Prøve nr.	Dybde (m)	Intens.	23/3	24/4	27Ts	27Tm	28ab	nor30	29ab	30d	29ba	30O	30ab	30ba	31abS	31abR	32abS	32abR	33abS	33abR	34abS	34abR	35abS	35abR
			m/z191											m/z191										
S8719		9310208	21	22	21	23	91	34	37	15	20	0	91	23	22	42	13	20	14	12	9	7	7	10
S8722	HRP	1152	0	2	0	5	129	0	6	12	6	0	21	7	5	10	2	5	0	0	0	0	0	0
S8724		18567168	6	8	18	20	21	25	43	14	15	0	104	20	30	29	18	16	15	12	9	7	6	5
S8712		23146496	9	9	18	19	20	26	47	13	15	0	104	17	30	26	18	16	17	13	10	7	6	5
S8726		27197440	5	8	15	22	32	22	43	13	15	0	105	21	31	30	15	17	14	11	8	7	4	4
S8714	HRP	86	12	4	22	43	6	5	89	11	41	0	125	51	62	71	20	38	9	14	5	9	6	7
S8715	HRP	291	8	3	4	22	0	4	38	5	13	0	59	21	42	39	12	17	5	6	3	4	3	3
S8728		16592896	7	8	15	30	21	25	50	14	19	0	104	27	38	39	17	21	14	13	9	8	6	6
S8703		48726016	2	6	5	42	10	7	53	14	25	0	107	34	39	35	18	23	8	10	6	7	4	6
S8676		7792640	20	19	40	27	24	58	52	30	15	0	92	14	30	22	23	17	22	15	16	10	11	7
S8735		12939264	12	14	35	28	26	65	47	35	16	0	94	17	29	19	24	17	23	15	16	11	10	8
S8678		20242432	8	10	29	23	23	55	45	26	16	0	97	17	31	21	25	19	25	17	17	11	10	8
S8679		12783616	8	10	31	24	25	57	46	26	16	0	97	16	30	21	25	19	25	16	18	11	11	9
S8680		8325120	13	15	40	29	25	93	39	34	15	0	70	15	15	10	20	17	26	16	19	12	12	9
S8681		7799808	40	29	37	25	21	23	65	15	17	0	99	15	30	24	18	15	15	11	10	7	7	5
S8731		17965056	4	5	18	17	23	26	40	16	15	0	99	17	29	25	19	17	18	13	12	9	8	6
S8684		19058688	7	7	18	15	23	24	42	16	16	0	99	16	29	26	21	17	20	15	13	10	9	7
S8685		14766080	5	6	20	17	25	29	42	20	17	0	99	18	30	25	20	17	21	15	12	8	8	6
S8698		10760192	4	5	19	18	25	30	42	18	15	0	98	17	29	24	19	17	18	13	12	8	9	7
S8686		11046912	7	7	22	18	22	32	45	22	16	0	97	19	32	25	23	20	24	16	15	11	11	9
S8732		15572992	5	6	20	17	20	30	42	21	16	0	96	18	30	25	23	18	24	16	15	11	11	9
S8688		11165696	6	7	22	17	15	34	41	25	15	0	81	19	27	22	23	19	23	15	16	10	10	9
S8733		12099584	6	7	22	19	20	40	47	26	17	0	89	20	31	25	26	23	30	18	20	12	13	11
S8689		9297920	6	9	24	18	18	39	45	28	18	0	94	22	31	26	26	20	25	17	17	11	11	9
S8734		11845632	5	7	25	21	20	44	52	28	19	0	88	21	31	26	29	22	29	19	20	12	15	10
Fluids																								
S8737	HRP	854	5	9	33	24	29	63	52	37	21	0	119	20	33	24	26	19	24	15	16	10	11	7
S8738	HRP	492	7	14	37	28	29	82	55	41	19	0	115	22	37	26	30	21	23	13	13	7	9	5

Prøve nr.	Dybde (m)	m/z217 Intens	27DbS	27DbR	27aaS	27aaR	29aaS	29bbR	29bbS	29aaR
S8719		6213632	38	30	26	79	23	26	32	100
S8722	HRP	262	10	11	17	105	41	15	21	124
S8724		5027840	48	35	30	39	53	54	59	95
S8715		7293952	42	33	29	40	50	50	53	98
S8726		6890496	46	35	29	37	53	51	55	98
S8714	HRP	14	43	30	19	99	20	34	40	107
S8715	HRP	24	27	22	20	38	26	38	39	110
S8728		4371456	42	31	25	43	47	47	48	96
S8703		25182208	9	7	14	18	30	46	47	106
S8676	0	4131840	63	46	30	29	38	45	41	42
S8735		6884352	59	41	27	27	39	46	45	43
S8678		8220672	48	38	28	27	41	51	51	56
S8679		5114880	56	40	27	35	44	50	47	75
S8680		3763200	61	46	25	22	27	28	33	31
S8681		2232320	51	40	39	43	53	55	56	85
S8731		5533696	40	31	26	32	51	61	56	91
S8684		6047744	32	30	27	29	46	58	59	90
S8685		5129216	35	31	26	34	49	57	57	92
S8698		3313664	41	31	29	34	53	65	60	89
S8686		4005888	36	34	28	31	43	57	60	90
S8732		5298176	34	32	27	29	45	61	63	87
S8688		3962880	31	36	29	29	40	60	61	86
S8733		4793344	35	35	28	20	42	63	62	77
S8689		3549184	36	37	28	29	41	61	63	85
S8734		5017600	33	33	29	21	40	64	63	75
Fluids										
S8737	HRP	311	63	45	32	45	69	80	75	83
S8738	HRP	210	96	62	31	42	63	69	71	78

Prøve nr.	Dybde (m)	m/z218 Intens	27bbR	27bbS	28bbR	28bbS	29bbR	29bbS	30bbR	30bbS	m/z219 Intens	27D2	ppm
S8719		3104768	46	29	68	66	63	68	10	11	12574720	106	114
S8722	HRP	149	19	15	43	31	30	31	6	6	*		
S8724		3767296	55	40	53	61	88	96	17	17	4136960	96	48
S8715		4921344	58	48	52	64	89	98	17	17	8017920	101	93
S8726		4849664	57	44	52	65	91	99	16	16	6191104	100	62
S8714	HRP	9	36	33	40	30	81	77	13	10	*		
S8715	HRP	12	57	44	56	50	102	99	11	13	*		
S8728		2699264	57	42	55	63	93	94	17	17	17100800	107	123
S8703		14094336	48	8	37	22	105	105	0	0	12722176	105	49
S8676	0	2461696	65	43	51	63	86	84	18	17	2813952	81	54
S8735		4142080	60	40	47	65	87	87	18	18	3607552	80	49
S8678		5426176	56	35	47	60	87	90	20	19	4405248	83	51
S8679		3238912	58	37	46	58	87	85	20	20	3165184	85	50
S8680		1651200	64	31	42	68	59	71	15	18	2403328	82	51
S8681		1781504	68	52	53	61	85	88	15	15	3795968	92	58
S8731		4233216	50	39	50	60	95	92	20	18	3759104	92	62
S8684		4751360	46	37	47	56	84	94	16	17	3365888	85	53
S8685		3822592	50	40	51	62	90	95	17	18	3579904	93	53
S8698		2725888	46	36	46	53	92	90	19	18	2120704	86	52
S8686		3123200	49	38	48	58	85	93	16	18	2994176	90	51
S8732		4370432	46	36	46	56	82	92	17	16	3552256	89	50
S8688		3232768	48	37	49	60	82	91	16	17	3644416	91	50
S8733		4034560	45	33	43	51	82	88	14	17	3267584	83	50
S8689		3036160	45	36	46	59	82	92	16	17	3041280	90	50
S8734		4265984	48	35	45	56	86	89	15	17	3717120	85	51
Fluids													
S8737	HRP	280	56	48	61	77	115	113	26	29	281	83	56
S8738	HRP	179	63	53	67	85	111	115	26	29	244	55	51

* std not identifiable (too weak)

Derivation of biomarker ratios reported in Table 6.

Ratio	Derivation	m/z
Triterpanes		
22S	32αβS/(32αβS+32αβR)	191
Ts/Tm	27Ts/27Tm	191
TtX	30d/29βα	191
30D/H	30d/30αβ	191
29/30H	29αβ/30αβ	191
30αβ	30αβ/(30αβ+30βα)	191
28αβ/H	28αβ/30αβ	191
3R/H	(23/3)/30αβ	191
4R/H	(24/4)/30αβ	191
35/34H	(35αβR+35αβS)/(34αβR+34αβS)	191
Dem/H	25nor30αβ/30αβ	191
O/H	30O/30αβ	191
G/H	30G/30αβ	191
ppmH*	ppm 27Ts+27Tm+29αβ+29βα+30αβ+30βα+31αβS+31αβR+32αβS+32αβR+33αβS+33αβR +34αβS+34αβR+35αβS+35αβR	191
Steranes		
20S	29ααS/(29ααR+29ααS)	217
ββ	(29ββR+29ββS)/(29ββR+29ββS+29ααR+29ααS)	217
%C27	100*(27ββR+27ββS)/(27ββR+27ββS+28ββR+28ββS+29ββR+29ββS)	218
%C28	100*(28ββR+28ββS)/(27ββR+27ββS+28ββR+28ββS+29ββR+29ββS)	218
%C29	100*(29ββR+29ββS)/(27ββR+27ββS+28ββR+28ββS+29ββR+29ββS)	218
C30/st	(30ββR+30ββS)/(27ββR+27ββS+28ββR+28ββS+29ββR+29ββS)	218
Dia/reg	(27dβR+27dβS)/(27ααR+27ααS)	217
ppmS*	ppm 27ββR+27ββS+28ββR+28ββS+29ββR+29ββS	218
H/S	Intensities(27Ts+27Tm+29αβ+29βα+30αβ+30βα+31αβS+31αβR+32αβS+32αβR+33αβS+33αβR+34αβS+34αβR +35αβS+35αβR)/Intensities(27ββR+27ββS+28ββR+28ββS+29ββR+29ββS)	

* ppm calculated from comparison with m/z 219 intensity for D2-cholestane

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Biomarker codes used in derivation of ratios

Compound name	Old code	NEW CODE
Triterpanes		
$C_{23}H_{42}$ tricyclic terpane	P	23/3
$C_{24}H_{44}$ tricyclic terpane	Q	24/3
$C_{25}H_{46}$ tricyclic terpane[1]	R	25/3
$C_{24}H_{42}$ tetracyclic terpane	S	24/4
$C_{26}H_{48}$ tricyclic terpane[2]	T	26/3
18α(H)-22,29,30-trisnorneohopane	27A	27Ts
17α(H)-22,29,30-trisnorhopane	27B	27Tm
17α(H), 21β(H)-25,28,30-trisnorhopane		25nor28αβ
17α(H), 21β(H)-28,30-bisnorhopane	28A	28αβ
17α(H), 21β(H)-25-norhopane		25nor30αβ[3]
17α(H), 21β(H)-30-norhopane	C29A	29αβ
18α(H)-30-norneohopane		29Ts
15α-methyl-17α(H)-27-norhopane (TtX)	X	30D
17β(H), 21α(H)-30-norhopane (normoretane)	C29B	29βα
18α(H)-oleanane		30O
17α(H), 21β(H)-hopane	C30A	30αβ
17β(H), 21α(H)-hopane (moretane)	C30B	30βα
Gammacerane		30G
17α(H), 21β(H), 22(S)-homohopane	C31S	31αβS
17α(H), 21β(H), 22(R)-homohopane	C31R	31αβR
17α(H), 21β(H), 22(S)-bishomohopane	C32S	32αβS
17α(H), 21β(H), 22(R)-bishomohopane	C32R	32αβR
17α(H), 21β(H), 22(S)-trishomohopane	C33S	33αβS
17α(H), 21β(H), 22(R)-trishomohopane	C33R	33αβR
17α(H), 21β(H), 22(S)-tetrakishomohopane	C34S	34αβS
17α(H), 21β(H), 22(R)-tetrakishomohopane	C34R	34αβR
17α(H), 21β(H), 22(S)-pentakishomohopane	C35S	35αβS
17α(H), 21β(H), 22(R)-pentakishomohopane	C35R	35αβR

1 may be broad peak or doublet 2 may be doublet 3 listed in Statoil spreadsheats as "nor30" for convenience

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Steranes

13β(H), 17α(H), 20(S)-cholestane (diasterane)	27a	27dβS
13β(H), 17α(H), 20(R)-cholestane (diasterane)	27b	27dβR
13α(H), 17β(H), 20(R)-cholestane (diasterane)	27c	27dαR
13α(H), 17β(H), 20(S)-cholestane (diasterane)	27d	27dαS
5α(H), 14α(H), 17α(H), 20(S)-cholestane	27e	27ααS
5α(H), 14β(H), 17β(H), 20(R)-cholestane	27f	27ββR
5α(H), 14β(H), 17β(H), 20(S)-cholestane	27g	27ββS
5α(H), 14α(H), 17α(H), 20(R)-cholestane	27h	27ααR
24-methyl-13β(H), 17α(H), 20(S)-cholestane (diasterane)	28a	28dβS
24-methyl-13β(H), 17α(H), 20(R)-cholestane (diasterane)	28b	28dβR
24-methyl-13α(H), 17β(H), 20(R)-cholestane (diasterane)	28c	28dαR
24-methyl-13α(H), 17β(H), 20(S)-cholestane (diasterane)	28d	28dαS
24-methyl-5α(H), 14α(H), 17α(H), 20(S)-cholestane	28e	28ααS
24-methyl-5α(H), 14β(H), 17β(H), 20(R)-cholestane	28f	28ββR
24-methyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	28g	28ββS
24-methyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	28h	28ααR
24-ethyl-13β(H), 17α(H), 20(S)-cholestane (diasterane)	29a	29dβS
24-ethyl-13β(H), 17α(H), 20(R)-cholestane (diasterane)	29b	29dβR
24-ethyl-13α(H), 17β(H), 20(R)-cholestane (diasterane)	29c	29dαR
24-ethyl-13α(H), 17β(H), 20(S)-cholestane (diasterane)	29d	29dαS
24-ethyl-5α(H), 14α(H), 17α(H), 20(S)-cholestane	29e	29ααS
24-ethyl-5α(H), 14β(H), 17β(H), 20(R)-cholestane	29f	29ββR
24-ethyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	29g	29ββS
24-ethyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	29h	29ααR
24-propyl-5α(H), 14α(H), 17α(H), 20(S)-cholestane	30e	30ααS
24-propyl-5α(H), 14β(H), 17β(H), 20(R)-cholestane	30f	30ββR
24-propyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	30g	30ββS
24-propyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	30h	30ααR
4-methyl-14α(H), 17α(H)-cholestanes		M28αα
4,24-dimethyl-14α(H), 17α(H)-cholestanes		M29αα
4-methyl-24-ethyl-14α(H), 17α(H)-cholestanes		M30αα
4,23,24-trimethyl-14α(H), 17α(H)-cholestanes (dinosteranes)		M30D

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TABLE 7. THOMPSON'S INDICES FROM LIGHT HYDROCARBON ANALYSIS, WELL 6204/11-1

Depth mRKB	Sample type	Sample no.#	A	B	X	W	C	I	F	H	U	R	S
1938.00	RCI 3B	Fluidlab	0.89	4.49	5.53	0.20	0.18		0.16		2.44		
2032.50	FMT 3D	Fluidlab	1.44	7.69	11.60	0.19	0.12		0.11		2.84		
2043.90	RCI 3A	Fluidlab	1.85	5.69	6.71	0.31	0.14		0.13		2.79		

"Fluidlab" = sample analysed by Statoil's Fluidlab

DEFINITIONS OF THOMPSON'S INDICES :

AROMATICITY :

$$A = \frac{\text{Benzene}}{\text{n-hexane}} \qquad B = \frac{\text{Toluene}}{\text{n-heptane}} \qquad X = \frac{\text{m+p xylene}}{\text{nC8}} \qquad W = \frac{\text{Benzene}*10}{\text{cC6}}$$

PARAFINICITY :

$$C = \frac{\text{nC6+nC7}}{\text{cC6+mcC6}} \qquad I = \frac{\text{2mC6+3mC6}}{\text{1c3dmcC5+1t3dmcC5+1t2dmcC5}} \qquad F = \frac{\text{nC7}}{\text{mcC6}}$$

$$H = \frac{\text{nC7}*100}{\text{cC6+2mC6+2,3dmcC5+3mC6+1c3dmcC5+1t3dmcC5+1t2dmcC5+nC7+mcC6}}$$

NAPHTHENES/ISOCOMPOUNDS:

$$U = \frac{\text{cC6}}{\text{mcC5}}$$

PARAFINS/ISOCOMPOUNDS :

$$R = \frac{\text{nC7}}{\text{2mC6}} \qquad S = \frac{\text{nC6}}{\text{2,2dmC4}}$$

TABLE 8. CARBON ISOTOPE DATA FOR OILS, EXTRACTS AND FRACTIONS, WELL 6204/11-1

Codes in figs.	Depth m RKB	Sample type	Sample no.	d13C					
				EOM	Sats	Arom	Pol	Asph	Ker
C1	2134.39	CORE-CHIP	S8719						
C2	2157.60	CORE-CHIP	S8722						
U1s	2619.00	CUTTINGS	S8724	-26.82	-28.16	-26.89	-26.11	-25.08	-24.63
U2s	2642.00	SWC	S8712	-26.83	-28.20	-26.96	-26.03	-24.68	-23.80
U3s	2670.00	CUTTINGS	S8726	-25.91	-28.09	-26.44	-25.36	-24.22	-22.79
U4	2680.00	SWC	S8714	-24.62					
U5	2731.00	SWC	S8715	-24.38					
U6s	2757.00	CUTTINGS	S8728						
M1	2871.00	CUTTINGS	S8703	-24.30	-25.98	-24.63	-24.49	-24.01	
CR1	2015.75	PLUG	S8676						
CR2	2017.70	CORE-CHIP	S8735	-27.38	-27.99	-26.54	-27.22	-26.91	
CR3	2148.48	PLUG	S8678	-27.47	-28.05	-26.97	-27.23	-26.95	
CR4	2150.25	PLUG	S8679						
CR5	2154.25	PLUG	S8680	-27.72	-28.11	-27.04	-27.80	-27.26	
JR1	2779.00	PLUG	S8681	-26.50	-27.79	-26.69	-26.39	-24.60	
JR2	2789.00	CORE-CHIP	S8731	-27.36	-27.86	-26.92	-27.06	-25.55	
JR3	2797.25	PLUG	S8684	-27.42	-27.83	-26.89	-26.91	-25.56	
JR4	2804.50	PLUG	S8685						
JR5	2808.60	CORE-CHIP	S8698						
JR6	2814.50	PLUG	S8686	-27.21	-27.68	-26.86	-26.46	-25.33	
JR7	2815.82	CORE-CHIP	S8732						
JR8	2819.75	PLUG	S8688	-27.26	-27.66	-26.71	-26.52	-26.01	
JR9	2821.31	CORE-CHIP	S8733	-27.23	-27.68	-26.62	-26.29	-29.40	
JR10	2821.50	PLUG	S8689						
JR11	2823.30	CORE-CHIP	S8734	-27.24	-27.66	-26.57	-26.20	-25.53	
	Fluids								
F1	2032.50	FMT 3D	S8737	-26.99	-27.72	-26.80	-26.94	-27.45	
F2	2043.90	RCI 3A	S8738	-27.03	-27.74	-26.76	-26.81	-27.39	

TABLE 9. CHEMICAL AND ISOTOPIC COMPOSITIONS OF GASES, WELL 6204/11-1 1FE Drilla

Test	Depth (mRKB)
RCI 3B	1938
RCI 3C	2787

Codes in figs.	%C1	%C2	%C3	%iC4	%nC4	%C5	CO2	SumC1-C5	Wetness	Dryness
CR	94.1	3.2	0.2	0.26	0.08	0.17	1.7	98.01	0.04	0.96
JR	96.2	2.5	0.8	0.14	0.22	0.1	0.1	99.96	0.04	0.96

Wetness = (C2-C5)/(C1-C5)
Dryness = C1/(C1-C5)

Test	Depth (mRKB)
RCI 3B	1938
RCI 3C	2787

Codes in figs.	d13C C1	d13C C2	d13C C3	d13C iC4	d13C nC4	d13C C5	dD C1	d13C CO2	d18O CO2
CR	-32.9	-27.0	-17.6	-24.4		-25.0	-163.0	-17.2	-6.4
JR	-36.5	-31.5	-28.7	-24.5	-28.5		-146.0	-19.0	-14.5

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REPORT ON VISUAL KEROGEN AND CARBON ISOTOPES, WELL NOCS 6204/11-1, STATOIL

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Norway

Date: 13.01.95

Table 1 : Thermal Maturity Data for well STATOIL NOCS 6204/11-1

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
2134.39	ccp	bulk	-	-	-	-	4.5-5.0	-	0001-0B
2157.60	ccp	bulk	-	-	-	-	5.0-5.5(?)	-	0002-0B
2619.00	cut	bulk	-	-	-	-	5.5-6.0	-	0003-0B
2642.00	swc	bulk	-	-	-	-	6.0-6.5	-	0004-0B
2670.00	cut	bulk	-	-	-	-	6.0	-	0005-0B
2680.00	swc	bulk	-	-	-	-	6.5	-	0006-0B
2731.00	swc	bulk	-	-	-	-	6.0-6.5	-	0007-0B
2757.00	cut	bulk	-	-	-	-	6.0	-	0008-0B

Table 3 : Tabulation of carbon isotope data for EOM/EOM - fractions for well STATOIL NOCS 6204/11-1

Code	Typ	Lithology	EOM	Saturated	Aromatic	NSO	Asphaltenes	Kerogen	Sample
S8678	cut	bulk	-27.47	-28.05	-26.97	-27.23	-26.95	-	0012-0
S8684	cut	bulk	-27.42	-27.83	-26.89	-26.91	-25.56	-	0014-0
S8686	cut	bulk	-27.21	-27.68	-26.86	-26.46	-25.33	-	0015-0
S8688	cut	bulk	-27.26	-27.66	-26.71	-26.52	-26.01	-	0016-0
S8712	cut	bulk	-26.83	-28.20	-26.96	-26.03	-24.68	-23.80	0010-0
S8724	cut	bulk	-26.82	-28.16	-26.89	-26.11	-25.08	-24.63	0019-0
S8726	cut	bulk	-25.91	-28.09	-26.44	-25.36	-24.22	-22.79	0011-0
S8731	cut	bulk	-27.36	-27.86	-26.92	-27.06	-25.55	-	0013-0
S8733	cut	bulk	-27.23	-27.68	-26.62	-26.29	-29.40 -29.22	-	0017-0
S8734	cut	bulk	-27.24	-27.66	-26.57	-26.20	-25.53	-	0018-0

Table 2: Visual Kerogen Composition Data, STATOIL NOCS 6204/11-1

Depth Units: m

Depth	Spl	Sample No.	Amorphous AM%	FA	HA	Algal/Phytoplankton AP%	Cy	Ta	Bo	Di	De	Herbaceous HE%	SP	Cu	De	Woody WO%	FL	NF	De	Coaly CO%	FS	De
2134.39	ccp	S8719	Tr	*		5	*			*	*	5	**	*	*	30		*	*	60	*	
2157.60	ccp	S8722	Tr	*		5	*			*	*	10	*	*	**	30		**	*	55	**	*
2619.00	cut	S8724	15	*		Tr	*		*		*	35	**	*	*	40		**	*	10	*	*
2642.00	cut	S8712	20	*		Tr	*			*	*	35	*	*	**	30		**	*	15	**	*
2670.00	cut	S8726	20	*		Tr	*			*	*	30	*	*	**	35		**	*	15	**	*
2680.00	cut	S8714	20	*		Tr	*				*	30	*	*	**	35		*	**	15	*	**
2731.00	cut	S8715	5	*		5	*			*	*	40	*	*	**	40		**	*	10	*	*
2757.00	cut	S8728	15	*		Tr	*				*	40	*	*	**	30		**	*	15	**	*

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1 Introduction

This report gives the result of routine vitrinite reflectance analyses on 40 samples covering the interval from 564 to 2949 mRKB in well 6204/11/1 offshore Norway.

2 Material

2.1 Samples

The material was provided from the client as 31 unwashed cuttings, 7 side wall core chips and 2 core chips. The sample positions are indicated in figure 1.

2.2 Geological information and casing points

Information on stratigraphy in well 6204/11-1 was provided from the client and is shown in figure 1.

3 Analytical techniques

3.1 Preparation

The cuttings samples were washed and then treated with hydrochloric and hydrofluoric acid prior to further preparation. The aim was to avoid soft and expanding mineral phases in order to ensure good polishing quality. The side wall core chips and the core chips were treated as bulk material.

The sample material resulting from the acid treatment and the bulk samples were embedded in an epoxy resin to make briquettes, ground flat and polished using 0.25 micron diamond paste and magnesium oxide as the two final steps.

3.2 Analysis

The analytical equipment being used was a Zeiss MPM 03 photometer microscope equipped with an Epiplan-Neofluar 40/0.90 oil objective. The sensitive measuring spot was kept constant for all measurements at about 2.5 micron in diameter. The measurements were made through a green band pass filter (546 nm) and in oil immersion (refractive index 1.515 at 18°C). The readings were made without a polarizer and using a stationary stage. This procedure is called measurement of random reflectance (%Rm). The photometer is calibrated daily against a standard of known reflectance (%Rm= 0.588) and routinely (daily) checked against two other standards of significant different reflectances (%Rm=0.879 and 1.696). A deviation from these values of less than ±0.01 and ±0.02 respectively is considered as acceptable. The calibration is routinely checked during the course of measurements at least every hour, and a deviation of less than ±0.005 is considered as acceptable.

For each sample at least 20 points were measured if possible, and quality ratings are given to various important aspects which may affect the measurements. The aspects are abundance of vitrinite, uncertainties in the identification of indigenous vitrinite, type of vitrinite, particle size, particle surface quality and abundance of pyrite.

3.3 Presentation of results

The raw data from the measurements are presented in appendix for each sample both as tabulated data and histograms. A true vitrinite population is selected among the readings based on observations made during the measurements, and arithmetic mean values are calculated for this population and other populations. A quality rating is given to the true population. The results are listed in table 1.

The results are presented as vitrinite reflectance versus depht plots on linear and semilogarithmic scales (figure 1). A vitrinite reflectance versus depth trend is interpreted manually on the linear plot and transferred to the semilogarithmic plot. The interpreted trend is also listed in table 2.

4 Results

In the interval 850-2000mRKB the kerogen concentrate samples have a high content of pyrite which may affect the measurements towards higher values and must be avoided if possible. From the sample at 2046mRKB and downwards to about 2600mRKB there is an interval with a lot of hydrocarbon staining which may lower the reflectance value. In spite of these problems it has been possible to establish a fairly reliable vitrinite reflectance versus depth trend for well 6204/11/1.

Table 1 Vitrinite reflectance data

Well
6204/11-1

IFE no.	Depth, mRKB	Sample type	Lithology	%Rm	Std. dev.	N	Quality	Preparation
ST 1751	564	swc	clst	0.25	0.05	22	P	bulk
ST 1752	650	cut	clst/sst	0.33	0.06	24	P	HF
ST 1753	758	swc	sst	-	-	-	barren	bulk
ST 1754	850	cut	clst	0.30	0.04	20	M	HF
ST 1755	955	cut	clst	0.34	0.04	24	M	HF
ST 1756	1050	cut	clst	0.33	0.04	23	M	HF
ST 1757	1266.5	swc	clst	-	-	-	barren	bulk
ST 1758	1325	cut	clst	0.36	0.06	17	M	HF
ST 1759	1375	cut	clst	0.38	0.09	21	M	HF
ST 1760	1425	cut	clst	0.34	0.07	24	P	HF
ST 1761	1492	swc	clst	0.36	0.05	4	P	bulk
ST 1762	1525	cut	clst	0.38	0.06	21	M	HF
ST 1763	1575	cut	clst	0.44	0.06	23	M	HF
ST 1764	1625	cut	clst	0.38	0.06	21	M	HF
ST 1765	1675	cut	clst	0.32	0.04	15	M	HF
ST 1766	1725	cut	clst	0.37	0.05	26	M	HF
ST 1767	1780	cut	clst	0.42	0.09	22	M	HF
ST 1768	1805	swc	clst	0.39	0.05	19	M	bulk
ST 1769	1857	swc	clst	0.44	0.01	2	P	bulk
ST 1770	1905	cut	clst	0.42	0.06	20	M	HF
ST 1771	1962	cut	clst	0.41	0.07	6	M	HF
ST 1772	2046	cut	clst	0.44	0.05	5	P	HF
ST 1773	2015.69	core	clst	0.48	0.07	23	M	bulk
ST 1774	2106	cut	clst	0.45	0.05	8	P	HF
ST 1775	2157.7	core	clst	0.44	0.07	17	M	bulk
ST 1776	2205	cut	clst	0.47	0.08	23	P	HF
ST 1777	2250	cut	clst	0.48	0.09	23	P	HF
ST 1778	2298	cut	clst	0.46	0.04	17	M	HF
ST 1779	2346	cut	clst	0.43	0.06	22	M	HF
ST 1780	2400	cut	clst	0.52	0.06	21	M	HF
ST 1781	2441.5	swc	clst	0.44	0.06	15	M	bulk
ST 1782	2505	cut	clst	0.47	0.04	15	M	HF
ST 1783	2550	cut	clst	0.55	0.05	22	M	HF
ST 1784	2601	cut	clst	0.47	0.06	22	M	HF
ST 1785	2649	cut	clst	0.47	0.05	20	G	HF
ST 1786	2703	cut	clst	0.47	0.04	21	M	HF
ST 1787	2745	cut	clst	0.52	0.08	22	M	HF
ST 1788	2865	cut	clst/coal	0.37	0.04	24	P	HF
ST 1789	2901	cut	clst	0.54	0.08	27	M	HF
ST 1790	2949	cut	clst	0.60	0.03	4	P	HF

G	Good quality	**P**	Poor quality	**A**	Mud additive	**HF**	HF-treated
M	Moderate quality	**X**	Not vitrinite	**Barren**	Barren of vitrinite	**Bulk**	Bulk rock

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SUMMARY

One gas sample from well 6204/11-1, 1932.5 mRKB was analysed during March 1995.

On the gas sample C_1 - C_5 and CO_2 are quantified. The $\delta^{13}C$ value is measured on C_1, C_2, C_3, iC_4 and nC_4, iC_5 and nC_5 and CO_2. In addition the δD value is measured on methane.

The work is done in accordance with the "The Norwegian Industry Guide to Organic Geochemical Analyses", Third Edition 1993.

NB Correct depth to 1938 m

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APPROVED BY	Arne Råheim	1995-03-24	Arne Råheim

1 Introduction

One gas sample from well 6204/11-1, 1932.5 mRKB was received for isotope analysis March 1995.

On the gas sample C_1 - C_5 and CO_2 are quantified. The $\delta\ ^{13}C$ value is measured on C_1, C_2, C_3, iC_4 and nC_4, iC_5 and nC_5 and CO_2. In addition the δ D value is measured on methane.

2 Analytical procedures

Aliquots of the gas is sampled from the gas bottle with a syringe.

The gas composition is determined on a Carlo Erba Mega gas chromatograph equipped with a Porapak Q column and thermal conductivity- (TCD) and flame ionisation- (FID) detectors.

For isotopic determination the different gas components are separated by a Carlo Erba 4200 gas chromatograph, and then oxidised in separate CuO-ovens at 850°C. Separate ovens are used in order to prevent cross contamination. The combustion products CO_2 and H_2O are frozen into collection vessels and separated.

The combustion water is reduced with zinc metal in sealed quarts tubes at 900°C to prepare hydrogen for isotope analysis.

The isotopic measurements were performed on a Finnigan MAT 251 and a Finnigan Delta mass spectrometer.

IFEs value on NBS 22 is 29.77 ± .06‰ PDB.

3 Results

The volume composition of the gas sample is given in Table 1. The results have been normalised to 100%.

The stable isotope composition of the gas sample is given in Table 2. Due to low concentration of the individual components iC_4 and nC_4 are isotopically determined in one fraction. The carbon isotopic composition of iC_5 and nC_5 (determined in one fraction) is also included in the table.

Prior to the analysis of the present gas sample a laboratory standard gas mixture is analysed. The isotopic composition of the standard gas is within what can be expected. For the gas sample the uncertainty on the $\delta\ ^{13}C$ value is estimated to be $\pm$ 0.3‰ PDB and includes all the different analytical steps. The uncertainty in the δ D value is likewise estimated to be $\pm$ 5‰.

The molecular composition related to carbon isotope variations in methane are plotted in Figure 1 (Schoell, 1983), the carbon and hydrogen variations in methane in Figure 2 (Schoell, 1983) and carbon isotope variations in ethane related to carbon isotope variations in methane in Figure 3 (Schoell, 1983).

Table 1 Volume composition of a gas sample from well 6204/11-1

Sample	IFE no	C_1 %	C_2 %	C_3 %	iC_4 %	nC_4 %	iC_5 %	nC_5 %	CO_2 %	ΣC_1-C_5	Wet-ness	iC_4/ nC_4/
1932.5m	15021	94.1	3.2	0.2	0.26	0.08	0.35	0.17	1.7	98.3	0.04	3.46

Table 2 Isotopic composition of a gas sample from well 6204/11-1

Sample	IFE no	C_1 $\delta\ ^{13}C$ ‰ PDB	C_1 δ D ‰ SMOW	C_2 $\delta\ ^{13}C$ ‰ PDB	C_3 $\delta\ ^{13}C$ ‰ PDB	C_4 $\delta\ ^{13}C$ ‰ PDB	C_5 $\delta\ ^{13}C$ ‰ PDB	CO_2 $\delta\ ^{13}C$ ‰ PDB	CO_2 $\delta\ ^{18}O$ ‰ PDB
1932.5m	15021	-32.9	-163	-27.0	-17.6	-24.4	-25.0	-17.2	-6.4

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SUMMARY

One gas sample from well 6204/11-1, FMT 331664, 2787.0 m recombination was received and analysed during December 1994/ January 1995.

On the sample C_1 - C_5 and CO_2 are quantified. The $\delta^{13}C$ value is measured on methane, ethane, propane, the butanes and CO_2 . In addition the δD value is measured on methane.

The work is done in accordance with the "The Norwegian Industry Guide to Organic Geochemical Analyses", Third Edition 1993.

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APPROVED BY	Arne Råheim	1995-01-12	Arne Råheim

1 INTRODUCTION

One gas sample from well 6204/11-1, FMT 331664, 2787.0 m was received and analysed during December 1994 / January 1995.

On the sample C_1 - C_5 and CO_2 are quantified. The $\delta\ ^{13}C$ value is measured on methane, ethane, propane, the butanes and CO_2. In addition the δ D value is measured on methane.

2 ANALYTICAL PROCEDURE

Aliquots of 1 ml of the gas sample is sampled with a syringe for analysis on a Porapak Q column connected with flame ionisation (FID) and thermal conductivity (TCD) detectors. The samples are compared with two standard gas mixtures containing CO_2 and C_1 - C_5 hydrocarbons in different concentrations. The detection limit for the hydrocarbon gas components is 0.01 µl/ml and for CO_2 0.1 µl/ml.

For the isotope analysis gas is sampled with a syringe and then separated into the different gas components by a Carlo Erba 4200 gas chromatograph. The hydrocarbon gas components are oxidised in separate CuO-ovens in order to prevent cross contamination. The combustion products CO_2 and H_2O are frozen into collection vessels and separated.

The combustion water is reduced with zinc metal in a sealed quarts tube to prepare hydrogen for isotopic analysis.

The isotopic measurements are performed on a Finnigan MAT 251 and a Finnigan Delta mass spectrometer.

IFEs value on NBS 22 is 29.77 ± .06‰ PDB.

3 RESULTS

The volume composition of the gas sample is given in Table 1. The results have been normalised to 100%. The stable isotope results are given in Table 2.

The uncertainty on the $\delta^{13}C$ value is estimated to be ± 0.3‰ PDB and includes all the different analytical steps. The uncertainty in the δD value is likewise estimated to be ± 5‰.

The $\delta^{13}C$ values of methane, ethane and propane are plotted in James maturity diagram (James, 1983), Figure 1. The molecular composition related to carbon isotope variations in methane are plotted in Figure 2 (Schoell, 1983), the carbon and hydrogen variations in methane in Figure 3 (Schoell, 1983) and carbon isotope variations in ethane related to carbon isotope variations in methane in Figure 4 (Schoell, 1983).

Table 1 Volume composition of a gas sample from well 6204/11-1.

Sample	IFE no	C_1 %	C_2 %	C_3 %	iC_4 %	nC_4 %	iC_5 %	nC_5 %	CO_2 %	ΣC_1-C_5	Wet-ness	iC_4/ nC_4/
FMT 331664, 2787.0m	14772	96.2	2.5	0.8	0.14	0.22	0.06	0.04	0.1	99.9	0.04	0.65

Table 2 Isotopic composition of a gas sample from well 6204/11-1.

Sample	IFE no	C_1 $\delta^{13}C$ ‰ PDB	C_1 δD ‰ SMOW	C_2 $\delta^{13}C$ ‰ PDB	C_3 $\delta^{13}C$ ‰ PDB	iC_4 $\delta^{13}C$ ‰ PDB	nC_4 $\delta^{13}C$ ‰ PDB	CO_2 $\delta^{13}C$ ‰ PDB	CO_2 $\delta^{18}O$ ‰ PDB
FMT 331664, 2787.0m	14772	-36.5	-146	-31.5	-28.7	-24.5	-28.5	-19.0	-14.5

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