

6.4 Mud Report

Phases

36" hole, 30" csg.: The 36" hole was drilled with sea water with returns to the sea bed. A 1.08 rd spud mud with funnel viscosity of 100⁺ was mixed for spotting on connections and a 1.20 rd, 100⁺ spud mud was mixed for displacement of the hole before running the casing.

26" hole, 20" csg.: The riser was run before the 17½" pilot hole was drilled. A 1.03 rd sea water mud was used mixed of gel, soda ash, lime, caustic soda and barite.

During opening the hole to 26" prehydrated gel, sea water and caustic soda was added to the system continuously to maintain hole stability.

17½" hole, 13-3/8" csg.: Sea water mixed with gel, caustic soda, lime and barite was used when drilling out of 20" csg. shoe. At 1225 m CMC and Spersene was added to the system to reduce the fluid loss down to 15 ml/30 min and control flow properties.

At 1910 m the mud was gradually changed over to fresh water system by using drill water as treatment water. Due to the gumbo clay and shale being drilled, the fluid loss was reduced from 15 cc to 6 cc/30 min using CMC, Drispac and bentonite. Flow properties were controlled using Spersene and XP-20 (chrome lignosulfonate). Maximum mud density required for this interval was 1.26 rd.

12-1/4" hole, 9-5/8" csg.: When drilling the 12-1/4" hole from 2738 m to 3417 m the mud density was kept constant at 1.26 rd. From here and down to 3511 m the mud density was continuously increased to 1.34 rd. The mud was mixed with Spersene, gel XP-20, Drispac, lime, caustic soda. At 3145 m, Resinex was added to the system to reduce HT-HP fluid loss and stabilize the system for higher down hole temperature.

8-3/8" hole, 7" liner: The mud density was increased to 1.38 rd before the 9-5/8" csg. shoe was drilled out. It was kept constant down to 3593 m where it was increased to 1.45 rd. Final density at 3775 m was 1.46 rd. The fresh water, Spersene, XP-20 system was maintained to total depth utilizing Resinex and CMC for fluid loss control.
See Table A.4.

MUD SUMMARY

TABLE A.4

HOLE SIZE (inc)	DEPTH (m)	MUD DENSITY (rd)	FV (sec)	PV (mPa·S)	YP (Pa)	GEL STRENGTH (Pa)	FILTRATE ml/30 min.	CAKE mm	CL (ppm)	CALCIUM (ppm)	pH
36	194	1.08	100 ⁺	10	26	20/80	14	2	3 000	TR	9.5
17 $\frac{1}{2}$	251	1.07	50	8	14	4/10	20	2	10 000	40	9.5
"	468	1.08	50	7	20	6/20	30	2	15 000	40	9.5
"	712	1.08	50	8	20	6/15	35	2	15 000	40	9.5
26	196	1.08	45	6	15	3/12	40	2	16 000	40	9.0
"	714	1.09	40	5	24	5/9	40	2	16 000	40	9.0
17 $\frac{1}{2}$	901	1.08	40	7	11	4/10	40	2	16 000	800	9.0
"	1065	1.12	44	10	25	5/13	38	2	17 000	500	9.5
"	1177	1.10	43	7	16	4/11	40	2	17 000	600	9.5
"	1394	1.13	44	7	18	5/14	35	2	17 000	150	9.5
"	1475	1.12	42	8	11	4/11	15	2	15 000	250	10.0
"	1673	1.16	50	10	8	3/15	9	2	14 000	180	10.0
"	1904	1.18	50	27	6	4/20	6	2	9 000	0	9.5
"	2128	1.17	50	21	9	2/18	6	2	8 800	140	9.5
"	2183	1.20	55	20	7	2/21	7	2	8 000	NIL	9.5
"	2306	1.21	47	18	9	3/25	6	3	8 500	140	9
"	2495	1.20	45	20	7	3/9	6	2	7 000	100	9.5
"	2595	1.20	45	20	5	2/14	6	2	7 000	120	9.5
"	2670	1.26	50	23	8	4/15	6	2	7 000	80	9.5
"	2733	1.26	53	29	9	2/13	6	2	7 500	100	9.5
12-1/4	2800	1.26	52	30	7	1/14	7	2	8 000	50	11.0
"	2909	1.27	48	23	5	1/9	6	2	7 400	150	9.5
"	3035	1.27	55	22	6	1/12	6	2	7 500	150	9.5
"	3142	1.26	52	20	6	1/10	6	2	7 000	100	10.5
"	3227	1.25	50	20	6	2/12	6	2	6 500	80	10.5
"	3353	1.25	45	20	6	1/10	6	2	6 000	50	10.5
"	3489	1.28	46	17	6	2/13	6	2	6 000	50	10.5
"	3495	1.32	43	16	5	1/10	6	2	5 000	50	10.5
"	3508	1.34	43	16	5	1/10	6	2	5 000	50	10.5
8-3/8	3520	1.38	45	17	5	1/12	5	2	5 000	TR	11.0
"	3593	1.44	48	20	7	2/11	5	2	5 000	40	10.5
"	3609	1.46	50	18	11	1/13	4	2	8 000	80	11.0
"	3775	1.46	51	34	6	1/14	5	2	8 000	120	10.5

WELL SUMMARY

RFT RESULTS

Well:

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RUN 1		RUN 2		RUN 3	
DEPTH (KB)	FORMATION PRESSURE	DEPTH (KB)	FORMATION PRESSURE	DEPTH (KB)	FORMATION PRESSURE
1 3560 m	6828 PSIG	1 3728 m	7459 PSIG	1 3611.8 m	6874 PSIG
2 3597 m	6825 PSIG	2 3728 m	7459 PSIG		
3 3595 m	6851 PSIG	3 3724 m	7453 PSIG		
4 3592 m	TIGHT	4 3745 m	TIGHT		
5 3589.2 m	6845 PSIG	5 3755.5 m	TIGHT		
6 3586.5 m	6849 PSIG	6 3728 m	7402 PSIG		
7 3584 m	6845 PSIG	7 3724 m	7398 PSIG		
8 3582 m	6846 PSIG	8 3613 m	6848 PSIG		
9 3580 m	6845 PSIG	9 3612 m	6842 PSIG		
10 3578 m	6846 PSIG	10 3611 m	6838 PSIG		
11 3573 m	6840 PSIG	11 3601 m	6831 PSIG		
12 3568.5 m	6840 PSIG	12 3598 m	6830 PSIG		
13 3565 m	6836 PSIG	13 3596 m	6826 PSIG		
		14 3612 m	6842 PSIG		
		15 3611.8 m	6841 PSIG		

FORMATION FLUID SAMPLES WERE TAKEN AT 3560m AND 3611.8m. CONTENTS OF SAMPLE CYLINDERS FOUND NOT TO BE REPRESENTATIVE OF TRUE FORMATION HYDROCARBON COMPOSITION. THE SEPARATOR SAMPLES FROM THE PRODUCTION TEST WILL BE USED AS REFERENCE DATA.

DST SUMMARY

TEST NUMBER AND PERFOR. INTERVAL	EVENT	TIME HOURS	CHOKE SIZE INCHES	RECORDED BOTTOM HOLE PRESSURE BAR	BOTTOM HOLE TEMP. °C	FLOWING WELLHEAD PRESSURE BAR	WELLHEAD TEMP. °C	GAS FLOW RATE 10 ³ Nm ³ /d	GAS GRAVITY (SP.GR)	OIL FLOW RATE STm ³ /d	OIL GRAVITY °API	WATER FLOWRATE m ³ /d	GAS-OIL RATIO Nm ³ /STm ³
DST no 1 3610-3614 m	Initial shut in			478.2									
	Flow no. 1	4.3	20/64	352.9		77.9	3.3	63.3	0.804	15.7	43.0	0	4024
	Flow no. 2	4.8	12/64	411.4	125.6	120.8	8.3	33.7	"	18.1	"	"	1861
	Final shut in	8.9		469.0									
DST no 2 3561-3584 m	Initial shut in			474.5									
	Flow no. 1	7.8	22/64	461.6	125.6	298.4	53.9	363.6	0.761	232.1	46.1	0	1321
	Flow no. 2	6.9	32.5/64	451.2	126.2	247.1	73.9	499.8	0.775	377.9	46.0	"	1322
	Flow no. 3	6.5	48/64	445.2	126.7	192.3	73.3	622.9	0.778	474.0	43.4	"	1320
	Flow no. 4	1.0	-	449.4	126.7	-	-	± 500	-	-	-	-	-
	Final shut in	15.2		472.7	122.8								

NOTE: FLOWS IN DST 1 NOT STABILIZED

1 Nm³ = 37.326 SCF
1 Nm³/STm³ = 5.934 SCF/STB

Checked: S.I. Leivestad
Date: 26.9.78