

Well Name	34/11-4	Location	Norway	Date & Time	22-Feb-99 12:43
Operator	STATOK	Contractor/Rig	Trencocean Arctic	Interval	12:25 in
Operator Rep.	Johan Bysveen	Contractor Rep.	O.Sæthre-T. Myrvang	Dowell Eng.	G.Michels /Thierry Lapotre
Analysis Type	WBM	Fluid System	QUADRIL HT	Spud Date	18-Sep-1998

DRILLING FLUIDS PROPERTIES RECORD - From 12-Jan-1999 08:00 to 22-Feb-1999 12:40												
Property Name	Units	66	67	68								
Date		18-Feb-99	20-Feb-99	21-Feb-99								
Time		20:00	22:00	22:00								
Sample loc.		Active 6	Active 8	Active 8								
MD	m	3536.	3543.	3615.								
TVD	m	3636.	3643.	3618.								
Flow. Temp.	degC	43.	29.									
Density	g/cm3	1.85	1.86	1.85								
Funnel Visc.	s	160	135	155								
500 rpm		174	180	185								
300 rpm		122	125	127								
200 rpm		89	102	101								
100 rpm		72	71	71								
60 rpm		58	59	60								
30 rpm		45	43	43								
6 rpm		30	27	26								
3 rpm		25	22	23								
Rheo. Temp.	degC	30.	30.	30.								
Plastic Visc.	cP	52.	56.	59.								
Yield Point	Pa	33.5	33.5	33.5								
10 sec. Gel	Pa	12.4	11.9	12.								
10 min. Gel	Pa	31.1	31.1	30.								
n-annulus		0.344	0.377	0.371								
K-annulus	Pa-s^n	7.296	5.076	5.415								
API Filtrate	mL	3.	3.3	3.4								
HTHP Filtrate	mL											
HTHP Cake	1/32nd"											
PI	mL	0.15	0.08	0.08								
Mf	mL	0.6	0.5	0.5								
pH		9.8	9.5	9.8								
Ca2+	mg/L	344.7	320.6	320.6								
Mg2+	mg/L	0.	0.	0.								
Cl-	g/L	82.	90.	80.								
KCl	g/L	116.	106.	106.								
Sand %	%	0.5	0.5	0.5								
Water %	%	95.	95.	95.								
Oil %	%	0.1	1.	1.								
Polyol %	%	2.9	2.5	2.5								
Corr. Solids %	%	30.0	28.9	28.9								
LOS %	%	9.4	9.5	7.2								
MBT	kg/m3	38.	38.	36.								

This report has been produced with MudCADE Software 1.1c - Mon 22-Feb-1999 12:45

Administration Data					
Well Name	34/11-4	Location	Norway	Date & Time	27-Feb-99 12:00
Operator	STATOIL	Contractor/Rig	Transocean Arctic	Interval	12:20 In
Operator Rep.	Magne Aase	Contractor Rep.	O.Søthre-L.Fjeldheim	Dowell Eng.	G.Mitchell/T.Lapotre
Analysis Type	WSM	Fluid System	QUADRILL HT	Spud Date	09-Dec-1998

DRILLING FLUIDS PROPERTIES RECORD - From 19-Feb-1999 00:10 to 27-Feb-1999 12:00														
Property Name	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
Date		19-Feb-99	19-Feb-99	20-Feb-99	21-Feb-99	22-Feb-99	22-Feb-99	23-Feb-99	24-Feb-99	24-Feb-99	25-Feb-99	25-Feb-99	26-Feb-99	27-Feb-99
Time		10:15	20:00	22:00	22:00	04:30	14:30	18:00	12:00	14:30	15:00	21:00	13:30	23:30
Sample loc.		Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S
MD	m	3628	3538	3543	3815	3568	3585	3588	3886	3585	3586	3404	3527	3593
TYD	m	3628	3638	3643	3815	3568	3585	3588	3886	3585	3586	3404	3527	3593
Flow. Temp.	degC	28.8	43	29	29	29	37.1	30	42	37.1	47.2	34.04	43.2	50
Density	g/cm3	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.72	1.72	1.7	1.7
Funnel Visc.	s	147	150	138	155	135	130	140	164	153	88	88	170	110
600 rpm		177	174	180	188	182	182	184	164	163	68	64	114	80
300 rpm		123	122	128	127	127	129	129	131	129	60	64	77	60
200 rpm		99	96	102	101	102	108	107	107	108	49	61	61	47
100 rpm		72	72	71	71	75	77	80	77	77	38	37	43	32
60 rpm		59	58	58	58	62	66	71	64	66	28	30	36	28
30 rpm		48	45	43	43	47	52	54	50	52	22	22	28	19
6 rpm		27	30	27	28	27	22	33	35	32	17	9	17	13
3 rpm		24	25	22	23	22	20	28	28	29	9	6	15	10
Rheo. Temp.	degC	80	80	80	80	80	80	80	80	80	80	80	80	80
Plastic Visc.	cP	64	62	65	68	55	53	55	58	53	28	30	37	30
Yield Point	Pa	33	33.5	33.8	32.8	34.5	34.3	35.3	37.3	33.3	16.3	16.3	18.2	13.4
10 sec. Gel	Pa	12.8	12.4	11.9	12	12.9	15	15.8	15	15	5	7.5	9.5	8.1
10 min. Gel	Pa	32	31.7	31.1	30	33.3	37	38.8	37	37	13	13.8	23.3	17.7
n-annulus		0.368	0.344	0.377	0.371	0.381	0.324	0.332	0.351	0.324	0.412	0.614	0.355	0.388
Kennulus	Pa*s^n	6.875	7.288	6.578	6.416	6.042	6.724	6.828	7.445	6.732	7.288	1.328	4.232	2.709
API Filtrate	mL	2.8	3	3.3	3.4	3.2	2.5	2.8	2.9	2.6	2.9	3.8	4.2	6.3
HTHP Filtrate	mL													
HTHP Cake	1/32nd"													
PI	mL	0.17	0.18	0.08	0.09	0.07	0.1	0.09	0.18	0.1	0.18	0.1	0.4	0.28
MI	mL	0.65	0.6	0.5	0.5	0.4	0.48	0.4	0.8	0.46	0.6	0.6	0.78	0.45
pH		8.4	9.8	9.5	9.8	9.4	9	9.2	9.3	9	8.3	8	10.4	10.8
Ca2+	mg/L	352.7	344.7	320.8	320.8	320.8	320.8	320.8	320.8	320.8	240.8	240.8	861.7	821
Mg2+	mg/L	0	0	0	0	0	0	0	0	0	0	0	24.8	0
Cl-	g/L	56	52	50	50	50	50	50	50	50	40	39	48	40
KCl	g/L	118	118	108	108	108	104	104	104	104	88	78	88	88
Sand %	%	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
Water %	%	85	85	88	88	85	85	85	85	85	78	75	72	72
Oil %	%	0	0.1	1	1	0	0	0	0	0	0	0	0	0
Polyol %	%	2.9	2.9	2.5	2.5	2.8	3	2.3	3	3	3	2.8	3	3
Corr. Solids %	%	30.8	30.8	28.9	28.9	29.8	30.7	30.9	30.7	30.7	24.9	20.1	23.8	23.8
LGS %	%	0.1	0.6	0.5	1.2	0.1	0.1	0.1	0.2	0.1	0.1	0.2	1.2	4.8
MBT	kg/m3	36	36	35	36	36	35	36	36	35	27	27	30	29

This report has been produced with MudCADE Software 1.1c - Run 28-Feb-1999 11:00

Well Name		34/11-4		Location		Norway		Date & Time		07-Mar-99 23:59	
Operator		STATOIL		Contractor/Rig		Transocean Arctic		Interval		12-13	
Operator Rep.		Johann Bysveen		Contractor Rep.		T.Karlson-J.Falkheim		Dowell Eng.		G.Mitchell / Thierry Lapotre	
Analysts Type		OBM		FLM System		INTERDRILL™		Spud Date		06-Dec-98	

DRILLING FLUIDS PROPERTIES RECORD - From 27-Feb-1999 12:00 to 07-Mar-1999 23:59														
Property Name	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
Date		27-Feb-99	28-Feb-99	01-Mar-99	01-Mar-99	01-Mar-99	02-Mar-99	02-Mar-99	02-Mar-99	03-Mar-99	03-Mar-99	04-Mar-99	05-Mar-99	06-Mar-99
Time		23:50	08:00	05:00	15:15	21:30	05:00	16:00	22:00	05:00	12:30	20:00	23:00	14:00
Sample Loc.		Active 5	Active 6	Active 6	Active 6	Active 6	Active 5	Flow Line	Active 5	Active 5	Flow Line	Active 5	Active 5	Active 5
MD	m	3590.	3610.	3610.	3626.	3652.	3574.	3707.	3607.	3455.	3938.	3644.	3944.	3644.
TVD	m	3590.	3618.	3610.	3628.	3652.		3707.			3638.			
Flow Temp.	degC	30.	48.	48.	48.2	47.	46.	45.1	64.	82.	48.0			
Density	g/cm3	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8
Funnel Visc.	s	70	86	70	85	81	80	80	74	78	90	78	80	81
600 rpm		114	144	144	120	130	138	120	116	121	127	155	148	146
300 rpm		68	86	86	76	78	78	72	69	72	75	83	86	84
200 rpm		48	65	65	55	66	67	54	61	63	67	63	64	61
100 rpm		30	42	42	37	38	37	33	39	36	37	40	40	38
60 rpm		23	32	32	28	29	26	27	28	27	28	31	30	28
30 rpm		11	23	23	21	22	22	20	19	20	21	23	20	18
8 rpm		9	13	13	12	13	13	12	11	11	12	13	10	11
3 rpm		7	11	11	11	11	11	10	9	9	10	10	9	9
Rheo. Temp.	degC	50.	56.	50.	50.	50.	50.	50.	50.	50.	50.	55.	55.	55.
Plastic Visc.	mPa-s	46.	58.	58.	51.	52.	53.	45.	48.	48.	52.	56.	59.	61.
Yield Point	Pa	10.5	12.3	15.4	17.6	15.4	15.	14.2	15.	15.	15.	12.5	12.5	11.7
10 sec. Gel	Pa	4.8	7.6	7.8	6.5	6.6	7.	7.	6.6	5.	6.5	6.5	6.	6.5
10 min. Gel	Pa	3.5	11.9	11.5	13.	11.5	12.	12.	11.	12.2	12.	12.5	12.	11.2
n-annulus		0.494	0.447	0.447	0.417	0.428	0.42	0.428	0.442	0.482	0.498	0.46	0.485	0.485
K-annulus	Pa-s/n	1.308	2.718	2.718	2.608	2.608	2.608	2.608	2.608	2.608	2.608	2.618	2.618	2.608
HTHP Filtrate	mL	1.	1.2	1.2	1.2	1.2	1.	1.	1.	1.	1.2	1.	1.2	1.2
HTHP Cake	1/32nd"	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
CaCl2 (Aeq)	g/L	229.08	128.08	123.08	123.08	116.8	198.61	190.32	276.13	162.89	194.61	195.61	206.88	201.82
Excess Lime	kg/m3	8.	2.9	1.8	2.5	0.9	3.1	1.7	6.6	1.7	6.7	1.1	1.1	6.3
Electric Stab	V	620	580	580	501	588	588	629	588	648	762	773	806	814
Aw (calc)		0.995	0.999	0.999	0.995	0.991	0.998	0.997	0.998	0.998	0.999	0.995	0.999	0.999
Chlorides	g/L	27.48	32.48	32.48	18.	22.48	22.49	29.89	29.89	22.48	22.48	20.	20.	20.
Sand %	%	0.	0.	0.2	0.	0.4	0.2	0.2	0.2	0.2	0.2	0.4	0.3	0.3
Water %	%	18.	18.	18.	18.	19.	18.	17.	17.	17.	15.	18.	15.	15.5
Oil %	%	58.	64.	64.	63.	69.	24.	28.	68.	64.	68.	78.	65.	68.5
Brine %	%	18.	19.6	19.8	18.7	20.6	18.8	18.5	18.2	17.9	16.	18.7	15.5	16.2
Corr. Solids %	%	26.	26.4	26.4	26.3	26.4	27.4	26.5	26.3	26.3	26.	26.2	26.2	26.2
LGS %	%	2.6	5.8	5.8	8.8	5.8	6.9	3.7	6.6	6.4	4.2	3.6	3.8	3.7
HOS %	%	23.4	20.6	20.6	19.6	20.6	23.4	21.3	20.2	22.8	21.9	22.1	20.8	21.8
ASG Solids		4.03	3.88	3.88	3.7	3.84	3.8	3.97	3.81	3.88	3.97	3.99	4.01	3.99
Oil/Water Ratio		78:25	78:25	78:25	78:25	78:25	78:25	77:25	78:25	78:25	78:25	78:25	78:25	78:25
Oil/Brine Ratio		78:25	79:27	73:27	74:28	72:28	74:28	75:28	75:28	76:28	78:22	77:28	78:22	77:28

This report has been produced with MudTRAK Software 1.5 - Sat 27-Mar-1999 8:16

Schlumberger

Dowell

DRILLING FLUIDS SERVICES

MudTRAK*

Well Name		34/11-4		Location		Norway		Date & Time		07-Mar-99 23:58	
Operator		STATOIL		Contractor/Rig		Transocean Arctic		Interval		13-16	
Operator Rep.		Johann Bysveen		Contractor Rep.		T.Karlsson-J.Feldheim		Dowell Eng.		G.Mitchell / Thierry Laporte	
Analysis Type		OEM		Fluid System		INTERDRILL NT		Spud Date		09-Dec-1998	
DRILLING FLUIDS PROPERTIES RECORD - From 27-Feb-1999 12:00 to 07-Mar-1999 23:59											
Property Name	Units	14									
Date		07-Mar-99									
Time		14:00									
Sample loc.		Active S									
MD	m	3944.									
TYD	m										
Flow Temp.	degC	50.									
Density	g/cm3	1.8									
Funnel Visc.	s	78									
600 rpm		139									
300 rpm		82									
200 rpm		61									
100 rpm		39									
60 rpm		30									
30 rpm		22									
6 rpm		19									
3 rpm		10									
Rheo. Temp.	degC	89.									
Plastic Visc.	mPa-s	87.									
Yield Point	Pa	12.									
10 sec. Gel	Pa	7.									
10 min. Gel	Pa	53.									
n-annulus		0.457									
K-annulus	Pa-s^n	2.428									
HTHP Filtrate	mL	1.2									
HTHP Cake	1/32nd"	1.									
CaCl2 (Acq)	g/L	195.61									
Excess Lime	kg/m3	4.1									
Electric Slab	V	533									
Aw (calc)		6.388									
Chlorides	g/L	20.									
Sand %	%	0.1									
Water %	%	15.									
Oil %	%	54.									
Brine %	%	18.7									
Corr. Solids %	%	29.8									
LGS %	%	4.6									
HQS %	%	24.7									
ASG Solids		3.95									
Oil/Water Ratio	%	7723									
Oil/Brine Ratio	%	7824									

This report has been produced with MudTRAK Software 1.3 - Sat 27-Mar-1999 9:19

Schlumberger

Dowell

DRILLING FLUIDS SERVICES

MudTRAK*

		Administration Data												
Well Name	34/11-4	Location	Norway	Date & Time	30-Mar-99 23:59									
Operator	STATOIL	Contractor/Rig	Transocean Arctic	Interval	01/211									
Operator Rep.	Johann Byeveen	Contractor Rep.	O. Sæviha, T. Myrvang	Dowell Eng.	G. Mitchell / Thierry Lapotre									
Analysis Type	OBM	Field System	INTERDRILL NT	Start Date	06-Dec-1998									
DRILLING FLUIDS PROPERTIES RECORD - From 07-Mar-1999 23:59 to 30-Mar-1999 23:59														
Property Name	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
Date		08-Mar-99	08-Mar-99	09-Mar-99	09-Mar-99	10-Mar-99	10-Mar-99	11-Mar-99	11-Mar-99	12-Mar-99	12-Mar-99	13-Mar-99	14-Mar-99	14-Mar-99
Time		13:00	23:00	10:00	10:00	11:00	21:00	11:00	22:30	13:00	23:00	04:00	04:00	16:00
Sample loc.		Active 5	Active 5	FlowLine	FlowLine	FlowLine	Active 5	Active 5	Active 5	FlowLine	Active 5	FlowLine	Active 5	FlowLine
MD	m	3948.	3938.	3873.	3973.	3973.	3990.	4046.	4083.	4148.	4181.	4182.	4183.	4183.
TVD	m	3948.	3938.	-	-	-	3990.	4046.	4083.	-	4181.	-	-	-
Flow. Temp.	degC	40.	42.	42.	44.	40.	46.	48.	48.	48.	38.	34.	-	30.
Density	g/cm3	1.2	2.63	2.03	2.03	2.03	2.0	2.0	2.1	2.0	2.0	2.03	2.03	2.02
Funnel Visc.	u	79	115	115	109	121	93	122	80	121	118	119	113	101
600 rpm		181	179	187	188	179	188	178	188	174	181	188	187	188
300 rpm		84	102	108	90	99	91	104	81	89	93	80	82	94
200 rpm		62	78	74	74	74	86	78	68	69	69	68	67	68
100 rpm		40	49	47	47	48	64	48	41	40	41	40	41	43
60 rpm		39	45	36	36	34	72	38	30	38	30	30	30	31
30 rpm		21	28	28	28	24	23	28	20	21	21	21	21	21
6 rpm		12	14	-	13	13	11	19	10	7	10	10	10	10
3 rpm		10	12	12	10	10	9	10	8	8	8	8	8	8
Rheo. Temp.	degC	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.
Plastic Visc.	mPa.s	67.	72.	78.	70.	74.	64.	75.	68.	68.	68.	68.	68.	70.
Yield Point	Pa	123	143	153	153	123	183	143	15	123	123	123	123	123
10 sec. Gel	Pa	6.5	6.	7.	7.	6.	6.	6.5	5.5	5.8	5.	6.	6.	5.
10 min. Gel	Pa	12.8	12.8	12	12	12.8	11	12	11.8	11.8	11.8	11.8	11.8	11
n-annulus		0.482	0.495	0.477	0.488	0.488	0.502	0.508	0.528	0.508	0.533	0.528	0.53	0.533
K-annulus	Pa.s/m	2.498	2.970	2.318	2.298	2.598	2.837	3.008	3.298	3.70	3.916	3.928	3.928	3.928
HTHP Filtrate	mL	1.2	1.2	3.8	4.8	4.8	4.8	2.	2.	2.2	2.3	2.2	2.4	2.8
HTHP Cake	1/32nd"	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
CaCl2 (Acq)	g/L	105.81	208.88	223.88	210.88	210.88	198.01	240.78	218.98	312.97	294.78	312.97	382.1	512.97
Excess Lime	kg/m3	4.1	4.1	3.7	3.7	4.	3.8	4.3	3.8	3.8	3.8	3.8	4.3	5.8
Electric Slab	V	865	880	737	702	687	823	827	887	1058	1120	1201	1147	807
Aw (calc)		0.885	0.873	0.88	0.873	0.871	0.885	0.874	0.888	0.788	0.888	0.788	0.788	0.788
Chlorides	g/L	20.	20.	20.	17.6	17.1	17.5	28.	18.	30.	18.	20.	22.48	28.
Sand %	%	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Water %	%	18.	13.	14.	13.	13.	14.	12.	11.	10.	10.	10.	10.	10.
Oil %	%	54.	48.	46.	50.	50.	50.	51.	52.	52.	54.	55.	55.	55.
Brine %	%	18.6	15.6	14.7	13.6	13.8	14.5	13.8	11.5	10.8	10.8	10.8	10.8	10.8
Corr. Solids %	%	29.4	34.4	38.4	38.4	38.8	38.4	38.8	38.8	38.8	38.8	38.8	38.8	38.8
LGS %	%	4.9	5.1	4.7	4.6	4.8	4.8	4.4	5.4	4.	4.2	4.	3.8	4.8
HGS %	%	24.6	31.6	31.6	31.7	31.7	30.75	30.75	30.75	31.2	31.2	31.2	31.2	31.2
ASG Solids		3.83	3.88	3.88	4.	4.	3.98	4.	3.98	4.02	4.01	4.02	4.02	3.99
Oil/Water Ratio		77:23	75:25	78:22	79:21	79:21	79:22	80:20	82:18	83:17	84:16	83:17	83:17	83:17
Oil/Brine Ratio		77:23	75:25	77:23	78:21	79:21	78:22	78:21	82:18	83:17	84:16	83:17	83:17	83:17

This report has been produced with MudTRAK Software 1.5 - Wed 31-Mar-1999 12:00

Well Name	34/11-4	Location	Norway	Date & Time	30-Mar-99 23:59
Operator	STATOIL	Contractor/Rig	Transocean Arctic	Interval	01/21
Operator Rep.	Johann Bysveen	Contractor Rep.	O.Sæthre, T.Myrvang	Dowell Eng.	G.Mitchell / Thierry Laporte
Analysis Type	OBM	Fluid System	INTERDRILLING	Sample Data	03-2001-1999

DRILLING FLUIDS PROPERTIES RECORD - From 07-Mar-99 23:59 to 30-Mar-99 23:59

Property Name	Units	14	15	16	17	18	19	20	21	22	23	24	25	26
Date		14-Mar-99	15-Mar-99	15-Mar-99	16-Mar-99	16-Mar-99	17-Mar-99	18-Mar-99	18-Mar-99	19-Mar-99	19-Mar-99	20-Mar-99	20-Mar-99	21-Mar-99
Time		22:00	04:00	22:00	12:45	22:00	13:00	21:30	22:00	14:00	22:00	14:00	23:00	05:30
Sample Loc.		FlowLine	Active S	Active S	FlowLine	FlowLine	Active S	FlowLine	FlowLine	FlowLine	Active S	FlowLine	Active S	FlowLine
MD	m	4175.	4177.	4177.	4177.	4204.	4204.	4204.	4235.	4303.	4332.	4373.	4400.	4417.
TYD	m	4175.	4177.	4177.		4204.			4235.	4303.	4332.	4373.	4400.	4417.
Flow. Temp.	degC	30.			31.	30.		31.	32.	28.	28.	28.	28.	32.
Density	g/cm3	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
Funnel Visc.	s	120	118	120	141	120	133	138	150	148	135	140	160	142
600 rpm		148	160	165	158	188	157	138	162	165	158	170	182	162
300 rpm		84	80	88	88	89	90	90	89	88	87	98	82	82
200 rpm		62	63	64	64	65	65	65	64	64	64	72	70	68
100 rpm		38	38	39	38	40	38	38	39	40	38	43	41	42
60 rpm		28	28	29	28	29	28	27	28	28	28	30	32	31
30 rpm		19	20	19	18	19	19	18	19	20	19	22	22	21
8 rpm		10	10	10	9	10	10	9	10	10	10	11	11	10
3 rpm		8	8	8	8	8	8	8	8	8	8	8	8	8
Rheo. Temp.	degC	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.
Plastic Visc.	mPa-s	64.	64.	67.	67.	69.	67.	68.	67.	68.	67.	72.	70.	70.
Yield Point	Pa	9.8	10.8	10.1	12.1	9.8	11.	14.1	10.8	9.8	9.8	10.8	10.8	10.8
10 sec. Gel	Pa	5.5	6.	5.5	6.	6.	5.5	4.5	6.	6.	4.5	6.5	4.8	5.5
10 min. Gel	Pa	18.5	11.	11.5	11.5	10.5	12.	11.	10.	10.	8.	10.5	8.5	8.5
n-synulus		0.511	0.516	0.521	0.521	0.526	0.526	0.530	0.526	0.521	0.518	0.518	0.53	0.53
K-synulus	Pa-s^n	1.777	1.789	1.798	1.748	1.781	1.788	1.792	1.743	1.748	1.784	1.878	1.781	1.771
HTHP Filtrate	mL	2.4	2.8	2.4	2.2	2.2	2.2	2.	2.2	2.9	1.	2.2	1.8	1.8
HTHP Cake	(325µ)	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
CaCl2 (Aeq)	g/L	204.28	204.73	204.73	212.97	221.54	273.85	204.73	221.54	221.54	221.54	221.54	221.54	221.54
Excess Lime	kg/m3	5.2	5.2	4.1	5.7	3.8	5.5	5.8	5.8	5.5	6.	5.7	4.5	5.8
Electric Stab	V	1025	1018	973	836	1023	1008	835	1027	1027	1032	1127	1117	1180
Asr (calc)		0.779	0.849	1.049	0.798	0.799	0.813	0.808	0.814	0.811	0.811	0.811	0.811	0.811
Chlorides	g/L	17.5	18.	18.	20.	20.	17.5	15.	17.5	17.5	17.5	17.5	17.5	17.5
Sand %	%	0.9	0.3	0.3	0.2	0.5	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Water %	%	9.	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
Oil %	%	54.	53.	53.	52.	50.	53.5	55.5	55.5	55.5	55.	55.	55.	55.
Brine %	%	9.7	10.5	10.5	10.8	10.9	10.7	10.8	10.7	10.7	10.7	10.7	10.7	10.7
Conn. Solids %	%	20.2	20.5	20.5	20.2	20.1	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2
LGS %	%	4.8	5.7	5.6	5.5	5.2	4.5	4.5	5.4	5.4	5.3	5.4	5.3	5.4
HGB %	%	31.8	30.3	30.2	30.4	30.8	31.3	31.8	31.8	31.8	31.8	31.8	31.8	31.8
ASG Solids		3.98	3.95	3.95	3.95	3.97	4.	4.	3.98	3.98	3.97	3.98	3.97	3.98
Oil/Water Ratio	%	85:14	84:16	84:17	83:17	83:17	83:17	84:16	83:17	83:17	83:17	83:17	83:17	83:17
Oil/Brine Ratio	%	85:16	85:17	85:17	85:17	85:17	85:17	84:16	85:17	85:17	85:17	85:17	85:17	85:17

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Well Name	34/11-4	Location	Norway	Date & Time	30-Mar-99 23:59
Operator	STATOIL	Contractor/Rig	Transocean Arctic	Spud Date	07/2/98
Operator Rep.	Johann Byeveen	Contractor Rep.	O.Sæhre, T.Myrvang	Dowell Eng.	G.Mitchell / Thierry Lapotre
Analysis Type	OBM	Fluid System	INTERDRILLM		05-Dec-1998

DRILLING FLUIDS PROPERTIES RECORD From 07-Mar-1998 23:59 to 30-Mar-1999 23:59														
Property Name	Units	27	28	29	30	31	32	33	34	35	36	37	38	39
Date		21-Mar-99	21-Mar-99	22-Mar-99	22-Mar-99	22-Mar-99	24-Mar-99	25-Mar-99	25-Mar-99	26-Mar-99	26-Mar-99	27-Mar-99	28-Mar-99	28-Mar-99
Time		13:00	22:30	01:30	22:00	20:00	20:00	20:00	05:00	13:30	22:30	20:30	09:00	22:00
Sample loc.		FlowLine	Active S	FlowLine	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S
MD	m	4438	4438	4438	4438	4438	4438	4438	4438	4220	3750	5860	3090	4048
TYD	m	4438	4438	4438	4438	4438	4438	4438	4438	4220	3750	5860	3090	4048
Flow. Temp.	degC	34	37	37	37	37	37	37	30	38	40	33	38	42
Density	g/cm3	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
Funnel Visc.	s	140	130	128	100	180	160	160	190	195	180	185	195	120
600 rpm		185	184	184	170	170	168	168	180	180	180	184	207	205
300 rpm		94	89	88	87	87	84	84	102	107	105	103	117	118
200 rpm		70	69	70	70	70	72	72	74	78	78	80	84	85
100 rpm		43	42	44	44	44	42	42	47	48	48	49	52	52
60 rpm		31	31	32	33	33	32	32	35	37	34	36	39	39
30 rpm		22	21	21	22	22	21	21	24	26	22	24	26	27
8 rpm		11	11	10	11	11	10	10	10	10	11	11	13	13
8 rpm		9	8	8	8	8	8	8	9	10	8	9	10	10
Rheo. Temp.	degC	90	90	90	90	90	90	90	90	90	90	90	90	90
Plastic Visc.	mPa-s	71	71	71	78	75	72	72	78	82	81	81	80	80
Yield Point	Pa	11	10.5	10.5	11.5	13.5	10.2	10.4	11.5	12	11.3	10.5	10.9	12.4
10 sec. Gel	Pa	6	5.5	5.5	6.5	5.5	6	6	6	7	6.7	6	6	6.7
10 min. Gel	Pa	10	8.5	8	10	8	8	8	8	10	8.5	10	10	10
n-annulus		0.898	0.833	0.833	0.842	0.842	0.835	0.836	0.827	0.818	0.809	0.828	0.834	0.832
K-annulus	Para^n	0.893	1.716	1.716	1.849	1.849	1.785	1.786	1.844	1.807	1.843	1.808	1.789	1.788
HTHP Filtrate	mL	2.2	1.8	1.8	2	2	2	2	1.8	1.8	1.8	2.2	2	1.8
HTHP Cake	1/32nd"	1	1	1	1	1	1	1	1	1	1	1	1	1
CaCl2 (Acq)	g/L	204.06	218.02	233.2	233.2	233.2	233.2	233.2	233.2	221.64	207.60	189.84	207.68	234.73
Excess Lime	kg/m3	5.4	5.2	5.2	5	5	5	5	5	5	5	5	5	4.8
Electric Stab	V	1207	1128	1135	1098	1077	1060	1060	1110	828	812	835	789	795
Aw (calc)		0.897	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817
Chlorides	g/L	13	16.26	18.28	18.25	18.25	18.25	18.25	18.25	18.25	18.25	18	18	18
Sand %	%	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Water %	%	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	10	10	10	10	10
Oil %	%	63	58	55	55	55	53	52	50	51	51	51	50	48
Brine %	%	18.1	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2
Corr. Solids %	%	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9
LGS %	%	5.8	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
HGS %	%	31.1	30.5	30.5	30.7	30.2	30.2	30.4	30.4	30.2	30.2	30.2	30.2	30.2
ASG Solids		3.95	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.9	3.8	3.8	3.8	3.85
Oil/Water Ratio	%	65:15	65:15	65:15	65:15	65:15	65:15	65:15	65:15	65:15	65:15	65:15	65:15	65:15
Oil/Brine Ratio	%	84:18	84:18	84:18	84:18	84:18	84:18	84:18	84:18	85:17	85:17	85:17	85:17	85:18

Well Name	34/11-4	Location	Norway	Date & Time	30-Mar-99 23:59
Operator	STATOIL	Contractor/Rig	Transocean Arctic	Interval	01/2 in
Operator Rep.	Johann Bysveen	Contractor Rep.	O. Seethra, T. Myrvang	Dowell Eng.	G. Mitchell / Thierry Lapotre
Analysis Type	OBM	Fluid System	INTERDRILL NT	Spud Date	05-Dec-1995

DRILLING FLUIDS PROPERTIES RECORD - From 07-Mar-1999 23:59 to 30-Mar-1999 23:59												
Property Name	Units	40	41	42	43	44						
Data		29-Mar-99	29-Mar-99	29-Mar-99	30-Mar-99	30-Mar-99						
Time		02:30	09:30	23:50	13:18	23:00						
Sample loc.		Active S	Active S	Active S	Active S	Active S						
MD	m	4054.	4080.	4078.	4092.	4087.						
TVD	m	4054.		4078.		4087.						
Flow. Temp.	degC	43.	40.9	43.	44.	45.						
Density	g/cm3	2.0	2.0	2.0	2.0	2.0						
Funnel Visc.	s	125	128	120	110	110						
600 rpm		188	195	185	189	184						
300 rpm		106	112	105	105	104						
200 rpm		78	82	80	77	77						
100 rpm		48	50	49	46	47						
50 rpm		35	37	35	35	38						
30 rpm		24	26	25	24	23						
6 rpm		11	10	11	12	11						
3 rpm		9	10	9	10	9						
Rheo. Temp.	degC	60.	60.	60.	55.	60.						
Plastic Visc.	mPa.s	82.	83.	81.	78.	80.						
Yield Point	Pa	11.5	13.8	11.5	12.9	11.5						
10 sec. Gel	Pa	5.2	7.	5.3	6.5	5.3						
10 min. Gel	Pa	3.1	3.5	3.3	3.	3.						
n-annulus		0.595	0.525	0.593	0.511	0.591						
K-annulus	Pa.s ^{0.5}	1.82	2.172	1.995	2.222	1.933						
HTHP Filtrate	mL	1.6	1.1	1.2	1.	1.2						
HTHP Cake	1/32nd"	1.	1.	1.	1.	1.						
CaCl2 (Acc)	g/L	173.08	181.54	195.15	211.91	211.91						
Excess Lime	kg/m3	1.7	1.1	1.5	1.4	1.5						
Electric Stab	V	980	904	935	1021	1035						
Aw (calc)		9.985	9.87	9.87	9.87	9.87						
Chlorides	g/L	15.	16.25	16.25	16.25	16.25						
Sand %	%	0.3	0.2	0.2	0.2	0.3						
Water %	%	12.	12.	12.	12.	12.						
Oil %	%	50.	50.	50.	50.	50.						
Brine %	%	12.6	12.7	12.6	12.6	12.6						
Con. Solids %	%	37.4	37.3	37.4	37.4	37.4						
LGS %	%	8.4	8.3	8.4	8.5	8.5						
HGS %	%	28.	28.	28.	28.6	28.3						
ASG Solids		3.84	3.85	3.84	3.84	3.84						
Oil/Water Ratio	%	21:19	21:19	21:19	21:19	21:19						
Oil/Brine Ratio	%	80:20	80:20	80:20	80:20	80:20						

Title: Standard geochemical evaluation of wells 34/11-4, -4 T2 and -4 T3		
Document no.: LUT-GEO2499	Contract no./project no.:	Filing no.:

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Approved: LUT-GEO	Name: Frode Fasteland	Date/Signature: 11/1200 <i>[Signature]</i>

1 INTRODUCTION

This report presents the results of a standard geochemical evaluation of wells 34/11-4, -4T2 and -4T3, drilled in the Mats segment, east of Gullfaks Gamma in the Northern Viking Graben (Figure 1). 34/11-4 was drilled down to 3938.5mMD RKB with water based mud (WBM). Due to problems with the 9 7/8" casing, a sidetrack (34/11-4 T2) was drilled with oil based mud (OBM) from 3939m MD RKB down to 4438mMD RKB

A new well was sidetracked (34/11-4 T3) above the reservoir, using a water based mud system to optimize for hydrocarbon samples.

The aims of this project are to identify and evaluate potential source rock intervals and characterise migrated petroleum in terms of the parent source rock facies and level of thermal maturity. The analytical programme is described in detail in Appendix 1. The analytical work was performed in accordance with the guidelines given in "The Norwegian Industry Guide to Organic Geochemical Analyses (1993). The project was carried out by LGC geochemistry, with the exception of the vitrinite reflectance analyses and gas measurements which were carried out by IFE. All the data are provided in the Appendix.

APPENDICES:

Appendix 1. Vitrinite reflectance well 34/11-4 and -4 T2, offshore Norway, IFE

Appendix 2. Datareport on molecular and stable isotope composition of gas samples from well 34/11-4 T3, IFE

Appendix 3. Geochemical analysis of sediment samples, drilling mud extracts and hydrocarbon fluids from 34/11-4, -4 T2 and -4 T3, offshore Norway, LGC geochemistry

Table 1. Biomarker parameters

Well	Depth <small>(mMD RKB/mTYD MSL)</small>	Lith	Test sample type	Notes	20S	bb	22S	Ts/Tm	Ttx	30D/H	30ab	%C27	%C28	%C29
34/11-4	3924	clst	cutt	WBM	0.68	0.62	0.59	2.21	9.78	0.68	0.91	35	33	32
34/11-4T2	3948	mud	mud	OBM	0.39	0.32	0.57	0.17	0.00	0.00	0.80	25	39	36
34/11-4T2	3960	clst	cutt	OBM	0.38	0.32	0.62	0.23	0.27	0.03	0.79	25	40	35
34/11-4T2	3996	clst	cutt	OBM	0.39	0.33	0.60	0.37	0.51	0.05	0.79	27	39	34
34/11-4T2	4017	clst	cutt	OBM	0.39	0.29	0.62	0.22	0.27	0.03	0.79	24	40	36
34/11-4T2	4041	clst	cutt	OBM	0.37	0.28	0.59	0.11	0.00	0.00	0.79	21	42	37
34/11-4T2	4065	clst	cutt	OBM	0.38	0.28	0.60	0.12	0.00	0.00	0.79	19	43	38
34/11-4T2	4089	clst	cutt	OBM	0.39	0.28	0.59	0.10	0.00	0.00	0.78	20	43	37
34/11-4T2	4119	clst	cutt	OBM	0.37	0.27	0.60	0.10	0.00	0.00	0.78	22	41	37
34/11-4T2	4148	mud	mud	OBM	0.39	0.30	0.59	0.09	0.00	0.00	0.79	20	43	37
34/11-4T2	4152.7	sst	core	OBM	0.39	0.36	0.59	0.16	0.00	0.00	0.79	25	39	36
34/11-4T2	4157.9	sst	core	OBM	0.39	0.33	0.60	0.12	0.00	0.00	0.79	23	40	37
34/11-4T2	4165.8	sst	core	OBM	0.40	0.35	0.60	0.13	0.00	0.00	0.78	24	40	37
34/11-4T2	4176.8	sst	core	OBM	0.38	0.29	0.59	0.11	0.00	0.00	0.79	22	41	36
34/11-4T2	4195.1	sst	core	OBM	0.37	0.32	0.60	0.11	0.00	0.00	0.79	23	41	36
34/11-4T2	4196.1	sst	core	OBM	0.39	0.31	0.60	0.11	0.00	0.00	0.80	21	42	37
34/11-4T2	4198.2	sst	core	OBM	0.38	0.31	0.59	0.10	0.00	0.00	0.79	22	41	37
34/11-4T3	4151	MDT1	MDT	WBM	0.61	0.64	0.59	1.33	1.55	0.19	0.86	30	31	39
34/11-4T3	4194.8	MDT1	MDT	WBM	0.60	0.57	0.00	0.00	0.00	0.29	1.00	29	30	41
34/11-4T2	4204	mud	mud	OBM	0.39	0.37	0.56	0.18	0.00	0.00	0.81	26	40	34

Table 1 (cont). Biomarker parameters

Well	Depth <small>(mMD RKB/mTVD MSL)</small>	Lith	Test sample type	Notes	C30	Dia/reg	28ab/H	3R/H	4R/H	35/34H	29/30H	Dem/H	O/H
34/11-4	3924	clst	cutt	WBM	0.13	4.61	0.11	0.16	0.13	0.77	0.27	-	-
34/11-4T2	3948	mud	mud	OBM	0.00	0.47	0.03	0.19	0.07	0.74	0.57	-	-
34/11-4T2	3960	clst	cutt	OBM	0.09	0.55	0.00	0.19	0.07	0.63	0.63	-	-
34/11-4T2	3996	clst	cutt	OBM	0.06	0.67	0.00	0.18	0.07	0.76	0.60	-	-
34/11-4T2	4017	clst	cutt	OBM	0.08	0.60	0.00	0.12	0.06	0.56	0.64	-	-
34/11-4T2	4041	clst	cutt	OBM	0.05	0.45	0.00	0.11	0.05	0.61	0.64	-	-
34/11-4T2	4065	clst	cutt	OBM	0.05	0.41	0.00	0.09	0.04	0.52	0.60	-	-
34/11-4T2	4089	clst	cutt	OBM	0.04	0.42	0.00	0.11	0.05	0.52	0.64	-	-
34/11-4T2	4119	clst	cutt	OBM	0.06	0.43	0.00	0.11	0.05	0.47	0.67	-	-
34/11-4T2	4148	mud	mud	OBM	0.07	0.47	0.00	0.14	0.06	0.63	0.64	-	-
34/11-4T2	4152.7	sst	core	OBM	0.06	0.69	0.02	0.12	0.05	0.82	0.68	-	-
34/11-4T2	4157.9	sst	core	OBM	0.05	0.57	0.00	0.07	0.04	0.61	0.64	-	-
34/11-4T2	4165.8	sst	core	OBM	0.07	0.72	0.00	0.08	0.04	0.61	0.62	-	-
34/11-4T2	4176.8	sst	core	OBM	0.05	0.52	0.00	0.11	0.05	0.63	0.66	-	-
34/11-4T2	4195.1	sst	core	OBM	0.06	0.54	0.00	0.11	0.05	0.63	0.66	-	-
34/11-4T2	4196.1	sst	core	OBM	0.06	0.48	0.00	0.11	0.05	0.64	0.64	-	-
34/11-4T2	4198.2	sst	core	OBM	0.06	0.51	0.00	0.06	0.03	0.61	0.62	-	-
34/11-4T3	4151	MDT1	MDT	WBM	0.11	2.76	0.07	0.20	0.11	0.87	0.67	0.11	-
34/11-4T3	4194.8	MDT1	MDT	WBM	0.00	3.37	0.00	0.00	0.00	ERR	0.73	-	-
34/11-4T2	4204	mud	mud	OBM	0.07	0.97	0.02	0.15	0.07	0.79	0.65	-	-

Derivation of biomarker ratios reported in Table 1

<u>Ratio</u>	<u>Derivation</u>	<u>m/z</u>
Triterpanes		
22S	$32\alpha\beta S / (32\alpha\beta S + 32\alpha\beta R)$	191
Ts/Tm	$27Ts / 27Tm$	191
TiX	$30d / 29\beta\alpha$	191
30D/H	$30d / 30\alpha\beta$	191
29/30H	$29\alpha\beta / 30\alpha\beta$	191
30ab	$30\alpha\beta / (30\alpha\beta + 30\beta\alpha)$	191
C28ab/H	$28\alpha\beta / 30\alpha\beta$	191
3R/H	$(23/3) / 30\alpha\beta$	191
4R/H	$(24/4) / 30\alpha\beta$	191
35/34H	$(35\alpha\beta R + 35\alpha\beta S) / (34\alpha\beta R + 34\alpha\beta S)$	191
Dem/H	$25nor30\alpha\beta / 30\alpha\beta$	191
O/H	$30O / 30\alpha\beta$	191
G/H	$30G / 30\alpha\beta$	191
Steranes		
20S	$29\alpha\alpha S / (29\alpha\alpha R + 29\alpha\alpha S)$	217
bb	$(29\beta\beta R + 29\beta\beta S) / (29\beta\beta R + 29\beta\beta S + 29\alpha\alpha R + 29\alpha\alpha S)$	217
%C27	$100 * (27\beta\beta R + 27\beta\beta S) / (27\beta\beta R + 27\beta\beta S + 28\beta\beta R + 28\beta\beta S + 29\beta\beta R + 29\beta\beta S)$	218
%C28	$100 * (28\beta\beta R + 28\beta\beta S) / (27\beta\beta R + 27\beta\beta S + 28\beta\beta R + 28\beta\beta S + 29\beta\beta R + 29\beta\beta S)$	218
%C29	$100 * (29\beta\beta R + 29\beta\beta S) / (27\beta\beta R + 27\beta\beta S + 28\beta\beta R + 28\beta\beta S + 29\beta\beta R + 29\beta\beta S)$	218
C30st	$(30\beta\beta R + 30\beta\beta S) / (27\beta\beta R + 27\beta\beta S + 28\beta\beta R + 28\beta\beta S + 29\beta\beta R + 29\beta\beta S)$	218
Dia/reg	$(27d\beta R + 27d\beta S) / (27\alpha\alpha R + 27\alpha\alpha S)$	217