DRESSER NORWAY A.S.
MAGCOBAR

Statoil, 7121/4-1

MATERIAL COMSUMPTION BY INTERVAL

Interval 36" Hole for 30 Csg.
Seabed - 422 m

PRODUCT	UNIT SIZE	UNIT COST	COST
Bentonite	16 m/tons	$ 405.56	$ 6488.96
Soda Ash	3 sxs (50 kg)	22.81	68.43
			$ 6557.39

Meters drilled : 65 m
Average cost/m : $ 100.88
Mud built : 215 m^3
Average cost/m^3 : $ 30.50

DRESSER NORWAY A.S.
MAGCOBAR

Statoil, 7121/4-1

MATERIALS CONSUMPTION BY INTERVAL

Interval 26" Hole for 20" Csg.
422 m - 817 m

PRODUCT	UNIT SIZE	UNITS	UNIT COST	TOTALS
Barite	m/ton	83	$ 148.90	$ 12358.70
Bentonite	m/ton	42	405.56	17033.52
Caustic Soda	25 kg/sxs	23	22.05	507.15
Bi-Carb	25 kg/sxs	12	26.10	313.20
Soda Ash	50 kg/sxs	2	22.81	45.62
Interval Total				$ 30258.19

Meters drilled : 395 m
Average Cost/m : $ 76.60
Mud utilized : 1173 m^3
Average Cost/m^3 : $ 25.79

DRESSER NORWAY A.S.
MAGCOBAR

Statoil, 7121/4-1

MATERIALS CONSUMPTION BY INTERVAL

Depth: 815 - 1355 m
17 ½" hole for 13 3/8" Casing

PRODUCT	UNITS/UNIT SIZE	UNIT COST	COST(USD)
Barite	128 M/T	$ 148.90	$ 19059.20
Bentonite	7 M/T	405.56	2838.92
Caustic	10 25 kg	22.05	220.50
Gypsum	453 40 kg	10.90	4937.70
Celpol Reg	226 25 kg	198.50	44861.00
Celpol SL	20 25 kg	208.00	4160.00
XCD-Polymer	11 50 lbs	397.20	4369.20
Mica Fine	126 25 kg	21.60	2721.60
Mica Coarse	141 25 kg	21.60	3045.60
Nut Plug Fine	5 25 kg	20.00	100.00
Total			$ 86260.32

Meters drilled : 538 m
Average cost/m : $ 160.34
Mud built : 730 m^3
Average cost/m^3 : $ 118.16

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MAGCOBAR

Statoil, 7121/4-1

MATERIALS CONSUMPTION BY INTERVAL

Interval 12 1/4" hole for 9 5/8" csg 1355 m - 2285 m

PRODUCT	UNIT SIZE	UNITS	UNIT COST		TOTALS
Magcobar	m/t	269	$ 148.90	$	40054.10
Magcogel	50 kg/sx	39	19.57		763.23
Caustic	25 kg/sx	61	22.05		1345.05
Gypsum	40 kg/sx	199	10.90		2169.10
Celpol Reg.	25 kg/sx	130	198.50		25805.00
Celpol S/Lo	25 kg/sx	68	208.00		14144.00
XCD Polymer	50 lb/sx	23	397.20		9135.60
Spersene	50 lbUsx	80	21.90		1752.00
			Interval Total	$	95168.08

Meters drilled : 930
Avgr. cost/m : $ 102.33
Mud Buit : 534 m^3
Avgr. cost/m^3 : $ 178.22

DRESSER NORWAY A.S.
MAGCOBAR

Statoil, 7121/4-1

MATERIALS CONSUMPTION BY INTERVAL

Interval 8½" hole for 7" liner 2285 to 2587 m

PRODUCT	UNIT SIZE	UNITS	UNIT COST	TOTALS
Barite	M/T	158	$ 148.90	$ 23526.20
Bentonite	M/T	22	405.56	9822.32
Celpol Reg.	25 kg	34	198.50	6749.00
Celpol SL	25 kg	6	208.00	1248.00
XCD-Polymer	50 lbs	17	397.20	6752.40
Spersene	25 kg	94	21.90	2058.60
XP-20	25 kg	106	33.76	3578.56
Caustic	25 kg	27	22.05	595.35
Sapp	50 kg	4	84.64	338.56
Micaf	25 kg	50	21.40	1070.00
Micac	25 kg	65	21.40	1391.00
Nut Plug	25 kg	5	20.00	100.00
Interval Total				$ 56329.99

Meters drilled: 302 m
Average cost/meter: us$ 186.55
Mud built : 263 m^3
Average cost/m^3 : us$ 214.18

DRESSER NORWAY A.S.
MAGCOBAR

Statoil, 7121/4-1

MATERIALS CONSUMPTION BY INTERVAL

Interval; Testing, Plug and Abandonment

PRODUCT	UNIT SIZE	UNITS	UNIT COST	TOTALS
Magcobar	m/ton	9	$ 148.90	$ 1340.10
Spersene	25 kg/sxs	34	21.90	744.60
Celpol Reg.	25 kg/sxs	11	198.50	2183.50
XCD Polymer	50 lb/sxs	12	397.20	4766.60
Sapp	40 kg/sxs	18	84.64	1523.52
Interval Total				$ 10558.12

DRESSER

DAILY MATERIALS CONSUMPTION

WELL 7121/4-1

DATE	DEPTH	BARITE	BENTONITE	CAUSTIC	SODA ASH	BL-CARB.	GYPSUM	CELPOL REG.	CELPOL S/LO.	MICA FINE	MICA COARSLE	NUTPLUG FINE	XCD-POLYMER	SPERSENE	DAILY MUD COST U.S.$	REMARKS
6.8	405		16		3										6557.39	Make spud mud
7.8	422		8	3	1										3333.44	Make gel slurry for 26" hole
8.8	438														0	Dump cement contaminated mud
9.8	817	13			1										1958.51	Add prehydrated gel to maintain Y.P.
10.8	815		11	2		2									4557.46	Built gel for volume and dilution
11.8	815	3	15	5		4									6298.05	" " " " " "
12.8	815	14		6		1									2619.70	" " " " " "
13.8	815	53	8	7		5									11351.03	WT up to 1.15 built gel for disp.
14.8	815	10	4	1			86	57							15324.39	Built Gyp Polymer mud at 1.10 SG
15.8	897	54					32	22							12756.40	Built Premix
16.8	1086	28					144	47	8						16731.80	Drill. Buld mud
17.8	1120	23	1				67	36	9	40	57		2		16448.76	Lost Circ. Regain Circ. Drilled
18.8	1226			3			39	24		24		5	3		7065.25	DRilled. Wiper tripped twice
19.8	1336			6			72	32	3	43	61				10139.50	Drilled. Added LCM
20.8	1355							8		19	23		3		3686.80	Drilled to CSG. Depth
21.8	1355	13	2				13						3		4223.12	Wiper trips. Circulation.
22.8	1355														0	Ran cmt.ed 13 3/8" Casing
23.8	1355	10	23 sxs												1939.11	Test BOPs. Drilled plugs, cmt
24.8	1463	15	16 "				40	23							7548.12	L.O. test. Drilled ahead
25.8	1582	44					22	17	6						11413.90	Drilled Raised mud weight
26.8	1711	13		2			11	15	10						7157.20	Drilled.
27.8	1805	7		3			42	5	7						4014.75	DRilled. Bit tripped. Drilled
28.8	1877	27		2			50	14	2				1		8201.60	Drilled
29.8	1899	14		6			10		7				6	20	6603.10	Drilled. Bit tripped. Reamed.
30.8	2013	6		7			17	14					7	14	7099.05	Drilled.
31.8	2081			3			7	2	13				5	6	5361.05	Increase M.W. to 1.30
1.9	2107	17		4				8							4207.50	Add Celpol to maintain YP.
2.9	2170	20		3					7					7	4653.45	Ran centrifuge
3.9	2225	10		3				2	7					12	3670.95	Lower Gels with Spersene
4.9	2255	10		11				12	5					4	5241.15	Add Caustic to raise pH
5.9	2285	64		5				4					1	17	11203.35	Raise MW to 1.48

DRESSER

DAILY MATERIALS CONSUMPTION

WELL 7121/4-1 PAGE 2

DATE	DEPTH	BARITE	BENTONITE	CAUSTIC	SPERSENE	XP-20	SAPP	CELPOL REG.	CELPOL S/SL	XCD POLY-MER	MICA F	MICA C	NUT PLUG F		DAILY MUD COST	REMARKS
06.09	2285	12		6				14	4	1					5927.30	Lower M.W to 1.39. Raise M.W to 1.40
07.9	2285															Logging
08.9	2285			6						2					926.70	Raise pH. Build Hi-Vis pill
09.9	2285	5						3							1340.70	WT YP surface mud
10.9	2288	29						4		2					5906.50	WT YP mud, Celpol to maint. P/L
11.9	2321	27	3	1	9		4	6		6					9368.89	Drilled out cmt. Dump mud. Build new mud
12.9	2340	6				18		6		3					3883.68	Lower F/loss
13.9	2366	10			10	12				2					2907.52	Maintain rheology and fluid loss
14.9	2366	25	1	1	6					2	30	55	5		6994.41	LCM pills, build new mud. Cut mud WT.
15.9	2394	6	2		10	20			6	2					4641.12	General maintainment
16.9	2416		3	9	30	18		8							4267.81	Lower f/loss. Raise rheology.
17.9	2452	9	2	4	12						20	10			3144.22	Lost Cric. Treat rheology/f.loss
18.9	2517	8	6	3		10									4028.31	General maintaince
19.9	2566	3		3	6			4							1438.25	Generalmaintaince
20.9	2587	6		3	6	16									1631.11	Treat rheology and f/loss.
21.9	2587		NO USAGE												nil	
22.9	2587	10		2	5	12		3							2643.22	Treat/WT-up Reserve mud
23.9	2587	3													446.70	Logging
24.9	2587	11	5	1											3687.75	Cmt. Liner. Made up Gel slurry
25.9	2587		NO USAGE												nil	Picked up tubing
26.9	2530				34		8								1421.72	Drill cmt. top liner
27.9	2530		NO USAGE												nil	RIH 6" bit/csg scraper
28.9	2530							5							992.50	Run test string
29.9	2530		NO USAGE												nil	Testing
30.9	2530							3							595.50	Test / bullhead
1.10	2492							2							397.00	Pulled out test string
2.10	2492	3						1							645.20	Squeezed cement
3.10	2492									5					1986.00	Clean liner. Run test string
4.10	2492		NO USAGE												NIL	Testing
5.10	2492														NIL	Testing bullhead
6.10	2492														NIL	Circ. POH test string

DRESSER

DAILY MATERIALS CONSUMPTION

WELL 7121/4-1 PAGE 3

DATE	DEPTH	BARITE	SAPP	XCD POLYMER											DAILY MUD COST	REMARKS
7.10	2462														NIL	Squeeze circ.
8.10	2462		4												338.56	Srt bridge plus ran test string
9.10	2462														NIL	Testing
10.10	2462														NIL	Testing
11.10	2462														NIL	Bullheaded circ.
12.10	2462			4											1588.80	Circ. condition mud
13.10	2462		6												507.84	Squezzed dressed off cmt.
14.10	2410														NIL	Ran first string. Pulled out
15.10	2410														NIL	Repaired BHA. Tested BOPs.
16.10	2410	3													446.70	Testing
17.10	2410														NIL	Testing
18.10	2410	3													1638.00	Completed testing. Rig down.

DRESSER

DAILY MUD PROPERTIES

Well : 7121/4-1

PAGE 1

DATE	DEPTH	WT.	VIS	CORR. 115°F		GELS		pH	FLUID LOSS		CL ☒ CACL ☐ NACL ☐	ALKALINITY			CA	RETORT			V.G. METER READING @ 115°						Bbl	EXCESS	TOTAL
								BECK ☒ STRIP ☐	100 PSI API	500 PSI 300 °F HT-HP						% OIL	% SOL	% WATER	600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.		GYP	MUD COST
			SEC.	PV	YP	0	10					PF	PM	MF	ppm										CEC		
6.8	405	1.07	100+	-	-	-	-	-	-				SPUD	MUD													6557.39
7.8	422	1.05	41	9	12	7	12	-	-																		9890.83
8.8	428	1.04	40	6	22	7	17	-	-			GEL	SLURRY	FOR	26"	HOLE											9890.83
9.8	517	1.05	34	4	19	12	12	8.5	NC		9500	.1	.5	.2	560				27	23							11849.43
10.8	545	1.07	34	7	21	8	11	9.3	NC		11500	.2	.7	.4	660				28	28							16406.80
11.8	752	1.07	35	4	21	9	12	9.0	NC		17000	.1	.2	.2	1800				29	25							22704.85
12.8	815	1.15	38	3	17	9	9	9.5	NC		16000	.05	.2	.2	1700				23	20							25324.85
13.8	815	1.15	40	5	15	10	15	9.1	NC		1000	.1	.4	.2	160				25	20							34675.58
14.8	815	1.15	40	5	15	10	14	9.0	NC		1000	TR	.3	.1	160				25	20							51999.47
15.8	897	1.10	55	14	15	2	2	10.2	6.5		1000	TR	.1	.2	1880		3	97	42	28	21	12	2	2	2		64756.37
16.8	1086	1.12	70	17	20	2	4	9.3	4.6		2000	TR	.1	.15	2280		4	96	54	37	29	18	2	1	5	4.1	81488.17
17.8	1120	1.13	73	19	21	2	4	9.2	4.3		2600	TR	.15	.1	2000		4	96	59	40	32	20	3	2	6	3.6	97936.93
18.8	1226	1.13	75	19	19	2	4	9.8	3.9		200	TR	.1	.2	2000		5	95	57	38	30	19	3	2	6	3.9	105002.18
19.8	1336	1.13	76	18	17	2	4	9.6	4.3		1800	TR	.1	.1	2200		6	94	53	35	27	17	2	1	11	4.0	115141.6
20.8	1355	1.13	69	18	17	2	4	9.7	4.0		1800	TR	.1	.1	2080		6	94	53	35	26	17	2	1	12	3.6	118828.48
21.8	1355	1.13	72	19	17	2	5	9.2	4.1		1900	TR	.1	.1	2080		6	94	55	36	29	19	2	1	13	3.7	123051.60
22.8	1355	1.13	73	18	17	2	4	9.0	4.2		1900	TR	.1	.1	2200		6	94	53	35	26	16	2	1	13	3.4	123051.61
23.8	1355	1.20	67	18	19	2	4	9.0	4.0		1800	TR	.1	.15	2200		9	91	55	37	29	19	3	2	13	3.6	124990.72
24.8	1463	1.20	56	17	15	2	5	9.5	4.4		2500	TR	.1	.1	1680		9	91	49	32	23	14	2	1	13	3.4	132538.84
25.8	1582	1.27	58	20	15	2	9	9.0	4.5		2800	TR	.1	.1	1600		11	89	55	35	29	18	3	2	13	3.2	143952.74
26.8	1711	1.27	60	19	17	2	12	9.5	4.5		2900	TR	.1	.1	1640		11	89	55	36	28	18	3	2	13	3.1	151109.94
27.8	1805	1.27	53	19	17	2	14	9.2	4.6		2900	TR	TR	.1	640		11	89	55	36	28	18	3'	2	14	3.1	155124.69
28.8	1877	1.27	55	16	16	2	29	9.2	4.0		2900	TR	.15	.1	950		10	90	48	32	26	18	3	2	17	4.1	163326.29
29.8	1899	1.27+	55	15	13	3	21	9.8	4.7		2000	+1	.15	.15	1720		11	89	43	28	21	13	3	2	18	3.2	169929.34
30.8	2013	1.27	57	16	17	3	28	9.3	5.3		3000	.10	.15	.15	1740		11	89	49	33	26	18	4	3	18	4.15	177028.44
31.8	2081	1.30	61	16	17	4	30	9.2	5.1		3100	.1	.15	.1	1760		12	88	49	33	15	18	4	3	18	3.9	182389.49
1.9	2107	1.30	50	16	17	4	34	9.5	6.7		3000	.1	.15	.3	1600		11	89	49	33	26	17	3	2	19	4.1	186596.99
2.9	2170	1.34	61	17	18	5	39	9.1	6.4		3000	.1	.1	.5	1680		11	89	52	35	26	18	4	3	20	4.15	191250.44

DATE SPUD: DATE T.D.: COST:

DRESSER

DAILY MUD PROPERTIES

Well: 7121/4-1

PAGE 2

DATE	DEPTH	WT.	VIS	CORR. 115°F		GELS		pH	FLUID LOSS		CL ☒ CACL ☐ NACL ☐	ALKALINITY			RETORT			V.G. METER READING @ 115°						Bbl	EXCESS GYP	TOTAL MUD COST
								BECK ☒ STRIP ☐	100 PSI API	500 PSI 300 °F HT-HP					% OIL	% SOL	% WATER	600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.			
			SEC.	PV	YP	0	10				ppm	PF	PM	MF										CEC		
3.9	2225	1.34	51	15	15	3	34	9.2	5.9		3100	.1	.3	.7	1600	0	12	88	45	30	24	15	3	2	20	4.0	194921.39
4.9	2285	1.39	49	15	15	3	30	10.0	6.8		3100	.1	.4	.8	1480	0	15	85	45	30	23	15	4	3	20	3.6	200162.88
5.9	2285	1.39	47	15	15	3	24	9.6	5.6		3200	TR	.3	.8	1400	0	14	86	45	30	24	15	3	2	18	3.0	211365.88
6.9	2285	1.40	51	17	16	3	24	9.5	5.6		3500	.1	.3	.8	1120	0	15	85	50	33	25	16	3	2	18	2.6	217243.15
7.9	2285	1.39	54	16	17	3	20	9.2	5.2		3800	.2	.2	.8	1200	0	15	85	49	33	24	15	2	2	18	2.8	217243.15
8.9	2285	1.40	51	17	14	3	17	10.5	6.0		4000	.1	.8	.8	1000	0	14	86	48	31	22	14	2	2	17	2.6	218219.85
9.9	2285	1.45	53	20	15	3	25	10.0	4.6		4000	TR	.35	.5	1000	0	16	84	55	35	28	17	3	2	15	2.3	219554.85
10.9	2288	1.45	52	18	18	3	20	11.0	4.4		4000	.1	1.2	.9	1200	0	15	85	54	36	28	17	3	2	14	2.4	225657.35
11.9	2321	1.45	54	20	19	4	32	11.5	4.6	19.6	4800	.3	3.8	1.0	960	0	16	84	59	39	31	21	4	3	15		235026.24
12.9	2340	1.45	58	21	20	4	30	11.5	4.4	20.4	5000	.2	3.3	1.0	840	0	16	84	62	41	33	22	5	4	17.5		238909.92
13.9	2366	1.45	61	19	18	3	24	11.2	4.2	20.6	5000	.2	2.8	1.0	840	0	16	84	56	37	29	19	4	3	18		241817.44
14.9	2366	1.38	61	18	16	5	27	10.7	7.0	28.4	5000	.1	1.4	.8	1200	0	14	86	46	31	23	15	4	3	16		218812.35
15.9	2394	1.38	51	15	14	3	22	10.3	5.2	26.0	5500	.1	.8	.8	1200	0	14	86	44	29	21	14	3	2	17		253453.47
16.9	2416	1.38	61	25	16	4	22	10.0	4.5	19.5	5500	.1	.8	.9	1000	0	14	86	66	41	31	20	4	3	20		257721.28
17.9	2452	1.38	54	22	14	2	11	10.6	3.6	18.0	6800	.1	.8	1.0	400	0	14	86	58	36	27	16	4	3	20		260865.80
18.9	2517	1.38	52	18	14	3	14	10.6	4.1	18.4	7000	.2	1.0	1.0	800	0	14.5	86.5	50	32	22	14	3	2	20		264893.81
19.9	2566	1.38	54	20	14	2	14	10.5	4.0	16.6	7400	.1	.7	.9	920	0	14	86	54	34	26	16	3	2	19		266332.06
20.9	2587	1.38	53	19	14	3	13	10.4	4.2	18.2	7400	.15	.8	1.0	800	0	14	86	52	33	25	16	3	2	20		267963.17
21.9	2587	1.38	55	19	13	3	12	10.2	4.4	18	7000	.15	.7	.9	800	0	14	86	51	32	24	16	3	2	20		267963.17
22.9	2587	1.38	65	19	12	2	14	10.7	4.5	20	7000	.2	.9	1.0	760	0	14	86	50	31	23	14	3	2	20		270606.39
23.9	2587	1.38	51	19	12	2	13	10.5	4.3	19	7000	.15	.8	.9	800	0	14	86	50	31	23	14	3	2	19		271053.09
24.9	2587	1.38	60	19	12	2	12	10.2	4.7	19	7000	.1	.8	.9	720	0	14	86	50	31	22	13	3	2	19		274740.84
25.9	2587	1.38	47	17	11	2	10	10.3	4.8	21	7500	.15	.8	.9	780	0	14	86	45	28	19	12	2	1	19		274740.84
26.9	2530	1.30	56	15	13	3	28	12+	7.0		6500	.4	5.0	1.0	560	0	12	88	43	28	21	14	4	3	21		276162.56
27.9	2530	1.30	60	16	14	3	29	12+	6.8		6500	.4	4.8	.9	520	0	12	88	46	30	22	14	4	3	21		276162.56
28.9	2530	1.30	55	15	13	3	24	12+	7.2		6500	.4	4.8	1.0	560	0	12	88	43	28	20	13	3	2	20		277155.06
29.9	2530	1.30	53	16	12	3	21	12+	7.2		6500	.4	4.8	.9	520	0	12	88	44	28	19	12	2	1	20		277155.06
30.9	2530	1.30+	53	15	12	2	20	12+	6.6		6500	.5	3.6	.9	580	0	12	88	42	27	20	13	2	1	20		27,7750.56

DATE SPUD: DATE T.D.: COST:

DRESSER

DAILY MUD PROPERTIES

Well : 7121/4-1

PAGE 3

DATE	DEPTH	WT.	VIS SEC.	CORR. 115°F PV	CORR. 115°F YP	GELS 0	GELS 10	pH BECK ☐ STRIP ☐	FLUID LOSS 100 PSI API	FLUID LOSS 500 PSI 300 °F HT-HP	CL ☒ CACL ☐ NACL ☐	ALKALINITY PF	ALKALINITY PM	ALKALINITY MF	CA ppm	RETORT % OIL	RETORT % SOL	RETORT % WATER	V.G. METER READING @ 115° 600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.	Bbl CEC		TOTAL MUD COST
1.10	2492	1.30+	55	16	12	2	16	12+	7.6		6500	.45	3.5	.8	560		12	88	44	28	19	12	2	1	19		278147.56
2.10	2492	1.31	51	16	10	2	16	12+	7.5		6500	.4	3.5	1.0	520		12	88	42	26	19	12	2	1	18		278792.76
3.10	2492	1.31	54	17	16	3	28	12+	7.4		6300	.5	3.8	1.2	600		12+	87+	50	33	25	16	4	3	18		280778.76
4.10	2492	1.30+	54	16	15	3	31	12.0	7.2		6500	.5	3.8	1.3	580		12	88	47	31	24	15	4	3	18		280778.76
5.10	2492	1.30+	54	16	15	3	31	12	7.2		6500	.5	3.8	1.3	600		12	88	47	31	24	15	4	3	17.5		280778.76
6.10	2492	1.30	53	15	15	2	26	11.8	6.8		6500	.4	3.6	1.3	600		11.5	88.5	45	30	23	14	3	2	17		280778.76
7.10	2492	1.30	51	15	15	2	25	12.0	6.8		6500	.5	3.8	1.4	640		11.5	88.5	45	30	23	14	3	2	17		280611.89
8.10	2462	1.30+	51	15	14	2	22	11.7	6.8		6500	.35	2.7	1.5	560		11.5	88.5	44	29	22	14	3	2	17		280950.45
9.10	2462	1.30	51	15	14	2	22	11.7	6.8		6500	.35	2.7	1.5	560		11.5	88.5	44	29	22	14	3	2	17		280950.45
10.10	2462	1.30	51	15	14	2	22	11.7	6.8		6500	.35	2.7	1.5	560		11.5	88.5	44	29	22	14	3	2	17		280950.45
11.10	2462	1.31	51	15	14	4	28	11.8	6.6		6500	.3	2.9	1.7	640		12	88	44	29	23	15	3	2	17		280950.45
12.10	2462	1.30	54	16	15	3	26	11.6	7.0		6500	.3	2.8	1.3	640		11	89	47	31	25	17	4	3	16		282539.25
13.10	2410	1.30	54	16	15	3	22	11.6	7.0		6500	.3	2.7	1.4	580		11	89	47	31	25	17	4	3	16		283047.09
14.10	2410	1.30	54	16	15	3	22	11.6	7.0		6500	.3	2.7	1.4	580		11	89	47	31	25	17	4	3	16		283047.09
15.10	2410	1.30	54	16	15	3	22	11.6	7.0		6500	.3	2.7	1.4	580		11	89	47	31	25	17	4	3	16		283047.09
16.10	2410	1.30	54	16	15	3	22	11.6	7.0		6500	.3	2.7	1.4	580		11	89	47	31	25	17	4	3	16		283493.79
17.10	2410	1.30	54	16	15	3	22	11.6	7.0		6500	.3	2.7	1.4	580		11	89	47	31	25	17	4	3	16		283493.79
18.10	2410	1.30	52	14	14	3	23	12.0	8.2		6500	.3	4.2	1.7	640		11	89	42	28	21	14	3	2	15		285132.09
19.10	2410	1.30	50	15	13	2	35	12+	9.8		6500	.6	5.8	1.7	580		11	89	43	28	21	14	3	2	16		"
20.10	1964	1.30	50	15	12	2	32	12+	10.2		6500	.6	5.6	1.8	560		11	89	42	27	20	14	3	2	15		"
21.10	1115	1.30	47	15	11	2	30	12+	10.5		6500	.6	6.0	1.6	560		11	89	41	26	19	14	3	2	15		"
22.10	712	1.31	46	15	10	2	25	12+																			"
23.10	601	1.30	45	15	10	2	24	12+																			"
24.10	-	1.20	40																								"

DATE SPUD: DATE T.D.: COST:

5.2 REPEAT FORMATION TESTER

Pretest records:

Test no.	Depth mRKB	Temp. deg C	Formation pressure kPa	, gm/cc	Permeability	Comments
1	2321.5	63.9	26522	1.16	Seal failure	Not used
2	2322	63.9	26494	1.16	Poor/fair	Not used
3	2356.5	65	26591	1.15	Very good	Used
4	2327.2	65	26529	1.16	Very good	Used
5	2332.5	65	26529	1.16	Tight/poor	Not used
6	2333	65	26536	1.16	Poor	Used
7	2341	67.2	26570	1.16	Poor	Used
8	2364	67.4	26591	1.15	Excellent	Used
9	2337	65	26543	1.16	Poor	Used
10	2369	67.7	26612	1.15	Excellent	Used
11	2377	67.8	26619	1.14	Excellent	Used
12	2383	67.8	26639	1.14	Excellent	Used
13	2388	67.8	26646	1.14	Very good	Used
14	2405	69.2	26694	1.13	Fair/good	Used
15	2412	69.2	26715	1.13	Very good	Used
16	2421	70.8	-	-	Tight	-
17	2421.7	70.8	-	-	Tight	-
18	2429.5	71.7	26791	1.12	Good	Used
19	2434.5	71.7	26798	1.12	Excellent	Used
20	2440.5	71.7	26832	1.12	Excellent	Used
21	2452	73.1	-	-	Tight	-
22	2402.3	71.3	26667	1.13	Good	Used
23	2402.3	71.3	26667	1.13	Good	Used
24	2416.6	71.7	-	-	Tight	-
25	2420.6	71.7	26715	1.13	Good	Used
26	2425	71.7	-	-	Tight	-
27	2426.2	71.7	26729	1.12	Good	Used
28	2465.5	73.8	-	-	Tight	-
29	2470	73.8	27170	1.12	Excellent	Used
30	2472	73.8	27163	1.12	Excellent	Used
31	2478	74.9	27218	1.12	Excellent	Used
32	2485	74.9	27281	1.12	Excellent	Used
33	2502	75.9	27487	1.12	Excellent	Used
34	2518	77.3	27674	1.12	Very good	Used
35	2527.5	78.2	27777	1.12	Very good	Used
36	2559	79.9	28094	1.12	Excellent	Used

SAMPLING

Sample no. 1:

Segregated sample taken at 2356.5 m RKB. The 2 3/4 gallon chamber was bled off at wellsite:

Opening pressure: 16821 kPa
Gas : 1.95 m^3
Condensate : 0.20 E-3 m^3 (black)
Mudfiltrate : 1.25 E-3 m^3

The 1 gallon chamber was sent onshore for analysis:

Opening pressure: 18028 kPa at 15.6 C
Gas : 0.33 m^3
Condensate : 0.002 E-3 m^3 (brown)
Mudfiltrate : 0.11 E-3 m^3

Component	Mol%
CO_2	4.79
N_2	2.43
Methane	81.95
Ethane	4.91
Propane	2.35
i-butane	0.42
n-butane	0.86
i-pentane	0.35
n-pentane	0.34
Hexanes	0.22
Heptanes	0.47
Octanes	0.52
Nonanes	0.19
Decanes+	0.20
Total	100.00

Expansion factor E: 235.5 sm^3/m^3

Calculated gas gravity: 0.741

Sample no. 2:

Segregated sample taken at 2470 m RKB. The tool got stuck after retracting. After a successful fishing operation, the 2 3/4 gallon chamber was bled off at wellsite:

Opening pressure: 15752 kPa
Gas : 1.67 m^3
Condensate : 0.35 E-3 m^3 (brown)
Mudfiltrate : some

The 1 gallon chamber was sent onshore for analysis:

Opening pressure: 17099 kPa at 15.6^0 C
Gas : 0.76 m^3
Condensate : 0.08 E-3 m^3 (brown, 54.3 API)
Mudfiltrate: : 0.07 E-3 m^3

Component	Mol%
CO_2	4.97
N_2	2.74
Methane	82.14
Ethane	5.07
Propane	2.51
i-butane	0.41
n-butane	0.84
i-pentane	0.28
n-pentane	0.29
Hexanes	0.51
Heptanes+	0.24
Total	100.00

Expansion factor E: 233 sm^3/m^3

Calculated gas gravity: 0.711

Sample no. 3:

Segregated sample taken at 2412.0 m RKB. The 2 3/4 gallon chamber was bled off at wellsite:

Opening pressure: 13201 kPa
Gas : 0.78 m^3
Condensate : 0.10 E-3 m^3 (brown)
Mudfiltrate : 6.00 E-3 m^3

The 1 gallon chamber was sent onshore for analysis:

Opening pressure: 8651 kPa at 15.6° C
Gas : 0.004 m^3 at 34575 kPa
Mudfiltrate : 100%

The chamber was found to contain almost all mudfiltrate/water. It was therefore impossible to collect a gas sample for analysis.

5.3 Testing

DST NO. 1, WATER TEST

Objectives: Formation water samples for analysis
Determination of permeability
Pressure and temperature measurements

Perforation interval: 2497.6 - 2504.2 m

The test was performed by using of the following test string:

- 3.5" tubing in a 7" liner
- Downhole tester valve
- 4 pressure gauges in gauge carriers
- Tubing conveyed perforation, 12 shots/foot

TEST PERFORMANCE

The well was perforated underbalanced using diesel as cushion and flowed for 7.23 hours followed by a shut-in period of 12.1 hours.

The test operation was performed without any problems except from two pressure gauges; one failed and the other recorded erratic pressure and temperature.

During the flow period CO_2 and H_2S content was measured in the dissolved gas. However, the small flowrate was impossible to measure. Also density and BS&W was measured in addition to samples taken for trace element analysis.

TEST RESULTS

Testphase	Duration min.	WHP kPa	WHT C	BHP kPa	BHT C	Water Flow rate m^3/d	Choke mm
Flow	562	237	58.2	26700	89.2	346	25.4 +1.75
Build-up	725	1265	59	27028	85.6	-	-

Formation water measurements:

Density : 1.103 g/cc
Salinity : 99000 ppm Cl
pH : 5.7
Resistivity: 0.0673 Qm at 21° C

17 ppm H_2S and more than 20% CO_2 was measured in gas dissolved in formation water.

DST NO. 2, GAS TEST

Objectives: Formation samples for analysis
Determination of permeability
Pressure and temperature measurements

Perforation interval: 2465.93 - 2471.93 m RKB

The test was performed by using of the following test string:

- 3.5" tubing in a 7" liner
- Downhole tester valve
- 4 pressure gauges in gauge carriers
- Tubing conveyed perforation, 12 shots/foot

TEST PERFORMANCE

The well was perforated underbalanced using drill water as cushion. The following flow and shut-in periods were performed.

Flow period : 762 minutes
Build-up period: 1205 minutes

Two out of four gauges performed well. The well was perforated just 1 meter above the gas-water contact.

This caused a very high water production starting at about 7% with an increase to more than 99% water of the total fluids produced (water-coning) before the well was shut in.

TEST RESULTS

Test phase	Duration min.	WHP kPa	WHT °C	BHP kPa	BHT °C	Cond. Flow rate m^3/d	Gas Rate $sm^3/D \times 10^3$	Water rate m^3/d	BS&W %	Choke mm
Flow	47	20212	23.1	26881	84.0	-	424.8*	0	7	11.1
Flow	105	9132	37.1	26018	88.0	-	821.2*	0	46	25.4
Flow	350	10387	48.3	25477	88.8	34.8	391.4	309.4	93	19.0
Flow	260	12186	48.7	25879	89.2	0	136.5	304.4	99	12.7
Shut	1205	12345	12.2	27031	84.4	-	-	-	-	-

* = estimated

Gas oil ratio: 11203 Sm^3/m^3 (while producing 309.4 m^3/d water)

From Horner analysis of the main build-up:

DST NO. 3, OIL TEST

Objectives:

Receive good reservoir fluid samples for analysis
Determine productivity of the perforated zone
Pressure and temperature measurements

Perforation interval: 2419.85 - 2434.85 m RKB

The test was performed by using of the following test string:

- 3.5" tubing in a 7" liner
- Downhole tester valve
- 4 pressure gauges in gauge carriers
- Tubing conveyed perforation, 12 shots/foot

TEST PERFORMANCE

The well was perforated underbalanced using drill water as cushion and flowed for 15.78 hours (947 min.) followed by a shut-in period of 31.75 hours (1905 min).

The test operation (not including bottom hole sampling) was performed without any significant problems.

Good pressure data were obtained from three pressure gauges, the fourth pressure gauge reset to 17 hours delay causing no valuable data in gauge memory.

There were taken three sets of PVT-samples during the flow period, in addition to that four 50 l. drums, four 20 l. jerry cans, two 2 l. and two 1 l. cans of oil were obtained.

During the flow CO_2, H_2S, BS&W, oil and gas gravity were measured in addition to trace element analysis.

BOTTOM HOLE SAMPLING

After the shut-in period the well was reopened to obtain mono phasic bottom hole fluid samples. This operation was abandoned due to hydrate formation down hole. During the flow there were problems with icing/hydrate formation in the choke manifold, the flow was then choked on the steam exchanger. After approximately another two hours flow there were indications of hydrate formation down hole. The well was then shut-in. The indications of hydrate formation was a rapidly decreasing pressure and temperature on the upstream side of the choke.

TEST RESULTS

	Duration min.	WHP kPa	WHT C	BHP kPa	BHT C	Oil rate m^3/D	gas rate sm^3/D	GOR sm^3/m^3	choke mm.
Flow	947	4760	7	9123	76	81.6	88.3	1083	12.7
Build up	1905	5400	2	26532	83.5				

CO_2 = 6%
H_2S = 0%
BS & W = 0%

DST NO. 4, GAS TEST

Objectives: Formation samples for analysis
Determination of permeability
Pressure and temperature measurements

During pressure testing of the test string a leakage was discovered in drillpipe tester valve. The string was pulled and re-ran with a new dp-tester valve. The test was then named DST no. 4A.

DST NO. 4A, GAS TEST

Perforation interval: 2353 - 2385 m

The test was performed by using of the following test string:

- 3.5" tubing in a 7" liner
- Downhole tester valve
- 4 pressure gauges in gauge carriers
- Tubing conveyed perforation, 12 shots/foot

TEST PERFORMANCE

The well was perforated underbalanced using drill water as cushion. The following flow and shut-in periods were performed:

Inital flow : 3.22 hrs
Initial build-up: 3.37 hrs
Main flow : 12.03 hrs
Main build-up : 25.42 hrs

Due to fact that four of the top perforation guns were not fired the perfoation interval was reduced with 13 m. In addition charges were fired upwards, downwards and even outside the scallop.

Three of four gauges performed well.

TEST RESULTS

Testphase	Duration min.	WHP kPa	WHT C^0	BHP kPa	BHT C^0	Cond. Flow rate m^3/d	Gas Rate $sm^3/D \times 10^3$	Choke mm
Init.flow	192	10900	21	26153	85.1	79.3	813.7	25.4
Init.B-U	202	1265	59	26416	82.2	-	-	-
Main flow	722	10200	23	26161	87.5	109	844.3	25.4
Main B-U	1525			26420	81.4	-	-	-

Gas oil ratio: Main flow 7744 Sm^3/m^3

U-428 /8

société nationale
elf aquitaine (production)

. EP/S/EXP/RAG-Lab.Bss n° 129/86 RP
/dd

Boussens, 22nd November 1986

71-21/4-1

TROMSØ AREA - NORWAY

-

ORGANIC GEOCHEMICAL STUDY

OF A LIGHT OIL SAMPLE (DST 2)

AND OF A GAS SAMPLE

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CONTENTS

1 - LIGHT OIL SAMPLE..... 1

2 - GAS SAMPLE..... 2

ENCLOSURES

FIGURES :

Fig. 1 - Location map

Fig. 2 - Oil and condensate composition

Fig. 3 - Oil : Chromatograms

Fig. 4 - Pristane/n-C17 vs Phytane/n-C18 diagram

Fig. 5 - Oil : Fragmentograms (m/z = 191.2 - 217.2 - 218.2)

Fig. 6 - TM/TS vs 27 diaS/29 $\alpha\alpha$R

Fig. 7 - 29 $\alpha\alpha$S/29 $\alpha\alpha$ R vs 29 $\beta\beta$ R/29 $\alpha\alpha$ R

Fig. 8 - Gas : δ13C (CH4) vs gas composition

Fig. 9 - Gas : δ13C (CH4) vs δ13C(C2H6)

Fig. 10 - Gas : δ13C (CH4) vs δD (CH4)

TABLES :

Tab. 1 - DST 2 oil : Gross composition, chromatographical data, and isotopical data

Tab. 2 - DST 2 oil : Mass spectrometry data

Tab. 3 - Gas composition and isotopical data

ABBREVIATIONS AND UNITS USED IN THE TABLES

G.O.R.	Gas oil ratio (m3/m3)
SPEC.GRAV.	Specific gravity (g/cm3)
DIST.	Distillate)
SAT.	Saturated HC)
ARO.	Aromatic HC) % of total product
RES.	Resins)
ASPH.	Asphaltenes)
S/A	Saturated HC/Aromatic HC ratio
X1	n-C6/MCP
MCP	Methylcyclopentane
X2	n-C7/DMCP
DMCP	Dimethylcyclopentane
Y1	n-C7/TOL
TOL	Toluene
Z1	n-C10/DMN
DMN	Dimethylnonane (isoprenoid)
Pr,Ph	Pristane,Phytane (isoprenoids)
A/B	(Pristane/n-C17)/(Phytane/n-C18)
MPI 1	Methylphenantrene Index 1 = 1.5(2MP+3MP)/(P+1MP+9MP)
MPI 2	Methylphenantrene Index 2 = 3(2MP)/(P+1MP+9MP)
MPR	Methylphenantrene ratio = (2MP+3MP)/(1MP+9MP)
d13C	Isotopical ratio of the total product (HT) or of the topping residue (RD)

TABLE 1 TROMSO AREA

OIL AND CONDENSATE COMPOSITIONS
AND CHROMATOGRAPHICAL DATA

WELL	71-20/8-1	71-21/4-1
TEST	DST 3	DST 2
DEPTH	2093-2110	
GOR (m3/m3)	17750	117-200
° API	52.3	51.1
Spec.Grav.	0.7698	0.775
Sulfur (ppm)	-	365
DISTILLATE	80.7	71.7
ASPHALTENES	0	0
RESINS	0.1	0.4
SATURATED HC	15.5	22.5
AROMATIC HC	3.7	5.5
S/A	4.13	4.12
X1=n-C6/MCP	1.77	1.67
X2=n-C7/DMCP	5.85	4.63
Y1=n-C7/TOL	0.62	-
Z1=n-C10/DMN	6.41	1.89
n-alk.% TV	29	27
n-alk.% SAT.	33	26
Pr/n-C17 = A	0.80	1.00
Ph/n-C18 = B	0.40	0.63
Pr/Ph	2.91	1.97
A/B	1.96	1.58
MPI 1	-	0.55
MPI 2	-	0.60
MPR	-	0.71
d13 C HT/PDB	-28.0	-29.35
d13 C RD/PDB	-28.65	-29.90

TABLE 2 71-21/4-1

MASS SPECTROMETRY DATA
(Comparison to 71-20/8-1)

WELL TEST	71-20/8-1 DST 3	71-21/4-1 DST 2
29H/30H	0.62	0.68
Tm/Ts	0.62	0.93
23-3/30H	0.98	0.39
24-4/30H	0.50	0.30
32S/(32S+32R)	0.63	0.64
Bisnor/29H	0.19	0.13
26-3/24-4	0.81	0.69
29aaS/29aaR	1.11	1.23
29bbR/29aaR	1.56	1.84
27diaS/29aaR	8.78	5.48
% 27	44	45
% 28	27	24
% 29	29	31

TABLE 3 - 71-21/4-1

GAS COMPOSITION AND ISOTOPICAL DATA
(Analysis carried out by I.E.T.)

WELL	71-21/4-1
RESERVOIR	Gas zone
GOR (m3/m3)	7700
NZ	-
CO2	10.2
C1	79.0
C2	6.1
C3	3.2
i-C4	0.5
n-C4	0.9
C5+	-
i-C4/n-C4	0.49
C1/SCn	81.0
C1/(C2+C3)	4.9
d13C CH4	-46.0
C2H6	-33.1
C3	-31.3
i-C4	-27.1
n-C4	-30.9
CO2	-10.9
d18O CO2	-12.2
dD CH4	-130.0