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Source rock analysis well 15/12-5		
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Key words

15/12-5, source rocks, extraction, migrated hydrocarbons.

Abstract

The Upper Jurassic shales are fairly immature on the 15/12-5 structure, and seem to have a somewhat limited source rock quality. Migrated hydrocarbons extracted from the reservoir sandstone cores are definitly more mature, but might have been genereted from the same Upper Jurassic source rock in a more mature situation and probably with a slight change in facies.

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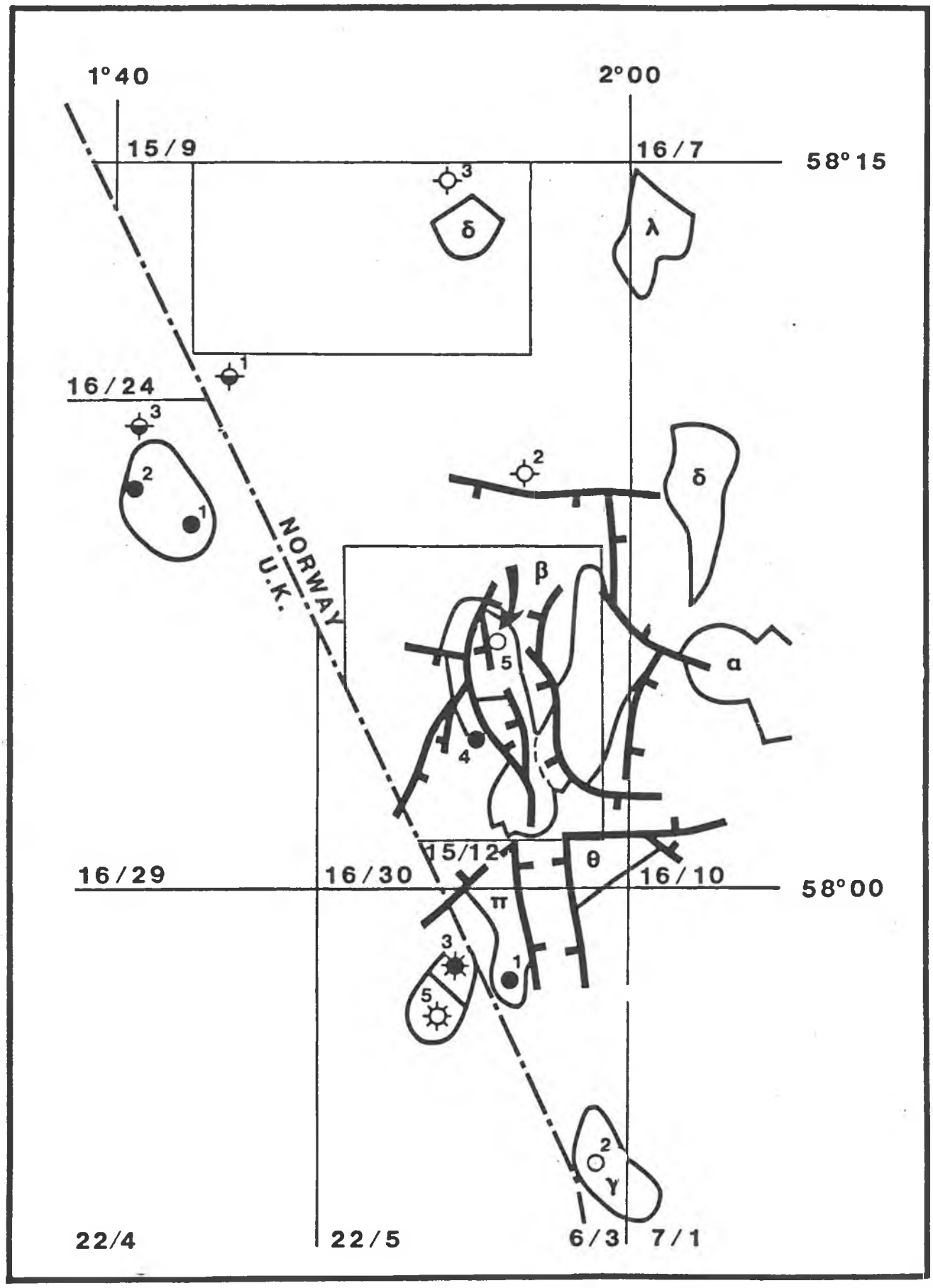
LOCATION MAP



INTRODUCTION

The analytical work presented in this report have been performed by IKU.

The added evaluation have been done at section for organic geochemistry, GEOLAB, Statoil.

On page 2 the location map is giving the well position within block 15/12.

UPPER JURASSIC SOURCE ROCKS

Cuttings, SWC's and conventional cores have been analysed from the Draupne (47 cm thick) and Heather (20 m thick) formations.

An approximate average for the total organic carbon in the Heather formation has been estimated to 1.5 %. On structure, the formation seems to be gradually more silty towards the bottom, and a more shaly facies off structure might have a better source rock quality.

The Draupne formation seems to have a more limited quality on this locality than normally observed for the Upper Jurassic hot shale. The total organic carbon is slightly below 2.5 % on average (1.9 - 2.8 %), while the production potential varies between 2 and 7.6 kg hydrocarbons/tonne rock. The HI-values are below 300 mg HC/gTOC (107 - 247). This seems, at the best, to classify the formation as a medium good source rock at an expected maturity level below R_o = 0.7. Data from quantified pyrolysis also indicate a somewhat reduced kerogen quality. Only up to 22 % of the produced hydrocarbons was within the C_{15}+ range. Qualitatively the amount of alkane/alkene pairs are significant, but not dominating. The optical analysis indicates over 80 % amorphous material. The biogenic source was however not possible to establish, but a smaller part of liptinitic material (5 - 10 %) contained significant amounts of terrestrial palynomorfs. Very high values for the pristane/phytane ratio in extracts from the formation and the low TOC-values seem to confirm a more coastal, less reducing environment for the deposition than what is usually the case. This goes especially for the Draupne formation. Significant amounts of higher normal alkanes in the C-25 to C-35 range also contributes to an impression of a significant element of higher land-plants in the kerogen. The amount of extractable material varies between 2000 and 4500 ppm.

The level of maturity, is however too low on structure to allow for any significant contribution to the observed accumulated hydrocarbons. A maturity level lower than the first main oil generating phase for kerogen type II is confirmed by a spore colour index between 2.5 - 3 corresponding to a vitrinite reflection value of R_o = 0.40 (in accordance to IKU correlation scheme). Biomarkers in extracts from the source rock confirms this level by 55 % $\beta\beta$ (m/Z) 217, low values for % 20S (38 %), low $\alpha\beta / \alpha\beta + \beta\alpha$ (85 %), high Tm/Ts values (3.5 - 7.4).

The chromatograms of the saturate fractions are also pointing at a low maturation level. This is especially indicated by the relatively high concentration of isoprenoids and a small but significant bimodale distribution. Correspondingly, the aromatic functions are showing values for the methyl phenanthrene index indicating low maturity. However, in the coresamples near the reservoir interval the component distribution is very abnormal. The chromatograms show a strong dominance of light hydrocarbons. The content of normal alkanes decreases drastically towards n-C19, followed by a low but constant concentration of heavier homologs towards n-C32. Whether this has any relationship to the observed close to 100 % "possible additives" (lignite) (see IKU p. 17) in cutting samples is difficult to prove. "Possible additives" was discovered in samples from the interval 2884 - 2900 m, 2900 - 2915 m and with decreasing amounts in samples from the interval 2915 - 2960 m.

Still, the isotopic composition of extracts and practions from the source rocks does not diverge from extracted hydrocarbons from the reservoir zone. This probably indicate that the accumulated hydrocarbons are generated from the same or highly similar source rocks at a higher level of maturity. Surprisingly, however, a fairly large difference was observed in the isotopic composition between the kerogen concentrate and the total extract.

CONCLUSION

The upper Jurassic source rocks on the 15/12-5 structure are fairly immature. The production potential classify the source rocks as medium good. The kerogen seems influenced by significant amounts of terestrial material, possibly deposited in a somewhat less reductive and more coastal than usually is the case. The accumulated hydrocarbons are therefore not produced on structure by the upper Jurassic shales.

ACCUMULATED/MIGRATED HYDROCARBONS

Headspace gas from sealed canned samples containing mud and cuttings have been analysed for the composition of light hydrocarbons. As table 1a - c (IKU) indicate, the total amount of methane and heavier gas-components is significant in parts of the sealing rock. The gas has probably mainly been generated at a higher maturity level than on structure, as indicated by a relatively low $i\text{-}C_4/n\text{-}C_4$ ratio and a significant wetness.

Similar gas compositions as observed in the sealing source rock has been observed through the hole reservoir zone. The definitely highest gas concentration was indicated in samples from 2915 to 2960 m.

Core samples from the reservoir interval have been extracted, and the total amount of extractable hydrocarbons and ratios of various fractions are given in table 6 -8. The highest concentration of hydrocarbons was observed near 2927.55 m, with a sharp decrease at 2952.65 m. The pristane/phytane ratio seems to vary little, between 1.2 and 1.5, typical values for North Sea oils generated from mature Upper Jurassic source rocks. For comparison, extracts from the source rocks show values between 2.4 and 3.5, and probably confirming.

a) the significantly higher maturity level in the migrated hydrocarbons relatively to the source rock on the structure and
b) that the environment of deposition has been more reductive in the drainage area for the migrated hydrocarbon.

The ratio seems to exclude any significant contribution for possible coal or coaly shale source rocks.

The biomarkers indicate a significantly higher level of maturity for the migrated hydrocarbons than for the extracts from the source rock.

Isotopically, the migrated hydrocarbons seem to have been generated by the Upper Jurassic shales, but at a higher level of maturity.

REPORT

REPORT TITLE:

DATAREPORT

SOURCE ROCK EVALUATION AND CHARACTERISATION OF HYDROCARBONS FROM WELL 15/12-5

REPORT NO.: 22.1850.00/02/87

AUTHORS:

K. Lind, M. Smelror, T. Berg, G. Haugen, B. Thorvaldsen

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REPORT

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DATE:	NO. OF PAGES:	NO. OF APPENDICES:	PROJECT MANAGER:	SIGN.:
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CLIENT:

Statoil, Geolab, v/ Steinar Ulvøen. Open contract T.4533, job no. 25.

SUMMARY:

This datareport presents the data of source rock evaluation and characterisation of hydrocarbons from well 15/12-5.

KEY WORDS:

Well 15/12-5

Source rock

Asphaltenes

Skipnes

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1. SUMMARY

Samples from well 15/12-5 were sent from Statoil to IKU for organic geochemical analysis. The aim of this project was to give an indication of quality and saturation of the hydrocarbons in the reservoir zone from 2918 m, and unconformities in the cap rock which is Draupne Fm (2841 m) and Heather Fm (2888 m). The job was assigned the IKU project code 22.1850.00 and was carried out according to the terms in the open contract T-4533 job no. 25.

The samples received for analysis were as follows:

- 199 canned cutting samples
- 13 sidewall cores (swc)
- 16 core samples

The canned cutting samples covered a depth interval from 234 m to T.D., while the samples which should be chosen for this project were in the interval from 2840 m to T.D.

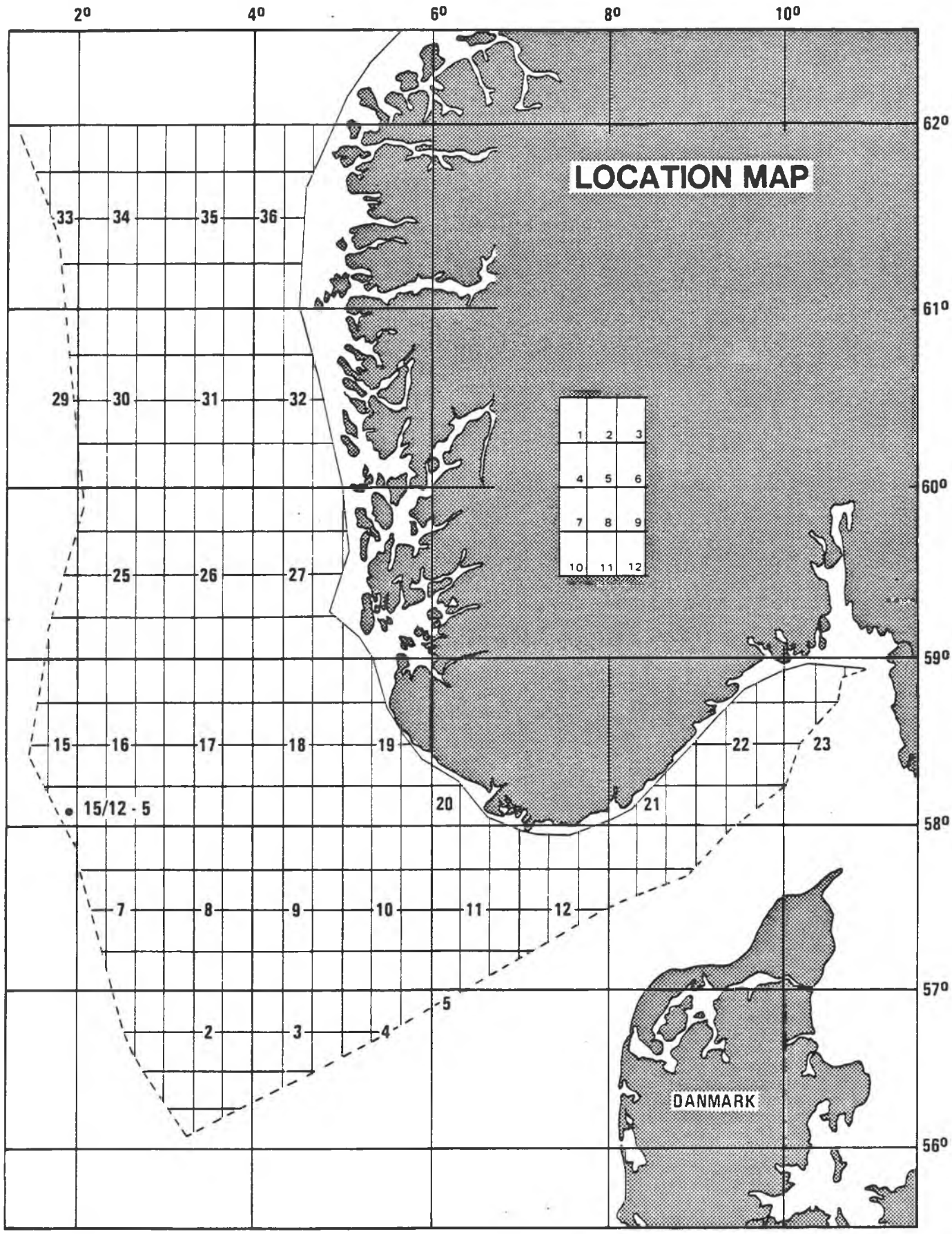
The following analysis were performed:

- Headspace and occluded gas analysis	20 samples
- Sample preparation, i.e. washing, sieving and handpicking, lithological description	20 samples
- Total organic carbon	15 samples
- Rock-Eval pyrolysis	15 samples
- Kerogen description, TAI	4 samples
- Preparation of kerogen concentrates	4 samples
- Pyrolysis-GC quantification	5 samples
- Extraction	20 samples
- Asphaltene precipitation	20 samples
- Iatroscan quantification	20 samples
- MPLC separation	20 samples
- GC of saturated hydrocarbons	20 samples
- GC of aromatic hydrocarbons	10 samples
- GC-MS of biomarkers	10 samples
- 13C/12C isotope ratios of extracts, saturates, aromatics, NSOs and asphaltenes	10 samples
- 13C/12C isotope ratios of kerogen concentrates	4 samples

Samples from interval 2840-2889 m were chosen for characterisation of the source rock, and 15 samples (10 cuttings and 5 sidewall cores) from this interval were analysed by TOC and Rock-Eval pyrolysis. The sample material from this interval was of poor quality and for preparation of kerogen concentrates and kerogen description only 4 samples were selected. For extraction and chromatographic separation 4 sidewall cores (swc) from this interval were analysed, while 16 sandstone cores from the reservoir zone were analysed for characterisation of the reservoir hydrocarbons.

The weight of saturated and aromatic hydrocarbons, NSOs' and asphaltenes after chromatographic separation of extracts are not satisfactory as commented by Statoil. The difference between the amount of NSOs' and asphaltenes given in Table 6 and the amount of nonhydrocarbons given in Table 7 are too high. The testing of our chromatographic system i.e. precolumns, regeneration, reproducability tests etc., has started and the results of these analysis will be given to Statoil as soon as they are available.

Five copies of the data report has been sent to Statoil and five copies are stored at IKU.


2°
4°
6°
8°
10°
62°
61°
60°
59°
58°
57°
56°
LOCATION MAP
1 2 3
4 5 6
7 8 9
10 11 12
33 34 35 36
29 30 31 32
25 26 27
15 16 17 18 19
22 23
20
21
15/12 - 5
7 8 9 10 11 12
5
2 3 4
DANMARK

2. EXPERIMENTAL METHODS

2.1 Gas analyses

Headspace gas:

A septum was attached to the can and a sample of the headspace gas was taken for analysis of C_1, C_2, C_3, i-C_4, nC_4 and C_{5+} hydrocarbons.

This analysis was performed on Carlo Erba Fractovap 2150 and 2350 gas chromatographs equipped with 2 m x 1/8" stainless steel columns filled with Porapack Q on Chromosorb using nitrogen as carrier gas. An oven temperature of 150°C was used. After elution of n-butane, the column was back-flushed and C_{5+} compounds were recorded as one peak. A standard gas sample containing methane, ethane, propane, n-butane, n-pentane and n-hexane (100 ppm each) was used for quantification.

The can was then opened and headspace volume, water volume, and sample weight were measured. The canned samples were washed with warm water (30-40°C) on 4.0, 2.0 and 0.125 mm sieves to remove drilling mud and were then dried at 35°C.

Occluded gas:

Prior to drying, an aliquot of the 2 mm fraction of each sample was crushed in water for 10 minutes using a gas-tight ball mill. The evolved gas was analysed as described for headspace gas.

2.2 Lithological descriptions

Lithological examinations were carried out using a binocular microscope (maximum 50x magnification). Colours were described on dry samples according to the "Rock Colour Chart" published in 1979 by the Geological Society of America, Boulder, Colorado. Handpicking of the cuttings for organic geochemical analyses was based on the lithological descriptions.

2.3 Total Organic Carbon

Bulk samples were crushed in a mortar. Aliquots of the samples were then weighed into Leco crucibles, treated three times with hot 10% HCl

to remove carbonate, and washed 4 times with distilled water to remove any traces of HCl. The crucibles were then placed on a hot plate (60°C) and dried for 24 hours. The total organic carbon (TOC) content of the dried samples was determined using a Leco CS 244 carbon analyser.

The instrument was calibrated using a Triassic shale (4.96% TOC) as a standard. Calibration and blank runs were carried out every 15th measurement.

2.4 Rock-Eval pyrolysis

Powdered sample (100 mg shale, 5-10 mg coal) was weighed into a platinum crucible (the base and cover of which are made of sintered steel), and analysed on a Rock-Eval II pyrolyser (Girdel/IFP) under standard conditions (Carrier gas: Helium; Flow Rate: 100 ml/min.; Temp.Program: 300°C (3 min.) - 25°C/min. - 550°C).

2.5 Preparation of kerogen concentrates

The powdered and pre-extracted rock sample was treated overnight with concentrated HCl (200 ml), followed by treatment with hot 40% HF (100 ml, 50°C, overnight). The acids were removed by decanting and repeated washing with hot water (2 hours), 10% ammonium carbonate solution (> 2 hours) and cold water (2x2 hours).

The kerogen was further purified by extraction with methanol, methanol/DCM (1:1) and hexane/DCM (1:1). The dried kerogen sample was then analysed for Total Carbon content.

2.6 Evaluation of kerogen type and thermal maturity in transmitted light

The rock samples were crushed and treated with hydrochloric acid and hydrofluoric acid in order to remove the mineral matter and isolate the kerogen. The isolated organic matter/kerogen was mounted in glycerine jelly on microscope slides as a strew mount.

The treatment of the isolated kerogen varied according the requirements and preservation of the samples. This included:

T-slide: represented the total acid residue
O-slide: represented the kerogen debris remaining after flotation in $3nBr_2$ to remove heavy minerals
N-slide: represented a sieved residue (15 µm mesh)
X-slide: represented oxidised residue.

T and/or O slides were necessary in order to evaluate the kerogen composition/palyno-facies of the samples.

N and/or X slides were required if it was necessary to concentrate larger kerogen fragments or spores/pollen for age determination or spore colour (NB: oxidised residue is not used for spore colour determination as oxidation will alter the colour).

The samples were studied using a Leitz Dialux microscope with a white halogen light source. Objective lenses of 10x and 63x magnification were used. The higher magnification allowed a more detailed description of the kerogen, with resolution of particles down to 2 µm diameter. The thermal alteration index (TAI) measurements were obtained from the colour of spores and pollen. The techniques used in visual kerogen study are adapted from Staplin (1969) and Burgess (1974).

COMPARISON OF MICROSCOPIC THERMAL MATURATION SYSTEMS AT IKU

MATURATION LEVEL	SPORE COLOUR		VITRINITE REFLECTANCE	SPORINITE FLUORESCENCE
	TAI	NEWTAI	%	
IMMATURE	1 - 2-	1.0- 3.5	0.25-0.40	1-4
EARLY MATURITY	2- - 2	3.5- 4.0	0.40-0.60	4-6
MODERATE MATURITY	2 - 2+	4.0- 4.5	0.60-0.80	6-7
MATURITY	2+ - 3-	4.5- 5.5	0.80-1.00	7-8
LATE MATURITY	3- - 3	5.5- 6.0	1.00-1.20	8-9
POST-MATURE	3 - 5	6.0-10.0	>1.20	Absent

2.7 Pyrolysis Gas Chromatography (Py-GC Programmed)

Thermal extraction (S1)

The whole rock (20-30 mg) or kerogen sample (<1 mg) was placed in a boat-shaped sample probe and thermo-extracted in a stream of helium at 340°C for 4 minutes.

Pyrolysis-Gas Chromatography (S2)

The thermo-extracted sample was pyrolysed in a helium atmosphere using a furnace type pyrolyzer as described by Solli et al. (1984). The pyrolysis temperature program was 340°C - 50°C/min. - 550°C. The outlet of the furnace was directly connected to a splitter (30:1) which enabled the pyrolysis products to be simultaneously recorded as a bulk "S2" peak by an FID and passed into a gas chromatograph. The pyrolysis products were trapped on the chromatographic column by cooling the front part of the column with liquid nitrogen. On completion of the pyrolysis programme, the collected pyrolysis products were injected onto the column by removing the nitrogen batch. The GC conditions are outlined below.

GC conditions

Column: 30 m DB-1, i.d. 0.32 mm, fused silica capillary column.
Carrier gas: Helium, inlet pressure 7.5 psi; flow rate 1.5 ml/min.

Temp. programme: -10°C (1 min.) - 5°C/min. - 310°C (10 min.)

2.8 Extractable Organic Matter

Powdered rock was extracted by Soxhlet technique with boiling dichloromethane (DCM) containing 7% methanol (v/v) as solvent.

DCM of organic geochemical grade was used and blank analyses indicated that the occurrence of contaminating hydrocarbons was negligable. Activated copper filings were used to remove any free sulphur from the samples.

After extraction, the solvent was evaporated off using a Büchi Rotavapor and the amount of extractable organic matter (EOM) was determined.

2.9 Separation of extractable organic matter (EOM) fractions

Iatroscan

The extractable organic material was diluted with DCM and ca. 20-30 µg of the solution were applied to a precleaned and activated Chromarod (type SII). Three replicates of each sample were analysed. The rods were fully developed with n-hexane (10-11 cm), then dried and redeveloped to half-rod height (5.5 cm) in toluene, and finally developed in DCM+MeOH (93:7v/v, 2.5 cm).

The rods were passed through the flame-ionisation detector (FID) of an Iatroscan TH-10 (H_2 = 160 ml/min; air = 2 l/min.; scan speed = 0.38 cm/sec. (gear no. 30)). The FID response was recorded and integrated using a DEC Minichrom system. The retention factors of the aliphatic and aromatic hydrocarbons were then determined by comparison with standards (nC_{20} and fluorene).

Medium-pressure liquid chromatography (MPLC)

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

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

2.10 Gas chromatographic analysis

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

The total aromatic fractions were diluted with n-hexane and analysed on an HP 5730A gas chromatograph, fitted with a DB-5 fused silica column

(15 x 0.25 mm i.d.), using a hydrogen carrier gas with a flow rate of 2.5 ml/min. The injection split ratio was 1:10.

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

Data processing for all the GC analyses was performed on a VG Multichrom lab data system.

2.11 Gas chromatography - mass spectrometry (GC-MS)

GC-MS analysis were performed on a VG Micromass 70-70H GC-MS-DS system. The Varian Series 3700 GC was fitted with a fused silica OV-1 capillary column (30m x 0.3 mm i.d.). Helium (1.5 ml/min) was used as carrier gas and the injections were performed in split mode (1.5 µl, split ratio 1:15).

The GC oven was programmed from 120°C (2 min.) to 280°C at 4°C/min.

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

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

2.12 $\delta^{13}C$ isotope analysis

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

The isotope ratios are given as delta-values (del):

$$del\ (\%) = ((R\ sample - R\ stand.) / (R\ stand.)) * 1000$$

13C/12C- isotope ratios are calculated versus PDB.

Project no.: 22.1850.00
Well ident.: 15/12-5
DATE : 14 - 4 - 87.

Table 1a:

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
C 5870	2855	4144	1184	1324	230	434	694	7317	3172	43.36	0.53
C 5871	2870	12520	5983	10283	2262	5528	11035	36577	24056	65.77	0.41
C 5872	2885	33552	12329	18701	2966	7803	17616	70351	36799	52.31	0.38
C 5873	2899	21984	9516	14542	3504	9434	29384	58971	36987	62.72	0.37
C 5874	2900	1709	566	678	111	314	1038	3378	1669	49.41	0.35
C 5875	2915	1425	672	866	121	343	1031	3428	2002	58.41	0.35
C 5876	2930	9918	2992	4293	1018	2110	3520	20330	10413	51.22	0.48
C 5877	2945	6013	1700	2988	925	2306	6218	13932	7919	56.84	0.40
C 5878	2960	496	210	417	111	294	2379	1527	1031	67.51	0.38
C 5879	2975	177	60	132	31	81	838	482	305	63.32	0.39
C 5881	3005	1071	296	540	179	467	1709	2554	1482	58.05	0.38
C 5882	3020	2781	1213	1937	482	1176	2900	7589	4808	63.35	0.41
C 5883	3035	4755	2040	3189	815	2028	5127	12827	8072	62.93	0.40
C 5884	3050	3695	1376	2462	721	1909	5468	10162	6467	63.64	0.38
C 5885	3065	6012	2520	3193	656	1593	4465	13975	7963	56.98	0.41
C 5886	3080	4354	1762	2219	419	920	1676	9674	5320	54.99	0.46
C 5887	3095	749	336	571	127	348	1135	2131	1382	64.85	0.37
C 5888	3110	763	340	547	121	325	817	2095	1332	63.57	0.37
C 5890	3140	752	350	504	103	274	1026	1983	1231	62.09	0.38
C 5891	3150	1136	437	567	122	316	932	2188	1442	65.93	0.39

Project no.: 22.1850.00
Well ident.: 15/12-5
DATE : 14 - 4 - 87.

Table 1b:

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCLUDED

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
C 5870	2855	200	117	564	140	596	3426	1616	1417	87.65	0.24
C 5871	2870	203	96	566	156	722	3827	1742	1539	88.37	0.22
C 5872	2885	531	1611	6598	619	3040	11601	12400	11870	95.72	0.20
C 5873	2889	1081	459	1521	284	1518	10936	5863	4782	81.56	0.19
C 5874 *	2900	116	55	321	95	350	1600	937	821	87.61	0.27
C 5875	2915	1579	262				12457	1841	262	14.23	
C 5876	2930	10391	553	2162	938	3238	29001	17281	6890	39.87	0.29
C 5877	2945	7940	247	468		699	14938	9354	1414	15.12	0.00
C 5878	2960	2471	294	404		382	14124	3551	1080	30.42	0.00
C 5879	2975	1648	197	293		263	11305	2401	753	31.35	0.00
C 5881	3005	711	80	119	35	92	1811	1027	316	25.77	0.27
C 5882	3020	1067	117	384	155	641	7885	2364	1297	54.88	0.24
C 5883	3035	1055	127	408	169	633	7823	2392	1337	55.90	0.27
C 5884	3050	857	96	178	45	227	5054	1403	547	38.95	0.20
C 5885	3065	706	146	562	134	591	4221	2140	1434	67.00	0.23
C 5886	3080	497	106	402	94	384	2220	1483	986	66.51	0.24
C 5887	3095	570	62	130	30	30	1919	822	252	30.68	1.00
C 5888	3110	885	89	147		107	1904	1228	343	27.94	0.00
C 5890	3140	564	43	74	14	34	945	730	166	24.76	0.37
C 5891	3150	453	31	149	24	175	1886	862	409	47.44	1.09

* The 125 µm fraction (normally 2 mm) was crushed for occluded gas.

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Table 1c:

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
C 5870	2855	4344	1300	1888	370	1030	4119	8933	4589	51.37	0.36
C 5871	2870	12723	6079	10849	2419	6250	16650	38319	25596	66.80	0.39
C 5872	2888	34083	13941	20299	3385	10844	29017	82751	48668	58.81	0.33
C 5873	2889	23066	9975	17064	3788	10942	40819	64834	41768	64.42	0.35
C 5874 *	2900	1825	621	998	206	664	2638	4315	2490	57.70	0.31
C 5875	2915	3004	934	866	121	343	13489	5269	2265	42.98	0.35
C 5876	2930	20309	3545	6485	1955	5349	32521	37612	17303	46.00	0.37
C 5877	2945	13953	1947	3486	925	3005	21156	23086	9534	40.02	0.31
C 5878	2960	2967	804	921	104	676	16803	5078	2111	41.57	0.16
C 5879	2975	1825	257	425	31	344	11943	2882	1058	36.70	0.09
C 5881	3005	1982	376	669	205	560	3540	3791	1799	47.47	0.37
C 5882	3020	3848	1330	2321	637	1818	10786	9953	6105	61.34	0.35
C 5883	3035	5810	2168	3597	984	2660	12749	15219	9409	61.83	0.37
C 5884	3050	4551	1471	2640	766	2137	10522	11565	7014	60.65	0.36
C 5885	3065	6718	2666	3756	791	2184	8636	16114	9396	58.31	0.36
C 5886	3080	4850	1868	2621	513	1304	3896	11157	6306	56.52	0.39
C 5887	3095	1319	397	701	157	378	3054	2953	1634	55.34	0.42
C 5888	3110	1648	429	694	101	431	2722	3303	1675	50.71	0.23
C 5890	3140	1316	373	578	117	319	1970	2703	1387	51.33	0.36
C 5891	3150	1639	488	716	154	491	2791	3490	1851	53.03	0.31

* The 125 µm fraction (normally 2 mm) was crushed for occluded gas.

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 15/12-5

Sample	Depth (m)	TOC	Lithology
C-5870	2840-2855	0.41	*60% Claystone, greyish green, waxy, blocky to subfissile, calcareous
		1.92	*20% Claystone, light olive grey to brownish grey, micromicaceous, blocky, noncalcareous.
			10% Claystone, greyish red to dark reddish brown, blocky to subfissile and stringy calcareous
			10% Chalk/Limestone, white, occasionally pink
			Sm.am. Sand; Pyrite; Claystone, black, fissile to subfissile; Claystone, grey, subfissile to blocky
C-5871	2855-2870	2.45	*40% Claystone, sandy and silty, black, dark, grey, dark brownish grey, micromicaceous, fissile to subfissile, slightly calcareous to calcareous
		0.51	*30% Claystone, greyish green, waxy, blocky to subfissile, calcareous
			20% Claystone, greyish red to dark reddish brown, blocky to subfissile and stringy, calcareous
			10% Chalk, Limestone, white, brownish white; Sand; Pyrite
C-5872	2870-2885	2.77	*30% Claystone, sandy and silty, black, dark grey, dark brownish grey, calcareous
		0.41	*30% Claystone, greyish green, waxy, subfissile, calcareous
		1.72	*20% Claystone, light olive grey, blocky, non-calcareous
			20% Claystone, greyish red to dark reddish brown, calcareous
			Sm.am. Coal; Chalk/Limestone, white, pink; Sand; Pyrite

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 15/12-5

Sample	Depth (m)	TOC	Lithology
C-5873	2885-2889	2.62	*30% Claystone, sandy and silty, black, dark grey, dark brownish grey, calcareous
		0.44	*20% Claystone, greyish green, waxy, subfissile to blocky, calcareous
		1.83	*20% Claystone, light olive grey to greyish brown, non-calcareous to slightly calcareous
			20% Claystone, greyish red to dark reddish brown, calcareous
			10% Sand, fine, single grains, subangular to subrounded
			Sm.am. Coal, black; Limestone, white
C-5874	2889-2900		100% Possibly additives (lignite)
			Sm.am. Sand, fine, angular to subrounded; Claystone, similar to above lithology
C-5875	2900-2915		100% Possibly additives (lignite)
			Sm.am. Sand; Claystone
C-5876	2915-2930		80% Sandstone, fine to medium, well cemented, silica cement
			20% Possibly additives (lignite)
			Sm.am. Claystones
C-5877	2930-2945		90% Sand/Sandstone, medium, silica and calcite cemented, subangular to subrounded
			10% Possibly additives (lignite)
			Sm.am. Claystones; Chalk, white
C-5878	2945-2960		90% Sand/Sandstone, medium to coarse, subangular to subrounded, no staining observed
			10% Possibly additives (lignite)

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 15/12-5

Sample	Depth (m)	TOC	Lithology
C-5879	2960-2975		100% Sandstone/Sand, medium to very coarse, subangular to subrounded, some brown coating on grains Sm.am. Possibly additives; Sandstone, grey, very fine to fine
C-5881	2990-3005		100% Sandstone, medium to fine, angular to subangular, well cemented, calcite and silica cement, occasionally some coarse and very coarse grains, occurring as single grains, possibly caved material Sm.am. Possibly additives (lignite)
C-5882	3005-3020		100% Sandstone, medium to fine/Sand, medium to very coarse Sm.am. ?Additives; Chalk, white
C-5883	3020-3035		100% Sandstone, medium to fine, well cemented/Sand, medium to very coarse, single grains Sm.am. ?Lignite additives; Pyrite
C-5884	3035-3050		100% Sandstone, very fine to fine, well cemented with silica, calcite and clay cement Sm.am. ?Lignite additive; Pyrite
C-5885	3050-3065		100% Sandstone, very fine to fine, well cemented with silica, calcite and clay cement, some medium to very coarse single grains Sm.am. ?Lignite additive; Coak, black; Pyrite; Chalk, white

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 15/12-5

Sample	Depth (m)	TOC	Lithology
C-5886	3065-3080		100% Sandstone, fine to medium, angular to subangular, well cemented, calcite, silica and clay cement, some medium to coarse, subangular to subrounded grains Sm.am. ?Lignite additive; Claystone, grey
C-5887	3080-3095		100% Sand/Sandstone, mainly as single grains, medium to very coarse, subangular to subrounded, cementing seems to be poor Sm.am. Claystone, grey to dark grey, micromiceous
C-5888	3095-3110		100% Sand/Sandstone, medium to very coarse, subangular to subrounded, mainly as single grains, cementing seems to be poor. No staining Sm.am. ?Lignite additive; Claystone, grey
C-5890	3125-3140		100% Sand/Sandstone, both medium to very coarse, single grains, (poorly cemented), and well cemented, fine Sm.am. ?Lignite additive
C-5891	3190-3150		Sand/Sandstone, both as medium to very coarse, single grain and as well cemented, fine, angular to subangular Sm.am. ?Lignite additive; Pyrite

Table 3:

D A T A F R O M R O C K E V A L P Y R O L Y S I S

IKU No.	DEPTH m/ft	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX S1/(S1+S2)	TEMP. MAX
		(mg/g ROCK)			(%)	(mg/g TOC)		S1+S2		(C)
C 5837	2846	0.68	5.30	1.29	2.48	214	52	5.98	0.11	436
		SWC								
C 5839	2850	0.75	7.23	1.54	2.29	316	67	7.98	0.09	432
		SWC								
C 5870	2855	0.11	0.13	1.22	0.41	32	298	0.24	0.46	440
		Clst gy grn								
C 5870	2855	0.23	2.74	1.34	1.92	143	80	2.97	0.08	433
		Clst lt olv gy								
C 5841	2870	0.66	4.48	0.81	2.18	206	37	5.14	0.13	434
		SWC								
C 5871	2870	0.19	0.25	1.50	0.51	49	294	0.44	0.43	434
		Clst gy grn								
C 5871	2870	0.59	6.35	0.86	2.45	259	35	6.94	0.09	433
		Clst blk dk gy								
C 5843	2879	0.23	0.44	0.52	1.05	42	50	0.67	0.34	433
		SWC								
C 5846	2885	0.40	2.25	0.53	1.47	153	36	2.65	0.15	434
		SWC								
C 5872	2885	0.20	1.84	1.71	1.72	107	99	2.04	0.10	431
		Clst lt olv gy								
C 5872	2885	0.79	6.83	1.44	2.77	247	52	7.62	0.10	433
		Clst blk dk gy								
C 5872	2885	0.14	0.08	1.65	0.41	20	402	0.22	0.64	446
		Clst gy grn								
C 5873	2889	0.16	0.13	2.09	0.44	30	475	0.29	0.55	331 *
		Clst gy grn								
C 5873	2889	0.32	2.42	2.32	1.83	132	127	2.74	0.12	432
		Clst lt olv gy								
C 5873	2889	0.81	6.18	0.79	2.62	236	30	6.99	0.12	434
		Clst blk dk gy								

* The low Tmax value (331^{o}C) is probably due to a low flat S2 peak.

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IKU SINTEF-GRUPPEN

Visual Kerogen Analysis

Table no.: 4.
Well no.: 15/12-5

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
C-5870	2840-2855	Am: 80% Lm: 5-10% W: 5-10% C: <5%	F-M-(L)	Poor-Fair	2,5 - 3	Organic residue dominated by degraded amorphous matter. The small liptinitic fraction contains mostly terrestrial palynomorphs.
C-5871	2855-2870	Am: >90% Lm: <5% W: <5% C: <5%	F-M-L	Poor	?	Organic residue totally dominated by fine-particulate amorphous matter and dark granular aggregates. The aggregates contain frequent pyrite framboids.
C-5872	2870-2885 Clst. lt. olv. gy	Am: 80-85% Lm: 5-10% W: 5-10% C: <5%	F-M-L	Fair	2.5-3	Mainly as sample C-5870 above.
C-5872	2870-2885 Clst. blk. dk gy	Am: 80% Lm: 5-10% W: 5-10% C: 5%	F-M-L	Fair	2.5-3?	Mainly as sample C-5872 above, but with a slightly higher proportion of woody and coaly material. Microforams recorded

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Table 5:

Semiquantitative data from pyrolysis gas chromatography

AREA
STATOIL 15/12-5

IKU NO	DEPTH (m)	SAMPLE TYPE	C1	C2-C5	C6-C14	C15+
C-5870	2855.00	Cut Clst lt olv gy	695216	1196463	4949633	651465
C-5871	2870.00	Cut Clst blk dk gy	932317	810198	7756713	2690137
C-5872	2885.00	Cut Clst blk dk gy	841703	2506810	7573573	2532992
C-5873	2889.00	Cut Clst blk dk gy	809294	2365808	6623119	1910691
C-5873	2889.00	Cut Clst lt olv gy	620824	1900635	4583342	595184

HEIGHT
STATOIL 15/12-5

IKU NO	DEPTH (m)	SAMPLE TYPE	C1	C2-C5	C6-C14	C15+
C-5870	2855.00	Cut Clst lt olv gy	3891	627031	1050775	91072
C-5871	2870.00	Cut Clst blk dk gy	6247	319405	1627106	322762
C-5872	2885.00	Cut Clst blk dk gy	5503	1527059	1561222	324279
C-5873	2889.00	Cut Clst blk dk gy	5608	1512648	1272212	257393
C-5873	2889.00	Cut Clst lt olv gy	3710	1070860	1072825	92016

PERCENT
STATOIL 15/12-5

IKU NO	DEPTH (m)	SAMPLE TYPE	C1	C2-C5	C6-C14	C15+
C-5870	2855.00	Cut Clst lt olv gy	9.28	15.97	66.06	8.69
C-5871	2870.00	Cut Clst blk dk gy	7.65	6.65	63.62	22.07
C-5872	2885.00	Cut Clst blk dk gy	6.24	18.59	56.17	18.79
C-5873	2889.00	Cut Clst blk dk gy	6.75	19.72	55.20	15.92
C-5873	2889.00	Cut Clst lt olv gy	8.06	24.68	59.52	7.73

TABLE 6.

AMOUNT OF ASPHALTENES AND NSO

IKU No.	Depth (m)	Rock extracted (g)	EOM (mg)	Asphaltenes (mg)	Asphaltenes (%)	NSO (mg)	NSO (%)
C-5836 SWC	2844.00	5.33	20.0	1.4	7.0	4.92	24.6
C-5840 SWC	2860.00	2.82	12.1	0.7	5.8	3.48	28.8
C-5844 SWC	2880.00	7.35	33.2	4.0	12.0	3.60	10.8
C-5847 SWC	2886.30	6.64	15.2	4.0	26.3	2.52	16.6
C-5848 Core	2892.60	106.09	252.4	70.9	28.1	56.40	22.3
C-5849 Core	2911.75	61.63	107.0	30.3	28.3	10.32	9.6
C-5850 Core	2917.50	141.50	927.8	158.9	17.1	104.96	11.3
C-5851 Core	2918.70	141.09	946.2	233.2	24.6	74.97	7.9
C-5852 Core	2921.20	53.52	523.0	101.2	19.3	60.03	11.5
C-5853 Core	2922.25	55.30	735.0	151.9	20.7	69.60	9.5
C-5854 Core	2924.40	48.76	721.0	223.7	31.0	47.70	6.6
C-5855 Core	2926.60	38.98	652.0	181.0	27.8	40.00	6.1
C-5856 Core	2927.55	21.57	467.0	122.9	26.3	39.00	8.4
C-5857 Core	2931.50	21.77	361.0	109.5	30.3	26.52	7.3
C-5858 Core	2935.60	60.23	1010.0	191.7	19.0	113.90	11.3
C-5859 Core	2937.55	27.00	579.0	118.3	20.4	155.30	26.8
C-5860 Core	2940.20	34.39	630.0	147.3	23.4	66.00	10.5
C-5861 Core	2942.55	50.94	1063.0	311.2	29.3	62.80	10.5
C-5862 Core	2943.70	44.95	667.0	208.0	31.2	38.22	5.9
C-5863 Core	2952.65	62.86	48.0	4.1	8.5	3.60	7.5

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T A B L E 7a:

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

MPLC-data

IKU-No	DEPTH (m)	Rock Extr. (g)	EOM (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
C 5836	2844.00 SWC	5.3	20.0	3.8	5.2	9.0	11.0	2.19
C 5840	2860.00 SWC	2.8	12.1	6.5	1.9	8.4	3.7	2.51
C 5844	2880.00 SWC	7.3	33.2	0.7	1.7	2.4	30.8	0.90
C 5847	2886.30 SWC	6.6	15.2	1.1	1.6	2.6	12.6	1.23
C 5848	2892.60 Core	106.1	252.4	39.0	42.6	81.6	170.8	1.63
C 5849	2911.75 Core	61.6	107.0	15.8	15.2	31.1	75.9	1.16
C 5850	2917.50 Core	141.5	927.8	393.6	236.2	629.8	298.0	0.82
C 5851	2918.70 Core	141.1	946.2	382.2	223.4	605.6	340.6	0.86
C 5852	2921.20 Core	53.5	523.0	179.2	100.9	280.1	242.9	0.88
C 5853	2922.25 Core	55.3	735.0	260.4	186.0	446.4	288.6	1.14
C 5854	2924.40 Core	48.8	721.0	272.4	167.5	439.9	281.1	0.96
C 5855	2926.60 Core	39.0	652.0	235.0	162.0	397.0	255.0	1.13
C 5856	2927.55 Core	21.6	467.0	187.2	126.4	313.6	153.4	1.28
C 5857	2931.50 Core	21.8	361.0	114.4	90.0	204.4	156.6	1.12
C 5858	2935.60 Core	60.2	1010.0	436.9	290.7	727.6	282.4	1.04
C 5859	2937.55 Core	27.0	579.0	214.2	150.5	364.8	214.2	1.38
C 5860	2940.20 Core	34.4	630.0	227.0	134.0	361.0	269.0	1.21
C 5861	2942.55 Core	50.9	1063.0	369.0	241.8	610.7	452.3	1.34
C 5862	2943.70 Core	45.0	667.0	238.4	143.8	382.2	284.8	0.89
C 5863	2952.65 Core	62.9	48.0	11.8	3.5	15.2	32.8	0.20

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T A B L E 7b:

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

MPLC-data

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
C 5836	2844.00 SWC	3752	720	968	1689	2064
C 5840	2860.00 SWC	4291	2298	681	2979	1312
C 5844	2880.00 SWC	4517	98	229	327	4190
C 5847	2886.30 SWC	2289	163	235	398	1892
C 5848	2892.60 Core	2379	368	402	769	1610
C 5849	2911.75 Core	1736	257	247	504	1232
C 5850	2917.50 Core	6557	2782	1669	4451	2106
C 5851	2918.70 Core	6706	2709	1584	4293	2414
C 5852	2921.20 Core	9772	3349	1886	5234	4538
C 5853	2922.25 Core	13291	4709	3363	8072	5219
C 5854	2924.40 Core	14787	5587	3435	9022	5765
C 5855	2926.60 Core	16727	6029	4156	10185	6542
C 5856	2927.55 Core	21650	8679	5858	14537	7114
C 5857	2931.50 Core	16582	5255	4132	9387	7195
C 5858	2935.60 Core	16769	7254	4826	12080	4689
C 5859	2937.55 Core	21444	7934	5576	13510	7934
C 5860	2940.20 Core	18319	6601	3896	10497	7822
C 5861	2942.55 Core	20868	7243	4746	11989	8878
C 5862	2943.70 Core	14839	5304	3199	8503	6336
C 5863	2952.65 Core	764	187	55	242	521

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T A B L E 7c:

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

MPLC-data

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
C 5836	2844.00 SWC	171.3	32.9	44.2	77.1	94.2
C 5840	2860.00 SWC	170.9	91.5	27.1	118.7	52.3
C 5844	2880.00 SWC	501.9	10.9	25.4	36.3	465.6
C 5847	2886.30 SWC	186.1	13.2	19.1	32.3	153.8
C 5848	2892.60 Core	146.0	22.6	24.6	47.2	98.8
C 5849	2911.75 Core	149.7	22.2	21.3	43.5	106.2
C 5850	2917.50 Core	799.6	339.2	203.5	542.8	256.9
C 5851	2918.70 Core	779.8	315.0	184.1	499.1	280.7
C 5852	2921.20 Core	1110.5	380.5	214.3	594.8	515.7
C 5853	2922.25 Core	1165.9	413.1	295.0	708.1	457.8
C 5854	2924.40 Core	1540.3	582.0	357.8	939.8	600.5
C 5855	2926.60 Core	1480.2	533.5	367.8	901.3	578.9
C 5856	2927.55 Core	1691.4	678.0	457.7	1135.7	555.7
C 5857	2931.50 Core	1480.6	469.2	369.0	838.1	642.4
C 5858	2935.60 Core	1612.4	697.5	464.1	1161.6	450.8
C 5859	2937.55 Core	1553.9	575.0	404.0	979.0	575.0
C 5860	2940.20 Core	1514.0	545.5	322.0	867.5	646.4
C 5861	2942.55 Core	1557.3	540.5	354.2	894.7	662.6
C 5862	2943.70 Core	1667.3	596.0	359.4	955.4	711.9
C 5863	2952.65 Core	381.8	93.5	27.7	121.2	260.6

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T A B L E 7d:

COMPOSITION OF MATERIAL EXTRACTED FROM THE ROCK

MPLC-data

IKU-No	DEPTH (m)	Sat EOM %	Aro EOM %	HC EOM %	SAT Aro x 100	Non HC EOM %	HC Non HC x 100
C 5836	2844.00 SWC	19.2	25.8	45.0	74.4	55.0	81.8
C 5840	2860.00 SWC	53.6	15.9	69.4	337.5	30.6	227.0
C 5844	2880.00 SWC	2.2	5.1	7.2	42.9	92.8	7.8
C 5847	2886.30 SWC	7.1	10.3	17.4	69.2	82.6	21.0
C 5848	2892.60 Core	15.5	16.9	32.3	91.5	67.7	47.8
C 5849	2911.75 Core	14.8	14.2	29.0	103.9	71.0	40.9
C 5850	2917.50 Core	42.4	25.5	67.9	166.7	32.1	211.3
C 5851	2918.70 Core	40.4	23.6	64.0	171.1	36.0	177.8
C 5852	2921.20 Core	34.3	19.3	53.6	177.6	46.4	115.4
C 5853	2922.25 Core	35.4	25.3	60.7	140.0	39.3	154.7
C 5854	2924.40 Core	37.8	23.2	61.0	162.7	39.0	156.5
C 5855	2926.60 Core	36.0	24.8	60.9	145.1	39.1	155.7
C 5856	2927.55 Core	40.1	27.1	67.1	148.1	32.9	204.4
C 5857	2931.50 Core	31.7	24.9	56.6	127.2	43.4	130.5
C 5858	2935.60 Core	43.3	28.8	72.0	150.3	28.0	257.6
C 5859	2937.55 Core	37.0	26.0	63.0	142.3	37.0	170.3
C 5860	2940.20 Core	36.0	21.3	57.3	169.4	42.7	134.2
C 5861	2942.55 Core	34.7	22.7	57.5	152.6	42.5	135.0
C 5862	2943.70 Core	35.7	21.6	57.3	165.8	42.7	134.2
C 5863	2952.65 Core	24.5	7.3	31.8	337.9	68.3	46.5

Project no.: 22.1850.00
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T A B L E 8a:

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

Iatroscan-data

IKU-No	DEPTH (m)	Rock Extr. (g)	EOM (mg)	Sat. (mg)	Aro. (mg)	RES 1 (mg)	RES 2 (mg)	TOC (%)
C 5836	2844	0.83	3.10	0.20	0.55	1.73	0.62	2.19
C 5840	2860	0.40	1.70	0.14	0.26	0.92	0.39	2.51
C 5844	2880	0.31	1.40	0.04	0.14	0.60	0.61	0.90
C 5847	2886.30	1.27	2.90	0.08	0.36	1.31	1.15	1.23
C 5848	2892.60	8.86	21.10	2.40	2.98	13.81	1.91	1.63
C 5849	2911.75	12.04	20.90	2.75	3.09	10.86	4.19	1.16
C 5850	2917.50	0.37	2.40	1.14	0.49	0.50	0.27	0.82
C 5851	2918.70	0.75	5.00	2.33	1.07	0.98	0.62	0.86
C 5852	2921.20	1.19	11.70	5.26	2.58	1.96	1.87	0.88
C 5853	2922.25	0.50	6.70	2.98	1.60	0.91	1.20	1.14
C 5854	2924.40	0.50	7.40	3.37	1.65	0.92	1.39	0.96
C 5855	2926.60	0.38	6.40	2.89	1.26	0.95	1.30	1.13
C 5856	2927.55	0.41	8.80	3.64	1.98	1.41	1.75	1.28
C 5857	2931.50	0.41	6.80	3.09	1.22	1.01	1.47	1.12
C 5858	2935.60	0.64	10.80	4.72	2.45	1.68	1.94	1.04
C 5859	2937.55	0.37	7.90	3.33	1.61	2.40	1.75	1.38
C 5860	2940.20	0.42	6.20	2.58	1.30	0.94	1.39	1.21
C 5861	2942.55	0.31	6.40	2.28	1.28	0.93	1.91	1.34
C 5862	2943.70	0.38	5.60	2.15	1.04	0.79	1.62	0.89
C 5863	2952.65	47.84	14.10	5.98	3.57	1.52	2.99	0.20

Project no.: 22.1850.00
Well ident.: 15/12-5
DATE : 3 - 2 - 87.

T A B L E 8b:

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

Iatroscan-data

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	RES 1	RES 2
C 5836	2844	3735	241	663	2084	747
C 5840	2860	4250	350	650	2300	975
C 5844	2880	4516	129	452	1935	1968
C 5847	2886.30	2283	63	283	1031	906
C 5848	2892.60	2381	271	336	1559	216
C 5849	2911.75	1736	228	257	902	348
C 5850	2917.50	6486	3081	1324	1351	730
C 5851	2918.70	6667	3107	1427	1307	827
C 5852	2921.20	9832	4420	2168	1647	1571
C 5853	2922.25	13400	5960	3200	1820	2400
C 5854	2924.40	14800	6740	3300	1840	2780
C 5855	2926.60	16842	7605	3316	2500	3421
C 5856	2927.55	21463	8878	4829	3439	4268
C 5857	2931.50	16585	7537	2976	2463	3585
C 5858	2935.60	16875	7375	3828	2625	3031
C 5859	2937.55	21351	9000	4351	6486	4730
C 5860	2940.20	14762	6143	3095	2238	3310
C 5861	2942.55	20645	7355	4129	3000	6161
C 5862	2943.70	14737	5658	2737	2079	4263
C 5863	2952.65	295	125	75	32	63

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Well ident.: 15/12-5
DATE : 3 - 2 - 87.

T A B L E 8c:

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

Iatroscan-data

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	RES 1	RES 2
C 5836	2844	170.5	11.00	30.26	95.18	34.11
C 5840	2860	169.3	13.94	25.90	91.63	38.84
C 5844	2880	501.8	14.34	50.18	215.05	218.64
C 5847	2886.30	185.6	5.12	23.05	83.86	73.62
C 5848	2892.60	146.1	16.62	20.63	95.63	13.23
C 5849	2911.75	149.6	19.69	22.12	77.76	30.00
C 5850	2917.50	791.0	375.74	161.50	164.80	88.99
C 5851	2918.70	775.2	361.24	165.89	151.94	96.12
C 5852	2921.20	1117.3	502.29	246.37	187.17	178.57
C 5853	2922.25	1175.4	522.81	280.70	159.65	210.53
C 5854	2924.40	1541.7	702.08	343.75	191.67	289.58
C 5855	2926.60	1490.5	673.03	293.43	221.24	302.75
C 5856	2927.55	1676.8	693.60	377.29	268.67	333.46
C 5857	2931.50	1480.8	672.91	265.68	219.95	320.12
C 5858	2935.60	1622.6	709.13	368.09	252.40	291.47
C 5859	2937.55	1547.2	652.17	315.32	470.04	342.73
C 5860	2940.20	1220.0	507.67	255.80	184.97	273.51
C 5861	2942.55	1540.7	548.87	308.14	223.88	459.80
C 5862	2943.70	1655.8	635.72	307.51	233.59	479.01
C 5863	2952.65	147.4	62.50	37.31	15.89	31.25

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Well ident.: 15/12-5
DATE : 3 - 2 - 87.

T A B L E 8d:

COMPOSITION OF MATERIAL EXTRACTED FROM THE ROCK

Iatroscan-data

IKU-No	DEPTH (m)	Sat EOM %	Aro EOM %	RES 1 EOM %	SAT / Aro x 100	RES 2 EOM %	RES 1 / RES 2 x 100
C 5836	2844	6.45	17.74	55.81	36.36	20.00	279.03
C 5840	2860	8.24	15.29	54.12	53.85	22.94	235.90
C 5844	2880	2.86	10.00	42.86	28.57	43.57	98.36
C 5847	2886.30	2.76	12.41	45.17	22.22	39.66	113.91
C 5848	2892.60	11.37	14.12	65.45	80.54	9.05	723.04
C 5849	2911.75	13.16	14.78	51.96	89.00	20.05	259.19
C 5850	2917.50	47.50	20.42	20.83	232.65	11.25	185.19
C 5851	2918.70	46.60	21.40	19.60	217.76	12.40	158.06
C 5852	2921.20	44.96	22.05	16.75	203.88	15.98	104.84
C 5853	2922.25	44.48	23.88	13.58	186.25	17.91	75.83
C 5854	2924.40	45.54	22.30	12.43	204.24	18.78	66.19
C 5855	2926.60	45.16	19.69	14.84	229.37	20.31	73.08
C 5856	2927.55	41.36	22.50	16.02	183.84	19.89	80.57
C 5857	2931.50	45.44	17.94	14.85	253.28	21.62	68.71
C 5858	2935.60	43.70	22.69	15.56	192.65	17.96	86.60
C 5859	2937.55	42.15	20.38	30.38	206.83	22.15	137.14
C 5860	2940.20	41.61	20.97	15.16	198.46	22.42	67.63
C 5861	2942.55	35.62	20.00	14.53	178.12	29.84	48.69
C 5862	2943.70	38.39	18.57	14.11	206.73	28.93	48.77
C 5863	2952.65	42.41	25.32	10.78	167.51	21.21	50.84

TABLE 9:

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

IKU No.	DEPTH (m)	PRISTANE / PHYTANE	A = PRISTANE / n-C17	B = PHYTANE / n-C18	A / B	n-C17 / n-C27	CPI
C 5836	2844 SWC	2.4	2.3	1.2	1.9	2.4	1.1
C 5840	2860 SWC	2.5	1.8	0.9	2.0	1.7	1.1
C 5844	2880 SWC	3.1	2.1	0.8	2.7	0.9	1.1
C 5847	2886.30 SWC	3.3	2.5	0.8	3.0	0.6	1.1
C 5848	2892.60 Core	3.0	1.5	0.9	1.8	2.5	1.3
C 5849	2911.75 Core	3.5	1.1	0.8	1.3	14.5	1.4
C 5850	2917.50 Core	1.5	0.7	0.6	1.3	3.5	1.0
C 5851	2918.70 Core	1.2	0.8	0.7	1.2	2.4	1.0
C 5852	2921.20 Core	1.4	0.7	0.6	1.3	5.9	1.1
C 5853	2922.25 Core	1.2	0.7	0.6	1.2	2.4	1.1
C 5854	2924.40 Core	1.4	0.8	0.6	1.3	2.2	1.0
C 5855	2926.60 Core	1.2	0.8	0.7	1.2	2.7	1.0
C 5856	2927.55 Core	1.4	0.7	0.6	1.3	2.6	1.1
C 5857	2931.50 Core	1.4	0.7	0.6	1.3	2.5	1.0
C 5858	2935.60 Core	1.4	0.7	0.5	1.3	3.0	1.0
C 5859	2937.55 Core	1.3	0.7	0.6	1.2	2.3	1.0
C 5860	2940.20 Core	1.3	0.8	0.6	1.3	2.4	1.1
C 5861	2942.55 Core	1.3	0.8	0.6	1.2	2.5	1.0
C 5862	2943.70 Core	1.3	0.8	0.6	1.3	1.7	1.0
C 5863	2952.65 Core	3.0	1.0	0.9	1.2	6.4	1.0

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TABLE 10:

AROMATIC HYDROCARBON RATIOS.

IKU No.	Depth (m)	MNR	DMNR	MPI 1	MPI 2
C-5836 SWC	2844.00	0.96	2.0	0.65	0.51
C-5840 SWC	2860.00	0.87	1.9	0.63	0.53
C-5844 SWC	2880.00	0.72	1.9	0.59	0.54
C-5848 Core	2892.60	1.16	2.3	0.58	0.55
C-5849 Core	2911.75	1.19	2.4	0.54*	0.48*
C-5852 Core	2921.20	1.12	2.0	0.65	0.67
C-5855 Core	2926.60	1.08	2.1	0.82	0.80
C-5858 Core	2935.60	0.98	2.0	0.85	0.83
C-5861 Core	2942.55	0.91	1.8	0.82	0.84
C-5863 Core	2952.65	1.00	2.4	0.60*	0.55*

* Erroneous ratio,because of small elution pattern.

MNR = methylnaphthalene ratio 2-MN/1-MN
DMNR = dimethylnaphthalene ratio 2,6-DMN+2,7-DMN/1,5-DMN
MPI 1 = methylphenanthrene index 1 1.5*(3-MP+2-MP)/(P+9-MP+1-MP)
MPI 2 = methylphenanthrene index 2 3*(2-MP/(P+9-MP+1-MP)

Table 11a: Isotope data.

IKU no.	Depth (m)	Extract	SAT	ARO	NSO	Asphaltenes
C-5836 swc	2844.00	-29.5	-29.4*	-29.6	-29.2	-28.7
C-5840 swc	2860.00	-28.5	-28.3*	-28.6	-28.3	-28.1
C-5844 swc	2880.00	-28.8	-28.2*	-28.7	-28.6	-28.5
C-5848 Core	2892.60	-28.7	-27.4*	-28.2	-29.1	-28.2
C-5849 Core	2911.75	-28.6	-29.4	-27.9	-28.3	-28.0
C-5852 Core	2921.20	-28.8	-29.1	-28.3	-28.7	-28.9
C-5855 Core	2926.60	-28.8	-29.1	-28.3	-28.2	-28.9
C-5858 Core	2935.60	-28.7	-29.1	-28.2	-28.3	-29.0
C-5861 Core	2942.55	-28.7	-29.1	-28.2	-28.5	-28.9
C-5863 Core	2952.65	-28.7	-29.3	-27.8	-28.6	-28.4

* The value could be too heavy because of a small sample amount.

Table 11b: Isotope data of kerogen concentrates.

IKU no.	Depth (m)	Kerogen concentrates
C-5870 Clst.lt.olv.gy	2840-2855	-26.0
C-5871 Clst.blk.dk.gy.	2855-2870	-27.3
C-5872 Clst.blk.dk.gy.	2870-2885	-27.9
C-5872 Clst.lt.olv.gy.	2870-2885	*

* Too little sample material (kerogen concentrate).

Table 12: Molecular ratios from sterane and terpane mass chromatograms. Maturity ratios.

IKU code	Depth (m)	αβ/αβ+βα[1)]	%22S[2)]	%ββ[3)]	%20S[4)]
C-5836 swc	2844.00	0.85	63.6	55.8	39.6
C-5840 swc	2860.00	0.80	62.0	55.5	37.8
C-5844 swc	2880.00	0.85	57.8	51.5	42.0
C-5848 Core	2892.60	0.86	63.5	57.8	38.9
C-5849 Core	2911.75	0.82	55.4	68.5	37.0
C-5852 Core	2921.20	0.92	65.9	76.1	55.1
C-5855 Core	2926.60	-	58.8	77.3	41.3
C-5858 Core	2935.60	0.92	58.5	73.5	43.2
C-5861 core	2942.55	-	59.9	75.5	47.2
C-5863 Core	2952.65	0.92	59.9	67.6	41.7

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

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Table 13: Molecular ratios from terpane and sterane mass chromatograms. Maturity and source characteristic ratios.

IKU no.	Depth (m)	Q/E[1]	Tm/Ts[2]	X/E[3]	Z/E[4]	a/a+j[5]
C-5836 swc	2844.00	0.06	5.40	0.07	-	0.74
C-5840 swc	2860.00	0.09	-	-	-	0.75
C-5844 swc	2880.00	0.07	7.40	0.04	-	0.75
C-5848 Core	2892.60	0.05	3.47	0.07	0.04	0.77
C-5849 Core	2911.75	0.08	-	0.08	-	0.75
C-5852 Core	2921.20	0.11	-	-	-	0.85
C-5855 Core	2926.60	0.09	0.50	-	-	0.82
C-5858 Core	2935.60	0.08	0.63	0.06	-	0.83
C-5861 Core	2942.55	0.09	0.55	-	-	0.84
C-5863 Core	2952.65	0.08	1.06	-	-	0.76

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

Table 14a:

Peak heights and areas from
m/z 191 mass chromatograms

Sample identity: C-5836, 2844.00 m (swc)

Peak heights and peak areas from m/z 191.

	m/z 191	
Peak identities	Peak heights	Peak areas
A	7.8	12.5
B	90.1	388.9
C	187.4	1116.2
X	15.2	33.1
D	23.7	86.5
E	285.4	1522.5
F	42.8	187.7
G	103.9	578.5
H	68.1	377.7
I	20.8	73.0
J_1	43.8	226.9
J_2	30.5	121.8
K_1	30.8	161.0
K_2	14.0	85.2
P	50.2	247.8
Q	18.4	83.5
R	14.4	110.7
S	21.3	98.6
T	5.1	27.5

Sample identity: C-5840, 2860.00 m (swc)

Peak heights and peak areas from m/z 191.

	m/z 191	
Peak identities	Peak heights	Peak areas
B	32.6	123.3
C	61.6	357.0
E	88.8	440.6
F	20.1	66.4
G	40.3	189.9
H	27.3	110.6
I	8.9	19.2
J_1	13.3	65.3
J_2	6.5	30.1
P	24.9	105.2
Q	10.1	36.4
R	5.9	35.0
S	11.7	51.2

Sample identity: C-5844, 2880.00 m (swc)

Peak heights and peak areas from m/z 191.

	m/z 191	
Peak identities	Peak heights	Peak areas
A	30.1	104.8
B	302.8	1354.1
C	465.7	3139.0
D	66.3	300.5
E	725.1	4092.9
F	124.0	567.3
G	278.8	1704.3
H	185.0	1090.1
I	52.1	289.8
J_1	108.3	756.5
J_2	82.9	512.4
K_1	56.7	357.4
K_2	30.8	134.0
L_1	19.2	114.6
L_2	12.0	62.7
P	122.6	573.9
Q	49.9	233.2
R	31.5	236.7
S	67.5	318.4
T	12.2	78.5

Sample identity: C-5848, 2892.60 m (Core)

Peak heights and peak areas from m/z 191.

Peak identities	m/z 191 Peak heights	Peak areas
A	44.5	151.0
B	210.1	911.1
Z	14.3	46.1
C	390.2	2725.9
X	37.0	105.8
D	53.1	193.4
E	752.5	4150.1
F	125.4	599.0
G	274.1	1748.6
H	197.4	1089.8
I	59.6	356.6
J_1	128.1	794.0
J_2	75.3	493.4
K_1	64.2	234.2
K_2	28.7	218.9
L_1	33.5	204.3
L_2	12.0	51.7
P	87.8	406.2
Q	30.6	142.1
R	19.6	145.3
S	39.8	164.4
T	7.9	54.4

Sample identity: C-5849, 2911.75 m (Core)

Peak heights and peak areas from m/z 191.

	m/z 191	
Peak identities	Peak heights	Peak areas
B	79.7	337.2
C	111.2	576.6
D	18.6	66.9
E	156.9	763.9
F	34.7	154.9
G	62.7	335.0
H	53.9	228.4
I	12.5	69.2
J_1	21.0	119.0
J_2	14.1	55.0
P	26.9	130.3
Q	10.0	36.3
R	7.1	49.5
S	11.9	58.6

Sample identity: C-5852, 2921.20 m (Core)

Peak heights and peak areas from m/z 191.

Peak identities	m/z 191 Peak heights	Peak areas
A	9.5	28.1
C	45.9	302.4
E	96.8	550.3
G	37.6	183.9
H	21.0	110.2
J_1	25.8	146.3
J_2	16.2	62.4
K_1	19.9	62.7
K_2	7.1	10.2
P	14.1	53.0
Q	10.8	48.6
R	5.7	25.3
S	7.6	25.2

Sample identity: C-5855, 2926.60 m (Core)

Peak heights and peak areas from m/z 191.

	m/z 191	
Peak identities	Peak heights	Peak areas
A	26.5	96.9
B	12.9	26.3
C	86.2	655.3
E	210.2	1198.1
G	72.1	377.6
H	45.4	258.3
J_1	46.0	270.1
J_2	25.2	124.6
K_1	30.6	156.4
K_2	18.6	103.7
L_1	12.5	38.1
L_2	8.7	33.2
P	27.3	118.8
Q	19.2	91.3
R	10.9	62.7
S	15.8	53.3

Sample identity: C-5858, 2935.60 m (Core)

Peak heights and peak areas from m/z 191.

Peak identities	m/z 191 Peak heights	Peak areas
A	65.1	256.4
B	34.4	146.5
C	165.3	1334.0
E	359.9	2147.5
F	19.5	63.9
G	112.8	695.8
H	77.2	399.4
J_1	72.5	448.7
J_2	46.6	279.0
K_1	35.2	227.0
K_2	26.7	133.5
P	37.2	160.5
Q	29.4	130.5
R	14.2	92.4
S	23.5	99.8
T	9.9	61.6

Sample identity: C-5861, 2942.55 m (Core)

Peak heights and peak areas from m/z 191.

	m/z 191	
Peak identities	Peak heights	Peak areas
A	25.3	92.6
B	12.7	40.0
C	70.6	536.4
E	181.0	374.6
G	55.8	317.4
H	35.7	177.5
J_1	33.3	232.2
J_2	22.3	110.8
K_1	16.1	102.5
K_2	10.3	25.9
P	18.2	71.5
Q	17.9	80.3
R	7.5	26.3
S	8.4	34.3

Sample identity: C-5863, 2952.65 m (Core)

Peak heights and peak areas from m/z 191.

	m/z 191	
Peak identities	Peak heights	Peak areas
A	17.8	69.8
B	18.2	80.9
C	73.1	459.6
E	126.7	681.6
F	9.4	35.6
G	33.1	160.2
H	26.7	118.0
J_1	14.9	65.3
J_2	11.0	31.3
P	23.0	103.7
Q	11.3	50.7
R	6.5	46.4
S	8.2	34.1

Table 14b:

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

Sample identity: C-5836, 2844.00 m (swc)

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

	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	92.8	492.6		
b	55.2	246.7		
c	19.2	83.0		
f	22.1	272.9		
g	27.0	255.1		
h	141.3	889.3	36.3	235.6
i	-	-	16.5	98.6
j	33.0	161.2		
k	72.7	465.5		
n	30.6	224.4	15.5	88.9
o	12.9	79.8	12.0	79.0
p	14.9	94.8		
q	36.4	197.9		
r	30.4	174.0	28.0	129.1
s	15.9	57.9	18.7	139.1
t	48.1	321.4		
u	36.8	222.3		
v	12.9	58.7		

Sample identity: C-5840, 2860.00 m (swc)

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

	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	31.2	150.7		
b	16.6	81.1		
c	6.6	31.1		
f	8.9	89.5		
g	10.3	75.1		
h	44.8	272.8	12.3	63.8
i	-	-	4.3	27.6
j	10.5	55.5		
k	17.8	123.2		
n	8.4	66.5	4.0	25.3
o	4.2	26.2	4.1	21.5
p	3.5	19.7		
q	10.1	49.8		
r	9.7	44.3	8.0	35.2
s	4.6	20.9	5.0	23.9
t	16.8	105.9		
u	15.1	85.5		
v	5.4	25.4		

Sample identity: C-5844, 2880.00 m (swc)

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

	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	182.2	904.4		
b	109.1	496.4		
c	37.9	161.9		
f	38.3	502.5		
g	45.9	354.4		
h	284.0	1839.8	63.8	453.8
i	-	-	42.0	229.5
j	59.8	288.9		
k	111.8	847.5		
n	42.0	445.6	27.0	197.0
o	31.8	185.4	27.1	156.6
p	18.4	112.2		
q	59.2	302.4		
r	41.0	261.2	37.5	187.6
s	26.0	138.9	31.6	242.2
t	90.7	563.5		
u	95.7	512.9		
v	26.7	133.5		

Sample identity: C-5848, 2892.60 m (Core)

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

	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	254.9	1325.8		
b	159.6	715.9		
c	46.5	195.5		
f	56.1	726.7		
g	72.5	628.5		
h	308.3	1836.4	72.7	485.0
i	-	-	43.7	242.8
j	73.8	419.5		
k	170.5	1106.6		
n	62.3	592.6	34.5	215.3
o	42.8	296.1	36.6	188.0
p	38.4	205.9		
q	66.9	426.5		
r	62.0	370.1	49.0	257.3
s	44.9	203.8	41.9	306.9
t	111.3	696.6		
u	64.3	353.7		
v	22.8	128.3		

Sample identity: C-5849, 2911.75 m (Core)

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

	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	16.2	82.5		
b	10.9	48.9		
c	4.2	13.6		
f	4.3	48.5		
g	5.4	48.4		
h	22.0	140.1	7.0	44.2
i	-	-	3.8	25.1
j	5.7	20.7		
k	9.5	78.4		
n	4.3	39.5	3.5	16.0
o	2.5	13.5	2.5	10.4
p	2.2	8.9		
q	4.7	27.4		
r	7.7	50.7	4.4	24.7
s	4.2	17.7	3.4	22.4
t	7.7	51.9		
u	11.0	73.7		
v	3.9	16.8		

Sample identity: C-5852, 2921.20 m (Core)

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

	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	43.1	224.6		
b	23.4	124.6		
c	5.7	21.1		
f	10.3	123.6		
g	8.8	75.9		
h	45.4	280.2	19.7	128.6
i	-	-	17.7	98.4
j	8.0	38.2		
k	18.4	136.9		
n	17.0	138.3	11.6	70.0
o	17.9	97.9	15.4	72.6
p	4.4	26.3		
q	6.7	55.1		
r	16.6	103.6	12.9	67.3
s	15.8	97.0	12.8	91.7
t	10.8	78.7		
u	19.4	108.0		
v	11.4	63.2		

Sample identity: C-5855, 2926.60 m (Core)

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

	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	60.2	309.3		
b	33.0	174.0		
c	7.4	30.4		
f	16.0	147.8		
g	12.6	123.5		
h	64.5	394.1	29.9	159.7
i	-	-	25.1	133.0
j	13.5	57.6		
k	27.1	208.2		
n	24.6	185.7	20.9	122.8
o	20.3	148.3	20.3	126.9
p	6.2	27.5		
q	9.5	64.2		
r	22.7	143.0	18.7	96.6
s	17.9	117.4	18.1	128.8
t	13.8	116.0		
u	41.5	214.7		
v	22.7	108.9		

Sample identity: C-5858, 2935.60 m (Core)

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

	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	72.3	366.0		
b	39.5	204.9		
c	9.4	33.3		
f	18.6	183.7		
g	16.7	143.1		
h	69.8	458.7	35.8	222.5
i	-	-	30.0	186.3
j	15.9	82.4		
k	32.9	298.8		
n	33.7	212.4	28.7	154.2
o	29.1	170.9	27.7	164.2
p	9.5	50.7		
q	16.8	126.5		
r	30.1	186.3	24.7	140.4
s	26.8	183.3	25.5	178.9
t	19.6	145.9		
u	46.7	262.1		
v	23.9	121.4		

Sample identity: C-5861, 2942.55 m (Core)

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

	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	35.6	180.1		
b	21.6	107.5		
c	5.0	21.9		
f	9.5	111.1		
g	8.8	85.5		
h	41.1	245.9	17.9	117.8
i	-	-	16.0	93.7
j	5.6	32.6		
k	17.6	119.1		
n	17.1	96.6	13.2	79.5
o	17.1	83.3	14.4	86.2
p	4.1	20.4		
q	8.5	61.5		
r	14.7	84.1	13.9	65.9
s	12.8	85.5	14.8	98.5
t	9.1	65.5		
u	24.6	144.0		
v	12.6	55.7		

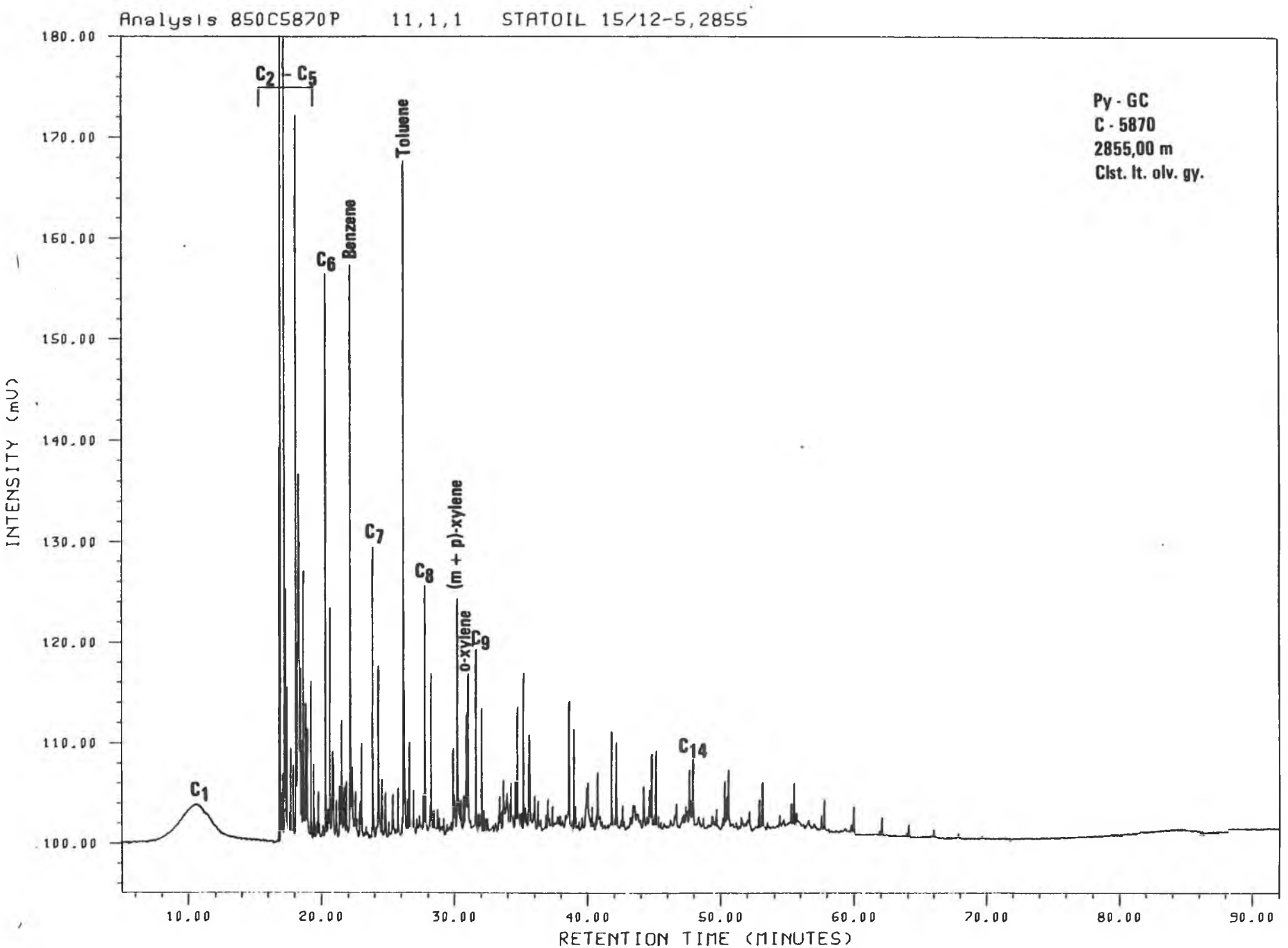
Sample identity: C-5863, 2962.65 m (Core)

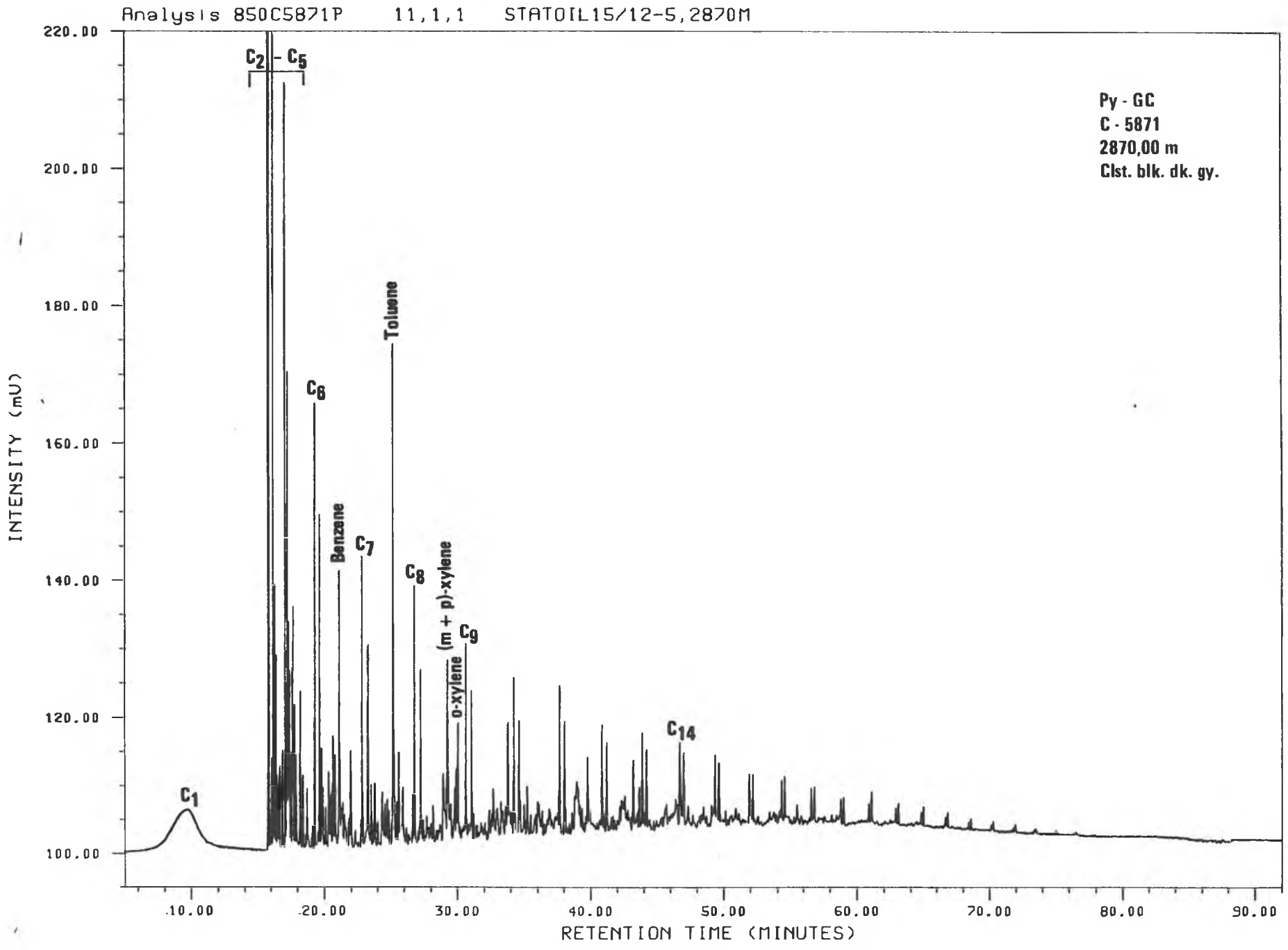
Peak heights and peak areas from m/z 217 and 218 mass chromatograms.

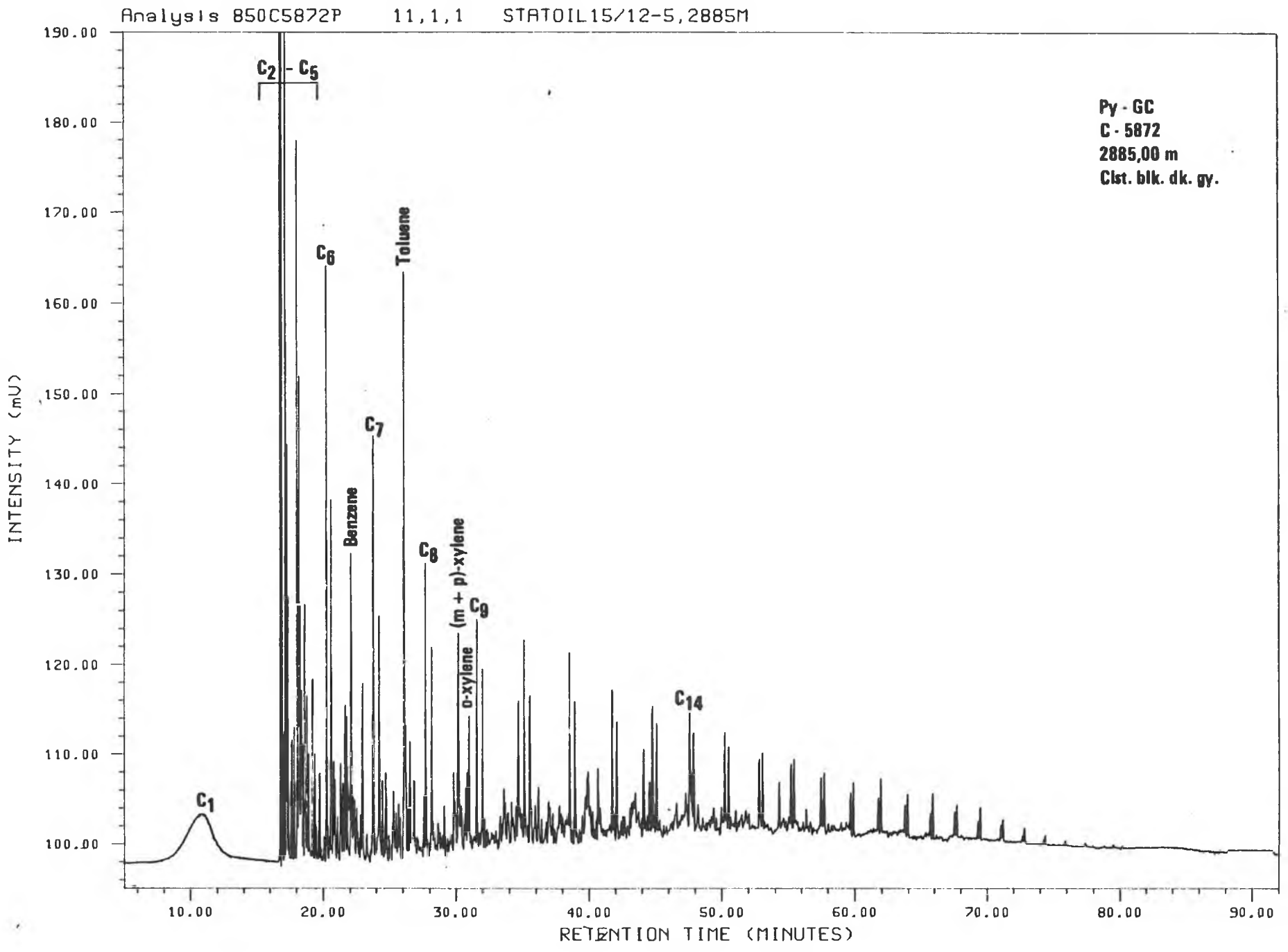
	m/z 217		m/z 218	
Peak identities	Peak heights	Peak areas	Peak heights	Peak areas
a	14.9	66.5		
b	8.7	41.4		
c	1.1	4.6		
f	4.3	43.5		
g	4.1	23.3		
h	18.7	115.1	9.0	57.1
i	-	-	7.1	37.4
j	4.9	15.5		
k	8.1	50.5		
n	7.8	53.6	6.0	34.2
o	7.3	42.4	4.8	27.2
p	2.3	9.1		
q	4.2	19.2		
r	4.4	25.1	4.7	22.8
s	4.1	25.1	4.0	30.2
t	5.2	28.4		
u	13.4	63.5		
v	5.7	30.6		

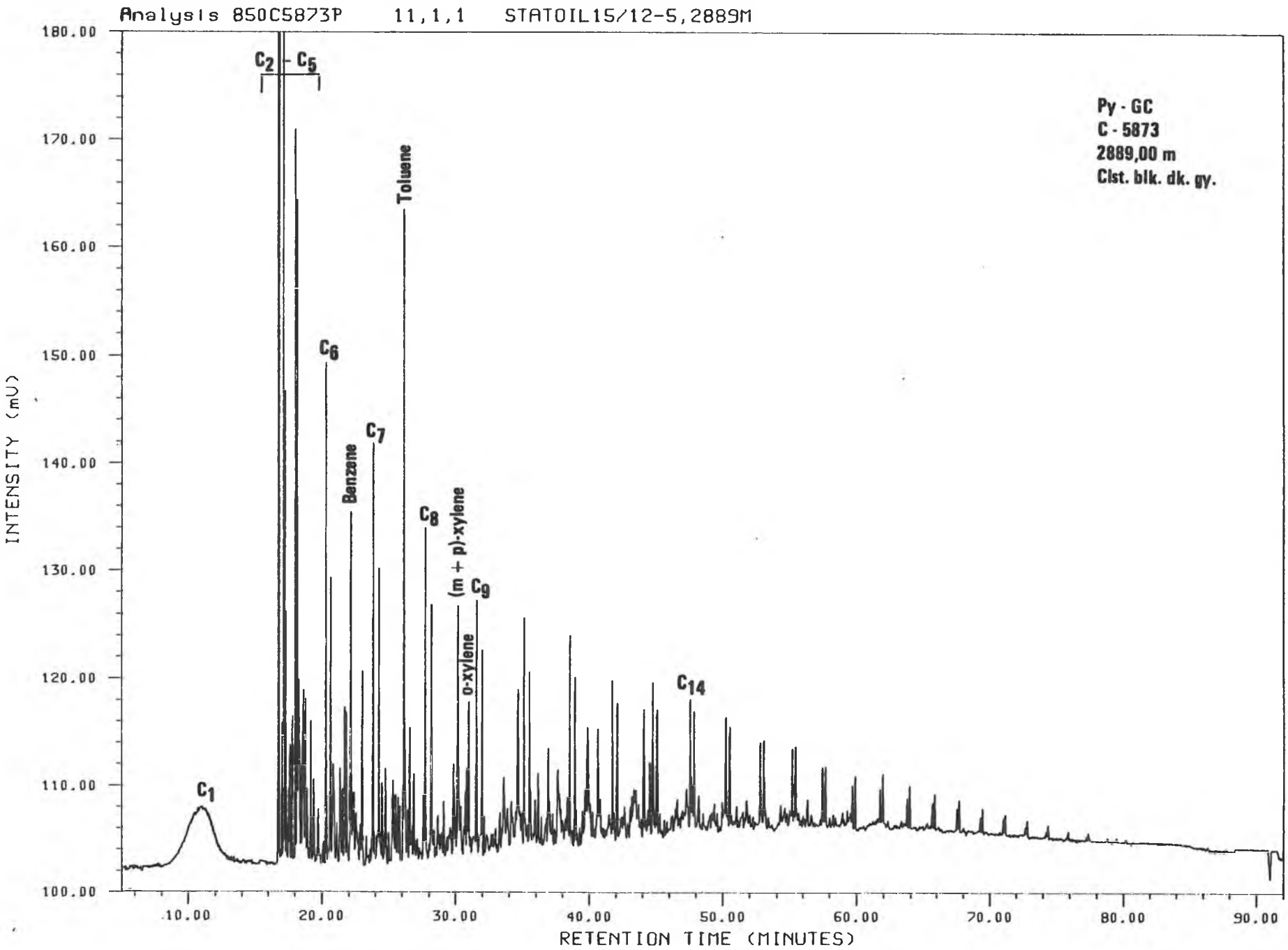
FIGURE 1

PYROLYSIS GAS CHROMATOGRAMS


Analysis 850C5870P 11,1,1 STATOIL 15/12-5,2855
Py - GC
C - 5870
2855,00 m
Clst. lt. olv. gy.
C2 - C5
C6
Benzene
Toluene
C7
C8
(m + p)-xylene
o-xylene
C9
C14
C1
INTENSITY (mU)
RETENTION TIME (MINUTES)
180.00
170.00
160.00
150.00
140.00
130.00
120.00
110.00
100.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00


Analysis 850C5871P 11,1,1 STATOIL15/12-5,2870M
Py - GC
C - 5871
2870,00 m
Clst. blk. dk. gy.
INTENSITY (mU)
220.00
200.00
180.00
160.00
140.00
120.00
100.00
C2 - C5
C6
Benzene
C7
Toluene
C8
(m + p)-xylene
o-xylene
C9
C14
C1
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
RETENTION TIME (MINUTES)


Analysis 850C5872P 11,1,1 STATOIL15/12-5,2885M
Py - GC
C - 5872
2885,00 m
Clst. blk. dk. gy.
C2 - C5
C6
Toluene
C7
Benzene
C8
(m + p)-xylene
o-xylene
C9
C14
C1
INTENSITY (mU)
RETENTION TIME (MINUTES)
190.00
180.00
170.00
160.00
150.00
140.00
130.00
120.00
110.00
100.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00


Analysis 850C5873P 11,1,1 STATOIL15/12-5,2889M
Py - GC
C - 5873
2889,00 m
Clst. blk. dk. gy.
C2 - C5
C6
Benzene
C7
Toluene
C8
(m + p)-xylene
o-xylene
C9
C14
C1
INTENSITY (mV)
RETENTION TIME (MINUTES)
180.00
170.00
160.00
150.00
140.00
130.00
120.00
110.00
100.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00

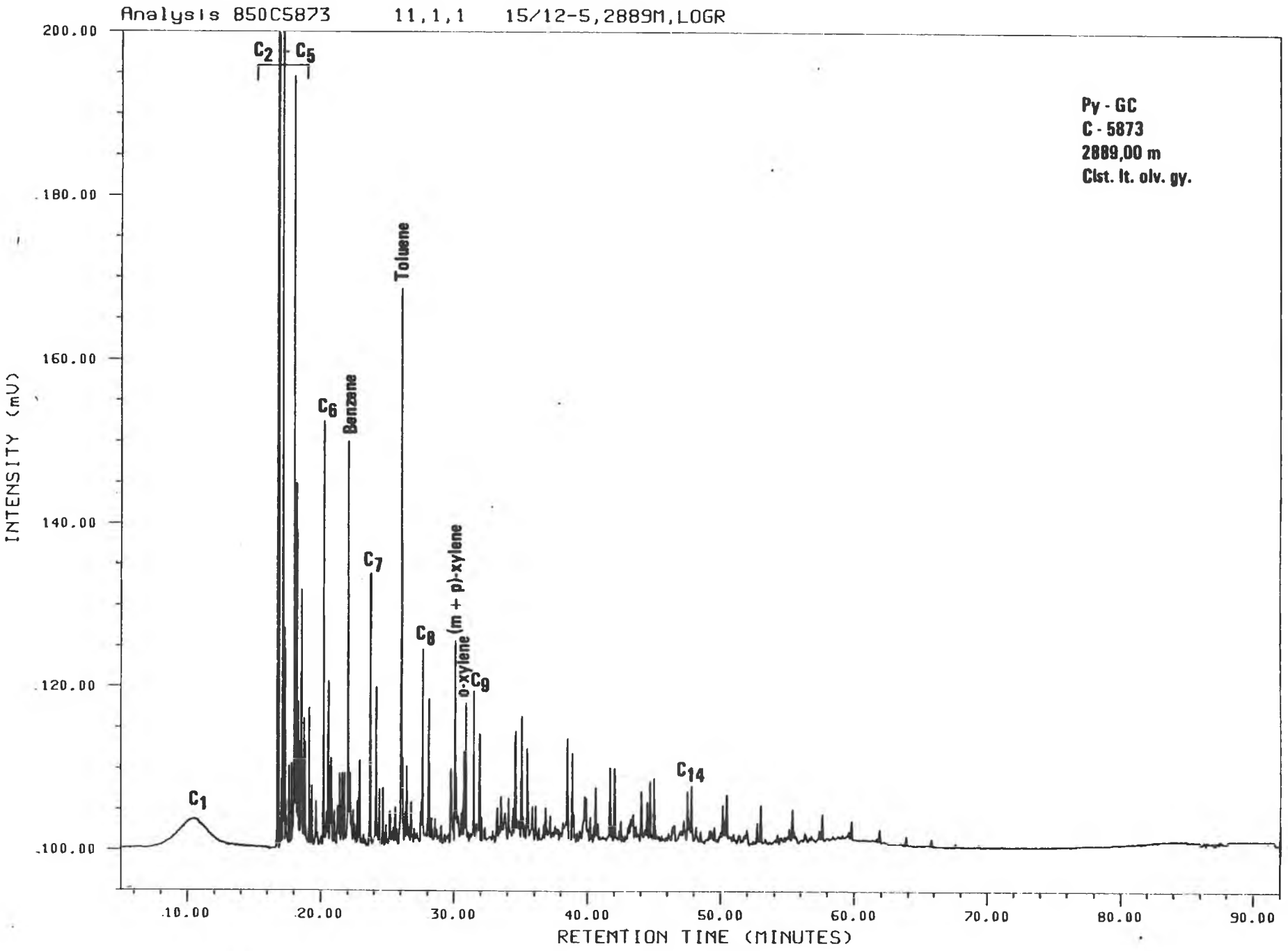
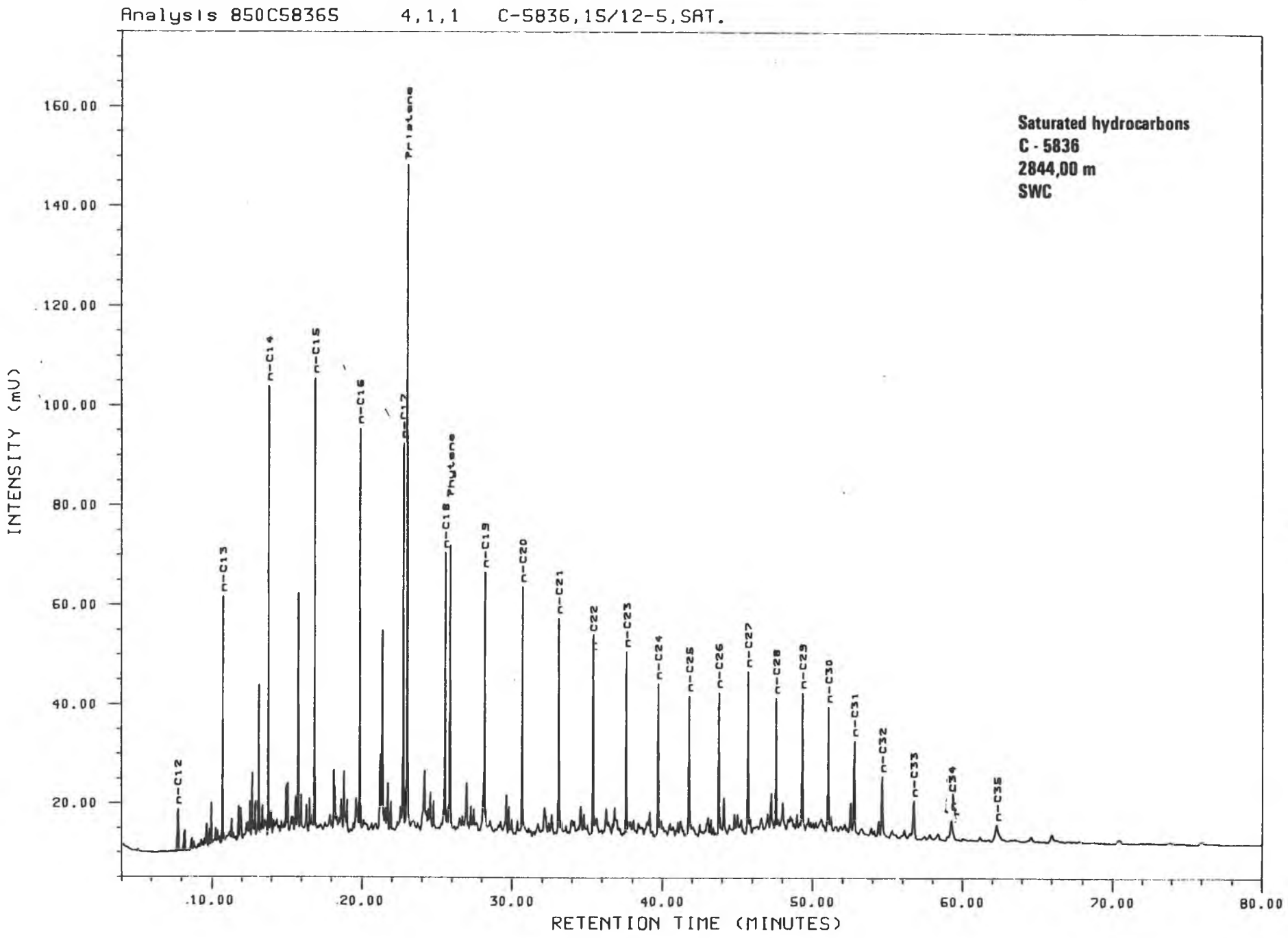
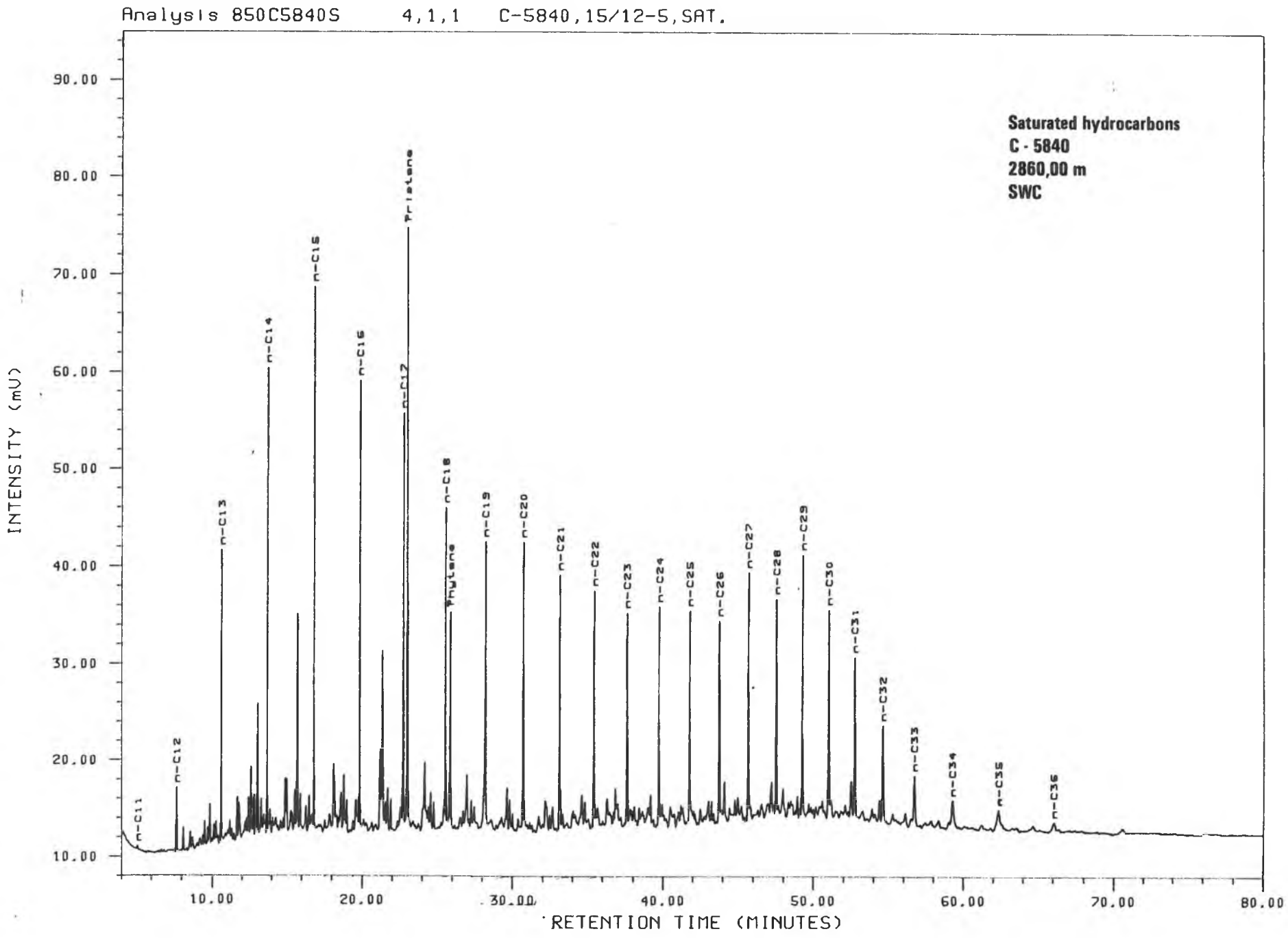

Analysis 850C5873 11,1,1 15/12-5,2889M,LOGR
Py - GC
C - 5873
2889,00 m
Clst. lt. olv. gy.
INTENSITY (mV)
RETENTION TIME (MINUTES)
C1
C2 - C5
C6
Benzene
C7
Toluene
C8
(m + p)-xylene
o-xylene
C9
C14

FIGURE 2

SATURATED HYDROCARBON GAS CHROMATOGRAMS

$n\text{-}C_{15}$ etc. - n-alkanes
Pr - pristane
Ph - phytane
* - other acyclic isoprenoids


Analysis 850C5836S 4,1,1 C-5836,15/12-5,SAT.
Saturated hydrocarbons
C - 5836
2844,00 m
SWC
INTENSITY (mU)
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
RETENTION TIME (MINUTES)


Analysis 850C5840S 4,1,1 C-5840,15/12-5,SAT.
Saturated hydrocarbons
C - 5840
2860,00 m
SWC
INTENSITY (mV)
RETENTION TIME (MINUTES)
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
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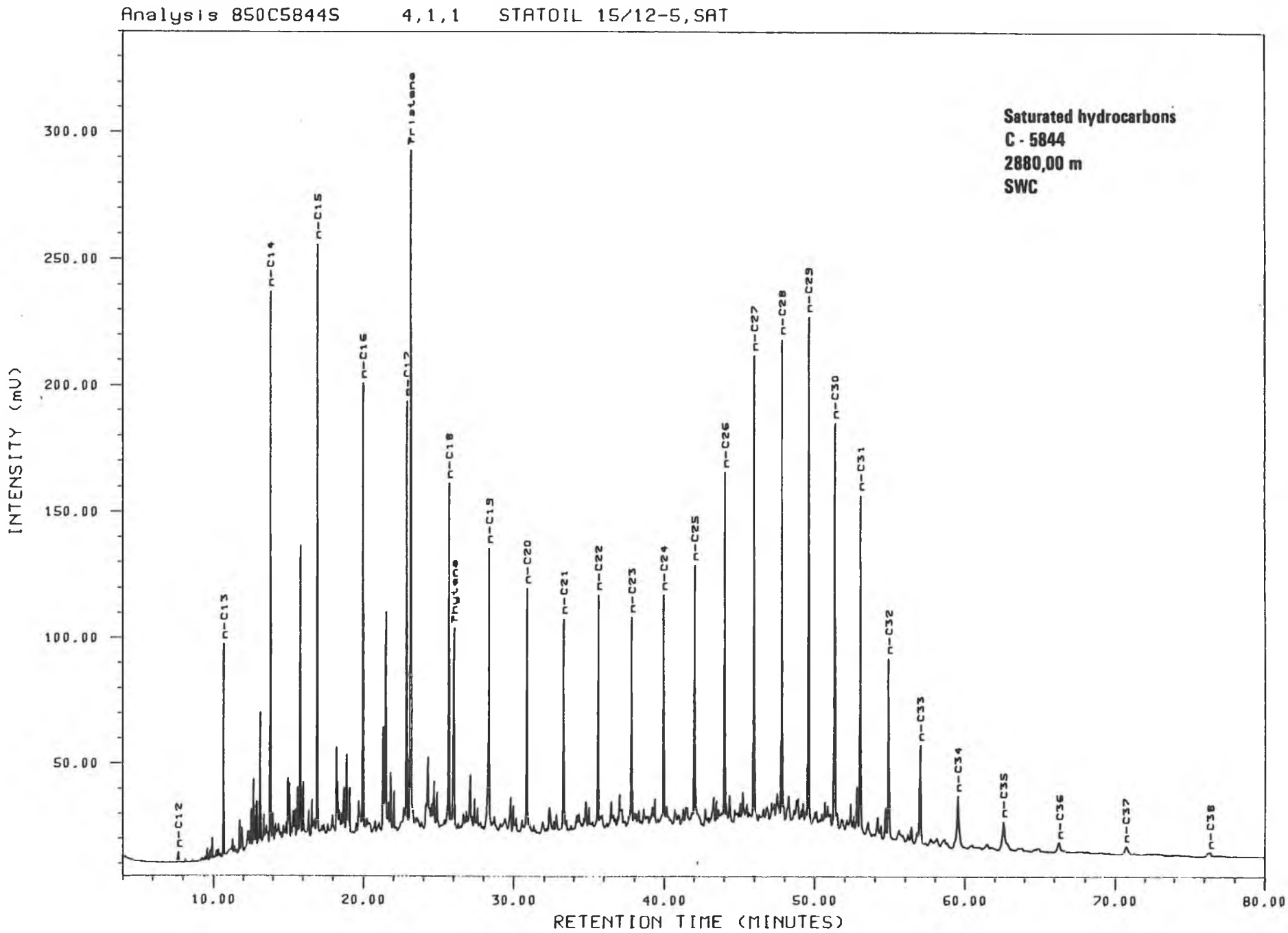
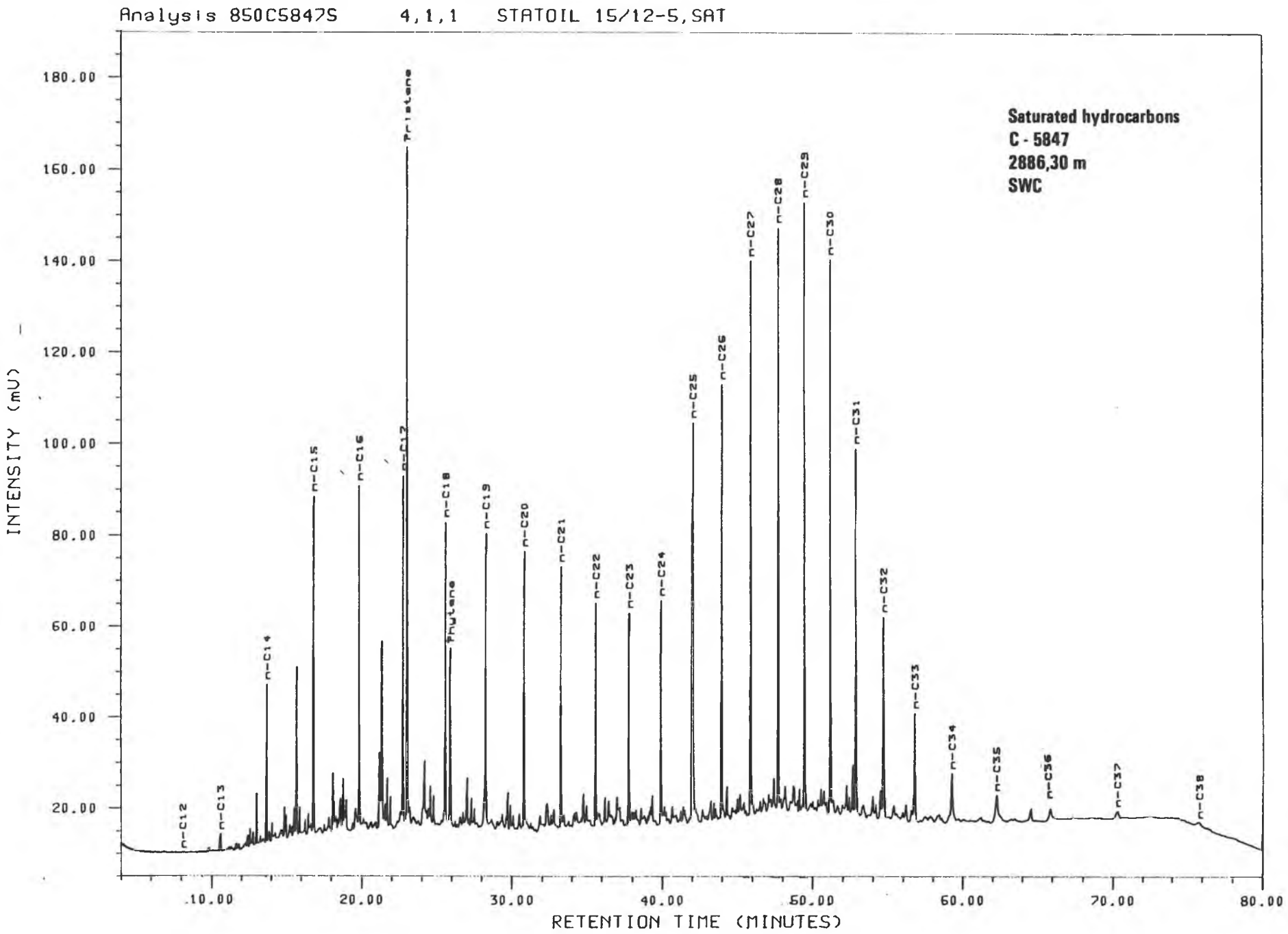
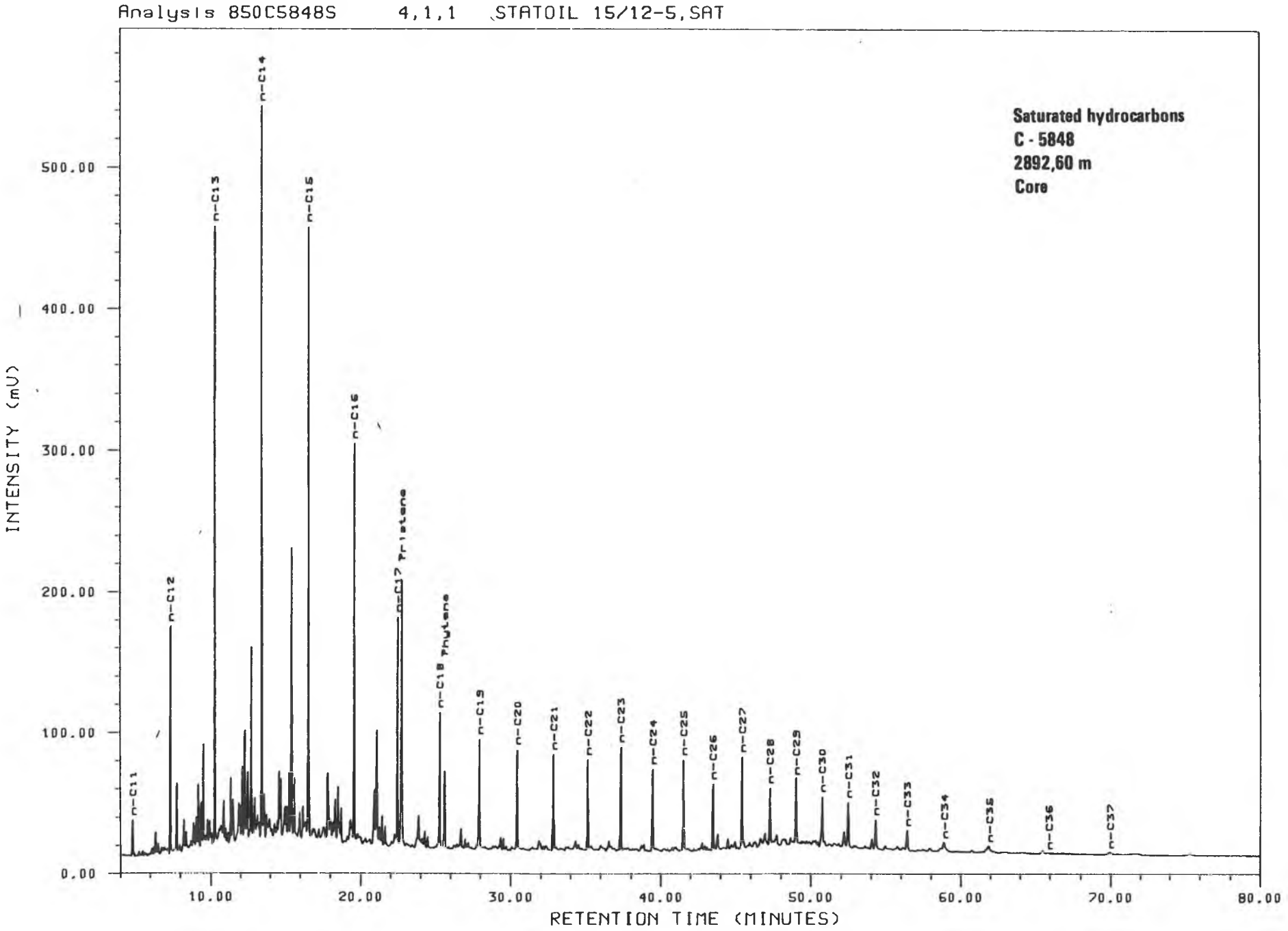
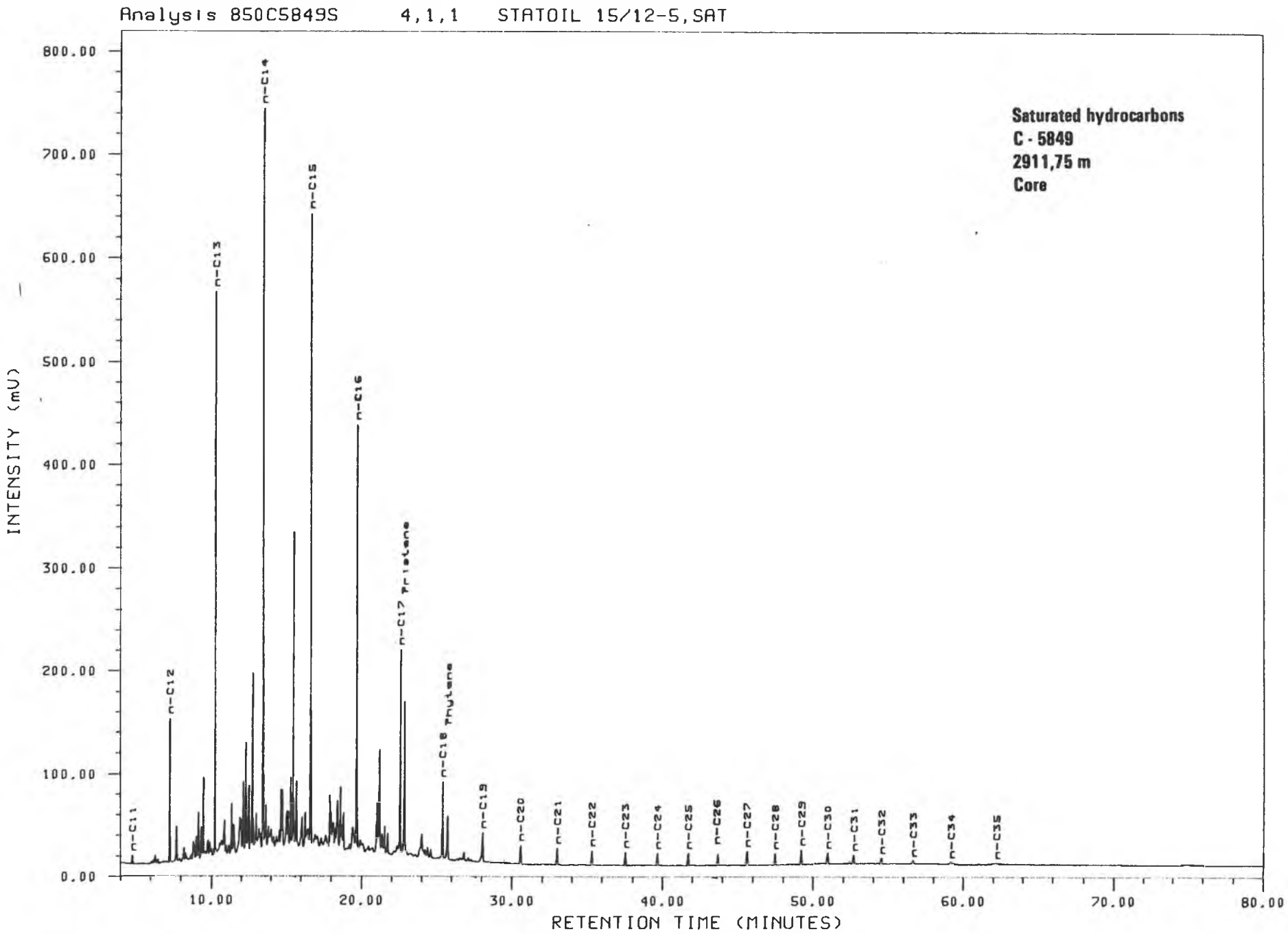
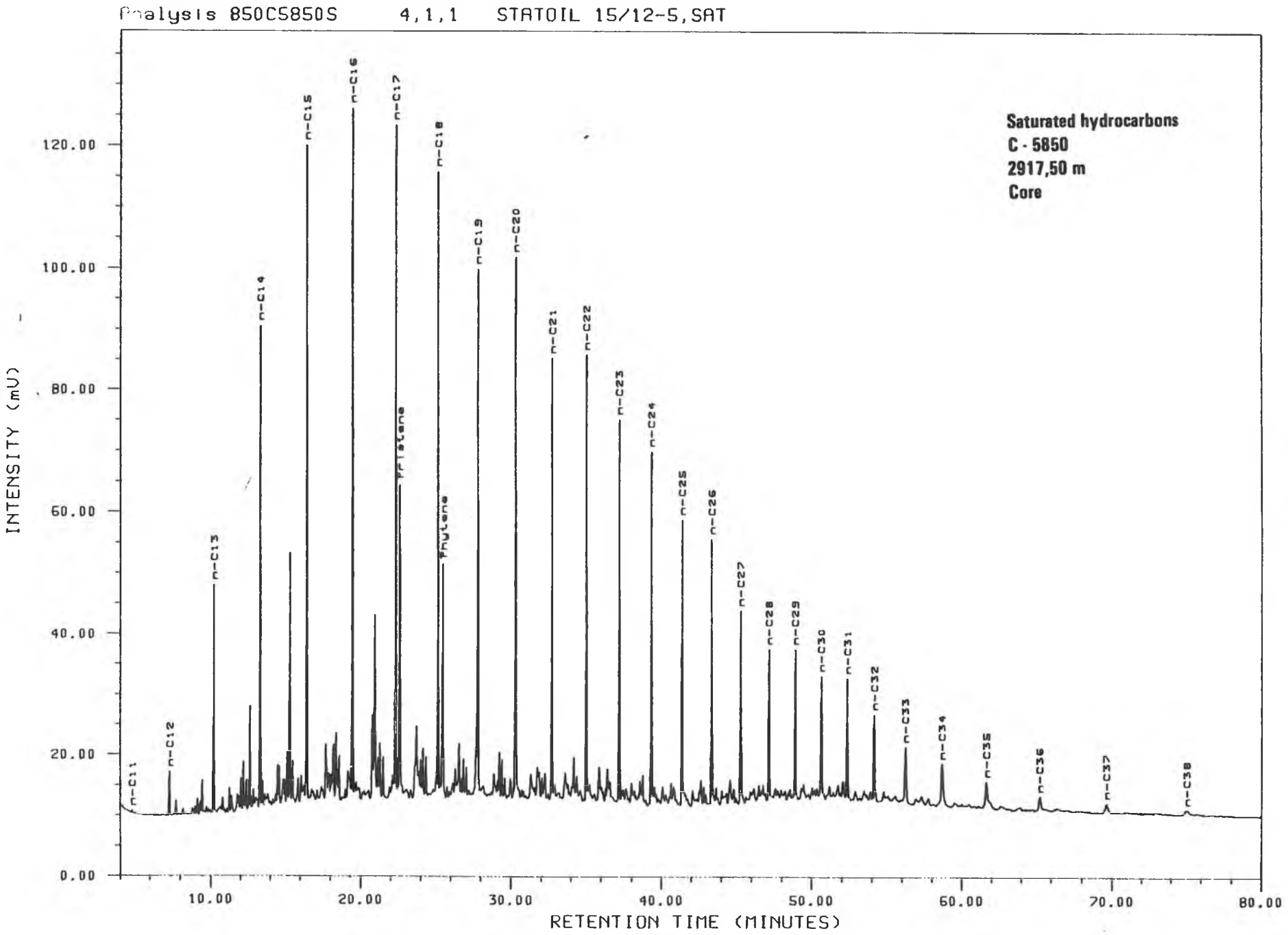
n-C32
n-C33
n-C34
n-C35
n-C36

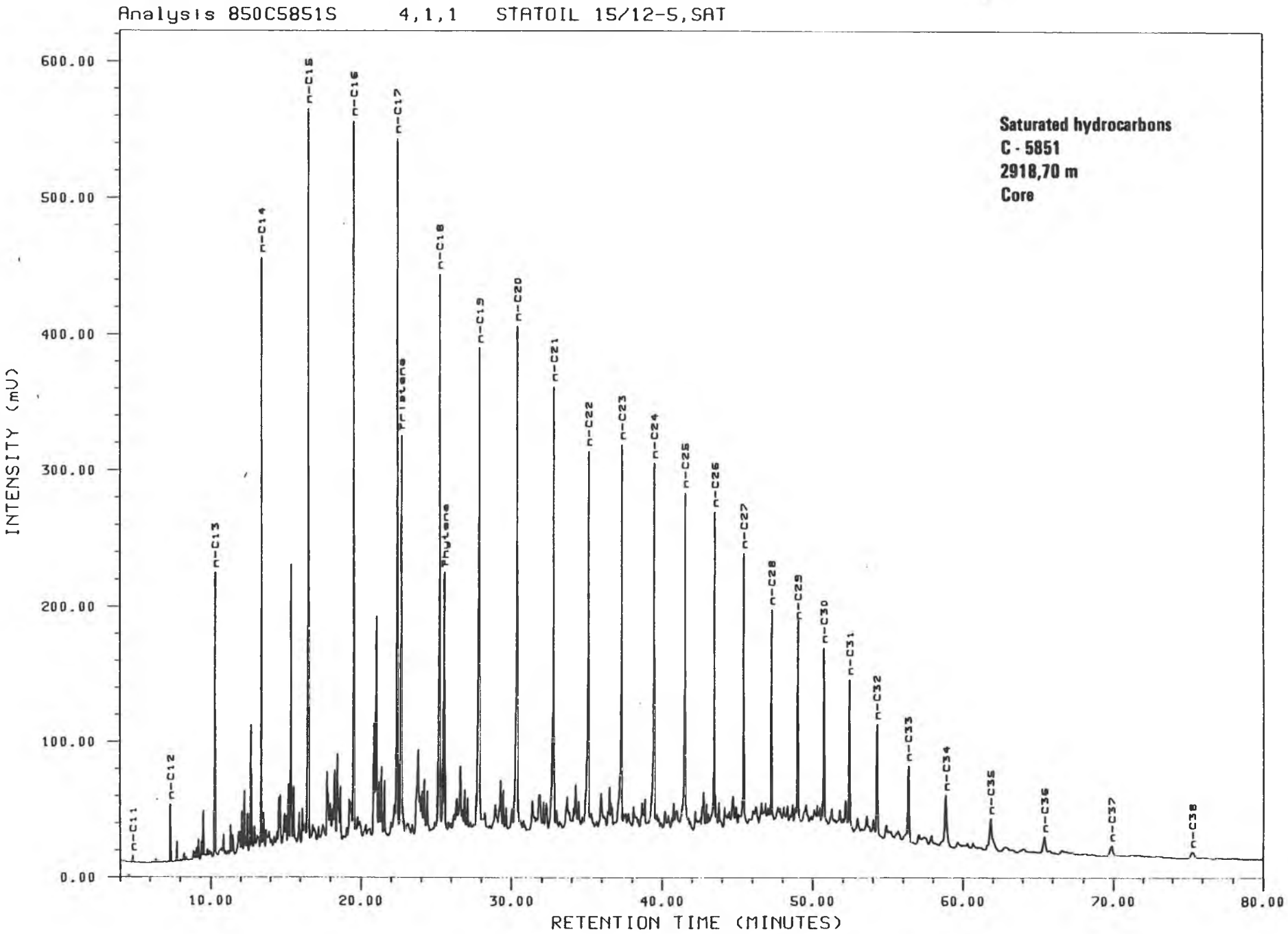

Analysis 850C5844S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5844
2880,00 m
SWC
INTENSITY (mV)
RETENTION TIME (MINUTES)
300.00
250.00
200.00
150.00
100.00
50.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C12
n-C13
n-C14
n-C15
n-C16
Pristane
n-C17
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37
n-C38

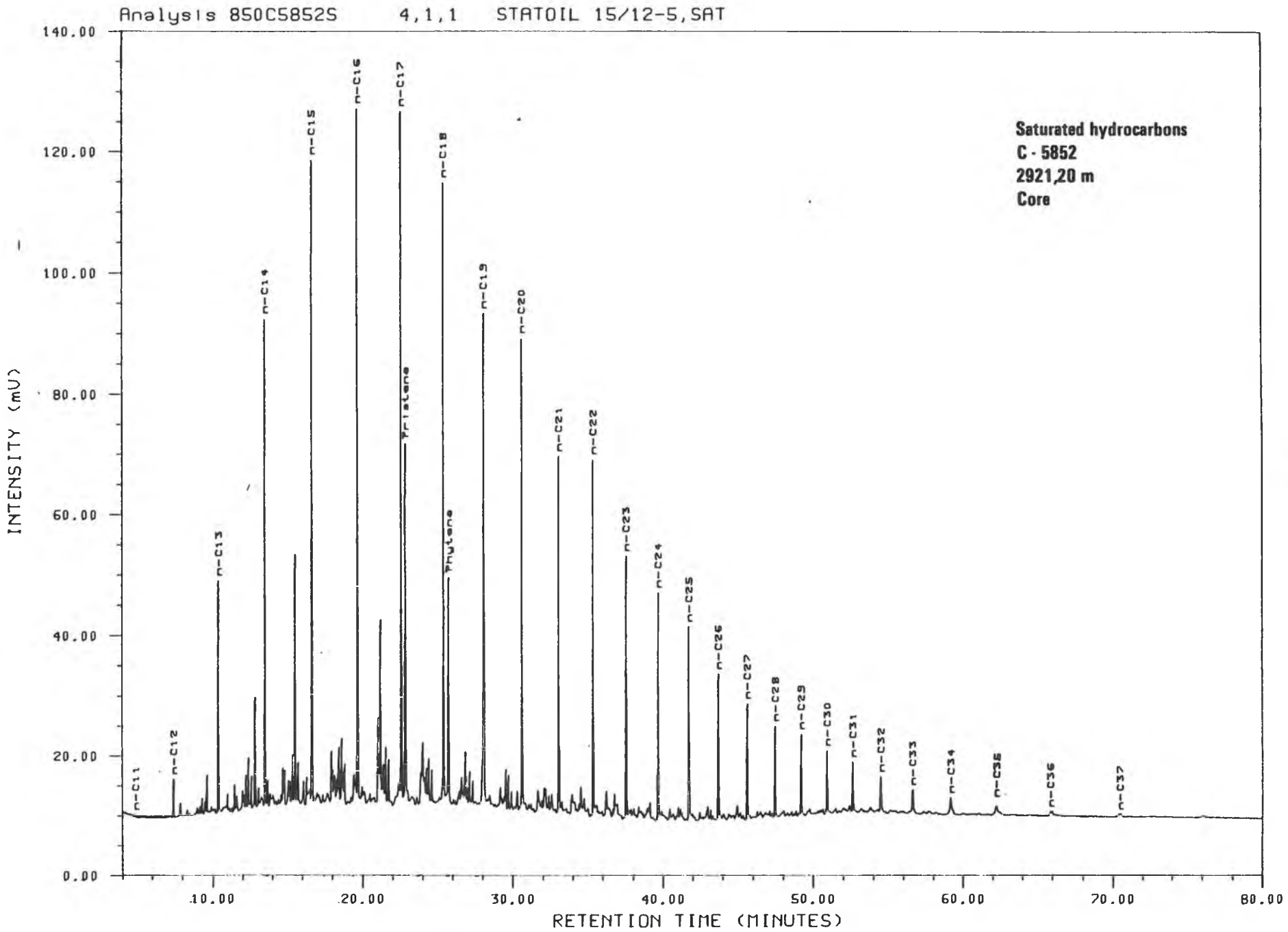

Analysis 850C5847S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5847
2886,30 m
SWC
INTENSITY (mU)
RETENTION TIME (MINUTES)
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37
n-C38

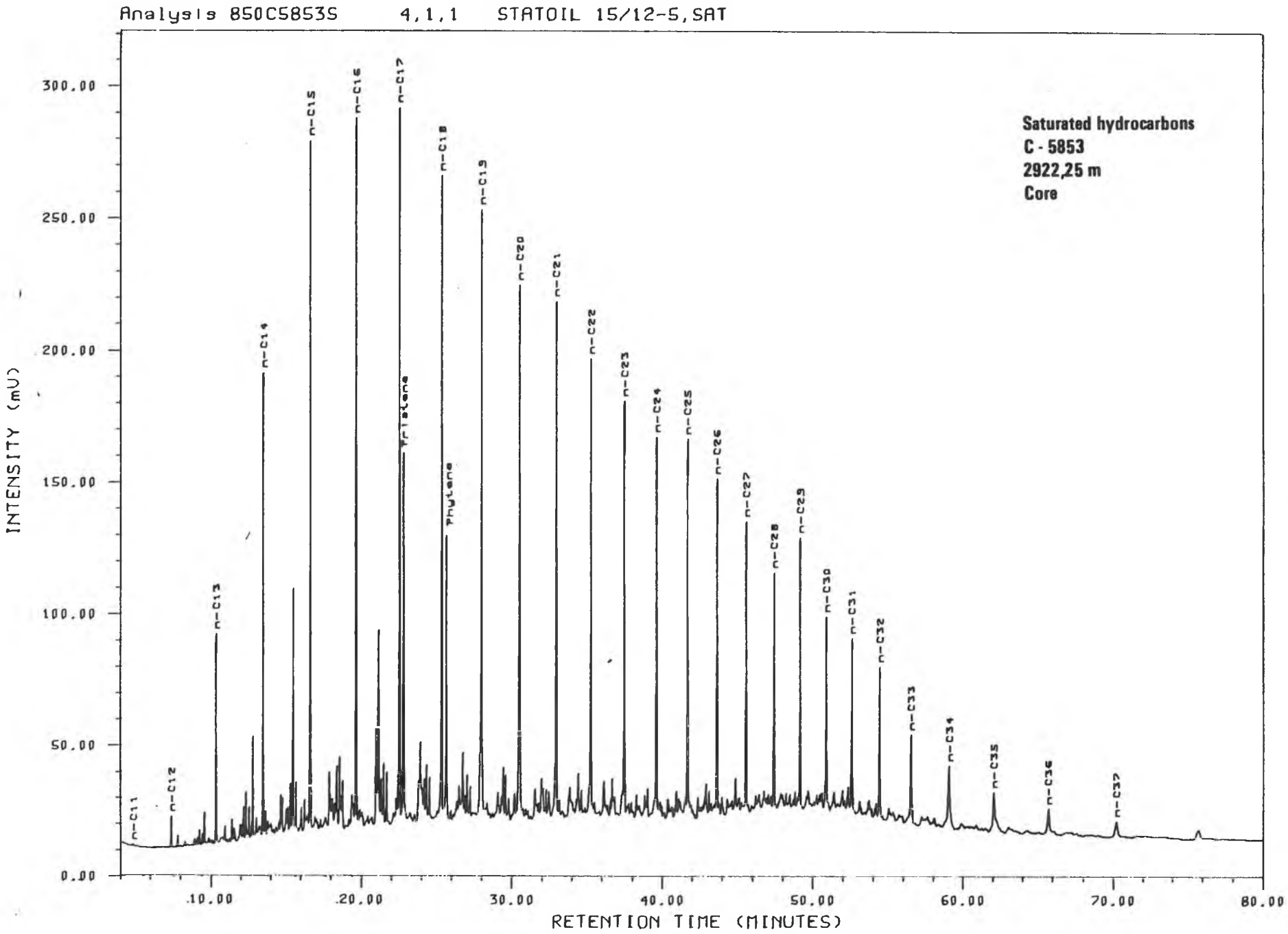

Analysis 850C5848S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5848
2892,60 m
Core
INTENSITY (mV)
RETENTION TIME (MINUTES)
0.00
100.00
200.00
300.00
400.00
500.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5849S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5849
2911,75 m
Core
INTENSITY (mU)
RETENTION TIME (MINUTES)
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17 Pristane
n-C18 Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35


Analysis 850C5850S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5850
2917,50 m
Core
INTENSITY (mV)
RETENTION TIME (MINUTES)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37
n-C38


Analysis 850C5851S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5851
2918,70 m
Core
INTENSITY (mU)
RETENTION TIME (MINUTES)
0.00
100.00
200.00
300.00
400.00
500.00
600.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37
n-C38


Analysis 850C5852S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5852
2921,20 m
Core
INTENSITY (mV)
RETENTION TIME (MINUTES)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5853S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5853
2922,25 m
Core
INTENSITY (mV)
RETENTION TIME (MINUTES)
0.00
50.00
100.00
150.00
200.00
250.00
300.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
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n-C30
n-C31
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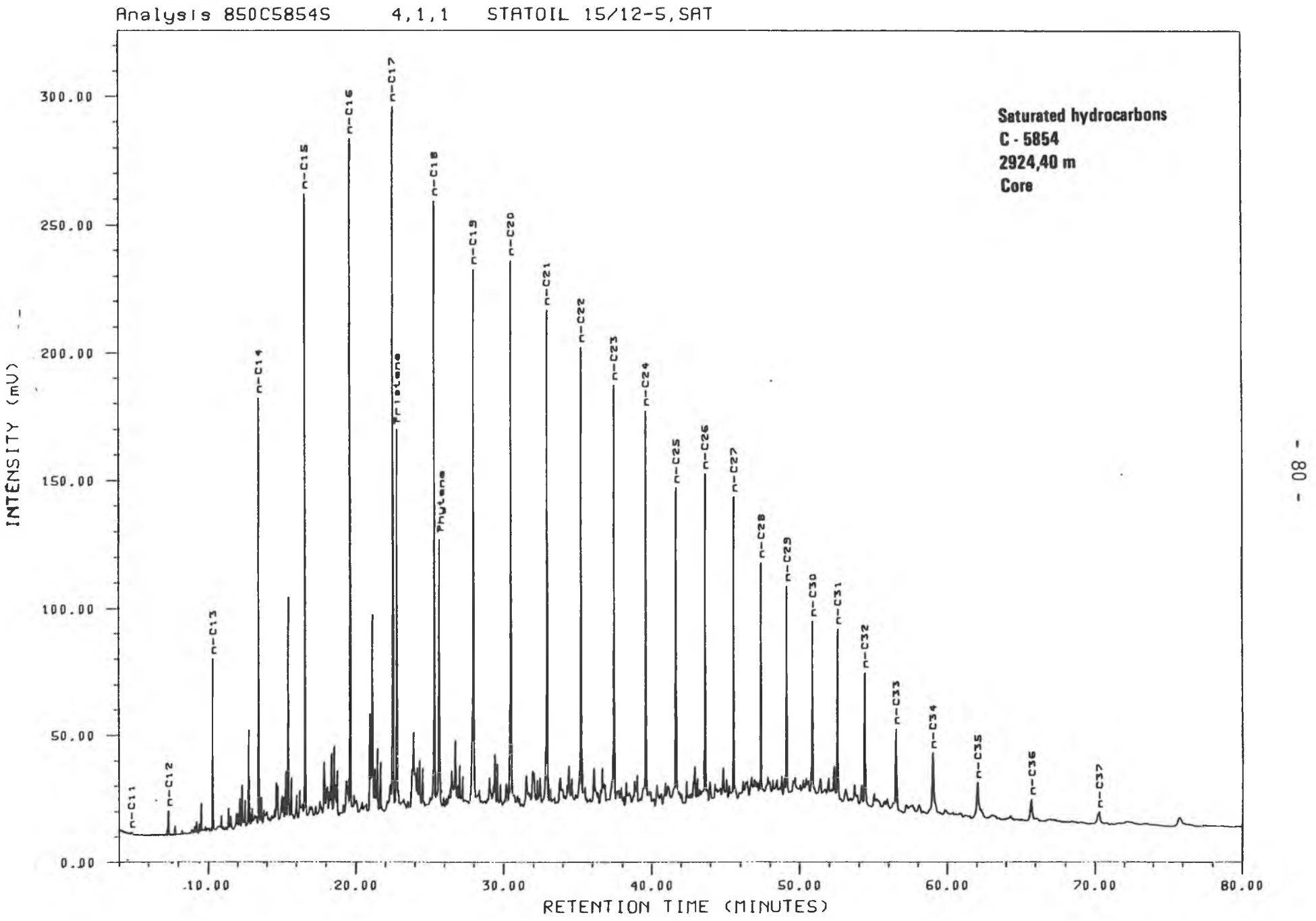
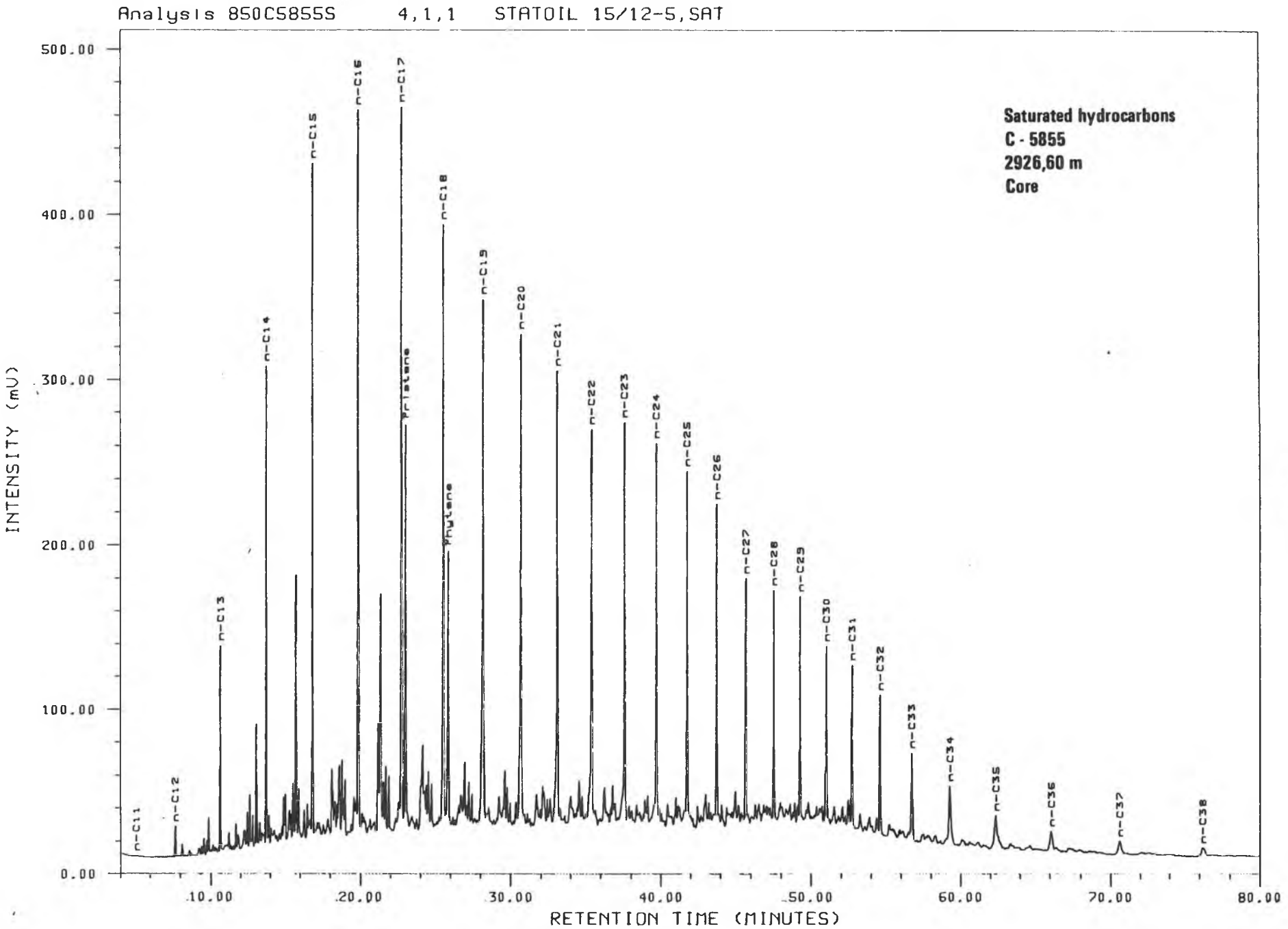
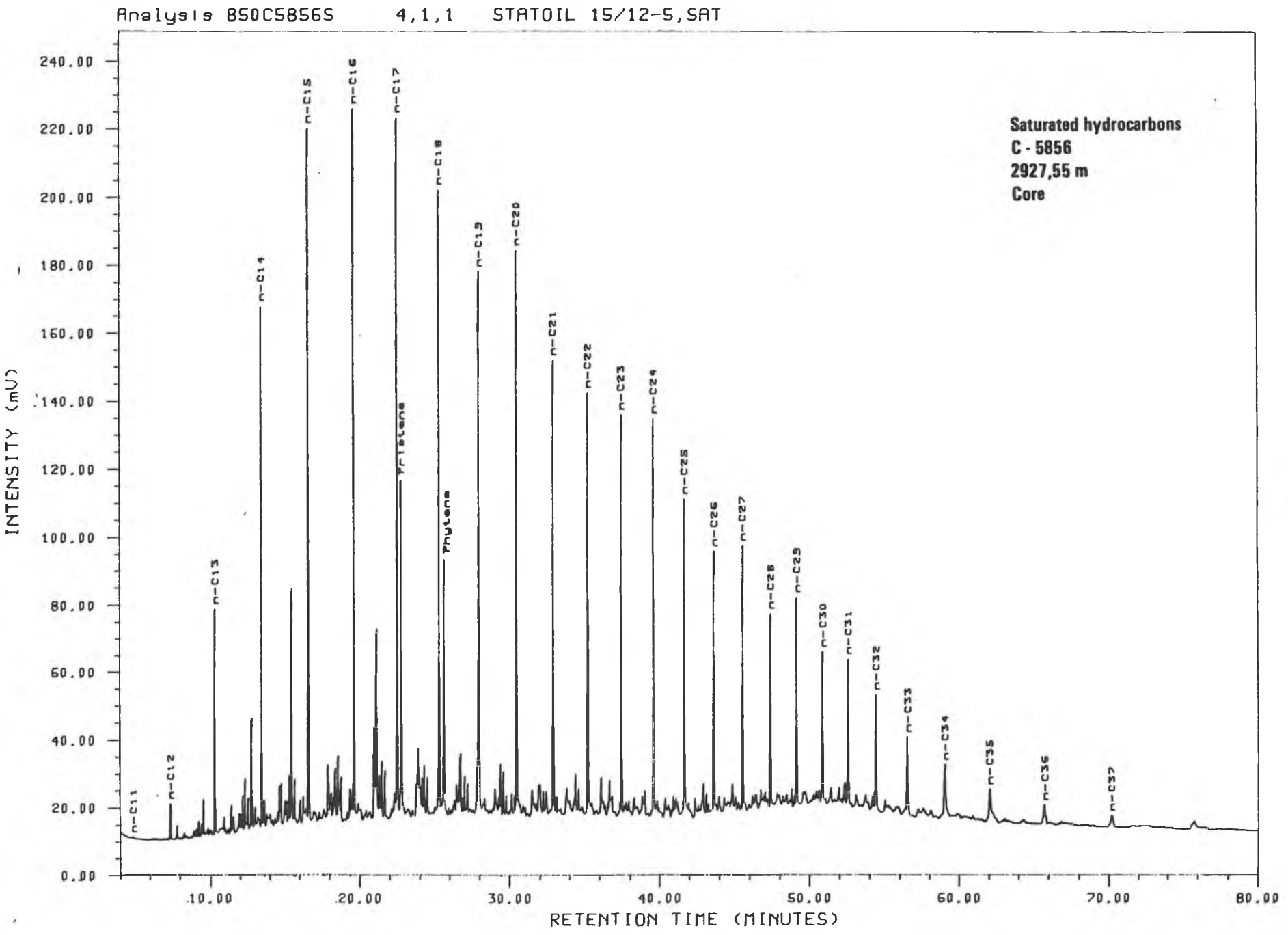
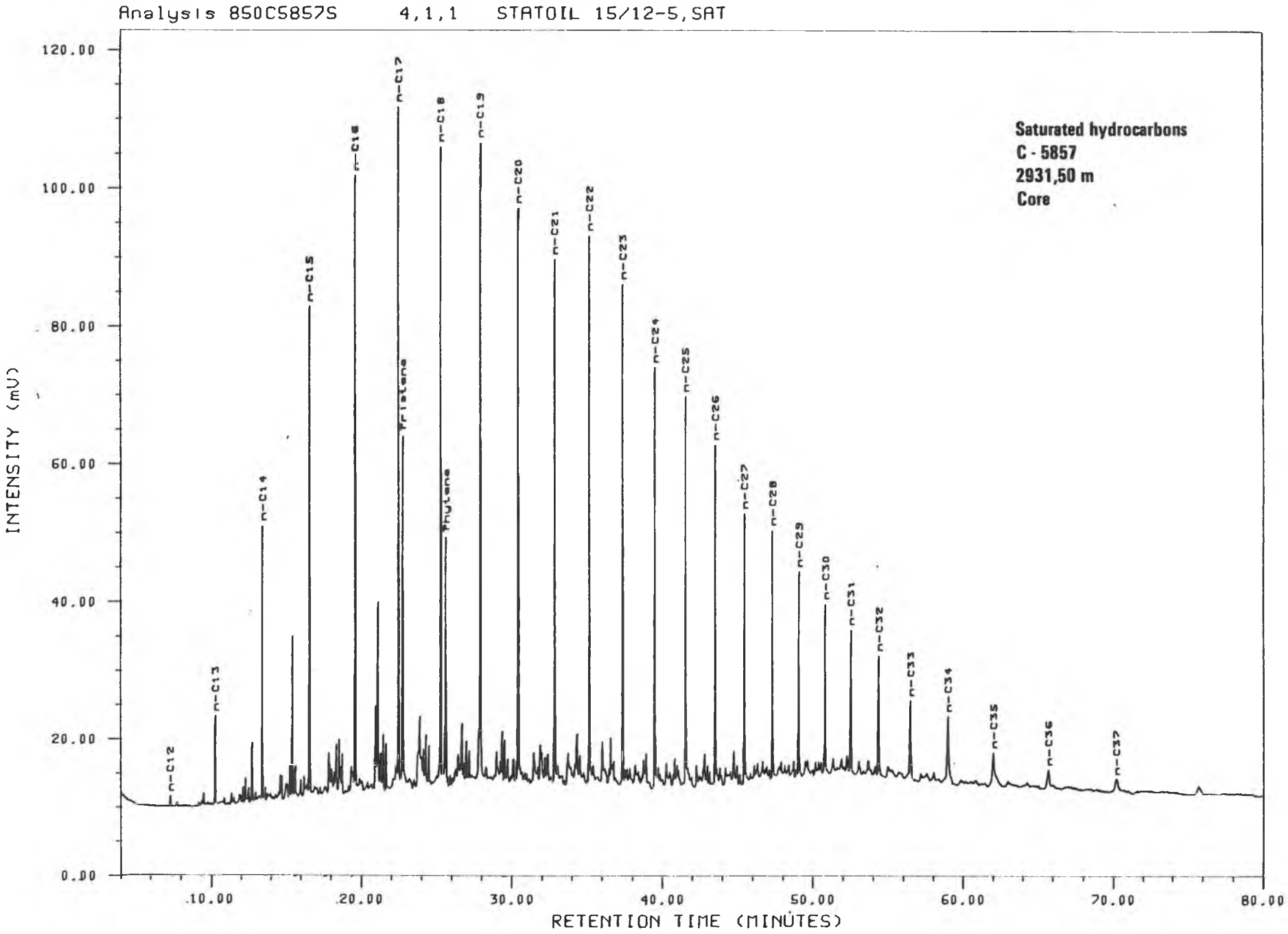
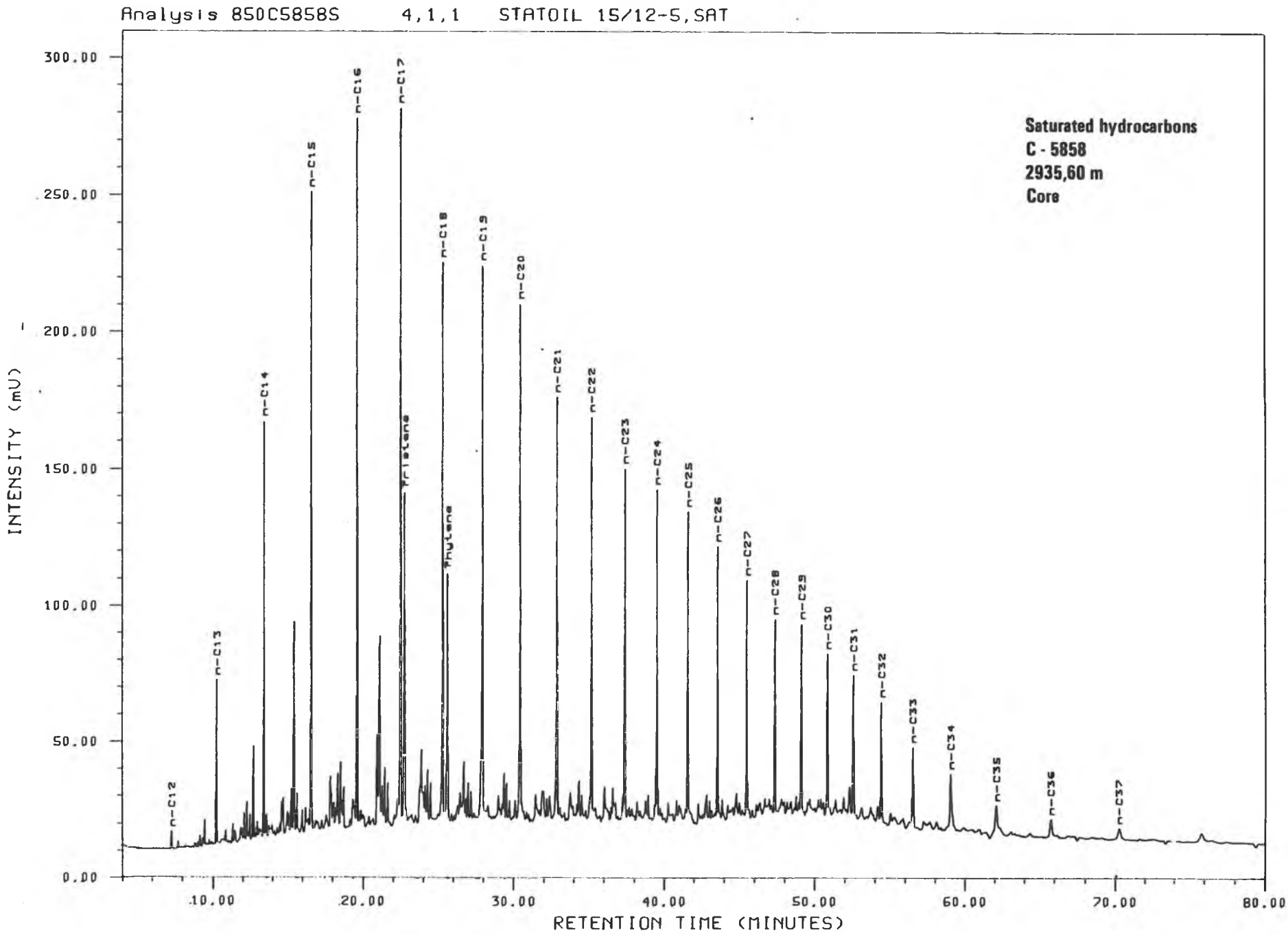
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5854S 4,1,1 STATOIL 15/12-S,SAT
Saturated hydrocarbons
C - 5854
2924,40 m
Core
INTENSITY (mU)
RETENTION TIME (MINUTES)
0.00
50.00
100.00
150.00
200.00
250.00
300.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5855S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5855
2926,60 m
Core
INTENSITY (mV)
RETENTION TIME (MINUTES)
500.00
400.00
300.00
200.00
100.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37
n-C38


Analysis 850C5856S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5856
2927,55 m
Core
INTENSITY (mU)
RETENTION TIME (MINUTES)
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5857S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5857
2931,50 m
Core
INTENSITY (mV)
RETENTION TIME (MINUTES)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5858S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5858
2935,60 m
Core
INTENSITY (mU)
RETENTION TIME (MINUTES)
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
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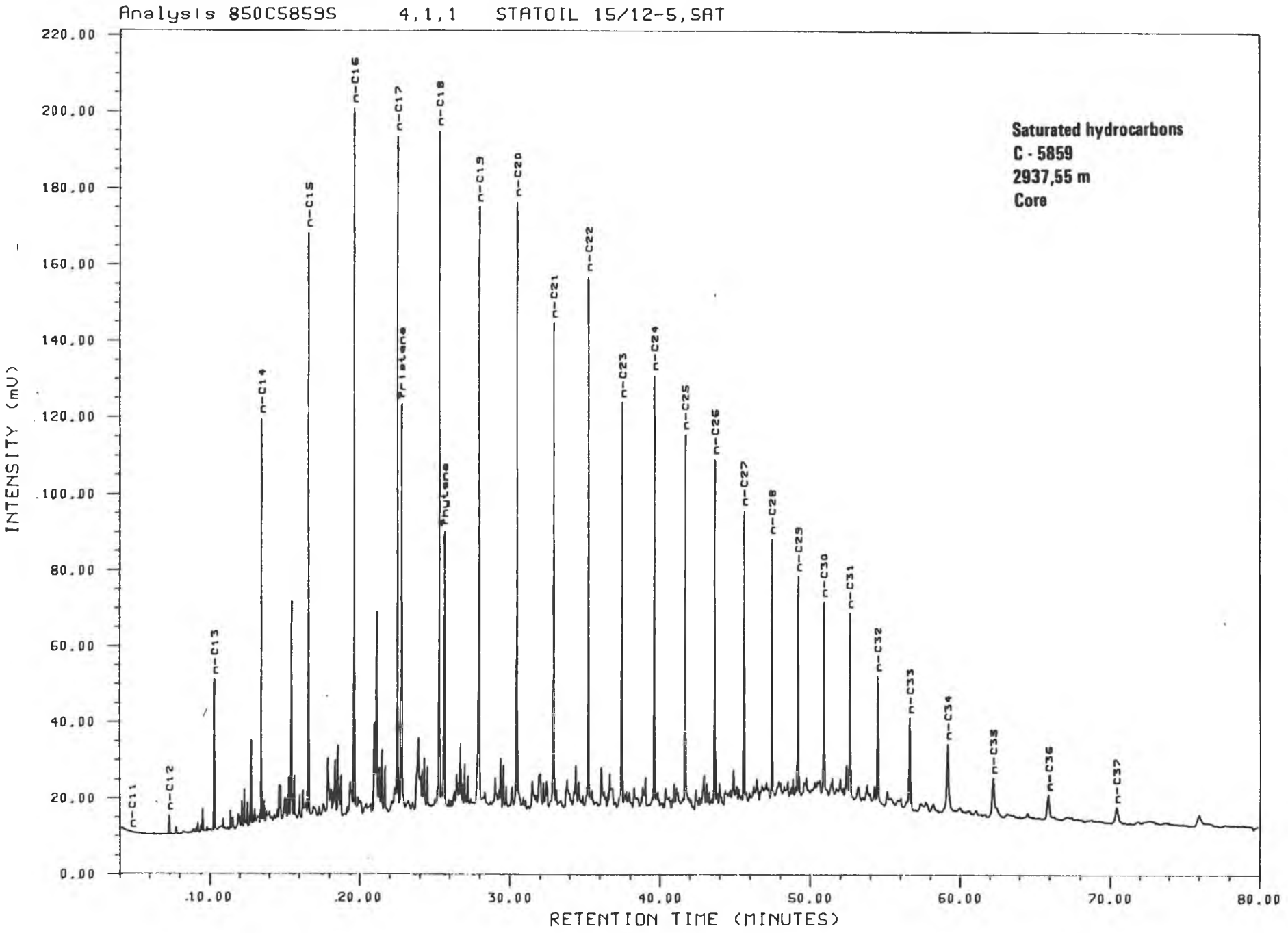
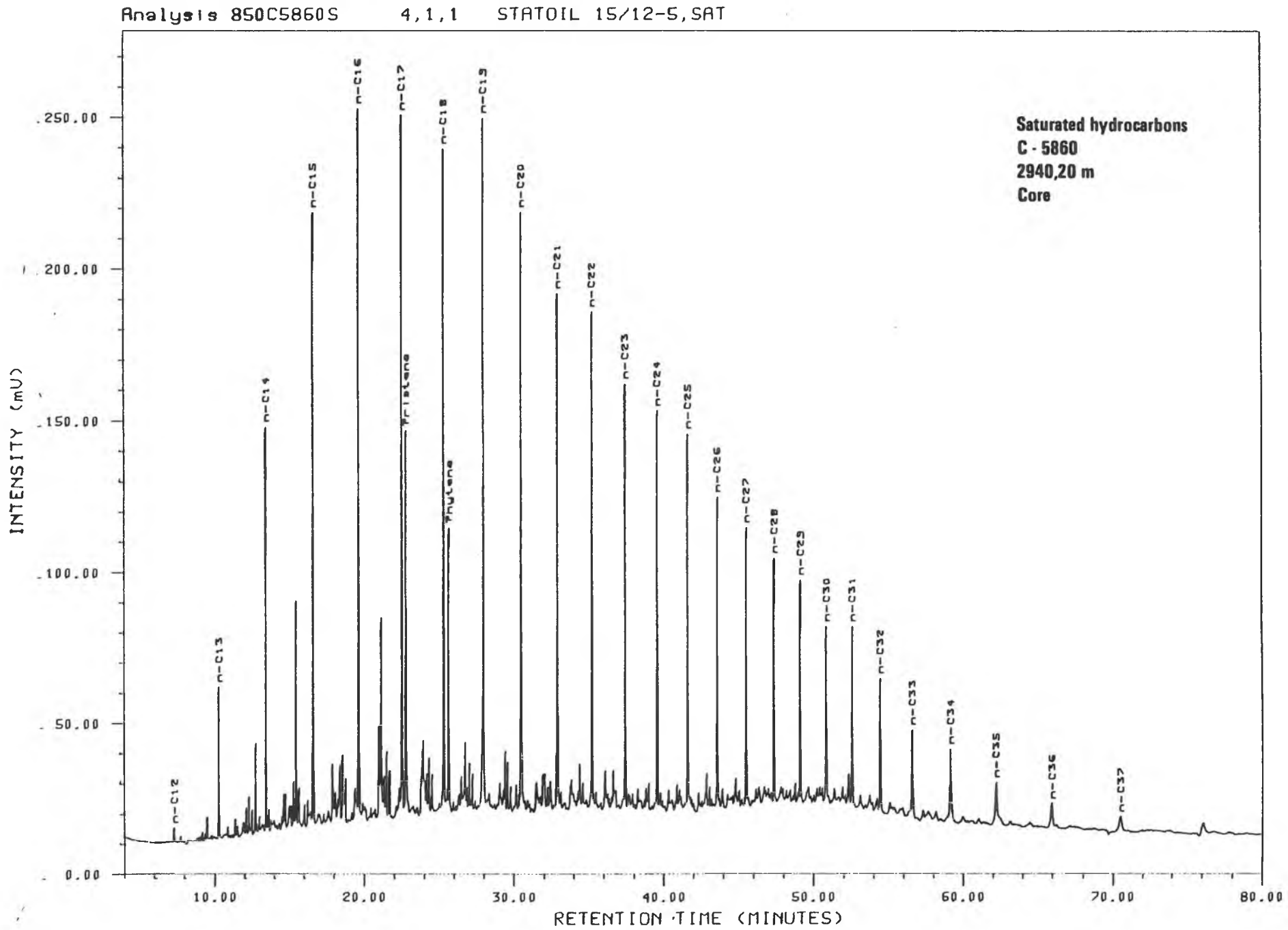
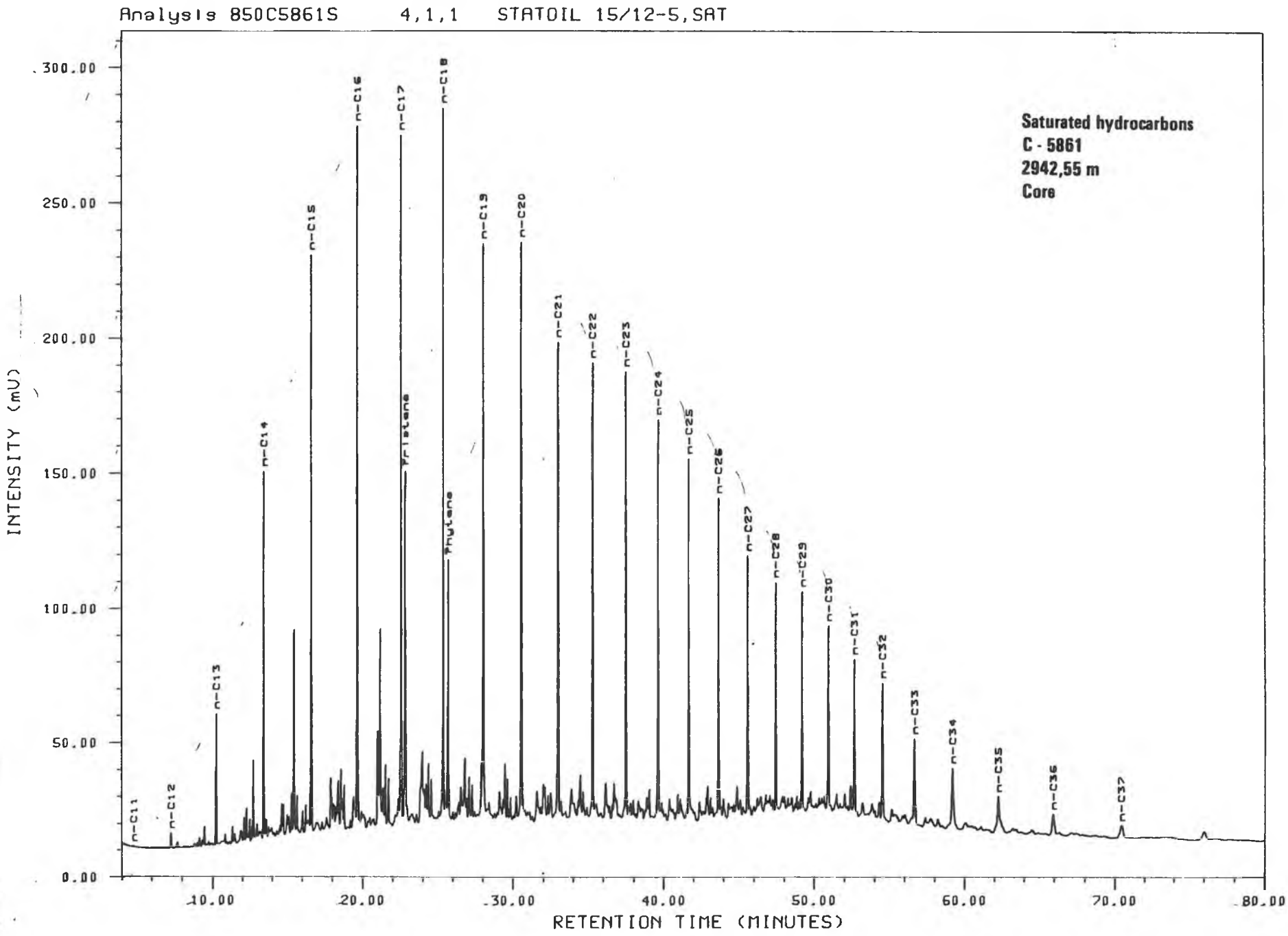
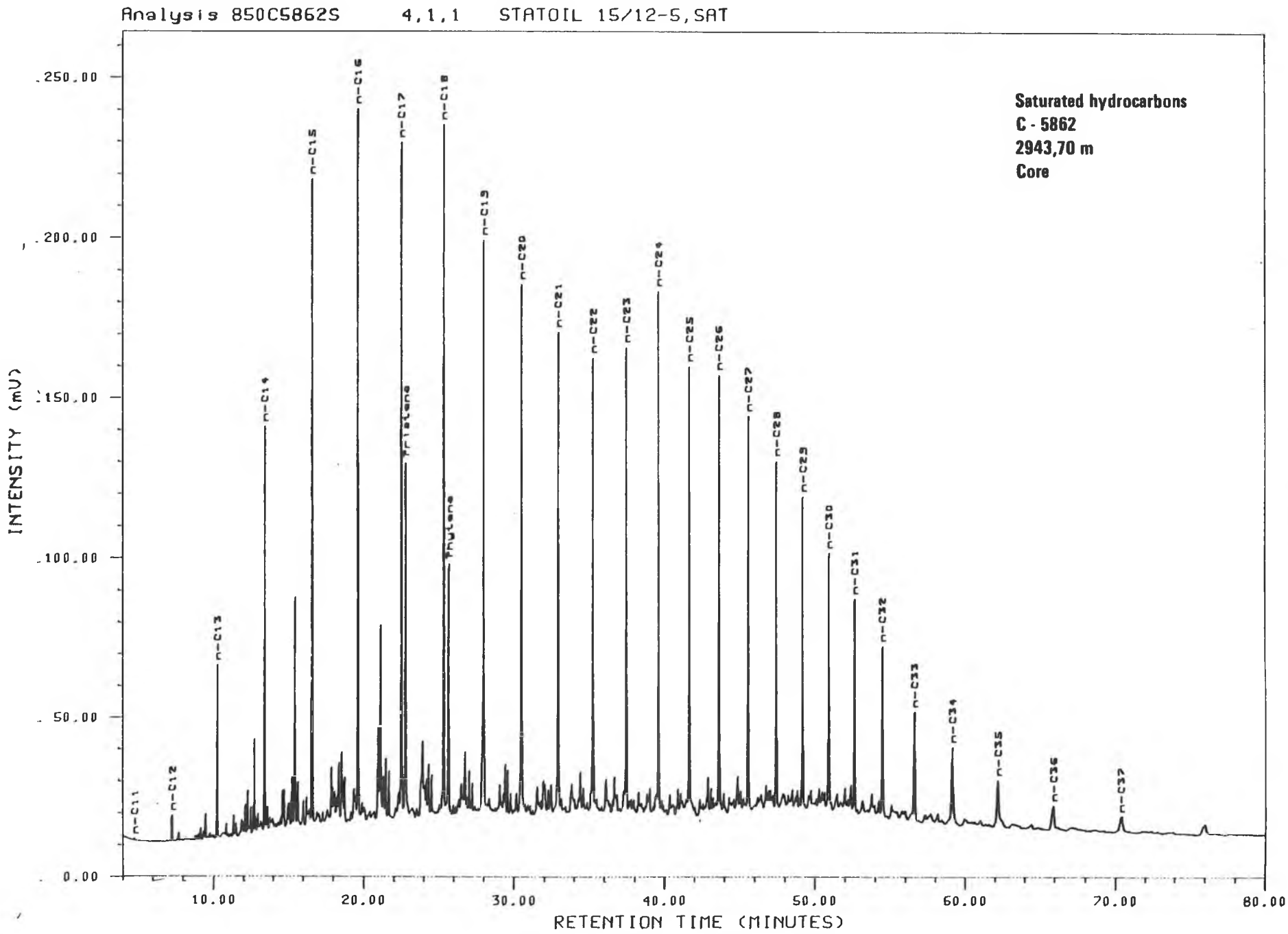
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5859S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5859
2937,55 m
Core
INTENSITY (mV)
RETENTION TIME (MINUTES)
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5860S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5860
2940,20 m
Core
INTENSITY (mU)
RETENTION TIME (MINUTES)
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5861S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5861
2942,55 m
Core
INTENSITY (mU)
RETENTION TIME (MINUTES)
0.00
50.00
100.00
150.00
200.00
250.00
300.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37


Analysis 850C5862S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5862
2943,70 m
Core
INTENSITY (mV)
250.00
200.00
150.00
100.00
50.00
0.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
Pristane
n-C18
Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
RETENTION TIME (MINUTES)

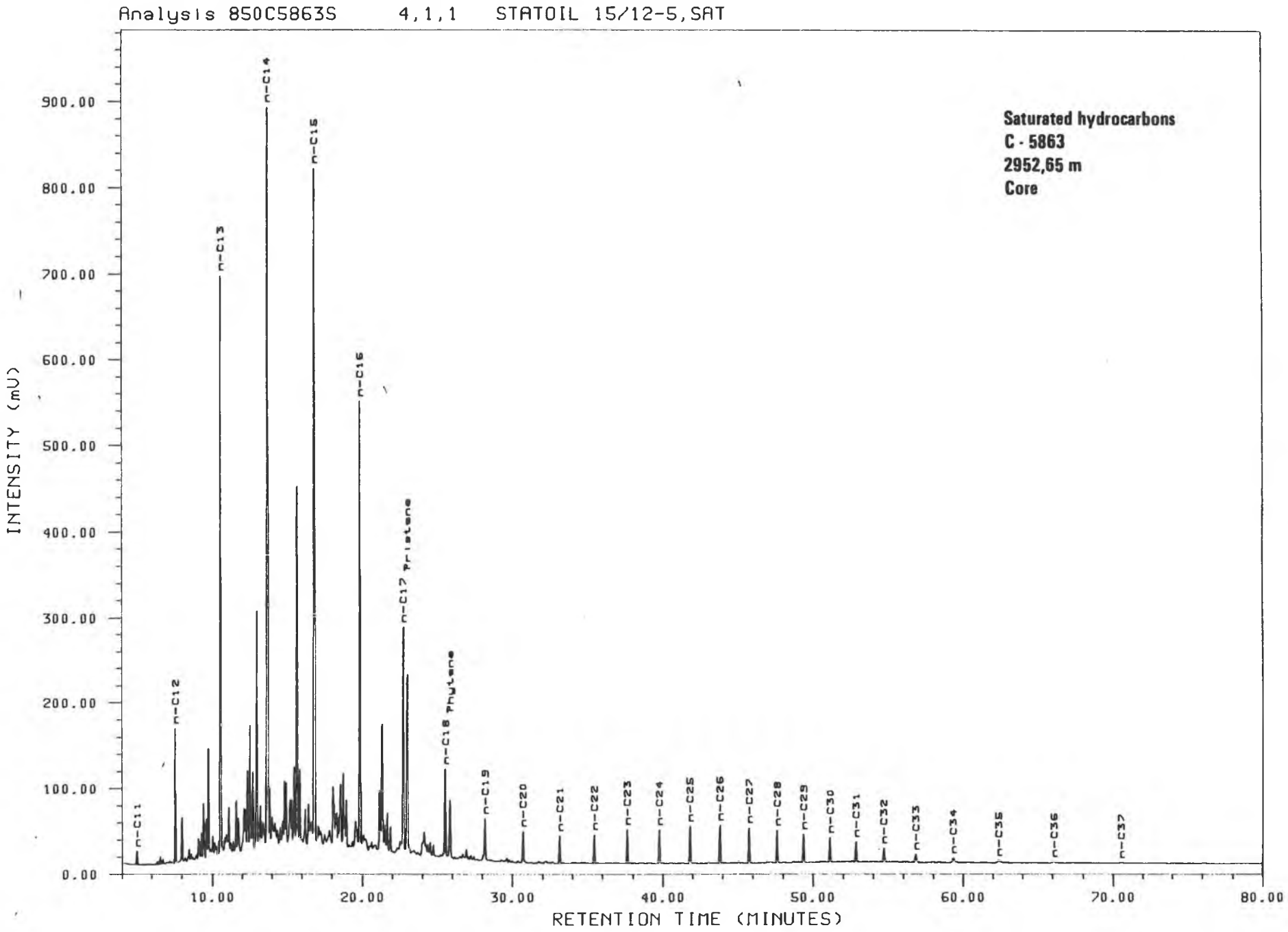
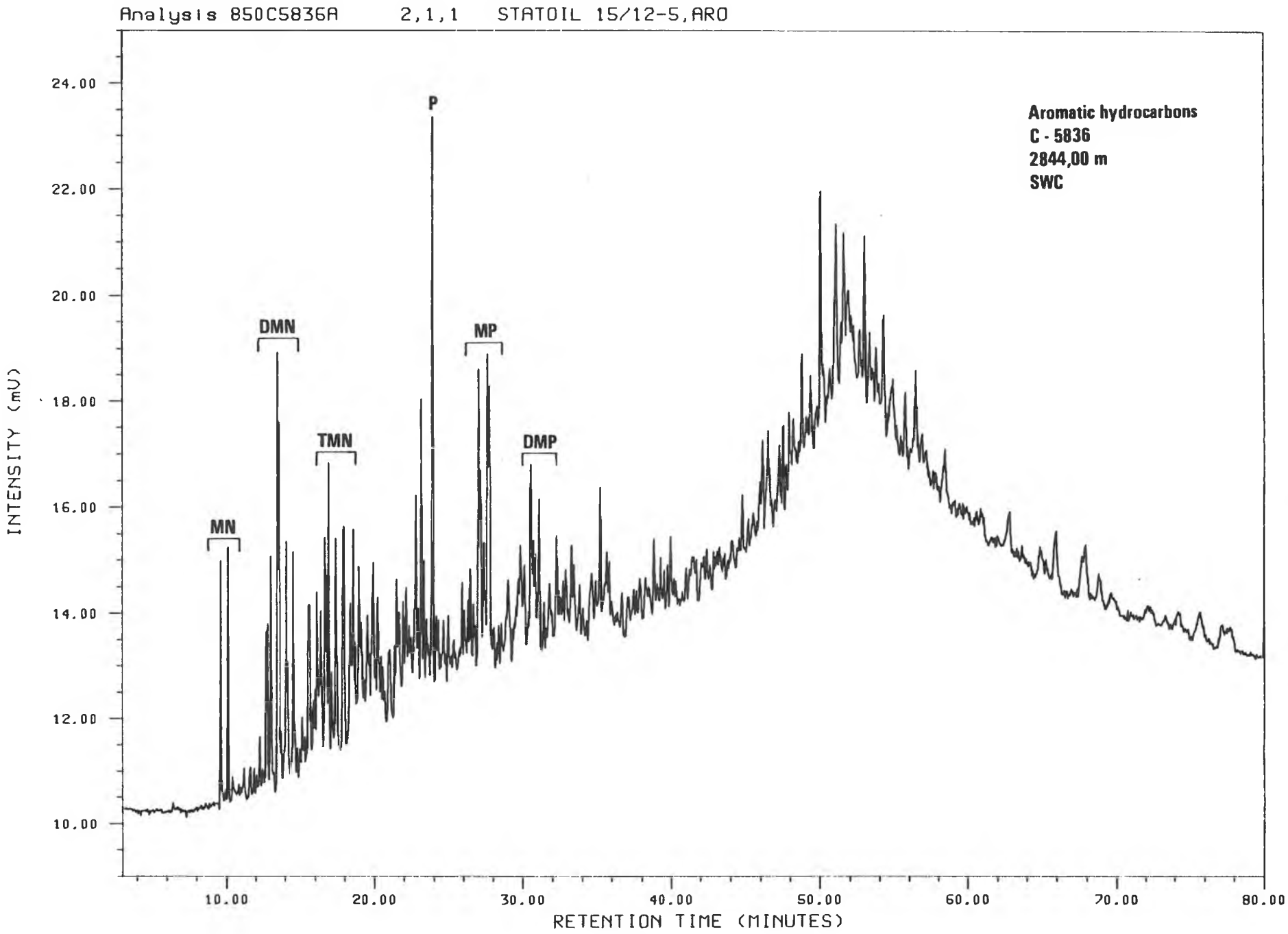
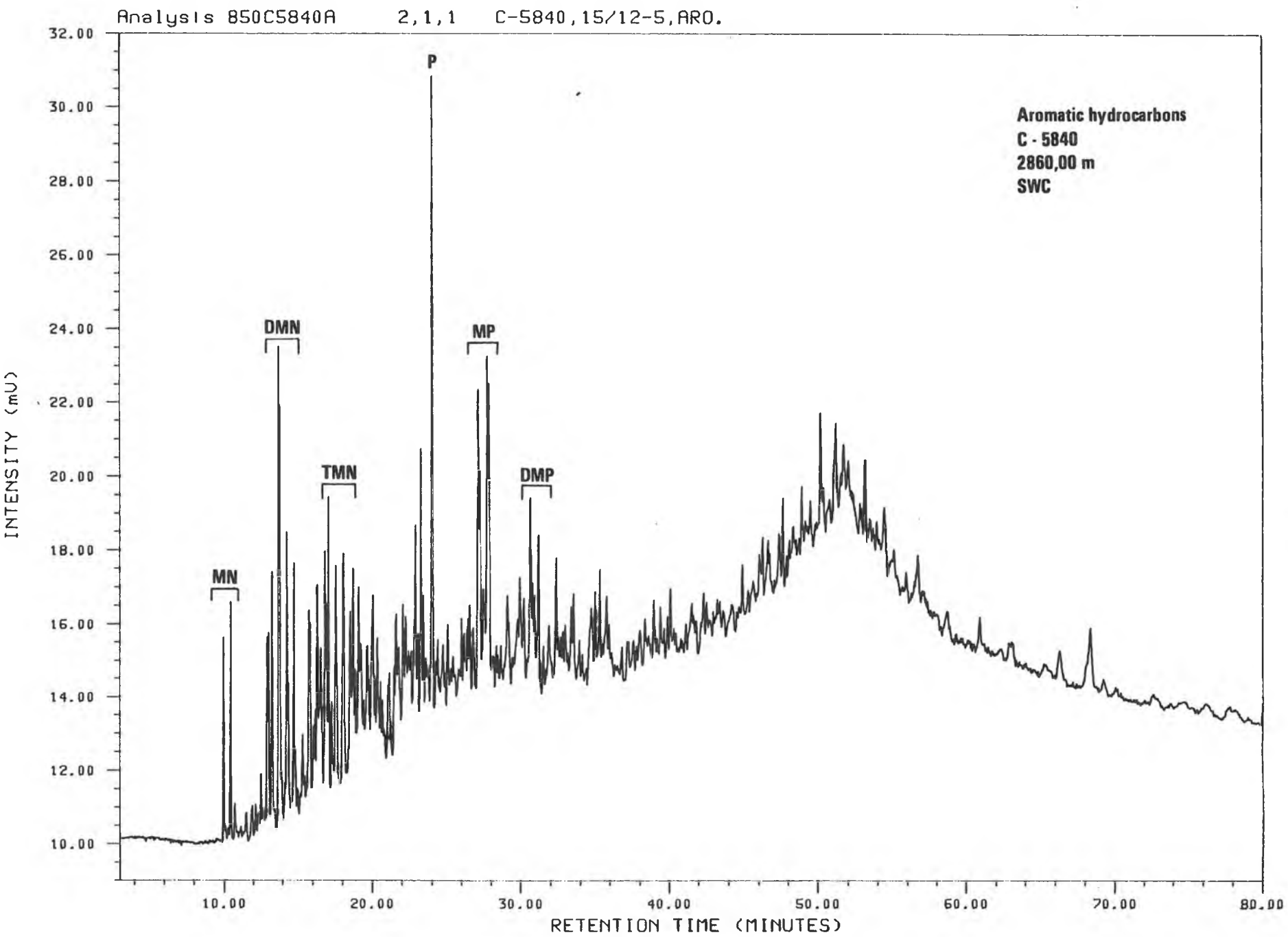

Analysis 850C5863S 4,1,1 STATOIL 15/12-5,SAT
Saturated hydrocarbons
C - 5863
2952,65 m
Core
INTENSITY (mU)
RETENTION TIME (MINUTES)
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
900.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17 Pristane
n-C18 Phytane
n-C19
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
n-C26
n-C27
n-C28
n-C29
n-C30
n-C31
n-C32
n-C33
n-C34
n-C35
n-C36
n-C37

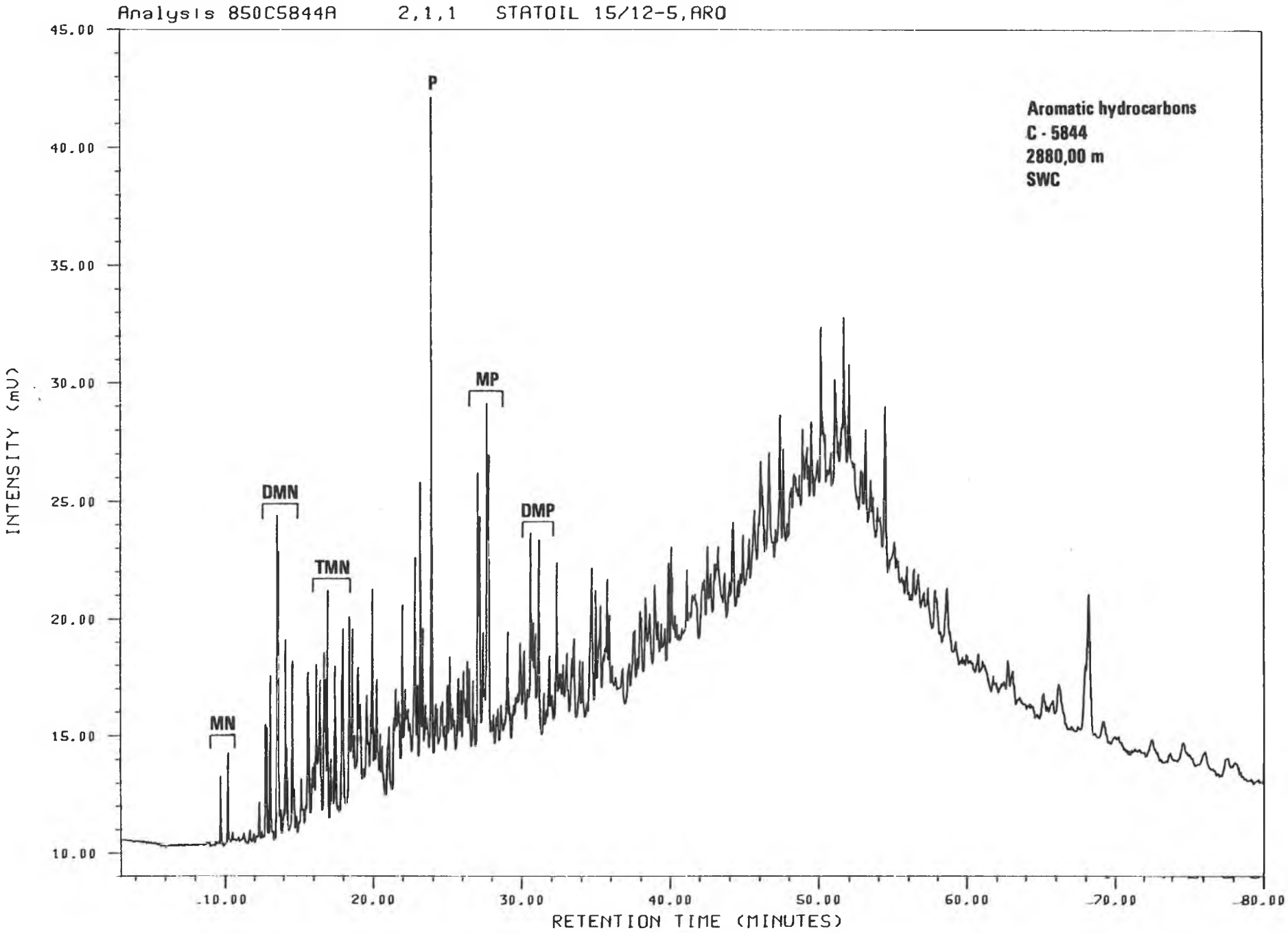
FIGURE 3

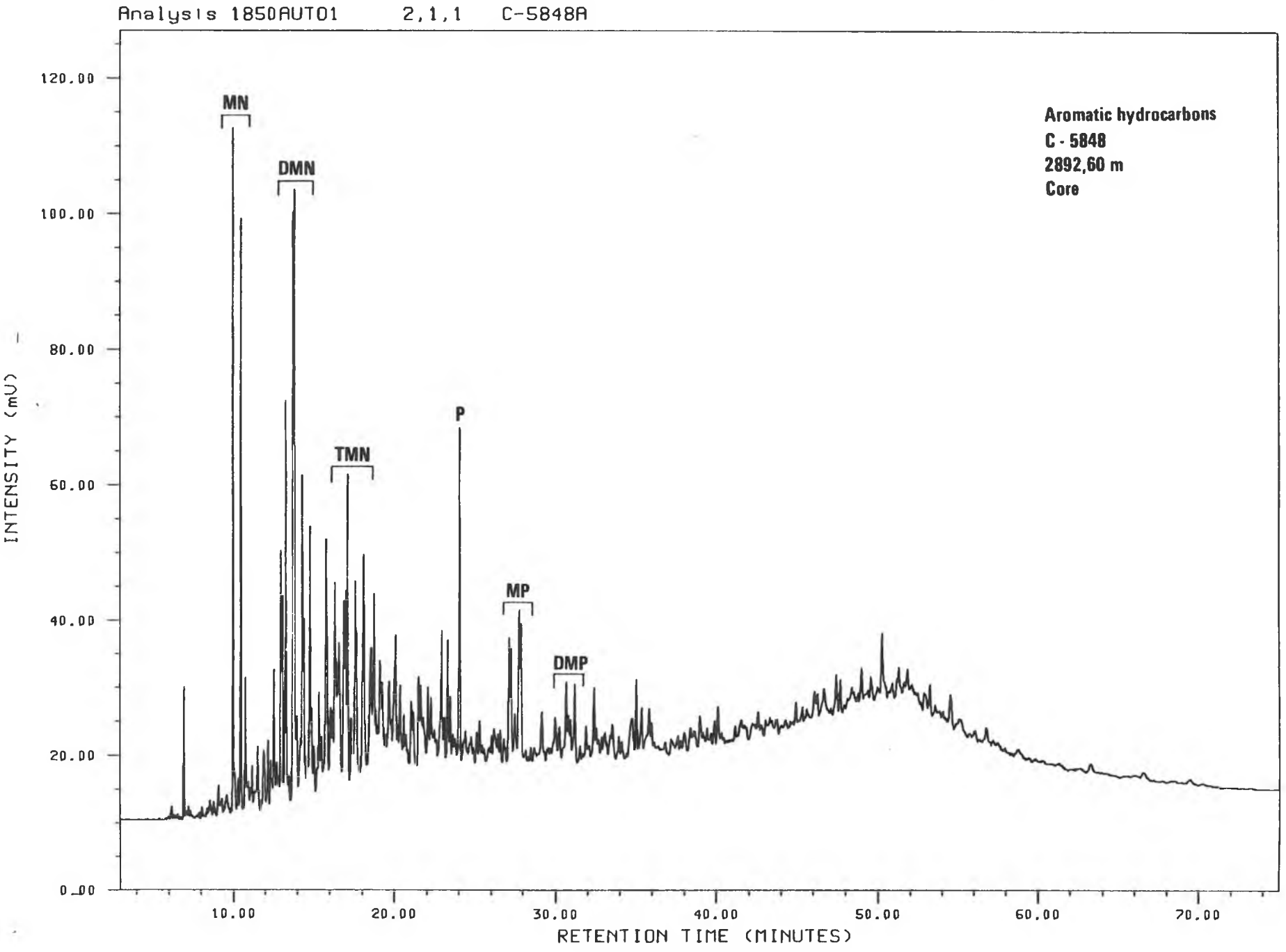
AROMATIC HYDROCARBON GAS CHROMATOGRAMS
FID DETECTION

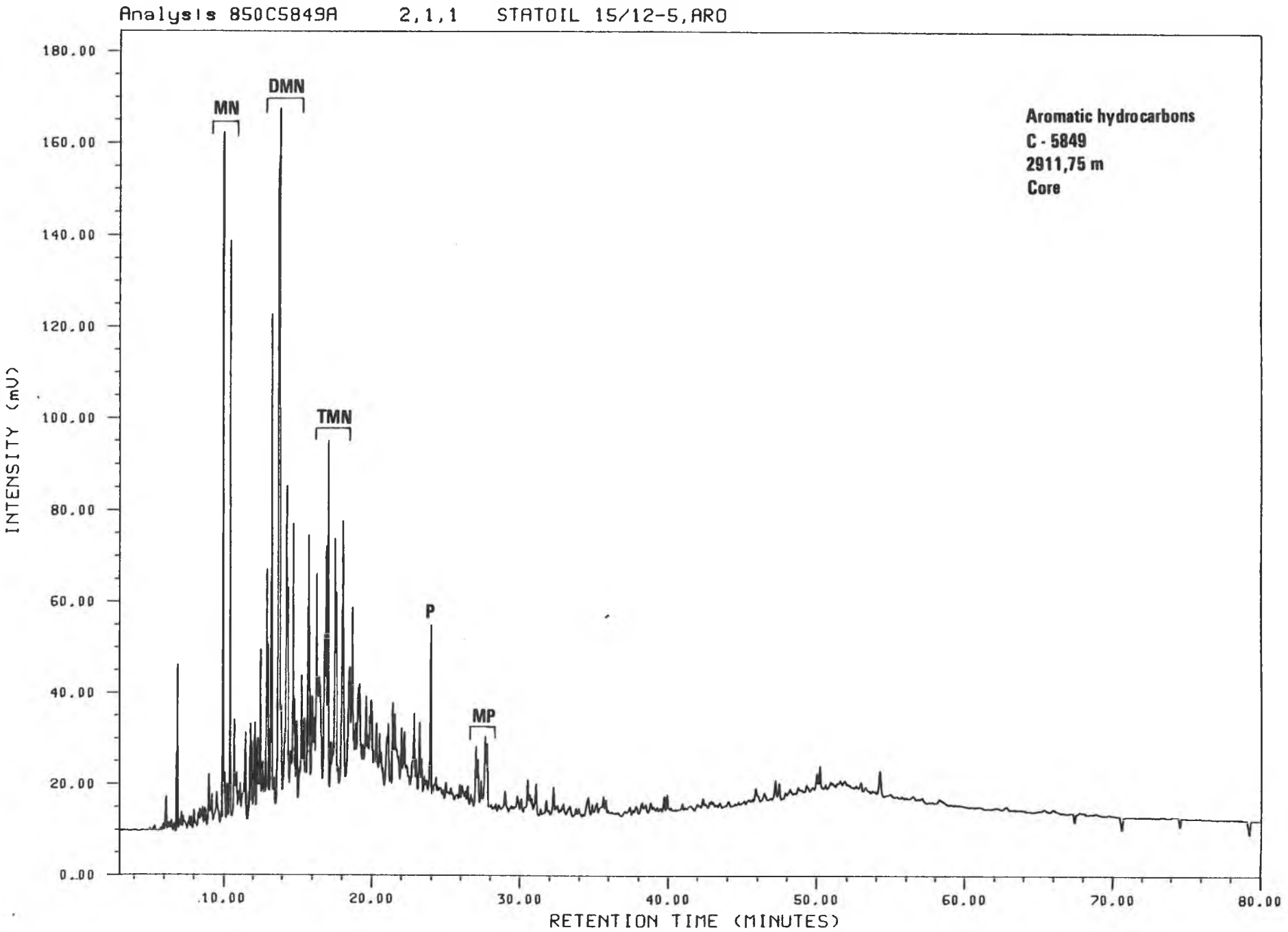
N,MN,DMN,TMN	- naphthalene and alkylated homologs
P,MP,DMP	- phenanthrene and alkylated homologs

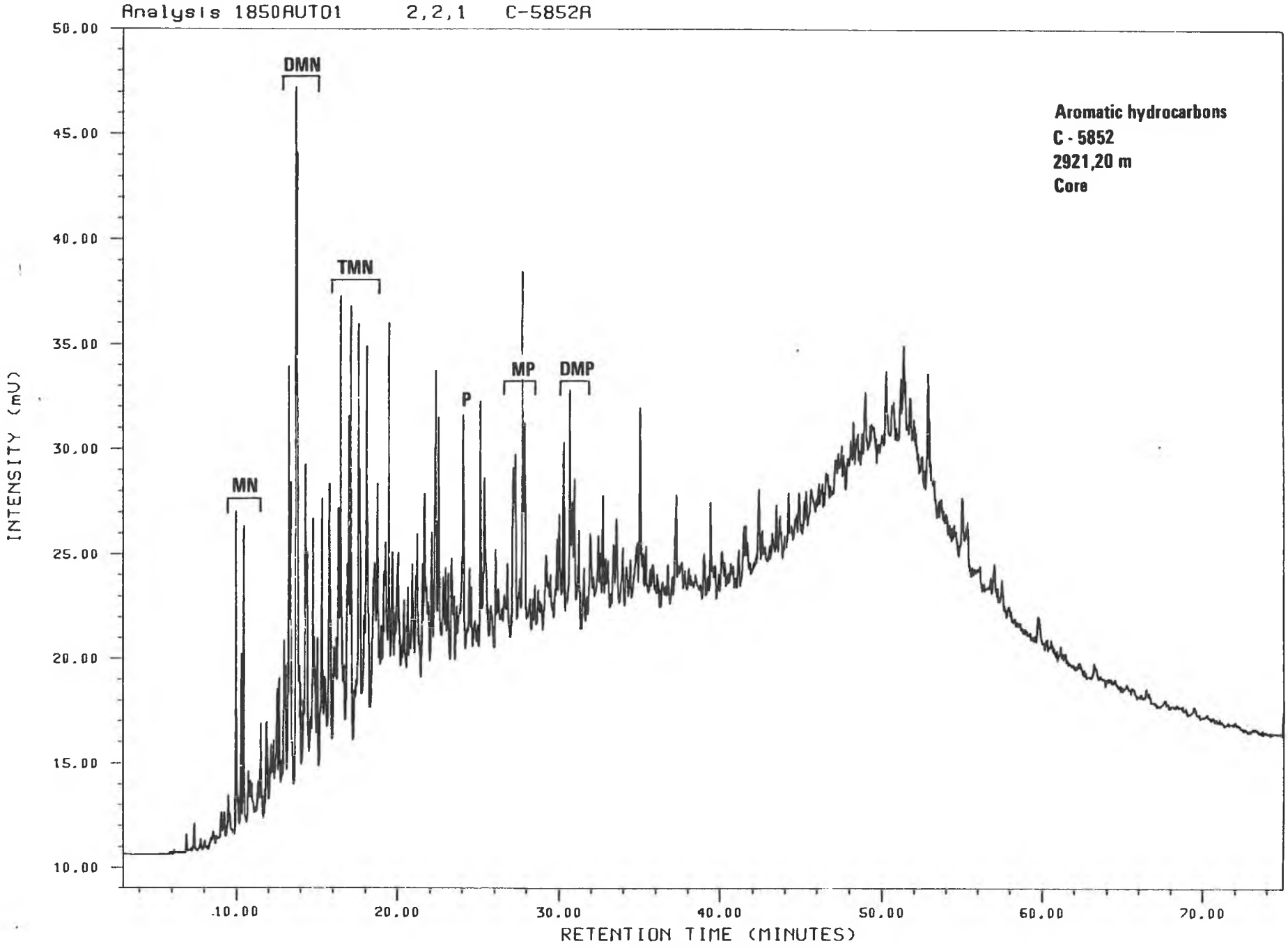

Analysis 850C5836A 2,1,1 STATOIL 15/12-5,ARO
Aromatic hydrocarbons
C - 5836
2844,00 m
SWC
MN
DMN
TMN
P
MP
DMP
INTENSITY (mV)
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
RETENTION TIME (MINUTES)

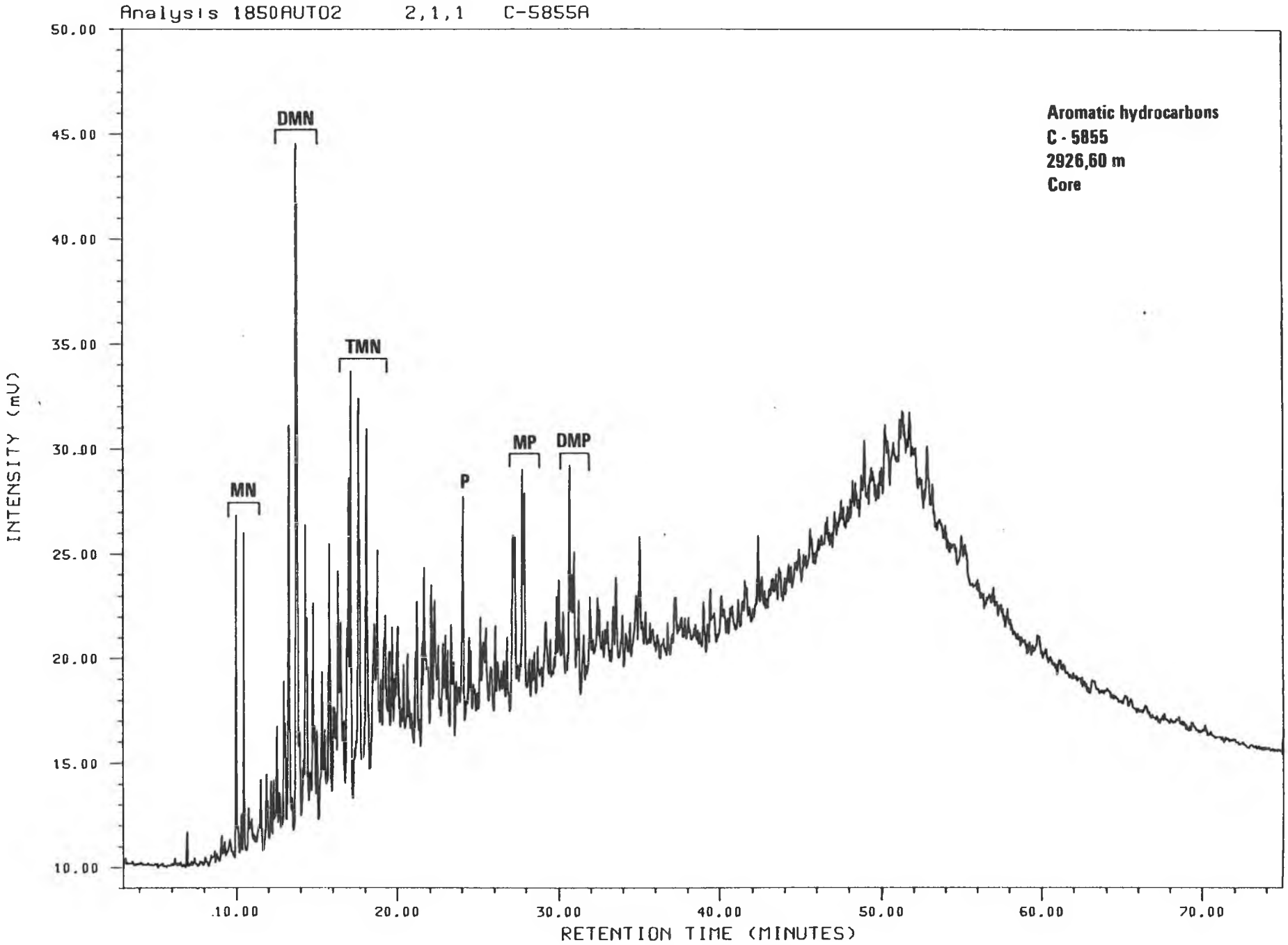

Analysis 850C5840A 2,1,1 C-5840,15/12-5,ARO.
Aromatic hydrocarbons
C - 5840
2860,00 m
SWC
MN
DMN
TMN
P
MP
DMP
INTENSITY (mU)
RETENTION TIME (MINUTES)
32.00
30.00
28.00
26.00
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00

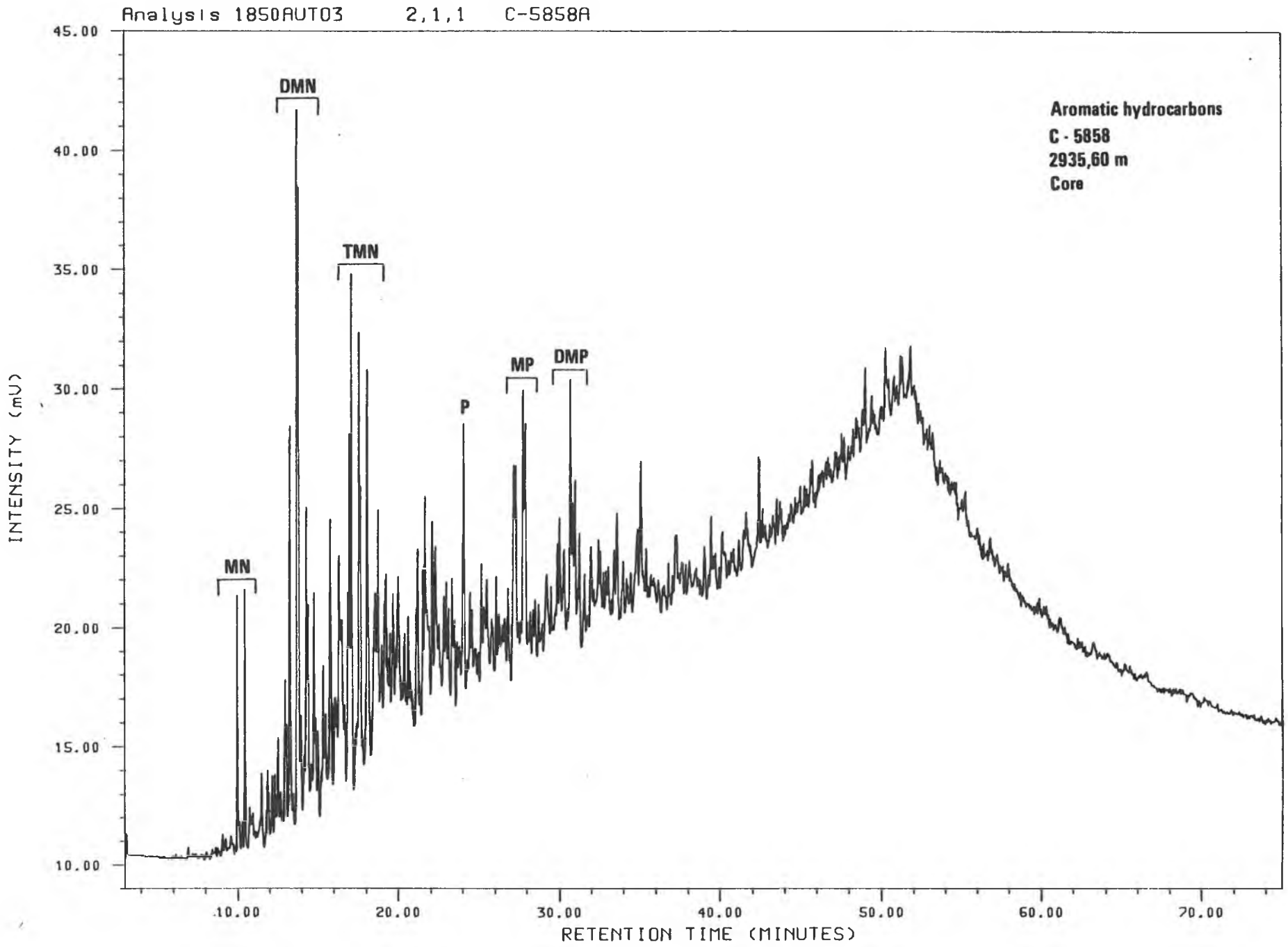

Analysis 850C5844A 2,1,1 STATOIL 15/12-5,ARO
Aromatic hydrocarbons
C - 5844
2880,00 m
SWC
P
MP
DMN
TMN
DMP
MN
INTENSITY (mU)
RETENTION TIME (MINUTES)
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00

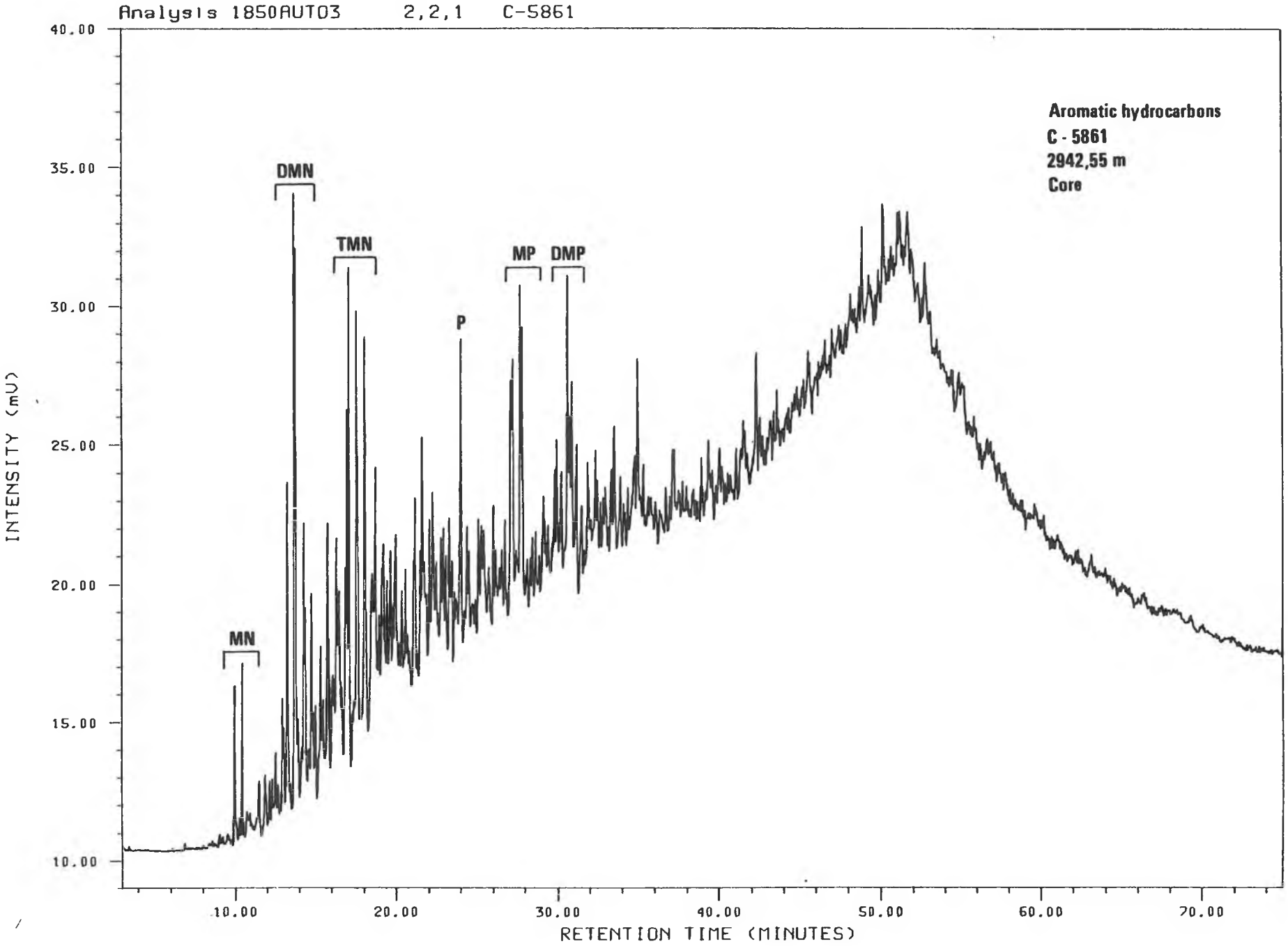

Analysis 1850AUT01 2,1,1 C-5848A
Aromatic hydrocarbons
C - 5848
2892,60 m
Core
MN
DMN
TMN
P
MP
DMP
INTENSITY (mU)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
RETENTION TIME (MINUTES)


Analysis 850C5849A 2,1,1 STATOIL 15/12-5,ARO
MN
DMN
TMN
P
MP
Aromatic hydrocarbons
C - 5849
2911,75 m
Core
INTENSITY (mV)
RETENTION TIME (MINUTES)
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00


Analysis 1850AUTO1 2,2,1 C-5852R
Aromatic hydrocarbons
C - 5852
2921,20 m
Core
DMN
TMN
MN
P
MP
DMP
INTENSITY (mV)
RETENTION TIME (MINUTES)
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00


Analysis 1850AUTO2 2,1,1 C-5855A
Aromatic hydrocarbons
C - 5855
2926,60 m
Core
DMN
TMN
MN
P
MP
DMP
INTENSITY (mV)
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
RETENTION TIME (MINUTES)


Analysis 1850AUT03 2,1,1 C-5858A
Aromatic hydrocarbons
C - 5858
2935,60 m
Core
MN
DMN
TMN
P
MP
DMP
INTENSITY (mV)
RETENTION TIME (MINUTES)
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00


Analysis 1850AUT03 2,2,1 C-5861
Aromatic hydrocarbons
C - 5861
2942,55 m
Core
MN
DMN
TMN
P
MP
DMP
INTENSITY (mV)
RETENTION TIME (MINUTES)
40.00
35.00
30.00
25.00
20.00
15.00
10.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00

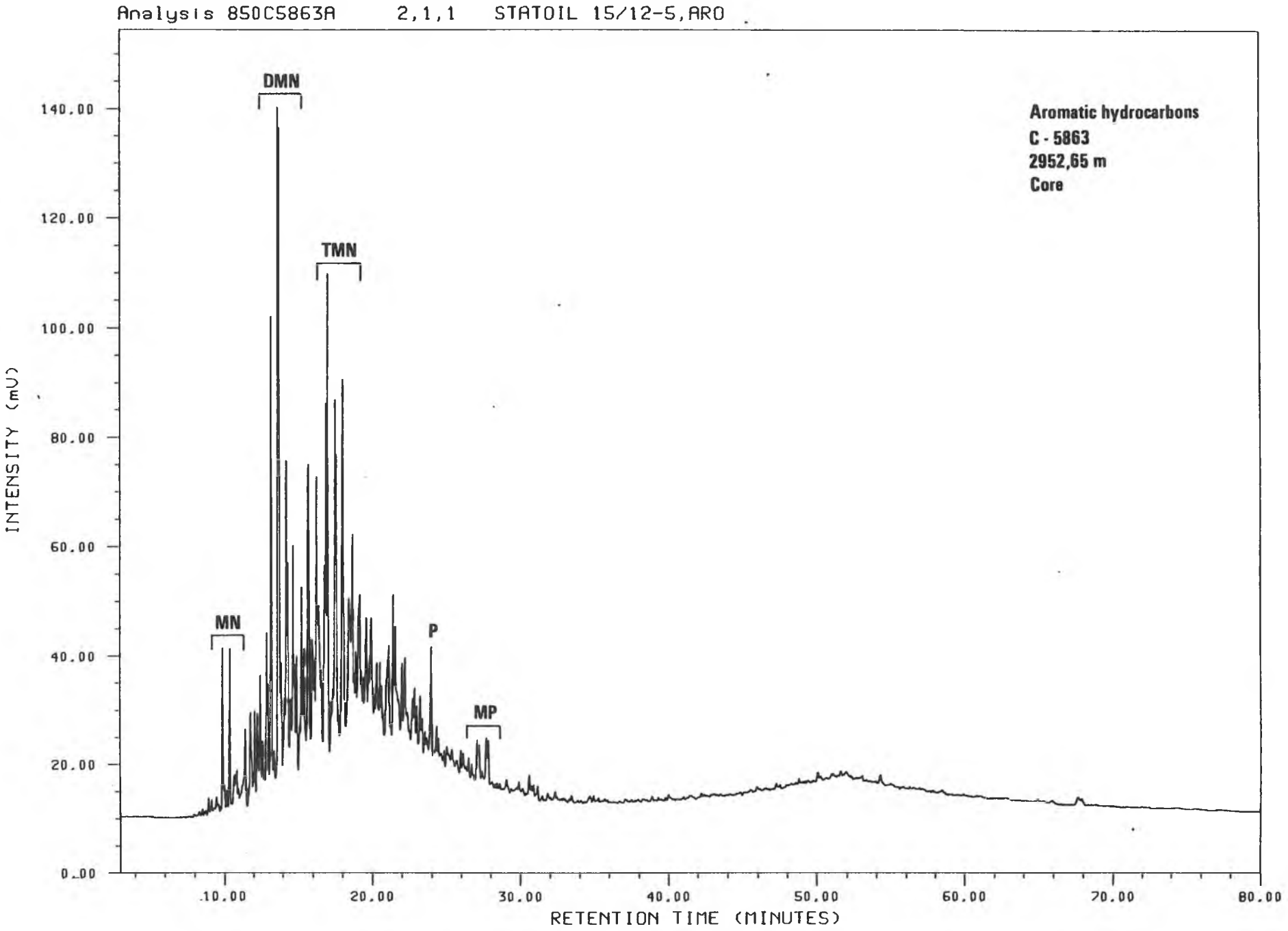
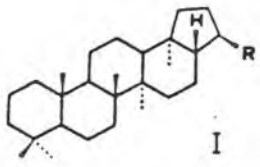

Analysis 850C5863A 2,1,1 STATOIL 15/12-5,ARO
DMN
TMN
MN
P
MP
Aromatic hydrocarbons
C - 5863
2952,65 m
Core
INTENSITY (mV)
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
RETENTION TIME (MINUTES)

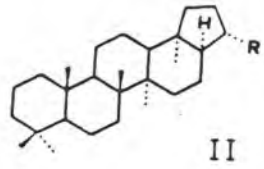
Figure 4.

Mass chromatograms representing terpanes (m/z 191) and m/z 205.

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



I



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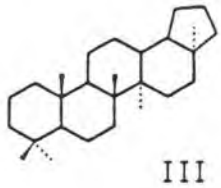

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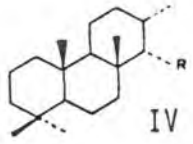

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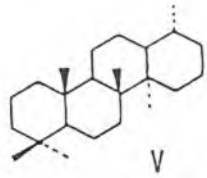
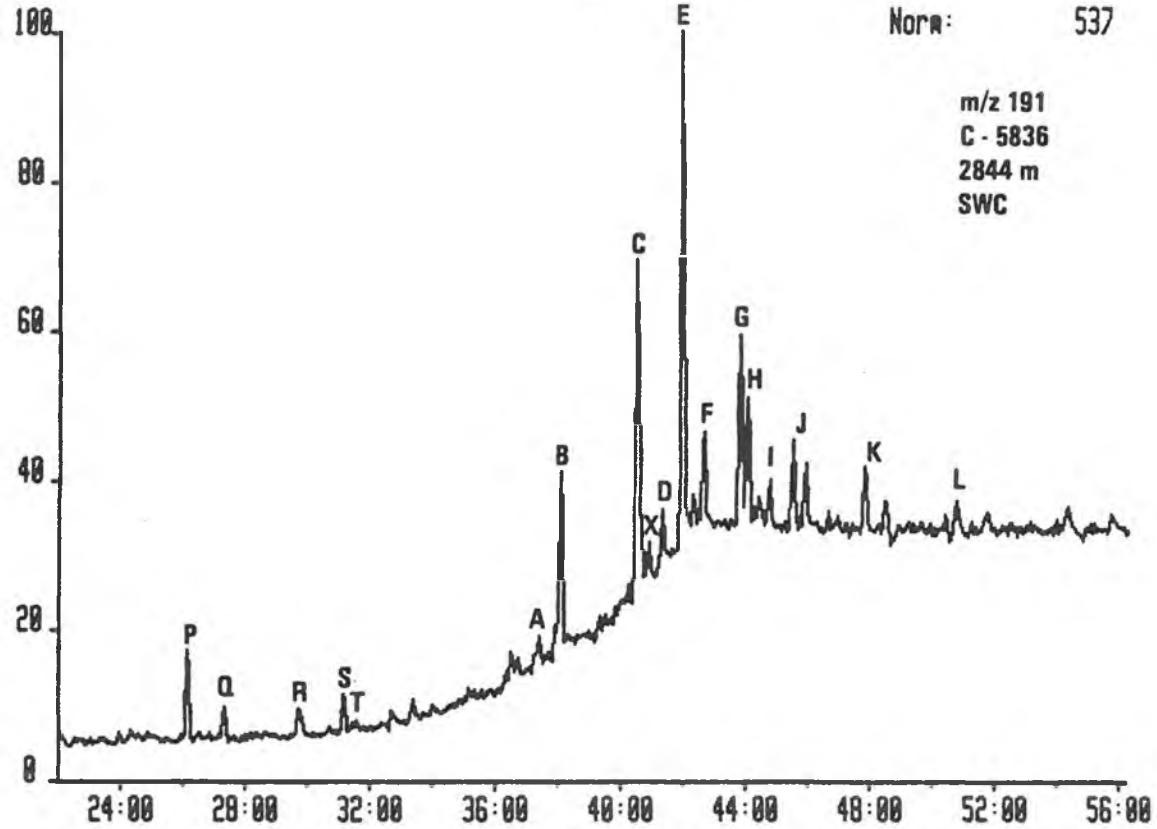


V

C5836SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:



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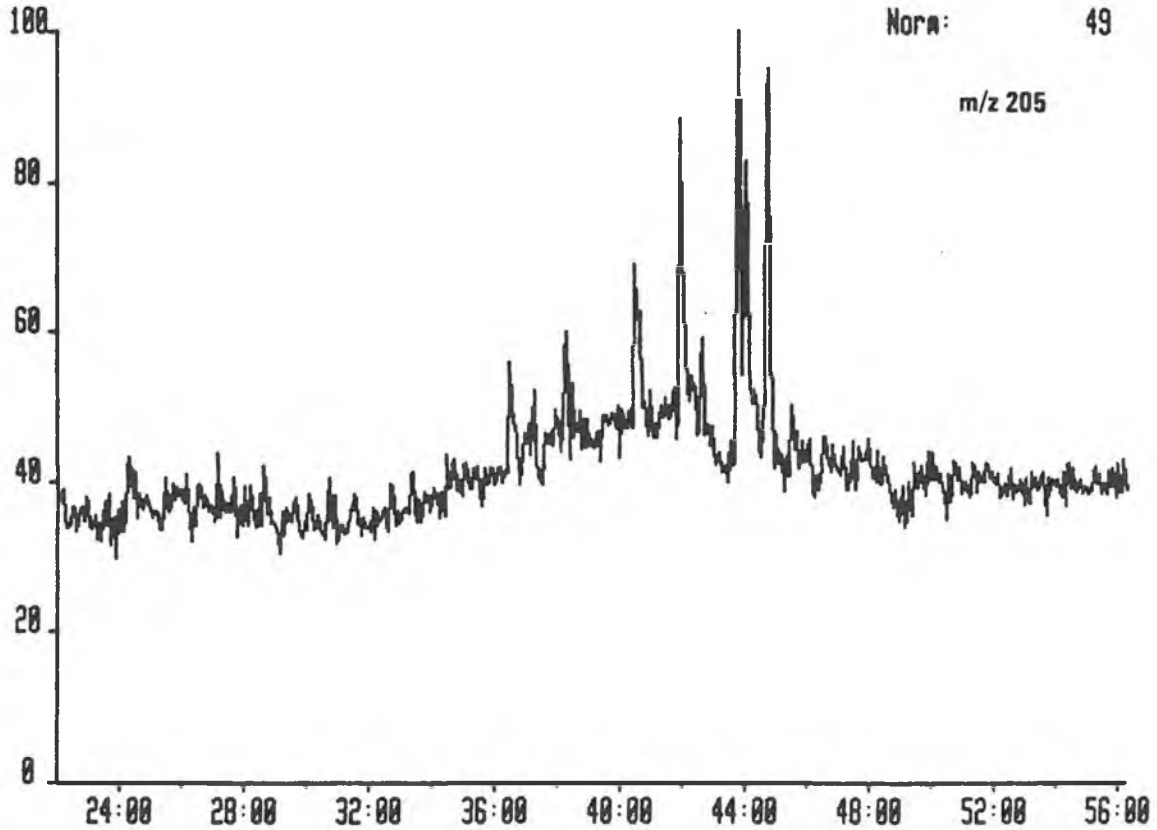
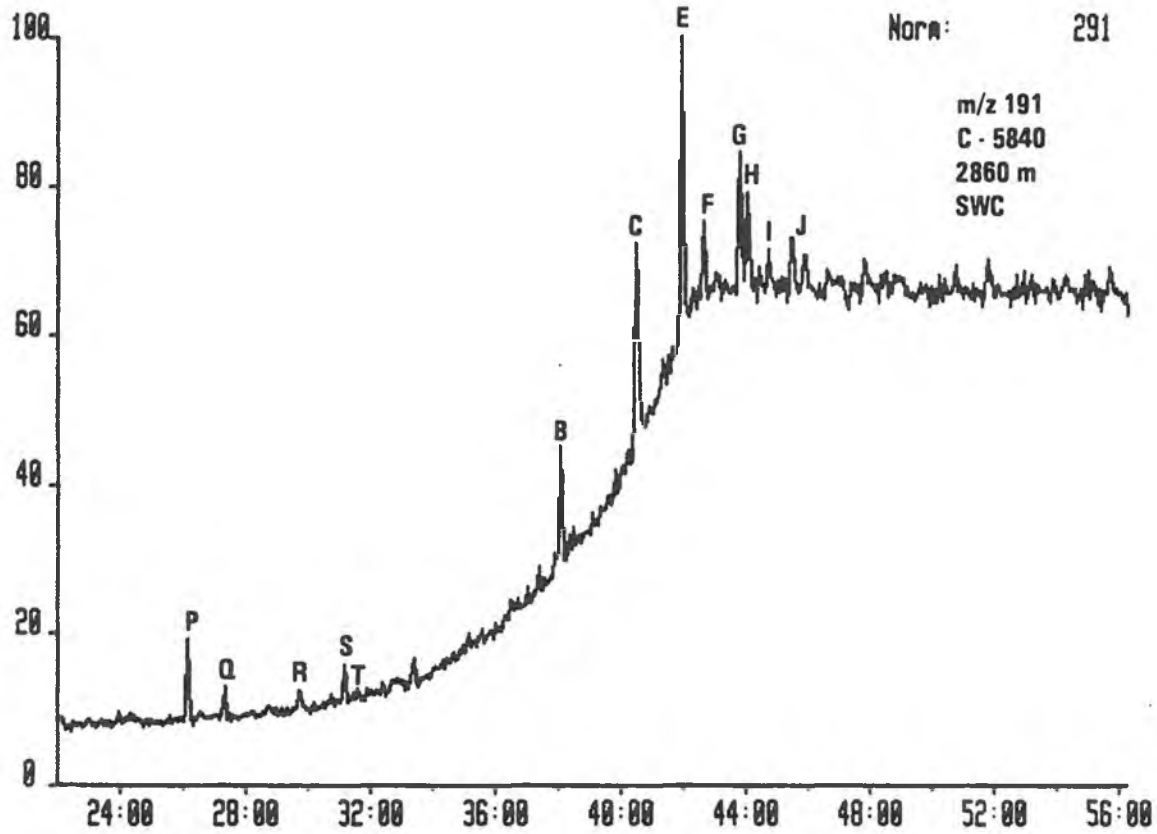
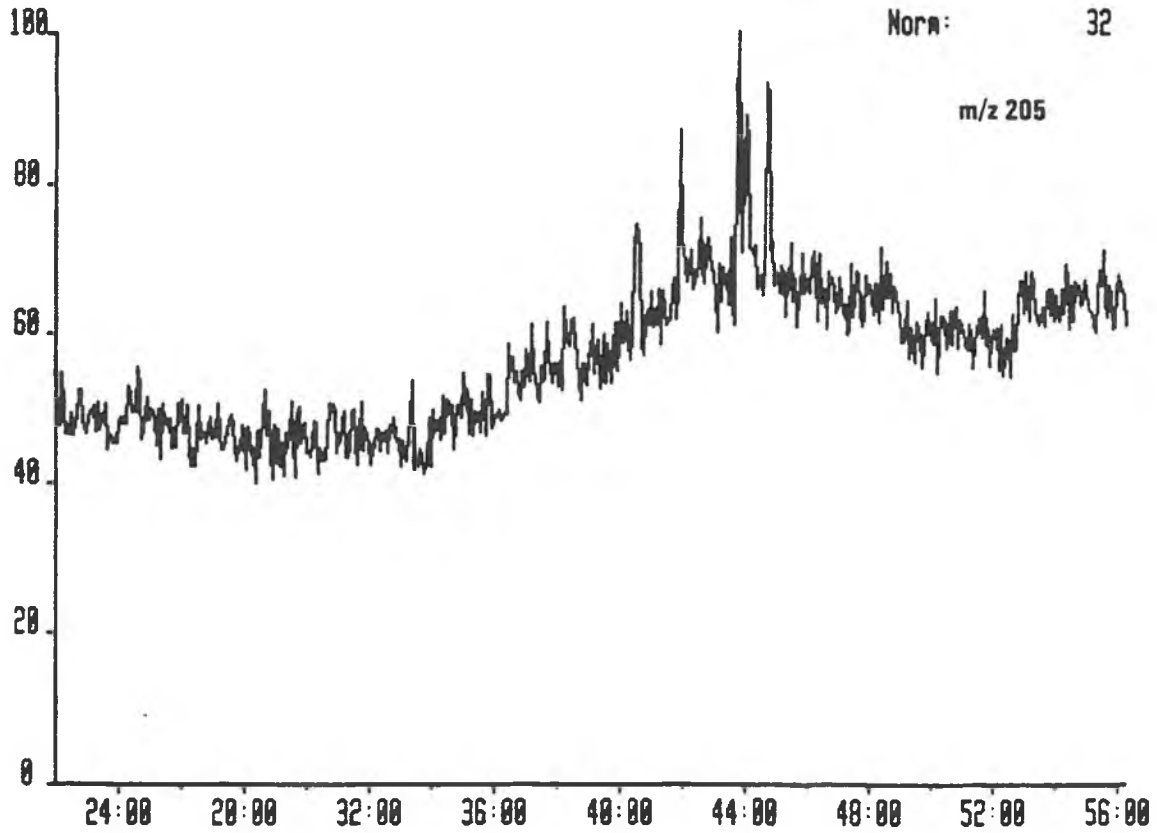
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:



C5840SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:



C5840SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:



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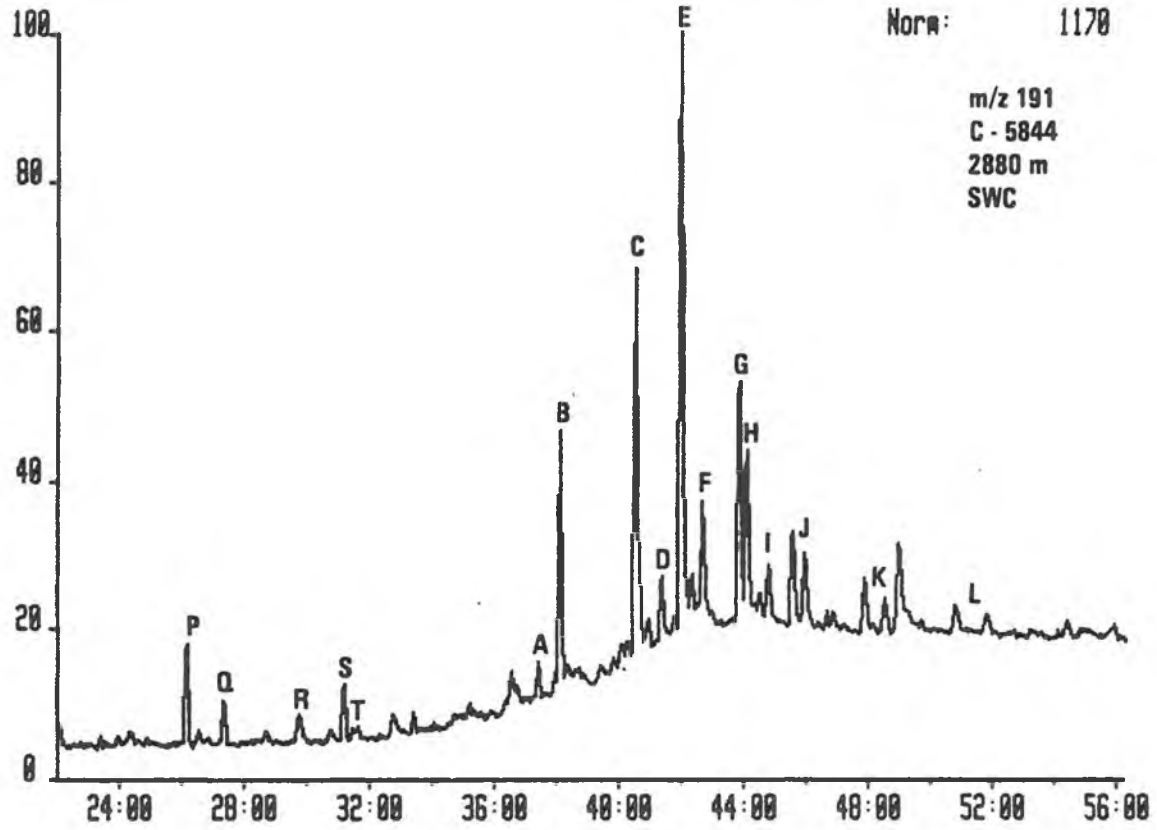
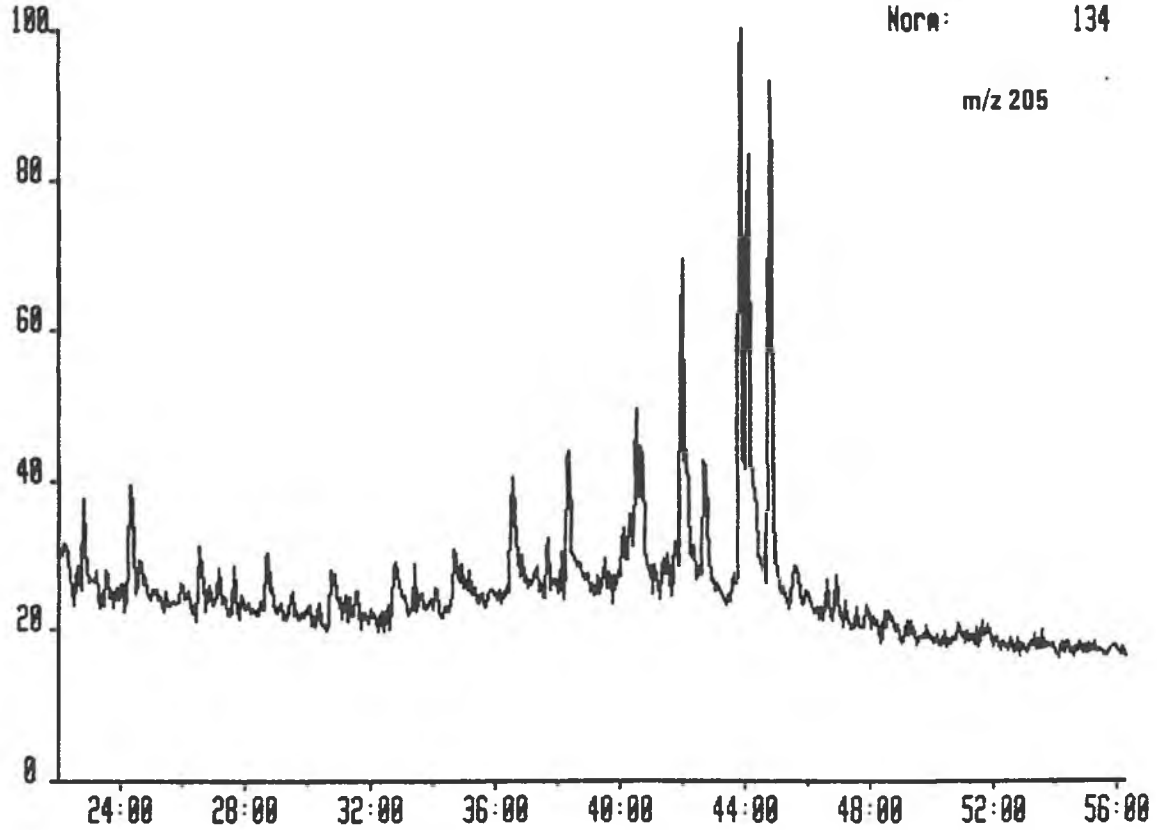
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:



C5844SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:



C5848SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 191.1000
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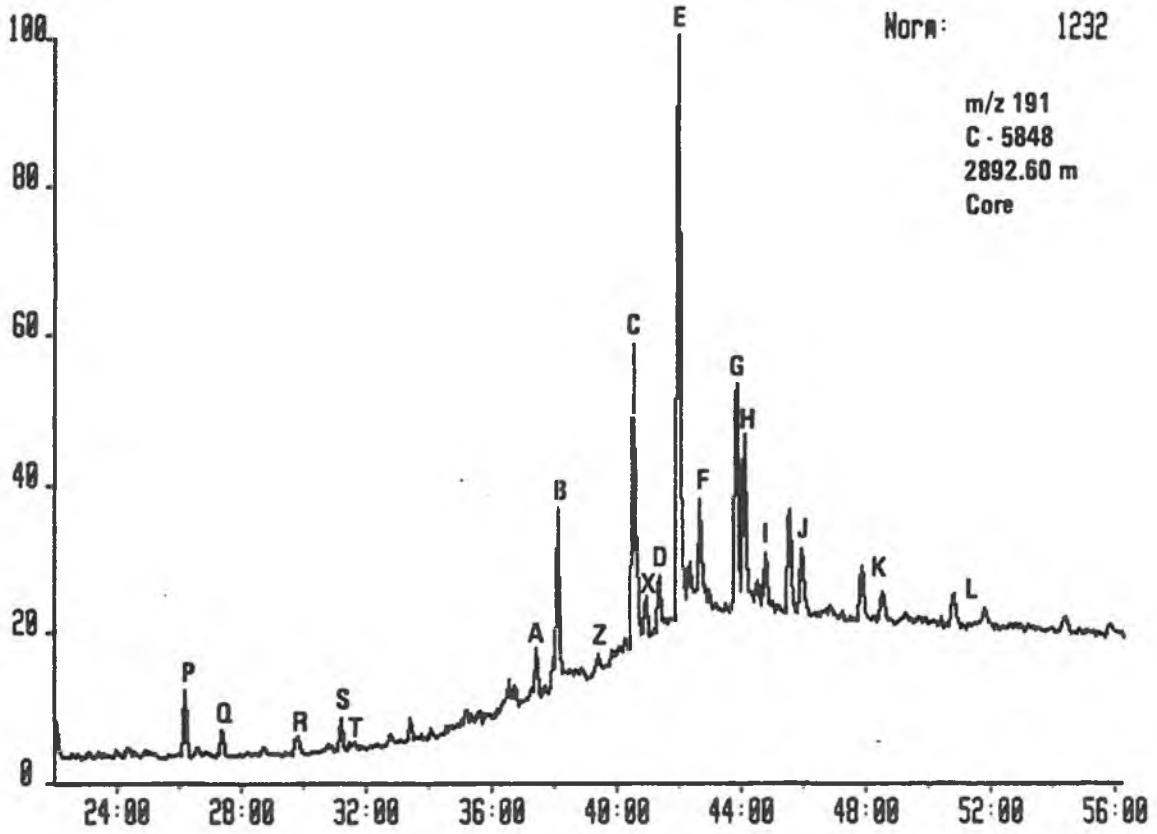

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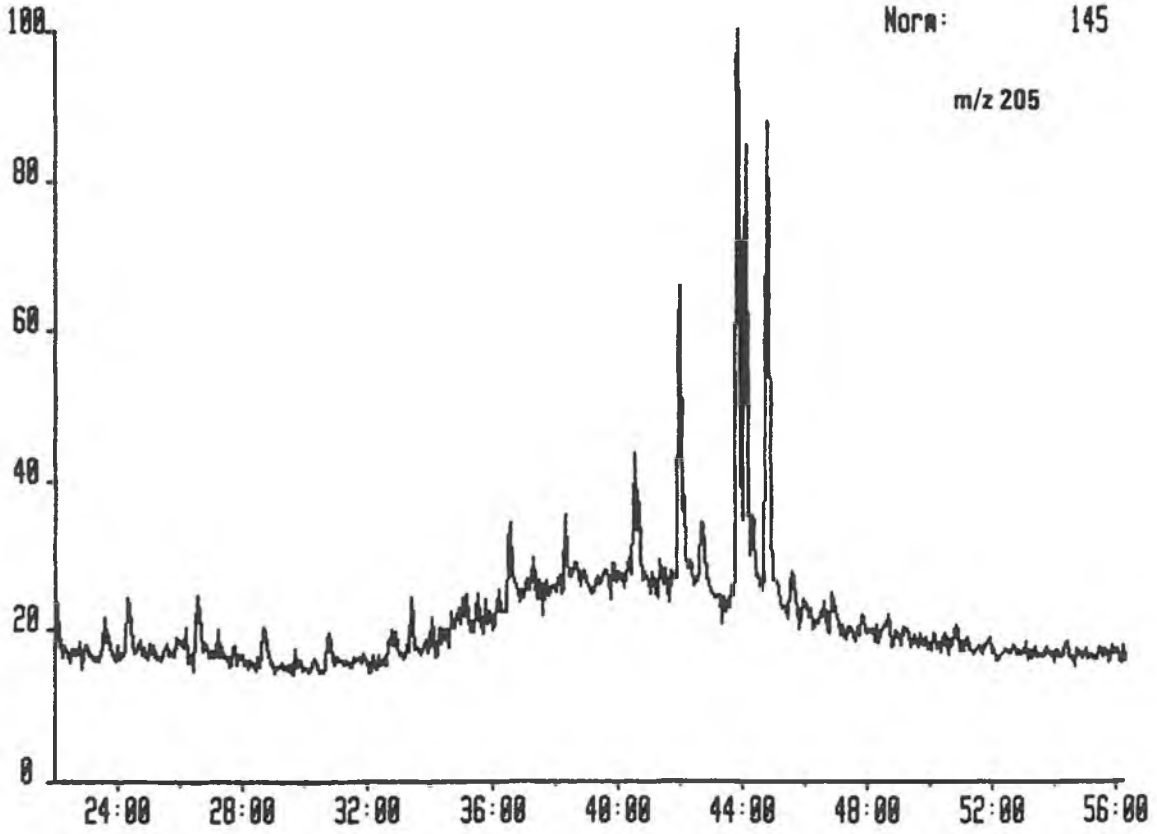
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:



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Sample 1 Injection 1 Group 1 Mass 191.1000
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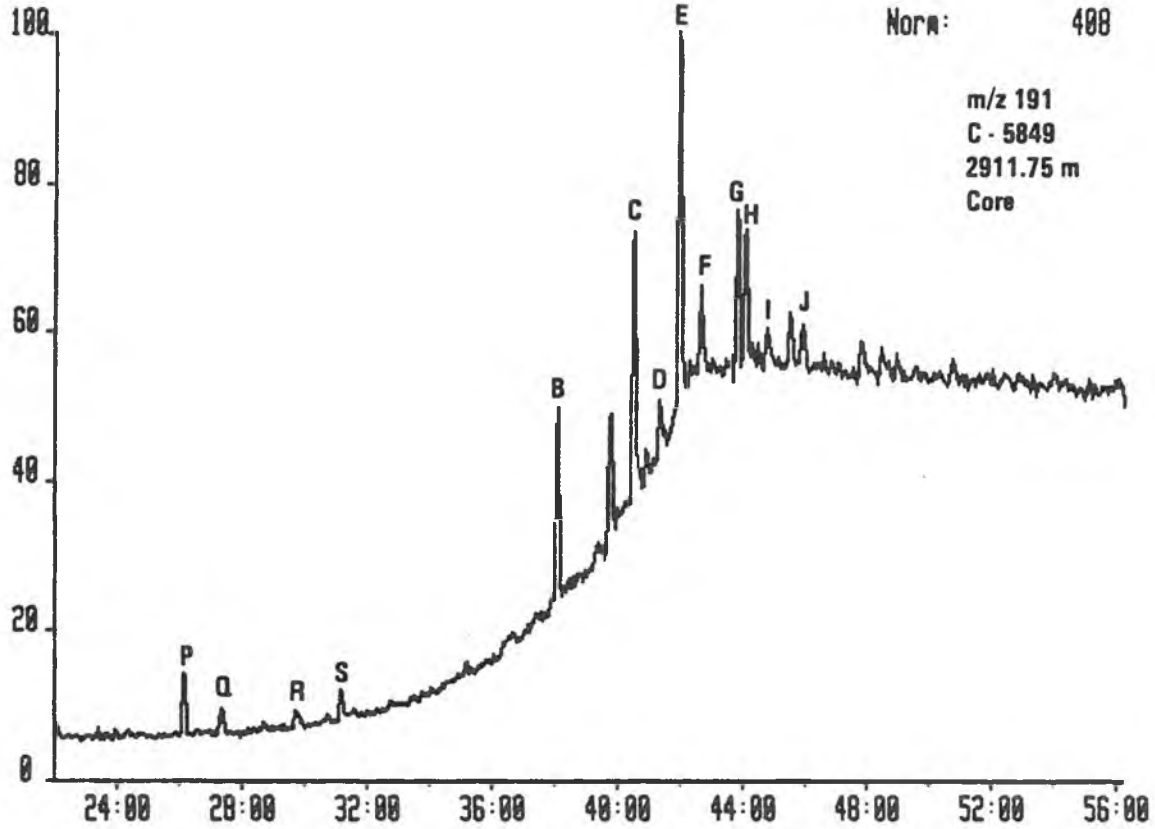

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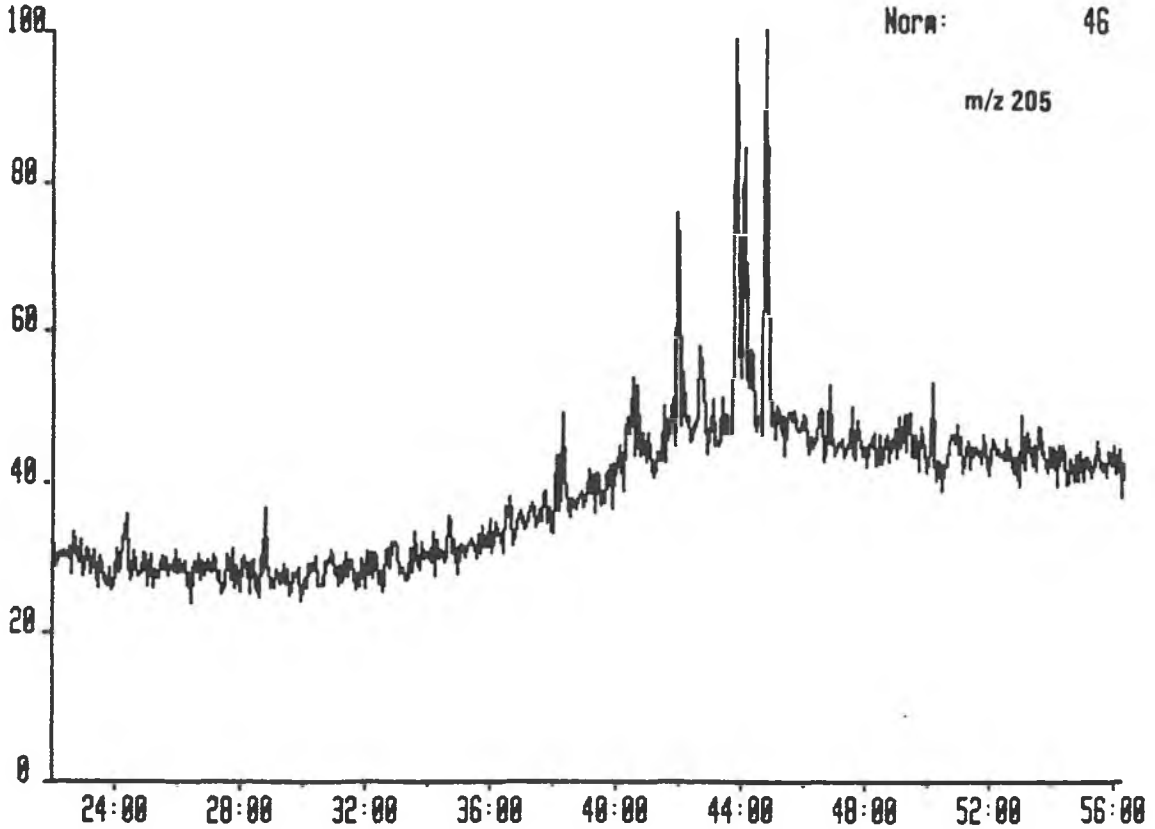
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:



C5852SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 191.1000
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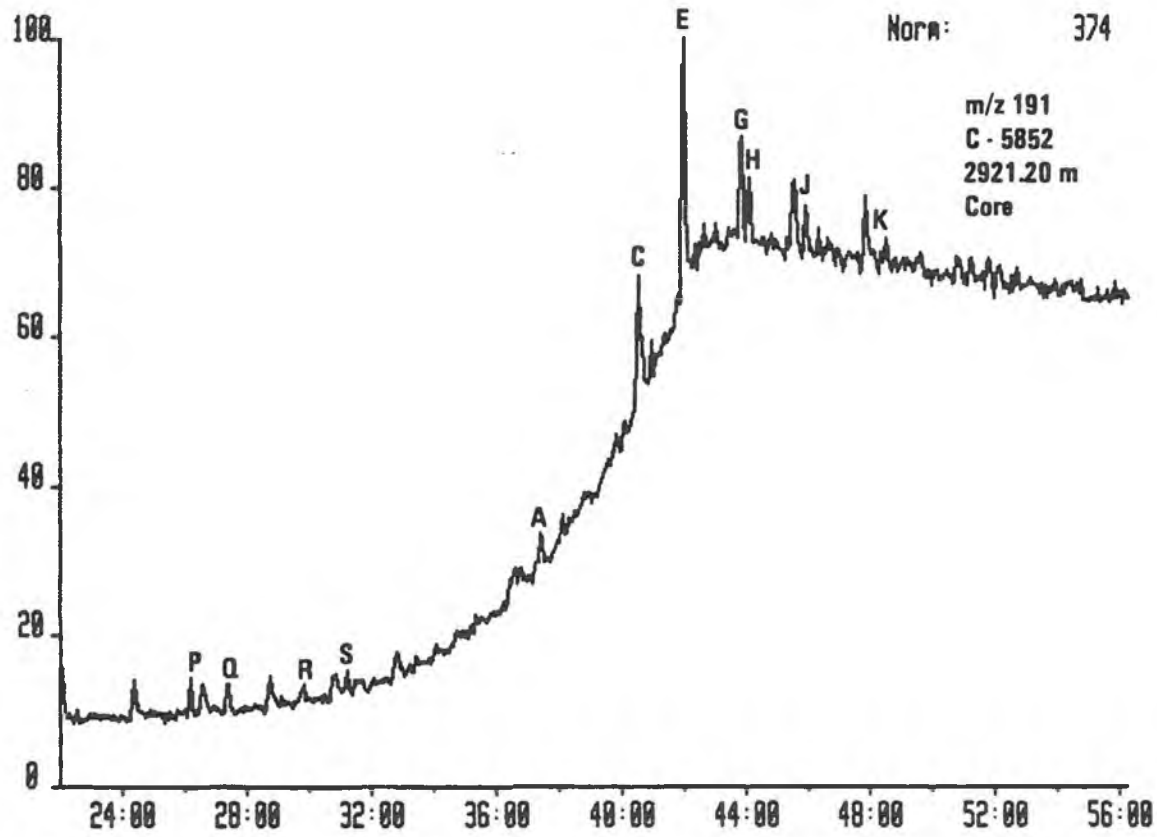

C5852SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 205.1000
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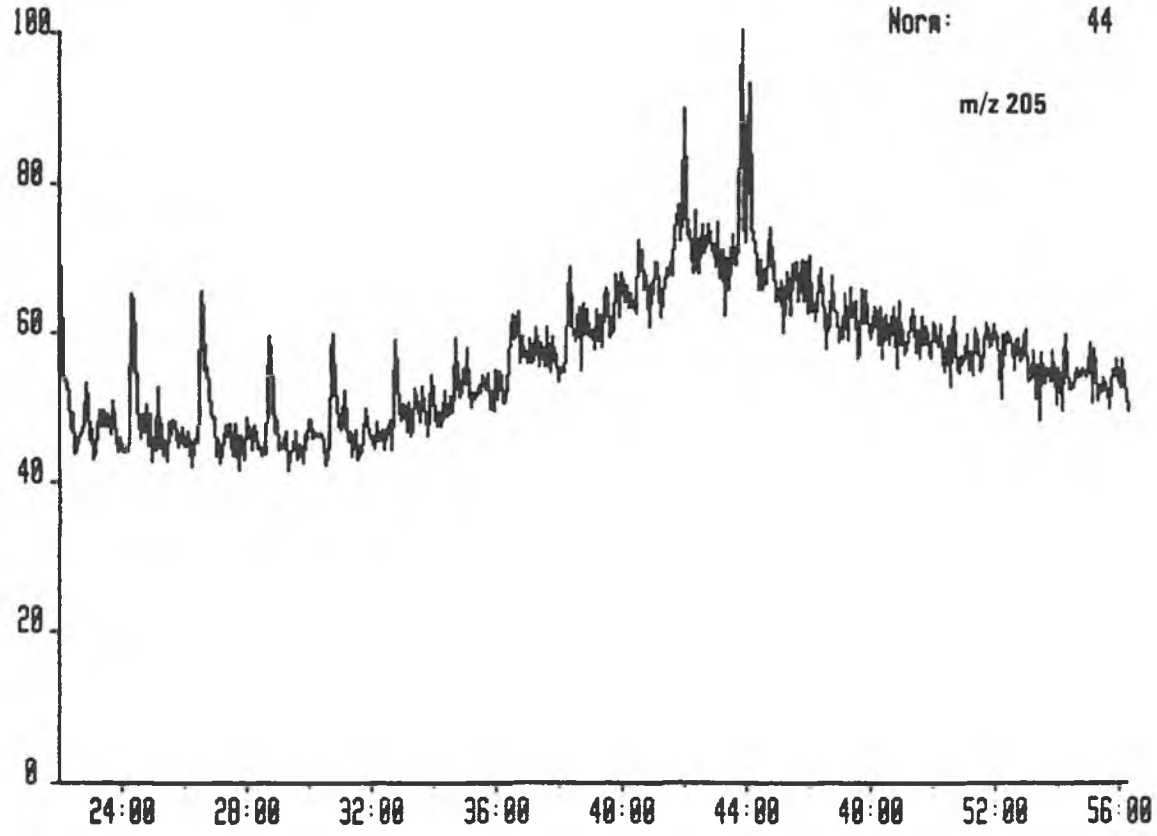

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Sample 1 Injection 1 Group 1 Mass 191.1000
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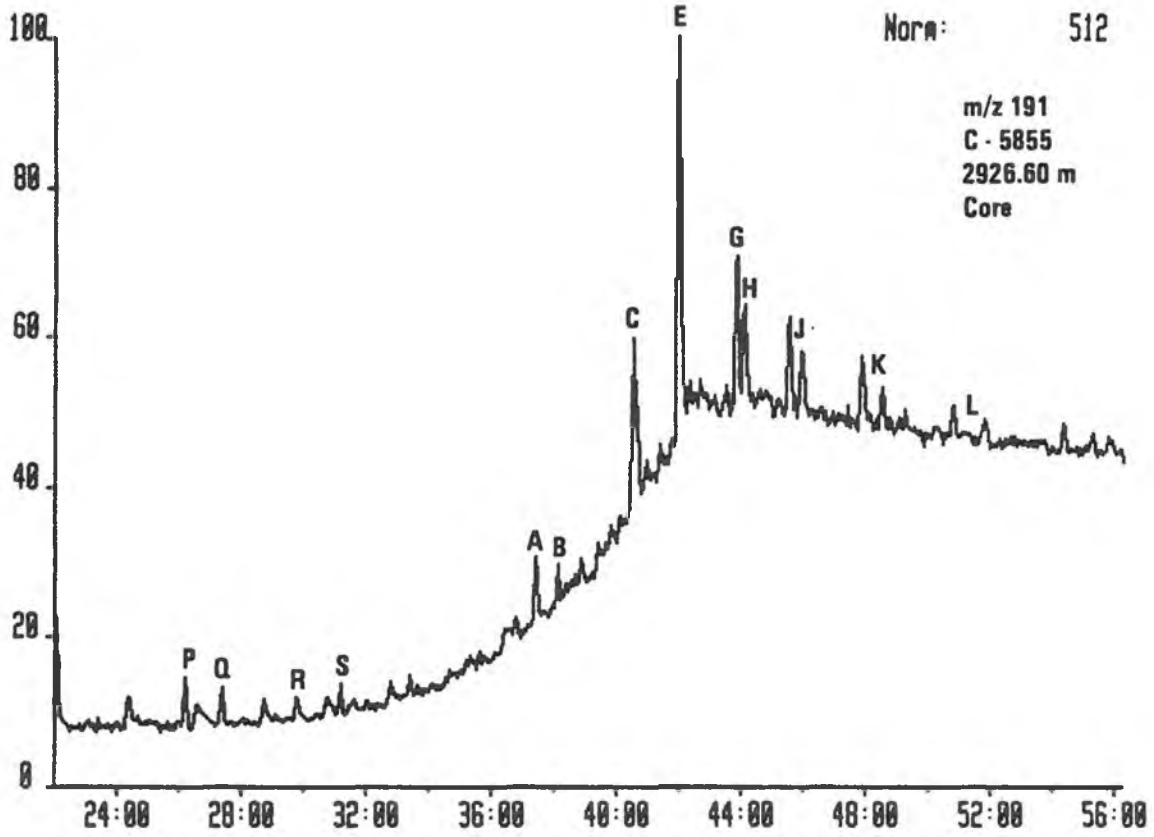

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Sample 1 Injection 1 Group 1 Mass 205.1000
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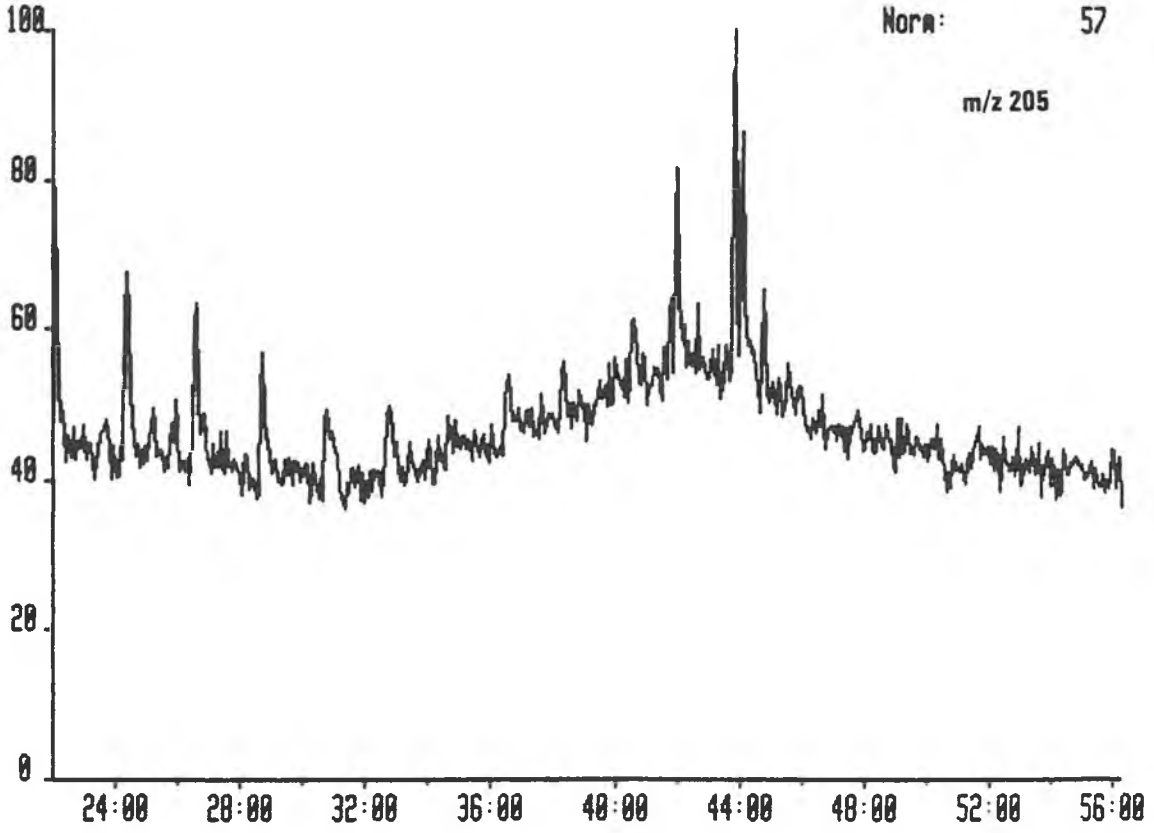

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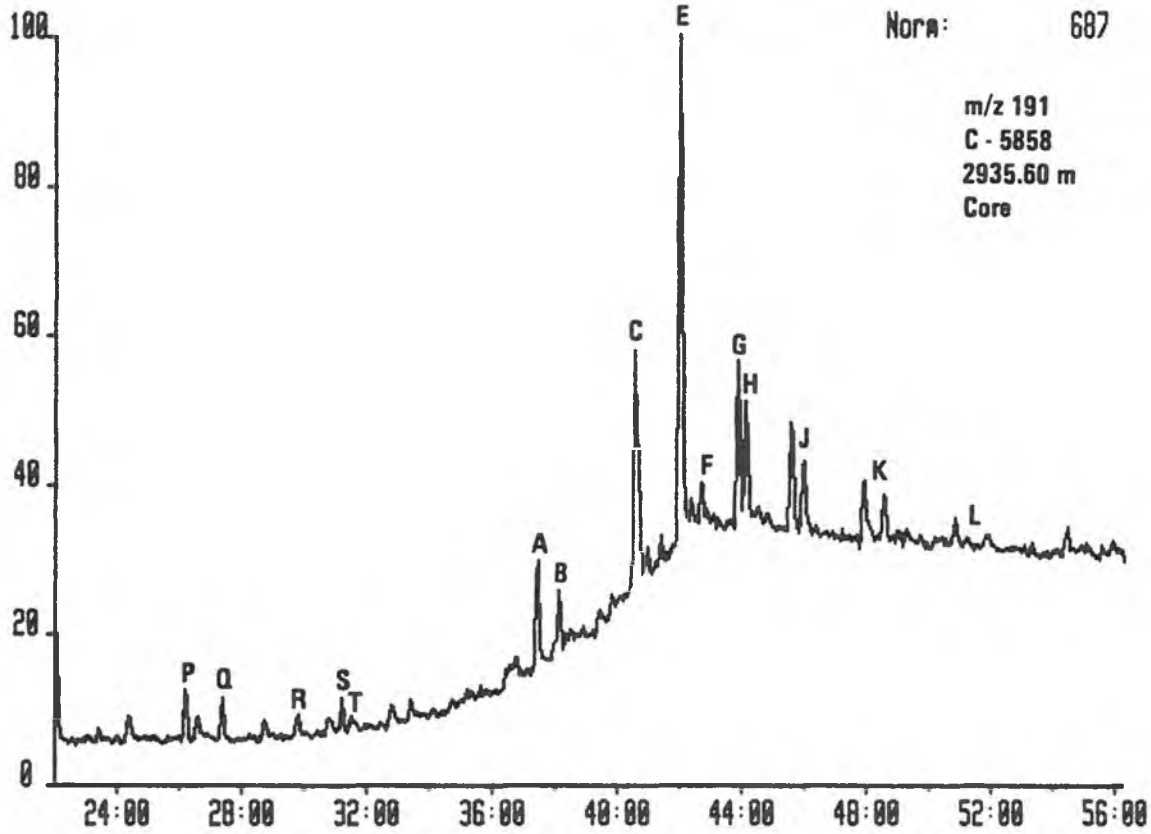

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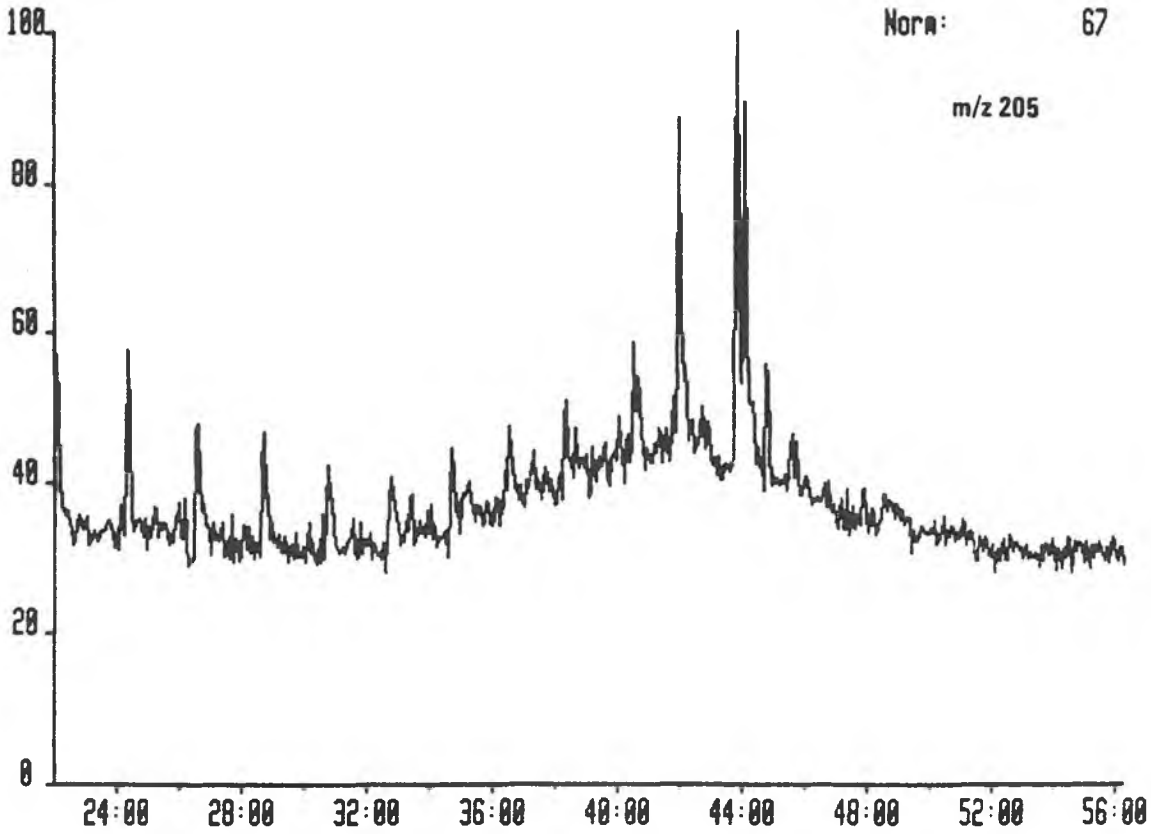

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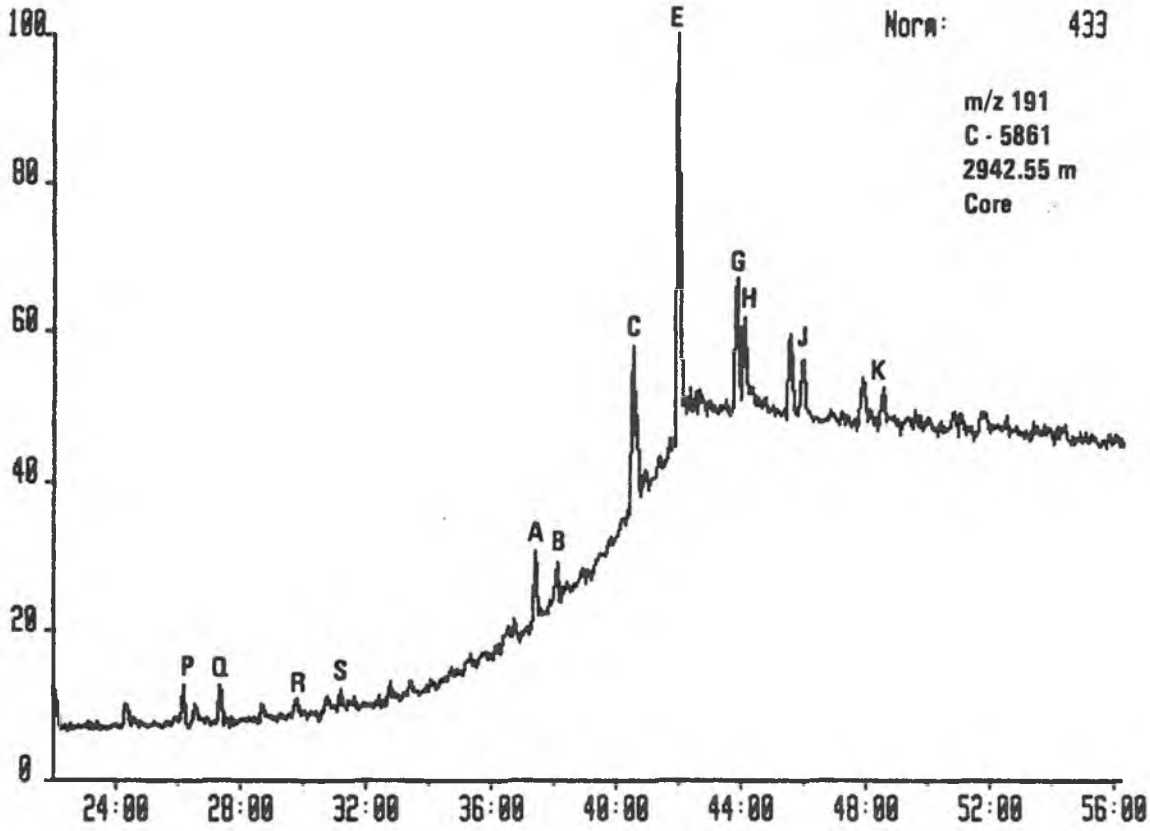

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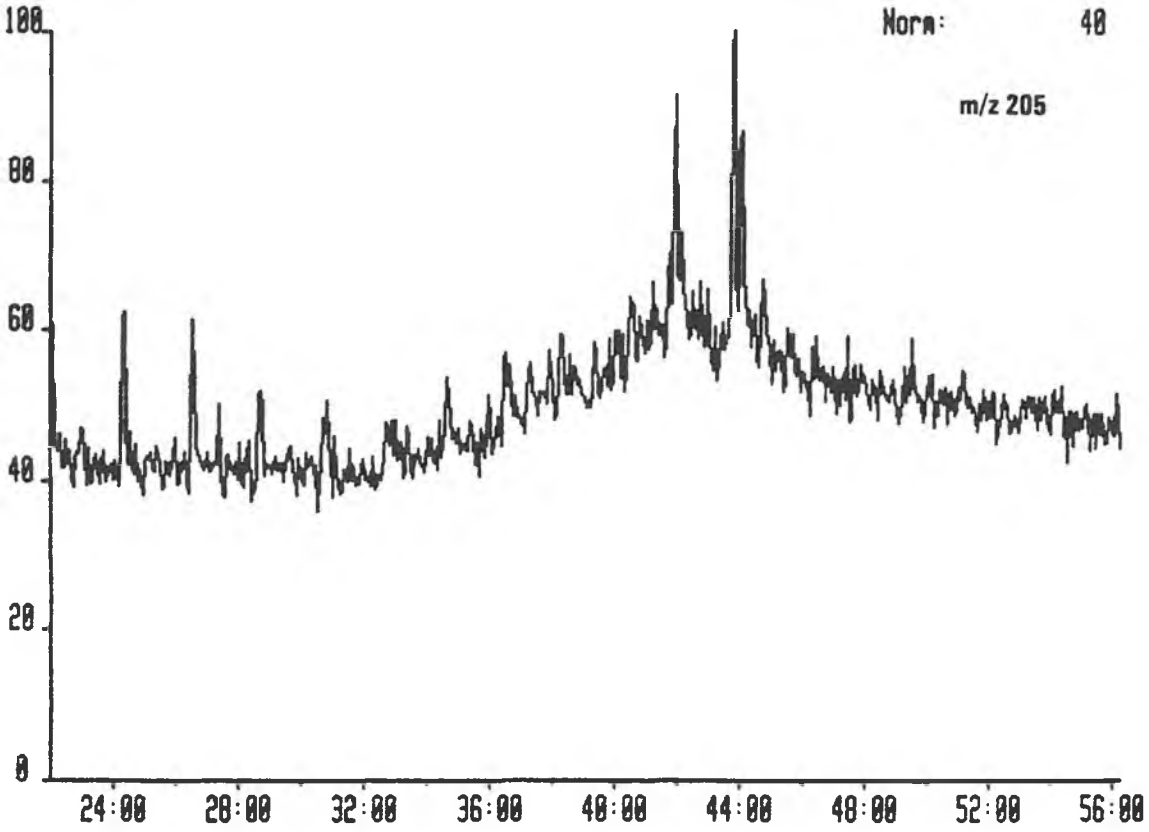
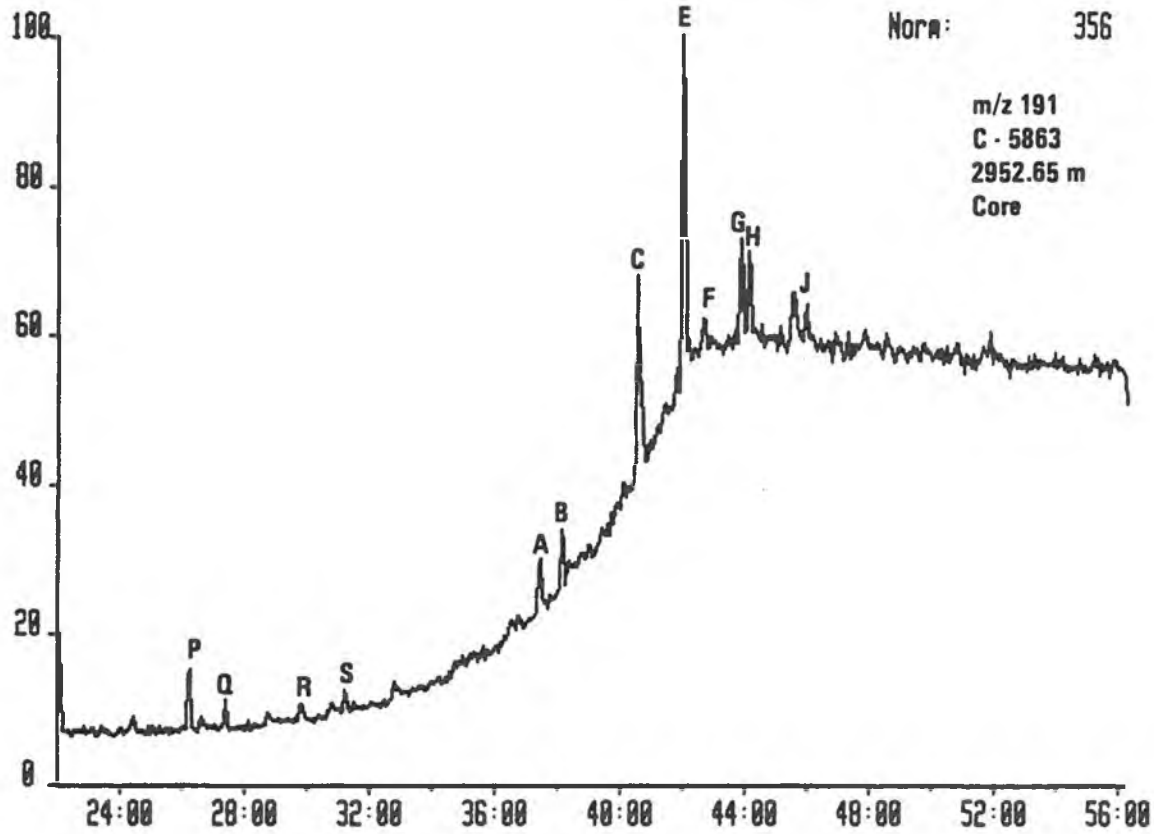


C5863SAT2 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:



C5863SAT2 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 205.1000
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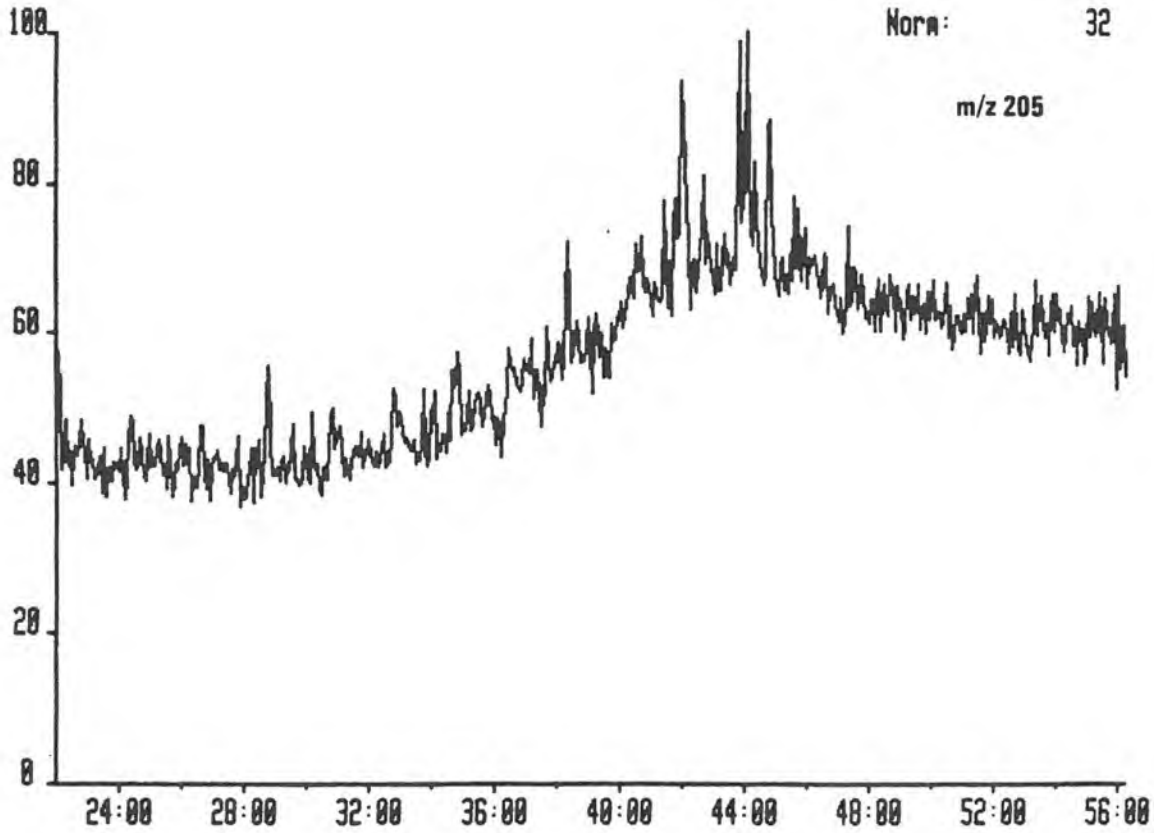
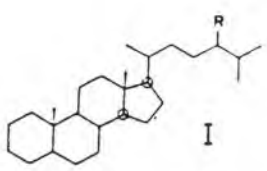
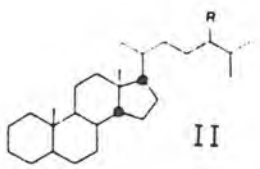


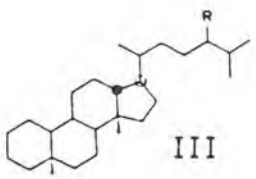
Figure 5.

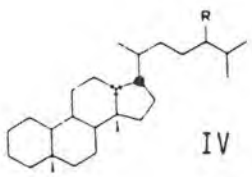
Mass chromatograms representing steranes (m/z 217 and 218)

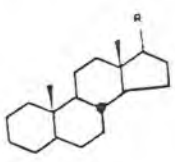
a	13β(H),17α(H)-diasterane (20S)	$C_{27}H_{48}$	(III,R=H)
b	13β(H),17α(H)-diasterane (20R)	$C_{27}H_{48}$	(III,R=H)
c	13α(H),17β(H)-diasterane (20S)	$C_{27}H_{48}$	(IV,R=H)
d	13α(H),17β(H)-diasterane (20R)	$C_{27}H_{48}$	(IV,R=H)
e	13β(H),17α(H)-diasterane (20S)	$C_{28}H_{50}$	(III,R=CH_3)
f	13β(H),17α(H)-diasterane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



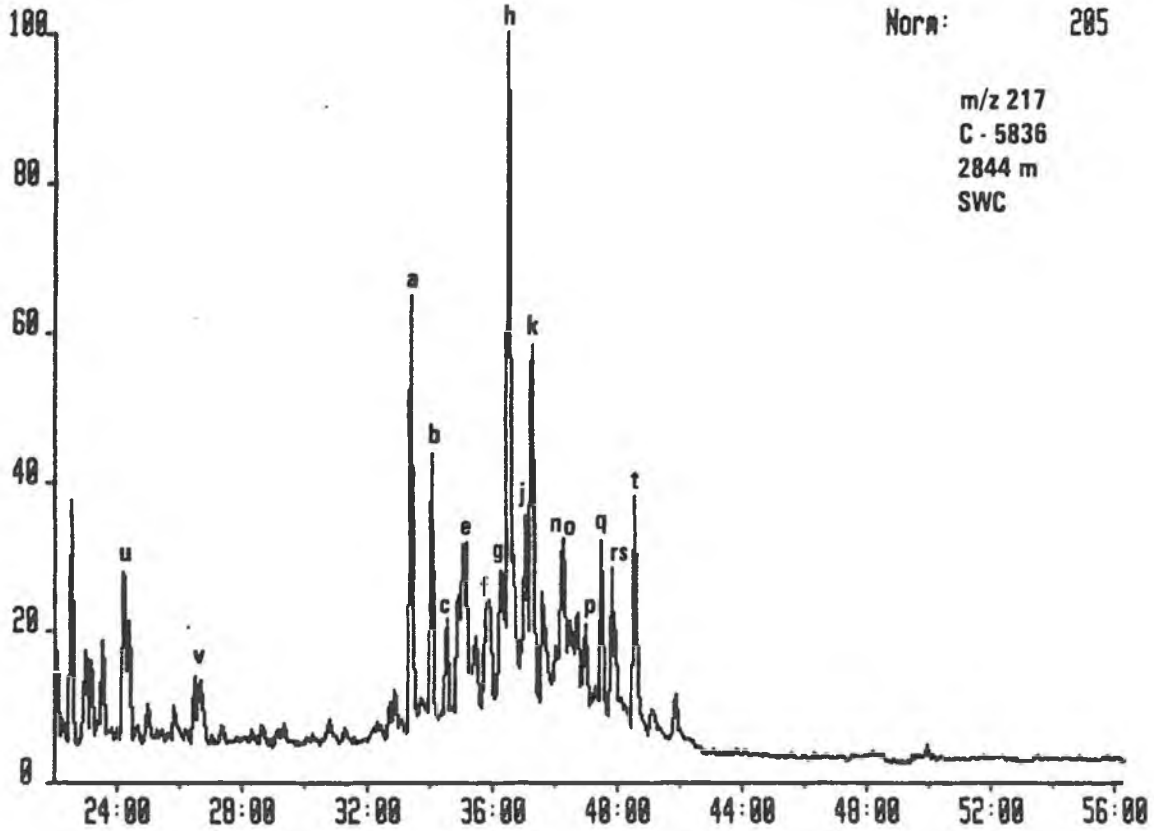




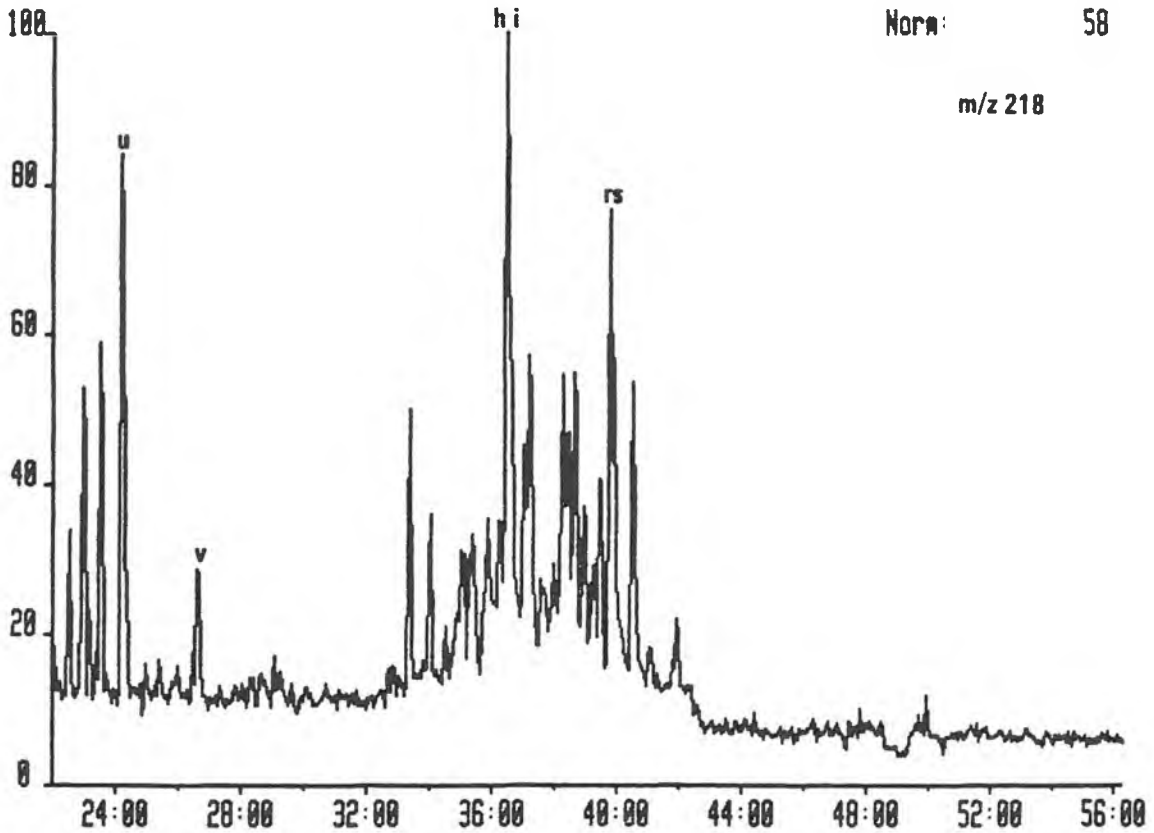




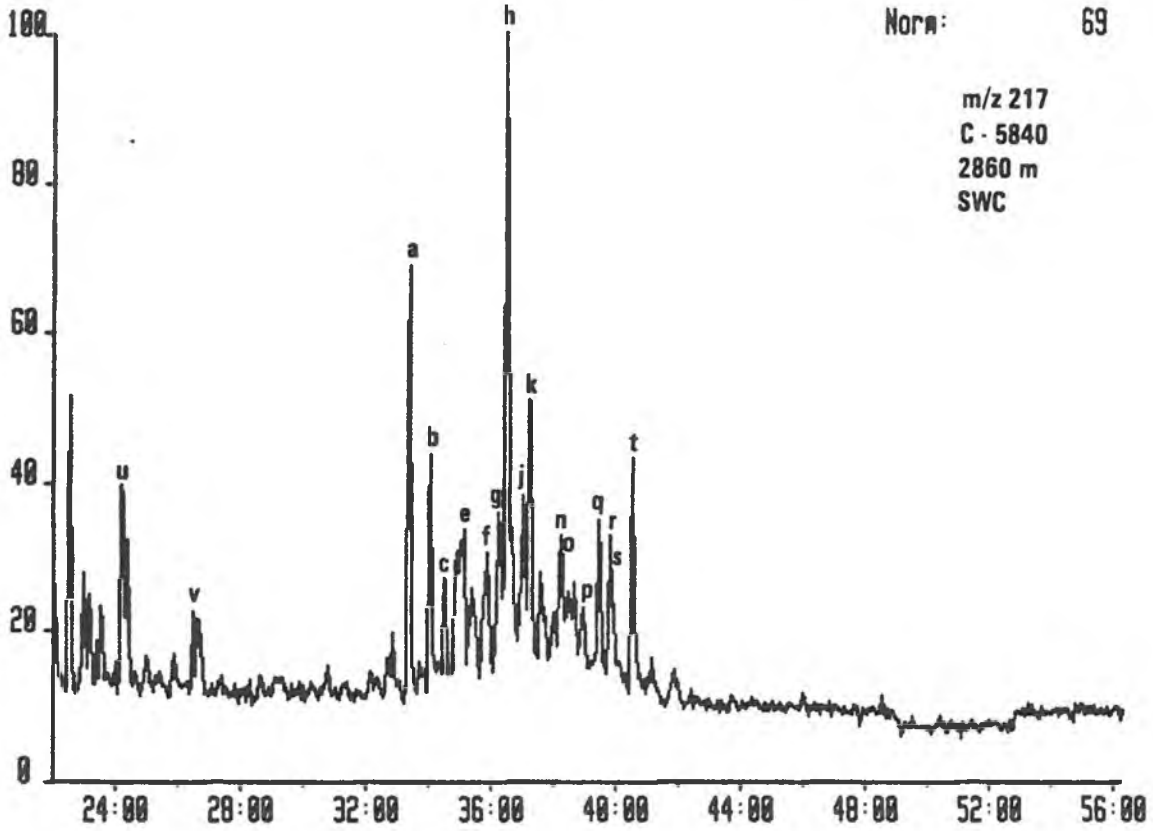
C5836SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



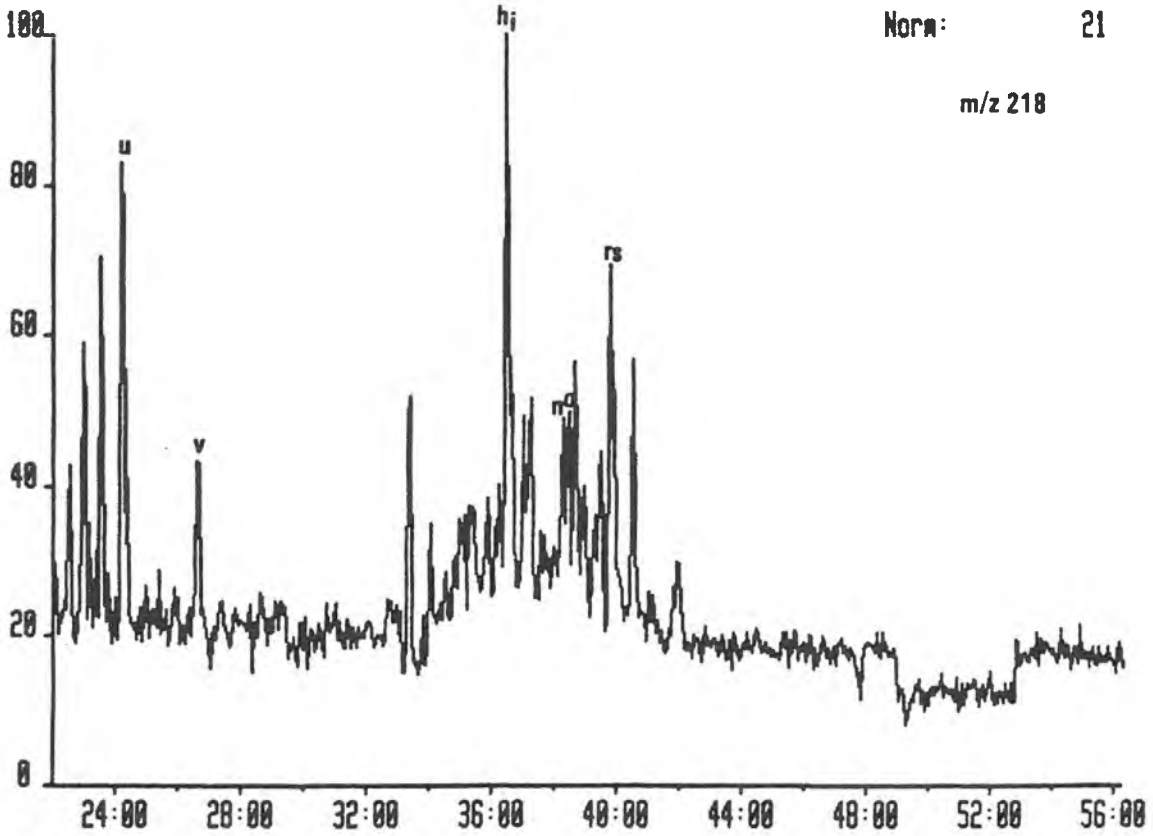
C5836SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:



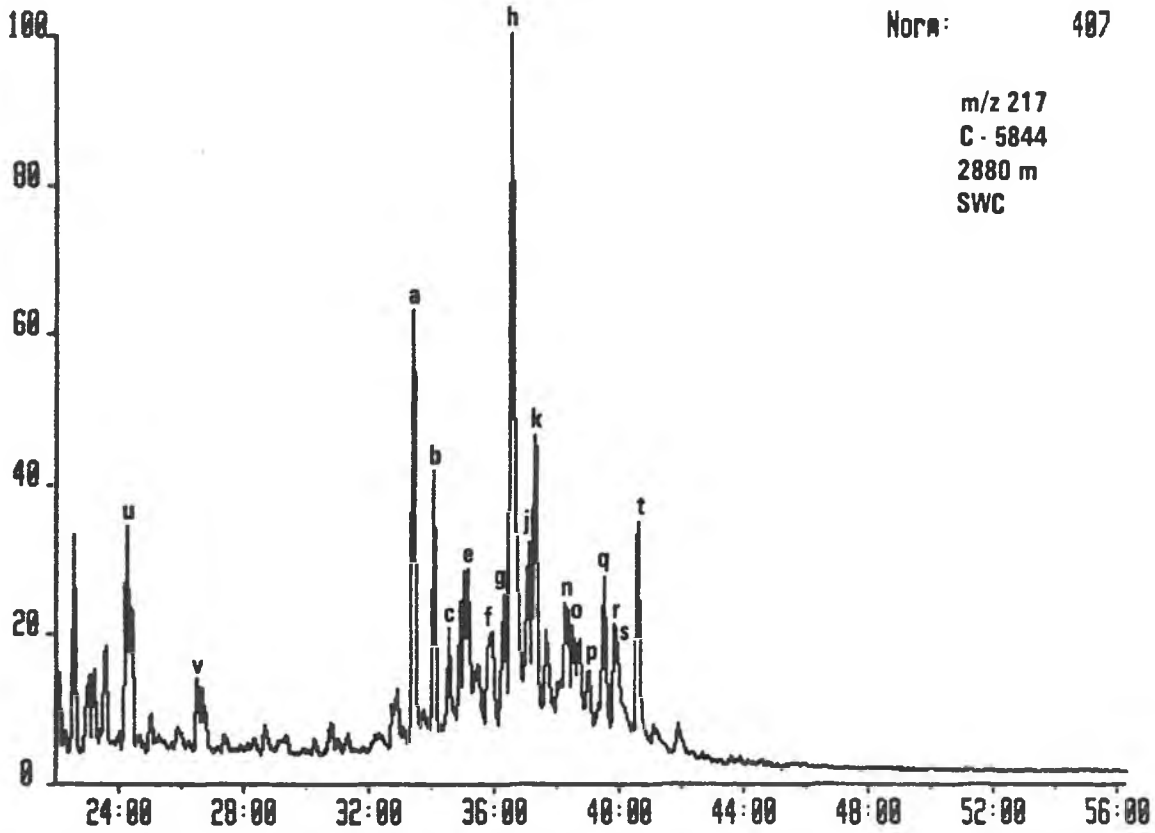
C5840SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



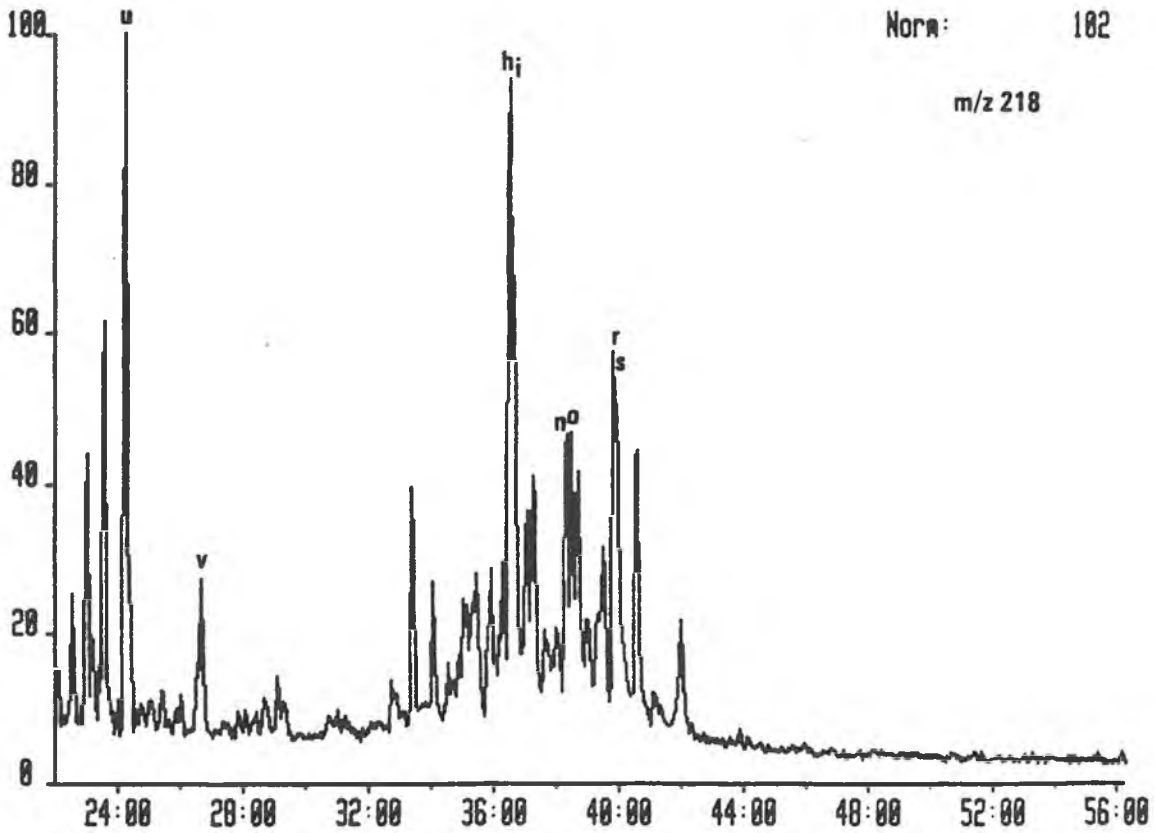
C5840SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:



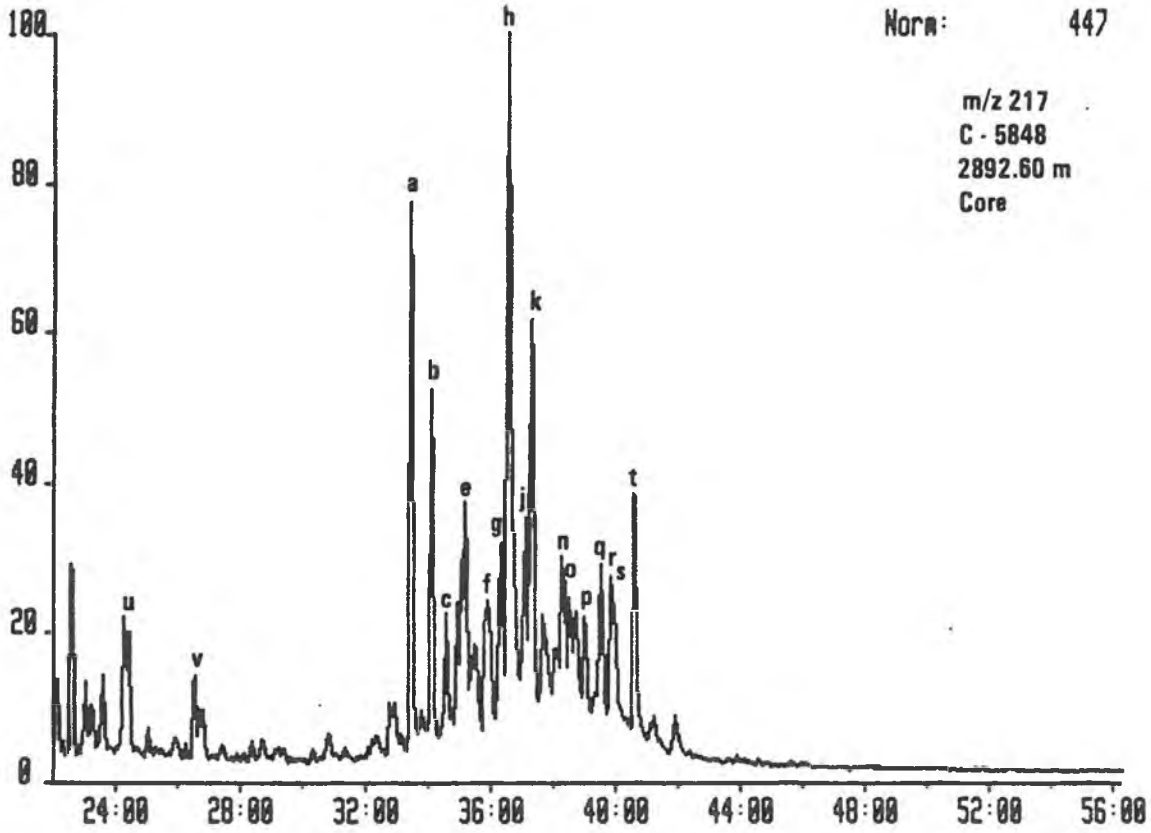
C5844SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



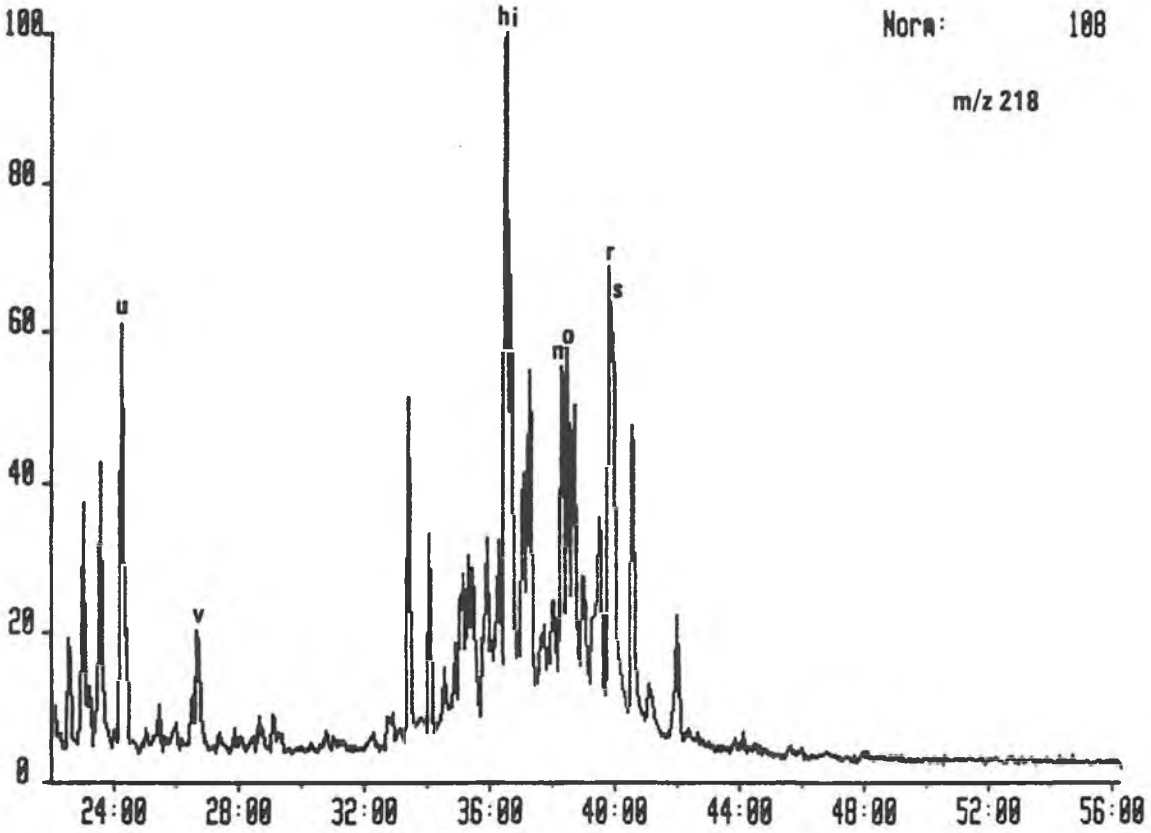
C5844SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:



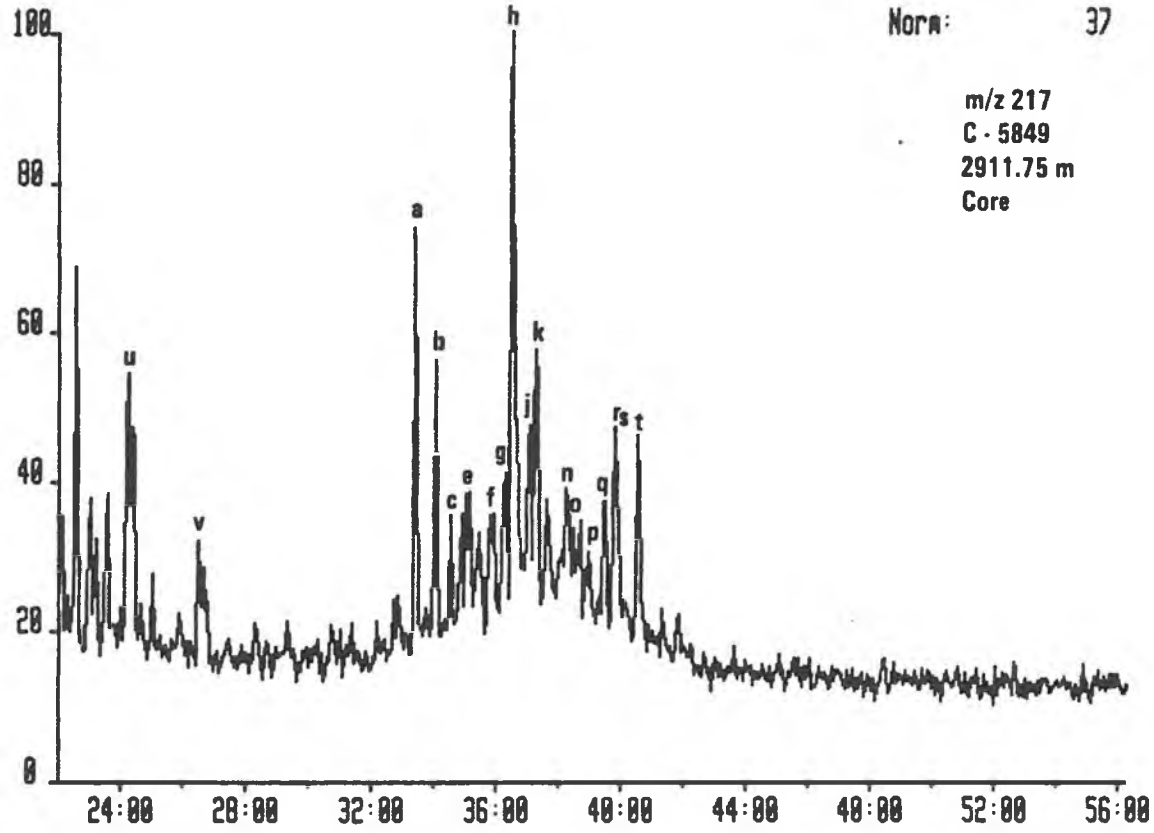
C5848SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



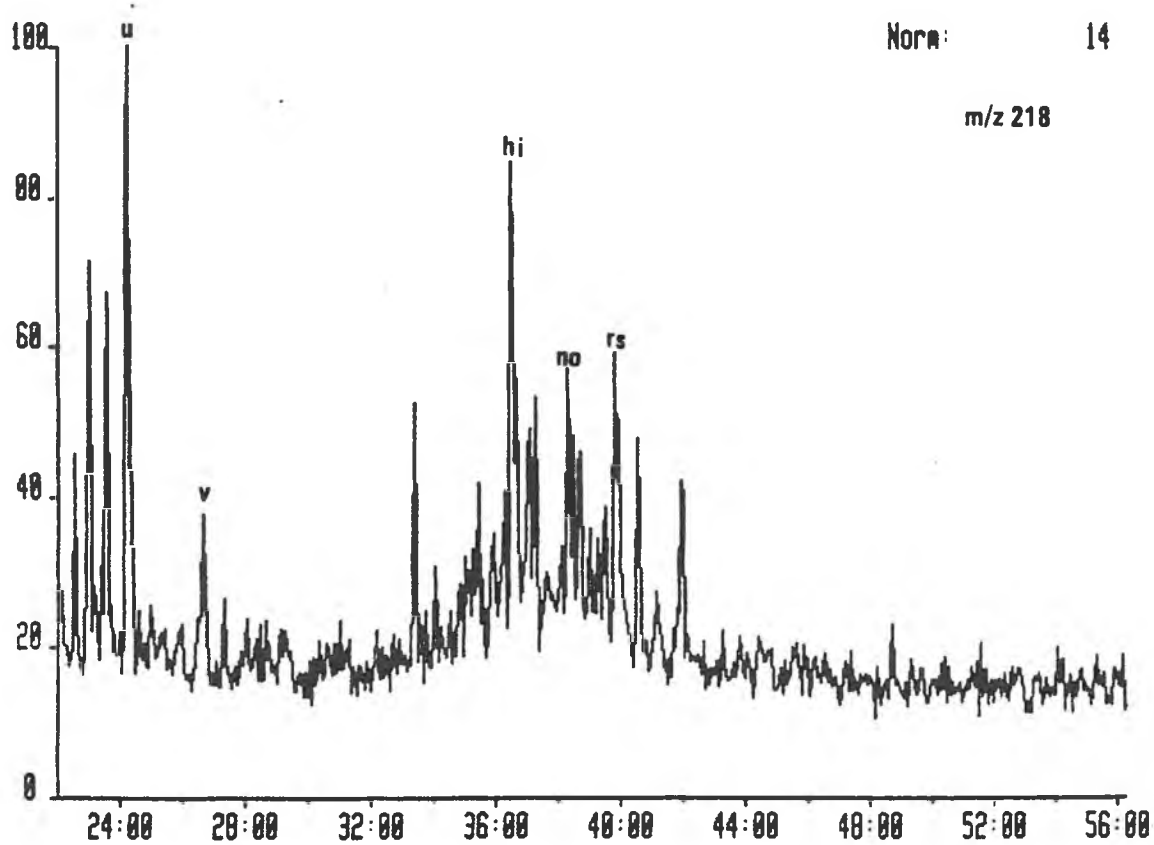
C5848SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:



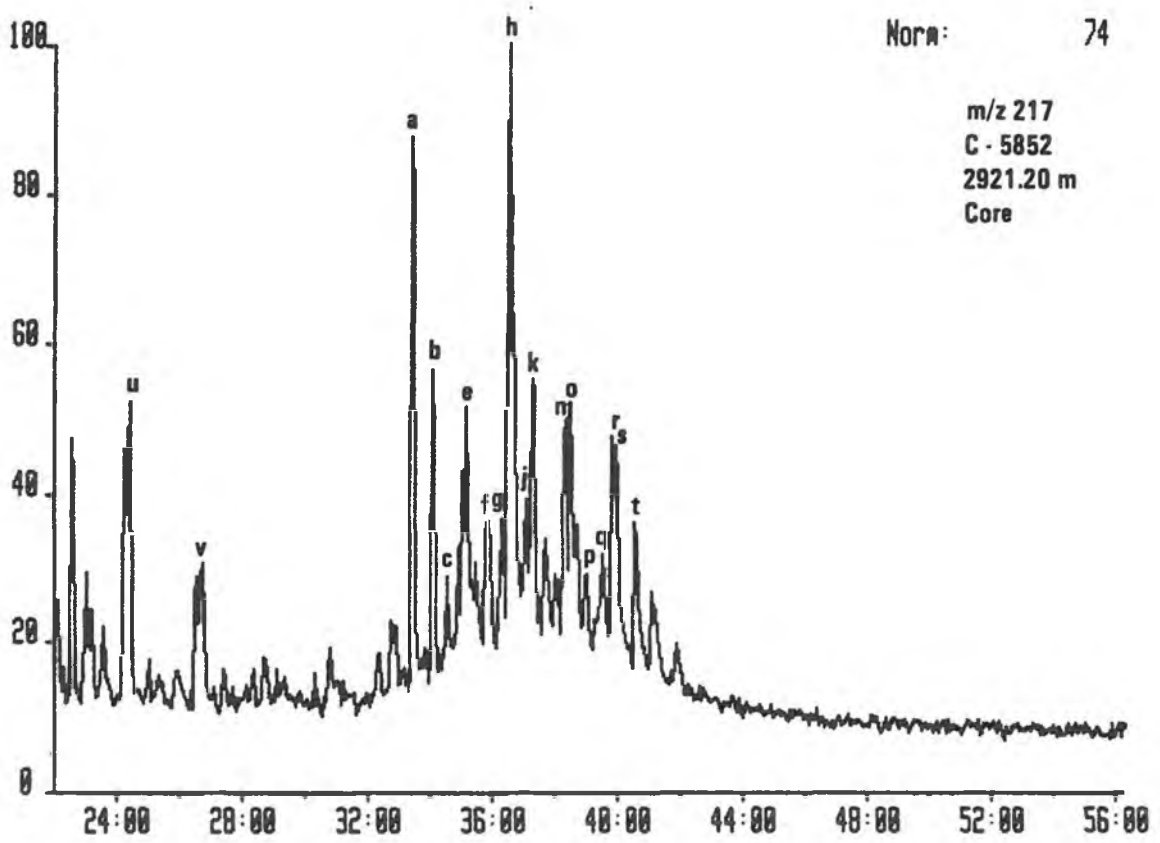
C5849SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



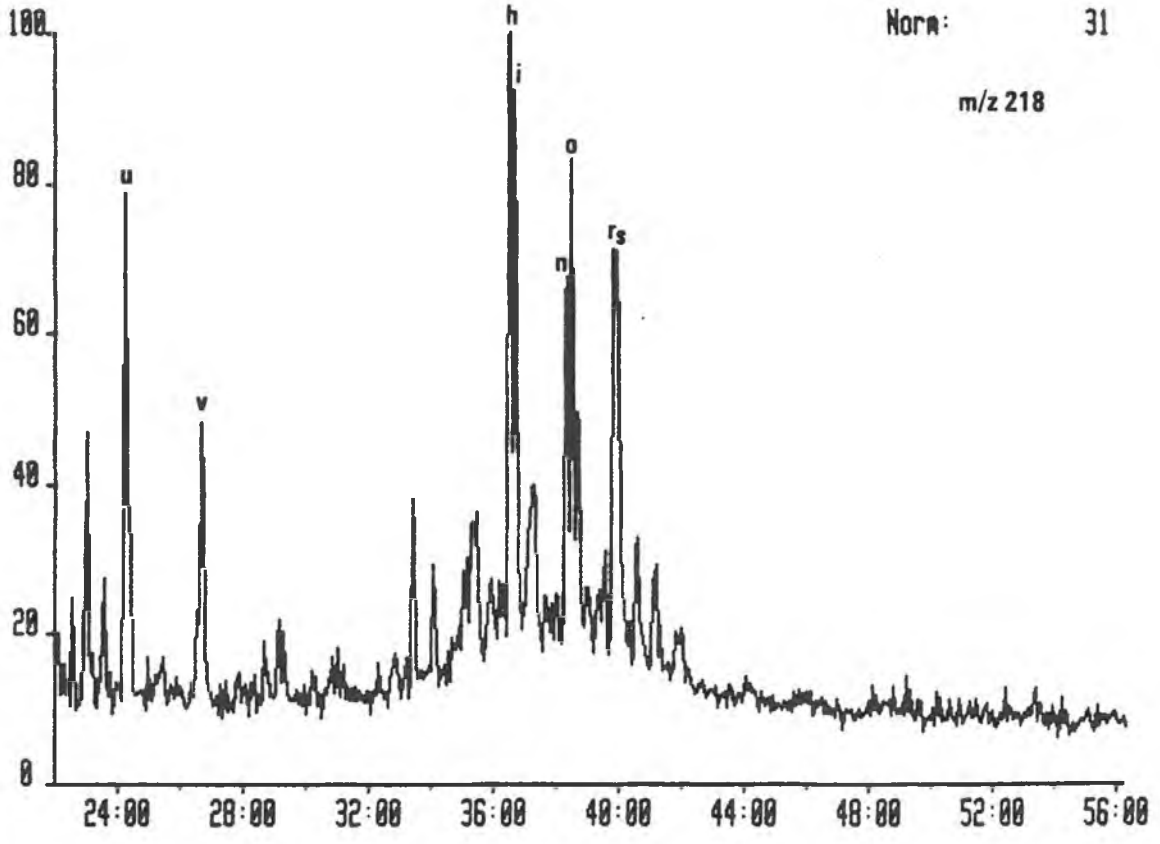
C5849SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:



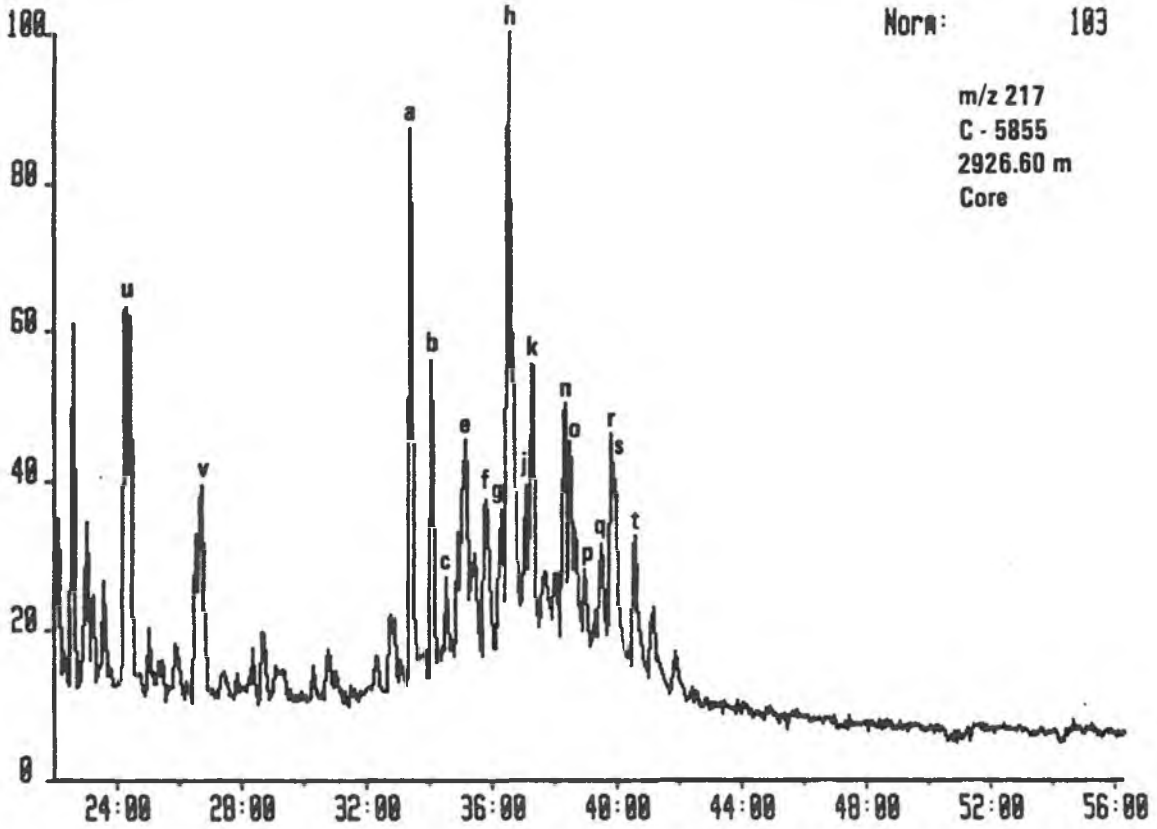
C5852SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



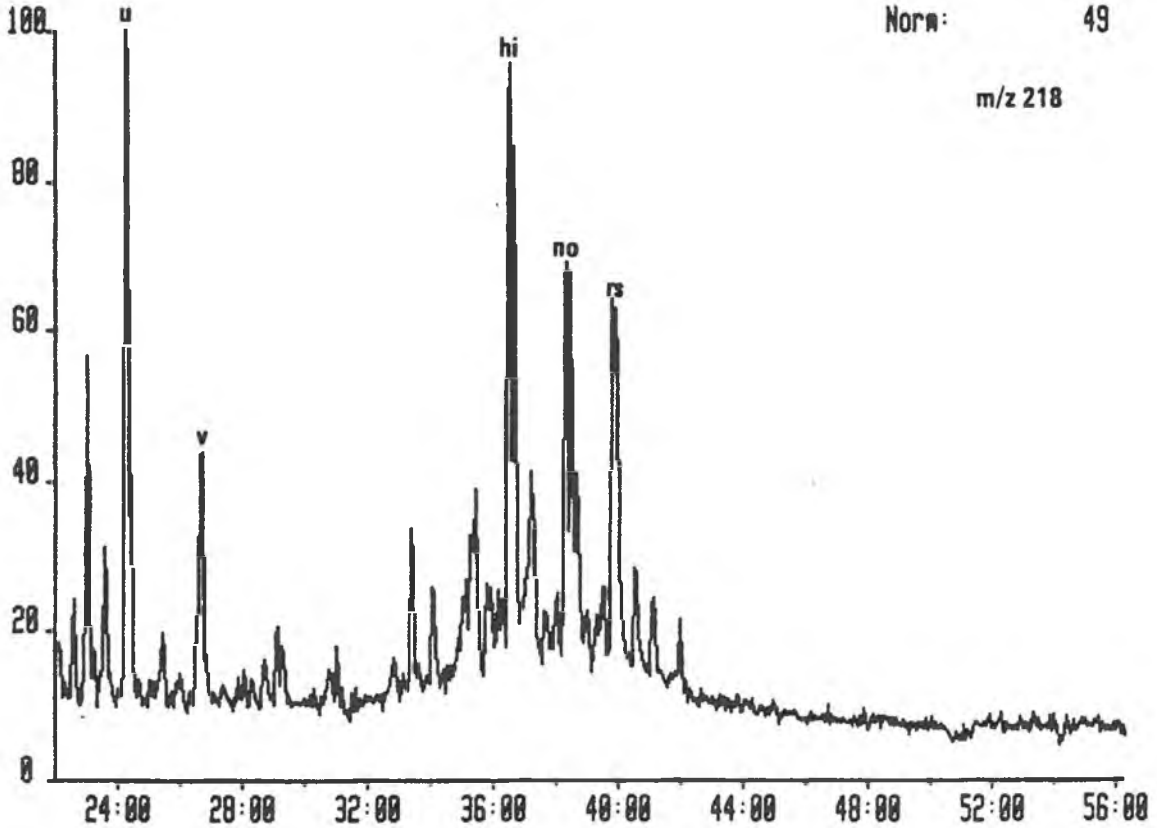
C5852SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:



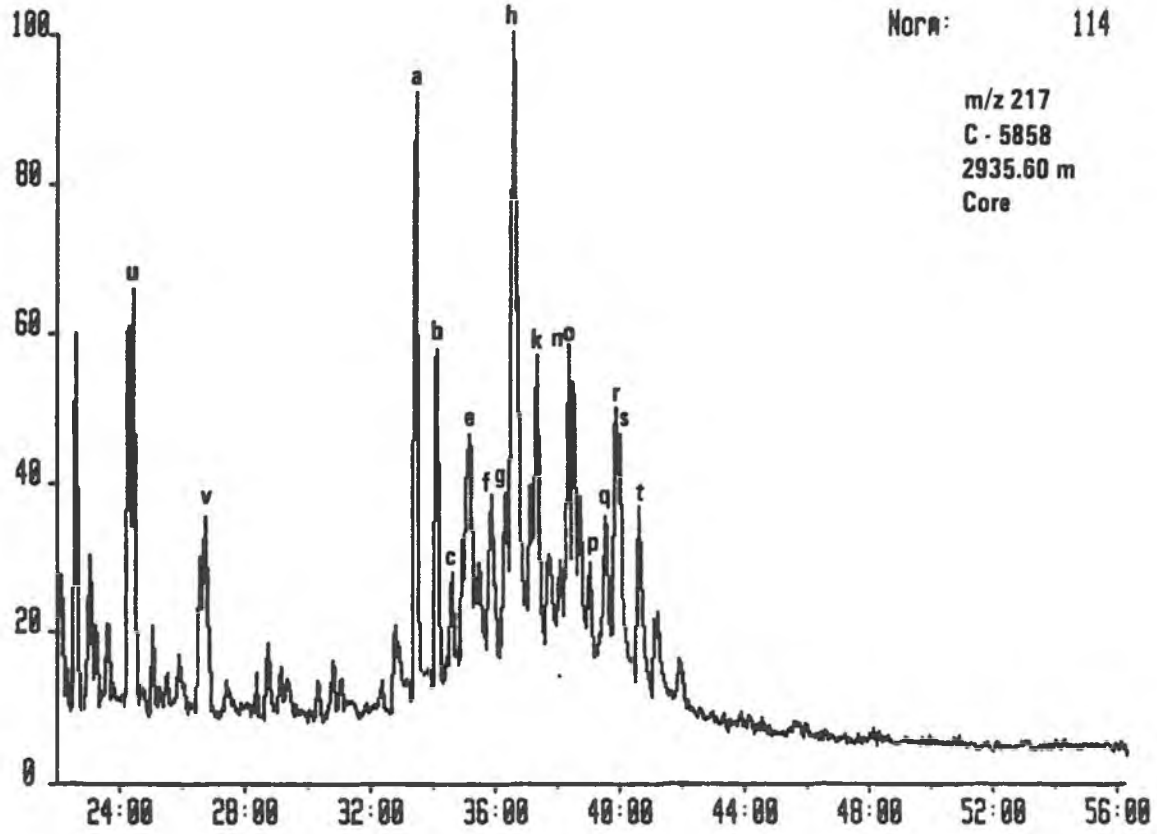
C5855SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



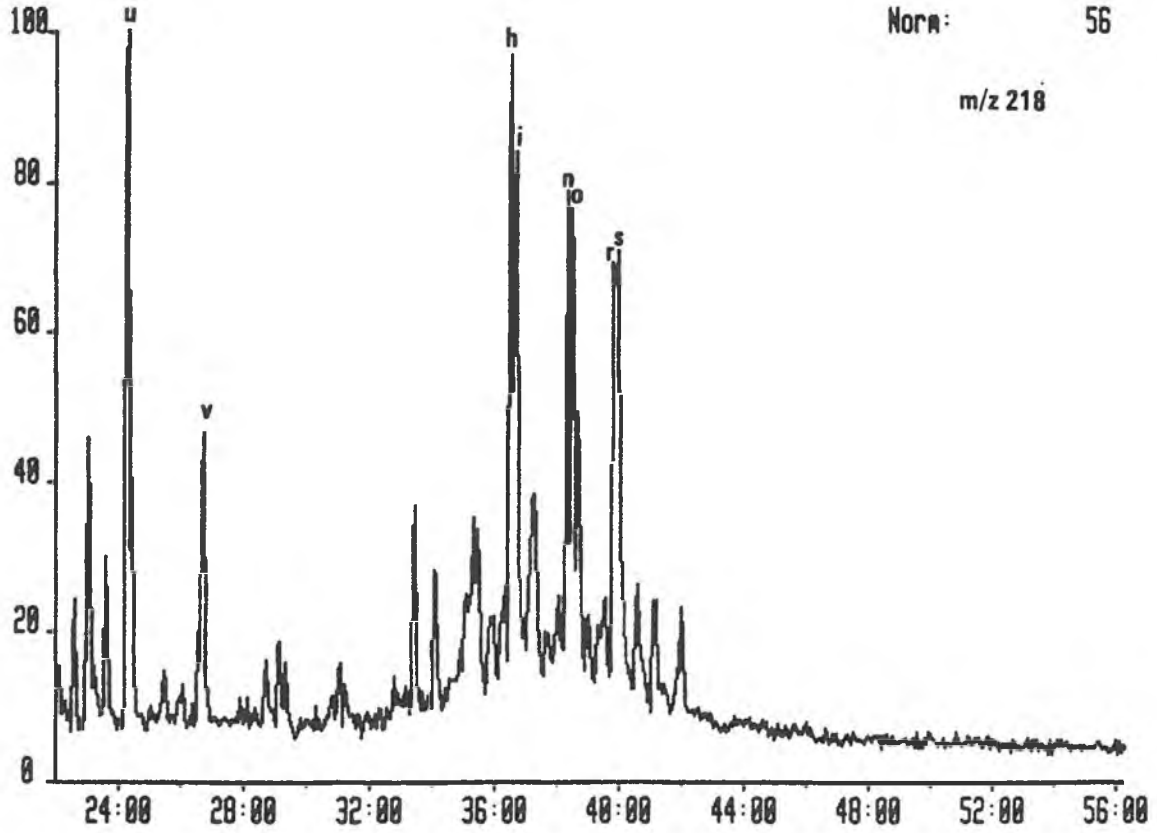
C5855SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:



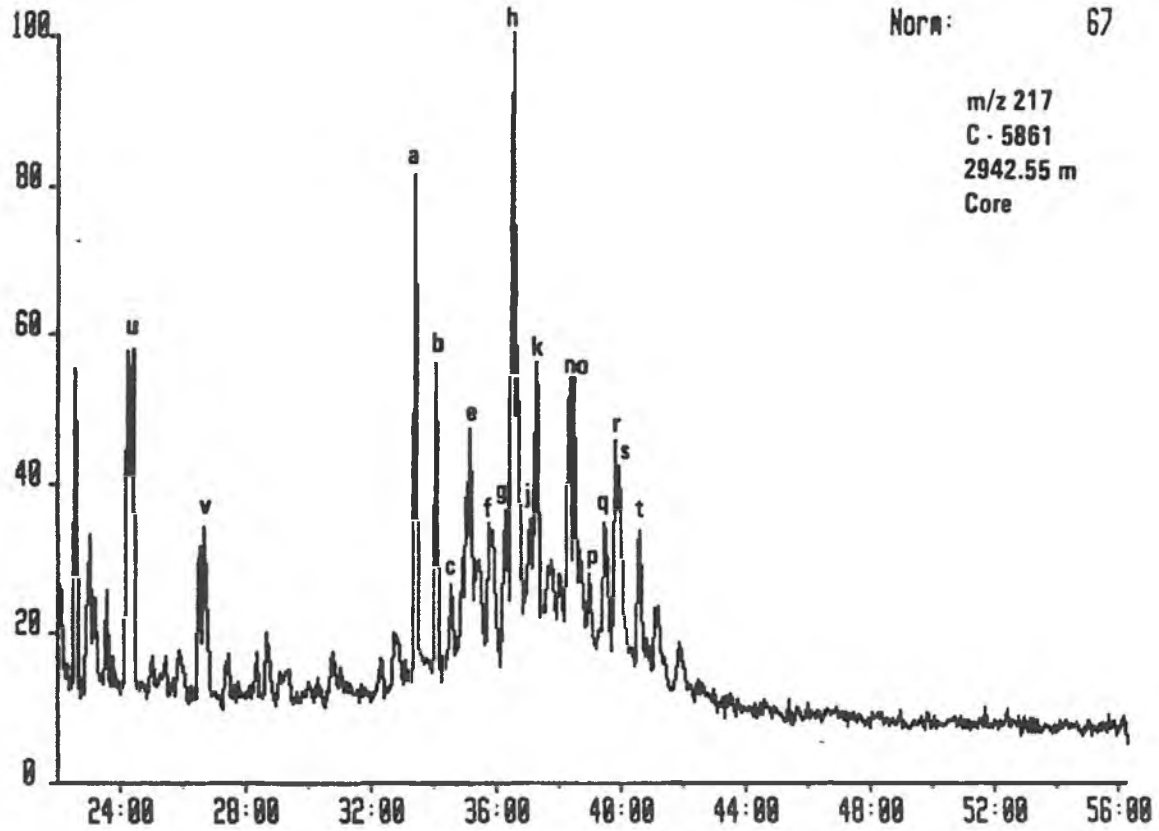
C5858SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



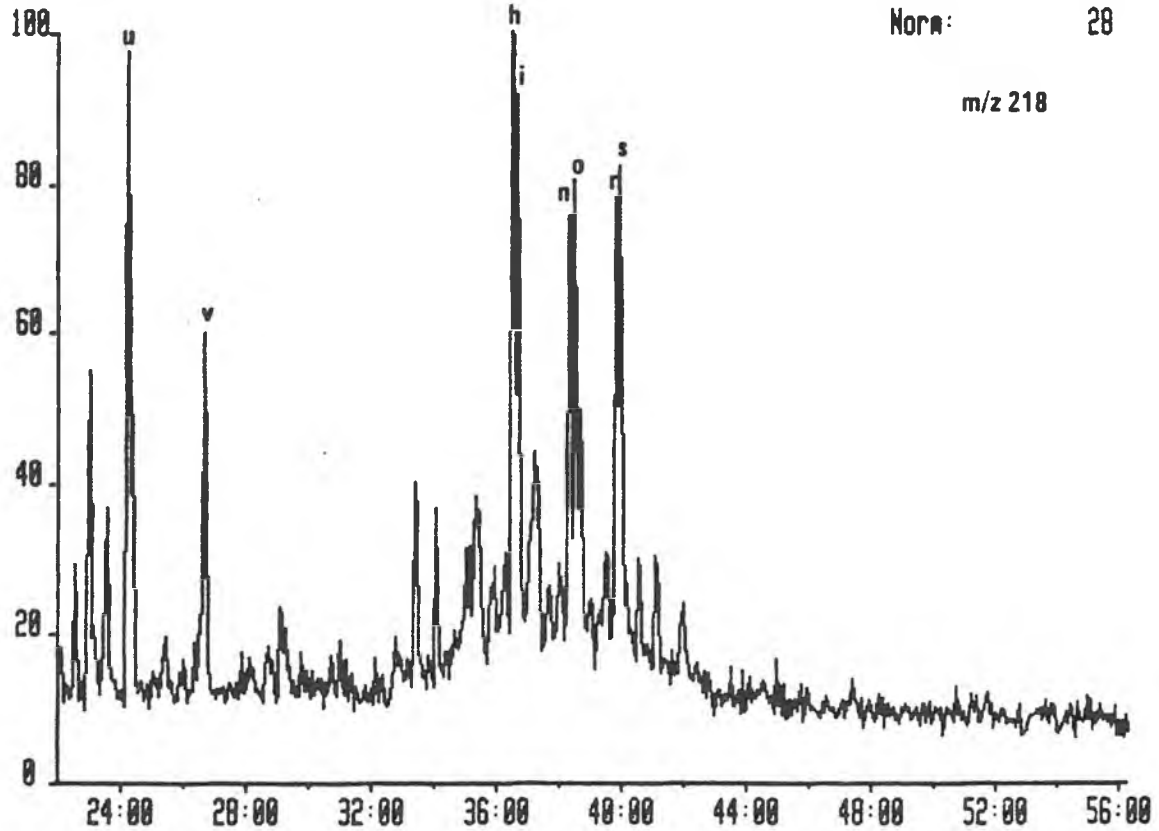
C5858SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:



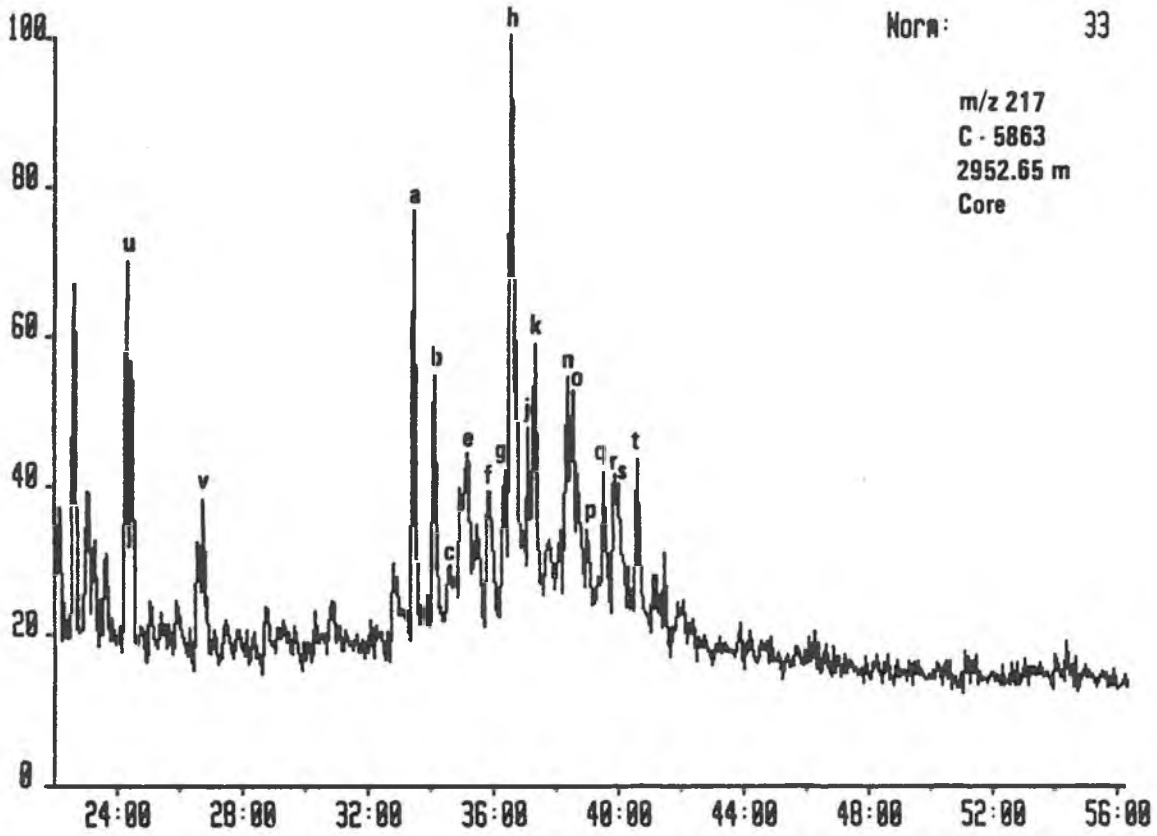
C5861SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



C5861SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:



C5863SAT2 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:



C5863SAT2 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:

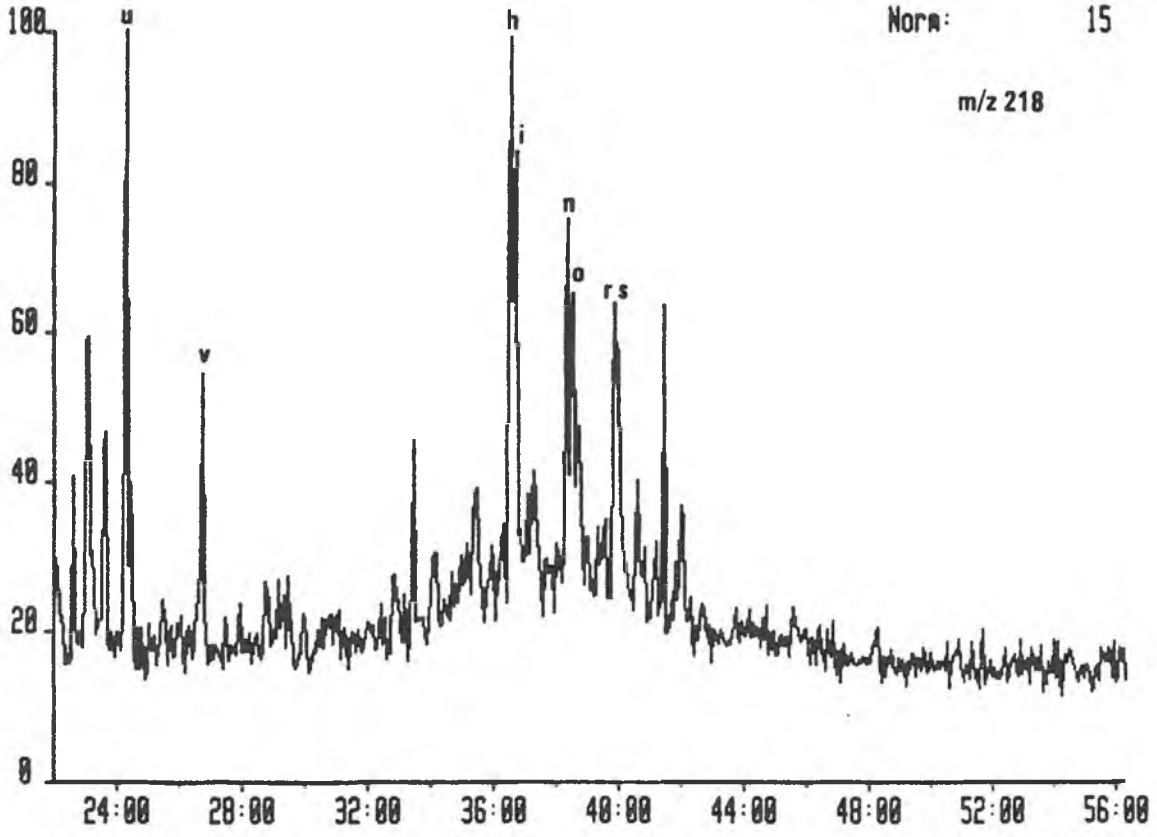
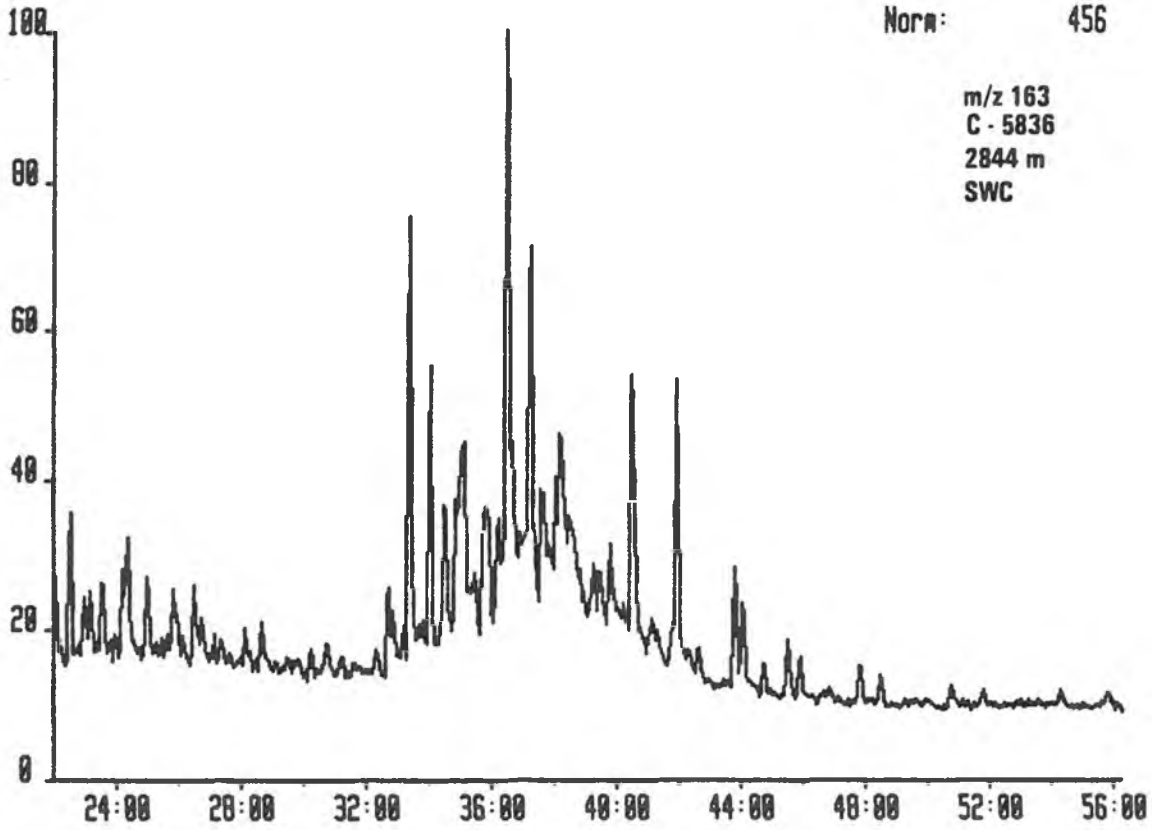


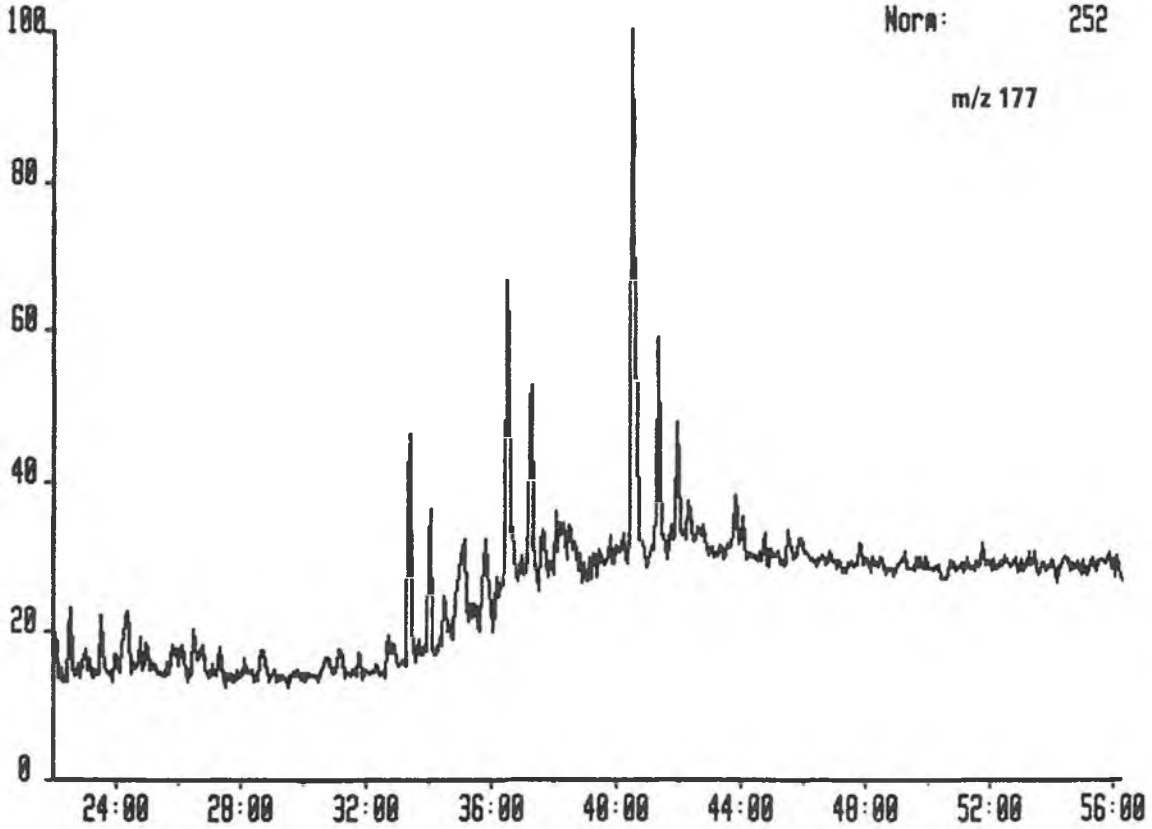
FIGURE 6

MASS CHROMATOGRAMS OF M/Z 163 AND 177

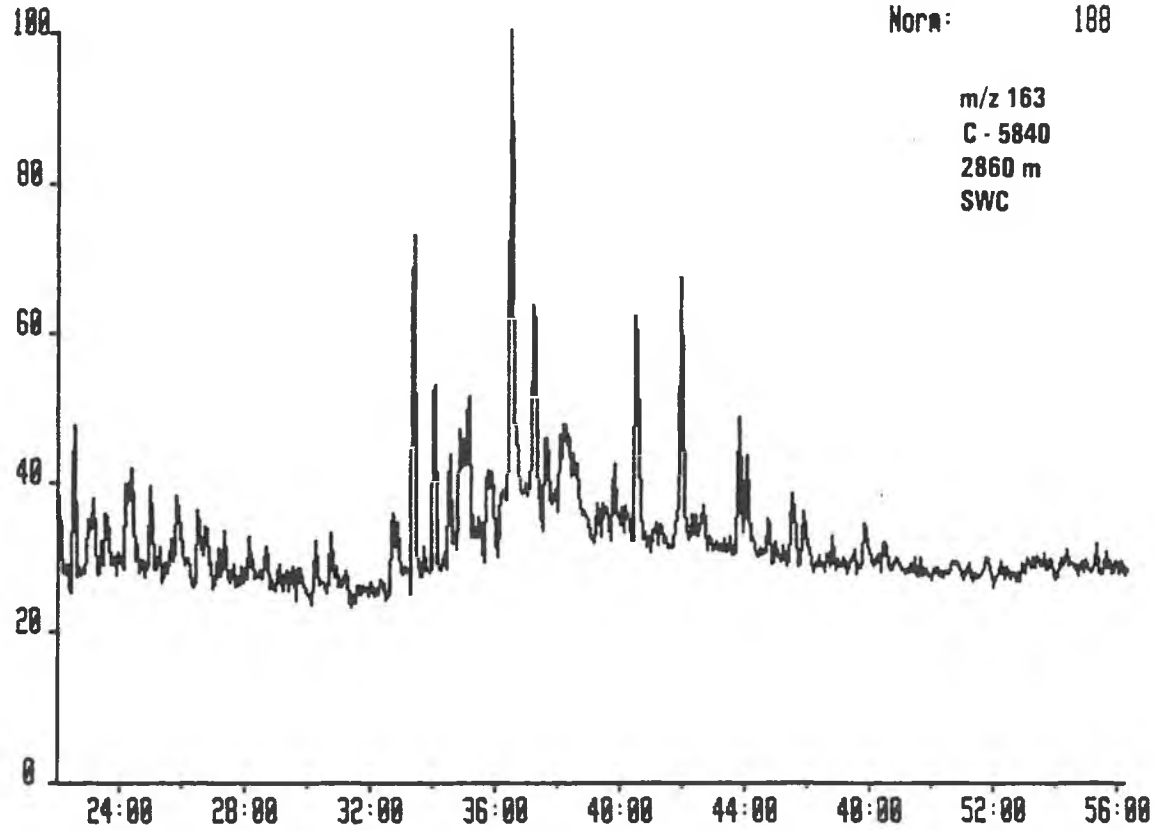
C5836SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



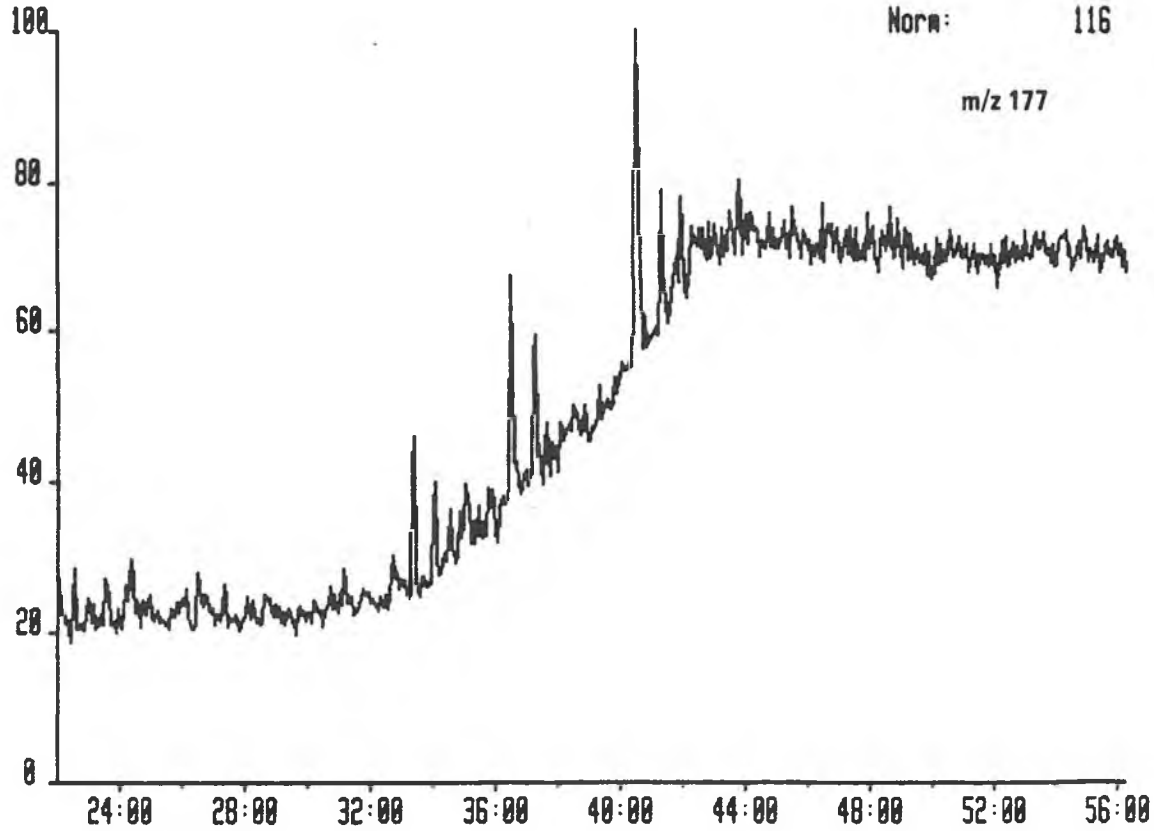
C5836SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:



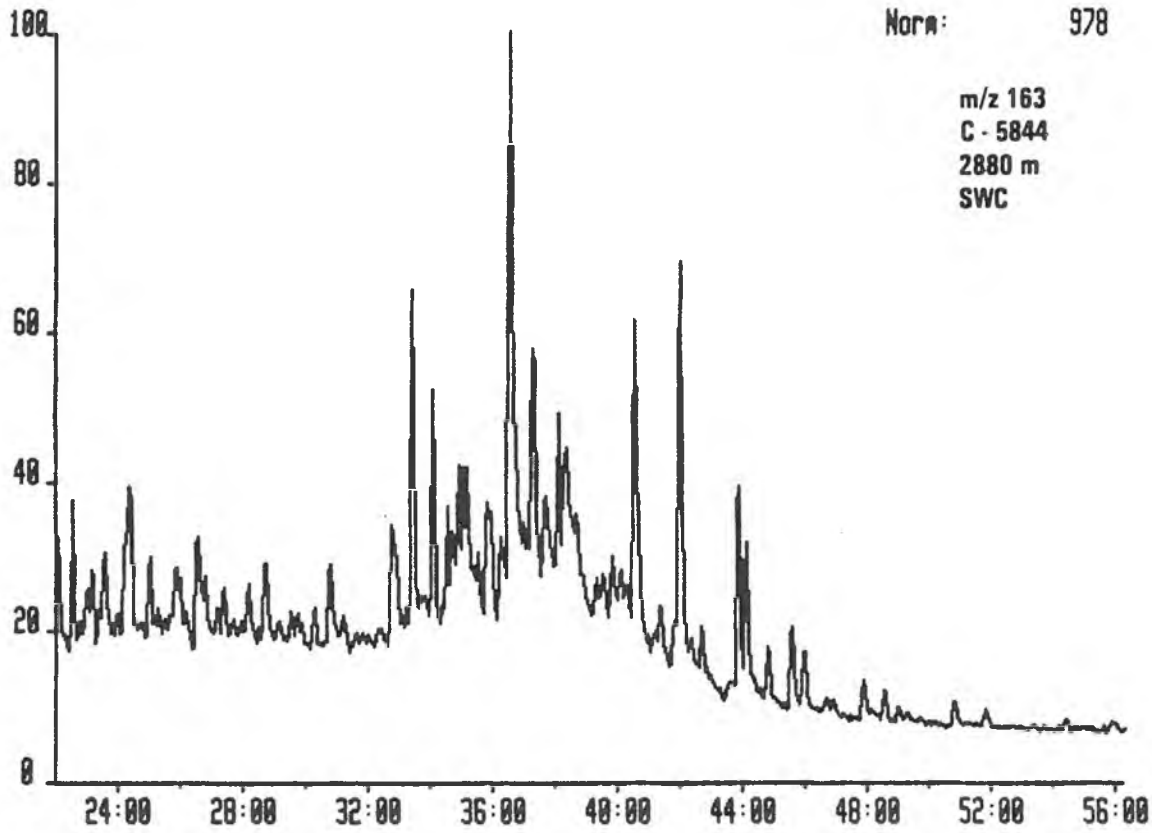
C5840SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



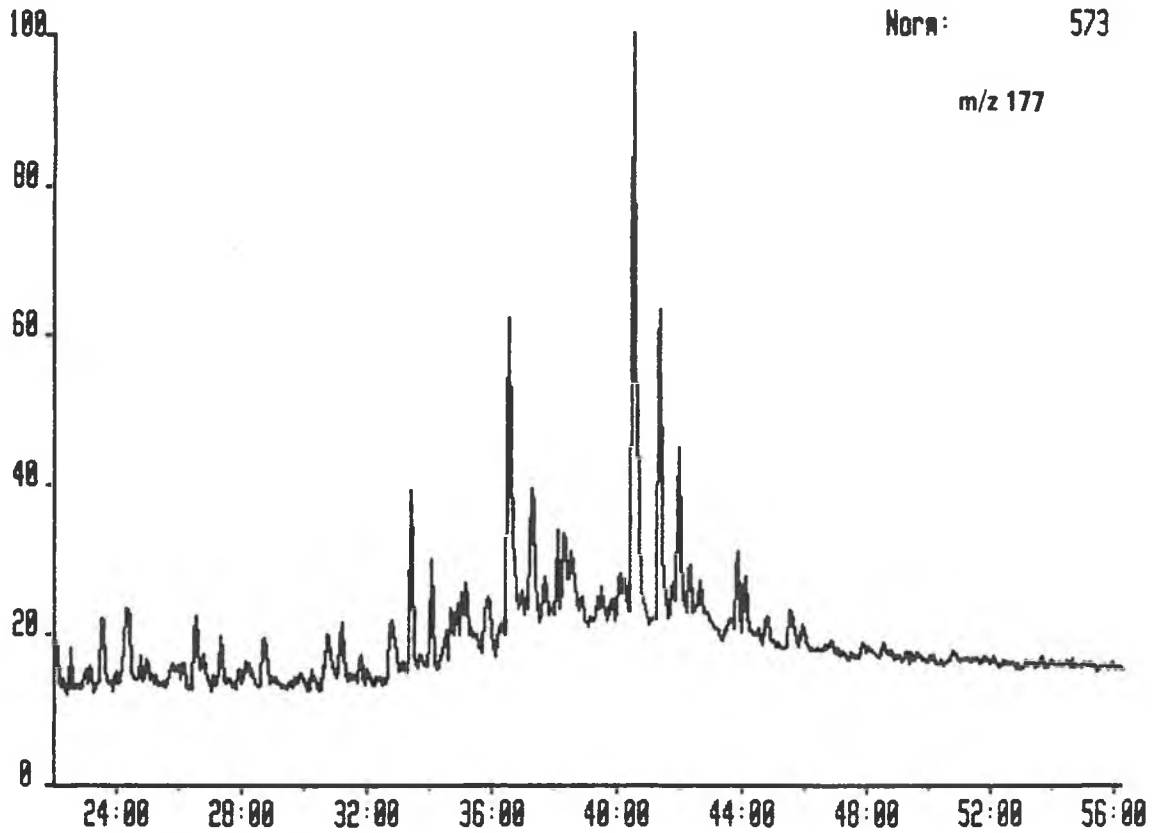
C5840SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:



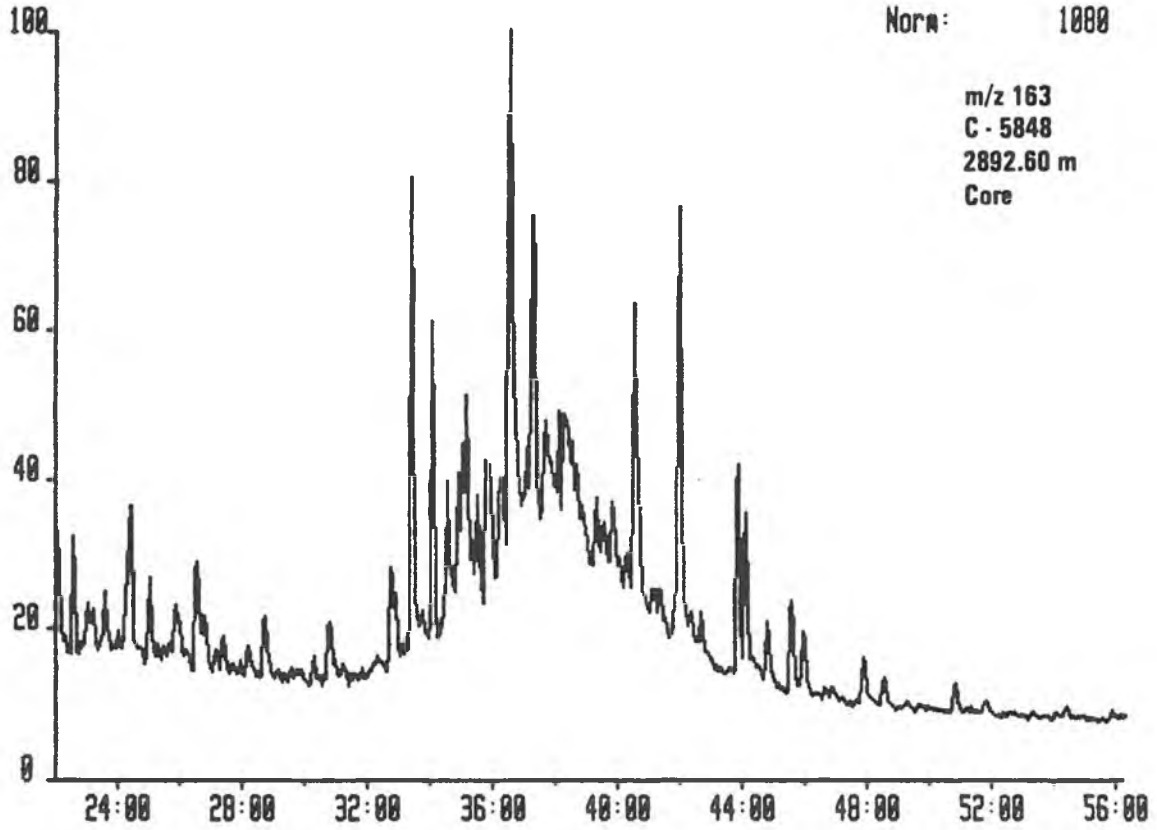
C5844SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



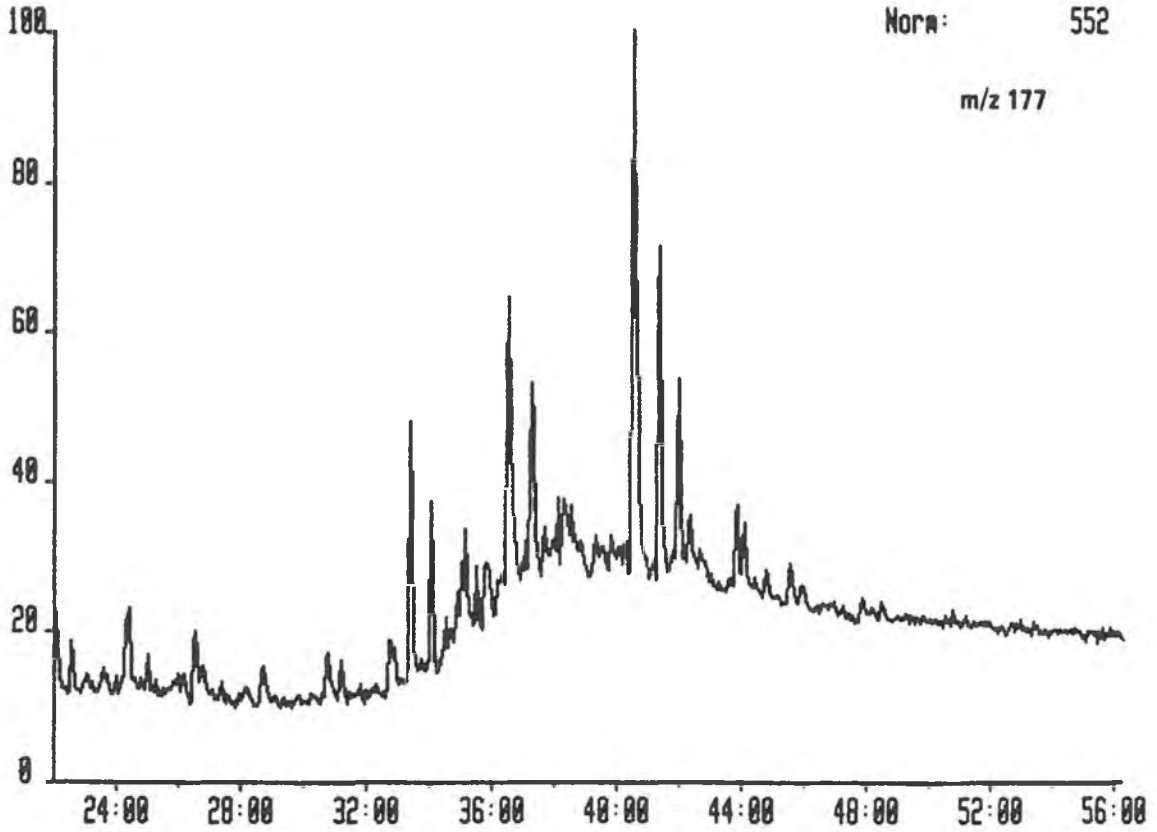
C5844SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:



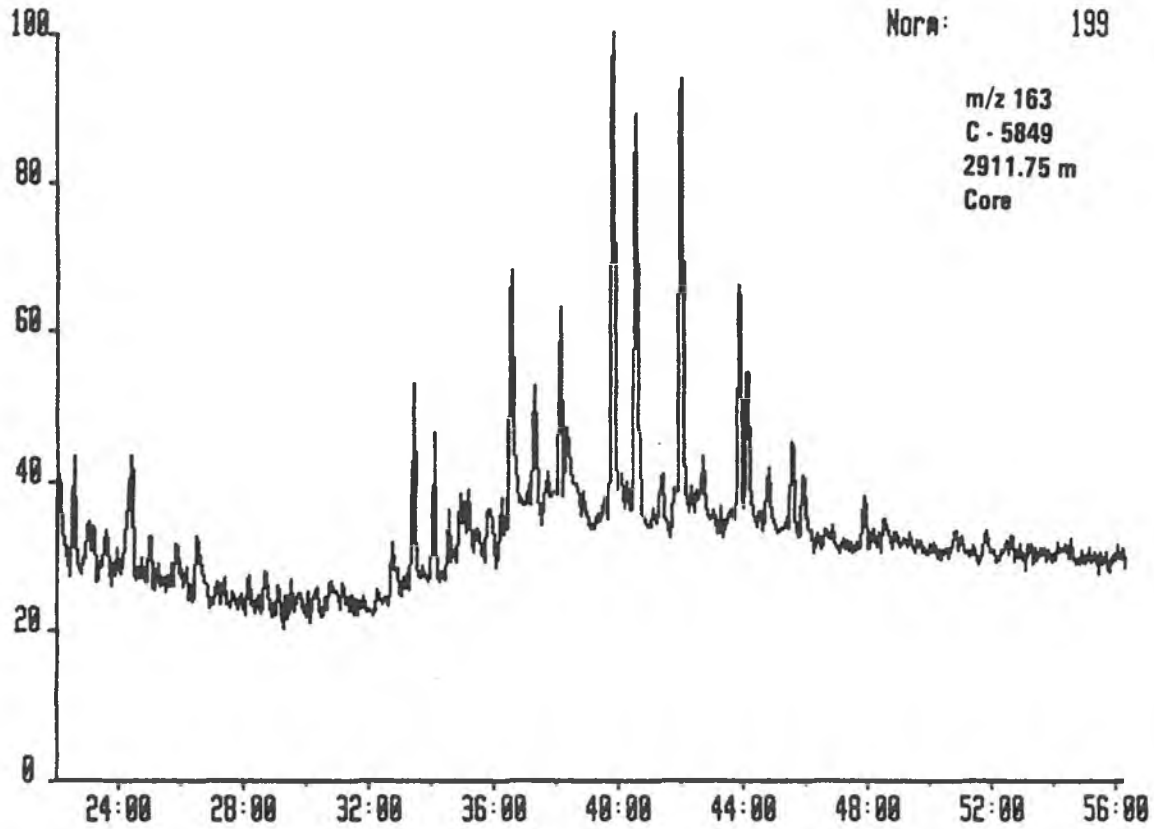
C5848SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



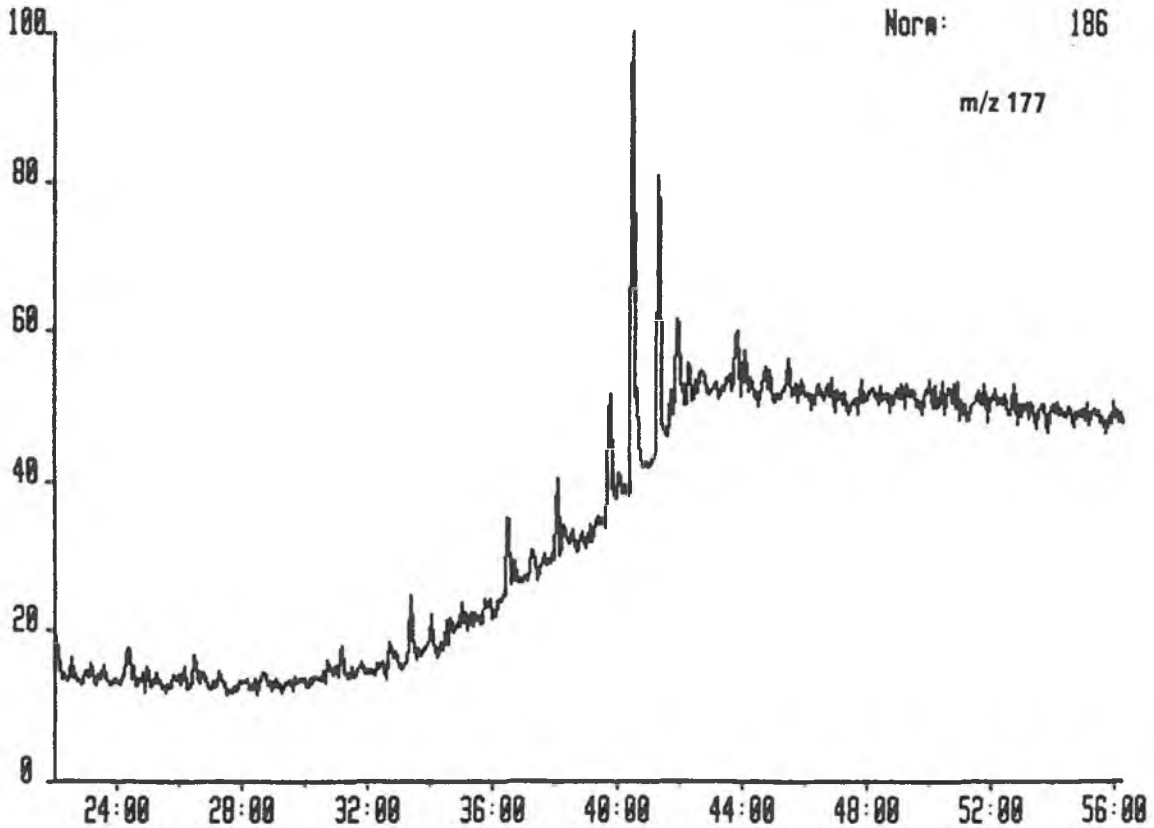
C5848SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:



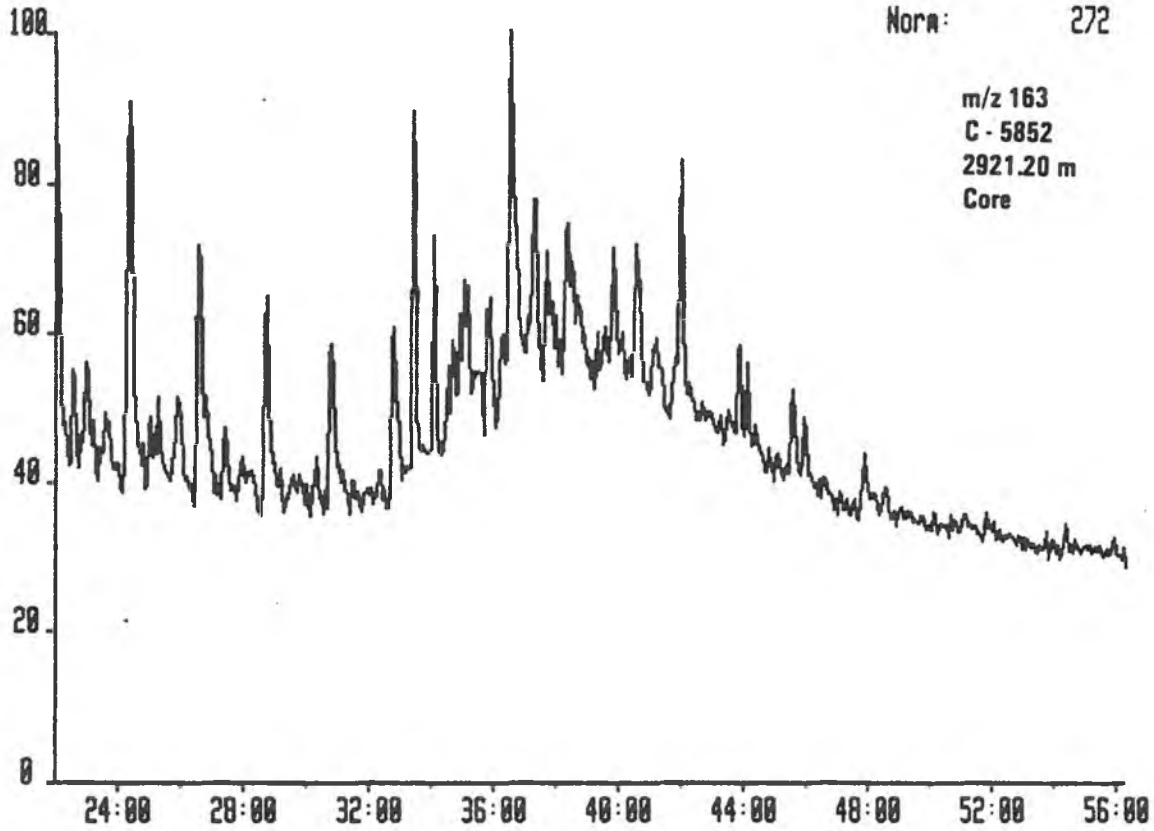
C5849SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



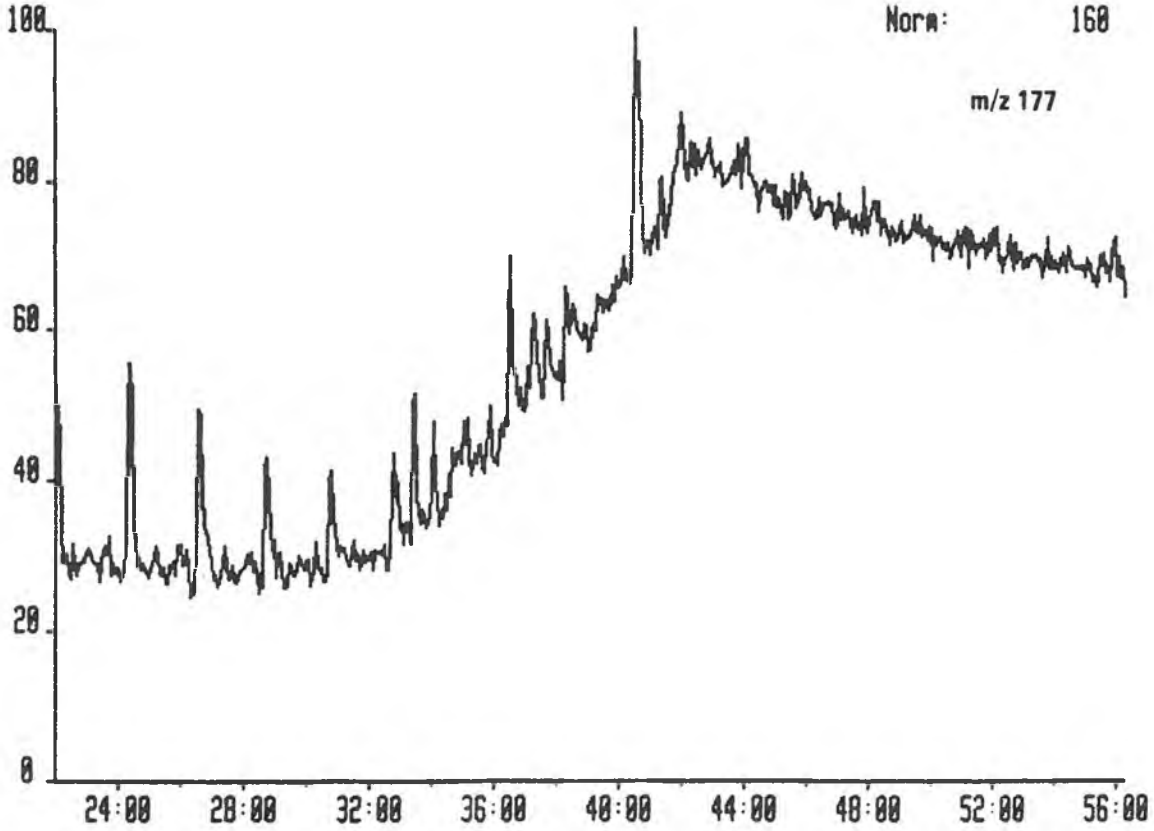
C5849SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:



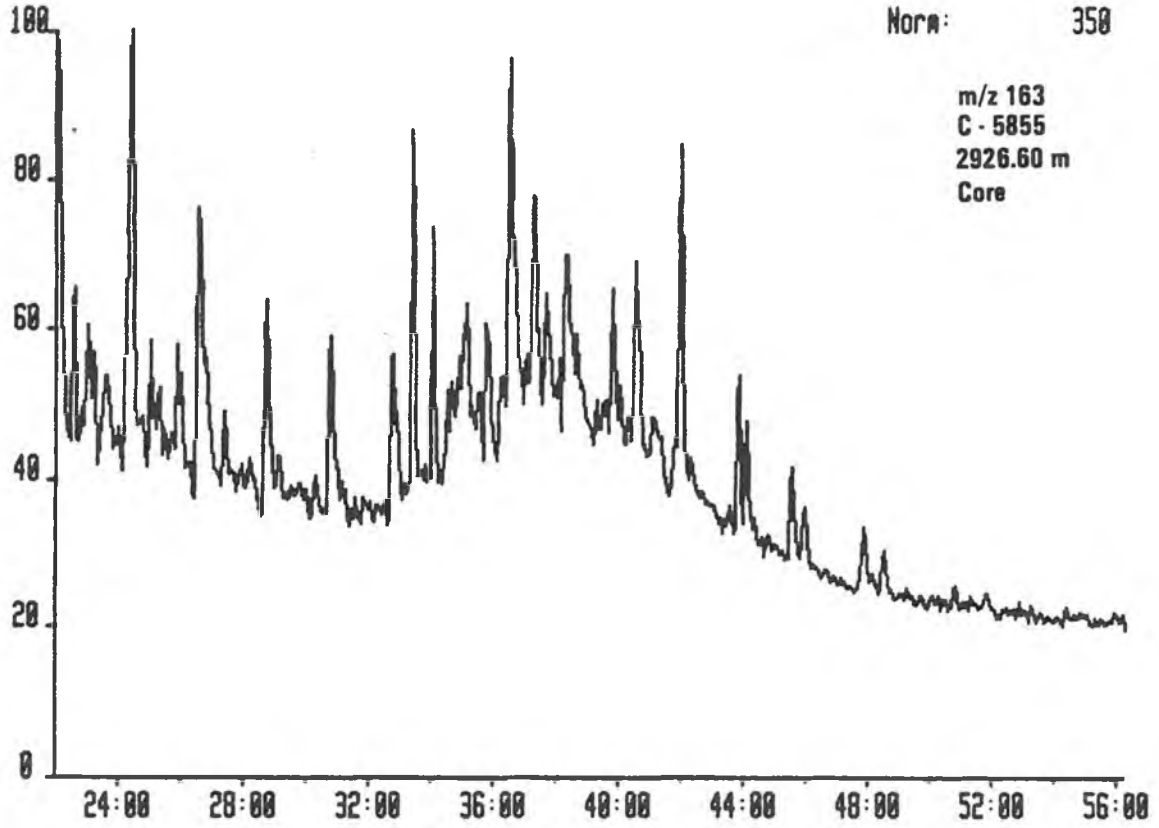
C5852SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



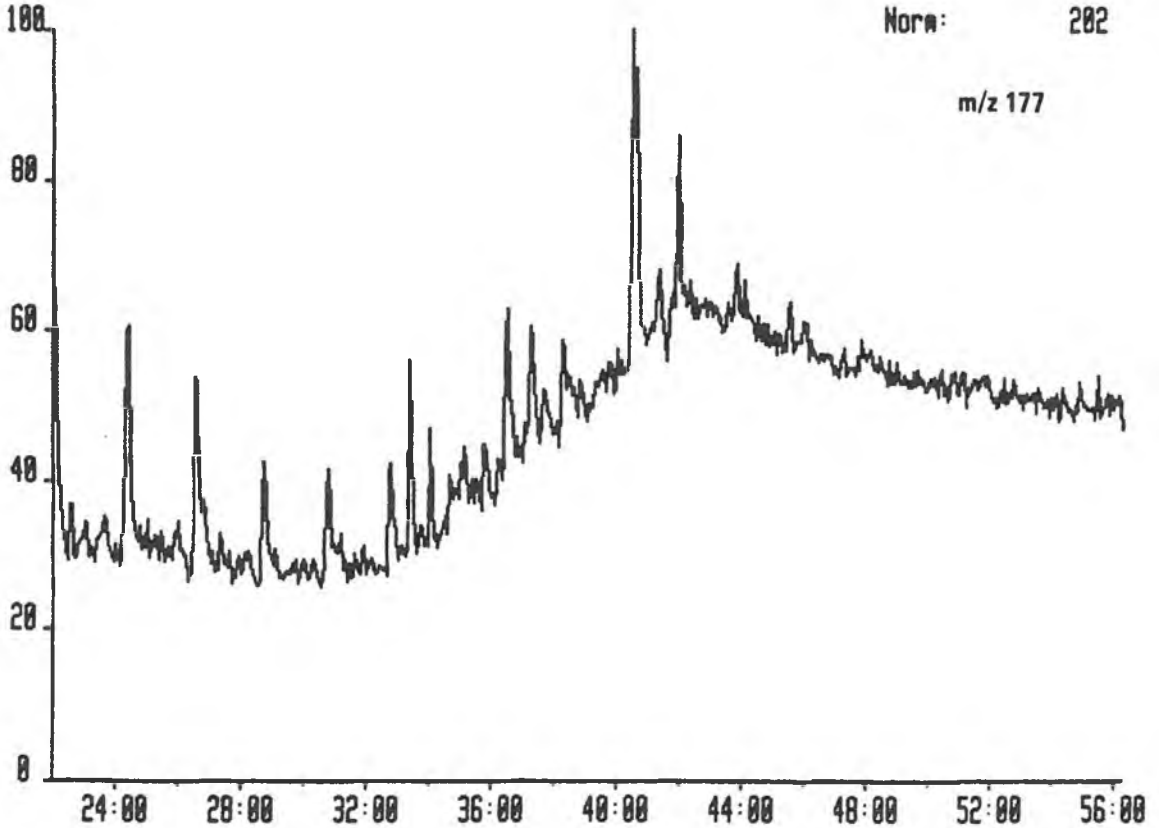
C5852SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:



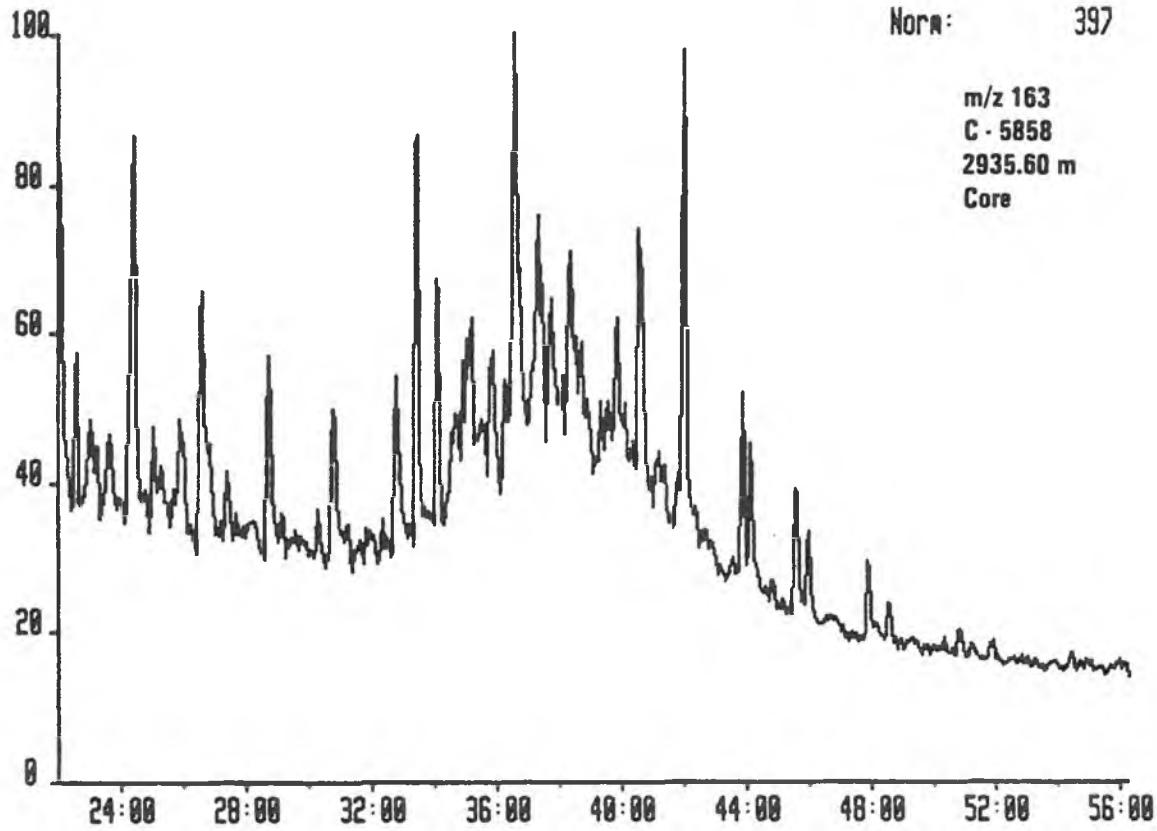
C5855SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



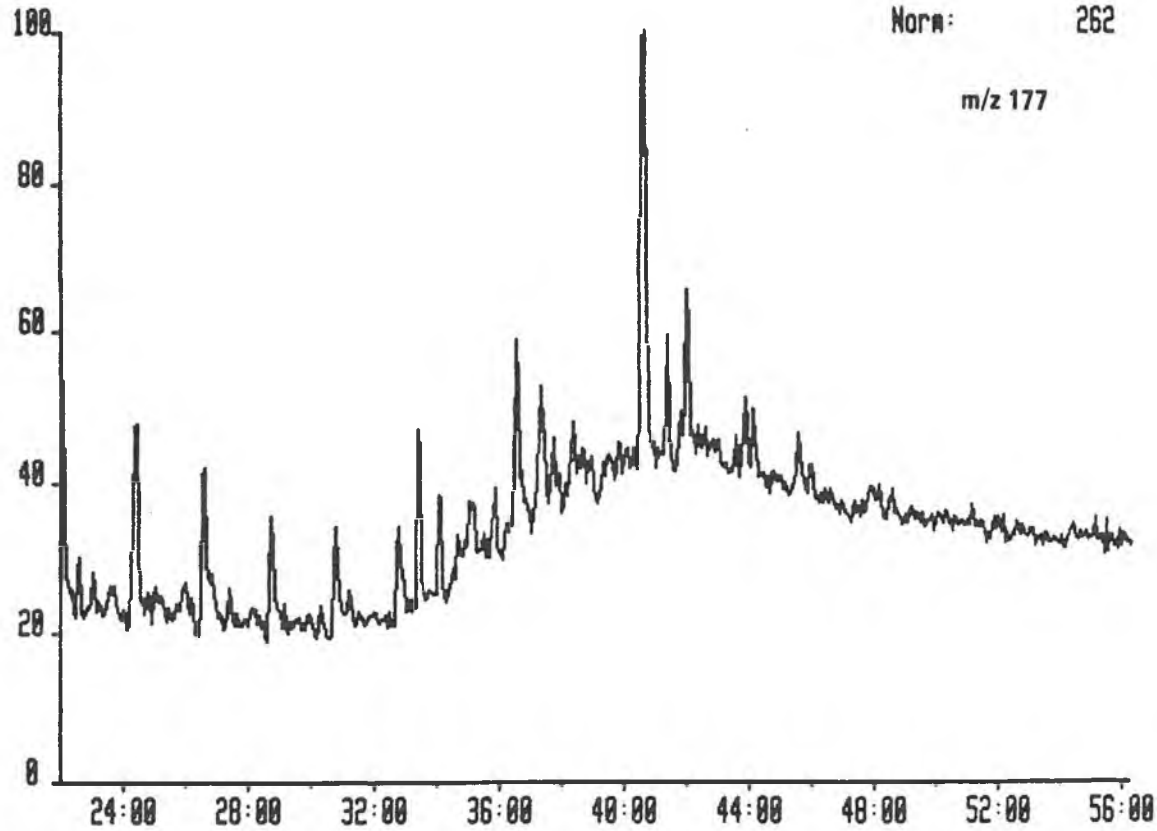
C5855SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:



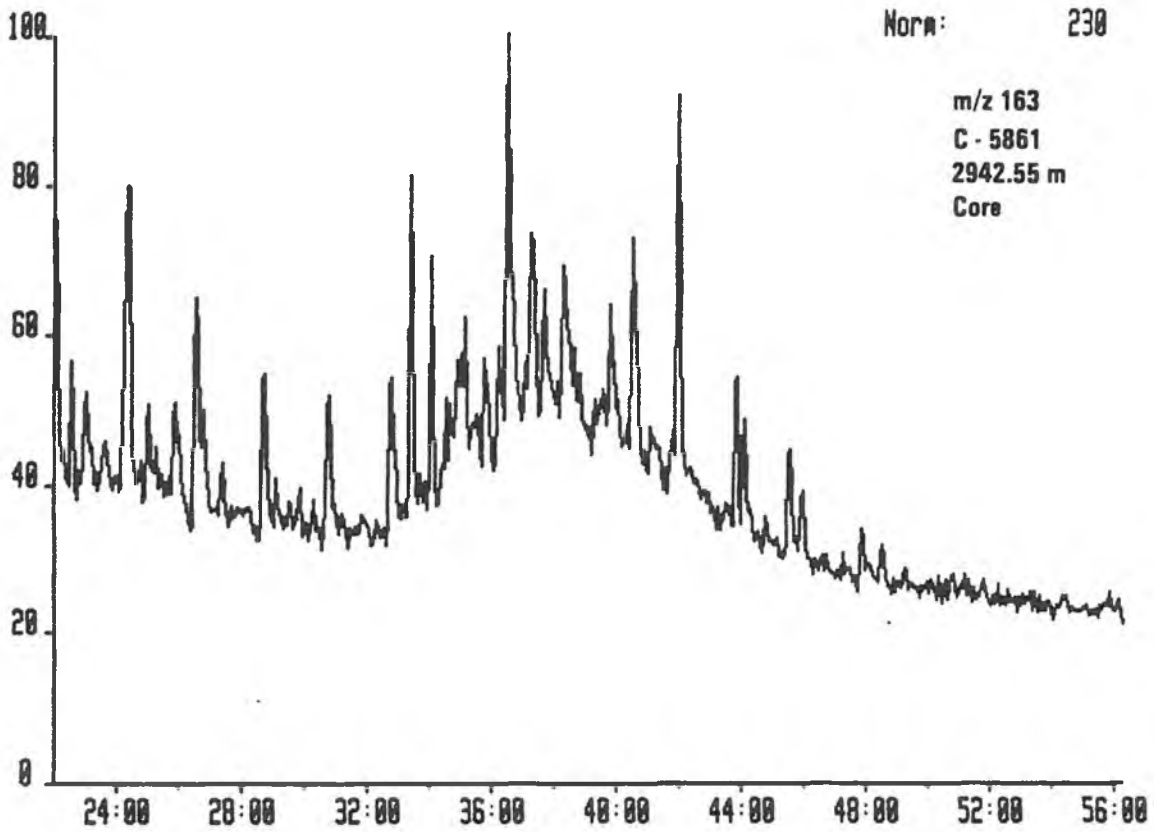
C5858SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



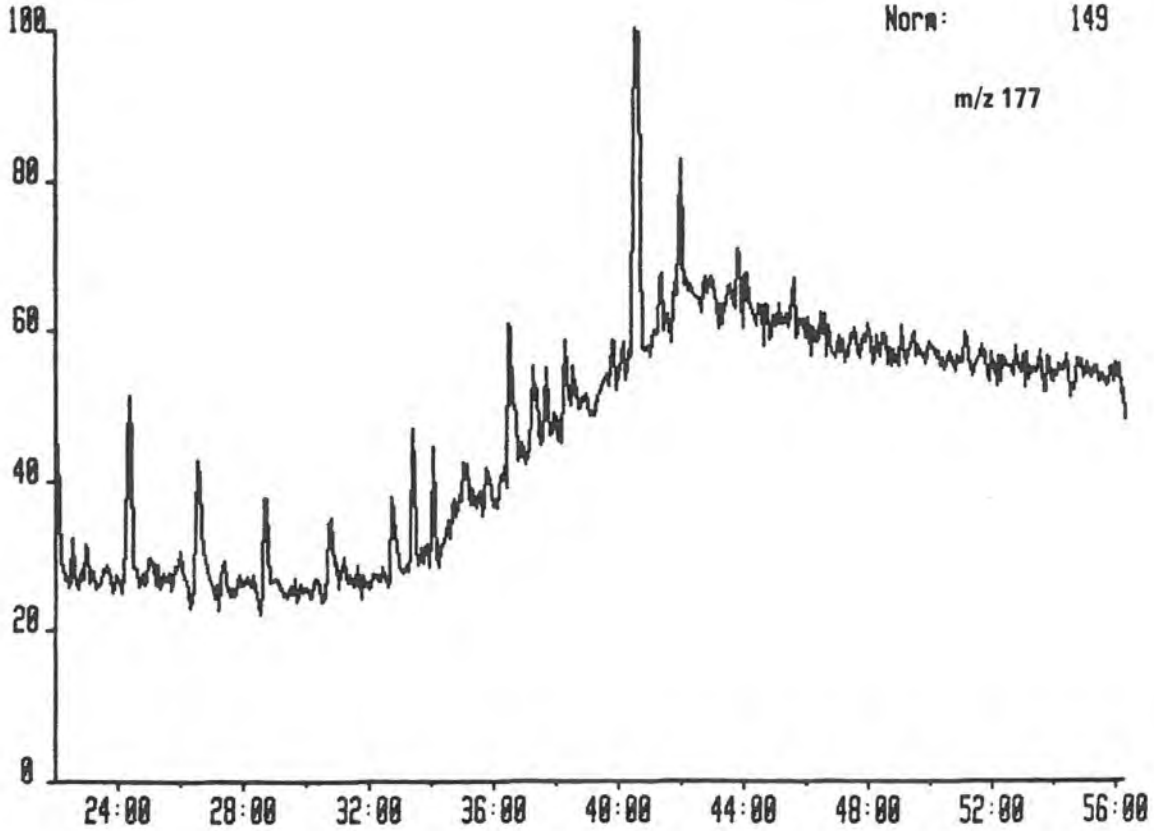
C5858SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:



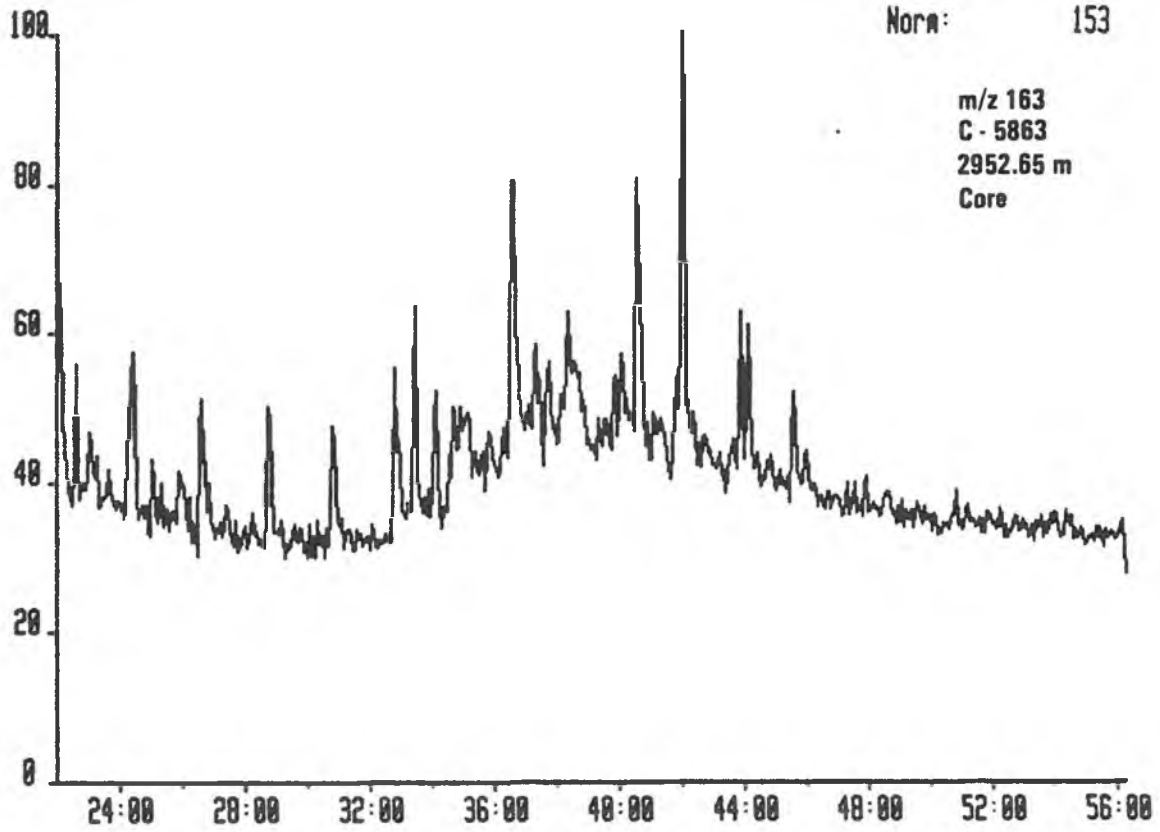
C5861SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



C5861SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:



C5863SAT2 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:



C5863SAT2 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:

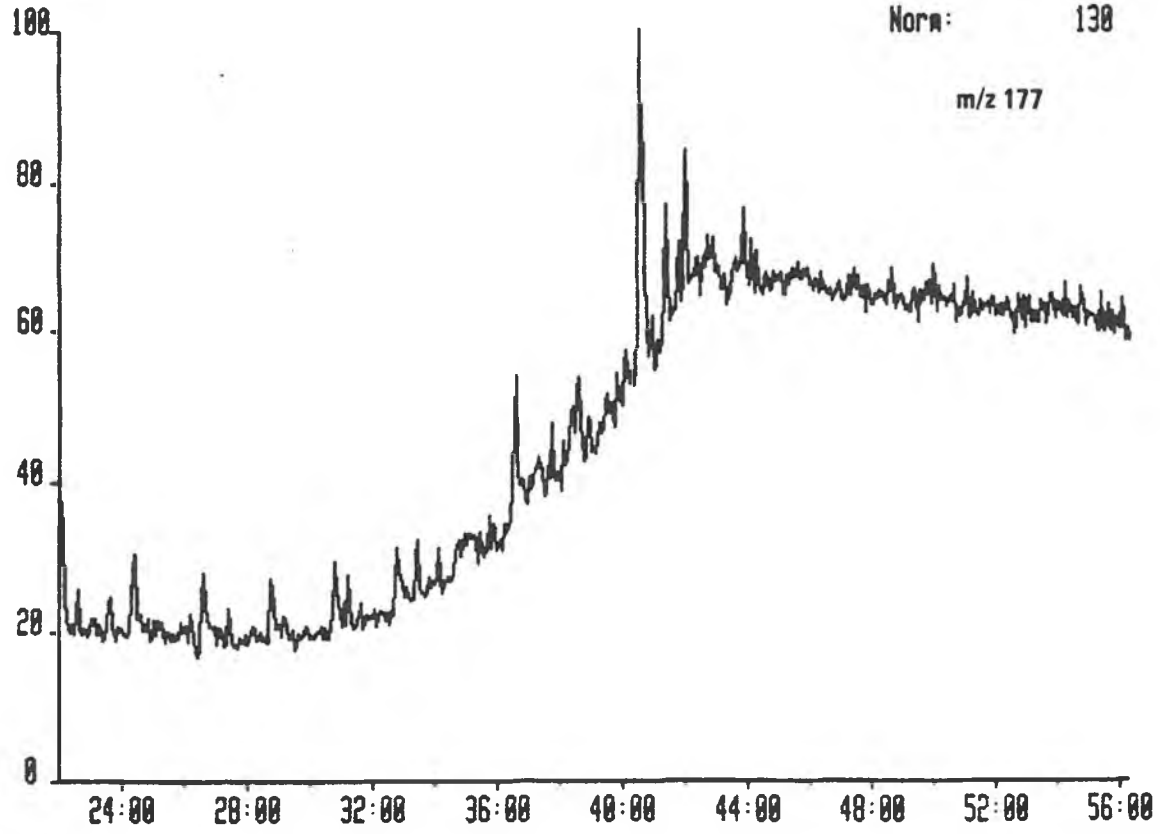
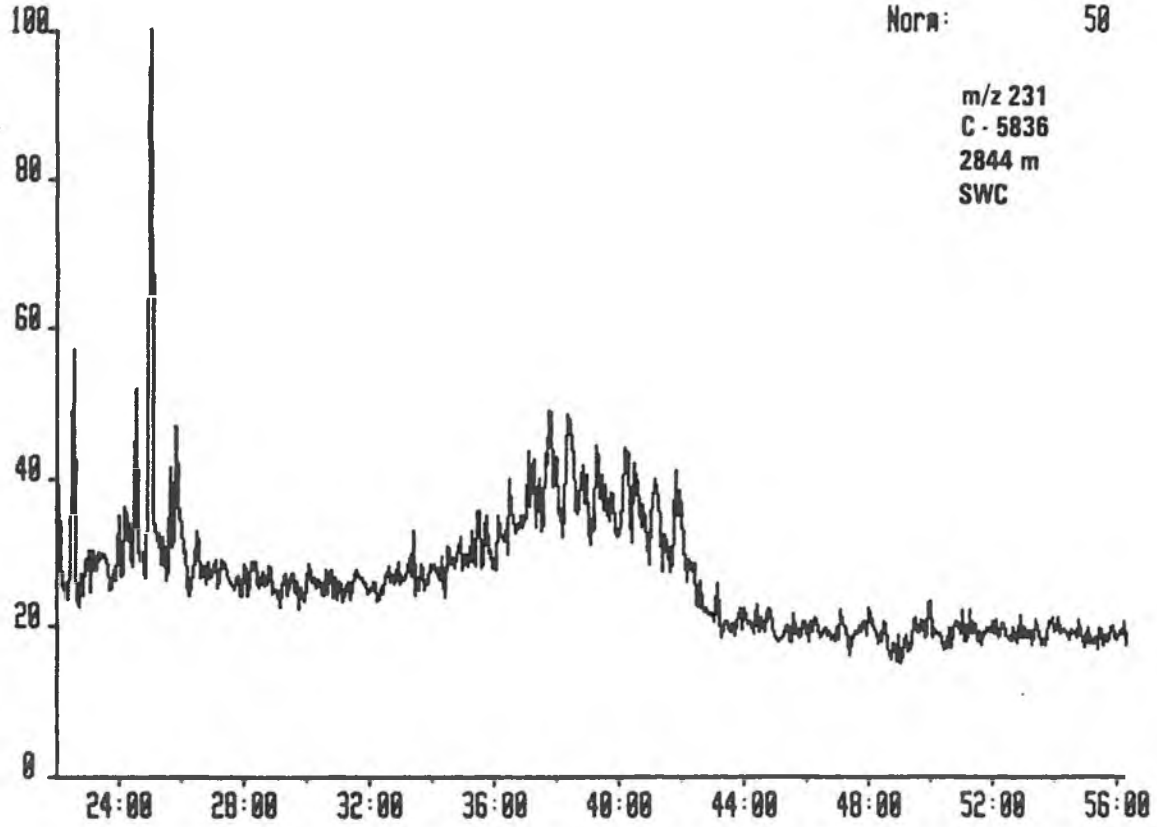


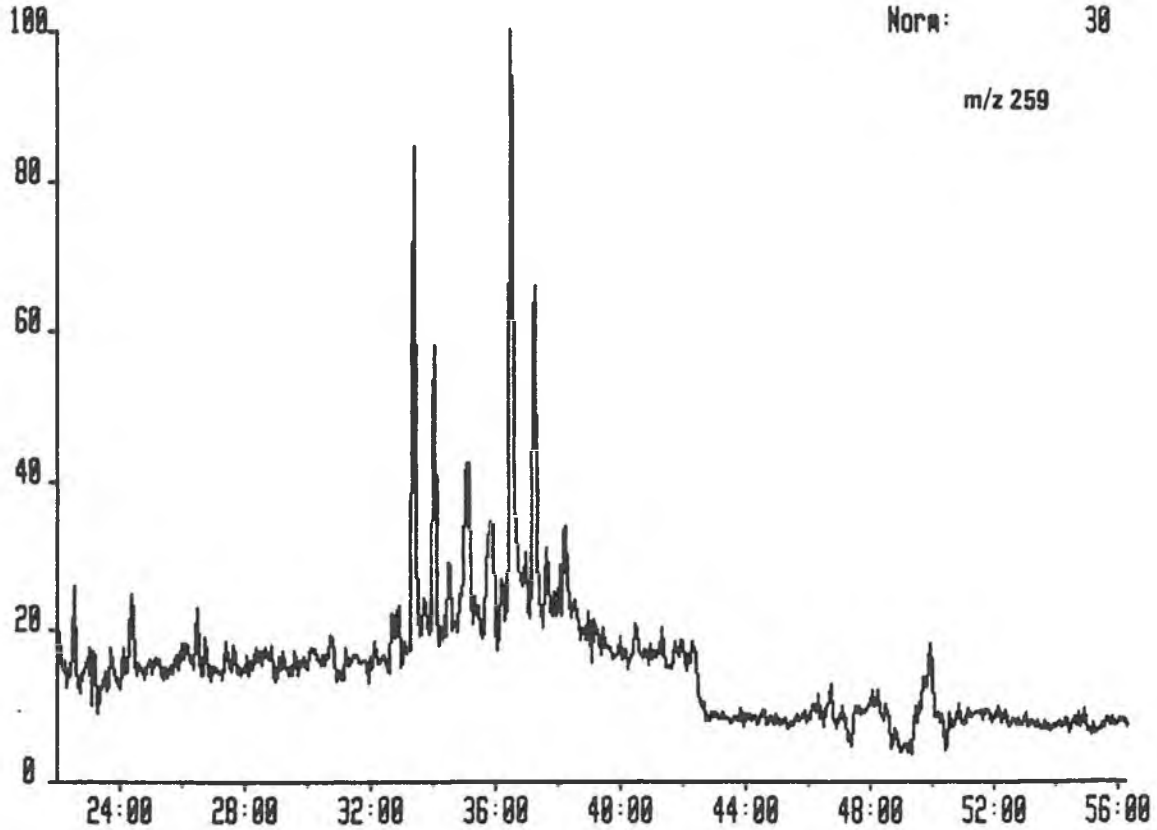
FIGURE 7

MASS CHROMATOGRAMS OF M/Z 231 AND 259

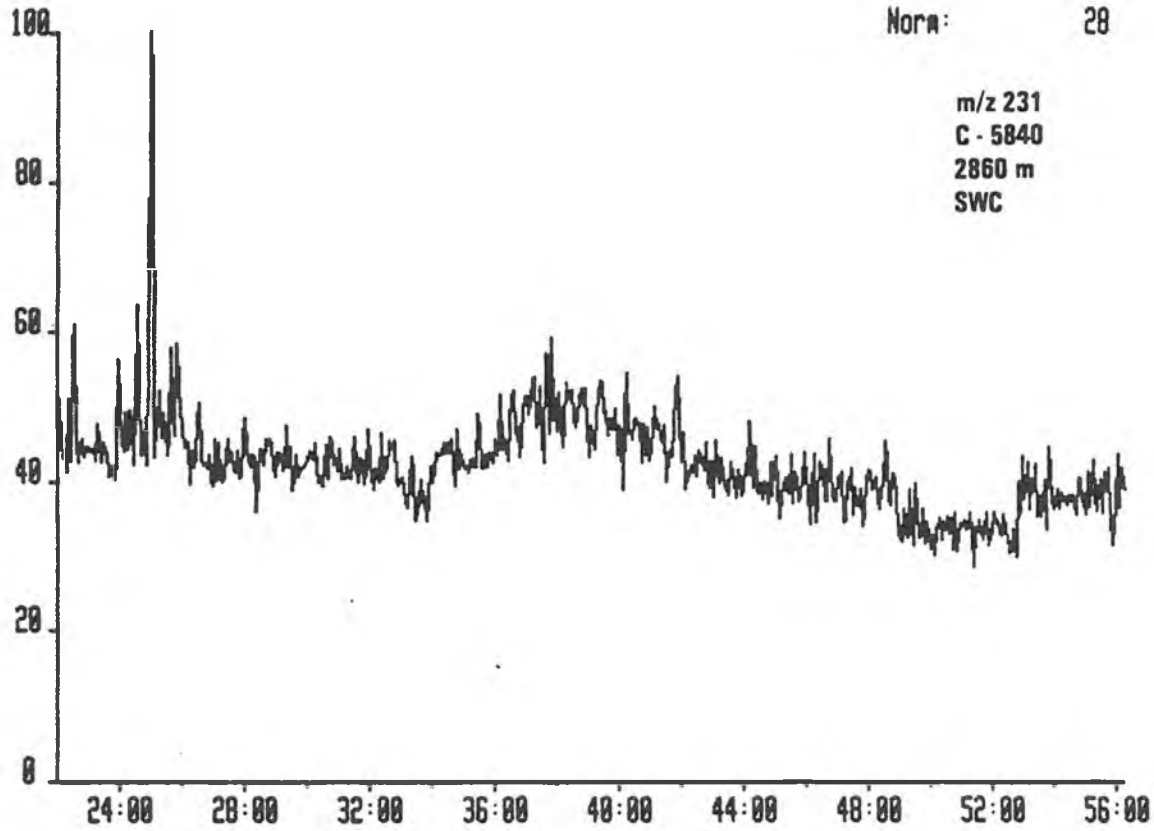
C5836SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



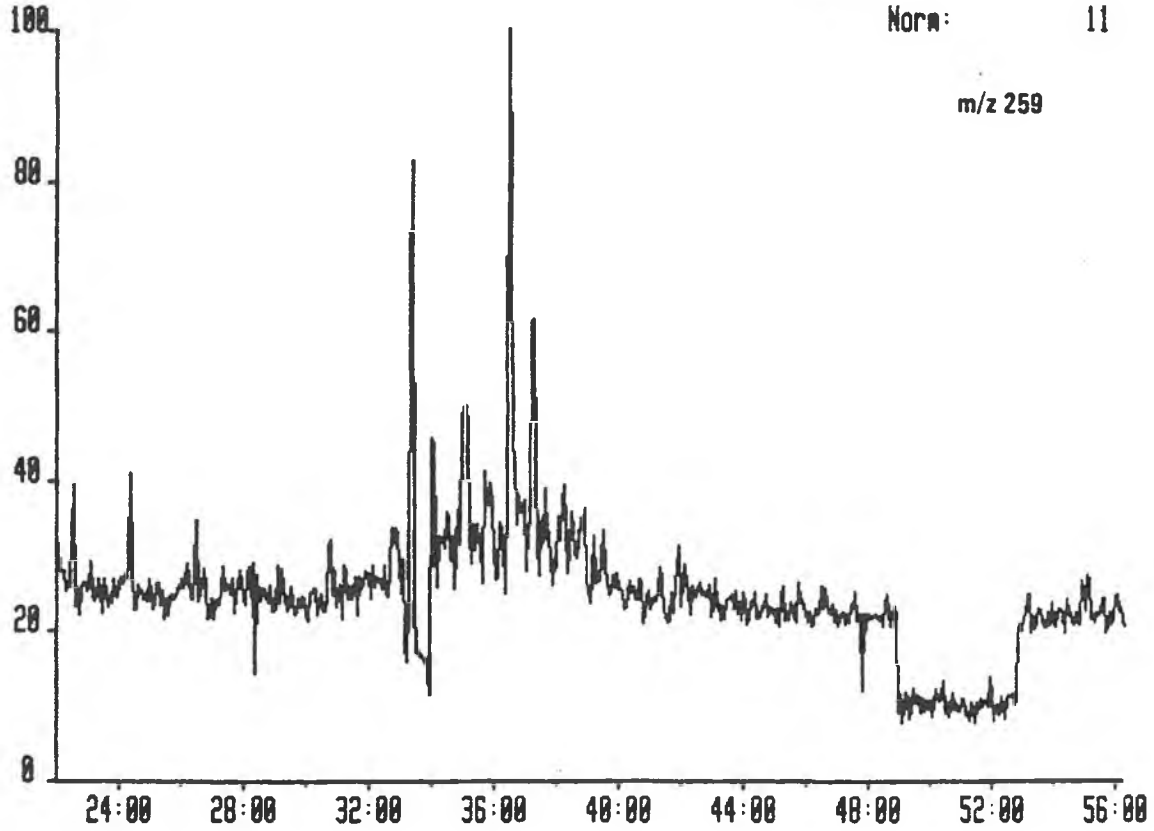
C5836SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:



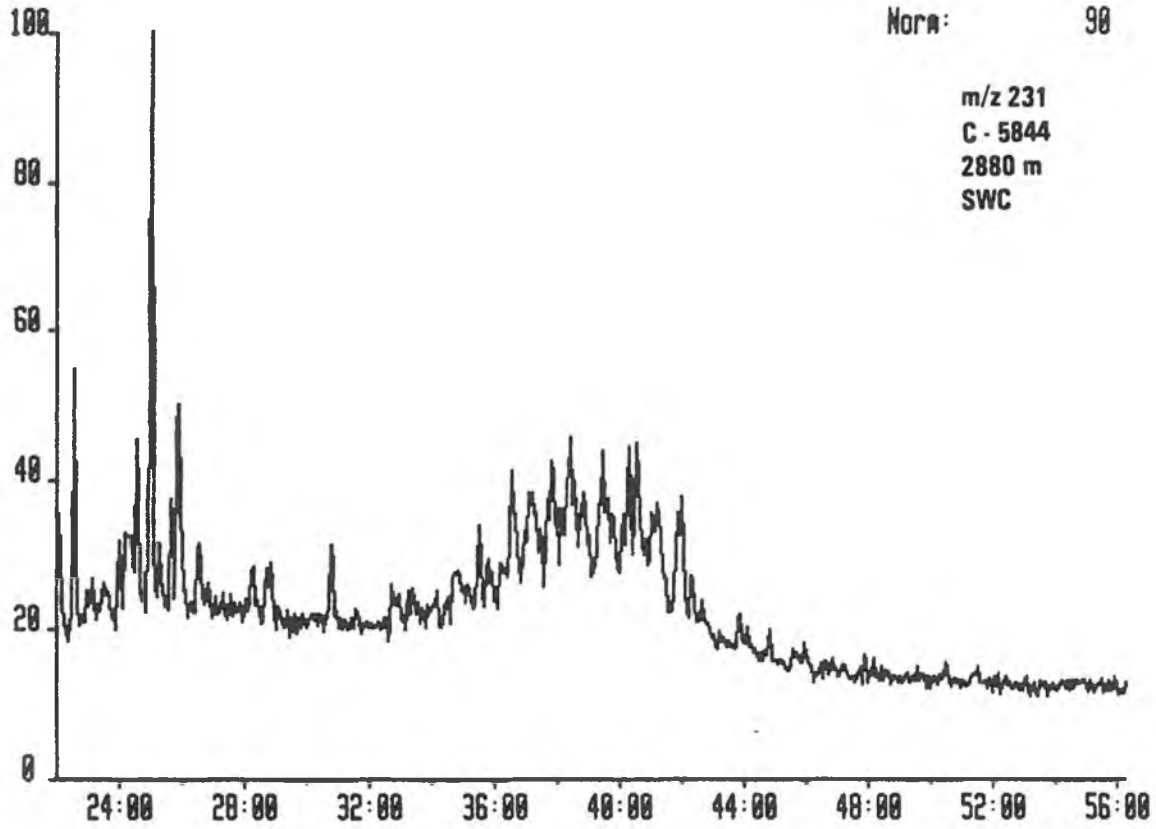
C5840SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



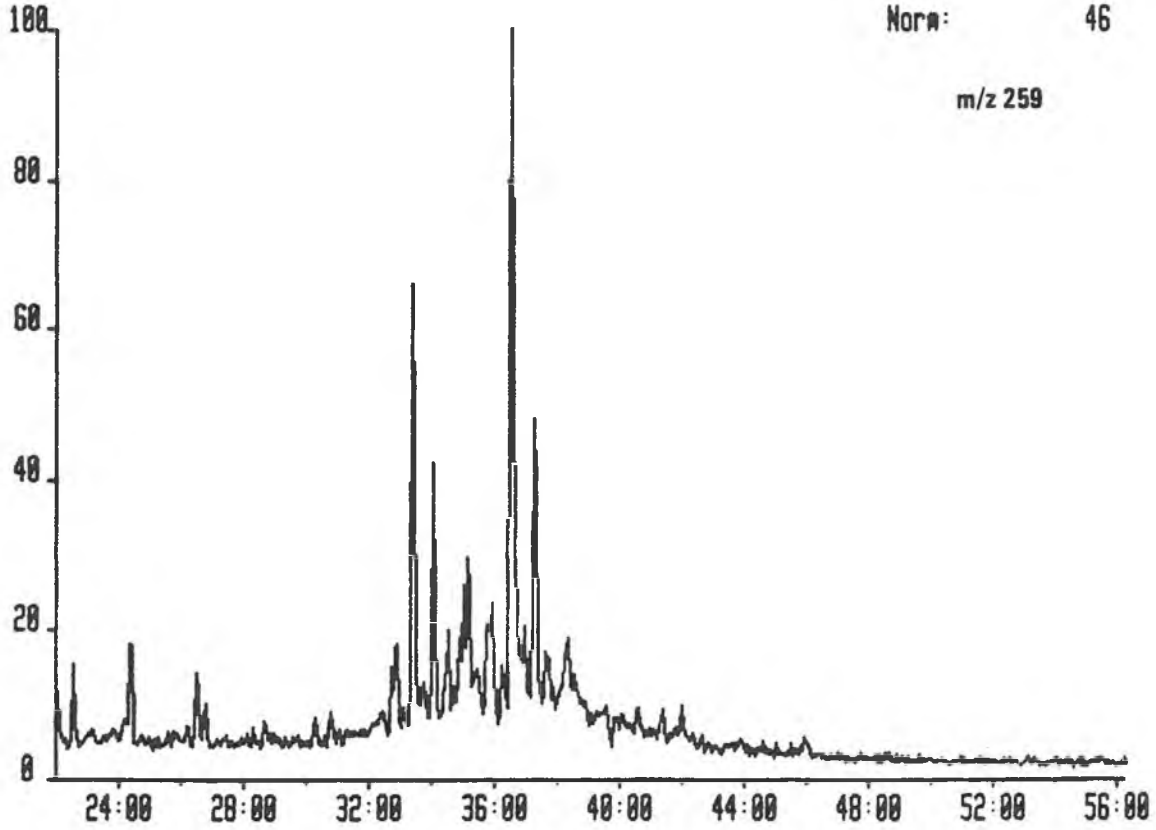
C5840SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:



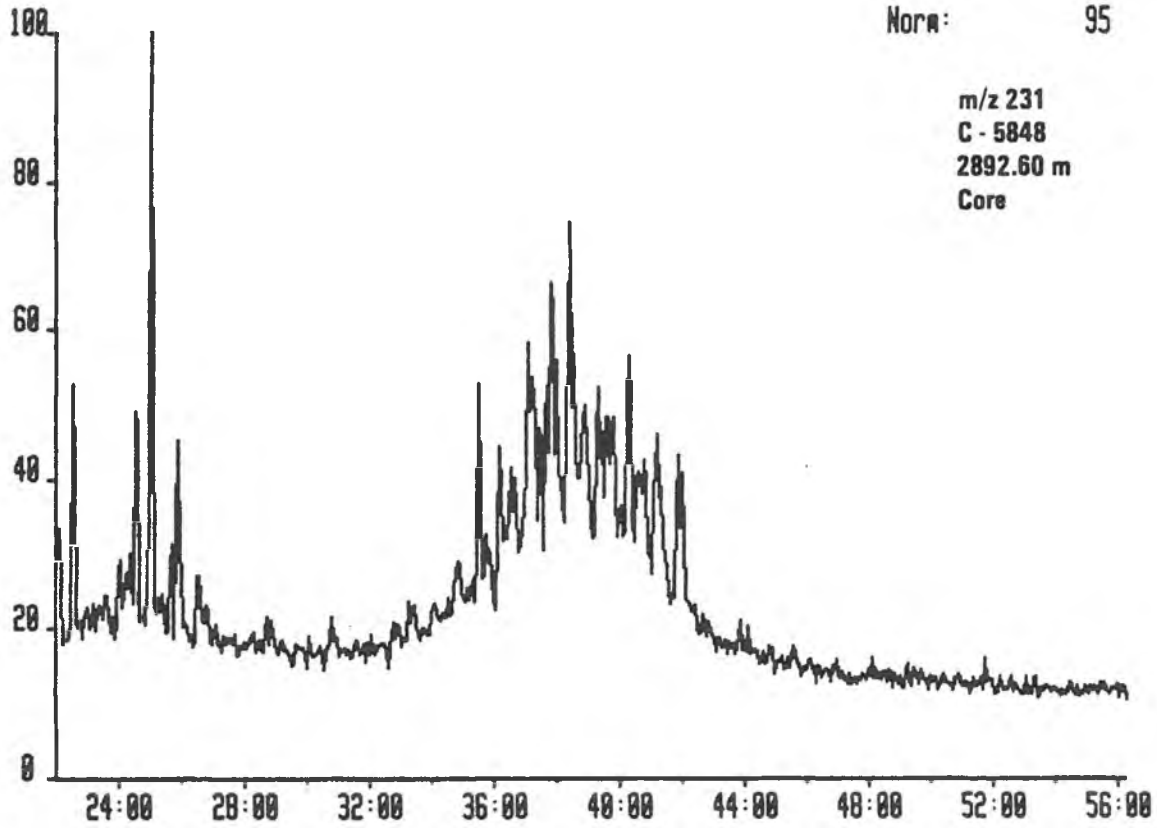
C5844SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



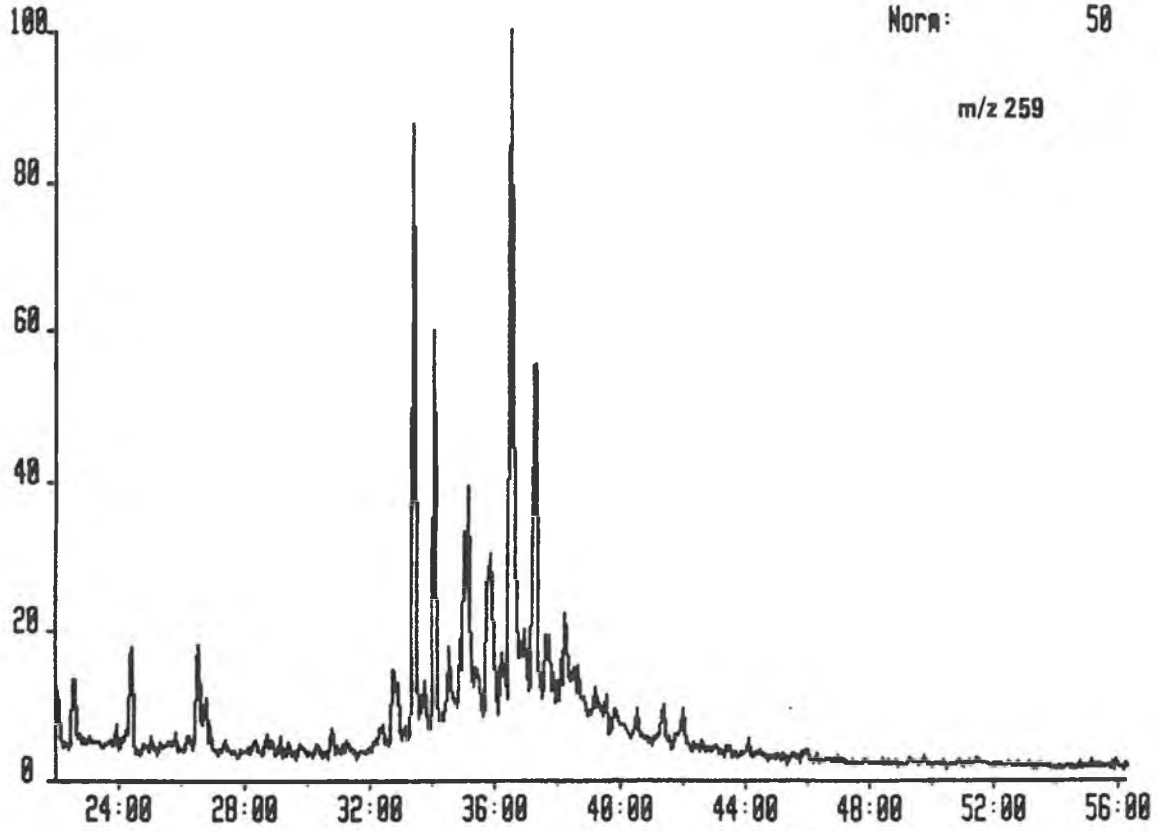
C5844SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:



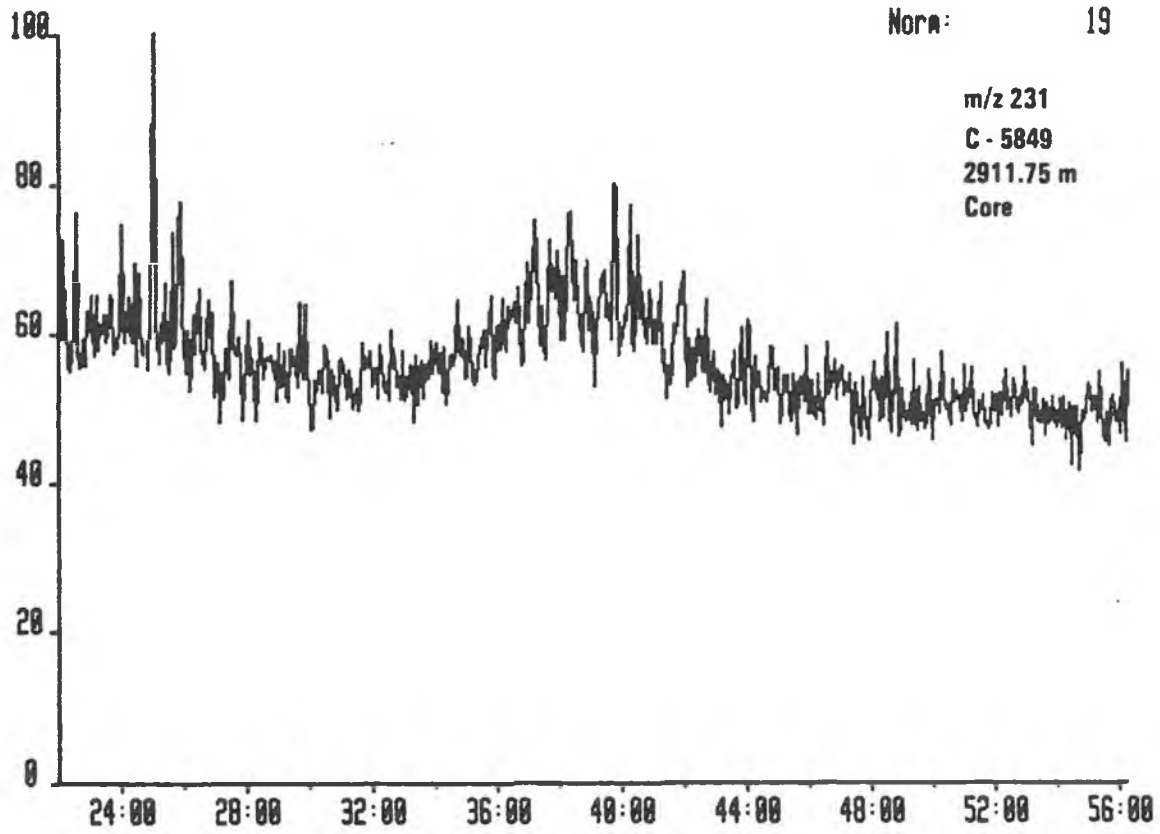
C5848SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



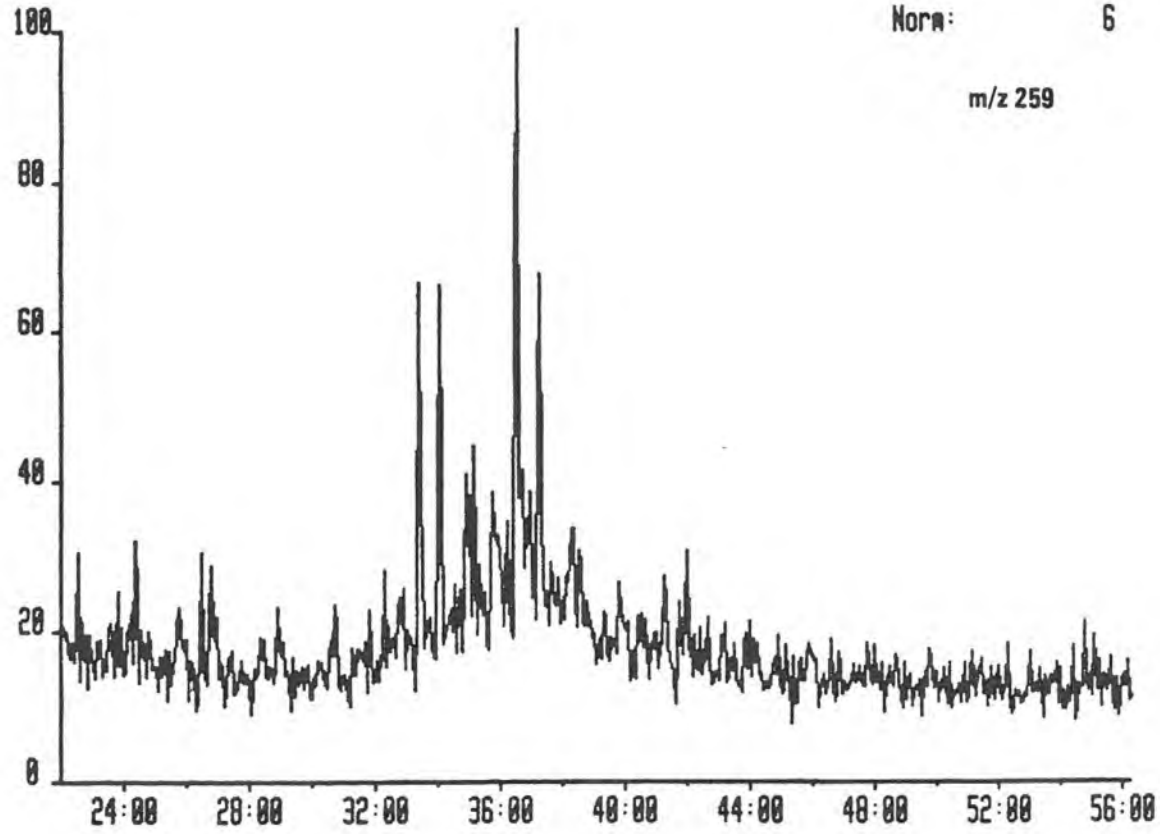
C5848SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:



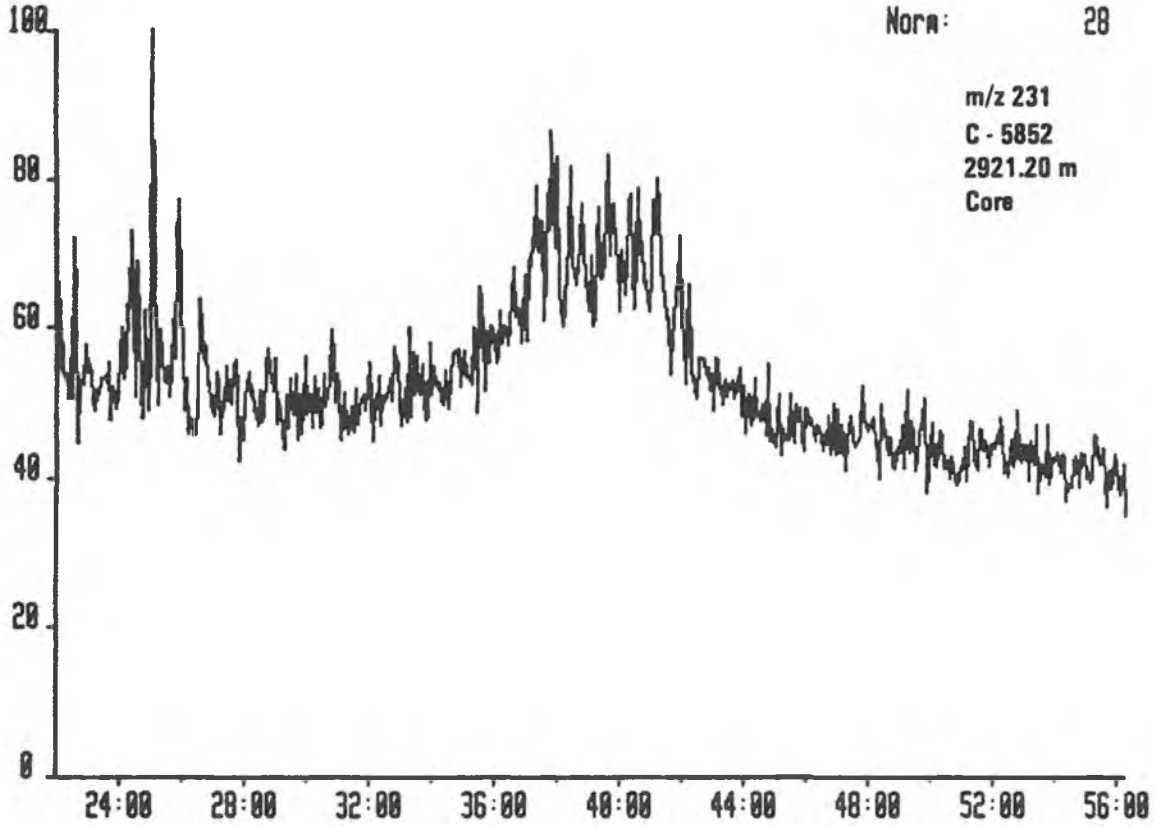
C5849SAT 5-FEB-07 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



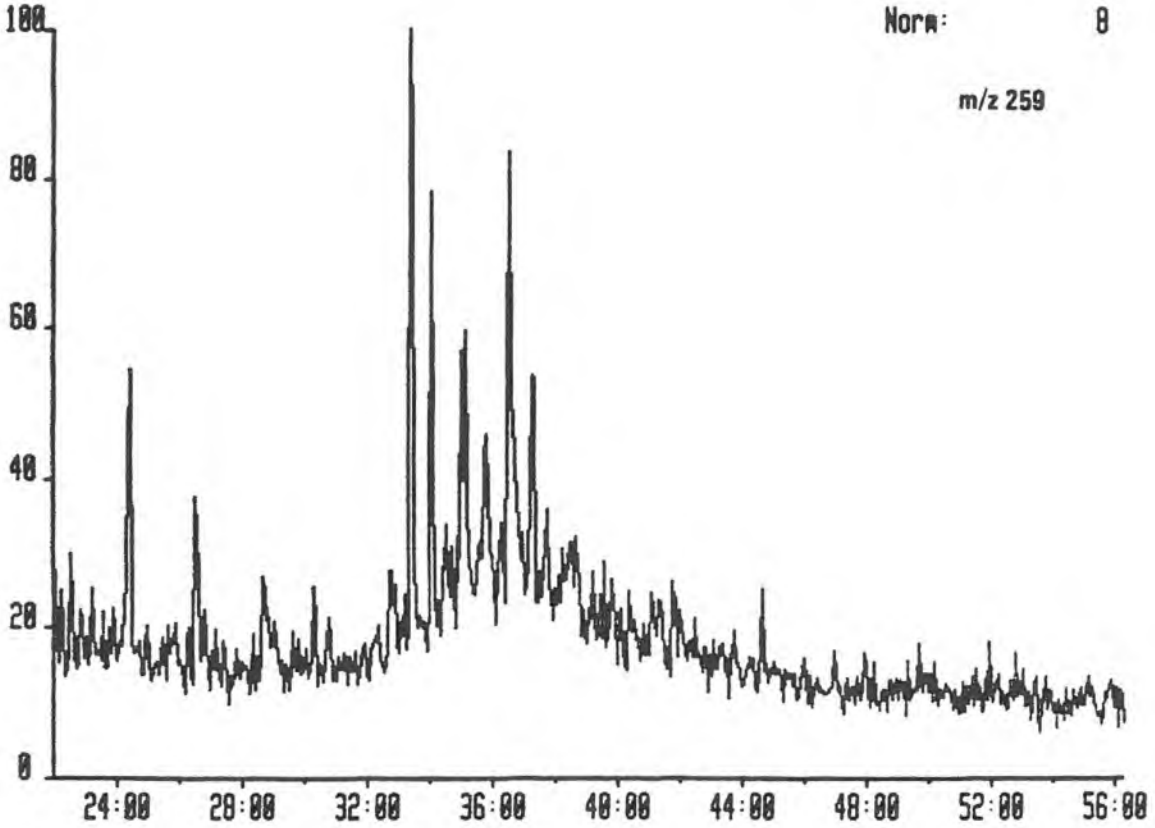
C5849SAT 5-FEB-07 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:



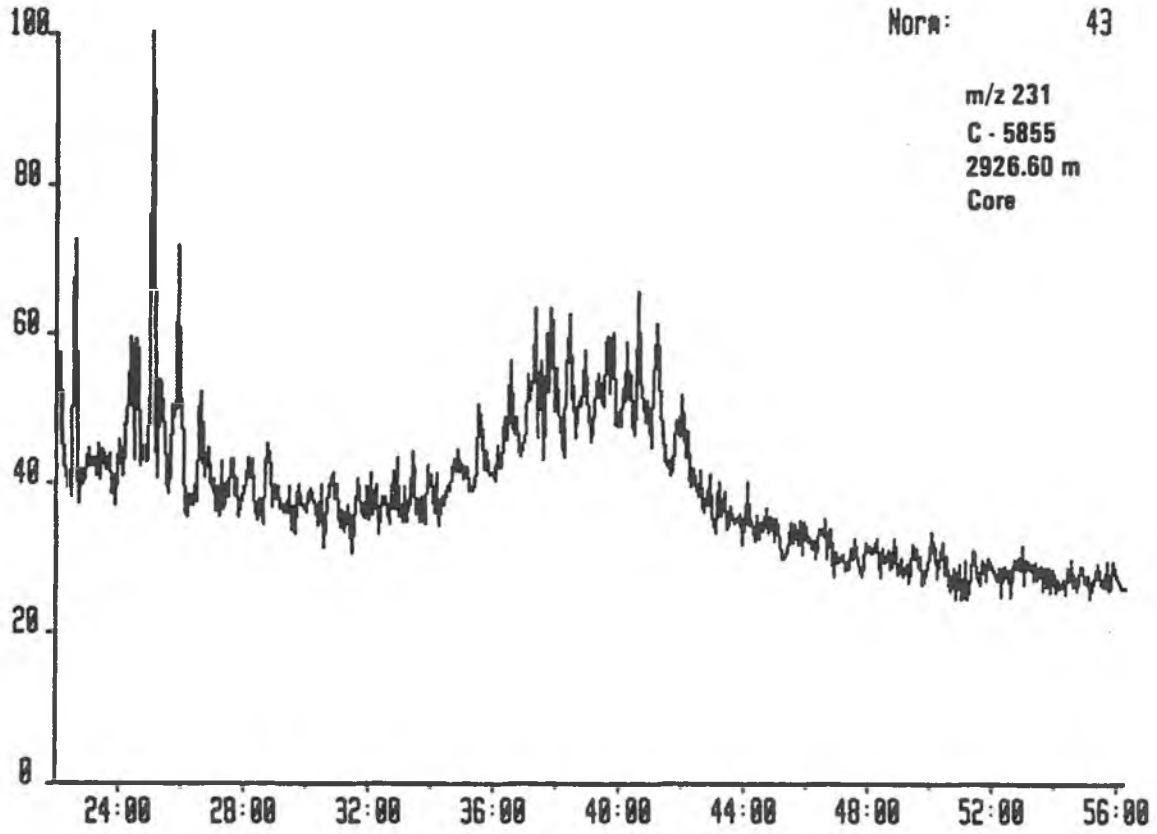
C5852SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



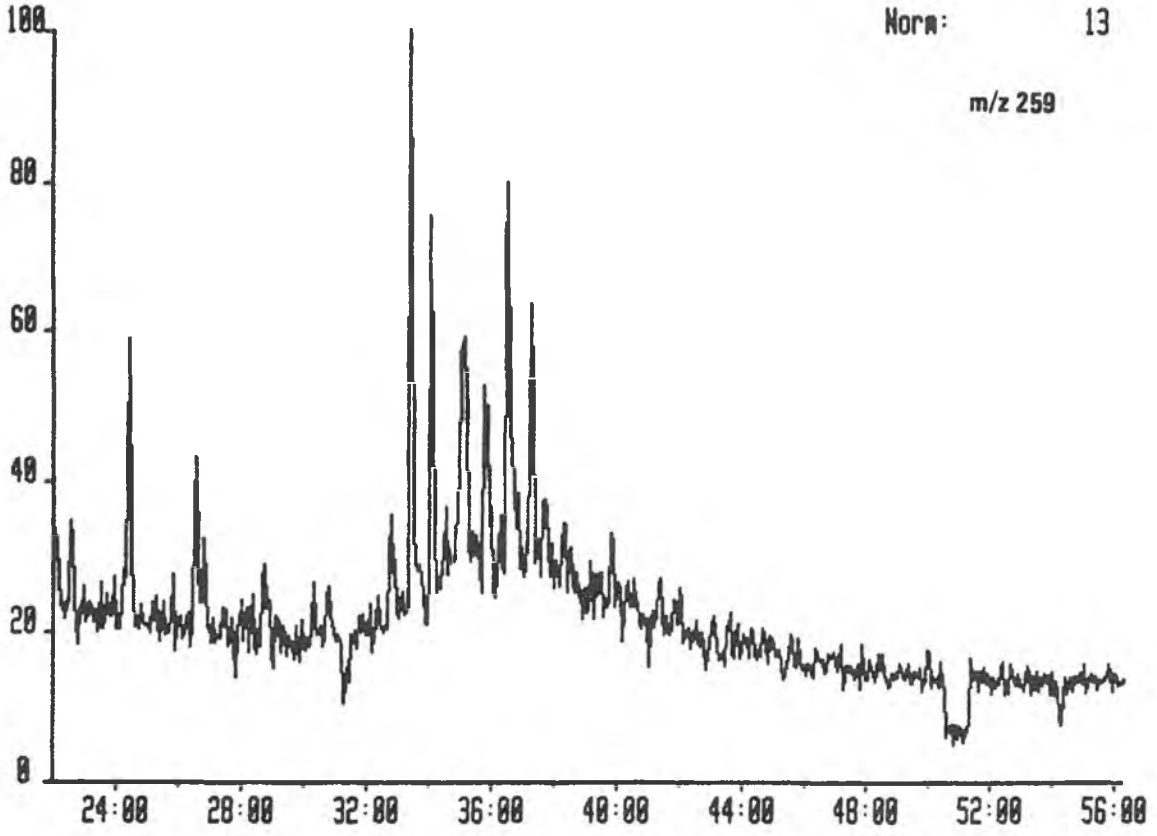
C5852SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:



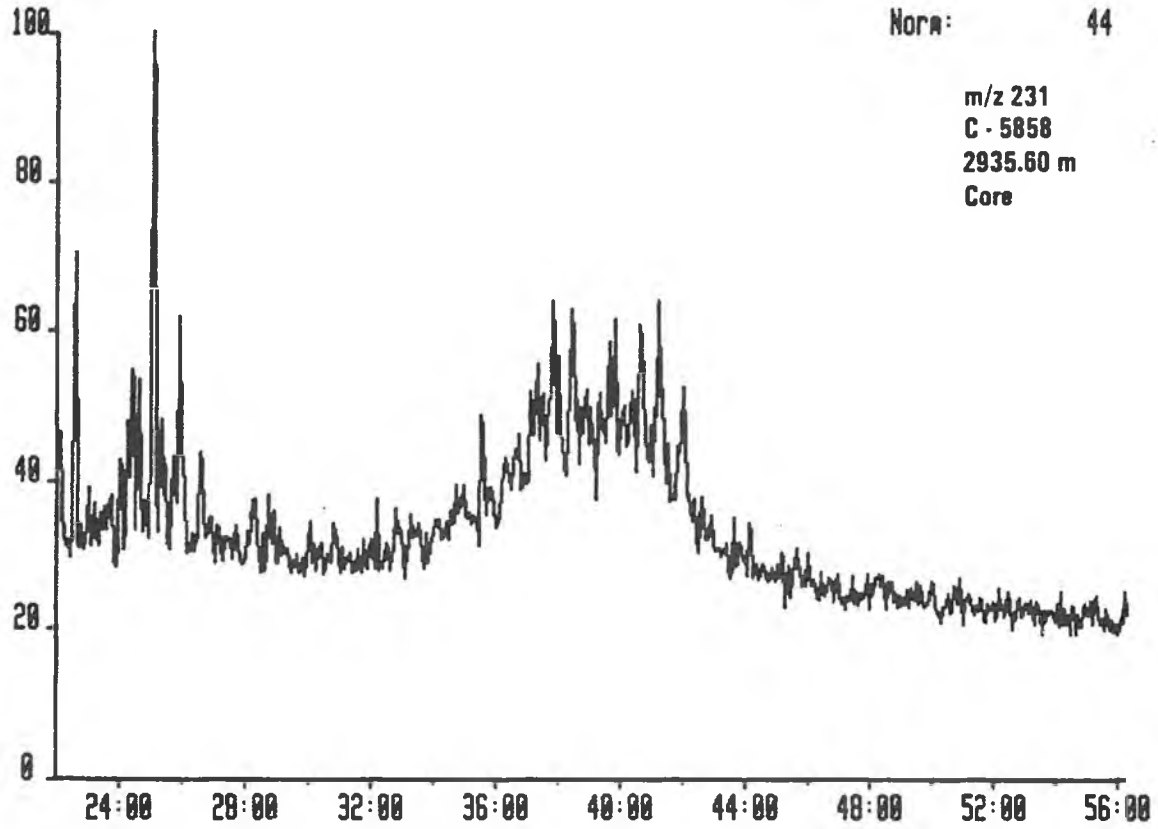
C5855SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



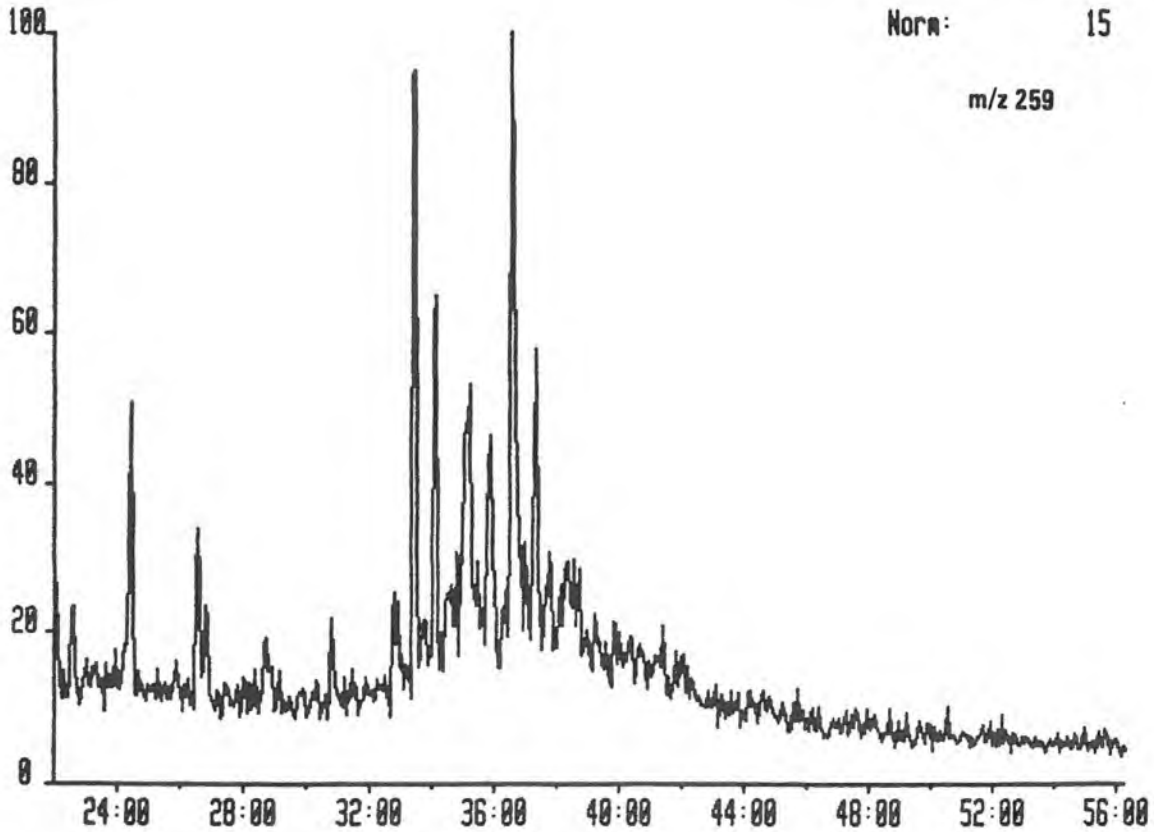
C5855SAT 5-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:



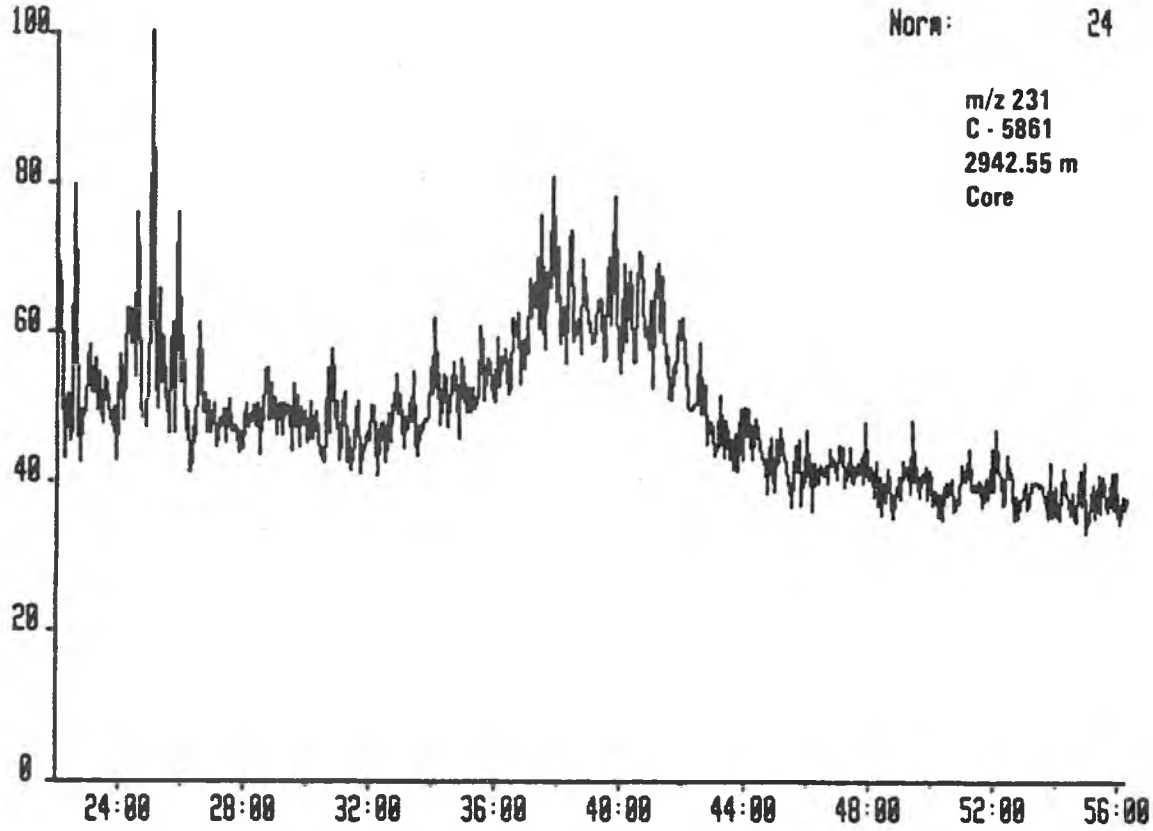
C5858SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



C5858SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:



C5861SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



C5861SAT 6-FEB-87 Sir:Voltage 7070H Acnt:IKU System:TRIT
Sample 1 Injection 1 Group 1 Mass 259.1000
Text: