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NORSK HYDRO a.s
FINAL REPORT
WELL 30/7-6

LICENCE 040 NORWAY

JANUARY 1979

LIST OF CONTENT

PREFACE

Licence 040 was awarded the Statoil/Petronord group in March 1975 with Norsk Hydro Produksjon a.s as operator. The licence includes the blocks 29/9 and 30/7 on the Norwegian Continental Shelf.

The group consists of the following companies:

Den norske stats oljeselskap a.s - Statoil	50 per cent
Elf Norge A/S	19,2 per cent
Total Marine Norsk A/S	14,4 per cent
Aquitaine Norge A/S	9,6 per cent
Norsk Hydro Produksjon a.s	6,8 per cent

The well 30/7-6 was drilled by Norsk Hydro Produksjon as. on behalf of the Statoil/Petronord group.

SUMMARY

The well 30/7-6 is a replacement for well 30/7-5 which was lost when the 20" casing parted while being run. The consequent fishing operations were unsuccessful and the rig was then moved 23 meters E-SE for the respudding.

The main objective of the well was to test possible Jurassic sandstones of Dogger and Liassic age. The secondary objectives were to test possible Upper Jurassic sandstone deposits and a Lower Cretaceous limestone reservoir. The well was planned to penetrate into the Triassic.

The well was planned to be drilled in two phases with a temporary abandonment after the 9-5/8" casing was set at approx. 3800 m. The well would then be re-entered and drilled to a T.D. of approx. 5000 meters employing the 11", 1000 bar BOP system.

Phase 1 of the well was drilled by the rig Polyglomar Driller. The rig move started on February 13, 1977 at 22.00 hrs and the well was spudded on February 15, 1977. The 30" casing was set at 186 m, the 20" casing at 765 m and the 13-3/8" casing at 2541 m. After some problems with the pressure testing of the stage cementing collar in the 13-3/8" casing, the 12-1/4" hole was drilled to 3784 m where a kick occurred from a formation subsequently found to correspond with a Middle Jurassic sandstone. During the shut in period, a gain of 77 bbls was registered which caused the formation to break down below the 13 3/8" casing shoe. The annulus was bridged off shortly after the well kicked and no reliable annulus pressure reading was obtained. Temperature logs were run inside the drill pipe to determine where the formation broke down below the bridge. The interpretation of the temperature logs indicates two possible zones with fluid loss into the formation, at 3320 m and 2670 m.

A heavy barite plug was pumped down inside the drill pipe which stopped the influx from the bottom of the well. Cement was later squeezed under the barite plug and the well was then plugged back to 2478 m with proper cement plugs

As a result of a requirement from the NPD a side-tracked hole had to be drilled with a maximum allowable distance of 50 m from the original plugged hole in order to observe that the flowing formation was properly closed off by the barite plug. To distinguish between the plugged back hole and the deviated hole, the latter will be referred to as 30/7-6 (I).

The deviated hole was kicked off below the 13-3/8" casing and the drilling started at 2619 m. The 12-1/4" hole was drilled to 3262 m and the 9-5/8" casing set at 3252 m. When testing the casing the stage cementing collar leaked and a squeeze had to be performed. The 8-3/8" hole was then drilled from 3262 m to 3711 m and the 7" liner was set at 3707 m.

The average penetration rate for the side-tracked hole was low due to extensive use of Dynadrill and Turbodrill to control the deviation of the hole as required from the NPD.

The 7" liner hanger was set as high as 2403 m to cover the stage collar in the 9-5/8" casing. When the running tool was disconnected and pulled the cement flash set, causing the string to get stuck 33 meters above the hanger. Fishing with wash-over operations had to be performed to free the string. The hole was temporarily plugged and abandoned and the rig left location on July 31, 1977 at 10.00 hrs.

Reopening of well 30/7-6 (I) started on April 8, 1978 at 15.00 hrs utilizing the rig "Treasure Seeker", equipped with a 11", 1000 bar BOP system. This section of the hole will be referred to as 30/7-6 (II).

The wellhead was located by running a side scan sonar on drill pipe approx. 10 m above the sea bed. However, bad weather caused some delay in the final positioning of the rig.

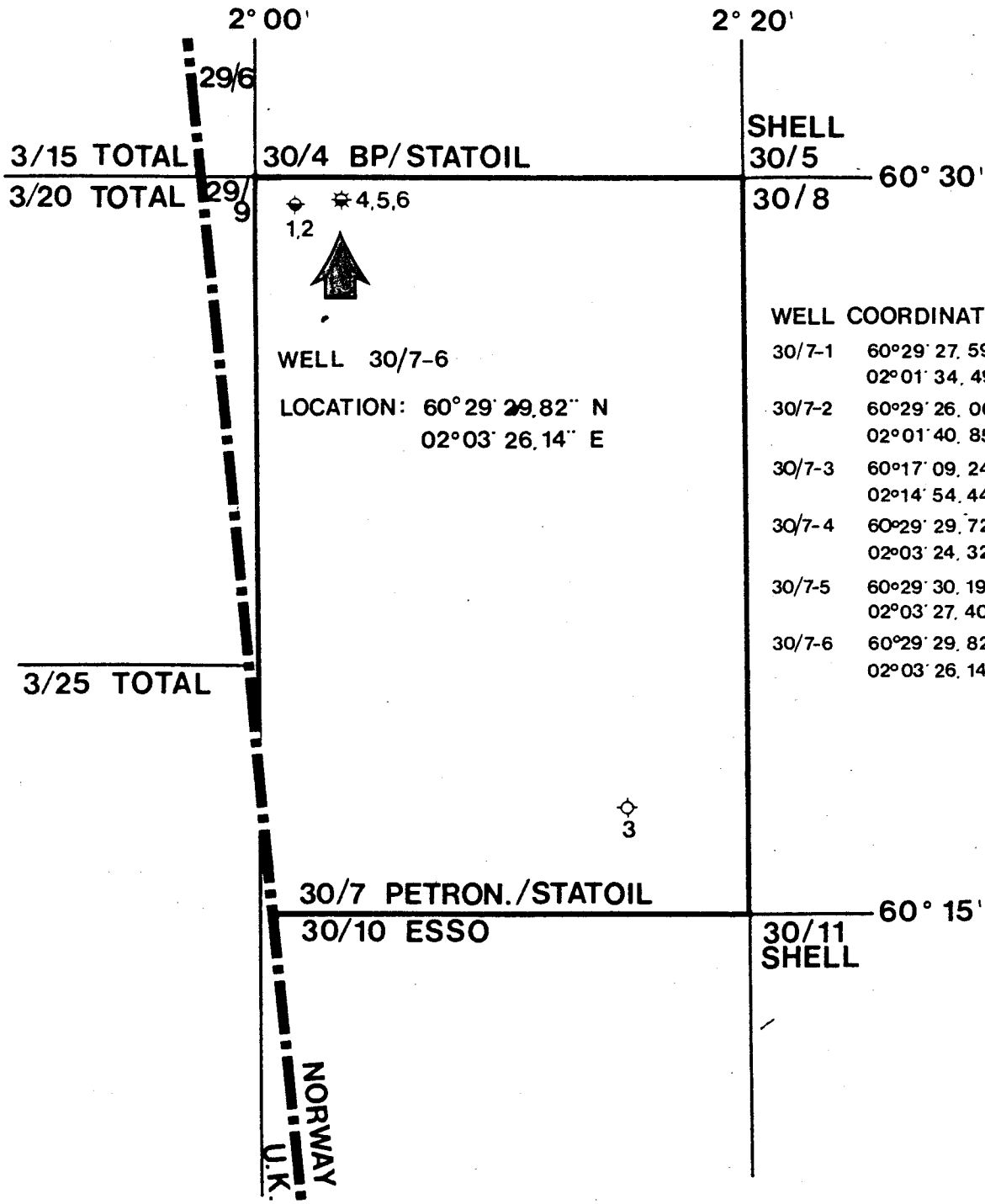
Drilling of the cement plugs started on April 19 and the 7" liner shoe at 3707 m was drilled out with a 6" bit on April 26.

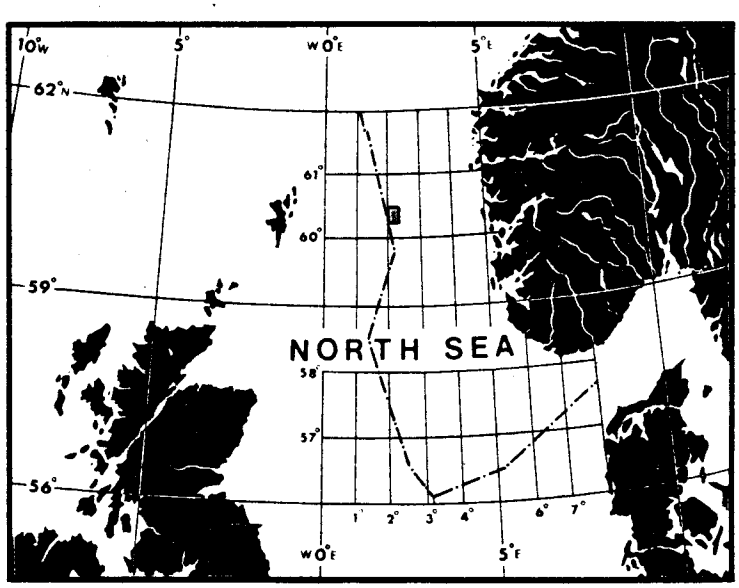
At 3792 m the well entered a high pressured sandstone reservoir of Middle Jurassic age. While the well was shut in at 3810 m pressure was recorded in both the annulus and in the drill pipe. The kick was circulated out and the mud density increased to 2.04 sp.gr. before the drilling of the 6" hole continued.

Intermediate logs were run at 3826 m, 3968 m and 4069 m. Based on the results from these logs the well was found to have penetrated a reservoir sequence of 100 m (3792 - 3892 m), containing a net pay of 75 m. Average porosity and water saturation were calculated to respectively 19.4% and 20%.

On May 19 the well was drilled to 4115 m into the shales of the Dunlin Formation of Early Jurassic age. Due to the high pressure it was decided to stop further drilling before the Statfjord Formation was entered. Complete logging was performed at T.D., including RFT's, velocity survey and sidewall cores. No DST's were performed in the well. Data from the RFT's indicate, however, that the reservoir contains gas condensate with a condensate gravity of 42 - 55^{o} API.

The hole was plugged back and abandoned on June 4th, 1978 at 03.00 hrs.





LOCATION MAP
30/7-6

5 km

5 miles

Norsk Hydro

TABLE 1

SUMMARY OF WELL DATA

Location		60°29'29,82" N 02°03'26,14" E
Operator		Norsk Hydro Produksjon a.s
Phase I		
Rig		Polyglomar Driller
Contractor		Rasmussen Global Marine Ltd.
Phase II		
Rig		Treasure Seeker
Contractor		Wilh. Wilhelmsen
RKB elevation (to MSL)	Phase I and II	24 m
Water depth (RKB)	Phase I and II	140,5 m
Start of drilling operations		February 13, 1977
Spudded		February 15, 1977
Temporary Abandoned		July 31, 1977
Commencement of operations Phase II		April 8, 1978
Reentered		April 18, 1978
Permanent Abandoned		June 4, 1978
T.D. (Driller)		4115 m
T.D. (Logger)		4114 m
Formation at T.D.		Dunlin Fm. of Early Jurassic age.
Status		Gas condensate discovery in Middle Jurassic sandstones-plugged and abandoned.

Well program	Phase I and II	
	Hole record:	36" to 188 m
		26" to 770 m
		17½" to 2550 m
		12-1/4" to 3784 m (plugged back)
		12-1/4" to 3252 m
		8-3/8" to 3711 m
		6" to 4115 m
	Casing record:	30" set at 186 m
		20" set at 765 m
		13-3/8" set at 2541 m
		9-5/8" set at 3252 m
		7" liner set at 3707 r

SECTION A

OPERATIONS

WELL 30/7-6

PHASE I

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SECTION A - PHASE I

TABLES:

FIGURES AND ENCLOSURES

SUMMARY OF WELL DATA - PHASE I

Operator	Norsk Hydro Production a.s
Rig	Polyglomar Driller
Contractor	Rasmussen Global Marine Ltd
RKB elevation	24 m
Water depth	116.5 m (140.5 m RKB)
Start of Drilling Operations	February 13, 1977
Spudded	February 15, 1977
Temporary Abandonment	July 31, 1977

Well Program:

Hole record:
- 36" hole to 188 m RKB
- 26" hole to 770 m RKB
- 17½" hole to 2550 m RKB
- 12-1/4" hole to 3784 m RKB (plugged back)
- 12-1/4" hole to 3252 m RKB
- 8-3/8" hole to 3711 m RKB

Casing record:
- 30" casing set at 186 m RKB
- 20" casing set at 765 m RKB
- 13-3/8" casing set at 2541 m RKB
- 9-5/8" casing set at 3252 m RKB
- 7" liner set at 3707 m RKB

1. LOCATION SURVEY

A location survey was performed in January 1977 prior to drilling the well.

The survey covered an area of 3 x 3 kilometer square with the centre location:

60° 29' 28,68" N
02° 03' 21,48" E

Well 30/7-6 was drilled 80 meters E-NE off this center point after two attempts had failed. (Previous reported wells 30/7-4 and 5).

The surveing equipment was Simrad EK-S echo-sounder, EG & G side scan sonar and EG & G sparker/boomer system.

The navigating system was Magnavox Satellite Navigation integrated with the Decca Main Chain and the ships gyro and speed log. The Decca Pulse 8 system was also utilized. The echograms and sonograms registered an even sea/floor gently sloping towards north-east with the water depth at the centre location of 116,5 m. The top 30-40 meters of the sea floor were mainly well sorted sand, with indication of a glacial deposit of heterogeneous moraine consisting of gravel and boulder rocks in a clay matrix underneath.

2. POSITIONING AND ANCHORING OF THE RIG

The well was finally spudded at a location which was approximately 23 meters E-SE from the 30/7-5 location by adjusting the anchor chains without resetting the anchors.

From May 8 to May 12, 1977 the Magnavox Satellite Navigation System was used on board the rig to determine the exact location of well 30/7-6. With reference to the European Datum 1950, International Spheriod, the location was determined to be:

Latitude 60° 29' 29,82" N
Longitude 02° 03' 26,14" E

Accuracy on this position is stipulated to ± 9 meters in each direction. The rig was moored with 8 LWT anchors and chains and one piggy back anchor on each of anchors No. 1, 2,3,6 and 7. The anchors were pretensioned to:

Chain No.	1:	140 000 lbs
" "	2:	170 000 "
" "	3:	190 000 "
" "	4:	190 000 "
" "	5:	260 000 "
" "	6:	200 000 "
" "	7:	235 000 "
" "	8:	225 000 "

On April 20, anchor No. 7 slipped and was reset with one extra piggy back thus totalling two piggy backes on achor No. 7. It was then tensioned to 210 000 lbs.

Fig. A.1 shows the final anchor pattern.

3. RESUMÉ OF OPERATIONS - PHASE I

3.1 Summary

The drilling progress is shown in Figure A.2. The rig started to move to location on February 13, 1977 and the well was spudded on February 15.

The 30" casing was set at 186 m and the 20" casing at 765 m with measurements from RKB. The 17½" hole was drilled to 2550 m and the 13-3/8" casing run with the shoe at 2541 m. The casing was cemented in two stages with the stage cementing collar at 2106 m. In pressure testing the casing to 4000 psi the pressure bled off at 2600 psi. To locate the leak a RTTS packer was used to test the casing in stages The leak was finally detected at the 13-3/8" casing shoe. The leak off after squeezing cement around the 13-3/8" casing shoe was 1.81 sp.gr. equivalent pressure.

While drilling the 12-1/4" hole from 2550 m to 2800 m the formation pore pressure increased rapidly and the mud weight was consequently increased successively from 1.26 sp.gr. to 1.71 sp.gr. In the interval from 3550 m to 3610 m the pore pressure again increased necessitating the mud weight to be rised to 1.76 sp.gr. Intermediate logs were run at 3613 m.

On April 14, when drilling at 3784 m a gas kick occurred. During the 3-5 minutes it took to close the BOP an influx of 77 bbls was reported before the well was shut in.

Due to insufficient formation integrity in the open hole section the formation broke down at an early stage and no annular pressure was recorded at the surface. The reservoir pore pressure and permability indicated that an underground flow was taking place. To locate the fractured formation a series of temperature logs were run inside the drill pipe. Interpretation of the logs indicated that the formation initially was fractured at the 13-3/8" casing shoe before the annulus was bridged off. A new fracture was also determined at approx. 2670 m before the annulus again was bridged off. This

resulted in the main fracture at 3320 m.

Four days after the well kicked a 1000 sxs barite plug was pumped down the drill pipe. The well was observed for another four days and a series of temperature logs were run to ascertain that the well was killed after which 500 sxs of cement was squeezed below the bit.

The drill pipe was then perforated and cement squeezed into the formation and cement plugs set inside the drill pipe in intervals in the open hole section. See Fig. A.3. On May 13, the well was plugged back to 2478 m. A detailed report of the kick and the underground flow has previously been distributed to the NPD and the partners.

The Norwegian Petroleum Directorate requested a side tracked well to be drilled below the 13-3/8" casing to prove that the underground flow was killed and the well was stable. To distinguish between the plugged back hole and the deviated hole the latter is referred to as 30/7-6 (I).

The 12-1/4" deviated hole 30/7-6 (I) started at 2619 m on March 13, 1977. According to the NPD this hole was to be drilled with a maximum horizontal distance of 50 meter from the plugged back hole to determine if any intervals were charged with gas.

The deviated hole was kicked off with Dynadrill followed by rotary drilling down to 3037 m. In order to keep the well within the limited distance extencive use of Dynadrilling was required and which drastically reduced the progress of the operations.

At 3145 m on June 1, a break-down and accident with the travelling block caused a four days delay in the drilling operations. Logs were run at 3262 m which was the T.D. of the 12-1/4" hole. The 9-5/8" casing was run at 3252 m and cemented in two stages using a stage cementing collar at 2553 m

When pressure testing the casing this was found leaking. The leakage was located to the stage cementing collar and the collar was consequently squeezed. The following pressure test was carried out according to specifications.

A leak off test was performed below the 9-5/8" casing shoe giving an equivalent leak off pressure of 2.07 sp.gr. The 8-3/8" hole was drilled and intermediate logs run at 3500 m, 3696 m and 3706 m. When drilling at 3706 m heaving shale problems and lost circulation were encountered. The mud weight was reduced from 1.94 sp.gr. to 1.92 sp.gr. and lost circulation material was added. The well was healed and the drilling continued to 3711 m where final logs were run.

The 7" liner was then run to 3707 m with hang off point inside the 9-5/8" casing at 2403 m. When pulling the running string after cementing the liner, cement above the liner hanger flash set around the lower part of the string which left a fish inside the 9-5/8" casing. The fish was washed over with wash-over pipe and recovered after 16 days. The flapper valve in the liner hanger was drilled out on July 26, and the 7" liner and the 9-5/8" casings were pressure tested to 4500 psi.

Well 30/7-6 (I) was temporarily abandoned by setting a drillable packer in the 9-5/8" casing above the liner hanger and three cement plugs at intervals back to surface. (See Fig. A-5.) Before the anchors were pulled, a corrosion cap was placed over the wellhead and the location was marked by four marker buoys.

The rig left location on July 31, 1977 at 10.00 hrs.

3.2 Diary Report

13th February	The rig was moved to location for well 30/7-6.
14th February	Installed the 30" casing in the permanent guide base and hung off the assembly on one side of the moon pool. Made up BHA for spud. Repaired heave compensator.
15th February 188 m	Ran down with 26" bit and 36" hole opener, sea bed measured to 140.5 m from RKB. Drilled 36" hole from 140.5 m to 188 m and circulated with 1.2 sp.gr. mud. Ran and cemented the 30" casing at 186 m. Released running tool and washed the inside of the 30" wellhead before POOH. Started to run the riser and the 30" pin connector.
16th February 188 m	Landed the riser and tested the pin connector to 35 000 lbs overpull. Made up BHA and drilled out the cement from 179 m to 186 m. Lost circulation after the cement was drilled out. Jumped diver and observed leak around the 30" casing. Ran open ended drill pipe to 186 m and squeezed 20 bbls cement. Attempted to fill the riser - negative. Ran open ended drill pipe outside the riser to 2 m below the sea bed and pumped cement around the 30" casing. Tagged the cement with the BHA at 187 m.
17th February 277 m	Ran open ended drill pipe and squeezed 450 sks cement with 20 sks mica. Waited on cement. Drilled cement from 177 m to 188 m. Drilled 26" hole from 188 m to 259 m. Changed underreamer and drilled from 259 m to 277 m.

18th February	690 m	Drilled from 277 m to 672 m. Changed bit and underreamer arms and drilled from 672 m to 690 m.
19th February	770 m	Drilled from 690 m to 770 m. Pulled drill string, displaced riser with sea water and observed well. Pulled riser and 30" hydraulic latch. RIH with 26" bit and displaced hole with high viscosity mud.
20th February	770 m	Ran and cemented 20" casing and displaced cement with sea water. Had to hold 500 psi against plug to make it hold. Jumped the divers to inspect and clean the wellhead. 20" csg. shoe at 765 m.
21st February	770 m	Moved BOP over moon pool and tested kill and choke loops to 5000 psi. Ran BOP and riser, tested kill and choke lines to 5000 psi, shear rams and casing to 1000 psi, pipe rams to 10 000 psi and annular preventers to 3500 psi. Made up BHA with 17½" bit.
22nd February	984 m	Drilled cement from 739 m to 780 m. Ran leak-off test at 780 m giving formation leak-off pressure equivalent to 1.24 sp.gr. mud. Drilled from 780 m to 984 m.
23rd February	1508 m	Drilled from 984 m to 1508 m.
24th February	1772 m	Changed bit and drilled from 1508 m to 1772 m.
25th February	1923 m	Drilled from 1772 m to 1923 m. Had 100 000 lbs overpull between 1752 m and 1394 m when pulling out for bit change. Ran ISF/BHC logs but unable to get below 1478 m.

26th February	2055 m	Drilled from 1923 m to 2055 m. POOH to log, 85 000 lbs overpull from 1962 m to 1905 m.
27th February	2098 m	Rigged up to run sonic log. Depth meter on unit did not work. Changed 17½" bit and drilled from 2055 m to 2098 m.
28th February	2207 m	Changed bit and drilled from 2098 m to 2207 m.
1st March	2264 m	Changed bit and function tested BOP and diverter. Drilled from 2207 m to 2264 m.
2nd March	2347 m	Changed bit and drilled from 2264 m to 2347 m.
3rd March	2421 m	Drilled from 2347 m to 2421 m. Checked for flow at 2402 m, no flow.
4th March	2531 m	Drilled from 2421 m to 2531 m.
5th March	2550 m	Drilled from 2531 m to 2550 m. Circulated sample and increased mud wt. to 1.22 sp.gr. Spotted 20 bbls of 1.41 sp.gr. mud.
6th March	2550 m	Ran ISF/BHC/GR/SP logs from 2460 m to 20" csg. shoe. Ran in with BHA and circulated and conditioned mud. Ran FDC/CNL and side wall core gun.
7th March	2550 m	Made up new bit, washed and reamed from 2468 m to 2550 m.
8th March	2550 m	Ran ISF/BHC logs from 2550 m to 2560 m. Made up 13-3/8" casing hanger and seal assembly. Circulated and conditioned mud before running 13-3/8" casing. POOH and washed wellhead. Ran 66 jts. of 13-3/8" casing, changed to 500 ton elevators and slips.

9th March	2550 m	Ran 13-3/8" casing. Displaced cement for 1st stage cementing and bumped plug with 2500 psi, held pressure for 15 min. Dropped plug and pressured up to 800 psi to open sleeves on stage cementing collar.
10th March	2550 m	Displaced cement for 2nd stage and bumped plug with 2500 psi, held pressure for 15 min. Washed inside wellhead. Tested seal assembly to 3500 psi. Attempted to test BOP, but the seals were leaking in the test plug. Changed seals and tested BOP and annular preventers to 3500 psi, rams and kill and choke lines to 10 000 psi.
11th March	2550 m	Tested choke manifold to 10 000 psi. Made up BHA with 12-1/4" bit and drilled out stage cementing collar at 2106 m, tagged float collar at 2528 m. Attempted to pressure test the 13-3/8" casing to 4000 psi but the pressure bled off at 2600 psi.
12th March	2550 m	Made up RTTS packer and tried to set and test packer at 1686 m. Slips on packer did not hold.
13th March	2550 m	Installed new rubber on packer and removed junk from slips. RIH with open ended drill pipe to 2124 m and reverse circulated. Set RTTS packer at 2096 m and tested casing to 4000 psi above packer. Leak-off at 2000 psi when tested below packer. Reset packer at 2116 m and tested to 4000 psi above the packer.The pressure bled off when attempting to pressure test the casing below the packer. Reset packer at 2144 m and tested to 4000 psi above the packer. Tagged float collar with

		packer assembly and attempted to set packer at 2528 m, 2522 m, 2512 m and 2502 m, but the slips would not hold. Pulled out to inspect packer.
14th March	2550 m	Reverse circulated with open ended drill pipe at 2528 m. Made up RTTS packer and set packer at 2516 m. Tested above packer to 4000 psi. Tested below to 1280 psi - pressure dropped to 900 psi. Tried to set packer at 2522 m - negative. Pumped slug. Made up 12-1/4" bit and RIH.
15th March	2550 m	Drilled float collar at 2528 m and shoe at 2541 m. Pressured up to 2000 psi. Pressure bled back to 1500 psi. Spotted a 40 bbls cement plug through open ended drill pipe at 2540 m and squeezed 24 bbls cement into the formation. Ran in with a 12-1/4" bit, tagged the cement at 2489 m and drilled cement from 2489 m to 2502 m.
16th March	2680 m	Drilled cement from 2502 m to 2546 m. Pressure tested cement to 2050 psi. Washed to 2550 m and drilled to 2566 m. Ran leak-off test at 2566 m. Formation leak-off pressure was equivalent to 1.81 sp.gr. mud. Drilled from 2566 m to 2634 m. Raised mud wt. to 1.32 sp.gr. Drilled from 2634 m to 2680 m. Checked for flow and observed 15 bbls pit gain. Shut in the well and observed; SIDP = 100 psi, SICP = 150 psi. Circulated through chokes while increasing the mud wt. to 1.48 sp.gr.
17th March	2718 m	Circulated out influx through choke and raised the mud wt. to 1.50 sp.gr. Checked for flow - no flow. Raised the mud wt. to 1.56 sp.gr. and circulated bottoms up.

18th March	2766 m	Changed bit. Reamed from 2670 m to 2718 m. Drilled from 2718 m to 2733 m. Raised the mud wt. to 1.63 sp.gr. and drilled from 2733 m to 2745 m. Raised the mud wt. to 1.68 sp.gr. and drilled from 2745 m to 2766 m.
19th March	2894 m	Drilled from 2766 m to 2789 m. Raised the mud wt. to 1.70 sp.gr. Drilled from 2789 m to 2894 m.
20th March	2930 m	Drilled from 2894 m to 2930 m. POOH. Retrieved wear bushing and tested BOP. - OK. Replaced wear bushing and RIH with new bit.
21st March	3000 m	Drilled from 2930 m to 3000 m.
22nd March	3037 m	Drilled from 3000 m to 3023 m. Changed bit and tested choke and kill manifold to 7000 psi - OK. Drilled from 3023 m to 3037 m.
23rd March	3083 m	Drilled from 3037 m to 3083 m.
24th March	3144 m	Drilled from 3083 m to 3100 m. Changed bit and made up new BHA. Drilled from 3100 m to 3144 m.
25th March	3173 m	Drilled from 3144 m to 3173 m.
26th March	3231 m	Drilled from 3173 m to 3231 m.
27th March	3287 m	Drilled from 3231 m to 3287 m. Had 30 - 40 000 lbs overpull when pulling out to 13-3/8" casing shoe.
28th March	3342 m	RIH and washed down 6 m of fill. Attempted to drill - master bushing came out of rotary table due to excessive heave of the rig (up to 7 ft). Welded straps over master bushing and drilled from 3287 m to 3342 m.

29th March	3402 m	Drilled from 3342 m to 3402 m. Made wiper trip to 13-3/8" casing shoe.
30th March	3464 m	Drilled from 3402 m to 3455 m. Picked up off bottom and repositioned rig by manupulating on the anchor chains. Drilled from 3455 m to 3464 m.
31st March	3471 m	Drilled from 3464 m to 3471 m. Slugged pipe and pulled into 13-3/8" casing due to weather. Picked up hang-off tool and hung off the drill string. Disconnected riser, laid down diverter and pulled slip joint above rotary table. Waited on weather.
1st April	3471 m	Waited on weather. Dressed slip joint and landed riser, hooked up kill and choke line and tested to 10 000 psi - OK.
2nd April	3471 m	Found damaged hose to blue pod caused by wire line being pulled off pod. Jumped divers, but guide line to bell parted and divers had to return. Hooked up tugger line to bell and jumped divers to clear away broken guide wire.
3rd April	3471 m	Pulled riser. Repaired damaged hose to blue pod and replaced VX-rings. Waited on weather. Ran riser and tested choke and kill line to 5000 psi - OK. RIH with drill pipe and hung-off running tool. Made up in the hang-off tool.
4th April	3478 m	Removed hang-off tool and circulated bottoms up at 2486 m. Tested BOP with test plug - all tests were OK. Drilled from 3471 m to 3478 m.

5th	April	3490 m	Drilled from 3478 m to 3490 m. Pulled out of hole to change bit.
6th	April	3547 m	Drilled from 3490 m to 3547 m.
7th	April	3572 m	Made wiper trip to 13-3/8" casing shoe. Drilled from 3547 m to 3572 m.
8th	April	2613 m	Drilled from 3572 m to 3613 m. Made wiper trip to 3309 m and had 80 000 lbs overpull 46 m off bottom. Circulated out trip gas.
9th	April	3613 m	Raised the mud wt. to 1.76 sp.gr. Made wiper trip to 13-3/8" casing shoe and circulated bottom up. POOH. Ran ISF/Sonic logs.
10th	April	3613 m	Lost one centralizer and three rubber stabilizers in the hole from the logging tool. Ran junk basket, reverse circulated and got the sentralizer and one stabilizer.
11th	April	3641 m	Rerun junk basket and reversed without success. Made up bit and reamed past junk from 3610 m to 3613 m. Drilled from 3613 m to 3641 m.
12th	April	3715 m	Drilled from 3641 m to 3715 m.
13th	April	3742 m	Drilled from 3715 m to 3717 m. Made wiper trip to 13-3/8" casing shoe. Drilled from 3717 m to 3723 m. Got drilling break at 3721 m. Circulated bottom up. Gained 10 bbls. Checked for flow - no flow. Drilled from 3727 m to 3730 m. Circulated out after drilling break. Drilled from 3730 m to 3732 m. Circulated out for drilling break and conditioned the mud. Drilled from 3732 m to 3742 m.

14th April	3784 m	Recorded 8 bbls pit gain and checked for flow - no flow. Drilled from 3742 m to 3763 m. Got drilling break at 3762 m and circulated bottoms up. Drilled from 3763 m to 3768 m. Circulated and checked for flow - no flow. Drilled from 3768 m to 3784 m, got drilling break at 3783 m. The well started flowing and gave 77 bbls pit gain in less than 5 minutes before it was shut in.
15th April	3784 m	Raised the mud weight to 1.85 sp.gr. in the active tanks and pumped 125 bbls of weighted mud down the hole - no returns. No shut in casing and drill pipe pressures, but slowly building up. Continued to displace with new mud down the hole till a total volume of 280 bbls of mud was pumped. Shut in the well and observed the pressure build up while rigging up to run temperature logs. The temperature survey tool malfunctioned at 1500 m and a new tool was ordered from shore. Flushed the hole and circulated riser with 1.76 sp.gr. mud. Pumped 49 bbls of 2.28 sp.gr. mud down the drill pipe and monitored shut in pressures: SIDP = 50 psi, SICP = 310 psi.
16th April	3784 m	Contined to pump 2.28 sp.gr. mud down the hole till a total volume of 610 bbls had been pumped. Displaced 164 bbls of heavy mud with 1.76 sp.gr. mud. Ran temperature log No. 1, No. 2 and No. 3. Had to bleed off annulus pressure several times while running the logs.
17th April	3784 m	Ran temperature log No. 4. Pumped down 1000 bbls of 2.16 sp.gr. mud followed by a 1000 sxs 2.52 sp.gr. barite plug. Displaced barite plug with 50 bbls 2.16 sp.gr. mud and 175 bbls 1.80 sp.gr. mud. Waited for the barite to settle.

18th April	3784 m	Bled off drill pipe pressure and found barite plug to be holding. Ran temperature log No. 5 and No. 6.
19th April	3784 m	Pumped down 30 bbls of 2.16 sp.gr. mud. Held 400 psi drill pipe pressure for 15 minutes and got 0.5 bbls of mud in return. Ran temperature log No. 7. Pumped down 50 bbls of 2.16 sp.gr. mud. Ran temperature log No. 8.
20th April	3784 m	Pumped down 100 bbls of 2.16 sp.gr. mud. Ran temperature log No. 9. Ran GR/CNL logs. Ran temperature log No. 10.
21st April	Plugged back to approx. 3450 m	Built 1.80 sp.gr. mud in active tanks. Pumped 500 sxs class 'G' cement. The cement plug did not hold. Kept 1300 psi pressure on the plug while waiting on cement to set. Ran free point indicator and found the string to be stuck at 2650 m.
22nd April	Plugged back to approx. 2750 m	Ran perforating gun and attempted to perforate at 3100 m. Gun misfired. Reran the perforating gun and perforated the drill pipe at 3103 m. Pumped 30 bbls of 1.80 sp.gr. mud and 225 sxs class 'G' cement with 0.7% CFR-2 and 0.2% HR-7. Held 1000 psi back pressure on drill pipe while waiting for cement to set. Ran charge and shot off drill pipe at 2800 m. Pumped down 13 bbls mud and observed a flow back of 24 bbls. Shut in the well and had SIDP = 1150 psi. Bled off in steps, approx. 10 bbls at a time. After bleeding off 46 bbls the SIDP was 1400 psi.
23rd April	Plugged back to approx. 2750 m	Bled back annulus pressure from 700 psi to 100 psi. Pumped 50 bbls 1.80 sp.gr. mud to compensate for bleed mud. Pumped down a 2.33 sp.gr. barite plug containing 1070 sxs of barite. Displaced barite plug with

		175 bbls of 1.80 sp.gr. mud. Waited on barite to settle. The drill pipe pressure was releived and a small back flor observed. After a short shut in period there was no more back flow. Set a 150 sxs class 'G' cement plug at 2800 m. Waited on cement to set. Tested choke and kill manifold - OK.
24th April	Plugged back to approx. 2750 m	Attempted to pressure test the cement plug which broke down at 700 psi. A small back flow was recorded. Spotted a class 'G' cement plug with 0.7% CFR-2 and 0.2% HR-7. Displaced plug with 160 bbls 1.80 sp.gr. mud and waited on cement. Got a slow back flow when opening up on drill pipe. Spotted 200 sxs cement and displaced with 10 bbls of water followed by 150 bbls 1.80 sp.gr. mud.
25th April	Plugged back to approx. 2750 m	No back flow observed when bleeding off pressure on the cement. Pressure tested cement plug to 2000 psi for 15 minutes - OK. Ran perforating gun and perforated drill pipe at 2700 m. Pressured up to 2000 psi before fracturing and pumped 17 bbls of mud. No back flow when bleeding down the drill pipe pressure. Ran perforating gun to 2650 m and perforated the drill pipe. Pumped 10 bbls of mud and observed no back flow when bleeding off drill pipe pressure. Again pumped 10 bbls of mud and got a bleed back of 0.5 bbls.
		Ran perforating gun to 2600 m and perforated the drill pipe. Pumped 8 bbls of mud and got 7 bbls bleed. Ran perforating gun to 2553 m and perforated the drill pipe. Observed 10 bbls pit gain when relieving drill pipe pressure. When checking for flow, some free gas was breaking out of the mud.

26th April	Plugged back to approx. 2750 m	Circulated bottoms up and cut the drill pipe at 2700 m. Unable to pull the drill pipe free. Ran strip charge gun to 2530 m and backed off the drill pipe. Pulled out drill pipe from 2530 m.
27th April	Plugged back to approx. 2750 m	Attempted to retrieve the wear bushing, but the tool would not pass upper annular preventer. Washed through BOP with wash tool. Retrieved wear bushing and tested BOP stack. All tests were OK, except for middle pipe ram.
28th April	Plugged back to approx. 2750 m.	Replaced wear bushing and RIH with wash over string. Tagged top of the fish at 2530 m. Washed over top of the drill pipe screwed into it, jarred free and pulled out.
29th April	Plugged back to approx. 2750 m	Made up BHA and washed from 2607 m to 2695 m.
30th April	Plugged back to 2666 m	Circulated out gas at 2695 m and washed to 2700 m. Pulled out to 13-3/8" casing shoe. Ran back to 2700 and circulated before pulling out. A bit with cut-off shanks run in to 2700 m. Pumped 10 bbls cement slurry consisting of Norcem class 'G' cement with 10% sand and 0.5% CFR-2. Displaced with 150 bbls of 1.78 sp.gr. mud.
1st May	Plugged back to 2544 m	Reverse circulated at 2650 m. Tagged top of cement at 2666 m and circulated at 2660 m. Pumped 60 bbls cement slurry consisting of Norcem class 'G' cement with 10% sand and 0.5% CFR-2. Displaced with 155 bbls of 1.78 sp.gr. mud. Reverse circulated at 2515 m. Tagged top of cement at 2599 m. Pumped 40 bbls of

		Norcem class 'G' neat cement slurry. Displaced with 135 bbls of 1.78 sp.gr. mud. Reverse circulated at 2470 m. Tagged top of cement at 2561 m. Pumped 40 bbls of Norcem class 'G' neat cement. Displaced with 133 bbls of 1.78 sp.gr. Reverse circulated at 2450 m.
2nd May	Plugged back to 2503 m	Tagged top of cement at 2544 m. Set cement plug and reverse circulated at 2395 m. Tagged cement at 2503 m and pulled out. Ran in with a drillable squeeze packer.
3rd May	Plugged back to 2478 m	Set packer at 2491 m and pressure tested it to 1100 psi - OK. Set a cement plug at 2488 m. Displaced riser, kill - and choke lines with sea water. Disconnected slip joint and pulled BOP stack. Changed VX-ring in lower H-4 connector and element and ring seal in upper annular preventer.
4th May	Plugged back to 2478 m	Repaired and serviced BOP stack.
5th May	Plugged back to 2478 m	Tested BOP stack. Waited on orders.
6th May	Plugged back to 2478 m	Waited on orders Pressure tested choke and kill manifold to 10 000 psi - OK.
7th May	Plugged back to 2478 m	Waited on orders. Rigged up to run BOP and riser.

8th May	Plugged back to 2478 m	Ran BOP and riser. Pressure tested kill and choke line to 7500 psi - OK. Pressure tested BOP - OK. Started to make up new drill collars.
9th May	Plugged back to 2478 m	Ran down with new BHA and tagged cement at 2478 m. Circulated at 2478 m and pulled out. Waited on orders.
10th May	2502 m	Waited on orders. Drilled cement from 2478 m and tagged bridge plug at 2491 m. Pushed the plug down to 2499 m and started drilling the plug.
11th May	2586 m	Drilled the bridge plug from 2502 m to 2506 m. Drilled cement from 2506 m to 2564 m. Held BOP-drill. Time to shut in the well - 4 min., time to hang off drill pipe in the BOP stack - 8 min. Ran in with new bit to 2564 m and drilled cement from 2564 m to 2586 m.
12th May	2622 m	Drilled cement from 2586 m to 2599 m. Pulled up to 2586 m and reamed down to 2599 m. Circulated gas cut mud, drilled to 2622 m and ran directional survey. Made up BHA for directional drilling with Dyna Drill. Ran in with Dyna Drill and attempted to run the directional survey tool through the drill string using the sand line - unsuccessful Pulled out with Dyna Drill.
13th May	2631 m	Cleaned cement from Dyna Drill and bit and ran down to 2616 m, ran survey. Washed down to 2619 m and started to drill a deviated hole from 2619 m. Drilled from 2619 m to 2631 m.

Note: To differ between the plugged back hole and the new deviated hole, the well will be designated 30/7-6 I in further references.

14th May	2638 m	Drilled with Dyna Drill from 2631 m to 2638 m - surveys at 2614 m and 2624 m. Ran leak off test at 2575 m. Formation leak-off pressure was equivalent to 1.86 sp.gr. mud. Pulled out to change bit.
15th May	2684 m	Ran in with new BHA and reamed from 2628 m to 2638 m. Drilled from 2638 m to 2684 m - surveys at 2636 m, 2646 m, 2656 m, 2665 m and 2674 m. Pulled out to change bit.
16th May	2732 m	Drilled from 2684 m to 2732 m - surveys at 2689 m, 2698 m and 2707 m.
17th May	2834 m	Drilled from 2732 m to 2834 m - surveys at 2727 m, 2745 m, 2783 m and 2822 m.
18th May	2875 m	Pulled out to change bit. Retrieved wear bushing after washing the wellhead. Pressure tested the BOP stack with the test tool - all tests OK. Drilled from 2834 m to 2875 m - surveys at 2841 m and 2860 m.
19th May	2955 m	Drilled from 2875 m to 2955 m - surveys at 2879 m, 2908 m, 2928 m and 2945 m. Pulled out to change bit.
20th May	3011 m	Drilled from 2955 m to 3011 m - surveys at 2965 m and 2994 m.
21st May	3037 m	Drilled from 3011 m to 3037 m - surveys at 3014 m and 3037 m. Pulled out to change bit and BHA. Repaired electric motor for rotary table.
22nd May	3048 m	Pressure tested kelly and mud manifold - tests were OK. Drilled with Dyna Drill from 3037 m to 3048 m.

23rd May	3063 m	Drilled with Dyna Drill from 3048 m to 3055 m - survey at 3042 m. Pulled out to change bit and BHA. Drilled from 3055 m to 3063 m.
24th May	3078 m	Drilled from 3063 m to 3074 m - survey at 3070 m. Pulled out to change bit and BHA. Ran survey to orient the Dyna Drill and drilled from 3074 m to 3078 m.
25th May	3093 m	Drilled with Dyna Drill from 3078 m to 3093 m - surveys at 3073 m and 3080 m. Pulled out to change bit.
26th May	3105 m	Ran survey to orient the Dyna Drill and drilled from 3093 m to 3105 m - survey at 3098 m.
27th May	3106 m	Drilled with Dyna Drill from 3105 m to 3106 m - survey at 3106 m. Pulled out to change bit and BHA. Retrieved wear bushing after washing wellhead with wasking tool. Pressure tested the BOP stack with test tool - all tests OK.
28th May	3115 m	Changed from Dyna Drill to Turbo Drill. Ran survey to orient Turbo Drill and drilled from 3106 m to 3115 m - surveys at 3098 m and 3103 m. Pulled out to change bit.
29th May	3126 m	Ran survey to orient Turbo Drill and drilled from 3115 m to 3126 m - survey at 3107 m. Pulled out to change bit and BHA.
30th May	3128 m	Reamed from 3070 m to 3126 m. Drilled from 3126 m to 3128 m - survey at 3122 m. Pulled out to change back to Turbo Drill.
31st May	3145 m	Drilled with Turbo Drill from 3128 m to 3145 m -surveys at 3131 m and 3134 m.
1st June	3145 m	Pulled out to change bit and BHA. Laid down Turbo Drill and bent sub. When running in hole with the new BHA, the travelling block dropped from the derrick into the drill floor.

		Nobody was hurt and the rotary table was not damaged. The accident was caused by the adjustment bolt for the brake bands had parted, and at the same time the Elmagco Brake malfunctioned, caused by a spline ring breaking loose from the Hi clutch drum assembly. A total of 760 ft of drilling line and the drilling line spooler were damaged and the line guard at the crown was bent. Slipped and cut the damaged drilling line, replaced the broken adjustment bolt and reinstalled the travelling block in the guide rails.
2nd June	3145 m	Repaired bent shaft on Crown - o - Matic sylinder. Checked rotary table. Build guard over fast line sheave. Repaired draw works drum guard. Inspected rotary beames. Inspected lock pin bolts on heave compensator.
3rd June	3145 m	Waited on replacement parts for broken spline ring. Circulated at 1912 m for 2½ hrs. Replaced spline ring on Elmagco Brake. Inspected the hook. Pulled out with the drill string.
4th June	3148 m	Made up new BHA and drilled from 3145 m to 3148 m - survey at 3148 m. Pulled out to 13-3/8" casing shoe. Inspected elevator links and brake assembly with magnaflux and found two cracks in old welds. Rewelded and tested with magnaflux - OK.
5th June	3162 m	Drilled from 3148 m to 3162 m - surveys at 3151 m and 3154 m. Pulled out to change bit. Washed wellhead with washing tool and retrieved wear bushing. Pressure tested the BOP stack with test tool - all tests OK. Tested stand pipe manifold and kelly valves. Found leak in upper kelly valve.

6th June	3185 m	Repaired and tested upper kelly valve - OK. Drilled from 3162 m to 3185 m - surveys at 3168 m and 3183 m.
7th June	3205 m	Drilled from 3185 m to 3205 m - surveys at 3191 m and 3200 m. Pulled out to change bit.
8th June	3234 m	While running in the hole, a dope brush was lost inside the drill pipe. Reverse circulated and recovered the brush. Drilled from 3205 m to 3234 m - surveys at 3213 m.
9th June	3262 m	Drilled from 3234 m to 3262 m - survey at 3258 m. Made wiper trip, circulated and conditioned mud at 3262 m prior to running logs.
10th June	3262 m	Pulled out of hole to run logs. Ran ISF/ Sonic logs, and then FOC/CNL logs. Ran down with new bit and reamed from 3050 m to 3201 m.
11th June	3262 m	Reamed from 3201 m to 3262 m. Circulated at 3262 m and pulled out of hole. Ran FDC/CNL logs, dipmeter and velocity survey.
12th June	3262 m	Finished running velocity survey. Made up running tool and seal assembly for 9-5/8" casing hanger. RIH, circulated and conditioned mud prior to running casing. Retrieved wear bushing and prepared to run 9-5/8" casing.
13th June	3262 m	Ran the 9-5/8" casing. Cemented the casing in first stage with 160 bbls cement slurry and bumped the plug with 1200 psi. Dropped plug and pressured up to open sleeves on stage collar. The sleeves would not open.

14th June	3262 m	Pressured up on stage cementing collar to 4000 psi but the sleeves did not open. Ran CBL log and tagged the stage cementing collar at 2554 m. Pulled out with logging tool and pressured up on the stage cementing collar. The sleeves opened at 1200 psi. Cemented the casing in second stage with 405 bbls cement slurry. Lost returns after having displaced 75% of the total displacement volume. Bumped the shut-off plug with 1200 psi and pressured up to 3000 psi to close the sleeves in the stage cementing collar. Back flow when pressure was bled off. Re-pressured to 3000 psi and the sleeves closed. Energized the casing hanger seal assembly and tested it to 9000 psi for 5 minutes - OK. Pressure tested the BOP stack with test tool - all tests OK.
15th June	3262 m	Replaced wear bushing and made up new BHA with 8-3/8" bit. Drilled the stage cementing collar and pressured up to 2500 psi, but pressure bled back. Tagged float collar at 3218 m, pumped slug and pulled out with drill string.
16th June	3262 m	Ran CBL log. Pressure tested choke and kill manifold - all tests OK. Ran in hole with RTTS tool and reverse circulated at the stage cementing collar. Ran further down to float collar and reverse circulated. Set the RTTS packer at 3210 m and pressured up below the packer to 5000 psi for 5 minutes - OK. Reverse circulated at 2580 m and set packer at 2570 m. Pressured up below packer to 4400 psi for 5 min. - OK. Pressured up annulus to 1900 psi above packer. Set packer at 2534 m and pressured up below packer to 1000 psi before the pressure bled off.

17th June	3262 m	Pulled out with RTTS tool and made up an EZ drillable packer on running tool. When running down with the EZ packer, the packer accidentally took weight and set at 284 m. Made up bit and BHA to drill out the packer. While drilling the packer it came loose and was pushed down to 2658 m. Pulled out to run a new EZ packer.
18th June	3262 m	Set the new EZ packer at 2535 m. Tested the packer to 3000 psi. Pumped 300 sxs cement and squeezed into the formation. Reverse circulated at 2530 m. Pulled out with the packer running tool.
19th June	3262 m	Drilled out the packer at 2535 m and cement to 2562 m. Closed the upper pipe ram on drill pipe and tested the 9-5/8" casing and the stage cementing collar to 5000 psi for 15 min. - OK. RIH and pushed the accidentally EZ packer set down to 3216 m. Drilled out the packer, float collar and the cement to 3249 m.
20th June	3267 m	Drilled cement and casing shoe and cement to 3255 m. Reamed to 3262 m. Drilled from 3262 m to 3267 m. Pulled into 9-5/8" casing shoe and ran leak off test at 3267 m. Formation leak off pressure was equivalent with 2.07 sp.gr. mud. Built mud wt. to 1.86 sp.gr. Pulled out and washed wellhead.
21st June	3283 m	Pressure tested the BOP stack - all tests OK. Replaced the wear bushing after cleaning the running tool for cement. RIH. Drilled from 3267 m to 3280 m. Lost 20 bbls of mud into the formation. Circulated at 3280 m with 1400 psi pump pressure without loosing mud. Drilled from 3280 m to 3283 m.

22nd June	3332 m	Drilled from 3283 m to 3295 m. Checked for flow and circulated bottoms up. Drilled from 3295 m to 3310 m. Checked for flow - no flow. Drilled from 3310 m to 3332 m. Pulled 10 stands and had 30 000 lbs overpull. Ran down to bottom and circulated bottoms up. Ran survey on sand line to 3329 m. Pulled out to 2553 m and circulated. Pulled out to change bit.
23rd June	3369 m	Ran down to 3306 m and reamed to bottom. Drilled from 3332 m to 3335 m. Pulled out to 9-5/8" casing shoe and repaired valve in mud manifold. Drilled from 3335 m to 3356 m. Checked for flow - no flow. Drilled from 3356 m to 3369 m.
24th June	3434 m	Drilled from 3369 m to 3424 m. Ran survey at 3421 m and made wiper trip to 9-5/8" casing shoe. Drilled from 3424 m to 3434 m.
25th June	3500 m	Drilled from 3434 m to 3500 m. Checked for flow at 3480 m, 3490 m and 3500 m - no flow. Ran survey at 3497 m. Made wiper trip to 9-5/8" casing shoe and pulled out to run logs.
26th June	3500 m	Ran ISF - BHC - sonic - GR logs, then DLL - MSFL - GR logs and then DLL - FDC - CNL - GR logs and then DLL - FDC - CNL - GR - RFT logs
27th June	3589 m	Completed the intermediate log runs and drilled from 3500 m to 3589 m.
28th June	3688 m	Drilled from 3589 m to 3688 m checking for flow at every connection - no flow.

29th June	3696 m	Drilled from 3688 m to 3691 m - survey at 3688 m. Pulled to 3598 m and ran survey at 3595 m. Pulled out to change bit and run logs. Ran ISF - Sonic - GR logs. Drilled from 3691 m to 3696 m. Checked for flow at 3692 m - no flow.
30th June	3706 m	Drilled from 3696 m to 3706 m. Built mud wt. to 1.92 sp.gr. Made wiper trip to 9-5/8" casing shoe and checked for flow - no flow. Circulated and worked the drill pipe. Heaving shales caused partially packing off the hole. Built the mud wt. to 1.94 sp.gr. and pulled out to casing shoe. Ran down to bottom and tried to break circulation. Unable to circulate. Pulled out to 3644 m with 100 000 lbs overpull. Unable to circulate. Pulled out to 9-5/8" casing shoe and tried to circulate. Had 10% returns when circulating at 50 GPM, lost 30 bbls of mud. Pulled out to change bit.
1st July	3706 m	Took the stabilizers out of the BHA and ran down to 9-5/8" casing shoe. Circulated and had 10% returns. Cut the mud wt. in the active system back from 1.94 to 1.92 sp.gr. Spotted and displaced lost circulation material in intervals down to 3706 m. Had 30% returns when displacing lost circulation material at 3706 m. Total mud loss during last 24 hrs. was 210 bbls.
2nd July	3706 m	Displaced more lost circulation material at 3706 m and had 70% returns. Pulled out to 3586 m and circulated. No returns. Spotted and circulated a plug of lost circulation material and had full returns. Ran down and tagged bottom - no fill. Pulled out to 3695 m and circulated with full returns.

		Circulated at 3680 m with 90% returns. Checked for flow - no flow. Obtained full returns when circulating at 3680 m Tagged bottom - no fill, and pulled out to run logs.
3rd July	3706 m	Ran ISF - Sonic - GR logs, then FDC - CNL logs, DSL - SRS logs, dipmeter and RFT.
4th July	3706 m	Ran RFT, velocity survey and CST. Run in hole with new bit.
5th July	3711 m	Circulated bottoms up twice and drilled from 3706 m to 3711 m. Made wiper trip to 9-5/8" casing shoe. Washed and reamed from 3708 m to 3711 m.
6th July	3711 m	Circulated and spotted 20 bbls of high viscosity mud on bottom. Pulled out to run logs. Ran GR log. Started to run the 7" liner.
7th July	3711 m	Ran the liner on drill pipe and worked and washed the liner from 3696 m to 3707 m. Circulated until the mud was free of gas. Dropped the ball, pressured up and set the slips on the liner hanger. The hanger was set at 2403 m. Released the setting tool and set back down. Cemented the liner with 124 bbls cement slurry and bumped the plug with 1700 psi. Pulled out of the liner hanger with running tool. Hade 100 000 lbs overpull before the running tool came loose. Pulled and laid down one single drill pipe and cementing head. Pulled one stand of drill pipe with 20 000 overpull. Picked up the kelly and tried to circulate and rotate - no success. Continued attempts to free the

		string were unsuccessful. Ran collar locator and found top of the setting tool at 2369 m. Ran free point indicator and found the string to be stuck at 2299 m and completely free at 2280 m.
8th July	3711 m	Ran string shot to 2275 m. When torquing up before shooting, the pipe backed off mechanically at 2203 m. Pulled out with the string. Ran down with open ended drill pipe and screwed into fish. Ran a string shot to 2279 m and backed off. Pulled out and made up a wash-over string.
9th July	3711 m	Ran in with wash-over pipe and tagged the top of the fish at 2277 m. Washed over fish from 2285 m to 2302 m. Pulled out to change wash-over shoe.
10th July	3711 m	Waited for wash-over shoe to arrive from shore. Ran down to 2268 m and worked down over top of fish to 2303 m. Washed over fish from 2303 m to 2308 m. Pulled out and inspected the wash pipe and laid out one damaged joint.
11th July	3711 m	Ran down with wash pipe and washed over fish from 2308 m to 2309 m. Pulled out with wash pipe and laid out two damaged joints. Ran down with jar, screwed into top of fish and jarred on fish. Made ready to run free point indicator.
12th July	3711 m	Ran free point indicator - the pipe was from 15% to 30% free down to 2360 m. Jarred on the fish. Ran string shot and backed off the pipe at 2301 m. Pulled out and ran down with wash pipe from 2301 m to 2308 m.

13th July	3711 m	Washed over fish from 2308 m to 2329 m. Pumped high viscosity mud and pulled out. Ran down with jar and screwed into top of fish at 2301 m. Jarred on fish and torqued up after jarring. Ran string shot and casing collar locator. Fired the string shot but failed to back off. Ran down with a new string shot which did not pass through the jar. Ran down with a modified string shot.
14th July	3711 m	Backed off the drill string at 2329 m and pulled out. Reamed with wash pipe from 2321 m to 2329 m. Washed over fish from 2329 m to 2340 m . Pulled out with wash pipe.
15th July	3711 m	Ran down with jar and screwed into top of fish. Jarred on the fish and ran free point indicator. Ran string shot which misfired. Ran a new string shot, but did not back off. Ran two more string shots but did not succeed in backing off.
16th July	3711 m	Jarred on the fish. The drill pipe backed off mechanically up the string but was screwed back on. Ran string shot which misfired. Ran new string shot and tried to back off at 2351 m - unsuccessful. Backed off mechanically at 2303 m, but screwed back on and pulled out with string. Ran down with wash pipe.
17th July	3711 m	Washed from 2340 m to 2349 m. Jarred on pipe. Pulled out to change wash over shoe. Washed over fish from 2349 m to 2351 m.

18th July	3711 m	Washed over fish from 2351 m to 2353 m. Pulled out with wash pipe but left 0.66 m of wash over shoe in the hole. Ran in with 8½" overshot and latched on top of the fish. Jarred on the fish and ran free point indicator.
19th July	3711 m	Ran string shot and torqued up for backing off. Lost torque and pulled out with overshot. Had lost 25% of the grapple in the hole. An attempt to screw into the fish with drill pipe was unsuccessful. Ran external pipe cutter and worked cutter over fish.
20th July	3711 m	Unable to cut the drill pipe and pulled out. Ran new overshot and latched on top of fish. Ran sinkerbar to check that tool joints were open. Ran string shot but the pipe did not back off. Backed off mechanically in drill collars but screwed back on. Ran second string shot. When picking up on the string before firing, the string came free. Pulled out the fishing assembly.
21st July	3711 m	Ran overshot but did not succeed latching on to fish. Ran new overshot and latched on top of fish. Ran strings shot which stopped at top of the fish. Ran sinkerbars.
22nd July	3711 m	Ran string shot to 2348 m, backed off the pipe and pulled out. Screwed into top of the fish with drill pipe. Ran successively three string shots, but was not able to back off. Backed off the pipe at 2348 m with the fourth string shot and pulled out.

23rd July	3711 m	Pressure tested the casing to 4000 psi for 5 minutes - OK. Washed over fish from 2351 m to 2357 m. Pulled out and circulated high viscosity mud through the booster line.
24th July	3711 m	Washed over fish from 2357 m to 2362 m when the wash pipe got stuck. Jarred on the pipe but it did not come loose. Ran string shot to 2328 m and backed off and pulled out. Ran down and screwed into top of fish. Jarred on the fish which came free. Washed over fish from 2361 m to 2362 m.
25th July	3711 m	Washed from 2362 m to 2368 m. Pulled out and retrieved the fish inside the wash pipe. Made up 8-3/8" bit and BHA and drilled cement from 2368 m to 2375 m. Pressure tested the 9-5/8" casing to 4500 psi for 15 minutes - OK. Drilled cement from 2375 m to 2399 m. Circulated before pulling out.
26th July	3711 m	Ran down with bit and casing scraper to 2399 m. Circulated bottoms up and pulled out. Made up new BHA of 6" bit, 4-3/4" drill collars and 3½" drill pipe. Drilled out flapper valve in liner hanger.
27th July	3711 m	Circulated and conditioned mud in the 7" liner. Pressure tested the casing and liner to 4500 psi for 15 minutes - OK. Ran CBL - GR - CNL logs.
28th July	3711 m	Ran casing caliper log. Ran down with open ended drill pipe to 2380 m and set cement plug No. 1 from 2380 m to 2260 m. Pulled out to 2200 m. Reverse circulated and pulled out.
29th July	3711 m	Set an EZ drillable packer on wire line at 2197 m. Ran down to 770 m and circulated bottoms up before setting cement plug No. 2.

		Set cement plug No. 3 at 270 m, pulled out to 160 m and reverce circulated. Displaced riser with salt water and retrieved wear bushing. Ran down with impression block and took impression of the inside of the 9-5/8" casing hanger. Replaced the wear bushing.
30th July	3711 m	Landed BOP stack on test stump. Made ready to run corrosion cap and marking buoy. Jumped divers to stab the cap and chain weights for the marker buoy. Started to pull anchors. Pulled anchors No. 1,2,3,4,5 and 7.
31st July	3711 m	Pulled anchors No. 6 and 8. Released the rig to Elf at 10.00 hrs.

3.3 Time Distribution

The total time for drilling well 30/7-6 phase I, was 167.5 days, ref. Table A.2 and Fig. A.4.

The drilling operation for phase I can be divided into three main groups.

1. Drilling of the well down to 3784 m where the gas kick occured. Time consumption: 60 days.

2. The operations to control the gas kick, plug the well back to 2478 m and prepare the side tracking operation. Time consumption: 27.5 days.

3. The drilling of the deviated hole, 30/7-6 (I), from kick-off at 2619 m and down to 3711 m, where the well was temporarily plugged and abandoned. Time consumption: 80 days.

These three main operation groups had different impact on the total time distribution.

The drilling operation down to 3784 m very closely followed the planned drilling prognoses.

The time to control the kick and plug back to 2478 m is almost entirely reported as "lost time due to hole problems" and grosly contributed in making this time as high as 15.4 % of the total time.

The average penetration rate for drilling the side tracked hole was low due to the extensive use of Dyna Drill and Turbo Drill to control the required maximum distance of 50 m from the plugged-back hole. After the 7" liner was set, 16 days were lost in combined wash-over and fishing operations to free the liner running string. These 16 days represents the main part of the 11.7% of total time reported as "lost time due to fishing operations".

4. TEMPORARY ABANDONMENT OF THE WELL

The temporary abandonment program is shown in Fig. A.5. The 7" liner was set at 3707 m and hung off inside the 9-5/8" casing at 2403 m. Temporary abandonment was carried out as follows:

1. The cement plug No. 1 was set with 132 sxs class 'G' neat cement from 2380 m to 2760 m.

2. EZ drillable packer was run on wireline and set at 2197 m.

3. Set cement plug No. 2 with 55 sxs class 'G' neat cement from 770 m to 720 m.

4. Set cement plug No. 3 with 110 sxs class 'G' neat cement from 270 m to 170 m.

5. A corrosion cap was placed over the 30" wellhead and the four guide wires were cut. The location was marked with a marker buoy anchored to a 500 kg cement clamp placed 4 ft from the wellhead and fastened to the guide base beam. This buoy was later lost and had to be replaced. Three additional marker buoys were positioned with a distance of 200 m from the wellhead, ref. Fig. A-6. The area around the wellhead was inspected for debries by divers and found to be clear.

5. MATERIALS REPORT

5.1 Casing and Wellhead

A Vetco wellhead system was used. It was adapted to be used in conjunction with the 15 000 psi BOP stack.

The 36" hole was drilled without guideance system. The 30" casing was run with the permanent guide base installed on the 30" wellhead.

The riser was connected on the 30" wellhead and the 26" hole was drilled using a 17½" bit and a 26" underreamer. The 20" casing was run with the 18-3/4" wellhead housing in the 30" wellhead.

A 17½" hole was drilled through the 10 000 psi BOP stack and the 13-3/8" casing was run and cemented in two stages with a stage cementing collar.

The 12-1/4" hole was drilled to 3784 m when a gas kick and underground flow occurred and the hole had to be plugged back to the 13-3/8" casing shoe. A new deviated 12-1/4" hole (30/7-6 (I)) was drilled from below the 13-3/8" shoe with "kick off" at 2619 m. The 9-5/8" casing was run and cemented in two stages.

The 8-3/8" hole was drilled and a 7" liner was run and hung off inside the 9-5/8" casing using a hydraulic liner hanger. The well was then temporarely plugged and abandoned.

The following types of casing were run:

Size	Grade	Weight lbs/ft	Length m	Setting depth m
30"	B	457	37	186
	B	310	11	
20"	K-55	94	182	765
	K-55	133	446	
13-3/8"	C-95	68	606	
	N-80	72	1797	2541
	Q-125	58,4	1043	
9-5/8"	P-110	53,5	1204	
	P-110	47	660	3252
	N-80	47	206	
7" liner	S-95	29	1304	3707

5.2 Bits

Ref.: Table A.3

The 36" hole was drilled with a 26" pilot bit and a 36" hole opener.

The 26" hole was drilled with a 17½" pilot bit and a 26" underreamer.

The 17½" was drilled with 7 bits:

2 bits	IADC code	111 to 1923 m	from 770 m
2 "	" "	131 to 2098 m	
2 "	" "	323 to 2264 m	
1 "	" "	525 to 2550 m	

The 12-1/4" hole was drilled to 3784 m before the gas kick occurred. This section was drilled with 7 bits:

1 bit	IADC	code	111	to	2718 m	from 2550 m
1 "	"	"	114	to	3023 m	
1 "	"	"	527	to	3100 m	
1 diamond bit				to	3471 m	
1 bit	IADC	code	527	to	3490 m	
i diamond bit				to	3784 m	

The new 12-1/4" deviated hole 30/7-6 (I) with kick-off point at 2619 m was drilled down to setting depth of the 9-5/8" casing with 16 bits:

1 bit	IADC	code	134	to	2638 m	from 2619 m
3 "	"	"	114	to	2955 m	
2 "	"	"	135	to	3055 m	
1 "	"	"	114	to	3074 m	
4 "	"	"	134	to	3126 m	
2 "	"	"	214	to	3145 m	
2 "	"	"	215	to	3205 m	
1 "	"	"	134	to	3259 m	

The 8-3/8" hole was drilled from the 9-5/8" casing shoe to 3711 m with 5 bits:

1 bit	IADC	code	134	to	3332 m	from 3267 m
2 diamond bits				to	3691 m	
2 bits	IADC	code	215	to	3711 m	

5.3 Mud Report

Phases:

36" hole, 30" csg.	The 36" hole was drilled with sea water with return to sea bed. A 1.21 sp.gr. mud mixed of gel and lime with 200 + funnel viscosity was used as spot mud and to displace the sea water in the hole before running casing.
26" hole, 20" csg.	The riser was run before starting on the 26" hole. When drilling the hole a 1.09 sp.gr. mud was used composed of gel, caustic, CMC and some barite and mud detergent. Mica was mixed into the mud as lost circulation material. Before running the 20" casing 200 bbls of 80 + funnel viscosity mud with LCM was spotted on bottom.
17½" hole 13-3/8" csg.	Sea water and Q-mix was used when drilling out of the 20" casing. A mud mixed from gel, lignosulfonate, caustic and mud detergent was used. Down to 2050 m the mud weight was 1.09 sp.gr. and 1.12 sp.gr. down to 2420 m. It was then steadily increased to 1.25 sp.gr. at 2550 m. From 2420 m barite was also mixed into the mud.
12-1/4" hole down to 3784 m	When drilling the 12-1/4" hole from 2550 m to 2800 m, the mud weight was continuously increased from 1.25 sp.gr. to 1.71 sp.gr. It was kept unchanged down to 3550 m before again raised to 1.76 sp.gr. The mud was mixed from gel, lignosulfonate, caustic, barite

CMC and mud detergent. When drilling the lower part of the hole lignite and Drillaid was added.

12-1/4" hole (30/7-6 (I) 9-5/8" casing

A 1.76 sp.gr. mud was used in the diviated hole to 3262 m where the 9-5/8" casing was set at 3252 m. The mud was mixed from gel, lignosulfonate, caustic, barite and lignite. Sodium bicarbonate was added in the upper part of the hole for mud treatment due to cement contamination, probably originating from the squeezed and plugged back hole.

8-3/8" hole, 7" liner

When drilling out off the 9-5/8" casing the mud weight was increased to 1.86 sp.gr. and kept unchanged to 3650 m. It was then raised to 1.88 sp.gr. Immidiately before reaching T.D. at 3711 m, the mud weight was raised to 1.92 sp.gr. before running logs and the 7" liner. The mud used for the 8-3/8" hole was similar to that used for drilling the 12-1/4" hole.

For further information see Table A.4: Mud Summary

5.4 Cement

The 30" casing was set at 186 m and cemented with a lead slurry, followed by a tail in slurry. The lead slurry consisted of 500 sxs class 'G' cement with an equivalent of 12% dry blended bentonite and 2% $CaCl_2$ and the tail in slurry was 420 sxs class 'G' cement with 2% $CaCl_2$.

The 20" casing was set at 765 m and cemented with lead slurry of 3070 sxs class 'G' cement with an equivalent of 12% dry blended bentonite and 2% $CaCl_2$ and a tail in slurry of 400 sxs class 'G' neat cement.

The 13-3/8" casing was set at 2541 m and cemented in two stages with a stage cementing collar at 2106 m. The same cement slurry was used for both stages, 846 sxs and 3462 sxs in the first and second stage respectively. The slurry concisted of class 'G' cement with 1% CFR-2 and 0.3% Halad-9.

The 9-5/8" casing was set at 3252 m and cemented in two stages with a stage cementing collar at 2553 m. In stage one 770 sxs class 'G' cement with 0.7% CFR-2 and 0.2% HR-7 were used and in stage two 1900 sxs class 'G' cement with 0.7% CFR-2 and 0.1% HR-7 were used.

The 7" liner was cemented with 600 sxs class 'G' cement with 1% CFR-2, 0.5% Halad-9 and 0.1% HR-12.

Laboratory tests of the slurry before the liner was cemented gave a thickening time of 5 hrs. 55 minutes. When the liner was cemented, excess cement above the liner hanger set up in less than 2 hrs. 30 minutes causing the liner running string to be cemented in the 9-5/8" casing immediately after the running tool was disengaged.

Later laboratory analysis of the mixing water used indicates that the 0.5% Halad-9 was not mixed in the mixing water as prescribed in the drilling program. This is believed to be the cause for the fast setting of the cement.

6. COST REPORT - WELL 30/7-6 PHASE I

The well was first drilled to 3784 m where a gas kick occurred and the hole had to be plugged back to the 13-3/8" casing shoe at 2541 m. A side tracked hole was drilled from 2619 m. At 3711 m the drilling of this phase I was completed and the well was temporarely abandoned. The total rig time on location was 167.5 days.

By November 30 , 1978 the well had accumulated a total cost of 87.000 MM N.kr. For detailed cost report ref. Table A.5.

TABLE A.1

HOLE DEVIATION - 30/7 - 6

Depth (m)	Inclination (degrees)	Direction (degrees)	Depth (m)	Inclination (degrees)	Direction (degrees)
138	2	-	2149	1	N 28 W
188	0,75	-	2207	1,25	N
232	0,75	S 20 W	2264	1,75	N 10 E
323	1	N 20 W	2356	2	N 7 W
408	0,5	S 65 E	2454	2	S 33 E
498	0,75	N 65 E	2550	3°	N 2 E
594	0,75	N 20 W	2718	3,75	N 45 E
672	1,5	N 52 E	2803	3,5	N 27 E
842	0,5	N 5 W	2899	3,25	N 10 E
936	0,25	N 68 E	2992	2,75	S 51 W
1021	0,75	S 67 E	3023	2	N 9 W
1078	0,75	N 33 W	3100	0,75	S 51 W
1117	0,5	S 53 E	3192	2	S 31 W
1203	1	N 32 E	3287	3	S 48 W
1297	2,25	N 55 E	3402	4,5	S 47 W
1383	1,25	N 62 E	3471	5	S 65 W
1469	2,25	N 32 E	3537	4,5	S 59 W
1508	2,25	N 58 E	3547	4	S 60 W
1600	1,25	S 88 E	3613	3,75	S 66 W
1696	1,5	N 78 E	3717	3,75	S 72 W
1782	0,5	N 73 E			
1922	1	N 4 W			
2026	1,5	N 10 W			
2055	2	N 24 E			

Continues on next page:
Hole deviation for 30/7-6I

TABLE A.1 (cont.)

HOLE DEVIATION - 30/7 - 6 I

Depth (m)	Inclination (degrees)	Direction (degrees)	Depth (m)	Inclination (degrees)	Direction (degrees)
2604	3	N 20 E	3042	3,75	S 80 E
2614	3,25	N 28 E	3056	4,1	S 78 E
2620	3,25	N 41 E	3064	3,7	S 73 E
2624	4	N 42 E	3075	3,25	S 74 E
2636	4,25	N 58 E	3086	3	S 64 E
2646	5	N 66 E	3094	2,75	S 62 E
2655	5,75	N 69 E	3106	2	S 44 E
2665	6,5	N 75 E	3110	2,75	S 34 E
2674	7,5	N 78 E	3115	3	S 26 E
2689	8	N 83 E	3119	3,25	S 10 E
2696	8	N 83 E	3128	4,8	S 5 W
2707	7,5	N 88 E	3142	5,9	S 14 W
2727	7,5	N 85 E	3145	6	S 17 W
2745	7,75	N 84 E	3154	7	S 18 W
2764	7,75	N 86 E	3159	8	S 21 W
2793	7,5	N 83 E	3168	5,25	S 20 W
2823	7	N 83 E	3181	7,5	S 21 W
2842	7	N 83 E	3191	6,25	S 24 W
2861	7	N 81 E	3200	5,25	S 18 W
2879	6	N 81 E	3212	5	S 20 W
2908	5,25	N 79 E	3231	4,5	S 17 W
2928	4,75	N 74 E	3258	3,6	S 17 W
2945	4,5	N 79 E	3329	3,5	S 18 W
2965	4,5	N 77 E	3421	3,9	S 33 W
2994	3,9	N 78 E	3497	3,8	S 16 W
3014	3,75	N 81 E	3595	5	S 65 W
3037	3,6	N 87 E	3688	5,5	S 80 W

TABLE A.2

TIME DISTRIBUTION

OPERATION	DAYS	PERCENTAGE OF TOTAL TIME
1. Underway	-	-
2. Mooring	1,41	0,84
3. Drilling	40,98	24,47
4. Tripping/Surveying	20,35	12,15
5. Circulating and cond. mud	2,59	1,55
6. Run and cement casing	12,43	7,43
7. Formation evaluation	9,75	5,82
8. Subsea equipment	4,65	2,76
9. Lost time - DRLG equip.	4,90	2,92
10. Lost time - Subsea equip.	3,49	2,08
11. Lost time - Fishing	19,52	11,66
12. Lost time - Hole problems	25,86	15,44
13. Lost time - Mooring system	0,07	0,03
14. Lost time - wo weather	3,94	2,36
15. Lost time - wo equip.	0,17	0,10
16. Lost time - wo orders	4,06	2,43
17. Lost time - completion equip.	-	-
18. Lost time - other	10,28	6,14
19. Plug and abandon	3,05	1,82
SUM TOTAL	167,5 days	100%

TABLE A.3

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BIT RECORD

COUNTY	FIELD	STATE	SECTION	TOWNSHIP	RANGE	LOCATION	WELL NO
NORTH SEA	BLOCK 30/7	NORWAY				30/7	6

CONTRACTOR	RIG NO.	OPERATOR	TOOLPUSHER	SALESMAN
RASMUSSEN GLOBAL MARINE	PGD	NORSK HYDRO		

SPUD	UNDER SURF.	UNDER INTER.	SET SAND ST.	REACHED T.D.	PUMP NO. 1 LINER	PUMP NO. 2 LINER	PUMP POWER	TYPE MUD
FEB. 15, 77					7¼" x 12" ABOVE 1422 m 6¼" x 12" BELOW 1422 m	7¼" x 12" ABOVE 1422 m 6¼" x 12" BELOW 1422 m	FA - 1600	LIGNO SULF.

DRILL PIPE SIZE	TYPE	O.D.	DRILL COLLARS NUMBER	O.D.	I.D.	LENGTH	DRAWWORKS POWER
5"	TOOL JOINTS						

NO.	SIZE	MAKE	TYPE	JET 32ND IN	SERIAL	DEPTH OUT	m	HOURS	m/HR	ACCUM DRLG. HRS.	WT 1000 LBS	R P M	VERT DEV.	PUMP PRESS	PUMP OPER.	SPM 1	SPM 2	MUD WT.	MUD VIS.	MUD W.L.	DULL. COND. T	DULL. COND. B	DULL. COND. G	DULL. COND. OTHER	FORMATION REMARKS
1	26"	HTC	OSC 3AJ	3x22	TD 098	188	46	3¼	14	3¼	0/5	70/120	1°	200	P	40	40	SEA WATER			1	2	IN		
	36"	SERVCO	15000	N.O.																					
2	17½"	REED	Y 13 J	3x22	528410	672	484	24¾	19,6	28	10/20	125	1°	1350	P	65	65	1,10	60	12	4	3	IN		
	26"	SERVCO	15000	U.R.																	4	8	IN		
3	17½"	REED	Y 11 J	3x22	530862	770	98	4	25	32	10/15	128		1350	P	63	63	1,10	80	13	2	2	IN		
	26"	SERVCO	15000	U.R.																	4	3	IN		
4*	26"	HTC	OSC 3AJ	--	TD 104	* USED ON WIPER TRIP, NOT ROTATED																			
5	17½"	REED	Y 11 J	3x20	536923	1508	738	23¾	31	68	30/60	150	2¼°	3000	P	85	85	1,09	40	14	6	5	1/8		
6	17½	REED	Y 11 J	18-18-20	229942	1923	415	18¾	22,1	81¾	50	145	1°	3350	P	105	105	1,09	49	10,2	8	8	1/8	ONE CONE LOCKED	
7	17½	REED	Y 13 J	3x18	233925	2055	132	11½	11,5	93¼	50/120	150/160	2°	3350	P	105	105	1,09	51	14,4	6	8	IN		
8	17½	REED	Y 13 J	3x18	233923	2096	44	11¾	3,7	105	50/120	140/160	—	3500	P	104	104	1,10	49	12	7	8	1¼		
9	17½	SMF	TH 3 KJ	3x18	4868	2207	109	16	6,8	121	75/120	100/105	1¼°	3500	P	102	102	1,12	53	10,5	4	8	1/8		
10	17½	SMF	TH 3 KJ	3x18	4870	2264	57	16	3,6	137	75	100/110	1¾°	3500	P	102	102	1,12	50	8,5	7	8	1/8		
11	17½	SMITH	2 JS	3x18	258 ER	2550	286	66½	4,3	203½	65/120	90	3°	3500	P	92	92	1,22	60	6,5	4	6	1/8		
12	17½	SMF	TH 3 KJ	OUT	4865	2550	WIPER TRIP																		

TABLE A.3 (CONT.)

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BIT RECORD

COUNTY	FIELD	STATE	SECTION	TOWNSHIP	RANGE	LOCATION	WELL NO.
NORTH SEA	BLOCK 30/7	NORWAY				30/7	6

CONTRACTOR	RIG NO.	OPERATOR	TOOLPUSHER	SALESMAN
RASMUSSEN GLOBAL MARINE	PGD	NORSK HYDRO		

SPUD	UNDER SURF.	UNDER INTER.	SET SAND ST.	REACHED T.D.	PUMP NO. 1 LINER	PUMP NO. 2 LINER	PUMP POWER	TYPE MUD
FEB. 15, -77					6 1/4" x 12" STROKE	6 1/4" x 12" STROKE	FA-1600	LIGNO SULF.

DRILL PIPE SIZE	TYPE	O.D.	TOOL JOINTS	DRILL COLLARS NUMBER	O.D.	I.D.	LENGTH	DRAWWORKS POWER
5"								

NO.	SIZE	MAKE	TYPE	JET 32ND IN	SERIAL	DEPTH OUT	m	HOURS	m/HR	ACCUM DRLG. HRS.	WT. 1000 LBS.	R P M	VERT DEV.	PUMP PRESS	PUMP OPERATION	SPM 1	SPM 2	MUD WT.	MUD VIS.	MUD W.L.	DULL. COND. T	DULL. COND. B	DULL. COND. G	DULL. COND. OTHER	FORMATION REMARKS
13	12 1/4	HTC	OSC 3AJ	13-13-14	HD 019	2550		DRILLED STAGE CEMENTING																	
14	12 1/4	HTC	OSC 3AJ	13-13-14	HD 146	2550		DRILLED FLOAT COLLAR AND SHOE																	
RR 14	12 1/4	HTC	OSC 3AJ	13-13-14	HD 146	2718	168	18 3/4	9	222 1/4	40	115	3 3/4°	3500	P	59	58	1,56	48	7,4	1	2	IN		
15	12 1/4	HTC	X 3A	3x14	62908	2930	212	33	6,4	255 1/4	45	120	3 1/4°	3500	P	60	60	1,71	54	5,7	5	8	IN		
16	12 1/4	HTC	X 3A	3x14	81020	3023	93	25 1/4	3,7	280 1/2	45	115	2°	3500	P	58	58	1,71	53	5,4	4	8	IN		
17	12 1/4	REED	FP 52	3x14	734469	3100	77	39	2	319 1/2	60	70/80	3 1/4°	3500	P	58	58	1,71	51	4,8	2	8	IN	ONE CONE LOCKED	
18	12 1/4	HYCALOG	WARC 75P	◇	15839	3471	371 X	138 1/2	2,7	458	60/70	180/200	5°	3500	P	70	70	1,71	48	4,2	80	%	USED (SEVERAL CRACKS)		
19	12 1/4	REED	FP 52	3x14	734531	3490	19	16 1/4	1,2	474 1/4	40/50	80	—	3500	P	58	58	1,71	58	5,2	1	8	IN	ONE CONE CRACKED	
20	12 1/4	HYCALOG	WARC 75P	◇	15872	3784	294 X	100 1/2	2,9	574 1/2	55	185	—	3600	P	68	68	1,76	46	4,4		BIT	LOST IN HOLE		
21	12 1/4	HTC	OSC 3AJ	OUT	JT 203		CLEANED OUT HOLE TO TOP OF FISH AT 2700 m																		
22	12 1/4	REED	S 13 G	3x20	NDL 208	2564						DRILLING				CEMENT									
23	12 1/4	REED	S 13 G	3x20	NDL 209	2622						DRILLING				CEMENT								(START DRILLING 30/7-6A)	
			START TO DRILL NEW 12 1/4" HOLE (30/7-6 (1)) KICK OFF AT 2619 m																						
24	12 1/4	HTC	X 1G	3x20	66003	2638	16	14	1,1	588 3/4	10/20	200/300	4 1/4°	2000	S	90		1,76	50	6	2	1	WN	DYNADRILL	
25	12 1/4	HTC	X 3A	3x18	66212A	2684	46	11 3/4	3,9	600 1/2	30/45	90	7 1/2°	3000	P	64	64	1,76	54	6,5	2	2	IN		

TABLE A.3 (CONT.)

PRINTED IN U. S. A.

BIT RECORD

COUNTY	FIELD	STATE	SECTION	TOWNSHIP	RANGE	LOCATION	WELL NO
NORTH SEA	BLOCK 30/7	NORWAY				30/7	6

CONTRACTOR	RIG NO.	OPERATOR	TOOLPUSHER	SALESMAN
RASMUSSEN GLOBAL MARINE	PGD	NORSK HYDRO		

SPUD	UNDER SURF.	UNDER INTER.	SET SAND ST.	REACHED T.D.	PUMP NO. 1 LINER	PUMP NO. 2 LINER	PUMP POWER	TYPE MUD
FEB. 15, -77					6¼" x 12" STROKE	6¼" x 12" STROKE	FA-1600	LIGNO SULF.

DRILL PIPE SIZE	TYPE	O.D.	TOOL JOINTS	NUMBER	DRILL COLLARS O.D.	I.D.	LENGTH	DRAWWORKS POWER
5"								

NO.	SIZE	MAKE	TYPE	JET 32ND IN	SERIAL	DEPTH OUT	m	HOURS	m/HR	ACCUM DRLG. HRS.	WT. 1000 LBS.	R P M	VERT DEV.	PUMP PRESS	PUMP OPERATION	S P M 1	S P M 2	MUD WT	MUD VIS.	MUD W.L.	DULL. COND. T	DULL. COND. B	DULL. COND. G	DULL. COND. OTHER	FORMATION REMARKS
26	12¼	HTC	X 3 A	3x18	31023	2834	150	30¼	5	630¾	20/50	65/150	7°	3000	P	64	64	1,76	58	5,2	3	4	1/8		
27	12¼	HTC	X 3 A	3x18	81022	2955	121	23	5,2	653¾	15/55	180/150	4½°	3000	P	62	62	1,76	57	5	7	8	IN	2 CONES LOCKED	
28	12¼	REED	S 13 G	3x18	NDL 207	3037	82	21¼	3,9	675	35/50	160/180	3½°	3100	P	62	62	1,76	60	4,6	3	8	1/8	1 CONE LOCKED	
29	12¼	REED	S 13 G	OUT	NDL 210	3055	18	17½	1	692½	12	280	3½°	2000	P	46	46	1,76	63	4,8	2	7	1/8	DYNADRILL	
30	12¼	HTC	X 3 A	3x18	81021	3074	19	8	2,4	700½	35	100	3¼°	3000	P	61	61	1,76	62	4,8	1	N	C		
31	12¼	SMF	ES 5 J	OUT	55043	3093	19	16½	1,2	717	8/15	280	3°	2100	P	47	47	1,76	54	4,8	2	8	IN	DYNADRILL	
32	12¼	SMF	ES 5 J	OUT	55044	3106	13	19½	0,7	736½	10/15	280	2°	2100	P	47	47	1,76	47	4	2	7	IN	DYNADRILL	
33	12¼	HTC	X 1 G	OUT	886 ML	3115	9	15	0,6	745½	20	—	3°	2300	P	48	48	1,76	52	4,4	2	6	IN	TURBODRILL	
34	12¼	HTC	X 1 G	OUT	885 ML	3126	11	9¾	1,2	755¼	15/22	—	3¼°	2400	P	50	50	1,76	54	4,4	4	4	IN	TURBODRILL	
35	12¼	HTC	XV	3x18	83154	3128	2	1¾	1,1	757	40/45	145	4¾°	3500	P	66	66	1,76	65	4,4	1	N	C		
36	12¼	HTC	XV	OUT	83155	3145	17	22	0,8	779	15/26	—	6°	2300	P	48	48	1,76	57	4,5	4	7	IN	TURBODRILL	
37	12¼	SMF	EM 2 KJ	15-16-16	51843	3162	17	5¾	3	784¾	35	150	7°	3000	P	55	55	1,76	83	4,8	2	3	IN		
38	12¼	SMF	EM 2 KJ	15-15-16	51844	3205	43	28	1,5	812¾	10/30	100	6°	3100	P	55	55	1,76	57	4,8	3	5	IN		
39	12¼	SMF	ES 5 J	15-16-16	55045	3259	54	31¼	1,7	844	10/30	100	4°	3400	P	58	58	1,76	56	4,8	4	4	IN		
RR 37	12¼	SMF	EM 2 KJ	3x18	51843	3262	3	1¼	2,4	845¼	45	125	—	3500	P	66	66	1,76	59	4,9	3	3	IN		

TABLE A.3 (CONT.)

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BIT RECORD

COUNTY	FIELD	STATE	SECTION	TOWNSHIP	RANGE	LOCATION	WELL NO
NORTH SEA	BLOCK 30/7	NORWAY				30/7	6

CONTRACTOR	RIG NO.	OPERATOR	TOOLPUSHER	SALESMAN
RASMUSSEN GLOBAL MARINE	PGD	NORSK HYDRO		

SPUD	UNDER SURF.	UNDER INTER.	SET SAND ST.	REACHED T.D.	PUMP NO. 1 LINER	PUMP NO. 2 LINER	PUMP POWER	TYPE MUD
					6¼" x 12" STROKE	6¼" x 12" STROKE		LIGNOSULF.

DRILL PIPE SIZE	TYPE	O.D.	TOOL JOINTS	NUMBER	DRILL COLLARS O.D.	I.D.	LENGTH	DRAWWORKS POWER

NO.	SIZE	MAKE	TYPE	JET 32ND IN	SERIAL	DEPTH OUT	m	HOURS	m/HR	ACCUM DRLG. HRS.	WT 1000 LBS	R P M	VERT DEV.	PUMP PRESS	PUMP OPER-ATION	S P M 1	S P M 2	MUD WT.	MUD VIS	MUD W.L.	DULL. COND. T	DULL. COND. B	DULL. COND. G	DULL. COND. OTHER	FORMATION REMARKS
RR 37	12¼	SMF	EM 2 KJ	3x18	51843		WIPER TRIP FOR 9⅝" CASING														3	3	IN		
40	8⅜	SMF	ES 5 KJ	3x11	207105		DRILLED STAGE CEMENTING COLLAR														6	2	IN		
41	8⅜	SMF	EM 2 KJ	OUT	20664		DRILLED EZ DRILLABLE PACKER														1	1	IN		
42	8⅜	SMF	EM 2 KJ	3x11	20661		DRILLED PACKER, FLOAT COLLAR AND SHOE														4	7	1/16		
43	8⅜	SEC	S 44 G	14-16-16	388079	3332	65	24	2,7	869¼	45	130	3½°	1850	S		71	1,86	62	6,5	2	6	IN		
44	8⅜	HYCALOG	401C-LM	◇	15476	3500	165	51½	3,3	920¾	45/50	200	3¾°	2400	S		74	1,86	52	5,5					
45	8⅜	HYCALOG	401C-LM	◇	15492	3691	191	39½	4,8	959¼	50/60	200	5½°	3500	S		72	1,88	54	4,8					APPROX. 70% USED
46	8⅜	SMF	EM 2 KJ	3x11	20662	3706	15	6	2,5	966¼	20	110	—	2750	S		69	1,91	56	4,1	2	2	IN		
47	8⅜	SMF	EM 2 KJ	OUT	20663	3711	5	8¾	0,6	975	10/20	100/110	—	750	S		55	1,92	50	3,3	7	6	3/16		
48	8⅜	SMF	ES 5 KJ	OUT	20707	DRILLED OUT CEMENT ON TOP OF 7" LINER HANGER																			
49	6	HTC	OSC 1G	OUT	75939	DRILLED OUT FLAPPER VALVE IN 7" LINER HANGER																			

TABLE A.4

MUD SUMMARY - WELL 30/7-6 (PHASE I)

MUD SYSTEM - GEL LIGNOSULFONATE

Depth m	W.t sp.gr.	Funn. visc. sec.	PV cp	YP lb/100 ft^2	Gelstr. lb/100 ft^2	ph	Filtr. loss	HT-HP filtr. loss	Cake 32nd in.	pm	pf/Mf	Cloride ppm	Calsium ppm	Sand o/o	Solids o/o	Oil o/o	Water o/o	Meth. blue
188	1,09	38	10	6	3/7	10	21	-	2	-	0,4/-	5500	60	-	5	0	95	-
380	1,09	60	11	17	5/15	9	12,5	-	2	-	0,21/-	8900	100	0	5	0	95	-
770	1,10	78	14	27	11/20	9,5	13	-	2	-	0,21/-	3500	60	0,5	5	0	95	-
985	1,07	49	9	23	7/22	8,5	22	-	2	-	0,11/-	8800	120	0,75	4	0	96	-
1108	1,07	51	10	26	7/23	8,5	21,4	-	2	-	0,11/-	11500	100	1	4	0	96	27
1297	1,07	39	8	11	2/20	8,5	19	-	2	-	-	14500	300	TR	4	0	96	-
1489	1,09	38	8	8	1/9	8,5	14	-	2	-	011/-	12500	280	TR	4	0	96	30
1771	1,09	40	12	17	8/25	8,5	10,4	-	2	-	-	7500	80	TR	6	0	94	-
1876	1,08	45	11	18	7/26	8,5	10,6	-	2	-	011/-	5500	80	TR	6	0	94	-
1988	1,10	48	14	16	6/19	8,5	12	-	2	-	-	7000	160	0,25	6	0	94	-
2056	1,09	51	11	22	6/25	8,5	14,4	-	2	-	-	9100	200	TR	6	0	94	28
2098	1,10	49	13	14	6/21	8,5	12	-	-	-	-	7200	120	TR	6	0	94	33
2190	1,12	53	21	17	3/23	9	10,5	-	2	-	-	6500	80	-	6	0	94	43
2262	1,12	44	18	18	3/22	9	8	-	1	-	-	5300	40	1	6	0	94	45

TABLE A.4 (cont.)

MUD SUMMARY - WELL 30/7-6 (PHASE I)

MUD SYSTEM - GEL LIGNOSULFONATE

Depth m	W.t sp.gr.	Funn. visc. sec.	PV cp	YP lb/100 ft^2	Gelstr. lb/100 ft^2	ph	Filtr. loss	HT-HP filtr. loss	Cake 32nd in.	pm	pf/Mf	Cloride ppm	Calsium ppm	Sand o/o	Solids o/o	Oil o/o	Water o/o	Meth. blue
2344	1,12	50	18	25	3/22	9,5	8	-	1	-	0,2/-	4500	40	-	6	1	93	40
2421	1,14	55	21	24	3/23	9,5	6	-	1	-	0,1/-	4500	40	-	6	2	92	-
2528	1,16	57	25	23	4/17	9,5	6,8	-	1	-	-	3800	40	-	7	1	92	45
2550	1,20	73	27	26	4/27	9,5	6,4	-	1	-	-	3600	60	-	7	1	92	-
2582	1,25	39	15	7	0/4	12	8,5	-	2	5,5	3,2/4,8	5000	40	TR	11	0	89	-
2680	1,53	44	29	8	0/7	12	6,7	-	2	5,1	3,1/5,2	5000	60	TR	22	0	78	30
2718	1,56	49	37	13	0/12	11,5	7,1	-	2	5,8	2,9/4,3	5100	80	TR	21	0	79	-
2790	1,68	55	40	12	0/7	11,5	6	21	2	-	2,2/3,4	5300	80	TR	23	0	77	26
2842	1,71	57	44	13	0/7	11,5	6,2	-	2	-	2,2/3,2	5500	80	TR	24	0	76	24
2938	1,71	54	41	10	0/4	11,5	5,7	19	2	-	2/-	6000	40	TR	25	0	75	26
3020	1,71	52	39	12	0/5	11,5	5,3	14,5	2	-	2,3/-	5700	40	025	25	0	75	28
3094	1,71	49	36	11	0/2	11,5	4,7	14,6	2	5	2/-	5300	40	TR	25	0	75	28
3185	1,71	52	41	9	0/3	10,5	4,4	14	2	4	1,3/-	4800	80	025	25	0	75	27
3247	1,71	55	47	10	0/4	11	4	14,2	2	3,5	2/-	4700	60	025	26	0	74	27

TABLE A.4 (cont.)

MUD SUMMARY - WELL 30/7-6 (PHASE I)

MUD SYSTEM - GEL LIGNOSULFONATE

Depth m	W.t sp.gr.	Funn. visc. sec.	PV cp	YP lb/100 ft^2	Gelstr. lb/100 ft^2	ph	Filtr. loss	HT-HP filtr. loss	Cake 32nd in.	pm	pf/Mf	Cloride ppm	Calsium ppm	Sand %	Solids %	Oil %	Water %	Meth. blue
3340	1,71	61	56	17	3/6	9,5	4	14,5	2	23	1,5/2,5	4000	40	-	25	0	75	30
3384	1,71	62	54	20	2/4	10	4,2	13	2	23	1,2/2,2	3600	40	-	25	-	75	32,5
3464	1,71	59	49	13	1/2	9,5	4,2	-	2	2	1/1,5	3600	40	-	25	-	75	30
3547	1,71	55	43	17	1/2	9	4,8	12	1	14	0,9/1,9	3800	60	-	27	1	72	-
3591	1,70	53	39	12	1/2	9	4,4	-	1	14	0,8/2,5	3800	50	-	26	-	74	28
3613	1,70	50	33	9	1/2	9,5	4,8	11	1	14	0,8/2,6	3900	60	-	25	-	75	-
3690	1,76	52	38	12	1/8	9	5	13,5	2	-	0,41/-	3800	40	0,75	27	0	73	27
3746	1,76	46	30	9	1/12	9,5	4,4	13,5	2	-	0,71/-	3800	20	0,5	27	0	73	28
3763	1,76	46	28	9	1/12	9	4,7	-	2	-	0,41/-	4000	80	0,5	27	0	73	-
3779	1,76	49	33	12	1/13	9	4,6	-	2	-	0,41/-	3900	40	0,5	-	-	-	-
3784	1,76	60	40	13	1/21	9,5	6,2	21	2	-	0,81/-	4100	80	025	29	0	71	27
30/7- 6. (I)																		
2627	1,76	52	41	20	2/24	11,5	9,8	-	2	9	5,3/-	4400	80	1,25	25	0	75	24
2684	1,76	55	45	15	1/5	12	6,5	-	2	6	3,6/-	4800	80	0,75	25	0	75	26

TABLE A.4 (cont.)

MUD SUMMARY - WELL 30/7-6 PHASE I

MUD SYSTEM - GEL LIGNOSULFONATE

Depth m	W.t sp.gr.	Funn. visc. sec.	PV cp	YP lb/100 ft^2	Gelstr. lb/100 ft^2	ph	Filtr. loss	HT-HP filtr. loss	Cake 32nd in.	pm	pf/Mf	Cloride ppm	Calsium ppm	Sand %	Solids %	Oil %	Water %	Meth. blue
2747	1,76	61	54	15	2/5	11,5	5,2	-	2	5,5	3,2/-	5200	80	0,75	24	0	76	26
2834	1,76	58	49	14	1/4	11	5,2	16	2	4,4	3/-	5000	120	0,75	26	0	74	26
2884	1,76	57	54	15	1/5	10,5	4,9	14,8	2	3,6	2,4/-	4800	120	0,5	27	0	73	27
2955	1,76	63	61	14	2/5	10,5	5	-	2	3	2/-	4700	140	0,5	27	0	73	24
3020	1,76	69	63	15	1/5	10,5	4,7	14,5	2	1,5	0,6/-	4900	140	0,75	27	0	73	28
3098	1,76	54	48	10	1/2	10	4,8	14	1	3	1,8/4,2	4500	120	-	27	-	73	30
3158	1,76	83	60	20	1/4	10	4,8	13,2	2	2,8	1,4/3,4	6000	260	-	29	-	71	25
3205	1,76	58	47	14	1/4	10,5	4,7	14	2	1,8	1/-	5600	120	0,5	28	0	72	26
3262	1,76	56	47	13	1/4	10	4,8	13	2	1,6	0,8/-	5400	80	0,25	27	0	73	26
3278	1,86	57	51	13	2/5	10,5	6,5	18	2	2,4	2/4	600	160	0,25	27	0	73	20
3332	1,86	64	53	18	2/4	10,5	6	17	2	2,2	1,8/3,6	6000	150	0,25	29	0	71	20
3424	1,86	63	56	18	2/4	10,5	6	17	2	2	1,2/3,1	6000	150	0,25	28	0	72	22
3500	1,86	55	33	14	2/4	10,5	6	-	2	1,6	0,8/2,6	6000	180	0,25	28	0	72	22
3567	1,86	63	35	13	1/7	9,5	5,3	-	2	1,5	0,8/2,4	5700	120	0,25	28	0	72	25

TABLE A.4 (cont.)

MUD SUMMARY - WELL 30/7-6 PHASE I

MUD SYSTEM - GEL LIGNOSULFONATE

Depth m	W.t sp.gr.	Funn. visc. sec.	PV cp	YP lb/100 ft^2	Gelstr. lb/100 ft^2	ph	Filtr. loss	HT-HP filtr. loss	Cake 32nd in.	pm	pf/Mf	Cloride ppm	Calsium ppm	Sand %	Solids %	Oil %	Water %	Meth. blue
3615	1,86	60	34	11	2/8	9,5	4,9	16	2	1,4	05/2	5700	100	0,25	28	0	72	24
3661	1,86	55	44	15	1/7	10	5,8	-	2	1,9	13/-	5600	80	0,25	29	0	71	-
3691	1,86	56	47	9	1/8	10	4,8	15,5	2	1,8	11/-	5400	80	0,25	29	0	71	23
3711	1,92	50	38	7	0/5	10	2,9	13,6	2	1,9	12/-	5500	80	TR	29	-	71	29

TABLE A-5

PRELIMINARY COST REPORT

Accumulative cost pr.November 30, 1978 - Well 30/7-6 Phase I

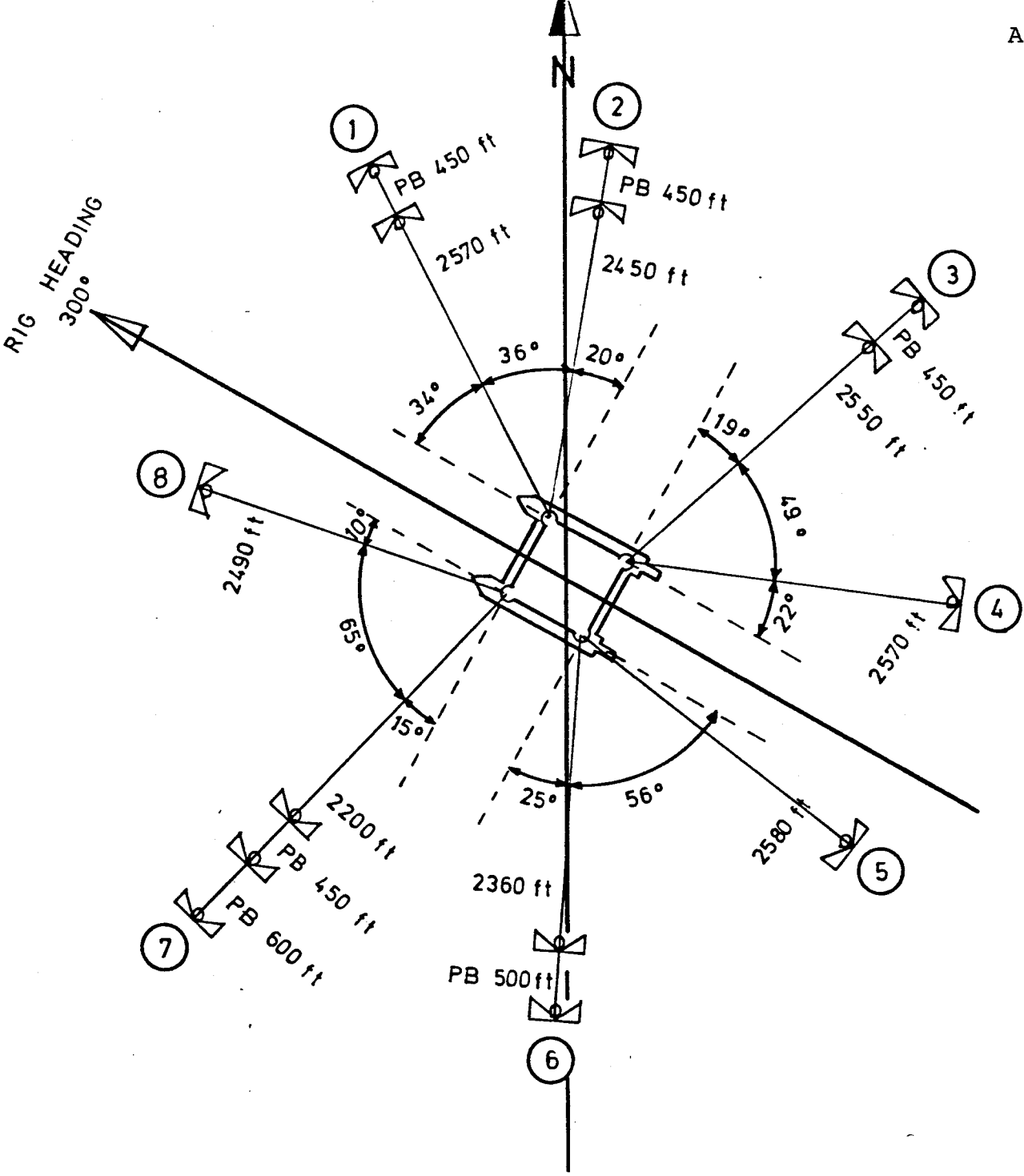
		Amounts in 1000 N.kr.
Misc. services rel. to rig pos.		
Locationing	97	
Sub total, positioning		97
Drilling rig		
Rig contract	35.047	
Sub total, drilling rig		35.047
Supplies		
Drill bits	926	
Coring eq.	130	
Drilling tools	1.520	
Casing and casing eq.	7.992	
Mud products	4.035	
Cement	842	
Wellhead eq.	473	
Fuel and greases	3.114	
Miscellaneous	470	
Sub total, supplies		19.502
Services and tool rentals		
Helicopter	2.124	
Supply boats/stand-by ship	7.087	
Mud engineering	94	
Mud logging	1.238	

Amounts in 1000 N.kr.

Cementing	545	
Logging	3.515	
Fishing	273	
Fishing tool rentals	393	
Coring	58	
Test tool rentals	265	
Diving	2.003	
Radioservices	96	
Meteorological services	30	
Catering	141	
Miscellaneous services	986	
Sub total, services and tool rental.		18.848

Operators cost

Mobilization	2.356	
Repair cost	1.949	
Insurance	628	
Demob. P.G.D.	495	
Termination P.G.D.	1.921	
Base	1.617	
Laboratory studies	218	
Onshore services	1.581	
Drilling supervision	1.536	
Geological supervision	878	
Exploration assistance	327	
Sub total, related costs		13.506
Total cost of well :		87.000



HEADING: 300°

Well coordinates: 60° 29' 29,82" N
02° 03' 26,14" E

Water depth (MSL): 116,5 m

Norsk Hydro Drilling Dept	Mooring line pattern Polyglomar Driller Well 30/7-6	Gr. no.	Fig. A-1
		Date: 28/10-77 Sign: TAA/Hes	Dwg. no.

Fig. A.2

DRILLING PROGRESS, WELL 30/7-6 Phase 1

Operator: Norsk Hydro
Coordinates: 60° 29' 29,82" N
02° 03' 26,14" E

Spud in: February 15, 1977
Well compl: July 31, 1977
Rig: Polyglomar Driller

Water depth: 116,5 m
RKB to MSL: 24 m
RKB to SeaBed: 140,5 m

DEPTHS RKB	LITHO SECTION	CASINGS	STAGES	SHOWS	DESCRIPTIONS, OBS	MUD MATERIALS	MUD WT SP GR
					24 m SEA LEVEL		
50							
100							
150					140.5m SEA BOTTOM		
		30" 186m	QUARTERNARY		Sd, vf-m, occ v crs, subang-rnd. Cly, m dk-dk gy, silty, sl calc w/		1.0
200					204 cbls and pbls of basement rocks		1.07
250					Cly, dk gy-m dk gy, firm, silty, sl calc.		
					286		
300					Sd, clr Qtz, vf-m, occ crs-v crs, ang-rnd, mic, intbd w/ Cly, m gy-olv gy, sft-firm, silty, occ v silty. Occ tr Glau, dk grn-blk, hd and abn shell frags.	Gel Caustic CMC Barite MD Ca Cl	
350							
400							
450							
500			PLIOCENE				
550							
600							
650					670		
700							
750		20" 765m					
800					Lign, blk-v dk brn, fibrous, wood struc.		
850			MIOCENE	C1			1.09
900					Slst, brn, firm, sl calc.		
950					Lign, a.a.		
					973		
1000					Clyst, olv gy, occ olv blk, sft-firm, micro-mic, sl calc, slty, sdy, glau.		
1050					1048		
					Slst, olv gy, olv blk, sft-firm, micro-mic, sl calc, occ sdy, arg grdg Clyst		
1100					1095		
1150					Clyst, lt-dk olv gy, sft-firm, stky, micro-mic, sl-n calc, slty Thin strgs Sst, lt gy, vf, subang-subrnd, firm, fri, calc cmt. Tr Glau, Pyr.	Gel Caustic CMC Lign. sulf. MD	
1200			OLIGOCENE	C1, C2, trC3			
1250					1255		
1300					1313		
1350			LATE		Slst, lt olv gy, lt olv brn, firm, n calc, occ pyr, occ grdg to Sst, lt gy, f, subrnd, glau.		
1400					1395		
					Clyst, a.a w/thin intbd Slst		
1450					1438 and Sst a.a. Tr Pyr.		
					Slst a.a w/intbds Clyst and lse		
1500					1472 Sd a.a.		
1550					Clyst, lt olv gy, lt gy-gy grn, sft bcm ind and firm, n calc, freq slty grdg Slst, occ glau and pyr.		
1600			EOCENE	C1	Thin strgs Sst, lt gy, f, calc cmt and Lst, lt brn-dk brn, crypto xln, v hd, occ dol.		
1650							
1700					Clyst a.a bec ind grdg to Sh		
1750							
					1783,5		
1800				C1, C2, trC3	Sd, lse, clr, fros Qtz, vf-crs, ang-subrnd, occ micro-mic and glau, occ calc cmt, no shows. Intbd w/ Clyst/Sh, lt-dk gy, m-dk gy grn, firm, blky, n calc pt slty. Tr Pyr, Poss. tr Tuff.		
1850							
1900					1923		
					Clyst / Sh, a.a w/ thin strgs Sst,		
1950					1965 f grdg Slst. Strgs Lst, lt gy, firm-hd, arg, pyr.		

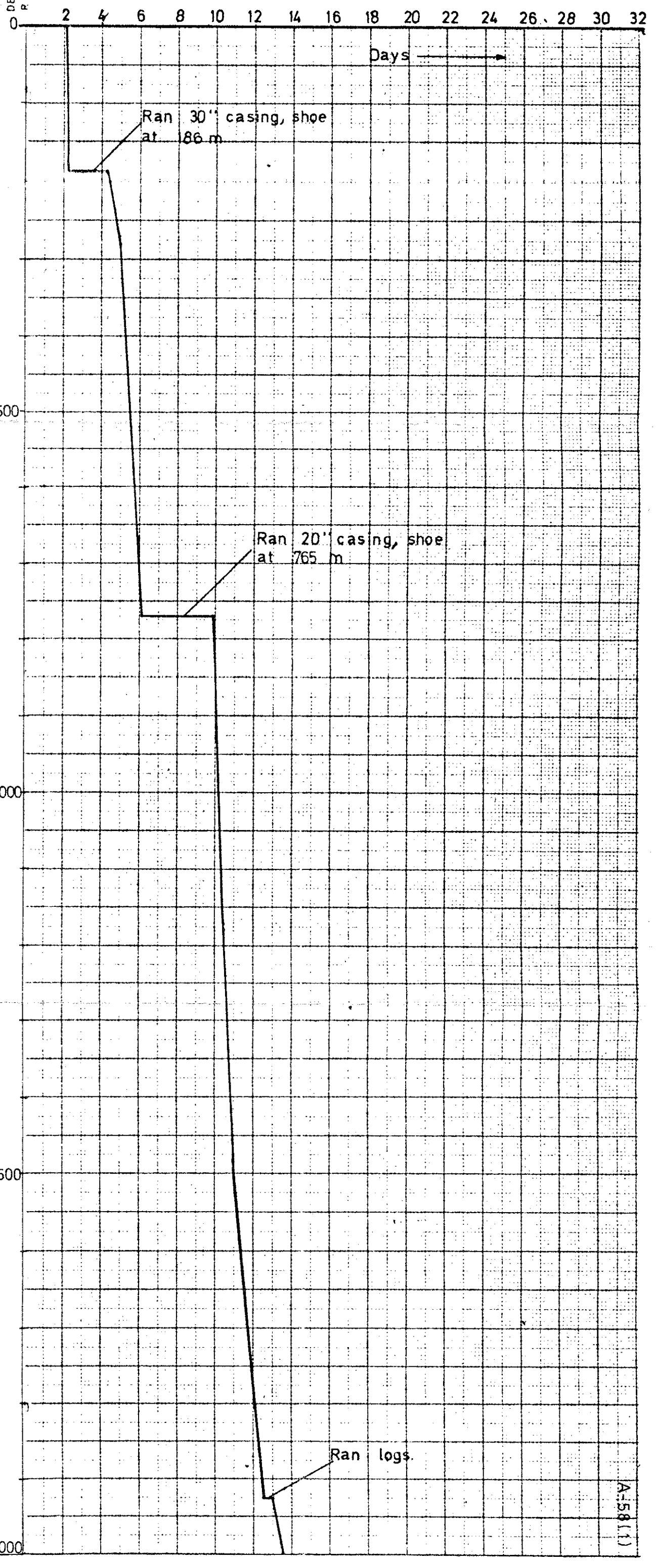


Fig. A.2 (cont.)

DRILLING PROGRESS, WELL 30/7-6 Phase 1

Operator: Norsk Hydro
Coordinates: 60° 29' 29 82" N
02° 03' 26,14" E

Spud in: February 15, 1977
Well compl: July 31, 1977
Rig: Polyglomar Driller

Water depth: 116,5m
RKB to MSL: 24 m
RKB to SeaBed: 140, 5 m

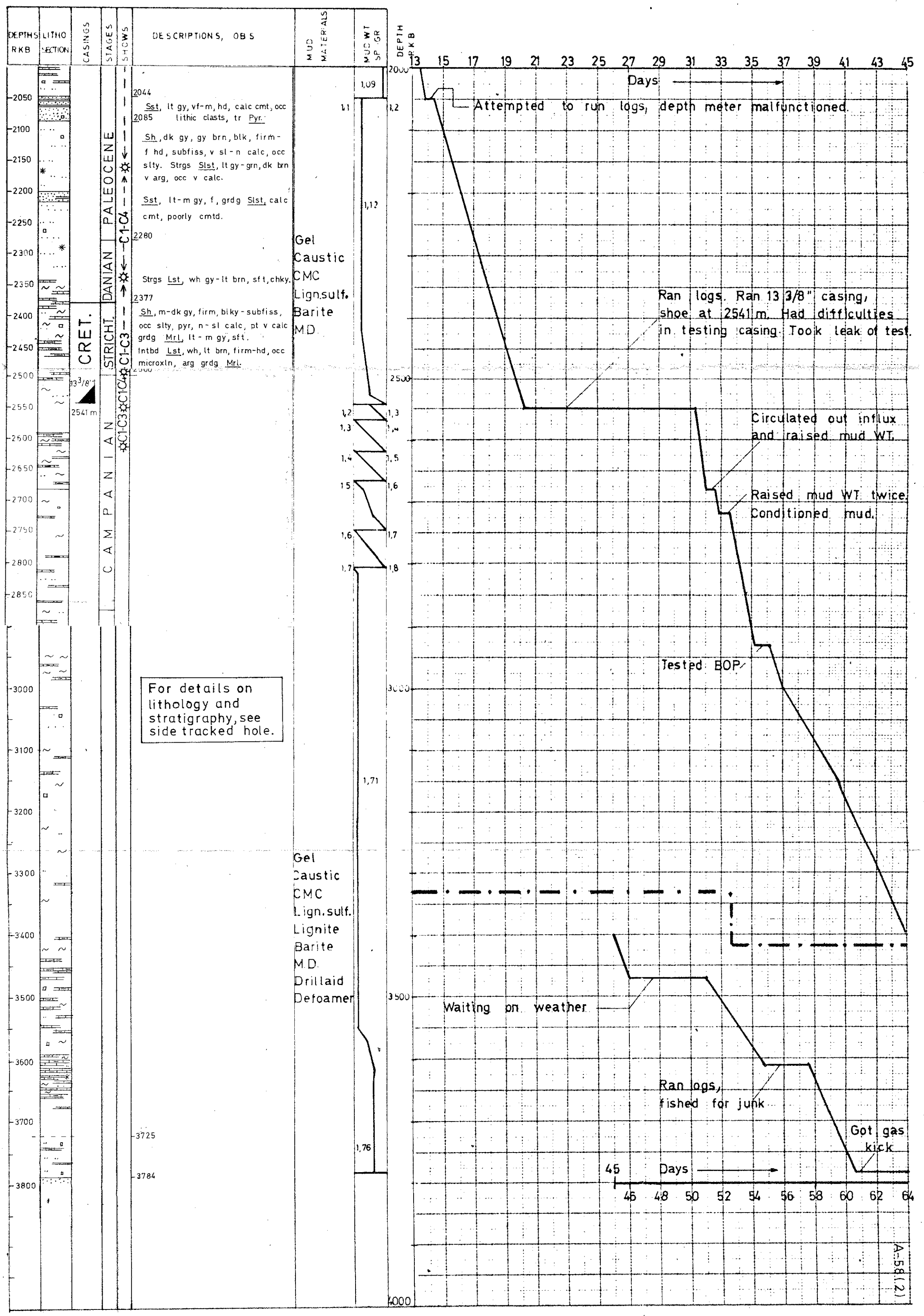


Fig A.2 (cont.)
DRILLING PROGRESS, WELL 30/7-6 Phase 1

Operator: Norsk Hydro
Coordinates: 60° 29' 29,82" N
02° 03' 26,14" E

Spud in: February 15, 1977
Well compl: July 31, 1977
Rig: Polyglomar Driller

Water depth: 116,5 m
RKB to MSL: 24 m
RKB to SeaBed: 140,5m

DEPTHS RKB	LITHO SECTION	CASINGS	STAGES	SHOWS	DESCRIPTIONS, OBS	MUD MATERIALS	MUD WT SP GR
2500		13 3/8" 2541 m			SIDETRACKED HOLE STARTED AT 2619 M	Gel Caustic CMC / Lign. sulf. Lignite Bicarb. Barite	1,7
2550					2592 Mrl, vlt-lt gy, v sft-firm, grdg to Sh dwnwards Strgs Lst, lt gy, chlky, arg grdg Mrl, and Dol, tan, hd, crypto xln		
2600			C1-C3 C1C4		2685 Sh/Clyst, m-dk gy, dk grn gy, firm occ hd, blky-subfiss, occ micro-mic, sl-mod calc, occ silty, pyr w/ thinly intbd		
2650							
2700							1,76
2750					Mrl lt gy, sft, stcky, Lst, dol lt-m brn, hd, dns crypto xln occ arg and		
2800					2885 Slst, m-dk trn, occ rd, firm-hd, m-sl calc arg		
2850							
2900							

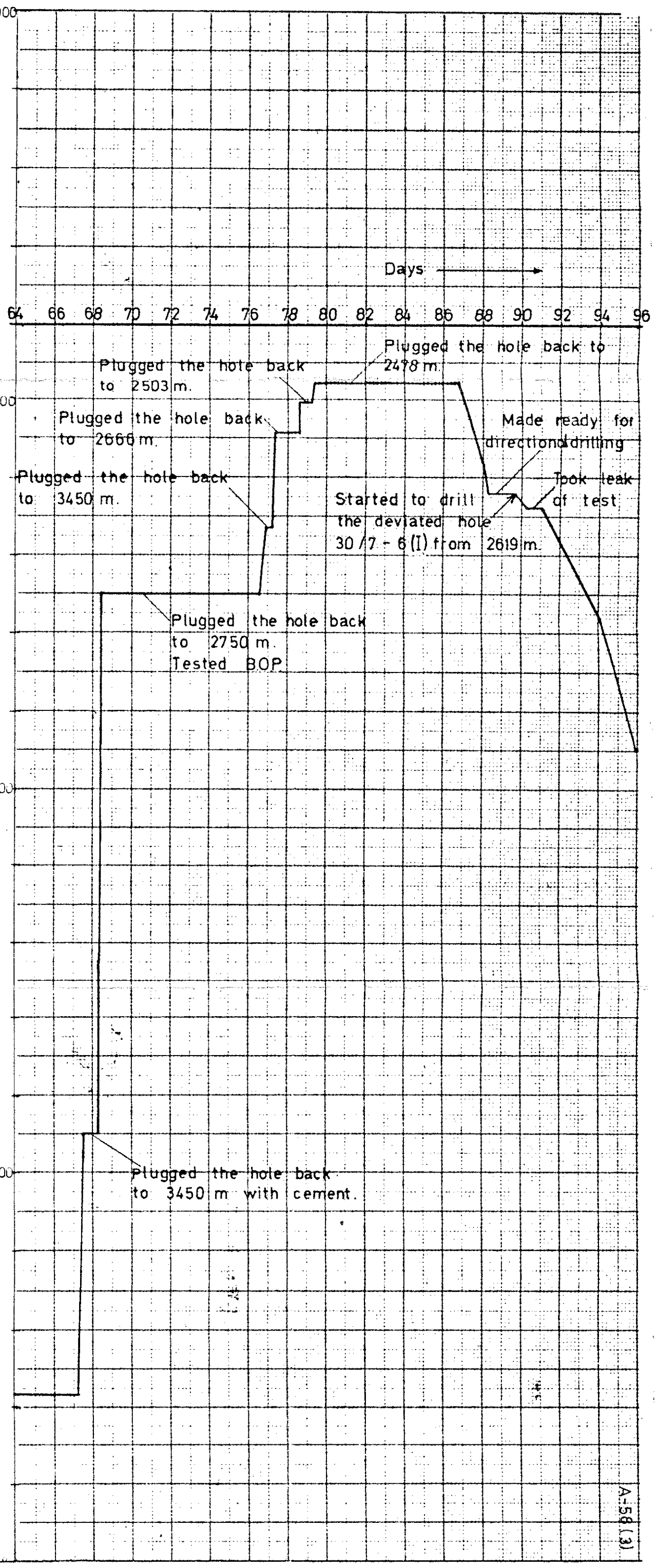


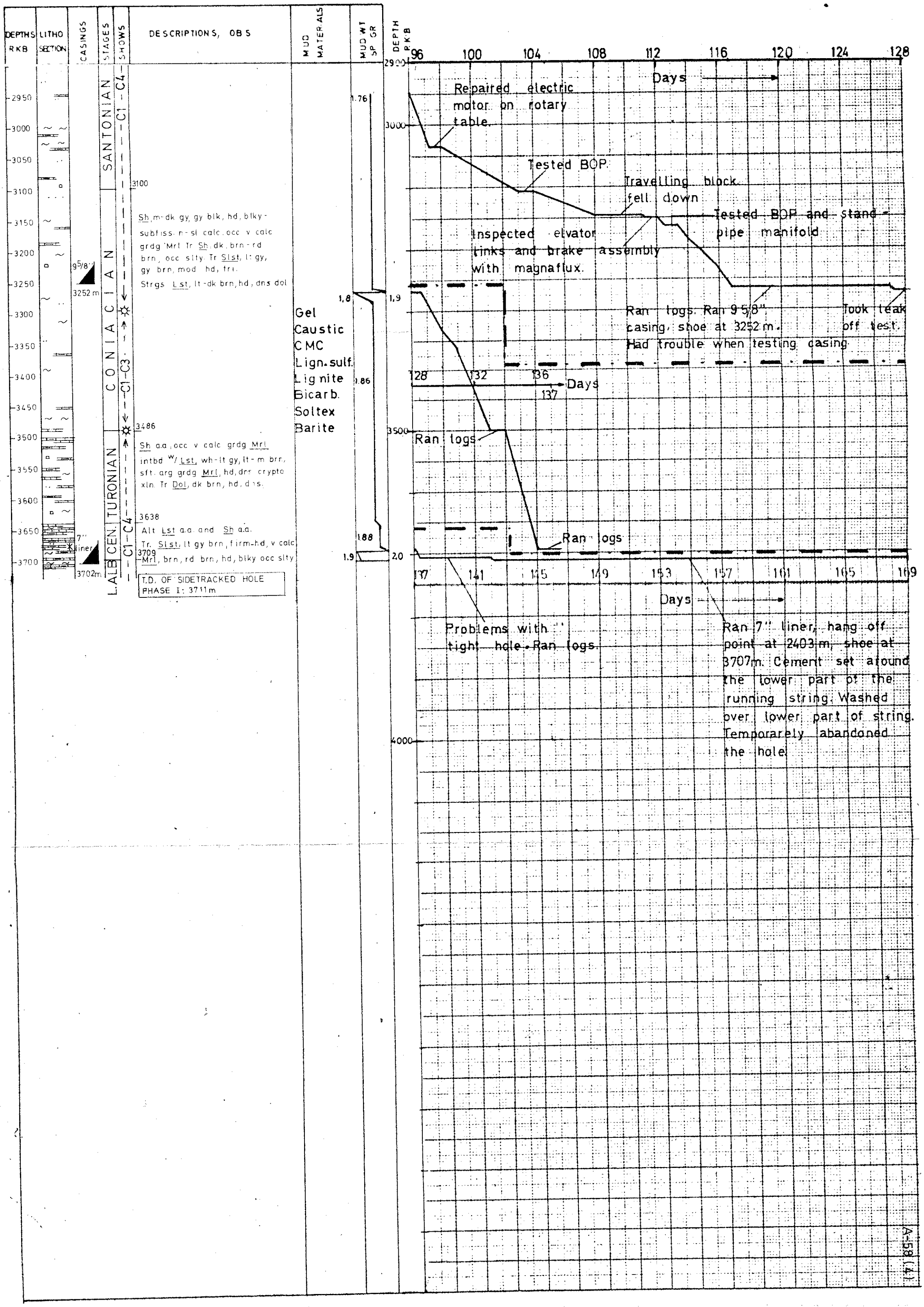
Fig A.2 (cont.)

DRILLING PROGRESS, WELL 30/7-6 Phase 1

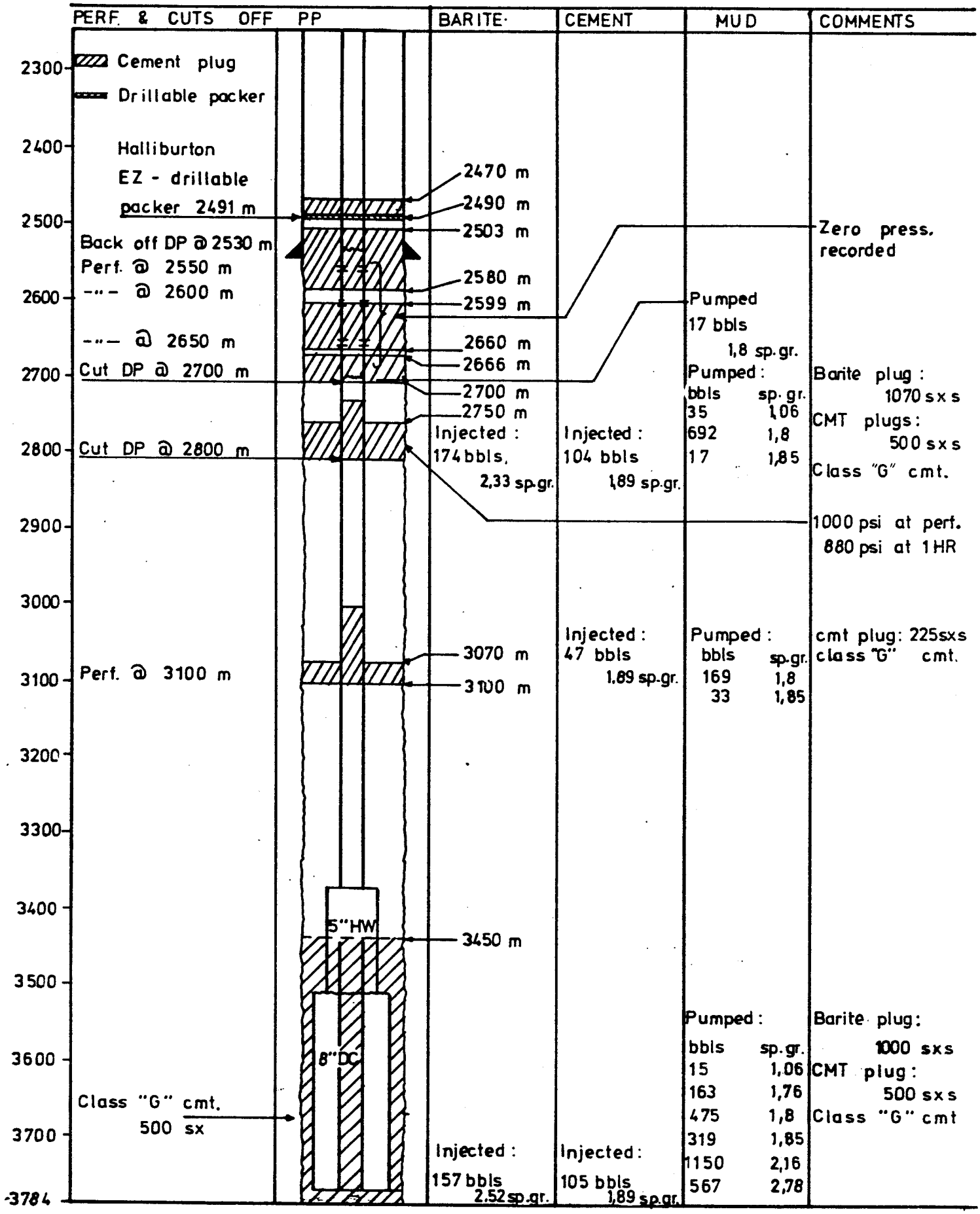
Operator: Norsk Hydro
Coordinates: 60° 29' 29,82" N
02° 03' 26 14" E

Spud in: February 15, 1977
Well compl: July 31, 1977
Rig: Polyglomar Driller

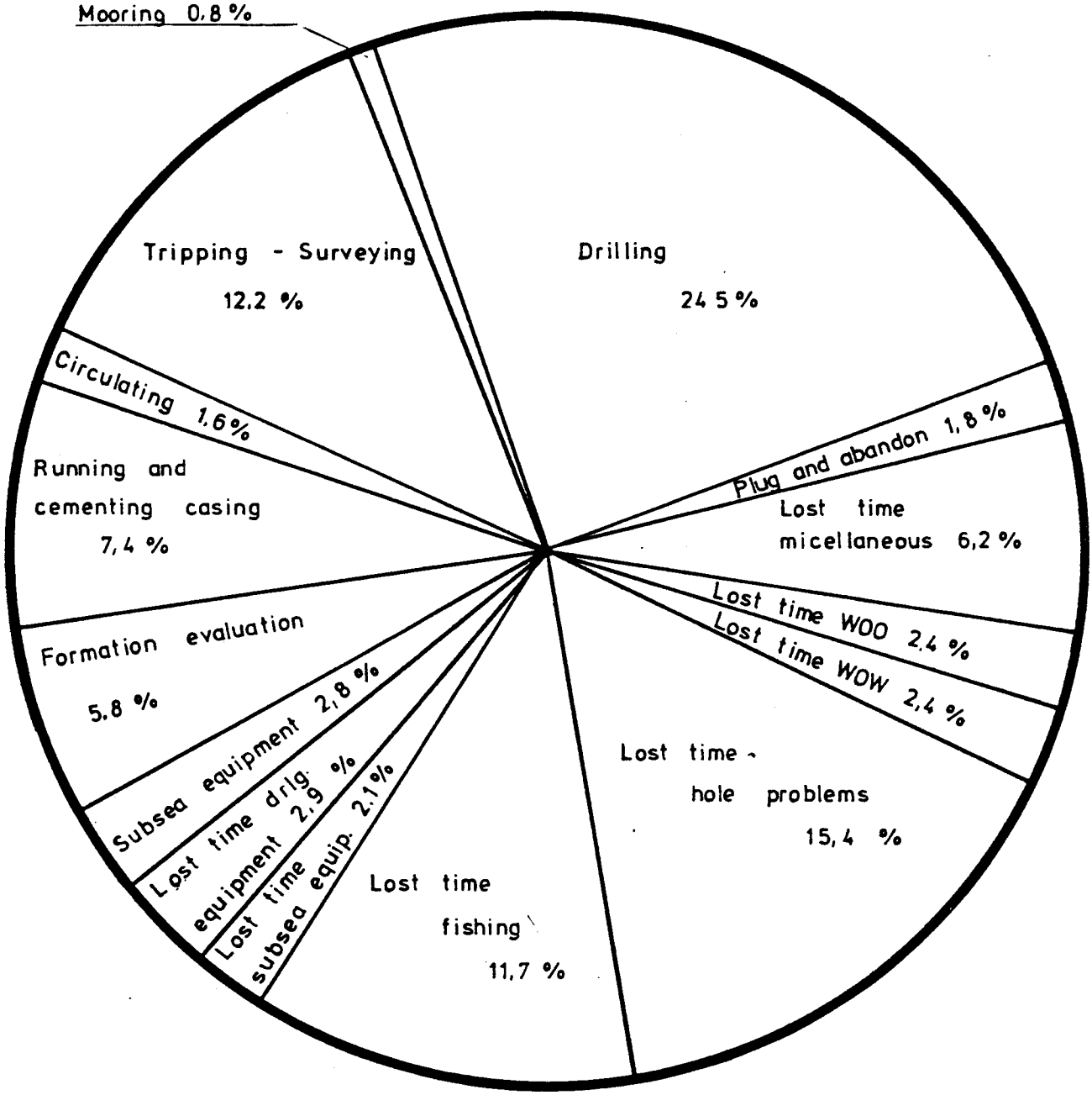
Water depth: 116,5 m
RKB to MSL: 24 m
RKB to SeaBed: 140,5m



WEIGHTS & VOLUMES PUMPED IN HOLE

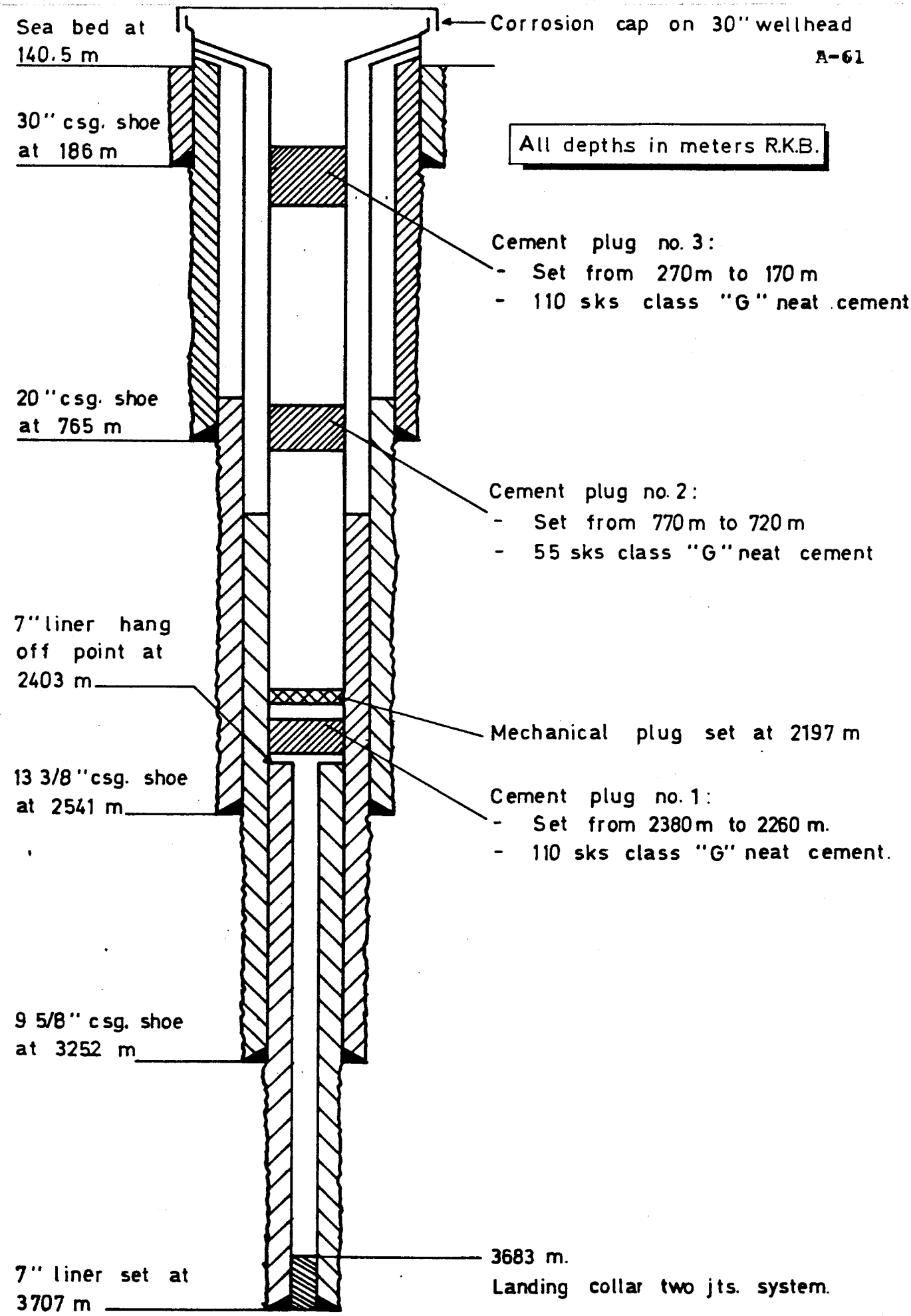


Norsk Hydro Drilling Dept	PLUGGING OF THE 12 1/4" HOLE (30/7-6) BEFORE DRILLING THE DEVIATED HOLE (30/7-6 II)	Gr. no. 2	Fig. A-3
		Date: 20/10-1977 Sign: TAA / Hes	Dwg. no. 36



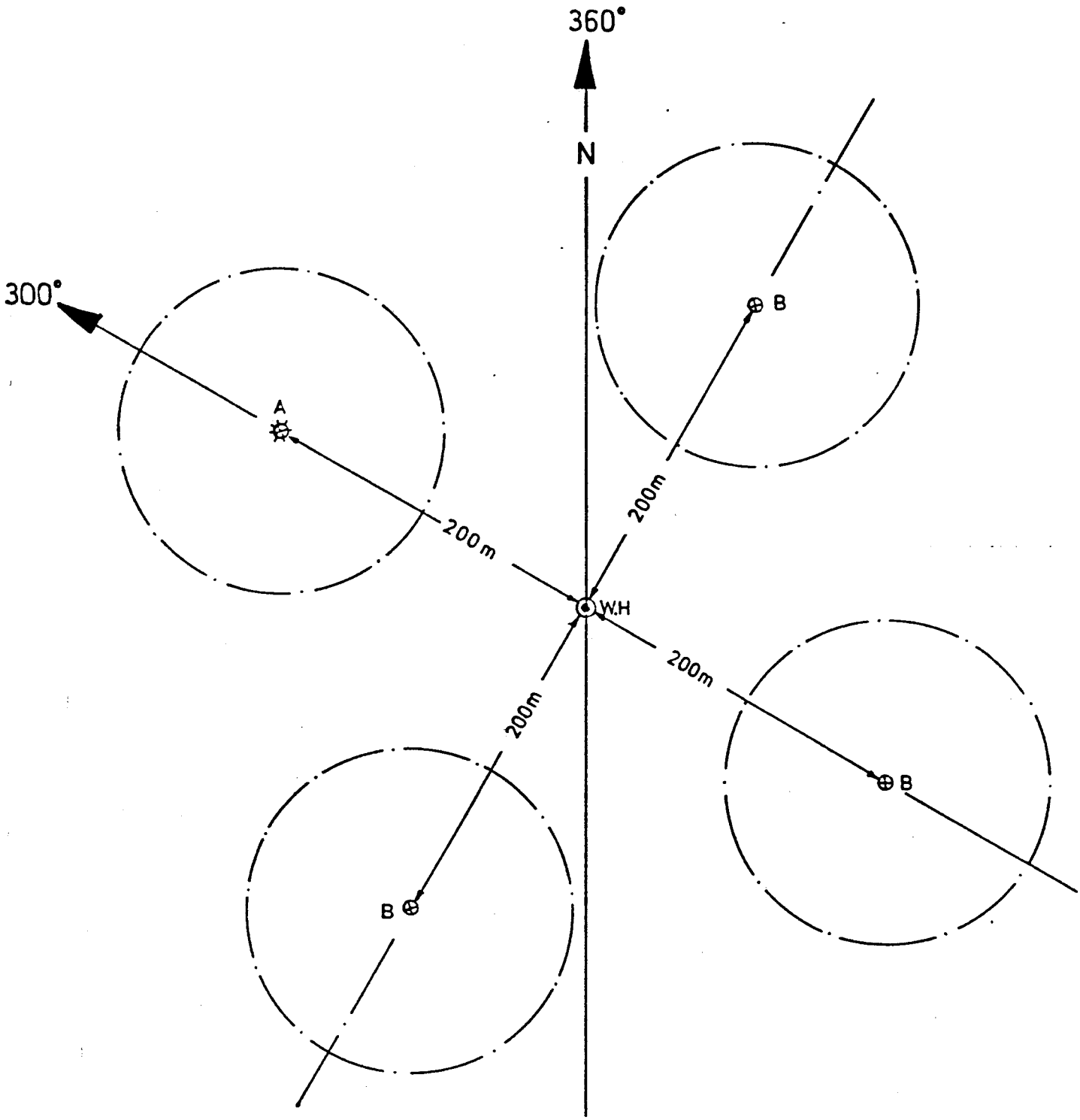
Total time : 4020 hours
167,5 days

Norsk Hydro Drilling Dept	Total time distribution - Well 30/7 - 6. Phase 1	Gr. no. 2	Fig. A.4
		Date : 31 / 10 - 77 Sign : TAA / Hes	Dwg. no. 37



Norsk Hydro Drilling Dept	Temporary abandonment of well 30/7-6 phase I	Gr no 2	Fig. A. 5
		Date: 20/10-77 Sign: TAA / Hes	Dwg no 38

MARKING BUOY SYSTEM
WELL 30/7-6
(HORIZONTAL WIEW)



WELLHEAD POSITION: 60° 29 ' 29. 82 " N
02° 03 ' 26. 14 " E

W.H: WELLHEAD

A: 3 WEIGHTS MAIN BUOY W/SIGNAL LIGHTS

B: 3 WEIGHTS BACK UP BUOY

Fig. A.6

ENCLOSURE A-7

OCEANEERING NORWAY A/S

SUB SEA ACTIVITIES
CONSTRUCTION – DIVING – SURVEYS

A-63

BOX 638
4001 STAVANGER
NORWAY
(045) 32660 and 21285

DIVE INSPEKTION REPORT

(Dykker Inspeksjons Rapport)

Nr. 000131

DATE (Dato) July 30 '77

TIME (Tid) 0430 hrs.

CLIENT (Kunde) Norsk Hydro

DEPTH (Dyp) 380 ft.

VESSEL (Skip) Polyglomar Driller

DIVERS (Dykkere) R.Newport

M.Corsi

LOCATION (Posisjon) 30/7-6
Norwegian Sector

EQUIPMENT (Utstyr) Bell, Rat Hat, H/W Suit

PURPOSE OF DIVE (Hensikt med dykket) Abandon well 30/7-6.

1. Place corrosion cap over wellhead, top it up with oil, release it from Sandline.
2. Land 500kg. cement sinker on sea bed, run 1/2" chain from sinker to guidebase and secure, turn sinker loose from tugger line.
3. Cut loose all four guide wires from guideposts.
4. Inspect immediate visinity of well head for debris.

REMARKS Dive called at 0430 ~~0445~~-hrs. Divers and equipment ready in bell at 0445 hrs. Bell left dekk at 0450 hrs. Bell on bottom at 0505 hrs. Divers observing corrosioncap and cement sinker being lowerd to within 4 ft. above wellhead. Commenced pressure up the bell at 0538 hrs. Diver left the bell and wrestled with the sinker (500)kg. to get it off to guidebase and on to the seabed. Had to cut it loose from the guidewires to do so. Sinker positioned 4ft. away from wellhead between guideposts 3&4. The 1/2" chain was wrapped 3 turns around guidebase beam and secured with a 1/2" snaphook. Sinker was then released from tuggerwire. Job complete 0615 hrs. Diver cut corrosion cap loose from guideropes and positioned cap over wellhead. Diver secured cap with the three bolts provided. Diver opend valve on hyd. hose and shut ventwalve. Drillflor commenced pumping oil. Diver asked for 12ft. slack on all guidewires and stood on guidebase to cut 1,4,2,3 in this order. Wires cut 6ft. from top of guideposts. Job complete 0700hrs. Diver back to bell for a rest. Diver shut hyd. hose valve and released corrosion cap from hose and sandline. Diver observed all guidewires, underwater Tv., tuggerwire and sandline+ hose being recoverd to surface. Diver recoverd his tools and inspected area around wellhead. All clear. Job 100% complete 0740hrs. Diver returned to bell. Bell left bottom at 0745hrs. Bell landed and T:U.P. ed at 0800hrs. Saturation decompression commenced at 0800hrs. E.T.A. surface Aug. 1, at 2200hrs.

REPORTED BY: [illegible] Reppe

Total time on bottom:
2hrs.7min.

Original: Client – Blue Copy: Area Office – Yellow Copy: Clients Rep. – Red Copy: Rig Copy.

DREYER

POLYGLOMAR DRILLER

SEAFLOOR INSPECTION REPORT, WELL 30/7-6A

Well 30/7-6A, coordinates: 60°29′28″,59 N - 02°03′26″,83 E - was temporary abandoned July 30th, 1977. Two divers were lowered down to wellhead in diving-bell at 0450hrs. July 30th, 1977. One diver was locked out. No obstructions or debris other than wellhead was found by diver on seafloor. TV was run down on guidelines. No obstructions or debris other than wellhead was observed.

Diving Supervisor

Dagfinn Reppe (sign)

Norsk Hydro Supervisor

Bill Riddle (sign)

SECTION B

OPERATIONS

WELL 30/7-6

PHASE II

LIST OF CONTENTS

SECTION B - PHASE II

TABLES:

FIGURES AND ENCLOSURES:

SUMMARY OF DATA - PHASE II

Operator	Norsk Hydro Production a.s
Rig	Treasure Seeker
Contractor	Wilh. Wilhelmsen
RKB elevation	24 m
Water depth	116.5 m (140.5 m RKB)
Commencement of operations	April 8, 1978
Reentering of well	April 18, 1978
Permanent Abandonment	June 4, 1978

Well Program: 6" hole from 3711 m to 4115 m RKB

1. POSITIONING AND ANCHORING OF THE RIG

Location of well 30/7-6 with reference to European Datum of 1950:

Latitude 60° 29' 29.82" N
Longitude 02° 03' 26.14" E

After abandonment of well 15/5-1 the rig, Treasure Seeker was moved to location 30/7-6 to reopen and deepen the well.

The well location was marked with 4 marking buoys. The rig was released from well 15/5-1 on April 8, 1978 and arrived on the location on April 9. The achors No. 1,4, 8, 6 and 2 were set. A side scan sonar was run on drill pipe approxemately 10 m above the sea floor to locate the wellhead. This was found 35 m off from the initial rig position. Bad weather impeded the positioning of the rig over the wellhead by manipulation on the anchor chains. The anchor chain No. 2 parted at a pull of 1120 kN, but the anchor was recovered.

The anchors No. 5,3 and 7 were run. Piggy-backs were set on all the anchors.

On April 13, the wellhead was relocated using the side scan sonar on drill pipe. The rig was positioned over the wellhead by manipulating the anchors and the divers installed the guide lines to the wellhead.

On April 18, before opening the well, the rig heading was 300° (ref. Fig. B1) and the chain tensions were:

Chain No.	1:	1023	kN
" "	2:	992	"
" "	3:	1224	"
" "	4:	1135	"
" "	5:	1025	"
" "	6:	957	"
" "	7:	890	"
" "	8:	979	"

2. RESUMÉ OF OPERATIONS - PHASE II

2.1 Summary

The drilling of well 30/7-6 phase II commenced on April 8, 1978 with the rig Treasure Seeker. The well was planned to be deepened to approximately 4150 m by drilling a 6" slim hole below the 7" liner utilizing the 11" BOP stack with a working pressure of 1000 bar (15000 psi).

Bad weather conditions caused some delays in the final positioning of the rig, and some more time was lost due to difficulties during the testing of the 11" BOP stack.

The reopening of the well started on April 18 by drilling the cement plugs set for temporary abandonment. The 7" liner shoe at 3707 m was drilled out with a 6" bit on April 26, with a 1.92 sp.gr. mud.

At 3713 m a leak off test was performed which gave a formation leak off pressure equivalent to 2.17 sp.gr. mud. CNL - GR logs were run through the liner, and two attempts were made to run a casing caliper log to determine casing wear, but the tool malfunctioned both times.

When the 6" hole was drilled to 3731 m, the bit was pulled into the liner shoe and the formation integrity was tested to an equivalent pressure gradient of 2.10 sp.gr.

At 3792 m a high pressured hydrocarbon bearing sandstone formation was encountered. When drilling at 3810 m the well was shut in giving pressure in both the annulus and the drill pipe.

The gas influx was circulated out and the mud weight increased to 1.98 sp.gr.

After several circulations the mud density was raised to 2.01 rd., and to 2.04 sp.gr. The shut in pressures in the annulus and the drill pipe were checked at intervals during the circulation. Two days elapsed in conditioning and stabilizing the well.

Intermediate logs were run at 3826 m, 3968 m and 4069 m.

On May 19, the hole was drilled to a depth of 4115 m. Complete logging program was performed, including RFT-logs, velocity surveys and side wall core gun. Due to differential sticking the RFT-log had to be fished out of the hole twice with an overshot on drill pipe.

It was finally decided that 4115 m would be the total depth of the well. The hole was plugged back with cement and abandoned on June 4, 1978 at 03.00 hrs. Fig. B-3 shows the abandonment program for the well.

2.2 Diary Report

8th April 1978 — The rig was released from well 15/5-1 on April 8 at 15.00 hrs. and moved to well 30/7-6.

9th April — The rig was positioned over the well. Ran anchors and made ready to locate the wellhead with a side scan sonar ran on drill pipe.

10th April — The wellhead was located with the side scan sonar 35 m from rig center, but the wind was too strong for moving the rig by manipulating on the anchors.

11th April — Started to position the rig over the well using the side scan sonar to locate the wellhead.

12th April — While positioning the rig anchor chain No. 2 broke and it became necessary to slack off the other anchors. The anchor was recovered and the broken chain was repaired. Started to rerun anchor No. 2.

13th April — Ran anchor No. 2 and positioned the rig over the wellhead. Divers removed the corrosion cap and reestablished the four guide lines on the posts. Retrieved the wear bushing and made ready to run the 11" BOP stack.

14th April — During function testing of the 11" BOP stack on the spider beams, the 18-3/4" x 11" H-4 connector was dropped into the sea. It landed on the wellhead damaging 2 guide wires and bending a guide post slightly. The diver fastened a sling to the connector which was retrieved and latched on to the 11" BOP stack.

15th April	The diver cut and reinstalled the two damaged guide wires. When running the BOP stack, a leak in the choke line was observed while testing and the stack was pulled back on the stump.
16th April	Repairs were carried out, but when the BOP stack was retested, new leakages were observed. Started to repair the BOP stack.
17th April	After completion of the BOP repairs, the stack was successfully pressure tested.
18th April	The 11" BOP stack was run on 16" riser and latched on to the wellhead. The stack was then successfully tested and the wear bushing was run.
19th April Well reopened to 262 m	Started to reopen well 30/7-6 by drilling cement from 190 m to 262 m
20th April Well reopened to 1500 m	Drilled cement from 262 m to 277 m. Washed down from 614 m to 712 m. Drilled cement from 712 m to 756 m and RIH to 1500 m.
21st April Well reopened to 2273 m	Continued to run in hole and tagged the EZ-drillable packer at 2231 m. Drilled the packer and continued to run in hole. Debries from the drilled packer obstructed the drill string. Circulated to catch debries with the junk sub and pulled out to change bit. RIH and tagged cement at 2235 m and drilled cement down to 2273 m.
22nd April Well reopened to 2401 m	Drilled cement from 2272 m to 2379 m and washed down to 2397 m. Drilled cement from 2397 m to 2401 m. Pulled out to change lower part of the drill string to 3½" drill pipe and 4-3/4" drill collars.

23rd April Well reopened to 2401 m	Tested the BOP stack with the test tool and made up new drill string and bottom hole assembly.
24th April Well reopened to 2401 m	After running down with the new drill string and a 6" bit, the jet nozzles plugged and the string had to be pulled out.
25th April Well reopened to 3707 m	Drilled cement from 2401 m to 2403 m and washed down to the 7" liner catcher sub. The mud density was raised to 1.92 sp.gr. and the catcher sub was drilled out.
26th April Well reopened to 3715 m	Drilled out the 7" liner shoe and continued to drill new 6" hole down to 3713 m. Pulled out to change bit.
27th April 3713 m	Ran leak-off test at 2713 m, formation leak-off pressure was equivalent to 2.17 sp.gr. mud. Pulled out and ran CNL/GR logs. RIH with 7" casing scraper.
28th April 3713 m	Pulled out with the casing scraper and ran CNL/GR logs. Ran a casing caliper log which was a misrun.
29th April 3731 m	Made a second run with the casing caliper log, but seals in the logging tool did not withstand the hydrostatic head in the hole. RIH with 6" bit and drilled from 3713 m to 3731 m.
30th April 3750 m	Drilled from 3731 m to 3744 m. Pulled into the 7" casing shoe and tested the formation to an equivalent mud density of 2.10 sp.gr. Drilled from 3744 m to 3750 m, and pulled out to change bit. Tested the BOP stack with the test tool.
1st May 3772 m	Drilled 6" hole from 3750 m to 3772 m.

2nd May 3810 m	Drilled from 3772 m to 3810 m. A fluid gain of 0.5 m^3 was observed in the trip tank and the well was shut in. A pressure of 58.6 bar was observed on the casing side, but no pressure was observed on the drill pipe side. A 1.98 sp.gr. mud was circulated around the bit. The pump was shut down and both casing and drill pipe side showed a pressure reading of 34.5 bar. The pressure on the casing side was bled back to 20.7 bar which created a fluid gain of 2.4 m^3 in the trip tank. In 15 minutes the shut in pressures increased to 10.3 bar on the drill pipe side and 151.7 bar on the casing side. A 2.01 sp.gr. mud was circulated around the bit, giving shut in pressures of 62 bar on the drill pipe side and 86.2 bar on the casing side. Circulation continued. The shut in pressures were checked at intervals.
3nd May 3810 m	Circulation continued and the mud density was raised to 2.04 sp.gr. The shut in pressures were checked giving zero pressure on the drill pipe side while the casing side had a pressure fluctuated between 16.9 bar and 31.1 bar. Continued to circulate with the 2.04 sp.gr. mud. The gas readings from the mud circulated out showed a decreasing tendency.
4th May 3810 m	Circulation continued. Stripped back to bottom while circulation continued. Flow checks showed the well to be static. Pulled out to 3736 m and observed the well - static. Ran back to bottom and continued to circulate to condition the mud.
5th May 3826 m	Circulated 2.04 sp.gr. mud and continued the drilling, stopping at intervals to circulate bottoms up. Drilled from 3810 m to 3826 m. Raised the mud density to 2.06 sp.gr. and pulled out to run logs.

6th May 3826 m	Ran ISF/Sonic logs but could not get below 3802 m. Ran then FDC/CNL logs but could not get below 3794 m.
7th May 3829 m	Finished the logging. RIH with new bit and drilled from 3826 m to 3829 m.
8th May 3890 m	Drilled from 3829 m to 3890 m.
9th May 3937 m	Drilled from 3890 m to 3937 m.
10th May 3968 m	Drilled from 3937 m to 3968 m
11th May 3968 m	Pulled out to run logs. Ran ISF/Sonic and FDC/CNL logs.
12th May 3968 m	Ran casing caliper/casing inspection logs. Tested the BOP stack with the test tool - OK. RIH with new bit.
13th May 4000 m	Drilled from 3968 m to 4000 m.
14th May 4053 m	Drilled from 4000 m to 4053 m
15th May 4069 m	Drilled from 4053 m to 4069 m Pulled out to run logs.
16th May 4073 m	Ran ISF/Sonic logs. Drilled from 4069 m to 4073 m.
17th May 4091 m	Drilled from 4073 m to 4091 m
18th May 4096 m	Drilled from 4091 m to 4096 m. Pulled out to change bit.

19th May 4115 m	Drilled from 4096 m to 4115 m. Made a wiper trip and got stuck at the 7" liner shoe.
20th May 4115 m	Pulled the stuck drill string free and washed down to bottom. Pulled out and ran FDC/CNL/GR logs.
21st May 4115 m	Ran dipmeter, but could not get the dipmeter below 3875 m. Made wiper trip to clean the hole.
22nd May 4115 m	Finished the wiper trip and pulled out to run logs. Ran dipmeter and DLL/MSFL logs.
23rd May 4115 m	Made wiper trip and circulated on bottom to condition the mud. Pulled out to run logs.
24th May 4115 m	Ran RFT-log. Ran velocity survey but was unable to get below 3863 m.
25th May 4115 m	Made wiper trip and circulated on bottom to condition the mud. Pulled out to run logs.
26th May 4115 m	Ran RFT log. Due to malfunction in the RFT tool this got stuck in the hole and had to be fished out using an overshot on drill pipe.
27th May 4115 m	Recovered the stuck RFT tool. Made wiper trip and circulated on bottom to condition the mud.
28th May 4115 m	Ran RFT log. When trying to pull out with the RFT tool, it was stuck in the hole. Ran down with overshot on drill pipe to the fish.
29th May 4115 m	Recovered the stuck RFT tool. Ran in hole for wiper trip, but the bit got stuck at 4095 m.

30th May 4115 m	Worked the stuck drill pipe free. Washed down to bottom and circulated to condition the mud. Pulled out and ran velocity survey.
31 May Plugged back to 3650 m	Ran side wall core gun. RIH with open ended drill pipe and set cement plug No. 1 from 4080 m to 3870 m. Set cement plug No. 2 from 3870 m to 3650 m.
1st June Plugged back to 2200 m	Set cement plug No. 3 from 2453 m to 2353 m. Set bridge plug at 2200 m.
2nd June Plugged back to 180 m	Set cement plug No. 4 from 2168 m. Set cement plug No. 5 from 770 m to 740 m. Set cement plug No. 6 from 280 m to 180 m.
3rd June Well abandoned	Pulled riser and BOP stack. Ran explosive charge into wellhead on wire line and cut the casing strings 5 m below the sea bed. Pulled the wellhead using the casing running tool. Deballasted the rig and changed out 500 ft chain on anchor No. 2 while deballasting. Pulled the anchors No. 2,3,4,5,6,8 and the piggy-backs.
4th June	Pulled anchor No. 1. Released the rig to Statoil at 03.00 hrs. on June 4, 1978.

2.3 Time Distribution

The time to move the rig to location, reenter the well, drill 6" slim hole to 4115 m, evaluate the well and plug and abandon took 56.54 days.
The time distribution is shown in Table B-2 and Figure B-2.

The operation can be devided into five main groups.

1. Rig move, reentering and drilling cement plugs, 10.0 days.
2. Checking of hole condition before drilling out of 7" liner, 1.83 days.
3. Drilling of the well to TD, 20.58 days.
4. Formation evaluation, 4.54 days
5. Plugging and abandoning of the well, 3.54 days

A total time of 3.42 days was lost caused by dropping the 11" x 18-3/4" adapter and mechanical problems with the BOP stack.

Problems with excessive gas in the annulus required 2.97 days to control.

A total time of 3.35 days was required for fishing of RFT tools due to differential sticking.

The rest of the time, 3.09 days was caused by loss of anchor chain overboard, drilling equipment failure, and waiting on weather.

3. ABANDONMENT OF WELL 30/7-6

The abandonment program is shown in Fig. B-3. After the 6" hole below the 7" liner shoe was drilled to 4115 m and the complete logging was performed, the abandonment of the well was carried out as follows:

1. From 4090 m to 3870 m cement plug No. 1 was set with 86 sxs class 'G' cement with 35% SSA-1, 37% Hi Dense, 0.29 gps CFR-2L and 0.03 gps HR 6L.

2. From 3870 m to 3650 m cement plug No. 2 was set with 87 sxs class 'G' cement with the same slurry as for plug No. 1.

3. From 2453 m to 2339 m cement plug No. 3 was set with 61 sxs class 'G' cement with slurry as for plug No. 1.

4. A mechanical bridge plug was set at 2200 m.

5. From 2198 m to 2168 m cement plug No. 4 was set with 30 sxs class 'G' cement with slurry as for plug No. 1.

6. From 770 m to 740 m cement plug No. 5 was set with 34 sxs class 'G' neat cement.

7. From 280 m to 180 m cement plug No. 6 was set with 112 sxs class 'G' neat cement.

8. The casings were cut 5 m below sea bed and the wellhead retrieved.

4. PORE PRESSURE AND FORMATION INTEGRITY

4.1 Pore pressure

Pore pressure detection was performed during drilling the well from the 7" liner shoe to TD.

The shoe was drilled out by assuming the pore pressure in the side tracked wellbeing equal to the pressure estimated in the original well at the same depth. The Dc-Exp. was used to quantitatively describe the pressure gradient which was checked with other pressure indicators.

Predicted pore pressure:

Depth (m)	Dc-Ecp. sp.gr.	Predicted pressure sp.gr.
3700	-	1.72
3750	1.75	1.74
3765	1.76	-
3780	1.76	-
3788	1.76	-
3800	-	1.87
3850	-	1.91
3900	-	1.92
4000	-	1.94
4085	1.82	-
4095	1.80	-
4100	-	1.96

The pressure reading from the RFT at the top of the reservoir sandstone gave the reservoir pressure equivalent to 1.98 sp.gr.

A small influx of gas into the wellbore was encountered while drilling into the reservoir sand.After several mud circulations a representative formation pressure reading was obtained from shut in of the well which was used to calculate the reservoir pressure. The pressure gradient was estimated to 2.04 sp.gr.

4.2 Formation Integrity

A formation integrity test was performed underneath the 7" liner shoe.

A second formation holding pressure test was performed at 3744 m to check the integrity of the penetrated limestone stringers.

The test results were:

Depth m	Integrity Gradient sp.gr.	
3713	2.17	
3744	2.10	(holding gradient)

5. MATERIALS REPORT

5.1 Bit - 30/7-6 (II)

Ref. Table B-3 page
When reopening well 30/7-6, three 8-3/8" Security M44N bits were used to drill out the cement plugs inside the 9-5/8" casing. One 6" Reed Y-13 bit was used to drill out the cement plugs and the shoe in the 7" liner.

To drill the 6" hole below the 7" liner six bits were used:

4 bits IADC code 527 from 3713 m to 4069 m
1 bit " " 627 " 4069 m to 4096 m
1 Christensen diamond bit dype MD 331 from 4096 m to 4115 m

5.2 BOTTOM HOLE ASSEMBLIES - 30/7-6 REENTRY

Bit no.	Bit size	Bit type	Bottom Hole assembly
1	8 3/8"	M 44 N	Bit - Junksub - bit sub - 9 x 6 1/2" DC's - x'over - 9 x 5 HWDP
2	"	"	Bit - Junksub - bit sub- 12 x 6 1/2" DC's - x'over - 9 x 5 HWDP
3	"	"	" " "
4	6"	Y - 13	Bit - Floatsub - monel - 25 x 4 3/4" DC's - 1683m 3 1/2" DP-x'over
5	6"	"	Junk basket - monel - 22 x 4 3/4" DC's - jar - 3 x 4 3/4" DC's - x'over - 168 x 3 1/2" DP - 5" DP.
6	6"	Ocs 1G	Bit - csg scraper - bit sub - monel - 22 x 4 3/4" DC's - jar - 3 x 4 3/4" - x'over - 168 x 3 1/2" DP
7	6"	F 3	Bit NB'stab - monel - ss - 22 x 4 3/4" DC's - jar - 3 x 4 3/4" DC's - x'over - 168 x 3 1/2" DP - 5" DP
8	6"	F 3	Bit NB'stab - monel - ss - 2 x 4 3/4" DC's - ss - 20 x 4 3/4" DC's - jar - 3 x 4 3/4" DC's - x'over - 168 x 3 1/2" DP.
9	6"	F 3	Bit - bit sub - monel - 25 x 4 3/4" DC's - x'over - 168 x 3 1/2" DP
10	6"	F 3	Bit - bit sub - monel - 25 x 4 3/4" DC's - x'over - 168 x 3 1/2" DP
11	6"	M 88 F	Bit - bit sub - monel - 22 x 4 3/4" DC's-Jar x'over-168 x 3 1/2" DP
12	5 31/32"	MD 331	Same as above.

5.3 Mud Report

Ref. Table B-4 page B-22
A fresh water gel - crome lignosulfonate mud system was used for reopening well 30/7-6 and the drilling of the 6" slim hole from 3707 m to 4115 m.

When drilling out of the 7" liner shoe the mud had a relative density of 1.92. The mud was mixed from fresh water, gel and crome lignosulfonate with barite used as weighting material. Lime and XP-20 was used for shale control, soda ash to treat out calcium in the mud, and CMC and Resinex for filter loss control. Some Drispac was also used for filter loss control when logging after the well had been drilled to total depth.

When drilling in the hydrocarbon bearing zone at 3810 m, the mud density was raised to 2.04 sp.gr. At 3826 m the mud density was raised to 2.09 sp.gr. and later to 2.10 sp.gr. at 3965 m. While drilling below 3965 m the mud density was decreased to 2.06 sp.gr. at 4078 m which was used for the remaining operation of the well.

6. WELL COST REPORT - 30/7-6 PHASE II

The reentry of well 30/7-6 started on April 8, 1978 and the well was plugged and abandoned on June 4, 1978. The total operation took 56.4 days.

By November 30 , 1978 the accumulated well costs were 21.562 M N.kr. For detailed cost report ref. Table B.5.

TABLE B-2

Time Distribution

	Operation	Days	Percentage of total time
1	Under way	0.70	1.24
2	Mooring	2.31	4.09
3	Drilling	8.81	15.58
4	Tripping and surveying	11.77	20.82
5	Circulating and cond. mud	2.29	4.05
6	Running and cementing csg.	0.23	0.41
7	Cased hole evaluation	1.60	2.83
8	Formation evaluation	4.54	8.03
9	Sub Sea equipment	2.55	4.51
10	Temp. abandoned well	4.54	8.02
11	Lost time - drlg. equipment	1.58	2.79
12	Lost time - sub sea equipm.	3.42	6.05
13	Lost time - fishing	3.35	5.93
14	Lost time - hole problems	2.97	5.25
15	Lost time - mooring	0.72	1.27
16	Lost time - waiting on weather	0.79	1.40
17	Lost time - waiting on equipm.	0.08	0.14
18	Lost time - waiting on orders	-	-
19	Lost time - compl. equipm.	-	-
20	Lost time - others	0.53	0.94
21	Plugging and abandoning	3.54	6.26
22	Mich.	0.22	0.39
	Sum total	56.4	100%

TABLE B.3

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BIT RECORD FOR 30/7-6 (II)

COUNTY	FIELD	STATE	SECTION	TOWNSHIP	RANGE	LOCATION	WELL NO.
NORTH SEA	BLOCK 30/7	NORWAY				30/7	6

CONTRACTOR	RIG NO.	OPERATOR	TOOLPUSHER	SALESMAN
WILHELMSEN	TREASURE SEEKER	NORSK HYDRO		

SPUD	UNDER SURF.	UNDER INTER.	SET SAND ST.	REACHED T.D.	PUMP NO. 1	LINER	PUMP NO. 2	LINER	PUMP POWER	TYPE MUD
APRIL 19-78					12" STROKE x	6½"	12" STROKE x	6½"	FA - 1600	LIGNO SULF.

DRILL PIPE	SIZE	TYPE	O.D.	NUMBER	O.D.	I.D.	LENGTH	DRAWWORKS POWER
5" AND 3½"	TOOL JOINTS			DRILL COLLARS				

NO.	SIZE	MAKE	TYPE	JET 32ND IN	SERIAL	DEPTH OUT	m	HOURS	m/HR	ACCUM DRLG. HRS.	WT. kN	R P M	VERT DEV.	PUMP PRESS. BAR	PUMP OPERATION	SPM 1	SPM 2	MUD WT.	MUD VIS.	MUD W.L.	DULL. COND. T	DULL. COND. B	DULL. COND. G	DULL. COND. OTHER	FORMATION REMARKS
1	8 3/8"	SECURITY	M44N	OUT	802848	234	44	15	2,9	15	67	49/50	—	28	P	35	36	1,9	55	8	2	2	I		DRLG. CEMENT
2	8 3/8"	SECURITY	M44N	3x16	387375	2231	87	24 3/4	3,5	39 3/4	87	50	—	105	P	36	36	1.9	50	8	6	3	I	BROKEN TEETH	—"—
3	8 3/8"	SECURITY	M44N	3x16	803003	2399	164	24	7	63 3/4	88	55	—	105	P	36	36	1,92	52	7½	6	3	I	—"—	DRLG. CEM. + EZ PACKER
4	6"	REED	Y-13	3x16	727910	3713	46	8½	5,4	72¼	90	50	—	183	S		50	1,92	60	8	1	LOST CONE			DRLG. CEM. & FLOAT + 1m FROM CSG. SCRAPER RUN
RR 5	6"	HTC	OSC 1G	REG.	75939	3702	—										50	1,92	60	8					
6	6"	SMITH	F3	3x11	439 LL	3749	36	18¼	2,0	90½	44/50	49/50	—	220	S		44	1,98	62	7,2	2	3	I	3 INSERTS BROKEN AND CONES WASHED	
7	6"	SMITH	F3	2x10 1x11	722 NE	3826	77	32 3/4	2,4	123¼	50	30	—	135	S		30	2,04	58	3,8	1	2	I		SAND
8	6"	SMITH	F3	3x11	654 NE	3968	142	63	2,3	186¼	70	40	4½°	183	S		40	2,09	46	1,6	1	8	I	INSERT BROKEN	SAND/SHALE
9	6"	SMITH	F3	2x11 1x12	270 NE	4069	101	49½	2,0	235 3/4	82/66	40	3¾°	183	S	38		2,07	60	2	1	1	I		
10	6"	SECURITY	M88F	0-11-15	745578	4096	27	39¼	0,7	275	88	45	—	186	S	43		2,06	56	2	1	8	I	1 VENTED BREATHER WASHED OUT	
11	5 31/32"	CHRISTENSEN	MD 331	—	92560	4115	19	6 3/4	2,8	281¾	120	44	—	241	S	40		2,06	50	2,6	DIAMOND BIT				

TABLE B.4

MUD SUMMARY

BIT SIZE (inc)	DEPTH (m)	MUD DENSITY (rd)	FV (sec)	PV (mPa·S)	YP (Pa)	GEL STRENGTH (Pa)	FILTRATE ml/30 min.	CAKE mm	CL (ppm)	CALCIUM (ppm)	pH	REMARKS
8 3/8	-	1,92	60	35	10	3/8	7,5	2	450	TR	11	Drlg. cmt.
6	-	1,92	60	44	9	2/15	8	2	5800	75	10,5	" "
6	3715	1,92	60	42	9	2/16	8	2	6300	60	10,5	
6	3734	1,98	62	50	4	2/12	7,2	2	7200	TR	10,5	
6	3790	1,99	58	40	3	2/10	5,5	2	7200	40	11	
6	3810	2,04	64	45	6	2/12	4	2	7000	TR	10,5	
6	3826	2,09	60	45	5	2/10	4,2	2	6500	TR	10,5	
6	3968	2,10	46	40	3	1/6	1,6	1	6500	TR	10	
6	3971	2,08	50	40	5	1/6	1,8	1	6500	100	10	
6	4062	2,07	58	40	6	1/6	2	1	6500	50	10,5	
6	4078	2,06	58	40	5	1/6	2	1	5500	50	10,5	
$5^{31}/_{32}$	4097	2,06	58	40	6	1/6	1,8	1	5500	100	10,5	
$5^{31}/_{32}$	4115	2,06	60	40	5	1/6	2,2	1	6000	160	10,5	T.D.

TABLE B-5

WELL COST - 30/7-6 PHASE II

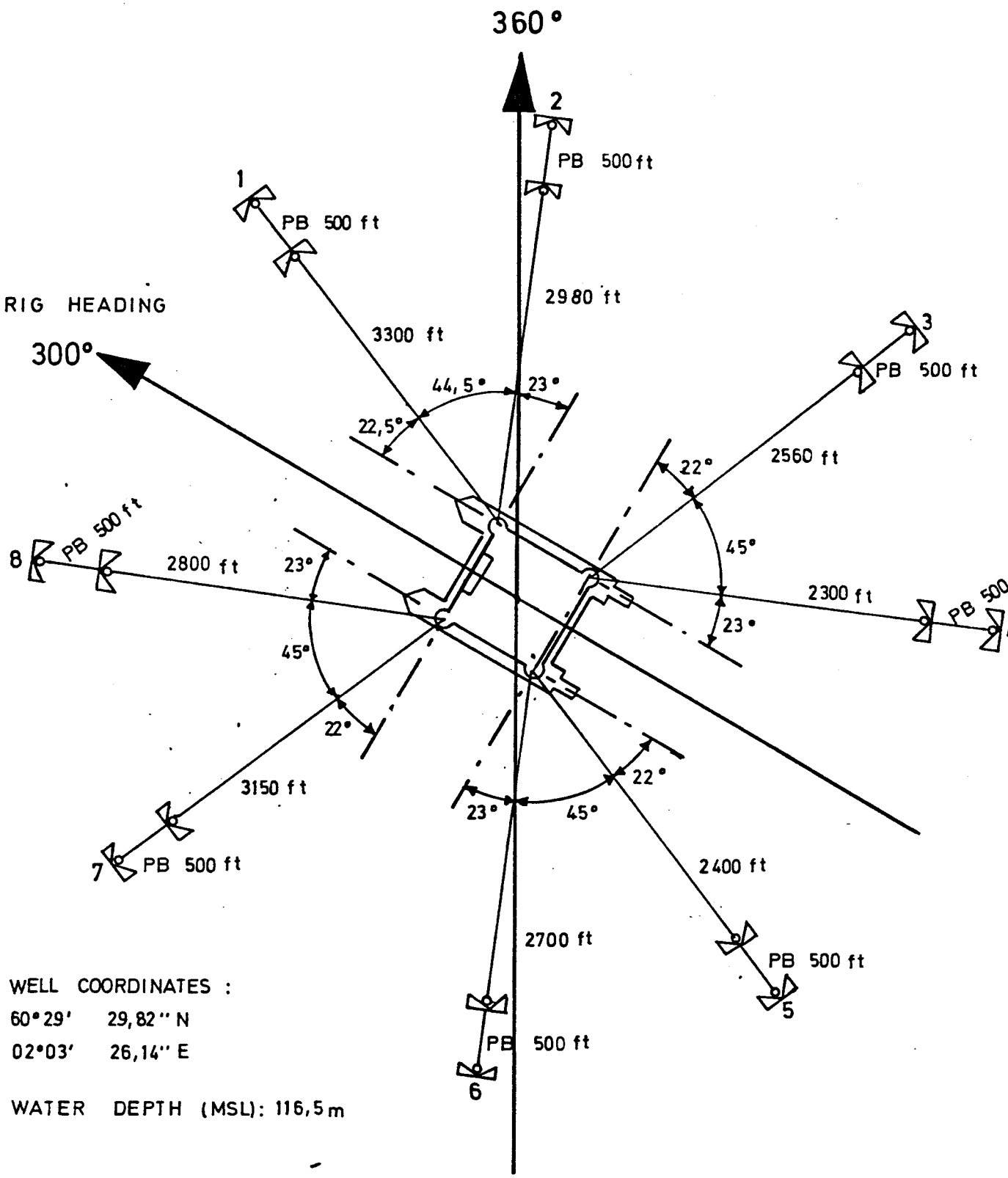
ACCUMULATED COST PR. NOVEMBER 30, 1978 - WELL 30/7-6 PHASE II

Amounts in 1000 N.kr.

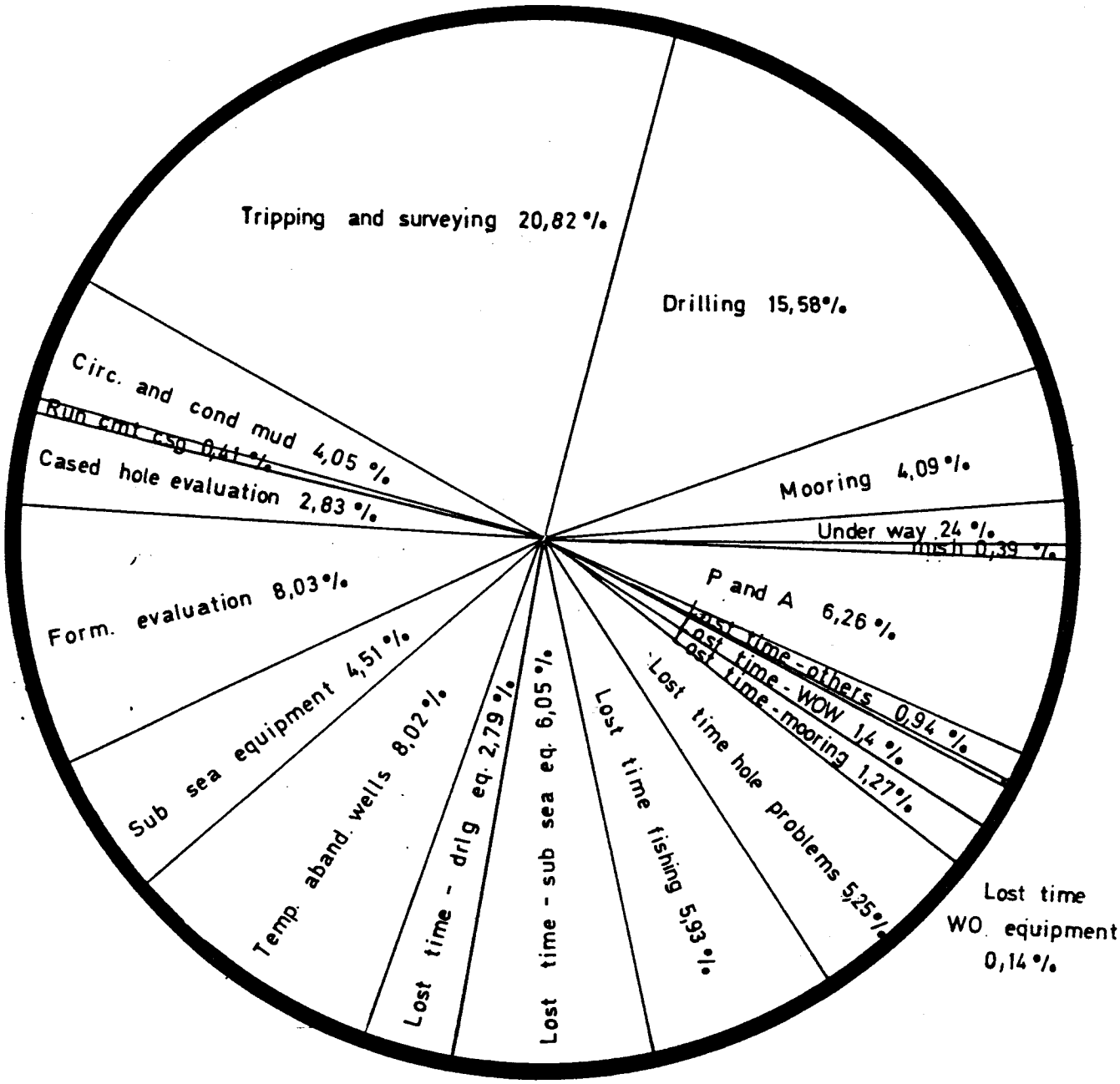
Misc. serv. related to rig positioning		
Resurvey	5	
Locationing	239	
Sub total positioning		244
Drilling rig		
Rig contract	8.082	
Sub total, drilling rig		8.082
Supplies		
Drill bits	107	
Coring equipment	3	
Casing equipment	79	
Test tubing	12	
Mud products	1.285	
Cement	196	
Wellheads	11	
Fuel and greases	962	
Miscellaneous	17	
Sub total, supplies		2.772
Services and tool rentals		
Helicopter	818	
Supply and stand by ships	1.943	
Mud engineering	164	
Mud logging	328	
Cementing	191	
Logging	2.056	

Amounts in 1000 N.kr.

Casing cutting	73	
Coring	5	
Test tool rentals	170	
Diving	866	
Radioservice	54	
Meteorological services	25	
Catering	34	
Miscellaneous	309	
Sub total, services and tool rentals		7.036
Operator costs		
Mobilization costs	278	
Insurance	851	
Base	333	
Laboratory studies	40	
Onshore drilling supervision	543	
Offshore drilling supervision	920	
Offshore geological supervision	390	
Exploration assistance	165	
Sub total, operators costs		3.528
Total cost, phase II		21.562

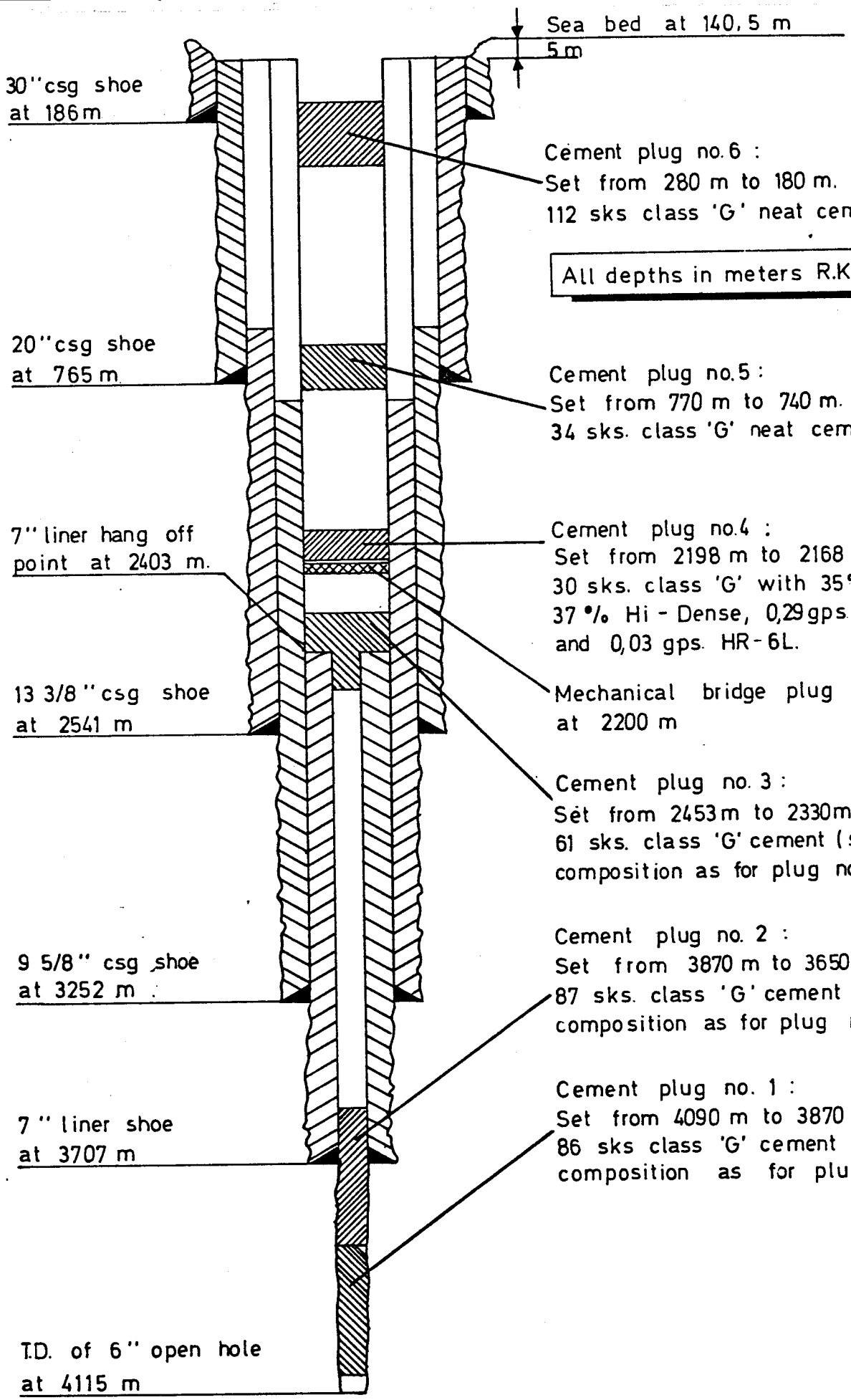


NORSK HYDRO DRILLING DEPT.	MOORING LINE PATTERN TREASURE SEEKER WELL 30/7-6 (II)	GR. NO.	FIG. B-1
		DATE: 5/7-1978 SIGN AAp / Hes	DWG. NO.



TOTAL TIME : 1357,5 HOURS
56,4 DAYS

NORSK HYDRO DRILLING DEPT	TOTAL TIME DISTRIBUTION WELL 30/7-6	GR NO 2	FIG B. 2
		DATE : 20/6 78 SIGN : AAp / Hes	DWG. NO. 34



Norsk Hydro Drilling Dept.	Abandonment of well 30/7-6	Gr. no.	Fig. B.3
		Date.: 15/6-78 Sign TAA / Hes	Dwg. no.

ENCLOSURE B.4

TREASURE SEEKER

June 3rd 1978

SEABED INSPECTION REPORT

WELL 30/7-6.

THE WELL 30/7-6 WAS PERMANENTLY ABANDONED JUNE 3rd 1978.

THE CASING WAS CUT OFF 5 m. BELOW SEABED AND THE GUIDEBASE WITH THE WELLHEAD AND CASINGS RECOVERED.

A SEABED INSPECTION WAS PERFORMED USING T.V.

NO OBJECTS WERE OBSERVED.

W.W. TOOLPUSHER

Don Black

N.HYDRO SUPERVISOR

Jerry Breland

SECTION C

GEOLOGY

LIST OF CONTENTS

SECTION C

TABLES

1. OBJECTIVES

The main objective of the well was to test possible sandstones of Middle and Early Jurassic age. A Lower Cretaceous limestone reservoir and Upper Jurassic sandstone deposits were considered as possible secondary objectives. The hydrocarbon - bearing Eocene sands tested by the 30/7-2 well were expected to be encountered within the same structural closure by this well. The well was planned to penetrate into the Triassic.

2. RESULTS

The 30/7-6 well encountered high pressured gas condensate bearing sandstones of Middle Jurassic age (Bathonian). The well was stopped in shales within the Dunlin Formation of Early Jurassic age. The underlying Statfjord Formation was thus not investigated, neither was the Triassic penetrated.

The top of the Eocene sands were penetrated at 1783.5 m (KB)[x] and were found to be water wet. This agrees with the observation made in 30/7-2, in which the oil water contact was defined at 1783 m (KB).

The top of the hydrocarbon bearing sandstones in the Jurassic was encountered at 3792 m and the reservoir continued with interbeds of shales and coals down to 3892 m. This corresponds to a total thickness of 100 m which based on wire line log evaluation, contains a net sand of 75 m. No hydrocarbon water contact was penetrated in the well. Average porosity has been calculated to 19.4% and average water saturation to 20%.

No DSTs were performed in this well, but RFTs were run for an evaluation of the reservoir. Data from these tests

x) KB elevation: 25 m

indicate that the reservoir contains gas condensate with a condensate gravity of 42 - 55° API. The pressure in the reservoir at 3852 m measured 733.4 bars (10634 psig), the pressure gradient determined at 0.032 bar/m (0.14 psi/f) and the temperature recorded at 126° C (259° F).

Below 3913 m another sequence of interbedded sandstones and shales with minor coal beds continues down to the base of the Brent Formation at 4058 m. This gross interval of 145 m contains a net sand of 39 m. Average porosity of these sandstones which are water wet, is 13%.

3. STRATIGRAPHY

The biostratigraphic evaluation of the well 30/7-6 has been performed by the laboratories of the Continental Shelf Institute (IKU) in Trondheim. Robertson Research International Ltd. has done a seperate study of the interval 3395 - 3780 m. Results from analysis and studies performed for Elf Aquitaine, Norge over the Cretaceous sequence have also to some extent been considered and used.

The basic material for the analysis is ditch cutting samples, but side wall core samples have also been studied.

Well site micropaleontology was carried out by the laboratories of Robertson Research Int. Ltd. during the drilling of the interval from 3395 m to 3613 m. Due to the use of diamond bits over most of this interval and the poorly fossiliferous nature of these rocks, little information were gained from this study.

The final stratigraphic breakdown of the well has been obtained by comparing and adjusting the results of the biostratigraphy with wire line log correlations.

The interval covering the lower part of the Upper Cretaceous through the Lower Cretaceous and into the Upper Jurassic, has been particularly difficult to divide into well defined stages. The presented breakdown of this interval is based on a compilation of the results from analysis performed by the three laboratories previously mentioned, on material from both the original and the sidetracked hole. These biostratigraphic results have again been compared and adjusted to the wire line logs to give the final breakdown.

The stratigraphy of the well is shown on page 4 and 5, included in this table is also a lithostratigraphic breakdown. The lithostratigraphic terminology applied is taken from Deegan and Scull: "A standard lithostratigraphic nomenclature for the Central and Northern North Sea" 1977.

Norsk Hydro

Oslo - Norway

WELL: 30/7-6

DEPTH REF: K.B ELEVATION K.B 24m ALL DEPTH IN METERS (m)

CRONOSTRATIGRAPHY				LITHOSTRATIGRAPHY	
SYSTEM	SERIES / STAGE	DEPTH	THICKNESS	GROUP	FORMATION / MEMBER
		140.5		140.5	
QUATERNARY	EARLY PLEISTOCENE	286	145.5	NORDLAND GROUP	
TERTIARY	PLIOCENE	670	384		
	LATE OLIGOCENE-MIOCENE	1090	425		
	OLIGOCENE	1280	160		
	EOCENE	1965	710	HORDALAND GROUP	1783.5 FRIGG FM. 1923
	PALEOCENE	2280	315	ROGALAND GROUP 2044	BALDER-SELE FM. 2000 LISTA FM. 2044
	DANIAN	2377	97	MONTROSE GROUP 2354	HEIMDAL FORMATION 2280 MAUREEN FM. 2354
CRETACEOUS	UPPER MAASTRICHTIAN	2500	123	SHETLAND GROUP	FORMATION "F" 2377 FORMATION "E" 2592
	CAMPANIAN	2885	355		
	SANTONIAN	3100	245		FORMATION "D"
	CONIACIAN	3486	386		3486

Norsk Hydro

Oslo - Norway

WELL: 30/7-6

DEPTH REF.: K.B. ELEVATION K.B. 24 m / below 3711 m: 25 m ALL DEPTH IN METERS (m)

CRONOSTRATIGRAPHY					LITHOSTRATIGRAPHY		
SYSTEM	SERIES / STAGE		DEPTH	THICKNESS	GROUP	FORMATION / MEMBER	
CRETACEOUS	UPPER		3486		SHETLAND GROUP		3486
		TURONIAN	3638	152		FORMATION "C"	3620
						FORMATION "B"	3638
		CENOMANIAN	3709	71	3709	FORMATION "A"	3709
		LATEST ALBIAN	3725	16	CROMER KNOLL GR 3725		3725
JURASSIC	UPPER	MIDDLE - LATE VOLGIAN	3738	8	HUMBER GROUP	KIMMERIDGE FM	3738
		CALLOVIAN	3792	59	3792	HEATHER FM	3792
	MIDDLE	BATHONIAN	3910	118	4057	BRENT FORMATION: TARBERT MBR	3887
						NESS MBR	4001
		BAJOCIAN	4057	147		ETIVE MBR	4031
						RANNOCH MBR	4051
						BROOM MBR	4057
	LOWER	MIDDLE AALENIAN - TOARCIAN	4115 (TD)	58		DUNLIN FM: DRAKE MEMBER	4115

4. LITHOSTRATIGRAPHY

This summary is compiled predominantly from ditch cuttings descriptions. Wire line logs are used as assistance in the lithological interpretation and to place boundaries of rock formations.

Supplementary side wall core samples are available from Lower Tertiary, Cretaceous and Jurassic.

I. QUATERNARY

Early Pleistocene (140.5 - 286 m)

140.5 - 204 m

This unit consists mainly of very fine to medium,occasionally very coarse grained sand. Towards the base the sand is interbedded with a medium to dark grey, soft, silty and slightly calcareous clay. A dark grey, silty glacial clay with cobbles and pebbles was encountered between 152 and 164 m. The cobbles and pebbles comprised an admixture of rolled granites, gneisses, schists and flints.

204 - 286 m

Underlying the sands is a series of clay described as dark grey, silty and slightly calcareous.

From the sea bed and down to approximately 975 m the formations are included in the Nordland Group.

II. TERTIARY

Pliocene (286 - 670 m)

This interval comprises unconsolidated sand with interbedded clays. The sands consist of clear quarts grains, very fine to medium, occasional coarse, angular to rounded containing mica and traces of glauconite. The clays are medium to olive grey, soft to firm and silty.

Several fossiliferous intervals were encountered throughout the section, comprising abundant broken bivalves, foraminifera and echinoids.

Miocene - Late Oligocene (670 - 1095 m)

670 - 973 m

The top of this section is evidenced by the appearance of 3 distinct clay beds. Underlying this the dominat lithology comprises unconsolidated sands similar to those of the overlying Pliocene. In the lower part of the section the sands become more argillaceous, and from 865 m to 885 m a dark olive green, sticky, partly silty clay was encountered. Siltstone described as brown, firm and slightly calcareous is found in varying quantities below 900 m. Beds of lignite are recorded at 795 m and 960 m, and between 940 m and 950 m abundant shell fragments are recorded. Traces of glauconite appear throughout this as well as the two underlying sections.

973 - 1048 m

This interval consists of a fairly homogeneous olive grey, occasional olive black, micro micaceous, silty, occasional sandy and slighty calcareous claystone.

1048 - 1095 m

Underlying the claystone and extending to the base of this unit is found a siltstone with some sandy interbeds. The siltstone is olive grey and olive black, soft to firm, micro micaceous and slightly calcareous.

The interval from approximately 975 m and down to 1923 m is considered to belong to the Hordaland Group.

Oligocene (1095 - 1255 m)

The main lithology in this section is a light to dark olive grey, soft to firm, sticky, micro micaceous and occasional slightly calcareous claystone. It is generally silty and thin stringers of a light grey, very fine, calcareous sandstone are recorded occasionally through the section. Traces of glauconite and pyrite occur.

This interval is a part of the Hordaland Group.

Eocene (1255 - 1965 m)

Below a 33 m thick sequence at the top comprising interbedded claystone continued from above and a fine grained, calcareous sandstone, this stage can be divided into three units. Down to 1472 m a siltstone is the dominant lithology. Below this a more homogeneous claystone unit occurs, extending down to 1783.5m where a sand sequence is entered.

1313 - 1472 m

Siltstone described as light olive grey and light olive brown, firm, occasional micro micaceous, non calcareous and argillaceous. Interbeds of claystone as described above are seen, notably between 1395 m and 1438 m. In places the formation becomes more coarse grained, grading to light grey, fine, glauconitic sandstones occuring as laminae or thin stringers. Traces of pyrite are recorded.

1472 - 1783.5 m

A homogeneous claystone, light olive grey and light grey to grey green, soft becoming firm and blocky, non calcareous with frequent silty parts. Below 1700 m this passes into a dark olive grey to dark grey, blocky to

subfissile, silty claystone. With increasing depth this claystone becomes more indurated and grades to shale. Thin stringers of a light grey, fine, calcareous cemented, glauconitic sandstone are seen throughout the interval, and below 1555 m stringers of brown, hard, crypto crystalline, occasional dolomitic limestones were encountered. Traces of pyrite occur.

1783.5 - 1965 m

Below 1783.5 m a marked change in the lithology is evidenced by the appearance of thick sand units interbedded with shale layers. The sand consists of clear and frosted, very fine to coarse, angular to subrounded quartz grains. In general the sand is loose, but in places and especially towards the base of the interval calcareous cemented sandstones occur. The shales are light to dark grey and medium to dark grey green, blocky, non calcareous and partly silty. Traces of glauconite, mica and pyrite occur throughout the interval.

This interval, down to 1923 m, is considered to represent the Frigg Formation of the Hordaland Group.

Below 1923 light to medium grey, grey green, micro micaceous, occasionally slightly calcareous, silty shale becomes the prominent lithology. Traces of tuff are found in this interval and interbeds of sandstones, described as above, still occur.

The interval 1923 - 1965 m is interpreted to represent the upper part of the Balder-Sele Formation found within the Rogaland Group.

Paleocene (1965 - 2377 m)

1965 - 2000 m

The tuffaceous shales in the overlying interval continue through this sequence. Stringers of calcareous sandstones described as above and limestones, white and tan, firm and very hard, occur frequently in the shales.

This section forms the lower part of the Balder-Sele Formation.

2000 - 2044 m

This interval consists mainly of an olive grey, occasional brown black, fissile, non calcareous and non tuffaceous shale. Thin stringers of sandstones and limestones still occur, but are less frequent than above.

This interval represents the Lista Formation within the Rogaland Group.

2044 - 2280 m

The top of this interval is marked by the appearance of thick sandstone units. These sandstones are very fine to medium grained, poorly cemented with calcareous cement and moderate sorted. Interbedded with these sandstones and the dominant lithology between 2084 m and 2197 m are some dark grey, grey brown, black and occasionally dark green shales with frequent siltstone stringers and laminae. Below 2197 m and down to the bottom of this interval sandstone units again occur. These units are generally thinner than recorded at the top, consisting of more well cemented sandstones which have decreased grain size, now being mainly fine to silty. Traces of pyrite are recorded throughout the section and glauconite occurs towards the base.

This sand and shale unit is interpreted to represent the Heimdal Formation within the Montrose Group.

Danian (2280 - 2377 m)

2280 - 2354 m

The dominant lithology is a light to dark grey, slightly silty and non calcareous claystone which often becomes soft and sticky and grades to clay. Thin stringers of very fine to fine grained sandstones are recorded through the interval and towards the bottom a thin limestone stringer is observed. Traces of glauconite and pyrite are common in this interval.

This interval is interpreted to represent the Maureen Formation within the Montrose Group.

2354 - 2377 m

A good break on the wire-line logs can be seen at 2354 m and this together with the increase in the calcareous content of the formation below define the top of the Shetland Group, which also includes all the formations of Late Cretaceous age.

The Shetland Group can be subdivided into smaller units. Each subunit has however not yet been designated as formations and has thus not been given any specific names. In accordance with the standard lithostratigraphic nomenclature report by Deegan and Scull the different units in 30/7-6 have been called Formations "F" to "A".

The interval down the 2377 m is an alternating sequence of light to medium grey marls, occasionally silty with carbonaceous laminae, and claystones similar to those described above.

This interval is considered to form the Formation "F".

III. CRETACEOUS

Upper Cretaceous (2377 - 3709 m)

Maastrichtian (2377 - 2500 m)

Predominantly an argillaceous section of shales and marls with thin stringers of limestones and traces of pyrite. The shales are described as medium to dark grey, dark brown grey, firm and blocky or subfissile. They are occasionally silty, pyritic and generally non to slightly calcareous. In places the shales, however, become more calcareous and grades to light to medium grey, soft, amorphous marlstones. The limestone stringers are white or off white, light brown, fairly hard, micro crystalline and argillaceous.

This interval is placed within the upper half of the Formation "E".

Campanian (2500 - 2885 m)

2500 - 2592 m

This interval comprises the lower part of Formation "E" and consists of shales with occasional marly sequences as described in the overlying interval.

2592 - 2685 m

Below 2592 m the formation becomes more calcareous and is described as a white to light grey, amorphous marl with stringers of limestones and minor dolomites. The limestones are white, soft and chalky, light grey, firm, micro crystalline and argillaceous with traces of glauconite. The dolomite are tan, hard and crypto crystalline.

Towards the base of this interval the formation again becomes more argillaceous and grades to shale.

This interval represents the top of the Formation "D".

2685 - 2885 m

A monotonous sequence of shale and claystone with occasional thin interbedded limestones and traces of siltstone. The shales are medium to dark grey, grey brown, firm, blocky and pyritic. In general they are non to only slightly calcareous, but become in places more calcareous and grade to marlstones. The limestones are light to medium brown, hard, often argillaceous, crypto crystalline and dolomitic.

This interval is a continuation of the Formation "D".

Santonian (2885 - 3100 m)

The lithology of the overlying sequence continues through this stage and represents a further continuation of Formation "D".

Coniacian (3100 - 3486 m)

A homogenous interval comprising mainly shale with minor calcareous, marly sequences. The shale is described as medium to dark grey, grey black, hard, blocky or subfissile, occasional micro micaceous and non to slightly calcareous. Traces of a dark brown shale are recorded together with a grey brown siltstone. Stringers of light to dark brown, hard, dense, crypto crystalline, argillaceous and dolomitic limestones are reported occasionally.

This interval is included in and forms the basal part of the Formation "D".

Turonian (3486 - 3638 m)

3486 - 3620 m

Below 3486 m a distinct increase in the number of limestone interbeds in the shale occurs. These limestones are white to light grey, light to medium brown, soft, crumbly and argillaceous. Occasionally they are described as dolomitic, becoming dark brown, hard and crypto crystalline. The shale and the calcareous marly interbeds are lighter coloured than in the overlying interval, reflecting the increased carbonate content; they are otherwise similar.

This interval is interpreted to represent the Formation "C".

3620 - 3638 m

This short interval has a similar lithology as reported above except for the occurence of some dark grey to black, micro micaceous shale. This shale appearance togehter with a high gamma ray response and a lower velocity indicates that this interval represents the Formation "B" (equates with the Plenus Marl Formation in the central North Sea).

Cenomanian (3638 - 3709 m)

A sharp break on the logs and a concurrent change in the lithology are found at the top of this stage. The interval comprises alternating limestones, shales and marls with varying amounts of siltstone, mica, pyrite and glauconite. The limestones are off white, light grey and light to dark brown, firm to hard, dense and both micro and crypto crystalline. Occasionally they become dolomitic and in places very argillaceous and grade to marl. The shales are described as medium to dark grey, occasionally olive black, hard, fissile and slightly calcareous. Towards the base of the sequence some red brown, brown coloured, earthy and silty marl is reported.

This limestone, shale and marl unit is considered to represent the oldest formation in the Shetland Group; Formation "A".

Lower Cretaceous (3709 - 3725 m)
Latest Albian (3709 - 3725 m)

This interval which comprises a light to medium grey, grey brown, calcareous and silty shale with traces of a hard, crypto crystalline dolomite, is delimited both at the top and the base by clear breaks on the petrophysical logs. The gamma ray character is especially clear and shows a substantial increase at the base and an equivalent decrease at the top.

This interval is interpreted to represent a formation (not named) within the Cromer Knoll Group.

IV. JURASSIC

Upper Jurassic (3725 - 3792 m)
Late - Middle Volgian (3725 - 3738 m)

A very distinct change in lithology at 3725 m indicates the base Cretaceous - top Jurassic interface. Below this prominent unconformity extends the characteristic dark grey to black or dark brown organic rich shale of the Kimmeridge Clay Formation, which in this well, coincides with the Middle to Late Volgian stage. This shale is silty, micro micaceous, pyritic, slightly to moderate calcareous and interbedded with thin stringers of white, micro crystalline limestone.

The Kimmeridge Clay Formation represents a subdivision of the Humber Group.

Callovian (3738 - 3792 m)

The organic rich shale of the overlying interval continues through this stage. The shale is, however, less radioactive and have in addition to the limestone stringers also stringers of brown, hard, argillaceous, crypto crystalline dolomite. Traces of sand occur towards the base while traces of pyrite are recorded throughout this shale.

This interval is considered to represent the Heather Formation within the Humber Group.

Middle Jurassic (3792 - 4057 m)

The Middle Jurassic is clearly defined by the Bathonian and Bajocian stages, the entire interval comprising the Brent Formation.

Bathonian (3792 - 3910 m)
Bajocian (3910 - 4057 m)

3792 - 3887 m

The top of this interval is distinguished by an abrupt change in lithology from the overlying argillaceous sediments to a clear, coarse to very coarse grained, unconsolidated sandstone. Further down the sandstone becomes very fine to medium grained, still occasional coarse, slightly micaceous with subordinate thin shale and coal beds and some caleareous bands. The shales are mainly dark grey to dark brown, occasional silty, micaceous and carbonaceous, but also light to medium grey, calcareous and occasional orange to red. The sandstones have a visible porosity varying from very good to fair but also poor in places where calcareous cement is reported. Pyrite is recorded as traces over the whole sequence.

This interval is clearly identified as the Tarbert Member, the youngest member within the Brent Formation.

3887 - 4001 m

This interval consists of interbedded sandstones and shales with stringers of dolomites in the upper part and coal beds in the top and towards the base of the interval. The sandstones are clear, light grey and light brown, very fine to medium grained and moderate to well sorted. They are occasionally argillaceous and have in places calcareous and siliceous cement. The porosity is described as fair to poor but occasional good. The shales are light to medium grey and dark grey brown, subfissile, micro micaceous and often silty, carbonaceous and pyritic. The dolomites are brown, very hard, argillaceous and micro micaceous.

The lithological appearance of this interval suggests that it forms the Ness Member within the Brent Formation.

4001 - 4035 m

Massive clear, white and light brown sandstones with interbedded shales and a thin coal bed occur over this sequence. The sandstones are fine to coarse, occasionally very coarse to granules grained, poorly to moderate sorted, and have in places calcareous bands and kaolinitic matrix. The porosity is desribed as being good to fair but also very poor. The shales are medium grey to dark grey brown, blocky, very silty and carbonaceous.

This interval represents the Etive Member within the Brent Formation.

4035 - 4051 m

The appearance of mica distinguishes this sandstone unit from the ones above and below and suggests that it represents the Rannoch Formation. The sandstone is, in addition to being micaceous, clear and light grey, fine to coarse grained, poorly sorted and contains calcareous bands. The porosity is described as fair.

4051 - 4057 m

This 6 m thick interval consists of a clear and light grey, fine to coarse grained, poorly sorted calcareous sandstone. Very coarse and pebble sized grains are commonly recorded as is feldspar in addition to quartz. The porosity is fair to poor.

This sandstone unit is well known as the Broom Member, the oldest member within the Brent Formation.

Lower Jurassic (4057 - 4115 m T.D.)
Middle Aalenian - Toarcian (4057 - 4115 m)

An apparent lithological change at 4057 m, from the overlying arenaceous sediments to homogeneous shales below, clearly marks the entry into the Dunlin Formation. These shales are described as medium to dark grey and grey brown, subfissile, blocky and hard with local softer interbeds. They are micro micaceous, carbonaceous, slightly calcareous and locally silty with sandy stringers. Pyrite is recorded as traces throughout the sequence.

This interval is considered to represent an upper part of the Drake Member, the youngest member within the Dunlin Formation.

5. HYDROCARBON SHOWS

Evaluation of hydrocarbon shows at the well site was carried out in a conventional manner.

Below 188 m a complete hydrocarbon total gas detector (50 units = 1%) and a gas chromatograph for automatic and continuous gas analysis, recorded as ppm by volum of C_1 through C_5, were operational.

5.1 GAS RECORD

188 - 2175 m

Throughout this interval the continous ditch gas recording does not exceed 1%. The interval can however, be further subdivided on the basis of chromatograph analysis. Between 1120 and 1330 m the occurrence of ethane (C_2) and traces of propane (C_3) is noted, and again between 1630 and 2175 m. For the rest of the interval only methane (C_1) is reported. Gas peaks tend to correlate with sands or silts, but these lithologies are common components of the section and their occurrence does not necessarily coincide with higher gas reading, the Eocene Frigg Formation sands are such an example.

2175 - 2600 m

The upper boundary of this interval coincides with the first occurrence of gasses heavier than C_3. Iso and normal-butanes, (iC_4 and nC_4) are both recorded at various levels in the section. However, most of the total continuous ditch gas recordings remain below 1%. Occasionally peaks exceed this to an average of 1.4 - 1.7% with a maximum value for the entire interval, at 2197 m of 4%. This coincides with the top of one of the most significant of the Paleocene sands, and the first appearence of the butanes.

A subdivision of the interval is possible on the basis of chromatograph results. The occurence of iC_4 and nC_4 delineate zones from 2175 to 2338 m and 2495 to 2545 m. Between these intervals the gas profile is more subdued and components proportionally less. No gases heavier than C_3 were detected.

Remarks:

Below this interval and down to the Upper Jurassic and further down to T.D. at 3784 m, the original borehole encountered at several horizons, high pressure gas in considerable quantity. The original borehole was plugged back to 2478 m and a side-tracked hole was drilled firstly from 2619 m and down to 3711 m, and secondly after being re-entered down to the T.D. 4115 m. The gas intervals described below are taken from the second hole, which in general, allowing for differences in mud weights used, rates of penetration and hole size, have an expectedly similar profile to the original hole.

2600 - 2810 m

Below 2600 m a marked gas increase was observed together with a change from the generally smooth profile of the overlying interval to one of more erratic nature. In general however, the continuous ditch gas recording has an average background of 1 to 2%, with occasional peaks exceeding this, notably at 2660 m where this reached 4%. Maximum chromatograph readings at the same depth read 25000, 900, 300, 40 and 80 ppm for C_1, C_2, C_3, iC_4 and nC_4 respectively. Thoughout the interval however, average readings were in the range of 8000, 450, 80, 10 and 200 ppm.

2810 - 2940 m

A marked increase at 2810 m marks the top of this interval. Average continuous ditch gas recordings increase to 2-3% with a maximum value of 6% at 2920 m. The average chromatograph results give 20000, 800, 120, 40 and 50 ppm for C_1, C_2, C_3, iC_4 and nC_4 respectively. Towards the base of this unit a gradual increase in the gas is observed.

2940 - 3265 m

Below 2940 m the gas decreases to an average total ditch gas of 1%. Throughout this section a gradual reduction with increasing depth can be observed. Chromatograph values show a corresponding drop, and the occurence of iC_4 and nC_4 becomes intermittant. Resulting from this the section can be subdivided into zones with and without iC_4 and nC_4. Zones without are observed between 3075 m and 3140 m, and 3225 m and 3245 m. In general these correlate with intervals where higher percentages of shale cuttings were recorded.

3265 - 3486 m

This zone is characterized by a further drop in recorded gas from the overlying interval, with a noted absence of gases heavier than C_3. The average total ditch gas ranges between 0.25 and 0.5%.

3486 - 3725 m

A marked increase in gas below 3486 m is observed, which although variable in profile and quantity, is consistent in character throughout the interval. Total continuous ditch gas ranges from 0.5 to 40% with corresponding off-scale chromatograph readings. The high gas readings correlate with the occurrence of numerous thin limestone stringers in the Cretaceous shales overlying the Upper Jurassic "hot" shales, which are known for their source rock potential.

3725 - 3792 m

The top of this interval correlates with the Cimmerian Unconformity below which extends the organic-rich Upper Jurassic shales of the Kimmeridge Clay Formation. The top is evidenced by prominent gas peaks at 3729 m and 3739 m where continuous ditch gas recordings reach 13%. Below this the gas profile is irregular with average ranges between 1 and 5%. Correlation with chromatograph recordings is good with all constituents C_1 through nC_4 recorded. Gas composition ratio (C_1/ C_2-C_4) for the interval ranges between 10 and 15, slightly increasing towards the base.

3792 - 3887 m

This interval delineates the sandstone reservoir section. The top is evidenced by a prominent gas peak where continous ditch gas is recorded in excess of 20%. The gas gradually reduces throughout the interval reaching its lowest reading of 0,3% at the base. Constituents C_1 through C_4 are recorded, the latter becoming discontinuous below 3850 m. Ratios increase with good correlation towards the base of the unit.

3887 - 4057 m

Below 3887 m a change in lithology to interbedded sandstones, shales and coals gives rise to a marked change in the nature of the continuous ditch gas curve, which becomes much more erratic. Continuous ditch gas ranges from 0.16 to 2%, and the heavier gasses iC_4 and nC_4 occur in intermittent trace quantities only. Correlation between gas peaks and sandstone beds is good.

4057 - 4114 m

The appearance of the homogeneous Dunlin shales below 4057 m correlates well with a marked change in the gas profile. The continuous ditch gas becomes consistently steady with values below 0,6% and comprising C_1 to C_2 with only traces of C_3.

5.2 OIL STAIN AND FLUORESCENE

1965 - 2282 m

The top of this interval coincides with the top of the Paleocene stage which is characterized by numerous interbeds of sandstone and siltstone with some limestone stringers at the top. Within many of these is reported a gold or dull gold yellow fluorescence, with a slow and occasional fast streaming fluorescence cut. This is weaker in some places than others, but in general described as milky to white. Occasionally brown oil stain was observed on the cuttings. Only a minor increase in gas was recorded across this interval, but the consistent occurrence of C_3 and C_4 was recorded below 2175 m.

2343 - 3034 m

This interval, describing the lower part of Danian and an Upper Cretaceous interval, is characterized by a change from the overlying arenaceous and argillaceous clastic lithology to the calcareous shales, marls and limestones of the Shetland Group. Within these the limestones are reported to have various amounts of dull to bright yellow or yellow orange fluorescence with a moderately fast streaming pale to bright yellow or white fluorescence cut. In places there is no cut suggesting mineral fluorescence, however below

2685 m an occasional dark brown oil stain is reported. Below this same level minor siltstone stringers are found and these have occasionally a dull green yellow fluorescence with a weak slow streaming white fluorescence cut.

3792 - 3892 m

Although significant gas shows were reported in this Jurassic section while drilling and gas condensate were proven from wire line logs and RFTs, no fluorescence or fluorescence cut was observed on the cuttings. In some side wall cores, however, occasional weak fluorescence could be seen and a faint hydrocarbon odour smelled.

6. CORING

6.1 CONVENTIONAL CORES

No conventional cores were taken in the well due to safety considerations.

6.2 SIDE WALL CORES

Side wall cores were taken from 1773 m and down through the whole well, the deepest core being recovered at 4109 m.

A total of 5 runs were made. In all runs 30 cores were asked for. Run 1, from 1773 m to 2418 m, recovered 25 cores. Run 2, from 3262 m to 3706 m, recovered 21 cores. A mechanical failure in the gun made the number of bullets fired in run 3 (3682.5 - 3705 m) very low; only 7 were shot and 4 recovered. The same failure was experienced on run 4 (3704.5 - 3630 m), resulting in only 12 shots with 10 recovered cores. In the last run, run 5, two guns with 30 and 15 bullets each were combined. A total of 44 bullets were fired and 41 cores recovered.

A detailed description of the cores is given in appendix 1.

7. WIRELINE LOGGING

The following lists contain a summary of the wireline logs run in the well 30/7-6 and show the dates, logged intervals and run numbers for each log.

For the general view and the convenience two separate lists have been made, one for the phase I and another for phase II.

PHASE I:

LOG	DATE	LOGGED INTERV.	RUN NO.
ISF/SONIC/GR	6.03.77	2460 - 765 m	1
"	8.03.77	2551 - 1740 m	2
"	15.04.77	3612 - 2541 m	3[x)]
"	10.06.77	3254 - 2541.5 m	4
"	26.06.77	3500 - 3252 m	5
"	29.06.77	3689.5 - 3470 m	6
"	3.07.77	3705.2 - 3650 m	7
GR	6.07.77	3670 - 3711 m	1
FDC/CNL/GR	6.03.77	2559 - 1700 m	1
"	11.06.77	3260 - 2541 m	2
"	26.06.77	3500 - 3252 m	3
"	3.07.77	3707 - 3470 m	4
CNL/GR	27.07.77	3666 - 3250 m	5
DLL/MSFL/GR	26.06.77	3498 - 3252 m	1
"	3.07.77	3707 - 3470 m	2
HDT	11.06.77	3260 - 2544.5 m	1
"	3.07.77	3707 - 3252 m	2

LOG	DATE	LOGGED INTERV.	RUN NO.
FIL	3.07.77	3707 - 3252 m	1
VELOCITY SURVEY	11.-12.06.77	3150 - 600 m	1
"	4.07.77	3707 - 3262 m	2
RFT	26.06.77	3500 - 3262 m	1
"	3.07.77	3707 - 3262 m	2
CST	7.03.77	2418 - 1773 m	1
"	4.07.77	3707 - 3262 m	2
"	"	3705 - 3682.5 m	3
"	"	3704.5 - 3630 m	4
NEUTRON LOG	20.04.77	3770 - 2550 m	1
CBL	16.06.77	3215 - 1000 m	1
HRT	16.04.77	2777 - 2000 m	1
"	"	3775 - 2000 m	2
"	"	3775 - 2000 m	3
"	17.04.77	3606 - 2000 m	4
"	18.04.77	3452 - 2000 m	5
"	"	2820 - 2000 m	6
"	19.04.77	3130 - 2000 m	7
"	"	3295 - 2000 m	8
"	20.04.77	3770 - 2000 m	9
"	21.04.77	3770 - 2000 m	10

x) Log run in initial hole later on plugged back to 2478 m and sidetracked.

PHASE II:

LOG	DATE	LOGGED INTERV.	RUN NO.
ISF/SONIC/GR	6.05.78	3801 - 3702 m	8
"	11.05.78	3965.8 - 3687.5 m	9
"	16.05.78	4065.5 - 3897.5 m	10
"	21.05.78	4112.2 - 3779.2 m	11
FDC/CNL/GR	6.-7.05.78	3780 - 3702.2 m	8 (CNL to 3250 m)
"	11.05.78	3965.5 - 3702 m	9
"	20.05.78	4113.3 - 3779.2 m	10
CNL/GR	27.04.78	3711.5 - 3250 m	6
"	28.04.78	3706.5 - 3250 m	7
DLL/MSFL/GR	22.05.78	4113.7 - 3772 m	3
HDT	21.-22.05.78	4112.2 - 3707 m	3
VELOCITY SURVEY	22.-24.05.78	3863 - 2150 m	3
"	30.05.78	4115 - 120 m	4
RFT	24.05.78	3793 m	3
"	25.-27.05.78	4008.5 - 3855.5 m	4
"	28.05.78	3806.5 - 3891.5 m	5
CST	31.05.78	4109 - 3727.5 m	5

8. SPECIAL STUDIES

The biostratigraphic evaluation of the well has been performed by the laboratories of the Continental Shelf Institute (IKU) and of Robertson Research International Ltd. (RR). The following reports contain the results of these studies:

1. "Norsk Hydro N - 30/7-6
   Biostratigraphy" . IKU .

2. "Paleontological note:
   Biostratigraphy and kerogen studies of
   (N) 30/7-6A and (N) 30/7-6". IKU.

3. "Biostratigraphy of (N) 30/7 (3408 - 3710 m).
   Reassessment of (N) 30/7-6 (2285 - 3600 m).
   Kerogen studies of (N) 30/7-6A and 30/7-6". IKU.

4. "30/7-6A Biostratigraphy phases I & II
   3408 - 4109 m". IKU.

5. "Biostratigraphy Norwegian North Sea well
   Norsk Hydro 30/7-6.
   Interval 3395 - 3780 m". RR.

A geochemical study of the well has been performed by the Continental Shelf Institute (IKU). Robertson Research International Ltd. (RR) has in addition analysed 16 samples from the well on spore colouration. The results from these studies are presented in the following reports:

1. "Source rock evaluation of well 30/7-6".
   IKU.

2. "Source rock evaluation of well 30/7-6A.
   Section II".
   IKU.

3. "Spore colouration analysis of sixteen samples from the Norsk Hydro 30/7-6 Norwegian North Sea well".
   RR.

APPENDIX 1
SIDE WALL CORE DESCRIPTIONS

SIDE WALL CORES DESCRIPTION

WELL	30/7-6	RUN N°	One
LICENCE	040	PAGE N°	One
		DATE	7.3.77

SERVICE COMPANY	Schlum
ASKED	30
RECOVERED	25
SHOT	30
LOST	5
FULL BULLET	13
GEOLOGIST	Nicklin/ Thomassen

tr trace - M medium - G good

N°	DEPTHS m	REC	LITHOLOGY	Fluorescence	CUT
30	1773	100%	Clyst/Sh: dk olv grn v/occ brn - dkgy strgs and patches, fairly sft, sticky, firm-crumbly bcm ind w/crude fiss, (micro-mic shean		
			on parting surfaces), non calc, nod, spic Pyr (<1.0 mm) and Slst litho-clasts/pbls <1.0cm, pale yel/wh flu in Slst.	on Slst.	
29	1776	100%	Clyst/Slst: dk gy, sl trgrn, f intbd dk brn Clyst, sft-firm, micro-mic, non calc, non foss, no flu.		
28	1780	0	Lost		
27	1782	100%	Clyst: lt gy-lt grn gy, sft-firm, sl incr ind w/crude subfis, clean, tr micro-mic, f intbd dk brn Clyst, non calc, non foss,		
			no flu.		
26	1798	75%	Sst: lt gy, v f, sft, poor - no cmtd, well srtd, subang, gen clean f dispersed Mica and Glau and min g, non calc, no shows.		
25	1806	90%	Sst: lt gy, f-m, subrnd-subang, sft, no cmt, poorly srtd, f dispersed Mica, Glau, min a/a occ tr wh Feldspar, f dk brn intbds,		
			no shows.		
24	1821	80%	Clyst/Slst: m gy - m gy grn, firm, crumbly, sl incr ind, massive, non-v sl calc, occ f Sd, some grn lithoclasts (≤2.0 mm).		
23	1862,5	50%	Sst: gy, f-m, fairly srtd, subrnd-subang, poor-non cmtd, occ slty, mica, occ Glau (vf), no shows.		
22	1848	60%	Sst: gen as 23 w/incl of Clyst clasts, no shows.		
21	1883	50%	Sst: a/a.		
20	1907	60%	Clyst/Sh: m-dk gy, firm, incr ind bcm fairly hd, blky, micro-mic, non calc, no Slt or Sd, occ wh spec poss feldspar.		
19	1956	0	Lost		
18	1969	100%	Clyst/Sh: lt gy - gy grn, firm, inc ind bcm subfis, sl sticky, v sl calc, micro-mic, patchy streaky grn Sh clasts, f Pyr spics.		
17	1973	40%	Lst: lt gy, firm, crumbly, dns, sl sticky, arg, non foss, f widely dispersed spic Pyr, no vis vug por, w oil stn on parting surfaces		
			and bright yel-straw flu, rapid streaming wh cut (no min. flu)		

SIDE WALL CORES DESCRIPTION

WELL	30/7-6	RUN N°	One
LICENCE	040	PAGE N°	Two
		DATE	7.3.77

SERVICE COMPANY	Schlum
ASKED	30
RECOVERED	25
SHOT	30
LOST	5
FULL BULLET	13
GEOLOGIST	Nicklin/ Thomassen

tr trace - M medium - G good

N°	DEPTHS m	REC	LITHOLOGY	Fluorescence	CUT
16	1990	0	Lost		
15	2032	0	Lost		
14	2055	40%	Sst: lt gy, f-m, hd, calc cmt, fair srtd, trf lithic frags (blk+ grn), micro-mic, occ spot oil stn w yel-gold flu, no cut.		
13	2067	90%	Sh: dk gy-blk, firm, hd, incr ind, subfis, crumbly, sl micro-mic, non-v sl calc.		
12	2118	100%	Clyst/Sh: a/a.		
11	2192	Tr	Poss Slst.		
10	2201	80%	Clyst: dk gy, sft-firm, sticky, blky, micro-mic partings, non calc.		
9	2212	100%	Clyst: a/a.		
8	2281	50%	Sst: m-ltgy, f grdg to Slst, subrnd-subang, firm, poorly cmtd, mod srtd, intermitant organic/Slty laminae w/occ blk lithic organic clasts (<3,0 mm). Yel/wh Patchy flu, slow weak cut.		
7	2310	60%	Sh/Clyst: dk gy-blk, firm-hd, dns, mass, micro-mic, non calc, faint yel background flu, no cut.		
6	2327	50%	Clyst/Sh: blk, dk gy, sticky, firm, non calc.		
5	2335	70%	Clyst/Sh: a/a.		
4	2346	60%	Clyst/Sh: a/a.		
3	2356	0	Lost.		
2	2385	60%	Clyst/Sh: gen a/a.		
1	2418	40%	Clyst/Sh: a/a.		

SIDE WALL CORES DESCRIPTION

WELL	30/7-6 (Sidetrack)
LICENCE	040
RUN N°	Two
PAGE N°	One
DATE	4/7-77

SERVICE COMPANY	SCHLUM
ASKED	30
RECOVERED	21
SHOT	29
LOST	5
FULL BULLET	0
GEOLOGIST	NICKLIN

tr trace - M medium - G good

N°	DEPTHS m	REC	LITHOLOGY	Fluorescence	CUT
1	3706	2"	SH: 100% dk gy,gyblk,v.hd,apr v.dns,blky-sub fiss, finely lamin, sl slty,mod calc, sl pyr.		
2	3705	2"	SH: 50% ltgy,med gy,gybrn,fairly hd,frm,crbly,earthy text, v.foss (forams-domin Globotruncuna ?),v calc grdg to Shaley Lst.		
			50% dk gy-gyblk a/a #1. NB: Calcimetry = 39·5% (NB on 2nd run, sample from same dpth was 100% blk sh.)		
3	3704	20%	LST (grdg to Mrl/Sh): med-ltgy,sft-mod hd,crbly,blky-subfiss, earthy text, slty due to slt size micro-foss(formas a/a),f-vf spks		
			+ occ thin wispy streaks blk carbon.mat ,poss frag reworked Sh,v.argil grdg to Mrl or Lmy Sh,-conv "fragile", micro-mic.		
4	3702	20%	LST (grdg to Mrl/Sh): a/a (#3) Flu: 3+4: v.weak, pale blueish- wh flu; slow, non streaming dull yell-grn cut. Calcimetry = 67%		
5	3701	15%	Sh/Mrl: dk-med gy brn,frm,sft,occ sticky,v.f. bcm Clyst,dns,mass, with poor fis, v.calc, grdg to shly Lst, micro-mic,occ patcy rewkd. Sh		
6	3699	70%	Sh: 100% blk,dkgy,modhd,frm, roughly fiss,sli lam,crbly,micro-mic, calc.		
7	3697	35%	LST (grdg Mrlst):lt-medgy,gy,spkld,mot,str,frm-mod hd,crbly,sl fiss,v.argil,grdg to Mrl,with rewkd clasts of Sh and v.f-f		
			spkld inclusions/frags; micro-mic,oss sltv(poss micro-foss:forams) Calcimetry = 4%		
8.	3691.5	)			
9	3689	)	LOST		
10	3685	)			
11	3680	45%	Mrl.(grdg to Shly Lst): medgy-gybrn,gen crbly,poorly consol detritus,occ v.hd-hd in patches,v slty and foss (formas a/a),		
			rewkd CO_3 + argil mat , v.f. blk,spkd mat . No clasts, multiple v.thin alternating dkgy-ltbrn, graded Laminae.		
12	3659	15%	Lst(Shaley grdg to Mrl):lt-medgy,modhd-sft,crbly,blky subfiss, frequent rewkd dk Sh clasts,v.argil grdg to Mrl,micro-mic in part		
			v.abundant foss (forams a/a)		

SIDE WALL CORES DESCRIPTION

WELL	30/7-6 (Sidetrack)
LICENCE	040
RUN N°	Two
PAGE N°	Two
DATE	4/7/77

SERVICE COMPANY	Schlum
ASKED	30
RECOVERED	21
SHOT	29
LOST	5
FULL BULLET	0
GEOLOGIST	Nicklin

tr : trace - M medium - G good

N°	DEPTHS m	REC	LITHOLOGY	Fluorescence	CUT
13	3641	MUD TR	EMPTY		
14	3635	30%	SH blk,mod hd-hd,dns,v.fine grdg to Clyst,blky,sub fiss,occ micro-mic,relativ.non calc,occ tr pyr		
15	3628	25%	SH a/a		
16	3590	20%	SH (grdg to Mrl) ltgy,gy sligrn gy,occ dk gy,mod hd,frm,subfiss blky,v.calc,grdg to Mrl.rewkd dkgy/blk Sh as in lenses/patches		
			+ streaks, apr non foss.		
17	3572		MISSING		
18	3545	50%	SH (some grdy to Mrl) gen a/a with sl dkr colour; occ tr pyr.		
19	3632		MISSING		
20	3528	75%	SH: dkgy,occblk,fg,homog,fiss,splty,tr micro-mic,non calc.		
21	3510	15%	SH:(Grdg to Mrl or with patches of Mrl as intermittant lenses)ltgy, med gy,mod frm-sft,occ v.sft,crbly,occ sticky,sl. lamin ,rubbly-		
			blky,text,occ sub fiss,slty (poss foss a/a) v.calc grdg to Mrl.		
22	3494	5%	SH (grdg to Mrl a/a)		
23	3465	5%	SH a/a		
24	3408	10%	SH a/a		
25	3398	Tr.	Lst with Mrl: Lst: gy,dk gy,v.hd,dns,cryptoxn,v argil,thinly intbd with Sh,poss dol ? Mrl,lt gy,off wh,v sft,sticky,amorph		
26	3389	Tr	SH: dk gy, hd, blky, splty,non calc		
27	3350	15%	SH+ MRL a/a		
28	3315	25%	SH: dkgy,blk,hd,sub fiss,blky,sl- earthy text,sl- calc		

SIDE WALL CORES DESCRIPTION

WELL: 30/7-6 (Sidetrack)	RUN N°: Two
LICENCE:	PAGE N°: Three
	DATE: 4/7/77

SERVICE COMPANY	Schlum
ASKED	30
RECOVERED	21
SHOT	29
LOST	5
FULL BULLET	0

GEOLOGIST: Nicklin

tr trace - M medium - G good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	CUT
29	3290		MISFIRE		
30	3262	35%	SH with Mrl a/a		

SIDE WALL CORES DESCRIPTION

WELL	30/7-6 (Sidetrack)	RUN N°	Three
LICENCE	040	PAGE N°	One
		DATE	4/7/77

SERVICE COMPANY	SCHLUM
ASKED	30
RECOVERED	4
SHOT	7
LOST	0
FULL BULLET	0
GEOLOGIST	Nicklin

tr trace - M medium - G good

N°	DEPTHS m	REC	LITHOLOGY	Fluorescence FLO	Fluorescence CUT
1	3705	TR	SH: blk,dkgy,frm-modhd-hd,sub fiss-fiss,sli splty,calc. (NB.Samp from"same"dpth on Run #1 contained 50% ltgy Limey Sh)		
2	3704		MISFIRE		
3	3703.5		EMPTY		
4	3703	15%	LST: (grdg to Mrl/Limey Sh) Calcimetry 67% med-ltgy,sft-mod hd, crbly,blky-sub fiss,earthy text,occ slty text due to slt size micro-		
			foss (forams possy.agglutin "Globotruncana")in abundance,f-v.f. spks+ occ thin strks,blk carbon.mat /rewkd Sh.v.argilgrdg to Sh/		
			Mrl.gen "fragile",micro-mica ; Flu: v.weak pale bluish wh, non-v slight,slow,non streaming dull vell-grn cut.		
5	3700		EMPTY		
6	3698	15%	SH: blk,hd, blky,britt, v.f. lam,non calc, micro-mic.		
7	3695	10%	SH a/a		
8	3690		MISFIRE		
9	3682.5		EMPTY		
10			GUN FAILURE -		
			ALL BULLETS -		
30			FAILED TO FIRE		

SIDE WALL CORES DESCRIPTION

WELL	30/7-6 (Sidetrack)
LICENCE	040.
RUN N°	Four
PAGE N°	One
DATE	4/7/77

SERVICE COMPANY	SCHLUM.
ASKED	30
RECOVERED	10
SHOT	12
LOST	3
FULL BULLET	1
GEOLOGIST	NICKLIN

tr trace - M medium - G good

N°	DEPTHS m	REC	LITHOLOGY	Fluorescence	CUT
1	3704.5	25%	LST(Shly grdg to Mrl): med gy,dk gy,lt gy,spkld,mottled,mod hd,frm-crbly,blky,earthy,slty text,sli graded,v.argil,foss(forams,		
			dominantly"Globotruncana"?),f blk spks,carbon mat ,tr pyr. occ micro-mic.		
2	3704	25%	a/a		
3	3703.5	10%	Lst(Shly grdg to Mrl), lt brn, lt rd/brn-tan,gybrn,frm,sft,crbly, blky,occ sli fiss,f.gr v.argil,occ calcitic patch,foss (forams),		
			occ widely dispersed carbon mat as frags or specks, occ micro-mic . micro-pyr.		
5	3700	5%	Lst (Shly) as in #1. with occ tr patchy Mrl wh, off wh, v.sft, stky.		
6	3696	2%	Lst (Shly) ltgy, dkgy, spkld, mottled, hd, britt,blky,rough sucrosic text,v argil,foss (forams a/a)micor-mic,micro-pyr,blk specks		
7	3694	90%	SH med gy,dkgy,lt gy, mod hd,occ sft,sticky,occ blky with rough lam,some rewkd patches,some alternating bands dk/blk Sh,mod calc,		
			non mica , non pyr, occ calc " patches "		
8	3690		EMPTY		
9	3682.5		EMPTY		
10	3660	45%	MRL/SH: dk gy,dkgybrn, mod hd-hd, frm,sli crbly-britt,blky,tr micro-mic, v.calc, poss foss (a/a)		
11	3640	15%	SH (MRLY): med gybrn, mod hd,sli crbly,frm, blky,subfiss,earthy text a/a, v.calc		
12	3635	10%	SH: blk,v.hd,britt,fria,blky,sli sucrosic text v.pyr with replace-ment of micro-foss+occ macro-foss frag.possy sl. dol.		
13	3630	20%	SH(Mrly), med gy,firm,mod hd,occ crbly,blky-sub fiss,sli spkld, occ micro-mic, poss tr foss. (forams a/a)		
14+15+16			MISSING		
17 - 30			MISFIRED - GUN FAILURE.		

SIDE WALL CORES DESCRIPTION

WELL	30/7-6
LICENCE	040
RUN N°	Five
PAGE N°	One
DATE	31.5.78

SERVICE COMPANY	Schlum
ASKED	45
RECOVERED	41
SHOT	44
LOST	4
FULL BULLET	36
GEOLOGIST	Nils Fagerland

tr trace - M medium - G good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	CUT
1	4114	0	LOST		
2	4109	60	Sh: olv blk-dk gy, mod hd.		
3	4103	25	Sh: brownish blk, firm.		
4	4097	Tr	Sh: dk brn, firm, v slty.		
5	4075	20	Sh: dk brn, sft-firm, v slty.		
6	4057	0	LOST		
7	4057	0	LOST		
8	4042.5	65	Sd: gy, vf, subang, lse, mod srtd, slty, arg, poor-fair por.	No show	
9	4027.5	80	Sh: dk brn, firm, v slty.	No show	
10	4021	15	Sd: gy-lt brn gy, clr qtz grains in brn arg mtx, vf-f, subang, lse, mod srtd, probable gd por.	"	
11	3998	40	Sh: olv gy, mod hd, tr small coal frags.		
12	3981.5	80	Coal: blk, mod hd, arg in parts.		
13	3971	80	Sh: brownish blk, firm.		
14	3969	90	Sh: olv gy, mod hd, sl frac, tr coal frags.		
15	3954	0	MISFIRE		
16	3937.5	50	Sh: brn, sft-firm, slty and sdy with abn vf grains.		
17	3936	90	Sh: dk brn-brownish blk, mod hd, fractured.		
18	3920.5	75	Sh: olv gy-brownish gy, mod hd, sl fractured.		

SIDE WALL CORES DESCRIPTION

WELL	30/7-6
LICENCE	040
RUN N°	Five
PAGE N°	Two
DATE	31.5.78

SERVICE COMPANY	Schlum
ASKED	45
RECOVERED	41
SHOT	44
LOST	4
FULL BULLET	36
GEOLOGIST	Nils Fagerland

tr trace - M medium - G good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	CUT
19	3904.5	90	Sh: olv gy, mod hd.		
20	3902	0	EMPTY		
21	3900	70	Sh: chocolate brn, sft.		
22	3891.5	75	Sst: brn, f.	No show	
23	3889	0	LOST		
24	3885.5	60	Sst: brn, vf-m, pr srtd.	"	
25	3882.5	75	Sst: brn, vf-crs.	"	
26	3865	30	Sst: lt brn - gy, vf, subang, lse, mod-well srtd, arg No show due to vaporisation?	"	
27	3864	40	Sst: vf-m.	"	
28	3856	80	Sst: brn, vf.	"	
29	3852.5	40	Sst: f-slt, arg, mica.	"	
30	3852	0	EMPTY		
31	3837.5	80	Sst: f, v arg	"	
32	3827.5	70	Slst: v arg, also sdy with vf grains	No show	
33	3824	60	Sst: m, wrapped in foil	"	
34	3813	90	Sst: brn, vf-slt, mica, w/sl, fluo.		
35	3811	80	Sst: brn, vf-slty, arg, mica.	"	
36	3795	90	Sst: brn, f-m, lse.	"	

SIDE WALL CORES DESCRIPTION

WELL	30/7-6
LICENCE	040
RUN N°	Five
PAGE N°	Three
DATE	31.5.78

SERVICE COMPANY	Schlum
ASKED	45
RECOVERED	41
SHOT	44
LOST	4
FULL BULLET	36

GEOLOGIST: Nils Fagerland

tr trace - M medium - G good

N°	DEPTHS	REC	LITHOLOGY	Fluorescence	CUT
37	3789	0	LOST		
38	3785	0	EMPTY		
39	3780	60	Sh: brownish blk, firm, slty, sl micro-mic, non calc.		
40	3770	60	Sh: greyish brn, sft, appears as clay.		
41	3760	60	Sh: chocolate brn to olv brn, sft, appears as clay.		
42	3750	60	Sh: dusky yellowish brn, firm to mod hd.		
43	3739	65	Sh: as below		
44	3732	80	Sh: greyish blk to brownish blk, firm, blky, slty, non calc.		
45	3727.5	50	Marlstone/Sh: olv gy, firm.		

APPENDIX 2
WELL SUMMARY

WELL SUMMARY

Coord: 60° 29' 29.82" N 02° 03' 26.14" E
Line: 653 805 SP 158 · 75m off in NE direct.
Depths datum: R.K.B.
Rig: Phase I: Polyglomar Driller
Phase II: Treasure Seeker
Water depth: 116.5 m R.K.B. elev.: Phase I: 24m
Stopped in: Dunlin Fm (Lower Jurassic) Phase II: 25m

Spudded: Feb. 15. 1977
Temp. abandoned: July 31. 1977
Re-entered: April 8. 1978
Started drlg formation: April 29. 1978
Completed: June 4. 1978
T.D. Driller: Phase I: 3711m II: 4115m
T.D. Logger: 4114 m

Well: 30/7-6

Country: NORWAY

OPERATOR Norsk Hydro Produksjon as

LICENCE 040 OWNED BY: Statoil / Petronord

TARGETS:

Middle and Lower Jurassic Sandstones

RESULTS:

GAS CONDENSATE DISCOVERY IN MIDDLE JURASSIC SANDSTONES (BATHONIAN).
3792 - 3892 m.
GROSS PAY : 100 m NET PAY: 75 m
AVERAGE POROSITY : 19.4 %
AVERAGE S_w : 20 %

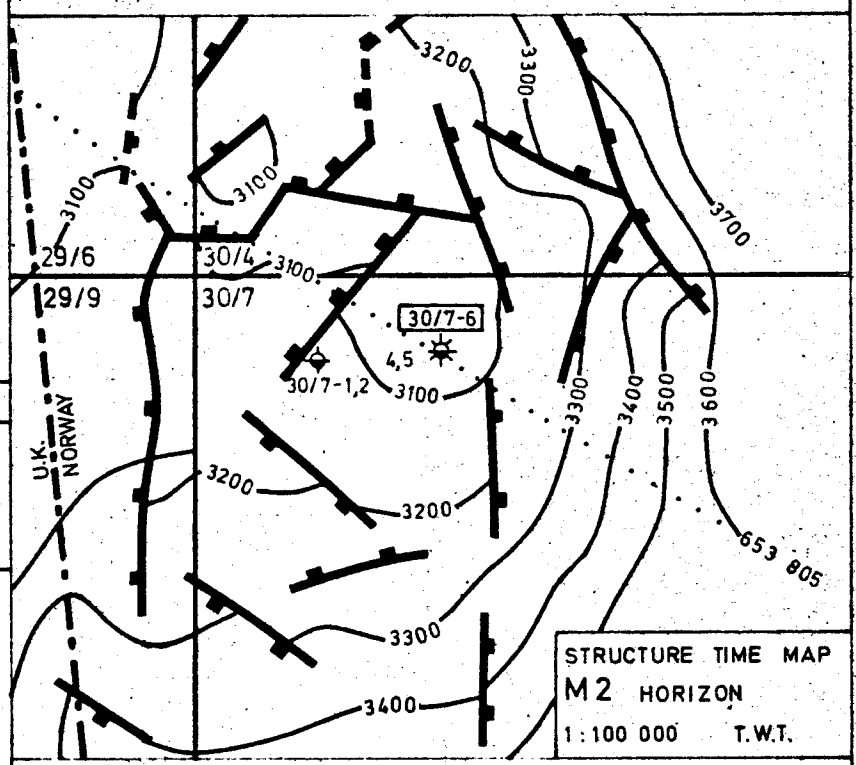
CASINGS

30" at 186 m
20" at 765 m
13 3/8" at 2541 m
9 5/8" at 3252 m
7" liner at 3702 m

CORES

No conventional cores were taken.

CST 1	1773 - 2418 m	30/25
CST 2-4	3262 - 3706 m	90/31
CST 5	3727.5 - 4009 m	45/41



LOGS

ISF-SONIC	765 - 2460 m	1	WST	600 - 3150 m	1
	1740 - 2551 m	2		3262 - 3707 m	2
	2541 - 3612 m	3		2150 - 3863 m	3
	2541.5 - 3254 m	4		120 - 4115 m	4
	3252 - 3500 m	5			
	3470 - 3689.5m	6	RFT	3262 - 3500 m	1
	3650 - 3705.2m	7		3262 - 3707 m	2
	3702 - 3801 m	8		3703 m	3
	3687.5 - 3965.8m	9		3855.5 - 4008.5 m	4
	3897.5 - 40655m	10		3793 - 3891,5 m	5
	3779.2 - 4112.2m	11			
GR	3670 - 3711m	1	HRT	2000 - 2777 m	1
FDC-CNL	1700 - 2459 m	1		2000 - 3775 m	2
	2541 - 3260 m	2		2000 - 3775 m	3
	3252 - 3500 m	3		2000 - 3706 m	4
	3470 - 3707 m	4		2000 - 3452 m	5
	3250 - 3666 m	5		2000 - 2820 m	6
	3250 - 3711.5m	6		2000 - 3130 m	7
	3250 - 3706.5m	7		2000 - 3295 m	8
	3702.2 - 3780 m	8		2000 - 3770 m	9
	3702 - 3965.5m	9		2000 - 3770 m	10
	3779.2 - 4113.3m	10	CBL	1000 - 3215 m	1
HDT	2544.5 - 3260 m	1			
	3252 - 3707 m	2			
	3707 - 4112.2m	3			
DLL-MSFL	3252 - 3498 m	1			
	3470 - 3707 m	2			
	3772 - 4113 m	3			
FIL	3252 - 3707 m	1			
Neutron	2550 - 3770 m	1			

SHOWS

188 - 1120 m:	C1	< 1.0 %
1120 - 1330 m:	C1, C2, tr C3	< 1.0 %
1330 - 1630 m:	C1	< 1.0 %
1630 - 2175 m:	C1, C2, tr C3	< 1.0 %
2175 - 2338 m:	C1-C4	0.2 - 1.0 %
2338 - 2495 m:	C1-C3	0.2 - 1.0 %
2495 - 2545 m:	C1-C4	0.2 - 1.0 %
2545 - 2600 m:	C1-C3	0.2 - 1.0 %
2600 - 2810 m:	C1-C4	0.4 - 4.0 %
2810 - 2940 m:	C1-C4	2.0 - 6.0 %
2940 - 3265 m:	C1-C3, occ C4	0.2 - 1.8 %
3265 - 3486 m:	C1-C3	0.1 - 1.0 %
3486 - 3725 m:	C1-C4	0.5 - 4.0 %
3725 - 3792 m:	C1-C4	1.0 - 1.3 %
3792 - 3854 m:	C1-C4	2.0 - 20 %
3854 - 3887 m:	C1-C3, tr C4	0.4 - 2 %
3887 - 4057 m:	C1-C3, tr C4	0.2 - 2 %
4057 - 4115 m:	C1, C2, tr C3	< 0.6 %

1925 - 2282 m : ◓ (occ stain) on Sst, Slst and Lst.
2343 - 3034 m : ◓ on Lst, below 2685 m ◔, also on Slst
3792 - 3892 m : ◓ occ weak on SWCs

Checked: S.I.Leivestad
Date: 7-12-78

RFT RESULTS

Well: 30/7-6

RUN 1

	DEPTH (KB)	FORMATION PRESSURE
1	3488.5 m	DRY
2	3488.8 m	DRY
3	3488.0 m	DRY
4	3487.5 m	DRY
5	3363.9 m	DRY
6	3365.3 m	DRY

RUN 1 AND 2 WERE MADE TO INVESTIGATE IF ANY PERMEABLE BEDS, INDICATED FROM LOG ANALYSIS, WERE PRESENT IN THE LOWER UPPER CRETACEOUS. NO PERMEABLE BEDS WERE FOUND.

RUN 2

	DEPTH (KB)	FORMATION PRESSURE
1	3703.1 m	117 PSIG - DRY
2	3697.2 m	215 PSIG - DRY
3	3685.0 m	245 PSIG - DRY
4	3676.6 m	816 PSIG - DRY
5	3655.8 m	319 PSIG - DRY
6	3647.0 m	2012 PSIG - DRY
7	3641.5 m	3356 PSIG - DRY
8	3606.2 m	453 PSIG - DRY
9	3592.3 m	396 PSIG - DRY
10	3588.5 m	377 PSIG - DRY
11	3580.6 m	469 PSIG - DRY
12	3551.2 m	357 PSIG - DRY
13	3522.9 m	— DRY
14	3512.1 m	289 PSIG - DRY
15	3509.8 m	238 PSIG - DRY
16	3504.0 m	243 PSIG - DRY
17	3501.2 m	313 PSIG - DRY
18	3522.1 m	253 PSIG - DRY
19	3638.5 m	224 PSIG - DRY

RUN 3

	DEPTH (KB)	FORMATION PRESSURE
1	3793 m	10 607 PSIG

TOOK SEGREGATED SAMPLE (1+2 3/4 GAL)-RECOVERED MUD FILTRATE AND SMALL QUANTITY OF HC:
C_7^+ GRAVITY: 54.6° API.

RUN 4

	DEPTH (KB)	FORMATION PRESSURE
1	4008.5 m	10 832 PSIG
2	3932 m	10 706 PSIG
3	3891.5 m	10 607 PSIG
4	3878.5 m	10 638 PSIG
5	3868 m	10 599 PSIG
6	3864 m	10 598 PSIG
7	3855.5 m	10 597 PSIG

AT 3855.5 m TOOK SEGREATED SAMPLE -RECOVERED MUD FILTRATE AND ONLY SMALL QUANTITY OF HC:
OIL GRAVITY: 42-48° API.

RUN 5

	DEPTH (KB)	FORMATION PRESSURE
1	3806.5 m	10 611 PSIG
2	3837.5 m	10 640 PSIG
3	3793 m	10 615 PSIG
4	3891.5 m	10 662 PSIG

AT 3891.5 m TOOK SEGREGATED SAMPLE - RECOVERED ONLY MUD FILTRATE.

Checked: S.I.Leivestad
Date: 7-12-78

GEOLOGICAL WELL SUMMARY

LOCATED ON LINE : 653 805
SP : 148 75m off in NE direction
N : 60° 29' 29.82" E : 02° 03' 26.14"
WATER DEPTH : 116.5 m

WELL: 30/7-6

DEPTHS m KB	FORMATIONS	STAGES	SHOWS	DESCRIPTIONS, OBS
24				24 m SEA LEVEL
140.5	30° 186m	QUARTERNARY		140.5m SEA BOTTOM
140.5–204		QUARTERNARY		Sd, vf-m, occ v crs, subang-rnd. Cly, m dk-dk gy, slty, sl calc w/ cbls and pbls of basement rocks
204–286		QUARTERNARY	☼	Cly, dk gy - m dk gy, firm, slty, sl calc.
286–670		PLIOCENE	C1	Sd, clr Qtz, vf-m, occ crs-v crs, ang - rnd, mic, intbd w/ Cly, m gy - olv gy, sft - firm, slty, occ v slty. Occ tr Glau, dk grn-blk, hd and abn shell frags.
670–973	20° 765m	OLIGOCENE - MIOCENE	C1	Lign, blk-v dk brn, fibrous, wood struc. Slst, brn, firm, sl calc. Lign, a.a.
973–1048	TERTIARY	LATE OLIGOCENE	C1	Clyst, olv gy, occ olv blk, sft-firm, micro-mic, sl calc, slty, sdy, glau.
1048–1095	TERTIARY	LATE OLIGOCENE	☼	Slst, olv gy, olv blk, sft-firm, micro-mic, sl calc, occ sdy, arg grdg Clyst
1095–1255	TERTIARY	OLIGOCENE	C1, C2, tr C3	Clyst, lt - dk olv gy, sft-firm, stky, micro-mic, sl - n calc, slty. Thin strgs Sst, lt gy, vf, subang-subrnd, firm, fri, calc cmt. Tr Glau, Pyr.
1313–1395	TERTIARY	EOCENE	☼ C1	Slst, lt olv gy, lt olv brn, firm, n calc, occ pyr, occ grdg to Sst, lt gy, f, subrnd, glau.
1395–1438	TERTIARY	EOCENE	C1	Clyst, a.a w/thin intbd Slst and Sst a.a. Tr Pyr.
1438–1472	TERTIARY	EOCENE	C1	Slst a.a w/intbds Clyst and lse Sd a.a.
1472–1783.5	TERTIARY	EOCENE	☼ C1	Clyst, lt olv gy, lt gy - gy grn, sft bcm ind and firm, n calc, freq slty grdg Slst, occ glau and pyr. Thin strgs Sst, lt gy, f, calc cmt and Lst, lt brn - dk bm, crypto xln, v hd, occ dol. Clyst a.a bec ind grdg to Sh
1783.5–1923	TERTIARY	EOCENE	C1, C2, tr C3	Sd, lse, clr, fros Qtz, vf-crs, ang - subrnd, occ micro-mic and glau, occ calc cmt, no shows. Intbd w/ Clyst / Sh, lt-dk gy, m-dk gy grn, firm, blky, n calc pt slty. Tr Pyr. Poss. tr Tuff
1923–1965	TERTIARY	EOCENE	C1, C2, tr C3	Clyst / Sh, a.a w/ thin strgs Sst, f grdg Slst. Strgs Lst, lt gy, firm-hd, arg, pyr.
2044–2085	TERTIARY	PALEOCENE	C1-C4	Sst, lt gy, vf-m, hd, calc cmt, occ lithic clasts, tr Pyr.
2085–2280	TERTIARY	PALEOCENE	☼ C1-C4	Sh, dk gy, gy brn, blk, firm - f hd, subfiss, v sl - n calc, occ slty. Strgs Slst, lt gy-grn, dk brn v arg, occ v calc. Sst, lt-m gy, f, grdg Slst, calc cmt, poorly cmtd.
2280–2377	TERTIARY	DANIAN	☼ C1-C4	Strgs Lst, wh gy - lt brn, sft, chky.
2377–	CRET.	MAASTRICHT.	C1-C3	Sh, m-dk gy, firm, blky - subfiss, occ slty, pyr, n - sl calc, pt v calc grdg Mrl, lt - m gy, sft. Intbd Lst, wh, lt brn, firm-hd, occ microxln, arg grdg Mrl.

GEOLOGICAL WELL SUMMARY

DEPTHS m KB | LITHO SECTION | FORMATIONS | STAGES | SHOWS | DESCRIPTIONS. OBS

LOCATED ON LINE SP

WELL 30/7-6

WATER DEPTH 116,5 m

2500

SIDETRACKED HOLE STARTED AT 2619 M.

2592

Mrl, vlt-lt gy; v sft-firm, grdg to Sh dwnwards. Strgs Lst, lt gy, chlky, arg grdg Mrl, and Dol, tan; hd, crypto xln.

2685

Sh/Clyst, m-dk gy, dk grn gy, firm, occ hd, blky-subfiss, occ micro-mic, sl-mod calc, occ slty, pyr w/ thinly intbd

Mrl, lt gy, sft, stcky,

Lst, dol lt-m brn, hd, dns, crypto xln occ arg and

2885 Slst, m-dk brn, occ rd, firm-hd, n-sl calc arg.

3100

Sh, m-dk gy, gy blk, hd, blky-subfiss, n-sl calc, occ v calc grdg Mrl. Tr Sh, dk, brn-rd brn, occ slty. Tr Slst, lt gy, gy brn, mod hd, fri.

Strgs Lst, lt-dk brn, hd, dns dol.

3486

Sh a.a, occ v calc grdg Mrl intbd w/ Lst, wh-lt gy, lt-m brn, sft, arg grdg Mrl, hd, dns, crypto xln. Tr Dol, dk brn, hd, dns.

3638

Alt Lst a.a. and Sh a.a.

Tr. Slst, lt gy brn, firm-hd, v calc

3709 Mrl, brn, rd brn, hd, blky occ slty.

T.D. OF SIDETRACKED HOLE PHASE I: 3711m

PHASE II

3725 Sh, dk gy-blk, blky, slty, 3738 micro mic, carb, sl calc.

Strgs Lst and Dol.

3792

Sst, clr, lt gy, lt brn, vf-m, occ crs, ang-subang, in prt calc cmt occ silic, pyr, gd-fair por.

Intbd w/ Sh, dk gy-dk brn, carb. Beds of Coal, blk, hd.

3887

3910

Intbd Sst, clr, lt gy, lt brn, vf-m, occ slty, in prt calc and silic cmt, fair-pr por.

Sh, lt-m gy, dk gy brn, often carb w/ Coal bds

4001 Strgs of Dol, brn, vhd

Sst, f-crs, occ v crs, occ kaolin, occ calc cmt, mic,

4057 Intbd w/ Sh, carb.

Sh, m-dk gy, gy brn, loc slty and sdy, micro-mic, carb, pyr.

4115

T.D. 4115m

S.I.L., DEC. -78