

POST - WELL AUDIT

COMPANY: STATOIL

WELL NAME: 15/9-18

Denne rapport
tilhører



UND DOK.SENTER

L.NR. 30084750001

KODE Well 15/9-18 nr. 20

Returneres etter bruk

NORSK PETROLEUM SERVICES A/S

POST - WELL AUDIT

COMPANY: STATOIL

WELL NAME: 15/9-18

NORSK PETROLEUM SERVICES A/S

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
SLEIPNER

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OIL COMPANY	: Statoil
CONTRACTOR	: ODCC
RIG	: Deep Sea Bergen
WELL NAME/No.	: 15/9-18
LOCATION/BLOCK No.	: 15/9
ENGINEERS	: Bristow, Cluck, Craddock, Wood
T.D.	: 3622 m
TOTAL DEVIATION	: 2 1/4°

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OPERATING AREA

COST SUMMARY

OPERATOR	:	STATOIL
BLOCK No./LOCATION	:	15/9
WELL NAME/No.	:	15/9-18
TOTAL DEPTH	:	3622 m
DEVIATION	:	2 1/4°
SPUD DATE	:	16.12.83
DATE T.D. REACHED	:	20.02.84
TOTAL DRILLING DAYS	:	25
Cost Of Mud Materials Used On Well	:	\$236,898.06
Cost Of Mud Materials Used For Drilling	:	\$236,898.06
MUD COST/RTK M	:	\$67.65
MUD COST/DAY	:	\$3,158.64
MUD COST/ROTATING HOUR	:	\$397.81
DAYS ENGINEERING SERVICE	:	75
Cost Of Mud Materials & Engineering Service	:	\$268,448.06
END OF WELL INVENTORY ADJUSTMENT	:	nil
Engineering Days Not Included In Total Cost	:	nil

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OPERATING AREA Sleipner

OPERATOR STATOIL

WELL NAME/No. 15/9-18

CONTRACTOR ODCC

RIG Deep Sea Bergen

BAROID ENGINEERS Craddock, Wood, Bristow, Cluck

T.D. 3622 m

CASING/DEPTH	DRILLING	CASING JOB	TESTING	NIPPLE UP AND TEST STACK	REAMING AND SCHLUMBERGER	WOW	TOTAL
30" 181	13	8	-	-	-	3	24
20" 497	48	14.5	-	6.5	-	7	76
13 3/8" 1150	42.5	15.0	-	8	-12.5	5	83
9 5/8" 2742	223.5	18.0	-	2.5	23-20.5	4.5	292
8 1/2" 3622	268.5	-	-	26.5	10.0-110	-	415
TOTAL	595.5	55.5	-	43.5	33.0-143	19.5	890

Date moved on location/skidded over slot:

Date moved off location/skid off:

Total days on well:

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OPERATING AREA SLEIPNER

OPERATOR STATOIL

WELL NAME/No. 15/9-18

CONTRACTOR ODCC

RIG Deep Sea Bergen

BAROID ENGINEERS Bristow, Cluck, Craddock, Wood

T.D. 3622 m

HOLE SIZE	CASING SIZE	CASING SET AT	MUD TYPE	MUD COST	DRILLING DAYS
36"	30"	181 m	Seawater and hiVis Gel Pills	10076.06	13 hrs
26"	20"	497 m	Seawater/Gel	44607.62	62 hrs
17 1/2"	13 3/8"	1150 m	Gyp/Lignosulphonate	55093.04	42.5 hrs
12 1/4"	9 5/8"	2742 m	Gyp/Lignosulphonate	66685.56	223.5 hrs
8 1/2"	-	to 3622	Lignite/Lignosulphonate	60435.86	268.5 hrs

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INTERVAL SUMMARY

SECTION 36" Hole/30" Casing
Spud Depth 120 m ft. 203... m .62...
Spud Date 16th Dec 1983
TD Depth 182 m
TD Date 16/17th Dec 1983
Maximum Hole Deviation 1 1/2°
Drilling Days 13 hrs
Total Days on Interval 2
Interval Mud Cost \$ 10,076.06
Volume Built 317 m³
Volume Transferred to Interval 0
Volume Salvaged 109 m³
Volume Lost to Formation and/or Dumped 208 m³
Cost per Barrel \$ 5.05 **Cost/m³** \$ 31.79
Cost per ft. 49.64m ..162.51
Cost per Day \$ 5,038.03

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OPERATING AREA 15/9-18^r
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INTERVAL SUMMARY

SECTION 26" Hole/20" Casing

Spud Depth 181 m ft. 1112... m ...339.

Spud Date 18 Dec 1983

TD Depth 520 m

TD Date 21 Dec 1983

Maximum Hole Deviation 1/4^o

Drilling Days 62 hrs

Total Days on Interval 6

Interval Mud Cost \$ 44,607.62

Volume Built 1199 m³

Volume Transferred to Interval 109 m³

Volume Salvaged 0

Volume Lost to Formation and/or Dumped 1308 m³

Cost per Barrel \$ 5.92 / \$ 37.20 per m³

Cost per ft. 40..11 m ...131.58

Cost per Day \$ 7,434.60

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OPERATING AREA 15/9-18
Sleipner

INTERVAL SUMMARY

SECTION	17 1/2" Hole	13 3/8" Casing
Spud Depth	520 m	ft. m ...650.
Spud Date	24/12/83	
TD Depth	1170	
TD Date	27/12/83	
Maximum Hole Deviation	3/4°	
Drilling Days	42.5 hrs	
Total Days on Interval	6	
Interval Mud Cost	\$ 55093.04	
Volume Built	548 m ³	
Volume Transferred to Interval	0	
Volume Salvaged	421 m ³	
Volume Lost to Formation and/or Dumped	127 m ³	
Cost per Barrel	\$ 16.01	m ³ = 100.53
Cost per ft. 25.84. m ...84.76		
Cost per Day	\$ 9182.17	

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INTERVAL SUMMARY

SECTION 12 1/4"
Spud Depth 1170 m ft. m ..592.
Spud Date 30/12/83
TD Depth 2762 m
TD Date 16/01/84
Maximum Hole Deviation 2 1/4°
Drilling Days 223.5
Total Days on Interval 18
Interval Mud Cost \$ 66685.56
Volume Built 889 m³
Volume Transferred to Interval 421 m³
Volume Salvaged 352 m
Volume Lost to Formation and/or Dumped 946 m³
Cost per Barrel \$ 11.94 Cost per m³ \$ 75.01
Cost per ft. 12.77 m 41.89
Cost per Day \$ 3031.16

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INTERVAL SUMMARY

SECTION 8 1/2"
Spud Depth 2762 m ft. m .860..
Spud Date 20/01/84
TD Depth 3622 m
TD Date 20/02/84
Maximum Hole Deviation 2°
Drilling Days 32 268.5 hrs
Total Days on Interval 41
Interval Mud Cost \$ 60435.81
Volume Built 179 m³
Volume Transferred to Interval 352
Volume Salvaged Nil
Volume Lost to Formation and/or Dumped 531 m³
Cost per Barrel \$ 18.12 \$ 113.81 per m³
Cost per ft. 21.42 m 70.27
Cost per Day \$ 1888.62

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OPERATING AREA 15/9-18
 Sleipner

INTERVAL DISCUSSION

36" Hole/30" Casing set at 181 m

This section was drilled without problems with a 26" bit and a 36" hole opener, using seawater and pumping high viscosity Bentonite/seawater pills on connections.

The well was spudded on the 16th December 1983. The seabed was tagged at 120 m RKB and drilled to 182 m in 13 hrs. High viscosity pills were pumped on each connection. After reaching 144 m the hole was washed free of a tight spot from 124 m to 134 m.

At TD the hole was displaced twice with high viscosity mud. A wiper trip was made, and the hole displaced again with high viscosity mud, prior to pulling out of the hole to run casing.

The 30" casing was then run and cemented in less than a day.

No problems were encountered on this section. The method of drilling with seawater and pumping high viscosity pills again worked well.

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OPERATING AREA 15/9-18
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INTERVAL DISCUSSION

26" Hole/20" Casing set at 497 m

This section of hole was drilled in three stages using a Bentonite/seawater mud system, with returns to the rig shakers the only major problem encountered was severe mud losses.

The cement and shoe were drilled out, without a riser using a 26" bit and seawater, on the 18th December. After the riser was installed a 12 1/4" bit was run in the hole. An initial mud weight of 1.06 SG was used to commence drilling, and 20/40 mesh screens installed on the shakers.

After drilling to 250 m sand was encountered and the mud weight out increased rapidly to a maximum of 1.22 SG. All the solids control equipment was run with good results, but the shaker screens became "plugged" with the sand and consequently severe mud losses were recorded.

When out of the sand, very sticky clay was drilled and this also caused "plugged" shaker screens, so the mud losses were still high.

After reaching TD at 520 m, the hole was logged and showed large washout in the sand section. Due to the possibility of gas in the sands it was decided to use an under reamer instead of a 26" hole opener. So a 12 1/4" bit, 17 1/2" hole opener, and 26" under reamer was run in the hole, without any drag or fill. Unfortunately the same problems occurred in regard to mud losses as in the first stage of drilling.

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INTERVAL DISCUSSION

26" Hole cont.

The 26" hole was drilled to a depth of 520 m. The mud was then circulated while reducing the mud weight from 1.10 SG to 1.07 SG prior to pumping 141 CU.M. of 1.31 SG mud in the hole to the well head. The riser was then displaced with seawater and pulled. A 26" bit was made up and run in the hole. After getting to bottom with a minimum of problems, 180 CU.M. of 1.31 SG mud was pumped to the well head. The bit was then pulled and 20" casing was run and cemented without problems. A total of 216 CU.M. of 1.31 SG mud was used to fill the casing and circulate the casing volume, prior to cementing.

Severe mud losses occurred while drilling this section of hole, which resulted in a large volume of mud be made up to replace these losses. This, and the building of 396 CU.M. of 1.31 SG mud caused the mud cost for this section to be far greater than was estimated. A total of 811 CU.M. of mud was lost over the shakers, it is hard to suggest a better way to drill this section.

The maintaining of a low mud weight was not a large problem as both the desander and the desilter worked very well. Throughout the sand section the discharge from the desander was in excess of 1.55 SG and the desilter discarded vast quantities of a fine silty sand.

The cost of weighting up the 396 CU.M. of mud to 1.31 SG was \$ 19,593.08 and this contributed greatly to the total cost of the section.

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OPERATING AREA 15/9-18
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INTERVAL DISCUSSION

12 1/4" Hole 9 5/8" Casing

This hole section was drilled with Gypsum/Lignosulfonate as in the previous interval.

Hole problems were limited to that of tight hole in the upper section. Mud weight was increased to 1.17 SG at 1800 meters and then to 1.23 SG at 2000 meters. The increased mud weight appeared to reduce drag substantially.

Relatively high dilution rates were required to maintain Bentonite clay content at an acceptable figure. Approximately 900 m³ dilution was required through this section. The mud cleaner and centrifuge were utilised continually to reduce the rate of dilution.

Two cores were cut from 2630 to 2644 meters.

The hole was logged and casing run and cemented without problems.

Mud cost for this interval was \$ 67,000.

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INTERVAL DISCUSSION

17 1/2" Hole

This section was drilled without incident with Gypsum/Lignosulfonate mud. Two hundred eighty cubic meters of mud was prepared initially for this section.

The hole was displaced with Gypsum/Lignosulfonate mud after drilling the 20" shoe and 3 m of formation.

No problems were encountered while drilling the pleistocene-pliocene clay sequence or while drilling the utsira sands.

Dilution rate while drilling ranged from 6 to 10 m³ per hour seawater and 4 to 6 m³ per hour of Gyp/Lignosulfonate mud previously prepared. Mud properties were easily maintained in this manner.

Solids control equipment operated efficiently throughout this section. The mud cleaner was operated in the disilter configuration while drilling the utsira sand. The centrifuge was operated as required to assist in reducing sand content. Shakers were fitted with 20 over 40 mesh screens for this section.

The logging tool was unable to go past the bottom of the sand section on the second logging run. Thirty cubic meters of 200 viscosity mud were prepared and spotted on bottom to suspend the cavine sand. This apparently eliminated the problem. A second 30 m³ high viscosity pill was spotted on bottom prior to running casing. Casing was run and cemented in place without incident.

Mud cost for this section was within 10 % of the estimated cost - \$ 55,000 actual against an estimated \$ 50,000.

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OPERATING AREA 15/9-18
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INTERVAL DISCUSSION

8 1/2" Hole

This section was drilled with Lignite/Lignosulfonate mud. Gyp mud from the 12 1/4" interval was salvaged. No further Gypsum was added. Filtration rate was controlled with CC 16 and CMC LV.

The upper part of this section was drilled with turbine and stratapax bit.

Mud weight was held at 1.24 SG to 3040 meters. At this point mud weight was increased sequentially to 1.42 SG at 3110 meters. Anticipated pore pressures necessitated the increased mud weight.

Four cores were cut from 3230-3267 meters. The cored section was also logged.

Problems included twist-off and cement contamination. Approximately 5 days were lost when the drill string parted at the saver sub. Fish could not be pulled through the well head. The fish was pushed to bottom and crushed so that drilling could be continued. At 3321 m the hole was logged prior to pulling the riser for repair. An attempt to set a cement plug at 2650-2550 meters failed. A second attempt at 2400-2250 meters also failed. On both attempts almost all the cement appeared to be distributed throughout the system. Almost no cement was visible at the shakers. The third attempt to plug was successful. On this occasion a hi vis gel and water was used as a spacer.

The remainder of this section was drilled without problems. TD was reached on 20 February. Open hole was logged and subsequently plugged and abandoned.

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OPERATING AREA 15/9-18
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MATERIALS USED PER CASING INTERVAL

36" Hole 30" Casing set at 181 m

<u>MATERIAL</u>	<u>UNIT</u>	<u>ESTIMATED</u>		<u>ACTUAL</u>	
		<u>QUANTITY</u>	<u>COST \$</u>	<u>QUANTITY</u>	<u>COST \$</u>
Bargain	M/T	33	3,942.51	23	2,747.81
Bentonite	M/T	16	4,340.00	27	7,155.00
Soda Ash	50 kg	2	29.04	0	0
Caustic Soda	25 kg			15	<u>173.25</u>
Total Cost			8,211.55		10,076.06
Cost/bbl		1200	6.84	1993	5.05
Cost/m ³		191	42.99	317	31.79
Cost/meter		65	126.33	62	162.51

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OPERATING AREA 15/9-18
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MATERIALS USED PER CASING INTERVAL

26" Hole 20" Casing set at 518 m

<u>MATERIAL</u>	<u>UNIT</u>	<u>ESTIMATED</u>		<u>ACTUAL</u>	
		<u>QUANTITY</u>	<u>COST \$</u>	<u>QUANTITY</u>	<u>COST \$</u>
Bargain	M/T	37	4,420.39	164	19,593.08
Bentonite	M/T	40	10,600.00	81	21,465.00
Soda Ash	50 kg	5	72.60	1	14.52
Caustic Soda	25 kg			52	600.60
Staflor	25 kg			21	2,296.98
CaCl ₂	50 kg			32	<u>637.44</u>
Total Cost			15,092.99		44,607.62
Cost/m ³		692	21.81	1199	37.20
Cost/bbl		4350	3.47	7541	5.92
Cost/meter		327	46.16	339	131.58

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OPERATING AREA 15/9-18
SLEIPNER

MATERIALS USED PER CASING INTERVAL

17 1/2" Hole 13 3/8" Casing

MATERIAL	UNIT	ESTIMATED		ACTUAL	
		QTY	COST \$	QTY	COST \$
BARGAIN	M/T	25	2,986.75	41	4,898.27
BENTONITE	M/T	33	8,745.00	41	10,865.00
CAUSTIC SODA	25 kg	170	1,963.50	86	993.30
CMC HV	25 kg			21	984.27
CMC LV	25 kg	140	5,620.00	122	4,867.80
DESCO	25 lb			16	620.64
DEXTRID	50 lb	240	9,996.00	174	7,247.10
GYPSUM	50 kg	700	3,255.00	447	4,157.10
LIME	40 kg			22	179.52
Q-BROXIN	25 kg	175	2,861.25	76	1,242.60
SODA ASH	50 kg	11	159.72	12	174.24
XC POLYMER	25 kg	56	14,470.00	73	<u>18,862.20</u>
			50,057.62		55,093.04
Cost/m ³		765	65.43	548	100.53
Cost/bbl		4810	10.41	3452	16.61
Cost/meter		650	77.01	650	84.76

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
SLEIPNER

MATERIALS USED PER CASING INTERVAL

12 1/2" Hole/9 5/8" Casing

<u>MATERIAL</u>	<u>UNIT</u>	<u>ESTIMATED</u>		<u>ACTUAL</u>	
		<u>QTY</u>	<u>COST \$</u>	<u>QTY</u>	<u>COST \$</u>
BARGAIN	M/T	125	14,933.75		
BENTONITE	M/T	28	7,420.00		
CAUSTIC SODA	25 kg	228	2,633.40		
CMC LV	25 kg	152	6,064.80	56	2,234.40
DEXTRID	50 lb	335	13,952.25	30	1,249.50
GYPSUM	25 kg	760	3,534.00	132	1,227.60
LIGNOSULPHONATE	25 kg	305	4,986.75		
SODA ASH	50 kg	19	275.88		
XCD POLYMER	50 lb	63	<u>16,279.20</u>	14	<u>3,617.60</u>
			70,080.53		8,329.10

Above item costed at 1983 prices those materials listed below are costed at 1984 prices effective 01/01/84.

BARGAIN	M/T		134	13,400.00
BENTONITE	M/T		13	3,250.00
CAUSTIC SODA	25 kg		201	2,261.25
CMC HV	25 kg		45	1,653.75
CMC LV	25 kg		209	7,680.75
DEXTRID	50 lb		184	10,922.28
GYPSUM	50 kg		191	1,776.30
GYPSUM	40 kg		402	2,990.38
LIME	40 kg		4	32.64
Q-BROXIN	25 kg		27	357.75
XCD POLYMER	25 kg		43	<u>14,030.90</u>
				58,356.46
Total Cost			70,080.53	66,685.56
Cost per m ³	665	105.38	889	75.01
Cost per bbl	4185	16.75	5591	11.93
Cost per m	1620	43.20	1592	41.89

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
SLEIPNER

MATERIALS USED PER CASING INTERVAL

8 1/2" Hole

<u>MATERIAL</u>	<u>UNIT</u>	<u>ESTIMATED</u>		<u>ACTUAL</u>	
		<u>QTY</u>	<u>COST \$</u>	<u>QTY</u>	<u>COST \$</u>
BARGAIN	M/T	151	18,039.97	181	18,100.00
BENTONITE	M/T	18	4,770.00	29	7,250.00
CAUSTIC SODA	25 kg	113	1,305.15	154	1,732.50
CC 16	50 lb	186	3,162.00	424	7,208.00
CMC LV	25 kg	56	2,234.00	219	9,150.75
LIME	40 kg			5	40.80
LIGNOSULPHONATE	25 kg	338	5,526.30	520	6,890.80
SODIUM BICARBONATE	50 kg	13	216.97		
SODA ASH	50 kg	14	203.28	6	121.92
TORQ TRIM II	55 gal			10	7,345.00
W 300	55 gal			2	1,158.44
XCD POLYMER	25 kg			4	<u>1,438.40</u>
			<u>35,458.07</u>		<u>60,435.81</u>
Cost per m ³	270	131.33		531	113.82
Cost per bbl	1695	20.92		2340	18.10
Cost per m	915	38.75		860	70.27

Note: Estimated cost at 1983 prices. Actual cost at 1984 prices effective 01/01/84.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

TOTAL MATERIAL CONSUMPTION

MATERIAL	PACKAGING	QUANTITY
BARGAIN	M/T	543
BENTONITE	M/T	191
CALCIUM CHLORIDE	50 kg	47
CAUSTIC SODA	25 kg	508
CC - 16	50 lb	424
CMC LV	25 kg	636
CMC HV	25 kg	66
DESCO	25 lb	16
DEXTRID	50 lb	388
GYPSUM	40 kg	402
GYPSUM	50 kg	1038
LIME	40 kg	31
Q-BROXIN	25 kg	623
SODA ASH	50 kg	19
STAFLO	25 kg	21
TORQ TRIM II	55 gal	10
W-300	55 gal	2
XCD POLYMER	25 kg	134

MUD PROPERTY RECAP

DATE	DEPTH metres	DENSITY SG	VISC. OSITY secs	FILTRATE		PH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			OTHER													
				secs 32/mm	17 32/mm		HY/HP 500psi 17 32/mm	PV cp	YP lbs/100ft ² -gms/cm ²	10" 10'	15 20	CI	17	Pf	Mf	Pm	Oil %	Water %	Corr. Solids %	CEC PPB Bent. Eq.	SAND	HDS	LDS									
1983																																
17.12	182	1.04	100	17	2	-	-	11.4	25	50	15	20																				
18.12	182	1.04	50	32	2	-	-	10.0	17	25	7	13																				
19.12	331	1.08	38	35	4	-	-	9.4	18	24	13	15	10000	500	.1	.3	-	0	96	4	20	1	0/0									
20.12	520	1.08	42	38	3	-	-	9.4	10	30	18	21	10000	600	.1	.3	-	0	96	4	25	1	1/4									
21.12	(438) 520	1.09	39	50	4	-	-	10.0	11	32	15	17	11000	600	.1	.3	-	0	95	5	27	1	1/4									
22.12	520	1.31	36	NC	4	-	-	8.8	20	8	5	7	11000	600	.1	.3	-	0	91	9	15	TR										
23.12	520																															
24.12	520	1.05	38	25	2	-	-	12.0	16	25	4	7	18000	1200	1.0	1.5	-	0	96	4	15	0										
25.12	610	1.10	45	12	2	-	-	11.5	15	19	3	10	18000	1300	.75	1.15	-	0	95	5	15	1	1/4	15			45					
26.12	819	1.13	52	8.1	2	-	-	10.5	21	21	11	23	18000	1300	.25	.5	-	0	95	5	14	TR	15			20	75					
27.12	1170	1.12	52	7.4	1	-	-	9.5	20	25	11	25	18000	2000	.1	.3	-	0	91	9	15	TR	20			75						
28.12	1170	1.13	50	8.4	1	-	-	9.7	18	18	9	18	16000	1300	.1	.3	-	0	93	7	12	TR	20			75						
29.12	1170	1.13	58	6.8	1	-	-	9.7	18	17	8	22	16000	1480	.1	.3	-	0	93	7	12	TR	20			75						

SpecialtyKk a.s.

MUD PROPERTY RECAP

DATE	DEPTH metres	DENSITY SG	VISC- OSITY secs	FILTRATE		HY-HP filt ° 500psi 1 1/2" / 32" ccs	PH	RHEOLOGY				FILTRATE ANALYSIS				RETORT ANALYSIS				OTHER			
				cake	ccs			PV	YP	10"	10'	CI	TH	PI	Mf	XS GYP	Oil %	Water %	Solids %	PPB	Bent. Eq.	SAND	HDS
30.12	1174	1.13	44	9.4	2		11.2	18	12	6	13	15000	1520	.4	1.0	3.8		93	7	14	1/3	10	60
31.12	1367	1.13	43	7.2	1		11.3	17	16	4	18	15000	1440	.4	.9	5.0		93	7	14	1/4	0	65
01.01	1625	1.13	46	7.4	1		10.0	14	17	7	21	17000	1680	.1	.9	4.0		93	7	16	1/3	0	65
02.01	1790	1.17	53	7.4	1		9.5	16	20	9	27	17000	1760	.1	.3	4.0		93	7	18	1/3	20	60
03.01	2003	1.20	54	7.0	1		9.5	19	20	9	26	18000	1720	.1	.4	3.8		92	8	18	1/4	30	65
04.01	2050	1.20	53	6.2	1		9.5	18	16	11	27	18000	1640	.1	.4	3.4		92	8	22	1/4	50	40
05.01	2065	1.23	48	8.0	1		10.0	16	21	15	24	19000	2000	.1	.35	3.2		89	11	20	1/3	50	60
06.01	2252	1.23	46	8.2	1		9.4	16	22	20	33	18000	2140	.1	.35	4.2		89	11	22	1/4	50	60
07.01	2340	1.24	43	9.2	1		9.2	13	18	15	20	18000	2020	.2	.60	5.0		90	10	20	1/4	70	40
08.01	2435	1.23	43	7.2	1		9.1	13	16	13	20	18500	2020	.1	.35	5.0		90	10	20	TR	61	45
09.01	2454	1.23	44	7.5	1		9.0	13	16	10	17	18500	2020	.1	.4	5.0		90	10	20	TR	61	45
10.01	2560	1.23	47	7.8	1		9.7	15	15	8	22	18500	1800	.1	.35	4.8		90	10	20	1/4	61	45
11.01	2630	1.23	52	7.2	1		9.5	17	16	7	29	18500	1800	.1	.35	5.0		90	10	23	TR	61	45
12.01	2633	1.23	49	7.4	1		9.5	17	16	8	35	19000	1960	.1	.5	4.8		90	10	20	TR	61	45
13.01	2644.5	1.23	51	8.0	1		9.2	18	17	10	35	19000	2080	.1	.8	4.9		90	10	20	TR	61	45
14.01	2669	1.23	53	8.8	1		9.0	22	16	8	31	19000	1880	.1	.7	3.8		90	10	20	TR	61	45
15.01	2693	1.23	50	8.4	1		9.8	18	16	9	38	19500	1620	.1	1.2	2.9		90	10	19	TR	61	45
16.01	2730	1.23	52	8.2	1		10.0	17	21	12	37	20000	1600	.1	1.4	2.7		89	11	21	TR	61	45
17.01	2762	1.23	50	7.4	1		10.0	19	18	6	30	19500	1600	.1	1.2	2.6		90	10	20	TR	61	45

MUD PROPERTY RECAP

DATE	DEPTH metres	DENSITY SG	VISC- OSITY secs	FILTRATE Coke 1" / 32mm ccs	HT/HP fill		PH	RHEOLOGY			FILTRATE ANALYSIS					RETORT ANALYSIS				CEC			OTHER														
					° 500psi	ccs / min		PV cp	YP lbs/100ft ² -gms/cm ²	10' 10'	Ca	Cl	Mf	Xs GEL	Oil %	Water %	Solids %	PPB Bent. Eq.	SAND %	HDS ppb	LDS ppb																
1984																																					
18.01	2762	1.23	50	7.5	1			9.7	19	18	7	30	19500	1600	.1	1.0	2.5			90	10	20		TR		61								45			
19.01	2762	1.23	60	7.6	1			8.4	19	21	10	33	19500	1600	.1	1.0	2.5			90	10	20		TR		61								45			
20.01	2762	1.24	54	7.6	2			9.0	18	17	9	30	20000	1560	.1	1.0	2.8			90	10	20		TR		61								45			
21.01	2791	1.24	46	7.2	2	4	21	11.1	16	12	4	18	20000	1640	.4	1.5	3.3			90	10	20		1/4		55								58			
22.01	2914	1.24	50	6.0	1	16.0	2	10.9	18	13	3	16	20000	1400	.3	1.2	2.3			90	10	20		1/4		55								58			
23.01	3005	1.24	51	7.4	1	19.0	3	10.6	19	12	4	18	19000	1240	.2	.8	1.3			89	11	25		1/4		60								75			
24.01	3040	1.24	50	7.4	1	19.0	3	10.0	18	12	5	18	18000	1400	.2	.8	1.4			89	11	25		1/4		60								75			
25.01	3040	1.24	54	6.4	1	19.0	3	9.9	19	12	4	18	18000	1360	.2	.9	1.4			89	11	25		1/4		60								75			
26.01	3040	1.24	54	6.6	1	19.6	3	10.3	17	13	4	17	18000	1320	.3	.6	1.2			89	11	25		TR		60								75			
27.01	3040	1.24	60	6.2	1	18.0	3	10.2	17	12	3	14	17500	1280	.25	.6	1.2			89	11	25		1/4		60								75			
28.01	3043	1.30	55	6.2	1	17.6	3	10.7	17	12	4	16	18000	1200	.3	.6	-			88	12	25		1/4		150								40			
29.01	3088	1.35	53	6.0	1	17.0	3	10.8	18	12	4	14	17000	1240	.3	.7	-			88	12	25		1/4		170								32			
30.01	3102	1.39	55	5.0	1	15.0	3	10.7	21	12	4	15	18000	1320	.25	.6	0.9			87	13	22		TR		170								46			
31.01	3130	1.42	54	4.4	1	14.6	3	10.6	22	11	4	16	18500	1280	.2	.6	-			84	16	22		TR		170								46			
01.02	3218	1.42	54	4.2	1	14.4	3	10.6	23	14	4	16	19000	1080	.25	.6	-			85	15	22		TR		165								30			
02.02	3234	1.42	57	3.8	1	14.0	3	10.6	23	13	4	15	19000	1040	.2	.7	0.2			84	16	25		TR		150								45			
03.02	3264	1.42	57	3.8	1	11.2	2	10.8	22	12	2	11	18000	1040	.4	.7				84	16	23		TR		150								45			
04.02	3321	1.42	48	3.7	1	11.0	2	10.6	21	13	3	14	18000	820	.4	1.4				84	16	24		1/4		150								45			
05.02	3321	1.42	59	3.8	1	11.0	2	10.6	21	13	3	14	18000	800	.4	1.4				84	16	24		TR		150								45			

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WELL NAME: 15/9-18

SLEIPNER

MUD PROPERTY RECAP

DATE	DEPTH metres	DENSITY	VISC- OSITY	FILTRATE		HYDR fill	pH	RHEOLOGY			FILTRATE ANALYSIS				RETORT ANALYSIS				CEC			OTHER						
				secs	SG			secs	ccs	1" / 32"	Cake	° 500psi	CP	VP	10"	10'	CI	Ca	Pf	Mf	XS GEL	Oil %	Water %	Solids %	PPB	Bent. Eq.	SAND	HDS
1984																												
06.02	3321	1.42	57	4.7	1	14.2	2	11.9	22	12	3	13	18000	680	1.0	2.6	2.9	0	16	84	23	23	1/4	150	45	9.0		
06.02	bottoms 2303	1.44		4.8	1			12.05	23	11	2	13	17500	700	1.4	2.65	4.5	0	1				2/3				21.5	
07.02	3321	1.42	62	4.7	1	13.8	2	12.1	22	12	3	14	18000	640	1.35	2.85	2.9	0	16	84	23	23	1/2	150	45	12.0		
08.02	3321	1.42	61	5.0	1	10.8	2	12.1	21	12	2	12	18000	640	1.6	2.85	3.5	0	16	84	22	22	1/2	150	45	17.0		
09.02	3321	1.42	78	4.9	1	13.0	2	12.3	21	12	2	13	18000	680	1.9	3.4	5.3	0	16.5	83.5	22	22	1/2	135	57	21		
10.02	3321	1.42	63	4.8	1	15.0	2	12.2	24	11	2	12	16500	820	1.9	3.3	3.3	0	16	84	22	22	1	150	45	21		
11.02	3361	1.42	62	4.6	1	14.8	2	12.0	25	12	2	14	15500	700	1.7	3.1	2.9	0	16	84	24	24	1/4	150	45	20		
12.02	3406	1.42	62	4.8	1	14.6	2	12.0	24	13	2	15	15500	660	1.4	2.9	2.9	0	16	84	24	24	1/4	150	45	20		
13.02	3443	1.42	64	4.7	1	14.6	2	11.9	24	13	2	16	15500	800	1.4	2.9	2.8	0	16	84	24	24	TR	150	45	19		
14.02	3480	1.42	64	4.8	1	14.8	2	11.8	24	14	3	17	16000	800	1.2	2.6	2.5	0	16	84	23	23	TR	150	45			
15.02	3481	1.42	68	4.8	1	15.0	2	11.8	25	13	2	16	16200	800	1.1	2.5	2.4	0	16	84	23	23	TR	150	45			
16.02	3497	1.42	63	5.0	1	15.2	2	11.8	24	12	2	15	16000	940	1.1	2.5	1.8	0	16	84	23	23	TR	150	45			
17.02	3524	1.42	63	4.6	1	15.2	2	11.6	24	12	3	15	17000	960	1.1	2.4	1.6	0	16	84	23	23	1/4	150	45			
18.02	3540	1.42	65	4.4	1	14.8	3	11.8	24	12	3	15	17000	1040	.8	2.1	-	0	16	84	20	20	1/4	150	45			
19.02	3573	1.42	68	4.6	1	15.2	3	11.8	24	14	3	15	17000	1080	.9	2.3	1.6	0	16	84	20	20	1/4	150	45			
20.02	3618	1.42	62	4.4	1	15.0	3	12.0	23	12	3	13	17500	720	1.5	2.5	-	0	16	84	20	20	1/4	150	45	13.8		
21.02	3622	1.41	57	4.6	1	15.2	3	12.0	21	11	3	10	18000	720	1.1	2.4	-	0	16	84	20	20	1/4	150	45	-		
22.02	3622	1.42	63	4.2	1	14.6	3	12.0	23	12	3	14	17000	640	1.1	2.4	-	0	16	84	20	20	1/4	150	45			
23.02	3622	1.42	74	4.4	1	14.8	3	12.0	23	12	2	12	17000	640	1.1	2.8	-	0	16	84	20	20	1/4	150	45			

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WELL NAME: 15/9-18 SLEIPNER

MUD PROPERTY RECAP

DATE	DEPTH metres	DENSITY SG	VISCOSITY		FILTRATE		RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			OTHER								
			secs	1"/32mm	Cake 1"/32mm	HT/HP filt °500psi	pH	PV cp	YP lbs/100ft ²	10" 10'	10" 10'	Cl mg/litre	Ca ppm	Pf	Mf	XS Gyp	Oil %	Water %	Solids %	CEC PPB	Bent. Eq.	Sand	HDS	LDS	pm		
																										secs	32/mm
24.02	3622	1.42	65	4.4	1	15.4	3	11.9	23	11	2	10	18000	680	1.0	2.1	-	0	84	16	-	1/3	150	45			
25.02	3622	1.42	67	4.6	1	15.4	3	11.9	22	12	2	10	18000	680	1.0	2.2	-	0	84	16	-	1/3	-	-			
26.02	2650	1.42	55	5.0	2	16.2	3	12.3	22	11	3	10	19000	800	1.7	2.5	-	0	84	16	-	1/3	-	-	16.0		
27.02	1040	1.42	59	4.8	2	16.4	3	12.4	20	11	2	11	20000	960	1.5	2.8	-	0	84	16	-	1/3	-	-			
28.02	366	1.40	84	5.6	2	16.8	3	12.5	20	12	3	18	17000	920	2.0	3.4	-	0	83	17	-	1/3	-	-			
01.03	-	1.40	100	5.8	2	-	-	12.5	20	13	3	22	17000	960	2.1	3.6	-	0	83	17	-	1/3	-	-			

NORSK PETROLEUM SERVICES A/S

WELL NAME: 15/9-18 Sleipner

BIT & HYDRAULIC RECORD

Bit No.	Type	Size	Depth out	Footage	Hrs. run	Cum time	Wt on Bit	RPM	Pump Output	Pump Press	Ann vel	Liner Size	5 pm	Jet Sizes	Bit Grading
		ins/mm	m	ft/m		hrs	x 100 lbs/kgs		lpm	BAR	DC DP m/min	ins/mm			
RR 13	LX 13	8 1/2	3038	-	-							6		32 nds	T B G
14	JD8	8 1/2	3038				5000	20	DRILL ON JUNK			6		3 x 13	
15	JD8	8 1/2	3047	8	1 1/2	381.5	12000	100	1134	25/210	73	6	70	3 x 13	
16	J4	8 1/2	3128	81	32	413.5	12/14000	100	1620	200	104	6	100	3 x 12	
17	J3	8 1/2	3230	102	29	442.5	14/20000	70	1458	230	93	6	90	3 x 11	5 6 I
18	C22	8 1/2	3267	36	18 1/2	461	8/11000	90	1215	115	78	6	75		Core
19	S44 F	8 1/2	3321	54	14	575			-	-	-	6	-	3 x 12	8 8 1/8
20	S44 F	8 1/2	Drill Cement	116	5 1/2	480.5	15000	90	1523	203	97	6	94	3 x 12	1 1 I
21	J4	8 1/2	3362	41	16 1/2	497	19000	85	1523	200	97	6	94	3 x 12	7 4 I
22	J22	8 1/2	3424	62	16	513	20000	70	1507	200	96	6	93	3 x 12	
23	J22	8 1/2	3481	57	36	549	15/20000	70	1507	200	96	6	93	3 x 12	8 8 1/8
24	R8DJ	8 1/2	3482	1	3 1/2	552.5	0/8000	0	1507	200	96	6	93	3 x 13	6 7 4/32
25	JD4	8 1/2	3524	42	17	569.5	15000	60	1507	200	96	6	93	3 x 12	7 4 I
26	JD4	8 1/2	3540	16	10	579.5	15/20000	60	1393	200	89	6	86	3 x 12	7 4 I
27	JD4	8 1/2	3560	20	11 1/2	591	20000	60	1393	200	89	6	86	3 x 12	7 4 1/16
28	J33	8 1/2	3622	62	30 1/2	622.5	16/18000	60	1858	200	93	6	90	3 x 12	4 8 I
RR 14	JD8	8 1/2	3622	-		CIRCULATE									

NORSK PETROLEUM SERVICES A/S

WELL NAME: 15/9-18 Sleipner

BIT & HYDRAULIC RECORD

Bit No.	Type	Size	Depth out	Footage	Hrs. run	Cum time	Wt on Bit	RPM	Pump Output	Pump Press	Ann vel	Liner Size	5 pm	Jet Sizes	Bit Grading
		ins/mm	m	ft/m		hrs	x 100 lbs/kgs		lpm	Bar	DC, DP m/min	ins/mm			
1	3AJ	26"	182	62	13	13	0/5000	65	3072	22/35	10	6 1/2	160	32 nds	T B G
1RR	3AJ	26"	185	69	1 1/2	14 1/2	0/5000	65	3936	100	13	6 1/2	205	3 x 20	1 2 I
2	SDF	12 1/4	520	335	17 1/2	32	0/6000	120	3360	170	70	6 1/2	175	3 x 16	3 3 I
2	SDF	12 1/4	396	201	17 1/2	49.5	0/3000	140	3360	75	70	6 1/2	175	3 x 14	
2	SDF	12 1/4	522	131	14 1/2	64	0/3000	140	3456	75	72	6 1/2	180	3 x 10	
1RR	3AJ	26"	518		C I R C U L A T E										
3	XIG	17 1/2	525	53	5	69		50/60	3456	-		6 1/2	180	3 x 18	
4	SDS	17 1/2	1170	645	26 1/2	95.5	0/10000	120/150	3456	170		6 1/2	180	3 x 16	
4RR	SDS	17 1/2	1170	-	C I R C U L A T E										
7RR	FP12	12 1/4	1271	151	8	163.5	5/10000	80/100	2976	178	62	6 1/2	155	3 x 16	3 2 I
5	J1	12 1/4	2090	779	51 1/2	155	8/10000	120	2688	206	56	6 1/2	140	3 x 15	3 4 1/32
6	J1	12 1/4	2454	404	66	221	5/18000	120	2688	206	56	6 1/2	140	3 x 15	5 4 1/8
7	XDG	12 1/4	2630	176	37 1/2	258.5	5/18000	100	2573	200	54	6 1/2	134	3 x 15	8 7 I
8	C22	12 1/4	2644	12	12	270.5	15000	140	1920	150	40	6 1/2	100	3 x 15	7 8 I
9	XIG	12 1/4	2683	138	17 1/2	288	8000	200	2534	215	53	6 1/2	132	3 x 15	50 % worn
10	R401	12 1/4	2683	-	-	-	8000	70	2496	200	52	6 1/2	150	3 x 10	50 % worn
11	F2	12 1/4	2701	61	21 1/2	309	18000	75	2458	200	51	6 1/2	128	3 x 15	1 2 I
11	F2	12 1/4	2762	61	18	327	0	70	2496	200	52	6 1/2	130	3 x 15	1 2 I
12	SDF	8 1/2	2765	55	4	331	15/10000	65/110	1701	200	109	6	105	3 x 12	Drill Cement
13	LX13	8 1/2	3038	273	49	380	15/17000	-	1814	280	116	6	112	Diamond	

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

1983

DAILY OPERATIONS LOG

15 December

Arrived on location 15/9-18. Set anchors. Mixing spud mud.

16 December

Spud in well at 8 a.m. Tagged seabed at 120 m and drilled to 144 m. Washed tight spot from 124 to 134 m. Drilled to 182 m (T.D.). Pumped 5-10 m³ Hi Vis pills before each connection at T.D. Displaced hole with 60 m³ Hi Vis mud.

17 December

POOH 1 std ret. survey. RIH and pump 60 m³ Hi Vis mud. Drop survey. POOH 1 std ret. survey. RIH and pump 60 m³ Hi Vis mud. POOH to run 30" casing. Run and cement same.

18 December

Drilled out cement and 3 m new formation with 26" bit using sea water. R/O to run pin connector. Run riser. RIH and tag bottom at 185 m. Drill 12 1/4" pilot hole. When drilling sand. Recorded severe losses over shakers. Desilter and desander. Sand content up to 2 1/2 0/0 mud weight out of hole up to max. 1.22 SG.

19 December

Drilled 12 1/4" hole to 520 m. Circulate and condition mud. POOH to shoe. No drag. RIH to TD. Survey. POOH. R/O Dresser Atlas. Log hole. M/U 26" hole opener and RIH.

20 December

Underream 26" hole to 386 m. POOH, no drag change cutter arms. RIH no fill, underream 26" hole.

21 December

Underream 26" hole to 520 m. Circulate and reduce mud weight from 1.10 to 1.07 SG. Pump 141 m³ 1.31 SG mud in hole to well head. POOH to well head and displace riser with seawater. POOH. Pull riser.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

DAILY OPERATIONS LOG

22 December

Pulled riser. RIH with 26" bit. Spot 180 m³ 1.31 SG mud in hole to well head. POOH. R/U and run 20" casing. Filled casing with 1.31 SG mu. When casing landed, circulate volume with 1.31 SG mud. Cement casing.

23 December

WOC. Dumped remaining volume 1.31 mud. Began building gyl/ligno system. Run BOP and test same.

24 December

Test BOP and lines. RIH and drill cement shoe and new formation with seawater. Displace hole with 1.05 SG gyp/ligno mud. POOH. Change BHA. RIH. Drill 17 1/2" hole.

25 December

Drill 17 1/2" hole with surveys to 819 m. Circulate R/U - POOH 15 stds. Hang off WOW.

26 December

WOW. RIH. No fill. Drill and survey to 1141 m.

27 December

Drill 17 1/2" hole to 1170 m TD. Circulate B/U. POOH to shoe. Tight at 1001 m. RIH 2 m fill. Circulate B/U. POOH. R/U Dresser Atlas and log hole. R/D D.A. RIH to ream tight spots at 1004 to 1120 m and 1140 to 1170 m. Circulate B/U. Pump 30 m³ Hi Vis pill. POOH.

28 December

R/D Dresser Atlas. RIH with 17 1/2" circulate cond. mud. Reduced YP to 17. Pump 30 m³ high viscosity mud. POOH. R/U and run 13 3/8" casing.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

DAILY OPERATIONS LOG

29 December

Run and cement 13 3/8" casing. Test BOP. Drill cement and shoe. Reduce mud weight to 1.13 for leak off test. Leak off 1.52 SG equivalent.

30 December

Drill to 1368 m. Installed 4 corrosion rings in drill string. 2 in heavy weight drill pipe. 1 in kelly sub. 1 in stand no. 33.

31 December

Drilled to 1618 m. Maximum overpull on wiper trips - 20,000 DaN.

1984

1 January

Drill to 1781 m. Stuck at 1781 m. Unable to circulate, pulled singles and worked tight hole from 1781 m to 1635 m. Wash and ream from 1635 m to 1781 m. Drill to 1790 m. Increased mud weight to 1.16-1.17 SG.

2 January

Tight spots at 1645 - 1273 m, on wiper trip. Increased mud weight to 1.20 SG at 1890 m. Drill to 2003 m.

3 January

Drill to 2050m. POOH to shoe. Displace riser with seawater at 1030 hrs. WOW. Displace riser with mud at 2130 hrs. Attempt to circulate at shoe, bit plugged. POOH.

4 January

POOH. RIH with bit no. 6. Circulate at 1062 m. Reamed extensively to bottom. Increased mud weight to 1.23 SG. Running centrifuge on 'ilmenite recovery'. added 98 m³ seawater.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

DAILY OPERATIONS LOG

5 January

Drilled 12 1/4" from 2105 to 2156 m. Survey. PO 10 std max. OP 30 K daN. No fill. Drilled to 2176 m. Survey. Drilled to 2243 m. Added new mud for volume. Running centrifuge and adding water.

6 January

Drilled to 2281 m. Survey, 7 std, max OP. 30 K daN. No fill. Drilled to 2300 m. Survey, 5 std, OP. 20 K daN. Drilled to 2327 m. Repairs to gooseneck, 2327 to 2330 m.

7 January

Drilled to 2377 m. Survey. Tight 2342 - 2314 m max. 30 K. Reamed 2342 - 2313 m and 2311 - 2329 m. Drilled to 2432 m. Reduced water loss to 7-8 ml API. Ran centrifuge added water.

8 January

Drilled to 2454 m. CBU. Survey. POOH. max. 30 K daN O/Pull. Test BOP. RIH new bit. Old bit 1/8" undergauge. Ran 2320 to 2338 m.

9 January

Reamed to 2454 m. Drilled to 2369 m (break at 2365 m). Circulate sample up. Drilled to 2493 m. Survey. PO to 2200 m. No drag, no fill. Drilled to 2551 m. Have been maintaining low pH (9.0-9.5) and minimal to nil Lignosulphonate to minimize "drilled clay" dispersion. Maintaining "Inhibitor" by high ionic calcium content and excess Gypsum. pH raised at request of Statoil and T. Pogue to 9.5+.

10 January

Drilled 12 1/4" from 2551 m to 2630 m. No drag. POOH.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

DAILY OPERATIONS LOG

11 January

Make up core barrel and RIH. Take weight at 2600 m, wash and ream to 2630 m. Cut core to 2633 m. Lose pump pressure, check pump no. 1. POOH, tight at 2620 m and 2450 m. Recover core (90%), sandstone and shale. RIH. Changed two lower shaker screens to 20 x 40 mesh. Cleaned out mud cleaner cones. Running centrifuge to remove excess clay and holding mud weight by dilution.

12 January

Continue RIH. Rig heave to great, POOH. RIH, tight at 2600 m. Wash and ream from 2583 to 2632.5 m. Circulate, drop ball and cut core no. 2 to 2644.5 m. POOH, recover core (shale). Running centrifuge and a stream of water. Hole washed out by an estimated factor of 1.18.

13 January

RIH rock bit. Wash and ream to bottom. Drill from 2644.5 m to 2667 m. POOH to 1015 m. Hang off and WOW. Retrieve hang off tool and RIH. Increasing treatments of caustic and CMC to raise pH and lower water loss. Running a small stream of water.

14 January

RIH. Drill to 2684 m. Circulate, drop survey and POOH, no drag. RIH Stratapax bit. Wash and ream from 2649 to 2683 m. Drill to 2687 m. Adding caustic and CMC for pH and filtrate control. Running a small stream of seawater for weight control.

15 January

Drill to 2701 m. Circulate, POOH. Tight spot at 2533 m. RIH bit no. 11. Drill to 2722 m. Slight increase in clay content of mud and hence also in yield point and gel strengths. Run centrifuge over one circulation to control.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

DAILY OPERATIONS LOG

16 January

Drill from 2722 to 2762 m. TD for 12 1/4" interval. Circulate bottoms up, drop survey and make wiper trip to shoe. RIH. Wash and ream from 2655 to 2762 m. Circulate bottoms up and POOH for electric logs.

17 January

Continue POOH. Rig up Dresser Atlas, run electric logs and rig down.

18 January

RIH, circulate shakers clean, POOH. Rig up and run 9 5/8" casing.

19 January

Run and cement 9 5/8" casing. Displace cement. Test BOP. RIH with new BHA. Lost 30 m³ mud while displacing cement.

20 January

Drill cement, shoe and 3 meters of new hole. Perform leak-off test to 1.74 SG equivalent. Trip for turbine. Drill to 2775 m.

21 January

Drill cement, shoe and 3 meters new hole. Perform leak-off to 1.74 SG equivalent. Trip for turbine. Drill to 2775 m.

22 January

Garret gas trail analysis indicated zero sulphides. Drill to 2886 m. Survey. No drag on fill on POOH to shoe. Drill to 2904 m.

23 January

Drill to 3038 m. Drill string parted at saver sub. Tag fish 11 m below rotary. POOH with fish. Built 46 m³ new volume.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

DAILY OPERATIONS LOG

24 January

Attempt to pull BHA, no success. RIH to 9 5/8" shoe with fish.
Mixed 30 m³ new mud weighted to 1.24.

25 January

Rotate string below 9 5/8" casing shoe. POOH. Pick up new BHA.

26 January

RIH with bit no. 13. Attempt to crush junk. POOH. RIH with
scraper to 350 m. POOH. Make up RTTS tool.

27 January

Pressure test 9 5/8" casing to 340 bar. Test BOP. RIH with junk
basket. Trip for bit no. 15. No fill.

28 January

Drill on junk to 3047 m. Trip for bit no. 6. Check out rotary
table electrical system.

29 January

Drill 8 1/2" hole to 3098 m.

30 January

Drill to 3128 m. Raise weight to 1.42 SG. Trip for bit no. 17.

31 January

Complete trip for bit no. 17. Drill 8 1/2" hole to 3216 m.
Added 12 m³ prehydrated gel to active.

1 February

Drill to 3230 m. Trip for core barrel. Cut core no. 3 to 3233 m.

2 February

Cut core no. 3 to 3248.5 m (100%). Ream from 3232 m. Cut core no. 4
to 3263 m.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
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DAILY OPERATIONS LOG

3 February

Cut core no. 4 to 3267 m (100%). RIH 8 1/2" bit (no. 9). Ream 3230 - 3267 m. Drilled to 3319 m. Added Q-Mix.

4 February

Drilled to 3321 m. CBU. POOH. DA logging. RIH OEDP.

5 February

RIH OEDP to 3321 m. CBU. Set cement plug 2650 - 2550 m. Reverse circ. 2500 m, no cement. POOH. RIH 8 1/2" bit. CBU at 2500, 2552, 2602, 2629 and 2659 m. RIH reamed 3303 to 3321 m. CBU. Some cement at shakers and mud weight increase. Raised pH to 12, added seawater, Q-Broxin and CC-16 to reduce increasing rheology.

6 February

CBU. POOH. RIH OEDP set balanced cement plug 2400-2250 m. PO to 2200 m. CBU. No cement. RIH 8 1/2" bit. Failed to tag cement. CBU at 2303 m mud weight up (max. 1.49 SG). Checked BU sample for cement - positive. Pm 21.5 excess Ca (as excess Gypsum) 4.5 ppb. PO to 2200 m. WOC.

7 February

WOC. RIH CBU at 2287 m mud weight up (1.45) RIH to shoe. CBU. Weight up to 1.51 SG. RIH to 3317 m, 4 m fill. Cleaned to TD, CBU. Mud weight up dumped 7 m³. POOH. OP 328 m to 3235 m (max. 20 K daN). RIH OEDP set plug 2400 to 2250 m. Hi Vis Gel preflush. PO to 2200. CBU. Dump 4 m³ low weight mud.

8 February

POOH. RIH 8 1/2" bit to 2186 m. WOC. Pressure test cement OK. RIH tag cement at 2264 m. Circulate. Hang off drill string. Displaced riser. Pull riser repair and test.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

DAILY OPERATIONS LOG

9 February

Ran and tested riser. Displaced riser. Tested BOP's. RIH to 2264 m. Drilled hard cement 2264 to 2367 m, and soft cement 2367 to 2380 m. Washed to 2405 m. CBU. RIh to 3311 and reamed to TD. CBU. POOH. Tight 3263 to 3224 m (30 K daN). Added reserve mud for volume and to reduce cement contamination.

10 February

POOH. RIH and reamed 3244 to 3272 m. RIH to TD. No fill. Drilled 3321 to 3360 m. Added Q-Mix to raise YP and lower HPHT.

11 February

Drilled to 3362 m. CBU. POOH. Bit change. RIH and drill 3362 m to 3405 m. Drill breaks at 3368, 3375, 3389, 3401 m. Flow checks negative.

12 February

Drilled to 3424 m. CBU. POOH. Tight 3280 - 3230 m (25 K daN). RIH new bit. Reamed 3414 - 3424 m). Drilled to 3442 m. Adding defoamer.

13 February

Drilled 8 1/2" 3442 m to 3480 m. Added Torq Trim II (1.6 ppb a/c high torque.

14 February

Drilled 8 1/2" to 3481 m. Wiper trip to 3181 m. No fill. 3 cones lost in hole. Dresser Atlas MFT. RIH bit no. 24. Ream and washed 3457 to 3481 m. No fill. Worked junk basket.

15 February

Worked junk basket made hole to 3482 m. POOH no drag. RIH with reverse circulation junk basket. Washed and reamed 3465 m to TD. Worked basket. POOH, no drag. RIH bit no. 25. Washed and reamed 3445 to 3482 m. Drilled to 3489 m.

NORSK PETROLEUM SERVICES A/S.

OPERATING AREA 15/9-18
Sleipner

DAILY OPERATIONS LOG

16 February

Drill to 3524 m. Survey. Trip for bit no 26.

17 February

Drill to 3540 m. Trip for bit no 27. Made up 12 m³ prehydrated gel.

18 February

Drill to 3560 m. Trip for bit no 28. Drill to 3565. Added 6 m³ prehydrated gel.

19 February

Drill 8 1/2" hole to 3617 m. Added 7 m³ water, 12 m³ reserve mud.

20 February

Drill to 3622 m. Circulate bottoms up, POOH to log.

21 February

Complete log no 5. RIH for conditioning trip.

22 February

Finish RIH for conditioning trip. No fill. Circulate and condition mud 3 hours. POOH, no drag.

23 February

RIH, circulate and condition mud. POOH. Make log run no 10. RIH, circulate bottoms up. POOH to log.

24 February

POOH. Run logs 11,12,13. RIH, circulate bottoms up.

25 February

Set 4 balanced plugs from 3622 to 3000 m. Set balanced plug from 2800 to 2650 m.

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OPERATING AREA 15/9-18
Sleipner

DAILY OPERATIONS LOG

26 February

Set retainer, squeeze cement. Perforate 9 5/8" casing.

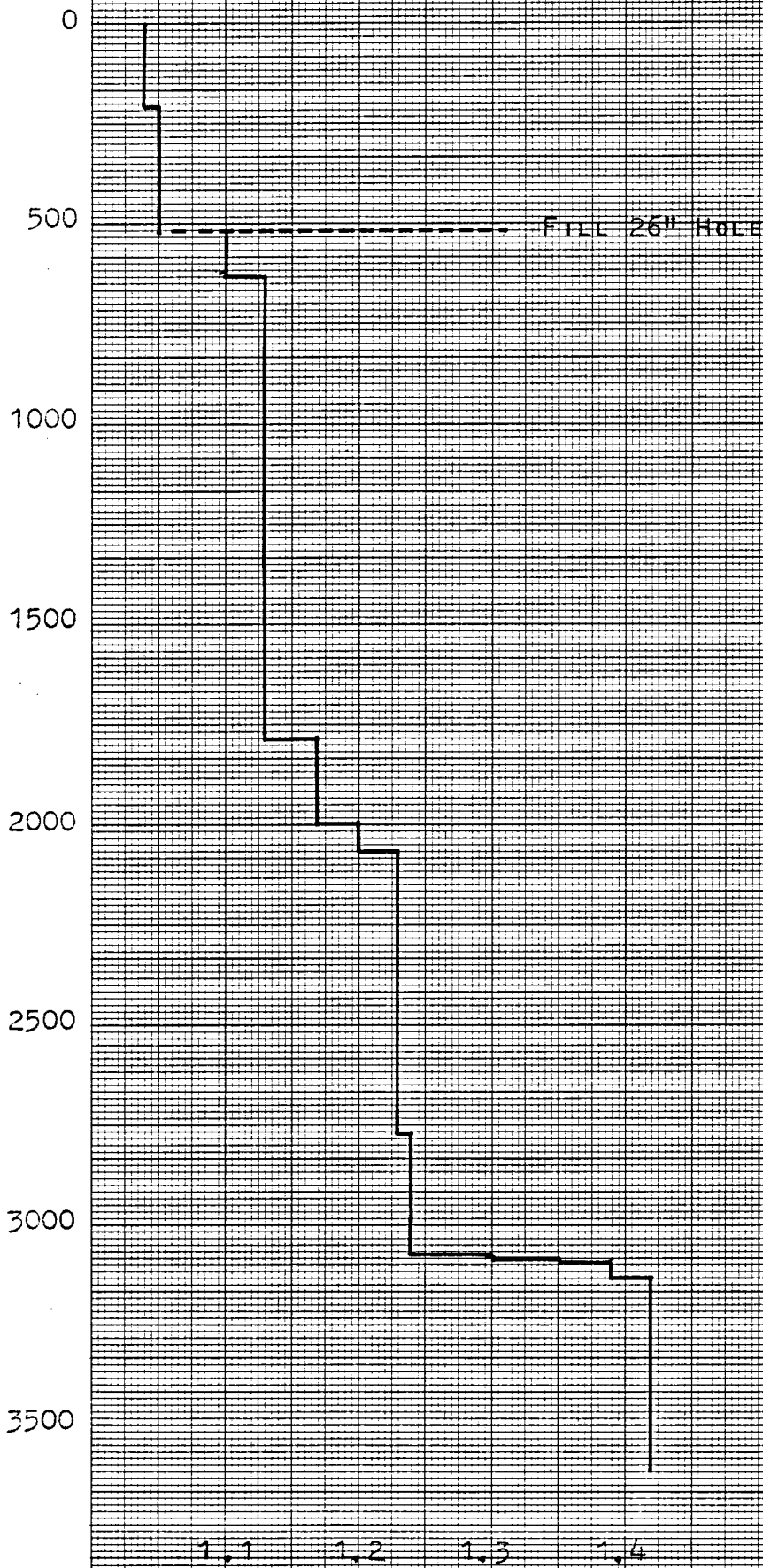
27 February

Cut and retrieve 9 5/8" casing. Set balanced plug from 500-380 m.
Scraper trip. Set plug. Displace hole with seawater.

28 February

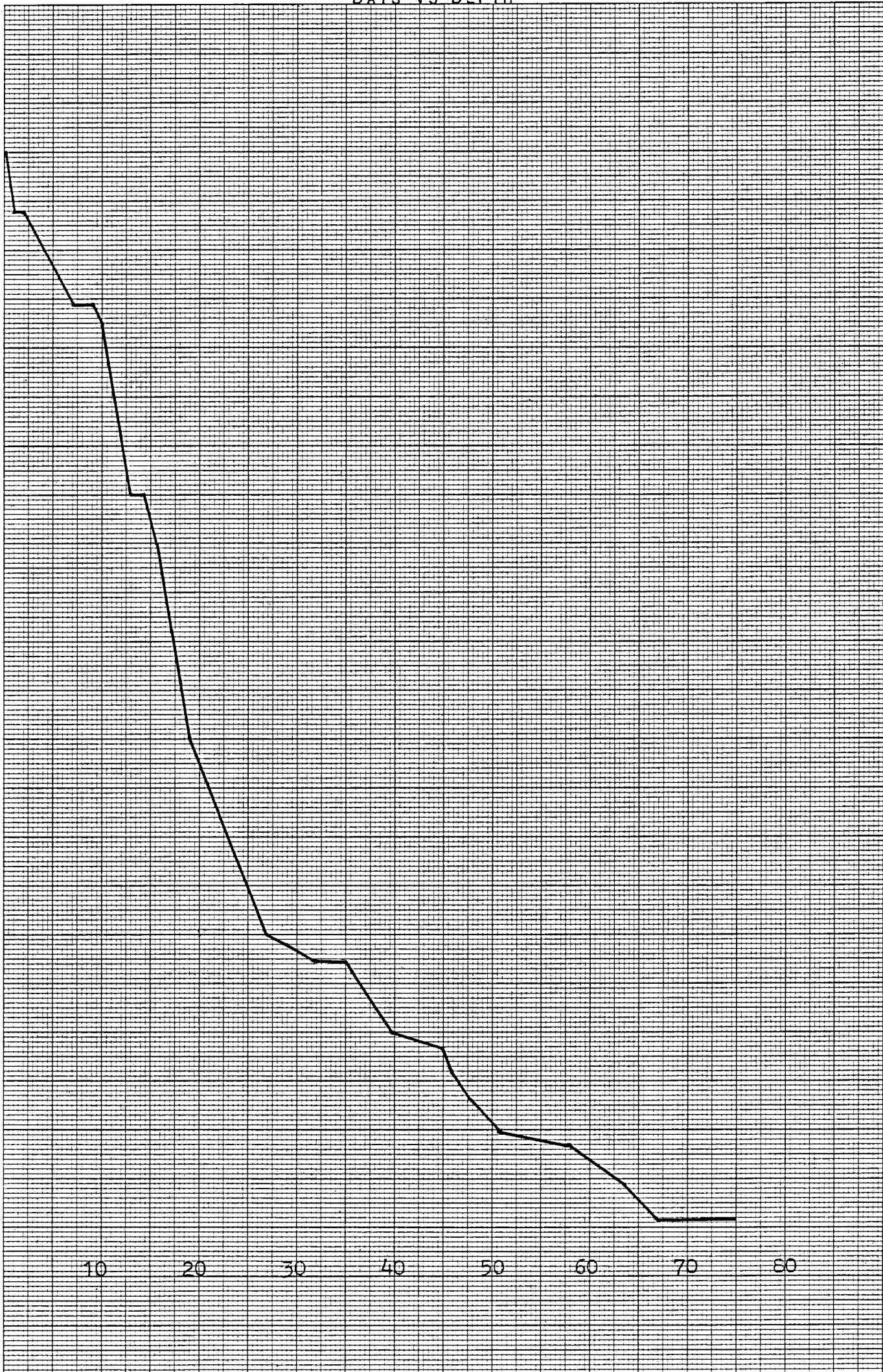
Cut 13 3/8" casing at 201 m. Retrieve 13 3/8" casing.

SPECIFIC GRAVITY VS DEPTH

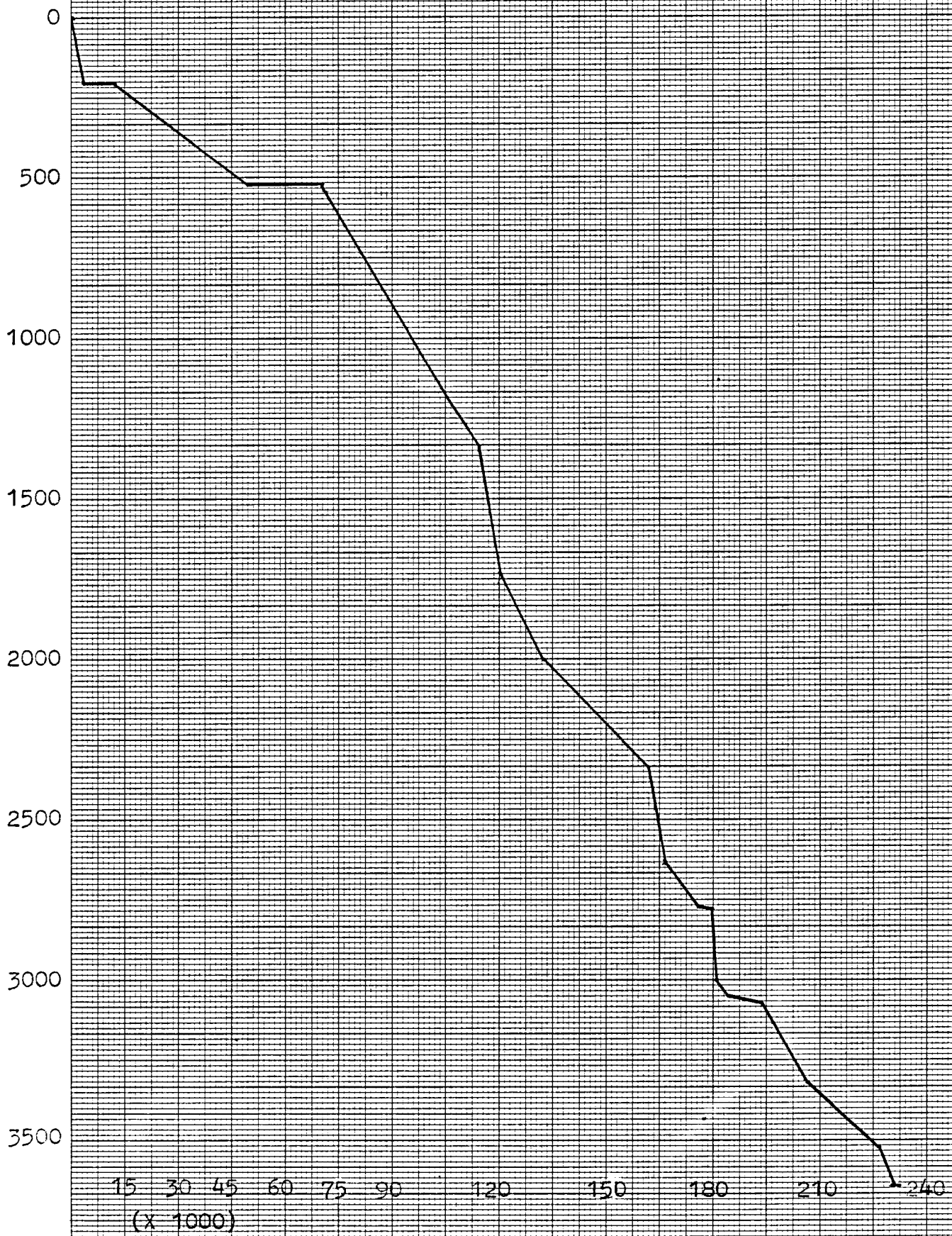


DAYS VS DEPTH

0
500
1000
1500
2000
2500
3000
3500
10 20 30 40 50 60 70 80



MUD COST VS DEPTH



ROTARY HOURS VS DEPTH

0
500
1000
1500
2000
2500
3000
3500

40 80 160 240 320 400 480 560

