STATOIL WELL NO.6507/8-2

DRILLING MUD PROPERTIES RECORD

AREA: NORTH SEA

MUD SYSTEM: SPUD MUD/KCl-POLYMER. RIG: OYVI DELTA

DAY No.	DATE 1987	DEPTH metre	M.W. sg	F.V. s/qt	600	300	A.V cps	P.V cps	Y.P	GEL 0	GEL 10	pH	API Filt.	CAKE 32nds	HTHP ml.	Chl.ppm *1000	Calc. ppm	Pf	%Sol.	%Oil	%Sand	MBT ppb	KCl ppb
1	13/ 8						0	0	0														
2	14/ 8						0	0	0														
3	15/ 8	394	1.04	100			0	0	0			10.50											
4	16/ 8	412	1.05	120			0	0	0			10.60											
5	17/ 8	455	1.05	120			0	0	0			10.40											
6	18/ 8	521	1.05	100			0	0	0			10.50											
7	19/ 8	521	1.08	48	25	16	12.5	9	7	1	1	9.00	8	1		64	200	.2					32.00
8	20/ 8	521	1.08	48	25	16	12.5	9	7	1	1	9.00	8	1		64	400	.2					32.00
9	21/ 8	964	1.15	55	40	25	20	15	10	1	2	8.90	4	1		81	400	.05	8		.25	4	42.00
10	22/ 8	1070	1.17	53	35	22	17.5	13	9	1	2	8.70	4	1		78	440	.05	8		.25	5	41.00
11	23/ 8	1070	1.18	52	32	20	16	12	8	1	2	9.30	4.3	1		72	400	.3	8		.25	5	39.00
12	24/ 8	1440	1.18	53	36	23	18	13	10	1	2	9.00	4.3	1		75	560	.05	8		Tr.	6	38.00
13	25/ 8	1753	1.45	58	54	32	27	22	10	1	2	8.70	4	1		78	600	.1	17		.5	8	43.00
14	26/ 8	1881	1.45	59	56	33	28	23	10	1	2	8.70	3.9	1		83	600	.1	17		.5	9	46.00
15	27/ 8	1881	1.45	55	50	29	25	21	8	1	2	8.60	4.2	1		85	640	.1	17		.25	8	45.00
16	28/ 8	1881	1.45	57	48	28	24	20	8	1	2	8.70	4	1		85	640	.1	17		.25	8	45.00
17	29/ 8	1913	1.23	51	32	20	16	12	8	1	2	9.20	4	1		66	600	.25	10		.25	6	33.00
18	30/ 8	1990	1.23	59	41	25	20.5	16	9	1	2	9.10	3.8	1		67	600	.1	10		.5	6	35.00
19	31/ 8	2235	1.23	59	41	25	20.5	16	9	1	2	9.10	3.8	1		67	600	.1	10		.25	6	34.00
20	1/ 9	2348	1.23	55	42	26	21	16	10	1	2	8.70	3.8	1		66	600	.05	10		.5	6	32.00
21	2/ 9	2607	1.23	54	38	23	19	15	8	1	2	8.40	4	1		61	700	0	10		.5	6	29.00
22	3/ 9	2690	1.23	57	42	25	21	17	8	1	2	8.40	4.1	1		55	700	0	10		.5	6	25.00
23	4/ 9	2690	1.23	55	42	25	21	17	8	1	2	8.40	4.1	1		55	700	0	10		.5	6	25.00
24	5/ 9	1750	1.23	52	34	21	17	13	8	1	2	8.50	4	1		54	700	.05	10		.75	6	25.00
25	6/ 9	1725	1.45	53	50	29	25	21	8	1	2	8.20	4.1	1		54	700	0	17		.75	6	23.00

STATOIL NO.6507/8-2 MATERIAL COST AND CONSUMPTION AREA: HALTENBANKEN, HEIDRUN RIG: DYVI DELTA

PRODUCT	UNIT SIZE	UNIT PRICE $	36" SECTION	COST $	26" SECTION	COST $	17.5" SECTION	COST $	12.25" SECTION	COST $	8.5" SECTION	COST $	6" SECTION	COST $	TEST P & A	COST $	TOTAL USED	TOTAL COST N.KR.
BARITE	M.T.	86.00		.00		.00	14	1204.00	177	15222.00		.00		.00	86	7396.00	277	23822.00
BENTONITE	M.T.	219.00	32	7008.00		.00		.00		.00		.00		.00		.00	32	7008.00
CAUSTIC SODA	25 KG	11.50	8	92.00		.00		.00		.00		.00		.00		.00	8	92.00
BICARBONATE	50 KG	17.92		.00	N	.00	7	125.44	30	537.60	5	89.60		.00	4	71.68	46	824.32
SODA ASH	30 KG.	9.60		.00	O	.00	8	76.80	4	38.40	3	28.80		.00		.00	15	144.00
KCl	50 KG.	16.64		.00		.00	1925	32032.00	850	14144.00	375	6240.00		.00		.00	3150	52416.00
BENTONITE	50 KG.	14.08		.00	C	.00		.00	13	183.04		.00		.00		.00	13	183.04
POTT.HYDROX	25 KG.	33.28		.00	O	.00	1	33.28		.00		.00		.00		.00	1	33.28
XC-POLYMER	50 LBS.	216.00		.00	N	.00		.00		.00		.00		.00		.00	0	.00
DRISPAC REG.	50 LBS.	80.50		.00	S	.00	91	7325.50	44	3542.00	73	5876.50		.00	3	241.50	211	16985.50
DRISPAC SLO.	50 LBS.	80.50		.00	U	.00	244	19642.00	164	13202.00	54	4347.00		.00		.00	462	37191.00
		5.31		.00	M	.00		.00		.00		.00		.00		.00	0	.00
		6.40		.00	P	.00		.00		.00		.00		.00		.00	0	.00
SPERCELL C	25 KG	12.00		.00	T	.00		.00		.00		.00		.00		.00	0	.00
DESCO	25 LBS.	35.84		.00	I	.00		.00		.00		.00		.00		.00	0	.00
		92.85		.00	O	.00		.00		.00		.00		.00		.00	0	.00
ANCOLIG C	25 KG.	20.48		.00	N	.00		.00		.00		.00		.00		.00	0	.00
MICA C	25 KG.	10.00		.00		.00		.00		.00		.00		.00		.00	0	.00
MICA F	25 KG.	10.00		.00		.00		.00		.00		.00		.00		.00	0	.00
NUT PLUG C	25 KG.	14.08		.00		.00		.00		.00		.00		.00		.00	0	.00
NUT PLUG F	25 KG.	14.08		.00		.00		.00		.00		.00		.00		.00	0	.00
ANCO RESIN	25 KG	89.60		.00		.00		.00		.00		.00		.00		.00	0	.00
SOLTEX	50 LBS.	73.60		.00		.00		.00		.00		.00		.00		.00	0	.00
ZINCCARBONATE	25 KG.	57.60		.00		.00		.00		.00		.00		.00		.00	0	.00
DEFOAMER	25 LIT.	75.52		.00		.00		.00		.00		.00		.00		.00	0	.00
ANCOCIDE	25 KG.	69.12		.00		.00		.00		.00		.00		.00		.00	0	.00
DETERGENT	200 L	297.00	1	297.00		.00		.00		.00		.00		.00		.00	1	297.00
TOTALS				7397.00		.00		60439.02		46869.04		16581.90		.00		7709.18		138699.14
HOLE DRILLED (METRES)				80		66		549		811		809						2315
COST PR.METRE				92.46		.00		110.09		57.79		20.50						59.91
TOTAL DAYS				4		1		5		4		7				4		25
COST PR. DAY				1849.25		.00		12087.80		11717.26		2368.84				1927.30		5547.97
MUD MIXED (CU.M)				370		10		710		236		262				18		1606
COST PR.CU.M				19.99		.00		85.13		198.60		63.29				428.29		86.36

Norcem Anchor A/S Mud Volume Distribution Summary for Well 6507/8-2.

Hole Size in	Start Depth m	Section Length m	Vol Built m^3	Vol Dumped m^3	Vol Lost To Formation m^3	Vol Lost to Solids Equipment m^3	Vol Left Between Casing m^3	Cuttings Vol Drilled m^3	Vol Taken To Next Section m^3	Interval Mud Type
36	375	80	370	nil	*240	nil	nil	53	130	Gel spud mud
26	455	66	10	25	*100	nil	nil	23	15	Gel spud mud
17 1/2	521	549	710	127	0	190	26	85	462	KCl Polymer
12 1/4	1070	811	236	113	0	129	nil	62	456	KCl Polymer
8 1/2	1881	809	262	155	0	153	nil	29	410	KCl Polymer

Interval Hole Size in	36	26	17 1/2	12 1/4	8 1/2
Interval Start Depth m	375	455	521	1070	1881
Interval Start Date d/m	15/08	18/08	20/08	24/08	29/08
Interval TD Date d/m	17/08	18/08	22/08	26/08	03/09
Max Deviation degrees	1.1	1.1	1.2	1.9	1.80
Drilling Days	3	1	2	3	7
Vol Transfered to Int. m^3	130	15	95	462	456
Vol Salvaged from Int. m^3	nil	130	462	456	410
Vol Between Casings m^3	nil	nil	26	nil	nil
Vol Lost to Formation m^3	*nil	*nil	nil	nil	nil
Vol Dumped m^3	nil	25	127	113	155
Vol Lost to Solids Eqpt m^3	nil	nil	190	129	153
Vol Dumped to Sea m^3	*240	*100	317	242	308
Vol Cuttings Drilled m^3	53	23	85	62	29

* Returns to Sea-bed, # Casing cemented without returns, **Between cement plugs.

STATOIL

SECTOR FOR PETROLEUM TECHNOLOGY

Geological laboratories

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Title GEOCHEMICAL ANALYSES PERFORMED ON SIDEWALL CORES WELL 6507/8-2

Requested by Swinder Singh Gahlla, Let-K	**Project** Geochemistry, well 6507/8-2	
Date 30.06.88	**No. of pages:** 11 Figures: 9 Tables: 4	**No. of enclosures** Appendices: 2

Key words Geochemical analyses, swc, hydrocarbon potential, gas chromatography, kerogen quality, maturity evaluation, isotopic composition, biomarker analyses

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5.7.88

Snorre Olaussen, Dept. Manager
Statoil Geological laboratories

1 INTRODUCTION

The present geochemical study of well 6507/8-2 was performed for PLO 124 upon request from Swinder Singh Gahlla, Statoil Let-Kristiansund. The purpose of the project was to study a selection of sidewall cores with respect to source rock properties and level of maturity.

The following analytical program was performed during this project:

1. Sample preparation
3. TOC analyses
4. Rock-Eval pyrolyses

5. Vitrinite reflectance analyses
6. Kerogen description and TAI
7. Extraction and quantification of ASPH
8. MPLC separation of SATS, ARO and NSO's
9. Gas chromatography of SAT fraction
10. Gas chromatography of ARO fraction and MPI
11. 13C/12C isotopic composition of extracts, SATS, ARO, NSO's and ASPH.
12. GC/MS of biomarkers
13. Interpretation and reporting

The analyses were carried out according to Statoil requirements for geochemical projects.

Table 1 shows a list of the sidewall cores used in this study, and the lithological descriptions are listed as given by the well site geologist.

TABLES

Table 1: List of sidewall cores used and lithological description [1], well 6507/8-2

Sample nos.	Depth (mRKB)	Lithological descriptions
S-2971	2123.00	CLYST: SLTY, GRY, v. MIC. MIC, SFT
S-2972	2354.50	CLYST: DK. GRY-BLK, SFT, SL. STKY
S-2973	2356.50	SHALE: SLTY, DK. GRY, HD
S-2974*	2356.50 [2]	COAL: SHLY, BLK, BRTL, SHNY, MOD. HD
S-2975	2363.00	CLYST: GRY-BRN GRY, FRM, MIC. MIC, WAXY
S-2976*	2613.50	COAL: SHLY, BLK, FRM, BLKY
S-2977	2616.00	COAL: SHLY, BLK-DK GRY, FRM-MOD HD, MIC. MIC, WAXY

1) Lithological description taken from the well site swc description.
2) Taken from top gun, extra run
* Samples taken for solvent extraction

Table 2

WELL : 6507/8-2

TOC AND ROCK EVAL TYPE DATA

Depthp m KB	Sample number		S1	S2	TOC	HI	PP	PI	TMAX
2123,00	S2971	*	0,1	3.0	3,0	99	3,1	0,03	428
2354,50	S2972	*	0,7	30,0	26,1	115	30,7	0,02	425
2356,50	S2973	*	1,4	75,7	42,8	177	77,1	0,02	426
2356,50	S2974	*	1,8	102,0	54,7	186	103,8	0,02	425
2363,00	S2975	*	0,2	7,9	5,9	135	8,1	0,02	427
2613,50	S2976	*	2,2	145,3	60,9	238	147,5	0,01	421
2616,00	S2977	*	0,8	60,5	49,8	122	61,4	0,01	427

HI=Hydrogen Index (mgHK/g TOC) // OI=Oksygen Index (mgCO2/g TOC)
PP=Production potential (kgHK/ton rock) // PI=Prodction Index

Table 3

WELL : 6507/8-2

EXTRACTION DATA (PPM OF ROCK)

Depthp m KB	Sample number		TOTAL EOM	HYDROCARBONS SAT	ARO	Total	IKKE H: ROKARBONER Asph	NSO	Total
2356,50	S2974	*	18816	1052	3488	4540	9096	5180	14276
2613,50	S2976	*	43862	2575	8224	10799	20378	12685	33063

EXTRACTION DATA (% OF EOM)

Depthp m KB	Sample number		HYDROCARBONS SAT	ARO	Total	NON HYDROCARBONS Asph	NSO	Total
2356,50	S2974	*	5,59	18,54	24,13	48,34	27,53	75,87
2613,50	S2976	*	5,87	18,75	24,62	46,46	28,92	75,38

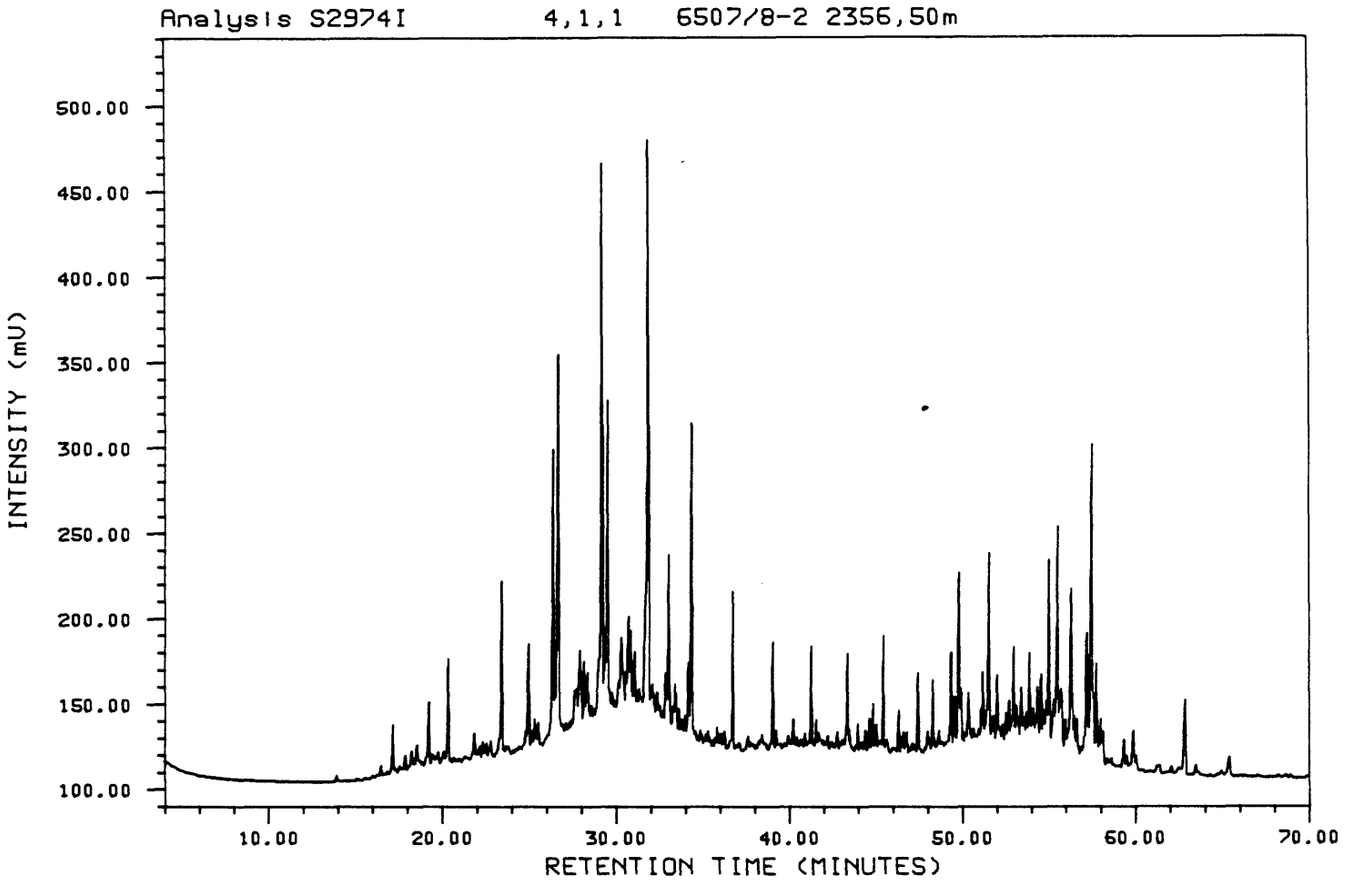
Table 4

WELL : 6507/8-2

GAS-CHROMATOGRAPHIC DATA

Depth m KB	Sample number		PRISTANE PHYTANE	PRISTANE N-C17	PHYTANE N-C18	A/B	CPI1	CPI2
2356.50	S2974	*	1,17	1,65	0,61	2,70	1,21	1,24
2613.50	S2976	*	1,40	1,66	0,54	3,07	1,87	1,41

Figures 6 and 7
Saturate fraction gas chromatograms, upper part
Aromatic fraction gas chromatograms, lower part


Analysis S2974I 4,1,1 6507/8-2 2356,50m
INTENSITY (mU)
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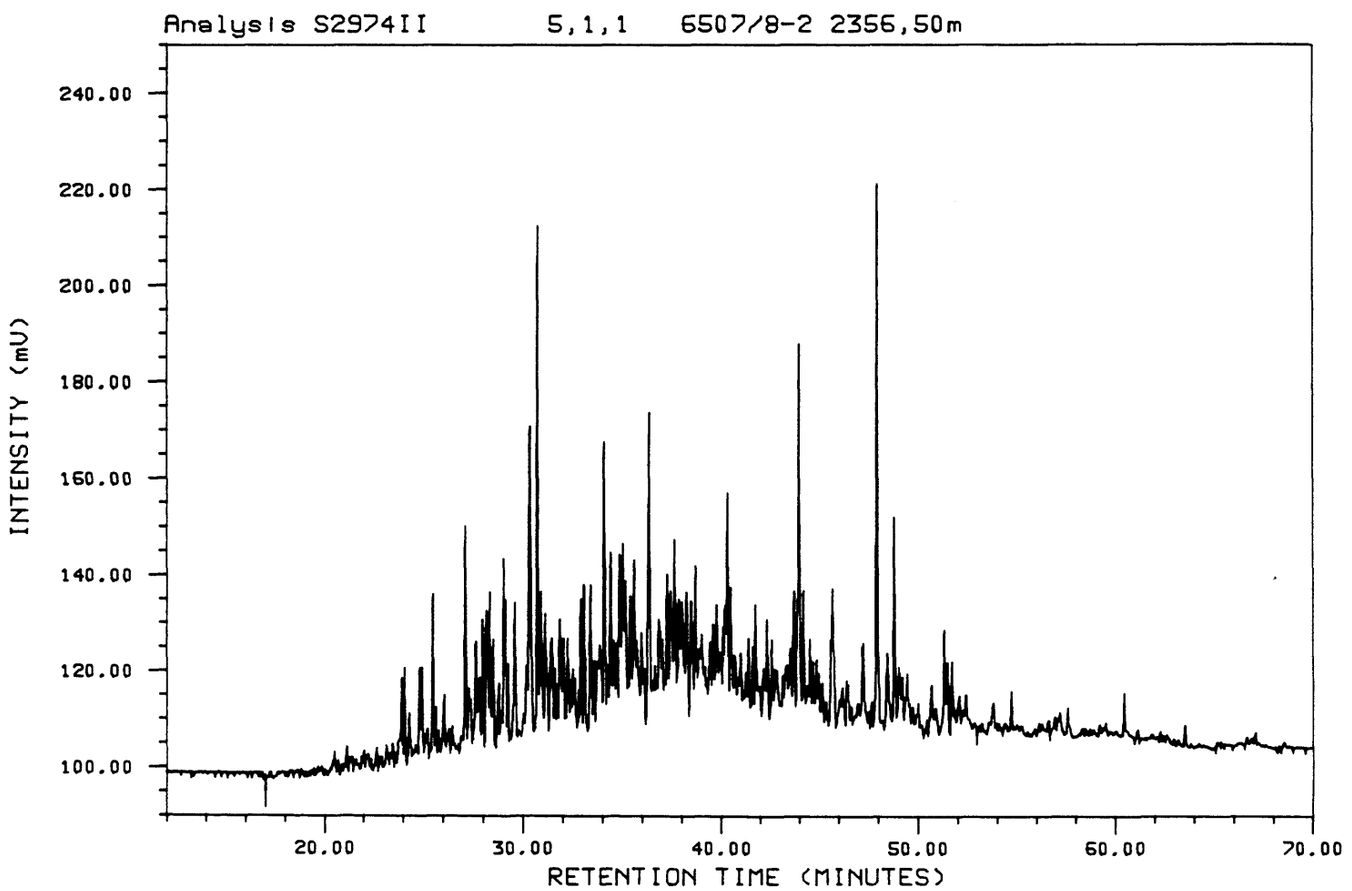
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
RETENTION TIME (MINUTES)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INTENSITY (mU)
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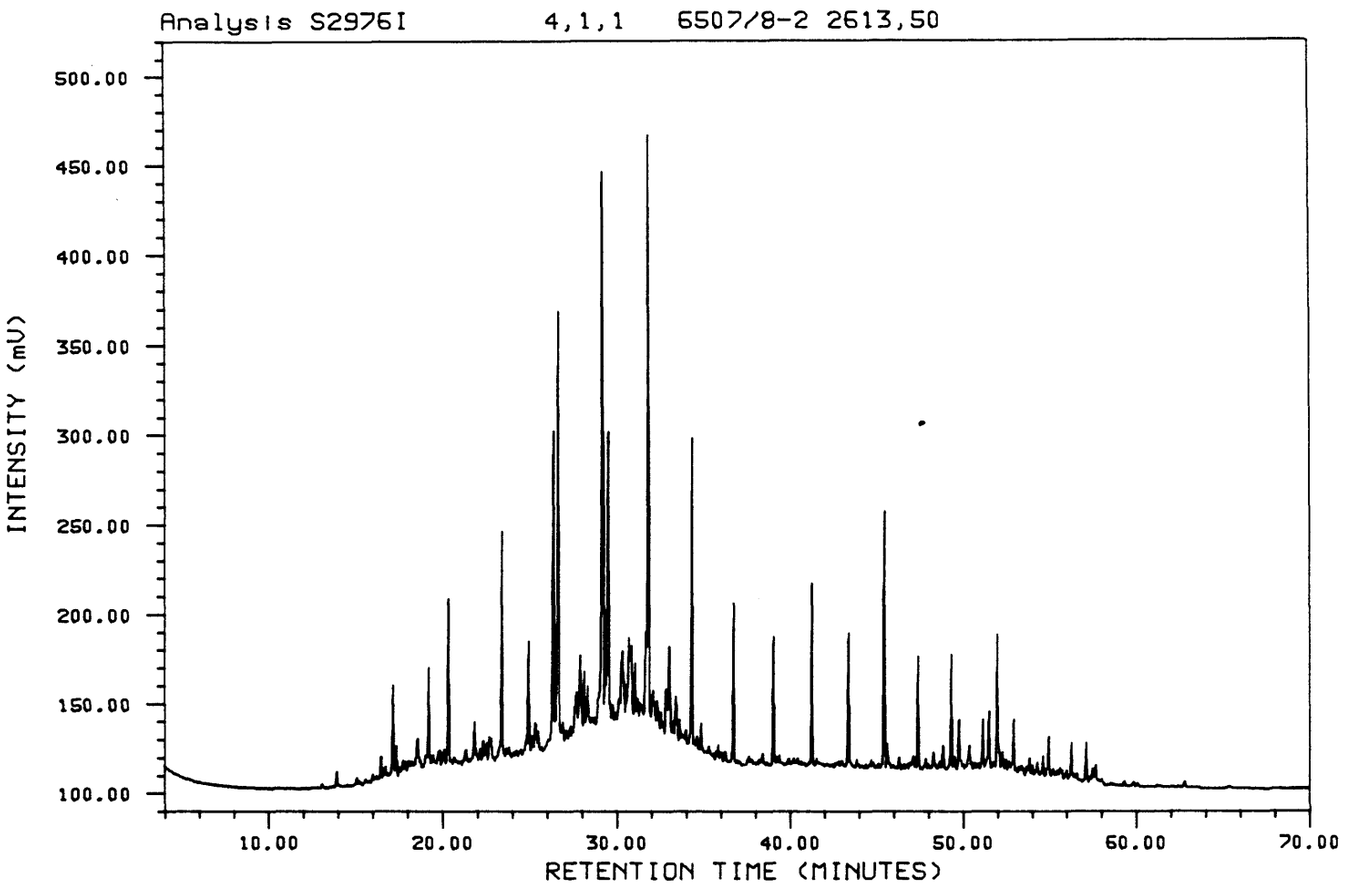
220.00
200.00
180.00
160.00
140.00
120.00
100.00
20.00
30.00
40.00
50.00
60.00
70.00
RETENTION TIME (MINUTES)


Analysis S2976I 4,1,1 6507/8-2 2613,50
INTENSITY (mV)
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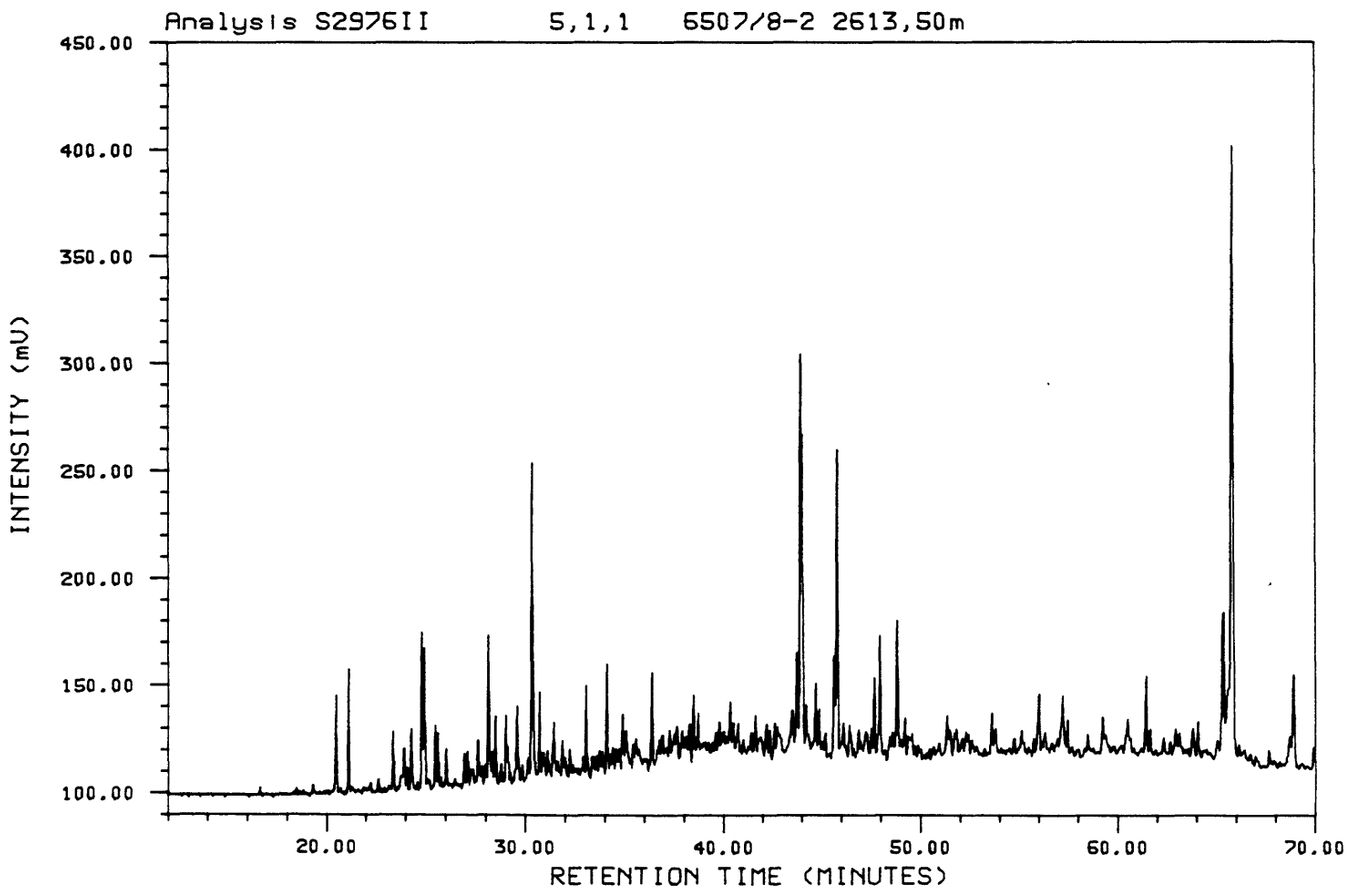
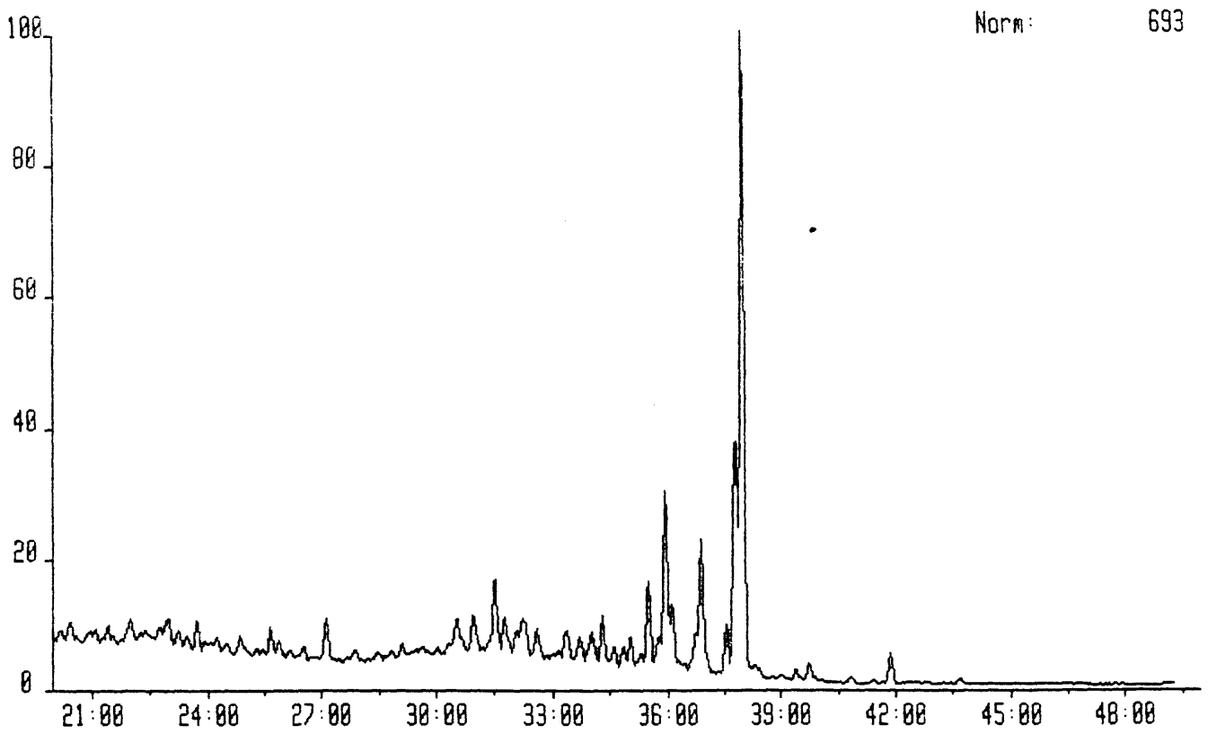
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
RETENTION TIME (MINUTES)


Analysis S2976II 5,1,1 6507/8-2 2613,50m
INTENSITY (mV)
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
20.00
30.00
40.00
50.00
60.00
70.00
RETENTION TIME (MINUTES)

Figures 8 and 9
GC/MS biomarker analyses

S2974 25-MAR-87 Sir:Magnetic TS250 Sys: BIO
Sample 1 Injection 1 Group 1 Mass 177.1640
Text:METTET FRAKSJON,LRP



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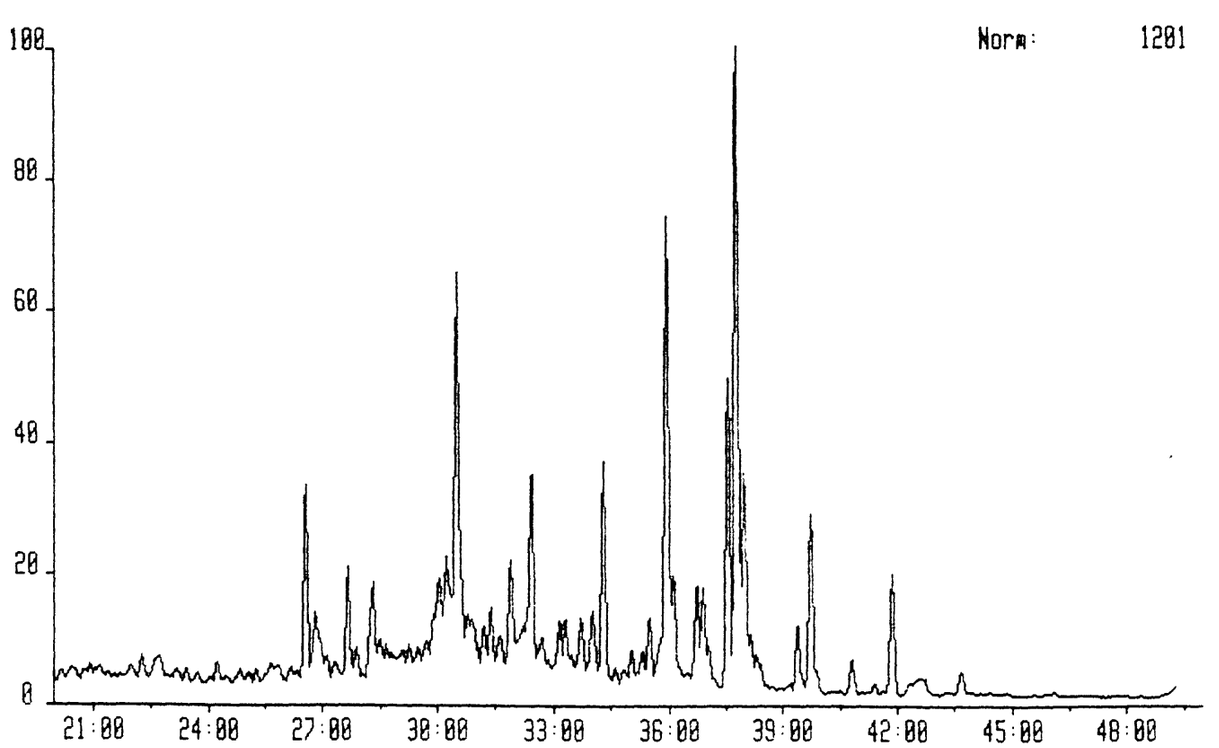

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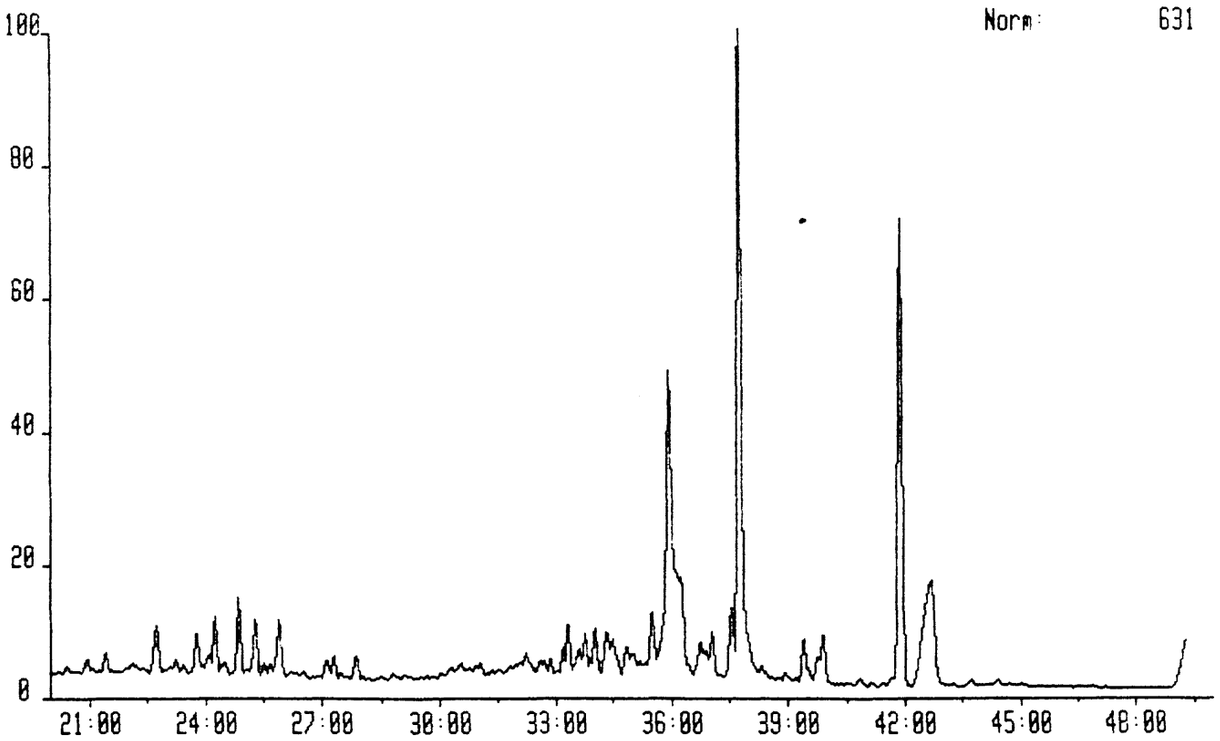

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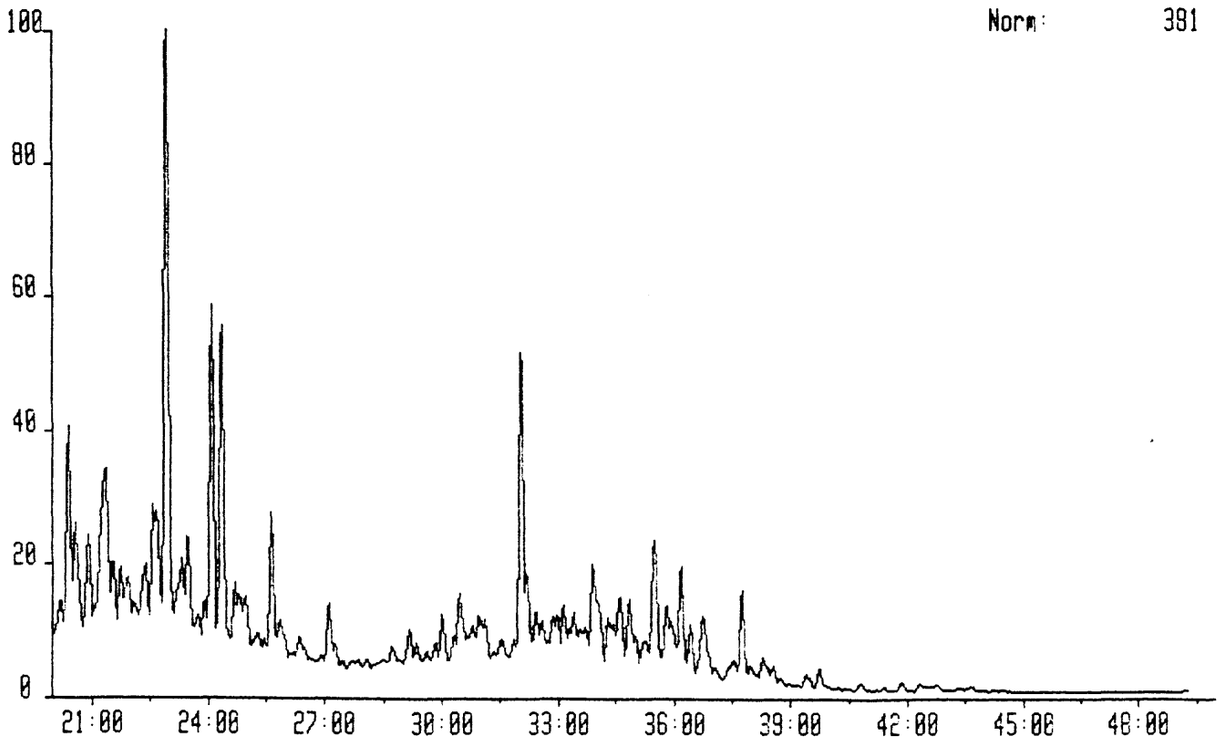

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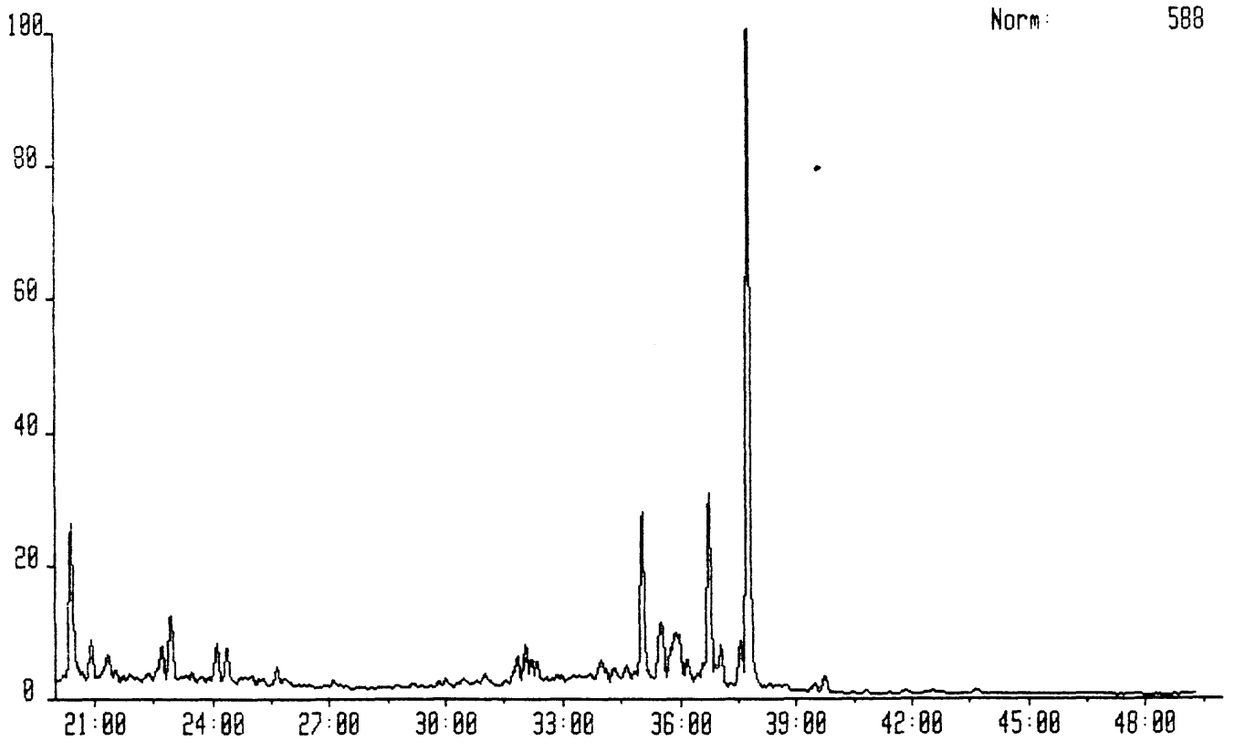

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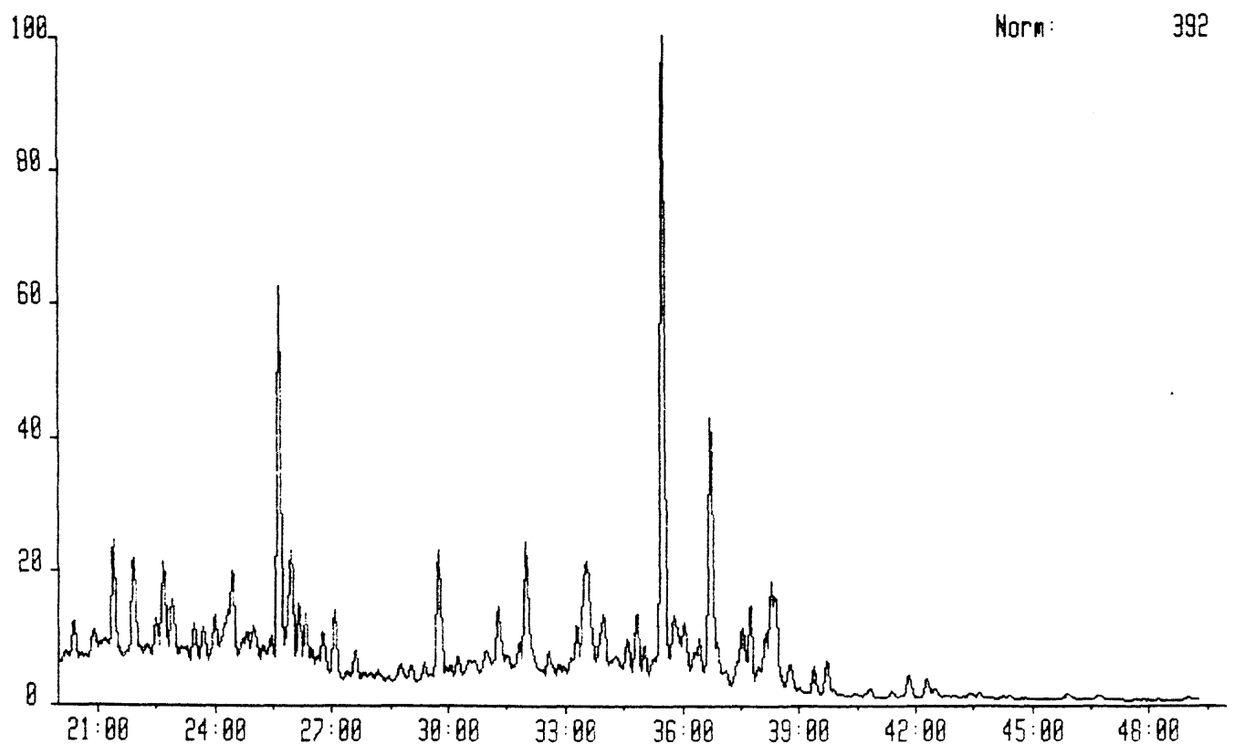

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Sample 1 Injection 1 Group 1 Mass 259.2420
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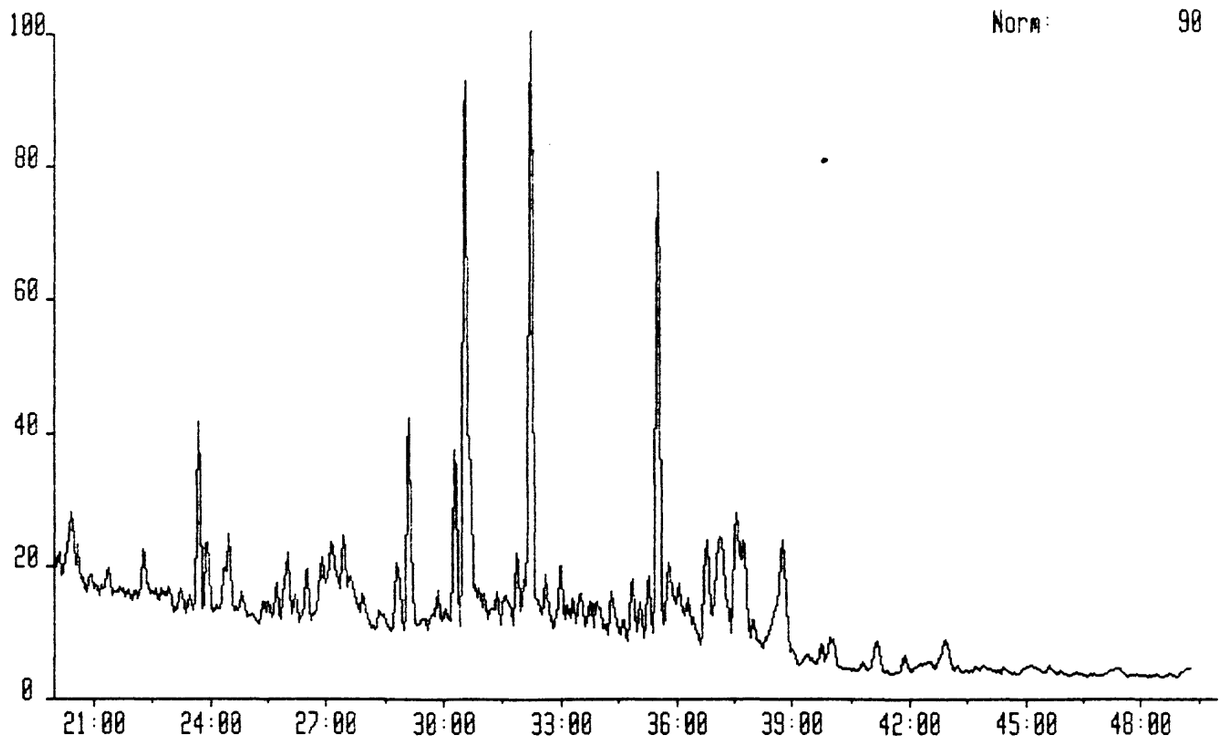

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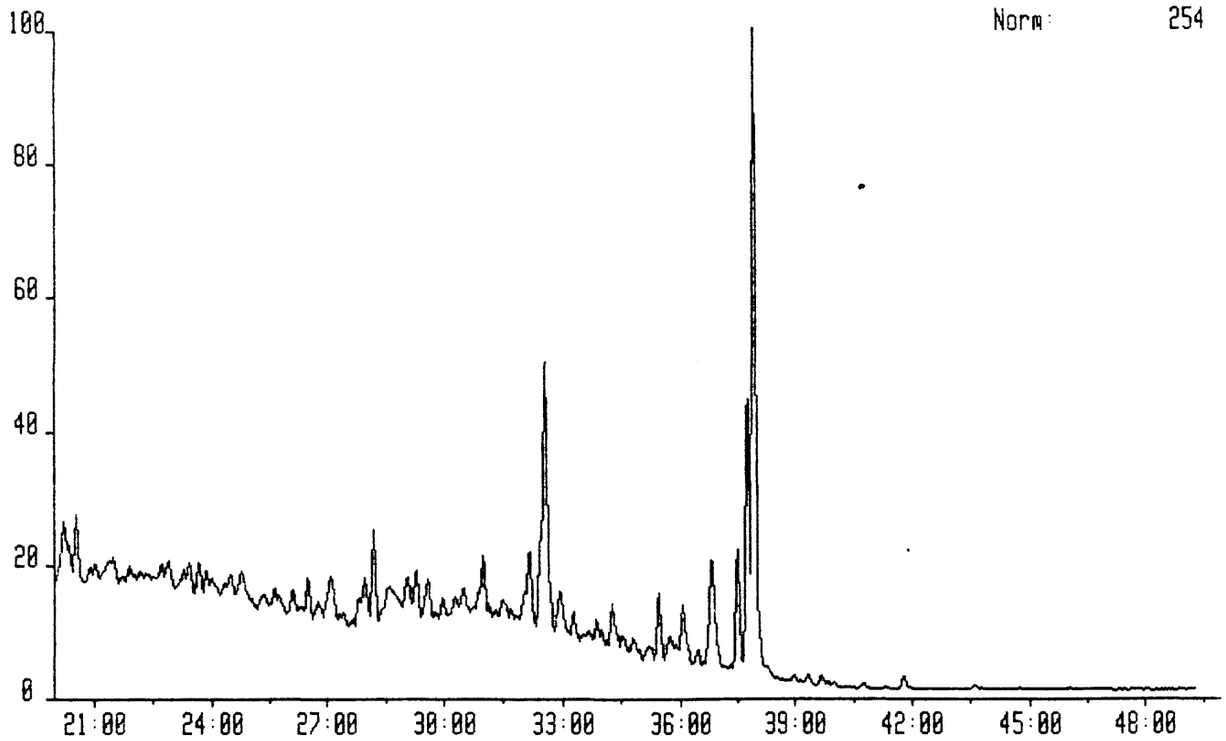

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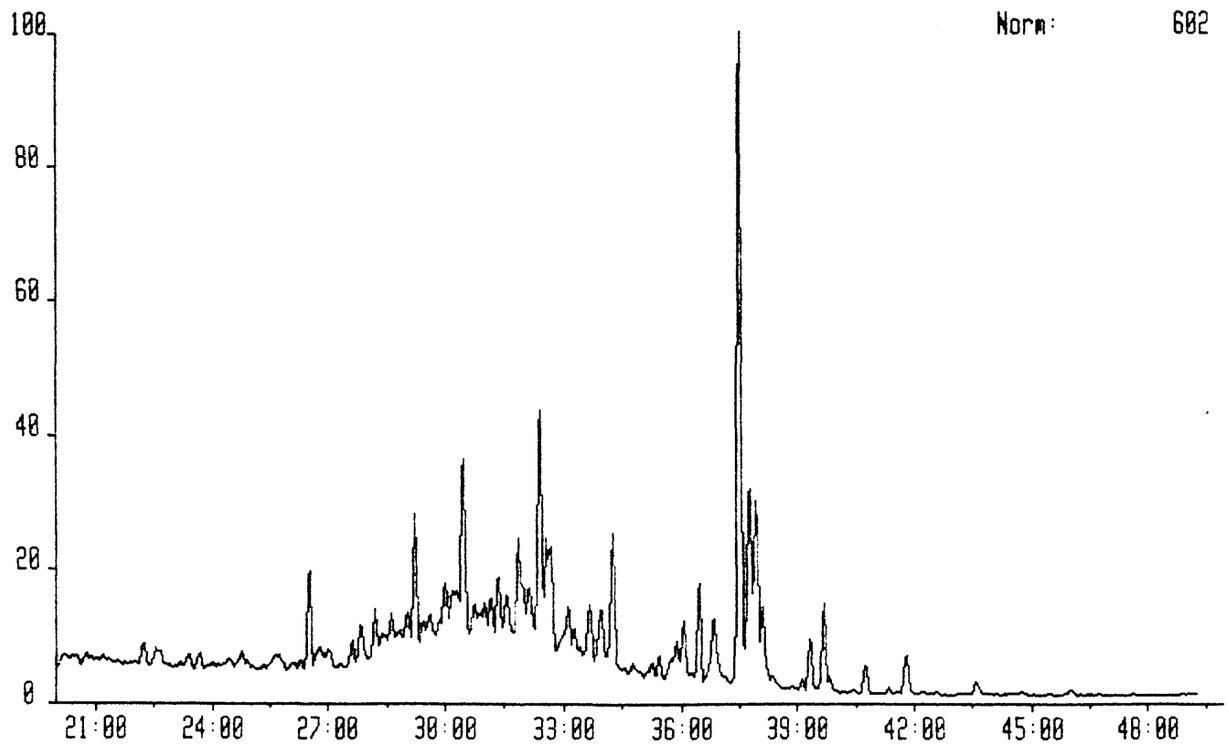

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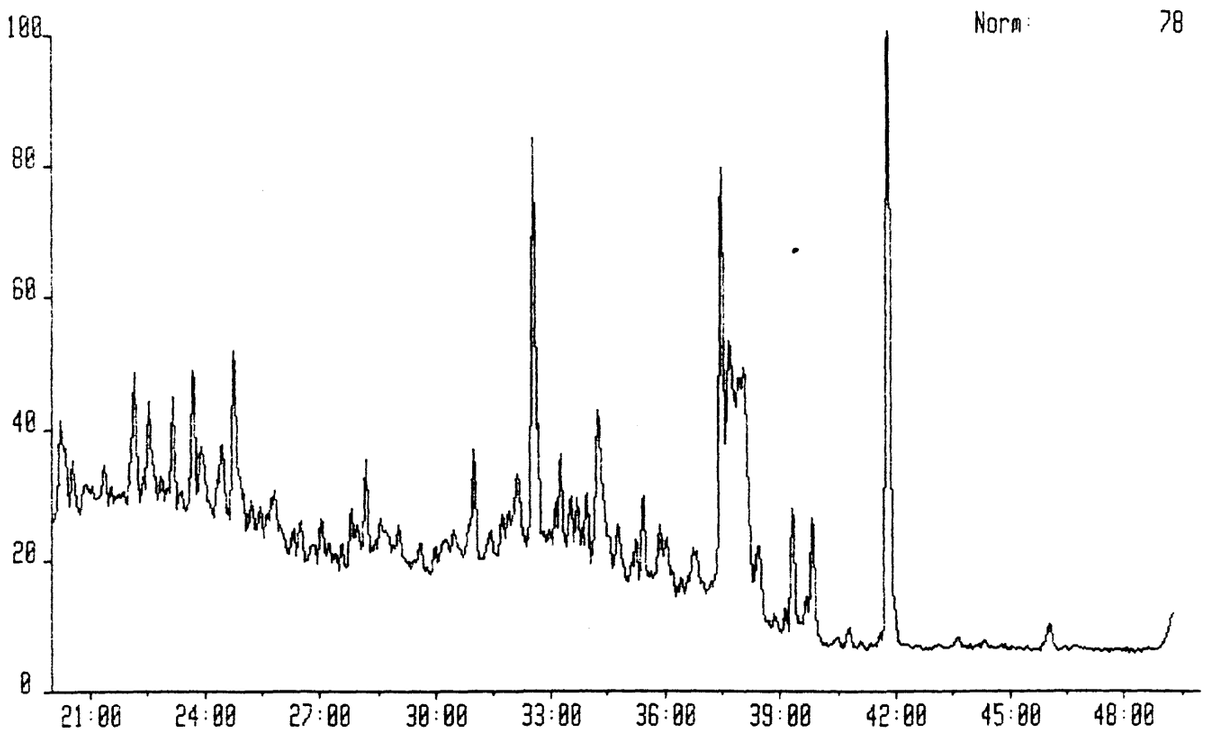
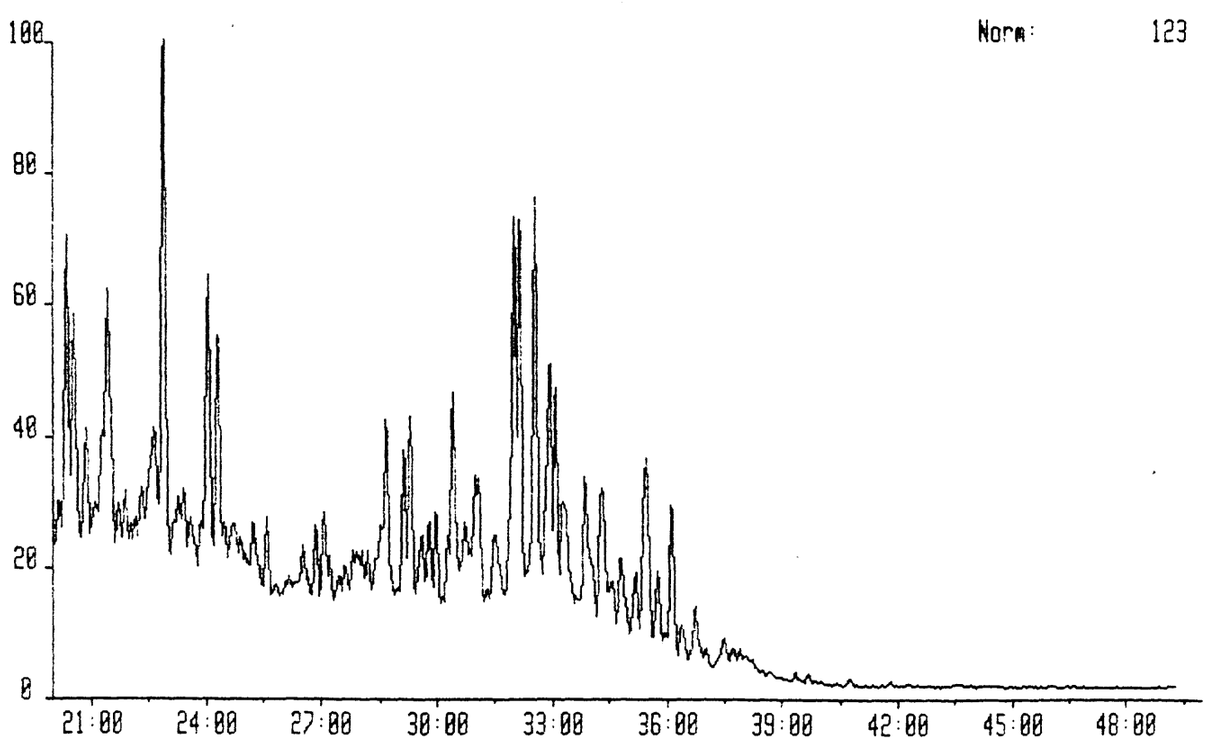
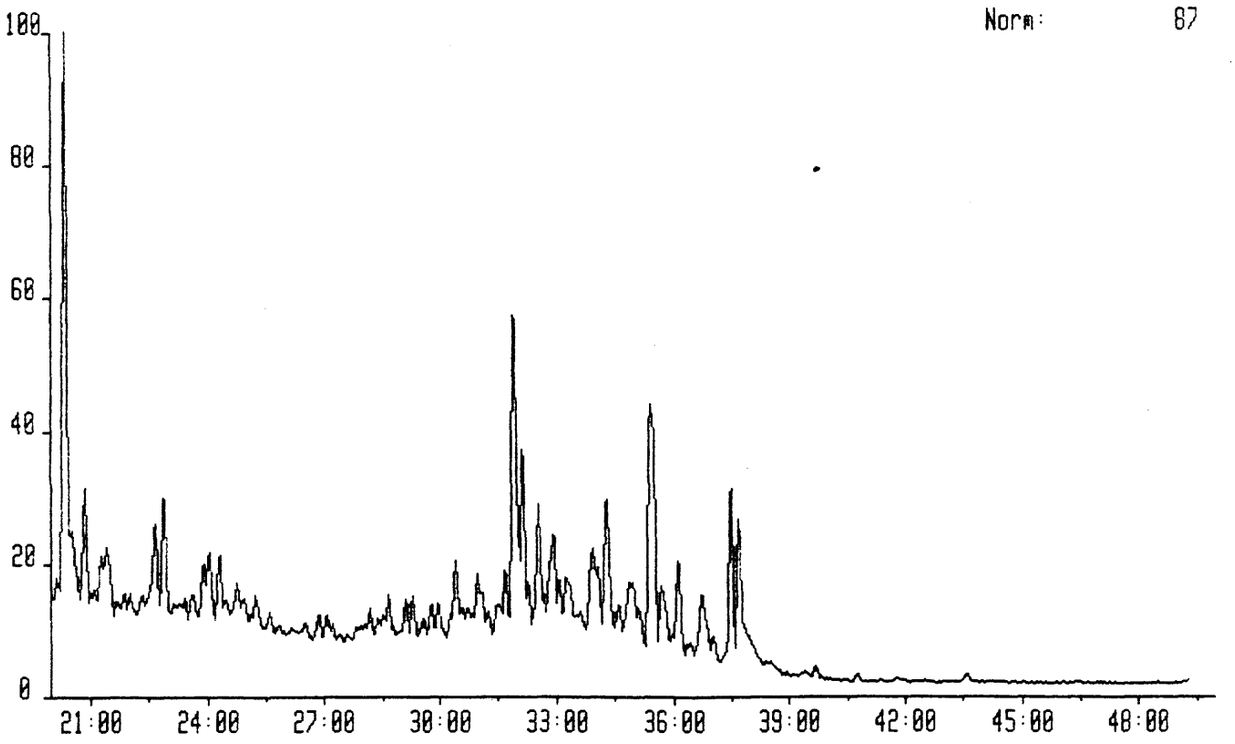
Sample 1 Injection 1 Group 1 Mass 205.1950
Text:METTET FRAKSJON,LRP



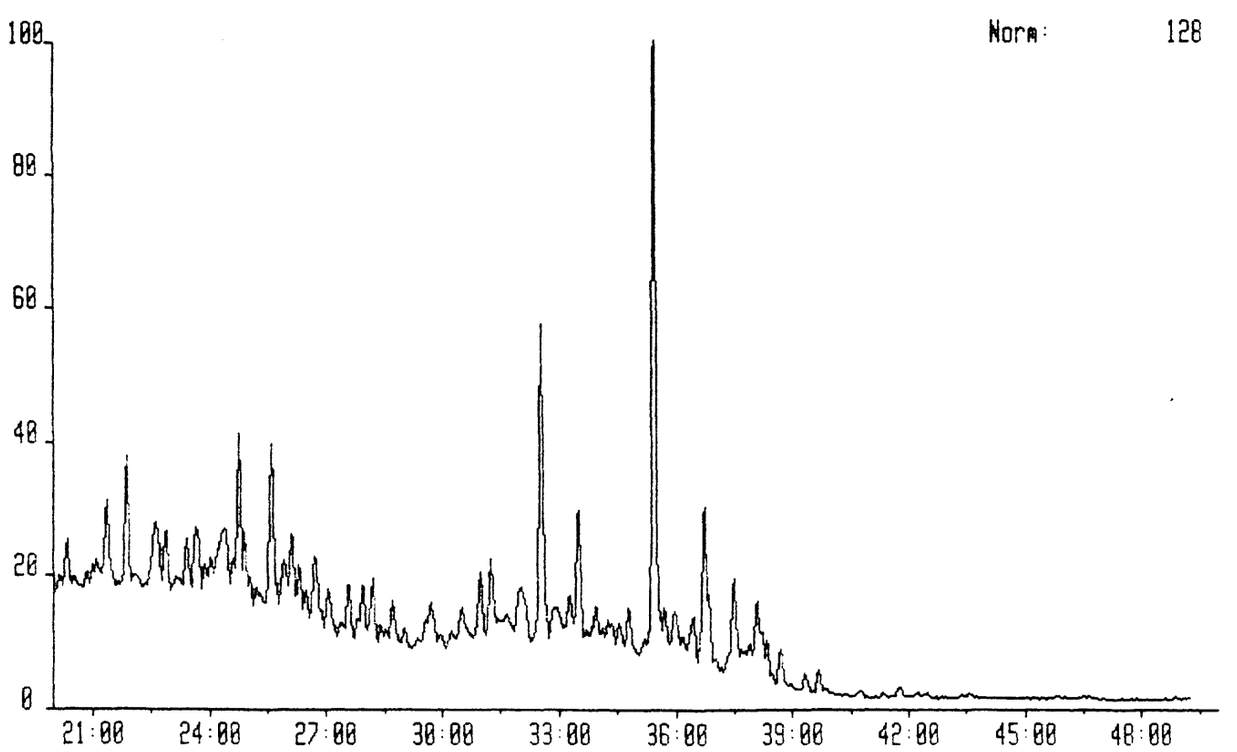
S2976 26-MAR-87 Str:Magnetic TS250 Sys: BIO
Sample 1 Injection 1 Group 1 Mass 217.1950
Text:METTET FRAKSJON,LRP



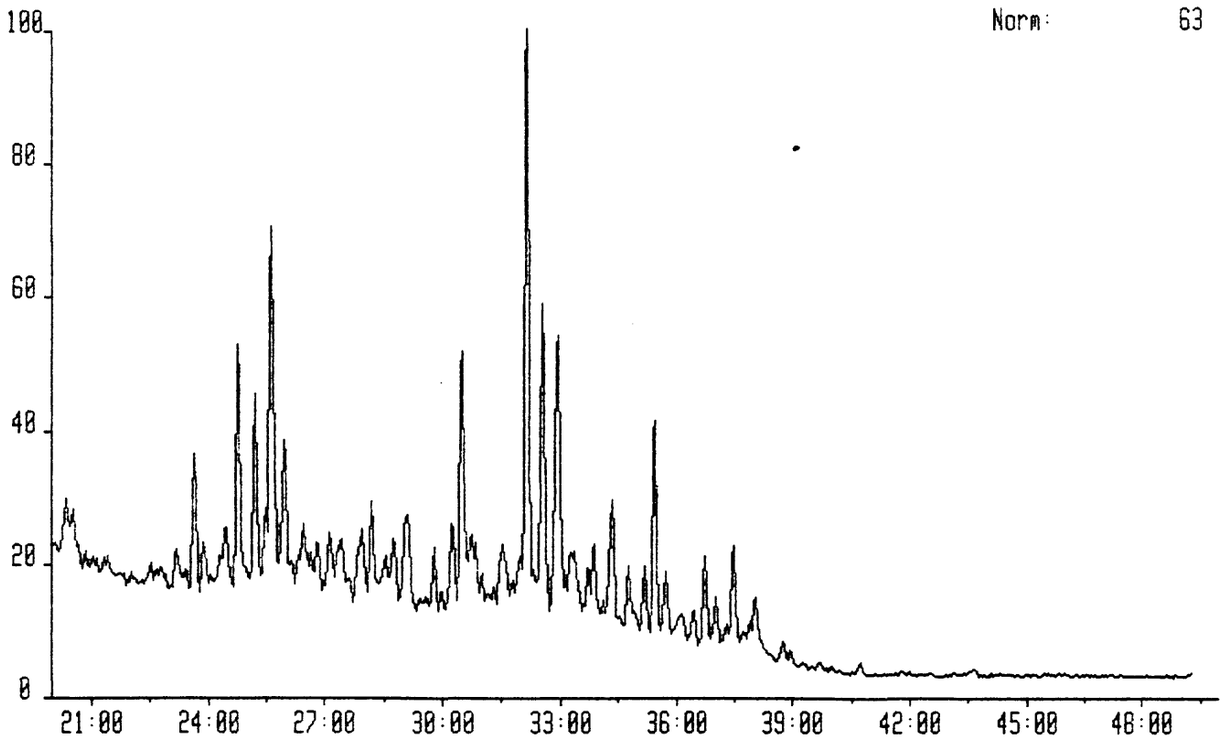
S2976 26-MAR-87 Sir:Magnetic TS250 Sys: BIO
Sample 1 Injection 1 Group 1 Mass 218.2030
Text:METTET FRAKSJON,LRP



S2976 26-MAR-87 Sir:Magnetic TS250 Sys: BIO
Sample 1 Injection 1 Group 1 Mass 231.2110
Text:METTET FRAKSJON,LRP



S2976 26-MAR-87 Sir:Magnetic TS250 Sys: BIO
Sample 1 Injection 1 Group 1 Mass 259.2420
Text:METTET FRAKSJON,LRP



APPENDIX A

VITRINITE REFLECTANCE, KEROGEN DESCRIPTION AND TAI

(Data from analyses performed by IKU)

DESCRIPTION IN REFLECTED LIGHT

IKU SINTEF-GRUPPEN

WELL 6507/8-2

S-2972, 2354.5m
Vitrinite reflectance: 0.34% (30). Sporinite Fluorescence: ?

Semi-fusinite appears to be the most abundant maceral type in this organic-rich claystone, and can form quite large chips. A low-reflecting huminitic (i.e. vitrinite precursor) maceral is also quite abundant, although a specific identification could not be assigned. Reflectance measurements were taken on on the huminite particles. Common microfracturing of the organic particles may indicate influence from oxidation and/or weathering. This would also account for the fact that although liptinitic material is observed under white light, no liptinite fluorescence is observed under ultra-violet illumination.

S-2977, 2616.0m
Vitrinite reflectance: 0.42% (30). Sporinite Fluorescence: 6-7?

Inertinite is less abundant in this carbonaceous claystone sample.Abundant huminite/vitrinite particles are present, although these tend to be of rather variable surface quality. Although there are indications that two huminite/vitrinite populations may be present, reflectance measurements appear to be reasonably consistent. Microfracturing of this material is rather common, together with occaisional variation in particle reflectance which suggests the influence of oxidation processes. The common occurrence of generally well-preserved pyrite suggests that oxidation could not have been too extensive in this sample. Liptinitic material is quite common under ultra-violet light, although the very low intensity of the fluorescence makes any detailed observations largely impossible. Sporinite appears to be the main liptinite type present.

Sample Identification:T-4533 #46; 6507/8-2
Reference number:22.1884.10
(1/1)

VITRINITE REFLECTANCE DATA

IKU NO	SAMPLE ID	DEPTH (M)	VITRINITE REFLECTANCE	REL RAT	STANDARD DEVIATION	FLUORESCENCE
S-2972	----	2354.5	0.34 (30)	G	0.07	?
S-2977	----	2616.0	0.42 (30)	G	0.06	6-7?

REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
S = Stained; R = Reworked

VISUAL KEROGEN ANALYSIS

TABLE NO.: 1
WELL NO.: 6507/8-2

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
S 2974	2356.50	Am: <5% Lm: 5% W: >90% C:	F-M-L	Good	?3.5-4.0*	Organic residue totally dominated by angular dark brown and black woody/coaly phytoclasts. * Possible evidence of oxidation.
S-2976	2613.50	Am: <5% Lm: 5% W: >90% C:	(F)-M-(L)	Fair-Good	?3.5-4.0*	Comparable to sample S 2974 but containing dominantly larger/thicker woody/coaly fragments

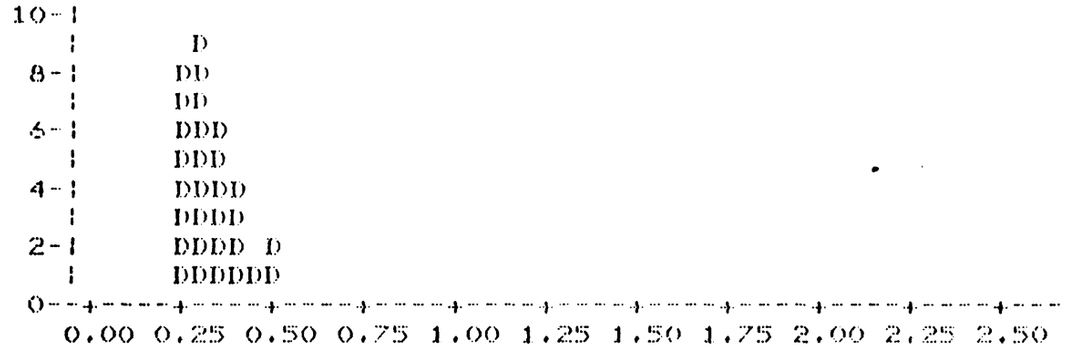
ABBREVIATIONS:

Am = Amorphous
Al = Algae
W = Woody material
C = Coaly fragments
Lm = Liptinitic material

F = Fine
M = Medium
L = Large

IKU SINTEF-GRUPPEN

IKU# S-2972 2354.5M 4507/9-2

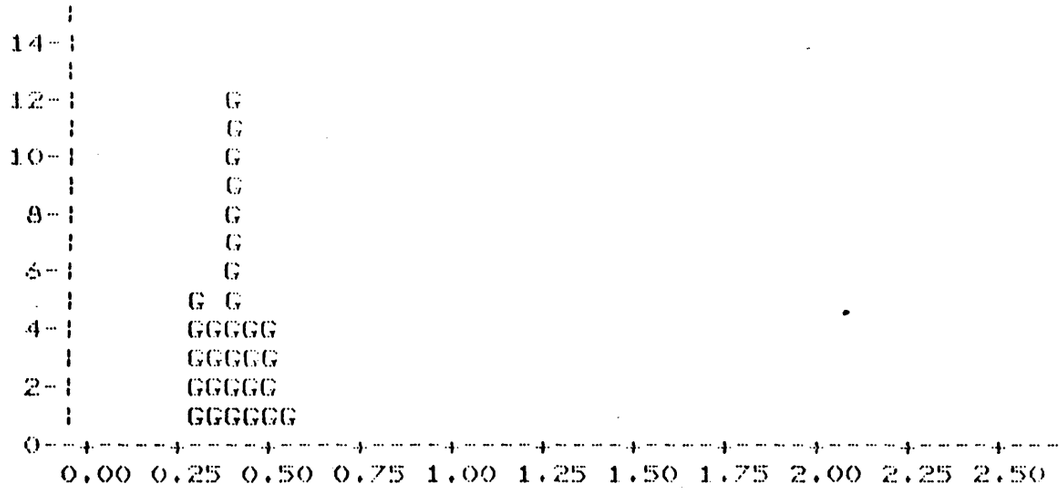


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.25	0.55	ALL	30	0.34	0.07
			OVERALL	30	0.34	0.07

ORDERED VALUES FOLLOW:

0.25D 0.26D 0.27D 0.27D 0.28D 0.28D 0.28D 0.28D 0.30D 0.30D 0.31D
0.31D 0.31D 0.32D 0.33D 0.34D 0.34D 0.35D 0.36D 0.36D 0.36D 0.36D
0.37D 0.40D 0.41D 0.41D 0.43D 0.46D 0.50D 0.54D

IKU# S-2977 2616.OM 4507/8-2



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.33	0.59	ALL	30	0.42	0.06
			OVERALL	30	0.42	0.06

ORDERED VALUES FOLLOW:

0.33G 0.34G 0.34G 0.34G 0.34G 0.35G 0.36G 0.37G 0.37G 0.40G 0.40G
0.40G 0.40G 0.40G 0.40G 0.40G 0.40G 0.41G 0.42G 0.43G 0.44G 0.45G
0.46G 0.46G 0.48G 0.50G 0.50G 0.50G 0.51G 0.58G

APPENDIX B

CARBON ISOTOPIC ANALYSES OF EXTRACTS AND EXTRACT FRACTIONS

(Data from analyses performed by IFE)

DATARAPPORT

Institutt for energiteknikk

ISOTOPANALYSER BRØNN 6507/8-2
T 6269 NR. 117

1. INNLEDNING

10 ekstraktfraksjoner ble mottatt for isotopanalyse juni 1988. $\delta^{13}C$ er bestemt i fraksjonene.

2. ANALYSEPROSEDYRE

2-3 mg (eller så mye som mulig) av prøven forbrennes i glassampuller med CuO ved 550^{0}C i 1 time. Alle isotopbestemmelser er foretatt på et Finnigan MAT 251 massespektrometer. Vår verdi på NBS 22 er -29.77 $\pm$ 0.6 o/oo PDB.

3. RESULTATER

$^{13}C/^{12}C$ isotopverdiene for ekstraktfraksjonene er gitt i Tabell 1.

Tabell 1 $\delta^{13}C$ i ekstraktfraksjoner brønn 6507/8-2

		$\delta^{13}C_{PDB}$				
Prøve nr.	IFE nr.	EOM	SAT	ARO	NSO	ASF
S-2974	7469	-27.4	-31.2	-27.5	-27.9	-26.8
S-2976	7470	-26.7	-29.2	-26.4	-26.7	-26.3