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REPORT TITLE/ TITTEL

Correlation of Oil Shows/Source Rocks in 7120/8-2.

CLIENT/ OPPDRAGSGIVER

Statoil

RESPONSIBLE SCIENTIST/ PROSJEKTANSVARLIG

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SUMMARY/ SAMMENDRAG

Examination of 4 oil shows and a condensate from Lower Jurassic sandstones indicates that they are probably from the same source. The main source rocks present in the well are the Cretaceous/Upper Jurassic type II or II/III claystones with up to 10% TOC and thinner Lower Jurassic carbonaceous claystones and coals with type III kerogens. The most likely source of the heavy paraffin-rich shows and probably the condensate also is the Upper Jurassic claystones. There may be a contribution from the Lower Jurassic coals/claystone to the low molecular weight hydrocarbons in the condensate.

KEY WORDS/ STIKKORD

Oil Show | Condensate | Source Rock | Correlation

087/r/ah/1

CONTENTS

EXPERIMENTAL AND DESCRIPTION OF INTERPRETATION LEVELS

Total Organic Carbon (TOC)

Picked cuttings of the various lithologies in each sample was crushed in a centrifugal mill. Aliquots of the samples were then weighed into Leco crucibles and treated with hot 2N HCl to remove carbonate and washed four times with distilled water to remove traces of HCl. The crucibles were then dried at 80^{o}C. The samples were then analysed on a Leco E C 12 carbon analyser, to determine the total organic carbon (TOC).

The results are shown in table A in the Appendix with the lithological description.

Rock-Eval Pyrolysis

100 mg crushed sample was put into a platinum crucible whose bottom and cover are made of sintered steel and analysed on a Rock-Eval pyrolyser.

Extractable Organic Matter (EOM)

From the TOC results samples were selected for extraction. Of the selected samples, where possible approximately 100 gm of each was extracted in a flow blending system (Radke et al,, 1978, Anal. Chem. 49, 663-665) for 10 min. using dichloromethane (DCM) as solvent. The DCM used as solvent was distilled in an all glass apparatus to remove contaminants.

Activated copper filings were used to remove any free sulphur from the samples.

After extraction, the solvent was removed on a Buchi Rotavapor and transferred to a 50 ml flask. The rest of the solvent was then removed and the amount of extractable organic matter (EOM) determined.

Chromatographic Separation

The extractable organic matter (EOM) was separated into saturated fraction, aromatic fraction and non hydrocarbon fraction using a MPLC system with hexane as eluant (Radke et al., Anal. Chem., 1980). The various

fractions were evaporated on a Buchi Rotavapor and transferred to glass-vials and dried in a stream of nitrogen. The various results are given in Tables C-F in the Appendix.

Gas Chromatographic Analyses

The saturated and aromatic hydrocarbon fractions were each diluted with n-hexane and analysed on a HP 5730 A gas chromatograph, fitted with a 25 m OV101 glass capillary column and an automatic injection system. Hydrogen (0.7 ml/min.) was used as carrier gas and the injection was performed in the split mode (1:20). Ratios determined from the saturated hydrocarbon gas chromatograms are shown in table G. Gas chromatograms are shown in figures a and b in the Appendix.

GC-MS Analysis

The GC-MS analysis were performed on a VG 70-70H mass spectrometer coupled to a Varian 3700 gas chromatograph. A 20m OV-1 fused silica column was fitted in the chromatograph and helium was used as carrier gas. Injections were performed in split mode.

The saturated hydrocarbons were analysed by Multiple Ion Detection (MID) with a scan cycle time of approximately 2 seconds. Full data collection was applied for the aromatic fractions with a scan time of 2 sec/decade. Data acquisition was done by a VG data system.

Figures c and d in the Appendix show the various mass fragmentograms.

Measurement of ratios used was performed as follows:

Triterpane and sterane ratios were calculated from peak height in the m/z 191 and 217 fragmentogram. Correction for variation in intensity of m/z 217 fragmentograms between ββ and ααα steranes was also made (ratio 1) based on peak area in m/z 217 i.e. r+s/q+r+s+t; ratio 2 absolute percentage in ααα and ββ steranes i.e. 2(r+s)/q+t+2(r+s).

INTRODUCTION

The aim of this study was to correlate oil shows and a condensate present in Jurassic sandstones of well 7120/8-2 with the potential source rocks in the same well. An added complication to this is the presence of migrated hydrocarbons within parts of the source rock sequences, which will interfere with the attempted correlation.

A brief discussion follows of the petroleum potential of the different source rock sequences in the well plus the amounts and composition of extractable organic matter in the oil shows.

Potential Source Rocks

The source rocks which theoretically could have produced the hydrocarbons present in the oil shows and condensate include:

- Palaeocene-Cretaceous claystone from 800-950 metres approximately.
- Lower Cretaceous-Upper Jurassic claystones 1950-2085 metres.
- Lower Jurassic claystones and coals from 2100 metres to 2400 metres approximately.

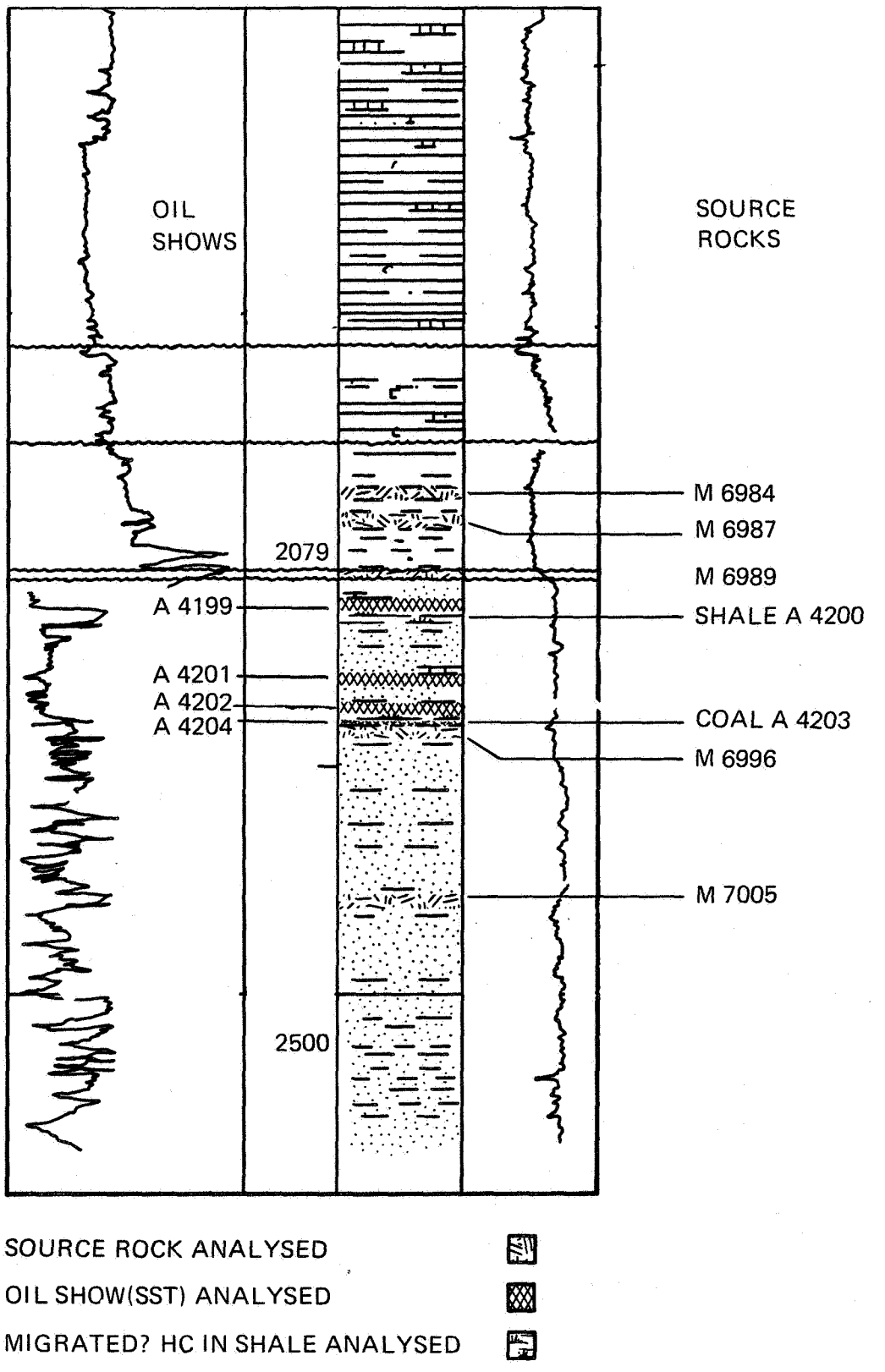
Based on Rock-Eval pyrolysis and TOC data (Appendix 1 and 2) the most probable oil source would be the Upper Jurassic claystones (Hydrogen indices 200-400, TOC 4-10%). However wet gas and condensates could be derived from the other source rock horizons. A detailed assessment of source horizons and correlation to the oil shows and condensates is given later.

Oil Shows

The soluble bitumen of the sandstones between 2100 and 2220 (see figure 1) metres consists of approximately 70% hydrocarbons (average 71.2%) with extractabilities (milligrams hydrocarbons per gram TOC) of between 200-400 (average 298 mgs HC/g TOC), and saturate to aromatic hydrocarbon ratio is approximately 3:1. This data indicates the presence of oil stain, i.e. migrated hydrocarbons in these sandstones. This conclusion is supported by qualitative observations of the fluorescence and cut fluorescence of the hand specimens under ultra-violet light, and the high Rock-Eval production indices (average 0.77).

Figure 1

Location of source rocks and oils shows in 7120/8-2 (Gamma Ray response shown on left) of stratigraphic section modified from Statoil diagram.



The presence of migrated hydrocarbons in certain samples of the source rocks is indicated. The high Rock-Eval production index value for the lowest type II/III claystone sample of the Upper Jurassic 2070-2085m (M-6989, production index = 0.24) in what is an early mature section, suggests the presence of migrated hydrocarbons.The occurrence of a dull orange fluorescence and white cut fluorescence in silt lamina of a claystone from the Lower Jurassic at 2100 metres (A-4200), and the high saturate/aromatic ratio (2.4) of the hydrocarbons from this surface washing of this claystone also suggests the presence of migrated hydrocarbons.

The following discussion is in four sections:

A Correlation of the oil shows.
B Correlation of oil shows to condensate.
C Correlation of oil shows and condensate to source rocks.
D Conclusions

All gas chromatograms and mass fragmentograms which are discussed are shown in the appendix, along with extraction and Rock-Eval data.

A. Correlation of oil shows

Gas chromatography saturated hydrocarbons

The oil shows in the four sandstone cores between 2100 and 2220 metres (A-4199, A-4201, A-4202 and A-4204) have very similar saturated hydrocarbon gas chromatograms (see appendix for gas chromatograms). The four samples have unimodal smooth (CPI 1-1.1) n-alkane distributions ranging from nC_{12}-nC_{36}, with the maximum between nC_{19}-nC_{21}. Pristane/nC_{17} and pristane/phytane ratios are very similar for all the samples (0.6-0.7 and 1.4-1.8 respectively, see table 1).

Table 1. Saturated hydrocarbon ratios

	IKU code	Depth (m)	Pristane nC_{17}	Pristane Phytane	CPI
Sandstones	A-4199	2100.16 - 2100.28	0.6	1.9	1.0
	A-4201	2178.70 - 2178.80	0.6	1.9	1.0
	A-4202	2191.17 - 2191.25	0.7	1.9	1.1
	A-4204	2217.49 - 2217.56	0.6	1.9	1.1
Claystone wash.	A-4200	2113.76 - 2113.82	0.7	2.8	1.2
Condensate	A-4205	-	0.1	2.6	N.M.

The hydrocarbons washed from the shale (A-4200) show a different saturated hydrocarbon pattern to the oil shows. It has a bimodal n-alkane distribution with a narrow, main envelope from nC_{13}-nC_{20} (maximum nC_{16}) and a minor envelope from nC_{21}-nC_{36} (maximum at nC_{29}).

The weak fluorescence, but bright white cut fluorescence, in the siltstone laminae in this claystone might indicate that condensate-type migrated hydrocarbons are present. This suggestion is supported by the dominant low molecular weight n-alkane envelope. The washings of the coal (A-4203) from 2200 metres showed mostly high molecular weight components from nC_{20}-C_{35}.

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Gas Chromatography Aromatic Hydrocarbons

The aromatic hydrocarbon distributions of the four sandstone samples are similar to each other. Phenanthrene (P), methyl phenanthrenes (MP) and dimethyl phenanthrenes (DMP) dominate in the top three samples (A-4199, A-4121, A-4122). The alkyl naphthalenes (C_1-, C_2- and C_3-naphthalenes marked MN, DMN and TMN on chromatograms, see appendix) are more prominent in the lowest sandstone sample A-4204 and least prominent in the top sample A-4199.

The detailed pattern of aromatic hydrocarbons of these oil shows is very similar, and the relative peak heights of alkyl naphthalenes and methyl phenanthrenes are very similar. Table 2 shows values for various parameters which are regarded mostly as maturity parameters (Radke et al., 1982).

Table 2. Aromatics Ratios

	IKU code	2:1 MNR	2:1 ENR	DMNR	MPI 1	MPR
	A-4199	-	-	2.4	0.89	0.95
	A-4201	1.6	2.4	2.4	0.82	0.90
Sandstones						
	A-4202	1.6	2.5	2.2	0.94	0.91
	A-4204	1.7	2.4	2.8	0.78	0.95
Claystone	A-4200	1.4	2.8	4.1	0.76	1.03
wash						
condensate	A-4205	-	2.7	3.6	0.92	1.22

$$\text{2:1 MNR} = \frac{\text{2-methyl naphthalene}}{\text{1-methyl naphthalene}}$$

Marked MN on chromatograms

$$2{:}1\ ENR = \frac{\text{2-ethyl naphthalene}}{\text{1-ethyl naphthalene}}$$

Marked DMN on chromatograms

$$DMNR = \frac{\text{2,6+2,7-dimethylnaphthalene}}{\text{1,5 dimethylnaphthalene}}$$

$$MPI\ 1 = \frac{\text{1.5x(3+2-methylphenanthrene)}}{\text{phenathrene+(9+1-methylphenanthrene)}}$$

Marked MP on chromatograms

$$MPR = \frac{\text{3+2-methyl phenanthrene}}{\text{9+1-methyl phenanthrene}}$$

The slightly higher methyl phenanthrene and dimethylnaphthalene ratios for the condensate suggest that it may come from a slightly more mature source rock than the oil shows. The values for the claystone washings suggests that the migrated hydrocarbons present in the sample are mainly low molecular weight hydrocarbons from condensate. The general dominance of relatively high molecular weight aromatics as well as saturated hydrocarbons compared to normal crude oils suggests a loss of low molecular weight material from the oil shows. The claystone washings are dominated by dimethyl and trimethyl naphthalenes. The coal (A-4203) was also washed before extraction and the aromatic hydrocarbons from this are dominated by phenanthrene and alkyl phenanthrenes. The dominant saturated hydrocarbons in the coal, as previously mentioned, are dominated by high molecular weight n-alkanes. It is probable that a surface coating of high molecular weight hydrocarbons similar to the oil shows is responsible for the hydrocarbon pattern in the coal. The aromatic hydrocarbon distribution of the extracts of the claystone (A-4200) and coal (A-4203) are unlike the oil shows and the washings and are dominated by naphthalene and the alkyl naphthalenes (see appendix).

Gas Chromatography - Mass Spectroscopy

Several mass fragmentograms of the saturated and aromatic hydrocarbons were obtained.

Saturated Hydrocarbons

m/z 191 fragmentogram (triterpanes)

The m/z 191 traces of the saturated hydrocarbons of the oil shows are very similar (see table 3 showing ratios of various triterpanes).

Table 3. Triterpane ratios from m/z 191 fragmentogram.

Sample	IKU code	A/B	C/E	F/E	E/G	%22S (G/G+H)
Sandstones	A-4199	1.2	0.5	0.08	2.7	60%
	A-4201	1.3	0.6	0.10	3.1	60%
	A-4202	1.3	0.5	0.11	2.5	66%
	A-4204	1.3	0.7	0.12	2.3	62%
Claystone wash	A-4200	0.6	0.8	0.14	1.5	64%
Condensate	A-4205	1.5	1.1	0.05	2.4	68%

KEY

A = C_{27} hopane
B = C_{27} hopane
C = C_{29} hopane
E = C_{30} hopane
F = C_{30} moretane

% 22S =G/G+H percentage of C_{31}22S hopane to the total amount of C_{31}22S + C_{31}22R hopanes

Full identification of hopanes is shown with the mass fragmentograms in the appendix.

The dominant compound is the $C_{30}17\alpha(H)$, $21\beta(H)$ hopane (marked E on fragmentogram) in future referred to as the $C_{30}\alpha\beta$hopane. Second is $C_{29}\alpha\beta$ hopane (C). The relative amounts of A and B which are C_{27} triterpanes (see key to fragmentograms in the appendix) are similar. This ratio has been used as a maturity parameter (Seifert and Moldowan, 1978) as Tm/Ts. Tm or maturable triterpane (peak B) over Ts or stable

triterpane (peak A) gives a decreasing value with increasing maturity. The value A/B increases with maturity. This ratio is low for the claystone washings indicating lower maturity for the washings than the condensate or oil shows. The low value may be that the measurement is performed on triterpanes indigenous to the claystone (see source rock triterpane ratio values in table 9).

The percentage of C_{31}22Sαβhopane in all the shows, condensate and washings is characteristic for mature samples. The increase in C_{29} relative to C_{30}αβhopane in the condensate may be due to a slightly higher maturity of the condensate. The ratio of F/E (moretane/hopane ratio) is also a rough indicator of maturity. The smaller the value, the higher the maturity of the sample (see source rock discussion).

m/z 217 fragmentogram

The general distributions of steranes in the oil shows are very similar. Table 4 gives some ratios used in this source rock/crude oil correlation. Figure 2 roughly plots the relative composition of C_{27}, C_{28} and C_{29}αααsteranes in the shows and the source rocks.

Table 4. Sterane* ratios of oil shows and condensate (plus shale A-4200 wash values for coal wash were not measurable).

Sample type	IKU code	C_{27}/C_{29} diasteranes (a+b/h+k)	C_{29}diasteranes / C_{29} regular steranes (h+k/q+r+s+t)	C_{29} % ββ steranes 1	C_{29} % ββ steranes 2	C_{29} %20S steranes (q/q+t)
Sandstones	A-4199	0.95	0.97	64%	79%	59%
	A-4201	0.80	0.94	56%	73%	60%
	A-4202	1.07	0.65	59%	80%	55%
	A-4204	0.78	0.71	60%	74%	51%
Shale wash	A-4200	1.1	0.53	57%	76%	45%
Condensate	A-4205	1.8	0.67	56%	73%	58%

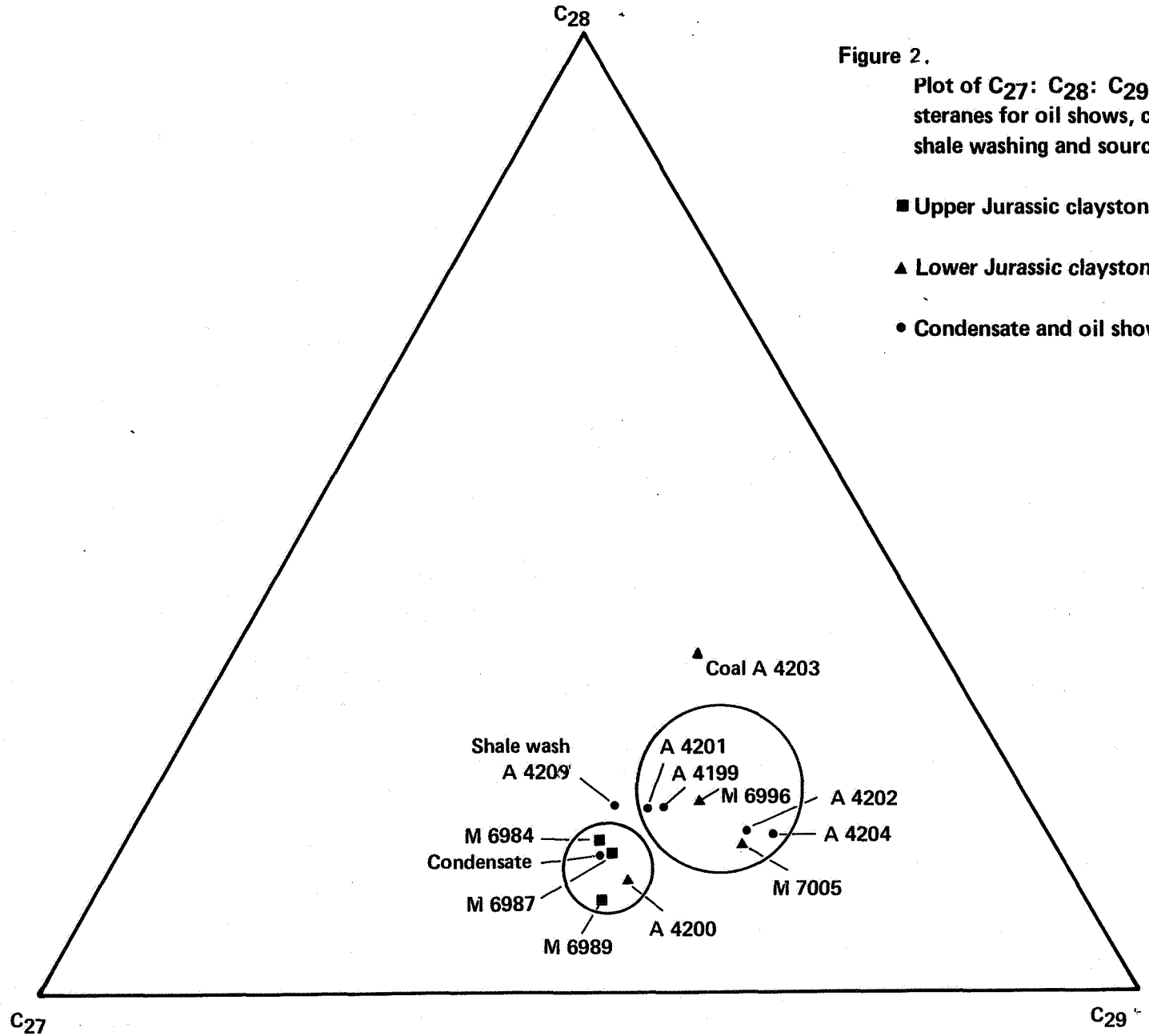

Figure 2.

Plot of C_{27}: C_{28}: C_{29} $\alpha\alpha\alpha$ 20R steranes for oil shows, condensate, shale washing and source rocks.

■ **Upper Jurassic claystones**

▲ **Lower Jurassic claystones**

• **Condensate and oil shows**

* For full identification see key to mass fragmentograms.

The variation in certain ratios is quite large. There is a slight difference in %20S C_{29} values between the top two and bottom two sandstones. There is also some difference between the top and bottom two samples in the C_{29} diasteranes/regular sterane ratio, with more of the C_{29} diasteranes in the top two sandstones. Increases in diasterane to regular sterane ratios have been attributed to increased migration distance and/or increased maturation (Seifert and Moldowan, 1982). The amount of C_{27} diasteranes relative to C_{29} diasteranes is also much greater in the condensate than the oil shows or claystone washing and is due perhaps to both maturity and longer migration distance. The lower C_{29} diasterane to regular sterane ratio in the condensate and bottom two shows to the other two shows may indicate a source difference.

Another possibility is that the top two are in some way slightly more mature than the bottom (also have higher %20S) or have been altered more during migration or as mentioned possibly there is more than one source. However apart from the evident difference in amount of C_{29} diasteranes and also larger amounts of the C_{29} ααα20R sterane (marked t) in the top two samples other small variations in values could be difficulties in accurate measurement.

Aromatic Hydrocarbon Fragmentograms

The m/z 91, 92, 105 and 106 fragmentograms of the four sandstones are very similar (see source rock/oil show correlation for details) whereas the washings of the shale is unlike both these and the aromatics of the extract from the shale. The condensate is difficult to compare with the shows since boiling point ranges are quite different, although, where ranges overlap the distributions are similar.

Summary

The oil show samples are most probably from the same main source. However, the small differences in sterane distributions indicate possibly minor additional sources or different migration histories.

B. Correlation of oil shows to condensate

It is impossible to compare the shows and the condensate from the saturated hydrocarbon chromatograms since their boiling ranges are quite different (e.g. maximum nC_7 in condensate, and nC_{19}-nC_{21} in the oil shows). Comparison can only be undertaken on, certain of the mass fragmentograms of the saturated and aromatic hydrocarbons.

Saturated Hydrocarbons

m/z 191 fragmentograms

Apart from the apparently smaller $C_{29}\alpha\beta$hopane (C) in the shows, the triterpane pattern of the condensates and the shows is similar, e.g. triterpanes A/B ratios, relative amounts of C_{30} to $C_{31}\alpha\beta$hopanes(i.e. E/G, see table 1).

The claystone wash is less like the condensate and the oil shows, and ratios such as A/B are intermediate between the values for the claystone extract and the condensate/shows.

m/z 217

%20S C_{29} and $\%\beta\beta C_{29}$ sterane values (see previous measurements) are very similar for both condensate and shows. However, the general pattern is different, in the condensate the C_{27} diasteranes (peaks a and b) are much more prominent than in the shows (table 4).

m/z 205

There are differences in the pattern between the oil shows and the condensate and the claystone washings. The low concentration of the triterpanes in the condensate and washings may be a reason for the difference. The changed pattern being due to acquisition of a different pattern in the condensates and washings derived perhaps from other sources during migration through source rock intervals.

Another possible explanation is that there is so little of the triterpanes that minor fragment ions from other compound groups affect the distribution.

Aromatic Hydrocarbons

The boiling point ranges are different, and the m/z 92 and 106 aromatic hydrocarbon fragmentograms as previously mentioned have similar distributions where there is overlap in boiling ranges. It is probable that the condensate has come from the same source or sources, although slightly more mature (see aromatics ratios in Table 2 and the discussion following table 2).

Summary

It is difficult to correlate condensate to shows since boiling point ranges are quite different. However, both shows and condensate are paraffin-rich, and although the condensate is of higher maturity based on aromatics ratios, other parameters indicate a fair similarity between condensate and shows.

C. Correlation of oil shows and condensate to source rocks

The source rocks which could be the source for hydrocarbons in this well as previously mentioned are:

1) Palaeocene-Cretaceous claystones from 800-950 metres.
2) Cretaceous-Upper Jurassic claystones from 1950-2085 metres.
3) Lower Jurassic claystones and coals below 2100 metres.

The first sequence plus most of the Cretaceous claystones to 1980 metres have from good to rich values for organic carbon (1-3% TOC) but hydrogen indices are generally less than 100 (i.e. mostly type IV kerogen) with poor petroleum potentials <1. Only the samples at the top of the Cretaceous 870-885 metres, and 930-945 metres have fair petroleum potentials. The Lower Cretaceous-Upper Jurassic claystones show a gradual increase in petroleum potential downwards from good to rich. The kerogen type is mostly type III within the Cretaceous and type II/III in the Jurassic interval. The Lower Jurassic claystones contain type III kerogen with good petroleum potential. The coal(s) in this sequence appear to be inertinite and vitrinite rich and not abundant in exinite.

A preliminary assessment of Rock-Eval data and extraction data and the saturated hydrocarbon gas chromatograms from the three main horizons mentioned indicates that:

1) The top horizon is immature, but the high production index values suggest the presence of migrated hydrocarbons. The low T_{max} suggests that the S_2 peak may represent asphaltic material in part and if so it is unlikely to be a good enough oil source. It would also be difficult to correlate with oil shows and condensate because of the abundance of migrated hydrocarbons.

2) The Cretaceous-Jurassic sequence from 1950-2085 metres is moderate mature or at the oil generation threshold. Three samples were chosen for analysis, table 5 lists details of source rock richness, type etc.

Table 5: Cretaceous-Upper Jurassic source rock characteristics

Sample Age	IKU Code	Depth	HI	OI	Pet. Pot.	Prod. Ind.	%HC	Sat/ Aro	mgs HC/ g TOC
Cretaceous	M-6984	1995-2010m TOC 4.1% type II/III	291	8	13	0.10	51	0.9	33
Jurassic	M-6987	2040-2055m TOC 7.9% type II/III	243	7	22	0.14	53	1.0	32
Jurassic	M-6989	2070-2085m TOC 10.4% type II/III	229	6	32	0.24	33	0.8	15

(Gassintervall 2081 - 2161 ("M. Jura" sst))

The high production index of the last sample suggests the presence of migrated hydrocarbons unless the kerogen has begun to yield significantly greater quantities of hydrocarbons (compared to the sample which is only 20 metres above). This migrated material will obscure the indigenous hydrocarbon distributions and therefore any correlation of the oil shows with this sample will be of doubtful value.

3) The claystones/coals of Lower Jurassic age are within the upper part of the oil window. Four samples have been chosen for analysis see table 6.

Table 6. Source Rock Characteristics of Lower Jurassic Claystones

Sample Age	IKU Code	Depth	HI	OI	Pet. Pot.	Prod. Ind.	%HC	Sat/ Aro	mgs HC/ g TOC
Claystone	A-4200	2113.76-.82 1.5% TOC type III	110	8	2	0.14	55	0.5	9
Coal	A-4203	2213.85m type II/III	217	5	173	0.15	32	0.4	24
Claystone	M-6696	2331-46m 4.4% TOC type II/III	235	6	12	0.16	37	0.5	50
Claystone	M-7005	2366-81m 9.2% TOC type III	145	9	14	0.07	32	0.6	6

Apart from the top sample which has a fairly high percentage of hydrocarbons the other samples may not be too badly affected by introduced hydrocarbons (all samples were washed before analysis).

Based on the maturity data from the source rock report (and supported by gc-ms data to be discussed) none of the samples are mature enough to have produced the oil or condensate present in this well. Therefore the correlation is restricted to indicating the most probable source, assuming that the source facies do not change laterally.

Gas chromatography

The saturated hydrocarbon patterns do not allow any definite eliminations to be made. The abundance of high molecular weight n-alkanes (greater than nC_{20}) in the shows could be derived from either the Upper or Lower Jurassic claystones.

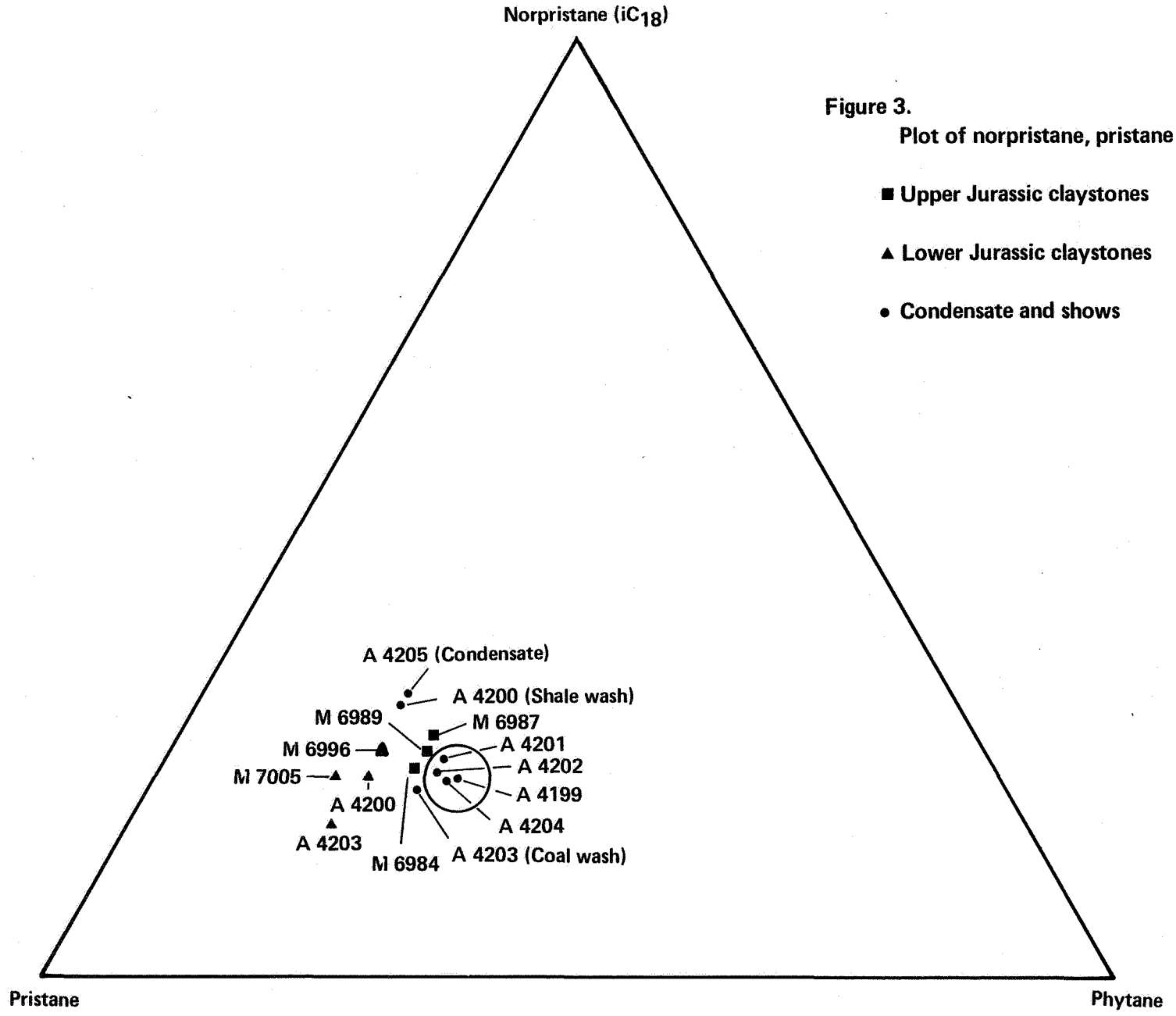

Figure 3.
Plot of norpristane, pristane and phytane.

■ **Upper Jurassic claystones**

▲ **Lower Jurassic claystones**

• **Condensate and shows**

Table 7. Saturated hydrocarbon parameters for source rocks

Sample type	Sample	Pristane/nC_{17}	Pristane/phytane	CPI
	M-6984	2.8	3.0	1.5
	M-6987	2.6	2.6	1.3
Claystones	M-6989	2.5	2.9	1.3
	A-4200	0.7	3.0	1.3
Coal	A-4203	0.9	4.2	1.0
Claystones	M-6996	0.7	2.7	1.2
	M-7005	1.3	3.0	1.3

A triangular plot (figure 3) of pristane, phytane and nor-pristane (the C_{18} isoprenoid) indicates that distribution of these isoprenoids for the shows is closest to the Upper Jurassic/Cretaceous claystones whereas the condensate is quite separate from the shows. The hydrocarbons washed from the claystone (A-4200) are very similar to the condensate, but quite different to the hydrocarbons extracted from the claystone. A similar observation can be made for the distribution of isoprenoids washed from the coal which are quite different to the extracted hydrocarbons from the coal but very similar to the shows. Since the coal is close to the oil show zone it is not unreasonable for the coal to be surface coated with migrating hydrocarbons of the same composition as the shows. The claystone, A-4200, has probably been affected by migrated condensate-type hydrocarbons.

Normally in marine shales with type II kerogen the pristane/phytane ratios are low (below 3) and generally <1.5 when immature, and between 1-2 at peak oil generation. Coals and carbonaceous claystones tend to change from low values ($\sim$1) when immature to very high values up to 10 at peak oil generation. Values for the shows of 1.9 would tend to support a type II origin for these hydrocarbons, rather than coals or carbonaceous claystones.

Aromatic hydrocarbons

Methylnapthalene and phenanthrene ratios (table 8) suggest at least peak oil generation maturity for the source rocks which yielded the oil shows and condensate. The Cretaceous/Upper Jurassic samples are moderate to early mature and the aromatic distributions such as the methyl napthalene and methyl phenanthrene ratios are lower than for the shows (table 2). This indicates that a higher maturity for these source rocks is required to reach the same values as the shows.

Table 8. Methyl Naphthalene and Phenanthrene Ratios

IKU no.	MNR 2/1	MPI 1	MPR
M-6984	1.04	0.50	0.83
M-6987	1.02	0.60	0.65
M-6989	1.11	0.66	0.80
A-4200	1.18	0.74	0.97
A-4203	-	0.70	0.85
M-6996	1.22	0.71	0.82
M-7005	1.16	0.66	0.86

The higher methyl phenanthrene ratios (MPI 1) obtained for A-4200, A-4203 and M-6996 but not M-7005 are probably due to the presence of migrated hydrocarbons of the same type as the oil shows or condensate. Whereas the lowest sample M-7005 shows some similarities to the Upper Jurassic source rock samples, and probably consists in part of caved material.

* ENR and DMNR (see Table 2) were not calcuated.

Gas Chromatography - Mass Spectrometry

Several mass fragmentograms of saturated and aromatic hydrocarbons were obtained for the source rocks.

Saturated hydrocarbon mass fragmentograms

m/z 191 fragmentograms (triterpanes). Several observations can be made about the triterpane distributions. Table 9 shows a variety of triterpane values which have been used in correlation problems. In the Cretaceous-Upper Jurassic claystone samples, the C_{31} 22S epimer is less than 22R i.e. peak G<H unlike the shows and condensate suggesting that maturity of the claystones is less than required for oil generation. Similarly the two lower samples from the Lower Jurassic have G<H, also suggesting that this horizon is not mature enough for major oil generation. Values of G>H occur in the bottom sample from the Upper Jurassic and top two samples from the Lower Jurassic is probably due to the presence of migrated hydrocarbons in these samples, rather than a maturity difference.

The C_{31}-C_{35} αβ22S and R epimers tend to be more prominent in the Cretaceous/Upper Jurassic samples than the Lower Jurassic and is perhaps a source related feature (at this level of maturity).

The moretanes (peaks D, F, I) are more prominent in the Lower Jurassic than Upper Jurassic samples which may also be a source related difference since there is no great difference in maturity between the Upper and Lower Jurassic. Moretane/αβ hopane ratios (e.g. F/E in table 9) tend to decrease with increasing maturity and values suggest that the Lower Jurassic shales are relatively immature.

Table 9. Triterpane ratios of source rocks

IKU no.	A/B	C/E	F/E	F/G	%22S G/G+H
M-6984	0.27	0.70	0.20	2.0	49%
M-6987	0.39	0.58	0.15	2.3	48%
M-6989	0.16	0.81	0.16	1.5	53%
A-4200	0.12	0.87	0.29	1.2	64%
A-4203	0.19	0.63	0.13	1.5	70%
M-6996	0.21	0.99	0.28	2.1	47%
M-7005	0.13	0.97	0.27	1.8	48%

Full identification of hopanes is shown with the mass fragmentograms in the appendix.

Also suggestive of low maturity is the ratio of the C_{27} hopanes A/B, which is low for all samples in comparison with the oil shows and condensate values (cf table 3 and 9). The difference between shows and source rocks in the ratio of C_{29} to C_{30} αβ hopane (C/E) and C_{30} to C_{31} αβ hopane (E/G) are part maturity and part source controlled.

The difference between shows (table 3) and source rocks (table 9) are probably mainly maturity affected, eg. is the higher value of %22S and A/B of the shows and condensates compared to most of the source rocks.

The coal (A-4203) is noticeably different to the other samples in having the C_{28} bisnorhopane and from the m/z 163 and 177 fragmentograms an additional compound which is probably the C_{27} triterpane tentatively identified by Bjorøy and Rullkötter (1980) as a C_{25},C_{28},C_{29}, trisnormoretane and identified by Volkman et al (1983) in fact as a 25, 28, 30 trisnorhopane (peak marked 1 in m/z 177 fragmentogram in the Appendix). The presence of this compound is also suspected in M-6996, a claystone below the coal. There is no evidence for either of these compounds in the shows and condensates which would appear to suggest that they are not the source of the hydrocarbons in the shows and condensate. However, the other claystone sample A-4200 does not appear to have these compounds and therefore from this evidence alone, some carbonaceous claystones in the Lower Jurassic cannot be ruled out at least as a part source for the hydrocarbons.

m/z 217 fragmentogram (sterane fragmentogram). Figure 2 shows a plot of the relative amounts of C_{27}:C_{28}:C_{29} ααα 20R steranes (peaks marked j:p:t) for shows and source rocks. This indicates that the Cretaceous/Upper Jurassic claystones are relatively richer in C_{27} steranes in comparison with the Lower Jurassic claystones. The relative sterane distribution of oil shows plots closest to the Lower Jurassic claystones whereas the condensate plots closest to the Upper Jurassic claystones. However, there is probably a tendency in the formation of condensates for bias towards lower molecular weight compounds due to high maturity and migration processes and the relative ratio of C_{27}:C_{28}:C_{29} is probably not representative of the source of the condensate, although it may be a guide.

The sterane ratio for claystone A-4200 plots close to the condensate which may be due to the presence of migrated hydrocarbons in this

claystone rather than to a source similarity. The similarity of the ratios of the carbonaceous claystones M-6996 and M-7005 for the oil shows (i.e. relatively rich in C_{29} steranes) suggests that they are related.

However, the shows and the condensate and the Upper Jurassic claystones are richer in C_{27} diasteranes than the Lower Jurassic claystones and this would suggest that the Upper Jurassic claystones are a more likely source (see table 10). Maturation parameters based on sterane ratios i.e. %20S C_{29} steranes (i.e. peaks q/q+t) and %ββ C_{29} steranes (i.e. 2nd ratio $2(r+s)/q+2(r+s)+t$) (see Mackenzie et al., 1980) are shown in table 10. They indicate that the source rocks are less mature than the oil shows and condensates.

Table 10. Sterane ratios of source rocks

IKU Code	$\frac{C_{27}}{C_{29}}$ diasteranes	$\frac{C_{29} \text{ diasterane}}{C_{29} \text{ regular steranes}}$	%20S	%ββ 1	%ββ 2
M-6984	1.08	0.52	50%	42%	59%
M-6987	1.13	0.62	52%	52%	69%
M-6989	0.83	0.83	50%	54%	69%
A-4200	0.83	0.59	32%	41%	59%
A-4203	0.29	0.83	63%	48%	51%
M-6996	0.49	0.68	48%	55%	71%
M-7005	0.70	0.48	40%	38%	55%

The low C_{27}/C_{29} diasterane ratio in the Upper Jurassic sample M-6989 relative to the other two and the high value for A-4200 in the Lower Jurassic may be due to the presence of migrated hydrocarbons masking the ratios characteristic for the indigenous material. The relatively high value for M-7005 is probably due to the presence of caved Upper Jurassic claystones in this sample.

Aromatic hydrocarbon mass fragmentograms

Comparison of the Upper and Lower Jurassic samples indicates:

There is a distinct double homology in the m/z 91/92 and 105/106 fragmentograms of the Upper Jurassic samples, and the lowest sample from the Lower Jurassic M7005 and in the condensates and claystones. However, in the case of M-7005 there are indications (from visual kerogen analysis) that there is caved material present, which probably includes Upper Jurassic claystones. Otherwise, the double homology is less distinct in the Lower Jurassic claystones and tends to be a shorter range.

In the m/z 198 fragmentogram which is characteristic of methyl dibenzothiophenes, the Upper Jurassic claystones show three main peaks, in which the first and last are similar in size. The shows, condensate and Lower Jurassic shales are dominated by the first peak. The increase in ratio of the first to the last (4/1 methyl dibenzothiophene) appears to be a function of both maturity and environment (Hughes et al. 1983). In this case the difference between shows plus condensate and the Upper Jurassic claystones is mainly one of maturity.

D. Conclusions

The oils shows and condensate are probably from the same main source, although slight differences in sterane distributions may be due to differences in migration distances. The aromatic maturity parameters (dimethyl naphthalene ratio and MPI 1) indicate that the condensate is of higher maturity than the shows, whereas sterane ratios (which reach an equilibrium at a maturity level lower than the aromatic ratios) show slight differences probably not related to maturity. Based on several factors the Cretaceous-Upper Jurassic claystones are the most likely source of shows and condensate. This sequence is thick (up to 100 metres in both 7120/8-1 and 2) and most samples have a good-rich Rock-Eval petroleum potentials. The Lower Jurassic claystones appear to be thin and the petroleum potential is lower (excluding the coal, which does not appear from biomarkers to be a probable source). The Cretaceous/Upper Jurassic claystones which are richer in saturated hydrocarbons (average 21% of EOM) than the Lower Jurassic claystones (average 11% of EOM), would be a more likely source for the paraffin-rich oil shows. Pyrolysis gas chromatograms of the Upper Jurassic claystones (not shown here; see source rock evaluation report) indicate that high molecular weight alkanes/alkenes up to nC_{30} are abundant. The alkane/alkene homology is most prominent in the Upper Jurassic claystones, and correlates well with microscopic analysis which indicates an abundance of cuticles in kerogens from this sequence. Kerogen in this source rock would tend to yield paraffin-rich hydrocarbons.

The acyclic isoprenoid plots also apparently favours the Upper Jurassic claystones. Triterpane and sterane ratios tend to give both positive and negative correlations e.g. the higher C_{29} $\alpha\alpha\alpha$ 20R steranes in the shows and Lower Jurassic claystones than in the Upper Jurassic claystones, would tend to suggest the former are the most likely source. However increased maturity and migration may well affect the ratio of C_{27} to C_{29} compounds. The triterpane distribution in the coal is unlike the shows and condensate and therefore is probably not a source for them. The possibility of other undrilled source rocks cannot be assessed, but the Mid-Triassic is considered to be another potential oil source in the Barents Sea area. Any satisfactory correlation of oils/source rocks should be finally performed on a regional basis, allowing statistical analysis of as many potential sources and oils (if present) as possible.

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APPENDIX

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: A.
WELL NO.:

Sample	Depth (m)	TOC	Lithology
M-6984	1995-2010	4.1	Claystone, dark grey - black, dark grey, brownish dark grey, partly micromicaceous and lustrous, subfissile
M-6987	2040-2055	7.9	Claystone, as above, micaceous, some coaly particles
M-6989	2070-2085	10.4	Claystone, as above, slightly calcareous
A-4200	2113.76 - 2113.82	1.5	Claystone, black, carbonaceous, micromicaceous, sample shows occasional dull yellow-orange fluorescent laminae under ultra-violet light and gives a similar cut fluorescence to the sandstone of A-4199.
A-4203	2213.85	67.6	Coal, black, bright, conchoidal fracture, in ultra-violet light shows a bright white cut fluorescence
M-6996	2231-2246	4.4	Claystone (40%) of total lithology, dark grey, brownish black, occasionally carbonaceous
M-7005	2366-2381m	9.2	(40% of total lithology) dark grey, black, carbonaceous

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: A.
WELL NO.:

Sample	Depth (m)	TOC	Lithology
A-4199	2100.16 - 2100.28		Sandstone, two-thirds of the sample consists of coarse grained material, the rest is fine grained, coarse grained contains rounded, frosted quartz grains some very coarse grained, includes clay pellets, carbonaceous fragments partially pyritic, fine to very fine grained material, subangular, sample shows a dull yellow 'spotty' fluorescence under ultra-violet light and a bright white cut fluorescence
A-4201	2178.7 - 2178.8		Sandstone, clear, white, fine grained, quartz, angular to sub angular, contains bitumen filled fracture, it has a similar fluorescence and cut fluorescence to the sandstone above
A-4202	2191.17 - 2191.25		Sandstone, as above
A-4204	2217.49 -		Sandstone, very fine - fine grained, quartz, carbonaceous fragments, pyritic in part, micaceous laminae, fluorescence and cut fluorescence similar to A-4202

IKU

TABLE B.

R O C K E V A L P Y R O L Y S E S

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	OIL OF GAS CONTENT S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
M 6984	2010.00	1.37	11.87	0.32	4.08	291	8	13.24	0.10	431
M 6987	2055.00	3.09	19.25	0.57	7.92	243	7	22.34	0.14	432
M 6989	2085.00	7.70	23.77	0.65	10.40	229	6	31.47	0.24	430
A 4199	2100.16 -.28	0.45	0.07	0.13	0.15	47	87	0.52	0.87	414
A 4200	2113.76 -.82	0.28 Sh	1.68	0.13	1.53	110	8	1.96	0.14	442
A 4201	2178.70 -.80	0.20	0.06	0.01	0.08	75	13	0.26	0.77	416
A 4202	2191.17 -.25	0.27	0.07	0.09	0.12	58	75	0.34	0.79	362
A 4203	2213.85	26.78 Coal	146.57	3.49	67.59	217	5	173.35	0.15	434
A 4204	2217.49 -.56	0.49	0.25	0.33	0.29	86	114	0.74	0.66	416
M 6996	2246.00	2.01	10.23	0.26	4.35	235	6	12.24	0.16	439
M 7005	2381.00	0.95	13.34	0.79	9.17	145	9	14.29	0.07	437

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IKU

T A B L E : C.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

IKU-No	DEPTH (m)	Rock Extr. (g)	EOM (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
M 6984	2010.00	52.7	140.3	33.3	37.5	70.8	69.5	4.05
M 6987	2055.00	40.8	197.0	51.2	52.2	103.4	93.6	7.92
M 6989	2085.00	35.9	175.0	24.7	32.8	57.5	117.5	10.40
A 4199	2100.16 -.28	96.9	76.7	46.6	11.5	58.1	18.6	0.15
A 4200 Sh	2113.76 -.82	107.7	28.0	5.3	10.2	15.5	12.5	1.53
A 4201 Sst	2178.70 -.80	104.6	37.0	18.5	7.9	26.4	10.6	0.08
A 4202	2191.17 -.25	102.8	48.9	25.4	7.4	32.8	16.1	0.12
A 4203 Coal	2213.85	1.1	56.0	4.9	13.1	18.0	38.0	67.59
A 4204 Sst	2217.49 -.56	122.3	107.7	55.3	20.6	75.9	31.8	0.29
A 6996	2246.00	10.5	61.3	7.6	15.0	22.6	38.7	4.35
A 7005	2381.00	10.8	19.5	2.3	3.9	6.2	13.3	9.17
A 4205 Cond	Fl.nv. 116/424		115.0	4.9	7.8	12.7	102.3	
A 4200 Wash	2133.76 -.82		8.8	1.7	0.7	2.4	6.4	
A 4203 Wash	2213.85		6.0	0.7	0.7	1.4	4.6	

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IKU

T A B L E : D.

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm OF rock)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
M 6984	2010.00	2662	632	712	1343	1319
M 6987	2055.00	4828	1255	1279	2534	2294
M 6989	2085.00	4875	688	914	1602	3273
A 4199	2100.16	792	481	119	600	192
	-.28					
A 4200	2113.76	260	49	95	144	116
Sh	-.82					
A 4201	2178.70	354	177	76	252	101
Sst	-.80					
A 4202	2191.17	476	247	72	319	157
	-.25					
A 4203	2213.85	50909	4455	11909	16364	34545
Coal						
A 4204	2217.49	881	452	168	621	260
Sst	-.56					
A 6996	2246.00	5838	724	1429	2152	3686
A 7005	2381.00	1806	213	361	574	1231
A 4205	Fl.nv.					
Cond	116/424					
A 4200	2133.76					
Wash	-.82					
A 4203	3002.00					
Wash						

DATE : 29 - 8 - 83.

IKU

T A B L E : E.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
M 6984	2010.00	65.7	15.6	17.6	33.2	32.6
M 6987	2055.00	61.0	15.8	16.2	32.0	29.0
M 6989	2085.00	46.9	6.6	8.8	15.4	31.5
A 4199	2100.16	527.7	320.6	79.1	399.7	128.0
	-.28					
A 4200	2113.76	17.0	3.2	6.2	9.4	7.6
Sh	-.82					
A 4201	2178.70	442.2	221.1	94.4	315.5	126.7
Sst	-.80					
A 4202	2191.17	396.4	205.9	60.0	265.9	130.5
	-.25					
A 4203	2213.85	75.3	6.6	17.6	24.2	51.1
Coal						
A 4204	2217.49	303.7	155.9	58.1	214.0	89.7
Sst	-.56					
A 6996	2246.00	134.2	16.6	32.8	49.5	84.7
A 7005	2381.00	19.7	2.3	3.9	6.3	13.4
A 4205	Fl.nv.					
Cond	116/424					
A 4200	2133.76					
Wash	-.82					
A 4203	2213.85					
Wash						

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IKU

T A B L E : F.

COMPOSITION IN % OF MATERIAL EXTRACTED FROM THE ROCK

IKU-No	DEPTH (m)	Sat / EOM	Aro / EOM	HC / EOM	SAT / Aro	Non HC / EOM	HC / Non HC
M 6984	2010.00	23.7	26.7	50.5	88.8	49.5	101.9
M 6987	2055.00	26.0	26.5	52.5	98.1	47.5	110.5
M 6989	2085.00	14.1	18.7	32.9	75.3	67.1	48.9
A 4199	2100.16 -.28	60.8	15.0	75.7	405.2	24.3	312.4
A 4200 Sh	2113.76 -.82	18.9	36.4	55.4	52.0	44.6	124.0
A 4201 Sst	2178.70 -.80	50.0	21.4	71.4	234.2	28.6	249.1
A 4202	2191.17 -.25	51.9	15.1	67.1	343.2	32.9	203.7
A 4203 Coal	2213.85	8.8	23.4	32.1	37.4	67.9	47.4
A 4204 Sst	2217.49 -.56	51.3	19.1	70.5	268.4	29.5	238.7
A 6996	2246.00	12.4	24.5	36.9	50.7	63.1	58.4
A 7005	2381.00	11.8	20.0	31.8	59.0	68.2	46.6
A 4205 Cond	Fl.nv. 116/424	4.3	6.8	11.0	62.8	89.0	12.4
A 4200 Wash	2133.76 -.82	19.3	8.0	27.3	242.9	72.7	37.5
A 4203 Wash	2213.85	11.7	11.7	23.3	100.0	76.7	30.4

DATE : 29 - 8 - 83.

IKU

T A B L E G.

TABULATION OF DATAS FROM THE GASCHROMATOGRAMS

IKU No.	DEPTH (m)	PRISTANE / n-C17	PRISTANE / PHYTANE	CPI
M 6984	2010.00	2.8	3.0	1.5
M 6987	2055.00	2.6	2.6	1.3
M 6989	2085.00	2.5	2.9	1.3
A 4199	2100.16	0.6	1.9	1.0
	-.28			
A 4200	2113.76	0.7	3.0	1.3
Sh	-.82			
A 4201	2178.70	0.6	1.9	1.0
Sst	-.80			
A 4202	2191.17	0.7	1.9	1.1
	-.25			
A 4203	2213.85	0.9	4.2	1.0
Coal				
A 4204	2217.49	0.6	1.9	1.1
Sst	-.56			
M 6996	2246.00	0.7	2.7	1.2
M 7005	2381.00	1.3	3.0	1.3
A 4205	Fl.nv.	0.1	2.6	0.0
Cond	116/424			
A 4200	2133.76	0.7	2.8	1.2
Wash	-.82			
A 4203	2213.85	0.7	2.0	1.1
Wash				

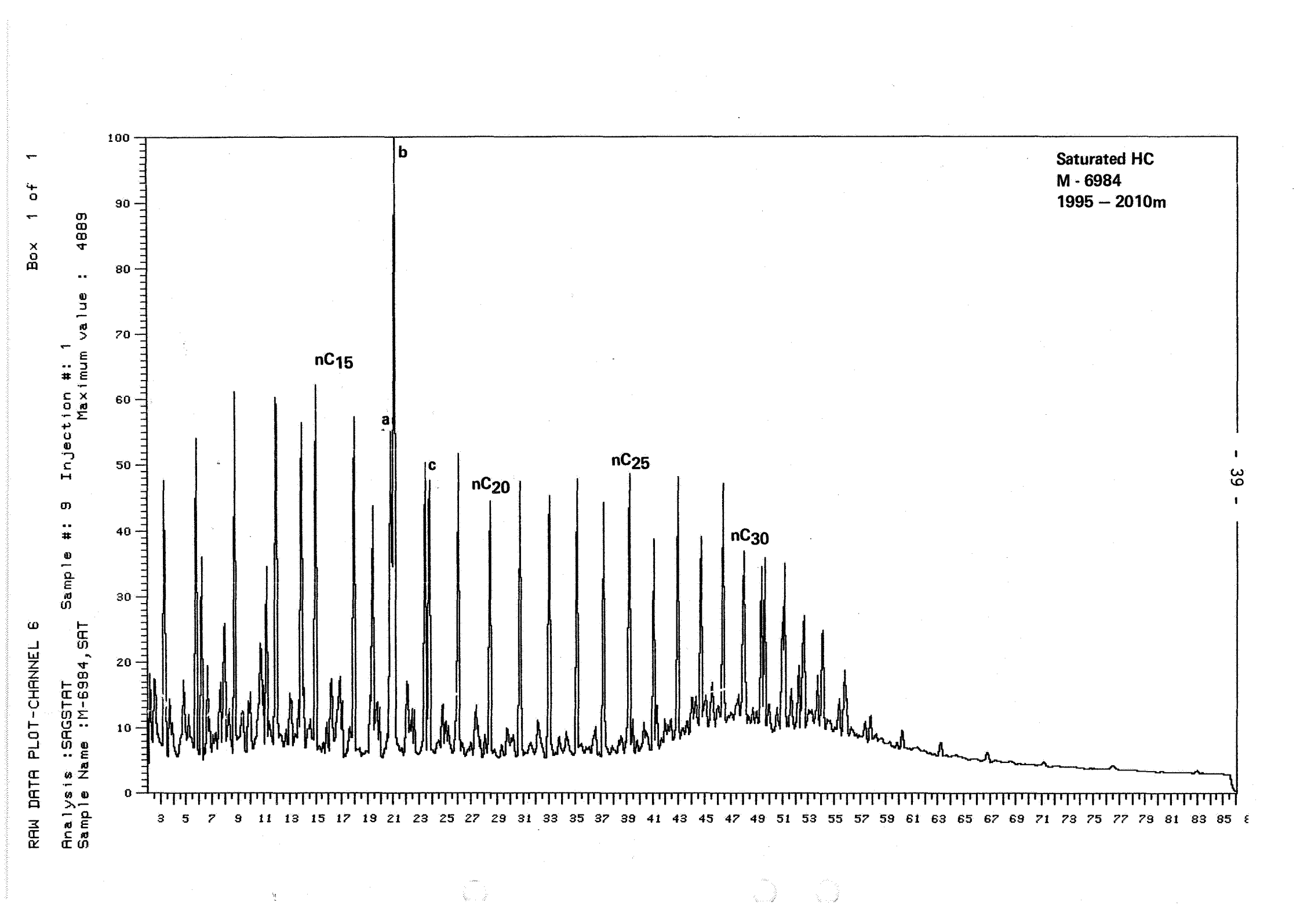
DATE : 30 - 8 - 83.

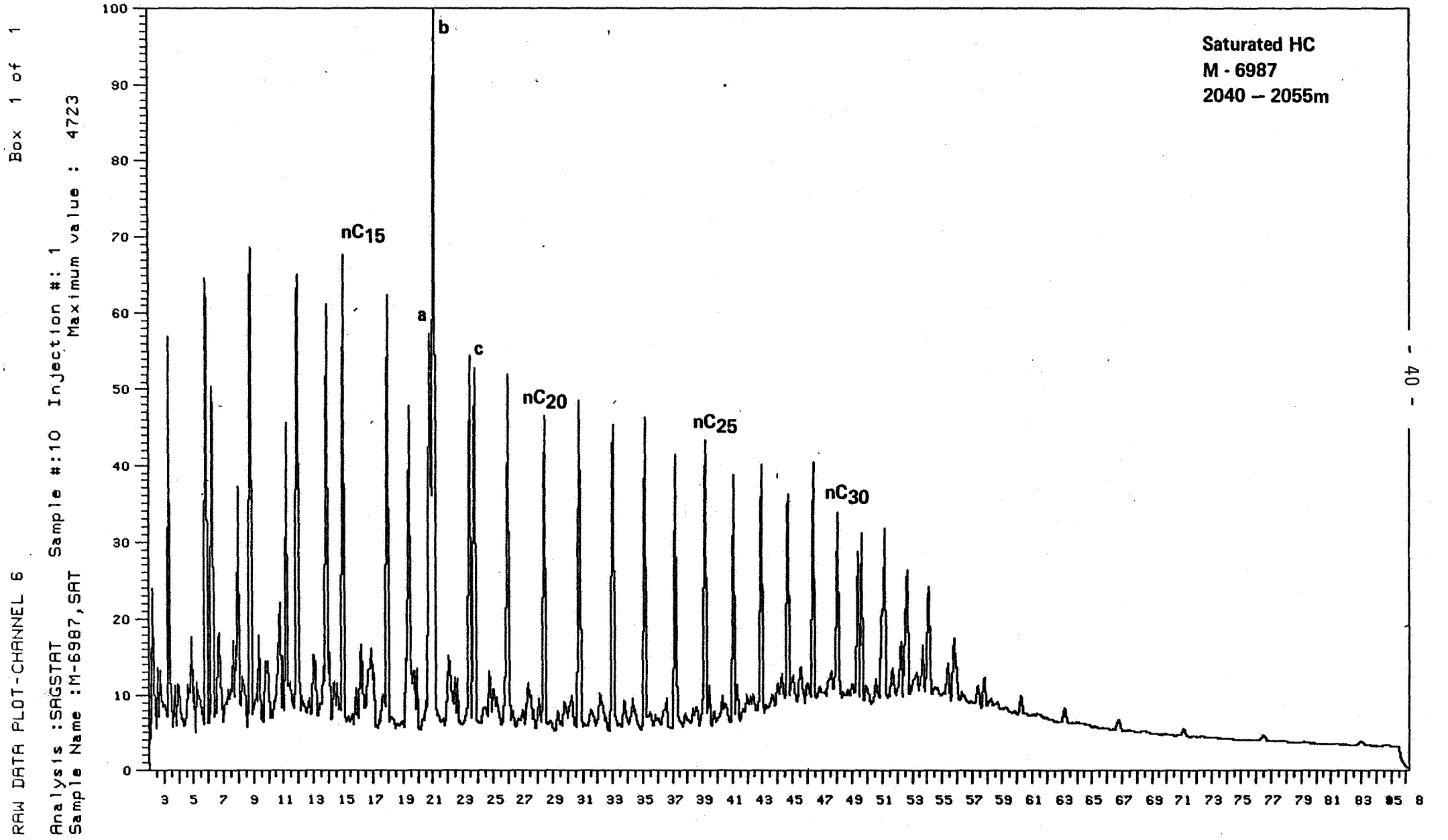
Figure a.

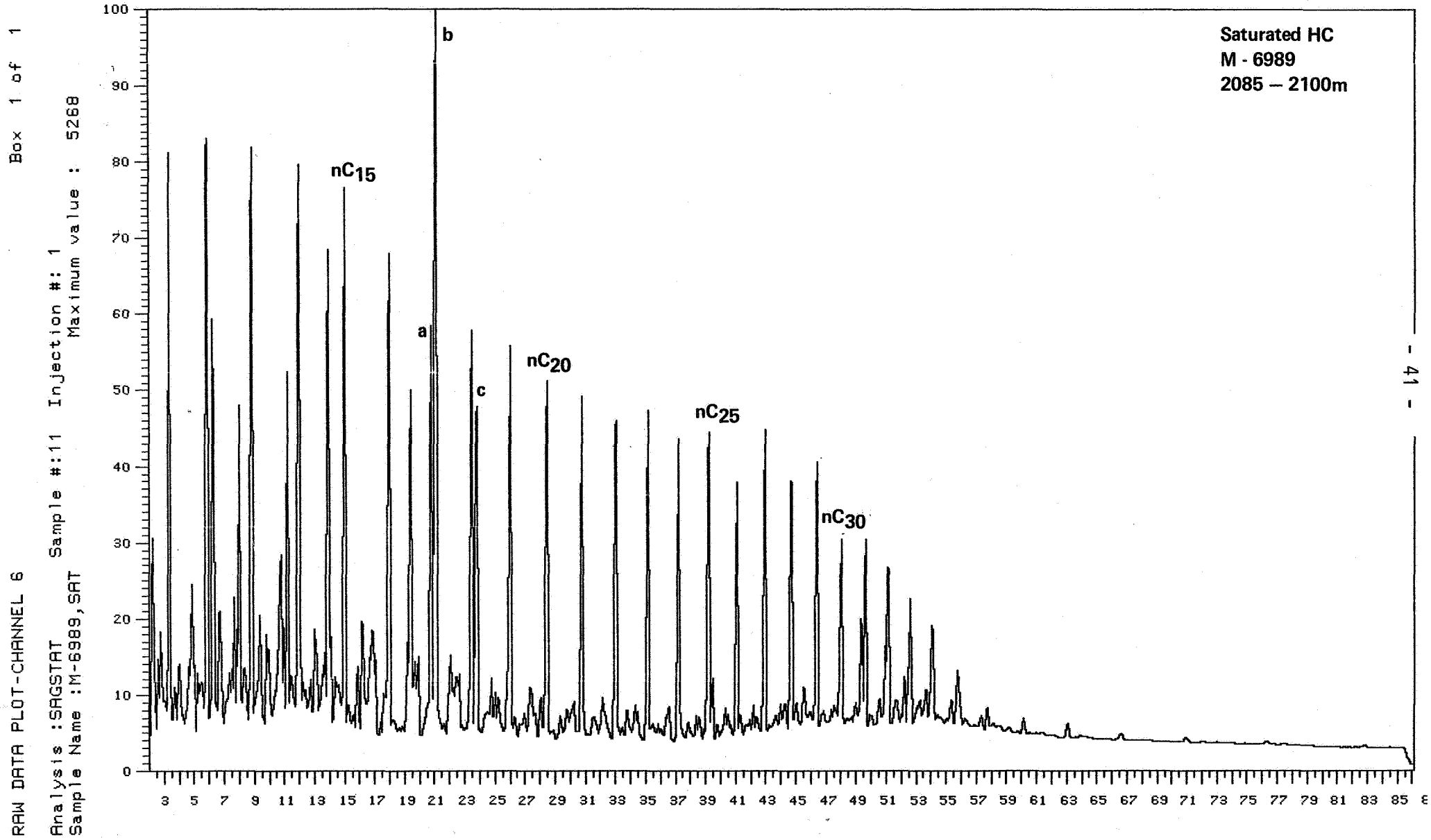
Saturated Hydrocarbon gas chromatograms for source rocks, oil shows and condensate plus condensate whole oil chromatogram (gas chromatograph temperature programmed from $-40^{o}C$ to $+260^{o}C$, using the same chromatograph on which the saturated hydrocarbons were run.

Key

a = nC_{17} alkane
b = pristane
c = phytane


RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :SAGSTAT
Sample Name :M-6984,SAT
Sample #: 9 Injection #: 1
Maximum value : 4889
Saturated HC
M - 6984
1995 – 2010m
nC15
nC20
nC25
nC30
a
b
c
- 39 -

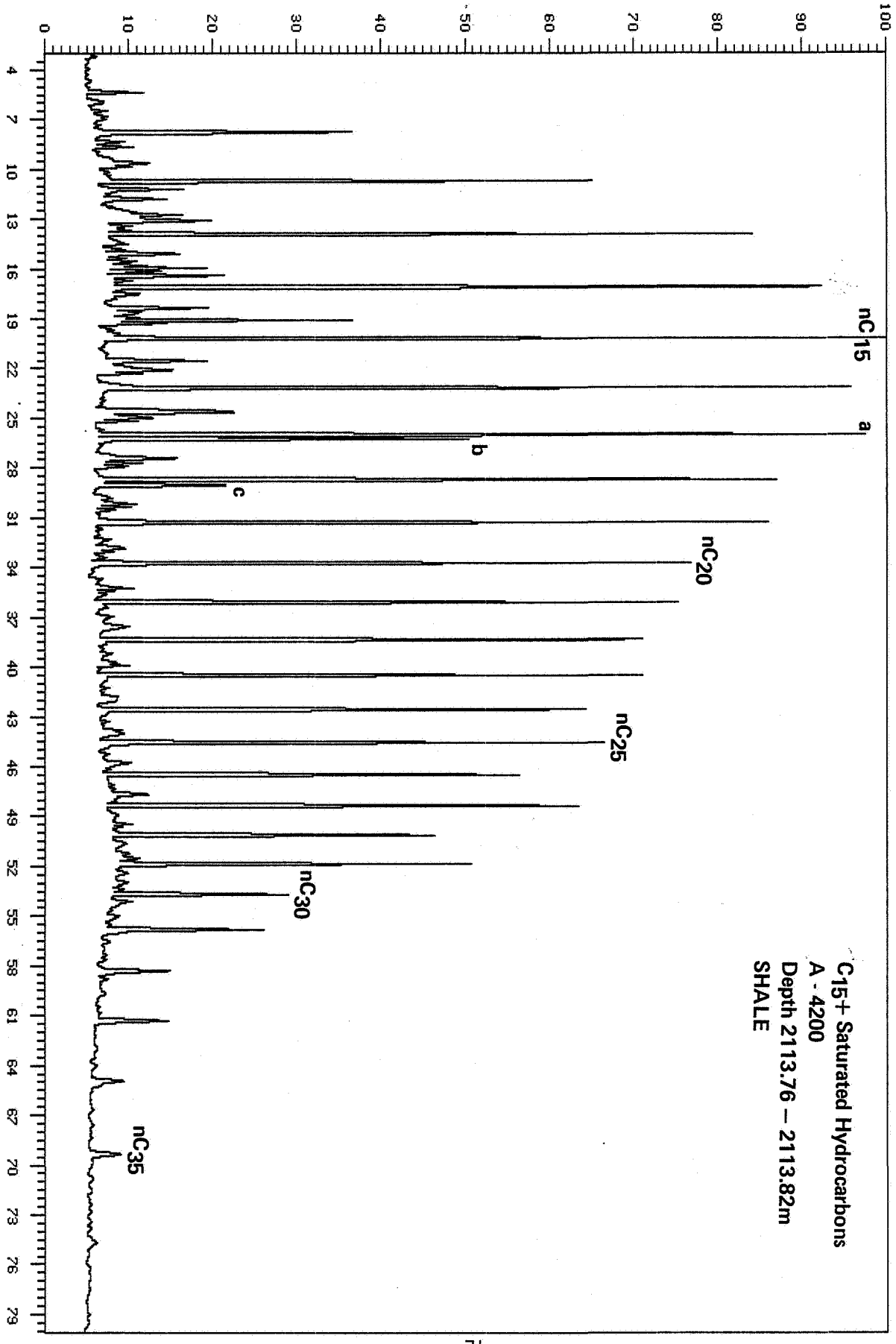

RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :SAGSTAT Sample #:10 Injection #: 1
Sample Name :M-6987,SAT Maximum value : 4723
Saturated HC
M - 6987
2040 – 2055m
nC15
nC20
nC25
nC30
a
b
c
- 40 -


RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :SAGSTAT
Sample Name :M-6989,SAT
Sample #:11 Injection #: 1
Maximum value : 5268
Saturated HC
M - 6989
2085 – 2100m
nC15
nC20
nC25
nC30
a
b
c
- 41 -

Printed at 12:11 on 13/Jun/83

RAW DATA PLOT-CHANNEL 5 Box 1 of 1

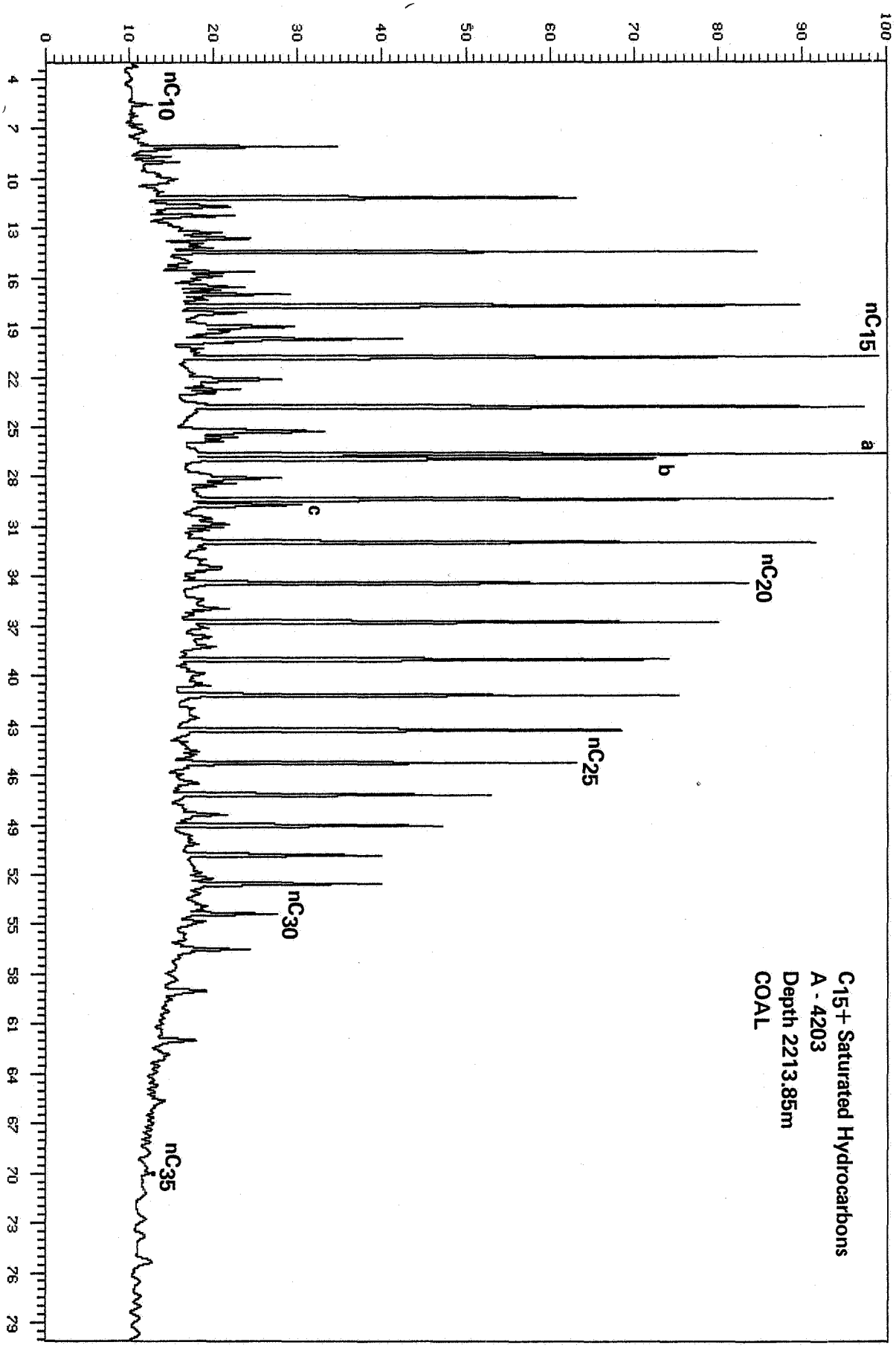
Analysis :0137A4200S1 Sample #: 1 Injection #: 1
Sample Name :A-4200,S,7120/8-2,MS Maximum signal (%): 10.84

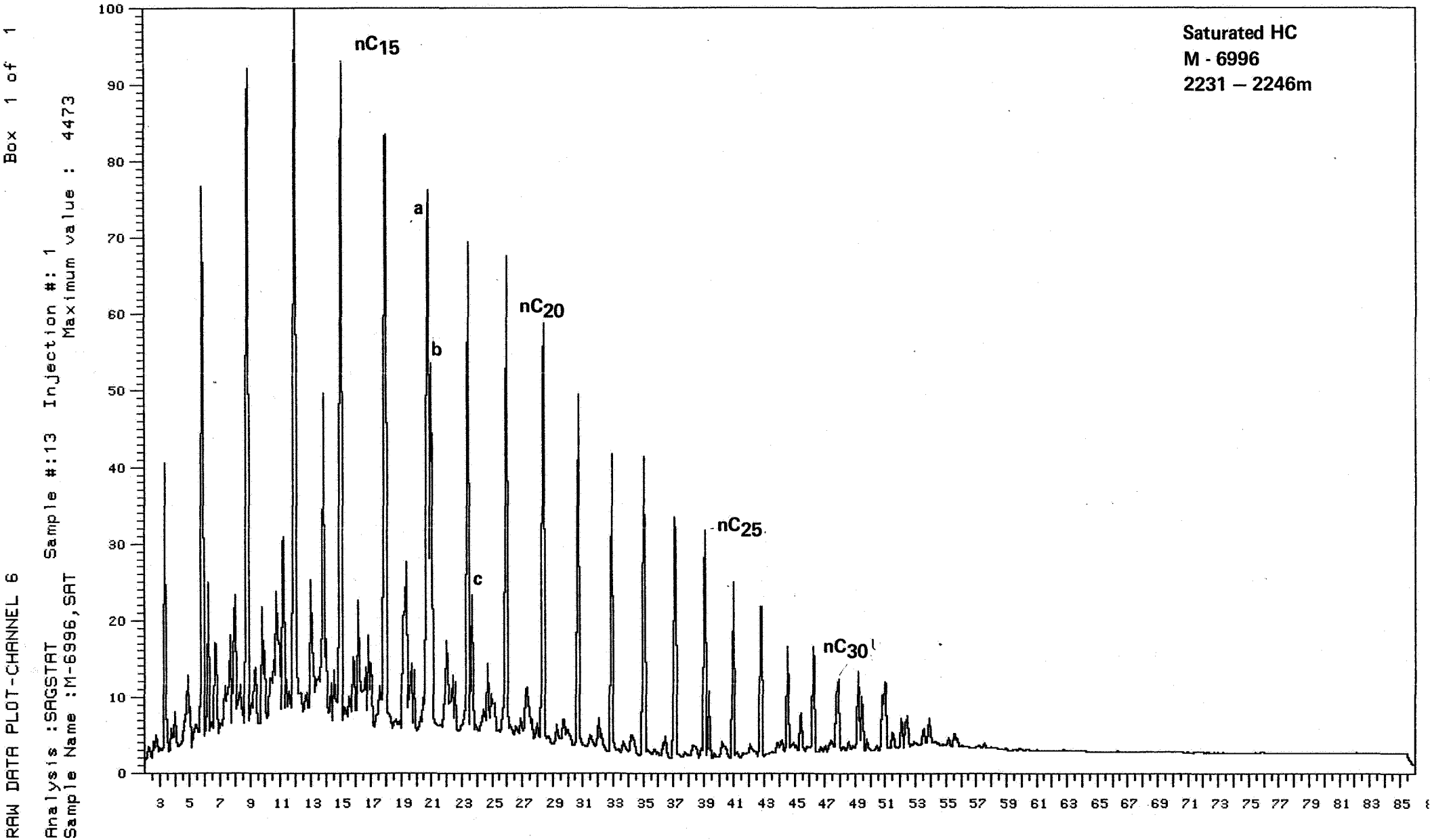


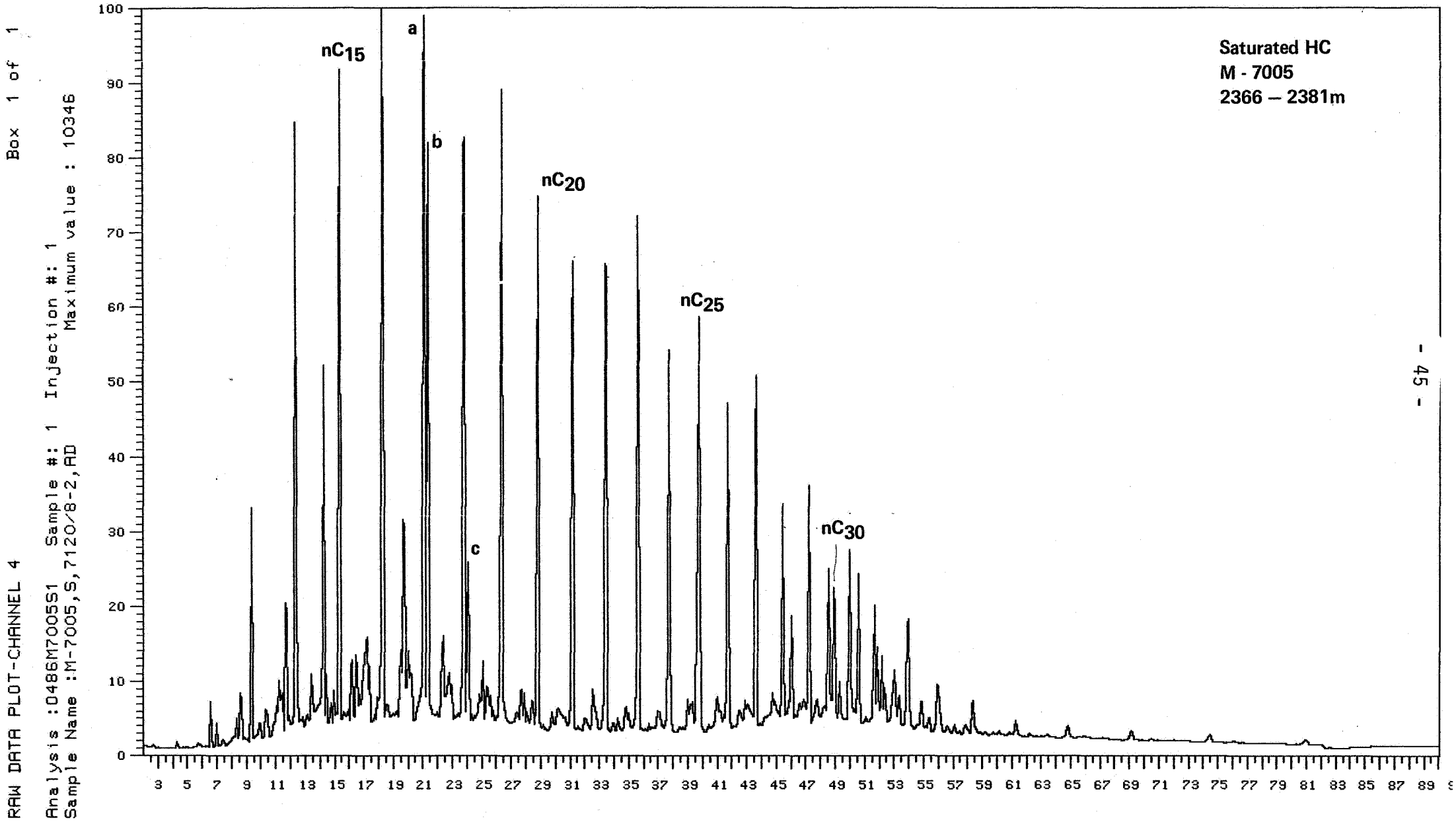
Printed at 13:29 on 13/Jun/83

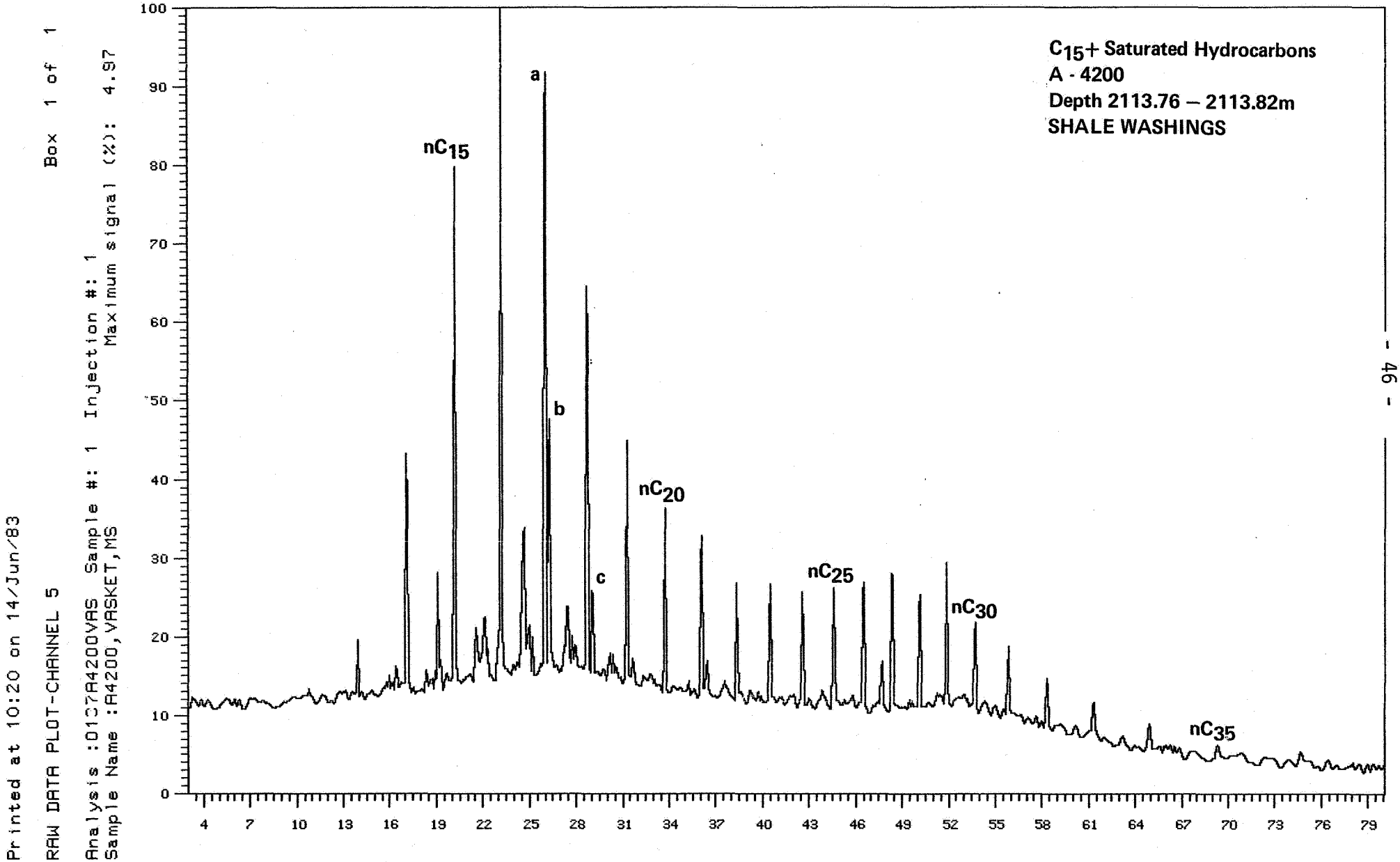
RAW DATA PLOT-CHANNEL 5 Box 1 of 1

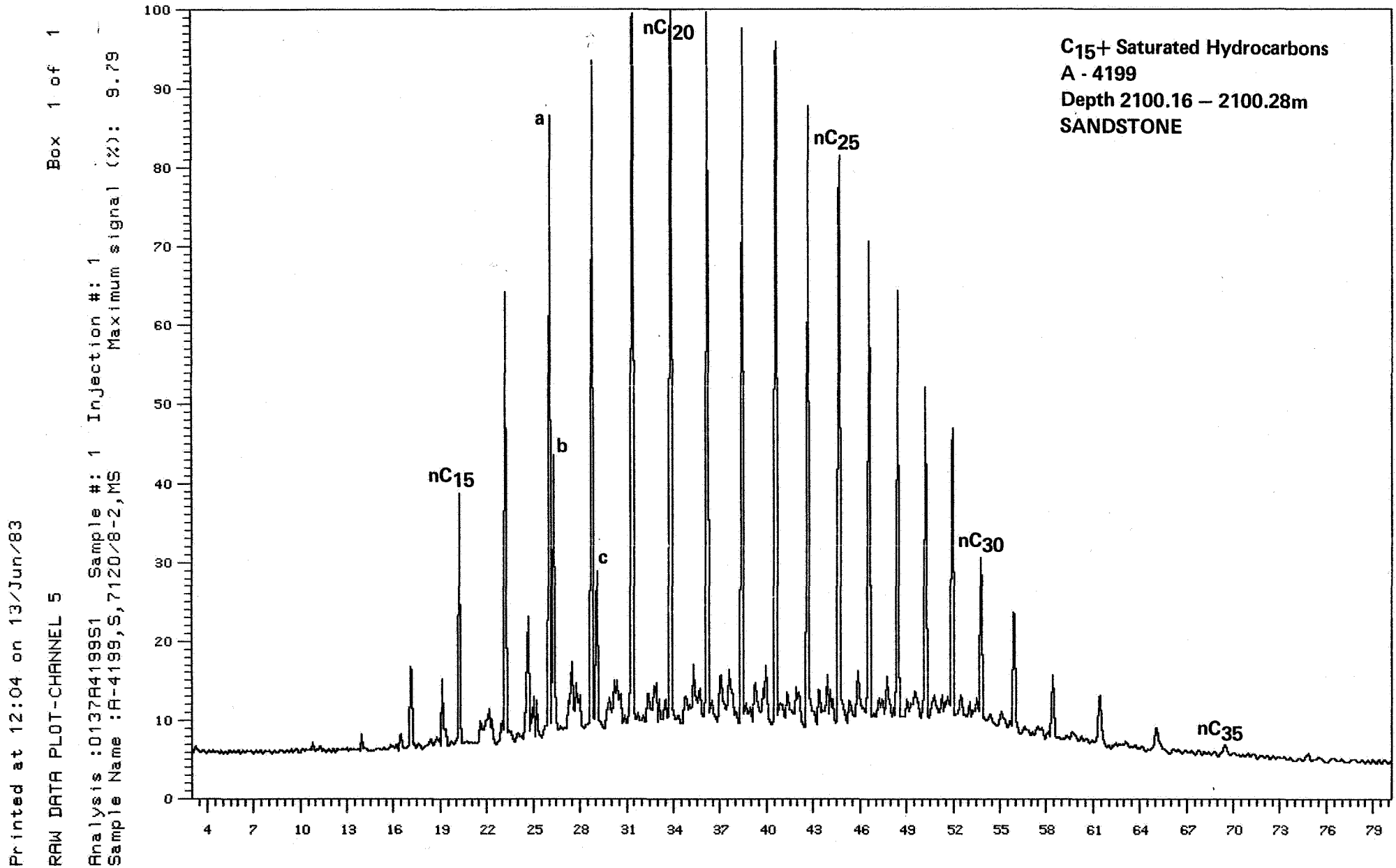
Analysis :0137A4203S1 Sample #: 1 Injection #: 1
Sample Name :A-4203,S,7120/8-2,MS Maximum signal (%): 4.73




RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :SAGSTAT
Sample Name :M-6996,SAT
Sample #:13 Injection #: 1
Maximum value : 4473
Saturated HC
M - 6996
2231 – 2246m
nC15
nC20
nC25
nC30
a
b
c


RAW DATA PLOT-CHANNEL 4
Box 1 of 1
Analysis :0486M700551 Sample #: 1 Injection #: 1
Sample Name :M-7005,S,7120/8-2,AD Maximum value : 10346
Saturated HC
M - 7005
2366 – 2381m
nC15
a
b
c
nC20
nC25
nC30
- 45 -

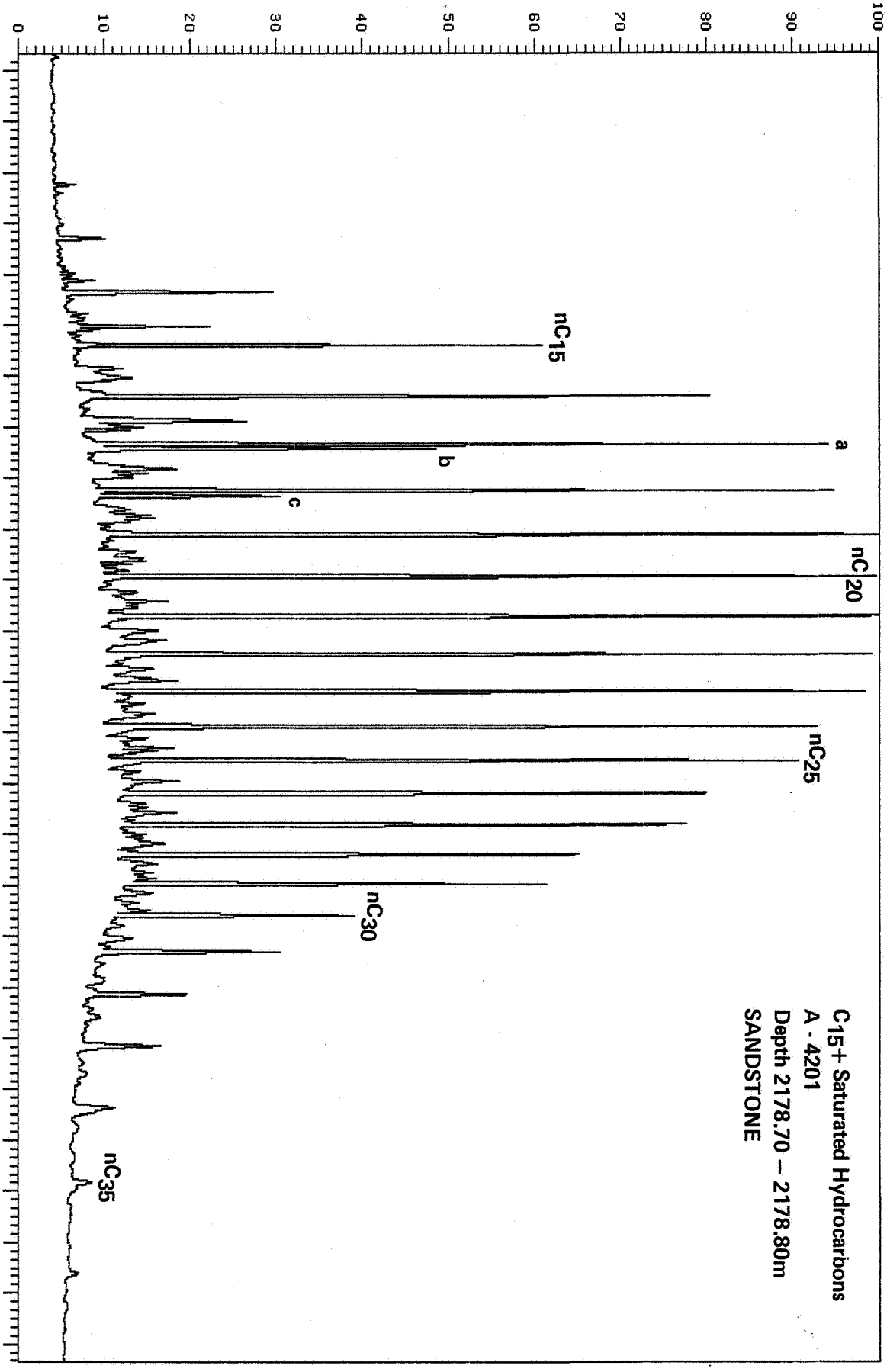

Printed at 10:20 on 14/Jun/83
RAW DATA PLOT-CHANNEL 5
Box 1 of 1
Analysis :0137A4200VAS Sample #: 1 Injection #: 1
Sample Name :A4200,VASKET,MS
Maximum signal (%): 4.97
C15+ Saturated Hydrocarbons
A - 4200
Depth 2113.76 – 2113.82m
SHALE WASHINGS
nC15
a
b
c
nC20
nC25
nC30
nC35
100
90
80
70
60
50
40
30
20
10
0
4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79

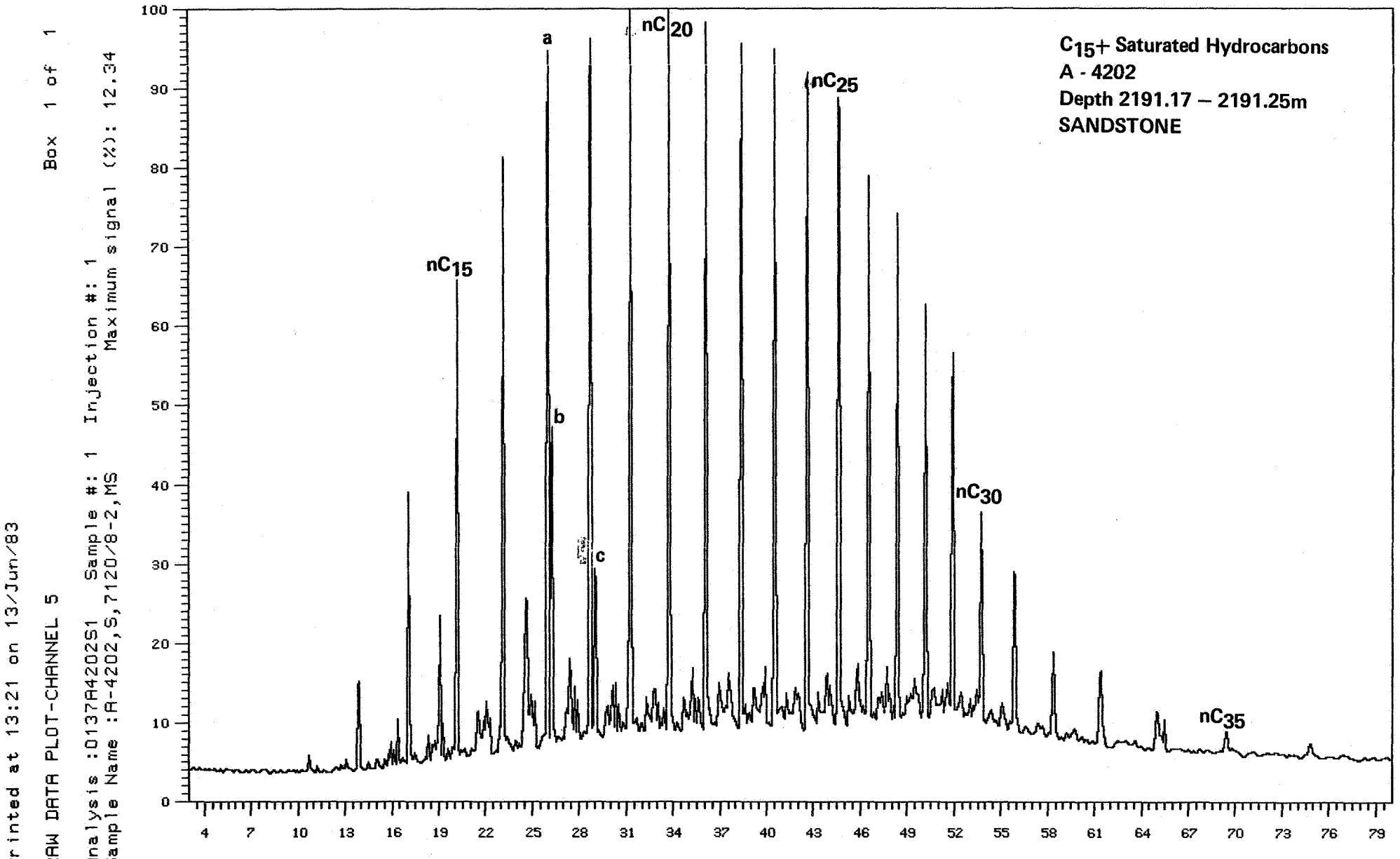

Printed at 12:04 on 13/Jun/83
RAW DATA PLOT-CHANNEL 5
Box 1 of 1
Analysis :0137A4199S1 Sample #: 1 Injection #: 1
Sample Name :A-4199,S,7120/8-2,MS Maximum signal (%): 9.79
C15+ Saturated Hydrocarbons
A - 4199
Depth 2100.16 – 2100.28m
SANDSTONE
nC15
a
b
c
nC20
nC25
nC30
nC35
100
90
80
70
60
50
40
30
20
10
0
4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79

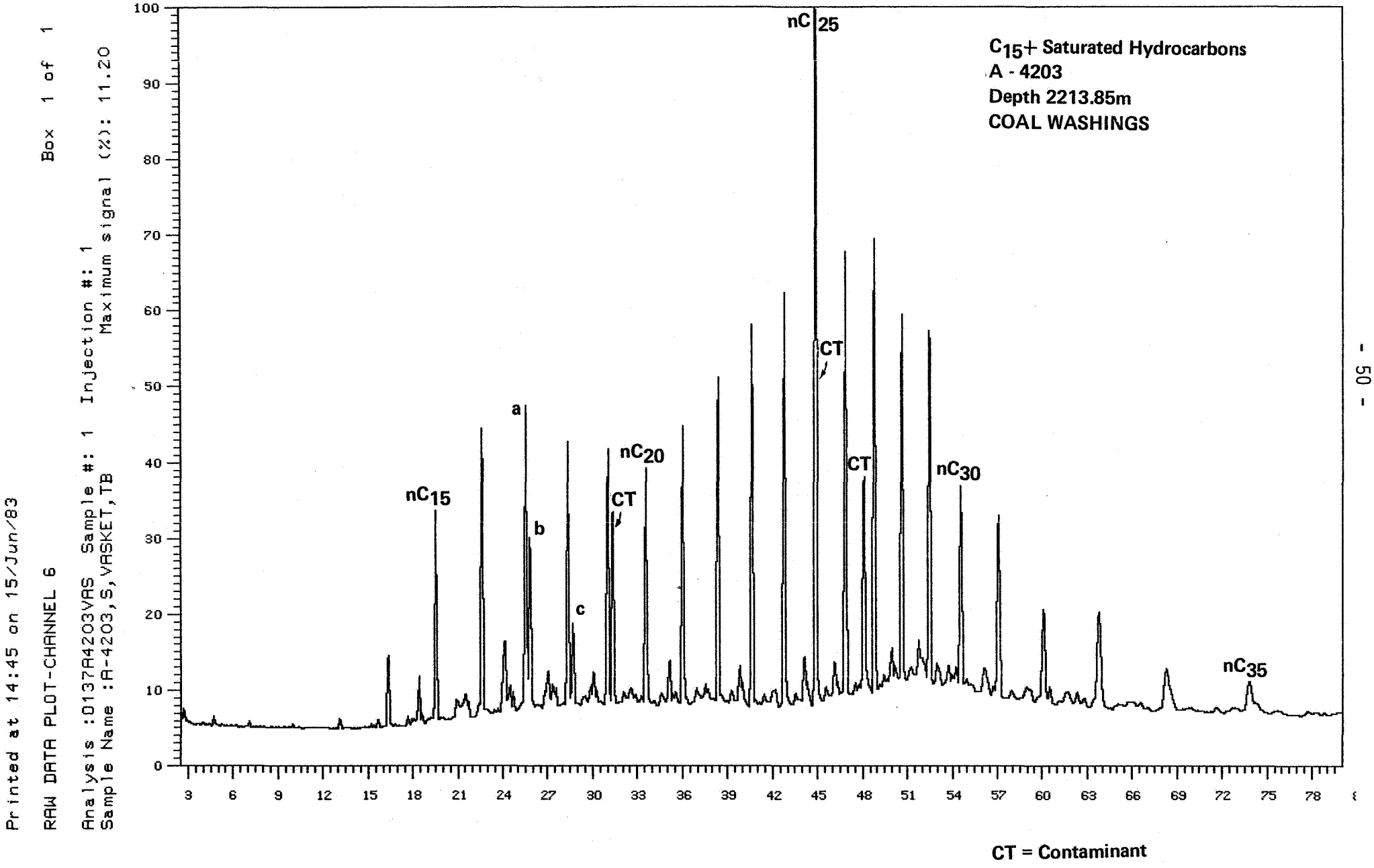
Printed at 12:18 on 13/Jun/83

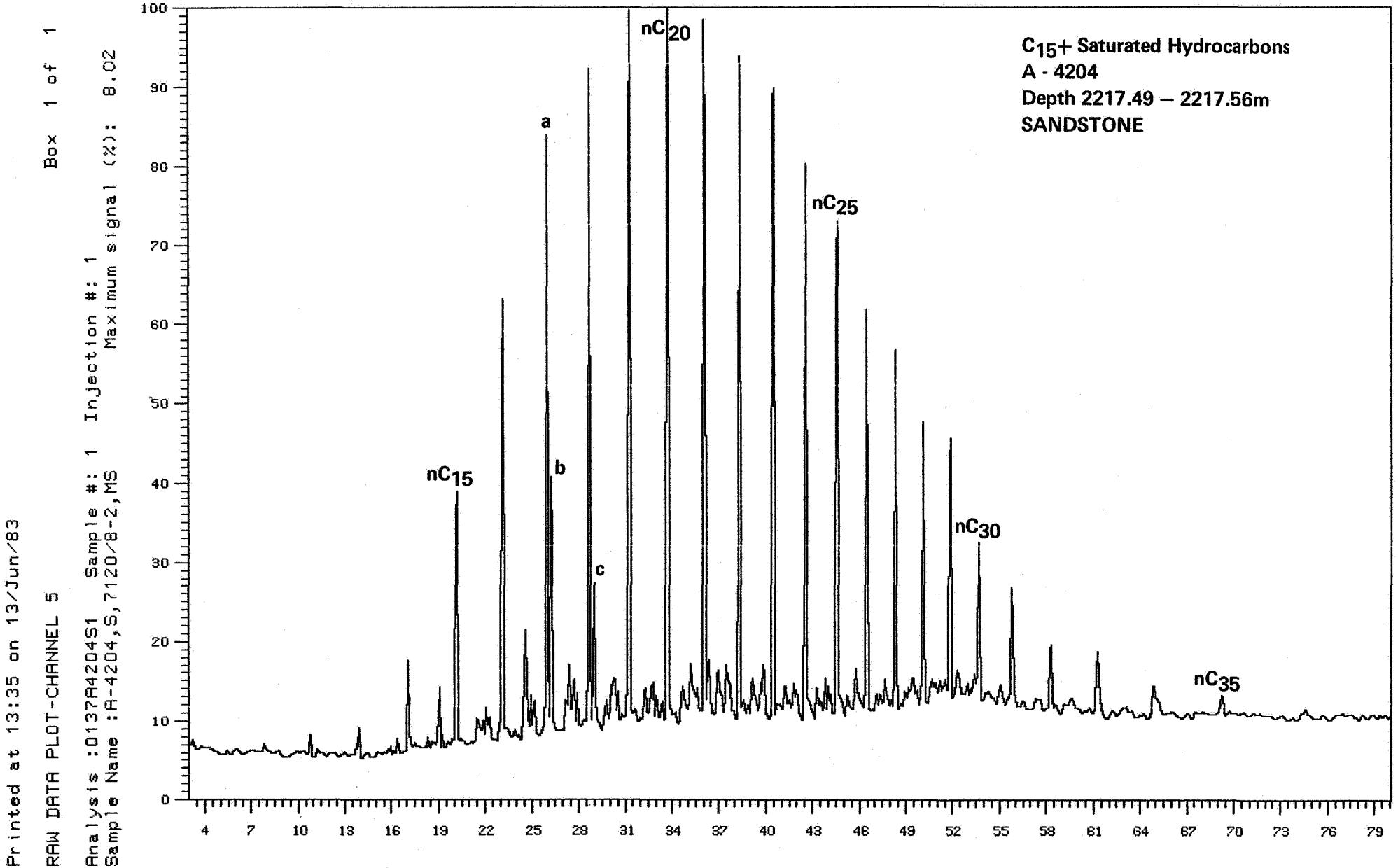
RAW DATA PLOT-CHANNEL 5 Box 1 of 1

Analysis :0137A4201S1 Sample #: 1 Injection #: 1
Sample Name :A-4201,S,7120/8-2,MS Maximum signal (%): 14.92




Printed at 13:21 on 13/Jun/83
RAW DATA PLOT-CHANNEL 5
Box 1 of 1
Analysis :0137A4202S1 Sample #: 1 Injection #: 1
Sample Name :A-4202,S,7120/8-2,MS Maximum signal (%): 12.34
C15+ Saturated Hydrocarbons
A - 4202
Depth 2191.17 – 2191.25m
SANDSTONE
nC15
a
b
c
nC20
nC25
nC30
nC35
100
90
80
70
60
50
40
30
20
10
0
4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79

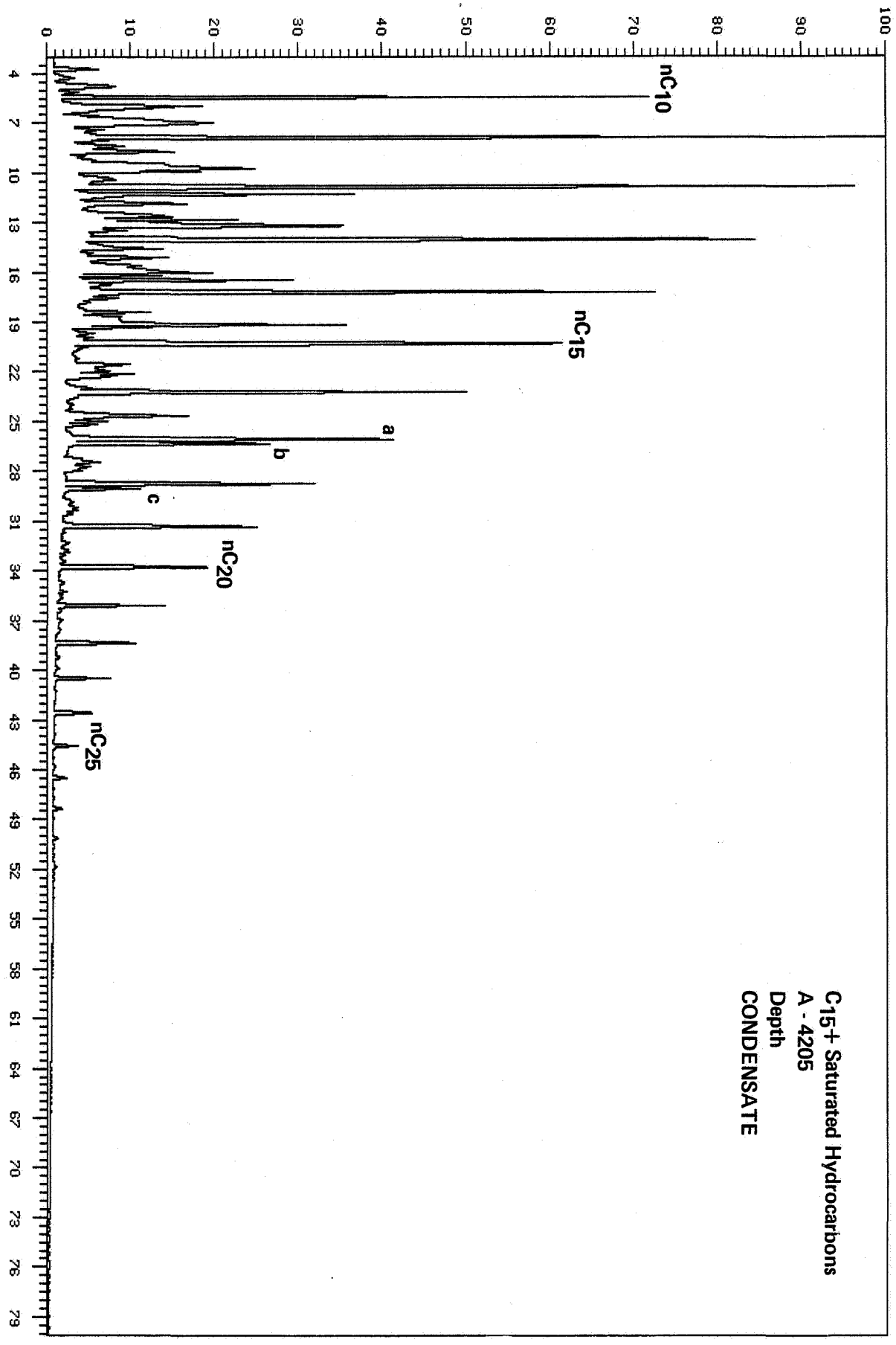

Printed at 14:45 on 15/Jun/83
RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :0137R4203VRS Sample #: 1 Injection #: 1
Sample Name :R-4203,S,VASKET,TB Maximum signal (%): 11.20
C15+ Saturated Hydrocarbons
A - 4203
Depth 2213.85m
COAL WASHINGS
nC25
nC15
nC20
nC30
nC35
a
b
c
CT
CT
CT
CT = Contaminant
0
10
20
30
40
50
60
70
80
90
100
3
6
9
12
15
18
21
24
27
30
33
36
39
42
45
48
51
54
57
60
63
66
69
72
75
78


Printed at 13:35 on 13/Jun/83
RAW DATA PLOT-CHANNEL 5
Box 1 of 1
Analysis :0137R4204S1 Sample #: 1 Injection #: 1
Sample Name :A-4204,S,7120/8-2,MS Maximum signal (%): 8.02
C15+ Saturated Hydrocarbons
A - 4204
Depth 2217.49 – 2217.56m
SANDSTONE
nC15
a
b
c
nC20
nC25
nC30
nC35
100
90
80
70
60
50
40
30
20
10
0
4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79

Printed at 13:42 on 13/Jun/83

RAW DATA PLOT-CHANNEL 5 Box 1 of 1

Analysis :0137A4205S1 Sample #: 1 Injection #: 1
Sample Name :A-4205,S,7120/8-2,MS Maximum signal (%): 64.50



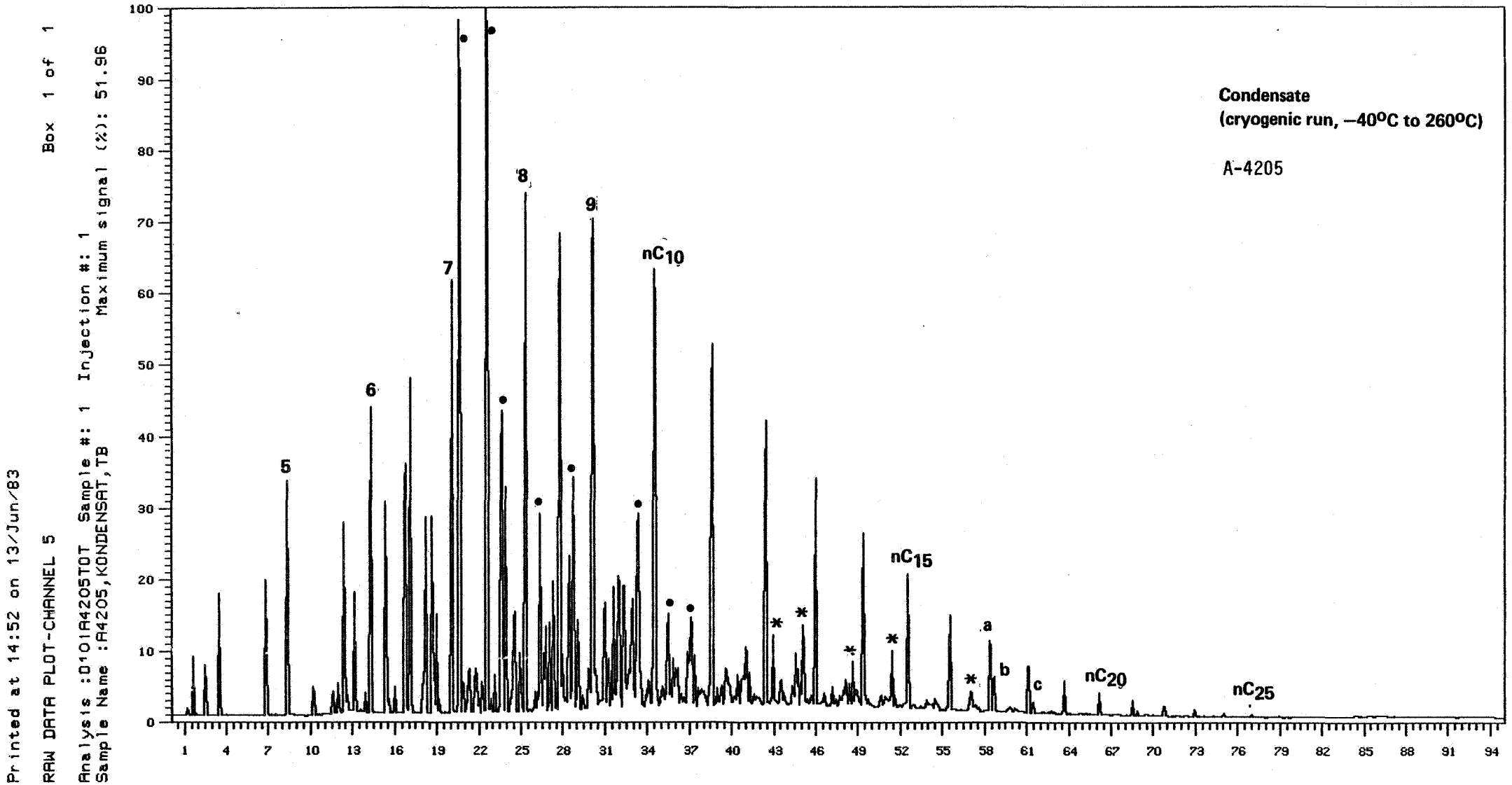
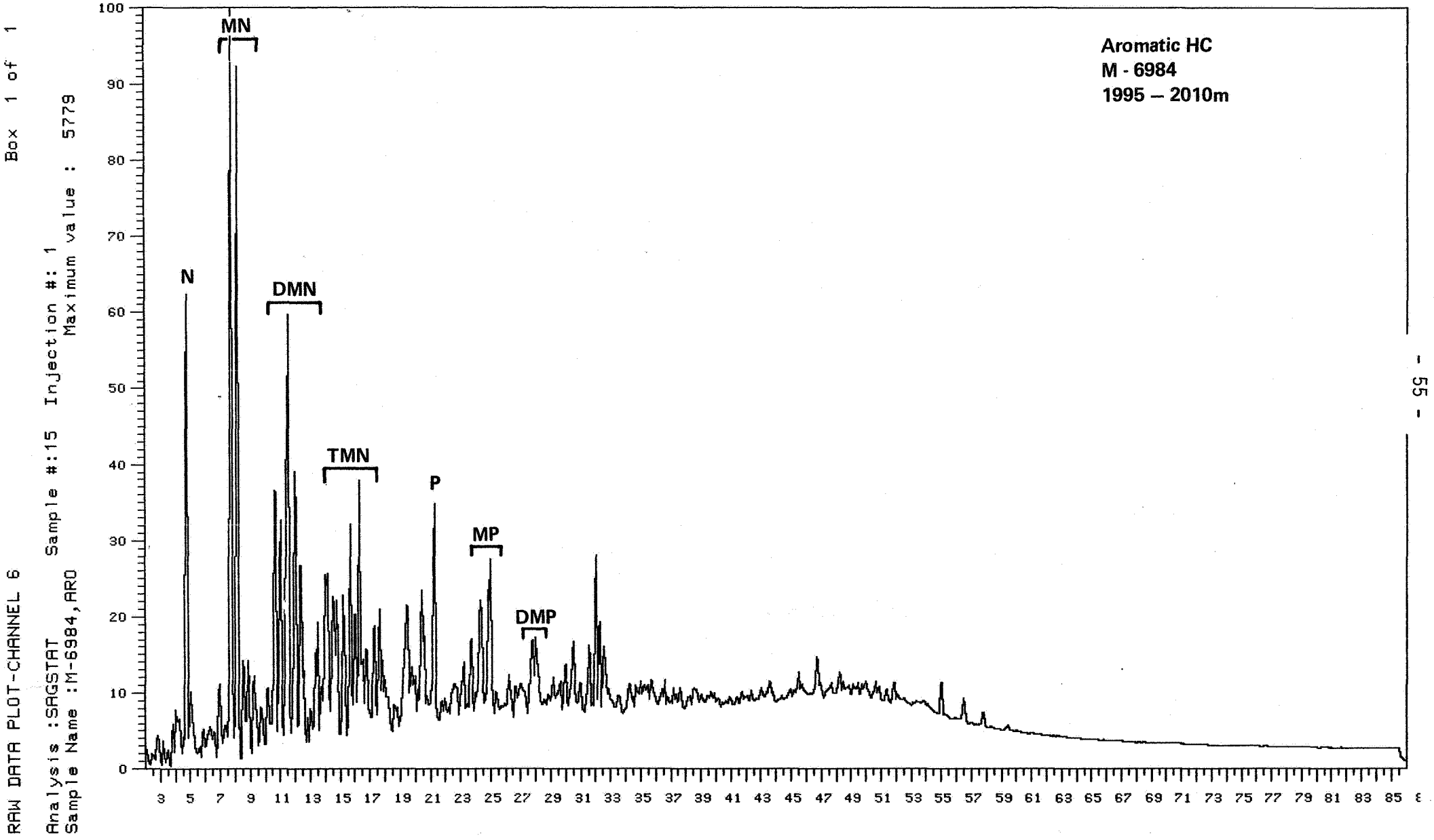

Printed at 14:52 on 13/Jun/83
RAW DATA PLOT-CHANNEL 5
Box 1 of 1
Analysis :D1O1A4205TOT Sample #: 1 Injection #: 1
Sample Name :A4205,KONDENSAT,TB Maximum signal (%): 51.96
Condensate
(cryogenic run, –40°C to 260°C)
A-4205
5
6
7
8
9
nC10
nC15
nC20
nC25
a
b
c
*
100
90
80
70
60
50
40
30
20
10
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88 91 94

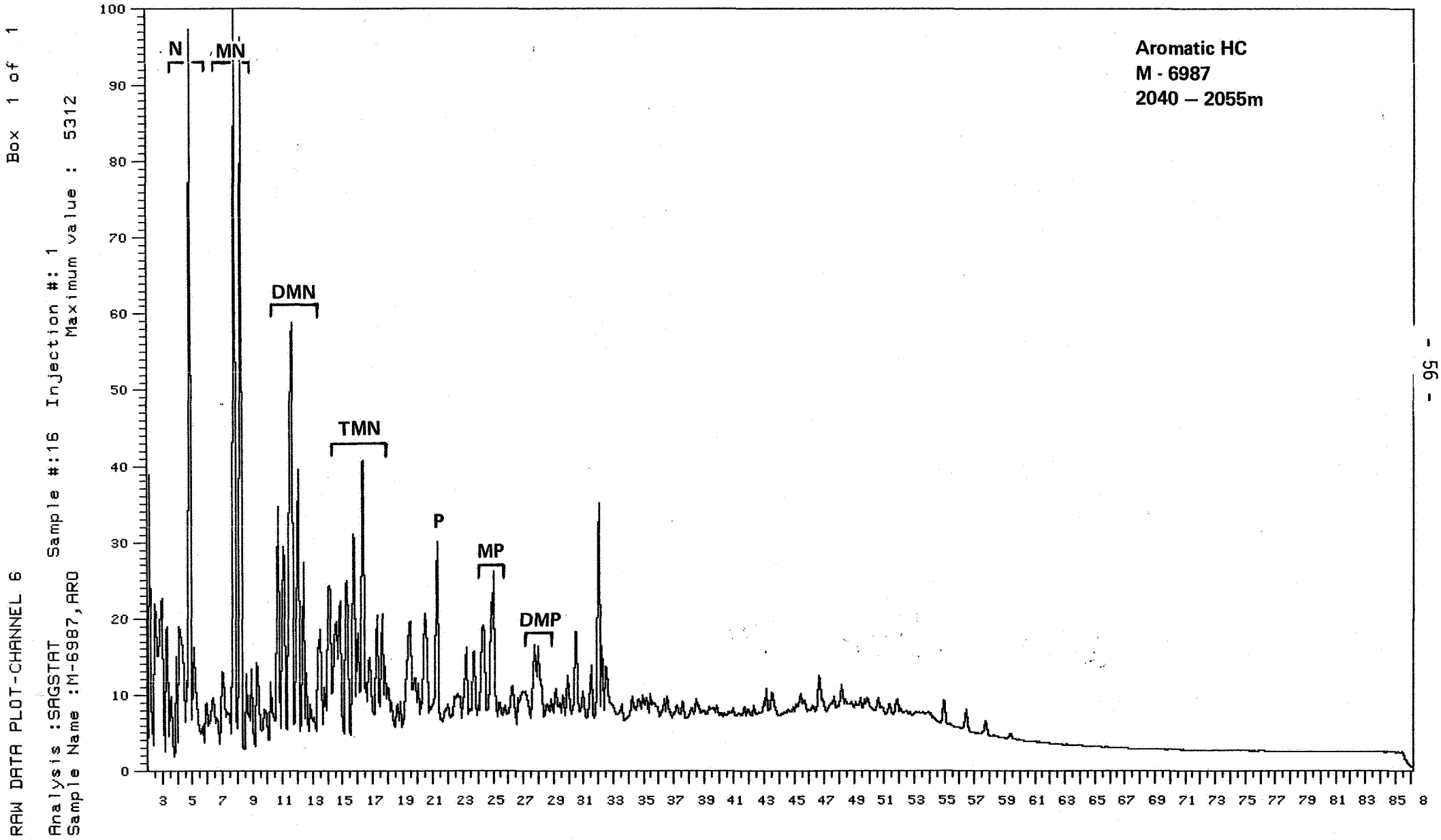
Figure b.

Aromatic hydrocarbon gas chromatograms for source rocks, oil shows and condensate.

Key

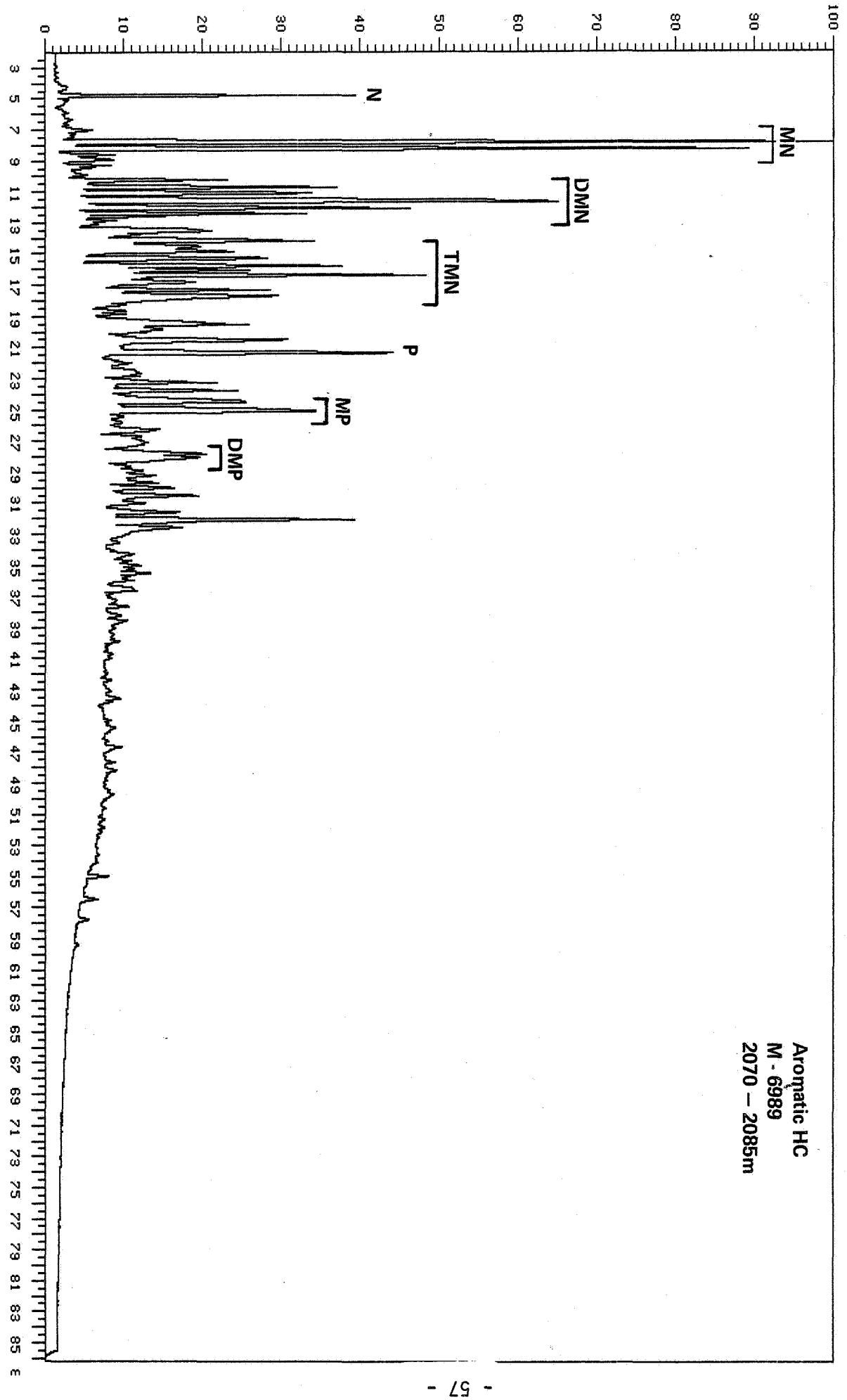
N	=	Naphthalenes
MN	=	Methylnaphthalenes
DMN	=	Dimethylnaphthalenes
TMN	=	Trimethylnaphthalenes
P	=	Phenanthrene
MP	=	Methylphenanthrenes


RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :SAGSTAT
Sample Name :M-6984,ARO
Sample #:15 Injection #: 1
Maximum value : 5779
Aromatic HC
M - 6984
1995 – 2010m
N
MN
DMN
TMN
P
MP
DMP
- 55 -


RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :SAGSTAT
Sample Name :M-6987,ARO
Sample #:16 Injection #: 1
Maximum value : 5312
N
MN
DMN
TMN
P
MP
DMP
Aromatic HC
M - 6987
2040 – 2055m
- 56 -

RAW DATA PLOT-CHANNEL 6 Box 1 of 1

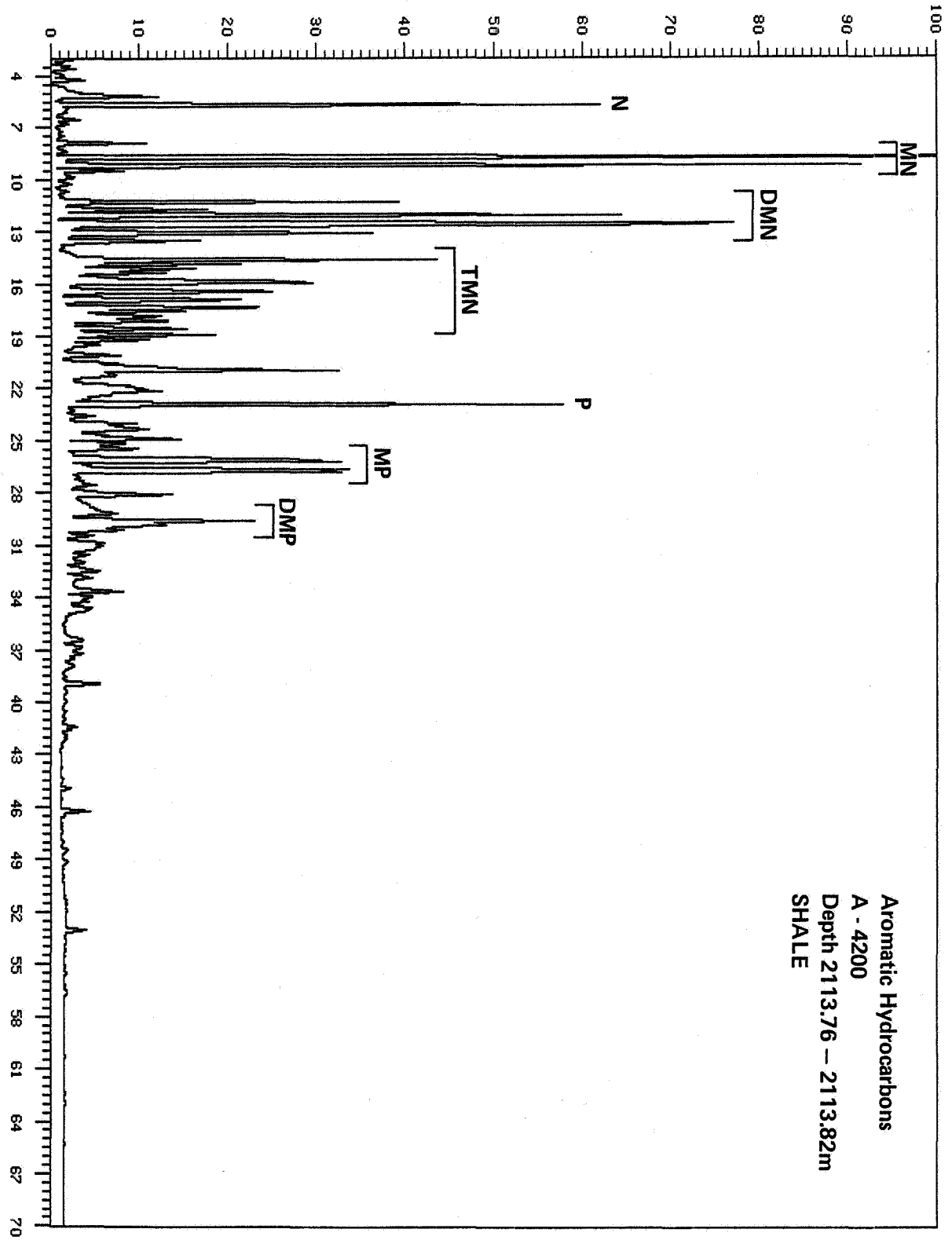
Analysis :SAGSTAT Sample #:17 Injection #: 1
Sample Name :M-6989,ARO Maximum value : 5417



Printed at 14:32 on 08/Aug/83

RAW DATA PLOT-CHANNEL 7 Box 1 of 1

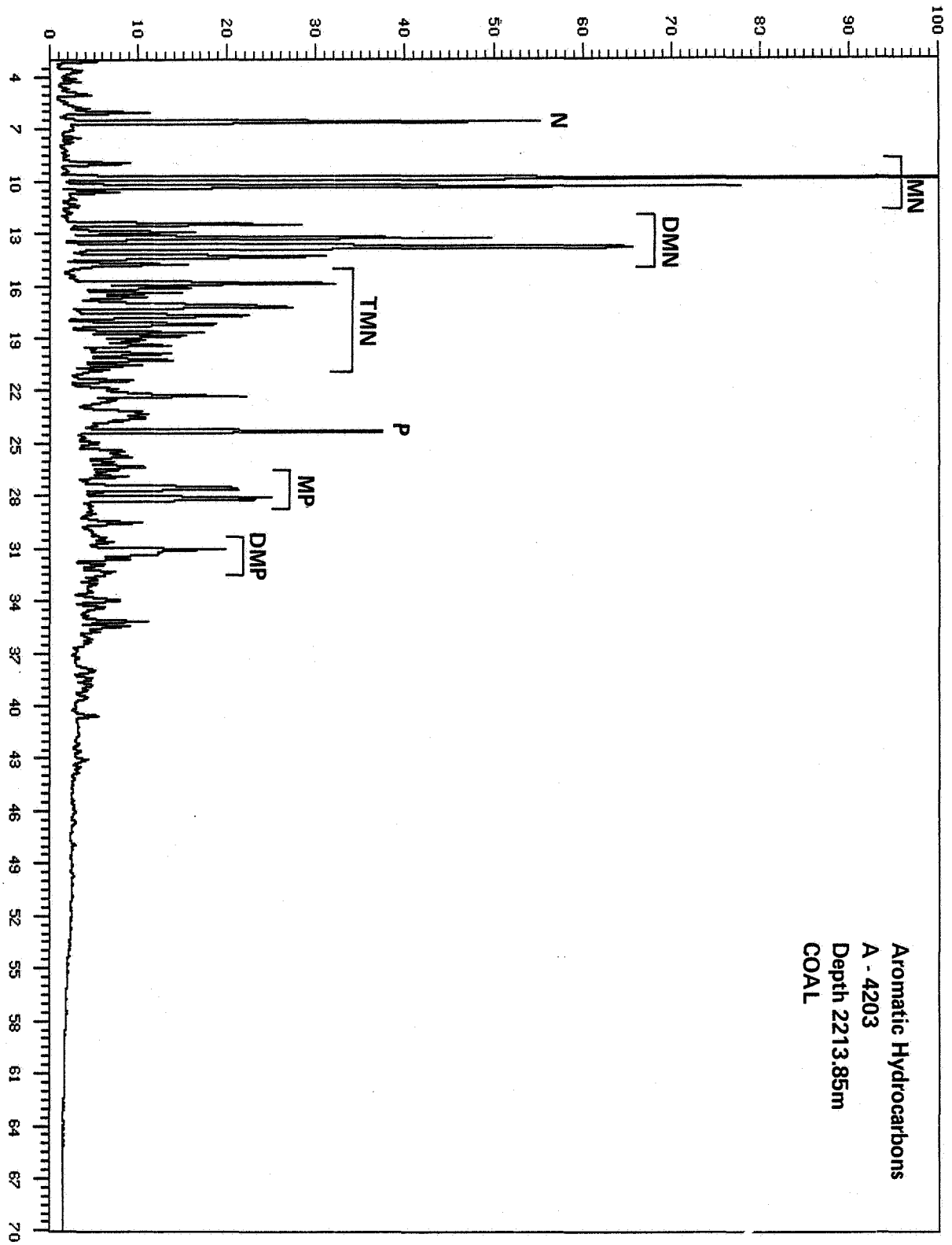
Analysis :0137A4200A1 Sample #: 1 Injection #: 1
Sample Name :A-4200,A,7120/8-2,MS Maximum signal (%):100.00



Printed at 14:37 on 08/Aug/83

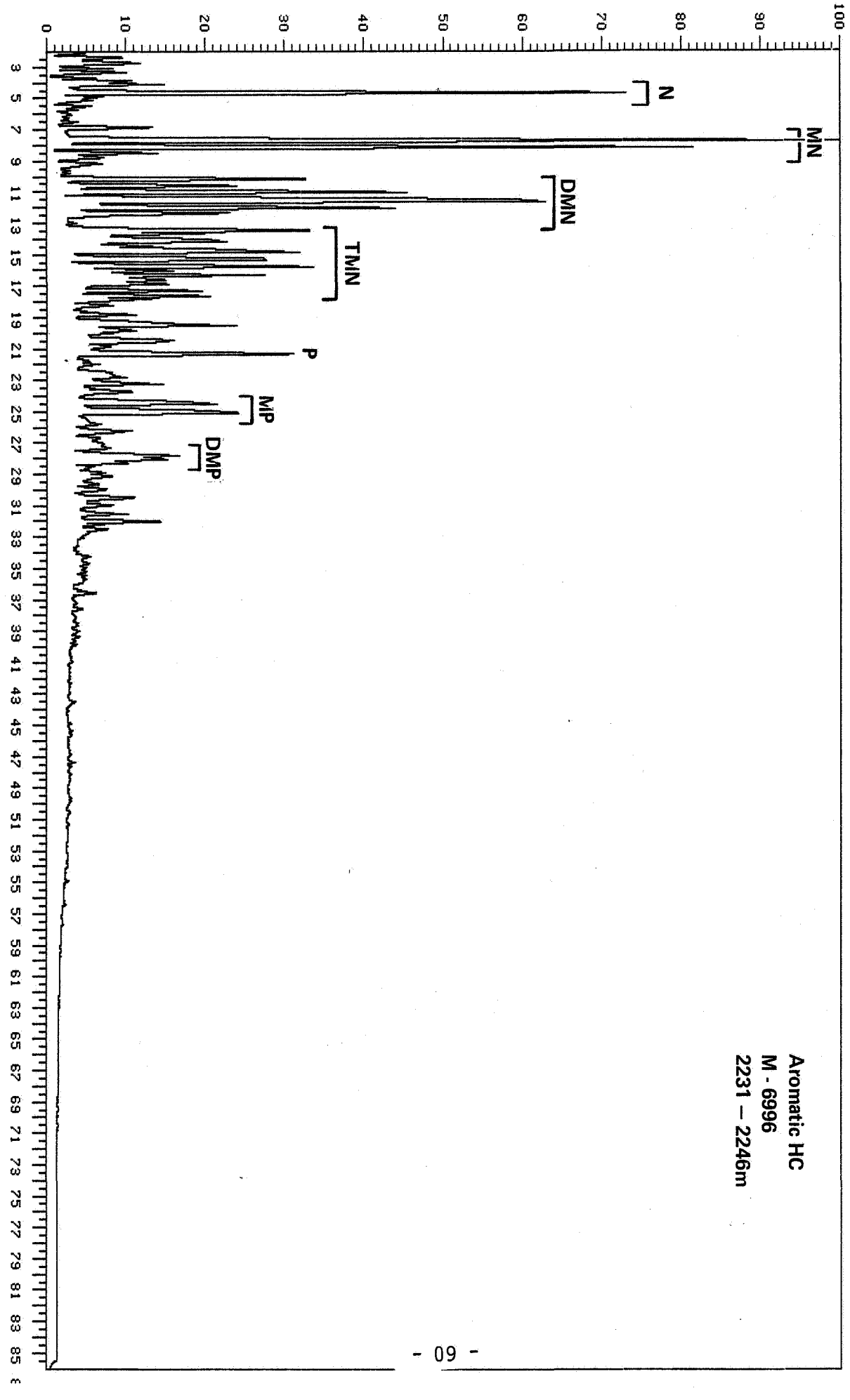
RAW DATA PLOT-CHANNEL 7 Box 1 of 1

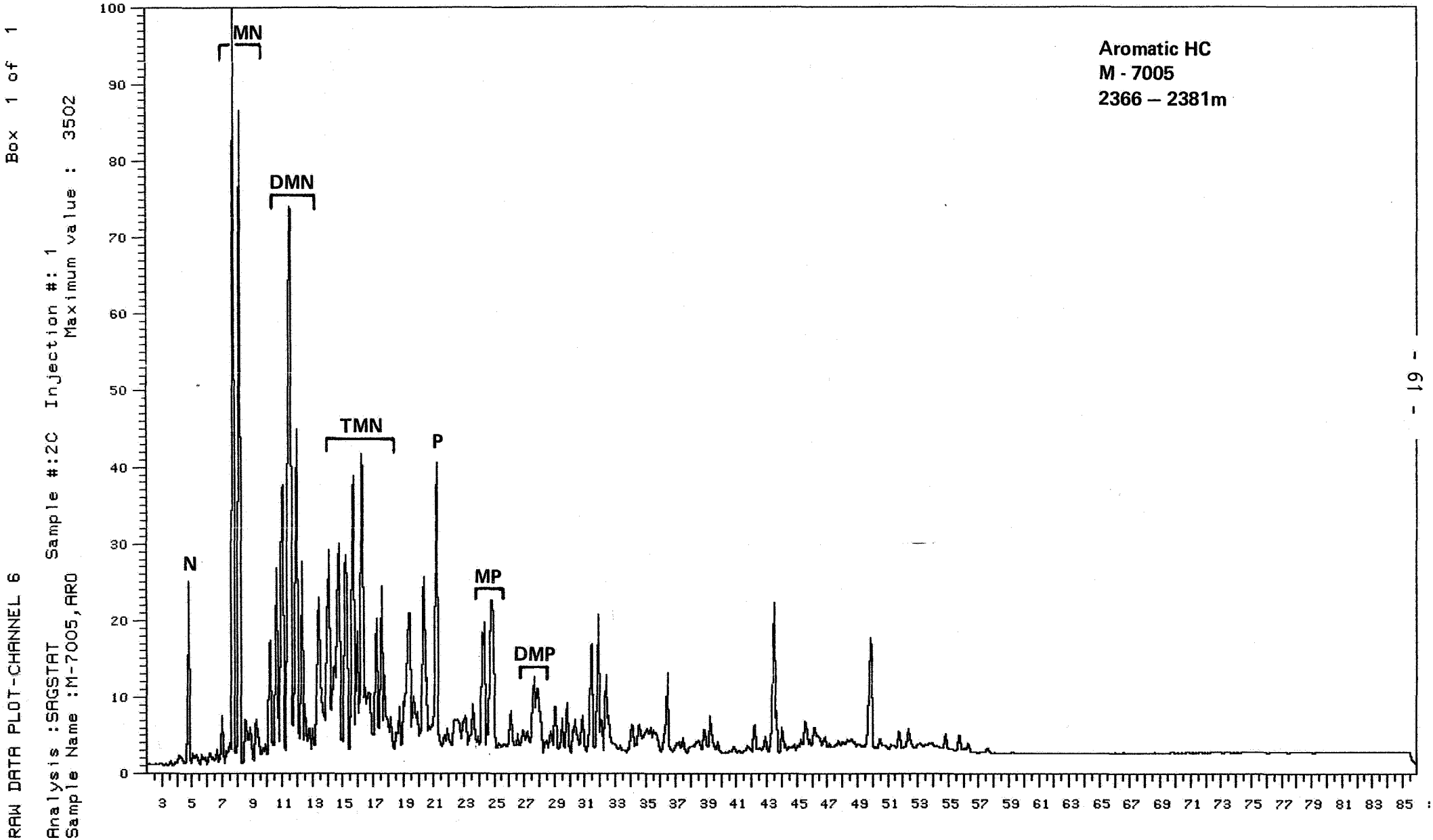
Analysis :0137A4203A1 Sample #: 1 Injection #: 1
Sample Name :A-4203,A,7120/8-2,MS Maximum signal (%):100.00



RAW DATA PLOT-CHANNEL 6 Box 1 of 1

Analysis :SAGSTAT Sample #:19 Injection #: 1
Sample Name :M-6996,ARO Maximum value : 9084

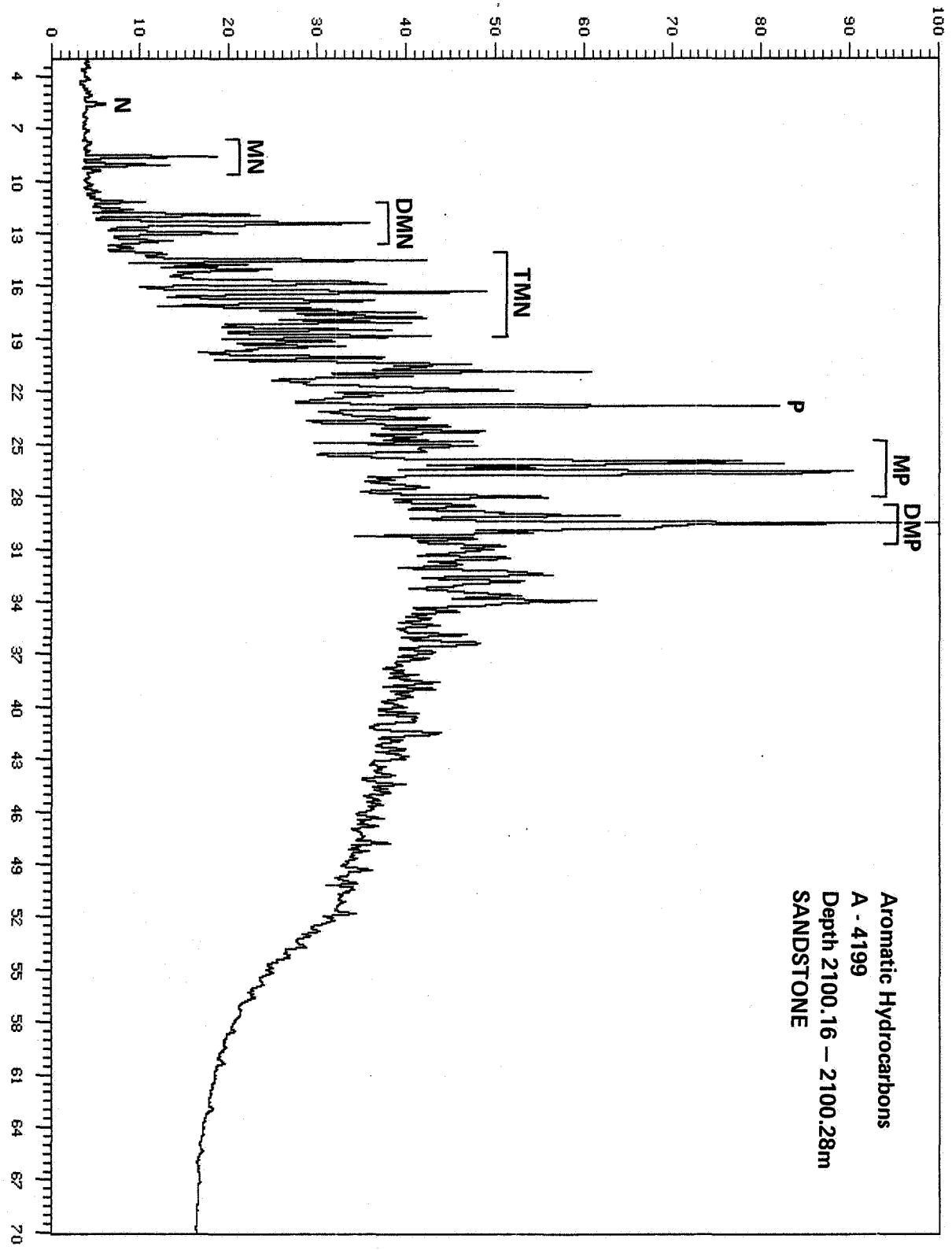



RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :SAGSTAT
Sample Name :M-7005,ARO
Sample #:2C Injection #: 1
Maximum value : 3502
Aromatic HC
M - 7005
2366 – 2381m
MN
DMN
TMN
P
N
MP
DMP
- 61 -

Printed at 11:42 on 13/Jun/83

RAW DATA PLOT-CHANNEL 7 Box 1 of 1

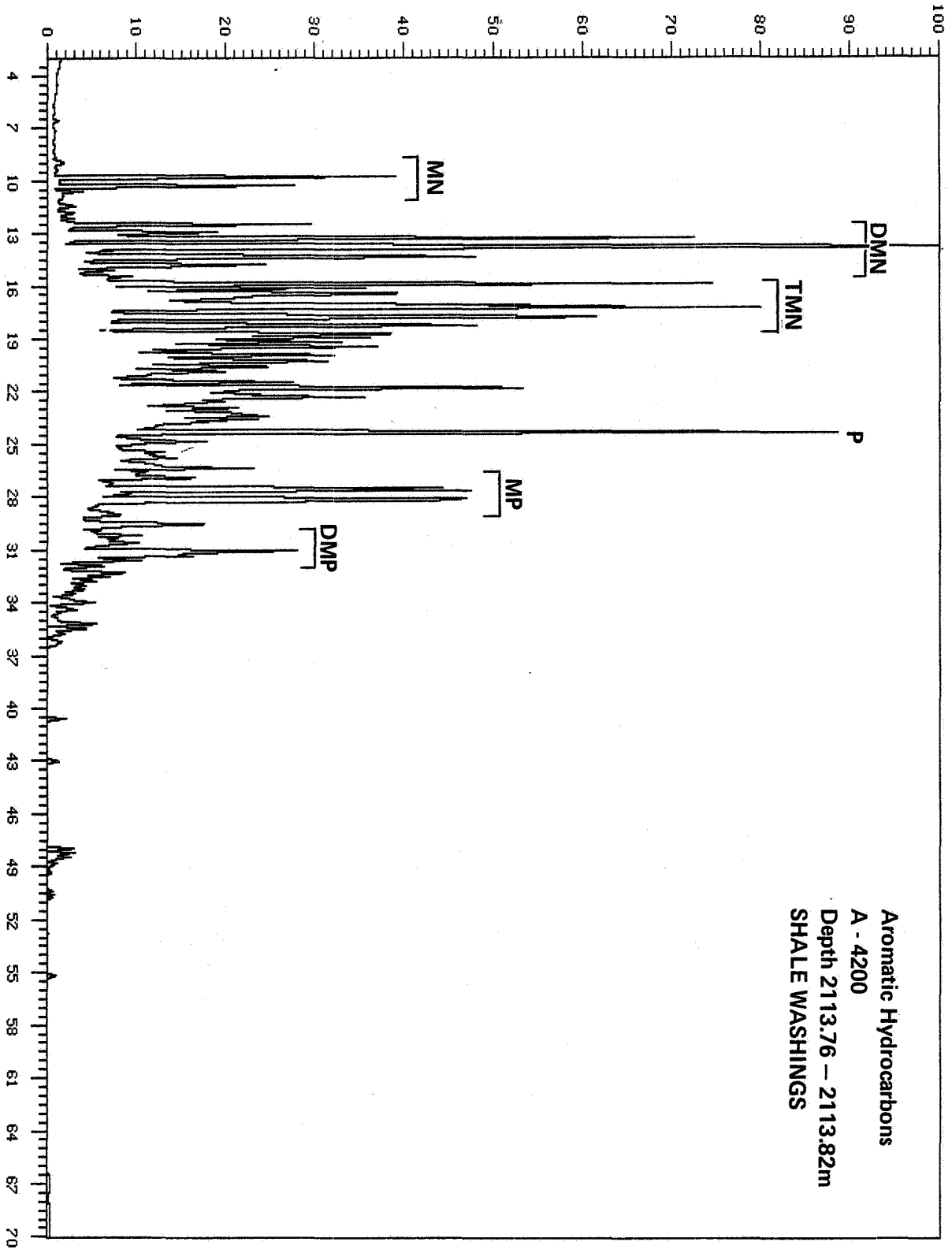
Analysis :0137A4199A1 Sample #: 1 Injection #: 1
Sample Name :A-4199,A,7120/8-2,MS Maximum signal (%): 14.52



Printed at 12:23 on 14/Jun/83

RAW DATA PLOT-CHANNEL 7 Box 1 of 1

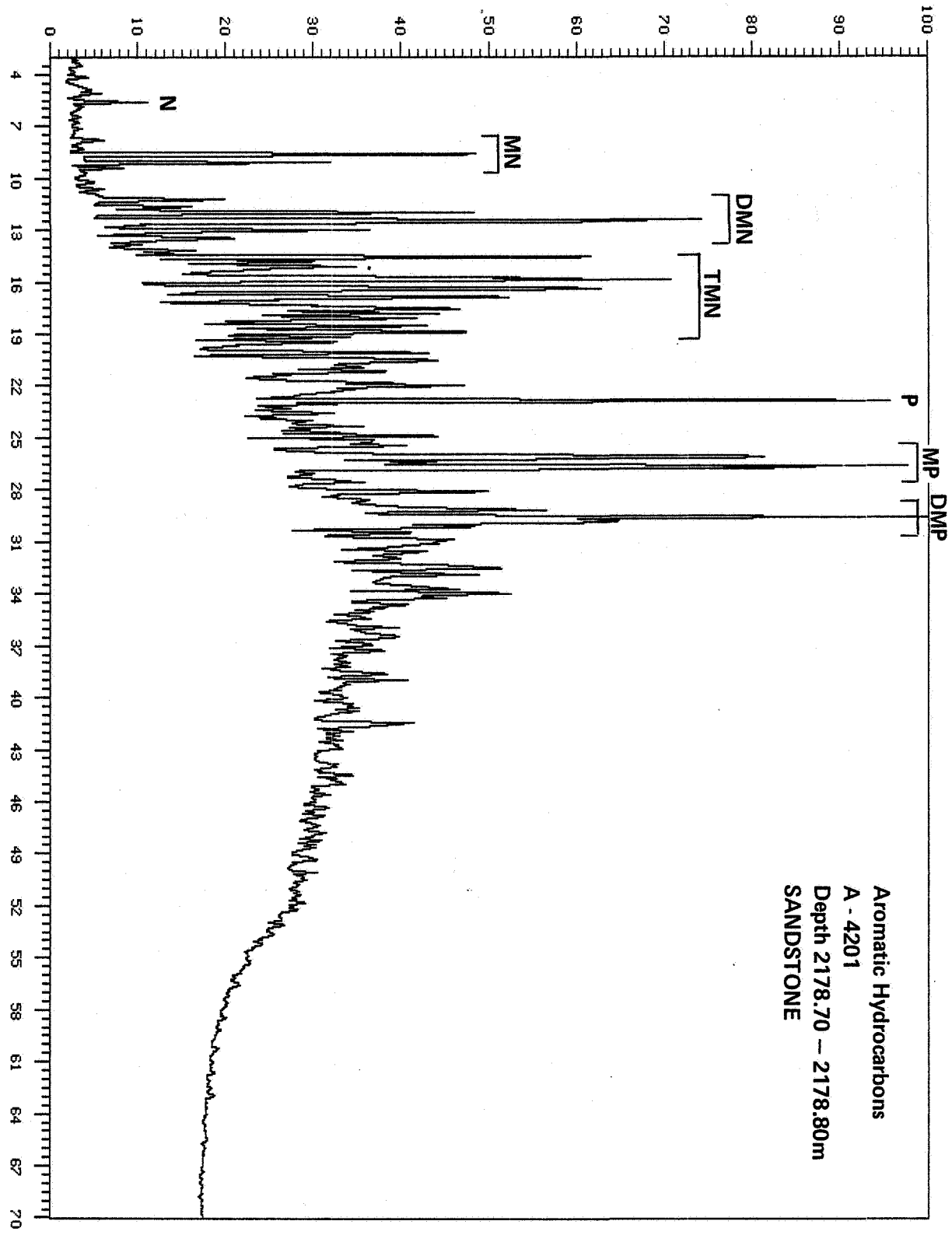
Analysis :0137A4200VAS Sample #: 1 Injection #: 1
Sample Name :A4200,A,VASKET,MS Maximum signal (%): 19.40



Printed at 11:47 on 13/Jun/83

RAW DATA PLOT-CHANNEL 7 Box 1 of 1

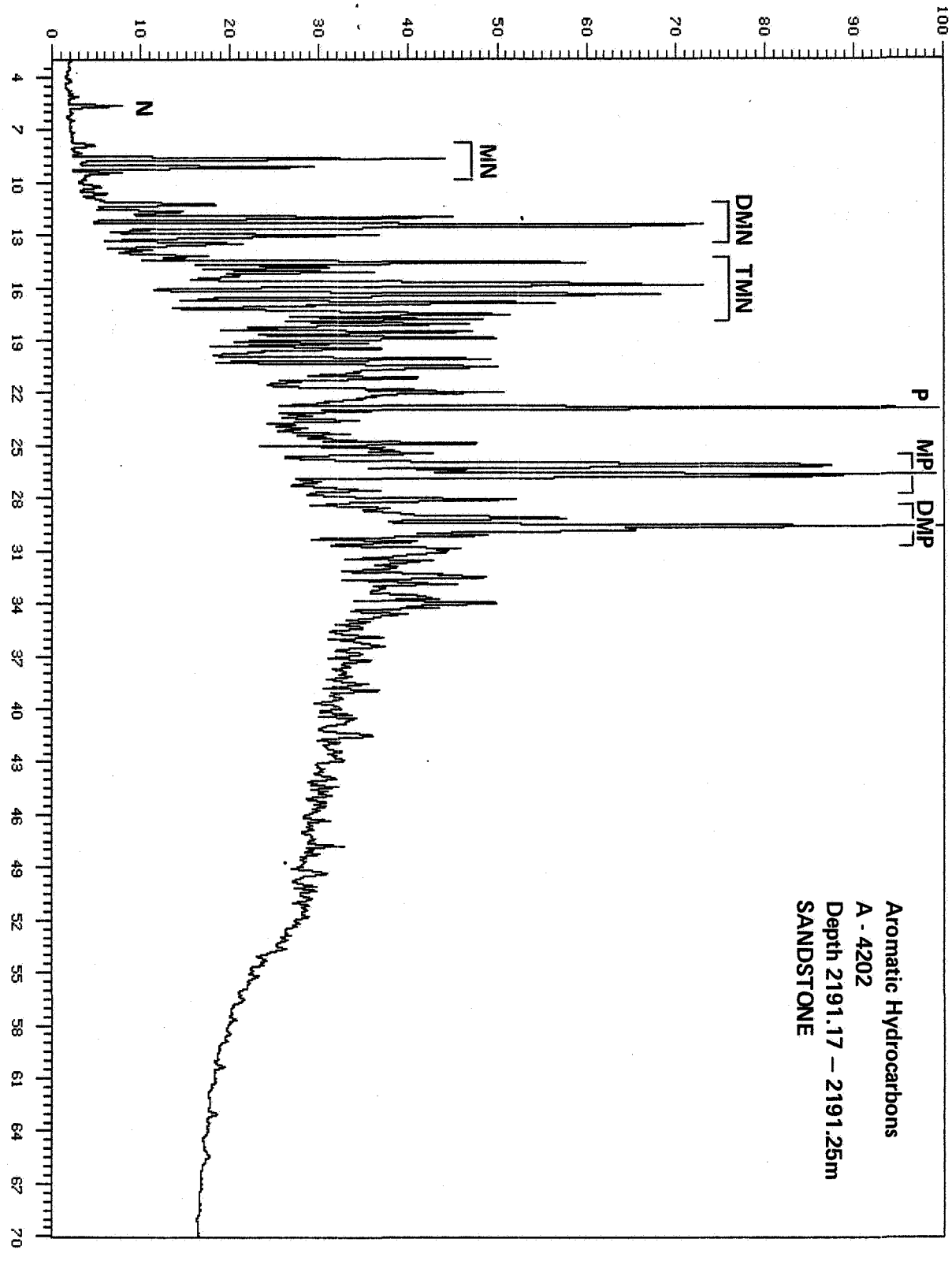
Analysis :0137A4201A1 Sample #: 1 Injection #: 1
Sample Name :A-4201,A,7120/8-2,MS Maximum signal (%): 11.97



Printed at 11:51 on 13/Jun/83

RAW DATA PLOT-CHANNEL 7 Box 1 of 1

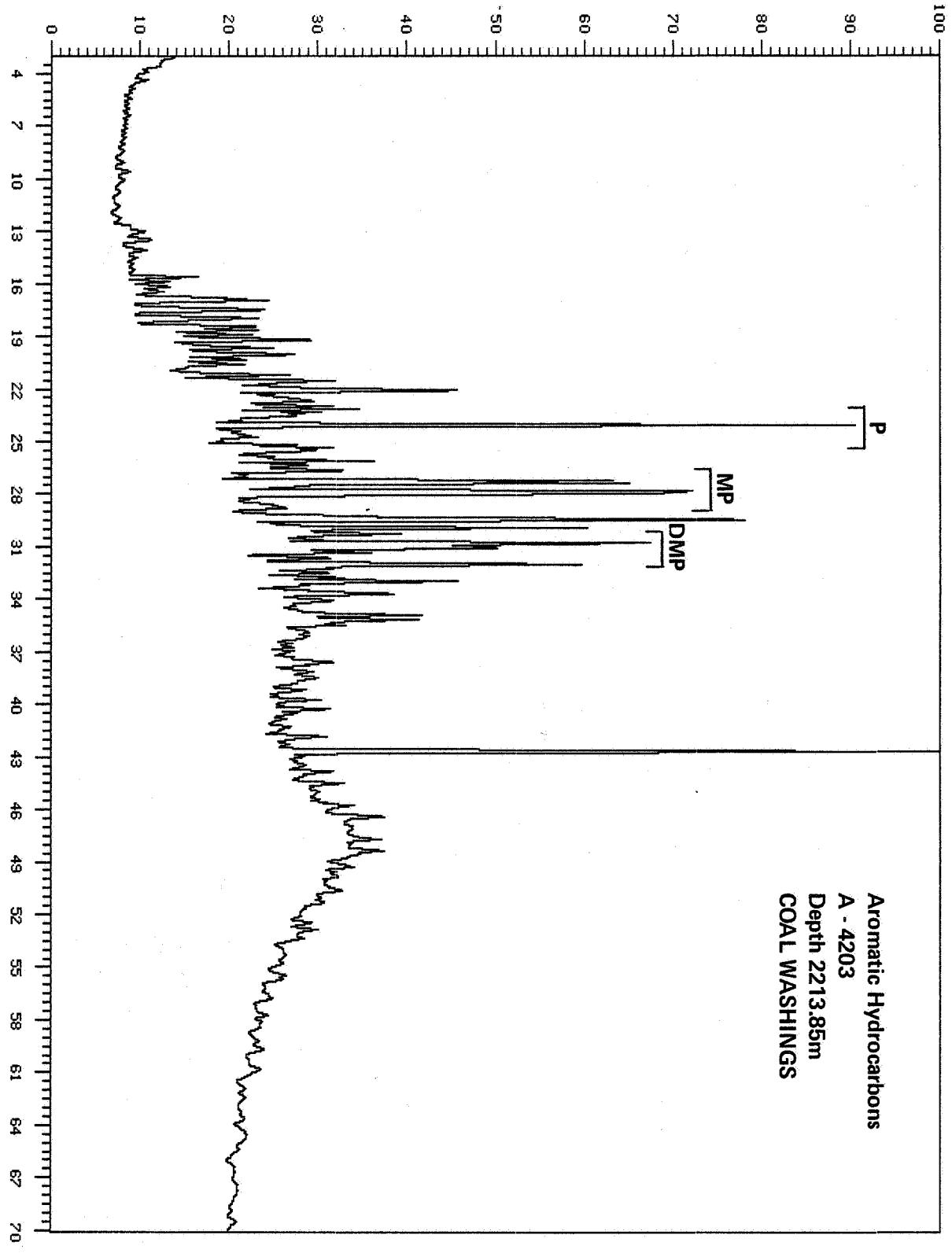
Analysis :0137A4202A1 Sample #: 1 Injection #: 1
Sample Name :A-4202,A,7120/8-2,MS Maximum signal (%): 13.42



Printed at 11:10 on 16/Jun/83

RAW DATA PLOT-CHANNEL 7 Box 1 of 1

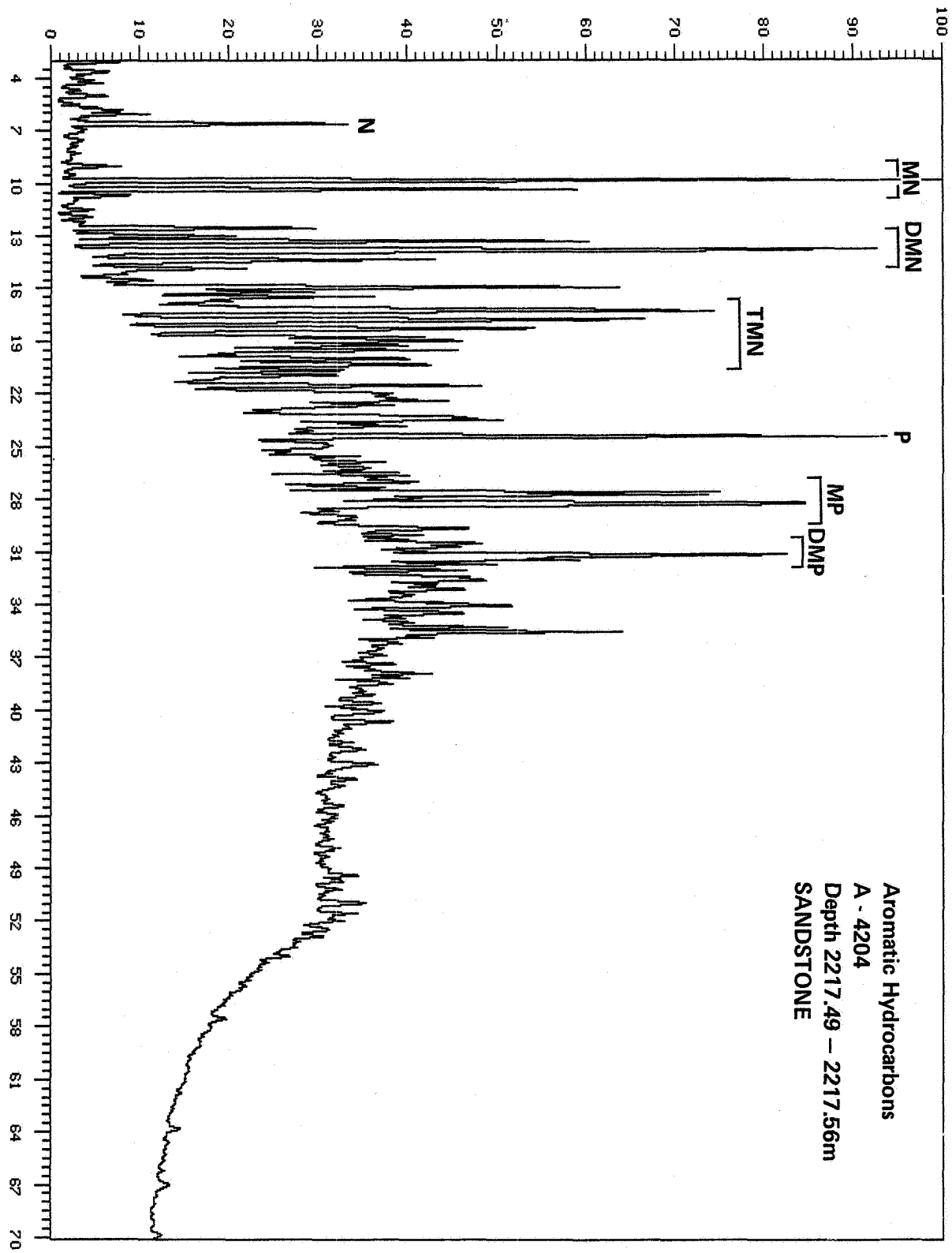
Analysis :0137A4203VAS Sample #: 1 Injection #: 1
Sample Name :A4203,A,VAS2,MS Maximum signal (%): 3.13



Printed at 11:57 on 13/Jun/83

RAW DATA PLOT-CHANNEL 7 Box 1 of 1

Analysis :0137A4204A1 Sample #: 1 Injection #: 1
Sample Name :A-4204,A,7120/8-2,MS Maximum signal (%): 10.13



Printed at 14:34 on 08/Aug/83

RAW DATA PLOT-CHANNEL 7 Box 1 of 1

Analysis :0137A4205A1 Sample #: 1 Injection #: 1
Sample Name :A-4205,A,7120/8-2,MS Maximum signal (%):100.00

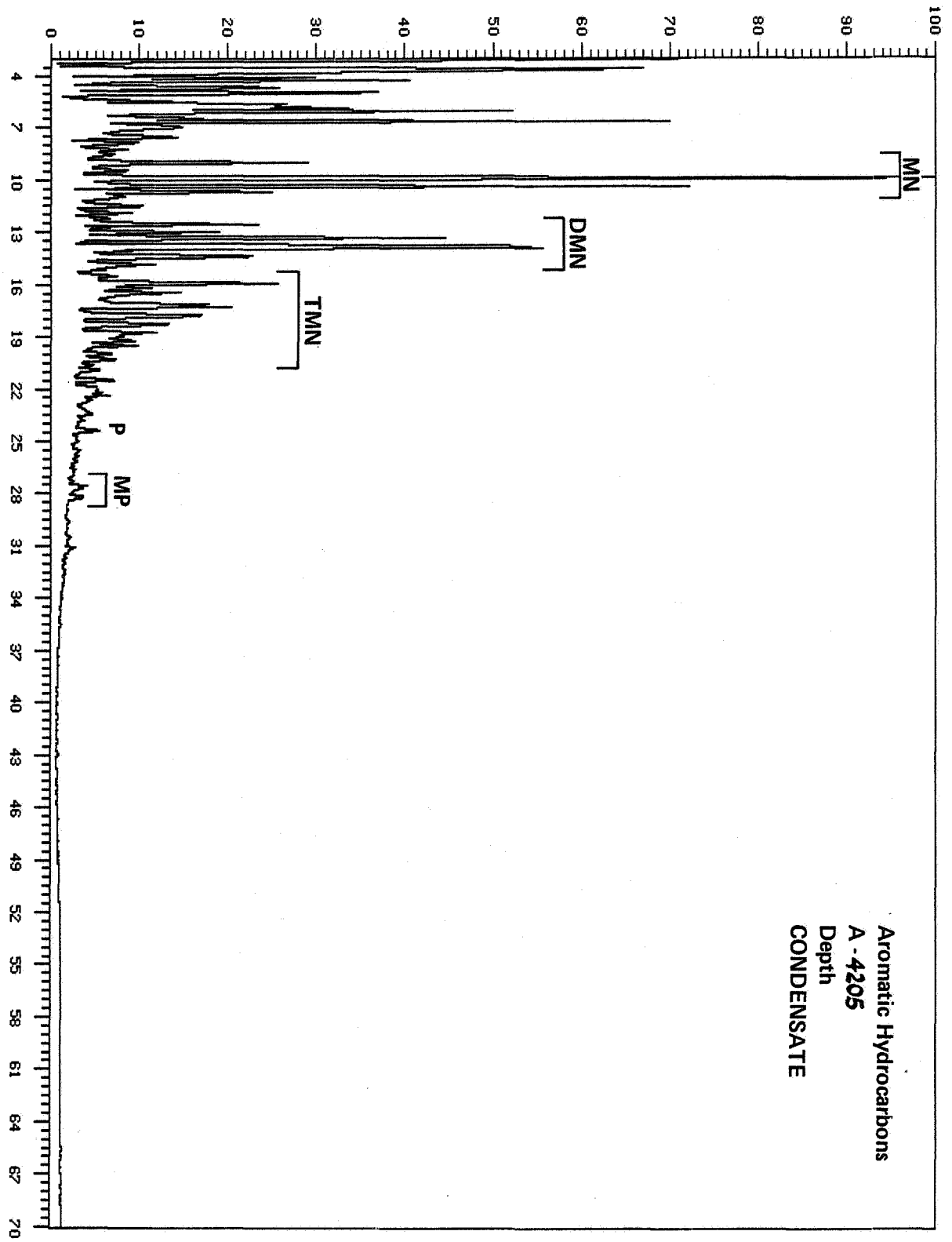


Figure c.

Mass fragmentograms from saturated hydrocarbons source rocks, oil shows and condensate.

Key to mass fragmentograms m/z 191 fragmentogram (triterpanes)

Code	Compound	Elemental composition
A	Ts C_{27} 18α(H) Trisnorneohopane	$C_{27}H_{46}$
B	Tm C_{27} 17α(H) Trisnorhopane	$C_{27}H_{46}$
C	17α(H)-norhopane	$C_{29}H_{50}$
D	normoretane	$C_{29}H_{50}$
E	17α(H)-hopane	$C_{30}H_{52}$
F	moretane	$C_{30}H_{52}$
G	17α(H)-homohopane (22S)	$C_{31}H_{54}$
H	17α(H)-homohopane (22R)	$C_{31}H_{54}$
I	homomoretane	$C_{31}H_{54}$
J	17α(H)-bishomohopane 22S	$C_{32}H_{56}$
K	17α(H)-bishomohopane 22R	$C_{32}H_{56}$
L	17α(H)-trishomohopane 22S	$C_{33}H_{58}$
M	17α(H)-trishomohopane 22R	$C_{33}H_{58}$
N	17α(H)-tetrakishomohopane 22S	$C_{34}H_{60}$
O	17α(H)-tetrakishomohopane 22R	$C_{34}H_{60}$
P	17α(H)-pentakishomohopane 22S	$C_{35}H_{62}$
Q	17α(H)-pentakishomohopane 22R	$C_{35}H_{62}$
Z	17α(H), 28,30 bisnorhopane	$C_{28}H_{48}$
i	25,28,30-trisnorhopane	
X	not identified	
Y	not identified	

Key to mass fragmentograms m/z 217, 218,259 (steranes).

Code	Compound	Elemental Composition
a	13β, 17α-diacholestane (20S)	$C_{27}H_{48}$
b	13β, 17α-diacholestane (20R)	$C_{27}H_{48}$
c	13α, 17β-diacholestane (20S)	$C_{27}H_{48}$
d	13α, 17β-diacholestane (20R)	$C_{27}H_{48}$
e	24-methyl-13β, 17α-diacholestane (20S)	$C_{28}H_{50}$
f	24-methyl-13β, 17α-diacholestane (20R)	$C_{28}H_{50}$
g	24-methyl-13α, 17β-diacholestane (20S)	$C_{28}H_{50}$
	+ 14α, 17α-cholestane (20S)	$C_{27}H_{48}$
h	24-ethyl-13β, 17α-diacholestane (20S)	$C_{29}H_{52}$
	+ 14β, 17β-cholestane (20R)	$C_{27}H_{48}$
i	14β, 17β-cholestane (20S)	$C_{27}H_{48}$
	+ 24-methyl-13α, 17β-diacholestane (20R)	$C_{28}H_{50}$
j	14α, 17α-cholestane (20R)	$C_{27}H_{48}$
k	24-ethyl-13β, 17α-diacholestane (20R)	$C_{29}H_{52}$
l	24-ethyl-13α, 17β-diacholestane (20S)	$C_{29}H_{52}$
m	24-methyl-14α, 17α-cholestane (20S)	$C_{28}H_{50}$
n	24-ethyl-13α, 17β-diacholestane (20R)	$C_{29}H_{52}$
	+ 24-methyl-14β, 17β-cholestane (20R)	$C_{28}H_{50}$
o	24-methyl-14β, 17β-cholestane (20R)	$C_{28}H_{50}$
p	24-methyl-14α, 17α-cholestane (20R)	$C_{28}H_{50}$
q	24-ethyl-14α, 17α-cholestane (20S)	$C_{29}H_{52}$
r	24-ethyl-14β, 17β-cholestane (20R)	$C_{29}H_{52}$
s	24-ethyl-14β, 17β-cholestane (20S)	$C_{29}H_{52}$
t	24-ethyl-14α, 17α-cholestane (20R)	$C_{29}H_{52}$

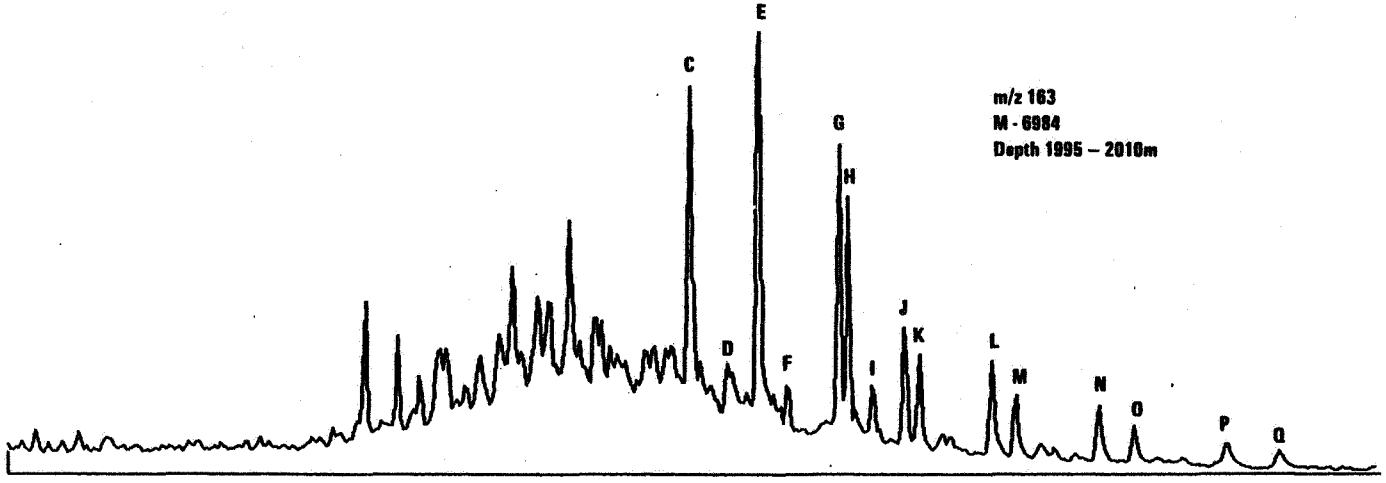
IKU

Mass Fragmentograms from Saturated Hydrocarbons of M-6984

CRETACEOUS/UPPER JURASSIC CLAYSTONE

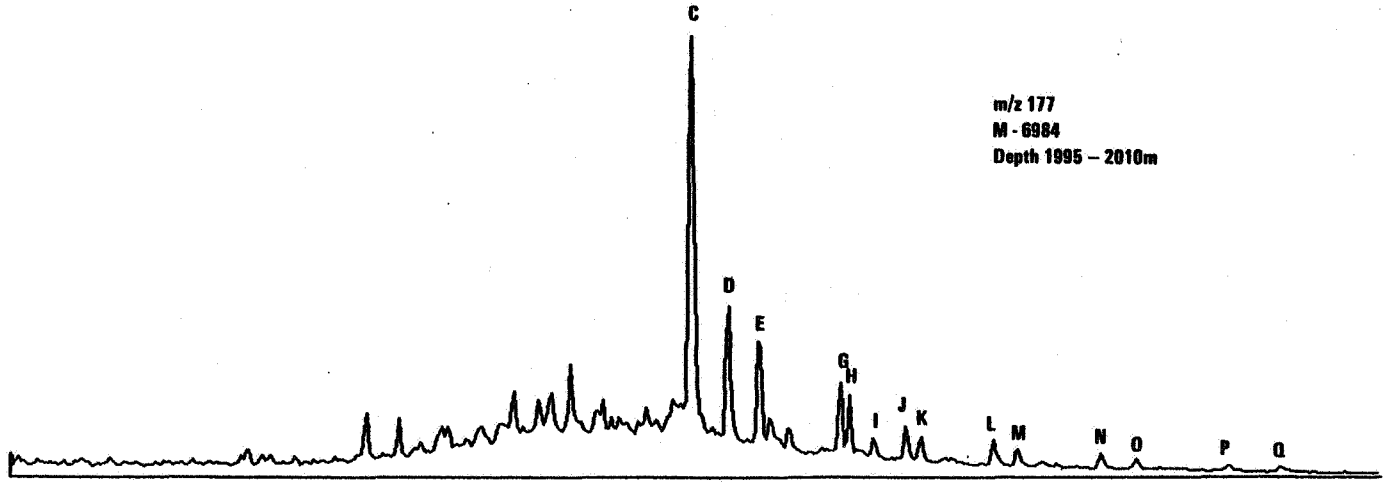
Depth 1995 - 2010 metres

[0.00001 M6984S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



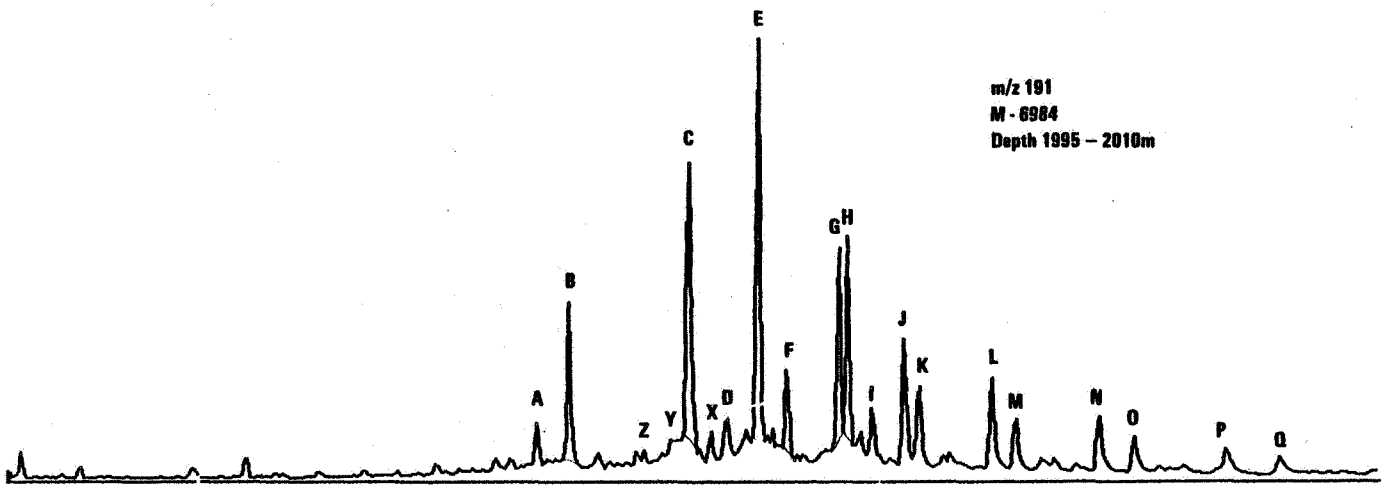
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6984S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



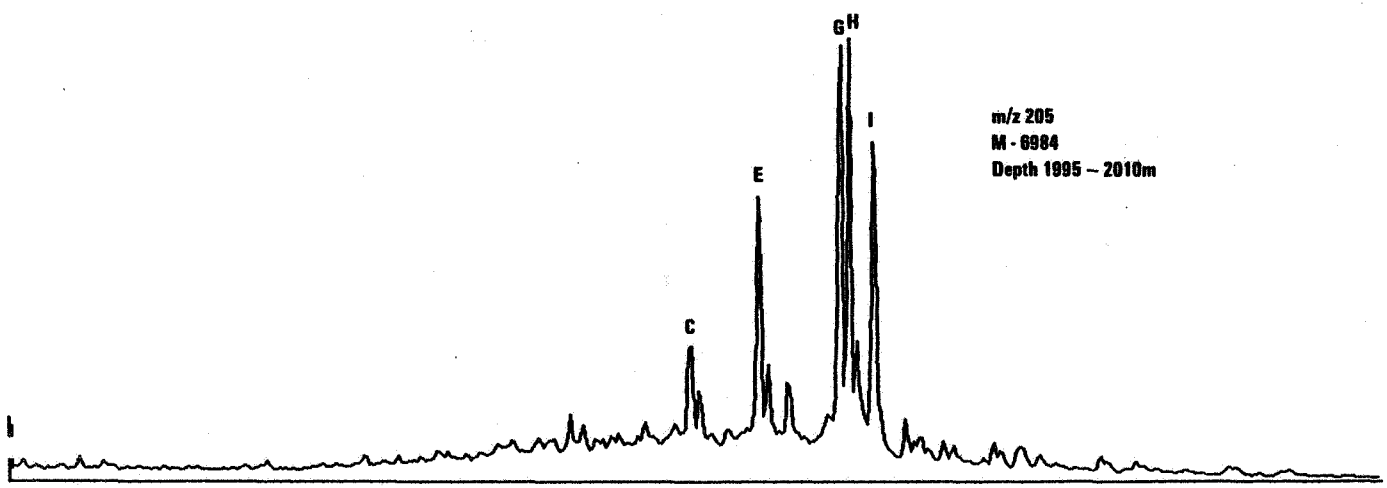
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6984S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



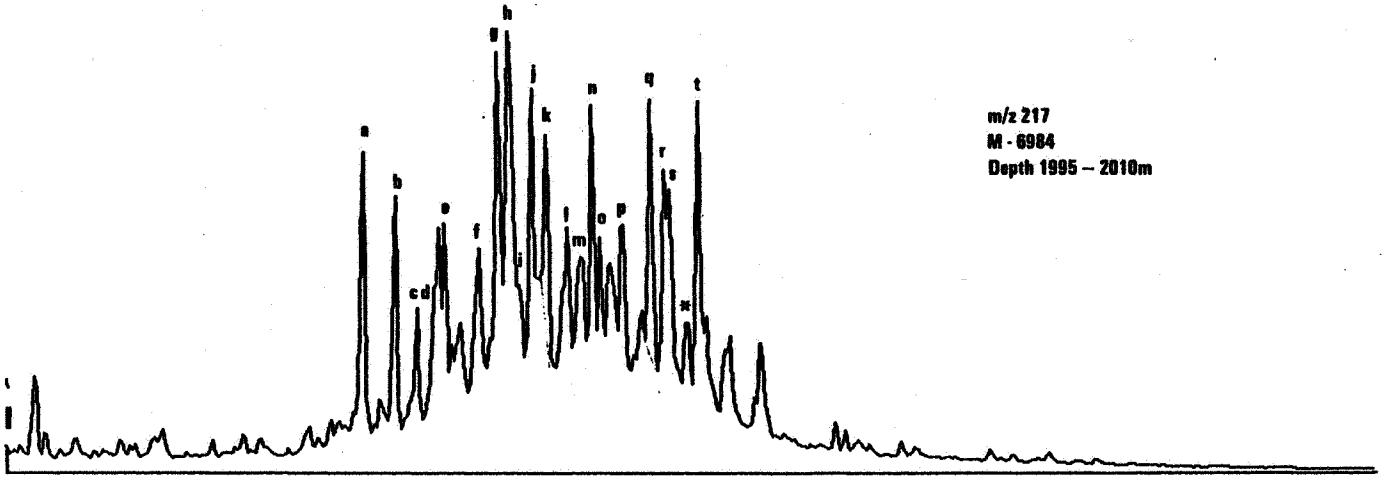
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6984S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



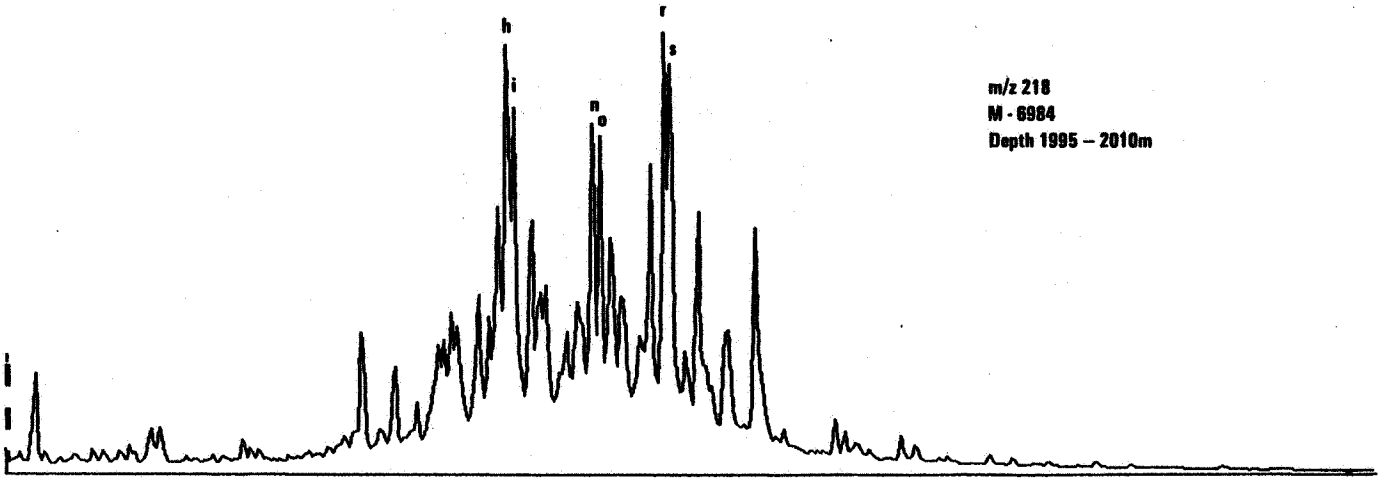
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6984S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



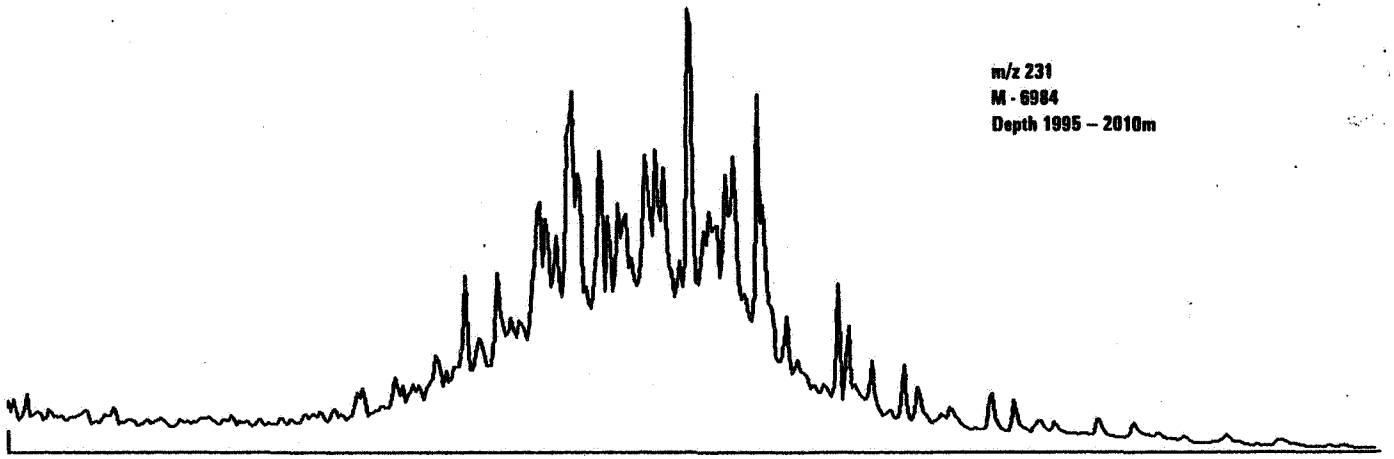
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6984S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



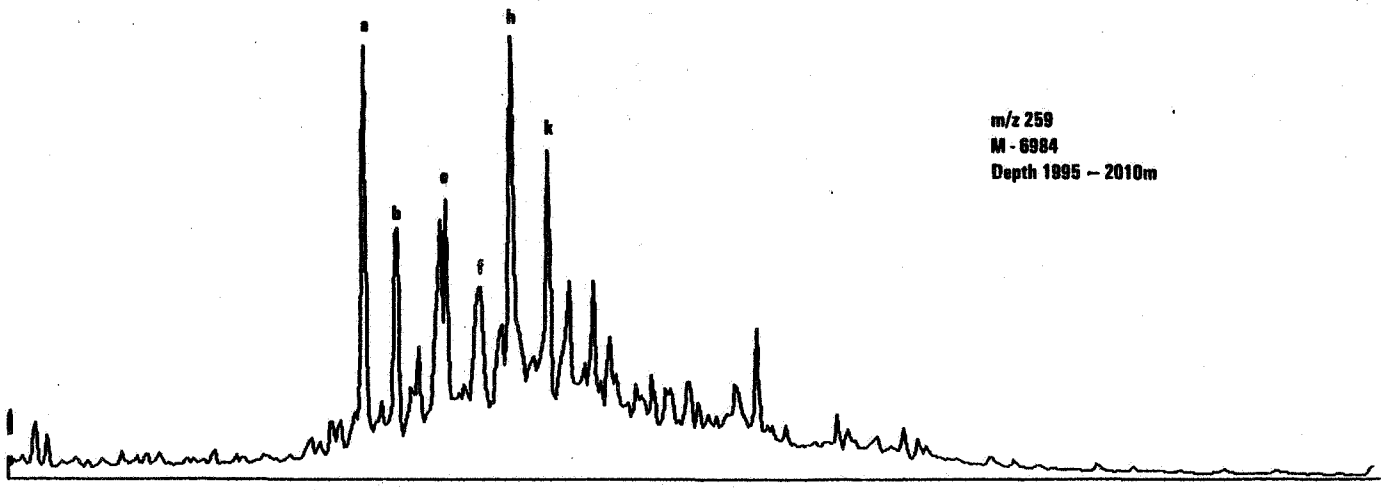
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6984S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S #231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6984S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S G231S #259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

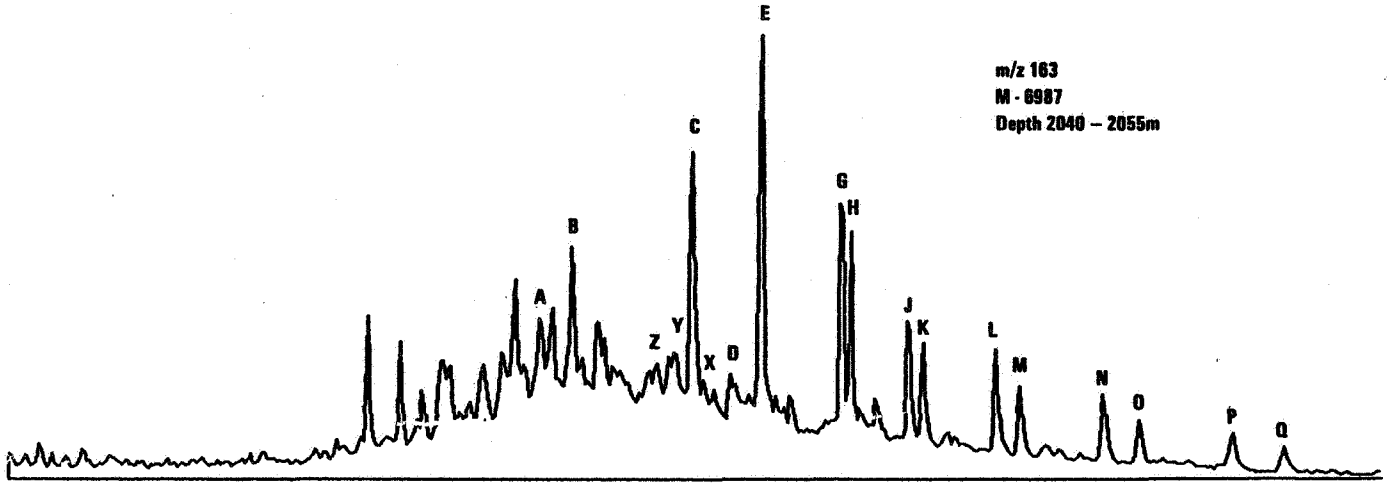
IKU

Mass Fragmentograms from Saturated Hydrocarbons of M-6987

UPPER JURASSIC CLAYSTONE

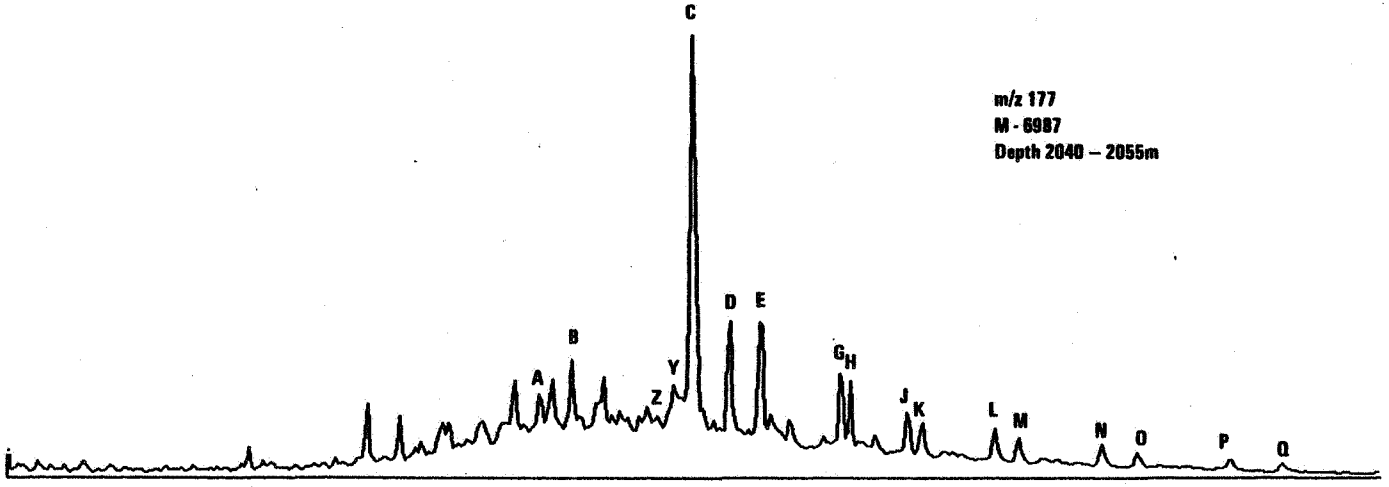
Depth Interval 2231 - 2246 metres

[0.0000] M6987S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



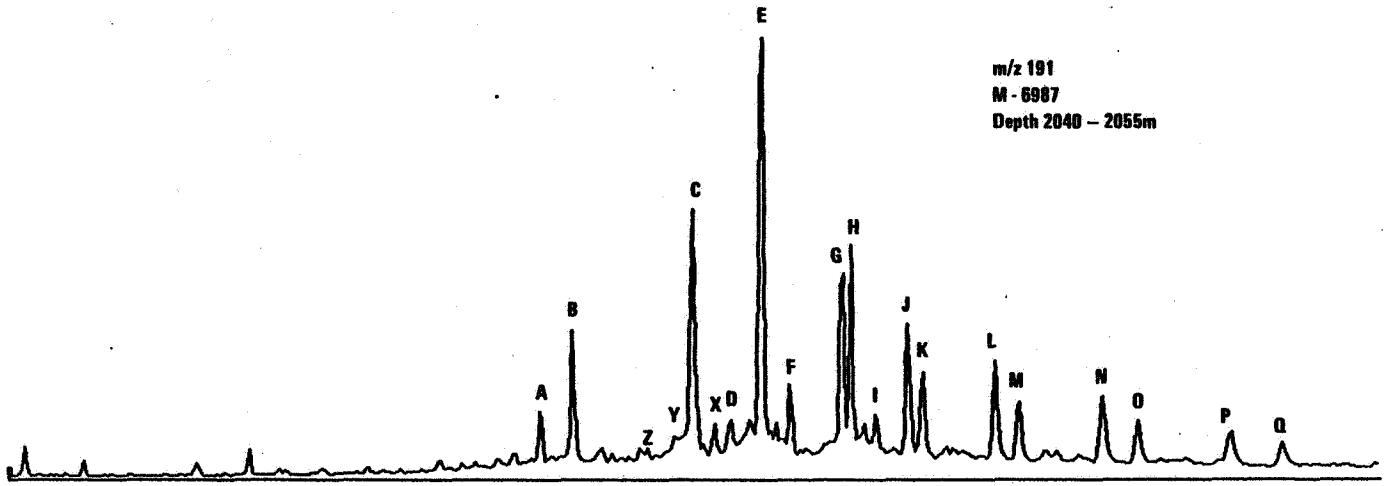
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6987S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



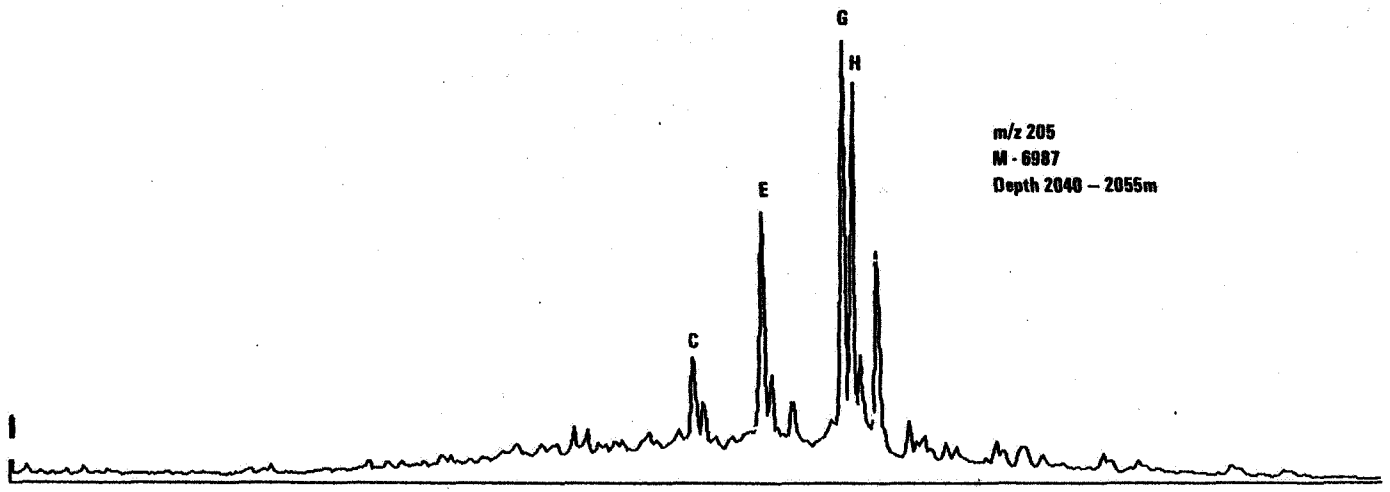
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6987S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



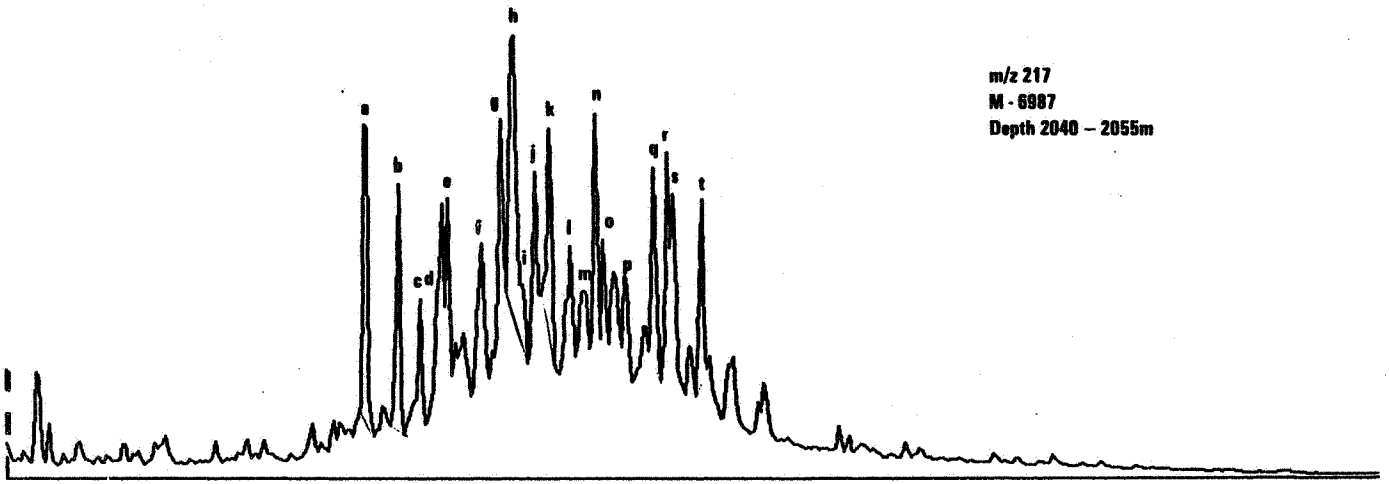
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6987S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



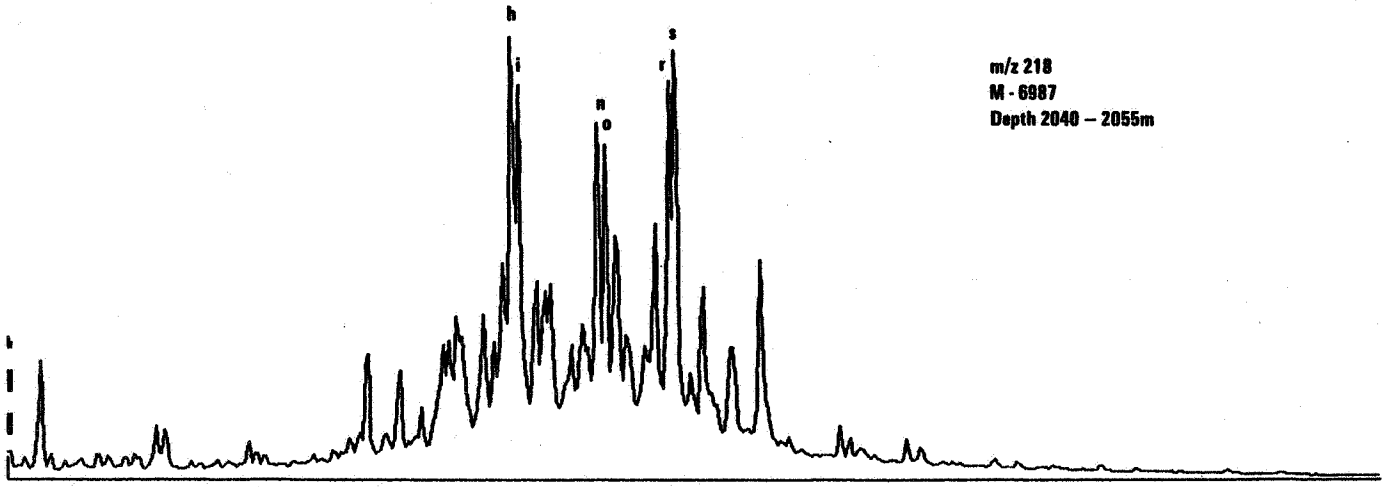
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6987S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



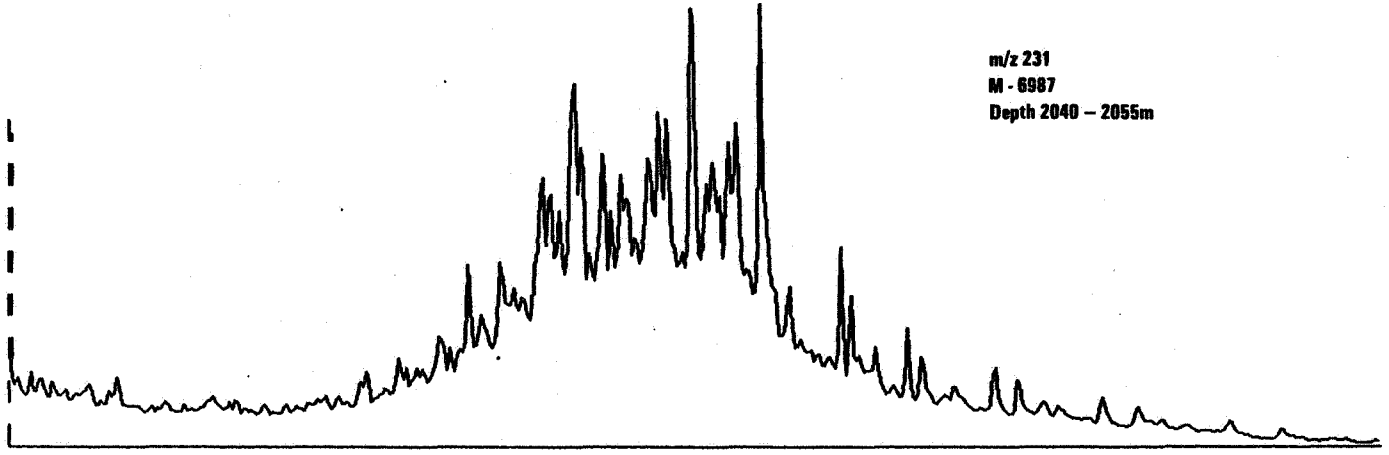
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6987S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



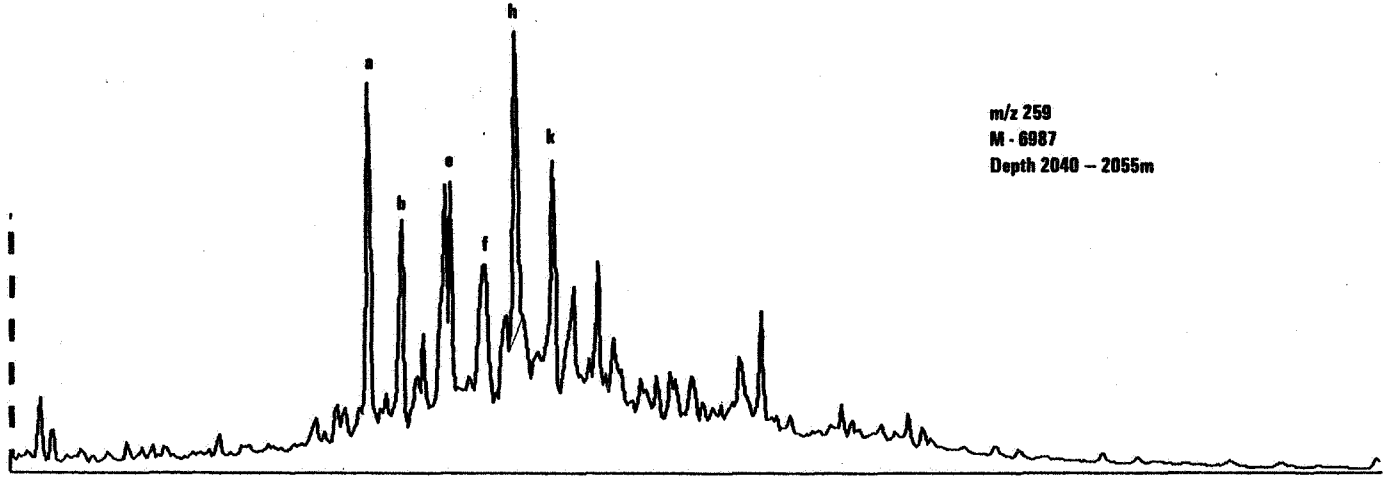
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6987S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S #231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6987S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S G231S #259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



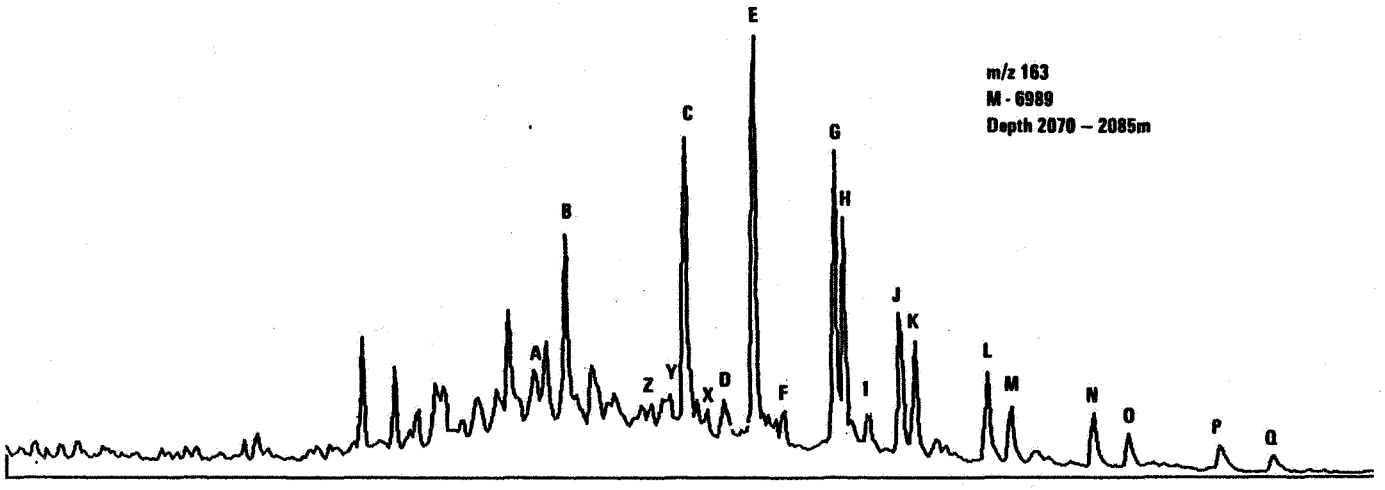
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

Mass Fragmentograms from Saturated Hydrocarbons of M-6989

UPPER JURASSIC CLAYSTONE

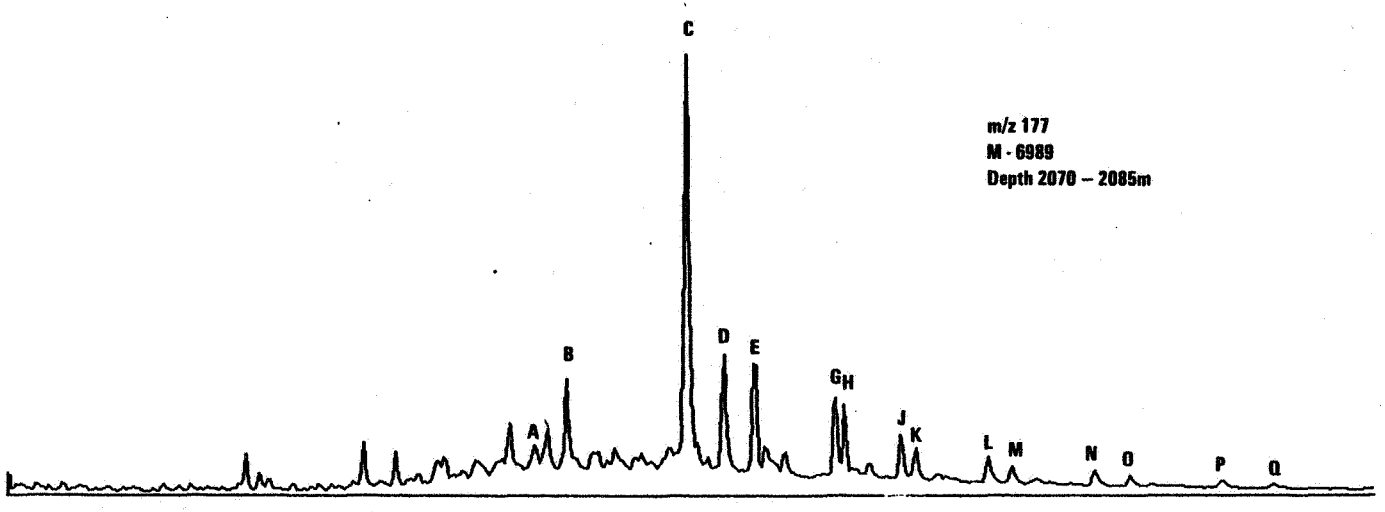
Depth 2070 - 2085 metres

[0.0000] M6989S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



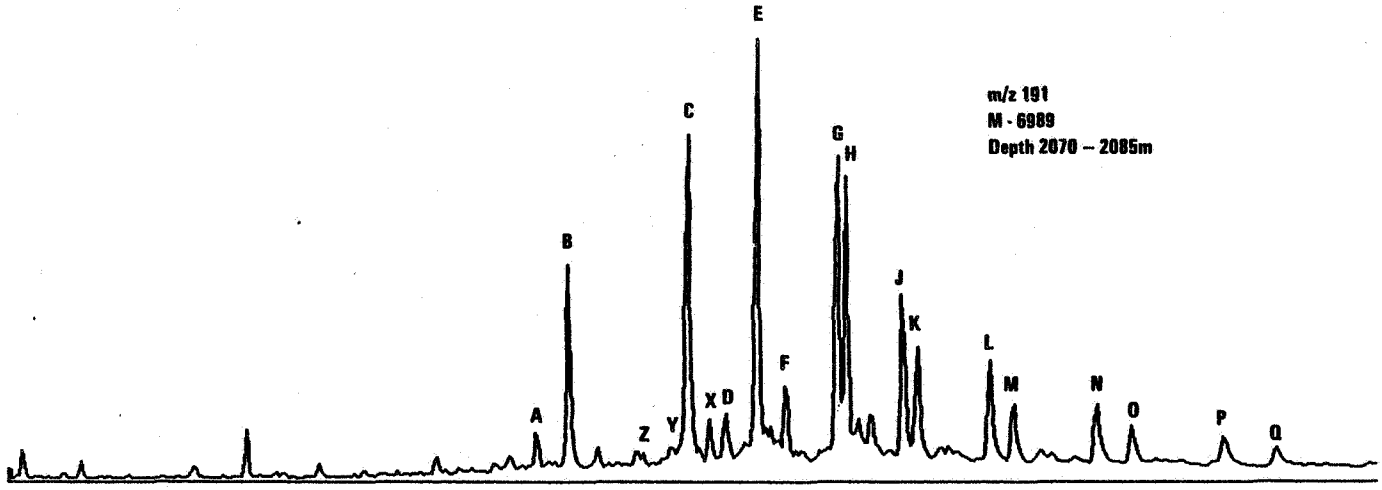
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6989S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



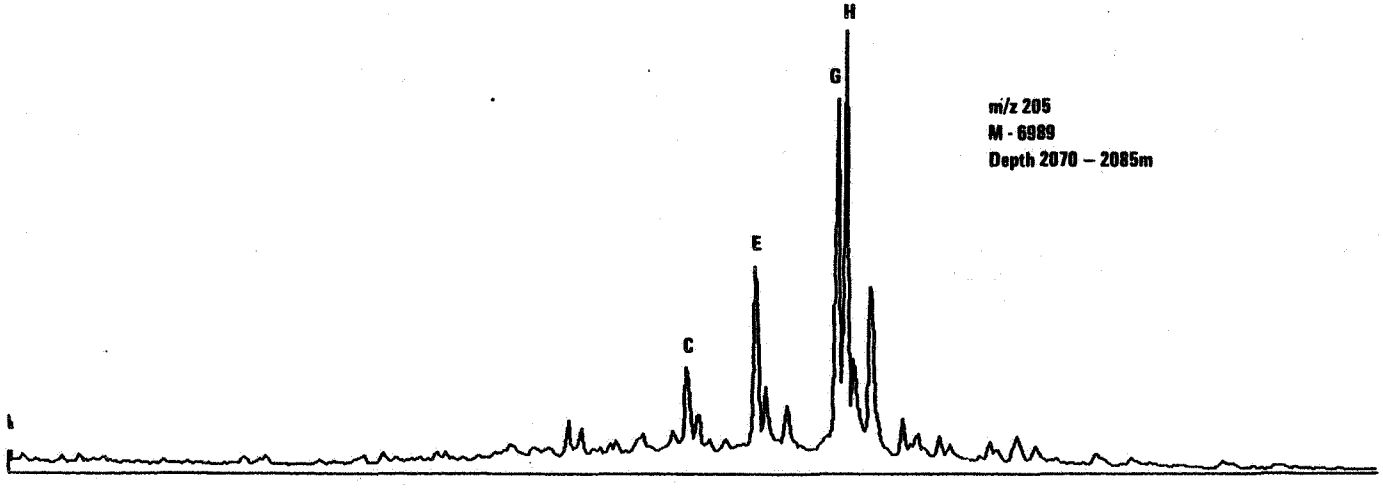
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.00001 M6989S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



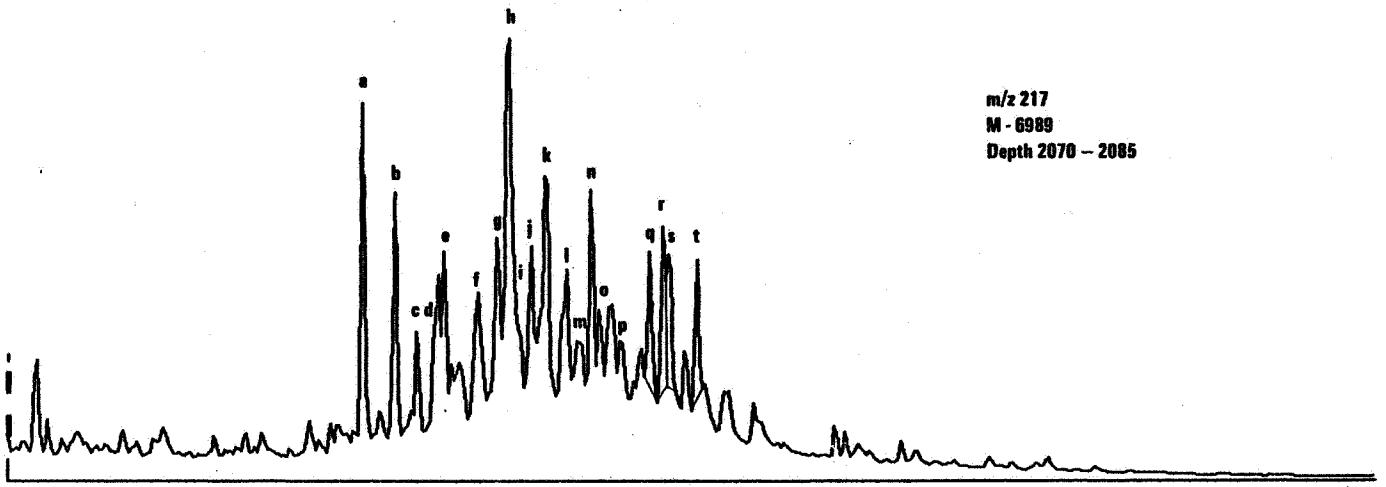
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.00001 M6989S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



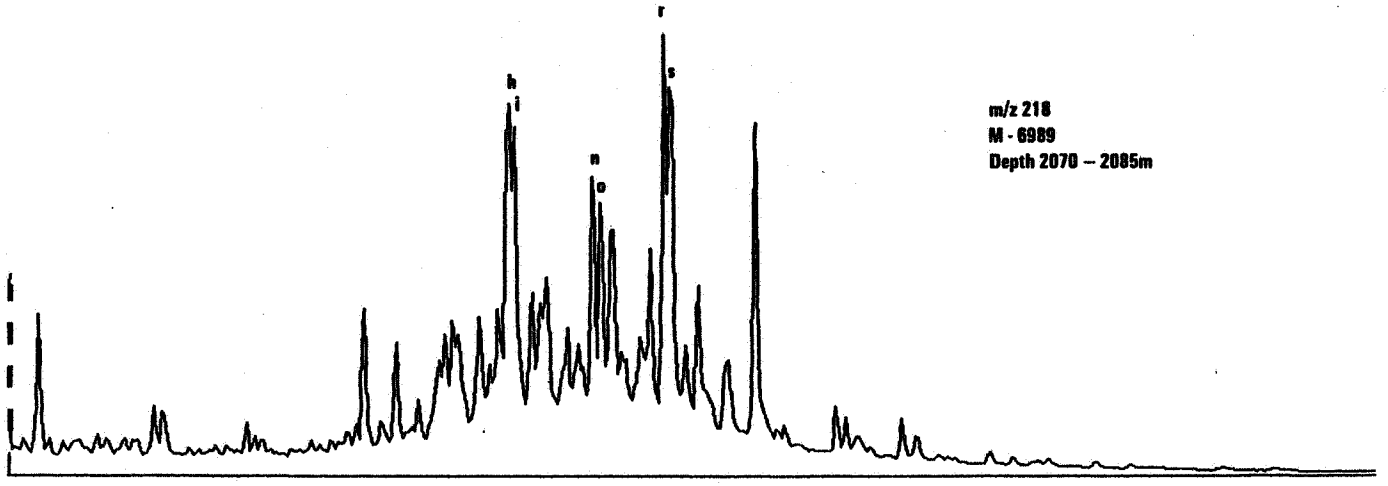
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6989S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



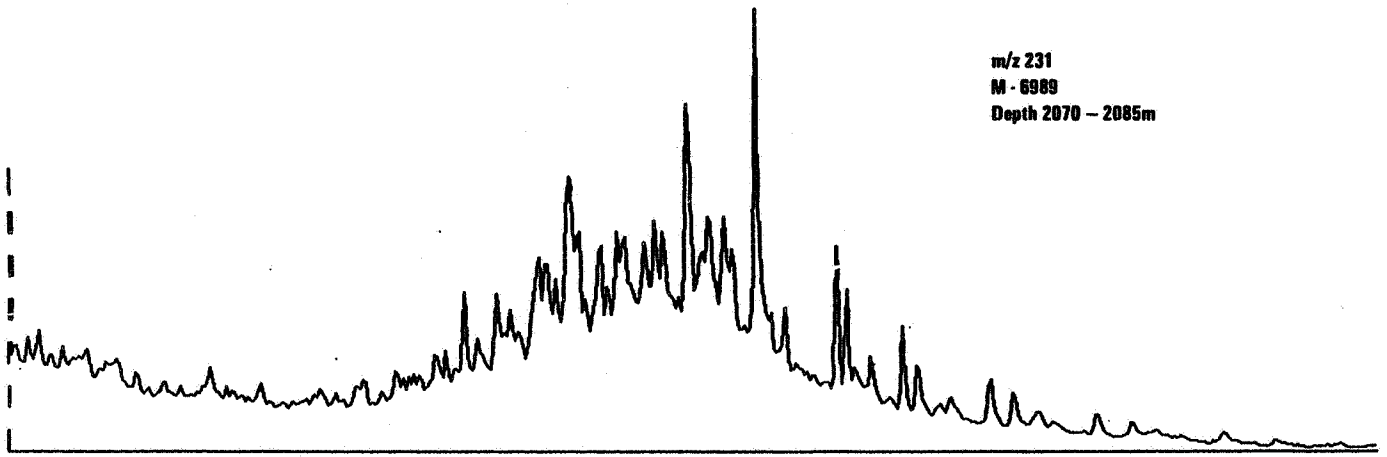
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6989S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



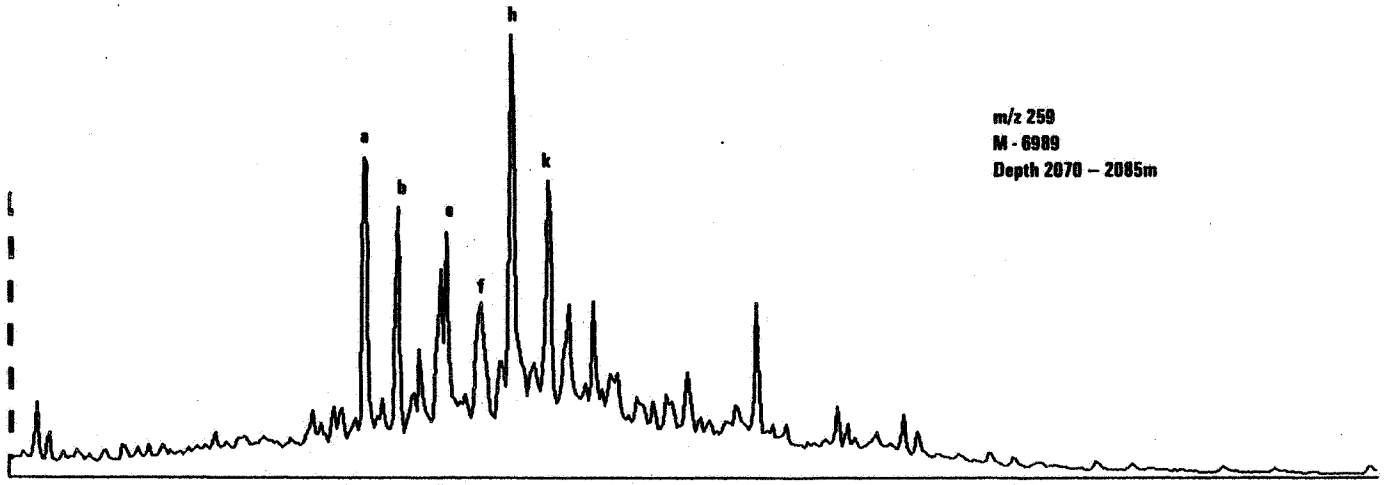
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6989S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S #231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6989S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S G231S #259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



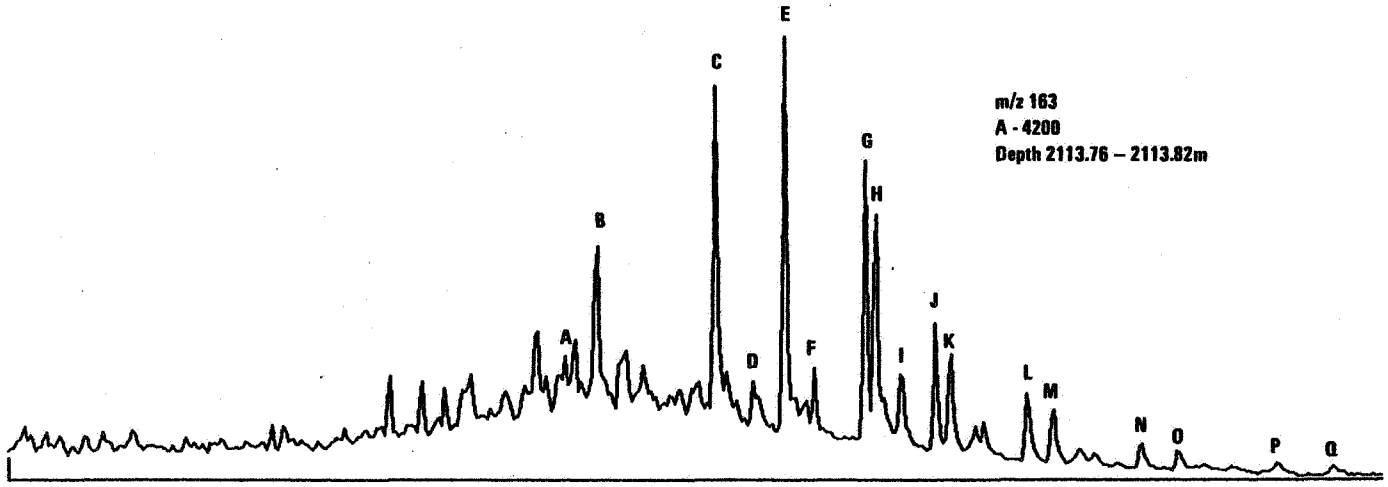
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

Mass Fragmentograms of Saturated Hydrocarbons of A-4200

LOWER JURASSIC CLAYSTONE

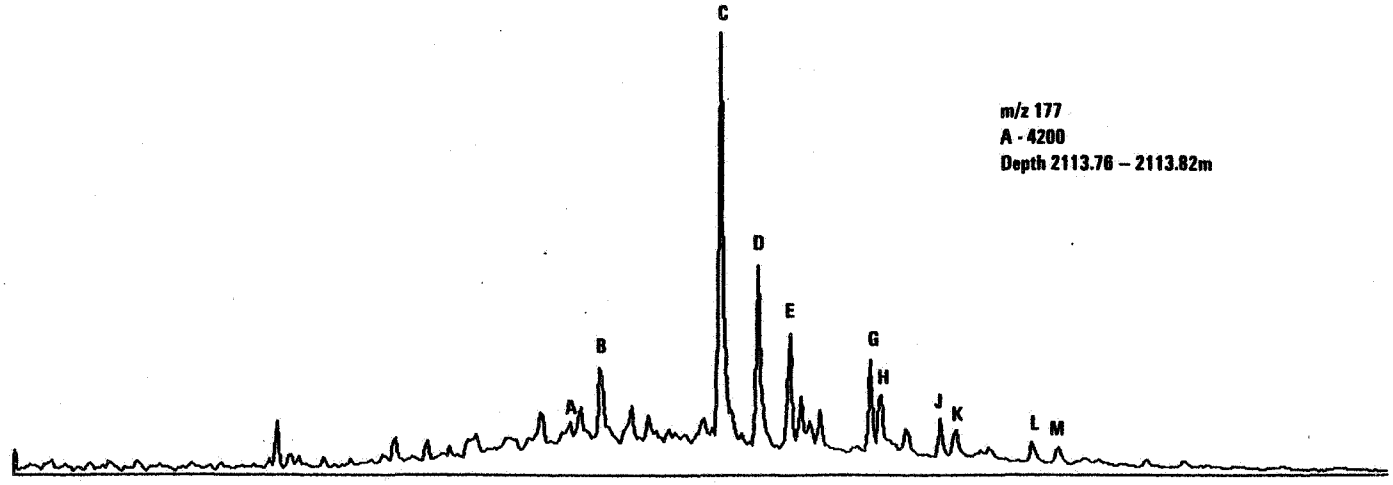
Depth Interval 2113.76 - 2113.82 metres

[0.0000] A4200S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



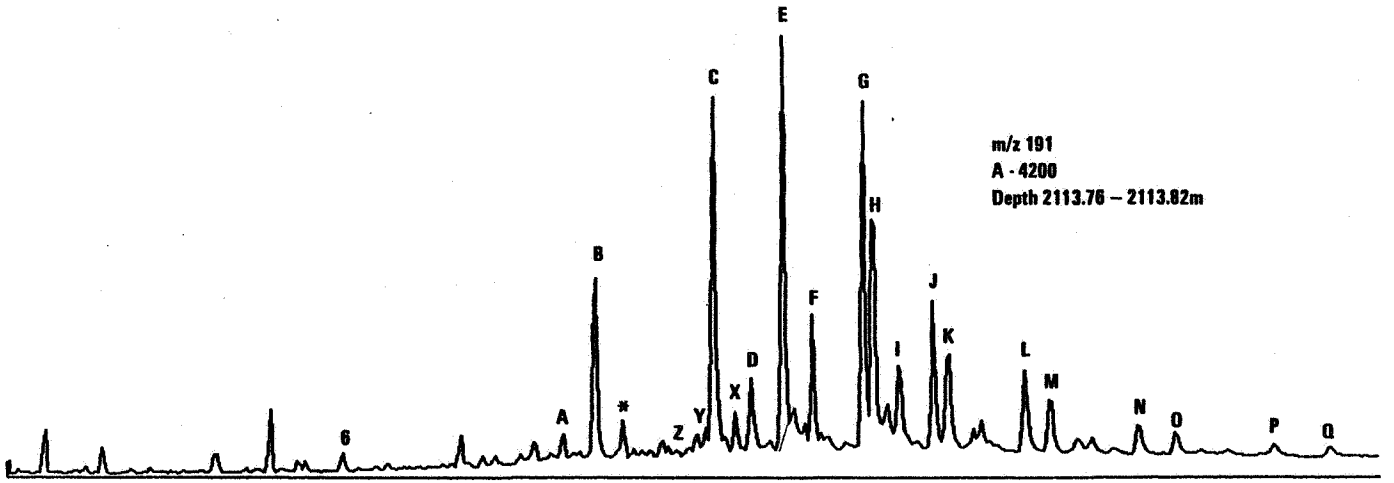
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



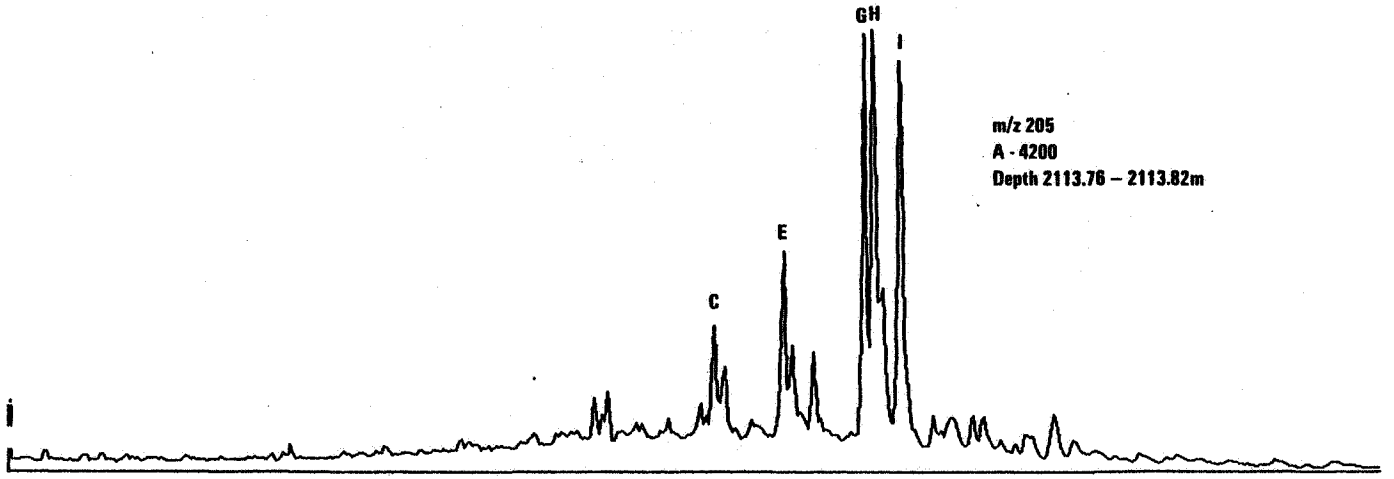
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



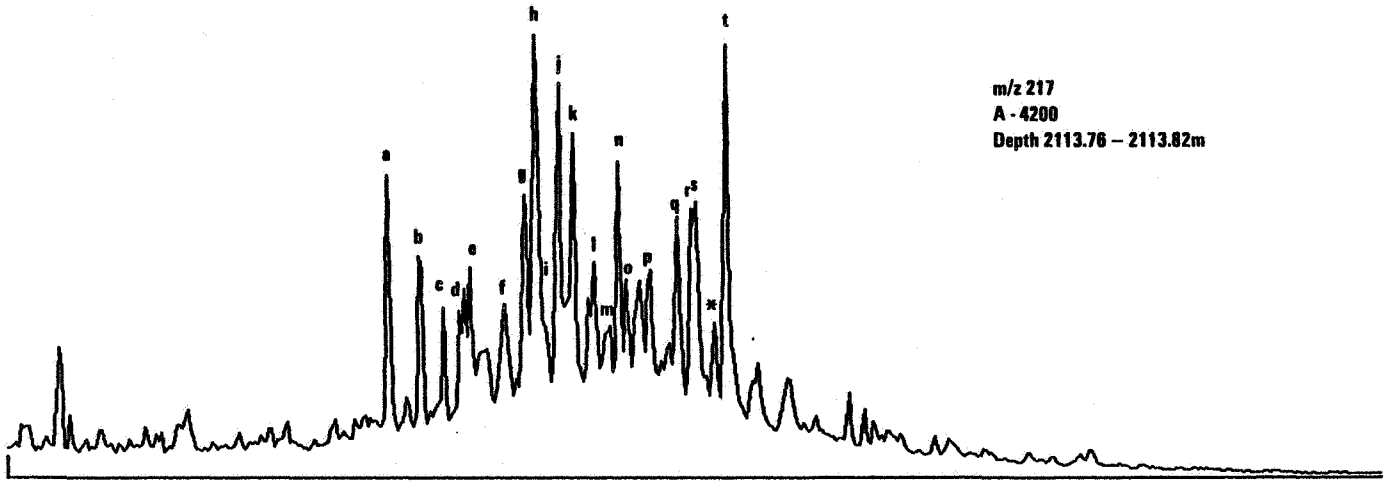
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

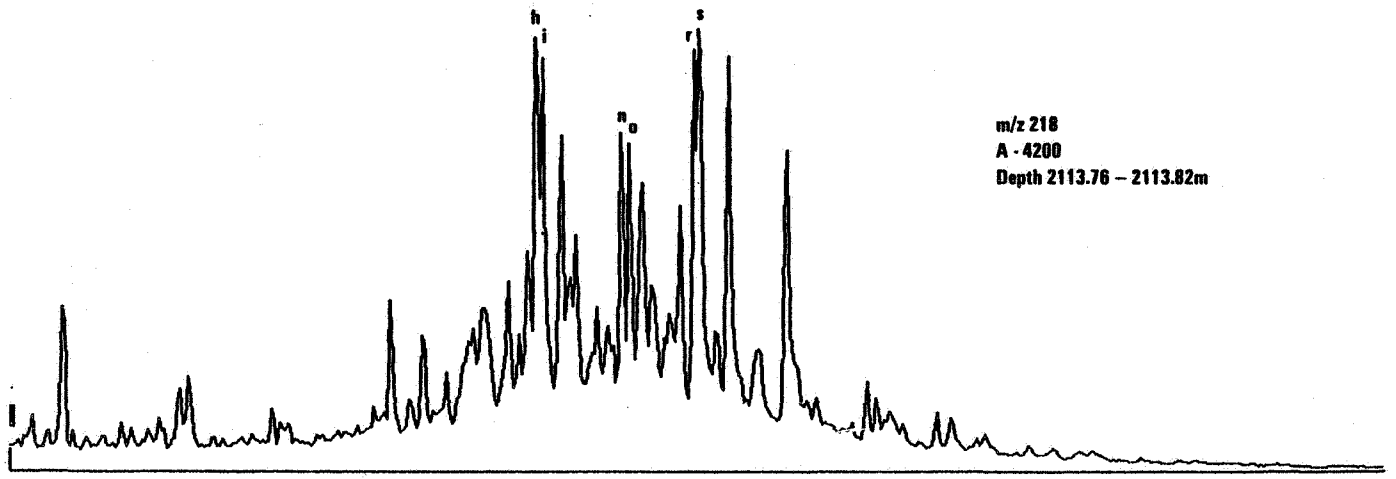
[0.0000] A4200S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



m/z 217
A - 4200
Depth 2113.76 – 2113.82m

0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00

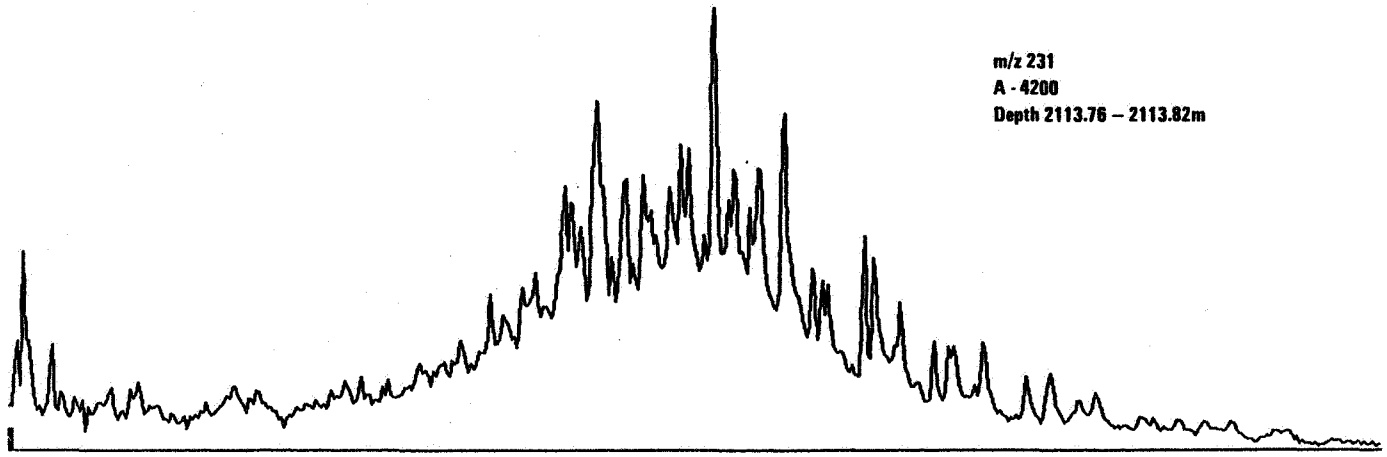


m/z 218
A - 4200
Depth 2113.76 – 2113.82m

0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S #231S H259S

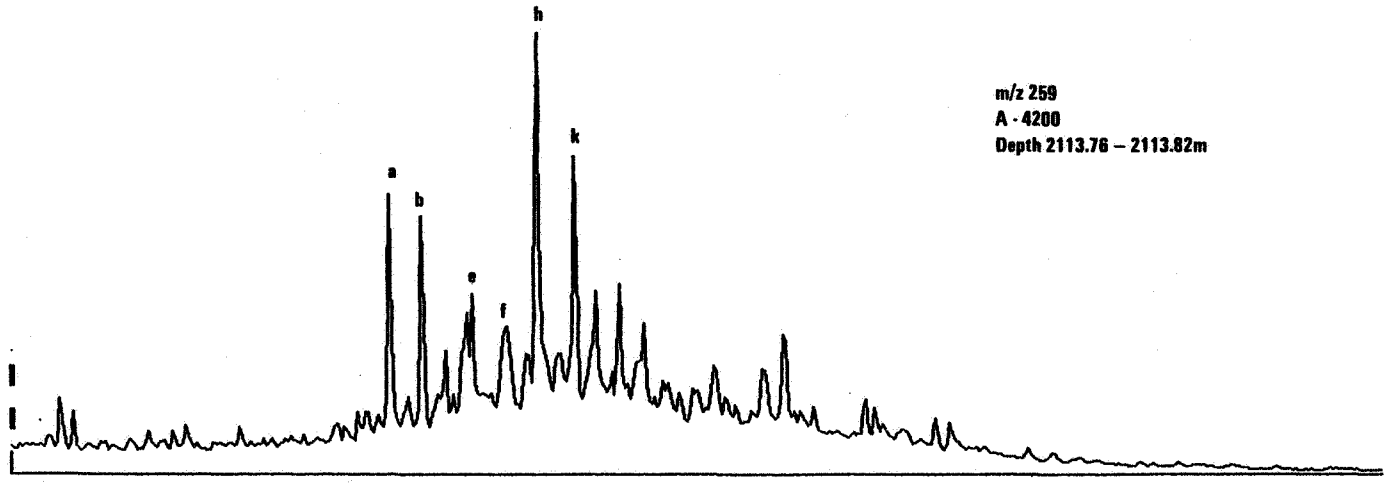
RETN.TIME	HEIGHT	AREA	UNCALIBRATED.
0:24:13	8.87	57.69	



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S G231S #259S

RETN.TIME	HEIGHT	AREA	UNCALIBRATED.
0: 0: 0	0.00	0.00	



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

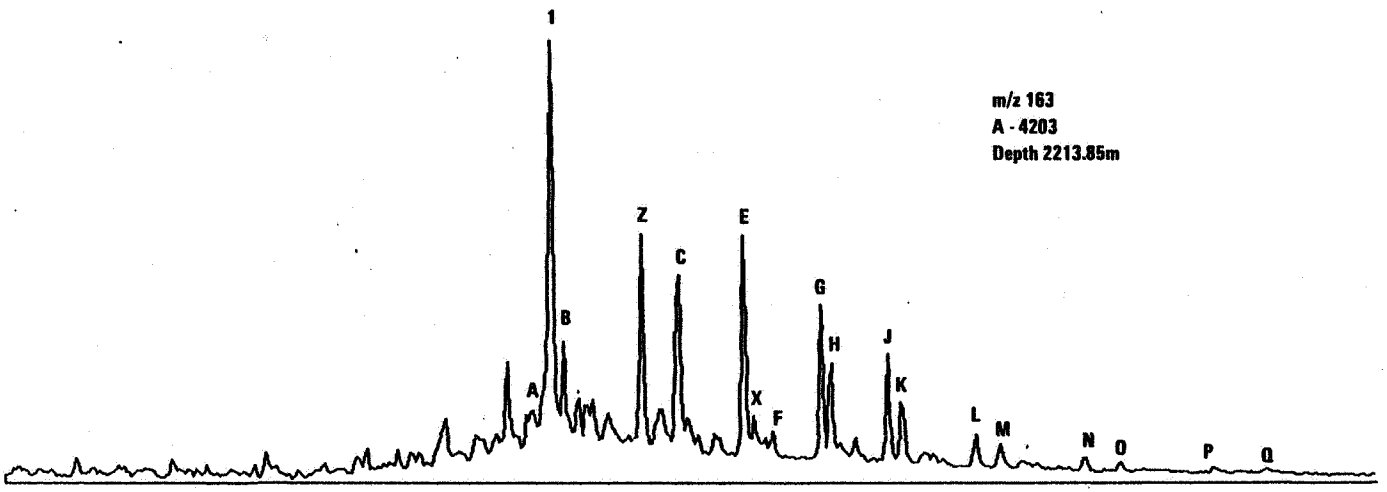
IKU

Mass Fragmentograms from Saturated Hydrocarbons of A-4203

LOWER JURASSIC COAL

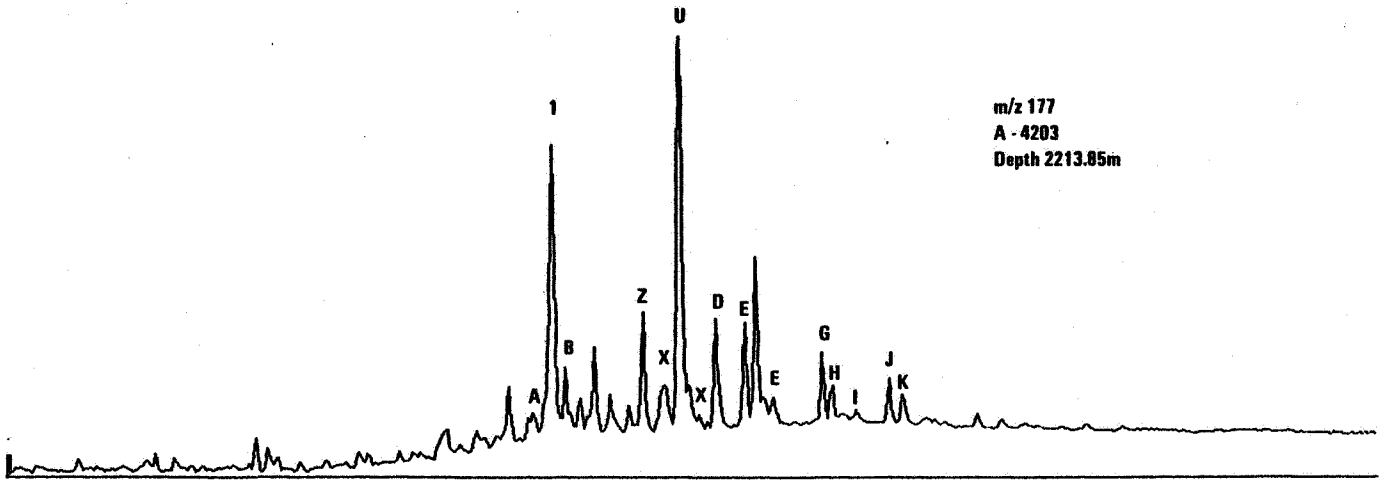
Depth 2213.85 metres

[0.0000] A4203S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



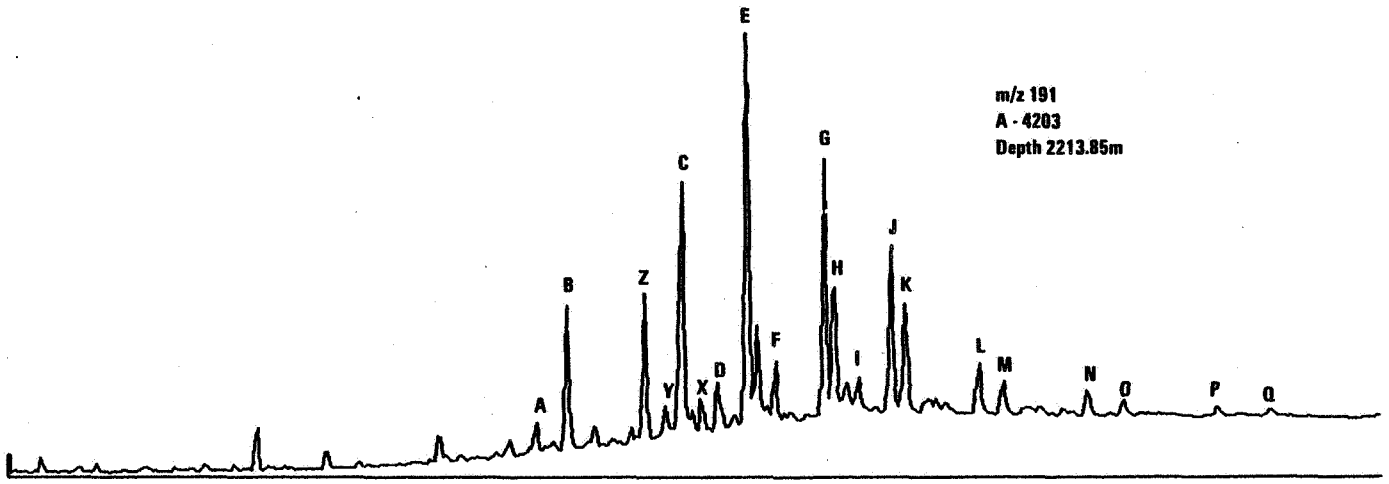
0 HRS 24 MINS 15 SECS 0 HRS 52 MINS 15 SECS

[0.0000] A4203S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



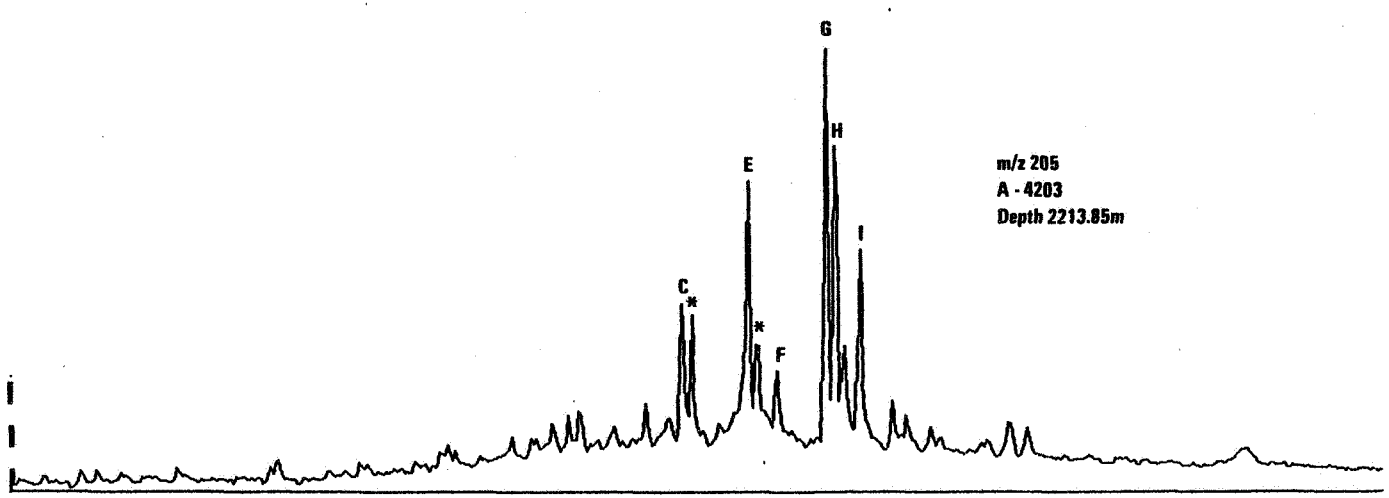
0 HRS 24 MINS 15 SECS 0 HRS 52 MINS 15 SECS

[0.0000] A4203S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S H191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



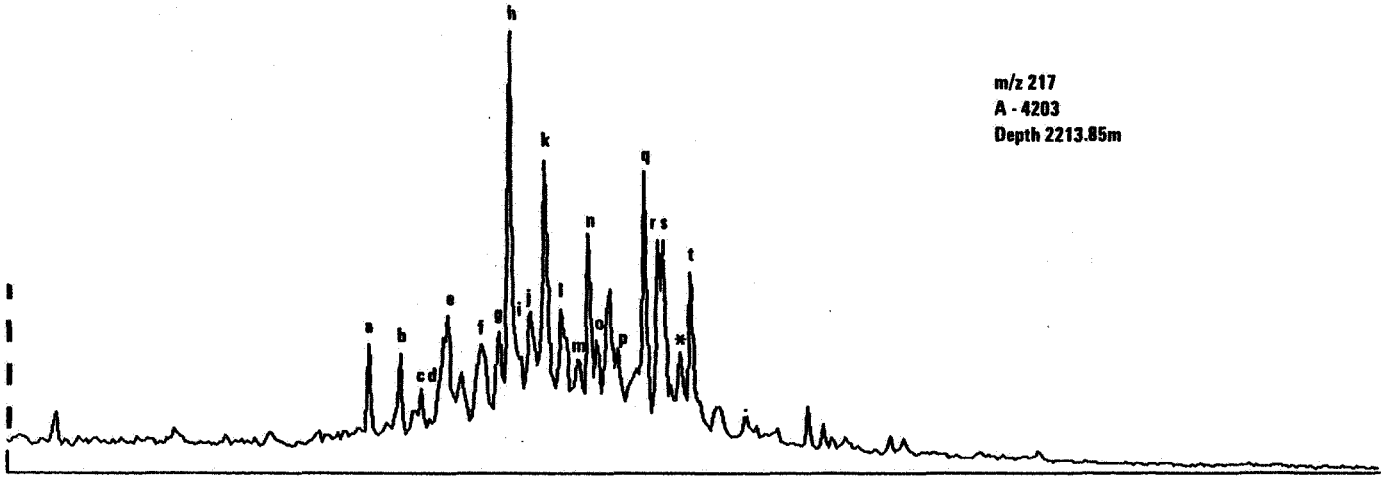
0 HRS 24 MINS 15 SECS 0 HRS 52 MINS 15 SECS

[0.0000] A4203S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S H205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 15 SECS 0 HRS 52 MINS 15 SECS

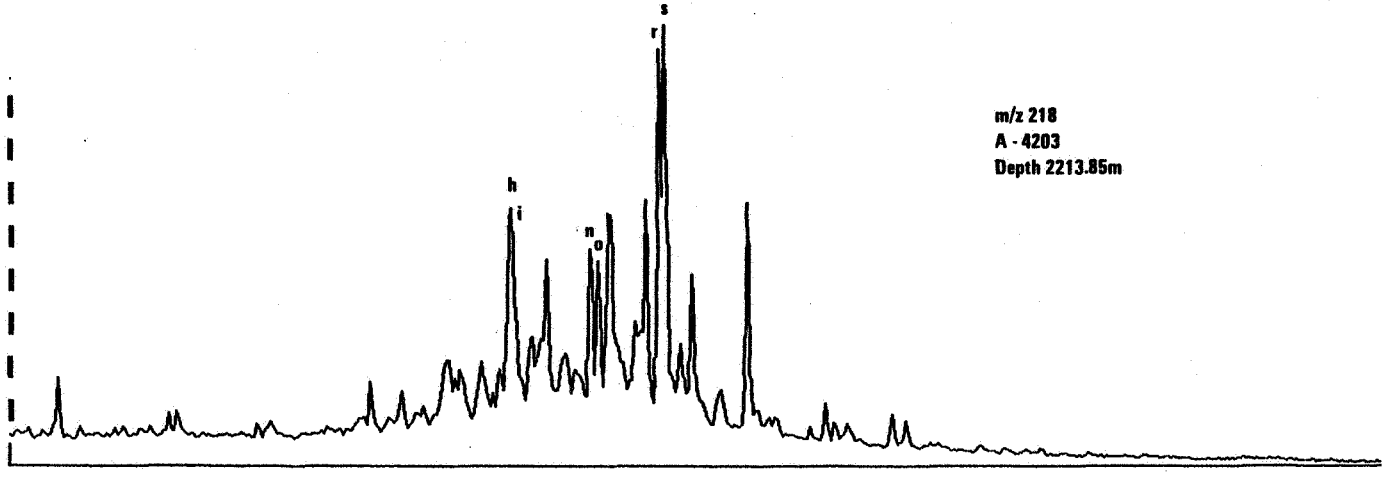
[0.0000] A4203S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



m/z 217
A - 4203
Depth 2213.85m

0 HRS 24 MINS 15 SECS 0 HRS 52 MINS 15 SECS

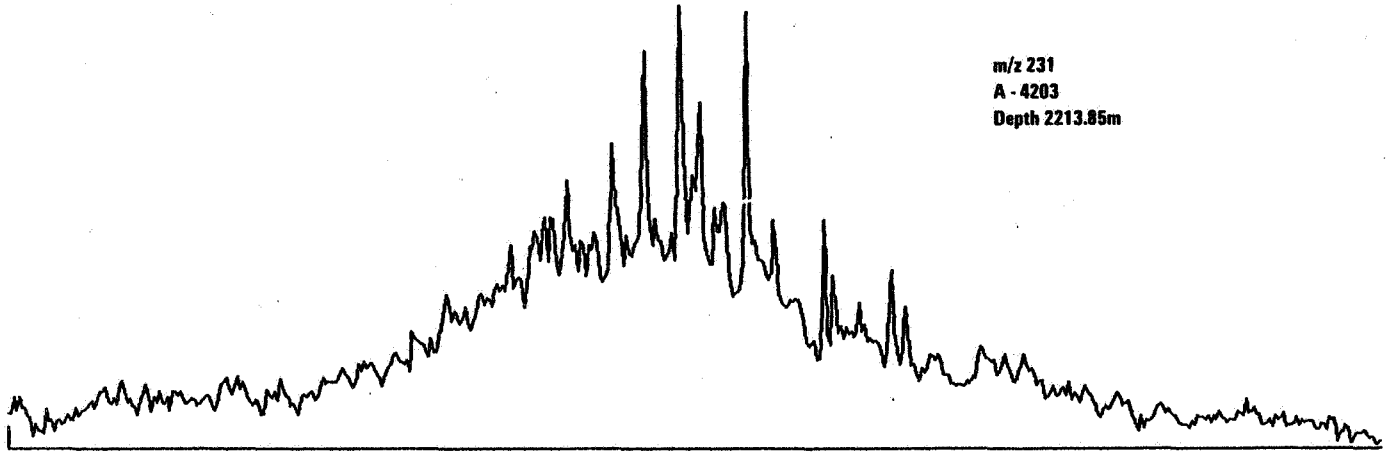
[0.0000] A4203S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



m/z 218
A - 4203
Depth 2213.85m

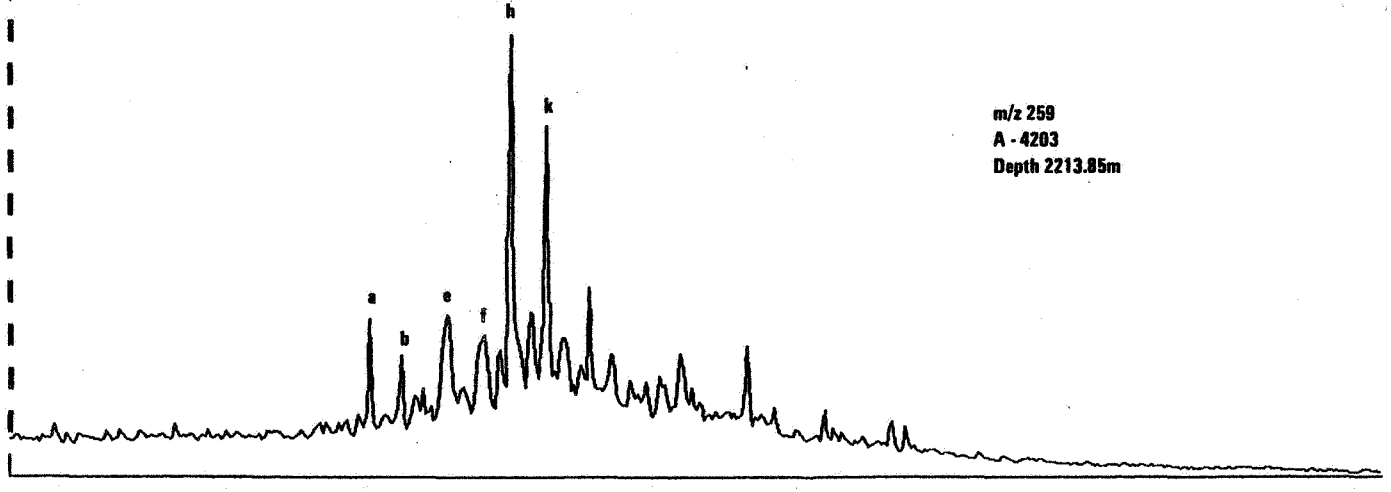
0 HRS 24 MINS 15 SECS 0 HRS 52 MINS 15 SECS

[0.0000] A4203S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S #231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 15 SECS 0 HRS 52 MINS 15 SECS

[0.0000] A4203S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S G231S #259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 15 SECS 0 HRS 52 MINS 15 SECS

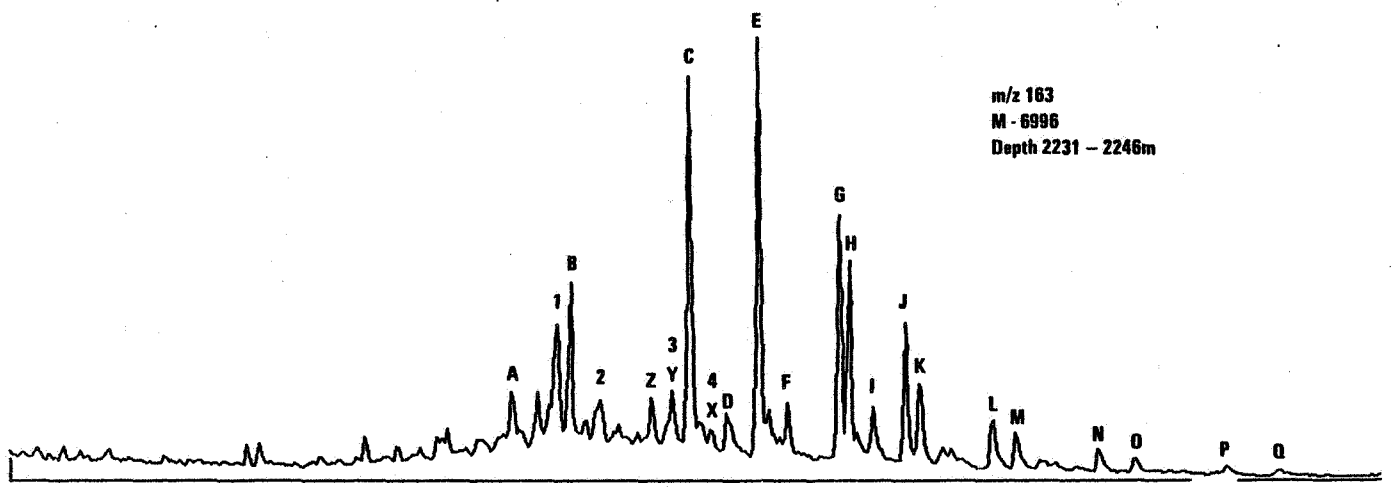
IKU

Mass Fragmentograms from Saturated Hydrocarbons of M-6996

LOWER JURASSIC CLAYSTONE

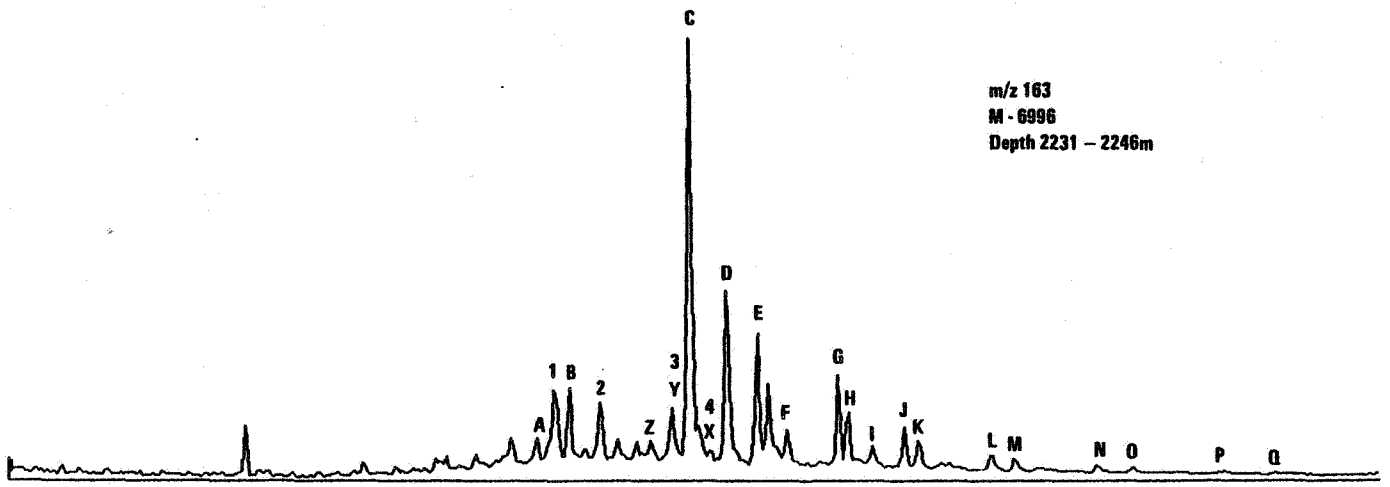
Depth Interval 2231 - 2246 metres

[0.0000] M6996S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



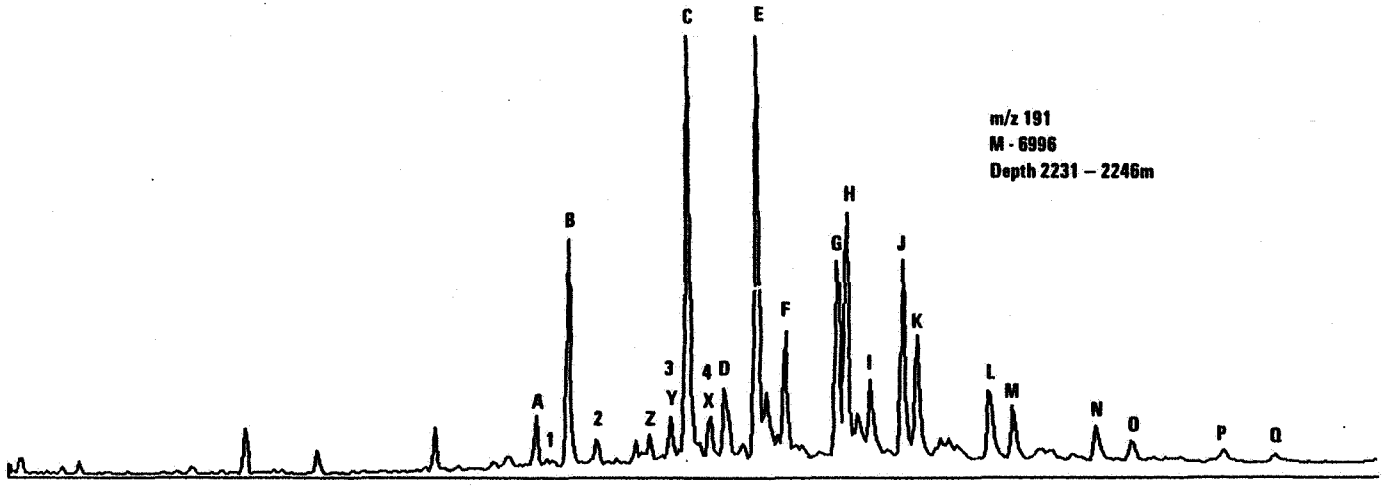
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6996S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



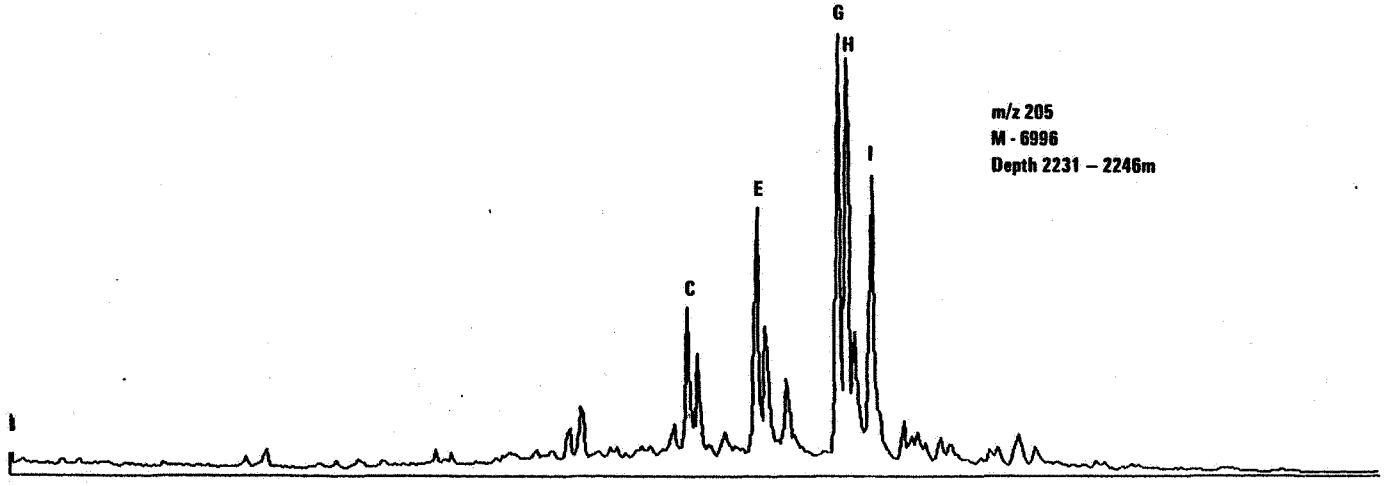
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6996S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



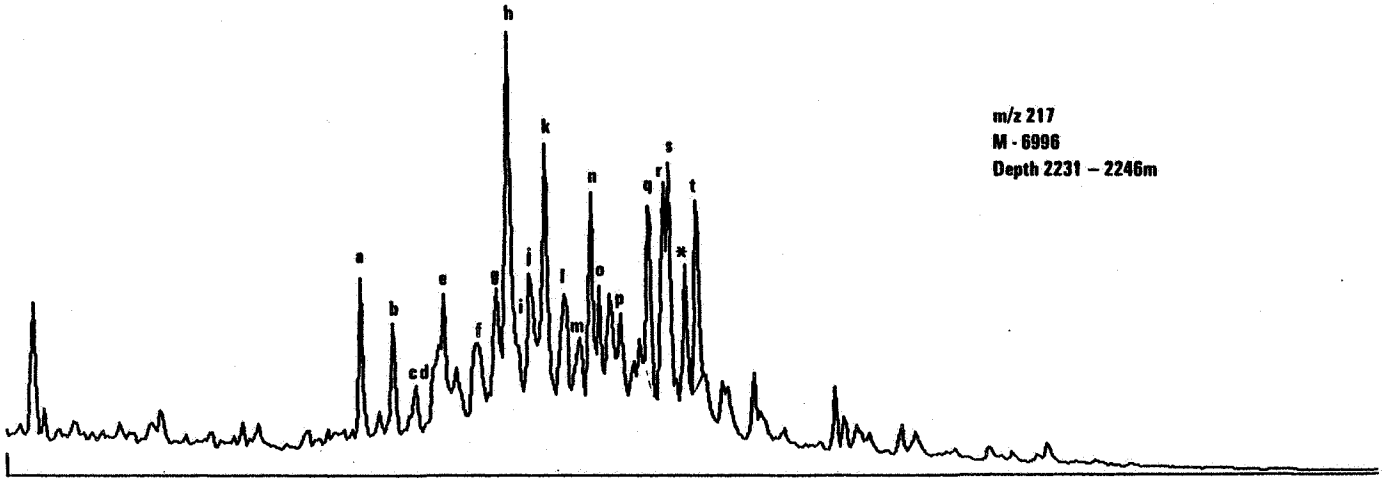
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6996S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



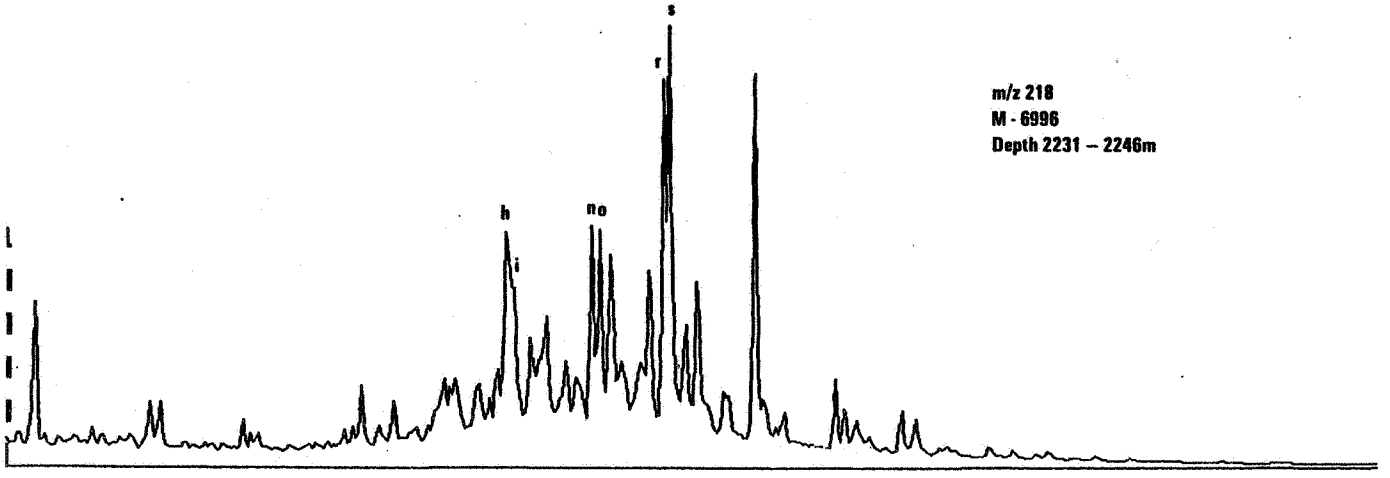
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6996S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00

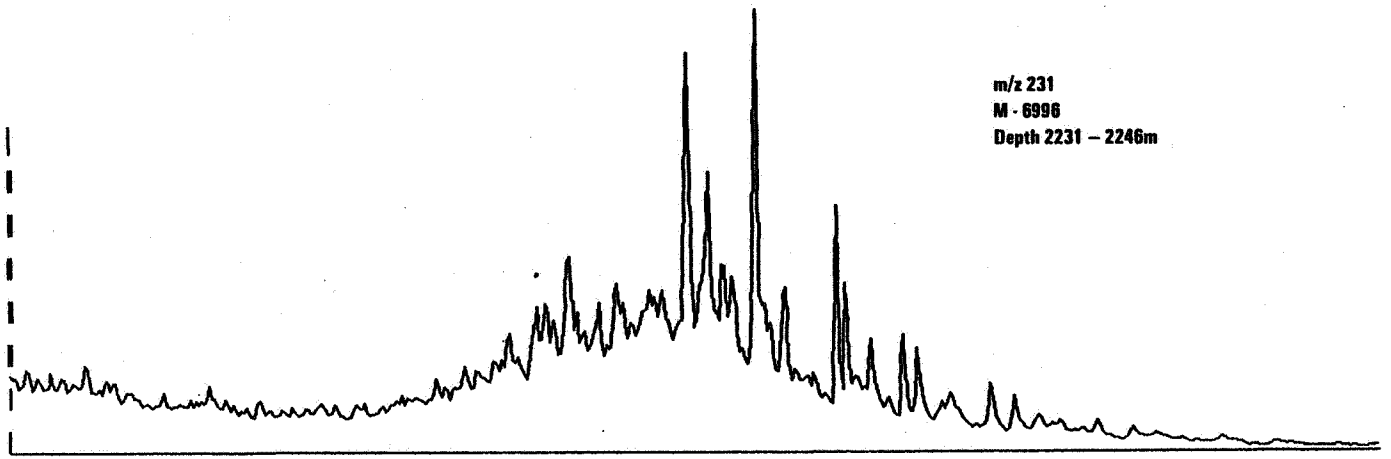


0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6996S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00

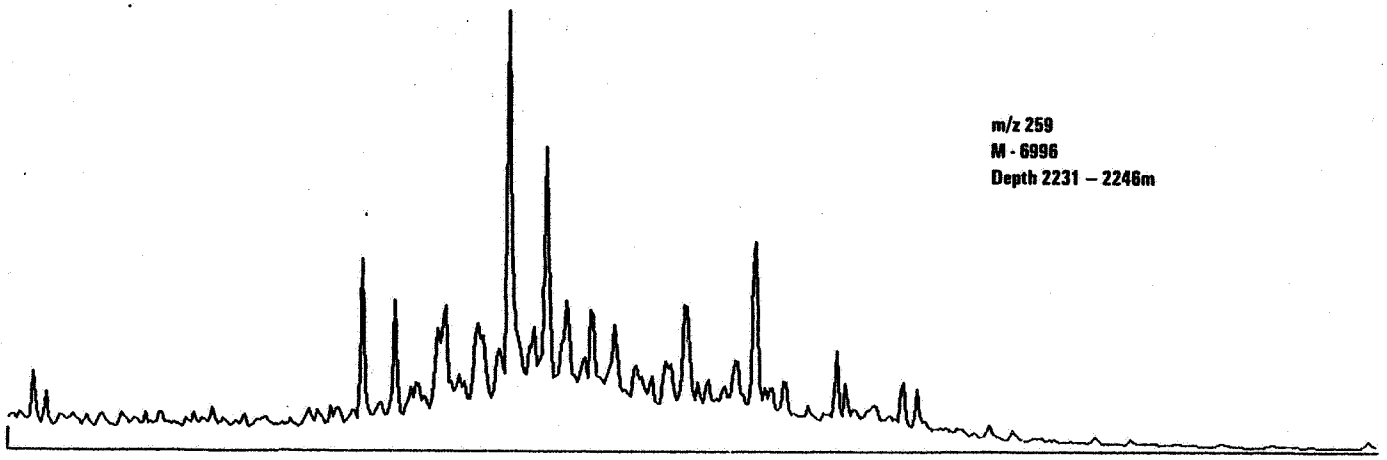


[0.0000] M6996S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S #231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M6996S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S G231S #259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



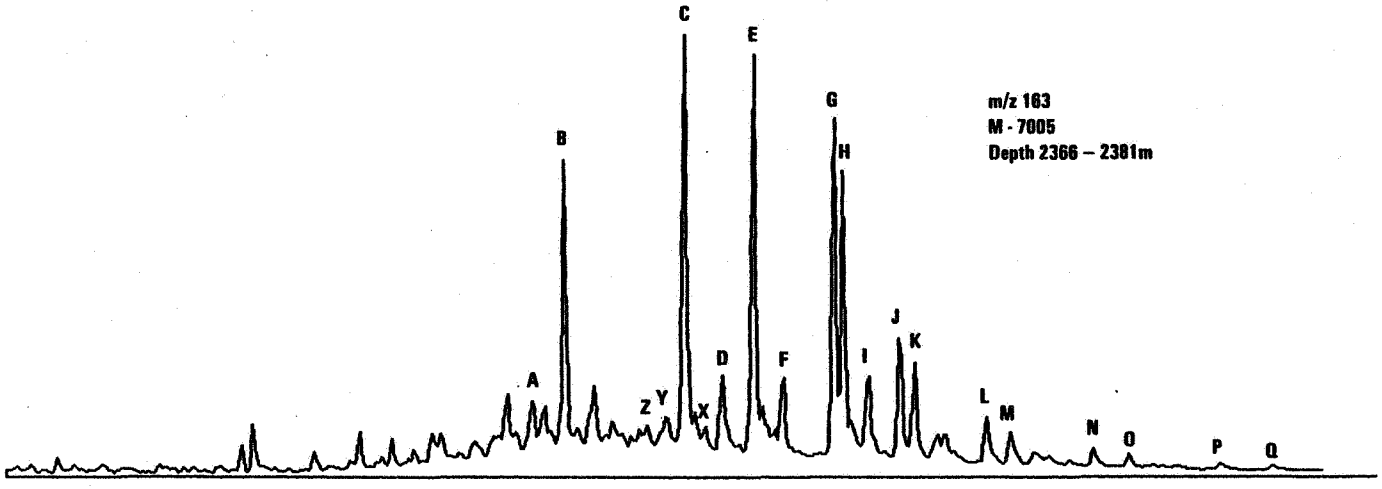
IKU

Mass Fragmentograms from Saturated Hydrocarbons of M-7005

LOWER JURASSIC CLAYSTONE

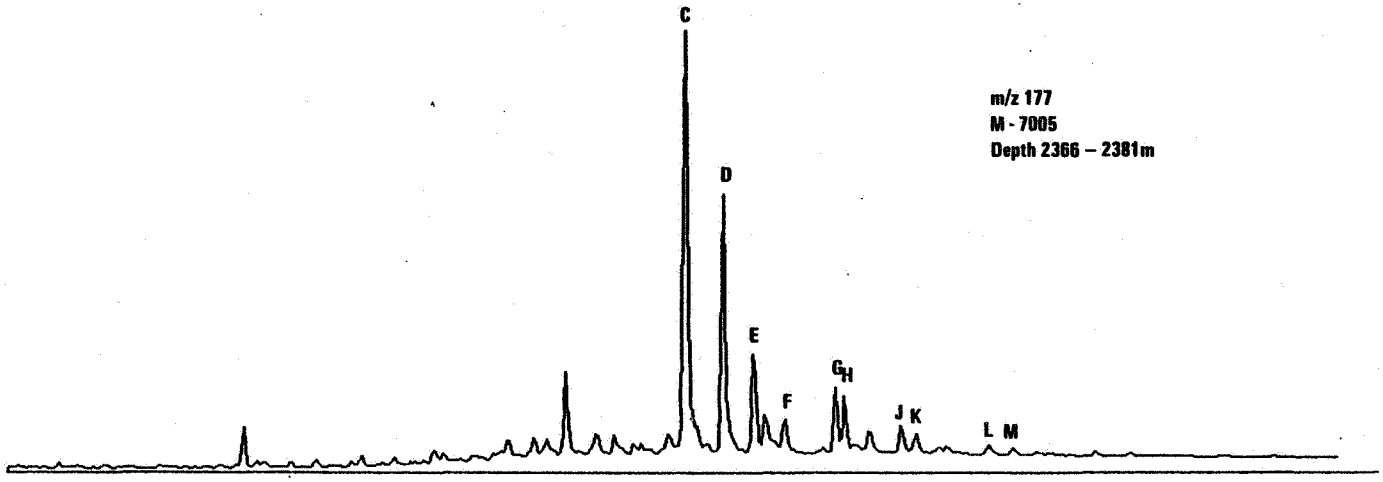
Depth 2366 - 2381 metres

[0.0000] M7005S .SD · RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
M163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



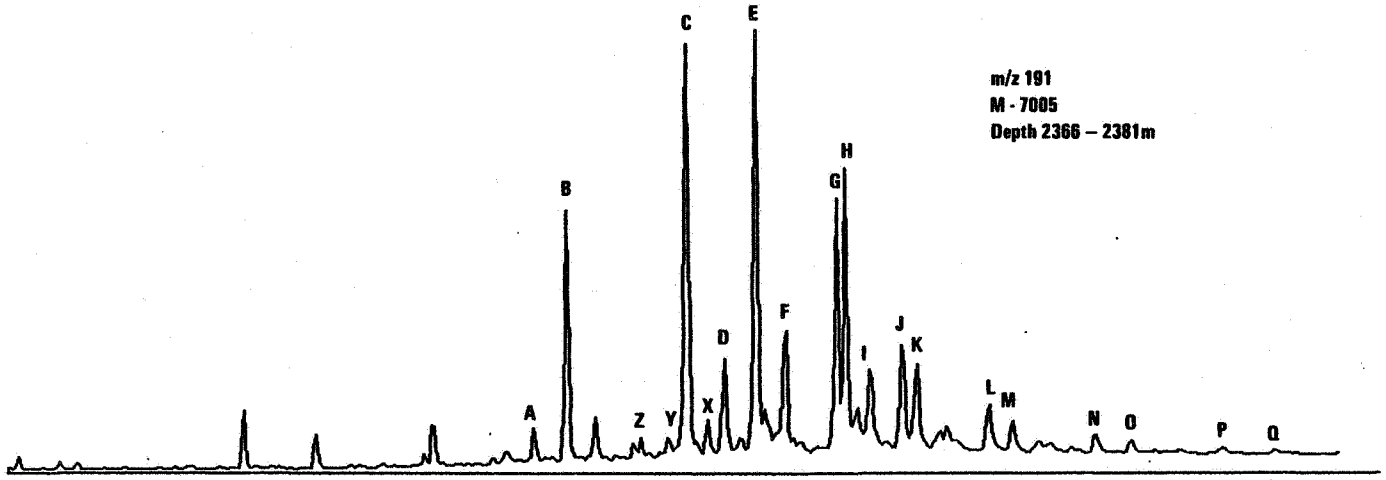
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M7005S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



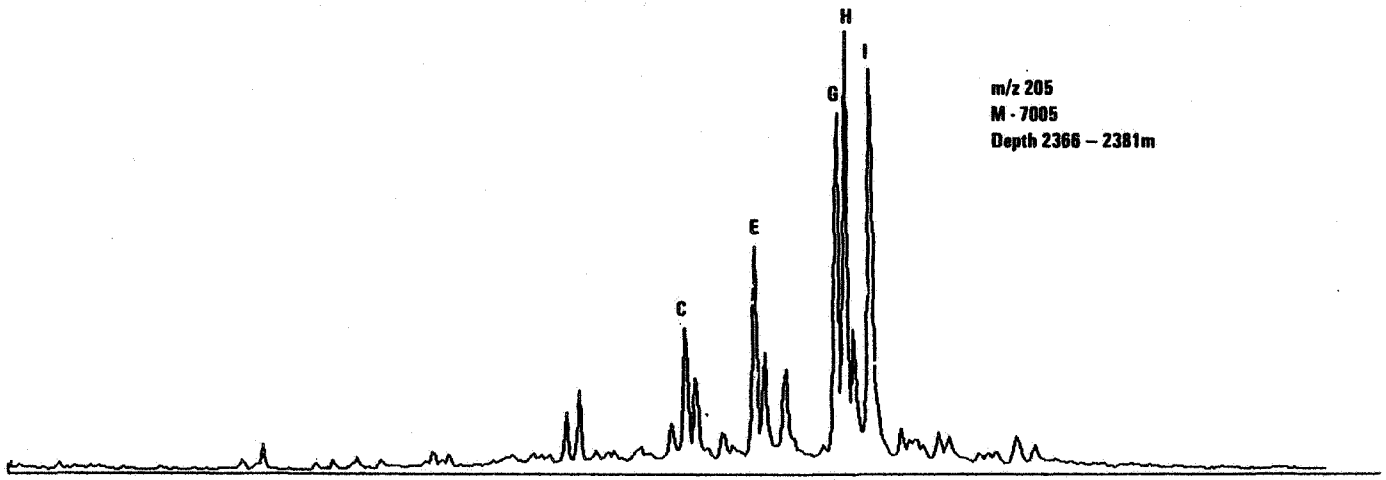
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M7005S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



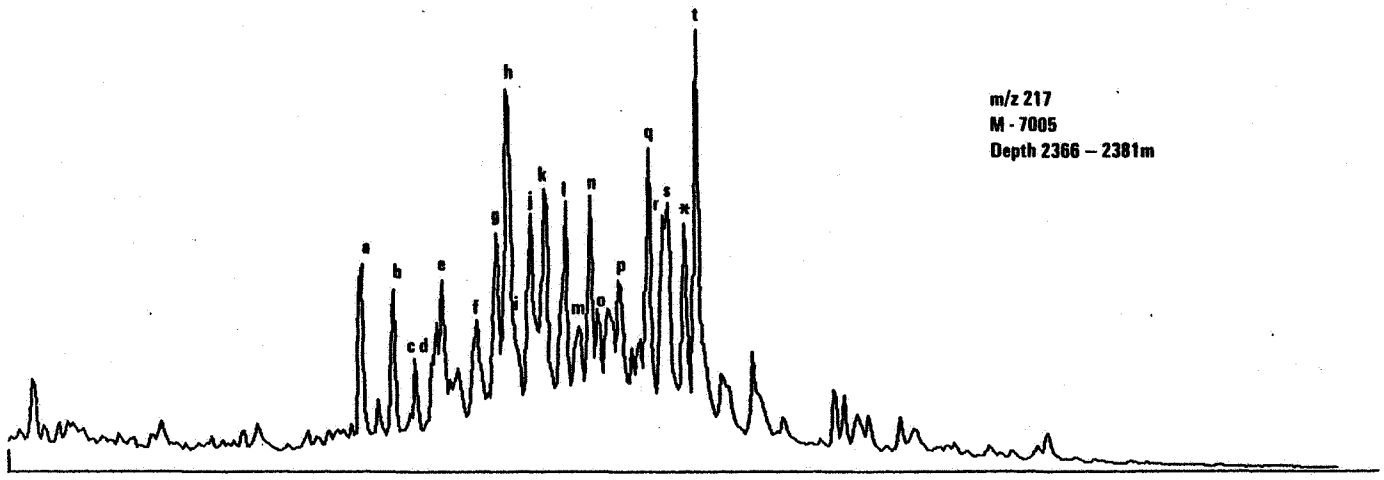
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M7005S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



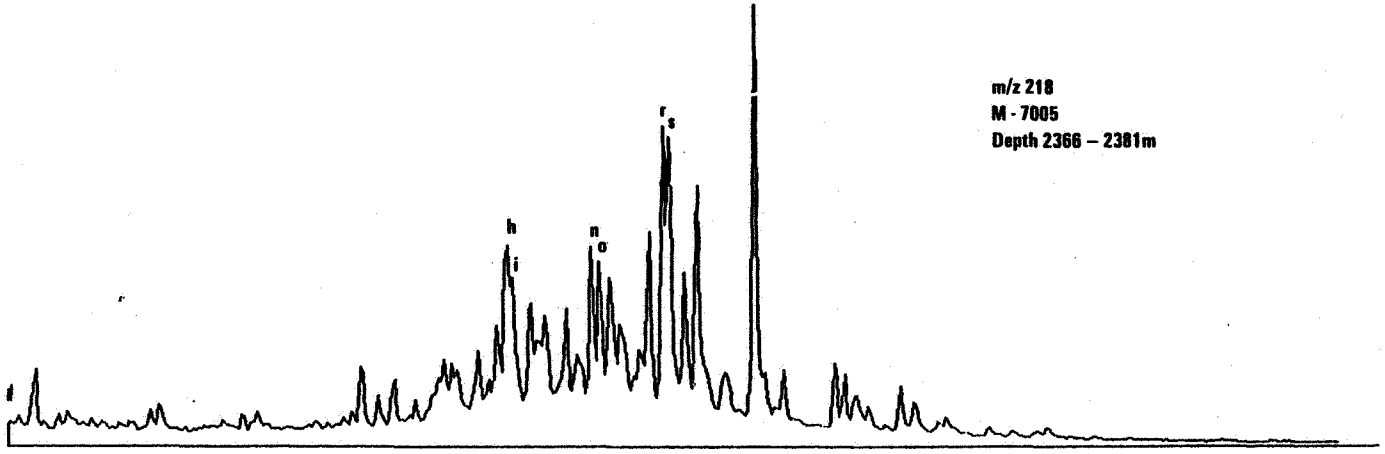
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M7005S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

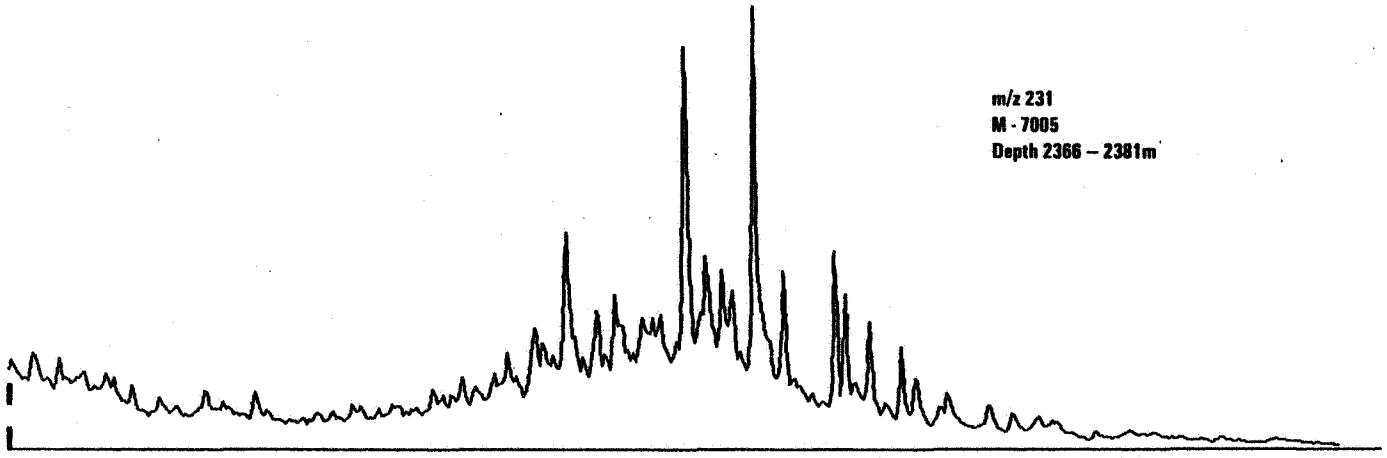
[0.0000] M7005S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M7005S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S #231S H259S

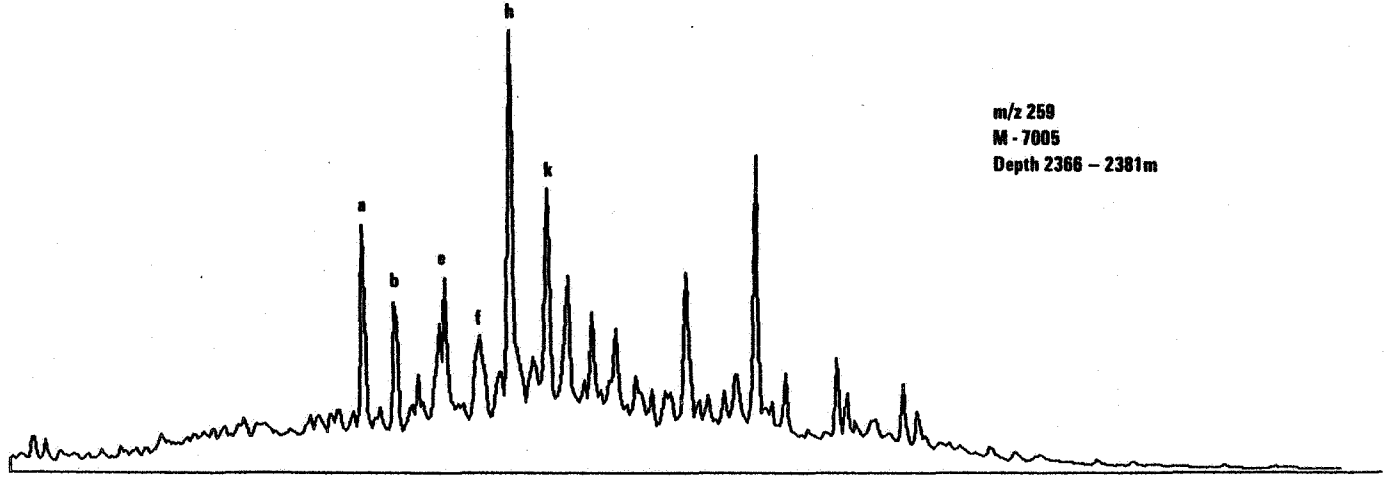
RETN.TIME	HEIGHT	AREA	UNCALIBRATED.
0:24:13	8.14	52.74	



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] M7005S .SD RUN - 1 TRITERPANER/STERANER,STATOIL KORRELASJON 7120/8-2,25-JUL-83
A163S B177S C191S D205S E217S F218S G231S #259S

RETN.TIME	HEIGHT	AREA	UNCALIBRATED.
0: 0: 0	0.00	0.00	



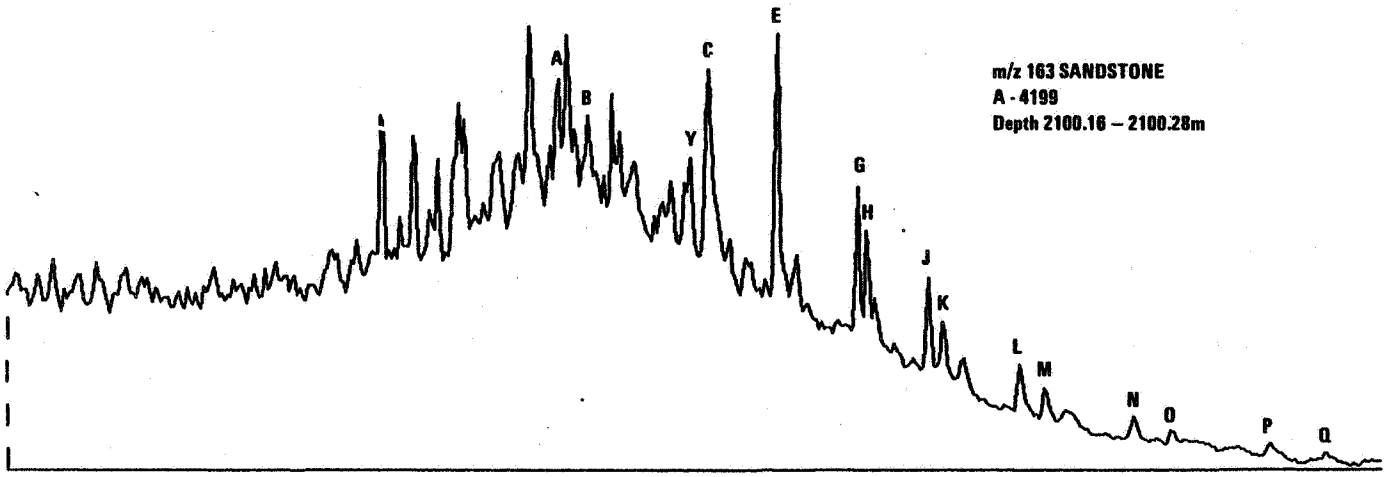
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

Mass Fragmentograms of Saturated Hydrocarbons of A-4199

LOWER JURASSIC/SANDSTONE (OIL SHOW)

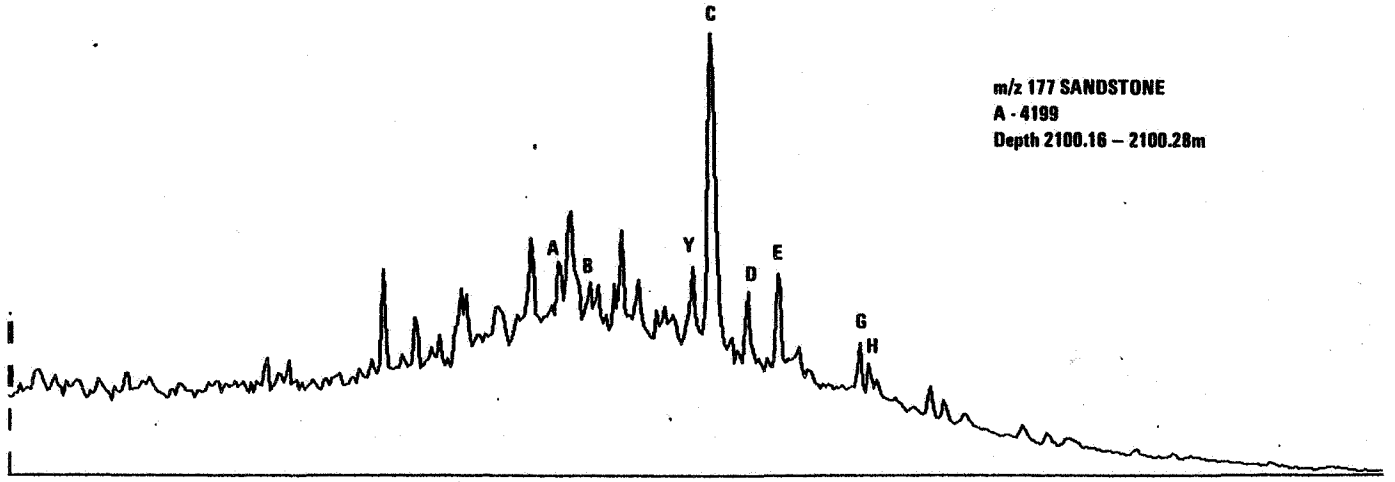
Depth Interval 2100.16 - 2100.28 metres

[0.0000] A4199S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
M163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



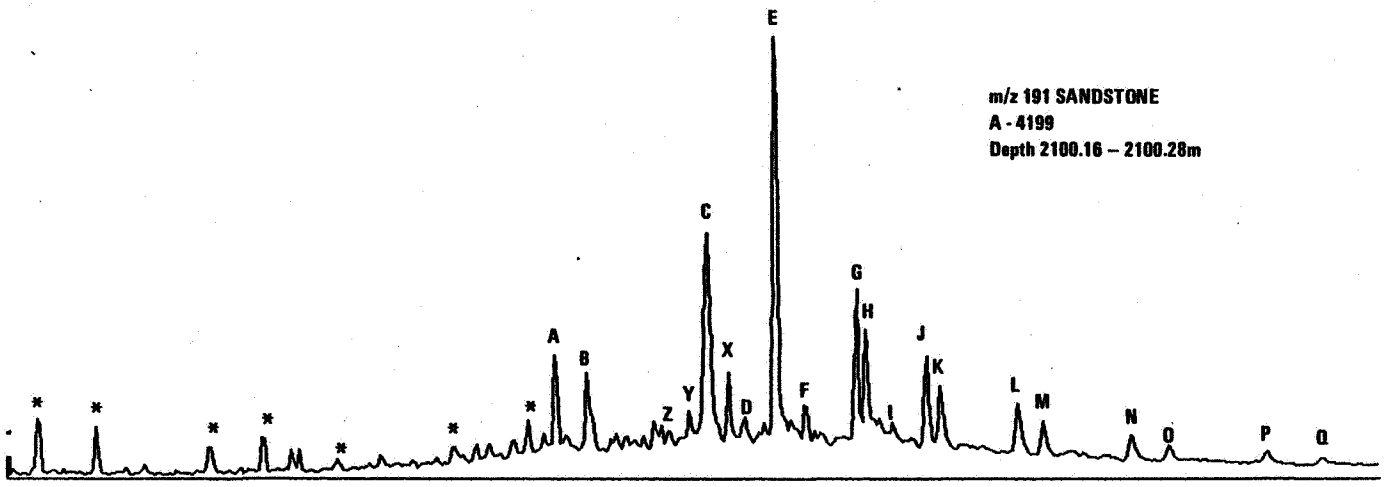
0 HRS 12 MINS 33 SECS 0 HRS 40 MINS 33 SECS

[0.0000] A4199S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S M177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



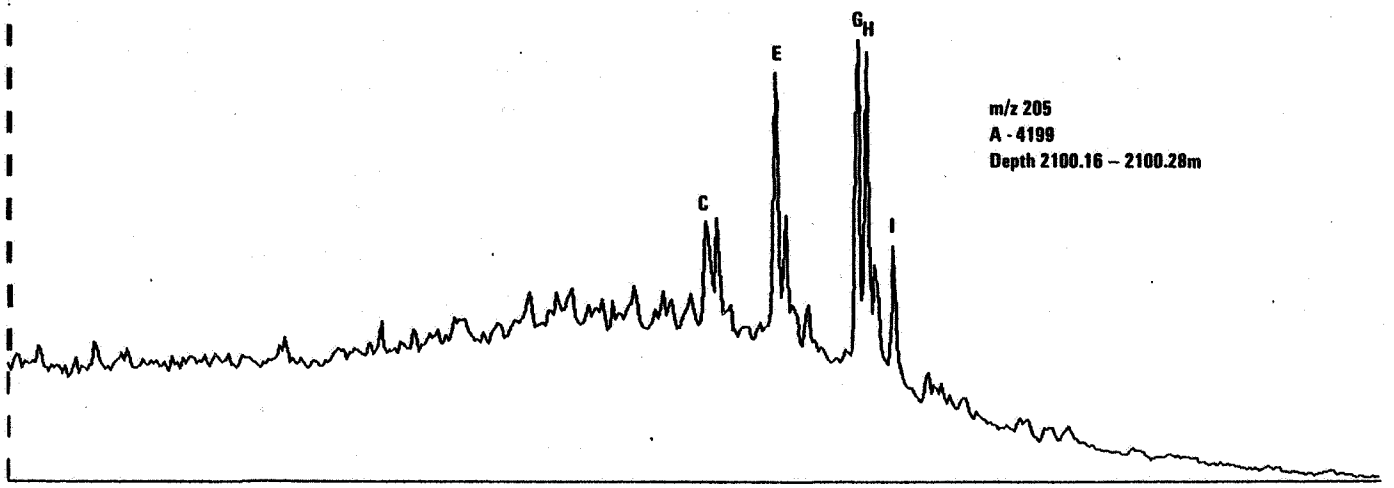
0 HRS 12 MINS 33 SECS 0 HRS 40 MINS 33 SECS

[0.0000] A4199S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



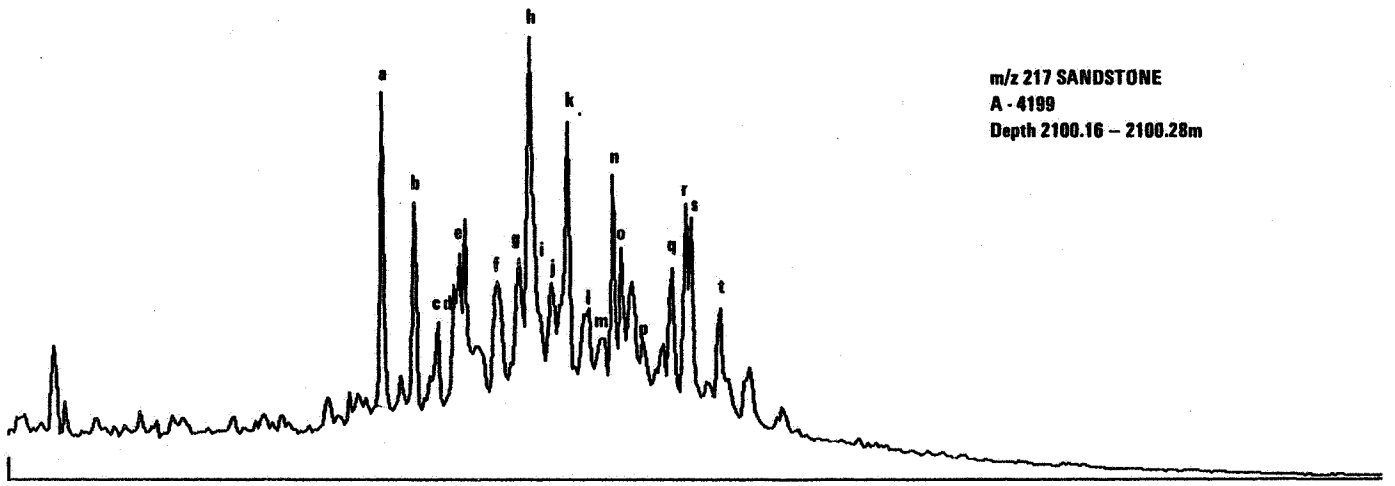
0 HRS 12 MINS 33 SECS 0 HRS 40 MINS 33 SECS

[0.0000] A4199S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 12 MINS 33 SECS 0 HRS 40 MINS 33 SECS

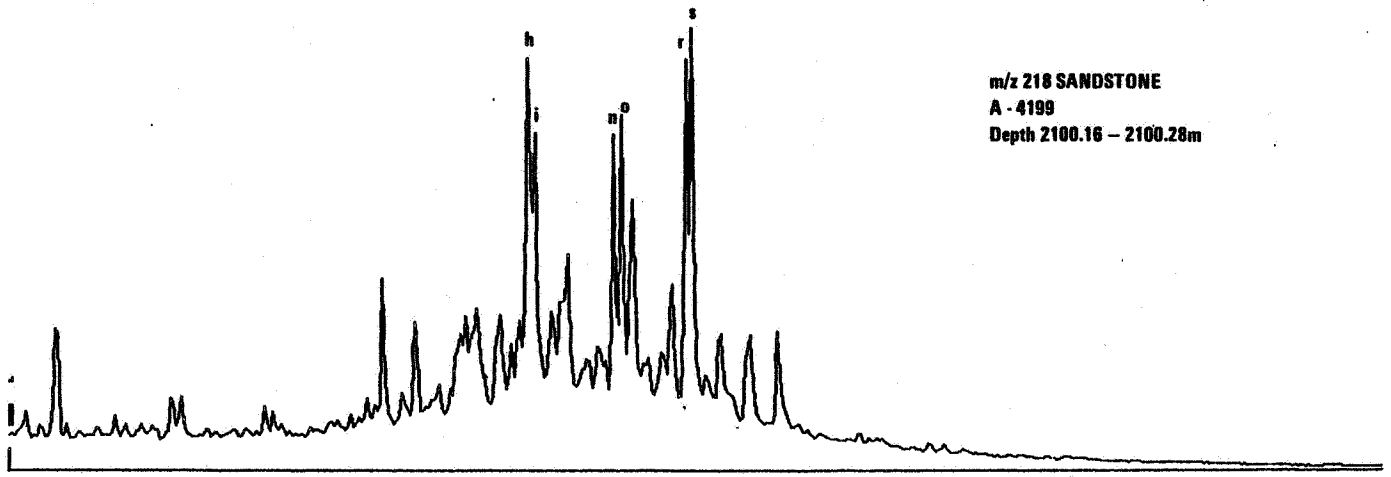
[0.0000] A4199S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



m/z 217 SANDSTONE
A - 4199
Depth 2100.16 – 2100.28m

0 HRS 12 MINS 33 SECS 0 HRS 40 MINS 33 SECS

[0.0000] A4199S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00

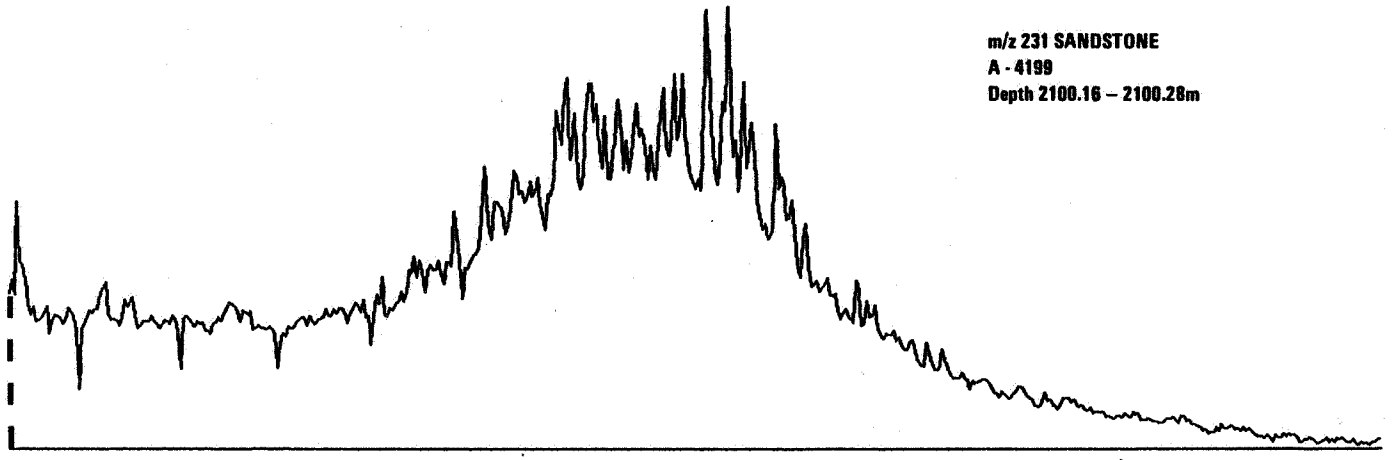


m/z 218 SANDSTONE
A - 4199
Depth 2100.16 – 2100.28m

0 HRS 12 MINS 33 SECS 0 HRS 40 MINS 33 SECS

[0.0000] A4199S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S #231S H259S

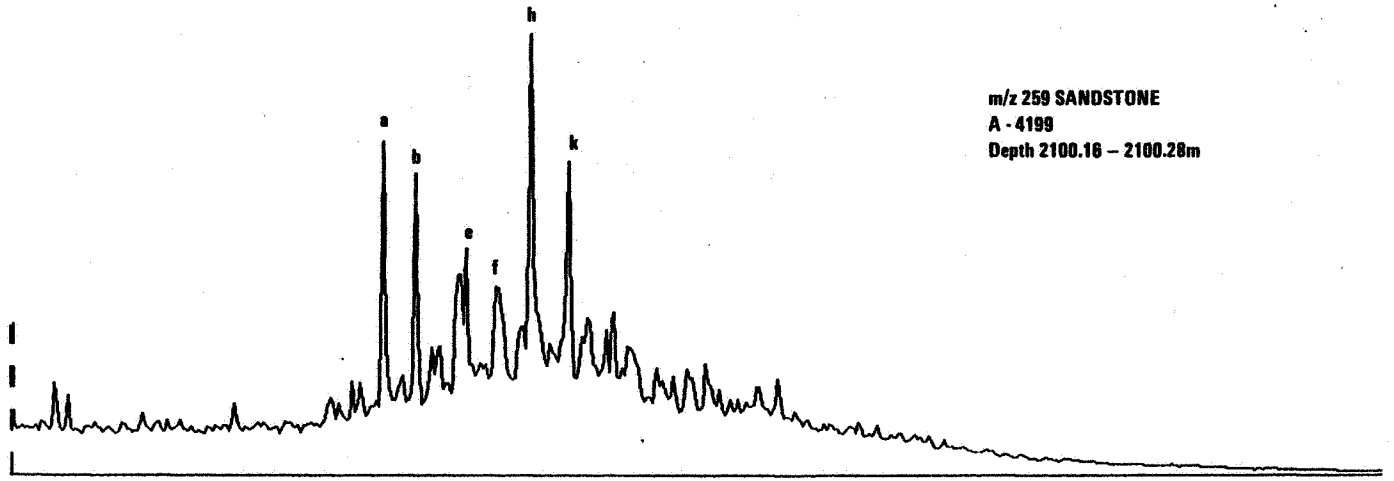
RETN.TIME	HEIGHT	AREA	UNCALIBRATED.
0:12:36	10.37	67.06	



0 HRS 12 MINS 33 SECS 0 HRS 40 MINS 33 SECS

[0.0000] A4199S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S G231S #259S

RETN.TIME	HEIGHT	AREA	UNCALIBRATED.
0: 0: 0	0.00	0.00	



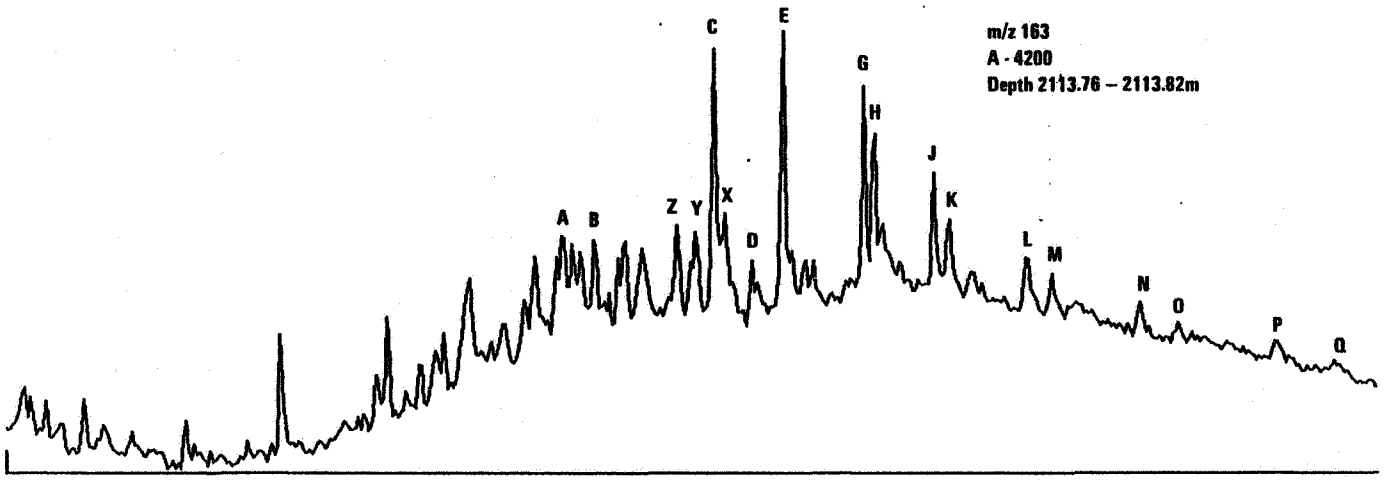
0 HRS 12 MINS 33 SECS 0 HRS 40 MINS 33 SECS

Mass Fragmentograms from Saturated Hydrocarbons of A-4200

LOWER JURASSIC CLAYTONE (surface wash of claystone core)

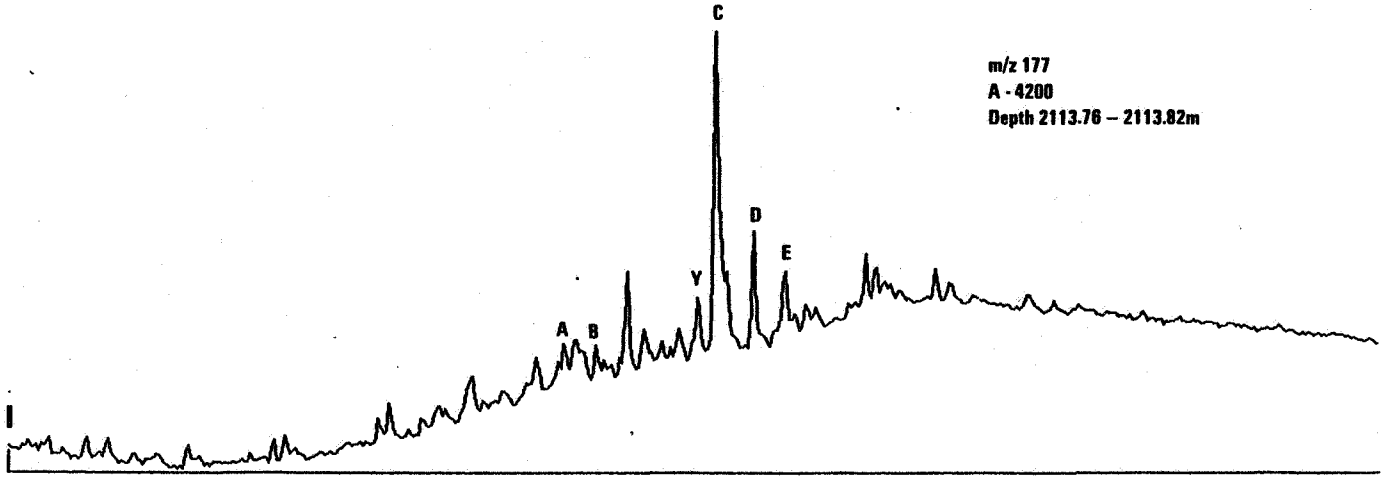
Depth 2113.76 - 2113.82 metres

[0.0000] A4200V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



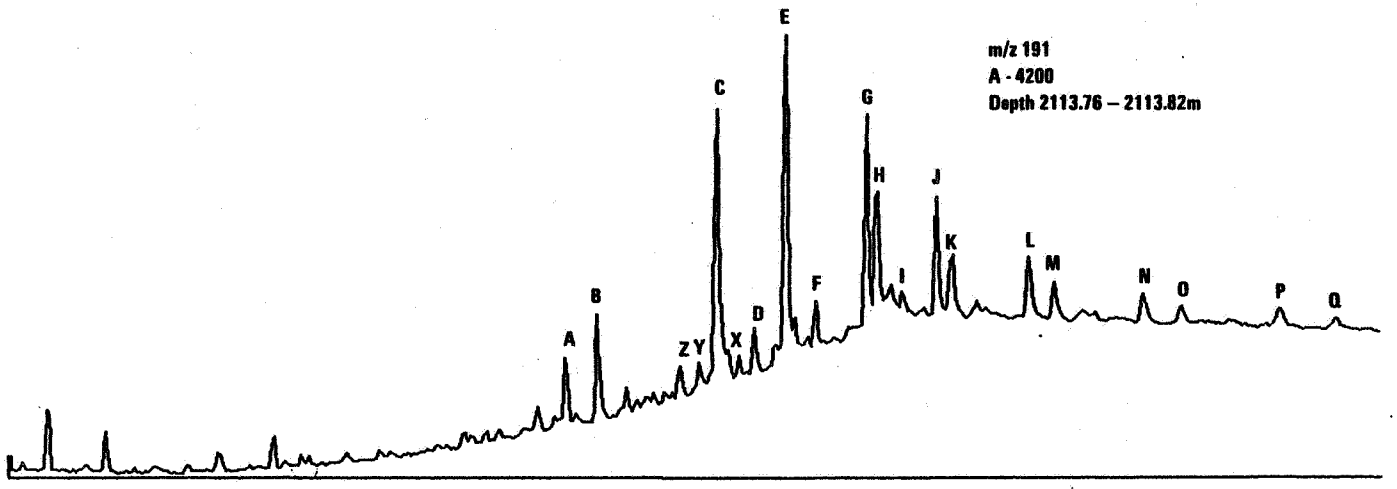
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



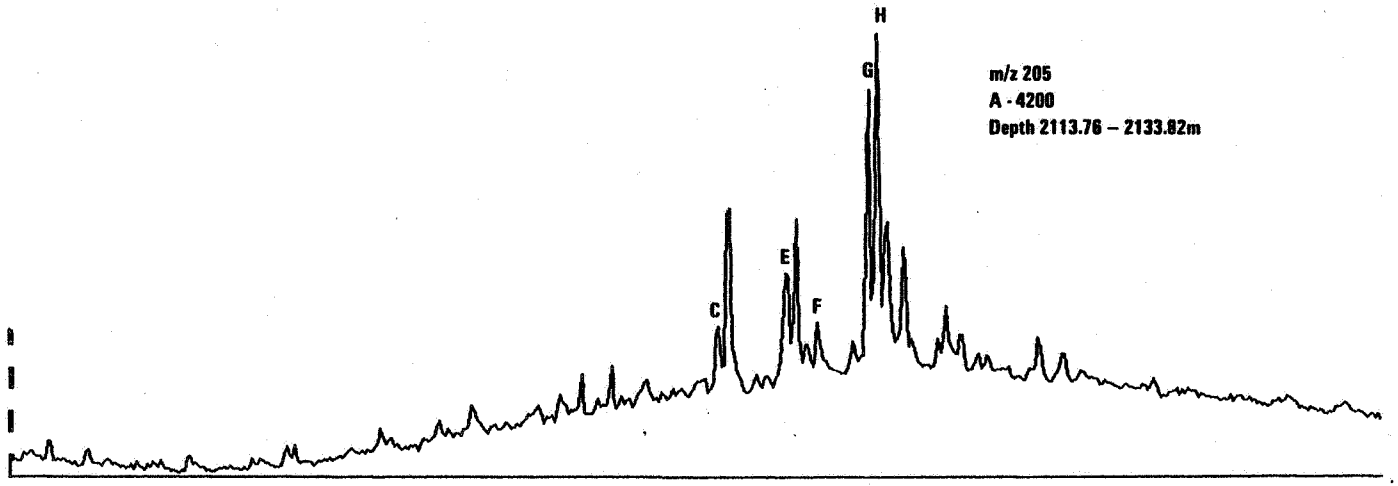
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



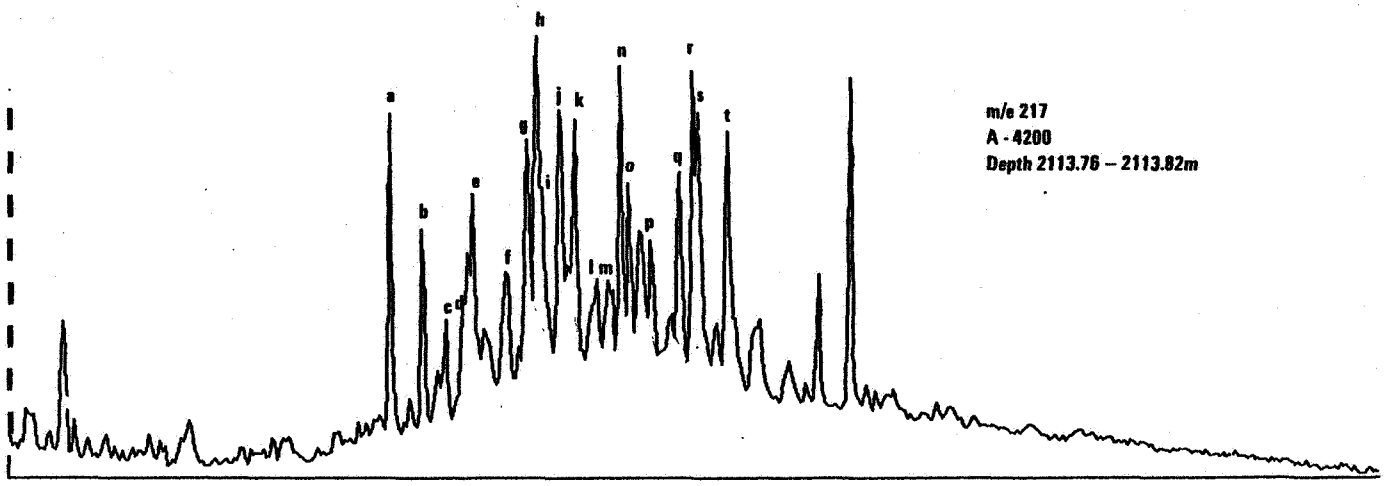
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



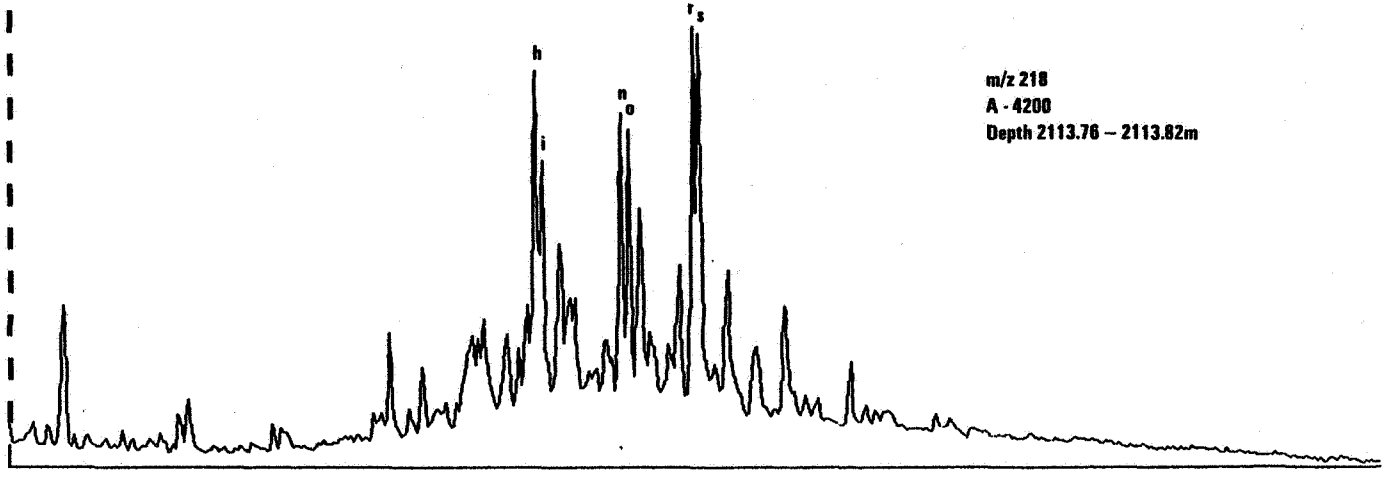
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



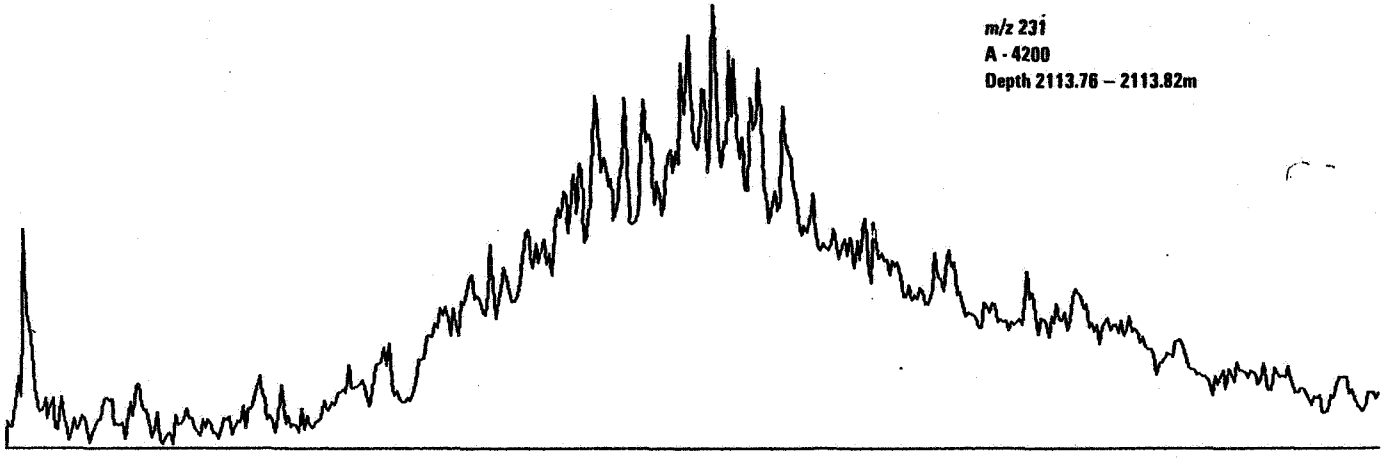
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



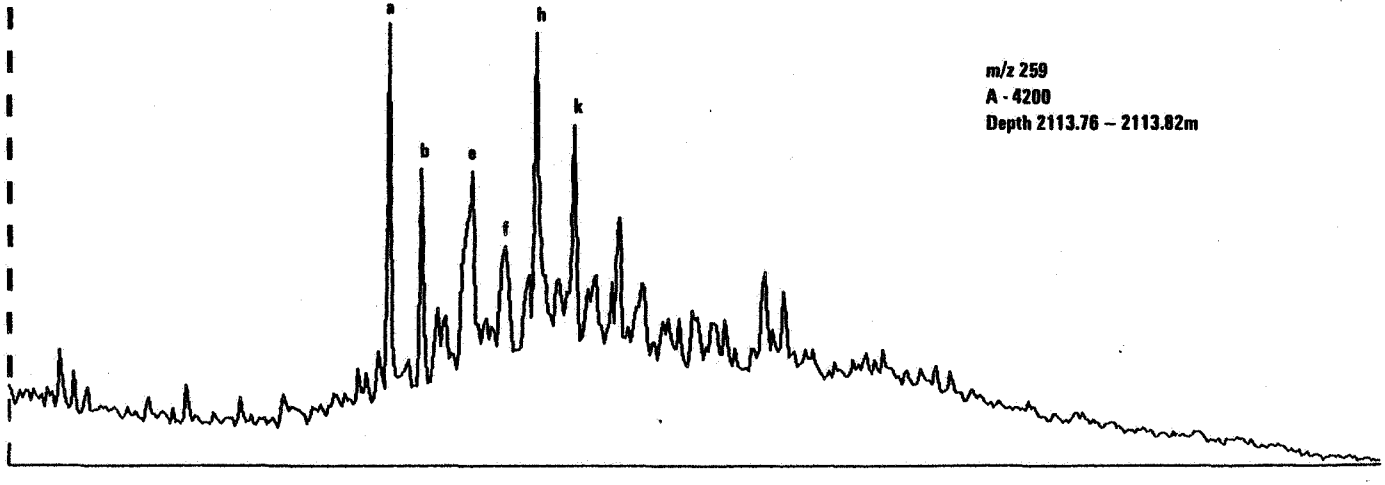
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S #231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4200V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S G231S #259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

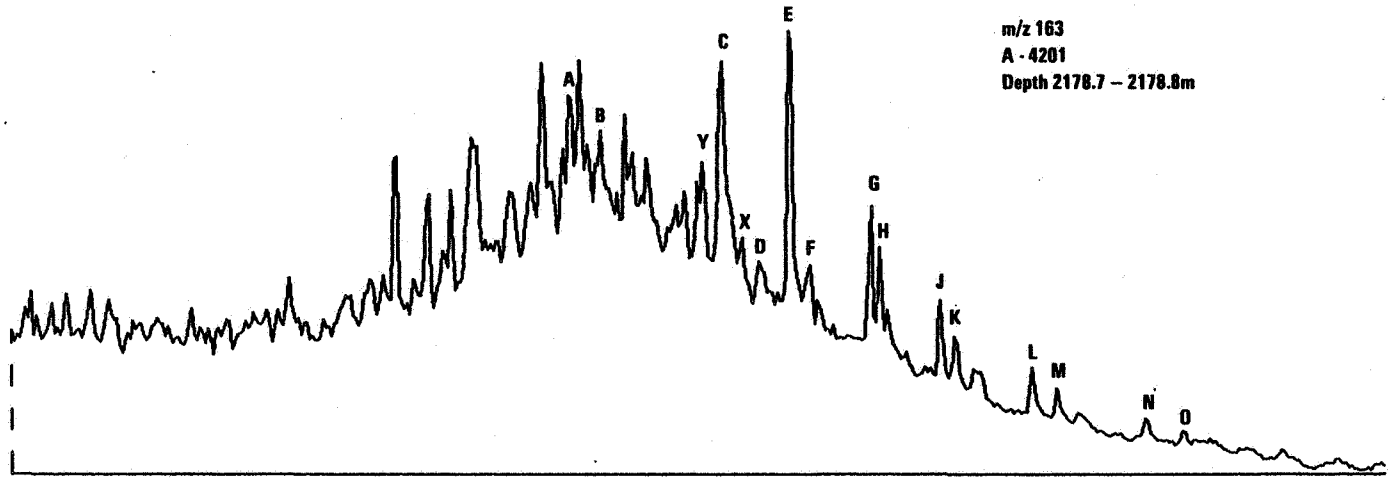
IKU

Mass Fragmentograms from Saturated Hydrocarbons of A-4201

LOWER JURASSIC SANDSTONE

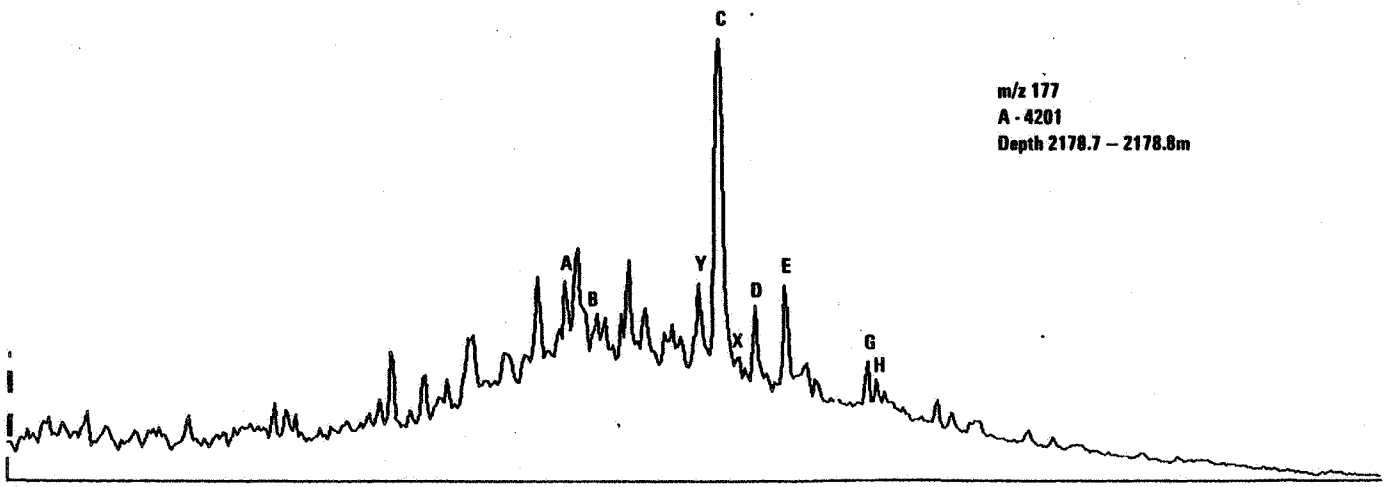
Depth 2178.7 - 2178.8 metres

[0.0000] A4201S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



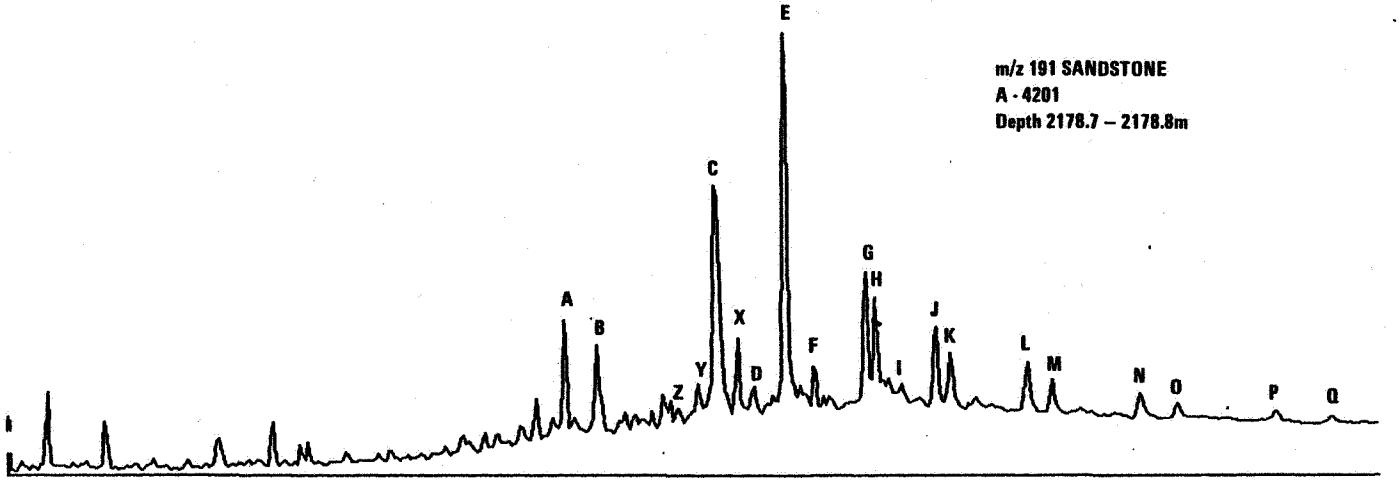
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4201S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



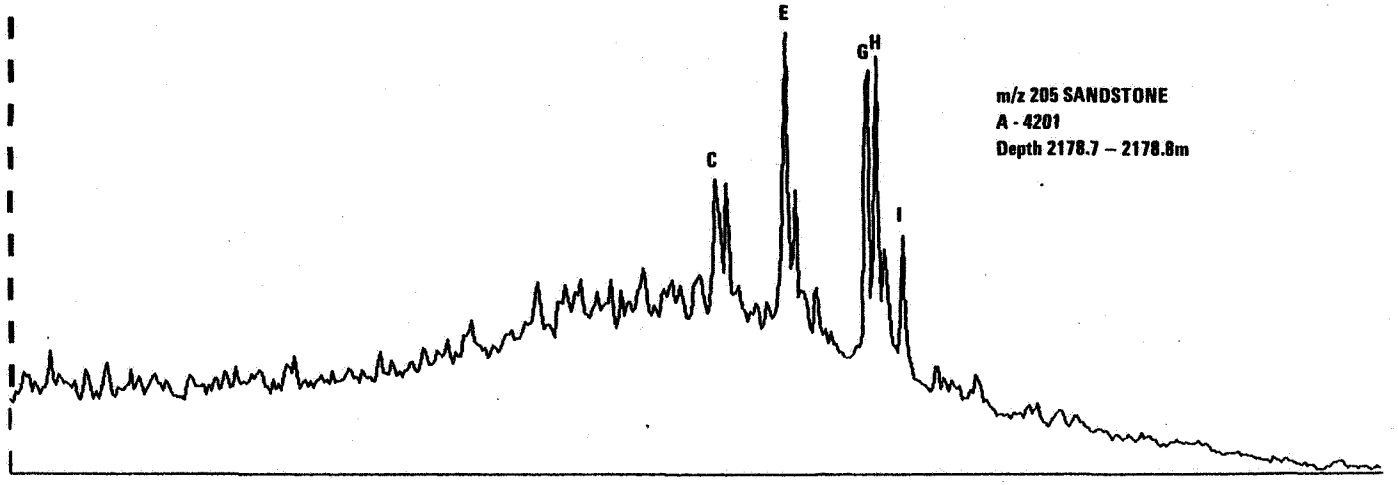
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4201S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



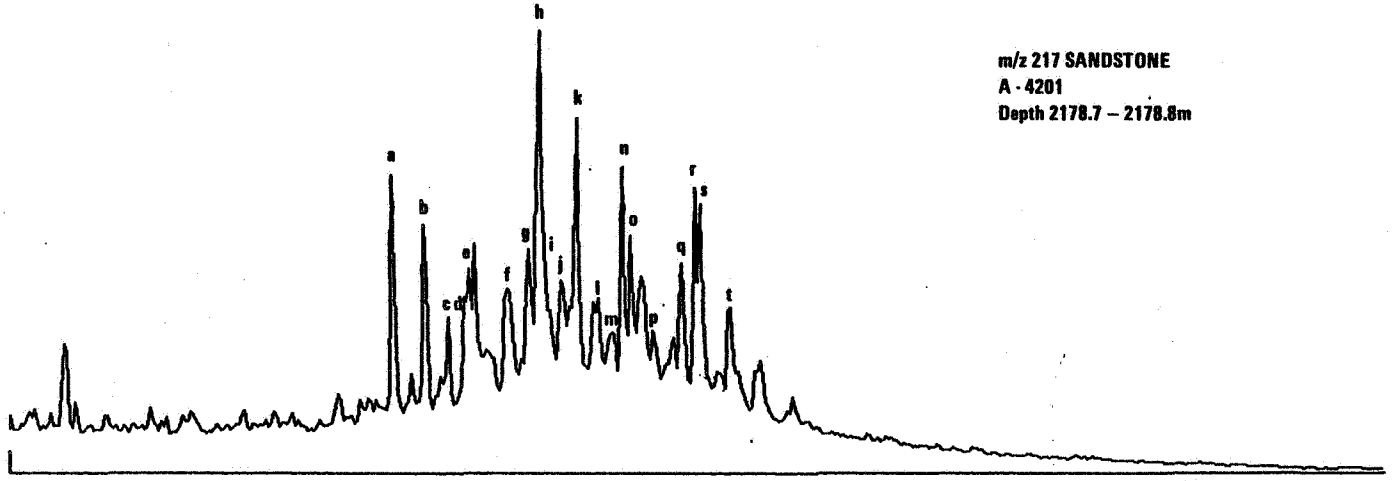
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4201S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



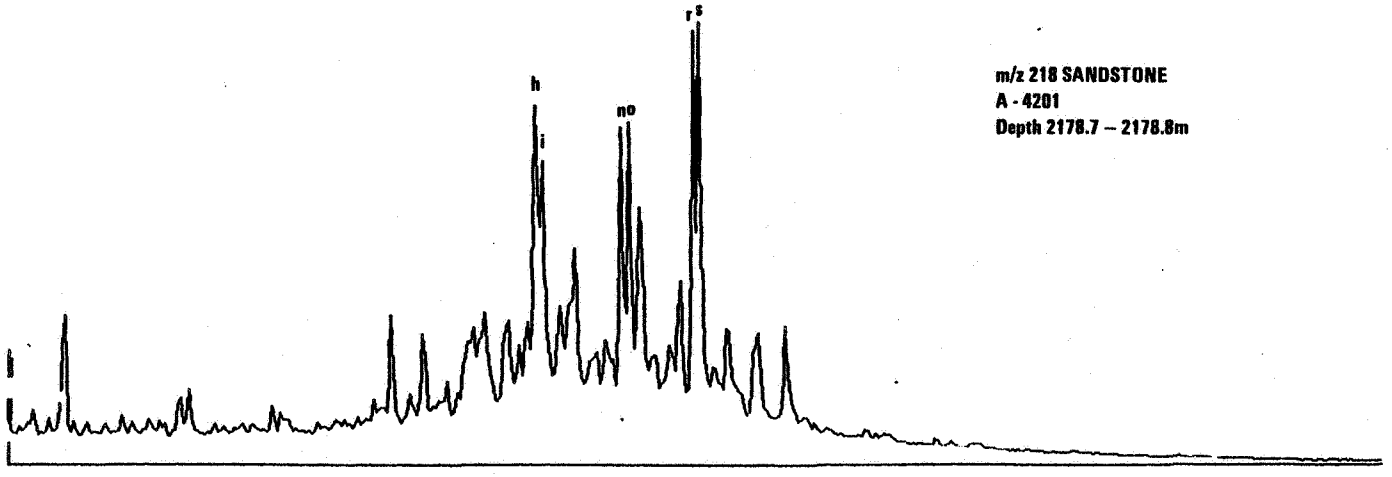
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4201S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

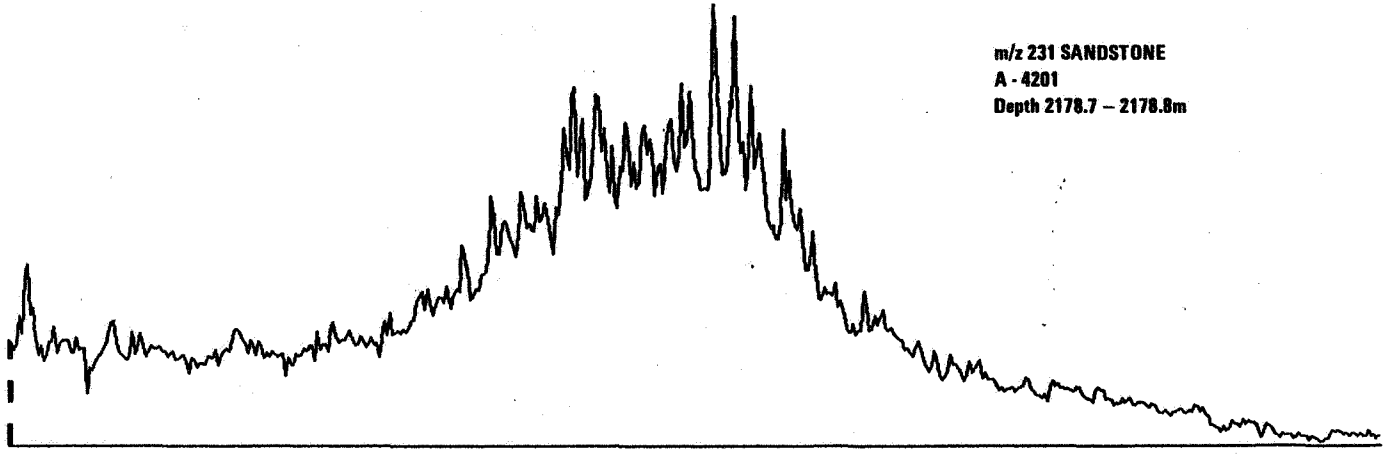
[0.0000] A4201S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4201S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S #231S H259S

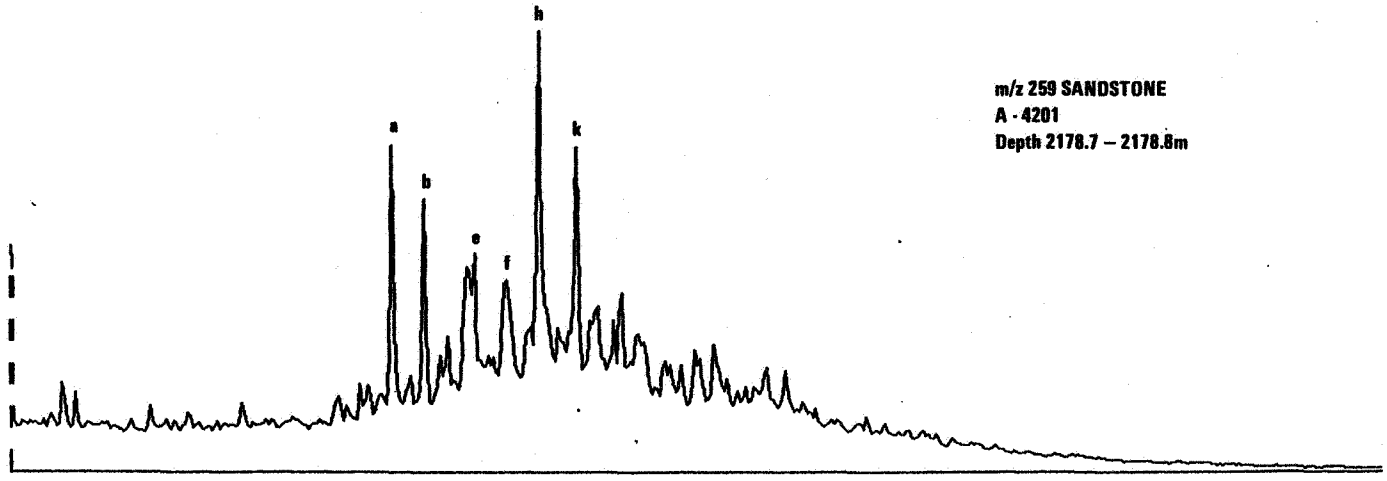
RETN.TIME	HEIGHT	AREA	UNCALIBRATED.
0:24:13	7.65	46.18	



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4201S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S G231S #259S

RETN.TIME	HEIGHT	AREA	UNCALIBRATED.
0: 0: 0	0.00	0.00	



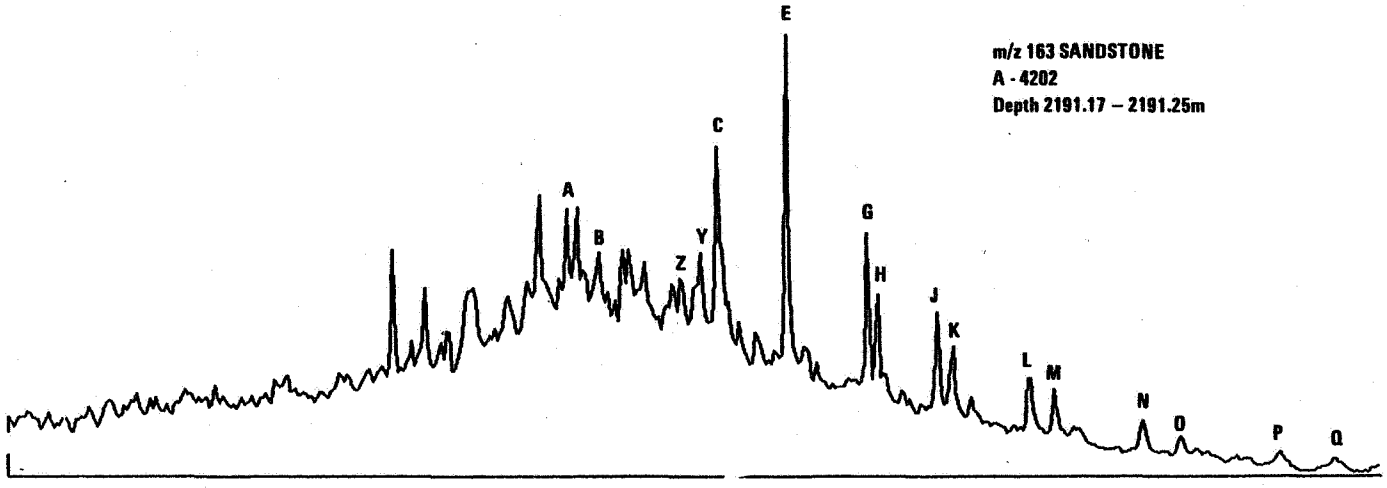
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

Mass Fragmentograms from Saturated Hydrocarbons of A-4202

LOWER JURASSIC SANDSTONE (OIL SHOW)

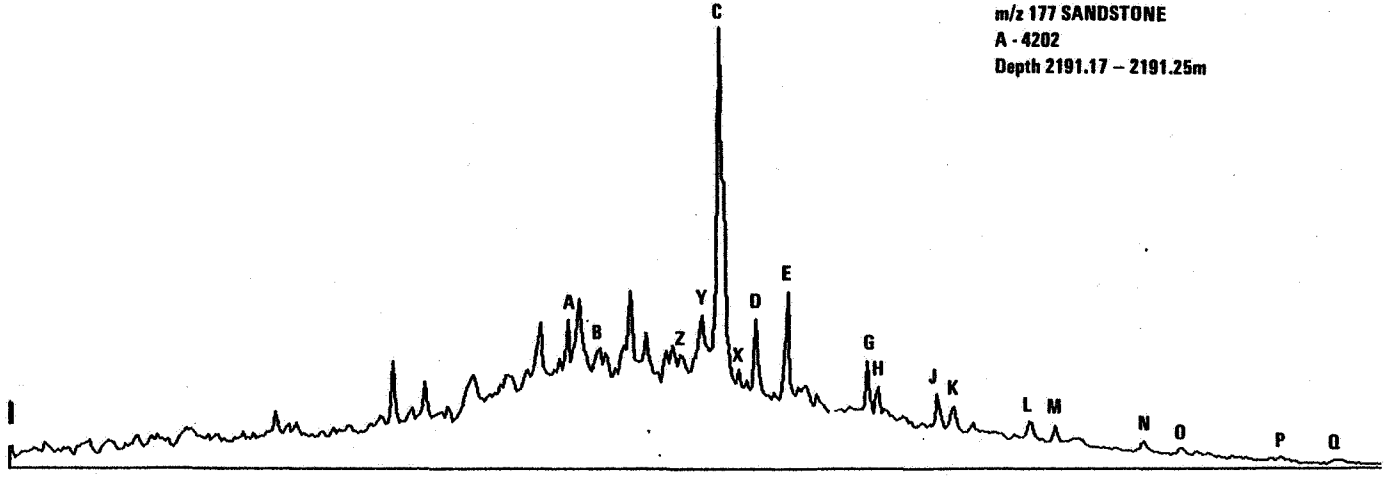
Depth 2191.17 - 2191.25 metres

[0.0000] A4202S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



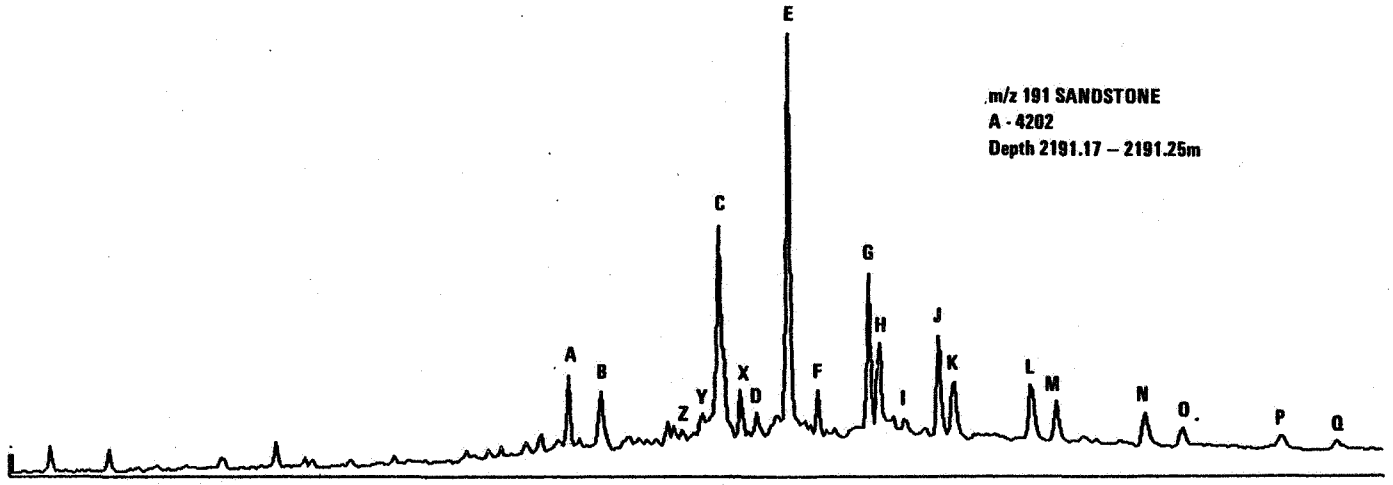
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4202S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



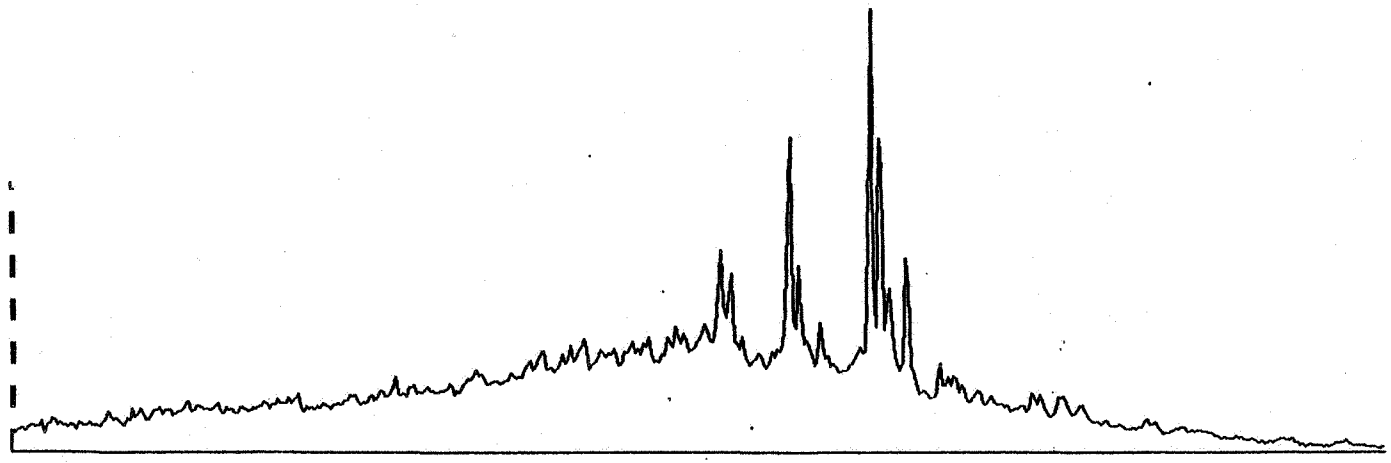
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4202S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



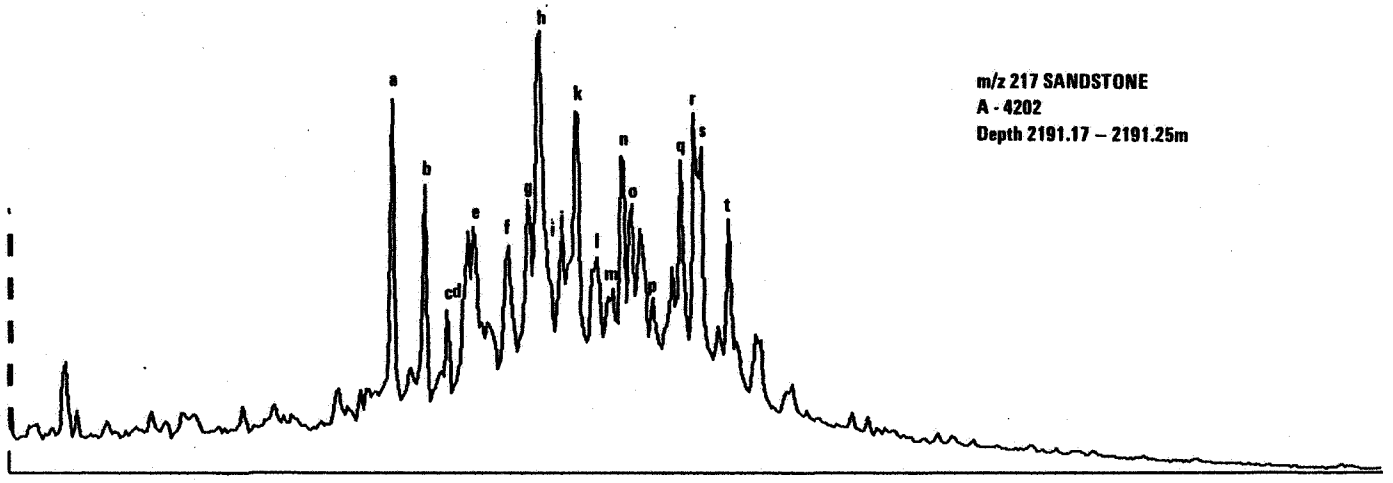
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4202S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



J HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

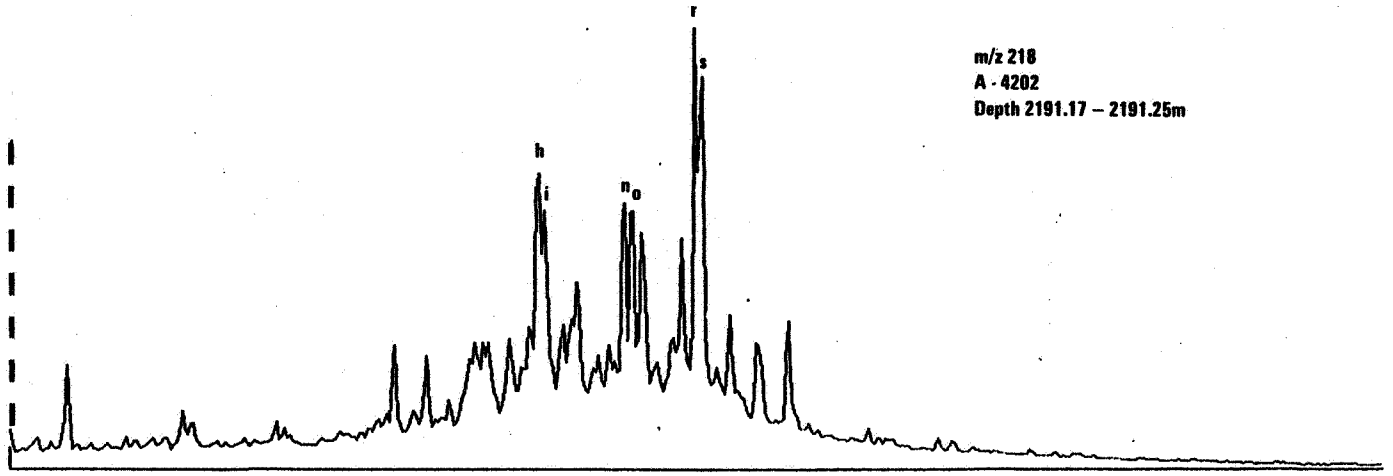
[0.0000] A4202S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



m/z 217 SANDSTONE
A - 4202
Depth 2191.17 – 2191.25m

0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

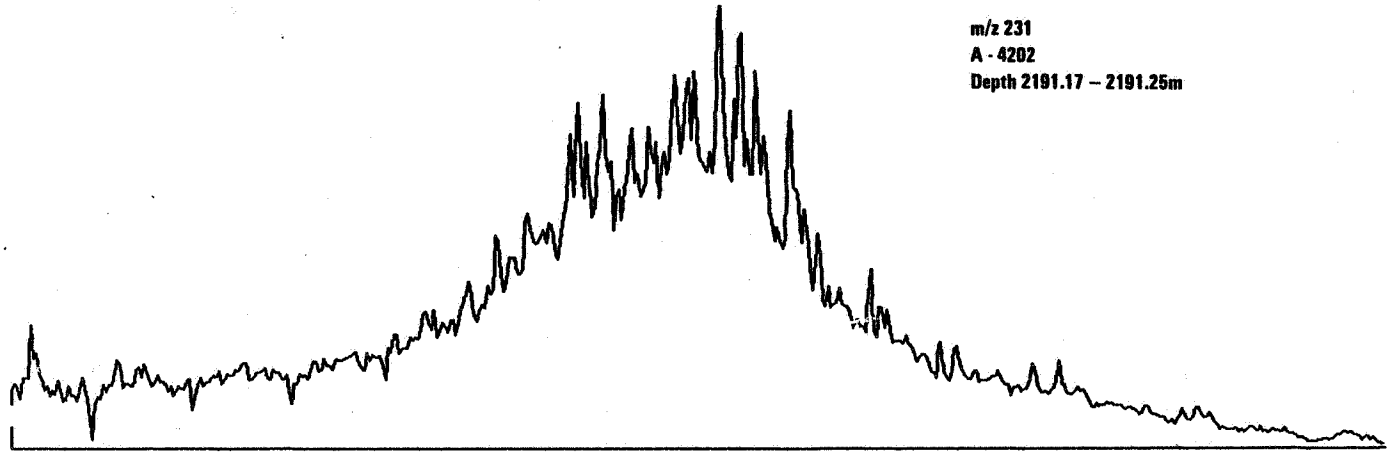
[0.0000] A4202S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



m/z 218
A - 4202
Depth 2191.17 – 2191.25m

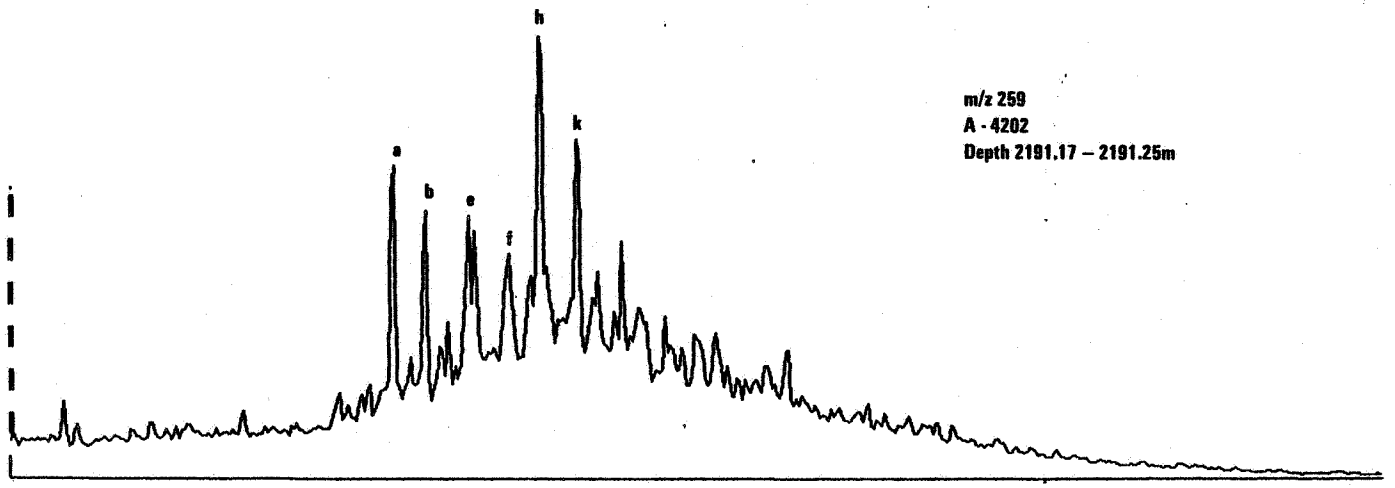
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4202S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S H231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4202S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



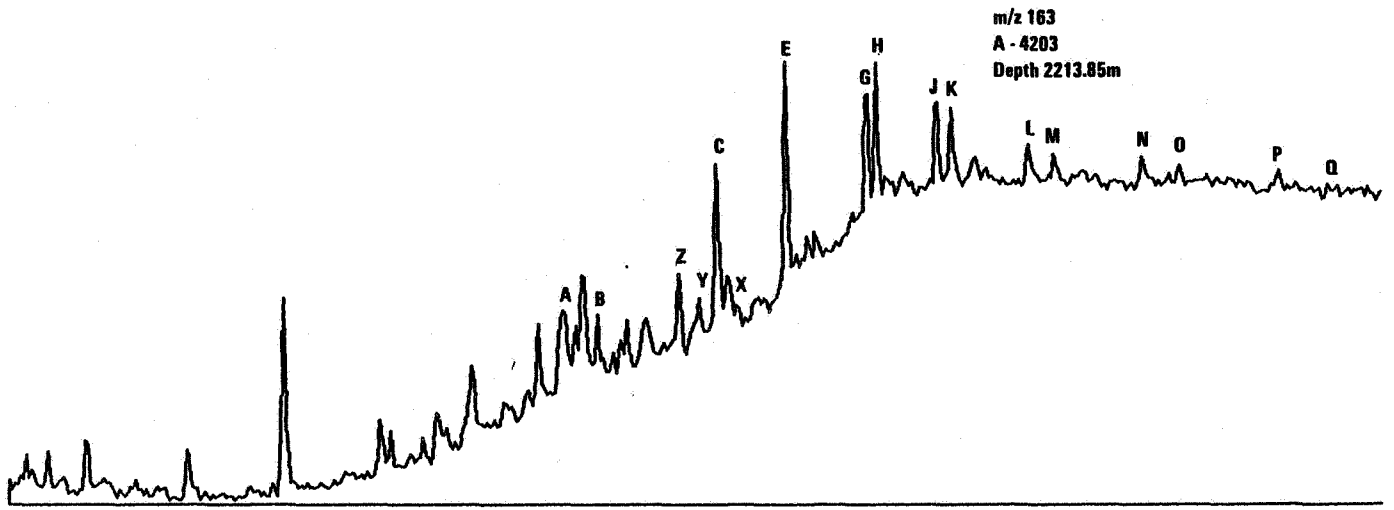
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

Mass Fragmentograms from Saturated Hydrocarbons of A-4203

LOWER JURASSIC COAL (surface wash of coal)

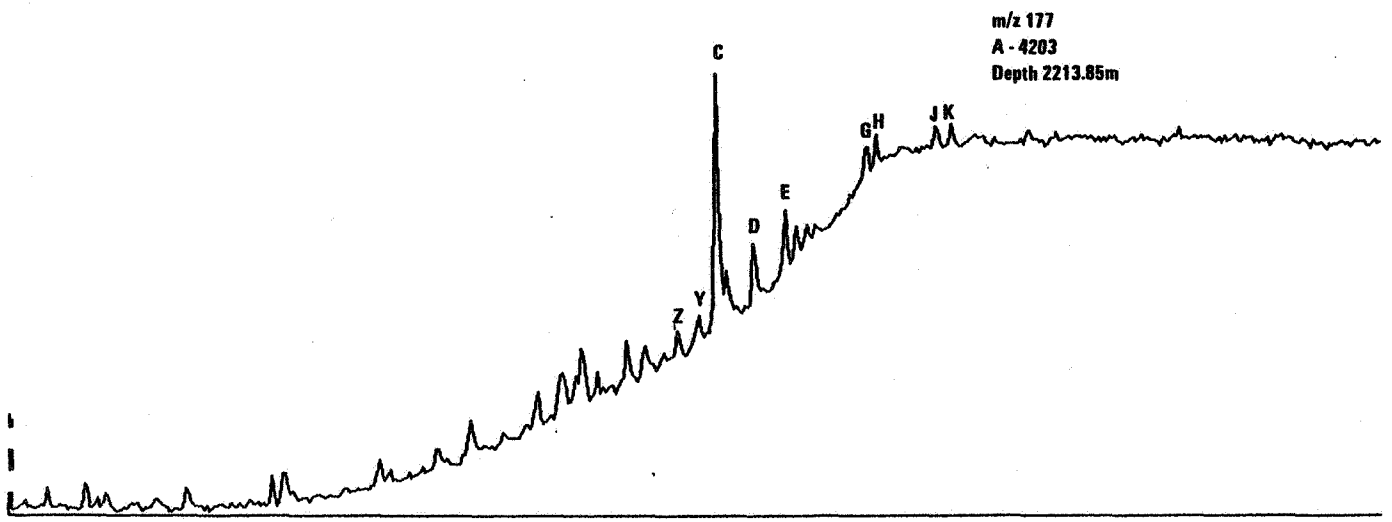
Depth 2213.85 metres

[0.0000] A4203V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



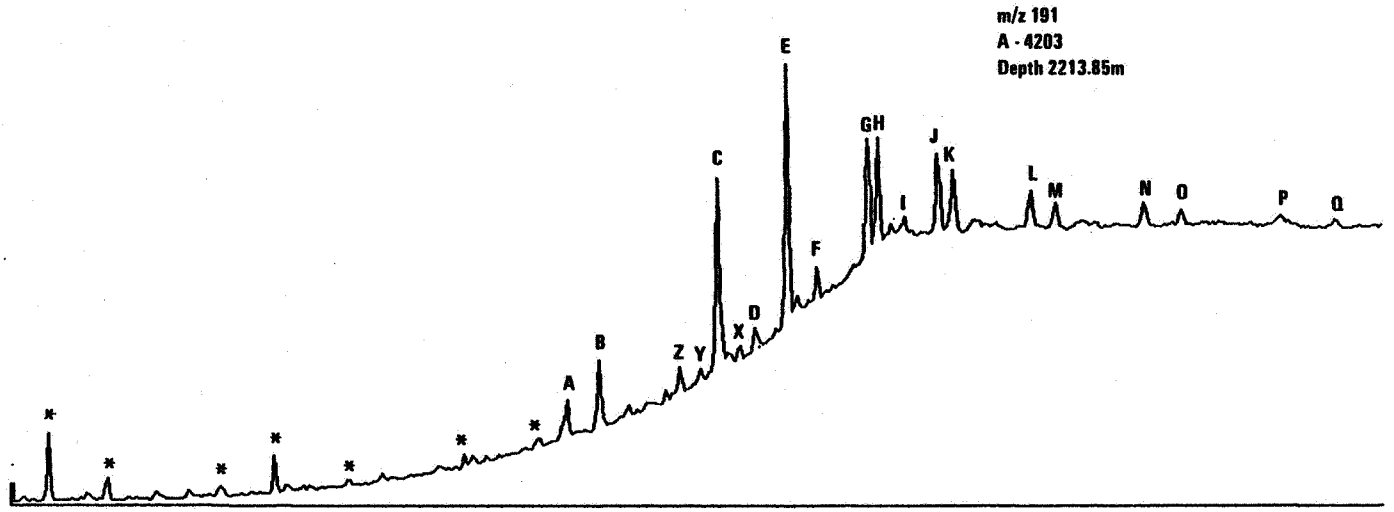
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4203V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



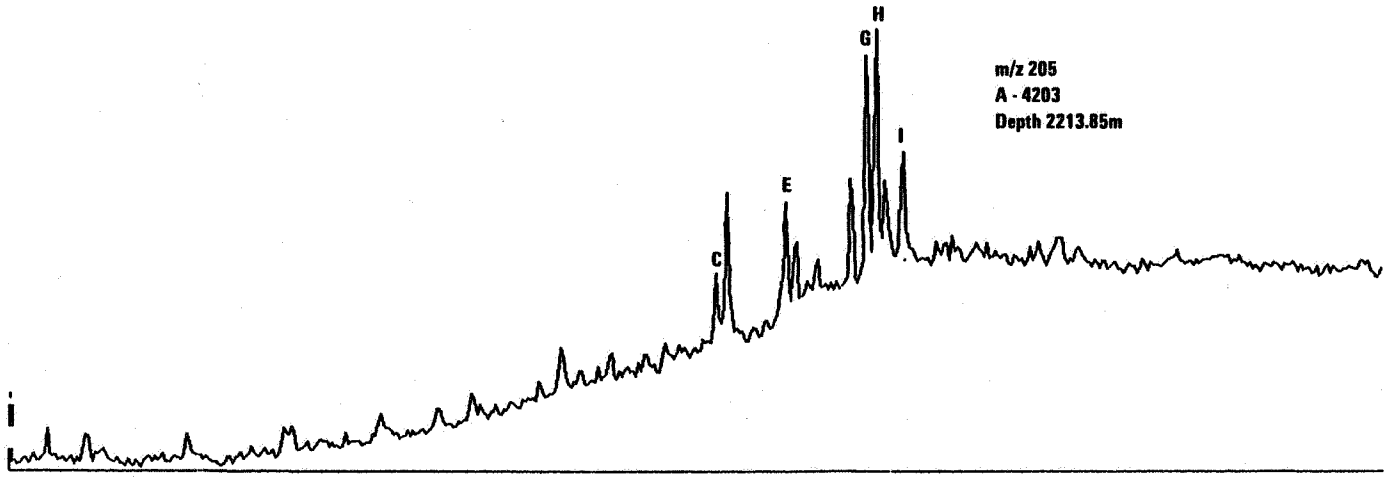
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4203V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



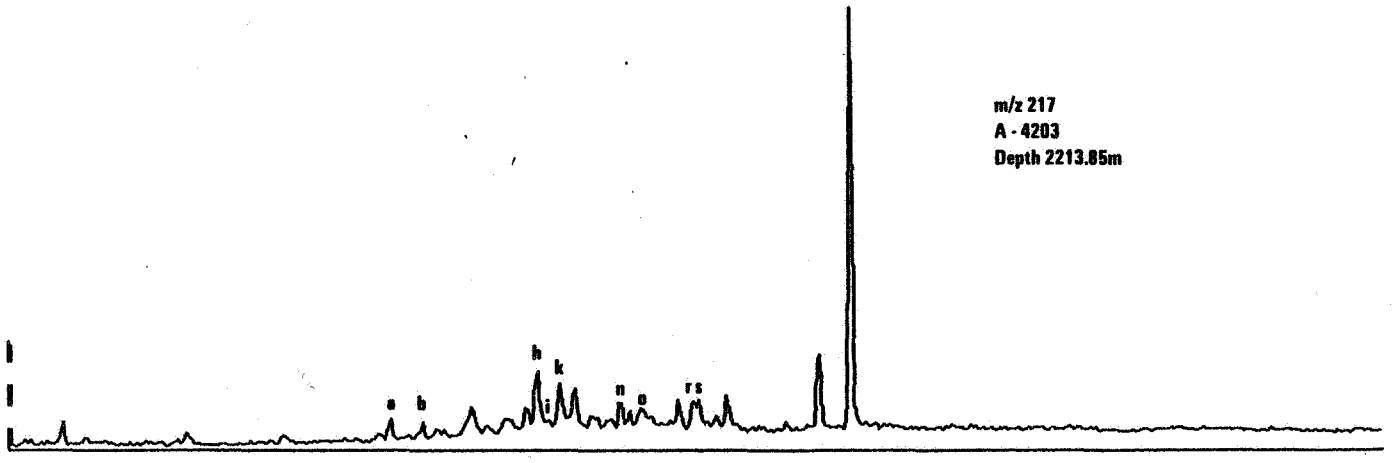
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4203V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



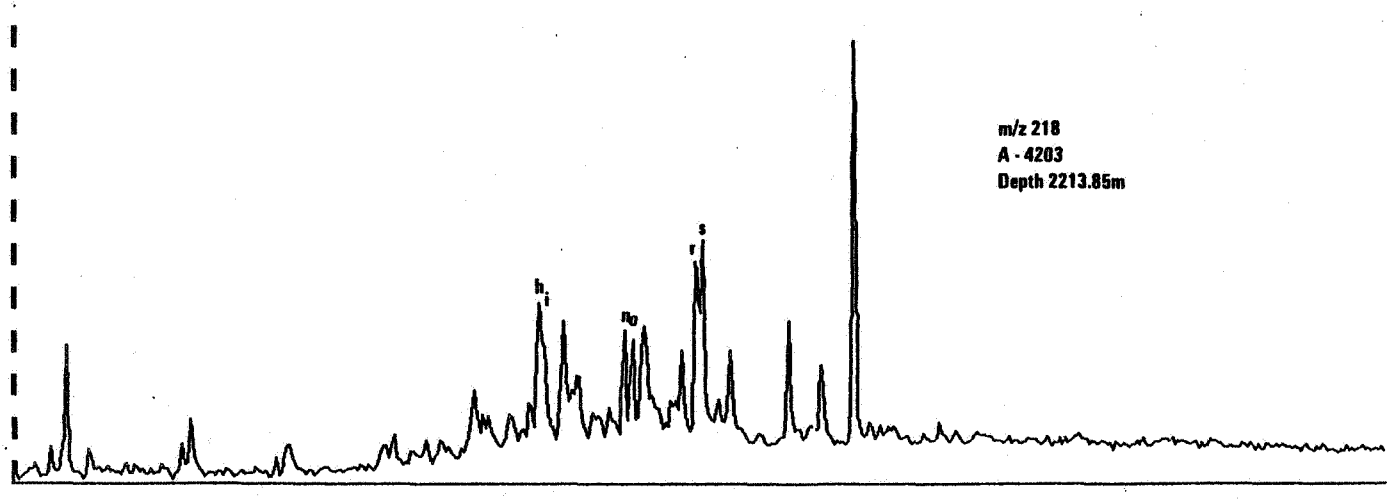
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4203V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S H217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



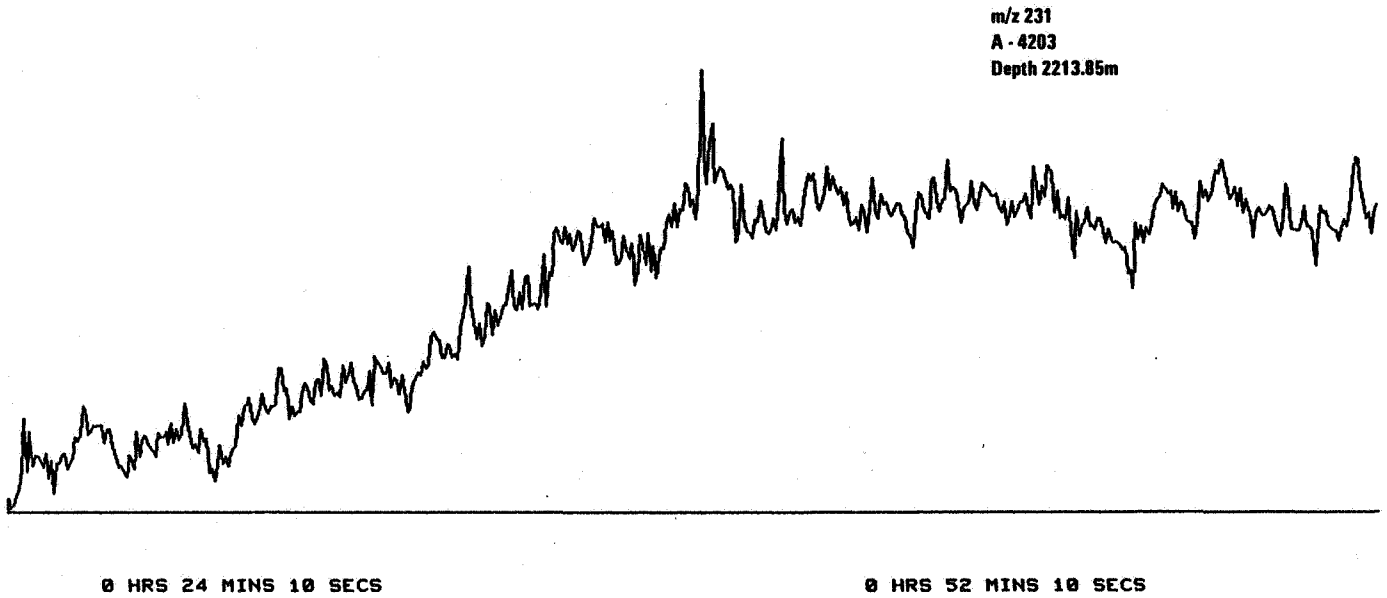
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4203V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S H218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



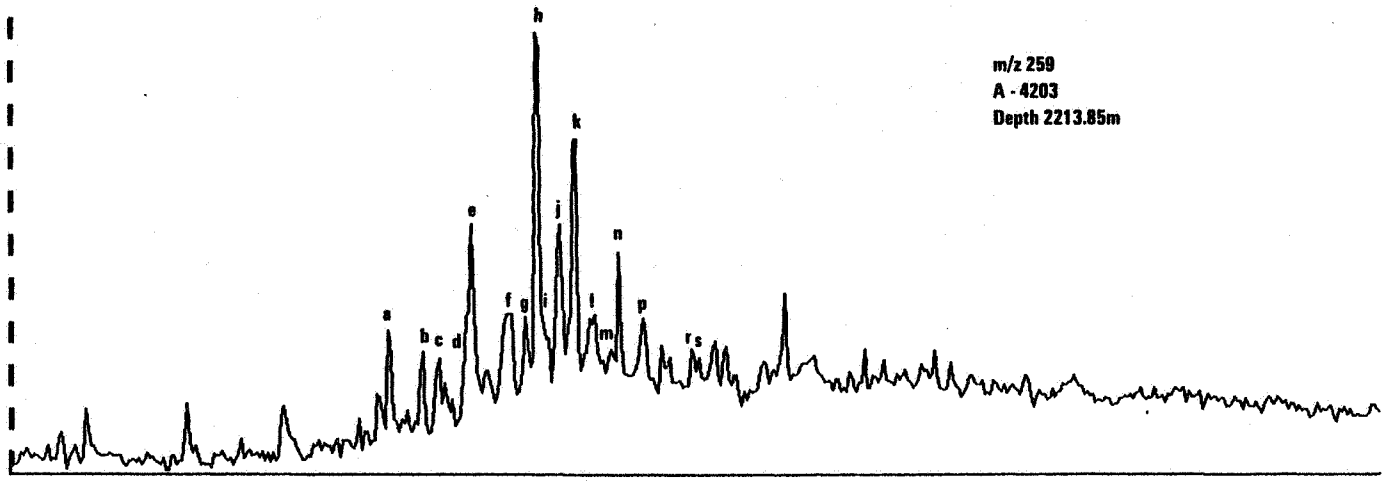
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4203V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S #231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4203V .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S G231S #259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



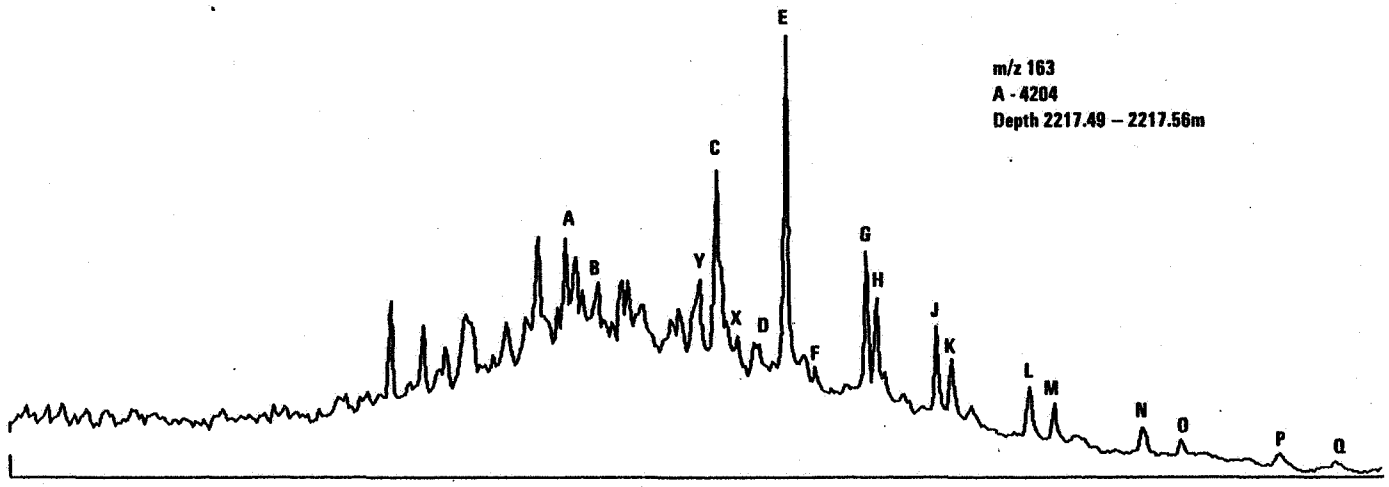
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

Mass Fragmentograms of Saturated Hydrocarbons of A-4204

LOWER JURASSIC SANDSTONE (OIL SHOW)

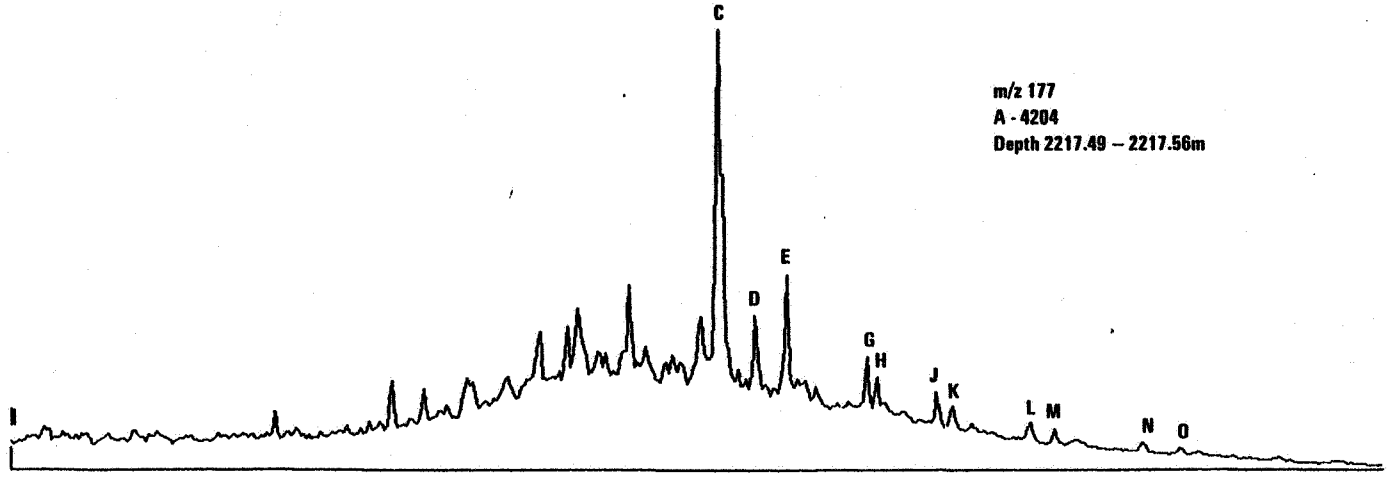
Depth 2217.49 - 2217.56 metres

[0.0000] A4204S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



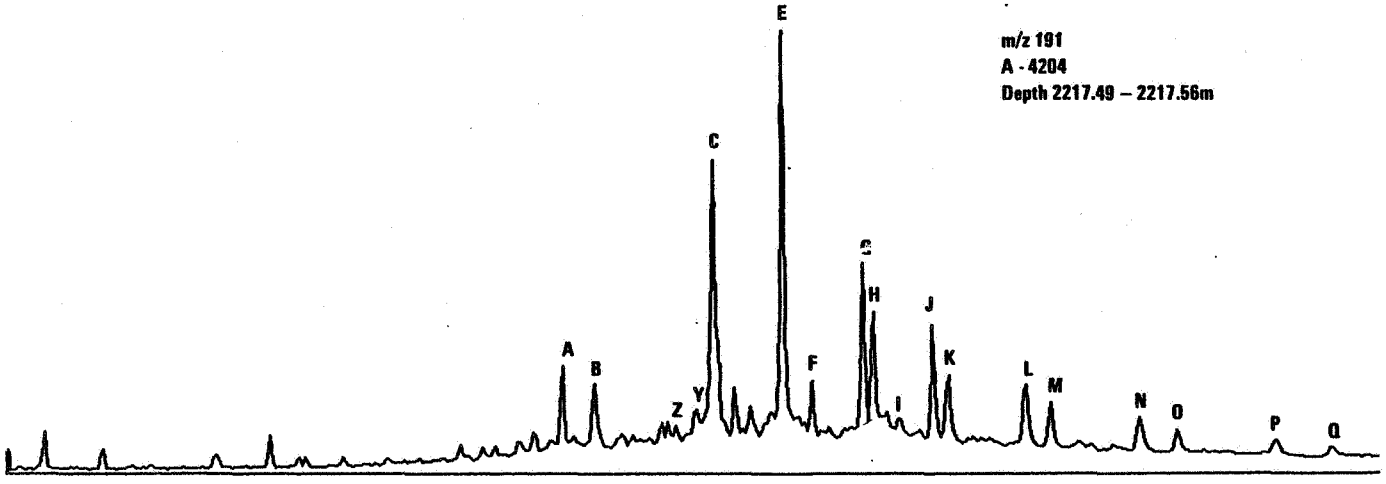
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4204S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



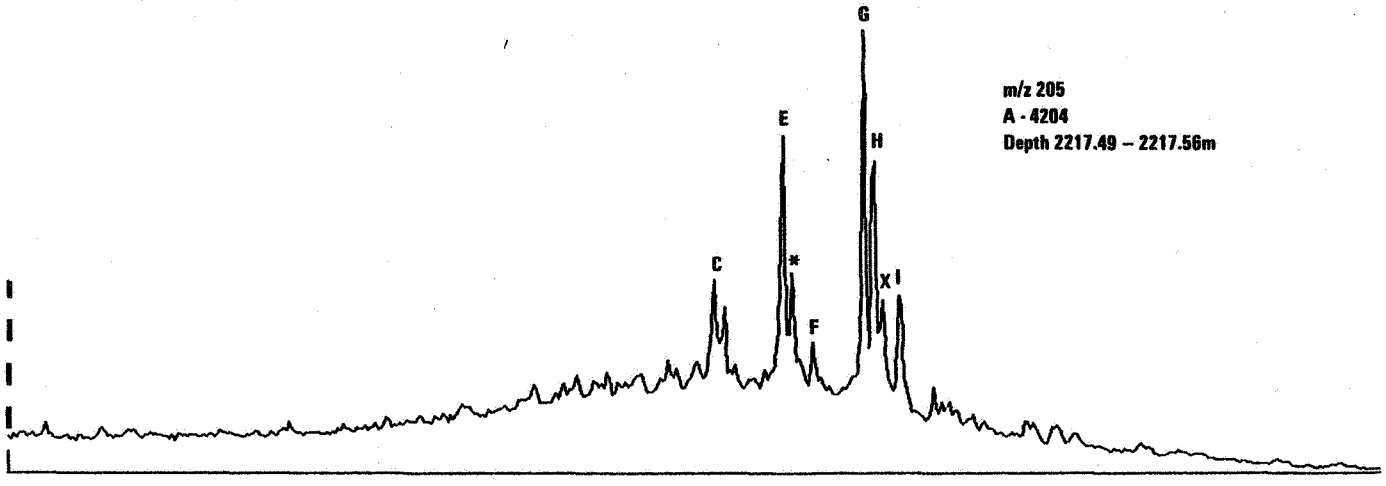
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4204S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



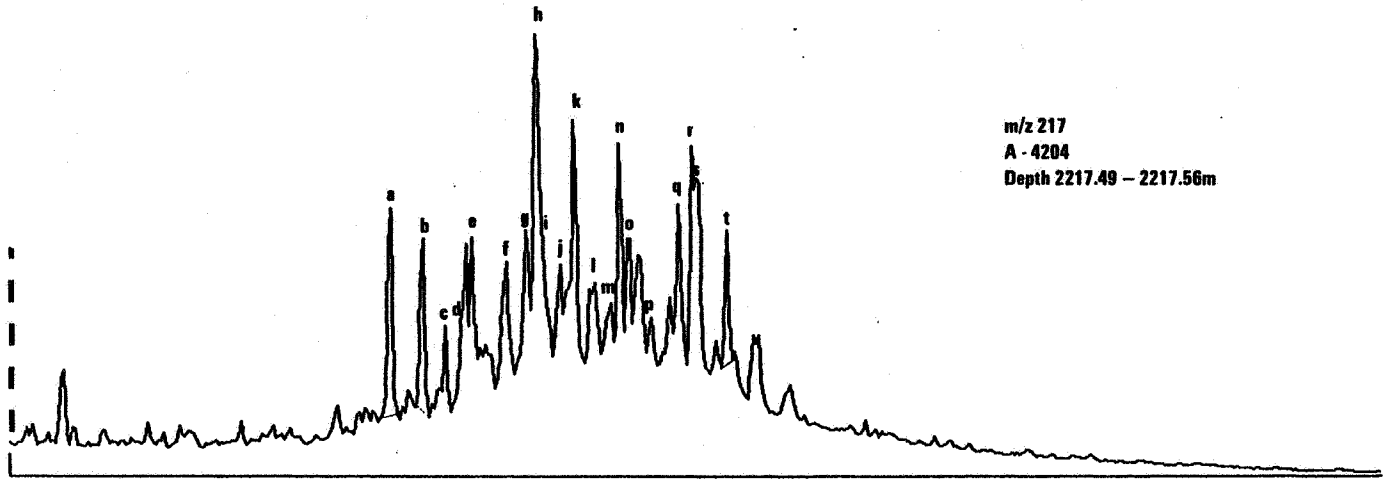
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4204S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



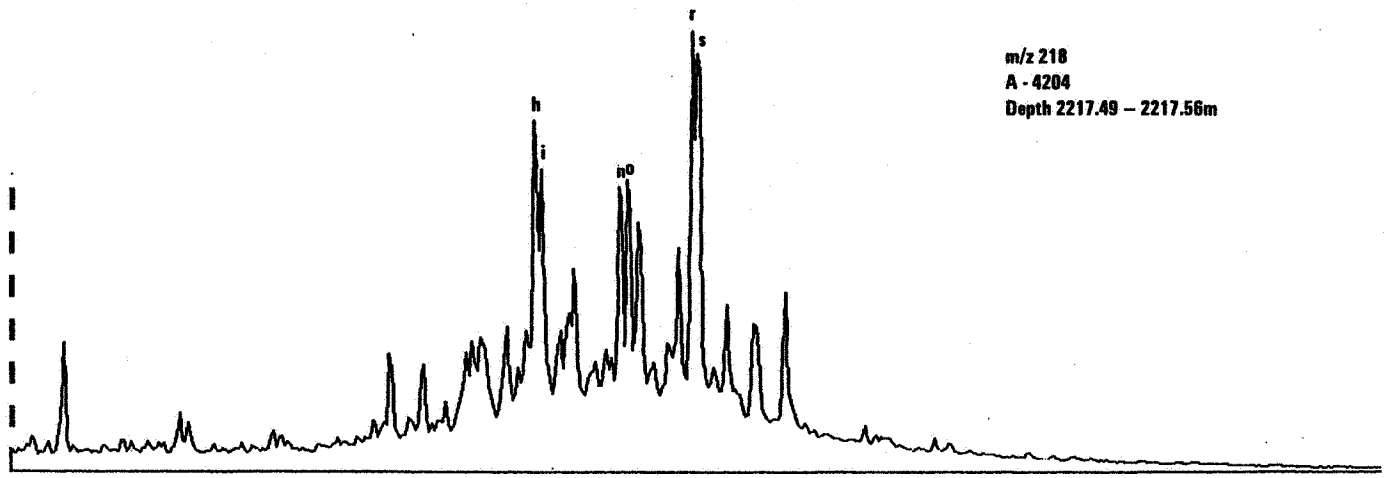
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4204S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



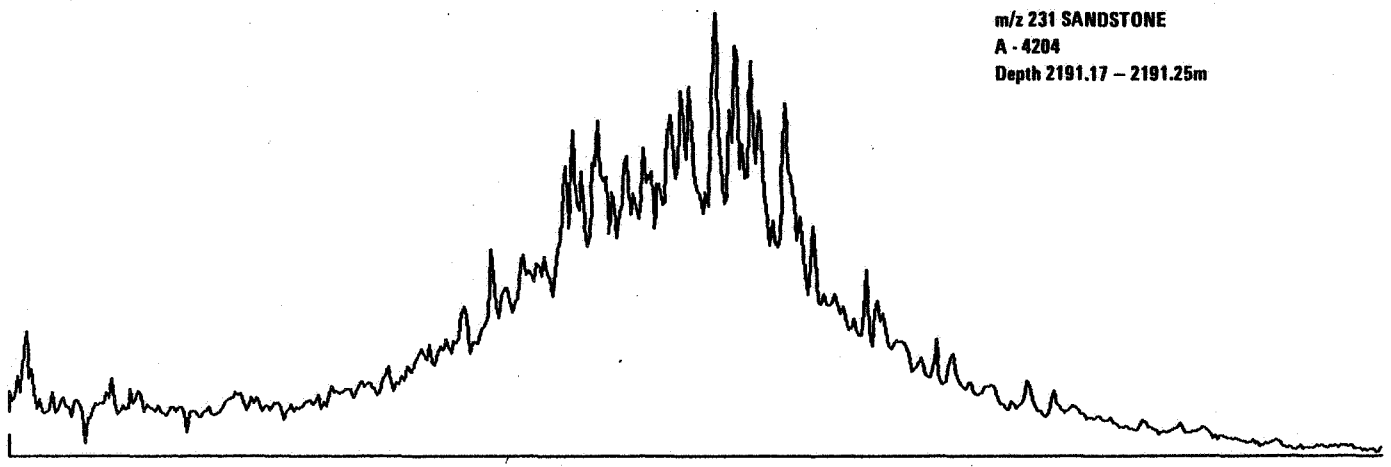
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4204S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



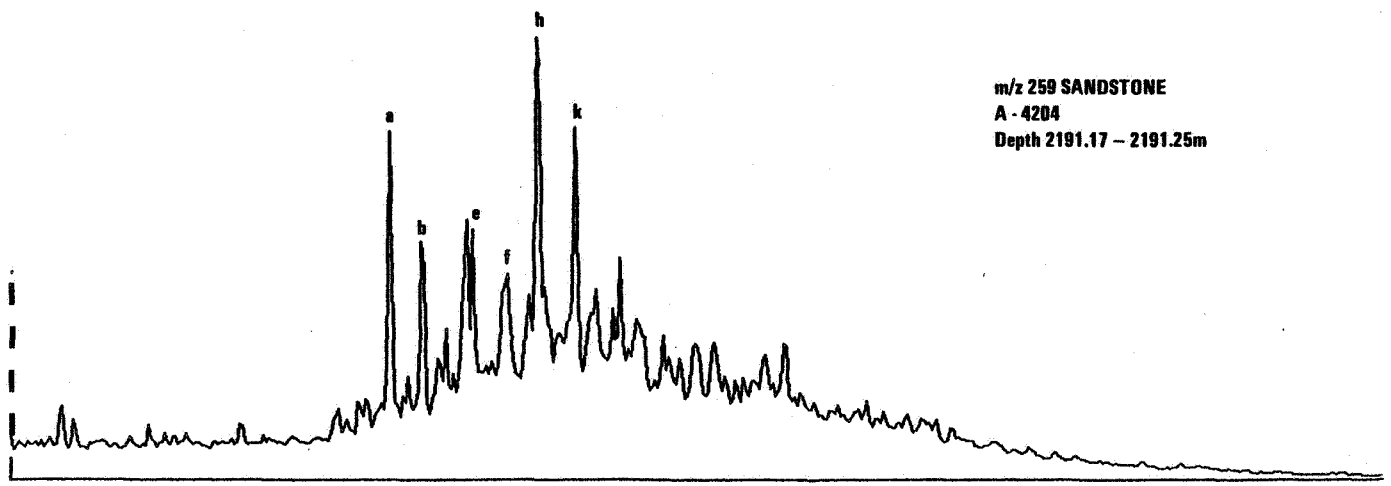
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4204S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S #231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4204S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S G231S #259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



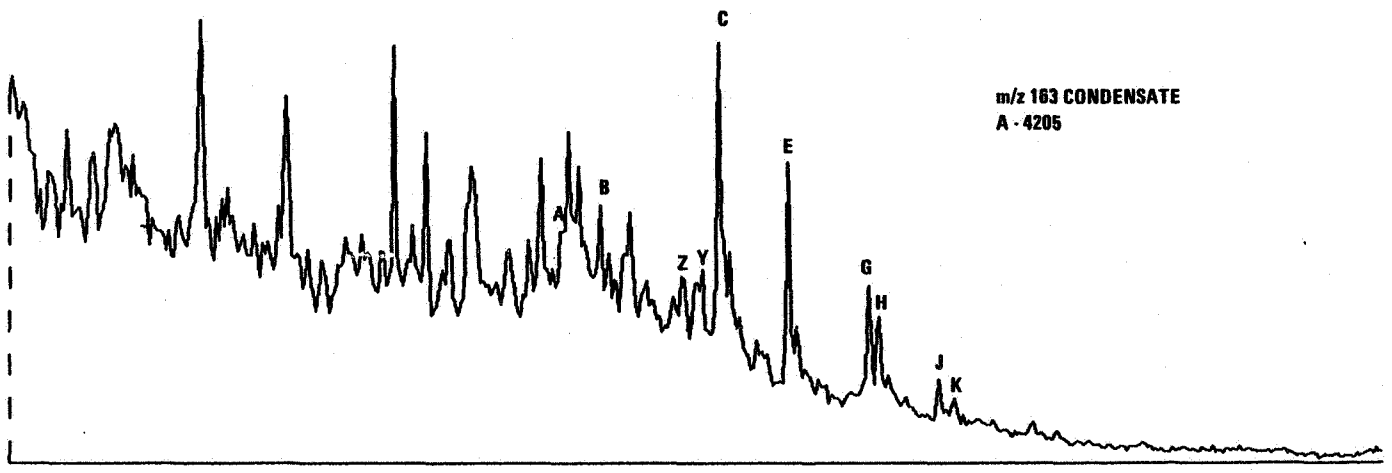
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

Mass Fragmentograms of Saturated Hydrocarbons of A-4205

CONDENSATE

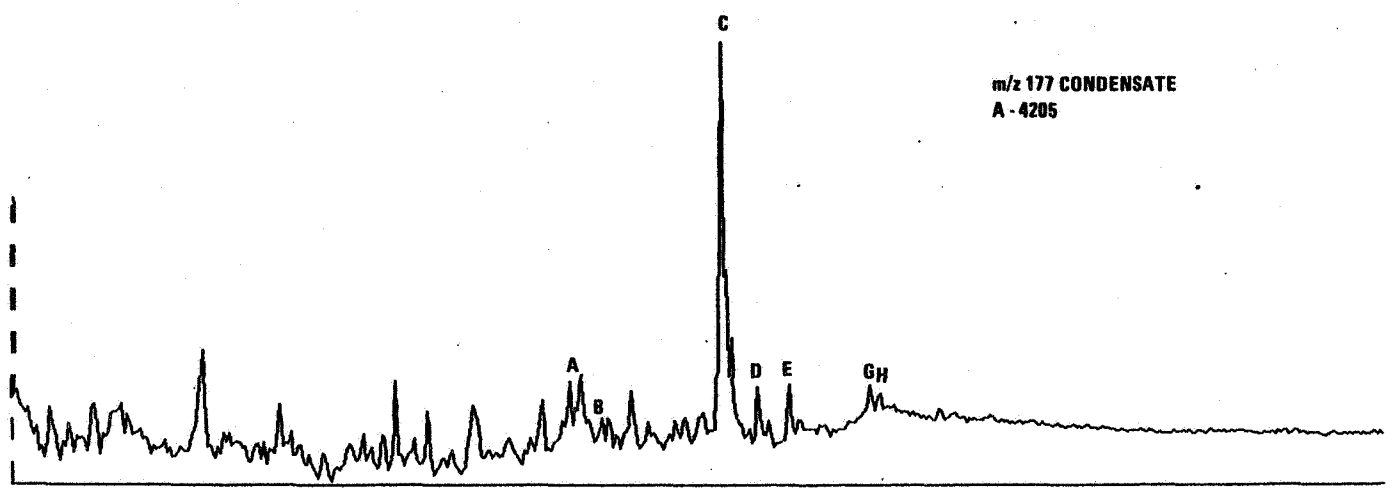
Depth

[0.0000] A4205S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
#163S B177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



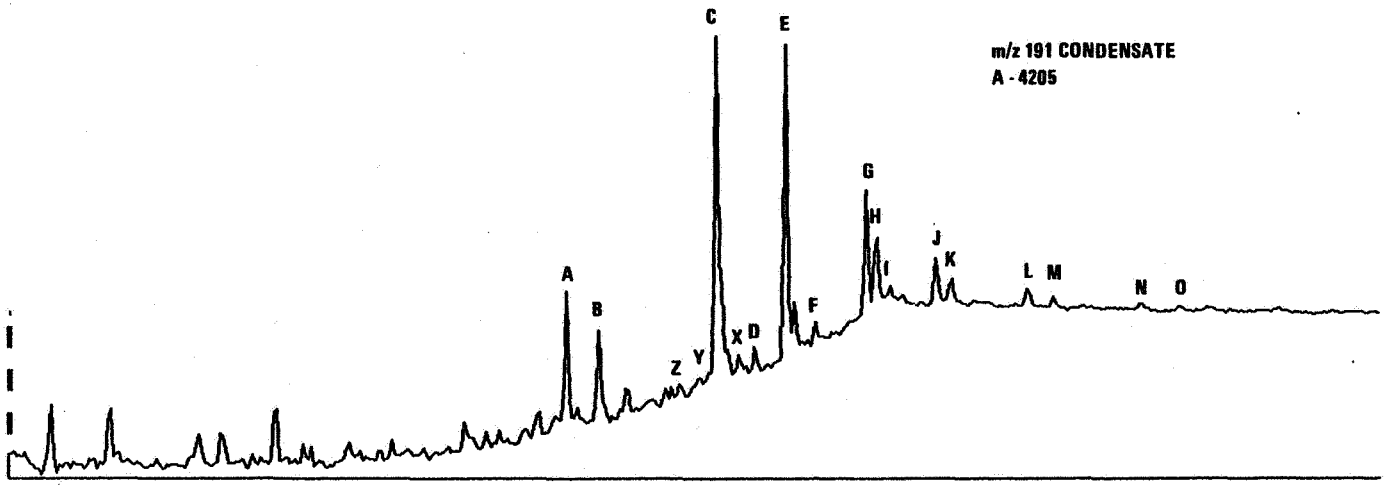
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4205S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S #177S C191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



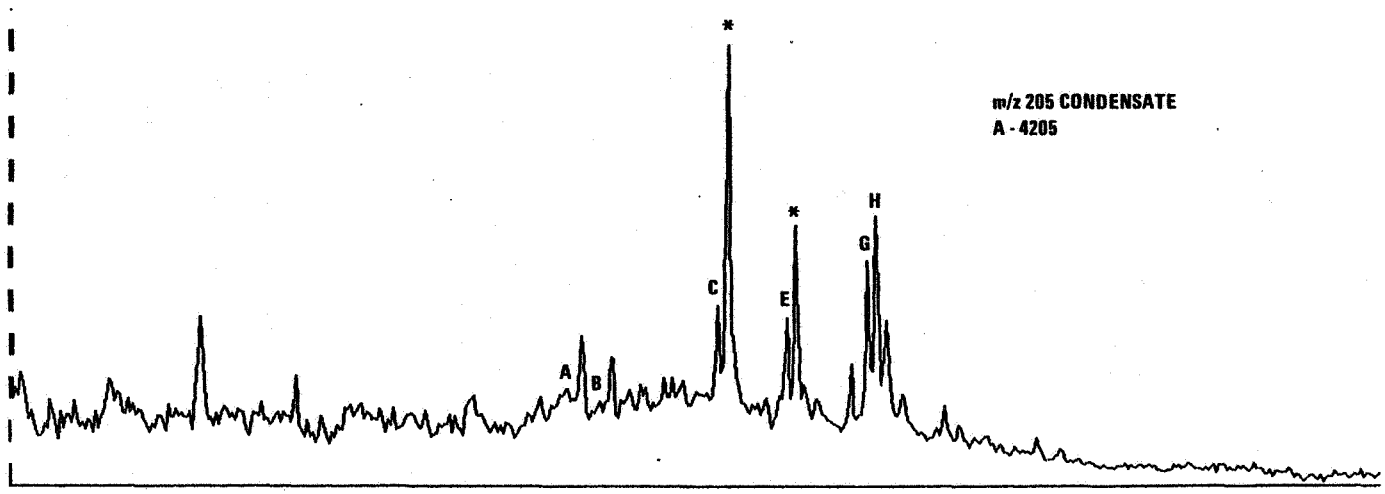
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4205S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S #191S D205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



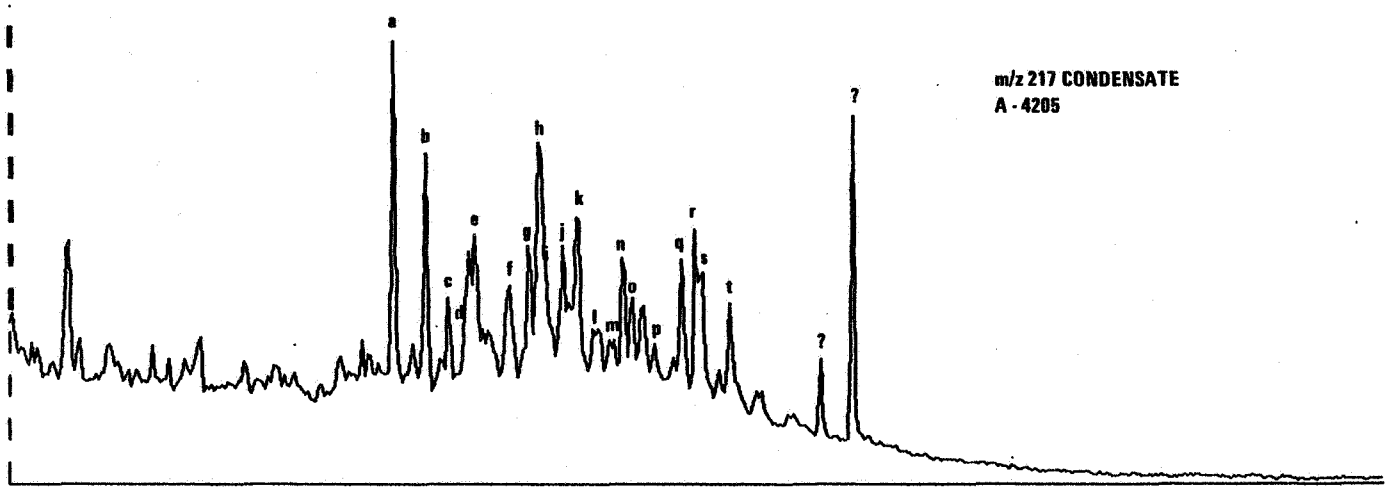
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4205S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S #205S E217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



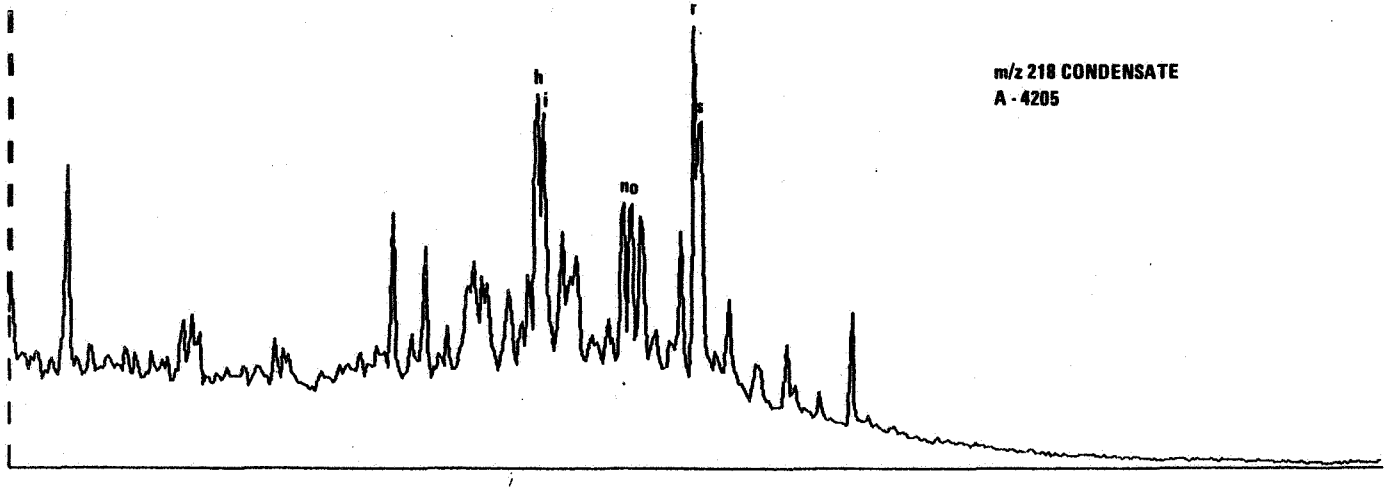
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4205S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S #217S F218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



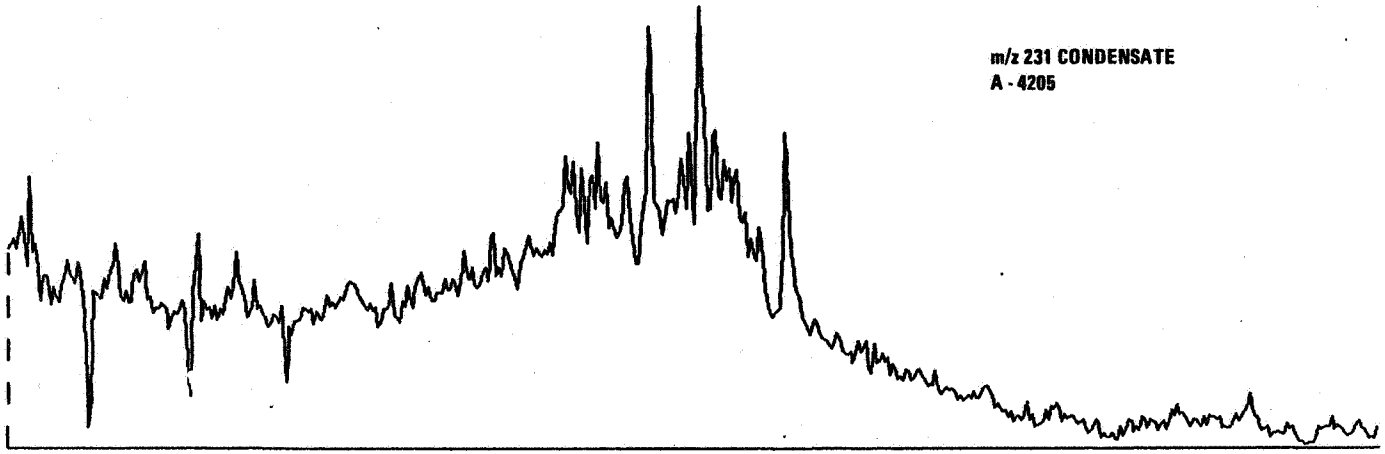
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4205S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S #218S G231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



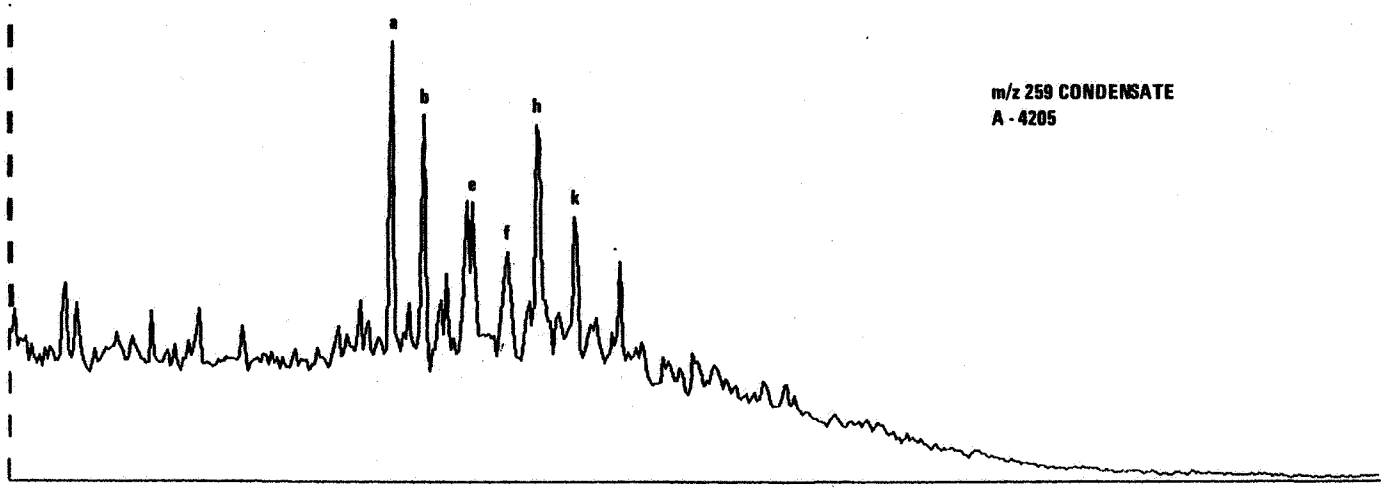
0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4205S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S #231S H259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

[0.0000] A4205S .SD RUN - 1 STATOIL KORRELASJON,7120/8-2,TRITERP./STER.22-JUN-83
A163S B177S C191S D205S E217S F218S G231S #259S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0: 0: 0 0.00 0.00



0 HRS 24 MINS 10 SECS 0 HRS 52 MINS 10 SECS

Figure d.

Mass fragmentograms from aromatic hydrocarbons of source rocks, oil shows and condensate.

Key

N	=	Naphthalenes
MN	=	Methylnaphthalenes
DMN	=	Dimethylnaphthalenes
TMN	=	Trimethylnaphthalenes
P	=	Phenanthrene
MP	=	Methylphenanthrenes
DBT	=	Dibenzothiophene
MDBT	=	Methyldibenzothiophenes
DMDBT	=	Dimethyldibenzothiophenes
•	=	Homologies in m/e 91, 92, 105 and 106 mass fragmentograms
•	=	Mono-alkyl benzenes prominent in m/z 91

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AROMATIC HYDROCARBON MASS FRAGMENTOGRAMS

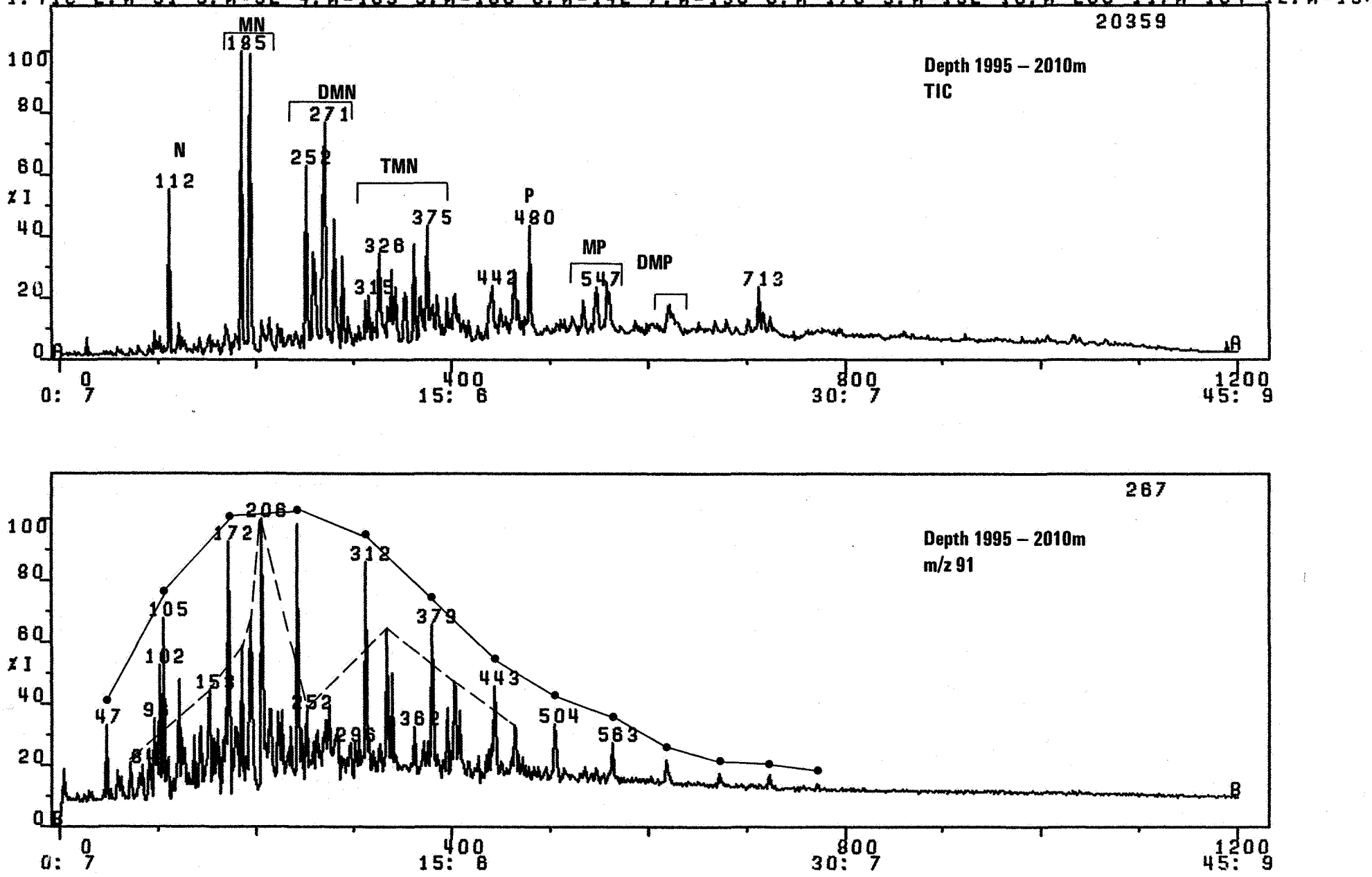
Key

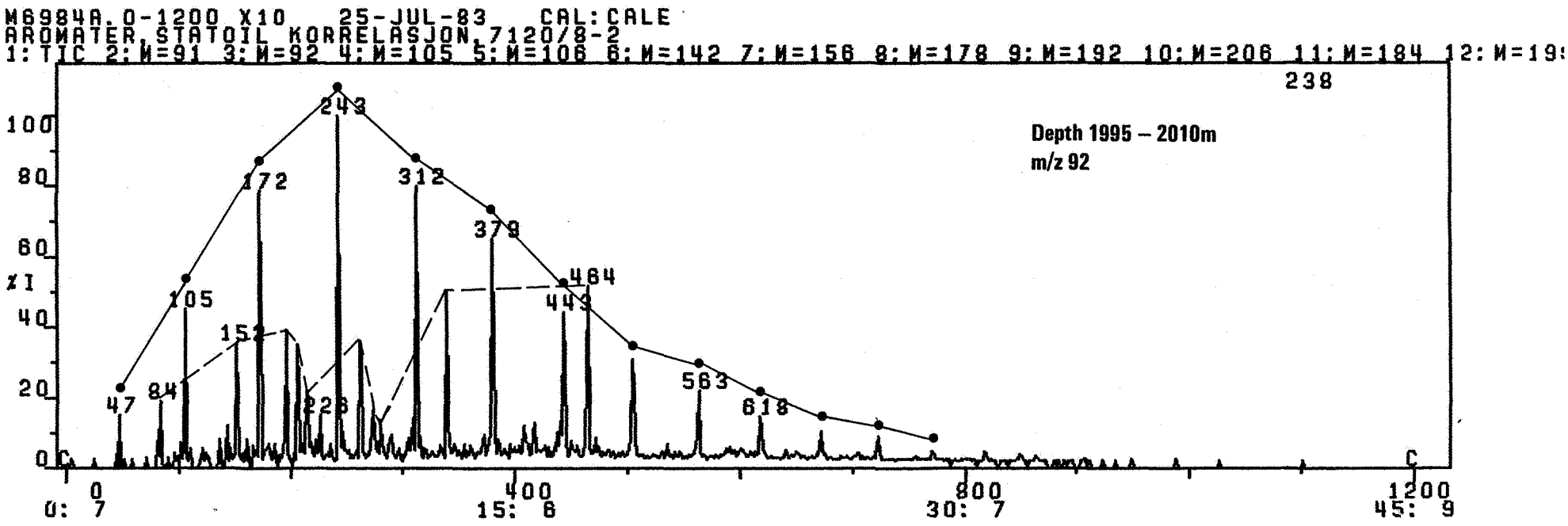
N	=	Naphthalenes
MN	=	Methylnaphthalenes
DMN	=	Dimethylnaphthalenes
TMN	=	Trimethylnaphthalenes
P	=	Phenanthrene
MP	=	Methylphenanthrenes
DBT	=	Dibenzothiophene
MDBT	=	Methyldibenzothiophenes
DMDBT	=	Dimethyldibenzothiophenes
•	=	Homologies in m/e 91, 92, 105 and 106 mass fragmentograms
•	=	Mono-alkyl benzenes prominent in m/z 91

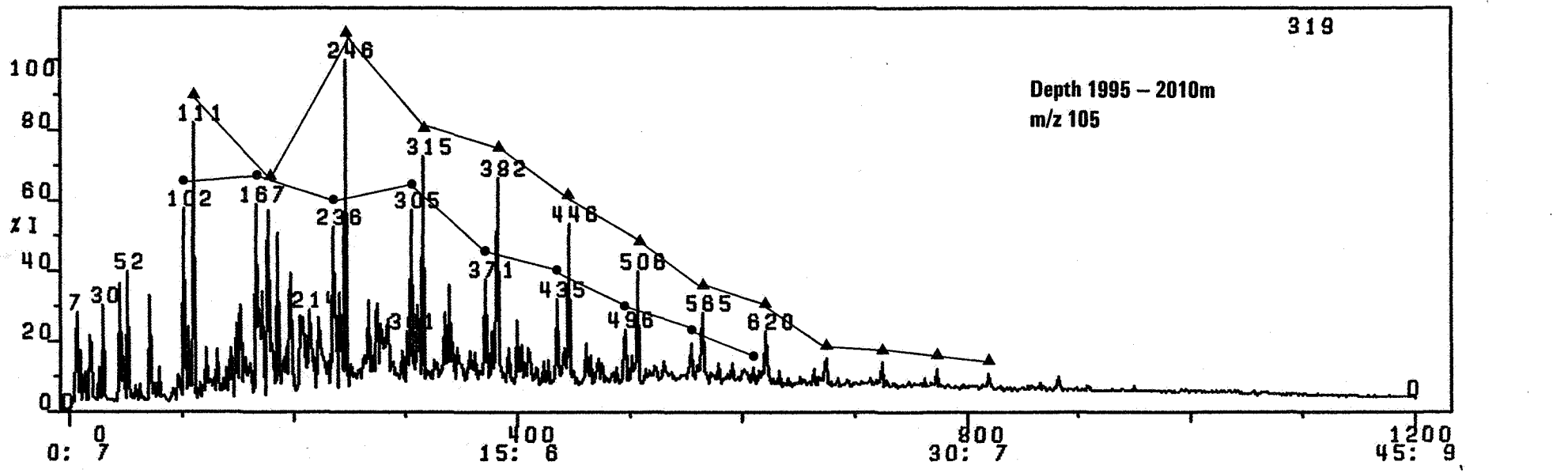
Mass Fragmentograms from Aromatic Hydrocarbons of M-6984

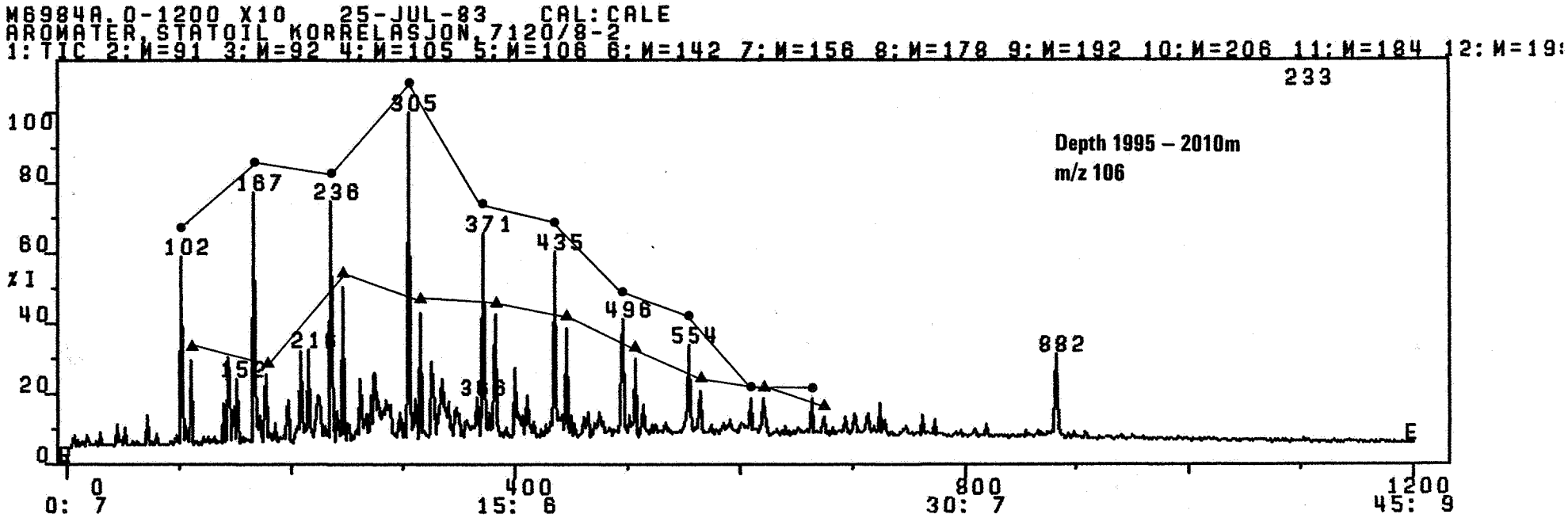
CRETACEOUS/UPPER JURASSIC CLAYSTONE

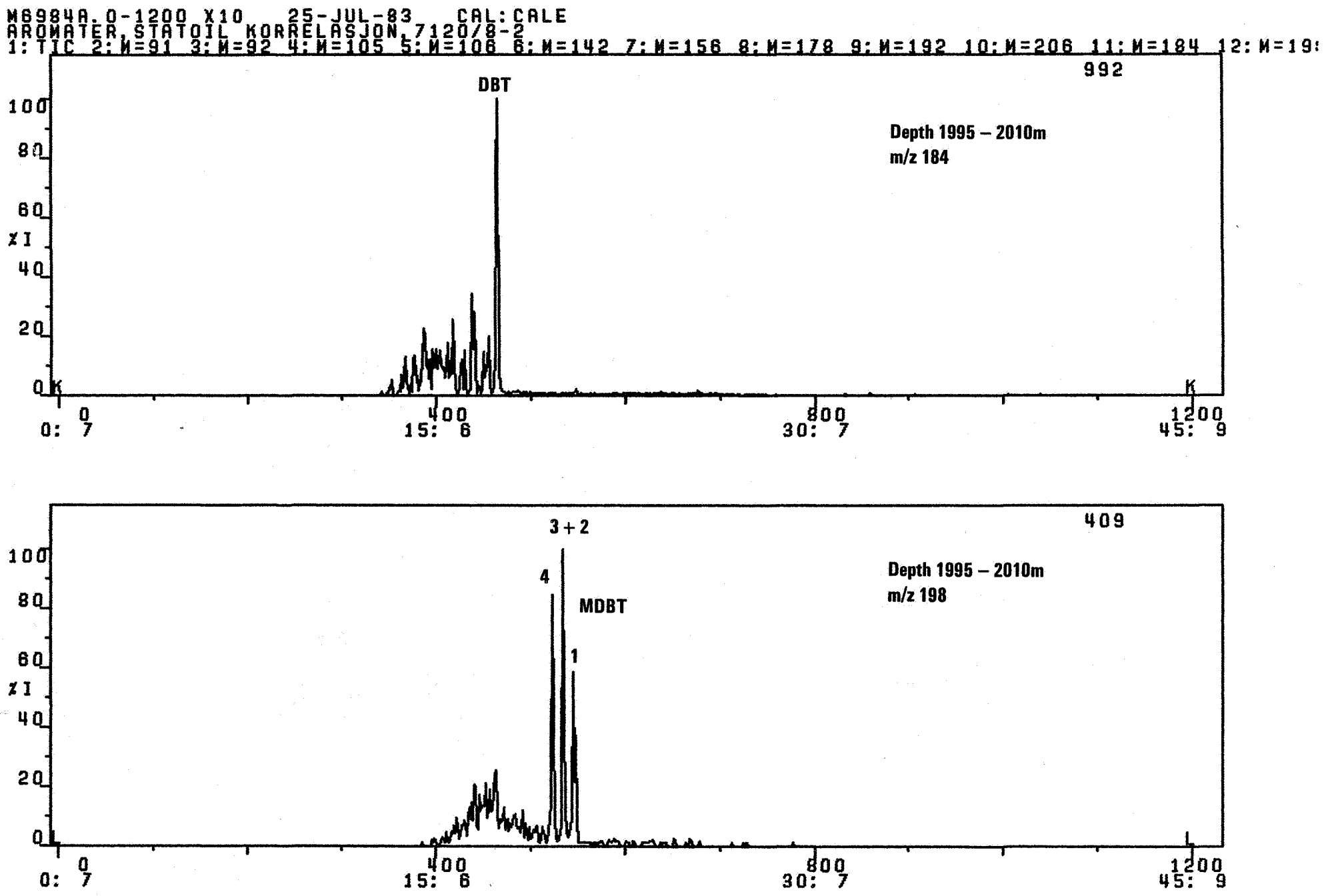
Depth 1995 - 2010 metres

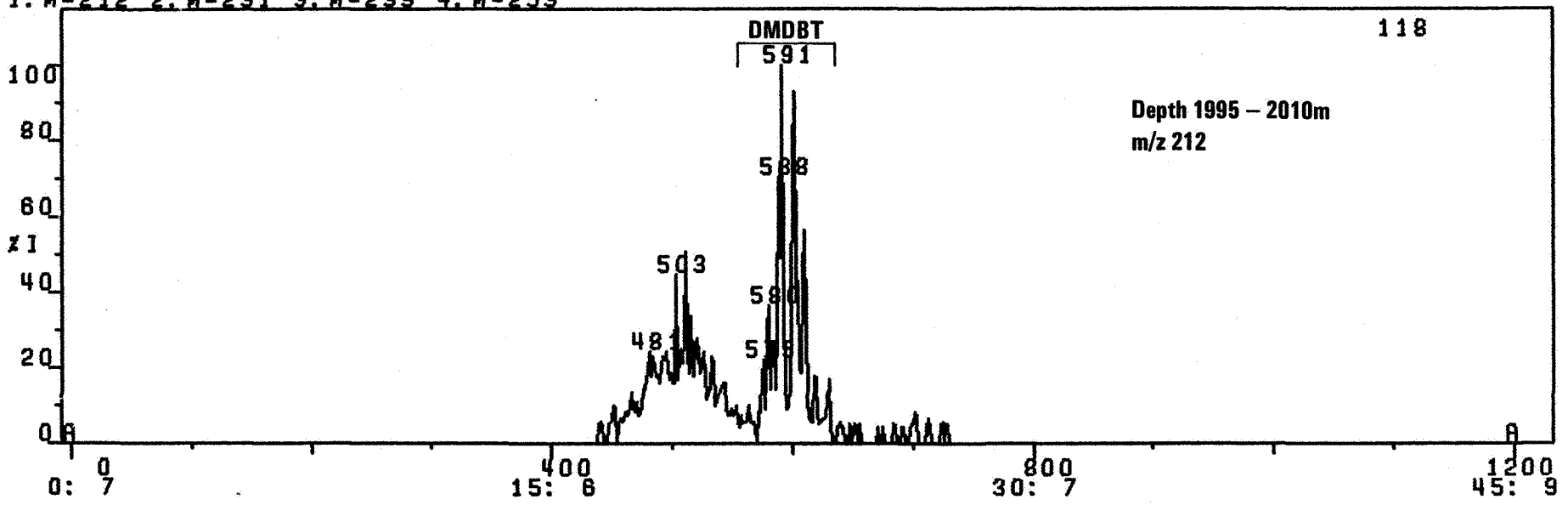

M6984A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON,7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19
20359
Depth 1995 – 2010m
TIC
MN
185
DMN
271
N
112
252
TMN
375
326
315
P
480
442
MP
547
DMP
713
xI
100
80
60
40
20
0
0
400
800
1200
0: 7
15: 8
30: 7
45: 9
267
Depth 1995 – 2010m
m/z 91
208
172
312
105
379
102
153
443
47
252
362
296
504
563

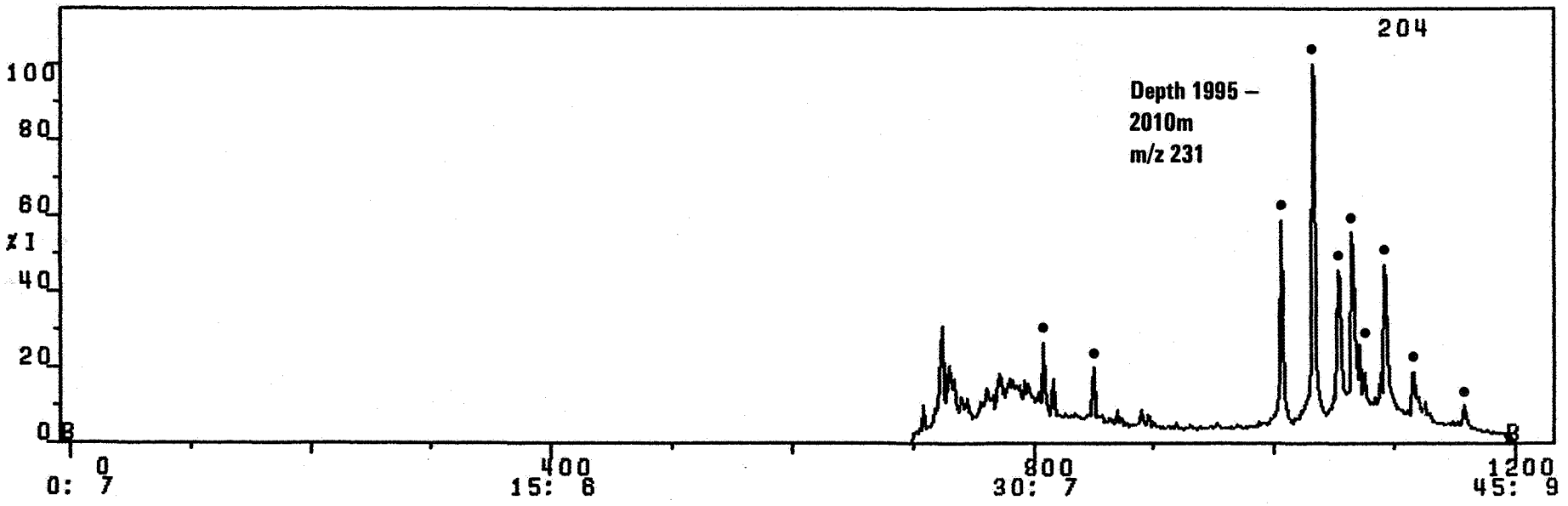

M6984A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON,7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19
238
Depth 1995 – 2010m
m/z 92
243
172
312
379
484
105
443
152
563
84
618
47
226
%I
0
400
800
1200
0: 7
15: 6
30: 7
45: 9

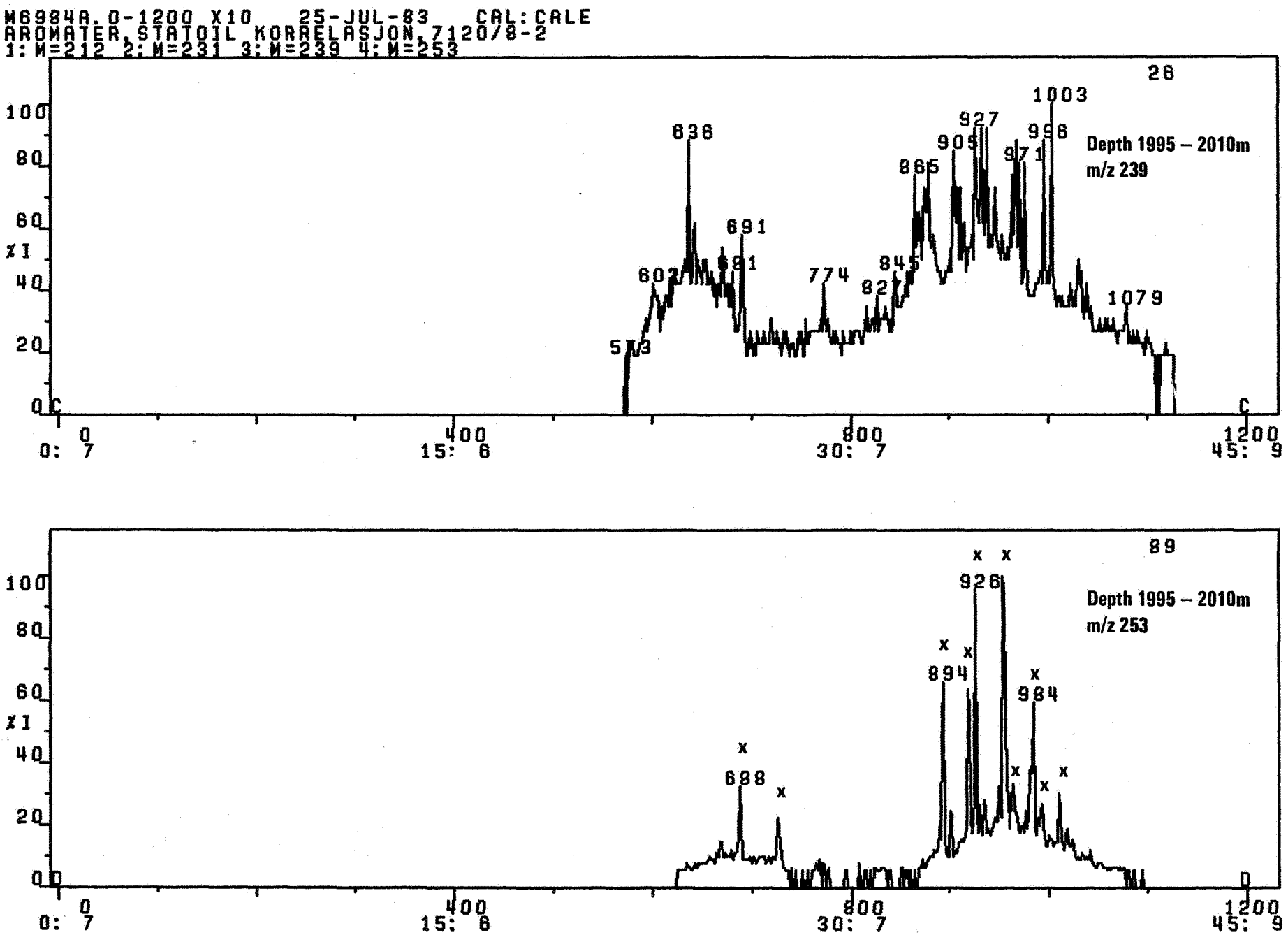

319
Depth 1995 – 2010m
m/z 105
246
111
315
382
102
167
305
446
236
508
52
371
435
585
73
214
496
620
%I
0
400
800
1200
0: 7
15: 6
30: 7
45: 9


M6984A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON,7120/8-2
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=142 7: M=156 8: M=178 9: M=192 10: M=206 11: M=184 12: M=19
Depth 1995 – 2010m
m/z 106
233
805
167
236
102
371
435
496
554
882
216
152
366
100
80
60
40
20
0
%I
0
400
800
1200
0: 7
15: 8
30: 7
45: 9


M6984A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON,7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19
992
DBT
Depth 1995 – 2010m
m/z 184
100
80
60
%I
40
20
0
0
400
800
1200
0: 7
15: 6
30: 7
45: 9
409
3+2
4
MDBT
1
Depth 1995 – 2010m
m/z 198


M6984A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON,7120/8-2
1: M=212 2: M=231 3: M=239 4: M=253
DMDBT
591
118
Depth 1995 – 2010m
m/z 212
588
503
581
481
575
100
80
60
%I
40
20
0
0
400
800
1200
0: 7
15: 6
30: 7
45: 9


204
Depth 1995 –
2010m
m/z 231
100
80
60
%I
40
20
0
0
400
800
1200
0: 7
15: 6
30: 7
45: 9


M6984A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON,7120/8-2
1: M=212 2: M=231 3: M=239 4: M=253
26
Depth 1995 – 2010m
m/z 239
89
Depth 1995 – 2010m
m/z 253
xI
0
0: 7
400
15: 6
800
30: 7
1200
45: 9

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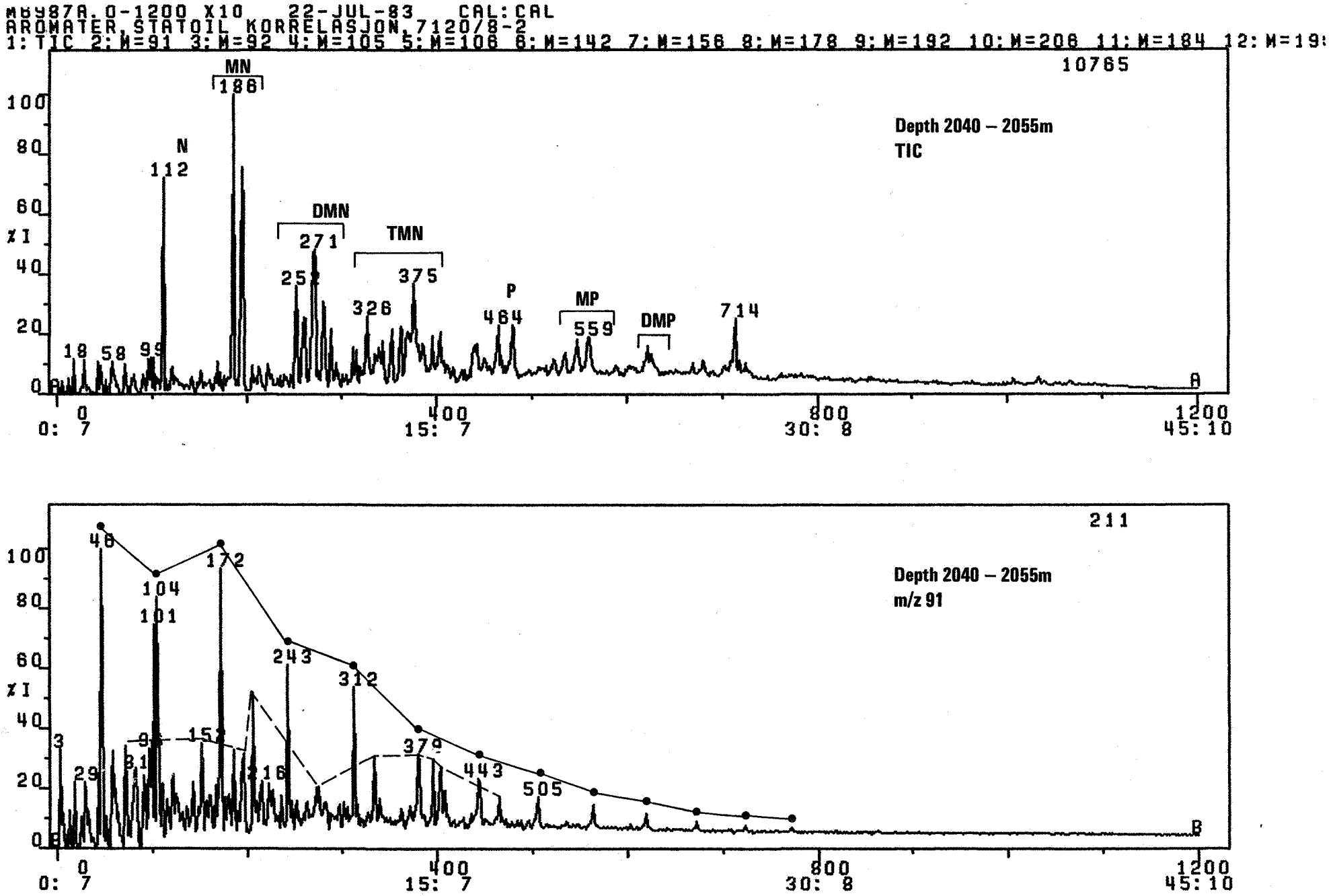
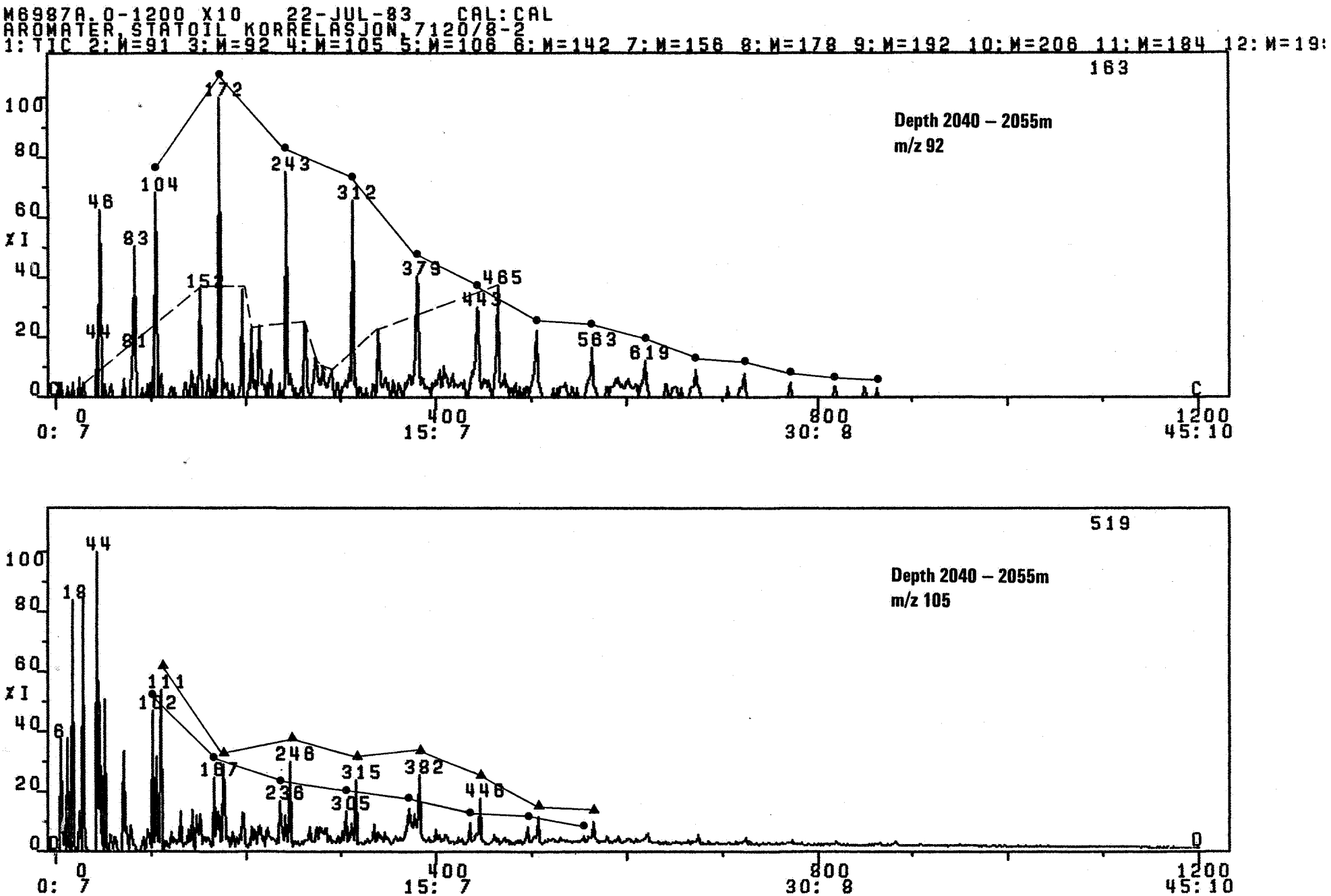
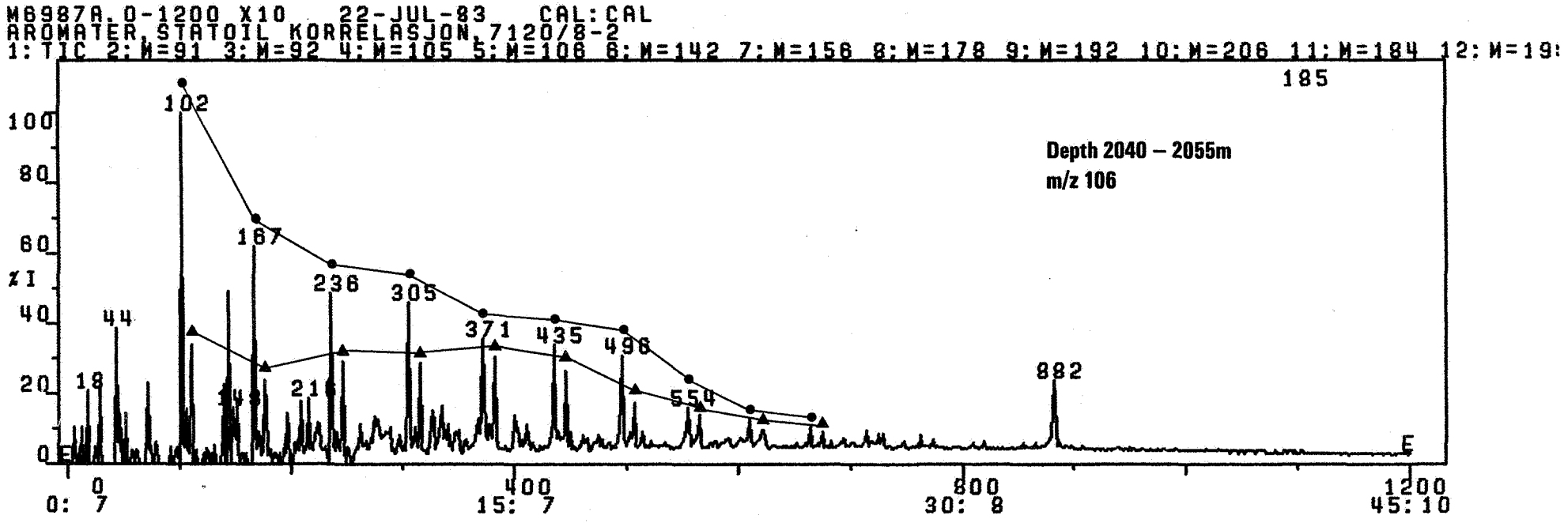
Mass Fragmentograms from Aromatic Hydrocarbons of M-6987

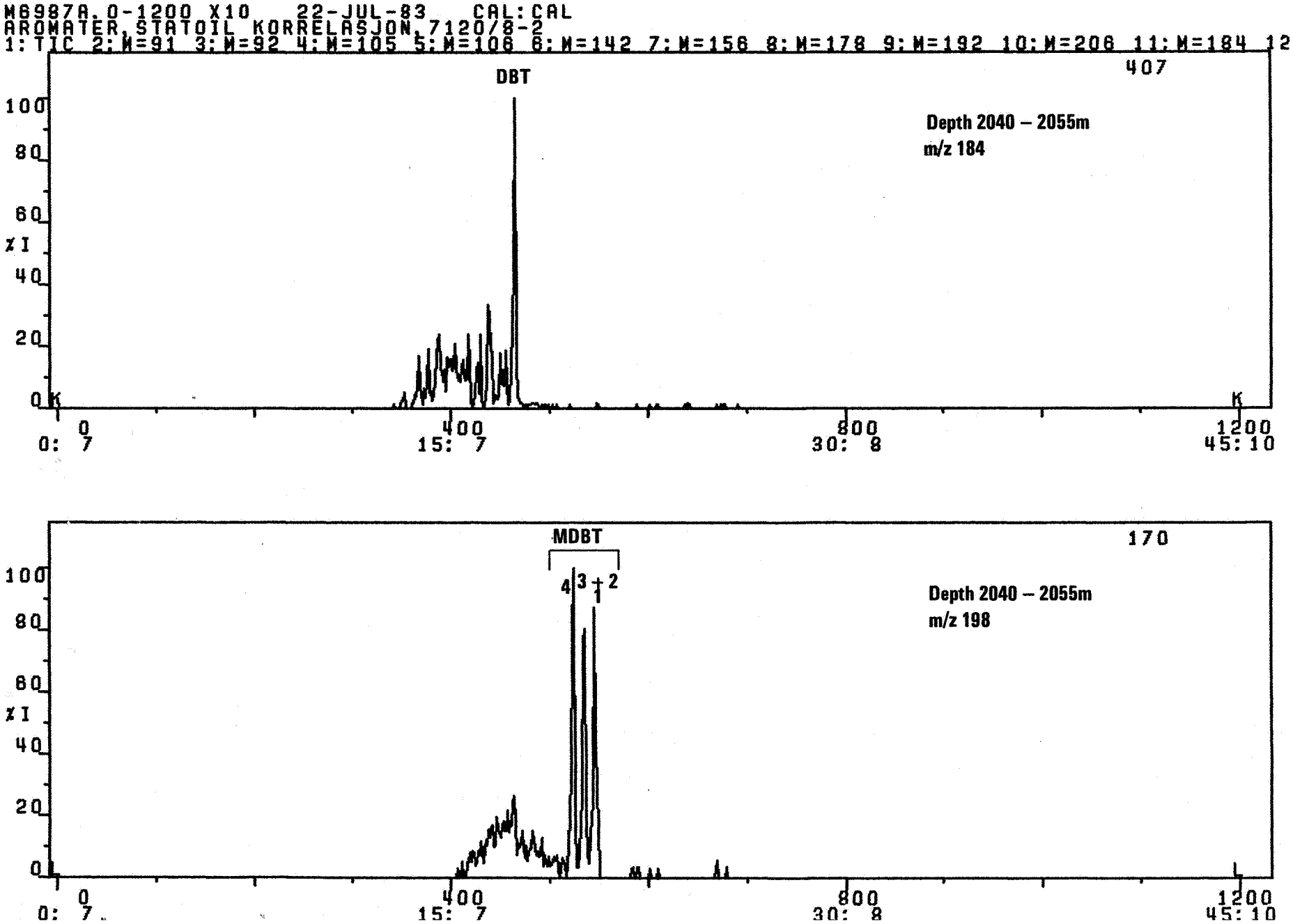
UPPER JURASSIC CLAYSTONE

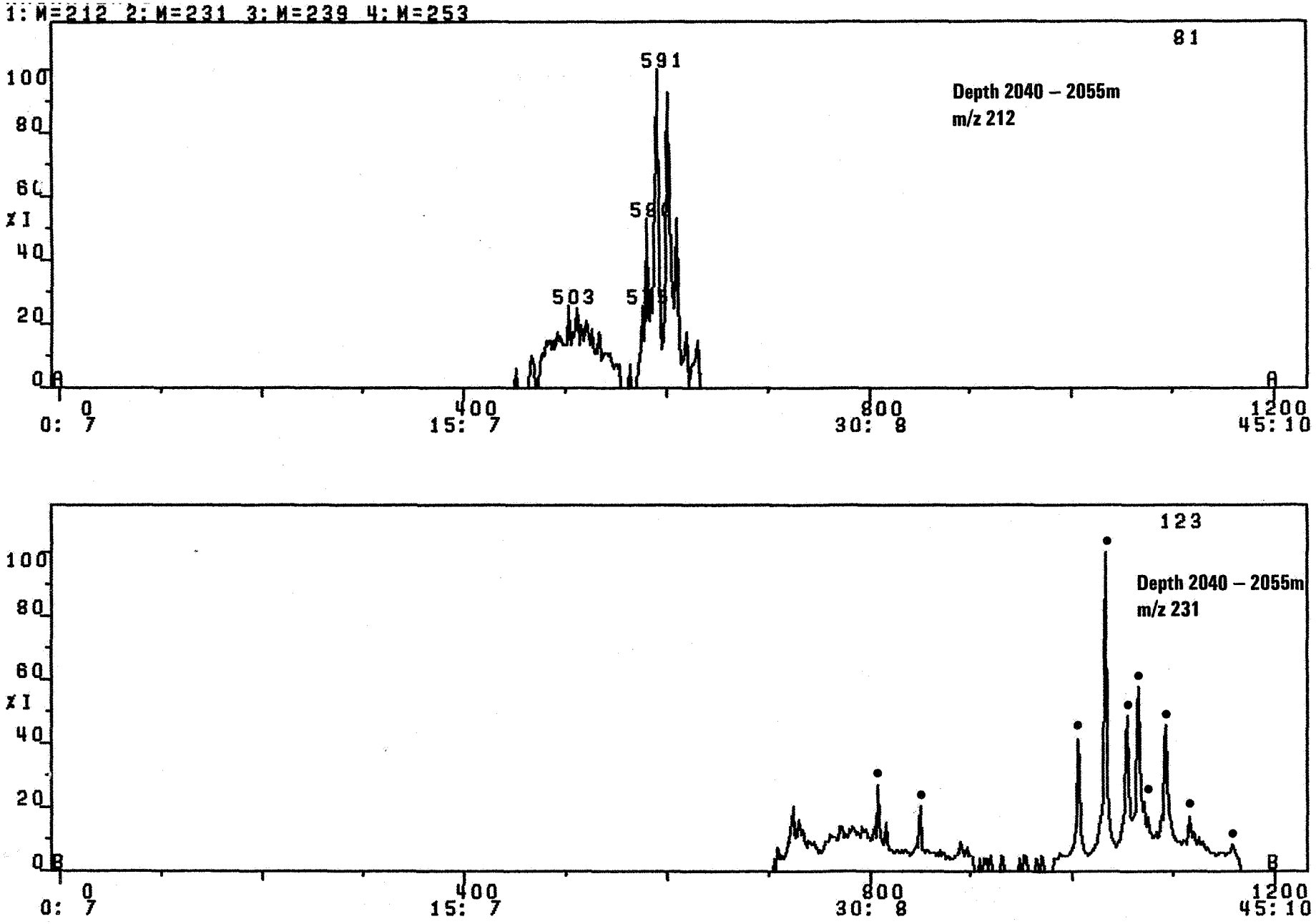
Depth 2040 - 2055 metres

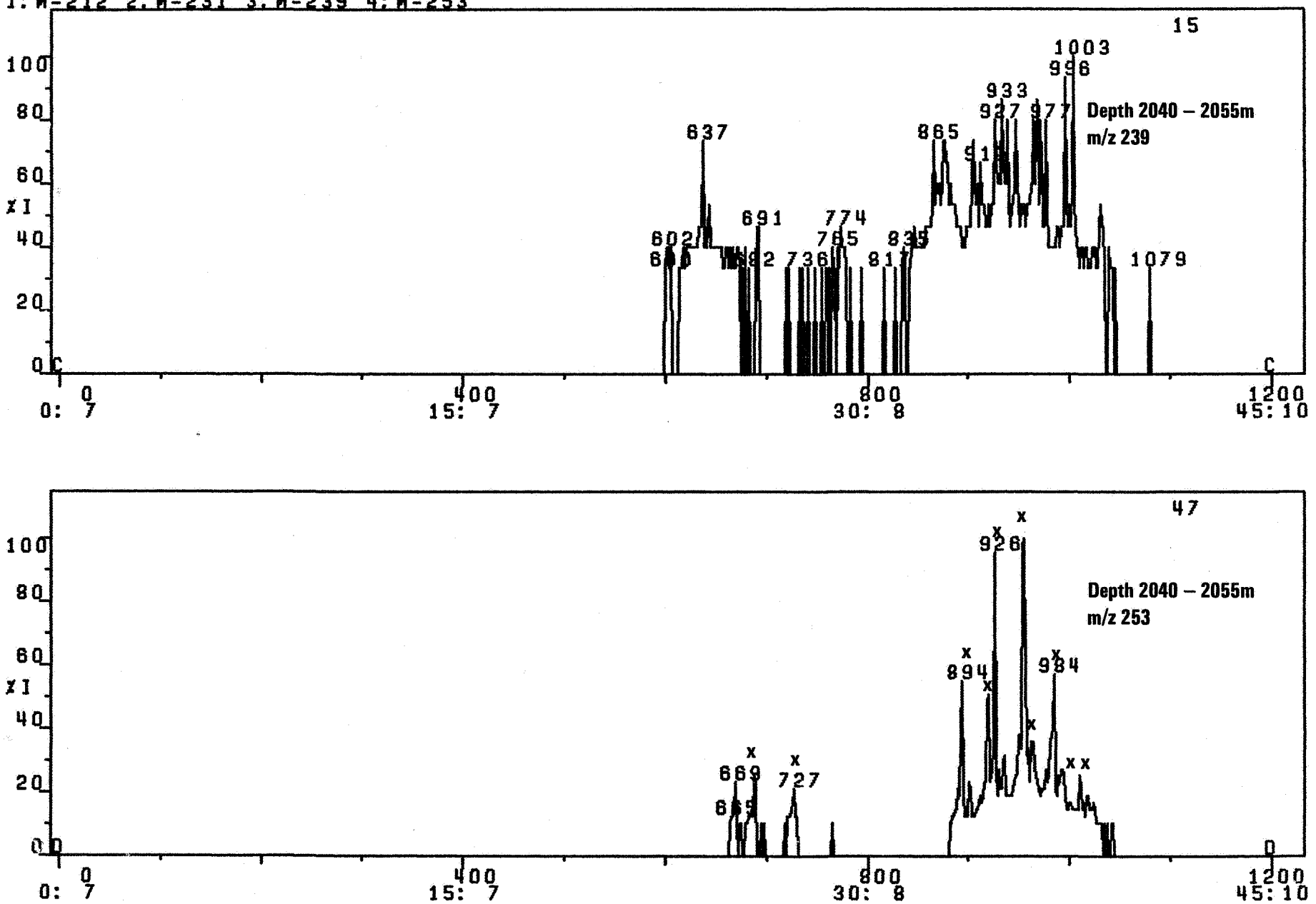

M8987A.0-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON,7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19
10765
Depth 2040 – 2055m
TIC
MN
188
N
112
DMN
271
TMN
375
P
464
MP
559
DMP
714
326
252
18
58
99
A
211
Depth 2040 – 2055m
m/z 91
48
104
101
172
243
312
379
443
505
3
29
81
151
216
B
xI
0
400
800
1200
0: 7
15: 7
30: 8
45: 10


M6987A.0-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON,7120/8-2
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=142 7: M=156 8: M=178 9: M=192 10: M=206 11: M=184 12: M=19
163
Depth 2040 – 2055m
m/z 92
519
Depth 2040 – 2055m
m/z 105
xI
0: 7
15: 7
30: 8
45: 10


M86987A.D-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON,7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19:
Depth 2040 – 2055m
m/z 106
%I
100
80
60
40
20
0
102
185
167
236
305
371
435
496
554
882
44
18
0
400
800
1200
0: 7
15: 7
30: 8
45:10


M6987A.0-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON,7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19:
DBT
407
Depth 2040 – 2055m
m/z 184
100
80
60
%I
40
20
0
0
400
800
1200
0: 7
15: 7
30: 8
45: 10
MDBT
170
4 3 2
1
Depth 2040 – 2055m
m/z 198


1: M=212 2: M=231 3: M=239 4: M=253
81
591
503
Depth 2040 – 2055m
m/z 212
100
80
60
40
20
0
0
400
800
1200
0: 7
15: 7
30: 8
45: 10
123
Depth 2040 – 2055m
m/z 231


M6987A.0-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON,7120/8-2
1: M=212 2: M=231 3: M=239 4: M=253
15
1003
996
933
927 977
Depth 2040 – 2055m
m/z 239
637
865
691
774
602
765
835
736
817
1079
xI
100
80
60
40
20
0
0: 7
400
15: 7
800
30: 8
1200
45: 10
47
926
Depth 2040 – 2055m
m/z 253
894
984
669
727
xI
100
80
60
40
20
0
0: 7
400
15: 7
800
30: 8
1200
45: 10

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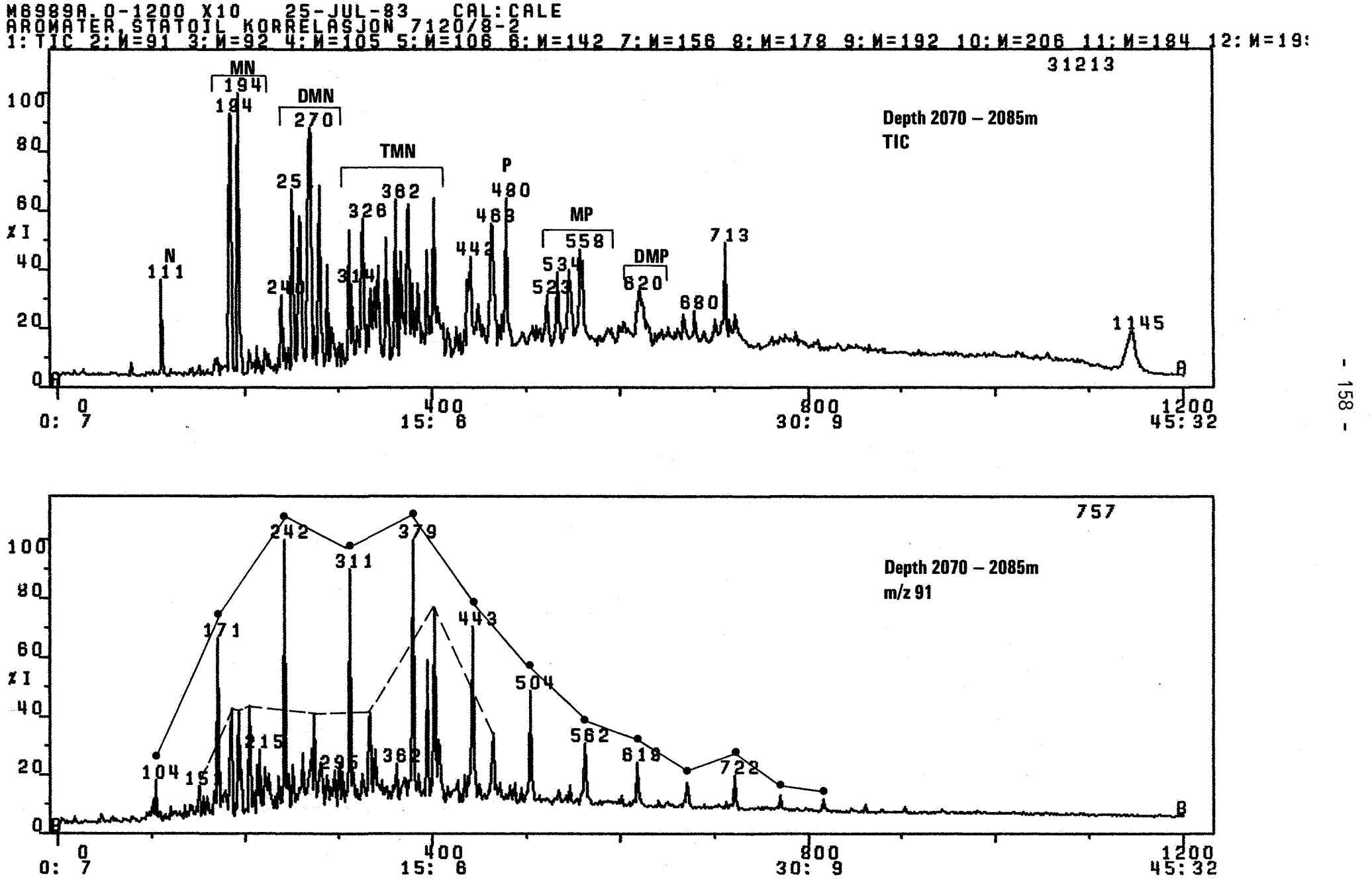
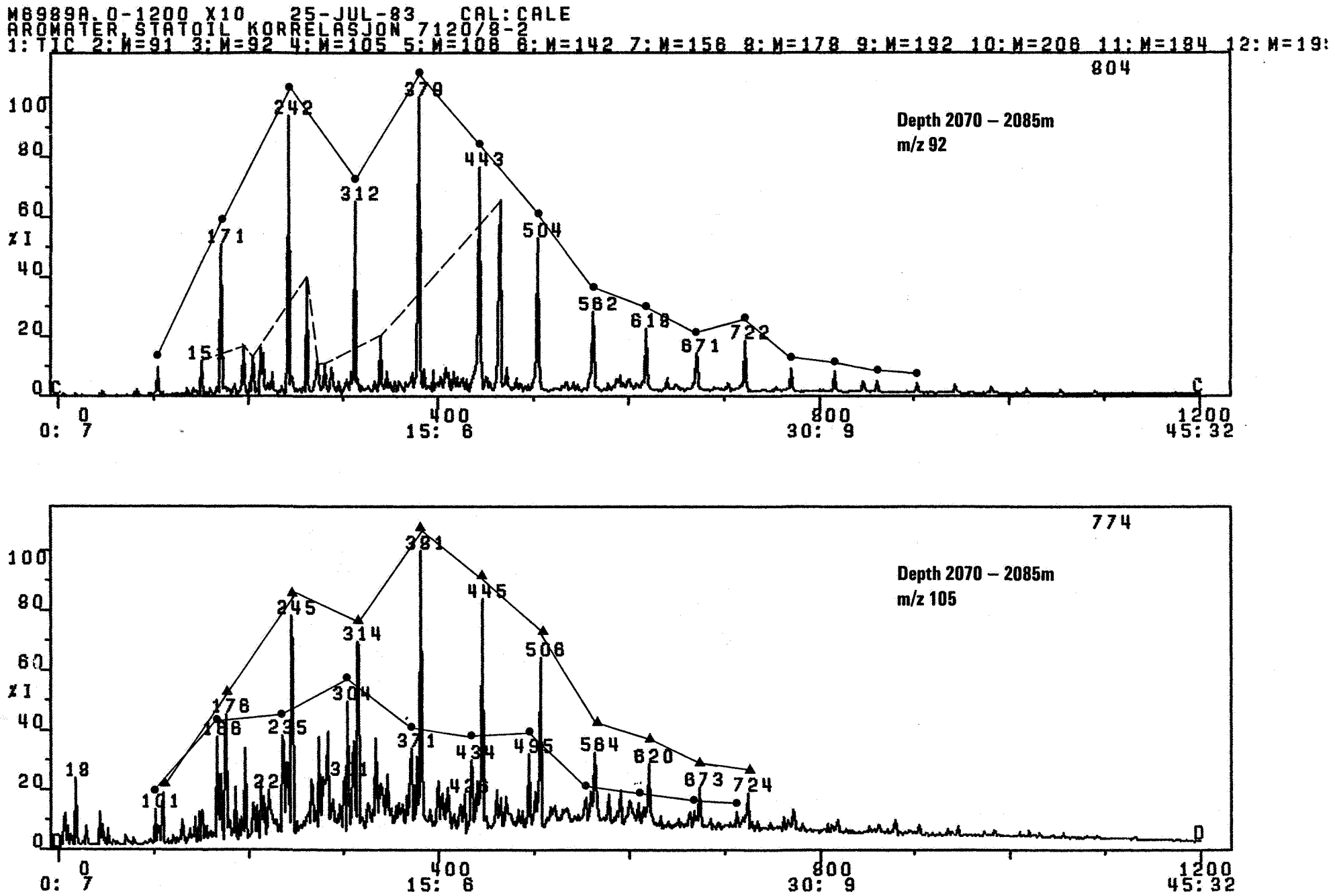
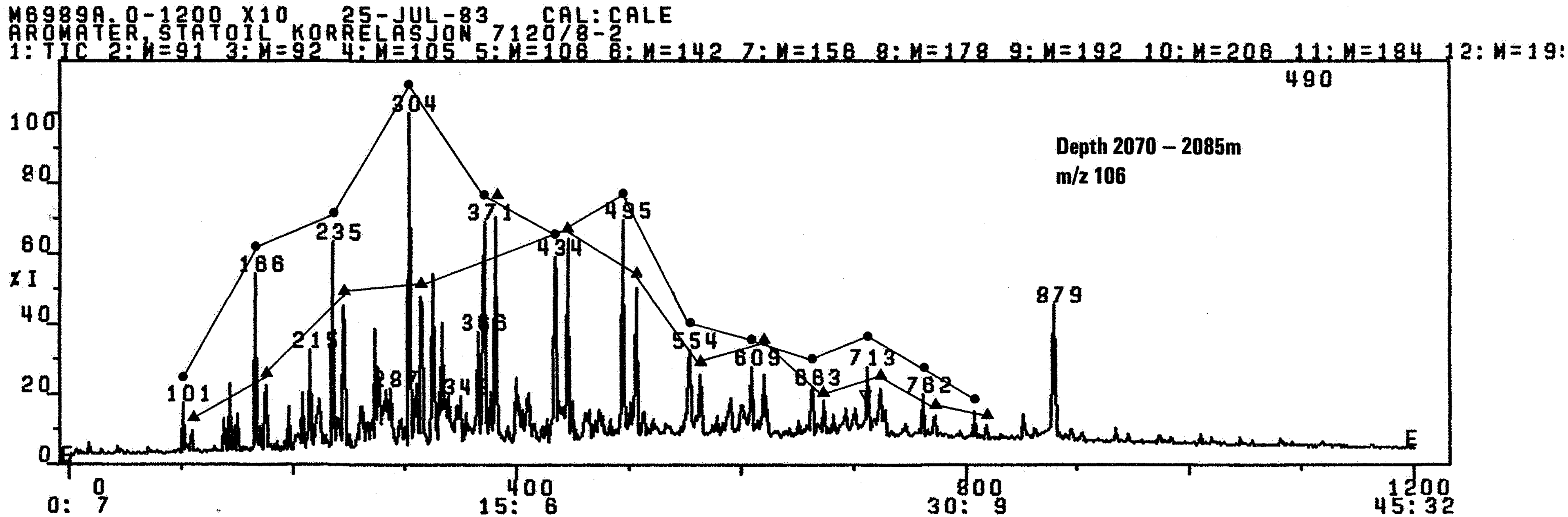
Mass Fragmentograms from Aromatic Hydrocarbons of M-6989

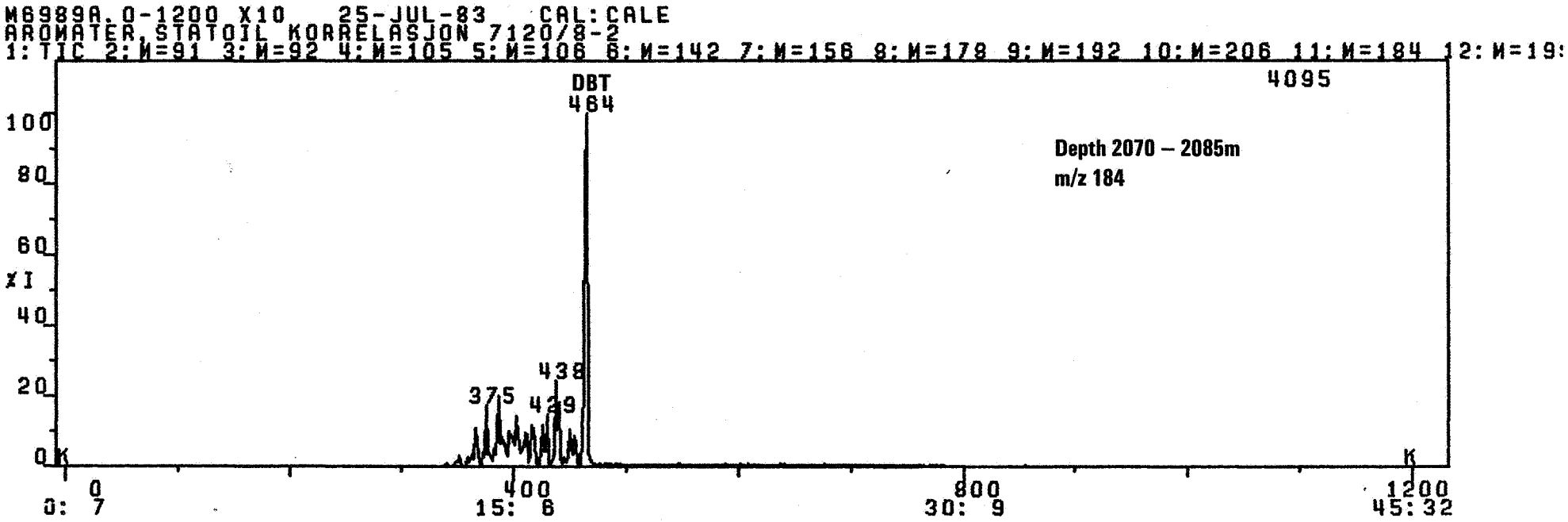
UPPER JURASSIC CLAYSTONE

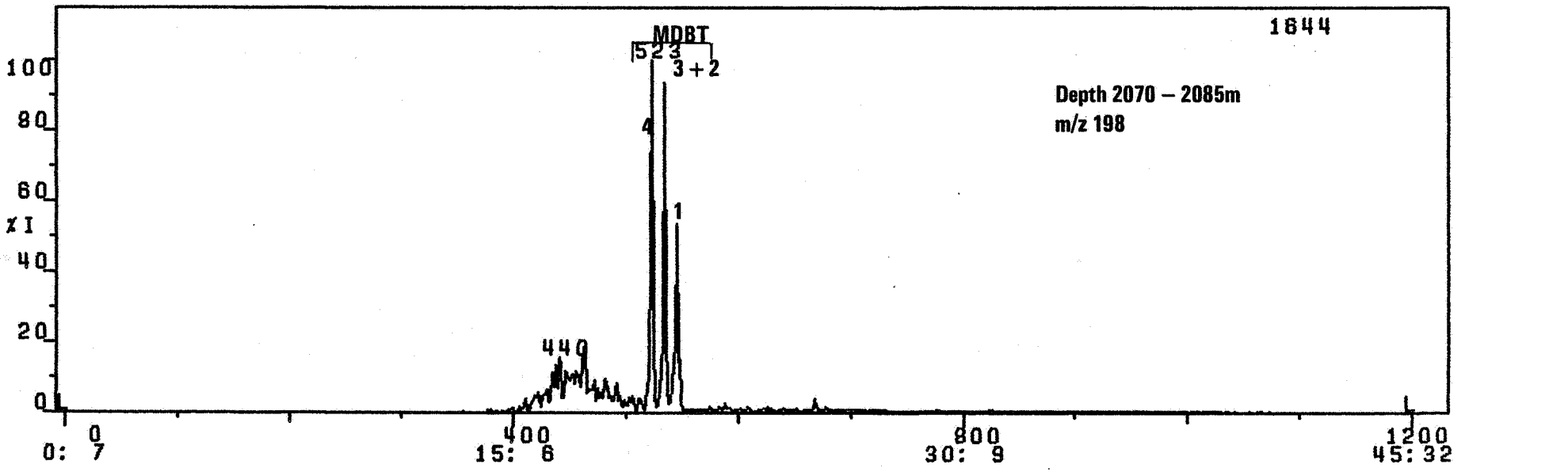
Depth 2070 - 2085 metres

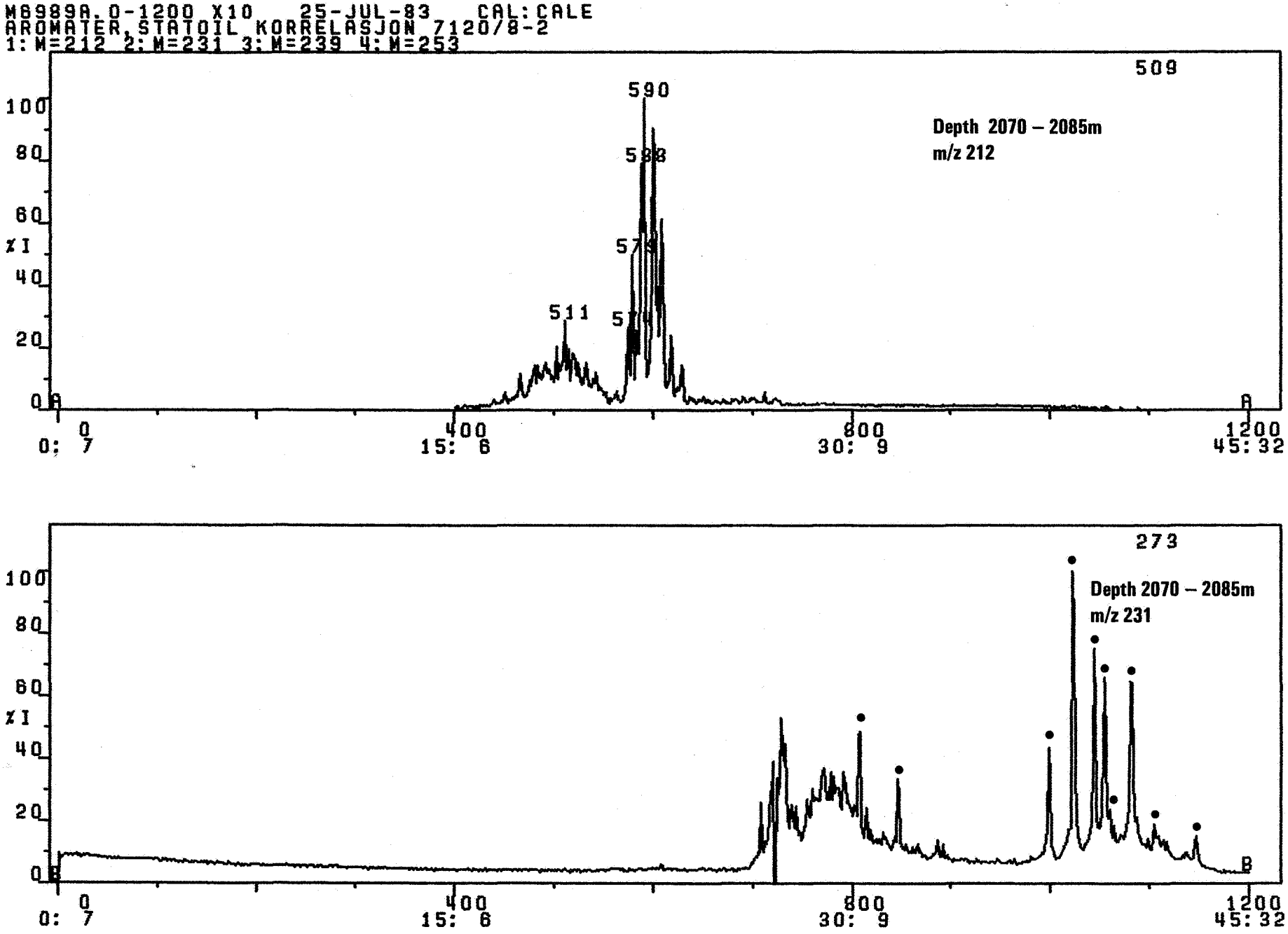

M6989A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19
31213
Depth 2070 – 2085m
TIC
MN
194
DMN
270
TMN
382
P
480
MP
558
DMP
820
N
111
184
25
240
326
314
442
468
523
534
680
713
1145
B
xI
100
80
60
40
20
0
0
400
800
1200
0: 7
15: 6
30: 9
45: 32
757
Depth 2070 – 2085m
m/z 91
242
311
379
171
443
504
562
619
728
104
151
215
295
362
B

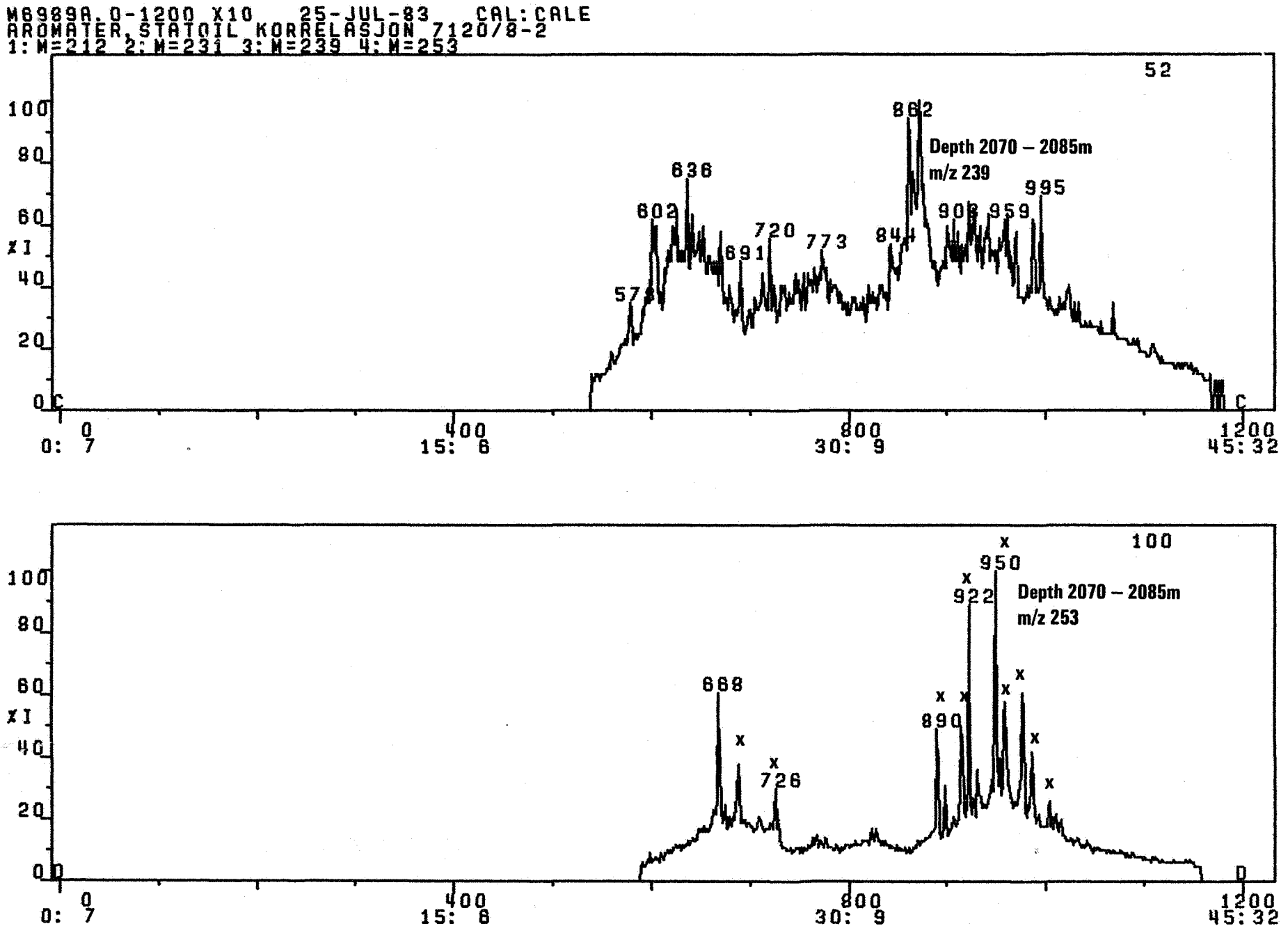

M6989A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=108 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19:
804
Depth 2070 – 2085m
m/z 92
242
378
312
443
171
504
582
618
671
722
15
774
Depth 2070 – 2085m
m/z 105
381
445
245
314
508
178
304
186
235
371
434
495
584
620
673
724
18
101
22
0: 7
15: 6
30: 9
45: 32


M8989A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=142 7: M=156 8: M=178 9: M=192 10: M=206 11: M=184 12: M=19
Depth 2070 – 2085m
m/z 106
%I
490
304
371
235
434
495
166
879
215
386
554
609
683
713
762
287
101
0: 7
15: 6
30: 9
45:32


M6989A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=142 7: M=156 8: M=178 9: M=192 10: M=206 11: M=184 12: M=19:
DBT
464
4095
Depth 2070 – 2085m
m/z 184
438
375
429
100
80
60
xI
40
20
0
0
400
800
1200
0: 7
15: 6
30: 9
45: 32


MDBT
1644
523
3+2
4
1
Depth 2070 – 2085m
m/z 198
440
100
80
60
xI
40
20
0
0
400
800
1200
0: 7
15: 6
30: 9
45: 32


M8989A.D-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1: M=212 2: M=231 3: M=239 4: M=253
509
590
588
578
511
574
Depth 2070 – 2085m
m/z 212
100
80
60
%I
40
20
0
A
A
0
400
800
1200
0: 7
15: 6
30: 9
45: 32
273
Depth 2070 – 2085m
m/z 231
100
80
60
%I
40
20
0
B
B
0
400
800
1200
0: 7
15: 6
30: 9
45: 32

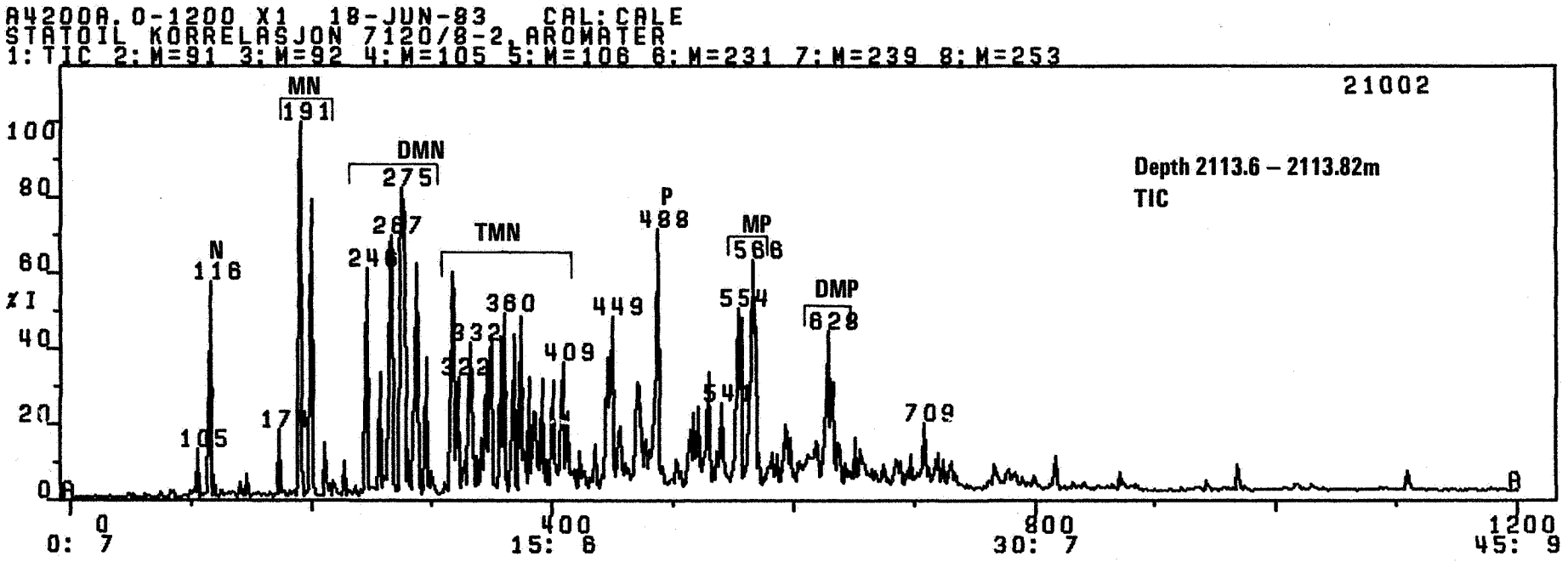

M69889A.0-1200 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1: M=212 2: M=231 3: M=239 4: M=253
52
Depth 2070 – 2085m
m/z 239
862
636
602
720
773
691
844
995
908
959
573
100
80
60
xI
40
20
0
0
400
800
1200
0: 7
15: 8
30: 9
45: 32
100
Depth 2070 – 2085m
m/z 253
950
922
890
668
726

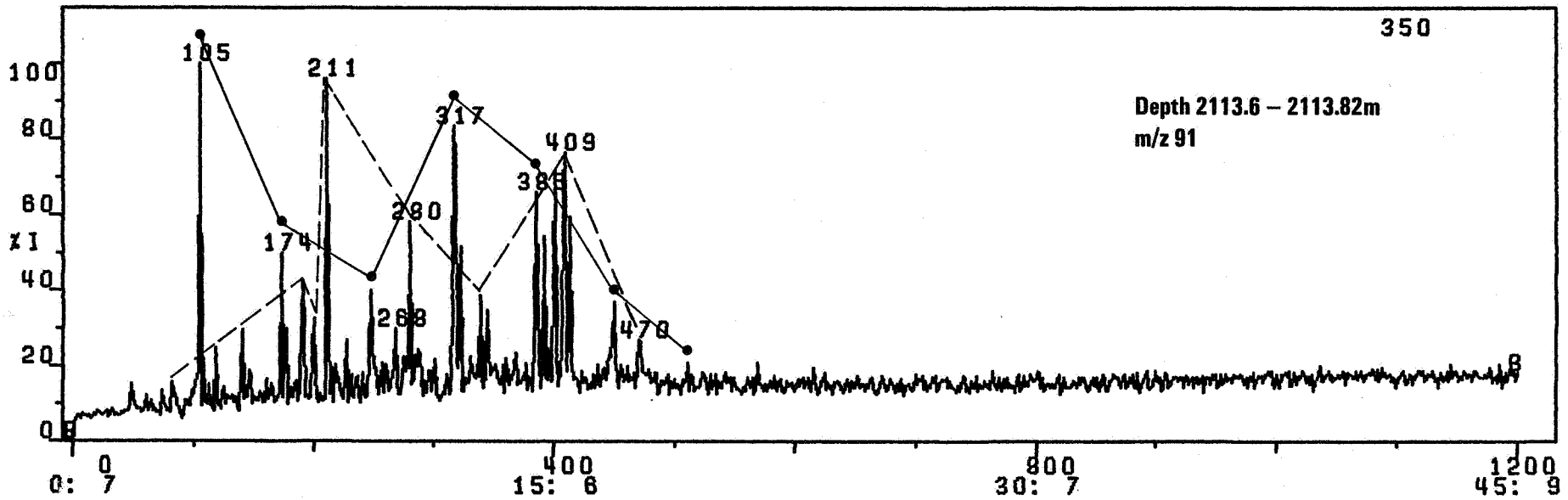
IKU

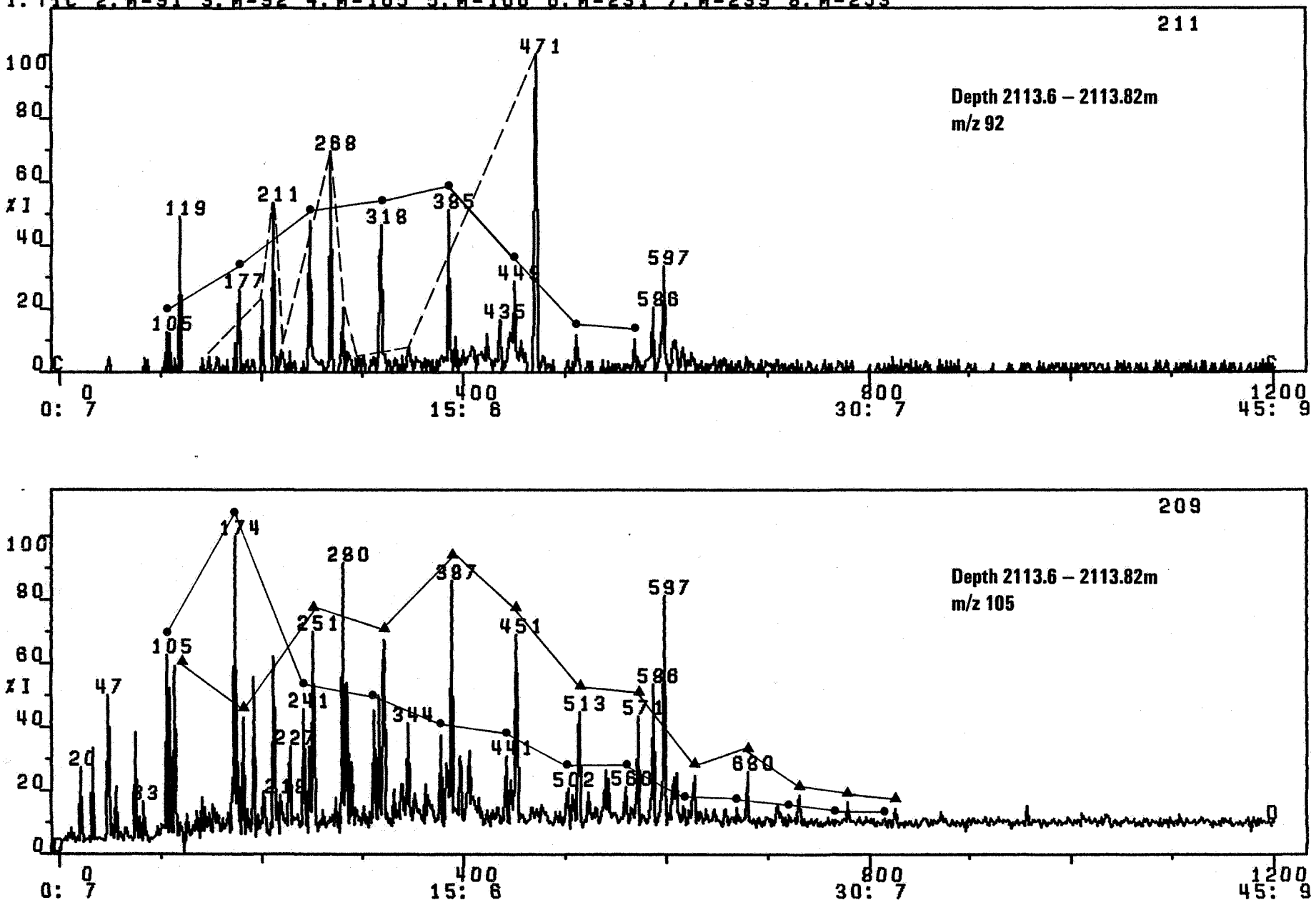
Mass Fragmentograms from Aromatic Hydrocarbons of A-4200

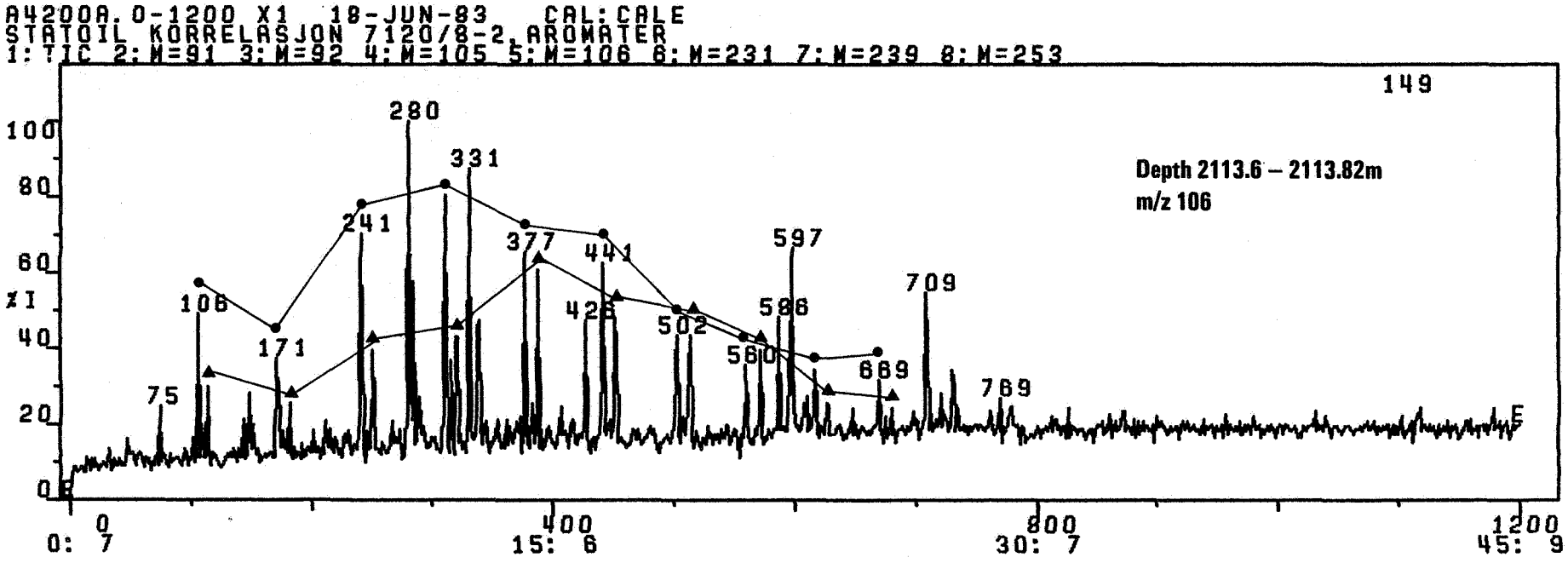
LOWER JURASSIC CLAYSTONE

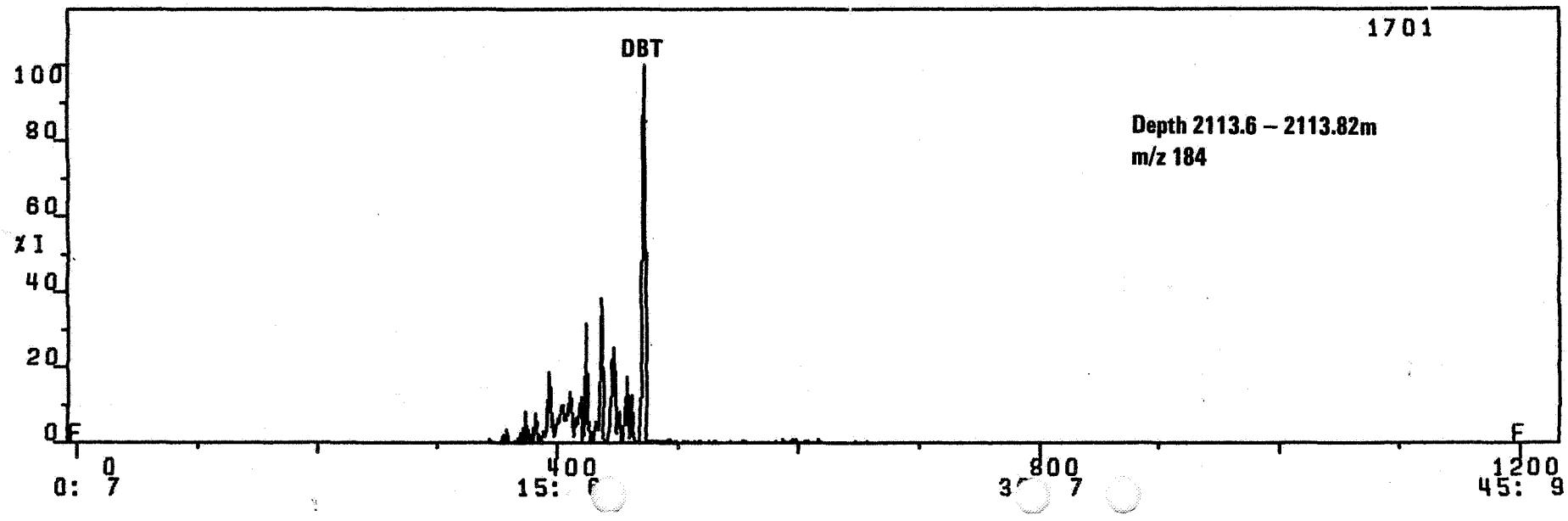
Depth 2113.6 - 2113.82 metres

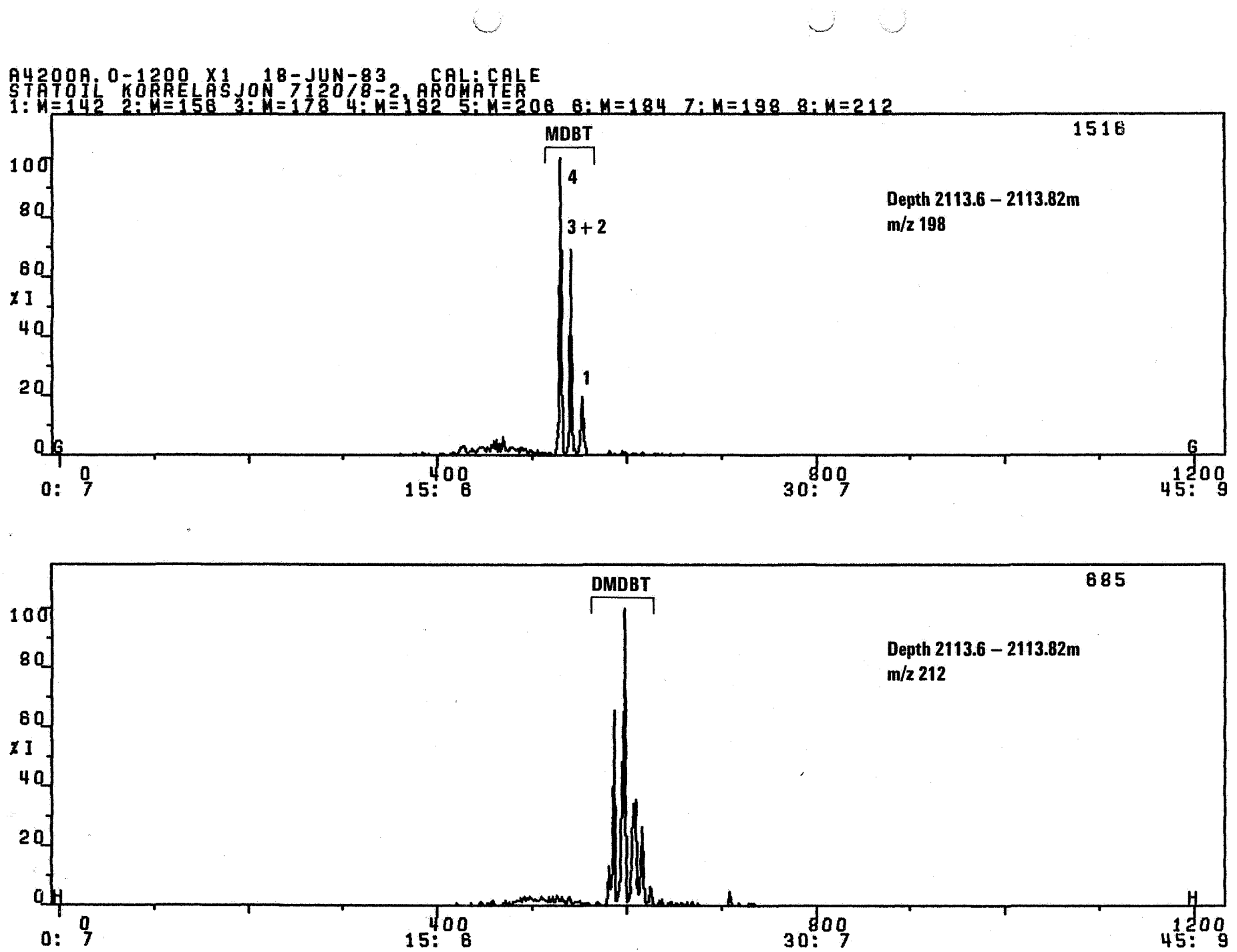

A4200A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON 7120/8-2, AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253
21002
Depth 2113.6 – 2113.82m
TIC
MN
191
DMN
275
TMN
N
116
P
488
MP
566
DMP
828
105
171
246
287
322
332
380
409
449
554
709
xI
0: 7
15: 6
30: 7
45: 9

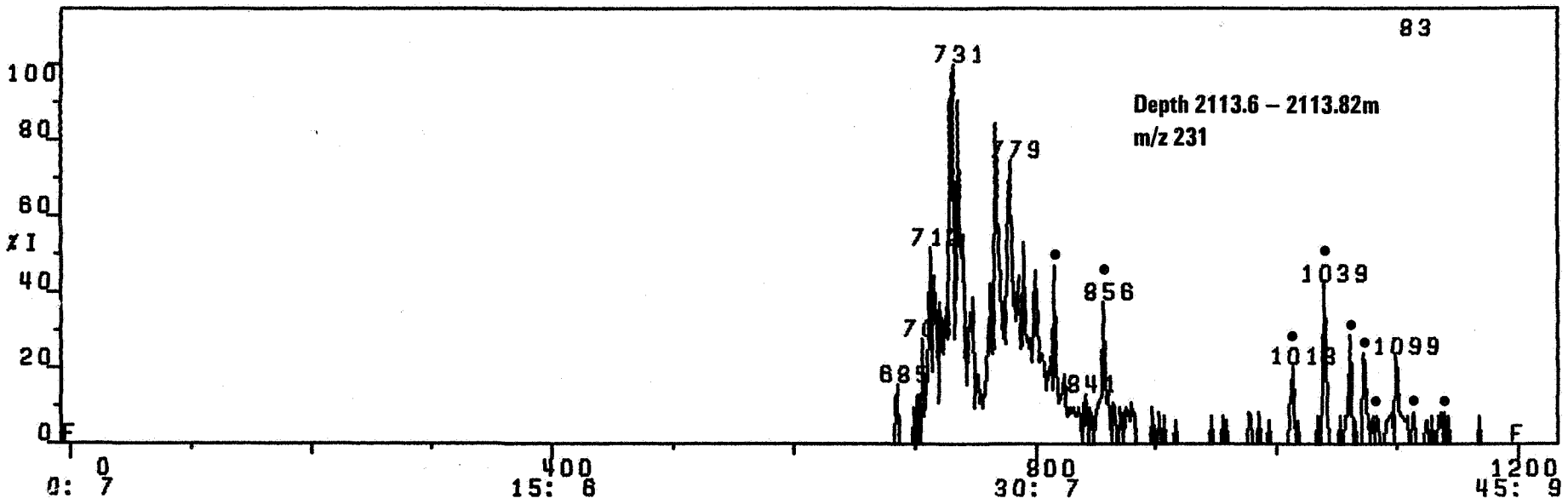

350
Depth 2113.6 – 2113.82m
m/z 91
105
211
317
409
174
280
288
388
478
xI
0: 7
15: 6
30: 7
45: 9

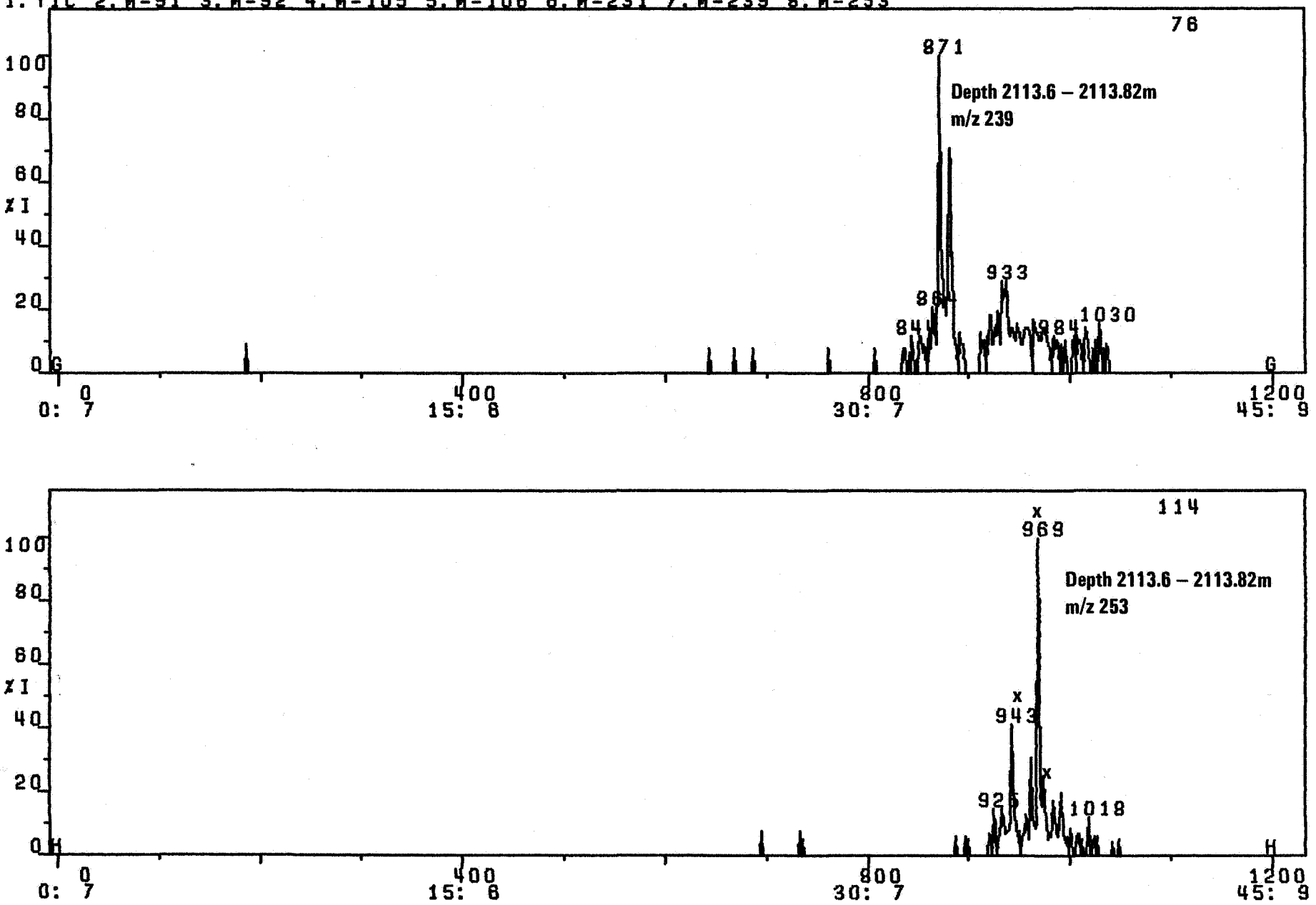

A4200A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON 7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
211
Depth 2113.6 – 2113.82m
m/z 92
471
288
211
119
318
385
177
105
435
449
597
586
209
Depth 2113.6 – 2113.82m
m/z 105
174
280
387
597
251
105
451
47
586
241
513
571
344
227
441
680
20
502
566
33
218
0
400
800
1200
0: 7
15: 6
30: 7
45: 9


A4200A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON 7120/8-2, AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
149
Depth 2113.6 – 2113.82m
m/z 106
280
331
241
377
441
597
709
106
171
426
502
586
560
689
769
75
100
80
60
40
20
0
%I
0
400
800
1200
0: 7
15: 6
30: 7
45: 9


1701
DBT
Depth 2113.6 – 2113.82m
m/z 184
100
80
60
40
20
0
%I
0
400
800
1200
0: 7
15: 6
30: 7
45: 9


A4200A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON 7120/8-2,AROMATER
1: M=142 2: M=156 3: M=178 4: M=192 5: M=206 6: M=184 7: M=198 8: M=212
MDBT
1516
4
3+2
1
Depth 2113.6 – 2113.82m
m/z 198
100
80
60
XI
40
20
0
0: 7
15: 6
30: 7
45: 9
DMDBT
685
Depth 2113.6 – 2113.82m
m/z 212


83
731
779
856
1039
1099
685
841
Depth 2113.6 – 2113.82m
m/z 231
100
80
60
XI
40
20
0
0
400
800
1200
0: 7
15: 8
30: 7
45: 9

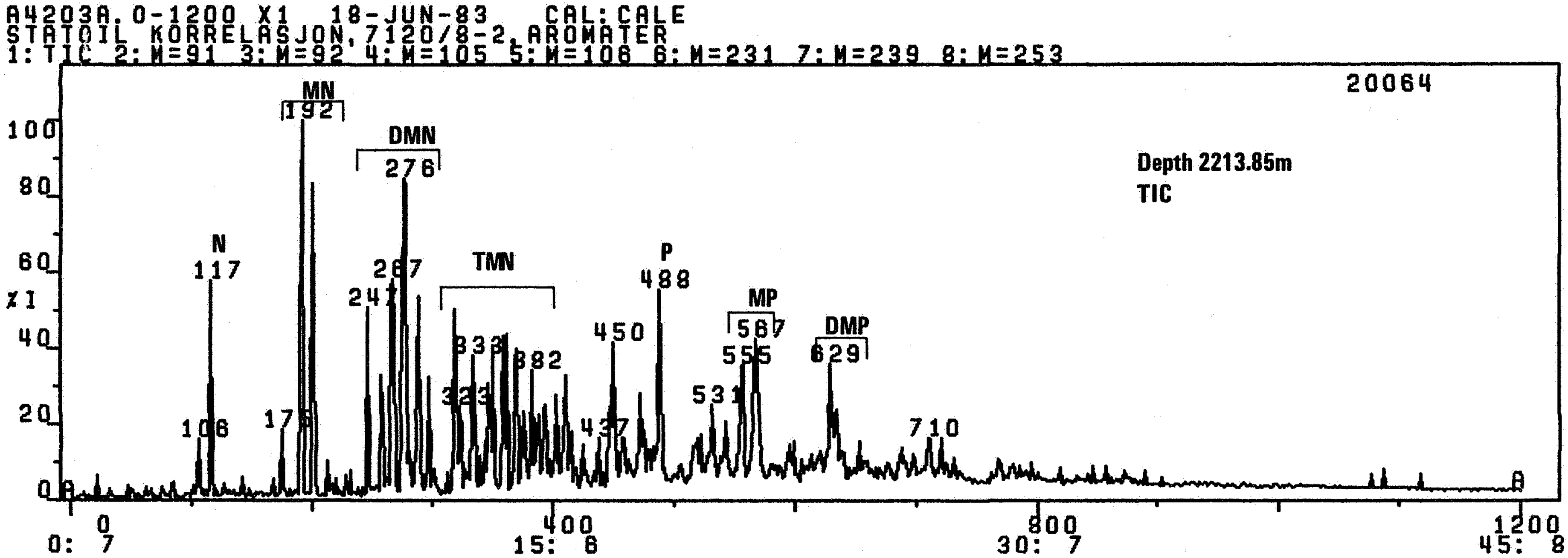

A4200A.0-1200 X1 16-JUN-83 CAL:CALE
STATOIL KORRELASJON 7120/8-2, AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253
76
871
Depth 2113.6 – 2113.82m
m/z 239
933
1030
984
844
100
80
60
40
20
0
XI
0
400
800
1200
0: 7
15: 8
30: 7
45: 9
114
969
Depth 2113.6 – 2113.82m
m/z 253
943
926
1018

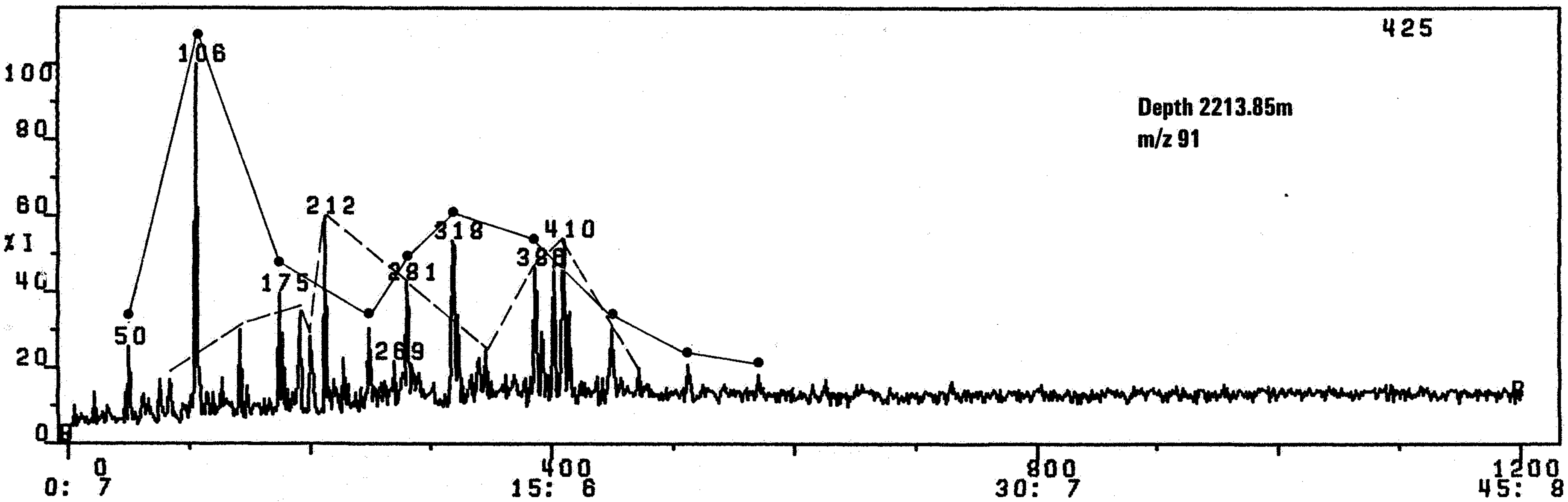
IKU

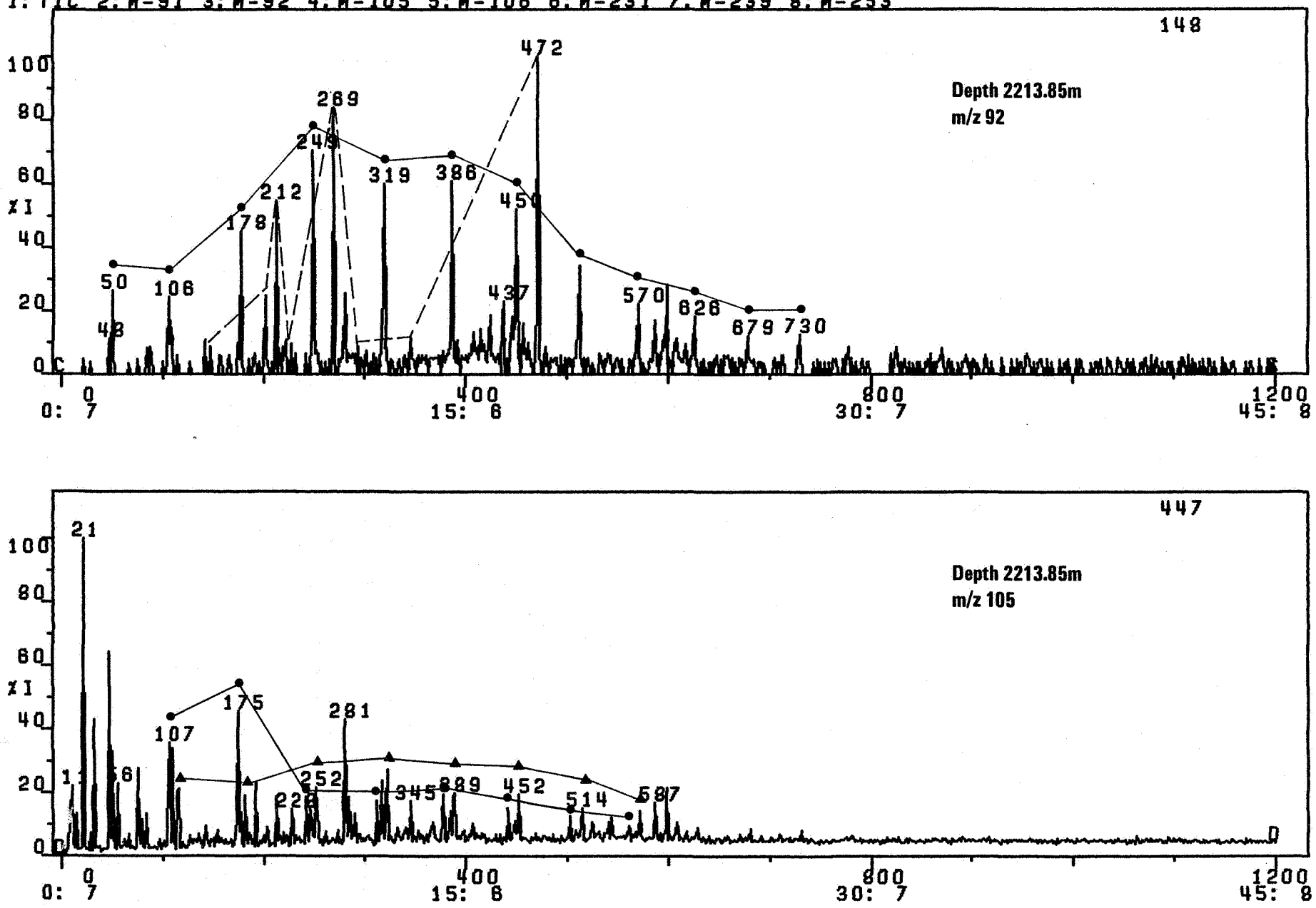
Mass Fragmentograms from Aromatic Hydrocarbons of A-4203

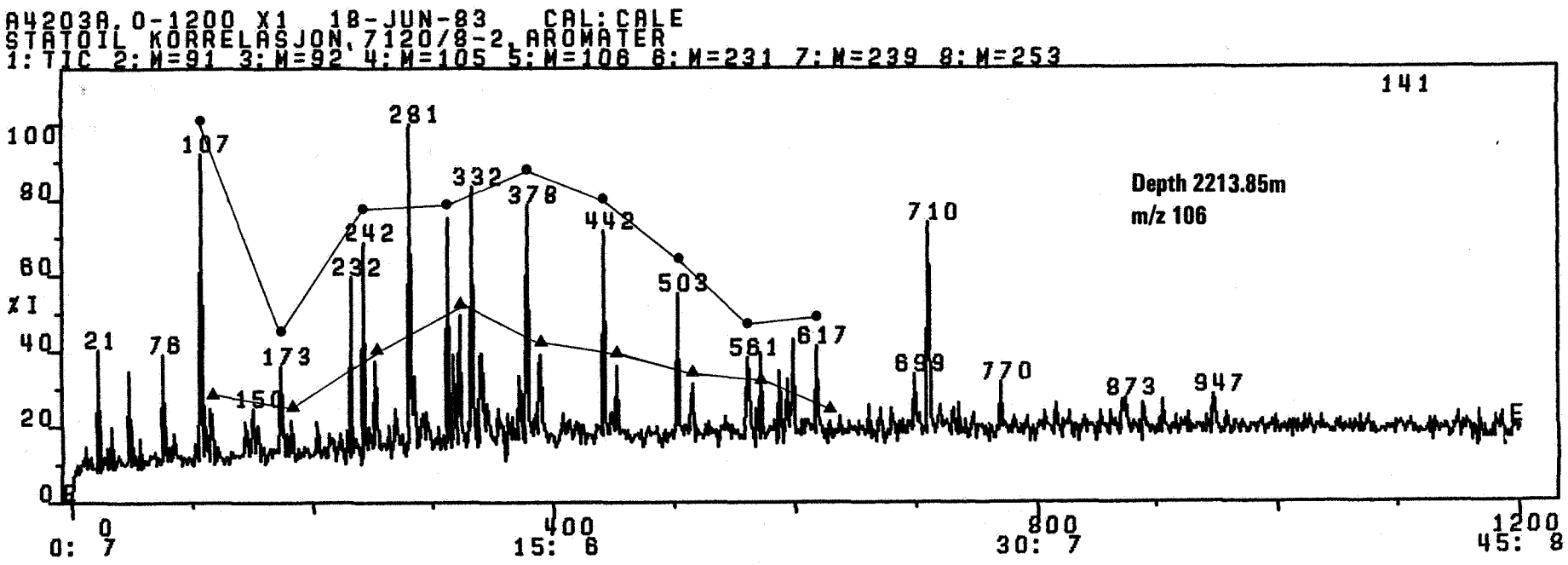
LOWER JURASSIC COAL

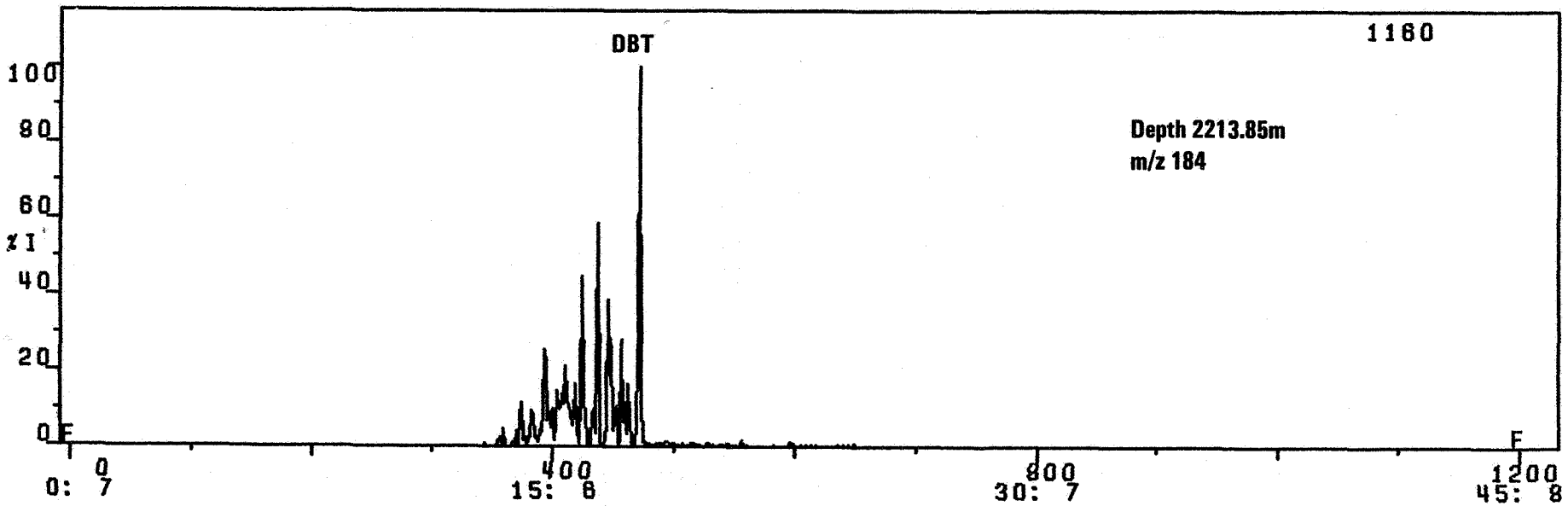
Depth 2213.85 metres

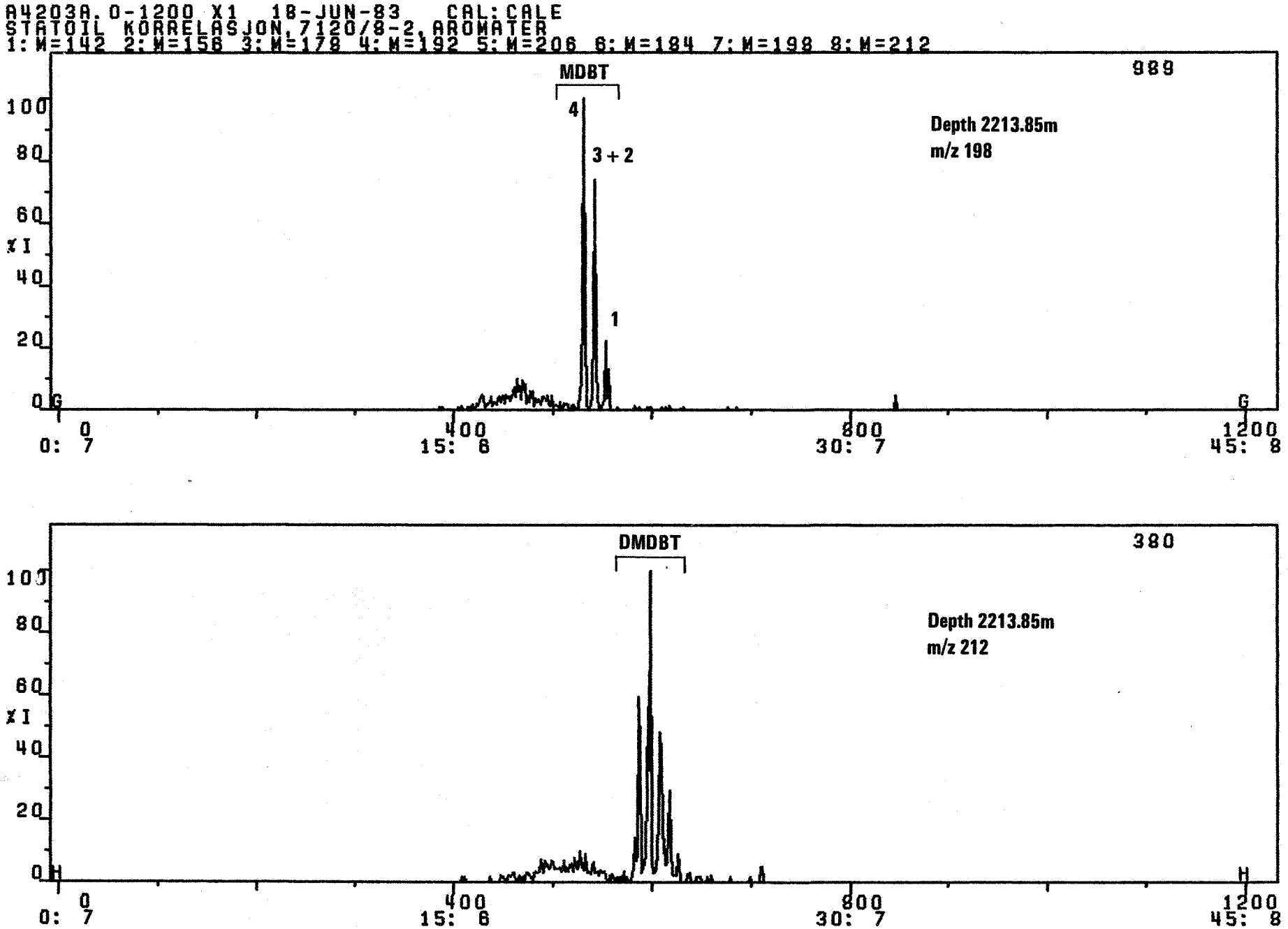

A4203A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON.7120/8-2.AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
20064
Depth 2213.85m
TIC
MN
192
DMN
276
N
117
TMN
P
488
MP
567
DMP
629
247
287
333
382
323
450
555
531
437
106
175
710
%I
0
400
800
1200
0: 7
15: 6
30: 7
45: 8

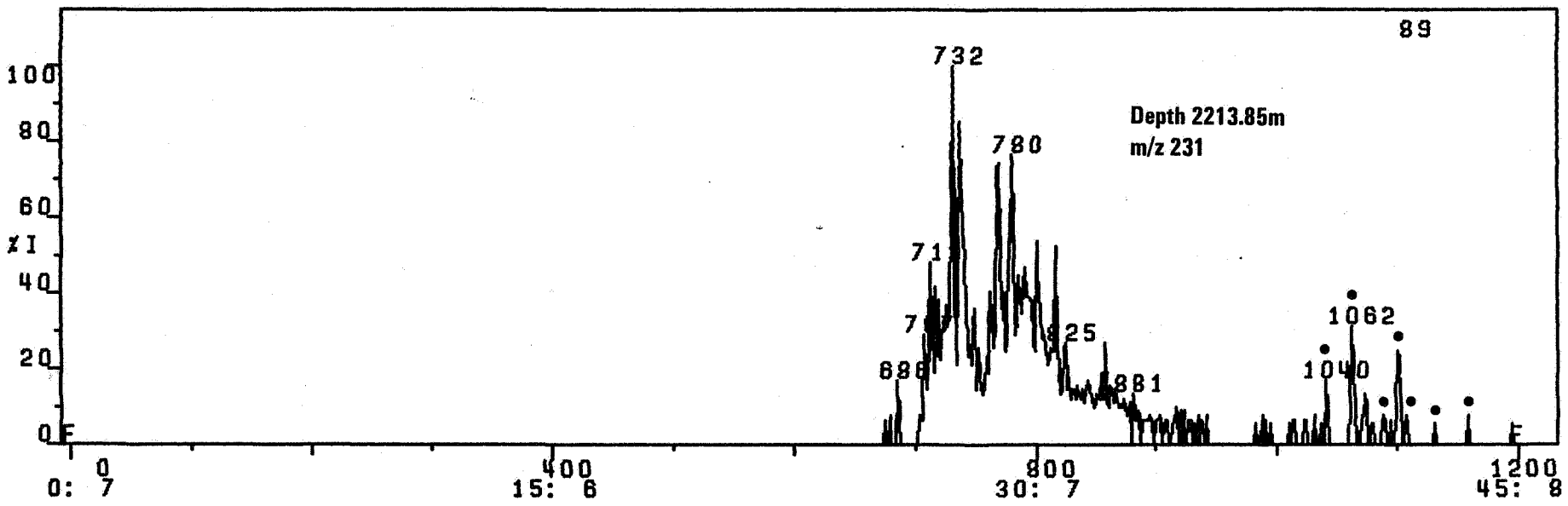

425
Depth 2213.85m
m/z 91
106
212
318
410
388
381
175
50
269
%I
0
400
800
1200
0: 7
15: 6
30: 7
45: 8

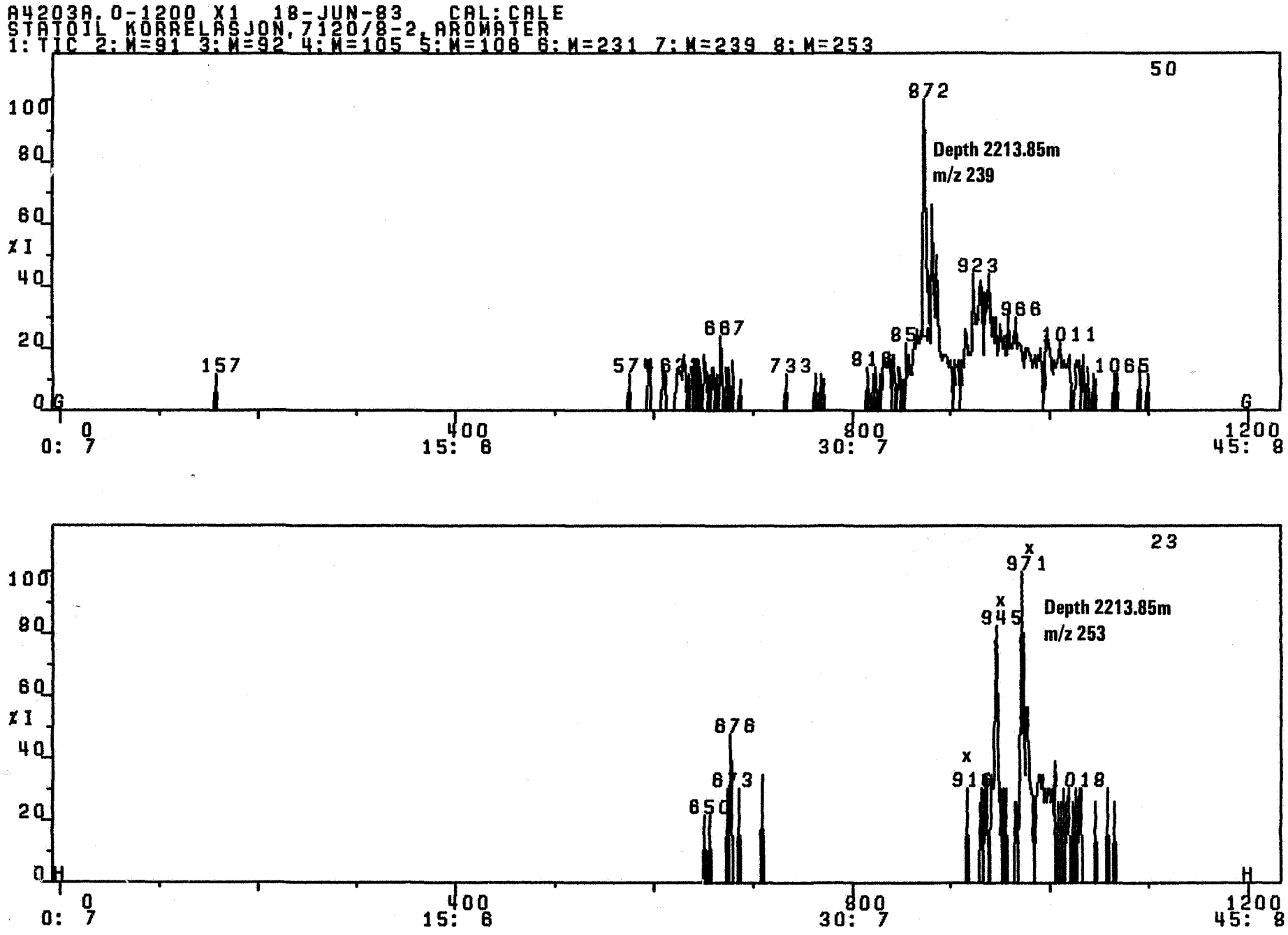

A4203A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
148
Depth 2213.85m
m/z 92
472
289
243
319
386
212
178
450
50
106
437
570
626
679
730
43
447
Depth 2213.85m
m/z 105
21
175
281
107
252
345
389
452
514
587
0
400
800
1200
0: 7
15: 6
30: 7
45: 8


A4203A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
141
Depth 2213.85m
m/z 106
107
281
332
378
242
232
442
710
503
561
617
21
76
173
150
699
770
873
947
%I
100
80
60
40
20
0
0
400
800
1200
0: 7
15: 6
30: 7
45: 8


1160
DBT
Depth 2213.85m
m/z 184
%I
100
80
60
40
20
0
0
400
800
1200
0: 7
15: 6
30: 7
45: 8


A4203A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:M=142 2:M=156 3:M=178 4:M=192 5:M=206 6:M=184 7:M=198 8:M=212
MDBT
989
4
3+2
1
Depth 2213.85m
m/z 198
100
80
60
%I
40
20
0
0: 7
15: 8
30: 7
45: 8
DMDBT
380
Depth 2213.85m
m/z 212


89
732
780
Depth 2213.85m
m/z 231
71
1062
825
1040
686
881
100
80
60
%I
40
20
0
0
400
800
1200
0: 7
15: 6
30: 7
45: 8

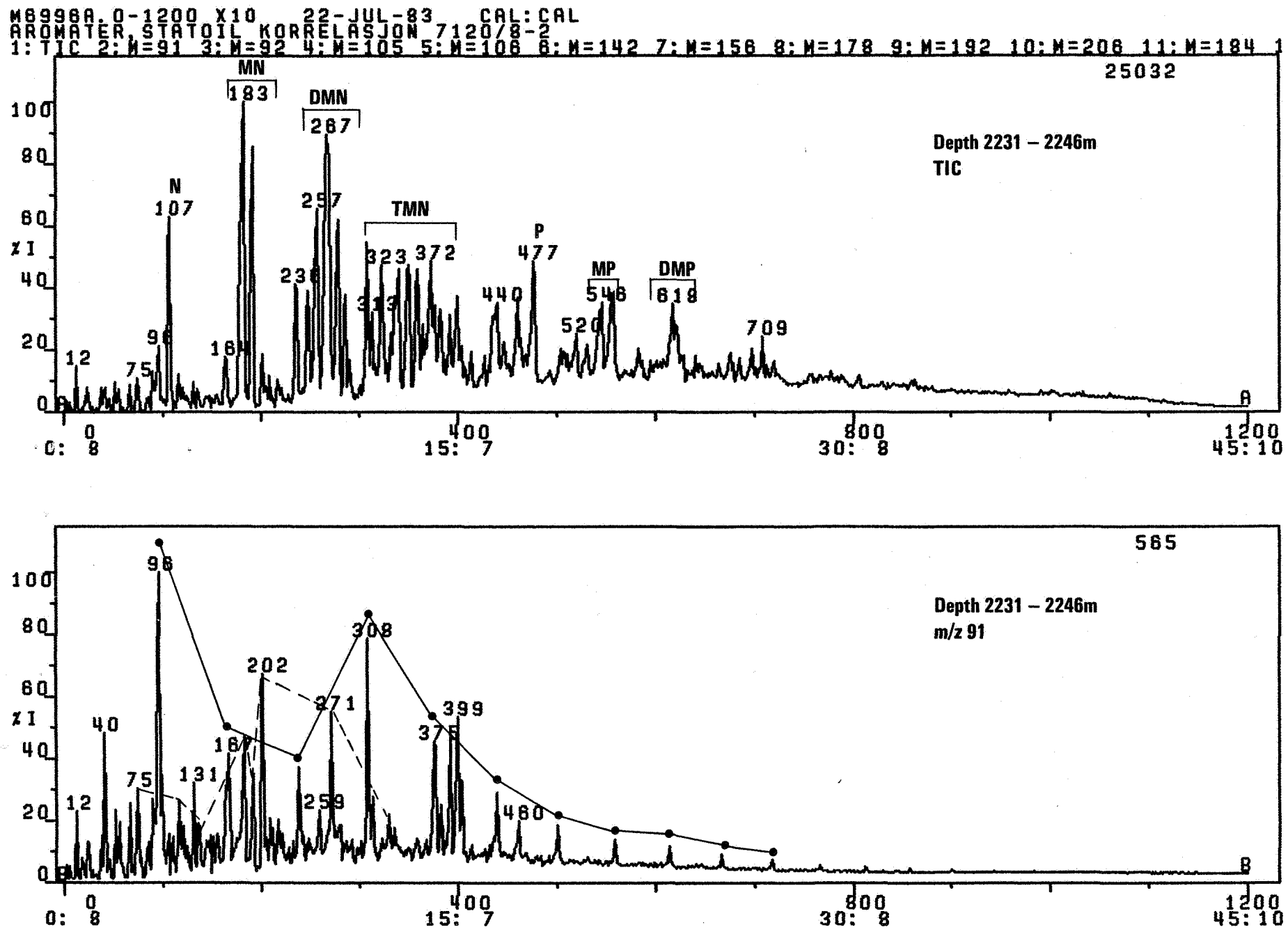

A4203A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
50
872
Depth 2213.85m
m/z 239
923
966
667
1011
157
733
1065
100
80
60
40
20
0
%I
0
400
800
1200
0: 7
15: 6
30: 7
45: 8
23
971
945
Depth 2213.85m
m/z 253
676
673
650
916
018

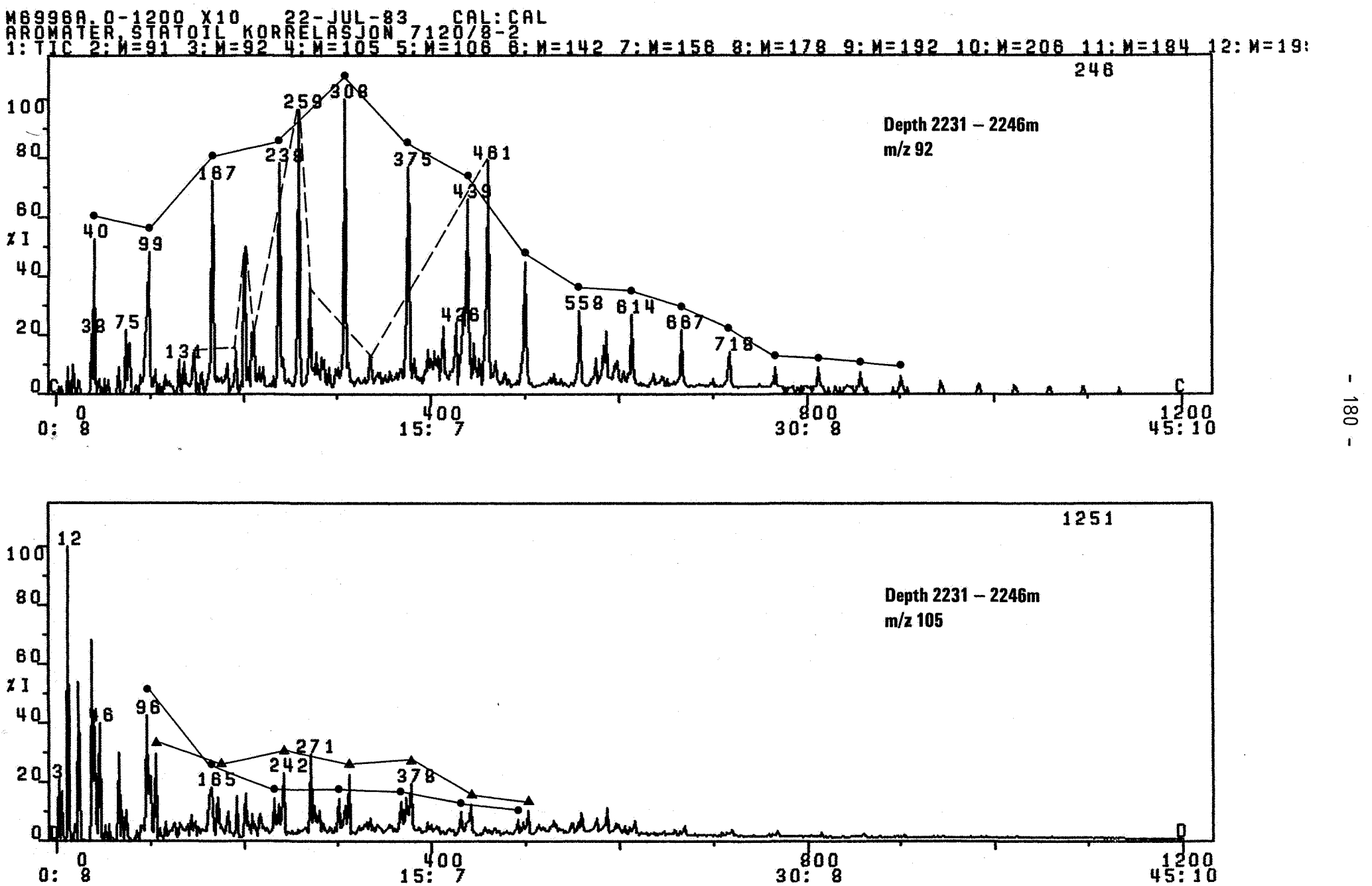
IKU

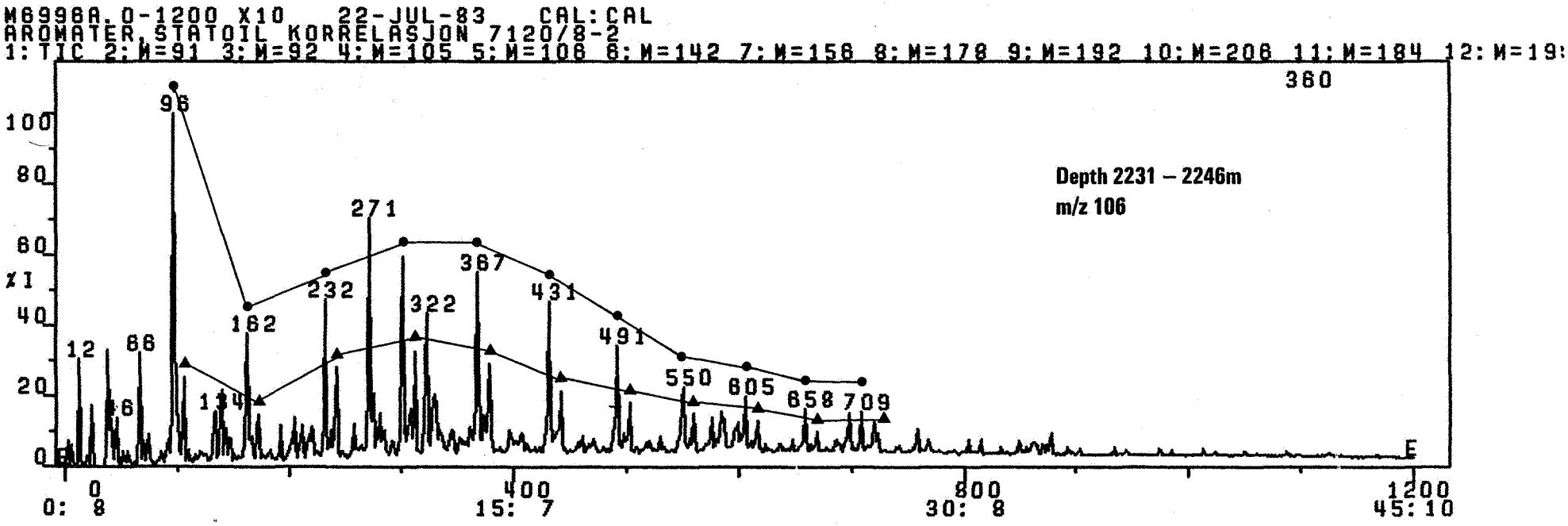
Mass Fragmentograms from Aromatic Hydrocarbons of M-6996

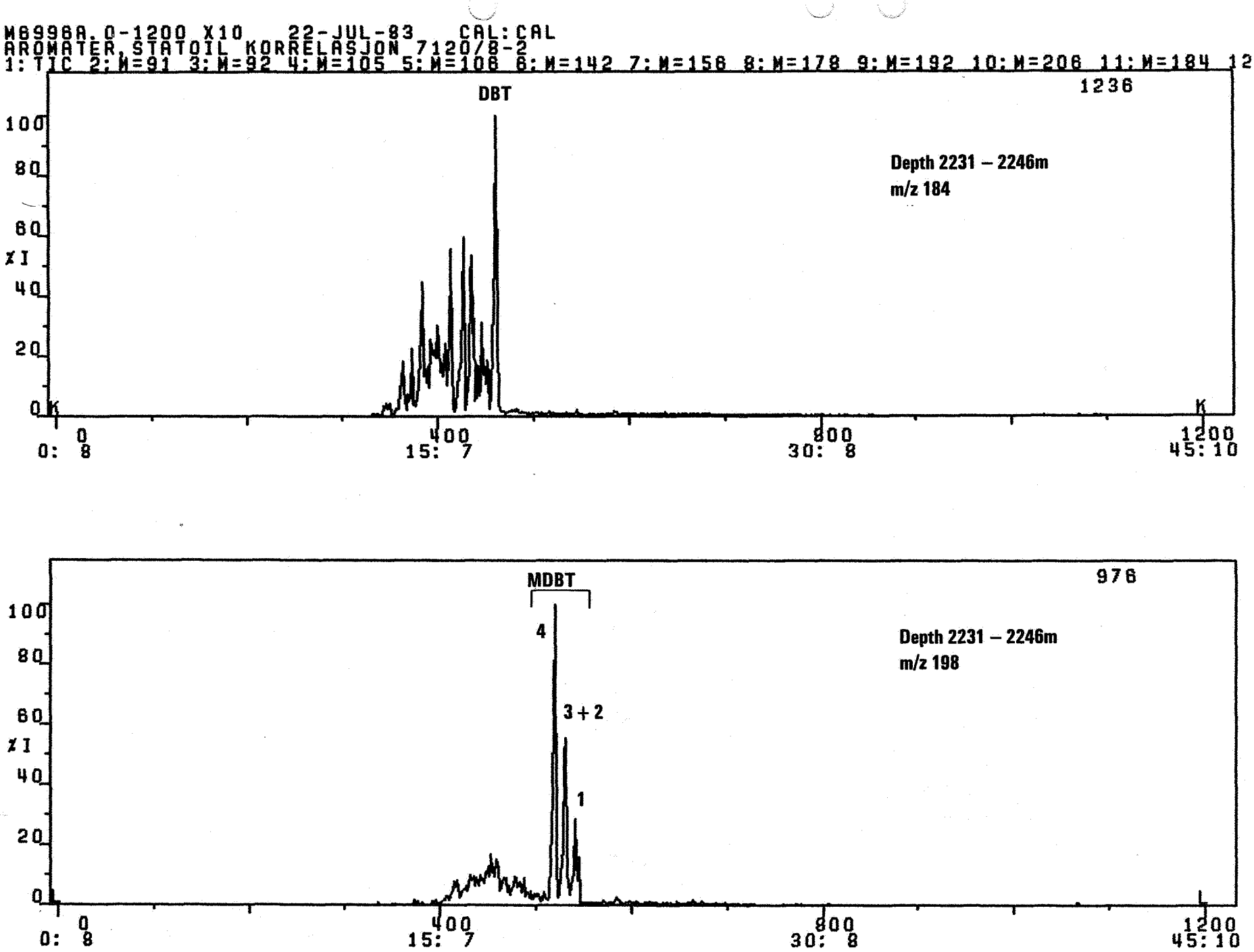
LOWER JURASSIC CLAYSTONE

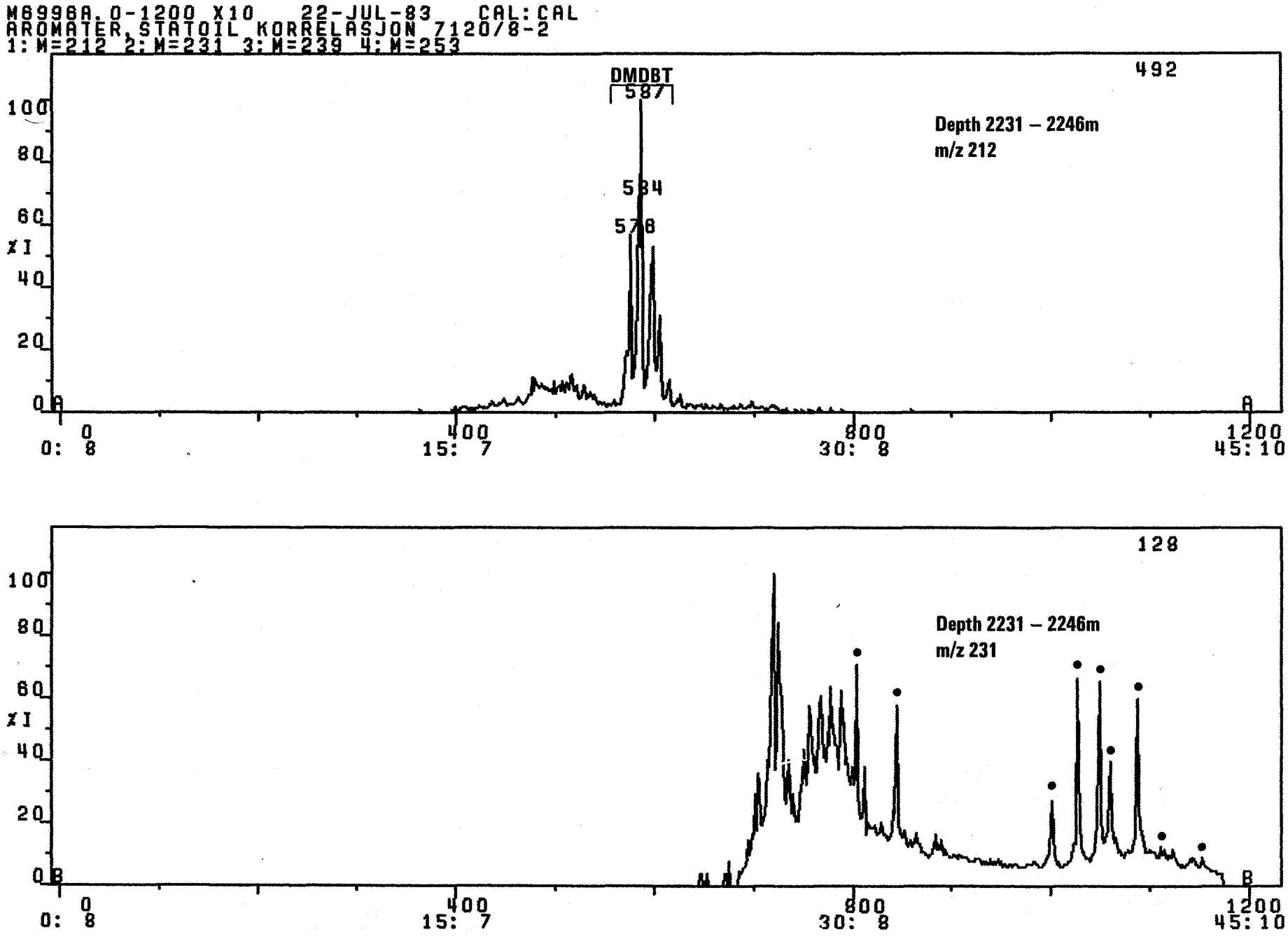
Depth 2231 - 2246 metres

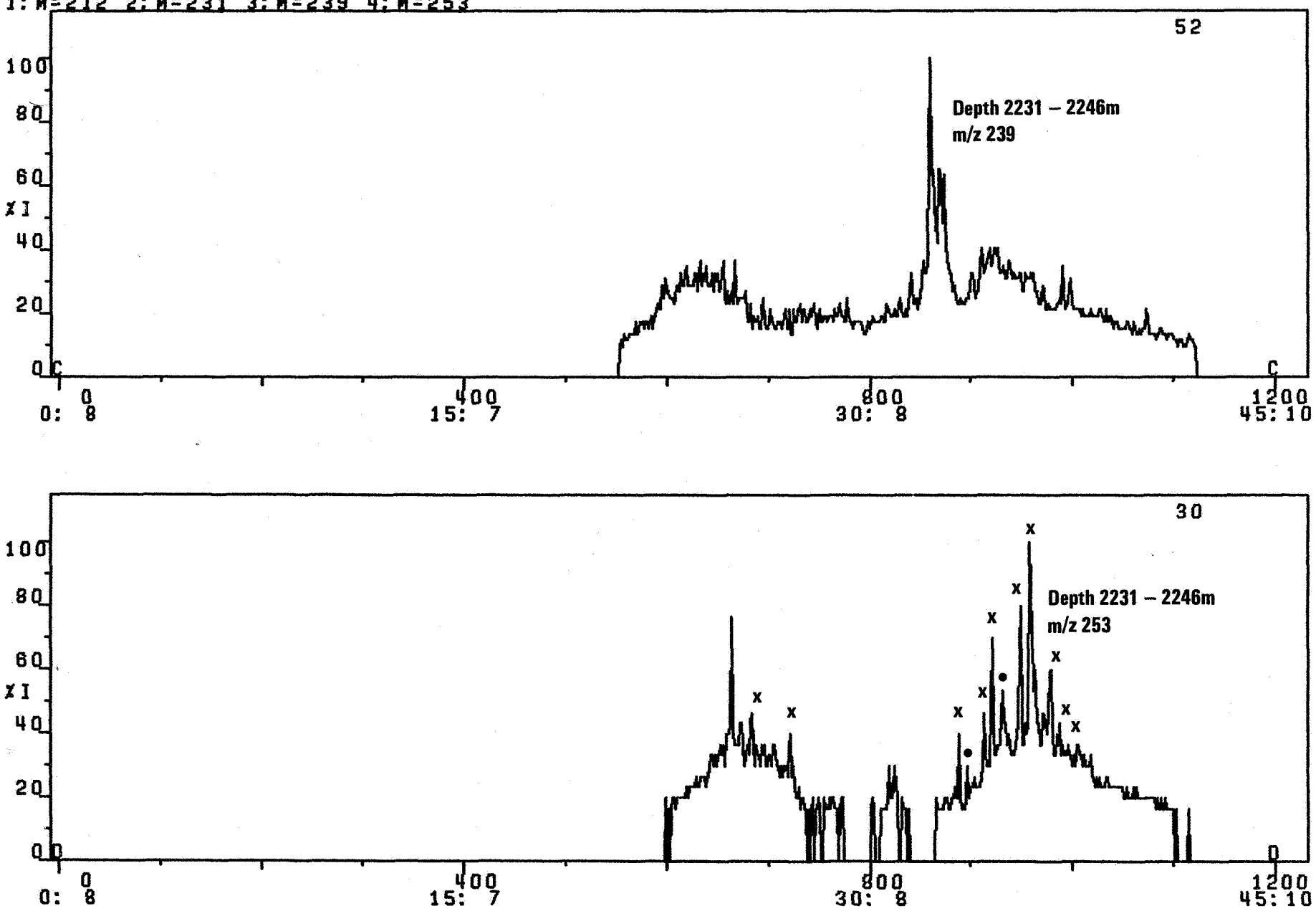

M8998A.0-1200 X10 22-JUL-83 CAL:CAL
AROMATER STATOIL KORRELASJON 7120/8-2
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=142 7: M=156 8: M=178 9: M=192 10: M=206 11: M=184 12: M=19
25032
Depth 2231 – 2246m
TIC
MN
183
DMN
267
N
107
TMN
323 372
P
477
MP
548
DMP
618
257
238
313
440
520
709
96
75
12
16
%I
100
80
60
40
20
0
A
0
400
800
1200
0: 8
15: 7
30: 8
45: 10
565
Depth 2231 – 2246m
m/z 91
96
308
202
271
399
40
75
131
16
259
480
12
%I
B


M6996A.0-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON 7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19:
246
Depth 2231 – 2246m
m/z 92
100
80
60
%I
40
20
0
40
99
167
238
259
308
375
439
461
426
558
614
667
718
0
400
800
1200
0: 8
15: 7
30: 8
45: 10
1251
Depth 2231 – 2246m
m/z 105
12
96
46
3
165
242
271
378
0
400
800
1200
0: 8
15: 7
30: 8
45: 10


M6998A.D-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON 7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=108 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19:
360
Depth 2231 – 2246m
m/z 106
96
271
232
322
387
431
491
162
12
66
114
550
605
658
709
100
80
60
%I
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45:10


M6996A.0-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON 7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=108 6:M=142 7:M=158 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19:
DBT
1236
Depth 2231 – 2246m
m/z 184
%I
100
80
60
40
20
0
K
K
0
400
800
1200
0: 8
15: 7
30: 8
45:10
MDBT
976
4
3+2
1
Depth 2231 – 2246m
m/z 198
%I
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45:10

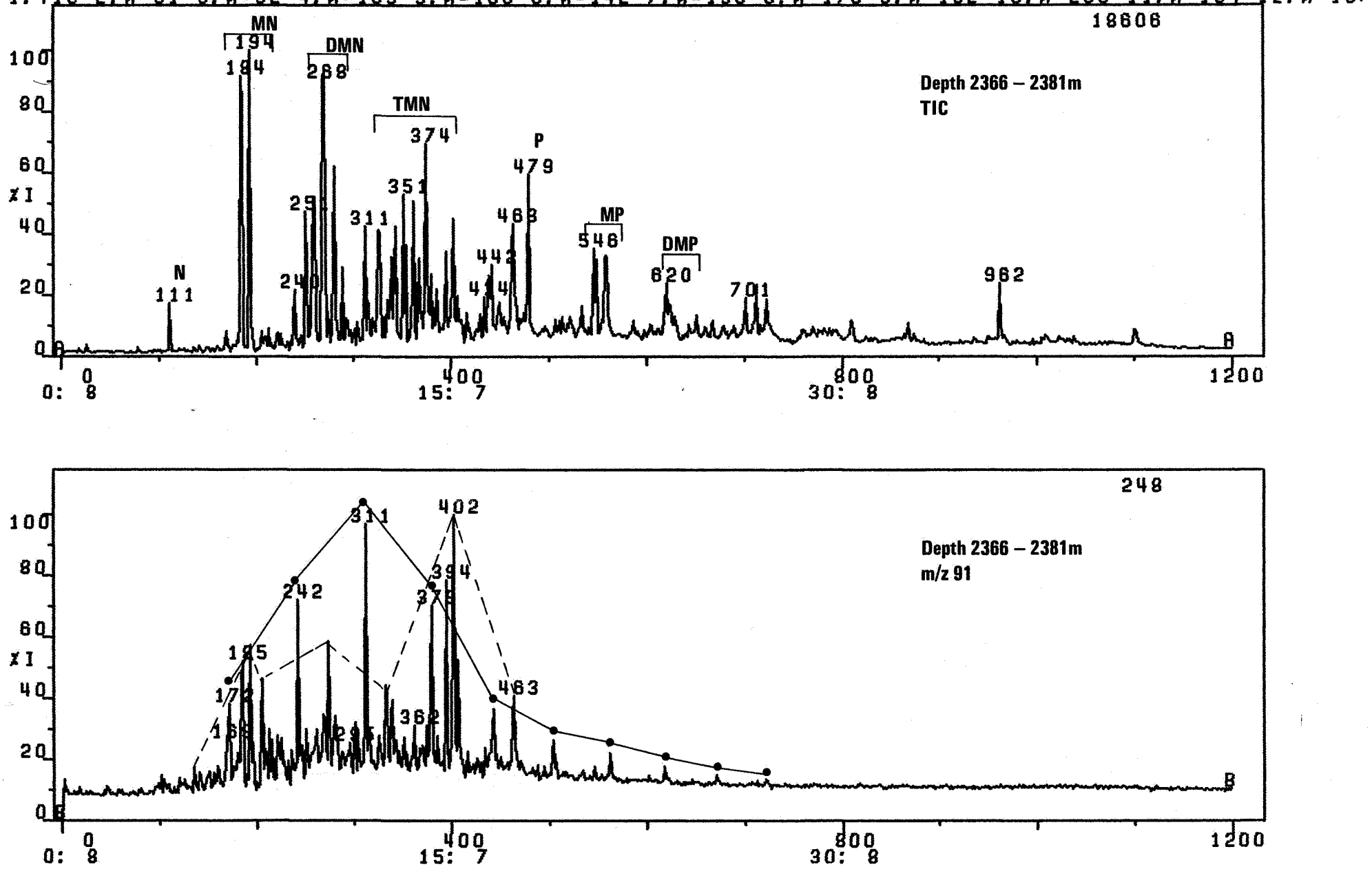

M6998A.0-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON 7120/8-2
1: M=212 2: M=231 3: M=239 4: M=253
DMDBT
587
584
578
492
Depth 2231 – 2246m
m/z 212
XI
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45: 10
128
Depth 2231 – 2246m
m/z 231

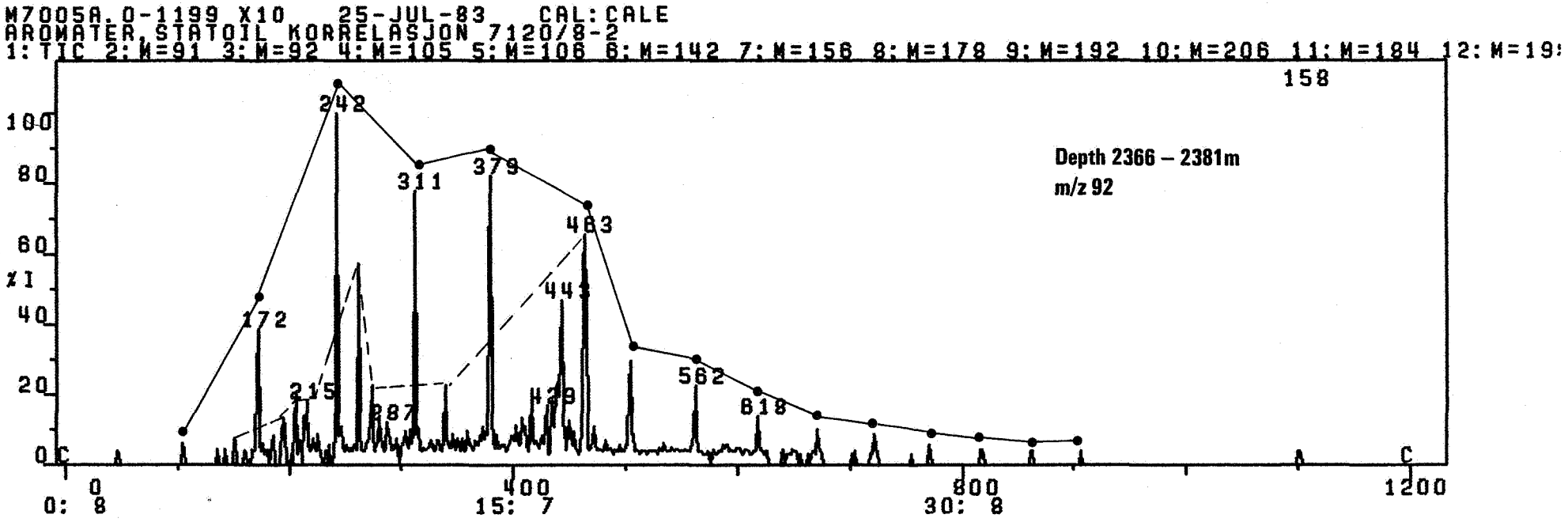

M6996A.0-1200 X10 22-JUL-83 CAL:CAL
AROMATER,STATOIL KORRELASJON 7120/8-2
1: M=212 2: M=231 3: M=239 4: M=253
52
Depth 2231 – 2246m
m/z 239
100
80
60
XI
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45: 10
30
Depth 2231 – 2246m
m/z 253

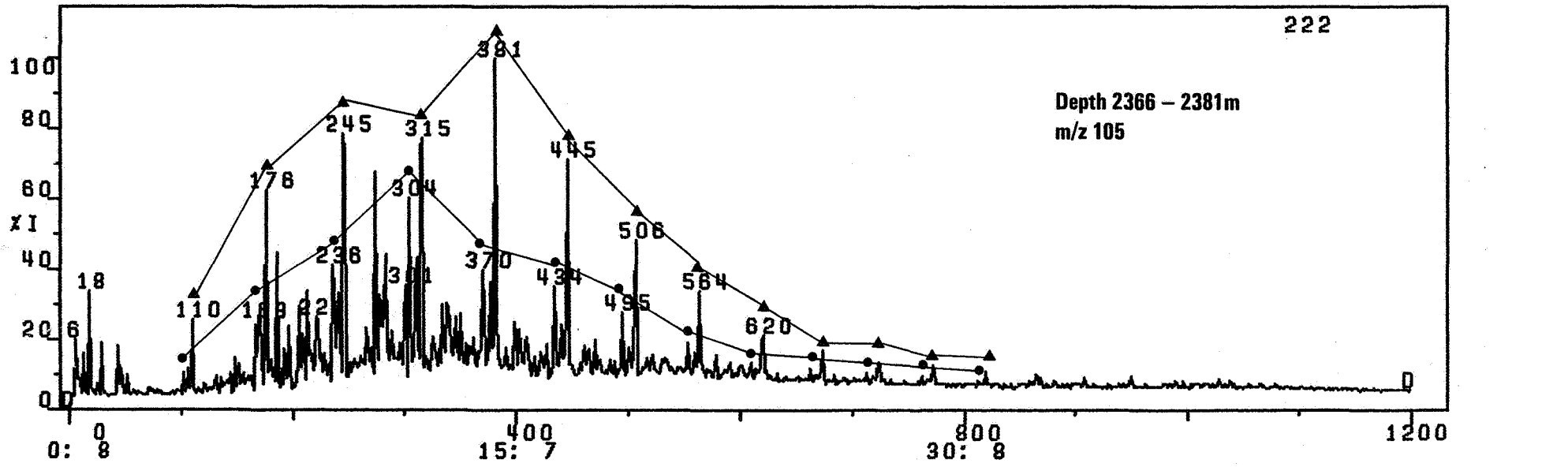
Mass Fragmentograms from Aromatic Hydrocarbons of M-7005

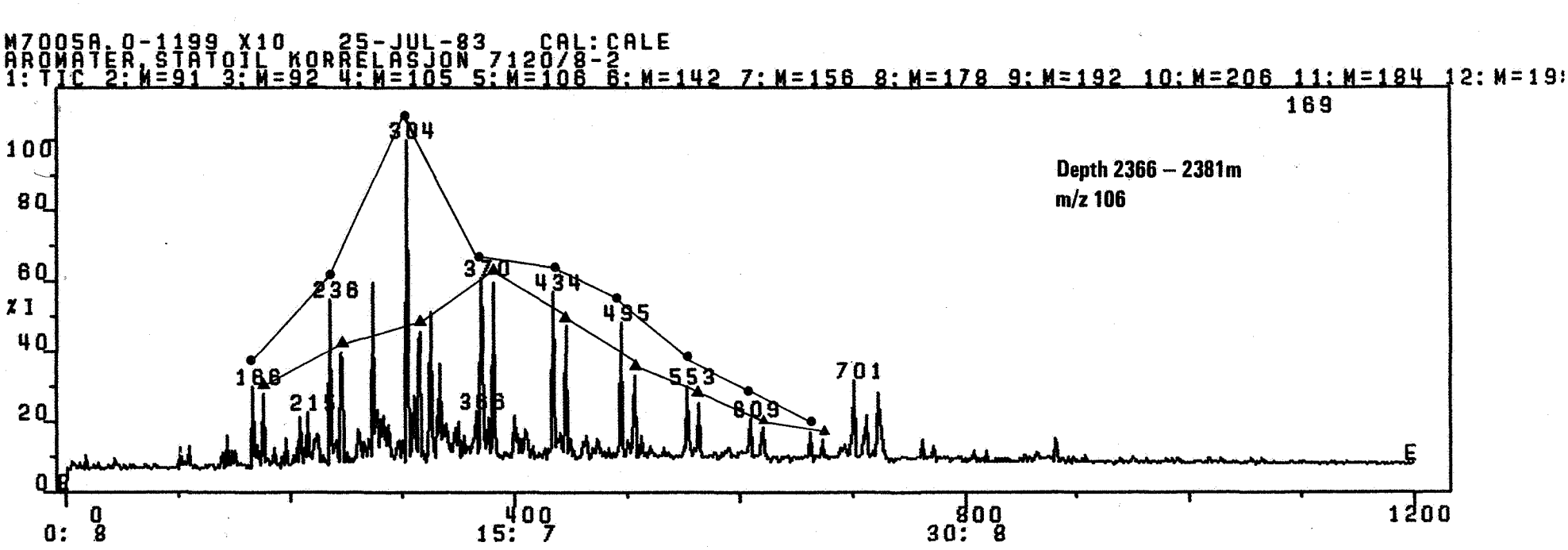
LOWER JURASSIC CLAYSTONE

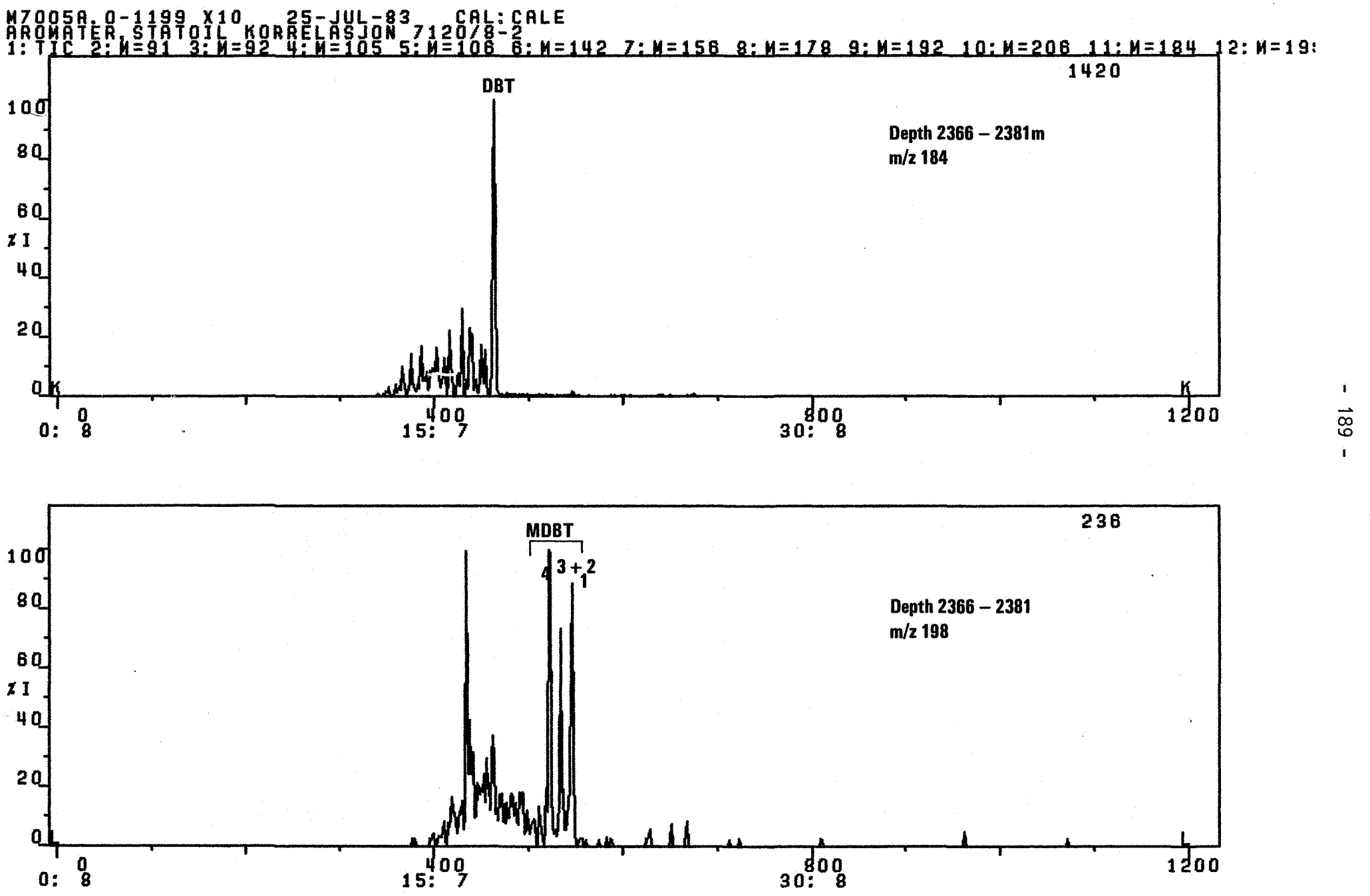
Depth 2366 - 2381 metres

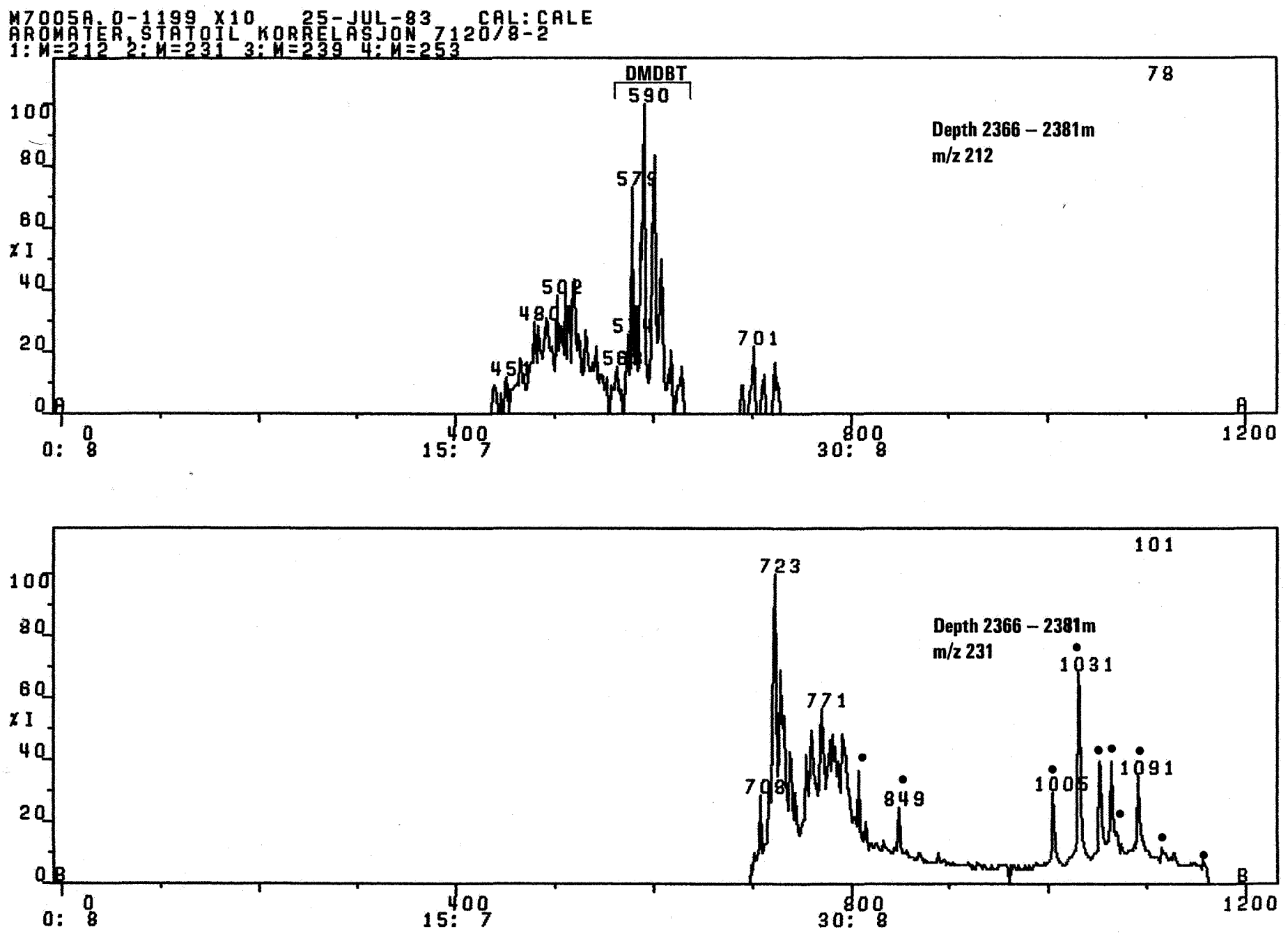

M7005A.D-I199 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19
18606
Depth 2366 – 2381m
TIC
MN
DMN
TMN
P
MP
DMP
N
111
194
184
288
374
351
311
479
463
546
620
701
962
442
414
240
100
80
60
40
20
0
xI
0
400
800
1200
0: 8
15: 7
30: 8
248
Depth 2366 – 2381m
m/z 91
402
394
242
195
172
168
362
463
100
80
60
40
20
0
xI
0
400
800
1200
0: 8
15: 7
30: 8

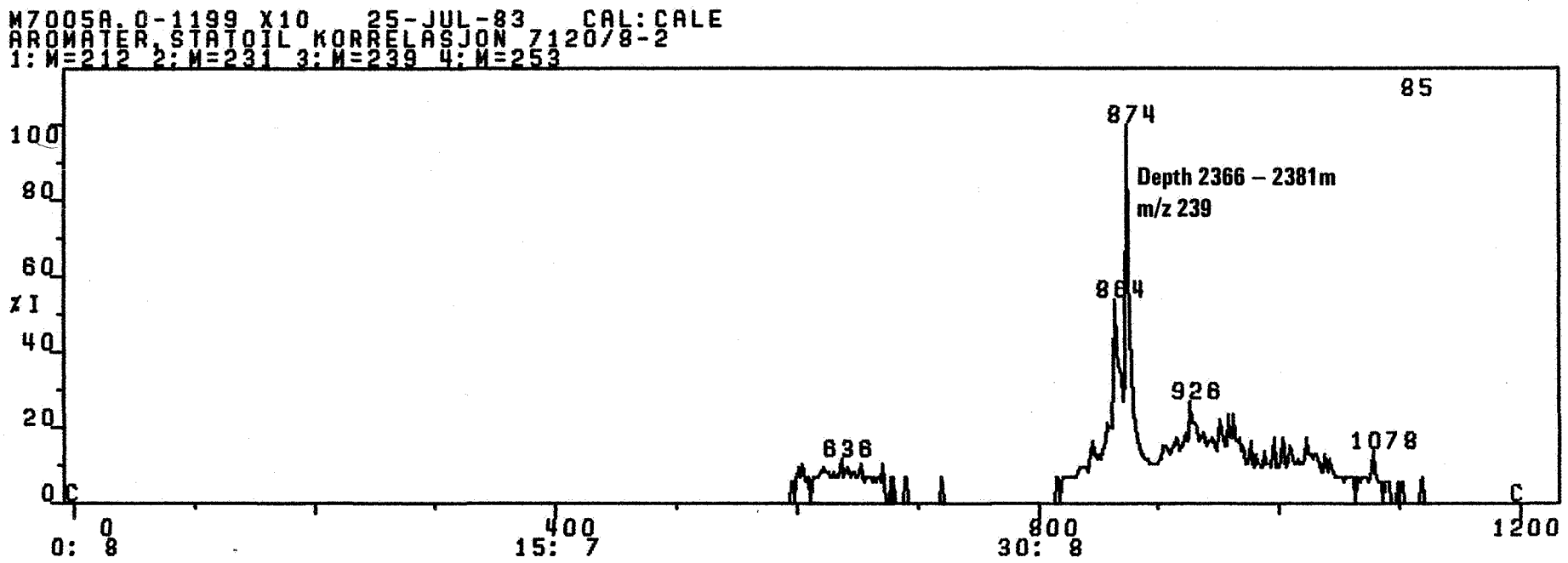

M7005A.0-1199 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19
158
Depth 2366 – 2381m
m/z 92
242
311
379
463
443
172
215
287
429
562
618
100
80
60
40
20
0
XI
0
400
800
1200
0: 8
15: 7
30: 8

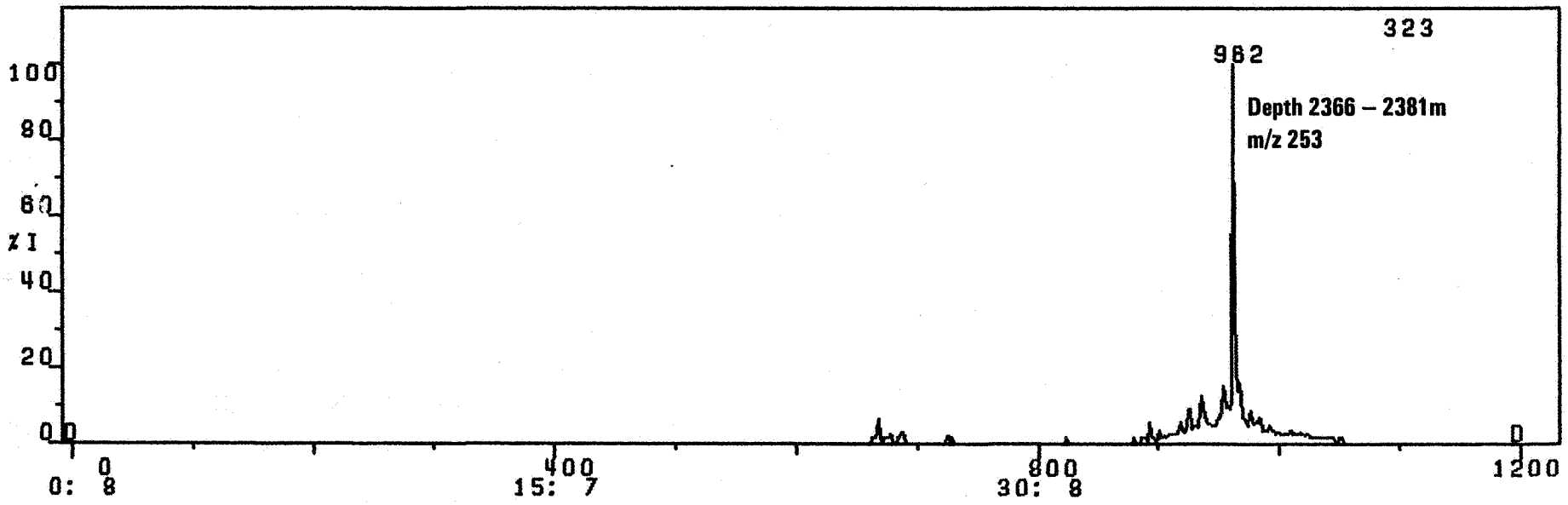

222
Depth 2366 – 2381m
m/z 105
381
245
315
445
178
304
506
236
370
434
564
620
110
18
6
100
80
60
40
20
0
XI
0
400
800
1200
0: 8
15: 7
30: 8


M7005A.0-1199 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=142 7: M=156 8: M=178 9: M=192 10: M=206 11: M=184 12: M=19
Depth 2366 – 2381m
m/z 106
169
304
236
370
434
495
553
701
168
213
366
609
100
80
60
40
20
0
X1
0
400
800
1200
0: 8
15: 7
30: 8


M7005A.0-1199 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=142 7:M=156 8:M=178 9:M=192 10:M=206 11:M=184 12:M=19:
1420
DBT
Depth 2366 – 2381m
m/z 184
%I
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
236
MDBT
4
3+2
1
Depth 2366 – 2381
m/z 198
%I
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8


M7005A.D-1199 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1: M=212 2: M=231 3: M=239 4: M=253
DMDBT
590
78
Depth 2366 – 2381m
m/z 212
579
502
480
701
451
100
80
60
40
20
0
%I
0
400
800
1200
0: 8
15: 7
30: 8
101
723
Depth 2366 – 2381m
m/z 231
1031
771
1091
708
849
1005

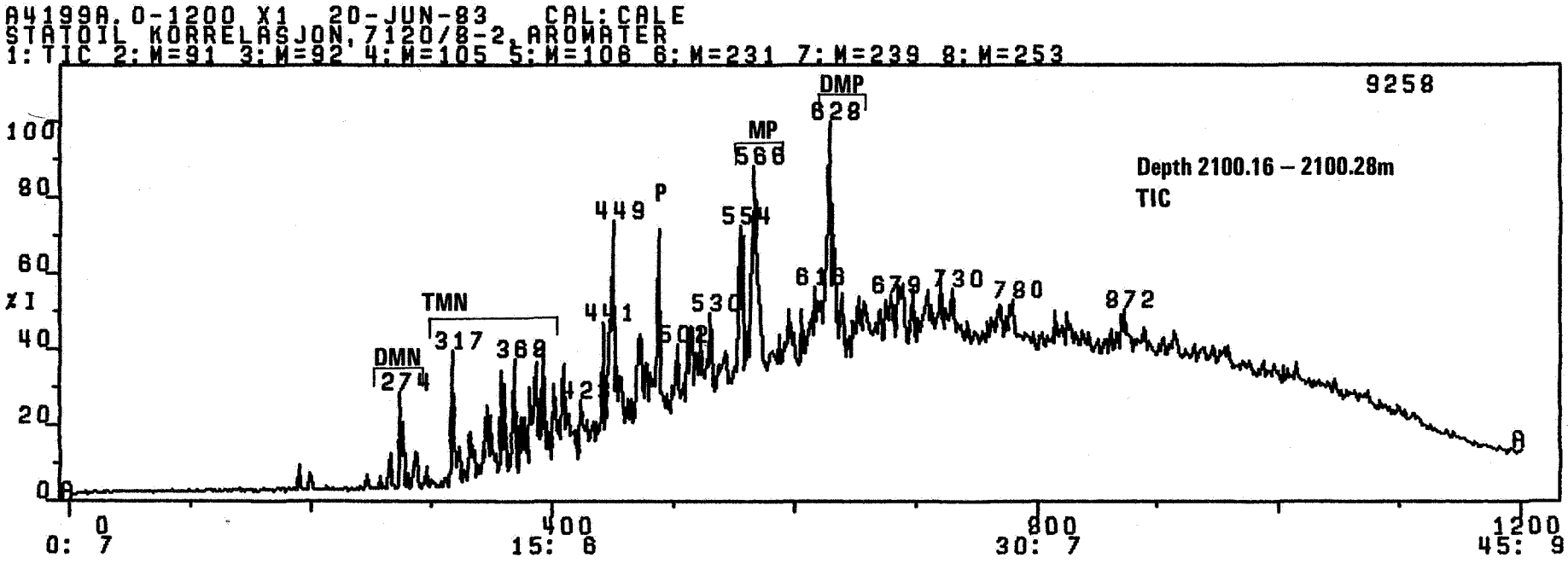

M7005A.D-1199 X10 25-JUL-83 CAL:CALE
AROMATER,STATOIL KORRELASJON 7120/8-2
1: M=212 2: M=231 3: M=239 4: M=253
85
874
Depth 2366 – 2381m
m/z 239
864
926
636
1078
100
80
60
40
20
0
xI
0
400
800
1200
0: 8
15: 7
30: 8

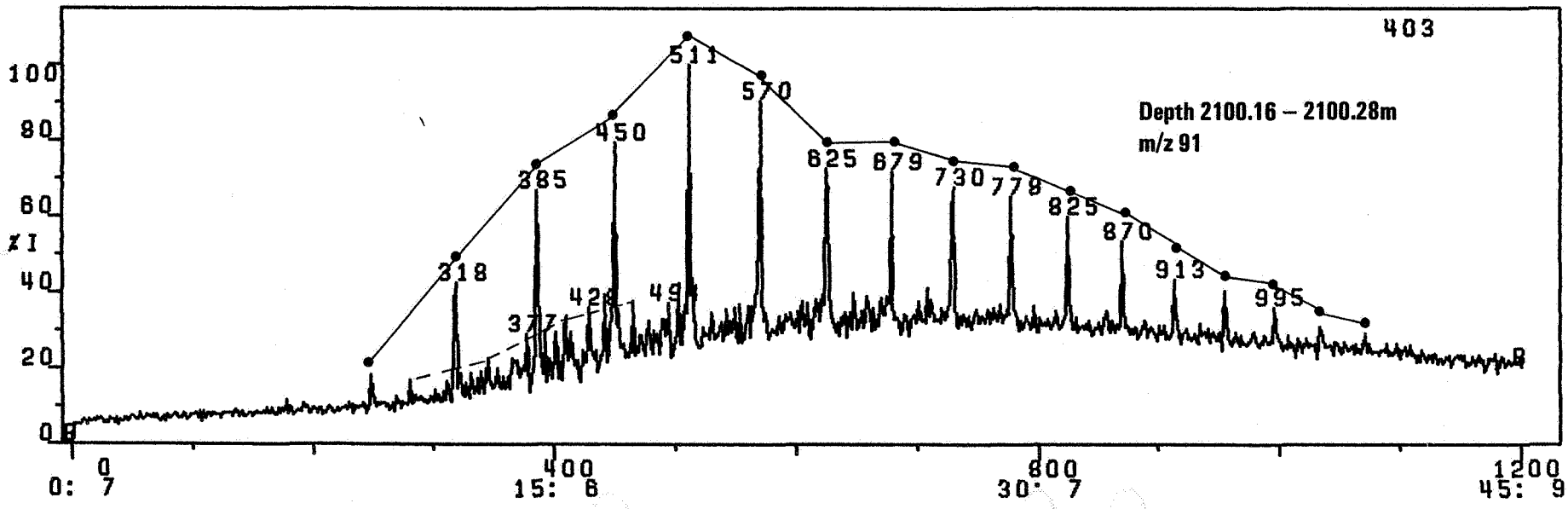

323
982
Depth 2366 – 2381m
m/z 253
100
80
60
40
20
0
xI
0
400
800
1200
0: 8
15: 7
30: 8

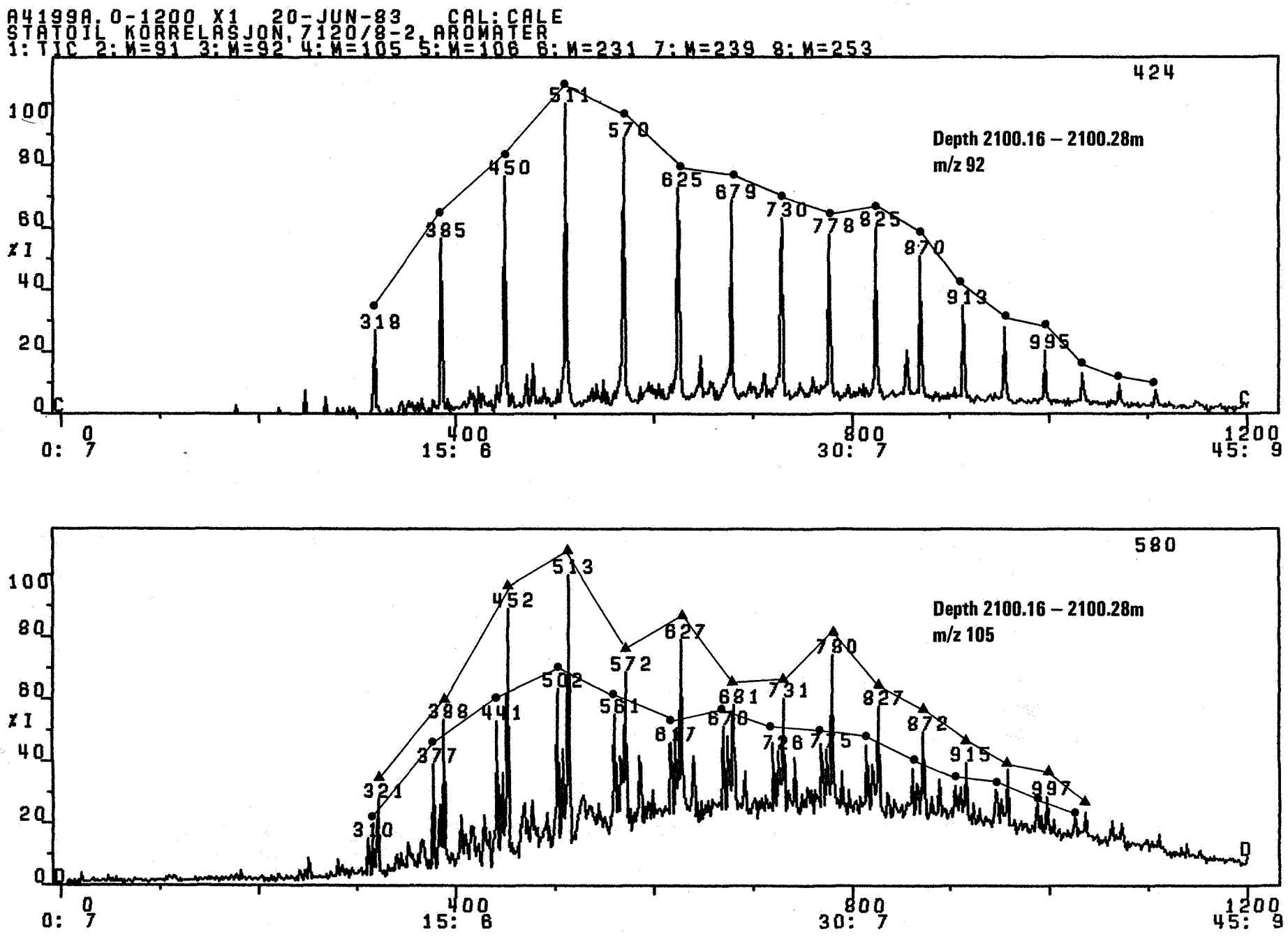
Mass Fragmentograms from Aromatic Hydrocarbons of A-4199

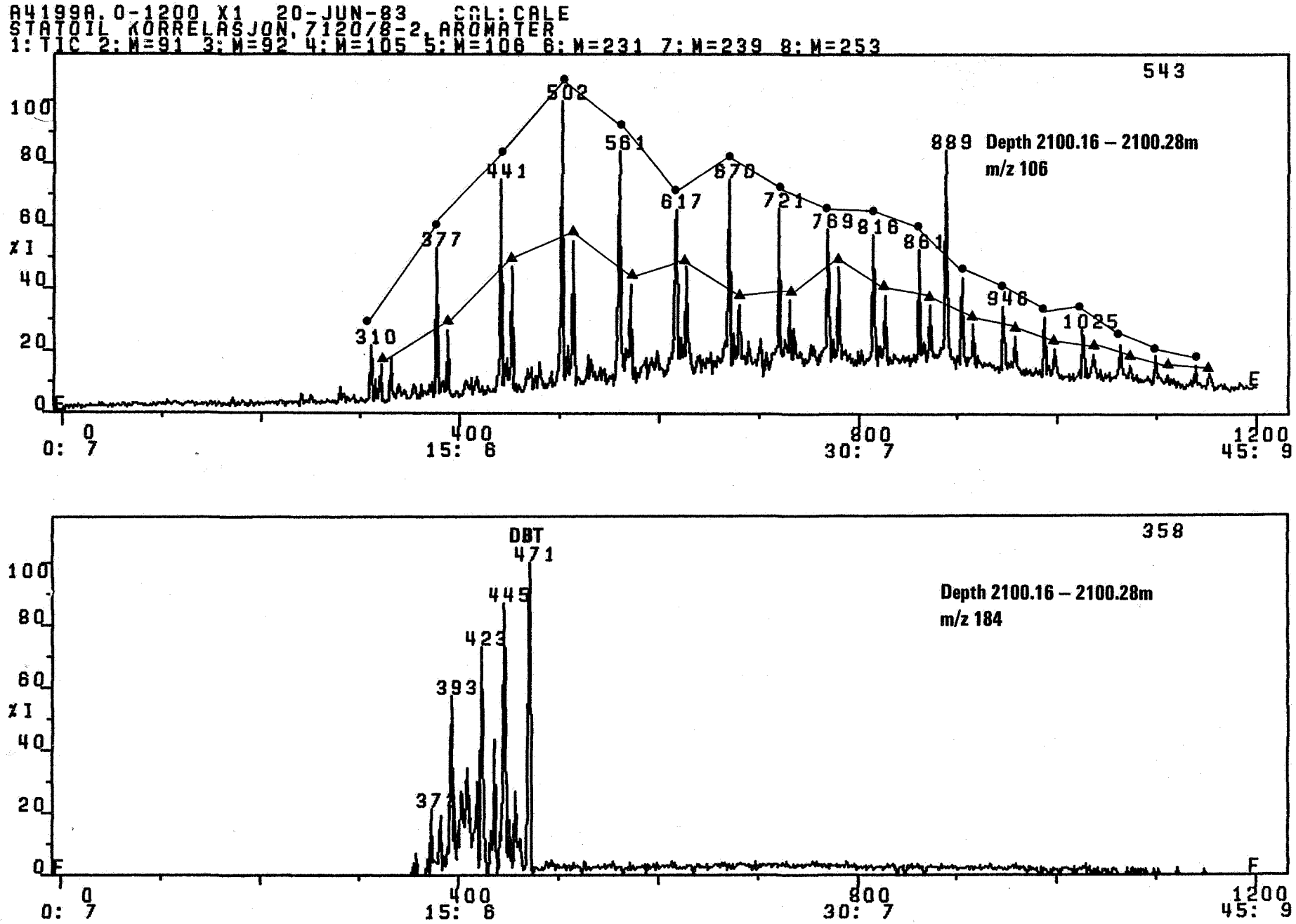
LOWER JURASSIC SANDSTONE (OIL SHOW)

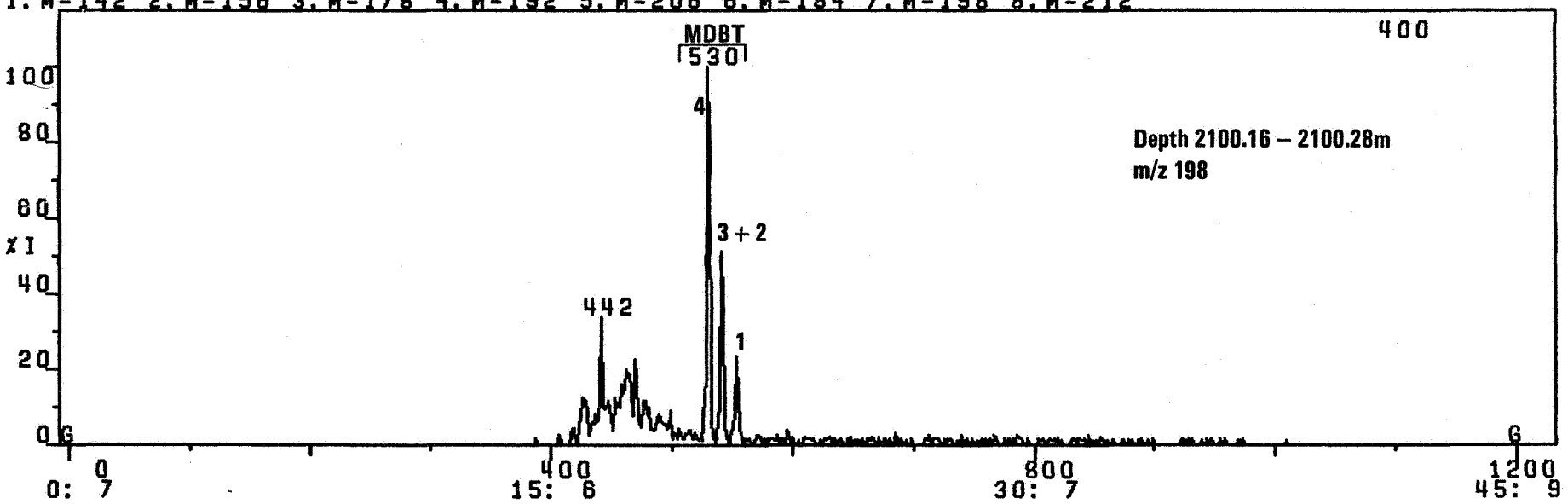
Depth 2100.16 - 2100.28 metres

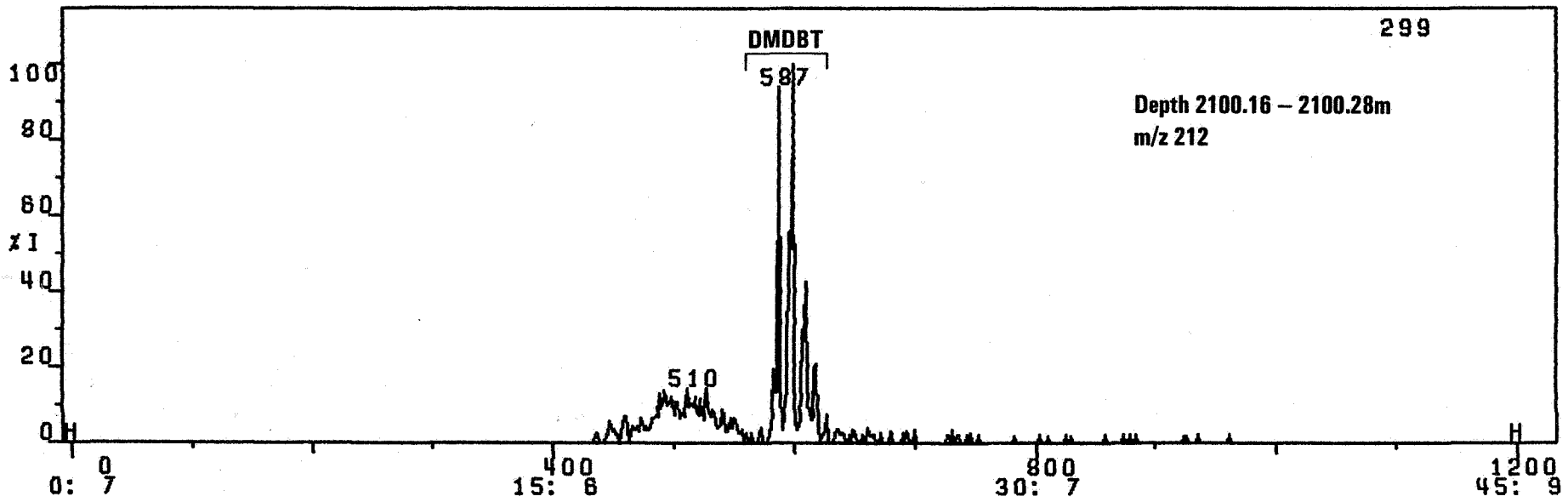

A4199A. 0-1200 X1 20-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253
9258
Depth 2100.16 – 2100.28m
TIC
DMP
628
MP
566
P
449
554
DMN
274
TMN
317
368
441
502
530
616
679
730
780
872
xI
0
20
40
60
80
100
0: 7
15: 8
30: 7
45: 9

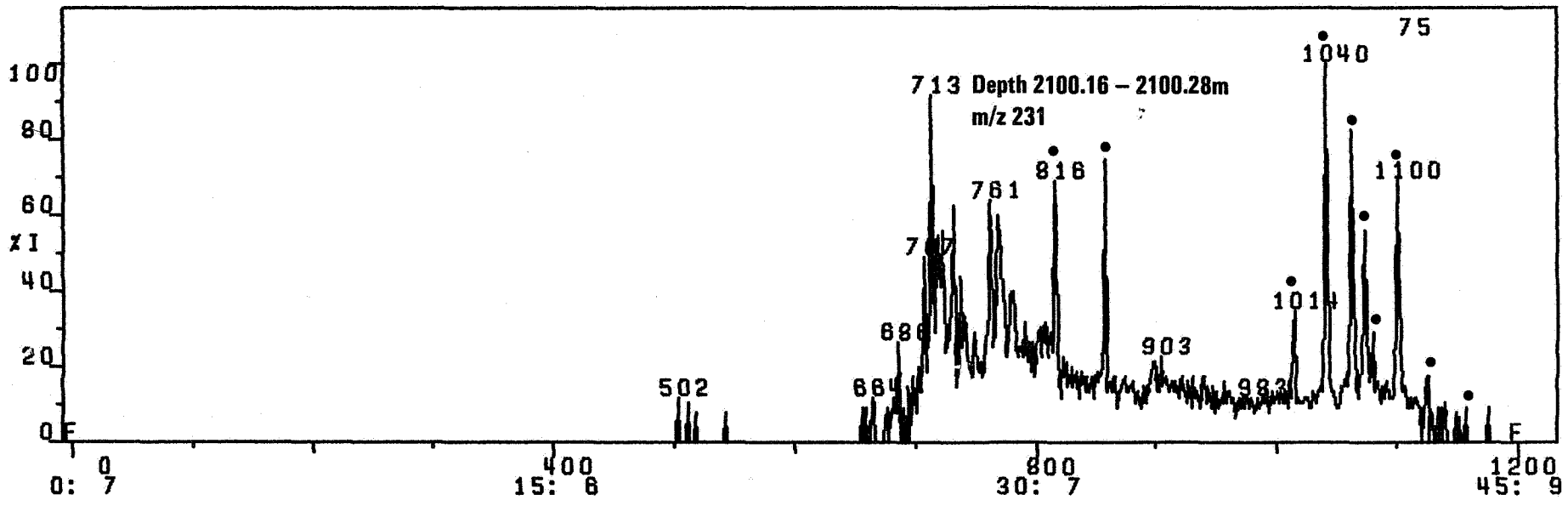

403
Depth 2100.16 – 2100.28m
m/z 91
511
570
450
385
318
377
428
825
679
730
778
825
870
913
995
xI
0
20
40
60
80
100
0: 7
15: 8
30: 7
45: 9

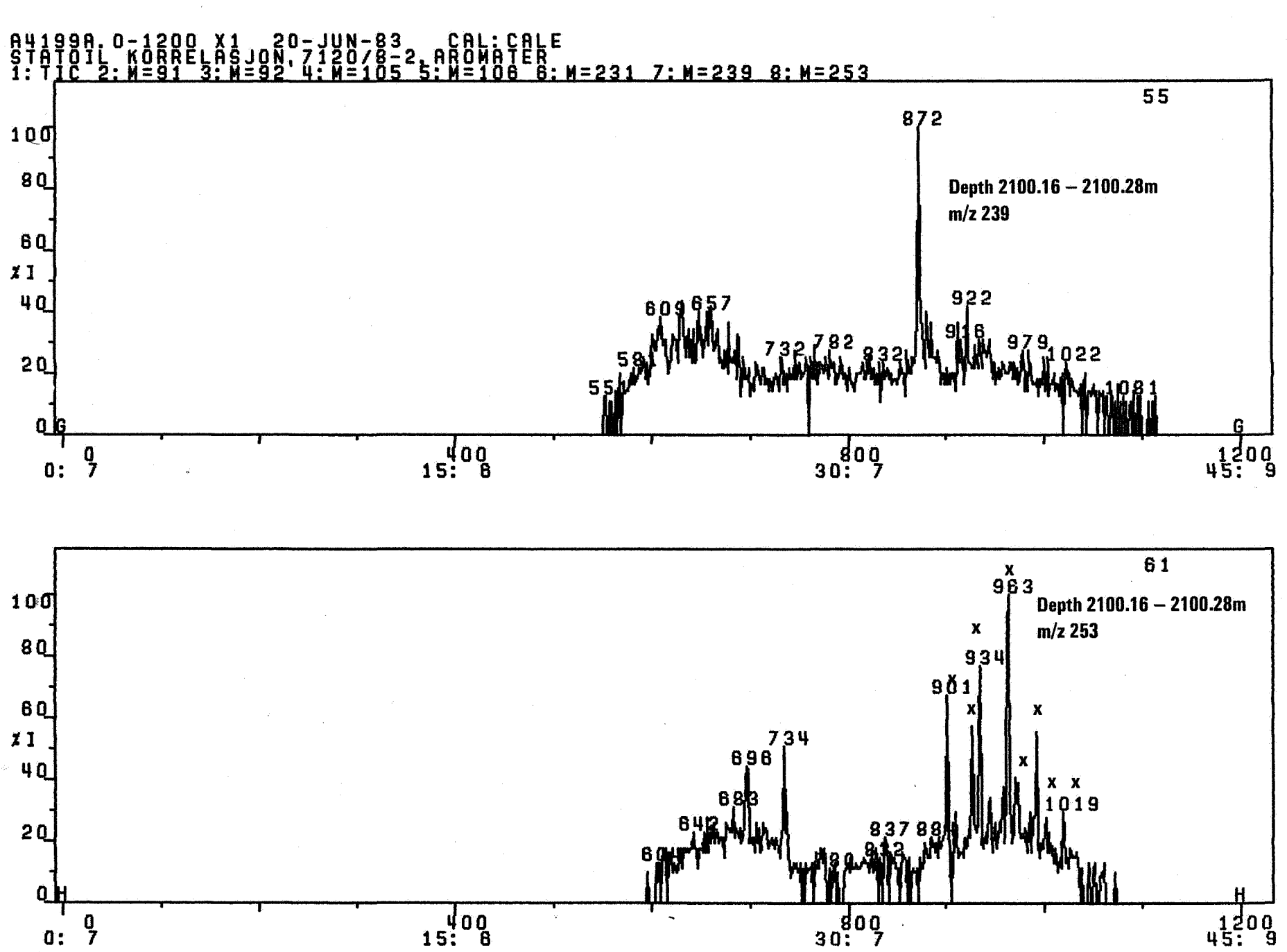

A4199A.0-1200 X1 20-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
424
Depth 2100.16 – 2100.28m
m/z 92
318
385
450
511
570
625
679
730
778
825
870
913
995
580
Depth 2100.16 – 2100.28m
m/z 105
310
321
377
398
441
452
502
513
561
572
617
627
670
681
726
731
775
780
827
872
915
997
0: 7
15: 6
30: 7
45: 9


A4199A.0-1200 X1 20-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
543
502
561
441
617
670
721
769
816
861
889
377
310
946
1025
Depth 2100.16 – 2100.28m
m/z 106
%I
100
80
60
40
20
0
0: 7
400
15: 6
800
30: 7
1200
45: 9
DBT
471
445
423
393
371
358
Depth 2100.16 – 2100.28m
m/z 184


A4199A.0-1200 X1 20-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:M=142 2:M=156 3:M=178 4:M=192 5:M=206 6:M=184 7:M=198 8:M=212
MDBT
530
400
Depth 2100.16 – 2100.28m
m/z 198
4
3+2
442
1
100
80
60
40
20
0
XI
G
G
0
400
800
1200
0: 7
15: 6
30: 7
45: 9


DMDBT
587
299
Depth 2100.16 – 2100.28m
m/z 212
510
100
80
60
40
20
0
XI
H
H
0
400
800
1200
0: 7
15: 6
30: 7
45: 9


713 Depth 2100.16 – 2100.28m
m/z 231
1040
75
816
1100
761
717
1014
686
903
664
502
983
100
80
60
%I
40
20
0
F
0
400
800
1200
0: 7
15: 8
30: 7
45: 9

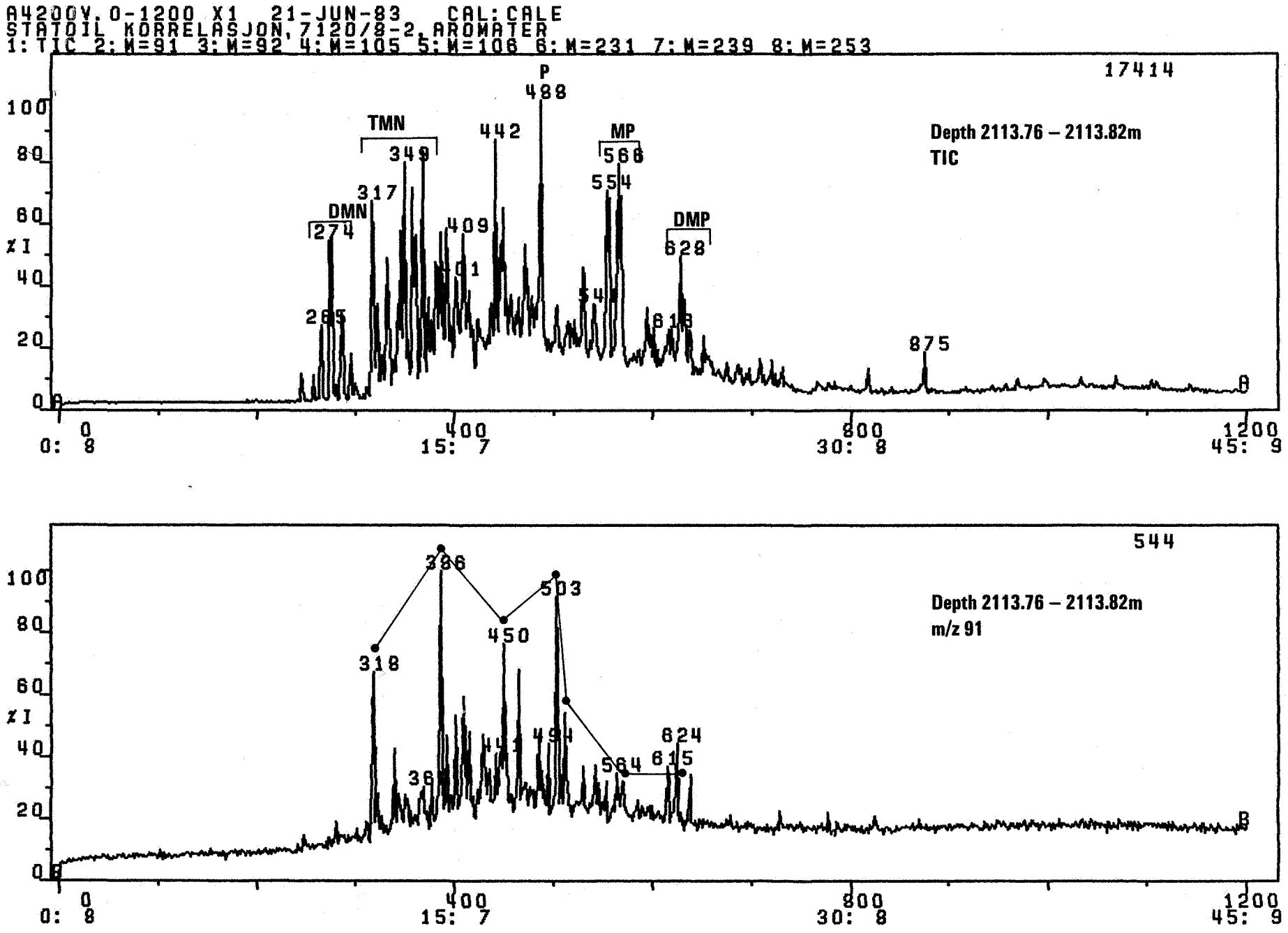

A4199A.0-1200 X1 20-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
55
872
Depth 2100.16 – 2100.28m
m/z 239
609 657
58
55
732 782 832
922
916
979
1022
1081
100
80
60
%I
40
20
0
0
400
800
1200
0: 7
15: 8
30: 7
45: 9
61
983
Depth 2100.16 – 2100.28m
m/z 253
934
901
734
696
683
642
837
1019

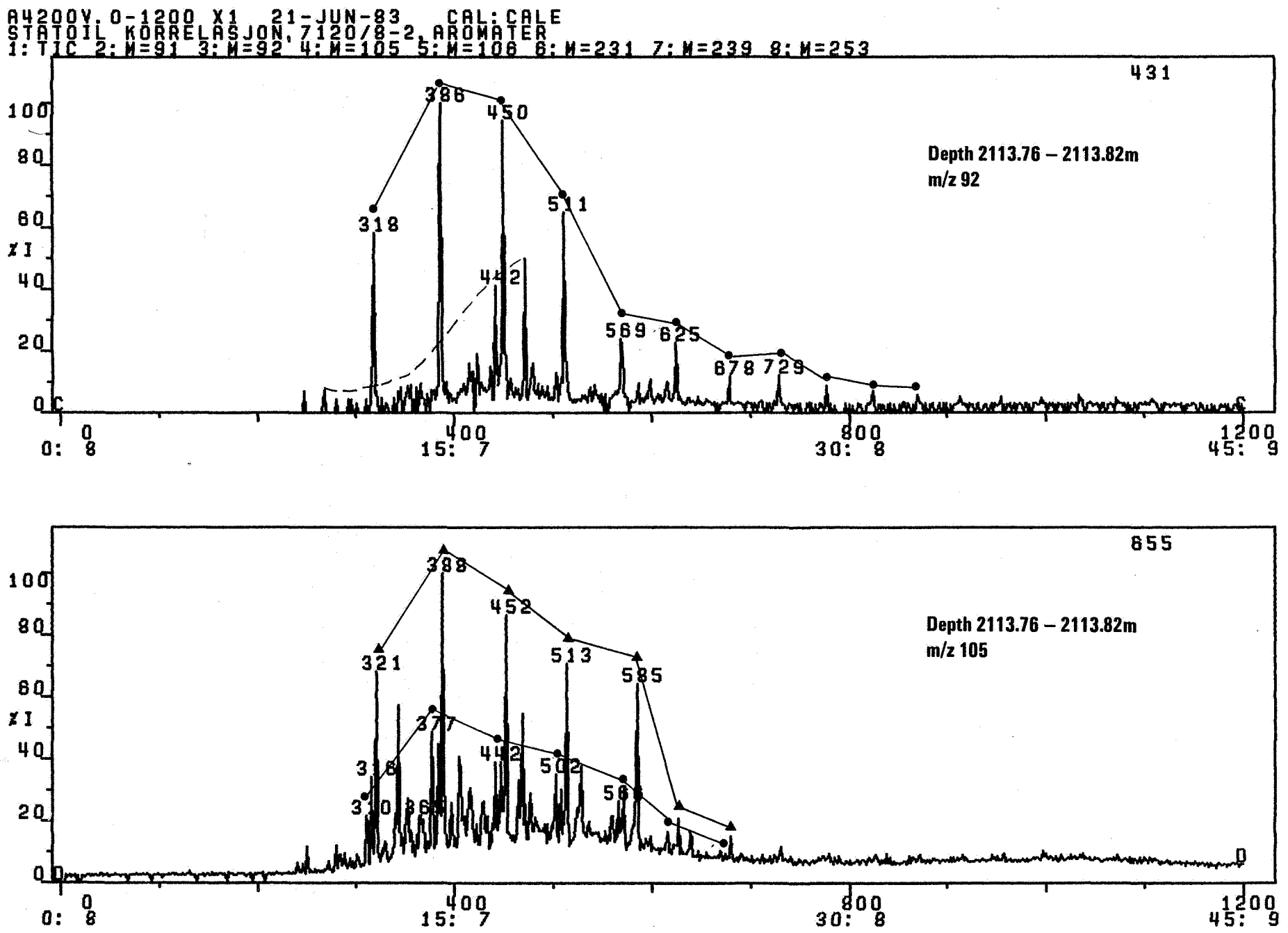
IKU

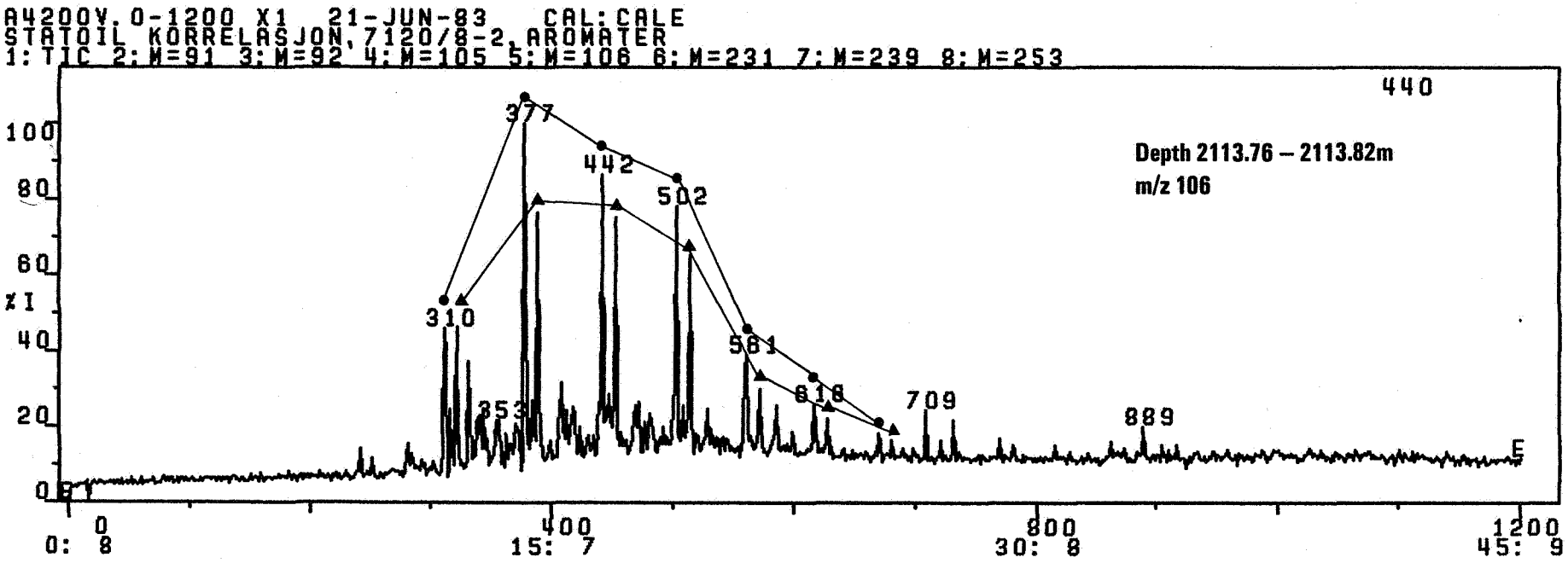
Mass Fragmentograms from Aromatic Hydrocarbons of A-4200

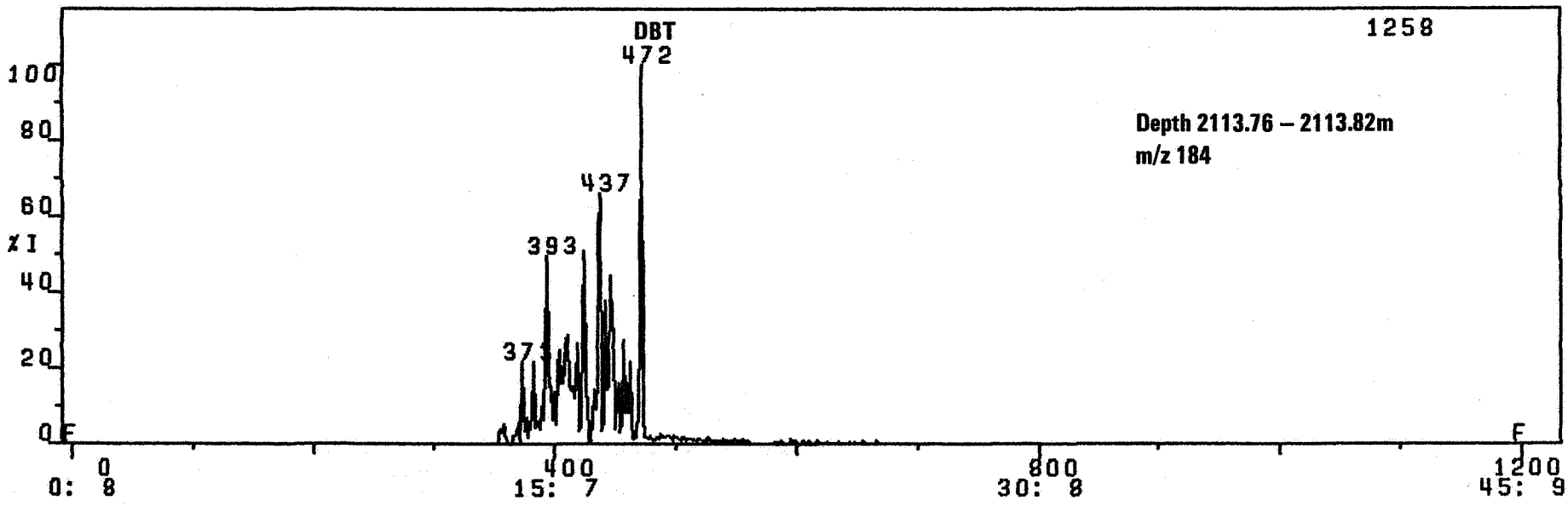
LOWER JURASSIC CLAYSTONE (SURFACE WASH OF CLAYSTONE)

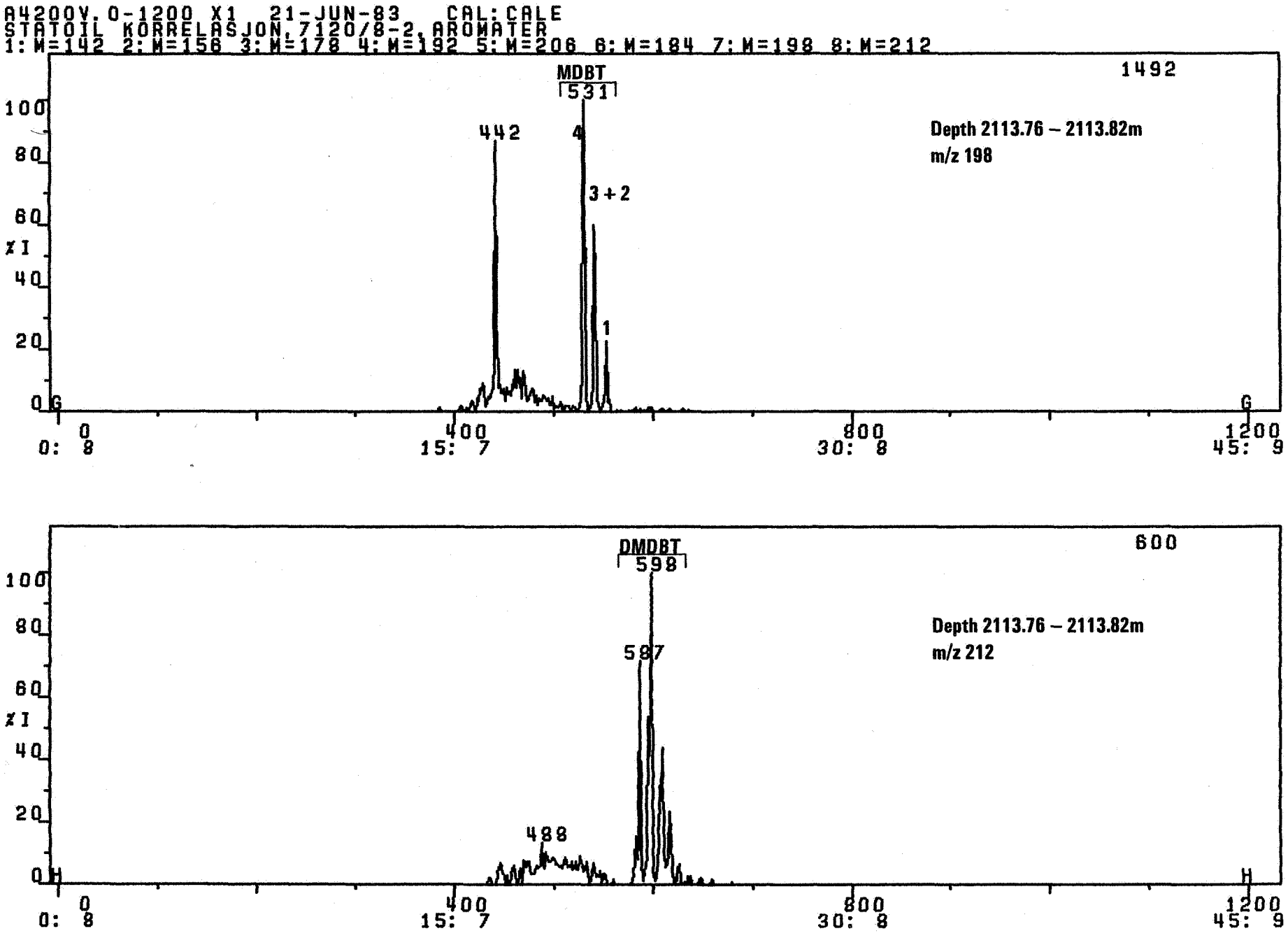
Depth 2113.76 - 2113.82 metres

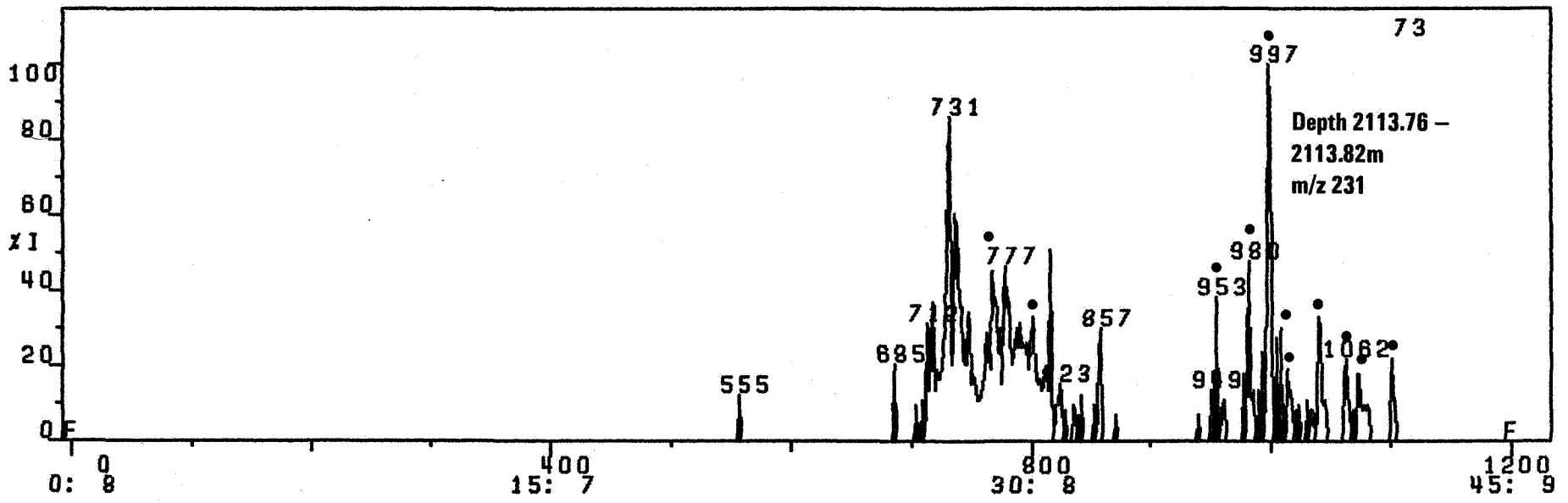

A4200V.0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
17414
Depth 2113.76 – 2113.82m
TIC
P
488
TMN
442
MP
568
349
554
317
DMN
274
409
DMP
628
265
875
544
Depth 2113.76 – 2113.82m
m/z 91
386
503
450
318
624
615
564
494
36
0
400
800
1200
0: 8
15: 7
30: 8
45: 9
XI

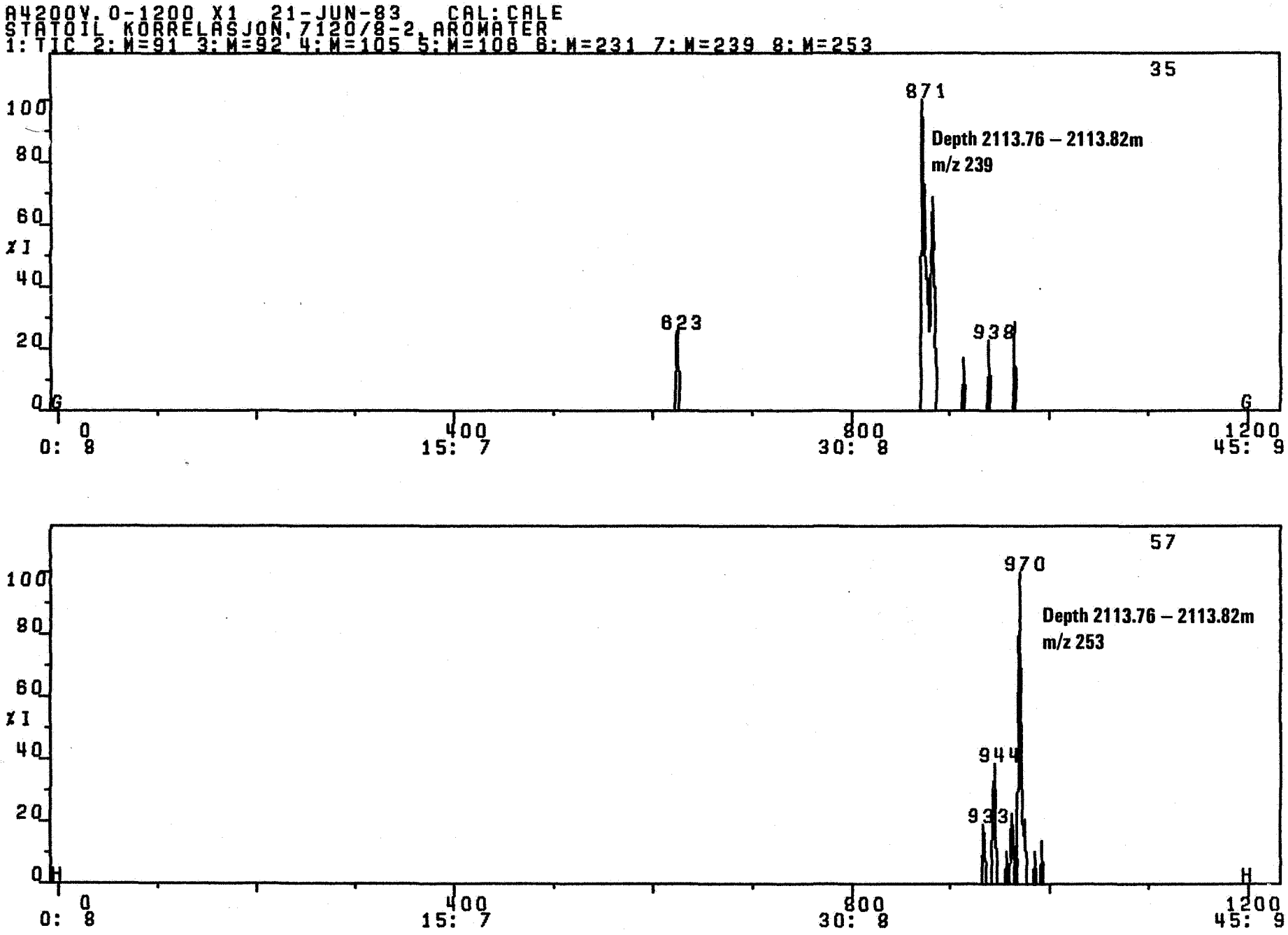

A4200V, 0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON, 7120/8-2, AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253
431
Depth 2113.76 – 2113.82m
m/z 92
388
450
318
511
442
569
625
678
729
655
Depth 2113.76 – 2113.82m
m/z 105
388
452
321
513
585
377
442
502
318
310
0:8
15:7
30:8
45:9


A4200V.0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
440
Depth 2113.76 – 2113.82m
m/z 106
377
442
502
310
561
618
709
353
889
%I
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45: 9


DBT
472
1258
Depth 2113.76 – 2113.82m
m/z 184
437
393
371
%I
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45: 9


A4200V.0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1: M=142 2: M=156 3: M=178 4: M=192 5: M=206 6: M=184 7: M=198 8: M=212
MDBT
531
1492
442
4
3+2
1
Depth 2113.76 – 2113.82m
m/z 198
100
80
60
40
20
0
XI
G
G
0
400
800
1200
0: 8
15: 7
30: 8
45: 9
DMDBT
598
600
587
488
Depth 2113.76 – 2113.82m
m/z 212
H
H


73
997
731
Depth 2113.76 –
2113.82m
m/z 231
777
980
953
857
685
555
23
1062
100
80
60
40
20
0
0: 8
400
15: 7
800
30: 8
1200
45: 9


A4200V.0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=108 6: M=231 7: M=239 8: M=253
35
871
623
938
Depth 2113.76 – 2113.82m
m/z 239
100
80
60
%I
40
20
0
G
G
0
400
800
1200
0: 8
15: 7
30: 8
45: 9
57
970
944
933
Depth 2113.76 – 2113.82m
m/z 253
H
H

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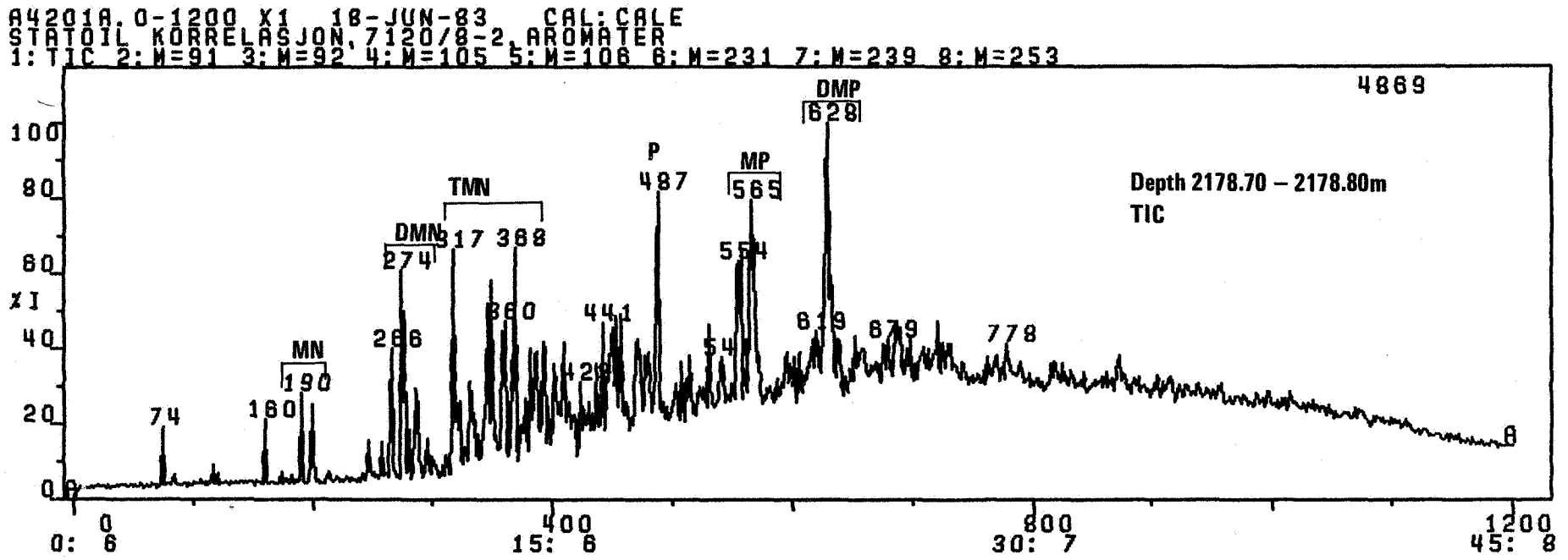
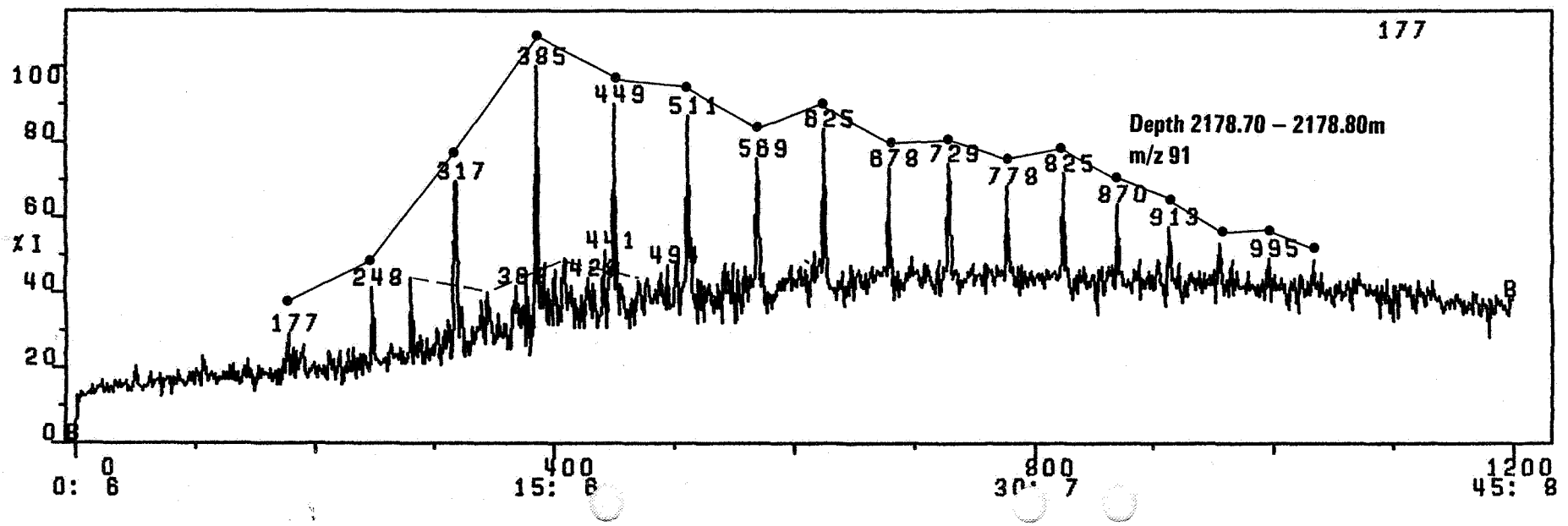
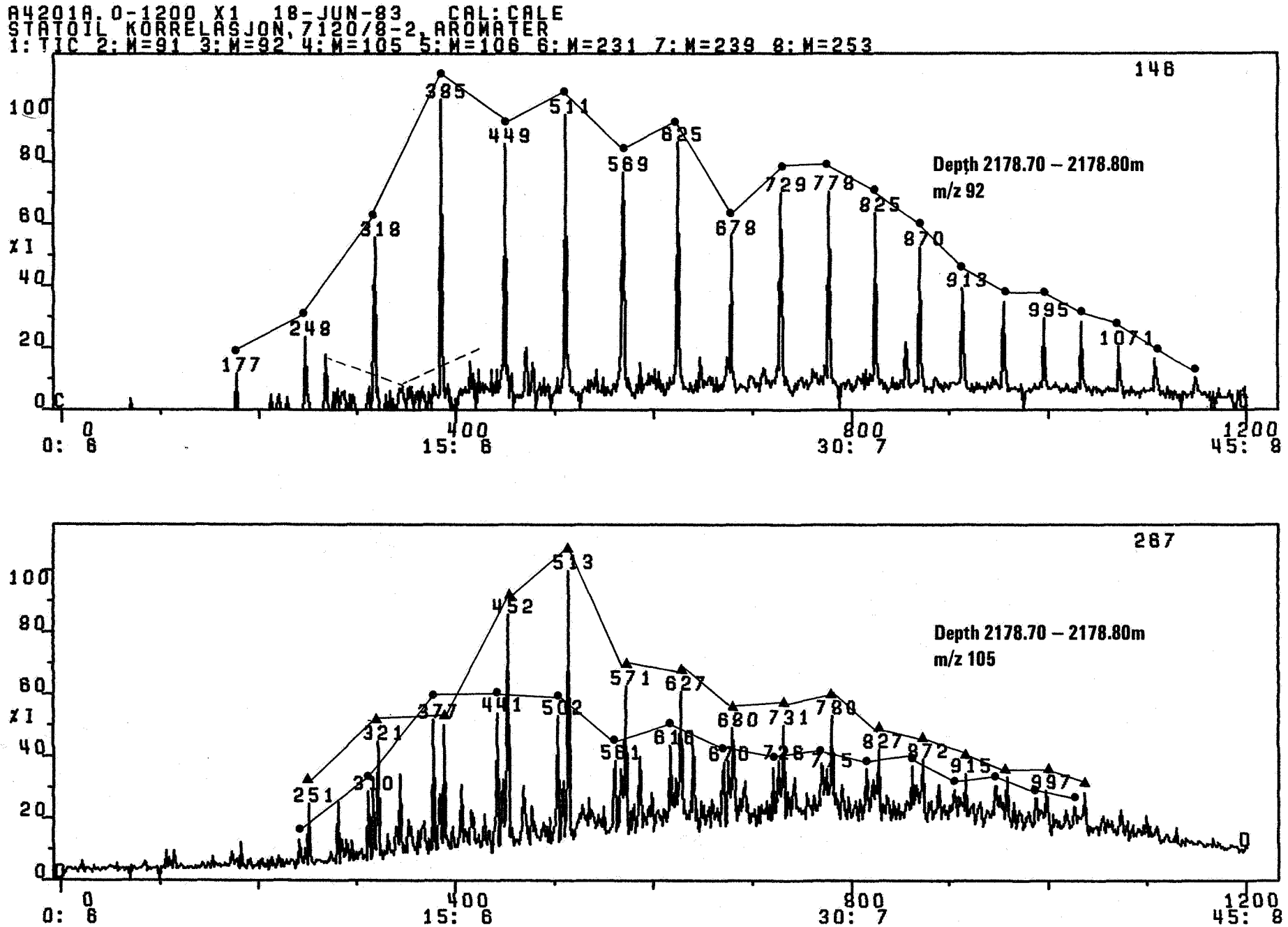
Mass Fragmentograms from Aromatic Hydrocarbons of A-4201

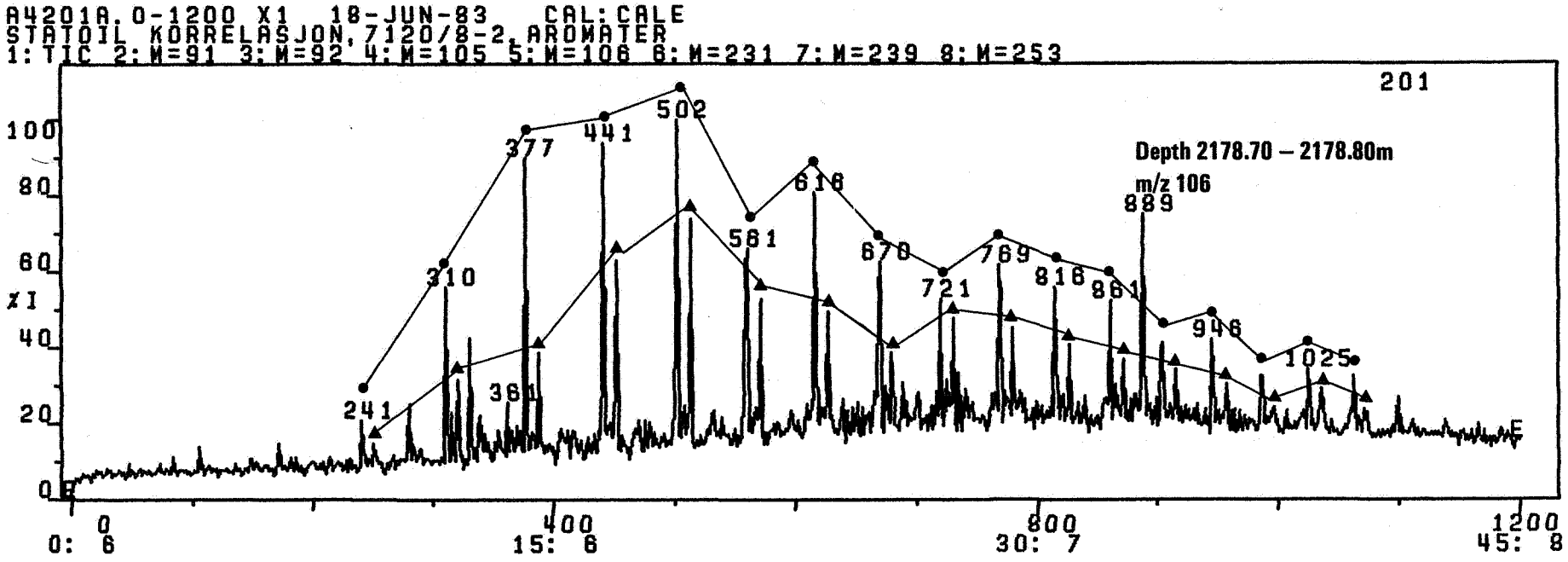
LOWER JURASSIC SANDSTONE

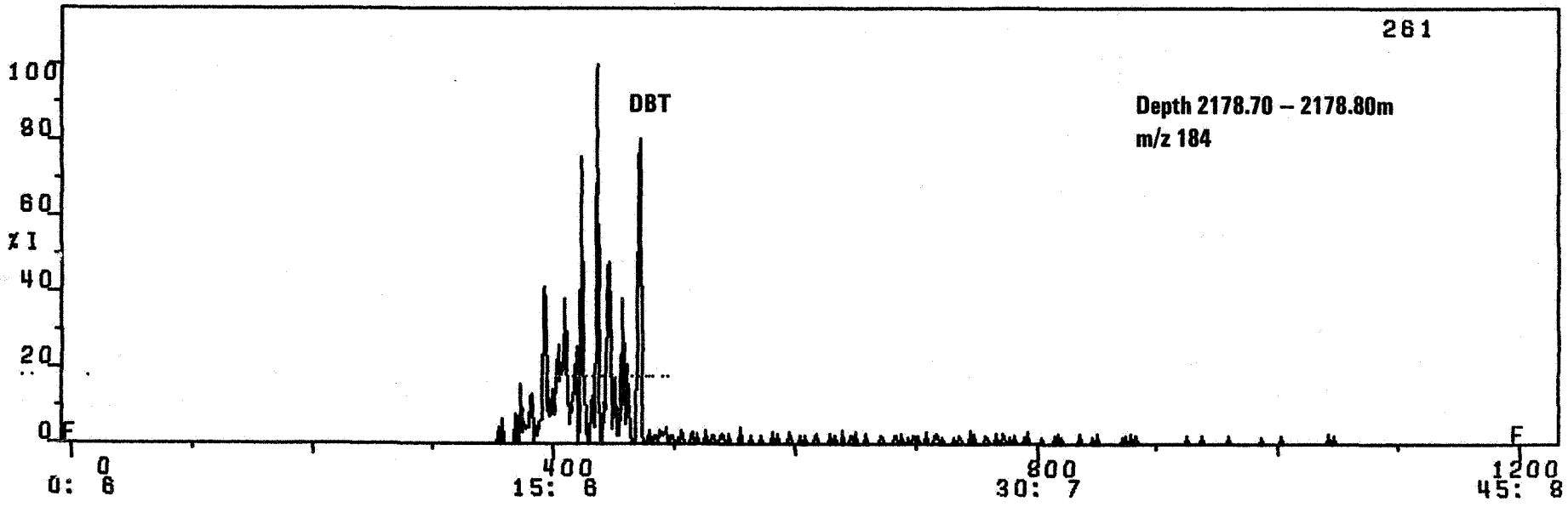
Depth 2178.70 - 2178.80 metres

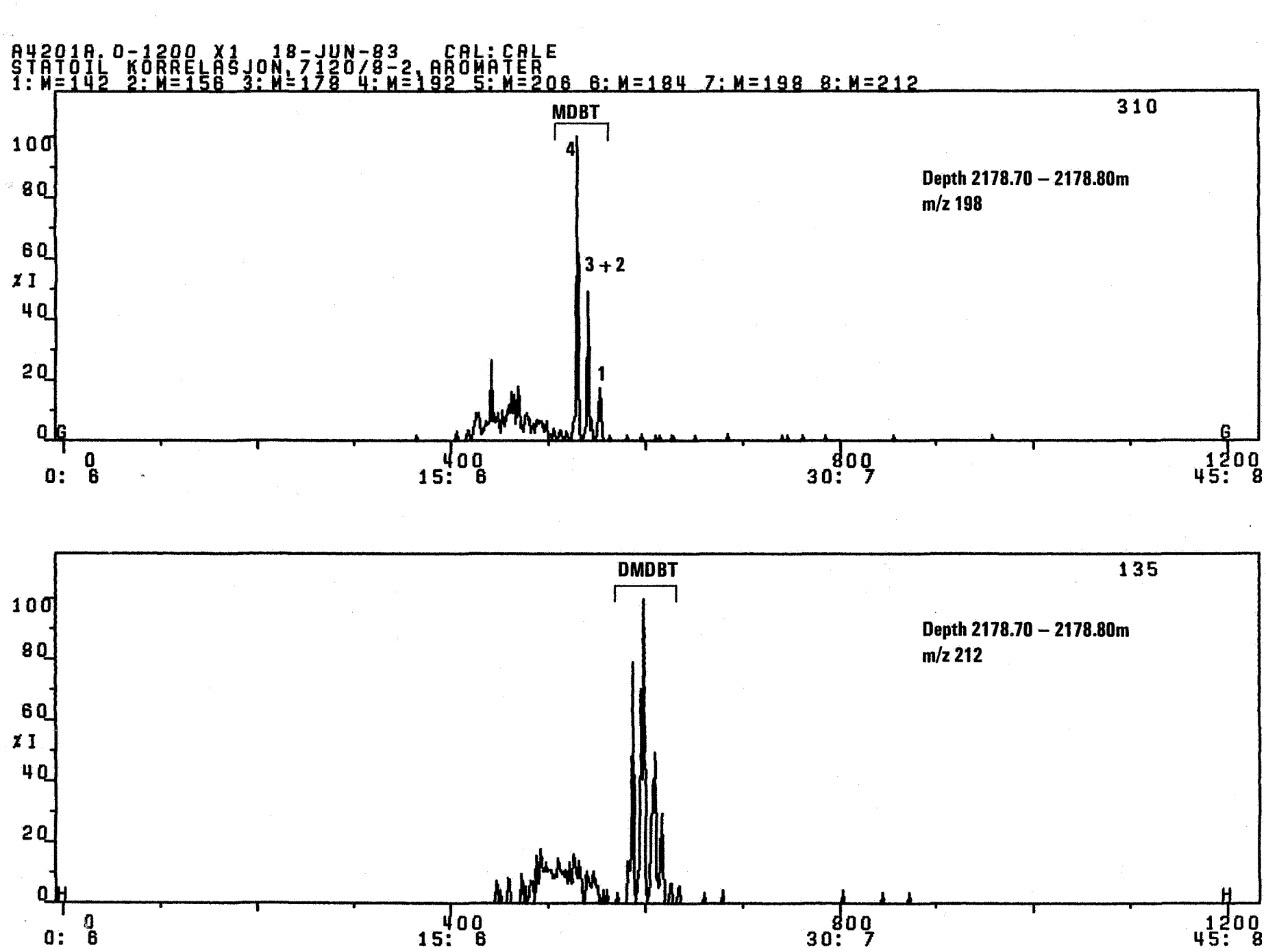

A4201A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
4869
Depth 2178.70 – 2178.80m
TIC
DMP
628
P
487
MP
565
TMN
DMN
274
MN
190
74
160
266
317
368
380
441
554
619
679
778
XI
0
400
800
1200
0: 6
15: 6
30: 7
45: 8

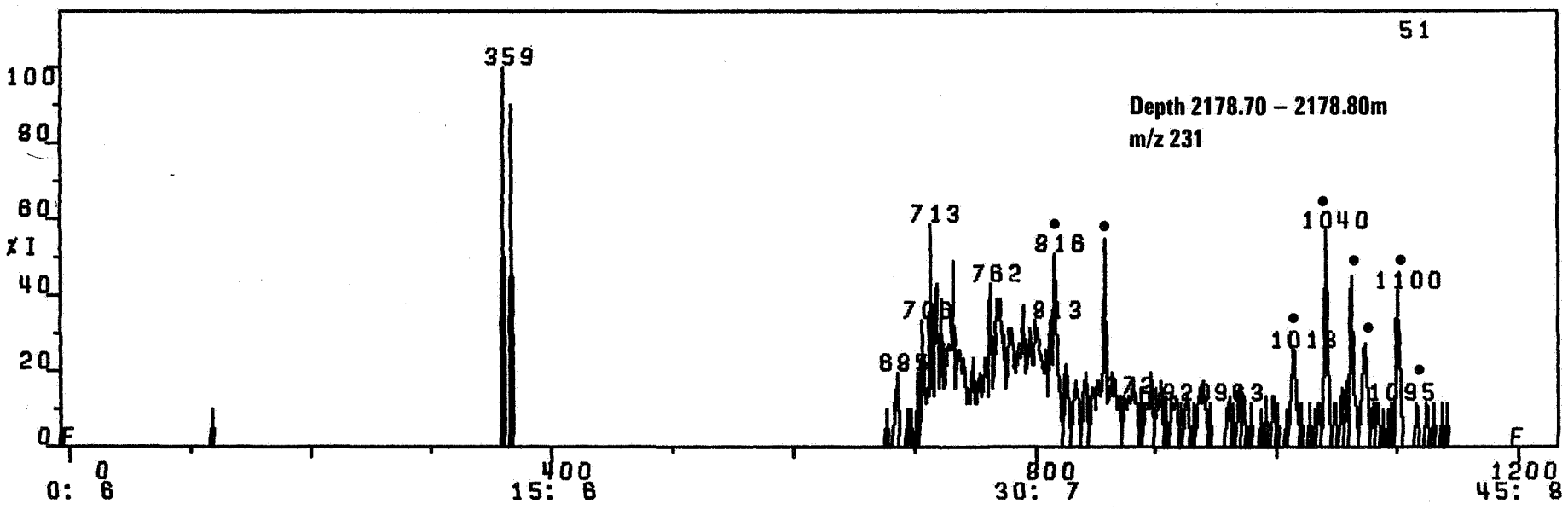

177
Depth 2178.70 – 2178.80m
m/z 91
385
449
511
589
825
878
729
778
825
870
913
995
317
248
177
411
XI
0
400
800
1200
0: 6
15: 6
30: 7
45: 8

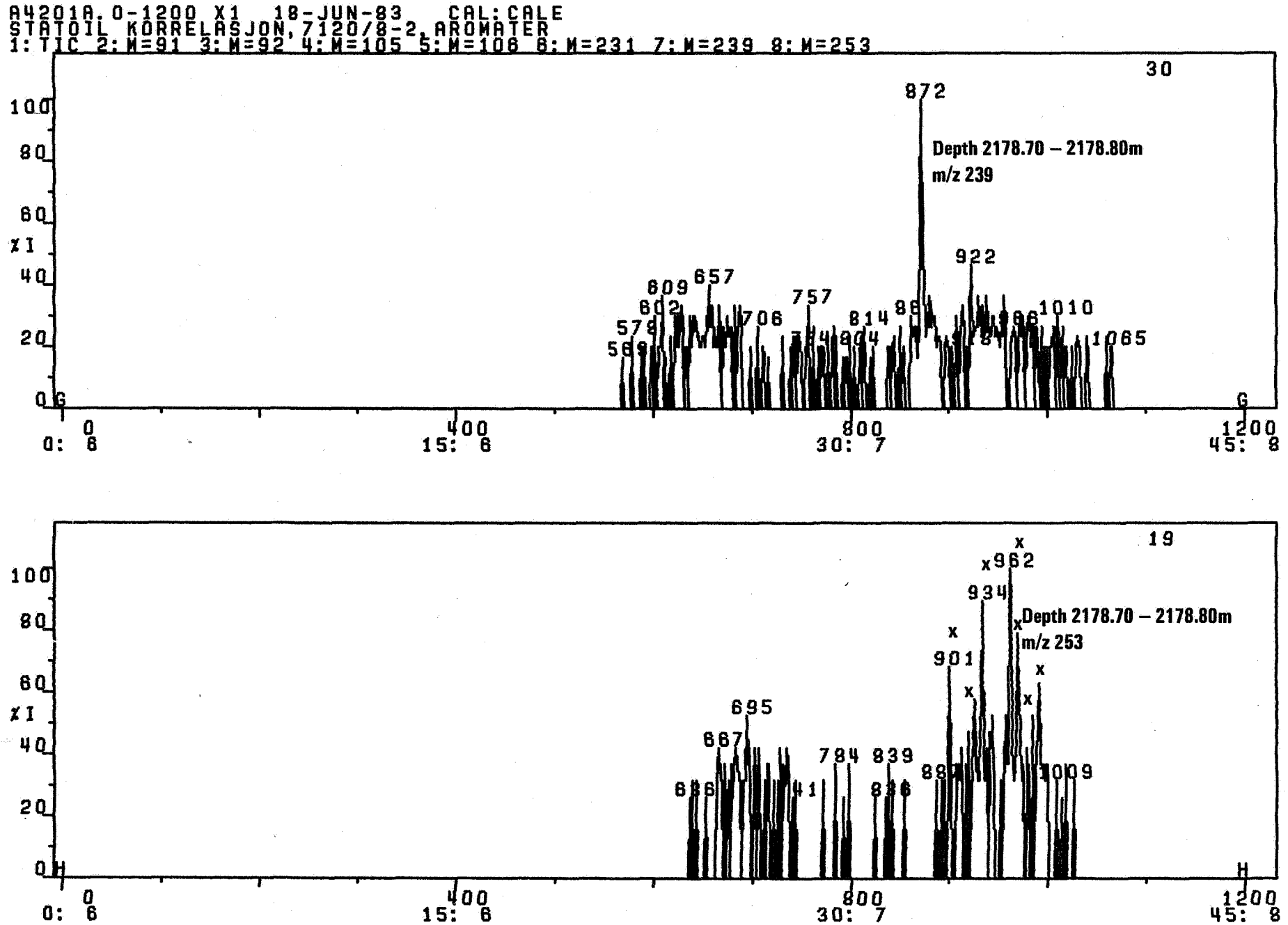

A4201A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
146
385
449
511
569
625
678
729 778
825
870
913
995
1071
318
248
177
Depth 2178.70 – 2178.80m
m/z 92
XI
100
80
60
40
20
0
0
400
800
1200
0: 6
15: 6
30: 7
45: 8
267
513
452
571
627
680
731
780
827
872
915
997
377
441
502
321
251
310
561
618
676
726
775
Depth 2178.70 – 2178.80m
m/z 105


A4201A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2, AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253
201
Depth 2178.70 – 2178.80m
m/z 106
241
310
361
377
441
502
581
616
670
721
769
816
861
889
946
1025
XI
100
80
60
40
20
0
0
400
800
1200
0: 6
15: 6
30: 7
45: 8


261
DBT
Depth 2178.70 – 2178.80m
m/z 184
XI
100
80
60
40
20
0
0
400
800
1200
0: 6
15: 6
30: 7
45: 8


A4201A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:M=142 2:M=156 3:M=178 4:M=192 5:M=206 6:M=184 7:M=198 8:M=212
MDBT
310
Depth 2178.70 – 2178.80m
m/z 198
4
3+2
1
100
80
60
40
20
0
%I
0: 6
15: 6
30: 7
45: 8
DMDBT
135
Depth 2178.70 – 2178.80m
m/z 212


51
359
Depth 2178.70 – 2178.80m
m/z 231
713
816
762
1040
1100
1013
1095
100
80
60
%I
40
20
0
0
400
800
1200
0: 6
15: 6
30: 7
45: 8


A4201A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253
30
872
Depth 2178.70 – 2178.80m
m/z 239
922
609
657
757
602
706
814
1010
1065
19
962
934
Depth 2178.70 – 2178.80m
m/z 253
901
695
667
784
839
1009
100
80
60
%I
40
20
0
0: 6
400
15: 6
800
30: 7
1200
45: 8

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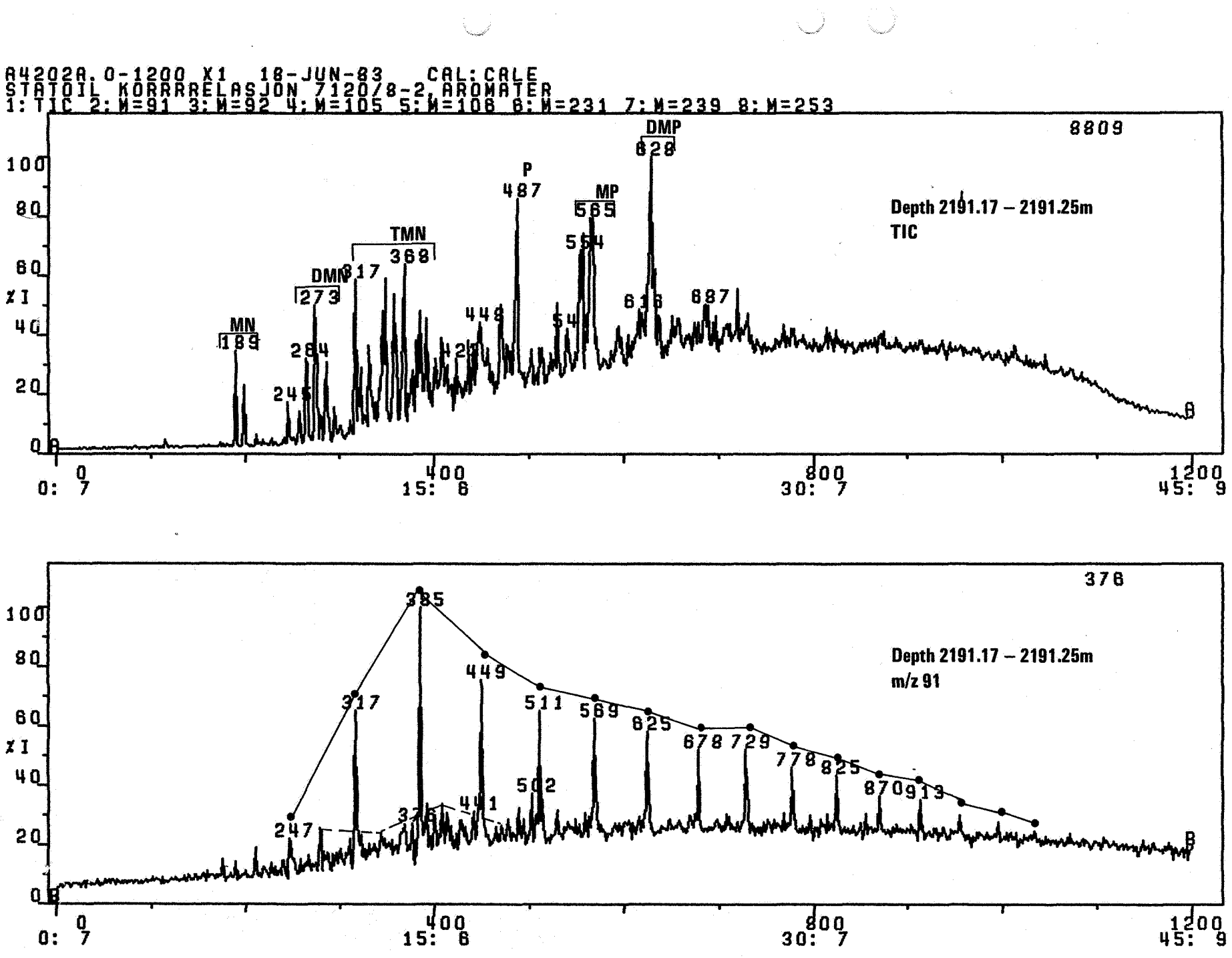
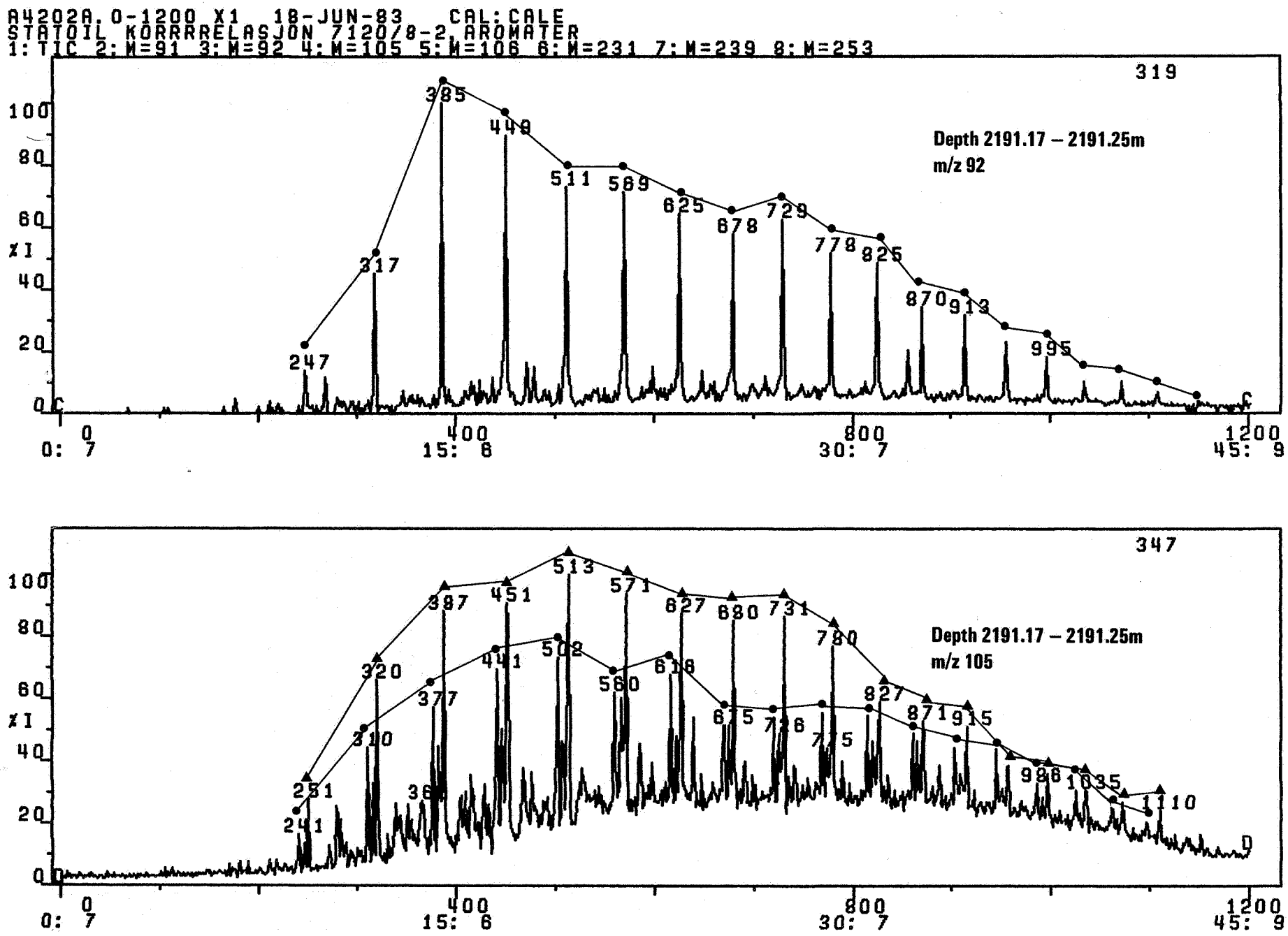
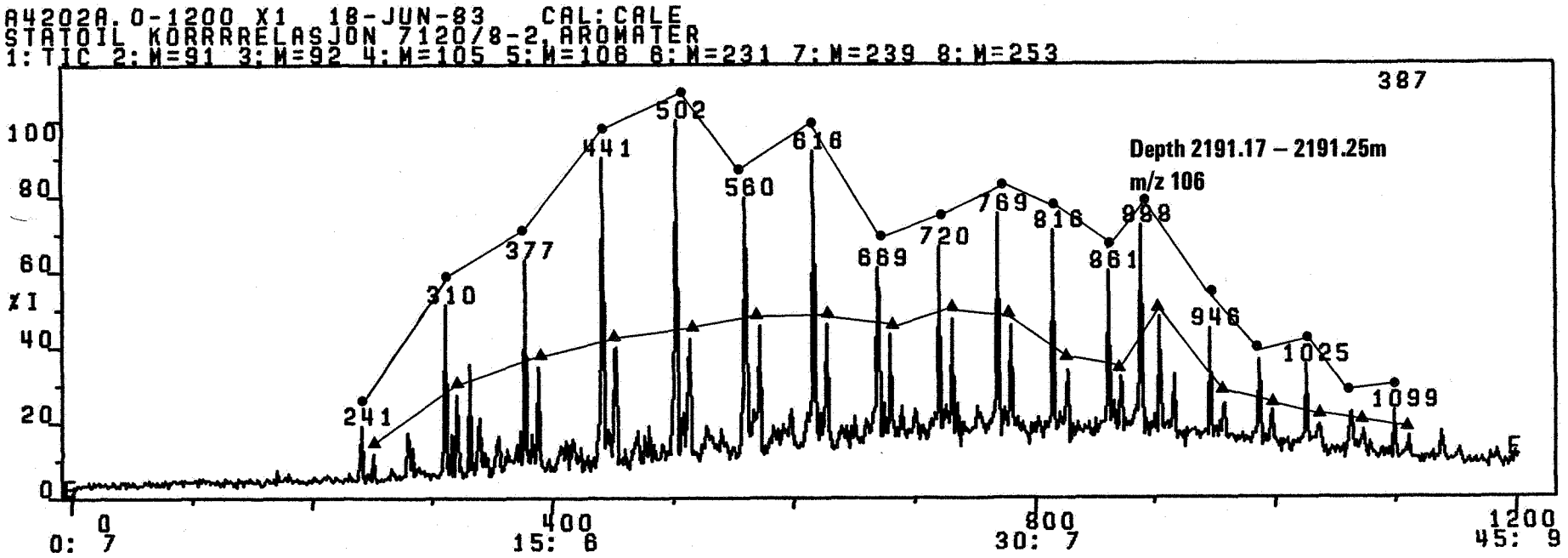
Mass Fragmentograms from Aromatic Hydrocarbons of A-4202

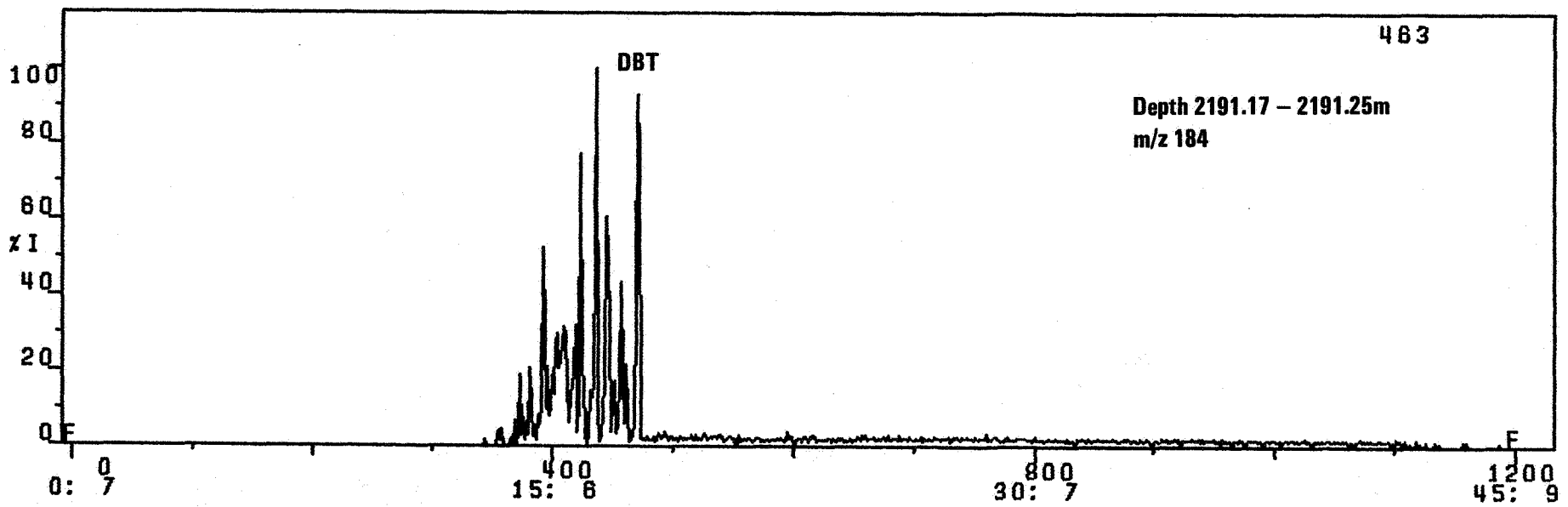
LOWER JURASSIC SANDSTONE (OIL SHOW)

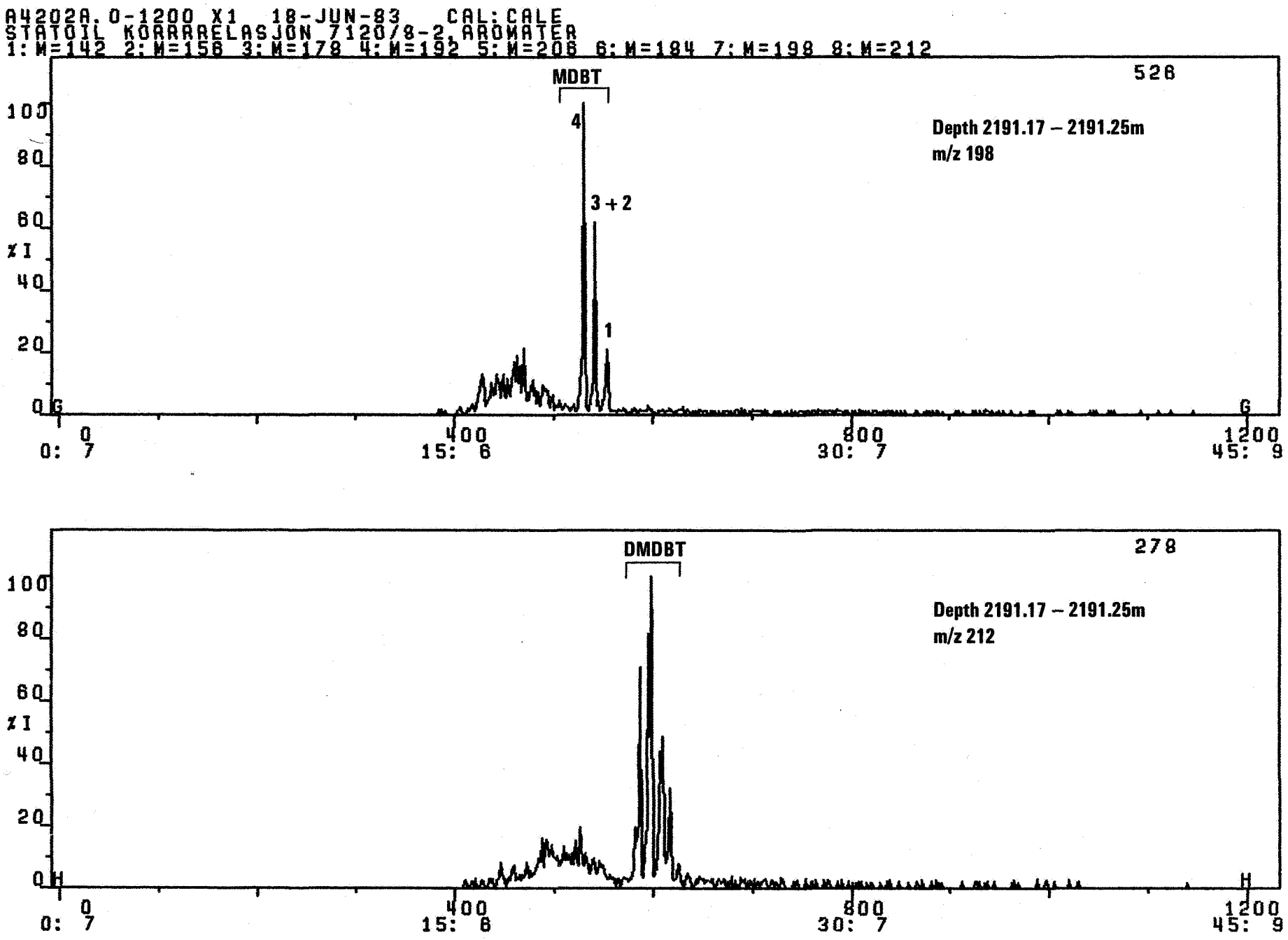
Depth 2191.17 - 2191.25 metres

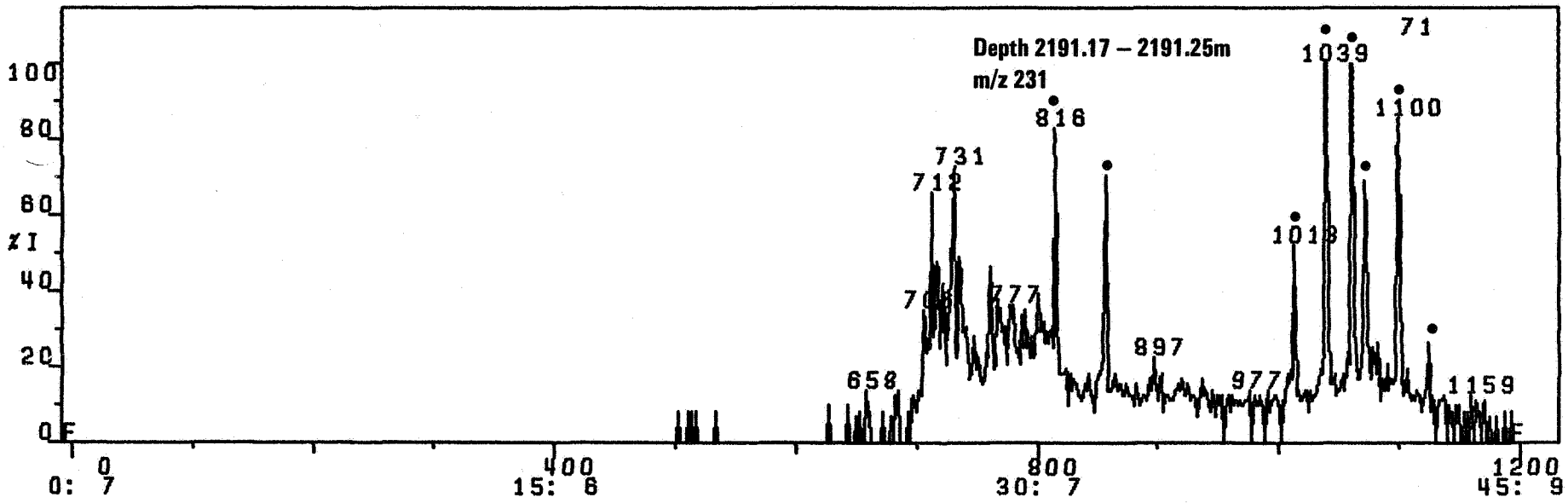

A4202A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRRELASJON 7120/8-2, AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253
8809
Depth 2191.17 – 2191.25m
TIC
MN
189
DMN
273
TMN
368
P
487
MP
565
DMP
628
284
245
317
448
554
616
687
XI
0: 7
15: 8
30: 7
45: 9
376
Depth 2191.17 – 2191.25m
m/z 91
385
317
449
511
589
625
678
729
778
825
870
913
247
376
441
502


A4202A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRRELASJON 7120/8-2, AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253
319
Depth 2191.17 – 2191.25m
m/z 92
385
449
317
247
511
589
625
678
729
778
825
870
913
995
347
Depth 2191.17 – 2191.25m
m/z 105
513
571
451
387
627
680
731
780
320
441
502
560
618
377
310
251
241
827
871
915
986
1035
1110
0: 7
15: 6
30: 7
45: 9

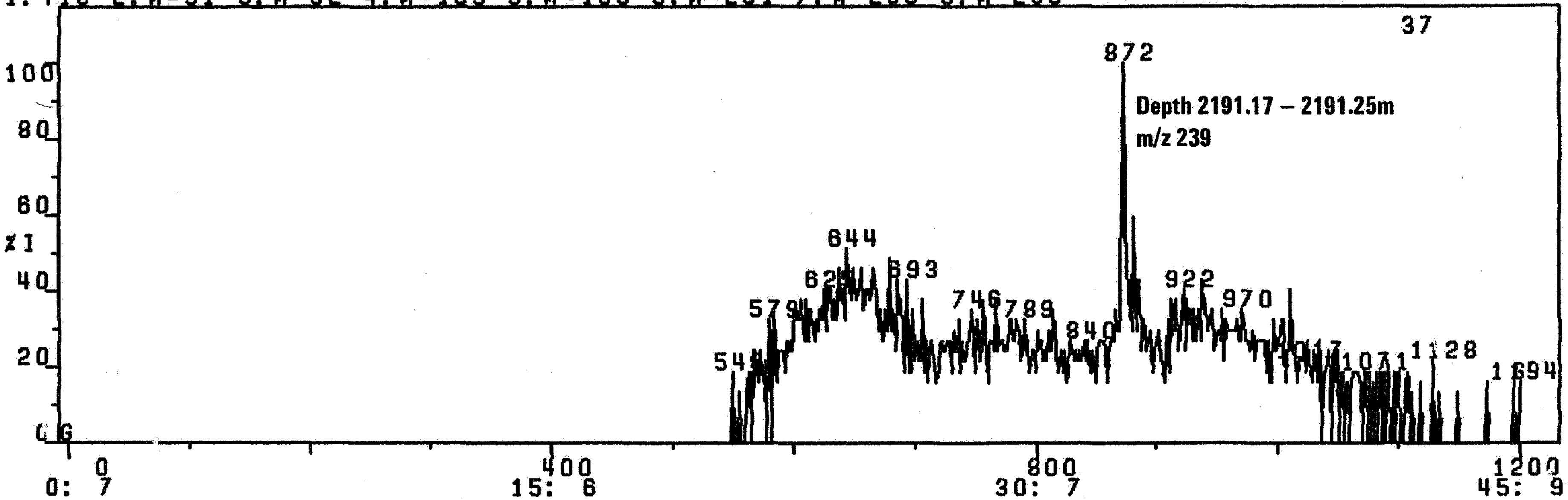

A4202A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRRRELASJON 7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
387
Depth 2191.17 – 2191.25m
m/z 106
241
310
377
441
502
560
616
669
720
769
816
861
998
946
1025
1099
xI
100
80
60
40
20
0
0: 7
15: 6
30: 7
45: 9

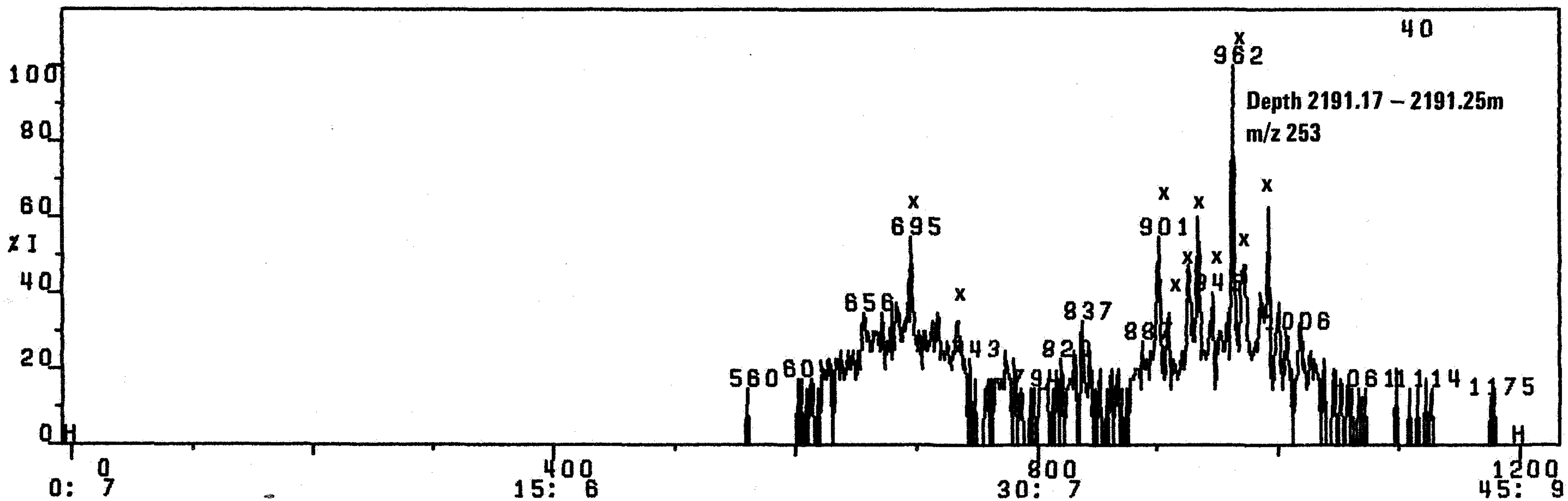

463
DBT
Depth 2191.17 – 2191.25m
m/z 184
xI
100
80
60
40
20
0
0: 7
15: 6
30: 7
45: 9


A4202A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRARELASJON 7120/8-2, AROMATER
1: M=142 2: M=156 3: M=178 4: M=192 5: M=206 6: M=184 7: M=198 8: M=212
MDBT
526
Depth 2191.17 – 2191.25m
m/z 198
4
3 + 2
1
100
80
60
%I
40
20
0
G
G
0
400
800
1200
0: 7
15: 6
30: 7
45: 9
DMDBT
278
Depth 2191.17 – 2191.25m
m/z 212
100
80
60
%I
40
20
0
H
H
0
400
800
1200
0: 7
15: 8
30: 7
45: 9


Depth 2191.17 – 2191.25m
m/z 231
100
80
60
%I
40
20
0
658
712
731
816
897
977
1039
1100
1159
0
400
800
1200
0: 7
15: 6
30: 7
45: 9

A4202A.0-1200 X1 18-JUN-83 CAL:CALE
STATOIL KORRRRELASJON 7120/8-2, AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253





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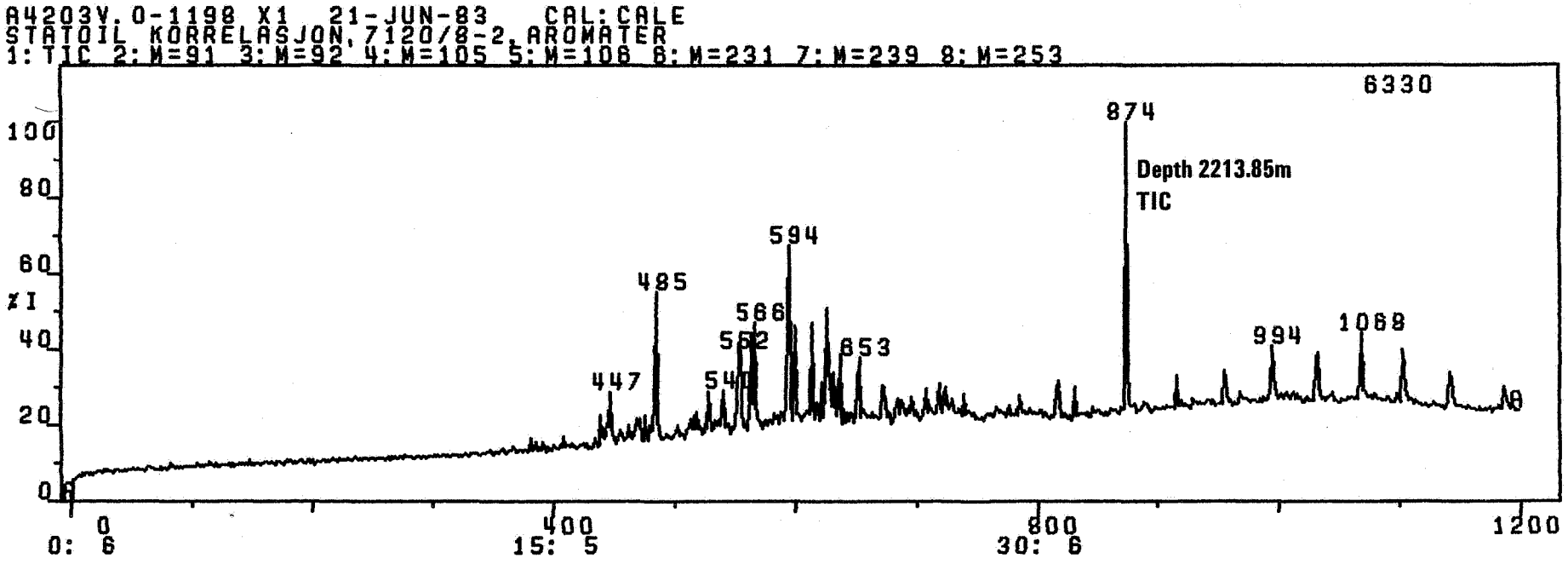
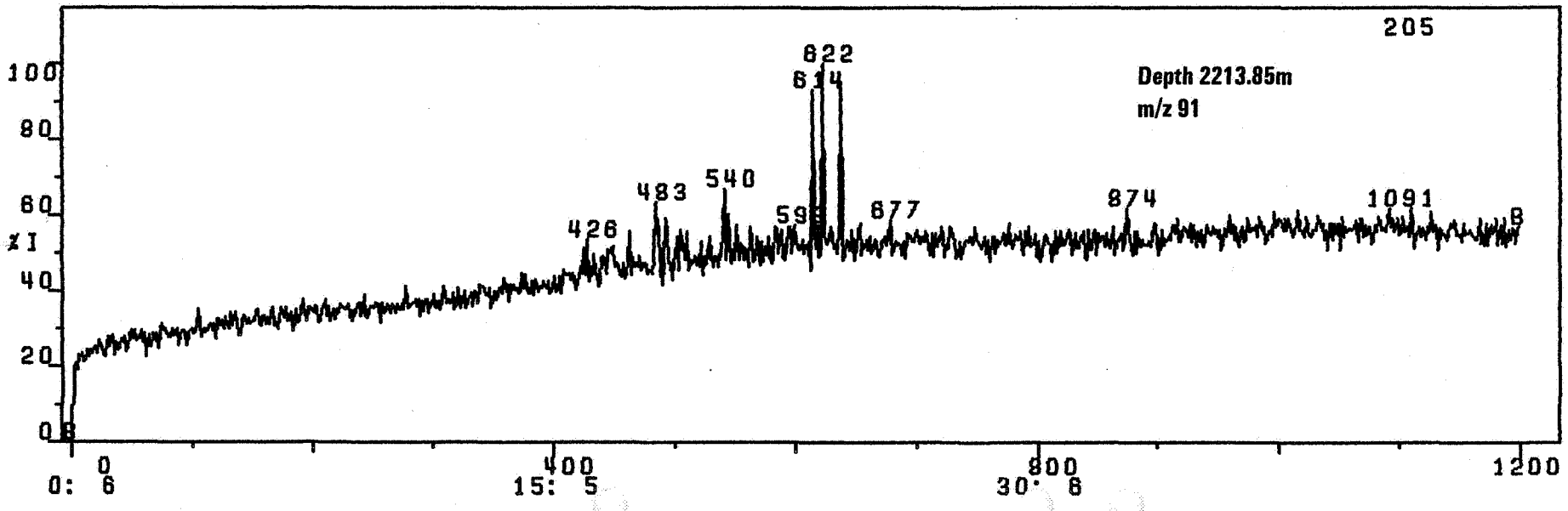
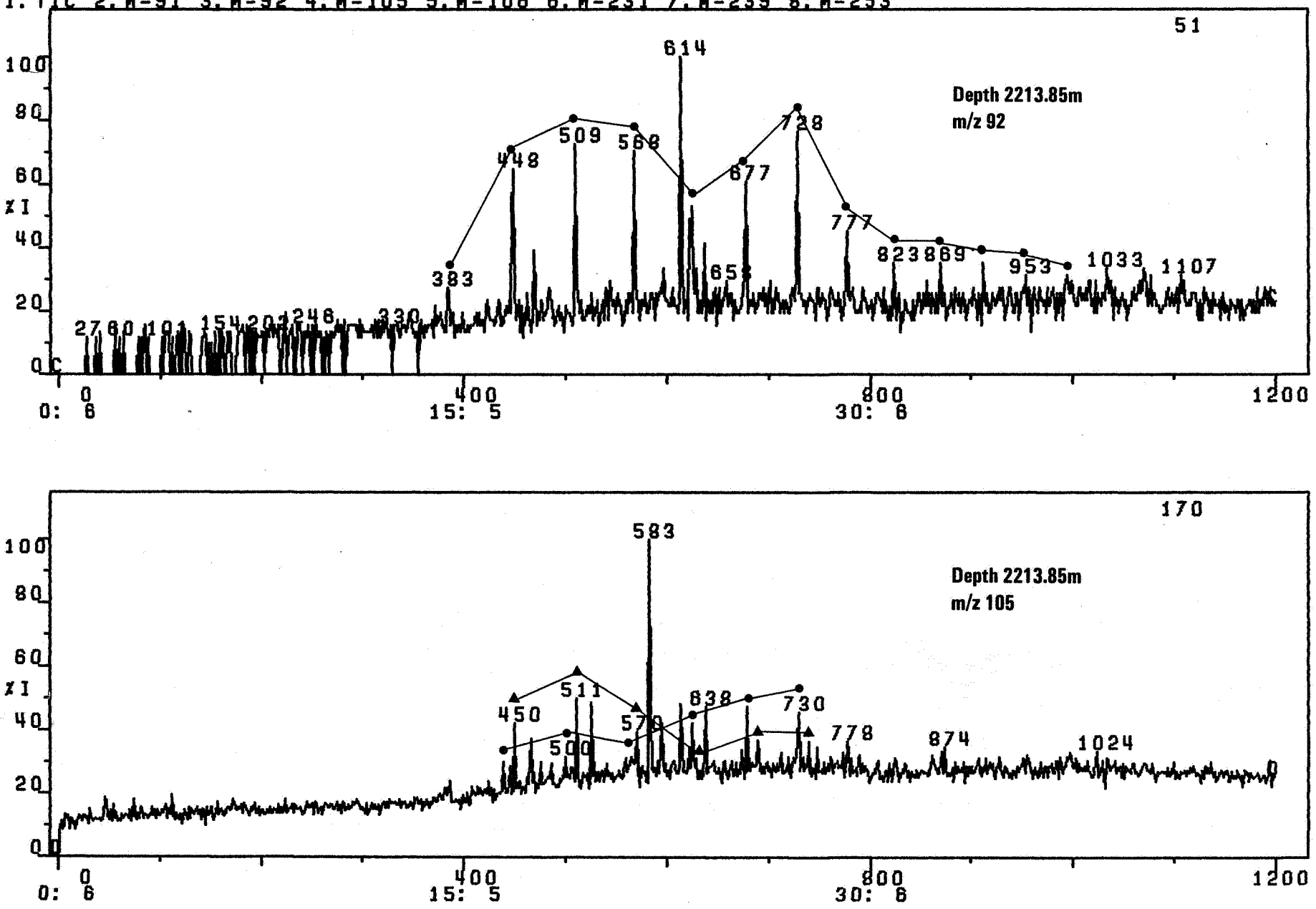
Mass Fragmentograms from Aromatic Hydrocarbons of A-4203

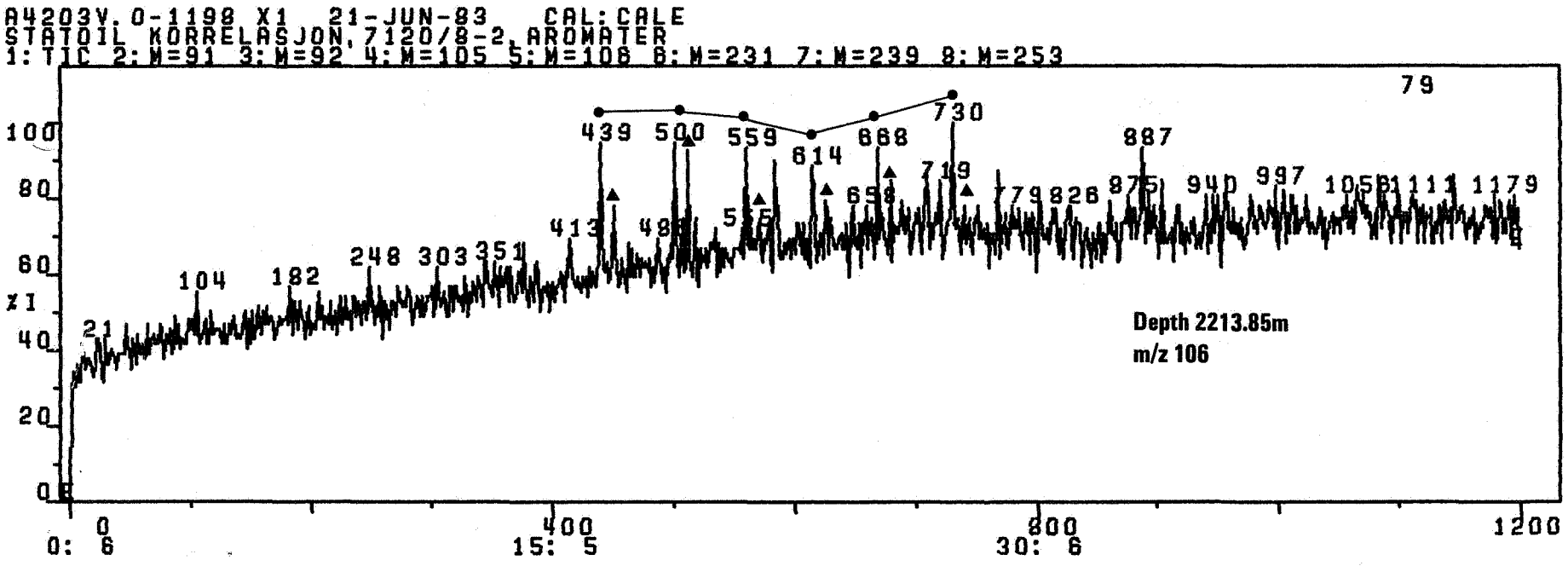
LOWER JURASSIC COAL (SURFACE WASH OF COAL)

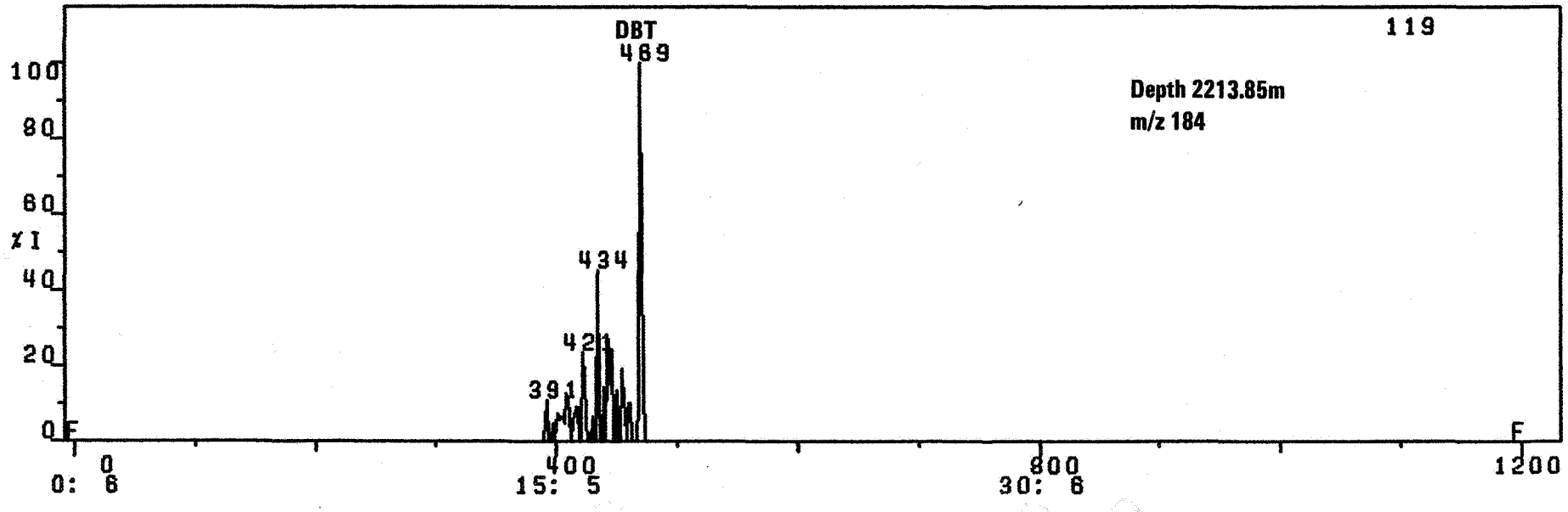
Depth 2213.85 metres

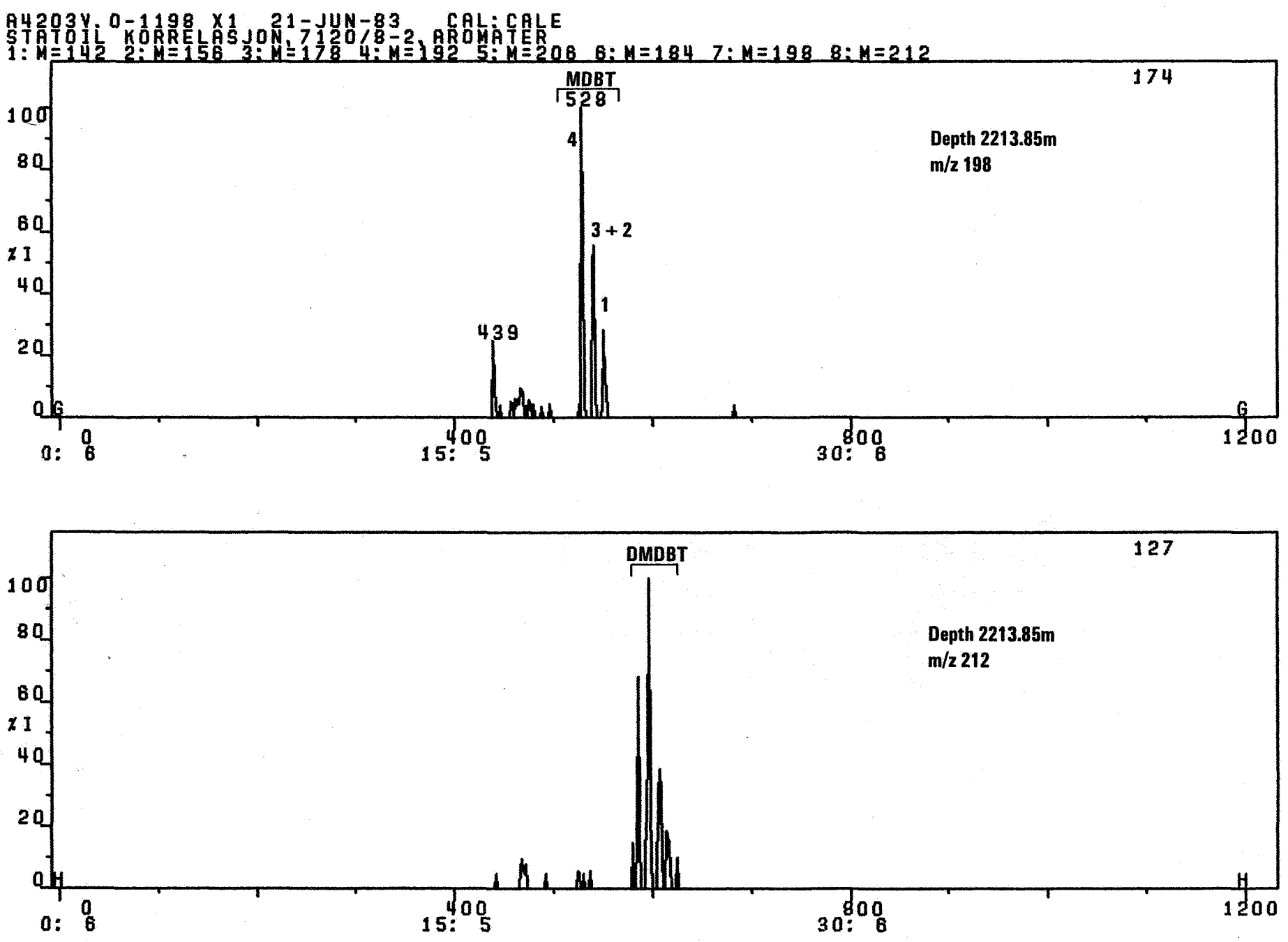

A4203V.0-1198 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
6330
874
Depth 2213.85m
TIC
594
485
566
562
653
447
994
1068
100
80
60
%I
40
20
0
0
400
800
1200
0: 6
15: 5
30: 6

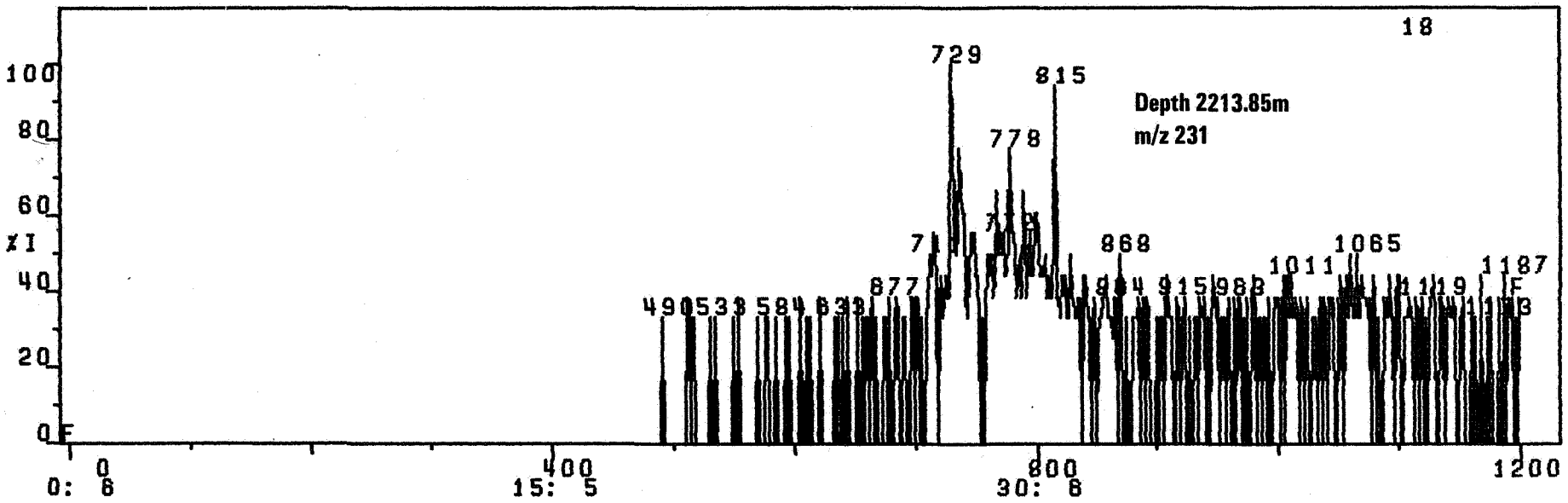

205
822
614
Depth 2213.85m
m/z 91
483
540
426
877
874
1091
100
80
60
%I
40
20
0
0
400
800
1200
0: 6
15: 5
30: 6

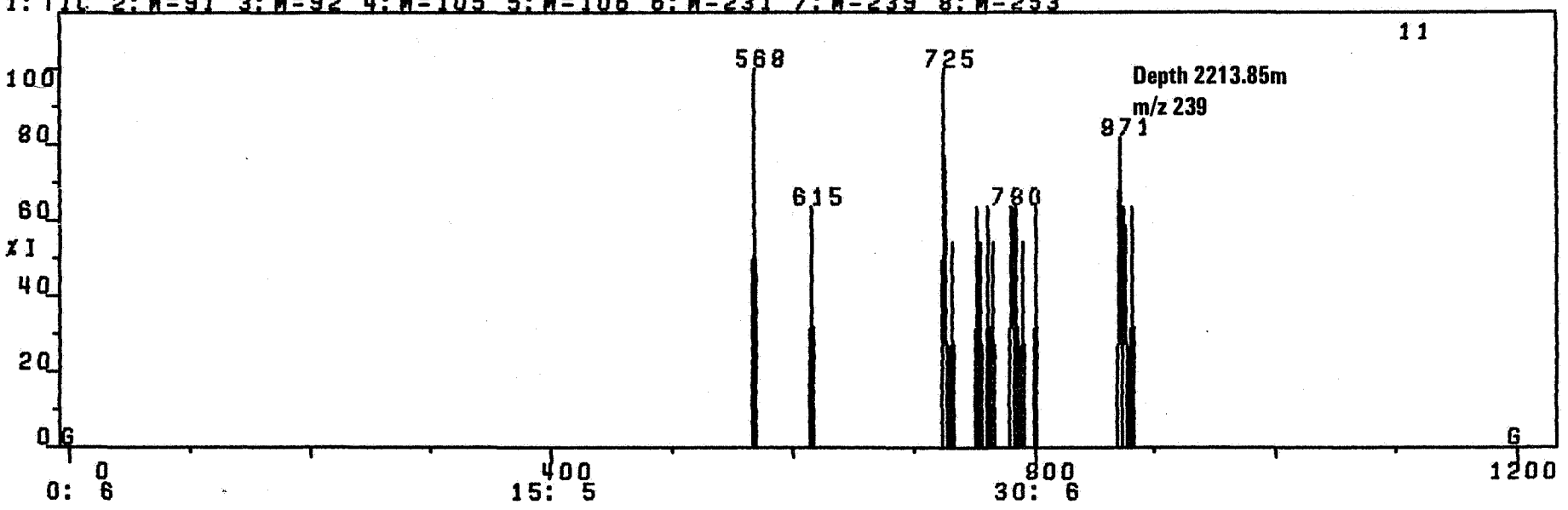

A4203V.0-1198 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
51
Depth 2213.85m
m/z 92
614
509
568
448
728
677
777
383
653
823869
953
1033
1107
330
1246
1542
1101
2760
XI
100
80
60
40
20
0
0
400
800
1200
0: 6
15: 5
30: 6
170
Depth 2213.85m
m/z 105
583
511
450
500
578
638
730
778
874
1024
XI
100
80
60
40
20
0
0
400
800
1200
0: 6
15: 5
30: 6

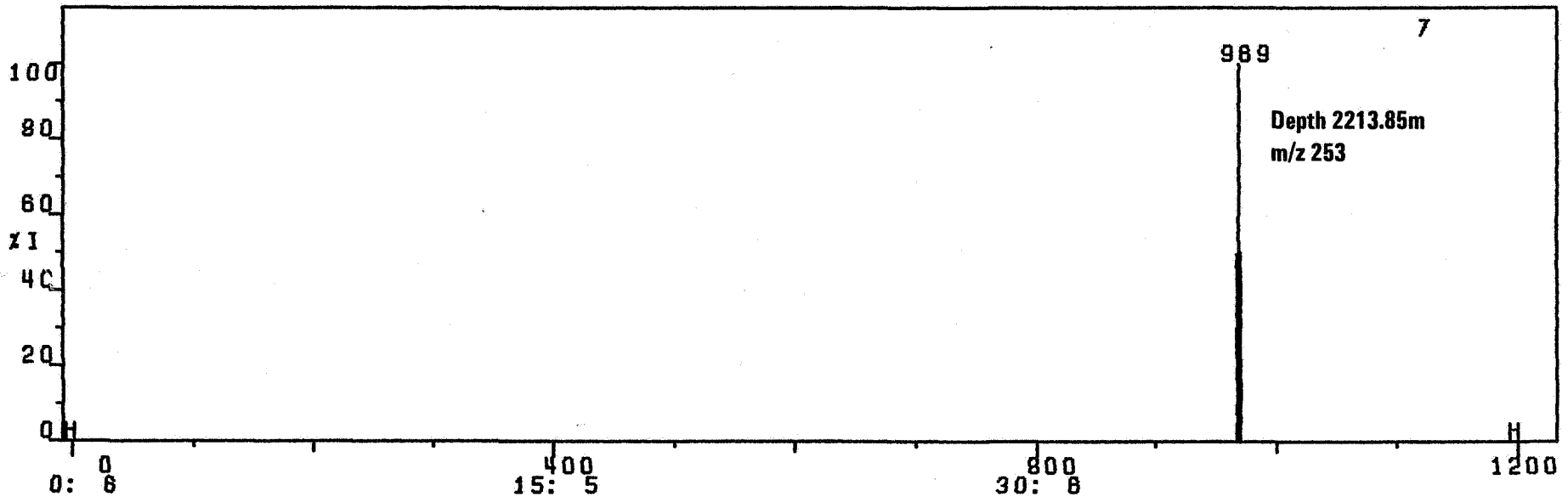

A4203V.0-1198 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
79
Depth 2213.85m
m/z 106
xI
0:6
15:5
30:6


DBT
489
119
Depth 2213.85m
m/z 184
xI
0:6
15:5
30:6


A4203Y.0-1198 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:M=142 2:M=156 3:M=178 4:M=192 5:M=206 6:M=184 7:M=198 8:M=212
MDBT
528
174
Depth 2213.85m
m/z 198
4
3+2
1
439
%I
100
80
60
40
20
0
0: 6
400
15: 5
800
30: 6
1200
DMDBT
127
Depth 2213.85m
m/z 212


18
729
815
Depth 2213.85m
m/z 231
778
868
1065
1187
877
1011
100
80
60
XI
40
20
0
0
400
800
1200
0: 8
15: 5
30: 8


A4203V.0-1198 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=108 8: M=231 7: M=239 8: M=253
11
568
725
615
780
971
Depth 2213.85m
m/z 239
100
80
60
%I
40
20
0
0
400
800
1200
0: 6
15: 5
30: 6


7
989
Depth 2213.85m
m/z 253
100
80
60
%I
40
20
0
0
400
800
1200
0: 6
15: 5
30: 8

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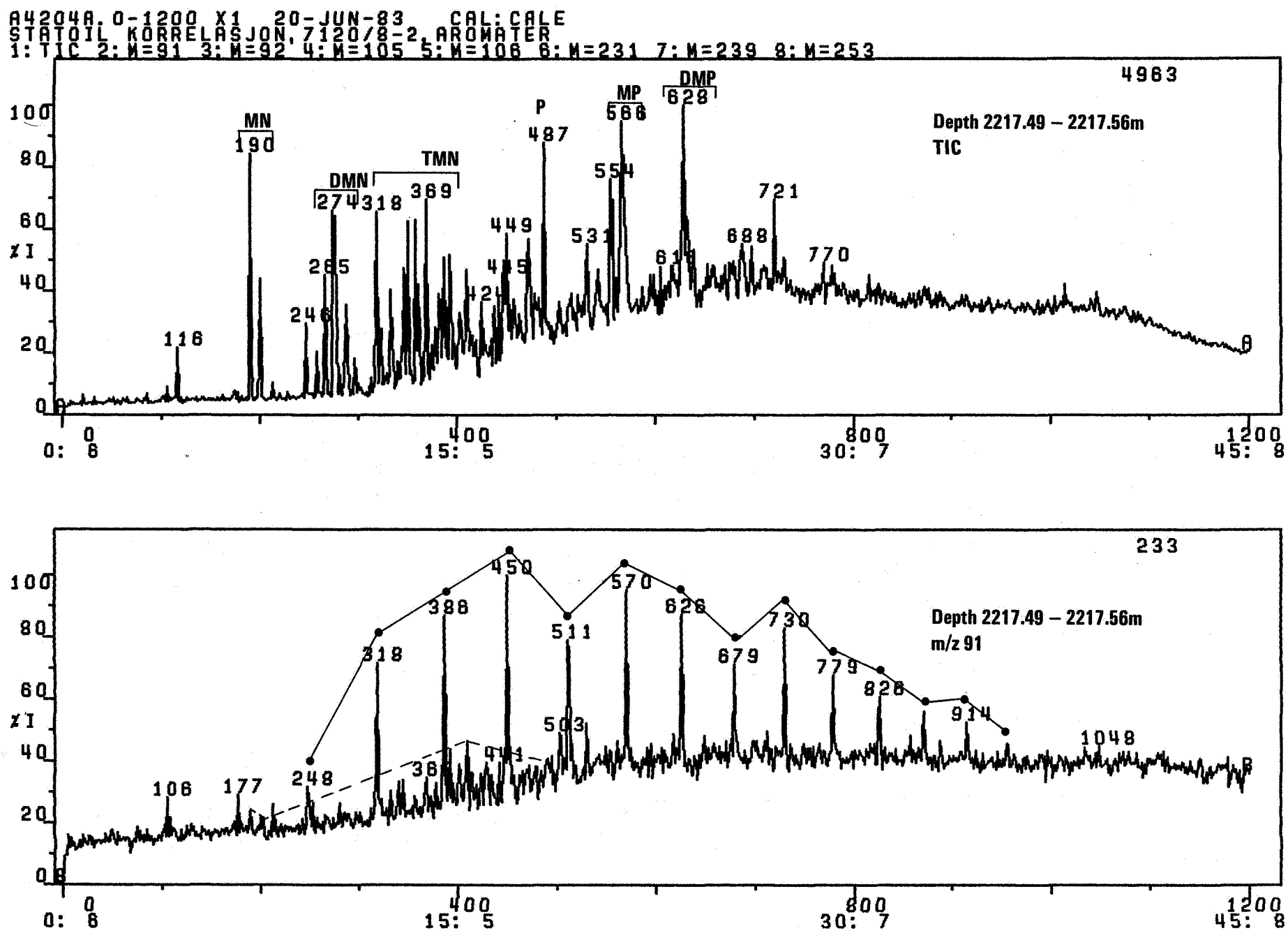
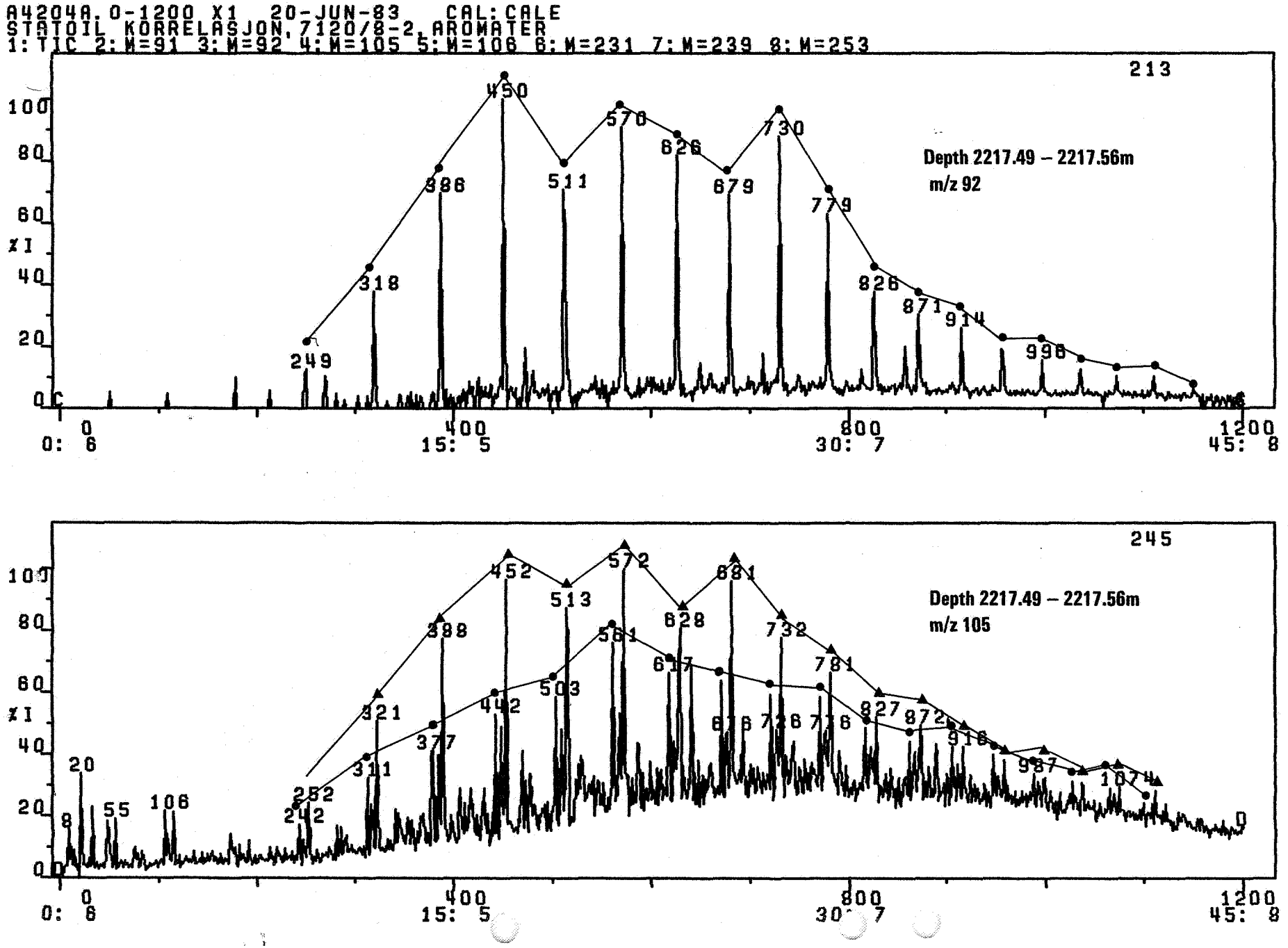
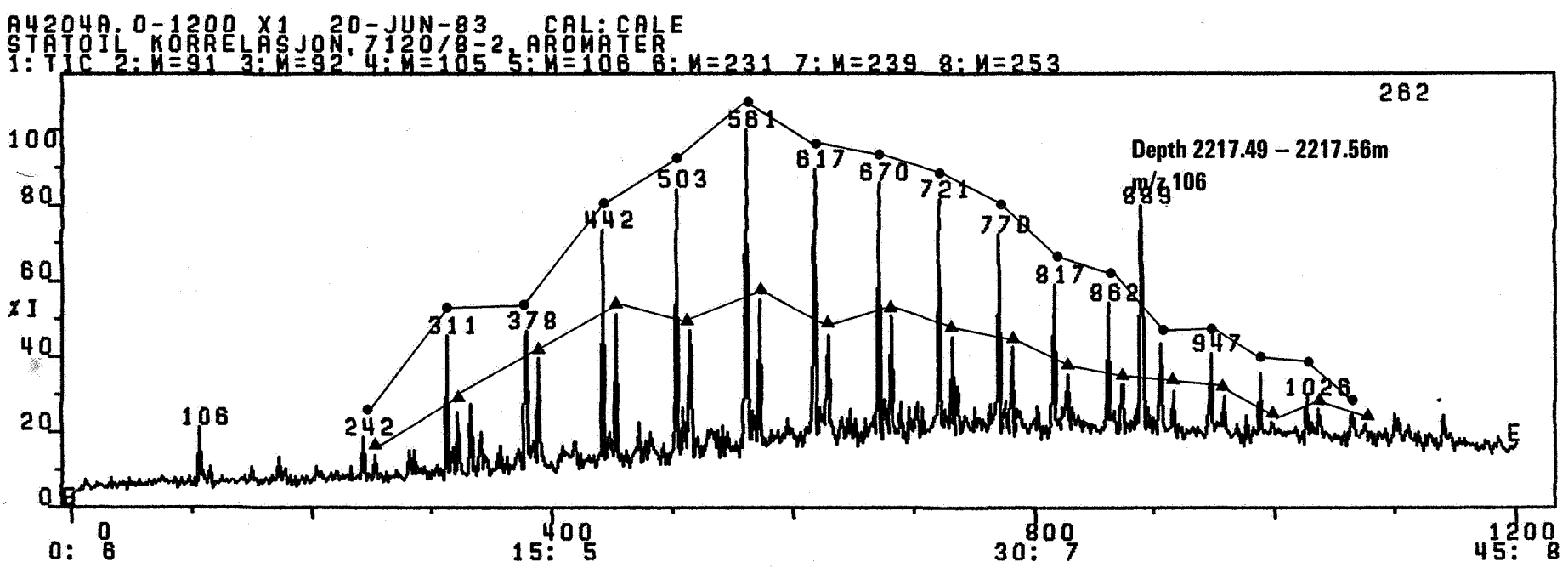
Mass Fragmentograms from Aromatic Hydrocarbons of A-4204

LOWER JURASSIC SANDSTONE (OIL SHOW)

Depth 2217.49 - 2217.56 metres


A4204A.0-1200 X1 20-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2, AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
4963
Depth 2217.49 – 2217.56m
TIC
MN
190
DMN
274
TMN
369
P
487
MP
566
DMP
628
554
721
688
770
449
531
318
285
246
116
445
xI
100
80
60
40
20
0
0: 8
15: 5
30: 7
45: 8
233
Depth 2217.49 – 2217.56m
m/z 91
450
388
570
626
511
730
679
779
826
914
1048
503
411
318
248
177
106
36


A4204A.0-1200 X1 20-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
213
Depth 2217.49 – 2217.56m
m/z 92
245
Depth 2217.49 – 2217.56m
m/z 105
0: 0
15: 5
30: 7
45: 8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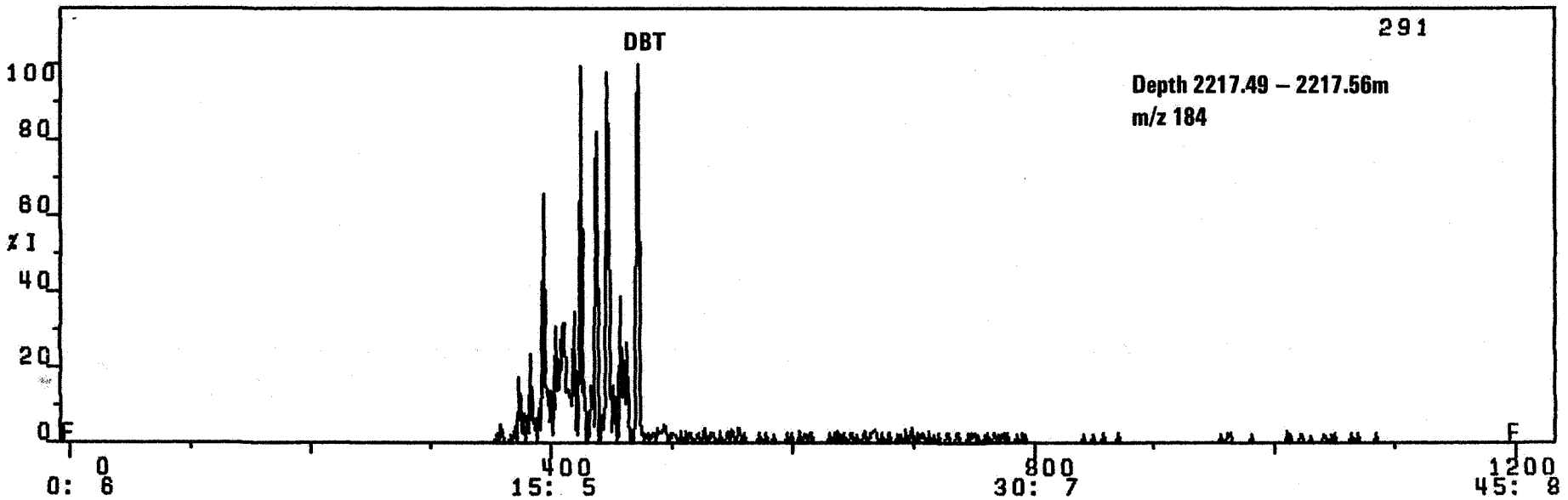
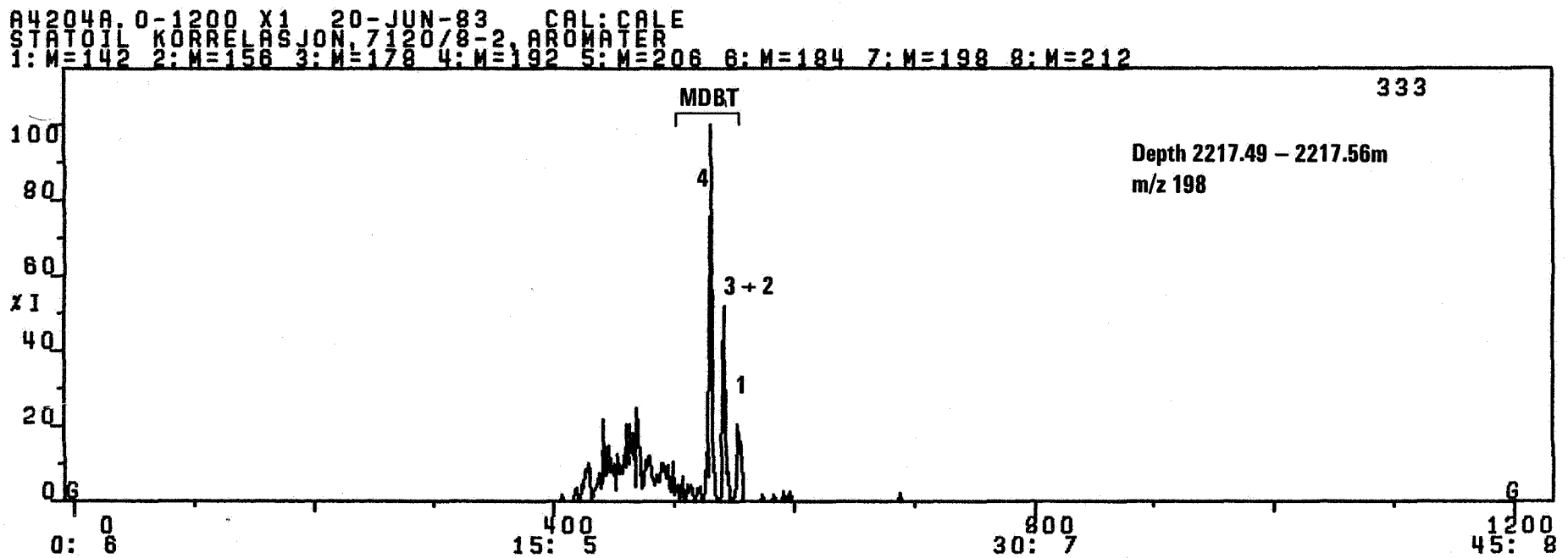
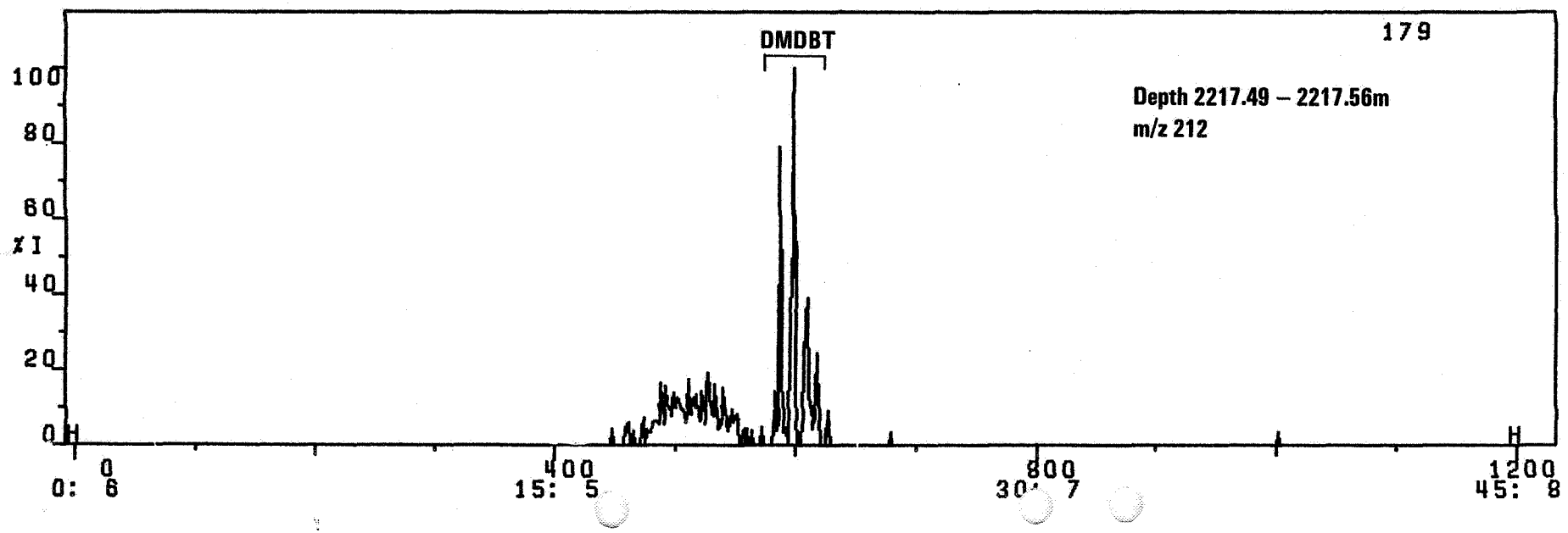
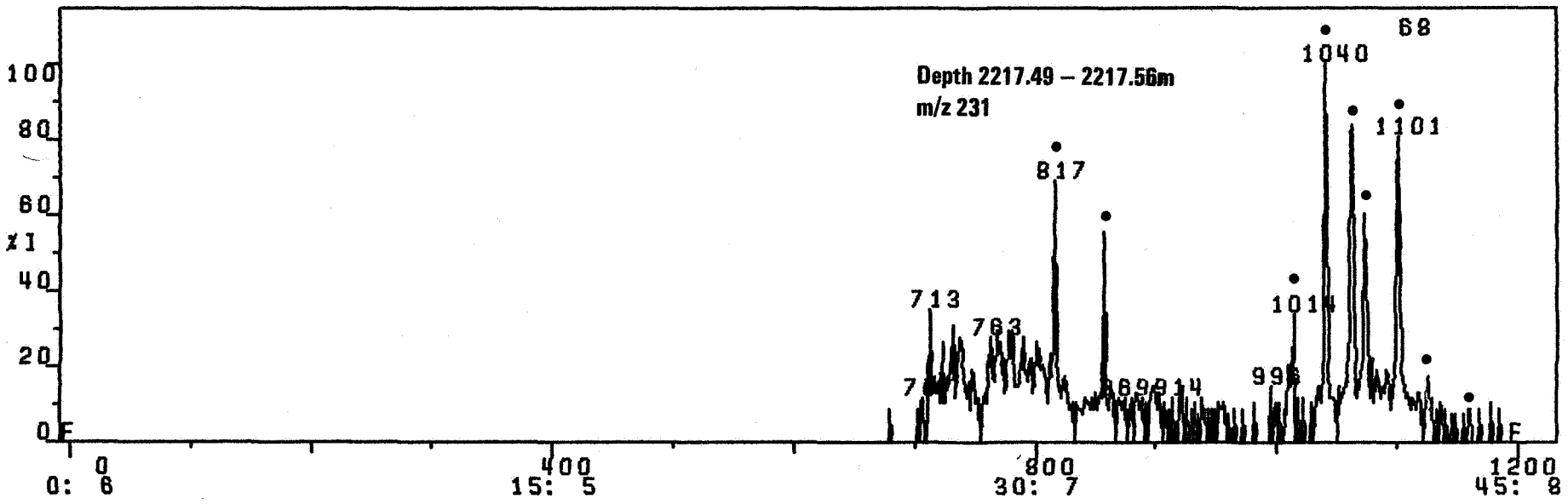
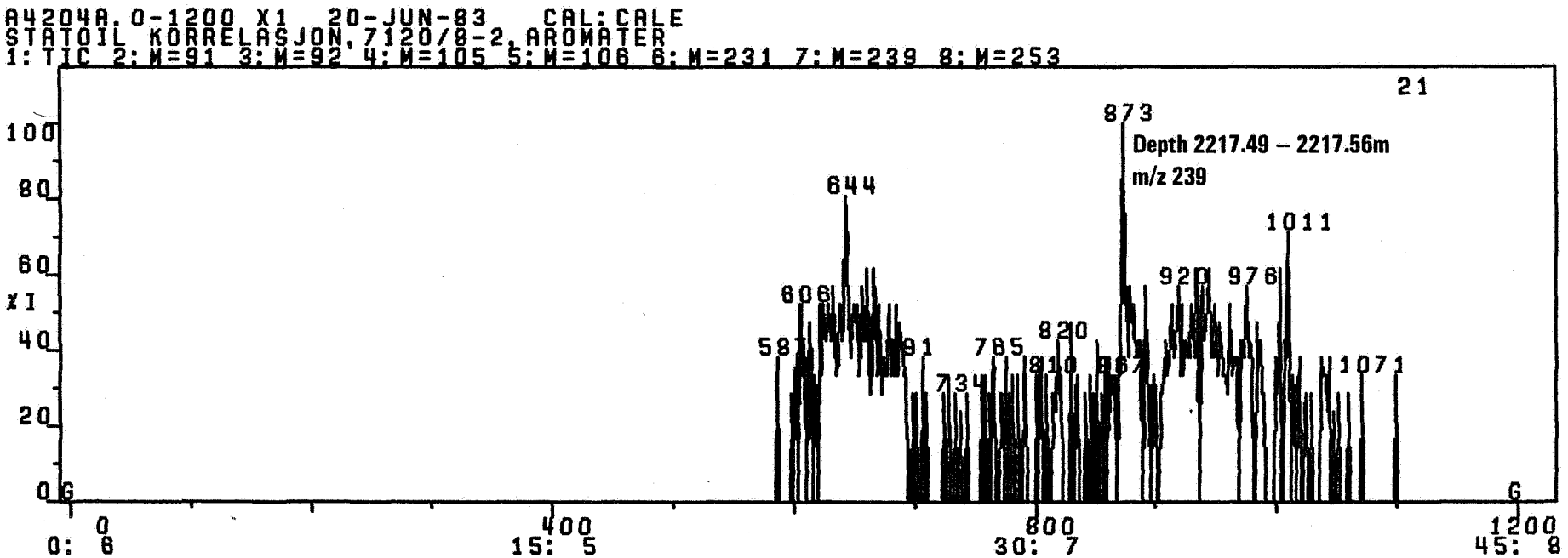
STATOIL KORRELASJON,7120/8-2, AROMATER
1: TIC 2: M=91 3: M=92 4: M=105 5: M=106 6: M=231 7: M=239 8: M=253
262
Depth 2217.49 – 2217.56m
m/z 106
106
242
311
378
442
503
561
617
670
721
778
817
862
889
947
1026
xI
0: 6
15: 5
30: 7
45: 8

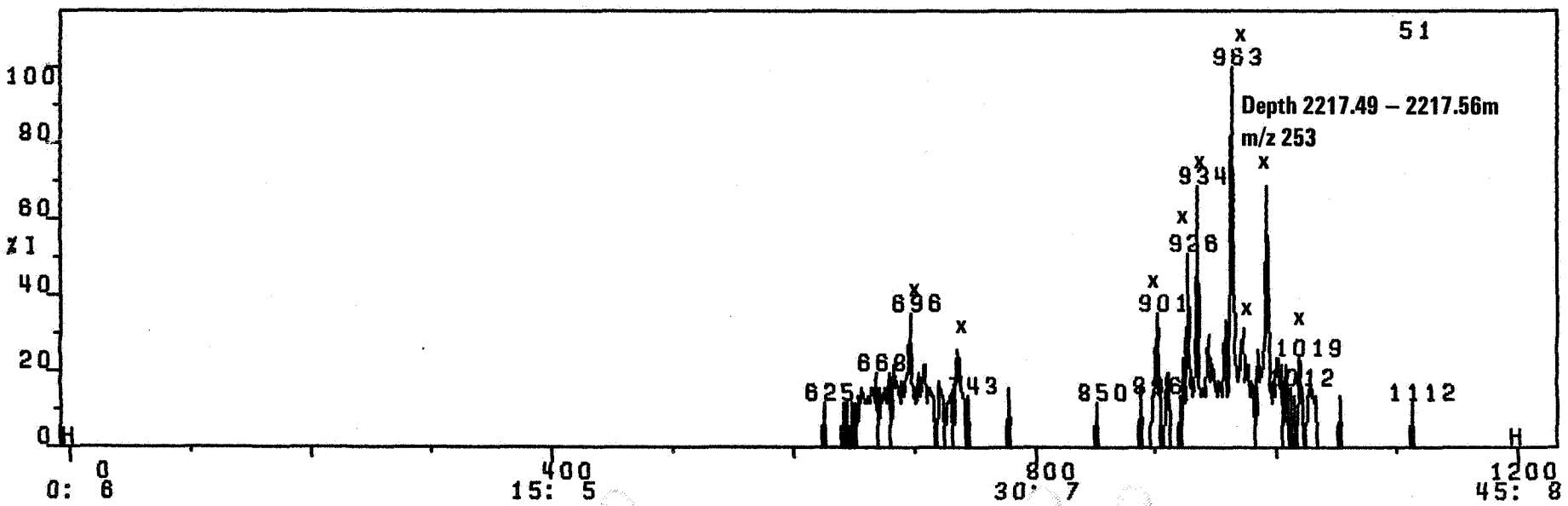

291
DBT
Depth 2217.49 – 2217.56m
m/z 184
xI
0: 6
15: 5
30: 7
45: 8


A4204A.0-1200 X1 20-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:M=142 2:M=156 3:M=178 4:M=192 5:M=206 6:M=184 7:M=198 8:M=212
333
MDBT
Depth 2217.49 – 2217.56m
m/z 198
4
3+2
1
100
80
60
%I
40
20
0
0: 6
400
15: 5
800
30: 7
1200
45: 8


179
DMDBT
Depth 2217.49 – 2217.56m
m/z 212
100
80
60
%I
40
20
0
0: 6
400
15: 5
800
30: 7
1200
45: 8


Depth 2217.49 – 2217.56m
m/z 231
100
80
60
40
20
0
X1
68
1040
1101
817
713
763
1014
0: 6
15: 5
30: 7
45: 8


A4204A.0-1200 X1 20-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
21
Depth 2217.49 – 2217.56m
m/z 239
873
644
1011
976
920
808
820
785
734
1071
100
80
60
40
20
0
X1
0
400
800
1200
0: 6
15: 5
30: 7
45: 8

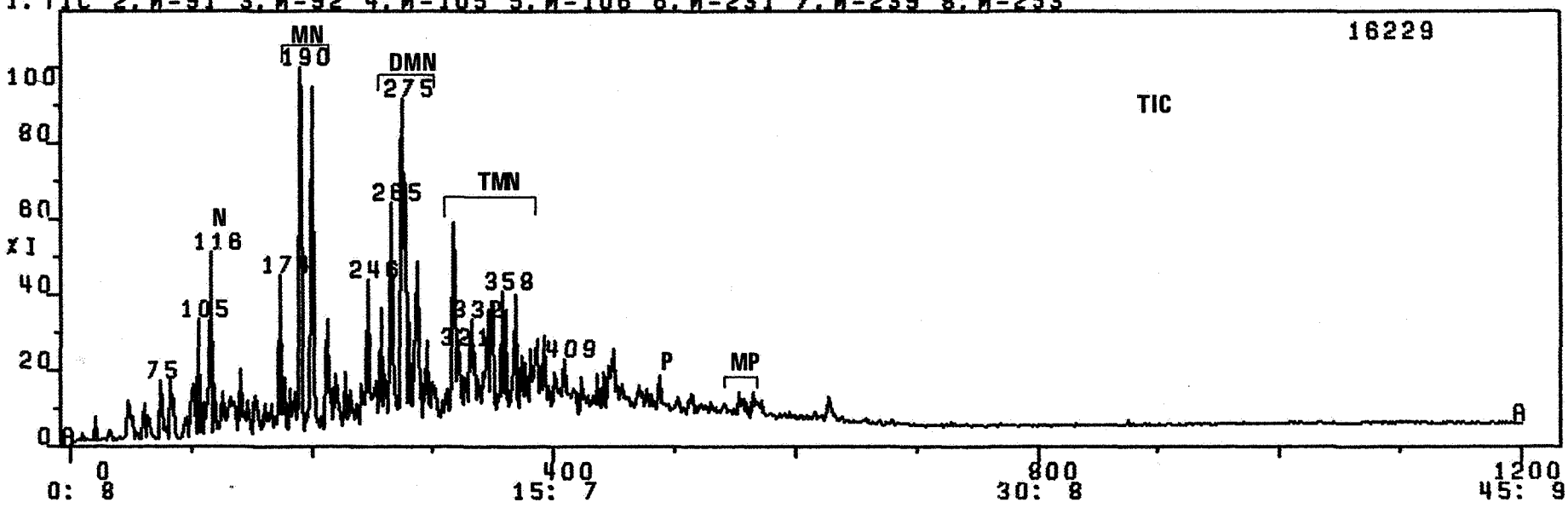

51
Depth 2217.49 – 2217.56m
m/z 253
983
934
926
901
696
668
625
743
850
1019
1112
100
80
60
40
20
0
X1
0
400
800
1200
0: 6
15: 5
30: 7
45: 8

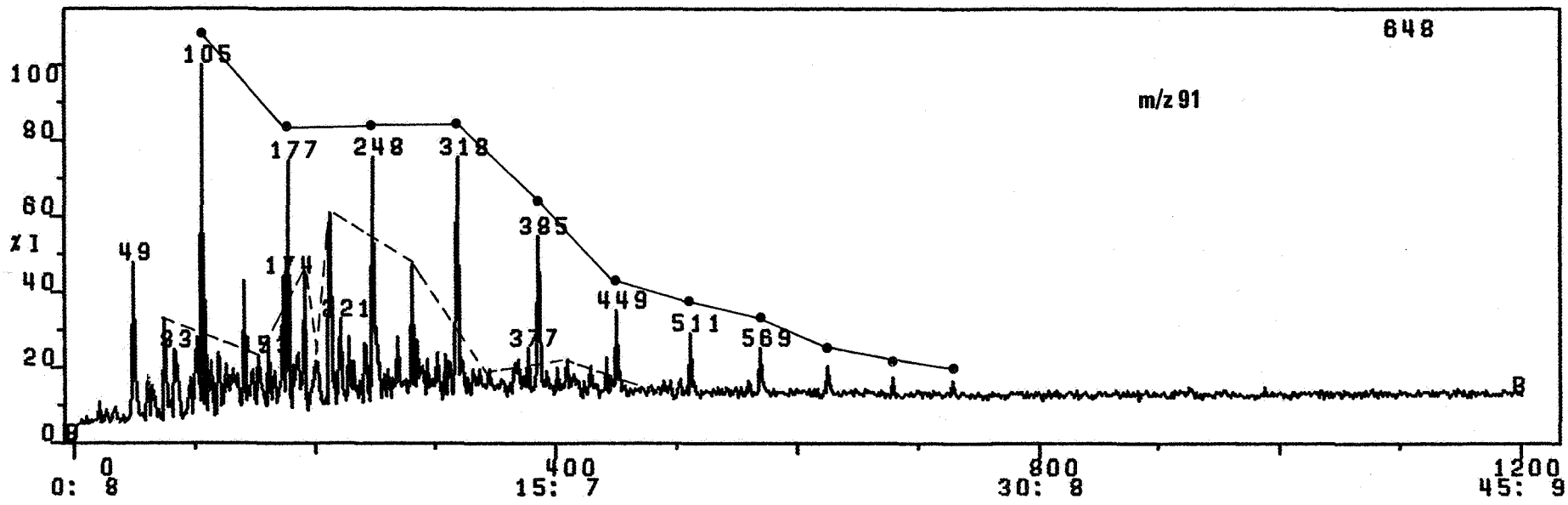
IKU

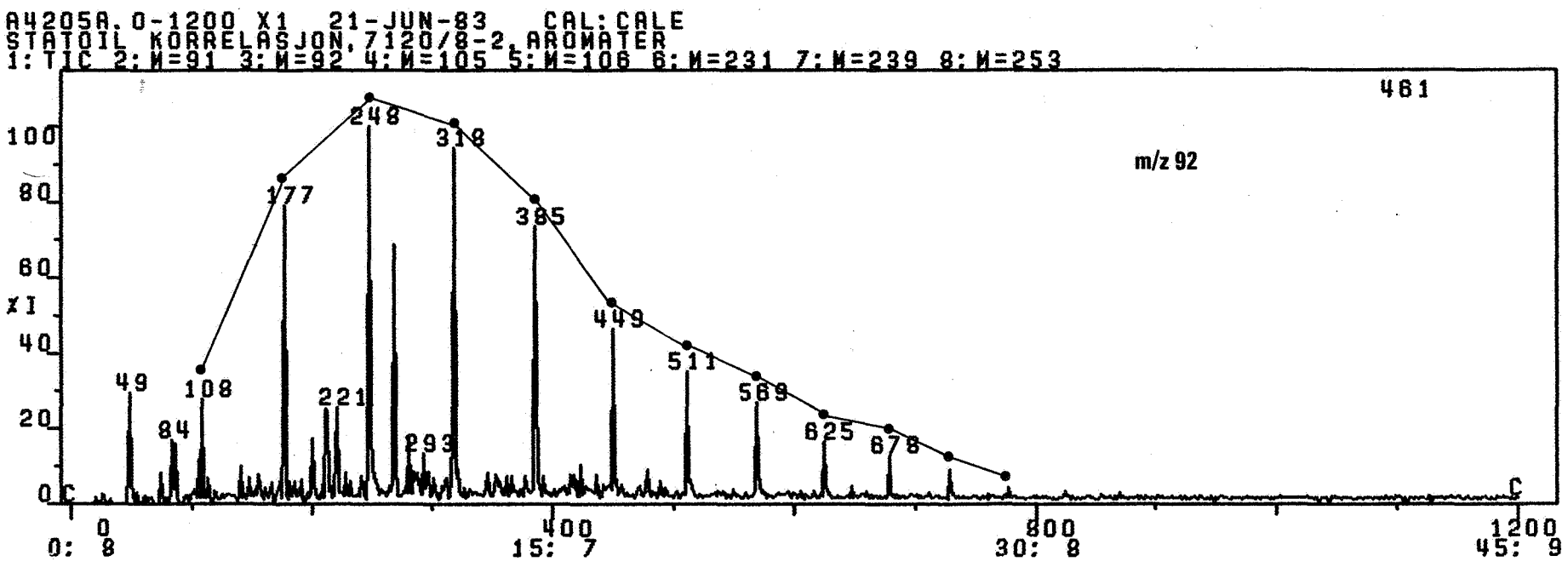
Mass Fragmentograms from Aromatic Hydrocarbons of A-4205

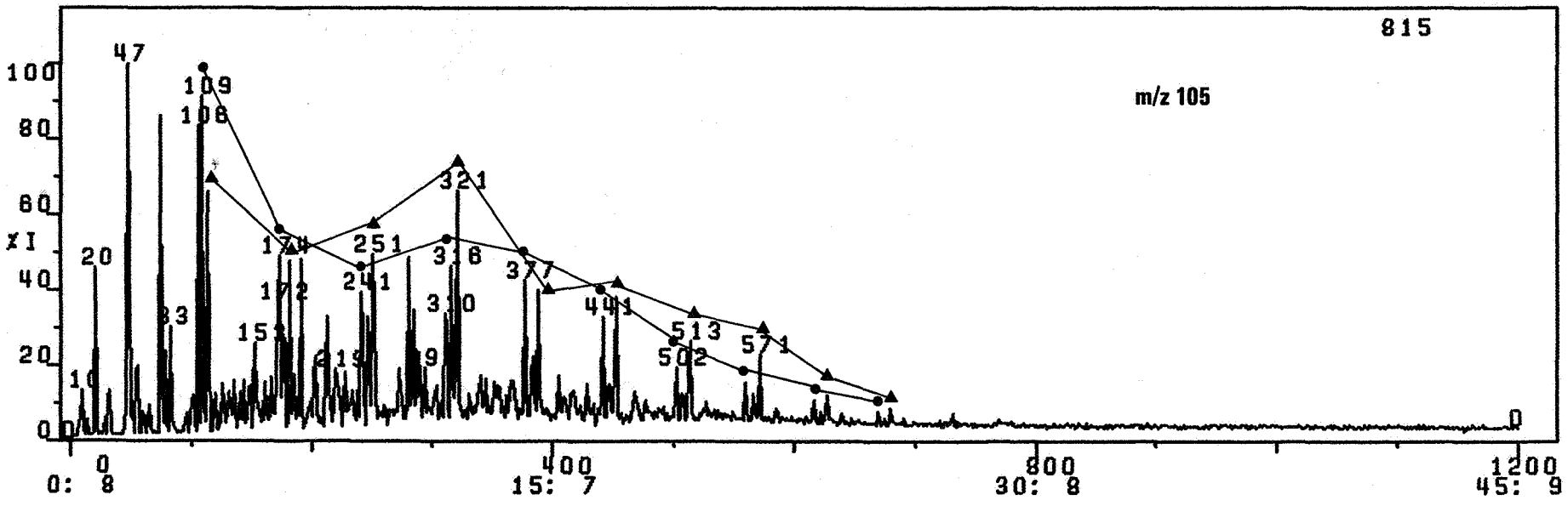
CONDENSATE

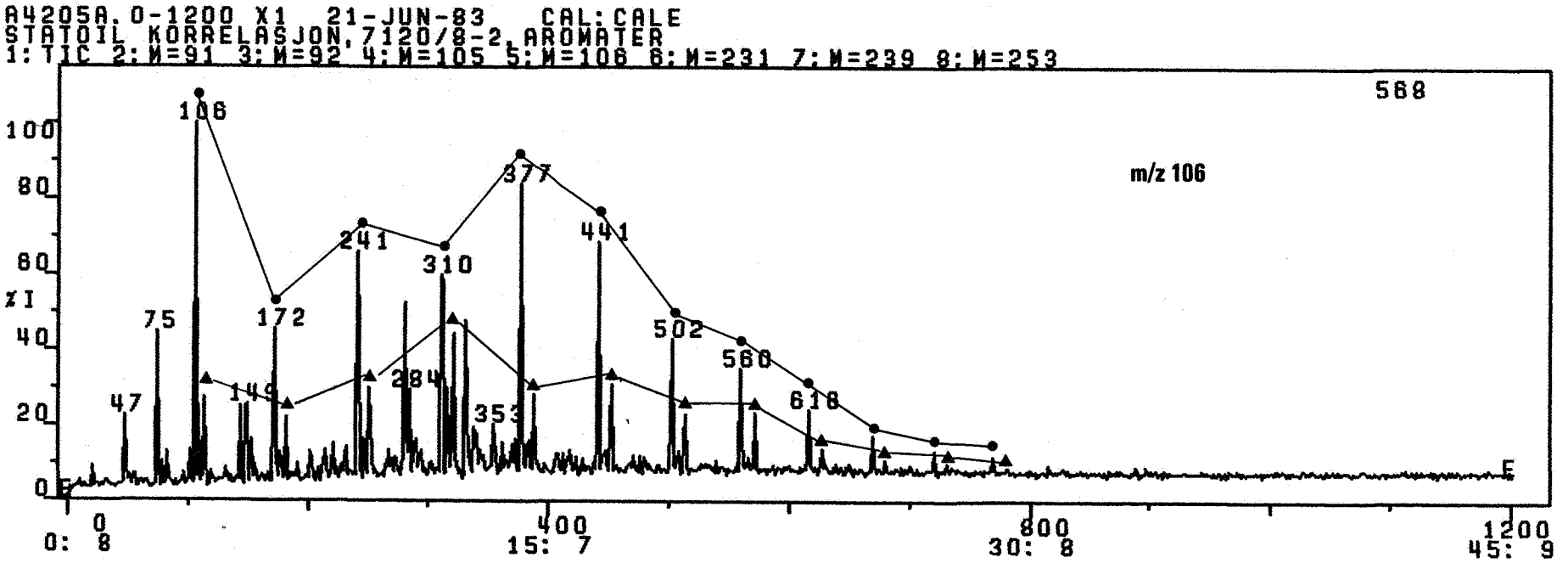
Depth

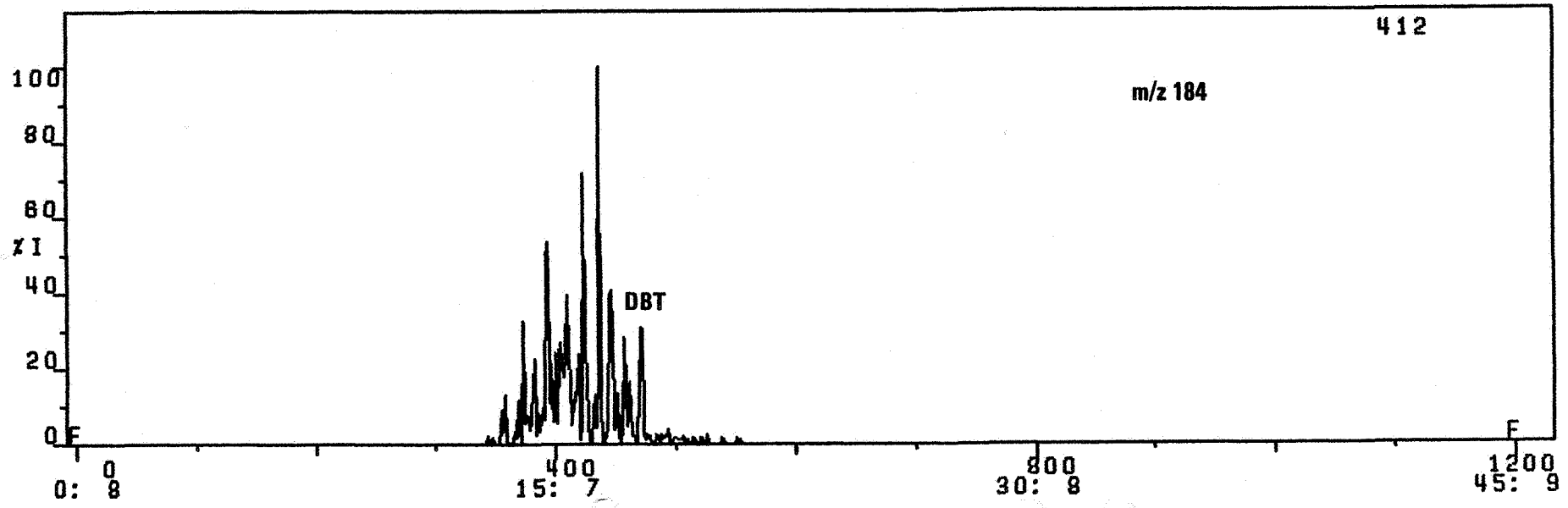

A4205A.0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2, AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
16229
TIC
MN
190
DMN
275
TMN
N
116
105
75
177
246
285
358
338
321
409
P
MP
xI
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45: 9

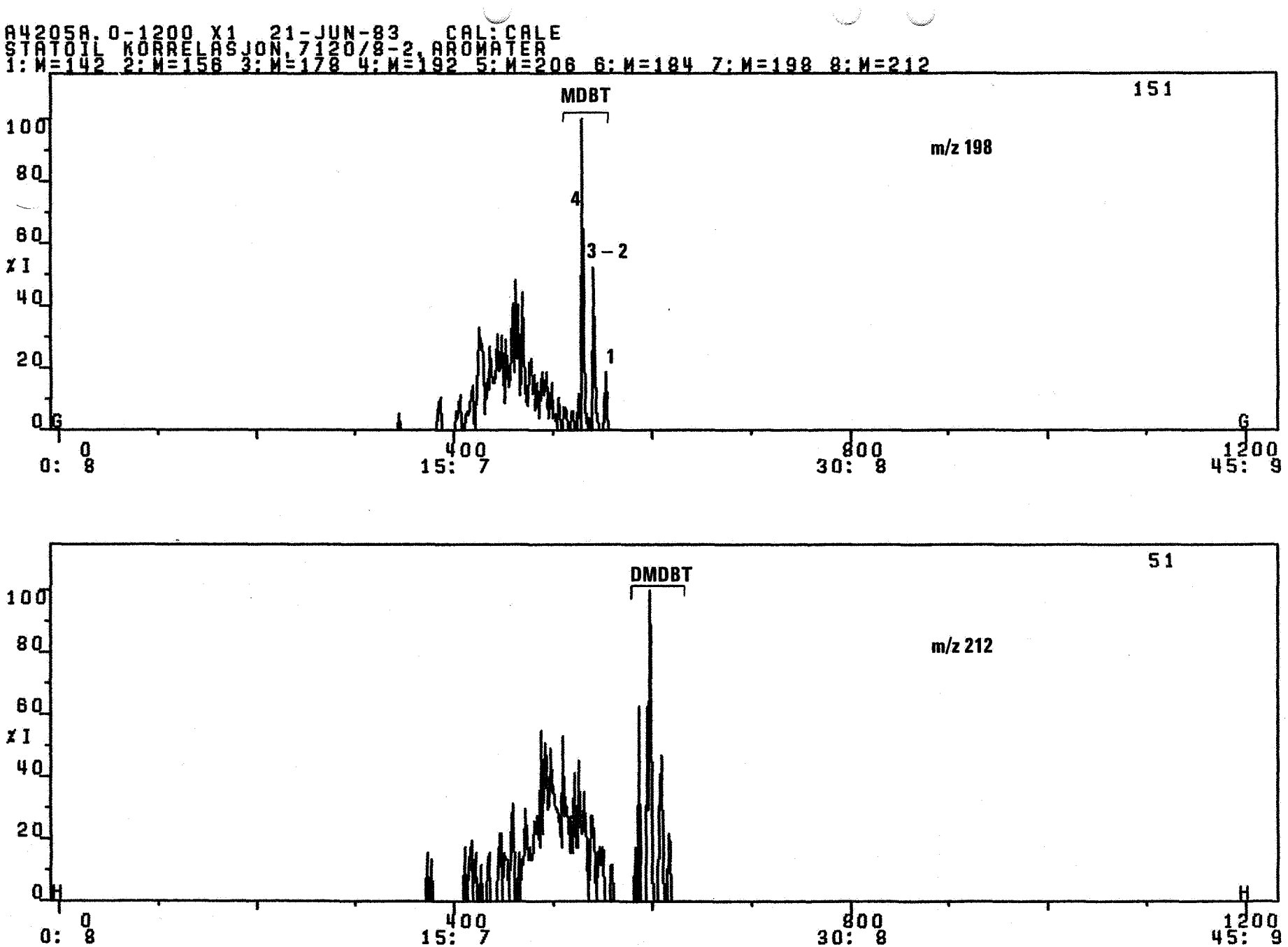

848
m/z 91
105
177
248
318
385
449
511
569
49
83
174
221
377
xI
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45: 9

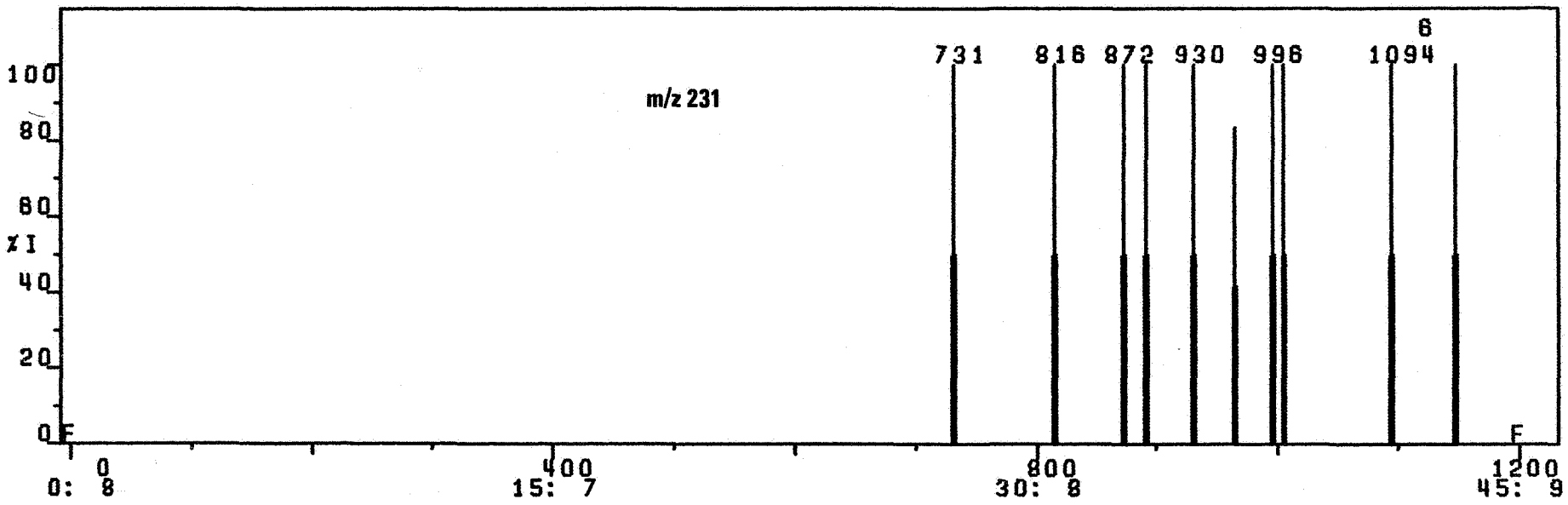

A4205A.0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2, AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
461
m/z 92
248
318
177
385
449
511
569
625
678
108
221
293
49
84
XI
0: 8
15: 7
30: 8
45: 9

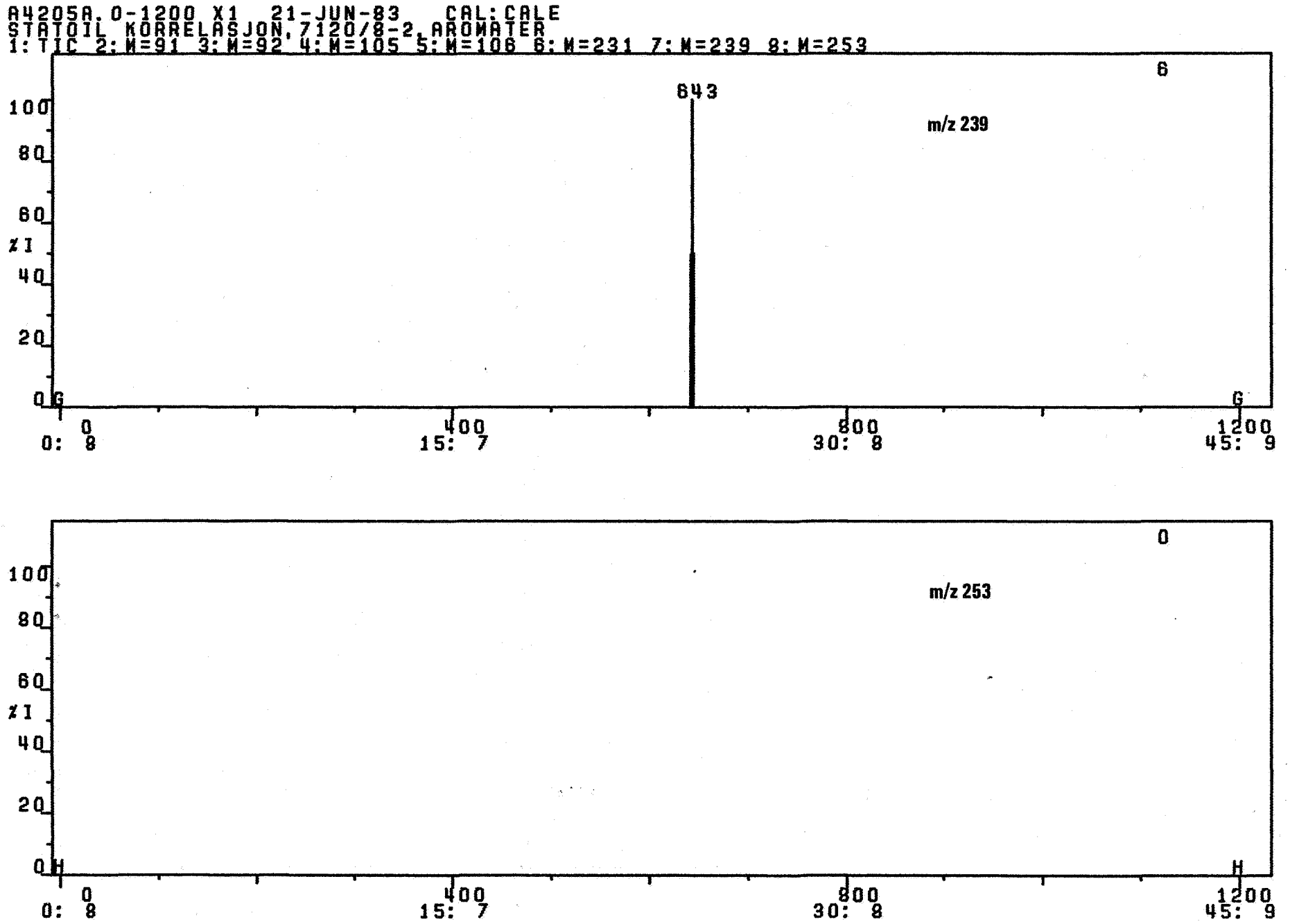

815
m/z 105
47
109
108
321
251
241
377
441
513
571
502
20
83
XI
0: 8
15: 7
30: 8
45: 9


A4205A.0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
568
m/z 106
106
377
241
310
441
172
75
502
560
618
47
149
284
353
%I
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45: 9


412
m/z 184
DBT
%I
100
80
60
40
20
0
0
400
800
1200
0: 8
15: 7
30: 8
45: 9


A4205A.0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2,AROMATER
1: M=142 2: M=156 3: M=178 4: M=192 5: M=206 6: M=184 7: M=198 8: M=212
MDBT
151
m/z 198
4
3 - 2
1
100
80
60
% I
40
20
0
G
G
0
400
800
1200
0: 8
15: 7
30: 8
45: 9
DMDBT
51
m/z 212
100
80
60
% I
40
20
0
H
H
0
400
800
1200
0: 8
15: 7
30: 8
45: 9


m/z 231
731
816
872
930
996
1094
6
100
80
60
%I
40
20
0
F
F
0
400
800
1200
0: 8
15: 7
30: 8
45: 9


A4205A.0-1200 X1 21-JUN-83 CAL:CALE
STATOIL KORRELASJON,7120/8-2, AROMATER
1:TIC 2:M=91 3:M=92 4:M=105 5:M=106 6:M=231 7:M=239 8:M=253
6
643
m/z 239
100
80
60
%I
40
20
0
G
G
0
400
800
1200
0: 8
15: 7
30: 8
45: 9
0
m/z 253
100
80
60
%I
40
20
0
H
H
0
400
800
1200
0: 8
15: 7
30: 8
45: 9