



BAROID DIVISION
NATIONAL LEAD COMPANY

10

DRILLING MUD RECORD

COMPANY Phillips Petroleum Co. STATE Norway CASING PROGRAM: 13 3/8 inch at 5376 ft.
 WELL 2/4 - 4x + 2/4 - 4AX COUNTY North Sea 9 5/8 inch at 9936 ft.
 DATE 9-1-70 CONTRACTOR Neptune Rig 7 LOCATION 2/4 7 inch at 10,892 ft.
 STOCKPOINT Stavanger BAROID ENGINEER Witt - Whatley - Carlile - Evansec TWP _____ RNG _____ TOTAL DEPTH 10,894 ft.

DATE	DEPTH feet	WEIGHT lb/gal	VISCOSITY Sec	FILTRATION		SAND %	SALT		pH	VISCOSITY			GELS		FILTRATE ANALYSIS				RETORT ANALYSIS			REMARKS AND TREATMENT	
				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 %		
JUNE 15	400	8.8	100	NC																			Set 30" casing @ 448'
16	800	8.8	100	NC																			Delg 26" hole w/ seawater
17	1000	8.8	100	NC																			Scumming 20 lbs mud after first single-trusted off below Kelly
18	2025	10	100	NC																			Raised mud wt. to 10 ppg. Pump down 1200 psi. Pipe stuck @ 1500'
19	2025	11.0	100	NC																			Backed off @ 940'. Set cmt plug to abandon hole.
20	2025	8.8	100	NC																			Call for 30" casing.
21	200	8.8	100	NC																			Delg 30" hole w/ seawater
22	426	8.8	100	NC																			Set 30" casing @ 425'
23	1200	10.0	100	NC																			Delg 26" hole w/ seawater
24	1920	10.0	100	NC																			Drilled to 1920'. Spotted 100 lbs 10 lb mud. Ran 26" casing to 1878'
25	1920	10.0	100	NC																			Running Riser + BOP.
26	1920	10.0	100	NC																			Running Riser + BOP.
27	1920	12.6	41	5.2	2	0			10.5	25	5	0	3	22,500	760			1.2	2	84	14		Drilled out cmt - Displace seawater
28	2130	12.8	41	5.2	2	1/4			10.5	25	7	1	4	22,000	260			1.0	2	84	14		Delg Gumbar w/ 1 1/2" bit
29	3150	14.1	47	5.6	2	1/2			10.0	29	9	2	7	20,000	300			.7	3	74	23		Delg @ 70 ft/hr.
30	3716	14.2	43	5.4	2	1/2			10.0	24	8	2	9	20,000	580			.6	4	71	25		Delg Gumbar w/ Aht mud Rings
July 1	4425	14.3	46	5.2	2	1/2			9.5	18	15	5	14	20,000	1320			.4	5	68	27		Delg @ controlled rate
2	4876	14.3	44	4.8	2	1/4			9.0	21	17	2	11	20,000	980			.15	5	69	26		Aht mud Rings
3	5400	14.3	42	5.8	2	TR			9.0	18	15	4	19	20,000	1440			.1	5	63	27		Drilled to 5400' - E logs stopped at 2400' Trip to condition hole
4	5400	14.4	44	6.0	2	TR			8.5	20	17	5	22	20,000	1720			.1	4	70	26		Ran E logs - Set 13 3/8" casing
5	5400	14.4	44	6.0	2	TR			8.5	20	17	5	22	20,000	1720			.1	4	70	26		To 5376'. Nipple up.
6	5400	14.4	44	6.0	2	TR			8.5	20	17	5	22	20,000	1720			.1	4	70	26		Hit cmt custom mud @ 490' Drilled from cmt @ 4790'
7	5400	14.1	47	6.0	2	TR			11.0	25	14	2	12	21,000	400			1.5	4	70	26		Drilled out cement - Cold mud
8	6200	14.3	51	5.9	2	TR			10.5	25	14	2	12	21,000	400			.8	4	71	25		Drilling Gumbar
9	7300	14.3	56	7.2	2	1/4			10.0	26	15	3	15	20,000	360			.5	3	71	26		Delg ahead w/ some vis trouble
10	7900	14.3	50	6.0	2	1/4			10.0	26	11	3	10	21,000	400			.5	3	71	26		Delg in soft cmt.
11	8865	14.3	52	5.6	2	1/4			10.0	26	16	2	15	21,000	200			.6	3	71	26		Normal Drilling



BAROID DIVISION
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DRILLING MUD RECORD

COMPANY Phillips Petroleum Co.

STATE Norway

CASING PROGRAM: 13 3/8 inch at 5376 ft.

WELL 2/4 - 4X + 2/4 - 4AX

COUNTY North Sea

9 5/8 inch at 9936 ft.

DATE 9-1-70

CONTRACTOR Neptune Rig 7

LOCATION 2/4

7 inch at 10,892 ft.

STOCKPOINT Stavanger

BAROID ENGINEER Witt-Whatley-Carlile-Evans

SEC _____ TWP _____ RNG _____

TOTAL DEPTH 10,894 ft.

DATE	DEPTH feet	WEIGHT lb/gal	VISCOSITY Sec	FILTRATION		SAND %	SALT		pH	VISCOSITY			FILTRATE ANALYSIS				RETORT ANALYSIS			REMARKS AND TREATMENT	
				cc	Cake 32nd		NaCl ppm	Cl ppm		cp	Pv	Yp	in	10min	Cl ppm	Ca ppm	SO ₄ ppm	Alk Pf	Oil %		Water %
July 12	9600	14.3	51	5.6	2	1/4			10.0	26	16	2	15	19,500	230		.7	.3	71	26	Normal Drilling
13	9814	14.3	50	5.5	2	1/2			10.5	26	16	2	15	19,500	260		.7	.3	71	26	E. Log - Drilling Drags
14	9864	14.3	54	5.4	2	1/4			10.0	29	17	3	17	20,000	300		.3	.3	71	26	Drilling
15	10,025	14.4	49	4.8	2	3/4			9.5	24	15	3	12	20,000	240		.2	.2	72	26	Running E. Logs
16	10,025	14.4	49	4.8	2	3/4			9.5	24	15	3	12	20,000	240		.2	.2	72	26	Condition mud For 9 7/8 casing
17	10,025	14.4	59	5.2	2	1/2			9.0	28	34	4	11	19,000	280		.15	.2	72	26	Run 9 7/8 casing To 9936
18	10,025	14.3	53	3.6	2	1/2			10.0	32	16	2	11	18,000	100		.9	.6	68	26	Drilling out cement
19	10,153	14.4	50	4.2	2	3/4			10.5	27	11	2	8	18,000	100		1.9	.6	68	26	Cut Core #1
20	10,202	14.3	48	4.0	2	3/4			10.0	28	7	1	5	18,000	100		1.0	.4	70	26	Cut Core #2 and #3
21	10,220	14.3	47	4.5	2	1/2			10.5	27	12	1	5	18,500	160		.8	.4	70	26	Cut Core #4 and #5
22	10,300	14.4	46	4.4	2	1/2			10.5	26	12	1	5	18,500	200		.95	.4	70	26	Drilling ahead of 8 1/2" bit
23	10,440	14.4	46	4.3	2	3/4			10.5	27	11	1	5	18,800	200		.80	.5	68	27	Core #6 and #7
24	10,488	14.3	45	4.5	2	1/2			10.0	27	11	1	5	18,500	200		.65	.5	68	27	Core #8 and #9
25	10,554	14.4	47	4.6	2	1/2			10.0	27	12	1	5	18,500	200		.7	.5	68	27	Core #10 + #11
26	10,638	14.3	46	4.7	2	1/2			10.0	27	11	2	5	18,000	200		.95	.5	68	27	Core #12 - Normal Drily
27	10,844	14.3	48	4.4	2	1/2			10.0	27	11	1	5	17,500	140		.8	.5	68	27	Circ For E logs
28	10,844	14.3	48	4.4	2	1/2			10.0	27	11	1	5	17,500	140		.8	.5	68	27	Running E. Logs
29	10,894	14.4	55	4.4	2	1/2			9.5	34	18	2	11	17,000	140		.6	.5	67	28	Condition mud For 7"
30	10,894	14.4	53	4.4	2	1/2			9.5	34	18	2	11	17,000	140		.6	.5	67	28	Run 7" liner to 10,892
31	10,892	14.4	53	4.4	2	1/2			9.5	34	18	2	11	17,000	140		.6	.5	67	28	Attempt to Kill Gas Leak between 13 3/8 + 20" casing
August 1	10,892	14.4	53	4.4	2	1/2			9.5	34	18	2	11	17,000	140		.6	.5	67	28	W.O.C. Pressure test cont.
2	10,892	14.4	53	4.4	2	1/2			9.5	34	18	2	11	17,000	140		.6	.5	67	28	Going in hole w/ tubing
3	10,848	14.2	45	5.2	2	3/4			11.0	22	10	2	8	17,000	160		2.3	.4	68	28	Circ TD 10,848 - Condition mud prior to Band log
4	10,894	14.3	48	5.4	2	1/2			11.0	27	12	1	10	17,000	160		2.0	.4	68	28	Logging + Squeeze
5	10,894	14.3	47	6.0	2	1/4			11.0	26	11	1	6	17,500	200		1.5	.4	70	26	Port + SQUEEZE #2
6	10,894	14.3	46	5.9	2	1/4			11.0	26	10	0	5	18,000	160		1.3	.4	70	26	Daly CMT
7	10,894	14.3	48	5.9	2	1/4			11.0	26	10	0	5	18,000	160		1.2	.4	70	26	Daly CMT - SQUEEZE
8	10,894	14.4	47	5.9	2	7/8			11.0	32	11	0	10	17,900	200		1.5	.4	69	27	Daly RETAINER - Mix 32 bbls hi 4's mud to flush hole
9	10,894	14.3	48	6.2	2	7/8			10.5	25	10	0	8	18,200	160		1.5	.4	70	26	Testing well

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COUNTY North Sea

9 5/8 inch at 9936 ft

CONTRACTOR Neptune Rig 7

LOCATION 2/4

SEC _____ TWP _____ RNG _____

7 inch at 10,892 ft

STOCKPOINT Stavanger

DATE _____

BAROID ENGINEER Witt-Whatley-Carlile-Evans

TOTAL DEPTH 10,894 ft

DATE	DEPTH feet	WEIGHT lb/gal	VISCOSITY Sec	FILTRATION		SAND %	SALT		pH	VISCOSITY			GELS		FILTRATE ANALYSIS				RETORT ANALYSIS			REMARKS AND TREATMENT
				cc	Cake 32nd		NaCl ppm	Cl ppm		cp	Pv	Yp	in	10min	Cl ppm	Ca ppm	SO ₄ ppm	Alk Pf	Oil %	Water %	Solids %	
August 10	10,894	14.3	48	6.2	2	TR			10.5	25	10	0	8	18,200	160		15	4	70	26	Test and Acidize	
11	10,894	14.3	45	5.9	2	TR			10.0	26	7	0	6	19,100	120		.3	3	71	26	Kill Well - Circ Gas Cut Mud - R.T.H. w/ bit + SERAPOR	
12, 13, 14	10,894	14.3	46	6.2	2	TR			9.5	26	7	0	6	18,000	160		.5	3	72	25	Flow + Acidize Well - Kill Well - lost 200 bbl Mud - Mix 300 bbl	
15	10,894	14.3	47	7.2	2	TR			9.0	24	4	0	10	17,600	120		.3	3	73	24	Set Cement Plug	
16	10,894	14.3	49	7.1	2	TR			9.0	26	9	0	10	17,400	140		.3	2	74	24	Circ hole - Wait on weather	
17	10,894	14.3	48	6.8	2	TR			10.5	27	5	0	6	19,000	400		.6	3	73	24	Testing well	
18	10,894	14.3	48	6.8	2	TR			10.5	27	5	0	6	19,000	400		.6	3	73	24	Good mud to Kill Well	
19	10,894	14.3	50	7.0	2	TR			9.8	28	6	0	7	20,000	480		.5	2	74	24	Killed Well	
20	10,894	14.4	45	7.0	2	TR			10.0	27	5	0	6	20,000	480		.5	2	73	25	Set Cement Plug	
21	10,894	14.3	46	6.3	2	TR			9.8	27	5	0	6	20,000	480		.5	2	74	24	PERF - Testing - Well did not flow	
22	10,894	14.3	48	5.3	2	TR			10.2	28	7	0	8	21,000	280		.5	2	74	24	Low Bridge Plug - Permeate	
23	10,894	14.3	47	5.3	2	TR			10.0	27	7	0	8	21,000	280		.5	2	74	24	Test and Acidize	
24	10,894	14.3	55	5.9	2	TR			9.8	27	7	0	11	19,600	280		.5	2	74	24	Testing	
25	10,894	14.2	46	6.9	2	TR			9.3	29	5	0	3	18,000	240		.4	2	78	20	Plugging Well - Temporary Plug + Abandon	



MUD MATERIALS
USED (Total)

DRILLING MUD RECORD

BR-1907-5

MATERIAL	AMOUNT	COST \$	MATERIAL	AMOUNT	COST \$	MATERIAL	AMOUNT	COST \$
Barite	2151 MT	142,267.14	Bi Carb	147 SX	826.14			
Drillaid	1175 SX	7,637.50	DD	18 Drum	4350.00			
Q-Broxin	149 SX	1397.62	W-300	3 "	1084.20			
Desco	251 SX	7906.50	E MICA	172 SX	966.64			
Bentonite	929 SX	3381.56	C MICA	120 SX	674.40			
Elasal	482 SX	5379.12						
Zeogel	981 SX	2942.71						
Salt Gel	7 MT	898.17						
CMC	296 SX	3575.68						
DRISpac	29 SX	1608.63						
Dextrid	50 SX	875.00						
Causlic Soda	191 SX	1898.54						
Soltex	298 SX	6252.04						
Soda Ash	77 SX	391.16						

TOTAL COST 194,318.01

- Testing -

Drill stem tests through perforations of the 7" liner were carried out with the following results:

DST No. 1

Perforated interval 10,380 - 10,510 feet with 4 shots per foot. IF 10 mins, ISI 2 hrs. 30 mins, Flow No. 1 12 hrs. 13 mins, SI No. 1 8 hrs. Flow No. 2, 6 hrs, FSI 6 hrs. Flowed 0.896 MMCFD gas and 734 BPD of 37.3° API gravity oil through a 10/64 inch choke, and 5.855 MMCFD gas and 4411 BPD oil through a 24/64 inch choke.

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IHP 7948 PSI, IFP 5594 PSI, ISIP 7172, PSI, FP No. 1 7046 PSI, SIP No. 1 7159 PSI, FP No. 2 6068 PSI, FSIP 7126 PSI, FHP 7790 PSI, all recorded at 10,461 feet. Failed in further acidizing.

DST No. 1A

Perforated interval 10,423 - 10,454 feet with 4 shots per foot. IF 7 hrs. 30 mins, ISI 6 hrs, acidized with 17,500 gal and shut in 3 hrs, FF 10 hrs. 15 mins, FSI 6 hrs. Flowed 3.354 MMCFD gas and 2728 BPD oil through a 14/64 inch choke, and 3.454 MMCFD gas and 2687 BPD oil of 36.9° API gravity through a 21/64 inch choke. IHP 7979 PSI, IFP 6401 PSI, ISIP 7130 PSI, FFP 7086 PSI, FSIP 7149 PSI, FHP 7820 PSI, all recorded at 10,461 feet.

DST No. 2

Perforated interval 10,190 - 10,310 feet with 4 shots per foot. Malfunction.

DST No. 2A

Same interval. IF 10 mins, ISI 2 hrs. 30 mins, Flow No. 1 6 hrs. SI No. 1 6hrs, Flow No. 2 7 hrs. 30 mins. SI No. 2 6 hrs, acidized with 15,200 gal and shut in 3 hrs, Flow No. 3 6 hrs, FSI 6 hrs. Flowed 0.831 MMCFD gas and 649 BPD oil of 36.8° API gravity through a 12/64 inch choke, 3.956 MMCFD gas and 3055 BPD oil of 37° API gravity through a 50/64 inch choke and, after acidization, 4.005 MMCFD gas and 3022 BPD oil of 37.1° API gravity through a 21/64 inch choke. IHP 7613 PSI, IFP 4856 PSI, ISIP 7041 PSI, FP No. 1 6511 PSI, SIP No. 1 6997 PSI, FP No. 2 2886 PSI, SIP No. 2 6931 PSI, FP No. 3 6754 PSI, FSIP 6984 PSI, FHP 7737, all recorded at 10,213 feet.

DST No. 3

Perforated interval 10,130 - 10,150 feet with 4 shots per foot. Malfunction.

DST No. 4

Perforated interval 9980 - 10,090 feet with 4 shots per foot. IF 10 mins, ISI 2 hrs. 30 mins, Flow No. 1 6 hrs. 21 mins, SI No. 1 10 hrs. acidized with 16,200 gal and shut in 3 hrs, Flow No. 2 10 hrs. 40 mins, SI No. 2 6 hrs. Flow No. 3 9 hrs. SI No. 3 7 hrs. Flowed 0.644 MMCFD gas and 366 BPD oil of 37.5° API gravity through a 24/64 inch choke, after acidization, flowed 0.532 MMCFD gas and 330 BPD oil of 37.3° API through a 8/64 inch choke and 3.253 MMCFD gas and 2586 BPD oil of 37.3° API gravity through a .