	-	START TO TAKE GAS SAMPLES FROM SEPARATOR.													
1315	15	55	110	106	107.98	2.750	"	"	"	1.0045	1.0048	1.007	56065.93	6.054	
1330	15	55	111	108	109.49	"	"	"	"	"	"	"	56072.76	6.139	
1345	15	57	112	108	109.98	"	"	"	"	"	1.0029	"	55961.1	6.155	



# FLOPETROL

Client : HUDBAY  
Field : BALEEN  
Well : # 1

Section: ANNEX 42  
Page : 01  
Report N°: 231181261181

Base : PERTH

D.S.T. # 1

## - SURFACE SAMPLING -

Date of sampling : 24.11.81 Service order : \_\_\_\_\_ Sampling No. : #1  
Sample nature : GAS Sampling point : GAS OUTLET ON SEPARATOR

A - RESERVOIR AND WELL CHARACTERISTICS -  
Producing zone : SANDSTONE Perforations : 706-700 METERS Sampling interval : 6 METERS

Depth origin : RT Tubing Dia. : 3½ Casing Dia. : 7" LINER  
Surface elevation : \_\_\_\_\_ Shoe : \_\_\_\_\_ Shoe : \_\_\_\_\_

<u>Bottom hole static conditions</u>	Initial pressure : <u>1079 PSIG</u> at depth : <u>671.3 MTR</u> date : <u>23.11.81</u>
	Latest pressure measured : <u>1079.3 PSIG</u> at depth : <u>"</u> date : <u>24.11.81</u>
	Temperature : <u>111.5°F</u> at depth : <u>"</u> date : <u>24.11.81</u>

B - MEASUREMENT AND SAMPLING CONDITIONS - ± 6 HOURS  
Time at which sample was taken : 0300-0320 HRS Time elapsed since stabilisation : \_\_\_\_\_

<u>Bottom hole dynamic conditions</u>	Choke size : <u>1"</u> since : <u>23.11.81</u> Well head pressure : <u>81</u> Well head temp. : <u>18°C</u>
	Bottom hole pressure : <u>176.7 PSIG</u> at depth : <u>671.3 MTR</u> date : <u>24.11.81</u>
	Bottom hole temp. : _____ at depth : _____ date : _____

Flow measurement of sampled gas - Gravity(air:1) : .575 Factor Fpv = 1 : 1.004  
Values used for calculations : VZ

<u>Separator</u>	Pressure : <u>50 PSIG</u>	Rates - Gas : <u>1.811 MM</u> SCFD	GOR : <u>-</u> (separator cond.)
	Temp. : <u>17 °F</u>	Oil (separator cond.) : <u>-</u> BOPD	

<u>Stock tank</u>	Atmosphere : _____ mmHg. _____ °F	Oil at 60 °F : _____ BOPD
	Tank temperature : _____ °F	

BSW : - % WLR : - %

Transferring fluid : VACUUM Transfer duration : 20 MIN

Final conditions of the shipping bottle :  
Pressure : 50 PSIG Temp : 17°C

## C - IDENTIFICATION OF THE SAMPLE -

Shipping bottle No. : A-11977 sent on : \_\_\_\_\_ by : \_\_\_\_\_ Shipping order No. : \_\_\_\_\_  
Addressee : \_\_\_\_\_

<u>Coupled with</u>	<u>LIQUID</u>	<u>GAS</u>
<u>Bottom hole samples No.</u>	_____	_____
<u>Surface samples No.</u>	_____	<u>A-8526</u>

Measurement conditions.  
 A - Tank.  B - Meter.  C - Dump.  
 a - Corrected with shrinkage tester.  b - Corrected with tank.

## D - REMARKS -

NO FLUIDS PRODUCED DURING TEST.

\_\_\_\_\_  
Visa Chief Operator

No.: DOP 127



D.S.T. #                      1

## - SURFACE SAMPLING -

Date of sampling :                      24.11.81 Service order :                      Sampling No. :                      # 2  
Sample nature :                      GAS Sampling point :                      GAS OUTLET ON SEPARATOR

### A - RESERVOIR AND WELL CHARACTERISTICS -

Producing zone :                      SANDSTONE Perforations :                      706-700 MTRS Sampling interval :                      6 MTRS  
Depth origin :                      RT Tubing Dia. :                      3½" HYD Casing Dia. :                      7" LINER  
Surface elevation :                      Shoe :                      Shoe :                     

Bottom hole static conditions	Initial pressure	: <u>                    </u> 1079.9 PSIG	at depth: <u>                    </u> 671.3 MTR	date: <u>                    </u> 23.11.81
	Latest pressure measured	: <u>                    </u> 1079.3 PSIG	at depth: <u>                    </u> "	date: <u>                    </u> 24.11.81
	Temperature	: <u>                    </u> 115.5°F	at depth: <u>                    </u> "	date: <u>                    </u> 24.11.81

### B - MEASUREMENT AND SAMPLING CONDITIONS -

Time at which sample was taken :                      0325-0345 hrs Time elapsed since stabilisation :                      ± 6 HOURS

Bottom hole dynamic conditions	Choke size : <u>                    </u> 1" since: <u>                    </u> 23.11.81	Well head pressure: <u>                    </u> 81	Well head temp.: <u>                    </u> 18° C
	Bottom hole pressure: <u>                    </u> 176.7 PSIG	at depth: <u>                    </u> 671.3 MTRS	date: <u>                    </u> 24.11.81
	Bottom hole temp. : <u>                    </u>	at depth: <u>                    </u>	date: <u>                    </u>

Flow measurement of sampled gas - Gravity (air: 1):                      .575 Factor Fpv =  $\frac{1}{\sqrt{Z}}$  :                      1.004  
Values used for calculations :

Separator	Pressure: <u>                    </u> 50 PSIG	Rates - Gas : <u>                    </u> 1.837 MM SCFD	GOR: <u>                    </u> -
	Temp. : <u>                    </u> 17 °C	Oil (separator cond.): <u>                    </u> - BOPD	(separator cond.)

Stock tank	Atmosphere : <u>                    </u> mmHg. <u>                    </u> °F	Oil at 60 °F : <u>                    </u> BOPD
	Tank temperature: <u>                    </u> °F	<b>A</b> <b>B</b> <b>C</b> <b>a</b> <b>b</b>

BSW:                      % WLR:                      %Transferring fluid :                      VACUUM Transfer duration :                      20 MINSFinal conditions of the shipping bottle :  
Pressure :                      50 PSIG Temp:                      17°C

### C - IDENTIFICATION OF THE SAMPLE -

Shipping bottle No. :                      A-8526 sent on :                      by:                      Shipping order No.:                       
Addressee :                     

Coupled with	LIQUID	GAS
Bottom hole samples No.	<u>                    </u>	<u>                    </u>
Surface samples No.	<u>                    </u>	<u>                    </u> A-11977 <u>                    </u>

Measurement conditions.  
 Tank .  Meter .  Dump .  
 Corrected with shrinkage tester.  Corrected with tank .

### D - REMARKS -

NO FLUIDS PRODUCED DURING TEST.

Visa Chief Operator

Base :    PERTH   Field :    BALEEN   Page :    03   Well :    # 1   Report N°: 231181261181D.S.T. #    2   

## - SURFACE SAMPLING -

Date of sampling :    26.11.81    Service order :                      Sampling No. :    # 3     
Sample nature :    GAS    Sampling point :    GAS OUTLET ON SEPARATOR   

### A - RESERVOIR AND WELL CHARACTERISTICS -

Producing zone :    SANDSTONE    Perforations :    662-670 MTRS    Sampling interval :    8 METERS     
Depth origin :    RT    Tubing Dia. :    3½ PH6 HYD    Casing Dia. :    7" LINER     
Surface elevation :                      Shoe :                      Shoe :                     

Bottom hole static conditions	Initial pressure	: <u>   1073.9 PSIG   </u> at depth: <u>   631 MTR   </u> date: <u>   26.11.81   </u>
	Latest pressure measured	: <u>                    </u> at depth: <u>   "   </u> date: <u>   26.11.81   </u>
	Temperature	: <u>                    </u> at depth: <u>   "   </u> date: <u>   26.11.81   </u>

### B - MEASUREMENT AND SAMPLING CONDITIONS -

Time at which sample was taken:    1310-1347 HRS    Time elapsed since stabilisation:    + 1 HR   

Bottom hole dynamic conditions	Choke size : <u>   1"   </u> since: <u>   1200HR   </u> Well head pressure: <u>   249PSIG   </u> Well head temp.: <u>   19°C   </u>
	Bottom hole pressure: <u>                    </u> at depth: <u>                    </u> date: <u>                    </u>
	Bottom hole temp. : <u>                    </u> at depth: <u>                    </u> date: <u>                    </u>

Flow measurement of sampled gas - Gravity (air: 1):    .578    Factor Fpv =  $\frac{1}{\sqrt{Z}}$  :    1.007     
Values used for calculations :

Separator	Pressure : <u>   95   </u> PSIG	Rates - Gas <u>   6.054 MM   </u> SCFD	GOR: <u>   -   </u> (separator cond.)
	Temp. : <u>   13   </u> °C	Oil (separator cond.): <u>                    </u> BOPD	

Stock tank	Atmosphere : <u>                    </u> mmHg. <u>                    </u> °F	Oil at 60 °F : <u>                    </u> BOPD
	Tank temperature: <u>                    </u> °F	

BSW :                      % WLR :                      %Transferring fluid :    PURGED 4 TIMES    Transfer duration :    15 MINS   Final conditions of the shipping bottle :  
Pressure :    95 PSIG    Temp:    13°C   

### C - IDENTIFICATION OF THE SAMPLE -

Shipping bottle No. :    A-11939    sent on :                      by:                      Shipping order No.:                       
Addressee :                     

Coupled with	LIQUID	GAS
Bottom hole samples No.	<u>                    </u>	<u>                    </u>
Surface samples No.	<u>                    </u>	<u>   A-11954   </u>

Measurement conditions.

 Tank .       Meter .       Dump .  
 Corrected with shrinkage tester.     Corrected with tank .

### D - REMARKS -

NO CONDENSATE PRODUCED, SMALL AMOUNT OF WATER/MUD.

Visa Chief Operator

D.S.T. # 2

    - SURFACE SAMPLING -

Date of sampling : 26.11.81 Service order :                                  Sampling No. :                  #                  4  
Sample nature :                                   GAS Sampling point : GAS OUTLET LINE ON  
SEPARATOR

    A - RESERVOIR AND WELL CHARACTERISTICS -

Producing zone :                                  Perforations : 662-670 MTRS Sampling interval : 8 MTRS  
Depth origin :                                   RT Tubing Dia. : 3½" PH6 HYD Casing Dia. : 7" LINER  
Surface elevation :                                  Shoe :                                  Shoe :                                 

<u>Bottom hole static conditions</u>	Initial pressure : <u>                                </u> at depth : <u>                                </u> date : <u>                                </u>
	Latest pressure measured : <u>                                </u> at depth : <u>                                </u> date : <u>                                </u>
	Temperature : <u>                                </u> at depth : <u>                                </u> date : <u>                                </u>

    B - MEASUREMENT AND SAMPLING CONDITIONS -

Time at which sample was taken : 1330-1345 HRS Time elapsed since stabilisation : ± 1.25 HRS

<u>Bottom hole dynamic conditions</u>	Choke size : <u>1" FIXED</u> since : <u>                                </u> Well head pressure : <u>251 PSIG</u> Well head temp. : <u>19°C</u>
	Bottom hole pressure : <u>                                </u> at depth : <u>                                </u> date : <u>                                </u>
	Bottom hole temp. : <u>                                </u> at depth : <u>                                </u> date : <u>                                </u>

Flow measurement of sampled gas - Gravity (air: 1) : .578 Factor Fpv = 1 / √Z : 1.007  
Values used for calculations :

<u>Separator</u>	Pressure : <u>96</u> PSIG	Rates - Gas : <u>6.155MM</u> SCFD	GOR : <u>                                </u> (separator cond.)	
	Temp. : <u>14°C</u> °F	Oil (separator cond.): <u>                                </u> BOPD		<table border="1"><tr><td><u>B</u></td></tr><tr><td><u>C</u></td></tr></table>
<u>B</u>				
<u>C</u>				

<u>Stock tank</u>	Atmosphere : <u>                                </u> mmHg. <u>                                </u> °F	Oil at 60 °F : <u>                                </u> BOPD				
	Tank temperature : <u>                                </u> °F		<table border="1"><tr><td><u>A</u></td><td><u>B</u></td><td><u>C</u></td><td><u>a</u></td><td><u>b</u></td></tr></table>	<u>A</u>	<u>B</u>	<u>C</u>
<u>A</u>	<u>B</u>	<u>C</u>	<u>a</u>	<u>b</u>		

BSW :                                  % WLR :                                  %

Transferring fluid : PURGED 4 TIMES Transfer duration : 15 MINS

Final conditions of the shipping bottle :                                   
Pressure :                                  Temp :                                 

    C - IDENTIFICATION OF THE SAMPLE -

Shipping bottle No. : A-11954 sent on :                                  by :                                  Shipping order No. :                                   
Addressee :                                 

<u>Coupled with</u>	<u>LIQUID</u>	<u>GAS</u>
<u>Bottom hole samples No.</u>	<u>                                </u>	<u>                                </u>
<u>Surface samples No.</u>	<u>                                </u>	<u>A-11939</u>

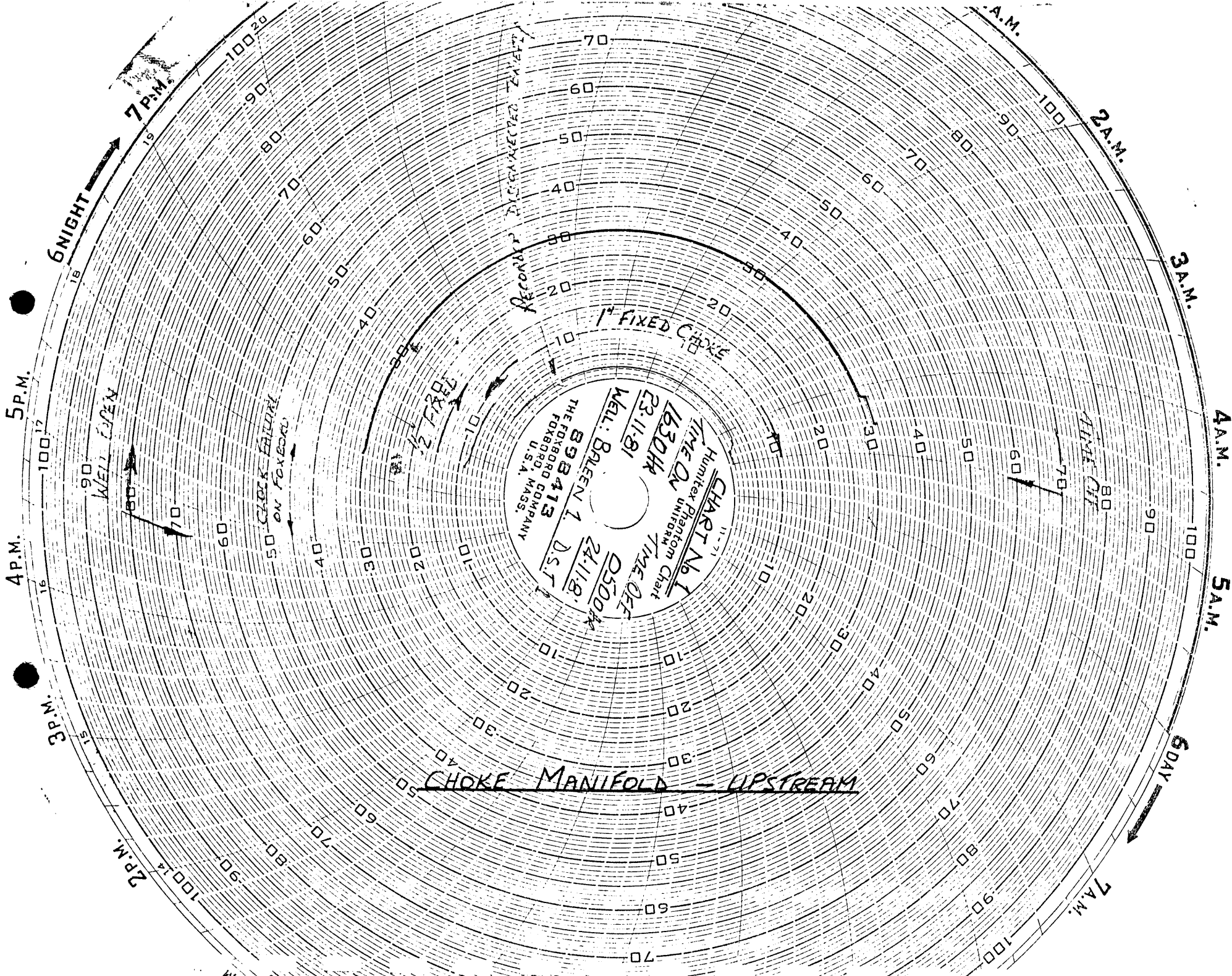
Measurement conditions,  
 Tank .                               Meter .                               Dump .  
 Corrected with shrinkage tester.     Corrected with tank .

    D - REMARKS -

NO CONDENSATE PRODUCED ALTHOUGH SMALL AMOUNT OF WATER/MUD.

Visa Chief Operator

--



RECORDING DISCONTINUED 2/11/81

1" FIXED CHOKE

CHOKE MANIFOLD - UPSTREAM

CHART No. 1  
Humitex Phantom Chart  
The Foxboro Company  
U.S.A.  
898413  
MAIL: BAILEY 7  
D.S.T.  
23.11.81  
1630H  
TIME ON  
24.11.81  
0500H  
TIME OFF

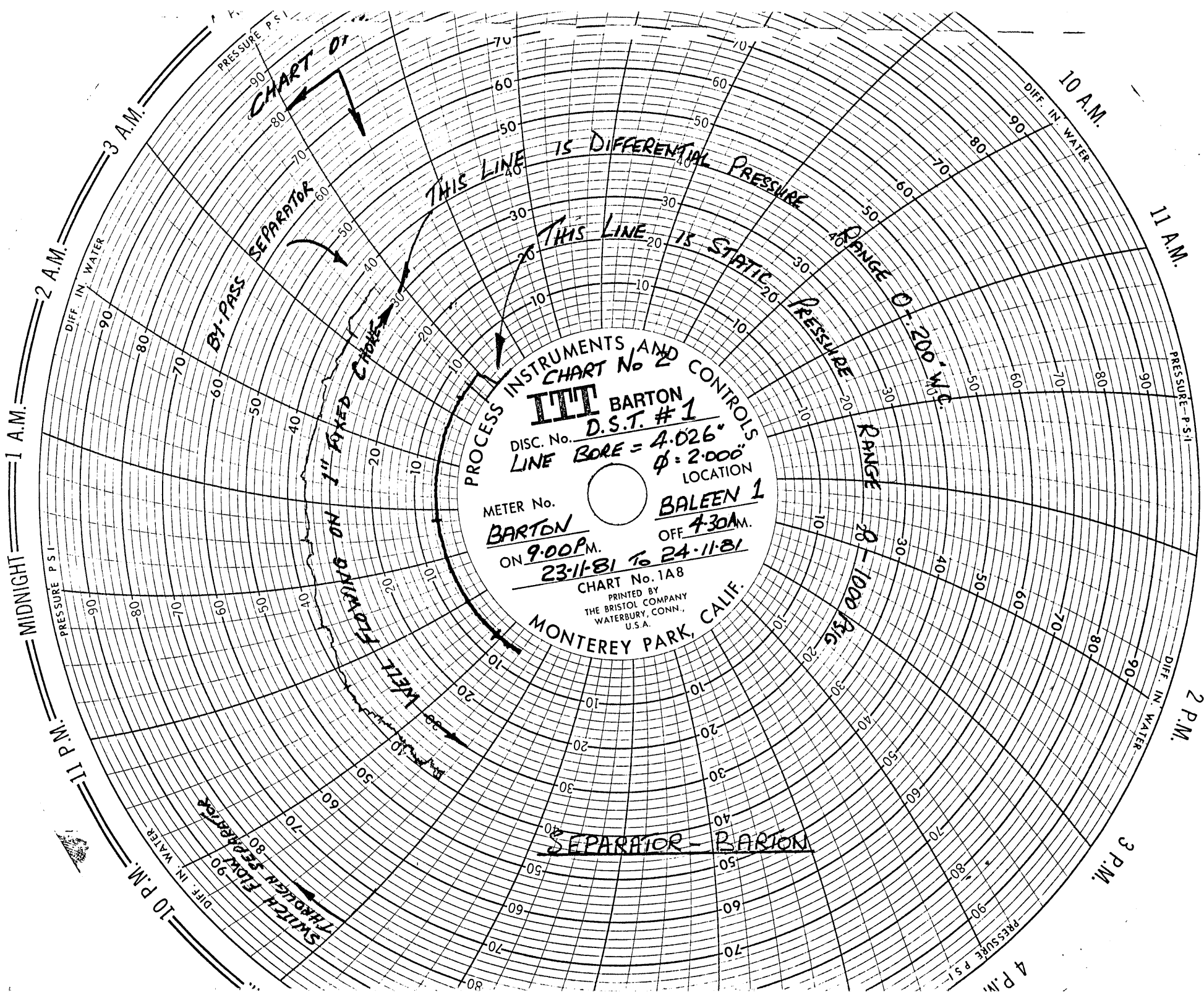
7 P.M.  
6 NIGHT  
5 P.M.  
4 P.M.  
3 P.M.  
2 P.M.

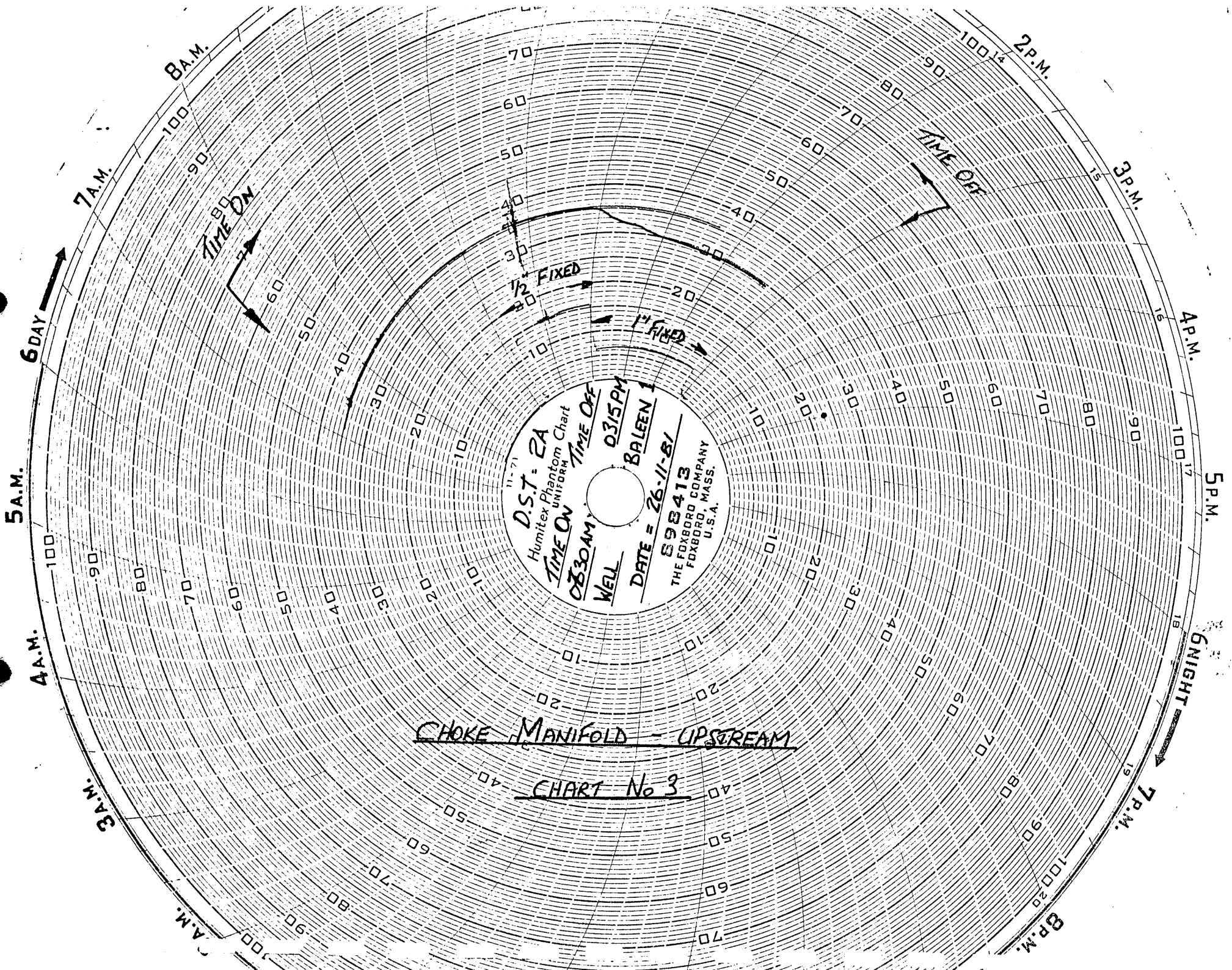
1 A.M.  
2 A.M.  
3 A.M.  
4 A.M.  
5 A.M.  
6 DAY  
7 A.M.

NEW  
WELL OPEN

CHECK  
ENTRY  
ON FLOOR

TIME  
OUT





11-71  
D.S.T. - 2A  
Humitex Phantom Chart  
UNIT-DRM  
TIME ON 0830AM  
TIME OFF 0315PM  
WELL BAILEN 1  
DATE = 26-11-81  
898413  
THE FOXBORO COMPANY  
FOXBORO, MASS.  
U.S.A.

CHOKE MANIFOLD - UPSREAM

CHART No 3

TIME ON

TIME OFF

1/2 FIXED

1" FIND

APPENDIX A2

D O W E L L S C H L U M B E R G E R

T E C H N I C A L R E P O R T N o s .

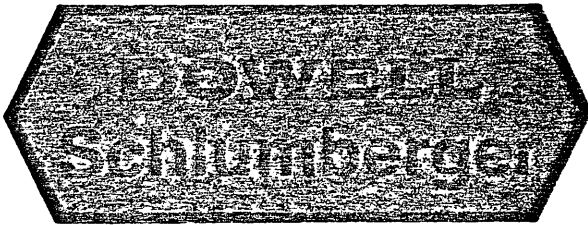
F8112, F8113

REPORT N° F 81112

JOB N° \_\_\_\_\_

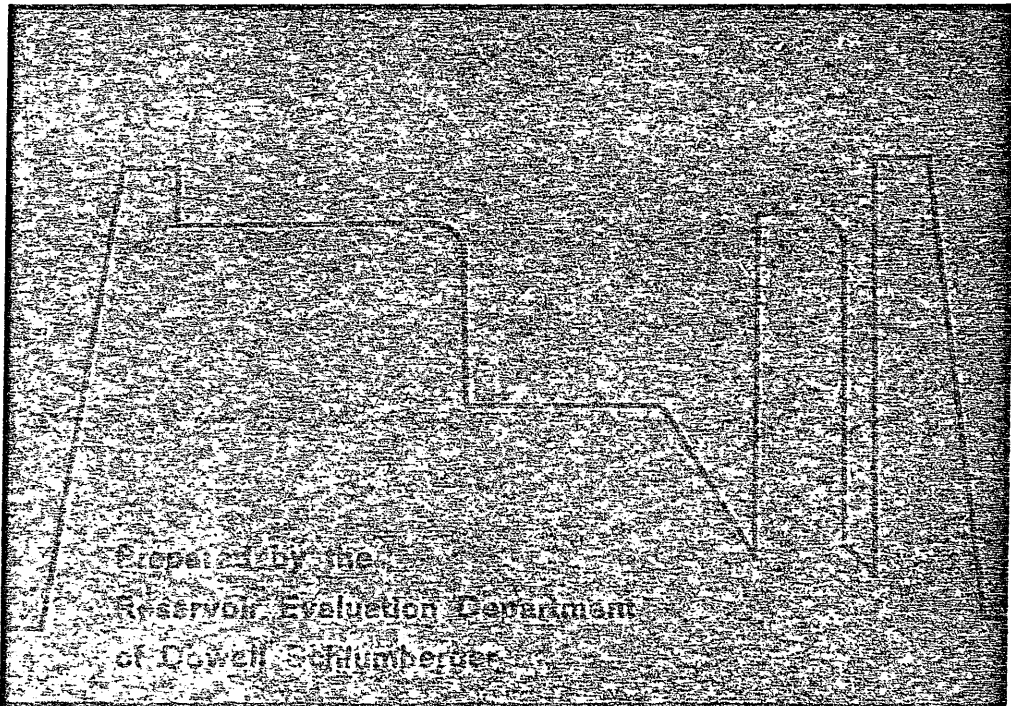
INVOICE/SIR. \_\_\_\_\_

DATE DECEMBER 29, 1981



# SPECIAL DATA ANALYSIS

COMPANY HUBBAY OIL AUSTRALIA WELL BAIEN 1 FIELD GYPPSLAND  
TEST N° 1 COUNTRY AUSTRALIA



Prepared by the  
Reservoir Evaluation Department  
of Dowell Schlumberger



## ASSUMPTIONS MADE FOR CALCULATIONS OF LIQUID RECOVERIES

1. Q is averaged at a constant rate.
2. P<sub>f</sub> is formation flowing pressure at a constant rate.
3. Formation flow is single phase, and any gas produced at surface is assumed to have separated in the drill pipe.
4. Radial flow is assumed.
5. Where specific reservoir parameters are not available, an Estimated Damage Ratio is calculated by assuming :
 

Effective permeability, K, is . . . . . 1-200md	Formation porosity, $\phi$ , is . . . . . 10-30 %
Fluid compressibility, C, is . . . . . 10 <sup>-6</sup> to 10 <sup>-4</sup>	Fluid viscosity, $\mu$ , is . . . . . 0.05 to 50cp
Well bore radius, r <sub>w</sub> , is . . . . . 3 7/8" to 4 3/8"	

which gives an average value for the function  $\log \frac{K}{\phi \mu C r_w^2}$  of 5.5

6. Other standard radial flow equilibrium assumptions.

### EMPIRICAL EQUATIONS

1. 
$$D.R. = \frac{P_o - P_f}{M \left[ \log \frac{KT}{\phi \mu C r_w^2} - 2.85 \right]}$$
 where  $M = \frac{P_1 - P_{10}}{\log \text{ cycle}}$

2. 
$$\text{Transmissibility} = \frac{Kh}{\mu} = \frac{162.6QB}{M}$$

3. DST  $J = \frac{Q}{P_o - P_f}$       Theoretical  $J = \frac{7.08 \times 10^{-3} kh}{\mu B \ln(re/rw)}$       Assumed  $\ln(re/rw) = 7.60$

4. Radius of investigation, r<sub>i</sub> =  $\sqrt{\frac{KT}{57,600 \phi \mu C}}$       where T = flow time in minutes

5.  $\Delta P_{\text{Skin}} = P_o - P_f - \left[ \frac{P_o - P_f}{DR} \right]$  psi

## ASSUMPTIONS MADE FOR CALCULATIONS FOR GAS RECOVERIES

1. Q<sub>g</sub> is steady state flow, and unless stated otherwise is at standard conditions, 14.7 psi and 60° F.
2. P<sub>f</sub> is final formation flowing pressure at steady state flow.
3. Formation flow is single phase, and any liquid (condensate) produced at surface is assumed to have condensed in the drill pipe.
4. Radial flow is assumed.
5. Where specific reservoir parameters are not available, an Estimated Damage Ratio is calculated by assuming :
 

Effective permeability, K, is . . . . . 1-200md	Formation porosity, $\phi$ , is . . . . . 10-30 %
Fluid compressibility, C, is . . . . . 10 <sup>-6</sup> to 10 <sup>-4</sup>	Fluid viscosity, $\mu$ , is . . . . . 0.05 to 50cp
Well Bore radius, r <sub>w</sub> , is . . . . . 3 7/8" to 4 3/8"	

which gives an average value for the function  $\log \frac{K}{\phi \mu C r_w^2}$  of 5.5

6. If not given, gas specific gravity is assumed to be 0.7 (air 1.0), with a pseudo critical temperature of 385 Rankin and a pseudo critical pressure of 668 psia.
7. Other standard radial flow steady state assumptions.

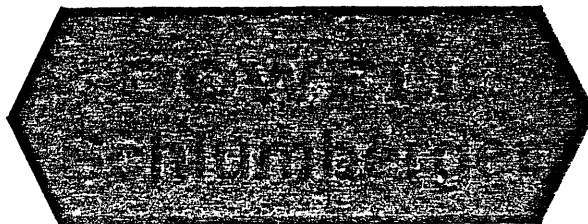
### EMPIRICAL EQUATIONS

1. 
$$D.R. = \frac{P_o^2 - P_f^2}{M_g \left[ \log \frac{KT}{\phi \mu C r_w^2} - 2.85 \right]}$$
 where  $M_g = \frac{P_1^2 - P_{10}^2}{\log \text{ cycle}}$

2. 
$$\text{Transmissibility} = \frac{Kh}{\mu} = \frac{1637 Q Tr Z}{M_g}$$

3. Radius of Investigation, r<sub>i</sub> =  $\sqrt{\frac{KT}{57,600 \phi \mu C}}$       where T = flow time in minutes

4.  $\Delta P_{\text{Skin}} = P_o - P_f - \left[ \frac{P_o - P_f}{DR} \right]$  psi



## CONFIRMATION OF REPORT DISTRIBUTION

TO \_\_\_\_\_ HUBBAY OIL AUSTRALIA \_\_\_\_\_  
 \_\_\_\_\_

WELL BALEEN 1 FIELD GYPPSLAND TEST NO 1

COUNTRY AUSTRALIA DATE DECEMBER 29, 1981

Dowell Schlumberger has been requested to furnish the following companies with Technical Reports. This distribution of Technical Reports will be used for :

- All tests on this well,
- This one test only,

unless otherwise notified.

\_\_\_\_\_ 6 TECHNICAL REPORT (S)

\_\_\_\_\_  
 \_\_\_\_\_  
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\_\_\_\_\_ TECHNICAL REPORT (S)

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\_\_\_\_\_ TECHNICAL REPORT (S)

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\_\_\_\_\_ TECHNICAL REPORT (S)

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# SPECIAL DATA ANALYSIS

## HORNER METHOD

### RESERVOIR ENGINEERING DATA – GAS TEST

 RECORDER N J 1629

Maximum Reservoir Pressure INITIAL	Po	1081	psig	Flow Rate (gas)	Qg	1800	$\frac{\text{MCF}}{\text{day}}$
Damage Ratio	DR	10.3		Flow Rate (equivalent)	Q	6612	$\frac{\text{Bbls}}{\text{day}}$
Transmissibility (to gas)	$\frac{Kh}{\mu}$	83564	$\frac{\text{Md-ft}}{\text{Cp}}$	Slope of Shut-In Curve FINAL	Mg1	17264	$\frac{\text{psi}^2}{\text{log cycle}}$
Productive Capacity	Kh	919	Md-ft	Slope of Shut-In Curve	Mg2		$\frac{\text{psi}^2}{\text{log cycle}}$
Permeability (to gas)	K	48.9	Md	Gas Specific Gravity		0.6	
Radius of Investigation	ri	538	ft.	Oil Gravity		-	<sup>o</sup> API
Pressure Gradient		0.51	$\frac{\text{psi}}{\text{ft.}}$	$\Delta P$ skin		-	psi

These calculations were based on the following data, either supplied from the well, or obtained from the current technical literature.

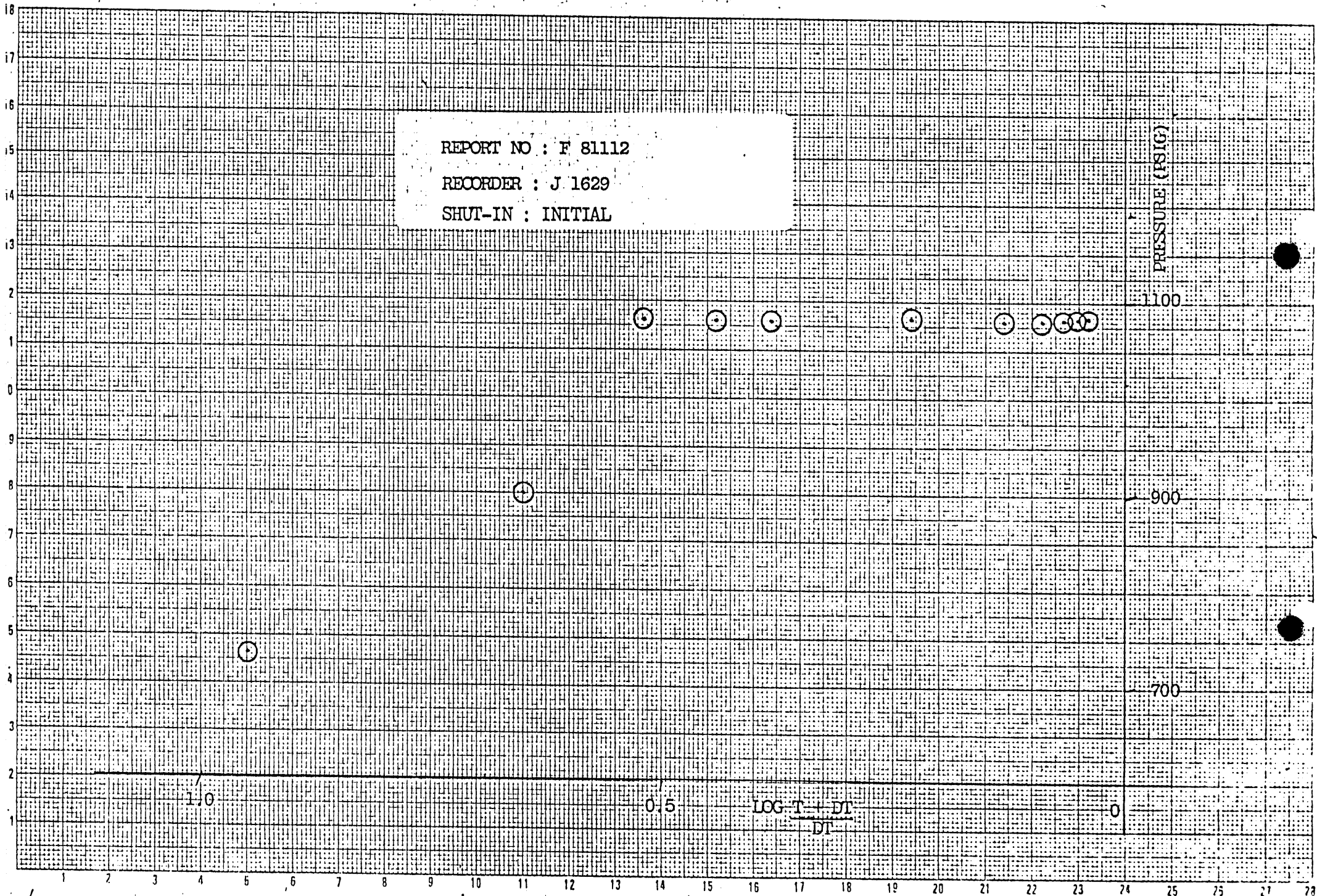
Net Productive Interval	h	18.8	ft	Gas Deviation Factor	Z	0.9	
Porosity	$\phi$	10	%	Gas viscosity at reservoir conditions.	$\mu_g$	0.011	cps
Test Temperature	Tr	544	<sup>o</sup> R	Gas Compressibility	C	$1.6 \times 10^{-3}$	
Well Bore Radius	rw	3.5	in.	Total Flow Time	T	601	mins.

*In interpreting well information and making recommendations, Dowell Schlumberger will give Customer the benefit of its best judgment as to the correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical, mechanical or other measurements, Dowell Schlumberger cannot and does not guarantee the accuracy or correctness of any interpretation and Customer shall absolve Dowell Schlumberger and hold it harmless against any loss or damage whatsoever, whether incurred by Customer or any other person, arising out or resulting from, directly or indirectly, any such interpretation.*

REPORT NO : F 81112

RECORDER : J 1629

SHUT-IN : INITIAL



REPORT NO : F 81112

RECORDER : J 1629

SHUT-IN : FINAL

PRESSURE (PSIG)

1200

1000

800

600

400

4.0

3.0

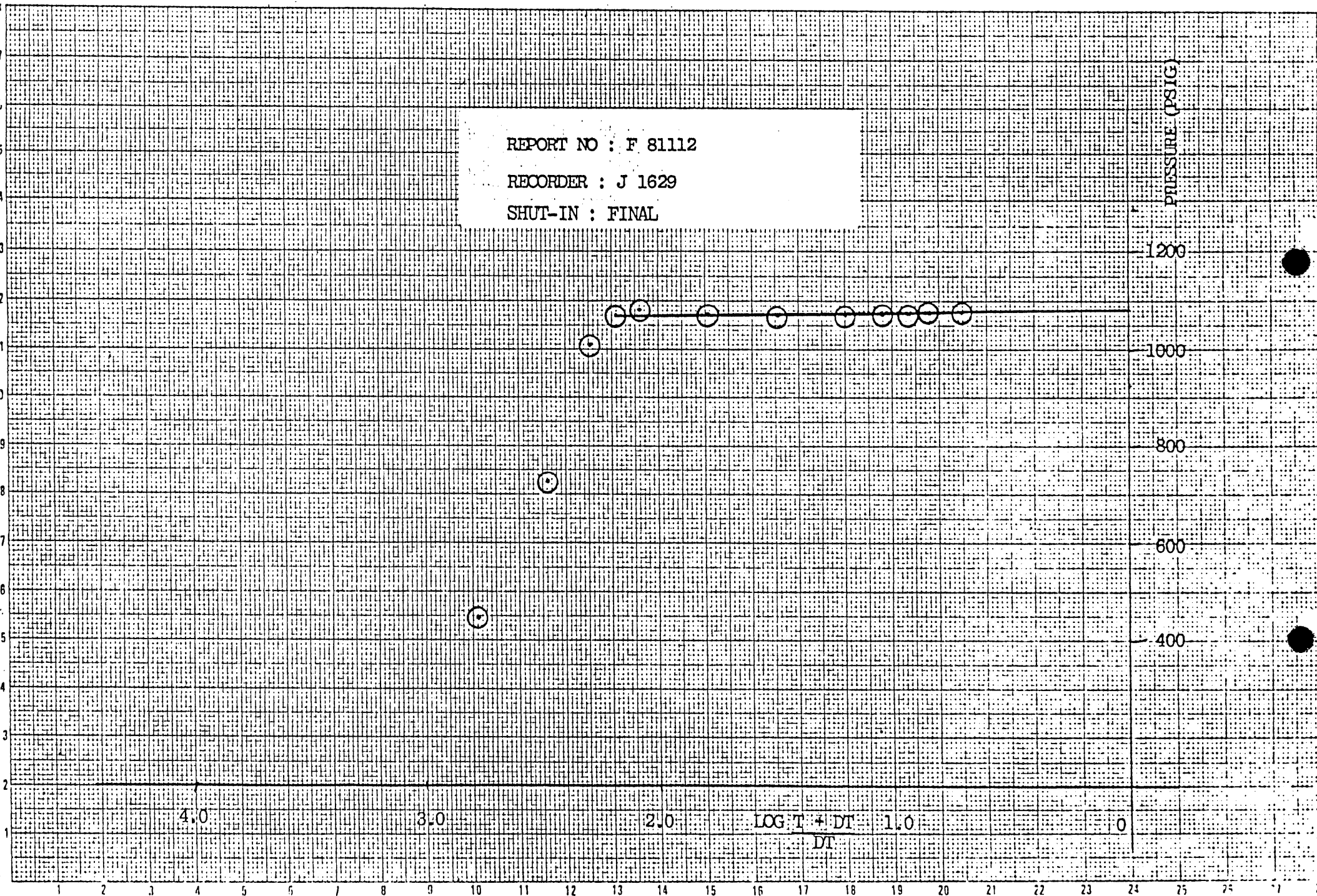
2.0

LOG T + DT

1.0

0

DT



## PRESSURE DATA FOR RECORDER : J 1629

LABEL POINT	$\Delta T$ (mins)	PRESSURE (PSI)	$\frac{T + \Delta T}{\Delta T}$	LOG	$P_w - P_f$ (PSI)	COMMENTS
1		1378				INITIAL HYDROSTATIC
2	0	251				INITIAL FLOW (1)
	3	414				
3	7	453				INITIAL FLOW (2)
3	0	453				START SHUT-IN
	1	731	8.00	0.90	278	T = 7
	2	900	4.50	0.65	447	
	3	1080	3.33	0.52	627	
	4	1080	2.75	0.44	627	
	5	1080	2.40	0.38	627	
	10	1080	1.70	0.23	627	
	20	1080	1.35	0.13	627	
	30	1080	1.23	0.09	627	
	40	1080	1.18	0.07	627	
	50	1080	1.14	0.06	627	
	60	1081	1.12	0.05	628	
4	65	1081	1.11	0.04	628	INITIAL SHUT-IN
5	0	361				FINAL FLOW (1)
	20	514				
	40	483				
	60	478				
	80	449				
	100	452				
	150	329				
	200	257				
	300	245				
	400	245				
	500	245				
6	594	231				FINAL FLOW (2)
6	0	231				START SHUT-IN
	1	448	602.00	2.78	217	T = 601



RECORDER NO : J 1782

CAPACITY : 4700 PSI

DEPTH : 2176.71 FT

OPENING : OUTSIDE

TEMPERATURES : 84 DEG F

CLOCK NO : 9-0354 CAP: 48 HRS CLOCK TRAVEL : 0.020385 in/min

CALIBRATION DATA AT

M = 936.001

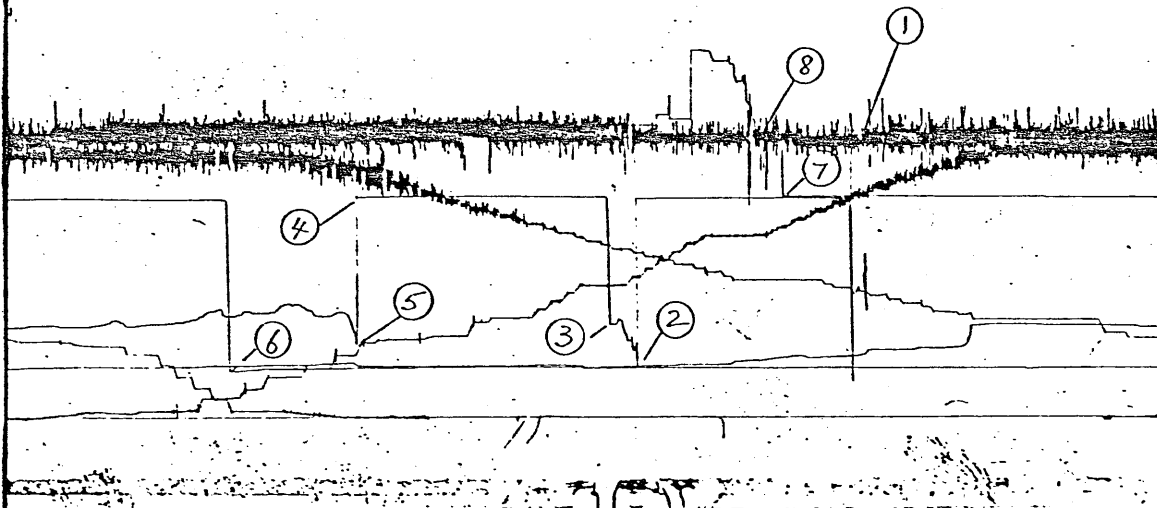
A = 1.100

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.

DST #1  
8A UEN 1

9-0354  
48 HRS  
4700 PSI  
INSIDE  
J 1782



PRESSURE DATA FOR RECORDER : J 1782

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
INITIAL HYDROSTATIC	1	1377		
INITIAL FLOW (1)	2	250		
INITIAL FLOW (2)	3	450	7	7
INITIAL SHUT-IN	4	1074	63	61
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)	5	358	0	0
FINAL FLOW (2)	6	226	615	599
FINAL SHUT-IN	7	1065	130	149
FINAL HYDROSTATIC	8	1358		

REMARK :





RECORDER N<sup>o</sup> : J 1630

CAPACITY : 2800 PSI

DEPTH : 2182.36 FT

OPENING : OUTSIDE

TEMPERATURES : 83 DEG F

CLOCK N<sup>o</sup> : 9-3487 CAP: 48 HRS CLOCK TRAVEL : 0.022299 in/min

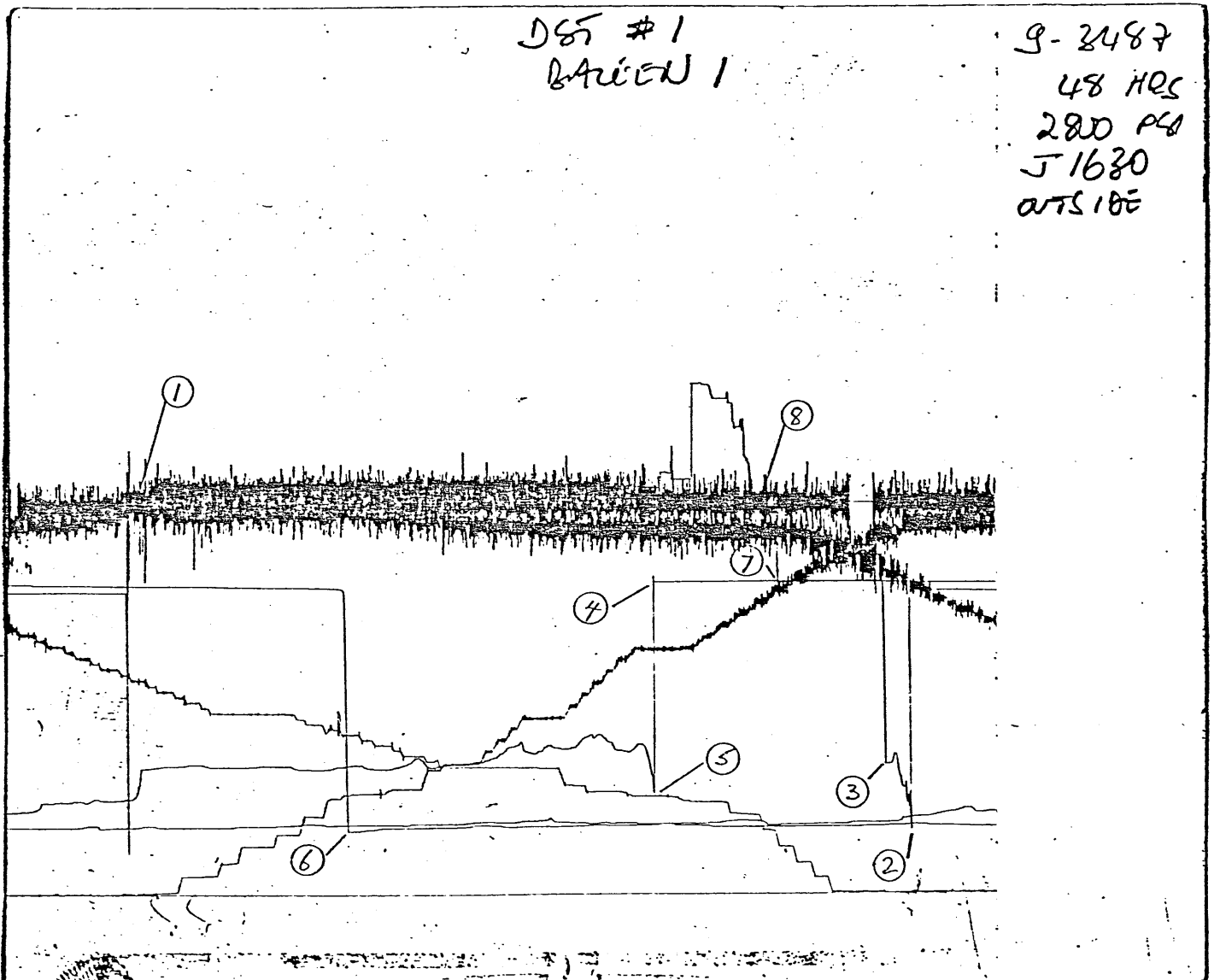
CALIBRATION DATA AT

M = 569.94154

A = 5.357018

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.



PRESSURE DATA FOR RECORDER : J 1630

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
INITIAL HYDROSTATIC	1	1382		
INITIAL FLOW (1)	2	224		
INITIAL FLOW (2)	3	454	7	7
INITIAL SHUT-IN	4	1095	63	62
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)	5	357	0	0
FINAL FLOW (2)	6	225	615	599
FINAL SHUT-IN	7	1092	130	148
FINAL HYDROSTATIC	8	1373		

REMARK :



RECORDER N° : J 1629

CAPACITY : 2800 PSI

DEPTH : 2121.84 FT

OPENING : INSIDE

TEMPERATURES : 84 DEG F

CLOCK N° : 9.0936 CAP: 96 HRS

CLOCK TRAVEL : 0.010885 in/min

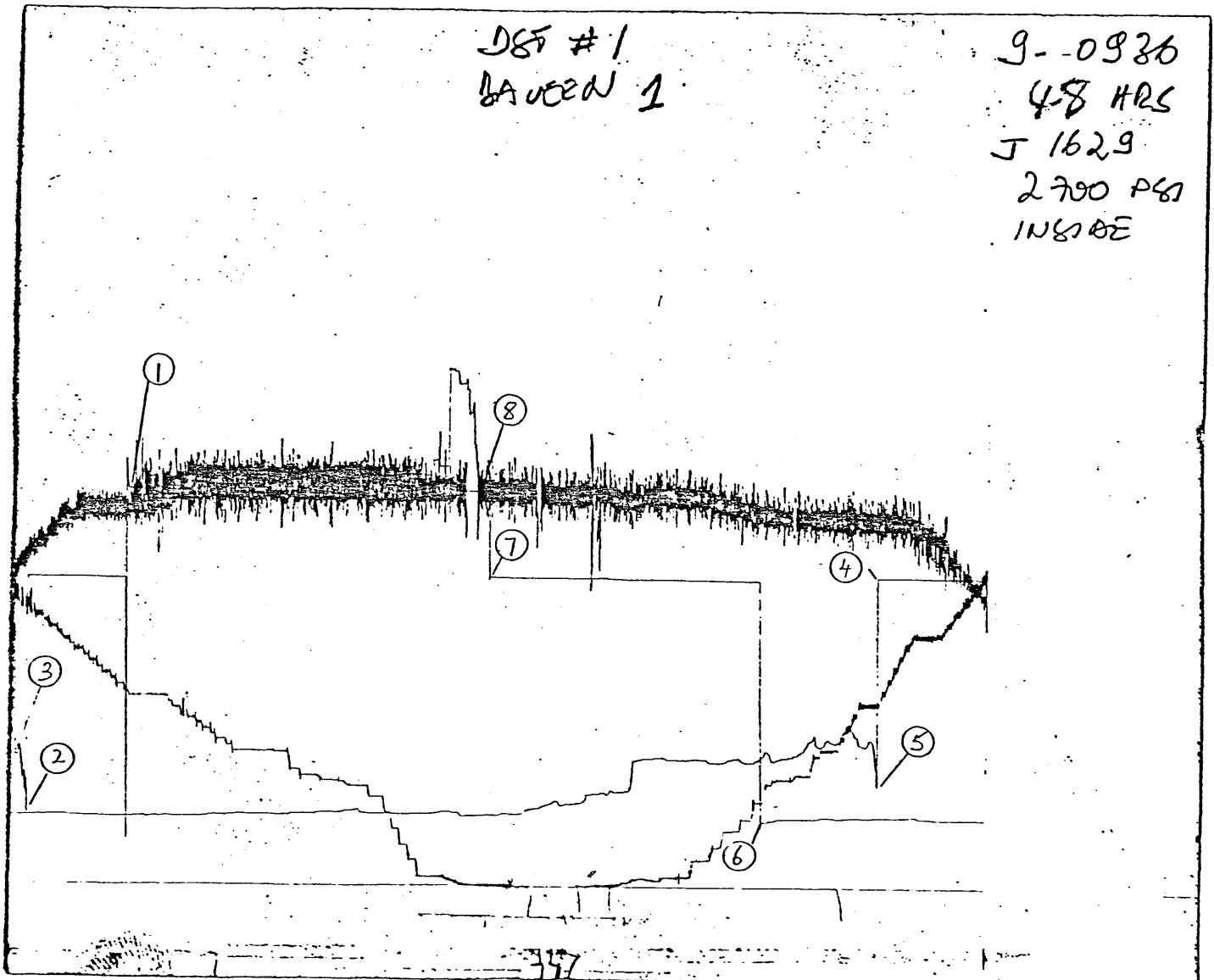
CALIBRATION DATA AT

M = 558.9304

A = 0.8222

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.



PRESSURE DATA FOR RECORDER : J 1629

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
INITIAL HYDROSTATIC	1	1378		
INITIAL FLOW (1)	2	251		
INITIAL FLOW (2)	3	453	7	7
INITIAL SHUT-IN	4	1081	63	65
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)	5	361	0	0
FINAL FLOW (2)	6	231	615	594
FINAL SHUT-IN	7	1076	130	149
FINAL HYDROSTATIC	8	1374		

REMARK :

## PRESSURE DATA FOR RECORDER : J 1629

LABEL POINT	$\Delta T$ (mins)	PRESSURE (PSI)	$\frac{T + \Delta T}{\Delta T}$	LOG	$P_w - P_f$ (PSI)	COMMENTS
	2	726	301.50	2.48	495	
	3	1010	201.33	2.30	779	
	4	1069	151.25	2.18	838	
	5	1070	121.20	2.08	839	
	10	1070	61.00	1.79	839	
	20	1070	31.05	1.49	839	
	40	1073	16.02	1.20	842	
	60	1073	11.02	1.04	842	
	80	1074	8.51	0.93	843	
	100	1075	7.01	0.85	844	
7	149	1076	5.03	0.70	845	FINAL SHUT-IN
8		1374				FINAL HYDROSTATIC

WELL IDENTIFICATION			
Company:	HUDBAY OIL AUSTRALIA	Well No.:	BALEEN I
Field:	GYPPSLAND	Location:	BASS STRAIT
Tested Interval:	From 2198 Ft. to 2216.8 Ft.	Country:	AUSTRALIA
Co-ordinates:	LAT 38° 0' 36 01 S LONG 148° 26' 8 74" E		
Type Test:	Open Hole <input type="checkbox"/>	Casing <input checked="" type="checkbox"/>	Conventional <input type="checkbox"/>
Valve:	MFE <input type="checkbox"/>	PCT <input checked="" type="checkbox"/>	SPRO <input checked="" type="checkbox"/>
	Straddle: <input type="checkbox"/>	Land rig <input type="checkbox"/>	Jack-up <input type="checkbox"/>
		Floater <input checked="" type="checkbox"/>	with Packer <input type="checkbox"/>
		Retainer <input type="checkbox"/>	

HOLE DATA			
Geologic Level:	LOWER CRETACEOUS	Description:	SANDSTONE, SHALE, MINOR COAL
Net Productive Interval:	18.8 ft.	Estimated Porosity:	POOR %
Total Depth:	2386.4 ft.	Depths measured from:	RKTIB
Open Hole Size:	8 1/2 in.	Rat Hole Size:	
Casing Size:	9-5/8 in.	Liner Size:	7 in.
Before test:	Caliper Yes <input type="checkbox"/>	No <input type="checkbox"/>	Scraper Yes <input checked="" type="checkbox"/>
		No <input type="checkbox"/>	Circulation Yes <input checked="" type="checkbox"/>
			for 2 hrs; No <input type="checkbox"/>

MUD DATA			
Mud Type:	POLYMER	Weight:	1.08 SG
Viscosity:	38	Water Loss:	7 cc
Filtrate Resistivity:		Mud Resistivity:	
		at:	
		°F;	Chloride ppm:

INSTRUMENT AND CHART DATA				
Recorder No.	J 1782	J 1630	J 1629	SPRO
Capacity (psig)	4700	2800	2800	
Depth	2176.71	2182.36	2131.84	
Inside/Outside	OUTSIDE	OUTSIDE	INSIDE	
Above/Below valve	BELOW	BELOW	BELOW	
Clock No.	9-0354	9-3487	9-0936	
Capacity (hrs.)	48 HRS	48 HRS	96 HRS	
Temperature	84° F	83 DEG F	84 DEG F	
Initial Hydrostatic Pressure				1032.2
Pre-flow	(1) Start Pressure			95.8
	(2) Finish Pressure	CHARTS TO BE READ AT STATION		
Initial Shut-in Pressure		590.8		590.8
Second Flow	(1) Start Pressure			367.0
	(2) Finish Pressure			-
Second Shut-in Pressure				-
Final Flow	(1) Start Pressure			1079.3
	(2) Finish Pressure			
Final Shut-in Pressure				
Final Hydrostatic Pressure				

OPERATIONS SUMMARY			
Left Station at	:	on	On Location at
Started Operations at	02 : 00 on 22.11.81	Finished Operations at	15 : 30 on 24.11.81
Off Location at	:	on	Return Station at
			Mileage

Comments: GOOD TEST. TOOLS WORKED GOOD.  
 SPRO GAUGE GOOD (81205)  
 SOME PROBLEMS WITH DIGITAL TO ANAWY PANELS.

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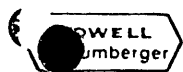


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Station:	AUS	SIR No.:	61651 - 61652	Date:	24.11.81
Customer:		Tester:	CIT. ROUX	Customer:	



Customer: HUBBAY OIL AUSTRALIA Well No: BALEEN 1 Test No. 1

TEST SEQUENCE AND FLOW RATE DATA

Description and Flow Rates	Date	Time hrs mins	Pressure psig	Surface Choke
Packer Depth: 685,2 M <del>ft</del> Set at:	23,11,81	15 40		
Opened Tool: (Annulus pressure) 1032,5 psi	"	16 40		
MEDIUM BLOW	"		95	1/2
GAS TO SURFACE		16 44	385	1/2
MUD TO SURFACE		16 46	410	1/2
CLOSE PUT FOR FIRST SHUT-IN (SEE SPRO DATA FOR PRESSURE READINGS + PLOTS)		16 47	413	1/2
OPEN POT FOR SECOND FLOW		17 50		
FLOWING DRY GAS G1 SG 0.578		18 00	360	1/2
		18 30	330	1/2
		19 00	320	1/2
CHANGE CHOKE		20 00		1
THROUGH SEPARATOR		21 00	95	1
	24,11,81	0 00	104	1
CLOSED PUT FOR FINAL SHUT-IN (SEE SPRO)		4 05		1
UNLATCH SPRO/POH GAUGE		5 33		1
Reverse Circulation Started (Pump pressure 500 psig)		5 45		
Reverse Circulation Finished		6 07		
Pulled Packer Loose/Pulled Out of Retainer		6 12		
Cushion Type: NO Amount bbls ; Length ft ; Pressure psi				Bottom Choke 1"

RECOVERY DATA

Recovery Description	Feet	Bbls	% Oil	% Water	% Other
1					
2					
3 1.8 MMCFD DRY GAS					
4					
5 MUD IN DC BELOW REV. SUBS	30	0.3			
6					

	Oil-API Gravity	Gas Gravity	G.O.R.	Resistivity	Chlorides
1	° at °F			at °F	ppm
2	° at °F			at °F	ppm
3	° at °F			at °F	ppm
4	° at °F			at °F	ppm
5	° at °F			at °F	ppm
6	° at °F			at °F	ppm

Comments : \_\_\_\_\_



# Equipment Data

Report No. F 81112

Customer : HUBBAY OIL AUSTRALIA Well No. : BALEEN 1 Test No. : 1

### SAMPLE CHAMBER RECOVERY DATA

Sampler Drained On Location <input checked="" type="checkbox"/> Elsewhere <input type="checkbox"/> Name : _____ Address : _____	Recovery	Resistivity	Chlorides (ppm)
	Gas <u>7</u> cu ft.	Water _____ at _____ °F	
	Oil _____ c.c.	Mud _____ at _____ °F	
	Water <u>TR</u> c.c.	Mud Filtrate _____ at _____ °F	
	Mud <u>TR</u> c.c.	Pit Mud _____ at _____ °F	
	_____ °API _____ °F	Pit Mud Filtrate _____ at _____ °F	
Gas/Oil Ratio	cu ft./bbl	Sample Chamber Pressure	104 psi.

### EQUIPMENT SEQUENCE

Components (including D.P. and D.C.)	Type	O.D. (in)	I.D. (in)	LengthM	Depth
BULL NOSE	JOTCO	4 3/4	2 1/4	0.25	
RECORDER CARRIER J 200 J 1782	J 200	4-7/8	1 1/2	1.80	
RECORDER CARRIER J 200 J 1630	J 200	4-7/8	1 1/2	1.80	
PERFORATED ANCHORS	JOTCO	4 3/4	2 1/4	6.20	
X O 2-7/8 EUE / 3 1/2 FH	"	4 3/4	2 1/4	0.32	
BELOW PACKER 7" POSITEST	"	5.23	2.0	0.67	685.2
ABOVE PACKER	"	"	"	0.41	
X O 3 1/2 FH / 2-7/8 IF	"	4 3/4	2 1/4	0.33	
SAFETY JOINT	BOWEN	4 3/4	2-1/16	0.60	
TR 03 HYDRAULIC JAR	JOTCO	4 3/4	1 1/2	2.35	
RECORDER CARRIER J 200 J 1629	"	4 3/4	1 1/2	1.80	
MFE/HRT	"	5	1-3/8	2.90	
PRESSURE CONTROLLED TEST	"	4 3/4	1	7.66	
X O ACME PIN X 3 1/2 FH PIN	"				
SPRO BARREL ACME BOX/BOX	JOTCO	4 3/4	2 1/4	2.40	
LIFTING SUB 3 1/2 FH BOX X ACME PIN	"				
X O 3 1/2 IF BOX X 3 1/2 FH PIN	"				
DRILL COLLAR	PETRONAR	4 3/4	2 1/4		
PUMP OUT SUB	JOTCO	4 3/4	2 1/4	0.36	
DRILL COLLAR	PETRONAR	4 3/4	2 1/4		
PUMP OUT SUB	JOTCO	4 3/4	2 1/4		
DRILL COLLAR	PETRONAR	4 3/4	2 1/4	0.36	
SLIP JOINT	JOTCO	5	2 1/4	7.16	
SLIP JOINT	JOTCO	5	2 1/4	8.68	
DRILL COLLAR	PETRONAR	4 3/4	2 1/4		
X O 3 1/2 PH 6 X 3 1/2 IF PIN	"			0.30	
TUBING	"	3 1/2	-		
X O 4 1/2 ACME PIN X 3 1/2 PH 6 PIN	"			0.20	
FLUTED HANGER ACME BOX / BOX	"	4 1/2		0.61	
SLICK JOINT	"			1.80	
E 2 TREE	FLOPETROL			2.44	
SPACER SUB	FLOPETROL			1.52	
X O 3 1/2 PH 6 BOX X 4 1/2 ACME PIN				0.30	
TUBING					
X O 4 1/2 IF BOX X 3 1/2 PH 6 PIN				0.34	
SAVER SUB				0.26	
X O 6 1/2 ACME PIN X 4 1/2 IF PIN				0.32	
FLOW HEAD 7-7/8 BOWEN WING / 6 1/2 ACME BOX					
SCHLUM X O SCHLUM PIN X 7-7/8 BOWEN					
SCHLUM WIRELINE BOP					
SCHLUM RISER PIPE					
SCHLUM GREASE INT					
Total Drill Pipe					
Total Drill Collar					

Comments : \_\_\_\_\_



To be completed by Customer Representative

Report No. F 81112

Customer : HUBBAY OIL AUSTRALIA Well No. : BALEEN 1 Test No. : 1

Table with 7 columns: Tested Interval, Sand-stone, Lime-stone, Chalk, Clay, Shale, Other (please specify). Rows include Major Mineral Species, Minor Mineral Species, and Stringers or Lenses.

Open Hole : [ ] I.D. [ ] in

Is the tested interval :

In Casing : [ ] O.D. [ ] in. Wt : [ ] lb. ft. I.D. [ ] in.

Open Hole Interval : (Total Depth) \_\_\_\_\_ (Foot of Casing) \_\_\_\_\_

Perforated Intervals : \_\_\_\_\_

In the tested interval how many productive zones do logs show :

1 [ ] 2 [ ] 3 [ ] more [ ]

What is the average porosity of the interval ?

[ ] %

Is the interval homogeneous ?

Yes [ ] No [ ]

Is formation consolidation :

Good [ ] Mod [ ] Low [ ]

What is the clay content :

% or High [ ] Mod [ ] Low [ ]

Is the formation fractured

Heavily [ ] Mod [ ] Little [ ]

In this interval, is there expected near the wellbore :

Geological fault ?

Yes [ ] No [ ]

Interval thickness change ?

Yes [ ] No [ ]

Fluid phase contact ?

Yes [ ] No [ ]

—If yes :—

Oil-Water [ ]

Gas-Water [ ]

Oil-Gas [ ]

During drilling of the interval, was there :

Lost circulation ?

Yes [ ] No [ ]

Sand production ?

Yes [ ] No [ ]

Other (please specify) \_\_\_\_\_

Before testing was there a :

Scraper run ?

Yes [ ] No [ ]

Caliper run ?

Yes [ ] No [ ]

Mud circulation to bottom ?

Yes [ ] No [ ]

—If yes :—

for how long [ ]

If no, how long since [ ]

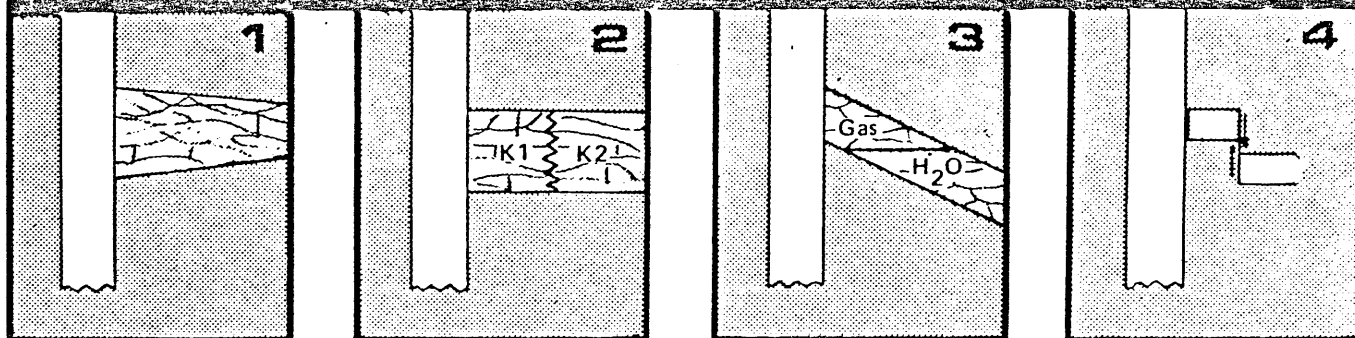
Additional Comments : \_\_\_\_\_

Customer Representative : \_\_\_\_\_



# GEOLOGICAL INTERPRETATION GUIDE \*

## 1 GENERAL CAUSES OF A BREAK UPWARD IN SLOPE VALUE



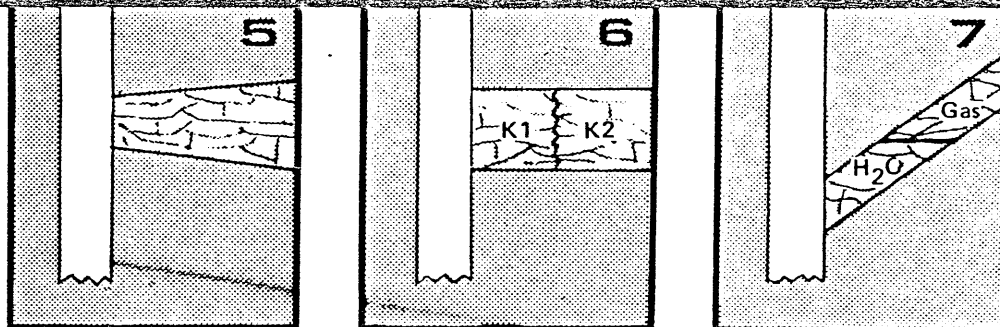
1 Decrease in thickness of pay zone away from well bore

2 Decrease in effective permeability away from well bore (facies change) K1 K2

3 Increase in fluid viscosities away from the well bore (gas-water contact, gas-oil contact)

4 Sealing barrier (fault)

## 2 GENERAL CAUSES OF A BREAK DOWNWARD IN SLOPE VALUE

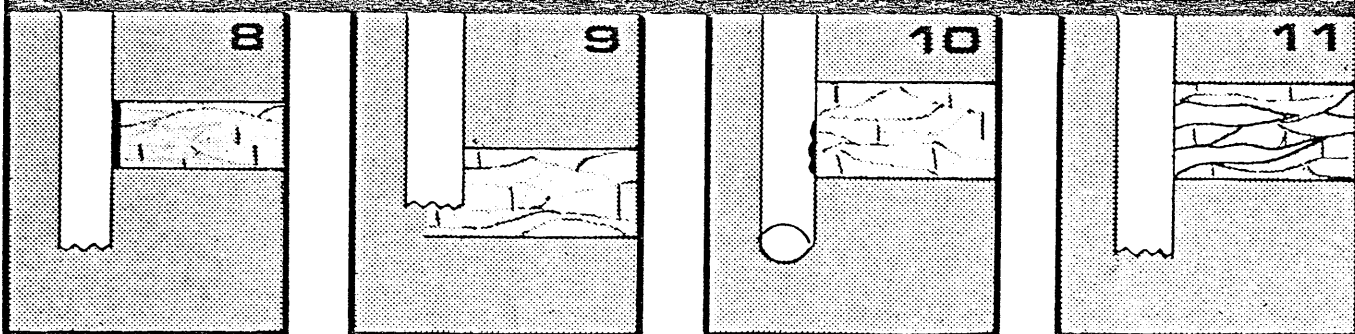


5 Increase in thickness of pay zone away from well bore

6 Increase in effective permeability away from well bore K1 K2

7 Decrease in fluid viscosities away from well bore

## 3 CONDITIONS WHICH WILL GIVE INDICATION OF DAMAGE OR STIMULATION



8 True Skin Damage - (Caused by : filtrate invasion, bit damage, drilling solids invasion, etc..)

9 Pseudo Damage - Incomplete penetration of porous zone

10 Pseudo Damage - Choking effect of perforations (cased hole)

11 Stimulation limited natural fracture system

\* ILLUSTRATED CAUSES OF ANOMALIES DETECTED THROUGH PRESSURE BUILD-UP ANALYSIS

DOWELL-SCHLUMBERGER  
 \*\*\*\*\*

SURFACE  
 PRESSURE  
 READ  
 OUT  
 \*\*\*\*\*

COMPANY                    HUSBAY OIL AUSTRALIA LTD.  
 WELL                        BALEEN N.1  
 TEST                        N.1  
 DEPTH                      685.29 MT.  
 PRESS/TEMP GAUGE        FLOPETROL 81205  
 GAUGE CAPACITY          10000 PSIA  
 GAUGE DEPTH              671.3 MT.

TIME	DEL T	PRESSURE	TEMPERATURE	T+DEL T	LOG(T+DEL T)	PRESSURE	COMMENTS
HR:MN:SE	MIN	PSI	DEGREES F	DEL T	(DEL T)	DIFF	
16:27:08		988.6	-8.31				
16:27:16		1020.4	85.48				
16:27:20		1020.5	85.48				
16:27:30		1020.4	85.48				
16:27:40		1020.4	85.48				
16:27:50		1020.4	85.48				
16:28:00		1032.2	111.54				
16:28:10		1032.3	111.54				
16:28:20		1032.3	111.54				

16:29:00	1032.3	111.57
16:29:10	1032.4	111.57
16:29:20	1032.4	111.57

16:29:30	1032.4	111.57
16:29:40	1032.4	111.57
16:29:50	1032.4	111.57
16:30:00	1032.4	111.56
16:30:10	1032.5	111.56
16:30:20	1032.4	111.56
16:30:30	1032.5	111.56
16:30:40	1032.5	111.56
16:30:50	1032.4	111.56
16:31:00	1032.4	111.54
16:31:10	1032.5	111.54
16:31:20	1032.5	111.54
16:31:30	1032.5	111.54
16:31:40	1032.6	111.54
16:31:50	1032.6	111.54
16:32:00	1032.5	111.51
16:32:10	1032.5	111.51
16:32:20	1032.5	111.51
16:32:30	1032.5	111.51
16:32:40	1032.5	111.51
16:32:50	1032.6	111.51
16:33:00	1032.5	111.47
16:33:10	1032.5	111.47
16:33:20	1032.4	111.47
16:33:30	1032.5	111.47
16:33:40	1032.5	111.47
16:33:50	1032.5	111.47
16:34:00	1032.5	111.45
16:34:10	1032.5	111.45
16:34:20	1032.5	111.45
16:34:30	1032.5	111.45
16:34:40	1032.5	111.45
16:34:50	1032.7	111.45
16:35:00	1033.3	111.42
16:35:10	1033.8	111.42
16:35:20	1034.1	111.42
16:35:30	1034.4	111.42
16:35:40	0.0	95.8

1032/111  
Schulenberg

1st Flow

16:36:30	0.8	247.3	111.41			
16:36:40	1.0	252.2	111.41			
16:36:50	1.2	275.0	111.41			
16:37:01	1.4	303.7	111.54			
16:37:10	1.5	310.3	111.54			
16:37:20	1.7	319.3	111.54			
16:37:30	1.8	322.7	111.54			
16:37:40	2.0	325.7	111.54			
16:37:50	2.2	331.0	111.54			
16:38:00	2.3	336.4	111.78			
16:38:10	2.5	345.4	111.78			
16:38:20	2.7	356.1	111.78			
16:38:30	2.8	362.9	111.78			
16:38:40	3.0	371.4	111.78			
16:38:50	3.2	386.3	111.78			
16:39:00	3.3	402.1	112.01			
16:39:10	3.5	419.1	112.01			
16:39:20	3.7	435.1	112.01			
16:39:30	3.8	447.7	112.01			
16:39:40	4.0	454.5	112.01			
16:39:50	4.2	458.1	112.01			
16:40:00	4.3	457.3	112.20			
16:40:10	4.5	451.3	112.20			
16:40:20	4.7	441.7	112.20			
16:40:30	4.8	434.3	112.20			
16:40:40	5.0	427.5	112.20			
16:40:50	5.2	421.7	112.20			
16:41:00	5.3	415.4	112.36			
16:41:10	5.5	413.3	112.36			
16:41:20	5.7	411.9	112.36			
16:41:30	5.8	409.9	112.36			
16:41:40	6.0	408.8	112.36			
16:41:50	6.2	406.5	112.36			
16:42:00	6.3	408.0	112.46			
16:42:10	6.5	410.0	112.46			
16:42:20	6.7	413.2	112.46			
16:42:30	0.2	590.8	112.46	43.000	1.6335	-0
16:42:40	0.3	901.9	112.46	22.000	1.3424	311
16:42:50	0.5	1054.8	112.46	15.000	1.1761	464
16:43:00	0.7	1075.7	112.48	11.500	1.0607	485
16:43:10	0.8	1077.4	112.48	9.400	0.9731	487
16:43:20	1.0	1078.0	112.48	8.000	0.9031	487

BOWELL  
Sonnemberger

1st Shut in

16:44:00	1.7	1078.9	112.40	5.200	0.7160	488
16:44:10	1.8	1079.0	112.40	4.818	0.6829	488
16:44:20	2.0	1079.1	112.40	4.500	0.6532	488
16:44:30	2.2	1079.3	112.40	4.231	0.6264	488
16:44:41	2.3	1079.3	112.40	3.979	0.5997	489
16:44:51	2.5	1079.4	112.40	3.781	0.5777	489
16:45:01	2.7	1079.5	112.20	3.609	0.5574	489
16:45:12	2.9	1079.6	112.20	3.442	0.5368	489
16:45:20	3.0	1079.8	112.20	3.333	0.5229	489
16:45:30	3.2	1079.8	112.20	3.211	0.5066	489
16:45:40	3.3	1079.9	112.20	3.100	0.4914	489
16:45:50	3.5	1079.9	112.20	3.000	0.4771	489
16:46:00	3.7	1079.9	111.96	2.909	0.4638	489
16:46:10	3.8	1079.8	111.96	2.826	0.4512	489
16:46:20	4.0	1079.9	111.96	2.750	0.4393	489
16:46:30	4.2	1079.9	111.96	2.680	0.4281	489
16:46:40	4.3	1079.9	111.96	2.615	0.4175	489
16:46:50	4.5	1079.9	111.96	2.556	0.4075	489
16:47:01	4.7	1079.8	111.76	2.495	0.3970	489
16:47:10	4.8	1079.9	111.76	2.448	0.3889	489
16:47:20	5.0	1079.9	111.76	2.400	0.3802	489
16:47:30	5.2	1079.9	111.76	2.355	0.3720	489
16:47:40	5.3	1079.9	111.76	2.313	0.3641	489
16:47:50	5.5	1079.9	111.76	2.273	0.3565	489
16:48:00	5.7	1079.8	111.64	2.235	0.3493	489
16:48:10	5.8	1079.8	111.64	2.200	0.3424	489
16:48:20	6.0	1079.8	111.64	2.167	0.3358	489
16:48:30	6.2	1079.9	111.64	2.135	0.3294	489
16:48:40	6.3	1079.9	111.64	2.105	0.3233	489
16:48:50	6.5	1079.9	111.64	2.077	0.3174	489
16:49:00	6.7	1079.8	111.56	2.050	0.3118	489
16:49:10	6.8	1079.8	111.56	2.024	0.3063	489
16:49:20	7.0	1079.8	111.56	2.000	0.3010	489
16:49:30	7.2	1079.9	111.56	1.977	0.2960	489
16:49:40	7.3	1079.8	111.56	1.955	0.2910	489
16:49:50	7.5	1079.9	111.56	1.933	0.2863	489
16:50:00	7.7	1079.8	111.52	1.913	0.2817	489
16:50:10	7.8	1079.8	111.52	1.894	0.2773	489
16:50:20	8.0	1079.8	111.52	1.875	0.2730	489
16:50:30	8.2	1079.8	111.52	1.857	0.2688	489
16:50:40	8.3	1079.8	111.52	1.840	0.2648	489
16:50:50	8.5	1079.8	111.52	1.824	0.2609	489

16:51:20	9.0	1079.8	111.50	1.778	0.2499	489
16:51:30	9.2	1079.8	111.50	1.764	0.2464	489
16:51:40	9.3	1079.8	111.50	1.750	0.2430	489
16:51:50	9.5	1079.8	111.50	1.737	0.2398	489

16:52:00	9.7	1079.8	111.50	1.724	0.2366	489
16:52:10	9.8	1079.8	111.50	1.712	0.2335	489
16:52:20	10.0	1079.8	111.50	1.700	0.2304	489
16:52:30	10.2	1079.8	111.50	1.689	0.2275	489
16:52:40	10.3	1079.8	111.50	1.677	0.2246	489
16:52:50	10.5	1079.8	111.50	1.667	0.2218	489
16:53:00	10.7	1079.8	111.51	1.656	0.2191	489
16:53:10	10.8	1079.8	111.51	1.646	0.2165	489
16:53:20	11.0	1079.8	111.51	1.636	0.2139	489
16:53:30	11.2	1079.8	111.51	1.627	0.2114	489
16:53:40	11.3	1079.8	111.51	1.618	0.2089	489
16:53:50	11.5	1079.8	111.51	1.609	0.2065	489
16:54:00	11.7	1079.8	111.53	1.600	0.2041	489
16:54:10	11.8	1079.8	111.53	1.592	0.2018	489
16:54:20	12.0	1079.8	111.53	1.583	0.1996	489
16:54:30	12.2	1079.8	111.53	1.575	0.1974	489
16:54:40	12.3	1079.8	111.53	1.568	0.1952	489
16:54:50	12.5	1079.8	111.53	1.560	0.1931	489
16:55:00	12.7	1079.8	111.55	1.553	0.1911	489
16:56:00	13.7	1079.8	111.58	1.512	0.1796	489
16:57:00	14.7	1079.8	111.60	1.477	0.1695	489
16:58:00	15.7	1079.8	111.63	1.447	0.1604	489
16:59:00	16.7	1079.8	111.66	1.420	0.1523	489
17:00:00	17.7	1079.8	111.69	1.396	0.1450	489
17:01:00	18.7	1079.8	111.72	1.375	0.1383	489
17:02:00	19.7	1079.8	111.74	1.356	0.1322	489
17:03:00	20.7	1079.8	111.77	1.339	0.1267	489
17:04:00	21.7	1079.8	111.79	1.323	0.1216	489
17:05:00	22.7	1079.8	111.82	1.309	0.1169	489
17:06:00	23.7	1079.8	111.84	1.296	0.1125	489
17:07:00	24.7	1079.8	111.86	1.284	0.1085	489
17:08:00	25.7	1079.8	111.88	1.273	0.1047	489
17:09:00	26.7	1079.8	111.90	1.263	0.1012	489
17:10:00	27.7	1079.8	111.92	1.253	0.0980	489
17:11:00	28.7	1079.8	111.94	1.244	0.0949	489
17:12:00	29.7	1079.8	111.96	1.236	0.0920	489
17:13:00	30.7	1079.8	111.98	1.228	0.0893	489
17:14:00	31.7	1079.9	112.00	1.221	0.0867	489

17:18:00	35.7	1079.9	112.06	1.196	0.0778	489
17:19:00	36.7	1079.9	112.07	1.191	0.0759	489
17:20:00	37.7	1079.8	112.09	1.186	0.0740	489
17:21:00	38.7	1079.8	112.10	1.181	0.0723	489

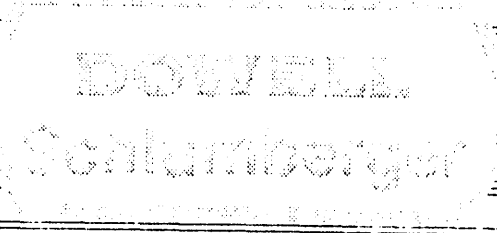
17:22:00	39.7	1079.9	112.11	1.176	0.0706	489
17:23:00	40.7	1079.8	112.12	1.172	0.0690	489
17:24:00	41.7	1079.9	112.13	1.168	0.0674	489
17:25:00	42.7	1079.8	112.14	1.164	0.0660	489
17:26:00	43.7	1079.8	112.15	1.160	0.0646	489
17:27:00	44.7	1079.8	112.16	1.157	0.0632	489
17:28:00	45.7	1079.9	112.17	1.153	0.0619	489
17:29:00	46.7	1079.8	112.17	1.150	0.0607	489
17:30:00	47.7	1079.8	112.18	1.147	0.0595	489
17:31:00	48.7	1079.8	112.19	1.144	0.0584	489
17:32:00	49.7	1079.9	112.19	1.141	0.0573	489
17:33:00	50.7	1079.8	112.20	1.138	0.0562	489
17:34:00	51.7	1079.8	112.21	1.135	0.0552	489
17:35:00	52.7	1079.8	112.21	1.133	0.0542	489
17:36:00	53.7	1079.9	112.22	1.130	0.0532	489
17:37:00	54.7	1079.8	112.22	1.128	0.0523	489
17:38:00	55.7	1079.8	112.23	1.126	0.0514	489
17:39:00	56.7	1079.9	112.23	1.124	0.0506	489
17:40:00	57.7	1079.8	112.24	1.121	0.0498	489
17:41:00	58.7	1079.9	112.24	1.119	0.0490	489
17:41:20	59.0	1079.8	112.24	1.119	0.0487	489
17:41:30	59.2	1079.9	112.24	1.118	0.0486	489
17:41:40	59.3	1079.8	112.24	1.118	0.0484	489
17:41:50	59.5	1079.9	112.24	1.118	0.0483	489
17:42:00	59.7	1079.8	112.25	1.117	0.0482	489
17:42:10	59.8	1079.9	112.25	1.117	0.0480	489
17:42:20	60.0	1079.9	112.25	1.117	0.0479	489
17:42:30	60.2	1079.9	112.25	1.116	0.0478	489
17:42:40	60.3	1079.9	112.25	1.116	0.0477	489
17:42:50	60.5	1079.9	112.25	1.116	0.0475	489
17:43:00	60.7	1079.8	112.25	1.115	0.0474	489
17:43:10	60.8	1079.8	112.25	1.115	0.0473	489
17:43:20	61.0	1079.9	112.25	1.115	0.0472	489
17:43:30	61.2	1079.9	112.25	1.114	0.0471	489
17:43:40	61.3	1079.9	112.25	1.114	0.0469	489
17:43:50	61.5	1079.9	112.25	1.114	0.0468	489
17:44:00	61.7	1079.8	112.26	1.114	0.0467	489
17:44:10	61.8	1079.8	112.26	1.113	0.0466	489



17:45:00	62.7	1079.9	112.26	1.112	0.0460	489
17:45:10	62.8	530.7	112.26	1.111	0.0459	-60
17:45:20	63.0	380.7	112.26	1.111	0.0458	-210

2nd Flow

17:45:30	0.5	308.1	112.26
17:45:40	0.7	320.4	112.26
17:45:50	0.8	335.4	112.26
17:46:00	1.0	347.3	112.18
17:46:10	1.2	366.0	112.18
17:46:20	1.3	380.4	112.18
17:46:30	1.5	397.9	112.18
17:46:40	1.7	413.8	112.18
17:46:50	1.8	429.6	112.18
17:47:00	2.0	441.6	111.81
17:47:10	2.2	452.7	111.81
17:47:20	2.3	463.3	111.81
17:47:30	2.5	471.4	111.81
17:47:40	2.7	478.0	111.81
17:47:50	2.8	483.1	111.81
17:48:00	3.0	486.9	111.40
17:48:10	3.2	489.6	111.40
17:48:20	3.3	492.0	111.40
17:48:30	3.5	493.8	111.40
17:48:40	3.7	494.5	111.40
17:48:50	3.8	494.7	111.40
17:49:00	4.0	494.1	111.06
17:49:10	4.2	493.2	111.06
17:49:20	4.3	491.9	111.06
17:49:30	4.5	490.6	111.06
17:49:40	4.7	488.7	111.06
17:49:50	4.8	487.0	111.06
17:50:00	5.0	484.3	110.81
17:50:10	5.2	481.7	110.81
17:50:20	5.3	479.4	110.81
17:50:30	5.5	476.7	110.81
17:50:40	5.7	474.6	110.81
17:50:50	5.8	472.0	110.81
17:51:00	6.0	469.7	110.60
17:51:10	6.2	468.2	110.60
17:51:20	6.3	466.5	110.60
17:51:30	6.5	465.2	110.60
17:51:40	6.7	463.8	110.60
17:51:50	6.8	462.6	110.60



17:52:20	7.3	459.3	110.41
17:52:30	7.5	456.6	110.41
17:52:40	7.7	456.8	110.41
17:52:50	7.8	457.3	110.41

17:53:00	8.0	457.2	110.22
17:53:10	8.2	457.2	110.22
17:53:20	8.3	456.5	110.22
17:53:30	8.5	456.2	110.22
17:53:40	8.7	457.0	110.22
17:53:50	8.8	457.7	110.22
17:54:00	9.0	457.7	110.00
17:54:10	9.2	458.2	110.00
17:54:20	9.3	458.4	110.00
17:54:30	9.5	458.9	110.00
17:54:40	9.7	459.1	110.00
17:54:50	9.8	459.2	110.00
17:55:00	10.0	459.3	109.75
17:55:10	10.2	459.5	109.75
17:55:20	10.3	460.3	109.75
17:55:30	10.5	460.6	109.75
17:55:40	10.7	461.3	109.75
17:55:50	10.8	462.8	109.75
17:56:00	11.0	467.8	109.45
17:56:10	11.2	470.4	109.45
17:56:20	11.3	472.3	109.45
17:56:30	11.5	480.2	109.45
17:56:40	11.7	482.8	109.45
17:56:50	11.8	485.3	109.45
17:57:00	12.0	487.3	109.10
17:57:10	12.2	489.5	109.10
17:57:20	12.3	491.9	109.10
17:57:30	12.5	493.5	109.10
17:57:40	12.7	495.1	109.10
17:57:50	12.8	496.4	109.10
17:58:00	13.0	497.6	108.71
17:58:10	13.2	499.2	108.71
17:58:20	13.3	501.1	108.71
17:58:30	13.5	503.5	108.71
17:58:40	13.7	504.5	108.71
17:58:50	13.8	506.1	108.71
17:59:00	14.0	507.8	108.28
17:59:10	14.2	509.1	108.28
17:59:20	14.3	511.0	108.28

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NO. 111111  
NO. 111111

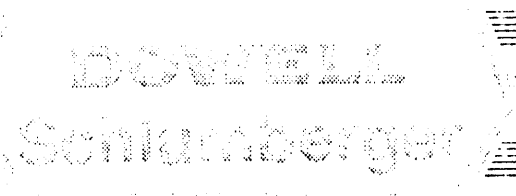
17:59:50 14.8 513.1 108.20  
18:00:00 15.0 512.2 107.82  
18:00:10 15.2 511.7 107.82  
18:00:20 15.3 510.9 107.82

18:00:30 15.5 509.4 107.82  
18:00:40 15.7 508.1 107.82  
18:00:50 15.8 505.3 107.82  
18:01:00 16.0 503.8 107.35  
18:01:10 16.2 502.2 107.35  
18:01:20 16.3 504.0 107.35  
18:01:30 16.5 504.0 107.35  
18:01:40 16.7 504.6 107.35  
18:01:50 16.8 508.7 107.35  
18:02:00 17.0 508.6 106.88  
18:02:10 17.2 508.1 106.88  
18:02:20 17.3 507.4 106.88  
18:02:30 17.5 506.8 106.88  
18:02:40 17.7 506.5 106.88  
18:02:50 17.8 505.3 106.88  
18:03:00 18.0 503.0 106.41  
18:03:10 18.2 501.6 106.41  
18:03:20 18.3 500.7 106.41  
18:03:30 18.5 500.5 106.41  
18:03:40 18.7 499.8 106.41  
18:03:50 18.8 498.4 106.41  
18:04:00 19.0 496.5 105.95  
18:04:10 19.2 495.8 105.95  
18:04:20 19.3 494.6 105.95  
18:04:30 19.5 491.5 105.95  
18:04:40 19.7 488.9 105.95  
18:04:50 19.8 487.3 105.95  
18:05:00 20.0 484.7 105.49  
18:05:10 20.2 482.7 105.49  
18:05:20 20.3 480.5 105.49  
18:05:30 20.5 478.3 105.49  
18:05:40 20.7 477.4 105.49  
18:05:50 20.8 475.5 105.49  
18:06:00 21.0 472.8 105.06  
18:06:10 21.2 470.7 105.06  
18:06:20 21.3 469.9 105.06  
18:06:30 21.5 469.6 105.06  
18:06:40 21.7 468.5 105.06  
18:06:50 21.8 466.6 105.06

DOWELL  
Schlumberger

18:07:20	22.3	464.3	104.65
18:07:30	22.5	463.7	104.65
18:07:40	22.7	462.2	104.65
18:08:00	23.0	461.7	104.28

18:08:30	23.5	462.1	104.28
18:09:00	24.0	461.3	103.94
18:09:30	24.5	462.0	103.94
18:10:00	25.0	464.5	103.61
18:10:30	25.5	466.5	103.61
18:11:00	26.0	468.0	103.31
18:11:30	26.5	469.6	103.31
18:12:00	27.0	472.3	103.00
18:12:30	27.5	475.5	103.00
18:13:00	28.0	474.5	102.70
18:13:30	28.5	472.3	102.70
18:14:00	29.0	467.6	102.41
18:14:30	29.5	464.5	102.41
18:15:00	30.0	457.9	102.13
18:15:30	30.5	454.4	102.13
18:16:00	31.0	451.3	101.86
18:16:30	31.5	448.4	101.86
18:17:00	32.0	446.4	101.60
18:17:30	32.5	447.5	101.60
18:18:00	33.0	450.7	101.36
18:18:30	33.5	453.3	101.36
18:19:00	34.0	454.9	101.13
18:19:30	34.5	458.4	101.13
18:20:00	35.0	461.6	100.90
18:20:30	35.5	479.8	100.90
18:21:00	36.0	477.5	100.67
18:21:30	36.5	476.6	100.67
18:22:00	37.0	475.7	100.43
18:22:30	37.5	473.1	100.43
18:23:00	38.0	471.3	100.19
18:23:30	38.5	469.7	100.19
18:24:00	39.0	467.2	99.97
18:24:30	39.5	463.2	99.97
18:25:00	40.0	455.3	99.77
18:25:30	40.5	451.5	99.77
18:26:00	41.0	446.7	99.57
18:26:30	41.5	442.3	99.57
18:27:00	42.0	437.4	99.39



18:29:00	44.0	425.0	99.08
18:29:30	44.5	423.5	99.08
18:30:00	45.0	421.9	98.94
18:30:30	45.5	420.5	98.94

18:31:00	46.0	419.9	98.80
18:31:30	46.5	419.5	98.80
18:32:00	47.0	419.7	98.67
18:32:30	47.5	418.6	98.67
18:33:00	48.0	416.9	98.53
18:33:30	48.5	415.5	98.53
18:34:00	49.0	415.5	98.40
18:34:30	49.5	414.6	98.40
18:35:00	50.0	414.0	98.28
18:35:30	50.5	413.4	98.28
18:36:00	51.0	411.8	98.15
18:36:30	51.5	411.9	98.15
18:37:00	52.0	412.3	98.03
18:37:30	52.5	412.5	97.91
18:38:00	53.0	411.7	97.91
18:38:30	53.5	412.1	97.91
18:39:00	54.0	410.9	97.79
18:39:30	54.5	409.9	97.79
18:40:00	55.0	408.8	97.66
18:40:30	55.5	409.0	97.66
18:41:00	56.0	409.2	97.53
18:41:30	56.5	409.1	97.53
18:42:00	57.0	407.1	97.40
18:42:30	57.5	406.6	97.40
18:43:00	58.0	404.9	97.27
18:43:30	58.5	403.2	97.27
18:44:00	59.0	403.0	97.15
18:44:30	59.5	402.6	97.15
18:45:00	60.0	406.3	97.04
18:45:30	60.5	408.4	97.04
18:46:00	61.0	415.6	96.92
18:46:30	61.5	421.9	96.92
18:47:00	62.0	427.2	96.80
18:47:30	62.5	431.7	96.80
18:48:00	63.0	431.4	96.66
18:48:30	63.5	433.5	96.66
18:49:00	64.0	430.2	96.50
18:50:00	65.0	422.5	96.33
18:51:00	66.0	418.1	96.18

18:55:30	70.5	389.9	79.57
18:55:40	70.7	391.2	79.57
18:55:50	70.8	391.7	79.57

18:56:00	71.0	398.3	95.43
18:56:10	71.2	398.2	95.43
18:56:20	71.3	398.3	95.43
18:56:30	71.5	398.6	95.43
18:56:40	71.7	398.8	95.43

18:56:50	71.8	398.8	95.43
18:57:00	72.0	398.5	95.34
18:57:10	72.2	398.7	95.34
18:57:20	72.3	399.4	95.34
18:57:30	72.5	399.4	95.34
18:57:40	72.7	399.3	95.34
18:57:50	72.8	399.4	95.34
18:58:01	73.0	399.2	95.28
18:58:10	73.2	399.3	95.28
18:58:20	73.3	399.3	95.28
18:58:30	73.5	399.3	95.28
18:58:40	73.7	399.0	95.28
18:58:50	73.8	399.1	95.28
18:59:00	74.0	399.0	95.23
18:59:10	74.2	399.4	95.23
18:59:20	74.3	400.2	95.23
18:59:30	74.5	400.7	95.23
18:59:40	74.7	400.8	95.23
18:59:50	74.8	400.8	95.23
19:00:00	75.0	400.6	95.17
19:00:10	75.2	401.7	95.17
19:00:20	75.3	402.0	95.17
19:00:30	75.5	402.3	95.17
19:00:40	75.7	402.4	95.17
19:00:50	75.8	402.6	95.17
19:01:00	76.0	402.9	95.11

18:56:50  
18:57:00  
18:57:10  
18:57:20  
18:57:30  
18:57:40  
18:57:50  
18:58:01  
18:58:10  
18:58:20  
18:58:30  
18:58:40  
18:58:50  
18:59:00  
18:59:10  
18:59:20  
18:59:30  
18:59:40  
18:59:50  
19:00:00  
19:00:10  
19:00:20  
19:00:30  
19:00:40  
19:00:50  
19:01:00

19:01:10	76.2	403.4	95.11
19:01:20	76.3	403.5	95.11
19:01:30	76.5	403.6	95.11
19:01:40	76.7	403.9	95.11
19:01:50	76.8	404.5	95.11
19:02:00	77.0	406.4	95.03
19:02:10	77.2	407.4	95.03
19:02:20	77.3	407.9	95.03
19:02:30	77.5	408.3	95.03
19:02:40	77.7	408.2	95.03
19:02:50	77.8	408.3	95.03
19:03:00	78.0	409.7	94.95
19:04:00	79.0	411.7	94.86
19:05:00	80.0	411.8	94.77

19:06:00	81.0	410.0	94.67
19:07:00	82.0	408.4	94.59
19:08:00	83.0	406.3	94.51
19:09:00	84.0	404.6	58.06
19:10:00	85.0	381.5	30.76
19:11:38	86.6	380.3	30.76
19:12:00	87.0	397.1	94.18
19:17:52	1532.9	399.2	93.90
19:18:00	1533.0	399.3	93.76
19:19:00	1534.0	398.1	93.71
19:20:00	1535.0	400.7	93.67
19:21:00	1536.0	403.6	93.63
19:22:00	1537.0	409.1	93.58
19:23:00	1538.0	409.9	93.52
19:24:00	1539.0	410.6	93.46
19:25:00	1540.0	412.0	93.40
19:26:00	1541.0	412.3	93.35
19:27:00	1542.0	412.2	93.29
19:28:00	1543.0	411.5	93.24
19:29:00	1544.0	410.6	93.18
19:30:00	1545.0	408.7	93.13
19:31:00	1546.0	407.2	93.07
19:32:00	1547.0	406.0	93.03
19:33:00	1548.0	405.4	92.98
19:34:00	1549.0	404.6	92.94
19:35:00	1550.0	404.8	92.90
19:36:00	1551.0	405.4	92.87

DOWELL  
SUNLUBBER

19:42:00	1557.0	404.8	92.67
19:43:00	1558.0	404.9	92.63
19:44:00	1559.0	406.1	92.58
19:45:00	1560.0	410.4	92.54
19:46:00	1561.0	412.8	92.49
19:47:00	1562.0	413.2	92.45
19:48:00	1563.0	412.8	92.41
19:49:00	1564.0	413.1	92.38
19:50:00	1565.0	412.2	92.36
19:51:00	1566.0	410.1	92.34
19:52:00	1567.0	408.7	92.33
19:53:00	1568.0	408.1	92.32
19:54:00	1569.0	407.7	92.31

19:55:00	1570.0	408.7	92.29
19:56:00	1571.0	409.3	92.28
19:57:00	1572.0	407.6	92.25
19:58:00	1573.0	406.2	92.22
19:59:00	1574.0	404.5	92.20
20:00:00	1575.0	403.9	92.17
20:01:00	1576.0	402.8	92.16
20:02:00	1577.0	402.4	92.14
20:03:00	1578.0	401.5	92.13
20:04:00	1579.0	\$\$\$\$\$\$	92.10
20:05:00	1580.0	\$\$\$\$\$\$	91.97
20:06:00	1581.0	265.9	91.79
20:07:00	1582.0	266.2	91.53
20:08:00	1583.0	262.5	91.23
20:09:00	1584.0	263.2	90.95
20:11:59	1587.0	265.4	90.95
20:12:19	1587.3	255.8	64.80
20:13:03	1588.1	255.8	64.80
20:14:39	1589.7	247.0	64.80
20:15:52	1590.9	269.6	88.77
20:16:37	1591.6	263.9	88.61
20:17:00	1592.0	262.0	88.49
20:18:00	1593.0	257.0	88.33
20:19:00	1594.0	261.6	88.19
20:20:00	1595.0	261.3	88.04
20:21:00	1596.0	262.2	87.89
20:22:00	1597.0	256.5	87.73
20:23:00	1598.0	256.2	87.57
20:24:00	1599.0	256.2	87.40



20:27:00	1602.0	251.8	86.90
20:28:00	1603.0	252.2	86.73
20:29:00	1604.0	253.3	86.56
20:30:00	1605.0	244.0	86.41
20:31:00	1606.0	234.1	86.27
20:32:00	1607.0	229.9	86.14
20:33:00	1608.0	228.2	86.03
20:34:00	1609.0	227.5	85.94
20:35:00	1610.0	225.9	85.84
20:36:00	1611.0	223.8	85.75
20:37:00	1612.0	222.3	85.66
20:38:00	1613.0	222.0	85.55
20:39:00	1614.0	221.4	85.43
20:40:00	1615.0	221.7	85.31

20:41:00	1616.0	220.6	85.18
20:42:00	1617.0	219.4	85.06
20:43:00	1618.0	217.9	84.93
20:44:00	1619.0	217.6	84.81
20:45:00	1620.0	224.9	84.69
20:46:00	1621.0	231.3	84.57
20:47:00	1622.0	229.9	84.44
20:48:00	1623.0	227.9	84.31
20:49:00	1624.0	226.0	84.18
20:50:00	1625.0	223.8	84.07
20:52:00	1627.0	221.1	83.92
20:56:00	1631.0	210.5	83.68
21:00:00	1635.0	199.7	63.29
21:04:00	1639.0	199.7	63.29
21:08:00	1643.0	199.7	63.29
21:12:00	1647.0	199.7	63.29
21:54:22	1689.4	188.0	63.29
21:56:00	1691.0	193.6	80.96
22:00:00	1695.0	196.4	81.03
22:04:00	1699.0	192.4	80.99
22:08:00	1703.0	191.2	80.94
22:12:00	1707.0	192.3	80.90
22:16:00	1711.0	194.7	80.87
22:20:00	1715.0	198.4	80.82
22:24:00	1719.0	199.5	80.81
22:28:00	1723.0	193.8	80.75
22:32:00	1727.0	197.4	80.67
22:36:00	1731.0	201.9	80.61

22:56:00	1751.0	198.0	80.41
23:00:00	1755.0	195.6	80.31
23:04:00	1759.0	192.9	80.30
23:08:00	1763.0	194.7	80.29
23:12:00	1767.0	192.5	80.24
23:16:00	1771.0	192.3	80.17
23:20:00	1775.0	192.1	80.14
23:24:00	1779.0	194.1	80.12
23:28:00	1783.0	194.5	80.13
23:32:00	1787.0	190.9	80.11
23:36:00	1791.0	191.7	80.14
23:40:00	1795.0	194.7	80.21
23:44:00	1799.0	196.0	80.15

23:43:00	1803.0	192.7	80.14
23:52:00	1807.0	190.2	80.17
23:55:00	1811.0	189.7	80.16
00:00:00	1815.0	189.7	80.14
00:04:00	1819.0	187.0	80.11
00:08:00	1823.0	185.8	80.10
00:12:00	1827.0	187.4	80.09
00:15:00	1831.0	188.3	80.07
00:20:00	1835.0	188.1	80.05
00:24:00	1839.0	170.5	9.19
00:24:28	1839.5	171.2	9.19
00:24:31	1839.5	171.4	9.19
00:24:40	1839.7	171.5	9.19
00:24:50	1839.3	171.4	9.19
00:25:00	1840.0	192.1	80.05
00:25:10	1840.2	191.9	80.05
00:25:20	1840.3	191.9	80.05
00:25:30	1840.5	191.8	80.05
00:25:40	1840.7	191.6	80.05
00:25:50	1840.8	191.2	80.05
00:26:00	1841.0	185.6	62.89
00:26:10	1841.2	185.6	62.89
00:26:20	1841.3	186.3	62.89
00:26:30	1841.5	186.3	62.89
00:26:40	1841.7	186.4	62.89
00:26:50	1841.8	186.2	62.89
00:27:00	1842.0	191.9	80.04
00:27:10	1842.2	192.0	80.04
00:27:20	1842.3	191.8	80.04

UNIVERSITÄT  
SACHSEN AN DER  
TU BERGAKADEMIE  
FREIBERG

00:32:00	1847.0	185.5	80.01
00:36:00	1851.0	172.8	38.42
00:40:00	1855.0	184.7	79.86
00:44:00	1859.0	193.8	79.86
00:48:00	1863.0	187.6	79.84
00:52:00	1867.0	187.8	79.80
00:56:00	1871.0	187.4	79.78
01:00:00	1875.0	191.5	79.74
01:04:00	1879.0	189.7	79.73
01:08:00	1883.0	190.1	79.75
01:12:00	1887.0	191.1	79.78
01:16:00	1891.0	190.2	79.77
01:20:00	1895.0	192.0	79.70

01:24:00	1899.0	190.6	79.66
01:28:00	1903.0	195.5	79.66
01:32:00	1907.0	191.9	79.64
01:36:00	1911.0	189.4	79.66
01:40:00	1915.0	189.5	79.69
01:44:00	1919.0	188.8	79.70
01:48:00	1923.0	189.6	79.72
01:52:00	1927.0	189.8	79.74
01:56:00	1931.0	188.8	79.76
02:00:00	1935.0	188.3	79.80
02:04:00	1939.0	188.8	79.82
02:08:00	1943.0	189.8	79.82
02:12:00	1947.0	189.5	79.81
02:16:00	1951.0	189.2	79.81
02:20:00	1955.0	189.4	79.81
02:24:00	1959.0	192.0	79.82
02:28:00	1963.0	193.1	79.84
02:32:00	1967.0	192.3	79.86
02:36:00	1971.0	195.8	79.90
02:40:00	1975.0	188.9	79.93
02:44:00	1979.0	190.5	79.98
02:48:00	1983.0	189.2	80.07
02:52:00	1987.0	194.4	80.15
02:56:00	1991.0	190.2	80.21
03:00:00	1995.0	188.4	80.22
03:04:00	1999.0	189.2	80.26
03:08:00	2003.0	188.5	80.30
03:12:00	2007.0	187.5	80.33
03:16:00	2011.0	186.2	80.34

Schlumberger

03:28:00	2023.0	191.0	80.29
03:32:00	2027.0	188.8	80.28
03:36:00	2031.0	190.1	80.30
03:40:00	2035.0	188.3	80.26
03:44:00	2039.0	188.7	80.19
03:48:00	2043.0	191.2	80.13
03:51:20	2046.3	187.7	80.05
03:51:30	2046.5	187.3	80.05
03:51:40	2046.7	187.2	80.05
03:51:50	2046.8	186.9	80.05
03:52:00	2047.0	186.9	80.05
03:52:10	2047.2	186.7	80.05
03:52:20	2047.3	186.4	80.05
03:52:30	2047.5	186.5	80.05

03:52:40	2047.7	186.2	80.05
03:52:50	2047.8	185.2	80.05
03:53:00	2048.0	184.2	79.97
03:53:10	2048.2	183.0	79.97
03:53:20	2048.3	182.2	79.97
03:53:30	2048.5	181.5	79.97
03:53:40	2048.7	181.6	79.97
03:53:50	2048.8	180.8	79.97
03:54:00	2049.0	180.6	79.97
03:54:10	2049.2	180.4	79.97
03:54:20	2049.3	179.9	79.97
03:54:30	2049.5	179.7	79.97
03:54:40	2049.7	179.9	79.97
03:54:50	2049.8	179.7	79.97
03:55:00	2050.0	179.5	79.97
03:55:10	2050.2	179.4	79.97
03:55:20	2050.3	179.4	79.97
03:55:30	2050.5	179.2	79.97
03:55:40	2050.7	179.2	79.97
03:55:50	2050.8	179.2	79.97
03:56:00	2051.0	179.2	79.97
03:56:10	2051.2	179.2	79.97
03:56:20	2051.3	178.9	79.97
03:56:30	2051.5	179.4	79.97
03:56:40	2051.7	178.9	79.97
03:56:50	2051.8	178.0	79.97
03:57:00	2052.0	177.7	79.86
03:57:10	2052.2	177.5	79.86

03:57:50	2052.8	177.1	79.86
03:58:00	2053.0	177.0	79.86
03:58:10	2053.2	177.0	79.86
03:58:20	2053.3	176.8	79.86
03:58:30	2053.5	176.8	79.86
03:58:40	2053.7	176.8	79.86
03:58:50	2053.8	176.7	79.86
03:59:00	2054.0	176.7	79.86
03:59:10	2054.2	177.0	79.86
03:59:20	2054.3	176.9	79.86
03:59:30	2054.5	176.6	79.86
03:59:40	2054.7	176.7	79.86
03:59:50	2054.8	176.6	79.86
04:00:00	2055.0	176.6	79.86

04:00:10	2055.2	176.4	79.86
04:00:20	2055.3	176.5	79.86
04:00:30	2055.5	176.5	79.86
04:00:40	2055.7	176.5	79.86
04:00:50	2055.8	176.4	79.86
04:01:00	2056.0	176.4	79.73
04:01:10	2056.2	176.3	79.73
04:01:20	2056.3	176.2	79.73
04:01:30	2056.5	176.7	79.73
04:01:40	2056.7	176.2	79.73
04:01:50	2056.8	173.0	79.73
04:02:00	2057.0	976.7	79.71
04:02:10	2057.2	1062.8	79.71
04:02:20	2057.3	1074.9	79.71
04:02:30	2057.5	1076.5	79.71
04:02:40	2057.7	1077.2	79.71
04:02:50	2057.8	1077.6	79.71
04:03:00	2058.0	1077.9	79.65
04:03:11	2058.2	1078.1	79.65
04:03:21	2058.4	1078.3	79.65
04:03:39	2058.7	1078.5	79.65
04:03:42	2058.7	1078.6	79.65
04:03:51	2058.9	1078.6	79.65
04:04:04	2059.1	1078.7	79.50
04:04:10	2059.2	1078.7	79.50
04:04:20	2059.3	1078.8	79.50
04:04:30	2059.5	1078.8	79.50
04:04:40	2059.7	1078.9	79.50

2nd Shut-in

04:05:20 2060.3 1078.9 79.37  
04:05:30 2060.5 1078.9 79.37  
04:05:40 2060.7 1078.9 79.37  
04:05:50 2060.8 1078.9 79.37  
04:06:00 2061.0 1078.9 79.27  
04:06:10 2061.2 1078.9 79.27  
04:06:20 2061.3 1078.9 79.27  
04:06:30 2061.5 1078.9 79.27  
04:06:40 2061.7 1079.0 79.27  
04:06:50 2061.8 1079.0 79.27

04:07:00 2062.0 1078.9 79.21  
04:07:10 2062.2 1078.9 79.21  
04:07:20 2062.3 1078.9 79.21  
04:07:30 2062.5 1079.0 79.21

04:07:40 2062.7 1078.9 79.21  
04:07:50 2062.8 1079.0 79.21  
04:08:00 2063.0 1079.0 79.21  
04:08:10 2063.2 1079.0 79.21  
04:08:20 2063.3 1079.0 79.21  
04:08:30 2063.5 1079.0 79.21  
04:08:40 2063.7 1079.0 79.21  
04:08:50 2063.8 1079.0 79.21  
04:09:00 2064.0 1079.0 79.23  
04:09:10 2064.2 1079.0 79.23  
04:09:20 2064.3 1079.0 79.23  
04:09:30 2064.5 1079.0 79.23  
04:09:40 2064.7 1079.0 79.23  
04:09:50 2064.8 1079.0 79.23  
04:10:00 2065.0 1079.0 79.29  
04:10:10 2065.2 1079.0 79.29  
04:10:20 2065.3 1079.0 79.29  
04:10:30 2065.5 1079.0 79.29  
04:10:40 2065.7 1079.0 79.29  
04:10:50 2065.8 1079.0 79.29  
04:11:00 2066.0 1079.0 79.37

04:11:40	2066.7	1079.0	79.37
04:11:50	2066.8	1079.0	79.37
04:12:00	2067.0	1079.1	79.48
04:12:10	2067.2	1079.0	79.48
04:12:20	2067.3	1079.1	79.48
04:12:30	2067.5	1079.1	79.48
04:12:40	2067.7	1079.0	79.48
04:12:50	2067.8	1079.0	79.48
04:13:00	2068.0	1079.1	79.60
04:13:10	2068.2	1079.1	79.60
04:13:20	2068.3	1079.1	79.60
04:13:30	2068.5	1079.1	79.60
04:13:40	2068.7	1079.1	79.60
04:13:50	2068.8	1079.1	79.60
04:14:00	2069.0	1079.1	79.73
04:14:10	2069.2	1079.1	79.73
04:14:20	2069.3	1079.1	79.73
04:14:30	2069.5	1079.1	79.73
04:14:40	2069.7	1079.1	79.73
04:14:50	2069.8	1079.1	79.73
04:15:00	2070.0	1079.1	79.87

04:15:10	2070.2	1079.1	79.87
04:15:20	2070.3	1079.1	79.87
04:15:30	2070.5	1079.1	79.87
04:15:40	2070.7	1079.1	79.87
04:15:50	2070.8	1079.1	79.87
04:16:00	2071.0	1079.1	80.03
04:18:00	2073.0	1079.2	80.35
04:20:00	2075.0	1079.2	80.69
04:22:00	2077.0	1079.3	81.04
04:24:00	2079.0	1079.2	81.41
04:26:00	2081.0	1079.3	81.77
04:28:00	2083.0	1079.3	82.14
04:28:10	2083.2	1079.2	82.14
04:28:20	2083.3	1079.3	82.14
04:28:30	2083.5	1079.2	82.14
04:28:40	2083.7	1079.2	82.14
04:28:50	2083.8	1079.2	82.14
04:29:00	2084.0	1079.3	82.32
04:29:10	2084.2	1079.3	82.32
04:29:20	2084.3	1079.3	82.32

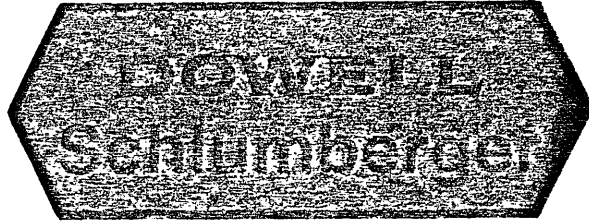
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04:30:39	2085.7	1079.2	82.50
04:30:41	2085.7	1079.3	82.50
04:30:51	2085.9	1079.2	82.50
04:31:02	2086.0	1079.3	82.69
04:31:10	2086.2	1079.3	82.69
04:31:20	2086.3	1079.3	82.69
04:31:30	2086.5	1079.3	82.69
04:31:40	2086.7	1079.3	82.69
04:31:50	2086.8	1079.3	82.69
04:32:00	2087.0	1079.3	82.86
04:32:10	2087.2	1079.3	82.86
04:32:20	2087.3	1079.3	82.86
04:32:30	2087.5	1079.3	82.86
04:32:40	2087.7	1079.3	82.86
04:32:50	2087.8	1079.2	82.86
04:33:00	2088.0	1079.3	83.04
04:33:10	2088.2	1079.3	83.04
04:33:20	2088.3	1079.3	83.04
04:33:30	2088.5	1079.3	83.04

04:33:40	2088.7	1079.3	83.04
04:33:50	2088.8	1079.2	83.04
04:34:00	2089.0	1079.3	83.22
04:34:10	2089.2	420.7	83.22
04:34:20	2089.3	1079.3	83.22
04:34:30	2089.5	1079.3	83.22
04:34:40	2089.7	1079.3	83.22
04:34:50	2089.8	1079.3	83.22
04:35:00	2090.0	1079.3	83.40
04:35:10	2090.2	1079.3	83.40
04:35:20	2090.3	1079.3	83.40
04:35:30	2090.5	1079.3	83.40
04:35:40	2090.7	1079.3	83.40
04:35:50	2090.8	1079.3	83.40
04:40:00	2095.0	1079.3	84.27
04:45:00	2100.0	1079.4	85.10
04:50:00	2105.0	1079.4	85.90
04:55:00	2110.0	1079.3	86.65
05:00:00	2115.0	1079.3	87.37
05:05:00	2120.0	1079.4	88.05
05:10:00	2125.0	1079.4	88.69



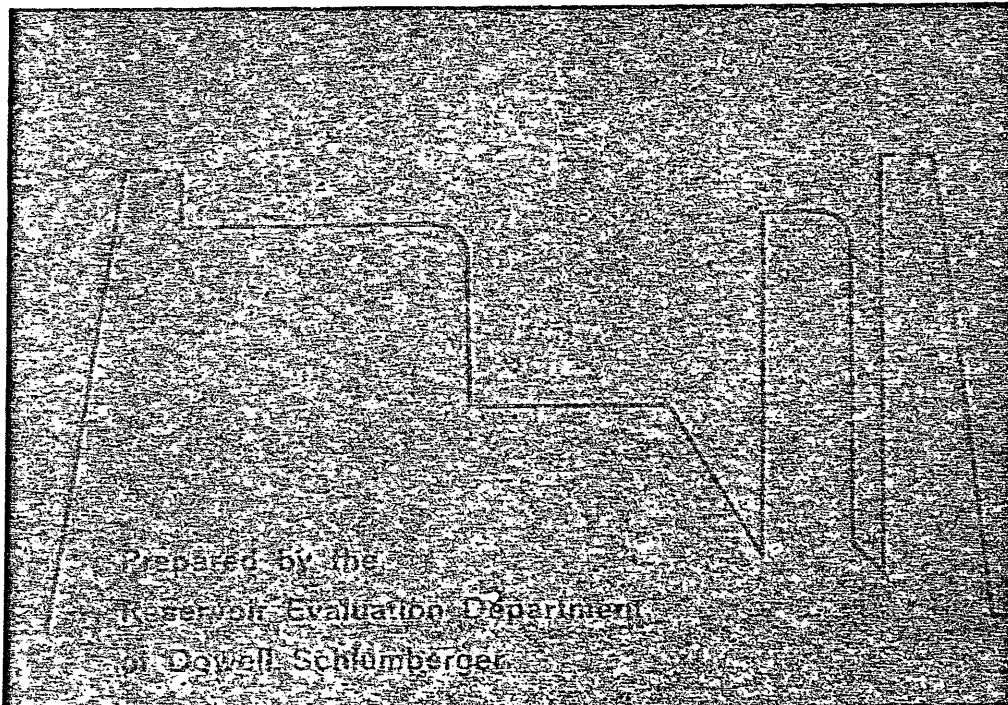
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05:14:50	2129.8	1079.3	89.18
05:15:00	2130.0	1079.3	89.30
05:15:10	2130.2	1079.4	89.30
05:15:20	2130.3	1079.4	89.30
05:15:30	2130.5	1079.4	89.30
05:15:40	2130.7	1079.4	89.30
05:15:50	2130.8	1079.3	89.30
05:16:00	2131.0	1079.4	89.41
05:16:10	2131.2	1079.3	89.41
05:16:20	2131.3	1079.3	89.41
05:16:30	2131.5	1079.3	89.41
05:16:40	2131.7	1079.3	89.41
05:16:50	2131.8	1079.3	89.41
05:17:00	2132.0	1079.3	89.53
05:17:10	2132.2	1079.4	89.53
05:17:20	2132.3	1079.4	89.53

REPORT N° F 81113  
JOB N° \_\_\_\_\_  
INVOICE/SIR. \_\_\_\_\_  
DATE Dec. 30, 1981



# TECHNICAL REPORT

COMPANY HUBBAY OIL AUSTRALIA WELL BALEEN # 1 FIELD \_\_\_\_\_  
TEST N° 2 COUNTRY AUSTRALIA



Prepared by the  
Reservoir Evaluation Department  
of Dowell Schlumberger



# Dowell Schlumberger (Western) S.A.

(Incorporated with limited liability in Panama)

Telephone: 451 4319

Cables:

Telex: Orang AA 94215

January 7th, 1982

Dear Sirs,

The enclosed report would reflect a mechanically sound Drill Stem Test during which the tools functioned properly.

Visual inspection of all three charts showed a pressure kick during the Final Shut-In. Formation anomalies are usually not so abrupt in character so that a mechanical response would be suspect. The fact that the pressure surge occurred on all three recorders and at the same time would rule out recorder malfunction. The anomaly noted during the Final Shut-In should be viewed with caution.

The formation exhibited the characteristics of high permeability and damage was calculated. A portion of the damage could be pseudo caused by turbulent flow through the perforations. Well conditions should be reviewed to determine this factor.

Respectfully yours

John F. Viscarde  
TECHNICAL DEPARTMENT



# SPECIAL DATA ANALYSIS

## HORNER METHOD

### RESERVOIR ENGINEERING DATA - GAS TEST

 RECORDER N           J 1629          

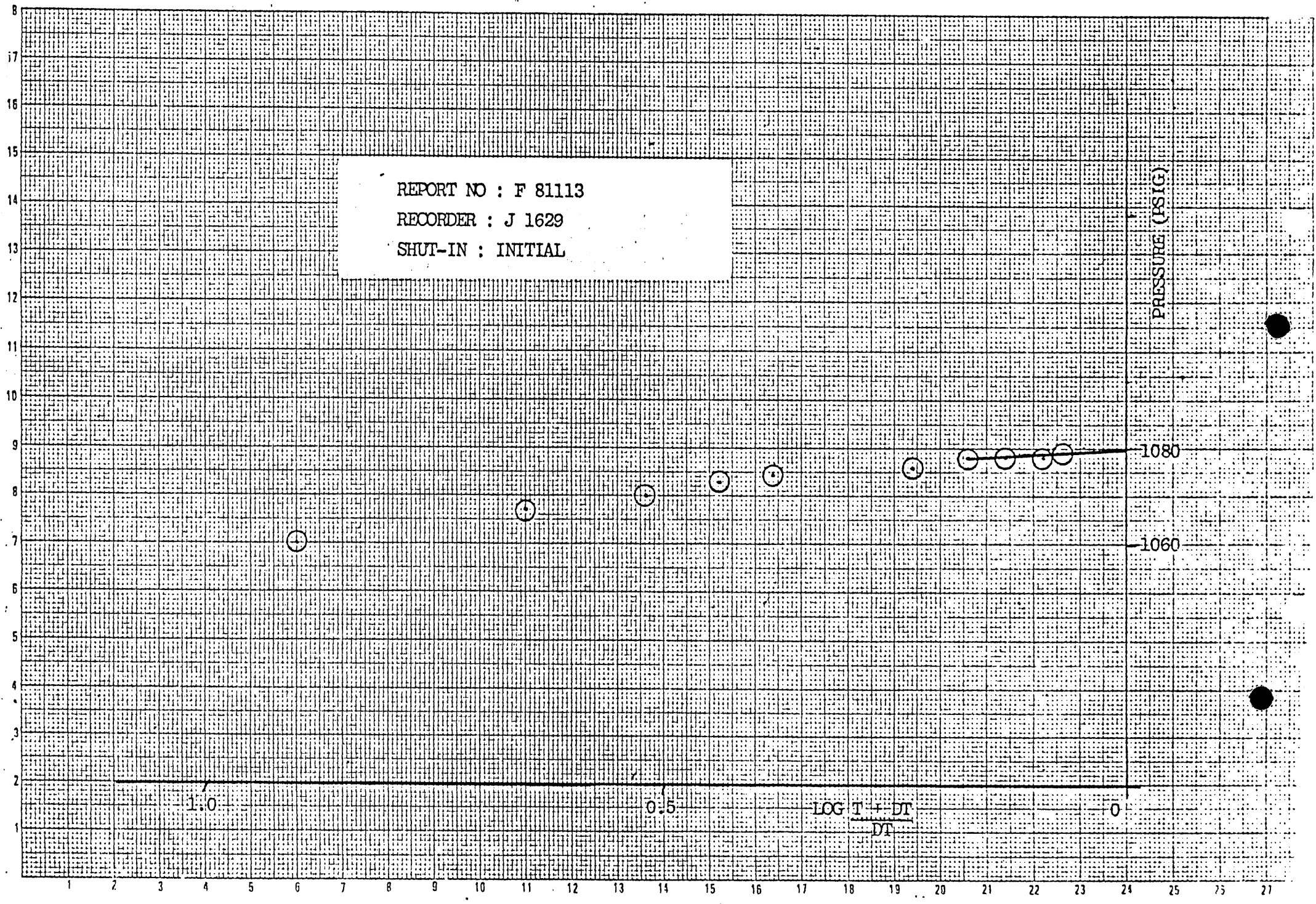
Maximum Reservoir Pressure INITIAL	Po	1080	psig	Flow Rate (gas) 1" CHOKE	Qg	5850	MCF day
Damage Ratio	DR	1.8		Flow Rate (equivalent)	Q	13739	Bbls day
Transmissibility (to gas)	$\frac{Kh}{\mu}$	107055	$\frac{Md-ft}{Cp}$	Slope of Shut-In Curve FINAL	Mg1	40831	$\frac{psi^2}{log cycle}$
Productive Capacity	Kh	1338	Md-ft	Slope of Shut-In Curve	Mg2		$\frac{psi^2}{log cycle}$
Permeability (to gas)	K	55.8	Md	Gas Specific Gravity		0.6	
Radius of Investigation	ri	465	ft.	Oil Gravity		-	°API
Pressure Gradient		0.55	$\frac{psi}{ft.}$	$\Delta P$ skin		-	psi

These calculations were based on the following data, either supplied from the well, or obtained from the current technical literature.

Net Productive Interval	h	24	ft	Gas Deviation Factor	Z	0.85	
Porosity	$\phi$	10	%	Gas viscosity at reservoir conditions.	$\mu_g$	0.0125	cps
Test Temperature	Tr	537	°R	Gas Compressibility	C	$1.1 \times 10^{-3}$	
Well Bore Radius	rw	3.5	in.	Total Flow Time	T	307	mins.

*In interpreting well information and making recommendations, Dowell Schlumberger will give Customer the benefit of its best judgment as to the correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical, mechanical or other measurements, Dowell Schlumberger cannot and does not guarantee the accuracy or correctness of any interpretation and Customer shall absolve Dowell Schlumberger and hold it harmless against any loss or damage whatsoever, whether incurred by Customer or any other person, arising out or resulting from, directly or indirectly, any such interpretation.*

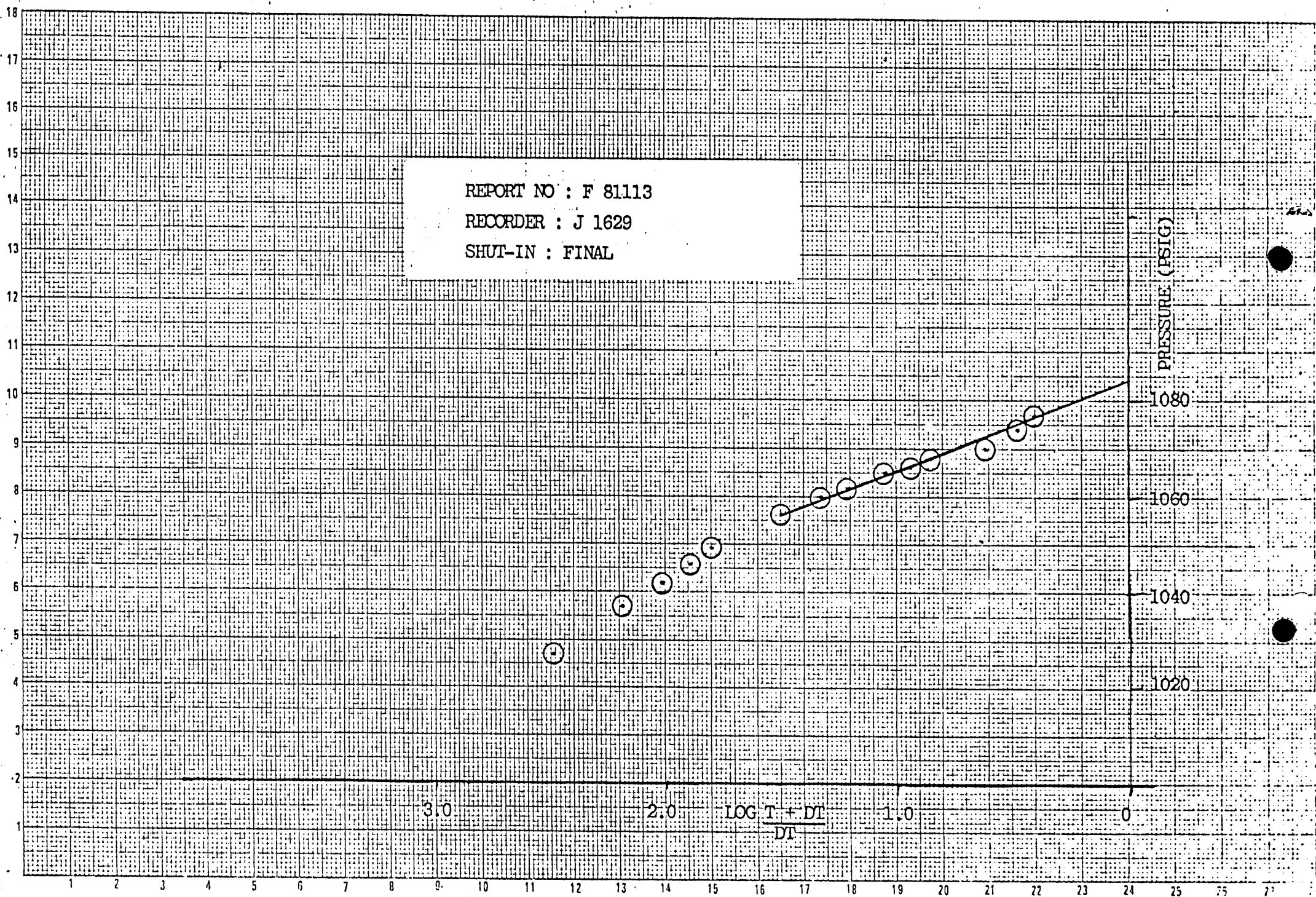
REPORT NO : F 81113  
RECORDER : J 1629  
SHUT-IN : INITIAL



REPORT NO : F 81113

RECORDER : J 1629

SHUT-IN : FINAL



RECORDER N° : J 1782

CAPACITY : 4700 PSI

DEPTH : 2000.16 FT

OPENING : OUTSIDE

TEMPERATURES : 78 DEG F

CLOCK N° : 9-0936 CAP: 96 HRS CLOCK TRAVEL : 0.01046 in/min

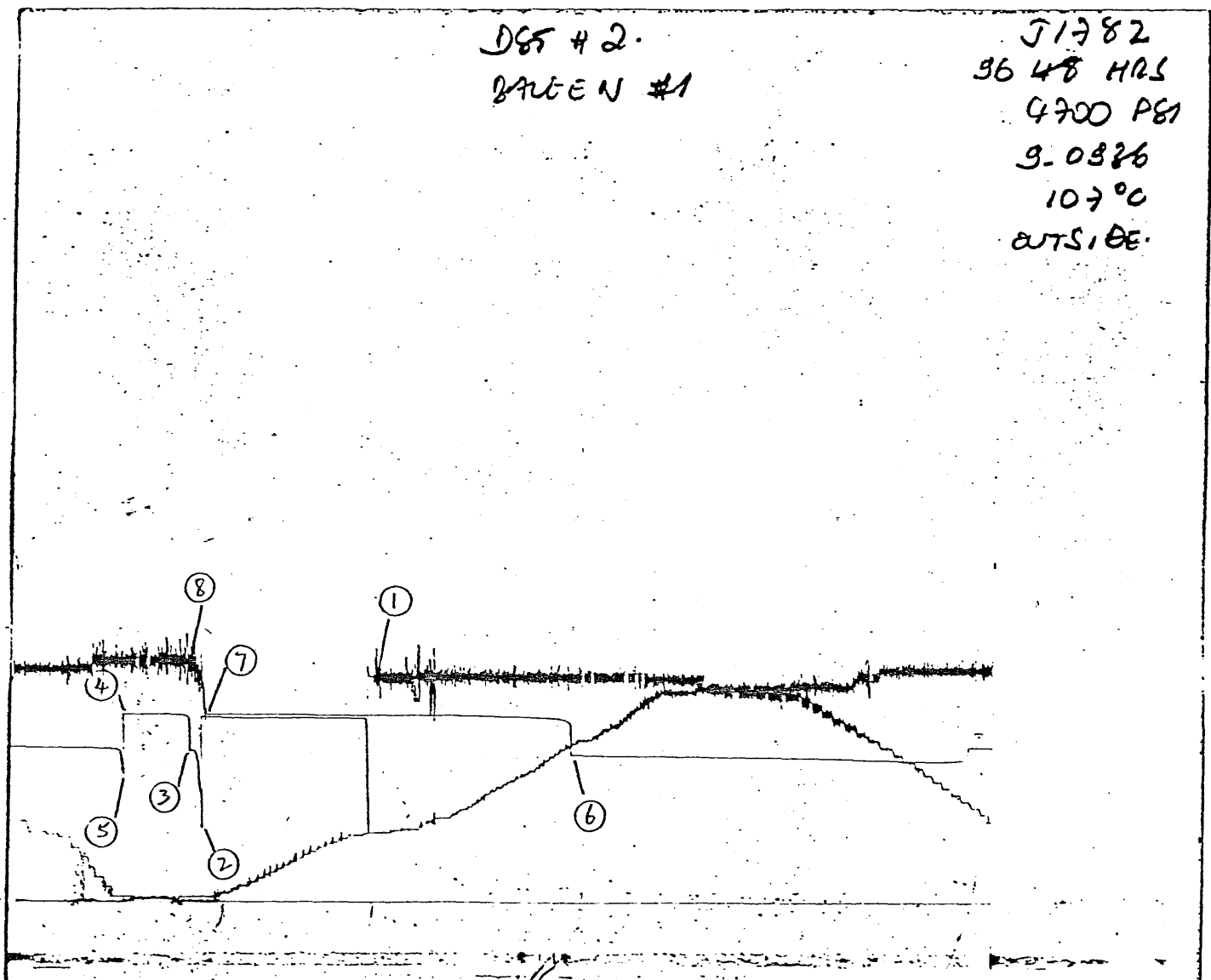
CALIBRATION DATA AT

M = 936.001

A = - 1.10

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.





PRESSURE DATA FOR RECORDER :

J 1782

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
INITIAL HYDROSTATIC	1	1248		
INITIAL FLOW (1)	2	429		
INITIAL FLOW (2)	3	869	6	7
INITIAL SHUT-IN	4	1068	39	38
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)	5	738	0	0
FINAL FLOW (2)	6	841	300	301
FINAL SHUT-IN	7	1068	205	204
FINAL HYDROSTATIC	8	1370		

REMARK :

RECORDER N° : J 1630

CAPACITY : 2800 PSI

DEPTH : 1994.67 FT

OPENING : OUTSIDE

TEMPERATURES : 78 DEG F

CLOCK N° : 9-0354 CAP: 48 HRS

CLOCK TRAVEL : 0.019684 in/min

CALIBRATION DATA AT

M = 570.51964

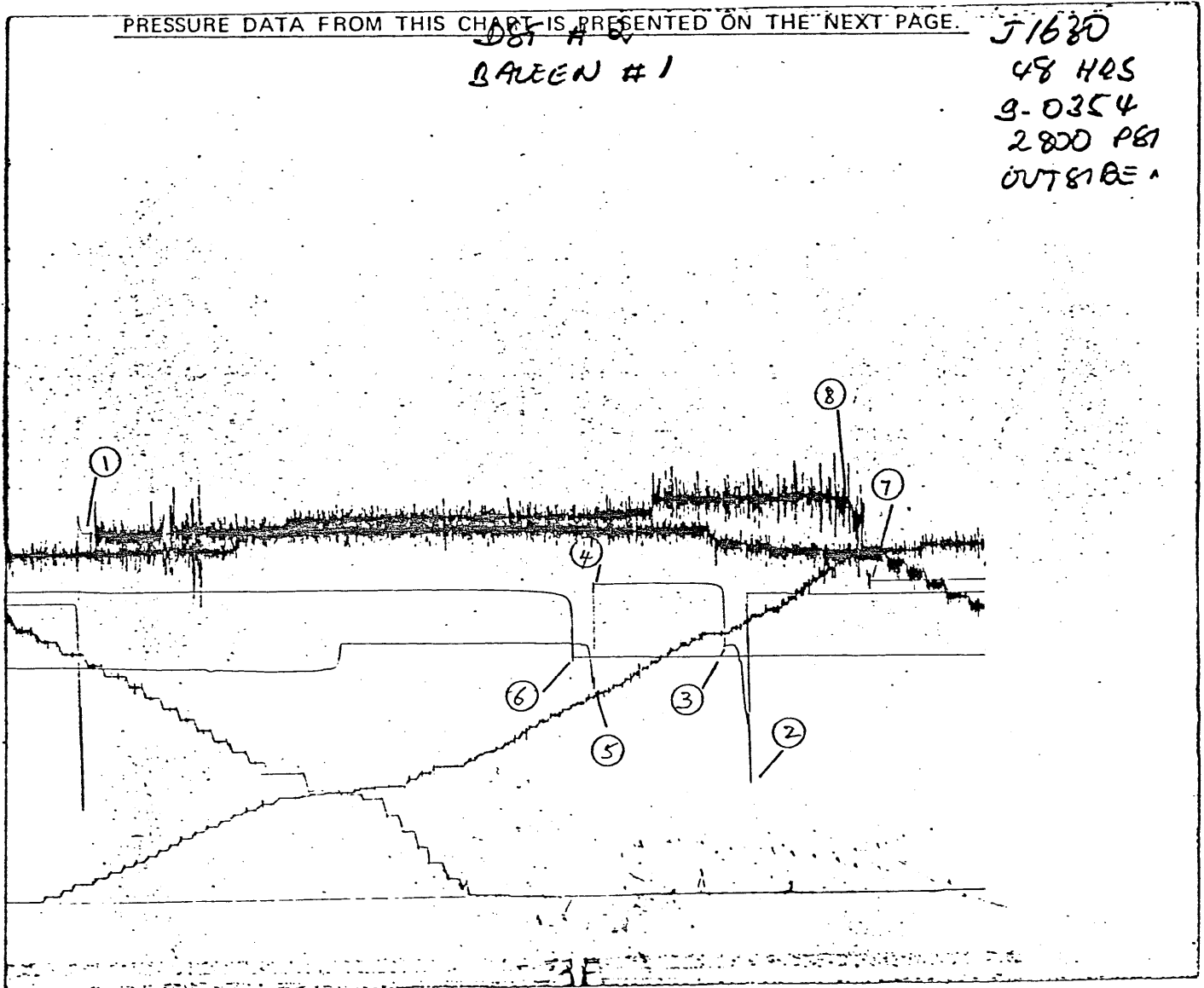
A = 5.357018

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.

*DOT # 5  
GREEN # 1*

*J1630  
48 HRS  
9-0354  
2800 PSI  
OUTSIDE*



PRESSURE DATA FOR RECORDER : J 1630

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
INITIAL HYDROSTATIC	1	1297		
INITIAL FLOW (1)	2	393		
INITIAL FLOW (2)	3	871	6	7
INITIAL SHUT-IN	4	1096	39	38
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)	5	728	0	0
FINAL FLOW (2)	6	841	300	300
FINAL SHUT-IN	7	1096	205	205
FINAL HYDROSTATIC	8	1355		

REMARK :

RECORDER NO : J 1629

CAPACITY : 2800 PSI

DEPTH : 1974.92 FT

OPENING : INSIDE

TEMPERATURES : 77 DEG F

CLOCK NO : 9-0348 CAP: 48 HRS CLOCK TRAVEL : 0.021705 in/min

CALIBRATION DATA AT

M = 559.24843

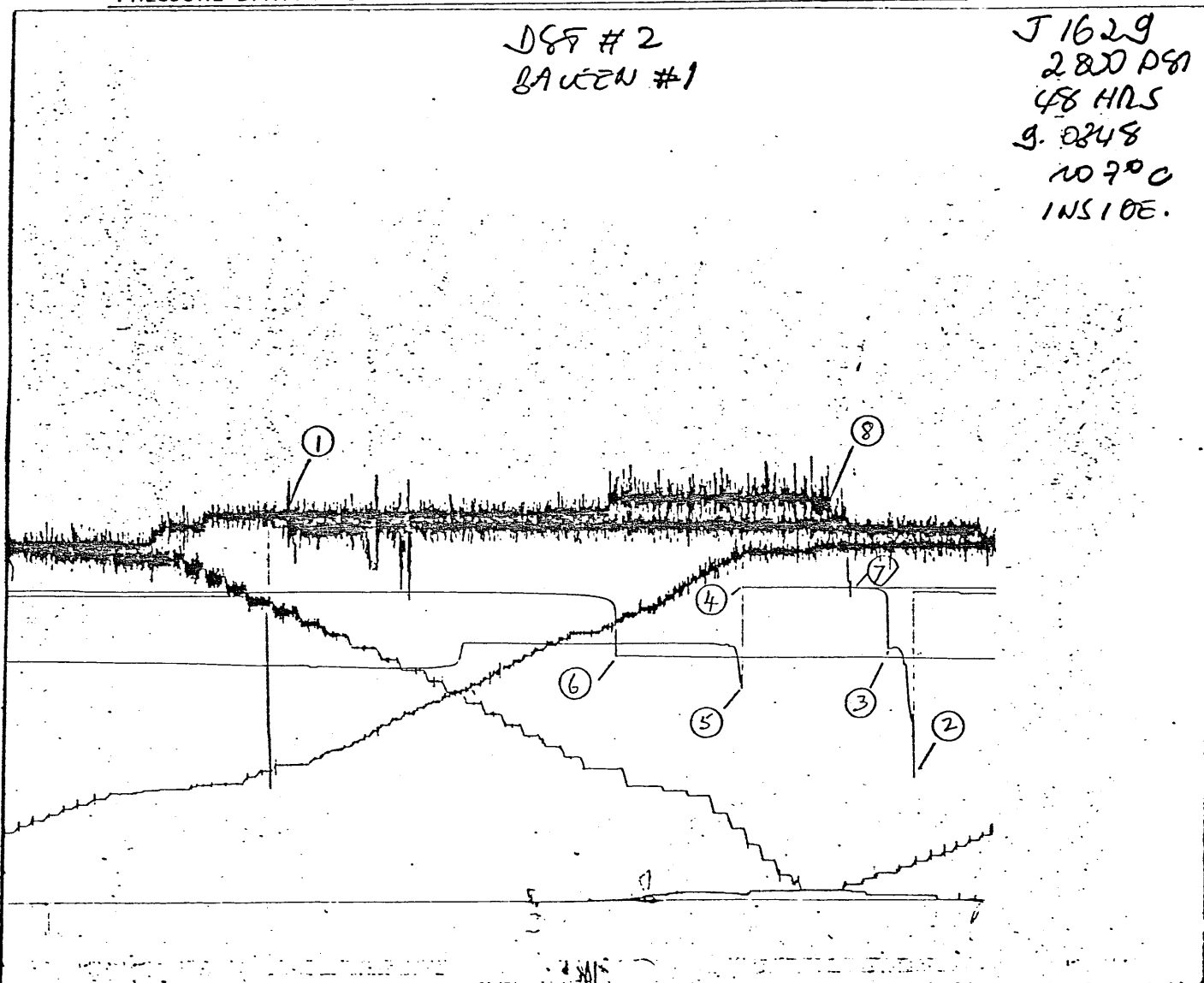
A = 1.08641

PRESSURE (PSI) = DEFLECTION (INS) X M ± A

PRESSURE DATA FROM THIS CHART IS PRESENTED ON THE NEXT PAGE.

DSF # 2  
BAWEN # 1

J 1629  
2800 PSI  
48 HRS  
9-0348  
77.0 C  
INSIDE.



PRESSURE DATA FOR RECORDER : J 1629

DESCRIPTION	LABEL POINT	PRESSURE (PSI)	TIME GIVEN	TIME COMPUTED
INITIAL HYDROSTATIC	1	1334		
INITIAL FLOW (1)	2	426		
INITIAL FLOW (2)	3	866	6	7
INITIAL SHUT-IN	4	1079	39	39
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
THIRD FLOW (1)				
THIRD FLOW (2)				
THIRD SHUT-IN				
FINAL FLOW (1)	5	734	0	0
FINAL FLOW (2)	6	847	300	300
FINAL SHUT-IN	7	1077	025	203
FINAL HYDROSTATIC	8	1358		

REMARK :

## PRESSURE DATA FOR RECORDER : J 1629

LABEL POINT	$\Delta T$ (mins)	PRESSURE (PSI)	$\frac{T + \Delta T}{\Delta T}$	LOG	$P_w - P_f$ (PSI)	COMMENTS
1		1334				INITIAL HYDROSTATIC
2	0	426				INITIAL FLOW (1)
	3	818				
3	7	866				INITIAL FLOW (2)
3	0	866				START SHUT-IN
	1	1060	8.00	0.90	194	T = 7
	2	1067	4.50	0.65	201	
	3	1070	3.33	0.52	204	
	4	1073	2.75	0.44	206	
	5	1074	2.40	0.38	207	
	10	1076	1.70	0.23	210	
	15	1078	1.47	0.17	212	
	20	1078	1.35	0.13	212	
	30	1078	1.23	0.09	212	
4	39	1079	1.18	0.07	213	FINAL SHUT-IN
5	0	734				FINAL FLOW (1)
	20	889				
	40	889				
	60	892				
	80	812				
	100	811				
	150	827				
	200	833				
	250	840				
6	300	847				FINAL FLOW (2)
6	0	847				START SHUT-IN
	1	1027	308.00	2.49	180	T = 307
	2	1037	154.50	2.19	190	
	3	1042	103.33	2.01	195	
	4	1046	77.75	1.89	199	
	5	1049	62.40	1.80	202	
	10	1056	31.70	1.50	209	
	15	1060	21.47	1.33	213	

PRESSURE DATA FOR RECORDER : J 1629

LABEL POINT	$\Delta T$ (mins)	PRESSURE (PSI)	$\frac{T + \Delta T}{\Delta T}$	LOG	$P_w - P_f$ (PSI)	COMMENTS
	20	1062	16.35	1.21	215	
	30	1065	11.23	1.05	218	
	40	1066	8.68	0.94	219	
	50	1068	7.14	0.85	221	
	100	1070	4.07	0.61	223	
	150	1074	3.05	0.48	227	
7	203	1077	2.51	0.40	230	FINAL SHUT-IN
8		1358				FINAL HYDROSTATIC

WELL IDENTIFICATION			
Company: <u>HUBBAY OIL AUSTRALIA</u>	Well No.: <u>BALLEN 1</u>	Test No.: <u>2</u>	
Field: <u>GYPSLAND</u>	Location: <u>BASS STRAIT</u>	Country: <u>AUSTRALIA</u>	
Tested Interval: From <u>2017.78</u> Ft. to <u>2042.16</u> Ft. <u>24.38</u>			
Co-ordinates: _____			
Type Test: Open Hole <input type="checkbox"/> Casing: <input checked="" type="checkbox"/> Conventional <input type="checkbox"/> Straddle: <input type="checkbox"/> Land rig <input type="checkbox"/> Jack-up <input type="checkbox"/> Floater <input checked="" type="checkbox"/>			
Valve: MFE <input type="checkbox"/> PCT <input checked="" type="checkbox"/> SPRO <input checked="" type="checkbox"/> Other: _____ with Packer <input type="checkbox"/> Retainer <input type="checkbox"/>			

HOLE DATA			
Geologic Level: <u>LOWER CRETACEOUS</u>		Description: <u>SANDSTONE, SHALE, MINOR COAL</u>	
Net Productive Interval: <u>24</u> ft.		Estimated Porosity: <u>POOR</u> %	
Total Depth: <u>2386.4</u> ft.		Depths measured from: <u>RKTB</u> Elevation: <u>29.35</u> ft.	
Open Hole Size: <u>8 1/2</u> in.		Rat Hole Size: _____ in., from _____ ft.	
Casing Size: <u>9-5/8</u> in.		<u>40</u> lbs/ft. Liner Size: <u>7</u> in., <u>29</u> lbs/ft. from <u>1417.27</u> ft	
Before test: Caliper Yes <input type="checkbox"/> No <input type="checkbox"/> Scraper Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Circulation Yes <input checked="" type="checkbox"/> for <u>2</u> hrs; No <input type="checkbox"/>			

MUD DATA			
Mud Type: <u>POLYMER</u>		Weight: _____	
Viscosity: <u>38</u>		Water Loss <u>7</u> cc Mud Resistivity _____ at _____ °F	
Filtrate Resistivity: _____ at _____ °F; Chloride ppm: _____			

INSTRUMENT AND CHART DATA				
Recorder No.	J 1782	J 1630	J 1629	SPRO
Capacity (psig)	4700	2800	2800	10000
Depth	2000.16	1994.67	1974.92	1933.59
Inside/Outside	OUTSIDE	OUTSIDE	INSIDE	
Above/Below valve				
Clock No.	9-0936	9-0354	9-0348	
Capacity (hrs.)	96 HRS	48 HRS	48 HRS	
Temperature	78 DEG F	78 DEG F	77 DEG F	
Initial Hydrostatic Pressure				
Pre-flow	(1) Start Pressure			
	(2) Finish Pressure			
CHARTS TO BE READ AT STATION				
Initial Shut-in Pressure				
Second Flow	(1) Start Pressure			
	(2) Finish Pressure			
Second Shut-in Pressure				
Final Flow	(1) Start Pressure			
	(2) Finish Pressure			
Final Shut-in Pressure				
Final Hydrostatic Pressure				

OPERATIONS SUMMARY			
Left Station at _____ : _____ on _____	On Location at _____ : _____ on _____		
Started Operations at <u>00</u> : <u>00</u> on <u>26.11.81</u>		Finished Operations at <u>06</u> : <u>00</u> on <u>27.11.81</u>	
Off Location at _____ : _____ on _____	Return Station at _____ : _____ on _____ Mileage _____		

Comments: COULD NOT OVERRISE PCT / RIG PUMP NOT GOING ABOVE 2000 PSI (COST PRIME).  
TOOLS WORKED OK.

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# Surface Data

Report No. F 81113

Customer: HUBBAY OIL AUSTRALIA	Well No: BALEEN 1	Test No. 2
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### TEST SEQUENCE AND FLOW RATE DATA

Description and Flow Rates	Date	Time		Pressure psig	Surface Choke
		hrs	mins		
Packer Depth: 648 M <del>XX</del> Set at:	26.11.81	08	30		
Opened Tool: (Annulus pressure 1016.3 psi)	"	10	00		
STRONG BLOW (MUD)					
		10	02	480	1/2"
		10	04	797	1/2"
CLOSE TOOL FOR FIRST SHUT-IN		10	06		
OPEN PCT FOR SECOND FLOW		10	45		
GAS RATE + 3.8 MMCFD		10	55	630	1/2"
		12	00	210	1"
CLOSE PCT FOR FINAL SHUT-IN		15	45		
Reverse Circulation Started (Pump pressure 500 psig)		18	40		
Reverse Circulation Finished		19	00		
Pulled Packer Loose/ <del>Retired Out of Retainer</del>		19	10		
Cushion Type : NONE	Amount	bbls ; Length	ft ; Pressure	psi	Bottom Choke 1"

### RECOVERY DATA

	Recovery Description	Feet	Bbls	% Oil	% Water	% Other
1	1/2 CHOKE 4.03 MMSCFD 646 PSI					
2						
3	1" CHOKE 5.85 MMSCFD 242 PSI					
4						
5						
6						

	Oil-API Gravity	Gas Gravity	G.O.R.	Resistivity	Chlorides
1	° at °F	0.578		at °F	ppm
2	° at °F			at °F	ppm
3	° at °F			at °F	ppm
4	° at °F			at °F	ppm
5	° at °F			at °F	ppm
6	° at °F			at °F	ppm

Comments :

Customer: HUBBAY OIL AUSTRALIA Well No.: BALEEN 1 Test No.: 2

SAMPLE CHAMBER RECOVERY DATA			
Sampler Drained On Location <input checked="" type="checkbox"/> Elsewhere <input type="checkbox"/> Name: _____ Address: _____	Recovery		Resistivity
	Gas _____ cu ft.	Water _____ at _____ °F	Chlorides (ppm)
	Oil _____ c.c.	Mud _____ at _____ °F	
	Water _____ c.c.	Mud Filtrate _____ at _____ °F	
	Mud _____ c.c.	Pit Mud _____ at _____ °F	
	_____ °API _____ °F	Pit Mud Filtrate _____ at _____ °F	
Gas/Oil Ratio _____ cu ft./bbl	Sample Chamber Pressure _____	85	psi.

EQUIPMENT SEQUENCE					
Components (including D.P. and D.C.)	Type	O.D. (in)	I.D. (in)	Length	Depth
BULL NOSE 3 1/2 FH BOX	JOHNSTON	4 3/4	2 1/4	0.20	
RECORDER CARRIER J 1782 3 1/2 FH	J 200	"	1 1/2	1.80	
RECORDER CARRIER J 1630 3 1/2 FH	J 200	"	1 1/2	1.80	
PERF. ANCHORS 3 1/2 FH	JOHNSTON	"	2 1/4	6.10	
X O 2-7/8 EUE X 3 1/2 FH	"	"	"	0.32	
POSITEST 6-5/8 - 7 7-5/8 29	"	5.83	2.0	0.67	647.43
W / OY PASS	"	5.83	2.0	0.41	
X O 3 1/2 FH X 2-7/8 IF	"	4 3/4	2 1/4	0.33	
SAFETY JOINT 3 1/2 FH	BOWEN	4 3/4	2-7/8	0.60	
TR 63 HYDRAULIC JAR 3 1/2 FH	JOHNSTON	4 3/4	1 1/2	2.35	
RECORDER CARRIER J 1629 3 1/2 FH	J 200	4 3/4	1 1/2	1.80	
MFE/HRT ACME BOX X 3 1/2 FH PIN	JOHNSTON	5	1-3/8	2.80	
PCT ACME BOX X 3 1/2 FH PIN	"	4 3/4	1	4.66	
X O ACME PIN X 3 1/2 FH PIN	"	4 3/4	2 1/4		
SPRO BARREL ACME BOX / BOX	"	4 3/4	2 1/4		
LIFTING SUB 3 1/2 FH BOX X ACME PIN	"	3 1/2	2 1/4		
X O 3 1/2 IF BOX X 3 1/2 FH PIN	"	4 3/4	2 1/4	2.69	
DRILL COLLAR 3 1/2 IF (X1)	-	4 3/4	2 1/4	9.46	
PUMP OUT SUB 3 1/2 IF	JOHNSTON	4 3/4	2 1/4	0.36	
DRILL COLLAR 3 1/2 IF (X 2)	-	4 3/4	2 1/4	18.30	
PUMP OUT SUB 3 1/2 IF	JOHNSTON	4 3/4	2 1/4	0.36	
DRILL COLLAR 3 1/2 IF (X15)	-	4 3/4	2 1/4	139.99	
SLIP JOINT 3 1/2 IF	JOHNSTON	4 3/4	2 1/4	7.16	
SLIP JOINT 3 1/2 IF	"	4 3/4	2 1/4	8.68	
DRILL COLLAR 3 1/2 IF (X3)	-	4 3/4	2 1/4	28.31	
X O 3 1/2 PH 6 X 3 1/2 IF	-	4 3/4	2.6	0.20	
TUBING	-	3 1/2	2.6	359.77	
X O 4 1/2 ACME PIN X 3 1/2 PH 6 PIN	-	4 1/2	2 1/4	0.20	
FLUTE HANGER 4 1/2 ACME BOX / BOX	-			0.80	
SLICK JOINT 4 1/2 ACME PIN / PIN		5		1.80	
E2 TREE 4 1/2 ACME BOX / BOX	FLOPETROL			2.44	
SAVER SUB 4 1/2 ACME BOX / PIN				0.26	
SPACER SUB 4 1/2 ACME BOX / PIN				1.52	
X O 4 1/2 IF BOX X 4 1/2 ACME PIN				0.33	
HWDP (2 STANDS) 4 1/2 IF BOX X PIN	PETRONAS	5	4.276	56.71	
X O SUB 6 1/2 ACME PIN X 4 1/2 IF					
FLOW HEAD	FLOPETROL				
STICK UP APPROX. 4.86 M					
SPRO DEPTH APPROX. 630.13 M					
Total Drill Pipe					
Total Drill Collar					

Comments: \_\_\_\_\_





SYMBOLS USED

- $\Delta T$  - INCREMENT OF TIME (MINUTES)
- $\frac{T + \Delta T}{\Delta T}$  - DIMENSIONLESS TIME CONSTANT USED FOR THE HORNER PLOT  
 $\Delta T$  IS THE INCREMENT OF SHUT-IN TIME (MINUTES)  
 $T$  IS TOTAL FLOW TIME PRECEDING SHUT-IN (MINUTES)
- LOG - LOGARITHM TO BASE 10 OF  $\frac{T + \Delta T}{\Delta T}$
- $P_w - P_f$  - PRESSURE BUILD-UP ABOVE FINAL FLOWING PRESSURE PRECEDING THE BUILD UP WHICH IS USED FOR THE MCKINLEY PLOT.

DOWELL SCHLUMBERGER

\*\*\*\*\*

SURFACE  
PRESSURE  
READ  
OUT  
\*\*\*\*\*

COMPANY HUDBAY AUSTRALIA

WELL BALEEN #1

TEST #2

DEPTH 647mt

PRESS/TEMP GAUGE FLOPETROL #81205

GAUGE CAPACITY 10000 psia

GAUGE DEPTH 588.7 mt

TIME	DEL T	PRESSURE	TEMPERATURE	T+DEL T	LOG(T+DEL T)	PRESSURE	COMMENTS
HR:MN:SE	MIN	PSI	DEGREES F	DEL T	( DEL T )	DIFF	
09:55:00		1016.4	107.50				
09:55:39		1016.4	107.50				
09:55:40		1016.4	107.50				
09:55:50		1016.4	107.50				
09:56:00		1016.4	107.58				
09:56:10		1016.5	107.58				
09:56:20		1016.4	107.58				
09:56:30		1016.4	107.58				
09:56:40		1016.5	107.58				
09:56:50		1016.4	107.58				
09:57:00		1016.5	107.65				
09:57:10		1016.5	107.65				

09:57:50		1016.5	107.65
09:58:00		1016.5	107.71
09:58:10		1016.5	107.71
09:58:20		1016.5	107.71
09:58:30		1016.5	107.71
09:58:40		1016.5	107.71
09:58:50		1016.5	107.71
09:59:00		1016.5	107.75
09:59:10		1016.8	107.75
09:59:20		1017.1	107.75
09:59:30		1017.4	107.75
09:59:40		1017.4	107.75
09:59:50		1017.4	107.75
10:00:00	0.0	225.6	107.79
10:00:10	0.2	412.6	107.79
10:00:20	0.3	461.8	107.79
10:00:30	0.5	476.8	107.79
10:00:40	0.7	476.3	107.79
10:00:50	0.8	491.9	107.79
10:01:00	1.0	504.9	107.88
10:01:10	1.2	537.5	107.88
10:01:20	1.3	581.1	107.88
10:01:30	1.5	629.9	107.88
10:01:40	1.7	676.8	107.88
10:01:50	1.8	723.0	107.88
10:02:00	2.0	757.5	108.03
10:02:10	2.2	755.3	108.03
10:02:20	2.3	749.7	108.03
10:02:30	2.5	760.7	108.03
10:02:40	2.7	774.9	108.03
10:02:50	2.8	787.5	108.03
10:03:00	3.0	798.6	108.13
10:03:10	3.2	806.0	108.13
10:03:20	3.3	813.4	108.13
10:03:30	3.5	817.9	108.13
10:03:40	3.7	819.8	108.13
10:03:50	3.8	820.0	108.13
10:04:00	4.0	819.6	108.21
10:04:10	4.2	819.5	108.21
10:04:20	4.3	818.0	108.21
10:04:30	4.5	817.4	108.21
10:04:40	4.7	815.8	108.21

10:05:10

5.2

808.9

108.26

10:05:20	5.3	805.7	108.26			
10:05:30	5.5	804.6	108.26			
10:05:40	5.7	804.1	108.26			
10:05:50	5.8	802.7	108.26			
10:06:00	6.0	802.2	108.30			
10:06:10	6.2	801.6	108.30			
10:06:20	6.3	800.3	108.30			
10:06:30	6.5	799.6	108.30			
10:06:40	6.7	797.2	108.30			
10:06:50	6.8	998.3	108.30			
10:07:00	0.2	1038.9	108.29	42.000	1.6232	41
10:07:10	0.3	1046.8	108.29	21.500	1.3324	49
10:07:20	0.5	1051.0	108.29	14.667	1.1663	53
10:07:30	0.7	1053.5	108.29	11.250	1.0512	55
10:07:40	0.8	1055.6	108.29	9.200	0.9638	57
10:07:50	1.0	1057.5	108.29	7.833	0.8939	59
10:08:02	1.2	1059.1	108.17	6.694	0.8257	61
10:08:11	1.4	1060.2	108.17	6.062	0.7826	62
10:08:21	1.5	1061.3	108.17	5.505	0.7408	63
10:08:31	1.7	1062.2	108.17	5.059	0.7041	64
10:08:42	1.9	1063.2	108.17	4.661	0.6685	65
10:08:51	2.0	1063.8	108.17	4.388	0.6423	66
10:09:00	2.2	1064.4	107.96	4.154	0.6185	66
10:09:10	2.3	1065.0	107.96	3.929	0.5942	67
10:09:20	2.5	1065.6	107.96	3.733	0.5721	67
10:09:30	2.7	1066.1	107.96	3.563	0.5518	68
10:09:40	2.8	1066.6	107.96	3.412	0.5330	68
10:09:50	3.0	1067.0	107.96	3.278	0.5156	69
10:10:00	3.2	1067.3	107.76	3.158	0.4994	69
10:10:10	3.3	1067.6	107.76	3.050	0.4843	69
10:10:20	3.5	1067.9	107.76	2.952	0.4702	70
10:10:30	3.7	1068.2	107.76	2.864	0.4569	70
10:10:40	3.8	1068.5	107.76	2.783	0.4445	70
10:10:50	4.0	1068.7	107.76	2.708	0.4327	70
10:11:00	4.2	1068.8	107.57	2.640	0.4216	70
10:11:10	4.3	1069.0	107.57	2.577	0.4111	71
10:11:20	4.5	1069.2	107.57	2.519	0.4011	71
10:11:30	4.7	1069.4	107.57	2.464	0.3917	71
10:11:40	4.8	1069.6	107.57	2.414	0.3827	71
10:11:50	5.0	1069.8	107.57	2.367	0.3741	71
				2.323	0.3660	72

10:12:50	6.0	1070.5	107.43	2.139	0.3302	72
10:13:00	6.2	1070.5	107.32	2.108	0.3239	72
10:13:10	6.3	1070.7	107.32	2.079	0.3178	72
10:13:20	6.5	1070.8	107.32	2.051	0.3120	73
10:13:30	6.7	1070.9	107.32	2.025	0.3064	73
10:13:40	6.8	1071.0	107.32	2.000	0.3010	73
10:13:50	7.0	1071.0	107.32	1.976	0.2958	73
10:14:00	7.2	1071.1	107.26	1.953	0.2908	73
10:14:10	7.3	1071.2	107.26	1.932	0.2860	73
10:14:20	7.5	1071.3	107.26	1.911	0.2813	73
10:14:30	7.7	1071.3	107.26	1.891	0.2768	73
10:14:40	7.8	1071.4	107.26	1.872	0.2724	73
10:14:50	8.0	1071.5	107.26	1.854	0.2681	73
10:15:00	8.2	1071.5	107.22	1.837	0.2640	73
10:15:10	8.3	1071.6	107.22	1.820	0.2601	73
10:15:20	8.5	1071.6	107.22	1.804	0.2562	73
10:15:30	8.7	1071.7	107.22	1.788	0.2525	73
10:15:40	8.8	1071.7	107.22	1.774	0.2489	73
10:15:50	9.0	1071.8	107.22	1.759	0.2453	74
10:16:00	9.2	1071.8	107.20	1.745	0.2419	74
10:16:10	9.3	1071.9	107.20	1.732	0.2386	74
10:16:20	9.5	1071.9	107.20	1.719	0.2354	74
10:16:30	9.7	1072.0	107.20	1.707	0.2322	74
10:16:40	9.8	1072.0	107.20	1.695	0.2291	74
10:16:50	10.0	1072.0	107.20	1.683	0.2262	74
10:17:00	10.2	1072.1	107.20	1.672	0.2233	74
10:17:10	10.3	1072.2	107.20	1.661	0.2204	74
10:17:20	10.5	1072.2	107.20	1.651	0.2177	74
10:17:30	10.7	1072.2	107.20	1.641	0.2150	74
10:17:40	10.8	1072.3	107.20	1.631	0.2124	74
10:17:50	11.0	1072.3	107.20	1.621	0.2098	74
10:18:00	11.2	1072.3	107.20	1.612	0.2073	74
10:18:10	11.3	1072.4	107.20	1.603	0.2049	74
10:18:20	11.5	1072.4	107.20	1.594	0.2025	74
10:18:30	11.7	1072.4	107.20	1.586	0.2002	74
10:18:40	11.8	1072.5	107.20	1.577	0.1980	74
10:18:50	12.0	1072.5	107.20	1.569	0.1957	74
10:19:00	12.2	1072.5	107.21	1.562	0.1936	74
10:19:10	12.3	1072.6	107.21	1.554	0.1915	74
10:19:20	12.5	1072.6	107.21	1.547	0.1894	74



10:19:50	13.0	1072.7	107.21	1.520	0.1835	74
10:20:00	13.2	1072.7	107.22	1.519	0.1816	74
10:20:10	13.3	1072.7	107.22	1.513	0.1797	74

10:20:20	13.5	1072.7	107.22	1.506	0.1779	74
10:20:30	13.7	1072.8	107.22	1.500	0.1761	74
10:20:40	13.8	1072.8	107.22	1.494	0.1743	74
10:20:50	14.0	1072.8	107.22	1.488	0.1726	75
10:21:00	14.2	1072.8	107.23	1.482	0.1710	75
10:21:10	14.3	1072.9	107.23	1.477	0.1693	75
10:21:20	14.5	1072.9	107.23	1.471	0.1677	75
10:21:30	14.7	1072.9	107.23	1.466	0.1661	75
10:21:40	14.8	1072.9	107.23	1.461	0.1646	75
10:21:50	15.0	1073.0	107.23	1.456	0.1630	75
10:22:00	15.2	1072.9	107.25	1.451	0.1615	75
10:22:10	15.3	1073.0	107.25	1.446	0.1601	75
10:22:20	15.5	1073.0	107.25	1.441	0.1586	75
10:22:30	15.7	1073.0	107.25	1.436	0.1572	75
10:22:40	15.8	1073.0	107.25	1.432	0.1558	75
10:22:50	16.0	1073.0	107.25	1.427	0.1544	75
10:23:00	16.2	1072.5	106.11	1.423	0.1531	74
10:24:00	17.2	1073.2	107.29	1.398	0.1455	75
10:25:00	18.2	1073.2	107.31	1.376	0.1387	75
10:30:00	23.2	1073.5	107.41	1.295	0.1123	75
10:31:40	24.8	1073.6	107.45	1.275	0.1056	75
10:31:50	25.0	1073.6	107.45	1.273	0.1049	75
10:32:00	25.2	1073.6	107.48	1.272	0.1043	75
10:32:10	25.3	1073.6	107.48	1.270	0.1037	75
10:32:20	25.5	1073.6	107.48	1.268	0.1031	75
10:32:30	25.7	1073.6	107.48	1.266	0.1025	75
10:32:40	25.8	1073.6	107.48	1.265	0.1019	75
10:32:50	26.0	1073.7	107.48	1.263	0.1013	75
10:33:00	26.2	1073.6	107.50	1.261	0.1008	75
10:33:10	26.3	1073.7	107.50	1.259	0.1002	75
10:33:20	26.5	1073.6	107.50	1.258	0.0996	75
10:33:30	26.7	1073.6	107.50	1.256	0.0991	75
10:33:40	26.8	1073.7	107.50	1.255	0.0985	75
10:33:50	27.0	1073.6	107.50	1.253	0.0980	75
10:34:00	27.2	1073.7	107.52	1.252	0.0974	75
10:34:10	27.3	1073.6	107.52	1.250	0.0969	75
10:34:20	27.5	1073.7	107.52	1.248	0.0964	75
10:34:30	27.7	1073.7	107.52	1.247	0.0959	75
10:34:40	27.8	1073.7	107.52	1.246	0.0953	75

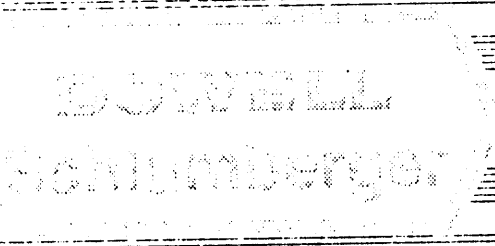
10:35:30	28.7	1073.7	107.54	1.238	0.0929	75
10:35:40	28.8	1073.7	107.54	1.237	0.0924	75

10:35:50	29.0	1073.7	107.54	1.236	0.0919	75
10:36:00	29.2	1073.7	107.56	1.234	0.0914	75
10:36:10	29.3	1073.7	107.56	1.233	0.0909	75
10:36:20	29.5	1073.7	107.56	1.232	0.0905	75
10:36:30	29.7	1073.7	107.56	1.230	0.0900	75
10:37:00	30.2	1073.8	107.58	1.227	0.0887	75
10:38:00	31.2	1072.7	105.30	1.219	0.0861	74
10:39:00	32.2	1073.8	107.62	1.212	0.0837	75
10:40:00	33.2	1073.8	107.64	1.206	0.0814	76
10:41:00	34.2	1073.8	107.66	1.200	0.0792	76
10:42:00	35.2	1073.9	107.67	1.194	0.0771	76
10:43:00	36.2	1073.9	107.69	1.189	0.0752	76
10:44:00	37.2	1073.9	107.70	1.184	0.0733	76
10:44:59	38.1	1073.9	107.71	1.179	0.0716	76
10:45:02	38.2	1073.9	107.71	1.179	0.0715	76
10:45:10	38.3	1073.9	107.71	1.178	0.0712	76
10:45:20	38.5	1013.5	107.71	1.177	0.0710	75
10:45:30	38.7	685.1	107.71	1.177	0.0707	-313

10:45:40	0.2	585.7	107.71			
10:45:50	0.3	596.7	107.71			
10:46:00	0.5	595.2	107.70			
10:46:10	0.7	632.7	107.70			
10:46:20	0.8	680.9	107.70			
10:46:30	1.0	714.6	107.70			
10:46:40	1.2	743.6	107.70			
10:46:50	1.3	767.6	107.70			
10:47:00	1.5	785.4	107.44			
10:47:10	1.7	800.6	107.44			
10:47:20	1.8	810.9	107.44			
10:47:30	2.0	818.3	107.44			
10:47:40	2.2	823.2	107.44			
10:47:50	2.3	825.6	107.44			
10:48:00	2.5	826.0	107.08			
10:48:10	2.7	825.9	107.08			
10:48:20	2.8	825.3	107.08			
10:48:30	3.0	824.2	107.08			
10:48:40	3.2	822.9	107.08			
10:48:50	3.3	821.8	107.08			
10:49:00	3.5	817.7	106.81			
10:49:10	3.7	815.6	106.81			

10:49:40	4.2	813.0	106.81
10:49:50	4.3	811.7	106.81
10:50:00	4.5	807.1	106.64

10:50:10	4.7	808.2	106.64
10:50:20	4.8	800.8	106.64
10:50:30	5.0	801.9	106.64
10:50:40	5.2	803.2	106.64
10:50:50	5.3	805.2	106.64
10:51:00	5.5	805.6	106.51
10:51:10	5.7	806.6	106.51
10:51:20	5.8	809.1	106.51
10:51:30	6.0	811.1	106.51
10:51:40	6.2	813.3	106.51
10:51:50	6.3	815.0	106.51
10:52:00	6.5	815.9	106.39
10:52:10	6.7	816.5	106.39
10:52:20	6.8	817.3	106.39
10:52:30	7.0	817.7	106.39
10:52:40	7.2	818.0	106.39
10:52:50	7.3	818.2	106.39
10:53:00	7.5	818.1	106.28
10:53:10	7.7	818.3	106.28
10:53:20	7.8	818.1	106.28
10:53:30	8.0	817.9	106.23
10:53:40	8.2	817.8	106.23
10:53:50	8.3	818.1	106.23
10:54:00	8.5	818.0	106.16
10:54:10	8.7	817.5	106.16
10:54:20	8.8	817.2	106.16
10:54:30	9.0	816.7	106.16
10:54:40	9.2	816.0	106.16
10:54:50	9.3	816.3	106.16
10:55:01	9.5	816.7	106.05
10:55:10	9.7	816.1	106.05
10:55:20	9.8	815.8	106.05
10:55:30	10.0	815.8	106.05
10:55:40	10.2	815.3	106.05
10:55:50	10.3	815.5	106.05
10:56:00	10.5	785.1	24.71
10:56:10	10.7	784.7	24.71
10:56:20	10.8	784.8	24.71
10:56:30	11.0	784.5	24.71



10:57:10	11.7	814.4	105.81
10:57:20	11.8	814.4	105.81
10:57:30	12.0	813.9	105.81

10:57:40	12.2	814.3	105.81
10:57:50	12.3	813.8	105.81
10:58:00	12.5	813.1	105.68
10:58:10	12.7	812.6	105.68
10:58:20	12.8	812.3	105.68
10:58:30	13.0	811.9	105.68
10:58:40	13.2	811.8	105.68
10:58:50	13.3	811.3	105.68
10:59:00	13.5	811.0	105.55
10:59:10	13.7	811.1	105.55
10:59:20	13.8	811.2	105.55
10:59:30	14.0	810.7	105.55
10:59:40	14.2	811.8	105.55
10:59:50	14.3	813.3	105.55
11:00:00	14.5	814.4	105.41
11:00:10	14.7	815.3	105.41
11:00:20	14.8	815.8	105.41
11:00:30	15.0	816.5	105.41
11:00:40	15.2	816.9	105.41
11:00:50	15.3	817.3	105.41
11:01:00	15.5	817.6	105.28
11:01:10	15.7	817.9	105.28
11:01:20	15.8	818.1	105.28
11:01:30	16.0	818.2	105.28
11:01:40	16.2	818.4	105.28
11:01:50	16.3	818.0	105.28
11:02:00	16.5	817.8	105.16
11:02:10	16.7	817.7	105.16
11:02:20	16.8	817.7	105.16
11:02:30	17.0	817.6	105.16
11:02:40	17.2	817.3	105.16
11:02:50	17.3	817.0	105.16
11:03:00	17.5	817.1	105.05
11:03:10	17.7	816.7	105.05
11:03:20	17.8	817.0	105.05
11:03:30	18.0	816.9	105.05
11:03:40	18.2	817.0	105.05
11:03:50	18.3	816.9	105.05
11:04:00	18.5	816.9	104.96

BRUNNEN  
SCHUMBERGER

11:04:40	19.2	817.0	104.96
11:04:50	19.3	817.0	104.96
11:05:01	19.5	817.0	104.87

11:05:10	19.7	817.1	104.87
11:05:20	19.8	817.0	104.87
11:05:30	20.0	817.0	104.87
11:05:40	20.2	816.9	104.87
11:05:50	20.3	816.6	104.87
11:06:00	20.5	816.8	104.80
11:06:10	20.7	816.9	104.80
11:06:20	20.8	816.9	104.80
11:06:30	21.0	816.7	104.80
11:06:40	21.2	816.6	104.80
11:06:50	21.3	816.3	104.80
11:07:00	21.5	816.0	103.60
11:07:10	21.7	816.2	103.60
11:07:20	21.8	815.9	103.60
11:07:30	22.0	815.8	103.60
11:07:40	22.2	816.0	103.60
11:07:50	22.3	815.9	103.60
11:08:00	22.5	816.3	104.67
11:08:10	22.7	816.4	104.67
11:08:20	22.8	816.3	104.67
11:08:30	23.0	816.3	104.67
11:08:40	23.2	816.2	104.67
11:08:50	23.3	816.2	104.67
11:09:00	23.5	816.2	104.60
11:09:10	23.7	816.2	104.60
11:09:20	23.8	816.2	104.60
11:09:30	24.0	816.3	104.60
11:09:40	24.2	815.7	104.60
11:09:50	24.3	816.0	104.60
11:10:00	24.5	815.3	103.42
11:10:10	24.7	815.4	103.42
11:10:20	24.8	815.3	103.42
11:10:30	25.0	815.0	103.42
11:10:40	25.2	814.9	103.42
11:10:50	25.3	815.0	103.42
11:11:00	25.5	815.5	104.50
11:11:10	25.7	815.3	104.50
11:11:20	25.8	815.3	104.50
11:11:30	26.0	815.3	104.50
11:11:40	26.2	815.3	104.50

11:12:10	26.7	813.8	102.21
11:12:20	26.8	813.8	102.21
11:12:30	27.0	813.7	102.21

11:12:40	27.2	813.5	102.21
11:12:50	27.3	813.5	102.21
11:13:00	27.5	814.4	104.40
11:13:10	27.7	814.4	104.40
11:13:20	27.8	814.2	104.40
11:13:30	28.0	814.1	104.40
11:13:40	28.2	813.9	104.40
11:13:50	28.3	813.8	104.40

11:14:00	28.5	813.3	103.23
11:14:10	28.7	813.1	103.23
11:14:20	28.8	813.1	103.23
11:14:30	29.0	813.2	103.23
11:14:40	29.2	813.5	103.23
11:14:50	29.3	813.9	103.23
11:15:00	29.5	814.8	104.31
11:15:10	29.7	815.3	104.31
11:15:20	29.8	815.3	104.31
11:15:30	30.0	815.4	104.31
11:15:40	30.2	815.5	104.31
11:15:50	30.3	815.6	104.31
11:16:00	30.5	815.7	104.27
11:16:10	30.7	815.6	104.27
11:16:20	30.8	815.5	104.27
11:16:30	31.0	815.5	104.27
11:17:00	31.5	815.3	104.24
11:18:00	32.5	814.8	104.20
11:19:00	33.5	814.4	104.18
11:20:00	34.5	813.9	104.15
11:21:00	35.5	813.9	104.12
11:22:00	36.5	813.9	104.09
11:23:00	37.5	813.8	104.07
11:24:00	38.5	813.2	104.04
11:25:00	39.5	813.2	104.02
11:26:00	40.5	813.3	103.99
11:27:00	41.5	813.3	103.97
11:28:00	42.5	813.4	103.95

11:33:00	47.5	813.4	103.89
11:34:00	48.5	813.6	103.88
11:35:00	49.5	814.1	103.87
11:36:00	50.5	814.3	103.86
11:37:00	51.5	814.2	103.86

11:38:00	52.5	813.7	101.63
11:39:00	53.5	814.8	103.85
11:40:00	54.5	814.7	103.85
11:41:00	55.5	813.5	101.62
11:42:00	56.5	814.9	103.85
11:43:00	57.5	814.8	103.85
11:44:00	58.5	814.9	103.85
11:45:00	59.5	815.4	103.85
11:46:00	60.5	815.7	103.85
11:47:00	61.5	815.8	103.86
11:48:00	62.5	815.8	103.86
11:49:00	63.5	815.9	103.87
11:50:00	64.5	816.2	103.88
11:51:00	65.5	816.4	103.88
11:52:00	66.5	816.3	103.89
11:53:00	67.5	816.4	103.89
11:54:00	68.5	816.6	103.90
11:55:00	69.5	816.7	103.91
11:56:00	70.5	817.0	103.91
11:57:00	71.5	817.4	103.92
11:58:00	72.5	817.6	103.93
11:59:00	73.5	817.7	103.94
12:00:00	74.5	808.7	103.95
12:01:00	75.5	725.4	103.95
12:02:00	76.5	662.7	103.87
12:03:00	77.5	655.3	103.53
12:04:00	78.5	651.9	102.98
12:05:00	79.5	654.9	102.33
12:06:00	80.5	650.2	101.70
12:07:00	81.5	645.5	100.02
12:08:00	82.5	643.4	99.50
12:09:00	83.5	642.7	100.12
12:10:00	84.5	640.8	99.70
12:11:00	85.5	641.3	99.33
12:12:00	86.5	640.8	99.01
12:13:00	87.5	640.9	98.73
12:14:00	88.5	640.8	97.41

BRUNNEN  
Schramberg

12:17:00	91.5	642.8	97.93
12:18:00	92.5	642.5	96.74
12:20:00	94.5	644.4	97.69
12:22:00	96.5	645.6	97.52
12:24:00	98.5	646.5	97.39
12:26:00	100.5	646.9	97.31

12:28:00	102.5	\$\$\$\$\$\$	97.24			
12:30:00	104.5	\$\$\$\$\$\$	97.01			
12:32:06	106.6	\$\$\$\$\$\$	34.34			
12:33:20	107.8	648.9	96.58			
00:00:10	495.3	656.1	96.80	1.603	0.2049	-75
00:00:20	495.5	656.3	96.80	1.603	0.2049	-74
00:00:30	495.7	656.1	96.80	1.603	0.2048	-75
12:44:18	1259.5	656.0	96.80	1.237	0.0924	-75
12:44:26	1259.6	650.5	96.91	1.237	0.0924	-80
12:44:30	1259.7	650.0	96.91	1.237	0.0924	-81
12:44:40	1259.8	649.8	96.91	1.237	0.0924	-81
12:44:50	1260.0	649.5	96.91	1.237	0.0924	-81
12:45:03	1260.2	649.6	96.94	1.237	0.0924	-81
12:50:00	1265.2	651.6	96.98	1.236	0.0920	-79
12:55:00	1270.2	652.3	97.04	1.235	0.0917	-78
13:00:00	1275.2	655.3	97.08	1.234	0.0914	-75
13:05:00	1280.2	657.8	97.18	1.233	0.0911	-73
13:10:00	1285.2	659.7	97.29	1.232	0.0908	-71
13:15:00	1290.2	661.4	97.40	1.231	0.0904	-69
13:20:00	1295.2	662.7	97.50	1.231	0.0901	-68
13:25:00	1300.2	663.8	97.59	1.230	0.0898	-67
13:30:00	1305.2	662.7	97.67	1.229	0.0895	-68
13:35:00	1310.2	662.6	97.71	1.228	0.0892	-68
13:52:34	1327.7	665.2	97.71	1.225	0.0881	-65
13:53:29	1328.7	642.8	34.35	1.225	0.0881	-88
13:53:37	1328.8	665.7	97.54	1.225	0.0881	-65
13:53:40	1328.8	665.8	97.54	1.225	0.0881	-65
13:53:50	1329.0	665.9	97.54	1.225	0.0880	-65
13:54:00	1329.2	666.1	97.56	1.225	0.0880	-65
13:54:10	1329.3	666.0	97.56	1.225	0.0880	-65
13:54:20	1329.5	666.4	97.56	1.225	0.0880	-64
13:54:30	1329.7	666.3	97.56	1.225	0.0880	-64
13:54:40	1329.8	666.5	97.56	1.225	0.0880	-64
13:54:50	1330.0	666.1	97.56	1.225	0.0880	-65
13:55:00	1330.2	666.2	97.61	1.225	0.0880	-64

FLOPET. GAUGE JUMPED AHEAD 48H



14:20:00	1355.2	665.6	97.91	1.220	0.0865	-65
14:21:49	1357.0	652.7	60.21	1.220	0.0864	-78
14:21:50	1357.0	652.7	60.21	1.220	0.0864	-78
14:22:02	1357.2	\$\$\$\$\$\$	37.91	1.220	0.0864	\$\$\$\$\$
14:22:22	1357.5	-663.1	37.91	1.220	0.0864	-1394

14:22:30	1357.7	642.0	37.91	1.220	0.0864	-89
14:22:40	1357.8	643.4	37.91	1.220	0.0863	-87
14:22:50	1358.0	644.1	37.91	1.220	0.0863	-87
14:23:00	1358.2	666.3	97.63	1.220	0.0863	-64
14:23:10	1358.3	666.4	97.63	1.220	0.0863	-64
14:25:00	1360.2	667.4	97.63	1.220	0.0862	-63
14:30:00	1365.2	667.0	97.78	1.219	0.0859	-64
14:35:00	1370.2	669.9	97.94	1.218	0.0856	-61
14:40:00	1375.2	670.3	98.03	1.217	0.0854	-60
14:45:00	1380.2	669.0	98.11	1.216	0.0851	-62
14:50:00	1385.2	668.2	98.14	1.216	0.0848	-63
14:55:00	1390.2	667.4	98.13	1.215	0.0845	-63
15:00:00	1395.2	666.9	98.09	1.214	0.0842	-64
15:05:00	1400.2	667.4	98.05	1.213	0.0840	-63
15:10:00	1405.2	667.4	98.04	1.213	0.0837	-63
15:15:00	1410.2	\$\$\$\$\$\$	98.04	1.212	0.0834	\$\$\$\$\$
15:20:00	1415.2	667.6	98.05	1.211	0.0832	-63
15:25:00	1420.2	669.3	98.07	1.210	0.0829	-61
15:28:38	1423.8	669.4	98.08	1.210	0.0827	-61
15:28:46	1423.9	669.5	98.09	1.210	0.0827	-61
15:28:50	1424.0	669.0	98.09	1.210	0.0827	-62
15:29:00	1424.2	668.9	98.09	1.210	0.0827	-62
15:29:10	1424.3	669.4	98.09	1.210	0.0827	-61
15:29:20	1424.5	669.2	98.09	1.210	0.0827	-62
15:29:30	1424.7	669.3	98.09	1.210	0.0827	-61
15:29:40	1424.8	669.4	98.09	1.210	0.0826	-61
15:29:50	1425.0	669.4	98.09	1.210	0.0826	-61
15:30:00	1425.2	669.8	98.08	1.210	0.0826	-61
15:30:10	1425.3	669.7	98.08	1.210	0.0826	-61
15:30:20	1425.5	669.3	98.08	1.210	0.0826	-61
15:30:30	1425.7	669.4	98.08	1.209	0.0826	-61
15:30:40	1425.8	669.3	98.08	1.209	0.0826	-61
15:30:50	1426.0	669.2	98.08	1.209	0.0826	-61
15:31:00	1426.2	669.2	98.08	1.209	0.0826	-61
15:31:10	1426.3	669.4	98.08	1.209	0.0826	-61
15:31:20	1426.5	669.5	98.08	1.209	0.0826	-61
15:31:30	1426.7	669.5	98.08	1.209	0.0826	-61

15:32:00	1427.2	669.1	98.07	1.209	0.0825	-62
15:32:10	1427.3	669.3	98.07	1.209	0.0825	-61
15:32:20	1427.5	669.1	98.07	1.209	0.0825	-62
15:32:30	1427.7	669.3	98.07	1.209	0.0825	-61
15:32:40	1427.8	669.7	98.07	1.209	0.0825	-61
15:32:50	1428.0	669.6	98.07	1.209	0.0825	-61

15:33:00	1428.2	669.5	98.07	1.209	0.0825	-61
15:33:10	1428.3	669.7	98.07	1.209	0.0825	-61
15:33:20	1428.5	669.9	98.07	1.209	0.0825	-61
15:33:30	1428.7	669.7	98.07	1.209	0.0824	-61
15:33:40	1428.8	669.5	98.07	1.209	0.0824	-61
15:33:50	1429.0	669.9	98.07	1.209	0.0824	-61
15:34:00	1429.2	670.1	98.07	1.209	0.0824	-60
15:34:10	1429.3	670.4	98.07	1.209	0.0824	-61
15:34:20	1429.5	670.1	98.07	1.209	0.0824	-61
15:34:30	1429.7	670.1	98.07	1.209	0.0824	-61
15:34:40	1429.8	669.9	98.07	1.209	0.0824	-61
15:34:50	1430.0	669.7	98.07	1.209	0.0824	-61
15:35:00	1430.2	669.4	98.07	1.209	0.0824	-61
15:35:10	1430.3	669.2	98.07	1.209	0.0824	-61
15:35:20	1430.5	669.1	98.07	1.209	0.0823	-62
15:35:30	1430.7	669.2	98.07	1.209	0.0823	-61
15:35:40	1430.8	669.3	98.07	1.209	0.0823	-61
15:35:50	1431.0	669.6	98.07	1.209	0.0823	-61
15:36:00	1431.2	669.6	98.07	1.209	0.0823	-61
15:36:10	1431.3	669.6	98.07	1.209	0.0823	-61
15:36:20	1431.5	669.7	98.07	1.209	0.0823	-61
15:36:30	1431.7	669.6	98.07	1.209	0.0823	-61
15:36:40	1431.8	669.5	98.07	1.209	0.0823	-61
15:36:50	1432.0	670.0	98.07	1.209	0.0823	-61
15:37:00	1432.2	670.0	98.07	1.209	0.0823	-61
15:37:10	1432.3	670.1	98.07	1.209	0.0823	-61
15:37:20	1432.5	670.2	98.07	1.208	0.0822	-60
15:37:30	1432.7	670.0	98.07	1.208	0.0822	-61
15:37:40	1432.8	670.7	98.07	1.208	0.0822	-60
15:37:50	1433.0	670.7	98.07	1.208	0.0822	-60
15:38:00	1433.2	670.5	98.07	1.208	0.0822	-60
15:38:10	1433.3	670.8	98.07	1.208	0.0822	-60
15:38:20	1433.5	670.8	98.07	1.208	0.0822	-60
15:38:30	1433.7	670.9	98.07	1.208	0.0822	-60
15:38:40	1433.8	670.3	98.07	1.208	0.0822	-60

15:39:30	1434.7	670.4	98.07	1.208	0.0821	-60
15:39:40	1434.8	670.6	98.07	1.208	0.0821	-60
15:39:50	1435.0	670.2	98.07	1.208	0.0821	-61
15:40:00	1435.2	670.5	98.08	1.208	0.0821	-60
15:40:10	1435.3	670.2	98.08	1.208	0.0821	-61
15:40:20	1435.5	670.6	98.08	1.208	0.0821	-60

15:40:30	1435.7	670.5	98.08	1.208	0.0821	-60
15:40:40	1435.8	670.2	98.08	1.208	0.0821	-61
15:40:50	1436.0	670.5	98.08	1.208	0.0821	-60
15:41:00	1436.2	669.8	98.09	1.208	0.0821	-61
15:41:10	1436.3	670.2	98.09	1.208	0.0820	-60
15:41:20	1436.5	670.3	98.09	1.208	0.0820	-60
15:41:30	1436.7	670.1	98.09	1.208	0.0820	-61
15:41:40	1436.8	670.3	98.09	1.208	0.0820	-60
15:41:50	1437.0	670.1	98.09	1.208	0.0820	-61
15:42:00	1437.2	670.2	98.09	1.208	0.0820	-61
15:42:10	1437.3	670.4	98.09	1.208	0.0820	-60
15:42:20	1437.5	670.3	98.09	1.208	0.0820	-60
15:42:30	1437.7	670.4	98.09	1.208	0.0820	-60
15:42:40	1437.8	670.6	98.09	1.208	0.0820	-60
15:42:50	1438.0	670.2	98.09	1.208	0.0820	-61
15:43:00	1438.2	670.0	98.09	1.208	0.0819	-61
15:43:10	1438.3	669.9	98.09	1.208	0.0819	-61
15:43:20	1438.5	669.7	98.09	1.208	0.0819	-61
15:43:30	1438.7	669.7	98.09	1.208	0.0819	-61
15:43:40	1438.8	669.9	98.09	1.208	0.0819	-61
15:43:50	1439.0	670.2	98.09	1.208	0.0819	-61
15:44:00	1439.2	670.2	98.09	1.208	0.0819	-60
15:44:10	1439.3	670.1	98.09	1.208	0.0819	-61
15:44:20	1439.5	670.5	98.09	1.207	0.0819	-60
15:44:30	1439.7	671.2	98.09	1.207	0.0819	-59
15:44:40	1439.8	671.8	98.09	1.207	0.0819	-59
15:44:50	1440.0	730.7	98.09	1.207	0.0819	0
15:45:00	1440.2	980.7	98.09	1.207	0.0818	250
15:45:10	1440.3	997.8	98.09	1.207	0.0818	267
15:45:20	1440.5	1006.0	98.09	1.207	0.0818	275
15:45:30	1440.7	1011.7	98.09	1.207	0.0818	281
15:45:40	1440.8	1015.5	98.09	1.207	0.0818	285
15:45:50	1441.0	1018.7	98.09	1.207	0.0818	288
15:46:00	1441.2	1021.5	97.99	1.207	0.0818	291
15:46:10	1441.3	1023.9	97.99	1.207	0.0818	293
15:46:20	1441.5	1026.1	97.99	1.207	0.0818	295
15:46:30	1441.7	1028.1	97.99	1.207	0.0818	297

2ND SHUT IN

15:47:01	1442.2	1033.0	97.55	1.207	0.0817	302
15:47:14	1442.4	1033.8	97.55	1.207	0.0817	303
15:47:21	1442.5	1035.4	97.55	1.207	0.0817	305
15:47:34	1442.7	1036.4	97.55	1.207	0.0817	306
15:47:40	1442.8	1037.5	97.55	1.207	0.0817	307
15:47:50	1443.0	1038.2	97.55	1.207	0.0817	307

15:48:00	1443.2	1038.7	97.00	1.207	0.0817	308
15:48:10	1443.3	1039.5	97.00	1.207	0.0817	309
15:48:20	1443.5	1040.2	97.00	1.207	0.0817	310
15:48:30	1443.7	1040.9	97.00	1.207	0.0817	310
15:48:40	1443.8	1041.5	97.00	1.207	0.0817	311
15:48:50	1444.0	1042.0	97.00	1.207	0.0816	311
15:49:00	1444.2	1042.4	96.55	1.207	0.0816	312
15:49:10	1444.3	1042.9	96.55	1.207	0.0816	312
15:49:20	1444.5	1043.4	96.55	1.207	0.0816	313
15:49:30	1444.7	1043.9	96.55	1.207	0.0816	313
15:49:40	1444.8	1044.3	96.55	1.207	0.0816	314
15:49:50	1445.0	1044.7	96.55	1.207	0.0816	314
15:50:00	1445.2	1045.0	96.22	1.207	0.0816	314
15:50:10	1445.3	1045.3	96.22	1.207	0.0816	315
15:50:20	1445.5	1045.7	96.22	1.207	0.0816	315
15:50:30	1445.7	1046.1	96.22	1.207	0.0816	315
15:50:40	1445.8	1046.4	96.22	1.207	0.0816	316
15:50:50	1446.0	1046.7	96.22	1.207	0.0815	316
15:51:00	1446.2	1047.0	95.99	1.207	0.0815	316
15:51:10	1446.3	1047.2	95.99	1.206	0.0815	317
15:51:20	1446.5	1047.5	95.99	1.206	0.0815	317
15:51:30	1446.7	1047.8	95.99	1.206	0.0815	317
15:51:40	1446.8	1048.1	95.99	1.206	0.0815	317
15:51:50	1447.0	1048.4	95.99	1.206	0.0815	318
15:52:00	1447.2	1048.5	95.85	1.206	0.0815	318
15:52:10	1447.3	1048.8	95.85	1.206	0.0815	318
15:52:20	1447.5	1049.0	95.85	1.206	0.0815	318
15:52:30	1447.7	1049.3	95.85	1.206	0.0815	319
15:52:40	1447.8	1049.5	95.85	1.206	0.0815	319
15:52:50	1448.0	1049.7	95.85	1.206	0.0814	319
15:53:00	1448.2	1049.8	95.77	1.206	0.0814	319
15:53:10	1448.3	1050.1	95.77	1.206	0.0814	319
15:53:20	1448.5	1050.3	95.77	1.206	0.0814	320
15:53:30	1448.7	1050.5	95.77	1.206	0.0814	320
15:53:40	1448.8	1050.6	95.77	1.206	0.0814	320
15:53:50	1449.0	1050.8	95.77	1.206	0.0814	320
15:54:00	1449.2	1050.9	95.77	1.206	0.0814	320

15:54:30	1449.7	1051.5	95.75	1.206	0.0814	321
15:54:40	1449.8	1051.7	95.75	1.206	0.0813	321
15:54:50	1450.0	1051.8	95.75	1.206	0.0813	321
15:55:00	1450.2	1051.9	95.77	1.206	0.0813	321
15:55:10	1450.3	1052.1	95.77	1.206	0.0813	321
15:55:20	1450.5	1052.2	95.77	1.206	0.0813	322

15:55:30	1450.7	1052.4	95.77	1.206	0.0813	322
15:55:40	1450.8	1052.5	95.77	1.206	0.0813	322
15:55:50	1451.0	1052.7	95.77	1.206	0.0813	322
15:56:00	1451.2	1052.8	95.82	1.206	0.0813	322
15:56:10	1451.3	1052.9	95.82	1.206	0.0813	322
15:56:20	1451.5	1053.0	95.82	1.206	0.0813	322
15:56:30	1451.7	1053.1	95.82	1.206	0.0813	322
15:56:40	1451.8	1053.3	95.82	1.206	0.0812	323
15:56:50	1452.0	1053.4	95.82	1.206	0.0812	323
15:57:00	1452.2	1053.5	95.89	1.206	0.0812	323
15:57:10	1452.3	1053.7	95.89	1.206	0.0812	323
15:57:20	1452.5	1053.8	95.89	1.206	0.0812	323
15:57:30	1452.7	1053.9	95.89	1.206	0.0812	323
15:57:40	1452.8	1054.0	95.89	1.206	0.0812	323
15:57:50	1453.0	1054.0	95.89	1.206	0.0812	323
15:58:00	1453.2	1054.2	95.97	1.206	0.0812	323
15:58:10	1453.3	1054.3	95.97	1.206	0.0812	324
15:58:20	1453.5	1054.4	95.97	1.205	0.0812	324
15:58:30	1453.7	1054.5	95.97	1.205	0.0812	324
15:58:40	1453.8	1054.6	95.97	1.205	0.0811	324
15:58:50	1454.0	1054.7	95.97	1.205	0.0811	324
15:59:00	1454.2	1054.8	96.07	1.205	0.0811	324
15:59:10	1454.3	1054.9	96.07	1.205	0.0811	324
15:59:20	1454.5	1055.0	96.07	1.205	0.0811	324
15:59:30	1454.7	1055.1	96.07	1.205	0.0811	324
15:59:40	1454.8	1055.2	96.07	1.205	0.0811	324
15:59:50	1455.0	1055.2	96.07	1.205	0.0811	325
16:00:00	1455.2	1055.3	96.18	1.205	0.0811	325
16:00:10	1455.3	1055.4	96.18	1.205	0.0811	325
16:00:20	1455.5	1055.5	96.18	1.205	0.0811	325
16:00:30	1455.7	1055.6	96.18	1.205	0.0811	325
16:00:40	1455.8	1055.7	96.18	1.205	0.0810	325
16:00:50	1456.0	1055.8	96.18	1.205	0.0810	325
16:01:00	1456.2	1055.8	96.30	1.205	0.0810	325
16:01:10	1456.3	1056.0	96.30	1.205	0.0810	325
16:01:20	1456.5	1056.0	96.30	1.205	0.0810	325

16:02:00	1457.2	1056.3	96.42	1.205	0.0810	326
16:02:10	1457.3	1056.4	96.42	1.205	0.0810	326
16:02:20	1457.5	1056.5	96.42	1.205	0.0810	326
16:02:30	1457.7	1056.6	96.42	1.205	0.0809	326
16:02:40	1457.8	1056.6	96.42	1.205	0.0809	326
16:02:50	1458.0	1056.7	96.42	1.205	0.0809	326

16:03:00	1458.2	1056.8	96.55	1.205	0.0809	326
16:03:10	1458.3	1056.9	96.55	1.205	0.0809	326
16:03:20	1458.5	1056.9	96.55	1.205	0.0809	326
16:03:30	1458.7	1057.0	96.55	1.205	0.0809	326
16:03:40	1458.8	1057.1	96.55	1.205	0.0809	326
16:03:50	1459.0	1057.1	96.55	1.205	0.0809	326
16:04:00	1459.2	1057.2	96.68	1.205	0.0809	326
16:04:10	1459.3	1057.3	96.68	1.205	0.0809	327
16:04:20	1459.5	1057.3	96.68	1.205	0.0809	327
16:04:30	1459.7	1057.4	96.68	1.205	0.0808	327
16:04:40	1459.8	1057.4	96.68	1.205	0.0808	327
16:04:50	1460.0	1057.5	96.68	1.205	0.0808	327
16:05:00	1460.2	1057.6	96.82	1.205	0.0808	327
16:05:10	1460.3	1057.6	96.82	1.205	0.0808	327
16:05:20	1460.5	1057.7	96.82	1.204	0.0808	327
16:05:30	1460.7	1057.7	96.82	1.204	0.0808	327
16:05:40	1460.8	1057.8	96.82	1.204	0.0808	327
16:05:50	1461.0	1057.8	96.82	1.204	0.0808	327
16:06:00	1461.2	1057.9	96.96	1.204	0.0808	327
16:06:10	1461.3	1058.0	96.96	1.204	0.0808	327
16:06:20	1461.5	1058.0	96.96	1.204	0.0808	327
16:06:30	1461.7	1058.1	96.96	1.204	0.0807	327
16:06:40	1461.8	1058.1	96.96	1.204	0.0807	327
16:06:50	1462.0	1058.2	96.96	1.204	0.0807	327
16:07:00	1462.2	1058.2	97.11	1.204	0.0807	328
16:07:10	1462.3	1058.3	97.11	1.204	0.0807	328
16:07:20	1462.5	1058.4	97.11	1.204	0.0807	328
16:07:30	1462.7	1058.4	97.11	1.204	0.0807	328
16:07:40	1462.8	1058.5	97.11	1.204	0.0807	328
16:07:50	1463.0	1058.5	97.11	1.204	0.0807	328
16:08:00	1463.2	1058.6	97.26	1.204	0.0807	328
16:08:10	1463.3	1058.6	97.26	1.204	0.0807	328
16:08:20	1463.5	1058.7	97.26	1.204	0.0807	328
16:08:30	1463.7	1058.7	97.26	1.204	0.0806	328
16:08:40	1463.8	1058.7	97.26	1.204	0.0806	328
16:08:50	1464.0	1058.8	97.26	1.204	0.0806	328

16:09:30	1464.7	1059.0	97.41	1.204	0.0806	328
16:09:40	1464.8	1059.1	97.41	1.204	0.0806	328
16:09:50	1465.0	1059.1	97.41	1.204	0.0806	328
16:10:00	1465.2	1059.2	97.56	1.204	0.0806	329
16:10:10	1465.3	1059.2	97.56	1.204	0.0806	329
16:10:20	1465.5	1059.3	97.56	1.204	0.0806	329

16:10:30	1465.7	1059.3	97.56	1.204	0.0805	329
16:10:40	1465.8	1059.4	97.56	1.204	0.0805	329
16:10:50	1466.0	1059.4	97.56	1.204	0.0805	329
16:11:00	1466.2	1059.5	97.70	1.204	0.0805	329
16:11:10	1466.3	1059.5	97.70	1.204	0.0805	329
16:11:20	1466.5	1059.5	97.70	1.204	0.0805	329
16:11:30	1466.7	1059.6	97.70	1.204	0.0805	329
16:11:40	1466.8	1059.6	97.70	1.204	0.0805	329
16:11:50	1467.0	1059.7	97.70	1.204	0.0805	329
16:12:00	1467.2	1059.7	97.84	1.204	0.0805	329
16:12:10	1467.3	1059.7	97.84	1.204	0.0805	329
16:12:20	1467.5	1059.8	97.84	1.203	0.0804	329
16:12:30	1467.7	1059.8	97.84	1.203	0.0804	329
16:12:40	1467.8	1059.8	97.84	1.203	0.0804	329
16:12:50	1468.0	1059.9	97.98	1.203	0.0804	329
16:13:00	1468.2	1060.0	97.98	1.203	0.0804	329
16:13:10	1468.3	1060.0	97.98	1.203	0.0804	329
16:13:20	1468.5	1060.0	97.98	1.203	0.0804	329
16:13:30	1468.7	1060.1	97.98	1.203	0.0804	329
16:13:40	1468.8	1060.1	97.98	1.203	0.0804	329
16:13:50	1469.0	1060.1	98.12	1.203	0.0804	330
16:14:00	1469.2	1060.2	98.12	1.203	0.0804	330
16:14:10	1469.3	1060.2	98.12	1.203	0.0804	330
16:14:20	1469.5	1060.3	98.12	1.203	0.0803	330
16:14:30	1469.7	1060.3	98.12	1.203	0.0803	330
16:14:40	1469.8	1060.3	98.12	1.203	0.0803	330
16:14:50	1470.0	1060.4	98.25	1.203	0.0803	330
16:15:00	1470.2	1060.4	98.25	1.203	0.0803	330
16:15:10	1470.3	1060.5	98.25	1.203	0.0803	330
16:15:20	1470.5	1060.4	98.25	1.203	0.0803	330
16:15:30	1470.7	1060.5	98.25	1.203	0.0803	330
16:15:40	1470.8	1060.5	98.25	1.203	0.0803	330
16:15:50	1471.0	1060.6	98.25	1.203	0.0803	330

16:16:50	1472.0	1060.7	98.57	1.203	0.0802	330
16:17:00	1472.2	1060.8	98.50	1.203	0.0802	330
16:17:10	1472.3	1060.8	98.50	1.203	0.0802	330
16:17:20	1472.5	1060.8	98.50	1.203	0.0802	330
16:17:30	1472.7	1060.8	98.50	1.203	0.0802	330
16:17:40	1472.8	1060.9	98.50	1.203	0.0802	330
16:17:50	1473.0	1060.9	98.50	1.203	0.0802	330

16:18:00	1473.2	1061.0	98.63	1.203	0.0802	330
16:18:10	1473.3	1061.0	98.63	1.203	0.0802	330
16:18:20	1473.5	1061.1	98.63	1.203	0.0802	330
16:18:30	1473.7	1061.1	98.63	1.203	0.0801	330
16:18:40	1473.8	1061.1	98.63	1.203	0.0801	330
16:18:50	1474.0	1061.1	98.63	1.203	0.0801	330
16:19:00	1474.2	1061.1	98.75	1.203	0.0801	331
16:19:10	1474.3	1061.2	98.75	1.203	0.0801	331
16:19:20	1474.5	1061.3	98.75	1.203	0.0801	331
16:19:30	1474.7	1061.3	98.75	1.203	0.0801	331
16:19:40	1474.8	1061.3	98.75	1.203	0.0801	331
16:19:50	1475.0	1061.3	98.75	1.202	0.0801	331
16:20:00	1475.2	1061.4	98.86	1.202	0.0801	331
16:20:10	1475.3	1061.4	98.86	1.202	0.0801	331
16:20:20	1475.5	1061.4	98.86	1.202	0.0801	331
16:20:30	1475.7	1061.4	98.86	1.202	0.0800	331
16:20:40	1475.8	1061.5	98.86	1.202	0.0800	331
16:20:50	1476.0	1061.5	98.86	1.202	0.0800	331
16:21:00	1476.2	1061.5	98.97	1.202	0.0800	331
16:21:10	1476.3	1061.6	98.97	1.202	0.0800	331
16:21:20	1476.5	1061.6	98.97	1.202	0.0800	331
16:21:30	1476.7	1061.6	98.97	1.202	0.0800	331
16:21:40	1476.8	1061.6	98.97	1.202	0.0800	331
16:21:50	1477.0	1061.6	98.97	1.202	0.0800	331
16:22:00	1477.2	1061.7	99.08	1.202	0.0800	331
16:22:10	1477.3	1061.7	99.08	1.202	0.0800	331
16:22:20	1477.5	1061.8	99.08	1.202	0.0800	331
16:22:30	1477.7	1061.7	99.08	1.202	0.0799	331
16:22:40	1477.8	1061.7	99.08	1.202	0.0799	331
16:22:50	1478.0	1061.8	99.08	1.202	0.0799	331
16:23:00	1478.2	1061.8	99.19	1.202	0.0799	331
16:23:10	1478.3	1061.9	99.19	1.202	0.0799	331
16:23:20	1478.5	1061.9	99.19	1.202	0.0799	331
16:23:30	1478.7	1061.9	99.19	1.202	0.0799	331
16:23:40	1478.8	1061.9	99.19	1.202	0.0799	331



16:24:30	1479.7	1062.0	99.29	1.202	0.0798	331
16:24:40	1479.8	1062.1	99.29	1.202	0.0798	331
16:24:50	1480.0	1062.1	99.29	1.202	0.0798	331
16:25:00	1480.2	1062.1	99.39	1.202	0.0798	331
16:25:10	1480.3	1062.2	99.39	1.202	0.0798	331
16:25:20	1480.5	1062.2	99.39	1.202	0.0798	331

16:25:30	1480.7	1062.2	99.39	1.202	0.0798	331
16:25:40	1480.8	1062.3	99.39	1.202	0.0798	332
16:25:50	1481.0	1062.2	99.39	1.202	0.0798	332
16:26:00	1481.2	1062.3	99.48	1.202	0.0798	332
16:26:10	1481.3	1062.3	99.48	1.202	0.0798	332
16:26:20	1481.5	1062.3	99.48	1.202	0.0798	332
16:26:30	1481.7	1062.4	99.48	1.202	0.0798	332
16:26:40	1481.8	1062.4	99.48	1.202	0.0797	332
16:26:50	1482.0	1062.4	99.48	1.202	0.0797	332
16:27:00	1482.2	1062.4	99.58	1.202	0.0797	332
16:27:10	1482.3	1062.4	99.58	1.201	0.0797	332
16:27:20	1482.5	1062.5	99.58	1.201	0.0797	332
16:27:30	1482.7	1062.5	99.58	1.201	0.0797	332
16:27:40	1482.8	1062.5	99.58	1.201	0.0797	332
16:27:50	1483.0	1062.5	99.58	1.201	0.0797	332
16:28:00	1483.2	1062.6	99.67	1.201	0.0797	332
16:28:10	1483.3	1062.6	99.67	1.201	0.0797	332
16:28:20	1483.5	1062.6	99.67	1.201	0.0797	332
16:28:30	1483.7	1062.6	99.67	1.201	0.0797	332
16:28:40	1483.8	1062.6	99.67	1.201	0.0796	332
16:28:50	1484.0	1062.6	99.67	1.201	0.0796	332
16:29:00	1484.2	1062.7	99.77	1.201	0.0796	332
16:30:00	1485.2	1062.8	99.86	1.201	0.0796	332
16:31:00	1486.2	1062.9	99.95	1.201	0.0795	332
16:32:00	1487.2	1063.1	100.04	1.201	0.0795	332
16:33:00	1488.2	1063.2	100.13	1.201	0.0794	332
16:34:00	1489.2	1063.3	100.22	1.201	0.0794	333
16:35:00	1490.2	1063.4	100.30	1.200	0.0793	333
16:36:00	1491.2	1063.5	100.39	1.200	0.0793	333
16:37:00	1492.2	1063.6	100.48	1.200	0.0792	333
16:38:00	1493.2	1063.7	100.56	1.200	0.0792	333
16:39:00	1494.2	1063.8	100.64	1.200	0.0791	333
16:40:00	1495.2	1064.0	100.72	1.200	0.0791	333
16:41:00	1496.2	1064.0	100.80	1.200	0.0790	333
16:42:00	1497.2	1064.1	100.87	1.199	0.0790	333
16:43:00	1498.2	1064.2	100.95	1.199	0.0789	334

16:47:00	1502.2	1064.6	101.24	1.199	0.0788	334
16:48:00	1503.2	1064.6	101.31	1.199	0.0787	334
16:49:00	1504.2	1064.7	101.38	1.199	0.0787	334
16:50:00	1505.2	1064.8	101.44	1.198	0.0786	334
16:51:00	1506.2	1064.9	101.50	1.198	0.0786	334
16:52:00	1507.2	1064.9	101.56	1.198	0.0785	334

16:53:00	1508.2	1065.0	101.62	1.198	0.0785	334
16:54:00	1509.2	1065.1	101.67	1.198	0.0784	334
16:55:00	1510.2	1065.2	101.72	1.198	0.0784	334
16:56:00	1511.2	1065.2	101.77	1.198	0.0783	335
16:57:00	1512.2	1065.3	101.82	1.198	0.0783	335
16:58:00	1513.2	1065.4	101.87	1.197	0.0782	335
16:59:00	1514.2	1065.5	101.92	1.197	0.0782	335
17:00:00	1515.2	1065.5	101.97	1.197	0.0781	335
17:01:00	1516.2	1065.6	102.02	1.197	0.0781	335
17:02:00	1517.2	1065.7	102.06	1.197	0.0780	335
17:03:00	1518.2	1065.8	102.11	1.197	0.0780	335
17:04:00	1519.2	1065.8	102.15	1.197	0.0779	335
17:05:00	1520.2	1065.8	102.19	1.196	0.0779	335
17:06:00	1521.2	1065.9	102.24	1.196	0.0779	335
17:07:00	1522.2	1066.0	102.28	1.196	0.0778	335
17:08:00	1523.2	1066.0	102.32	1.196	0.0778	335
17:09:00	1524.2	1066.0	102.36	1.196	0.0777	335
17:10:00	1525.2	1066.2	102.40	1.196	0.0777	335
17:11:00	1526.2	1066.2	102.44	1.196	0.0776	335
17:12:00	1527.2	1066.2	102.47	1.196	0.0776	336
17:13:00	1528.2	1066.2	102.51	1.195	0.0775	336
17:14:00	1529.2	1066.3	102.55	1.195	0.0775	336
17:15:00	1530.2	1066.4	102.59	1.195	0.0774	336
17:16:00	1531.2	1066.4	102.62	1.195	0.0774	336
17:17:00	1532.2	1066.5	102.66	1.195	0.0773	336
17:18:00	1533.2	1066.6	102.70	1.195	0.0773	336
17:19:00	1534.2	1066.6	102.73	1.195	0.0773	336
17:20:00	1535.2	1066.6	102.76	1.195	0.0772	336
17:21:00	1536.2	1066.7	102.80	1.194	0.0772	336
17:22:00	1537.2	1066.7	102.83	1.194	0.0771	336
17:23:00	1538.2	1066.8	102.87	1.194	0.0771	336
17:24:00	1539.2	1066.9	102.91	1.194	0.0770	336
17:25:00	1540.2	1066.9	102.95	1.194	0.0770	336
17:26:00	1541.2	1067.0	102.99	1.194	0.0769	336
17:27:00	1542.2	1067.0	103.03	1.194	0.0769	336
17:28:00	1543.2	1067.0	103.09	1.194	0.0769	336

17:31:00	1546.2	1067.2	103.40	1.193	0.0767	336
17:32:00	1547.2	1067.2	103.33	1.193	0.0767	336
17:33:00	1548.2	1067.2	103.38	1.193	0.0766	337
17:34:00	1549.2	1067.2	103.43	1.193	0.0766	337
17:35:00	1550.2	1067.2	103.48	1.193	0.0765	337
17:36:00	1551.2	1067.3	103.53	1.193	0.0765	337
17:37:00	1552.2	1067.3	103.57	1.192	0.0764	337

17:38:00	1553.2	1067.4	103.61	1.192	0.0764	337
17:39:00	1554.2	1067.4	103.64	1.192	0.0763	337
17:40:00	1555.2	1067.4	103.67	1.192	0.0763	337
17:41:00	1556.2	1067.5	103.70	1.192	0.0762	337
17:42:00	1557.2	1067.5	103.73	1.192	0.0762	337
17:43:00	1558.2	1067.6	103.75	1.192	0.0762	337
17:44:00	1559.2	1067.6	103.78	1.192	0.0761	337
17:45:00	1560.2	1067.7	103.80	1.191	0.0761	337
17:46:00	1561.2	1067.7	103.83	1.191	0.0760	337
17:47:00	1562.2	1067.7	103.86	1.191	0.0760	337
17:48:00	1563.2	1067.7	103.88	1.191	0.0759	337
17:49:00	1564.2	1067.8	103.91	1.191	0.0759	337
17:50:00	1565.2	1067.8	103.94	1.191	0.0758	337
17:51:00	1566.2	1067.8	103.97	1.191	0.0758	337
17:52:00	1567.2	1067.9	104.00	1.191	0.0758	337
17:53:00	1568.2	1067.9	104.03	1.190	0.0757	337
17:54:00	1569.2	1067.9	104.06	1.190	0.0757	337
17:55:00	1570.2	1067.9	104.08	1.190	0.0756	337
17:56:00	1571.2	1068.0	104.11	1.190	0.0756	337
17:57:00	1572.2	1068.1	104.14	1.190	0.0755	337
17:58:00	1573.2	1068.1	104.16	1.190	0.0755	337
17:59:00	1574.2	1068.1	104.18	1.190	0.0754	337
18:00:00	1575.2	1068.1	104.20	1.190	0.0754	337

SUMMARY OF RESULTS

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APPENDIX A3

POSITIONING REPORT

BALEEN-1

RIG POSITIONING REPORT

November, 1981.

Submitted By: K.H. Sit,  
GEOPHYSICIST.

Supervised By: A.J. Ferworn,  
CHIEF GEOPHYSICIST

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## INTRODUCTION

The Baleen-1 positioning survey was conducted between 30th October and 5th November, 1981.

The survey consisted of:

1. Setting up the trisponder survey net. .
2. Checking the survey systems.
3. Positioning and setting the anchor buoys.
4. Determining the final rig position.

Decca Survey Australia Ltd. supplied both personnel and survey equipment.

The equipment used to conduct the survey consisted of:-

1. Two Trisponder receivers.
2. One Satellite receiver - (JMR-4).
3. Four onshore Trisponder base stations.

The Trisponder was the primary navigation system used to position the rig with the satellite navigation system as an independent check and a 100% backup.

A licenced surveyor contracted from Navigation Australia was on board during the Baleen-1 positioning to verify Decca's readings.

A HOAL Geophysicist was also on board to supervise the survey.

Independent reports will be submitted by Navigation Australia and Decca Survey Australia.

PROPOSED RIG LOCATION

The proposed rig location for Baleen-1 was shotpoint 300, line GB81-31.

The co-ordinates for the position were:-

Latitude      038<sup>0</sup> 00' 36.01" S  
Longitude     148<sup>0</sup> 26' 08.74" E

UTM co-ordinates from Central Meridian 147<sup>0</sup>

5792088.0 metres North  
0626042.5 metres East

The following base stations were used for the survey:-

	<u>Easting</u>	<u>Northing</u>
Mt. Cann	674487.5	5831332.7
Raymond	640921.4	5824777.0
Jemmy	584670.0	5806793.0
Nowa Nowa	596073.9	5827551.6

The distances to the proposed Baleen-1 well from the base stations were:-

Mt. Cann	62359 metres
Raymond	35924 metres
Jemmy	43920 metres
Nowa Nowa	46445 metres



## ANCHOR PATTERN AND BUOYS

Using the given bow heading of  $230^{\circ}$ , anchor line bearings, and anchor cable and chain length of 457.2 metres, the positions of the anchor buoys were determined graphically.

The following table lists the positions:

<u>Anchor Buoy No.</u>	<u>Bearing</u>	<u>Easting</u>	<u>Northing</u>
1	$260^{\circ}$	625544.5	5791993
2	$290^{\circ}$	625575.5	5792225
3	$350^{\circ}$	626007.5	5792576
4	$20^{\circ}$	626250.5	5792551
5	$80^{\circ}$	626542.5	5792182
6	$110^{\circ}$	626512.5	5791940
7	$290^{\circ}$	626070.5	5791603
8	$200^{\circ}$	625827.5	5791631
Bow Heading	$230^{\circ}$		

The anchor buoys consisted of a 51 mm pipe approximately 5.5 metres long with a Norwegian buoy at the centre. A 0.6 metre section of chain was attached to the bottom and a coloured pennant was attached to the top. These were anchored by two 1 metre steel rails weighing approximately 68 kgm each. Three concrete cylinders were also attached to the base of each buoy to keep the pipe vertical. 60 metres of rope were used at each anchor, to allow a maximum swing of approximately 24 metres.

DAILY LOG

Thursday 29th October

2300 hrs.

Hong Sit and Rod Keene of Navigation Australia departed Perth.

Friday 30th October

0500 est.

Arrived Melbourne Airport.

0600 hrs.

Driving to Bairnsdale.

1030 hrs.

Arrived at Bairnsdale.

1245 hrs.

Departed Bairnsdale by helicopter.

1255 hrs.

Arrived on rig "Petromar North Sea".

1415 hrs.

On board supply boat "Yardie Creek"

Saturday 31st October

0945 hrs.

Alongside Esso "Tuna" platform for position checks.

1025 hrs.

Departed "Tuna" platform

1130 - 1355 hrs.

Checking Fathometer sections

1645 hrs.

At anchor off Marlow

Sunday 1st November

0700 hrs.

En route to "Baleen" location

0830 - 1030 hrs.

Laying buoy pattern

1030 - 1200 hrs.

Checking Pattern

1330 hrs.

En route Pt. Welshpool

Monday 2nd November

0130 hrs.

Arrived Pt. Welshpool

1300 hrs.

R. Keene Navigation Australia, J. Duncan Decca Surveys, H. Sit Huidbay departed Pt. Welshpool by vehicle for Bairnsdale.

0500 hrs.

Arrive Bairnsdale

0645 hrs.

Depart by helicopter for rig

0655 hrs.

Arrive "Petromar North Sea"

1200 hrs.

Equipment arrives on helicopter

Monday 2nd November

1200 - 1500 hrs.

Erecting Trisponder radio and Satellite receiver on bridge of rig.  
Awaiting movement of rig.

## CONCLUSIONS AND RECOMMENDATIONS

The Baleen-1 well positioning was completed satisfactorily, however there were certain difficulties:

1. Insufficient weight was attached to the buoy anchors and they were subsequently swept out of position by up to 6 kilometres. No extra weights were available on board; only 5 buoys were finally dropped to allow extra weights to be applied.
2. Two lengths of railing line approximately 1 metre in length were used during the survey. It is recommended in future that at least four pieces be used.

All personnel involved in the survey performed extremely well and high professional standards were maintained by the positioning crews from Decca and Navigation Australia.

## SURVEY NET VERIFICATION AND SURVEY CHECKS

Esso's "Tuna" platform was chosen to check the Trisponder Survey net. Due to the heavy seas it was not possible to get too close alongside the "Tuna". However, three fixes were taken approximately 40 metres from the co-ordinated position. These fixes resulted in differences of approximately 20 metres west and 10 metres north from the true position.

Two seabed topographic features on lines GB81-37 and GB81-40 were also used to verify the survey net to make sure that the survey net used to position the rig matched that used in the seismic recording. The attempt to "re-occupy" these two seismic lines proved to be very satisfactory as the features appeared within 20 metres of the proposed location.

The Anchor buoys were layed at the "Baleen" location on Sunday 1 November between the hours 0830 and 1030. The co-ordinates of the buoys were checked soon after the last buoy was down. The moonpool buoy had to be re-positioned as it was found to be approximately 120 metres out of position.

The supply boat "Yardie Creek" then sailed to Port Welshpool, to allow one set of Trisponder equipment to be placed on board the "Petromar North Sea". This enabled the rig position to be constantly monitored when mooring onto the location.

The "Yardie Creek" returned on 2nd November to the Baleen location. All anchor buoys were out of position by up to six kilometres due to insufficient weights attached to the buoys. All buoys except one were recovered and relayed on a new heading of  $210^{\circ}$  (requested by the drilling superintendent). Only buoys No. 1, 3, 5, 8 and the moonpool were layed in order to allow extra weights to be attached to the buoys and a check made between the hours 1420 and 1510 confirmed that all the buoys were within 50 metres of the proposed location.

## FINAL POSITIONING

The "Petromar North Sea" departed the "West Seahorse" location at 1400, Tuesday 3rd November. It arrived on "Baleen" location at 2000 and the first anchor, no. 5, was dropped at 2135. At 1225, Wednesday 4th November, the last anchor was dropped. Trisponder signals were extremely good throughout.

## FINAL POSITION

The final position of the Baleen No.1 well is:

Latitude 038<sup>0</sup> 00' 36.630" SOUTH  
Longitude 148<sup>0</sup> 26' 08.400" EAST

UTM Co-ordinates from 147<sup>0</sup> Central Meridian

Northing 5792068 metres  
Easting 626032 metres

The stem is 23 metres at a bearing of 207.7<sup>0</sup> from the proposed location.

Final distances to the Baleen No.1 well from the base stations are:

Mt. Cann 62350 metres  
Raymond 35913 metres  
Jemmy 43919 metres  
Mt. Nowa Nowa 46441 metres

The JMR-4 Satellite Doppler observations were taken on board the rig to check the Baleen-1 location established by the Trisponder observations. The satellite positions after 4 passes was:

Latitude 038<sup>0</sup> 00' 36.582"  
Longitude 148<sup>0</sup> 26' 08.239"

Tuesday 3rd November

1430 hrs.

Awaiting movement of rig.

"Petromar North Sea" departed West Seahorse  
Location

1900 hrs.

Arrived "Baleen" location.

2035 hrs.

Dropped 1st anchor

Wednesday 4th November

1225 hrs.

Last anchor in location

1625 hrs.

Rig on location and all anchors tensioned  
up

Final location fixes commenced

Thursday 5th November

0640 hrs.

Final fix taken

0735 hrs.

Keene, Duncan, Sit departed rig by helicopter  
to Bairnsdale

0755 hrs.

Arrive Bairnsdale

0810 hrs.

Depart Bairnsdale by light aircraft for  
Melbourne airport

0920 hrs.

Arrives Melbourne

0925 est.

Depart Melbourne

1130 est.

Arrive Perth.

OIL and GAS DIVISION

13 SEP 1982

3.0

G E O L O G Y

(Pages 23 - 43)

### 3.0

## GEOLOGY

### 3.1

#### Summary of Previous Investigations

Gippsland Basin exploration commenced in 1924 with the reported discovery of oil and gas in a water bore drilled onshore near Lakes Entrance. To date, over 125 wells have been drilled in the onshore part of the basin but only minor hydrocarbon accumulations have been encountered.

The initial exploration in the offshore Gippsland Basin was by the Bureau of Mineral Resources, for whom a regional gravity and aeromagnetic survey was conducted between 1951 and 1956. The first permits, covering a large part of the offshore Gippsland Basin, were taken up by BHP Co. Ltd. (later Hematite Petroleum Pty. Ltd.) in 1960. Esso joined the original permittee in 1964 and the first offshore well, Barracouta No.1, was drilled in 1965. Over eighty offshore wells have been drilled in the basin resulting in the discovery of recoverable reserves of approximately 3 billion barrels ( $0.466 \times 10^{12} \text{ m}^3$ ) of oil and 8 trillion cubic feet ( $220.4 \times 10^{12} \text{ m}^3$ ) of gas.

A summary of early contributions to the understanding of the geology and hydrocarbon potential of the Gippsland Basin was presented by W.F. Threlfall and others in 1974. Esso-BHP have published several papers on basinal stratigraphy and geological evolution during their exploration and development of the basin, and papers dealing with the geology of individual fields have been published as the fields were developed.

Exploration Permit Vic/P-11 consists of 51 blocks which previously formed parts of Exploration Permits Vic/P-1 and Vic/P-8, held respectively by Esso-BHP and a consortium headed by BOC Australia. The area now covered by Vic/P-11 was gazetted in December 1976 and applications for the permit were invited. The permit was granted to Gas and Fuel Corporation of Victoria on August 8, 1978, and Beach Petroleum subsequently became joint Permittee and Operator.



Hudbay Oil (Australia) Ltd. farmed into the Permit in December, 1980, and in February 1981 shot the GB81 Seismic Survey, consisting of 359 line kilometres of 36-fold seismic. Detailed mapping, incorporating data from the GB81 survey, Beach Petroleum's GB79 Seismic Survey and trade data from Esso's G80A Seismic Survey, defined several prospects.

## 3.2 Geological Setting

### 3.2.1 Regional Setting

The Baleen structure lies towards the northern margin of the Gippsland Basin, which is situated in south-eastern Australia and is bounded to the north and south by the Victorian Highlands and Bassian Rise respectively (Enclosure 2). The western limit of the basin is taken as the Mornington Peninsula and to the east the basin opens to the Tasman Sea. The Gippsland Basin covers approximately 50,000 km<sup>2</sup> and is filled with up to 10,000 metres of Lower Cretaceous to Recent sediments.

### 3.2.2 Tectonic Elements (Enclosure 2)

The offshore Gippsland Basin is separated by fault complexes into three major divisions: The North Platform, or Lakes Entrance Platform; the graben-like Central Deep or Strzelecki Basin; and the South Platform (Hocking & Taylor, 1964; James and Evans, 1971; Hocking, 1972).

The stable platforms to the north and south are areas where the Tertiary sequence unconformably overlies Palaeozoic basement. In these areas the structures within the Tertiary section consist simply of small-scale drapes over palaeo-topographic ridges and small fault scarps.

The Southern Platform is separated from the Central Deep Basin by a major fault complex, the South Bounding Fault. This is an offshore extension of the Foster Fault System and consists of a system of down-to-basin normal faults arranged en echelon. The northern boundary of the Central Deep is less well defined.

Major fault trends within the central part of the basin are offshore extensions of the east-west trending Foster Fault and the antithetic, east-west trending Rosedale Fault System. In the Baleen area the latter is known to be a reverse fault superimposed upon an older normal fault within the Lower Cretaceous, and has a throw of up to 160 metres. Reverse movement along the fault

system is believed to have occurred as a result of the same stresses that led to the development of the major anticlines in the central basin during the late Eocene to early Oligocene.

Numerous northwest-southeast, basin-forming normal faults have been recognized within the Central Deep. The general trend of these faults is approximately parallel to that of the faults in the neighbouring Bass Basin.

The major hydrocarbon-bearing anticlinal structures in the central basin are elongate, with a dominant southwest-northeast axial trend. They were formed by right-lateral, convergent shearing brought about by the movement of continental plates, as discussed in Section 3.2.3. The main hydrocarbon traps in the Vic/P-11 Permit were formed as a result of this same shearing stress, by arching associated with reverse movement superimposed upon older normal faults.

### 3.2.3 Geological Evolution and Regional Stratigraphy (Figure 15)

During the Lower to Middle Palaeozoic a series of major orogenies occurred within the Tasman Geosyncline. This resulted in a dominantly north-south structural grain within the tightly folded and faulted Palaeozoic metamorphics. These geosynclinal sediments were subsequently intruded by Lower Devonian granitic rocks. A major rift formed across southern Australia during the Jurassic due to the separation of the Antarctic and Australian cratons. The rift valley formed over the entire length of the present southern coast of Australia. Into this major depositional axis a typical sequence of rift valley sediments was rapidly deposited, as clastics were stripped from the adjacent Palaeozoic highlands. The initial deposits of the Upper Jurassic to Lower Neocomian consist of conglomeratic wedges and alluvial fan detritus, commonly of a quartzose sandstone nature. Jurassic intrusives and Lower Cretaceous extrusives, both associated with rifting, provided a major provenance for 3,500 metres of Lower Cretaceous Strzelecki Group sediments.

During Lower Cretaceous times the Gippsland Basin formed a half graben with the major subsidence along the southern Foster Fault system. The Strzelecki Group sediments are texturally mature but mineralogically immature, being feldspathic and chloritic. They consist of a monotonous cyclic sequence of interbedded sands, silts and muds deposited on a subsiding fluvial plain. A large east-west rift developed, separating sediments of the Tasman Geosyncline. The eastern end of this rift is believed to have terminated in a triple junction formed by the Australian, Antarctic and Lord Howe Rise plates. The western arm of the triple junction was coincident with the ancestral Otway and Gippsland Basins and, as this arm of the triple junction failed during the Turonian, the Lord Howe Rise plate moved eastwards away from the Australian-Antarctic plate. This resulted in the rifting of the eastern portion of the Antarctic and Australian plates along a line parallel to, and off the west coast of Tasmania. Therefore the Tasmanian craton remained attached to the Australian plate but was separated from it by an east-west, aborted rift valley basin.

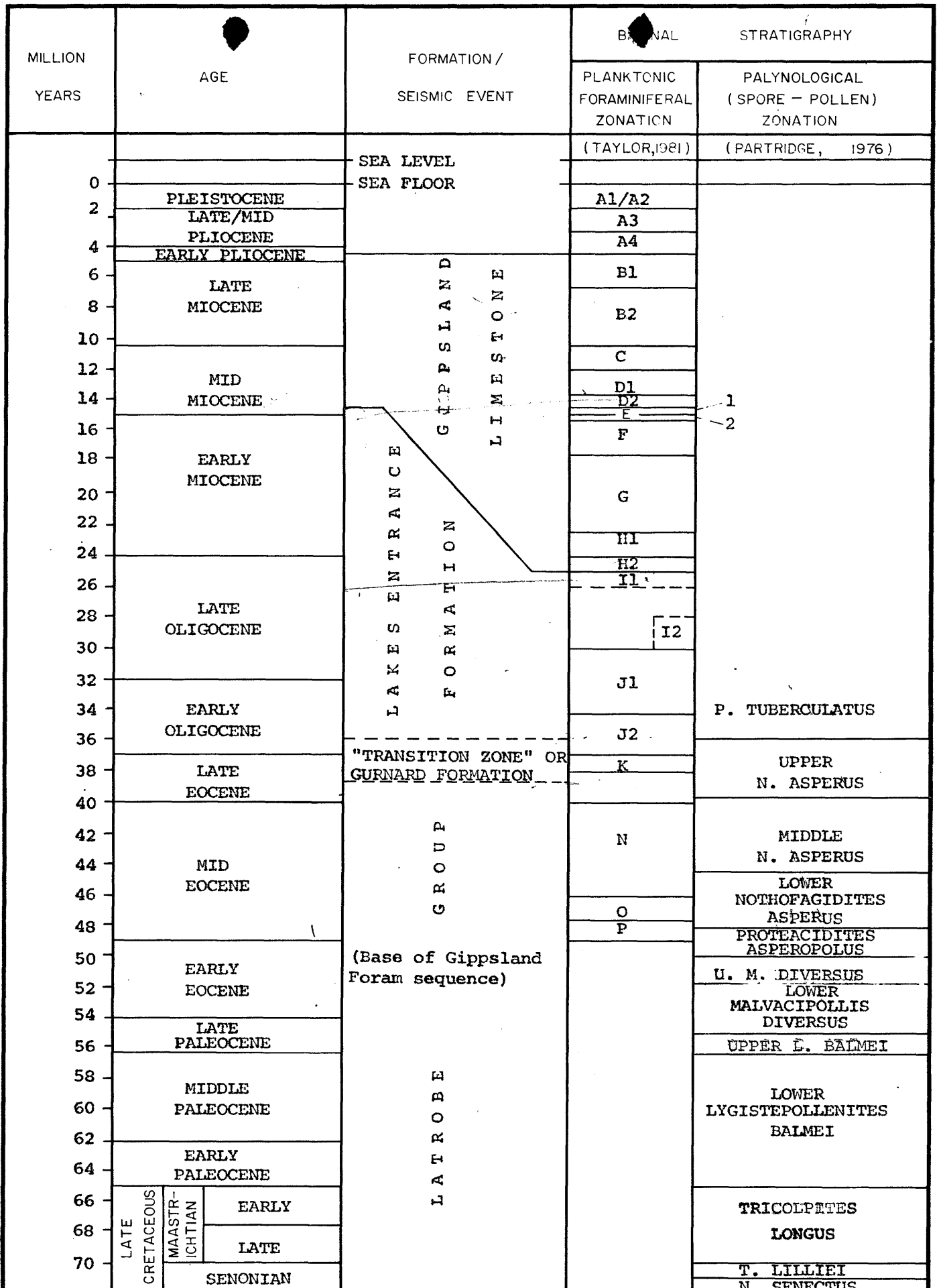
The Lower Cretaceous Strzelecki Group sediments are unconformably overlain by up to 5,000 metres of fluvial and lacustrine Latrobe Group sediments. Upper Cretaceous sedimentation tended to be superimposed on the underlying Strzelecki Group with the deposition of shales, minor coals and poorly sorted sandstones in a fluvial environment. In the early Senonian, approximately 85 million years B.P., the Lord Howe Rise Plate separated, resulting in the deposition of a complex system of fluvial and deltaic plain sediments sourced from the northwest and north. Growth and movement on the basin-forming normal faults resulted in continued subsidence of the basin during the Palaeocene and Eocene.

The northern part of the basin was uplifted as fault movement elsewhere in the basin lessened during the Eocene. A period of submarine and subaerial channel-cutting occurred during the Middle to Upper Eocene in the Tuna-Flounder area. The channel-cutting marked the onset of a marine transgression from the southeast during the uppermost Eocene to Lower

Oligocene, a period of instability and basin tilting. The en echelon disposition of the fold trends and fault systems is most likely the result of Upper Eocene east-west, right lateral, convergent shear deformation. The crestal areas of the folds were subsequently eroded during an associated period of relative sea level drop, while the deeper parts of the regime reactivated the severe channeling and the Marlin Channel was formed as subaerial and submarine drainage systems were laterally restricted.

The transgression continued into the Lower Oligocene with the deposition of the shallow water glauconitic sands and silts of the Gurnard Formation. Around the margins of the basin, sand buildups occurred as the transgression reached its maximum extent. During the uppermost Eocene to Lower Oligocene a marked change in sediment type occurred: the fluvial and deltaic coarse grained clastics were replaced by fine grained, calcareous shales and marls. The change in sediment type may be, in part, due to a change in provenance related to the widespread deposition onshore of volcanics during the Upper Eocene wrenching episode.

Sealevel fluctuations during the Miocene produced a complex system of interfingering and overlapping channels, which cut into the soft limestones and marls of the Lakes Entrance Formation and Gippsland Limestone. A linear, submarine slump zone of over 125 kilometres in length has been observed along the major south-bounding fault system. A wedge of sediment moved towards the centre of the basin as a result of reactivation of this fault system during the Miocene. A major cratonic uplift, the Kosciusko Uplift, was initiated in the Miocene and culminated during the Upper Pliocene and Lower Pleistocene. The Victorian Highlands were uplifted and provided a renewed clastic provenance, while faults and associated structures around the northern margins of the basin were rejuvenated. Extensive erosion is currently occurring in the Strzelecki Hills and a relatively thin veneer of Quarternary sediments is being deposited across the southeastern Gippsland coastal plain.



Author: B. Butcher  
 Drawn: A. Clark  
 Date: April 1982

Hudbay Oil (Australia) Ltd.  
 OFFSHORE GIPPSLAND BASIN  
**REGIONAL STATIGRAPHIC COLUMN**

Scale:  
 Drawing No: A4-GL-490

Figure 15

### 3.3

#### Stratigraphy

A sedimentary section ranging in age from Lower Cretaceous to Recent was penetrated in Baleen No.1 (Figure 16).

Age determinations are based upon palaeontological and palynological studies of sidewall cores (Appendices B1 & B2). The boundaries of individual units were established by using the age determinations in conjunction with lithological data, from the microscopic examination of drill cuttings and sidewall cores, and wireline log interpretations. Time-rock subdivisions were placed midway between sidewall core points, unless more accurate subdivisions were made possible by log response or cuttings lithology.

Owing to the standard practice of not installing a marine riser until after the setting of the 20 inch casing, no samples were recovered from the seabed to 209 metres.

The stratigraphy encountered in the well is described below. All depths quoted are below the Rotary Table, which is 9.45 metres above Mean Spring Low Water.

#### Lower Cretaceous (1030 - 707 metres)

Undifferentiated sandstones, siltstones and claystones typify the Lower Cretaceous at Baleen No.1. All lithologies have high matrix contents and grain-sizes are generally very fine to fine. Minor coal seams occur at 930 metres and silicified bands occur within the more coarse lithologies. Wireline log evidence indicates the possibility of a weathered zone between 850 and 707 metres. The appearance of *Coptospora paradoxa* confirms the presence of non-marine Strzelecki Group sediments at 709 metres and the unconformity is interpreted at 707 metres. stop

#### Upper Eocene (707 - 653 metres)

The unconformity at 707 metres marks the base of the Upper Eocene sediments and represents the onset of a marine transgression of the area. Poor yields prevented reasonable Kalevala  
9P

palaeontological age determinations within this interval but palynological examination indicated nothing older than the Middle N. asperus zone. Lithologically, the interval consists of two iron oxide/carbonate rich, sandstone-siltstone bands separated by a glauconitic and micaceous claystone-siltstone-sandstone sequence (Appendix B3).

#### Upper Eocene (653 - 638.5 metres)

The Latest Eocene is represented by a continuance of the glauconitic claystones, with an increasing amount of calcareous material. Zone K planktonic foraminifera were recognized, with plant micro fossil assemblages more confidently assigned to the Late N. asperus zone. The interval was deposited in water depths of less than 10 metres, probably in an estuarine entrance.

#### Lower Oligocene (638.5 - 627 metres)

The interval consists of a sequence of glauconitic claystone with minor calcilutite and calcisiltite. This has been assigned to Taylor's Zone J, and is thought to have been deposited in an inner shelf environment in water depths of about 10-40 metres. An unconformity marks the top of this zone.

#### Latest Oligocene to Lower Miocene (627 - 545 metres)

This section consists of interbedded calcisiltite and claystone with skeletal fragments but has been separated from the overlying interval on the basis of planktonic foraminifera. Above approximately 604 metres, the unit was assigned to Zone H-1 and was apparently deposited in water depths of about 200 metres in a mid shelf canyon. Between about 627 metres and 604 metres, the unit was assigned to Zone H, and is believed to have been deposited on an upper slope fan in water depths of 200-300 metres.



Lower Miocene (545 - 447 metres) *Gippsland zone*

A decrease in the proportion of clay and finely divided carbonate material over skeletal fragments brought a gradation over this interval from calcisiltites and calcareous claystones to skeletal calcarenite. This is indicative of decreased water depths in the area of deposition from about 200 metres to 40 metres. Planktonic foraminifera from Zones G to F were recognized, and a mid shelf canyon is believed the most likely environment of deposition.

Middle Miocene (447 - 343 metres) *Gipps L's*

Above 447 metres the Middle Miocene again consists of dominantly very coarse skeletal fragments with minor calcisiltite and calcilutite. The section is believed to have been deposited in a canyon head environment, in water depths of about 40 metres, and contained planktonic foraminifera from Zones E to D.

Middle Miocene to Recent (343 - 225 metres)

The upper section of the Gippsland Limestone was represented in Baleen No.1 by skeletal calcarenite with minor calcisiltite and calcilutite. Faunal types recognized included corals, echinoids, pelecypods, bryozoans and forams. Such an assemblage indicates deposition in an inner continental shelf environment, in water depths of about 10-40 metres, and corresponds to Planktonic Foraminiferal Zones C to A of Taylor (in prep.).

STRATIGRAPHY	PLAETONIC FORAM ZONE	PALYNOLOGICAL (SPORE - POLLEN)	DRILL DEPTH (metres)	SUBSEA DEPTH (metres)	EVENT	PALAEO DEPOSITIONAL ENVIRONMENT
	Taylor, (1981)	Partridge, (1976)	9.45	0	SEA LEVEL	
			64.3	54.9	SEA FLOOR	
RECENT TO MIDDLE MIOCENE	A TO C					INNER SHELF 10-40 METRES
MIDDLE MIOCENE	D TO E		343	333.5	TRANSITIONAL	CANYON HEAD 40 METRES
			447	437.5	TRANSITIONAL	
LOWER MIOCENE	F		519	509.5		MID SHELF CANYON 40-200 METRES
	G		545	535.5	TRANSITIONAL	
LOWER MIOCENE	H-1		604.5	595	TRANSITIONAL	SHELF EDGE CANYON ~200 METRES
LOWER MIOCENE TO UPPER OLIGOCENE	H-2		627	617.5	UNCONFORMITY	UPPER SLOPE FAN 200-300 METRES
LOWER OLIGOCENE	J-1		638.5	629		INNER SHELF 10-40 METRES
UPPER EOCENE	K	LATE N. ASPERUS	654.5	645		NEAR SHORE < 10 METRES
	?	MIDDLE TO LATE N. ASPERUS	707	697.5	UNCONFORMITY	
		COPTOSPORA PARADOXA	729	719.5		
		INDETERMINATE	806	796.5		
	ALBIAN	COPTOSPORA PARADOXA	847.5	838		
LOWER CRETACEOUS		INDETERMINATE			STRELECKI GROUP	NON MARINE
			1030	1020.5	TOTAL DEPTH	

Author:  
M. Battrock

Hudbay Oil (Australia) Ltd.

Date:  
July, 1982

Drawn by:  
T. Cole

BALEEN - 1

STRATIGRAPHIC TABLE

Drawing N°  
A4-GL-582

Figure.16

Structure

Baleen No.1 was drilled on the southern side of a major east-west, high angle reverse fault which is upthrown to the south, i.e. towards the centre of the basin. Reverse movement, associated with wrenching along a pre-existing, normal, down-to-the-basin fault trend, caused arching into the fault and thereby formed the northern boundary of the structure.

The normal fault trend formed during Upper Jurassic to Lower Cretaceous times, with further growth continuing during the Upper Cretaceous and Lower Tertiary. The reverse movement is believed to have been associated with the wrench faulting which took place during the Upper Eocene to Lower Oligocene.

The Baleen structure consists of two culminations separated by a minor saddle, with closure extending over 10 kilometres in an east-west direction. Closure has been mapped at two horizons, designated "Top Latrobe" and "Top Strzelecki".

A high resolution dipmeter was run over the interval from 566-1029 metres. Interpretation of the dipmeter data was enhanced by the use of a Cluster-Pooled Arrow Plot, Cyberdip and a Geodip run over selected intervals. The dipmeter data have been divided into different intervals, based on the magnitude and direction of the recorded dips, as follows:

570 - 597 m	:	Dips ranged between 5-30 <sup>0</sup> , with a southerly orientation.
598 - 604 m	:	3-8 <sup>0</sup> , northeasterly orientation; possible transition zone.
604 - 609 m	:	3-6 <sup>0</sup> , southerly orientation.
611 - 639 m	:	14-34 <sup>0</sup> , north-northeasterly orientation; dip readings sparse.
640 - 658 m	:	No reliable trends.
658 - 700 m	:	9-40 <sup>0</sup> , general south-westerly orientation; readings widely spaced.
700 - 750 m	:	Extremely low frequency of readings; southerly trend.
750 - 778 m	:	8-25 <sup>0</sup> , south-easterly orientation.

778 - 790 m : No reliable readings.  
790 - 898 m : 6-26<sup>0</sup>, mainly between east and south.  
903 - 957 m : 5-36<sup>0</sup>, orientation poorly defined, between  
northeast-southwest, dominantly easterly.  
959 - 962 m : 17-30<sup>0</sup>, north-westerly orientation.  
966 - 1031 m (T.D.): 3-22<sup>0</sup>, between northwest-south; averaging  
10<sup>0</sup> easterly.

Below 750 metres, the Cyberdip and Cluster dipmeter logs show evidence of a structural dip component of between 6-12<sup>0</sup> to the south and east. Due to the low frequency of readings above 750 metres a structural component was not removed prior to processing the Geodip log.

### 3.5 Predicted vs Actual Depth to Seismic Marker

Several seismic events were recognized in Baleen No.1 and well data has shown these to be related to significant lithological changes and age boundaries. The recorded data is listed in the following table. Further information can be found in Enclosures 3 and 4, and Figure 17.

#### Horizon Identification - Baleen-1

<u>Horizon</u>	<u>Predicted Depth*</u>	<u>Actual Depth</u> ✓	<u>Two-way Time (sec)</u>
Sea Floor	53 m	54.9 m	0.073
"Top Latrobe"	617 m -	617.5 m ✗	0.619
Top Iron Nodule Band	N/A	644.0 m	0.645
"Top Strzelecki"	747 m -	697.5 m ✗	0.696
Near Base "Weathered Zone"	N/A	840.5 m	0.825
Total Depth	1000 m	-1020.5 m	0.922

\* Note: Depths quoted in this table are subsea.

*KB - 9.45m*

The event identified as "Top Latrobe" and predicted at 613 metres subsea was encountered at 644 metres. It corresponded with the top of an iron nodule band. The "Top Strzelecki" horizon was predicted at 747 metres subsea but was encountered at 697.5 metres.

PE903910

This is an enclosure indicator page.  
The enclosure PE903910 is enclosed within the  
container PE902682 at this location in this  
document.

The enclosure PE903910 has the following characteristics:

ITEM\_BARCODE = PE903910  
CONTAINER\_BARCODE = PE902682  
NAME = Baleen 1 predicted and actual section  
BASIN = GIPPSLAND  
PERMIT = VIC/P11  
TYPE = WELL  
SUBTYPE = STRAT\_COLUMN  
DESCRIPTION = Baleen 1 Predicted and Actual Section.  
Figure 17 from WCR  
REMARKS =  
DATE\_CREATED = 30/06/82  
DATE\_RECEIVED = 13/09/82  
W\_NO = W759  
WELL\_NAME = Baleen-1  
CONTRACTOR = Hudbay Oil (Australia) Ltdq  
CLIENT\_OP\_CO = Hudbay Oil (Australia) Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

### 3.6

#### Porosity and Permeability

Porosities for Baleen No.1 have been estimated by microscopic examination of drill cuttings and wireline log interpretation (Appendix B4).

The three hydrocarbon bearing intervals, 660-672m, 672-696m and 696-707m, have average log-derived porosities of 30%, 26% and 25% respectively. From 660-696 metres, the sediments were fine-grained, poorly-sorted mixtures of clay minerals, quartz silt and fine quartz sand, with glauconite and limonite (Appendix B3). RFT's and a Drill Stem Test over the interval 662-670m, confirmed that the interval had suspected formation damage and indicated a formation permeability of only 56 md.

The zone from 696-707 m, contained coarse sand with less clay and silt-sized material than the overlying interval and calculations based on a DST over this interval indicated a formation permeability of 747 md. Extremely high skin effects were observed due to formation damage.

Log derived porosities below 707 metres averaged 20% within the Strzelecki Group sediments (Appendix B4). These are regarded as being high considering the argillaceous matrix of RFT's also indicate that the formation is tight and that the Strzelecki Group doesn't form a reservoir unit at the Baleen-1 location. However where the permeability within these sediments is better developed, it will be a valid secondary target.

### 3.7 Hydrocarbon Indications

#### 3.7.1 Summary

Interpretations of wireline logs indicated three hydrocarbon-bearing zones in Baleen No.1: these were between 660-672 m, 672-696 m and 696-707 m. Drill Stem Tests of the upper and lower zones produced dry gas from each zone.

#### 3.7.2 Hydrocarbon Indications During Drilling

##### Continuous Gas Monitoring

A continuous record of gas levels in the drilling mud was maintained by Exploration Logging Inc., using a total gas analyser and gas chromatography. Monitoring commenced at 225 metres, in the 12-1/4" hole.

The following table summarizes the gas readings observed during drilling:

<u>Depth (m)</u>	<u>Total Gas</u>	<u>Pet. Vap.</u>	<u>Range of Gas Readings</u>					
			<u>C<sub>1</sub></u>	<u>C<sub>2</sub></u>	<u>C<sub>3</sub></u>	<u>iC<sub>4</sub></u>	<u>nC<sub>4</sub></u>	<u>C<sub>5</sub></u>
225-460	0	0	0	0	0	0	0	0
460-525	Tr-2	0	20-600	0	0	0	0	0
525-640	2-22	0-Tr	400-5300	0-20	0-10	0-30	0-Tr	0
640-653	20-100	Tr-1	400-8950	Tr	Tr	0-30	Tr	0
654.5	500+	1+	(Gas trap indicated - sample not analysed)					
655-665	(No readings after gas kick)							
665-745	3-44	0-Tr	375-13222	0	0	0-20	0	0
745-1030 (T.D.)	Tr-12	0-Tr	20-1790	0	0	0-39	0	0

- Notes:
- 1) "Petroleum Vapours" includes C<sub>2</sub> and higher hydrocarbons.
  - 2) Total Gas and Petroleum Vapours are given in units, where 1 unit = 200 ppm.
  - 3) C<sub>1</sub> - C<sub>5</sub> are given in ppm.
  - 4) Gas chromatograph malfunction was responsible for the loss of some higher hydrocarbon records, i.e. C<sub>3</sub>, iC<sub>4</sub> and C<sub>5</sub>.



### Fluorescence from Drill Cuttings

Examination of drill cuttings showed traces of fluorescence at 605-610 metres and between 650-725 metres. The fluorescence was described on claystones as being spotty yellow or yellow-white with fast, green-white or creamy white solvent fluorescence, with similar indications described on sandstones below 700 metres.

All samples were contaminated to some degree of petroleum derivatives, notably diesel fuel, from the drill water which was supplied to the Exlog unit.

### Oil Staining/Free Oil

Possible light brown staining was observed on siltstones from 670-675 metres.

#### 3.7.3 Sidewall Cores

Isolated specks of dull, gold fluorescence were observed in nine of the sidewall cores, the highest being at 623.0 metres and the lowest at 927.0 metres. In all cases the samples produced either no solvent fluorescence or extremely pale solvent fluorescence.

Further details are given in Appendix B5.

#### 3.7.4 Further Indications

DST-1 over the interval 700-706 metres flowed dry gas at rates up to 1.8 MMcf/D through a 1" choke. DST-2 over the interval 662-670 metres flowed dry gas at rates up to 6.3 MMcf/D through a 1" choke. Section 2.5 of this report summarizes the testing programme. Analyses of the gas samples can be found in Appendix B6.

Contributions to Geological Knowledge

1. It is interpreted that a faster rate of sedimentation occurred during the basal Miocene at Baleen than at the Flathead and Lakes Entrance locations. Sedimentation occurred in palaeo water depths of 200-300 metres and is interpreted as part of a marine canyon complex.
2. The lack of significant Oligocene section indicates a hiatus of some 5 million years during the Oligocene at the Baleen location.
3. The Upper Eocene sequence has been interpreted as marine with petrological variations coincident with sea level fluctuations during the Upper Eocene. It is therefore proposed that no Latrobe Group sediments were penetrated.
4. The Baleen No.1 well confirmed the presence of suitable reservoir rocks within the "marine transgressive unit". Porosities decreased with depth from 30-20% over the interval 660-707 metres which constituted the hydrocarbon zone.
5. Production tests confirmed the presence of hydrocarbons, with DST's flowing dry gas at rates of up to 6.3 MMcf/d and formation permeabilities in excess of 800 md.
6. Abnormally high skin effects were observed during the production tests at Baleen-1 due to formation damage. Flow rates in excess of 20 MMcf/d are anticipated if formation damage is kept to a minimum.
7. Palynological studies of sidewall cores at Baleen dated the upper section of the Strzelecki Group to be of Albian age (Lower Cretaceous). This is amongst the youngest Strzelecki Group sediments penetrated in the Gippsland Basin.
8. Although the Strzelecki Group sediments at Baleen-1 were tight they would be considered as a valid target if permeabilities were better developed.

Poor  
geology

#### 4.0

#### WELL DATA

#### 4.1

#### Formation Sampling

A standard "Alpha" unit from Exploration Logging Australia Inc. was used for the 1981-82 Gippsland Basin drilling programme. Exlog personnel provided continuous monitoring of ditch gas and mud pit levels, and recorded the following parameters, together with ditch gas, every 5 metres : gas chromatography, calcimetry, blender gas analyses and mud weight in and out. Corrected drilling exponent calculations were also performed every 5 metres in shaly intervals, but are not considered reliable due to a faulty motion compensator on the drilling vessel. A Drill Monitor System panel provided continuous readings of engineering/drilling parameters, which were noted every 5 metres.

Washed and dried cuttings samples were collected in 5 metre (minimum) compilations from below the base of the 20" casing shoe, at 209m, to the Total Depth at 1030m. Hubbay and Exlog geologists maintained separate lithological logs (see Enclosures 5 & 6 and Appendix B7).

400g unwashed, 15m composite samples were bagged from below the 20" casing shoe and 100g unwashed, 15m composite samples were taken from below the 9-5/8" casing shoe, at 564m. The former were submitted for palynological study; the latter were sealed with preservation in cans and submitted for geochemical analysis.

## 4.2 Coring Programme

### 4.2.1 Conventional Cores

No conventional cores were cut in Baleen No.1.

### 4.2.2 Sidewall Cores

#### Summary

#### Suite 1 (09/11/81)

Interval Shot	:	230.0 - 551.7 metres
Shots Attempted	:	30
Cores Recovered	:	30
Bullets Empty	:	Nil
Bullets Misfired	:	Nil
Bullets Lost	:	Nil

#### Suite 2 (18/11/81)

Interval Shot	:	566.0 - 1030.0 metres
Shots Attempted	:	60
Cores Recovered	:	52
Bullets Empty	:	4
Bullets Lost	:	4
Bullets Misfired	:	Nil

Total : 90 Shots      82 Recovered

# BALEEN-1.

## 4.3 Wireline Logs and Wireline Sampling

Schlumberger Seaco ran the following wireline logs and Repeat Formation Tests in Baleen No.1:

<u>Suite</u>	<u>Date</u>	<u>Logs</u>	<u>Interval (m)</u>	<u>Remarks</u>
1	09/11/81	FDC-GR (1:200 & 1:500)	208.0 - 575.3	
		DIT-BHC-GR (1:200 & 1:500)	208.5 - 573.5	Recorded GR to 65 m
		CST (1:200)	230.0 - 551.7	
2	17/11/81	FDC-CNL-GR (1:200 & 1:500)	566.0 -1030.0	
		DLL-MSFL-GR (1:200 & 1:500)	566.0 -1025.0	
		BHC-GR (1:200 & 1:500)	566.0 -1025.0	
		HDT (1:200)	566.0 -1029.0	
	18/11/81	RFT-GR	661.0 - 998.5	5K gauges used in pressure test, halve all pressures.
		CST (1:200)	581.0 -1014.1	Two runs of the CST were made.
	21/11/81	CBL-VDL (1:200)	440.0 - 718.5	
23/11/81	Perforation Record (1:200)	700.0 - 706.0		
27/11/81	Bridge Plug Setting Record (1:200)	634 - 652.0		

### Additional Services

<u>Date</u>	<u>Logs</u>	<u>Interval (m)</u>
17/11/81	Cyberlook (1:200)	566.0 -1029.0
05/12/81	Continuous Dipmeter (Cluster with Dipmean) (1:200 & 1:500)	567 -1029.0
17/11/81	Cyberdip (1:100)	566.0 -1029.0
	Geodip (1:20)	625-725, 910-1000

Refer to Appendix B4 for further details and interpretation of the logs.

A Velocity Survey and Synthetic seismogram were run by Seismic Services Limited (Enclosures 3 & 4).

Repeat Formation Tests (RFT's)

Fourteen RFT's were attempted in Baleen No.1: eight were pressure tests, the remainder were for sampling. No hydrocarbons were recovered, but a small amount of mud was recovered in three of the tests. Further details of the RFT's and a discussion of the results are presented in Appendix B4.

REFERENCES

Hocking, J.B., 1972: Geological Evolution and Hydrocarbon Habitat, Gippsland Basin. J. Aust. Petrol. Expl. Assoc., 12(1), pp 132-137.

Hocking, J.B., and Taylor, D., 1964: The Initial Marine Transgression in the Gippsland Basin, Victoria, Paps. Aust. Petrol. Expl. Assoc., 1964

James, E.A., and Evans, P.R., 1971: The Stratigraphy of the Offshore Gippsland Basin. J. Aust. Petrol. Expl. Assoc., 11 pp. 71-74.

APPENDIX B1

PALAEONTOLOGY REPORT



FORAMINIFERAL SEQUENCE  
in BALEEN #1

For:- HUBBAY OIL (AUSTRALIA) LTD.

January 14th, 1982

*Paltech* Report  
1982/01



**PALTECH** PTY  
LTD

MARINE MICROPALAEONTOLOGISTS  
SYDNEY NEW SOUTH WALES  
MIDLAND WESTERN AUSTRALIA

THE FORAMINIFERAL SEQUENCE

IN BALEEN #1

Fifty six samples from BALEEN #1 were examined for foraminiferal content although only fifty five side wall cores were examined (see footnote ¶). The following sequence was interpreted :-

Sidewall Cores Depth(m)	Approx. E-log Unit Boundary	Age	Zone*	Paleoenvironment
230.0 to 332.6		Pliocene to Mid Miocene	A to C	Inner Continental shelf (~10-40m)
-----Transitional-----				
353.7 to 435.2		Mid Miocene	D to E	Canyon Head (~40m)
-----Transitional-----				
458.0 to 538.0		Early Miocene	F to G	Mid shelf canyon (40-200m)
-----Transitional-----				
551.7.0 to 597.0		Early Miocene	H-1	Shelf edge canyon (~200m)
-----Transitional-----				
612.0 to 627.0¶		Early Miocene	H	Upper slope fan (200-300m)
~~~~~627.0~~~~~				
627.0¶ to 632.0		Oligocene	J	Inner shelf (10-40m)
-----638.5-----				
640.0 to 651.0		Late Eocene	K	Estuarine entrance >10m
-----657.0 to 662.0-----				
658.0 to 698.0		?	No plank. forams found	Deltaic/Estuarine
-----base of sequence examined-----				

\*Planktonic foraminiferal zonation after Taylor in prep.

¶SWC at 627 treated as two distinct samples as initial perusal showed two distinct lithologies, so it was split axially.

A list of side wall cores studied is shown on Tables I & 2. Planktonic foraminiferal content varied; being sporadic in the deltaic / estuarine sediments and consistently diagnostic in the Early Miocene, but preservation precluded positive identification in some Mid Miocene samples from 458.0 to 332.6m.

Tables I & II (herein) detail the record summarised on page 1. A correlation diagram, Figure 1, is included, as is a micro-paleontological data sheet, which shows the interpreted reliability of the planktonic zone determinations.

#### CORRELATION OF BALEEN #1 with ADJACENT WELLS and LAKES ENTRANCE

The fence diagram, Figure 1, demonstrates marked differences between Baleen and the other sequences in both biostratigraphic and approximate paleobathymetric correlations, in that: -

- 1) Oligocene sedimentation is poorly represented when compared with Flathead and the on shore sequence at Lakes Entrance. Thus the Oligocene hiatus, common to many Gippsland off shore sequences is indicated in Baleen. The Baleen hiatus represents a period of some 5 million years.
- 2) A paleodepth discrepancy is evident at the base of the Miocene (zone H) with Baleen sedimentation having occurred on the upper continental slope (estimated depths between 200 & 300m), whilst sedimentation in other sequences was on the inner continental shelf (approximately 40m). Structural adjustment during the late Oligocene was probably responsible for both the biostratigraphic hiatus and the paleobathymetric differences. Erosion was also evident with recycled Eo/Oligocene foraminifera being recorded in the basal Miocene samples in Baleen (refer Tables I & II). It is also noted that the Eo/Oligocene faunas in all sections, including Baleen, were of estuarine to inner shelf origin (~0-40m).
- 3) There was a much higher accumulation rate in Baleen during the basal Miocene (Zone H) when compared with the other sections. These basal Miocene, proximal Carbonate turbidites, in Baleen, effectively filled the Oligocene depression created between 30 and 25 million years. Paleobathymetric equilibrium was achieved between sections (on Figure 1) by the Early/Mid Miocene boundary (Zones F/E) at 15 million years.

NOTES and EXPLANATORY REFERENCES

- 1) LAKES ENTRANCE OIL SHAFT: Biostratigraphic sequence, shown on Figure 1, was adapted from Jenkins, D.G, 1960 - Planktonic foraminifera from the Lakes Entrance oil shaft, Victoria, Australia. *Micropaleontology*, 6(4); 345-371. Additional data below 367m and above 65m was gathered from wells and outcrop in immediate vicinity and is lodged in *Paltech* files.
- 2) PREVIOUS WELLS DRILLED ADJACENT TO BALEEN AND WHALE on VIC/P11. Data shown on Figure 1 regarding FLATHEAD #1 is from *Paltech* files. However GANNET #1 and ALBATROSS #1 were precluded from correlation because of poor quality data, as the only samples available and examined were ditch cuttings.
- 3) PALEOBATHYMETRIC INTERPRETATIONS were derived from the distribution of depth sensitive, benthonic foraminifera (listed on Table II) recorded in *Paltech* files with collaboration from:- HAYWARD, B.W. & BUZAS, M.A., 1979- Taxonomy and paleoecology of early Miocene benthic foraminifera of Northern New Zealand and the North Tasman Sea. *Smithsonian Contribs. to Paleobiology* 36; and references cited therein.

M I C R O P A L E O T O L O G I C A L D A T A S H E E T

B A S I N: GIPPSLAND ELEVATION: KB: 9.8m GL: 54.9m

WELL NAME: BALEEN # 1 TOTAL DEPTH: \_\_\_\_\_

A G E	FORAM. ZONULES	H I G H E S T D A T A				L O W E S T D A T A						
		Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	
PLEISTOCENE	A <sub>1</sub>											
	A <sub>2</sub>											
PLIO-CENE	A <sub>3</sub>											
	A <sub>4</sub>						275.6	1				
	B <sub>1</sub>	287.0	0				298.4	1				
	B <sub>2</sub>	308.2	1				308.2	1				
MIOCENE	LATE	C	321.2	1			332.6	1				
		M I D D L E	D <sub>1</sub>	353.3*	1							
			D <sub>2</sub>									
	EARLY	E <sub>1</sub>										
		E <sub>2</sub>										
		F	469.0*	0				514.0	1			
		G	524.0	1				538.0	1			
		H <sub>1</sub>	551.7	1				623.0	1	618.0	0	
	OLIGOCENE	LATE	H <sub>2</sub>	627.0†				627.0†	1			
			I <sub>1</sub>									
EARLY		I <sub>2</sub>										
		J <sub>1</sub>	627.0†	1				632.0	1			
		J <sub>2</sub>										
EOCENE	K	646.0	1				646.0	1				
	Pre-K											

COMMENTS: \* Interval from 469.0 to 366.0 can only be designated as E/D; being impossible to subdivide biostratigraphically due to poor preservation caused initially by canyon deposition & subsequent redistribution of carbonate and silica. This interval is represented by nine SWCs. † SWC at 627 sampled across a disconformity between J-1 and H-2, thus sampling the widespread Gippsland late Oligocene hiatus. The higher sample contains a mixed fauna of recycled J with H-2.

CONFIDENCE RATING: 0: SWC or Core - Complete assemblage (very high confidence).  
 1: SWC or Core - Almost complete assemblage (high confidence).  
 2: SWC or Core - Close to zonule change but able to interpret (low confidence).  
 3: Cuttings - Complete assemblage (low confidence).  
 4: Cuttings - Incomplete assemblage, next to uninterpretable or SWC with depth suspicion (very low confidence).

NOTE: If an entry is given a 3 or 4 confidence rating, an alternative depth with a better confidence rating should be entered, if possible. If a sample cannot be assigned to one particular zone, then no entry should be made, unless a range of zones is given where the highest possible limit will appear in one zone and the lowest possible limit in another.

DATA RECORDED BY: PALTECH PTY, LTD. DATE: 4/1/1982.  
 DATA REVISED BY: \_\_\_\_\_ DATE: \_\_\_\_\_



PE900815

This is an enclosure indicator page.  
The enclosure PE900815 is enclosed within the  
container PE902682 at this location in this  
document.

The enclosure PE900815 has the following characteristics:

- ITEM\_BARCODE = PE900815
- CONTAINER\_BARCODE = PE902682
  - NAME = Foraminifera Distribution Table
  - BASIN = GIPPSLAND
  - PERMIT = VIC/P11
  - TYPE = WELL
  - SUBTYPE = DIAGRAM
  - DESCRIPTION = Significant Benthonic Foraminiferal  
Distribution, Residue Lithology and  
Paleoenvironmental Assessment, Baleen-1
- REMARKS =
- DATE\_CREATED = 14/01/1982
- DATE\_RECEIVED =
- W\_NO = W759
- WELL\_NAME = BALEEN-1
- CONTRACTOR = PALTECH PTY LTD
- CLIENT\_OP\_CO = HUSBAY OIL

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX B2

PALYNOLOGY REPORT



BALEEN NO. 1 WELL

Palynological Examination and Kerogen  
Typing of Sidewall Cores

by

W.K. Harris

## PALYNOLOGICAL REPORT

Client : Hudbay Oil (Australia) Ltd.  
Study : Baleen No. 1 Well, Gippsland Basin.  
Aims : Determination of age and distribution of kerogen types and spore colour.

### INTRODUCTION

Thirty nine sidewall cores from Baleen No. 1 Well drilled in the Gippsland Basin at Lat. 38°0'36.63"S, Long. 148°28'8.4"E in Vic. P-11 were processed by normal palynological procedures.

The basis for the biostratigraphic and consequent age determinations are based on Stover and Partridge (1973) and Partridge (1976) for the Tertiary sediments and principally on Dettman (1963), Dettman and Playford (1969) with the modifications of Dettman and Douglas (1976) and Burger (1973) for the Early Cretaceous sequence.

### OBSERVATIONS AND INTERPRETATION

#### A. Biostratigraphy

Table 1 summarises the biostratigraphy and age determinations for the samples studied. Tables II and III indicate the distribution of species encountered in the Early Cretaceous and Tertiary sequences respectively.

Several samples from this well are barren of plant microfossils and this is mostly due to unfavourable lithologies. These are dominated by light grey to white argillaceous sandstone and claystones generally representing oxidising environments of deposition.

Where plant microfossils have been recovered they are generally well preserved but assemblages were often not very diverse limiting the biostratigraphic precision.

#### 1. Early Cretaceous 709 to 1014m

Assemblages from this section of the well were generally well preserved but many samples yielded only very sparse or poorly diversified assemblages. Between 878m and 1014.1m there is little diversity in the assemblages and nothing in particular that can be used for precise biostratigraphic assignment. The species recorded are consistent with an Early Cretaceous age but their range is often much greater.

An assemblage at 840.1m records the first appearance of Coptospora paradoxa marking the base of the zone of Coptospora paradoxa. The assemblages at this point became more diversified although low yields predominate. Between 745 and 795m yields are low and assemblages are poorly diversified. The Coptospora paradoxa assemblage reappears at 723m and the top of the Cretaceous section appears to still in this zone at 709m.

BALEEN NO. 1 WELL

TABLE 1

SUMMARY OF BIOSTRATIGRAPHY AND AGE

<u>DEPTH IN METRES</u>	<u>BIOSTRATIGRAPHIC UNIT</u>	<u>AGE</u>
640	Late N. asperus	Late Eocene
646	Late N. asperus	Late Eocene
651	Late N. asperus	Late Eocene
658	Middle-Late N. asperus	Late Eocene
659	Middle-Late N. asperus	Late Eocene
672	Middle-Late N. asperus	Late Eocene
675	Middle-Late N. asperus	Late Eocene
678	Middle-Late N. asperus	Late Eocene
680	Middle-Late N. asperus	Late Eocene
683	Middle-Late N. asperus	Late Eocene
685	Middle-Late N. asperus	Late Eocene
688	Middle-Late N. asperus	Late Eocene
690	Middle-Late N. asperus	Late Eocene
693	No older Middle N. asperus	?Late Eocene
698	No older Middle N. asperus	?Late Eocene
709	Coptospora paradoxa	Albian
723	Coptospora paradoxa	Albian
735	Barren	-
745	Indeterminate	Early Cretaceous
751	Indeterminate	Early Cretaceous
765	Indeterminate	Early Cretaceous
774	Indeterminate	Early Cretaceous
784	Barren	-
795	Indeterminate	Early Cretaceous
817.9	Coptospora paradoxa	Albian
830	Coptospora paradoxa	Albian
840	Coptospora paradoxa	Albian
855	Barren	-
878	Indeterminate	Early Cretaceous
918	Indeterminate	Early Cretaceous
927	Indeterminate	Early Cretaceous
941	Indeterminate	Early Cretaceous
946.9	Indeterminate	Early Cretaceous
958	Indeterminate	Early Cretaceous
967	Indeterminate	Early Cretaceous
973	Indeterminate	Early Cretaceous
982	Indeterminate	Early Cretaceous
998	Indeterminate	Early Cretaceous
1014.1	Indeterminate	Early Cretaceous



BALEEN NO. 1 WELLTABLE IIIDISTRIBUTION OF TERTIARY SPECIES

Depth in metres	698	693	690	688	685	683	680	678	675	672	659	658	651	646	640
Baculatisporites comaumensis	X						X				X	X		X	
Baculatisporites disconformis	X														
Cupanieidites orthoteichus	X	X						X	X						
Cyathidites splendens aff.	X														
C. australis	X	X				X	X	X	X	X	X	X		X	
Gleicheniidites circinidites	X						X								X
Haloragacidites harrisii	X	X	X	X	X	X	X	X	X		X	X	X		X
Haloragacidites sp.	X														
Helciporites astrus	X														
Hystrichosphaeridium sp.	X														
Kuylisporites waterbolki	X								X						
Laevigatosporites major	X														
Lygistepollenites florinii	X	X				X		X	X				X		
Malvacipollis diversus	X	X				X	X		X		X	X	X		
Myrtaceidites parvus/mesonesus	X		X				X		X						
Nothofagidites brachyspinulosus	X	X				X	X	X		X	X				
Nothofagidites emarcidus/heterus	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Nothofagidites falcatus	X		X			X			X		X				X
Nothofagidites flemingii	X						X		X		X		X	X	
Phyllocladidites mawsonii	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Podocarpidites sp	X	X	X				X	X	X		X	X			X
Proteacidites parvus	X	X													
Rugulatisporites mallatus aff.	X					X		X							
R. trophus	X														
Sapotaceoidaepollenites rotundus	X											X			
Simplicepollis meridianus	X					X		X							
Spinidium sp.	X		X								X				
Triletes tuberculiformis	X		X								X				
Tricolporites geranoides aff.	X														
Verrucosiporites cristatus	X					X									
Dacrycarpites australiensis		X													
Lycopodiumsporites sp.		X													
Matonisporites ornamentalis		X										X			X
Microcachyridites antarcticus		X												X	
Parvisaccites catastus		X													X
Periporopollenites demarcatus		X									X				
Periporopollenites vesicus		X	X												
Podosporites microsaccatus		X													
Proteacidites latrobensis		X													
Paralecaniella indentata		X		X				X				X			
Operculodinium sp.		X					X								
Deflandrea phosphoritica		X													
Corrudinium incompositum		X													
Proteacidites pachypolus		X				X	X		X						
Santalumidites cainozoicus		X				X	X			X					



All of the Cretaceous assemblages are of non-marine aspect.

2. Eocene 640 to 698m

Although assemblages from this section of the well were well preserved the samples yielded in general very low quantities of organic matter with concomittant poor diversity.

Notwithstanding these features all assemblages can be assigned to the Nothofagidites asperus zone and some refinement can be made within this. Assemblages from 698 and 693m are certainly no older than Middle N. asperus zone but could be younger. The low diversity of Proteacidites spp. would tend to favour the younger age but with low diversity assemblages this assignment may be questioned. Dinoflagellates are uncommon in the sample at 698m but indicate some marine influence. Dinoflagellate assemblages become more diverse at 693m and the remainder of the samples to 640m have an increasingly stronger marine influence attesting to marine transgression in the Late Eocene.

The age of samples up to 658m is Late Eocene but their low yields and poor diversity precludes more precise biostratigraphic determination. The general appearance of the assemblages however would favour to younger assignment. From 651 - 640m the assemblages are more confidently assigned to the Late N. asperus zone from dinoflagellate evidence which includes the dominance of Spiniferites spp. and Areosphaeridium pectiniforme. The very common occurrence of dinoflagellates in these samples is indicative of open marine probably near shore sedimentation.

There would appear to be no significant breaks in the Eocene section of the well and the entire sequence was deposited under the influence of a late Eocene transgression.

B. Kerogen Types and Spore Colouration

During routine palynological processing of sidewall cores an unoxidised kerogen sample was taken and the nature of the kerogens and spore colouration are documented in Table V. Only those samples which yielded spore/pollen assemblages have been examined. Spore colour is expressed as the "Thermal Alteration Index" (TAI) of Staplin (1969) according to the scale in Table IV.

TABLE IV

<u>Thermal - Alteration Index</u>	<u>Organic matter/spore colour</u>
1 - none	fresh, yellow
2 - slight	brownish yellow
3 - moderate	brown
4 - strong	black
5 - severe	black and evidence of rock metamorphism.

Total organic matter (TOM) is expressed semi-quantitatively in the scale-abundant, moderate, low, very low, barren. Samples classed as having abundant or moderate amounts of TOM would be expected to have TOC's (total organic content) greater than 1%.

In this report four classes of organic matter are recognised - amorphogen, phyrogen, hylogen and melanogen and these terms are more or less synonymous with amorphous, herbaceous, woody and coaly. For reasons as outlined by Bujak et al. (1977) the former terms are preferred because they do not have a botanical connotation. The thermal alteration index scale follows that of Staplin (1969) and as outlined by Bujak et al. (1977). At a TAI of 2+ all four types of organic material contribute to hydrocarbon generation whereas at a TAI of 2, only amorphogen forms liquid hydrocarbons. The upper boundary defining the oil window is at a TAI of approximately 3 but varies according to the organic type. Above TAI 3+ all organic types only have a potential for thermally derived methane.

1. Cretaceous Section

Kerogen types throughout this unit are characterised by high melanogen with only one exception (e.g. 878m) where amorphogen becomes a significant component. If this section was mature for the generation of hydrocarbons it would yield dominantly gas with minor amounts of condensate.

Spore colour throughout is consistent at about 2 and cannot be considered to be mature especially when the kerogens are dominated by melanogen. These factors together with low to very low TOM values, militates against this section as a potential hydrocarbon source.

2. Tertiary Section - Eocene

This section is characterised by very low TOM's and the dominant kerogen type is amorphogen which appears as finely divided organic matter.

Where spore colour was determined it is indicative of immaturity.

All of the evidence suggests that this section in the early Tertiary is immature and does not contain sufficient organic matter of a favourable nature to be considered as a potential source rock for the generation of hydrocarbons.



BALEEN NO. 1 WELL

TABLE V

DISTRIBUTION OF KEROGEN TYPES AND SPORE COLOUR


<u>DEPTH (m)</u>	<u>TAI</u>	<u>TOM</u>	<u>PHYROGEN %</u>	<u>AMOR. %</u>	<u>HYLOGEN %</u>	<u>MELANOGEN %</u>
640	-	very low	*Tr	95		5
646	-	very low		95	Tr	5
651	**N.D.	very low		90	Tr	10
658	N.D.	very low		60	Tr	40
659	N.D.	very low		90	Tr	10
672	N.D.	very low		60	Tr	40
675	N.D.	very low	Tr	90	Tr	10
678	1+	very low	5	70	5	25
680	N.D.	very low	5	80	Tr	15
683	1+	very low	25	40	5	30
685	1+	very low	Tr	60	Tr	40
688	1+	very low	Tr	70	Tr	30
690	1+	very low	Tr	60	Tr	40
693	1+	very low	Tr	70	Tr	30
698	1+	low	Tr	60	Tr	40
709.0	2	very low	10	-	10	80
723	2+	very low	30	-	10	60
735	N.D.	very low	-	-	-	100
745	N.D.	very low	10	-	Tr	90
751	N.D.	very low	5	-	Tr	95
765	N.D.	very low	5	-	Tr	95
774	2	very low	5	-	Tr	95
784	N.D.	barren	-	-	-	100
795	2	very low	10	Tr	10	80
817.9	2	low	30	Tr	20	50
830	2	very low	20	-	10	70
840.1	2	low	25	-	15	50
855	N.D.	barren	-	-	-	-
878	2+	very low	10	60	Tr	30
918	2	low	5	-	5	90
927	2	low	15	-	5	80
941	N.D.	very low	10	-	Tr	90
946	2+	very low	10	-	Tr	90
958	N.D.	very low	5	-	Tr	95
956	2	very low	10	-	Tr	90
973.0	N.D.	low	20	Tr	10	70
982	N.D.	low	5	-	5	90
998	2-	low	30	-	10	60
1014	N.D.	very low	5	-	5	90

\* Tr indicates "trace"

\*\* N.D. indicates "not determined"

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W.K. Harris  
Consulting Geologist

16 July 1982

APPENDIX B3

PETROLOGY REPORT

Special Core Analysis Study  
for  
HUBBAY OIL, LTD. (AUSTRALIA)  
No. 1 Baleen Well

Special Core Analysis



**CORE LABORATORIES, INC.**

Special Core Analysis



February 22, 1982

Hudbay Oil, Ltd. (Australia)  
256 Adelaide Terrace  
P. O. Box 6124  
Hay Street East  
Perth, Western Australia 6000

Attention: Mr. J. W. Roestenburg

Subject: Combination Petrographic Studies  
No. 1 Baleen Well  
File Number: SCAL-308-81471

Gentlemen:

On December 1, 1981, seven core samples from the subject well were received by the Special Core Analysis Department of Core Laboratories, Inc., at Dallas, Texas, with a request by a representative of Core Laboratories International, Ltd., in Singapore for Combination Petrographic Studies. Damage in transit, however, permitted examination of only three of the samples. These examinations consisted of Petrographic Analysis by Thin Section, Mineral Content Determinations by X-ray Diffraction and Scanning Electron Microscope (SEM) observations. Results of these analyses are presented herein.

A portion of each of the submitted samples was prepared for thin section analysis and examined with a polarized light microscope. Thin section descriptions appear on Pages 1 through 3.

Additional portions of each of the samples were prepared for X-ray diffraction analyses. As requested, the whole rock and clay-sized (less than 4 microns in diameter) fractions were analyzed separately using monochromatic  $\text{CuK}\alpha$  radiation. Results of these analyses appear on Page 4.

Another portion of each of the samples was prepared for SEM examination by creating freshly broken surfaces and coating these surfaces with a thin (750Å) film of gold-palladium. A discussion of the features observed by SEM appears on Pages 5 and 6.

Net clay values for the samples from 662 meters, 702 meters, and 705 meters were found to be 11.3 percent, 12.4 percent and 14.4 percent, respectively. Predominant among the clay minerals identified in each sample is kaolinite. Lesser amounts of illite clay were also identified in each sample. Production problems associated with these clays include a possible "mobile fines" reduction of permeability resulting from high flow rates, and a significant development of microporosity leading to high irreducible water saturations. Although a detrital

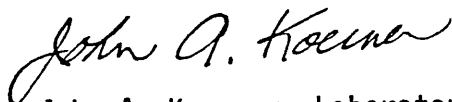
Hudbay Oil, Ltd. (Australia)  
File Number: SCAL-308-81471  
Page Two

matrix morphology is indicated in SEM photomicrographs, problems associated with these clay minerals should be minimized. Hydrochloric (HCl) acid or HCl/hydrofluoric (HF) acid treatments could have a positive effect; however, the presence of iron-rich dolomite, siderite and pyrite in these samples requires the addition of an iron-chelating agent (e.g., citric acid) and an oxygen scavenger to inhibit formation damage by gelatinous ferric hydroxide. The significant content of montmorillonite identified in the sample from 662 meters reflects substantial contamination by drilling mud infiltrate, and does not pose a problem to production.

It has been a pleasure performing these analyses on behalf of Hudbay Oil, Ltd. (Australia). Should any questions arise, or if we can be of further assistance, please do not hesitate to contact us.

Very truly yours,

Core Laboratories, Inc.



John A. Koerner, Laboratory Supervisor  
Special Core Analysis

JAK:SRO:md  
7cc. - Addressee

Petrographic Analysis by Thin Section

Hudbay Oil, Ltd.  
No. 1 Balleen Well

Depth, meters: 662

Very fine sandstone: quartz arenite

This sample is a moderately sorted, moderately packed quartz arenite. It consists of 73 percent quartz, 9 percent clay, 7 percent pyrite, 4 percent mica, 3 percent rock fragments, 2 percent goethite-limonite, and 2 percent organic material. Grain roundness varies from angular to subrounded while grain shapes vary from elongate to subequant and average 0.09mm in diameter. Grain contacts are tangential, planar, or concavo-convex.

Monocrystalline quartz exhibiting straight or undulose extinction is the major framework grain. Microlite inclusions of zircon and apatite are common in the quartz crystals. Minor vacuolization of quartz grains is also noted. Polycrystalline quartz with sutured subcrystal contacts and undulose extinction is rare. The lithic portion consists primarily of muscovite and biotite which are occasionally bent around framework grains. Microcrystalline chert grains are present in minor amounts. Glauconite pellets, although rare in occurrence, have been partially replaced by subhedral to euhedral pyrite. Clay clasts have also been replaced by pyrite. Pyroxene, zircon, collophane, glauconite, leucosene, ilmonite, and apatite occur in trace amounts. Cementation is primarily by grain-coating and pore-filling detrital clays. Euhedral to subhedral and framboidal pyrite and goethite-limonite act as substantial pore-filling cements. Glauconite pellets and clay clasts have suffered the effects of post-depositional compaction and consequently are often deformed around stable framework grains. Hematite and microcrystalline quartz are minor cementing agents.

Primary intergranular porosity accounts for approximately 2 percent of this sample.

All percentages were obtained by point count.

Petrographic Analysis by Thin Section

Hudbay Oil, Ltd.  
No. 1 Baleen Well

Depth, meters: 702

Fine sandstone: iron-rich quartz arenite

This sample is a moderately sorted, moderately packed iron-rich quartz arenite which consists of 37 percent quartz, 25 percent siderite, 25 percent goethite, 6 percent detrital clay, 3 percent feldspar, 2 percent organic material, and 2 percent mica. Grain roundness varies from angular to subrounded while grain shapes vary from elongate to subequant. Grain sizes average 0.12mm in diameter. Grain contacts are either tangential or planar.

The predominant framework grain, monocrystalline quartz, exhibits straight or undulose extinction and contains occasional microlitic inclusions of apatite and zircon. Muscovite and biotite often show evidence of post-depositional compaction and consequently are deformed around stable framework grains. Albite-twinning plagioclase represents the feldspar portion of this sample and alteration to sericite and clay is common. In addition, etching along cleavage traces is noted. Traces of hornblende, dolomite, hematite, and glauconite are present.

Cementation is primarily by equal amounts of siderite and goethite. Occasionally euhedral to subhedral siderite rhombs and goethite, which often replaces glauconite pellets, are present as pore-filling and grain-coating cements. Detrital clay is present as a grain-coating cement.

Primary intergranular porosity accounts for approximately 3 percent of this sample.

All percentages were obtained by point count.



Petrographic Analysis by Thin Section

Hudbay Oil, Ltd.  
No. 1 Balleen Well

Depth, meters: 705

Coarse sandstone: slightly metamorphosed quartz wacke

This sample is a poorly sorted, loosely packed quartz wacke. It consists of 29 percent quartz framework grains, 50 percent sericitized polycrystalline quartz matrix, 16 percent clay, and 5 percent pyrite. Grain roundness varies from angular to subrounded while grain shapes vary from elongate to subequant. Grain sizes range from 0.2mm to 6.1mm in diameter. Grain contacts, although rare due to the high percentage of matrix material, are tangential or planar.

Monocrystalline quartz exhibiting strongly undulose extinction and containing occasional microlite inclusions of apatite and zircon is the predominant framework grain. Polycrystalline quartz grains with sutured subcrystalline contacts and strongly undulose extinction are not as abundant as monocrystalline quartz grains. Many of the quartz grains are stretched and aligned with respect to a common plane, a product of slight metamorphism. Pyroxene, zircon, ilmenite, leucosene, and tourmaline are found in trace amounts.

Cementation is primarily by a matrix composed of sericitized polycrystalline quartz which appears to be encroaching upon quartz framework grains. This matrix accounts for the greatest loss in porosity of this sample. Detrital clay, detected by the overall "dirty" appearance of the matrix (in plane-polarized light) further reduces porosity. Isolated patches of large (up to 1.7mm), skeletal pyrite crystals have partially replaced framework grains and also serve as a minor cement.

Primary intergranular porosity, due to the abundance of matrix material, is less than 1 percent.

All percentages were obtained by point count.

Mineral Content Determination  
 (by X-ray Diffraction)

Hudbay Oil, Ltd.  
 No. 1 Baleen Well

Sample Depth, Meters:	<u>662</u>		<u>702</u>		<u>705</u>	
Particle Size of Sample Fraction:	Whole Rock	Clay	Whole Rock	Clay	Whole Rock	Clay
Estimate of Net Percent Clay Minerals:	11.3		12.4		14.4	

<u>Mineral</u>	<u>Percent of Sample Analyzed</u>					
Quartz	86		42		81	
Feldspars	Trace		5		Trace	
Dolomite(Fe-Rich)	-		1		-	
Siderite	1		19		Trace	
Pyrite	2		-		5	
Barite	*		-		Trace	
Goethite	-		21		-	
Kaolinite	5	47	8	66	12	86
Illite/Mica	3	23	4	34	2	14
Montmorillonite	3	30	-	-	-	-

\*Significant barite from drilling mud contamination

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgement of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

Scanning Electron Microscope Study

Hudbay Oil, Ltd.  
No. 1 Balleen Well

Depth, meters: 662

The sample from 662 meters is a dark gray, loosely consolidated, very fine grain sandstone. Photomicrograph A1(100X) shows a moderately packed aggregate of very fine sand and silt grains cemented by siderite and a matrix of detrital clay. Primary intergranular porosity, viewed in photomicrographs B1(600X) and C1(700X), has been reduced by the cements such that only microporosity associated with the matrix material is significant. A more detailed examination of the matrix material, provided by photomicrographs B2(3000X) and C2(3500X), reveals a poorly defined morphology which suggests a primarily detrital origin. In addition, photomicrograph B1(600X) shows framboidal pyrite.

Depth, meters: 702

The sample from 702 meters is a brown, loosely consolidated, very fine grain sandstone. Photomicrograph A1(100X) shows a moderately packed aggregate of very fine sand and silt grains cemented by a matrix of detrital clay, crystalline siderite and minor amounts of dolomite. Although the cements have greatly reduced primary intergranular porosity, photomicrographs B1(600X) and C1(700X) suggest significant microporosity associated with the matrix material. Photomicrographs B2(3000X) and C2(3500X) provide a more detailed examination of the matrix material, revealing the poorly defined morphology of detrital clay. In addition, finely crystalline rhombohedrons of dolomite are also present.

Scanning Electron Microscope Study

Hudbay Oil, Ltd.  
No. 1 Balleen Well

Depth, meters: 705

The sample from 705 meters is a light gray, loosely consolidated, very fine grain sandstone. Photomicrograph A1(100X) shows a moderately packed aggregate of very fine sand and silt grains cemented by a detrital clay matrix and minor amounts of siderite. Primary intergranular porosity, viewed in photomicrographs B1(700X) and C1(800X), has been reduced such that only microporosity associated with the matrix material is significant. Photomicrographs B2(3500X) and C2(4000X) provide a more detailed view of the matrix material and reveal a poorly defined morphology suggesting a primarily detrital origin.

APPENDIX B4

WIRELINE LOG INTERPRETATION

(REFER TO ATTACHED REPORT)

APPENDIX B5

LOG OF CORES

Lynden Title

Mr.G.T.Meldrum  
Hudbay Oil (Australia) Ltd,  
256 Adelaide Terrace  
Perth

2 Rowan Place  
Woodlands 6018  
16 December,1981.

Dear Greg,

Baleen # 1; Side Wall Cores

enclosed herein are the lithological descriptions of the side wall cores from Baleen # 1 as requested in your letter of November 27. The samples are of unconsolidated sand but because of the tight packing of grains and crystals there is virtually no intergranular pore space to be measured. We have not pursued the identity of the clays or carbonate by X-ray diffraction since this would involve a lengthy investigation that seems unwarranted in the circumstances.

Invoices for this work are enclosed.

Yours sincerely,



R.G. Brown  
B. W. Logan  
Geologists



## BALEEN No.1 - LOG OF SAMPLES

### Description of Cuttings Samples

All depths quoted are below the Rotary Table, which is 9.45 metres above Mean Spring Low Water and 64.35 metres above the sea floor.

Colours are taken from the Geological Society of America's "Rock Colour Chart". Samples were collected from the base of the 20 inch casing shoe at 209 metres R.T. to Total Depth at 1030 metres.

225 - 295 metres  
(70 metres)

Calcarenite, skeletal, glauconitic below 280 m, white to dark yellow orange to olive grey, very fine to granular, dominantly fine (forams) and granular (skeletal fragments), poorly sorted, angular to rounded, 15-30% calcite silt, 10-25% micrite, trace-5% clay minerals, trace-5% glauconite, 0-trace pyrite, unconsolidated to moderately hard, fair to very good intergranular porosity, trace intraskeletal porosity.

295 - 500 metres  
(205 metres)

Calcarenite, skeletal, light grey to medium dark grey, very fine to granular, dominantly granular and very coarse, poorly sorted, angular to rounded, 10-30% calcite silt, trace-25% micrite, 0-10% clay minerals, trace quartz silt, trace quartz grains, trace glauconite, 0-trace pyrite, 0-trace chlorite, unconsolidated to soft, fair to very good intergranular porosity.

500 - 577 metres  
(77 metres)

Calcsiltite, skeletal, light grey to dark grey to dark greenish grey, 15-45% skeletal fragments (decreasing with depth), very fine to granular, dominantly medium, poorly sorted, angular to rounded, 5-15% micrite, 5-10% clay minerals, trace-5% calcite cement, trace pyrite, 0-trace glauconite, 0-trace chlorite, soft to moderately hard, nil to poor intergranular porosity.

Interbedded with 5-35% Claystone, medium dark grey to olive black, 10-15% micrite, 5-20% calcite silt,



0-5% skeletal fragments, trace pyrite, moderately hard, nil porosity.

577 - 635 metres  
(58 metres)

Claystone, calcareous, light green grey to olive black, 5-30% skeletal fragments (fine to granular, dominantly coarse, poorly to moderately sorted), 15-20% calcite silt, 5-15% micrite, trace-5% glauconite, trace pyrite, trace chlorite, soft to moderately hard.

With 5-65% (maximum between 590-605m) Calcsiltite, skeletal, light green grey to medium greenish grey, 25-30% skeletal fragments (dominantly coarse, moderately sorted), 5-10% micrite, 5-15% clay minerals, soft to moderately hard, trace intergranular porosity.

635 - 690 metres  
(55 metres)

Claystone, glauconitic, calcsiltitic in part, light green grey to greyish olive, 10-40% glauconite, limonitic in part, 5% skeletal fragments, 15-20% calcite silt, 5-10% micrite, trace pyrite, trace chlorite, very soft to soft.

With 10-35% Sandstone, silty in part, glauconitic, clear to light grey to greyish brown, very fine to medium grained, dominantly very fine and fine (size increasing with depth), subangular to subrounded, moderately sorted, 15-25% quartz silt, 10-15% glauconite, trace-10% dolomite, soft to hard, trace-10% intergranular porosity.

And below 660 m, trace-5% Sandstone, clear to white to light grey, coarse to granular, dominantly very coarse, subangular to rounded, well sorted, unconsolidated.

Note: glauconite oxidised to limonite granules below below 645 m.

690 - 700 metres  
(10 metres)

Claystone, glauconitic, as between 635-690 m.

With 30-40% Sandstone, glauconitic, clear to greyish brown, very fine to medium, dominantly medium, subangular to subrounded, moderately sorted, 10% quartz silt, 10% glauconite, 5% dolomite, soft to moderately hard, 5-10% intergranular porosity.

And 20-40% Sandstone, coarse to granular as between 660-690 m.

(percentage of claystone and fine sandstone decreasing; coarse, unconsolidated sand increasing from 690-700m).

700 - 705 metres  
(5 metres)

Sandstone, coarse to granular, as between 660-690m.

With 15% Claystone, glauconitic, as between 635-690m.

705 - 730 metres  
(25 metres)

Sandstone, clear to white to light grey, very fine to granular, dominantly very coarse (at 705m) decreasing to dominantly medium below 715 m, subangular to rounded, poorly to moderately sorted, 5% glauconite, trace pyrite, 0-trace calcite cement, unconsolidated, very good porosity

With (below 710 m), 20-35% Siltstone, argillaceous in part, dark grey to greenish grey to medium bluish grey, 15-20% clay minerals, trace-10% pyrite, 0-5% chlorite, hard to very hard.

730 - 830 metres  
(100 metres)

Sandstone, argillaceous in part, clear to white to light grey, very fine to granular, dominantly medium, subangular to subrounded, poorly to moderately sorted, 5-25% kaolin-type clay minerals below 765 m, trace-5% glauconite, trace pyrite, trace skeletal fragments, 0-trace calcite cement, trace carbonaceous material (below 740m), unconsolidated to very soft, poor to very good intergranular porosity.

With 30-45% Siltstone, argillaceous in part, as between 705-730m.

And below 740m, 5-30% Claystone, skeletal in part, olive grey to dark grey to dark green grey, 10-20% skeletal fragments, trace-10% quartz silt, trace pyrite, trace chlorite, trace brown mica (very coarse biotite flakes).

And below 760m, 15-40% Siltstone, arenaceous, light brown to light grey, 35-45% quartz grains, (very fine to fine, dominantly very fine), trace brown mica (very coarse flakes), 5-15% clay minerals, trace pyrite, very soft to soft, trace porosity.

And between 760-780m, and 815-825m, 5-20% Coal, brownish black, soft to moderately hard.

830 - 880 metres  
(50 metres)

Sandstone, argillaceous in part, clear to white to light grey to light brown, very fine to granular, dominantly medium, subangular to rounded, poorly to moderately sorted, 5-20% "white" clay minerals (? kaolin), 10-15% quartz silt, trace glauconite, trace pyrite, trace skeletal fragments, trace carbonaceous material and (below 855 m) trace lithic fragments, fair to very good intergranular porosity.

With 30-45% Siltstone, dark grey to greenish grey to brown to orange pink, 10-15% clay minerals, trace-5% pyrite, trace chlorite, moderately hard to hard.

And trace-15% Claystone, as between 730-830m.

And above 740m, 10-15% Siltstone, arenaceous, as between 730-830m.

880 - 925 metres  
(45 metres)

Sandstone, argillaceous in part, generally as between 830-880m, with trace feldspar.

With 30-45% Siltstone, as between 830-880m.

And 0-5% increasing to 25% at 925m Claystone, olive grey to dark grey to dark green grey, trace-10% skeletal fragments, very fine to fine, trace-15% quartz silt, trace of pyrite, chlorite and brown mica, soft.

925 - 955 metres  
(30 metres)

Sandstone, argillaceous in part, between 880-925m, with trace lithic fragments below 930 m, trace to poor porosity.

With 20-40% Siltstone as between 830-880m.

And 5-40% (dominant between 930-935m) Coal, black, vitreous, high rank at 935m.

And 15-50% (dominant between 940-945m) Claystone, silty in part, as between 880-925m.

955 - 1030 metres  
(75 metres)

Sandstone, argillaceous in part, clear to white to light grey to orange, very fine to granular, dominantly medium, subangular to rounded, 10-20% white clay minerals (? kaolin), trace-10% quartz silt, trace glauconite, trace pyrite, trace skeletal fragments, 0-trace carbonaceous material, trace feldspar, rare trace lithic fragments, unconsolidated to very soft (see note below), fair to good intergranular porosity.

With 30-45% Siltstone, as between 830-880m.

And nil-20% Claystone, silty in part as between 880-925m.

Also nil-20% Coal, as between 925-955m.

NOTE: Below 900 m, cuttings show unconsolidated quartz and siltstone pieces (plus minor claystone and coal), with very little white clay. However chips taken from top shaker show more clay matrix (20% ± ?) and vary from very soft, when wet, to moderately hard or friable when dry. Hence porosity is thought to be much less than indicated from study of cuttings samples.

APPENDIX B6

G E O C H E M I C A L   A N A L Y S E S

GEOCHEMICAL ANALYSIS OF  
GAS SAMPLES A-8526 AND  
A-11939 FROM BALEEN #1

G.W. WOODHOUSE

Petroleum Geochemistry Group  
School of Applied Chemistry  
W.A. Institute of Technology  
Kent Street  
BENTLEY WA 6102

February, 1982

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COMMENTS AND CONCLUSIONS	4

RESULTS



RESULTSCOMPOSITIONAL ANALYSIS

<u>Component</u>	<u>A-11939 (by volume)</u>	<u>A-8526 (by volume)</u>
Methane	95.8%	95.6%
Ethane	0.16%	0.13%
Propane	8ppm	11ppm
Butanes	3ppm	7ppm
Pentanes	2ppm	2ppm
Carbon Dioxide	0.02%	0.02%
Nitrogen	4.00%	4.20%

ISOTOPE ANALYSIS

<u>Sample</u>	<u><math>\delta^{13}\text{C}</math> (PDB)</u>
A-8526	-49.8 <sup>o</sup> /oo
A-11939	-45.3 <sup>o</sup> /oo

COMMENTS AND CONCLUSIONS

COMMENTS AND CONCLUSIONSGENERAL

Two cylinders (#A-8526 and #A-11939) of gas from the Baleen #1 exploration well were provided for geochemical analysis. Firstly, the C<sub>1</sub>-C<sub>5</sub> hydrocarbon composition of each gas was determined by gas chromatography using a Chromosorb 102 column and a flame ionization detector (FID). Secondly, the relative proportions of nitrogen, carbon dioxide and ethane in the samples was determined by gas chromatography using a Chromosorb 102 column and a thermal conductivity detector (TCD). Since the proportion of ethane was measured in both analyses and the relative detector responses of all of the analysed gases is known the relative proportion by volume of each of the components was able to be calculated. Finally, the stable carbon isotope ratio of each of the gases was measured using an MS-20 stable isotope mass spectrometer.

We have reason to believe that the determination of the proportion of methane in dry gases such as these Baleen samples is most accurately carried out using a TCD detector rather than an FID detector. Unfortunately, at the time of these analyses we did not have a column suitable for this type of analysis but we are in the process of rectifying this problem for future analyses.

GAS COMPOSITION

The compositional analysis data clearly shows that the two gases are similar in composition and further that they are very dry and contain a moderately high proportion of nitrogen.

CARBON ISOTOPE COMPOSITION

It is now well-established that the following carbon isotope criteria can often be used to characterize the source of natural gas:

<u>Carbon Isotope Values</u>	<u>Gas Source</u>
-75 to -58 <sup>o</sup> /oo	dry bacterial methane
-58 to -40 <sup>o</sup> /oo	gas associated with oil
-40 to -25 <sup>o</sup> /oo	deep, dry thermal gas

Thus, the isotope ratios for the Baleen #1 gases are typical of gas associated with oil generation. However, this type of gas usually has an abundant C<sub>2</sub>+ component whereas the Baleen gas has a very small C<sub>2</sub>+ fraction. Therefore to explain the isotope ratio and the hydrocarbon composition of Baleen gas it is necessary to suggest that this gas is a mixture of dry bacterial methane and dry thermal gas.

It should be noted that more tenuous explanations such as migration effects could account for the observed hydrocarbon and isotopic composition of these gas samples.

GAS AND FUEL CORPORATION OF VICTORIA  
SCIENTIFIC SERVICES DEPARTMENT

**SPECIAL TEST REPORT**

Requested by	Hudbay Oil (Aust.) Pty. Ltd.	Sample Book No. 811179.....
Date Received	11th December, 1981	
Material	Natural Gas	Job No. ....248.....
Query	Analysis on Balcon No 1	Report No. ...81/786/AN.....
Origin of Sample	DST #2    DST #1 Sampling bottles Serial Nos. A11954, A11977	

REPORT

ANALYSIS OF SAMPLING BOTTLE SERIAL NO. A11954.

COMPONENTS

MOLAR CONCENTRATION

Methane	97.9 ±	0.2 percent
Ethane	0.10 ±	0.01 percent
Propane	14 ±	2 ppm
iso Butane	5 ±	2 ppm
normal Butane		less than 2 ppm
neo Pentane	11 ±	2 ppm
iso Pentane		less than 2 ppm
normal Pentane		less than 2 ppm
Heavier Hydrocarbons	96 ±	4 ppm
Oxygen plus Argon	0.04 ±	0.01 percent
Nitrogen	1.87 ±	0.02 percent
Carbon Dioxide	0.13 ±	0.01 percent
Helium	30 ±	10 ppm

A sulphur compound boiling in the range 120 - 160°C (carbon disulphide, ethyl mercaptan or dimethyl sulphide) was found to be present at < 0.2 mgm/m<sup>3</sup> as sulphur. Hydrogen sulphide was not detected (detection limit 5 ppm).

A second sample, sampling bottle Serial No. A11977, was found to be at atmospheric pressure. An oxygen analysis of 7.1 percent indicated air contamination. Lack of sample pressure prevented further analysis.

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A Laboratory Certificate, Statement or Report may not be published except in full unless permission for the publication of an approved abstract has been obtained, in writing"



Chemist I. STRUDWICK  
Checked *[Signature]*

Date 11/12/81  
Laboratory

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**SPECIAL TEST REPORT**

Requested by	Hudbay Oil (Aust) Pty. Ltd.	Sample Book No. <u>81/1209</u> .....
Date Received	21/12/81	Job No. .... <u>250</u> .....
Material	Natural Gas	Report No. .... <u>82/9/AN</u> .....
Query	Analysis	
Origin of Sample	Baleen Field Well No. 1	

REPORT

Analysis of Cylinder A - 8526

<u>Component</u>	<u>Mole Concentration</u>
Methane	96.8 % $\pm$ 0.2
Ethane	0.09 % $\pm$ 0.01
Propane	25 p.p.m $\pm$ 2
iso-Butane	4 p.p.m $\pm$ 1
n-Butane	4 p.p.m $\pm$ 1
neo-Pentane	4 p.p.m $\pm$ 1
iso-Pentane	5 p.p.m $\pm$ 1
n-Pentane	5 p.p.m $\pm$ 1
Higher Hydrocarbons	100 p.p.m $\pm$ 10
Carbon Dioxide	0.18% $\pm$ 0.01
Nitrogen	2.67 % $\pm$ 0.05
Oxygen + Argon	0.24 % $\pm$ 0.01
Helium	30 p.p.m $\pm$ 10
Pressure in cylinder	Approximately 15 lb/in <sup>2</sup>

Distribution: Mr. D. R. McDonald, Hudbay Oil (Aust) Pty.Ltd

"This Laboratory is registered by the National Association of Testing Authorities, Australia. The test(s) reported herein have been performed with its terms of registration,

A Laboratory Certificate, Statement or Report may not be published except in full unless permission for the publication of an approved abstract has been obtained, in writing"



Chemist	C. Rudolph	Date	22/12/81
Checked	<i>[Signature]</i>	Laboratory	

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# WATER ANALYSIS REPORT FORM

Sample No. 1 Sampled By Schlumberger  
 Date Sampled \_\_\_\_\_ Analysed By Analabs  
 Field Gippsland Basin Type of Well Wildcat  
 Formation \_\_\_\_\_ Well Designation Baker#1  
 Source of Water Sample RFT#1 Depth Interval (metres) 470-3  
 (ie. DST, RFT etc.)

**CHEMICAL ANALYSIS**      JOB REF 82.0 01 22331

Ionic Species		Concentration	
		mg/litre	me/litre
C A T I O N I C	Sodium	3800	165.22
	Calcium	19100	955
	Magnesium	165	13.75
	Barium	6.3	
	Iron	1.5	
A N I O N I C	Chloride	158078	1636
	Sulphate	500	10.42
	Carbonate	< 0.3	
	Bicarbonate	414.8	6.8

Sulphur Concentration (as H<sub>2</sub>S) 25.6 mg/litre

**OTHER PROPERTIES**

pH (at 60°F) 7.23 mg / l

Specific Gravity (60°F/60°F) 1.0737 mg / l

Resistivity (ohm-metres) 117760

Refractive Index (at 60°F) \_\_\_\_\_

# WATER ANALYSIS REPORT FORM

Sample No. 2 Sampled By Schlumberger  
 Date Sampled ..... Analysed By ANALABS  
 Field Crippsland Basin Type of Well Wildcat  
 Formation ..... Well Designation Bakeen#1  
 Source of Water Sample RFT#1 Depth Interval(metres) 463  
 (ie. DST, RFT etc.)

CHEMICAL ANALYSIS      JOB REF    82.0 01 22331

Ionic Species		Concentration	
		mg/litre	me/litre
C A T I O N I C	Sodium	6100	265.22
	Calcium	40000	2000
	Magnesium	320	26.67
	Barium	9.3	
	Iron	8	
A N I O N I C	Chloride	115162	3244
	Sulphate	900	18.75
	Carbonate	< 0.3	
	Bicarbonate	217.16	3.56

Sulphur Concentration (as H<sub>2</sub>S) ..... 18.4 ..... mg/litre

OTHER PROPERTIES

pH(at 60°F) ..... 6.81 mg / 1

Specific Gravity (60°F/60°F) ..... 1.1429 mg / 1

Resistivity(ohm-metres) ..... 235520 .....

Refractive Index(at 60°F) .....



APPENDIX B7

LOG OF SAMPLES

SIDEWALL CORE DESCRIPTIONS

WELL: **BALEEN-1**

DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY SIZE %		SILT SIZE %						GRAINS TYPE & %		CEMENT TYPE & %		DIAGENESIS			ROUNDING	SORTING	HARDNESS	POROSITY TYPE & %	ACCESSORIES			HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA		
				CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	RANGE	DOMINANT	TYPE & %	TYPE & %	TYPE	%	TEXTURE	TYPE & %					TYPE & %	TYPE & %						
																									TYPE & %				TYPE & %	TYPE & %
230.0	5.5	Skeletal CALCISILTITE	Pale olv - lt olv gry	10	15	Tr	50	Tr	25			VF-G	F-						SR	P	VS	-	G	Tr				-	No Fluor, no solv Fluor but oil but oil bubbles with HCl indicates contamination SK - mainly for	
241.4	4.5	Skeletal Argillaceous CALCISILTITE	Olv gry	25	20	Tr	35	Tr	20			VF-M	-F						A-	R	S	g	Tr	G	Tr			Clay "lumps"	Oil bubbles with HCl in most s below due to contamination	
253.8	5.5	Argillaceous Calcisiltite	Lt olv gry - olv gry	30	20	Tr	30		15					C	Tr					P	M	g	Tr	G	5			-	Trace min Fluor	
264.4	5.0	Argillaceous Calcisiltitic CALCARENITE	Lt olv gry - olv gry	20	20		20		40			VF-C	F						SA	-R	M	M	-	G	Tr			-		
275.6	3.5	Calcareous CLAYSTONE	Olv gry & dk grnsh gry	40	15	Tr	30		10			VF-M	VF							M	M	-	G	5			-			
287.0	4.5	Argillaceous CALCARENITE	Olv gry - dk grnsh gry	25	20	Tr	20		30			VF-M	VF							M	S-M	g	Tr	G	5			-		
298.4	5.5	Argillaceous CACISILTITE	Lt olv gry - olv gry	25	15	Tr	45		15			VF-C	F							M	S-M	g	Tr	G	Tr	Ce	Tr	-	White spotted appearance	
308.2	5.0	Calcisiltitic CALCARENITE	Olv gry - dk grnsh gry	15	10	Tr	20		55			VF-G	M	F-					A-	R	M	S-M	g	10	G	Tr		-	Spotted appearance	
321.2	5.0	Argillaceous CALCARENITE	Grnsh gry - dk grnsh gry	25	15		25		35			VF-G	M	F-					A-	R	P	S-M	g	5-10	G	Tr		-	Spotted appearance larger skeletal fragments	
332.6	5.0	Argillaceous CALCARENITE	Gnsh gry - dk grnsh gry	25	10		10		55			VF-G	M						A-	R	P	S-M	g	5-10	G	5	Ce	Tr	-	Large skeletal fragments

STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)

SYNGENETIC STRUCTURES

Stratification		Current-produced markings		Organism-produced markings		Penecontemporaneous deformation structures	
Parallel	Type						
Thickness of bedding		Irregular bedding		Ripple marks		Burrowed	
Metric System		Graded bedding		asymmetrical interference		slightly burrowed	
millimeter bed	1mm-10mm	No apparent bedding		symmetrical		moderately burrowed	
centimeter bed	1cm-10cm	Nodular bedding		Pull over flame structure		well burrowed	
Cross Bedding				Scour and fill		Churned	
in general				Flute cast		Bored	
with angle indicated	∠°			Groove cast		Bored surface	
chevron				Striation		Organism tracks and trails	
climbing				Parting lineation		Plant root tubes	
festoon						Vertebrate tracks	
planar							

EPIGENETIC STRUCTURES

Solution structures	Tectonic structures
Breccia, solution, collapse	Fractures
Disolution - compaction (horse tail)	Slickensides
Syolite	Breccia, tectonic
Vadose pisolite	
Vadose silt	
Boxwork	
Salt hoppers or casts	

Abbreviations	GRAIN SIZE	CEMENT	DIAGENESIS	ROUNDING	SORTING	HARDNESS	POROSITY	ACCESSORIES	DIAGENETIC TEXTURES	HYDROCARBONS
VF	Very Fine	Q Silica	D Dolomitization	R Rounded	P Poor	U Unconsolidated	g Intergranular	Py Pyrite	CX Crypto <1/256mm	* Signifies presence
F	Fine	Py Pyrite	Q Silicification	SR Subrounded	M Moderate	VS Very Soft	v Vugular	Mc Mica	MX Micro 1/256 - 1/16mm	Full details described under supplementary data
M	Medium	C Calcite	X Recrystallization	SA Subangular	W Well	S Soft	i Intrasketal	Ch Chert		
C	Course	D Dolomite	Ce Chloritization	A Angular	VW Very Well	M Moderate		Cc Lignite/Coal		
VC	Very Coarse	Sd Siderite				H Hard		Hm Heavy minerals		
G	Granule & larger							Lf Lithic fragments		
								Gl Glauconite		

**SIDEWALL CORE DESCRIPTIONS**

**WELL: BALEEN-1**

DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY SIZE %		SILT SIZE %		GRAINS				CEMENT		DIAGENESIS			ROUNDING	SORTING	HARDNESS	POROSITY TYPE & %	ACCESSORIES			HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA	
				CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	RANGE	DOMINANT	TYPE & %	TYPE & %	TYPE	%					TEXTURE	TYPE & %	TYPE & %				TYPE & %
344.0	5.2	Argillaceous CALCARENITE	Lt olv gry - grnsh gry	20	10	Tr	30		30		VF-G	M	C-5				A-SR	P	M	g 15-20	G 5			-		Mineral Fluor only	
353.7	5.0	Argillaceous CALCARENITE	Olv grn	30	15	Tr	20		30		VF-G	F	C-5				A-SR	P	S-M	g 5-10				-	Wh streaky & bands of skeletal frags & ct cement giving min Fluor		
366.0	5.0	CALCARENITE	Lt olv gry - grnsh gry	10	15	Tr	20	Tr	55		VF-G	M					A-R	P	S	g 15-20	G Tr	Ce Tr		-			
378.5	3.7	Calciruditic CALCARENITE	Lt grnsh gry - grnsh gry	5	10		10		60		F-G	VC	C-15				A-R	P	M-H	g 10-15	G Tr			-			
390.0	4.5	Argillaceous CALCARENITE	Grnsh gry - dk grnsh gry	35	15	Tr	10	Tr	40		VF-G	M	C Tr				A-SR	P	M	g Tr	G Tr	Ce Tr		-			
405.6	4.7	Calcarenitic CALCISILTITE	Lt grnsh gry - grnsh gry	Tr	20	Tr	50		30		VF-G	F	C Tr				A-SR	P	S	g 5	G Tr?	Ce Tr		-			
412.0	3.7	Argillaceous Calcisiltitic CALCARENITE	Lt olv gry	25	15	Tr	30	Tr	30		VF-G	M					A-R	P	M-H	g Tr				-			
420.0	5.2	Argillaceous CALCARENITE	Olv gry - olv blk	30	10		15		40		VF-G	M	C-5				A-SR	P	S-M	g Tr	Cc Tr			-			
435.2	4.7	Argillaceous CALCARENITE	Grnsh gry - dk grnsh gry	30	15	Tr	25	Tr	30		VF-G	F	C Tr				A-SA	P	M	g Tr				-			
446.6	5.2	Calcarenitic Argillaceous CALCISILTITE	Lt olv gry - olv gry	25	10		35		25		VF-VC	M	C-5				A-SR	P	M-H	g Tr	Py Tr	G Tr			Mineral Fluor		

**STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)**

**SYNGENETIC STRUCTURES**

**EPIGENETIC STRUCTURES**

<p><u>Stratification</u> Parallel Type</p> <p>Thickness of bedding</p> <p><u>Metric System</u> millimeter bed 1mm-10mm <math>\frac{mm}{1000}</math> centimeter bed 1cm-10cm <math>\frac{cm}{100}</math></p> <p><u>Cross Bedding</u> in general with angle indicated <math>\angle 10^\circ</math> chevron climbing festoon planar</p>	<p><u>Current-produced markings</u></p> <p>Irregular bedding </p> <p>Graded bedding </p> <p>No apparent bedding </p> <p>Nodular bedding </p>	<p><u>Organism-produced markings</u></p> <p>Ripple marks asymmetrical </p> <p>symmetrical </p> <p>Pull over flame structure </p> <p>Scour and fill </p> <p>Flute cast </p> <p>Groove cast </p> <p>Striation </p> <p>Parting lineation </p>	<p><u>Penecontemporaneous deformation structures</u></p> <p>Burrowed slightly burrowed </p> <p>moderately burrowed </p> <p>well burrowed </p> <p>Churned </p> <p>Bored </p> <p>Bored surface </p> <p>Organism tracks and trails </p> <p>Plant root tubes </p> <p>vertebrate tracks </p>	<p><u>Solution structures</u></p> <p>Breccia, solution, collapse </p> <p>Disolution - compaction (horse tail) </p> <p>Syolite </p> <p>Vadose pisolite </p> <p>Vadose silt </p> <p>Boxwork </p> <p>Salt hoppers or casts </p>	<p><u>Tectonic structures</u></p> <p>Fractures </p> <p>Slickensides </p> <p>Breccia, tectonic </p> <p><u>Miscellaneous</u></p> <p>Geopetal fabric </p> <p>Cone-in-cone </p> <p>Stromatolites </p> <p>Boudinage, ball and age flow </p>
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<b>Abbreviations</b>	<b>GRAIN SIZE</b> VF Very Fine F Fine M Medium C Course VC Very Coarse G Granule & larger	<b>CEMENT</b> Q Silica Py Pyrite C Calcite D Dolomite Sd Siderite	<b>DIAGENESIS</b> D Dolomitization Q Silicification X Recrystallization Ce Chloritization	<b>ROUNDING</b> R Rounded SR Subrounded SA Subangular A Angular	<b>SORTING</b> P Poor M Moderate W Well VW Very Well	<b>HARDNESS</b> U Unconsolidated VS Very Soft S Soft M Moderate H Hard	<b>POROSITY</b> g Intergranular v Vugular i Intraskelatal	<b>ACCESSORIES</b> Py Pyrite Mc Mica Ch Chert Cc Lignite/Coat Hm Heavy minerals Lf Lithic fragments Gl Glauconite	<b>DIAGENETIC TEXTURES</b> CX Crypto <1/256mm MX Micro: 1/256 - 1/16mm	<b>HYDROCARBONS</b> * Signifies presence Full details described under supplementary data
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SIDEWALL CORE DESCRIPTIONS

WELL: BALEEN-1

DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY SIZE %		SILT SIZE %		GRAINS				CEMENT		DIAGENESIS			ROUNDING	SORTING	HARDNESS	POROSITY TYPE & %	ACCESSORIES			HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA		
				CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	RANGE	DOMINANT	TYPE & %	TYPE & %	TYPE	%					TEXTURE	TYPE & %	TYPE & %				TYPE & %	
																												TYPE & %
458.0	5.5	CALCARENITE	Grnsh gry - olv gry	20	20	Tr	20		40			VF-G	M						A-R	P	M	g 5	G tr					Min Fluor
469.0	5.5	Calcareous CLAYSTONE	Olv gry - olv blk	45	10		20		15			VF-M	F	C 10						M	M-H	g 5	Py Tr					Min Fluor - Parallel orientation of skeletal frag & calcite
476.0	2.5	Argillaceous CALCISILTITE	Lt olv gry - olv gry	25	25	5	35		10			VF-M	VF							M	S	g Tr						
481.6	5.5	Calcareous CLAYSTONE	Olv gry - olv blk	40	25		10		15			VF-M	F	C 10							M	M	g Tr					White steaks of calcite cement
493.0	5.0	Argillaceous CALCILUTITE	Grnsh gry - dk grnsh gry	20	50		20		10			VF-M	VF								M	M	g Tr					Slight Min Fluor
503.4	3.5	CALCISILTITE	Grnsh gry - lt bluish gry	15	25		40		15			VF-M	VF	C 5							M	M-H	-					Min Fluor only
514	5.0	Calcareous CLAYSTONE	Olv gry - dk grnsh gry	55	20		15		Tr			VF-M	VF	C 10								M-H	g Nil Tr					
524.0	5.1	Calcareous CLAYSTONE	Olv gry - olv blk	60	5		20		10			VF-M	F	C 5								M						Speckled appearance wh specks = skeletal frags
538.0	4.8	Calcareous CLAYSTONE	Olv gry - olv blk	70	10		10		10			VF-M	VF									M						No Fluor or solv Fluor, but a few "oil bubbles" in HCl contamination
551.7	2.8	Argillaceous CALCISILTITE	Olv gry - lt olv gry	30	15		45		10			F-C	M									S-M						No Fluor or solv Fluor, but a few "oil bubbles" in HCl contamination

STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)

SYNGENETIC STRUCTURES

EPIGENETIC STRUCTURES

<p><u>Stratification</u> Parallel Type</p> <p>Thickness of bedding Metric System millimeter bed 1mm-10mm <math>\frac{mm}{mm}</math> centimeter bed 1cm-10cm <math>\frac{cm}{cm}</math></p> <p><u>Cross Bedding</u> in general <math>\diagdown</math> with angle indicated <math>\diagdown</math> 10° chevron climbing <math>\diagdown</math> festoon <math>\diagdown</math> planar <math>\diagdown</math></p>		<p><u>Current-produced markings</u></p> <p>Irregular bedding <math>\approx</math> Graded bedding <math>\nabla</math> No apparent bedding <math>\nabla</math> Nodular bedding <math>\approx</math></p>			<p><u>Organism-produced markings</u></p> <p>Ripple marks asymmetrical <math>\approx</math> interference symmetrical <math>\approx</math> Pull over flame structure <math>\nabla</math> Scour and fill <math>\nabla</math> Flute cast <math>\nabla</math> Groove cast <math>\nabla</math> Striation <math>\nabla</math> Parting lineation <math>\approx</math></p>			<p><u>Organism-produced markings</u></p> <p>Burrowed slightly burrowed <math>\nabla</math> moderately burrowed <math>\nabla</math> well burrowed <math>\nabla</math> Churned <math>\nabla</math> Bored <math>\nabla</math> Bored surface <math>\nabla</math> Organism tracks and trails <math>\nabla</math> Plant root tubes <math>\nabla</math> Vertebrate tracks <math>\nabla</math></p>			<p><u>Penecontemporaneous deformation structures</u></p> <p>Mud cracks <math>\nabla</math> Rain or hail prints <math>\nabla</math> Pull-apart <math>\nabla</math> Slump structures and contorted bedding <math>\nabla</math> Convolute bedding <math>\nabla</math> Load cast <math>\nabla</math> Tepee structure <math>\nabla</math> Birdseye, fenestral fabric <math>\nabla</math></p>			<p><u>Solution structures</u></p> <p>Breccia, solution, collapse <math>\nabla</math> Disolution - compaction (horse tail) <math>\nabla</math> Sylolite <math>\nabla</math> Vadose pisolite <math>\nabla</math> Vadose silt <math>\nabla</math> Boxwork <math>\nabla</math> Salt hoppers or casts <math>\nabla</math></p>			<p><u>Tectonic structures</u></p> <p>Fractures <math>\nabla</math> Slickensides <math>\nabla</math> Breccia, tectonic <math>\nabla</math></p> <p><u>Miscellaneous</u></p> <p>Geopetal fabric <math>\nabla</math> Cone-in-cone <math>\nabla</math> Stromatolites <math>\nabla</math> Boudinage, ball and age flow <math>\nabla</math></p>		
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<b>Abbreviations</b>	<b>GRAIN SIZE</b>	<b>CEMENT</b>	<b>DIAGENESIS</b>	<b>ROUNDING</b>	<b>SORTING</b>	<b>HARDNESS</b>	<b>POROSITY</b>	<b>ACCESSORIES</b>	<b>DIAGENETIC TEXTURES</b>	<b>HYDROCARBONS</b>
VF Very Fine F Fine M Medium C Course VC Very Coarse G Granule & larger	Q Silica Py Pyrite C Calcite D Dolomite Sd Siderite	D Dolomitization Q Silicification X Recrystallization Ce Chloritization	R Rounded SR Subrounded SA Subangular A Angular	P Poor M Moderate W Well VW Very Well	U Unconsolidated VS Very Soft S Soft M Moderate H Hard	g Intergranular v Vugular i Intrastkeletal	Py Pyrite Mc Mica Ch Chert Cc Lignite/Coal Hm Heavy minerals Lf Lithic fragments Gl Glauconite	CX Crypto <1/256mm MX Micro 1/256 - 1/16mm	* Signifies presence , Full details described under supplementary data	

**SIDEWALL CORE DESCRIPTIONS**

**WELL: BALEEN-1**

DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY SIZE %		SILT SIZE %		GRAINS				CEMENT		DIAGENESIS			ROUNDING	SORTING	HARDNESS	POROSITY TYPE & %	ACCESSORIES			HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA	
				CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	RANGE	DOMINANT	TYPE & %	TYPE & %	TYPE	%					TEXTURE	TYPE & %	TYPE & %				TYPE & %
581.0	4.0	Argillaceous CALCILUTITE	Grn-bl - olv grn gry	30	60		5				5	C-VC	VC					M	-				-	#	Mnr concentration of calcite grains in indistinct bands		
584.9	2.5	Argillaceous CALCILUTITE	Grn gry - gry wh	20	70		Tr				10	C-VC	C					M	-				-	#	Calcite grains forming in irregular bands		
590.0	4.2	Calcilutitic CLAYSTONE	Dk gry grn	60	30				5	Tr								M	-	Py Tr	Gl Tr		-	⊕	Fossil fragments evident		
597.0	4.8	Calcilutitic CLAYSTONE	Olv grn - dk olv gry	50	30					10	Tr							M	-	Py Tr			-	⊕			
601.0	5.0	Calcilutitic CLAYSTONE	Olv grn - gry grn	55	30						5							M	-	Py Tr			-	⊕	Fossils internally replaced by pyrite		
612.0	4.0	MUD FILTRATE																								Contains "O" ring and other contaminants	
618.0	4.7	Calcilutitic CLAYSTONE	Dk olv grn	80	20		Tr			Tr	Tr							M	-	Py Tr			-	#	Fossil cast internally replaced by clay minerals		
623.0	5.0	Calcilutitic CLAYSTONE	Dk gry	80	20		Tr			Tr	Tr							M	-	Py Tr			*		A. One isolated dull yel gold speck of Fluor B. Nil		
627.0	4.6	Calcilutitic CLAYSTONE	Dk gry grn	70	20		Tr			10	Tr							S	-	Py Tr	Gl Tr		-	⊕	Mineral fluor		
632.0	3.0	MUD FILTRATE																									

**STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)**

**SYNGENETIC STRUCTURES**

**EPIGENETIC STRUCTURES**

<u>Stratification</u> <u>Parallel Type</u> Thickness of bedding <u>Metric System</u> millimeter bed 1mm-10mm $\frac{mm}{mm}$ centimeter bed 1cm-10cm $\frac{cm}{cm}$ <u>Cross Bedding</u> in general with angle indicated $\Delta$ chevron $\nabla$ climbing $\nabla$ festoon $\nabla$ planar $\nabla$		<u>Current-produced markings</u> Irregular bedding $\nabla$ Graded bedding $\nabla$ No apparent bedding $\nabla$ Nodular bedding $\nabla$		<u>Organism-produced markings</u> Ripple marks asymmetrical interference $\nabla$ symmetrical $\nabla$ Pull over flame structure $\nabla$ Scour and fill $\nabla$ Flute cast $\nabla$ Groove cast $\nabla$ Striation $\nabla$ Parting lineation $\nabla$		Burrowed slightly burrowed $\nabla$ moderately burrowed $\nabla$ well burrowed $\nabla$ Churned $\nabla$ Bored $\nabla$ Bored surface $\nabla$ Organism tracks and trails $\nabla$ Plant root tubes $\nabla$ Vertebrate tracks $\nabla$		<u>Penecontemporaneous deformation structures</u> Mud cracks $\nabla$ Rain or hail prints $\nabla$ Pull-apart $\nabla$ Slump structures and contorted bedding $\nabla$ Convolute bedding $\nabla$ Load cast $\nabla$ Teepee structure $\nabla$ Birdseye, fenestral fabric $\nabla$		<u>Solution structures</u> Breccia, solution, collapse $\nabla$ Disolution - compaction (horse tail) $\nabla$ Syllolite $\nabla$ Vadose pisolite $\nabla$ Vadose silt $\nabla$ Boxwork $\nabla$ Salt hoppers or casts $\nabla$		<u>Tectonic structures</u> Fractures $\nabla$ Sickensides $\nabla$ Breccia, tectonic $\nabla$ <u>Miscellaneous</u> Geopetal fabric $\nabla$ Cone-in-cone $\nabla$ Stromatolites $\nabla$ Boudinage, ball and age flow $\nabla$	
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<u>Abbreviations</u>	<u>GRAIN SIZE</u>	<u>CEMENT</u>	<u>DIAGENESIS</u>	<u>ROUNDING</u>	<u>SORTING</u>	<u>HARDNESS</u>	<u>POROSITY</u>	<u>ACCESSORIES</u>	<u>DIAGENETIC TEXTURES</u>	<u>HYDROCARBONS</u>
	VF Very Fine F Fine M Medium C Course VC Very Coarse G Granule & larger	Q Silica Py Pyrite C Calcite D Dolomite Sd Siderite	D Dolomitization Q Silicification X Recrystallization Ce Chloritization	R Rounded SR Subrounded SA Subangular A Angular	P Poor M Moderate W Well VW Very Well	U Unconsolidated VS Very Soft S Soft M Moderate H Hard	g Intergranular v Vugular i Intraskelatal	Py Pyrite Mc Mica Ch Chert Cc Lignite/Coal Hm Heavy minerals Lf Lithic fragments Gl Glauconite	CX Crypto <1/256mm MX Micro 1/256 - 1/16mm	* Signifies presence Full details described under supplementary data





























SIDEWALL CORE DESCRIPTIONS

WELL: BALEEN-1

DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY SIZE %		SILT SIZE %		GRAINS				CEMENT		DIAGENESIS			ROUNDING	SORTING	HARDNESS	POROSITY TYPE & %	ACCESSORIES			HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA					
				CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	RANGE	DOMINANT	TYPE & %	TYPE & %	TYPE	%					TEXTURE	TYPE & %	TYPE & %				TYPE & %				
																												TYPE & %	TYPE & %	TYPE & %	
640.0	4.6	Calcsiltitic Calcilititic CLAYSTONE	Dk brn - brnsh red	45	20		30											Tr												A. One isolated speck -dull yel gold Glauc Agg v coarse. Occ Limonite nodules	
646.0	4.6	CLAYSTONE	Dk gry	90	10																										
651.0	4.8	CLAYSTONE	Dk gry	90	10																										
658.0	4.5	Nodular Limonitic SILTSTONE	Dk red brn - v dk brn	20		20																									Limonite nodules are grains, can be crushed; yel Fe stain in acid
659.0	5.0	Limonitic SANDSTONE	Dk ferr red brn	30		20																									Limonitic nodules are grains; Yel Fe stain in acid
662.0	4.1	Limonitic SILTSTONE	Dk brn	30		40																									Ferruginisation - causes platelets of limmat - yel stain after Fe
665.0	4.6	SANDSTONE	Dk reddish brn	10		10		70																							No nodules
668.0	4.3	SANDSTONE	Dk reddish brn	10		10		70																							Sample Flushed with drilling fluids
670.0	5.1	SANDSTONE	Dk reddish brn	5		5		80																							Sample flushed
672.0	2.7	SANDSTONE	Dk reddish brn	10		10		70																							Pore throats choked - some gas re- after inundation in water to break up

STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)

SYNGENETIC STRUCTURES

<u>Stratification</u>		<u>Current-produced markings</u>		<u>Organism-produced markings</u>		<u>Pancontemporaneous deformation structures</u>	
<u>Parallel Type</u>							
Thickness of bedding	<u>Irregular bedding</u>		Ripple marks		Burrowed		Mud cracks
<u>Metric System</u>	<u>Graded bedding</u>		asymmetrical interference		slightly burrowed		Rain or hail prints
millimeter bed 1mm-10mm mm	<u>No apparent bedding</u>		symmetrical		moderately burrowed		Pull-apart
centimeter bed 1cm-10cm cm	<u>Nodular bedding</u>		well burrowed		well burrowed		Slump structures and contorted bedding
<u>Cross Bedding</u>			Pull over flame structure		Churned		Convolute bedding
in general			Scour and fill		Bored		Load cast
with angle indicated			Flute cast		Bored surface		Tepee structure
chevron			Groove cast		Organism tracks and trails		Birdseye, fenestral fabric
climbing			Striation		Plant root tubes		
festoon			Parting lineation		Vertebrate tracks		
planar							

EPIGENETIC STRUCTURES

<u>Solution structures</u>	<u>Tectonic structures</u>
Breccia, solution, collapse	Fractures
Dissolution - compaction (horse tail)	Stickensides
Syololite	Breccia, tectonic
Vadose pisolite	
Vadose silt	
Boxwork	<u>Miscellaneous</u>
Salt hoppers or casts	Geopetal fabric
	Cone-in-cone
	Stromatolites
	Boudinage, ball and age flow

Abbreviations

GRAIN SIZE

VF Very Fine  
F Fine  
M Medium  
C Course  
VC Very Coarse  
G Granule & larger

CEMENT

Q Silica  
Py Pyrite  
C Calcite  
D Dolomite  
Sd Siderite

DIAGENESIS

D Dolomitization  
Q Silicification  
X Recrystallization  
Ce Chloritization

ROUNDING

R Rounded  
SR Subrounded  
SA Subangular  
A Angular

SORTING

P Poor  
M Moderate  
W Well  
VW Very Well

HARDNESS

U Unconsolidated  
VS Very Soft  
S Soft  
M Moderate  
H Hard

POROSITY

g Intergranular  
v Vugular  
i Intraskelatal

ACCESSORIES

Py Pyrite  
Mc Mica  
Ch Chert  
Cc Lignite/Coal  
Hm Heavy minerals  
Lf Lithic fragments  
Gl Glauconite

DIAGENETIC TEXTURES

CX Crypto <1/256mm  
MX Micro 1/256 - 1/16mm

HYDROCARBONS

\* Signifies presence  
Full details described under supplementary data

SIDEWALL CORE DESCRIPTIONS

WELL: BALEEN-1

DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY SIZE %		SILT SIZE %		GRAINS				CEMENT		DIAGENESIS			ROUNDING	SORTING	HARDNESS	POROSITY TYPE & %	ACCESSORIES			HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA	
				CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	RANGE	DOMINANT	TYPE & %	TYPE & %	TYPE	%					TEXTURE	TYPE & %	TYPE & %				TYPE & %
675.0	5.0	SANDSTONE	Dk reddish brn	10		10		75				VF-F	VF						g VP	Gl 5	Mc Tr		#	Yel Fe stain in acid Pore throats choked - some gas released			
678.0	4.2	Silty SANDSTONE	Dk reddish brn	10		20		70				VF-F	VF						g VP	Gl Tr	Mc Tr	*	#	A. V mnr tr (one speck) dull gold Fluor B. Nil Yel Fe stain after acidisation			
680.0	5.1	Arenaceous Argillaceous SILTSTONE	Dk brn	20		50		25				VF	VF							Gl 5	Mc Tr	Py Tr	#				
683.0	4.6	Argillaceous Silty SANDSTONE	Dk brn	20		25		45				VF	VF						g VP	Gl 5	Mc 5		#				
685.0	4.5	Argillaceous Arenaceous SILTSTONE	Dk brn-brn	30		40		25				VF	VF								Mc 5		#	Grain size and shape applicable to quartz grains only			
688.0	2.5	Argillaceous SANDSTONE	Brn- dk brn- lt brn	20		10		70				VF	VF						g VP	Gl Tr	Mc Tr	Lf Tr	#	Flushed			
690.0	3.4	Silty Argillaceous SANDSTONE	Brn - dk brn - occ lt brn	25		20		45				VF-F	VF							Gl Tr	Mc 10	Lf Tr	#	Flushed			
693.0	4.5	Silty SANDSTONE	Brnsh - reddish brn	5		30		60				VF-G	VF							Gl Tr	Mc 5	Lf Tr	#	Mnr dull yel gold Fluor on two isolated specks. Nil Occ v coarse quartz grains			
696.0		NO RECOVERY																					-				
698.0	4.5	Silty SANDSTONE	Brn - dk brn	10		20		70				VF-V	VF							Gl Tr	Mc Tr	Cc Tr	*	#	A. Isolated specks (2) -dull yel Fluor occ v coarse quartz grains Flushed?		

STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)

SYNGENETIC STRUCTURES				EPIGENETIC STRUCTURES							
Stratification		Current-produced markings		Organism-produced markings		Penecontemporaneous deformation structures		Solution structures		Tectonic structures	
Parallel Type											
Thickness of bedding	Irregular bedding	Ripple marks	Burrowed	Mud cracks	Breccia, solution, collapse	Fractures	Fractures	Fractures	Fractures	Fractures	Fractures
Metric System	Graded bedding	asymmetrical	slightly burrowed	Run or hair prints	Disolution - compaction (horse tail)	Stickensides	Stickensides	Stickensides	Stickensides	Stickensides	Stickensides
millimeter bed	No apparent bedding	interference	moderately burrowed	Pull-apart	Sylolite	Breccia, tectonic	Breccia, tectonic	Breccia, tectonic	Breccia, tectonic	Breccia, tectonic	Breccia, tectonic
centimeter bed	Nodular bedding	symmetrical	well burrowed	Slump structures and contorted bedding	Vadose psolite	Miscellaneous	Miscellaneous	Miscellaneous	Miscellaneous	Miscellaneous	Miscellaneous
Cross Bedding				Convolute bedding	Vadose silt	Geopetal fabric	Geopetal fabric	Geopetal fabric	Geopetal fabric	Geopetal fabric	Geopetal fabric
in general				Load cast	Boxwork	Cone-in-cone	Cone-in-cone	Cone-in-cone	Cone-in-cone	Cone-in-cone	Cone-in-cone
with angle indicated				Tepee structure	Salt hoppers or casts	Stromatolites	Stromatolites	Stromatolites	Stromatolites	Stromatolites	Stromatolites
chevron				Birdseye, fenestral fabric		Boudinage, ball and age flow	Boudinage, ball and age flow	Boudinage, ball and age flow	Boudinage, ball and age flow	Boudinage, ball and age flow	Boudinage, ball and age flow
climbing											
festoon											
planar											

Abbreviations	GRAIN SIZE	CEMENT	DIAGENESIS	ROUNDING	SORTING	HARDNESS	POROSITY	ACCESSORIES	DIAGENETIC TEXTURES	HYDROCARBONS
VF	Very Fine	Q Silica	D Dolomitization	R Rounded	P Poor	U Unconsolidated	g Intergranular	Py Pyrite	CX Crypto <1/256mm	* Signifies presence
F	Fine	Py Pyrite	Q Silicification	SR Subrounded	M Moderate	VS Very Soft	v Vugular	Mc Mica	MX Micro 1/256 - 1/16mm	Full details described under supplementary data
M	Medium	C Calcite	X Recrystallization	SA Subangular	W Well	S Soft	i Intraskelatal	Ch Chert		
C	Course	D Dolomite	Ce Chloritization	A Angular	VW Very Well	M Moderate		Cc Lignite/Coal		
VC	Very Coarse	Sd Siderite				H Hard		Hm Heavy minerals		
G	Granule & larger							Lf Lithic fragments		
								Gl Glauconite		



SIDEWALL CORE DESCRIPTIONS

WELL: BALEEN-1

Main data table with columns: DEPTH (metres), RECOVERY (centimetres), ROCK TYPE, COLOUR, CLAY SIZE %, SILT SIZE %, GRAINS (TYPE & %, SIZE), CEMENT (TYPE & %), DIAGENESIS (TYPE, %, TEXTURE), ROUNDING, SORTING, HARDNESS, POROSITY TYPE & %, ACCESSORIES (TYPE & %, TYPE & %, TYPE & %), HYDROCARBONS, SEDIMENTARY STRUCTURES, SUPPLEMENTARY DATA.

STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)

SYNGENETIC STRUCTURES

EPIGENETIC STRUCTURES

Diagrammatic key for structures including Stratification (Parallel, Irregular, Graded, No apparent, Nodular), Current-produced markings (Ripple marks, Burrowed, Mud cracks, etc.), Organism-produced markings (Burrowed, Churned, Bored, etc.), Penecontemporaneous deformation structures (Pull-apart, Slump, Convolute, etc.), Solution structures (Breccia, Vadose pisolite, etc.), and Tectonic structures (Fractures, Slickensides, etc.).

Abbreviations table with columns: GRAIN SIZE (VF Very Fine, F Fine, M Medium, C Course, VC Very Coarse, G Granule & larger), CEMENT (Q Silica, Py Pyrite, C Calcite, D Dolomite, Sd Siderite), DIAGENESIS (D Dolomitization, Q Silicification, X Recrystallization, Ce Chloritization), ROUNDING (R Rounded, SR Subrounded, SA Subangular, A Angular), SORTING (P Poor, M Moderate, W Well, VW Very Well), HARDNESS (U Unconsolidated, VS Very Soft, S Soft, M Moderate, H Hard), POROSITY (g Intergranular, v Vugular, i Intraskelatal), ACCESSORIES (Py Pyrite, Mc Mica, Ch Chert, Cc Lignite/Coal, Hm Heavy minerals, Lf Lithic fragments, Gl Glauconite), DIAGENETIC TEXTURES (CX Crypto <1/256mm, MX Micro 1/256 - 1/16mm), HYDROCARBONS (\* Signifies presence, Full details described under supplementary data).



SIDEWALL CORE DESCRIPTIONS

WELL: BALEEN-1

DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY SIZE %		SILT SIZE %		GRAINS				CEMENT		DIAGENESIS			ROUNDING	SORTING	HARDNESS	POROSITY TYPE & %	ACCESSORIES			HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA			
				CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	RANGE	DOMINANT	TYPE & %	TYPE & %	TYPE	%					TEXTURE	TYPE & %	TYPE & %				TYPE & %		
																												TYPE & %	TYPE & %
784.0	3.2	SANDSTONE	Med gry - off wh grn	5		5		85				VF-M	F						SA-SR	M	S	g fr	Py 5	Gl Tr	Cc Tr		#	Pore throats blocked with finer fractions	
795.0	5.2	SANDSTONE	Lt gry - med dk gry	10		5		85				VF-M	F						SA-SR	M	S	g fr	Py Tr		Cc Tr		#		
813.0		NO RECOVERY																											
817.9	3.7	SANDSTONE	Med lt gry - gry	15		5		80				VF-F	VF									H	g VP		Lf Tr	Cc Tr		#	
830.0	3.2	Silty Claystone	Med gry - dk gry	80		20																H	-					#	
840.1	3.0	Argillaceous SANDSTONE	Med gry - gry	20		10		70				VF-F	VF						SA-A	W	M	g P		Lf Tr	Cc Tr		#		
855.0	3.6	SANDSTONE	Dk gry - wh	5				95				VF-M	F						A-SR	P	H	g P		Lf Tr			#	Kaolin - after feldspar?	
867.0		NO RECOVERY																											
878.0	2.3	CLAYSTONE	Med gry - grn gry	100																		S	-			Cc Tr	*		Quartz grains in Fracs only together w/lig Mats Brn C + Blk C - Fluor here
905.0		NO RECOVERY																											

STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)

SYNGENETIC STRUCTURES

EPIGENETIC STRUCTURES

Stratification		Current-produced markings		Organism-produced markings		Penecontemporaneous deformation structures		Solution structures		Tectonic structures	
Parallel Type	Irregular bedding	Ripple marks	Burrowed	Mud cracks	Breccia, solution, collapse	Fractures	Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
Thickness of bedding	Graded bedding	asymmetrical	slightly burrowed	Rain or hail prints	Disolution - compaction (horse tail)	Fractures	Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
Metric System	No apparent bedding	interference	moderately burrowed	Pull-apart	Sylolite	Slickensides	Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
millimeter bed	Nodular bedding	symmetrical	well burrowed	Slump structures and contorted bedding	Vadose pisolite	Breccia, tectonic	Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
centimeter bed				Convolute bedding	Vadose silt		Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
Cross Bedding				Load cast	Boxwork		Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
in general				Tepee structure	Salt hoppers or casts		Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
with angle indicated				Birdseye, fenestral fabric			Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
chevron							Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
climbing							Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
festoon							Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic
planar							Disolution - compaction (horse tail)	Slickensides	Fractures	Slickensides	Breccia, tectonic

Abbreviations	GRAIN SIZE	CEMENT	DIAGENESIS	ROUNDING	SORTING	HARDNESS	POROSITY	ACCESSORIES	DIAGENETIC TEXTURES	HYDROCARBONS
VF	Very Fine	Q Silica	D Dolomitization	R Rounded	P Poor	U Unconsolidated	g Intergranular	Py Pyrite	CX Crypto <1/256mm	* Signifies presence
F	Fine	Py Pyrite	Q Silicification	SR Subrounded	M Moderate	VS Very Soft	v Vugular	Mc Mica	MX Micro 1/256 - 1/16mm	Full details described under supplementary data
M	Medium	C Calcite	X Recrystallization	SA Subangular	W Well	S Soft	i Intraskelatal	Ch Chert		
C	Course	D Dolomite	Ce Chloritization	A Angular	VW Very Well	M Moderate		Cc Lignite/Coal		
VC	Very Coarse	Sd Siderite				H Hard		Hm Heavy minerals		
G	Granule & larger							Lf Lithic fragments		
								Gl Glaucanite		

**SIDEWALL CORE DESCRIPTIONS**

**WELL: BALEEN-1**

DEPTH (metres)	RECOVERY (centimetres)	ROCK TYPE	COLOUR	CLAY SIZE %		SILT SIZE %		GRAINS				CEMENT		DIAGENESIS			ROUNDING	SORTING	HARDNESS	POROSITY TYPE & %	ACCESSORIES			HYDROCARBONS	SEDIMENTARY STRUCTURES	SUPPLEMENTARY DATA
				CLAY MINERALS	MICRITE	QUARTZ	CALCITE	QUARTZ	SKELETAL	CALCITE	TYPE & %		TYPE & %	TYPE & %	%	TEXTURE					TYPE & %	TYPE & %	TYPE & %			
											RANGE	DOMINANT														
918.0	2.2	Argillaceous SILTSTONE	Dk gry - gry	25		75		Tr									S	-			Cc Tr	#				
927.0	3.5	Argillaceous SILTSTONE	Dk gry - gry blk	40		60											H	-			*	#	A. Isolated speck of dull gold color B. Nil			
941.0	2.6	SILTSTONE	Lt gry - med gry	10		90											H	-				#				
946.9	3.8	Argillaceous SILTSTONE	Lt gry - med gry	25		75		Tr									M	-				#				
958.0	2.5	Arenaceous SILTSTONE	Med gry - gry wh	5		50		45			VF-M	F				A-SA	P	M	g	VP		Lf Tr	Cc Tr	#	Fine band of Siltst across core	
967.0	3.1	Argillaceous SANDSTONE	Med gry - gry wh	25		10		65			VF-F	VF				A	W	S	g	P				#	Very thin planar beds	
973.0	3.2	Argillaceous Silty SANDSTONE	Med gry-wh - dk gry	30		20		50			VF	VF				A	W	S	g	P				#		
982.0	2.7	Argillaceous SANDSTONE	Med gry - gry wh	20		10		70			VF-F	VF				A	W	S	g	P				#		
998.0	2.3	Silty SANDSTONE	Gry - med gry wh	Tr		20		80			VF-F	F				A	W	S	g	P				#		
1014.1	4.0	Silty SANDSTONE	Gry- wh	Tr		20		80			VF-F	F				A	W	S	g	P				#		

**STRUCTURES (STRATIFICATION, SEDIMENTARY, DIAGENETIC)**

**SYNGENETIC STRUCTURES**

**EPIGENETIC STRUCTURES**

<p><u>Stratification</u></p> <p><u>Parallel Type</u></p> <p>Thickness of bedding</p> <p><u>Metric System</u></p> <p>millimeter bed 1mm-10mm <u>mm</u></p> <p>centimeter bed 1cm-10cm <u>cm</u></p> <p><u>Cross Bedding</u></p> <p>in general <u>∠</u></p> <p>with angle indicated <u>∠</u></p> <p>chevron <u>∠</u></p> <p>climbing <u>∠</u></p> <p>festoon <u>∠</u></p> <p>planar <u>∠</u></p>	<p><u>Irregular bedding</u> <u>∩</u></p> <p><u>Graded bedding</u> <u>∩</u></p> <p><u>No apparent bedding</u> <u>∩</u></p> <p><u>Nodular bedding</u> <u>∩</u></p>	<p><u>Current-produced markings</u></p> <p>Ripple marks</p> <p>asymmetrical <u>∩</u></p> <p>interference <u>∩</u></p> <p>symmetrical <u>∩</u></p> <p>Pull over flame structure <u>∩</u></p> <p>Scour and fill <u>∩</u></p> <p>Flute cast <u>∩</u></p> <p>Groove cast <u>∩</u></p> <p>Striation <u>∩</u></p> <p>Parting lineation <u>∩</u></p>	<p><u>Organism-produced markings</u></p> <p>Burrowed</p> <p>slightly burrowed <u>∩</u></p> <p>moderately burrowed <u>∩</u></p> <p>well burrowed <u>∩</u></p> <p>Churned <u>∩</u></p> <p>Bored <u>∩</u></p> <p>Bored surface <u>∩</u></p> <p>Organism tracks and trails <u>∩</u></p> <p>Plant root tubes <u>∩</u></p> <p>Vertebrate tracks <u>∩</u></p>	<p><u>Penecontemporaneous deformation structures</u></p> <p>Mud cracks <u>∩</u></p> <p>Rain or hail prints <u>∩</u></p> <p>Pull-apart <u>∩</u></p> <p>Slump structures and contorted bedding <u>∩</u></p> <p>Convolute bedding <u>∩</u></p> <p>Load cast <u>∩</u></p> <p>Tepee structure <u>∩</u></p> <p>Birdseye, fenestral fabric <u>∩</u></p>	<p><u>Solution structures</u></p> <p>Breccia, solution, collapse <u>∩</u></p> <p>Disolution - compaction (horse tail) <u>∩</u></p> <p>Syolite <u>∩</u></p> <p>Vadose pisolite <u>∩</u></p> <p>Vadose silt <u>∩</u></p> <p>Boxwork <u>∩</u></p> <p>Salt hoppers or casts <u>∩</u></p>	<p><u>Tectonic structures</u></p> <p>Fractures <u>∩</u></p> <p>Slickensides <u>∩</u></p> <p>Breccia, tectonic <u>∩</u></p> <p><u>Miscellaneous</u></p> <p>Geopetal fabric <u>∩</u></p> <p>Cone-in-cone <u>∩</u></p> <p>Stromatolites <u>∩</u></p> <p>Boudinage, ball and age flow <u>∩</u></p>
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Abbreviations	GRAIN SIZE	CEMENT	DIAGENESIS	ROUNDING	SORTING	HARDNESS	POROSITY	ACCESSORIES	DIAGENETIC TEXTURES	HYDROCARBONS
VF	Very Fine	Q Silica	D Dolomitization	R Rounded	P Poor	U Unconsolidated	g Intergranular	Py Pyrite	CX Crypto <1/256mm	* Signifies presence
F	Fine	Py Pyrite	Q Silicification	SR Subrounded	M Moderate	VS Very Soft	v Vugular	Mc Mica	MX Micro 1/256 - 1/16mm	Full details described under supplementary data
M	Medium	C Calcite	X Recrystallization	SA Subangular	W Well	S Soft	i Intraskelatal	Ch Chert		
C	Course	D Dolomite	Ce Chloritization	A Angular	VW Very Well	M Moderate		Cc Lignite/Coal		
VC	Very Coarse	Sd Siderite				H Hard		Hm Heavy minerals		
G	Granule & larger							Lf Lithic fragments		
								Gl Glauconite		

Baleen #1; 683.0 m

As for Baleen #1; 688.0 m; somewhat more micaceous and less calcareous.

Baleen #1; 678.0 m

Brown, unconsolidated, very fine grained, micaceous quartz sand; mottled with 0.2 mm to 2 mm patches and wisps that are more micaceous and possibly also contain plant fibre. Components; detrital quartz, 0.05 to 0.1 mm angular to very angular grains, 70%; mica flakes, tabular, 0.05 to 0.1 mm, 20%; glauconite grains, 0.05 mm, green, 5%; (?) authigenic feldspar, 2%. All grains are tightly packed with embayed and distorted mica flakes occupying interareas in a framework of quartz, so that there is no effective intergranular void space.

Baleen #1; 659.0 m

Brown, unconsolidated, micaceous, glauconitic quartz sand and sideritic carbonate. The sample consists of a patchy mosaic of these two lithotypes. The quartz sand is fine- to medium-grained, with 0.1 to 1 mm glauconite pellets and mica flakes in tightly packed arrays. Euhedral rhomboid siderite crystals 0.1 mm, form tightly packed aggregates.

Baleen #1; 693.0m

Brown, unconsolidated, very fine grained, calcareous, glauconitic and micaceous, quartz sand. Components: detrital quartz grains, angular to very angular, 0.05 to 0.1 mm, 60 to 70%; mica, red-brown, 0.05 to 0.1 mm flakes, 10 to 20%; glauconite pellets, green-brown to brown, rounded to ovoid bodies, 0.1 to 0.3 mm diam., 10 to 15%; feldspar, euhedral grains, 0.05 to 0.1 mm, 5 to 10%; calcite crystals, poikilotopic, 0.1 mm, 5%. All grains and crystals are tightly packed with embayed and distorted mica, glauconite and carbonate occupying interareas between detrital quartz grains, so that there is no intergranular void space. Quartz to quartz contacts are usually lined with thin mica plates, so that interlocking growth is prevented. Feldspar (? albite) appears to be authigenic growing from carbonate and mica.

Baleen #1; 688.0 m

Brown, fine- to very fine grained, micaceous, glauconitic and calcareous, quartz sand. Components: detrital quartz, 0.08 to 0.1 mm angular to very angular grains, 50%; glauconitic pellets, brown to black, 0.1 to 0.3 mm ovoid to rounded blebs, 20 to 30%; mica flakes 10%; ferroan calcite crystals 0.01 to 0.1 mm. All grains and crystals are tightly packed with embayed and distorted mica and glauconite occupying interareas between detrital quartz grains. Carbonate material also occupies intergranular space and occurs as crystal aggregates 0.1 to 0.5 mm in size.

PE601371

This is an enclosure indicator page.  
The enclosure PE601371 is enclosed within the  
container PE902682 at this location in this  
document.

The enclosure PE601371 has the following characteristics:

ITEM\_BARCODE = PE601371  
CONTAINER\_BARCODE = PE902682  
    NAME = Airgun Well Velocity Survey &  
          Calibrated Log Data  
    BASIN = GIPPSLAND  
    PERMIT =  
    TYPE = WELL  
    SUBTYPE = VELOCITY\_CHART  
    DESCRIPTION = Airgun Well Velocity Survey &  
                  Calibrated Log Data  
    REMARKS =  
    DATE\_CREATED = 17/11/1981  
    DATE\_RECEIVED = 13/09/1982  
    W\_NO = W759  
    WELL\_NAME = Baleen-1  
    CONTRACTOR = Seismograph Service (England) Ltd.  
    CLIENT\_OP\_CO = Hudbay Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE601372

This is an enclosure indicator page.  
The enclosure PE601372 is enclosed within the  
container PE902682 at this location in this  
document.

The enclosure PE601372 has the following characteristics:

ITEM\_BARCODE = PE601372  
CONTAINER\_BARCODE = PE902682  
    NAME = Wellsite Lithology Log  
    BASIN = GIPPSLAND  
    PERMIT =  
    TYPE = WELL  
    SUBTYPE = WELL\_LOG  
    DESCRIPTION = Wellsite Lithology Log (enclosure 5 of  
                  WCR) for Baleen-1  
    REMARKS =  
    DATE\_CREATED = 30/11/1981  
    DATE\_RECEIVED = 13/09/1982  
    W\_NO = W759  
    WELL\_NAME = Baleen-1  
    CONTRACTOR = Hudbay Oil Ltd  
    CLIENT\_OP\_CO = Hudbay Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE601373

This is an enclosure indicator page.  
The enclosure PE601373 is enclosed within the  
container PE902682 at this location in this  
document.

The enclosure PE601373 has the following characteristics:

ITEM\_BARCODE = PE601373  
CONTAINER\_BARCODE = PE902682  
    NAME = Velocity Log Linear Time Scale  
    BASIN = GIPPSLAND  
    PERMIT =  
    TYPE = WELL  
    SUBTYPE = WELL\_LOG  
    DESCRIPTION = Velocity Log Linear Time Scale  
                 (enclosure 4 of WCR) for Baleen-1  
    REMARKS =  
    DATE\_CREATED = 09/11/1981  
    DATE\_RECEIVED = 13/09/1982  
    W\_NO = W759  
    WELL\_NAME = Baleen-1  
    CONTRACTOR = SEISMOGRAPH SERVICE (ENGLAND) LTD.  
    CLIENT\_OP\_CO = Hudbay Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE601374

This is an enclosure indicator page.  
The enclosure PE601374 is enclosed within the  
container PE902682 at this location in this  
document.

The enclosure PE601374 has the following characteristics:

ITEM\_BARCODE = PE601374  
CONTAINER\_BARCODE = PE902682  
    NAME = Composite Well Log  
    BASIN = GIPPSLAND  
    PERMIT =  
    TYPE = WELL  
    SUBTYPE = COMPOSITE\_LOG  
    DESCRIPTION = Composite Well Log (enclosure 1 of WCR)  
                  for Baleen-1  
    REMARKS =  
    DATE\_CREATED = 30/11/1981  
    DATE\_RECEIVED = 13/09/1982  
    W\_NO = W759  
    WELL\_NAME = Baleen-1  
    CONTRACTOR = Hudbay Oil Ltd  
    CLIENT\_OP\_CO = Hudbay Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)



PE601375

This is an enclosure indicator page.  
The enclosure PE601375 is enclosed within the  
container PE902682 at this location in this  
document.

The enclosure PE601375 has the following characteristics:

- ITEM\_BARCODE = PE601375
- CONTAINER\_BARCODE = PE902682
- NAME = Exlog Formation Evaluation Log (Mud  
Log)
- BASIN = GIPPSLAND
- PERMIT =
- TYPE = WELL
- SUBTYPE = MUD\_LOG
- DESCRIPTION = Exlog Formation Evaluation Log (Mud Log  
--enclosure 6 of WCR) for Baleen-1
- REMARKS =
- DATE\_CREATED = 16/11/1981
- DATE\_RECEIVED = 13/09/1982
- W\_NO = W759
- WELL\_NAME = Baleen-1
- CONTRACTOR = EXLOG
- CLIENT\_OP\_CO = Hudbay Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE902683

This is an enclosure indicator page.  
The enclosure PE902683 is enclosed within the  
container PE902682 at this location in this  
document.

The enclosure PE902683 has the following characteristics:

ITEM\_BARCODE = PE902683  
CONTAINER\_BARCODE = PE902682  
    NAME = Geophysical Time Map Near Top Latrobe  
          Horizon  
    BASIN = GIPPSLAND  
    PERMIT =  
    TYPE = SEISMIC  
    SUBTYPE = HRZN\_CONTR\_MAP  
    DESCRIPTION = Geophysical Time Map Near Top Latrobe  
                  Horizon (Enclosure 2 of WCR) for  
                  Baleen-1  
    REMARKS =  
    DATE\_CREATED = 31/05/1981  
    DATE\_RECEIVED = 13/09/1982  
    W\_NO = W759  
    WELL\_NAME = Baleen-1  
    CONTRACTOR = SEISMOGRAPH SERVICE (ENGLAND) LTD.  
    CLIENT\_OP\_CO = Hudbay Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)