8. WIRELINE FORMATION TESTS

Summary of Results

Reservoir Pressure (at datum of 3490 m TVSS)	:	505 bar
Fluid Gradient	:	0.38 bar/10m
GDT (from logs)	:	3570 m TVSS

Two FMT runs were made over the interval 3415m - 3683.5m RKB (3392-3660m TVSS)

21 measurements were attempted resulting in 12 formation pressure points, 4 tight formation points, 1 attempt where no seal was obtained and 2 hydrocarbon samples. One of the pressure points, 3651.5m TVSS in the water leg, was not fully stabilised and only the sample of run 2 (3419.5m TVSS) had a good formation pressure measurement.

The formation pressures are plotted in Fig. 8.1. A single fluid gradient of 0.38 bar/10m is obtained with a datum pressure (at 3490m TVSS) of 505 bar.

Two segregated fluid samples were obtained. The first (No. 1) from 3564.5m RKB (3514m TVSS) and the second (No. 2) from 3442.5m RKB (3419.5m TVSS). Sample No. 1 contained gas, condensate and water, whilst Sample No. 2 contained gas and water only. The general properties of these 2 samples are given in Table 8.1.

Table 8.1

PROPERTIES OF FMT SAMPLE CHAMBER FLUIDS

SAMPLE NO. AND DEPTH	CONTENTS	GWR SM3/M3	WATER DENSITY KG/M3 AT 15 C	GAS GRAVITY	AVE MOL WT OF GAS
STO 18 3442.5 M	GAS AND WATER	3.2	1042.9	0.686	19.56
STO 21 3564.5 M	GAS, WATER AND COND.	4.4	1041.3	0.782	22.64

WIRELINE FORMATION TESTER RUN NO. 1

WELL 3/7-4

NO.	DEPTH (m bmsl)	CRYSTAL GAUGE (bar)	MUD GRADIENT (sg)	FORMATION GRADIENT (sg)	DRAWDOWN (sec)	REMARKS
1	2800	413.96	1.56	1.50	5	
2	2817	415.86	1.56	1.50	6	
3	2932	429.35	1.56	1.48	5	
4	3145.5					No seal
5	3145					No seal
6	3140					No seal
7	3234	502.58	1.56	1.57	3	
8	3235.1					Seg sample tool stuck

WIRELINE FORMATION TESTER RUN NO. 2

WELL 3/7-4

NO.	DEPTH (m bmsl)	CRYSTAL GAUGE (bar)	MUD GRADIENT (sg)	FORMATION GRADIENT (sg)	DRAWDOWN (sec)	REMARKS
1	3390	517.45	1.54			No seal
2	3417.5	502.37	1.54	1.49	5	
3	3426	502.63	1.54	1.48	5	
4	3440	502.95	1.54	1.48	5	
5	3464.5	504.24	1.54	1.48	5	
6	3478.5	504.56	1.54	1.47	5	
7	3504.5	505.70	1.54	1.46	5	
8	3510	505.94	1.54	1.46	5	
9	3530.5		1.54			Tight
10	3530		1.54			Tight
11	3539.5	507.28	1.54	1.45	6	
12	3544	507.12	1.54	1.45	5	
13	3566.5		1.54		6	Tight
14	3610.5		1.54		6	Tight
15	3634	528.43	1.54	1.47	5	
16	3644.5	529.68	1.53	1.47	5	
17	3658.5	532.75	1.53	1.47	5	
18	3649.5	534.72	1.53		5	Supercharged

Test Interval 3473 - 3537m, (Test 1a)

The above interval was perforated using a Baker model RD, hydraulic actuated firing head to fire the guns. The guns fired successfully with 393 bar surface pressure (7 minutes delay, whereby the THP was reduced to allow 35 bar drawdown on the formation prior to the guns firing). A total of 2.6m3 formation fluid was produced in 3.5 minutes and the well shut in for initial build up (352.8 bar). The well was beaned up gradually to 64/64" choke setting and the well produced on clean up. The clean up was interrupted due to a leak at the thermowell probe, downstream of the heater. The emergency shut down system was activated and the well closed in efficiently. Following a 1 hour repair, the test sequence continued and the well cleaned up and stabilised on a 48/64" choke. Three sets of separator PVT samples were taken during this stabilised flow period. The well was then shut in for build up. At this stage, the downhole PCT showed no indication of closing, and failed to operate throughout the remainder of the test.

Following the build up period, the well was opened up and beaned up to 48/64" choke setting for a main flow period. During this period, three further separator PVT sample sets were recovered. The main stabilised flow period was followed by the main build up, which essentially concluded the test of the lower interval.

The test deviated from the original programme as far as a multi rate test sequence was not carried out. This was due to the volume and nature of liquids being produced which negated the requirement for a "gas test".

Summary of Results, Test 1a:

	Duration (hours)	FTHP (bar)	Oil (m^3/d)	Gas (Mm^3/d)	GOR (Sm^3/Sm^3)
Stabilised flow (clean up)	12.6	215.7	629	749.7	1193
Build up (after cleanup)	8.5	352.8			
Main flow period	7.8	215.3	621	751.4	1210
Main build up	8.2	350.2			

Preliminary well interpretation results:

Permeability (md)	19.0
Permeability-thickness(md-m)	419.0
Damage skin	1.1

Test Interval 3440 - 3537m, (Test 1b)

The well was additionally perforated over the interval 3440 - 3470m, using a wireline conveyed, mechanical firing head to fire the TCP's. The operation went smoothly and the interval was successfully perforated.

The well was opened up and beaned up to 48/64" choke setting and produced on clean up for 1 hour and then shut in for initial build up. Thereafter, the well was opened up and again beaned up to 48/64" choke setting. The well stabilised quickly and three sets of separator PVT samples were taken. The well was then closed in for build up for 9 1/2 hours. The main flow period then followed and a further three sets of separator PVT samples were recovered. The well was then closed in for the main build up. Following the build up period, wireline was rigged up and the gun release tool run in the hole and the TCP's successfully dropped from the test string. Initial attempts to run a PLT past the lubricator valve were unsuccessful, due to the valve being frozen (hydrates) in the closed position. The valve was eventually cycled open after injecting methanol at the Xmas tree and circulating warm mud in the annulus via the riser booster system. A total of 20 hours were spent removing the hydrates before the PLT could be run in the hole. Once downhole, it was observed that the spinner was malfunctioning and the pressure transducer was producing spurious peaks, leaving only the temperature recorder functioning. On attempting to retrieve the tool, it was found impossible to re enter through the tailpipe and subsequently the wireline was parted at the weak point and the tool lost downhole. Whilst pulling out with the wireline, the cable parted in the lubricator due to a birdsnest. Attempts to cycle the PCT to closed position were unsuccessful. The wire was held in the wireline BOP and master valve and the well killed by bullheading. Once the well was observed dead, the wireline was retrieved. The well was brought back on stream, by displacing the tubing contents with 6.4m3 diesel, and then produced on cleanup. Following the clean up period, a dummy run was made through the tailpipe assembly with sinker bars. Thereafter, three bottom

hole samplers were taken with the tool string centred at 3522m. A further dummy run was then made with a similar centraliser configuration to that of the PLT. This resulted in the tool string being lost in the hole. Again it was found that the cable had birdsnested and could not be retrieved from the lubricator. The well was subsequently killed and the test sequence terminated.

Summary of Results, (Test 1b)

	Duration (hours)	FTHP (bar)	Oil (m^3/d)	Gas (Mm^3/d)	GOR (Sm^3/Sm^3)
Initial build up		362.5			
Stabilised flow (clean up)	9.3	230.8	613	833.1	1358
Build up (after cleanup)	9.5	361.6			
Main flow	8.0	231.2	605	839.6	1388
Build up after main flow	8.7	362.3			
Bottom hole sampling	1.4	360.3	69	113.1	1640
Build up	5.4	357.9			

Test 1b contd.

Baroid A/S

DAILY MATERIAL USAGE

OPERATOR: A/S NORSKE SHELL

WELL: 3/7-4

Date	Barite	Bentonite	Caustic Soda	CON DET	DEXTRID	EZ MUD	EZ SPOT	KCl	KCl Brine	Lime	PAC L	PAC R	Soda Ash	Sod. Bicarb.	THERMA-THIN	XCD Polymer	Wallnut	COST Daily	Cummulative
Unit	MT	MT	25 kg	55 g	25 kg	20 kg	55 g	50 kg	cu m	20 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	NOK	NOK
	36" Hole	30" casing																	
18-Sep-89		10	4										4					16,684.48	16,684.48
19-Sep-89																		0.00	16,684.48
20-Sep-89	35	5	1										1					29,234.27	45,918.75
21-Sep-89	3	8	2										2					14,975.51	60,894.26
Totals	38	23	7	0	0	0	0	0	0	0	0	0	7	0	0	0	0	60,894.26	
																		Cost per meter	96	634.32
																		Cost per cubic meter	391	155.74

Baroid A/S

DAILY MATERIAL USAGE

OPERATOR: A/S NORSKE SHELL

WELL: 3/7-4

Date	Barite	Bentonite	Caustic Soda	DEXTRID CON DET	DEXTRID EZ MUD	EZ SPOT	KCl Brine	Lime	PAC L	PAC R	Soda Ash	Sod. Bicarb.	THERMA-THIN XCD Polymer	Wallnut	COST Daily	Cummulative
Unit	MT	MT	25 kg	55 g	25 kg	20 kg	55 g	50 kg	cu m	20 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	NOK	NOK
	26" Hole	20"	casing															
22-Sep-89		2	2										2				3,512.24	64,406.50
23-Sep-89	0	6	2	0	0	0	0	0	0	6	0	0	2	0	0	0	10,242.04	74,648.54
24-Sep-89		3	2										2				5,122.24	79,770.78
25-Sep-89		5	4							6			4				8,924.28	88,695.06
26-Sep-89		3	2										2				5,122.24	93,817.30
Totals	0	19	12	0	0	0	0	0	0	12	0	0	12	0	0	0	32,923.04	
															Cost per meter		435	75.69
															Cost per cubic meter		522	63.07

Baroid A/S

DAILY MATERIAL USAGE

OPERATOR: A/S NORSKE SHELL

WELL: 3/7-4

Date	Barite	Bentonite	Caustic Soda	CON DET	DEXTRID	EZ MUD	EZ SPOT	KCl	KCl Brine	Lime	PAC L	PAC R	Soda Ash	Sod. Bicarb.	THERMA-THIN	XCD Polymer	Wallnut	COST Daily	Cummulative
Unit	MT	MT	25 kg	55 g	25 kg	20 kg	55 g	50 kg	cu m	20 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	NOK	NOK
17 1/2" Hole 13 3/8" casing																			
27-Sep-89			3			2			90		12	16	3		3			73,409.65	167,226.95
28-Sep-89	2																	1,202.18	168,429.13
29-Sep-89						2					12	9						13,466.46	181,895.59
30-Sep-89	23														2			16,871.89	198,767.48
01-Oct-89	29														1			18,955.02	217,722.50
02-Oct-89	11											4						9,033.99	226,756.49
03-Oct-89	10					3		66	110		2	10	1		2			85,576.23	312,332.72
04-Oct-89	38		4	1		26		66			18	25	8		15			89,240.31	401,573.03
05-Oct-89			6			5		245			42	31	2		3			74,104.37	475,677.40
06-Oct-89			17			9		50			4	21	2		7			35,714.18	511,391.58
07-Oct-89	25		6			10		5	100		20	25	2		7			114,205.66	625,597.24
08-Oct-89	31		9			16		103			10	2	7		2		5	46,295.03	671,892.27
09-Oct-89	30		8			17			50		27	21	5		5			90,312.26	762,204.53
10-Oct-89	96		4			32		115			14	2	4		3			95,234.71	857,439.24
11-Oct-89	71		9					55			11	6	5		5			66,849.54	924,288.78
12-Oct-89	94		16			8					25	15	15		25		4	124,546.90	1,048,835.68
13-Oct-89	47		7					115	20		8	14	7		7			75,196.74	1,124,032.42
14-Oct-89	44		4			6		75			7	19	3					51,948.95	1,175,981.37
15-Oct-89	26		8			6		75	52		16	16	9		11			91,474.14	1,267,455.51
16-Oct-89	53		10			12						20	14		1			51,615.62	1,319,071.13
17-Oct-89	24		9			4		50	23		11	8	1		2			49,075.19	1,368,146.32
18-Oct-89	49														1			30,976.82	1,399,123.14

Baroid A/S

DAILY MATERIAL USAGE

OPERATOR: A/S NORSKE SHELL

WELL: 3/7-4

Date	Barite	Bentonite	Caustic Soda	DEXTRID CON DET	EZ MUD	EZ SPOT KCl	KCl Brine	Lime	PAC L	PAC R	Soda Ash	Sod. Bicarb.	THERMA-THIN XCD Polymer	Wallnut	COST Daily	Cummulative
Unit	MT	MT	25 kg	55 g	25 kg	20 kg	55 g	50 kg	cu m	20 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	NOK	NOK
19-Oct-89															0.00	1,399,123.14
20-Oct-89	17														10,218.53	1,409,341.67
21-Oct-89															0.00	1,409,341.67
Totals	720	0	120	1	0	158	0	1020	445	0	239	264	88	0	0	102	9	1,315,524.37	
															Cost per meter			1,488	884.09
															Cost per cubic meter			1,225	1,073.90

Baroid A/S

DAILY MATERIAL USAGE

OPERATOR: A/S NORSKE SHELL

WELL: 3/7-4

Date	Barite	Bentonite	Caustic Soda	DEXTRID CON DET	EZ MUD	EZ SPOT KCl	KCl Brine	Lime	PAC L	PAC R	Soda Ash	Sod. Bicarb.	THERMA-THIN XCD Polymer	Wallnut	COST Daily	Cummulative
Unit	MT	MT	25 kg	55 g	25 kg	20 kg	55 g 50 kg	cu m	20 kg	25 kg	25 kg	25 kg	25 kg	25 kg	NOK	NOK
	12 1/4" Hole 9 5/8" casing															
22-Oct-89	54		5				40		19	13	5		4		81,190.70	1,490,532.37
23-Oct-89												9			374.85	1,490,907.22
24-Oct-89	9		8		21					8			4	8	25,960.13	1,516,867.35
25-Oct-89			16		20	114			11	8	3		2		34,466.23	1,551,333.58
26-Oct-89	19		12		16	174			11	8	3		2		49,526.02	1,600,859.60
27-Oct-89	17				12	42									18,621.89	1,619,481.49
28-Oct-89			4		6	58			6	10			2		20,797.10	1,640,278.59
29-Oct-89	5		2		4	50									9,360.87	1,649,639.46
30-Oct-89	16		6			143	50						9		65,403.53	1,715,042.99
31-Oct-89	11		8												7,465.99	1,722,508.98
01-Nov-89			2		5										2,090.90	1,724,599.88
02-Nov-89	16		10						12	2	2				19,240.68	1,743,840.56
03-Nov-89	56		11				60		8	8			3		82,890.92	1,826,731.48
04-Nov-89	9		7												6,157.06	1,832,888.54
05-Nov-89	29		10						5	5		27	1		39,109.07	1,871,997.61
06-Nov-89	30		2						5	5		27	1		38,856.16	1,910,853.77
07-Nov-89	32		2						6	6			1		28,237.79	1,939,091.56
08-Nov-89			4									69			33,729.85	1,972,821.41
09-Nov-89	9		6			25			5	5			1		15,948.72	1,988,770.13
10-Nov-89	16		5												10,151.19	1,998,921.32
11-Nov-89	44		29			171			35	12	2		3		78,519.98	2,077,441.30
12-Nov-89	50		3			57			12	4		18	1		55,563.46	2,133,004.76
13-Nov-89	58														34,863.22	2,167,867.98
14-Nov-89	7		6									5			7,261.38	2,175,129.36
15-Nov-89	13		5									24			19,931.52	2,195,060.88

Baroid A/S

DAILY MATERIAL USAGE

OPERATOR: A/S NORSKE SHELL

WELL: 3/7-4

Date	Barite	Bentonite	Caustic Soda	CON DET	DEXTRID	EZ MUD	EZ SPOT	KCl	KCl Brine	Lime	PAC L	PAC R	Soda Ash	Sod. Bicarb.	THERMA-THIN	XCD Polymer	Wallnut	COST Daily	Cummulative
Unit	MT	MT	25 kg	55 g	25 kg	20 kg	55 g	50 kg	cu m	20 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	NOK	NOK
16-Nov-89	7		8					30			8	3			51	1		40,644.69	2,235,705.57
17-Nov-89			3					46			12	4				1		15,800.46	2,251,506.03
18-Nov-89	37		2			2		28			7	2			20	1		42,429.10	2,293,935.13
19-Nov-89	39		8					28			9	3			20	1		45,337.32	2,339,272.45
20-Nov-89							8								35			35,857.15	2,375,129.60
21-Nov-89	26		2					16			11	4			10	1		32,759.05	2,407,888.65
22-Nov-89	25		3					49			11	3			10	2		36,245.02	2,444,133.67
23-Nov-89																		0.00	2,444,133.67
24-Nov-89	10																	6,010.90	2,450,144.57
25-Nov-89	23																	13,825.07	2,463,969.64
26-Nov-89	4																	2,404.36	2,466,374.00
27-Nov-89																		0.00	2,466,374.00
28-Nov-89	2																	1,202.18	2,467,576.18
29-Nov-89	3																	1,803.27	2,469,379.45
30-Nov-89	22																	13,223.98	2,482,603.43
01-Dec-89	4													14				8,391.46	2,490,994.89
02-Dec-89	6	2																6,826.54	2,497,821.43
Totals	708	2	189	0	0	86	8	1031	150	0	193	113	15	23	316	41	8	1,088,479.76	
Cost per meter																		1,275	853.71
Cost per cubic meter																		1,122	970.12

Baroid A/S

DAILY MATERIAL USAGE

OPERATOR: A/S NORSKE SHELL

WELL: 3/7-4

Date	Barite	Bentonite	Caustic Soda	CON DET	DEXTRID	EZ MUD	EZ SPOT	KCl	KCl Brine	Lime	PAC L	PAC R	Soda Ash	Sod. Bicarb.	THERMA-THIN	XCD Polymer	Wallnut	COST Daily	COST Cummulative
Unit	MT	MT	25 kg	55 g	25 kg	20 kg	55 g	50 kg	cu m	20 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	NOK	NOK
8 3/8" Hole 7" liner																			
03-Dec-89	3		2		40							3				2		15,280.09	2,513,101.52
04-Dec-89	14																	8,415.26	2,521,516.78
05-Dec-89	49				40						3	3	3			3		46,174.75	2,567,691.53
06-Dec-89	8																	4,808.72	2,572,500.25
07-Dec-89	21				40						11	5	3			10		46,063.10	2,618,563.35
08-Dec-89	4												16			3		7,604.51	2,626,167.86
09-Dec-89	23				6						6					4		24,811.71	2,650,979.57
10-Dec-89	11				10						9							14,161.49	2,665,141.06
11-Dec-89	3																	1,803.27	2,666,944.33
12-Dec-89	4																	2,404.36	2,669,348.69
13-Dec-89	1													7				892.64	2,670,241.33
14-Dec-89	6												21			3		9,003.54	2,679,244.87
15-Dec-89													4					157.48	2,679,402.35
16-Dec-89	2				12						6					4		13,448.82	2,692,851.17
17-Dec-89	5												16					3,635.37	2,696,486.54
18-Dec-89																		0.00	2,696,486.54
19-Dec-89																		0.00	2,696,486.54
20-Dec-89																		0.00	2,696,486.54
21-Dec-89	8				12						6		14		12			17,304.70	2,713,791.24
Totals	162	0	2	0	160	0	0	0	0	0	41	11	77	7	12	29	0	215,969.81	
															Cost per meter			120	1,799.75
															Cost per cubic meter			215	1,004.51

Baroid A/S

DAILY MATERIAL USAGE

OPERATOR: A/S NORSKE SHELL

WELL: 3/7-4

Date	Barite	Bentonite	Caustic Soda	CON DET	DEXTRID	EZ MUD	EZ SPOT	KCl	KCl Brine	Lime	PAC L	PAC R	Soda Ash	Sod. Bicarb.	THERMA-THIN	XCD Polymer	Wallnut	COST Daily	Cummulative
Unit	MT	MT	25 kg	55 g	25 kg	20 kg	55 g	50 kg	cu m	20 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	25 kg	NOK	NOK
Testing and abandonment																			
25-Dec-89																		0.00	2,713,791.24
26-Dec-89																		0.00	2,713,791.24
27-Dec-89																		0.00	2,713,791.24
28-Dec-89																		0.00	2,713,791.24
29-Dec-89																		0.00	2,713,791.24
30-Dec-89																		0.00	2,713,791.24
31-Dec-89																1		1,523.41	2,715,314.65
01-Jan-90	2																	1,202.18	2,716,516.83
02-Jan-90																		0.00	2,716,516.83
03-Jan-90																		0.00	2,716,516.83
04-Jan-89																		0.00	2,716,516.83
05-Jan-89	4															1		3,927.77	2,720,444.60
06-Jan-89																		0.00	2,720,444.60
07-Jan-89	12															4		13,306.72	2,733,751.32
08-Jan-89	3														11	1		8,635.83	2,742,387.15
09-Jan-90																		0.00	2,742,387.15
10-Jan-90	16															1		11,140.85	2,753,528.00
11-Jan-90																		0.00	2,753,528.00
Totals	37	0	0	0	0	0	0	0	0	0	0	0	0	0	11	8	0	39,736.76	
															Cost per meter				
															Cost per cubic meter			18	2,207.60

Baroid A/S

OPERATOR: A/S NORSKE SHELL
WELL: 3/7-4

TOTAL MATERIALS USED

PRODUCT	UNIT	QUANTITY
Barite	MT	1665
Bentonite	MT	44
Caustic Soda	25 kg	330
CON DET	55 gal	1
DEXTRID	25 kg	160
EZ MUD	20 kg	244
EZ SPOT	55 gal	8
KCl	50 kg	2051
KCl Brine	cu mtr	595
Lime	20 kg	12
PAC L	25 kg	473
PAC R	25 kg	388
Soda Ash	25 kg	199
Sod. Bicarb.	25 kg	30
THERMA-THIN	25 kg	339
XCD Polymer	25 kg	180
Wallnut	25 kg	17

Baroid A/S

MUD PROPERTY RECAP - Water Based

OPERATOR: AS NORSKE SHELL WELL: 3/7-4

Date	Depth m	Mud Wt. SG	Mud Vis. sec	Filtrate API ml	Filtrate HPHT ml	Ck 1/32"	pH	Rheology PV cp	Rheology YP lb/100 sq ft	Gels 10 Sec	Gels 10 Min	Cl g/l	Ca mg/l	Pf	Mf	Pm	Oil %	Water %	Solids %	MBT ppb	KCl ppb	Sand %
19-Sep-89								Gel Mud														
20-Sep-89	187																					
21-Sep-89	187		150																			
22-Sep-89	349	1.08	100																			
23-Sep-89	622	1.06	100																			
24-Sep-89	622	1.06	100																			
25-Sep-89	622	1.06	100																			
26-Sep-89	622	1.06	100																			
27-Sep-89	622							Mixing New Mud														
28-Sep-89	622							Mixing New Mud														
29-Sep-89	622							Mixing New Mud														
30-Sep-89	622							Mixing New Mud														
01-Oct-89	622	1.32	50	6.7		1	9.1	19	18	3	3	63	280	0.2	0.65		0	88	12	5	40	Tr
02-Oct-89	622	1.32	50	6.7		1	9.1	19	18	3	3	63	280	0.2	0.45		0	88	12	5	40	Tr
03-Oct-89	622	1.32	55	7		2	9	18	17	3	3	63	200	0.2	0.4		0	88	12	5	38	Tr
	755	1.32	49	7		2	8.8	19	16	3	3	200	0.5	0.3	65	0.15	0	88	12	7.5	40	Tr
04-Oct-89	974	1.36	65	12		2	8.6	17	14	9	20	62	320	0.05	0.2		0	84	16	17.5	34	0.5
	1001	1.34	54	9.2		2	8.6	18	19	9	38	63	300	0.05	0.2		0	84	16	17.5	42.5	0.5
05-Oct-89	1131	1.35	58	9.2		2	8.5	23	18	9	33	66	280	0.00	0.20		0	85	15	20.0	44.0	0.50
	1182	1.33	56	9.0		2	8.7	21	18	9	37	65	280	0.10	0.30		0	86	14	20.0	45.0	Tr
06-Oct-89	1377	1.33	56	8.9		1	8.5	18	20	7	37	69	200	0.10	0.20		0	85	15	25.0	44.0	0.50
	1377	1.33	53	9.0		1	8.5	21	19	9	41	66	200	0.00	0.40		0	85	15	25.0	38.0	0.25
07-Oct-89	1448	1.33	56	8.7		1	8.6	19	19	9	40	68	200	0.10	0.25		0	86	14	25.0	45.0	0.25
	1536	1.32	52	9.0		1	8.5	19	19	7	38	63	300	0.10	0.30		0	85	15	17.5	39.0	0.20
08-Oct-89	1649	1.33	58	9.8		1	8.5	21	19	9	43	64	280	0.15	0.60		0	86	14	25.0	44.0	Tr
	1649	1.33	65	9.5		1	8.5	18	17	8	45	65	250	0.10	0.70		0	86	14	25.0	40.0	0.20
09-Oct-89	1649	1.32		9.8		1	8.6	29	19	8	44	65	200	0.15	0.60		0	85	15	26.0	45.0	Tr

Baroid A/S

MUD PROPERTY RECAP – Water Based

OPERATOR: AS NORSKE SHELL WELL: 3/7-3

Date	Depth m	Mud Wt. SG	Mud Vis. sec	Filtrate API ml	Filtrate HPHT ml	Ck 1/32"	pH	Rheology PV cp	Rheology YP lb/100 sq ft	Gels 10 Sec	Gels 10 Min	Cl g/l	Ca mg/l	Pf	Mf	Pm	Oil %	Water %	Solids %	MBT ppb	KCl ppb	Sand %
09-Oct-89	1776	1.34	62	8.5		1	8.5	17	17	6	40	64	200	0.10	0.70		0	85	15	24.0	39.0	0.30
10-Oct-89	1853	1.42	62	8.8		1	8.5	22	18	9	43	63	280	0.10	0.65		0	82	18	26.0	42.0	Tr
	1942	1.50	67	9.6		2	8.5	22	22	17	80	65	250	0.10	0.70		0	78	22	38.0	38.0	0.25
11-Oct-89	1942	1.49	56	9.8		2	8.5	27	19	12	74	64	280	0.10	0.75		0	82	18	30.0	42.0	0.25
	2031	1.50	60	9.7		2	8.5	20	15	9	54	68	250	0.10	0.80		0	83	17	28.0	40.0	0.25
12-Oct-89	2110	1.50	48	8.9		1	8.5	18	16	8	35	61	200	0.15	0.75		0	82	18	26.0	40.0	0.25
	2110	1.50	60	9.8		1	8.5	18	19	9	55	65	200	0.15	0.85		0	82	18	28.0	39.0	0.25
13-Oct-89	2110	1.50	48	9.8		1	8.5	17	15	7	27	62	300	0.10	0.70		0	82	18	82.0	32.0	0.35
	2110	1.50	55	9.0		1	8.8	17	16	8	40	61	250	0.20	0.80		0	84	16	28.0	37.0	0.50
14-Oct-89	2110	1.50	56	9.2		1	8.1	17	16	7	40	62	420	0.10	0.50		0	82	18	26.0	39.0	0.30
	2110	1.50	56	9.5		1	8.5	21	18	9	50	66	380	0.10	0.80		0	80	20	30.0	35.0	0.25
15-Oct-89	2110	1.50	56	9.5		1	8.7	21	17	8	47	66	340	0.10	0.80		0	80	20	30.0	38.0	0.25
	2110	1.50	55	8.0		1	8.5	25	20	8	40	67	400	0.10	0.80		0	80	20	29.0	40.0	0.25
16-Oct-89	2110	1.50	53	8.9		1	8.5	21	17	8	45	67	400	0.10	0.80		0	80	20	27.5	40.0	0.25
	2110	1.50	60	7.5		1	8.4	23	17	6	30	68	400	0.15	0.90		0	81	19	30.0	37.0	0.30
17-Oct-89	2110	1.50	62	6.5		1	8.9	27	20	5	24	69	250	0.20	1.10		0	81	19	24.0	41.0	0.25
18-Oct-89	2110	1.50	56	6.7		1	8.6	27	20	5	25	69	300	0.10	0.90	1.00	0	81	19	22.0	41.0	Tr
19-Oct-89	2110	1.50	56	6.7		1	8.6	27	20	5	25	69	300	0.10	0.90		0	81	19	22.0	41.0	Tr
20-Oct-89	2110	1.50	51	6.8		1	10.1	19	15	6	18	67	440	0.10	0.70		0	80	20	18.0	40.0	Tr
21-Oct-89	2110	1.50	51	6.8		1	10.1	19	15	6	18	67	440	0.10	0.70		0	80	20	18.0	40.0	Tr
22-Oct-89	2110	1.50	51	6.8		1	10.1	19	15	6	18	67	440	0.10	0.70		0	80	20	18.0	40.0	Tr
23-Oct-89	2110	1.50	57	8.4		1	11.4	20	25	5	17	69	480	0.10	0.90		0	80	20	18.0	40.0	Tr
24-Oct-89	2119	1.50	49	7.6		1	10.8	24	13	5	20	67	380	0.10	0.90		0	80	20	20.0	35.0	Tr
	2173	1.50	53	6.7		1	10.4	28	17	5	25	68	320	0.10	0.80		0	81	19	20.0	35.0	Tr
	2225	1.50	50	5.9		1	10.5	27	16	6	30	68	320	0.10	0.80		0	81	19	20.0	37.0	0.00
25-Oct-89	2303	1.51	52	7.3		1	10.5	26	17	12	35	69	320	0.10	0.80		0	80	20	25.0	35.0	0.00
	2355	1.50	53	6.8		1	11.0	28	17	6	35	69	320	0.10	0.40		0	80	20	20.0	33.0	0.00

Baroid A/S

MUD PROPERTY RECAP - Water Based

OPERATOR: AS NORSKE SHELL WELL: 3/7-3

Date	Depth m	Mud Wt. SG	Mud Vis. sec	Filtrate API ml	Filtrate HPHT ml	Ck 1/32"	pH	Rheology PV cp	Rheology YP lb/100 sq ft	Gels 10 Sec	Gels 10 Min	Cl g/l	Ca mg/l	Pf	Mf	Pm	Oil %	Water %	Solids %	MBT ppb	KCl ppb	Sand %
25-Oct-89	2440	1.50	54	6.6		1	11.0	28	17	6	30	67	240	0.10	0.40		0	80	20	20.0	37.0	0.00
26-Oct-89	2517	1.50	55	5.5		1	10.6	23	18	7	35	65	240	0.05	0.80		0	80	20	25.0	34.0	0.00
	2595	1.50	53	5.5		1	11.0	24	17	7	34	67	240	0.10	0.60		0	80	20	20.0	37.0	0.00
	2487	1.50	54	5.8		1	10.6	23	17	8	38	65	280	0.05	0.90		0	80	20	25.0	36.0	0.00
27-Oct-89	2608	1.50	53	6.2		1	10.7	25	15	7	38	65	240	0.15	0.80		0	80	20	22.5	37.0	0.00
	2696	1.50	49	6.6		1	10.9	25	14	6	36	63	240	0.20	0.80		0	80	20	22.5	35.0	0.25
	2704	1.50	50	6.6		1	10.9	25	14	6	36	63	240	0.20	0.80		0	80	20	22.5	35.0	0.25
28-Oct-89	2735	1.51	50	5.5		1	10.9	21	17	7	25	61	240	0.20	0.70		0	81	19	22.5	34.0	0.25
29-Oct-89		1.50	50	6.4		1	10.5	21	16	7	35	64	240	0.10	0.50		0	81	19	22.5	35.0	Tr
	2777	1.50	49	6.6		1	10.9	22	15	7	33	62	360	0.15	0.60		0	81	19	22.5	34.0	Tr
30-Oct-89	2778	1.51	46	7.0		1	10.6	19	15	6	35	63	360	0.20	0.60		0	81	19	22.0	34.0	Tr
	2816	1.52	53	6.4		1	10.7	22	20	7	35	65	360	0.10	0.55		0	80	20	22.0	36.0	Tr
31-Oct-89	2854	1.53	54	7.0		1	10.6	21	21	7	39	67	360	0.20	0.60		0	80	20	22.0	38.0	Tr
	2889	1.52	53	7.4		1	10.6	23	24	9	45	67	360	0.15	0.50		0	80	20	20.0	38.0	Tr
01-Nov-89	2912	1.51	52	7.4		1	10.9	23	22	9	45	67	360	0.20	0.70		0	80	20	20.0	38.0	Tr
02-Nov-89	2960	1.50	46	7.6		1	11.0	22	21	9	49	64	200	0.15	0.60		0	79	21	20.0	36.0	Tr
	3005	1.50	47	7.5			10.6	26	24	15	75	63	200	0.20	0.50		0	78	22		35.0	Tr
03-Nov-89	3042	1.51	48	7.8		2	9.6	24	34	15	90	62	120	0.20	0.60		0	79	21	22.5	34.0	Tr
	3068	1.50	45	7.4		2	10.5	21	20	7	39	61	120	0.15	0.60	1.50	0	80	20	20.0	30.0	Tr
04-Nov-89	3106	1.51	41	7.0		2	10.8	20	20	6	39	67	60	0.05	0.60		0	82	18	20.0	38.0	Tr
	3106	1.50	44	7.0		1	11.0	24	22	8	43	62		0.20	0.60	1.10	0	82	18	22.0	31.0	Tr
05-Nov-89	3133	1.51	43	7.5		1	10.0	21	23	6	39	63	60	0.20	0.60	1.00	0	81	19	20.0	32.0	0.00
	3176	1.50	44	7.0		1	11.0	21	22	7	39	63	40	0.30	0.85		0	81	19	18.0	31.0	0.00
06-Nov-89		1.50	43	7.0		1	10.3	19	27	9	44	63	80	0.20	0.70		0	80	20	20.0	32.0	Tr
	3240	1.50	41	7.2		1	10.1	20	17	7	39	61	40	0.20	0.60		0	81	19	17.5	30.0	Tr
07-Nov-89	3256	1.52	40	6.8		1	9.6	19	14	5	25	58	40	0.10	0.50		0	81	19	17.0	30.0	Tr
	3256	1.52	40	6.8		1	9.6	19	14	5	25	58	40	0.10	0.50		0	81	19	17.0	30.0	Tr

Baroid A/S

MUD PROPERTY RECAP – Water Bas

OPERATOR: AS NORSKE SHELL

WELL: 3/7-3

Date	Depth m	Mud Wt. SG	Mud Vis. sec	Filtrate API ml	Filtrate HPHT ml	Ck 1/32"	pH	Rheology PV cp	Rheology YP lb/100 sq ft	Gels 10 Sec	Gels 10 Min	Cl g/l	Ca mg/l	Pf	Water %	Solids %	MBT ppb	KCl ppb	Sand %
08-Nov-89		1.50	43	7.4		1	10.4	19	22	9	45	58	50	0.20	80	20	20.0	28.0	Tr
	3297	1.51	42	7.6		1	9.6	19	24	11	35	58	40	0.20	81	19	20.0	28.0	Tr
09-Nov-89	3304	1.53	45	7.2		1	10.0	21	21	6	33	58	40	0.20	80	20	20.0	28.0	Tr
10-Nov-89	3316	1.51	0.38	7.6		1	9.5	18	19	8	35	58	40	0.10	80	20	20.0	27.0	0.00
	3330	1.50	39	7.8		1	10.4	18	23	10	40	58	60	0.20	80	20	20.0	27.0	1.00
11-Nov-89		1.51	52	7.9		1	10.4	23	45	30	80	55	40	0.20	80	20	20.0	25.0	1.00
	3357	1.51	41	7.7		1	10.4	18	25	20	45	50	40	0.20	80	20	20.0	25.0	1.00
	3380	1.51	43	7.2		1	10.4	20	24	9	38	55	40	0.20	80	20	20.0	25.0	1.00
12-Nov-89	3406	1.50	42	7.6		1	10.0	18	22	9	29	41	40	0.20	80	20	20.0	25.0	1.00
	3416	1.50	40	6.7		1	9.8	17	16	7	23	51	40	0.20	80	20	20.0	23.0	1.00
	3416	1.55	38	6.6		1	9.8	20	15	7	17	51	40	0.20	80	20	20.0	23.0	1.00
13-Nov-89	3416	1.55	38	6.6		1	9.8	20	15	7	17	51	40	0.20	80	20	20.0	23.0	1.00
	3416	1.55	40	6.1		1	9.0	21	15	6	23	50	40	0.20	80	20	15.0	23.0	1.00
14-Nov-89	3434	1.55	40	5.4		1	9.9	21	20	8	35	50	40	0.20	80	20	15.0	23.0	1.00
15-Nov-89	3454	1.55	39	6.1		1	9.4	20	19	7	28	50	40	0.50	80	20	15.0	23.0	1.00
	3457	1.55	38	6.2		1	9.3	20	17	7	24	50	40	0.50	80	20	15.0	23.0	1.00
	3484	1.55	38	6.1		1	9.9	20	17	7	23	50	40	0.50	80	20	15.0	23.0	1.00
16-Nov-89	3493	1.55	40	6.0		1	9.8	21	26	13	37	51	40	0.20	80	20	20.0	21.0	1.00
	3501	1.55	40	6.0		1	10.2	22	29	15	35	50	40	0.20	79	21	20.0	21.0	1.00
	3506	1.55	40	6.0		1	10.2	21	25	13	30	51	40	0.20	78	22	17.5	21.0	1.00
17-Nov-89	3506	1.55	40	6.0		1	10.2	21	25	13	30	51	40	0.20	76	24	17.5	21.0	1.00
18-Nov-89	3511	1.55	43	5.4		1	10.1	25	21	8	28	510	40	0.20	79	21	15.0	21.0	1.00
	3512	1.55	42	5.3		1	10.1	24	18	7	24	510	40	0.30	78	22	15.0	21.0	1.00
	3522	1.56	40	5.4		1	10.1	20	15	7	18	510	40	0.30	79	21	10.0	21.0	1.00
19-Nov-89	3539	1.55	39	5.0		1	9.3	20	15	6	17	500	40	0.65	80	20	10.0	21.0	1.00
	3559	1.55	39	5.1		1	9.1	21	19	7	22	500	40	0.30	79	21	15.0	21.0	1.00
	3571	1.55	40	5.0		1	9.6	20	17	7	18	500	40	0.30	79	21	15.0	21.0	1.00

Baroid A/S

MUD PROPERTY RECAP – Water Based

OPERATOR: AS NORSKE SHELL WELL: 3/7-3

Date	Depth m	Mud Wt. SG	Mud Vis. sec	Filtrate API ml	Filtrate HPHT ml	Ck 1/32"	pH	Rheology PV cp	Rheology YP lb/100 sq ft	Gels 10 Sec	Gels 10 Min	Cl g/l	Ca mg/l	Pf	Mf	Pm	Oil %	Water %	Solids %	MBT ppb	KCl ppb	Sand %
20-Nov-89	3594	1.55	39	4.6		1	9.3	22	20	7	24	500	30	0.40	1.10		0	79	21	10.0	21.0	1.00
	3603	1.55	40	4.7		1	9.4	27	21	8	25	480	30	0.30	0.90		0	78	22	12.5	20.0	1.00
	3603	1.55	40	4.7		1	9.4	27	21	9	25	480	30	0.30	0.90		0	78	22	12.5	20.0	1.00
21-Nov-89	3603	1.55	44	4.8		1	9.4	25	16	7	20	480	40	0.20	0.90		0	78	22	12.5	20.0	1.00
22-Nov-89	3603	1.58	44	4.2		1	9.4	28	18	7	16	420	40	0.50	1.60		0	79	21	10.0	18.0	1.00
	3603	1.58	44	4.2		1	9.4	28	18	7	16	420	40	0.50	1.60		0	79	21	10.0	18.0	1.00
23-Nov-89	3603	1.55	42	4.2		1	9.4	22	15	6	16	410	30	0.50	1.20		0	79	21	10.0	18.0	1.00
	3603	1.55	42	4.2		1	9.4	22	15	6	16	410	30	0.50	1.20		0	79	21	10.0	18.0	1.00
24-Nov-89	3603	1.55	41	3.4		1	9.4	23	14	6	17	410	40	0.50	1.40		0	79	21	10.0	18.0	9.75
25-Nov-89	3603	1.54	47	4.4		1	9.8	22	13	6	15	410	80	0.60	1.60		0	79	21	10.0	18.0	0.75
	3603	1.55	48	4.2		1	9.9	23	15	6	17	410	80	0.60	1.50		0	79	21	10.0	18.0	0.75
26-Nov-89	3603	1.55	47	3.6		1	9.6	22	17	6	16	420	80	0.70	1.90		0	79	21	10.0	18.0	0.50
	3603	1.55	48	3.8		1	9.6	22	17	6	17	420	80	0.70	1.70		0	79	21	10.0	18.0	0.50
27-Nov-89	3603	1.55	49	4.2		1	10.0	24	17	6	14	410	80	0.50	1.60		0	79	21	10.0	18.0	0.05
28-Nov-89	3473	1.55	50	4.0		1	10.1	24	18	6	16	420	80	0.60	1.60		0	79	21	10.0	18.0	0.05
29-Nov-89	3473	1.56	51	3.8		1	10.3	17	15	6	13	400	80	0.55	1.80		0	79	21	10.0	18.0	0.05
30-Nov-89	3473	1.55	46	4.4		1	10.4	19	16	6	14	400	80	0.60	1.80		0	79	21	10.0	18.0	0.05
	3473	1.57	45	4.8		1	10.5	19	16	6	17	390	120	0.65	1.70		0	79	21	10.0	17.0	0.05
01-Dec-89	3473	1.58	45	6.0		1	12.1	20	18	3	8	350	120	0.80	1.80		0	79	21	10.0	15.0	0.50
02-Dec-89	3385	1.58	48	6.0		1	12.3	21	10	3	9	350	120	0.80	1.80		0	79	21	10.0		0.50
03-Dec-89	3383	1.56	46	5.4		1	12.4	18	10	3	8	370	240	0.60	1.40		0	80	20	10.0		
04-Dec-89	3405	1.56	48	6.0		1	12.6	21	17	3	13	370	400	0.80	1.40		Tr	81	19	10.0		0.50
05-Dec-89	3423	1.55	46	6.0		1	12.5	18	11	3	7	370	400	0.80	1.60		Tr	81	19	10.0		Tr
06-Dec-89	3436	1.53	42	6.4	45	1	12.5	17	8	3	8	350	400	0.80	1.60		Tr	81	19	10.0		Tr
07-Dec-89	3464	1.53	42	4.6	44	1	11.5	16	10	3	7	280	680	0.40	0.90	3.30	Tr	81	19	6.0	7.0	0.25
08-Dec-89	3492	15.40	40	4.8	26	1	11.5	16	11	3	7	280	600	0.40	1.00		Tr	78	22	6.0		0.25
09-Dec-89	3504	1.53	50	4.6	20	1	11.6	23	18	3	10	280	480	0.40	1.00		Tr	81	19	7.0		0.25

Baroid A/S

MUD PROPERTY RECAP – Water Based

OPERATOR: AS NORSKE SHELL WELL: 3/7-3

Date	Depth m	Mud Wt. SG	Mud Vis. sec	Filtrate API ml	Filtrate HPHT ml	Ck 1/32"	pH	Rheology PV cp	Rheology YP lb/100 sq ft	Gels 10 Sec	Gels 10 Min	Cl g/l	Ca mg/l	Pf	Mf	Pm	Oil %	Water %	Solids %	MBT ppb	KCl ppb	Sand %
10-Dec-89	3514	1.53	49	4.2	20	1	11.5	21	183	3	9	270	480	0.40	1.00		Tr	79	21	7.0		0.25
11-Dec-89	3526	1.53	44	4.0	18	1	11.3	22	16	3	8	260	480	0.30	0.90		Tr	79	21	7.0		0.25
12-Dec-89	3560	1.53	44	3.2	21	1	11.2	20	16	5	8	260	560	0.20	1.10		0	79	21	7.0		0.25
	3560	1.53	42	3.6	19	1	11.0	19	15	4	7	260	600	0.15	0.80		0	79	21	7.0		0.25
13-Dec-89	3574	1.53	420	3.4	19	1	10.7	19	15	4	7	260	720	0.05	0.60		Tr	79	21	7.0		0.25
14-Dec-89	3601	1.53	42	3.6	20	1	11.0	22	18	4	12	270	320	0.20	0.90		0	79	21	7.0		0.25
15-Dec-89	3620	1.54	42	3.8	22	1	10.9	22	18	5	12	300	240	0.20	0.80		0	81	19	7.5		0.25
16-Dec-89	3675	1.53	40	3.6	17	1	10.7	22	20	7	14	300	280	0.15	0.75		0	81	19	7.5		0.25
	3700	1.53	43	3.4	16	1	10.5	21	19	7	13	300	260	0.15	0.70		0	81	19	7.5		0.25
17-Dec-89	3723	1.53	45	3.8	18	1	10.3	18	21	12	29	42	600	0.10	0.50		0	81	19	7.5		0.25
	3723	1.54	48	3.8	18	1	10.3	19	21	11	27	39	640	0.10	0.50		0	81	19	7.5		0.25
18-Dec-89	3723	1.54	49	3.8	18	1	10.1	19	21	11	27	37	640	0.05	0.50		0	81	19	7.5		0.25
19-Dec-89	3723	1.53	50	4.2	19	1	10.2	22	22	15	29	36	720	0.05	0.45		0	81	19	7.5		0.25
20-Dec-89	3723	1.53	53	4.1	20	1	10.1	21	22	14	29	36	740	0.05	0.45		0	80	20	7.5		0.25
21-Dec-89	3723	1.53	48	3.8	15	1	10.3	24	17	7	18	35	320	0.10	0.50		0	81	19	7.5		0.25
	3723	1.53	53	3.8	15	1	10.2	23	17	7	16	35	300	0.10	0.55		0	81	19	7.5		0.25
25-Dec-89	3671	1.53	50	6.8		3	11.2	23	17	6	13	27	450	0.30	0.70	3.00	0	81	19	6.0		0.25
26-Dec-89	3671	1.53	52	6.8		3	11.1	24	20	8	18	27	450	0.30	0.70	2.90	0	81	19	6.0		0.25
27-Dec-89	3671	1.53	50	6.8		3	11.0	19	18	7	17	27	450	0.30	0.70	2.90	0	81	19	6.0		0.25
28-Dec-89	3671	1.54	50	5.0		2	11.0	15	18	6	13	26	560	0.20	0.50	2.90	0	82	18	6.0		0.25
29-Dec-89	3671	1.54	48	5.0		1	11.0	17	15	6	13	26	560	0.20	0.50		0	82	18	6.0		0.25
30-Dec-89	3671	1.54	50	5.0		1	11.0	17	15	6	13	26	560	0.20	0.50		0	82	18	6.0		0.25
31-Dec-89	3671	1.54	50	5.0		1	11.0	17	15	6	13	26	560	0.20	0.50		0	82	18	6.0		0.25
01-Jan-90	3671	1.53	50	5.0		1	11.0	17	15	6	13	26	560	0.20	0.50		0	82	18	6.0		0.25
02-Jan-89	3671	1.53	50	5.0		1	11.0	17	15	6	13	26	560	0.20	0.50		0	82	18	6.0		0.25
03-Jan-90	3671	1.53	50	5.0		1	11.0	17	15	6	13	26	560	0.20	0.50		0	82	18	6.0		0.25
04-Jan-90	3671	1.54	50	5.0		1	11.0	17	15	6	13	26	560	0.20	0.50		0	82	18	6.0		0.25

Baroid A/S

MUD PROPERTY RECAP — Water Based

OPERATOR: AS NORSKE SHELL WELL: 3/7-3

Date	Depth m	Mud Wt. SG	Mud Vis. sec	Filtrate API ml	Filtrate HPHT ml	Ck 1/32"	pH	Rheology PV cp	Rheology YP lb/100 sq ft	Gels 10 Sec	Gels 10 Min	Cl g/l	Ca mg/l	Pf	Mf	Pm	Oil %	Water %	Solids %	MBT ppb	KCl ppb	Sand %
05-Jan-90	3671	1.54	45	5.0		1	10.5	16	15	6	13	25	560	0.10	0.30		0	82	18	5.0		0.25
06-Jan-90	3671	1.54	50	5.0		1	10.5	16	15	6	13	25	520	0.10	0.30		0	82	18	5.0		0.25
07-Jan-90	3671	1.54	45	5.0		1	10.5	16	15	6	13	25	520	0.10	0.30		0	82	18	5.0		0.25
08-Jan-90	3671	1.53	50	5.0		1	10.5	20	21	4	15	26	520	0.10	0.30		0	82	18	5.0		0.25
09-Jan-90	3671	1.55	56	5.0		1	10.5	20	21	4	15	26	520	0.10	0.30		0	81	19	5.0		0.25
10-Jan-90	3671	1.55	50	5.0		1	10.5	20	21	4	15	26	520	0.10	0.30		0	81	19	5.0		0.25
11-Jan-90	3671	1.55	50	5.0		1	10.5	20	21	4	15	26	520	0.10	0.30		0	81	19	5.0		0.25

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April 1990

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GEOCHEMICAL INVESTIGATION OF FOUR SOURCE ROCK EXTRACTS FROM WELL 3/7-4, NORWAY

by

J.M.A. Buiskool Toxopeus and E.F. Idiz

Sponsor: Shell Risavika Code: 87610610

Investigation: 811005086

KONINKLIJKE/SHELL EXPLORATIE EN PRODUKTIE LABORATORIUM

RIJSWIJK, THE NETHERLANDS

(Shell Research B.V.)

GEOCHEMICAL INVESTIGATION OF FOUR SOURCE ROCK EXTRACTS FROM WELL 3/7-4, NORWAY

1. INTRODUCTION

A geochemical investigation has been carried out on the following four samples from well 3/7-4, Norway:

- 3316 m, cuttings;
- 3430.8 m, core;
- 3469 m, core;
- 3554 m, core.

The results are shown in Tables 1-4 and in Figures 1-16.

2. RESULTS AND CONCLUSIONS

2.1 Extract analysis

Sample 3430.8 m yielded too small amounts of extract for a complete geochemical analysis; therefore analysis has been stopped.

TABLE 1 - GEOCHEMICAL DATA OF EXTRACTS

	NORWAY 3/7-4	
Sample	3316 m	3430.8 m
% ethyl acetate extract	0.20	0.14
% organic carbon after ethyl acetate extraction	1.5	2.8
extract/original carbon (after extraction)	0.13	0.05
% sulphur	-	
ppm V as metals	-	
ppm Ni as metals	-	
pristane/phytane	1.6	
pristane/nC_{17}	1.0	
phytane/nC_{18}	0.7	
C_{15} distribution		
1-ring	62	
2-ring	25	
3-ring	13	
C_{30} distribution		
3-ring	18	
4-ring	54	
5-ring	28	
C_{29} VR/E	0.75	
% saturates*	13	34
% aromatics	47	27
% heterocompounds	38	39
% rest (high molecular)	2.1	1.1
$\delta^{13}C$ °/oo (whole extract)	-27.7	
" (saturates)	-29.0	
" (aromatics)	-27.4	

*) Determined by thin-layer-chromatography

N.D. = Not detectable

TABLE 2 - GEOCHEMICAL DATA OF EXTRACTS

	NORWAY 3/7-4	
Sample	3469 m	3554 m
% ethyl acetate extract	0.52	0.35
% organic carbon after ethyl acetate extraction	10.1	4.4
extract/original carbon (after extraction)	0.05	0.08
% sulphur	-	-
ppm V as metals	-	-
ppm Ni as metals	-	-
pristane/phytane	7.0	5.1
pristane/nC_{17}	2.3	1.0
phytane/nC_{18}	0.4	0.2
C_{15} distribution		
1-ring	58	53
2-ring	23	37
3-ring	19	10
C_{30} distribution		
3-ring	ND	16
4-ring		22
5-ring		62
C_{29} VR/E	ND	0.89
% saturates*	5	22
% aromatics	51	51
% heterocompounds	43	27
% rest (high molecular)	0.8	0.6
$\delta^{13}C$ °/oo (whole extract)	-24.3	-25.7
" (saturates)	-26.5	-26.9
" (aromatics)	-24.3	-25.2

*) Determined by thin-layer-chromatography

N.D. = Not detectable

TABLE 3 - STERANE AND TRITERPANE DATA

	NORWAY 3/7-4
Sample	3316 m
Sterane/triterpane diagram*	
% iso-steranes	20
% rearranged-steranes	60
% triterpanes	21
Sterane diagram	
% iso-steranes	21 (254 ppm)
% rearranged-steranes	44 (522 ppm)
% normal-steranes	35 (423 ppm)
Sterane carbon number diagram	
% C-27	35 (417 ppm)
% C-28	30 (355 ppm)
% C-29	36 (427 ppm)
C-29 Sterane ratios	
20S/20S + 20R	0.47
iso/iso + normal	0.35
Tricyclics/tricyclics + pentacyclics	0.04

*) Recalculated

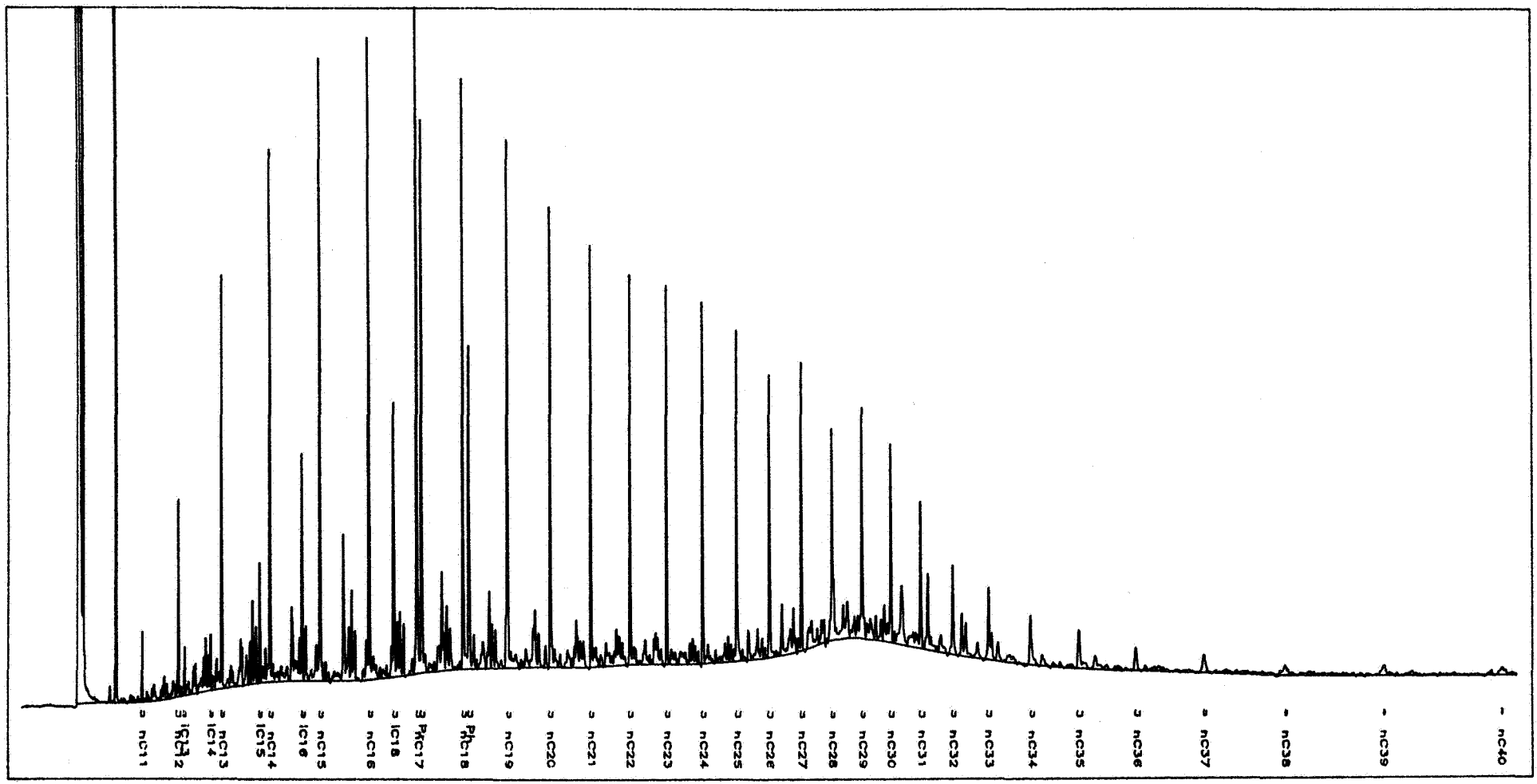
TABLE 4 - STERANE AND TRITERPANE DATA

	NORWAY 3/7-4	
Sample	3469 m	3554 m
Sterane/triterpane diagram*		
% iso-steranes	14	15
% rearranged-steranes	24	37
% triterpanes	62	48
Sterane diagram		
% iso-steranes	31 (36 ppm)	31 (205 ppm)
% rearranged-steranes	36 (42 ppm)	51 (338 ppm)
% normal-steranes	32 (38 ppm)	18 (120 ppm)
Sterane carbon number diagram		
% C-27	23 (27 ppm)	10 (65 ppm)
% C-28	24 (28 ppm)	18 (117 ppm)
% C-29	53 (61 ppm)	73 (481 ppm)
C-29 Sterane ratios		
20S/20S + 20R	0.51	0.55
iso/iso + normal	0.41	0.52
Tricyclics/tricyclics + pentacyclics	0.02	0.03

*) Recalculated

Reference nr. 901550 Recorded KSEPL GLC-5 19-02-90 GFS nr. 146241/02 Calibration nr.

GAS CHROMATOGRAM OF THE SATURATED HYDROCARBONS



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NORWAY 3/7-4

3316 M

S146241/2 CORE SAMPLE

FIG. 1.

Reference nr. 901555 Recorded KSEPL GLC-5 19-02-90 GHS nr. 146243/02 Calibration nr.

GAS CHROMATOGRAM OF THE SATURATED HYDROCARBONS

RKER 90.065

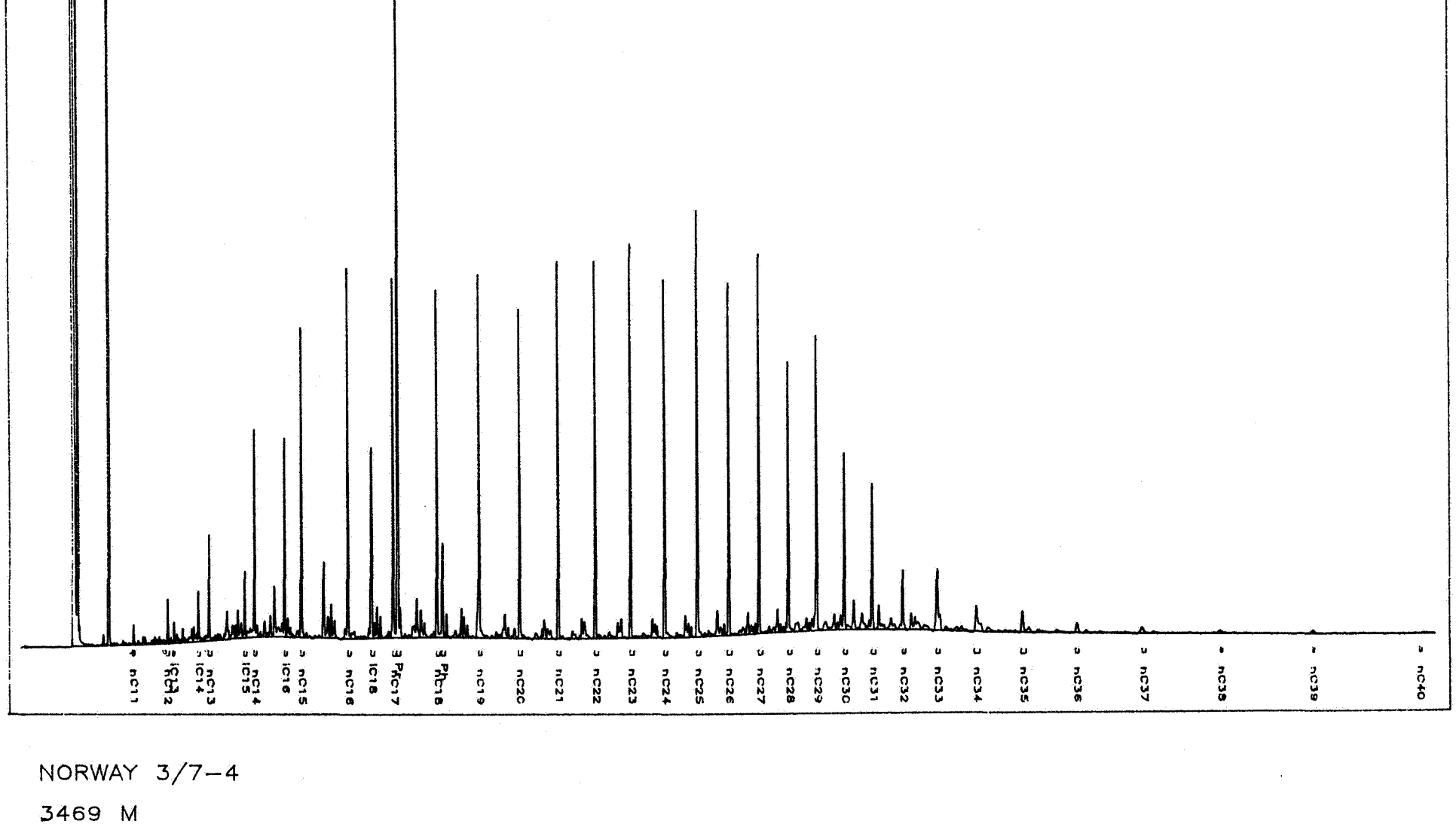

FIG. 2.

NORWAY 3/7-4

3469 M

S146243/2 CORE SAMPLE

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GAS CHROMATOGRAM OF THE SATURATED HYDROCARBONS

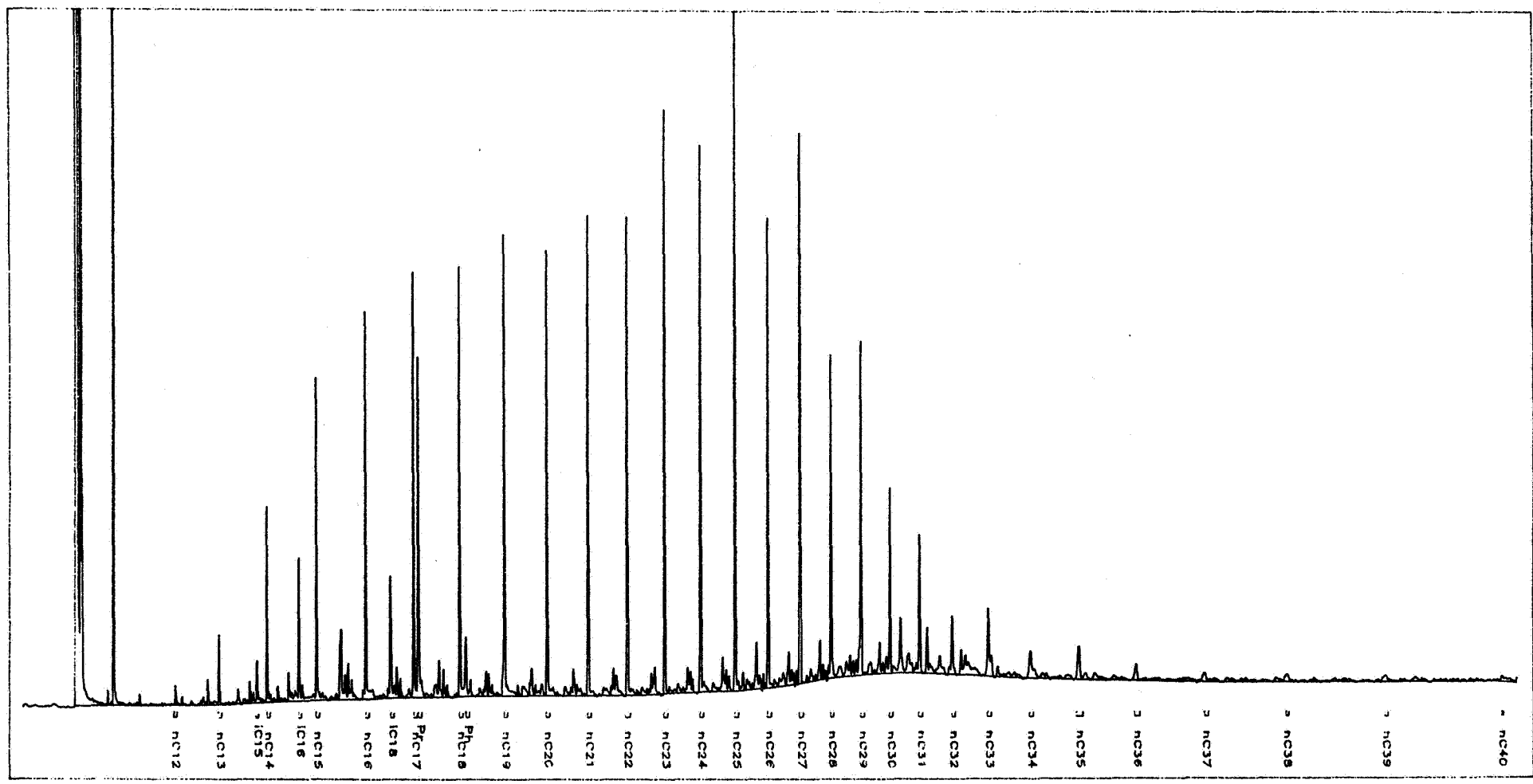

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FIG. 3.

NORWAY 3/7-4

3554 M

S146244/2 CORE SAMPLE

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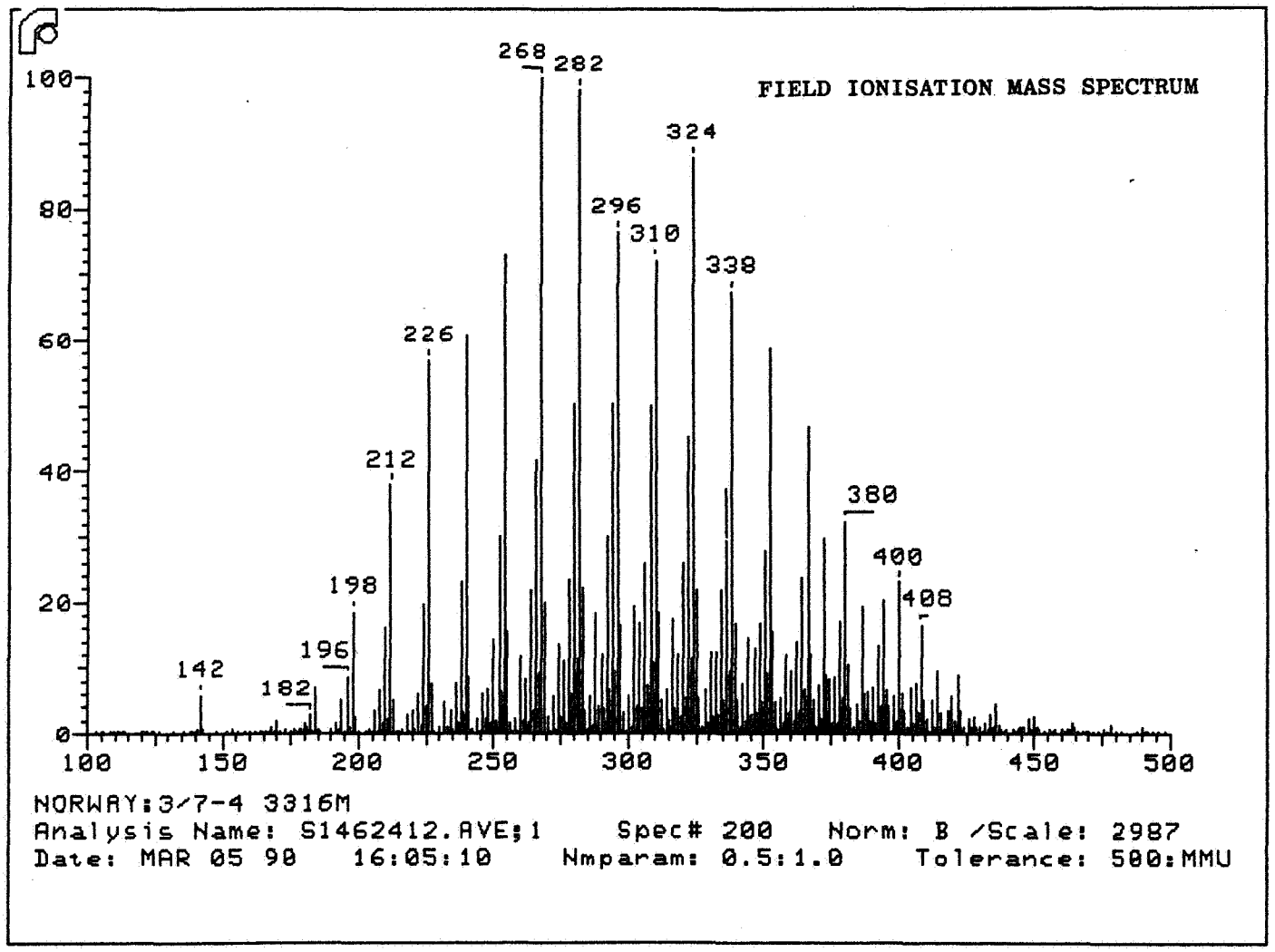


FIG. 4.

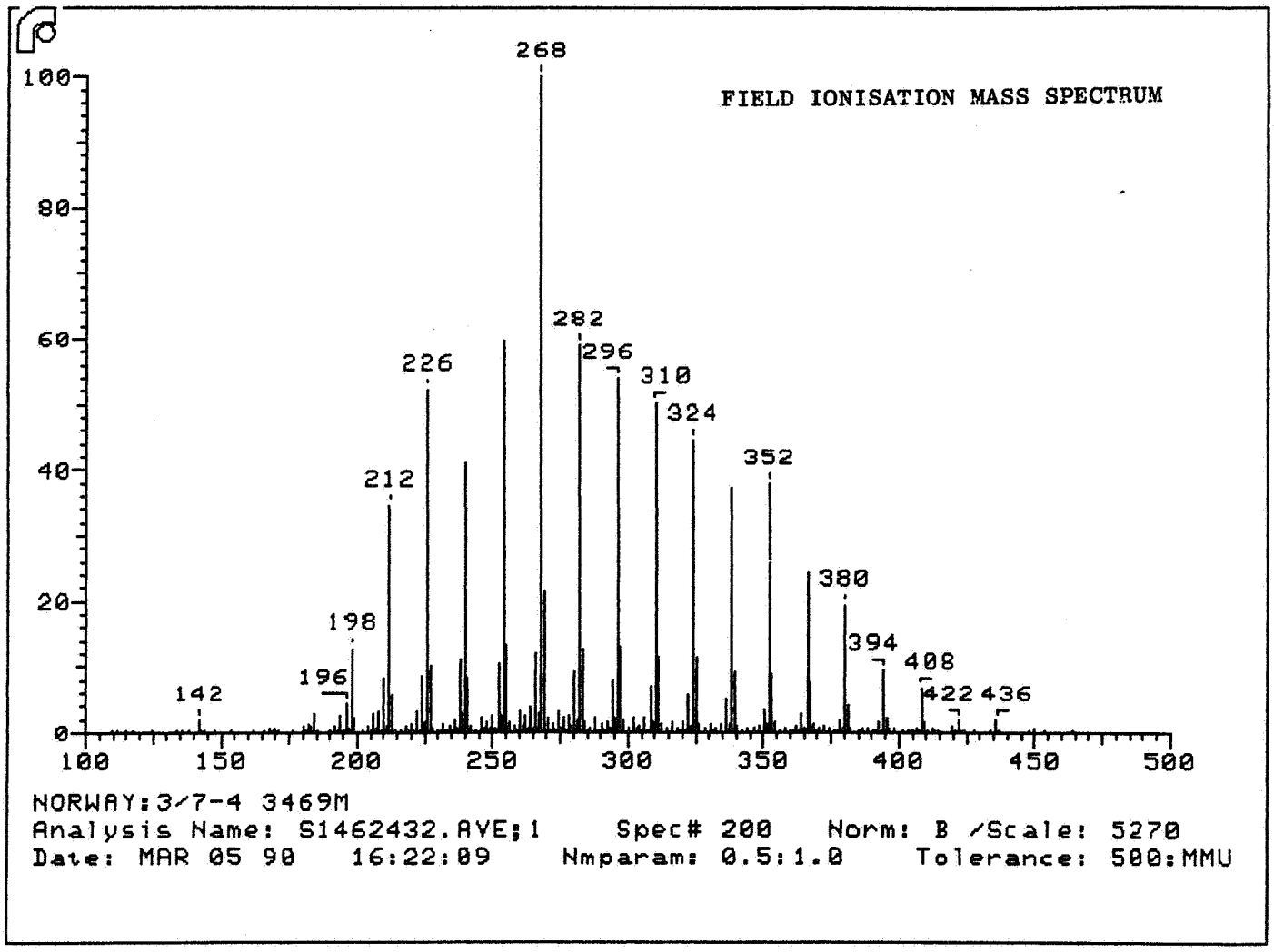

FIELD IONISATION MASS SPECTRUM
268
282
296
310
324
226
212
352
380
394
408
422
436
198
196
142
100
80
60
40
20
0
100
150
200
250
300
350
400
450
500
NORWAY:3/7-4 3469M
Analysis Name: S1462432.AVE;1 Spec# 200 Norm: B /Scale: 5270
Date: MAR 05 90 16:22:09 Nmparam: 0.5:1.0 Tolerance: 500:MMU

FIG. 5.

RKER 90.065

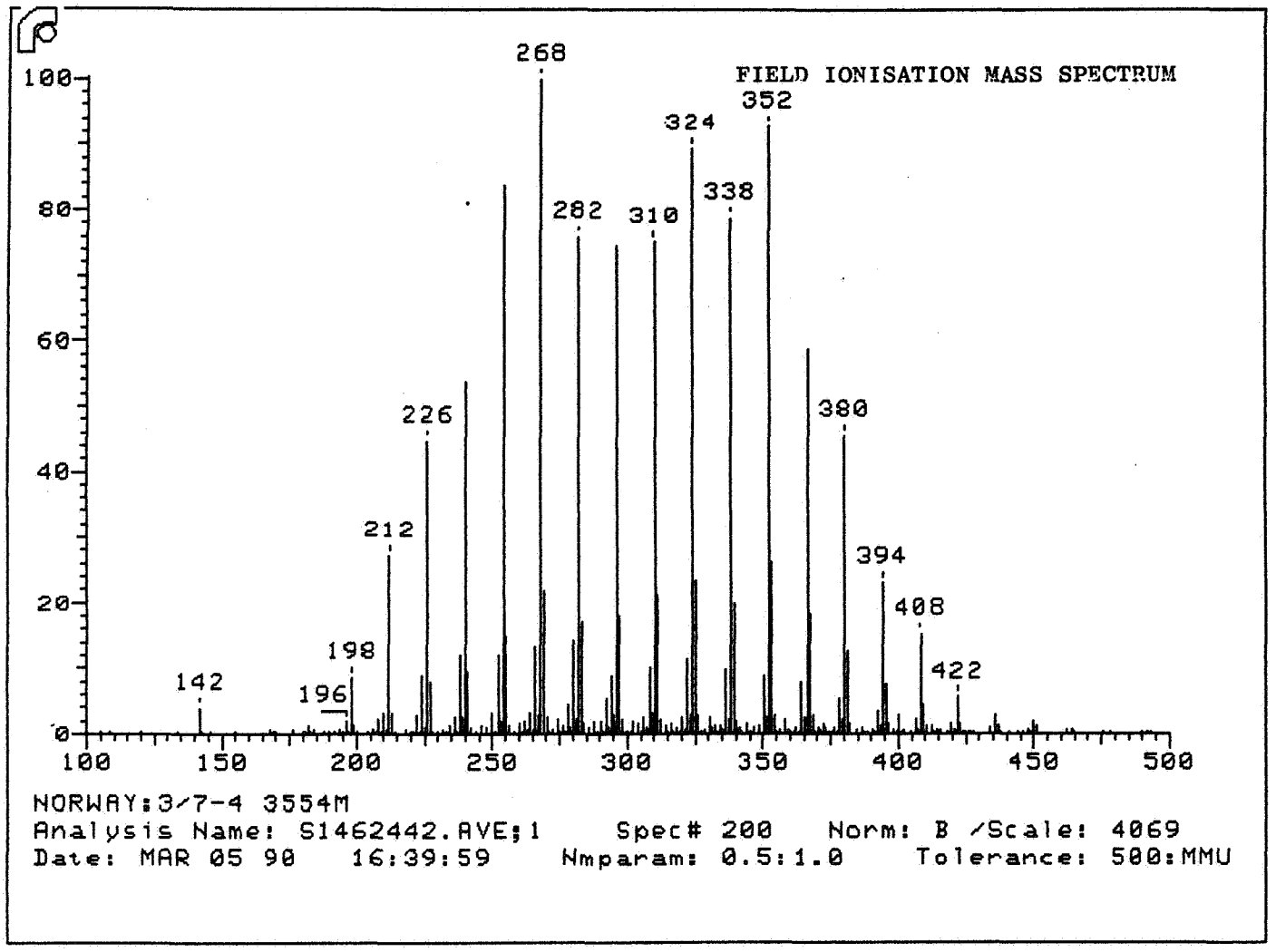
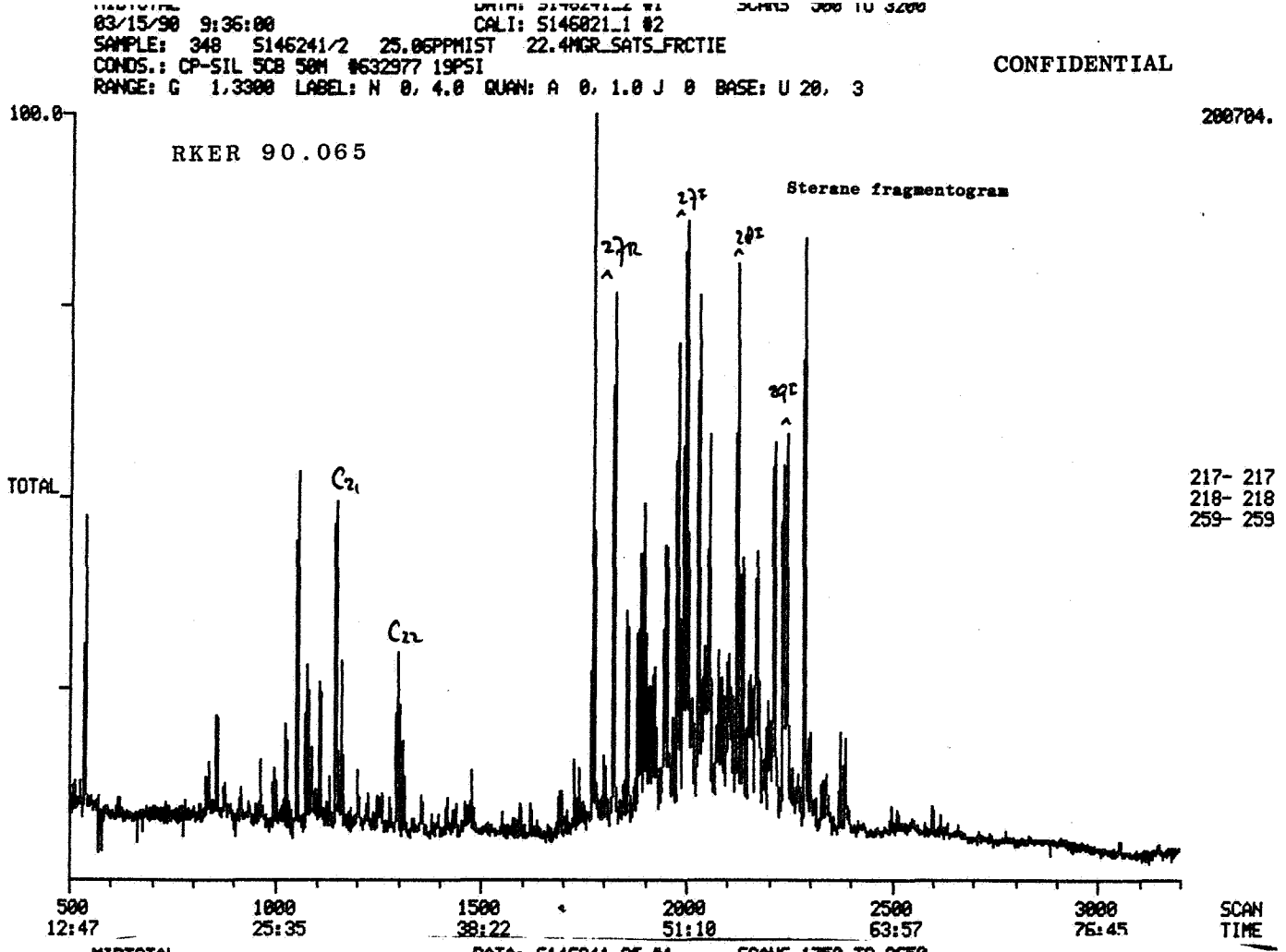


FIG. 6.



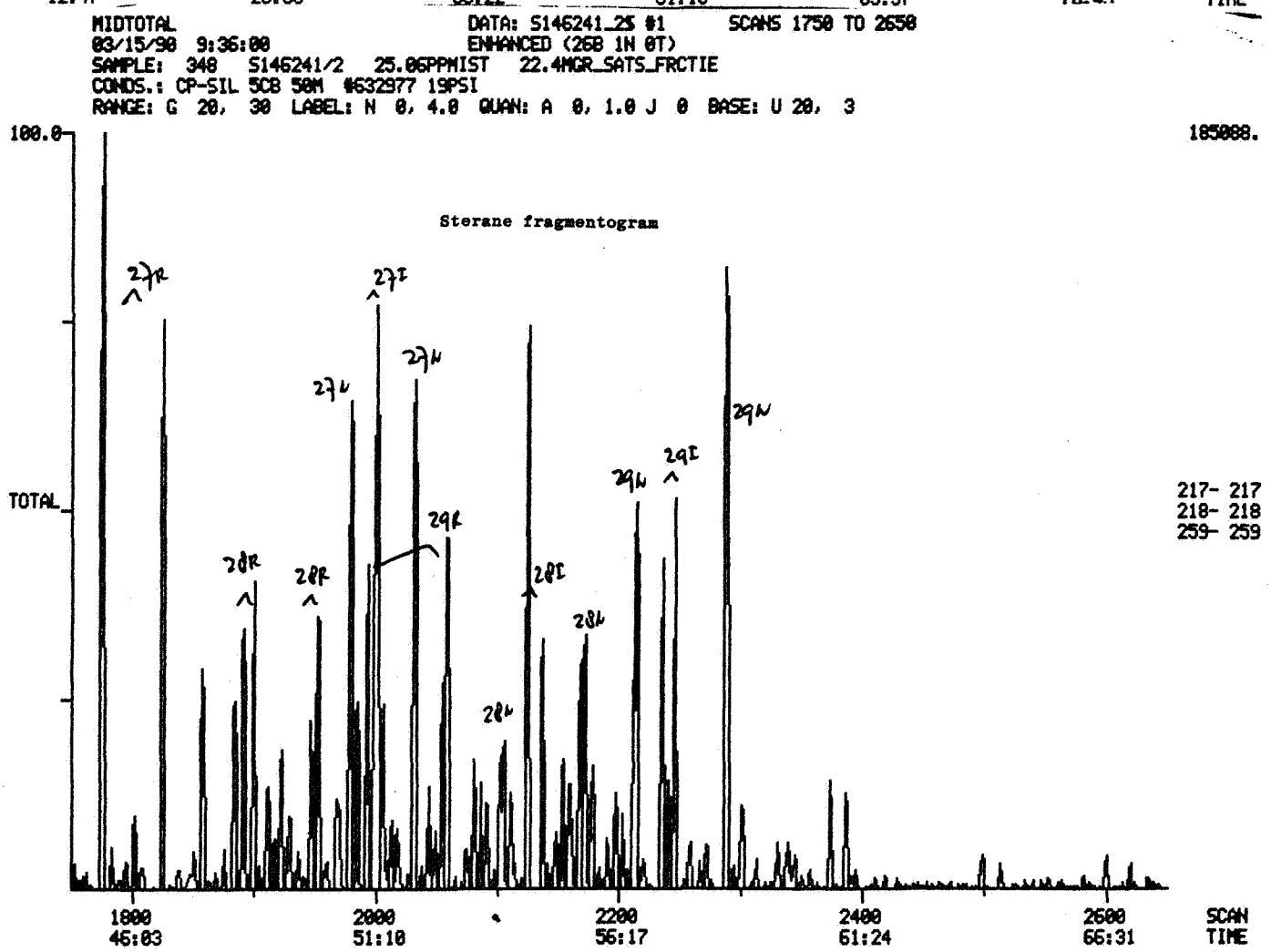


FIG. 8A. GC-MS analysis 3/7-3, 3316 m, source rock.

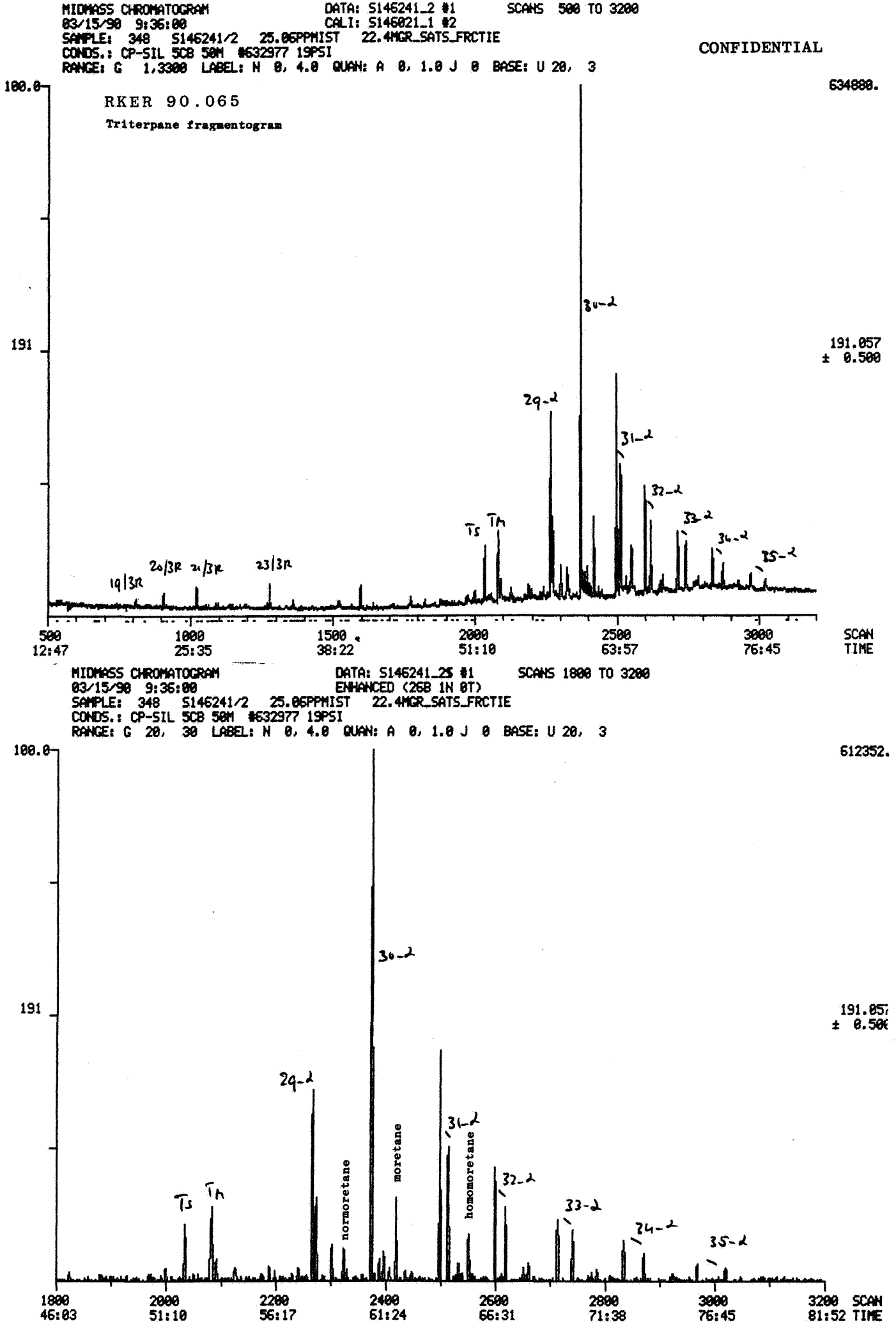
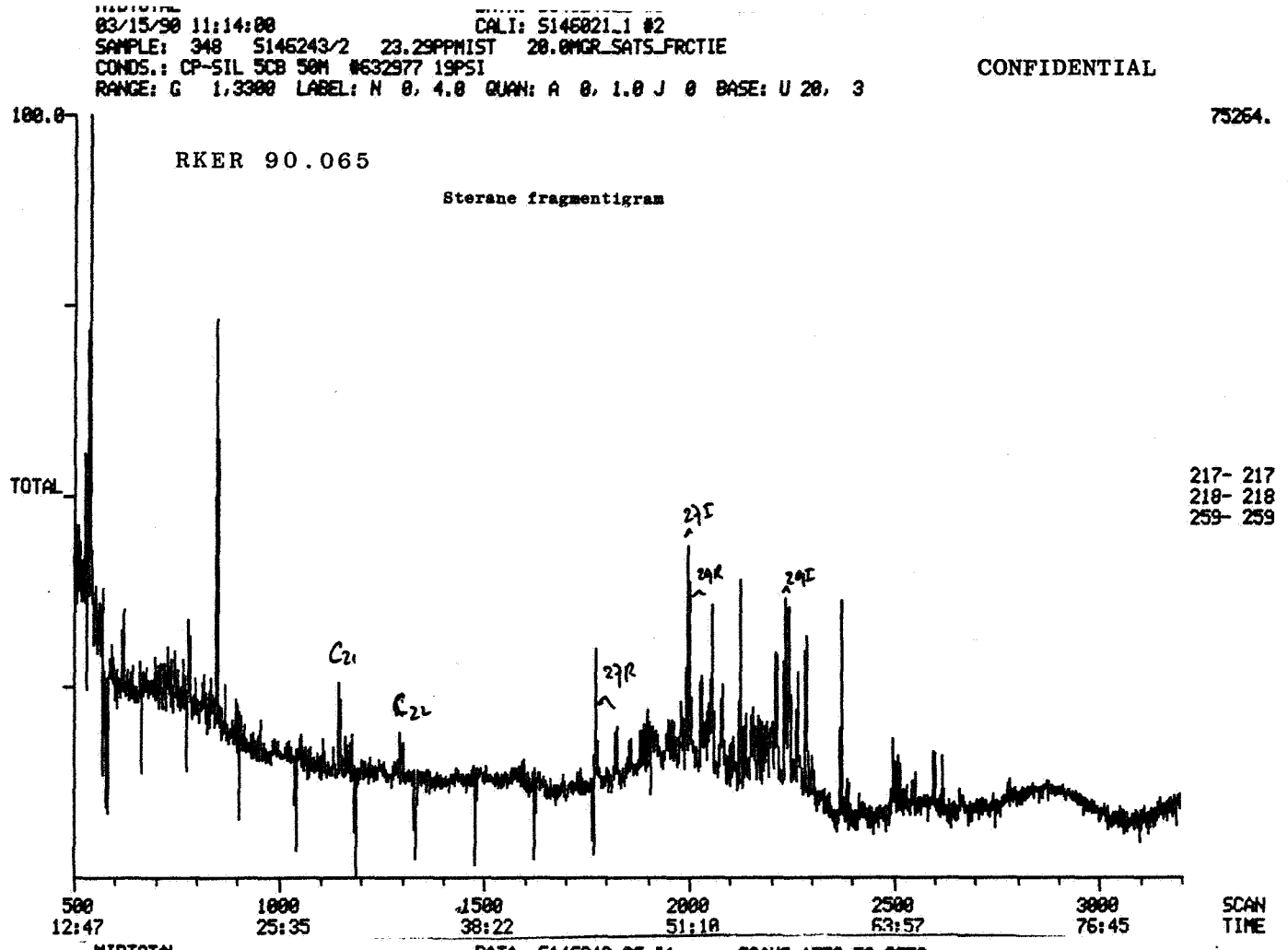


FIG. 8B. GC-MS analysis 3/7-3, 3316 m, source rock.



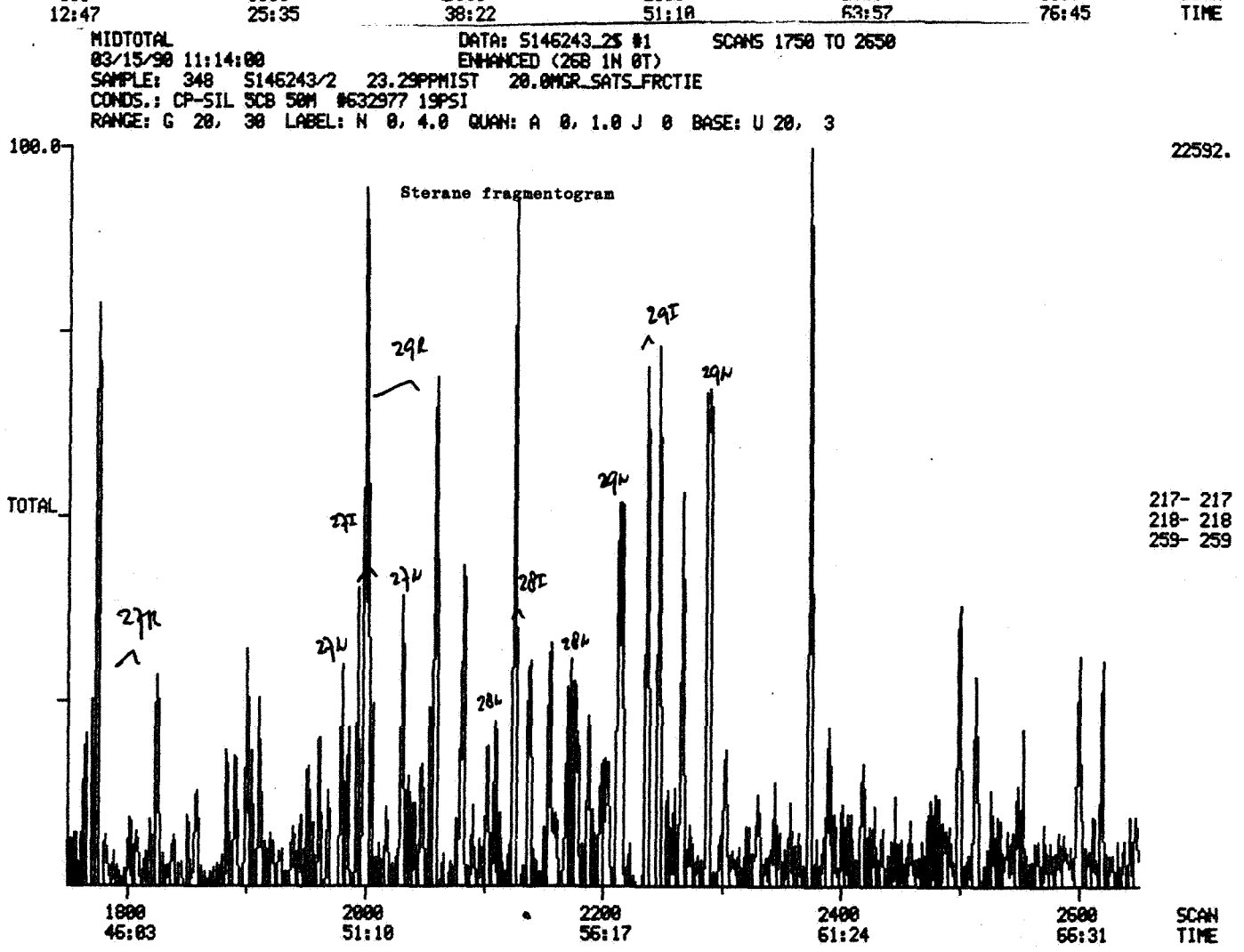
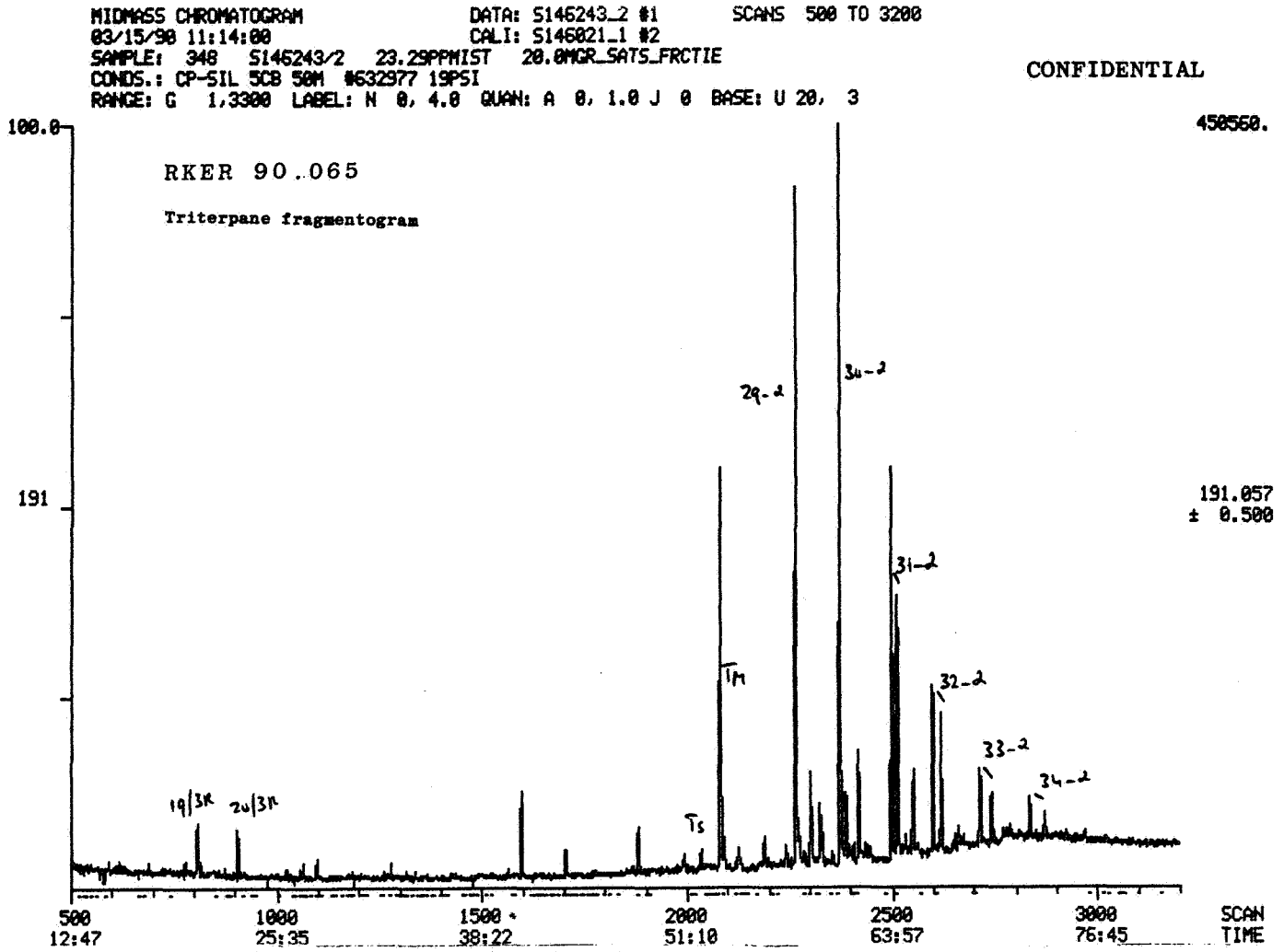


FIG. 9A. GC-MS analysis 3/7-3, 3469 m, source rock.



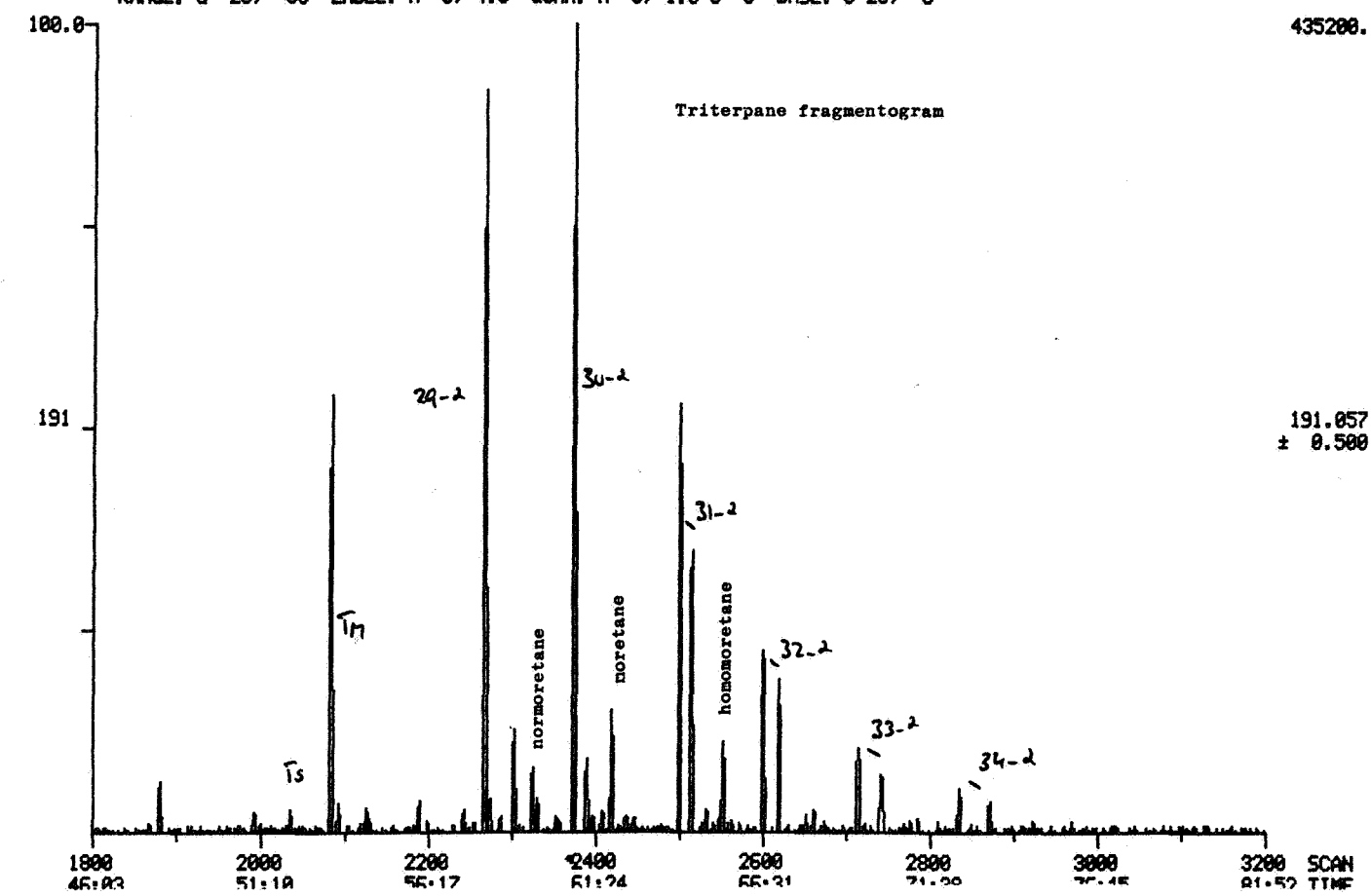
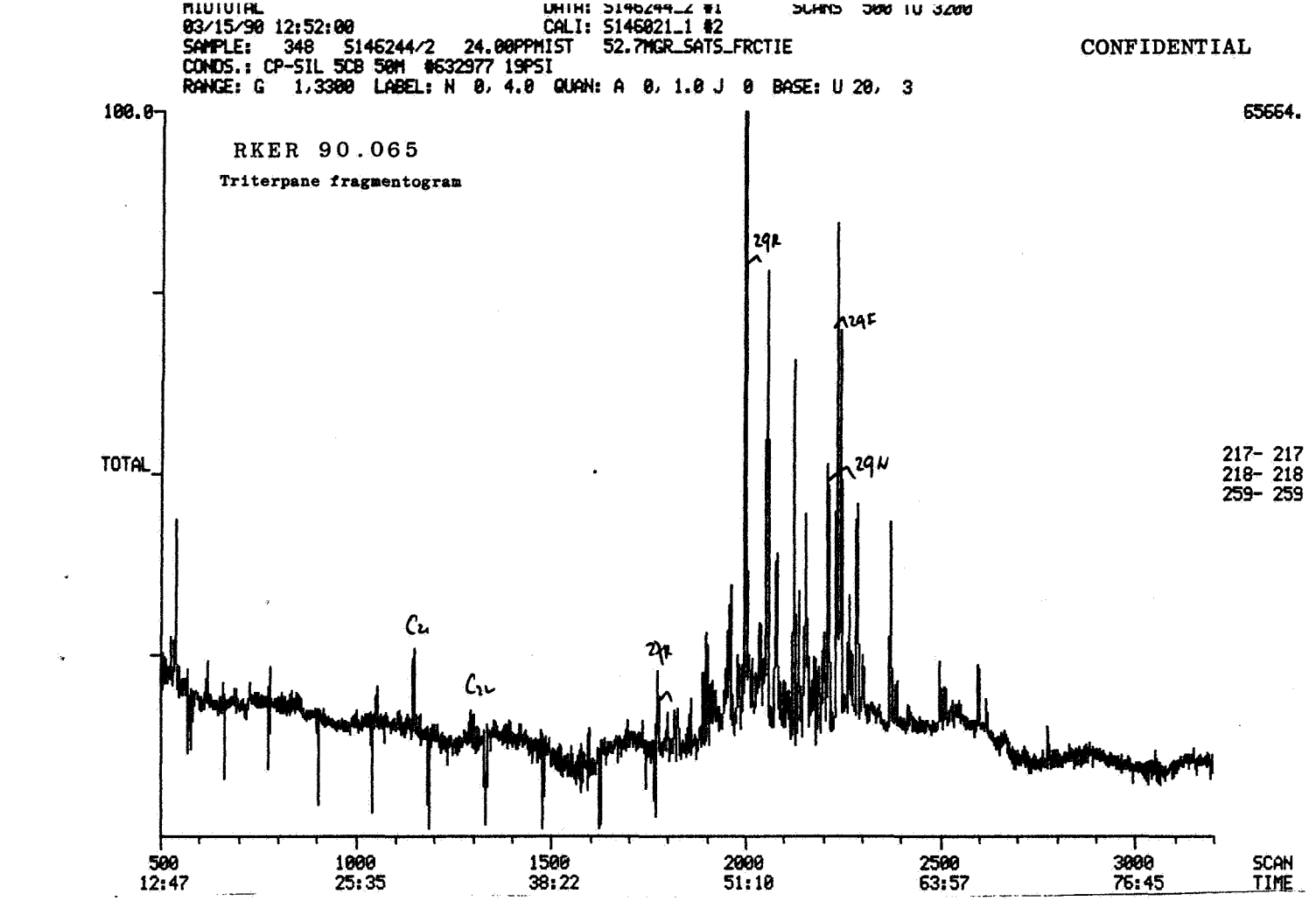


FIG. 9B. GC-MS analysis 3469 m, source rock.



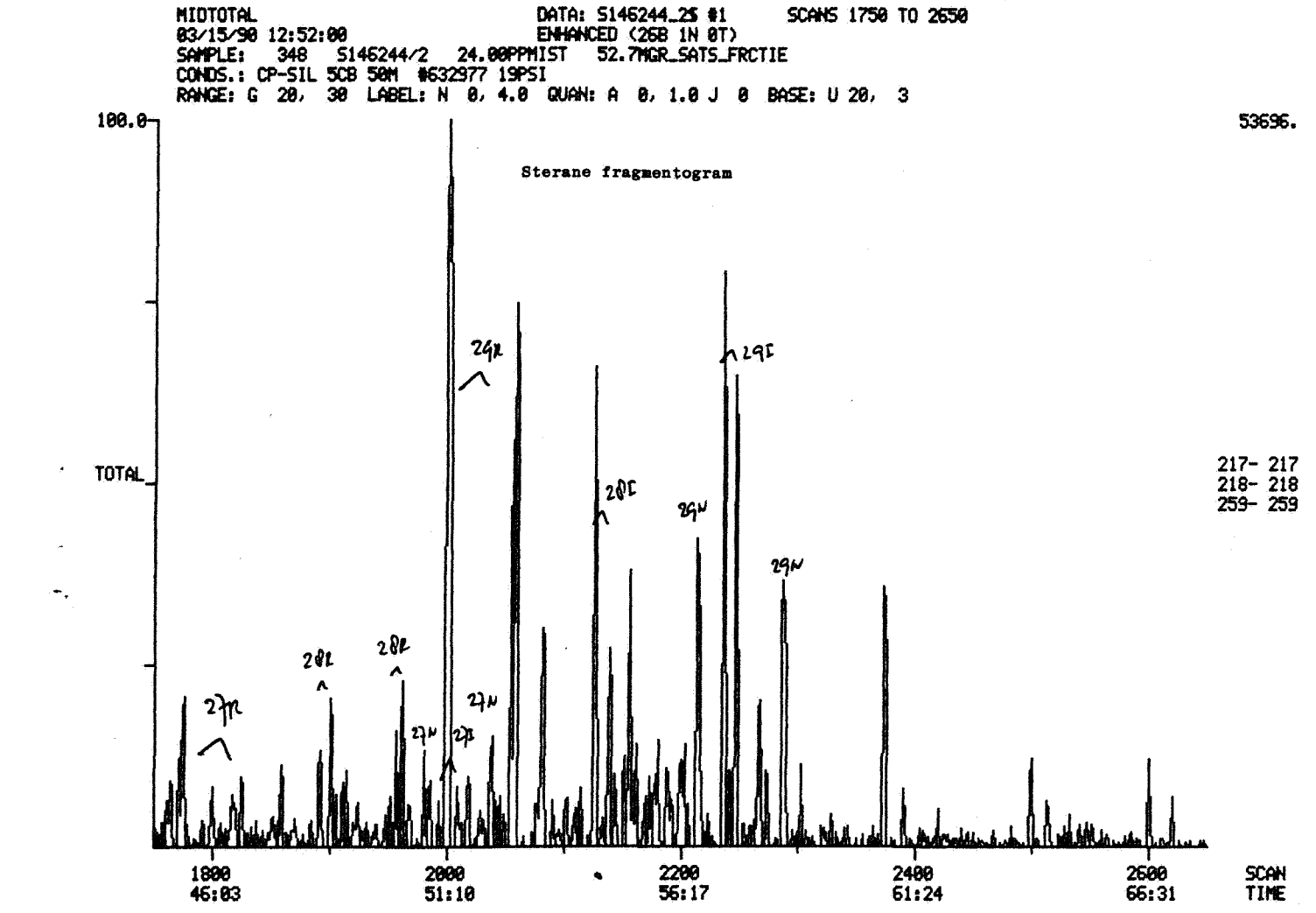


FIG. 10A. GC-MS analysis 3/7-3, 3554 m, source rock.

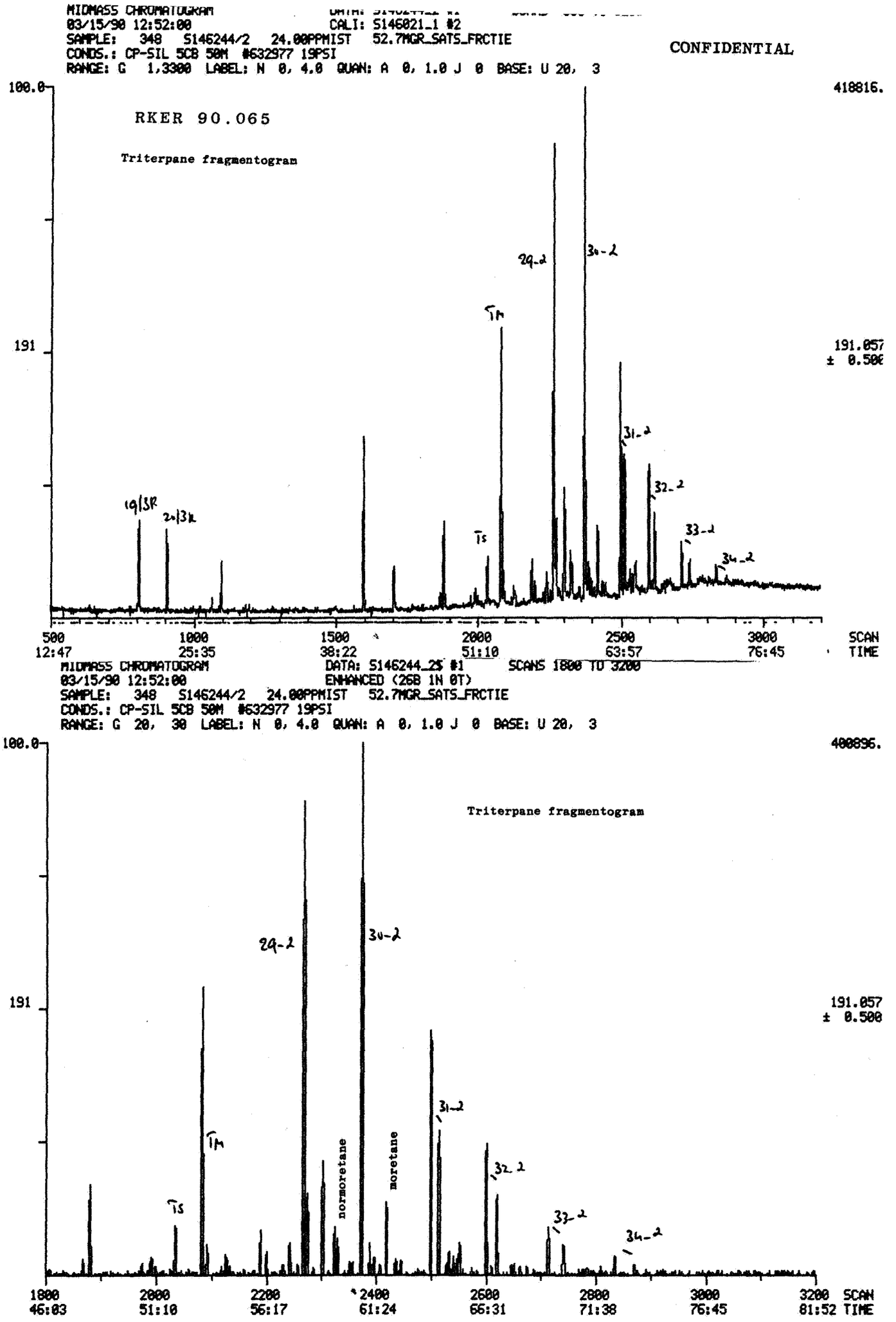
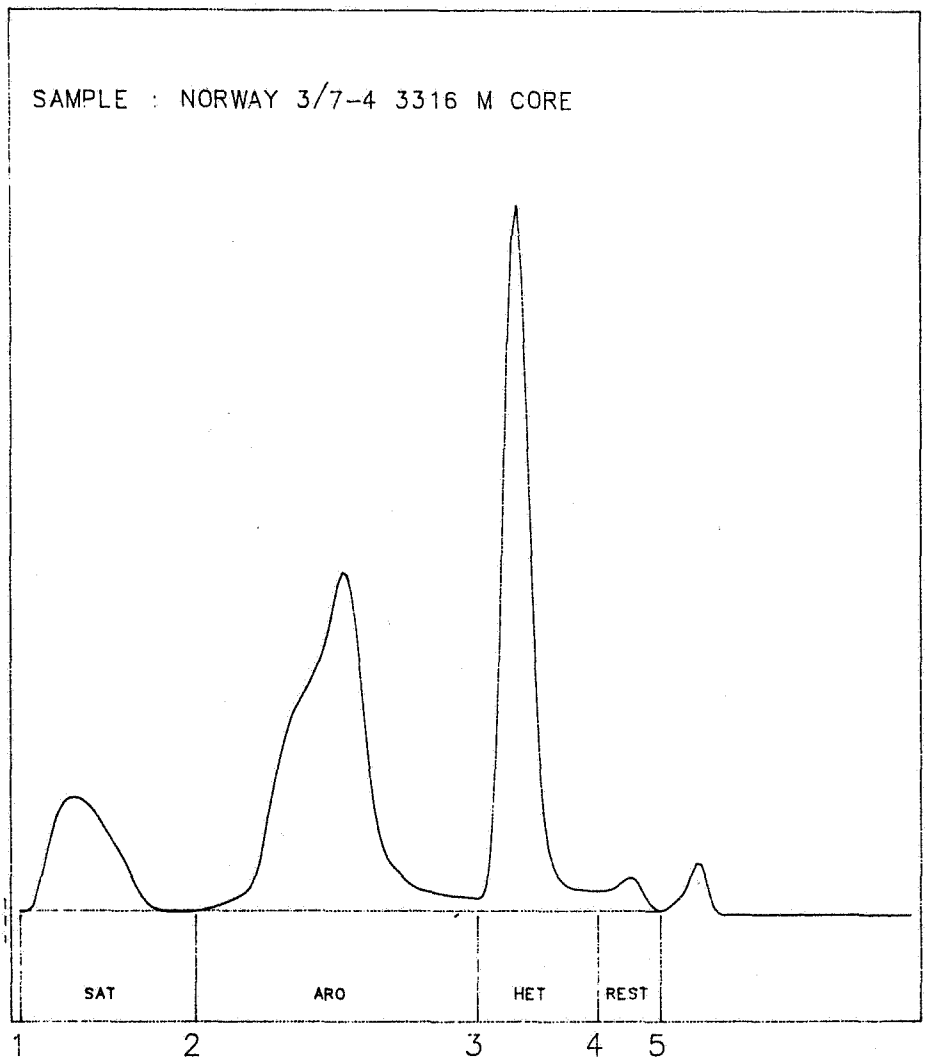


FIG. 10B. GC-MS analysis 3/7-3, 3554 m, source rock.



SAMPLE : S146241-2

WEIGHT LOST ON TOPPING	:	0.0 %
– SATURATES	:	13.2 %
– AROMATICS	:	46.5 %
– HETEROCOMPOUNDS	:	38.2 %
– REST (HIGH MOL.)	:	2.1 %

• WEIGHT PERCENTAGES CALCULATED FROM FID RESPONSE

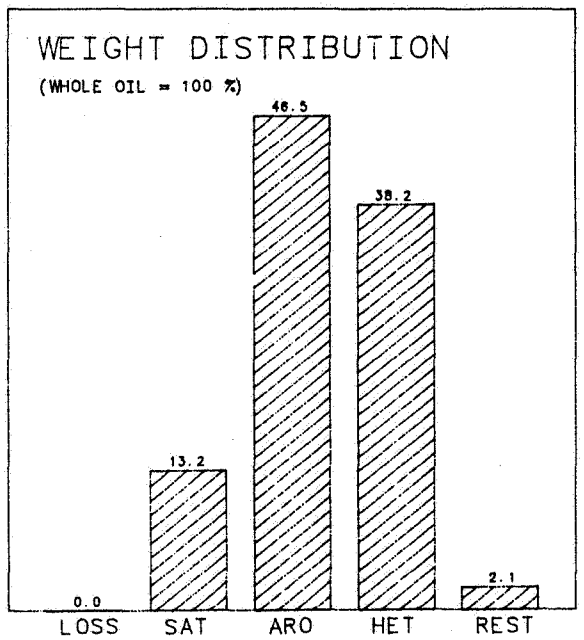
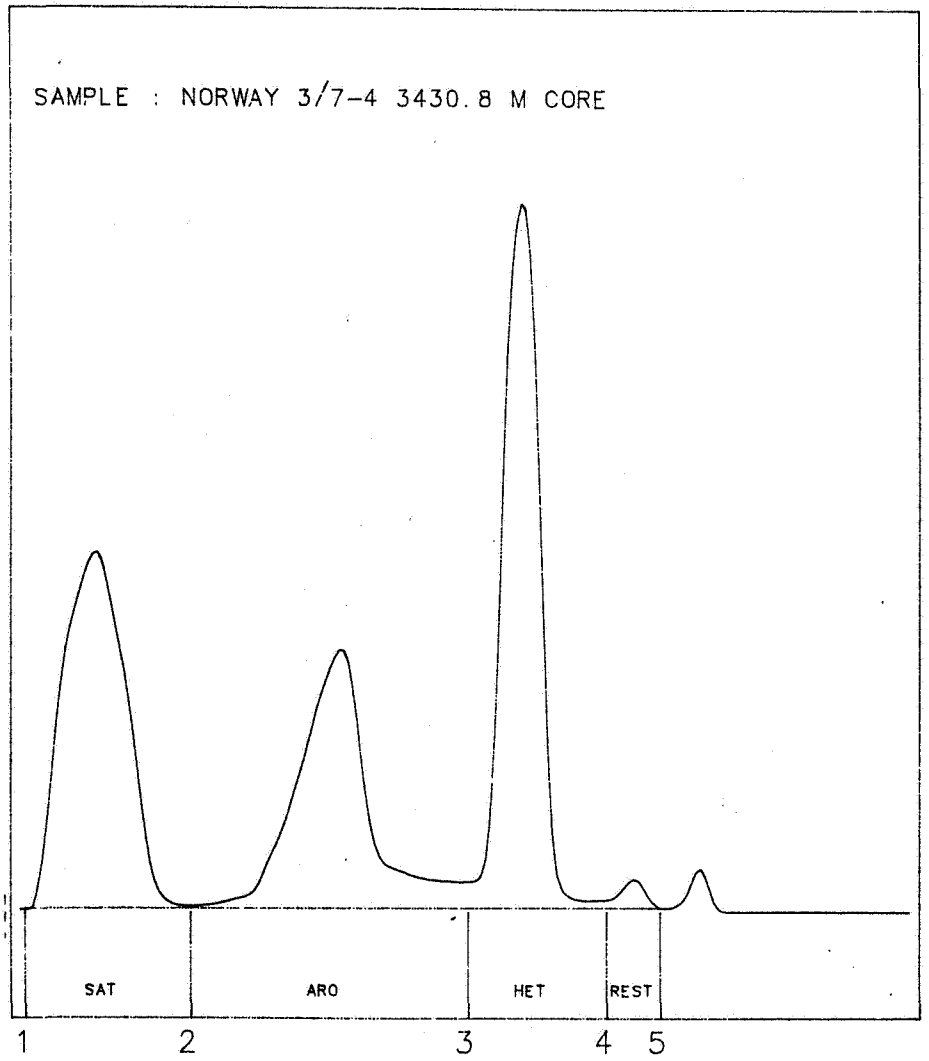


FIG. 13.



SAMPLE : S146242-2

WEIGHT LOST ON TOPPING	0.0 %
– SATURATES	33.5 %
– AROMATICS	27.0 %
– HETEROCOMPOUNDS	38.5 %
– REST (HIGH MOL.)	1.1 %

• WEIGHT PERCENTAGES CALCULATED FROM FID RESPONSE

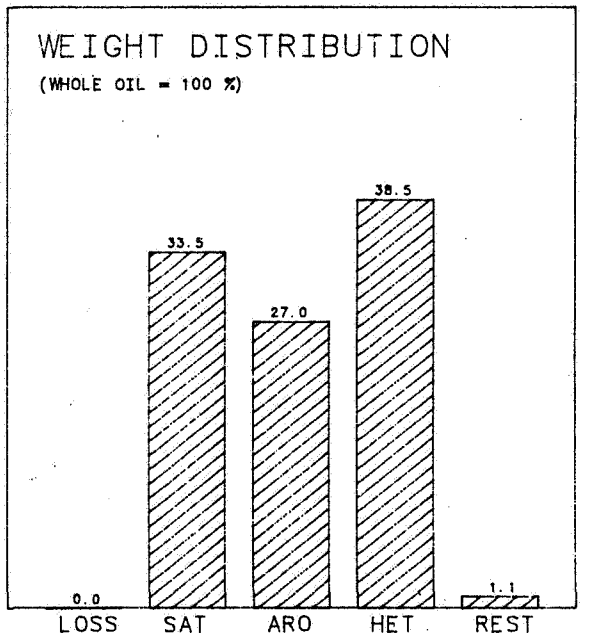


FIG. 14.

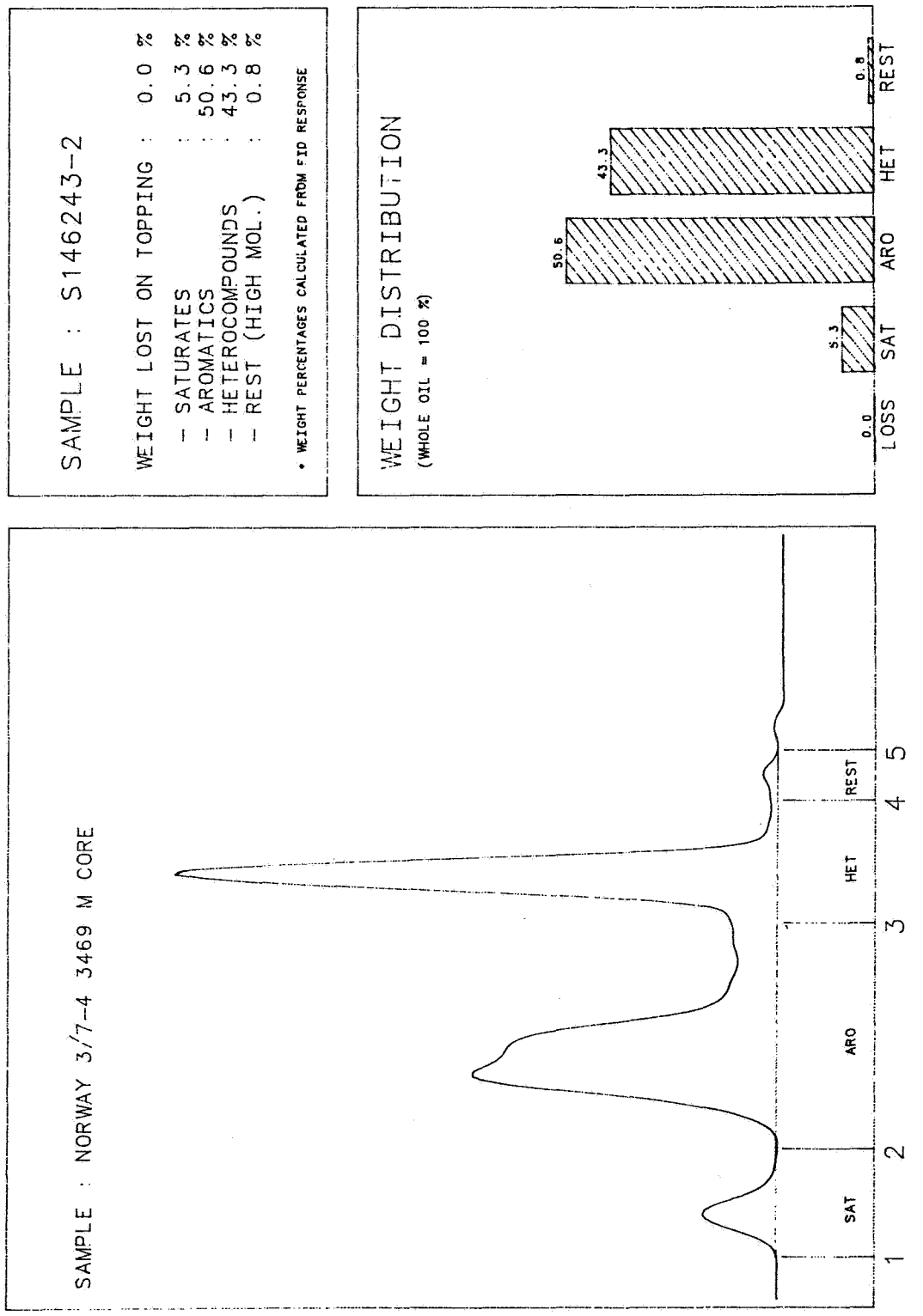

SAMPLE : S146243-2
WEIGHT LOST ON TOPPING : 0.0 %
- SATURATES : 5.3 %
- AROMATICS : 50.6 %
- HETEROCOMPOUNDS : 43.3 %
- REST (HIGH MOL.) : 0.8 %
* WEIGHT PERCENTAGES CALCULATED FROM FID RESPONSE
WEIGHT DISTRIBUTION
(WHOLE OIL = 100 %)
0.0
5.3
50.6
43.3
0.8
LOSS
SAT
ARO
HET
REST
SAMPLE : NORWAY 3/7-4 3469 M CORE
SAT
ARO
HET
REST
1
2
3
4
5

FIG. 15.

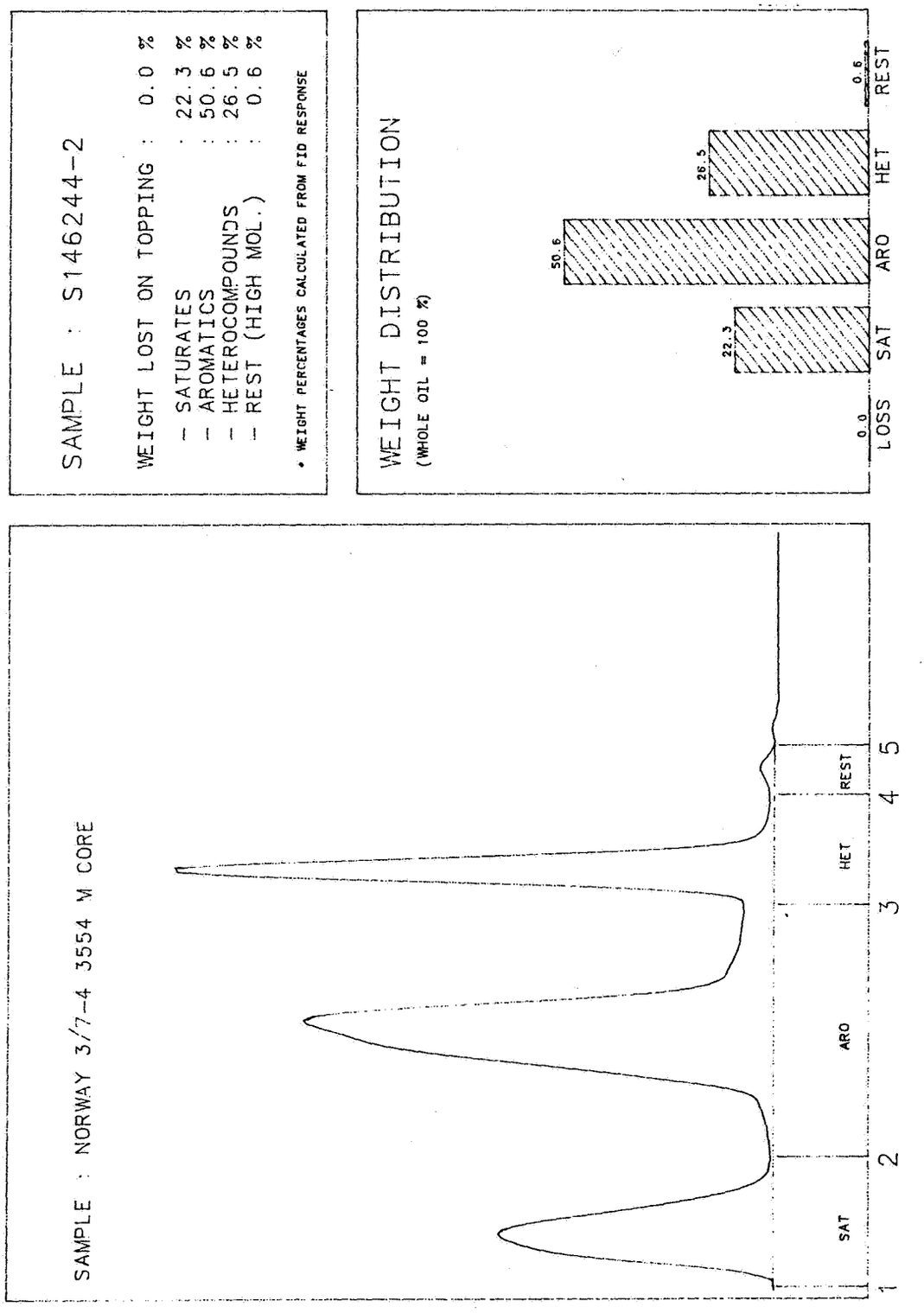

SAMPLE : S146244-2
WEIGHT LOST ON TOPPING : 0.0 %
- SATURATES : 22.3 %
- AROMATICS : 50.6 %
- HETEROCOMPOUNDS : 26.5 %
- REST (HIGH MOL.) : 0.6 %
* WEIGHT PERCENTAGES CALCULATED FROM FID RESPONSE
WEIGHT DISTRIBUTION
(WHOLE OIL = 100 %)
0.0
22.3
50.6
26.5
0.6
LOSS
SAT
ARO
HET
REST
SAMPLE : NORWAY 3/7-4 3554 M CORE
SAT
ARO
HET
REST
1
2
3
4
5

FIG. 16.

November, 1994

RKER.94.130

Geochemical investigation of source rock samples from well 03/07-04, Norway

by

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Sponsor: Norske Shell, Risavika Code: 876.106.10

investigation: 8BAS0862

KONINKLIJKE/SHELL EXPLORATIE EN PRODUKTIE LABORATORIUM
RIJSWIJK, THE NETHERLANDS

(Shell research B.V.)

Geochemical investigation of oils and source rock samples from well 03/07-04, Norway

1.0 Introduction

A geochemical investigation has been carried out on four source-rock samples from well 03/07-04, Norway.

- 3310.0 m., cuttings
- 3385.0 m., cuttings
- 3475.4 m., core sample
- 3563.4 m., core sample

Summary of the Geochemical Data of the extract from well 03/07-04 (3310 m.), Norway

Gravity and Gross Composition

% Extract :	0.2
% TOC after extract :	1.4
Extract/TOC :	0.14
Gross Composition (W%)	
Saturates :	no data
Aromatics :	no data
Heterocompounds :	no data
Rest (High molecular) :	no data
Sulphur (%) :	no data
Vanadium (ppm) :	no data
Nickel (ppm) :	no data

Saturates Distributions
(Gaschromatography)

Pristane / Phytane :	1.7
Pristane / n-C17 :	1.1
Phytane / n-C18 :	0.7
ACI :	12
Corr. Coeff. :	-0.9484

C-7 Distributions
(Gaschromatography)

C-7 Alkanes (%)	
Normal C-7 :	no data
Mono Branched :	
Poly Branched :	
C-7 Alkanes / Cyclo Alkanes (%)	
Normal C-7 :	no data
Cyclo Alkanes :	
Branched Alkanes :	
C-7 Alk. / Cyclo Alk. / Aromatics (%)	
Alkanes :	no data
Cyclo Alkanes :	
Aromatics :	

Carbon Isotope Ratios
(Mass Spectrometry)

Total Sample (topped) :	no data
Saturates :	-28.8
Aromatics :	-27.4

Distribution of Ring Compounds
(Field Ionisation Mass Spectrometry)

C-15 Ring Compounds (%)	
1 ring :	no data
2 ring :	
3 ring :	
C-30 Ring Compounds (%)	
3 ring :	no data
4 ring :	
5 ring :	
C-29 VR/E :	no data

Sterane and Triterpane Distributions
(Gaschromatography / Mass Spectrometry)

Steranes/Triterpanes (%)	
Iso Steranes :	27
Rearranged Steranes :	52
Triterpanes :	21
Steranes (%)	
Iso Steranes :	28
Rearranged Steranes :	36
Normal Steranes :	36
Triterpanes (%)	
C-30 Hopanes :	100
Oleanane (α+ β) :	0
W + T :	0
Steranes Carbon No. Dist. (%)	
C-27 :	33
C-28 :	25
C-29 :	42
C-29 Sterane Ratios	
20S / 20R + 20S :	0.42
Iso / Iso + Normal :	0.42
Triterpane Ratios	
TS / TM :	0.46
3R / 3R + 5R :	0.06

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Summary of the Geochemical Data of the extract from well 03/07-04 (3385 m.), Norway

Gravity and Gross Composition

% Extract :	0.2
% TOC after extract :	1.2
Extract/TOC :	0.17
Gross Composition (W%)	
Saturates :	no data
Aromatics :	no data
Heterocompounds :	no data
Rest (High molecular) :	no data
Sulphur (%) :	no data
Vanadium (ppm) :	no data
Nickel (ppm) :	no data

Saturates Distributions

(Gaschromatography)

Pristane / Phytane :	2.9
Pristane / n-C17 :	0.8
Phytane / n-C18 :	0.4
ACI :	10
Corr. Coeff. :	-0.8244

C-7 Distributions

(Gaschromatography)

C-7 Alkanes (%)	
Normal C-7 :	no data
Mono Branched :	
Poly Branched :	
C-7 Alkanes / Cyclo Alkanes (%)	
Normal C-7 :	no data
Cyclo Alkanes :	
Branched Alkanes :	
C-7 Alk. / Cyclo Alk. / Aromatics (%)	
Alkanes :	no data
Cyclo Alkanes :	
Aromatics :	

Carbon Isotope Ratios

(Mass Spectrometry)

Total Sample (topped) :	no data
Saturates :	-28.8
Aromatics :	no data

Distribution of Ring Compounds

(Field Ionisation Mass Spectrometry)

C-15 Ring Compounds (%)	
1 ring :	no data
2 ring :	
3 ring :	
C-30 Ring Compounds (%)	
3 ring :	no data
4 ring :	
5 ring :	
C-29 VR/E :	no data

Sterane and Triterpane Distributions

(Gaschromatography / Mass Spectrometry)

Steranes/Triterpanes (%)	
Iso Steranes :	30
Rearranged Steranes :	50
Triterpanes :	20
Steranes (%)	
Iso Steranes :	35
Rearranged Steranes :	39
Normal Steranes :	26
Triterpanes (%)	
C-30 Hopanes :	100
Oleanane (α+ β) :	0
W + T :	0
Steranes Carbon No. Dist. (%)	
C-27 :	34
C-28 :	27
C-29 :	39
C-29 Sterane Ratios	
20S / 20R + 20S :	0.48
Iso / Iso + Normal :	0.50
Triterpane Ratios	
TS / TM :	0.50
3R / 3R + 5R :	0.09

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Summary of the Geochemical Data of the extract from well 03/07-04 (3475.7 m.), Norway

Gravity and Gross Composition

% Extract :	0.6
% TOC after extract :	36.0
Extract/TOC :	0.02
Gross Composition (W%)	
Saturates :	no data
Aromatics :	no data
Heterocompounds :	no data
Rest (High molecular) :	no data
Sulphur (%) :	no data
Vanadium (ppm) :	no data
Nickel (ppm) :	no data

Saturates Distributions

(Gaschromatography)

Pristane / Phytane :	4.6
Pristane / n-C17 :	0.7
Phytane / n-C18 :	0.2
ACI :	16
Corr. Coeff. :	-0.9768

C-7 Distributions

(Gaschromatography)

C-7 Alkanes (%)	
Normal C-7 :	no data
Mono Branched :	
Poly Branched :	
C-7 Alkanes / Cyclo Alkanes (%)	
Normal C-7 :	no data
Cyclo Alkanes :	
Branched Alkanes :	
C-7 Alk. / Cyclo Alk. / Aromatics (%)	
Alkanes :	no data
Cyclo Alkanes :	
Aromatics :	

Carbon Isotope Ratios

(Mass Spectrometry)

Total Sample (topped) :	-25.0
Saturates :	-27.3
Aromatics :	-24.6

Distribution of Ring Compounds

(Field Ionisation Mass Spectrometry)

C-15 Ring Compounds (%)	
1 ring :	no data
2 ring :	
3 ring :	
C-30 Ring Compounds (%)	
3 ring :	no data
4 ring :	
5 ring :	
C-29 VR/E :	no data

Sterane and Triterpane Distributions

(Gaschromatography / Mass Spectrometry)

Steranes/Triterpanes (%)	
Iso Steranes :	21
Rearranged Steranes :	21
Triterpanes :	58
Steranes (%)	
Iso Steranes :	41
Rearranged Steranes :	27
Normal Steranes :	32
Triterpanes (%)	
C-30 Hopanes :	100
Oleanane (α+ β) :	0
W + T :	0
Steranes Carbon No. Dist. (%)	
C-27 :	18
C-28 :	27
C-29 :	55
C-29 Sterane Ratios	
20S / 20R + 20S :	0.55
Iso / Iso + Normal :	0.53
Triterpane Ratios	
TS / TM :	0.08
3R / 3R + 5R :	0.04

S16831211

Summary of the Geochemical Data of the extract from well 03/07-04 (3563.4 m.), Norway

Gravity and Gross Composition

% Extract :	1.0
% TOC after extract :	38.3
Extract/TOC :	0.03
Gross Composition (W%)	
Saturates :	no data
Aromatics :	no data
Heterocompounds :	no data
Rest (High molecular) :	no data
Sulphur (%) :	no data
Vanadium (ppm) :	no data
Nickel (ppm) :	no data

Saturates Distributions

(Gaschromatography)

Pristane / Phytane :	5.3
Pristane / n-C17 :	1.0
Phytane / n-C18 :	0.2
ACI :	14
Corr. Coeff. :	-0.9232

C-7 Distributions

(Gaschromatography)

C-7 Alkanes (%)	
Normal C-7 :	no data
Mono Branched :	
Poly Branched :	
C-7 Alkanes / Cyclo Alkanes (%)	
Normal C-7 :	no data
Cyclo Alkanes :	
Branched Alkanes :	
C-7 Alk. / Cyclo Alk. / Aromatics (%)	
Alkanes :	no data
Cyclo Alkanes :	
Aromatics :	

Carbon Isotope Ratios

(Mass Spectrometry)

Total Sample (topped) :	-25.8
Saturates :	-27.8
Aromatics :	-25.2

Distribution of Ring Compounds

(Field Ionisation Mass Spectrometry)

C-15 Ring Compounds (%)	
1 ring :	no data
2 ring :	
3 ring :	
C-30 Ring Compounds (%)	
3 ring :	no data
4 ring :	
5 ring :	
C-29 VR/E :	no data

Sterane and Triterpane Distributions

(Gaschromatography / Mass Spectrometry)

Steranes/Triterpanes (%)	
Iso Steranes :	17
Rearranged Steranes :	21
Triterpanes :	62
Steranes (%)	
Iso Steranes :	37
Rearranged Steranes :	31
Normal Steranes :	32
Triterpanes (%)	
C-30 Hopanes :	100
Oleanane (α+ β) :	0
W + T :	0
Steranes Carbon No. Dist. (%)	
C-27 :	24
C-28 :	29
C-29 :	47
C-29 Sterane Ratios	
20S / 20R + 20S :	0.44
Iso / Iso + Normal :	0.54
Triterpane Ratios	
TS / TM :	0.05
3R / 3R + 5R :	0.04

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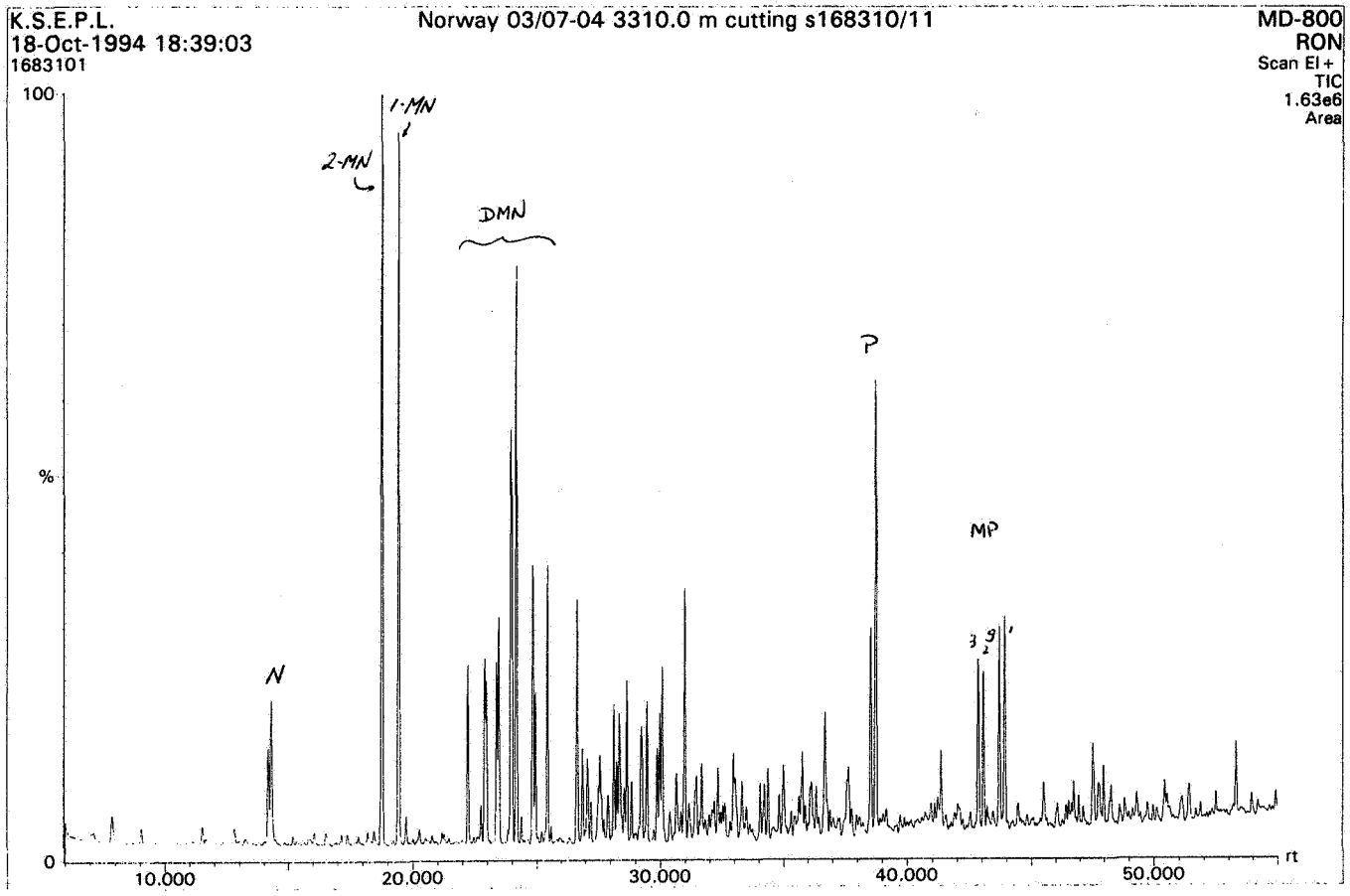
S1683101

Gas chromatogram of the aromatic hydrocarbons of the extract from well 03/07-04 (3310 m.), Norway



GCMS data of the aromatic fraction well 03/07-04 (3310 m.), Norway

Standard used for calculations: PDP
Discrimination factor : 0.78

I) NAPHTHALENES

a) Concentrations (ppm)		
2-MN		1262
1-MN		1103
2,6+2,7-DMN		473
1,6-DMN		662
1,5-DMN		335
1,3,5+1,4,6-TMN		171
2,3,6-TMN		141
1,2,5-TMN		217
C4-NAPH		123
THN		7
CAD		n.d.
Total Naphthalenes		4494

b) Parameters		
2-MN/1-MN	(MNR)	1.14
2,6+2,7-DMN/1,5-DMN	(DNR-1	1.41
2,3,6-TMN/1,3,5+1,4,6-TMN	(TNR-1	0.83
2,3,6-TMN/1,2,5-TMN	(TNR-2	0.65
2,3,6-TMN/THN		19.80
2,3,6-TMN/Cadelene		n.d.

II) PHENANTHRENES

a) Concentrations (ppm)	
P	970
3-MP	220
2-MP	229
9-MP	291
1-MP	310
Total Phenantrenes	2019

b) Parameters		
2-MP/1-MP		0.74
1.5*(2+3-MP/(P+1+9-MP))	(MPI-1	0.43
3*(2-MP/(P+1+9-MP))	(MPI-2	0.44
2+3-MP/1+9-MP		0.75
2+3-MP/1+9+2+3-MP		0.43

III) DIBENZOTHIOPHENES

a) Concentrations (ppm)	
DBT	107
4-MDBT	68
2+3-MDBT	55
1-MDBT	48
Total Dibenzothiophenes	278

b) Parameters	
4-MDBT/2+3-MDBT	1.22
4-MDBT/1-MDBT	1.41
2+3-MDBT/1-MDBT	1.15
4-MDBT/DBT	0.63
2+3-MDBT/DBT	0.52
1-MDBT/DBT	0.45

IV) BIPHENYLS

a) Concentrations (ppm)	
BP	304
2-MBP	35
3-MBP	236
4-MBP	69
Total Biphenyls	645

b) Parameters	
3-MBP/BP	0.78
3-MBP/4-MBP	3.42
3-MBP/2-MBP	6.78

V) DIBENZOFURANS

a) Concentrations (ppm)	
DBF	222
4-MDBF	91
2+3-MDBF	152
1-MDBF	72
Total Dibenzofurans	538

b) Parameters	
4-MDBF/2+3-MDBF	0.60
4-MDBF/1-MDBF	1.27
2+3-MDBF/1-MDBF	2.12
4-MDBF/DBF	0.41
2+3-MDBF/DBF	0.69
1-MDBF/DBF	0.32

VI) OVERALL RATIOS

Biphenyls/NAPH*	0.58
Dibenzothiophenes/NAP	0.25
Dibenzofurans/NAPH*	0.48

MN = methylnaphthalene
DMN = dimethylnaphthalene
TMN = trimethylnaphthalene
THN = tetrahyronaphthalene
DBF = methyldibenzofuran
MDBF= methyldibenzofuran
P = phenantrene
MP = methylphenanthrene
DBT = dibenzothiophene
MDBT= methyldibenzothiophene
BP = biphenyl
MBP = methylbiphenyl
NAPH*= 2,6+2,7-DMN + 1,5-DMN + 1,4,6+1,3,5-TMN + 2,3,6-TMN

GCMS data of the aromatic fraction well 03/07-04 (3310 m.), Norway

VII) Misc. NAPHTHALENES

a) Concentrations (ppm)

2,6-DMN	211	4,5-DMP	16
2,7-DMN	262	2,6+3,6-DMP	34
1,3+1,7-DMN	643	3,5-DMP	34
1,6-DMN	662	2,7-DMP	19
1,4-DMN	n.d.	3,9-DMP	151
2,3-DMN	150	1,6+2,5+2,9-DMP	59
1,5-DMN	335	1,7-DMP	69
1,2-DMN	227	1,9+4,9-DMP	68
1,4+2,3-DMN	150	1,5-DMP	n.d.
		1,8-DMP	23
		1,2-DMP	26
		9,10-DMP	n.d.

1,3,7-TMN	134	1,2,6-TMP	3
1,3,6-TMN	173	1,2,5-TMP	11
1,3,5+1,4,6-TMN	171	1,2,9-TMP	7
2,3,6-TMN	141	1,2,7-TMP	n.d.
1,2,7-TMN	92	1,2,8-TMP	22
1,6,7-TMN	136		
1,2,6-TMN	148		
1,2,4-TMN	32		
1,2,5-TMN	217		

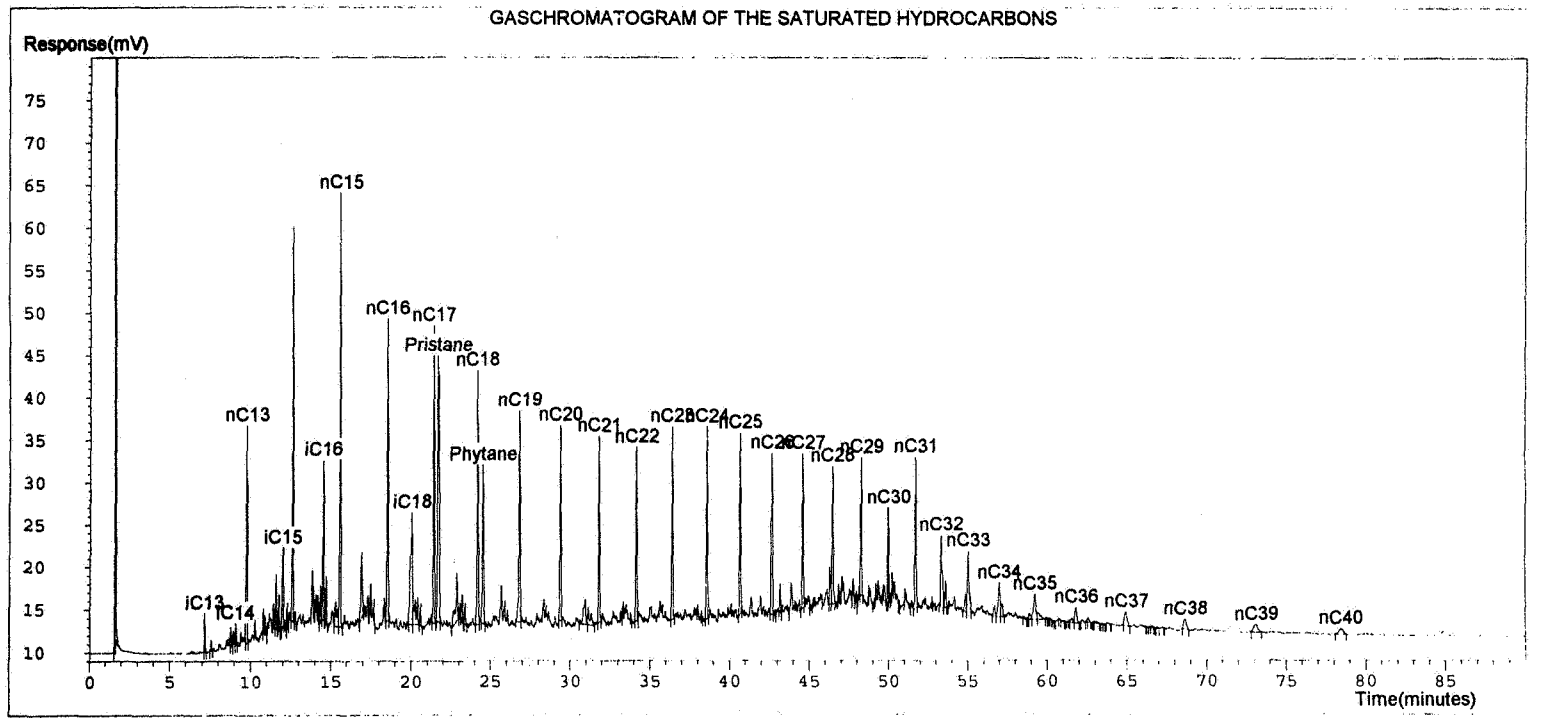
1,3,5,7-TeMN	23
1,3,6,7-TeMN	55
1,2,4,7-TeMN	45
1,2,5,7-TeMN	47
2,3,6,7-TeMN	30
1,2,6,7-TeMN	33
1,2,5,6-TeMN (C4-NAPH)	123

b) Parameters

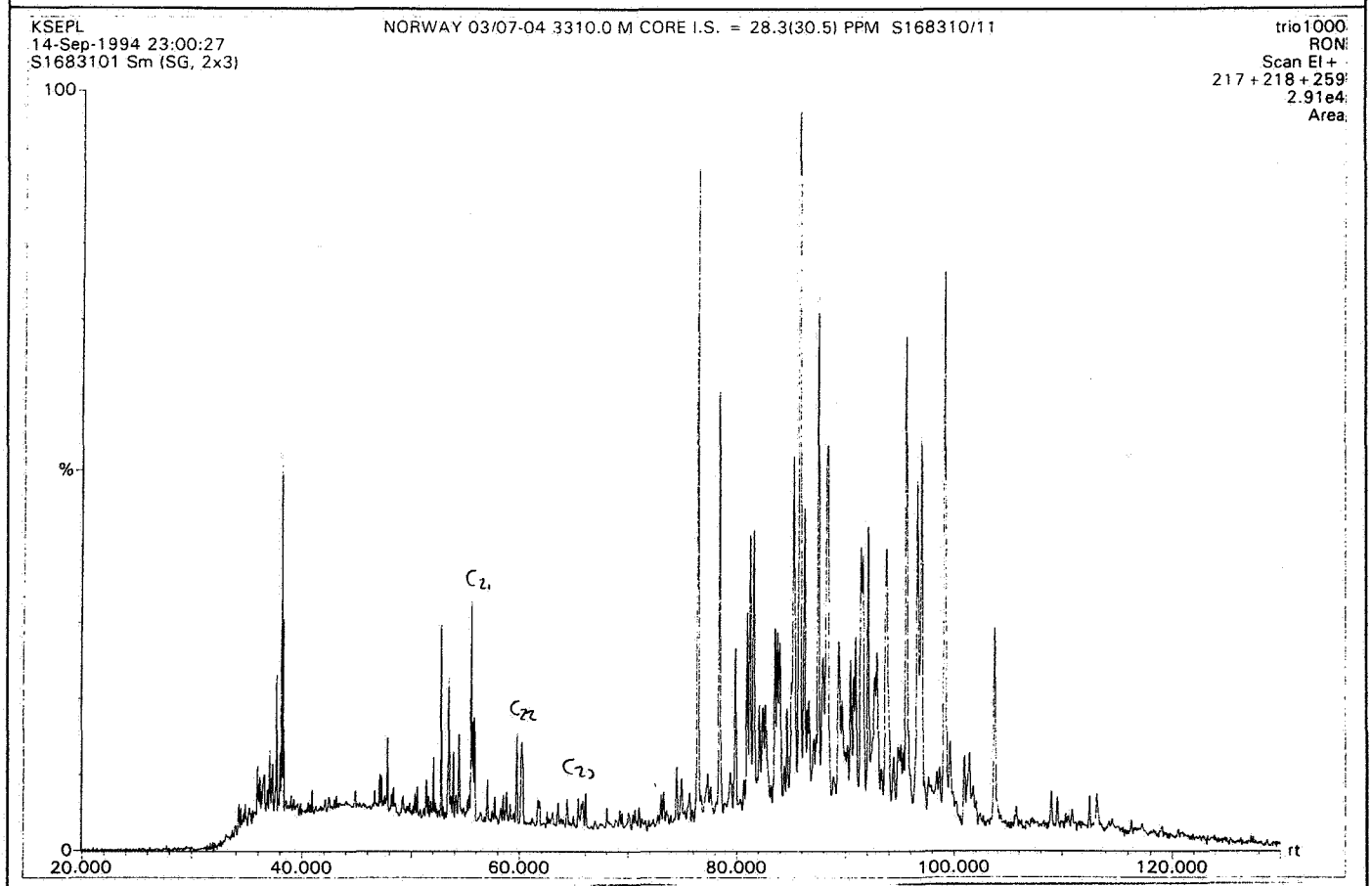
1,2,5-TMN/1,3,6-TMN	1.25
1,2,7-TMN/1,3,7-TMN	0.69

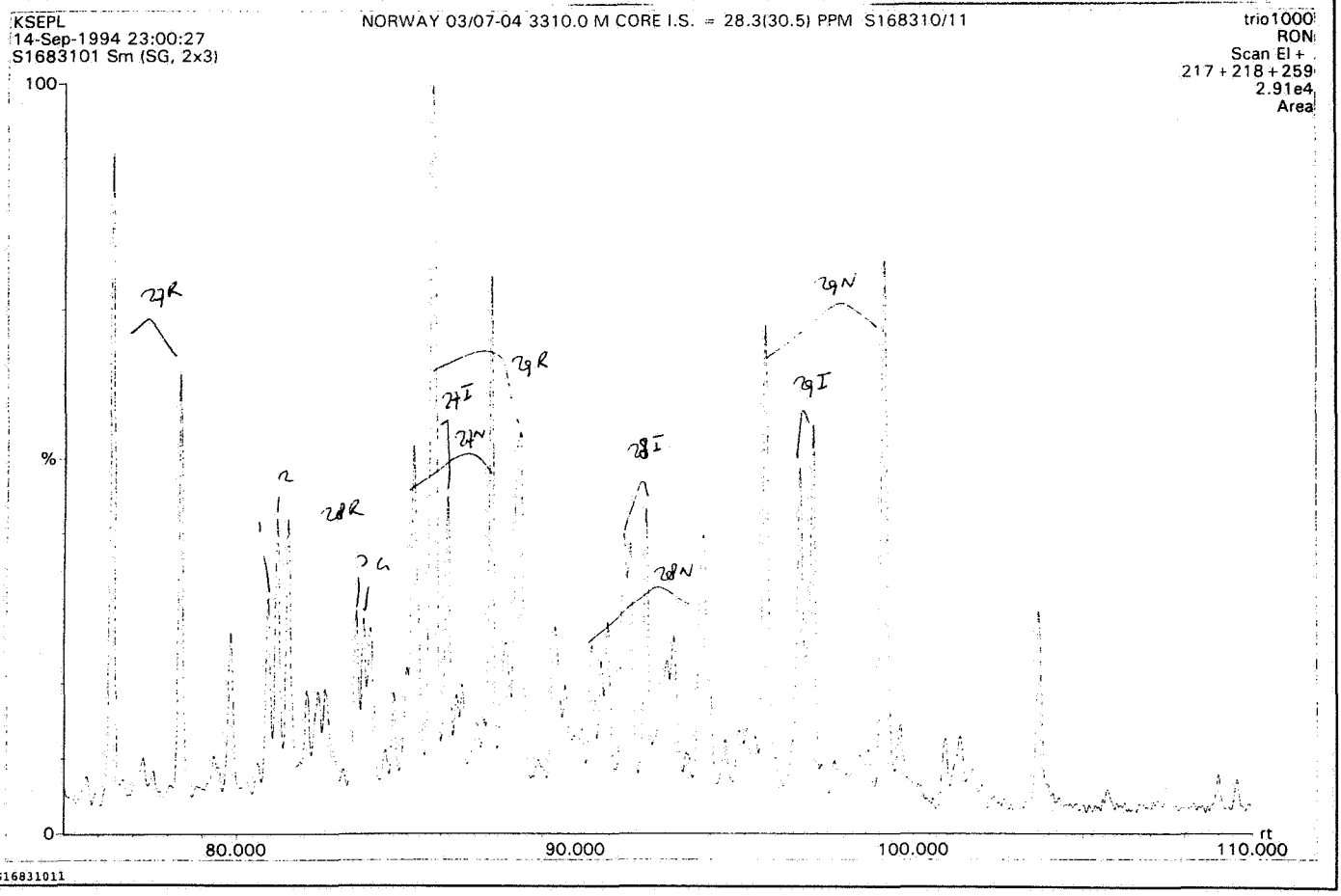
The assigment of some of these peaks is tentative

Gas chromatogram of the saturated hydrocarbons of the extract from well 03/07-04 (3310 m.), Norway



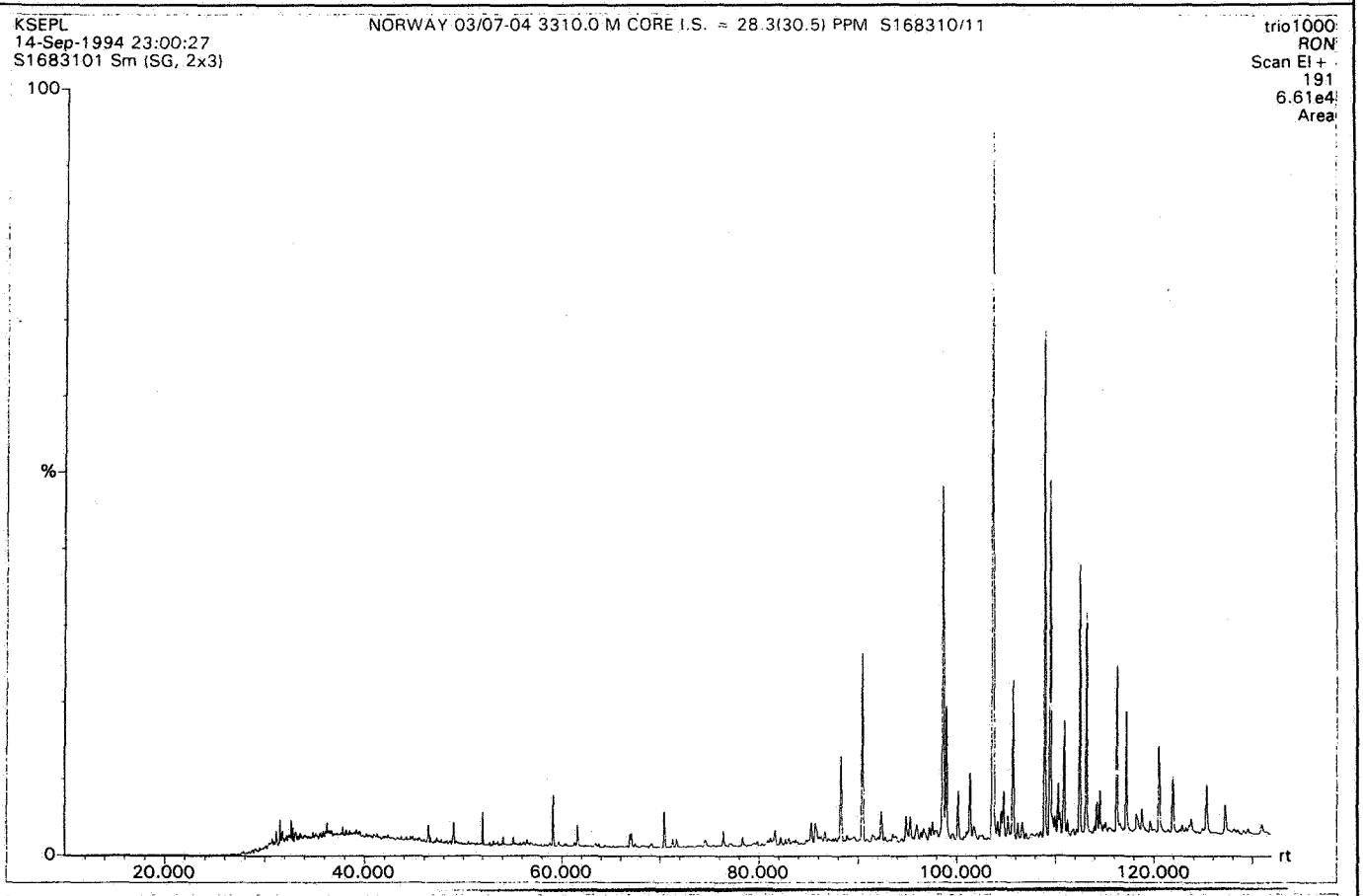
Sterane Fragmentograms of the extract from well 03/07-04 (3310 m.), Norway

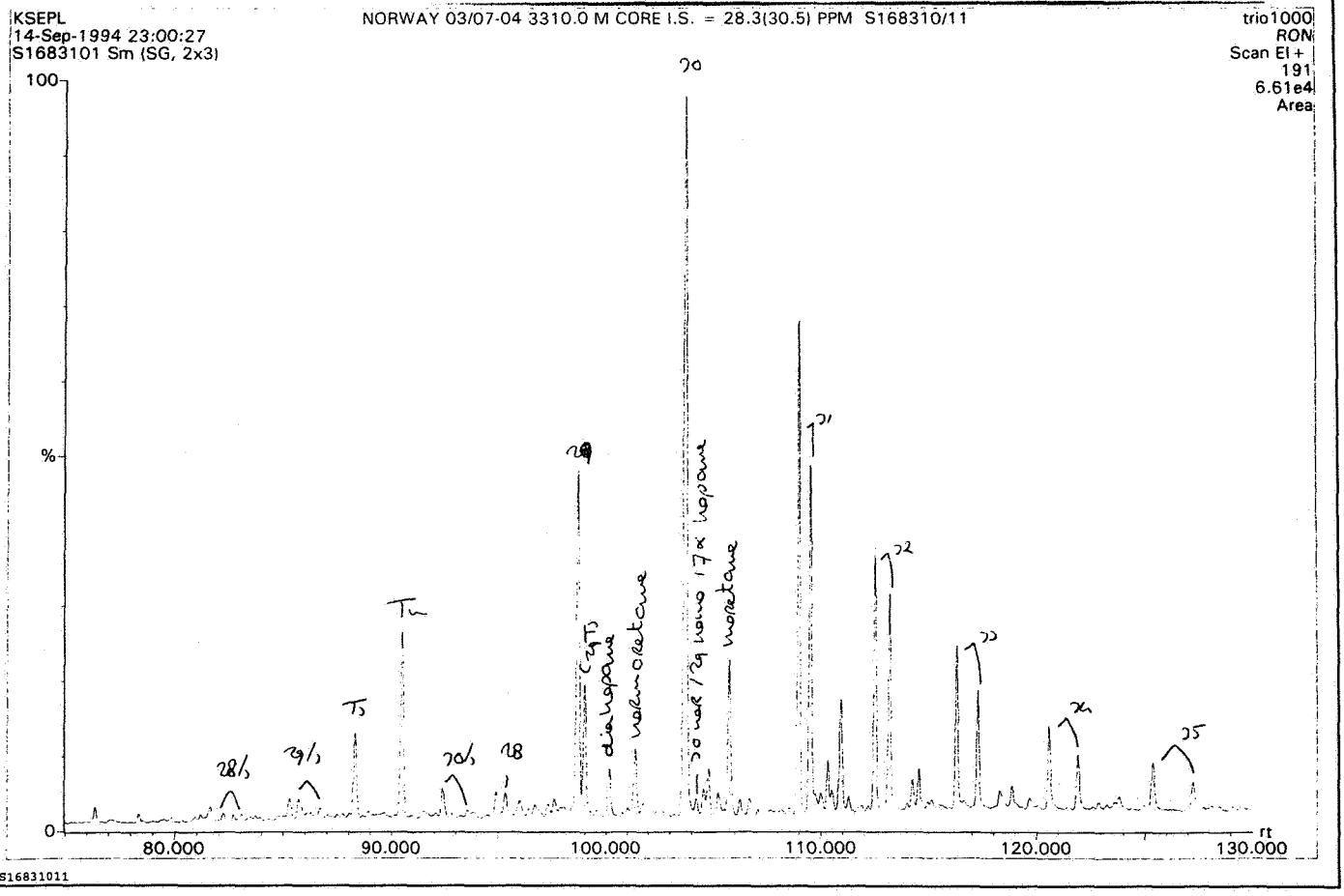




S16831011

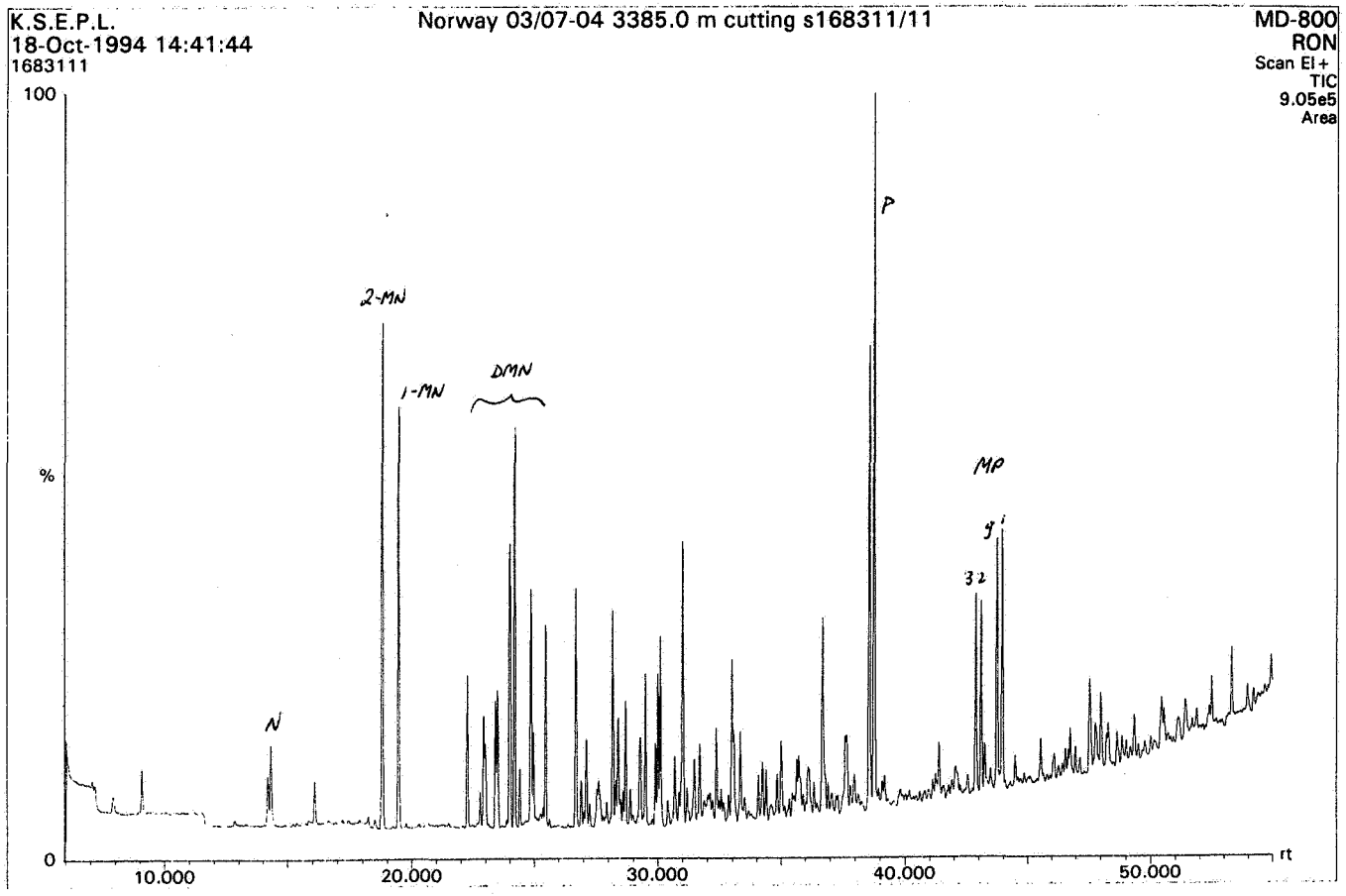
Triterpane Fragmentograms of the extract from well 03/07-04 (3310 m.), Norway





S16831111

Gas chromatogram of the aromatic hydrocarbons of the extract from well 03/07-04 (3385 m.), Norway



GCMS data of the aromatic fraction well 03/07-04 (3385 m.), Norway

Standard used for calculations: PDP
Discrimination factor : 0.18

I) NAPHTHALENES

a) Concentrations (ppm)		
2-MN		403
1-MN		321
2,6+2,7-DMN		155
1,6-DMN		220
1,5-DMN		132
1,3,5+1,4,6-TMN		64
2,3,6-TMN		78
1,2,5-TMN		125
C4-NAPH		102
THN		1
CAD		n.d.
Total Naphthalenes		1602

b) Parameters		
2-MN/1-MN	(MNR)	1.25
2,6+2,7-DMN/1,5-DMN	(DNR-1	1.17
2,3,6-TMN/1,3,5+1,4,6-TMN	(TNR-1	1.20
2,3,6-TMN/1,2,5-TMN	(TNR-2	0.62
2,3,6-TMN/THN		113.06
2,3,6-TMN/Cadelene		n.d.

II) PHENANTHRENES

a) Concentrations (ppm)		
P		741
3-MP		134
2-MP		138
9-MP		182
1-MP		180
Total Phenantrenes		1376

b) Parameters		
2-MP/1-MP		0.77
1.5*(2+3-MP/(P+1+9-MP))	(MPI-1	0.37
3*(2-MP/(P+1+9-MP))	(MPI-2	0.38
2+3-MP/1+9-MP		0.75
2+3-MP/1+9+2+3-MP		0.43

III) DIBENZOTHIOPHENES

a) Concentrations (ppm)	
DBT	56
4-MDBT	26
2+3-MDBT	22
1-MDBT	19
Total Dibenzothiophenes	123

b) Parameters	
4-MDBT/2+3-MDBT	1.15
4-MDBT/1-MDBT	1.39
2+3-MDBT/1-MDBT	1.21
4-MDBT/DBT	0.46
2+3-MDBT/DBT	0.40
1-MDBT/DBT	0.33

IV) BIPHENYLS

a) Concentrations (ppm)	
BP	129
2-MBP	11
3-MBP	132
4-MBP	44
Total Biphenyls	316

b) Parameters	
3-MBP/BP	1.02
3-MBP/4-MBP	3.02
3-MBP/2-MBP	11.58

V) DIBENZOFURANS

a) Concentrations (ppm)	
DBF	194
4-MDBF	61
2+3-MDBF	148
1-MDBF	58
Total Dibenzofurans	462

b) Parameters	
4-MDBF/2+3-MDBF	0.41
4-MDBF/1-MDBF	1.06
2+3-MDBF/1-MDBF	2.55
4-MDBF/DBF	0.32
2+3-MDBF/DBF	0.76
1-MDBF/DBF	0.30

VI) OVERALL RATIOS

Biphenyls/NAPH*	0.74
Dibenzothiophenes/NAP	0.29
Dibenzofurans/NAPH*	1.08

MN = methylnaphthalene
DMN = dimethylnaphthalene
TMN = trimethylnaphthalene
THN = tetrahyronaphthalene
DBF = methyldibenzofuran
MDBF= methyldibenzofuran
P = phenantrene
MP = methylphenanthrene
DBT = dibenzothiophene
MDBT= methyldibenzothiophene
BP = biphenyl
MBP = methylbiphenyl
NAPH*= 2,6+2,7-DMN + 1,5-DMN + 1,4,6+1,3,5-TMN + 2,3,6-TMN

GCMS data of the aromatic fraction well 03/07-04 (3385 m.), Norway

VII) Misc. NAPHTHALENES

a) Concentrations (ppm)

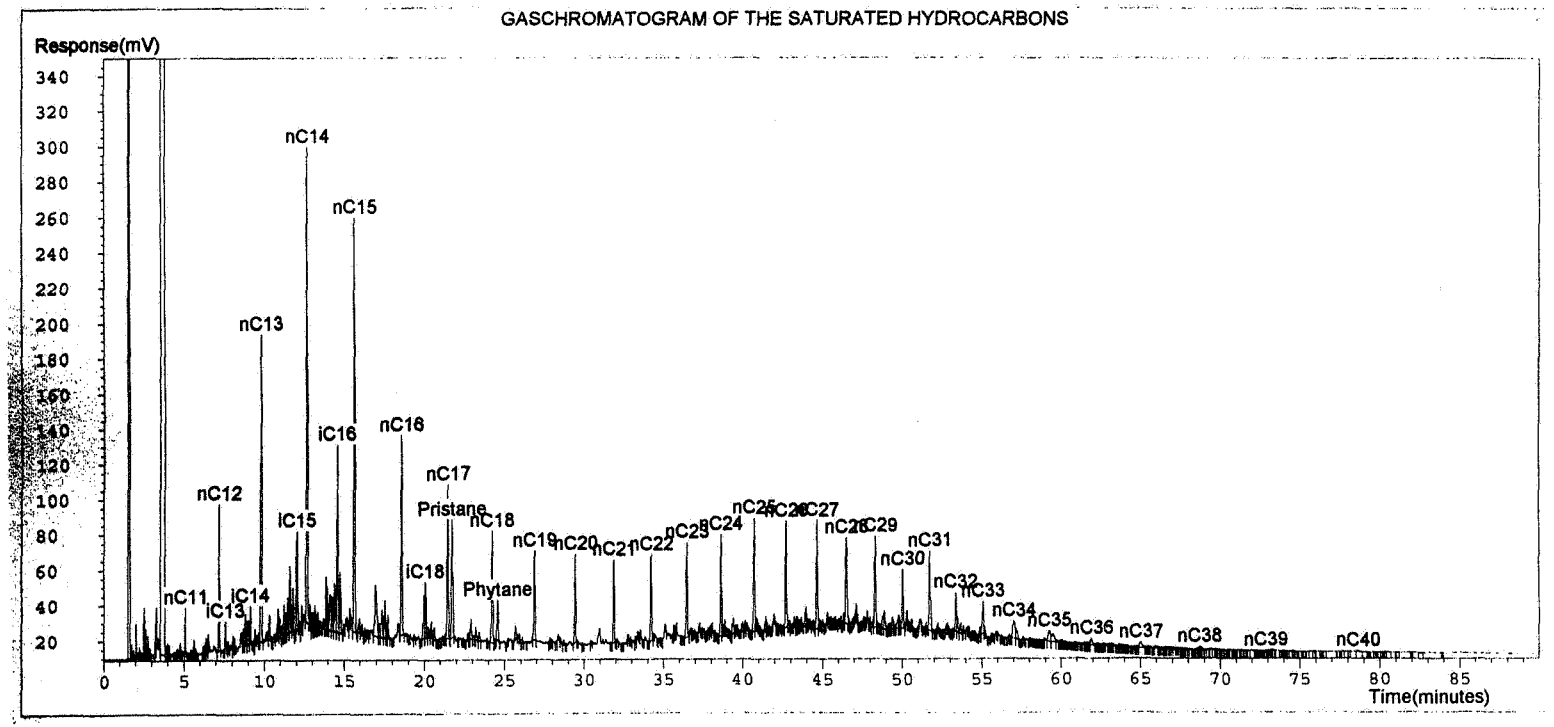
2,6-DMN	71	4,5-DMP	9
2,7-DMN	84	2,6+3,6-DMP	19
1,3+1,7-DMN	210	3,5-DMP	19
1,6-DMN	220	2,7-DMP	12
1,4-DMN	n.d.	3,9-DMP	90
2,3-DMN	46	1,6+2,5+2,9-DMP	47
1,5-DMN	132	1,7-DMP	50
1,2-DMN	85	1,9+4,9-DMP	42
1,4+2,3-DMN	46	1,5-DMP	n.d.
		1,8-DMP	13
		1,2-DMP	19
		9,10-DMP	n.d.
1,3,7-TMN	49	1,2,6-TMP	2
1,3,6-TMN	67	1,2,5-TMP	8
1,3,5+1,4,6-TMN	64	1,2,9-TMP	4
2,3,6-TMN	78	1,2,7-TMP	n.d.
1,2,7-TMN	41	1,2,8-TMP	13
1,6,7-TMN	78		
1,2,6-TMN	88		
1,2,4-TMN	12		
1,2,5-TMN	125		
1,3,5,7-TeMN	8		
1,3,6,7-TeMN	30		
1,2,4,7-TeMN	22		
1,2,5,7-TeMN	29		
2,3,6,7-TeMN	24		
1,2,6,7-TeMN	20		
1,2,5,6-TeMN (C4-NAPH)	102		

b) Parameters

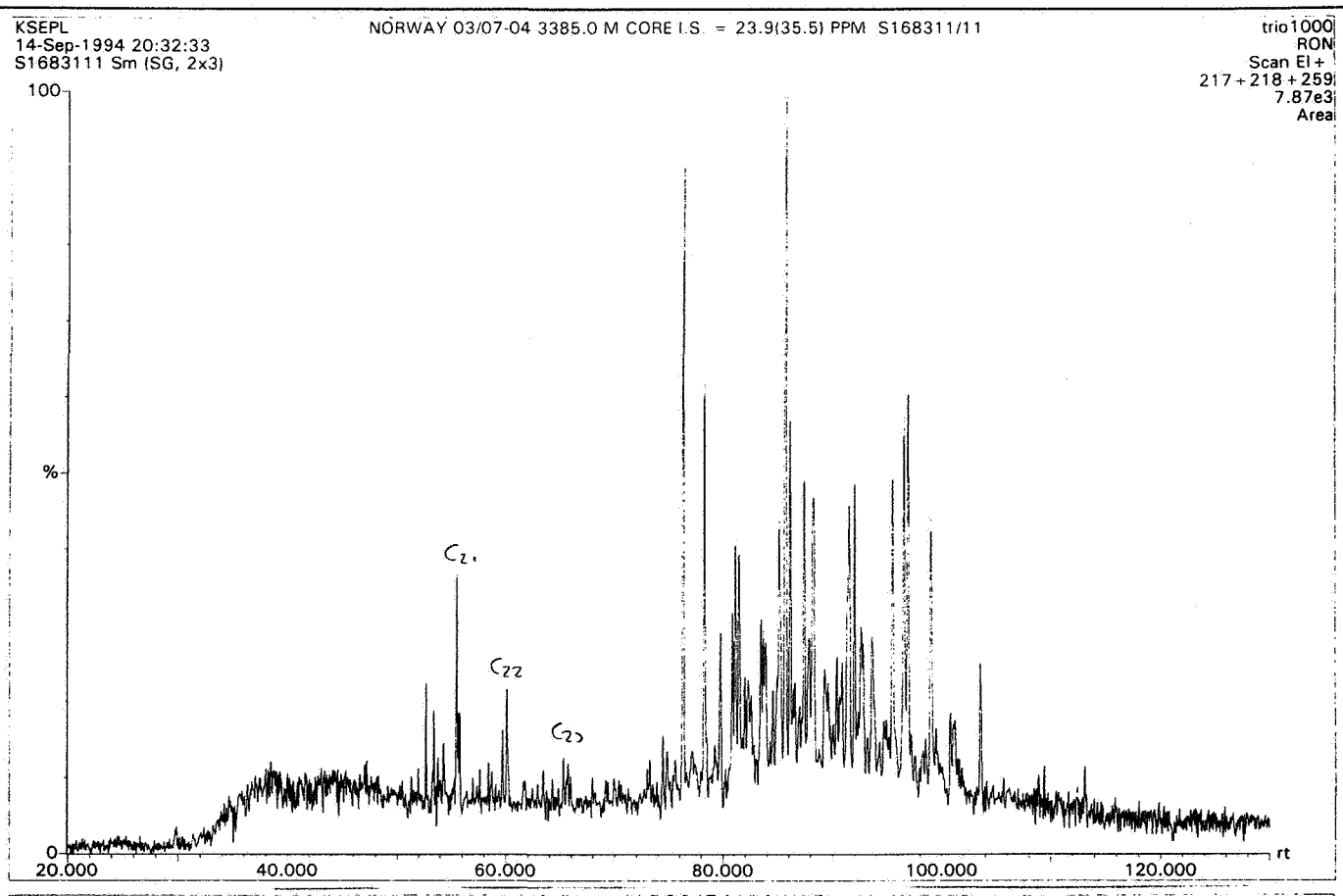
1,2,5-TMN/1,3,6-TMN	1.87
1,2,7-TMN/1,3,7-TMN	0.84

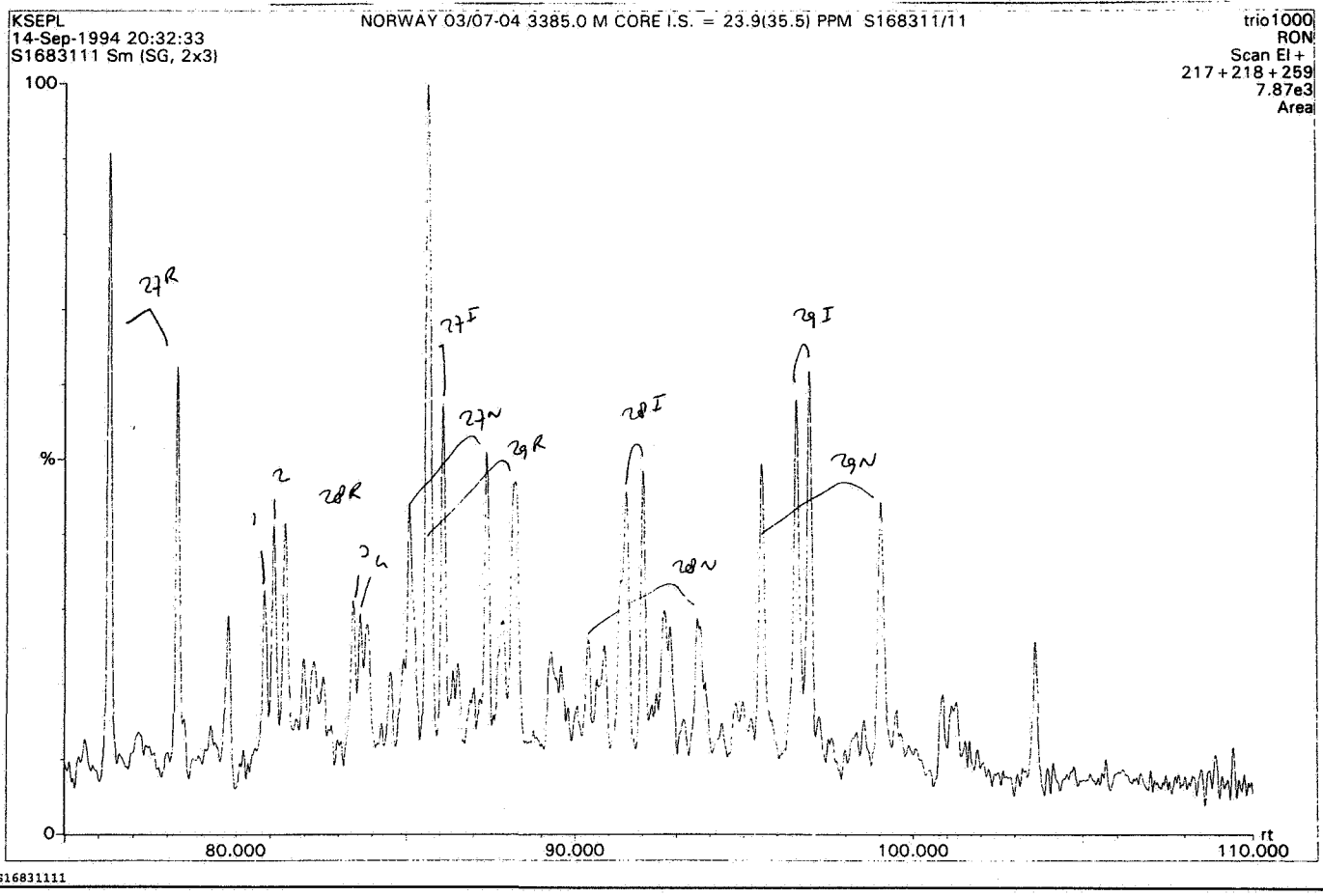
The assigment of some of these peaks is tentative

Gas chromatogram of the saturated hydrocarbons of the extract from well 03/07-04 (3385 m.), Norway



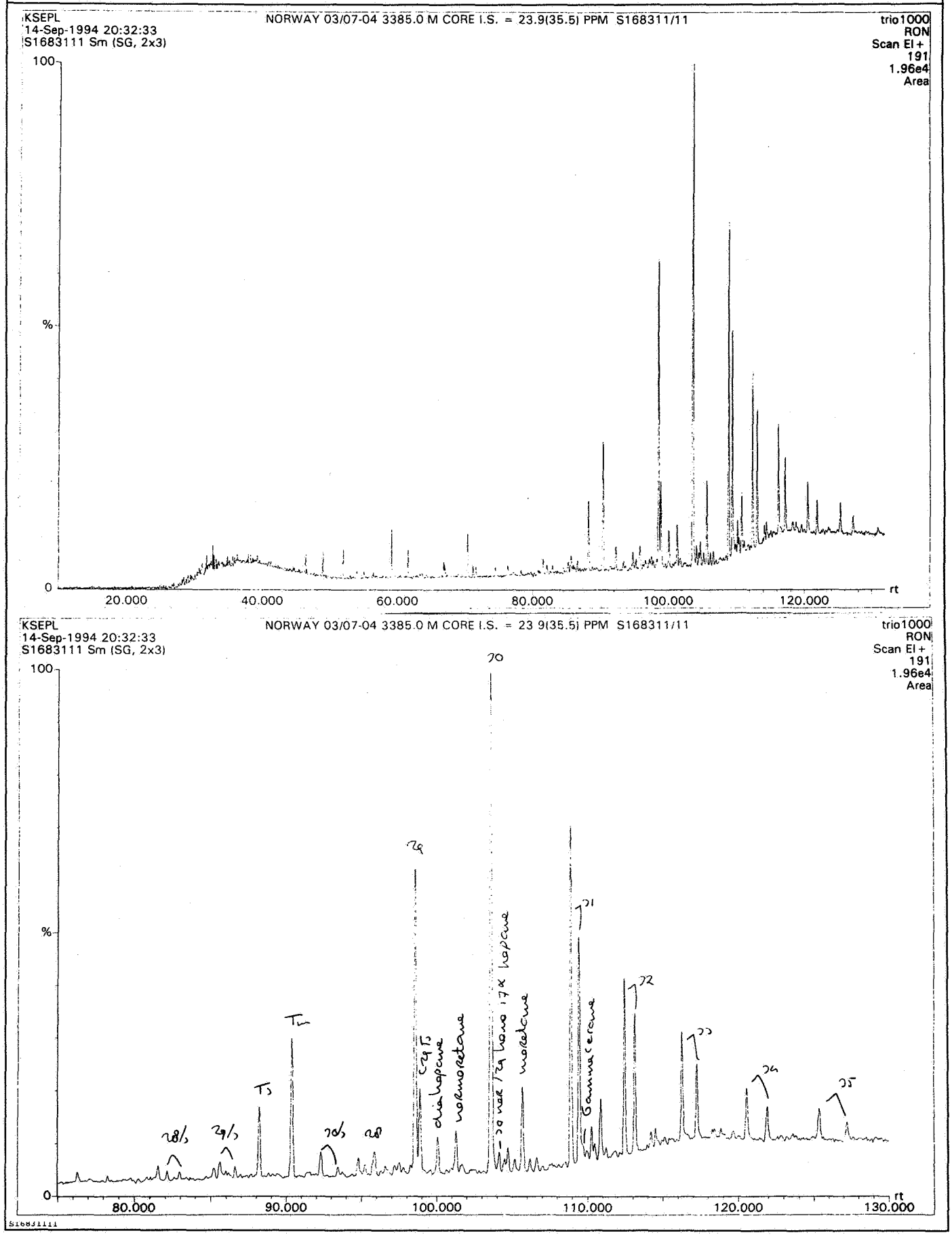
Sterane Fragmentograms of the extract from well 03/07-04 (3385 m.), Norway





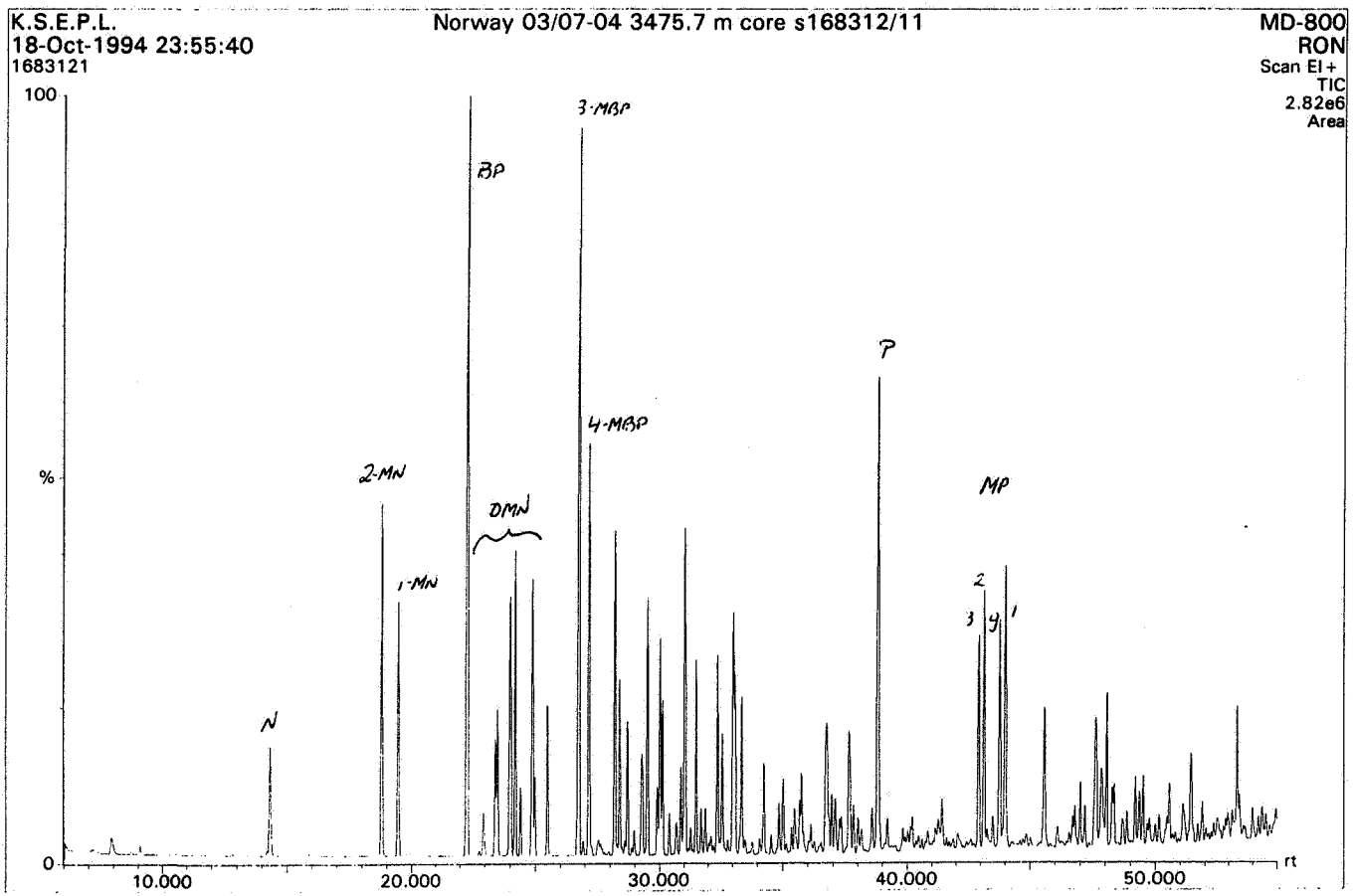
S16831111

Triterpane Fragmentograms of the extract from well 03/07-04 (3385 m.), Norway



S16831211

Gas chromatogram of the aromatic hydrocarbons of the extract from well 03/07-04 (3475.7 m.), Norway



GCMS data of the aromatic fraction well 03/07-04 (3475.7 m.), Norway

Standard used for calculations: PDP
Discrimination factor : 0.19

I) NAPHTHALENES		
a) Concentrations (ppm)		
2-MN		2305
1-MN		1560
2,6+2,7-DMN		1207
1,6-DMN		1351
1,5-DMN		1341
1,3,5+1,4,6-TMN		579
2,3,6-TMN		1105
1,2,5-TMN		833
C4-NAPH		425
THN		n.d.
CAD		n.d.
Total Naphthalenes		10705
b) Parameters		
2-MN/1-MN	(MNR)	1.48
2,6+2,7-DMN/1,5-DMN	(DNR-1	0.90
2,3,6-TMN/1,3,5+1,4,6-TMN	(TNR-1	1.91
2,3,6-TMN/1,2,5-TMN	(TNR-2	1.33
2,3,6-TMN/THN		n.d.
2,3,6-TMN/Cadelene		n.d.

II) PHENANTHRENES		
a) Concentrations (ppm)		
P		4423
3-MP		1243
2-MP		1587
9-MP		1371
1-MP		1651
Total Phenantrenes		10274
b) Parameters		
2-MP/1-MP		0.96
1.5*(2+3-MP/(P+1+9-MP))	(MPI-1	0.57
3*(2-MP/(P+1+9-MP))	(MPI-2	0.64
2+3-MP/1+9-MP		0.94
2+3-MP/1+9+2+3-MP		0.48

III) DIBENZOTHIOPHENES	
a) Concentrations (ppm)	
DBT	149
4-MDBT	117
2+3-MDBT	113
1-MDBT	24
Total Dibenzothiophenes	404

b) Parameters	
4-MDBT/2+3-MDBT	1.03
4-MDBT/1-MDBT	4.83
2+3-MDBT/1-MDBT	4.69
4-MDBT/DBT	0.78
2+3-MDBT/DBT	0.76
1-MDBT/DBT	0.16

IV) BIPHENYLS	
a) Concentrations (ppm)	
BP	5936
2-MBP	130
3-MBP	4241
4-MBP	1979
Total Biphenyls	12286
b) Parameters	
3-MBP/BP	0.71
3-MBP/4-MBP	2.14
3-MBP/2-MBP	32.70

V) DIBENZOFURANS	
a) Concentrations (ppm)	
DBF	2645
4-MDBF	1000
2+3-MDBF	2131
1-MDBF	766
Total Dibenzofurans	6543
b) Parameters	
4-MDBF/2+3-MDBF	0.47
4-MDBF/1-MDBF	1.31
2+3-MDBF/1-MDBF	2.78
4-MDBF/DBF	0.38
2+3-MDBF/DBF	0.81
1-MDBF/DBF	0.29

VI) OVERALL RATIOS	
Biphenyls/NAPH*	2.90
Dibenzothiophenes/NAP	0.10
Dibenzofurans/NAPH*	1.55

MN = methylnaphthalene
DMN = dimethylnaphthalene
TMN = trimethylnaphthalene
THN = tetrahyronaphthalene
DBF = methyldibenzofuran
MDBF= methyldibenzofuran
P = phenantrene
MP = methylphenanthrene
DBT = dibenzothiophene
MDBT= methyldibenzothiophene
BP = biphenyl
MBP = methylbiphenyl
NAPH*= 2,6+2,7-DMN + 1,5-DMN + 1,4,6+1,3,5-TMN + 2,3,6-TMN

S16831211

GCMS data of the aromatic fraction well 03/07-04 (3475.7 m.), Norway

/II) Misc. NAPHTHALENES

a) Concentrations (ppm)

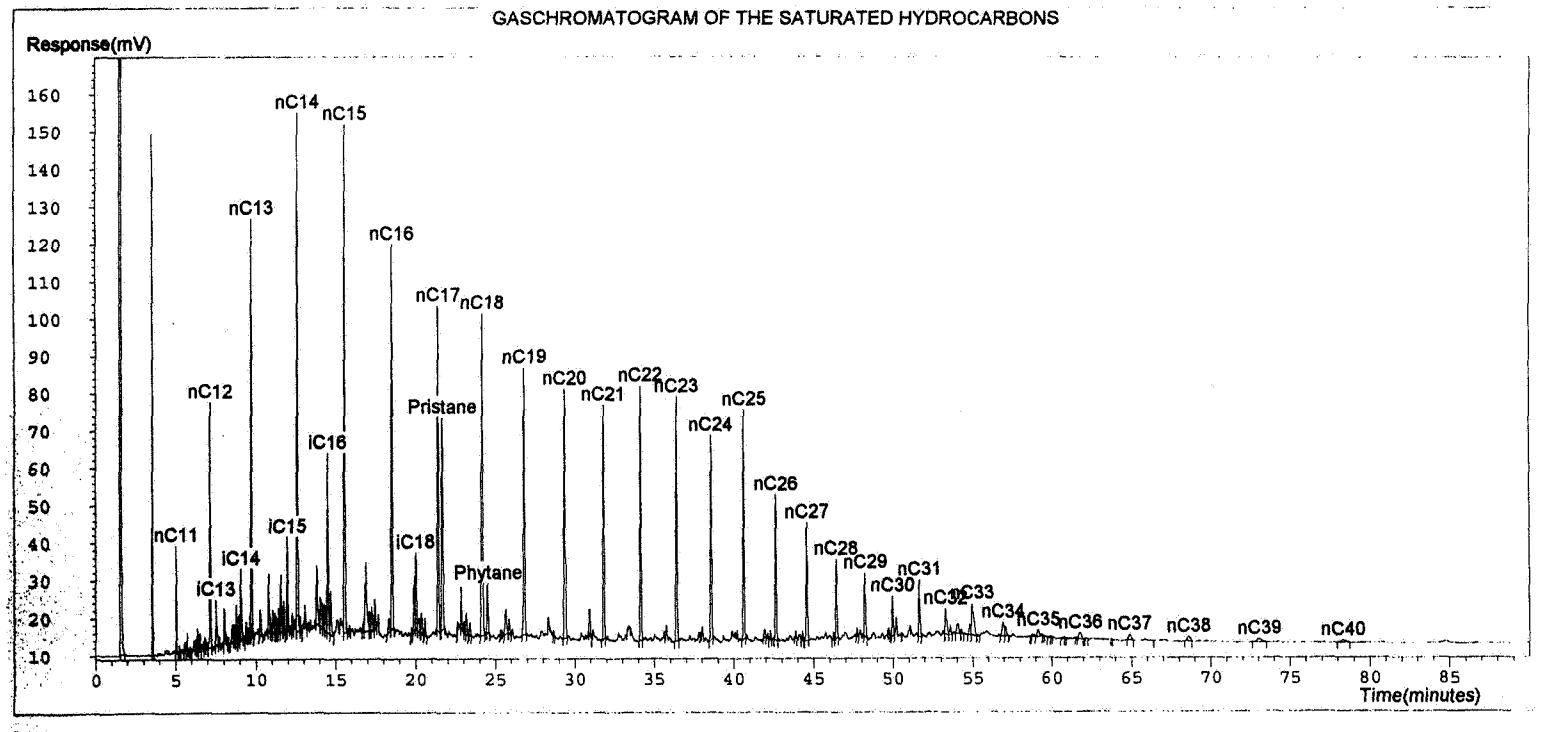
2,6-DMN	577	4,5-DMP	82
2,7-DMN	629	2,6+3,6-DMP	149
1,3+1,7-DMN	1604	3,5-DMP	278
1,6-DMN	1351	2,7-DMP	200
1,4-DMN	n.d.	3,9-DMP	1045
2,3-DMN	250	1,6+2,5+2,9-DMP	600
1,5-DMN	1341	1,7-DMP	759
1,2-DMN	551	1,9+4,9-DMP	262
1,4+2,3-DMN	250	1,5-DMP	n.d.
		1,8-DMP	133
		1,2-DMP	218
		9,10-DMP	n.d.
1,3,7-TMN	437	1,2,6-TMP	38
1,3,6-TMN	518	1,2,5-TMP	188
1,3,5+1,4,6-TMN	579	1,2,9-TMP	125
2,3,6-TMN	1105	1,2,7-TMP	n.d.
1,2,7-TMN	261	1,2,8-TMP	107
1,6,7-TMN	988		
1,2,6-TMN	517		
1,2,4-TMN	82		
1,2,5-TMN	833		
1,3,5,7-TeMN	45		
1,3,6,7-TeMN	365		
1,2,4,7-TeMN	206		
1,2,5,7-TeMN	162		
2,3,6,7-TeMN	178		
1,2,6,7-TeMN	103		
1,2,5,6-TeMN (C4-NAPH)	425		

b) Parameters

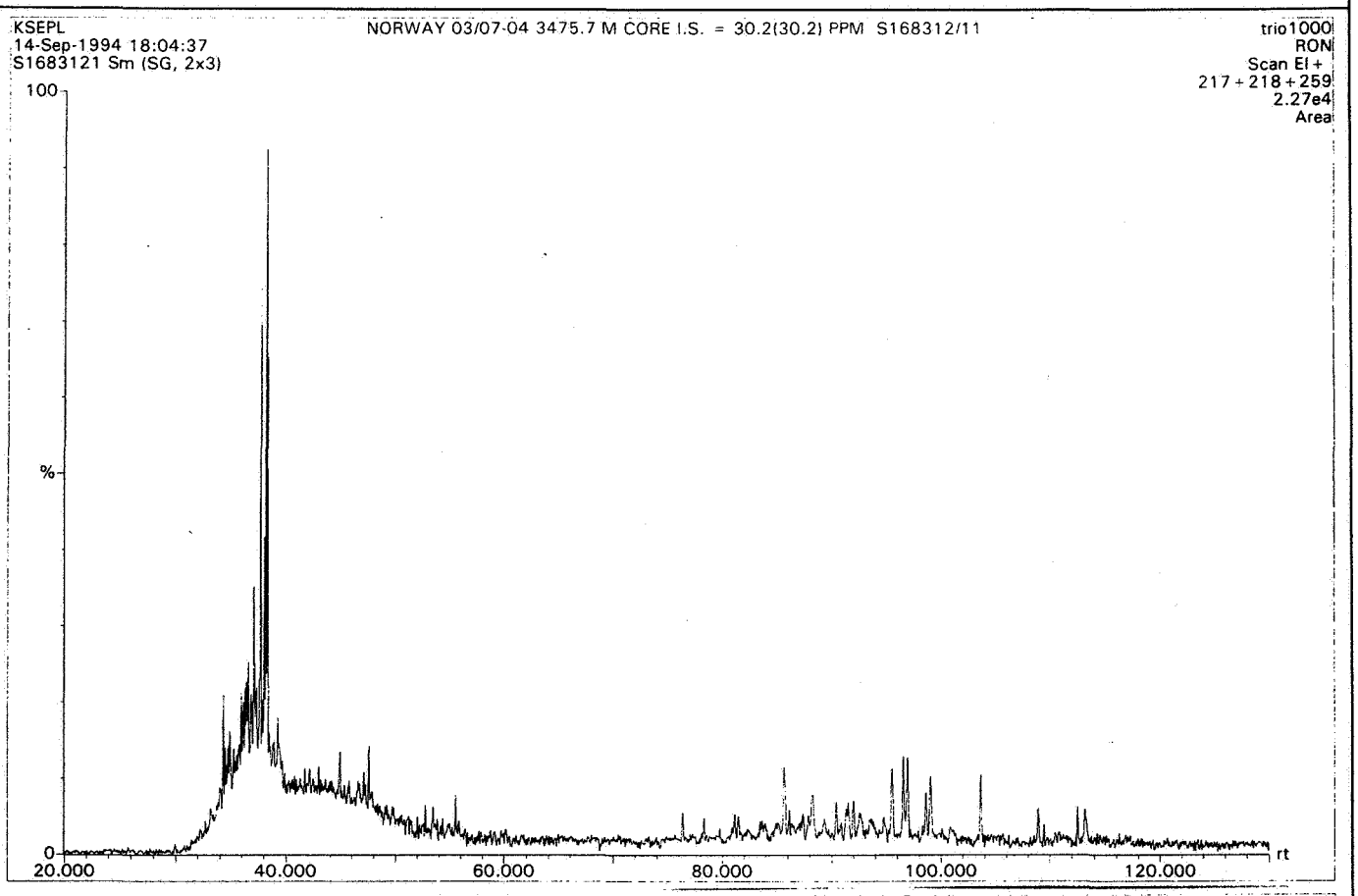
1,2,5-TMN/1,3,6-TMN	1.61
1,2,7-TMN/1,3,7-TMN	0.60

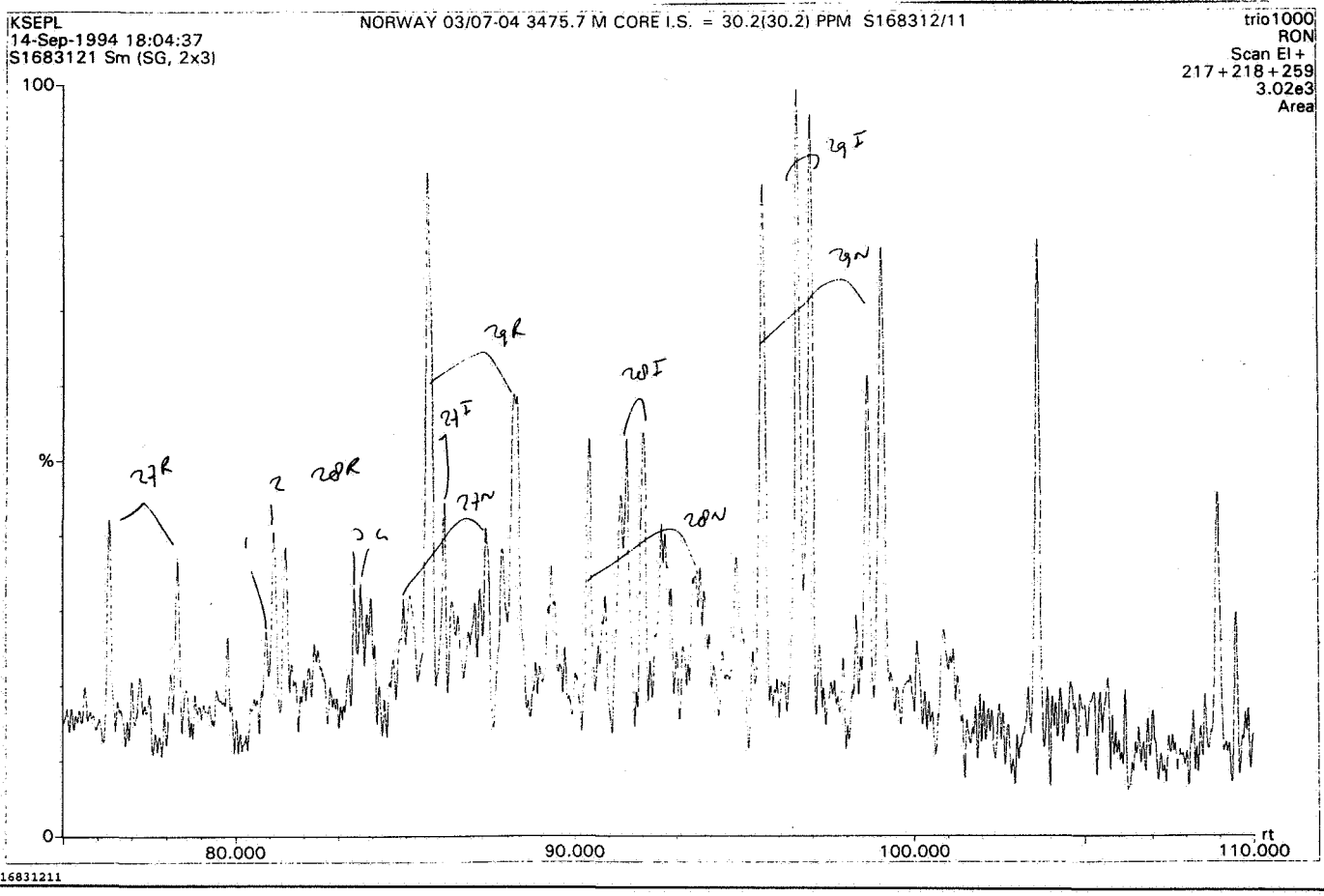
The assigment of some of these peaks is tentative

Gas chromatogram of the saturated hydrocarbons of the extract from well 03/07-04 (3475.7 m.), Norway



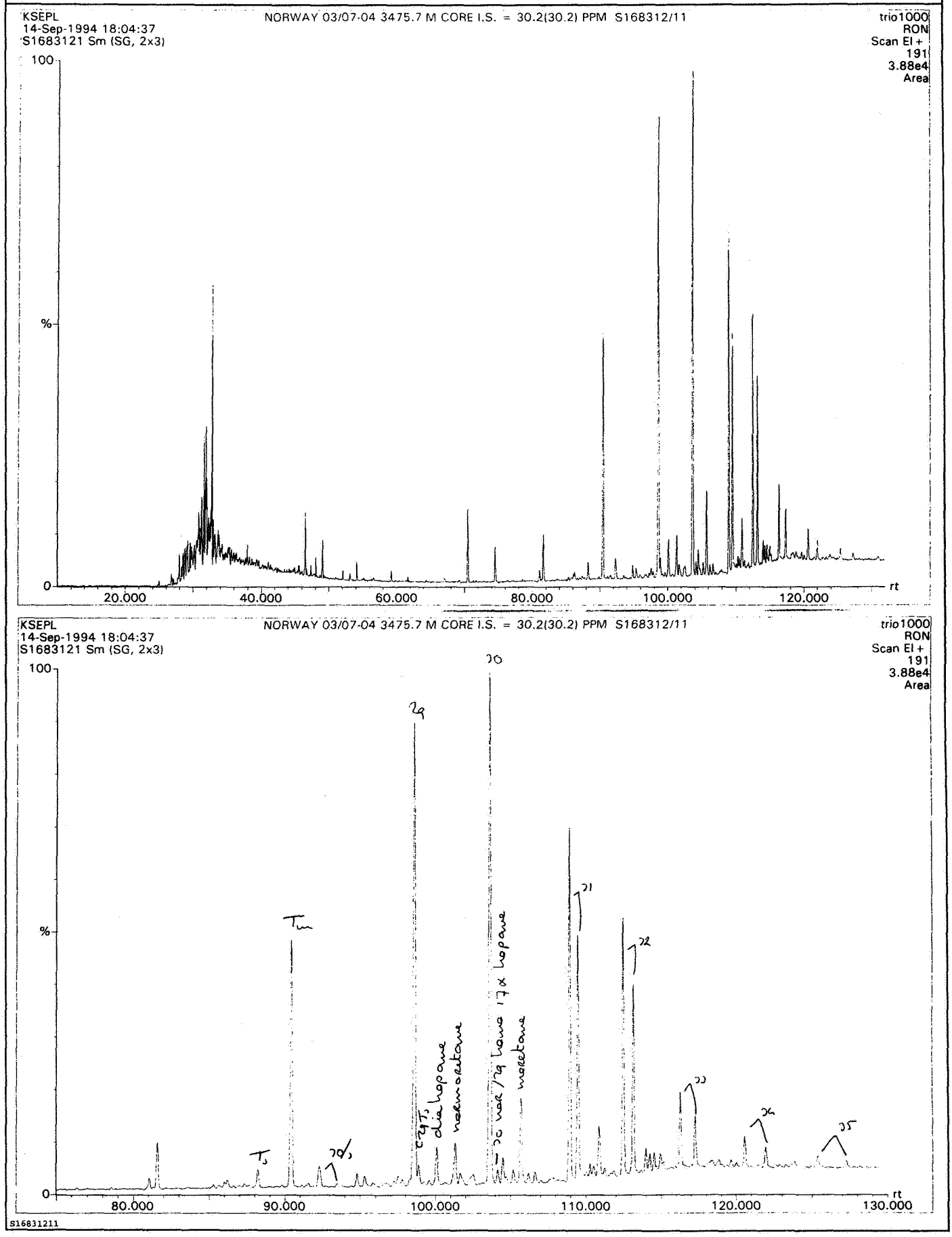
Sterane Fragmentograms of the extract from well 03/07-04 (3475.7 m.), Norway





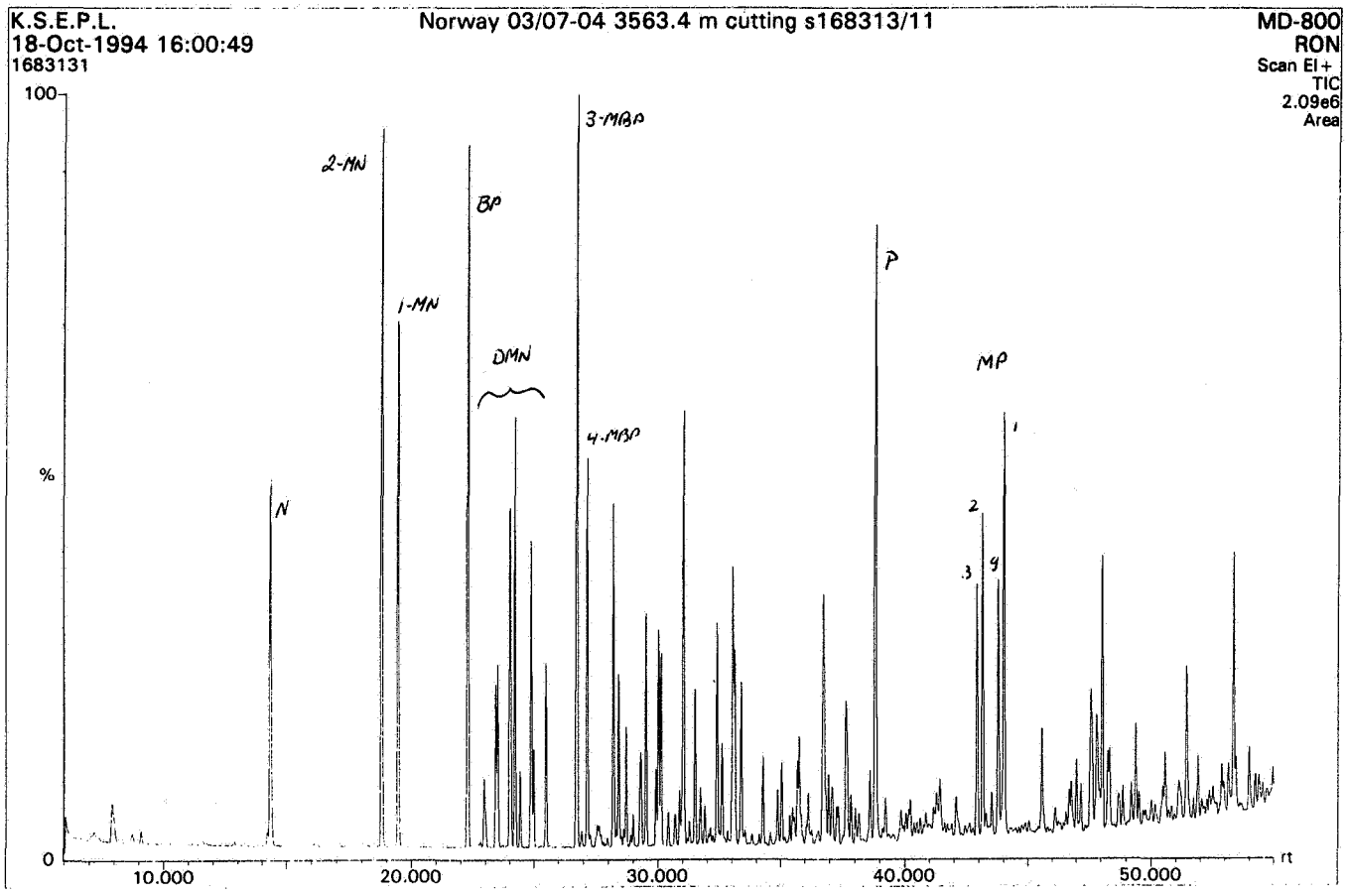
S16831211

Triterpane Fragmentograms of the extract from well 03/07-04 (3475.7 m.), Norway



S16831311

Gas chromatogram of the aromatic hydrocarbons of the extract from well 03/07-04 (3563.4 m.), Norway



GCMS data of the aromatic fraction well 03/07-04 (3563.4 m.), Norway

Standard used for calculations: PDP
Discrimination factor : 0.37

I) NAPHTHALENES

a) Concentrations (ppm)

2-MN	3332
1-MN	2236
2,6+2,7-DMN	1091
1,6-DMN	1304
1,5-DMN	979
1,3,5+1,4,6-TMN	379
2,3,6-TMN	667
1,2,5-TMN	870
C4-NAPH	656
THN	n.d.
CAD	n.d.
Total Naphthalenes	11514

b) Parameters

2-MN/1-MN	(MNR)	1.49
2,6+2,7-DMN/1,5-DMN	(DNR-1	1.11
2,3,6-TMN/1,3,5+1,4,6-TMN	(TNR-1	1.76
2,3,6-TMN/1,2,5-TMN	(TNR-2	0.77
2,3,6-TMN/THN		n.d.
2,3,6-TMN/Cadelene		n.d.

II) PHENANTHRENES

a) Concentrations (ppm)

P	3881
3-MP	1007
2-MP	1316
9-MP	1008
1-MP	1700
Total Phenantrenes	8912

b) Parameters

2-MP/1-MP		0.77
1.5*(2+3-MP/(P+1+9-MP))	(MPI-1	0.53
3*(2-MP/(P+1+9-MP))	(MPI-2	0.60
2+3-MP/1+9-MP		0.86
2+3-MP/1+9+2+3-MP		0.46

III) DIBENZOTHIOPHENES

a) Concentrations (ppm)

DBT	187
4-MDBT	115
2+3-MDBT	189
1-MDBT	31
Total Dibenzothiophenes	522

b) Parameters

4-MDBT/2+3-MDBT	0.61
4-MDBT/1-MDBT	3.72
2+3-MDBT/1-MDBT	6.11
4-MDBT/DBT	0.62
2+3-MDBT/DBT	1.01
1-MDBT/DBT	0.17

IV) BIPHENYLS

a) Concentrations (ppm)

BP	3540
2-MBP	94
3-MBP	2623
4-MBP	1194
Total Biphenyls	7452

b) Parameters

3-MBP/BP	0.74
3-MBP/4-MBP	2.20
3-MBP/2-MBP	27.77

V) DIBENZOFURANS

a) Concentrations (ppm)

DBF	1834
4-MDBF	776
2+3-MDBF	1600
1-MDBF	552
Total Dibenzofurans	4763

b) Parameters

4-MDBF/2+3-MDBF	0.48
4-MDBF/1-MDBF	1.41
2+3-MDBF/1-MDBF	2.90
4-MDBF/DBF	0.42
2+3-MDBF/DBF	0.87
1-MDBF/DBF	0.30

VI) OVERALL RATIOS

Biphenyls/NAPH*	2.39
Dibenzothiophenes/NAP	0.17
Dibenzofurans/NAPH*	1.53

MN = methylnaphthalene
DMN = dimethylnaphthalene
TMN = trimethylnaphthalene
THN = tetrahyronaphthalene
DBF = methyldibenzofuran
MDBF= methyldibenzofuran

P = phenantrene
MP = methylphenanthrene
DBT = dibenzothiophene
MDBT= methyldibenzothiophene
BP = biphenyl
MBP = methylbiphenyl

NAPH*= 2,6+2,7-DMN + 1,5-DMN + 1,4,6+1,3,5-TMN + 2,3,6-TMN

GCMS data of the aromatic fraction well 03/07-04 (3563.4 m.), Norway

VII) Misc. NAPHTHALENES

a) Concentrations (ppm)

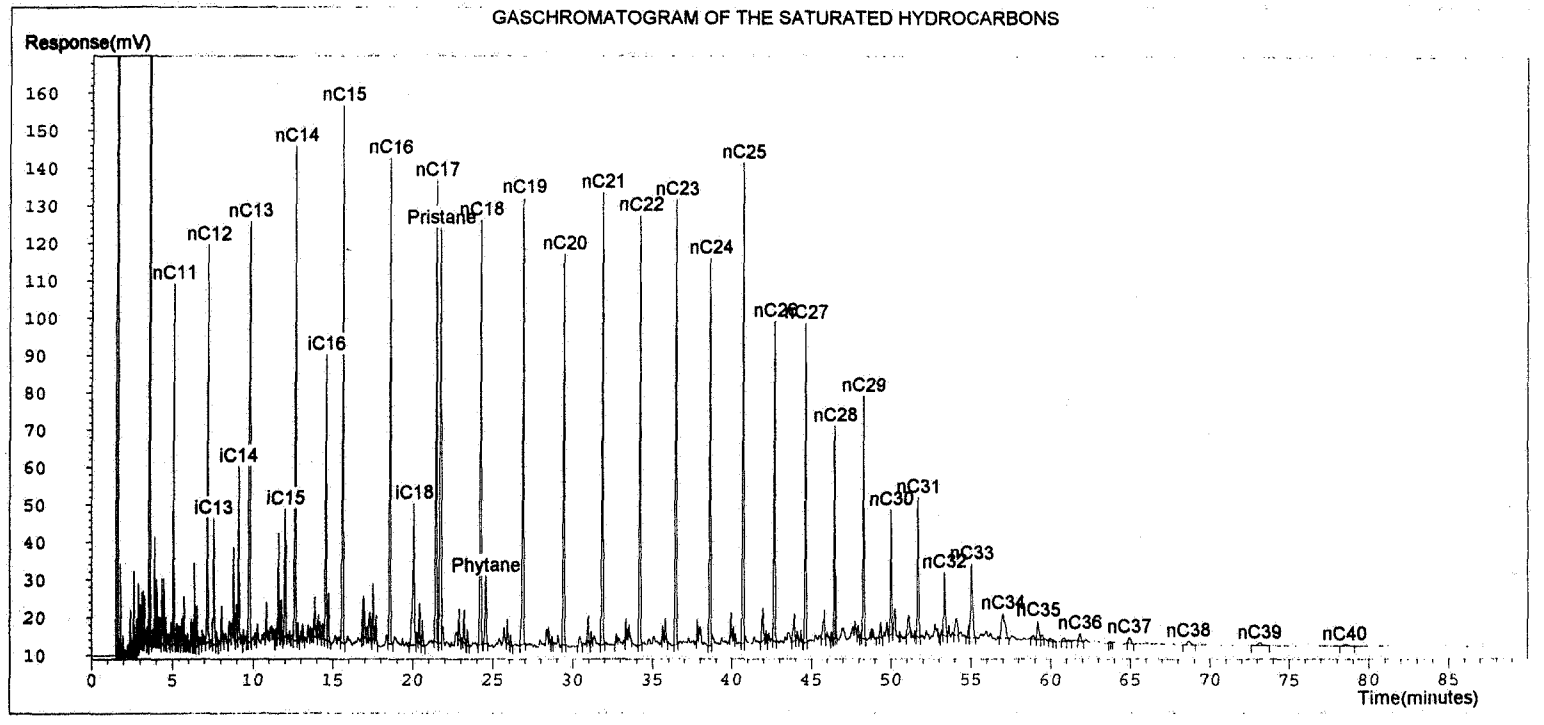
2,6-DMN	524	4,5-DMP	81
2,7-DMN	567	2,6+3,6-DMP	119
1,3+1,7-DMN	1404	3,5-DMP	210
1,6-DMN	1304	2,7-DMP	157
1,4-DMN	n.d.	3,9-DMP	781
2,3-DMN	235	1,6+2,5+2,9-DMP	666
1,5-DMN	979	1,7-DMP	975
1,2-DMN	445	1,9+4,9-DMP	241
1,4+2,3-DMN	235	1,5-DMP	n.d.
		1,8-DMP	119
		1,2-DMP	295
		9,10-DMP	n.d.
1,3,7-TMN	266	1,2,6-TMP	32
1,3,6-TMN	317	1,2,5-TMP	210
1,3,5+1,4,6-TMN	379	1,2,9-TMP	128
2,3,6-TMN	667	1,2,7-TMP	n.d.
1,2,7-TMN	208	1,2,8-TMP	169
1,6,7-TMN	651		
1,2,6-TMN	452		
1,2,4-TMN	58		
1,2,5-TMN	870		
1,3,5,7-TeMN	n.d.		
1,3,6,7-TeMN	252		
1,2,4,7-TeMN	155		
1,2,5,7-TeMN	177		
2,3,6,7-TeMN	204		
1,2,6,7-TeMN	127		
1,2,5,6-TeMN (C4-NAPH)	656		

b) Parameters

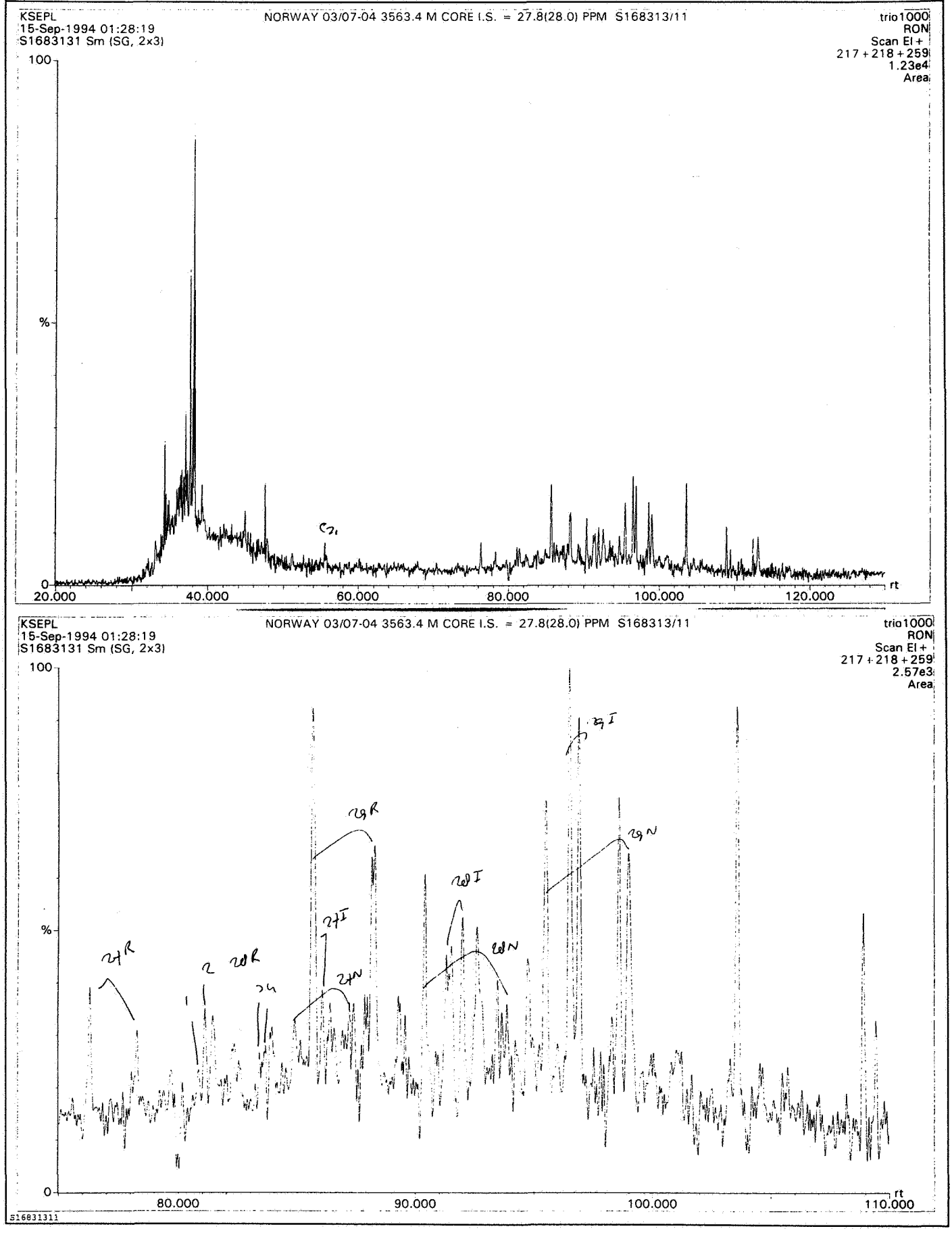
1,2,5-TMN/1,3,6-TMN	2.74
1,2,7-TMN/1,3,7-TMN	0.78

The assigment of some of these peaks is tentative

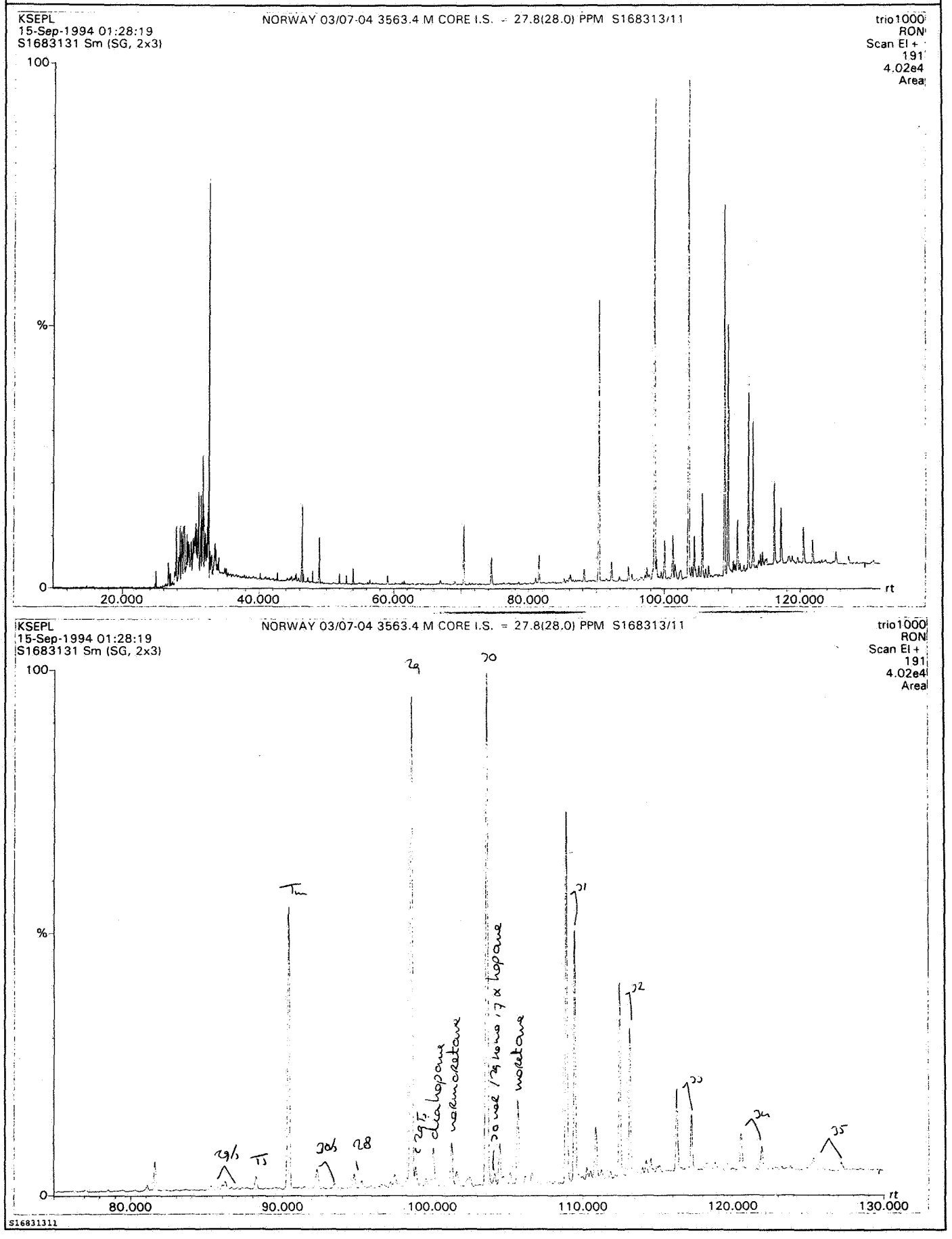
Gas chromatogram of the saturated hydrocarbons of the extract from well 03/07-04 (3563.4 m.), Norway



Sterane Fragmentograms of the extract from well 03/07-04 (3563.4 m.), Norway



Triterpane Fragmentograms of the extract from well 03/07-04 (3563.4 m.), Norway



K. S. E. P. L. , L R E / 4
G F S - Geochemical Filing System

L i s t i n g o f s a m p l e s w i t h R o c k E v a l d a t a

Country : Norway
Well/Outcrop : 03/07-04

Order seq.nr. : 010

Depth (m)	Sample Type	Formation name	TOC (wt%)	S-1 peak	S-2 peak	S-3 peak	Hydr. index	Oxyg. index	Tmax deg C	Prod. index
3310.00	C		1.4	0.29	2.71	1.18	194	84	437	0.10
3385.00	C		1.3	0.44	2.06	2.70	158	208	434	0.18
3475.40	R		31.3	6.70	85.30	3.50	273	11	461	0.07
3563.40	R		33.0	8.34	183.30	3.68	555	11	449	0.04

MACERAL DESCRIPTION OF WELL/OUTCROP

Norway, 03/07-04

Date : 5-SEP-94

Page : 1

Sample(s)	ORGANIC MATTER																										MINERAL MATTER		
	SOM				VITRINITE						LIPTINITE													INERTINITE					
	LOAD BEARING			NON-L. B.	VIT.-1				VIT.-2							ALGAE													
	DENSE	LAYERS	LENSES	DIFFUSE / INTERGRANULAR	LAYERS / LENSES TELOCOLLINITE	DETRITAL TELOCOLLINITE	LAYERS / LENSES TELINITE	DETRITAL TELINITE	LAYERS / LENSES DESMOCOLLINITE	DETRITAL DESMOCOLLINITE	SPORINITE (MICRO-)	SPORINITE (MEGA-)	CUTINITE	SUBERINITE	RESINITE (+ FLUORINITE)	LIPTODETRINITE	BOTRYOCOCCUS	TASMANITES	OTHER ALGAE	MICROPLANKTON	EXSUDATINITE (FLUORESCING)	EXSUDATINITE (NON-FLUORESING) S.HYDR.	SCLEROTINITE	(SEMI-) FUSINITE (+ INERTODETRINITE)	MICRINITE (+ OXY-MICRINITE)	UNDEFINED MINERALS	FRAMBOIDAL PYRITE	AGGREGATES / CRYSTALS PYRITE
3310.00 m/C			/	/					–	–	–					/				/	–			/	–	*	+	/
3385.00 m/C			/	/						–	–					/				/				–	–	*	/	/
3459.35 m/R					*				*		+				/	/	–				–			*		+		–
3469.30 m/R					+				*	+	+		+		–	/	/				/			+	–	*	–	–
3475.40 m/R	+			+					*		+		/		/	+	+				–			/	+	*	–	/
3558.59 m/R		+	+	+	*		+		+	+	/		+		/	/					–			/	+	*	–	–
3559.40 m/R			/	/							+		+			/								+	/	*	–	–
3563.40 m/R	*			+					+		+		/		–	+					–			*	+	*	–	–
3568.50 m/R		+	+	+	+				+	+	+		/			/	–							*	+	*	+	+

LEGEND	
*	ABUNDANT
+	COMMON
/	FEW
–	RARE

Depth (m)	Sample Type	Comment
3310.00	C	Initial micrinisation SOM Sample slightly oxidised Fossil remains Rare planktonic foraminifera Light yellow - yellow fluorescence
3385.00	C	Initial micrinisation SOM Sample slightly oxidised Light yellow - yellow fluorescence
3459.35	R	No comment present
3469.30	R	Sample slightly oxidised Partly coarse grained mineral matrix Yellow/orange fluorescing exsudatinite
3475.40	R	SOM partly micrinised Sample slightly oxidised Desmocollinite grades into SOM Yellow/brown fluorescence -> mature
3558.59	R	SOM partly micrinised Sample slightly oxidised Telinite is corpocollinite
3559.40	R	SOM partly micrinised
3563.40	R	SOM partly micrinised Desmocollinite grades into SOM Yellow/brown fluorescence -> mature
3568.50	R	SOM partly micrinised Sample slightly oxidised

Fig.

VISUAL VOLUME PERCENTAGE ESTIMATION

Norway, 03/07-04

Sample(s)	ORGANIC MATTER																									MINERAL MATTER		
	SOM				VITRINITE						LIPTINITE												INERTINITE					
	LOAD BEARING			NON-L. B.	VIT.-1				VIT.-2								ALGAE											
	DENSE	LAYERS	LENSES	DIFFUSE / INTERGRANULAR	LAYERS / LENSES TELOCOLLINITE	DETRITAL TELOCOLLINITE	LAYERS / LENSES TELINITE	DETRITAL TELINITE	LAYERS / LENSES DESMOCOLLINITE	DETRITAL DESMOCOLLINITE	SPORINITE (MICRO-)	SPORINITE (MEGA-)	CUTINITE	SUBERINITE	RESINITE (+ FLUORINITE)	LIPTODETRINITE	BOTRYOCOCCUS	TASMANITES	OTHER ALGAE	MICROPLANKTON	EXSUDATINITE (FLUORESCING)	EXSUDATINITE (NON-FLUORESING) S.HYDR.	SCLEROTINITE	(SEMI-) FUSINITE (+ INERTODETRINITE)	MICRINITE (+ OXY-MICRINITE)	UNDEFINED MINERALS	FRAMBOIDAL PYRITE	AGGREGATES / CRYSTALS PYRITE
3310.00 m/C			2	2					<1	<1	<1					2				1	R			1	R	86	5	1
3385.00 m/C			1	2						<1	<1					1				1				<1	R	92	2	1
3459.35 m/R					25				20		3				1	2	<1				D			40		9		<1
3469.30 m/R					5				20	10	3		3		<1	2	1				F			5		51	<1	<1
3475.40 m/R	10			10					30		3		2		1	4	4				R			1	C	34	<1	1
3558.59 m/R		3	3	3	20		5		10	10	2		4		1	2					R			2	C	35	<1	<1
3559.40 m/R			2	2	·						3		4			2								3	F	84	<1	<1
3563.40 m/R	20			10					5		6		1		<1	4					R			30	C	24	<1	<1
3568.50 m/R		4	4	3	5				5	10	3		2			2	<1							20	C	36	3	3

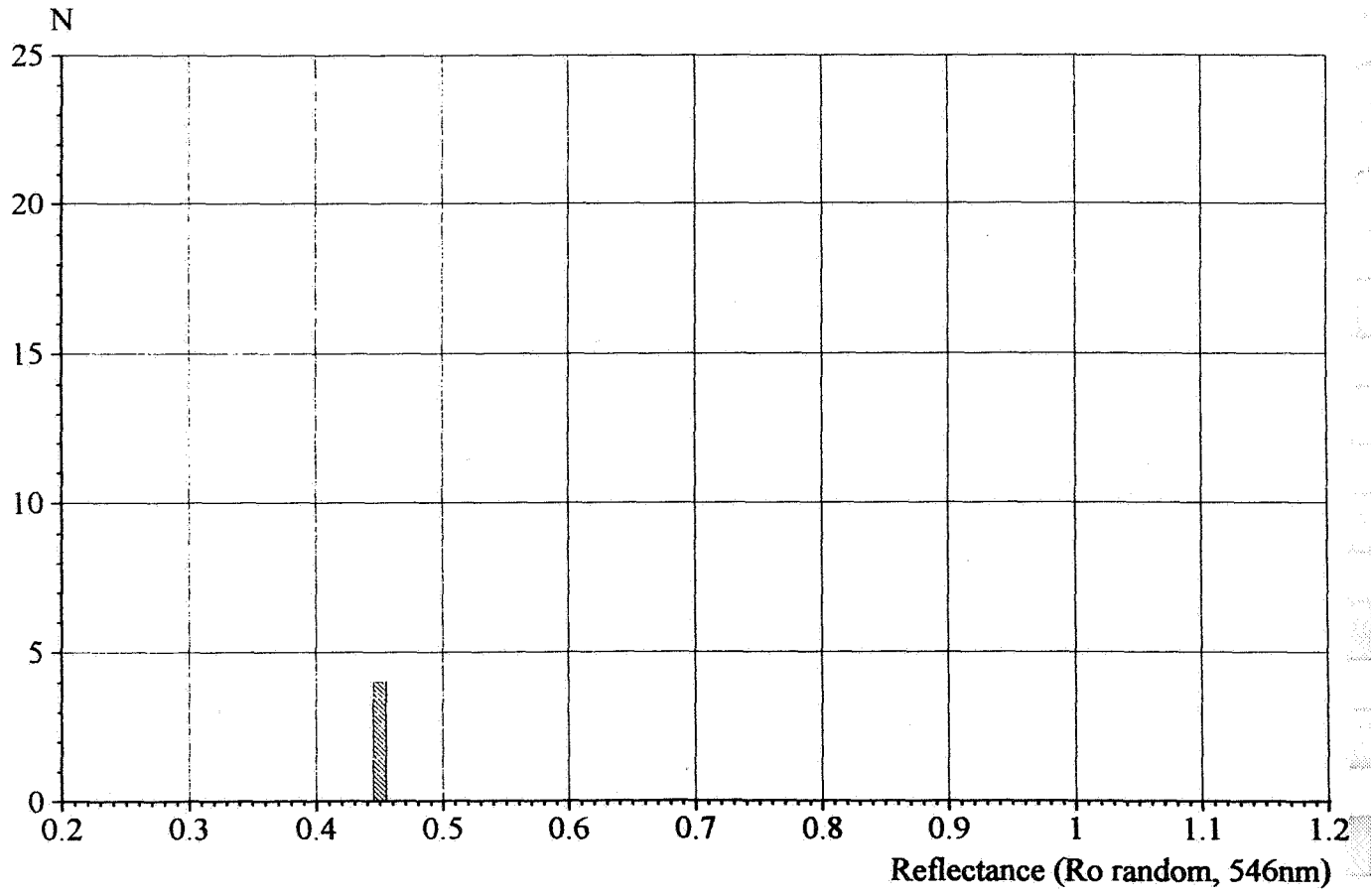
Fig. b

Confidential

Reflectance histogram

Country	*Norway*	Sample type	*Cutting*
Well	*03/07-04*	Sample/Order	*S168306/10*
Depth	*3310 m*	Analyst	*KMR*
Reference	*Derrick floor*	Date	*15-09-1994*

	Mean	Std	Min	Max	Mode	Measurements
Desmocollinite	*0.45*	*0*	*0.45*	*0.45*	*0.45*	*4*



Comment:

Single desmocollinite particle (caving ?)

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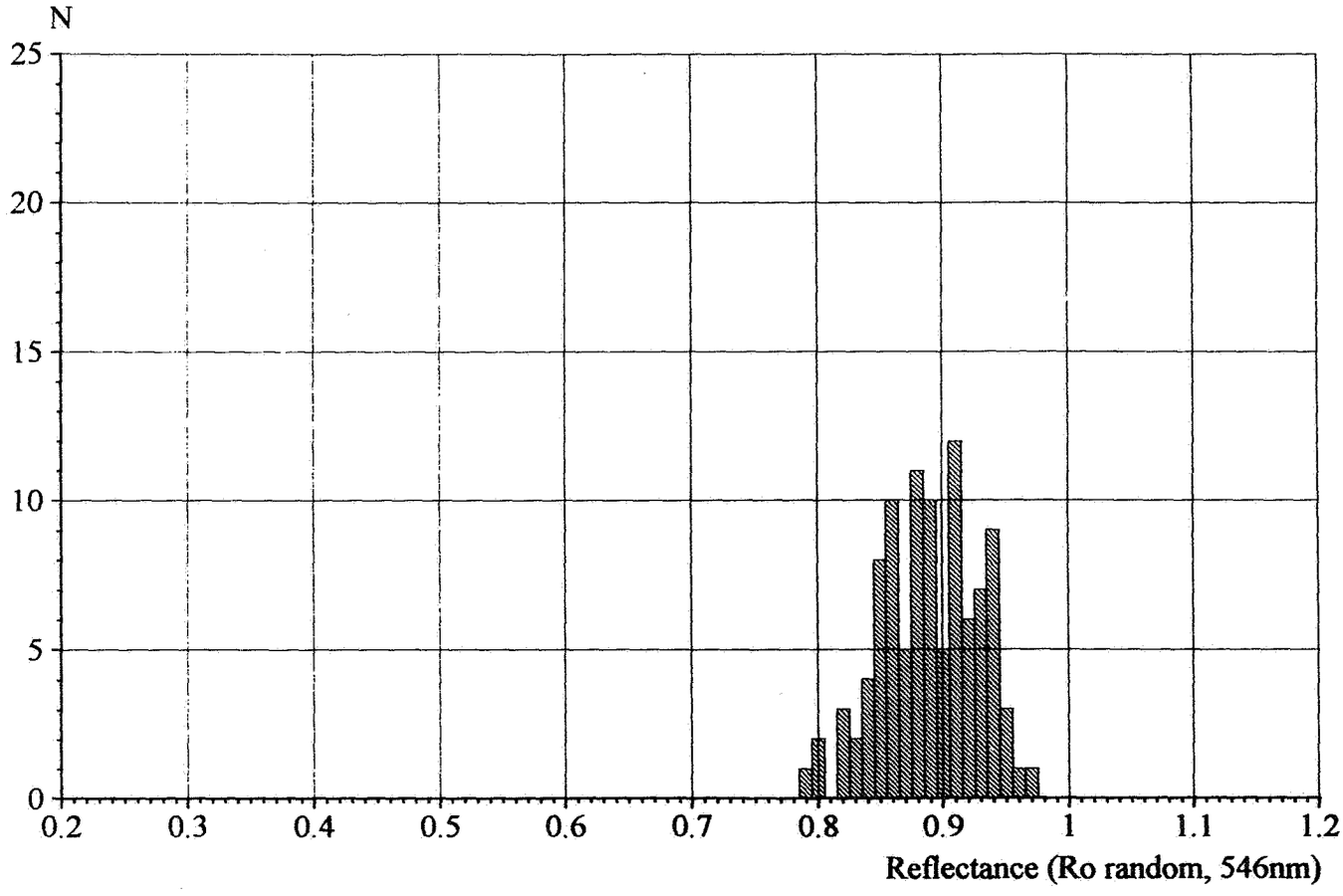
Reflectance histogram

Country	*Norway*	Sample type	*Core*
Well	*03/07-04*	Sample/Order	*S168308/10*
Depth	*3475.7 m*	Analyst	*KMR*
Reference	*Derrick floor*	Date	*15-09-1994*

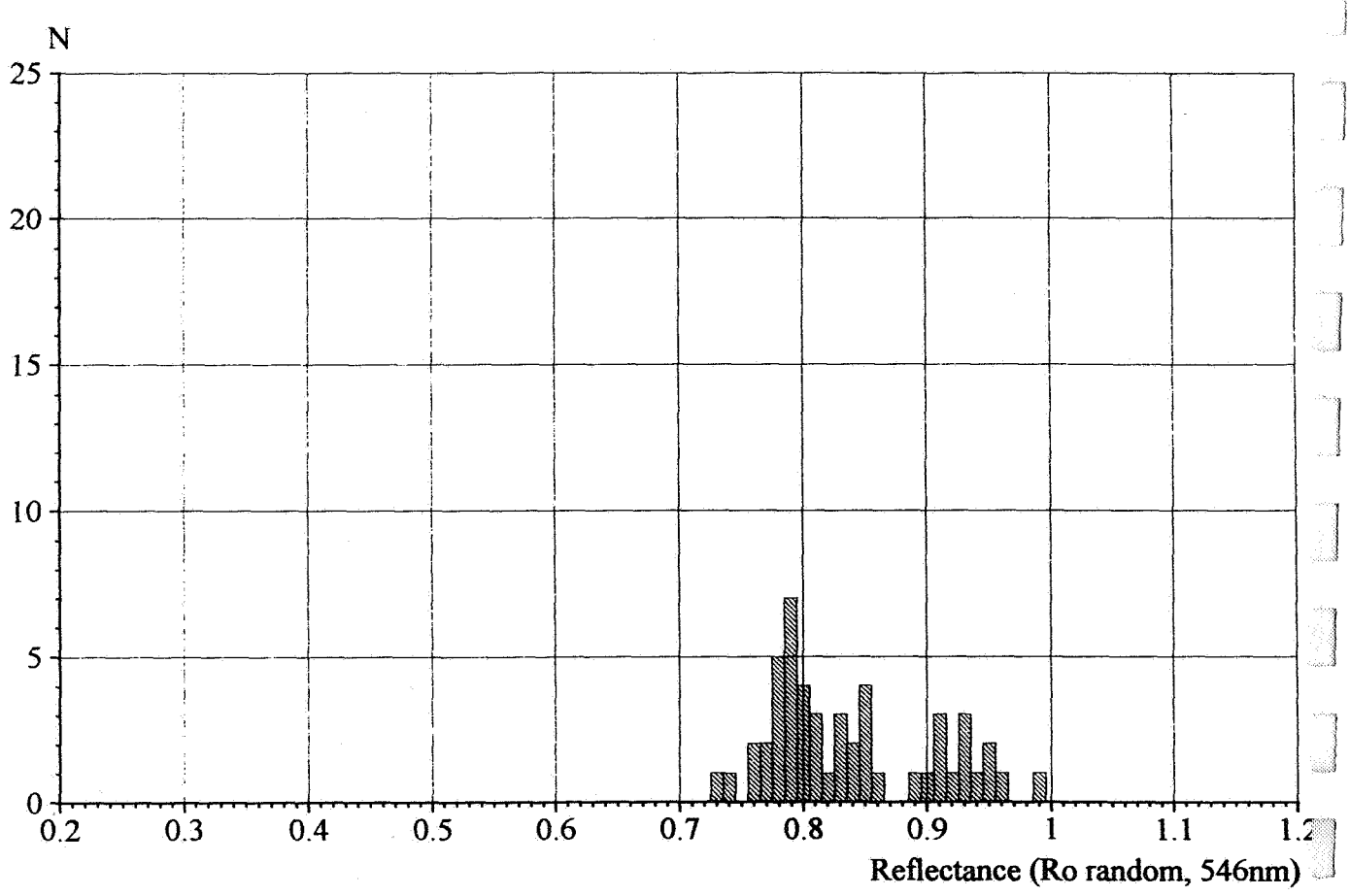
	Mean	Std	Min	Max	Mode	Measurements
Desmocollinite	*0.89*	*0.04*	*0.79*	*0.97*	*0.91*	*100*



Reflectance histogram

Country	*Norway*	Sample type	*Core*
Well	*03/07-04*	Sample/Order	*S168309/10*
Depth	*3563.4 m*	Analyst	*KMR*
Reference	*Derrick floor*	Date	*15-09-1994*

	Mean	Std	Min	Max	Mode	Measurements
Desmocollinite	*0.84*	*0.07*	*0.73*	*0.99*	*0.79*	*50*



U-619

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

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REPORT : GEOCHEMISTRY REPORT FOR WELL NOCS 3/7-4.
SCREENING DATA ONLY.

CLIENT(S) : NORSKE SHELL

RESPONSIBLE SCIENTIST : KJELL ARNE BAKKEN

AUTHORS : KJELL ARNE BAKKEN

DATE : 06.02.90

GEOLAB PROJECT : 526044

CLIENTS REF : S18973

INTRODUCTION

Samples were supplied by Norske Shell. The work was authorised by Kari Berge on behalf of Norske Shell. The analytical program was performed according to requests from Norske Shell. Only lithology description, TOC and Rock-Eval analyses were performed, i.e. only screening analysis. Samples were analysed in the interval from 3262 m to 3721 m. In-situ lithology was selected from each sample for TOC analyses (on LECO carbon analyser). Samples with TOC content of 1 % or greater were then analysed by Rock-Eval pyrolysis. A few sandstone samples were permitted analysed directly on Rock-Eval. In short: The analytical program ordered was a screening to identify possible source rocks.

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3262.00						0001
		0.10	50	Ca : w		0001-1L
			30	Sh/Clst: gn gy to m gy		0001-2L
			20	Sh/Clst: gy red, calc		0001-3L
3274.00						0002
		0.08	70	Ca : w		0002-1L
			20	Sh/Clst: gn gy to m gy		0002-2L
			10	Sh/Clst: gy red, calc		0002-3L
3283.00						0003
		0.09	70	Ca : w		0003-1L
			20	Sh/Clst: gn gy to m gy		0003-2L
			10	Sh/Clst: gy red, calc		0003-3L
			tr	Sh/Clst: gy blk		0003-4L
3292.00						0004
			50	Ca : w		0004-1L
		2.30	30	Sh/Clst: gy blk		0004-4L
			20	Sh/Clst: gn gy to m gy		0004-2L
			tr	Sh/Clst: gy red, calc		0004-3L
			tr	Other : pyr		0004-5L
3298.00						0005
			45	Sh/Clst: gn gy to m gy		0005-2L
			35	Ca : w		0005-1L
		2.24	15	Sh/Clst: gy blk		0005-4L
			5	Sh/Clst: gy red, calc		0005-3L
			tr	Other : pyr		0005-5L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
3310.00						0006
		2.27	70	Sh/Clst: gy blk to dsk y brn		0006-4L
			20	Sh/Clst: gn gy to m gy		0006-2L
			10	Ca : w		0006-1L
			tr	Sh/Clst: gy red, calc		0006-3L
			tr	Other : pyr		0006-5L
3316.00						0007
		2.18	80	Sh/Clst: gy blk to dsk y brn		0007-4L
			10	Ca : w		0007-1L
			10	Sh/Clst: gn gy to m gy		0007-2L
			tr	Sh/Clst: gy red, calc		0007-3L
3325.00						0008
		2.04	70	Sh/Clst: gy blk to dsk y brn		0008-4L
			15	Ca : w		0008-1L
			15	Sh/Clst: gn gy to m gy		0008-2L
			tr	Sh/Clst: gy red, calc		0008-3L
3334.00						0009
		2.23	50	Sh/Clst: gy blk to dsk y brn		0009-4L
			25	Ca : w, gy pi		0009-1L
			15	Sh/Clst: gn gy to m gy		0009-2L
			10	Ca : dsk y brn, dol		0009-5L
			tr	Sh/Clst: gy red, calc		0009-3L
3346.00						0010
		2.57	50	Sh/Clst: drk gy to gy blk to dsk y brn		0010-4L
			20	Ca : w, gy pi		0010-1L
			10	Sh/Clst: gn gy to m gy		0010-2L
			10	Ca : dsk y brn, dol		0010-5L
			10	Cont : prp, dd, tar-ad		0010-6L
			tr	Sh/Clst: gy red, calc		0010-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3364.00						0011
		2.79	60	Sh/Clst: drk gy to dsk y brn, slt		0011-4L
			20	Ca : w, gy pi		0011-1L
			10	Sh/Clst: gn gy to m gy		0011-2L
			10	Ca : dsk y brn, dol		0011-5L
			tr	Sh/Clst: gy red, calc		0011-3L
			tr	Cont : prp, dd, tar-ad		0011-6L
3370.00						0012
			50	S/Sst : v col, l		0012-5L
			30	Sh/Clst: drk gy to dsk y brn, slt		0012-3L
			10	Ca : w, gy pi		0012-1L
			10	Cont : prp, dd, fib		0012-4L
			tr	Sh/Clst: gn gy to m gy		0012-2L
3379.00						0013
			50	S/Sst : v col, l		0013-5L
			30	Sh/Clst: drk gy to dsk y brn, slt		0013-3L
			10	Ca : w, gy pi		0013-1L
			10	Sh/Clst: gn gy to m gy		0013-2L
			tr	Cont : prp, dd, fib		0013-4L
3388.00						0014
			50	Cont : dd		0014-4L
		2.11	20	Sh/Clst: drk gy to dsk y brn, slt		0014-3L
			15	Ca : w, gy pi		0014-1L
			15	Sh/Clst: gn gy to m gy		0014-2L
			tr	S/Sst : v col, l		0014-5L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3397.00						0015
			30	Ca : w, gy pi		0015-1L
		0.54	30	Sh/Clst: gn gy to m gy		0015-2L
		2.03	30	Sh/Clst: drk gy to dsk y brn, slt		0015-3L
			10	Cont : prp, dd, fib		0015-4L
			tr	S/Sst : v col, l		0015-5L
3421.80	ccp					0045
		1.72	100	Sh/Clst: drk gy to gy blk, carb, slt		0045-1L
3424.00						0016
		2.14	80	Sh/Clst: drk gy to gy blk to dsk y brn		0016-3L
			10	Cont : prp, fib		0016-4L
			5	Ca : w, gy pi		0016-1L
			5	Sh/Clst: gn gy to m gy		0016-2L
3424.90	ccp					0046
		3.39	100	Sh/Clst: drk gy to gy blk, carb, slt, mic		0046-1L
3426.00	ccp					0047
		2.62	100	Sh/Clst: drk gy to gy blk, carb, slt, mic		0047-1L
3430.80	ccp					0048
		2.97	100	Sh/Clst: drk gy to gy blk, carb, slt, mic		0048-1L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3432.50	ccp					0049
	3.60		100	Sh/Clst: drk gy to gy blk, carb, slt, mic		0049-1L
3433.00						0017
	2.14		80	Sh/Clst: drk gy to gy blk to dsk y brn		0017-3L
			10	Cont : prp, dd, fib		0017-4L
			5	Ca : w, gy pi		0017-1L
			5	Sh/Clst: gn gy to m gy		0017-2L
3439.50	ccp					0050
	2.04		100	Sh/Clst: drk gy to gy blk, carb, slt, mic		0050-1L
3442.00						0018
	39.00		50	Coal : blk		0018-5L
			25	Sh/Clst: drk gy to gy blk to dsk y brn		0018-3L
			10	Sh/Clst: gn gy to m gy		0018-2L
			10	Cont : prp, dd, fib		0018-4L
			5	Ca : w, gy pi		0018-1L
3447.90	ccp					0051
	8.09		100	Sh/Clst: drk gy to gy blk, carb, slt, mic		0051-1L
3457.90	ccp					0052
	4.23		100	Sh/Clst: drk gy to gy blk, carb, slt, mic		0052-1L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3459.60		ccp				0053
		79.00	100	Coal : blk		0053-1L
3460.00						0019
		0.43	40	S/Sst : lt brn gy		0019-6L
			20	Sh/Clst: drk gy to gy blk to dsk y brn		0019-3L
			15	Sh/Clst: gn gy to m gy		0019-2L
			10	Cont : prp, dd, fib		0019-4L
			10	Coal : blk		0019-5L
			5	Ca : w, gy pi		0019-1L
3466.00		ccp				0054
		7.78	100	Sh/Clst: drk gy to gy blk, carb, slt, mic		0054-1L
3469.00						0020
		66.90	80	Coal : blk		0020-4L
			20	S/Sst : lt brn gy		0020-5L
			tr	Sh/Clst: gn gy to m gy		0020-1L
			tr	Sh/Clst: drk gy to gy blk to dsk y brn		0020-2L
			tr	Cont : prp, dd, fib		0020-3L
3469.00		ccp				0055
		10.20	100	Sh/Clst: gy blk, mic		0055-1L
3475.00		ccp				0056
		11.50	100	Sh/Clst: gy blk to dsk y brn, carb, mic		0056-1L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3476.10		ccp				0057
		74.00	100	Coal : blk		0057-1L
3478.00						0021
		25.50	40	Coal : blk		0021-4L
			40	S/Sst : lt gy to lt brn gy		0021-5L
			10	Sh/Clst: gn gy to m gy		0021-1L
			5	Sh/Clst: drk gy to gy blk to dsk y brn		0021-2L
			5	Ca : w		0021-6L
			tr	Cont : prp, dd, fib		0021-3L
3486.00		ccp				0058
		5.56	100	Sh/Clst: dsk y brn, wx		0058-1L
3487.00						0022
			60	S/Sst : lt gy to lt brn gy		0022-5L
		15.20	15	Coal : blk		0022-4L
			10	Sh/Clst: gn gy to m gy		0022-1L
			10	Sh/Clst: drk gy to gy blk to dsk y brn		0022-2L
			5	Ca : w		0022-6L
			tr	Cont : prp, dd, fib		0022-3L
3495.50		ccp				0059
		4.53	100	Sh/Clst: dsk y brn, wx		0059-1L
3496.00						0023
		1.94	50	Sh/Clst: drk gy to dsk y brn		0023-2L
			25	Sh/Clst: gn gy to m gy		0023-1L
			10	Coal : blk		0023-4L
			10	S/Sst : lt gy to lt brn gy		0023-5L
			5	Ca : w		0023-6L
			tr	Cont : prp, dd, fib		0023-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3497.00		ccp				0060
		1.43	100	Sh/Clst: drk y brn, carb, slt		0060-1L
3506.75		ccp				0061
		1.74	100	Sh/Clst: drk y brn, carb, slt		0061-1L
3508.00						0024
		2.04	85	Sh/Clst: drk gy to dsk y brn		0024-2L
			10	Sh/Clst: gn gy to m gy		0024-1L
			5	Ca : w		0024-4L
			tr	S/Sst : lt gy to lt brn gy		0024-3L
3509.00		ccp				0062
		1.16	100	Sh/Clst: ol gy, carb, slt		0062-1L
3511.50		ccp				0063
		0.64	100	Sh/Clst: dsk y brn, wx		0063-1L
3514.00						0025
		2.10	80	Sh/Clst: drk gy to dsk y brn		0025-2L
			10	Sh/Clst: gn gy to m gy		0025-1L
			10	S/Sst : lt gy to lt brn gy		0025-3L
			tr	Ca : w		0025-4L
3519.80		ccp				0064
		11.50	100	Sh/Clst: dsk y brn, wx		0064-1L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3520.00	ccp					0065
		2.59	100	Sh/Clst: drk gy to dsk y brn, carb		0065-1L
3523.00						0026
		1.93	45	Sh/Clst: drk gy to dsk y brn		0026-2L
			45	S/Sst : lt gy to lt brn gy		0026-3L
			10	Sh/Clst: gn gy to m gy		0026-1L
			tr	Ca : w		0026-4L
3527.80	ccp					0066
		2.03	100	Sh/Clst: gy blk to dsk y brn, carb		0066-1L
3529.20	ccp					0067
		5.05	100	Sh/Clst: gy blk to dsk y brn, carb, mic		0067-1L
3535.00						0027
		1.85	45	Sh/Clst: drk gy to dsk y brn		0027-2L
			45	S/Sst : lt gy to lt brn gy		0027-3L
			10	Sh/Clst: gn gy to m gy		0027-1L
			tr	Ca : w		0027-4L
3539.90	ccp					0068
		3.48	100	Sh/Clst: dsk y brn, wx		0068-1L
3541.40	ccp					0069
		1.98	100	Sh/Clst: ol blk to dsk y brn		0069-1L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3544.00						0028
			70	S/Sst : lt gy to lt brn gy		0028-3L
			25	Sh/Clst: drk gy to dsk y brn		0028-2L
			5	Sh/Clst: gn gy to m gy		0028-1L
3552.80	ccp					0070
		0.77	100	Sh/Clst: ol gy to drk gy		0070-1L
3553.00						0029
			50	S/Sst : lt gy to lt brn gy		0029-3L
			30	Sh/Clst: drk gy to dsk y brn		0029-2L
			20	Sh/Clst: gn gy to m gy		0029-1L
3554.00	ccp					0071
		5.62	100	Sh/Clst: dsk y brn, carb, wx		0071-1L
3558.70	ccp					0072
		76.00	100	Coal : blk, cly		0072-1L
3559.00						0030
		0.30	50	S/Sst : lt gy to lt brn gy		0030-3L
			30	Sh/Clst: drk gy to dsk y brn		0030-2L
			20	Sh/Clst: gn gy to m gy		0030-1L
3559.50	ccp					0073
		28.80	100	Coal : blk, cly		0073-1L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3562.00						0031
			50	S/Sst : lt gy to lt brn gy		0031-3L
		43.90	30	Coal : blk		0031-4L
			10	Sh/Clst: gn gy to m gy		0031-1L
			10	Sh/Clst: drk gy to dsk y brn		0031-2L
3563.40	ccp					0074
		34.00	100	Coal : blk, cly		0074-1L
3567.30	ccp					0075
		1.97	100	Sh/Clst: drk y brn to dsk y brn, slt, mic		0075-1L
3574.30	ccp					0076
		2.27	100	Sh/Clst: drk y brn to dsk y brn, slt, mic		0076-1L
3577.00						0032
		0.28	50	S/Sst : lt gy to lt brn gy		0032-3L
			20	Sh/Clst: gn gy to m gy		0032-1L
			20	Sh/Clst: drk gy to dsk y brn		0032-2L
			10	Coal : blk		0032-4L
3586.00						0033
			70	S/Sst : lt gy to lt brn gy		0033-3L
			15	Sh/Clst: gn gy to m gy		0033-1L
			15	Sh/Clst: drk gy to dsk y brn		0033-2L
			tr	Coal : blk		0033-4L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
3595.00						0034
		0.27	80	S/Sst : lt gy to lt brn gy		0034-3L
			10	Sh/Clst: gn gy to m gy		0034-1L
			10	Sh/Clst: drk gy to dsk y brn		0034-2L
			tr	Coal : blk		0034-4L
3604.00						0035
		1.54	45	Sh/Clst: drk gy to dsk y brn		0035-2L
			45	S/Sst : lt gy to lt brn gy		0035-3L
			10	Sh/Clst: gn gy to m gy		0035-1L
			tr	Coal : blk		0035-4L
3613.00						0036
		1.76	80	Sh/Clst: drk gy to dsk y brn to drk y brn		0036-2L
			10	Sh/Clst: gn gy to m gy		0036-1L
			10	S/Sst : lt gy to lt brn gy		0036-3L
3622.00						0037
		1.52	60	Sh/Clst: drk gy to dsk y brn		0037-2L
			40	S/Sst : lt gy to lt brn gy		0037-3L
			tr	Sh/Clst: gn gy to m gy		0037-1L
			tr	Cont : prp		0037-4L
3634.00						0038
		15.60	90	Sh/Clst: drk gy to dsk y brn		0038-1L
			10	S/Sst : lt gy to lt brn gy		0038-2L

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type				Trb	Sample
Int	Cvd	TOC%	%	Lithology description			
3643.00							0039
		4.69	70	Sh/Clst:	blk to drk gy to dsk y brn		0039-1L
			10	S/Sst	: lt gy to lt brn gy		0039-2L
			10	Coal	: blk		0039-3L
			10	Ca	: w		0039-4L
3649.00							0040
		4.10	50	Sh/Clst:	blk to drk gy to dsk y brn		0040-1L
			30	S/Sst	: lt gy to lt brn gy		0040-2L
			10	Coal	: blk		0040-3L
			10	Ca	: w		0040-4L
3653.50	swc						0077
		76.50	100	Coal	: blk		0077-1L
3658.00							0041
		32.00	70	Coal	: blk		0041-3L
			15	S/Sst	: lt gy to lt brn gy		0041-2L
			10	Sh/Clst:	blk to drk gy to dsk y brn		0041-1L
			5	Ca	: w		0041-4L
3667.00							0042
			50	S/Sst	: lt gy to lt brn gy		0042-2L
		53.10	50	Coal	: blk		0042-3L
			tr	Sh/Clst:	blk to drk gy to dsk y brn		0042-1L
3676.00							0043
		0.44	75	S/Sst	: lt gy to lt brn gy		0043-2L
		39.70	25	Coal	: blk		0043-3L
			tr	Sh/Clst:	blk to drk gy to dsk y brn		0043-1L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3683.50		swc				0078
		12.00	100	Coal : blk		0078-1L
3685.00						0044
			50	S/Sst : lt gy to lt brn gy		0044-2L
		28.70	50	Coal : blk		0044-3L
			tr	Sh/Clst: blk to drk gy to dsk y brn		0044-1L
3694.00						0079
		0.38	70	S/Sst : w to lt gy, l		0079-1L
			15	Coal : blk		0079-2L
			10	Ca : w, chk		0079-3L
			5	Sh/Clst: blk to drk gy to dsk y brn		0079-4L
3703.00						0080
			40	S/Sst : w to lt gy		0080-1L
			40	Ca : w, m gy, slt, chk		0080-3L
			10	Coal : blk		0080-2L
			10	Sh/Clst: m gy to drk gy to dsk y brn		0080-4L
3712.00						0081
			70	Ca : w, chk		0081-3L
			20	Sh/Clst: m gy to drk gy to dsk y brn		0081-4L
			10	Coal : blk		0081-2L
			tr	S/Sst : w to lt gy		0081-1L
3721.00						0082
			40	Ca : w, chk		0082-3L
			40	Cont : bar		0082-5L
			10	Coal : blk		0082-2L
			10	Sh/Clst: m gy to drk gy to dsk y brn		0082-4L
			tr	S/Sst : w to lt gy		0082-1L

Table 2 : Rock-Eval table for well NOCS 3/7-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3292.00	cut	Sh/Clst: gy blk	0.96	7.60	0.33	23.03	2.30	330	14	8.6	0.11	440	0004-4L
3298.00	cut	Sh/Clst: gy blk	0.53	6.10	0.53	11.51	2.24	272	24	6.6	0.08	440	0005-4L
3310.00	cut	Sh/Clst: gy blk to dsk y brn	0.77	6.64	0.42	15.81	2.27	293	19	7.4	0.10	443	0006-4L
3316.00	cut	Sh/Clst: gy blk to dsk y brn	0.67	6.22	0.34	18.29	2.18	285	16	6.9	0.10	443	0007-4L
3325.00	cut	Sh/Clst: gy blk to dsk y brn	0.56	5.73	0.55	10.42	2.04	281	27	6.3	0.09	443	0008-4L
3334.00	cut	Sh/Clst: gy blk to dsk y brn	0.58	5.96	0.35	17.03	2.23	267	16	6.5	0.09	446	0009-4L
3346.00	cut	Sh/Clst: drk gy to gy blk to dsk y brn	0.91	7.88	0.35	22.51	2.57	307	14	8.8	0.10	441	0010-4L
3364.00	cut	Sh/Clst: drk gy to dsk y brn	1.01	8.42	0.68	12.38	2.79	302	24	9.4	0.11	442	0011-4L
3388.00	cut	Sh/Clst: drk gy to dsk y brn	0.49	4.62	0.49	9.43	2.11	219	23	5.1	0.10	445	0014-3L
3397.00	cut	Sh/Clst: drk gy to dsk y brn	0.52	5.26	0.44	11.95	2.03	259	22	5.8	0.09	441	0015-3L
3421.80	ccp	Sh/Clst: drk gy to gy blk	0.46	2.52	0.07	36.00	1.72	147	4	3.0	0.15	450	0045-1L
3424.00	cut	Sh/Clst: drk gy to gy blk to dsk y brn	0.62	4.96	0.11	45.09	2.14	232	5	5.6	0.11	446	0016-3L
3424.90	ccp	Sh/Clst: drk gy to gy blk	0.77	4.66	0.06	77.67	3.39	137	2	5.4	0.14	450	0046-1L
3426.00	ccp	Sh/Clst: drk gy to gy blk	0.53	4.19	0.25	16.76	2.62	160	10	4.7	0.11	449	0047-1L

Table 2 : Rock-Eval table for well NOCS 3/7-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3430.80	ccp	Sh/Clst: drk gy to gy blk	0.76	6.90	0.06	115.00	2.97	232	2	7.7	0.10	451	0048-1L
3432.50	ccp	Sh/Clst: drk gy to gy blk	0.82	7.01	-	-	3.60	195	-	7.8	0.10	450	0049-1L
3433.00	cut	Sh/Clst: drk gy to gy blk to dsk y brn	0.56	4.38	1.17	3.74	2.14	205	55	4.9	0.11	447	0017-3L
3439.50	ccp	Sh/Clst: drk gy to gy blk	0.66	1.98	0.28	7.07	2.04	97	14	2.6	0.25	449	0050-1L
3442.00	cut	Coal : blk	13.14	80.37	1.11	72.41	39.00	206	3	93.5	0.14	446	0018-5L
3447.90	ccp	Sh/Clst: drk gy to gy blk	2.06	17.39	0.10	173.90	8.09	215	1	19.4	0.11	447	0051-1L
3457.90	ccp	Sh/Clst: drk gy to gy blk	1.33	5.61	0.86	6.52	4.23	133	20	6.9	0.19	447	0052-1L
3459.60	ccp	Coal : blk	23.75	175.83	0.83	211.84	79.00	223	1	199.6	0.12	449	0053-1L
3460.00	cut	S/Sst : lt brn gy	1.18	0.82	0.57	1.44	0.43	191	133	2.0	0.59	438	0019-6L
3466.00	ccp	Sh/Clst: drk gy to gy blk	2.06	18.02	0.18	100.11	7.78	232	2	20.1	0.10	444	0054-1L
3469.00	cut	Coal : blk	21.22	130.81	1.83	71.48	66.90	196	3	152.0	0.14	449	0020-4L
3469.00	ccp	Sh/Clst: gy blk	2.65	25.29	0.17	148.76	10.20	248	2	27.9	0.09	445	0055-1L
3475.00	ccp	Sh/Clst: gy blk to dsk y brn	2.59	25.33	0.18	140.72	11.50	220	2	27.9	0.09	450	0056-1L
3476.10	ccp	Coal : blk	16.96	172.50	1.42	121.48	74.00	233	2	189.5	0.09	451	0057-1L

Table 2 : Rock-Eval table for well NOCS 3/7-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3478.00	cut	Coal : blk	6.66	41.60	0.80	52.00	25.50	163	3	48.3	0.14	451	0021-4L
3486.00	ccp	Sh/Clst: dsk y brn	1.42	10.24	0.09	113.78	5.56	184	2	11.7	0.12	447	0058-1L
3487.00	cut	Coal : blk	4.75	18.17	0.24	75.71	15.20	120	2	22.9	0.21	449	0022-4L
3495.50	ccp	Sh/Clst: dsk y brn	0.81	10.37	0.03	345.67	4.53	229	1	11.2	0.07	450	0059-1L
3496.00	cut	Sh/Clst: drk gy to dsk y brn	0.41	3.35	0.11	30.45	1.94	173	6	3.8	0.11	447	0023-2L
3497.00	ccp	Sh/Clst: drk y brn	0.38	2.00	-	-	1.43	140	-	2.4	0.16	447	0060-1L
3506.75	ccp	Sh/Clst: drk y brn	0.38	2.92	-	-	1.74	168	-	3.3	0.12	451	0061-1L
3508.00	cut	Sh/Clst: drk gy to dsk y brn	0.49	5.04	0.16	31.50	2.04	247	8	5.5	0.09	445	0024-2L
3509.00	ccp	Sh/Clst: ol gy	0.30	1.55	-	-	1.16	134	-	1.9	0.16	447	0062-1L
3514.00	cut	Sh/Clst: drk gy to dsk y brn	0.54	5.11	0.14	36.50	2.10	243	7	5.7	0.10	446	0025-2L
3519.80	ccp	Sh/Clst: dsk y brn	2.30	9.54	0.24	39.75	11.50	83	2	11.8	0.19	452	0064-1L
3520.00	ccp	Sh/Clst: drk gy to dsk y brn	0.54	3.24	-	-	2.59	125	-	3.8	0.14	449	0065-1L
3523.00	cut	Sh/Clst: drk gy to dsk y brn	0.53	4.39	0.30	14.63	1.93	227	16	4.9	0.11	445	0026-2L
3527.80	ccp	Sh/Clst: gy blk to dsk y brn	0.18	0.86	0.30	2.87	2.03	42	15	1.0	0.17	452	0066-1L
3529.20	ccp	Sh/Clst: gy blk to dsk y brn	1.35	9.76	-	-	5.05	193	-	11.1	0.12	446	0067-1L

Table 2 : Rock-Eval table for well NOCS 3/7-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3535.00	cut	Sh/Clst: drk gy to dsk y brn	0.50	4.03	0.16	25.19	1.85	218	9	4.5	0.11	445	0027-2L
3539.90	ccp	Sh/Clst: dsk y brn	0.60	5.46	0.02	273.00	3.48	157	1	6.1	0.10	449	0068-1L
3541.40	ccp	Sh/Clst: ol blk to dsk y brn	0.34	1.51	0.10	15.10	1.98	76	5	1.9	0.18	450	0069-1L
3554.00	ccp	Sh/Clst: dsk y brn	1.22	24.41	-	-	5.62	434	-	25.6	0.05	450	0071-1L
3558.70	ccp	Coal : blk	24.18	182.20	0.46	396.09	76.00	240	1	206.4	0.12	455	0072-1L
3559.00	cut	S/Sst : lt gy to lt brn gy	1.85	0.57	0.34	1.68	0.30	190	113	2.4	0.76	418	0030-3L
3559.50	ccp	Coal : blk	6.25	93.50	0.62	150.81	28.80	325	2	99.8	0.06	449	0073-1L
3562.00	cut	Coal : blk	11.38	125.83	1.66	75.80	43.90	287	4	137.2	0.08	446	0031-4L
3563.40	ccp	Coal : blk	11.02	67.14	0.61	110.07	34.00	197	2	78.2	0.14	452	0074-1L
3567.30	ccp	Sh/Clst: drk y brn to dsk y brn	0.42	2.70	0.12	22.50	1.97	137	6	3.1	0.13	450	0075-1L
3574.30	ccp	Sh/Clst: drk y brn to dsk y brn	0.55	3.91	0.19	20.58	2.27	172	8	4.5	0.12	449	0076-1L
3577.00	cut	S/Sst : lt gy to lt brn gy	1.97	0.62	0.25	2.48	0.28	221	89	2.6	0.76	421	0032-3L
3595.00	cut	S/Sst : lt gy to lt brn gy	1.05	0.54	0.22	2.45	0.27	200	81	1.6	0.66	433	0034-3L
3604.00	cut	Sh/Clst: drk gy to dsk y brn	0.20	2.11	0.41	5.15	1.54	137	27	2.3	0.09	450	0035-2L
3613.00	cut	Sh/Clst: drk gy to dsk y brn to drk y brn	0.31	3.32	0.36	9.22	1.76	189	20	3.6	0.09	449	0036-2L

Table 2 : Rock-Eval table for well NOCS 3/7-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3622.00	cut	Sh/Clst: drk gy to dsk y brn	0.22	2.70	0.11	24.55	1.52	178	7	2.9	0.08	449	0037-2L
3634.00	cut	Sh/Clst: drk gy to dsk y brn	3.63	35.49	0.43	82.53	15.60	228	3	39.1	0.09	448	0038-1L
3643.00	cut	Sh/Clst: blk to drk gy to dsk y brn	1.11	11.95	0.26	45.96	4.69	255	6	13.1	0.08	450	0039-1L
3649.00	cut	Sh/Clst: blk to drk gy to dsk y brn	1.01	12.15	0.31	39.19	4.10	296	8	13.2	0.08	451	0040-1L
3653.50	swc	Coal : blk	18.04	183.04	0.86	212.84	76.50	239	1	201.1	0.09	442	0077-1L
3658.00	cut	Coal : blk	8.64	86.75	1.75	49.57	32.00	271	5	95.4	0.09	445	0041-3L
3667.00	cut	Coal : blk	16.50	129.15	1.44	89.69	53.10	243	3	145.6	0.11	443	0042-3L
3676.00	cut	S/Sst : lt gy to lt brn gy	0.25	0.65	0.17	3.82	0.44	148	39	0.9	0.28	449	0043-2L
3676.00	cut	Coal : blk	13.00	108.20	1.40	77.29	39.70	273	4	121.2	0.11	446	0043-3L
3683.50	swc	Coal : blk	3.45	20.83	0.35	59.51	12.00	174	3	24.3	0.14	451	0078-1L
3685.00	cut	Coal : blk	8.00	63.20	0.60	105.33	28.70	220	2	71.2	0.11	450	0044-3L

April, 1990

RKER.90.068

Geochemical investigation of a gas sample from well 03/07-04, Norway

by

E.F. Idiz and R. Berhitoe

Sponsor: Norske Shell, Risavika Code: 876.106.10

investigation: 811005086

KONINKLIJKE/SHELL EXPLORATIE EN PRODUKTIE LABORATORIUM
RIJSWIJK, THE NETHERLANDS

(Shell research B.V.)

GEOCHEMICAL INVESTIGATION OF A GAS SAMPLE FROM WELL 03/07-04,NORWAY

1. INTRODUCTION

Geochemical analyses have been completed on the gas sample from the following well:

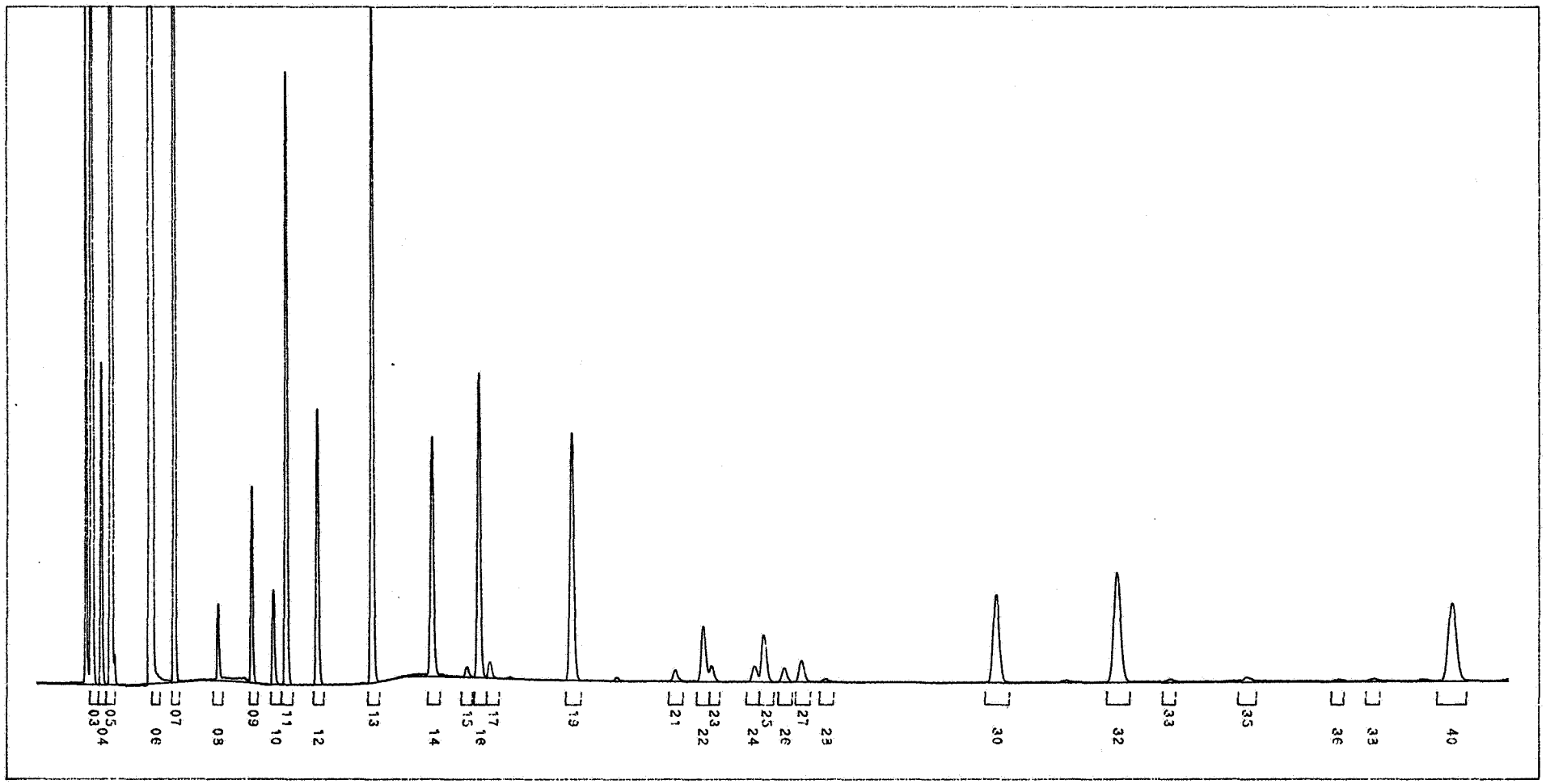
03/07-04, S 146325/3, GMC 445, 3440 - 3537 m

2. RESULTS

The composition of the gas (mole %, corrected for the presence of air) and the carbon isotope ratios are as follows:

Sample	03/07-04	
	3440 - 3537 m	
	Total gas (Hydrocarbons only)	
Methane	79.23	(83.65)
Ethane	8.78	(9.27)
Propane	4.35	(4.60)
i-Butane	0.51	(0.53)
n-Butane	0.96	(1.02)
i-Pentane	0.25	(0.27)
n-Pentane	0.26	(0.28)
C6+-hydrocarbons	0.37	(0.39)
Nitrogen	0.49	
Carbon monoxide	0.17	
Carbon dioxide	4.62	
$\delta^{13}C$ CH_4 (per mil)	-41.4	
$\delta^{13}C$ C_2H_6 (per mil)	-28.3	

GAS CHROMATOGRAM OF THE C-7 FRACTION OF A GAS SAMPLE



Norway
03/07-04
3440.00 m
GMC 0445, Fm., age: JM.

Figure 2

GAS CHROMATOGRAPHIC ANALYSIS OF THE FRACTION BOILING BELOW 114 DEGREES CENTIGRADE

Sample: S14632503 d.d. 16-mar-90 14:07
Recorded: L1-301 GLC-2

Country: Norway Well/Outcrop: 03/07-04

Depth/Collector: 3440.00 m

Comment: GMC 0445

COMPONENT No.	Name	RET.TIM (min)	MAXIMUM (mV)	AREA * (cnts)	WEIGHT PERC.
3	PROPANE	057:45	10193.0	103244	13.97
4	I-BUTANE	058:14	2228.7	17036	2.31
5	N-BUTANE	058:45	10195.7	117915	15.96
6	I-PENTANE	060:48	10182.9	79778	10.80
7	N-PENTANE	061:58	10175.0	91698	12.41
8	2.2-DIMETHYLBUTANE	064:12	530.5	4746	0.64
9	CYCLOPENTANE	065:54	1359.5	11770	1.59
10	2.3-DIMETHYLBUTANE	067:01	655.6	6785	0.92
11	2-METHYLPENTANE	067:40	4228.5	42706	5.78
12	3-METHYLPENTANE	069:15	1902.8	21235	2.87
13	N-HEXANE	072:04	4722.6	56491	7.65
14	METHYLCYCLOPENTANE	075:07	1654.3	24007	3.25
15	2.2-DIMETHYLPENTANE	076:54	72.5	1183	0.16
16	BENZENE	077:31	2106.1	29828	4.04
17	2.4-DIMETHYLPENTANE	078:04	112.8	1903	0.26
18	2.2.3-TRIMETHYLBUTANE	* * *	Not detected	* * *	
19	CYCLOHEXANE	082:14	1711.9	31151	4.22
20	3.3-DIMETHYLPENTANE	* * *	Not detected	* * *	
21	1.1-DIMETHYLCYCLOPENTANE	087:28	79.3	1770	0.24
22	2-METHYLHEXANE	088:54	387.0	8583	1.16
23	2.3-DIMETHYLPENTANE	089:18	112.4	2220	0.30
24	1-C-3-DIMETHYLCYCLOPENTANE	091:30	109.2	2693	0.36
25	3-METHYLHEXANE	091:58	325.9	7819	1.06
26	1-TR-3-DIMETHYLCYCLOPENTANE	093:00	99.0	2386	0.32
27	1-TR-2-DIMETHYLCYCLOPENTANE	093:53	149.6	3729	0.50
28	3-ETHYLPENTANE	095:06	25.0	675	0.09
30	N-HEPTANE	103:48	610.0	17784	2.41
31	1-C-2-DIMETHYLCYCLOPENTANE	* * *	Not detected	* * *	
32	METHYLCYCLOHEXANE	109:58	759.1	24963	3.38
33	1.1.3-TRIMETHYLCYCLOPENTANE	112:41	22.6	736	0.10
34	2.2-DIMETHYLHEXANE	* * *	Not detected	* * *	
35	ETHYLCYCLOPENTANE	116:36	33.5	1470	0.20
36	2.5-DIMETHYLHEXANE	121:19	16.9	575	0.08
38	2.2.3-TRIMETHYLPENTANE	123:07	20.2	723	0.10
40	TOLUENE	127:08	539.6	21201	2.87
	30	103:48	610.0	17784	
	Total peak area			738803	

*) Corrected for difference in response

Figure 2a

U-619 .3

February, 1990

RKER.90.033

Geochemical investigation of two crude oil samples from well 03/07-04, Norway

by

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Sponsor: Norske Shell, Risavika Code: 876.106.10

investigation: 811005085

KONINKLIJKE/SHELL EXPLORATIE EN PRODUKTIE LABORATORIUM
RIJSWIJK, THE NETHERLANDS

(Shell research B.V.)

Geochemical investigation of two crude oil samples from well 03/07-04, Norway

1.0 Introduction

A geochemical investigation has been carried out on two crude oil samples from well 03/07-04 (Lulita), Norway:

- OMC 4977, PT 1B, 3440-3537 m.,
- OMC 4978, PT 1A, 3473-3537 m.

Summary of the Geochemical Data of the oil sample from well 03/07-04 (3440 m.), Norway

Gravity and Gross Composition

API gravity (degrees) :	44.5
Specific Gravity (g/ml) :	0.8041
Gross Composition (wt%)	
Weight lost on topping :	43
Saturates :	79
Aromatics :	20
Heterocompounds :	1
Rest (High molecular) :	0
Gasoline fraction (%) :	19.7
Sulphur (%) :	0.0
Vanadium (ppm) :	0
Nickel (ppm) :	0

Saturates Distributions

(Gaschromatography)

Pristane / Phytane :	3.0
Pristane / n-C17 :	0.8
Phytane / n-C18 :	0.3
ACI :	15
Corr. Coeff. :	-0.9871

C-7 Distributions

(Gaschromatography)

C-7 Alkanes (%)	
Normal C-7 :	53
Mono Branched :	36
Poly Branched :	11
C-7 Alkanes / Cyclo Alkanes (%)	
Normal C-7 :	24
Cyclo Alkanes :	54
Branched Alkanes :	22
C-7 Alk. / Cyclo Alk. / Aromatics (%)	
Alkanes :	34
Cyclo Alkanes :	39
Aromatics :	27

Carbon Isotope Ratios

(Mass Spectrometry)

Total Oil (topped) :	-27.2
Saturates :	-27.7
Aromatics :	-25.8

S14572001

Distribution of Ring Compounds

(Field Ionisation Mass Spectrometry)

C-15 Ring Compounds (%)	
1 ring :	no data
2 ring :	
3 ring :	
C-30 Ring Compounds (%)	
3 ring :	no data
4 ring :	
5 ring :	
C-29 VR/E :	no data

Sterane and Triterpane Distributions

(Gaschromatography / Mass Spectrometry)

Steranes/Triterpanes (%)	
Iso Steranes :	23
Rearranged Steranes :	67
Triterpanes :	10
Steranes (%)	
Iso Steranes :	30
Rearranged Steranes :	58
Normal Steranes :	12
Triterpanes (%)	
C-30 Hopanes :	100
Oleanane + Lupane :	0
W + T :	0
Steranes Carbon No. Dist. (%)	
C-27 :	34
C-28 :	30
C-29 :	36
C-29 Sterane Ratios	
20S / 20R + 20S :	0.62
Iso / Iso + Normal :	0.68
Triterpane Ratios	
TS / TM :	1.36
3R / 3R + 5R :	0.26

Summary of the Geochemical Data of the oil sample from well 03/07-04 (3473 m.), Norway

Gravity and Gross Composition

API gravity (degrees) :	44.0
Specific Gravity (g/ml) :	0.8064
Gross Composition (wt%)	
Weight lost on topping :	42
Saturates :	78
Aromatics :	21
Heterocompounds :	1
Rest (High molecular) :	0
Gasoline fraction (%) :	18.2
Sulphur (%) :	0.0
Vanadium (ppm) :	0
Nickel (ppm) :	0

Saturates Distributions

(Gaschromatography)

Pristane / Phytane :	2.8
Pristane / n-C17 :	0.8
Phytane / n-C18 :	0.3
ACI :	16
Corr. Coeff. :	-0.9830

C-7 Distributions

(Gaschromatography)

C-7 Alkanes (%)	
Normal C-7 :	53
Mono Branched :	37
Poly Branched :	10
C-7 Alkanes / Cyclo Alkanes (%)	
Normal C-7 :	24
Cyclo Alkanes :	54
Branched Alkanes :	22
C-7 Alk. / Cyclo Alk. / Aromatics (%)	
Alkanes :	33
Cyclo Alkanes :	40
Aromatics :	27

Carbon Isotope Ratios

(Mass Spectrometry)

Total Oil (topped) :	-27.2
Saturates :	-27.8
Aromatics :	-25.8

S14572101

Distribution of Ring Compounds

(Field Ionisation Mass Spectrometry)

C-15 Ring Compounds (%)	
1 ring :	no data
2 ring :	
3 ring :	
C-30 Ring Compounds (%)	
3 ring :	no data
4 ring :	
5 ring :	
C-29 VR/E :	no data

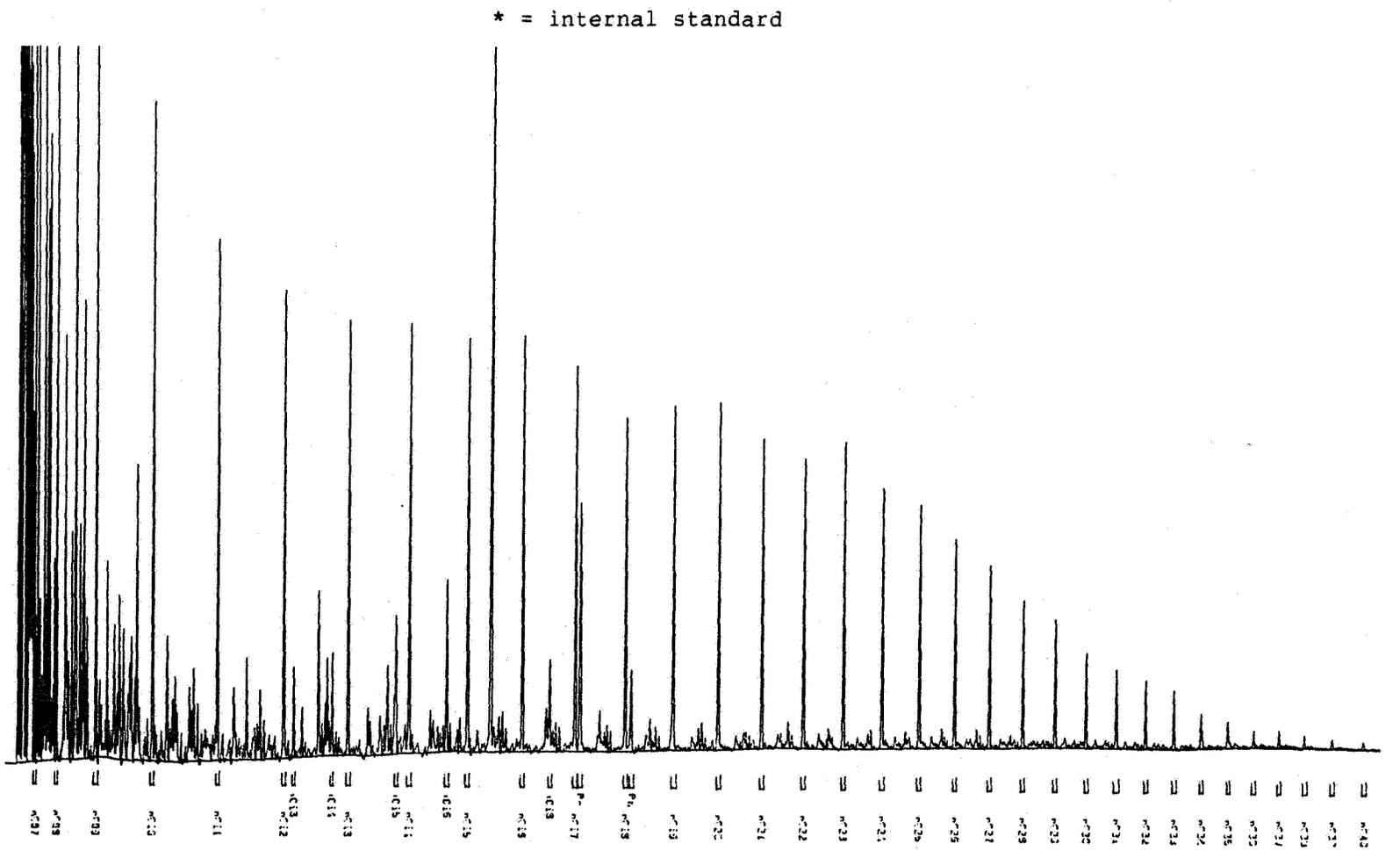
Sterane and Triterpane Distributions

(Gaschromatography / Mass Spectrometry)

Steranes/Triterpanes (%)	
Iso Steranes :	20
Rearranged Steranes :	68
Triterpanes :	12
Steranes (%)	
Iso Steranes :	27
Rearranged Steranes :	61
Normal Steranes :	12
Triterpanes (%)	
C-30 Hopanes :	100
Oleanane + Lupane :	0
W + T :	0
Steranes Carbon No. Dist. (%)	
C-27 :	32
C-28 :	31
C-29 :	37
C-29 Sterane Ratios	
20S / 20R + 20S :	0.58
Iso / Iso + Normal :	0.65
Triterpane Ratios	
TS / TM :	1.55
3R / 3R + 5R :	0.20

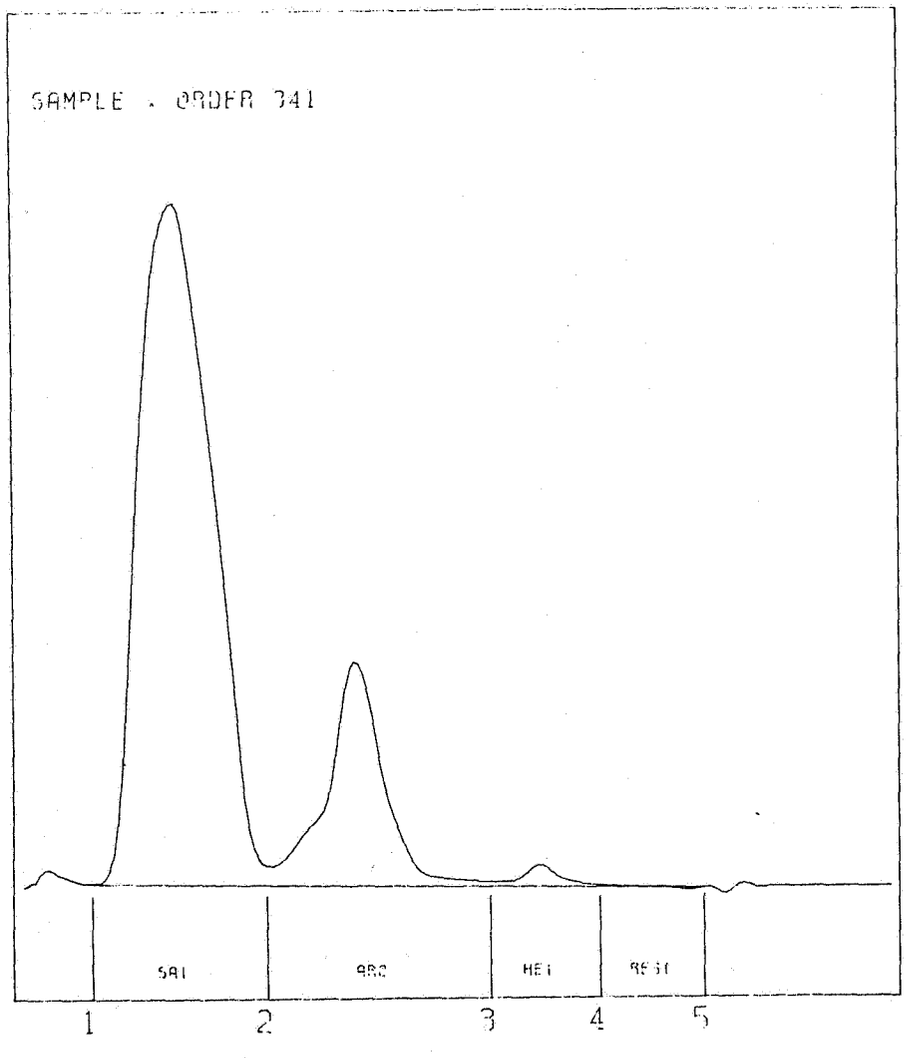
514572001

Gas chromatogram of the whole oil sample from well 03/07-04 (3440 m.), Norway



S145720O1

Gross Composition of the oil sample from well 03/07-04 (3440 m.), Norway



SAMPLE . S145720

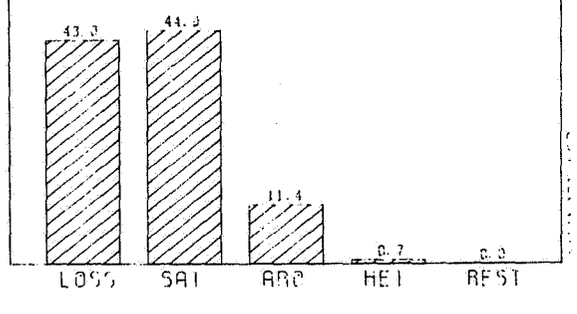
WEIGHT LOST ON TOPPING - 43.0 %

- SATURATES	-	78.7 %
- AROMATICS	-	20.0 %
- HETEROCOMPOUNDS	-	1.3 %
- REST (HIGH MOL.)	-	0.0 %

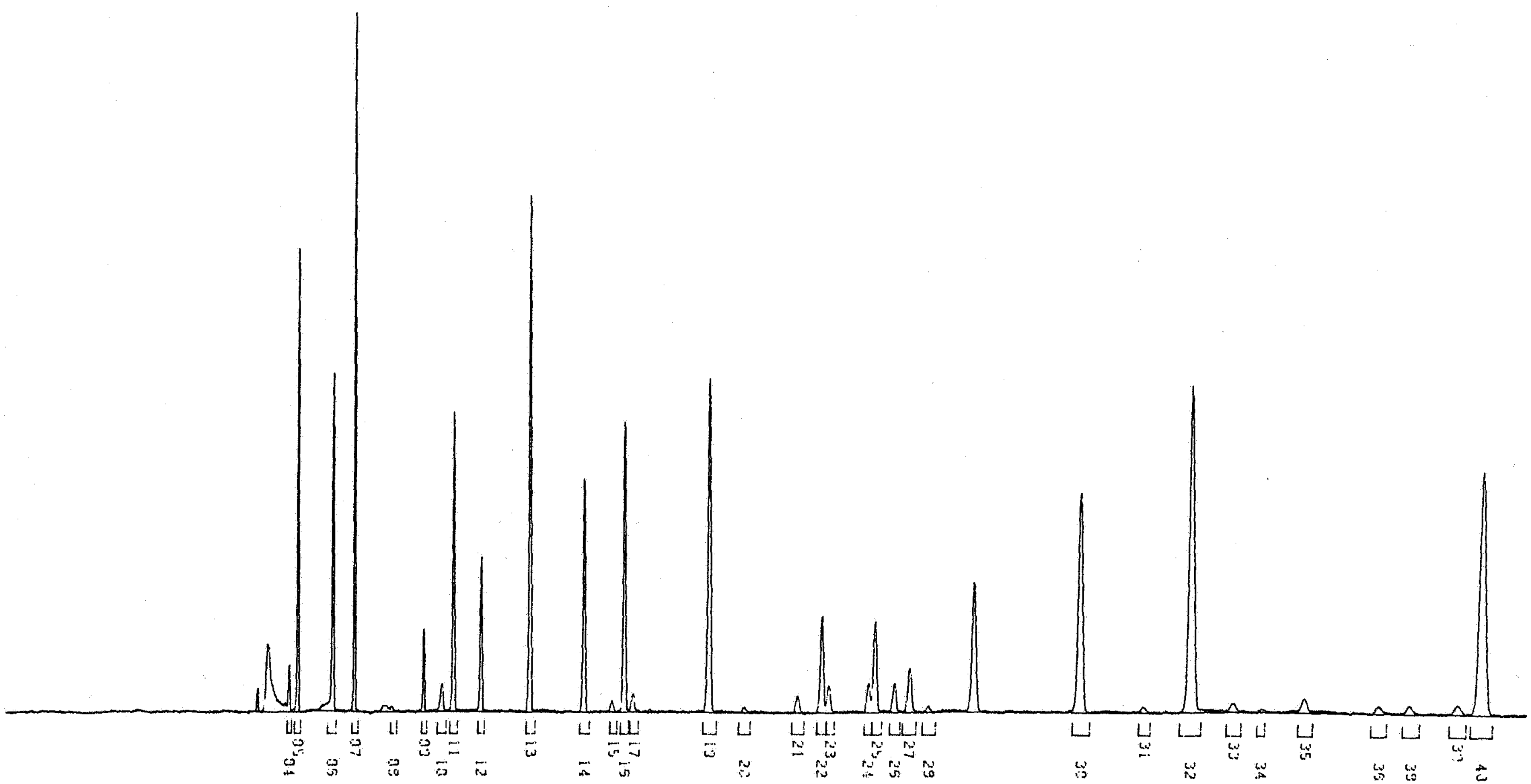
* WEIGHT PERCENTAGES RECALCULATED FROM FID RESPONSE

WEIGHT DISTRIBUTION

(WHOLE OIL = 100 %)



Gas chromatogram of the light fraction (< 120 C.) of the sample from well 03/07-04 (3440 m.), Norway



RKER.90.033

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Gas chromatographic hydrocarbons analysis (< 120 C.) well 03/07-04 (3440 m.), Norway

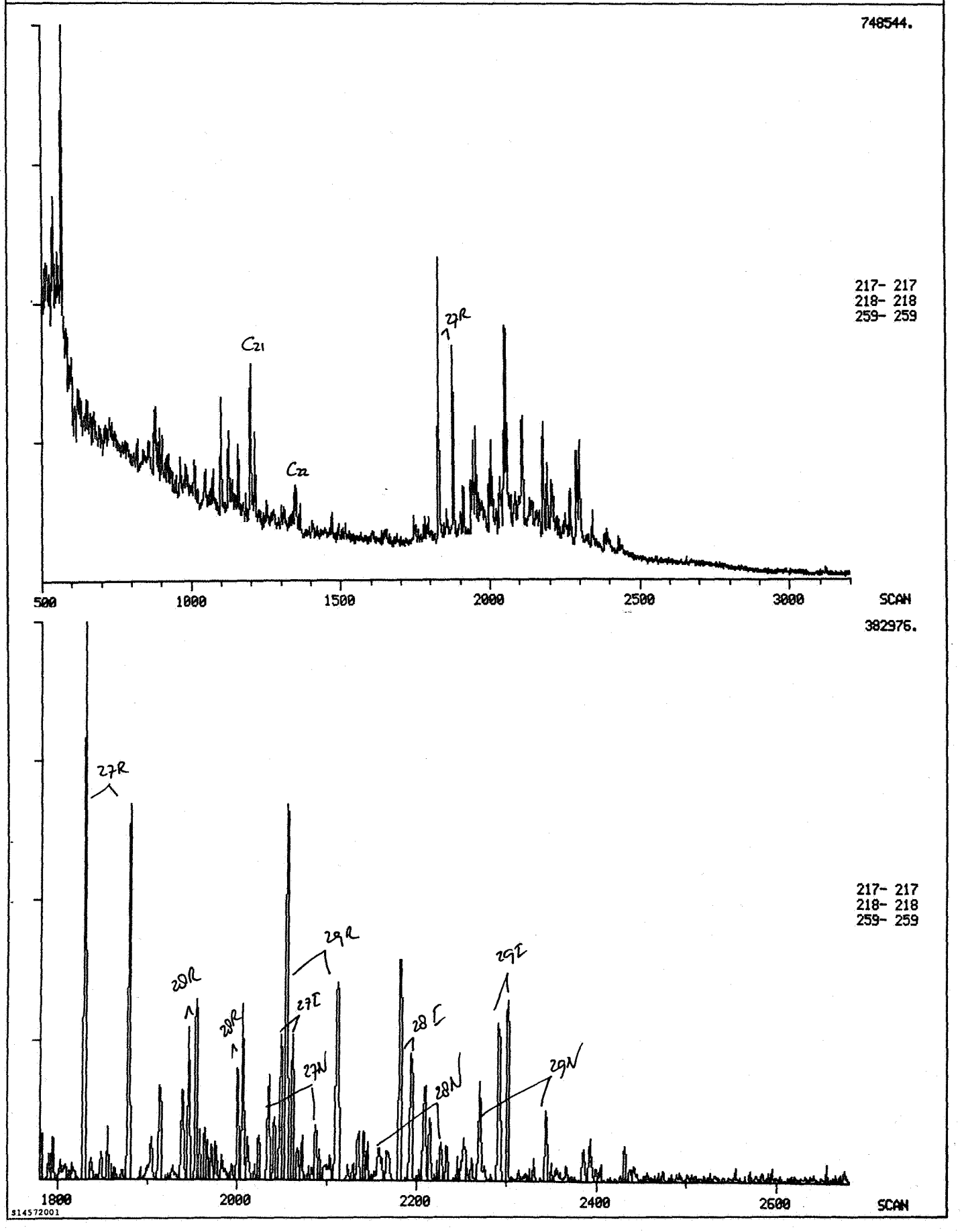
GAS CHROMATOGRAPHIC ANALYSIS OF THE FRACTION BOILING BELOW 114 DEGREES CENTIGRADE

Sample: S14572001 d.d. 20-jan-90 04:42

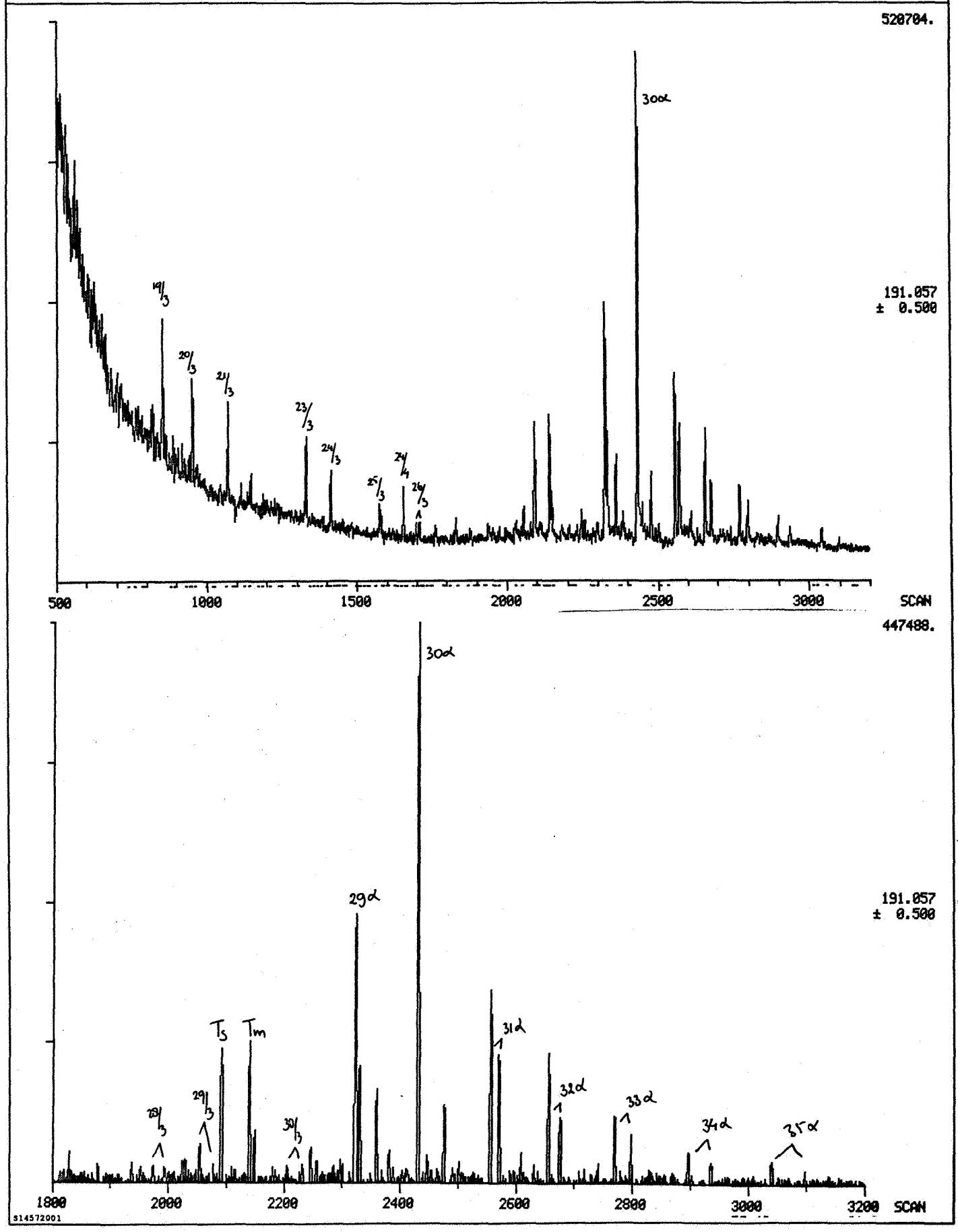
COMPONENT No.	Name	RET.TIM (min)	MAXIMUM (mV)	AREA * (cnts)	WEIGHT PERC.
4	I-BUTANE	016:43	390.6	3646	0.63
5	N-BUTANE	017:07	3868.3	26951	4.67
6	I-PENTANE	018:44	2816.1	27339	4.73
7	N-PENTANE	019:44	5885.2	39636	6.86
8	2.2-DIMETHYLBUTANE	021:29	47.0	804	0.14
9	CYCLOPENTANE	022:57	689.4	5864	1.02
10	2.3-DIMETHYLBUTANE	023:48	230.2	3913	0.68
11	2-METHYLPENTANE	024:21	2494.7	25077	4.34
12	3-METHYLPENTANE	025:38	1290.7	14391	2.49
13	N-HEXANE	027:55	4311.0	46136	7.99
14	METHYLCYCLOPENTANE	030:26	1949.2	24355	4.22
15	2.2-DIMETHYLPENTANE	031:44	97.9	1638	0.28
16	BENZENE	032:18	2419.5	31036	5.38
17	2.4-DIMETHYLPENTANE	032:42	154.8	2805	0.49
18	2.2.3-TRIMETHYLBUTANE	* * *	Not detected	* * *	
19	CYCLOHEXANE	036:14	2782.0	46282	8.02
20	3.3-DIMETHYLPENTANE	037:53	52.7	1124	0.19
21	1.1-DIMETHYLCYCLOPENTANE	040:20	142.9	2959	0.51
22	2-METHYLHEXANE	041:28	808.3	15601	2.70
23	2.3-DIMETHYLPENTANE	041:47	222.4	4546	0.79
24	1-C-3-DIMETHYLCYCLOPENTANE	043:39	244.3	5055	0.88
25	3-METHYLHEXANE	043:57	759.7	15436	2.67
26	1-TR-3-DIMETHYLCYCLOPENTANE	044:51	242.7	4943	0.86
27	1-TR-2-DIMETHYLCYCLOPENTANE	045:35	371.2	8371	1.45
28	3-ETHYLPENTANE	046:28	52.4	1232	0.21
30	N-HEPTANE	053:31	1831.3	47982	8.31
31	1-C-2-DIMETHYLCYCLOPENTANE	056:27	49.0	1415	0.25
32	METHYLCYCLOHEXANE	058:42	2720.4	79756	13.81
33	1.1.3-TRIMETHYLCYCLOPENTANE	060:37	73.2	2665	0.46
34	2.2-DIMETHYLHEXANE	062:00	24.2	528	0.09
35	ETHYLCYCLOPENTANE	063:59	119.2	4196	0.73
36	2.5-DIMETHYLHEXANE	067:27	67.6	2486	0.43
38	2.2.3-TRIMETHYLPENTANE	068:53	74.8	2767	0.48
39	1-TR-2-C-4-TRIMETHYLCYCLOPENTANE	071:07	81.7	3261	0.56
40	TOLUENE	072:15	2029.3	73206	12.68
	REFERENCE PEAK (29)	048:34	1079.2	26340	
	Total peak area			577401	

*) Corrected for difference in response

Sterane Fragmentograms of the oil sample from well 03/07-04 (3440 m.), Norway



Triterpane Fragmentograms of the oil sample from well 03/07-04 (3440 m.), Norway

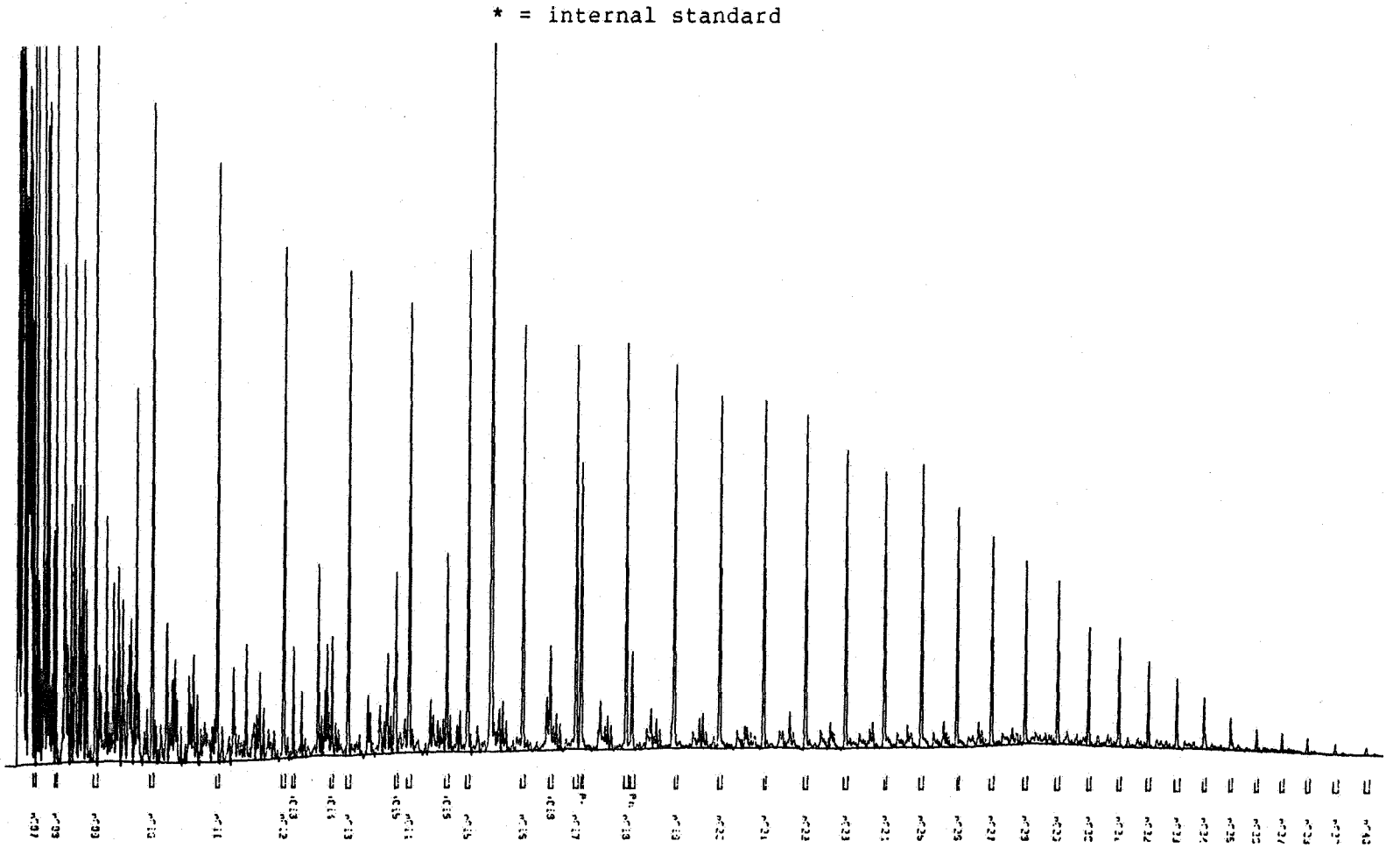


ANALYTICAL DATA

well 03/07-04 (3473 m.), Norway

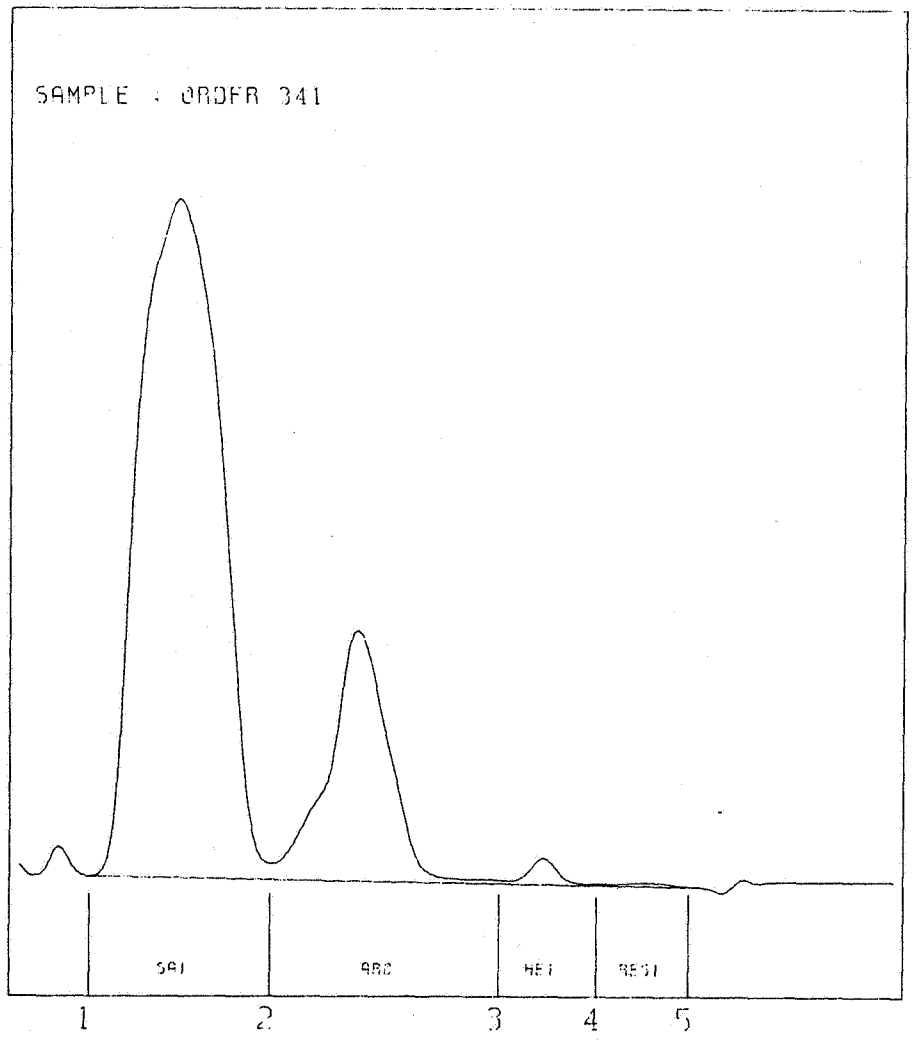
S14572101

Gas chromatogram of the whole oil sample from well 03/07-04 (3473 m.), Norway



S14572101

Gross Composition of the oil sample from well 03/07-04 (3473 m.), Norway

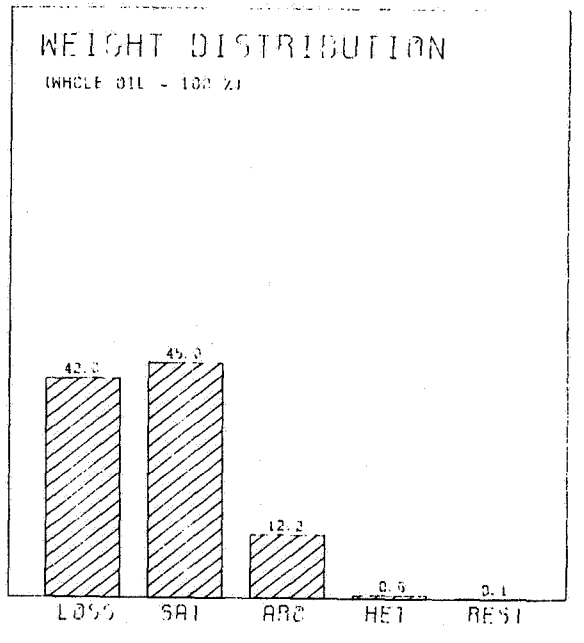


SAMPLE : 5145721

WEIGHT LOST ON TOPPING : 42.0 %

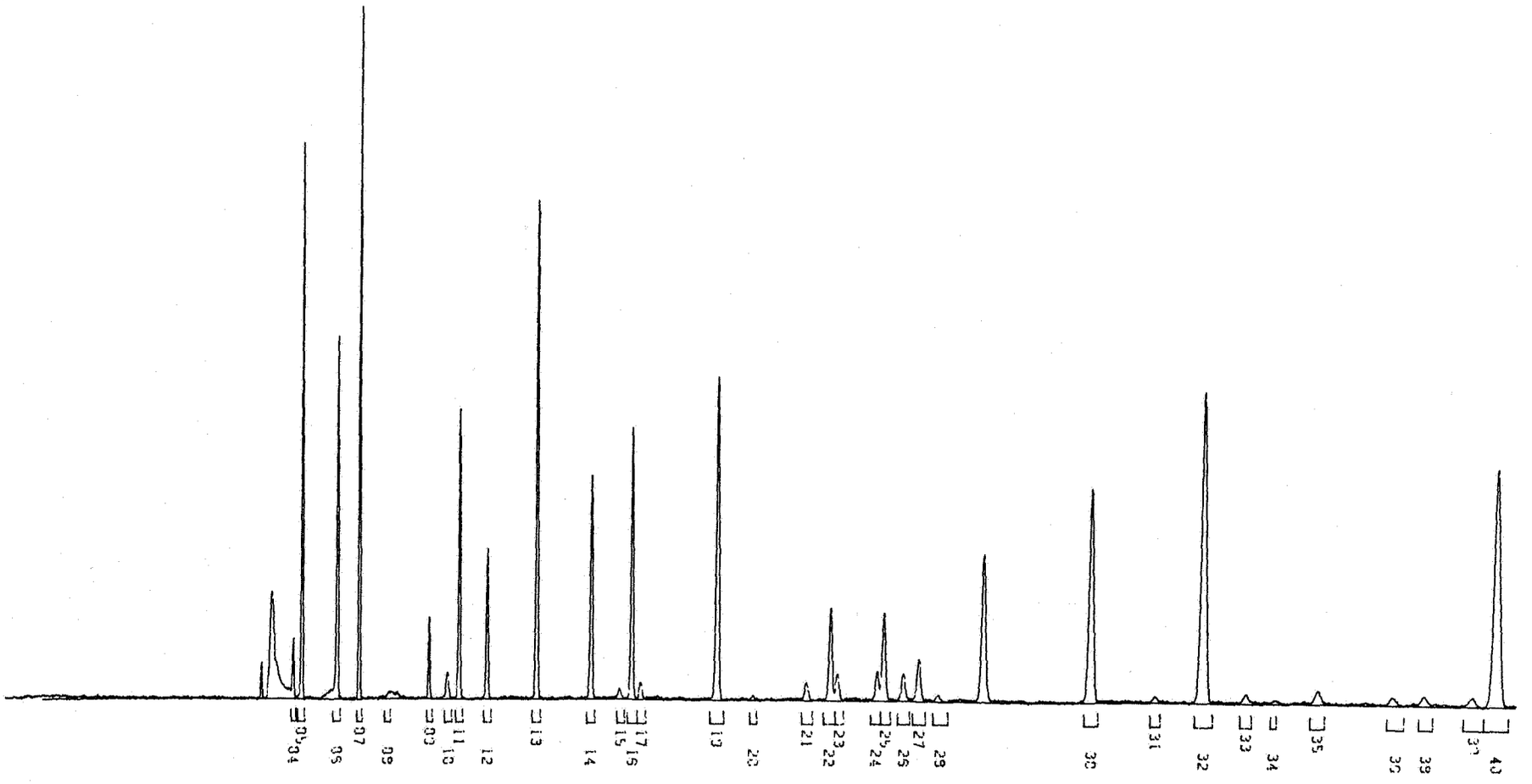
- SATURATES	77.6 %
- AROMATICS	21.1 %
- HETEROCOMPOUNDS	1.1 %
- REST (HIGH MOL.)	0.2 %

* WEIGHT PERCENTAGES ARE CALCULATED FROM FID RESPONSE



s1457210l

Gas chromatogram of the light fraction (< 120 C.) of the sample from well 03/07-04 (3473 m.), Norway



Gas chromatographic hydrocarbons analysis (< 120 C.) well 03/07-04 (3473 m.), Norway

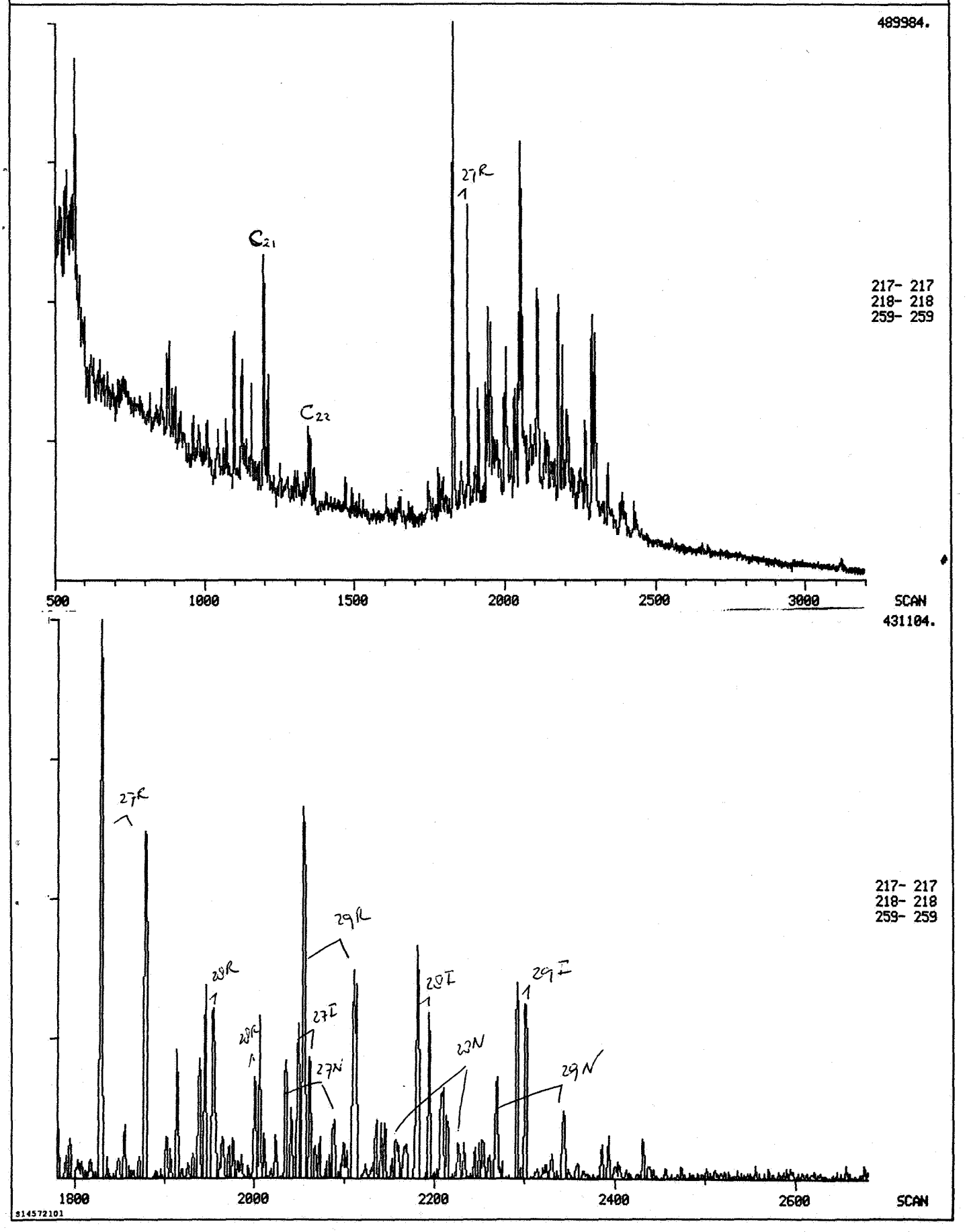
GAS CHROMATOGRAPHIC ANALYSIS OF THE FRACTION BOILING BELOW 114 DEGREES CENTIGRADE

Sample: S14572101 d.d. 20-jan-90 08:43

COMPONENT No.	Name	RET.TIM (min)	MAXIMUM (mV)	AREA * (cnts)	WEIGHT PERC.
4	I-BUTANE	016:42	384.3	3759	0.87
5	N-BUTANE	017:06	3504.7	24945	5.80
6	I-PENTANE	018:43	2285.8	21857	5.08
7	N-PENTANE	019:43	4536.9	30692	7.14
8	2.2-DIMETHYLBUTANE	021:06	44.7	748	0.17
9	CYCLOPENTANE	022:57	518.0	4366	1.02
10	2.3-DIMETHYLBUTANE	023:48	167.7	2705	0.63
11	2-METHYLPENTANE	024:20	1826.7	18337	4.26
12	3-METHYLPENTANE	025:37	949.3	10489	2.44
13	N-HEXANE	027:54	3143.9	33678	7.83
14	METHYLCYCLOPENTANE	030:25	1410.6	17861	4.15
15	2.2-DIMETHYLPENTANE	031:42	67.3	1243	0.29
16	BENZENE	032:16	1712.8	21879	5.09
17	2.4-DIMETHYLPENTANE	032:41	108.2	1827	0.42
18	2.2.3-TRIMETHYLBUTANE	* * * Not detected * * *			
19	CYCLOHEXANE	036:12	2036.5	33561	7.80
20	3.3-DIMETHYLPENTANE	037:51	32.6	552	0.13
21	1.1-DIMETHYLCYCLOPENTANE	040:19	114.8	2660	0.62
22	2-METHYLHEXANE	041:27	589.6	11646	2.71
23	2.3-DIMETHYLPENTANE	041:46	168.5	3386	0.79
24	1-C-3-DIMETHYLCYCLOPENTANE	043:37	185.8	4109	0.96
25	3-METHYLHEXANE	043:56	557.2	11251	2.62
26	1-TR-3-DIMETHYLCYCLOPENTANE	044:50	175.8	4030	0.94
27	1-TR-2-DIMETHYLCYCLOPENTANE	045:33	270.1	6261	1.46
28	3-ETHYLPENTANE	046:27	42.3	1092	0.25
30	N-HEPTANE	053:30	1346.9	34410	8.00
31	1-C-2-DIMETHYLCYCLOPENTANE	056:26	38.5	1058	0.25
32	METHYLCYCLOHEXANE	058:40	1962.2	56807	13.21
33	1.1.3-TRIMETHYLCYCLOPENTANE	060:38	60.7	1980	0.46
34	2.2-DIMETHYLHEXANE	062:00	24.9	498	0.12
35	ETHYLCYCLOPENTANE	063:58	86.6	3190	0.74
36	2.5-DIMETHYLHEXANE	067:25	51.7	2141	0.50
38	2.2.3-TRIMETHYLPENTANE	068:52	61.6	2455	0.57
39	1-TR-2-C-4-TRIMETHYLCYCLOPENTANE	071:06	58.3	2349	0.55
40	TOLUENE	072:12	1495.0	52185	12.14
	REFERENCE PEAK (29)	048:32	933.1	23346	
	Total peak area			430007	

*) Corrected for difference in response

Sterane Fragmentograms of the oil sample from well 03/07-04 (3473 m.), Norway



Triterpane Fragmentograms of the oil sample from well 03/07-04 (3473 m.), Norway