

DST No	2A	2B
Formation	Hugin	Hugin
Perforated interval m TVD RT	3099.9 - 3102.5 (3.0 m MD)	3099.2-3102.5 + 3046.2-3081.3 (3.0 + 39 m MD)
<b>Production and fluid data</b>		
Fluid flow rate <i>average rate</i>	300 Sm <sup>3</sup> /d	560 Sm <sup>3</sup> /d
Gas flow rate	27000 Sm <sup>3</sup> /d	45000 Sm <sup>3</sup> /d
GOR test	90 Sm <sup>3</sup> /Sm <sup>3</sup>	80 Sm <sup>3</sup> /Sm <sup>3</sup>
GOR single flash	111.8 Sm <sup>3</sup> /Sm <sup>3</sup>	111.8 Sm <sup>3</sup> /Sm <sup>3</sup>
Bottom hole flowing pressure / temperature	210 bar / 112.3 °C	326.5 bar / 110.8 °C
Pressure drawdown over perforations	approx. 120 bar	approx. 8.2 bar
Estimated initial pressure	336.5 bar +/- 0.5 bar	
CO <sub>2</sub> / H <sub>2</sub> S	2.5 ppm / 3.5 %	2.8 ppm / 3.5 %
Oil density	720 kg/m <sup>3</sup>	720 kg/m <sup>3</sup>
Gas gravity	0.724 (air = 1)	0.724 (air = 1)
Viscosity at Pb	0.790 mPa s	0.790 mPa s
Bubble point pressure	235.5 bar (BHS)	226.5 (surface PVT set)
BS&W	0	0

Table 3.2 Summary of measured values from test 2A&2B

See test report for more information



Dowell

DRILLING FLUIDS SERVICES

MudCADE\*

Administration Data

Well Name	15/9-19A	Location	NORWAY	Date & Time	03-Sep-97 23:59
Operator	Statoil	Contractor/Rig	Dolphin Drilling	Interval	8 1/2 in
Operator Rep.	S. Løland	Contractor Rep.	S. Skarsbø	Dowell Eng.	Gareth Finley/Neil Rothnie
Analysis Type	OBM	Fluid System	ULTIDRIILL	Spud Date	16-Jul-1997

DRILLING FLUIDS PROPERTIES RECORD - From 23-Jul-1997 23:59 to 10-Aug-1997 23:59

Property Name	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
Date		24-Jul-97	25-Jul-97	25-Jul-97	28-Jul-97	27-Jul-97	28-Jul-97	28-Jul-97	28-Jul-97	30-Jul-97	30-Jul-97	30-Jul-97	31-Jul-97	01-Aug-97
Time		23:59	14:28	21:00	22:00	21:15	17:00	22:15	22:45	10:21	17:30	21:00	17:00	05:00
Sample loc.		Pit 2	Active S	Active S	Active S	Active S	Active S	FlowLine	Active S	Active S	Active S	Active S	Active S	Active S
MD	m	2310.	2310.	2213.	2213.	2187.	2178.	2192.	2314.	2450.	2622.	2684.	2768.	2768.
TVD	m						2178.					2000.	2079.	2079.
Hole Angle	deg		60.			60.	60.	60.	60.	36.	37.	37.	26.	26.
Density	g/cm3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.49	1.5	1.5	1.5	1.5
Gradient	kPafm	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.6	14.7	14.7	14.7	14.7
Funnel Visc.	s		135	117	143	143	151	147	75	71	70	64	65	80
600 rpm		102	137	122	120	128	131	133	102	107	104	107	107	116
300 rpm		61	81	73	74	78	81	82	64	67	63	66	66	72
200 rpm		47	60	56	56	57	61	61	50	52	48	51	51	55
100 rpm		31	39	37	38	38	41	40	34	38	32	35	35	38
6 rpm		12	14	16	16	17	20	19	15	16	14	15	15	16
3 rpm		11	13	15	15	15	18	17	14	14	12	14	14	15
Plastic Visc.	cP	41	56	49	46	50	50	51	38	40	41	41	41	44
Yield Point	Pa	9.6	12.	11.5	13.4	13.4	14.8	14.8	12.4	12.9	10.5	12.	12.	13.4
10 sec. Gel	Pa	8.	10.	13.	12.	13.	15.	14.	11.	10.	10.	10.	10.	12.
10 min. Gel	Pa	15.	19.	19.	18.	20.	22.	20.	18.	17.	17.	17.	17.	16.
n-annulus		0.372	0.397	0.344	0.347	0.358	0.327	0.342	0.33	0.34	0.36	0.337	0.337	0.341
K-annulus	Pa-s^n	3.064	3.475	4.378	4.355	4.275	5.399	4.975	4.178	4.109	3.408	4.131	4.131	4.398
HTHP Filtrate	mL	1.5	2.	1.2	1.5	2.	2.	2.	1.8	2.	2.	2.	2.	1.8
HTHP Cake	1/32nd"	2.	1.	2.	2.	2.	1.	2.	2.	1.	1.	2.	1.	2.
HTHP Temp.	degC	250.	250.	250.	250.	250.	250.	250.	250.	100.	100.	100.	100.	100.
CaCl2 (Acq)	g/L	112.7	158.9	92.5	112.7	92.5	111.	98.5	99.1	144.9	172.1	144.3	172.1	125.8
CaCl2 (Mud)	g/L	38.1	50.9	30.5	38.1	30.5	33.3	30.5	27.7	39.1	43.	36.1	43.	33.3
Alkalinity		1.1	.55	1.7	1.7	1.4	1.5	1.7	1.7	2	2.5	1.6	1.55	1.3
Excess Lime	kg/m3	4.1	2.	6.3	6.3	5.2	5.6	6.3	6.3	7.4	9.3	5.9	5.7	4.8
Electric Stab	V	344		458	398	528	600	579	598	636	705	544	587	692
Aw (calc)		0.864	0.864	0.888	0.874	0.888	0.866	0.861	0.88	0.876	0.852	0.852	0.852	0.861
Chlorides	g/L	32.5	32.5	27.5	30.	27.5	30.	27.5	25.	25.	27.5	27.5	27.5	27.5
Sand %	%	0.	0.	1.	0.5	1.	1.	0.3	0.5	0.3	0.3	0.3	0.3	0.3
Water %	%	32.	32.	33.	32.	33.	30.	31.	28.	27.	25.	25.	25.	26.5
Oil %	%	49.	49.	49.	49.	49.	49.	49.	52.	52.	53.	54.	54.	53.
Corr. Solids %	%	17.6	17.8	18.8	17.8	18.8	19.8	18.8	18.9	20.1	21.	19.9	20.	19.4
LGS %	%	1.4	1.9	2.	1.5	1.4	5.8	3.5	3.2	4.6	5.8	3.5	3.7	2.5
HGS %	%	16.2	15.8	14.9	16.2	15.5	13.9	15.4	15.7	15.5	15.2	16.4	16.3	16.9
Oil/Water Ratio	%	60:40	60:40	60:40	60:40	60:40	62:38	61:39	65:35	66:34	68:32	68:32	68:32	67:33
Sulphide	mg/L													

This report has been produced with MudCADE Software 1.1c - Wed 7-Jan-1998 16:07

## Administration Data

Well Name	15/9-19A	Location	NORWAY	Date & Time	03-Sep-97 23:59
Operator	Statoli	Contractor/Rlg	Dolphin Drilling	Interval	8 1/2 In
Operator Rep.	S. Løland	Contractor Rep.	S. Skarsbø	Dowell Eng.	Gareth Finley/Neil Rothnie
Analysis Type	OBM	Fluid System	ULTIDRILL	Spud Date	16-Jul-1997

## DRILLING FLUIDS PROPERTIES RECORD - From 23-Jul-1997 23:59 to 10-Aug-1997 23:59

Property Name	Units	14	15	16	17	18	19	20	21	22	23	24	25	26
Date		01-Aug-97	01-Aug-97	02-Aug-97	03-Aug-97	03-Aug-97	04-Aug-97	04-Aug-97	05-Aug-97	05-Aug-97	05-Aug-97	06-Aug-97	06-Aug-97	06-Aug-97
Time		13:45	22:00	22:00	18:00	22:00	04:45	17:00	08:45	16:30	22:00	04:00	11:45	18:00
Sample loc.		Active S	Active S	Active S	Active S	Active S	FlowLine	Active S	Active S	Active S	Active S	Active S	Active S	Active S
MD	m	2763.	2783.	2783.	2806.	2912.	3028.	3057.	3180.	3316.	3356.	3380.	3437.	3370.
TVD	m		2089.	2089.		2207.	2315.	2343.	2407.	2578.	2614.	2636.	2688.	
Hole Angle	deg			26.	24.	22.	23.		25.	25.	25.	25.	25.	
Density	g/cm3	1.5	1.5	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.55	1.55	0.0
Gradient	kPa/m	14.7	14.7	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.2	15.2	0.
Funnel Visc.	s	70	72	79	68	70	68	70	60	58	54	54	54	
600 rpm		102	105	109	111	105	105	105	82	80	89	88	84	
300 rpm		64	68	67	68	65	65	65	51	58	55	54	52	
200 rpm		50	51	51	52	50	51	51	40	43	43	42	40	
100 rpm		33	33	36	35	35	35	35	27	30	29	29	27	
6 rpm		14	14	13	13	13	13	13	11	12	12	12	11	
3 rpm		13	13	12	12	12	12	12	10	11	11	11	10	
Plastic Visc.	cP	38	39	42	43	40	40	40	31	34	34	34	32	
Yield Point	Pa	12.4	12.9	12.	12.	12.	12.	12.	9.8	10.5	10.1	9.6	9.6	
10 sec. Gel	Pa	10.	10.	11.	9.	9.5	9.5	10.	8.	8.	8.	8.	14.	
10 min. Gel	Pa	20.	20.	19.	18.	19.	18.	18.	17.	17.	17.	18.	31.	
n-annulus		0.346	0.353	0.373	0.377	0.367	0.367	0.367	0.354	0.353	0.349	0.346	0.358	
K-annulus	Pa*s^n	3.777	3.736	3.335	3.317	3.371	3.371	3.371	2.869	3.158	3.179	3.199	2.85	
HTHP Filtrate	mL	1.2	1.3	1.3	1.	1.5	1.8	1.8	1.8	1.8	1.8	1.7	2.	
HTHP Cake	1/32nd"	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	
HTHP Temp.	degC	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	
CaCl2 (Acq)	g/L	123.3	123.3	128.8	133.8	144.1	144.3	144.3	144.8	144.8	144.8	144.8	145.3	
CaCl2 (Mud)	g/L	33.3	33.3	36.1	36.1	37.5	36.1	36.1	33.3	33.3	33.3	33.3	30.5	
Alkalinity		2.2	2.2	3	3.3	3.5	3.5	3.5	3.3	3.1	3.15	3.1	3.2	
Excess Lime	kg/m3	8.2	8.2	11.1	12.2	13.	13.	13.	12.2	11.5	11.7	11.5	11.9	
Electric Stab	V	677	671	618	639	628	668	652	669	677	651	662	737	
Aw (calc)		0.863	0.863	0.868	0.863	0.845	0.839	0.839	0.84	0.84	0.84	0.84	0.824	
Chlorides	g/L	27.5	27.5	27.5	27.5	30	30.	30.	27.5	27.5	27.5	27.5	27.5	
Sand %	%	0.3	0.3	0.4	0.	0.3	0.2	0.2	0.5	0.3	0.4	0.3	0.	
Water %	%	27.	27.	28.	27.	26.	25.	25.	23.	23.	23.	23.	21.	
Oil %	%	53.	53.	51.	52.	52.	53.	53.	55.	55.	55.	55.	57.	
Corr. Solids %	%	18.9	18.9	18.9	18.9	20.8	20.7	20.7	20.9	20.9	20.9	20.9	20.8	
LGS %	%	1.5	1.5	1.4	1.2	3.1	2.9	2.9	2.7	2.7	2.7	2.7	1.7	
HGS %	%	17.4	17.4	18.5	18.7	17.7	17.8	17.8	18.1	18.1	18.1	18.1	19.1	
Oil/Water Ratio	%	66:34	66:34	65:35	66:34	67:33	68:32	68:32	71:29	71:29	71:29	71:29	73:27	
Sulphide	mg/L								0.				0.	

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Administration Data					
Well Name	15/9-19A	Location	NORWAY	Date & Time	03-Sep-97 23:59
Operator	Statoil	Contractor/Rig	Dolphin Drilling	Interval	8 1/2 In
Operator Rep.	S. Løland	Contractor Rep.	S.Skarsbø	Dowell Eng.	Gareth Finley/Neil Rothnie
Analysis Type	OBM	Fluid System	ULTIDRILL	Spud Date	16-Jul-1997

DRILLING FLUIDS PROPERTIES RECORD - From 23-Jul-1997 23:59 to 10-Aug-1997 23:59

Property Name	Units	27	28	29	30	31	32	33	34	35	36	37	38	39
Date		08-Aug-97	06-Aug-97	06-Aug-97	06-Aug-97	06-Aug-97	07-Aug-97	07-Aug-97	07-Aug-97	08-Aug-97	09-Aug-97	09-Aug-97	10-Aug-97	10-Aug-97
Time		18:00	18:00	18:00	18:00	22:00	04:05	08:00	22:30	14:00	14:30	21:45	04:30	14:00
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	3370.	3370.	3370.	3494.	3532.	3581.	3586.	3632.	3653.	3701.	3736.	3774.	3803.
TVD	m				2739.	2774.	2800.	2824.	2866.	2886.	2926.	2960.	2995.	3020.
Hole Angle	deg				25.	24.	24.	25.	24.	24.	24.	24.	25.	24.
Density	g/cm3	0.0	0.0	0.0	1.55	1.55	1.55	1.55	1.55	1.55	1.58	1.56	1.55	1.55
Gradient	kPa/m	0.	0.	0.	15.2	15.2	15.2	15.2	15.2	15.2	15.5	15.3	15.2	15.2
Funnel Visc.	s				54	55	52	54	58	57	76	64	58	68
600 rpm					83	84	89	86	86	92	101	98	95	96
300 rpm					52	52	55	54	54	57	64	62	59	60
200 rpm					40	40	43	42	43	44	50	48	46	47
100 rpm					28	27	29	28	29	30	33	33	31	30
6 rpm					11	12	12	11	11	11	11	11	11	11
3 rpm					10	11	11	10	10	10	10	10	10	10
Plastic Visc.	cP				31	32	34	32	32	35	37	36	36	36
Yield Point	Pa				10.1	9.8	10.1	10.5	10.5	10.5	12.9	12.4	11.	11.5
10 sec. Gel	Pa				14.	7.	7.	8.	8.	9.	9.	7.	6.5	9.
10 min. Gel	Pa				32.	16.	15.5	18.	18.	18.	18.	16.	15.	18.
n-annulus					0.358	0.337	0.349	0.366	0.366	0.378	0.403	0.396	0.385	0.389
K-annulus	Pa*s^n				2.85	3.242	3.179	2.812	2.812	2.759	2.648	2.678	2.725	2.709
HTHP Filtrate	mL				1.8	1.9	2.	2.8	2.1	2.1	2.1	2.1	2.2	2.1
HTHP Cake	1/32nd"				2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
HTHP Temp.	degC				100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
CaCl2 (Acq)	g/L				145.3	156.5	138.7	166.5	166.5	158.5	158.5	158.5	151.3	158.5
CaCl2 (Mud)	g/L				30.5	33.3	30.5	33.3	33.3	33.3	33.3	33.3	33.3	33.3
Alkalinity					3	3.2	3.2	3	3.25	3.25	3.75	3.8	4	3.8
Excess Lime	kg/m3				11.1	11.9	11.9	11.1	12.	12.	13.9	14.1	14.8	14.1
Electric Stab	V				765	702	707	729	714	606	796	601	594	547
Aw (calc)					0.824	0.824	0.847	0.815	0.815	0.824	0.824	0.824	0.832	0.824
Chlorides	g/L				27.5	27.5	25.	27.5	27.5	27.5	27.5	27.5	27.5	27.5
Sand %	%				0.	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.3
Water %	%				21.	21.	22.	20.	20.	21.	21.	21.	22.	21.
Oil %	%				57.	56.	58.	57.	57.	57.	56.	57.	56.	57.
Corr. Solids %	%				20.8	21.8	21.	21.8	21.8	20.8	21.8	20.8	20.8	20.8
LGS %	%				1.7	3.9	2.	1.9	2.5	1.8	2.1	1.2	1.9	1.8
HGS %	%				19.1	17.9	19.	19.9	19.3	19.	19.8	19.7	18.9	19.
Oil/Water Ratio	%				73:27	73:27	72:28	74:26	74:26	73:27	73:27	73:27	72:28	73:27
Sulphide	mg/L							0.		0.	0.			

## Administration Data

Well Name	15/9-19A	Location	NORWAY	Date & Time	03-Sep-97 23:59
Operator	Statoil	Contractor/Rig	Dolphin Drilling	Interval	8 1/2 in
Operator Rep.	S. Løland	Contractor Rep.	S. Skarsbø	Dowell Eng.	Gareth Finley/Neil Rothnie
Analysis Type	OBM	Fluid System	ULTIDRILL	Spud Date	16-Jul-1997

## DRILLING FLUIDS PROPERTIES RECORD - From 10-Aug-1997 23:59 to 03-Sep-1997 23:59

Property Name	Units	40	41	42	43	44	45	46	47	48	49	50	51	52
Date		11-Aug-97	12-Aug-97	12-Aug-97	13-Aug-97	14-Aug-97	14-Aug-97	15-Aug-97	15-Aug-97	16-Aug-97	16-Aug-97	17-Aug-97	17-Aug-97	18-Aug-97
Time		13:00	14:00	22:45	21:27	03:00	22:30	14:00	23:00	14:00	23:00	15:30	21:00	14:00
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	3837.	3838.	3845.	3854.	3881.	3893.	3908.	3936.	3938.	3962.	3988.	3990.	3990.
TVD	m	3061.	3051.	3058.	3070.	3089.	3100.	3113.	3136.	3136.	3159.	3160.	3183.	3180.
Hole Angle	deg	24.	25.	25.	25.	25.	26.	27.	27.	27.	27.	27.	27.	27.
Density	g/cm3	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
Gradient	kPa/m	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Funnel Visc.	s	64	63	59	60	65	58	75	75	74	74	67	68	68
600 rpm		97	97	91	93	105	98	96	100	100	99	102	110	104
300 rpm		60	60	55	56	64	59	60	64	60	63	60	70	62
200 rpm		44	45	42	43	49	44	44	49	45	46	45	54	47
100 rpm		30	30	29	29	32	29	30	32	21	33	31	35	31
6 rpm		11	11	11	11	12	11	11	12	11	12	11	13	11
3 rpm		10	10	10	10	11	10	10	10	10	10	10	11	10
Plastic Visc.	cP	37	37	36	37	41	39	36	36	40	36	42	40	42
Yield Point	Pa	11.	11.	9.1	9.1	11.	9.6	11.5	13.4	9.6	12.9	8.8	14.4	9.6
10 sec. Gel	Pa	9.	9.	7.	7.	7.	7.	9.	7.	7.	7.	10.	8.	9.
10 min. Gel	Pa	18.	18.	13.	13.	14.	14.	17.	15.	14.	15.	18.	18.	18.
n-annulus		0.389	0.389	0.37	0.374	0.382	0.385	0.389	0.403	0.389	0.4	0.389	0.402	0.396
K-annulus	Pa.s^n	2.709	2.709	2.794	2.778	3.012	2.725	2.709	2.648	2.709	2.662	2.709	2.918	2.678
HHP Filtrate	mL	2.2	2.1	1.8	1.8	1.8	1.9	2.	2.	2.	2.	2.2	2.2	2.1
HHP Cake	1/32nd"	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
HHP Temp.	degC	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
CaCl2 (Acq)	g/L	151.3	151.3	151.3	151.3	151.3	151.3	151.3	151.3	151.3	151.3	151.3	151.3	138.3
CaCl2 (Mud)	g/L	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	31.4
Alkalinity		4.5	3.95	3.9	3.8	3.75	3.75	3.85	3.95	3.95	3.9	4	3.5	3.7
Excess Lime	kg/m3	16.7	14.6	14.4	14.1	13.9	13.9	14.3	14.6	14.6	14.4	14.8	13.	13.7
Electric Stab	V	547	550	494	502	594	578	580	587	540	534	553	550	504
Aw (calc)		0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.024	0.085	0.84
Chlorides	g/L	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	160.	160.	27.5
Sand %	%	0.3	0.3	0.1	0.1	0.1	0.1	0.	0.	0.	0.	0.2	0.1	0.3
Water %	%	22.	22.	22.	22.	22.	22.	22.	22.	22.	22.	22.	22.	23.
Oil %	%	56.	56.	56.	56.	56.	56.	56.	56.	56.	56.	56.	56.	55.
Corr. Solids %	%	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	19.3	19.3	20.8
LGS %	%	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	0.3	0.4	2.
HGS %	%	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.8
Oil/Water Ratio	%	72:28	72:28	72:28	72:28	72:28	72:28	72:28	72:28	72:28	72:28	72:28	72:28	71:29
Sulphide	mg/L	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

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## Administration Data

Well Name	15/9-19A	Location	NORWAY	Date & Time	03-Sep-97 23:59
Operator	Statoff	Contractor/Rig	Dolphin Drilling	Interval	8 1/2 in
Operator Rep.	S. Løland	Contractor Rep.	S. Skarsbø	Dowell Eng.	Gareth Finley/Neil Rothnie
Analysis Type	OBM	Fluid System	ULTIDRILL	Spud Date	16-Jul-1997

## DRILLING FLUIDS PROPERTIES RECORD - From 10-Aug-1997 23:59 to 03-Sep-1997 23:59

Property Name	Units	53	54	55	56	57	58	59	60	61	62	63	64	65
Date		18-Aug-97	19-Aug-97	20-Aug-97	20-Aug-97	21-Aug-97	21-Aug-97	21-Aug-97	22-Aug-97	23-Aug-97	24-Aug-97	25-Aug-97	26-Aug-97	27-Aug-97
Time		23:00	14:00	14:00	21:00	04:30	13:00	23:00	23:58	23:00	23:00	21:57	21:51	22:12
Sample loc.		Active S	Active S	Active S	Active S	Active S	Active S	Pit 2	Active S	Pit 2	Pit 2	Active S	Active S	Active S
MD	m	4017.	4017.	4017.	4017.	4017.	4131.	4131.	4131.	4131.	4131.	4131.	4131.	4131.
TVD	m	3205.	3205.	3205.	3205.	3205.	3318.	3318.		3318.	3318.	3318.	3318.	3331.
Hole Angle	deg	27.	27.	25.	25.	25.	25.	25.		25.	25.	25.	25.	25.
Density	g/cm3	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
Gradient	kPa/m	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Funnel Visc.	s	67	62	69	63	70	70	70	75	70	71	75	76	70
600 rpm		102	100	111	120	120	118	116	116	117	118	115	134	118
300 rpm		60	60	68	85	81	75	78	79	78	77	76	85	75
200 rpm		44	43	51	69	61	51	59	56	57	55	55	89	58
100 rpm		29	30	31	45	40	32	40	40	42	41	42	45	38
6 rpm		11	11	12	14	13	13	13	13	14	14	14	14	13
3 rpm		10	10	10	12	11	11	11	11	12	12	12	12	12
Plastic Visc.	cP	42	40	43	35	39	43	38	37	39	39	39	49	43
Yield Point	Pa	8.6	9.6	12.	23.9	20.1	15.3	19.2	20.1	18.7	18.2	17.7	17.2	15.3
10 sec. Gel	Pa	9.	9.	9.	8.	8.	8.	8.	8.	8.	8.	10.	10.	10.
10 min. Gel	Pa	18.	18.	17.	16.	19.	19.	18.	18.	18.	18.	17.	17.	17.
n-annulus		0.389	0.389	0.416	0.425	0.434	0.417	0.425	0.428	0.406	0.404	0.401	0.425	0.398
K-annulus	Pa-s*n	2.709	2.709	2.591	3.065	2.771	2.848	2.809	2.796	3.18	3.174	3.189	3.065	3.204
HTHP Filtrate	ml.	2.1	2.1	2.1	2.1				2.	2.2	2.2	1.	1.	2.2
HTHP Cake	1/32nd"	2.	2.	2.	2.				1.	2.	2.	2.	2.	2.
HTHP Temp.	degC	100.	100.	100.	100.					100.	100.	100.	100.	100.
CaCl2 (Acq)	g/L	144.8	132.7	138.7	127.2	144.8	144.8	144.8	170.1	144.8	144.8	144.8	144.6	168.9
CaCl2 (Mud)	g/L	33.3	30.5	33.3	30.5	33.3	33.3	33.3	39.1	33.3	33.3	33.3	33.3	37.2
Alkalinity		3.7	3.85	3.5	3.5	3.5	3.5	3.5	3	3	3	2	2.5	1
Excess Lime	kg/m3	13.7	14.3	13.	13.	13.	13.	13.	11.1	11.1	11.1	7.4	9.3	3.7
Electric Stab	V	505	511	445	578	501	478	618	595	540	535	550	550	565
Aw (calc)		0.84	0.125	0.329	0.217	0.796	0.796	0.796	0.854	0.798	0.796	0.878	0.876	0.855
Chlorides	g/L	27.5	150.	120.	140.	35.	35.	35.	25.	35.	35.	21.2	21.2	23.7
Sand %	%	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.	0.4	0.4	0.3	0.3	0.3
Water %	%	23.	23.	24.	24.	23.	23.	23.	23.	23.	23.	23.	23.	22.
Oil %	%	55.	55.	54.	54.	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	55.
Corr. Solids %	%	20.9	18.2	20.7	19.1	21.	21.	20.9	21.6	20.9	20.9	21.7	21.7	22.1
LGS %	%	2.1	0.3	2.1	0.4	2.8	2.2	2.7	3.5	2.7	2.7	3.5	3.5	4.4
HGS %	%	18.8	18.8	18.6	18.7	18.2	18.8	18.2	18.1	18.2	18.2	18.2	18.2	17.7
Oil/Water Ratio		71:29	71:29	69:31	69:31	70:30	70:30	70:30	70:30	70:30	70:30	70:30	70:30	71:29
Sulphide	mg/L	0.	0.	0.	0.	0	0.	0.						

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## Administration Data

Well Name	15/9-19A	Location	NORWAY	Date & Time	03-Sep-97 23:59
Operator	Statoil	Contractor/Rig	Dolphin Drilling	Interval	8 1/2 In
Operator Rep.	S. Løland	Contractor Rep.	S. Skarsbø	Dowell Eng.	Gareth Finley/Neil Rothnie
Analysis Type	OBM	Fluid System	ULTIDRILL	Spud Date	16-Jul-1997

## DRILLING FLUIDS PROPERTIES RECORD - From 10-Aug-1997 23:59 to 03-Sep-1997 23:59

Property Name	Units	66	67	68	69	70	71							
Date		28-Aug-97	29-Aug-97	30-Aug-97	31-Aug-97	01-Sep-97	02-Sep-97							
Time		20:04	20:58	23:31	22:20	23:59	22:44							
Sample loc.		Active S	Active S	Active S	Active S	Active S	Active S							
MD	m	4131.	4131.	4131.	4131.	4131.	4044.							
TVD	m	3318.	3318.	3318.	3318.	3318.								
Hole Angle	deg	25.	25.	25.	25.	25.								
Density	g/cm3	1.55	1.56	1.55	1.55	1.55	1.55							
Gradient	kPa/m	15.2	15.3	15.2	15.2	15.2	15.2							
Funnel Visc.	s	71	75	65	65	65	65							
600 rpm		120	133	110	112	110	112							
300 rpm		75	81	65	67	66	67							
200 rpm		59	61	52	52	52	52							
100 rpm		39	39	33	33	33	33							
6 rpm		14	13	12	12	13	12							
3 rpm		13	12	10	11	11	11							
Plastic Visc.	cP	45	52	45	45	44	45							
Yield Point	Pa	14.4	13.9	8.8	10.5	10.5	10.5							
10 sec. Gel	Pa	10.	10.	9.	9.	9.	9.							
10 min. Gel	Pa	17.	16.	13.	14.	15.	17.							
n-annulus		0.381	0.415	0.408	0.392	0.389	0.392							
K-annulus	Pa-s <sup>n</sup>	3.571	3.118	2.633	2.964	2.98	2.964							
HTHP Filtrate	mL	2.	1.	2.	2.	2.	2.							
HTHP Cake	1/32nd"	2.	2.	2.	2.	2.	2.							
HTHP Temp.	degC	100.	100.	100.	100.	100.	100.							
CaCl2 (Acq)	g/L	168.9	168.9	180.	180.	180.	180.							
CaCl2 (Mud)	g/L	37.2	37.2	35.2	35.2	35.2	35.2							
Alkalinity		2	2.5	3	3	3	3.5							
Excess Lime	kg/m3	7.4	9.3	11.1	11.1	11.1	13.							
Electric Stab	V	580	540	550	550	550								
Aw (calc)		0.855	0.855	0.863	0.863	0.863	0.863							
Chlorides	g/L	23.7	23.7	22.5	22.5	22.5	22.5							
Sand %	%	0.3	0.3	0.3	0.3	0.3	0.3							
Water %	%	22.	22.	22.	22.	22.	22.							
Oil %	%	55.	55.	58.	58.	58.	58.							
Corr. Solids %	%	22.1	22.1	21.2	21.2	21.2	21.2							
LGS %	%	4.4	3.8	2.3	2.3	2.3	2.3							
HGS %	%	17.7	18.3	18.9	18.9	18.9	18.9							
Oil/Water Ratio	%	71:29	71:29	72:28	72:28	72:28	72:28							
Sulphide	mg/L													

Administration Data					
Well Name	15/9-19A	Location	NORWAY	Date & Time	08-Nov-97 23:59
Operator	Statoll	Contractor/Rig	Dolphin Drilling	Interval	6 9/100 In
Operator Rep.	S. Leland	Contractor Rep.	S. Skarsbø	Dowell Eng.	Gareth Finley/Neil Rothnie
Analysis Type	OBM	Fluid System	ULTIDRILL	Spud Date	16-Jul-1997

DRILLING FLUIDS PROPERTIES RECORD - From 03-Sep-1997 23:59 to 06-Jan-1998 17:08

Property Name	Units	1	2	3	4	5	6	7	8	9	10	11	12	13
Date		11-Oct-97	12-Oct-97	13-Oct-97	14-Oct-97	15-Oct-97	16-Oct-97	17-Oct-97	18-Oct-97	19-Oct-97	20-Oct-97	21-Oct-97	22-Oct-97	23-Oct-97
Time		18:00	18:00	20:00	18:00	20:00	23:30	23:00	22:08	23:57	23:59	23:59	23:59	22:55
Sample loc.		Pit 2	Pit 2	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S	Active S
MD	m	4132.	4132.	4132.	4132.	4132.	4132.	4132.	4132.	4132.	4132.	4132.	4132.	4132.
TVD	m	3238.	3238.	3238.	3328.	3328.								
Hole Angle	deg													
Density	g/cm3	1.47	1.47	1.47	1.47	1.47	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.47
Gradient	kPa/m	14.4	14.4	14.4	14.4	14.4	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.4
Funnel Visc.	s													
600 rpm		132	132	132	132	130	118	116	118	116	117	116	118	139
300 rpm		80	80	80	80	82	72	72	72	72	72	71	72	83
200 rpm		58	58	58	58	58	57	59	58	59	59	59	59	61
100 rpm		36	36	36	36	36	36	38	38	39	39	39	40	40
6 rpm		13	13	13	13	13	13	13	13	13	13	14	14	14
3 rpm		11	11	11	11	11	10	10	10	11	11	11	11	13
Plastic Visc.	cP	52	52	52	52	48	46	44	46	44	45	45	46	56
Yield Point	Pa	13.4	13.4	13.4	13.4	16.3	12.4	13.4	12.4	13.4	12.9	12.4	12.4	12.9
10 sec. Gel	Pa	7.	7.	7.	7.	11.	10.	11.	11.	11.	11.	11.	11.	15.
10 min. Gel	Pa	17.	17.	17.	17.	13.	13.	14.	13.	13.	13.	14.	14.	17.
n-annulus		0.431	0.431	0.431	0.431	0.436	0.429	0.429	0.429	0.408	0.408	0.405	0.408	0.403
K-annulus	Pa-s^n	2.784	2.784	2.784	2.784	2.759	2.539	2.539	2.539	2.889	2.889	2.904	2.889	3.445
HTHP Filtrate	mL	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8
HTHP Cake	1/32nd"	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
HTHP Temp.	degC	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
CaCl2 (Acq)	g/L	74.	74.	74.	74.	74.	94.4	94.4	97.8	97.8	97.8	97.8	97.8	97.8
CaCl2 (Mud)	g/L	22.2	22.2	22.2	22.2	22.2	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4
Alkalinity		2.5	2.5	2.5	2.5	2.75	2.5	2.75	2.7	2.75	2.75	2.75	2.75	2.75
Excess Lime	kg/m3	9.3	9.3	9.3	9.3	10.2	9.3	10.2	10.	10.2	10.2	10.2	10.2	10.2
Electric Stab	V	440	440	440	440	440	434	440	440	440	440	438	438	427
Aw (calc)		0.922	0.922	0.922	0.922	0.922	0.919	0.919	0.916	0.916	0.916	0.916	0.916	0.916
Chlorides	g/L	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Sand %	%	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.	3.	0.3	3.	0.3	0.3
Water %	%	30.	30.	30.	30.	30.	29.	29.	28.	28.	28.	28.	28.	28.
Oil %	%	52.	52.	52.	52.	52.	52.	52.	52.	52.	52.	52.	52.	52.
Corr. Solids %	%	17.3	17.3	17.3	17.3	17.3	18.4	18.4	19.4	19.4	19.4	19.4	19.4	19.4
LGS %	%	1.3	1.3	1.3	1.3	1.3	2.9	2.9	4.9	4.9	4.9	4.9	4.9	5.5
HGS %	%	16.	16.	16.	16.	16.	15.5	15.5	14.5	14.5	14.5	14.5	14.5	13.9
Oil/Water Ratio	%	63:37	63:37	63:37	63:37	63:37	64:36	64:36	65:35	65:35	65:35	65:35	65:35	65:35
Sulphide	mg/L													

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<b>ADDRESS</b>	<b>KJELLER</b> Box 40, N-2007 Kjeller, Norway	<b>HALDEN</b> N-1751 Halden, Norway	<b>AVAILABILITY</b> In Confidence
<b>TELEPHONE</b>	+47 63 806000	+47 69 183100	
<b>TELEX</b>	76 361 isotp n	76 335 energ n	
<b>TELEFAX</b>	+47 63 815553		
<b>REPORT TYPE</b>	<b>REPORT NO.</b> IFE/KR/F-98/014		<b>DATE</b> 1998-01-26
	<b>REPORT TITLE</b>  DATAREPORT ON STABLE ISOTOPES, GAS SAMPLES FROM WELL 15/9-19A (ref. IFE no. 2.5.001.98)		<b>DATE OF LAST REV.</b>
			<b>REV. NO.</b>
	<b>CLIENT</b> Statoil/Geolab Nor		<b>NUMBER OF PAGES</b> 5
	<b>CLIENT REF.</b> Ann Elin Gilje/Richard Patience		<b>NUMBER OF ISSUES</b> 15
<b>SUMMARY</b>  Two gas samples from well 15/9-19A are analysed for gas and isotopic composition.  The work is done in accordance with the "The Norwegian Industry Guide to Organic Geochemical Analyses", Third Edition 1993.		<b>DISTRIBUTION</b>  Statoil/Geo Lab Nor (8) Andresen, B. Bjørnstad, T. Johansen, H. Siegélé, S. File (3)	
<b>KEYWORDS</b>			
	<b>NAME</b>	<b>DATE</b>	<b>SIGNATURE</b>
<b>PREPARED BY</b>	Björg Andresen Sylviane Siegélé	1998-01-26	<i>Björg Andresen</i> <i>Sylviane Siegélé</i>
<b>REVIEWED BY</b>	Harald Johansen	1998-01-26	<i>Harald Johansen</i>
<b>APPROVED BY</b>	Tor Bjørnstad	1998-01-26	<i>Tor Bjørnstad</i>

## 1 Introduction

Two gas samples from well 15/9-19A, Test 1A and Test 1B are analysed for gas and isotopic composition.

On the samples C<sub>1</sub> - C<sub>5</sub> and CO<sub>2</sub> are quantified. The  $\delta^{13}\text{C}$  value is measured on methane, ethane, propane, the butanes and CO<sub>2</sub>. In addition the  $\delta\text{D}$  value is measured on methane.

## 2 Analytical procedures

Aliquots of 0.5 ml are sampled with a syringe for analysis on a Poraplot Q column connected with flame ionisation (FID) and thermal conductivity (TCD) detectors. The detection limit for the hydrocarbon gas components is 0.01  $\mu\text{l/ml}$ , for CO<sub>2</sub> 0.2  $\mu\text{l/ml}$ .

For the isotope analysis 5-10 ml of the gas is sampled with a syringe and then separated into the different gas components by a Carlo Erba 4200 gas chromatograph. The hydrocarbon gas components are oxidised in separate CuO-ovens in order to prevent cross contamination. The combustion products CO<sub>2</sub> and H<sub>2</sub>O are frozen into collection vessels and separated.

The combustion water is reduced with zinc metal in sealed quartz tubes to prepare hydrogen for isotopic analysis. The isotopic measurements are performed on a Finnigan MAT 251 and a Finnigan Delta mass spectrometer.

IFEs value on NBS 22 is  $-29.77 \pm .06\text{‰}$  PDB.

The uncertainty in the  $\delta^{13}\text{C}$  value is estimated to be  $\pm 0.3\text{‰}$  PDB and includes all the different analytical steps. The estimate is based on repeated analysis of a laboratory standard gas mixture. The uncertainty in the  $\delta\text{D}$  value is likewise estimated to be  $\pm 5\text{‰}$ .

## 3 Results

The normalised volume composition of the gas samples is shown in Table 1. The stable isotope composition is shown in Table 2. Due to an analytical problem the uncertainty in the reported iC<sub>4</sub> isotope values are larger than indicated by repeated analysis of the laboratory standard gas mixture.

The analytical system has been tested with the standard gas mixture both in advance and after the analysis of the present samples, with acceptable results.

*Table 1 Volume composition of gas samples (normalised values) from well 15/9-19A*

Sample	IFE no GEO	C <sub>1</sub> %	C <sub>2</sub> %	C <sub>3</sub> %	iC <sub>4</sub> %	nC <sub>4</sub> %	iC <sub>5</sub> %	nC <sub>5</sub> %	CO <sub>2</sub> %	ΣC <sub>1</sub> -C <sub>5</sub> %	Wet- ness	iC <sub>4</sub> / nC <sub>4</sub>
Test 1A	980003	79.5	8.8	6.0	0.57	1.7	0.44	0.41	2.6	97.4	0.18	0.33
Test 2B	980004	82.5	7.6	4.7	0.45	1.4	0.31	0.39	2.6	97.4	0.15	0.31

*Table 2 Isotopic composition of gas samples from well 15/9-19A*

Sample	IFE no GEO	C <sub>1</sub> δ <sup>13</sup> C ‰ PDB	C <sub>1</sub> δ D ‰ SMOW	C <sub>2</sub> δ <sup>13</sup> C ‰ PDB	C <sub>3</sub> δ <sup>13</sup> C ‰ PDB	iC <sub>4</sub> δ <sup>13</sup> C ‰ PDB	nC <sub>4</sub> δ <sup>13</sup> C ‰ PDB	CO <sub>2</sub> δ <sup>13</sup> C ‰ PDB	CO <sub>2</sub> δ <sup>18</sup> O ‰ PDB
Test 1A	980003	-41.1	-212	-30.0	-33.0	-29.5	-34.8	-11.9	-9.8
Test 2B	980004	-40.7	-212	-30.0	-32.8	-28.5	-35.0	-12.1	-9.8

#### 4 Literature

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