TESTING

DST no. 1: 3079-3096 m
Produced 1023 m^3 oil/day and 114 800 m^3 gas/day on 60/64" choke and wellhead pressure equal to 54 bar.

DST no. 2: 2932-2941 m
Flowed well for 2 hours on 48/64" choke and produced 580 m^3 water/day and wellhead pressure equal to 37 bar. Performed water injection test.

DST no. 3: 2903-2923 m
Produced 1640 m^3 oil/day and 126 700 m^3 gas/day on 56/64" choke and wellhead pressure equal to 90 bar.

DST no. 4: 2866-2882 m
Produced 1230 m^3 oil/day and 101 900 m^3 gas/day on 46/64" choke and wellhead pressure equal to 103 bar.

DST no. 5: 2850-2857 m
Produced 578 m^3 oil/day and 46 200 m^3 gas/day on 48/64" choke and wellhead pressure equal to 41 bar.

DST no. 6: 2826-2833 m
Produced 237 m^3 water/day on 1" choke and wellhead pressure equal to 4 bar.

5.2 FMT and test summary

5.2.1 FMT results

A total of 26 pressure points were taken

5.2.2 DST results

A total of 6 DST's were performed in this well.

DST number 1 produced oil

DST number 2 produced water In this test water was also injected into the formation.

DST number 3 produced oil

DST number 4 produced oil In this test water was also injected into the formation.

DST number 5 produced oil

DST number 6 produced water from a sand

TEST RESULTS 30/3-4B TEST NUMBER 1

PERIOD	MINUTES	OIL RATES. SM^3/D	GAS RATES. SM^3/D	GOR. SM^3/SM^3	CHOKEDIAMETER. M	WHP. KPA	BHP. KPA	WHT. ^0C	BHT. ^0C
CLEAN UP	546.	940.	111100.	118.	.0238	5400.		52.	
"BUILD UP"	717.								
FIRST FLOW	480.	490.	57000.	116.	.0127	9000.	26000.	43.	125.
BUILD UP	309.						32000.		114.
SECOND FLOW	481.	910.	110000.	121.	.0238	5400.	23000.	54.	128.
BUILD UP	454.						33600.		124.
CONDITIONING FLOW	151.				.0040				
"BUILD UP"	412.								
SAMPLING	162.				.0040				
	I 3712.								

OIL DENSITY = 820. KG/M^3 AT 16^0C GAS RELATIV DENSITY = .77

CO_2 = 4.5 % H_2S = 2 PPM (MAX)

TABLE 5.3

TEST RESULTS 30/3-4B TEST NUMBER 2

PERIOD	MINUTES	WATER RATES. SM^3/D	CHOKEDIAMETER. M	WHP. KPA	BHP. KPA	WHT. ^0C	BHT. ^0C
FIRST FLOW	212.	690.	.0191	3750.	31800.	83.	120.
"BUILD UP"	997.				32500.		113.
FIRST INJECTION	1217.	- 800.		9623.	37500.	10.	27.
FALL OFF	279.				31900.		72.
SECOND INJECTION	414.	- 1600.		12136.	37500.	9.	19.
FALL OFF	269.				32000.		67.
"FRACTURE TEST"	84.	- 3160.		24800.	29800.		
	3472.						

WATER DENSITY = 1016 KG/M^3 AT 15^0C

CO_2 = 6 % (MAX)

H_2S = NONE

CL = 12400 MG/L

NACL = 20400 MG/L

TABLE 5.4

TEST RESULTS 30/3-4B TEST NUMBER 3

PERIODE	MINUTES	OIL RATES. SM^3/D	GAS RATES. SM^3/D	GOR. SM^3/SM^3	CHOKEDIAMETER. M	WHP. KPA	BHP. KPA	WHT. ^0C	BHT. ^0C
CLEAN UP	648.	1720.	141000.	82.	.0238	8400.		82.	
"BUILD UP"	379.								
FIRST FLOW	501.	700.	43200. *	62. *	.0127	11500.	31500.	61.	119.
BUILD UP	516.					12600.	32400	17.	114.
SECOND FLOW	380.	1500.	109000.	73.	.0206	9300.	30700.	85.	121.
BUILD UP	424.					12800.	32400.	13.	116.
CONDITIONING FLOW	234.								
"BUILD UP"	629.								
FIRST SAMPLING	101.				.0031				
"BUILD UP"	244.								
SECOND SAMPLING	136.				.0031				
	Σ 4228.								

* PROBLEMS WITH PLUGGING IN BARTON METER

OIL DENSITY = 830. KG/M^3 AT 15.5 ^0C GAS RELATIV DENSITY = .68

CO_2 = 3.4 % (MAX) H_2S = 2.9 PPM (MAX)

TABLE 5.5

TEST RESULTS 30/3-4B TEST NUMBER 4

PERIODE	MINUTES	WATER RATES. SM^3/D	OIL RATES. SM^3/D	GAS RATES. SM^3/D	GOR. SM^3/SM^3	CHOKEDIA. M	WHP. KPA	BHP. KPA	WHT. ^0C	BHT. ^0C
CLEAN UP	562.		1540.	128000.	83.	.0222	9000.		80.	
"BUILD UP"	458.									
FIRST FLOW	468.		760.	63500.	84.	.0127	11900.	31100.	67.	118.
BUILD UP	481.							32000.		114.
SECOND FLOW	597.		1300.	100500.	77.	.0183	10400.	30300.	78.	119.
BUILD UP	1542.							32000.		113.
CONDITIONING FLOW	78.		60.			.0032	12700.	31500.	57.	
"BUILD UP"	135.									
FIRST SAMPLING	136.					.0032				
"BUILD UP"	602.									
FIRST INJECTION	1025.	- 1145.						45300.		
FALL OFF	89.									
SECOND INJECTION	30.	- 104.								
	Σ 6203.									

OIL DENSITY = 0.834 AT 17^0C GAS RELATIV DENSITY = .77

CO_2 = 3.0 % H_2S = 2.2 PPM

TABLE 5.6

TEST RESULTS 30/3-4B TEST NUMBER 5

PERIODE	MINUTES	OIL RATES.SM^3/D	GAS RATES.SM^3/D	GOR.SM^3/SM^3	CHOKEDIAMETER.M	WHP.KPA	BHP.KPA	WHT.^0C	BHT.^0C
CLEAN UP	621.	530.	49000.	92.	.0191	4400.	19400.	53.	121.
"BUILD UP"	437.								
FIRST FLOW	478.	305.	25500.	84.	.0111	7000.	24700.	39.	121.
BUILD UP	715.						31900.		114.
SECOND FLOW	934.	550.	49000.	89.	.0191	4300.	18900.	63.	122.
BUILD UP	717.						31700.		116.
	Σ 3902.								

OIL DENSITY = 820. KG/M^3 AT 22.4 ^0C GAS RELATIV DENSITY = .77

CO_2 = 2.5 % H_2S = 1.0 PPM

TABLE 5.7

TEST RESULTS 30/3-4B TEST NUMBER 6

PERIOD	MINUTES	WATER RATES. SM^3/D	CHOKEDIAMETER. M	WHP. KPA	BHP. KPA	WHT. ^0C	BHT. ^0C
FIRST FLOW	535.	280. *	.0254	440.	27000.	36.	118.
BUILD UP	366.				31200.		114.
Σ	901.						

* RATES MEASURED FROM TANK

WATER DENSITY = 1016 KG/M^3 AT 15^0C

CO_2 = 14 % (MAX)

H_2S = NONE

CL = 12120 MG/L

NACL = 19970 MG/L

TABLE 5.8

WELL NAME: 30/3-4

NORSK PETROLEUM nps SERVICES

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spgf/			Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB	Sand	KCl(ppb)	
1985	metres	SG	secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100cm²			mg/litre	ppm				%	%	%	Bent. Eq.			
04.02		1.08	100					9.0					400	40										
05.02	248	1.06	85					9.0	17	31	17	26	4000	80										
06.02	248	1.06	88					9.2	18	37	20	26	4000	120	.1	.3			96	4				
07.02	492	1.10	41	33	3			8.8	6	25	10	11	10000	320	.1	.2						Trace		
08.02	622	1.09	42	35	3			8.5	6	26	20	24	10000	320	.1	.2						Trace		
09.02	622	1.19	42	35	3			7.7	8	34	21	26	10000	340								Trace		
10.02	622	1.11	38					9.3	6	19	13	16												
				Mix	KCl	mud	for	17	1/2"	Hole	Section													
11.02	Pit	1.10	48	11.0	2			9.0	16	26	3	3	55000	180	0	.2		0	94	6	0	0	42	
12.02	626	1.10	46	8.0	2			9.3	15	24	4	4	55000	180	.2	.6		0	93	7		Trace	43	
12.02	752	1.12	49	7.0	2			9.5	16	29	4	4	53000	220				0				1%	39	
12.02	794	1.14+	52					9.3	20	27	5	5	53000	190	.1	.2		0	91	9		3%	40	
13.02	903	1.16	48	5.6	1			9.3	22	24	5	5	58000	170	.1	.2		0	90	10		4%	39	
13.02	955	1.15-	46	5.6	1			9.2	18	25	6	6	60000	200	.1	.2		0	92	8		4%	41	
13.02	1023	1.14+	44	6.5	1			9.0	16	20	4	4	53000	200	.1	.3		0	92	8		3-5%	40	
14.02	1218	1.13	43	7.2	1			9.0	14	21	4	4	53000	240	.1	.2		0	91+	8+		1-5%	40	
14.02	1298	1.13-	40	7.2	1			9.3	12	20	4	4	50000	260				0	91+	8+		1.0	30	
14.02	1468	1.13	41	9.8	2			9.0	15	19	3	3	55000	360	.1	.3		0	91	9		1.5	35	
15.02	1480	1.15	53	8.0	1			8.9	20	30	6	7	64000	400				0	90	10		2	44	

WELL NAME: 30/3-4

NORSK PETROLEUM nps SERVICES I

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spgf/			Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB			
1985	metres	SG	secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100 cm²			mg/litre	ppm				%	%	%	Bent. Eq.	Sand	KCl(ppb)	
15.02	1510	1.14+	51	6.1	1			8.8	19	30	4	5	55000	300							8	1.5	45	
15.02	1514	1.14	50	6.2	1			9.0	18	30	4	5	58000	200	.2	.6		0	91	9	8	1.25	48	
16.02	1573	1.14	53	7.8	1			8.5	20	28	6	6	61000	220	.2	.6		0	91	9		1.0	40	
16.02	1682	1.25	52	6.7	1			9.0	20	30	4	6	56000	280				0	87	13		0.75	40	
16.02	1723	1.35	54	6.1	1			9.0	24	30	7	8	63000	330	.2	.5		0	84	16		0.75	45	
17.02	1788	1.40	53	6.7	1			8.8	28	28				400	.2	.5							40	
17.02	1788	1.43	58	5.4	1			9.1	28	32	4	5	63000	220	.2	.6		0	82	18	12	0.75	45	
18.02	1788	1.43	65	5.4	1			8.8	26	32	5	6	64000	300	.2	.6		0	82	18	11	1.0	42	
19.02	1788	1.42+	59	5.0	1			9.0	26	30	6	7	64000	220	.2	.6		0	82	18	12	1.25	40	
20.02	1788	1.43	57	5.2	1			9.2	23	30	4	4	63000	220	.2	.6		0	82	18	11	1.0	45	
21.02	1788	1.42+	59	5.4	1			9.1	19	27	4	7	65000	200	.2	.6		0	82	18	12	1.0	45	
22.02	1788	1.43	49	6.8	1			9.0	14	20	3	6	64000	240	.2	.5		0	82	18	12	1.25	45	
23.02	1788	1.42	61	5.8	1			8.9	21	32	4	5	74000	240	.2	.5		0	82	18	12	1.25	42	
24.02	1788	1.42	60	6.4	1			8.9	19	28	3	5	60000	280	.1	.5		0	82	18	12	1.0	42	
25.02	1788	1.42+	54	5.6	1			9.2	19	28	4	5	62000	320	.2	.5		0	84	16	12	1.0	40	
26.02	1788	1.42-	58	4.6	1			10.0	18	28	3	5	61000	280	.1	.4		4	79	17	12	1.25	43	
27.02	780	1.41	58	4.8	1			10.4	18	24	3	5	56000	560	.1	.4		4	80	16	12	1.5	40	
28.02	789	1.20	62	4.4	1			10.5	16	24	3	4	65000	160	.8	2.4		1	89	10		-5	50	
01.03	859	1.20	72	4.6	1			12.3	17	28	3	4	64000	40	1.3	2.2		1	88	11	5	2.0	51	

WELL NAME: 30/3-4

NORSK PETROLEUM nps SERVICES

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spcf/			Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB			
1985	metres	SG	secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100cm²			mg/litre	ppm				%	%	%	Bent. Eq.	Sand	KCl(ppb)	
02.03	1055	1.21	68	4.2	1			11.5	22	33	4	4	63000	60	.4	.6		1	88	11	5	2.5	50	
03.03	1385	1.20	62	6.4	1			9.4	20	32	2	4	66000	200	.2	.4		1	88	11	7	1.75	48	
04.03	1586	1.20	58	5.8	1			9.8	18	28	3	4	68000	80	.3	.7		1	88	11	12	1.5	52	
05.03	1792	1.45	60	6.8	1			10.0	27	29	2	4	63000	120	.2	.4		1	81	18	14	1.5	52	
06.03	1792	1.45	72	6.4	1			10.2	26	27	3	5	67000	160	.2	.3		1	81	18	15	1.5	50	
07.03	1792	1.34	53	4.9	1			10.1	18	15	2	3	63000	220	.1	.2		Trace	85	15	14	.75	50	
08.03	1792	1.34	57		1			10.0	20	18	2	3	59000	120	.1	.3		4	82	14	12	.6	48	
09.03	1792	1.34	62	3.2	1			11.0	22	18	2	3	59000	130	.1	.2		3	82	15	12	.5	48	
10.03		1.34	63	2.6	1			11.1	21	16	3	3	60000	130	.1	.2		3	82	15	12	.5	45	
11.03		1.33	64	2.6	1			11.6	20	18	3	4	59000	360	.1	.2		4	81	15	12	.5	45	
12.03		1.32	58	3.0	1			11.8	17	16	2	3	58000	360	.2	.3		6	80	14	10	.7	43	
13.03	597	1.33	57	5.6	1			12.2	17	12	2	3	49000	600	1.2	1.5		7	78	15	10	.7	40	
14.03	618	1.14+	68	4.2	1/2			9.8	14	24	3	3	57000	130	.2	.8		2	90	8	4	Trace	45	
15.03	719	1.15	74	4.2	<1			11.5	18	29	4	5	56000	110	.2	.4		Trace	91	8+	6	1/2	48	
16.03	755	1.16+	63	4.0	<1			11.7	18	23	3	5	61000	180	.2	.4		1	90	9	5	1/2	45	
16.03	932	1.15+	69	4.0	<1			11.3	20	26	4	4	57000	160	.1	.3		Trace	92	8	5	1 1/4	46	
17.03	991	1.16-	63	4.2	<1			10.2	17	28	5	5	63000	160	.1	.4		Trace	91	9		1	50+	
17.03	1086	1.15+	64	4.7	<1			9.5	16	29	4	6	55000	160	.1	.3		Trace	91	9		Trace	45	
17.03	1221	1.15+	63	5.3	<1			9.3	16	27	4	6	58000	240	.1	.3		Trace	91	9		0.5	46	

WELL NAME: 30/3-4

NORSK PETROLEUM SERVICES

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER	
					Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB		
1985	feet / metres	PPG / Spgt / SG	secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100cm²			mg/litre	ppm				%	%	%	Bent. Eq.	Sand	KCl(ppb)
18.03	1327	1.15	62	6	<1			9.0	20	26	3	4	56000	320	.1	.3		Trace	91	9	9	1 1/4	45
18.03	1414	1.15	61	5.1	<1			8.8	18	24	3	4	61000	220	.1	.5		4	87	9		1/2	50
18.03	1471	1.14+	65	4.7	<1			9.0	18	31	4	6	58000	160	.1	.4		4	87	9	10+	3/4	48
19.03	1558	1.15	77	4.3	<1			8.9	21	37	5	8	60000	180	.1	.3		7	85	8	10	1 3/4	45
19.03	1605	1.14	79	4.0	<1			9.3	20	38	5	7	58000	140	.1	.3		7	84	9	9	1/2	45
20.03	1605	1.14+	82	3.8	<1			9.0	19	33	6	9	58000	180	.1	.3		7	84	9	10	1.25	45
21.03	1583	1.32	76	4.8	<1			9.2	24	35	5	6	58000	280	.1	.3		6	80	14	10	3/4	45
22.03	1690	1.42	70	5.1	1			11.2	26	32	5	9	54000	80	.5	1.1		5	77	18	10	1	45
23.03	1814	1.44	67	4.5	1+			10.9	28	29	5	17	50000	100	.2	.4		5	77	18	13+	1	44
23.05	2005	1.50	68	5.5	1+			10.2	32	31	5	21	62000	200	.2	.4		5	75	20	15	3/4	50
24.05	2093	1.51	65	4.5	1+			10.2	29	29	5	20	71000	160	.2	.55		5	75	20	16	1/2	48
24.05	2160	1.51	67	5.0	1+			10.4	29	28	4	24	71000	120	.2	.4		5	75	20	20	1	55
25.05	2238	1.51	71	4.8	1+			10.2	29	27	6	25	67000	60	.2	.5		5	75	20	21	3/4	54
25.05	2357	1.51	67	5.8	1+			9.5	28	26	8	32	78000	160	.2	.4		4	75	21	22	1/4	56
26.05	2399	1.52	67	4.7	1+			9.6	29	25	5	35	81000	160	.1	.3		4	74	22	22	Trace	55
26.05	2493	1.51	62	5.0	1+			9.7	27	23	6	35	74000	120	.15	.4		4	74	22	22	Trace	55
27.03	2527	1.51	63	5.8	1+			10.3	22	19	4	38	74000	160	.15	.4		3	75	22	21	Trace	58
28.03	2634	1.51	65	4.8	1			9.9	24	20	6	35	80000	120	.1	.35		3	74	23	20	Trace	54
29.03	2653	1.51	65	4	1			9.8	23	19	6	34	79000	120	.1	.3		3	74	23	20	Trace	51

WELL NAME: 30/3-4

NORSK PETROLEUM nps SERVICES!

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spgf/			Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB			
1985	metres	SG	secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100cm²			mg/litre	ppm				%	%	%	Bent. Eq.	Sand	KCl(ppb)	
30.03	2689	1.51	61	4.3	1			10	24	18	6	32	78000	200	.2	.4		3	74	23	20	Trace	52	
31.03	2771	1.51	62	5	1			9.7	24	18	6	29	72000	100	.1	.4		2	76	22	19	Trace	46	
01.04	2812	1.51	57	5	1			9.7	23	16	5	25	72000	200	.1	.3		2	77	21	18	Trace	46	
02.04	2812	1.51	55	5	1			9.6	22	15	4	20	72000	200	.1	.3		2	77	21	18	Trace	46	
04.04	2796	1.46	50	4.8	1			9.6	17	12	3	13	67000	360	.1	.3		1	80	19	16	Trace	45	
			Start 8	1/2	Section.	Lignite/Lignosulfonate																		
05.04	2818	1.33	52	7.6	1	20	3	10.8	17	14	5	34	42000	220	.15	.3		Tr	84	16	17	Trace		
06.04	2830	1.33	46	7.2	1	17.5	3	9.7	15	10	3	19	43000	300	.1	.3		Tr	84	16	17	0		
07.04	2840	1.33	50	5.8	1	14.6	3	10.1	15	10	3	18	41000	180	.15	.4		Tr	85	15	17	0		
08.04	2859	1.33	55	6.2	1	13	3	10.0	17	11	4	18	36000	160	.15	.4		Tr	84	16	17	0		
09.04	2869	1.33	56	5.8	1	13.5	1	10.0	17	11	4	20	42000	140	.2	.5		Tr	85	15	17	0		
10.04	2908	1.33	55	5.6	1	10.0		10.0	17	11	4	21	38000	140	.15	.5		0	85	15	18	0		
11.04	2930	1.33	56	5.0	1	12.8	2	9.8	16	11	4	17	40000	140	.2	.7		Tr	84	16	18	Trace		
12.04	2939	1.34	56	5.1	1	13.0	2	9.8	16	10	3	17	38000	180	.2	.7		Tr	83	17	18	Trace		
13.04	2971	1.33	53	4.7	1	13.0	2	10.8	17	10	3	19	41000	100	.3	1.0		Tr	84	16+	18	0		
14.04	3023	1.34	52	4.8	1	12	2	10.3	19	12	4	19	32000	120	.3	1.0		Tr	83	17	18	0		
15.04	3092	1.34	57	4.8	1	11	2	10.1	28*	12	5	22	35000	100	.3	1.3		Tr	83-	17+	18	Trace	*80°F	
16.04	3131	1.33	53	4.8	1	12	2	10.0	17	11	4	17	32000	80	.3	1.1		Tr	83	17	17	Trace		

WELL NAME: 30/3-4

NORSK PETROLEUM nps SERVICES!

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spgf/			Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB			
1985	metres	SG	secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100 cm²			mg/litre	ppm				%	%	%	Bent. Eq.			
17.04	3171	1.33	53	4.9	1	12.8	2	10.1	17	12	4	18	34000	80	.3	1.2		TR	84	16		TR		
18.04	3287	1.33	48	5.3	1	13.0	2	10.3	20	13	5	24	35000	160	.3	1.2		0	83	17	18.5	0		
19.04	3287	1.33	50	5.0	1	12.5	2	10.1	19	11	4	18	33000	140	.4	1.4		TR	83	17	18	TR		
20,04	3287	1.33	56	5.2	1	13.0	2	10.3	20	13	5	21	31000	100	.4	1.5		1	82	17	20	TR		
21.04	3287	1.33	60	4.2	1	13.0	2	10.1	20	11	5	22	30000	120	.4	1.4		1	80	19	20	TR		
22.04	3287	1.33	59	4.5	1	13.0	2	10.0	19	11	5	22	30000	120	.4	1.4		1	80	19	20	TR		
23.04	3287	1.33	54	4.3	1	13.5	2	10.0	17	13	5	21	33000	160	.3	1.5		1	81	18	20	0		
24.04	2479	1.33	54	4.4	1	13.5	2	11.2	20	13	5	20	30000	200	.7	1.8		1	82	17	20	0		
25.04	2595	1.33	54	4.4	1	13.8	2	11.7	20	12	4	20	32000	60	1.2	3.0		1	81	18	19	0		
26.04	3250	1.23	57	8.2	1			11.5	18	14	5	23	25000	40	.6	1.7		TR	81	19	19	0		
27.04	Pit	1.23+	59	8.2	1			11.5	18	13	5	24	25000	40	.6	1.7		TR	81	19	19	0		
28.04	Pit	1.23	60	8.4	1			11.5	18	14	5	26	21000	40	.7	1.4		TR	80	20	20	0		
29.04	Pit	1.23	60	8.4	1			11.5	18	13	5	26	21000	40	.7	1.4		TR	80	20	20	0		
30.04	Pit	1.23+	56	8.5	1			11.4	16	13	5	22	22000	60	.5	1.4		0	85	15	20	0		
01.05	Pit	1.23	54	8.5	1			11.4	16	12	5	22	22000	60	.5	1.4		0	85	15	20	0		
02.05	3250	1.23+	61	8.2	1+			10.8	17	12	4	16	24000	120	.5	1.3		0	85	15	20	TR		
03.05		1.23	65	8.2	1			11.1	17	13	4	18	24000	160	.4	1.2		0	84	16	20	TR	(Pull test string)	
04.05	3074	1.23	63	8.8	1			10.9	19	11	3	14	22000	160	.4	1.4		0	84	16	20	TR		
05.05	2950	1.23	64	9.4	2			11.1	18	12	3	19	20000	200	.6	1.5		0	84	16	20	TR		

WELL NAME: 30/3-4

NORSK PETROLEUM SERVICES

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spcf/ SG			Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB			
1985	metres		secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100 cm²			mg/litre	ppm				%	%	%	Bent. Eq.			
06.05	2841	1.23	61	10.0	2			11.4	18	14	4	22	17000	80	.8	1.6		0	83	17	22	Trace		
07.05	3009	1.23	57	10.0	2			11.5	18	14	4	26	17000	120	.6	1.6		0	83	17	20	TR		
08.05	3009	1.23	60	11.4	2			11.7	18	14	4	33	16000	160	.9	1.8		0	83	17	20	TR		
09.05	3009	1.24	75	11.4	2			11.6	24	15	3	26	17000	240	1.6	2.4		0	83	17		TR		
10.05	3009	1.23	75	11.6	2			11.7	22	16	4	30	17000	160	1.8	3.0		0	84	16		TR		
11.05	3009	1.23	75	12.5	2			11.9	22	14	4	30	17000	120	1.8	3.4		0	84	16		TR		
12.05	3009	1.23	78	12.0	2			11.9	22	12	4	25	17000	120	2.0	3.4		0	84	16		TR		
13.05		1.23	53	11.5	2			11.8	17	11	3	18	17000	160	1.7	3.2		0	83	17		TR		
14.05	2928	1.23	57	12.5	2			11.9	18	14	3	24	17000	120	1.9	3.3		0	83	17		TR		
15.05	2928	1.23	52	12.8	2			11.9	17	12	3	26	17000	80	1.9	3.3		0	83	17	20	TR		
16.05	2928	1.23	56	13.5	2			11.9	16	9	5	28	16000	60	1.7	2.7		0	87	13	20	TR		
17.05		1.23	69	13.5	2			11.9	15	11	4	26	16000	60	1.7	2.7		0	87	13	20	TR	Flow well	
18.05		1.23	62	12.5	2			12.0	18	12	5	27	16000	60	1.4	2.6		0	88	12	20	TR	DST	
19.05		1.23	63	12.2	2			12.0	17	12	5	26	17000	60	1.7	2.7		0	88	12	20	TR		
20.05	2926	1.23	65	12.0	2			12.0	18	12	5	27	17000	60	1.3	2.4		0	89	11	20	0		
21.05	2898	1.23	66	12.0	2			12.0	18	12	5	27	17000	60	1.3	2.4		0	89	11	20	TR		
22.05	2898	1.23	65	12.0	2			12.1	18	14	5	27	16000	40	1.0	2.1		0	89	11	20	TR		
23.05	2898	1.23	63	11.8	2			12.0	20	14	5	27	16000	40	1.1	2.3		0	89	11	19	TR		
24.05	2898	1.23	61	12.5	2			12.0	17	11	5	28	17000	60	1.3	2.3		0	89	11	18	TR		

WELL NAME: 30/3-4

NORSK PETROLEUM nps SERVICES I

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE	HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spcf/			Cake	°500psi		PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB			
1985	metres	SG	secs	ccs	1"/32/mm	ccs 1"/32/mm		cp	lbs/100ft²-gms/100cm²			mg/litre	ppm				%	%	%	Bent. Eq.	Sand		
25.05	2898	1.23	64	12.5	2		12.0	18	11	5	30	17000	60	1.3	2.3		0	89	11	18	Trace		
26.05	2898	1.23	64	13.0	2		12.0	18	12	5	30	17000	60	1.4	2.4		0	89	11	18	TR		
27.05	2898	1.23	60	13.0	2		12.0	18	12	5	30	17000	60	1.4	2.4		0	89	11	18	TR		
28.05		1.23	60	14.0	2		12.0	18	12	6	32	16000	100	1.1	2.0		0	89	11	18	TR		
29.05	2863.5	1.23	53	12	2		11.7	15	11	5	30	15000	40	1.2	2.3		0	90	10	18	TR		
30.05		1.22+	47	13.5	2		12.0	13	9	3	24	17000	120	1.2	2.2		0	90	10	18	TR		
31.05		1.23	54	12.2	2		12.1	15	11	3	24	16000	120	1.0	2.2		0	90	10	18	TR		
01.06		1.23	53	12.4	2		12.1	15	10	3	22	16000	120	1.0	2.2		0	90	10	18	TR		
02.06		1.23	52	11.8	2		12.0	16	10	3	22	16000	120	1.0	2.2		0	90	10	18	TR		
03.06		1.23	51	11.4	2		12.0	14	12	4	22	16000	80	.7	1.6		0	90	10	18	TR		
04.06		1.23	53	11.8	2		11.9	14	12	4	25	15000	120	.7	1.2		0	90	10	18	TR		
05.06		1.23+	55	11.6	2		11.8	15	12	4	28	15000	80	.6	1.2		0	90	10	18	TR		
06.06		1.23	62	11.4	2		11.9	15	11	5	30	14000	120	.5	1.2		0	90	10	18	TR		
07.06		1.24	61	11.6	2		11.8	17	13	5	25	14000	160	.5	1.0		0	90	10	18	TR		
08.06		1.24	78	13.4	3		11.5	18	23	16	32	13000	80	.5	1.1		0	90	10	20	TR		
09.06		1.23+					10.5														Displace hole with 1.23 brine		
10.06		1.23		.			10.5					204000	66000			2.2					Plug & abandon		
11.06		1.23										204000	66000			2.2					Displace riser to sea-water, pull riser		

OPERATING AREA Statoil 30/3-4

MATERIALS USED PER CASING INTERVAL

36" Hole to 248 m 30" Casing at 248 m

Product	Unit	Unit Cost	Usage	Total Cost	Programm	Usage/Cost
Barite	MT	90.00	17	1,530.00	19	1,710.00
Bentonite	MT	220.00	30	6,600.00	14	3,080.00
Bicarbonate	50 kg	20.25	3	60.75		
Caustic Soda	25 kg	8.95	14	125.30	20	179.00
Lignosulfonate	25 kg	10.50	1	10.50		
Soda Ash	50 kg	19.05	5	~~35.25~~		
XCD Polymer	25 kg	337.13	1	337.13		
Cost of Mud Materials Mixed				8,758.93		4,969.00
Volume Built 412 m³						
Cost per Cubic Meter		21.26				

Volume/Cost transferred from previous section		
Volume transferred to next section	263 m³	5,591.26
Mud Cost this section		3,167.67

Cost per cubic meter/barrel	21.26/3.38	29.92/4.76
Cost per meter (63)	50.28	76.45
Cost per rotating hour 3.3	959.90	

OPERATING AREA Statoil 30/3-4

MATERIALS USED PER CASING INTERVAL

26" Hole to 606 m 20" Casing at 600 m

Product	Unit	Unit Cost	Usage	Total Cost	Programme Usage/Cost
Barite	MT	90.00	65	5,850.00	54 4,860.00
Bentonite	MT	220.00	51	11,220.00	50 11,000.00
Caustic Soda	25 kg	8.95	2	17.90	
CMC EHV	25 kg	43.75	5	218.75	
Cost of Mud Materials Mixed				17,306.65	15,860.00
Volume Built 874 m^3					
Cost per cubic meter				19.80	18.36

Volume/Cost transferred from Previous Section (263 m^3)		5,591.26
Volume transferred to Next Section 180 m^3 (20.14/m^3)		3,625.00
Mud Cost this Section		19,272.91
Cost per cubic meter/barrel	20.14/3.20	18.36
Cost per meter (358)	53.84	44.06
Cost per rotating hour 20.3	949.40	

OPERATING AREA Statoil 30/3-4

MATERIALS USED PER CASING INTERVAL

17 1/2" Hole to 1788 m

Product	Unit	Unit Cost	Usage	Total Cost	Programme Usage	Programme Cost
Barite	MT	90.00	213	19,170.00	196	17,640.00
Caustic Soda	25 kg	8.95	19	170.05		
PAC R	25 kg	68.25	254	17,335.50	162	11,056.50
KCl	50 kg	9.60	1825	17,520.00	1308	12,556.80
[illegible] brine	bbl	15.75	1421	22,380.75	1500	23,625.00
XCD Polymer	25 kg	337.13	81	27,307.53	46	14,072.78
Bicarbonate	50 kg	20.25	12	243.00		
PAC L	25 kg	68.25	9	614.25	81	5,528.25
Soda Ash	50 kg	19.05	25	476.25		
Illmenite	MT	90.00	16	1,440.00		
Lignosulfonate	25 kg	10.50	3	31.50		
CMC Hi Vis	25 kg	36.75	2	73.50		
Cost of Materials Mixed				106,762.33		84,479.33
Volume Built	1126 m³					
Cost per cubic meter	94.82					118.98

Volume/Cost transferred from Previous Section(180m³/20.14) 3,625.00

Volume transferred to Next Section 576 m³ (84.52/m³) 48,683.52

Mud Cost this Section 61,703.81

Cost per cubic meter/barrel	84.52/13.44	118.98
Cost per meter (1214)	50.83	71.59

OPERATING AREA Statoil 30/3-4

MATERIALS USED PER CASING INTERVAL

17 1/2" sidetrack to 1793 m

Product	Unit	Unit Cost	Usage	Total Cost
Barite	MT	90.00	2	180.00
Bentonite	MT	220.00	3	660.00
Caustic Soda	25 kg	8.95	38	340.10
KCl	50 kg	9.60	1928	18,508.80
Ilmenite	MT	90.00	167	15,030.00
Lignosulfonate	25 kg	10.50	2	21.00
PAC R	25 kg	68.25	97	6,620.25
PAC L	25 kg	68.25	51	3,480.75
Staflo	25 kg	107.45	81	8,703.45
Soda Ash	50 kg	19.05	37	704.85
Sodium Bicarbonate	50 kg	20.25	42	850.50
XCD Polymer	25 kg	337.13	36	12,136.68

Cost of Materials Mixed 67,236.38

Volume built 692 m^3

Cost per cubic meter 97.16

Volume/Cost transferred from Previous Section (576m^3/84.52 48,683.52

Volume transferred to Next Section 340 m^3 (91.42/m^3) 31,082.80

Mud Cost this Section 84,837.10

Cost per cubic meter/barrel 91.42/14.54

Cost per meter 80.64

OPERATING AREA Statoil 30/3-4

MATERIALS USED PER CASING INTERVAL

17 1/2" hole sidetrack to 1605 m

13 3/8" Casing set at 1583 m

Product	Unit	Unit Cost	Usage	Total Cost
Drispac Regular	50 lb	80.00	50	4,000.00
KCl	50 kg	9.60	1367	13,123.20
Ilmenite	MT	90.00	2	180.00
PAC R	25 kg	68.25	114	7,780.50
PAC L	25 kg	68.25	6	409.50
Sodium Bicarbonate	50 kg	20.25	38	769.50
Soda Ash	50 kg	19.05	6	114.30
Torq Trim	55 gal	300.00	30	9,000.00
XCD Polymer	25 kg	337.13	60	20,227.80

Cost of Materials Mixed 55,604.80

Volume Built 549 m^3

Cost per cubic meter 94.00

Volume/Cost transferred from Previous Section (340 m^3/91.42) 31,082.80

Volume transferred to Next Section 397 m^3 (97.51/m^3) 38,712.01

Mud Cost this Section 47,975.59

Cost per cubic meter 97.51

Cost per meter 47.60

OPERATING AREA Statoil 30/3-4

MATERIALS USED PER CASING INTERVAL

12 1/4" Hole to 2812 meters

Product	Unit	Unit Cost	Usage	Total Cost	Programme Usage	Programme Cost
Illmenite	MT	90.00	343	30,870.00	315	28,350.00
KCl	50 kg	9.60	1194	11,462.40	914	8,774.40
PAC R	25 kg	68.25	164	11,193.00	46	3,139.50
PAC L	25 kg	68.25	3	204.75	91	6,210.75
XCD Polymer	25 kg	337.13	43	14,496.59	12	3,671.16
Caustic Soda	25 kg	8.95	10	89.50		
Bicarbonate	50 kg	20.25	35	708.75	15	303.75
Soda Ash	50 kg	19.05	34	647.70		
Drispac R	25 kg	80.00	24	1,920.00		
CMC Lo Vis	25 kg	36.75	11	404.25		
Cost of Materials Mixed				71,996.94		50,449.56
Volume Built			228 cubic meters			
Cost per cubic meter built				270.52		126.12
Volume/Cost transferred from Previous Section 397 m³/97.51				38,712.01		
Volume transferred to Next Section 410 m³ (160.62)				65,855.97		
Mud Cost this Section				34,534.23		
Cost per cubic meter				160.62		126.12
Cost per meter				27.19		50.45

OPERATING AREA Statoil 30/3-4

MATERIALS USED PER CASING INTERVAL

8 1/2" Hole to m 7" liner set at m

Product	Unit	Unit Cost	Usage	Total Cost	Programme Usage	Programme Cost
Bentonite	MT	220.00	16.5	3,630.00	17	3,740.00
Caustic Soda	25 kg	8.95	87	778.65	46	411.70
Illmenite	MT	90.00	25	2,250.00	20	1,800.00
Lignite	50 lb	15.75	283	4,457.25	96	1,512.00
Lignosul-fonate	25 kg	10.50	333	3,496.50	261	2,740.50
Soda Ash	50 kg	19.05	2	38.10	6	114.30
Sodium Bicarbonate	50 kg	20.25	17	344.25	14	283.50
CMC Lo Vis	25 kg	36.75	2	73.50		
Cost of Mud Materials Mixed				15,068.25		10,602.00
Volume Built	160 cubic meter					
Cost per cubic meter built				94.18		66.26
Volume/Cost transferred from Previous Section				410 m³/160.62		65,854.20
Volume transferred to Next Section				384 m³(141.97)		54,516.18
Mud Cost this Section				26,406.27		
Cost per meter				141.97		
Cost per rotating hour (156.5)				168.73		

OPERATING AREA Statoil 30/3-4

MATERIALS USED PER CASING INTERVAL

PRODUCTION TESTS

Product	Unit	Quantity	Unit Cost $	Cost $
Bentonite	MT	31	220.00	6,820.00
Caustic Soda	25 kg	16	8.95	143.20
Desco	25 lb	5	38.79	193.95
Drispac R&C	50 lb	1	80.00	80.00
Ilmenite	MT	85	90.00	7,650.00
Lignosulfonate	25 kg	63	10.50	661.50
Soda Ash	50 kg	15	19.05	285.75
Sodium Bicarb.	50 kg	56	20.25	1,134.00
XCD Polymer	25 kg	5	337.13	1,685.65
			Total	18,654.05

Transferred to Interval: 386 m^3
Volume built: 261
Volume dumped: 647

TEMPORARY ABANDONMENT

Calcium Chloride	50 kg	926	21.20	19,631.20
Caustic Soda	25 kg	42	8.95	375.90
Sodium Chloride	50 kg	630	8.25	5,197.50
XCD Polymer	25 kg	9	337.13	3,034.17
Coat B1400X	55 gal	14	364.22	5,099.08
Coat 129	25 kg	4	57.00	228.00
			Total	33,565.85

Volume built: 196 m^3
Volume dumped: 84
Cost per m^3: $171.25

Institute for energy technology

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AVAILABILITY

Private
Confidential

REPORT TYPE

REPORT NO.
IFE/KR/F-85/182

DATE
1985-12-18

REPORT TITLE

REPORT ON STABLE ISOTOPES ($\delta^{13}C$, δD, $\delta^{18}O$) ON NATURAL GASES FROM WELL 30/3-4

DATE OF LAST REV.

REV. NO.

CLIENT
Statoil

NUMBER OF PAGES
5

CLIENT REF.
T-6269, avrop nr. 59

NUMBER OF ISSUES
15

SUMMARY

The gas components C_1-C_4 and CO_2 have been separated from the natural gas of well 30/3-4 and the $\delta^{13}C$ values of these components have been measured. The isotopic composition of hydrogen from CH_4 has also been measured.

DISTRIBUTION

Statoil 10
Andresen, B.
Brevik, E.M.
Råheim, A.

KEYWORDS

	NAME	DATE	SIGNATURE
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1. ANALYTICAL PROCEDURE

The natural gases have been separated into the different gas components by a Carlo-Erba 4200 instrument. This gas chromatograph is equipped with a special injection loop in order to concentrate the samples, in the case of low concentration of the gas components. The hydrocarbon gas components were oxidized in separate CuO-ovens in order to prevent cross contamination. The combustion products CO_2 and H_2O were frozen into collection vessels and separated.

The water was reduced with zinc metal in a sealed tube to prepare hydrogen for isotopic analysis. The isotopic measurements were performed on a Finnigan Mat 251 mass spectrometer. Our $\delta^{13}C$ value on NBS-22 is -29.77 $\pm$ .06 o/oo.

2. RESULTS

The composition of the samples are given in Table 1. The results have not been normalized to 100%. The rest is air. The stable isotope results are given in Table 2.

Our uncertainty on the $\delta^{13}C$ value is estimated to be $\pm$ 0.3 o/oo and includes all the different analysis step. The uncertainty on the δD value is likewise estimated to be $\pm$ 5 o/oo.

Table 1 Composition of gas samples from well 30/3-4

Sample	C_1 %	C_2 %	C_3 %	i-C_4 %	n-C_4 %	CO_2 %	$\frac{\Sigma C_2\text{-}C_4}{\Sigma C_1\text{-}C_4}$	$\frac{\text{i-}C_4}{\text{n-}C_4}$
30/3-4 DST 1	74	10	6.9	0.7	1.9	5.3	19.5	0.21
30/3-4 DST 4	76	11	7.2	0.6	1.8	2.8	20.6	0.21

Table 2 Isotopic composition of gas samples from well 30/3-4

Sample	C_1		C_2	C_3	i-C_4	n-C_4	CO_2	
	$\delta^{13}C$	δD SMOW	$\delta^{13}C$	$\delta^{13}C$	$\delta^{13}C$	$\delta^{13}C$	$\delta^{13}C$	$\delta^{18}O$ PDB
30/3-4 DST 1	-49.5	-220	-33.9	-31.9	-25.1	-30.6	-10.5	-14.3
30/3-4 DST 4	-49.8	-195	-33.2	-30.8	-24.1	-31.1	-12.2	-10.2

* James, Alan T. (1983): Correlation of Natural Gas by Use of Carbon Isotopic Distribution between Hydrocarbon Components, AAPG, Vol. 67, No. 7, July 1983.

** Schoell, M. (1983): Genetic Characterization of Natural Gases, AAPG, December 1983.

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IKU
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REPORT

REG. NO.:	ACCESSIBILITY:
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3

REPORT TITLE:

ORGANIC GEOCHEMICAL CHARACTERISATION AND CORRELATION OF CRUDE OILS FROM WELLS 30/3-A1, 30/3-2 AND 30/3-4

REPORT NO.: 22.1888.00/01/88

AUTHORS AND CONTRIBUTORS:

W. Krokstad, T. Vinge, B. Andresen (IFE)

DATE:	NO. OF PAGES:	NO. OF ENCLOSURES:	PROJECT MANAGER:	SIGN:
4 July 1988	91	-	Wenche Krokstad	

CLIENT:

Statoil, Geolab. Att.: Steinar Ulvøen. Statoil Open Contract T 120.218, job no.40

SUMMARY:

See page 6.

KEY WORDS:	
Veslefrikk Field	Well 30/3-A1
Oil-Oil correlation	Well 30/3-2
Well 30/3-4	Organic geochemistry

2. INTRODUCTION

2.1 General

The project was authorized by Steïnar Ulvøen, Statoil, Geolab and was carried out under IKU project no. 22.1888.00 according to Statoil contract T 120.218, job no. 40.

A draft report has been sent to Statoil for approval. Upon approval, ten copies of the final report, a data tape and remaining sample material, will be sent to the client. Five copies of the report will be stored at IKU.

2.2 Objective

The aim of this project is to characterize and correlate crude oils from the Veslefrikk Field by means of organic geochemical methods.

2.3 Information and samples supplied by Statoil

Table 1 presents information on the crude oils analysed. In addition to the samples analysed under contract T 120.218, job no. 40, results from an organic geochemical characterisation of DST-1 and DST-4 from well 30/3-4 (Leith et al., 1985) were available.

The crude oil densities provided by Statoil LET-Bergen were 0.799 g/cm^3 and 0.8388 g/cm^3 for well 30/3-A DST-1 and 30/3-2 DST-2, respectively. A density of 0.8388 g/cm^3 has been used for the well 30/3-A1 DST-2 sample in this project.

2.4 Analytical program and data quality

Table 1 presents the analytical program and the number of analyses performed. The analyses on DST-1 and DST-4 from well 30/3-4 are reported in Leith et al (1985), but selected data are shown in this report in order to give an overview of the analytical results available to the oil-oil correlations

in this Veslefrikk project.

The data quality is generally considered to be good. However, the FPD response during gas chromatography of the aromatics in well 30/3-A1 DST-1 was particularly noisy. This is attributed to the very low concentration of sulphur in this relatively high maturity oil.

At Statoils request the RFT sample from the Tarbert Fm in well 30/3-A1 was subjected to gas chromatography of total oil and GC-MS selecting m/z 191 and 217 only. This sample is diesel contaminated, which excludes many conventional correlation parameters. The correlation of the RFT oil with those from DST's is thus based solely on sterane and terpane data.

3. EXPERIMENTAL

3.1 Evaporation of the light components in fluid samples

Prior to chromatographic separation, the oil/condensate samples were heated to 210°C at atmospheric pressure until constant weight (at 210°C) was obtained.

The fraction of light components was determined as the weight difference between the original sample and the residuum left after heating. The plate and transferred to a short column of DCM-washed, deactivated alumina. The fractions were eluted from the column using ca. 30 ml DCM. The solvent was reduced to a volume of ca. 1 ml using a Büchi rotary evaporator and the remaining solvent/fraction mixture was transferred to a preweighed glass vial. The remaining solvent was evaporated under nitrogen and the weight of each fraction was determined.

3.2 Medium-pressure liquid chromatography (MPLC)

The oil (>210°C) sample was diluted in DCM (1:3 mg/µl)and the asphaltenes were precipitated using excess n-pentane (40:1 pentane:(DCM+EOM)). The asphaltene fraction was weighed after drying at 50°C for 12 hours.

The remaining maltenes were separated into saturated, aromatic and non-hydrocarbon fractions using an MPLC system with n-hexane as eluant (Radke et al. 1980). The various fractions were concentrated using a Büchi Rotavapor, then transferred to glass vials and the remaining solvent removed.

3.3 Gas chromatographic analysis

The whole oil sample was analysed using an HP 5730A gas chromatograph fitted with a 15 m DB-5 fused silica column. 0.02µl of sample solution were injected in split mode (split ratio 1:10). Hydrogen with a flow rate of 2.5 ml/min. was used as a carrier gas, and the temperature programme used was -50°C (2 min.) - 4°C/min. - 280°C.

The C_2-C_8 hydrocarbon compounds were analysed by hydrogen stripping on a Carlo Erba Fractovap gas chromatograph fitted with a 60 m x 0.32 mm (i.d.) fused silica column coated with 1.0 µm DB-1. The temperature programme used was 50°C (2 min.) - 4°C/min. - 210°C. An internal standard was used for quantification.

The saturated hydrocarbon fraction was diluted with n-hexane and analysed on a Carlo Erba Fractovap gas chromatograph equipped with a 15 m DB-5 fused silica column. Hydrogen was used as a carrier gas with a flow rate of about 1.5 ml/min. Injections were performed in split mode (split ratio 1:10). The temperature program used was 80°C (2 min.) - 4°C/min. - 280°C.

The aromatic fraction was diluted with n-hexane and analysed on a Varian Series 3700 gas chromatograph with a SE-54 fused silica column (50 m x 0.3 mm) and dual FID/FPD detectors. Hydrogen was used as a carrier gas with a flow rate of 0.5 ml/min.

A temperature programme of 80°C (2 min.) - 4°C/min. - 280°C was used.

All the data from the GC analyses were processed on a VG Multichrom lab data system.

Some ratios calculated from gas chromatograms

Saturates:

$$CPI\text{-}1 = \frac{1}{2}\left(\frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{24} + C_{26} + C_{28} + C_{30}} + \frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{26} + C_{28} + C_{30} + C_{32}}\right)$$

$$CPI\text{-}2 = \frac{2 \times nC_{27}}{nC_{26} + nC_{28}}$$

$$A = pr/nC_{17}$$

$$B = phy/nC_{18}$$

$$A/B = (pr/nC_{17})/(phy/nC_{18})$$

Aromatics:

MPI 1 = methylphenanthrene index 1 1.5 x (3-MP+2-MP)/(P+9-MP+1-MP)

MPI 2 = methylphenanthrene index 2 3 x 2-MP/(P+9-MP+1-MP)

3.4 Gas chromatography - mass spectrometry (GC-MS)

GC-MS analyses were performed on a VG Quadrupole 12-250 GC-MS system. The HP 5790A Series GC was fitted with a fused silica DB-5 capillary column (30 m x 0.32 mm i.d.). Helium (1.5 ml/min.) was used as carrier gas and the injections were performed in splitless mode.

GC-program: 60°C (2 min.) - 8°C/min. - 120°C (0 min.) - 4°/min. - 280°C.

The saturated hydrocarbons or the total oil were analysed in multiple ion mode (MID) at a scan cycle time of approximately 2 secs. The mass spectrometers operated at 70eV electron energy with an ion source temperature of 200°C. Data acquisition was performed using VG data systems.

Peaks were identified by comparison with elution patterns in certain mass chromatograms. Peak ratios were calculated from peak heights in the appropriate mass chromatograms.

3.5 δ^{13} isotope analysis

The $\delta^{13}C$ isotope analysis was performed by mass spectrometry at the Institute for Energy Technology (IFE) in Oslo according to their method. Their reference value for the standard NBS-22 is -29.8.

6. TABLES

Table 1. General sample information and analytical program.

IKU no.	Depth (m FKB)	Well	DST	GC -tot.	Topping 210°C	GC C_2-C_8	Deasph. MPLC sep.	GC -sat	GC[1] -aro	GC-MS[2]	$^{13}C/^{12}C$[3]
C-7428	No info	30/3-A1	RFT	x						x	
C-7259	3234.00-3250.00	30/3-A1	1	x	x	x	x	x	x	x	x
C-7258	3071.25-3088.25	30/3-A1	2	x	x	x	x	x	x	x	x
C-7260	2870.00-2874.00	30/3-2	2	x	x	x	x	x	x	x	x
C-1648	2866-2882	30/3-4	4	x	x	x	x	x	x	x	x
C-1647	3079-3096	30/3-4	1	x	x	x	x	x	x	x	x

1) Well 30/3-4: FID only
Wells 30/3-A1 and 30/3-2: FID/FPD

2) Wells 30/3-A1 (DST) and 30/3-2: m/z 191, 167, 177, 205, 217, 218, 231, 259.
Well 30/3-4: m/z 191, 217, 218
Well 30/3-A1 (RFT): m/z 191, 217 (total oil).

3) Wells 30/3-A1 (DST) and 30/3-2: Topped oil. sat, aro, NSO, asph.
Well 30/3-4: Sat and aro.

Table 2. $^{13}C/^{12}C$ isotope results (o/oo PDB).

Sample id.	Well	DST	Topped oil	SAT	ARO	NSO	ASPH	CV
C-7258	30/3-A1	2	-29.0	-29.3	-28.1	-27.8	-28.8	0.10
C-7259	30/3-A1	1	-28.4	-28.7	-27.5	-28.0	-27.8	0.09
C-7260	30/3-2	2	-29.3	-29.7	-28.5	-28.3	-29.0	0.22
C-1648	30/3-4	4		-29.6	-28.4			0.19
C-1647	30/3-4	1		-29.1	-27.8			0.26

Remarks

CV defined by Z. Sofer (1984):

$$CV = -2.53\ \delta^{13}C_{SAT} + 2.22\ \delta^{13}C_{ARO} - 11.65$$

Waxy oils: CV > 0.47

C-1648 and C-1647 are from Leith et al. (1985).

TABLE 3

FRACTION BOILING BELOW 210°C
DST SAMPLES

IKU-No.	CODE	Crude oil (mg)	oil >210C (mg)	Low molecular weight compounds (mg)	(%)
C 7258	30/3-A1,DST 2	177.9	121.0	56.9	32.0
C 7259	30/3-A1,DST 1	226.0	119.1	106.9	47.3
C 7260	30/3-2,DST 2	168.1	114.3	53.8	32.0

Table 4.

Composition of C_2-C_8 hydrocarbons

TABLE 4
COMPOSITION OF C2 - C8 HYDROCARBONS
DST SAMPLES

C-7259
3234.00 - 3250.00
DST 1

30/3-A1	area	µg	mg/ml	% of tot
isoC3	0			
nC3	0			
isoC4	0			
nC4	0			
isoC5	267363	2.35	7.86	.98
nC5	512883	4.52	15.08	1.88
CyC5 + 2,3DMC4 + 2MC5	374871	3.30	11.02	1.37
3MC5	168702	1.48	4.96	.62
nC6	625208	5.51	18.38	2.30
MCyC5	282457	2.49	8.30	1.03
benzene	258017	2.27	7.58	.94
CyC6	431030	3.80	12.67	1.58
2MC6	199238	1.75	5.85	.73
2,3DMC5	59084	.52	1.73	.21
3MC6	264525	2.33	7.77	.97
DMCyC5	229670	2.02	6.75	.84
nC7	642740	5.66	18.89	2.36
MCyC6	778944	6.87	22.90	2.86
EtCyC5 + 2,5DMC6	74509	.65	2.19	.27
2,4DMC6	54082	.47	1.59	.19
TMCyC5	33408	.29	.98	.12
toluene	490865	4.33	14.43	1.80
2 + 4MC7	235010	2.07	6.91	.86
3MC7	160276	1.41	4.71	.58
DMCyC6	221304	1.95	6.50	.81
nC8	631920	5.57	18.58	2.32
2,4DMC7 + DMCyC6	91472	.80	2.68	.33
EtCyC6	172345	1.52	5.06	.63
Etbenzene	89066	.78	2.61	.32
m/p-xylene	397715	3.50	11.69	1.46
2 + 4MC8	172414	1.52	5.06	.63
o-xylene	138237	1.21	4.06	.50
sum		71.07	236.92	29.65

total oil (µg inj): 239.70

%C2-C8 (tot.area) in tot.oil: 36.08

TABLE 4
COMPOSITION OF C2 - C8 HYDROCARBONS
DST SAMPLES

C-7258
3071.25 - 3088.25
DST 2

30/3-A1	area	µg	mg/ml	% of tot
isoC3	0			
nC3	0			
isoC4	0			
nC4	0			
isoC5	46302	.36	1.21	.14
nC5	204080	1.60	5.34	.63
CyC5 + 2,3DMC4 + 2MC5	264154	2.07	6.91	.82
3MC5	118220	.92	3.09	.36
nC6	426399	3.34	11.16	1.33
MCyC5	232053	1.82	6.07	.72
benzene	114855	.90	3.00	.35
CyC6	324196	2.54	8.48	1.01
2MC6	125293	.98	3.28	.39
2,3DMC5	45138	.35	1.18	.14
3MC6	178012	1.39	4.66	.55
DMCyC5	220250	1.72	5.76	.68
nC7	456104	3.58	11.94	1.42
MCyC6	598485	4.70	15.66	1.86
EtCyC5 + 2,5DMC6	70220	.55	1.83	.21
2,4DMC6	47162	.37	1.23	.14
TMCyC5	33725	.26	.88	.10
toluene	274192	2.15	7.17	.85
2 + 4MC7	182069	1.43	4.76	.56
3MC7	120695	.94	3.16	.37
DMCyC6	234880	1.84	6.14	.73
nC8	486085	3.81	12.72	1.51
2,4DMC7 + DMCyC6	87866	.69	2.30	.27
EtCyC6	150524	1.18	3.94	.46
Etbenzene	88208	.69	2.30	.27
m/p-xylene	195312	1.53	5.11	.60
2 + 4MC8	105436	.82	2.76	.32
o-xylene	91834	.72	2.40	.28
sum		43.37	144.56	17.23

total oil (µg inj): 251.64

%C2-C8 (tot.area) in tot.oil: 23.21

TABLE 4
COMPOSITION OF C2 - C8 HYDROCARBONS
DST SAMPLES

C-7260
2870.00 - 2874.00
DST 2
30/3-2

	area	µg	mg/ml	% of tot
isoC3	0			
nC3	0			
isoC4	0			
nC4	0			
isoC5	0			
nC5	0			
CyC5 + 2,3DMC4 + 2MC5	136566	1.12	3.75	.44
3MC5	111375	.91	3.06	.36
nC6	442979	3.65	12.18	1.45
MCyC5	228744	1.88	6.29	.74
benzene	96818	.79	2.66	.31
CyC6	286608	2.36	7.88	.93
2MC6	123188	1.01	3.38	.40
2,3DMC5	47151	.38	1.29	.15
3MC6	176020	1.45	4.84	.57
DMCyC5	211294	1.74	5.81	.69
nC7	418437	3.45	11.50	1.37
MCyC6	521741	4.30	14.34	1.71
EtCyC5 + 2,5DMC6	67064	.55	1.84	.21
2,4DMC6	38328	.31	1.05	.12
TMCyC5	37225	.30	1.02	.12
toluene	206389	1.70	5.67	.67
2 + 4MC7	166613	1.37	4.58	.54
3MC7	101254	.83	2.78	.33
DMCyC6	210311	1.73	5.78	.68
nC8	401635	3.31	11.04	1.31
2,4DMC7 + DMCyC6	78744	.64	2.16	.25
EtCyC6	130358	1.07	3.58	.42
Etbenzene	70211	.57	1.93	.23
m/p-xylene	154159	1.27	4.23	.50
2 + 4MC8	98761	.81	2.71	.32
o-xylene	66970	.55	1.84	.21
sum		38.18	127.29	15.17

total oil (µg inj): 251.64

%C2-C8 (tot.area) in tot.oil: 14.34

Table 5a. Molecular ratios from sterane and terpane mass chromatograms. Maturity ratios. DST samples from wells 30/3-A1 and 30/3-2 and RFT sample from the Tarbert Fm in well 30/3-A1.

Code	Well	Depth (m) DST	DST	αβ/αβ+βα[1]	%22S[2]	%ββ[3]	%20S[4]	%ββ[5]
C-7428	30/3-A1	-	RFT	0.94	62.22	66.85	46.67	80.13
C-7258	30/3-A1	3088.25	2	0.93	60.69	69.53	49.30	82.03
C-7259	30/3-A1	3250.00	1	1.00	61.76	73.47	48.72	84.71
C-7260	30/3-2	2874.00	2	0.94	62.73	66.54	46.59	79.91

1) E/(E+F) in m/z 191.
2) Average % distribution between first and second eluting isomers of extended hopanes.
3) r+s/(q+t+r+s) in m/z 217.
4) q/(q+t) in m/z 217.
5) 2(r+s)/(q+t+2(r+s)) in m/z 217.

Table 5b. Molecular ratios from terpane and sterane mass chromatograms. Maturity and source characteristic ratios.

IKU no.	Well	Depth (m)	DST	Q/E[1]	Tm/Ts[2]	X/E[3]	Z/E[4]	a/a+j[5]
C-7428	30/3-A1	-	RFT	0.08	0.5	0.07	0.14	0.92
C-7258	30/3-A1	3088.25	2	0.09	0.55	0.10	0.16	0.94
C-7259	30/3-A1	3250.00	1	0.30	0.26	0.18	0.17	0.97
C-7260	30/3-2	2874.00	2	0.06	0.61	0.06	0.16	0.89

1) Relative abundance of tricyclic terpanes (Q/E in m/z 191).
2) B/A in m/z 191.
3) Relative abundance of unknown (X/E in m/z 191).
4) Relative abundance of bisnorhopane (Z/E in m/z 191).
5) Relative abundance of C_{27} rearranged steranes (a/(a+j) in m/z 217).

T A B L E : 6.

WEIGHT OF TOPPED OIL AND CHROMATOGRAPHIC FRACTIONS
MPLC DATA. DST SAMPLES

IKU-No	CODE	Crude oil	OIL >210' (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)
C 7258	30/3-A1,DST 2	177.9	121.0	65.1	21.9	87.0	34.0
C 7259	30/3-A1,DST 1	226.0	116.8	80.3	22.3	102.6	14.2
C 7260	30/3-2, DST 2	168.1	114.3	63.6	21.4	85.0	29.3

T A B L E : 7.

COMPOSITION OF TOPPED OIL, MPLC DATA
DST SAMPLES

IKU-No	CODE	Sat / oil %	Aro / oil %	HC / oil %	SAT / Aro x 100	Non HC / oil %	HC / Non HC x 100
C 7258	30/3-A1,DST 2	53.8	18.1	71.9	297.3	28.1	255.9
C 7259	30/3-A1,DST 1	68.8	19.1	87.8	360.1	12.2	722.5
C 7260	30/3-2, DST 2	55.6	18.7	74.4	297.2	25.6	290.1

TABLE 8

WEIGHT AND CONCENTRATION OF ASPHALTENES AND NSO
DST SAMPLES

IKU-No.	CODE	Crude oil (mg)	Asphaltenes (mg)	Asphaltenes (%)	NSO (mg)	NSO (%)
C 7258	30/3-A1,DST 2	177.9	4.7	2.5	11.0	5.9
C 7259	30/3-A1,DST 1	226.0	3.6	2.3	7.5	4.8
C 7260	30/3-2, DST 2	168.1	3.6	2.3	7.5	4.8

T A B L E 9

TABULATION OF DATA FROM THE GASCHROMATOGRAMS
DST SAMPLES

IKU No.	CODE	A= PRISTANE/PHYTANE	B= PRISTANE/n-C17	PHYTANE/n-C18	A/B	n-C17/n-C27	CPI 1	CPI 2
C 7258	30/3-A1,DST2	1.5	0.7	0.5	1.4	2.1	1.0	1.0
C 7259	30/3-A1,DST1	1.6	0.7	0.5	1.5	3.0	1.1	1.0
C 7260	30/3-2, DST2	1.5	0.9	0.7	1.3	2.2	1.0	1.0

DATE : 13 - 3 - 88.

TABLE 10

M P - I N D I C E S
DST SAMPLES

IKU-No.	CODE	MP 1	MP 2
C 7258	30/3-A1,DST 2	0.7	0.8
C 7259	30/3-A1,DST 1	0.9	1.0
C 7260	30/3-2, DST 2	0.7	0.8

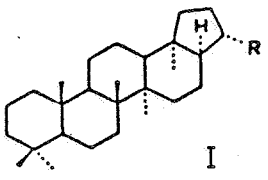
TABLE 11

D B T - I N D I C E S
DST SAMPLES

IKU-No.	CODE	4 --- MDBT 1	2+3 --- MDBT 1
C 7258	30/3-A1,DST 2	5.1	0.8
C 7259	30/3-A1,DST 1	-	-
C 7260	30/3-2, DST 2	3.7	0.7

Mass chromatograms representing terpanes

P	tricyclic terpane	$C_{23}H_{42}$	(IV,R=C_4H_9)
Q	tricyclic terpane	$C_{24}H_{44}$	(IV,R=C_5H_{11})
R	tricyclic terpane (17R,17S)	$C_{25}H_{46}$	(IV,R=C_6H_{13})
S	tetracyclic terpane	$C_{24}H_{42}$	(V)
T	tricyclic terpane (17R,17S)	$C_{26}H_{48}$	(IV,R=C_7H_{15})
A	T_s, 18α(H)-trisnorneohopane	$C_{27}H_{46}$	(III)
B	T_m, 17α(H)-trisnorhopane	$C_{27}H_{46}$	(I,R=H)
Z	bisnorhopane	$C_{28}H_{48}$	
C	17α(H)-norhopane	$C_{29}H_{50}$	(I,R=C_2H_5)
X	unknown triterpane	$C_{30}H_{52}$	
D	17β(H)-normoretane	$C_{29}H_{50}$	(II,R=C_2H_5)
E	17α(H)-hopane	$C_{30}H_{52}$	(I,R=C_3H_7)
F	17β(H)-moretane	$C_{30}H_{52}$	(II,R=C_3H_7)
G	17α(H)-homohopane (22S)	$C_{31}H_{54}$	(I,R=C_4H_9)
H	17α(H)-homohopane (22R)	$C_{31}H_{54}$	(I,R=C_4H_9)
	+ unknown triterpane (gammacerane?)		
I	17β(H)-homomoretane	$C_{31}H_{54}$	(II,R=C_4H_9)
J	17α(H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I,R=C_5H_{11})
K	17α(H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I,R=C_6H_{13})
L	17α(H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I,R=C_7H_{15})
M	17α(H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I,R=C_8H_{17})



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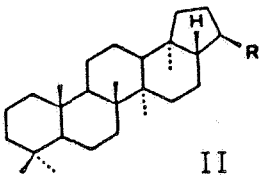

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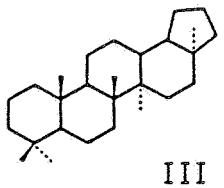
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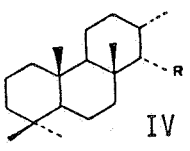

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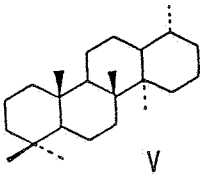
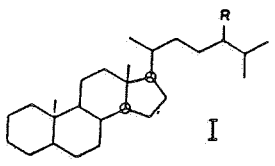

V

Mass chromatograms representing steranes

u	5α(H)-sterane	$C_{21}H_{36}$	(V,R=C_2H_5)
v	5α(H)-sterane	$C_{22}H_{38}$	(V,R=C_3H_7)
a	13β(H),17α(H)-diasterane (20S)	$C_{27}H_{48}$	(III,R=H)
b	13β(H),17α(H)-diasterane (20R)	$C_{27}H_{48}$	(III,R=H)
c	13α(H),17β(H)-diasterane (20S)	$C_{27}H_{48}$	(IV,R=H)
d	13α(H),17β(H)-diasterane (20R)	$C_{27}H_{48}$	(IV,R=H)
e	13β(H),17α(H)-diasterane (20S)	$C_{28}H_{50}$	(III,R=CH_3)
f	13β(H),17α(H)-diasterane (20R)	$C_{28}H_{50}$	(III,R=CH_3)
g	13α(H),17β(H)-diasterane (20S)	$C_{28}H_{50}$	(IV,R=CH_3)
	+ 14α(H),17α(H)-sterane (20S)	$C_{27}H_{48}$	(I,R=H)
h	13β(H),17α(H)-diasterane (20S)	$C_{29}H_{52}$	(III,R=C_2H_5)
	+ 14β(H),17β(H)-sterane (20R)	$C_{27}H_{48}$	(II,R=H)
i	14β(H),17β(H)-sterane (20S)	$C_{27}H_{48}$	(II,R=H)
	+ 13α(H),17β(H)-diasterane (20R)	$C_{28}H_{50}$	(IV,R=CH_3)
j	14α(H),17α(H)-sterane (20R)	$C_{27}H_{48}$	(I,R=H)
k	13β(H),17α(H)-diasterane (20R)	$C_{29}H_{52}$	(III,R=C_2H_5)
l	13α(H),17β(H)-diasterane (20S)	$C_{29}H_{52}$	(IV,R=C_2H_5)
m	14α(H),17α(H)-sterane (20S)	$C_{28}H_{50}$	(I,R=CH_3)
n	13α(H),17β(H)-diasterane (20R)	$C_{29}H_{52}$	(IV,R=C_2H_5)
	+ 14β(H),17β(H)-sterane (20R)	$C_{28}H_{50}$	(II,R=CH_3)
o	14β(H),17β(H)-sterane (20S)	$C_{28}H_{50}$	(II,R=CH_3)
p	14α(H),17α(H)-sterane (20R)	$C_{28}H_{50}$	(I,R=CH_3)
q	14α(H),17α(H)-sterane (20S)	$C_{29}H_{52}$	(I,R=C_2H_5)
r	14β(H),17β(H)-sterane (20R)	$C_{29}H_{52}$	(II,R=C_2H_5)
	+ unknown sterane		
s	14β(H),17β(H)-sterane (20S)	$C_{29}H_{52}$	(II,R=C_2H_5)
t	14α(H),17α(H)-sterane (20R)	$C_{29}H_{52}$	(I,R=C_2H_5)



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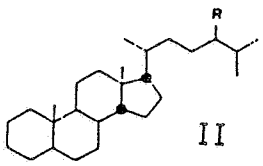

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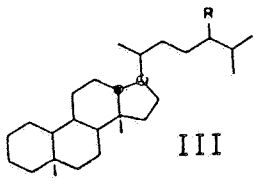

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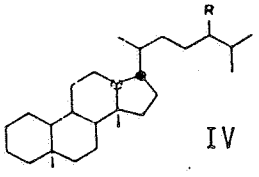

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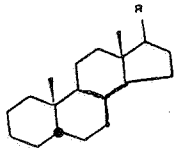

V

APPENDIX 2:

PROCESSING DATA, GAS CHROMATOGRAPHY OF SATURATES

HP 5730A

Channel:2 Title: HP-5710 Date 12/ 3/88 Time 12:55
Analysis:888C7258S Sample Name:STATOI_ 30/3-1,DST 2
Sample 1 Injection 1

	R/T	Height	Area	Identity	Type
	4.040	36490	87869	n-C11	OM
	6.349	72011	217321	n-C12	O
	9.149	103171	334388	n-C13	O
	12.168	110541	444694	n-C14	O
	15.208	117622	466795	n-C15	O
	18.184	114570	510508	n-C16	O
	21.048	107917	445132	n-C17	O
	21.208	59032	331127	Pristane	LO
	23.784	94152	405092	n-C18	O
	24.024	40553	219959	Phytane	O
	26.413	89300	370239	n-C19	O
	28.920	77580	340479	n-C20	FOM
	31.320	69157	306438	n-C21	O
R	33.629	65220	280691	n-C22	O
	35.848	64091	268546	n-C23	O
	37.981	61115	289754	n-C24	O
R	40.024	60181	286455	n-C25	OM
R	41.997	57583	248895	n-C26	LO
	43.901	51502	230801	n-C27	FO
	45.736	48846	233307	n-C28	O
	47.512	49773	252957	n-C29	OM
R	49.229	47687	224946	n-C30	O
	50.899	41690	211559	n-C31	LO
	52.563	31443	176285	n-C32	OM
	54.531	21829	163245	n-C33	LO
	56.925	15904	199509	n-C34	OM
	59.843	11469	144526	n-C35	OM
	63.432	6769	76361	n-C36	OM
	67.867	3963	55101	n-C37	OM
Total		2779851	14901510		

Sample Type: SA Scale Factor: 1.000 Amount: 1.000 Bottle: 1
Method: TB Calibration: TB Type: UC

HP 5730A

Channel:2 Title: HP-5710 Date 7/ 3/88 Time 14:16
Analysis:888C7259S Sample Name:STATOIL 30/3-1,DST
Sample 1 Injection 1

	R/T	Height	Area	Identity	Type
	4.104	21772	50450	n-C11	O
	6.365	60238	173422	n-C12	O
	9.128	94275	308803	n-C13	O
	12.115	110297	442862	n-C14	O
	15.139	119651	473544	n-C15	O
	18.099	114280	462371	n-C16	O
	20.957	109046	444535	n-C17	O
	21.117	51120	296108	Pristane	LO
	23.693	92245	398448	n-C18	O
	23.933	31858	182058	Phytane	O
	26.312	85210	352503	n-C19	O
	28.819	72194	331610	n-C20	OM
	31.219	66700	302013	n-C21	LO
R	33.523	60516	242946	n-C22	O
	35.736	53455	230358	n-C23	FOM
	37.864	51769	256496	n-C24	FOM
R	39.912	43700	208165	n-C25	FO
R	41.880	39836	195103	n-C26	OM
	43.779	36124	181550	n-C27	O
	45.619	32724	167661	n-C28	O
	47.384	31145	174991	n-C29	O
R	49.101	27185	174089	n-C30	O
	50.765	27307	220006	n-C31	O
	52.403	16110	134325	n-C32	O
	54.355	10231	96809	n-C33	O
	56.707	6822	87573	n-C34	LOM
	59.571	4833	66577	n-C35	OM
	63.125	2275	25544	n-C36	OM
	67.461	1390	16668	n-C37	M
Total		2464526	13680680		

Sample Type: SA Scale Factor: 1.000 Amount: 1.000 Bottle: 1
Method: TB Calibration: TB Type: UC

HP

Channel:2 Title: HP-5710 Date 12/ 3/
Analysis:888C7260S Sample Name:STATOIL 30/3-2,DST 2
Sample 1 Injection 1

	R/T	Height	Area	Identity	Type
	4.040	53001	128270	n-C11	LOM
	6.344	86965	264300	n-C12	O
	9.139	108024	365402	n-C13	O
	12.147	115425	460100	n-C14	LO
	15.187	124336	488548	n-C15	O
	18.157	119072	553975	n-C16	O
	21.016	111533	476408	n-C17	O
	21.187	76680	431443	Pristane	LO
	23.752	94091	419009	n-C18	O
	23.997	50887	283818	Phytane	LO
	26.371	89102	406464	n-C19	O
	28.872	75429	330754	n-C20	O
	31.272	67021	328909	n-C21	O
R	33.576	65586	270307	n-C22	O
	35.789	62901	256482	n-C23	O
	37.912	61077	270378	n-C24	FO
R	39.960	55862	266663	n-C25	FO
R	41.933	54080	271900	n-C26	OM
	43.832	50719	280833	n-C27	O
	45.667	50140	329218	n-C28	OM
	47.437	50658	335142	n-C29	OM
R	49.155	49438	332120	n-C30	O
	50.808	45596	394849	n-C31	O
	52.467	33976	338184	n-C32	OM
	54.429	24076	240467	n-C33	O
	56.776	18411	259721	n-C34	OM
	59.672	12401	175846	n-C35	OM
	63.203	7511	89892	n-C36	FOM
	67.573	4457	61524	n-C37	OM
Total		3231595	19717940		

Sample Type: SA Scale Factor: 1.000 Amount: 1.000 Bottle: 1
Method: TB Calibration: TB Type: UC

APPENDIX 3:

PEAK HEIGHTS IN M/Z 191, 217 AND 218 MASS CHROMATOGRAMS

C-7428

Peak heights from m/z 191 mass chromatogram.

Peak identities	m/z 191 Peak heights
P	8
Q	7
R	5
S	6
T	2.5
A	18
B	9
Z	12
C	40.5
X	6
D	4
E	86.5
F	6
G	26.5
H	16
J_1	15
J_2	9
K_1	8.5
K_2	5
L_1	4
L_2	2.5
M_1	2
M_2	1.5

C-7428

Peak heights from m/z 217 mass chromatogram.

Peak identities	m/z 217 Peak heights
a	69
j	6
q	14
r	34.5
s	26
t	16

C-7258

Peak heights from m/z 191 mass chromatogram.

Peak identities	m/z 191 Peak heights
P	8.5
Q	8
R	6
S	6
T	3
A	20
B	11
Z	14
C	44.5
X	8.5
D	5
E	88.5
F	6.5
G	25
H	17
J_1	14
J_2	9
K_1	8.5
K_2	5
L_1	3
L_2	2
M_1	2
M_2	1

C-7258

Peak heights from m/z 217 and 218 mass chromatograms.

Peak identities	m/z 217 Peak heights	m/z 218 Peak heights
a	75	
h		81.5
i		60
j	5	
n		59
o		71.5
q	17.5	
r	42	74
s	39	82
t	18	

C-7259

Peak heights from m/z 191 mass chromatogram.

Peak identities	m/z 191 Peak heights
P	22
Q	21
R	12
S	11.5
T	7
A	34.5
B	9
Z	12
C	31
X	13
E	71
G	18
H	13
J_1	11.5
J_2	6
K_1	7.5
K_2	4
L_1	3
L_2	2
M_1	2
M_2	1

C-7259

Peak heights from m/z 217 and 218 mass chromatograms.

Peak identities	m/z 217 Peak heights	m/z 218 Peak heights
a	84	
h	77	
i		60
j	3	
n		52.5
o		58.5
q	9.5	
r	26	53.5
s	28	66
t	10	

C-7260

Peak heights from m/z 191 mass chromatogram.

Peak identities	m/z 191 Peak heights
P	6.5
Q	6
R	4
S	5
T	3
A	18
B	11
Z	15
C	43
X	6
D	5
E	93
F	6
G	26
H	16
J_1	14
J_2	8
K_1	8.5
K_2	5
L_1	3
L_2	1.5
M_1	1.5
M_2	1

C-7260

Peak heights from m/z 217 and 218 mass chromatograms.

Peak identities	m/z 217 Peak heights	m/z 218 Peak heights
a	78	
h		84
i		65.5
j	10	
n		64
o		69
q	20.5	
r	46.5	75.5
s	41	79
t	23.5	

GEOLAB NOR

Geochemical Report for

Well NOCS 30/3-4

Authors: Malvin Bjorøy
Henning Jensen
Ian L. Ferriday

Geolab Nor A/S
Hornebergveien 5
7038 Trondheim
Norway

Date : 11.02.92

1.2 Analytical Program

A total of 200 cuttings and core-chip samples formed the base of the analytical program.

Analysis type	No of samples	Figures	Tables
Lithology description	200	1	1
TOC	52	1	1,2
Rock-Eval pyrolysis	52	2,3,4	2
Thermal extraction GC (GHM, S_1)	19	5a-h	
Pyrolysis GC (GHM, S_2)	19	6a-i,7	3
Soxhlet Extraction of organic matter	10		
MPLC/HPLC separation	10		4
Saturated hydrocarbon GC	10	8a-h	5
Aromatic hydrocarbon GC	10	9a-b	6
Vitrinite reflectance	12	10	7
Visual kerogen microscopy	11	11	7,8
Isotope composition C_{15}+ fractions	2	12,13	9a-b
GC - MS of saturated and aromatic HC	2	14a-z	10a-i

GEOLAB NOR

Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
1000.00								0042
			100	Sh/Clst: y brn, calc				0042-1L
			tr	Coal : blk				0042-2L
			tr	Cont : prp				0042-3L
1020.00								0043
			75	Sh/Clst: y brn, calc				0043-1L
			25	Ca : w to lt or				0043-2L
			tr	Cont : prp				0043-3L
1040.00								0044
			75	Sh/Clst: y brn, calc, s				0044-1L
			25	Ca : w to lt or				0044-2L
			tr	S/Sst : w to lt gy, f, l				0044-3L
			tr	Cont : prp				0044-4L
1060.00								0045
			75	Sh/Clst: pl y brn, s				0045-1L
			20	Ca : w to lt or				0045-2L
			5	S/Sst : w to lt gy, f, l				0045-3L
			tr	Cont : prp				0045-4L
1080.00								0046
			90	Sh/Clst: pl y brn, s				0046-1L
			5	Ca : w to lt or				0046-2L
			5	S/Sst : w to lt gy, f, l				0046-3L
			tr	Cont : prp				0046-4L

GEOLAB NOR

Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
1100.00								0047
			80	Sh/Clst:		pl y brn, s		0047-1L
			15	Ca	:	w to lt or		0047-2L
			5	S/Sst	:	w to lt gy, f, l		0047-3L
			tr	Cont	:	prp		0047-4L
1120.00								0048
			100	Sh/Clst:		pl y brn, slt, s		0048-1L
			tr	Ca	:	lt or		0048-2L
			tr	Cont	:	prp		0048-3L
1140.00								0049
			100	Sh/Clst:		y brn to pl y brn, calc, slt		0049-1L
			tr	Cont	:	prp		0049-2L
1160.00								0050
			100	Sh/Clst:		y brn to pl y brn, calc, slt		0050-1L
			tr	Cont	:	prp		0050-2L
1180.00								0051
			100	Sh/Clst:		y brn to pl y brn, calc, slt		0051-1L
			tr	Cont	:	prp		0051-2L
1200.00								0052
			100	Sh/Clst:		y brn to pl y brn, calc, slt		0052-1L
			tr	Cont	:	prp		0052-2L

GEOLAB NOR

Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
1220.00							0053
		100	Sh/Clst: y brn to pl y brn, calc, slt				0053-1L
1240.00							0054
		100	Sh/Clst: y brn to pl y brn, slt				0054-1L
1260.00							0055
		100	Sh/Clst: y brn to pl y brn to lt brn gy, calc, slt				0055-1L
1280.00							0056
		100	Sh/Clst: lt brn gy, slt				0056-1L
		tr	Cont : dd, prp				0056-2L
1300.00							0057
		100	Sh/Clst: lt brn gy, slt				0057-1L
1320.00							0058
		100	Sh/Clst: lt brn gy, slt				0058-1L
1340.00							0059
		100	Sh/Clst: lt brn gy, slt				0059-1L

GEOLAB NOR

Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
1360.00								0060
			100	Sh/Clst: lt brn gy, slt				0060-1L
1380.00								0061
			100	Sh/Clst: lt brn gy, slt				0061-1L
			tr	Cont : dd				0061-2L
1400.00								0062
			100	Sh/Clst: lt brn gy, slt				0062-1L
			tr	Cont : dd				0062-2L
1420.00								0063
			100	Sh/Clst: lt brn gy to y brn, calc				0063-1L
			tr	Cont : prp				0063-2L
1440.00								0064
			100	Sh/Clst: lt brn gy				0064-1L
			tr	Cont : prp				0064-2L
1460.00								0065
			100	Sh/Clst: lt brn gy to brn gy				0065-1L
			tr	Cont : prp				0065-2L
1480.00								0066
			65	S/Sst : w, crs, f, l				0066-1L
			35	Sh/Clst: lt brn gy				0066-2L
			tr	Cont : prp				0066-3L

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Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
1620.00						0073
		100	Sh/Clst:	m gy to brn gy		0073-1L
		tr	Sh/Clst:	lt brn		0073-2L
		tr	Cont :	prp		0073-3L
1640.00						0074
		100	Sh/Clst:	m gy		0074-1L
		tr	Sh/Clst:	lt brn		0074-2L
		tr	Cont :	prp		0074-3L
1660.00						0075
		100	Sh/Clst:	lt brn gy to brn gy to y gy		0075-1L
		tr	Ca :	or gy, mrl		0075-2L
		tr	Cont :	prp		0075-3L
1680.00						0076
		100	Sh/Clst:	lt brn gy to gy y to lt ol gy to pl ol		0076-1L
		tr	Sh/Clst:	lt brn		0076-2L
		tr	Cont :	prp		0076-3L
1700.00						0077
		100	Sh/Clst:	m gy to pl ol		0077-1L
		tr	Cont :	prp		0077-2L
1720.00						0078
		100	Sh/Clst:	pl ol to m gy		0078-1L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
1500.00								0067
			90	S/Sst	:	w, crs, f, l		0067-1L
			10	Sh/Clst	:	lt brn gy		0067-2L
			tr	Cont	:	prp		0067-3L
1520.00								0068
			90	S/Sst	:	w, crs, f, l		0068-1L
			10	Sh/Clst	:	lt brn gy		0068-2L
			tr	Cont	:	prp		0068-3L
1540.00								0069
			80	Sh/Clst	:	lt brn gy to brn gy		0069-1L
			20	S/Sst	:	w, f, crs, l		0069-2L
1560.00								0070
			85	Sh/Clst	:	lt brn gy to brn gy to pl y brn, slt		0070-1L
			15	S/Sst	:	w, f, crs, l		0070-2L
			tr	Cont	:	prp		0070-3L
1580.00								0071
			100	Sh/Clst	:	lt brn gy to brn gy to pl y brn, slt		0071-1L
			tr	Cont	:	prp		0071-2L
1600.00								0072
			100	Sh/Clst	:	lt brn gy to brn gy		0072-1L
			tr	Cont	:	prp, dd		0072-2L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
1740.00								0079
			100	Sh/Clst: pl ol to gn gy to m gy				0079-1L
			tr	Cont : prp, dd				0079-2L
1760.00								0080
			100	Sh/Clst: pl ol to gn gy to m gy				0080-1L
			tr	Cont : prp, dd				0080-2L
1780.00								0081
			100	Sh/Clst: pl ol to gn gy to m gy				0081-1L
			tr	Cont : prp, dd				0081-2L
1800.00								0082
			100	Sh/Clst: pl ol to drk y brn				0082-1L
1820.00								0083
			100	Sh/Clst: pl ol to drk y brn				0083-1L
1840.00								0084
			100	Sh/Clst: gn gy to lt gy				0084-1L
1860.00								0085
			100	Sh/Clst: gn gy to lt gy				0085-1L
			tr	S/Sst : w, f, l				0085-2L
			tr	Cont : prp, dd				0085-3L

Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
1880.00								0086
			100	Sh/Clst:		gn gy to lt gy		0086-1L
			tr	Cont	:	prp, dd		0086-2L
1900.00								0087
			100	Sh/Clst:		gn gy to lt gy		0087-1L
			tr	Cont	:	prp, dd		0087-2L
1920.00								0088
			100	Sh/Clst:		gn gy to lt gy		0088-1L
			tr	Ca	:	w to lt or to or gy, mrl		0088-2L
			tr	S/Sst	:	lt gy to lt brn, crs, l		0088-3L
1940.00								0089
			100	Sh/Clst:		pl ol to lt brn gy		0089-1L
			tr	Ca	:	w to lt or to or gy, mrl		0089-2L
			tr	Sh/Clst:		pl brn to brn gy		0089-3L
1960.00								0090
			60	Sh/Clst:		pl ol to lt brn gy		0090-1L
			35	Sh/Clst:		pl brn to drk y brn		0090-2L
			5	Ca	:	lt or to or gy		0090-3L
1980.00								0091
			80	Sh/Clst:		brn to pl brn, calc		0091-1L
			15	Sh/Clst:		lt gy to brn gy to y gy to pl ol to lt gn gy		0091-2L
			5	Ca	:	lt or		0091-3L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2000.00								0092
			50	Sh/Clst:		lt gy to pl ol		0092-2L
			40	Sh/Clst:		brn to pl brn, calc		0092-1L
			5	Ca	:	lt or		0092-3L
			5	Cont	:	dd		0092-4L
2020.00								0093
			75	Sh/Clst:		lt gy to lt brn gy to lt y gn		0093-2L
			20	Sh/Clst:		brn to pl brn, calc		0093-1L
			5	Ca	:	lt or to or gy		0093-3L
2040.00								0094
			80	Sh/Clst:		lt gy to lt brn gy to lt y gn		0094-2L
			15	Ca	:	lt or to or gy		0094-3L
			5	Sh/Clst:		brn to pl brn, calc		0094-1L
			tr	S/Sst	:	lt brn, crs, l		0094-4L
2060.00								0095
			80	Sh/Clst:		lt gy to lt brn gy to lt y gn		0095-2L
			15	Ca	:	lt or to or gy		0095-3L
			5	Sh/Clst:		brn to pl brn, calc		0095-1L
			tr	S/Sst	:	lt brn, crs, l		0095-4L
2080.00								0096
			55	Sh/Clst:		lt gy to m gy to pl ol		0096-1L
			40	Ca	:	lt or to or gy		0096-2L
			5	Sh/Clst:		brn to pl brn		0096-3L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2100.00								0097
			75	Sh/Clst:		lt gy to m gy to pl ol		0097-1L
			25	Ca	:	lt or to or gy		0097-2L
			tr	Sh/Clst:		brn to pl brn		0097-3L
2120.00								0098
			90	Sh/Clst:		lt gy to m gy to pl ol		0098-1L
			5	Ca	:	lt or to or gy		0098-2L
			5	Sh/Clst:		brn to pl brn		0098-3L
2140.00								0099
			95	Sh/Clst:		lt gy to m gy to pl ol		0099-1L
			5	Ca	:	lt or to or gy		0099-2L
			tr	Sh/Clst:		brn to pl brn		0099-3L
2160.00								0100
			90	Sh/Clst:		lt gy to m gy to pl ol		0100-1L
			10	Sh/Clst:		brn to pl brn		0100-3L
			tr	Ca	:	lt or to or gy		0100-2L
2180.00								0101
			95	Sh/Clst:		lt gy to m gy to pl ol		0101-1L
			5	Sh/Clst:		brn to pl brn		0101-2L
			tr	Cont	:	dd		0101-3L
2200.00								0102
			95	Sh/Clst:		lt gy to m gy to pl ol		0102-1L
			5	Cont	:	dd		0102-3L
			tr	Sh/Clst:		brn to pl brn		0102-2L
			tr	Ca	:	lt or		0102-4L

GEOLAB NOR

Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2220.00								0103
			95	Sh/Clst:		lt gy to m gy to pl ol		0103-1L
			5	Cont	:	dd		0103-3L
			tr	Sh/Clst:		brn to pl brn		0103-2L
			tr	Ca	:	lt or		0103-4L
2240.00								0104
			95	Sh/Clst:		lt gy to m gy to pl ol		0104-1L
			5	Sh/Clst:		brn to pl brn		0104-2L
			tr	Cont	:	dd		0104-3L
			tr	Ca	:	lt or		0104-4L
			tr	S/Sst	:	w, crs, l		0104-5L
2260.00								0105
			90	Sh/Clst:		lt gy to m gy to pl ol		0105-1L
			10	S/Sst	:	w to lt gy, crs, l		0105-5L
			tr	Sh/Clst:		brn to pl brn		0105-2L
			tr	Cont	:	dd		0105-3L
			tr	Ca	:	lt or		0105-4L
2280.00								0106
			85	Sh/Clst:		m gy, calc		0106-1L
			10	Ca	:	w to lt or		0106-2L
			5	S/Sst	:	w to lt gy, f, l		0106-3L
			tr	Sh/Clst:		pl brn		0106-4L
			tr	Cont	:	dd		0106-5L
2300.00								0107
			70	Sh/Clst:		m gy to pl ol, calc		0107-1L
			15	Ca	:	w to lt or		0107-2L
			10	Cont	:	dd, prp		0107-5L
			5	S/Sst	:	w to lt gy, f, l		0107-3L
			tr	Sh/Clst:		pl brn		0107-4L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2320.00								0108
			70	Sh/Clst:		m gy to lt ol gy, calc		0108-1L
			20	Ca	:	w to lt or		0108-2L
			5	S/Sst	:	w to lt gy, f, l		0108-3L
			5	Cont	:	dd, prp		0108-5L
			tr	Sh/Clst:		pl brn		0108-4L
2340.00								0109
			90	Sh/Clst:		m gy to lt ol gy, calc		0109-1L
			5	Ca	:	w to lt or		0109-2L
			5	S/Sst	:	w to lt gy, f, l		0109-3L
			tr	Cont	:	dd, prp		0109-4L
2360.00								0110
			95	Sh/Clst:		m gy to lt ol gy, calc		0110-1L
			5	S/Sst	:	w to lt gy, f, l		0110-2L
			tr	Sh/Clst:		pl brn		0110-3L
			tr	Ca	:	w to lt or		0110-4L
			tr	Cont	:	prp		0110-5L
2380.00								0111
			85	Sh/Clst:		m gy to lt ol gy, calc		0111-1L
			10	Ca	:	w to lt or		0111-4L
			5	S/Sst	:	w to lt gy, f, l		0111-2L
			tr	Sh/Clst:		pl brn		0111-3L
			tr	Cont	:	prp		0111-5L
2400.00								0112
			95	Sh/Clst:		m gy to lt ol gy, calc		0112-1L
			5	Cont	:	dd, prp		0112-5L
			tr	S/Sst	:	w to lt gy, f, l		0112-2L
			tr	Sh/Clst:		pl brn		0112-3L
			tr	Ca	:	w to lt or		0112-4L

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Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2420.00								0113
			100	Sh/Clst:	m gy to lt ol gy, calc			0113-1L
			tr	Sh/Clst:	pl brn			0113-2L
2440.00								0115
			100	Sh/Clst:	m gy, calc			0115-1L
			tr	Cont	: prp			0115-2L
2460.00								0119
			100	Sh/Clst:	m gy			0119-1L
			tr	Cont	: prp			0119-2L
2480.00								0120
			75	Sh/Clst:	lt gy to m gy, calc			0120-1L
			20	Ca	: w to lt or			0120-2L
			5	Cont	: prp, dd			0120-3L
			tr	Sh/Clst:	pl brn, calc			0120-4L
2500.00								0121
			100	Sh/Clst:	m gy to pl ol			0121-1L
			tr	Ca	: w to lt or			0121-2L
			tr	Cont	: prp, dd			0121-3L
			tr	Sh/Clst:	pl brn, calc			0121-4L
2520.00								0122
			90	Sh/Clst:	m gy to brn gy to pl ol			0122-1L
			5	Sh/Clst:	pl brn, calc			0122-2L
			5	Ca	: lt or to or gy			0122-3L
			tr	Cont	: prp, dd			0122-4L

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Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2540.00								0123
			80	Sh/Clst:		m gy to brn gy to pl ol		0123-1L
			10	Sh/Clst:		pl brn to drk y brn to gy red, calc		0123-2L
			5	Ca	:	lt or to or gy		0123-3L
			5	Cont	:	prp, dd, ns		0123-4L
2560.00								0124
			75	Sh/Clst:		m gy to brn gy to pl ol		0124-1L
			20	Ca	:	lt or to or gy		0124-3L
			5	Sh/Clst:		pl brn to drk y brn to gy red, calc		0124-2L
			tr	S/Sst	:	w to lt gy, f, l		0124-4L
			tr	Cont	:	prp, ns		0124-5L
2580.00								0125
			85	Sh/Clst:		m gy		0125-1L
			15	Ca	:	lt or to or gy		0125-2L
			tr	Cont	:	prp, ns		0125-3L
2600.00								0126
			70	Sh/Clst:		m gy		0126-1L
			15	Ca	:	lt or to or gy		0126-2L
			10	Cont	:	dd, prp		0126-3L
			5	Sh/Clst:		pl brn to dsk brn		0126-4L
2620.00								0127
			85	Sh/Clst:		m gy to lt ol gy to pl ol		0127-1L
			5	Ca	:	lt or to or gy		0127-2L
			5	Cont	:	dd, prp		0127-3L
			5	Sh/Clst:		pl brn to dsk brn		0127-4L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2640.00							0128
		85	Sh/Clst:		m gy		0128-1L
		5	Ca	:	or gy, mrl		0128-2L
		5	Cont	:	dd, prp		0128-3L
		5	Sh/Clst:		pl brn to dsk brn		0128-4L
2660.00							0129
		95	Sh/Clst:		m gy to pl ol, calc		0129-1L
		5	Ca	:	or gy, mrl		0129-2L
		tr	Sh/Clst:		pl brn to dsk brn		0129-3L
		tr	Cont	:	prp		0129-4L
2680.00							0130
		100	Sh/Clst:		m gy to pl ol, calc		0130-1L
		tr	Sh/Clst:		pl brn to dsk brn		0130-2L
		tr	Cont	:	prp		0130-3L
2700.00							0131
		100	Sh/Clst:		m gy to pl ol, calc		0131-1L
		tr	Sh/Clst:		pl brn to dsk brn		0131-2L
		tr	Cont	:	prp		0131-3L
2720.00							0132
		100	Sh/Clst:		m gy to pl ol, calc		0132-1L
		tr	Ca	:	or gy, mrl		0132-2L
		tr	Sh/Clst:		pl brn		0132-3L
		tr	Cont	:	prp		0132-4L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2740.00								0133
			100	Sh/Clst:		m gy to pl ol, calc		0133-1L
			tr	Ca	:	or gy, mrl		0133-2L
			tr	Sh/Clst:		pl brn		0133-3L
			tr	Cont	:	prp		0133-4L
2760.00								0134
			100	Sh/Clst:		m gy to pl ol, calc		0134-1L
			tr	Sh/Clst:		pl brn		0134-2L
			tr	Cont	:	prp		0134-3L
2770.00								0135
			100	Sh/Clst:		m gy, calc		0135-1L
			tr	Sh/Clst:		pl brn		0135-2L
			tr	Ca	:	lt or to or gy		0135-3L
			tr	Cont	:	prp		0135-4L
2775.00								0136
			100	Sh/Clst:		m gy, calc		0136-1L
			tr	Ca	:	lt or to or gy		0136-2L
			tr	Cont	:	prp		0136-3L
2780.00								0137
			100	Sh/Clst:		m gy, calc		0137-1L
			tr	Ca	:	lt or to or gy, mrl		0137-2L
			tr	S/Sst	:	w to lt gy, f, l		0137-3L
			tr	Cont	:	prp		0137-4L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2787.50								0138
			100	Sh/Clst:		m gy, calc		0138-1L
			tr	Ca	:	lt or to or gy, mrl		0138-2L
			tr	Cont	:	prp, dd		0138-3L
2790.00								0139
			95	Sh/Clst:		lt gy to m gy, calc		0139-1L
			5	Cont	:	prp, dd		0139-3L
			tr	Ca	:	lt or to or gy, mrl		0139-2L
2795.00								0140
			95	Sh/Clst:		m gy, calc		0140-1L
			5	Cont	:	prp, dd		0140-2L
			tr	Sh/Clst:		pl brn		0140-3L
			tr	S/Sst	:	w to lt gy, f, l		0140-4L
2800.00								0141
			95	Sh/Clst:		m gy to drk gy, calc, mic		0141-1L
			5	Cont	:	prp, dd		0141-2L
			tr	Coal	:	blk		0141-3L
			tr	Sh/Clst:		pl brn to drk y brn		0141-4L
2805.00								0142
			95	Sh/Clst:		m gy to drk gy, calc, mic		0142-1L
			5	Cont	:	prp, dd		0142-2L
2810.00								0143
			95	Sh/Clst:		m gy to drk gy, calc, mic		0143-1L
			5	Cont	:	prp, dd		0143-2L
			tr	Ca	:	lt or to or gy, mrl		0143-3L

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Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2817.50								0144
			60	Coal	: blk			0144-1L
			30	Sh/Clst	: drk gy to brn blk			0144-2L
			10	Cont	: prp, dd			0144-3L
2820.00								0145
			70	Coal	: blk			0145-1L
			20	Sh/Clst	: drk gy to brn blk			0145-2L
			5	Cont	: prp, dd			0145-3L
			5	Ca	: or gy, mrl			0145-4L
			tr	S/Sst	: w to lt gy, f, l			0145-5L
2825.00								0146
			70	Coal	: blk			0146-1L
			30	Cont	: prp			0146-2L
2830.00	ccp							0001
			100	Sltst	: lt gy, s, mic, calc			0001-1L
2835.25	ccp							0002
			100	Sh/Clst	: pl y brn, fe			0002-1L
2840.00	ccp							0003
			100	Sltst	: lt brn gy, pyr			0003-1L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2845.00	ccp						0004
		95	S/Sst	: w to pl y brn, crs, hd			0004-1L
		5	Coal	: blk, wx			0004-2L
2850.00	ccp						0005
		100	S/Sst	: w to lt gy to m gy, crs, cngl, hd, pyr			0005-1L
		tr	Coal	: blk, wx			0005-2L
2855.00	ccp						0006
		100	S/Sst	: w to lt gy to or gy, crs, hd			0006-1L
2860.00	ccp						0007
		100	S/Sst	: w to lt gy to or gy, f, hd			0007-1L
2865.00	ccp						0008
		100	S/Sst	: w to lt gy to pl y brn, f, hd, mic			0008-1L
2870.00	ccp						0009
		95	S/Sst	: w to lt gy to pl y brn, crs, hd, mic			0009-1L
		5	Coal	: blk, wx			0009-2L
2875.00	ccp						0010
		100	S/Sst	: lt gy to lt brn gy, crs, hd			0010-1L

Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2880.50	ccp						0011
		100	S/Sst		: w to lt gy to lt brn gy, crs, hd		0011-1L
2885.00	ccp						0012
		100	S/Sst		: lt gy to pl y brn, f, kln		0012-1L
2890.00	ccp						0013
		100	S/Sst		: lt gy to pl y brn, f, kln, hd, mic		0013-1L
2895.00	ccp						0014
		100	S/Sst		: lt gy to m gy to pl y brn, crs, kln, mic		0014-1L
2900.00	ccp						0015
		100	S/Sst		: lt gy to m gy to drk gn gy, crs, kln, glauc		0015-1L
2905.00	ccp						0016
		100	S/Sst		: m gy to lt brn gy, crs, kln, mic		0016-1L
2910.00	ccp						0017
		100	S/Sst		: m gy to lt brn gy, crs, kln, mic		0017-1L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2915.00	ccp						0018
		100	S/Sst	: lt gy to m gy to lt brn gy, crs			0018-1L
2920.00	ccp						0019
		100	S/Sst	: lt gy to m gy to lt brn gy, crs			0019-1L
2925.00	ccp						0020
		100	S/Sst	: lt gy to m gy to lt brn gy, crs			0020-1L
2930.00	ccp						0021
		100	S/Sst	: lt gy to m gy to lt brn gy, crs			0021-1L
2935.00	ccp						0022
		100	S/Sst	: lt gy to lt brn gy, crs			0022-1L
2940.00	ccp						0023
		100	S/Sst	: lt gy to m gy, crs			0023-1L
2945.00	ccp						0024
		100	S/Sst	: lt gy to lt brn gy, crs, kln			0024-1L
2950.00	ccp						0025
		100	Sh/Clst	: drk gy to brn blk, mic			0025-1L

Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2955.00	ccp						0026
		100	Sh/Clst: m gy, s				0026-1L
2960.00	ccp						0027
		100	S/Sst : w to lt gy to pl brn, crs, hd, calc				0027-1L
2965.00	ccp						0028
		100	Sh/Clst: w to lt gy to m gy, mic, slt				0028-1L
2970.00	ccp						0029
		100	Sh/Clst: drk gy to brn blk				0029-1L
2972.30	ccp						0030
		100	Sh/Clst: m gy to drk gy to brn blk, slt				0030-1L
2975.00							0147
		50	Sh/Clst: drk gy to brn blk				0147-1L
		30	Sh/Clst: lt brn				0147-2L
		20	Coal : blk, wx				0147-3L
		tr	Cont : prp				0147-4L
2980.00							0148
		75	Sh/Clst: drk gy to brn blk				0148-1L
		15	Coal : blk, wx				0148-3L
		10	Sh/Clst: lt brn gy, wx, slt				0148-2L
		tr	Cont : prp				0148-4L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2985.00								0149
			50	Sh/Clst: drk gy to brn blk				0149-1L
			25	Sh/Clst: lt brn gy, wx, slt				0149-2L
			25	Coal : blk, wx				0149-3L
			tr	Sh/Clst: lt brn				0149-4L
			tr	Cont : prp				0149-5L
2990.00								0150
			90	Sh/Clst: drk gy to brn blk				0150-1L
			10	Coal : blk, wx				0150-2L
			tr	Cont : prp				0150-3L
2995.00								0151
			95	Sh/Clst: drk gy to brn blk				0151-1L
			5	Coal : blk, wx				0151-2L
			tr	Cont : prp				0151-3L
3000.00								0152
			95	Sh/Clst: drk gy to brn blk				0152-1L
			5	Coal : blk, wx				0152-2L
			tr	Cont : prp				0152-3L
3005.00								0153
			85	Sh/Clst: drk gy to brn blk				0153-1L
			10	S/Sst : w to lt gy, f, l				0153-5L
			5	Coal : blk, wx				0153-2L
			tr	Sh/Clst: lt brn gy, slt, hd				0153-3L
			tr	Cont : prp				0153-4L

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Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
3007.50								0154
			60	Sh/Clst: drk gy to brn blk				0154-1L
			20	S/Sst : w to lt gy, f, crs, l				0154-2L
			15	Coal : blk, wx				0154-3L
			5	Cont : prp, dd				0154-4L
3015.00								0155
			60	Sh/Clst: drk gy to brn blk				0155-1L
			25	Coal : blk, wx				0155-3L
			15	S/Sst : w to lt gy, f, crs, l				0155-2L
			tr	Cont : prp, dd				0155-4L
3020.00								0156
			90	Sh/Clst: drk gy to brn blk				0156-1L
			5	S/Sst : w to lt gy, f, crs, l				0156-2L
			5	Coal : blk, wx				0156-3L
			tr	Cont : prp, dd				0156-4L
3025.00								0157
			70	Sh/Clst: drk gy to brn blk				0157-1L
			20	Coal : blk, wx				0157-3L
			10	S/Sst : w to lt gy, f, crs, l				0157-2L
			tr	Cont : prp, dd				0157-4L
3030.00								0158
			70	Sh/Clst: drk gy to brn blk				0158-1L
			15	Coal : blk, wx				0158-3L
			10	S/Sst : w to lt gy, f, crs, l				0158-2L
			5	Cont : prp, dd				0158-4L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
3035.00								0159
			70	Sh/Clst:		drk gy to brn blk		0159-1L
			15	S/Sst	:	w to lt gy, f, crs, l		0159-2L
			15	Coal	:	blk, wx		0159-3L
			tr	Cont	:	prp, dd		0159-4L
3040.00								0160
			70	Sh/Clst:		drk gy to brn blk		0160-1L
			15	Coal	:	blk, wx		0160-3L
			10	S/Sst	:	w to lt gy, f, crs, l		0160-2L
			5	Cont	:	prp, dd		0160-4L
3045.00								0161
			60	Sh/Clst:		drk gy to brn blk		0161-1L
			20	Coal	:	blk, wx		0161-3L
			15	Sh/Clst:		lt brn gy to brn gy to pl brn, slt, hd		0161-4L
			5	S/Sst	:	w to lt gy, f, crs, l		0161-2L
			tr	Cont	:	prp		0161-5L
3050.00								0162
			80	Sh/Clst:		drk gy to brn blk		0162-1L
			10	Cont	:	prp		0162-4L
			5	S/Sst	:	w to lt gy, f, crs, l		0162-2L
			5	Coal	:	blk, wx		0162-3L
3055.00								0163
			85	Sh/Clst:		drk gy to brn blk		0163-1L
			10	Coal	:	blk, wx		0163-3L
			5	Cont	:	prp		0163-4L
			tr	S/Sst	:	w to lt gy, f, crs, l		0163-2L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
3060.00							0164
		90	Sh/Clst:	drk gy to brn blk			0164-1L
		5	Coal	: blk, wx			0164-3L
		5	Cont	: prp			0164-4L
		tr	S/Sst	: w to lt gy, f, crs, l			0164-2L
3065.00							0165
		75	Sh/Clst:	drk gy to brn blk			0165-1L
		10	Coal	: blk, wx			0165-3L
		10	Cont	: prp			0165-4L
		5	S/Sst	: w to lt gy, f, crs, l			0165-2L
3070.00							0166
		90	Sh/Clst:	drk gy to brn blk			0166-1L
		5	S/Sst	: w to lt gy, f, crs, l			0166-2L
		5	Coal	: blk, wx			0166-3L
		tr	Cont	: prp, dd			0166-4L
3075.00							0167
		75	Sh/Clst:	drk gy to brn blk			0167-1L
		15	Sh/Clst:	lt gy to lt brn gy			0167-3L
		10	Coal	: blk, wx			0167-2L
		tr	Cont	: prp			0167-4L
3080.00							0168
		50	Sh/Clst:	drk gy to brn blk			0168-1L
		30	S/Sst	: w to lt gy, f, crs, l			0168-2L
		10	Coal	: blk, wx			0168-3L
		10	Sh/Clst:	lt gy to lt brn gy			0168-4L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
3085.00							0169
		80	S/Sst	: w to lt gy, crs, l			0169-2L
		10	Coal	: blk, wx			0169-3L
		5	Sh/Clst	: drk gy to brn blk			0169-1L
		5	Sh/Clst	: lt gy to lt brn gy			0169-4L
		tr	Cont	: prp			0169-5L
3086.00 ccp							0031
		100	S/Sst	: lt gy, crs			0031-1L
3091.00 ccp							0032
		75	S/Sst	: ol gy to lt gy, f, mic			0032-1L
		25	Sh/Clst	: drk gy to brn blk			0032-2L
3096.00 ccp							0033
		100	S/Sst	: lt gy to lt brn gy, crs			0033-1L
3101.00 ccp							0034
		95	Sh/Clst	: m gy, slt			0034-1L
		5	Sltst	: w			0034-2L
3106.00 ccp							0035
		100	Sltst	: ol gy to lt gy, cly, mic			0035-1L
3111.00 ccp							0036
		100	Sltst	: ol gy to lt gy, s, cly, mic			0036-1L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
3114.00	ccp						0037
		100	Sltst	:	ol gy to lt gy, s, cly, mic, hd		0037-1L
3119.00	ccp						0038
		100	Sltst	:	ol gy to lt gy, s, cly, mic, hd		0038-1L
3124.00	ccp						0039
		100	Sltst	:	ol gy to lt gy, s, cly, mic, hd		0039-1L
3128.00	ccp						0040
		100	Sltst	:	ol gy to lt gy to m gy, s, cly, hd		0040-1L
3130.70	ccp						0041
		100	Sh/Clst	:	lt gy to m gy to drk gy, slt, hd		0041-1L
3135.00							0170
		70	Sh/Clst	:	drk gy to brn blk, slt, hd		0170-1L
		15	Coal	:	blk, wx		0170-2L
		15	Cont	:	prp, dd		0170-3L
3140.00							0171
		95	Sh/Clst	:	drk gy to brn blk, slt, hd		0171-1L
		5	Cont	:	prp, dd		0171-3L
		tr	Coal	:	blk, wx		0171-2L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
3145.00								0172
			95	Sh/Clst: drk gy to brn blk, slt, hd				0172-1L
			5	Coal : blk, wx				0172-2L
			tr	Cont : prp, dd				0172-3L
3150.00								0173
			100	Sh/Clst: drk gy to brn blk, slt, hd				0173-1L
			tr	Coal : blk, wx				0173-2L
			tr	Cont : prp, dd				0173-3L
3155.00								0174
			100	Sh/Clst: drk gy to brn blk, slt, hd				0174-1L
			tr	Coal : blk, wx				0174-2L
			tr	Cont : prp, dd				0174-3L
3160.00								0175
			100	Sh/Clst: drk gy to brn blk, slt, hd				0175-1L
			tr	Coal : blk, wx				0175-2L
			tr	Cont : prp, dd				0175-3L
3165.00								0176
			95	Sh/Clst: drk gy to brn blk, slt, hd				0176-1L
			5	Coal : blk, wx				0176-2L
			tr	Cont : prp, dd				0176-3L
3170.00								0177
			40	Sh/Clst: drk gy to brn blk, slt, hd				0177-1L
			40	S/Sst : w to lt gy, crs, l				0177-2L
			20	Coal : blk, wx				0177-3L
			tr	Cont : prp				0177-4L

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Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Grp Frm Age Lithology description	Trb	Sample
3175.00						0178
			70	Sh/Clst: drk gy to brn blk, slt, hd		0178-1L
			15	Coal : blk, wx		0178-3L
			10	S/Sst : w to lt gy, crs, l		0178-2L
			5	Cont : prp		0178-4L
3180.00						0179
			80	Sh/Clst: drk gy to brn blk, slt, hd		0179-1L
			10	Coal : blk, wx		0179-3L
			5	S/Sst : w to lt gy, crs, l		0179-2L
			5	Cont : prp, dd		0179-4L
3185.00						0180
			95	Sh/Clst: drk gy to brn blk, slt, hd		0180-1L
			5	Cont : prp, dd		0180-3L
			tr	Coal : blk, wx		0180-2L
3190.00						0181
			75	Sh/Clst: drk gy to brn blk, slt, hd		0181-1L
			10	Coal : blk, wx		0181-2L
			10	S/Sst : w to lt gy, crs, l		0181-3L
			5	Cont : dd, prp		0181-4L
3195.00						0182
			65	Sh/Clst: drk gy to brn blk, slt, hd		0182-1L
			15	Coal : blk, wx		0182-2L
			15	S/Sst : w to lt gy, crs, l		0182-3L
			5	Cont : dd, prp		0182-4L

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Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
3200.00								0183
			75	Sh/Clst:		drk gy to brn blk, slt, hd		0183-1L
			15	Coal	:	blk, wx		0183-2L
			5	S/Sst	:	w to lt gy, crs, l, kln		0183-3L
			5	Cont	:	dd, prp		0183-4L
3205.00								0184
			80	Sh/Clst:		drk gy to brn blk, slt, hd		0184-1L
			10	Coal	:	blk, wx		0184-2L
			10	S/Sst	:	w to lt gy, crs, l, kln		0184-3L
			tr	Cont	:	dd, prp		0184-4L
3210.00								0185
			70	Sh/Clst:		drk gy to brn blk, slt, hd		0185-1L
			15	S/Sst	:	w to lt gy, crs, l, kln		0185-3L
			10	Coal	:	blk, wx		0185-2L
			5	Cont	:	dd, prp		0185-4L
3215.00								0186
			75	Sh/Clst:		drk gy to brn blk, slt, hd		0186-1L
			15	Coal	:	blk, wx		0186-2L
			5	S/Sst	:	w to lt gy, crs, l, kln		0186-3L
			5	Cont	:	dd, prp		0186-4L
3220.00								0187
			85	Sh/Clst:		drk gy to brn blk, slt, hd		0187-1L
			10	Coal	:	blk, wx		0187-2L
			5	S/Sst	:	w to lt gy, crs, l, kln		0187-3L
			tr	Cont	:	dd, prp		0187-4L

Table 1 : Lithology description for well N0CS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
3225.00							0188
		75	Sh/Clst:	drk gy to brn blk, slt, hd			0188-1L
		15	S/Sst	: w to lt gy, crs, l, kln			0188-3L
		10	Coal	: blk, wx			0188-2L
		tr	Cont	: dd, prp			0188-4L
3230.00							0189
		90	Sh/Clst:	drk gy to brn blk, slt, hd			0189-1L
		5	Coal	: blk, wx			0189-2L
		5	S/Sst	: w to lt gy, crs, l, kln			0189-3L
		tr	Cont	: dd, prp			0189-4L
3235.00							0190
		60	S/Sst	: lt gy to w, crs, l			0190-1L
		35	Sh/Clst:	drk gy, slt, hd			0190-2L
		5	Coal	: blk, wx			0190-3L
		tr	Cont	: prp			0190-4L
3240.00							0191
		80	S/Sst	: lt gy to w, crs, l, f, kln			0191-1L
		10	Sh/Clst:	m gy to drk gy, slt, hd			0191-2L
		5	Coal	: blk, wx			0191-3L
		5	Cont	: prp, dd			0191-4L
3245.00							0192
		75	S/Sst	: lt gy to w, crs, l, f, kln			0192-1L
		10	Sh/Clst:	m gy to drk gy, slt, hd			0192-2L
		10	Coal	: blk, wx			0192-3L
		5	Cont	: prp, dd			0192-4L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
3250.00								0193
			50	S/Sst	:	lt gy to w, crs, l, f, kln		0193-1L
			30	Cont	:	prp, dd		0193-4L
			10	Sh/Clst	:	m gy to drk gy, slt, hd		0193-2L
			10	Coal	:	blk, wx		0193-3L
3255.00								0194
			40	S/Sst	:	lt gy to w, crs, l, f, kln		0194-1L
			25	Cont	:	prp, dd		0194-4L
			20	Sh/Clst	:	m gy to drk gy, slt, hd		0194-2L
			15	Coal	:	blk, wx		0194-3L
3260.00								0195
			55	Sh/Clst	:	lt gy to m gy to drk gy, slt, hd		0195-2L
			40	S/Sst	:	lt gy to w, crs, l, f, kln		0195-1L
			5	Coal	:	blk, wx		0195-3L
			tr	Cont	:	prp, dd		0195-4L
3265.00								0196
			50	Sh/Clst	:	lt gy to m gy to drk gy, slt, hd		0196-2L
			40	S/Sst	:	lt gy to w, crs, l, f, kln		0196-1L
			10	Coal	:	blk, wx		0196-3L
			tr	Cont	:	prp, dd		0196-4L
3270.00								0197
			90	S/Sst	:	lt gy to w, crs, l, f, kln		0197-1L
			5	Sh/Clst	:	lt gy to m gy to drk gy, slt, hd		0197-2L
			5	Coal	:	blk, wx		0197-3L
			tr	Cont	:	prp, dd		0197-4L

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Table 1 : Lithology description for well NOCS 30/3-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
3275.00							0198
		90	S/Sst	:	lt gy to w, crs, l, f, kln		0198-1L
		5	Sh/Clst	:	lt gy to m gy to drk gy, slt, hd		0198-2L
		5	Coal	:	blk, wx		0198-3L
		tr	Cont	:	prp, dd		0198-4L
3280.00							0199
		90	S/Sst	:	lt gy to w, crs, l		0199-1L
		5	Sh/Clst	:	lt gy to m gy to drk gy, slt, hd		0199-2L
		5	Coal	:	blk, wx		0199-3L
		tr	Cont	:	prp, dd		0199-4L
3285.00							0200
		90	S/Sst	:	lt gy to w, crs, l		0200-1L
		5	Sh/Clst	:	lt gy to m gy to drk gy, slt, hd		0200-2L
		5	Coal	:	blk, wx		0200-3L
		tr	Cont	:	prp, dd		0200-4L

Table 2 : Rock-Eval table for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2560.00	cut	Ca : lt or to or gy	0.29	0.05	1.11	0.05	0.09	56	1233	0.3	0.85	422	0124-3L
2660.00	cut	Sh/Clst: m gy to pl ol	3.60	0.96	0.87	1.10	1.16	83	75	4.6	0.79	437	0129-1L
2740.00	cut	Sh/Clst: m gy to pl ol	3.84	0.88	0.61	1.44	1.01	87	60	4.7	0.81	440	0133-1L
2790.00	cut	Sh/Clst: lt gy to m gy	3.28	0.58	0.58	1.00	0.90	64	64	3.9	0.85	436	0139-1L
2800.00	cut	Sh/Clst: m gy to drk gy	4.54	0.79	0.65	1.22	1.04	76	63	5.3	0.85	436	0141-1L
2805.00	cut	Sh/Clst: m gy to drk gy	3.91	0.74	0.39	1.90	0.98	76	40	4.7	0.84	436	0142-1L
2810.00	cut	Sh/Clst: m gy to drk gy	5.04	5.79	0.63	9.19	3.30	175	19	10.8	0.47	437	0143-1L
2820.00	cut	Coal : blk	1.21	31.21	30.00	1.04	30.75	101	98	32.4	0.04	445	0145-1L
2830.00	ccp	Sltst : lt gy	1.55	0.65	0.16	4.06	0.32	203	50	2.2	0.70	420	0001-1L
2835.25	ccp	Sh/Clst: pl y brn	0.04	0.02	0.60	0.03	0.08	25	750	0.1	0.67	429	0002-1L
2840.00	ccp	Sltst : lt brn gy	1.49	0.84	0.18	4.67	0.34	247	53	2.3	0.64	398	0003-1L
2845.00	ccp	S/Sst : w to pl y brn	0.48	0.93	0.12	7.75	0.71	131	17	1.4	0.34	449	0004-1L
2850.00	ccp	S/Sst : w to lt gy to m gy	3.05	1.09	0.18	6.06	0.49	222	37	4.1	0.74	422	0005-1L
2855.00	ccp	S/Sst : w to lt gy to or gy	5.54	1.37	0.25	5.48	0.74	185	34	6.9	0.80	431	0006-1L
2865.00	ccp	S/Sst : w to lt gy to pl y brn	5.06	1.30	0.31	4.19	0.65	200	48	6.4	0.80	434	0008-1L

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Table 2 : Rock-Eval table for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2870.00	ccp	S/Sst : w to lt gy to pl y brn	3.49	1.48	0.09	16.44	0.74	200	12	5.0	0.70	427	0009-1L
2875.00	ccp	S/Sst : lt gy to lt brn gy	3.80	0.74	0.09	8.22	0.43	172	21	4.5	0.84	424	0010-1L
2880.50	ccp	S/Sst : w to lt gy to lt brn gy	3.79	0.86	0.20	4.30	0.46	187	43	4.7	0.82	429	0011-1L
2885.00	ccp	S/Sst : lt gy to pl y brn	4.15	1.08	0.08	13.50	0.51	212	16	5.2	0.79	426	0012-1L
2890.00	ccp	S/Sst : lt gy to pl y brn	4.71	1.61	0.14	11.50	0.62	260	23	6.3	0.75	426	0013-1L
2895.00	ccp	S/Sst : lt gy to m gy to pl y brn	5.50	1.46	0.22	6.64	0.71	206	31	7.0	0.79	431	0014-1L
2900.00	ccp	S/Sst : lt gy to m gy to drk gn gy	1.48	1.14	0.15	7.60	1.14	100	13	2.6	0.56	443	0015-1L
2910.00	ccp	S/Sst : m gy to lt brn gy	4.19	0.76	0.12	6.33	0.47	162	26	5.0	0.85	491	0017-1L
2920.00	ccp	S/Sst : lt gy to m gy to lt brn gy	3.05	0.62	0.19	3.26	0.36	172	53	3.7	0.83	419	0019-1L
2930.00	ccp	S/Sst : lt gy to m gy to lt brn gy	3.37	0.69	0.30	2.30	0.45	153	67	4.1	0.83	420	0021-1L
2940.00	ccp	S/Sst : lt gy to m gy	1.12	0.57	0.23	2.48	0.24	238	96	1.7	0.66	430	0023-1L
2950.00	ccp	Sh/Clst: drk gy to brn blk	0.56	2.08	0.03	69.33	1.12	186	3	2.6	0.21	443	0025-1L
2960.00	ccp	S/Sst : w to lt gy to pl brn	0.06	0.05	0.15	0.33	0.06	83	250	0.1	0.55	417	0027-1L

Table 2 : Rock-Eval table for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2970.00	ccp	Sh/Clst: drk gy to brn blk	0.50	3.26	0.49	6.65	1.32	247	37	3.8	0.13	440	0029-1L
2985.00	cut	Coal : blk	12.55	104.46	3.61	28.94	43.03	243	8	117.0	0.11	439	0149-3L
2995.00	cut	Sh/Clst: drk gy to brn blk	1.05	2.26	0.54	4.19	1.68	135	32	3.3	0.32	443	0151-1L
3005.00	cut	Sh/Clst: drk gy to brn blk	2.98	6.89	0.28	24.61	4.24	163	7	9.9	0.30	443	0153-1L
3025.00	cut	Sh/Clst: drk gy to brn blk	1.10	0.42	0.39	1.08	0.66	64	59	1.5	0.72	438	0157-1L
3040.00	cut	Sh/Clst: drk gy to brn blk	1.97	6.07	0.11	55.18	2.95	206	4	8.0	0.25	442	0160-1L
3050.00	cut	Sh/Clst: drk gy to brn blk	0.38	0.16	0.55	0.29	0.53	30	104	0.5	0.70	432	0162-1L
3060.00	cut	Sh/Clst: drk gy to brn blk	0.60	0.68	0.20	3.40	1.01	67	20	1.3	0.47	444	0164-1L
3070.00	cut	Sh/Clst: drk gy to brn blk	0.37	0.02	0.12	0.17	0.46	4	26	0.4	0.95	452	0166-1L
3086.00	ccp	S/Sst : lt gy	6.86	1.62	0.20	8.10	0.88	184	23	8.5	0.81	421	0031-1L
3091.00	ccp	S/Sst : ol gy to lt gy	2.94	0.94	0.06	15.67	0.56	168	11	3.9	0.76	421	0032-1L
3101.00	ccp	Sh/Clst: m gy	1.49	7.48	0.54	13.85	2.17	345	25	9.0	0.17	442	0034-1L
3111.00	ccp	Sltst : ol gy to lt gy	0.96	1.63	0.19	8.58	0.76	214	25	2.6	0.37	448	0036-1L
3119.00	ccp	Sltst : ol gy to lt gy	0.39	1.62	0.21	7.71	0.89	182	24	2.0	0.19	448	0038-1L
3130.70	ccp	Sh/Clst: lt gy to m gy to drk gy	0.54	2.42	0.06	40.33	1.24	195	5	3.0	0.18	446	0041-1L

Table 2 : Rock-Eval table for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3140.00	cut	Sh/Clst: drk gy to brn blk	0.97	0.35	0.50	0.70	0.61	57	82	1.3	0.73	428	0171-1L
3155.00	cut	Sh/Clst: drk gy to brn blk	0.57	0.15	0.31	0.48	0.43	35	72	0.7	0.79	395	0174-1L
3170.00	cut	bulk	0.74	0.20	0.47	0.43	0.56	36	84	0.9	0.79	437	0177-0B
3185.00	cut	Sh/Clst: drk gy to brn blk	0.46	0.09	0.24	0.38	0.35	26	69	0.6	0.84	400	0180-1L
3210.00	cut	Sh/Clst: drk gy to brn blk	0.54	0.18	0.37	0.49	0.49	37	76	0.7	0.75	437	0185-1L
3240.00	cut	S/Sst : lt gy to w	0.12	0.12	-	-	0.09	133	-	0.2	0.50	437	0191-1L
3250.00	cut	S/Sst : lt gy to w	0.15	0.18	-	-	0.12	150	-	0.3	0.45	440	0193-1L
3265.00	cut	Sh/Clst: lt gy to m gy to drk gy	1.11	0.29	0.24	1.21	0.52	56	46	1.4	0.79	429	0196-2L
3275.00	cut	S/Sst : lt gy to w	0.13	0.06	-	-	0.06	100	-	0.2	0.68	416	0198-1L

Table 3 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
2560.00	cut	Ca : lt or to or gy	9.10	27.65	53.89	9.37	0.05	0124-3L
2660.00	cut	Sh/Clst: m gy to pl ol	6.70	24.75	47.61	20.94	0.96	0129-1L
2805.00	cut	Sh/Clst: m gy to drk gy	7.84	21.46	45.10	25.60	0.74	0142-1L
2820.00	cut	Coal : blk	11.42	29.80	43.74	15.05	31.21	0145-1L
2830.00	ccp	Sltst : lt gy	4.07	24.18	51.84	19.91	0.65	0001-1L
2840.00	ccp	Sltst : lt brn gy	2.80	23.32	49.93	23.95	0.84	0003-1L
2855.00	ccp	S/Sst : w to lt gy to or gy	7.15	28.88	44.13	19.84	1.37	0006-1L
2895.00	ccp	S/Sst : lt gy to m gy to pl y brn	4.27	26.39	49.85	19.49	1.46	0014-1L
2940.00	ccp	S/Sst : lt gy to m gy	3.78	24.11	47.78	24.33	0.57	0023-1L
2950.00	ccp	Sh/Clst: drk gy to brn blk	5.88	18.11	36.60	39.41	2.08	0025-1L
2970.00	ccp	Sh/Clst: drk gy to brn blk	4.72	18.18	40.27	36.83	3.26	0029-1L
2985.00	cut	Coal : blk	6.88	14.01	31.33	47.78	104.46	0149-3L
3040.00	cut	Sh/Clst: drk gy to brn blk	7.80	17.09	28.86	46.25	6.07	0160-1L
3070.00	cut	Sh/Clst: drk gy to brn blk	5.31	36.84	47.22	10.63	0.02	0166-1L

Table 3 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
3086.00	ccp	S/Sst : lt gy	3.69	24.87	46.90	24.53	1.62	0031-1L
3101.00	ccp	Sh/Clst: m gy	3.64	17.01	33.94	45.40	7.48	0034-1L
3130.70	ccp	Sh/Clst: lt gy to m gy to drk gy	6.84	23.57	43.43	26.17	2.42	0041-1L
3155.00	cut	Sh/Clst: drk gy to brn blk	5.94	32.15	48.00	13.92	0.15	0174-1L
3250.00	cut	S/Sst : lt gy to w	9.37	36.54	41.22	12.87	0.18	0193-1L

Table 4 a: Weight of EOM and Chromatographic Fraction for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	Rock Extracted (g)	EOM (mg)	Sat (mg)	Aro (mg)	Asph (mg)	NSO (mg)	HC (mg)	Non-HC (mg)	TOC(e) (%)	Sample
2660.00	cut	Sh/Clst: m gy to pl ol	3.3	8.2	4.1	2.1	0.4	1.6	6.2	2.0	1.31	0129-1L
2805.00	cut	Sh/Clst: m gy to drk gy	2.8	12.3	6.1	2.8	1.0	2.4	8.9	3.4	3.78	0142-1L
2830.00	ccp	Sltst : lt gy	7.7	20.7	11.2	4.0	1.0	4.5	15.2	5.5	0.94	0001-1L
2840.00	ccp	Sltst : lt brn gy	9.7	20.6	12.5	3.8	0.7	3.6	16.3	4.3	0.48	0003-1L
2855.00	ccp	S/Sst : w to lt gy to or gy	9.5	39.0	23.1	7.2	1.2	7.5	30.3	8.7	0.61	0006-1L
2895.00	ccp	S/Sst : lt gy to m gy to pl y brn	8.7	41.1	23.8	9.7	1.4	6.2	33.5	7.6	0.77	0014-1L
2940.00	ccp	S/Sst : lt gy to m gy	9.7	6.0	0.4	2.8	1.4	1.4	3.2	2.8	0.42	0023-1L
2985.00	com	Composite sample - see table 4 e	0.8	12.1	3.6	2.7	2.6	3.2	6.3	5.8	34.80	0201-0B
3086.00	ccp	S/Sst : lt gy	9.4	53.0	33.5	9.8	2.1	7.6	43.3	9.7	0.73	0031-1L
3101.00	ccp	Sh/Clst: m gy	9.5	13.3	5.3	2.7	1.9	3.4	8.0	5.3	1.88	0034-1L

Table 4 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
2660.00	cut	Sh/Clst: m gy to pl ol	2507	1253	642	122	489	1896	611	0129-1L
2805.00	cut	Sh/Clst: m gy to drk gy	4346	2155	989	353	848	3144	1201	0142-1L
2830.00	ccp	Sltst : lt gy	2702	1462	522	130	587	1984	718	0001-1L
2840.00	ccp	Sltst : lt brn gy	2128	1291	392	72	371	1683	444	0003-1L
2855.00	ccp	S/Sst : w to lt gy to or gy	4109	2434	758	126	790	3192	916	0006-1L
2895.00	ccp	S/Sst : lt gy to m gy to pl y brn	4702	2723	1109	160	709	3832	869	0014-1L
2940.00	ccp	S/Sst : lt gy to m gy	619	41	288	144	144	330	288	0023-1L
2985.00	com	Composite sample - see table 4 e	14404	4285	3214	3095	3809	7500	6904	0201-0B
3086.00	ccp	S/Sst : lt gy	5626	3556	1040	222	806	4596	1029	0031-1L
3101.00	ccp	Sh/Clst: m gy	1398	557	283	199	357	841	557	0034-1L

Table 4 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
2660.00	cut	Sh/Clst: m gy to pl ol	191.42	95.71	49.02	9.34	37.35	144.73	46.69	0129-1L
2805.00	cut	Sh/Clst: m gy to drk gy	114.98	57.02	26.17	9.35	22.44	83.20	31.78	0142-1L
2830.00	ccp	Sltst : lt gy	287.48	155.55	55.55	13.89	62.50	211.10	76.38	0001-1L
2840.00	ccp	Sltst : lt brn gy	443.35	269.03	81.78	15.07	77.48	350.81	92.54	0003-1L
2855.00	ccp	S/Sst : w to lt gy to or gy	673.70	399.04	124.38	20.73	129.56	523.42	150.29	0006-1L
2895.00	ccp	S/Sst : lt gy to m gy to pl y brn	610.72	353.65	144.14	20.80	92.13	497.79	112.93	0014-1L
2940.00	ccp	S/Sst : lt gy to m gy	147.43	9.83	68.80	34.40	34.40	78.63	68.80	0023-1L
2985.00	com	Composite sample - see table 4 e	41.39	12.32	9.24	8.89	10.95	21.55	19.84	0201-0B
3086.00	ccp	S/Sst : lt gy	770.73	487.16	142.51	30.54	110.52	629.67	141.06	0031-1L
3101.00	ccp	Sh/Clst: m gy	74.39	29.64	15.10	10.63	19.02	44.75	29.64	0034-1L

Table 4 d: Composition of material extracted from the rock (%) for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	Sat / EOM	Aro / EOM	Asph / EOM	NSO / EOM	HC / EOM	Non-HC / EOM	Sat / Aro	HC / Non-HC	Sample
2660.00	cut	Sh/Clst: m gy to pl ol	50.00	25.61	4.88	19.51	75.61	24.39	195.24	310.00	0129-1L
2805.00	cut	Sh/Clst: m gy to drk gy	49.59	22.76	8.13	19.51	72.36	27.64	217.86	261.76	0142-1L
2830.00	ccp	Sltst : lt gy	54.11	19.32	4.83	21.74	73.43	26.57	280.00	276.36	0001-1L
2840.00	ccp	Sltst : lt brn gy	60.68	18.45	3.40	17.48	79.13	20.87	328.95	379.07	0003-1L
2855.00	ccp	S/Sst : w to lt gy to or gy	59.23	18.46	3.08	19.23	77.69	22.31	320.83	348.28	0006-1L
2895.00	ccp	S/Sst : lt gy to m gy to pl y brn	57.91	23.60	3.41	15.09	81.51	18.49	245.36	440.79	0014-1L
2940.00	ccp	S/Sst : lt gy to m gy	6.67	46.67	23.33	23.33	53.33	46.67	14.29	114.29	0023-1L
2985.00	com	Composite sample - see table 4 e	29.75	22.31	21.49	26.45	52.07	47.93	133.33	108.62	0201-0B
3086.00	ccp	S/Sst : lt gy	63.21	18.49	3.96	14.34	81.70	18.30	341.84	446.39	0031-1L
3101.00	ccp	Sh/Clst: m gy	39.85	20.30	14.29	25.56	60.15	39.85	196.30	150.94	0034-1L

Table 4 e: List of composite samples appearing in the extraction tables for well NOCS 30/3-4

Depth unit of measure: m

NOTE: Depths shown in tables 4 a to d correspond to the composite samples' lower depth.

Upper depth	Lower depth	Typ	Sample	Depth	Typ	Lithology	Sample
2975.00	2985.00	com	0201-0B is composed of:	2975.00	cut	Coal : blk, wx	0147-3L
				2980.00	cut	Coal : blk, wx	0148-3L
				2985.00	cut	Coal : blk, wx	0149-3L

Table 5 : Saturated Hydrocarbon Ratios for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	Pristane / nC17	Pristane / Phytane	Pristane + Phytane / nC17 + nC18	Phytane / nC18	CPI	Sample
2660.00	cut	Sh/Clst: m gy to pl ol	0.41	2.25	0.50	1.00	-	0129-1L
2805.00	cut	Sh/Clst: m gy to drk gy	0.69	2.89	0.62	0.48	1.31	0142-1L
2830.00	ccp	Sltst : lt gy	0.92	1.19	0.81	0.71	1.03	0001-1L
2840.00	ccp	Sltst : lt brn gy	0.80	1.53	0.71	0.60	1.06	0003-1L
2855.00	ccp	S/Sst : w to lt gy to or gy	0.80	1.11	0.68	0.58	1.05	0006-1L
2895.00	ccp	S/Sst : lt gy to m gy to pl y brn	0.81	1.23	0.71	0.62	1.09	0014-1L
2940.00	ccp	S/Sst : lt gy to m gy	0.78	1.45	0.69	0.60	1.16	0023-1L
2985.00	com	bulk	0.51	2.39	0.43	0.32	1.32	0201-0B
3086.00	ccp	S/Sst : lt gy	0.62	1.11	0.54	0.46	1.04	0031-1L
3101.00	ccp	Sh/Clst: m gy	0.48	2.08	0.41	0.32	1.22	0034-1L

Table 6 : Aromatic Hydrocarbon Ratios for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	Rc	DBT/P	4/1MDBT	(3+2) /1MDBT	Sample
2660.00	cut	Sh/Clst: m gy to pl ol	1.35	2.42	0.72	1.06	0.66	0.68	0.80	-	-	-	0129-1L
2805.00	cut	Sh/Clst: m gy to drk gy	1.26	1.92	0.16	0.80	0.54	0.54	0.72	-	-	-	0142-1L
2830.00	ccp	Sltst : lt gy	-	-	-	-	-	-	-	-	-	-	0001-1L
2840.00	ccp	Sltst : lt brn gy	-	-	-	-	-	-	-	-	-	-	0003-1L
2855.00	ccp	S/Sst : w to lt gy to or gy	-	-	-	-	-	-	-	-	-	-	0006-1L
2895.00	ccp	S/Sst : lt gy to m gy to pl y brn	-	-	-	-	-	-	-	-	-	-	0014-1L
2940.00	ccp	S/Sst : lt gy to m gy	-	-	-	-	-	-	-	-	-	-	0023-1L
2985.00	com	bulk	0.63	1.76	0.12	0.62	0.54	0.58	0.72	-	-	-	0201-0B
3086.00	ccp	S/Sst : lt gy	-	-	-	-	-	-	-	-	-	-	0031-1L
3101.00	ccp	Sh/Clst: m gy	0.79	2.93	0.18	0.70	0.54	0.57	0.72	-	-	-	0034-1L

Table 7 : Thermal Maturity Data for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
1000.00	cut	bulk	0.26	3	0.01	-	-	-	0042-0B
1300.00	cut	bulk	0.23	3	0.01	-	-	-	0057-0B
1460.00	cut	Sh/Clst: lt brn gy to brn gy	-	-	-	-	3.0(?)	-	0065-1L
1620.00	cut	bulk	0.37	7	0.03	-	-	-	0073-0B
1800.00	cut	Sh/Clst: pl ol to drk y brn	-	-	-	-	4.0	-	0082-1L
1900.00	cut	bulk	0.33	3	0.02	-	-	-	0087-0B
2200.00	cut	bulk	0.34	4	0.03	-	-	-	0102-0B
2280.00	cut	Sh/Clst: m gy	-	-	-	-	4.5	-	0106-1L
2500.00	cut	bulk	0.39	2	0.00	-	-	-	0121-0B
2520.00	cut	Sh/Clst: m gy to brn gy to pl ol	-	-	-	-	4.5	-	0122-1L
2660.00	cut	Sh/Clst: m gy to pl ol	-	-	-	-	5.5	437	0129-1L
2795.00	cut	bulk	0.50	6	0.05	-	-	-	0140-0B
2810.00	cut	Sh/Clst: m gy to drk gy	-	-	-	-	5.5-6.0	437	0143-1L
2835.25	ccp	bulk	NDP	-	-	-	-	-	0002-0B

Table 7 : Thermal Maturity Data for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
2950.00	ccp	bulk	0.53	6	0.16	-	-	-	0025-0B
2950.00	ccp	Sh/Clst: drk gy to brn blk	-	-	-	-	6.0	443	0025-1L
3040.00	cut	Sh/Clst: drk gy to brn blk	-	-	-	-	6.0-6.5	442	0160-1L
3055.00	cut	bulk	0.52	10	0.04	-	-	-	0163-0B
3101.00	ccp	Sh/Clst: m gy	-	-	-	-	6.5	442	0034-1L
3130.70	ccp	bulk	0.52	9	0.04	-	-	-	0041-0B
3170.00	cut	bulk	-	-	-	-	6.0(??)	437	0177-0B
3265.00	cut	bulk	NDP	-	-	-	-	-	0196-0B
3265.00	cut	Sh/Clst: lt gy to m gy to drk gy	-	-	-	-	6.5(??)	429	0196-2L

Table 8 : Visual Kerogen Composition Data for well NOCS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	LIPT %	Amor L	LipDet	Sp/Pol	Cuticl	Resine	Algae	Dinoflt	Acrit	Bit L	INERT %	Fusin	Semfus	Sentdet	Micrin	Sclero	Bit I	VITR %	Telin	Collinit	Vitdet	Amorv	Bitv	Sample
1460.00	cut	Sh/Clst: lt brn gy to brn gy	50		**	*			**	*			10			*				40	*		**			0065-1L
1800.00	cut	Sh/Clst: pl ol to drk y brn	NDP		**	*			*	*			NDP			*				NDP			*			0082-1L
2280.00	cut	Sh/Clst: m gy	TR		**	*			*	*			50			*				50			*			0106-1L
2520.00	cut	Sh/Clst: m gy to brn gy to pl ol	5		*	**			*				65			*				30			*			0122-1L
2660.00	cut	Sh/Clst: m gy to pl ol	10		*	*			*				30		*	**				60	*		**			0129-1L
2810.00	cut	Sh/Clst: m gy to drk gy	60	**	*	*			*				35	*	**	*				5	*		**			0143-1L
2950.00	ccp	Sh/Clst: drk gy to brn blk	30		*	**	*		*	*			25	*	**	*				45	**	*	*			0025-1L
3040.00	cut	Sh/Clst: drk gy to brn blk	70	**		**	*		*	*			15		*	**				15	*		**			0160-1L
3101.00	ccp	Sh/Clst: m gy	80	*		*	**		*				15		*	*				5	*		*			0034-1L
3170.00	cut	bulk	NDP										NDP							NDP						0177-0B
3265.00	cut	Sh/Clst: lt gy to m gy to drk gy	100	**	**	*			?				TR			*				TR			*			0196-2L

Table 9a : Tabulation of carbon isotope data for EOM/EOM - fractions or Oils for well N0CS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology	EOM/Oil	Saturated	Aromatic	NSO	Asphaltenes	Kerogen	Sample
2660.00	cut		-27.03	-27.69	-27.73	-28.67	-27.03	-	0129-1L
2805.00	cut		-28.18	-29.28	-26.85	-27.39	-26.08	-	0142-1L
2830.00	ccp		-29.16	-29.72	-28.53	-28.48	-27.62	-	0001-1L
2895.00	ccp		-29.12	-29.47	-28.58	-28.50	-28.69	-	0014-1L
3086.00	ccp		-28.71	-29.18	-27.99	-28.03	-28.40	-	0031-1L
3101.00	ccp		-27.99	-30.08	-27.17	-28.01	-25.78	-	0034-1L

Table 9b : Tabulation of cv values from carbon isotope data for well N0CS 30/3-4

Depth unit of measure: m

Depth	Typ	Lithology		Saturated	Aromatic	cv value	Sample
2660.00	cut			-27.69	-27.73	-3.15	0129-1L
2805.00	cut			-29.28	-26.85	2.82	0142-1L
2830.00	ccp			-29.72	-28.53	0.21	0001-1L
2895.00	ccp			-29.47	-28.58	-0.54	0014-1L
3086.00	ccp			-29.18	-27.99	0.04	0031-1L
3101.00	ccp			-30.08	-27.17	4.14	0034-1L

Table 10A: Variation in Triterpane Distribution (peak height) SIR for Well N0CS 30/3-4

Depth unit of measure: m

Depth	Lithology	B/A	B/B+A	B B+E+F	C/E	C/C+E	X/E	Z/E	Z/C	Z/Z+E	Q/E	E/E+F	C+D C+D+E+F	D+F/C+E	J1 J1+J2%	Sample
2660.00	Sh/Clst	15.84	0.94	0.31	0.86	0.46	0.01	0.02	0.02	0.02	0.21	0.84	0.47	0.21	56.24	0129-1
2805.00	Sh/Clst	6.08	0.86	0.18	0.57	0.36	0.03	0.01	0.01	0.01	0.03	0.87	0.36	0.14	55.47	0142-1
2830.00	Sltst	0.74	0.42	0.09	0.40	0.29	0.06	0.10	0.26	0.09	0.07	0.91	0.29	0.11	59.03	0001-1
2895.00	S/Sst	0.67	0.40	0.09	0.40	0.28	0.07	0.13	0.32	0.11	0.91	0.92	0.29	0.10	59.29	0014-1
3086.00	S/Sst	0.55	0.36	0.10	0.41	0.29	0.10	0.12	0.30	0.11	0.11	0.93	0.30	0.10	58.35	0031-1
3101.00	Sh/Clst	0.85	0.46	0.08	0.34	0.25	0.09	0.02	0.07	0.02	0.04	0.90	0.25	0.11	56.18	0034-1

Table 10B: Variation in Sterane Distribution (peak height) SIR for Well N0CS 30/3-4

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Ratio6	Ratio7	Ratio8	Ratio9	Ratio10	Sample
2660.00	Sh/Clst	0.73	30.59	67.82	1.67	0.77	0.85	0.73	0.51	0.44	1.52	0129-1
2805.00	Sh/Clst	0.77	43.22	62.07	0.39	0.65	0.55	0.43	0.45	0.76	1.44	0142-1
2830.00	Sltst	0.79	46.64	78.41	1.11	0.80	0.38	0.27	0.64	0.87	3.40	0001-1
2895.00	S/Sst	0.80	43.87	78.67	1.14	0.81	0.38	0.27	0.65	0.78	3.29	0014-1
3086.00	S/Sst	0.83	48.28	80.80	1.25	0.81	0.43	0.30	0.68	0.93	4.07	0031-1
3101.00	Sh/Clst	0.86	47.40	77.21	0.82	0.78	0.61	0.51	0.63	0.90	3.22	0034-1

Ratio1: a / a + j
Ratio2: q / q + t * 100%
Ratio3: 2(r + s)/(q + t + 2(r + s)) * 100%
Ratio4: a + b + c + d / h + k + l + n
Ratio5: r + s / r + s + q

Ratio6: u + v / u + v + q + r + s + t
Ratio7: u + v / u + v + i + m + n + q + r + s + t
Ratio8: r + s / q + r + s + t
Ratio9: q / t
Ratio10: r + s / t

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Table 10C: Variation in Triaromatic Sterane Distribution for Well N0CS 30/3-4

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Sample
2660.00	Sh/Clst	0.70	0.51	0.26	0.37	0.35	0129-1
2805.00	Sh/Clst	0.43	0.35	0.20	0.21	0.29	0142-1
2830.00	Sltst	0.60	0.55	0.35	0.34	0.48	0001-1
2895.00	S/Sst	0.59	0.60	0.37	0.33	0.46	0014-1
3086.00	S/Sst	-	-	-	-	-	0031-1
3101.00	Sh/Clst	0.84	0.80	0.66	0.65	0.79	0034-1

Ratio1: a1 / a1 + g1
Ratio2: b1 / b1 + g1
Ratio3: a1 + b1 / a1 + b1 + c1 + d1 + e1 + f1 + g1
Ratio4: a1 / a1 + e1 + f1 + g1
Ratio5: a1 / a1 + d1

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Table 10D: Variation in Monoaromatic Sterane Distribution for Well N0CS 30/3-4

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Sample
2660.00	Sh/Clst	0.35	0.21	0.23	0.23	0129-1
2805.00	Sh/Clst	0.42	0.23	0.25	0.19	0142-1
2830.00	Sltst	0.52	0.37	0.35	0.30	0001-1
2895.00	S/Sst	0.55	0.38	0.39	0.34	0014-1
3086.00	S/Sst	0.65	0.42	0.48	0.42	0031-1
3101.00	Sh/Clst	0.73	0.55	0.49	0.41	0034-1

Ratio1: A1 / A1 + E1
Ratio2: B1 / B1 + E1
Ratio3: A1 / A1 + E1 + G1
Ratio4: A1+B1 / A1+B1+C1+D1+E1+F1+G1+H1+I1

Table 10E: Aromatisation of Steranes for Well NOCS 30/3-4

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Sample
2660.00	Sh/Clst	0.40	0.92	0129-1
2805.00	Sh/Clst	0.31	0.95	0142-1
2830.00	Sltst	0.34	0.93	0001-1
2895.00	S/Sst	0.39	0.91	0014-1
3086.00	S/Sst	1.00	-	0031-1
3101.00	Sh/Clst	0.19	1.00	0034-1

$$\text{Ratio1:} \quad \frac{C1+D1+E1+F1+G1+H1+I1}{C1+D1+E1+F1+G1+H1+I1 + c1+d1+e1+f1+g1}$$

Ratio2: g1 / g1 + I1

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Table 10F: Raw GCMS triterpane data (peak height) SIR for Well N0CS 30/3-4

Depth unit of measure: m

Depth	Lithology	p	q	r	s	t	a	b	z	c	Sample
		x	d	e	f	g	h	i	j1		
		j2	k1	k2	l1	l2	m1	m2			
2660.00	Sh/Clst	18974.30	9019.00	3172.60	3471.00	1272.00	1411.10	22357.20	755.10	36574.00	0129-1
		501.20	8537.10	42295.70	8317.20	26070.50	13878.50	3228.00	3841.00		
		2989.00	1097.40	828.60	679.10	443.20	0.00	0.00			
2805.00	Sh/Clst	14386.50	4886.10	1898.00	6647.00	624.10	6706.60	40802.50	818.20	89166.80	0142-1
		4003.90	11639.80	157628.70	23329.30	79303.00	39117.80	8425.80	22949.00		
		18421.50	13331.00	7901.50	7707.00	4678.60	3526.90	1549.70			
2830.00	Sltst	56090.30	45648.50	20990.10	31387.40	11408.00	89885.30	66290.20	64584.00	252943.59	0001-1
		35862.80	36576.00	628131.81	63799.50	232382.30	151648.00	34883.30	146677.30		
		101799.60	112511.20	73252.00	67882.00	43877.00	54518.20	37071.00			
2895.00	S/Sst	68401.90	484541.50	21700.00	29104.50	13266.50	85781.30	57252.70	67248.00	210184.59	0014-1
		38447.30	29663.40	529604.19	47260.00	197178.09	124345.10	28742.40	133205.20		
		91480.30	105141.30	70336.00	59596.40	41659.30	54714.60	38045.30			
3086.00	S/Sst	41817.80	34033.60	15616.00	20845.20	9842.90	65031.30	35805.80	38098.70	128591.60	0031-1
		29901.60	18200.30	314568.59	25100.80	117413.50	74533.70	18763.80	79174.50		
		56505.30	56572.10	37074.20	34174.30	21948.20	30845.50	21617.10			

Depth unit of measure: m

Depth	Lithology	p	q	r	s	t	a	b	z	c	Sample
			x	d	e	f	g	h	i	j1	
		j2	k1	k2	l1	l2	m1	m2			
3101.00	Sh/Clst	73934.50	33701.00	8644.30	52219.50	3583.30	96393.30	82119.10	20173.60	281102.50	0034-1
		76314.00	24924.30	822158.50	94633.00	353062.81	218354.50	51183.90	184966.59		
		144294.59	97500.10	70063.60	62156.40	40103.10	24816.20	15938.00			

Table 10G: Raw GCMS sterane data (peak height) SIR for Well NOCS 30/3-4

Depth unit of measure: m

Depth	Lithology	u	v	a	b	c	d	e	f	g	Sample
		h	i	j	k	l	m	n	o		
		p	q	r	s	t					
2660.00	Sh/Clst	23663.50	5829.20	6017.40	3820.80	1705.10	1610.60	2594.30	1862.80	1666.40	0129-1
		3097.70	2787.60	2268.50	2137.60	1204.40	1662.80	1442.80	2599.10		
		1042.50	775.40	1815.80	854.60	1759.10					
2805.00	Sh/Clst	22154.50	5370.40	16615.30	12249.50	3920.10	4281.20	6866.30	4008.80	5238.80	0142-1
		17366.20	7575.20	5026.10	70785.90	3310.10	3062.40	3449.80	4683.20		
		2365.50	5429.00	5997.50	4278.60	7131.80					
2830.00	Sltst	104911.40	39367.30	128147.60	83337.10	27551.90	30885.30	59933.30	37714.10	36060.50	0001-1
		97377.80	81943.80	33810.50	68442.30	22954.30	28747.20	54996.30	71220.70		
		18330.30	38760.00	81760.10	69119.10	44346.50					
2895.00	S/Sst	99520.50	43187.60	129894.20	85493.90	31059.50	28006.40	60908.00	38983.00	43170.50	0014-1
		94746.40	77059.30	31544.50	68137.40	23833.10	32313.80	53208.70	69797.90		
		18694.20	35205.30	79651.50	68351.00	45052.70					
3086.00	S/Sst	82576.00	28782.40	101264.80	65135.30	23413.20	20564.20	44884.90	29185.90	25832.50	0031-1
		67986.90	53364.50	21415.90	49546.40	16264.00	20494.40	34937.60	50767.80		
		11940.20	23431.80	54968.00	47144.00	25105.50					

Depth unit of measure: m

Depth	Lithology	u	v	a	b	c	d	e	f	g	Sample
		h	i	j	k	l	m	n	o		
		p	q	r	s	t					
3101.00	Sh/Clst	91042.90	31438.30	43913.50	28453.30	9177.10	13033.40	17970.50	11053.70	11001.60	0034-1
		56411.30	22966.70	7152.90	35502.10	11520.20	6951.80	11529.30	18129.00		
		3482.40	13664.40	27135.90	21707.00	15165.00					

Table 10H: Raw GCMS trioaromatic sterane data (peak height) for Well N0CS 30/3-4

Depth unit of measure: m

Depth	Lithology	a1	b1	c1	d1	e1	f1	g1	Sample
2660.00	Sh/Clst	90021.20	41393.50	44286.00	169870.20	44711.00	70712.40	39148.00	0129-1
2805.00	Sh/Clst	230068.50	167186.00	188920.80	575018.50	311229.19	232227.80	304553.19	0142-1
2830.00	Sltst	344939.09	286176.00	108052.60	377711.41	250933.30	198329.20	232008.00	0001-1
2895.00	S/Sst	320352.00	332815.31	91121.50	383436.81	259021.91	168103.00	221546.80	0014-1
3086.00	S/Sst	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0031-1
3101.00	Sh/Clst	437504.81	337809.69	35448.30	117776.00	95161.20	60946.40	82724.00	0034-1

Depth unit of measure: m

Depth	Lithology	a1	b1	c1	d1	e1	f1	g1	h1	i1	Sample
2660.00	Sh/Clst	48199.20	23684.40	19752.00	17248.80	89143.40	32327.20	70956.00	14765.60	3318.90	0129-1
2805.00	Sh/Clst	118424.00	48463.40	102161.80	69167.80	166235.70	61567.30	186203.91	110460.40	16317.90	0142-1
2830.00	Sltst	163218.70	88241.90	84074.80	72789.20	150259.09	37511.70	146925.91	83829.30	17667.00	0001-1
2895.00	S/Sst	235910.59	121335.40	111576.40	67501.70	194363.41	43054.80	173228.80	92109.70	22708.30	0014-1
3086.00	S/Sst	6989.10	2800.10	1891.40	1527.20	3838.60	590.50	3767.10	1479.30	333.60	0031-1
3101.00	Sh/Clst	42852.00	19012.80	7067.30	12226.60	15471.70	15710.70	28951.40	11276.00	0.00	0034-1

Headspace Gas Analysis

The analysis is performed using a PERKIN ELMER 8310 gas chromatograph with a 2 mm PORA PAK Q 80/100 packed column and a loop injector. The carrier gas used is nitrogen and the column is run isothermally at 150°C, with back-flush.

From each sample can, 2 ml of headspace gas is taken and injected into the gas chromatograph for analysis of the C1 to C7 range of hydrocarbons. Correlation and quantitation is achieved by use of external standards.

Occluded Gas Analysis

The gas chromatograph used for this analysis is identical to that used for headspace gas analysis and is operated under the same conditions.

The canned samples are washed in temperated water to remove drilling contaminants and sieved on a 2 mm mesh sieve to remove large, caved rock fragments. Approximately 25 mg of sieved sample is then immersed in 25 ml of water and crushed in an airtight ball mill. After crushing, 2 ml of the emitted gas is taken from the ball mill and injected into the gas chromatograph.

Total Organic Carbon (TOC) Analysis

This analysis is performed using a LECO CS244 Carbon Analyzer.
Hand-picked lithology(ies) from cuttings samples is(are) crushed using a pestle and mortar and approximately 200 mg (50 mg for coals) is accurately weighed into LECO crucibles.
The samples are then treated three times with 10% hydrochloric acid, to remove oxidized (carbonate) carbon, and washed four times with distilled water. The samples are dried on a hotplate at 100°C and then loaded into the instrument for analysis of total organic carbon. Total carbon is also analyzed using the same instrument but approximately 200 mg of whole rock is used instead. The oxidized (carbonate) carbon can be calculated by weight difference.
Total organic carbon can also be analyzed on the ROCK-EVAL II Pyrolyser during the normal run of the instrument.

Rock-Eval Pyrolysis

This analysis is performed using a ROCK-EVAL II Pyrolyser into which approximately 100 mg of whole rock is loaded. Analysis involves heating the sample, from 300°C to 600°C, in an inert atmosphere (helium) to release the free hydrocarbons present (the S1 peak) and then pyrolysed (the S2 peak), both of which are detected by a FID. In the temperature interval between 300°C and 390°C, the released gases are split and a proportion passed through a carbon dioxide trap, which is connected to a thermal conductivity detector (TCD). The value obtained from the TCD corresponds to the amount of oxygen contained in the kerogen of the sample and is reported as the S3 peak.
The ROCK-EVAL II Pyrolyser also analyses the TOC of each sample subsequent to pyrolysis.

Thermal Extraction/Pyrolysis Gas Chromatography

The instrument used for this analysis is a Varian 3200/3500 Gas Chromatograph interfaced to a pyrolysis oven (the pyrolyser). A very small amount (< 2 mg) of whole rock sample is loaded on the pyrolyser and heated isothermally, at 300°C, for 4 minutes, during which time thermal extraction of the free hydrocarbons occurs (equivalent to the S1 peak of Rock-Eval). The released gases pass to a 25 m OV1 column with a nitrogen-cooled trap.

After 4 minutes the pyrolysis oven heats up to 550°C, at a rate of 37°C per minute, causing bound hydrocarbons to be released from the kerogen (equivalent to the S2 peak of Rock-Eval). These gases are passed through a 25 m OV1 column with a nitrogen-cooled trap.

The temperature program of the oven, in which the columns are housed is 0°C to 290°C at a rate of 4°C/min. Both the columns are linked to a FID detector.

Solvent Extraction of Organic Matter (EOM)

The samples are extracted using a Tecator Soxtec HT-System. Carefully weighed sample is taken in a pre-extracted thimble. Some activated copper is added to the extraction cup and dicholoromethane is used as an extraction solvent. The samples are boiled for 1 hour and rinsed for 2 hours. If the samples contain more than 10% TOC, then the whole procedure is repeated once. The resulting solution is filtered and the solvent removed by use of a rota-vaporator (200mb, 30°C). The amount of EOM is gravimetrically established.

Removal of Asphaltenes

Asphaltenes are removed from the EOM by precipitation in n-pentane. The amount of n-hexane to be used is prescribed by the formula:

$$\frac{\text{weight of EOM(g)} \times 40}{\text{density of n-hexane (g/cc)} \times 1000} = \text{amount of n-hexane (ml)}$$

The resulting solution and the precipitate is then poured into a pre-weighed plastic column containing a small amount of activated silica. The solution+precipitate is allowed to run through the column. The separated precipitate is collected, dried and weighed. The amount of asphaltenes recovered is calculated by weight difference. The solvent from the resulting solution is evaporated using a rotary evaporator, at 35°C and the dried sample either processed immediately, or stored in a freezer.

Chromatographic Separation of deasphaltened EOM

Chromatographic separation is performed using an MPLC system developed by the company. The EOM (minus asphaltenes) is injected into the MPLC and separated using hexane as an eluent. The saturated and aromatic hydrocarbon fractions are collected and the solvent removed using a rotary evaporator at 35°C. The fractions are then transferred to small pre-weighed vials and evaporated to dryness in a stream of nitrogen. The vials are re-weighed to obtain the weights of both the saturated and aromatic fractions. The weight of the NSO fraction which is retained on the column, is obtained by weight difference.

Gas Chromatographic Analyses

Saturated hydrocarbon fractions:

The instrument used for this analysis is a PERKIN ELMER 8320 Gas Chromatograph equipped with an FID detector and an OV1 column. The carrier gas is helium and the temperature program runs isothermally at 80°C for 2 minutes and then rises to 300°C at a rate of 4°C/min. Final hold time is 20 minutes. The saturated hydrocarbon fraction is diluted by 1:30 and a 1 microlitre aliquot of this is injected into the instrument.

Aromatic hydrocarbon fractions:

The instrument used is a PERKIN ELMER SIGMA 2000 Gas Chromatograph with a

50 m SE-54 packed column, split injector and a column splitter leading to an FID and an FPD detector, which allows simultaneous analysis of co-eluting hydrocarbons and sulphur compounds. The carrier gas is helium and the temperature program runs from 80°C to 280°C at a rate of 4°C/min. Final hold time is 25 minutes. The aromatic hydrocarbon fraction is diluted by 1:30 and a 1 microlitre aliquot of this is injected into the instrument.

Combined Gas Chromatography - Mass Spectrometry (GC-MS)

The GC-MS analyses were performed on a VG TS250 system interfaced to a Hewlett Packard 5890 gas chromatograph. The GC was fitted with a fused silica SE54 capillary column (50 m x 0.22 mm i.d.) directly into the ion source. Helium (12 psi) was used as carrier gas and the injections were performed in splitless mode. The GC oven was programmed from 45°C to 150°C at 35°C/min, at which point the programme rate was 2°C/min up to 310°C where the column was held isothermally for 15 min. For the aromatic hydrocarbons, the GC oven was programmed from 50°C to 310°C at 5°C/min. and held isothermally at 310°C for 15 min. The mass spectrometer was operated in electron impact (EI) mode at 70 eV electron energy, a trap current of 500 uA and a source temperature of 220°C. The instrument resolution used was 1500 (10 % value).

The data system used was a VG PDP11/73 system. The samples were analysed in multiple ion detection mode (MID) at a scan cycle time of approximately 1.1 sec. Calculation of peak ratios was done from peak heights in the appropriate mass fragmentograms.

Saturated Fractions

Terpanes

The most commonly used fragment ions for detection of terpanes are M/Z 163 for detection of 25,28,30 trisnormoretane or 25,28,30 trisnorhopane, M/Z 177 for detection of demethylated hopanes or moretanes, M/Z 191 for detection of tricyclic, tetracyclic- and pentacyclic terpanes and M/Z 205 for methylated hopanes or moretanes. The molecular ions M/Z 370 and 384 are also recorded for identification of C_{27} and C_{28} triterpanes respectively.

Steranes

The most commonly used fragment ions for detection of steranes are M/Z 149 to distinguish between 5α and 5β steranes, M/Z 189 and 259 for detection of rearranged steranes, M/Z 217 for detection of rearranged and normal steranes and M/Z 218 for detection of 14α(H) 17β(H) steranes.

The M/Z 231 fragment ion is used to detect possible aromatic contamination of the saturated fraction. It is also used for detection of methyl steranes.

Aromatic Fractions

Alkyl-substituted Benzenes
The M/Z 106 fragment ion is often used to detect the alkyl-substituted benzenes. It is especially useful for the detection of di-substituted benzenes. M/Z 134 can also be used for the detection of C_4-alkylbenzenes, but benzothiophene will also give a signal with this fragment ion.

Naphthalenes
Methyl naphthalenes are normally detected by the M/Z 142 fragment ion, while C_2-naphthalenes are detected by M/Z 156 and C_3-naphthalenes by M/Z 170.

Benzothiophenes and Dibenzothiophenes
Benzothiophene can be detected, as mentioned above, by M/Z 134. The M/Z 198 and M/Z 212 fragment ions are used for methyl-substituted dibenzothiophenes and dimethyl-substituted dibenzo-thiophenes respectively.

Phenanthrenes
Phenanthrene is detected using the M/Z 178 fragment ion. Anthracene will, if present, also give a signal in the M/Z 178 fragment ion. Methyl-substituted phenanthrenes give signals in the M/Z 192 fragment ion, while the M/Z 206 fragment ion shows the dimethyl-substituted phenanthrenes and the M/Z 220 fragment ion shows the C_3 substituted phenanthrenes.

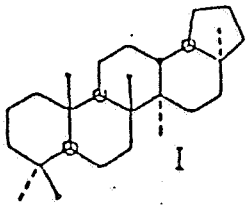
Aromatic Steranes
Monoaromatic steranes are detected using the M/Z 253 fragment ion, while the triaromatic steranes are detected using the M/Z 231 fragment ion.

Mass Fragmentograms representing Terpanes (M/Z 163, 177, 191, 205, 370, 384, 398, 412 and 426)

Peak Identification: (α and β refer to hydrogen atoms at C-17 and C-21 respectively unless indicated otherwise)

A.	18α trisnorneohopane (Ts)	$C_{27}H_{44}$	(I)
B.	17α trisnorhopane (Tm)	$C_{27}H_{46}$	(II, R=H)
Z.	Bisnorhopane	$C_{28}H_{48}$	(IV)
C.	αβ norhopane	$C_{29}H_{50}$	(II, R=C_2H_5)
D.	βα norhopane	$C_{29}H_{50}$	(III, R=C_2H_5)
E.	αβ hopane	$C_{30}H_{52}$	(II, R=i-C_3H_7)
F.	αβ hopane	$C_{30}H_{50}$	(III, R=i-C_3H_7)
G.	22S αβ homohopane	$C_{31}H_{54}$	(II, R=i-C_4H_9)
H.	22R αβ homohopane	$C_{31}H_{54}$	(II, R=i-C_4H_9)
I.	βα homomoretane	$C_{31}H_{54}$	(III, R=i-C_4H_9)
J.	22S αβ bishomohopane	$C_{32}H_{56}$	(II, R=i-C_5H_{11})
	22R αβ bishomohopane	$C_{32}H_{56}$	(II, R=i-C_5H_{11})
K.	22S αβ trishomohopane	$C_{33}H_{58}$	(II, R=i-C_6H_{13})
	22R αβ trishomohopane	$C_{33}H_{58}$	(II, R=i-C_6H_{13})
L.	22S αα tetrakishomohopane	$C_{34}H_{60}$	(II, R=i-C_7H_{15})
	22E αβ tetrakishomohopane	$C_{34}H_{60}$	(II, R=i-C_7H_{15})
M.	22S αβ pentakishomohopane	$C_{35}H_{62}$	(II, E=i-C_8H_{17})
	22E αβ pentakishomohopane	$C_{35}H_{62}$	(II, R=i-C_8H_{17})
P.	Tricyclic terpane	$C_{23}H_{42}$	(V, R=i-C_4H_9)
Q.	Tricyclic terpane	$C_{24}H_{44}$	(V, R=i-C_5H_{11})
R.	Tricyclic terpane (17R, 17S)	$C_{25}H_{66}$	(V, R=i-C_6H_{13})
S.	Tetracyclic terpane	$C_{24}H_{42}$	(VI)
T.	Tricyclic terpane (17R, 17S)	$C_{26}H_{48}$	(V, R=i-C_7H_{15})
N.	Tricyclic terpane	$C_{21}H_{38}$	(V, R=C_2H_5)
O.	Tricyclic terpane	$C_{22}H_{40}$	(V, R=C_3H_7)
Y.	25,28,30-trisnorhopane/moretane	$C_{27}H_{46}$	(VII)
X.	Unknown triterpane	$C_{30}H_{52}$	

STRUCTURES REPRESENTING TERPANES



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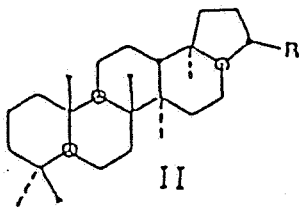

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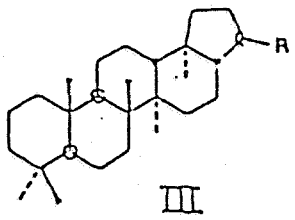

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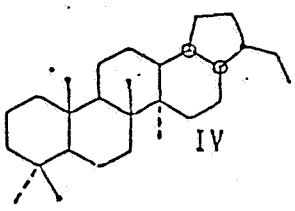

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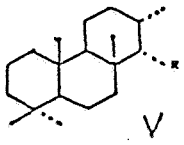

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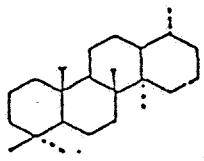

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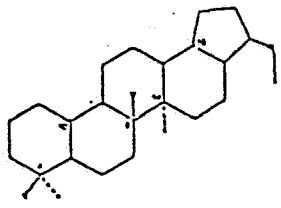


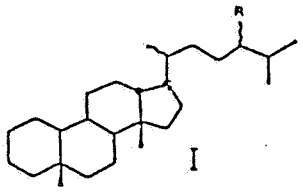
VII

Mass Fragmentograms representing Steranes (M/Z 149, 189, 217, 218, 259, 372, 386, 400 and 414)

Peak Identifications: α and β refer to hydrogen atoms at C-5, C-14 and C-17 in regular steranes and at C-13 and C-17 in diasteranes).

a.	20S βα diacholestane	$C_{27}H_{48}$	(I, R=H)
b.	20R βα diacholestane	$C_{27}H_{48}$	(I, R=H)
c.	20S αβ diacholestane	$C_{27}H_{48}$	(II, R=H)
d.	20R αβ diacholestane	$C_{27}H_{48}$	(II, R=H)
e.	20S βα 24-methyl-diacholestane	$C_{28}H_{50}$	(I, R=CH_3)
f.	20R βα 24-methyl-diacholestane	$C_{28}H_{50}$	(I, R=CH_3)
g.	20S αβ 24-methyl-diacholestane	$C_{28}H_{50}$	(II, R=CH_3)
	+ 20S ααα cholestane	$C_{27}H_{48}$	(III, R=H)
h.	20S βα 24-ethyl-diacholestane	$C_{29}H_{52}$	(II, R=C_2H_5)
	+ 20R αββ cholestane	$C_{27}H_{48}$	(IV, R=H)
i.	20S αββ cholestane	$C_{27}H_{48}$	(IV, R=H)
	+ 20R αβ 24-methyl-diacholestane	$C_{28}H_{50}$	(II, R=CH_3)
j.	20R ααα cholestane	$C_{27}H_{48}$	(III, R=H)
k.	20R βα 24-ethyl-diacholestane	$C_{29}H_{52}$	(I, R=C_2H_5)
l.	20R αβ 24-ethyl-diacholestane	$C_{29}H_{52}$	(II, R=C_2H_5)
m.	20S ααα 24-methyl-cholestane	$C_{28}H_{50}$	(III, R=CH_3)
n.	20R αββ 24-methyl-cholestane	$C_{28}H_{50}$	(IV, R=CH_3)
	+ 20R αβ 24-ethyl-diacholestane	$C_{29}H_{52}$	(II, R=C_2H_5)
o.	20S αββ 24-methyl-cholestane	$C_{28}H_{50}$	(IV, R=CH_3)
p.	20R ααα 24-methyl-cholestane	$C_{28}H_{50}$	(III, R=CH_3)
q.	20S ααα 24-ethyl-cholestane	$C_{29}H_{52}$	(III, R=C_2H_5)
r.	20R αββ 24-ethyl-cholestane	$C_{29}H_{52}$	(IV, R=C_2H_5)
s.	20S αββ 24-ethyl-cholestane	$C_{29}H_{52}$	(IV, R=C_2H_5)
t.	20R ααα 24-ethyl-cholestane	$C_{29}H_{52}$	(III, R=C_2H_5)
u.	5α sterane	$C_{21}H_{36}$	(VI, R=C_2H_5)
v.	5α sterane	$C_{22}H_{38}$	(VI, R=C_3H_7)

STRUCTURES REPRESENTING STERANES



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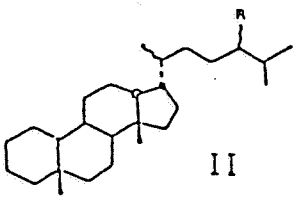

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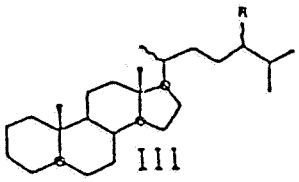

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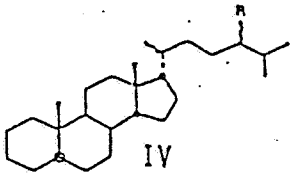

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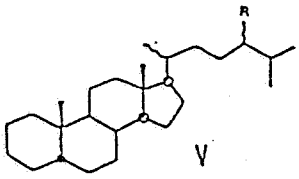

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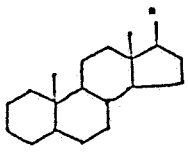


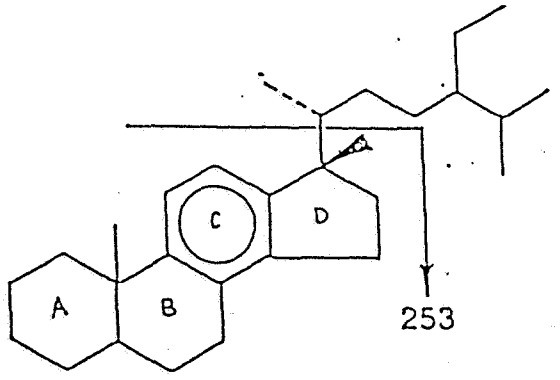
VI

Mass Fragmentograms representing Monoaromatic Steranes (M/Z 253)

Description of C-ring monoaromatic steroid hydrocarbons

Peak	Substituents R_1	R_2	R_3	R_4	Abbreviation of Compound
A1					$C_{21}M$
B1					$C_{22}MA$
C1	β(H)	CH_3	$S(CH_3)$	H	$\beta SC_{27}MA$
	β(H)	CH_3	$R(CH_3)$	H	$\beta RC_{27}MA$
D1	CH_3	H	$R(CH_3)$	H	$RC_{27}DMA$
	α(H)	CH_3	$S(CH_3)$	H	$\alpha SC_{27}MA$
E1	β(H)	CH_3	$S(CH_3)$	CH_3	$\beta SC_{28}MA$
	CH_3	H	$S(CH_3)$	CH_3	$SC_{28}DMA$
F1	α(H)	CH_3	$R(CH_3)$	H	$\alpha RC_{27}MA$
	α(H)	CH_3	$S(CH_3)$	CH_3	$\alpha SC_{28}MA$
	β(H)	CH_3	$R(CH_3)$	CH_3	$\beta RC_{28}MA$
G1	CH_3	H	$R(CH_3)$	CH_3	$RC_{28}DMA$
	β(H)	CH_3	$S(CH_3)$	C_2H_5	$\beta SC_{29}MA$
	CH_3	H	$S(CH_3)$	C_2H_5	$SC_{29}DMA$
	α(H)	CH_3	$R(CH_3)$	CH_3	$\alpha RC_{28}MA$
H1	β(H)	CH_3	$R(CH_3)$	C_2H_5	$\beta RC_{29}MA$
	CH_3	H	$R(CH_3)$	C_2H_5	$RC_{29}DMA$
I1	α(H)	CH_3	$R(CH_3)$	C_2H_5	$\alpha RC_{29}MA$

STRUCTURES REPRESENTING MONOAROMATIC STERANES:



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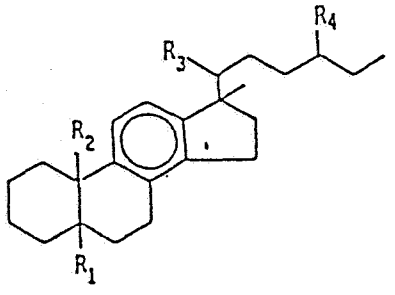
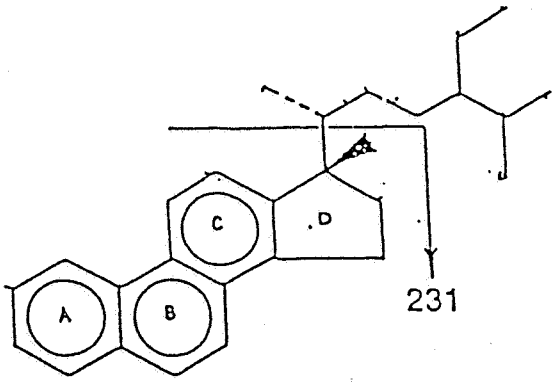


Mass Fragmentograms representing Triaromatic Steranes (M/Z 231)

Description of ABC-ring triaromatic steroid hydrocarbons

	Substituents		Abbreviation
Peak	R_1	R_2	of Compound
a1	CH_3	H	$C_{20}TA$
b1	CH_3	CH_3	$C_{21}TA$
c1	$S(CH_3)$	C_6H_{1-3}	$SC_{26}TA$
d1	$R(CH_3)$	C_6H_{13}	$RC_{26}TA$
	$S(CH_3)$	C_7H_{15}	$SC_{27}TA$
e1	$S(CH_3)$	C_8H_{17}	$SC_{28}TA$
f1	$S(CH_3)$	C_7H_{15}	$RC_{27}TA$
g1	$R(CH_3)$	C_8H_{17}	$RC_{28}TA$

STRUCTURES REPRESENTING TRIAROMATIC STERANES



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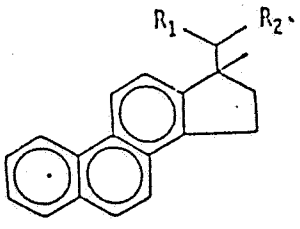

Isotope Ratio Mass Spectrometry

The isotope analysis were performed on a dual inlet VG SIRA 10 instrument. The combustion of the samples were done by a Carlo Erba EA 1108 element analyser directly connected to the inlet system of the mass spectrometer.

The combustion temperature was 1020°C and the carrier gas used was Helium. After the combustion H_2O and CO_2 were trapped in different cool traps. The CO_2 gas was then heated up before it was admitted to the mass spectrometer. The whole operation was controlled by an IBM PC50 computer system.

δ-values

The isotope ratios are given as δ-values in ‰ versus the PDB-standard:

$$\delta^{13}C = (R\ sample - R\ standard/R\ standard) \times 1000$$

$$R = {}^{13}C/{}^{12}C$$

The PDB-standard (a marine chalk of the Pee Dee-formation, USA) was created by Craig 1957. All results of $^{13}C/^{12}C$-analysis of organic matter today are calculated (Craig correction) against this international standard.

Reproducibility

The precision of the combustion system and the mass spectrometer is controlled by determination of an international calibrated standard, NBS22 oil and a house standard carbon. Double analysis on samples are also done.

Abbreviations

List of abbreviations used for lithology description

(sorted alphabetically)

ang	=	angular
bar	=	Baryte (mud additive)
bl	=	blue/blueish
blk	=	black
br	=	brittle
brn	=	brown/brownish
Ca	=	Carbonate (limestone/chalk/dolomite/siderite)
calc	=	calcareous
carb	=	carbonaceous
cem	=	cement used as additive (under "cont") or to describe cemented S/Sst
Chert	=	Chert
chk	=	Chalk/chalky
cly	=	clayey/shaley
cngl	=	conglomeratic
Coal	=	Coal
Coal-ad	=	Coal-like additive (e.g. chromlignosulfonate)
Congl	=	Conglomerate
Cont	=	Contaminant(s)
crs	=	coarse grained
dd	=	dried drilling mud
dol	=	Dolomite/dolomitic
drk	=	dark (colour)
dsk	=	dusk/dusky (colour)
evap	=	Salt/Gypsum/Halite (natural "Other" or as additive "Cont"
f	=	fine grained
fib	=	fibres (mud additive/contamination)
fis	=	fissile
fos	=	fossiliferous
glauc	=	glauconite/glauconitic
gn	=	green/greenish
gy	=	grey/greyish
hd	=	hard
ign	=	Igneous (material derived from igneous source)
Kaolin	=	Kaolin(ite)
kln	=	kaolinitic
l	=	loose
lam	=	laminated/laminae
lt	=	light (colour)
m	=	medium (colour or grain size)
Marl	=	Marl (calcareous claystone/mudstone)
mic	=	micaceous
Mica-ad	=	Mica used as mud additive
mrl	=	marly

No Mat.	=	No material left over after washing
ns	=	nutshells (mud additive)
ol	=	olive
ool	=	Oolite/oolitic
or	=	orange
Other	=	Other lithology/mineral, specified after this word
pi	=	pink/pinkish
pl	=	pale (colour)
prp	=	paint/rust/plastic contaminations/additives
pu	=	purple
pyr	=	Pyrite/pyritic
red	=	red/reddish
rnd	=	round/rounded
s	=	sandy
S/Sst	=	Sand and/or sandstone
Sh/Clst	=	Shale and/or claystone
sid	=	Siderite/sideritic
sil	=	siliceous/cherty
slt	=	silty
Sltst	=	siltstone
st	=	stained (with natural oil or oil-like additive)
tar-ad	=	Tar-like additive (e.g. "Black Magic")
Tuff	=	Tuff
tuff	=	tuffaceous
v col	=	various colours
w	=	white
wx	=	waxy
y	=	yellow/yellowish

Saga Petroleum a.s.

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Title

GEOCHEMICAL DATA REPORT FOR WELL 30/3-4

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Abstract

Five samples from the cored interval in well 30/3-4 have been analysed by Iatroscan (TLC-FID) and the saturated hydrocarbon fractions from all five samples were analysed by GC-FID and GC/MS.

NOT INCLUDED IN WELL TRADE.

Key Words

30/3-4, geochemistry, GC-FID, GC/MS, Veslefrikk

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1 Objectives

The objective of this study was to characterise the extractable hydrocarbons in five core samples from well 30/3-4 from the Veslefrikk Field, Norway.

2 General well information

The well was drilled by Statoil as operator of licence 052 from 5/2-85 to 12/6-85 and reached a total depth of 3287 mRKB. The KB of the rig was 23 metres and the water depth was 164 metres.

3 Samples and analytical scheme

Five samples were picked from the cored interval in the well on the 16th of September 1992 at NPD's store in Stavanger. The five samples (2833.0, 2855.8, 2912.0, 2925.1 and 3088.7 mRKB core depth) were analysed by Iatroscan (TLC-FID), and the saturated hydrocarbon fractions were analysed by GC-FID and GC/MS.

4 Vitrinite reflectance

No samples were analysed.

5 TOC and Rock Eval

No samples were analysed.

6 Iatroscan (TLC-FID)

Five samples were analysed, and the results are tabulated in Table 1.

7 GC-FID

The saturated hydrocarbon fraction of all five samples (2833.0, 2855.8, 2912.0, 2925.1 and 3088.7 mRKB core depth) were analysed by GC-FID. All the samples have a uniform n-alkane distribution without any signs of biological degradation.

Since the evaporative loss has affected the relative concentration of individual compounds, no ratios were calculated.

The GC-FID chromatograms are shown in figure 1.

8 GC/MS

The saturated hydrocarbon fractions of both samples were analysed by GC/MS and the mass chromatograms for m/z 191, 177, 217 and 218 are shown in figure 2.

Selected biological marker parameters are given in table 2.

9 Stable carbon isotopes

No samples were analysed.

Tab. 1

0 WELL NAME	1 NATIONALITY	2 LABORATORY	3 U.DEPTH	4 L.DEPTH	5 SAMPLE TYPE	6 LITHOLOGY	7 EOM mg/g
1 30/3-4	NOR	SAGA	2833.00	2833.00	CCP	SST	4.94
2 30/3-4	NOR	SAGA	2855.80	2855.80	CCP	SST	3.85
3 30/3-4	NOR	SAGA	2912.00	2912.00	CCP	SST	4.46
4 30/3-4	NOR	SAGA	2925.10	2925.10	CCP	SST	2.87
5 30/3-4	NOR	SAGA	3088.70	3088.70	CCP	SST	4.07

0 WELL NAME	8 SAT (mg/g)	9 ARO (mg/g)	10 POL (mg/g)	11 SAT %	12 ARO %	13 POLARS %	14 SAT ARO	15 METHODS
1 30/3-4	3.31	0.63	1.00	67.004049	12.753036	20.242915	5.253968	GC, GC/MS
2 30/3-4	2.68	0.57	0.60	69.610390	14.805195	15.584416	4.701754	GC, GC/MS
3 30/3-4	2.89	0.38	1.19	64.798206	8.520179	26.681614	7.605263	GC, GC/MS
4 30/3-4	1.84	0.38	0.65	64.111498	13.240418	22.648084	4.842105	GC, GC/MS
5 30/3-4	2.84	0.60	0.63	69.778870	14.742015	15.479115	4.733333	GC, GC/MS

Tab. 2

0 WELL NAME	1 CONS.	2 UPPER DEPTH	3 DEPTH	4 LITH	5 SAMPLE TYPE	6 Q/E	7 Ts/Tm	8 Z/C	9 ab/ab+ba
1 30/3-4	SAGA	2833.00	2833.00	SST	CCP	0.22	1.38	0.32	0.91
2 30/3-4	SAGA	2855.80	2855.80	SST	CCP	0.24	1.31	0.35	0.91
3 30/3-4	SAGA	2912.00	2912.00	SST	CCP	0.28	1.31	0.34	0.91
4 30/3-4	SAGA	2925.10	2925.10	SST	CCP	0.23	1.29	0.35	0.90
5 30/3-4	SAGA	3088.70	3088.70	SST	CCP	0.32	1.49	0.32	0.91

0 WELL NAME	10 %22S	11 %20S	12 %bb	13 a/a+j	14 C27st	15 C28st	16 C29st
1 30/3-4	0.58	0.57	0.60	0.82	35.71	30.44	33.84
2 30/3-4	0.59	0.56	0.60	0.81	35.91	30.70	33.39
3 30/3-4	0.61	0.59	0.61	0.80	37.68	31.62	30.70
4 30/3-4	0.59	0.56	0.59	0.81	34.07	31.35	34.58
5 30/3-4	0.60	0.58	0.60	0.83	35.26	31.10	33.63