10. DRILLING FLUID SUMMERY

CASING INTERVAL

Well:	6507/3-1	**Operator:**	Statoil		
Casing:	30"	**From/to:**	392,0 m	453,0 m	
Bit:	36"	**From/to:**	392,0 m	456,0 m	

Quantity:	Material:	Units:	Unit Price:	Total Cost NOK:
9	Wyoming Bentonite	ton	2 000,00	18 000,00
1	Caustic Soda	25 kg	85,00	85,00
2	Soda Ash	25 kg	120,00	240,00
	VOLUME m3			48,00

Total Cost for Interval:	18 325,00
Cost per meter	286,33
Days: 2 Cost per m3:	381,77

CASING INTERVAL

Well:	6507/3-1	**Operator:**	Statoil		
Casing:	20"	**From/to:**	392,0 m	881,0 m	
Bit:	26"	**From/to:**	456,0 m	900,0 m	

Quantity:	Material:	Units:	Unit Price:	Total Cost NOK:
87	Barite	ton	700,00	60 900,00
387	CMC HV	25 kg	290,00	112 230,00
	VOLUME	m3		1 010,00
		Total Cost for Interval:		173 130,00
		Cost per meter		389,93
Days: 4		Cost per m3:		171,42

CASING INTERVAL

Well:	6507/3-1	**Operator:**	Statoil		
Casing:	13 3/8"	**From/to:**	392,0 m	1846,0 m	
Bit:	17 1/2"	**From/to:**	900,0 m	1860,0 m	

Quantity:	Material:	Units:	Unit Price:	Total Cost NOK:
199	Barite	ton	700,00	139 300,00
224	Propol SL	25 kg	506,00	113 344,00
84	Propol Reg	25 kg	506,00	42 504,00
148	Gypsum	40 kg	55,00	8 140,00
19	Caustic Soda	25 kg	85,00	1 615,00
14	Probio II	25 l	485,00	6 790,00
	VOLUME	m3		725,00
		Total Cost for Interval:		311 693,00
		Cost per meter		324,68
Days: 7		Cost per m3:		429,92

CASING INTERVAL

Well:	6507/3-1	**Operator:**	Statoil		
Casing:	9 5/8"	**From/to:**	392,0 m	3168,0 m	
Bit:	12 1/4"	**From/to:**	1860,0 m	3183,0 m	

Quantity:	Material:	Units:	Unit Price:	Total Cost NOK:
1146	Barite	ton	700,00	802 200,00
516	Propol SL	25 kg	506,00	261 096,00
255	Gypsum	40 kg	55,00	14 025,00
51	Caustic Soda	25 kg	85,00	4 335,00
24	Probio II	25 l	485,00	11 640,00
57	Sodium Bicarbonate	25 kg	80,00	4 560,00
33	Lime	25kg	43,75	1 443,75
40	Propol reg.	25 kg	506,00	20 240,00
46	Wyoming Bentonite	25 kg	76,00	3 496,00
	VOLUME	m3		1 163,00

Total Cost for Interval:	1 123 035,75
Cost per meter	848,86
Cost per m3:	965,64

Days: 19

CASING INTERVAL

Well:	6507/3-1	**Operator:**	Statoil	
Casing:	7" Liner	**From/to:**	392,0 m	3953,0 m
Bit:	8 1/2"	**From/to:**	3183,0 m	3974,0 m

Quantity:	Material:	Units:	Unit Price:	Total Cost NOK:
1136	Barite	ton	700,00	795 200,00
289	Lignite Caustic	25 kg	100,00	28 900,00
286	Prothin	25 kg	90,00	25 740,00
218	Caustic Soda	25 kg	85,00	18 530,00
633	Proseal	25 kg	415,00	262 695,00
213	Miltemp	50 lb	2 360,00	502 680,00
43	Bentonite Wyom.	ton	2 000,00	86 000,00
34	Prodefoam	25 l	768,00	26 112,00
5	Proplug F	25 kg	120,00	600,00
1	Soda Ash	25 kg	120,00	120,00
2	Gypsum	40 kg	55,00	110,00
230	Prothin C	25 kg	90,00	20 700,00
197	Imcospot	50 lb	580,00	114 260,00
8	Pipelax	200 l	8 250,00	66 000,00
237	Propol SL	25 kg	506,00	119 922,00
8	Propol reg	25 kg	506,00	4 048,00
34	Probio II	25 l	485,00	16 490,00
259	Kemseal	50 lb	2 400,00	621 600,00
129	Sodium Bicarbonate	25 kg	80,00	10 320,00
5	Lime	25 kg	43,75	218,75
6	Diaseal M	40 lb	448,64	2 691,84
17	Bentonite	25 kg	60,00	1 020,00
	VOLUME m3			1 646,00
		Total Cost for Interval:		2 723 957,59
		Cost per meter		3 443,69
Days: 52		Cost per m3:		1 654,90

CASING INTERVAL

Well:	6507/3-1	**Operator:**	Statoil		
Casing:		**From/to:**			
Bit:	6"	**From/to:**	3974,0 m	4757,0 m	

Quantity:	Material:	Units:	Unit Price:	Total Cost NOK:
268	Barite	ton	700,00	187 600,00
169	Propol SL	25 kg	506,00	85 514,00
171	Kemseal	50 lb	2 400,00	410 400,00
34	Caustic Soda	25 kg	85,00	2 890,00
147	Proseal	25 kg	415,00	61 005,00
158	Miltemp	50 lb	2 360,00	372 880,00
9	Bentonite Wyom.	ton	2 000,00	18 000,00
19	Prodefoam	25 l	768,00	14 592,00
46	Sodium Bicarbonate	25 kg	80,00	3 680,00
29	Probio II	25 l	485,00	14 065,00
	VOLUME	m3		536,00

Total Cost for Interval:	1 170 626,00
Cost per meter	1 495,05
Cost per m3:	2 184,00

Days: 34

CASING INTERVAL

Well: 6507/3-1 **Operator:** Statoil
Casing: **From/to:**
Bit: Testing **From/to:**

Quantity:	Material:	Units:	Unit Price:	Total Cost NOK:
375	Barite	ton	700,00	262 500,00
9	Propol reg	25 kg	506,00	4 554,00
5	Kemseal	50 lb	2 400,00	12 000,00
24	Prothin	25 kg	90,00	2 160,00
33	Bentonite	25 kg	76,00	2 508,00
22	Miltemp	50 lb	2 360,00	51 920,00
29	Bentonite Wyom.	ton	2 000,00	58 000,00
6	Prodefoam	25 l	768,00	4 608,00
95	Sodium Bicarbonate	25 kg	80,00	7 600,00
10	Probio II	25 l	485,00	4 850,00
16	Caustic Soda	25 kg	85,00	1 360,00
35	Nutplug C/F	25 kg	120,00	4 200,00
3	Zinc Carbonate	25 kg	425,00	1 275,00
	VOLUME m3			149,00

Total Cost for Interval:	417 535,00
Cost per meter	
Days: 47	Cost per m3: 2 802,25

MUD VOLUME SUMMARY

WELL: 6507/3-1 **OPERATOR:** Statoil
RIG: Ross Rig

Section:	36"	26"	17 1/2"	12 1/4"	8 1/2"	6"	Testing	
Hole from [m]	392	456	900	1860	3183	3974		
Hole to [m]	456	900	1860	3183	3974	4757		
Hole length [m]	64	444	960	1323	791	783		
Mud Type	Bentonite	CMC	Gyp/polymer	Gyp/polymer	Gel/Ligno.	Kemseal/Pac/Miltemp		
Vol buildt	48	1010	725	1163	1646	536	149	
Vol transfered from external	120	0	0	0	0	0	0	
Vol transfered to external	0	0	0	0	0	0	145	
Vol behind casing [m3]	0	0	23	107	0	0	276	Squeezed/left in hole
Vol dumped	134	970	251	798	1035	351	250	
Vol lost to formation	0	0	0	83	12	0	27	
Vol lost on solids equipment	0	0	157	249	305	121	103	
Vol transferred to next interval	34,0	74,0	368,0	294,0	588,0	652	0	
Vol cuttings drilled [cub. m]	42,0	152,0	149,0	101,0	29,0	14,3	0	

TOTALS			
mud buildt	5277,0	**total buildt**	**5277**
mud dumped	3789,0	**total dumped**	**4724**
mud lost to formation	122,0	**total left in hole**	**528**
mud lost on solids cont.	935,0		
mud behind csg	130,0		
mud left in hole	276,0		
total mud left in hole	406,0		
total vol cuttings drilled	487,3		

4.2 Repeat Formation Testing

A total of 3 RFT run were performed in the well. All RFT runs were done before the well was sidetracked.

A total of 42 pressure measurements were attempted during the RFT logging. 7 pressure points indicated good/very good permeability, 2 points demonstrated fair/low permeability and 2 points poor permeability. Seal failure/supercharge occurred in 8 attempts while 3 measurements showed a tight formation. In as many as 19 attempts the tool was not able to get any seal to the formation.

The only sampling obtained was in RFT run 3c in the Garn formation at 3610 m RKB. The 2 3/4 gallon chamber was emptied offshore, containing gas and some condensate. The 1 gallon chamber was sent onshore for laboratory analysis, but was lost during transfer in the laboratory.

Data from 2 3/4 gallon chamber:

Fill up time	: 18 minutes
Opening pressure	: 145 bar.
Recovery	: 2.05 m3 gas and 1.69 litres of condensate/ mudfiltrate.
Density mudfiltrate	: 1.00 g/cm3
Density condensate	: 0.79 g/cm3
Amount CO2	: 0.5 %
Amount H2S	: none

Approximately gas composition:

C1 :	84.7 %
C2 :	9.3 %
C3 :	4.3 %
IC4:	0.7 %
NC4:	1.0 %

Opening pressure 1 gallon chamber 145 bar.

Fill up time:	32 min
Recovery:	Lost in laboratory.

4.3.4 DST No. 2

Objectives:

- Confirm movable hydrocarbons.
- Receive good reservoir samples for analyses.
- Pressure and temperature measurements.
- Determine permeability and productivity of the perforated interval.

Perforation interval: 3690 - 3724 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 shot/foot

Test performance

The well was perforated underbalance using drillwater as cushion with a differential pressure of approximately 10000 kPa.

The well was perforated with the choke manifold open on a 25.4 mm choke to surge tank. There was little response of flow.

After 7 hours and 21 minutes the well was shut-in. The cumulative production was measured to approximately 550 litres. One buildup period was performed before the well was opened to run bottom hole samplers. Three bottom hole samplers were run.

The bottom hole sampling was done with three PSTE sampler types at three different depths. The depths were 3636.6, 3639.1 and 3641.6 m RKB. The bottom hole pressure and temperature during sampling were 36379.4 kPa and 131.0 Deg.C. Some oil and gas was trapped between the LPR-N and the APR-M valves.

Analysis of the gas samples from Statoil:

Component	PSTE TS-19-12	PSTE TS-20-12
N2	0	8.41
CO2	0	4.80
C1	54.64	57.66
C2	20.42	12.01
C3	6.81	8.09
IC4	4.7	1.59
NC4	3.32	2.82
IC5	2.90	0.95
NC5	0.92	1.00
SUM C6/NC6	2.14/0.27	0.95/0.37
SUM C7/NC7	2.91/0.09	1.01/0.12
SUM C8/NC8	1.41/0.05	0.54/0.03
SUM C9/NC9	0.05	0.05/0.004
SUM C10+		0.004
TOTAL	100.22	99.88

TS-20-12: MW = 21.182 g/mol and a density of 0.731 (Air=1.0).

Analyses of the oil and the gas trapped between the LPR-N and the APR-M valves from Schlumberger:

Component	Oil	Gas
N2	0	4.00
CO2	0	1.52
C1	0	75.21
C2	0.05	10.05
C3	0.63	6.00
IC4	0.0	1.68
NC4	0.33	1.93
IC5	1.73	0.00
NC5	1.43	0.00
C6	0.57	0.12
C7+	95.26	0.08
Total	100.00	100.59

The oil was heated to 50 Deg. C.

.	oil	gas
Density	0.858 g/cc at 30 Deg.C	0.740 (air=1.0)
Viscosity	795 cp at 40 Deg.C	
Avg. molar mass	278.4 g/mol	21.4 g/mol

4.3.5 DST No. 3

Objectives:

- Receive good reservoir samples for analyses.
- Pressure and temperature measurements.
- Determine permeability and productivity of the perforated interval.

Perforation interval: 3611 - 3636 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 shot/foot

Test performance

The well was perforated underbalance using drillwater as cushion with a differential pressure of approximately 10000 kPa.

The following flow and shut-in periods were performed:

Clean-up flow	:	378 min.
Clean-up buildup	:	575 min.
Main flow	:	816 min.
Main buildup	:	1247 min.
Multirate flow	:	364 min.
Multirate buildup	:	722 min.

Figure 4.3.1 shows the test performance. Three out of four gauges performed well during the test.

TIME	WELL HEAD		CONDENSATE		GAS		GOR	H2S	CO2
	PRESS	TEMP	RATE	GRAV.	RATE Sm3* 1000	GRAV.	Sm3/		
hh:mm	Bar	DegC	Sm3	g/cc		air=1	Sm3	ppm	%
Clean up flow with 12.7 mm (12/64") fixed choke									
14:30	295.0	44.0	-	0.783	575	0.710	-		0
15:00	295.5	46.0	181.4	0.799	593	0.710	3038	-	-
16:00	296.5	49.0	196.4	0.799	591	0.710	3011	5.5	4.5
17:00	296.5	53.0	169.4	0.803	590	0.715	3483	-	-
18:00	292.4	54.0	186.7	0.806	588	0.715	3152	-	-
End clean up flow									
11.10.90									
03:30	129.5	7.0	0	-	0	-	-	-	-
Main flow period with 19.05 mm (48/64") choke									
07:30	236.0	62.0	301.6	0.792	811	0.705	2689	-	-
09:00	240.0	67.0	282.3	0.795	864	0.720	3062	5.5	3.2
11:00	241.2	71.0	277.0	0.798	763	0.710	2752	5.0	3.0
14:00	220.5	73.0	293.2	-	913	0.715	3112	4.6	1.4
16:00	221.5	74.5	276.7	0.803	915	0.714	3309	3.8	4.0
17:00	221.0	74.5	290.0	0.802	905	0.715	3120	3.9	3.6
End main flow period									
18:00	358.0								
23:30	352.5								
12.10.90									
13:55	349.0								
Multirate flow period with 12.7 mm (32/64") choke									
15:00	292.0	36.0	204.0	0.794	627	0.710	3060	10	2.6
15:45	298.5	51.0	193.4	0.799	613	0.715	3170	-	-
Multirate flow period with 19.05 mm (48/64") choke									
17:15	218.5	69.5	281.7	0.799	962	0.723	3288	6.0	3.0
17:45	219.5	71.0	282.7	0.808	880	0.721	3112	-	-
Multirate flow period with 25.4 mm (64/64") choke									
19:00	149.5	74.0	307.8	0.799	1076	0.724	3496	-	-
19:30	150.0	75.0	308.4	0.829	1076	0.720	3489	5.0	2.3
20:15	Close chole manifold. LPR-N not closed								
13.10.90									
08:00	349.0								
End DST No. 3									

Test analysis

Data from the Halliburton gauge no. 10119 is used in the test analyses.

The test analyses are performed on the build up periods from the Clean-up flow, Main flow and the Multirate flow periods.
The test is evaluated as a gas test. The semilog data is reached.

Gauge 10119 sensing depth: 3568.11 m RKB

Analyses	Pressure P (kPa)		Perm. k (md)	Skin S	Build-up Period
	Gauge P*	Reservoir P			
Horner	47024	47459 *	96.4	3.88	Clean-up
Horner	46966	47400 *	92.3	4.14	Main
Horner	46982	47417 *	90.1	2.26	Multirate

* Reservoir pressure P is calculated to mid perforations with a fluid density of 0.8 g/cc.

Figure 4.3.2 shows the rate history used in the analyses. Figure 4.3.3, 4.3.4 and 4.3.5 shows the Log-Log Buildup, Horner Buildup and the Horner Analysis plot.

The results from the Clean-up shut in period give the best results because the LPR-N tester valve failed during the Main and the Multirate shut in periods.