DRILLING FLUID SUMMARY

Well: 7/11 - 3X

Field: Cod

Rig: Ocean Traveller

Date: 15 October 1968
12 January 1969

Prepared by R. F. Wally

10 | 11 | 12 | 1968

24 3 13 23 3 13 23

PRESSURE vs. DEPTH PLOT

Well: 7/11-3X
Loc.: Cod
KB Elev.:
Spud:
Casing:
Completed:

20"@563'
13 3/8"@1527
9 5/8"@6471
7"@10,960'

Mud Ring
Tight Hole
Reaming
Cored

Est. Overburden Pressure Gradient (@ 1.0 psi/ft.)
Normal Formation Pressure Gradient (@ .43 psi/ft)

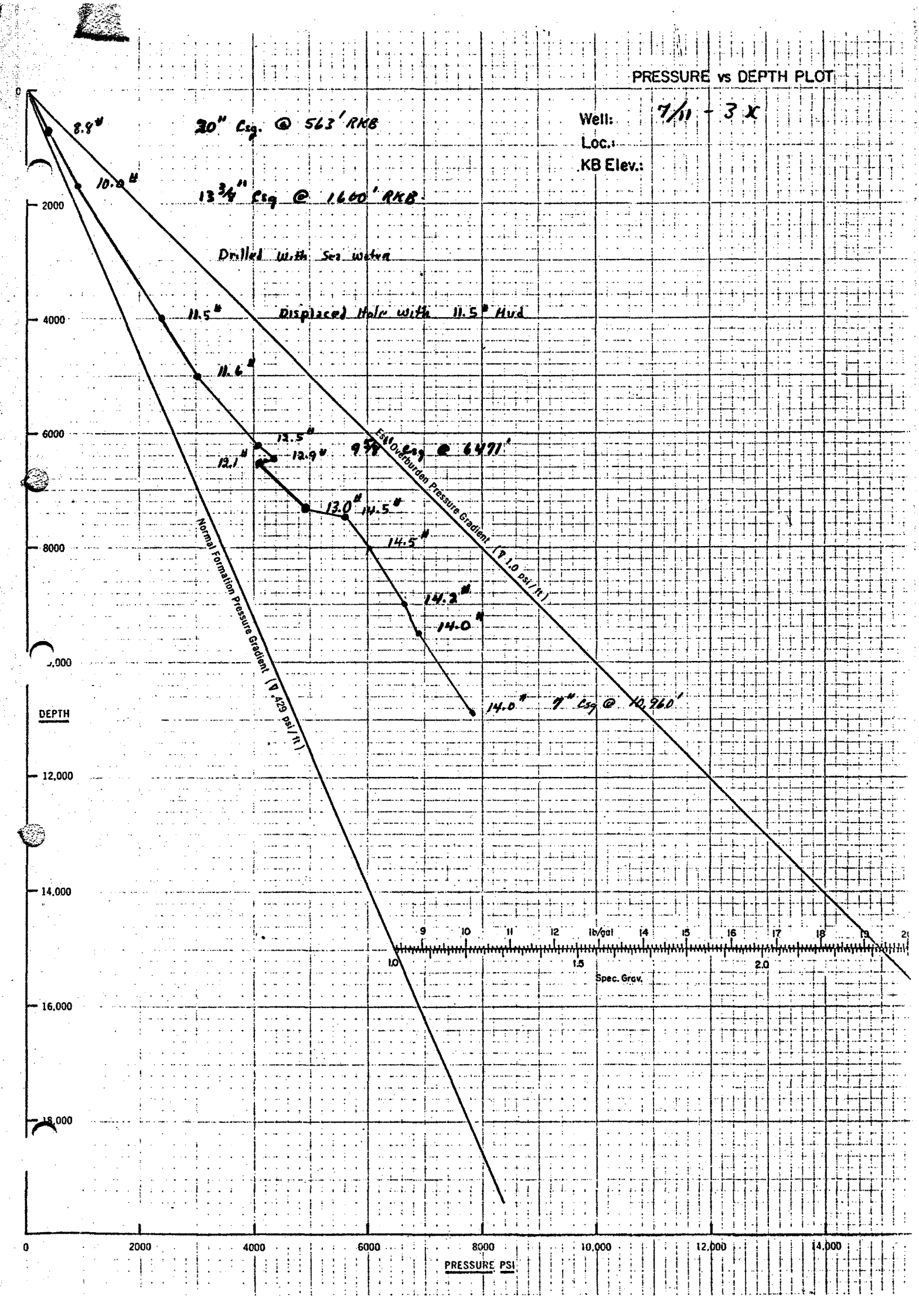
8.8
10.0
10.8
11.6
12.5
12.9
12.6
13.0
14.5
14.0

DEPTH FT.
2000
4000
6000
8000
10.000
12.000
14.000
16.000
18.000

Lb/Gal.
9 10 11 12 13 14 15 16 17 18 19 20
10 15 Spec. Grav. 20

Mud Weight
Sonic
Penetration

0 2000 4000 6000 8000 10.000 12.000 14.000
PRESSURE PSI


PRESSURE vs DEPTH PLOT
Well: 7/11 - 3 X
Loc.:
KB Elev.:
20" Csg. @ 563' RKB
13 3/4" Csg @ 1660' RKB
Drilled with Sea Water
Displaced Hole with 11.5# Mud
8.8#
10.0#
11.5#
11.6#
12.1#
12.5#
12.9#
13.0#
14.5#
14.5#
14.2#
14.0#
14.0#
9 5/8" Csg @ 6471'
7" Csg @ 10,960'
Est. Overburden Pressure Gradient (1.0 psi/ft)
Normal Formation Pressure Gradient (0.429 psi/ft)
DEPTH
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
9
10
11
12
lb/gal
14
15
16
17
18
19
1.0
1.5
2.0
Spec. Grav.
0
2000
4000
6000
8000
10,000
12,000
14,000
PRESSURE PSI

WELL : 7/11-3X
Field : Cod

15 OKT. 1968 - 12 JAN. 1969 - 94 DAYS

F. M. Co. - NORWAY

WELL RECAP

1	MUD TYPE		Sat. Salt Starch-Drispac	Sat. Salt Starch-CMC			
2	MUD WEIGHT	PPG	9.8 - 12.5	11.9 - 14.5	9.8 - 14.5		
3	INTERVAL EXAMINED	ft	1527 - 6471	6471 - 10,960	1527 - 10,960		
4	TOTAL FOOTAGE	ft	4944	4489	9433		
5	HRS DRILLING	hrs	36.5	200	236.5		
6	PENETRATION (4÷5)	ft/hr	135.4	22.4	39.9		
7	MUD COST CURRENT (1973)	$	45,768	77,621	123,389		
8	MUD COST/FT (7÷4)	$/ft	9.26	17.29	13.08		
9	HRS. CONDITIONING HOLE	hrs	53	101	154		
10	CONDITIONING COST (9 X Rig Cost)	$	100,700	191,900	292,600		
11	CONDITIONING COST/FT (10÷4)	$/ft	20.37	42.75	31.02		
12			01 NOV. 1968	02 DES. 1968	02 DES. 1968		
13	ROTATING COST (5X RIG COST)	$	69,350	380,000	449,350		
14	ROTATING COST/FT (13÷4)	$/ft	14.03	84.65	47.64		
15	FISHING HRS	hrs	—	11.5	11.5		
16	FISHING COST (15X RIG COST)	$	—	21,850	21,850		
17	FISHING COST/FT (15÷4)	$/ft	—	4.87	2.32		
18	TOTAL COST (7+10+13+16)	$	146,468	671,371	887,189		
19	TOTAL COST/FT (18÷4)	$/ft	29.63	149.56	94.05		
20	COMMENTS			Cored			

RIG COST = $1900/HR.

12¼" 8½" 39 DAYS

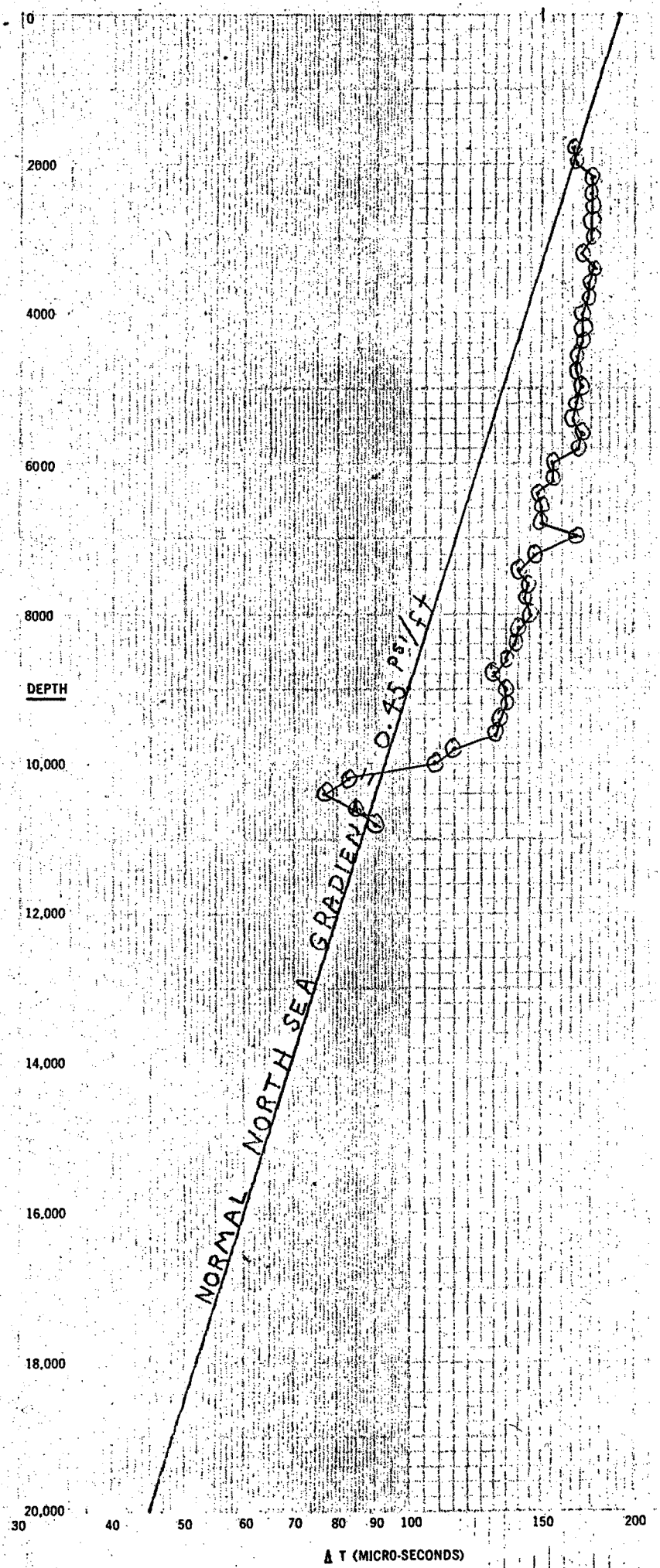
WELL: 7/11-3X
LOCATION: Cod
KB ELEV:

Data Sheet For Well Log Values

Shale Δt, Pressure Gradient, and Mud Weight

Depth	Δt	∇P	MW	Depth	Δt	∇P	MW	Depth	Δt	∇P	MW
				1800	165	.450	8.65	7400	140	.665	12.79
				2000	167	.465	8.94	7600	145	.670	12.88
				2200	175	.535	10.29	7800	143	.670	12.88
				2400	175	.560	10.77	8000	145	.695	13.36
				2600	175	.580	11.15	8200	140	.670	12.88
				2800	175	.590	11.35	8400	138	.665	12.79
				3000	175	.605	11.63	8600	135	.660	12.69
				3200	170	.585	11.25	8800	130	.640	12.31
				3400	177	.635	12.21	9000	135	.680	13.08
				3600	174	.635	12.21	9200	135	.685	13.17
				3800	173	.640	12.31	9400	133	.685	13.17
				4000	170	.635	12.21	9600	130	.670	12.88
				4200	170	.645	12.40	9800	115	.590	11.35
				4400	170	.650	12.50	10,000	108	.550	10.58
				4600	167	.650	12.50	10,200	83	.450	8.65
				4800	167	.660	12.69	10,400	77	.450	8.65
				5000	170	.690	13.27	10,600	85	.450	8.65
				5200	167	.685	13.17	10,800	90	.465	8.94
				5400	165	.680	13.08	11,000			
				5600	170	.715	13.75				
				5800	168	.710	13.65				
				6000	155	.650	12.50				
				6200	155	.660	12.69				
				6400	148	.640	12.31				
				6600	150	.660	12.69				
				6800	150	.665	12.79				
				7000	167	.745	14.33				
				7200	147	.665	12.79				

7/11-3X



- SANDSTONE
- SANDSTONE
- SHALE, LIMESTONE
- SANDSTONE, SHALE
LIMESTONE

Recommended Mud Program - North Sea - Norway

A. Hole Size: 26"

Total Depth: 465' RKB

Hole Volume: 114 bbls

This section is to be drilled using sea water with returns to the sea floor. Slugs of high viscosity mud will be pumped into the hole as filling becomes a problem. After the hole has been drilled, a volume of high viscosity sea water mud equal to twice the hole volume will be pumped through the bit.

Prepare the high viscosity mud as follows:

(a) Sea Water.

(b) 15 - 25 lbs/bbl Zeogel.

(c) 3 - 4 lbs/bbl Flosal

(d) 0.1 lb/bbl lime (to thicken mud).

and have these properties:

Density	8.8 ppg
Viscosity	+100 sec/qt.
Fluid-loss	No control

B. Hole Size: 17-1/2"

Total Depth: 1650' RKB

Hole Volume: 500 bbls

The mud for this section of hole will be prepared and used as in the 26" hole. Clean the hole with high viscosity mud and spot high viscosity mud in hole to run 13-3/8" casing.

C. Hole Size: 12-1/4"

Total Depth: 6500'

Hole Volume: 950 bbls

From the 13-3/8" casing shoe to a depth of 3800' sea water will be used as the drilling fluid. Mud returns will be dumped into the sea.

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While drilling with sea water the pit volume of 900 bbls can be mixed with a saturated sea water mud consisting of the following:

(1) Sea water + 100 lbs/bbl salt
(2) 1 - 1.5 lbs/bbl Drispac
(3) 2 - 2.5 lbs/bbl Starch

Note: Be sure all mud pits are clean before mixing surface volume.

Suggest that no Flosal be mixed on mud up in pits. The hole will provide adequate solids when the fluids pass the bit.

Suggest that no D.M.S. be used on mud up but add as needed thereafter, to aid in controlling fluid-loss by desorbing the Drispac and Starch from the drill solids.

The viscosity of the Drispac-Starch and salt water will not be high in the pits but will increase and require control soon after circulating around through the hole.

The displacement of the mud can be done while drilling ahead at a reduced rate of approximately 100'/hr. The hole volume at 3800' is 600 bbls and the pits have a volume of 900 bbls. While displacing additional volume can be gained by mixing salt, starch and Drispac then when the mud is turned back to the pits adequate volume will be in the pits to continue circulating and drill ahead.

After mud up the properties should be as follows:

Density - 10.2 to 10.5 ppg
Viscosity - 35 to 40 sec/qt.
Fluid-loss - 10 cc or below.

"I would suggest that a short trip be made near 4500' or sooner if appears necessary after mud up."

Run the D-Silter and D-Sander until start adding weight.

At 4500' start adding Barite to increase the mud density to 11.5 to 11.7 lbs/gal.

Desco will be added as necessary to control foaming and gels. (The small amount of Desco used in this section of the hole does not require caustic for pH. control).

./...

At 5000' the drilling fluid should have the following properties:

Density	-	11.5 to 11.7 lbs/gal.
Viscosity	-	40 - 45 sec/qt.
Fluid-loss	-	5 - 10 cc/30 min.
Chlorides	-	120,000 ppm or above.

The drilling rate from 5100' to 6500' will be adjusted to maintain the desired properties to drill the hole from 4000' to 6500' and to run casing.

D. Drill below the 9-5/8" casing with the drilling fluid as drilled the 12-1/4" hole. At approximately 7500' add 6% diesel with 5 lbs/bbl Soltex for torque reduction and aid in filteration control. Maintain chlorides 120,000 ppm or above but before drilling into salt section be sure to have completely saturated to avoid leaching out the salt and enlarging the hole.

CONFIDENTIAL

NOR/D&P/Well 7/11-4X
April 21, 1969

PHILLIPS 7/11-4X, NORTHEAST COD PROSPECT

GEOLOGIC PROGNOSIS

LOCATION: Field 7, Block 11, Production License 018, 57° 07' 47" N., 02° 29' 41" E., at the intersection of seismic line PG 022930 and line NJV 5707.

PROPOSED T.D.: 10,700' - (3261 m) WATER DEPTH MSL: 253' - (77 m)

RKB (MSL): +90' - (27 m) SEA FLOOR RKB: 343' - (104 m)

EXPECTED GEOLOGIC SECTION

xx SEISMIC REFLECTORS
(x objective zone) & estim obj sand thickness)

FORMATION	ESTIM TOP FT (M) RKB	EXPECTED LITHOLOGY
Recent-Pleist.		clay, sand & gravel
Pliocene		clay, shale
Miocene		
Burdigalian	?5200' - (1585 m)	clay, shale, thin lms
Aquitanian	?5900' - (1798 m)	" " " "
Oligocene	?6700' - (2042 m)	" " " "
?U.-M?Eocene (x 200-300'? Gross)	8500-9100' - (2591-2774 m)	(x) sand, shale, clay
U.Paleocene (xx PINK) (x 500' Gross)	9800' - (2987 m)	(x) sandstone & shale
Cod formation:		
Upper Sand Member	9800'	
Shale Member	9830' - (2996 m)	
Middle (main) Sand Member	9930' - (3027 m)	
Lower Sand Member	10220' - (3115 m)	
L. Paleocene		
Danian Ls (x 300' Gross)	10300' - (3139 m)	(x) limestone and chalk w/se inbd sh.

FORMATION	ESTIM TOP FT (M) RKB	EXPECTED LITHOLOGY
U.Cret (xx GREEN) (x'100' Gross)	10600' - (3241 m)	(x) limestone and chalk
Total Depth	10700' - (3261 m)	or drill 100' into limestone

CASING PROGRAM

HOLE SIZE	CASING SIZE	APPROX. DEPTH RKB FT (M)	EST. FM. SET IN
26"	20"	470' - (30.5 m)	
17-1/2"	13-3/8"	1500' - (457 m)	Pleist-Pliocene.
12-1/4"	9-5/8"	7000' - (2134 m)	Oligocene clay, shale
8-1/2"	7"	10700' - (3261 m)	Upper Cretaceous chalk

ANTICIPATED HOLE PROBLEMS

Heaving shale and tight hole conditions can be expected between 5100' and 7800' in the Lower Miocene through Oligocene. There is even a greater probability of hole trouble between 6500' and 7000'. Hard drilling can be expected from 10,300 - 10,700' T.D. in the Danian lms and Cretaceous chalk sections. Between 8500 - 9100' in the ?U.-?M.Eocene section gas sands may be present.

LOGGING PROGRAM

RUN	HOLE SIZE	TYPE LOG	INTERVAL
1	12-1/4"	GR-Sonic	From 7100' to csg shoe at 1500± (run GR to surf.)
		LL-7	From 7100' to csg shoe at 1500±
2	8-1/2"	An intermediate run of logs may be necessary in the Paleocene pay section. (Same as Run 3.)	
3	8-1/2"	GR-Sonic	From T.D. 10,700' to csg shoe at 7100'±.
		IES Velocity Survey HDT	As above
		FDC	Run over zones of interest if necessary
		SNP	"
		MLL/ML	"
		LL-7	"
		Sidewall Core Gun	"

CORING

At least three cores are planned: the first at about 9800' in the top of the Paleocene Upper Sand; the second at about 9930' in the top of the Middle (main) Sand; and the third at about 10,150' in the basal section of the Middle Sand. Full barrel recoveries should be attempted. Additional cores may be taken if warranted. Sidewall cores may be taken if warranted.

TESTING

As warranted.

Distribution:

Oslo Office (3)	Petrofina (1)
Stavanger Office (4)	AGIP (1)
Brussels Office (3)	Elf Oslo (3)

BAROID DIVISION
NATIONAL LEAD COMPANY

DRILLING MUD RECORD

COMPANY Phillips Petroleum Co. STATE Norway CASING PROGRAM: 13 3/8 inch at 1527
WELL 7-11-3X COUNTY North Sea 9 7/8 inch at 6471
DATE 12-31-68 CONTRACTOR ODECO LOCATION 7-11 7 inch at 10,965
STOCKPOINT Stavanger BAROID ENGINEER Bill Witt - Chuck Houwer SEC TWP RNG TOTAL DEPTH 10,992

DATE	DEPTH	WEIGHT	VISCOSITY	FILTRATION		SAND	SALT		pH	VISCOSITY			GELS		FILTRATE ANALYSIS				RETORT ANALYSIS			REMARKS AND TREATMENT
	feet	lb/gal	Sec	cc	Cake 32nd	%	NaCl ppm	Cl ppm		cp	Pv	Yp	in	10 min	Cl ppm	Ca ppm	SO_4 ppm	Alk Pf	Oil %	Water %	Solids %	
Dec 16	—	8.8	150																			W.O.W - Drlg Surface hole u
17	563	8.8	150																			water - Pump mud on conn.
18	563	8.8	100																			Set 20" CASING to 563'
19	1238	8.8	100																			Drlg w/ seawater
20	1675	8.8	100																			Drilled 17½" hole to 1675.
21	1675	10.0	90																			Set 13 3/8" CASING @ 1620.
22-24	1675	10.0	38	5	1	C		165,000	7.0	20	17	7	C	.1		220		0				WOW - WORKING ON ANCHORS
25	3800	10.0	38	5	1	C		165,000	7.0	20	17	7	C	1		220		0				Will DRILL with seawater to 3800
26	5150	10.8	38	5.5	2	1		152,000	7.5	16	15	3	C	1		250		0	3	87	11	Drlg - Having mud Rings
27	5972	11.6	43	4.3	2	1		148,000	7.8	24	21	6	C	1		230		.01	2	87	11	Having tight hole - Added 50 Ton
28	5972	12.2	54	4.8	2	1		154,000	8.0	40	35	10	1	6		550		.04	2	85	13	Cement contam. water / barite
29	5972	12.5	62	4.5	2	Tr		158,000	7.8	45	39	12	2	7		310		.06	1	86	13	Reaming - Raising wt. to 12.5+
30	6480	12.5	66	4.4	2	TR		166,000	7.5	54	50	18	2	8		520		.02	1	82	17	Drilling Ahead
31	6540	12.9	71	5.1	2	3		151,000	7.5	57	45	25	3	17		520		0	1	75	24	Conditioning hole to log
Nov. 1	6540	12.9	75	6.5	3	3		159,000	7.5	65	50	30	3	20		570		0	1	75	24	Ran 9 7/8" Casing to 6471
2-3-4																						Waiting on weather
5	6800	12.1	48	3.2	2	1½		128,000	8.5	47	40	14	2	6		200		.02	1	80	19	Drilled out shoe w/ 8½" bit.
6	7200	12.0	48	4.4	2	¾		150,000	8.0	40	32	16	2	7		300		.02	1	85	14	Drlg Ahead
7	7540	13.0	52	5.1	2	TR		148,000	8.5	44	36	16	3	10		360		.05	1	82	17	Washing - Raising wt. to 13.0
8	7540	13.0	52	4.9	2	TR		140,000	8.8	46	38	16	3	12		1000		.1	1	82	17	Excess calcium due to cement in Barite
9	7540	12.9	48	5.2	2	TR		138,000	8.5	38	32	12	2	8		960		.08	1	82	17	WOW - Waiting on Sodium Sulphate + Barite
10	7540	13.0	50	4.2	2	TR		135,000	8.5	40	33	14	3	10		880		.08	2	81	17	Lost 400 BBLs mud when fixing Riser - Reaming
11	7540	13.8	55	5.2	2	TR		135,000	8.4	40	33	14	3	12		500		.05	3	80	17	Raising wt & T 14.0
12	7540	14.5	60	4.2	2	TR		150,000	8.3	56	49	14	3	12		440		.04	2	77	21	Raising wt. to 14.5 - Reaming
13	7540	14.5	64	4.8	2	TR		130,000	7.8	56	48	14	2	16		200		.05	2	76	22	Reaming to bottom.
14	8135	14.5	65	5.4	2	TR		115,000	8.2	51	44	14	0	16		180		.3	2	72	26	Drilling ahead
15	8200	14.4	65	4.2	2	TR		115,000	8.2	60	55	10	0	16		180		.3	2	72	26	Drilling
16	8300	14.3	56	4.5	2	¾		116,000	7.8	50	47	6	1	14		200		.4	3	71	26	Drilling
17	9630	14.1	60	5.5	2	TR		126,000	8.6	41	36	10	1	16		160		.5	5	72	23	Drilling

BAROID DIVISION
NATIONAL LEAD COMPANY

DRILLING MUD RECORD

COMPANY Phillips Petroleum Co. STATE Norway CASING PROGRAM: 13 3/8 inch at 1527 ft

WELL 7-11-3X COUNTY North Sea 9 5/8 inch at 6476 ft

DATE 12-31-68 CONTRACTOR ODECO LOCATION 7-11 7" inch at 10,960 ft

STOCKPOINT Stavanger BAROID ENGINEER Bill Witt - Chuck Houwer SEC TWP RNG TOTAL DEPTH 10,992 ft.

DATE	DEPTH	WEIGHT	VISCOSITY	FILTRATION		SAND	SALT		pH	VISCOSITY			GELS		FILTRATE ANALYSIS				RETORT ANALYSIS			REMARKS AND TREATMENT
	feet	lb/gal	Sec	cc	Cake 32nd	%	NaCl ppm	Cl ppm		cp	Pv	Yp	in	10 min	Cl ppm	Ca ppm	SO_4 ppm	Alk Pf	Oil %	Water %	Solids %	
Nov. 18	10,053	14.0	56	6.4	2	TR		150,000	8.4	47	45	5	0	12		160		.5	4	72	24	Hole in good condition
19	10,053	13.9	54	5.0	2	TR		150,000	8.4	36	32	8	0	10		40		.4	4	72	24	Drilling
20	10,090	13.8	50	5.2	2	TR		135,000	8.2	38	34	8	0	12		40		.4	3	73	24	Cutting Core #1
21	10,150	13.8	52	5.1	2	1/2		142,000	8.4	40	34	12	0	10		100		.12	3	73	24	Cutting Core #2
22	10,200	13.9	51	4.9	2	3/4		160,000	8.4	40	33	14	0	8		120		.05	4	72	24	Drilling
23	10,370	13.9	50	4.8	2	3/4		156,000	8.4	41	35	12	0	8		120		.05	4	72	24	Cutting Core #3
24	10,430	13.9	51	4.8	2	1/2		158,000	8.4	41	35	12	0	8		120		.05	4	72	24	Drilling w/ Diamond bit
25	10,590	13.8	52	4.7	2	1/2		165,000	8.5	42	36	12	0	8		120		.05	4	71	25	Hole in good condition
26	10,720	13.8	53	4.8	2	1/2		155,000	8.5	43	36	14	0	8		140		.06	4	70	26	Small hole in mud Riser.
27	10,868	13.4	55	5.0	2	1/2		160,000	8.4	42	35	14	0	10		140		.06	3	71	26	Adding mica to stop hole in Riser
28	10,992	14.0	48	5.0	2	1		157,000	8.4	43	39	9	0	10		40		.5	3	73	24	Hole in good Shape
29	11	14.0	52	5.1	2	1/2		153,000	8.2	39	35	8	0	14		38		.3	2	74	24	Dely - Condition mud to E. log
30	11	13.9	63	4.2	2	1/2		150,000	8.4	49	42	14	0	16		48		.3	2	74	24	W/ bridge while logging
Dec. 1	11	13.9	65	4.2	2	1/2		150,000	8.4	49	42	14	0	16		28		.3	2	74	24	Logging
2-6	11	14.0	63	4.2	2	1/2		146,000	8.2	53	44	19	0	21		44		0	2	73	25	Running 7" Casing to 10,960. Waiting on weather
7	11	13.8	52	4.8	2	TR		140,000	8.2	44	38	12	0	12		80		.02	2	73	25	Circ. through Tubing
8	11	13.8	50	4.9	2	TR		125,000	8.4	44	38	12	0	10		80		.02	2	73	25	Testing DST #1
9-10	11	13.8	50	5.0	2	TR		125,000	8.4	44	38	12	0	10		100		.02	2	73	25	Testing DST #2
11-16	11	13.0	40	NC																		Testing DST #3, 4, 5. Reduce wt. to 13.0.
17-18	11	13.0	40	NC																		Test Packer Stuck in casing
19-20	11	12.8	42	10.8	2	TR		120,000	8.0	21	17	8	0	2		260		0	1	80	19	Blew tubing in two at top of Packer. Left Packer in hole. Pulling BOP's & Riser to Repair
21-25	11	12.9	45	12.8	2	TR		125,000	8.0	24	18	12	0	2		300		0	1	81	18	Repaired Riser & BOP Waited on weather 4 days Mixed 200 bbls New mud
26-27	11	12.2	42	15	2	TR		110,000	8.0	23	18	10	0	3		300		0	1	82	17	Testing DST #6
28-29	11	12.0	45	16	2	TR		100,000	8.0	23	18	10	0	2		280		0	1	81	18	Testing DST #7-8.
30	11																					Plugging

BAROID DIVISION
NATIONAL LEAD COMPANY

COMPANY Phillips Petroleum Co. STATE Norway

WELL 7-11-3X COUNTY North Sea

CONTRACTOR ODECO LOCATION 7-11 SEC TWP RNG

STOCKPOINT Stavanger DATE 12-31-68 BAROID ENGINEER Bill Witt - Chuck Hauwer

CASING PROGRAM: 13 3/8 inch at 1527 ft.
9 5/8 inch at 6421 ft.
7 inch at 10,960 ft

TOTAL DEPTH 10,992 ft.

DATE	DEPTH	WEIGHT	VISCOSITY	FILTRATION		SAND	SALT		pH	VISCOSITY			GELS		FILTRATE ANALYSIS				RETORT ANALYSIS			REMARKS AND TREATMENT
	feet	lb/gal	Sec	cc	Cake 32nd	%	NaCl ppm	Cl ppm		cp	Pv	Yp	in	10 min	Cl ppm	Ca ppm	SO_4 ppm	Alk Pf	Oil %	Water %	Solids %	

MATERIAL	AMOUNT	COST $
Barite Tons	868	57,418.20
Barite 50 kg sx	1500	4335.00
Barite 25 kg sx	1460	2117.00
Bentonite	335	1199.30
Salt Gel	1098	3145.18
Flosal	237	2644.92
Salt	6103	13,365.57
Starch	509	1481.19
Desco	408	12,852.00
Drispac	212	11,774.48
CMC	231	2804.34
Lignosulfonate	59	553.42
Soltex	159	3335.82
Aldo Flo-5	37	1585.00

MATERIAL	AMOUNT	COST $
Sodium Sulphate	577	2261.84
Bicarb of Soda	111	551.67
Soda Ash	100	538.00
Lime	14	29.68
Formaldehyde	20	133.60
Surflo W-300	2	658.60
Caustic Soda	6	60.30
Fine Mica	103	578.86
Tie Plug	5	36.90

Does not include diesel oil used

MATERIAL	AMOUNT	COST $
Drayage		
Sales Tax		
	TOTAL COST	127,540.87

BAROID

MUD MATERIALS USED (Total)

DRILLING MUD RECORD

BR-1907-5

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BIT RECORD

SHEET 1 OF 1

COUNTY	FIELD	STATE	SECTION	TOWNSHIP	RANGE	SPUD	US	UNDER INTER	SET SAND STRING
	North Sea								

CONTRACTOR	RIG NO.	LEASE	WELL NO.	COMPANY	TOOL PUSHER
ODECO	Ocean Tr.	7/11	3X	Phillips	Buckley Rubble

MAKE RIG	TYPE	RIG POWER	PUMP POWER	BOILERS — No.	RATED HP	PUMP No. 1	PUMP No. 2
National	Model 1625	ELC	ELC	—		Nat. N.1300-16	N-1300-1.6

DRILL PIPE	TOOL JOINT TYPE	DRILL COLLARS O.D.	I.D.	LENGTH	MUD TYPE	SALESMAN
5"	X.H	6¼ O.D	7 3/4	30'	Salt Sat.	NORSC Karlsen

RUN NO.	SIZE	MAKE	TYPE	JET SIZE	SERIAL	DEPTH FROM	DEPTH TO	FEET	HOURS	FEET PER HOUR	WEIGHT 1000 POUNDS	RPM	VERTICAL DEV.	PUMP PRESSURE	PUMP OPERATION	NO 1 SPM	NO 1 LINER	NO. 2 SPM	NO. 2 LINER	MUD WT.	MUD VIS.	REMARKS
1	26	HTC	OSC-3	Reg.	RV071	336	563	227	3		5/10	70		925	P	65	7¼			8.6	150	Good
2	17½	HTC	OSC-3	2-16 1-open	UK56388	563		Drilled	Cem	+ Lost	@ Top	of	hole									
3	17½	HTC	OSC-3	2-16 1-0	UK 44781	523	1675	1152	19½		5/15	100	½°	1300	P	60	7¼	60	7¼	S.W		T-1-B-1-
4	12¼	Sec.	M4NG	open	944758		1675			Drilled	Cem	Cond	hole									
4	12¼	Sec	S3J	3 5/8	103147	1675	5972	4297	28½		30	160		2900	P	51	6¾	53	6¾	12	80	Good
5	12¼	Sec	S3	3-11	103148	3832	6540	709	4 days	Clean	out	hole	Reaming	to	Bottom	T, B-						
6	8½	Sec	S-4	Dropped	in	w/	11	Drill	Collars													
7	8½	HTC	OSC-3	out	UK 43983	Floats 6431	6540	109	5½		Cem	+	Float	&	Shoe	Wash	to	TD				T6-B-1-
8	8½	Sec	S6J	3-13	101545	6540	7540	1000	18.5		22 Hrs	110		3000	S			55	6¾	12.5	47	T3-B6
9	8½	HTC	OWVJ	3-11	UK 64099	7540	2540	0	Wash	&	Ream			3000	S			46	6¾	13	53	T1-B2-
10	8½	HTC	X3A	3-11	UK 54759	7540	7803	263	8½		10/20	140		3000	S			40	6¾	14.5	68	T7-B7-7
11	"	HTC	X3A	3-11	UK 54737	7803	8749	946	19		20/25	100		3000	S			40	6¾	14.5	60	T-3-B2-
12	8½	HTC	OSC1GJ	1-10 2-11	UK 27097	8749	9633	844	21		20/25	100		3000	S			37	6¾			T4-B-3
13	8½	Sec	S-6J	1-10 2-11	945359	9633	9942	309	11.5		42	115		3000	S			42	6¾	13.9	62	T8-B-6-
14	8½	Sec	M4NGJ	1-10 2-11	945846	9942	10086	144	8		50	90		3000	S			41	6¾	13.8	49	T4-B-4-
CORE #1	8 7/16	Chris	DIABERRD		34654	10086	10811	25	9		15	60	100	900	Rec. 5'			31	6¾			
15	8½	Sec	M4NGJ	1-10 2-11	103514	Ream 23' 10086	10147	36	2.5		45	72		3000				45	6¾	13.8	900 lb to Core 55	T1B1-
CORE 2	8 7/16	Chris CORIBB			34656	10147	10192	45	5.5		15	60		900	S			32	6¾			
16	8½	Sec	N4NGJ	1-10 2-11	103519	10192	10369	177	5.5		45	75		3000	S			45	6¾	13.8	53	T-3-B-2-
CORE #3	8 7/16	Chris			34656	10369	10424	55	5		15	60		1000	S			32	6¾			
17	8 15/32	Chris	Di 2	eight	M 368246	10424	10613	189	33½		30	135		1500	S			36	6¾			½ 1/16 Grove in
18	8½	Sec	M4NGJ	1-10 2-11	103114	10613	10764	151	12		50	65		3000				41	6¾			T5-B6-
19	8½	Sec	M4NGJ	1-10 2-11	118923	10764	10810	46	8		30/40	65		3000	S			31	6¾	13.9	51	No Reco
20	8½	Sec	M4NGJ	1-16 2-11	10352	10810	10896	86	12		45	65		3000	S			42	6¾	13.9	52	T-7-B6-
21	8½	Sec	H7V	1-10 2-11	945365	10896	10941	45	12		55	60		3000	S			42	6¾	13.9	60	T-7-B4-

7/1 3X

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BIT RECORD

SHEET 2 OF

COUNTY	FIELD	STATE	SECTION	TOWNSHIP	RANGE	SPUD	US	UNDER INTER	SET SAND STRING

CONTRACTOR	RIG NO.	LEASE	WELL NO.	COMPANY	TOOL PUSHER

MAKE RIG	TYPE	RIG POWER	PUMP POWER	BOILERS — No.	RATED HP	PUMP No. 1	PUMP No. 2

DRILL PIPE	TOOL JOINT TYPE	DRILL COLLARS O.D.	I.D.	LENGTH	MUD TYPE	SALESMAN

RUN NO.	SIZE	MAKE	TYPE	JET SIZE	SERIAL	DEPTH FROM	DEPTH TO	FEET	HOURS	FEET PER HOUR	WEIGHT 1000 POUNDS	R P M	VERTICAL DEV.	PUMP PRESSURE	PUMP OPER-ATION	NO. 1 SPM	NO. 1 LINER	NO. 2 SPM	NO. 2 LINER	MUD WT.	MUD VIS.	REMARKS
22	8½	Sec	M4L	1-10 2-11	109114	10941	10992	51	9		50	60		3000	S	42	6¾			14.0	60	T-7-B6-[illegible]
23	8½	HTC	XG	1-10 2-11	UK 52608	10992	Circ for Logs	0	Circ Time for logs						S	42	6¾			141	50	
24	6"	Sec	H7UJ	out		10208	Kleanout 7" for Perf. only															

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L. Escher

October 8, 1968

Mr. A.T. Crump
Stavanger Office

Re: North Sea - Drilling Mud

After studying the information that I have available on the company drilled projects the 16/11-1X; 7/11-1X; 7/11-2X; 7/8-1X and the 17/4-1X drilled by Elf/Norge, I present the following comments and recommendations in an effort to eliminate the costly drilling problems experienced on all of above mentioned projects.

The reduction of the 17-1/2" hole to a 12-1/4" hole through the interval from the 13-3/8" casing to 6500' will solve the problem of low annular velocity giving better cleaning of the open hole and in the riser therefore reducing the possibility of forming the very troublesome mud ring in the riser and slip joint. The reduced hole size will reduce the total circulating volume therefore cutting the mud cost of initial mud up and the tourly maintenance.

It was evident by the cuttings and the hole not sloughing that the mud used on the 7/8-1X did perform very well even though it was very difficult to maintain and was very costly due to the large volume of solids drilled. To keep the system near saturated the salt additions created an additional solids problem making it necessary to add excessive amounts of water to control the viscosity, then more salt, starch, Drispac, Barite and Desco was required. Even though the salt additions create a vicious circle of maintenance the inhibiting benefit from the salt reducing the hydration of the clays and shales justifies the use. Added protection, by encapsulation, is given by the presence of Drispac and Starch. The starch and Drispac giving filter control and viscosity also.

Attached are copies of (1) Mud cost total to drill and set casing to 6500' on the 7/8-1X. (2) Mud cost as expected on the COD-3 or whatever is drilled. (3) A recommended mud program for the COD-3X with added comments built in.

The mud program is exact as you have recommended and have been using to 3800' and the program below is very much the same as was used on the 7/8-1X with a few suggestions throughout.

./..

Mr. A.T. Crump
Stavanger Office

October 8, 1968

After reading the correspondence from F.J. Shell, dated October 1, 1968 with reference to Mud Program - North Sea - Norway, I feel that after mud up to a saturated system at 3800' the echonomics can be relieved by the flexible chloride control of 120,000 ppm and above but still give good shale inhibition.

I plan NOW to be on location to work with and assist you and the contract mud engineer while drilling to 6500' on the next job.

P.L. Pope

Attachments

cc: T.J. Jobin
L.H. Hoelscher
F.J. Shell

PLP:aht/261/68

CHUB 7/8-1X

Mud Cost to drill and set 13-3/8" casing to 6500' RKB.

Product	Amount	Unit Cost	Product Cost
Zeogel	80 sx.	$ 2.91 / sk	$ 175.20
Salt Gel	655 sx.	$ 4.67 / sk	$ 3,058.85
Flosal	212 sx.	$ 11.16 / sk	$ 2,365.92
Lime	47 sx.	$ 2.12 / sk	$ 99.64
Materials used above 3825'		Total	$ 5,699.61
Barite	350 metric ton	$ 66.15 /met.ton	$ 23,152.50
Bentonite	220 sx.	$ 3.58 / sk.	$ 787.60
Drispac	246 sx.	$ 55.54 / sk.	$ 13,662.25
Starch	217 sx.	$ 6.98 / sk.	$ 1,514.66
Desco	112 sx.	$ 31.50 / sk.	$ 3,528.00
Aktaflo-"S"	19 drums	$ 205.00 / dm.	$ 3,895.00
Salt	5,830 sx.	$ 2.19 / sk.	$ 12,767.70
Soltex	30 sx.	$ 20.98 / sk.	$ 629.40
Diesel Oil	15 bbls.	$ 6.00 / bbl.	$ 90.00
Materials used below 3825'		Total	$ 60,027.11
Total cost of mud materials to 6500'			$ 65,726.72

COD 7/11-3X

Expected Mud to drill and set 9-5/8" casing to 6500' RKB.

Cost to set 20" casing - Expect same cost as to set 30" on 7/8-1X
Cost to set 13-3/8" casing - Expect same cost as to set 20" on 7/8-1X
Cost to set 9-5/8" casing - (As outlined below).

Product	Amount used on 7/8-1X	Amount expected use on 7/11-3X	Expected Product Cost
Barite	350 metric ton	180 metric ton	$ 11,907.00
Bentonite	220 sx.	220 sx.	$ 787.60
Drispac	246 sx.	100 sx.	$ 5,554.00
Starch	217 sx.	200 sx.	$ 1,396.00
Desco	112 sx.	40 sx.	$ 1,260.40
Aktaflo-"S"	19 drums	6 drums	$ 1,230.00
Salt	5,830 sx.	3,000 sx.	$ 6,570.00
Soltex	30 sx.	0 sx.	-
Diesel	15 bbls.	150 bbls.	$ 900.00
Estimated cost to drill below 4,000'			$ 29,605.00
Estimated cost to drill above 4,000'			$ 5,700.00
			$ 35,305.00

Cost to set 13-3/8" casing at 6500' - 7/8-1X	$ 65,726.72
Expected cost to set 9-5/8 casing at 6500' - 7/11-3X	$ 35,305.00
Expected Mud Cost Reduction	$ 30,421.72

Recommended Mud Program - North Sea - Norway

A. Hole Size: 26"

Total Depth: 465' RKB

Hole Volume: 114 bbls

This section is to be drilled using sea water with returns to the sea floor. Slugs of high viscosity mud will be pumped into the hole as filling becomes a problem. After the hole has been drilled, a volume of high viscosity sea water mud equal to twice the hole volume will be pumped through the bit.

Prepare the high viscosity mud as follows:

(a) Sea Water.

(b) 15 - 25 lbs/bbl Zeogel.

(c) 3 - 4 lbs/bbl Flosal

(d) 0.1 lb/bbl lime (to thicken mud).

and have these properties:

Density	8.8 ppg
Viscosity	+100 sec/qt.
Fluid-loss	No control

B. Hole Size: 17-1/2"

Total Depth: 1650' RKB

Hole Volume: 500 bbls

The mud for this section of hole will be prepared and used as in the 26" hole. Clean the hole with high viscosity mud and spot high viscosity mud in hole to run 13-3/8" casing.

C. Hole Size: 12-1/4"

Total Depth: 6500'

Hole Volume: 950 bbls

From the 13-3/8" casing shoe to a depth of 3800' sea water will be used as the drilling fluid. Mud returns will be dumped into the sea.

./..