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III DRILLING REPORT

### III I. SUMMARY

Well 15/9-10 was a wildcat designed to test possible hydrocarbon accumulations in the Jurassic sands of the 15/9- eta structure located in the southwest part of 15/9.

The well was drilled into rocks of possible Triassic age to a total depth of 3289 m RKB.

The well was drilled with "Neptuno Nordraug", and the well reached total depth after 48 days, only 5 days behind schedule.

The primary objective of this well was sandstones of Upper to Middle Jurassic age. A possible secondary prospect was the Heimdal Formation sand of Paleocene age. Unfortunately, these sands appeared to be dry, and the well was plugged and abandoned without any testing.

A total of 56 days were spent on this well, and the overall cost reported on this well was 40.7 MM N.kr. (per 31. of march 1982).

### III.2 DRILLING OPERATIONS IN INTERVALS

The drilling platform "Neptuno Nordraug" was transferred from well 34/10-12 at 20.00 hrs 13th of September 1981. The well was spudded at 2115 hrs 15th of September. The water depth was measured to be 98 m.

The final position was:  $58^{\circ} 19' 42.92''$  N  
 $01^{\circ} 46' 20.61''$  E

#### 36" hole, 123 - 172 m

The 36" hole was drilled with a 26" bit and a 36" hole-opener without temporary guide base. This section was drilled with seawater, and  $5\text{m}^3$  high vis gel mud was spotted on each connection. Displaced hole with seawater and  $32\text{m}^3$  gel mud plus  $8\text{m}^3$  1.2S.G. mud. The 30" housing and 5jts of 30" pipe was made up in the base plate in the moonpool in advance. The casing was run without problems, and the capacity of casing was circulated prior to cementing. Then the casing was cemented without problem. The shoe was drilled out with a 26" bit to 173 m and the riser and pin connector were run and the diverter nipped up, 32 hours after spud.

#### 26" hole: 172 - 485 m

Drilled 12 1/4" pilot hole from 173-186 m, where we lost circulation. Pumped  $16\text{m}^3$  high viscosity pill. Filled hole from above with seawater, but level in riser dropped. Drilled 12 1/4" hole from 186-189 m. Lost circulation again. Pumped  $11\text{m}^3$  lost circulation pill. Level dropped 25 m in 3 hours. Pumped  $12\text{m}^3$  LCM and got partial return. Drilled to 200 m with half return. Observed leak outside 30" on seabed. Set a balanced cement plug across 30" shoe with slurry density 1.91 S.G. Wait on cement, tagged same at 173m.

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Circulated and observed leak in pin connector. Pulled riser and RIH with 30" running tool with 2 jts. 3.5" DP below. Made up running tool and cemented inside 30" casing. Backed off running tool and POOH. Run in with 3½" DP and cemented outside 30" casing. Run riser and pin connector and RIH and tagged cement at 162 m. Drilled to 187 m with partial returns. Divers observed leak in seabed 10 m away from wellhead. Set LCM pill from 190 to 167 m and cement-plug up to 125 m. Wait on cement, tagged same at 173 m. Drilled from 173 - 178 m. Lost circulation. Pumped 6m<sup>3</sup> LCM pill (40lbs per bbl), and set a cement plug with density 1.33 S.G. Then bad weather forced us to disconnect the riser, and we waited a total of 29 hrs before we drilled the cement. The waiting time plus the cement/LCM-pill had cured our problem and we drilled 12 1/4" pilot hole to 485 m. Run ISF/GR/SONIC and determined to open the hole with 26" holeopener after evaluated the drilling parameters and the loys. Pulled riser and opened hole to 26" with a 12 1/4" bit and 26" holeopener. Run 20" casing, worked high spot at 442 m. Landed casing and circulated casing volume with seawater. Cemented casing, sub surface cement plug seared ok and plug bumped after displacing 20" shoe at 472 m. Cleaned 18 3/4" housing and guide frame. Ran BOP and tested same, ok. Tested 20" casing to 55 bar.

17½" hole: 485 - 1178 m

Drilled 3 m new formation and performed leak off test eq. to 1.75 S.G. mudweight. Drilled to 1178 m without problems. Took survey every 90 m and made short trip at 904 m. The bit, HTC OSC-3AJ averaged 27.6 m/hr in 25.1 hrs rotation time. After TD was reached, a wipertrip to shoe was made and the hole was displaced with high visc. mud. After two logruns and a wipertrip, the 13 3/8" casing was run and cemented. The sub sea cement plug was bumped with 172 bar, and the seal assembly was set and the casing tested to 172 bar.



12 1/4" hole: 1178 - 2719 m

Drilled 3m new formation and performed leak off test eq. to 1.65 S.G. mudweight. Drilled 12 1/4" hole to 2718 m. or 55 m into cretaceous Fm. Used 4 bits and they drilled from 71 - 950 m and averaged 2.8 - 25.2 m/hr. Some tight hole reported through this section, and we were not able to pass 1540 mw/ the ISF-SONIC/GAMMA RAY. Made a bit run to clean the tight sections at 1500 - 1540 m and at 2700-TD. Finished logging and made a cleanup trip before we run 9 5/8" casing. During cementing we had full returns, but we got cement to surface. Sat seal assembly and RIH to 1365 m, where we hit cement. Attempted to test casing, leaked off at 100 bar. RIH with RTTS packer and detected leak between 991 - 993 m. Set cementplug from 1100 - 1242 m, dressed off to 1144m. Squeeze cemented 9 5/8" casing with packer at 924 m. Tested casing to 172 bar, OK. Leaked off at 193 bar. Drilled out cement and displaced hole with seawater. Set a balanced cement plug from 993 m. Pulled out to 880 m, reversed out and hezitate squeezed. Tested casing to 217 bar, OK. Drilled cement and displaced back to mud. Tested casing at 2678 m to 193 bar. This 9 5/8" casing was now regarded as a liner, and approval was given to continue drilling and a 7" casing must be set if we should test the well.

8 1/2" hole: 2719 - 3289 m

Drilled 3 m new formation and performed formation integrity test to 1.78 eq. mudweight( no leak off observed). Drilled 8 1/2" hole from 2737 - 2980 m with a average of 6.9 m/hr. Cut four cores with full recovery in three of them. 2 m silty shale was recovered in core no. 1. Drilled to TD at 3289 m. The hole was logged without problems and the open hole was plugged back with cementplugs.



The only problem during P & A was that we were not able to pull the 9 5/8" casing after it was cut at 800 m. The 9 5/8" casing was then cut at 500 m and pulled without problems. The 20" and 30" casing were cut at 131 m and pulled and the well permanent abandoned.

"Neptuno Nordraug" had the last anchor pulled and left the location at 17.40 hrs 7th of November 1981 and under tow to 15/9-12.

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### III 3. EXTRACT OF DAILY ACTIVITIES

- 13/9 Under tow from well 34/10-12 to well 15/9-10.  
Transferred to 15/9-10 at 2000 hrs.
- 14/9 Arrived 15/9-10 location. Dropped first anchor at  
2146 hrs. Ran anchors.
- 15/9 Made up 30" casing string with base plate and hung off  
same in moon-pool. Spudded in at 2115 hrs. The water  
depth was measured to 98 m. Drilled 36" hole to 165 m.
- 16/9 Drilled 36" hole to 172 m. Made wiper trip to sea  
bed. Displaced hole w/gel mud. Took survey. POOH.  
Ran and landed 30" casing at 172 m. Cemented 30"  
casing. RIH w/26" bit. Tagged cement at 166 m.  
Drilled out shoe and 1 m new hole to 173 m. POOH.  
Ran riser. Installed diverter.
- 17/9 RIH w/12 1/4" bit. Drilled pilothole from 173-186  
m. Lost circulation. Pumped 16 m<sup>3</sup> high vis pill.  
Filled hole from above w/sea water. Riser level still  
dropping. Pumped 13 m<sup>3</sup> LCM. Filled hole from above  
w/sea water. Pumped 11 m<sup>3</sup> LCM. Riser level still  
dropping. Displaced hole w/mud. Drilled to 189 m.  
Lost circulation again. Pumped 11 m<sup>3</sup> LCM. POOH to  
shoe. Level dropped in riser. Pumped 12 m<sup>3</sup> LCM.  
Drilled 12 1/4" hole to 200 m. Had half return.  
Observed leak outside 30" casing on seabed. POOH.  
RIH w/open ended D.P. to 177 m and set a cement plug  
across the 30" shoe. POOH.
- 18/9 WOC for 6 hrs. RIH w/12 1/4" bit. Tagged cement at  
173 m. Observed leak on pin connector. POOH.  
Unlatched and pulled pin connector. RIH w/30" running  
tool w/2 joints of D.P. below and pumped down cement.



POOH w/running tool. Ran in w/3 ½" open ended D.P. and stinger into annulus between 36" hole and 30" casing. Pumped cement. POOH. Ran pin connector and riser.

- 19/9 RIH w/12 1/4" bit. Tagged cement at 162 m. Drilled cement to 187 m. "Mantis" observed leak 10 m away from wellhead. POOH. RIH w/open ended D.P. and set a LCM-plug from 190-167 m. Set cement plug from 167-125 m. POOH. WOC for 8.5 hrs. RIH. Tagged cement at 173 m. Drilled cement to 178 m. Lost circulation. POOH. RIH w/open ended D.P. to 178 m.
- 20/9 Pumped down .6 m<sup>3</sup> LCM and 9.3 ton cement (slurry density 1.38 s.g.) Unlatched riser and WOW.
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- 21/9 Latched on pin connector. RIH w/12 1/4" bit. Tagged cement at 161 m. Drilled cement to 200 m. Displaced hole w/mud. Drilled to 485 m. Circulated hole clean. Pumped 24 m<sup>3</sup> high vis pill. Took survey. POOH w/four stands. Swabbed 2 bbls. Ran back to bottom.
- 22/9 Pumped 5.6 m<sup>3</sup> LCM. Made wiper trip to 30" shoe. Circulated bottoms up. Took survey. POOH. Ran ISF-sonic/GR. RIH w/12 1/4" bit. Displaced hole w/sea water. Checked for flow- OK. Displaced hole w/1.15 s.g. mud. POOH. Pulled riser. RIH w/12 1/4" bit and 26" holeopener.
- 23/9 Drilled cement from 162-172 m. Opened 12 1/4" pilothole to 26" from 172-485 m. Pumped 3.2 m<sup>3</sup> high vis pill on each connection. Displaced hole w/1.14 s.g. mud. Took survey. Made wiper trip to 30" shoe.
- 24/9 Reamed tight spots. Made wiper trip to 300 m. Displaced hole w/1.14 s.g. mud. Pumped 10 m<sup>3</sup> 1.25 s.g. mud on bottom. POOH. Ran 20" casing. Worked tight spot at 442 m. Cemented casing.





- 25/9 Ran and landed BOP-stack, tested same. RIH w/17½" bit. Tagged cement at 453 m. Drilled cement and float collar.
- 26/9 Drilled cement to 468 m. Displaced hole w/1.05 s.g. mud. Tested 20" casing to 55 bar- OK. Drilled cement shoe and 3 m new hole to 488 m. Performed leak off test equivalent to 1.75 s.g. Drilled to 593 m. Took survey. Drilled to 697 m. Took survey. Drilled to 741 m.
- 27/9 Drilled to 800 m. Took survey. Drilled to 904 m. Took survey. Made wiper trip to 20" casing shoe. Tight spots from 840-538 m. Drilled to 999 m. Took survey. Drilled to 1094 m. Took survey. Drilled to 1101 m.
- 28/9 Drilled to 1178 m. Took survey. Made wiper trip to 20" shoe. Tight spots from 1134-1077 m. Reamed tight spots. Circulated and conditioned mud. Made wiper trip to 1050 m. No drag. Displaced hole w/high vis mud. POOH. Ran logs.
- 29/9 RIH w/17½" bit. Circulated hole clean. POOH. Ran and cemented 13 3/8" casing (casing shoe at 1166 m). Displaced cement and bumped plug w/172 bar. Held OK. Retrieved landing string. Washed wellhead area. Run seal assembly.
- 30/9 Tested seal assembly, BOP and 13 3/8" casing to 172 bar. Leak off test eq. to 1.65 S.G. Drilled 12 1/4" hole from 1181 m to 1212 m.
- 1/10 Drilled to 1273 m. Took survey. Drilled to 1367 m. Took survey. Drilled to 1461 m. Took survey. Drilled to 1557 m. Took survey. Short trip.
- 2/10 Drilled to 1652 m. Took survey. Drilled to 1747 m. Took survey. Drilled to 1842 m. Took survey.



- 3/10 Drilled to 1938 m. Took survey. Drilled to 2033 m. Increased mudweight to 1.22 s.g. Drilled to 2128 m. Took survey.
- 4/10 POOH. Tight hole around 1965 m, 1940 m, 1345 m and 1320 m. Max overpull 27 m/t. RIH w/new bit. Reamed 1735-57 m. Drilled from 2128 m to 2135 m. Gas cut mud. Drilled to 2221 m. Took survey. Drilled to 2314 m. Took survey.
- 5/10 Drilled to 2410 m. Took survey. Drilled to 2457 m. Took survey. POOH. Tight hole around 2340 m and 2000-2080 m.
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- 6/10 RIH with new bit. Tight hole 2074-2100 m and 2309-35 m. Drilled from 2457 to 2550 m. Took survey. Drilled to 2579 m.
- 7/10 Drilled to 2647 m. Took survey. POOH to 1050 m. Hang off and WOW. POOH.
- 8/10 RIH w/new bit. Reamed 2440-2560 m and 2630-2647 m. Drilled to 2689 m.
- 9/10 Drilled to 2718 m. Took survey. Short trip. Tight at 2700 m. POOH.
- 10/10 Logged: No 1: ISF-SONIC/GR. Unable to pass 1540 m. RIH w/bit. Leak in slip jt. Repaired same. Ream from 1500-1540 m. RIH to TD. Drilled to 2719 m. POOH. Run ISF-SONIC/GR.
- 11/10 Run FDC/GR, RFT, CST/GR, CBL/VDL/GR. RIH to TD. Circ. and clean.
- 12/10 Ran 9 5/8" casing. Shoe at 2706 m.

- 13/10 Circulated 158 m<sup>3</sup> mud. Cemented casing. Displaced cement with mud. Plug did not bump. Full return, but cement to surface. Set seal assembly. Tested same to 345 bar. Tested BOP. RIH, tagged cement at 1365 m. Drilled cement.
- 14/10 Drilled cement to 1422 m. Pressure tested casing, leaked. POOH. RIH w/bit and scraper. Circ. bttm. up and POOH. RIH w/RTTS packer. Detected leak in 9 5/8" casing between 991-993 m.
- 15/10 POOH. Run CBL. Set cementplug from 1100-1242 m. POOH. RIH w/8½" bit without nozzles.
- ~~16/10 Tagged cement at 1138 m, and dressed off to 1144 m. POOH. RIH w/RTTS packer and set same at 924 m. Squeeze cemented, WOC with pressure on both DP and annulus. Attempted to pressure test casing. Bled off DP pressure, kept 172 bar on annulus.~~
- 17/10 Tested casing to 172 bar. OK. Tested casing to 193 bar. No test. POOH. RIH w/bit and scraper. Drilled cement from 992 to 1008 m. RIH to 1144 m. Displaced hole with seawater. POOH. RIH openended and set a balanced cement plug from 993 m. Pull out to 880 m, reversed out and hesitated squeezed. WOC with 214 bar on annulus. POOH. RIH w/bit. Drilled cement from 982 m to 993 m.
- 18/10 Tested 9 5/8" casing to 217 bar. OK. Drilled cement from 1144 m to 1248 m and from 1422-1826 m.
- 19/10 Drilled cement and cement spots from 1868-2673 m. Tagged plug at 2678 m. Tested 9 5/8" csg at 2678 m to 193 bar. OK. Drilled plug and float collar. Drilled soft cement from 2680-2695 m. Circ. Tested 9 5/8" csg at 2695 m to 193 bar, pressure dropped 6.9 bar. Pumped 1.11 m<sup>3</sup> POOH.



- 20/10 Ran CBL. RIH w/bit and junk sub. Drilled cement from 2695 to shoe at 2706 m. Cleaned rat hole. Drilled 8½" hole from 2719-2722 m. Circ. Performed formation integrity test to 1.78 eqv. m.w. No leak off. Drilled 8½" hole from 2722-2737 m. POOH. Retrieved wear bushing. RIH w/test plug. Tested BOP stack.
- 21/10 Tested BOP stack on blue pod. Rams/kill and choke valves to 345 bar, annular preventer to 172 bar. Function tested on yellow pod. OK. POOH w/test tool. Set wear bushing. Tested turbine and RIH to 9 5/8" csg shoe. Reamed from 2718-2737 m. Drilled 8½" hole from 2737-2818 m.
- ~~22/10 Drilled 8½" hole to 2836 m. Took survey. POOH to csg shoe. RIH and drilled to 2932 m. Took survey. POOH to csg. shoe. RIH and performed SPR. Drilled from 2932-2943 m.~~
- 23/10 Drilled 8½" hole w/turbine from 2943-2980 m. Flow check at 2955 m. Increased mud weight to 1.5 s.g. Took survey. POOH. Serviced and laid out turbine. Changed bent kelly and pin - pin (X-O) between kelly and upper kelly cook. RIH w/8½" bit. No fill. Performed SPR-test. Drilled from 2980-2999 m.
- 24/10 Continued drilling 8½" hole to 3016 m. Flow check at 3003 m. OK. Drilled from 3016-3044 m. Max gas 1.7%. Dropped survey. POOH to csg shoe. Retrieved survey. RIH and drilled from 3044-3061 m. Dropped survey. POOH to cut core no. 1.
- 25/10 Strapped out of hole. No correction. Retrieved survey. Missrun. RIH with corebarrel and cut core no. 1 from 3061-3063 m. POOH and recovered 1.44 m. Made up 8 15/32" bit and ran in hole. Drilled hole from 3063-3079 m.



- 26/10 Continued drilling 8½" hole to 3082 m. Dropped survey and pumped slug. POOH and retrieved survey. Made up bit and core barrel and RIH. Cut core no. 2 from 3082-3100 m. POOH and recovered 18 m core, 100% rec. Made up 8½" bit and RIH.
- 27/10 RIH. Reamed from 3082-3100 m. Drilled 8½" hole from 3100-3137 m. Flow check at 3109 and 3130. OK. Dropped survey and POOH. RIH with core barrel and cut core no. 3 from 3137-3152 m.
- 28/10 Cut core no. 3 to 3153 m. Pumped slug. POOH. Recovered 15 m core. 93% rec. Tested BOP stack on yellow pod. Function tested on blue pod. OK. RIH to cut core no. 4. Tested choke-manifold to 172-345 bar. OK. Cut core no. 4 from 3153-3171 m. POOH and recovered 18 m. RIH w/Schlumberger ISF/SONIC/GR.
- 29/10 Rigged down Sch. RIH w/bit and junk basket. Reamed from 3140-3171 m. Drilled 8½" hole to 3244 m. Took survey 1½" deg. S6W. Drilled to 3277 m.
- 30/10 Drilled 8½" hole from 3277-3289 m. Dropped survey. POOH to csg. shoe. Retrieved survey 1 1/4 deg. S27W. POOH. SLM. No correction. Rigged up and ran logs.
- Run no. 1 : FDC/CML/GR  
Run no. 2 : ISF/SONIC/GR  
Run no. 3 : HDT
- 31/10 Continued logging. Run no. 3 : HDT. Run no. 4 : SSL. Run no. 5 : CST. Rigged down Schlumberger. RIH w/open ended DP to TD. Pressure tested cement lines to 69 bar. Mixed and pumped balanced cement plug no. 1 from 3289-3100 m. POOH to 3080 m.



- 1/11 POOH to 3080 m. Rev. circ. Tested surface lines to 69 bar. OK. Set balanced cement plug no. 2 from 3080-2880 m. POOH to 2756 m. Rev. circ. Tested surface lines. Set cem. plug no. 3 from 2756-2580 m. POOH to 2528 m. RIH w/bit and scraper. Tagged cement plug at 2595 m. Tested cem. plug to 110 bar. OK. POOH. RIH and set EZSV w/Sch. at 1198 m. POOH w/Sch.
- 2/11 RIH w/perf. gun. Tested surface lines. Perforated at 300m. POOH. RIH w/9 5/8" csg. cutting assembly to 800 m. Cut casing at 800 m. POOH. RIH w/9 5/8" csg. spear assy and attempted to pull casing. No success. RIH w/cutting assy to 500 m and cut 9 5/8" csg. POOH. RIH w/spear assy. POOH w/9 5/8" csg. RIH w/12 1/4" bit. Tagged top of 9 5/8" csg. at 500 m. POOH. RIH w/open ended DP to 830 m. Pressure tested cement lines. Pumped balanced cem. plug no. 4 from 830-770 m. POOH to 550 m. Set cem. plug no. 5 from 550-450 m. POOH. RIH w/Gauge Ring for 13 3/8" csg and junk basket to 440 m.
- 3/11 RIH w/13 3/8" EZSV and set same at 432m. RIH w/perforating gun and perforated at 200m. No pressure drop observed. RIH w/13 3/8" csg. cutter to 250 m. Cut csg. at 250 m. POOH. RIH w/csg. spear assy. POOH 13 3/8" csg. No overpull. RIH w/17½" bit. Tagged top of 13 3/8" csg. at 250 m. Circulated and cleaned hole. POOH. RIH w/open ended DP to 400 m. Displaced hole w/seawater. Set a cement plug from 350-150 m. Wait on cement for 6 hrs. RIH. Tagged cement plug at 165 m. POOH. Prepared to pull BOP. Wait on weather to pull BOP.



- 4/11 Wait on weather to pull BOP.
- 5/11 Wait on weather to pull BOP for 22 hrs. Started to pull BOP-stack.
- 6/11 Pulled BOP-stack. Cut 20" and 30" casing at 131 m. RIH w/20" spear and pulled wellhead loose. POOH w/wellhead on spider beam. Started pulling anchors.
- 7/11 Pulled anchors. "Nordraug" departed well 15/9-10 at 1740 hrs.  
Under tow to new location.
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III 4. WELL AND SUBSEA SCHEMATIC



# III 4 WELLBORE SCHEMATIC: 15/9-10



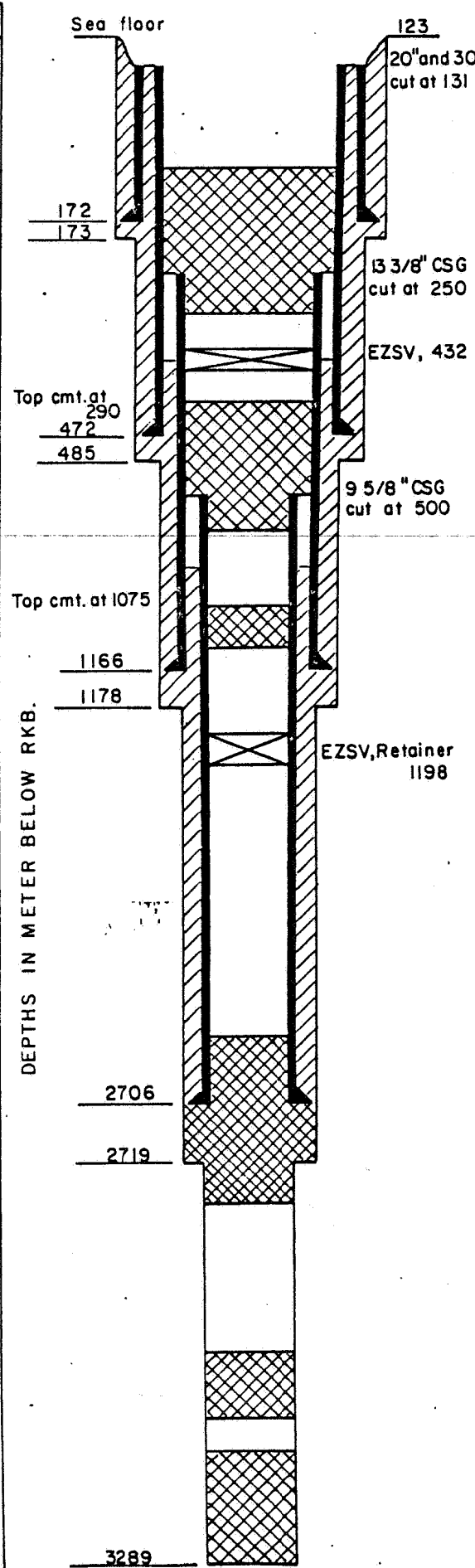
(Not to scale)

RKB - MSL: 25 m.

WATER DEPTH: 98 m.

Original av: TS  
Tegnet av: AM  
Dato: 3-5-82

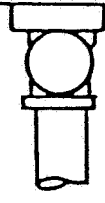

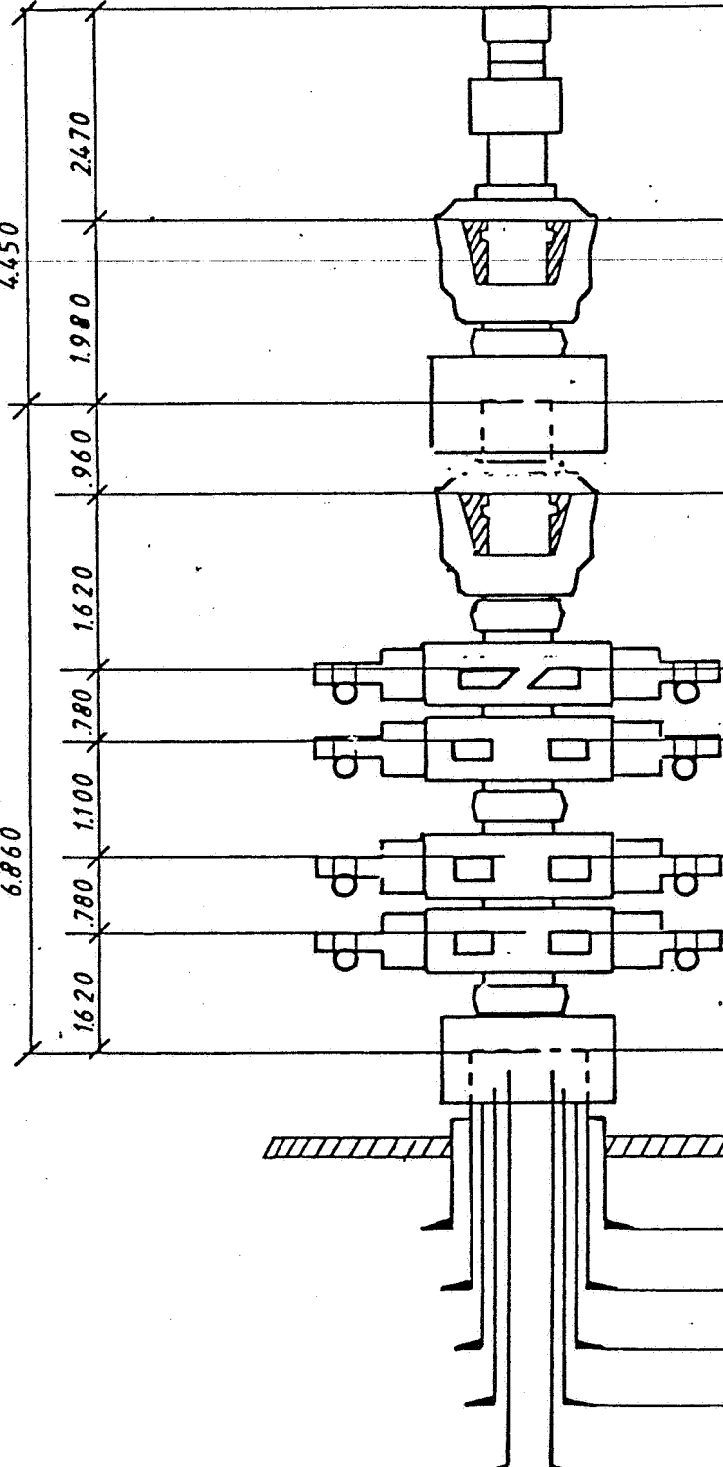
Hole	Casing
36"	30" Grad B 5 jts
26"	20" X-56 94 lb/ft 27 jts Housingjt.
17 1/2"	13 3/8" K-55 86 jts. 68 lb/ft
12 1/4"	9 5/8" P-110 75 jts N-80 147 jts 47 lb/ft
8 1/2"	



Casing cement	Plugs / Squeeze
LFAD: 16.7 ton "G" CMT w/sea water and 593 ltr. A-3L 1.56 S.G. TAIL: 13 ton "G" CMT w/sea water and 234 ltr. A7L. 1.91 S.G. Problems w/leak. Pump CMT behind 30"CSG	Squeezed 13 3/8" at 200
LFAD: 74.2 ton "G" CMT w/ 68.8m <sup>3</sup> sea water and 2637 ltr. A-3L and 133 ltr R-14 L 1.56 S.G. TAIL: 13.1 ton "G" CMT w/ 5.7m <sup>3</sup> sea water 1.91 S.G.	CMT plug (350-165) Squeezed 9 5/8" at 300
Pumped 1.6m <sup>3</sup> water ahead. LFAD: 51.9m <sup>3</sup> "G" CMT w/sea water and 1843LTR A-3L and 114 ltr. R-14L 1.56 S.G. TAIL: 13 ton "G" CMT w/fresh water 1.90 S.G.	CMT plug (550-450)  CMT plug (830-770)
USED: 3.2m <sup>3</sup> BJ mud sweep in front of slurry LFAD: 90 ton "G" CMT w/37.9m <sup>3</sup> fresh water and 1602 LTR D-19LN and 405 LTR D-31LN and 207LTR R-12L 1.90 S.G. TAIL: 20 ton "G" CMT w/8.36m <sup>3</sup> fresh water and 356LTR D-19LN and 240LTR D-31LN 1.90 S.G.	CMT plug (2756-2595)
	CMT plug (3080-2880)
	CMT plug (3289-3100)

SUBSEA ASSEMBY  
 "NORDRAUG"

WELL. 15/9-10

		METER	DRILLFLOOR
			
		25	SEA LEVEL
		108.19	TOP BALL JOINT
	2.670	110.66	UPPER ANNULAR
	1.980	112.64	RISER CONN.
	.960	113.6	LOWER ANNULAR
	1.620	115.22	SHEAR/BLIND RAM
	.780	116.0	UPPER RAM
	1.100	117.10	MIDDLE RAM
	.780	117.88	LOWER RAM
	1.620	119.5	TOP WELLHEAD
		123.0	SEA BOTTOM
		171.66	30" SHOE
		472.44	20" SHOE
		1166.23	13-3/8" SHOE
		2705.84	9-5/8" SHOE
	3289.0	7" SHOE	

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III 5. FORMATION INTEGRITY TEST

## NOMENCLATURE

Brønn	=	Well No
Dybde	=	Depth, m
Foring	=	Casing
Fartøy	=	Rig name
Høyde	=	Hight, m
Over vannfl.	=	Above sea level
Over sjøb.	=	Above sea floor
Tyngde	=	Weight
Maks. trykk	=	Max pressure
Boreslam	=	Mud
Tetthet	=	Density, S.G.
Vis	=	Funnel Viscosity, sec/qt.
P.V.	=	Plastic Viscosity, cps.
Y.P.	=	Yield Point, lbs/100 sq.ft.
<hr/>		
Filt	=	Filtrate, cc's/30 min
Gel	=	Gel, lbs/100 sq.ft.
Kapasitet	=	Capacity
Vol/tidsenhet	=	Liters/min.
Tilb. str.	=	Returns, liters
Antatt styrke	=	Predicted formation strenght, S.G.
Obs. spr. trykk	=	Surface pressure at leak off, bar
Ekv. formasj. styrke	=	Formation integrity (Leak off) S.G.
Volum	=	Volume, liters
Trykk	=	Pressure, bar
Anmerkninger	=	Comments

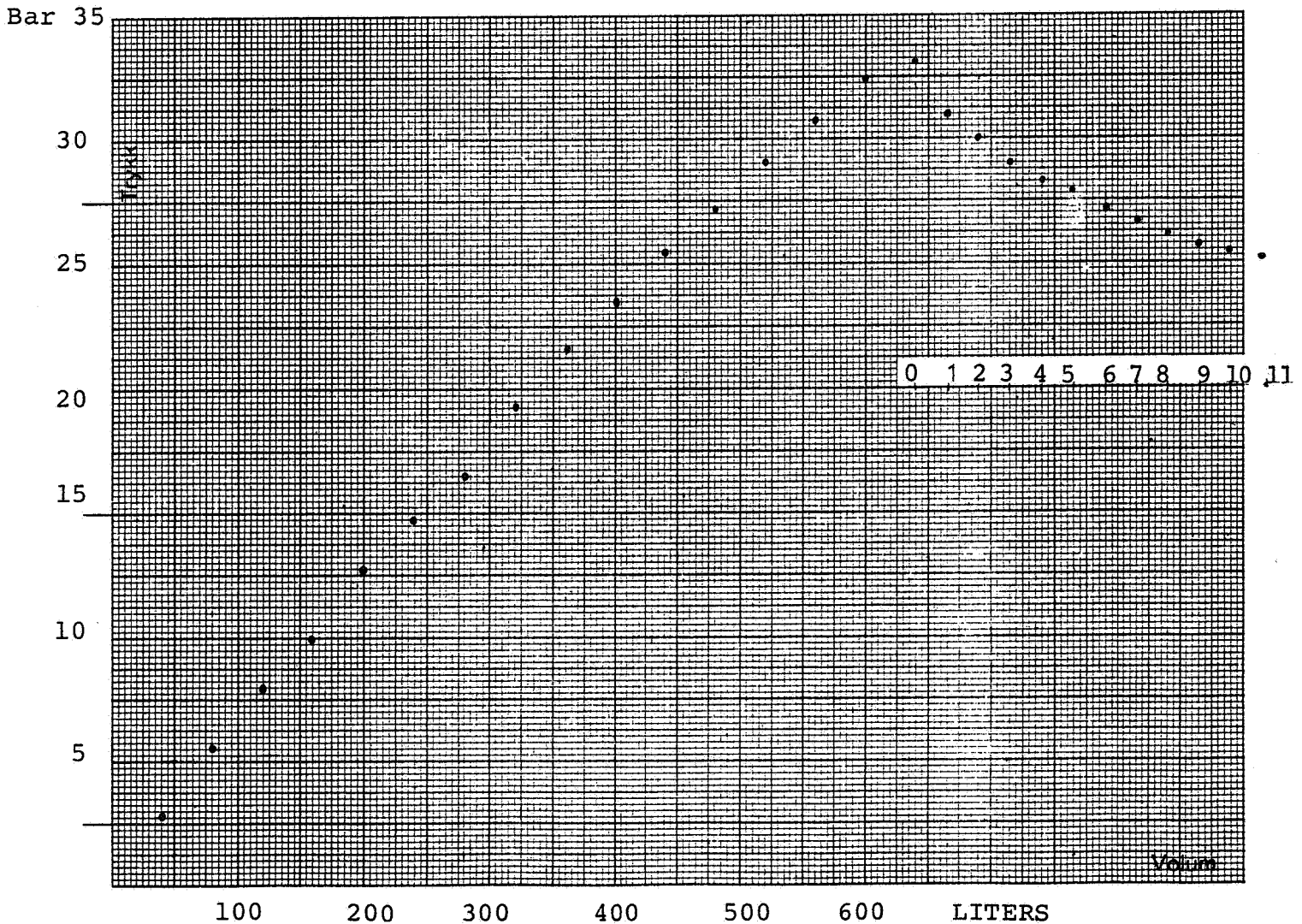


# FORMASJONSSTYRKETEST

Dato: 26.9.81

Brønn nr.: 15/9-10 Dybde: Brønn: 488 m Foring: 472 m Test: 55  
 Fartøy: Nordraug Høyde R.K.B.: Over vannfl.: 25 m Over sjøb.: 123 m  
 Foring: Diam.: 20" Tyngde: 94 lb/ft Grad: X-56 Maks. trykk: 144.8  
 Boreslam: Tetthet: 1.05 s.g Vis: 40 P.V.: 9 Y.P.: 10 Filt: 10.0 Gel.: 2/4  
 Pumpe: Type: BJ Kapasitet: - Vol./tidsenh.: 40 ltr/min Tilb.str.: 280 ltr  
 Antatt styrke: 1.47 s.g. Obs. spr. trykk: 32.4 bar Ekv. formasj. styrke: 1.75 s.g.

Volum	Trykk	Volum	Trykk	tid	Trykk	Anmerkninger
40	2.8	360	21.7	0	33.1	Pumperate was may be to low, since we obviously had relatively high fluid loss to formation
80	5.5	400	23.5	1	31.0	
120	7.9	440	25.5	2	29.0	
160	10.0	480	27.2	3	28.3	
200	12.8	520	29.0	4	27.9	
240	14.8	560	30.7	5	27.2	
280	16.6	600	32.4	6	26.7	
320	19.3	640	33.1	7	26.2	Sign.:
				8	25.7	
				9	25.5	
				10	25.2	
				11	25.2	





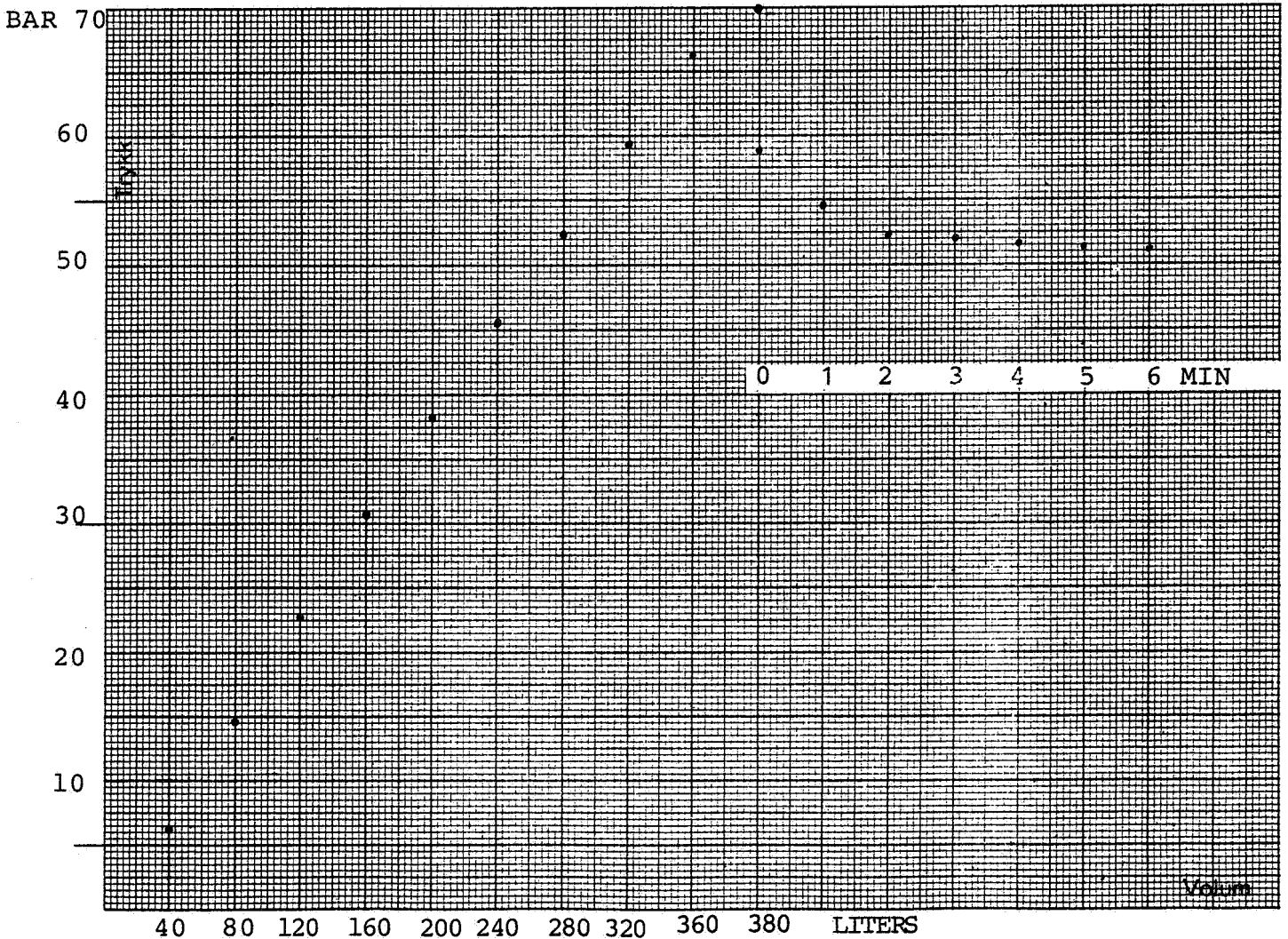
statoll

FORMASJONSSTYRKETEST

Dato: 1.10.81

Brønn nr.: 15/9-10 Dybde: Brønn: 1181 m Foring: 1166 m Test: 172  
 Fartøy: Nordraug Høyde R.K.B.: Over vannfl.: 25 m Over sjøb.: 123 m  
 Foring: Diam.: 13 3/8" Tyngde: 68 lb/ft Grad: K-55 Maks. trykk: 238  
 Boreslam: Tetthet: 1.2 s.g. Vis: 40 P.V.: 12 Y.P.: 16 Filt: - Gel.: 4/10  
 Pumpe: Type: BJ Kapasitet: - Vol./tidsenh.: 40 ltr/min Ilb.str.: 223 ltr.  
 Antatt styrke: 1.65 Obs. spr. trykk: 51.7 bar Ekv. formasj. styrke: 1.65 s.g.

Volum	Trykk	Volum	Trykk	tid	Trykk	Anmerkninger
40	6.2	360	66.2	0	58.6	At 69.7 bar the formation broke down without warning. Pressure dropped right down to 58.6 bar and levelled out at 51.7 bar.
80	14.5	380	69.7	1	54.8	
120	22.8			2	52.4	
160	30.7			3	52.1	
200	38.3			4	51.7	
240	45.5			5	51.4	
280	52.4			6	51.0	Sign.:
320	59.3					





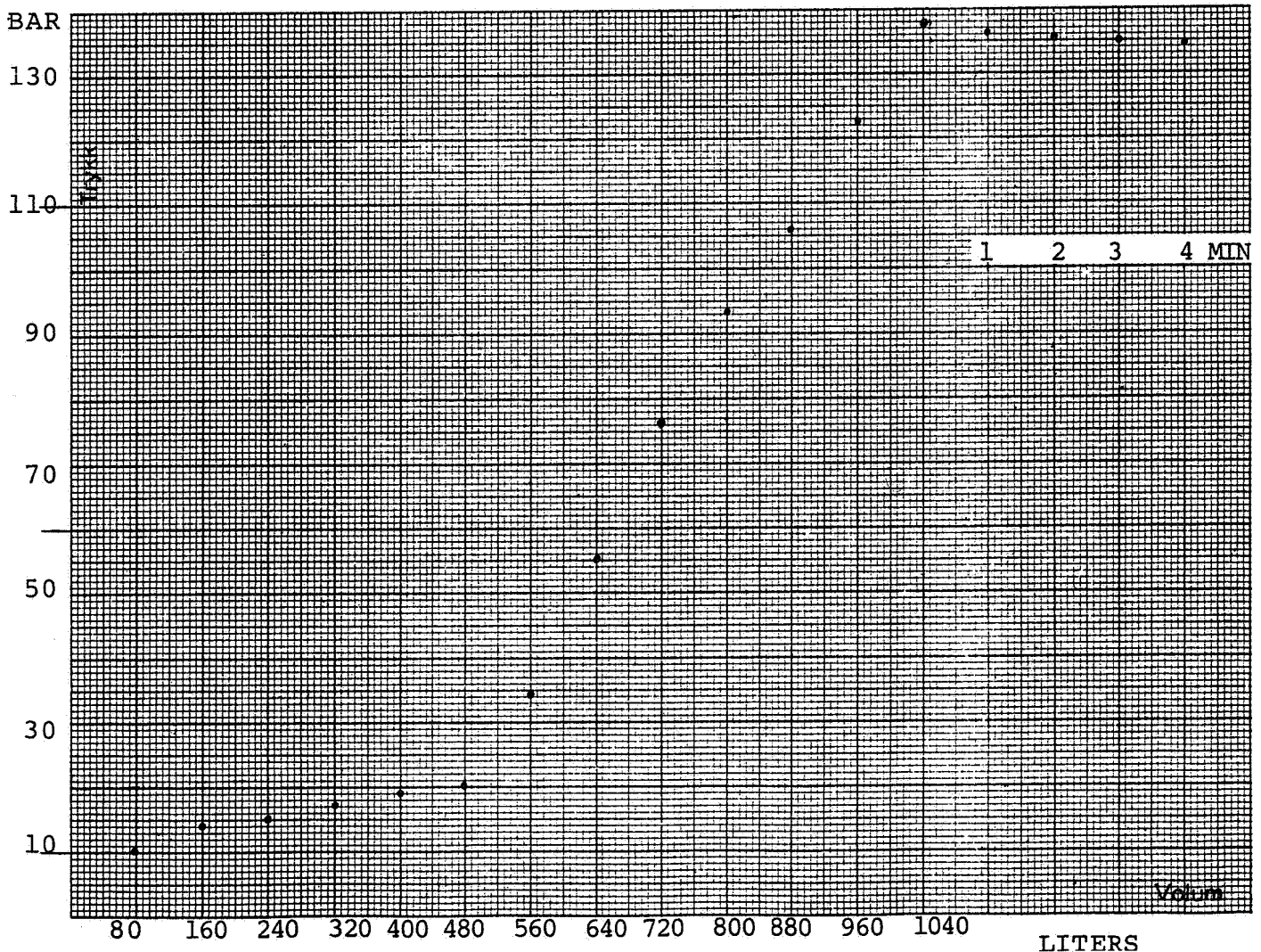
statoll

FORMASJONSSTYRKETEST

Dato: 20.10.81

Brønn nr.: 15/9-10 Dybde: Brønn: 2722 m Foring: 2706 m Test: 2706  
 Fartøy: Nordraug Høyde R.K.B.: Over vannfl.: 25 m Over sjøb.: 223 m  
 Foring: Diam.: 9 5/8" Tyngde: 47 lb/ft Grad: P 110, N-80 Maks. trykk: 474  
 Boreslam: Tetthet: 1.27 s.g. Vis: 40 P.V.: 10 Y.P.: 12 Filt: 11.1 Gel.: 5/15  
 Pumpe: Type: BJ Kapasitet: - Vol./tidsenh.: - Tilb.str.: -  
 Antatt styrke: 1.83 s.g. Obs. spr. trykk: 138 bar Ekv. formasj. styrke: 1.78 s.g.

Volum	Trykk	Volum	Trykk	tid	Trykk	Anmerkninger
80	10.3	720	76.6			
160	13.8	800	93.1	1	136.5	Pumped 1040 lts.
240	15.2	880	106.2	2	135.8	Bleed back 960 lts.
320	17.2	960	122.7	3	135.1	
400	18.6	1040	138.0	4	134.5	
480	20.7					
560	34.5					
640	55.2					Sign.:

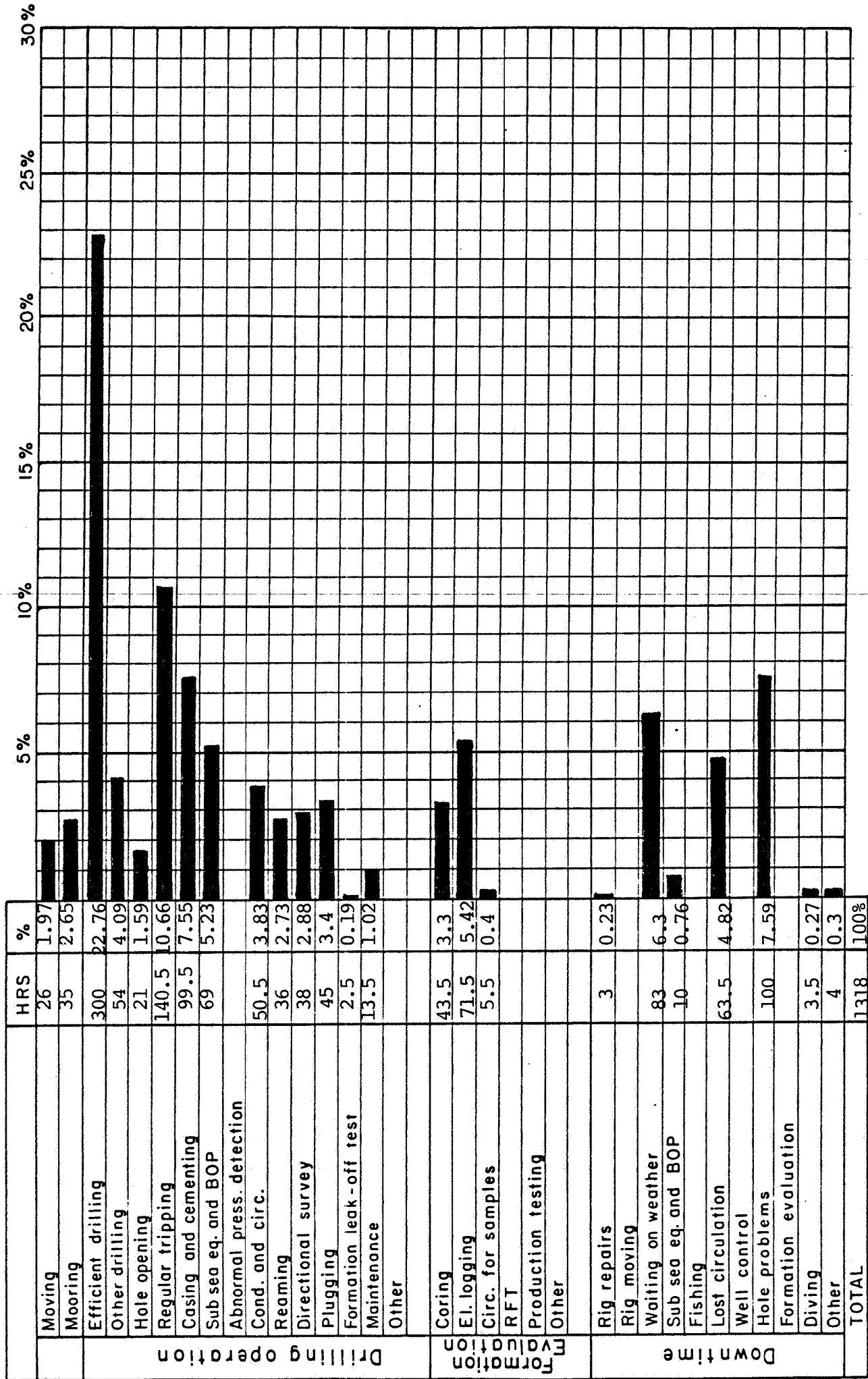


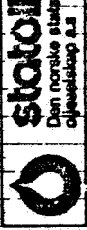
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III 6. RIG TIME DISTRIBUTION  
DRILLING TIME VS. DEPTH  
DRILLING COST VS. DEPTH



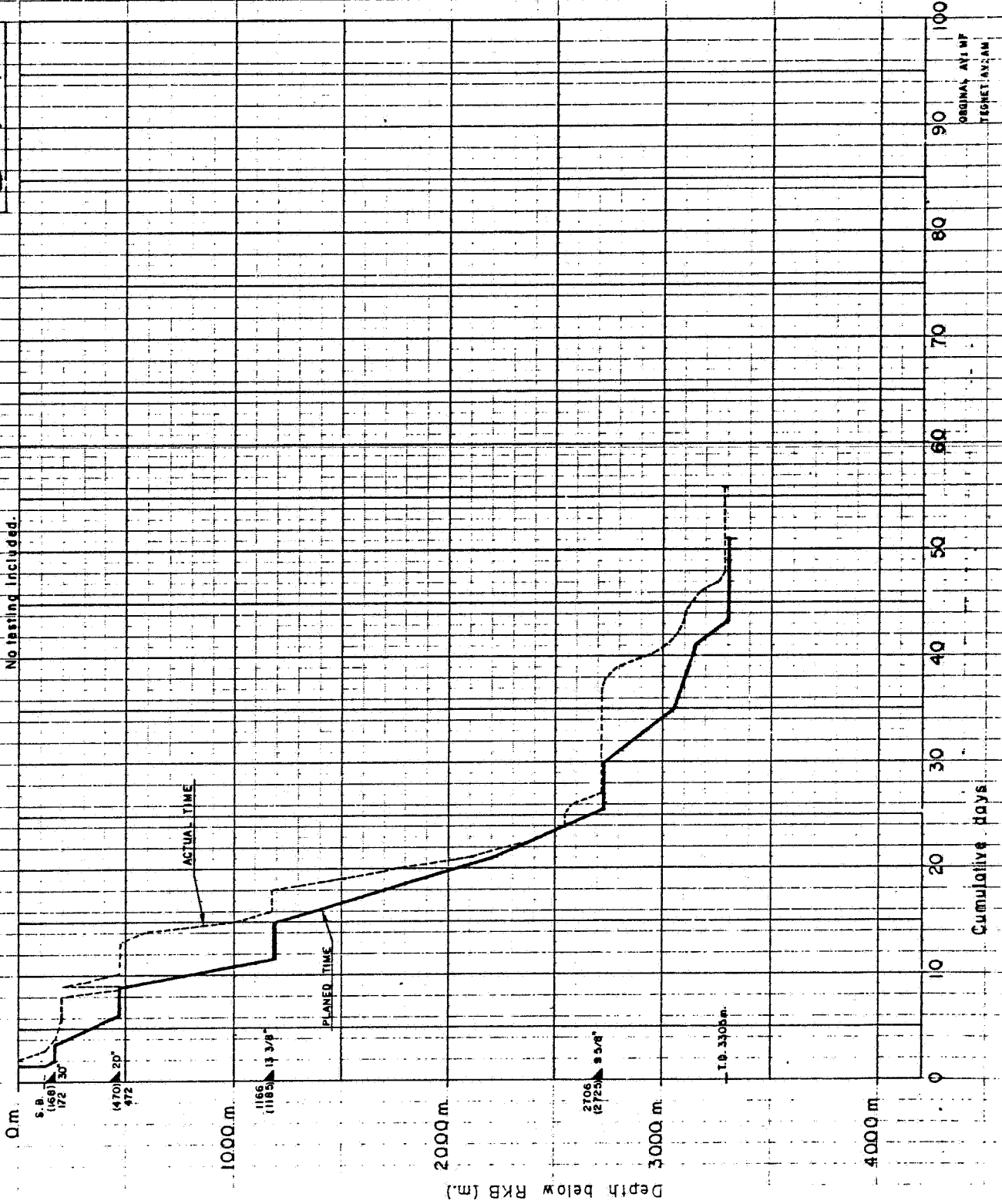
RIG TIME DISTRIBUTION FOR WELL 15/9-10





# WELL 15/9-10

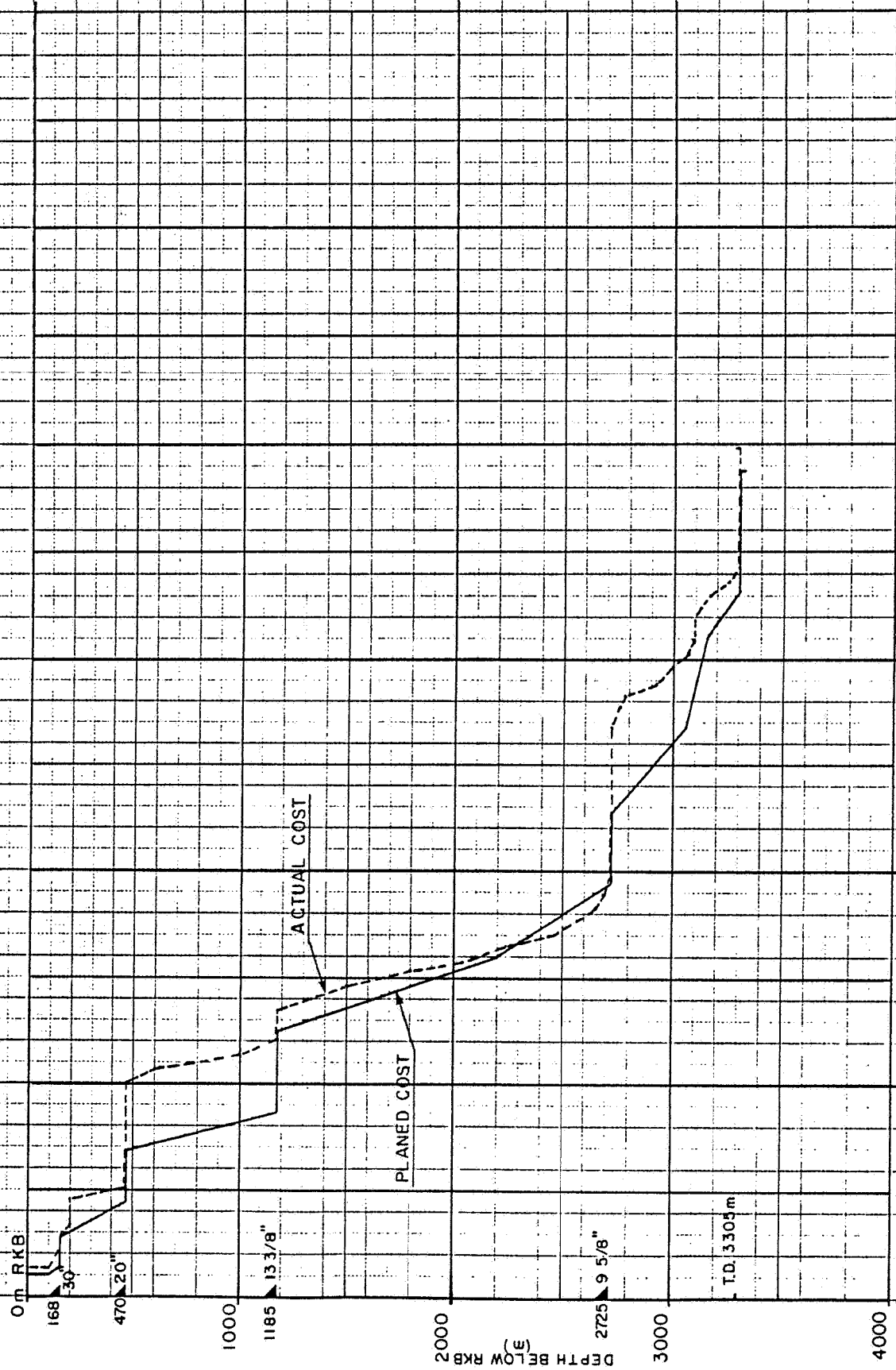
Drilling time v. s. depth, based on fair weather conditions.  
No testing included.



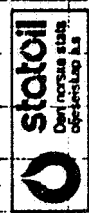
RIG: NORDBRAUG

WELL 15/9-10

Drilling cost v.s. depth.



CUMULATIVE COST (MM Kr.)



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III      7. BIT RECORD AND  
LITHOLOGY COLUMN



BORKRONEDATA

Brønn nr.: 15/9-10

Nr.	B. k. Nr.	Diam.	Fabr.	Type	Serie no.	Dyser 1/32"	Dybde ut	Fremdrift	Rot. tid	Total rot.tid	Bore- hast.	V.p.b.	O.p.m.	Pumpe			Tilstand			Anmerkninger		
														Trykk	V.grad	vft	T	B	G			
1	1	26" + 36"HO	HTC	OSC- 3AJ		3x24	173	50	12.5		4.0	2	40/70	10/62	816/ 4080							
2	1RR	26"	HTC	OSC- 3AJ		3x24	173	-				2	40									Drill cement + shoe
3	2	12 1/4"	HTC	X3		3x15	200	27	1.2		22.5	1.5	40/70	41/214	1632/ 3500							
4	2RR	12 1/4"	HTC	X3		NONE	485	285	8.8		32.4	1-9	125	67	3378							
5	2RR	12 1/4" +26"HO	HTC	X3		3x18 3x16	485	-				1-5	80	144	4200							
6	3	17 1/2"	HTC	OSC- 3AJ		2x18 1x20	1178	693	25.1		27.6	1.8/ 13.6	100/125	138/207	3957/ 4488							
7	4	12 1/4"	HTC	X3		3x14	2128	950	37.7		25.2	9/15	100/150	207/ 212	2450/ 2652							
8	5	12 1/4"	HTC	J3		3x14	2457	329	23.56		14.0	12/18	70/110	207	2450							
9	6	12 1/4"	HTC	XDG		3x15	2647	190	20.25		9.4	15/18	110/120	210	2475							
10	7	12 1/4"	HTC	XDG		3x15	2718	71	25.4		2.8	14/20	80/120	210	2385/ 2460							
11	8	12 1/4"	SEC	S33		3x15	2719	1	0.3		3.3	15	80	210	2360							
12	8RR	12 1/4"	"	"		3x15	2719	-						212	2430							
13	9	8 1/2"	HTC	XDG		3x14			Drill. cmt													
14	10	8 1/2"	HTC	J3		3x14	2695	1376	27.3		50.4	3/6.8	75	138/ 234	1760/ 2560							
15	11	8 1/2"	HTC	X3A		3x14	2737	18	5.67		3.2	11/16	85/110	221	2100							
16	12	8 1/2"	DIAMOND	LX-13		-	2980	243	35.3		6.9	20/23	710	283	2100							
17	13	8 1/2"	HTC	J3		3x11	3061	81	17		4.76	14/18	90/110	234	1367/ 1405							
18	14	8 15/32"	CHRIST	R-1		-	3063	2	2.3		0.87	5/10	70/110	63/72	1001							
19	15	8 1/2"	HTC	XDG		3x11	3082	19	3.1		6.13	12/18	95/105	234	1453							
20	16	8 15/32"	CHRIST	C-18		-	3100	18	5.7		3.2	12	145	166	1540							

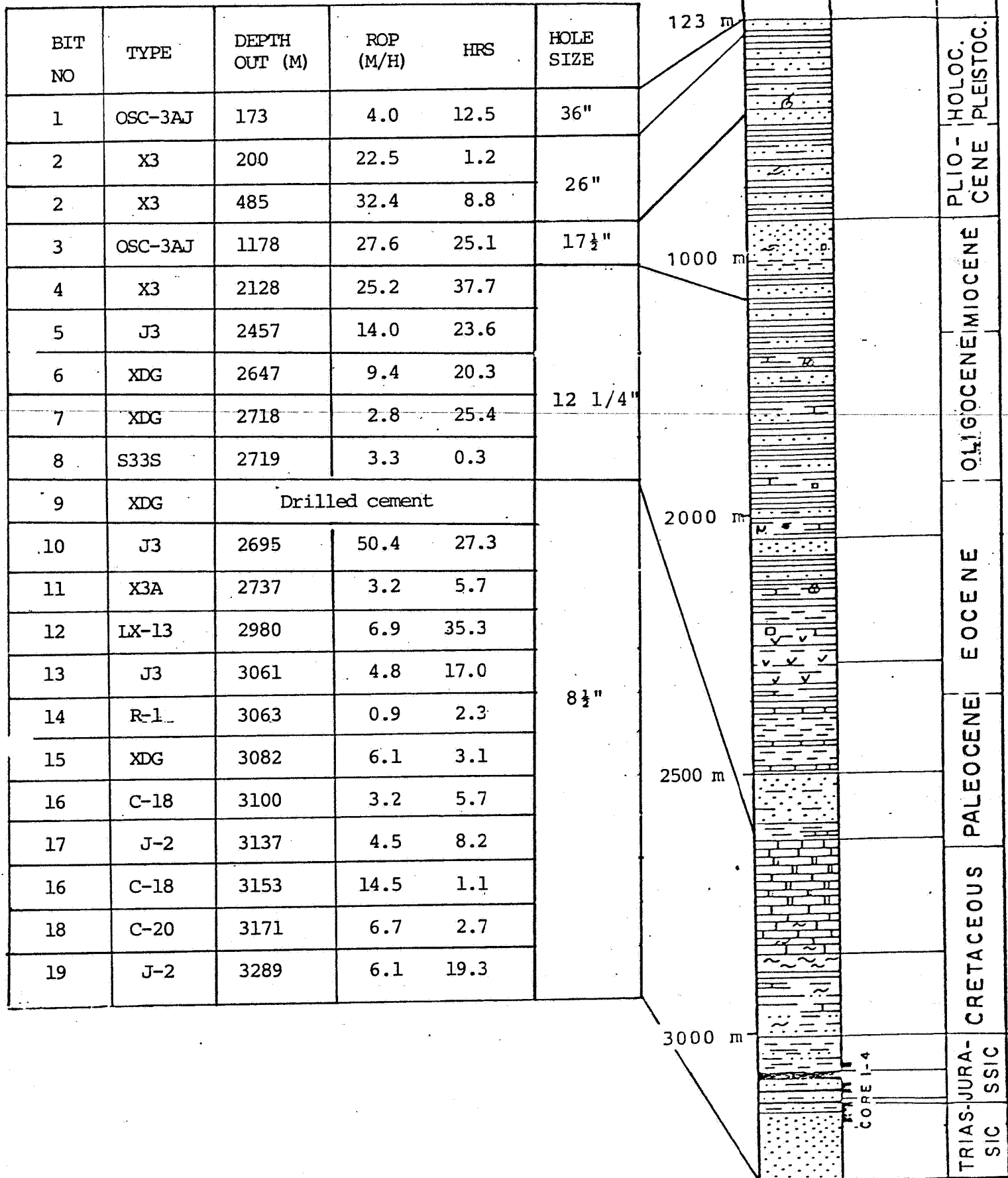
**BORKRONE DATA**

Brønn nr.: 15/9-10

Nr.	B. k. Nr.	Diam.	Fabr.	Type	Serie no.	Dyser 1/32"	Dybde ut	Fremdrift	Rot. tid	Total rot.tid	Børe- hast.	V.p.b.	O.p.m.	Pumpe			Tilstand			Anmerkninger	
														Trykk	V.grad	v/t	T	B	G		
21	17	8 1/2"	HTC	J2		3x11	3137	37	8.22		4.5	18-20	96/108	231		1530	4	3	I		
22	16RR	8 15/32"	CHRIST	C-18		-	3153	16	1.1		14.5	10-12	144	151		1514				Core no. 3	
23	18	8 15/32"	CHRIST	C-20		-	3171	18	2.69		6.7	10-12	140	162		1514				Core no. 4	
24	19	8 1/2"	HTC	J2		3x11	3289	118	19.33		6.1	16-20	100/110	232		1550	6	8	I		

BIT SEQUENCE AND LITHOLOGY COLUMN

15/9-10



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III 8. PRESSURE PROFILES





# 15/9-10 PRESSURE COMPOSITE PLOT

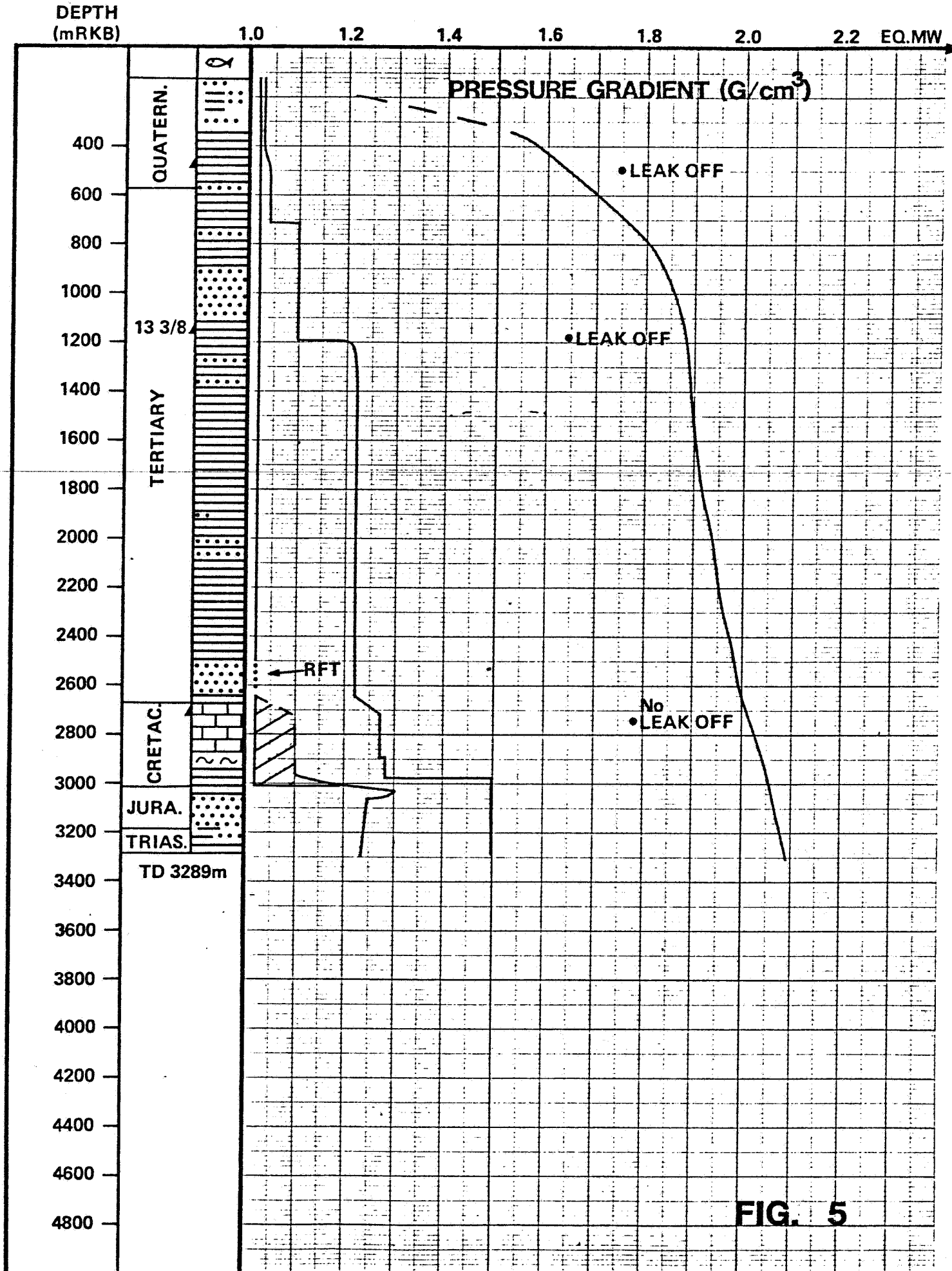


FIG. 5

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III

9. SURVEY

SPERRY-SUN INTERNATIONAL  
SINGLE SHOT SURVEY

STATOIL

15/9-10

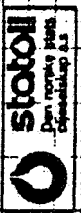
14 APRIL 1982

TOTAL DEPTH	DIRECTION DEG	ANGLE DEG MIN	VERTICAL DEPTH	LATITUDE METRES	DEPARTURE METRES	VERTICAL SECTION	DOG LEG
0	N 0.0 E	0 0	0.00	0.00 N	0.00 E	0.00	0.00
478	N 8.0 E	0 30	477.99	2.07 N	0.29 E	1.16	0.03
598	S 36.0 E	0 15	597.99	2.37 N	0.52 E	1.50	0.18
693	S 21.0 E	0 15	692.99	2.01 N	0.71 E	1.52	0.02
796	S 22.0 W	0 30	795.99	1.38 N	0.63 E	1.17	0.10
900	S 90.0 E	0 15	899.99	0.96 N	0.68 E	1.03	0.18
995	S 12.0 W	0 30	994.98	0.56 N	0.80 E	0.97	0.19
1090	S 59.0 W	0 15	1089.98	0.05 N	0.54 E	0.51	0.12
1174	N 11.0 E	0 15	1173.98	0.13 N	0.42 E	0.43	0.16
1270	N 14.0 W	0 45	1269.98	0.95 N	0.31 E	0.69	0.17
1363	N 20.0 W	0 30	1362.97	1.92 N	0.02 E	0.86	0.08
1458	N 42.0 E	0 30	1457.97	2.62 N	0.15 E	1.28	0.16
1553	N 13.0 E	0 45	1552.96	3.53 N	0.57 E	2.06	0.12
1648	N 69.0 E	1 45	1647.94	4.66 N	2.07 E	3.89	0.46
1743	N 52.0 E	1 15	1742.91	5.81 N	4.24 E	6.35	0.21
1839	N 68.0 E	1 30	1838.88	6.93 N	6.23 E	8.63	0.14
1934	N 48.0 E	1 30	1933.85	8.23 N	8.30 E	11.07	0.16
2029	N 34.0 E	1 45	2028.81	10.26 N	10.04 E	13.52	0.15
2124	N 59.0 E	1 45	2123.77	12.21 N	12.09 E	16.22	0.24
2217	N 62.0 E	1 15	2216.73	13.42 N	14.21 E	18.64	0.16
2311	N 28.0 E	0 45	2310.72	14.44 N	15.40 E	20.17	0.24
2406	N 1.0 E	1 15	2405.71	16.03 N	15.71 E	21.14	0.21
2453	N 17.0 E	1 30	2452.69	17.13 N	15.90 E	21.79	0.29
2546	N 12.0 E	1 45	2545.65	19.68 N	16.55 E	23.49	0.09
2643	N 70.0 E	0 30	2642.63	21.28 N	17.26 E	24.82	0.48
2714	S 28.0 E	0 30	2713.63	21.11 N	17.69 E	25.14	0.28
2808	S 2.0 W	1 0	2807.62	19.93 N	17.86 E	24.77	0.20
2904	S 63.0 E	1 0	2903.61	18.71 N	18.57 E	24.89	0.34
2954	S 28.0 E	0 45	2953.61	18.22 N	19.12 E	25.16	0.35
3040	S 38.0 E	1 45	3039.58	16.69 N	20.19 E	25.46	0.36
3078	S 17.0 E	2 0	3077.56	15.60 N	20.74 E	25.47	0.57
3133	S 10.0 E	1 30	3132.54	13.97 N	21.15 E	25.13	0.30
3240	S 6.0 W	1 30	3239.50	11.20 N	21.24 E	24.00	0.12
3285	S 29.0 W	1 15	3284.49	10.18 N	20.94 E	23.29	0.40

THE DOGLEG SEVERITY IS IN DEGREES PER 30 METRES.  
THE VERTICAL SECTION WAS COMPUTED ALONG N 64 4 E

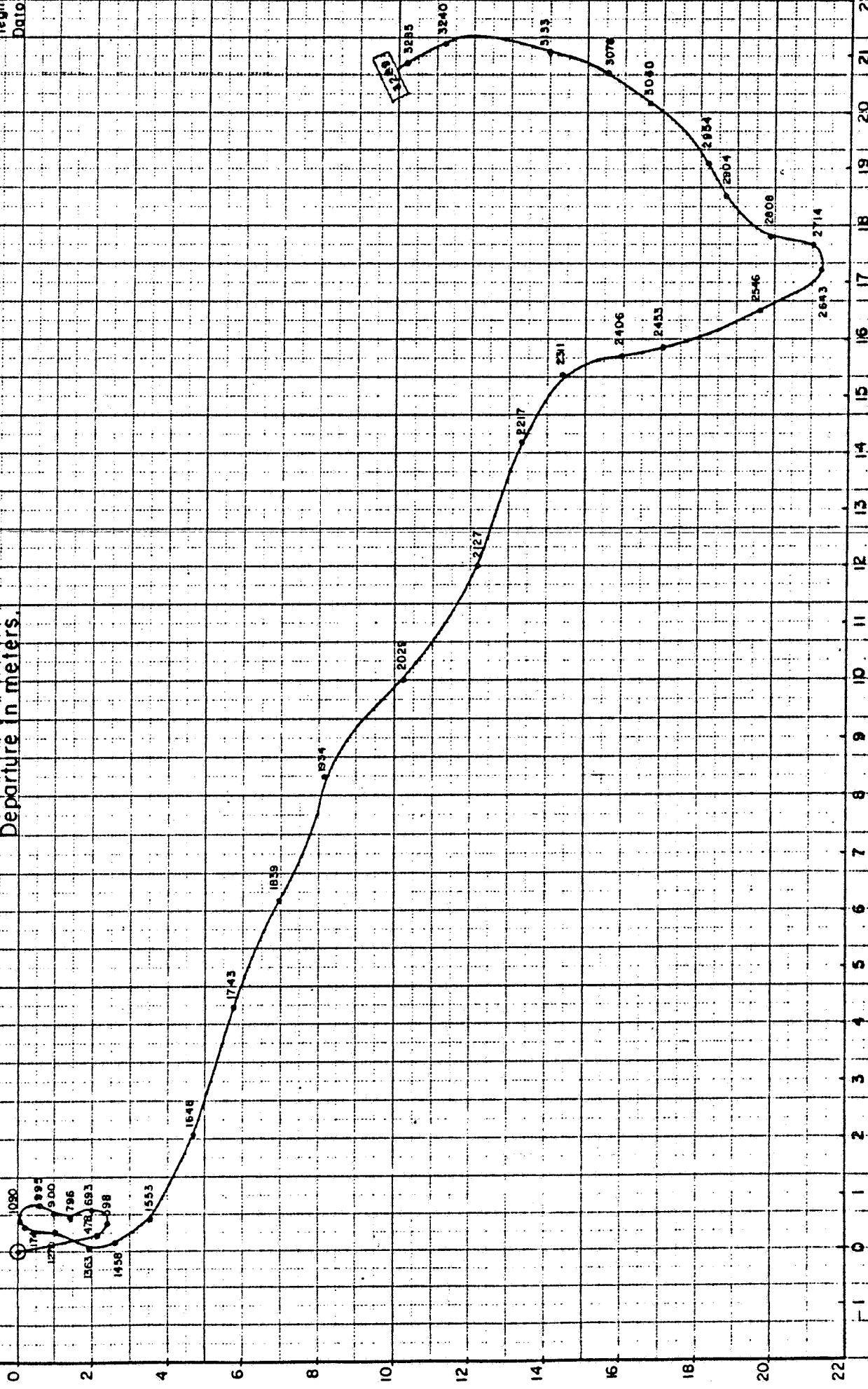
BASED UPON MINIMUM CURVATURE TYPE CALCULATIONS. THE BOTTOM HOLE  
DISPLACEMENT IS 23.29 METRES, IN THE DIRECTION OF N 64 4 E  
BOTTOM HOLE DISPLACEMENT IS RELATIVE TO WELLHEAD.

VERTICAL SECTION IS RELATIVE TO WELLHEAD.



Original: 09.11.15  
Tegning af: AM  
Dato: 19-4-82

1579-10  
Horizontal projection of well track  
Departure in meters.



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

E

---

III

10. DRILLING FLUID SUMMARY



4056 TANANGER  
TELF. OFFICE : (04) 69 66 77  
TELF. WARHOUSE : (04) 69 64 65 - 69 66 26  
TELEX: 33 173 Milin N  
BANKGIRO: 5343.05.17496

**A GENERAL REPRESENTATIVE FOR MILCHEM INT. LTD.**

STATOIL 15/9 - 10

Sept. 15, 1981 - Oct. 30, 1981.

WELL SUMMARY

This well was drilled from spud to T.D. in 45 days, with the only serious difficulties occurring in the 26" hole phase.

36" hole was drilled with seawater & high viscosity from seabed to 172 m. below R.K.B., 30" casing set and cemented in the first two days.

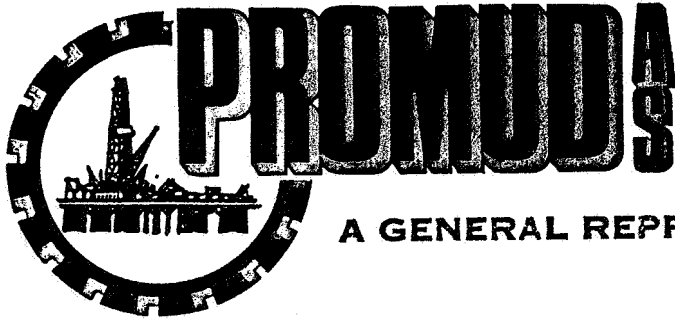
In the following 26" hole section the most serious difficulties in the operation arise. A completed loss of returns occurred at 186 m. necessitating the placement of a cement plug. After drilling out of the cement a leak outside the 30" casing was observed which was duly cemented. Drilling out of this cement, returns were again lost, at 178 m, requiring a further cement plug.

Total losses due to this loss zone were well in excess of 10 000 bbls.

The only other problems in this section were a couple of tight spots, between 440 m and 330 m, which were readily dealt with.

The 26" hole was drilled to 485 m T.D. and 20" casing run to 472 m.

The 17 1/2" hole was sunk to 1178 m and 13 3/8" casing set at 1166 m without incident. However, due to the unserviceability of the desilter it became necessary to use the mud cleaners in lieu. As the pump rate was 1100 gal/min and the mud cleaners' capacity only 800 gals/min., solids content rose and dilution with large quantities of seawater became necessary to control weight. This in turn required the addition of considerable quantities of Milpolymer 302 to maintain viscosity, together with Permalose as a secondary viscosifier.



4056 TANANGER  
TELF. OFFICE : (04) 69 66 77  
TELF. WARHOUSE : (04) 69 64 65 - 69 66 26  
TELEX: 33 173 Milin N  
BANKGIRO: 5343.05.17496

**A GENERAL REPRESENTATIVE FOR MILCHEM INT. LTD.**

page 2.

The 12 1/4" hole was drilled without significant mud problems, but the weight was increased slightly, (from 1.20 to 1.27 at T.D.) to alleviate some minor shale slaughting. This section was drilled to 2719 m R.K.B. and 9 5/8" casing set at 2706 m. Six days of rig time were lost, cementing a leak in the casing at 993 m, with an attendant increase in mud costs.

Finally in the 8 1/2" O.H., to 3291 m T.D., no serious problems were encountered.

Four cores were cut with excellent recoveries: 93 - 100 %. During the course of drilling the interval all available solids - control equipment was used, with obvious benefits.

T.D. was reached on October 30, the well logged and then plugged and abandoned.



# COMPLETION INTERVAL

COMPANY STATOIL Well No. 15/9 - 10 Page 1 of 8

Casing Size 30 " from 119.5 Meters to 172 (seabed) (Bit Size) 36 " hole from 119.5 Meters to 172

Material Consumption for Interval:

Product	Units	Size	Cost/Unit	Total Cost
Barite ( Bk )	2.9	MT	120.00	348.00
Bentonite ( Bk )	10.0	MT	305.00	3050.00
Milgel ( sxs )	400.0	50 kg	19.50	7800.00
Caustic Soda	16.0	25 kg	13.75	1220.00
Sodium Bicarbonate	6.0	50 kg	19.25	115.50

Material Cost for Interval \$ 11 533.50 Average Cost per meter \$ 219.69

Number of Days 2 Average Cost per Day \$ 5766.75

Comments

Drilled this interval with seawater & high viscosity sweeps. No problems encountered.





# COMPLETION INTERVAL

COMPANY STATOIL Well No. 15/9 - 10 Page 2 of 8

Casing Size 20 " from 119.5 Meters to 472 (Bit Size) 26 " hole from 172 Meters to 472

**Material Consumption for Interval:**

Product	Units	Size	Cost/Unit	Total Cost
Barite ( Bk )	75.1	MT	120.00	9012.00
Bentonite ( Bk )	51.9	MT	305.00	15829.50
Bentonite ( sxs )	216.0	50 kg	17.23	3721.68
Milgel	61.0	50 kg	19.50	1189.50
Caustic Soda	66.0	25 kg	13.75	907.50
Bicarb	17.0	50 kg	19.25	327.25
Drispac R.	13.0	50 lb	195.18	2537.34
Unical	3.0	25 kg	18.10	54.30
Gypsum	1.0	50 kg	9.75	9.75
Mica Fine	208.0	25 kg	17.08	3552.64
Mica Medium	8.0	25 kg	17.08	136.64
Nutplug	227.0	25 kg	17.97	4079.19
Kwikseal	129.0	25 kg	17.50	2257.50
Calsium Chloride	10.0	50 kg	19.50	195.00

Material Cost for Interval \$ 43 809.79 Average Cost per meter \$ 146.03

Number of Days 8 Average Cost per Day \$ 5476.22

**Comments**

The major problem of this section was lost circulation with the necessity to set two cement plugs and the loss of well over 10,000 bbls of spud mud.

A leak outside the 30" casing was noted, at depth 200 m, which required a cement job. There were minor snags with tight hole at points between 440 and 330 m.



# CASING INTERVAL

COMPANY STATOIL Well No. 15/9 - 10 Page 3 of 8

Casing Size 13 3/8 " from 120 to 1166 (Bit Size) 17 1/2 " hole from 472 to 1178 Meter

Material Consumption for Interval:

	<u>Cost per Unit</u>	<u>No.</u>	<u>Total Cost</u>
Mil Polymer 302	200.57	162	32492.34
Gypsum	9.75	79	770.25
Caustic	13.75	22	302.50
Nutplug ( Fine )	17.97	30	539.10
Permalose	50.32	89	4478.48
Drispac	195.18	20	3903.60
Unical	18.10	2	36.20
CMC LV	52.50	21	1102.50
LD - 8	69.04	2	138.08
Barite	120.00	30	3600.00
Bentonite	305.00	3	915.00

For  
kill  
mud

Material Cost for Interval \$ 48278.05 Average Cost per Meter \$ 68.38

Number of Days 5 Average Cost per Meter \$ 9655.61



# CASING INTERVAL

COMPANY STATOIL Well No. 15/9 - 10 Page 4 of 8

Casing Size 9 5/8 " from 120 to 2706 m (Bit Size) 12 1/4 " hole from 1166 to 2706 m

Material Consumption for Interval:

	<u>Cost per Unit</u>	<u>No. used.</u>	<u>Total Cost</u>
Barite	120.00	214.7	25764.00
Bentonite Bulk	305.00	14.8	4514.00
Drispac Reg.	195.18	22.0	4293.96
Drispac S.L.	204.81	41.0	8397.21
Caustic Soda	13.75	56.0	770.00
Gypsum	9.75	15.0	146.25
Milpolymer 302	200.57	81.0	16246.17
Soda Ash	18.90	2.0	37.80
Bicarb	19.25	42.0	808.50
Permalose	50.32	54.0	2717.28
Unical	18.10	187.0	3384.70
CMC LV	52.50	73.0	3832.50
Ligcon	19.99	84.0	1679.16

Material Cost for Interval \$ 72591.53 Average Cost per Meter \$ 47.14

Number of Days 20 Average Cost per Meter \$ 3629.58

This section was drilled without problems, other than some minor shale sloughing which was countered by raising the weight slightly ( 1.20 - 1.27 s.g. at T.D. ). A bridge was found in the hole on the first logging run which required cleaning out, but thereafter logging was no problem. 9 5/8" casing was successfully run, but on cementing was found to have a hole at 993 m. This was eventually squeezed off, but required 6 days of rig time and increased the mud cost for this section due to the necessity to treat cement contamination.

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# CASING INTERVAL

COMPANY STATOIL Well No. 15/9 - 10 Page 5 of 8

Casing Size 8 1/2 " from \_\_\_\_\_ to \_\_\_\_\_ (Bit Size) 8 1/2 " hole from 2706 m to 3291 m

**Material Consumption for Interval:**

	<u>Cost per Unit</u>	<u>No. Used.</u>	<u>Total Cost</u>
Barite Bulk	120.00	257.4	30888.00
Bentonite Bulk	305.00	26.2	7991.00
Caustic	13.75	71.0	976.25
Soda Ash	18.90	6.0	113.40
Bicarb	19.25	39.0	750.75
Drispac R	195.18	13.0	2537.34
Drispac SL	204.81	6.0	1228.86
Unical	18.10	304.0	5502.40
Ligcon	19.99	218.0	4357.82
Permalose	50.32	37.0	1861.84
Milpolymer 302	200.57	26.0	5214.82
LD - 8	169.04	1.0	169.04

Material Cost for Interval \$ 61591.52 \* Average Cost per Meter \$ 105.28 \*

Number of Days 17 1/2 Drilling Average Cost per Meter \$ 3519.51

\* NOTE: The above costs include P & A operation and any differences found in the final inventory due to losses.

No serious problems were encountered in this section apart. Four cores were cut, with excellent recoveries. Mud weight was raised to s.g. 1.5 at 2985 m. All available solids control equipment was in operation.

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# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 1 OF 1

DATE 15/9 DEPTH \_\_\_\_\_ TIME 24:00 hrs ENGINEER Dave Atkin

Spud in 36" hole from 123 m- 134 m.  
Checked drillwater 150 cl. 80 Ca+.  
Made up spud mud. Prepared high vis mud at 1.20. Pumping  
30 bbls per connection.

DATE 16/9 DEPTH 172 m TIME 24:00 hrs ENGINEER Atkin/Sørbø

Drilled 36" hole to 172 m. Pumped 50 bbls High Vis mud and displaced with seawater. Pumped 200 bbls High Vis mud and displaced with 60 bbls 1.25 mud. POOH. Ran and cemented 30" casing to 172 m. WOC. RIH and drilled cement and shoe + 1 m to 173 m. Pumped 30 bbls High Vis mud, circulated with seawater. POOH

DATE 17/9 DEPTH 197 m TIME 02:00 ENGINEER Dale/Sørbø

Made up diverter. RIH with new BHA. Drill 12 1/4" pilot hole. 173-186 m. Lost circulation. Pumped 100 bbls High Vis pill. Observe Hole. Mixed and pumped three 70 bbls Nutslug/Mica pills. Return after third pill. Displaced hole with Gel mud. Drilling 12 1/4" hole from 186 m- 189 m. Lost returns. Pumped two more Nutplug/Mica/Kwikseal pills. Mixed total of 1,000 bbls Gel mud to replaces losses and LCM pills.

DATE 18/9 DEPTH 200 m TIME 01:00 hrs ENGINEER Dale/Sørbø

Pumped 75 bbls LCM pill. Displaced with seawater, got returns. Drilled 12 1/4" pilot hole 189-200 m with 50 % return. Observe leak outside 30" casing. POOH. Set CMT plug. POH, RIH with 12 1/4" bit. Tag CMT at 173 m. Circulate. Observe leak on pinconnection. POH with riser. RIH with 30" running tool and stinger. Pump CMT.



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 2 OF     

DATE 19/9 DEPTH 200 m TIME 02:00 hrs ENGINEER Dale/Sørbø

Pumped cmt. Plug in hole. Pump cmt outside casing. Ran pin connection and riser. RIH and drilled cmt. 162-190 m with partial returns. Mixed and pumped LCM pill. Lost complete returns at 191 m. Divers observed leak 30 ft. from well lead. Set LCM plug 192-167 m. Set CMT plug 167-125 m. WOC.

DATE 20/9 DEPTH 200 m TIME 02:00 hrs ENGINEER Dale/Sørbø

WOC. RIH and tag CMT at 173 m. Drilled Cmt 173-178 m. Lost returns. Mixed and pumped LCM pill. Pumped CMT plug. WOC/WOW.

DATE 21/9 DEPTH 420 m TIME 01:30 hrs ENGINEER Dale/Sørbø

WOW, Run and landed riser. RIH with bit and BHA. Tag CMT at 161 m. Drill CMT 161-200m with seawater and 20 bbls Gel slugs each connection. Displace hole with Gel mud at 200m. Drill ahead with full returns. Mixed 750 bbls Gel mud for displacement and slugs. Running all solids control equipment, using seawater for dilution.

DATE 22/9 DEPTH 485 m TIME 02:30 hrs ENGINEER                     

Drill 12 1/4" pilot hole to 485m. Circulate and then pumped 150 bbls Hivis mud. POH 4 stands. Tight spot 440-350 m. RIH, circulate and raised weight to 1.10 sg. Mixed and pumped 35 bbls Nutplug pill. Wiper trip to shoe OK. Circulate bottoms up. Mixed and pumped 50 bbls Nutplug pill followed by 150 bbls Hivis mud. Log. RIH, no fill. Displace with seawater and deserve well. OK, displace hole with 1.4





# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 3 OF     

DATE 23/9 DEPTH 485 m TIME 04:00 hrs. ENGINEER Dale/Sørbø.

RIH with 12 1/2" bit and 26" hole opener. Drill CMT 162-172m. Reamed 12 1/4" hole to 26" with 20-40 bbls Hivis slug at each connection. Mixed 1600 bbls Hivis gel mud. Weight up 900 bbls to 1.14 for displacement.

DATE 24/9 DEPTH 485 m TIME 02:00 hrs. ENGINEER Dale/Sørbø.

Reamed 12 1/4" pilot hole to 26" 425-485 m with Highvis slugs on each connection. Circulate and pumped two 40 bbls Hivis slugs. Displace hole with 1.14 sg mud, Wiper trip to shoe. Reamed tight spots and 3 m fill. Pumped 40 bbls Hivis mud. Circulate out. Displace hole with 300 bbls 1.14 sg mud. Start trip to 300 mud. 1.5 m fill. Circulate out with 40 bbls Hivis mud. Displace hole with 1.14 sg mud plus 63 bbls 1.25 sg mud on bottom. Run 20".

DATE \_\_\_\_\_ DEPTH \_\_\_\_\_ TIME \_\_\_\_\_ ENGINEER \_\_\_\_\_

DATE \_\_\_\_\_ DEPTH \_\_\_\_\_ TIME \_\_\_\_\_ ENGINEER \_\_\_\_\_



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 4 OF     

DATE 27/9 DEPTH 630 m TIME 01:30 hrs. ENGINEER Dale/Creamer.

Drilling ahead, mud conditions holding well.

DATE 28/9 DEPTH 1049 m TIME 02:00 hrs. ENGINEER Dale/Creamer.

Drilling ahead, no problems. Mud conditions holding well.

DATE 29/9 DEPTH 1178 m TIME 02:00 hrs. ENGINEER Dale/Creamer.

Logging. Mud conditions stable.

DATE 30/9 DEPTH 1178 m TIME 03:00 hrs. ENGINEER Dale/Creamer.

13 3/8" casing at 1166 m. No problems.



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 5 OF     

DATE 1/10 DEPTH 1181 m TIME 02:30 hrs. ENGINEER Dale/Creamer.

Drill 13 3/8" casing shoe. Weight up to 1.20 sg. Cement contamination minimal.

DATE 2/10 DEPTH 1540 m TIME                      ENGINEER Dale/Creamer.

Drilling 1180-1540. No problems.

DATE 3/10 DEPTH 1832 m TIME                      ENGINEER Mallett/Creamer.

Drill 1540-1832 m. Some tight spots. Increase in PV-YP-Gels, treat with Polymer, Unical and water.

DATE 4/10 DEPTH 2115 m TIME                      ENGINEER Mallett/Creamer.

Increase weight to 1.22 for Shale Control.



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 6 OF     

DATE 5/10 DEPTH 2289m TIME                      ENGINEER Mallett/Creamer.

Drill ahead, No fill after trip. Minor tight spots during trip out.

DATE 6/10 DEPTH 2457m TIME                      ENGINEER Mallett/Creamer.

Drill ahead to 2457 m; Circulate, POOH for bit.

DATE 7/10 DEPTH 2550m TIME                      ENGINEER Mallett/Creamer.

POH, Minor tight spots. RIH. No fill, drill ahead.

DATE 8/10 DEPTH 2647m TIME                      ENGINEER Mallett/Creamer.

WOW.



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 7 OF       

DATE 9/10 DEPTH 2674m TIME            ENGINEER Mallett/Appleton.

Drilling ahead, raise weight to control shale. Shale OK, reduce weight again.

DATE 10/10 DEPTH 2718m TIME 01:00 hrs. ENGINEER Atkin/Appleton.

Drilled to 2710 m. Circulate - wiper trip to shoe. Mix 200 bbls. new mud at 1.25 sg and add to active system. Weighted system to 1.27 sg. Weighted kill mud to 1.30.

DATE 11/10 DEPTH 2719m TIME 24:00 hrs. ENGINEER Atkin/Appleton.

RIH, tight spot at 2700, work to bottom. Circulate hole clean. POOH and log. Unable to pass 1500 m. RIH to 1500 m. Ream to 1540m. Ream 2300-2318 m. Drill to 2719. Circulate hole clean. POH.

DATE 12/10 DEPTH 2719m TIME 24:00 hrs. ENGINEER Atkin/Appleton.

Log.



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 8 OF     

DATE 13/10 DEPTH 2719 m TIME 24:00 hrs. ENGINEER Atkin/Appleton.

RIH, tight spot at 2700 m. Wash and ream to 2719 m. Circulate bottoms up. POH. Run 9 5/8" casing.

DATE 14/10 DEPTH 2706m TIME 24:00 hrs. ENGINEER Atkin/Appleton.

Set 9 5/8 at 2706 and cement. Dumped cement contaminated mud.

DATE 15/10 DEPTH 1422 m TIME                      ENGINEER Atkin/Appleton.

RIH, tag cement at 1365 m. Test casing, leaking. Circulate then drill cement 1365 - 1422 m. Circulate bottoms up. Pressure test casing. POH. RIH with scraper to 1422 m. POH, RIH with RTT's tool. Test casing.

DATE 16/10 DEPTH 2719m TIME                      ENGINEER Atkin/Appleton.

Located casing leak at 993 m. POH. Run CBL. WOO. RIH, pumped balance plug from 1242 to 1100 m, POH to 1047 m. Circulate while WOC.



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 9 OF     

DATE 17/10 DEPTH 2719 m TIME                      ENGINEER Dale/Appleton.

WOC. Tag cement at 1138 m. Dressed hard cement to 1144 m. Circulate bottoms up. Set packer at 922 m. Pumped and squeeze cement. WOC.

DATE 18/10 DEPTH 2719 m TIME                      ENGINEER Dale/Appleton.

WOC, test casing, no good. POH with packer. RIH with bit and scraper. Drill cement 992 - 1008 m. RIH to 1144 m. Displace hole with seawater. POH, RIH.

DATE 19/10 DEPTH 2719 m TIME 02:00 hrs. ENGINEER Dale/Appleton.

Bled off pressure, POH. RIH with bit. Drill cement 982 - 997 m. Tested casing - OK. Drill cement 1144 - 1248 m. RIH. Drill cement 1422 - 1700 m. Drilling cement with seawater. Circulate 40 bbls. mud at 1600 m. Displacing hole with mud at 1700 m.

DATE 20/10 DEPTH 2719 m TIME 02:00 hrs. ENGINEER Dale/Appleton.

Drill cement 1700 - 1725 m. Displace hole with mud while drilling to clean hole. Displace back to seawater. Drill hard to soft cement. Displace hole with mud. Drill to 2407 m. Mud severely cement contaminated. Displace hole with seawater, drill to 2678m. Mixed 600 bbls new mud plus 140 bbls prehydrated gel to fill hole and replace mud used in hole cleaning slugs. Treating mud for cement contamination and lowering water loss.



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 10 OF     

DATE 21/10 DEPTH 2737m TIME 02:00 hrs. ENGINEER Dale/Appleton.

Displace hole with mud at 2678 m. Circulate and condition mud. Tested casing - OK. Drill plug, float and soft cement to 2695 m. Circulate bottoms up, tested casing - OK. POH, Ran CBL, RIH with new bit. Drill cement, shoe, sat hole and 3 meters new hole to 2722 m. Leak off 1.78 equavelant. Drill to 2734 m. Treated mud for cement contamination and lowering water loss with prehydrated gel, Unical and Ligcon.

DATE 22/10 DEPTH 2797m TIME                      ENGINEER Dale/Appleton.

Drill to 2737, POH. Test BOP. RIH with turbine. Ream 2718 - 2737 m. Drill ahead.

Weighted 300 bbl kill mud to 1.33. Raise vis of active system with prehydrated Gel.

DATE 23/10 DEPTH 2934m TIME                      ENGINEER Dale/Appleton.

Drilling ahead. Lowering fluid loss.

DATE 24/10 DEPTH 2985m TIME                      ENGINEER Dale/Appleton.

Drilling ahead to 2980. Raised weight to 1.50 sg while drilling. POH for bit trip. Lowered fluid loss to 5 cc. Ran desander and mud cleaner continuously when drilling and desilter occasionally.





# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 11 OF     

DATE 25/10 DEPTH 3058 m TIME                      ENGINEER Dale/Grüner.

Drill to 3016m. Circulate at shoe due to strike. RIH. Drill ahead.  
Maintaining mud properties. Checking for H<sub>2</sub>S each 100 m.  
Zero so far.

DATE 26/10 DEPTH 3067 m TIME                      ENGINEER Dale/Grüner.

Drill ahead to 3061 m. Circulate for samples. POH for core barrel, RIH.  
Cut core. POH, RIH with bit.

DATE 27/10 DEPTH              TIME 02:00 hrs. ENGINEER Dale Grüner.

RIH. Drill ahead to 3082 m. POH for core barrel. RIH cut core. POH.

DATE 28/10 DEPTH 3140 m TIME 02:00 hrs. ENGINEER Dale/Grüner.

Recover 100 % core number 2. RIH with bit. Ream 3082-3100 m. RIH drill to 3137.  
POH for core barrel, RIH.



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 12 OF     

DATE 29/10 DEPTH 3171 m TIME 02:00 hrs. ENGINEER Dale/Grüner.

Cut core. POH, recover 93 % of core. Test BOP. RIH with core barrel. Cut core.

One mud cleaner out of action due to burnt pump motor.

DATE 30/10 DEPTH 3266 m TIME 02:00 hrs. ENGINEER Dale/Grüner.

POH, recover 100 % core number 4. Ran electric logs. RIH with bit.

Ream 3140 - 3171 m. Drill ahead.

DATE 31/10 DEPTH 3291 m TIME 02:00 hrs. ENGINEER Mooney/Grüner.

POH, Logging.

DATE 1/11 DEPTH 3291 m TIME 02:00 hrs. ENGINEER Mooney/Grüner.

Finish logging, RIH and prepare to set plugs.



# DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 15/9 - 10 PAGE 13 OF     

DATE 2/11 DEPTH 3291 m TIME 01:00 hrs. ENGINEER Mooney/Grüner.

P & A.

Engineers off location.

DATE \_\_\_\_\_ DEPTH \_\_\_\_\_ TIME \_\_\_\_\_ ENGINEER \_\_\_\_\_

DATE \_\_\_\_\_ DEPTH \_\_\_\_\_ TIME \_\_\_\_\_ ENGINEER \_\_\_\_\_

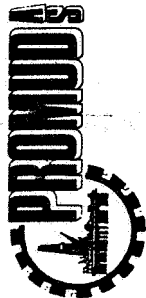
DATE \_\_\_\_\_ DEPTH \_\_\_\_\_ TIME \_\_\_\_\_ ENGINEER \_\_\_\_\_



# DAILY DRILLING MUD ADDITIONS

**Contractor** ROSS DRILLING     **OPERATOR** STATOIL     **LEGAL DESCRIPTION**  
**Rig No.** NORBRAUG     **Well Name And No.** 15/9 - 10     **Field** North Sea     **COUNTRY** Norway  
**Promud a/s Warehouse** PROMUD, TANANGER     **Spud Date** 15/9/81     **No. Drilling Days To T.D.** 44     **DATE T.D. REACHED** 30/10/81     **TOTAL DEPTH** 3291 m     **TOTAL COST \$** 223 227.99

DATE (1981)	DEPTH meters	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	DAILY COST	CUMULATIVE COST
15/9	134	Bentonite	7.8	60	305.00						3697.50
16/9	173	Bentonite	2.9	2.2	340						7836.00
17/9	197	Bentonite	61	216	3	129					11533.50
18/9	200	Bentonite	25.5	1	1						12067.36
19/9	200	Bentonite	3.3								23600.86
20/9	200	Bentonite	5.8								3188.50
21/9	420	Bentonite	7.6								2550.18
22/9	485	Bentonite	0.6								29339.54
23/9	485	Bentonite	2	17							31724.14
24/9	485	Bentonite	47	18.2							2494.00
25/9	485	Bentonite									700.64
26/9	485	Bentonite									34918.78
27/9	630	Bentonite	3								6746.11
28/9	1049	Bentonite									13578.90
29/9	1178	Bentonite	7								55243.79
30/9	1178	Bentonite									55243.79
1/10	1180	Bentonite	23								55243.79
2/10	1534	Bentonite	20								70309.37
3/10	1829	Bentonite	4								70309.37
4/10	2115	Bentonite	1								84895.74
5/10	2289	Bentonite	6								84895.74
6/10	2457	Bentonite	17								100221.17
7/10	2550	Bentonite	3								100221.17
		Bentonite									103480.45
		Bentonite									106240.45
		Bentonite									112754.35
		Bentonite									116474.23
		Bentonite									120912.41
		Bentonite									122529.33
		Bentonite									128564.28
		Bentonite									132751.47



# DAILY DRILLING MUD ADDITIONS

**Contractor** ROSS DRILLING    **OPERATOR** STATOIL    **LEGAL DESCRIPTION** \_\_\_\_\_  
**Rig No.** NORDRAUG    **Well Name And No.** 15/9 - 10    **Field** North Sea    **COUNTRY** Norway

**Promud a/s Warehouse** PROMUD, TANANGER    **No. Drilling Days to T.D.** 44    **DATE T.D. REACHED** 30/10/81    **TOTAL DEPTH** 3291 m    **TOTAL COST \$** 223 227.99

DATE (1981)	DEPTH meters	Spud Date										DAILY COST	CUMULATIVE COST		
		1	2	3	4	5	6	7	8	9	10				
8/10	2647													5605.93	138357.40
9/10	2674	7												9724.55	148081.95
10/10	2718	48												10425.40	158507.35
11/10	2719	11												1923.84	160431.19
12/10	2719														160431.19
13/10	2719													165.00	160596.19
14/10	2706	3.7												3966.75	164557.94
15/10	2719	24													
16/10	2719	4.7													
17/10	2719													564.00	170215.39
18/10	2719													195.18	170410.57
19/10	2719	10												Nil	170410.57
20/10	2719	32												1200.00	171610.57
21/10	2737	27												7114.11	178724.68
22/10	2797	47												7643.06	186367.74
23/10	2934	16												6990.60	193358.34
24/10	2985	55												3181.74	196540.08
25/10	3058	12												9059.66	205599.74
26/10	3067													4166.51	209766.25
27/10	3101	10												388.36	210154.61
28/10	3140													1255.00	211409.61
29/10	3171	15												Nil	211409.61
30/10	3291m													2036.00	213445.61
														442.45	214063.06

**Date** 30/10/81    **Promud a/s Technical Representative** Mallett/Appleton/Dale/Sø    **District** North Sea    **Region** Norway    **PAGE** 2 **OF** 3



# DAILY DRILLING MUD ADDITIONS

**Contractor** ROSS DRILLING **OPERATOR** STATOIL **LEGAL DESCRIPTION**  
NORDRAUG **Well Name** Block 15/9 N. Sea **COUNTRY** Norway  
**Rig No.** 15/9 - 10 **Field** Norway  
**Promud a/s Warehouse** PROMUD, TANANGER **Spud Date** 15/9/81 **No. Drilling Days To T.D.** 44 **DATE T.D. REACHED** 30/10/81 **TOTAL DEPTH** 3291 m **TOTAL COST** \$ 223 227.99

DATE (1981)	DEPTH meters	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	DAILY COST	CUMULATIVE COST	
31/10	3291 TD	Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit			214063.00	
1/11	TD	Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		*	222349.20	
2/11	TD	Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		**	332.50	222681.70
		Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		Unit		**	223227.99	

**Date** 2/11/81 **Promud a/s Technical Representative** Atkin/Sorbo/Date/creamer **District** North Sea **Region** Norway **PAGE** 3 **OF** 3  
PHEMIA'S SANDNES



# DRILLING MUD RECAP

**Contractor** ROSS DRILLING      **OPERATOR** STATOIL      **LEGAL DESCRIPTION** \_\_\_\_\_  
**Rig No.** NORDRAUG      **Well Name** 15/9 - 10      **Field** North Sea      **COUNTRY** Norway  
**Promud a/s Warehouse**      **And No.** \_\_\_\_\_      **Spud Date** 15/9/81      **No. Drilling Days To T.D.** \_\_\_\_\_      **DATE T.D. REACHED** \_\_\_\_\_      **TOTAL DEPTH** \_\_\_\_\_      **TOTAL COST \$** \_\_\_\_\_

DATE (1981)	TIME	DEPTH (meters)	WT (ppg)	FV API <sup>6</sup>	FV cp %	YIELD POINT (lb/100ft <sup>2</sup> )	GELS (1lb/100ft <sup>2</sup> ) 0/10	pH	FILTRATE (ml/30 min)	CHL. (mg/ml)	ALKALINITY (Pm, Pi, Mi)	CHLORIDE (ppm)	CALCIUM (ppm)	SAND (% by Vol.)	SOLIDS (% by Vol.)	OIL (% by Vol.)	WATER (% by Vol.)	METHY. BLUE (me/ml mud)	CIRC. VOLUME (bbl)	REMARKS	
5/10	0300	2289	1.22	51	9	10	8/14	9.5	14.5	1.5	0.39	0.37/1.1	18200	1325	0.50	8	0	92	20	2723	Drill ahead. No problems.
6/10	0230	2457	1.22	49	12	18	11/19	9.3	14	1.5	0.37	0.2/1.2	18100	1350	0.25	8	0	92	20	2778	Trip for bit No. 6.
7/10	0330	2550	1.22	49	14	20	9/14	9.4	14	1.5	0.41	0.4/1.3	18200	1300	0.25	8	0	92	20	2782	RIH continue to drill.
8/10	0300	2647	1.22	48	16	26	8/15	9.4	14	1.5	0.39	0.5/1.1	18500	1400	0.25	7	0	93	18	3010	W. O. W.
9/10	2400	2674	1.25	60	18	28	10/15	9.5	9.2	1.5	0.3	0.3/0.9	18000	1200	0.25	6	0	94	16	1676	Drilling ahead.
10/10	0100	2718	1.27	48	14	20	9/16	9.5	8.6	1.5	0.4	0.3/1.0	18000	1600	0.25	7	0	93	16		D/A. Made & conditioned mud.
11/10	2400	2719	1.27	53	15	21	7/20	9.5	9.5	2.0	0.3	0.3/0.8	18000	1800	TR	7	0	93	16		Reamed, logged & clean hole.
12/10	2400	2719	1.27	53	14	18	10/20	9.5	9.3	2.0	0.3	0.3/0.8	18000	1800	TR	7	0	93	16		Logging.
13/10	2400	2719	1.27	47	12	18	10/18	9.6	9.4	2.0	0.4	0.4/0.8	18000	1350	TR	7	0	93	15		Retrieved wear bushing. Cased
14/10	2400	2706	1.27	52	9	13	13/19	10.5	16	3.0	0.8	0.4/0.9	18000	260	TR	7	0	93	15		Cmtd. Test BOP. New BHA.
16/10	2400	2719	1.27	43	10	13	9/16	10.5	16.4	3.0	1.2	0.5/1.2	14600	350	TR	7	0	93	19		Leak incsg. Pump cmt. plug.
17/10	0200	2719	1.27	47	12	14	4/9	11.1	18.4	3.0	4.1	2.2/3.1	11500	320	TR	7	0	93	20		Dressed cmt. Set acr. Cmt squeeze in leak.
18/10	0200	2719	1.27	42	9	12	4/8	11.0	20.4	3.0	3.7	2.1/3.3	11900	320	TR	7	0	93	20		Tested csg. No good. Squeeze again.
19/10	0200	2719	1.22	40	8	10	4/16	11.0	26.5	3.0	4.5	1.5/2.3	11500	320	TR	5	0	95	20		Csg. OK. Drl cmt w/seawater.
20/10	0200	2719	1.27	48	10	14	2/10	11.8	11.8	3.0	4.8	2.3/3.3	10500	260	TR	8	0	92	25		Mud cmt. Cont. treated & lowered WL.
21/10	0200	2737	1.27	43	9	10	2/8	11.0	8.4	3.0	3.8	0.8/1.8	9000	200	TR	8	0	92	25.5		Drid. shoe. Leak off 1.78. Treated cmt.
22/10	0200	2797	1.27	44	10	12	5/17	10.6	9.2	3.0	2.3	0.6/1.2	6500	120	TR	9	0	91	23.5		Drid. 8 1/2" hole w/turbine bit.
23/10	0200	2934	1.28	45	11	13	5/13	9.5	7.4	1.0	1.6	0.3/0.8	6000	160	TR	9	0	91	25.0		Drid. 8 1/2" hole.
24/10	0200	2985	1.50	52	20	12	3/10	10.0	5.0	1.0	1.9	0.4/1.2	7000	160	TR	17	0	83	25.0		Raised wt. & lowered w.l.

**Date** 24/10      **Promud a/s Technical Representative** Mooney/Dale      **District** North Sea      **Region** Norway      **PAGE** 2 **OF** 3  
 PRENTISS SANDNES



# DRILLING MUD RECAP

**Contractor** ROSS DRILLING **OPERATOR** STAROIL **LEGAL DESCRIPTION** North Sea **COUNTRY** Norway  
**Rig No.** NORDRÅUG **Well Name And No.** 15/9 - 10 **Field**

**Promud a/s Warehouse** **Date** 15/9/81 **No. Drilling Days To T.D.** **DATE T.D. REACHED** **TOTAL DEPTH** **TOTAL COST \$**

DATE (1981)	TIME	DEPTH meters	WT (ppg)	FV API%	PV cp @	YIELD POINT (lb/100ft <sup>2</sup> )	GELS (lb/100ft <sup>2</sup> ) 0/10	pH	FILTRATE (ml/30 min)		Cake (32nd in)	Alkalinity			Chloride (ppm)	Calcium (ppm)	Sand Solids (% BY Vol.)	Oil Solids (% BY Vol.)	Methy. Blue (ppm mud)	Circ. Volume (bbl)	REMARKS
									API	HT-HP		°F	P <sub>m</sub>	P <sub>1</sub>							
15/9	2400	134	1.06	135				10.5						150	80						Spudded in at 2115 hrs.
16/9	2400	173	1.06	135				10						150	40						Ran&cnt.30" csg. at 172m.
17/9	0200	197	1.05	44				9.5						150	40						Drid. to 186m. Lost circulation
18/9	0100	200	1.05	45				9.6						150	60						Spotted LCM. Drid. to 200-lost circulation
19/9	0200	200	1.05	50				9.6						150	80						Cnt. Plug&outside csg. Some ret.
20/9	0200	200	1.05	48				9.6						150	80						Drid.cmt. to 178. Lost circ. WOW.
21/9	0130	420	1.06	46	6	42	18/25	9.5		3	0.35	0.15	0.21	1500	520	TR	3	97	25		Drid.cmt. 161-200m. Displaced.
22/9	0230	485	1.10	44	6	32	15/22	9.6		3	0.35	0.18	0.21	12000	560	TR	5	95	25		Drilling ahead.
23/9	0400	485	1.14	120				10.2						6500	440						Drid. to 485m. Raised MW to L10
24/9	0200	485	1.14	135				10.2						150	60						Pulled riser. RIH w/ 26 HO
25/9																					Drid. to 485m w/ seawater& visc. plugs.
26/9	0330	485	1.05	44	10	12	2/5	9.5	13	1	0.35	0.16	0.10	1600	1200	TR	3	97			1100 Drill out cement.
27/9	0130	630	1.08	44	12	16	4/10	10	11.9	1	0.32	0.17	0.31	17500	1200	TR	3	97			1281 Drilling/ No problems.
28/9	0200	1049	1.11	41	9	13	5/12	9.5	11.1	1	0.20	0.07	0.21	18500	1180	TR	4.5	95.5			1462 Drilling/ No problems.
29/9	0200	1178	1.11	42	9	14	5/11	9.5	10.8	1.5	0.29	0.18	0.21	18100	1090	TR	4.5	95.5			1650 Logging.
30/9	0300	1178	1.11	44	10	16	4/9	9.5	10.9	1.5	0.30	0.20	0.21	18000	1140	TR	4.5	95.5			1643 Cement 13 3/8" casing.
1/10	0230	1180	1.20	40	12	16	4/10	9.8	14	1.5	1.3	0.37	0.12	18500	1350	TR	4	96			1716 Drilling 12 1/4" hole.
2/10	0200	1534	1.20	47	13	31	9/16	9.4	12	1.5	0.44	0.37	0.12	18400	1270	TR	8	92	22		1982 Drill ahead/mud cond. Good.
3/10	0300	1832	1.20	96	12	24	9/16	9.4	14	1.5	0.38	0.29	0.13	18200	1250	TR	9	91	20		2244 Drill/Slight solids increase.
4/10	0300	2115	1.22	52	13	25	11/17	9.5	14.9	1.5	0.40	0.37	0.14	18300	1275	TR	8	92	21		





# DRILLING MUD RECAP

Contractor ROSS DRILLING OPERATOR STAFFOIL LEGAL DESCRIPTION NORDBLAUG  
 Well Name Tananger And No. 15/9 - 10 Field 15/9 COUNTRY North Sea, Norway  
 Rig No. NORDBLAUG No. Drilling 15/9/81 DATE T.D. REACHED 15/9/81 TOTAL DEPTH 15/9 TOTAL COST \$ 15/9  
 Promud a/s Warehouse Tananger Spud Date 15/9/81 Days To T.D. 15/9/81

DATE (19 81)	TIME	DEPTH meters	WT (ppg)	FV API%	PV cp %	YIELD POINT (lb/100ft <sup>2</sup> )	GELS (lb/100ft <sup>2</sup> ) 0/10	pH	FILTRATE (ml/30 min)			Coke (32nd in)	Alkalinity			Chloride (ppm)	Calcium (ppm)	Sand (% by Vol.)	Solids (% by Vol.)	Oil (% by Vol.)	Water (% by Vol.)	Methy. (me/ml mud)	Circ. Volume (bbt)	REMARKS
									API	HT-HP	HF		P <sub>m</sub>	P <sub>f</sub>	M <sub>t</sub>									
25/10	0200	3058	1.50	48	18	10	3/8	9.6	4.2	13.9	250	1	1.7	03/09	7500	180	TR	17	83	25.0			Drilling 8 1/2" hole.	
26/10	0200	3067	1.50	50	20	12	3/8	9.8	3.8	13.6	250	1	1.8	03/11	8000	160	TR	18	82	25.0			Coring.	
27/10	0200	3101	1.50	49	20	11	2/7	9.8	3.8	13.6	250	1	1.8	03/11	6500	160	TR	18	82	25.0			Drilled & cored well down due to formel lignite.	
28/10	0200	3140	1.50	49	19	11	2/5	9.6	4.0	14.0	250	1	1.2	03/14	7500	160	TR	17	83	25.0			Drilled.	
29/10	0200	3171	1.50	50	20	11	2/5	9.9	4.0	14.2	250	1	1.9	03/19	7000	120	TR	19	81	25.0	1296		Cored.	
30/10	0200	3766	1.50	50	19	10	2/9	10	4.8	14.9	250	1	2.2	04/19	7500	120	TR	18	82	25.0	1195		Logged & drilled.	
31/10	0100	3291	1.50	49	21	10	2/9	9.5	5.8		1	1.0	12/27	7500	160	TR	18	82	25.0	1377		Logging.		
1/11	0200	3291	1.48	48	25	10	2/9	9.4	5.2		1	0.7	04/16	8500	240	TR	20	80	25.0	1404		RH to set plugs.		
2/11	0100	3291	1.27	38	9	3	2/11	11	7.0		1	2.4	06/19	5000	100	TR	10	90	25.0	843		Drl. mud for wt. 1.27		