

RESULTS FROM FMT LOGGING

Log run no. 1

Depth (mRKB)	Pressure (kpa)		
	Dresser	Flopetrol 82818	SDP 82819
1462	16379	16551	16550
1475	15724	15886	15887
1468.5	15530	15685	15686
1485	15620	15765	15767
1492	15841	15989	15990
1507	15710	15858	15859
1520	15758	15906	15908
1534	15841	15972	15974
1543.5	15930	16062	16065
1568	16110	16236	16240
1571	16310	16437	16441
1571.5	16261	16382	16383
1578.5	16413	16525	16529

Flopetrol pressure gauges disconnected.

1462	15751
1468.5	15724
1475	15717
1485	15868
1492	15855
1520	15744

1568	16068
1543.5	15744
1571.5	15765
1578.5	15923
1582	15896
1613	15358

1644.5	16482
1697.5	17006
1758	17599
1862	18599
1905	19040
1973.5	18412

1567	15930
1552	15896
1535.5	15896
1516.5	15861

Log run no. 3

1485	15792
1492	15813
1507	15841
1535.5	15875
1552	15889
1562	16027
1572	15923

Log run no. 4

1574            15923

1577            15972

Log run no. 5

1475            15813

The first log run was made with Flopetrol SDP gauges in parallel with the Dresser gauge. The Dresser gauge disagreed with the Flopetrol gauges by more than 100 KPA, the difference was, however, not constant. Therefore it has been impossible to apply any from of correction. Only a water gradient could be established, this gives 1.02 g/cc.

Run no. 2 was a sampling run but the tool failed.

Run no. 3 was a combined pressure test/sampling run. The pressure points gave a gradient of 0.121 g/cc in the gas zone. Sampling failed and only small amounts of gas were found in the 2 3/4 gal. chamber. Sampling depth: 1572 m RKB.

Sampling in log run no. 4 gave mudfiltrate at 1577 m RKB.

Sampling at 1475 m RKB during log run no. 5 gave small amounts of gas at 1475 m RKB.

TEST SUMMARY.

Two tests were performed in this well. The first was a formation integrity test performed in the Sognefjord formation. The second test was also carried out in the Sognefjord formation. In this test a gravel pack was installed in the well.

In situ formation strength test (1572-1572.3 m RKb).

The well was perforated with a 4" casing gun. A total of five injection tests were performed in order to determine leak off pressure and possible fracture pressure.

Results.

Perforated interval : 1572 - 1572.3 mRKb  
Leak off pressure : 228000 kPa  
Possible fracture pressure : 248000 kPa

Gravel pack test (1506-1510 m RKb).

The well was perforated underbalanced and backflushed and cleaned up at a low rate. The well was then killed and the internal gravel pack was installed. After the gravel pack was installed a post gravel pack test string was run and the test continued. A summary of flow periods and results follow.

TEST RESULTS 31/6-2

Gravel pack test.

Initial reservoir pressure : 15769. kPa § 1490.6 mRKb  
Stabilized shut-in temperature : 61.5 deg C § 1490.6 mRKb  
Perforated interval : 1506 - 1510 mRKb

Flow data.

Perforating the well.

Flow period : Pre gravel pack test.  
gas rate m3/day : 276000  
surface pressure kPa : 13280  
bottom hole pressure kPa : 15780

Running gravel pack string.

Flow period : First post gravel pack test.  
gas rate m3/day : 243000  
surface pressure kPa : 4740

First acid job.

Flow period : Second post gravel pack test.  
gas rate m3/day : 359000  
surface pressure kPa : 6410

Second acid job.

Flow period : Third post gravel pack test.  
gas rate m3/day : 386000 497000 555000 602000  
surface pressure kPa : 10440 8715 7446 6391

Third acid job.

Flow period : Fourth post gravel pack test.  
gas rate m3/day : 547000 676000 777000 839000  
surface pressure kPa : 9620 7220 3870 5020

Run and set gauges.

Flow period : Fifth post gravel pack test.  
gas rate m3/day : 171000 813000  
surface pressure kPa : 12860 4963  
bottom hole pressure kPa : 15320 13088

buildup.

Flow period : First multirate test.  
gas rate m3/day : 194000 341000 581000 838000  
surface pressure kPa : 13500 12715 10329 5190  
bottom hole pressure kPa : 15496 15187 14459 13511

buildup.

Flow period : Clean up prior to acid job.

Fourth acid job.

Flow period : Eight post gravel pack flow.  
gas rate m3/day : 845000 854000  
surface pressure kPa : 5211 5237

Fifth acid job.

Flow period : Ninth post gravel pack flow.

Flow period : Tenth post gravel pack flow.  
gas rate m3/day : 860000  
surface pressure kPa : 5305

Run gauges on wireline.

Flow period : Pressure loss test.  
gas rate m3/day : 852000 601000 345000 195000  
surface pressure kPa : 5209 10387 12821 13552  
bottom hole pressure kPa : 13785 10387 15337 15585

buildup.

Flow period			: Single rate test.
gas rate	m3/day		: 860000
surface pressure		kPa	: 5292
bottom hole pressure		kPa	: 13945

buildup.

**WELL NAME:**

STATOIL  
 Deep Sea Bergen  
 31/6-2

**MUD PROPERTY RECAP**

DATE	DEPTH	DENSITY	VISC-O-SITY	FILTRATE	HY/HP IIII		pH	RHEOLOGY				FILTRATE ANALYSIS				RETORT ANALYSIS			CEC	OTHER			
					Coke	° 500psi		PV	YP	10"	10'	Cl	Ca	PI	MI	Oil	Water	Corr. Solids		PPB	ppb	ppb	
						1" / 32"																	32" / 32"
metres	SG	secs	ccs	1" / 32"	32" / 32"																		
18/10	-	1.04	50	NC	-		10.0	15	30	7	10												
19/10	412	1.04	45	NC	-		10.0	15	25	7	10												
20/10	412	1.04	45	NC	-		10.0	15	25	7	10												
21/10	412	1.06	40	NC	-		9.6	13	15	9	14												
22/10	413.5	1.06	36	NC			9.3	14	20	10	14												
23/10	546	1.08	41	46	4		9.5	17	33	18	19	13000	500	.4	.6	0	4.5	95.5	23	39		TR	
24/10	805	1.10	42	46	4		9.3	22	35	22	23	12000	900	.15	.45	0	5	95	23	46		TR	
25/10	(580)	1.11	43	35	3		8.7	17	33	21	22	12000	960	.10	.23	0	5.5	94.5	23	49	8		TR
26/10	(762)	1.11	36	40	3		8.4	16	25	18	19	12000	900	.10	.20	0	5.5	94.5	23	49	8		1/4
27/10	(799)	1.20	38	40	3		8.3	14	26	18	19	12000	900	.08	.20	0	8.5	91.5	23	45	50		TR
28/10	(799)	1.20	38	39	3		8.2	14	26	18	19	12000	900	.08	.20	0	8.5	91.5	23	45	50		TR
29/10	(799)	1.20	38	39	3		8.3	15	24	18	19	12000	960	.10	.20	0	8.5	91.5	23	45	50		TR
30/10	(566)	1.12	42	39	3		8.1	16	27	16	17	10000	840	.05	.20	0	5	95	20	35	20		TR
31/10	818	1.11	40	43	3		8.3	20	28	17	18	10000	980	.15	.25	0	5	95	20	40	15		TR
1/11	818	1.13	42	42	3		8.3	16	27	17	18	11000	1000	.10	.20	0	5.5	94.5	20	50	12		TR
2/11	818	1.20	35	58	3		8.3	13	12	9	10	13000	840	.10	.20	0	8	92	14	32	60		TR
3/11	818	1.20	35	52	3		8.2	13	11	9	10	13000	480	.10	.20	0	8	92	13	32	60		TR
4/11	818	1.20	35	52	3		8.3	13	12	9	10	13000	900	.10	.20	0	8	92	13	32	60		TR
5/11	818	1.20	34	50+	3		8.4	16	13	7	9	13000	880	.10	.20	0	7	93	14	32	60		TR

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**WELL NAME:**

**STATOIL**  
 Deep Sea Bergen  
 31/6-2

**MUD PROPERTY RECAP**

DATE	DEPTH metres	DENSITY SG	VISC- OSITY secs	FILTRATE		HY/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS				RETORT ANALYSIS			CEC	OTHER			Mg ppm	
				Cake 1"/32"	200° 500psi 1"/32"	10'	10'		Ca	Pf	Mf	KCl	Oil	Water	Corr. Solids	PPB	ppb	ppb	%						
																				ccs	ccs	cp	lbs/100ft <sup>2</sup> -gms/100cm <sup>2</sup>		mg/litre
6/11	818	1.21	44	50+	4			12.0	14	40	10	13	14000	1200	1.5	1.8			92	8	14	32	60	TR	
7/11	822	1.20	59	50+	3			12.0	11	50	22	24	13000	840	1.6	1.9			92	8	15	37	60	TR	
8/11	920	1.30	47	3.7	1	4.0	1	9.6	18	24	3	3		240	.3	.5	48		92	8	1	2	100	TR	
9/11	920	1.30	48	4.0	1	4.6	1	9.6	20	24	5	7	68000	320	.1	.3	46		90	10	4	37	57	1	
10/11	920	1.30	54	4.0	1	4.8	1	8.6	25	25	5	8	69000	320	.1	.7	45		90	10	4	37	57	1	
11/11	986	1.28	53	3.8	1	-	-	10.2	24	23	4	8	70000	320	.4	.7	47		91	9	4	35	54	3/4	
12/11	984	1.26	50	4.5	1	-	-	10.2	21	15	2	4	60000	320	.4	.7	40		90	10		30	50	3/4	
13/11	984	1.23	43	4.2	1	-	-	11.4	20	13	2	4	60000	280	.8	1.3	40	-	92	8	2	25	43.5	1/2	120
14/11	1006	1.20	44	5.6	1	-	-	12.0	20	11	2	3	55000	60	.95	1.55	38	-	93	7	2	19	37	1/2	60
15/11	1150	1.20	63	4.7	1	-	-	11.4	22	26	3	5	63000	160	.7	1.4	45	-	92	8	2.5	20	44	1/2	
16/11	1241	1.20	61	4.6	1	-	-	11.5	24	30	3	4	66000	160	.4	1.2	46	-	92	8	2.5	20	40	1/2	
17/11	1390	1.21	61	5.0	1	-	-	10.9	25	27	3	4	60000	280	.2	.7	43	-	90	10	5	31.7	50.7	1/2	
18/11	1400	1.20	48	5.3	1	-	-	10.7	20	18	3	4	60000	300	.15	.6	43	-	92	8	5	18	39	1/2	
19/11	1400	1.20	47	5.2	1	-	-	10.7	18	15	3	4	58000	320	.1	.3	40	0	90.5	9.5	6	27	48	1/2	
20/11	1400	1.20	45	5.2	1	-	-	10.7	18	15	3	4	58000	300	.1	.3	40	0	90.5	9.5	6	27	48	1/2	
21/11	1400	1.20	46	5.3	1	-	-	10.7	18	15	3	4	58000	300	.1	.3	40	0	90.5	9.5	6	27	48	1/2	
22/11	1366	1.20	46	5.0	1	8.4	1	10.4	18	15	2	3	58000	180	.1	.3	40	0	90.5	9.5	6	27	48	1/2	0
23/11	1427	1.20	43	5.4	1/2	9.0	1	12.0	17	14	2	3	65500	270	.2	.65	46	0	90.5	9.5	5.5	23	44	1/2	0
24/11	1453	1.25	46	5.0	1/2	13.2	1	11.7	18	16	3	4	67000	280	.1	.6	48	0	89	11	5.5	15	60	1/2	



**WELL NAME:**

STATOIL  
 Deep Sea Bergen  
 31/6-2

**MUD PROPERTY RECAP**

DATE	DEPTH metres	DENSITY SG	VISC-OSITY secs	FILTRATE		HY/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS				RETORT ANALYSIS			CEC	OTHER			
				Cake 1"/32"	°500psi ccs	1"/32"	°500psi ccs		PV cp	YP lbs/100ft <sup>2</sup> -gms/cm <sup>2</sup>	10" 100	10' cm <sup>2</sup>	Cl mg/litre	Ca ppm	Pf	Mf	Oil %	Water %	Corr. Solids %	PPB Bent. Eq.	LDS	HDS	SAND	
																					PPB	PPB	%	
25/11	1474	1.25	44	5.0	1/2	14.2	1	11.5	16	15	3	5	69000	260	.15	.60	49	0	89	11	5	15	60	1/2
26/11	1497	1.25	46	4.8	1/2	14.2	1	11.4	17	16	3	5	68000	280	.15	.60	48	0	89	11	5	15	60	1/3
27/11	1544	1.25	46	4.6	1/2	15.0	1	11.3	17	15	3	6	66000	320	.15	.6	48	0	89	11	5	15	60	1/3
28/11	1578	1.25	44	4.8	1	15.0	1	10.9	17	14	3	6	66000	400	.1	.6	49	0	89	11	5	15	60	1/3
29/11	1622	1.25	46	4.0	1	14.0	1	9.5	17	16	3	6	67000	280	.1	.4	49	0	89	11	5	15	60	1/3
30/11	1806	1.25	44	4.0	1	12.4	1	9.4	18	15	4	6	67000	260	.1	.5	48	0	89	11	5	15	60	1/2
1/12	1934	1.25	43	4.2	1	12.8	1	9.3	16	15	3	7	66000	240	.1	.5	47	0	89	11	5	15	60	1/4
2/12	2020	1.25	42	4.0	1	13.0	1	9.1	18	16	3	7	66000	240	.1	.5	46	0	89	11	5	15	60	1/4
3/12	2020	1.25	42	4.2	1	12.8	2	9.0	17	16	3	6	67000	240	.1	.5	46	0	89	11	5	15	60	1/4
4/12	2020	1.25	42	4.4	1	13.0	1	9.0	18	16	3	5	67000	240	.1	.5	46	0	89	11	5	15	60	1/4
5/12	2020	1.26	42	4.2	1	13.0	1	9.2	18	16	3	7	66000	240	.1	.5	46	0	89	11	5	15	60	1/4
6/12	2020	1.26	43	4.2	1	-	-	9.2	18	16	3	8	67000	240	.1	.5	46	0	89	11	5	15	60	1/4
7/12	2020	1.26	43	4.4	1	-	-	9.1	17	16	3	7	66000	240	.1	.4	46	0	89	11	5	15	60	TR
8/12	2020	1.26	49	5.8	2	-	-	11.4	30	25	10	20	60000	240	1.2	2.6	42	0	89	11	7	15	60	TR



# NORSK PETROLEUM SERVICES A/S.

OPERATING AREA      Statoil  
                                 Deep Sea Bergen  
                                 31/6-2 TROLL

## MATERIALS USED PER CASING INTERVAL

36" Hole to 412 m, 30" Casing at 412 m

MATERIALS	UNITS	ESTIMATED		ACTUAL	
		QUANTITY	COST \$	QUANTITY	COST \$
Aquagel	M/T	15	3,975.00	22	5,830.00
Caustic Soda	25 kg	21	161.70	12	138.60
Soda Ash	50 kg	2	29.04	2	29.04
Lime	25 kg			20	102.00
Total Cost			4,165.74		6,099.64
Cost/bbl		11500	3.62	2041	2.99
Cost/m <sup>3</sup>		183	22.76	324	18.83
Cost/m		65	64.09	78	78.20

# NORSK PETROLEUM SERVICES A/S.

Statoil  
OPERATING AREA Deep Sea Bergen  
31/6-2 TROLL

## MATERIALS USED PER CASING INTERVAL

26" Hole to 815 m, 20" Casing set at 801 m

MATERIALS	UNITS	ESTIMATED		ACTUAL	
		QUANTITY	COST \$	QUANTITY	COST \$
Aquagel	M/T	59	15,635.00	74	19,610.00
Bargain	M/T	53	6,331.91	133	15,889.51
Caustic Soda	25 kg	26	300.30	15	173.25
Soda Ash	50 kg	11	159.72	24	348.48
Lime	25 kg			22	112.20
Staflo	25 kg			4	437.52
Aquagel	100 lb			45	666.00
Total Cost			22,426.92		37,236.96
Cost/bbl		6525	3.44	7339	5.07
Cost/m <sup>3</sup>		1037	21.63	1165	31.96
Cost/m		423	53.02	416	89.51

# NORSK PETROLEUM SERVICES A/S.

OPERATING AREA      STATOIL  
                            Deep Sea Bergen  
                            31/6-2

## MATERIALS USED PER CASING INTERVAL

17 1/2" Hole to 920 m, 13 3/8" Casing set at 902 m

MATERIALS	UNITS	ESTIMATED		ACTUAL	
		QUANTITY	COST \$	QUANTITY	COST \$
Alcomer 110 1	25 kg	31	4,328.22	17	2,373.54
Bargain	M/T	167	19,951.49	201	24,013.47
Dextrid	50 lb	271	11,287.15	232	9,662.80
KCl (sx)	50 kg	386	7,527.00	910	17,745.00
KCl (brine)	bb1	1000	20,000.00	390	9,360.00
Staflo	25 kg	56	6,125.28	43	4,703.34
XC Polymer	50 lb	56	14,470.40	48	12,403.20
Bentonite	M/T			12	3,180.00
Caustic	25 kg			3	34.65
Bicarbonate	50 kg			42	700.98
Q-Broxin	25 kg			33	539.55
Total cost			83,689.54		84,716.53
Cost/bbl		2650	31.58		20.66
Cost/m <sup>3</sup>		421	198.79		129.93
Cost/m		600	139.48	154	550.10

# NORSK PETROLEUM SERVICES A/S.

OPERATING AREA      STATOIL  
                                  Deep Sea Bergen  
                                  31/6-2

## MATERIALS USED PER CASING INTERVAL

12 1/4" Hole to 1400 m, 9 5/8" Casing set at 1391 m

MATERIALS	UNITS	ESTIMATED		ACTUAL	
		QUANTITY	COST \$	QUANTITY	COST \$
Bargain	M/T	35	4,181.45	6	716.82
Caustic Soda	25 kg	35	404.25		
Dextrid	50 lb	117	4,873.05	139	5,789.35
KCl (sx)	50 kg	422	8,229.00	858	16,731.00
Soda Ash	50 kg	5	72.60	9	130.68
Sod. Bicarbonate	50 kg	13	216.97	38	634.22
XC Polymer	50 lb	67	17,312.80	45	11,628.00
Staflor	25 kg			52	5,687.76
Wallnut (F)	25 kg			98	1,283.80
Wallnut (C)	25 kg			215	2,816.50
Mica (C)	25 kg			141	1,847.10
Mica (F)	25 kg			227	2,973.70
Kwik Seal	40 lb			25	675.00
Alcomer	25 kg			23	3,211.26
Total cost			35,290.12		54,125.19
Cost/bbl		975	36.20	3572	15.15
Cost/m <sup>3</sup>		155	227.68	568	95.29
Cost/m		570	61.91	520	104.08

# NORSK PETROLEUM SERVICES A/S.

OPERATING AREA      STATOIL  
    Deep Sea Bergen  
    31/6-2

## MATERIALS USED PER CASING INTERVAL

8 1/2" Hole to 2020 m, 7" Casing set at 2004 m

MATERIALS	UNITS	ESTIMATED		ACTUAL	
		QUANTITY	COST \$	QUANTITY	COST \$
Aquagel	M/T	38	10,070.00	0	0
Bargain	M/T	28	3,345.00	60	7,168.20
Caustic	25 kg	69	796.95	0	0
CC - 16	50 lb	114	1,938.00	0	0
CMC LV	25 kg	35	1,640.45	0	0
Q-Broxin	25 kg	207	3,384.45	0	0
Soda Ash	50 kg	15	217.80	3	43.56
XC Polymer	50 lb	19	4,909.60	32	8,268.80
Dextrid	50 lb	0	0	130	5,414.50
KCl	50 kg	0	0	410	7,995.00
Bicarbonate	50 kg	0	0	14	83.56
Total cost			26,302.41		29,123.72
Cost/bbl		1900	13.84	1704	17.09
Cost/m <sup>3</sup>		302	87.09	271	107.46
Cost/m		515	51.07	620	46.97

# NORSK PETROLEUM SERVICES A/S.

OPERATING AREA

STATOIL  
Deep Sea Bergen  
31/6-2

## TOTAL MATERIALS USED (ON WELL)

	UNIT	TOTAL
Aquagel	M/T	102
Bargain	M/T	405
Caustic	25 kg	42
Soda Ash	50 kg	38
Lime	25 kg	42
KCl (brine)	bb1	390
KCl (sacks)	50 kg	2178
Alcomer 110	25 kg	40
Dextrid	50 lbs	501
Staflor	25 kg	99
XC Polymer	50 lbs	125
Q-Broxin	25 kg	45
Soda Bicarbonate	50 kg	94
Wallnut F	25 kg	98
Wallnut C	25 kg	215
Mica F	25 kg	141
Mica C	25 kg	227
Kwik Seal	40 lbs	25
Aquagel (sacks)	100 lbs	45



# NORSK PETROLEUM SERVICES A/S.

OPERATING AREA      STATOIL  
                         31/6-2 (Re-entry)

## MATERIALS USED PER CASING INTERVAL

MATERIAL	UNIT	UNIT COST	QUANTITY	COST \$
Barite	M/T	100.00	16	1,600.00
Bentonite	M/T	250.00	28	7,000.00
Caustic Soda	50 lb	11.25	16	180.00
CC 16	25 kg	17.00	38	646.00
CMC Lovis	25 kg	36.75	82	3,013.50
Lignosulfonate	25 kg	13.25	86	1,139.50
Soda Ash	50 kg	20.32	6	121.92
Sodium Bicarbonate	50 kg	21.60	41	885.60
XCD Polymer	25 kg	359.60	3	1,078.80
Total Cost of mud materials				15,665.32
Volume built	bb1	8.14	1924	15,665.32
Volume remaining at TD	bb1	8.14	1302	10,596.84
Volume lost/dumped while drilling	bb1		622	5,068.05
Cost/metre drilled (632 metres)		8.02		