

8.1 SUMMARY

Well 6407/9-3, the second Draugen appraisal well, which was drilled some four kilometres south of the discovery well, encountered a 34 m hydrocarbon column in the Frøya Formation. The OWC was interpreted at approximately 1638.5 m ss between the very good sands and the basal shale and was for that reason not very clear.

Prior to testing an FMT survey was carried out: the reservoir pressure measured was hydrostatic, 2395 psia at datum (1630 m ss).

In-situ stress tests were carried out at 1680 and 1738 m bdf. A maximum allowable bottom hole injection pressure based on fracturing of 3660 psia was evaluated from these tests and the Breckels and Van Eekelen correlation (Fig. 4.3).

The oil column was perforated from 1606.5 to 1618.5 m ss. The interval was gravelpacked and flowrates up to 15700 stb/d were achieved during the clean up. A multirate test incorporating 4 flow periods with a total flow duration of 36 hrs and a 24 hrs pressure build-up survey was carried out. The evaluation showed an average permeability of 5.7 Darcy over 36 m. Skins calculated ranged from 24 to 29. Observed productivity indices after gravelpacking varied from 147 to 166 stb/d/psi. The calculated ideal PI is 660 stb/d/psi.

The evaluated datum pressure was 2391 psia. Both this pressure and the FMT pressure of 2395 psia are well within measurement accuracy of the previously established reservoir pressure of 2392 psia.

WELL: 6407/9-3
PT-1 SAMPLES COLLECTED

No.	TEST	TIME	DATE	NATURE	S.G	SAMPLING POINT	CONTAINER DESCRIPTION /VOLUME	No.	REMARKS
BHS 1	PT-1B	10.23	17.7.85	OIL	N/A	BOTTOM HOLE DEPTH 1625.2m	680 cc SHIPPING BOTTLE	811515	BUBBLE POINT 510 PSIG @ 60.5°F
BHS 2	PT-1B	10.23	17.7.85	OIL	N/A	BOTTOM HOLE DEPTH 1627.4m	675 cc SHIPPING BOTTLE	811077	BUBBLE POINT 510 PSIG @ 60°C
BHS 3	PT-1B	10.23	17.7.85	OIL	0.821 @60°F	BOTTOM HOLE DEPTH 1629.6m	1 LITRE PLASTIC BOTTLE		BAD SAMPLE
WTR 1	PT-1B	22:50	16.7.85	WATER		WATER LINE AT SEPARATOR	5 LITRE PLASTIC CAN		PH = 1
WTR 2	PT-1B	02:00	17.7.85	WATER		WATER LINE AT SEPARATOR	5 LITRE PLASTIC CAN		PH = 1
WTR 3	PT-1B	04:20	17.7.85	WATER		WATER LINE AT SEPARATOR	5 LITRE PLASTIC CAN		PH = 1
OIL 1	PT-1B	15.00	16.7.85	OIL/WATER		UPSTREAM SANDCATCHER	1 LITRE PLASTIC CAN		
OIL 2	PT-1B	04.20	17.7.85	OIL	.819	SEPARATOR OIL LINE	5 LITRE PLASTIC BOTTLE		
OIL 3	PT-1D	13.50	18.7.85	OIL	.818	UPSTREAM SANDCATCHER	1-LITRE PLASTIC BOTTLE		

WELL: 6407/9-3
PT-1 SAMPLES COLLECTED

No.	TEST	TIME	DATE	NATURE	S.G	SAMPLING POINT	CONTAINER DESCRIPTION /VOLUME	No.	REMARKS
OIL 4	PT-1D	16.00	18.7.85	OIL	.820	UPSTREAM SANDCATCHER	1-LITRE PLASTIC BOTTLE		
OIL 5	PT-1D	16.10	18.7.85	OIL	.820	UPSTREAM SANDCATCHER	1-LITRE PLASTIC BOTTLE		
OIL 6	PT-1D	23.00	18.7.85	OIL	.818	UPSTREAM SANDCATCHER	1-LITRE PLASTIC BOTTLE		
OIL 7	PT-1D	04.05	19.7.85	OIL	.820	UPSTREAM SANDCATCHER	1-LITRE PLASTIC BOTTLE		
OIL 8	PT-1D	08.35	19.7.85	OIL	.818	UPSTREAM SANDCATCHER	1-LITRE PLASTIC BOTTLE		
OIL 9	PT-1E	01.15	20.7.85	OIL	.820	UPSTREAM SANDCATCHER	1-LITRE JERRY CAN		
OIL 10	PT-1E	02.30	20.7.85	OIL	.821	UPSTREAM SANDCATCHER	1-LITRE JERRY CAN		
OIL 11	PT-1E	08.00	20.7.85	OIL	.817	UPSTREAM SANDCATCHER	1-LITRE JERRY CAN		
OIL 12	PT-1E	08.30	20.7.85	OIL	.817	UPSTREAM SANDCATCHER	1-LITRE JERRY CAN		

WELL: 6407/9-3
PT-1 SAMPLES COLLECTED

No.	TEST	TIME	DATE	NATURE	S.G	SAMPLING POINT	CONTAINER DESCRIPTION /VOLUME	No.	REMARKS
OIL 13	PT-1E	21.25	20.7.85	OIL	.818	UPSTREAM SANDCATCHER	1-LITRE JERRY CAN		
OIL 14	PT-1E	23.35	20.7.85	OIL	.816	UPSTREAM SANDCATCHER	1-LITRE JERRY CAN		
OIL 15	PT-1E	04.00	21.7.85	OIL	.808	UPSTREAM SANDCATCHER	1-LITRE JERRY CAN		
OIL 16	PT-1E	06.00	21.7.85	OIL	.808	UPSTREAM SANDCATCHER	1-LITRE JERRY CAN		
P.V.T 1A	PT-1E	02.30	20.7.85	OIL		SEPARATOR-2	700 cc PVT CYLINDER	811448	
P.V.T 1B	PT-1E	02.30	20.7.85	GAS		SEPARATOR-2	20 LITRE PVT GAS BOTTLE	1019	
P.V.T 2A	PT-1E	08.30	20.7.85	OIL		SEPARATOR-2	700 cc PVT CYLINDER	811505	
P.V.T 2B	PT-1E	08.30	20.7.85	GAS		SEPARATOR-2	20 LITRE PVT GAS BOTTLE	1038	
PVT 3A	PT-1E	20.40	20.7.85	OIL		SEPARATOR-2	700 cc PVT CYLINDER	810873	

WELL: 6407/9-3
PT-1 SAMPLES COLLECTED

No.	TEST	TIME	DATE	NATURE	S.G	SAMPLING POINT	CONTAINER DESCRIPTION /VOLUME	No.	REMARKS
PVT 3B	PT-1E	20.40	20.7.85	GAS		SEPARATOR-2	20 LTR GAS PVT CYLINDER	1021	
BULK 1	PT-1E	01.30	20.7.85	OIL	.820	SEPARATOR-2	45 GALLON BARREL		
BULK 2	PT-1E	08.00	20.7.85	OIL	.817	SEPARATOR-2	45 GALLON BARREL		
BULK 3	PT-1E	21.10	20.7.85	OIL	.818	SEPARATOR-2	45 GALLON BARREL		
BULK 4	PT-1E	04.10	21.7.85	OIL	.808	SEPARATOR-2	45 GALLON BARREL		

WELL: 6407/9-3
SUMMARY OF SEPARATOR DATA

DATE TIME	THP/THT psig/°F	OILRATE stb/d	GOR scf/stb	Psep/Tsep psig/°F	BHP psia	COMMENTS
11.07.85						PT-1A 2Dd
14.00	425/60	24			2346.3	20/64" bean
14.30	428/60	-			2346.1	16/64" bean
15.00	467/56	1512			2336.6	BHP data from
15.30	481/57	579			2345.7	8430-037 Valtos
16.00	495/58	792	100	30/54	2343.3	18/64" bean
16.30	498/58	984	140	30/54	2342.0	
17.00	510/57	1032	152	40/56	2342.0	One gauge failed
17.30	520/56	984	156	45/52	2343.2	
18.00	525/56	672	239	50/52	2343.5	16/64" bean
16.07.85						PT-1B 3Dd
17.30	412/61	336				
18.00	340/63	1068				32/64" bean
18.30	354/58	660				
19.00	362/58	636				
19.30	385/58	1680				
20.00	445/58	588		90/53		24/64" bean
20.30	446/58	1122		90/53		
21.00	450/58	1131	109	90/52		
21.30	455/57	1144	112	100/52		
22.00	455/57	1146	120	100/52		BSW=0.5 %
22.30	457/56	1138	120	90/51		o ppm H2S
23.00	457/56	1125	123	90/51		.75 % CO2
16.07.85						PT-1B 4Dd
23.30	398/56	1932	146	110/51		36/64" bean
24.00	406/56	2343	132	100/51		
00.30	419/57	2795	111	95/52		

WELL: 6407/9-3
SUMMARY OF SEPARATOR DATA

DATE TIME	THP/THT psig/°F	OILRATE stb/d	GOR scf/stb	Psep/Tsep psig/°F	BHP psia	COMMENTS
01.00	425/57	2657	122	105/52		
01.30	430/58	2709	121	105/52		
02.00	435/58	2723	124	110/53		
02.30	440/59	2865	118	110/54		
03.00	440/60	2615	131	110/53		
03.30	445/60	2869	126	105/54		
04.00	450/60	2848	127	105/54		BSW = trace
04.30	447/60	2926	125	105/55		
05.00	449/60	2724	140	110/56		
<hr/>						
16.07.85						PT-1C 2Dd
10.05	556/63	252				8/64" bean
10.35	559/63	216				took 3 BHS: 2 OK
11.05	559/62	179				
11.35	559/64	195				Gauge failed
<hr/>						
18.07.85						PT-1D 3Dd
02.00	217/60					28/64" bean
03.00						
04.00						32/64" bean
05.00	455/61					
06.00	516/64					
07.00	505/64					
08.00	514/65					
09.00	521/67	1894	237	87/60		
10.00	527/69	3079	149	87/60		
11.00	531/70	3145	157	90/62		
<hr/>						
18.07.85						PT-1D 4Dd
12.00	497/75	4441	176	120/68		40/64" bean

WELL: 6407/9-3
SUMMARY OF SEPARATOR DATA

DATE TIME	THP/THT psig/°F	OILRATE stb/d	GOR scf/stb	Psep/Tsep psig/°F	BHP psia	COMMENTS
13.00	502/76	5069	152	110/71		no H ₂ S
14.00	504/76	5080	159	105/72		0.5 % CO ₂
15.00	488/-	6035	116	165/-		48/64" bean
16.00	490/78	6062	116	170/74		
17.00	491/79	6088	121	155/73		

WELL 6407/9-3
SUMMARY OF SEPARATOR DATA

DATE TIME	THP/THT psig/ ^o F	OILRATE stb/d	GOR scf/stb	Psep/Tsep psig/ ^o F	BHP psia	COMMENTS
18.07.85						PT-1D 5Dd
18.00	463/81	4089	67	195/71		Flowed through
19.00	450/82	4022 3824	98 108	210/71 210/73		2seps.each on
20.00	450/82	3662 4186	108 98	210/72 210/73		40/64" bean
18.07.85						PT-1D 6 Dd
21.00	331/86	5141 4521	72 121	250/73 250/78		2 seps. on
22.00	316/88	5745 6281	119 121	150/76 135/79		2* 64/64"bean
23.00	317/88	5903 6678	129 129	150/78 155/79		
24.00	320/88	5814 6700	127 129	160/77 155/79		
01.00	321/85	5890 6656	126 128	160/78 160/80		
19.07.85						PT-1D 7Dd
02.00	301/?	6245 6554	123 133	155/79 160/81		2 seps. on
03.00	295/88	6976 6500	161 159	135/79 140/82		2* 72/64" bean
04.00	295/87	7719 6598	138 169	135/78 140/81		
05.00	296/86	7397 6564	131 145	135/78 140/79		
19.07.85						PT-1D 8Dd
07.00	261/?	7212 7576	145 134	145/76 155/78		2 seps. on
08.00	261/?	7773 7611	113 134	145/78 160/77		2* 88/64" bean
19.07.85						PT-1D 9Dd
09.00	243/?	7760 7308	113 114	145/79 160/76		2 seps. on
09.30	242/?	7488 8264	117 101	145/79 155/76		
10.00	243/?	7444 8005	120 103	150/79 150/78		2*128/64" bean

WELL 6407/9-3
SUMMARY OF SEPARATOR DATA

DATE TIME	THP/THT psig/°F	OILRATE stb/d	GOR scf/stb	Psep/Tsep psig/°F	BHP psia	COMMENTS
19.07.85						PT-1E 1Dd
21.00	577/63					
22.00	577/59	2976	115	160/56	2354.7	one sep. on
23.00	554/60	2880	126	165/56	2355.1	32/64" bean
24.00	556/60	3328	99	170/56	2355.6	
01.00	557/61	3434	90	175/57	2355.6	BHP from HP 0784
02.00	557/61	3394	107	160/57	2355.5	1640.2 m bdf
03.00	558/62	3394	106	160/57	2355.5	
20.07.85						PT-1E 2Dd
04.00	452/70	4490 3431	102 146	150/63 170/65	2323.3	2 seps. on
05.00	453/73	4513 4349	104 115	155/63 170/66	2323.0	2* 40/64" bean
06.00	456/74	? 4552	81 108	150/65 170/68	2322.9	
07.00	457/74	? 4414	87 111	150/66 170/69	2322.7	0 % BSW
08.00	457/74	? 4432	79 110	150/65 170/69	2322.6	0 ppm H2S
09.00	457/76	? 4256	88 116	155/66 175/69	2322.7	0.4 % CO2
20.07.85						PT-1E 3Dd
10.00	313/84				2291.3	2 seps. on
11.00	297/85				2287.3	2* 72/64" bean
12.00	297/86				2287.2	
13.00	297/86	? 6730	159 166	150/75 160/79	2287.2	
14.00	297/87	? 6788	116 143	145/75 160/81	2287.3	
15.00	300/88	6480 7228	130 137	140/76 155/81	2287.2	
16.00	299/90	6538 6832	138 172	150/79 150/83	2287.1	
17.00	304/91	6163 6814	131 127	175/80 175/83	2288.0	0 % CO2
18.00	305/92	6110 5898	127 146	170/80 175/83	2288.3	0 ppm H2S
19.00	308/92	6184 6886	125 123	175/80 180/83	2288.2	
20.00	305/92	6241 6935	134 126	155/80 180/84	2287.7	sediment traces
21.00	305/92	6270 6696	135 140	160/79 180/84	2287.8	

WELL 6407/9-3
SUMMARY OF SEPARATOR DATA

DATE TIME	THP/THT psig/°F	OILRATE stb/d	GOR scf/stb	Psep/Tsep psig/°F	BHP psia	COMMENTS
22.00	305/92	6270 6664	135 143	160/79 180/83	2287.8	
23.00	305/92	6270 6694	134 136	160/79 160/83	2288.0	
24.00	--	6313 6672	135 151	160/79 180/82	2288.2	
01.00	306/90	6299 6815	136 146	165/78 180/82	2288.3	
02.00	306/88	6262 6707	135 148	165/80 180/82	2288.5	
21.07.85						PT-1E 4Dd
03.00	461/81	3746 4270	128 101	150/69 195/72	2322.4	2 seps. on
04.00	461/80	3796 4251	124 119	150/68 165/71	2322.4	2* 40/64" bean
05.00	461/79	3832 4240	123 121	145/68 165/70	2322.4	
06.00	460/78	3842 4251	123 121	145/67 165/69	2322.4	
07.00	460/79	3836 4272	123 121	145/68 165/69	2322.4	sediment trads
08.00	461/78	3840 4268	123 122	145/69 165/69	2322.3	0.4 % COs
09.00	461/79	3834 4259	123 125	145/69 165/69	2320.7	0 ppm H2S
22.07.85						PT-1F 2Dd
18.00	564/56					8/64 " bean
18.30	566/56					12/64" bean
19.00	566/56					
19.30	566/56	576				
20.00	566/56	518				

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January 1986

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GEOCHEMICAL INVESTIGATION OF A CRUDE OIL
FROM WELL 6407/9-3, Norway
by

J.M.A. Buiskool Toxopeus & F.M. van der Veen

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Code: 774.10.300



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KONINKLIJKE/SHELL EXPLORATIE EN PRODUKTIE LABORATORIUM

RIJSWIJK, THE NETHERLANDS

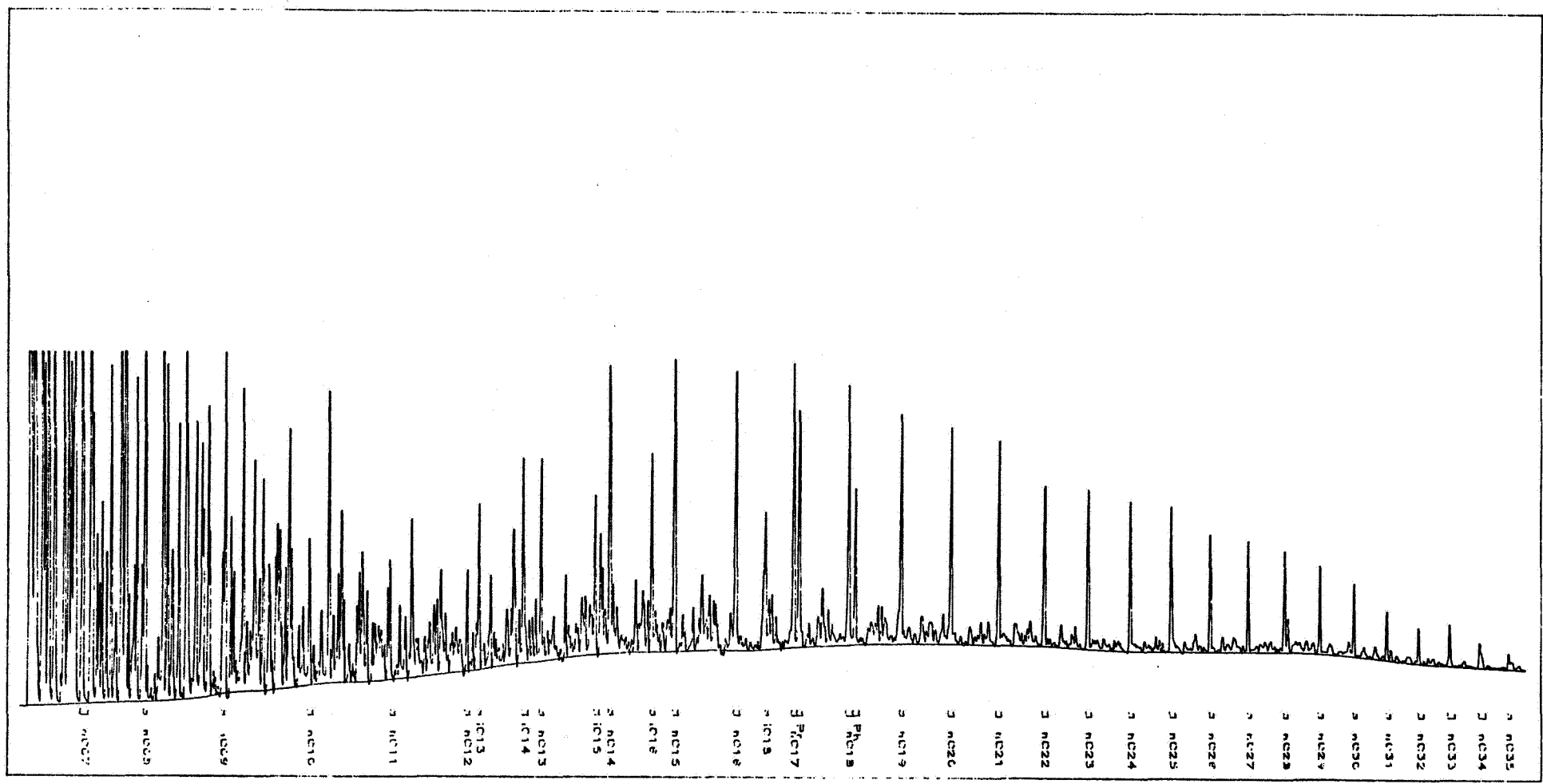
(Shell Research B.V.)

Table 1 - GEOCHEMICAL DATA OF OILS

Sample	Norway 6407/9-3 1633.5-1644 m PT-1B
API	40.7
specific gravity	0.8216
%w. boil. <120°C	13.4
% sulphur	0.4
ppm V as metals	0.7
ppm Ni as metals	0.8
pristane/phytane	2.1
pristane/nC17	1.0
phytane/nC18	0.5
C ₇ -distribution	
C ₇ -alkane	
nC7	50
monobranched	39
polybranched	10
C ₇ -alk/naphthene	
nC7	21
naphthenes	59
branched alkanes	21
C ₇ -alk/naphth/arom	
nC7	39
naphthenes	56
aromatics	5
C ₁₅ distribution	
1-ring	
2-ring	
3-ring	
C ₃₀ distribution	
3-ring	
4-ring	
5-ring	
C ₂₉ VR/E	
% asphaltenes	0
% saturates*	64
% aromatics	34
% heterocompounds	2
δ ¹³ C ^o /oo (whole oil)	-28.7
" (saturates)	
" (aromatics)	

*) Determined by thin-layer chromatography.
ND = not detectable.

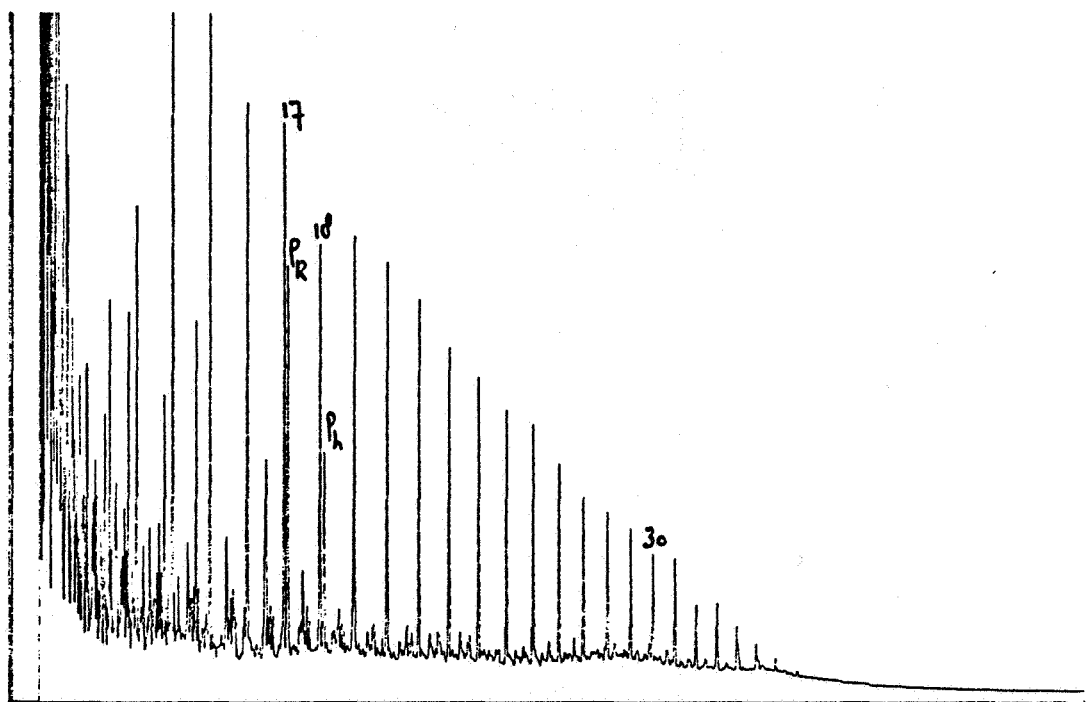
GAS CHROMATOGRAM OF WHOLE CRUDE



RKER 86.033

HALTENBANKEN, 6407/9--3

FIG. 1.



GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 2, NORWAY HALTENBANKEN 6407/9-3

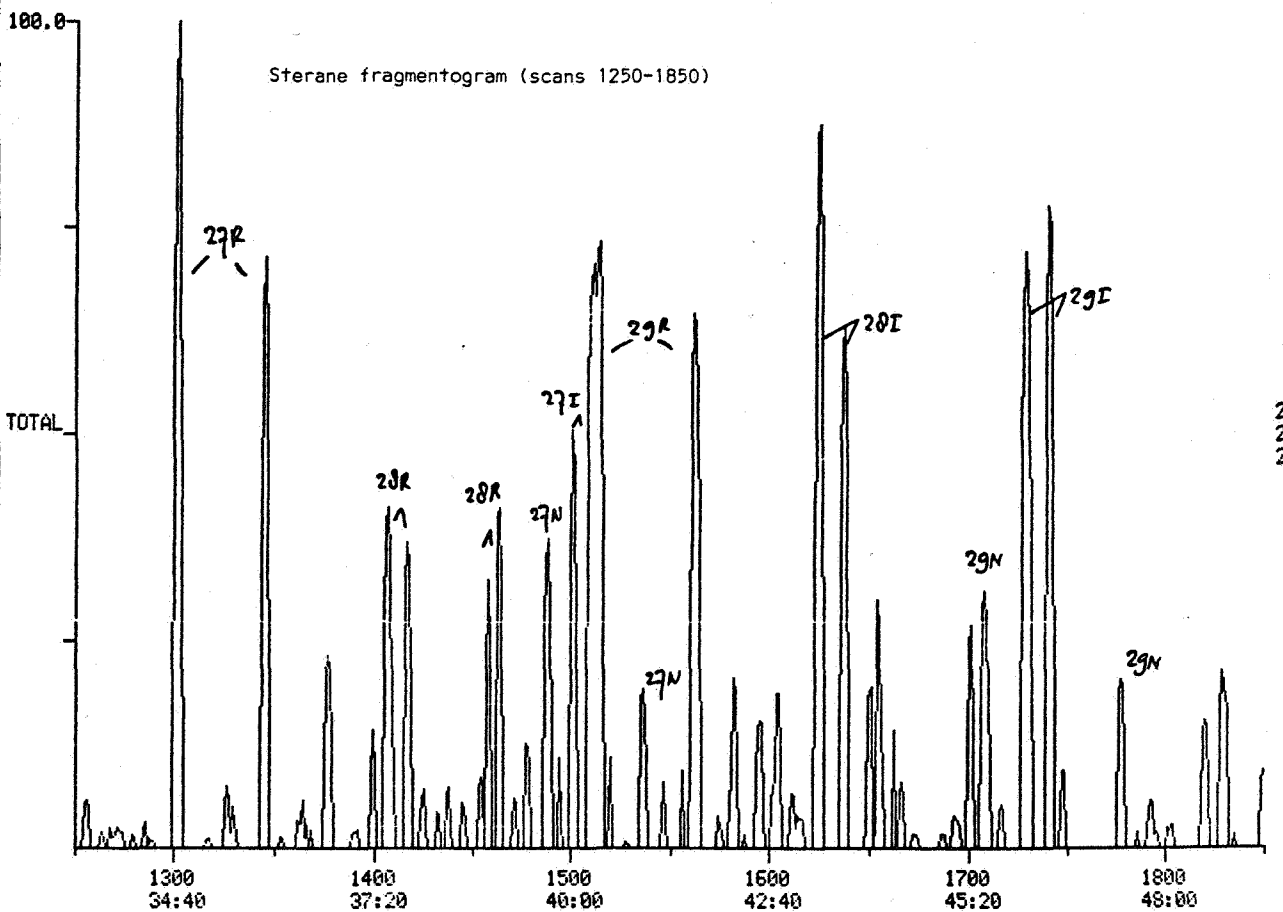
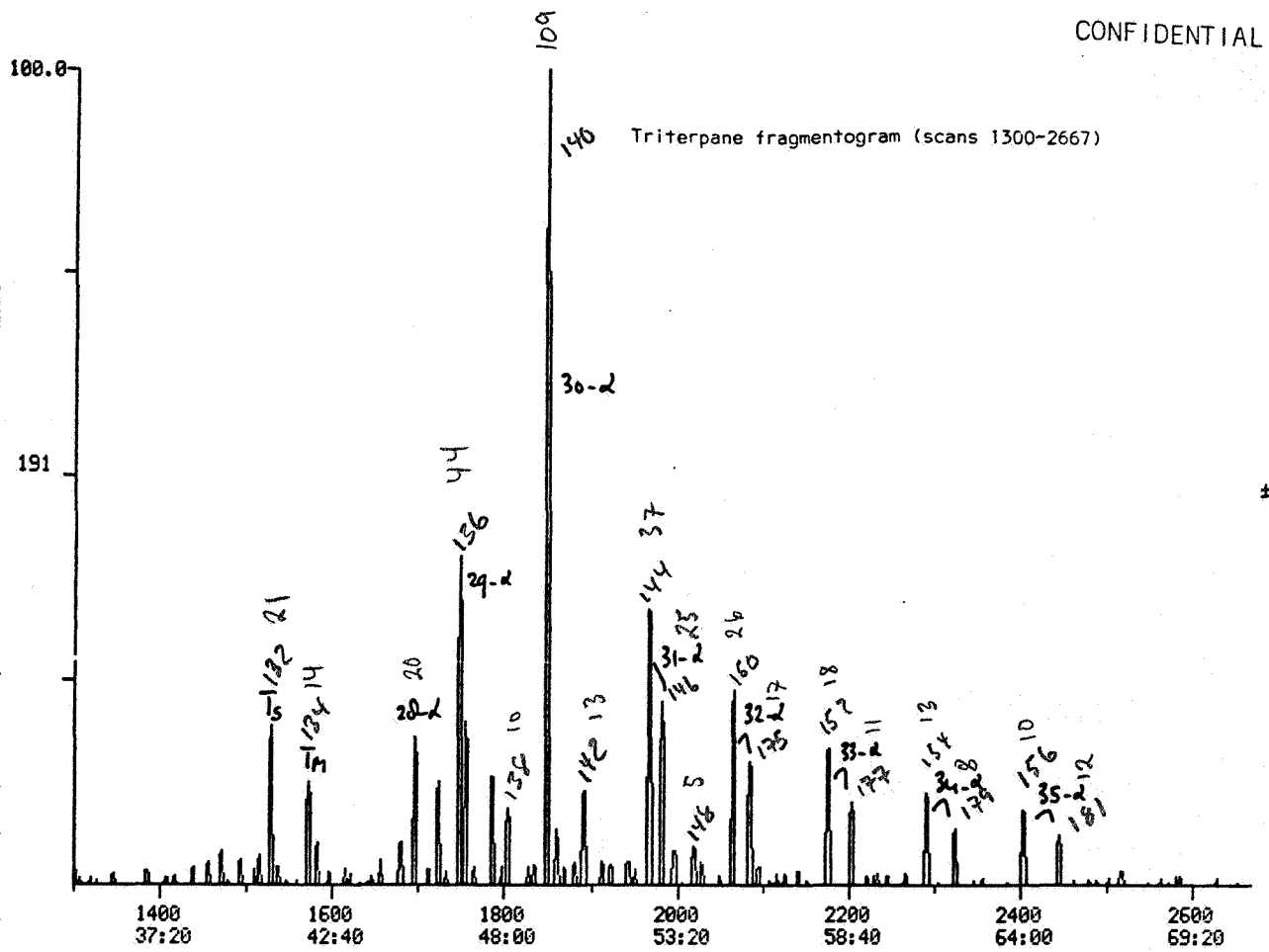


FIG. 5A. GC-MS analysis 6407/9-3, 1633.5-1644 m, crude oil.

57654.

Triterpane fragmentogram (scans 500-2684)

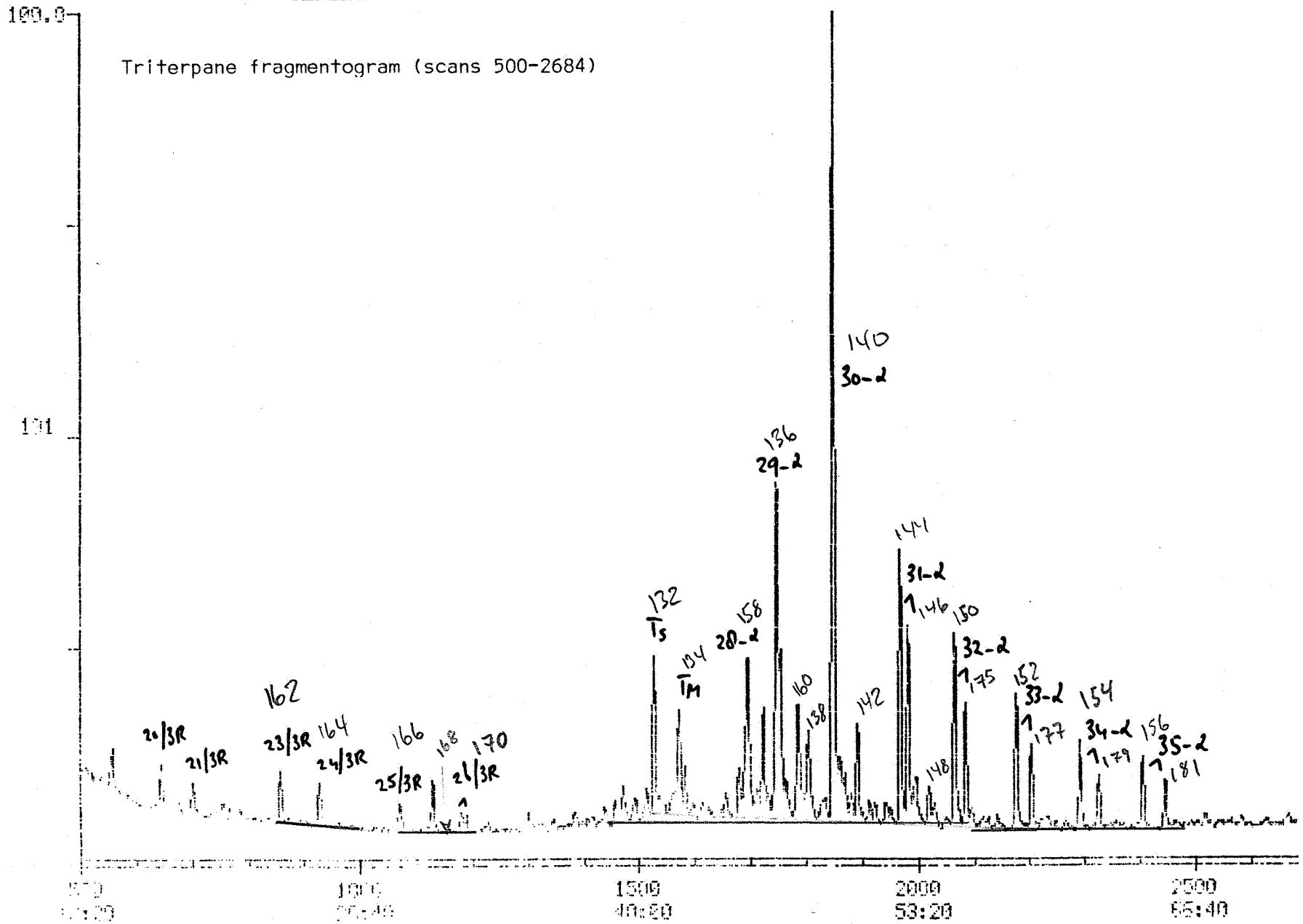


FIG. 5B. GC-MS analysis 6407/9-3, 1633.5-1644 m, crude oil.

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Title

GEOCHEMICAL DATA REPORT FOR WELL 6407/9-3

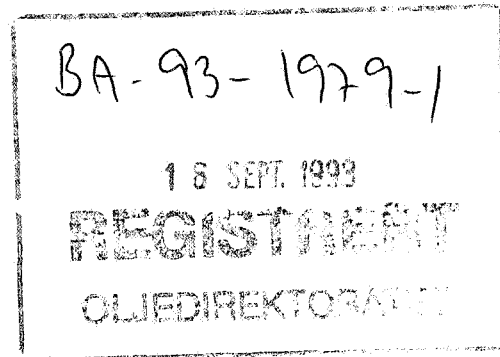
Authors(s)

VENCHE BJERKREIM PEDERSEN

Abstract

28 samples from the cored interval in well 6407/9-3 have been analysed by Iatroscan (TCL-FID).
 3 samples were analysed by GC-FID and GC/MS.

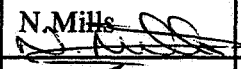
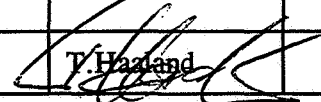
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Key Words

6407/9-3, geochemistry, Iatroscan, GC-FID, GC/MS

Classification: Free Saga and partners Internal Confidential Strictly confidential

Org. Unit	EUG			
Reviewed	N. Mills 			
Accepted				
Approved	T. Hagland 			

Hovedkontor/Head Office Oslo:

Adresse/Address
Kjarboveien 16
Postboks 490
N-1301 SANDVIKA

Telefon/Telephone
Nasjonalt 67 12 66 00
Intern. +47 67 12 66 00

Teleks/Telex
78852 Saga n
Telefax
Nasjonalt 67 126666
Intern. +47 67 126666

Driftsdivisjon/Operations Division Stavanger:

Adresse/Address
Godesettdalen 8
Postboks 117
N-4003 FORUS

Telefon/Telephone
Nasjonalt 04 57 40 00
Intern. +47 4 57 40 00

Teleks/Telex
33244 sagap n
Telefax
Nasjonalt 04 570261
Intern. +47 4 570261

1 Objectives

The objective of this study was to characterise the extractable hydrocarbons in 28 core samples from well 6407/9-3.

2 General well information

The well was drilled by Shell as operator of licence 093 from 3.5.85 to 28.7.85 and reached a total depth of 1868 mRKB. The KB of the rig was 25 metres and the water depth was 279 metres.

3 Samples and analytical scheme

28 samples were picked from the cored interval in the period 29th to 30th July 1991. All samples were analysed by Iatroscan (TLC-FID), and the saturated hydrocarbon fractions from 3 samples were analysed by GC-FID and GC/MS.

4 Vitrinite reflectance

No samples were analysed.

5 TOC and Rock Eval

No samples were analysed.

6 Iatroscan (TLC-FID)

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

7 GC-FID

The saturated hydrocarbon fractions from 3 samples were analysed by Saga Petroleum a.s.. The GC-FID chromatograms are shown in figure 1.

8 GC/MS

The GC/MS analyses were performed by Saga Petroleum a.s. The saturated hydrocarbon fractions from the samples were analysed by GC/MS and the mass chromatograms for m/z 191, 177, 217 and 218 are shown in figure 2. Selected biological marker parameters manually measured by Saga are given in table 2.

9 Stable carbon isotopes

No samples were analysed.

Table 1.

SAGLAB RESULTS MANAGEMENT : EXTRACTION ANALYSIS RESULTS in mg/g Rock

Data for Well 6407/9-3

Page 1

Type	St.Depth	En.Depth	Weight (g)	EOM mg/g Rock	EOM mg/g TOC	Sat (mg/g)	Aro (mg/g)	NSO (mg/g)	Asph (mg/g)	Polars (mg/g)	TOC (%)	M/I
CCP	1620.50	1620.50	2.19	1.30		0.56	0.24			0.50		I
CCP	1621.80	1621.80	1.60	1.36		0.43	0.21			0.72		I
CCP	1623.30	1623.30	2.30	1.93		0.37	0.24			1.32		I
CCP	1628.00	1628.00	2.20	1.64		0.38	0.32			0.94		I
CCP	1634.10	1634.10	3.27	9.69		5.13	2.33			2.23		I
CCP	1636.00	1636.00	3.41	6.76		4.10	1.76			0.91		I
CCP	1637.00	1637.00	2.46	3.59		0.42	1.99			1.18		I
CCP	1639.00	1639.00	3.40	4.69		3.00	1.27			0.41		I
CCP	1640.00	1640.00	3.09	5.48		3.42	1.59			0.47		I
CCP	1642.00	1642.00	3.23	6.92		3.89	1.68			1.35		I
CCP	1644.80	1644.80	2.81	11.26		5.53	3.52			2.22		I
CCP	1648.00	1648.00	3.07	5.64		2.77	1.16			1.71		I
CCP	1650.70	1650.70	2.77	6.36		3.58	1.61			1.17		I
CCP	1653.00	1653.00	2.89	4.85		2.76	1.15			0.94		I
CCP	1655.00	1655.00	2.93	4.70		2.45	1.01			1.25		I

28 RESULT(s) selected ..., from the following search criteria:

Company: SAG, Nat: NOR, Well:

6407/9-3, Type: CCP, Depth between:

0.000 and 99999.990 m, MPLC: I

SAGLAB RESULTS MANAGEMENT : EXTRACTION ANALYSIS RESULTS in mg/g Rock

Data for Well 6407/9-3

Page 2

Type	St.Depth	En.Depth	Weight (g)	EOM mg/g Rock	EOM mg/g TOC	Sat (mg/g)	Aro (mg/g)	NSO (mg/g)	Asph (mg/g)	Polars (mg/g)	TOC (%)	M/I
CCP	1657.00	1657.00	2.78	5.96		3.49	1.82			0.65		I
CCP	1659.00	1659.00	2.94	2.55		1.58	0.75			0.22		I
CCP	1663.00	1663.00	2.94	3.32		1.85	0.84			0.63		I
CCP	1667.00	1667.00	2.87	0.54		0.04	0.00			0.50		I
CCP	1668.00	1668.00	2.81	0.25		0.06	0.00			0.19		I
CCP	1671.00	1671.00	2.39	1.02		0.09	0.00			0.93		I
CCP	1673.00	1673.00	2.43	4.94		0.17	0.07			4.70		I
CCP	1674.00	1674.00	2.18	2.77		0.00	0.07			2.69		I
CCP	1675.00	1675.00	2.46	3.36		0.22	0.13			3.01		I
CCP	1676.00	1676.00	2.03	3.54		0.00	0.00			3.54		I
CCP	1677.00	1677.00	2.19	3.92		0.33	0.13			3.46		I
CCP	1678.00	1678.00	2.17	0.50		0.17	0.00			0.33		I
CCP	1679.80	1679.80	2.61	0.68		0.27	0.17			0.25		I

Averages this Well:

	3.91	0.00	1.68	0.86	0.00	0.00	1.37	0.00
--	------	------	------	------	------	------	------	------

28 RESULT(s) selected ..., from the following search criteria:

Company: SAG, Nat: NOR, Well:

6407/9-3, Type: CCP, Depth between:

0.000 and 9999.990 m, MPLC: I

SAGLAB RESULTS MANAGEMENT : EXTRACTION ANALYSIS RESULTS in mg/g Rock

Data for Well 6407/9-3

Page 3

Type	St.Depth	En.Depth	Weight (g)	EOM mg/g Rock	EOM mg/g TOC	Sat (mg/g)	Aro (mg/g)	NSO (mg/g)	Asph (mg/g)	Polars (mg/g)	TOC (%)	M/I
Averages all Wells:				3.91	0.00	1.68	0.86	0.00	0.00	1.37	0.00	

28 RESULT(s) selected ..., from the following search criteria:

Company: SAG, Nat: NOR, Well:

6407/9-3, Type: CCP, Depth between:

0.000 and 99999.990 m, MPLC: I

Table 2.

0 well	1	2 nat	3 formation	4	5 upper depth	6 lower depth	7 sample type	8 Ts/Tm
1 6407/9-3	6407/9-3	nor		saga_sept92	1634.10	1634.1	ccp	1.034483
2 6407/9-3	6407/9-3	nor		saga_sept92	1644.00	1644.0	ccp	1.035088
3 6407/9-3	6407/9-3	nor		saga_sept92	1657.00	1657.0	ccp	1.035714

0 well	9 Z/C	10 Z/Z+E	11 X/E	12 X/X+D	13 E/E+F	14 22S	15 a/a+j	16 20s
1 6407/9-3	0.527273	0.172619	0.158273	0.687500	0.891026	57.142857	0.777778	0.592233
2 6407/9-3	0.518519	0.166667	0.150000	0.677419	0.891720	56.910569	0.772109	0.592233
3 6407/9-3	0.504505	0.168168	0.158845	0.687500	0.890675	56.666667	0.760563	0.580000

0 well	17 bbS 217	18 %C27 abbS	19 %C28 abbS	20 %C29 abbS
1 6407/9-3	0.561702	28.464978	31.296572	40.238450
2 6407/9-3	0.554113	28.985507	31.884058	39.130435
3 6407/9-3	0.568966	28.654971	31.871345	39.473684

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July 1986

RKER.86.179

GEOCHEMICAL INVESTIGATION OF A SOURCE ROCK SAMPLE
FROM WELL 6407/9-3 (1621.9-1622.1 M), NORWAY

by

P.J.R. Nederlof and J.M.A. Buiskool Toxopeus

Sponsor: Shell Risavika

Code:774.103.00

Investigation: 812203926

eks1.

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KONINKLIJKE/SHELL EXPLORATIE EN PRODUKTIE LABORATORIUM

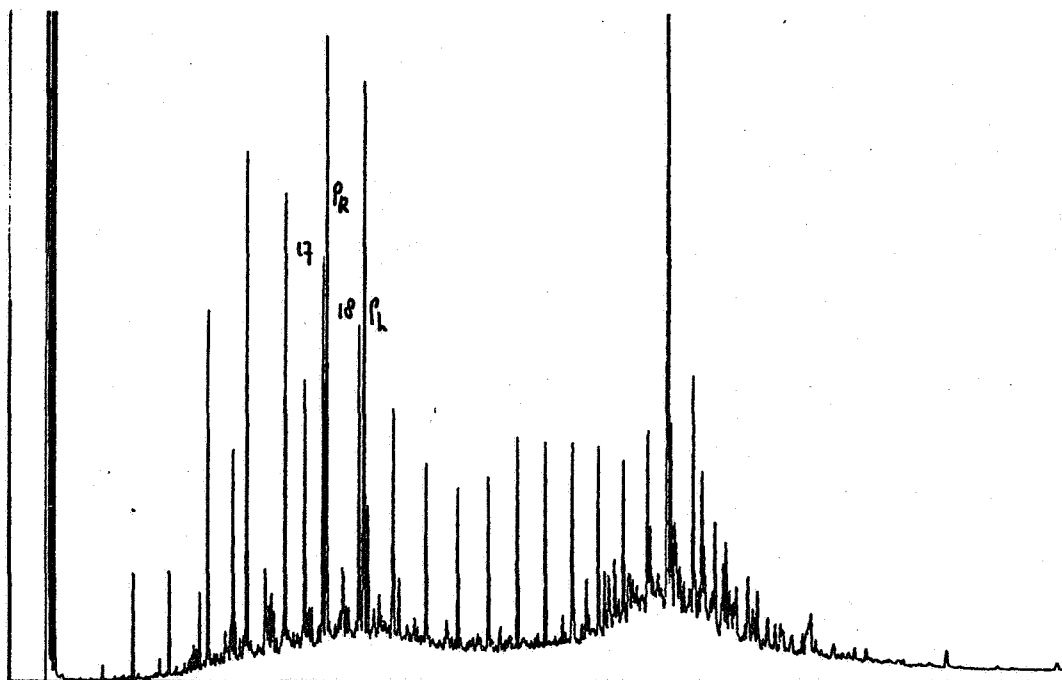
RIJSWIJK, THE NETHERLANDS

(Shell Research B.V.)

Table 1 - Geochemical data of extracts

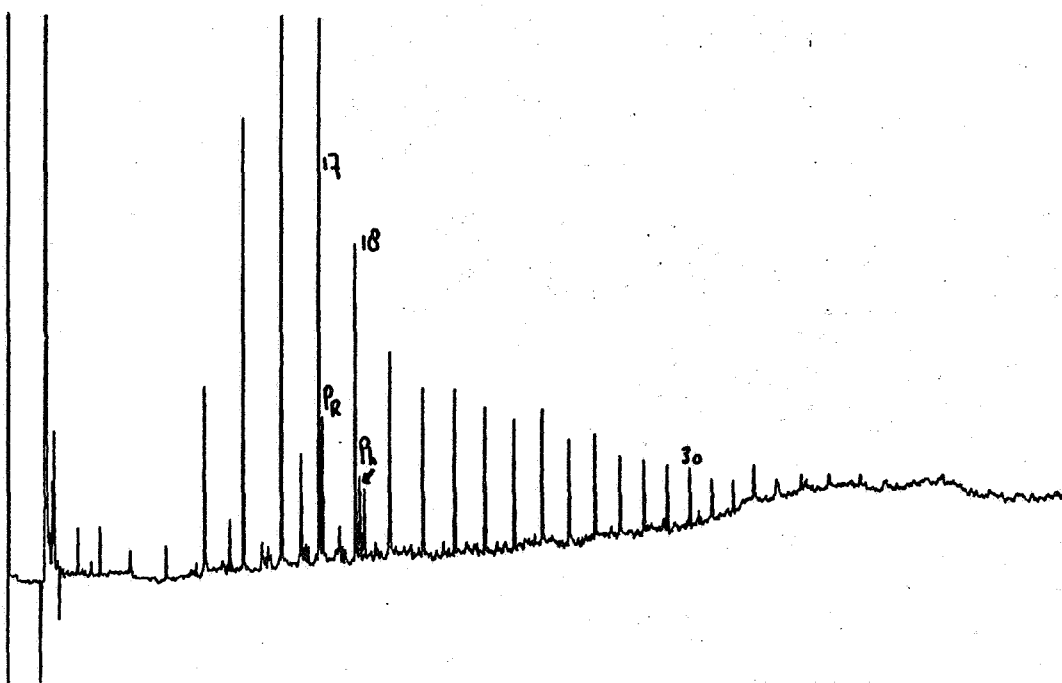
Sample	Norway 6407/9-3 1621.9-1622.1 m, cores	
	original	heated
% ethyl acetate extract	0.6	2.2
% organic carbon after ethyl acetate extraction	7.6	4.8
extract/original carbon (after extraction)	0.08	0.29
% sulphur		
ppm V as metals		
ppm Ni as metals		
pristane/phytane	0.9	1.7
pristane/nC17	1.7	0.4
phytane/nC18	2.3	0.4
C ₁₅ -distribution		
1-ring	53	64
2-ring	21	24
3-ring	25	12
C ₃₀ -distribution		
3-ring	8	20
4-ring	41	49
5-ring	51	31
C ₂₉ VR/E	0.70	-
% saturates*	7	13
% aromatics	15	28
% heterocompounds	68	45
% asphaltenes	11	14
$\delta^{13}\text{C}^{\circ}/\text{oo}$ (whole extract)	-30.7	-28.9
" (saturates)	-30.4	-29.9
" (aromatics)	-30.9	-30.5

*) Determined by thin-layer-chromatography



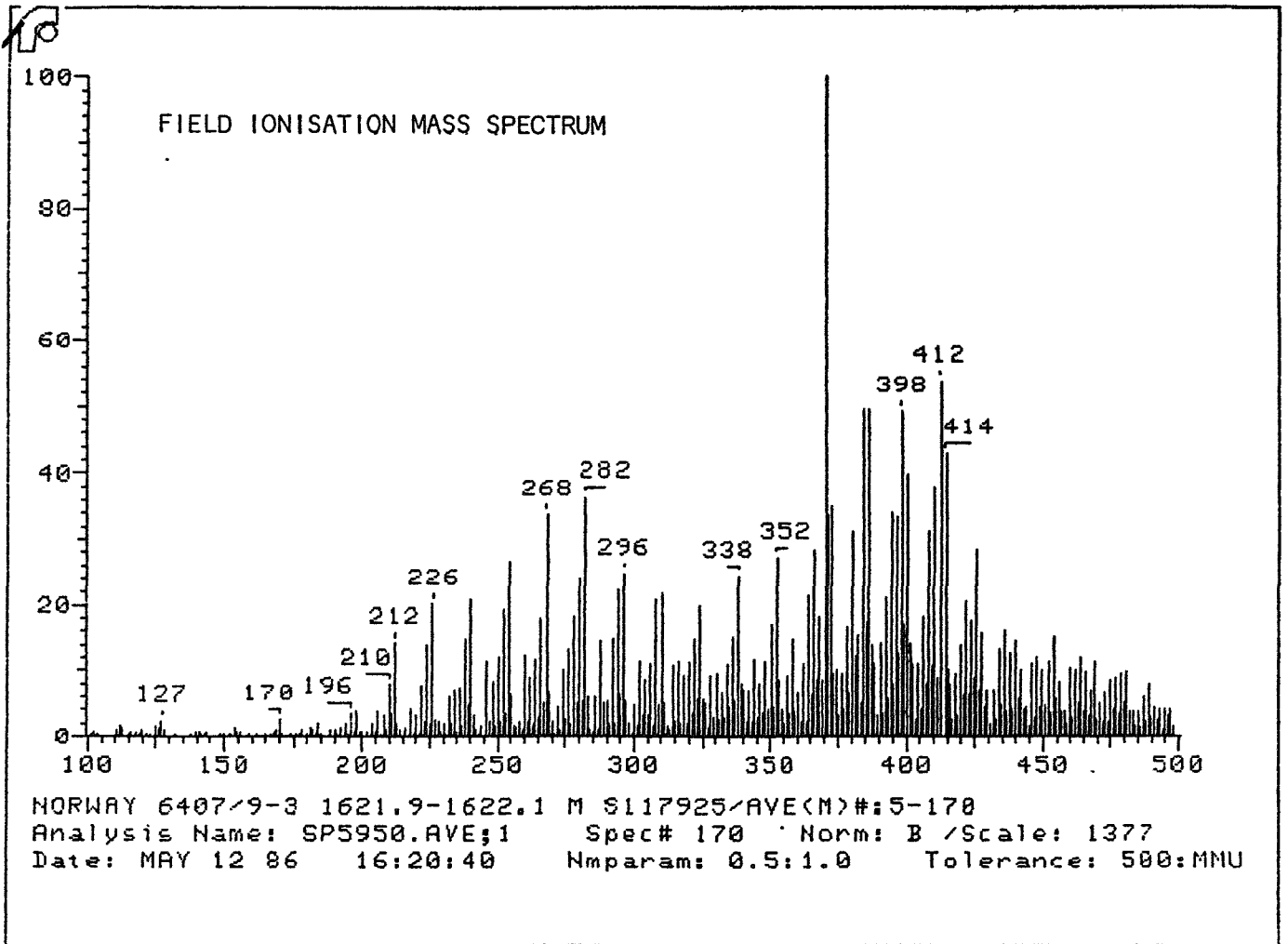
GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 1. NORWAY 6407/9-3 1621.9-1622.1 M



GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 2. NORWAY 6407/9-3 1621.9-1622.1M heated



127488.

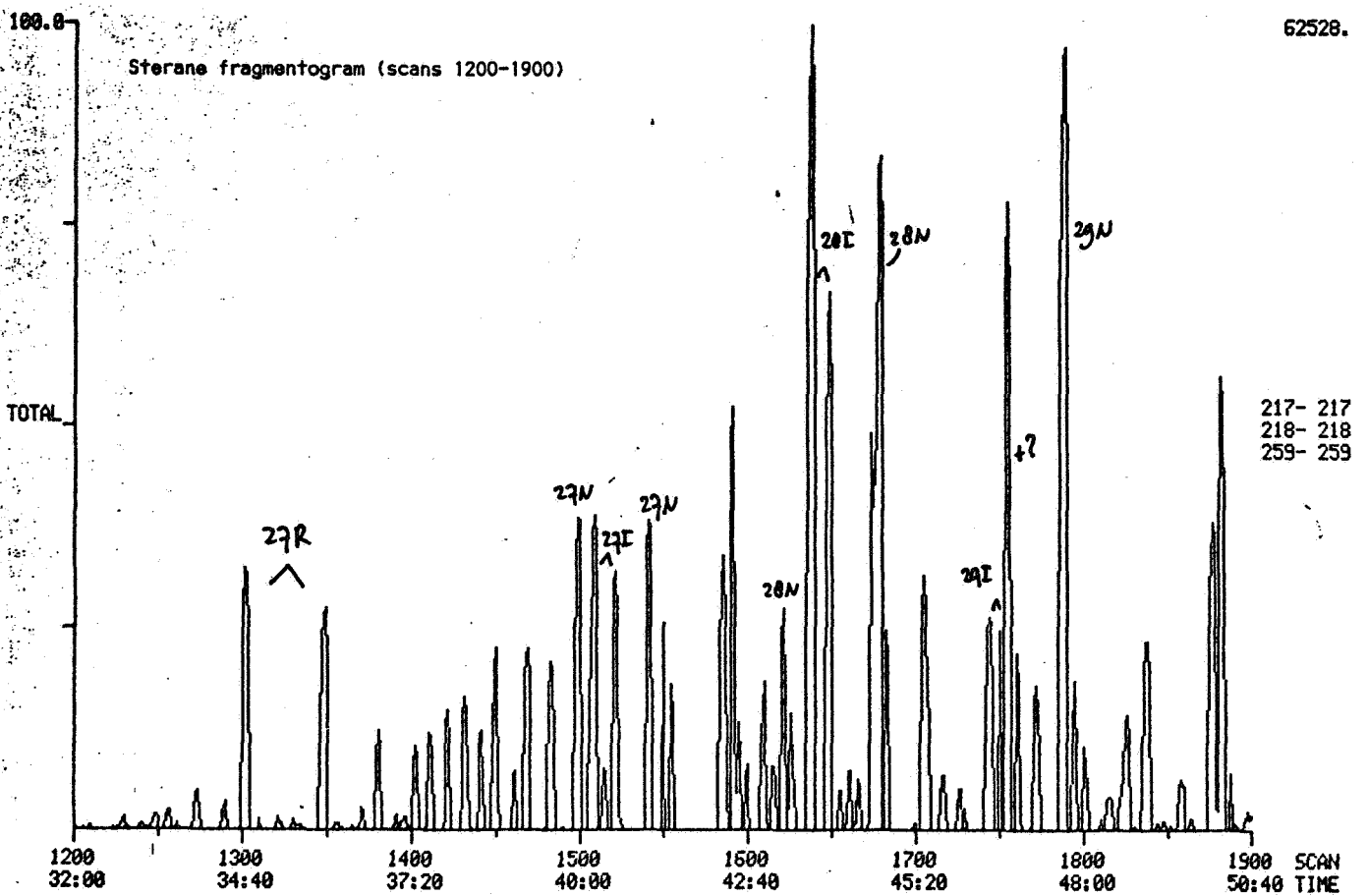
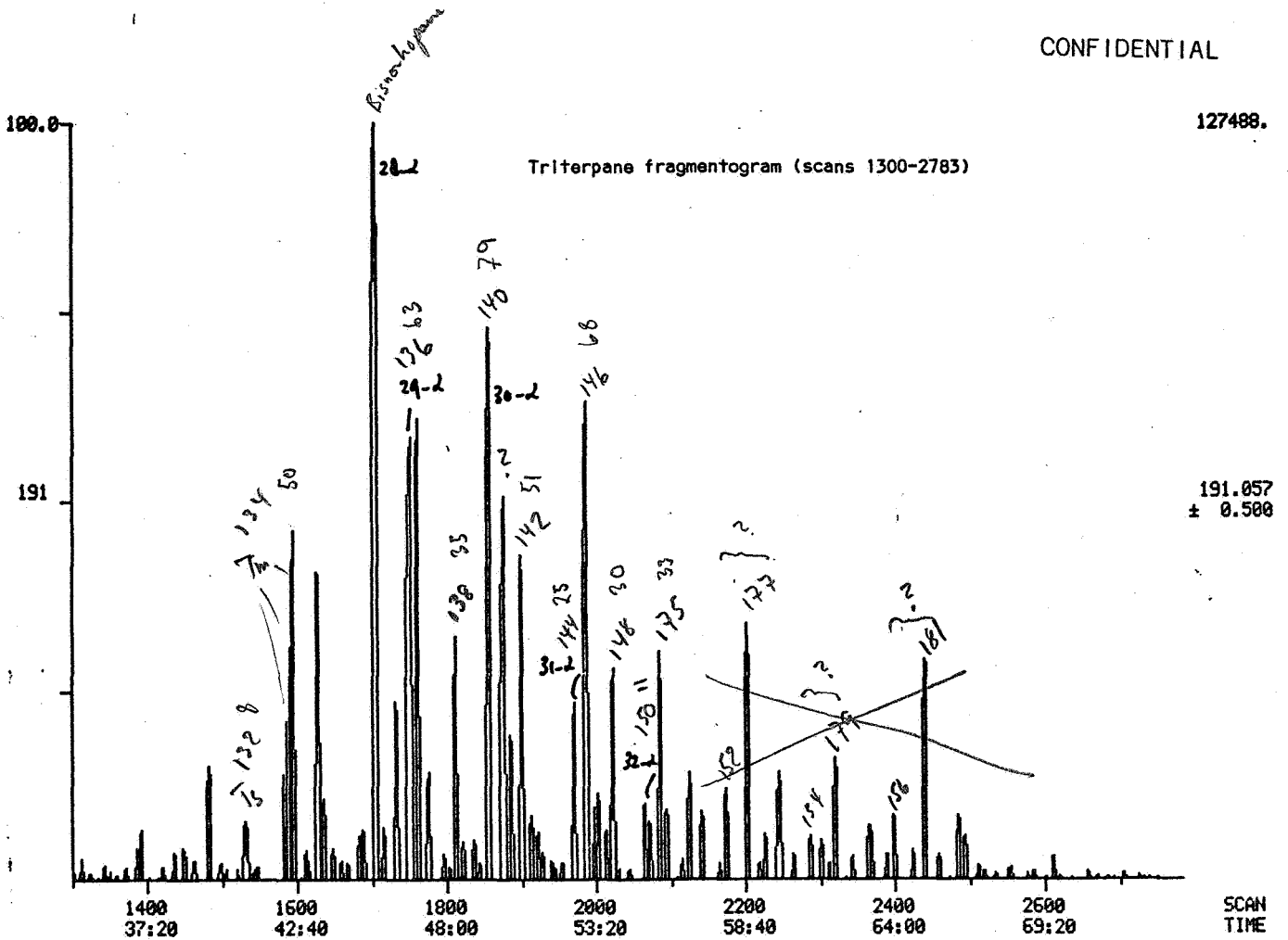


FIG. 5A. GC-MS analysis 6407/9-3, 1621.9-1622.1 m, core.

136960.

Triterpane fragmentogram (scans 500-2800)

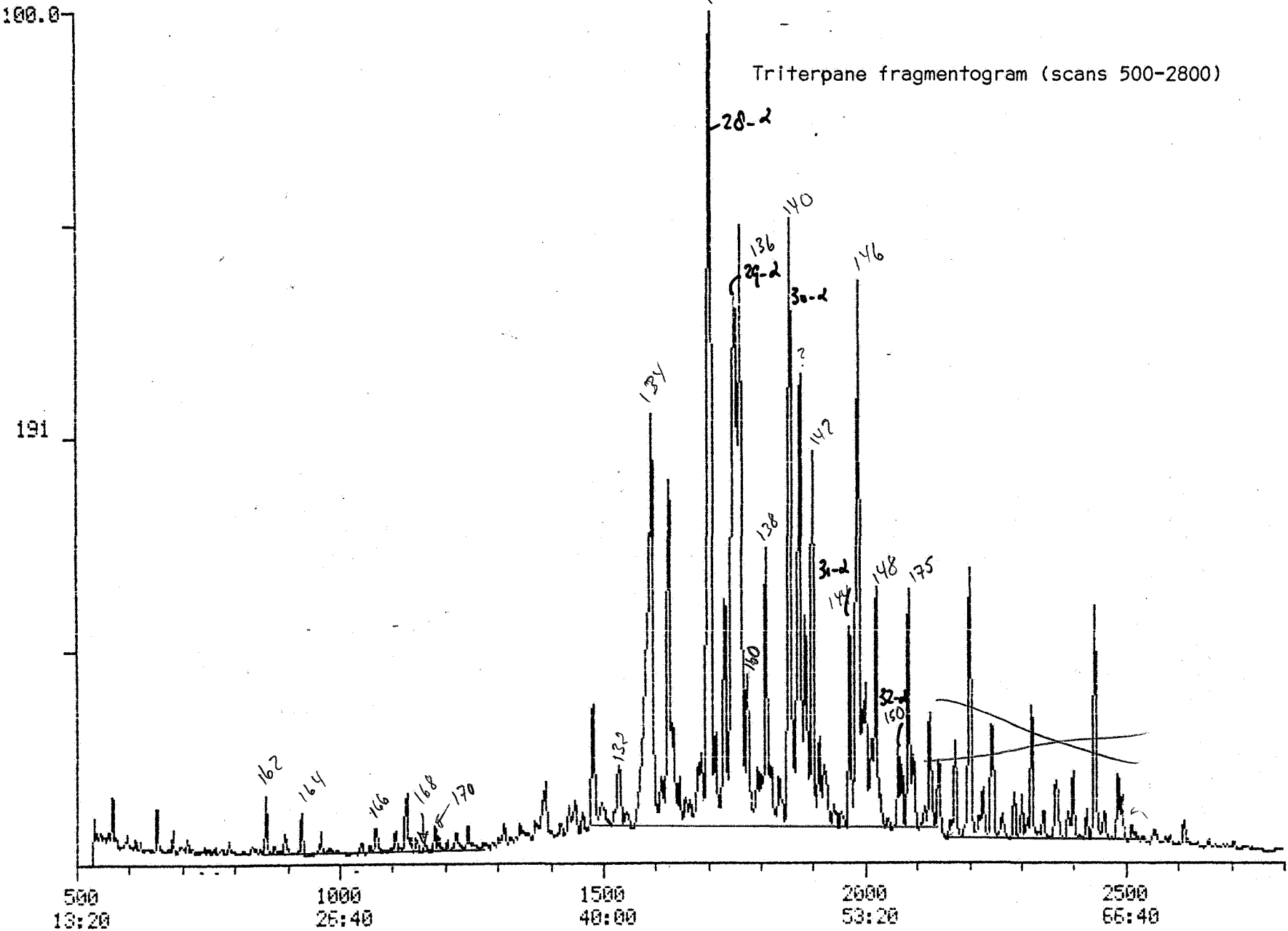


FIG. 5B - GC-MS analysis 6407/9-3, 1621.9-1622.1 m, core.

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MACERAL DESCRIPTION OF 3 SAMPLES FROM WELL 6407/9-3, NORWAY

DEPTH IN M	SAMPLE TYPE	ORGANIC																	INORG.						
		S. O. M.				VITRINITE						LIPTINITE				INERT.			UNDEFINED MINERALS	FRAMBOIDAL PYRITE	AGGREGATES OF PYRITE	CRYSTALS OF PYRITE			
DENSE S. O. M.	LAYERS OF S. O. M.	LENSES OF S. O. M.	DIFFUSE S. O. M.	INTERGRANULAR S. O. M.	PATCHES OF S. O. M.	VITRINITE-1			LAYERS OF VITRINITE-2	LENSES OF VITRINITE-2	DETITAL VITRINITE-2	SPORINITE	CUTINITE	RESINITE	LIFTODETRINITE	ALGAE		MICROPLANKTON					FXSUDATINITE	SCLEROTINITE	FUSINITE
1621.9	CORE	+	+	+	+										-	/				+	-	/			
1622.0	CORE	+	+	+	+							-	/			+	-	/		/		+	*	+	-
1622.1	CORE	+	+	+	+							-	/			+	-	/		/		+	*	+	-

LEGEND	
*	: ABUNDANT
+	: COMMON
/	: FEW
-	: RARE

COMMENT LINES FROM WELL/OUTCROP : 6407/9-3

1621.9 M : INITIAL MICRINISATION S.O.M.
SAMPLE SLIGHTLY OXIDISED
FOSSIL REMAINS

1622.0 M : INITIAL MICRINISATION S.O.M.
SAMPLE SLIGHTLY OXIDISED
FOSSIL REMAINS

1622.1 M : INITIAL MICRINISATION S.O.M.
SAMPLE SLIGHTLY OXIDISED
FOSSIL REMAINS

MACERAL DESCRIPTION

VISUAL VOLUME PERCENTAGE ESTIMATION

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Country NORWAY
Well/Location 6407/9-3

sample nr.
depth (ft/m)

1621.9
1622.0
1622.1

ORGANIC															INORG.																				
S. O. M.			VITRINITE						LIPTINITE					INERT.																					
DENSE S.O.M.	LAYERS OF S.O.M.	LENSES OF S.O.M.	DIFFUSE S.O.M.	INTERGRANULAR S.O.M.	PATCHES OF S.O.M.	VITRINITE-1						ALGAE							MICROPLANKTON	EXSUDANTINE	SCLEROTINITE	FUSINITE	MACRINITE	MICRINITE											
						LAYERS OF TELLOLLINITE	LENSES OF TELLOLLINITE	DETRITAL TELLOLLINITE	LAYERS OF TELINITE	LENSES OF TELINITE	DETRITAL TELINITE	LAYERS OF VITRINITE-2	LENSES OF VITRINITE-2	DETRITAL VITRINITE-2	SPORINITE	CUTINITE									RESINITE	LIPTODETRINITE	BACTEROCCUS	TASMANITES	OTHER ALGAE						
																														MICROPLANKTON	EXSUDANTINE	SCLEROTINITE	FUSINITE	MACRINITE	MICRINITE
5	10	5						<1	1			3	<1	2				1			67.5	<1													
5	10	5						<1	1			3	<1	2				1			69.3	<1													
5	10	5						<1	1			3	<1	2				1			67.5	<1													

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