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Title

PETROLEUM GEOCHEMICAL STUDIES OF WELLS 34/8-3 AND 34/8-3A

Summary/Conclusion/Recommendation

The Draupne Fm. in the analysed wells are dominated by type II kerogen with good to excellent potential for oil production.

The Heather Fm. in Well 34/8-3A is dominated by type III kerogen with potential for gas and condensate.

The oils from Wells 34/8-1 and 3 are of the same marine origin. Minor differences may indicate that the oils represent two separated reservoir systems.

The maturity of the oils suggests generation from a source rock with average maturity at peak oil generation or beyond.

The gases from 34/8-1 and 3 are of the same marine origin generated in the late oil or early condensate window.

Reservoir petroleum geochemistry have identified three different contacts in the cored section of Well 34/8-3A where one is a remnant contact. A fossil biodegraded oil column has been encountered below the remnant contact.

Keywords
Source rock evaluation, oil-oil correlation,
oil source rock correlation, gas-gas correlation

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1. INTRODUCTION

The present study on sediment samples and reservoir fluids of Wells 34/8-3 and 3A have been carried out by two different institutions:

- Stable carbon isotopes, Geolab Nor, Trondheim, Norway.

- Pyrolysis, extractions, GC, GC-MS, visual kerogentyping etc., by Norsk Hydro's Research Centre, Bergen, Norway.

This report has been compiled by the Petroleum Geochemistry Group at Norsk Hydro's Research Centre.

Only sediments from the Viking Group has been analysed with respect to source rock properties.

The mud type used was KCL/Polymer. Approximately 30% oil was added to the mud at 3177m in Well 34/8-3A, which may have effected the sediments up to the casing point at 2442m. At 2800m resinex and lignite were introduced to the mud system.
All depths refer to logger's depth (mRKB).

2. SOURCE ROCK EVALUATION

2.1 Rock Eval pyrolysis and Total Organic Carbon

Well 34/8-3

Ten meters (2827-2837m) of the Draupne Fm. of Middle - latest Volgian to Ryazanian age are resting directly on top of the Tarbert Fm. Three samples, 1 SWC and 2 DC, from this section have been analysed with respect to Rock Eval pyrolysis and total content of organic carbon (TOC). The results are listed in Table 2.1 and plotted in Fig. 2.1.1.

The Rock Eval data indicates a section with moderate to

good HC potential (S_2=5.27 - 13.97 kg/t, average S_2=8.58 kg/t. This is supported by the TOC values (2.73 - 4.69%, average = 3.57%). The hydrogen indecies are indicative of kerogen mixtures from type II and type III kerogens (Fig. 2.1,2) with potential for gas/condensate and light oil. (HI=193 - 282, average = 231).

Production indecies are low for the 2 DC samples 2830m and 2837m (0.02 and 0.03 respectively) to be at a depth where slight onset of oil generation occurs. (See section 3 on Maturity). The middle SWC sample (2835m) has a more normal PI (0.12) for this particular depth.

Well 34/8 - 3A

The Upper Jurassic Viking Group in this well consists of Draupne Fm. (9m), dated Mid Volgian - Ryazanian and Heather Fm. (19.5m) dated Bathonian.

From Draupne Fm. 6 samples have been analysed (4 SWC and 2 DC) and the results are listed in Table 2.1, and plotted in Fig. 2.1. The residual hydrocarbon potential, S_2, shows this section of Draupne Fm. to be very rich. One sample, 3008m, however, represents an event of poor source rock formation. The other samples give consistantly high S_2 values (17.8 - 31.4 kg/t). Average for the section = 19.8 kg/t.

The TOC values are also high (5.62 - 8.40%), apart from sample 3008m which is, in this context, extremely low.

The source rock quality based on hydrogen indecies (Fig. 2.1,4) indicates kerogens dominated by type II (HI = 212 - 499). Even the sample (3008m) with low HC potential is dominated by type II kerogen. The sample is representing an event with unusual high sediment matrix deposition rate relative to production and influx of organic matter.

The source quality tend to decrease towards the Draupne/ Heather boundary.

From the Heather Fm., 11 samples (3 SWC and 8 DC) have been analysed (Fig. 2.1.3 and Table 2.1. Apart from the lowermost sample (3032m) all samples tend to have a moderate to good hydrocarbon potential (S_2=3.49 - 12.23 kg/t, average 6.9 kg/t).

The TOC values are in the range 2.52 - 4.75% with an average of 3.3%.

The source rock quality based on hydrogen indecies are consistantly dominated by type III kerogen (HI=16 - 240), apart from one sample at 3025 m, which is a mixture of type II and III kerogens (HI=321). The dominating product likely to be produced from this horizon is gas and condensate.

Comparison of Wells 34/8-3 and 3A

These two wells are penetrating the Viking Group at locations very close to each other. The two Draupne Fms. are deposited within the same time-period. With respect to the source richness and quality, there seems to be a significant lateral difference between the two horizons. The section from 34/8-3, which overlaps the reservoir sediments directly, is much poorer than its time equivelent in Well 34/8-3A. An explanation, if the dating is correct, is that the section in 34/8-3 represents a more proximal situation than the other.

2.2 Extraction data

The results of extractions and group type separations are shown in Table 2.2.

From the Draupne Fm. in Well 34/8-3, only one sample has been extracted. The extraction yield is good 0.65%. The largest fraction is the asphaltenes 35.4% and the smallest fraction is the saturated fraction.

The Draupne Fm. in Well 34/8-3A has extraction yields of the same order as its time equivalents in 34/8-3 (apart from 3008m which also was low in HC potential). The asphaltene fraction is highest and the saturated together with the aromatic fractions are lowest in concentration. The relative asphaltene content increases in the Heather Fm. as expected for sediments dominated by type III kerogen. Also the extraction yields are dropping going from Draupne Fm. into the underlying Heather Fm. This is again, consistant with the reduction in kerogen quality from type II dominated to type III dominated material seen by other parameters, (e.g. HI).

2.3 Distribution of Saturated components in Source Rocks Extracts.

Saturated fractions have been analysed on capillary gas chromatography under standard conditions. Chromatograms are shown in Appendix I.

The chromatogram from 34/8-3, 2835m, Draupne Fm. shows a paraffin rich, high normal alkane distribution with slight odd over even carbon number preference, indicative of a slight terristral influence in a likely marin system. The sterane envelope is fairly pronounced.

Some molecular parameters are listed in Table 2.3 in which the carbon preference index (odd over even preference) CPI is quantified to 1.25.

The concentration of Pristane is high, $Pr/n\text{-}C_{17}$ ≈ 1.76. The ratio of Pristane versus Phytane (Pr/Ph ≈ 1.95) is moderate.

The 2 "uppermost" chromatograms (3005 and 3007.5m) from Draupne Fm. in Well 34/8-3A show similar features as the sample from 34/8-3. A marine type distribution with influence of higher plant material resulting in an odd carbon number preference (CPI >1.0). The sample at the Draupne/Heather boundary are approaching a bimodal

distribution, with more pronounced biomarker envelope. This distribution suggests a marine situation with a high influence of terrestrial material or large organic matter destruction at time of deposition.

The features of the extracts from the Heather Fm. are significantly different from the Draupne extracts. The components in the nC_{22} - nC_{30} range dominate the distribution suggesting that the higher plant derived material are dominating the extract. This shift in environment of deposition is also evident with respect to the molecular markers in Table 2.3.

2.4 Distribution of Aromatic Hydrocarbons

The chromatogram from 34/8-3, 2835m, Draupne Fm. (shown in Appendix II) are rich in the light end components. The chromatograms from Draupne Fm. in 34/8-3A have a tendency to bimodal distribution with a relative high abundance of high molecular aromatics. In the underlaying Heather Fm. the distribution becomes less bimodal and seems like an intermediate between the Draupne Fm. samples in 34/8-3A and the one in 34/8-3.

2.5 Biological Marker Content

The saturated fractions have been analysed on GC-MS with respect to their sterane and triterpane content. The fragmentograms are presented in Appendix III and some common biomarker ratios are listed in Table 2.5. The sample from 34/8-3, 2835m, tend to have ratios similar to the 2 uppermost samples in 34/8-3A. The sample at 3011m, the Draupne and Heather boundary, has parameters that suggest a transitional situation (e.g. T_s/T_m and Sterane/Triterpane in Fig. 2.5.1) between the Draupne and Heather environment of deposition. In several parameters, especially those that are environmental markers, it is a distinct shift between the Draupne and Heather Fms. in 34/8-3A, supporting what already has been suggested by nearly all of the source rock properties discussed above.

Considering the Sterane/Triterpane ratio, a relative indicator of environment of deposition, it is suggested, that the terrestrially influence is larger in Heather Fm. than in Draupne Fm. (Terrestrial material is more abundant in triterpanes relative to steranes.

2.6 Pyrolysis Gas Chromatography

Pyrolysis GC have been carried out on the same samples as were analysed by Rock Eval pyrolysis. The pyrograms are shown in Appendix IV.

The pyrograms from 34/8-3 support the source quality seen by other source parameters e.g. Rock Eval. Sample 2835m has a significantly better source quality and higher potential for liquid production than the other two samples from the horizon.

The pyrograms from Well 34/8-3A, Draupne Fm. indicate a good liquid potential. A qualitative appraisal based on the relative concentration of long chained paraffins, suggests that the paraffin contents follow that of the hydrogen indecies. In Heather Fm. the relative concentration of xylene and toluene increase and the paraffin concentration in general decreases. However, the pyrograms still indicate a moderate to good liquid potential apart from the lowermost sample, 3032m, which is only gasprone.

2.7 Visual Kerogen Typing 34/8-3A, Draupne and Heather Fms.

The kerogen composition of 8 samples has been described semi-quantitatively, following the standard reporting procedures.

Four different characteristic types of composition have been recognized (see Table 2.7):

A. 2990.0m SWC: (Kromer Knoll Group)

Low productivity; finely disseminated material domin-

ates the total kerogen (95/9). The concentrated kerogen (>15 micron) is dominated by inertinite. Dinocysts are common, spores and pollen present.

B. 3005.0m, 3007.5m and 3008.0m SWC: (Draupne Fm.)

Relatively high productivity; aggregates of liptinitic amorphous organic matter dominate; small pyrite framboids abundantly present in AOM. Pollen, spores, acritarchs, dinocysts embedded in the AOM matrix. Tasmanitids rare.

Hydrocarbons stain the embedding plastic (green fluorescence).

C 3011.0m SWC: (Draupne Fm.)

Relatively high productivity; aggregates of liptinitic AOM dominate; small pyrite framboids abundant in AOM matrix. Part of the pollen, spores, acritarchs, dinocysts and tasmanitids embedded, part free. Tasmanitids relatively common; trace of Botryococcus.

Hydrocarbons stain the embedding plastic.

D. 3016.0, 3018.0 and 3023.0m SWC: (Heather Fm.)

Relatively high (3016.0m) to moderate productivity; finely disseminated material dominates (70/30), mostly humic. Pyrite rare, mostly in palynomorphs. The coarse kerogen (>15 micron) consists of medium to very coarse inertinite and woody particles (ca. 30-40%), abundant pollen and spores and commom (?) dinocysts; some cutinite. Traces of AOM.

Hydrocarbon stain the embedding plastic.

AOM Description

In all cases where AOM is encountered, it is of importance to note both the embedded allochtonous, as well as the presence of other components which are not embedded in the AOM matrix. This is indicated in the Table 2.7.

3. MATURITY

3.1 Vitrinite Reflectance

Vitrinite reflectance have not been measured in these wells.

3.2 Colouration of Spores and Pollen

Studies of Spore and Pollen Colouration have not been carried out in these wells.

3.3 Molecular Markers

Sterane (20S) and triterpane (22S) isomerisation have been calculated from the analyzed section of the Viking Group, (Table 2.5). The 20S values are 30-40%. The oil window (R_0 ~0.5%) commences in the area at 20S values ≈ 25%. Peak oil generation occurs at approximately 50-58%. The analysed sections are consequently located at depths where early oil generation exists.

This is supported by the 22 S values which have reached equilibrium, ca 60%. This equilibrium is reached at the start of oil generation.

4. CORRELATION STUDIES

4.1 Oil-oil Correlations 34/8-1 and 34/8-3

Two oils (34/8-1, DST 2 and 34/8-3, DST 1) have been analysed with respect to distribution of components in whole oils, distribution of saturated and aromatic compounds in C_{15+} fractions, biomarker contents and stable carbon isotop compositions.

The related chromatograms and fragmentograms are compiled in Appendix V. Calculated molecular ratios and isotope compositions are listed in Tables 2.3, 2.5 and 4.1 respectively.

By visual inspection of the various chromatograms, (whole oil and SAC and AROM fractions), the oils are apparently belonging to the same oil family. This is supported by the molecular ratios in Tables 2.3 and 2.5.

The stable isotopes suggest some minor differences between the oils. The whole oil of 34/8-1 is isotopically lighter than the 34/8-3 oil (0.30 and 0.35°/$_{oo}$). A similar shift is observed for the SAC and, to a lesser extent, the AROM fraction (Error limit is 0.05 - 0.10°/$_{oo}$). However, the Galimov plot of the two oils in Fig. 4.1.1 shows that their overall trend is very similar and that the NSO and asphaltene fraction have very close values.

The general conclusion is that these two oils are of the same origin, but minor differences such as in the isotope parameters may indicate that they may belong to separated reservoir systems. The maturity of the oils are similar and they are derived from a source rock at peak oil generation or beyond.

4.2 Oil-Source Rock Correlations

There is no obvious and apparant relationship between the

oils and the sediment extract from the overlying source rocks (c.f. biomarker parameters in Table 2.5). This is of course partly due to an apparent maturity difference between the oils and the sediments.

A significant difference is the prescene of the (28 bisnorhopane (Bnor/Bnor + nor) in the oils, whilst the same source marker is totally lacking in the sediment extracts. However, the bisnorhopane is very frequently found in Upper Jurassic sediments of both Draupne and Heather Fms. This source rock system can therefor not be excluded.

The stable isotope values are in line with values identified for Draupne Fm. in the area (29-31°/$_{oo}$). The Heather Fm. tends to have heavier isotope values (25-27°/$_{oo}$). (This is also the case for Brent coals and Dunlin shales).

Primarily based on the isotope values of the oils supported by the presence of bisnorhopane which is likely to be found in the Draupne Fm. off structure, Draupne Fm. is suggested as the source rock for the 34/8 oils.

4.3 Gas-gas correlation

Gas from 34/8-1 (DST #2 and #3) and 34/8-3 (DST #1, #2 and #3), have been analysed for their molecular and stable isotope composition. The results are listed in Tables 4.2 and 4.3. For interpretational purposes, some of the data have been applied in Schoell and James diagrams (Fig. 4.2,2).

The molecular parameters from Table 4.2 suggest the gases to be dry and with significant similar features. The stable carbon isotopes (Table 4.3) indicate also apparent similarities. These data plotted in Schoell diagrams (Fig. 4.2,2) are suggested to be derived from a marine source (TT(m) in Fig. 4.2,2) generated in the early condensate window (Tc in Fig. 4.2,2).

The James diagram (Fig. 4.2,2), however, suggests a separation between the gases with respect to their thermal maturity. The gases from 34/8-3 have equal stable isotope composition and are according to the James diagram generated in the middle of the oil window. The gases from 34/8-1 differ in their methane composition, but plot equal in the James diagram, with a maturity at the end of the oil window.

Obvious discrepancies exist between the interpretations deduced from the Schoell and James diagrams. The James plot suggests two gas families with different maturities where the Schoell plots say one family with higher maturity than the James plots suggest.

The discrepancy between the various interpretations is due to the n-butane and n-propane contents which are taken into account in the James diagram, but not in the Schoell diagrams.

The isotope values of n-butane from all the gases are plotting outside the line in the James plots, suggesting the gases to be mixtures; maybe from different source rocks at different thermal maturities. This may account for the discrepancies between the two interpretational schemes.

Due to the effect of mixing it is, therefore, possible to conclude that the suggestions by the Schoell interpretation are more valid than that of the James plot. (Based on wetness and methane isotope composition). However, the James diagram indicates that the reservoired gases may have been superimposed by gases of different maturities and/or source rocks.

5. RESERVOIR STUDIES

Sandstone samples from the reservoir section of Well 34/8-3A have been extracted and the extract analysed with respect to gross composition and distribution of saturated and aromatic hydrocarbons.

The objectives have been to identify oil quality variations and to identify possible fossil contacts.

The gross composition data together with extraction results and molecular ratios from saturated fractions are listed in Tables 2.2 and 2.3. Chromatograms and fragmentograms of biological markers are compiled in Appendices I, II and III.

The total EOM, Asphaltene content and Pr/nC_{17} ratio are plotted in Fig. 5.1.1 together with the RFT contacts.

The EOM data suggest a "chemical" contact of approximately 3115m, with residual oil below. A GOC may exist between 3051 and 3061m. No apparent tar mat have been identified in the analysed section.

The gross composition data suggests the same basic oil down to 3110m. A slight shift occurs towards a more NSO rich oil below 3110m.

The Pr/nC_{17} data indicates also a significant shift between 3112 and 3117m. The same shift is also seen in several biomarker parameters (Table 2.5), e.g. Ts/Tm sensitive to environment of deposition. Visual inspection of chromatograms indicate that biodegradation has occurred below that depth.

The Pr/nC_{17} values also suggest a minor shift at 3051-3061m. This shift may indicate a barrier in the reservoir restricting the oils in the reservoir to blend. The chromatograms may indicate a fresh oil superimposed on a remnant biodegraded oil above this contact.

These data indicate that the oil column in 35/8-3A may have been larger than the present day column. It is possible that the consequent loss of hydrocarbons has occurred at a time when the reservoir has been burried much shallower, before the reservoir temperatur reached beyond 60° (60°C is when biodegradation ceases).

The presence of a non-degraded remnant oil column between the fossil contact and the RFT-contact, may suggest that a second adjustment or loss has also occurred a substantial time after the first loss.

6. CONCLUSIONS

- The Draupne Fm. in Wells 34/8-3 and 3A are dominated by type II kerogen with good to excellent potential for oil production

- The Heather Fm. in Well 34/8-3A is dominated by kerogen type III with potential for gas and condensate production.

- The oils from Wells 34/8-1 and 3 are of the same, marine origin. Main differences may indicate that the oils are derived from two different reservoir systems.

- The average maturity of oils suggests generation from a source rock with maturity at peak oil generation or beyond.

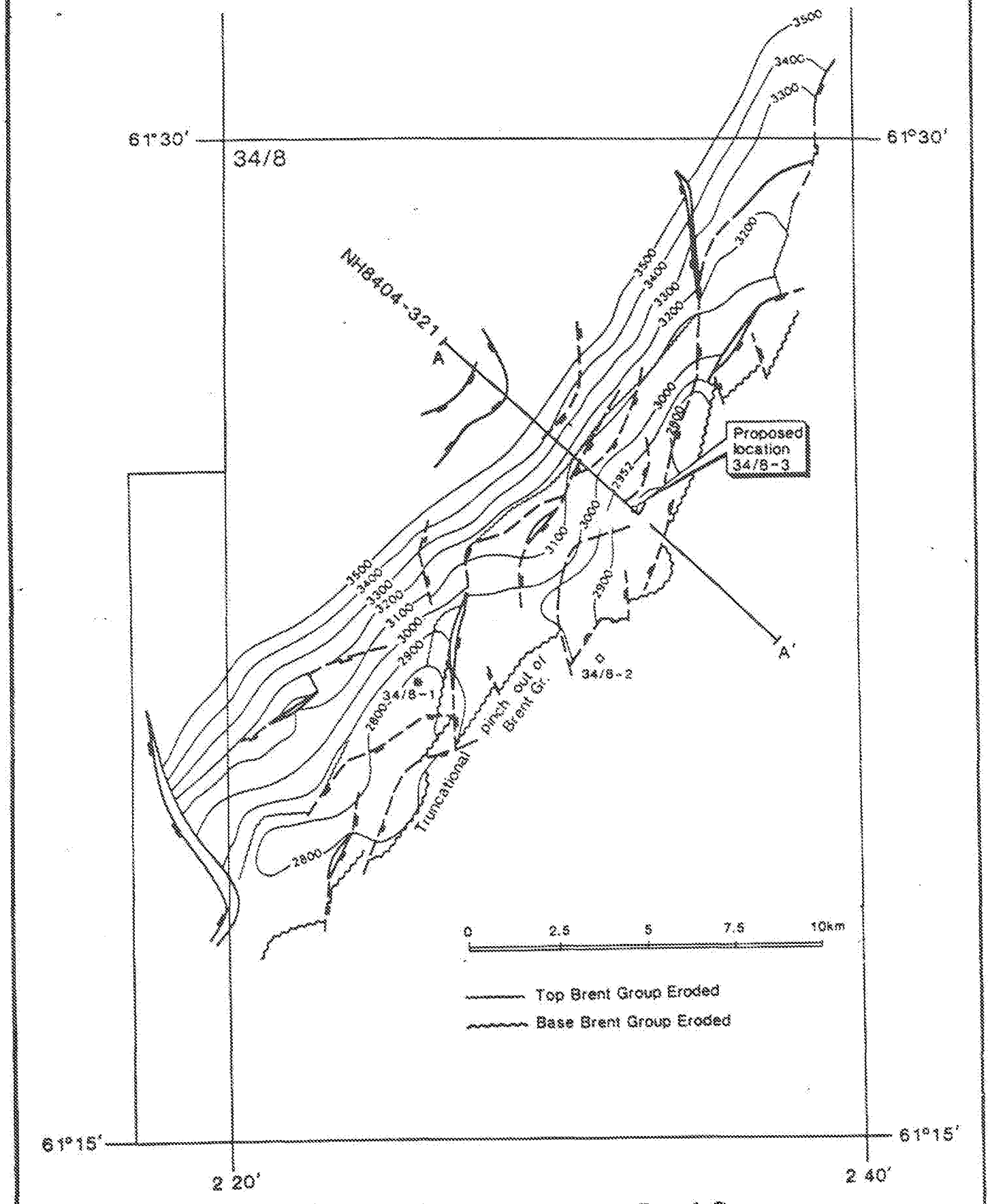
- The gases from 34/8-1 and 3 are likely derived from a marine source rock at late oil early condensate window maturity.

- The gases within each well are similar. Maturity discrepancies between the gases of the various wells may exist.

- The gases may have been mixed in with other gases.

- Reservoir petroleum geochemistry in the 34/8-3A reservoir has identified three different contacts where one is a remnant contact. A fossil biodegraded oil column has been encountered below the present day live oil column and below the fossil remnant contact. The reservoir studies suggest that two significant adjustments of the OWC have occurred.

FIG. 1.1 Location map



Structural depth map, Top Brent Group

Norsk Hydro Drilling Department	Location Map Well 34/8-3 & 3A	Gr. no.:	Fig.: 3
		Date: 22.01.88 Sign: KOH/ALH	Dwg. no.:

FIG. 1.2 Well summary

HYDRO PRELIMINARY GEOLOGICAL WELL SUMMARY

LOCATED ON LINE SP
61° 24' 28.04" N NH 8404-321 275
02° 32' 45.06" E
WATER DEPTH 382m MSL

WELL 34/8-3

DEPTH m RKB | LITHO SECTION | SYSTEM | SERIES/STAGE | GROUP | FORMATION | DESCRIPTION | SHOWS

405m SEABED

Interval 405-1317m drilled w/ returns to seabed. 30" @ 491m

Lithology interpreted from MWD.

QUAT.?

TERTIARY

NORDLAND GP.

Hordaland

UTSIRA

1098m
Sd
1150m

Drilled w/ returns to seabed. 13 3/8" @ 1302m

1317m

Clyst: olv gy,slty,loc grd Slst,non calc.
rr strgs Lst,Sd.
tr Glau.

1510m

Clyst: bcm in pt dk grn gy, else o/o.

strgs Dol.

Clyst: bcm pred dk grn gy.

strgs Lst.

1820m
Clyst/Tuff:m gy,wh/blk
1862m specs.

Clyst: m dk gy,slty,non - sl calc.

1974m
strgs Sd,vf-m,pr srtd,
2012m no show.
Clyst: lt gy-m gy,sl slty,calc,loc grd Mrl.

strgs Lst,Dol

Clyst: bcm less calc, else o/o.

strgs Sst: vf,mod-w srtd, lt brn oil stn,bri yel flu, yel wh flu cut.

TERTIARY

CRETACEOUS

U.CRETACEOUS

HORDALAND GP.

ROGALAND GP.

BALDER

LISTA/SELE

SHETLAND GP.

MONT

MAUR

0.2-8.8 % C1-C4 - 0.1-0.5 % C1,occ C2-C4

HYDRO PRELIMINARY GEOLOGICAL WELL SUMMARY

LOCATED ON LINE SP
60° 24' 28.04" N NH 8404-321 275
02° 32' 45.06" E
WATER DEPTH 382m MSL

WELL 34/8-3

DEPTH m RKB | LITHO SECTION | SYSTEM | SERIES/STAGE | GROUP | FORMATION | DESCRIPTION | SHOWS

SYSTEM: CRETACEOUS; JURASSIC
SERIES/STAGE: U.CRETACEOUS; M.JUR.–U.JUR.; L.JURASSIC
GROUP: SHETLAND GP.; BRENT GP.; DUNLIN GP.
FORMATION: KVITNOS; HEIMDAL; RANNOCH EQUIV.; DRAKE; COOK; BURTON; AMUNDSEN; STAFFJ.

Clyst: m lt gy–olv gy–olv blk,slty grd Slst,loc calc. strgs Sst w/ shows a/a.
8 5/8" 2587m
Clyst: dk–m gy,sl slty, else a/a.
strgs Lst,Dol.

Clyst: bcm v calc grd Mrl.
2795m
Clyst/Mrl: mod brn,slty.
2827m
Clyst: brn blk,slty,v carb.
2837m
Sst: f–m,occ crs bcm vf w/depth,fair–gd vis por, tr Coal at top.
Gas show: 2839–2931m
Oil show: 2931–2951m
2965m
Sh: dk gy,slty–v slty,non calc.
3006m
Sst: m,occ f–crs bcm vf–f at base,pr srtd,no vis por, no show.
Intbd Clyst: olv gy,slty grd Slst,non–sl calc.
3117.5m
Clyst: a/a.
3154.5m
Sst: vf–f,loc slty,arg mtx, no vis por.
Clyst: olv gy,slty loc grd Slst,non–sl calc.
Sst: f–v crs,gen lse,no show.
3278m
strgs Coal.
T.D.(Driller) 3328m
T.D.(Logger) 3328.5m

SHOWS: 0.2–8.6 % C1–C4; 0.03–0.21 % C1–C3; 0.16–28.8 % C1–C4; 0.08–4.8 % C1–C4; 0.02–0.11 % C1,occ C2–C3

HYDRO

GEOLOGICAL WELL SUMMARY

DEPTH m RKB	LITHO SECTION	SYSTEM	SERIES/STAGE	GROUP	FORMATION	DESCRIPTION	SHOWS

LOCATED ON | LINE | SP

WATER DEPTH 405m RKB

WELL 34/8-3A

Depth scale (m RKB): 2500, 2550, 2600, 2650, 2700, 2750, 2800, 2850, 2900, 2950, 3000, 3050, 3100, 3150, 3200, 3250, 3300, 3350, 3400, 3450, 3500, 3550, 3600, 3650, 3700

Second scale: 3750, 3800, 3850, 3900, 3950, 4000, 4050, 4100, 4150, 4200, 4250, 4300, 4350, 4400, 4450, 4500, 4550, 4600, 4650, 4700, 4750, 4800, 4850, 4900, 4950

System	Series/Stage	Group	Formation	Description
LATE CRETACEOUS	E.CAMP.			Clyst: o/a. Tr Dol: o/a. Tr Lst: o/a.
LATE CRETACEOUS	M.-L.SANTONIAN			Tr Sst: clr-mlky,occ lt grn-lt brn Qtz,vf,occ f,subang-subrnd,lse,occ mod hd,silic cmt, no vis por.
LATE CRETACEOUS	E.-M.SANT.			
LATE CRETACEOUS	CON.			2972m MD/2843m TVD
E.CR		C.K.		Clyst: mod brn,m dk gy,mnr Lst
JURASSIC		VIK.	HE.D.	3003m MD/2875m TVD Clyst: olv blk-brn blk, carb. earthy.
JURASSIC	BAJ.	BRENT GP	TARB.	3031.5m MD/ 2900.5m TVD Sst: lt gy-pl yel brn,Qtz,vf-m, tr crs-pbl,subang-subrnd,w srtd,silic cmt,calc cmt.
JURASSIC	AALEN-BAJOC	BRENT GP	ETI.	Tr Slst: dusky yel brn,subfis-blky,mod hd-hd,non calc-loc calc,mic-loc v mic,tr plant rem,tr pyr,loc vf sdy.
JURASSIC	AALEN-BAJOC	BRENT GP		BROOM FM
JURASSIC	AALEN-BAJOC	DUN.	DR.	3195m MD/3091m TVD
				3230m MD/3091m TVD

7" 3230m

FIG. 2.1,1 Plot of Rock Eval values versus depth

Draupne Fm. 34/8-3

Well: 34/8-3

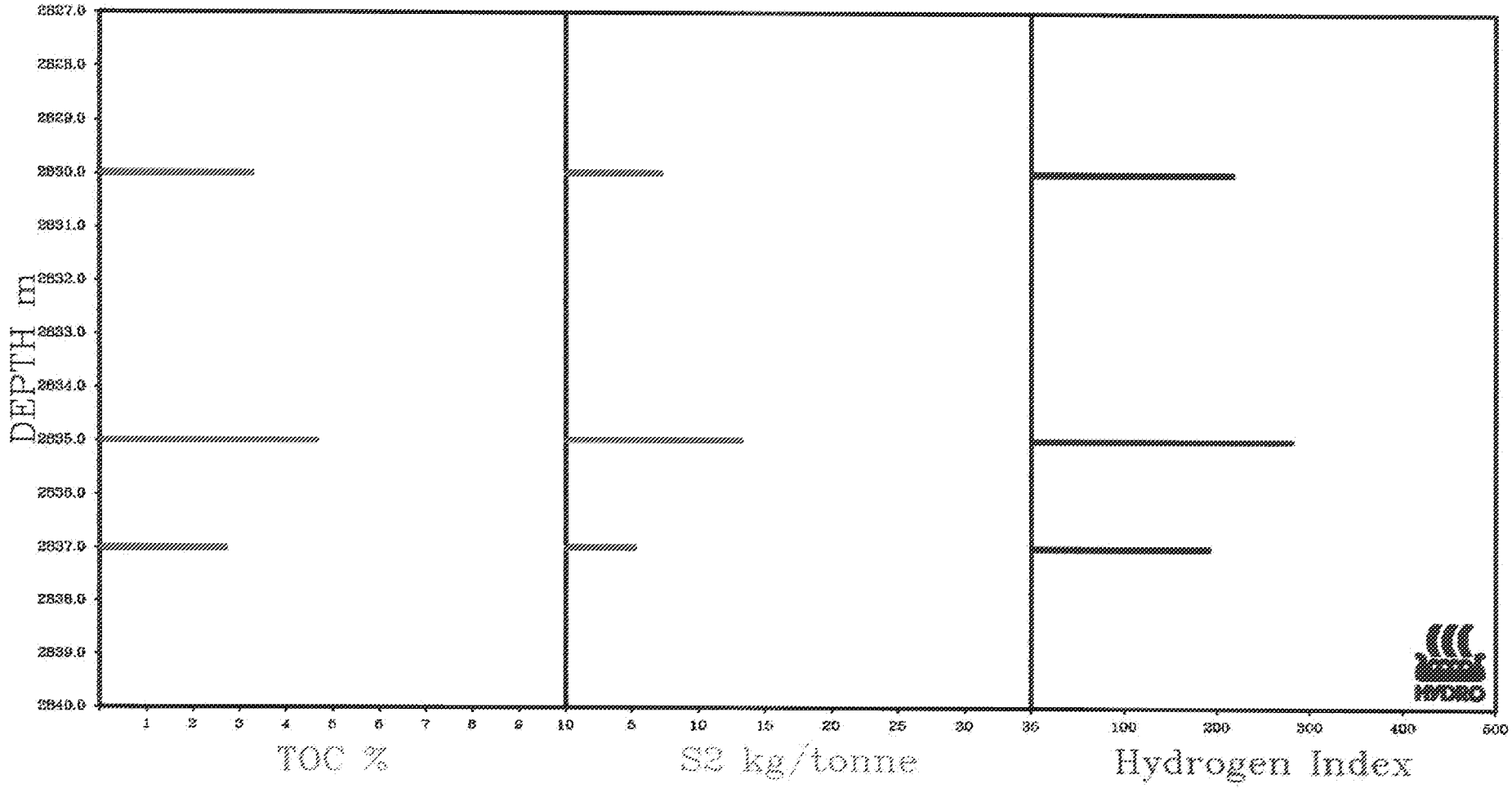

DEPTH m
2827.0
2828.0
2829.0
2830.0
2831.0
2832.0
2833.0
2834.0
2835.0
2836.0
2837.0
2838.0
2839.0
2840.0
1 2 3 4 5 6 7 8 9 10
TOC %
5 10 15 20 25 30 35
S2 kg/tonne
100 200 300 400 500
Hydrogen Index

FIG. 2.1,2 Van Krevlen – plot HI versus Tmax

Draupne Fm. 34/8–3

WELL: 34/8-3

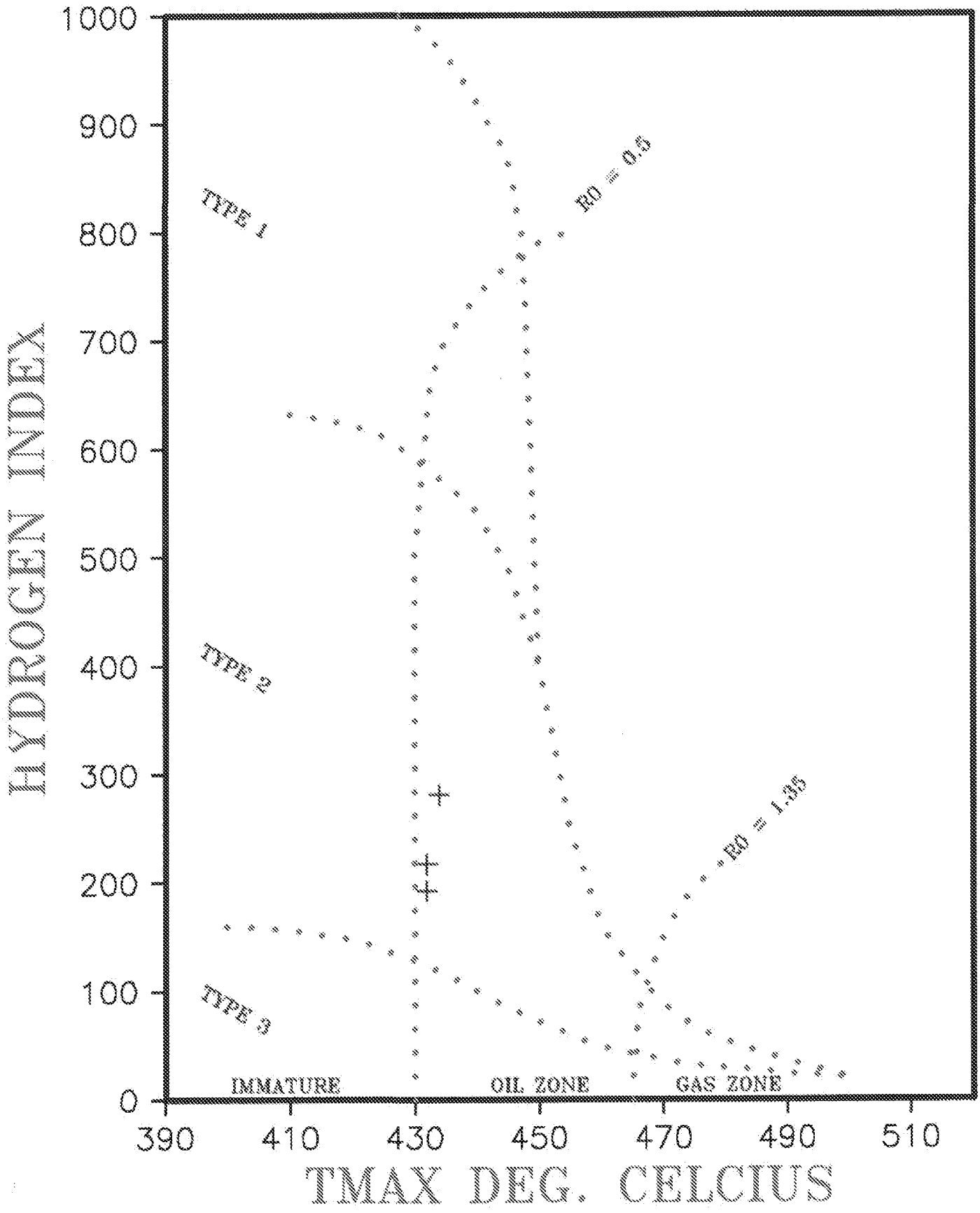

HYDROGEN INDEX
1000
900
800
700
600
500
400
300
200
100
0
TYPE 1
TYPE 2
TYPE 3
RO = 0.5
RO = 1.35
IMMATURE
OIL ZONE
GAS ZONE
390
410
430
450
470
490
510
TMAX DEG. CELCIUS

FIG. 2.1,3 Plot of Rock Eval values versus depth

Draupne & Heather Fms. 34/8–3A

Well: 34/8-3A

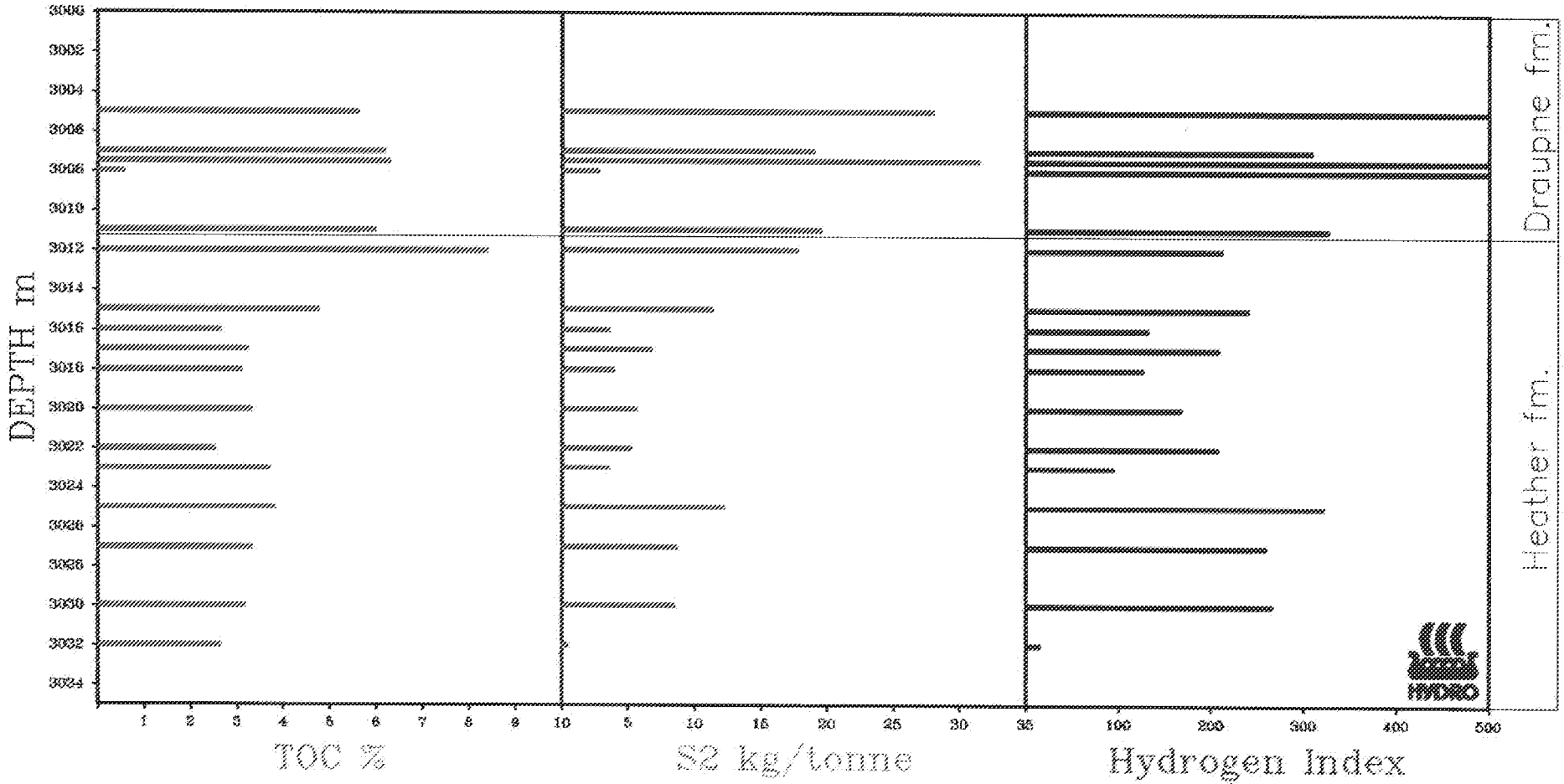

DEPTH m
3000
3002
3004
3006
3008
3010
3012
3014
3016
3018
3020
3022
3024
3026
3028
3030
3032
3034
1 2 3 4 5 6 7 8 9 10
TOC %
5 10 15 20 25 30 35
S2 kg/tonne
100 200 300 400 500
Hydrogen Index
Draupne fm.
Heather fm.
NPD

FIG. 2.1,4 Van Krevlen – plot HI versus Tmax

Draupne & Heather Fms. 34/8–3A

FIG. 2.5,1 Biomarker parameters versus depth

Draupne & Heather Fms. 34/8-3A

Well: 34/8-3A

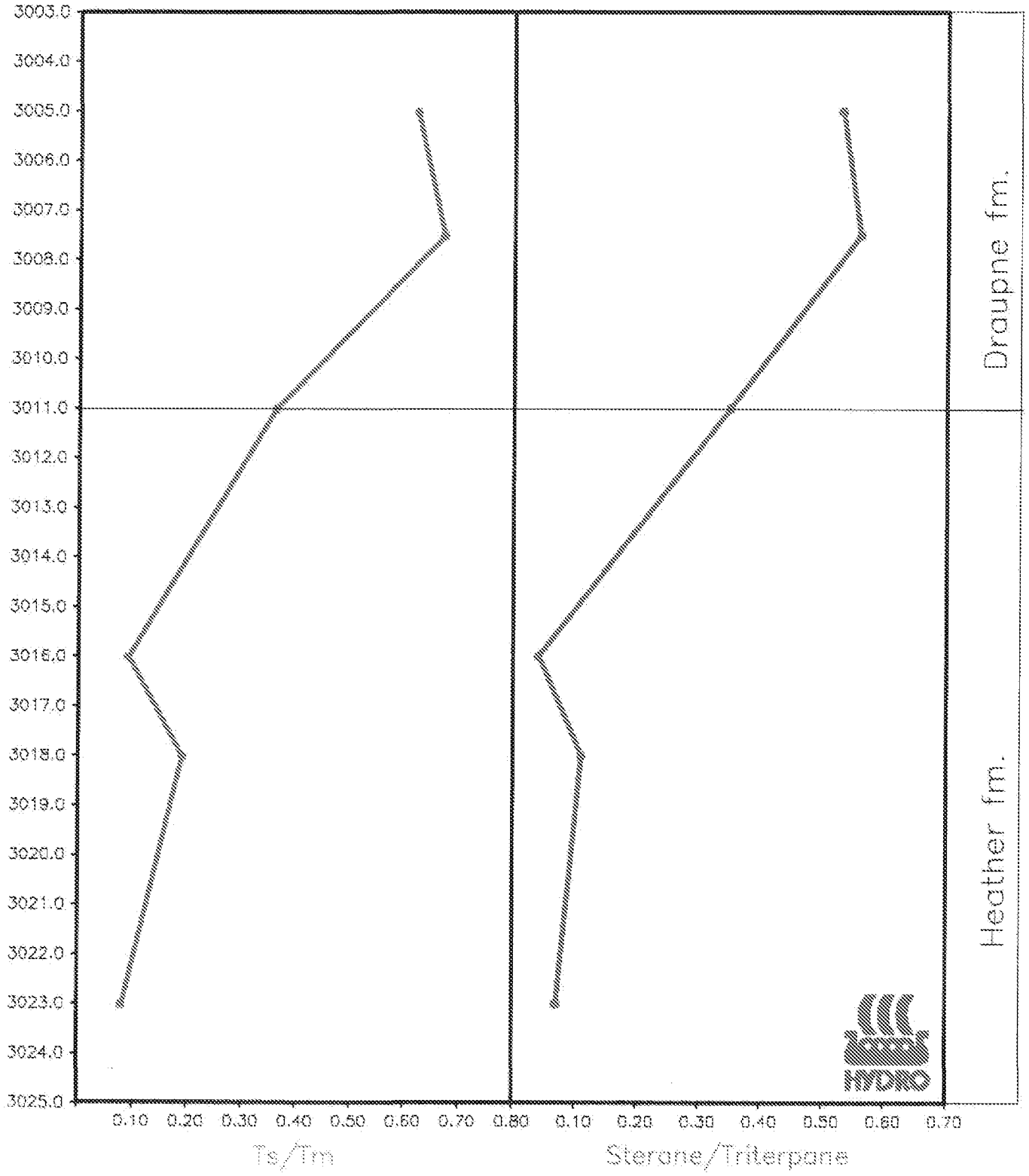

3003.0
3004.0
3005.0
3006.0
3007.0
3008.0
3009.0
3010.0
3011.0
3012.0
3013.0
3014.0
3015.0
3016.0
3017.0
3018.0
3019.0
3020.0
3021.0
3022.0
3023.0
3024.0
3025.0
Draupne fm.
Heather fm.
0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80
Ts/Tm
0.10 0.20 0.30 0.40 0.50 0.60 0.70
Sterane/Triterpane
HYDRO

FIG. 2.7,1 Visual kerogen typing 34/8-3A

Draupne & Heather Fms.

Fig. 2.7.1 VISUAL KEROGEN TYPING 34/8-3A

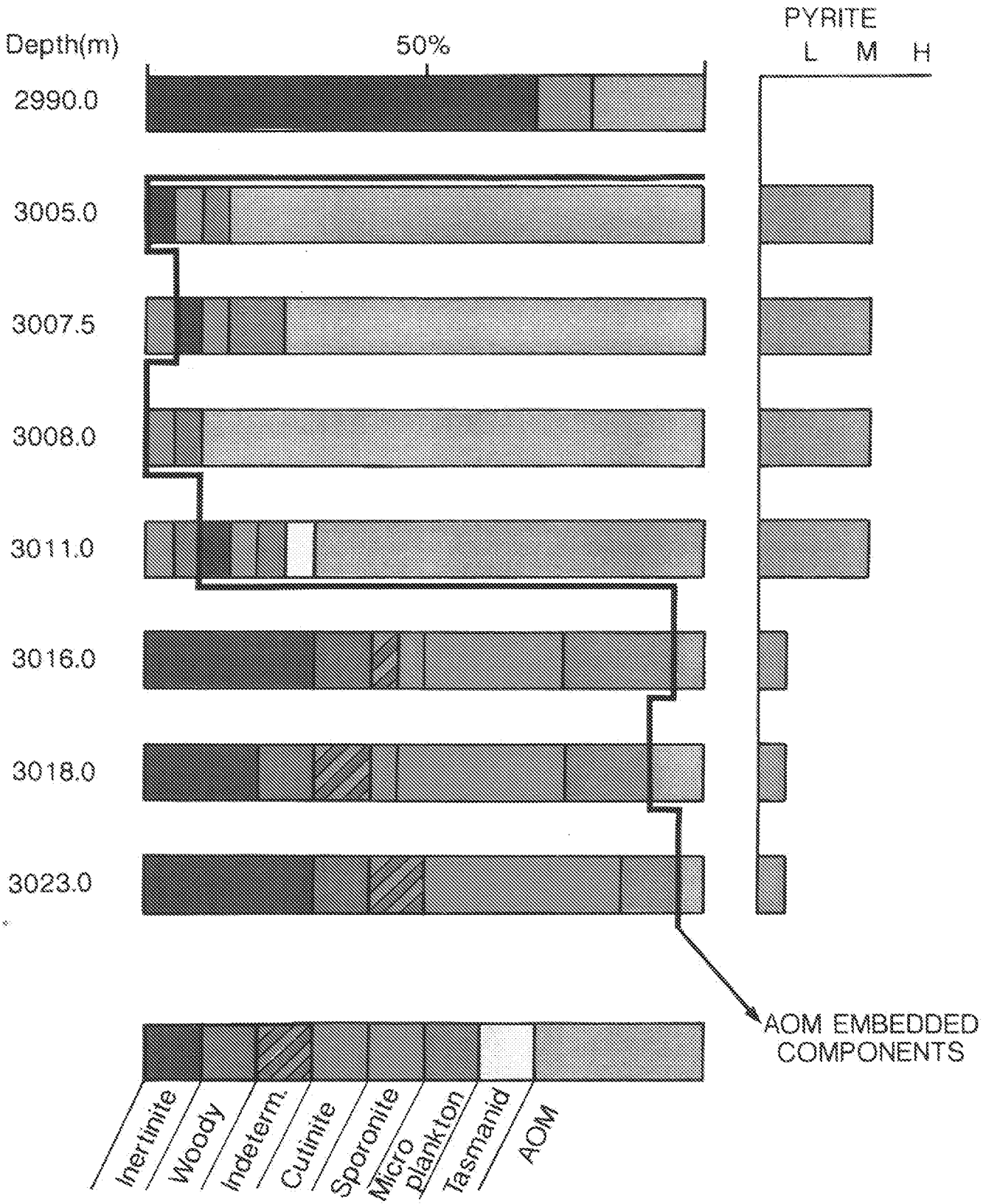
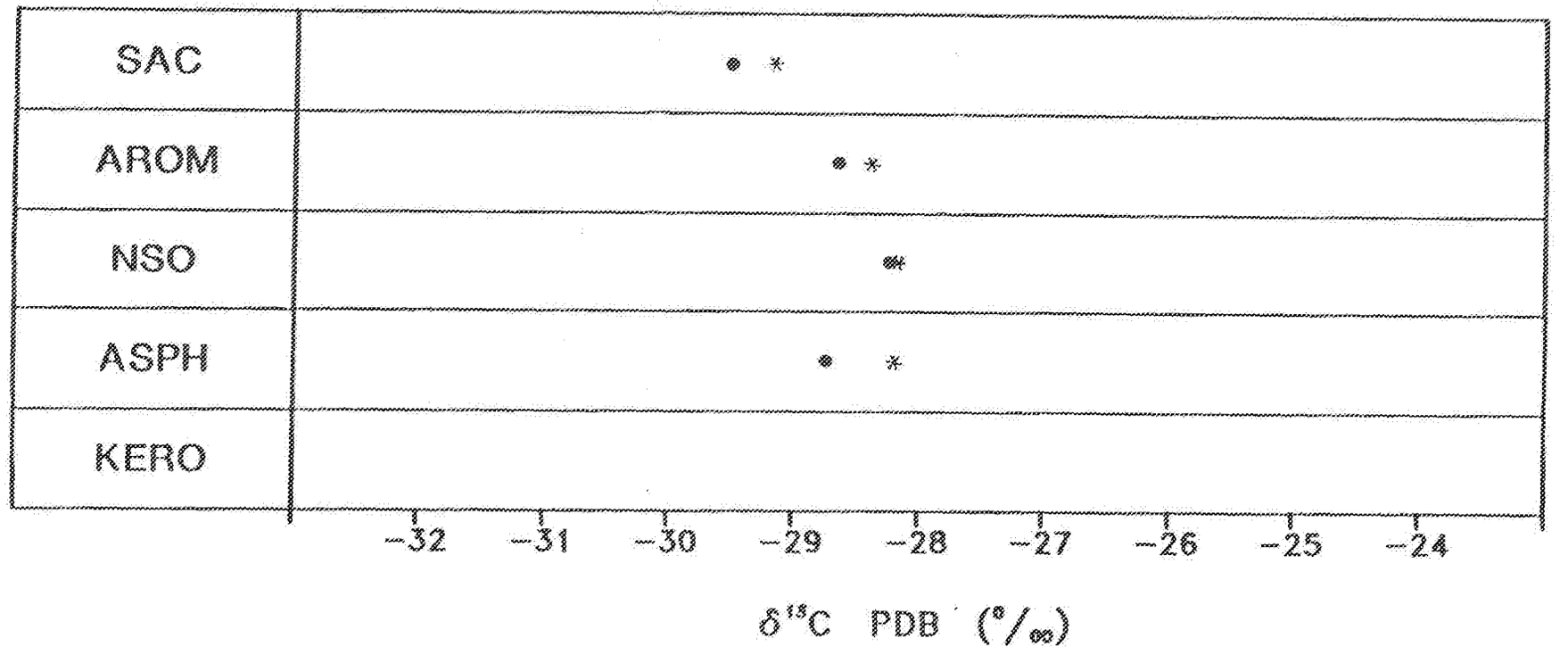


FIG. 4.1,1 Galimov plot of 34/8 – oils

GALIMOV PLOT



WHOLE OIL $\delta^{13}C$ = 34/8-1 DST2:-29.12 , 34/8-3 DST1:-26.85

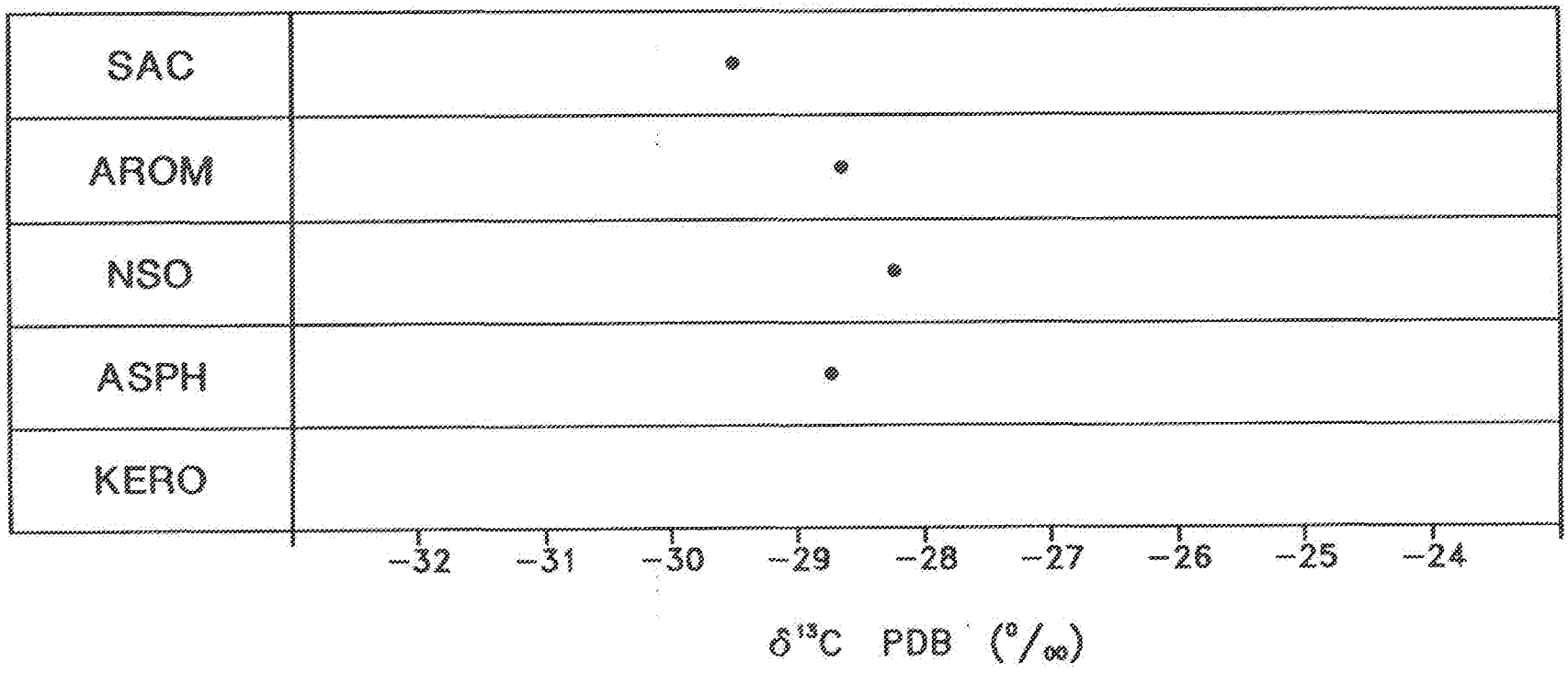
WHOLE EXTRACT $\delta^{13}C$ =

PYROLYSATE $\delta^{13}C$ =

34/8-1 DST2 ●

34/8-3 DST1 *

WELL 34/8-1 DST2

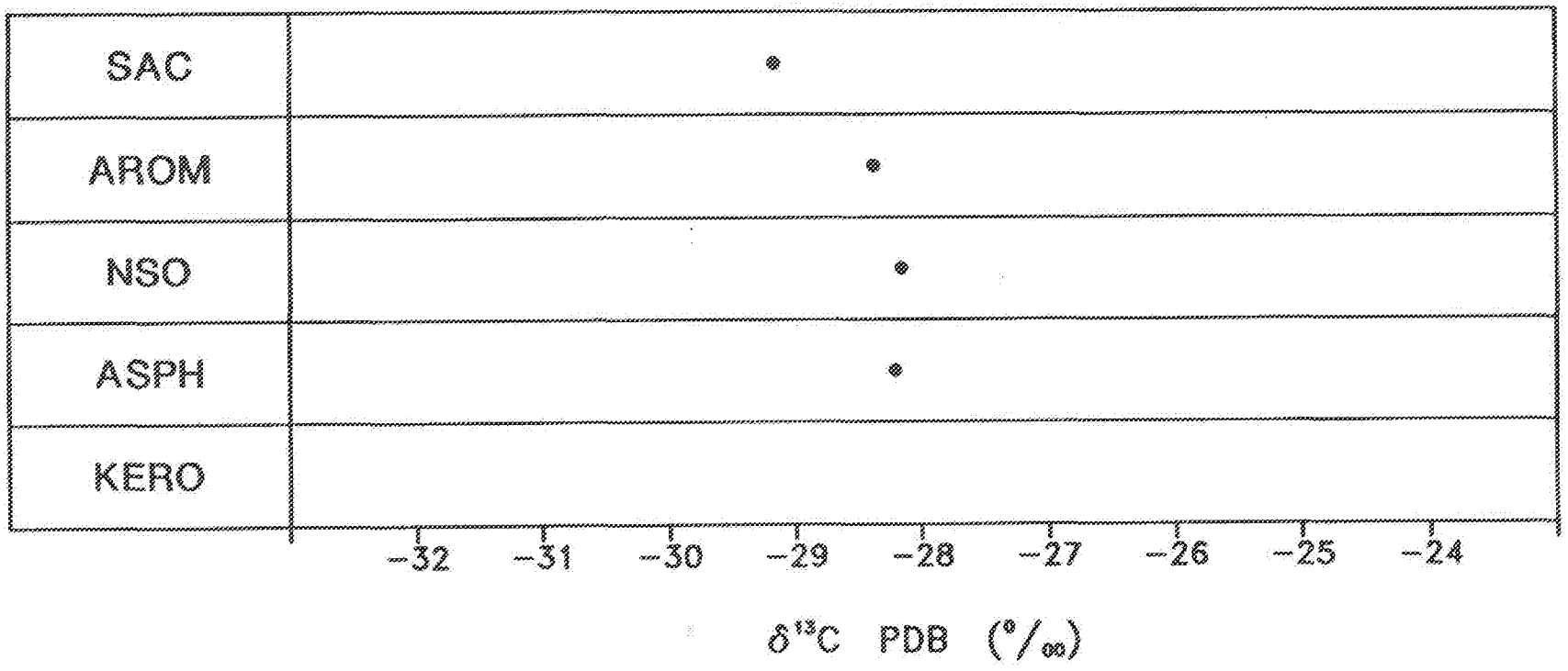


WHOLE OIL $\delta^{13}C$ = -29.12

WHOLE EXTRACT $\delta^{13}C$ =

PYROLYSATE $\delta^{13}C$ =

WELL 34/8-3 DST1



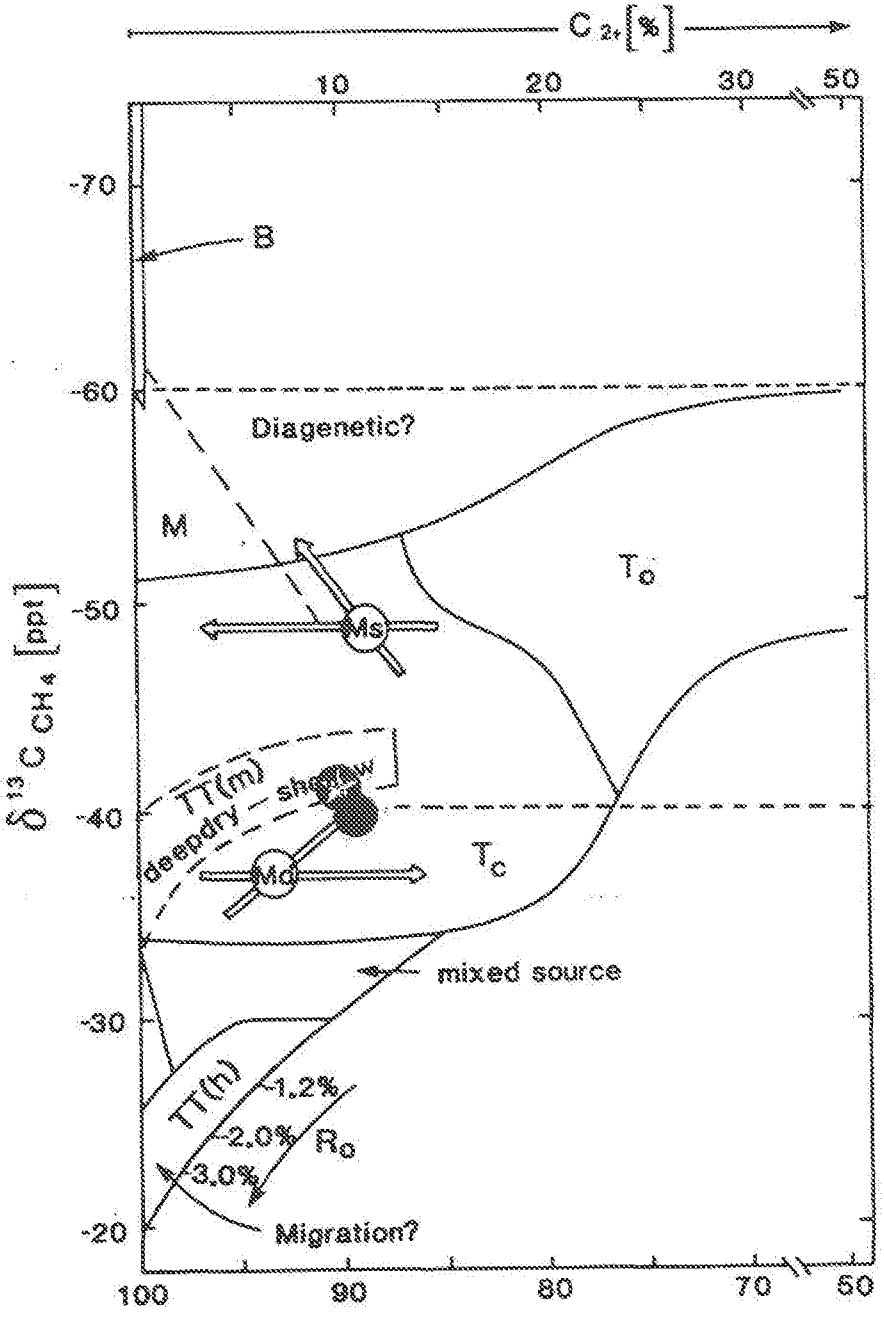
WHOLE OIL $\delta^{13}C$ = -28.85

WHOLE EXTRACT $\delta^{13}C$ =

PYROLYSATE $\delta^{13}C$ =

Fig 4.2,2 Schoell and James plots of the 34/8 gases

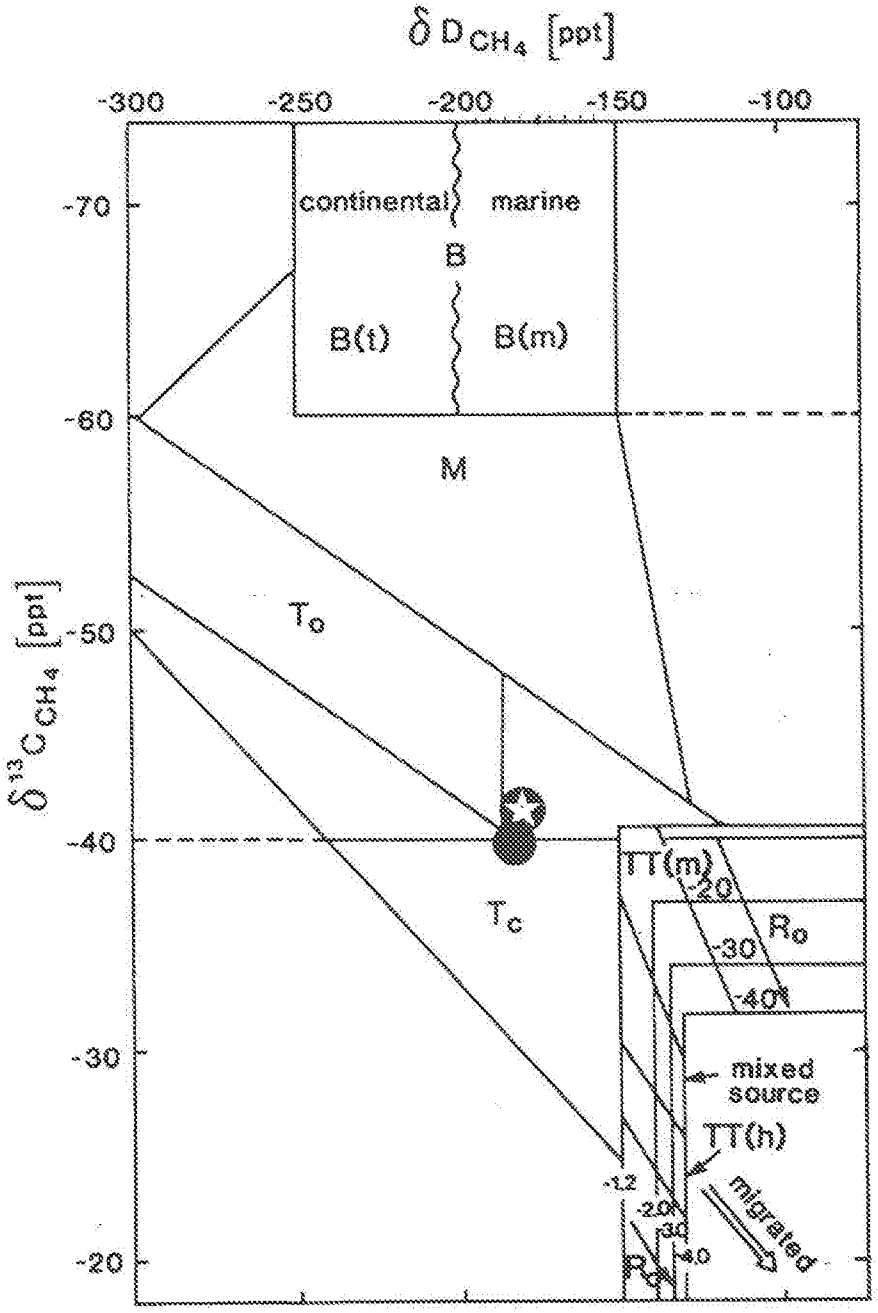
SCHOELL PLOT I



34/8-1, DST 2 and 34/8-3, DST 1,2 and

34/8-1, DST 3

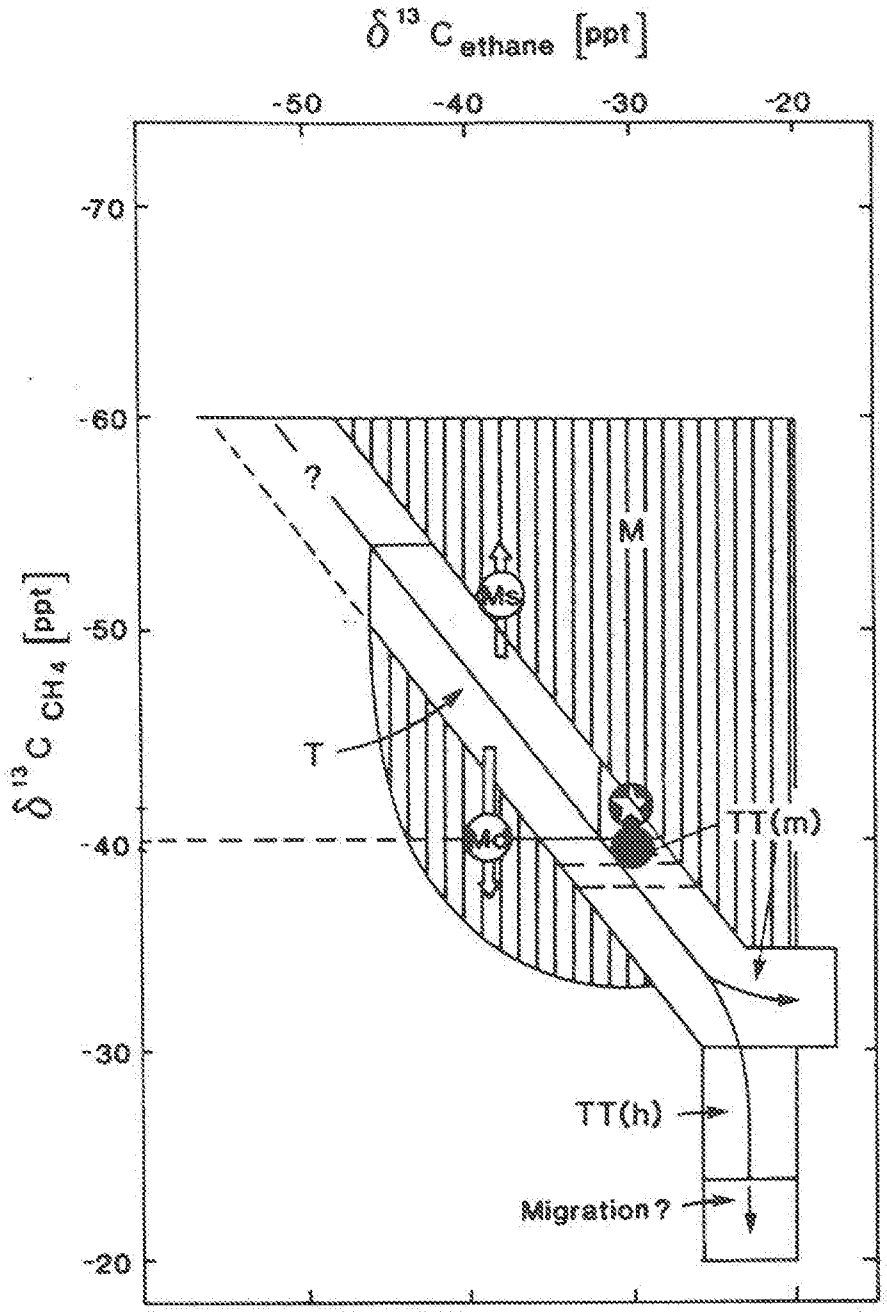
SCHOELL PLOT II



● 34/8-1, DST 2 and 34/8-3, DST 1,2 and

✪ 34/8-1, DST 3

SCHOELL PLOT III



● 34/8-1, DST 2 and 34/8-3, DST 1,2 and

✪ 34/8-1, DST 3

JAMES DIAGRAM

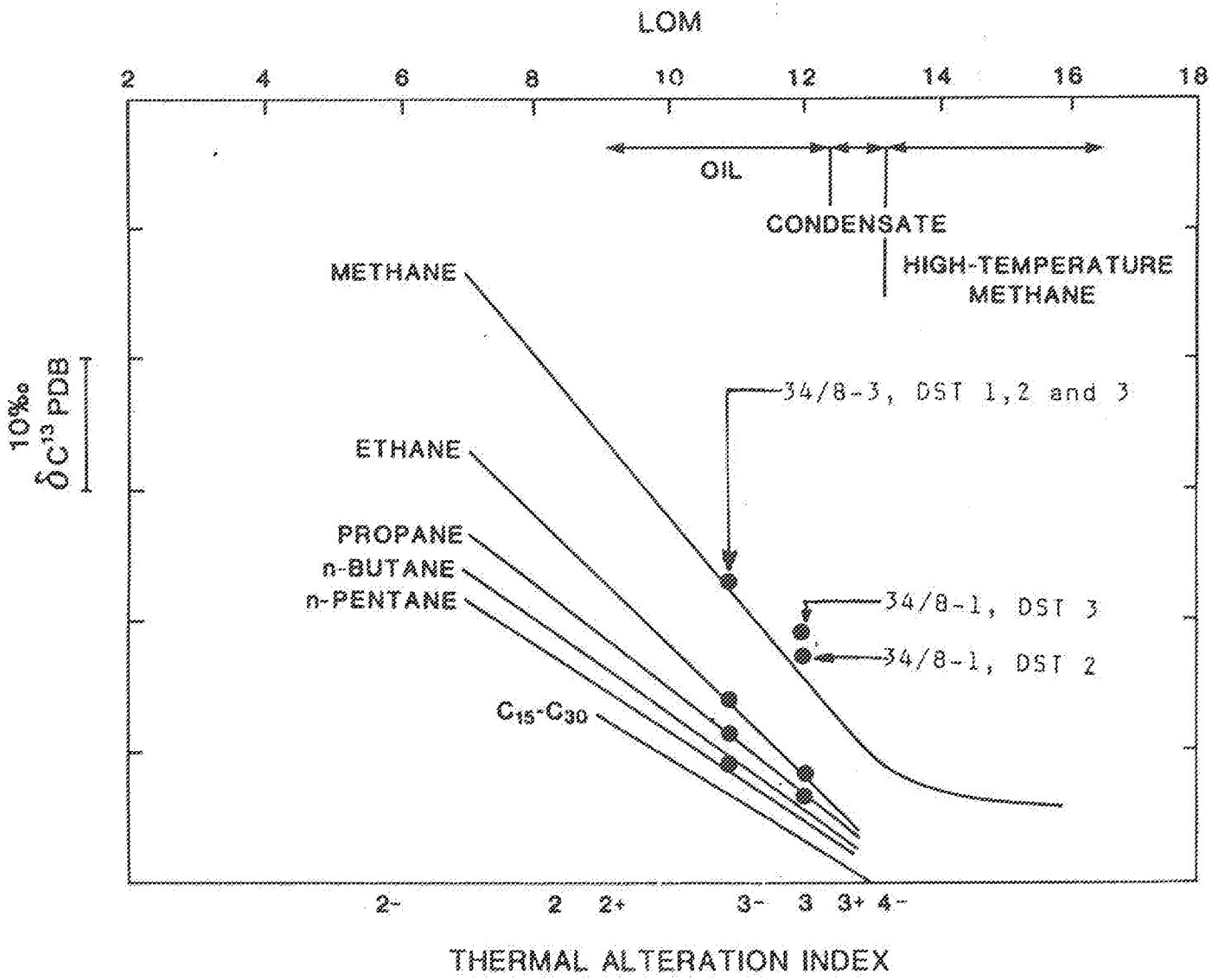


FIG. 5.1,1 Plot of EOM, ASPH. and ^{Pr}/n-C17

from the 34/8-3A reservoir

. Plot of EOM, ASPH and Pr/n-C_{17} versus depth.

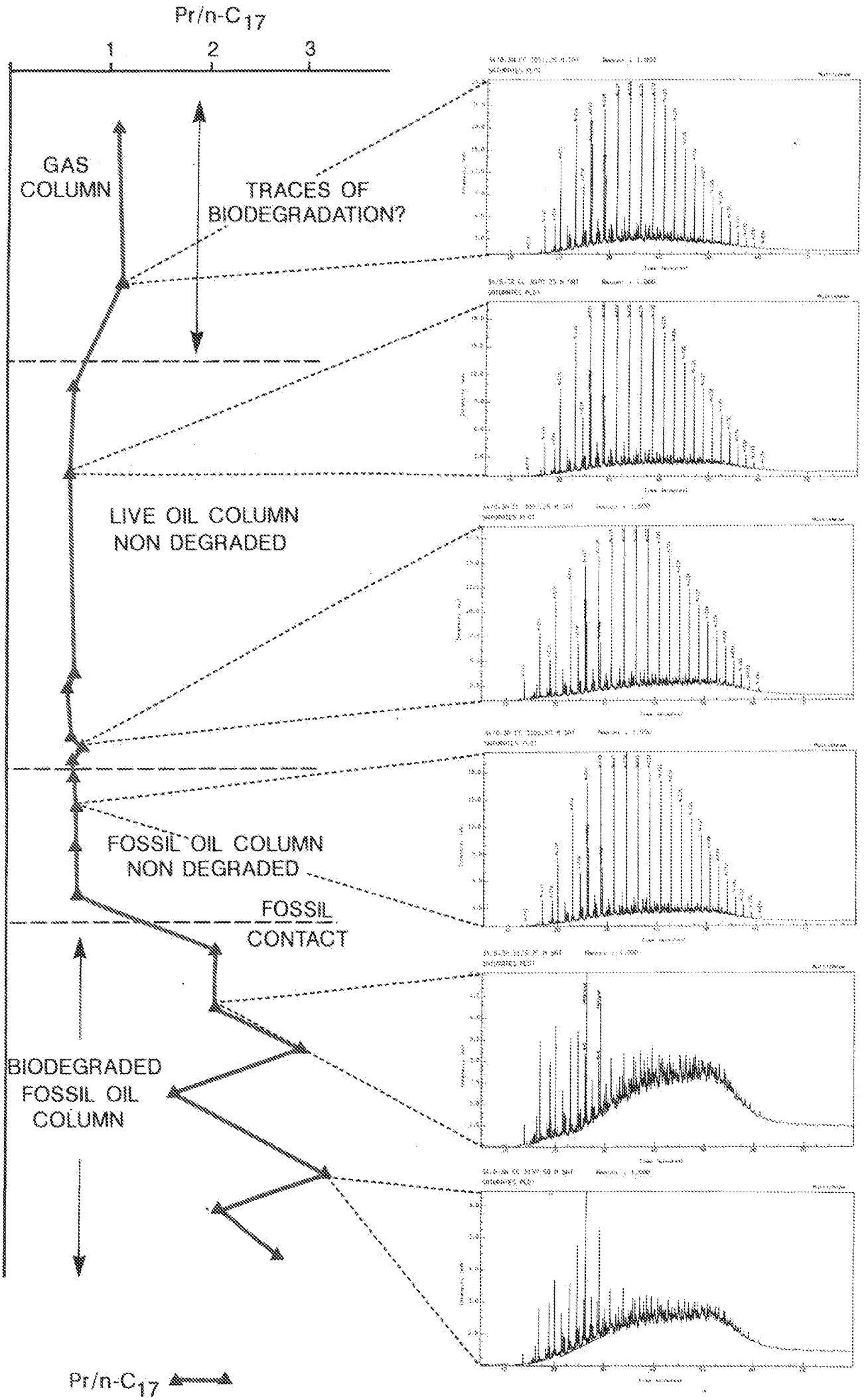


TABLE 2.1 Source rock parameters

Wells 34/8-3 and 3A

Table 2.1.1 SOURCE ROCK SCREENING DATA WELL 34/8-3

Petroleum Geochemistry Group
Research Center Bergen
HYDRO

Depth (m)	Group/Fm	% Lithology	Sample	S1 Kg/t	S2 Kg/t	S3 Kg/t	TOC %	HI	OI	PI	Tmax Deg.c	Company
2830.00	DRAUPNE		DC	0.2	7.2	1.7	3.3	218	52	0.02	432	F-BERGEN
2835.00	DRAUPNE		SWC	1.8	13.3	0.7	4.7	283	14	0.12	434	F-BERGEN
2837.00	DRAUPNE		DC	0.1	5.3	1.1	2.7	193	40	0.03	432	F-BERGEN

Table 2.1.1 SOURCE ROCK SCREENING DATA WELL 34/8-3A

Petroleum Geochemistry Group
Research Center Bergen

HYDRO

Depth (m)	Group/Fm	% Lithology	Sample	S1 Kg/t	S2 Kg/t	S3 Kg/t	TOC %	HI	OI	PI	Tmax Deg.c	Company
2990.00	CROMER KNOL		SWC	0.1	0.7	1.8	0.8	85	210	0.10	465	F-BERGEN
3005.00	DRAUPNE		SWC	3.2	28.0	0.4	5.6	498	7	0.10	431	F-BERGEN
3007.00	DRAUPNE	90 SH	DC	1.0	19.0	2.4	6.2	308	38	0.05	427	F-BERGEN
3007.50	DRAUPNE		SWC	1.9	31.4	0.7	6.3	499	11	0.06	431	F-BERGEN
3008.00	DRAUPNE		SWC	0.2	2.8	0.6	0.6	498	104	0.07	428	F-BERGEN
3011.00	DRAUPNE		SWC	2.6	19.5	0.7	6.0	327	11	0.12	429	F-BERGEN
3012.00	DRAUPNE	90 SH	DC	1.6	17.8	2.3	8.4	212	28	0.08	426	F-BERGEN
3015.00	HEATHER	95 SH	DC	1.4	11.4	1.3	4.8	240	27	0.11	428	F-BERGEN
3016.00	HEATHER		SWC	0.6	3.5	0.4	2.6	132	17	0.14	435	F-BERGEN
3017.00	HEATHER	85 SH	DC	0.8	6.7	1.2	3.2	208	37	0.10	432	F-BERGEN
3018.00	HEATHER		SWC	0.6	3.9	0.8	3.1	126	27	0.12	435	F-BERGEN
3020.00	HEATHER	70 SH	DC	0.8	5.6	1.5	3.3	168	45	0.13	431	F-BERGEN
3022.00	HEATHER	80 SH	DC	0.6	5.2	1.0	2.5	207	39	0.10	431	F-BERGEN
3023.00	HEATHER		SWC	1.0	3.5	0.7	3.7	95	19	0.22	435	F-BERGEN
3025.00	HEATHER	90 SH	DC	0.7	12.2	0.9	3.8	321	24	0.06	430	F-BERGEN
3027.00	HEATHER	80 SH	DC	0.8	8.6	1.2	3.3	259	36	0.08	430	F-BERGEN
3030.00	HEATHER	70 SH	DC	0.6	8.4	1.0	3.2	266	32	0.07	432	F-BERGEN
3032.00	HEATHER	70 SH	DC	0.1	0.4	1.8	2.7	16	66	0.19	425	F-BERGEN

TABLE 2.2 Extraction data

Sediments Wells 34/8–3 and 3A

Oils Wells 34/8–1 and 3

Table 2.2.1 SOURCE ROCK EXTRACTION DATA I WELL 34/8-3

Petroleum Geochemistry Group
Research Center Bergen
HYDRO

Depth(m)	Group/Fm	EOM(mg)	EOM(%)	Hydrocarbons SAT(%)	Hydrocarbons ARO(%)	Hydrocarbons TOTAL(%)	Non Hydrocarbons NSO(%)	Non Hydrocarbons ASPH(%)	Non Hydrocarbons TOTAL(%)
2835.00	DRAUPNE		0.65	19	23	43	22	35	57

Table 2.2.2 SOURCE ROCK EXTRACTION DATA II WELL 34/8-3

Petroleum Geochemistry Group
Research Center Bergen
HYDRO

Depth(m)	Group/Fm	TOC (%)	EOM(%)/TOC(%)	SAT(%)/TOC(%)	SAT(%)/ARO(%)	HC/non HC
2835.00	DRAUPNE	4.69	0.14	4.12	0.82	0.75

Table 2.2.1 SOURCE ROCK EXTRACTION DATA I WELL 34/8-3A

Petroleum Geochemistry Group
Research Center Bergen
HYDRO

Depth(m)	Group/Fm	EOM(mg)	EOM(%)	Hydrocarbons SAT(%)	ARO(%)	TOTAL(%)	Non Hydrocarbons NSO(%)	ASPH(%)	TOTAL(%)
2990.00	CROMER KNOLL		0.02						
3005.00	DRAUPNE		0.50	19	18	37	32	30	63
3007.50	DRAUPNE		0.60	19	19	38	32	30	62
3008.00	DRAUPNE		0.09					32	32
3011.00	DRAUPNE		0.65	13	16	30	16	54	70
3016.00	HEATHER		0.11					57	57
3018.00	HEATHER		0.14					57	57
3023.00	HEATHER		0.12					67	67
3036.25	HEATHER		0.10	54	16	70	13	17	30
3051.25	HEATHER		0.12	52	18	70	12	18	30
3061.50	HEATHER		1.44	54	23	77	11	12	23
3070.25	HEATHER		1.00	62	26	88	10	3	12
3089.50	HEATHER		1.02	62	24	86	11	2	14
3091.72	HEATHER		0.92	59	23	82	10	8	19
3096.75	HEATHER		0.92	63	25	88	10	3	12
3097.25	HEATHER		0.32	60	23	82	14	4	18
3098.75	HEATHER		0.29	61	25	86	11	3	14
3100.25	HEATHER		0.25	61	25	86	11	3	14

Table 2.2.1 SOURCE ROCK EXTRACTION DATA I WELL 34/8-3A (cont'd)

Depth(m)	Group/Fm	EOM(mg)	EOM(%)	Hydrocarbons SAT(%)	ARO(%)	TOTAL(%)	Non Hydrocarbons NSO(%)	ASPH(%)	TOTAL(%)
3103.50	HEATHER		0.81	59	30	89	9	2	11
3107.25	HEATHER		0.86	62	25	87	11	2	13
3112.25	HEATHER		0.98	64	25	88	10	2	12
3117.50	HEATHER		0.23	47	29	76	17	7	24
3123.25	HEATHER		0.10	36	23	60	27	14	41
3127.50	HEATHER		0.11	43	24	67	21	12	33
3131.50	HEATHER		0.22	46	25	71	22	7	29
3139.50	HEATHER		0.21	43	31	74	18	8	26
3143.50	HEATHER		0.20	49	25	74	19	8	26
3148.25	HEATHER		0.32	0	0	0	0	5	5

Table 2.2.2 SOURCE ROCK EXTRACTION DATA II WELL 34/8-3A

Petroleum Geochemistry Group
Research Center Bergen
HYDRO

Depth(m)	Group/Fm	TOC (%)	EOM(%)/TOC(%)	SAT(%)/TOC(%)	SAT(%)/ARO(%)	HC/non HC
2990.00	CROMER KNOLL	0.84	0.02			
3005.00	DRAUPNE	5.62	0.09	3.42	1.07	0.59
3007.50	DRAUPNE	6.30	0.10	3.05	1.01	0.62
3008.00	DRAUPNE	0.56	0.16			
3011.00	DRAUPNE	5.98	0.11	2.24	0.82	0.42
3016.00	HEATHER	2.64	0.04			
3018.00	HEATHER	3.10	0.05			
3023.00	HEATHER	3.70	0.03			
3036.25	HEATHER				3.48	2.32
3051.25	HEATHER				2.99	2.32
3061.50	HEATHER				2.39	3.35
3070.25	HEATHER				2.37	7.06
3089.50	HEATHER				2.60	6.35
3091.72	HEATHER				2.62	4.41
3096.75	HEATHER				2.50	7.06
3097.25	HEATHER				2.65	4.62
3098.75	HEATHER				2.42	6.19
3100.25	HEATHER				2.46	5.99

Table 2.2.2 SOURCE ROCK EXTRACTION DATA II WELL 34/8-3A (cont'd)

Depth(m)	Group/Fm	TOC (%)	EOM(%)/TOC(%)	SAT(%)/TOC(%)	SAT(%)/ARO(%)	HC/non HC
3103.50	HEATHER				1.96	8.17
3107.25	HEATHER				2.44	6.87
3112.25	HEATHER				2.58	7.40
3117.50	HEATHER				1.64	3.12
3123.25	HEATHER				1.55	1.47
3127.50	HEATHER				1.80	2.06
3131.50	HEATHER				1.84	2.46
3139.50	HEATHER				1.36	2.85
3143.50	HEATHER				1.93	2.83

EXTRACTION DATA OF 34/8-OILS

WELL	WELL	SAMPLE TYPE	ASPH % OIL	SAT % OIL	ARO % OIL	NSO % OIL	SAT/ARO
34/8-1	34/8-1	DST 2	0.26	64.01	26.03	9.67	2.46
34/8-3	34/8-3	DST 1	0.30	66.50	26.60	6.60	2.50

TABLE 2.3 Molecular ratios from chromatogram of saturated fractions.

Sediments Wells 34/8–3 and 3A

Oils, Wells 34/8–1 and 3

Table 2.3.1 SATURATED FRAC., MOLECULAR RATIOS WELL 34/8-3

Petroleum Geochemistry Group
Research Center Bergen
HYDRO

Depth	Group/Fm	Pr/n-C17	Pr/Ph	CPI-I	CPI-II	n-C15+/Total	n-C20/n-C25
2835.00	DRAUPNE	1.76	1.95	1.25	1.28		

Table 2.3.1 SATURATED FRAC., MOLECULAR RATIOS WELL 34/8-3A

Depth	Group/Fm	Pr n-C17	Pr/Ph	CPI-I	CPI-II	n-C15+/Total	n-C20/n-C25
3005.00	DRAUPNE	1.75	1.51	1.14	1.11		
3007.50	DRAUPNE	1.71	1.51	1.13	1.01		
3011.00	DRAUPNE	1.44	1.92	1.20	1.19		
3016.00	HEATHER	3.30	5.12		1.12		
3018.00	HEATHER	1.20	3.67		1.16		
3023.00	HEATHER	3.20	2.46		1.13		
3036.25	HEATHER	1.09	1.60	1.07	0.97		
3051.25	HEATHER	1.14	1.43	1.10	0.99		
3061.50	HEATHER	0.66	1.51	1.10	1.03		
3070.25	HEATHER	0.62	1.40	1.16	1.03		
3089.50	HEATHER	0.66	1.60	1.13	0.97		
3091.72	HEATHER	0.59	1.41	1.18	1.08		
3096.75	HEATHER	0.65	0.95	1.03	0.97		
3097.25	HEATHER	0.72	1.36	1.05	0.94		
3098.75	HEATHER	0.64	1.40	1.06	0.93		
3100.25	HEATHER	0.66	1.34	1.07	1.05		
3103.50	HEATHER	0.69	1.41	1.14	1.04		
3107.25	HEATHER	0.68	1.55	1.12	0.99		

Table 2.3.1 SATURATED FRAC., MOLECULAR RATIOS WELL 34/8-3A (cont'd)

Depth	Group/Fm	Pr/n-C17	Pr/Ph	CPI-I	CPI-II	n-C15+/Total	n-C20/n-C25
3112.25	HEATHER	0.69	1.41	1.04	0.97		
3117.50	HEATHER	2.10	1.48				
3123.25	HEATHER	2.07	1.28				
3127.50	HEATHER	2.95	1.36				
3131.50	HEATHER	1.67	1.63				
3139.50	HEATHER	3.41	1.42				
3143.50	HEATHER	2.10	1.63				
3148.25	HEATHER	2.74	1.46		1.32		

MOLECULAR RATIOS FROM CHROMATOGRAMS OF SATURATED FRACTIONS
34/8-OILS

WELL	WELL	SAMPLE TYPE	PRISTAN/ n-C17	PRISTAN/ PHYTAN	C.P.I. 1	C.P.I. 2
34/8-1	34/8-1	DST 2	0.62	1.56	1.13	1.03
34/8-3	34/8-3	DST 1	0.52	1.63	1.08	1.04

TABLE 2.5 Sterane and Triterpane ratios from sediments, Wells 34/8–3 and 3A.

Oils, Wells 34/8–1 and 3

BIOMARKER RATIOS

DEPTH m	SAMPLE TYPE	WELL	STERANE ISOMERISATION			TRITERPANES ISOMERISATION					STERANE/ TRITERPANE
			20S % aaa	20S+R %abb	C2920Raaa/ HOMOPREG	Ts/ Tm	NOR/ NOR+HOP	BNOR/ BNOR+NOR	MORETAN/ HOPAN	%22S BISHOMOHOP	
OIL	DST 2	34/8-1	51	63	0.55	3.10	0.29	0.23	0.12	59.0	0.40
OIL	DST 1	34/8-3	48	61	0.55	3.30	0.27	0.19	0.10	60.0	0.45
2835.00	SWC	34/8-3	31	27	3.90	0.64	0.37		0.17	62.5	0.36
3005.00	SWC	34/8-3A	31	25	4.70	0.62	0.41		0.17	60.0	0.53
3007.50	SWC	34/8-3A	30	24	5.10	0.67	0.38		0.18	61.5	0.56
3008.00	SWC	34/8-3A									
3011.00	SWC	34/8-3A	38	32	4.55	0.36	0.34		0.18	61.0	0.35
3016.00	SWC	34/8-3A	33	26	3.00	0.09	0.41		0.43	56.0	0.04
3018.00	SWC	34/8-3A	40	48	2.10	0.19	0.43		0.38	58.5	0.11
3023.00	SWC	34/8-3A	35	27	4.80	0.08	0.38		0.41	59.5	0.07
3036.25	CC	34/8-3A	50	62	0.40	3.10	0.28	0.19	0.11	63.5	0.58
3051.25	CC	34/8-3A	50	64	0.40	3.10	0.29	0.18	0.10	63.5	0.60
3061.50	CC	34/8-3A	50	63	0.40	3.00	0.28	0.19	0.11	65.0	0.47
3070.25	CC	34/8-3A	52	63	0.45	3.10	0.31	0.19	0.07	62.0	0.69
3089.50	CC	34/8-3A	56	63	0.45	3.80	0.30	0.17	0.10	60.5	0.63
3091.75	CC	34/8-3A	51	65	0.50	3.20	0.29	0.18	0.10	63.0	0.58
3096.75	CC	34/8-3A	54	64	0.55	3.30	0.29	0.18	0.10	62.0	0.57
3097.25	CC	34/8-3A	53	62	0.55	3.40	0.30	0.20	0.10	62.0	0.60
3098.75	CC	34/8-3A	52	64	0.55	3.20	0.29	0.17	0.08	60.0	0.58
3100.25	CC	34/8-3A	55	64	0.50	3.50	0.31	0.21	0.09	60.0	0.68
3103.50	CC	34/8-3A	52	66	0.50	3.50	0.28	0.20	0.09	61.5	0.64
3107.25	CC	34/8-3A	50	62	0.55	3.20	0.29	0.18	0.10	58.5	0.63
3112.25	CC	34/8-3A	56	63	0.50	3.00	0.29	0.17	0.10	59.0	0.62
3117.50	CC	34/8-3A	48	63	1.00	2.00	0.32	0.30	0.10	61.0	0.55
3123.25	CC	34/8-3A	50	63	1.00	2.20	0.33	0.31	0.10	62.5	0.57
3127.50	CC	34/8-3A	52	63	0.95	2.30	0.32	0.30	0.11	63.0	0.52
3131.50	CC	34/8-3A	51	61	0.80	2.00	0.33	0.29	0.11	57.0	0.63
3139.50	CC	34/8-3A	53	62	0.90	2.00	0.32	0.30	0.09	63.0	0.56
3143.50	CC	34/8-3A	50	60	0.90	2.00	0.31	0.31	0.10	61.0	0.48
3148.25	CC	34/8-3A	55	61	0.90	2.30	0.30	0.30	0.10	64.0	0.56

TABLE 2.7 Visual kerogen typing

Table 2.7.1 KEROGEN COMPOSITION, SPORE AND POLLEN COMPOSITION WELL 34/8-3A

Depth (m)	Group/Fm	Amorphous matr.	Woody	Inert-inite	Palyno-morphs	Algal	Herbaceous	Reworked (%)	Particle size	Preserv. (1-3)
2990.00	CROMER KNOLL			70.00	30.00					
3005.00	DRAUPNE	85.00		5.00	10.00					
3007.50	DRAUPNE	75.00		5.00	20.00					
3008.00	DRAUPNE	90.00			10.00					
3011.00	DRAUPNE	70.00		5.00	25.00					
3016.00	HEATHER	5.00		30.00	50.00					
3018.00	HEATHER	10.00		20.00	55.00					
3023.00	HEATHER	5.00		30.00	50.00					

TABLE 2.7

	C/F	Inert	Woody	Lipt	AOM	Remarks
2990.0	5/95	70%		30		Cysts Abd.
				<10P+S, 20Cy>		
3005.0		(5)		10	80 (0)	tr. Tasm.
				<5P+S, 5Cy>		
3007.5		(5)		20	75 (5)	tr. Tasm.
				<10P+S, 10Cy>		
3008.0				10	90 (0)	
				<5P+S, 5Cy>		
3011.0		(5)		25	70 (10)	common Tasm. tr. Botryoc.
				<10P+S, 10Cy, 5Tas>		
3016.0	30/70	30	15	50	(5)	
				<5Cu, 25P+S, 20Cy>		
3018.0	30/70	20	15	55	10	
				<10Cu, 30P+S, 15Cy>		
3023.0	30/70	30	15	50	(5)	
				<5Cu, 35P+S, 10Cy>		

Explanation:
C/F: ratio coarse (>15u) vs. finely disseminated
(5) traces of kerogen component
< > composition of liptinite components
AOM 80, (5) kerogen components not embedded in AOM matrix

TABLE 4.1 Stable carbon isotope values

34/8 – oils

STABLE CARBON ISOTOPE VALUES
34/8-OILS

WELL	SAMPLE TYPE	Isotope 13C OIL	Isotope 13C SAT	Isotope 13C ARO	Isotope 13C NSO	Isotope 13C ASPH	Isotope 13C DEASPH.OIL
34/8-1	DST 2	-29.12	-29.50	-28.65	-28.24	-28.74	-29.1
34/8-3	DST 1	-28.85	-29.17	-28.38	-28.16	-28.21	-28.6

Tables 4.2 and 4.3 Molecular and Stable Isotope Composition of the 34/8 gases

Table 4.2 Molecular composition of natural gases, 34/8-1 and 34/8-3

Sample	C_1	C_2	C_3	iC_4	nC_4	C_{2+}	$\frac{iC_4}{nC_4}$	$\frac{C_1}{C_{2+}}$	C_1-C_4	Wetness	CO_2
34/8-1,#2	88.4	5.8	2.9	0.45	0.95	10.1	0.47	8.75	98.6	0.10	1.4
34/8-1,#3	89.4	5.3	2.7	0.40	0.95	9.4	0.42	9.56	98.7	0.09	1.3
34/8-3,#1	85.7	7.9	2.7	0.41	0.89	11.9	0.46	7.20	98.0	0.12	2.0
34/8-3,#2	89.0	5.5	2.5	0.41	0.93	9.3	0.44	9.52	98.8	0.10	1.2
34/8-3,#3	87.1	6.8	2.4	0.38	0.89	10.5	0.43	8.32	98.0	0.11	2.0

Table 4.3 Stable isotope composition of natural gases, 34/8-1 and 34/8-3

Sample	Methane	Ethane	Propane	Butane		D	CO_2	
				iC_4	nC_4		13_C	18_O
34/8-1,#2	-39.2	-30.5	-29.0	-29.1	-29.2	-170	-14.0	-12.7
34/8-1,#3	-41.5	-30.7	-29.4	-29.1	-29.2	-160	-14.8	-13.9
34/8-3,#1	-39.4	-30.3	-28.0	-22.9	-25.6	-158	-9.4	-9.8
34/8-1,#2	-39.5	-30.1	-28.0	-25.9	-25.8	-169	-14.9	-10.8
34/8-3,#3	-39.5	-30.2	-28.3	-24.6	-26.2	-167	-8.2	-12.0

APPENDIX I Chromatograms of saturated fractions

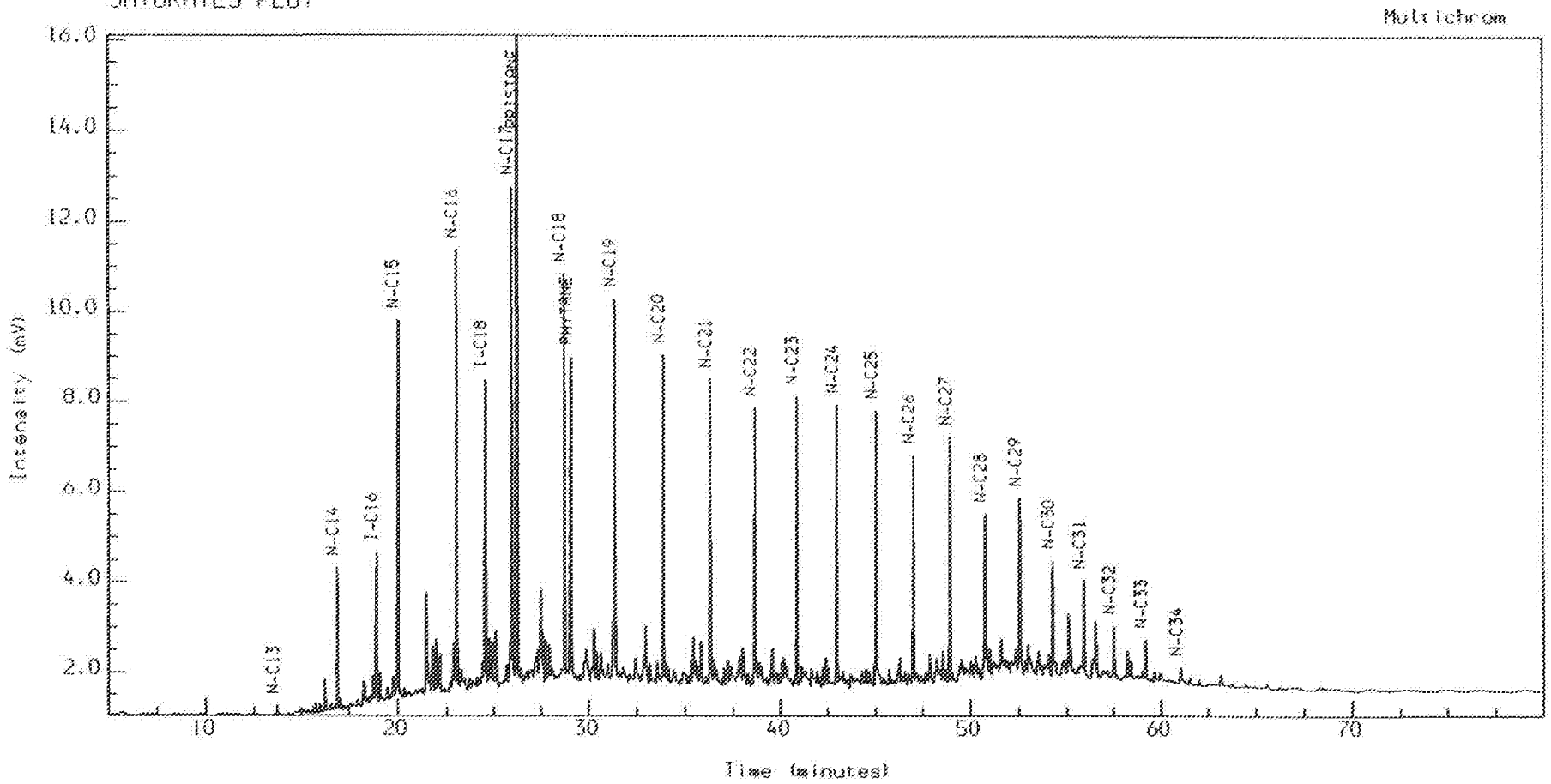
Sediments Wells 34/8–3 and 3A

NOR.. HYDRO F-BERGEN, PETROLEUM GE..CHEMISTRY

Analysis Name : [PETRO] 7 A340803S.5.1.

34/8-3 SWC 2835 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 18-AUG-1989 at 19:19

Reported on 21-AUG-1989 at 10:57

Method : MSDS

Calibration : MSDS

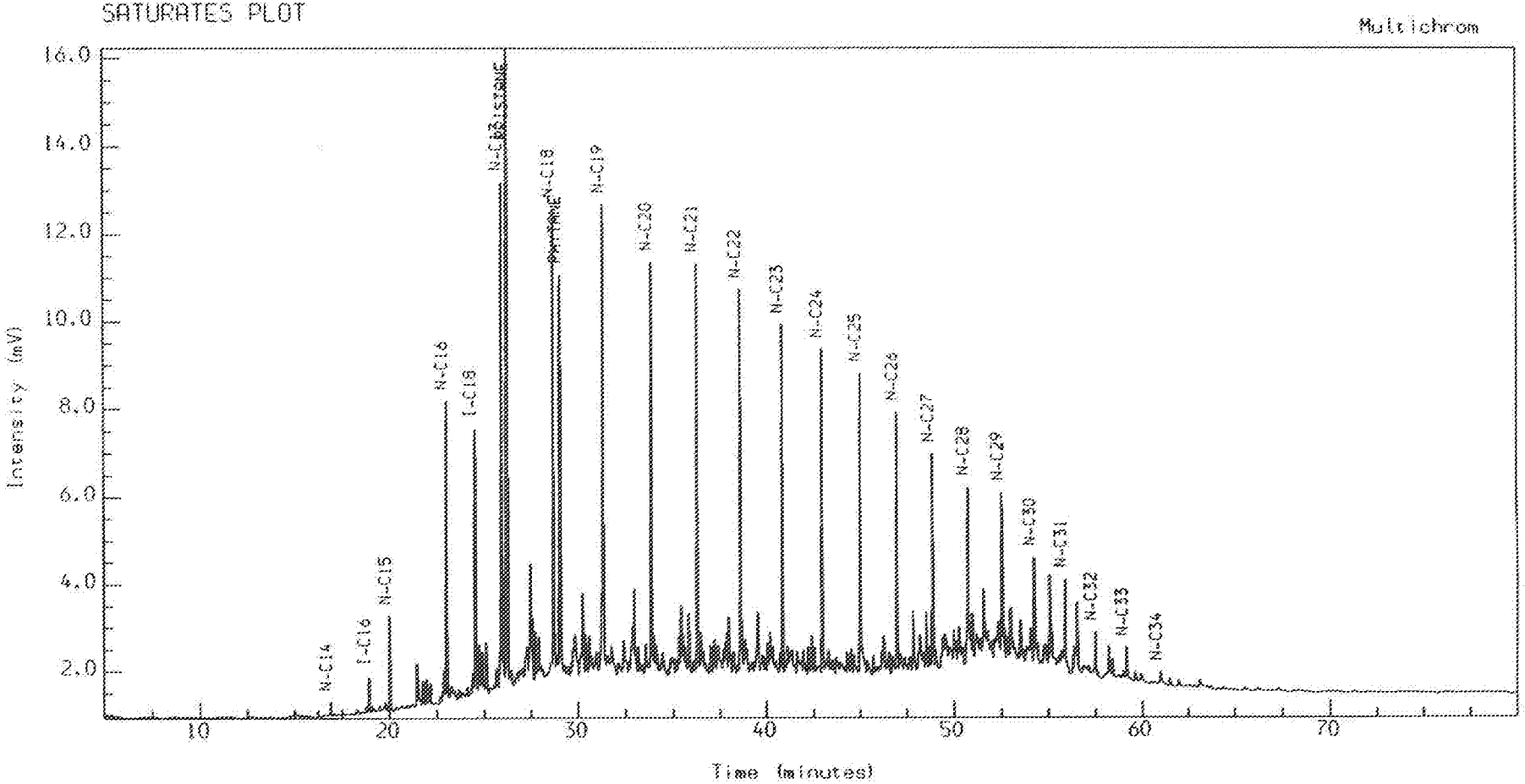
Run Sequence : MSDS

NOR.. HYDRO F-BERGEN. PETROLEUM GE..CHEMISTRY

Analysis Name : [PETRO1 7 A340803S.6.1.

34/8-3A SWC 3005 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 18-AUG-1989 at 20:51

Reported on 21-AUG-1989 at 11:01

Method : MSDS

Calibration : MSDS

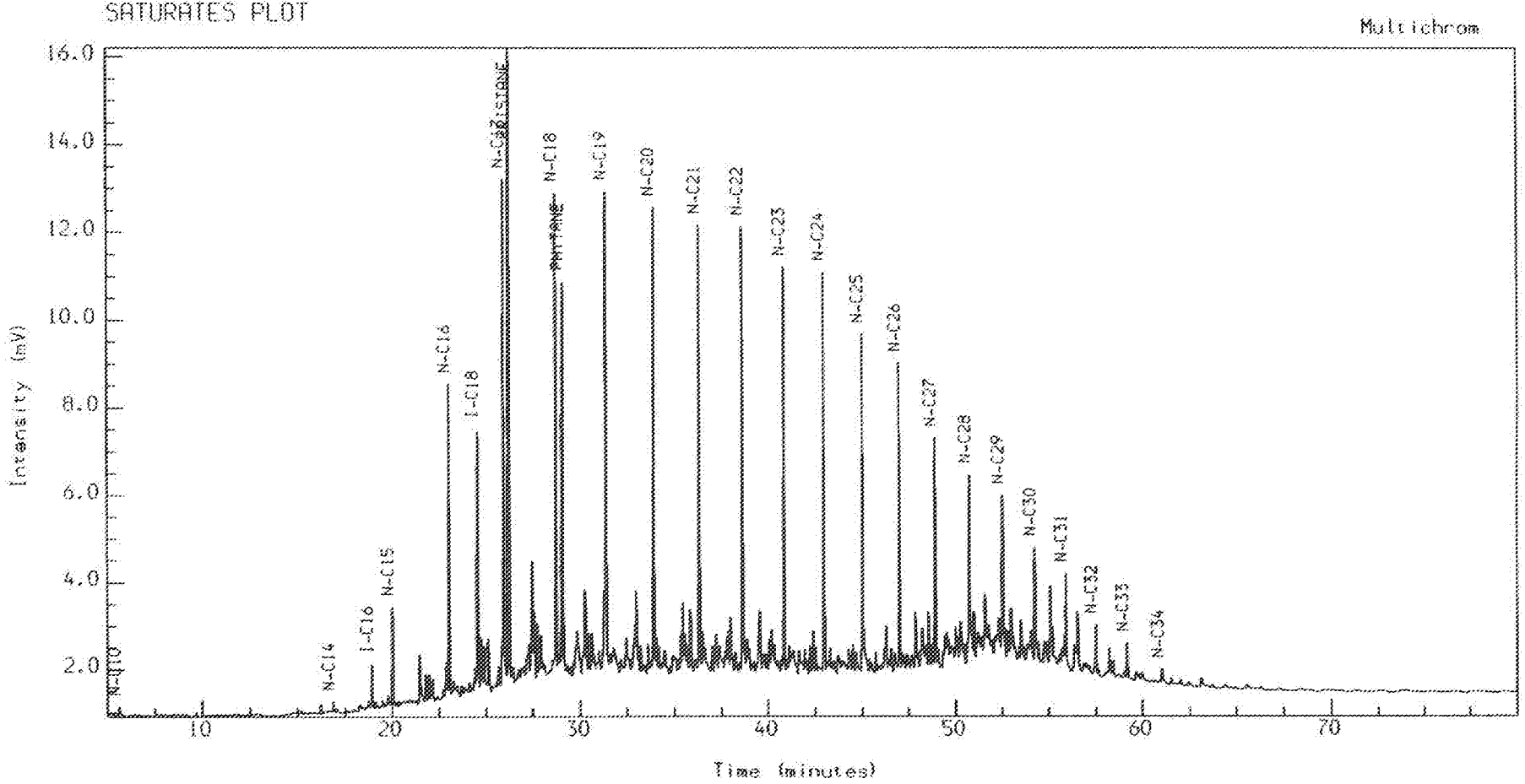
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 A3408035.7.1.

34/8-3A SWC 3007.5 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 18-AUG-1989 at 22:22

Reported on 21-AUG-1989 at 11:04

Method : MSDS

Calibration : MSDS

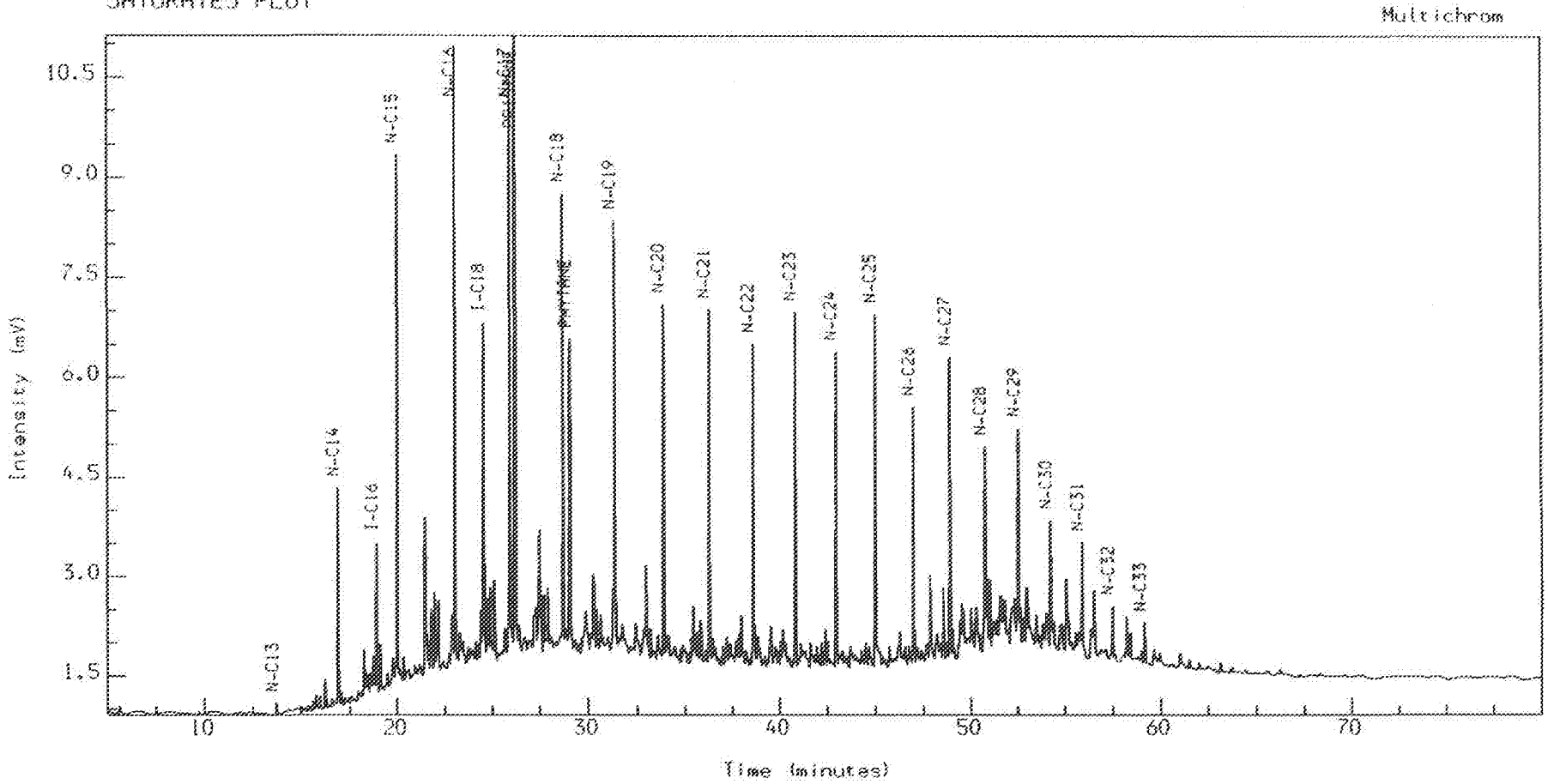
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 A340803S.8.1.

34/8-3A SWC 3011 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 18-AUG-1989 at 23:53

Reported on 21-AUG-1989 at 11:07

Method : MSDS

Calibration : MSDS

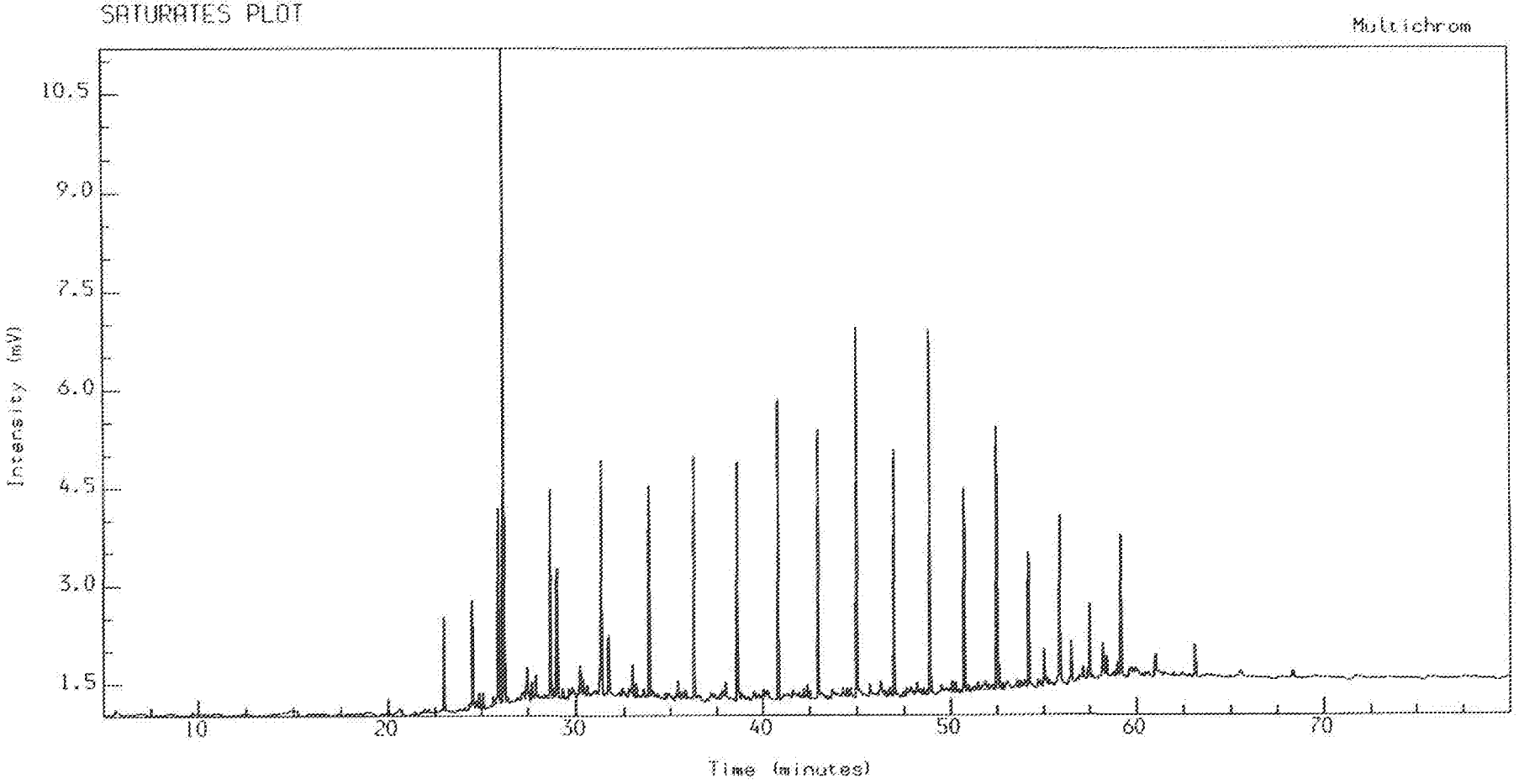
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 A340803S.9.1.

34/8-3A SWC 3016 M SAT Amount : 1.000

SATURATES PLOT



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Channel Title : MSD

Lims ID :

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Reported on 24-AUG-1989 at 17:53

Method : MSDS

Calibration : MSDS

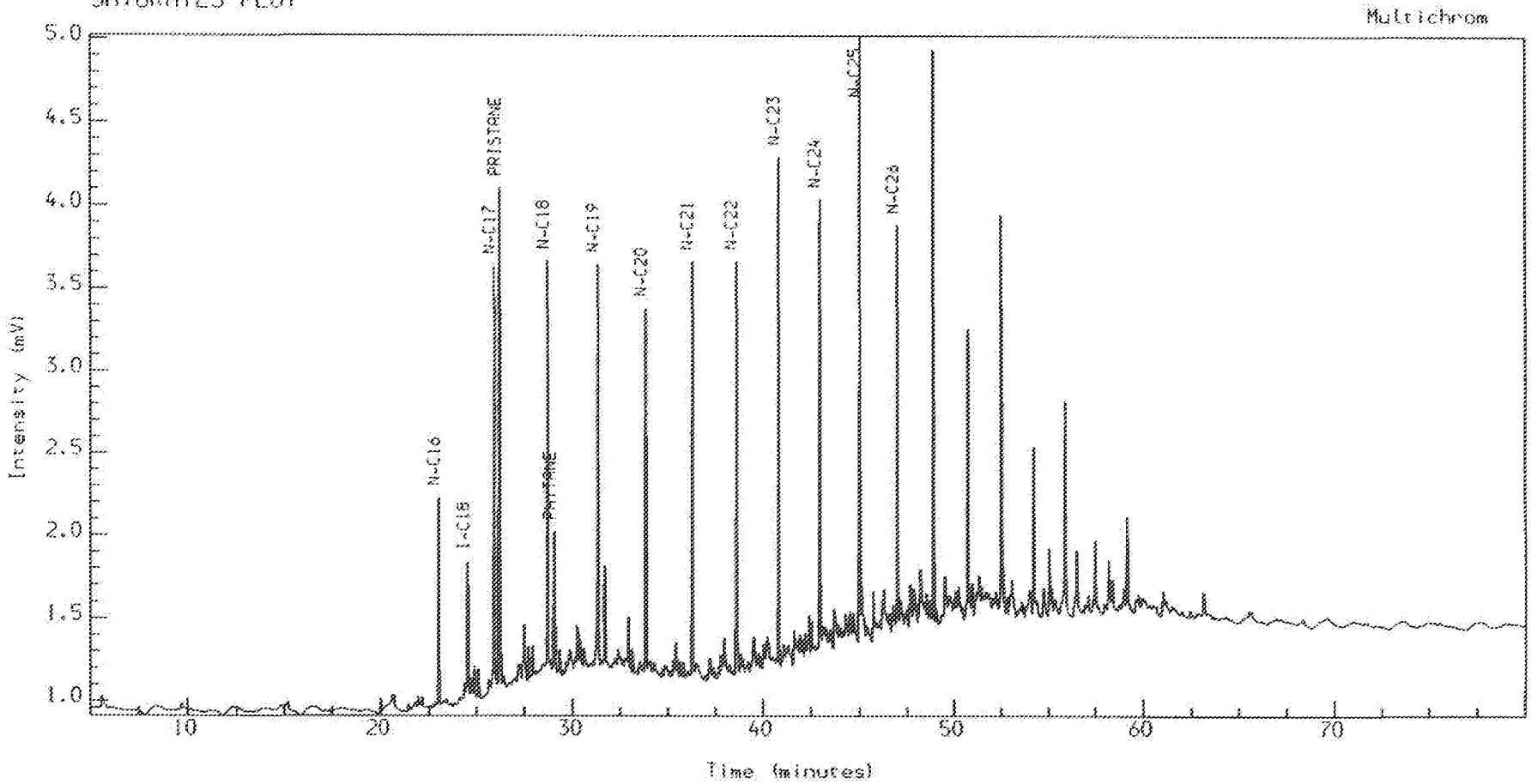
Run Sequence : MSDS

NOR.. HYDRO F-BERGEN, PETROLEUM GE..CHEMISTRY

Analysis Name : [PETRO] 7 A340803S.10.1.

34/8-3A SWC 3018 M SAT Amount : 1.000

SATURATES PLOT



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Channel Title : MSD

Lims ID :

Acquired on 19-AUG-1989 at 02:56

Reported on 21-AUG-1989 at 11:12

Method : MSDS

Calibration : MSDS

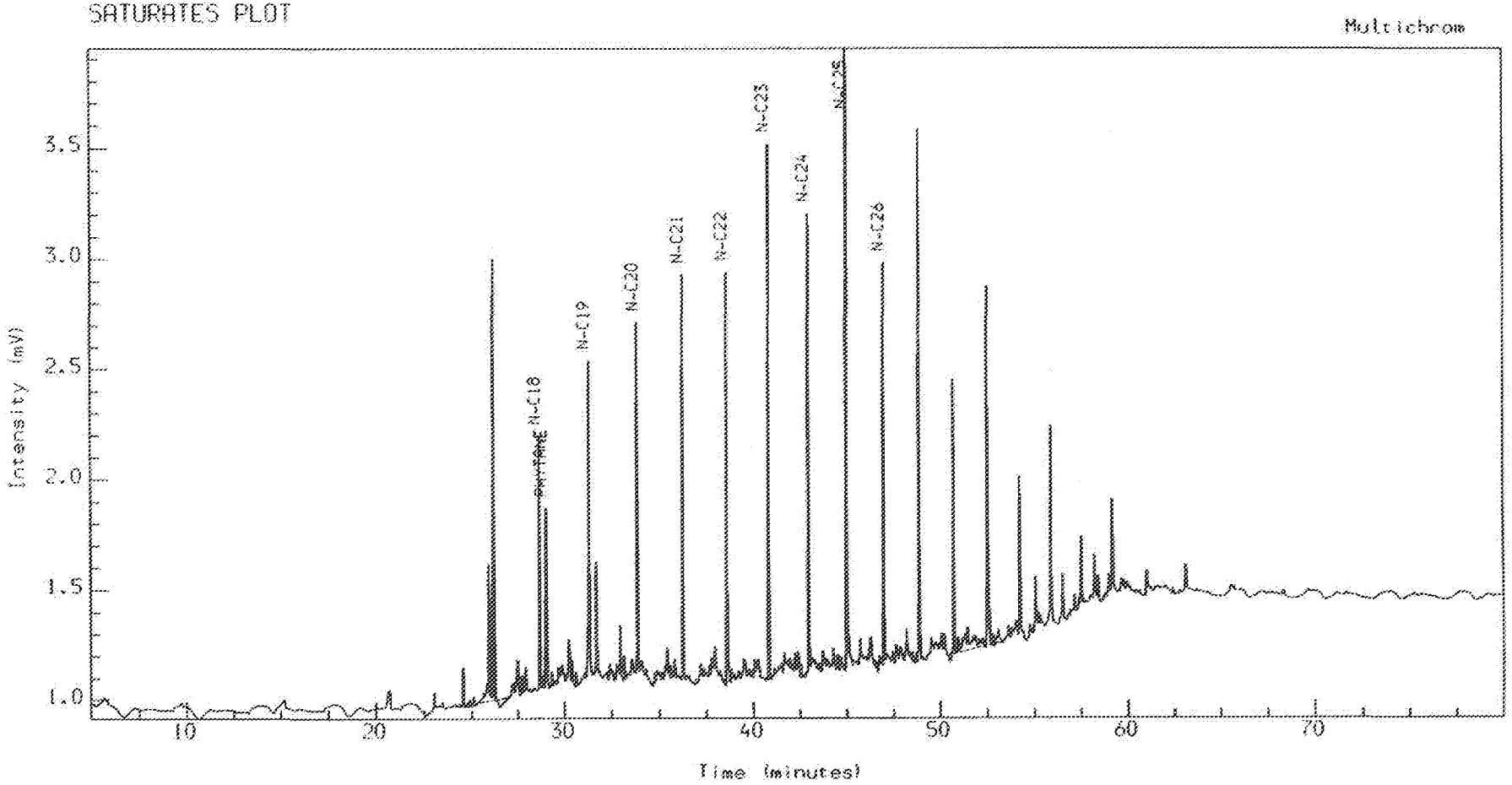
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 A3408035.11.1.

34/8-3A SWC 3023 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 19-AUG-1989 at 04:28

Reported on 24-AUG-1989 at 17:35

Method : MSDS

Calibration : MSDS

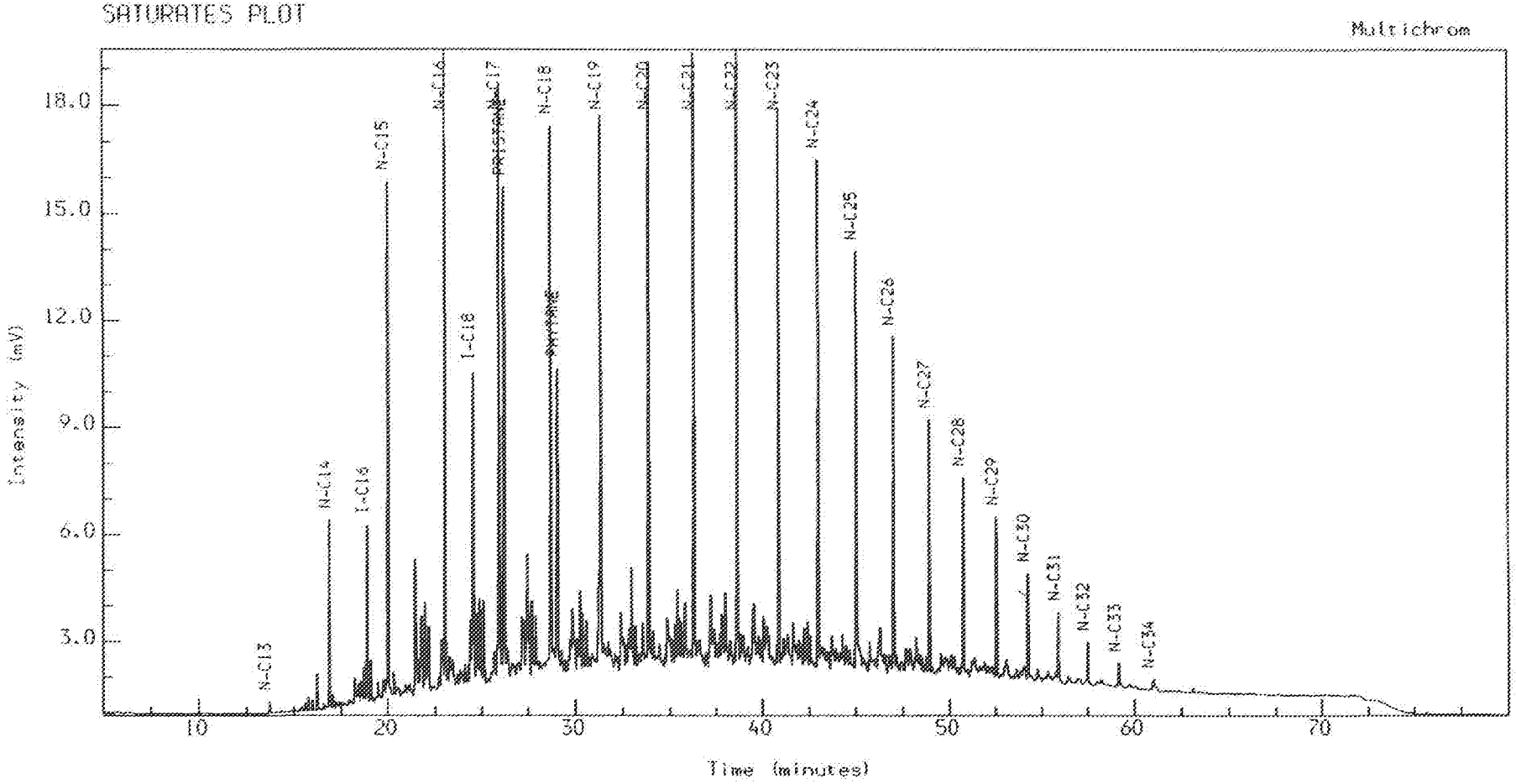
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 A340803S.12.1.

34/8-3A CC 3036.25 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 19-AUG-1989 at 06:00

Reported on 24-AUG-1989 at 17:37

Method : MSDS

Calibration : MSDS

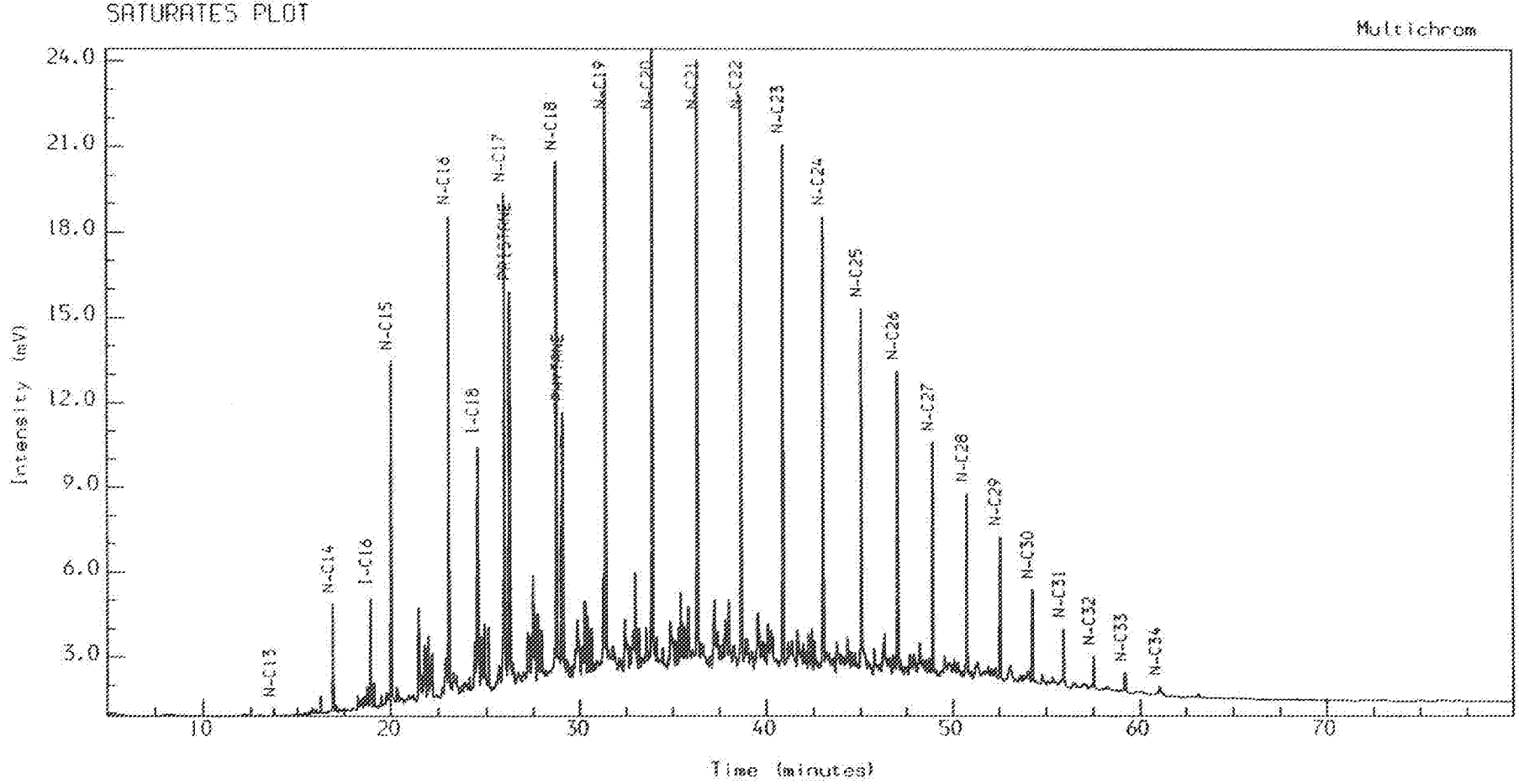
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 8340803S.3.1.

34/8-3A CC 3051.25 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 22-AUG-1989 at 19:44

Reported on 24-AUG-1989 at 15:22

Method : MSDS

Calibration : MSDS

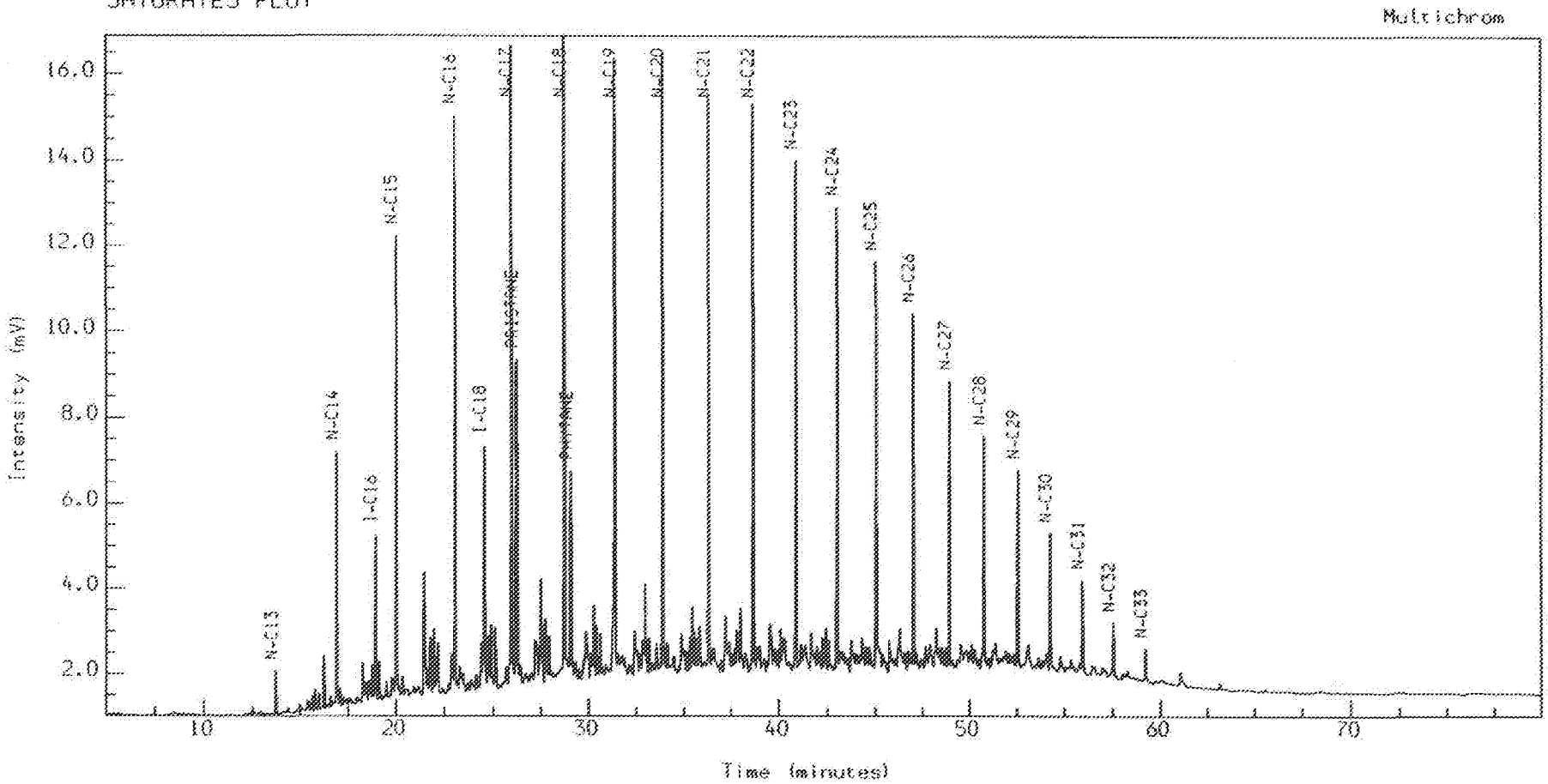
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 B340803S.4.1.

34/8-3A CC 3061.50 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 22-AUG-1989 at 21:15

Reported on 24-AUG-1989 at 15:25

Method : MSDS

Calibration : MSDS

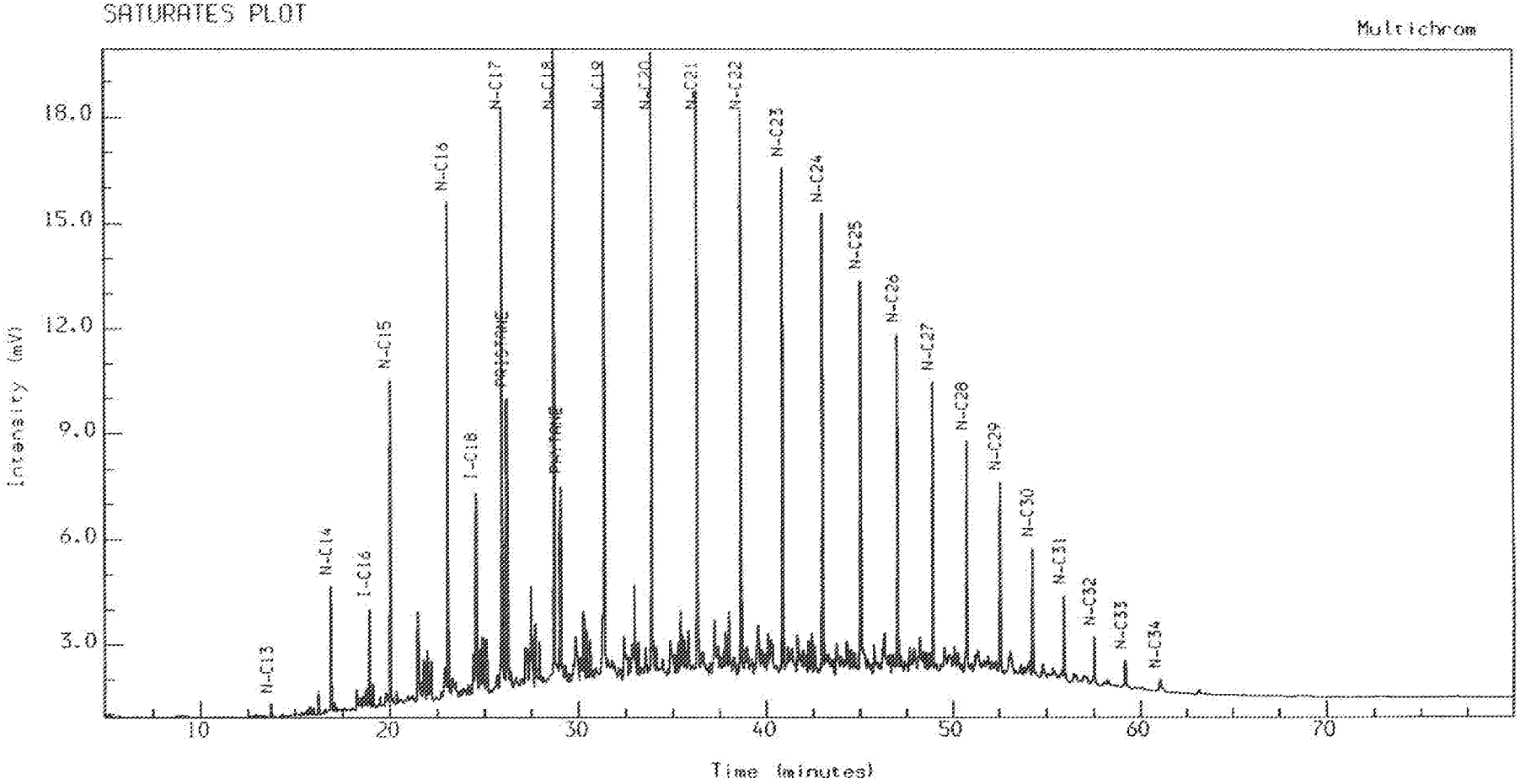
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 B3408035.5.1.

34/8-3A CC 3070.25 M SAT Amount : 1.000

SATURATES PLOT



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Channel Title : MSD

Lims ID :

Acquired on 22-AUG-1989 at 22:47

Reported on 24-AUG-1989 at 15:28

Method : MSDS

Calibration : MSDS

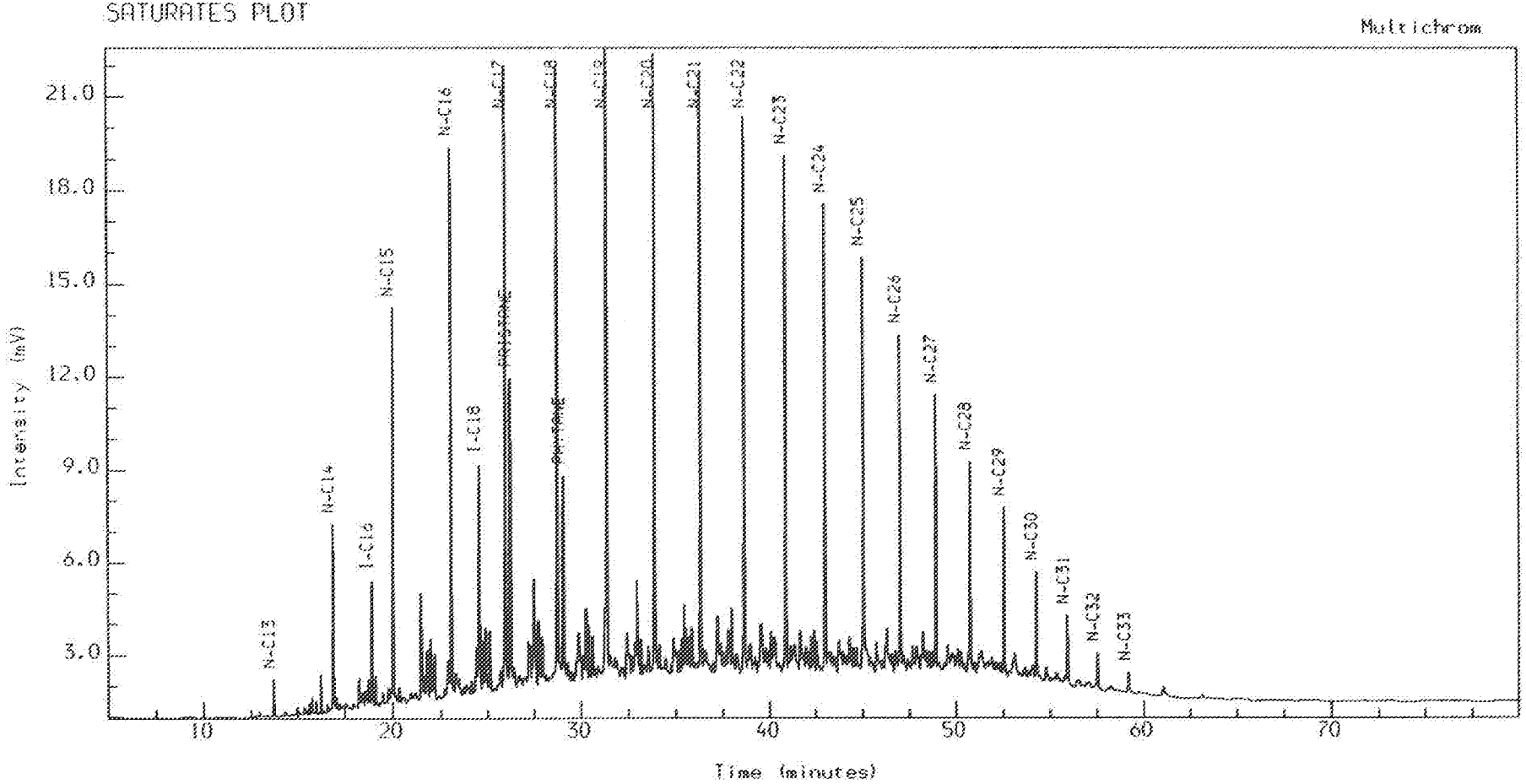
Run Sequence : MSDS

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]CHEMISTRY

Analysis Name : [PETRO] 7 B340803S.6.1.

34/8-3A CC 3089.50 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 23-AUG-1989 at 00:19

Reported on 24-AUG-1989 at 15:31

Method : MSDS

Calibration : MSDS

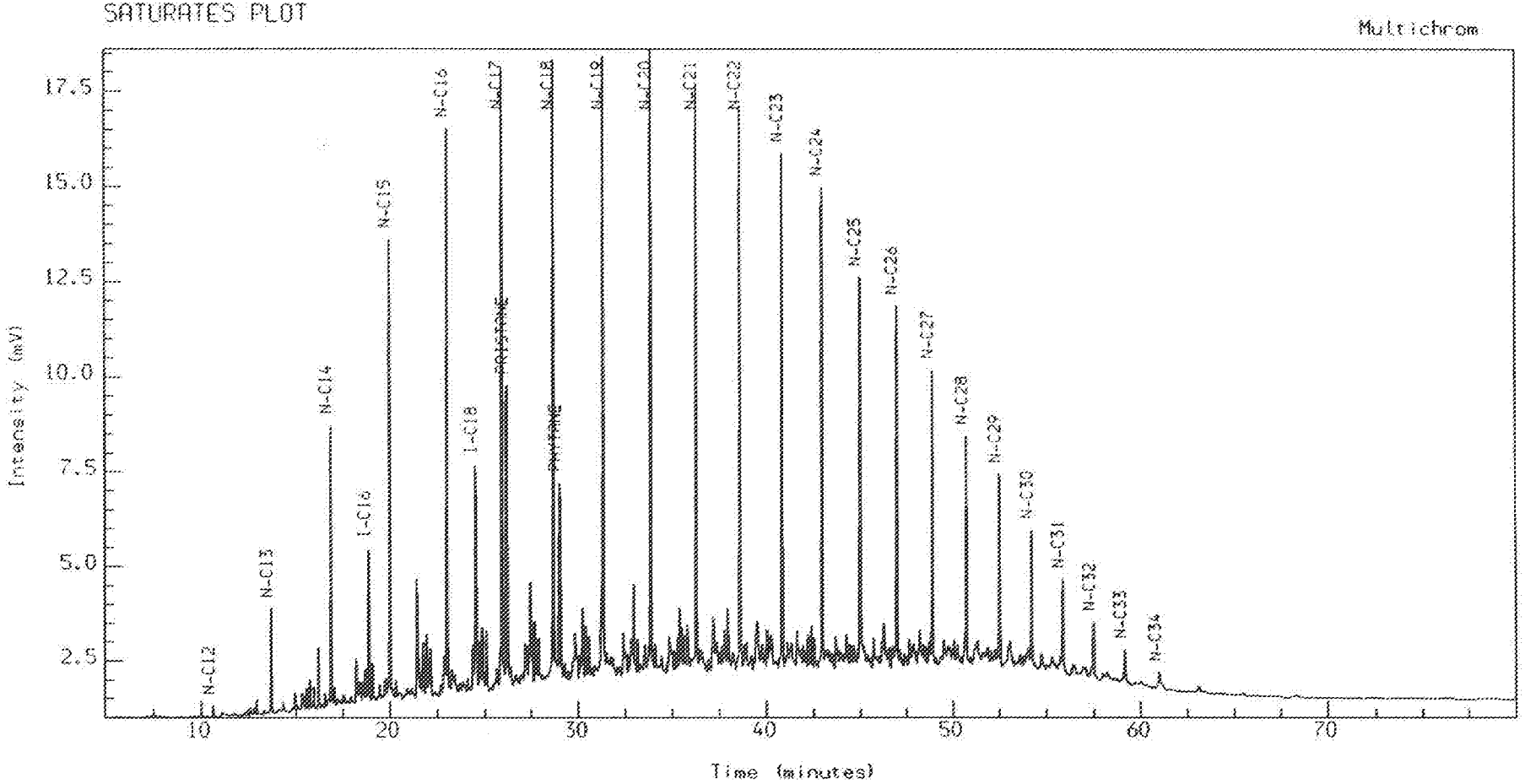
Run Sequence : MSDS

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]HEMISTRY

Analysis Name : [PETRO] 7 C3408035.7.1.

34/8-3A CC 3091.75 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 15:24

Reported on 27-AUG-1989 at 19:03

Method : MSDS

Calibration : MSDS

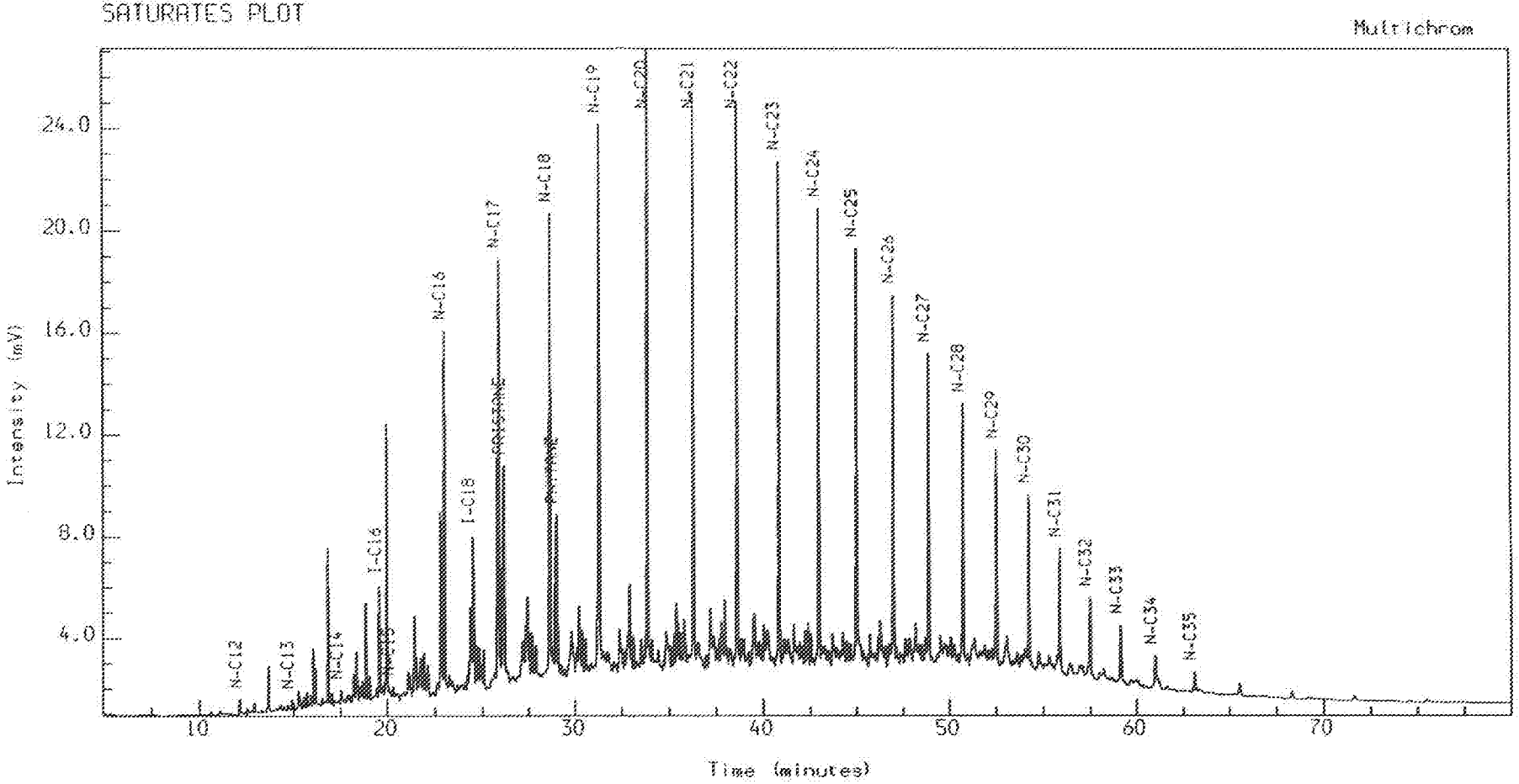
Run Sequence : MSDS

NORSK HYDRO E-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 C340803S.8.1.

34/8-3A CC 3096.75 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 17:31

Reported on 27-AUG-1989 at 19:06

Method : MSDS

Calibration : MSDS

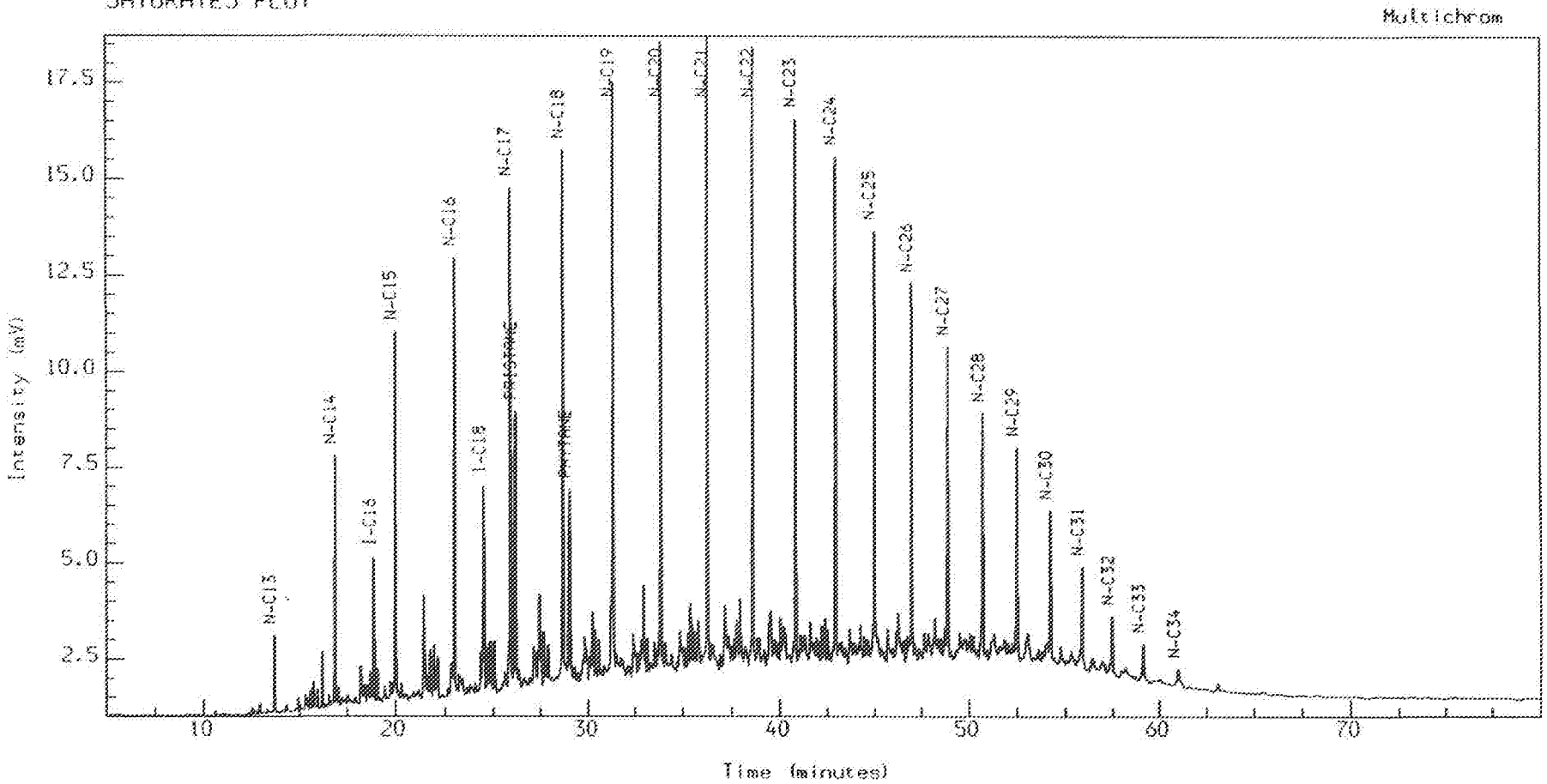
Run Sequence : MSDS

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]HEMISTRY

Analysis Name : [PETRO] 7 C340803S.9.1.

34/8-3A CC 3097.25 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 19:02

Reported on 27-AUG-1989 at 19:10

Method : MSDS

Calibration : MSDS

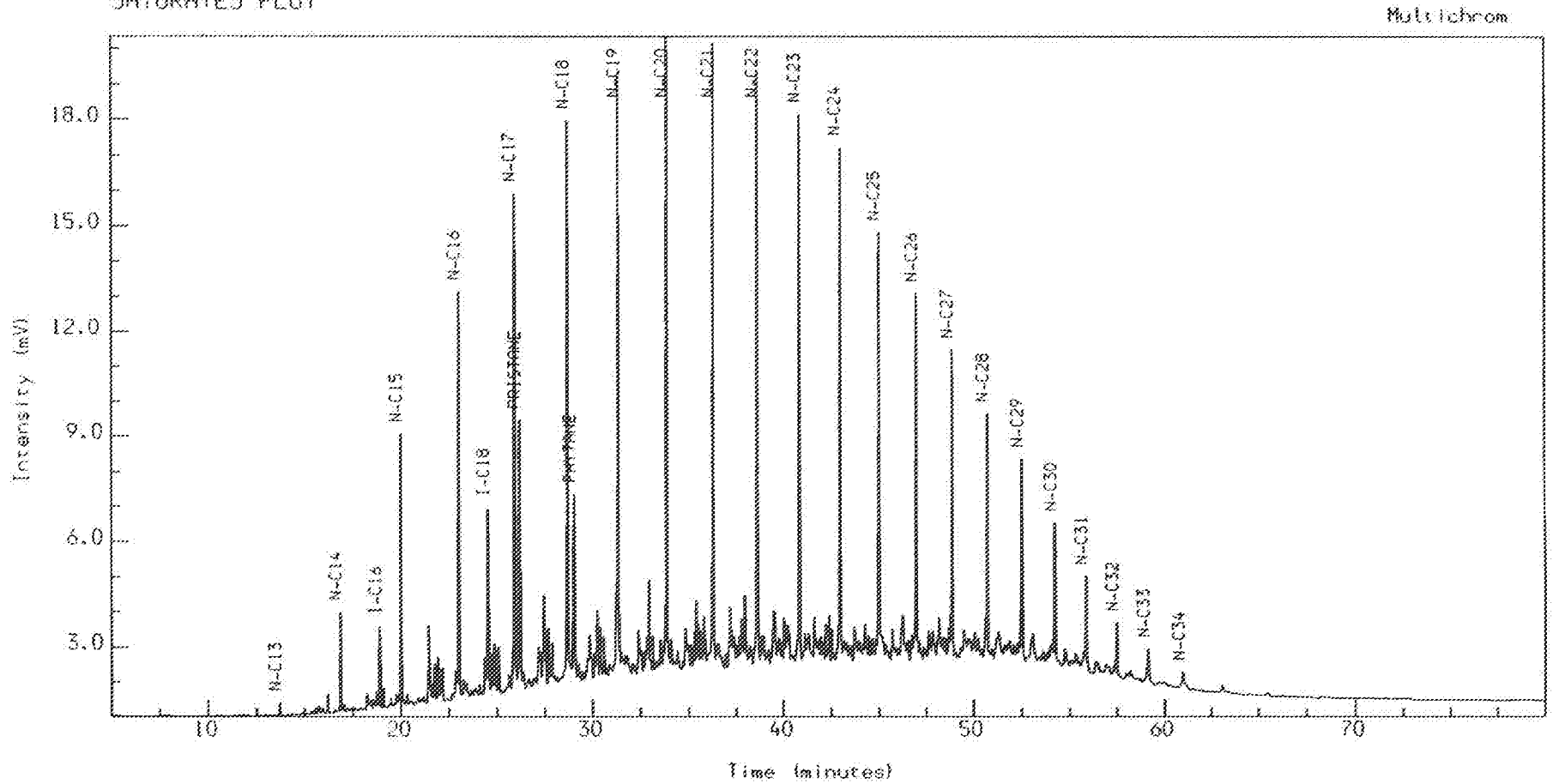
Run Sequence : MSDS

NOR... HYDRO F-BERGEN, PETROLEUM GE...HEMISTRY

Analysis Name : [PETRO] 7 C340803S.10.1.

34/8-3A CC 3098.75 M SAT Amount : 1.000

SATURATES PLOT



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Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 20:34

Reported on 27-AUG-1989 at 19:13

Method : MSDS

Calibration : MSDS

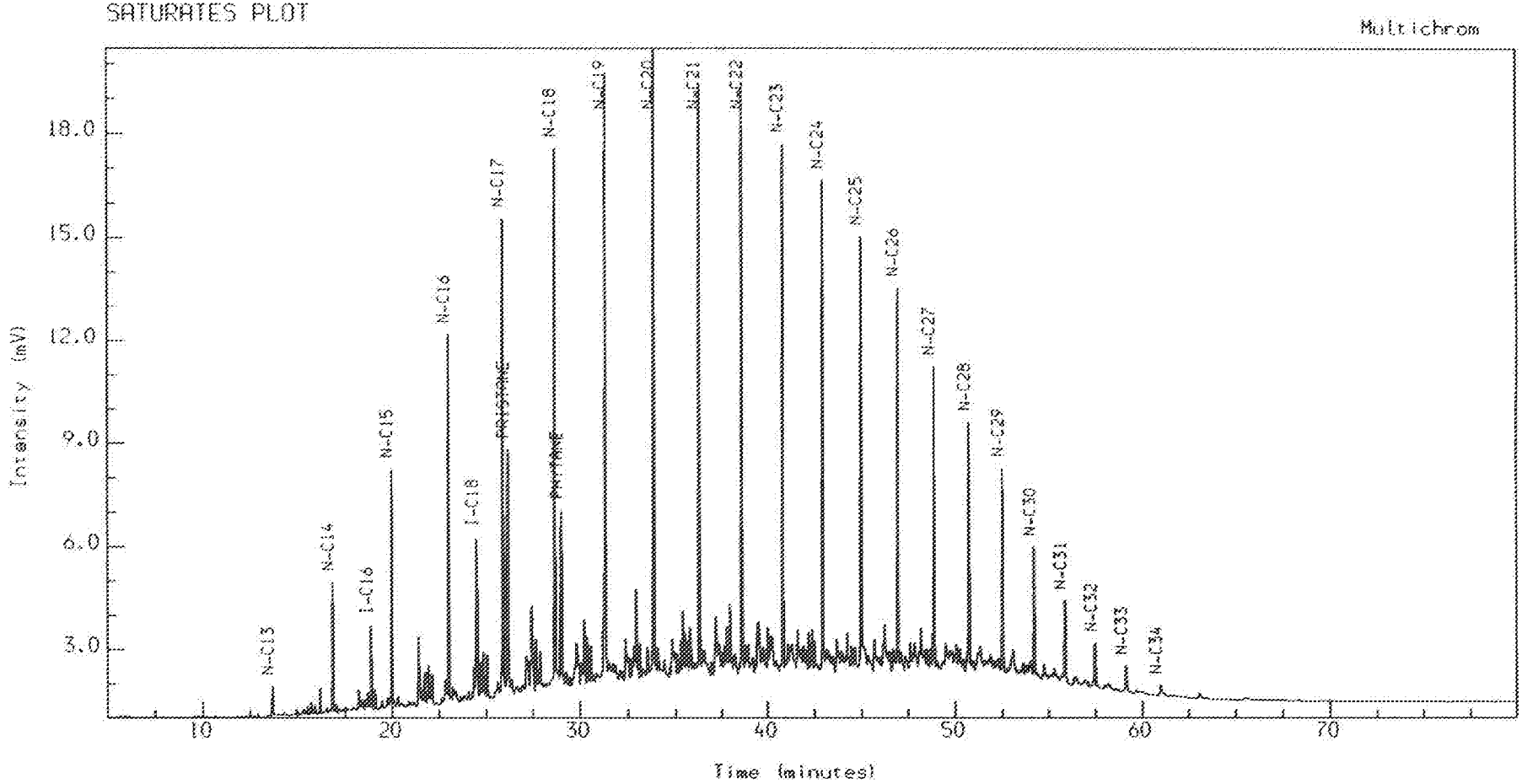
Run Sequence : MSDS

NORSK HYDRO E-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 C340803S.11.1.

34/8-3A CC 3100.25 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 22:06

Reported on 27-AUG-1989 at 19:16

Method : MSDS

Calibration : MSDS

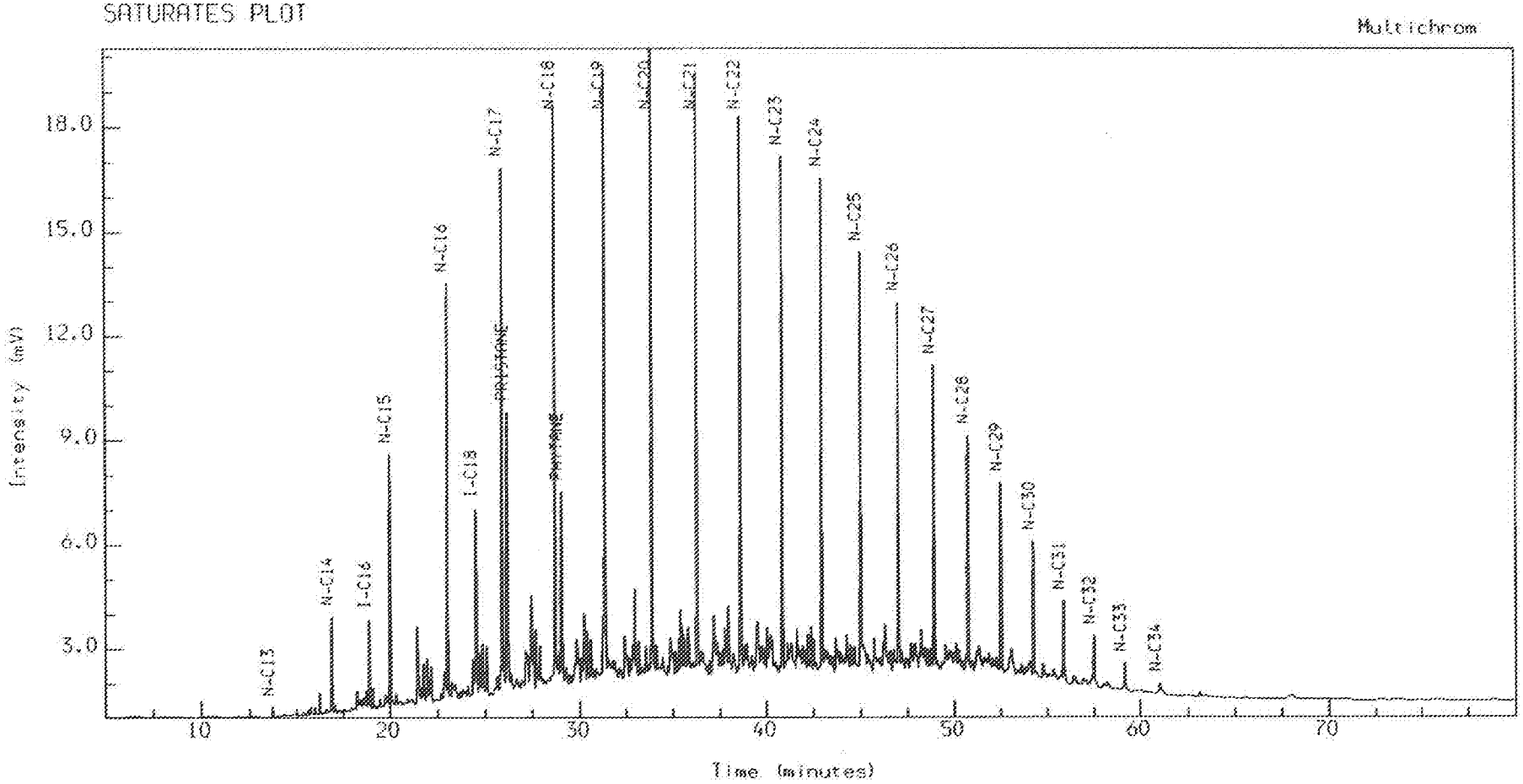
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 CS40803S,4,1.

34/8-3A CC 3103.50 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 10:49

Reported on 27-AUG-1989 at 18:52

Method : MSDS

Calibration : MSDS

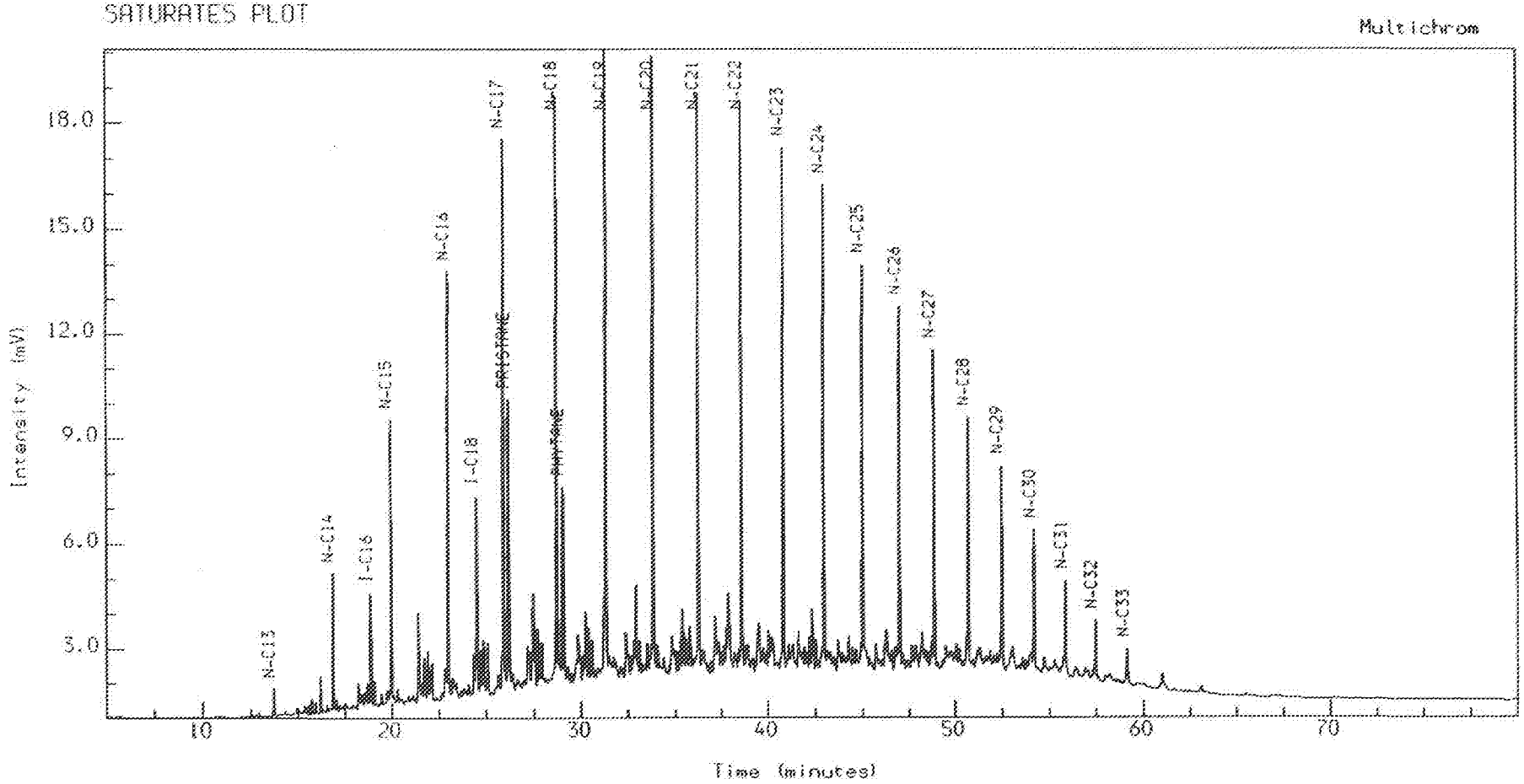
Run Sequence : MSDS

NORSK HYDRO E-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 C340803S.5.1.

34/8-3A CC 3107.25 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 12:21

Reported on 27-AUG-1989 at 18:56

Method : MSDS

Calibration : MSDS

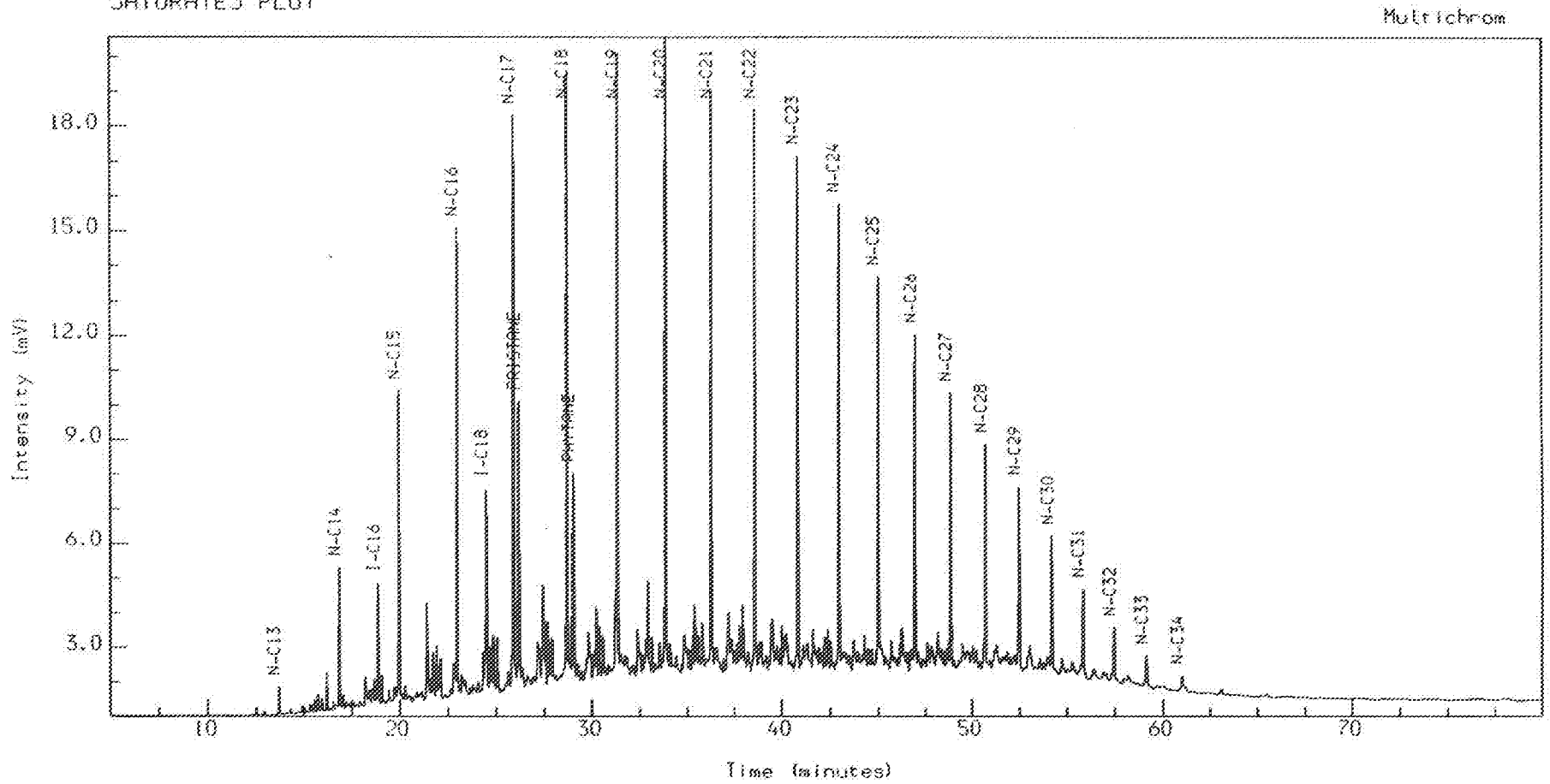
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 C3408038.6.1.

34/8-3A CC 3112.25 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 13:53

Reported on 27-AUG-1989 at 18:59

Method : MSDS

Calibration : MSDS

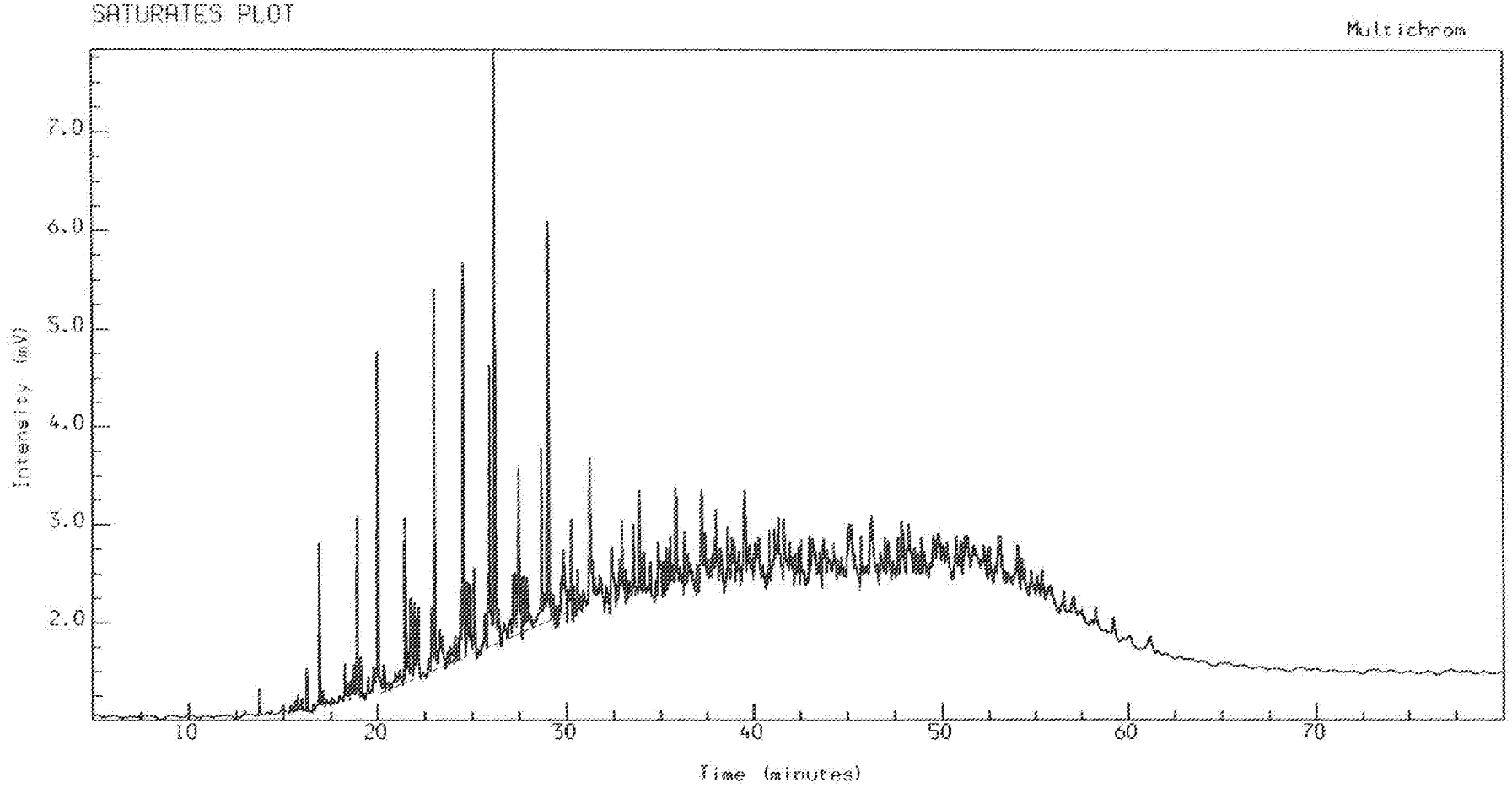
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 B340803S.7.1.

34/8-3A CC 3117.50 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 23-AUG-1989 at 14:04

Reported on 24-AUG-1989 at 18:02

Method : MSDS

Calibration : MSDS

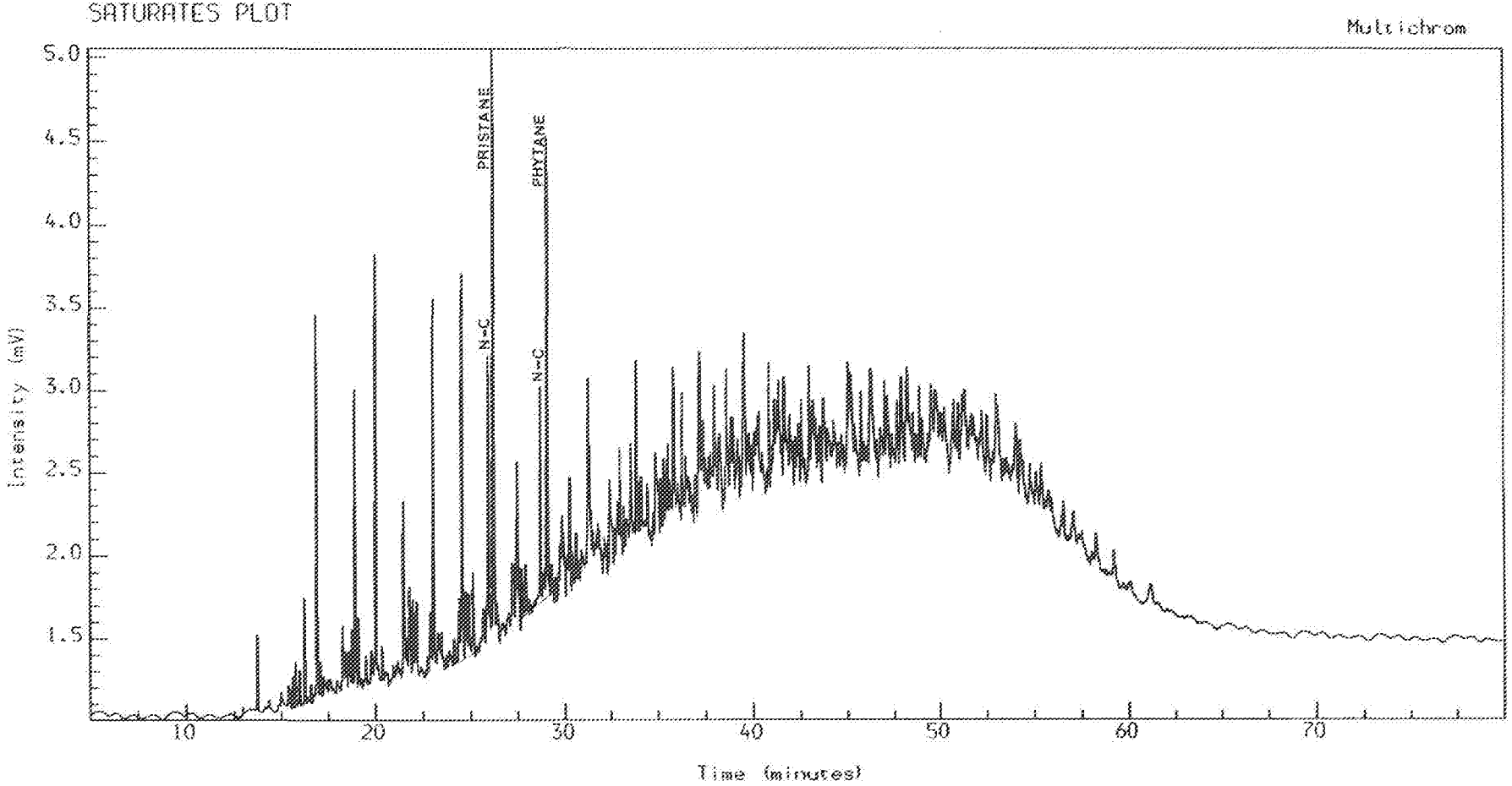
Run Sequence : MSDS

NORS.. HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 B340803S.8.1.

34/8-3A 3123.25 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 23-AUG-1989 at 15:36

Reported on 24-AUG-1989 at 18:05

Method : MSDS

Calibration : MSDS

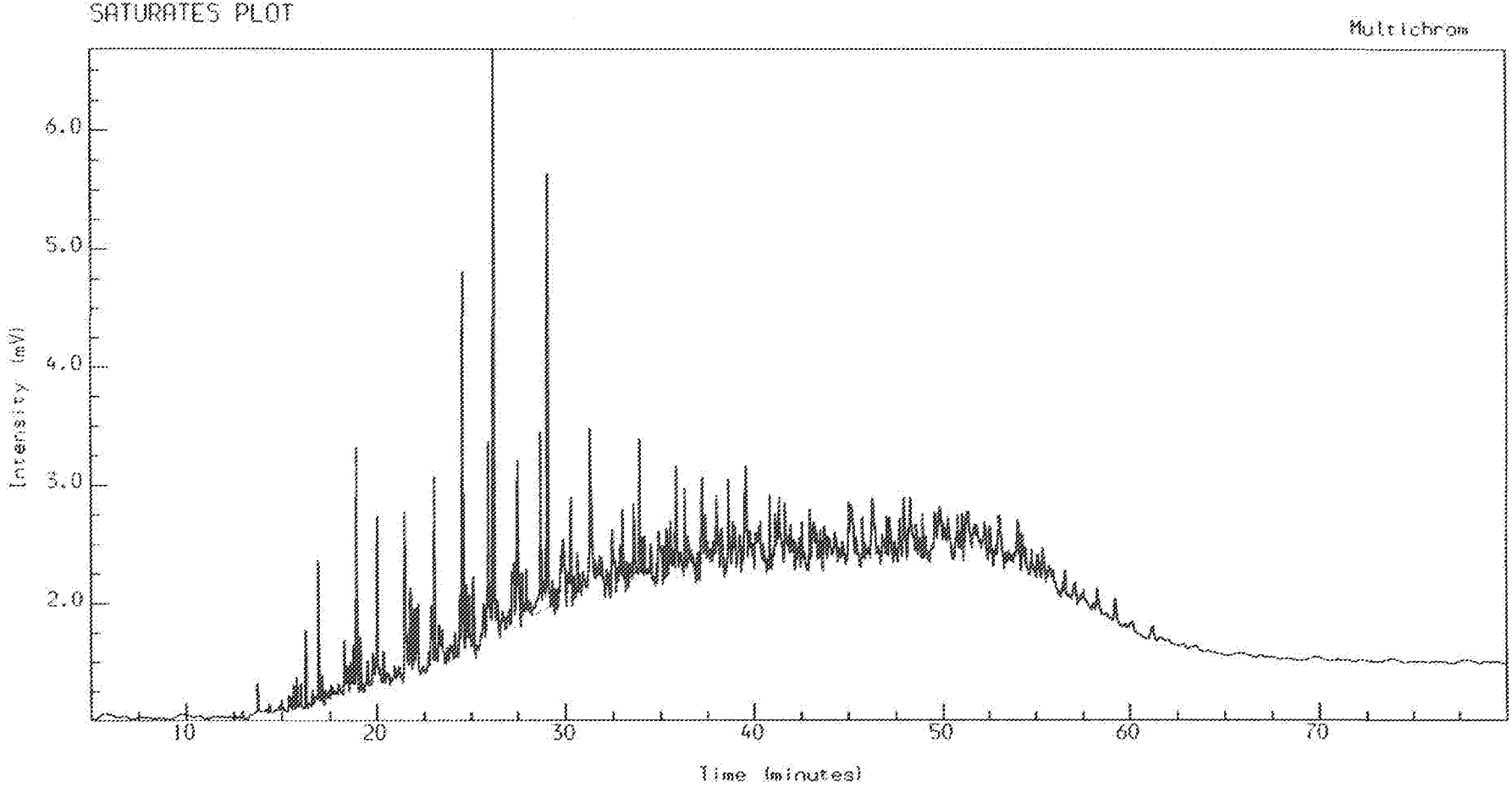
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 B3408055.9.1.

34/8-3A CC 3127.50 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 23-AUG-1989 at 17:08

Reported on 24-AUG-1989 at 18:07

Method : MSDS

Calibration : MSDS

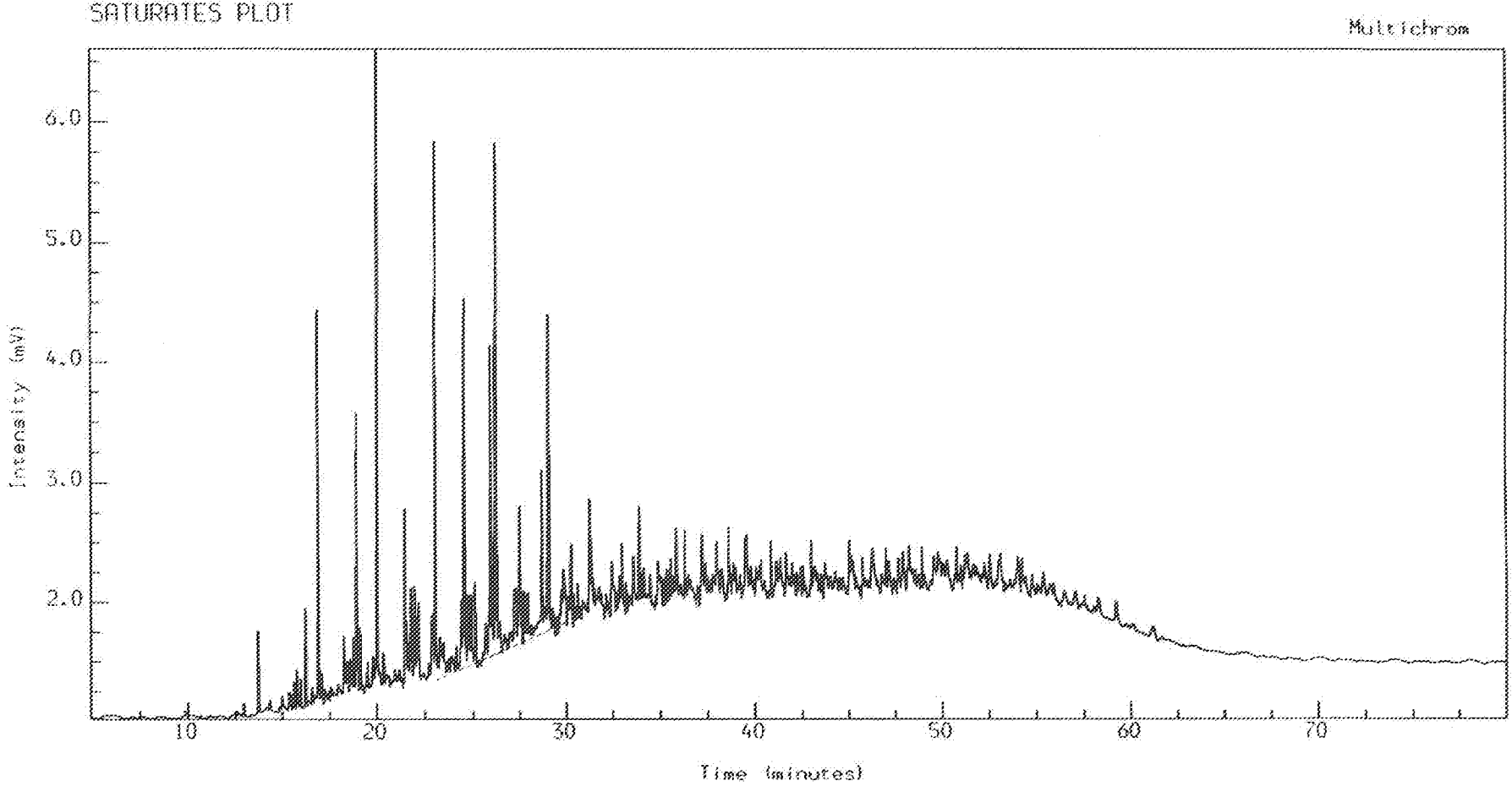
Run Sequence : MSDS

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]CHEMISTRY

Analysis Name : [PETRO] 7 B340803S.10.1.

34/8-3A CC 3131.50 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 18:39

Reported on 24-AUG-1989 at 18:10

Method : MSDS

Calibration : MSDS

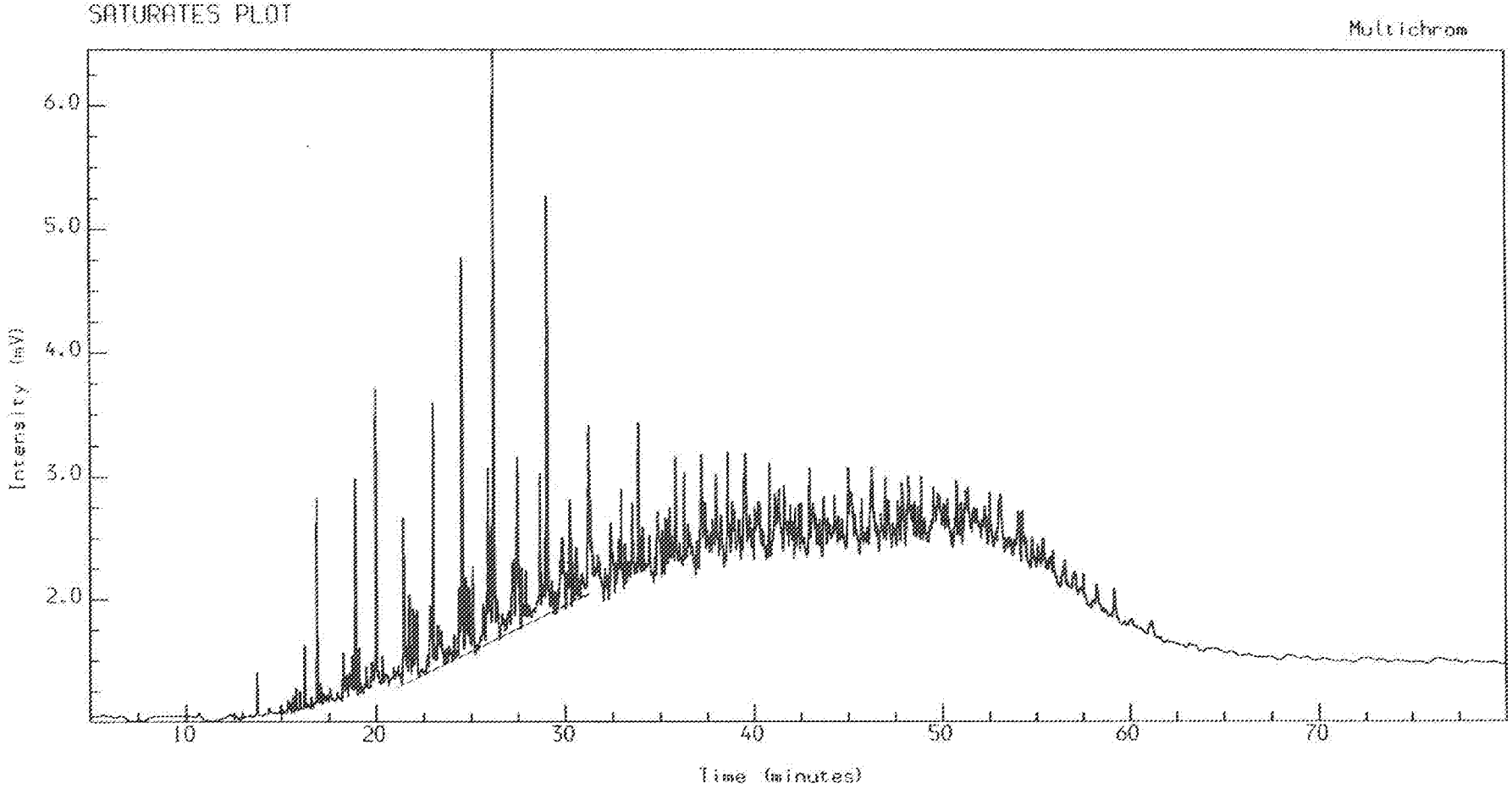
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 B340803S.11.1.

34/8-3A CC 3139.50 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 23-AUG-1989 at 20:11

Reported on 24-AUG-1989 at 18:12

Method : MSDS

Calibration : MSDS

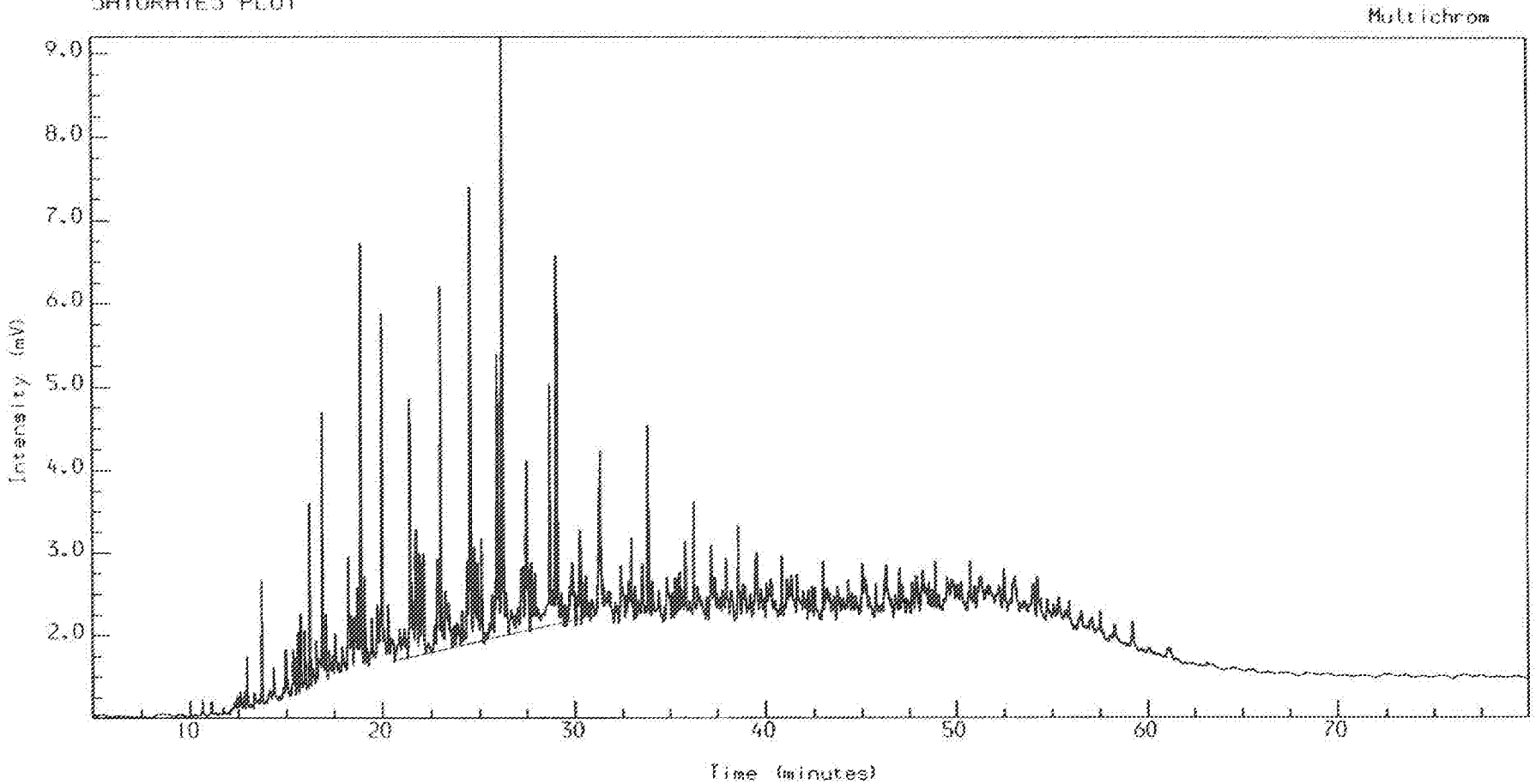
Run Sequence : MSDS

NOR.. HYDRO F-BERGEN, PETROLEUM GE..HEMISTRY

Analysis Name : [PETRO] 7 B340803S.12.1.

34/8-3A CC 3143.50 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 25-AUG-1989 at 21:43

Reported on 24-AUG-1989 at 18:15

Method : MSDS

Calibration : MSDS

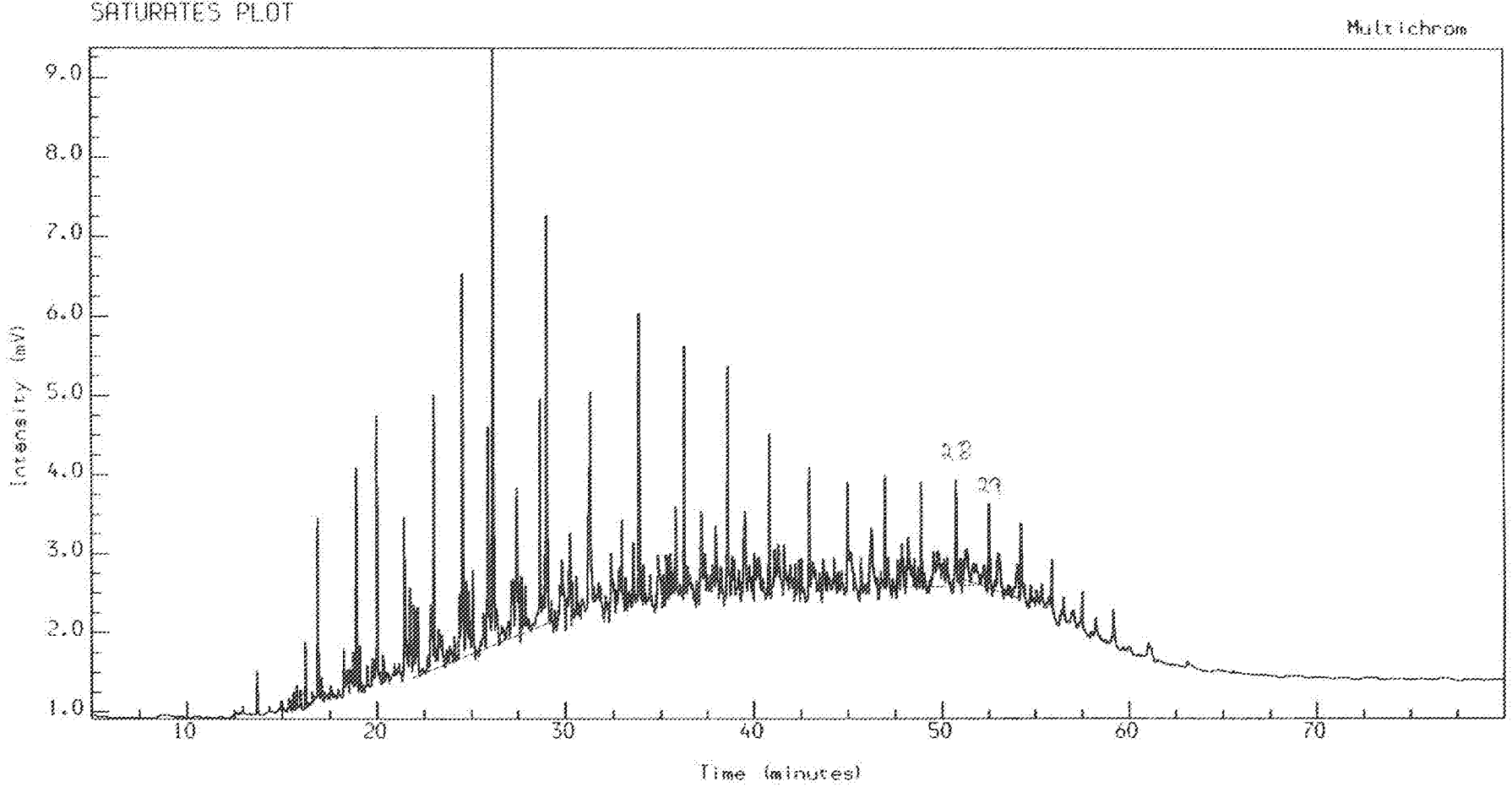
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 B3408035.13.1.

34/8-3A CC 3148.25 M SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 23-AUG-1989 at 23:14

Reported on 24-AUG-1989 at 18:18

Method : MSDS

Calibration : MSDS

Run Sequence : MSDS

APPENDIX II Chromatograms of aromatic fractions

Sediments, Wells 34/8-3 and 3A

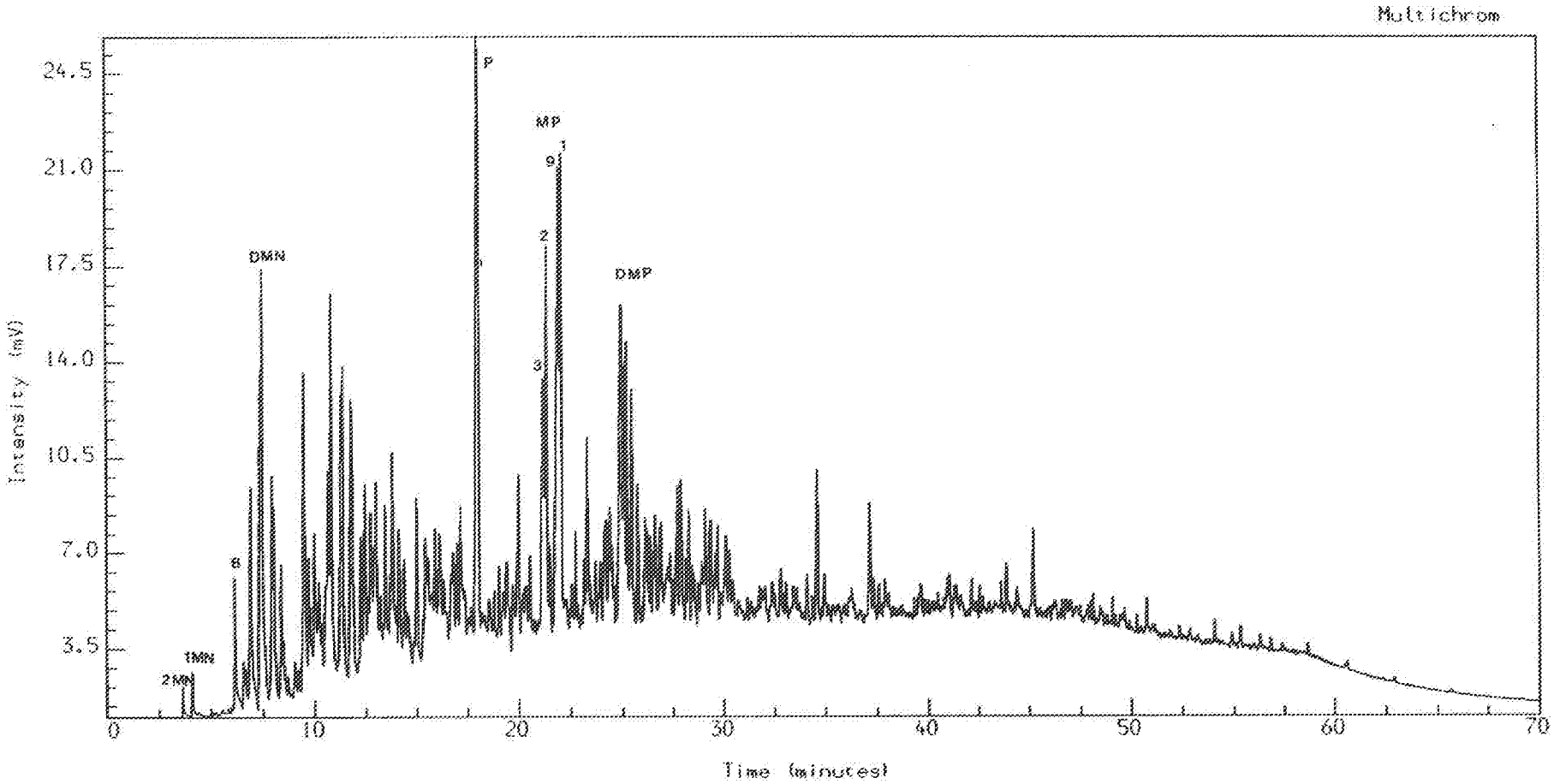
IDENTIFICATION OF AROMATIC HYDROCARBONS

N	Naphtalene
MN	MethylNaphtalenes
B	Biphenyl
DMN	DiMethylNaphtalenes
P	Phenantrene
MP	MethylPhenantrenes
DMP	DiMethylPhenantrenes

NORSK HYDRO E-BERGEN. PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.3.1.

34/8-3 SWC 2835 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 18-AUG-1989 at 16:58

Reported on 21-AUG-1989 at 15:34

Method : ARO

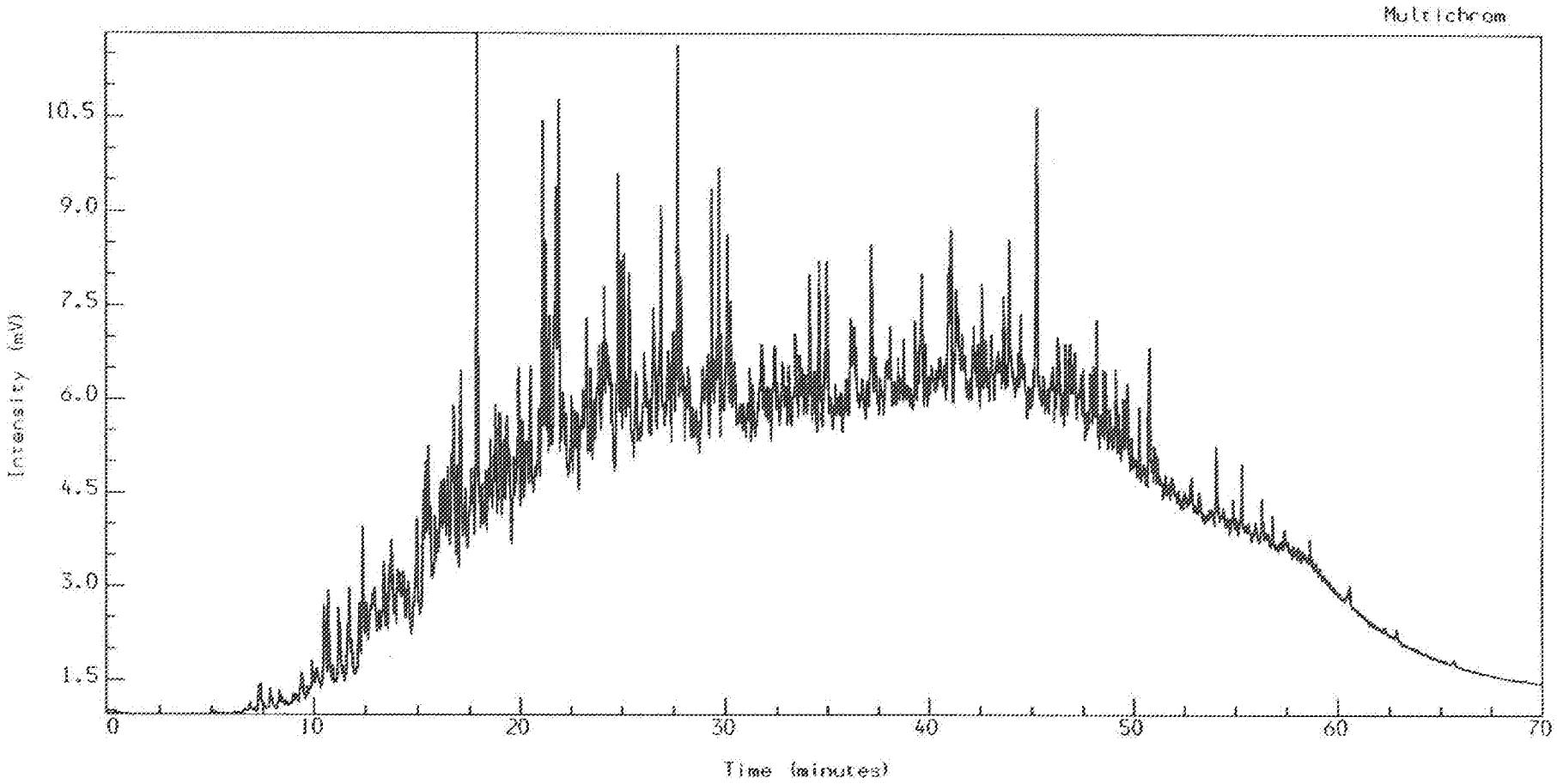
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] I A340803A.4.1.

34/8-3A SWC 5005 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 18-AUG-1989 at 18:39

Reported on 21-AUG-1989 at 15:37

Method : ARO

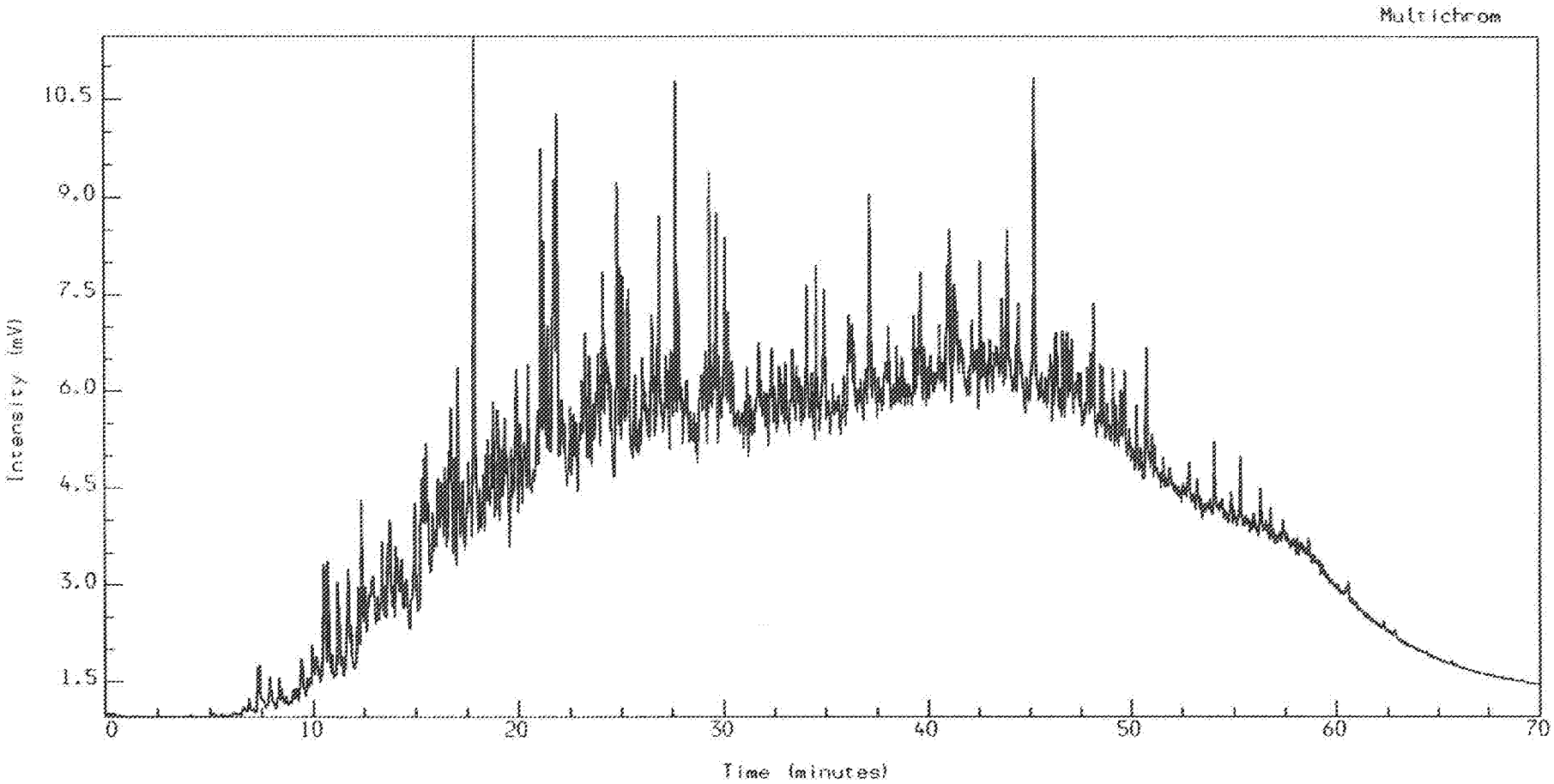
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.5.1.

34/8-3A SWC 3007.5 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 18-AUG-1989 at 20:20

Reported on 21-AUG-1989 at 15:40

Method : ARO

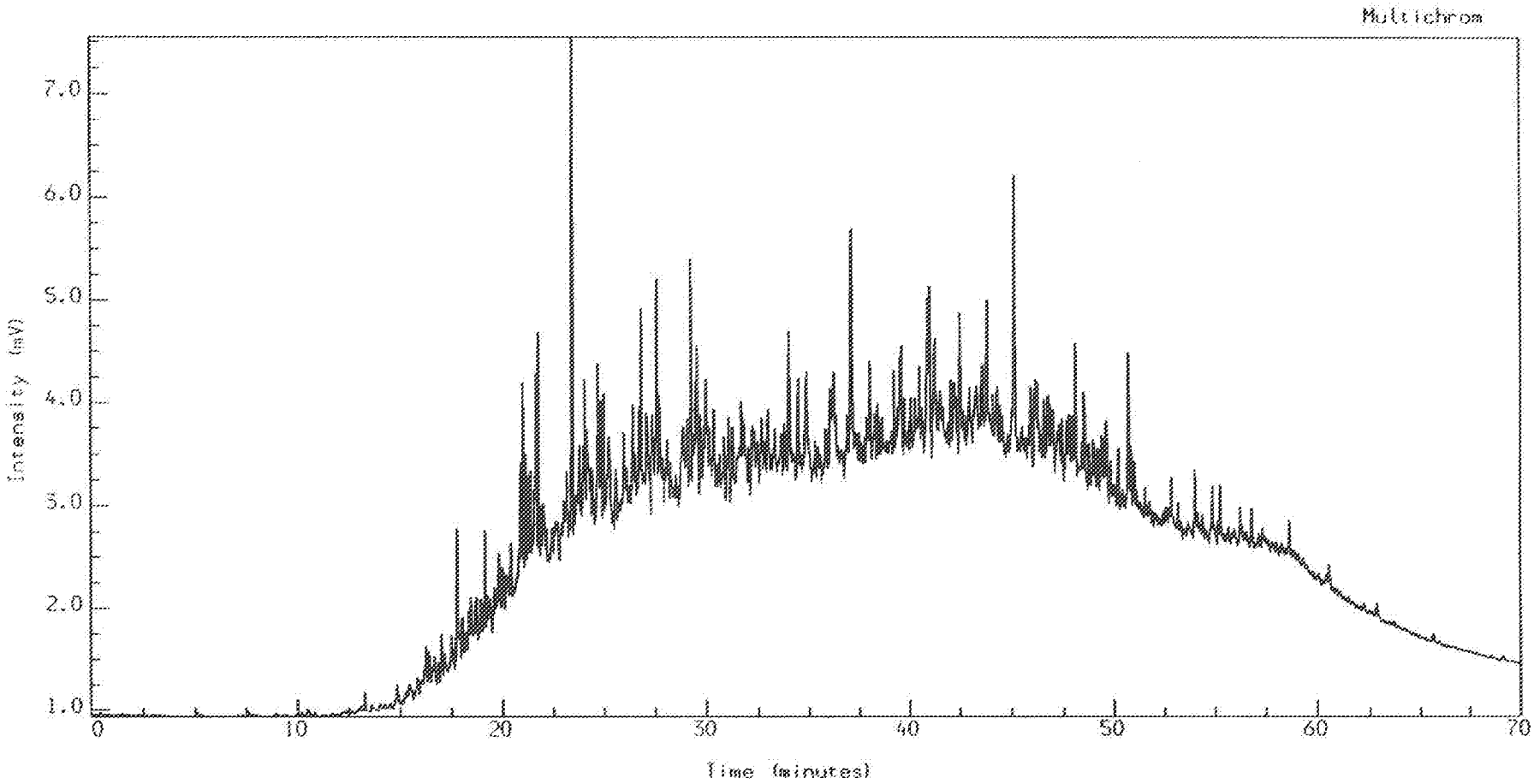
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A,6,1.

34/8-3A SWC 3008 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 18-AUG-1989 at 22:01

Reported on 21-AUG-1989 at 15:43

Method : ARO

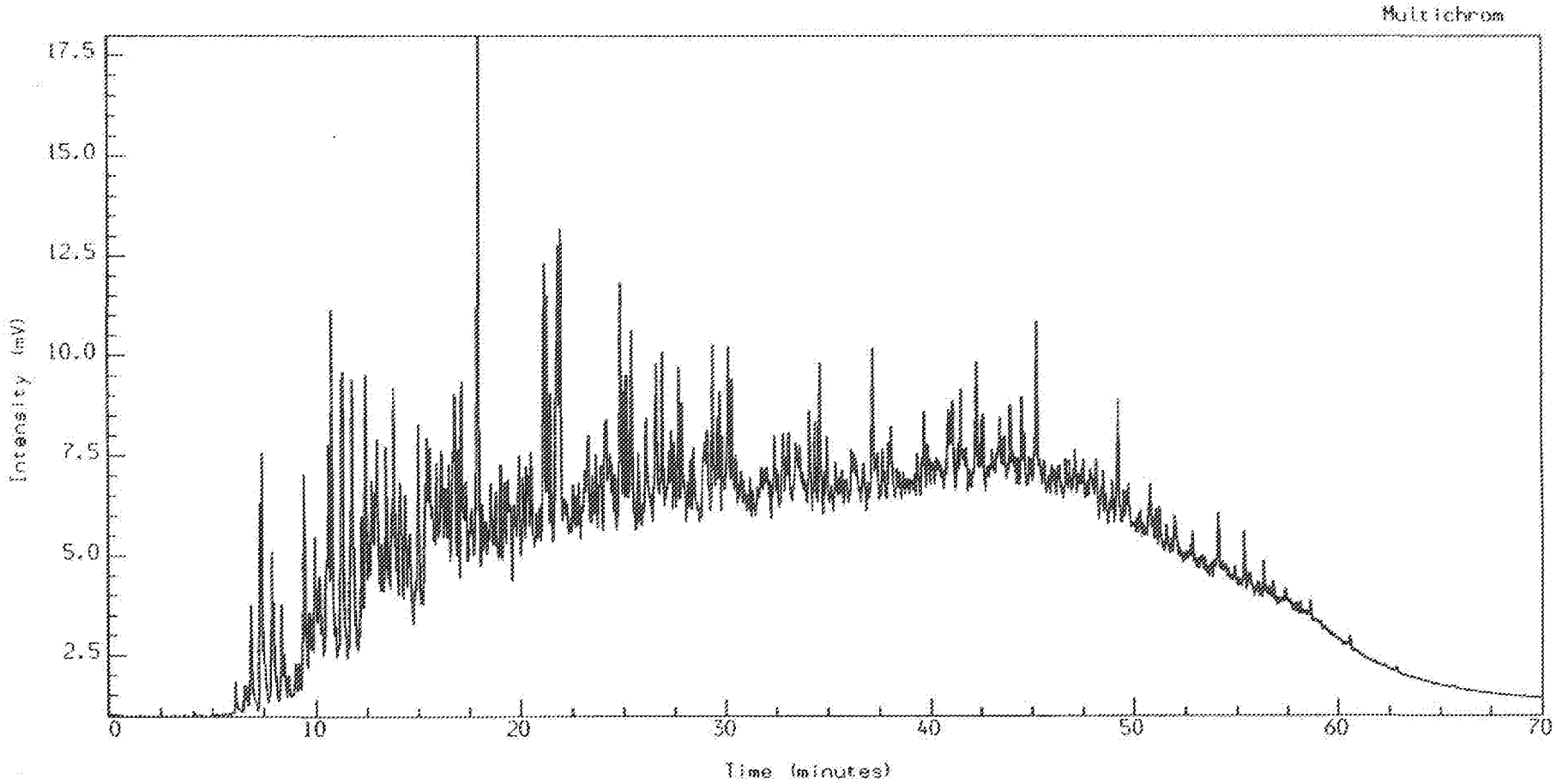
Calibration : ARO

Run Sequence : ARO

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]HEMISTRY

Analysis Name : [PETRO] I A340803A.7.1.

34/8-3A SWC 3011 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 18-AUG-1989 at 23:42

Reported on 21-AUG-1989 at 15:45

Method : ARO

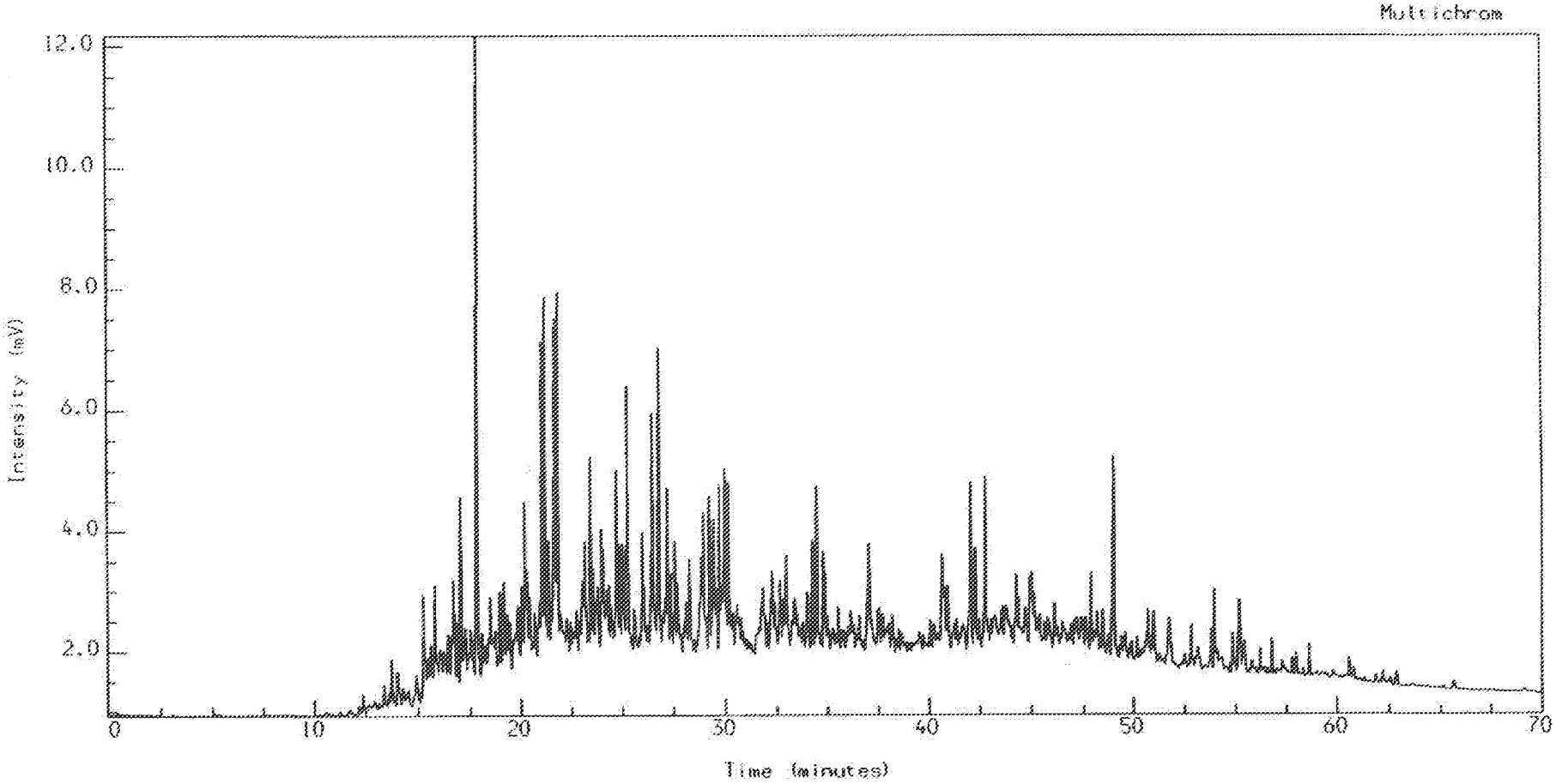
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] I AS40803A.8.1.

34/8-3A SWC 3016 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 01:23

Reported on 21-AUG-1989 at 15:48

Method : ARO

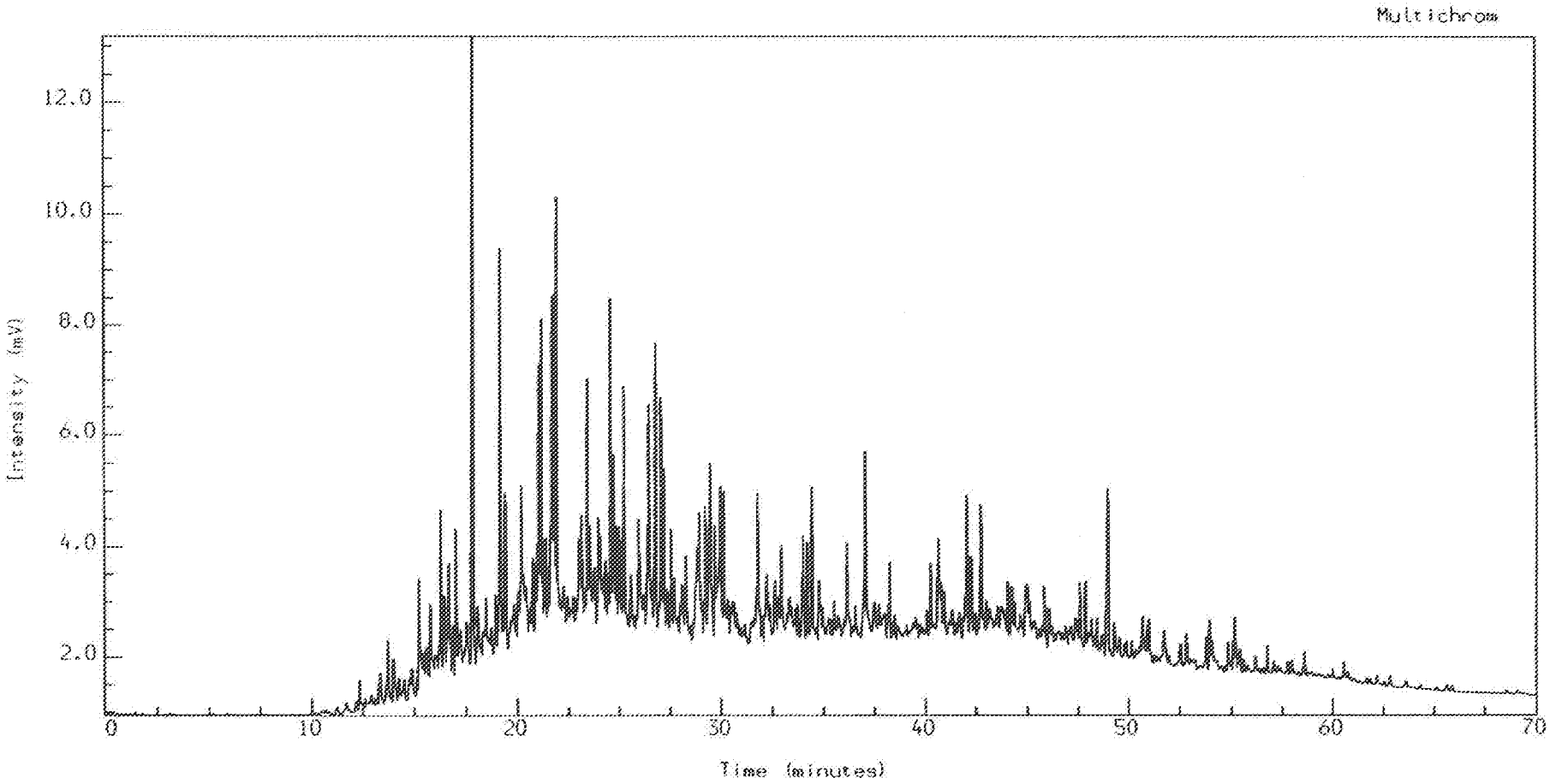
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] I A340803A.9.I.

34/8-3A SWC 3018 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 05:05

Reported on 22-AUG-1989 at 10:29

Method : ARO

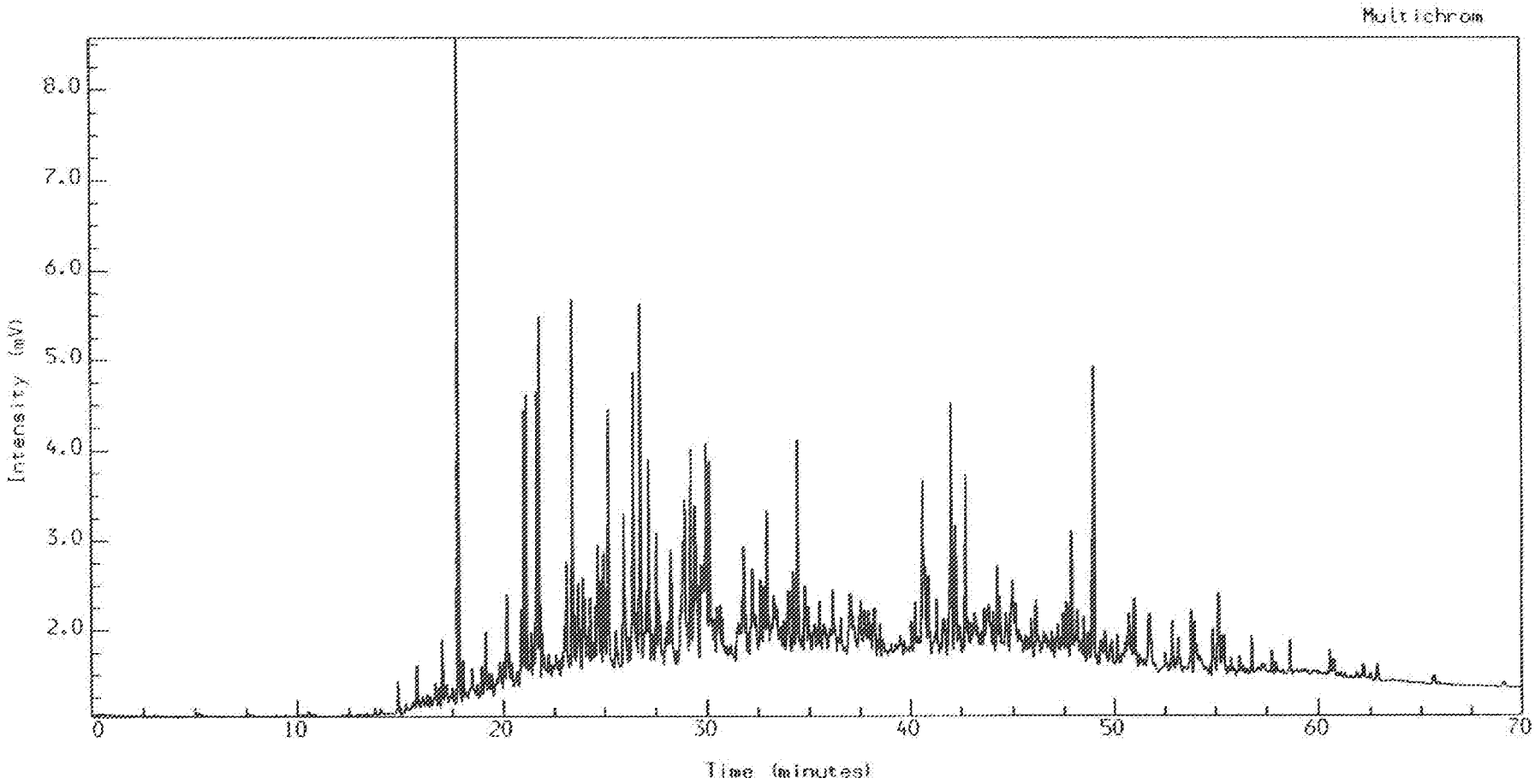
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.10.1.

34/8-3A SWC 3023 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 04:46

Reported on 22-AUG-1989 at 10:35

Method : ARO

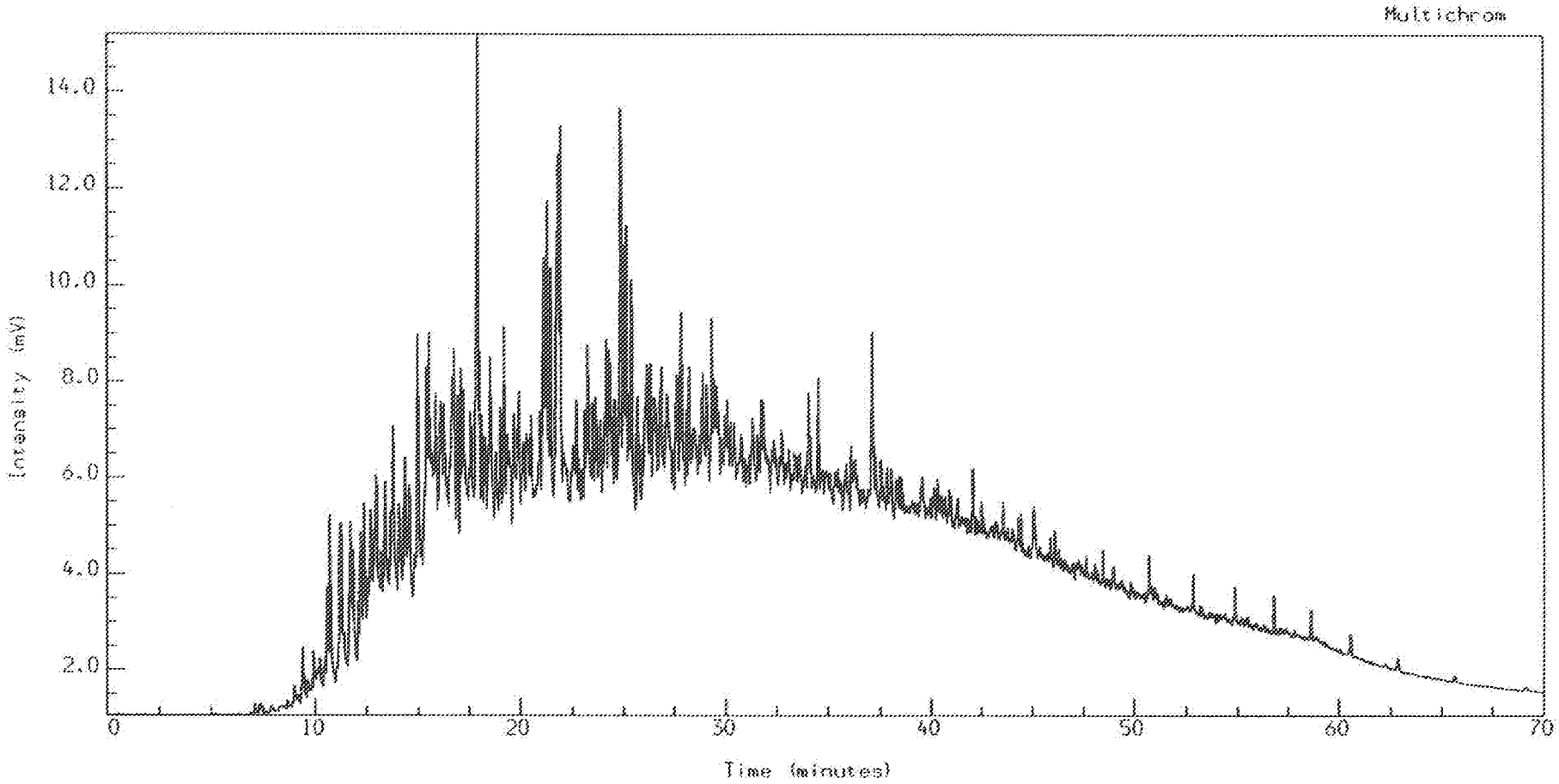
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.11.1.

34/8-3A CC 3036.25 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 06:27

Reported on 22-AUG-1989 at 10:41

Method : ARO

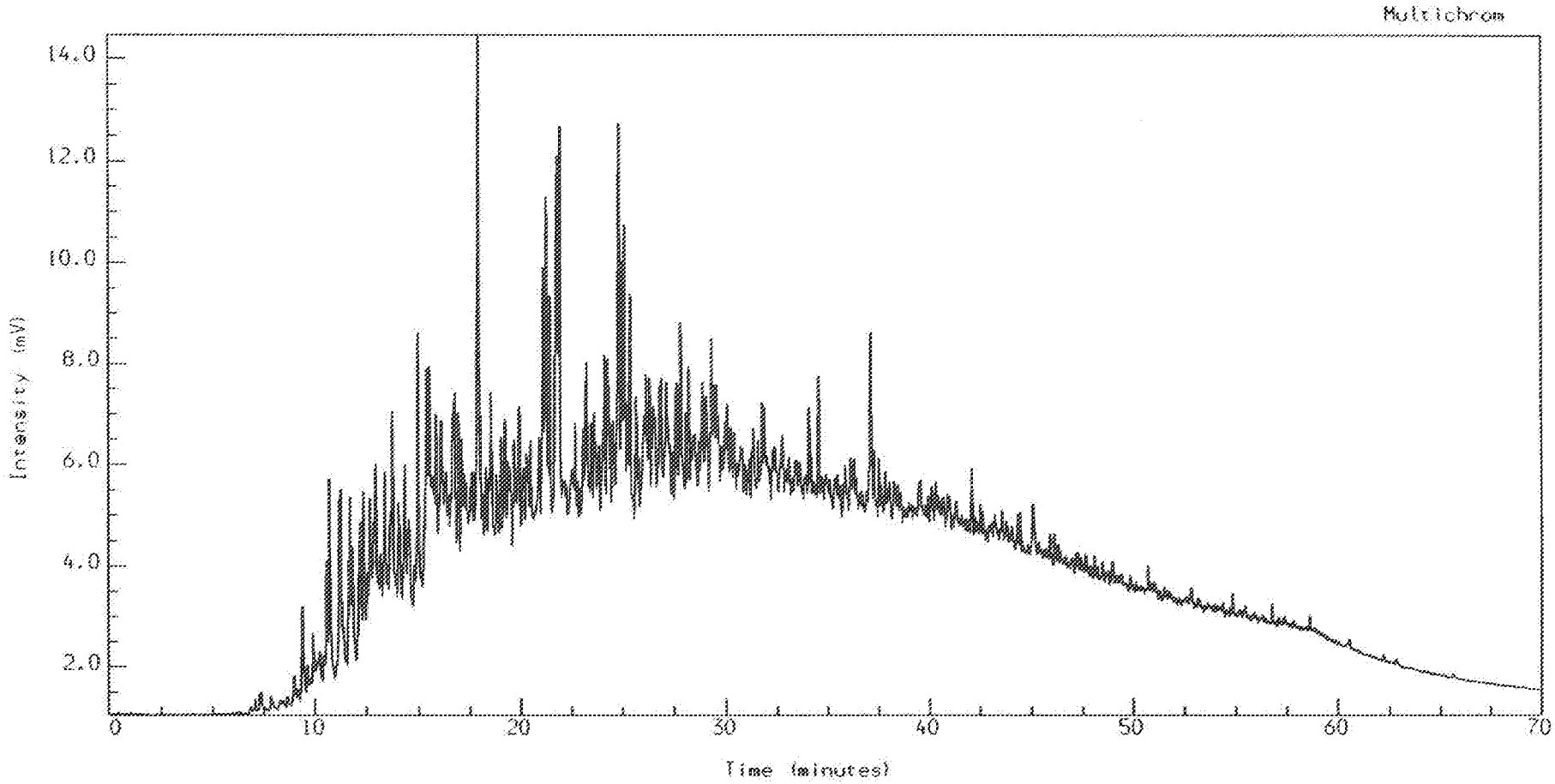
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.12.1.

34/8-3A CC 3051.25 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 08:09

Reported on 22-AUG-1989 at 10:47

Method : ARO

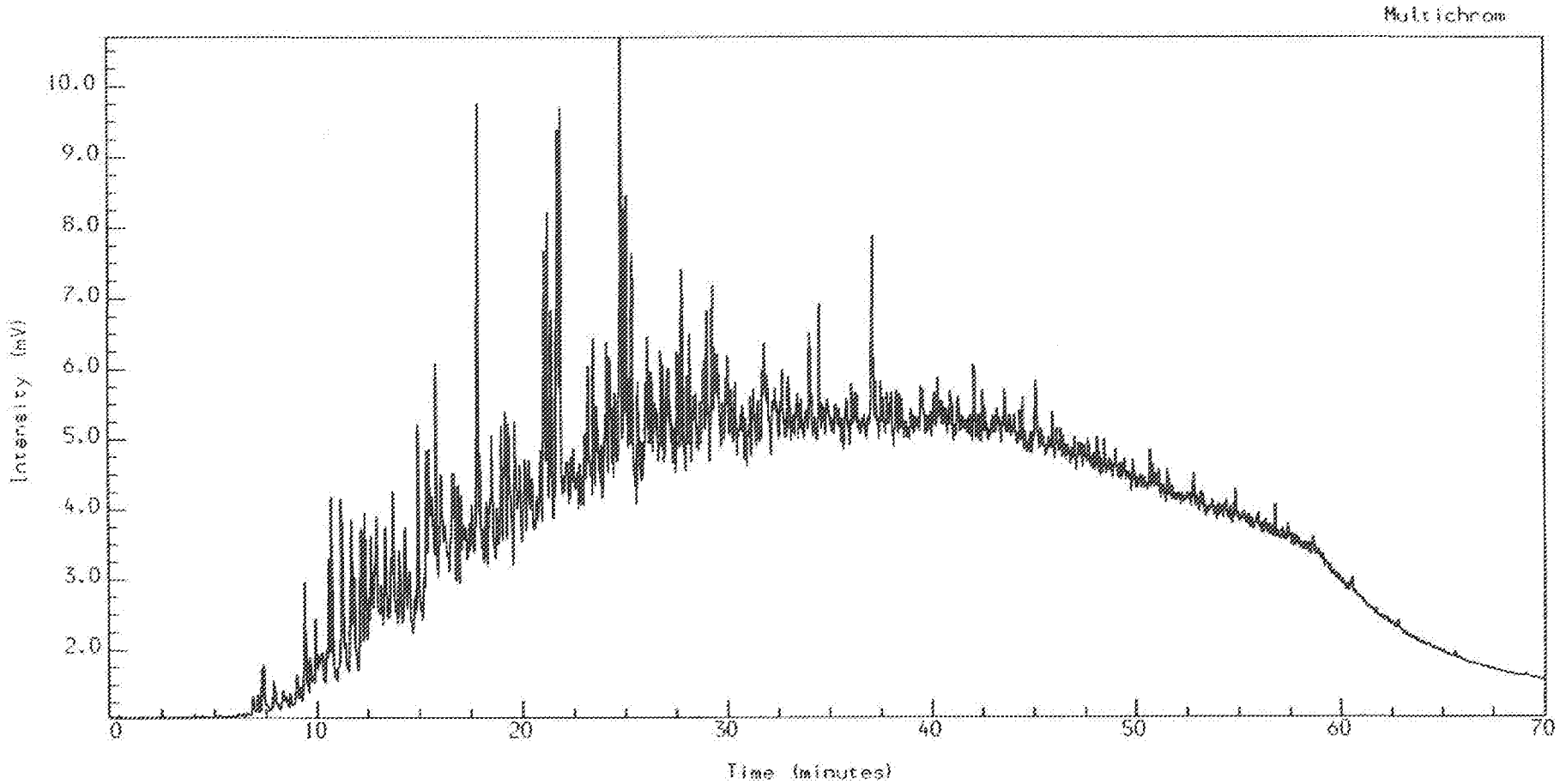
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.13.1.

34/8-3A CC 3061.50 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 09:50

Reported on 22-AUG-1989 at 10:50

Method : ARO

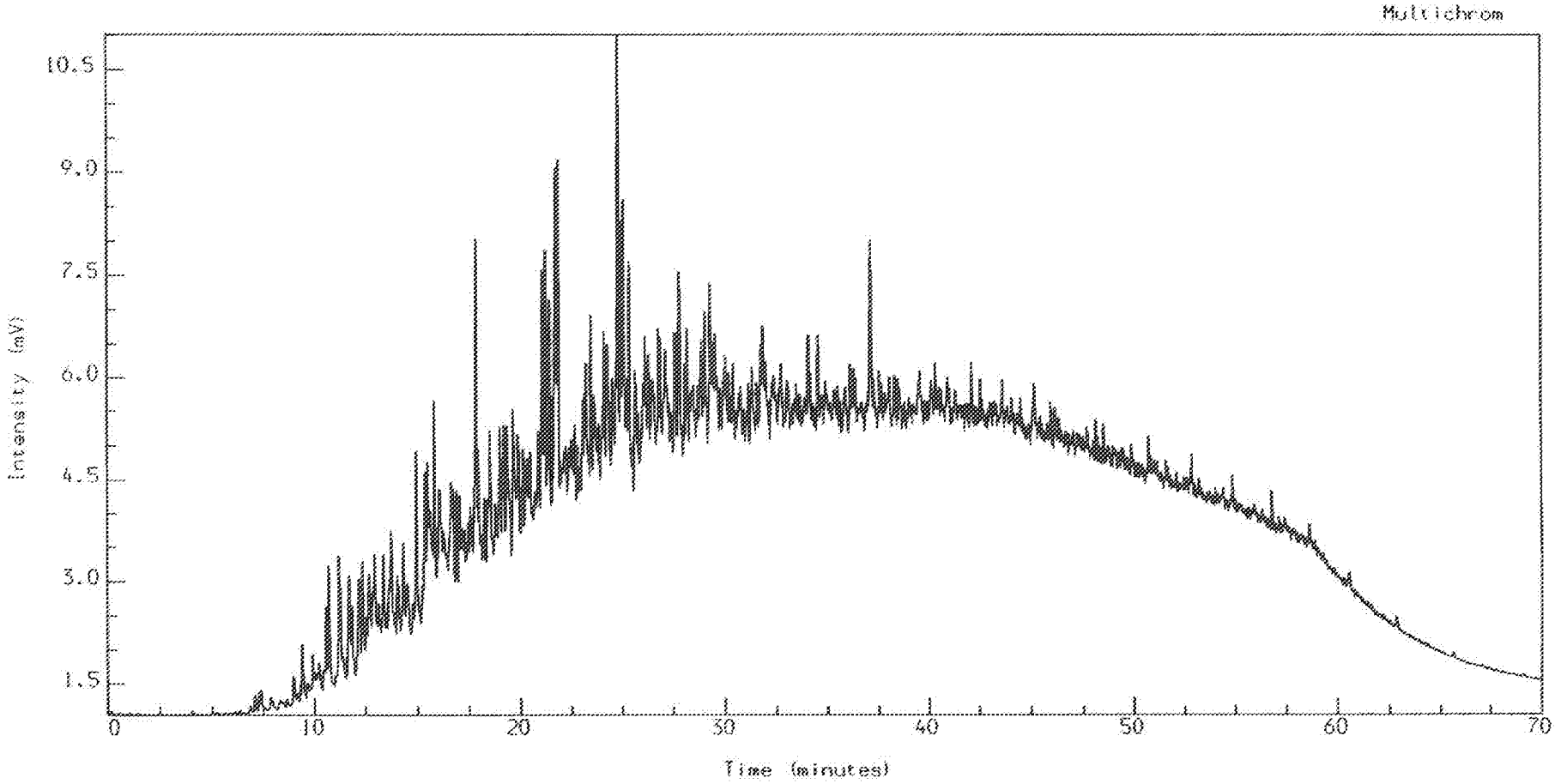
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.14.1.

34/8-3A CC 3070.25 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 11:32

Reported on 22-AUG-1989 at 11:00

Method : ARO

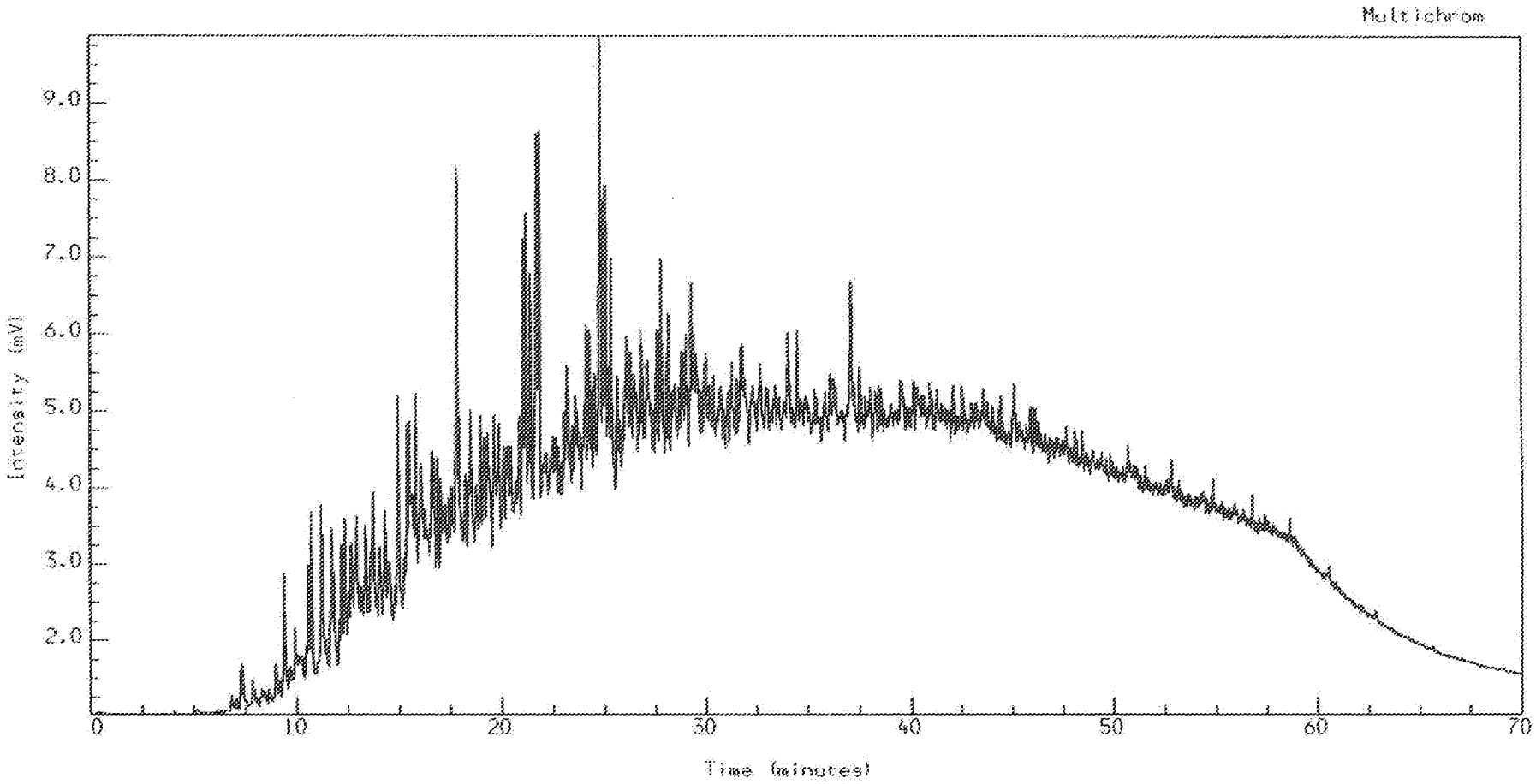
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.15.1.

34/8-3A CC 3089.50 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 13:13

Reported on 22-AUG-1989 at 11:06

Method : ARO

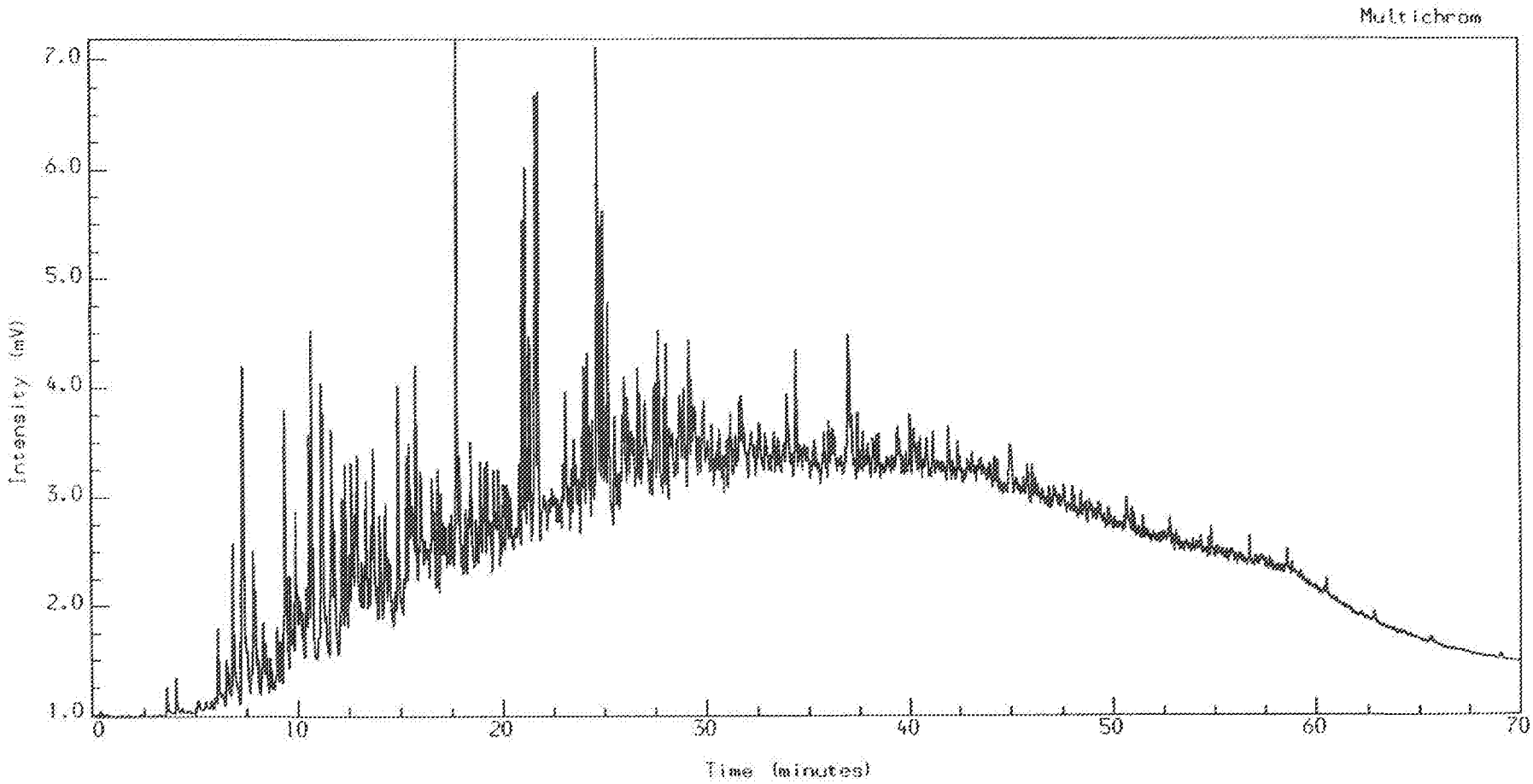
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 B340803A,1,1.

34/8-3A CC 3091.75 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 22-AUG-1989 at 12:19

Reported on 23-AUG-1989 at 10:28

Method : ARO

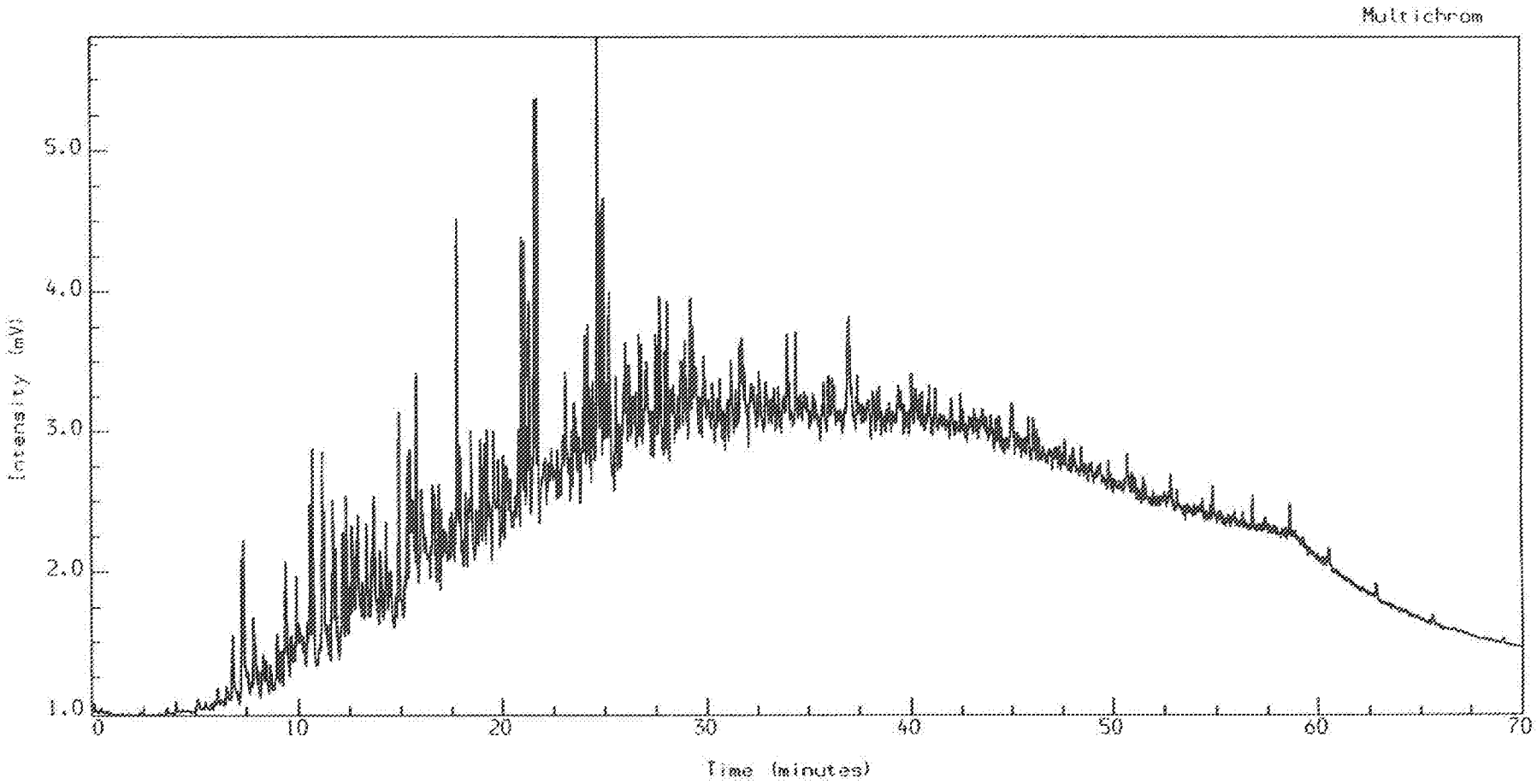
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 B340803A,2,1.

34/8-3A CC 3096.75 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 22-AUG-1989 at 13:59

Reported on 23-AUG-1989 at 10:30

Method : ARO

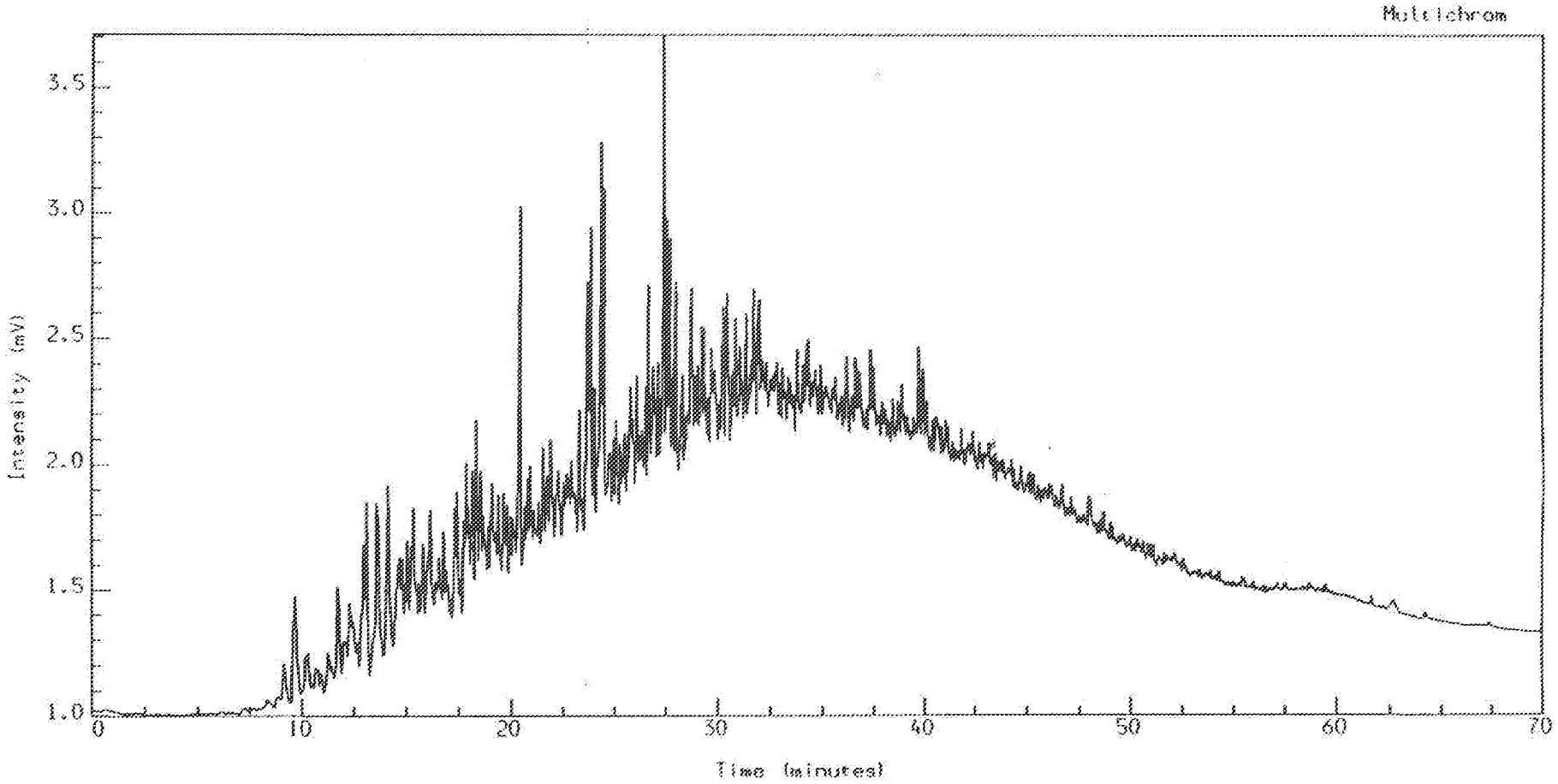
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 D340803A.1.1.

34/8-3A CC 3097.25 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 28-AUG-1989 at 12:16

Reported on 28-AUG-1989 at 13:45

Method : ARO

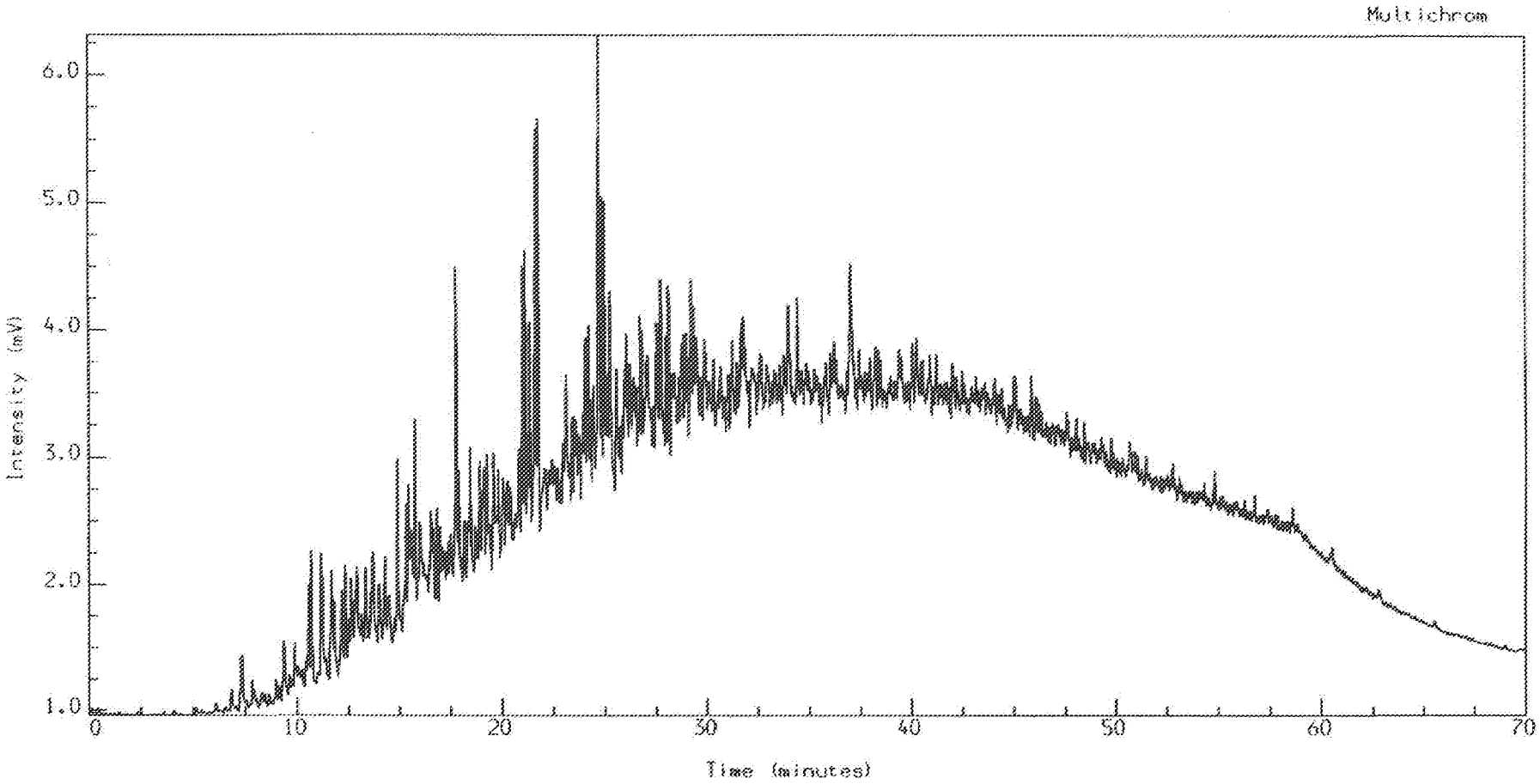
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 B340803A,4,1,

34/8-3A CC 3098.75 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 22-AUG-1989 at 17:19

Reported on 23-AUG-1989 at 10:34

Method : ARO

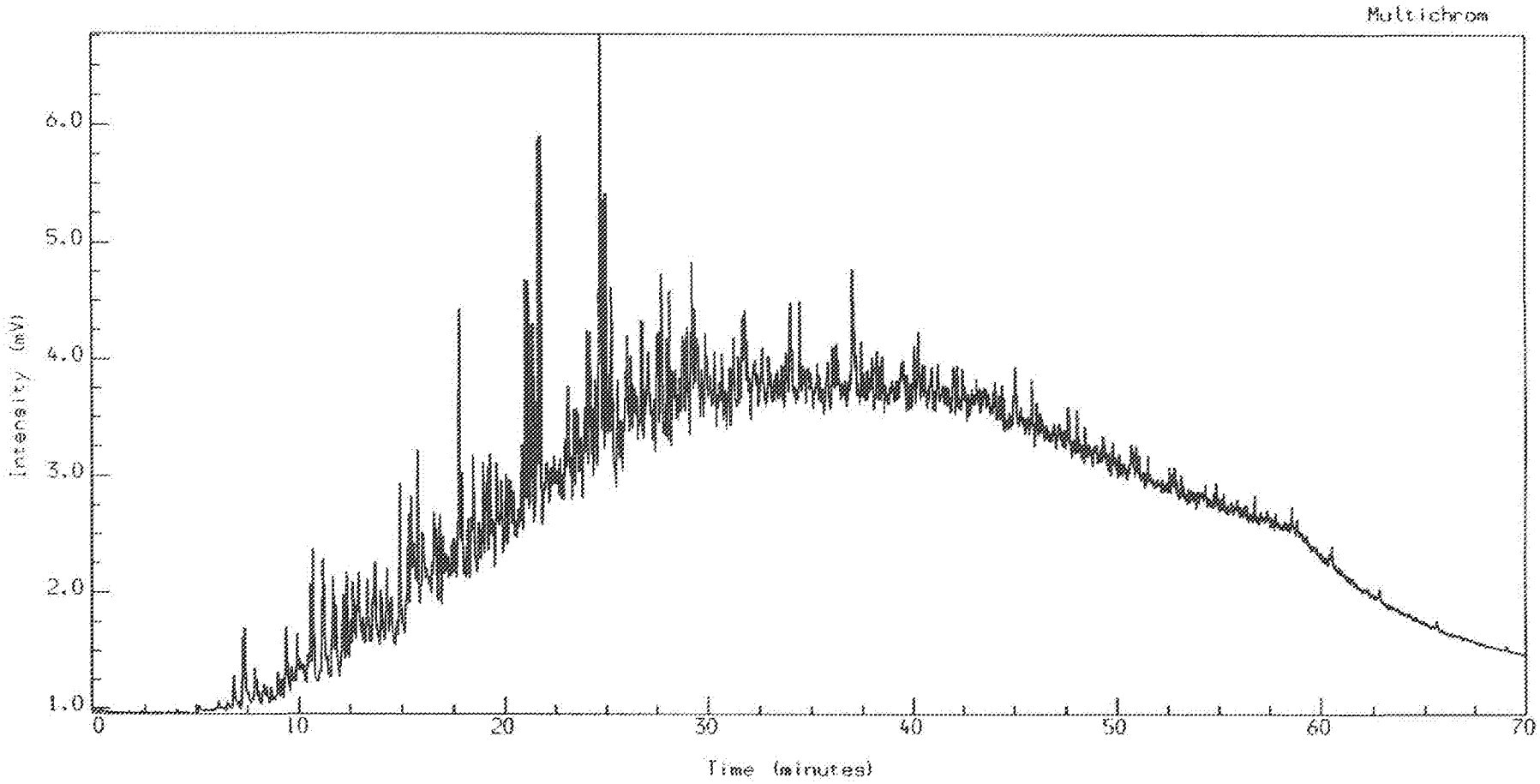
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 B340803A.5.1.

34/8-3A CC 3100.25 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 22-AUG-1989 at 18:59

Reported on 23-AUG-1989 at 10:36

Method : ARO

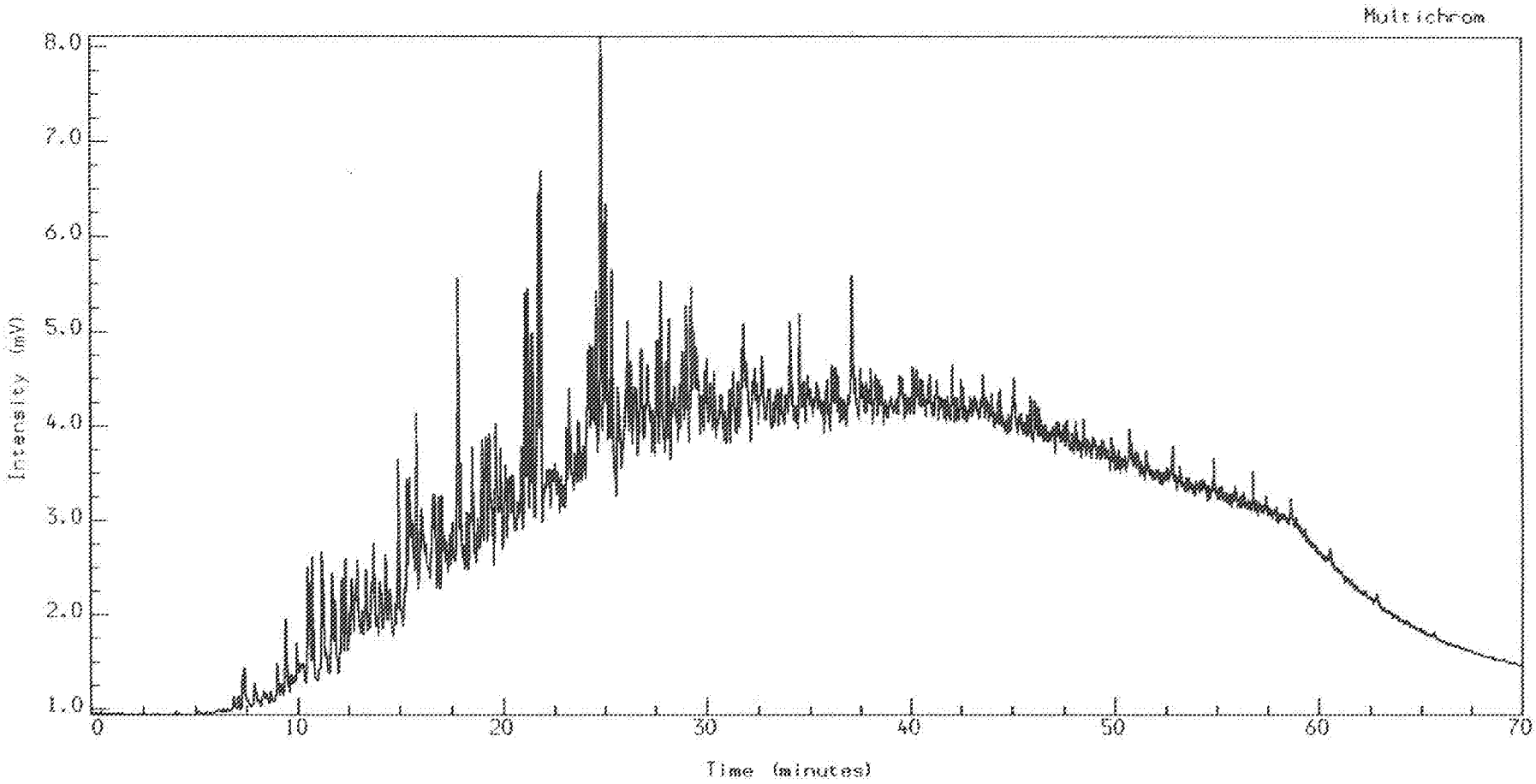
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.16.1.

34/8-3A CC 3103.50 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 14:54

Reported on 22-AUG-1989 at 11:54

Method : ARO

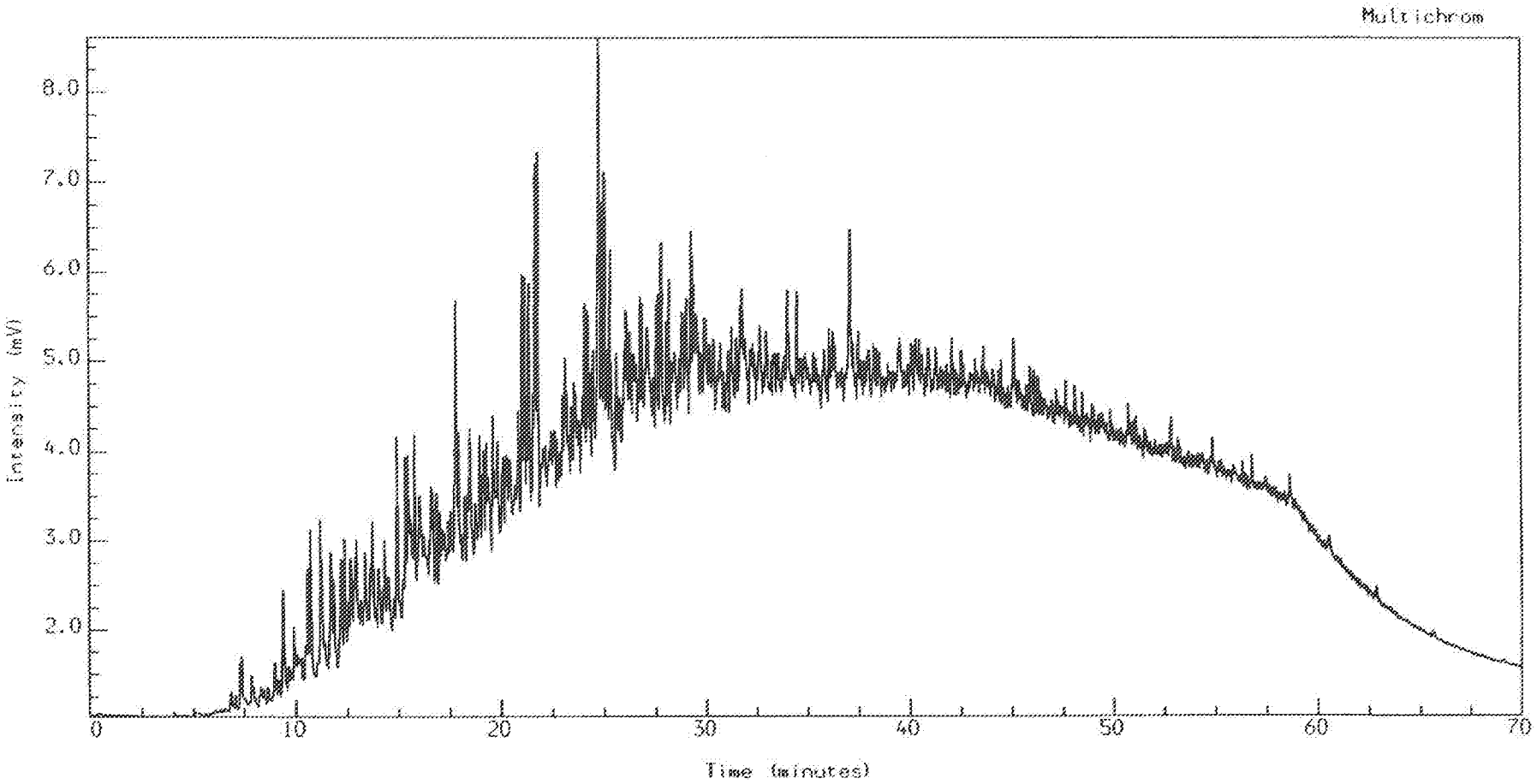
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.17.1.

34/8-3A CC 3107.25 M ARO Amount : 1.000



Instrument : HP5680

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 16:36

Reported on 22-AUG-1989 at 12:18

Method : ARO

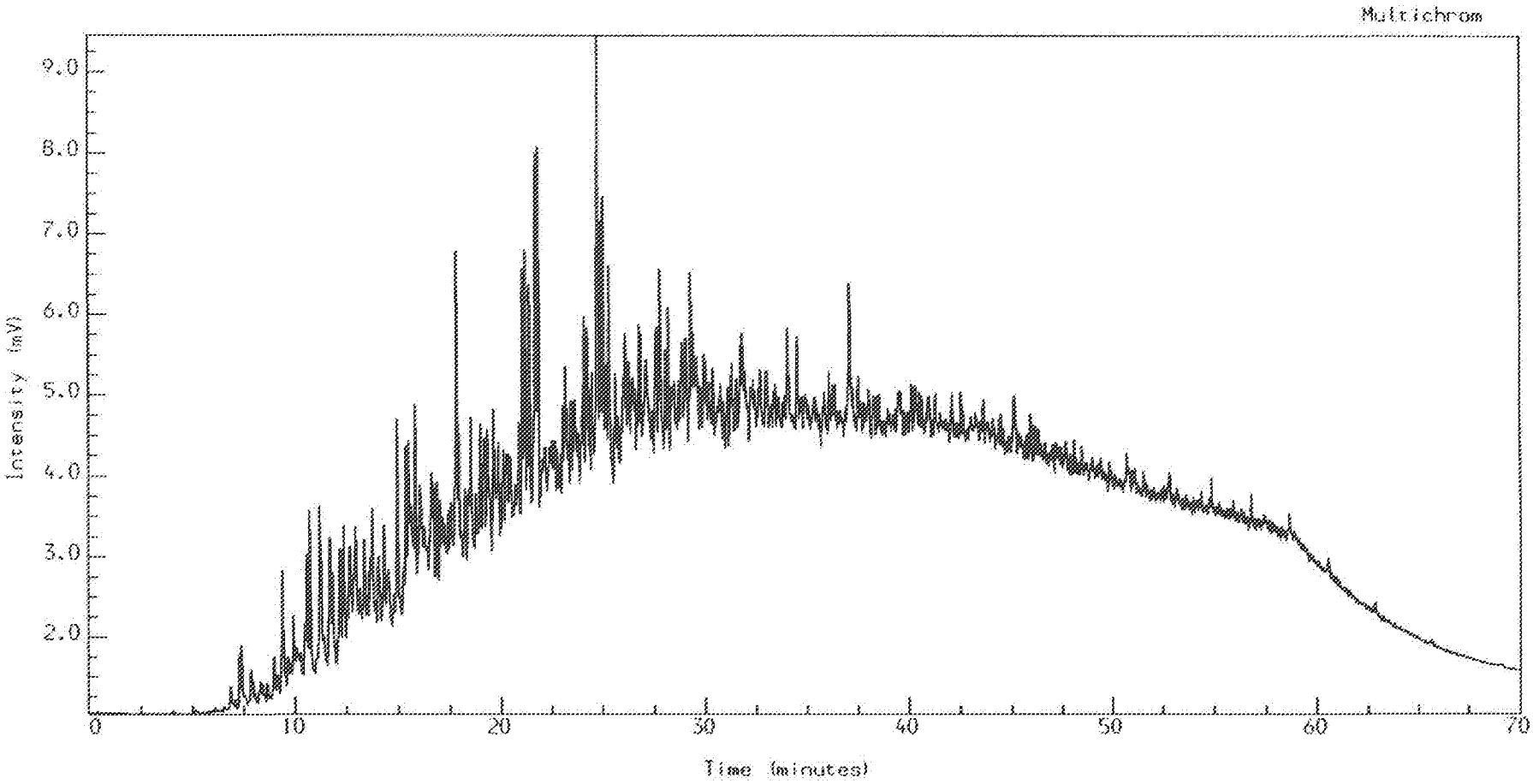
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO E-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.18.1.

34/8-3A CC 3112.25 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 19-AUG-1989 at 18:18

Reported on 22-AUG-1989 at 12:23

Method : ARO

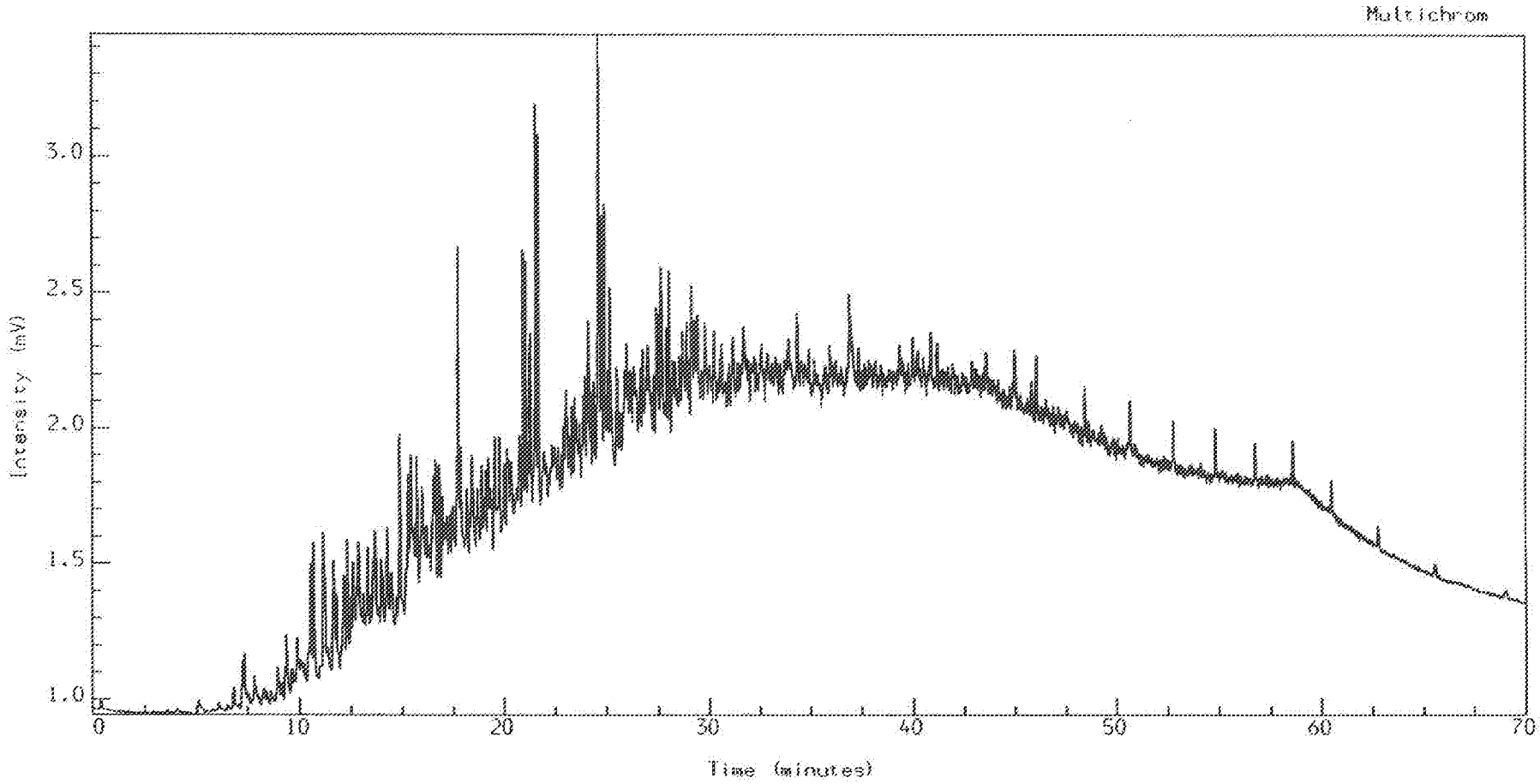
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 B340803A.6.1.

34/8-3A CC 3117.50 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 22-AUG-1989 at 20:40

Reported on 23-AUG-1989 at 10:38

Method : ARO

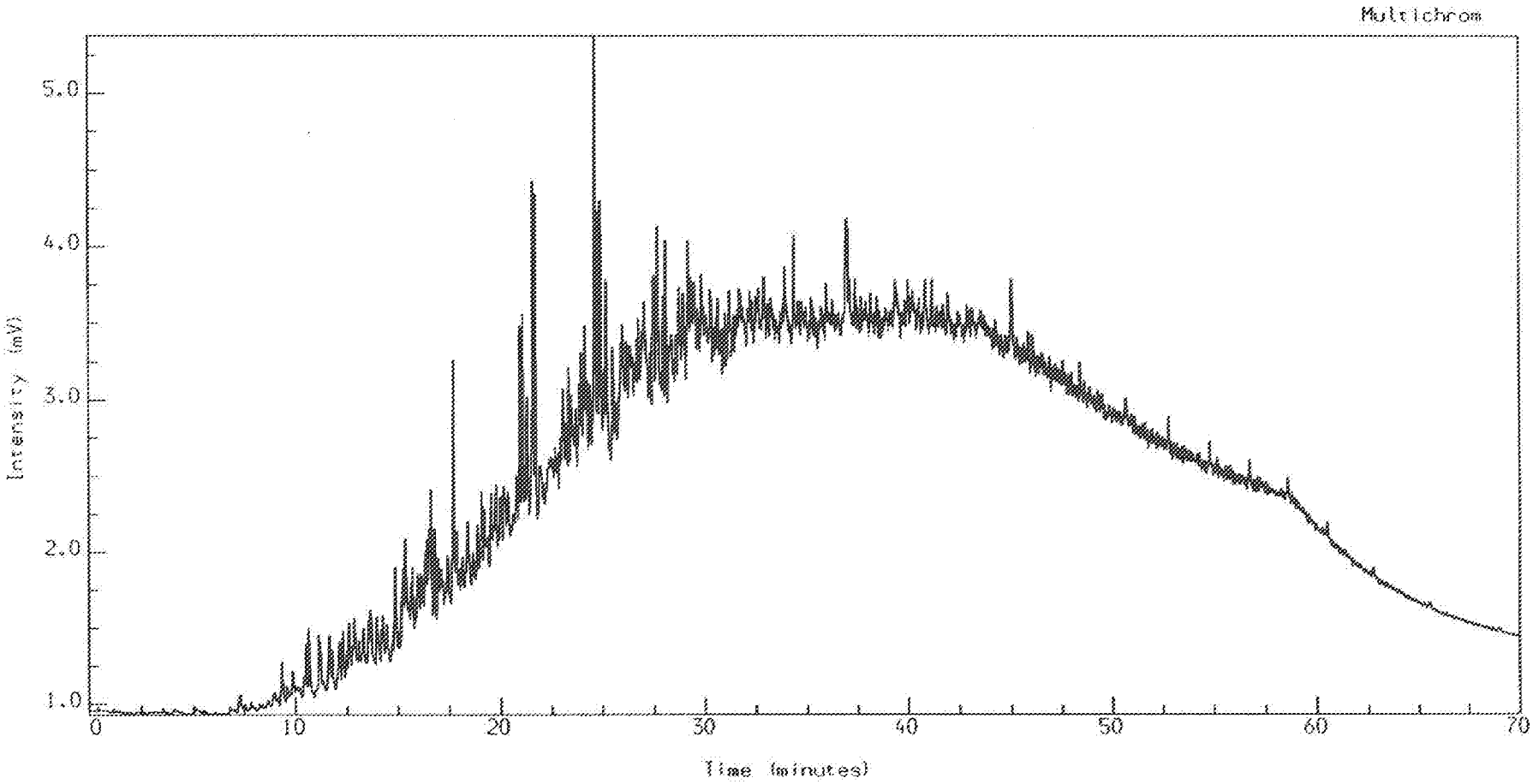
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO E-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 C340803A.5.1.

34/8-3A CC 3123.25 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 23-AUG-1989 at 20:14

Reported on 24-AUG-1989 at 12:04

Method : ARO

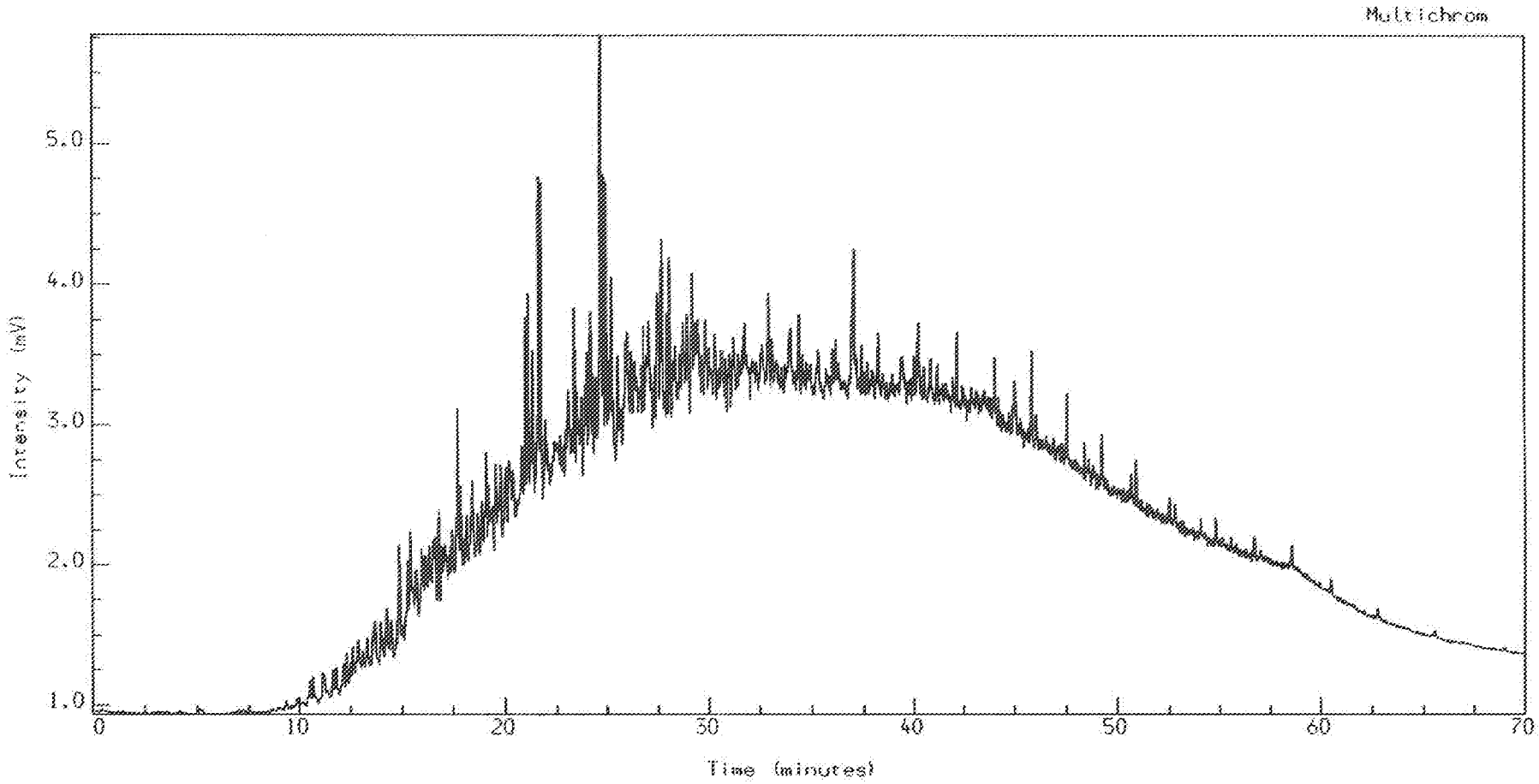
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] I C340803A.6.I.

34/8-3A CC 3127.50 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 23-AUG-1989 at 21:54

Reported on 24-AUG-1989 at 12:06

Method : ARO

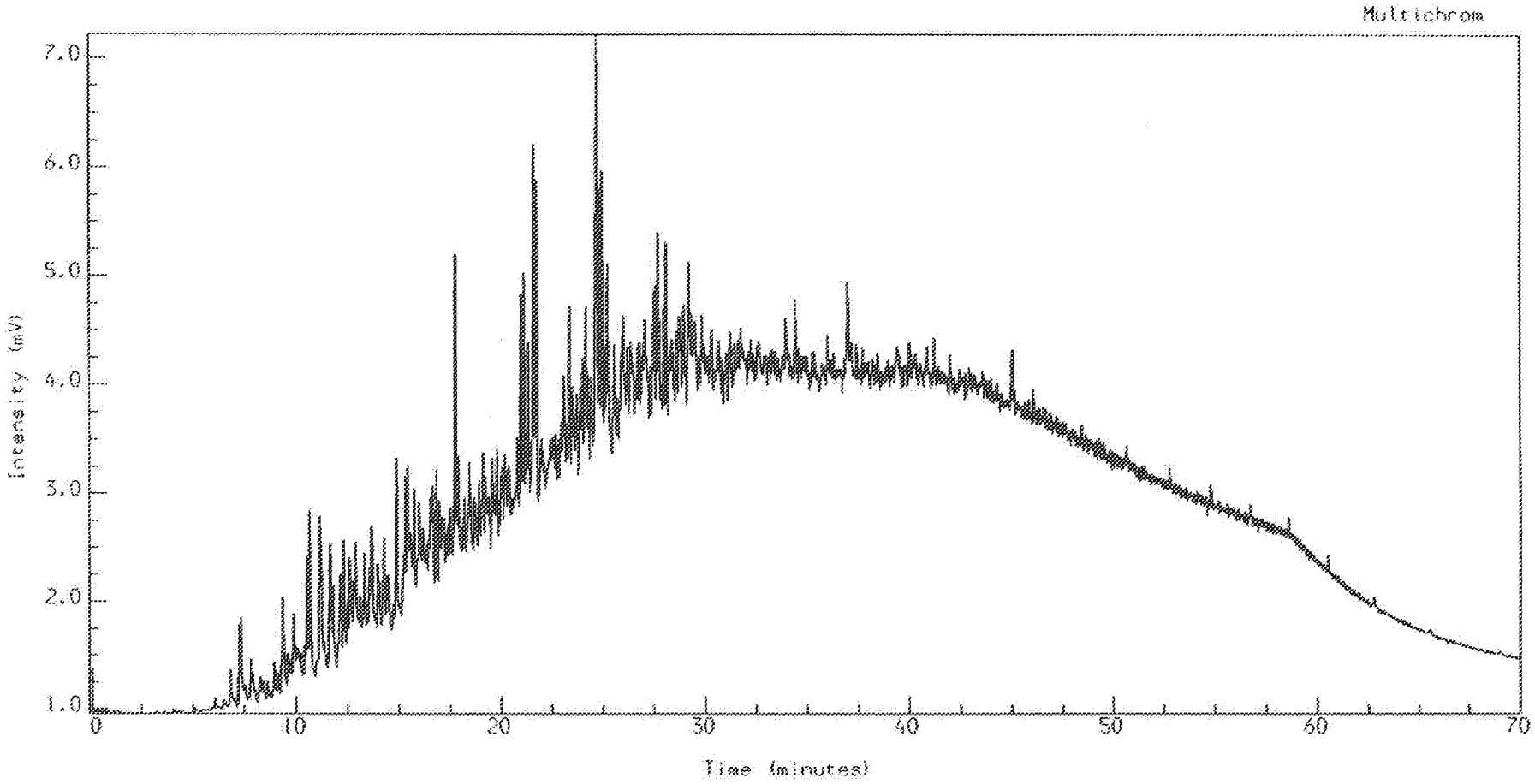
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 C340803A.1.1.

34/8-3A CC 3131.50 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 23-AUG-1989 at 13:33

Reported on 24-AUG-1989 at 11:54

Method : ARO

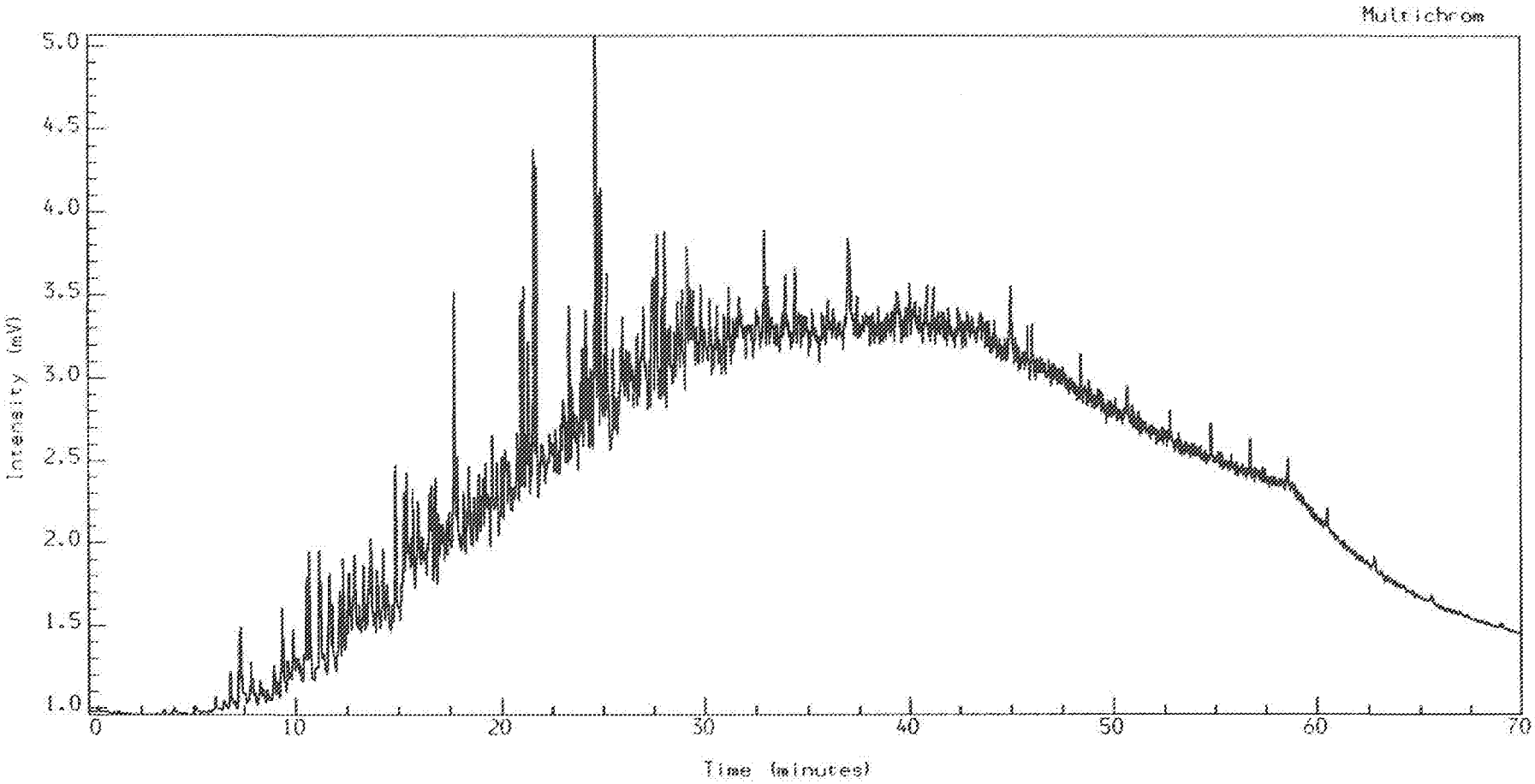
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 C340303A.2.1.

34/8-3A CC 3139.50 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 23-AUG-1989 at 15:13

Reported on 24-AUG-1989 at 11:56

Method : ARO

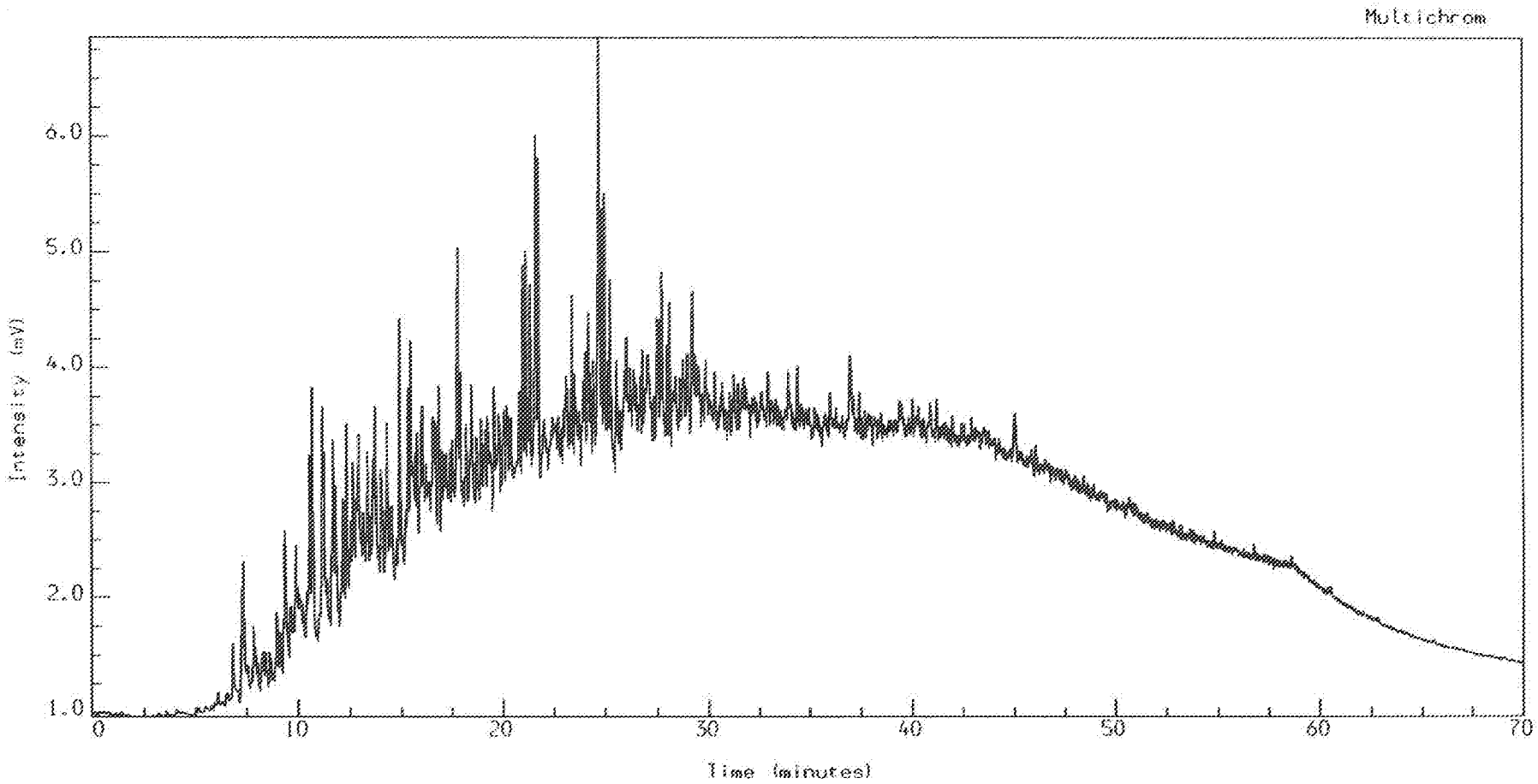
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 C340803A.3.1.

34/8-3A CC 3143.50 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 23-AUG-1989 at 16:53

Reported on 24-AUG-1989 at 11:59

Method : ARO

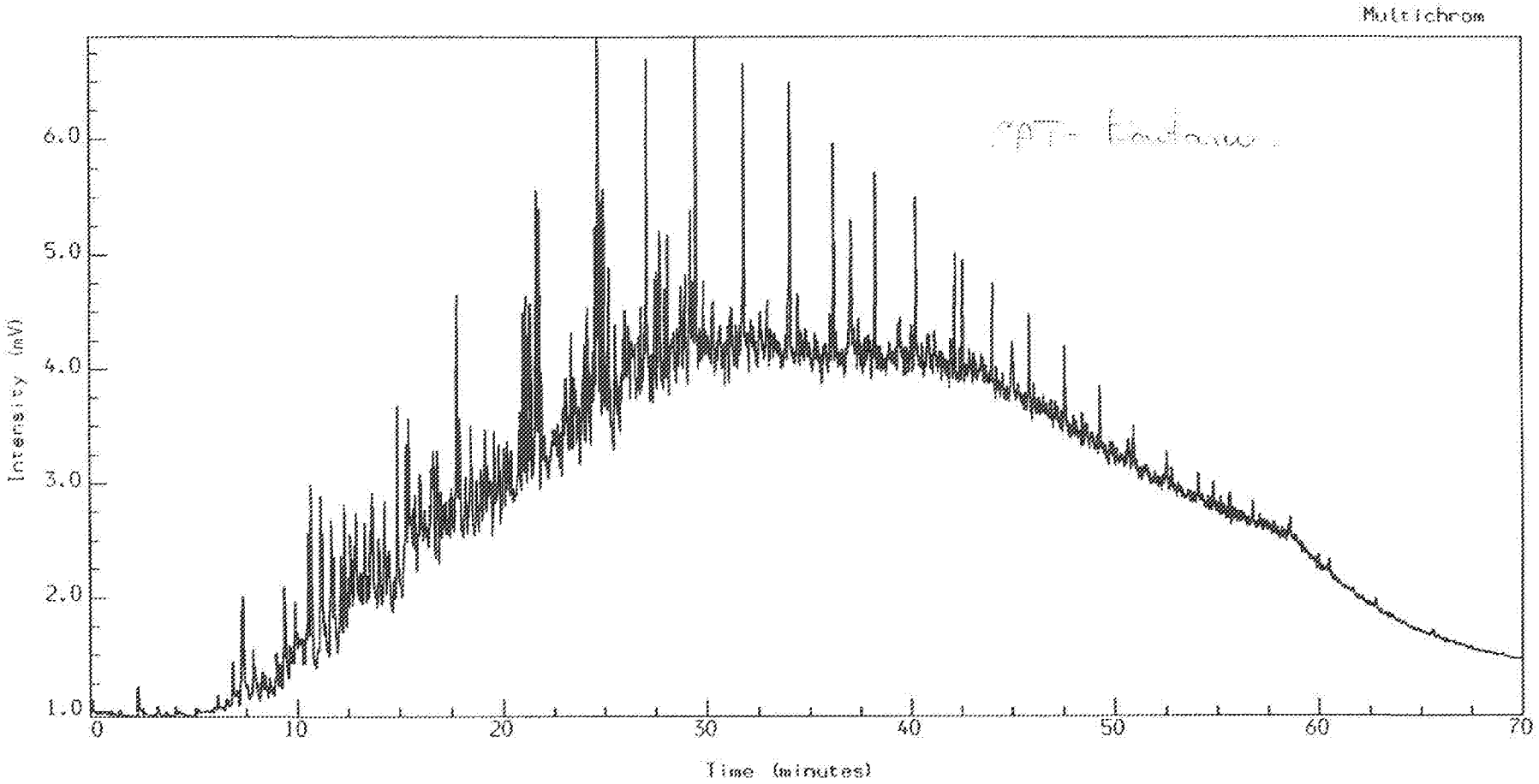
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 C340803A.4.1.

34/8-3A CC 3148.25 M ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 23-AUG-1989 at 18:33

Reported on 24-AUG-1989 at 12:01

Method : ARO

Calibration : ARO

Run Sequence : ARO

APPENDIX III Fragmentograms of Steranes and Triterpanes

Sediments, Wells 34/8-3 and 3A

m/z 217 – Steranes

m/z 191 – Triterpanes

IDENTIFICATION OF BIOLOGICAL MARKERS

Triterpanes (m/z 191):

Numbers from 18 to 35 corresponds to the carbon number of the molecule, the following capital letter identifies the stereochemistry and/or the number of rings.

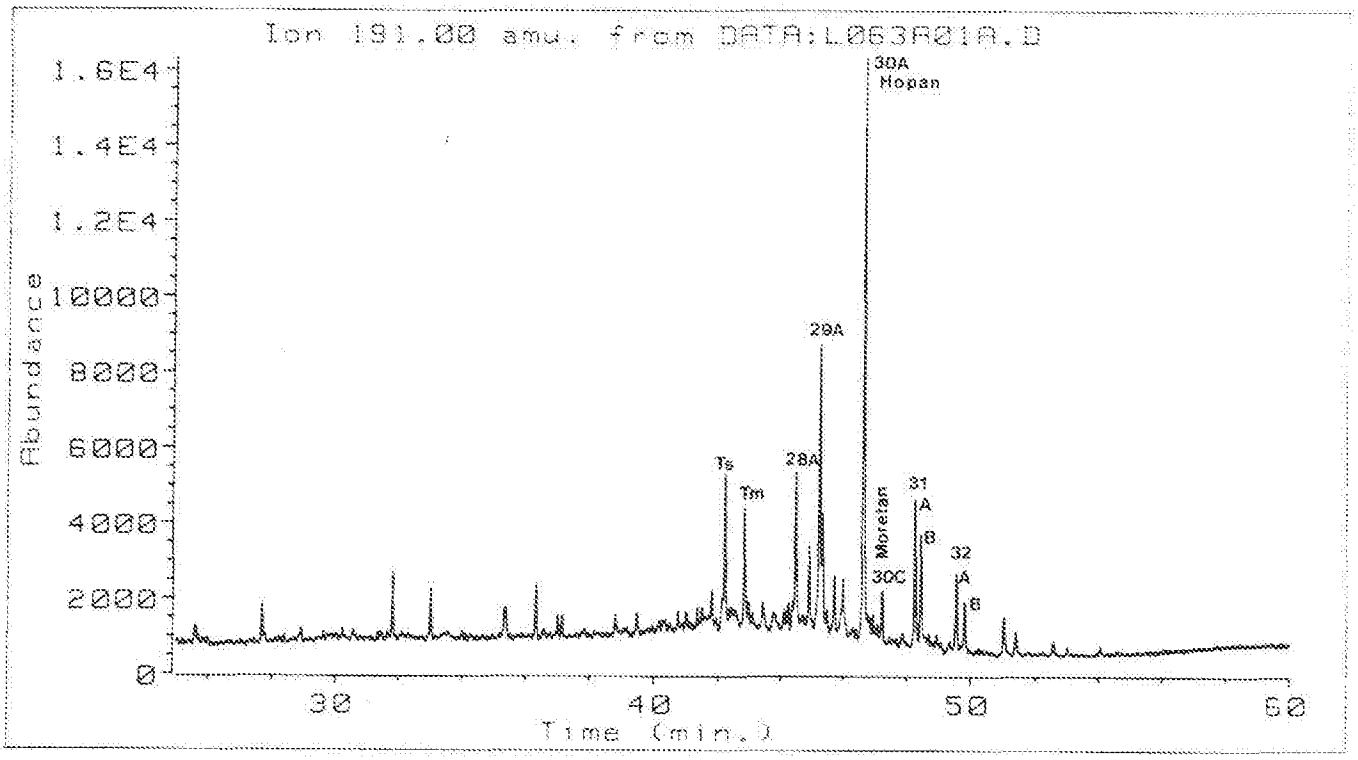
A 17α(H)-hopanes (I) 22S
B 17α(H)-hopanes 22R
C 17β(H)-moretanes (II) 22S
D 17β(H)-moretanes 22R
E 17β(H)-hopanes (III)
F Neohopanes (IV)
G Gammacerane (V)
H $\Delta^{13,18}$-hopenes (VI)
I 25-norhopanes (VII)
L Lupane (VIII)
O 18α(H)-oleanane (IX)
X Tetracyclic terpanes (X)
Y Tricyclic terpanes (XI)

Steranes (m/z 217):

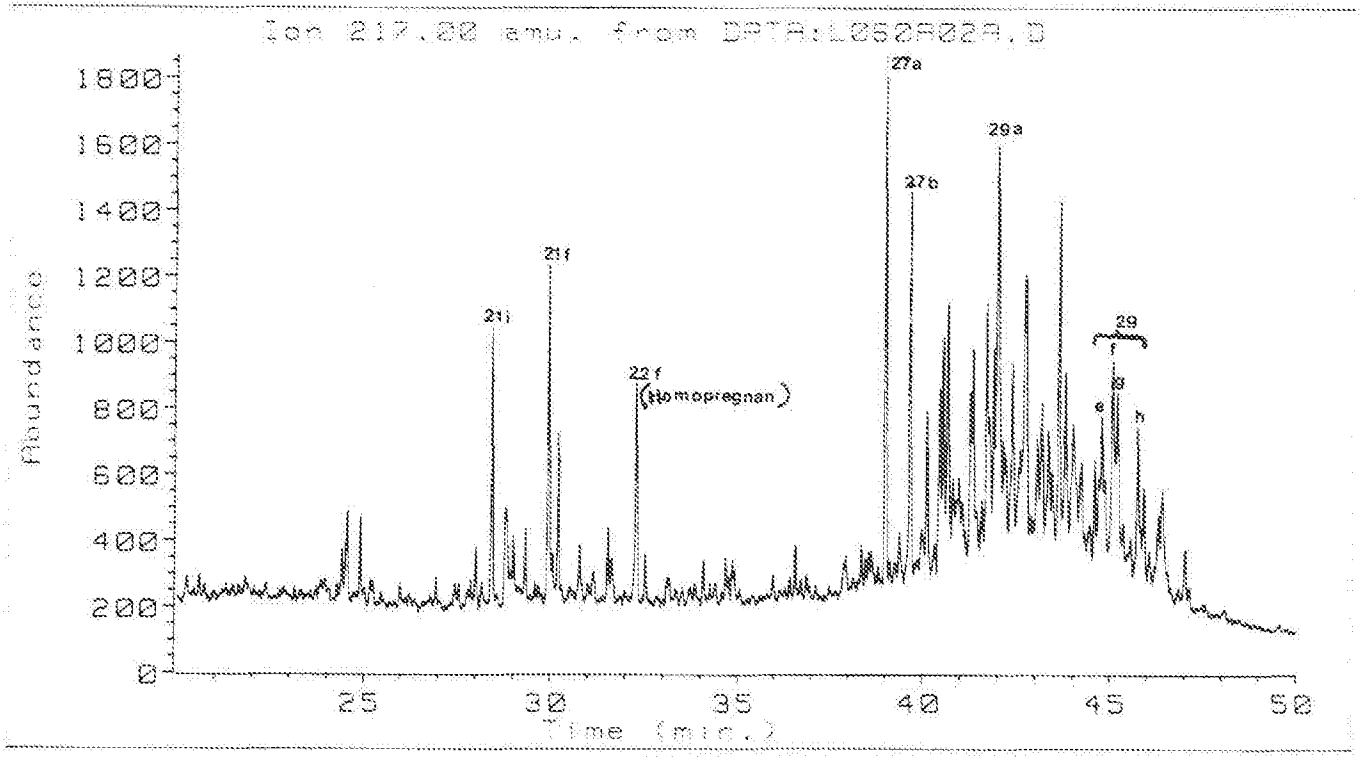
Numbers from 20 to 30 corresponds to the carbon number of the molecules, the following small letter identifies the stereochemistry.

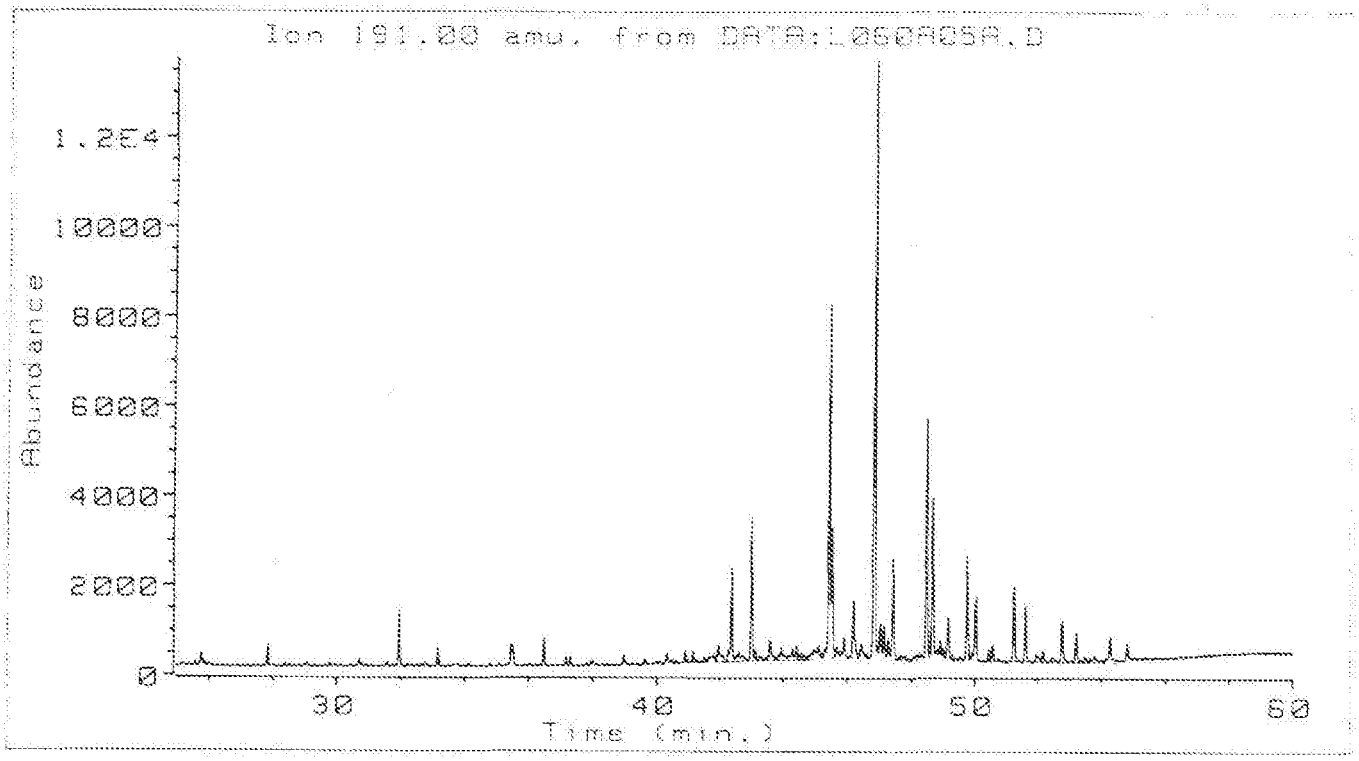
a 13β(H),17α(H)-diasteranes 20S (1)
b 13β(H),17α(H)-diasteranes 20R (2)
c 13α(H),17β(H)-diasteranes 20S (3)
d 13α(H),17β(H)-diasteranes 20R (4)
e 5α(H),14α(H),17α(H)-steranes 20S (5)
f 5α(H),14β(H),17β(H)-steranes 20R (6)
g 5α(H),14β(H),17β(H)-steranes 20S (7)
h 5α(H),14α(H),17α(H)-steranes 20R (8)
i 5β(H),14α(H),17α(H)-steranes (9)
k 4-methylsteranes (10)

Examples: 31B corresponds to 17α(H)-homohopane 22R
29e corresponds to ααα-ethylcholestane 20S

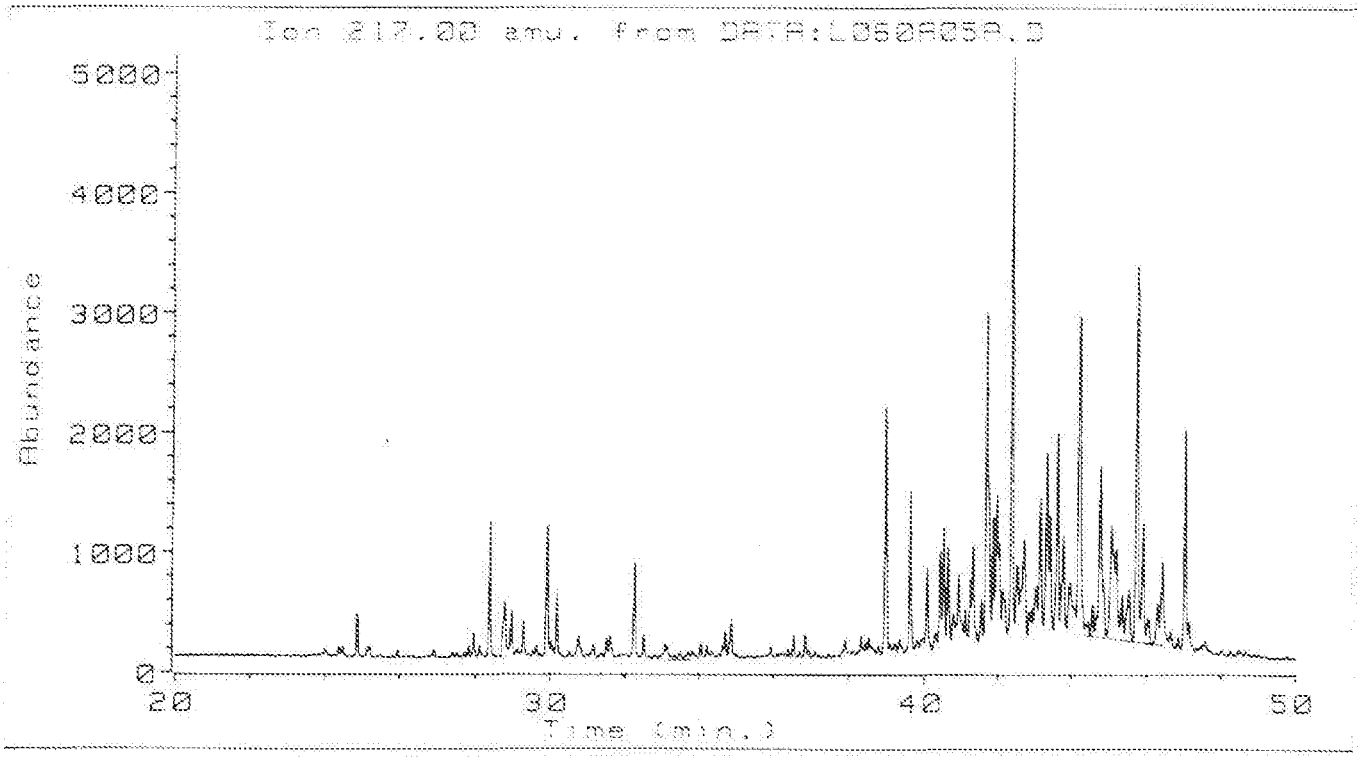


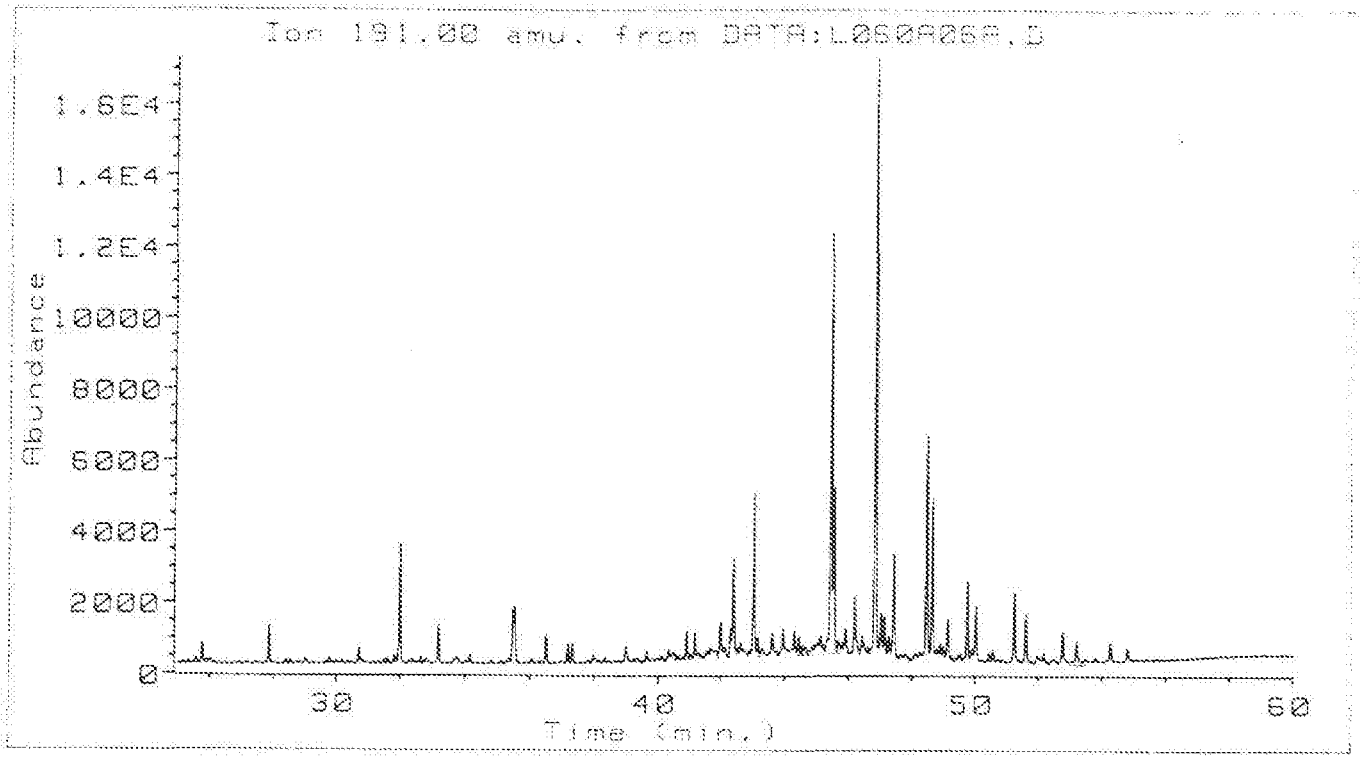
BIOMSTANDARD



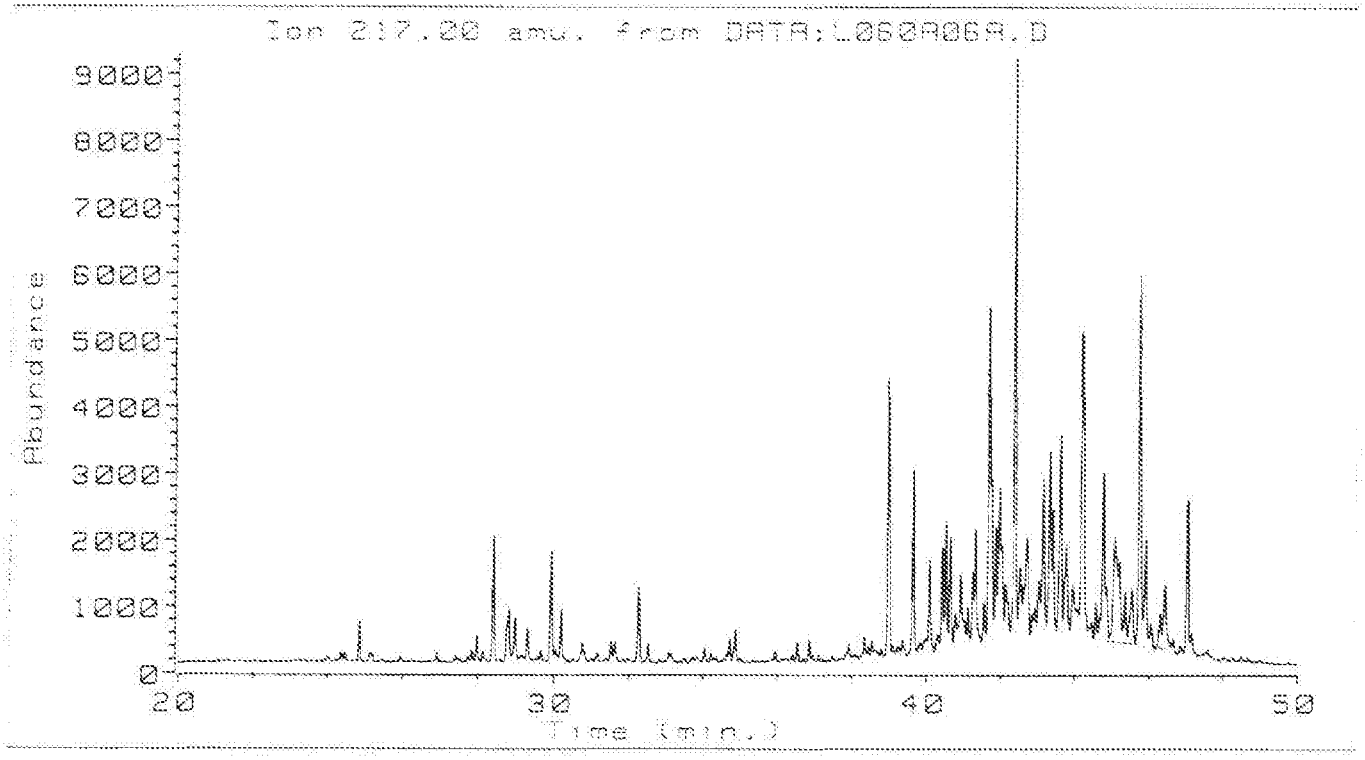


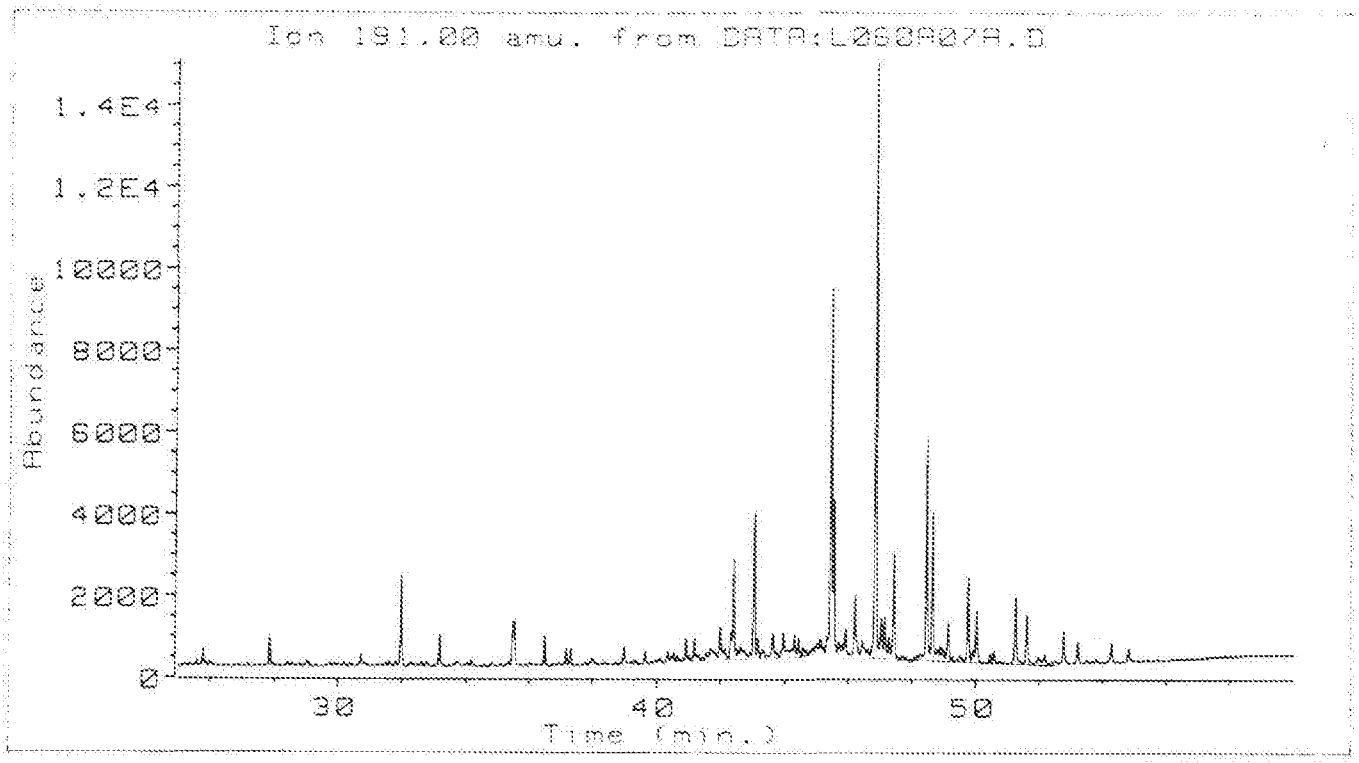
34/8-3 SWC 2835 m



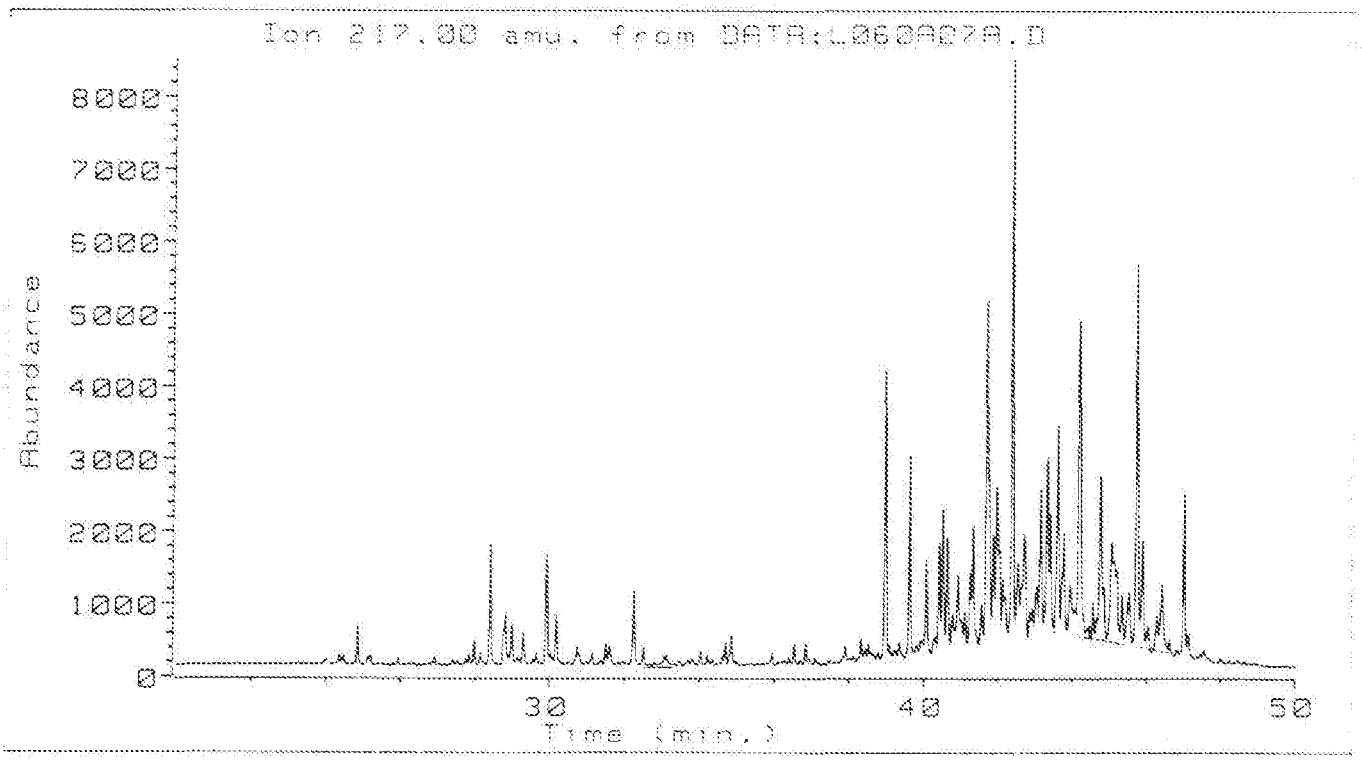


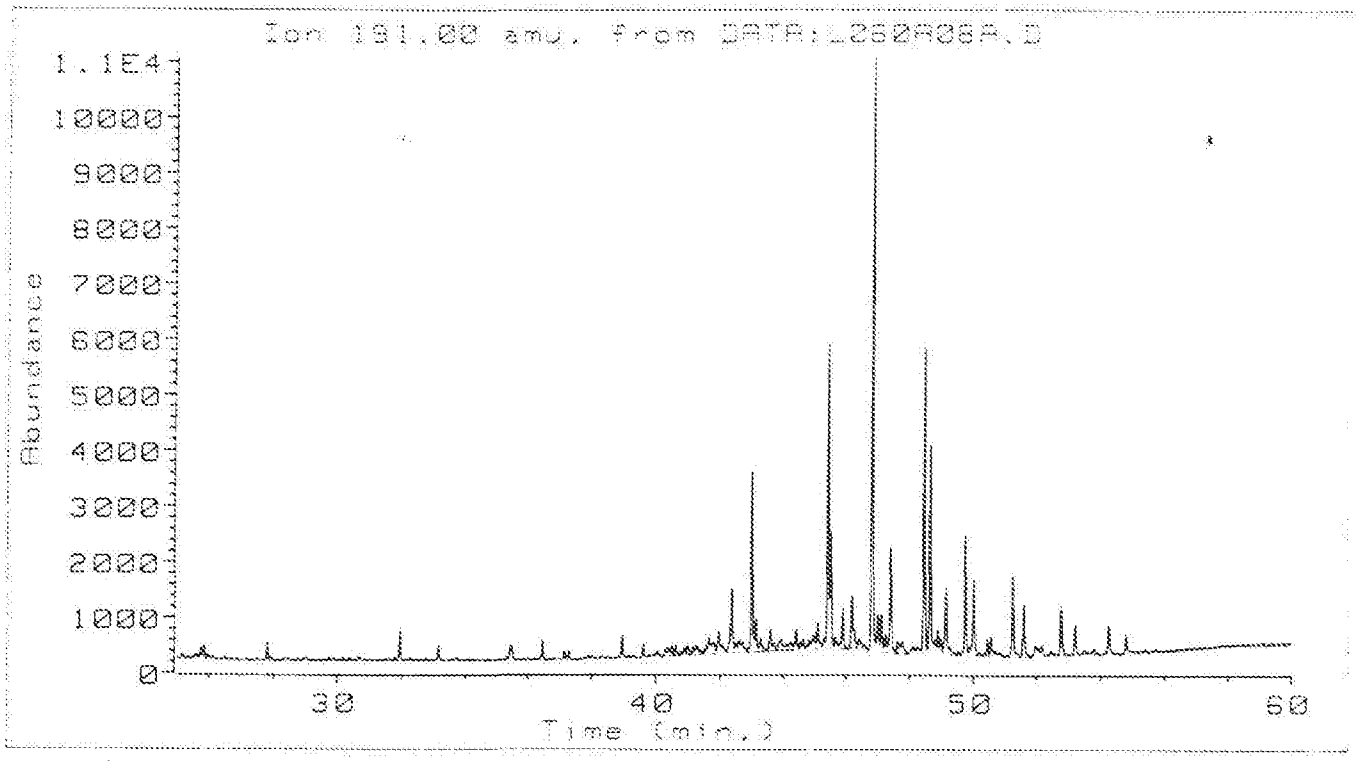
34/8-3A SWC 3005 m



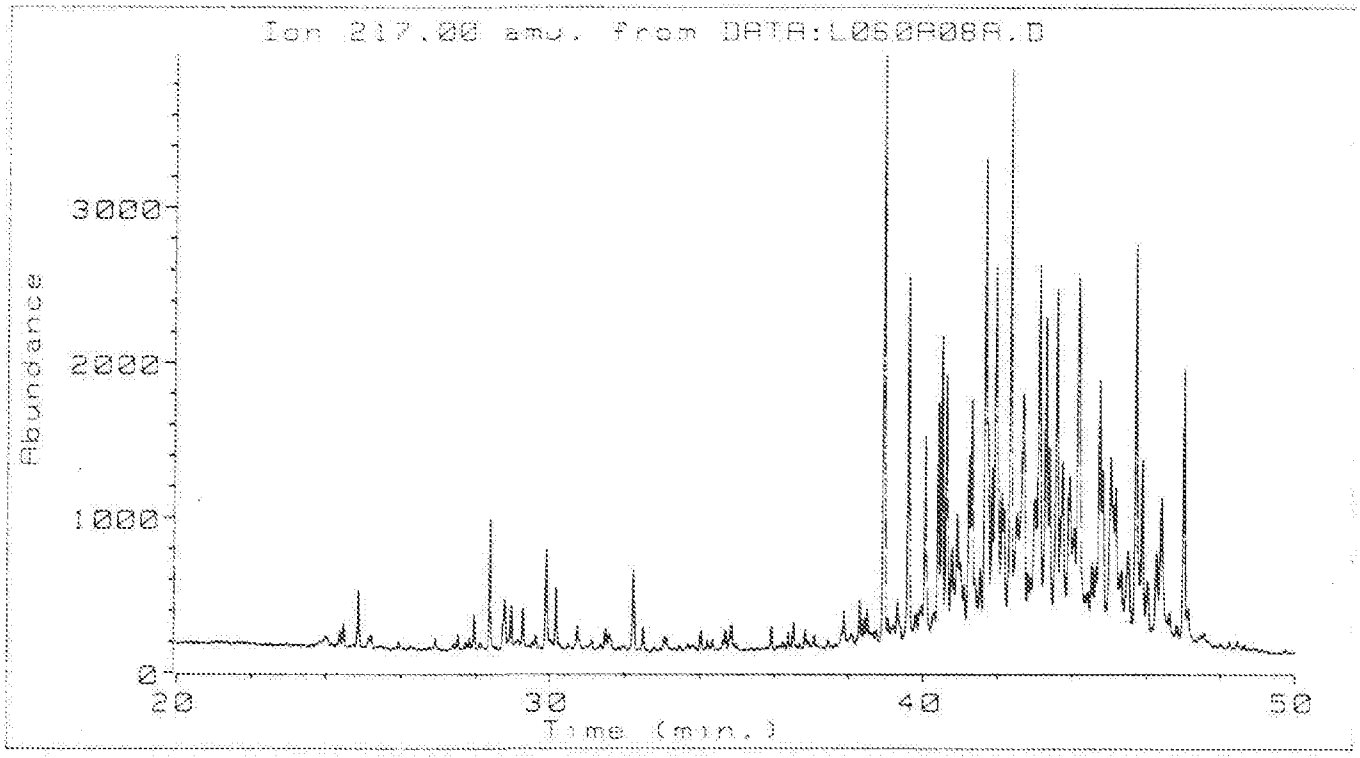


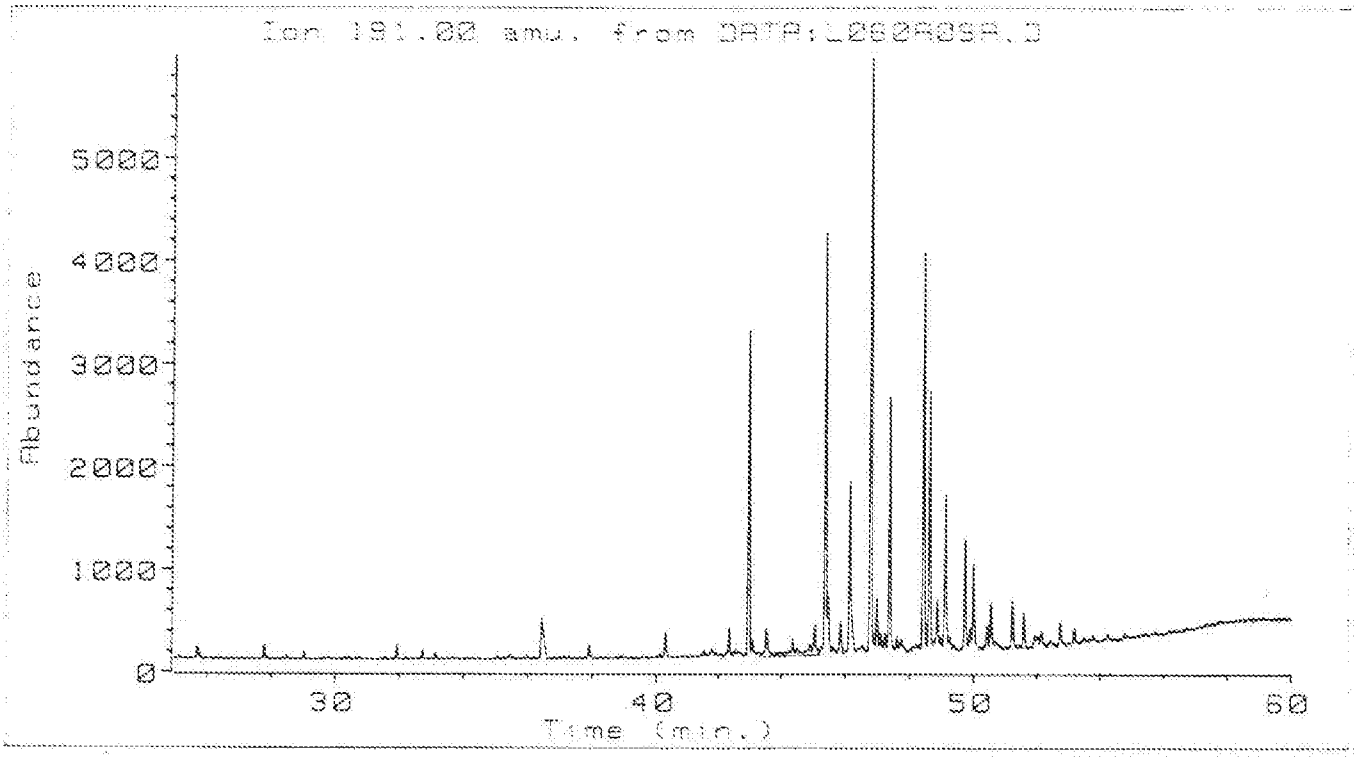
34/8-3A SWC 3007.5 m



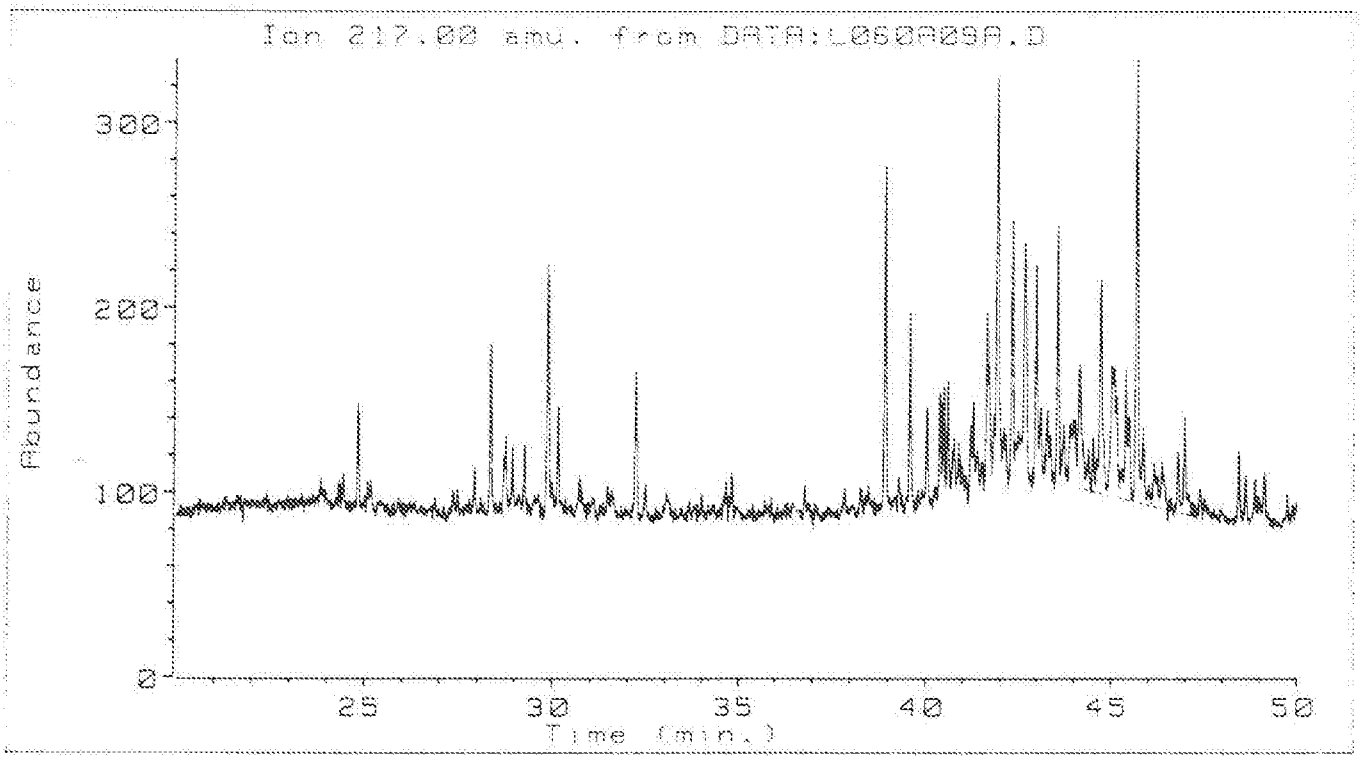


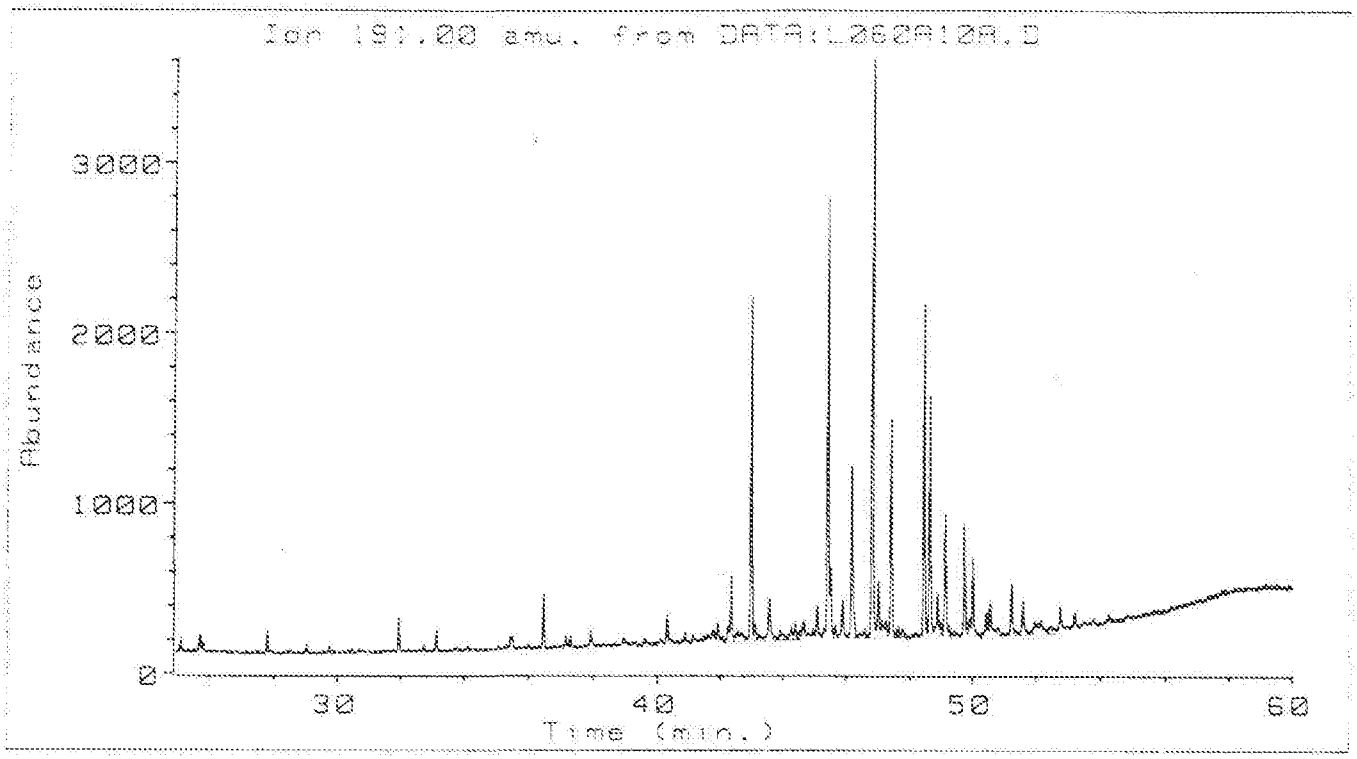
34/8-3A SWC 3011 m



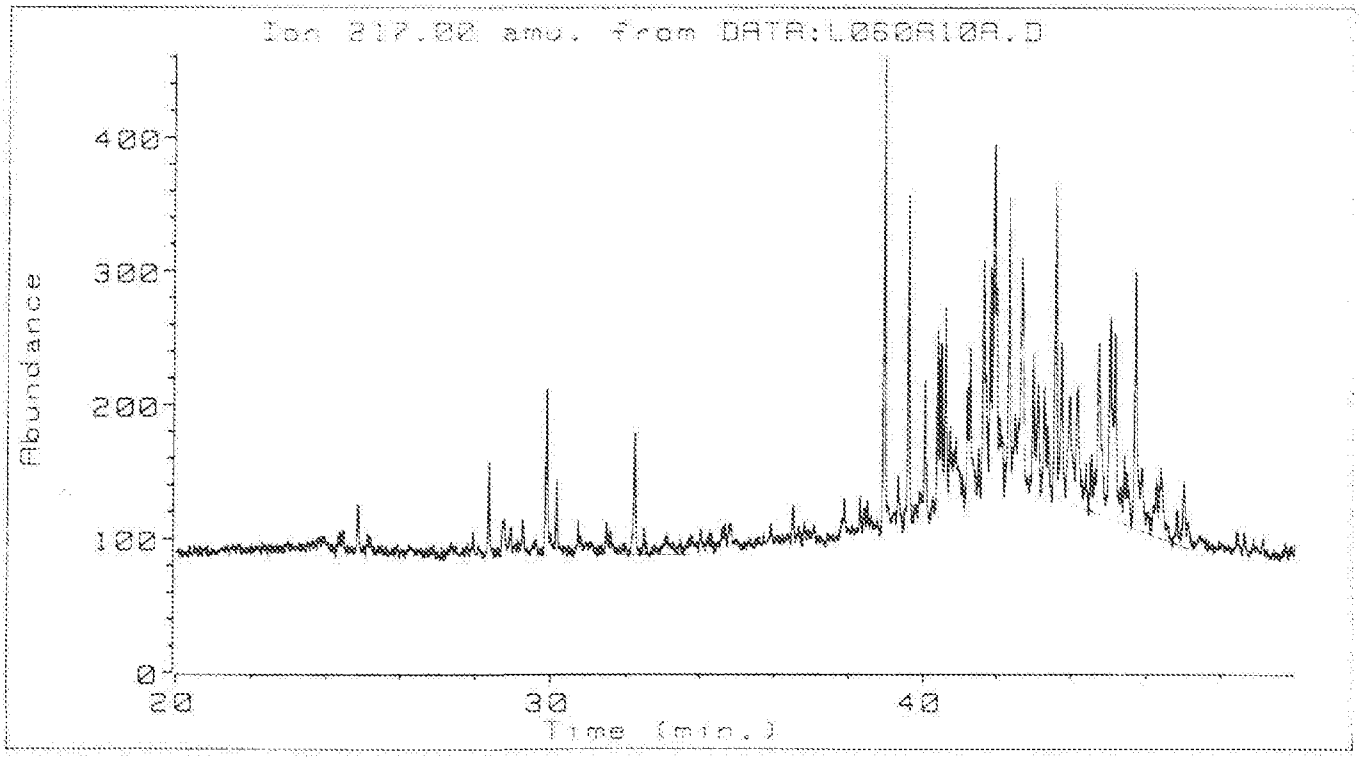


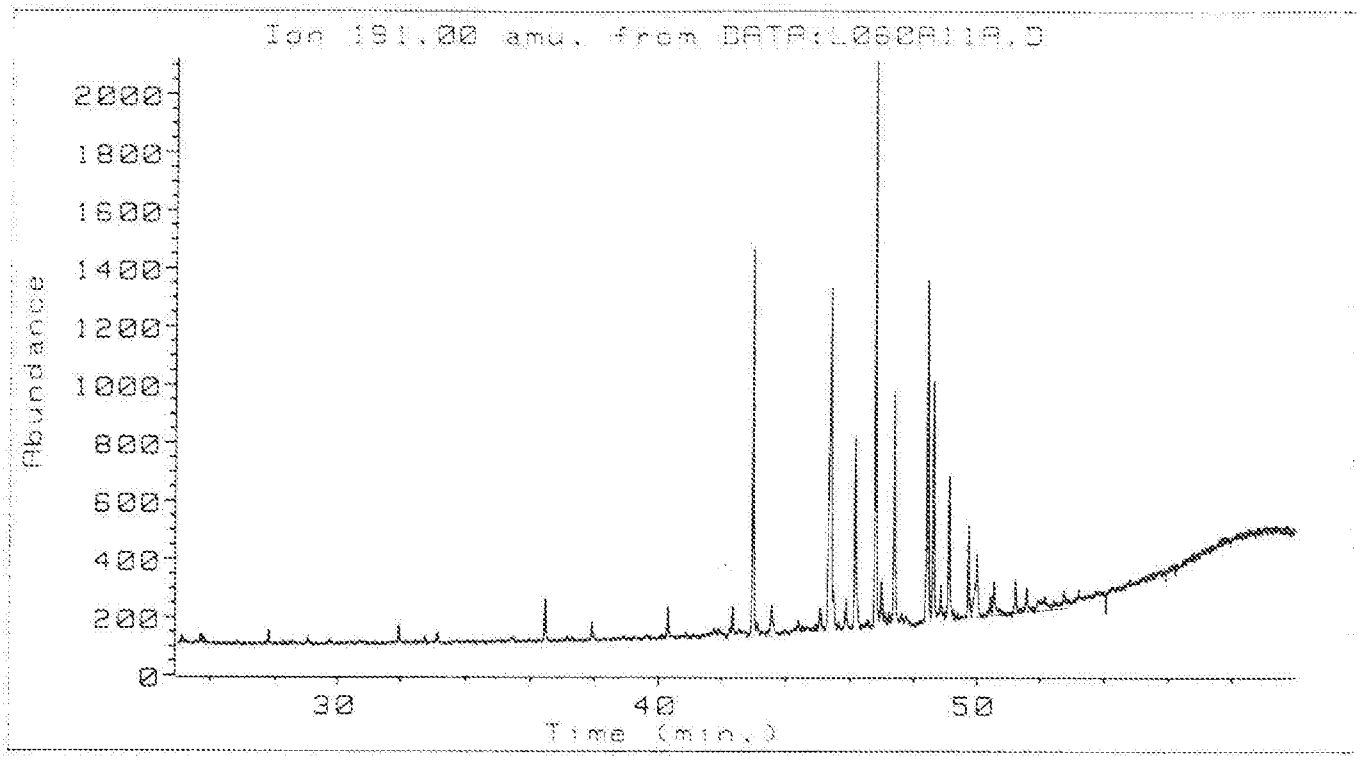
34/8-3A SWC 3016 m





34/8-3A SWC 3018 m





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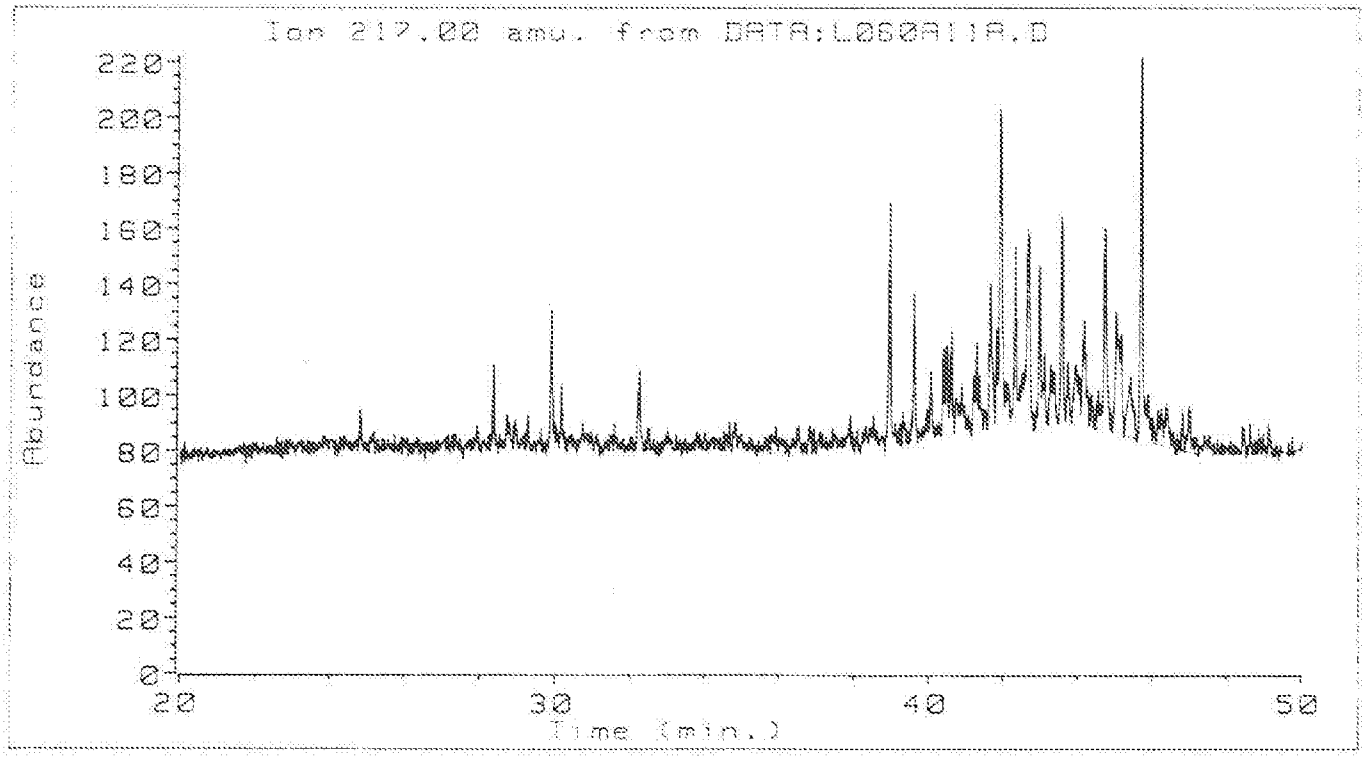
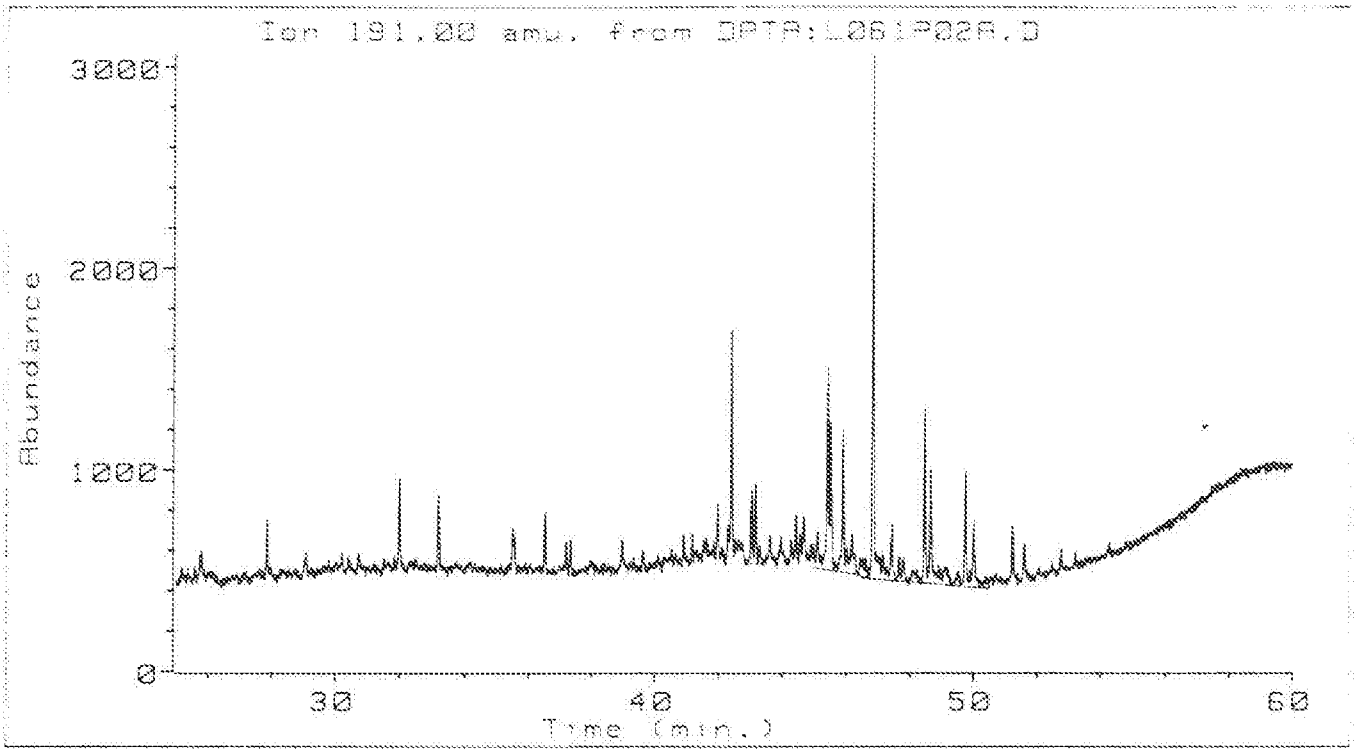
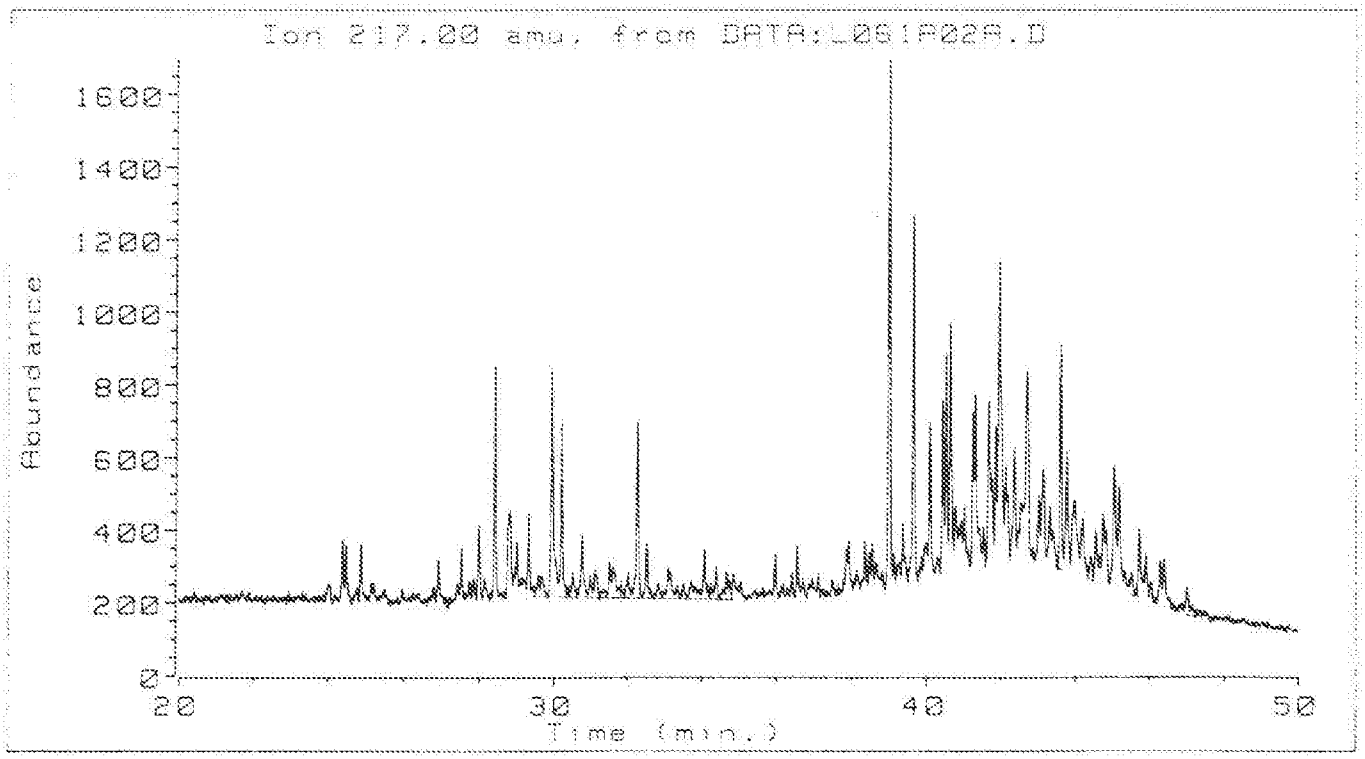
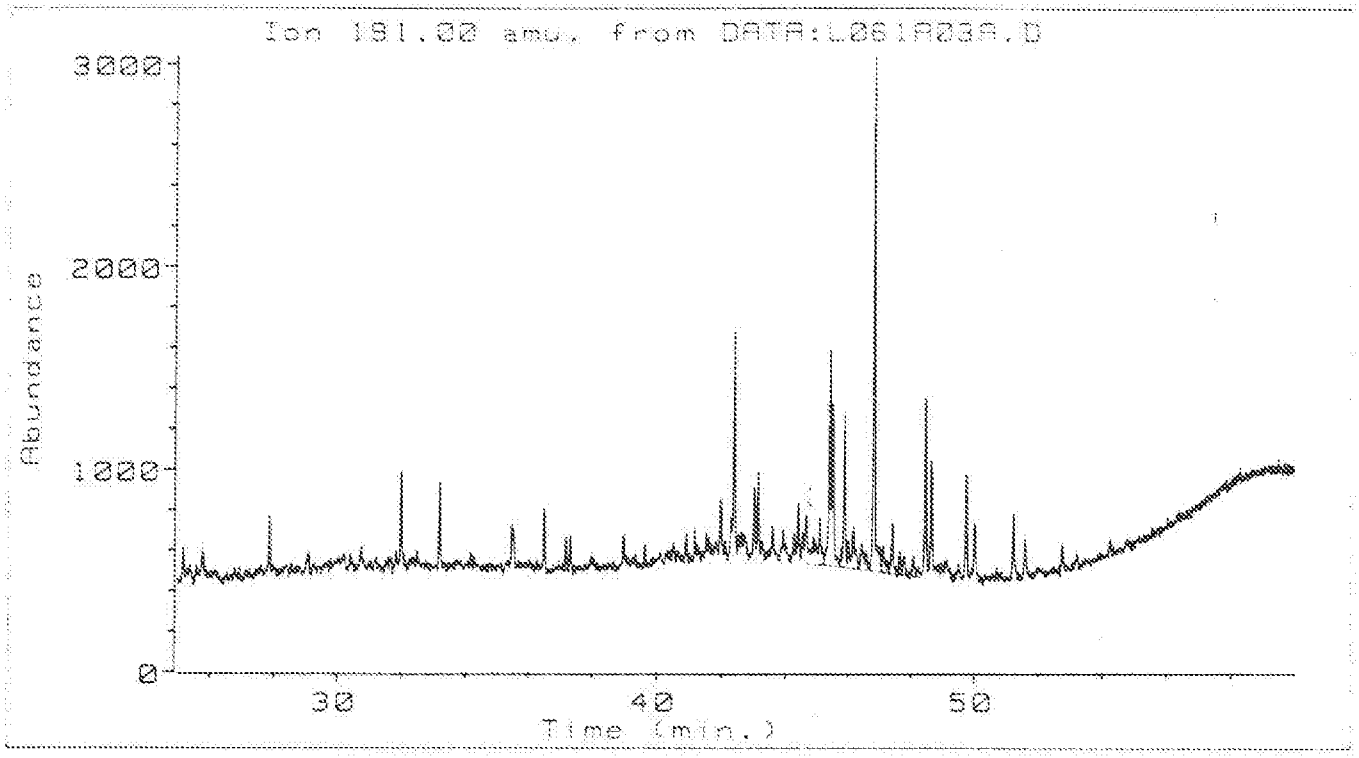




34/8-3A CC 3036.25 m





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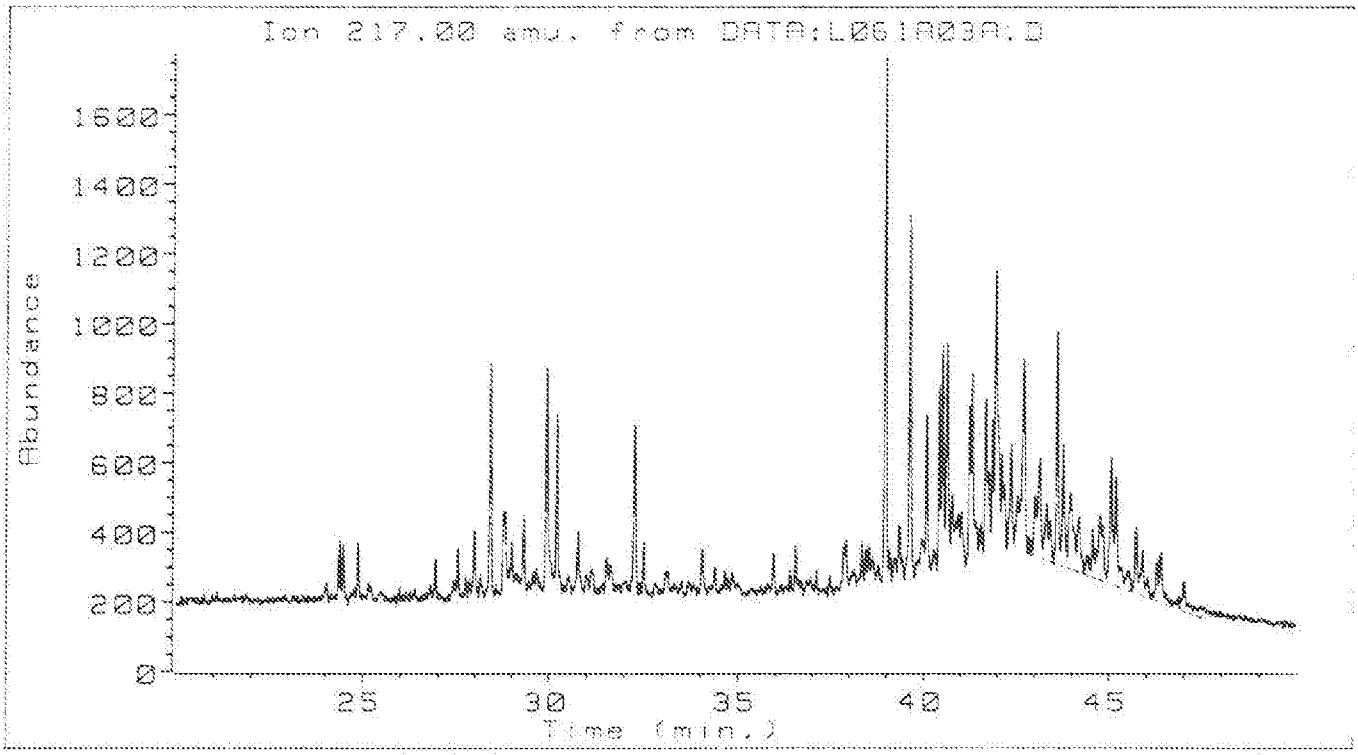

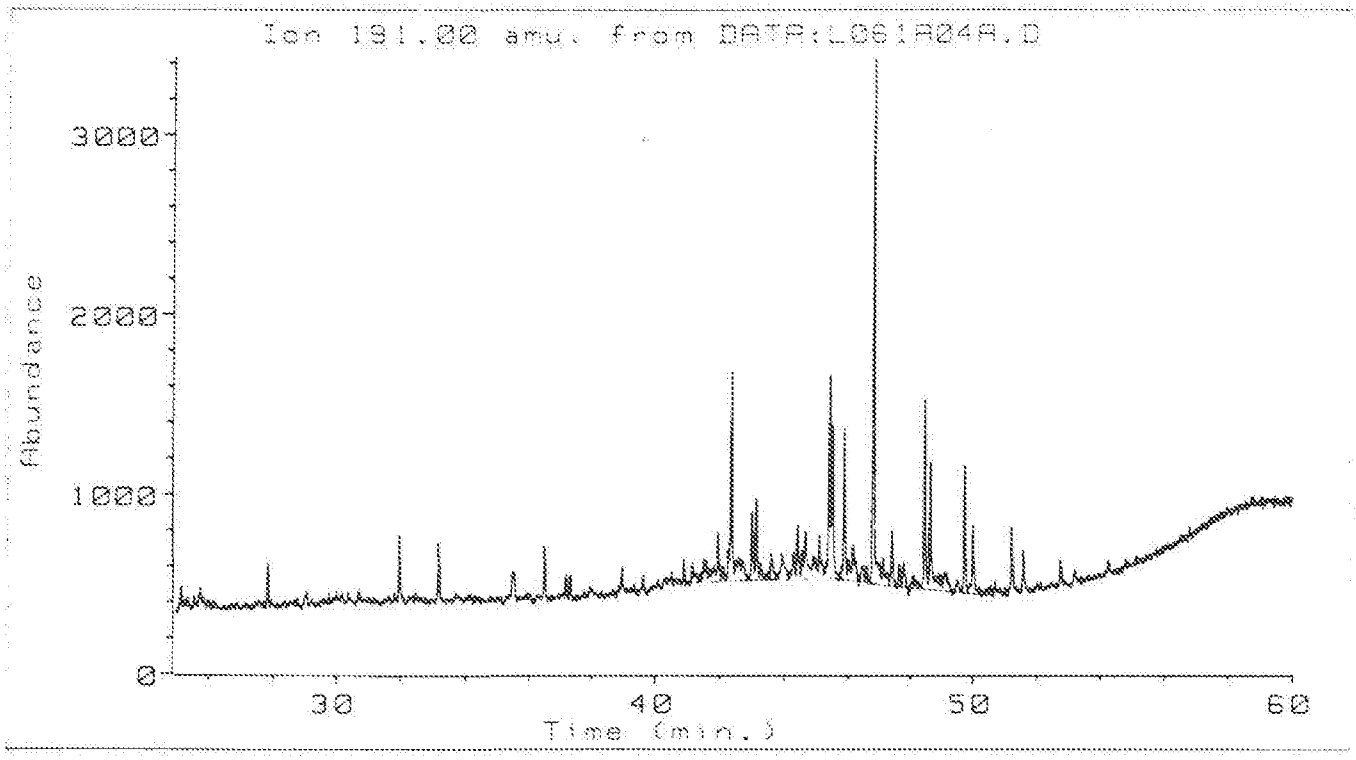

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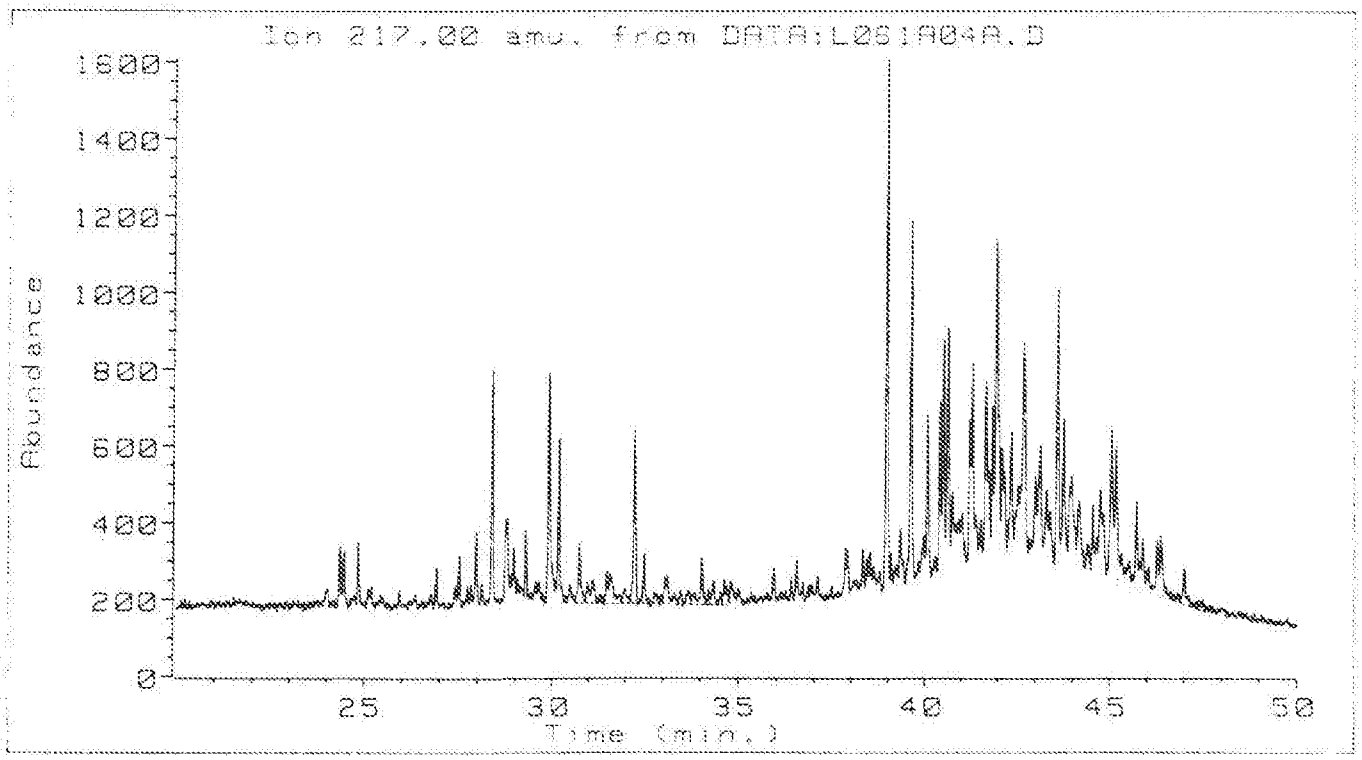
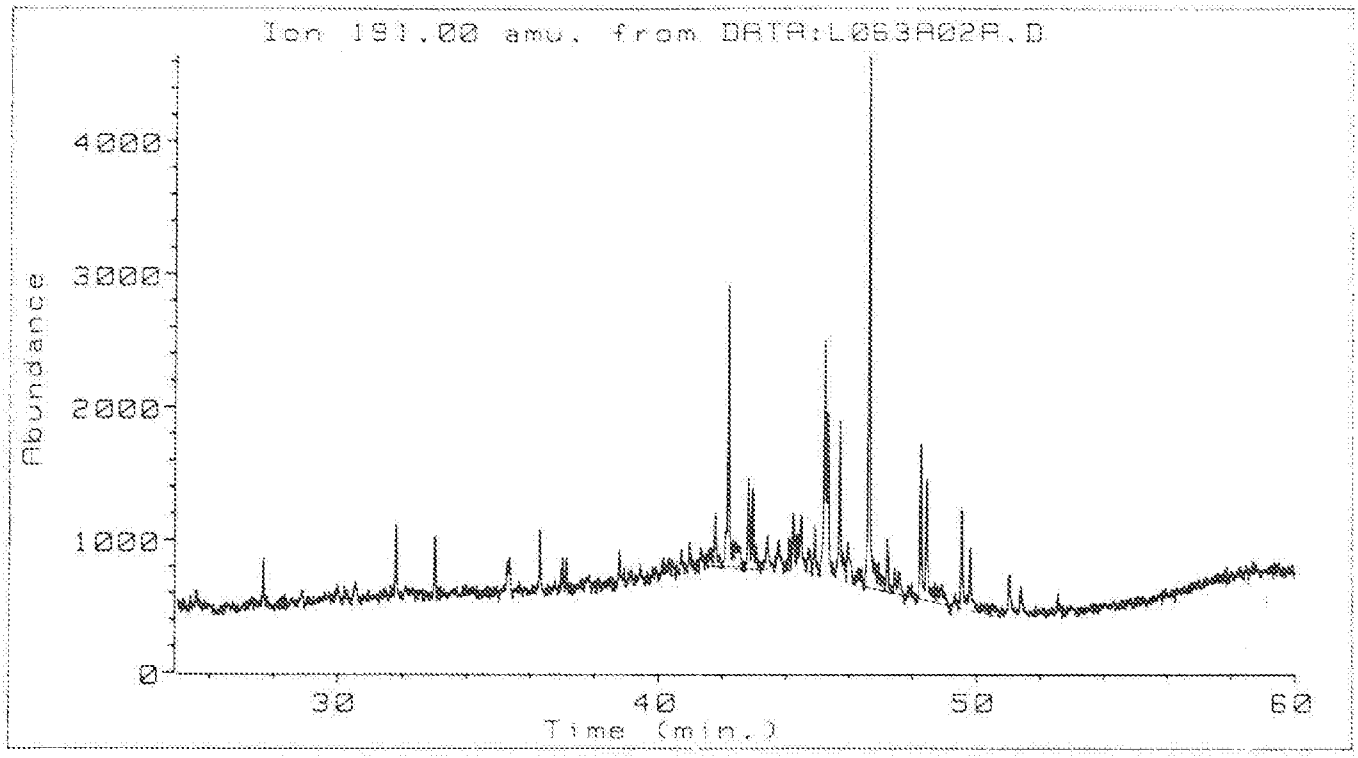
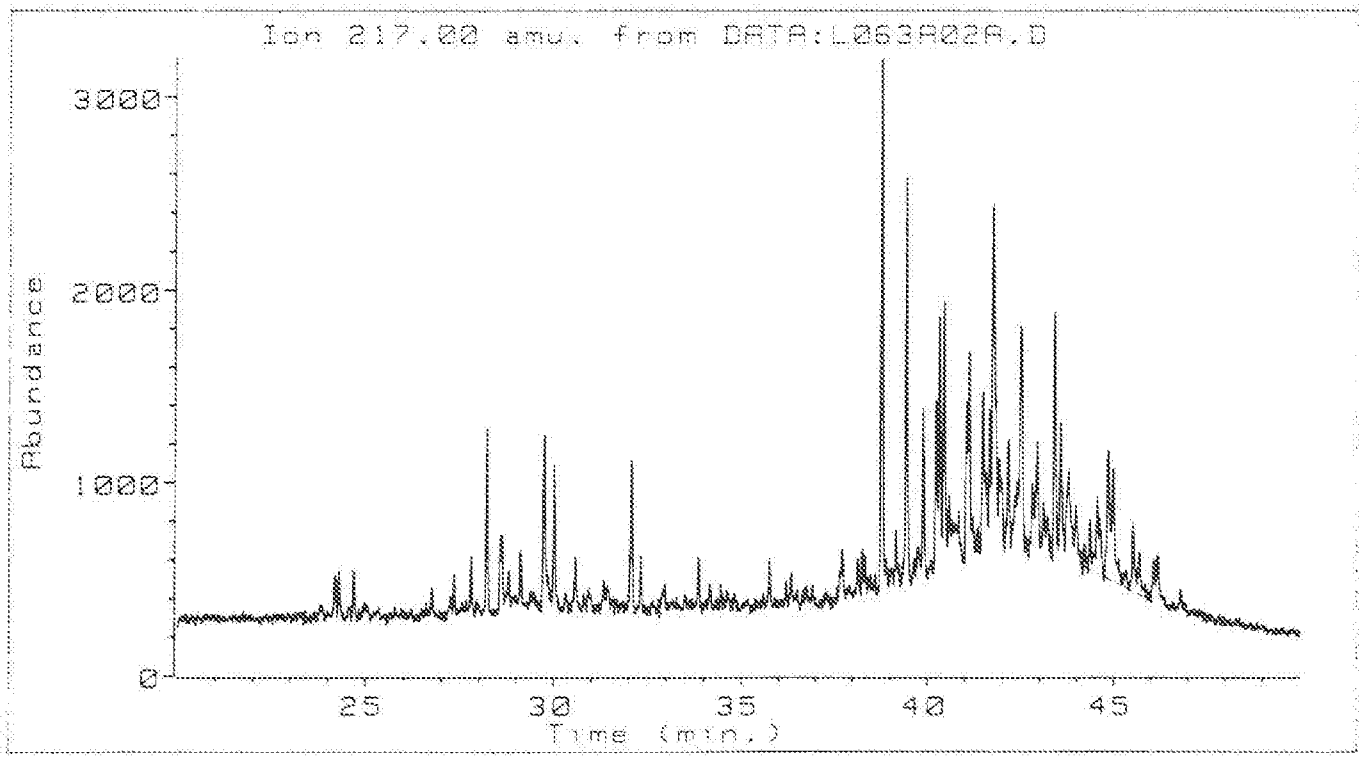
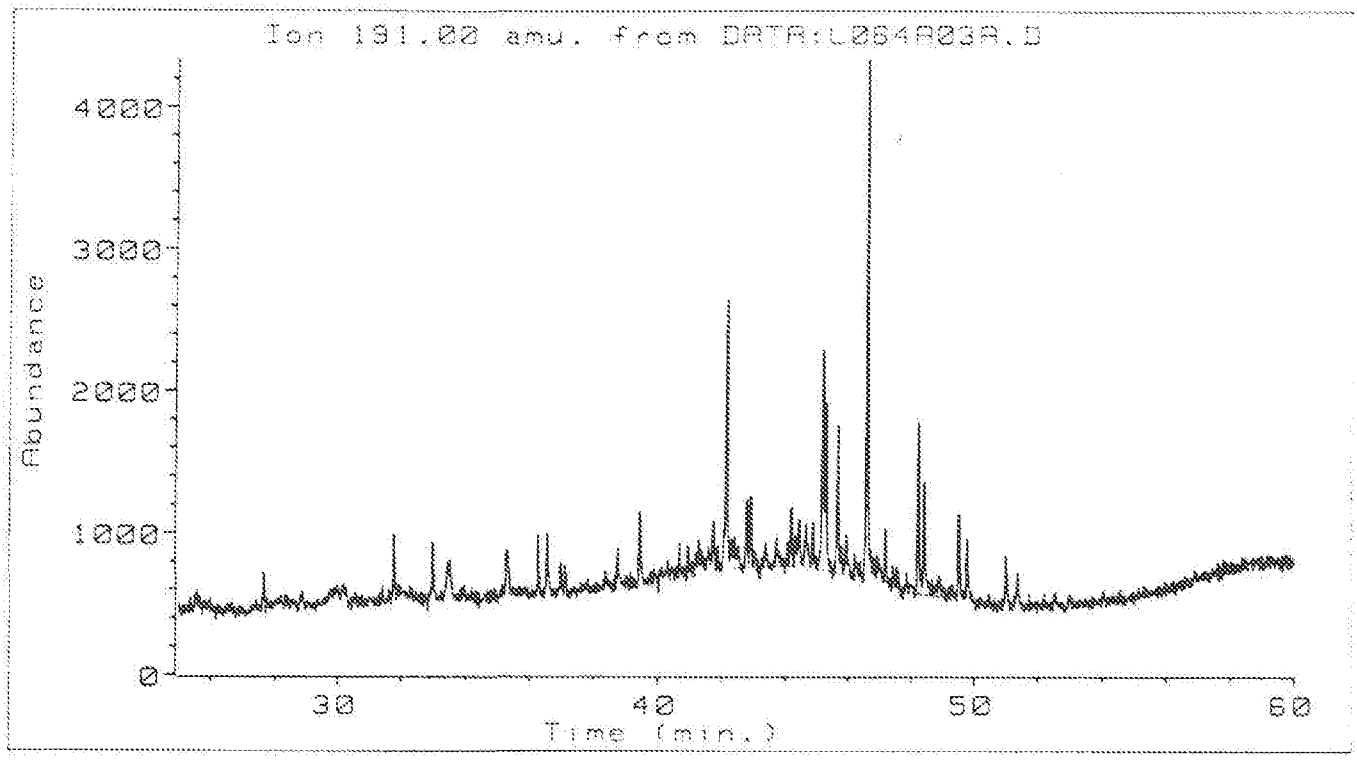




34/8-3A CC 3070.25 m





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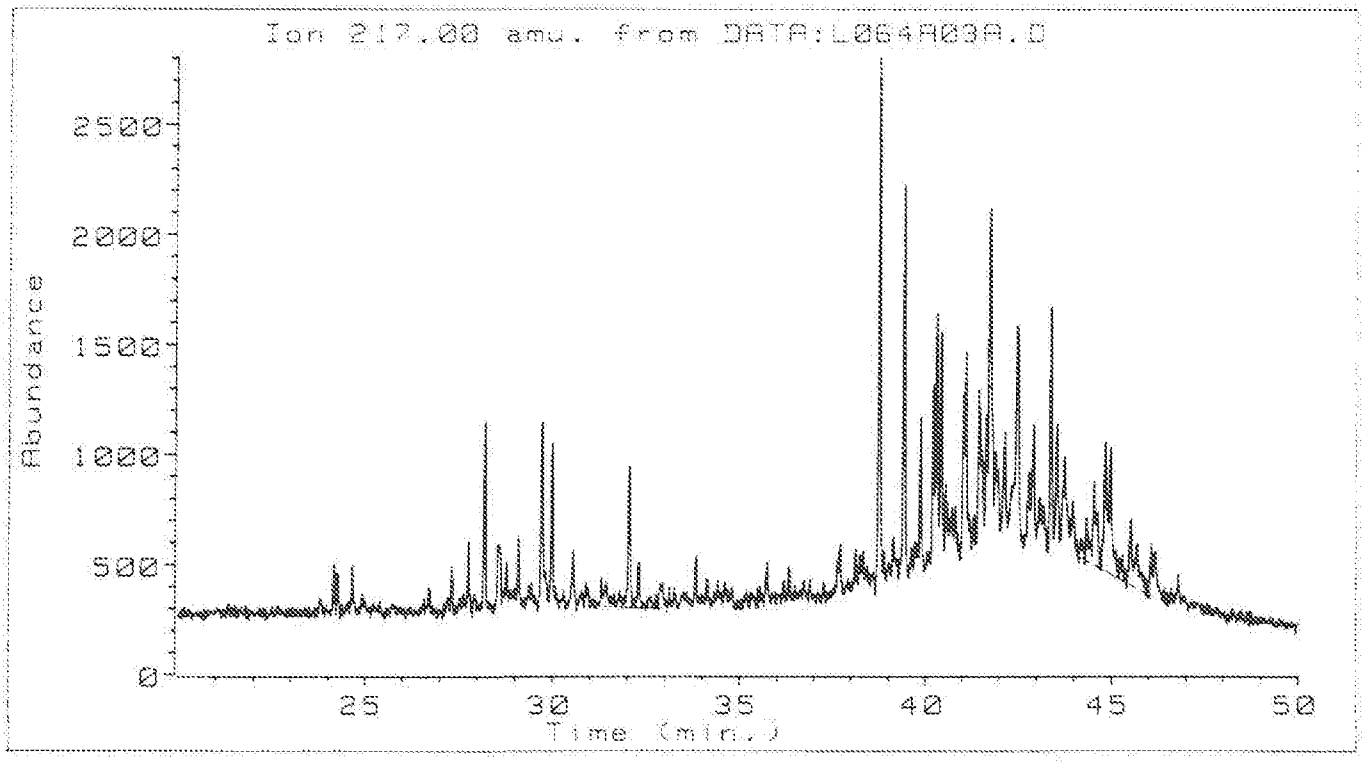
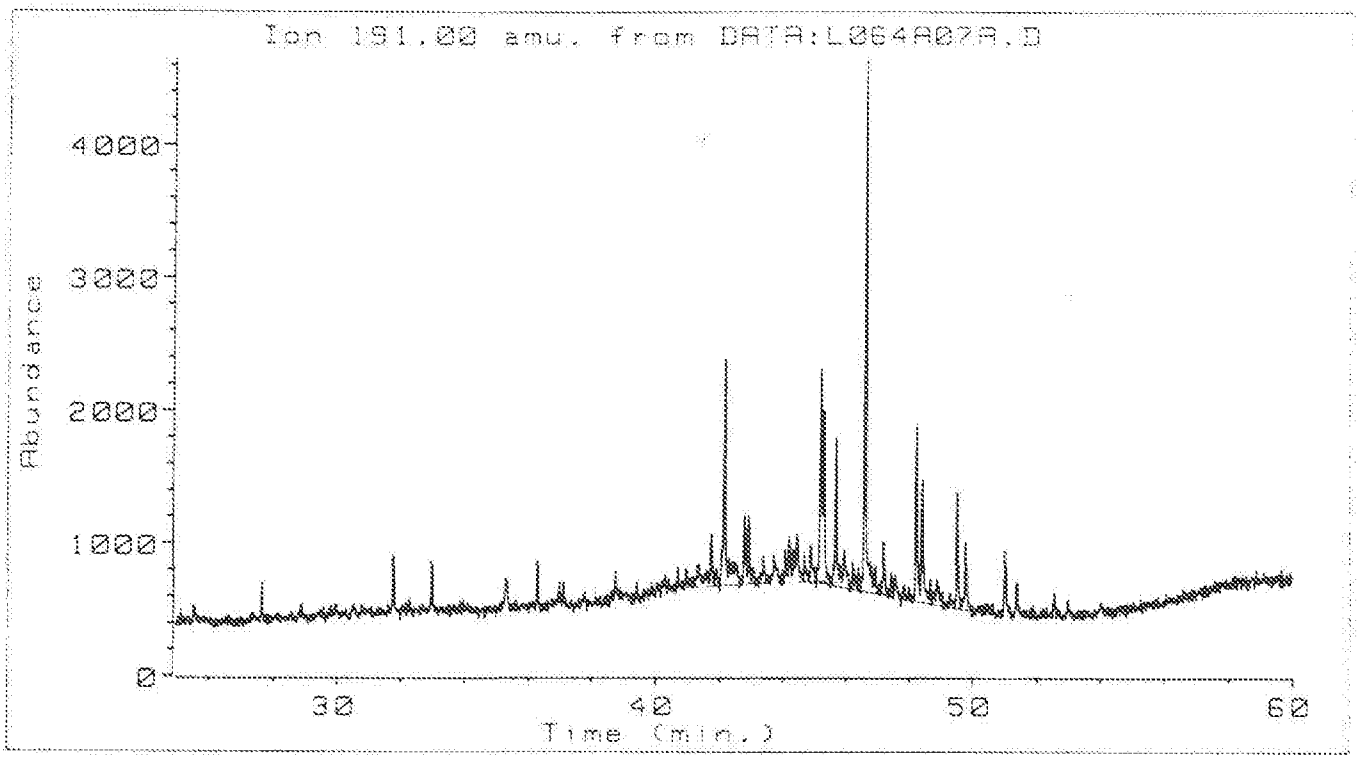
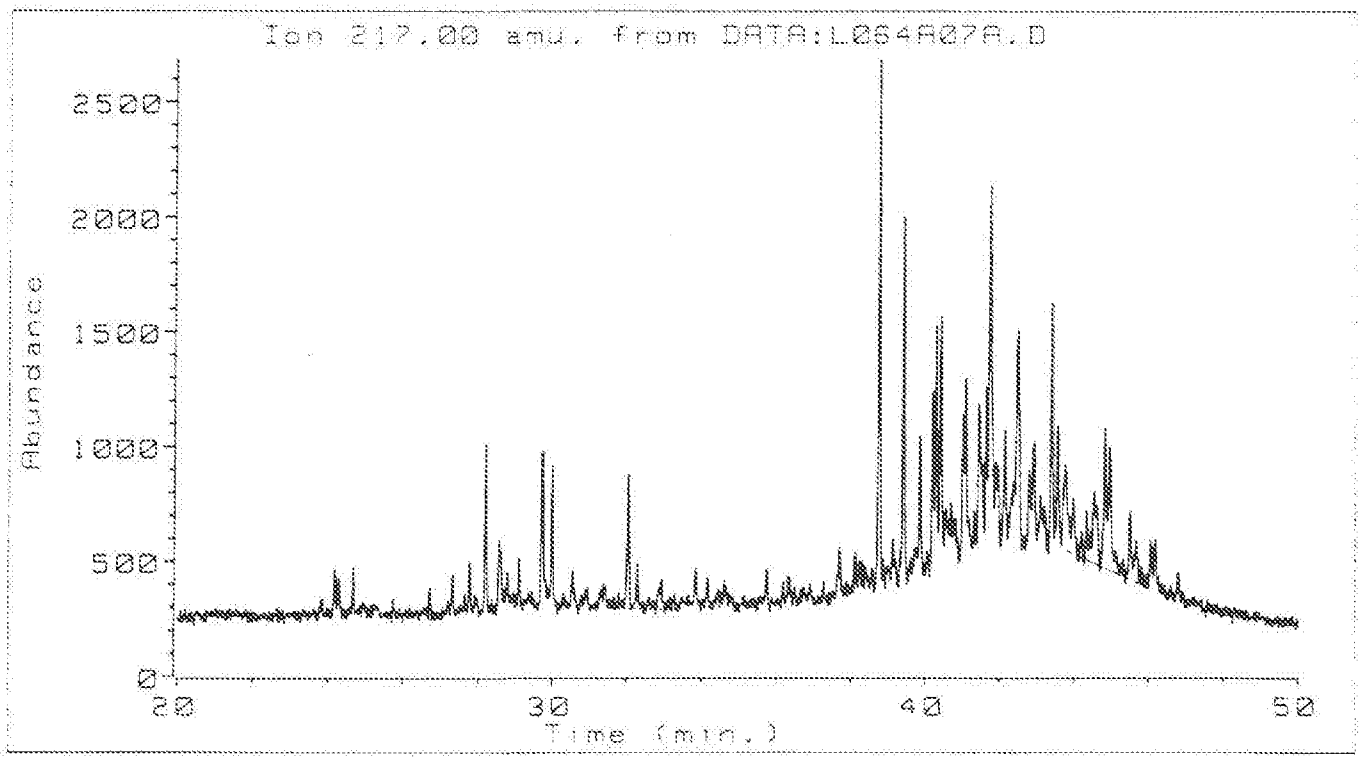
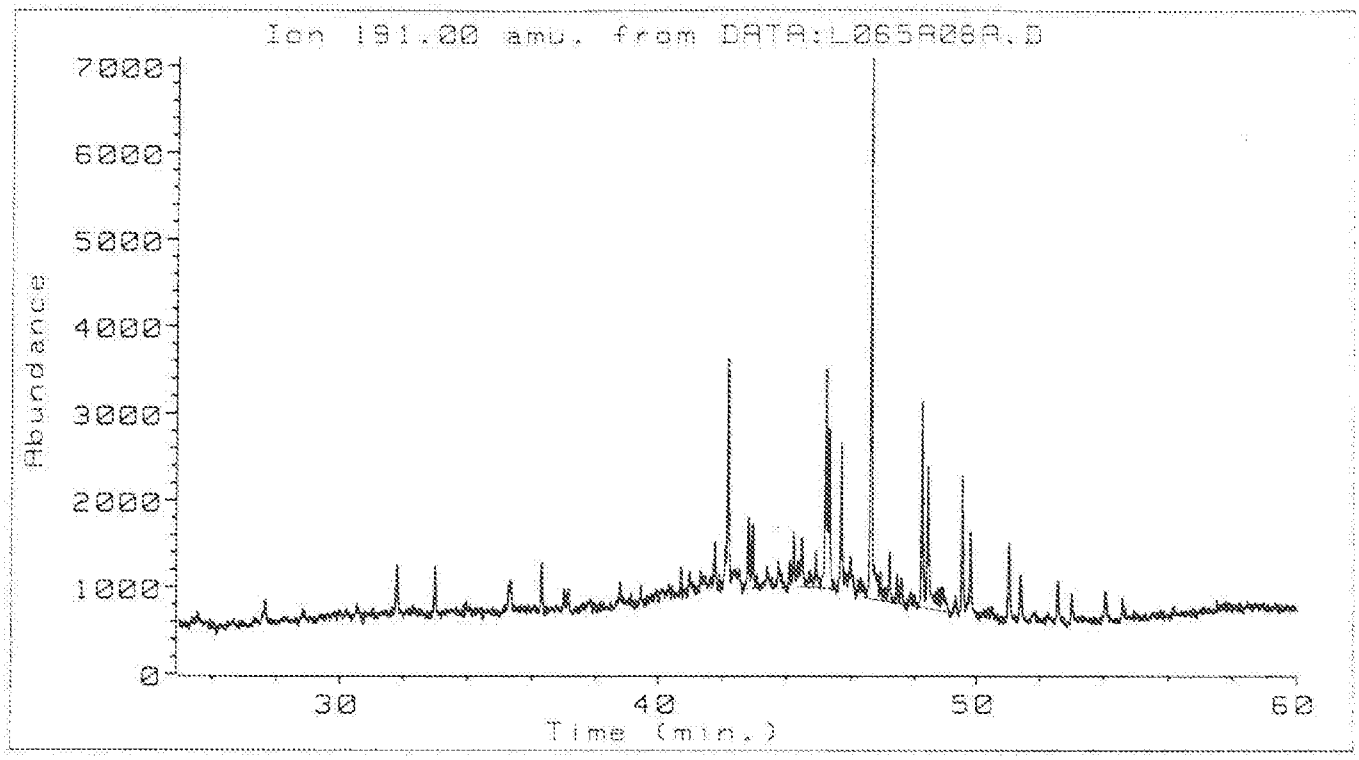




34/8-3A CC 3091.75 m





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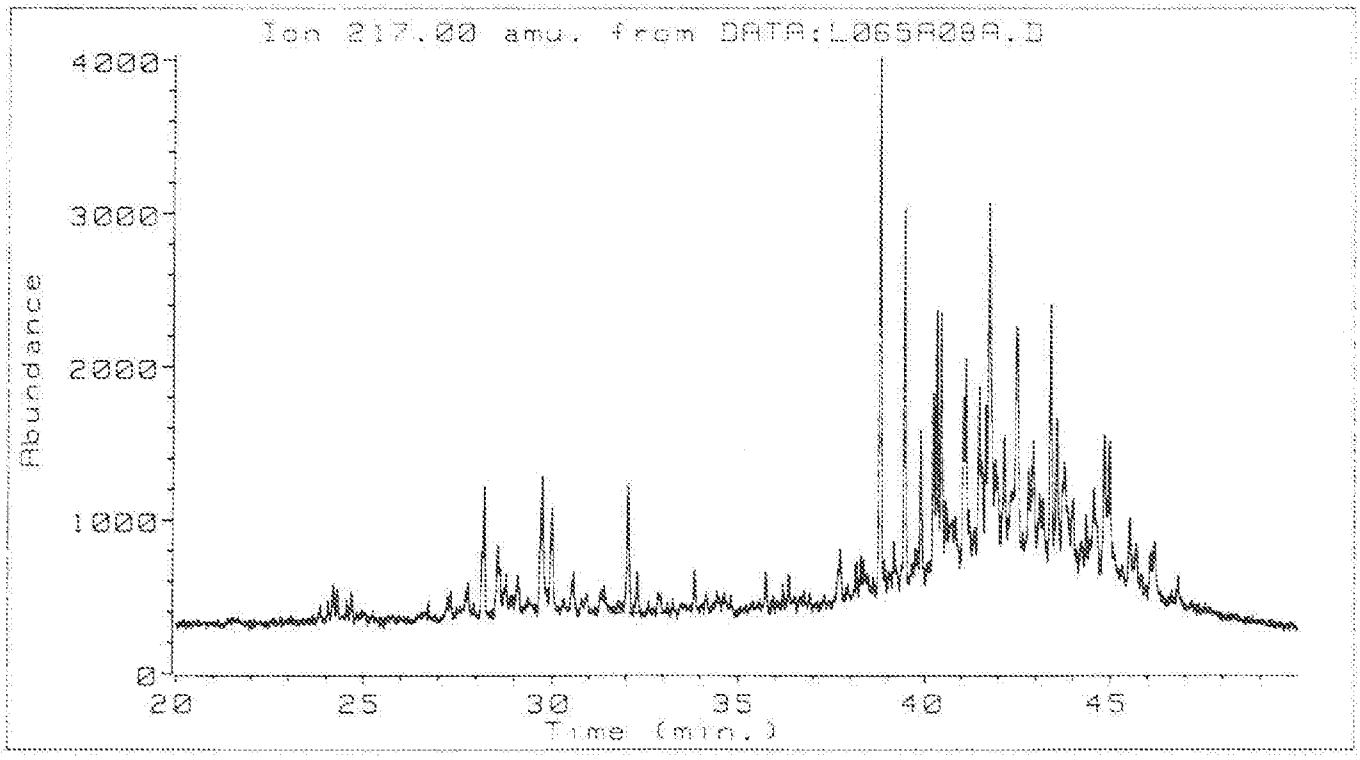

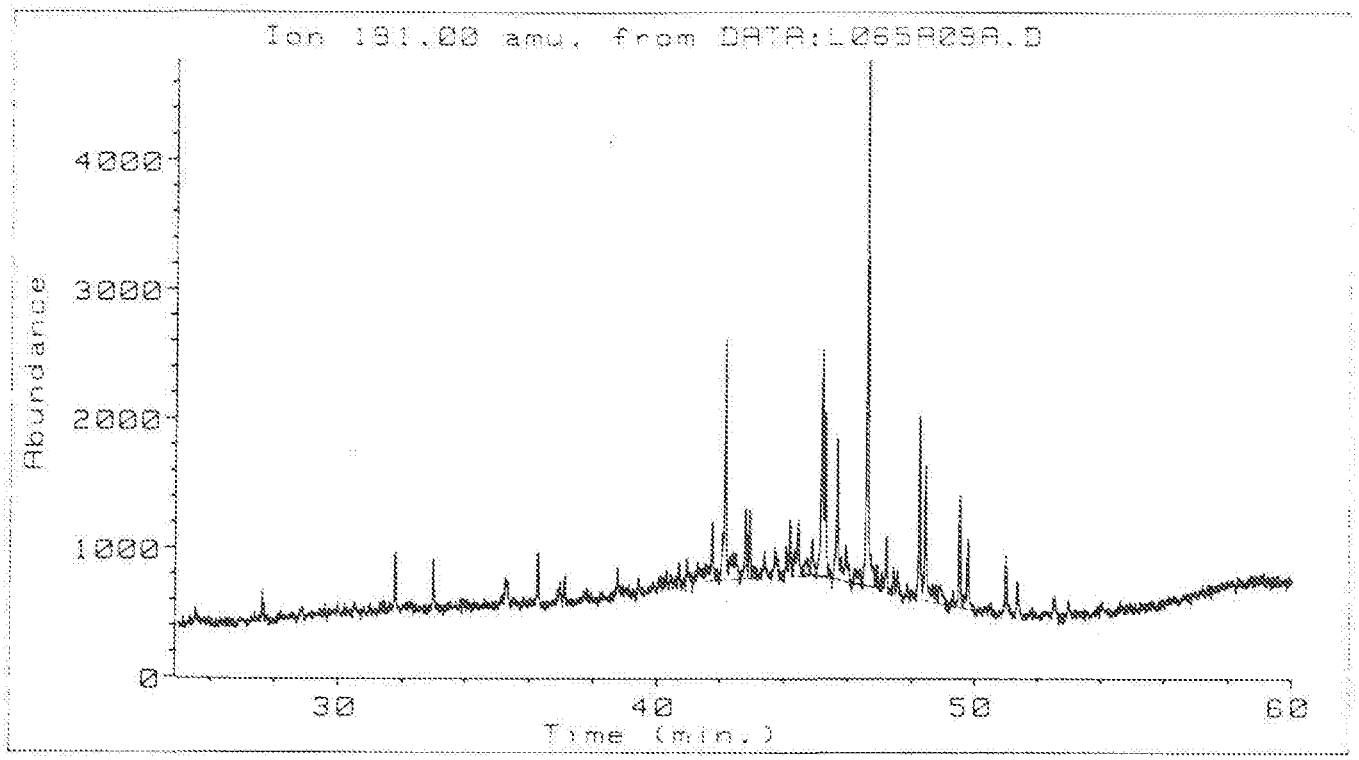

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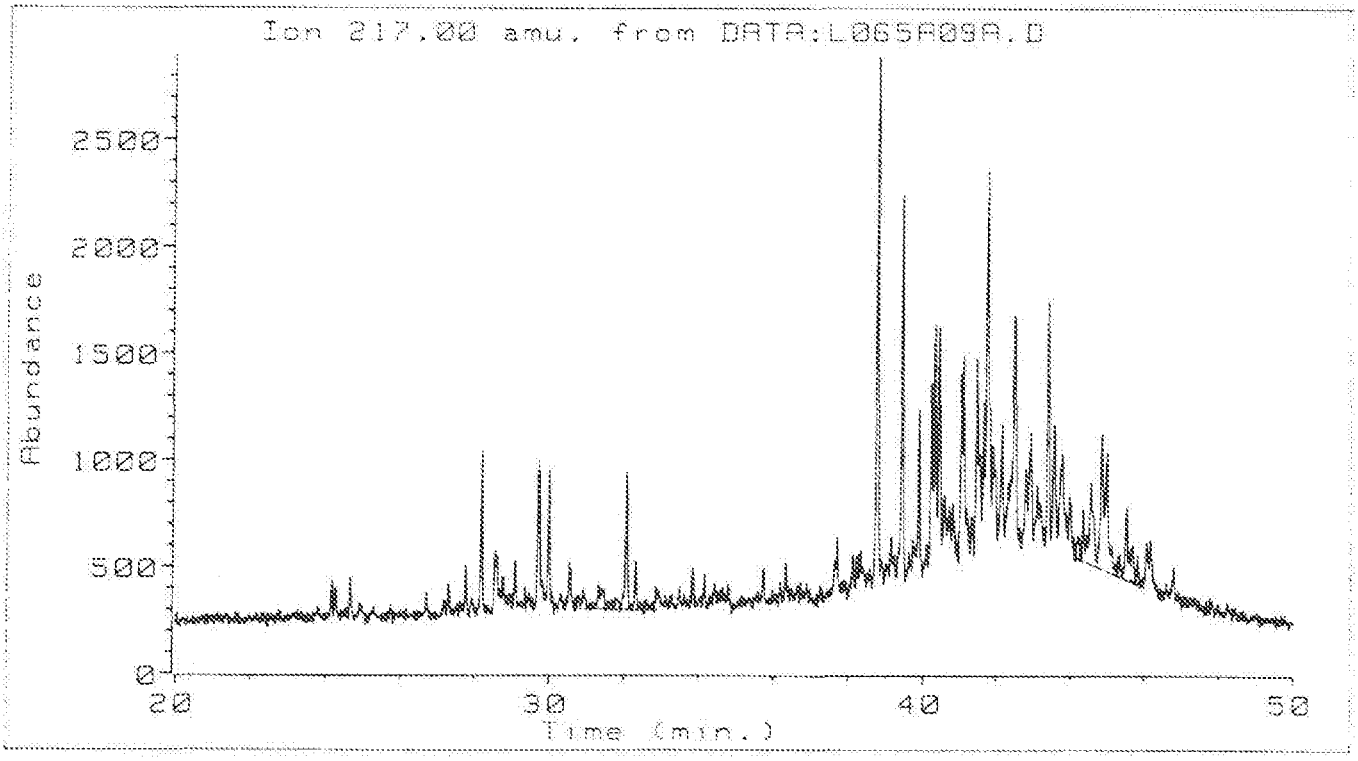

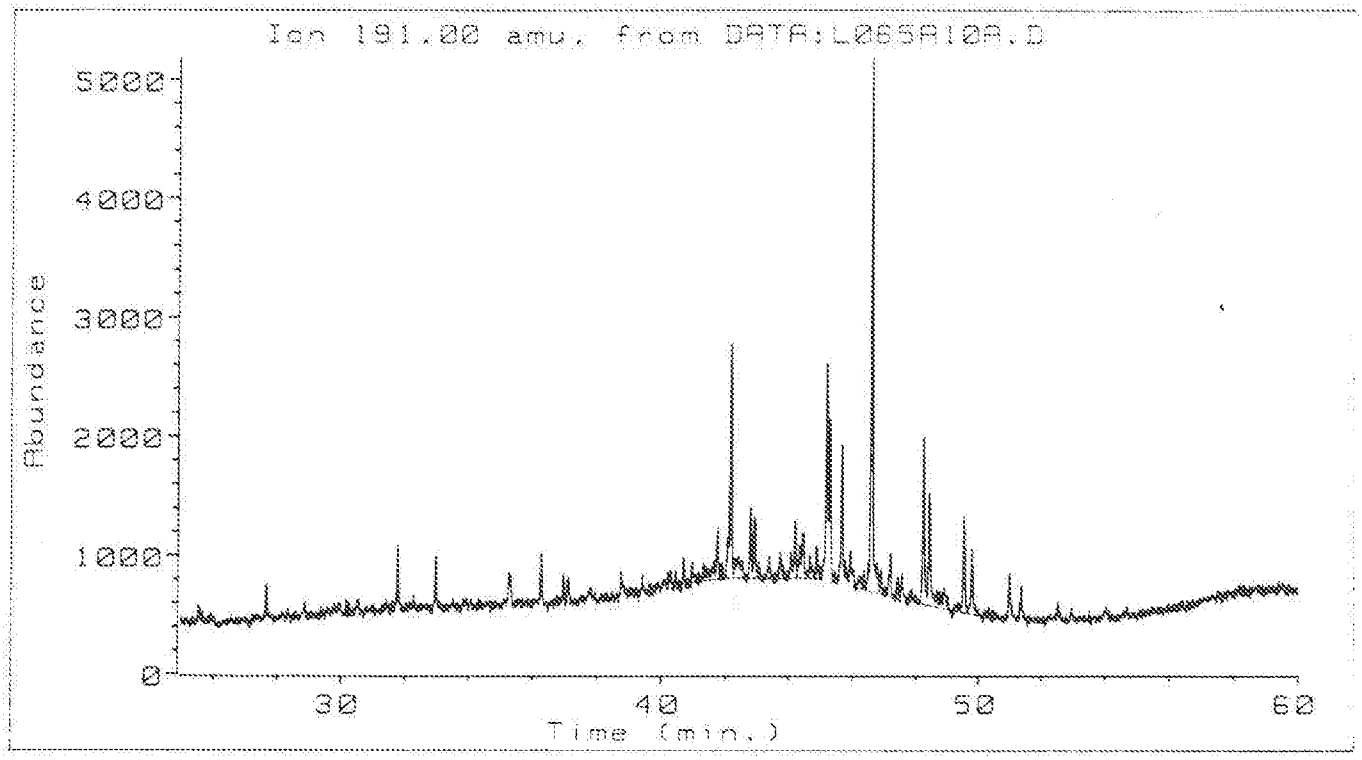

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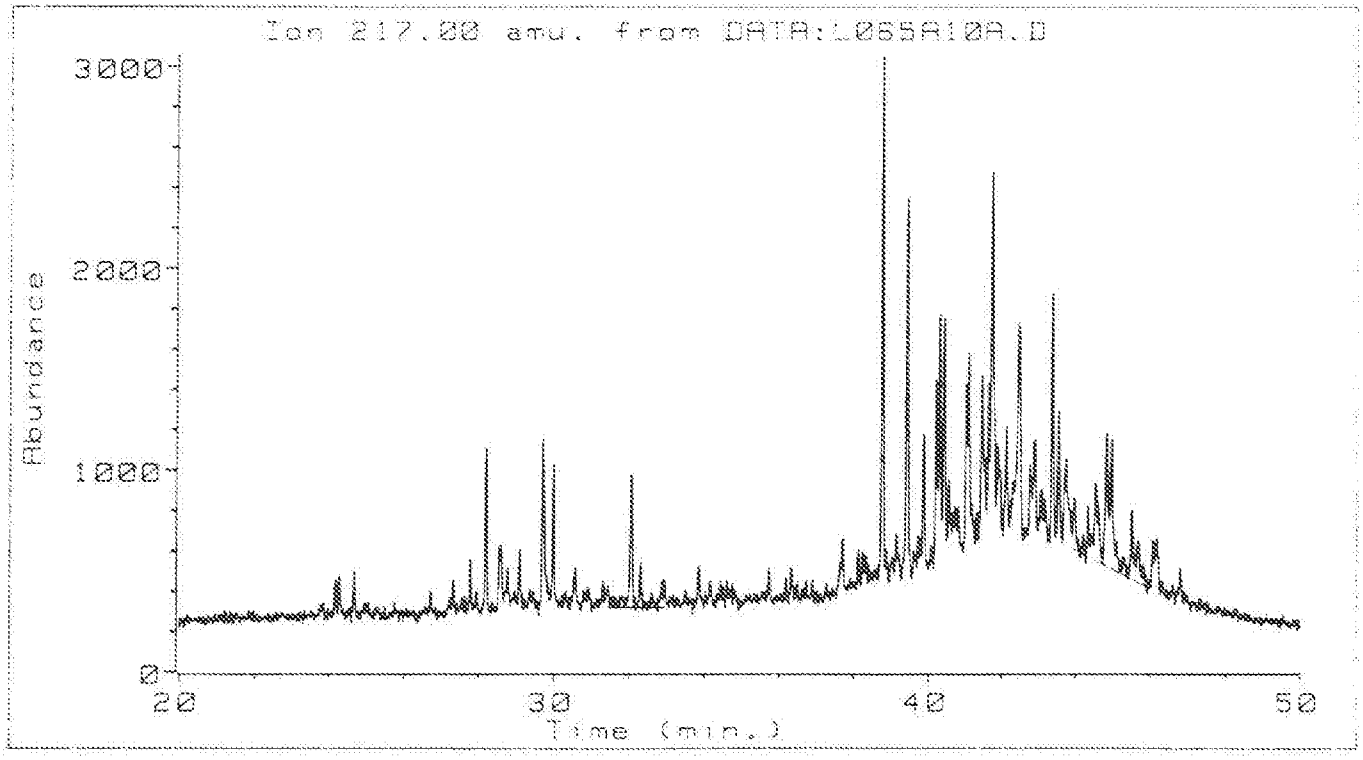

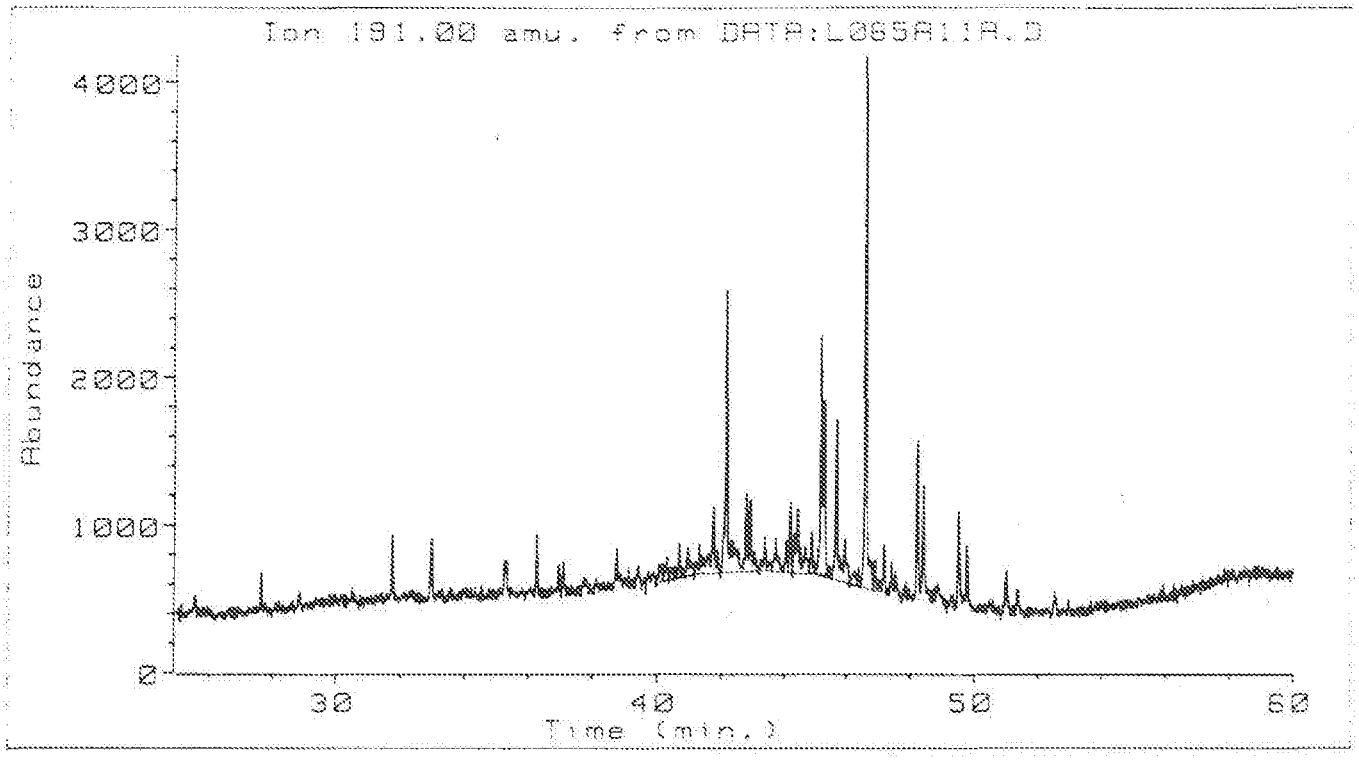

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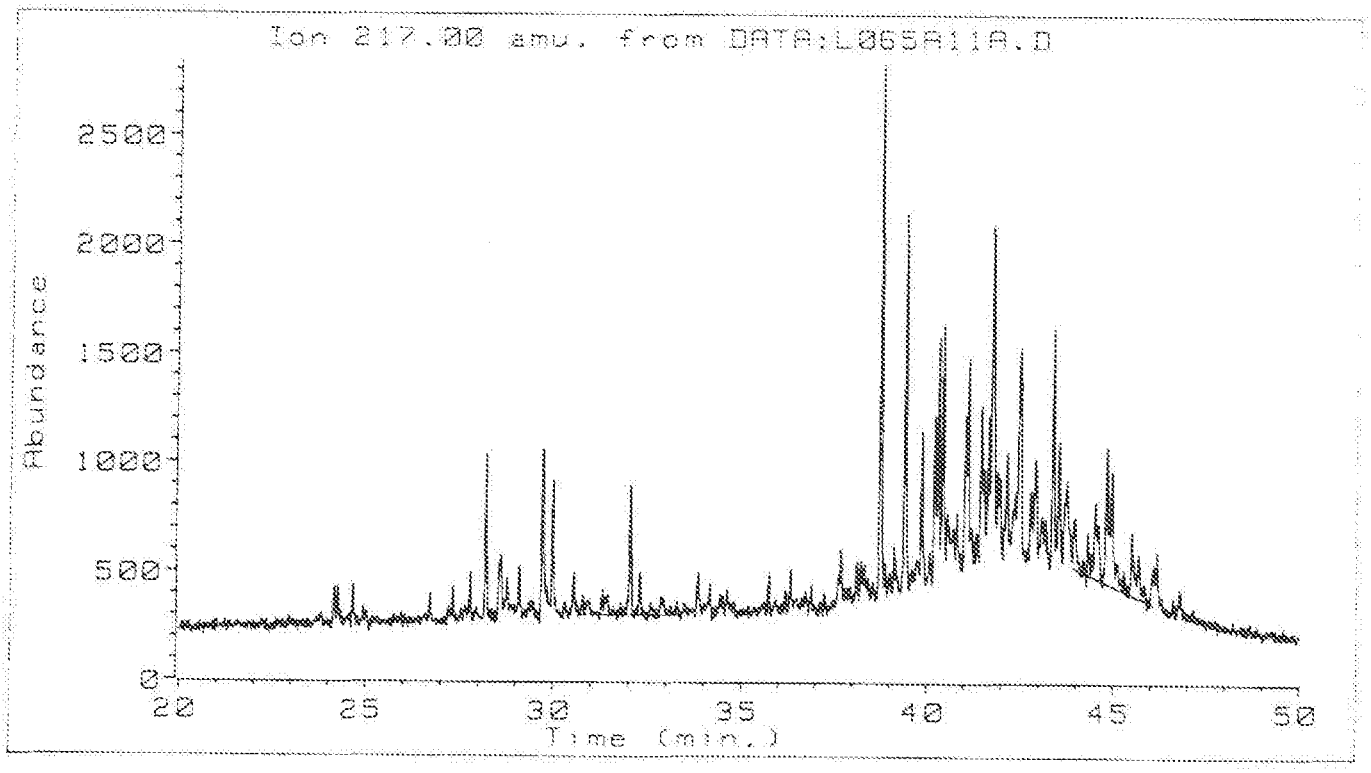

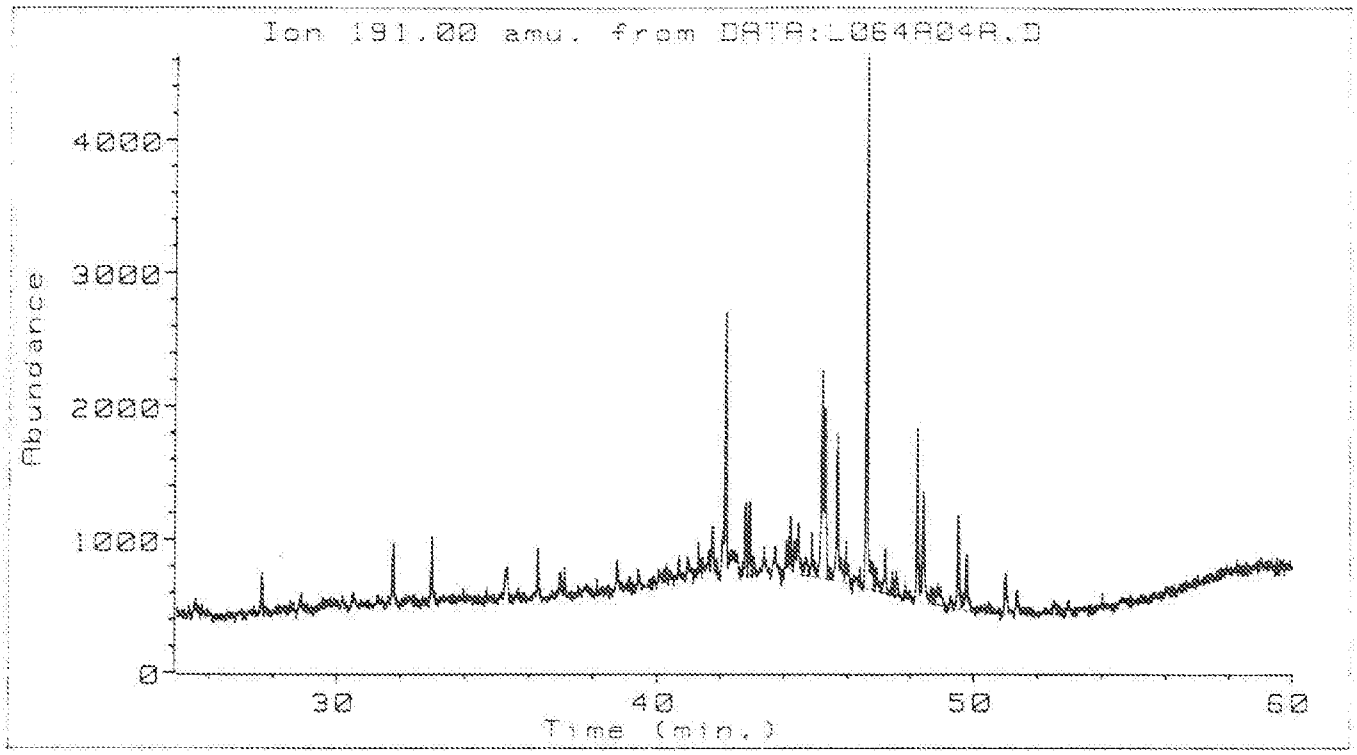

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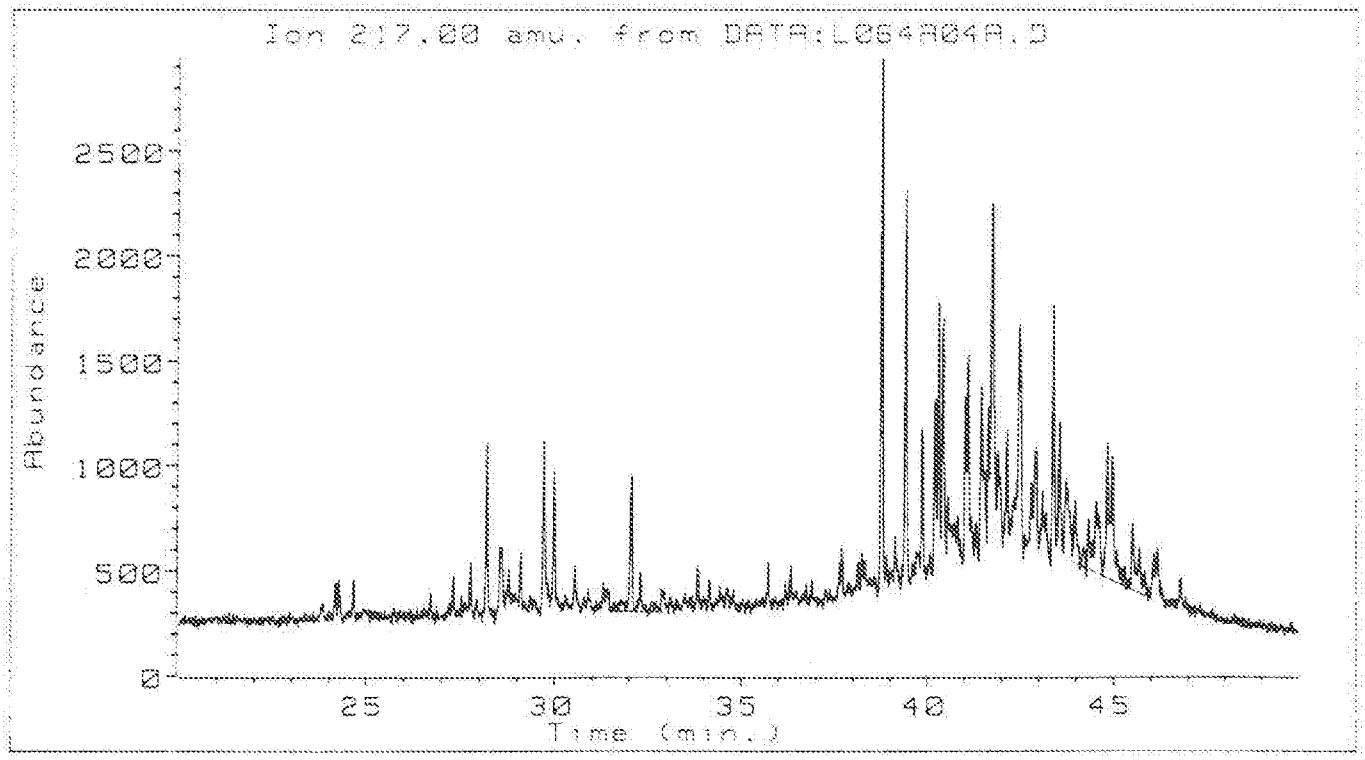
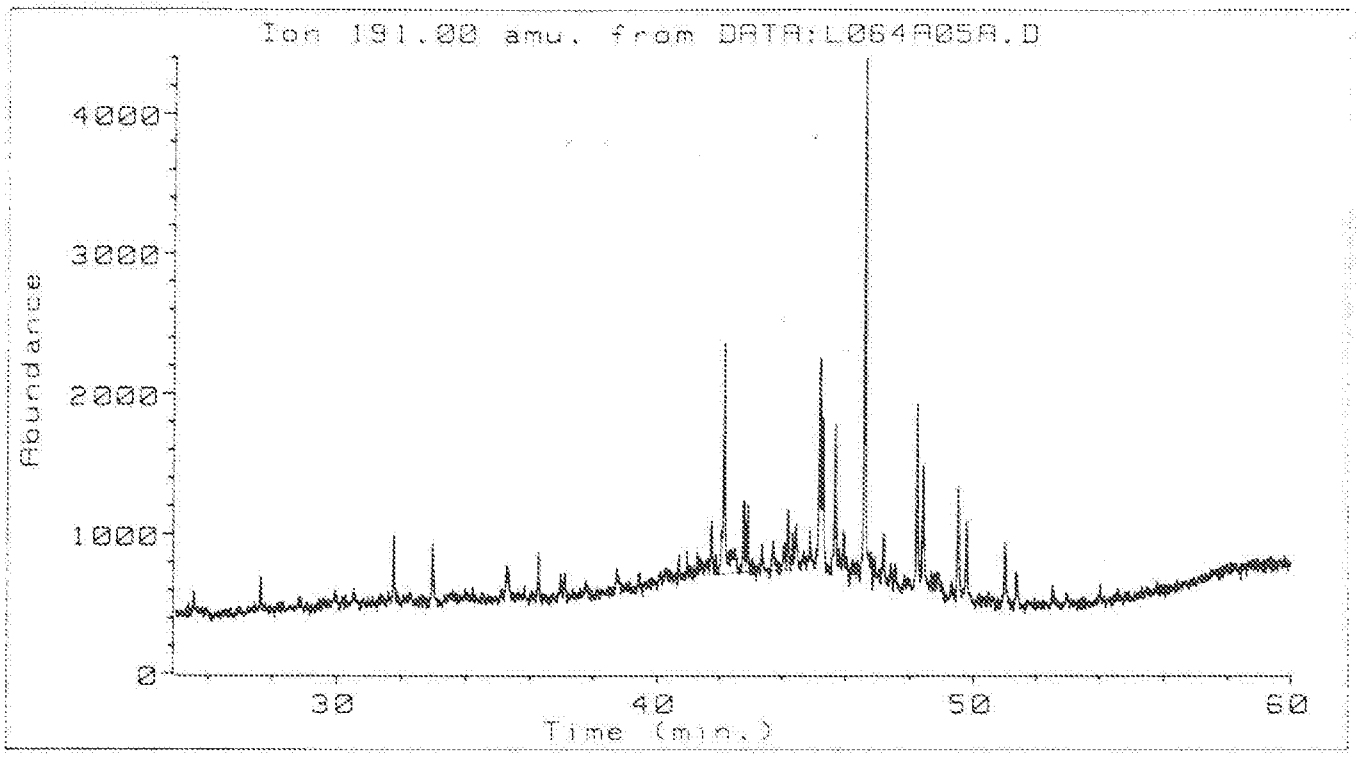
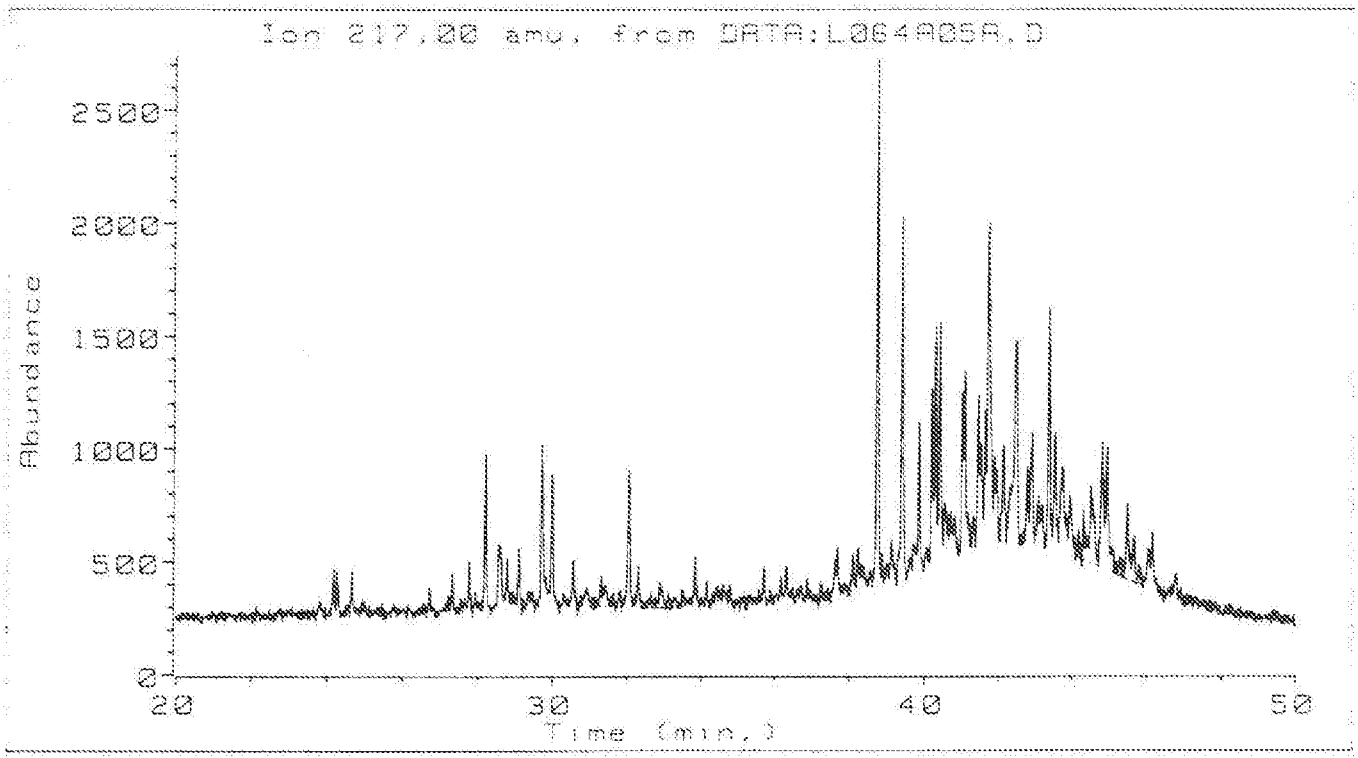
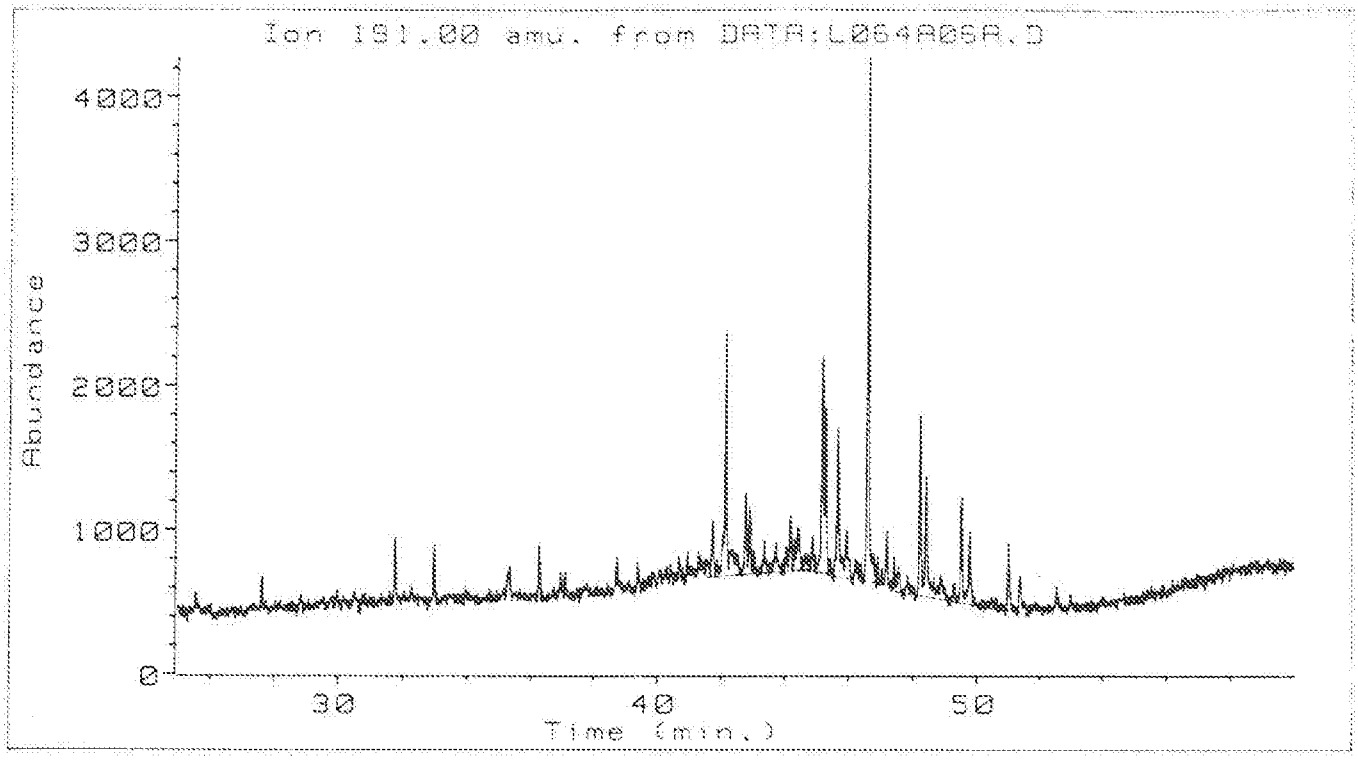




34/8-3A CC 3107.25 m





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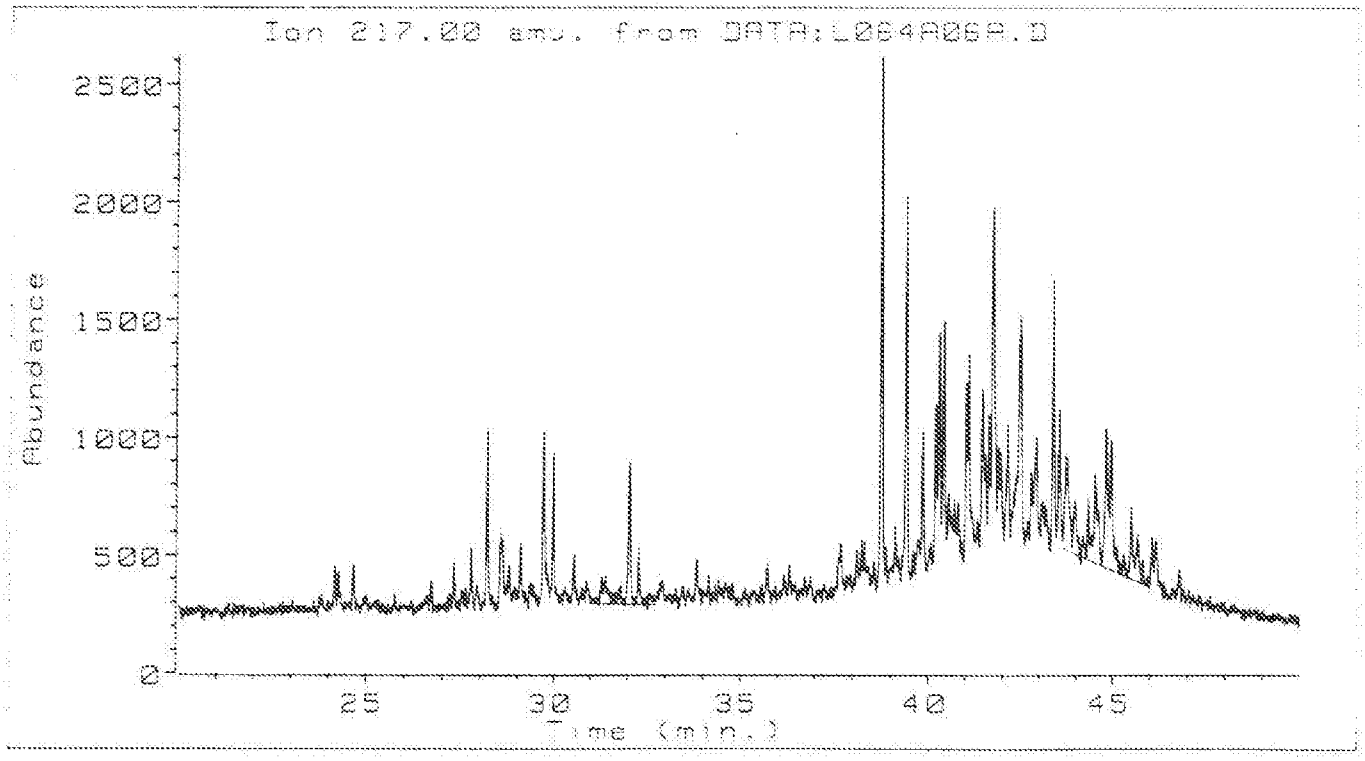

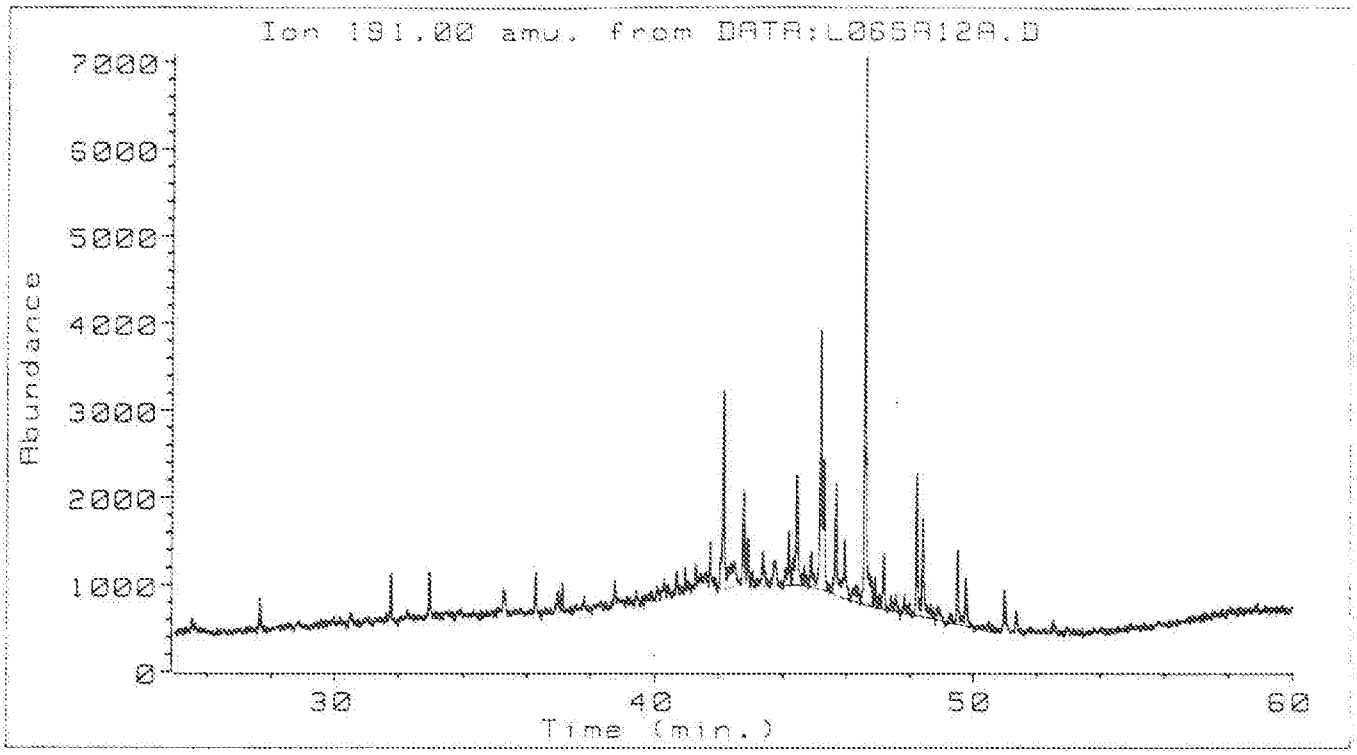

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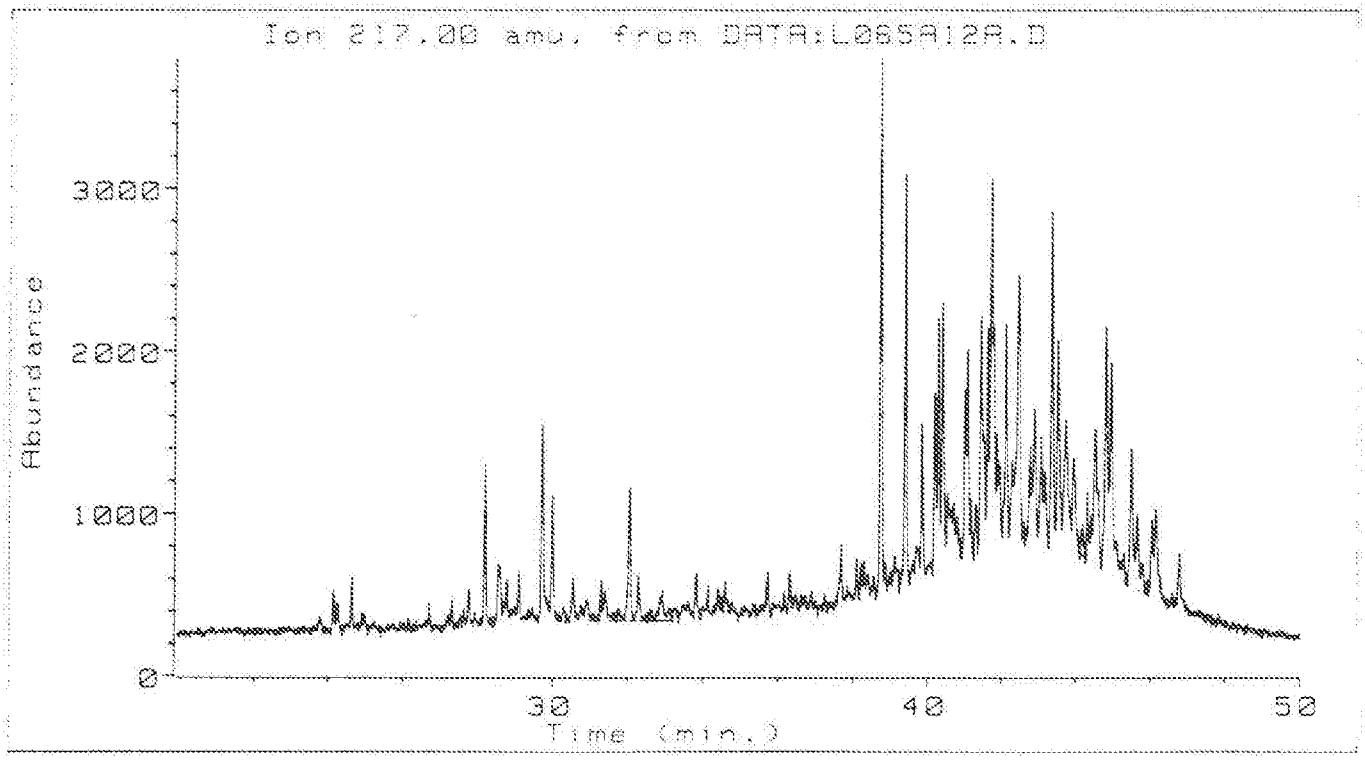

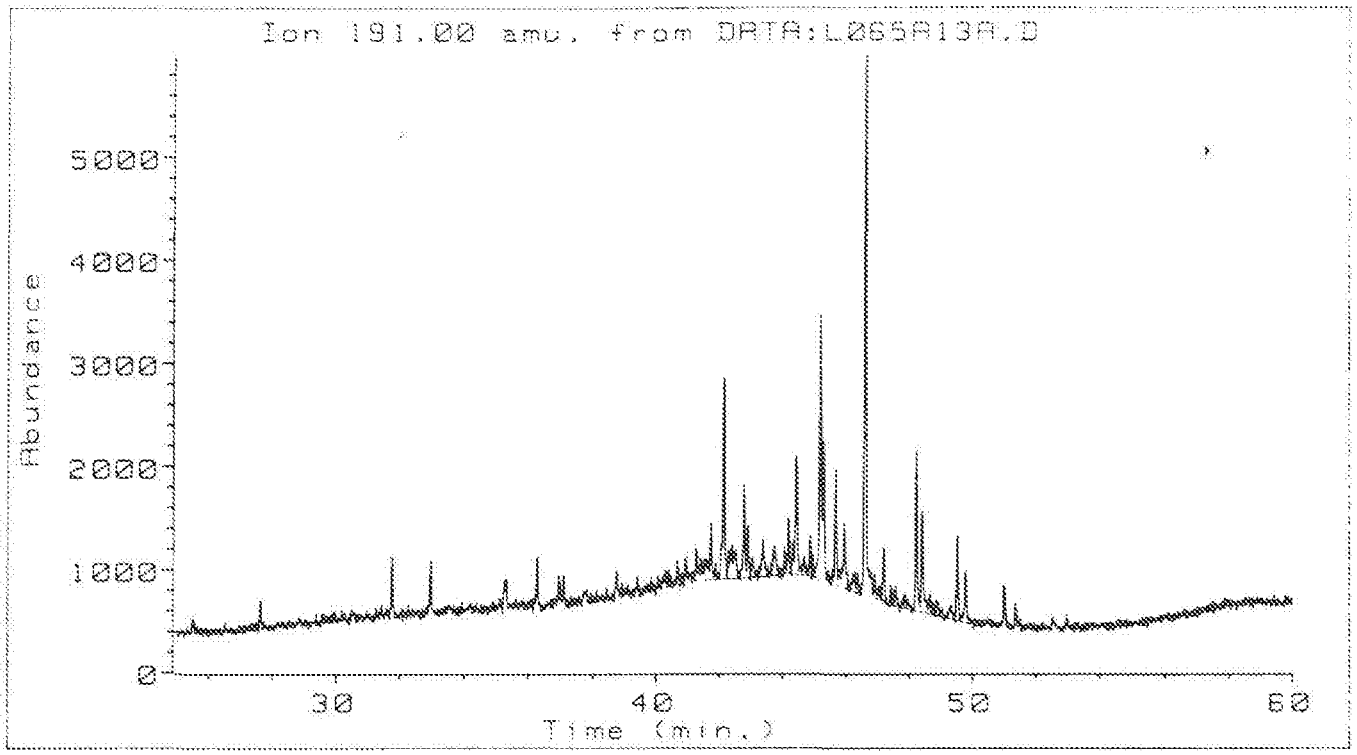

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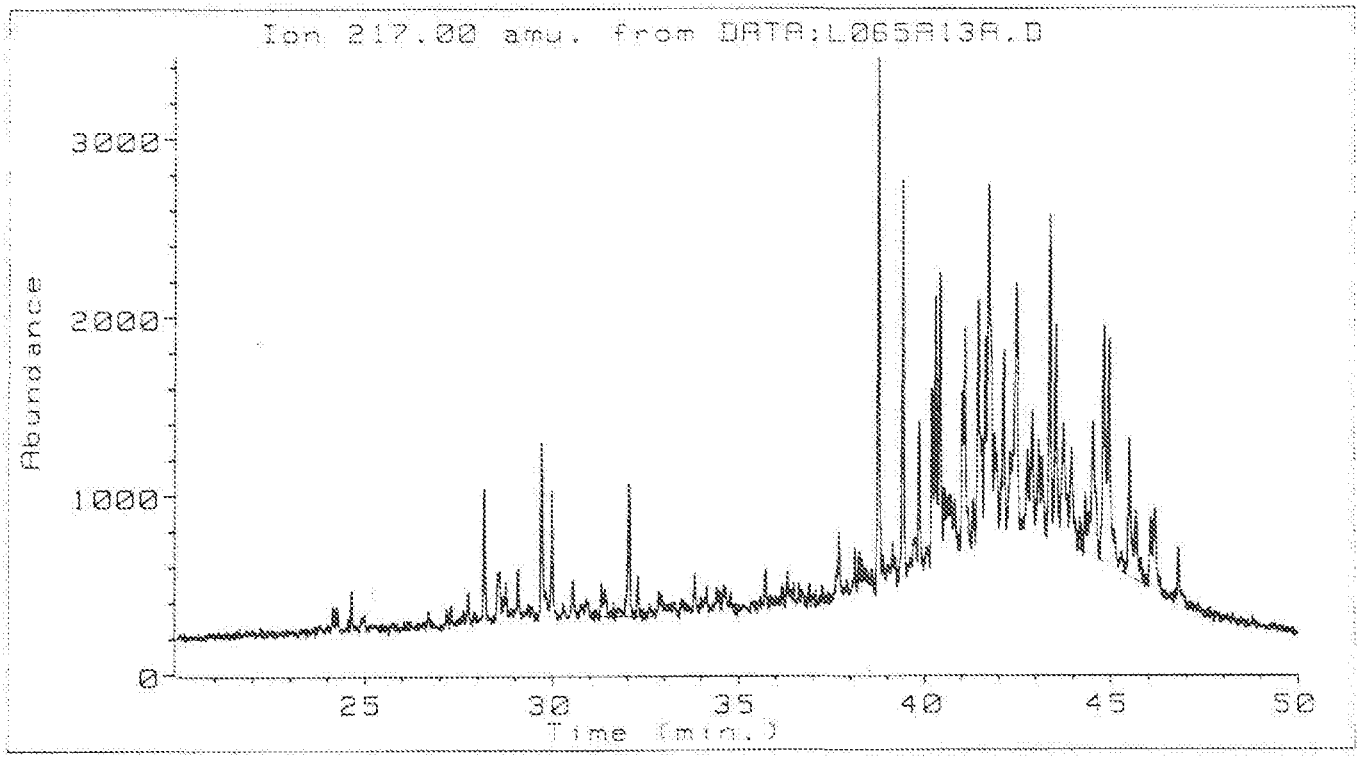

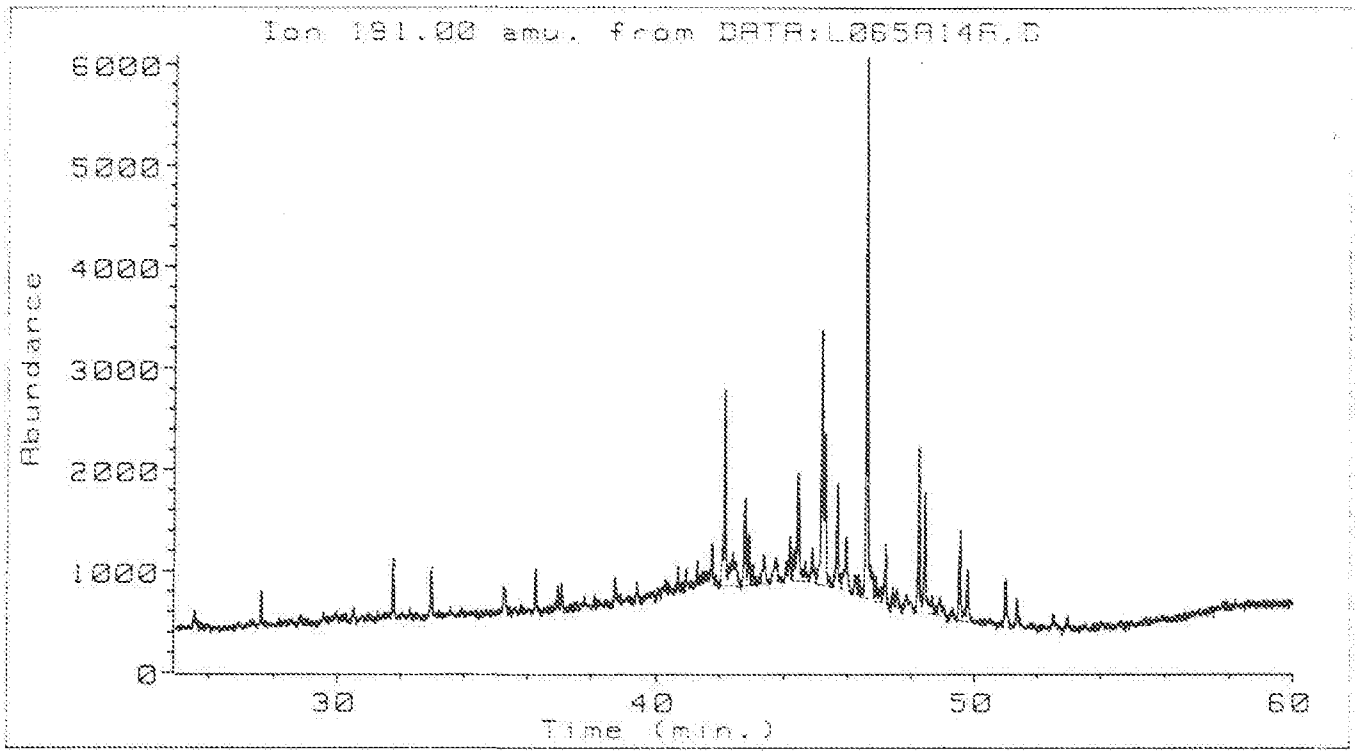

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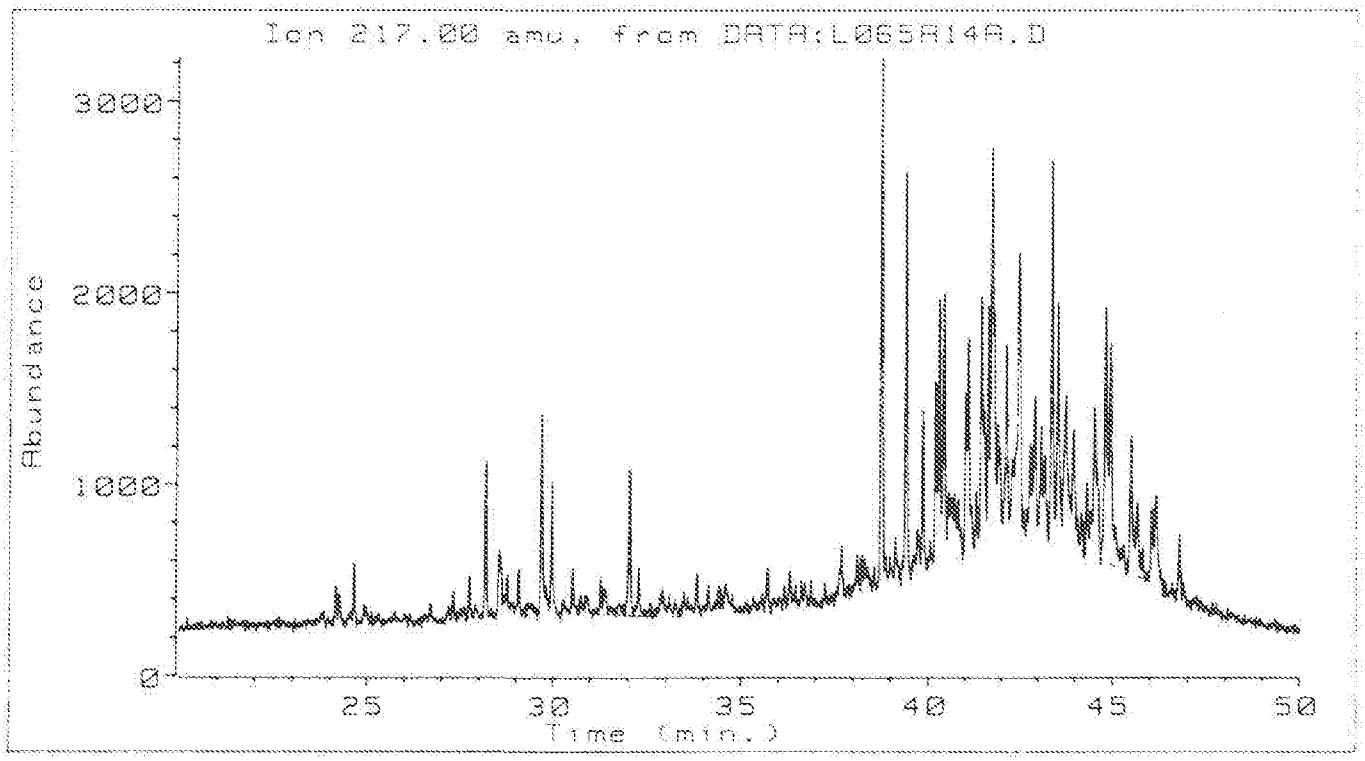
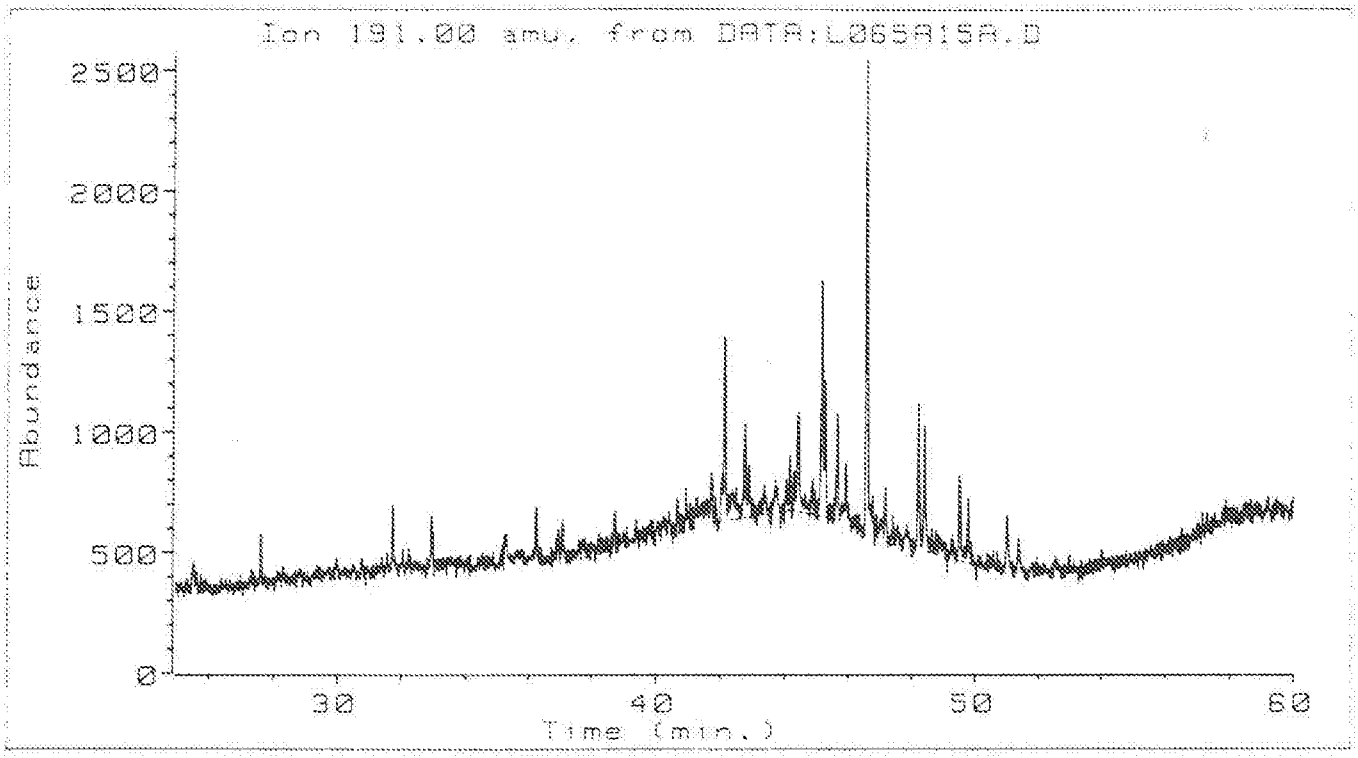
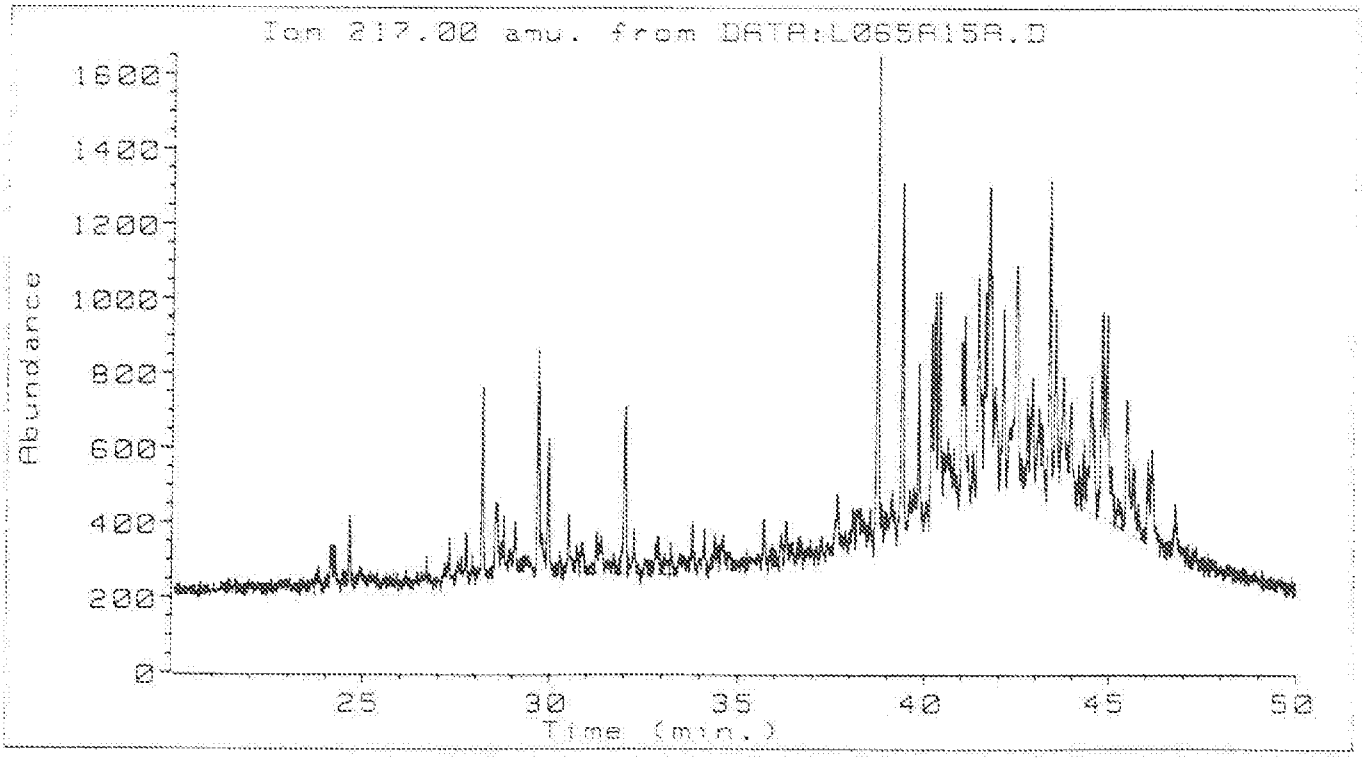
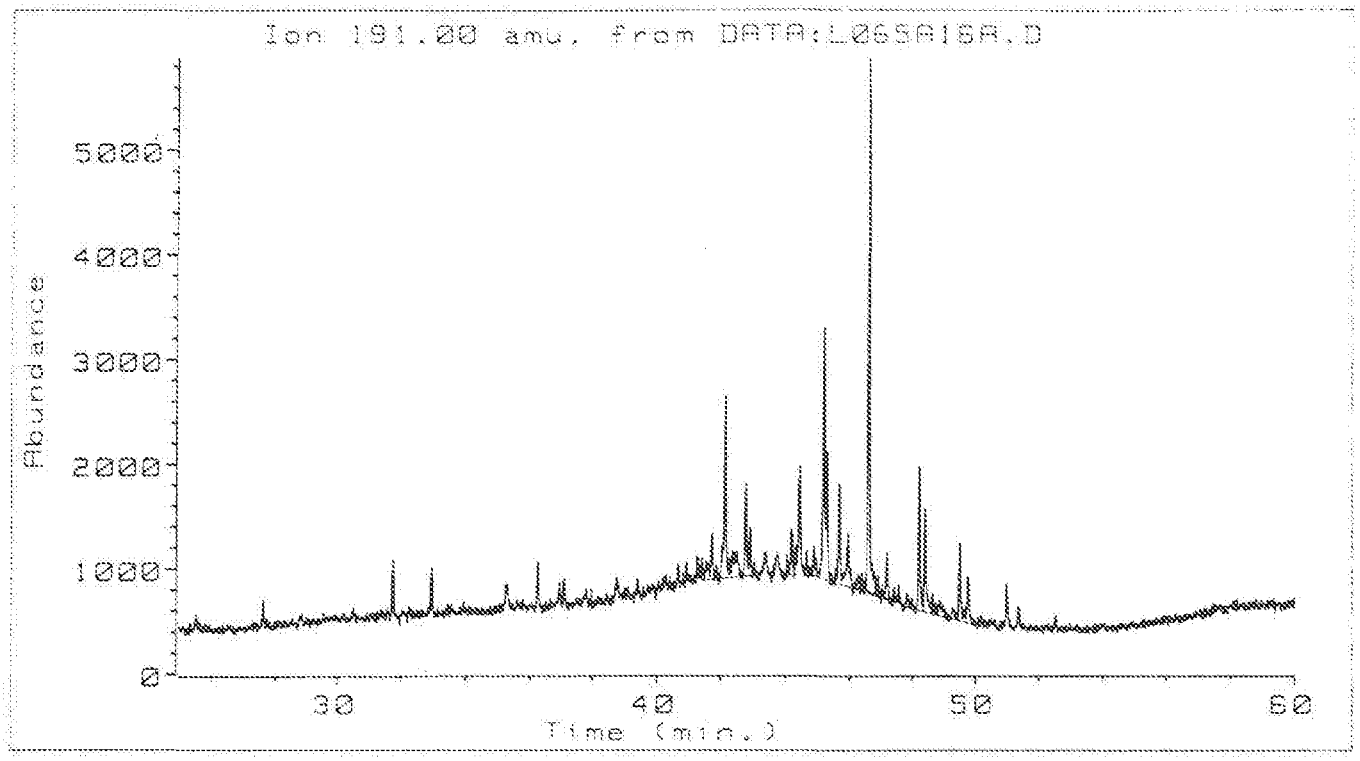


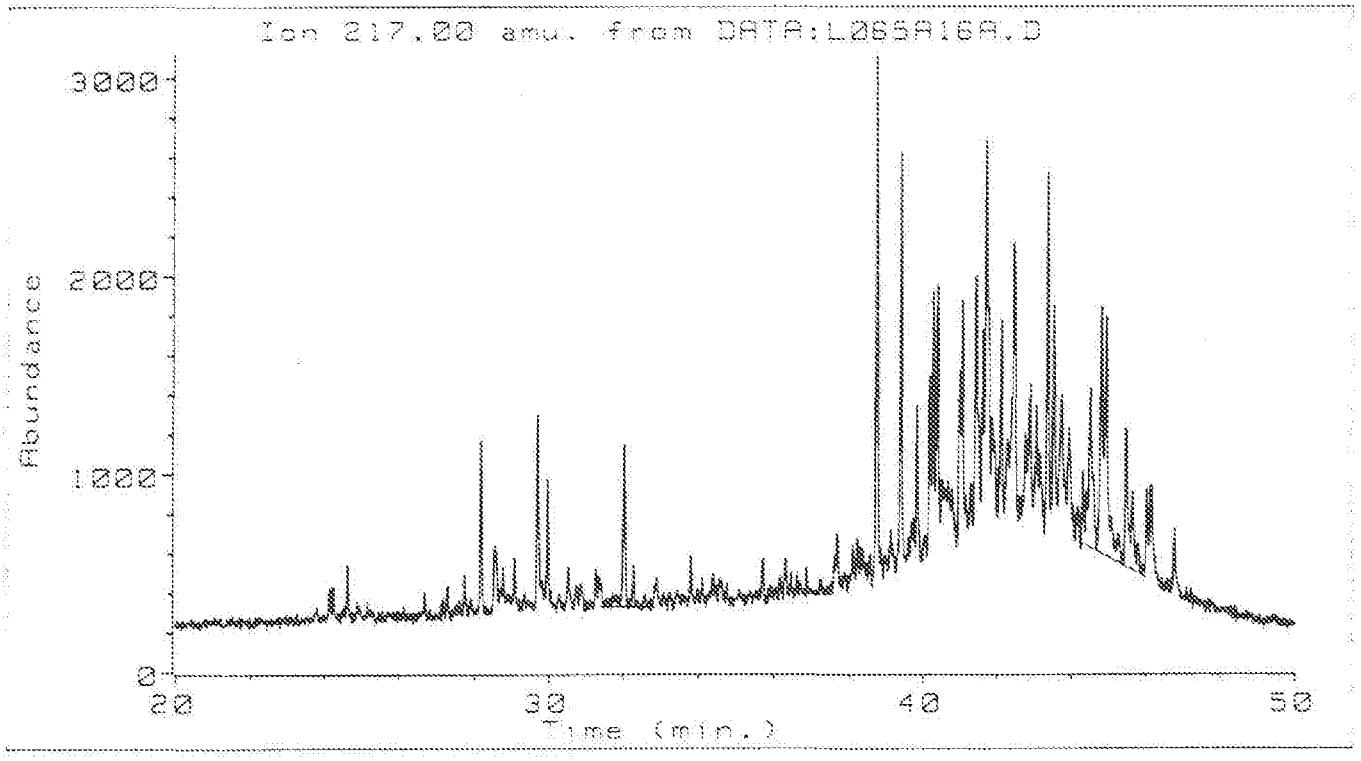


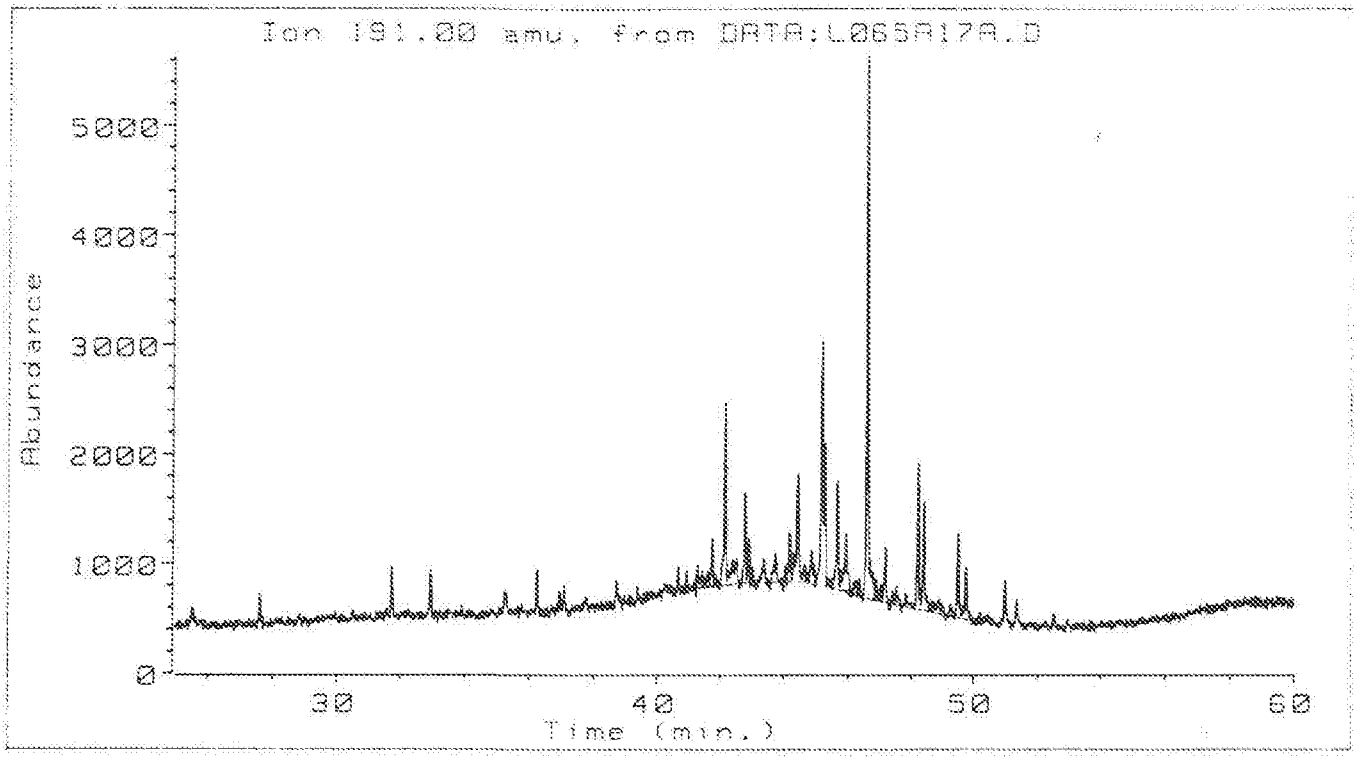
34/8-3A CC 3131.50 m



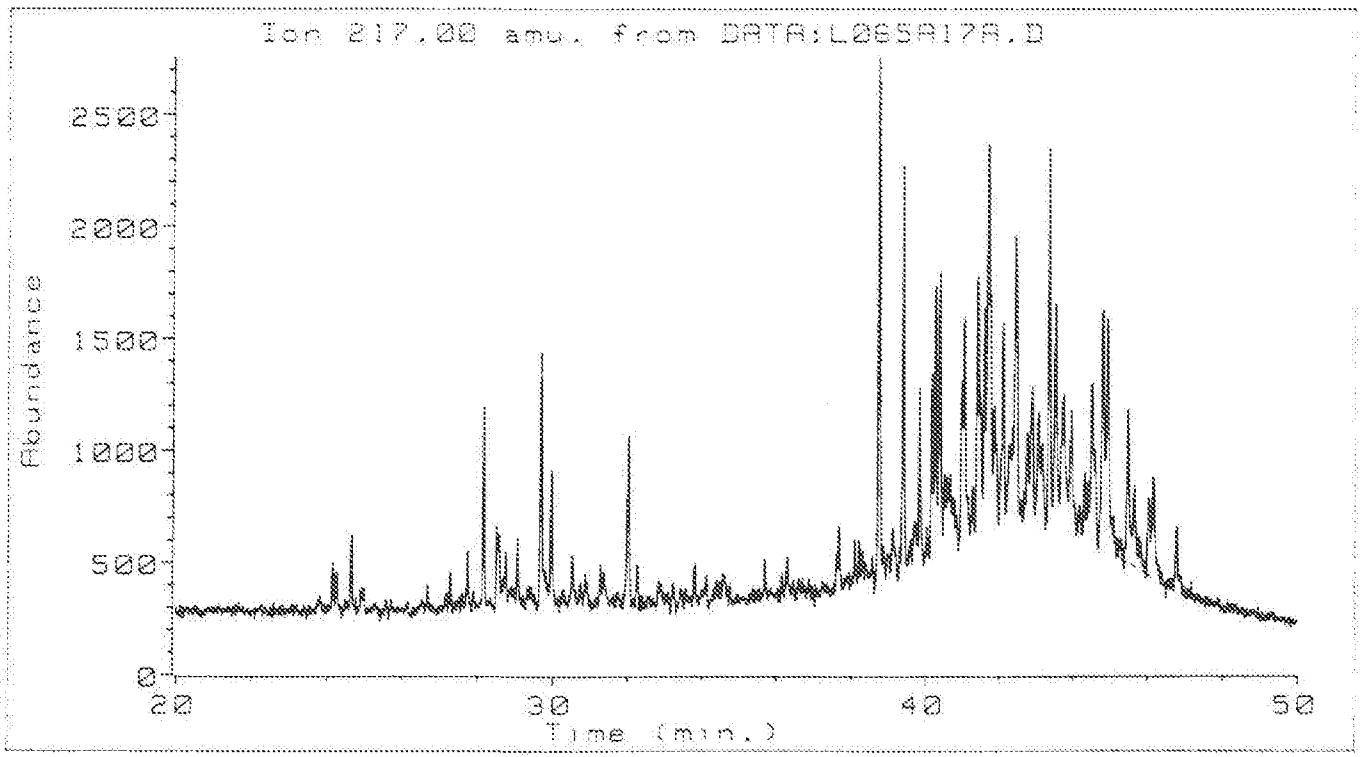


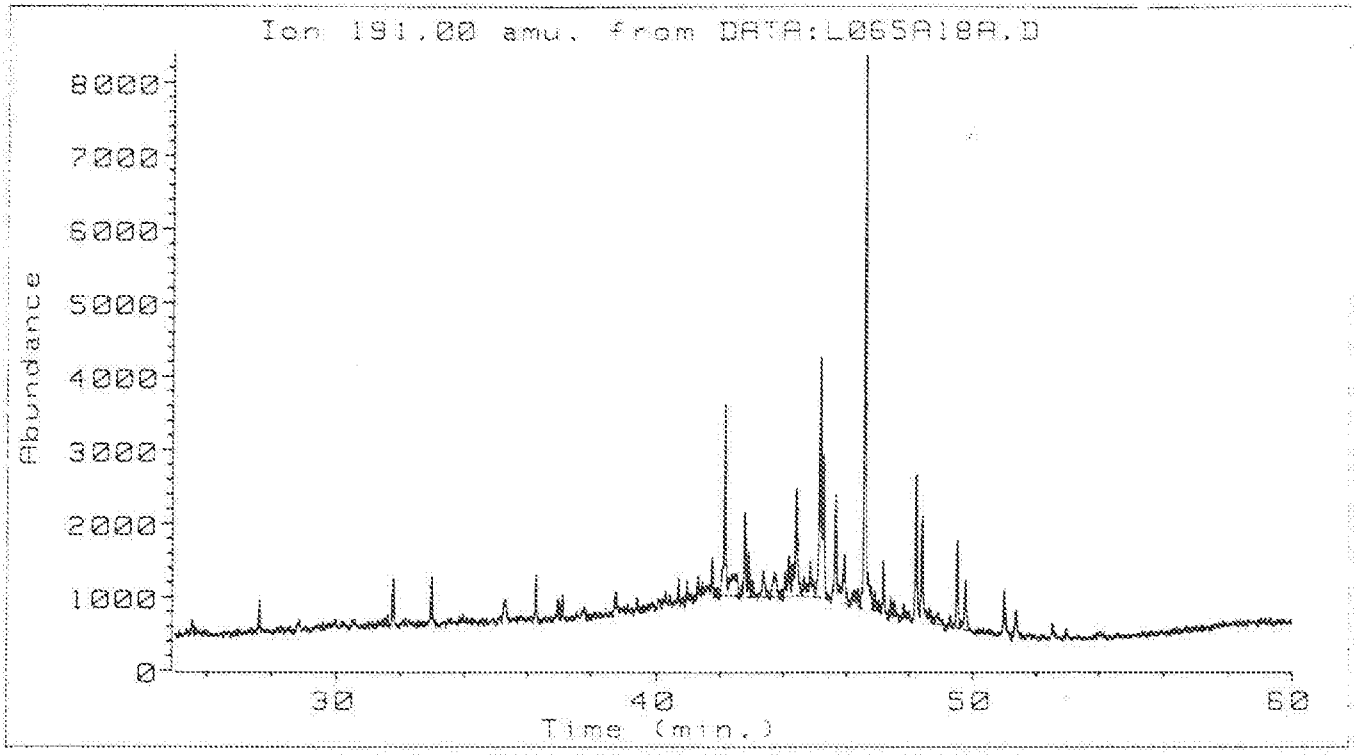
34/8-3A CC 3139.50 m



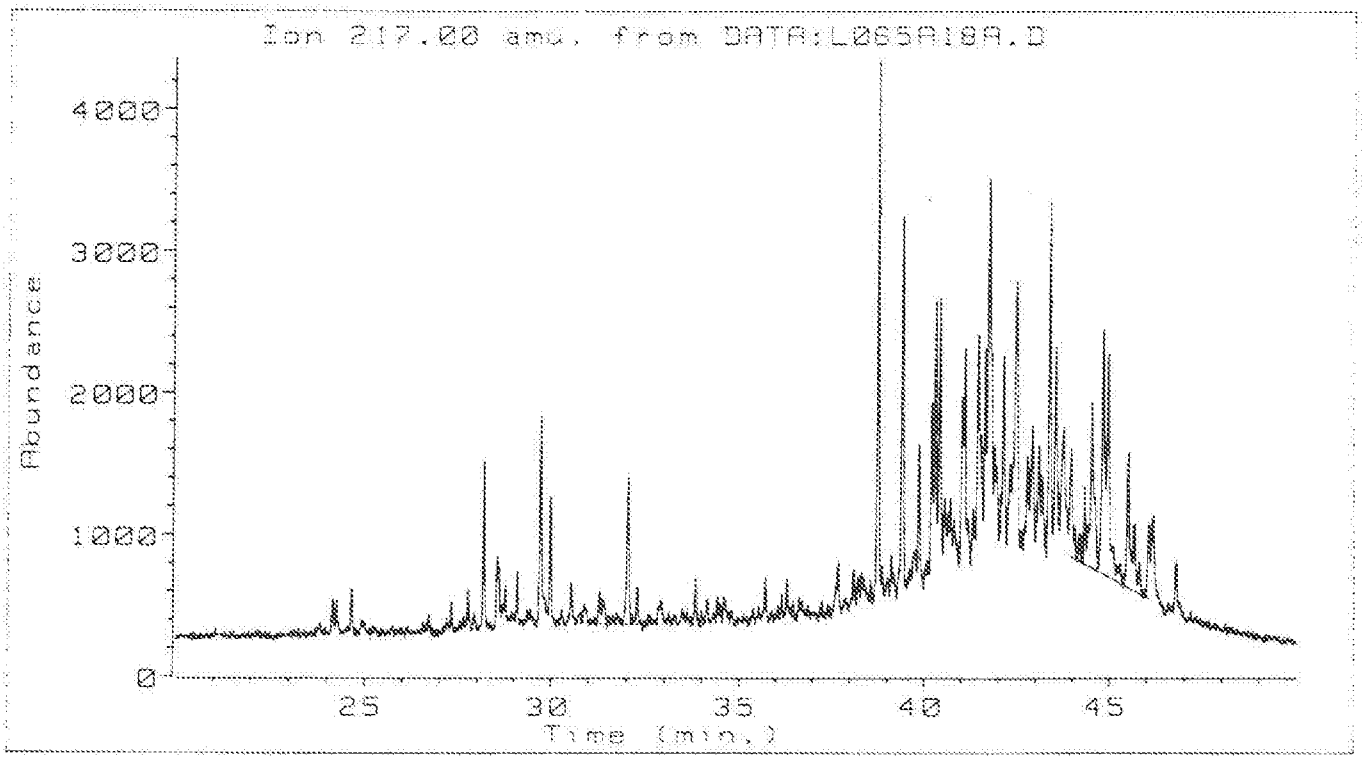


34/8-3A CC 3143.50 m





34/8-3A CC 3148.25 m



APPENDIX IV Pyrograms

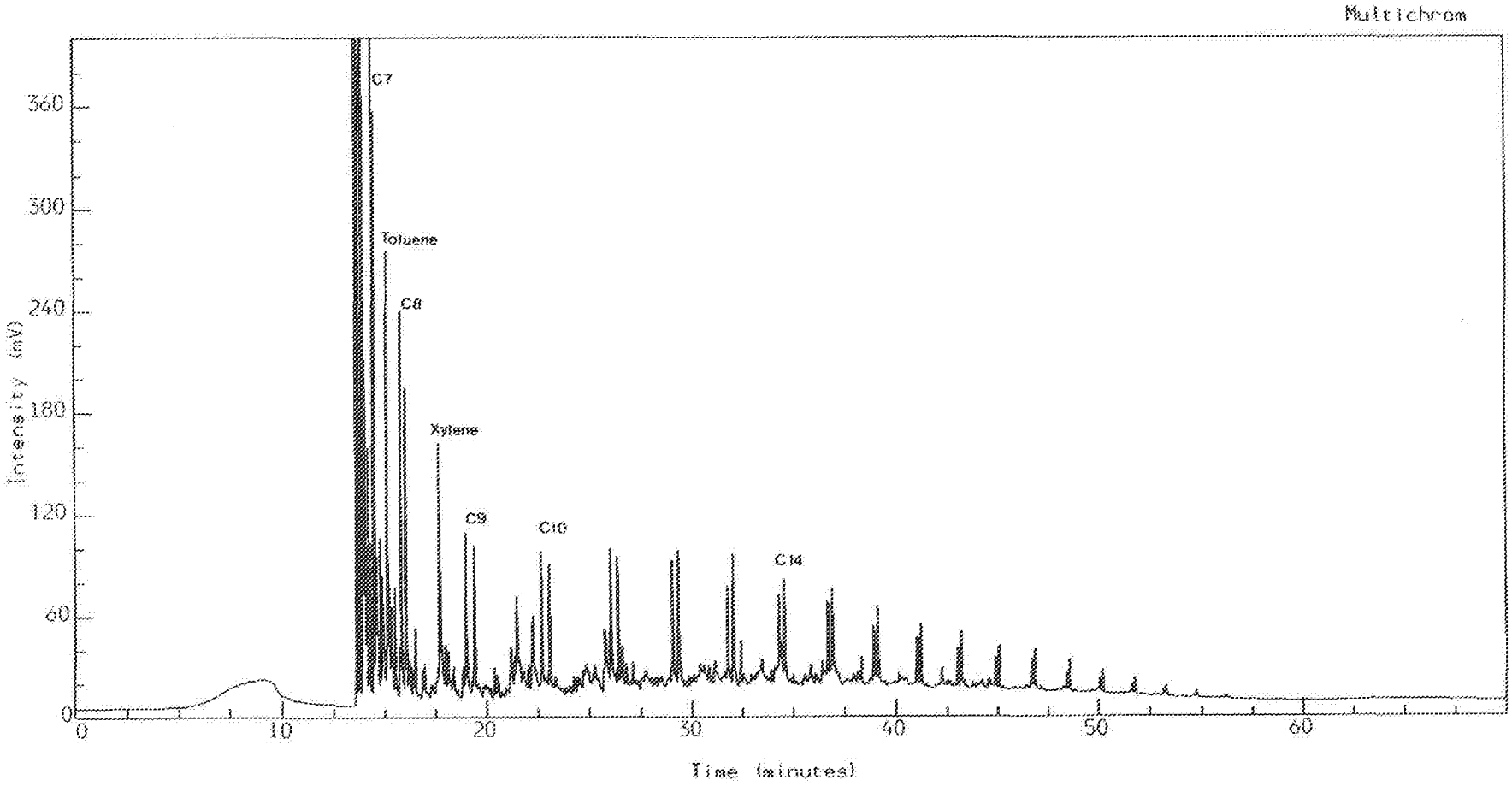
Extracted sediments

Wells 34/8–3 and 3A

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 9 D340803P.1.1.

ST 1 Amount : 1.000



Instrument : HP5890

Channel Title : PYROLYSIS FID

Lims ID :

Acquired on 29-AUG-1989 at 09:51

Reported on 29-AUG-1989 at 11:41

Method : PYRO

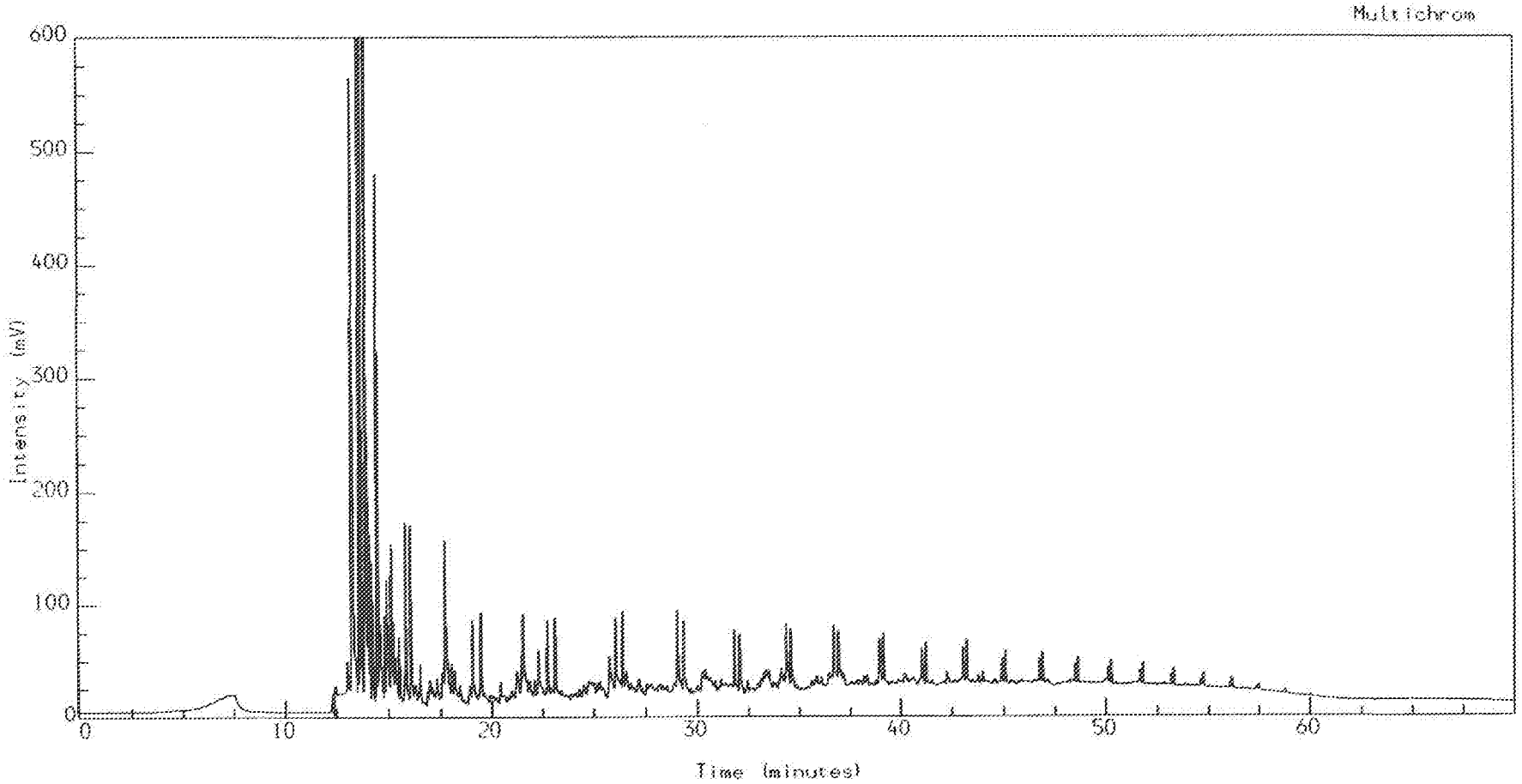
Calibration :

Run Sequence : PYRO

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]HEMISTRY

Analysis Name : [PETRO] 9 C340803P.7.1.

34/8-3 2830 M DC Amount : 1.000



Instrument : HP5890

Channel Title : PYROLYSIS FID

Lims ID :

Acquired on 25-AUG-1989 at 14:40

Reported on 29-AUG-1989 at 09:28

Method : PYRO

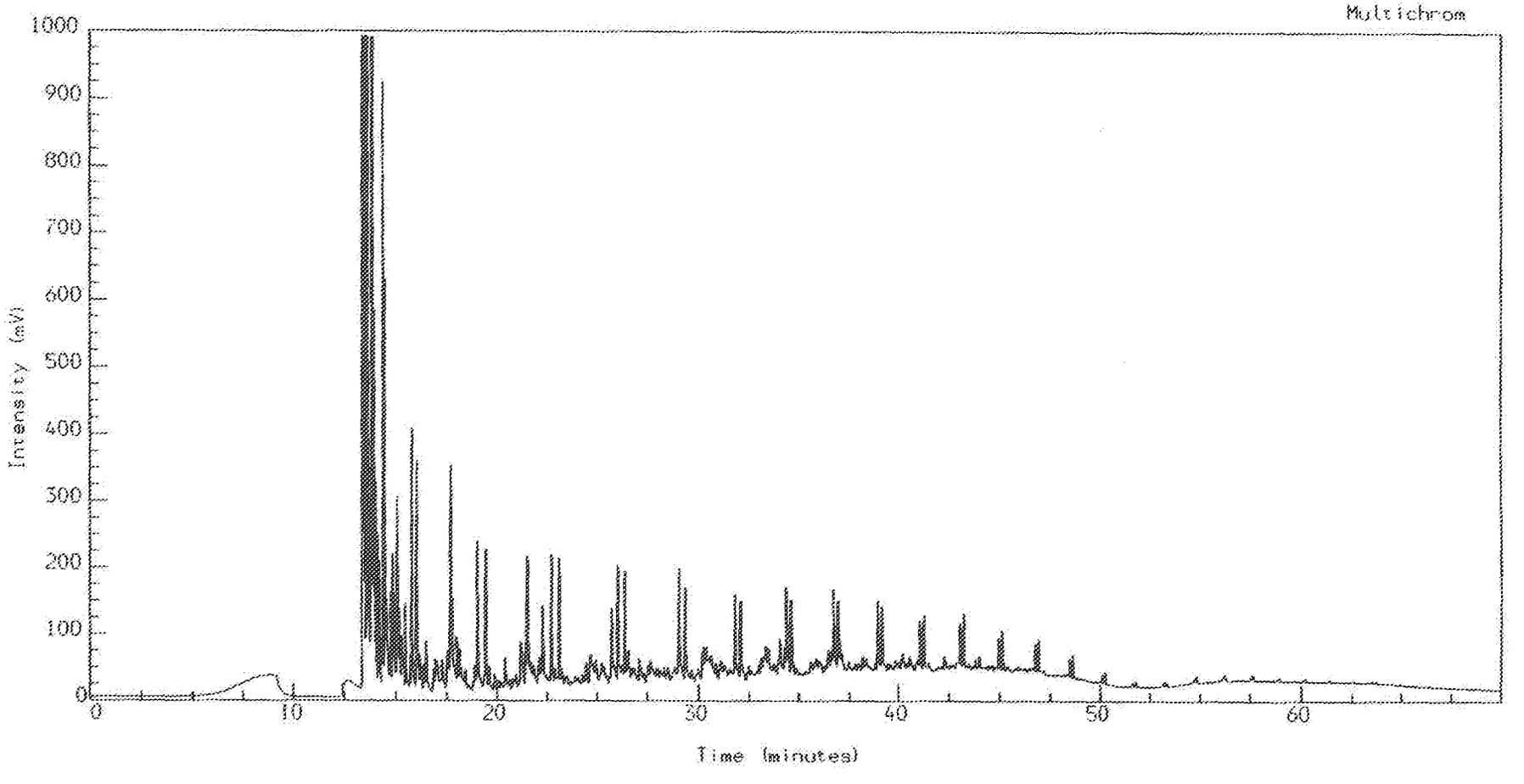
Calibration :

Run Sequence : PYRO

NOR.. HYDRO F-BERGEN, PETROLEUM GE HEMISTRY

Analysis Name : [PETRO] 9 A340803A_P,11,1.

34/8-3 2835 M SWC Amount : 1.000



Instrument : HP5890

Channel Title : PYROLYSIS FID

Lims ID :

Acquired on 31-JUL-1989 at 13:42

Reported on 6-SEP-1989 at 17:33

Method : PYRO

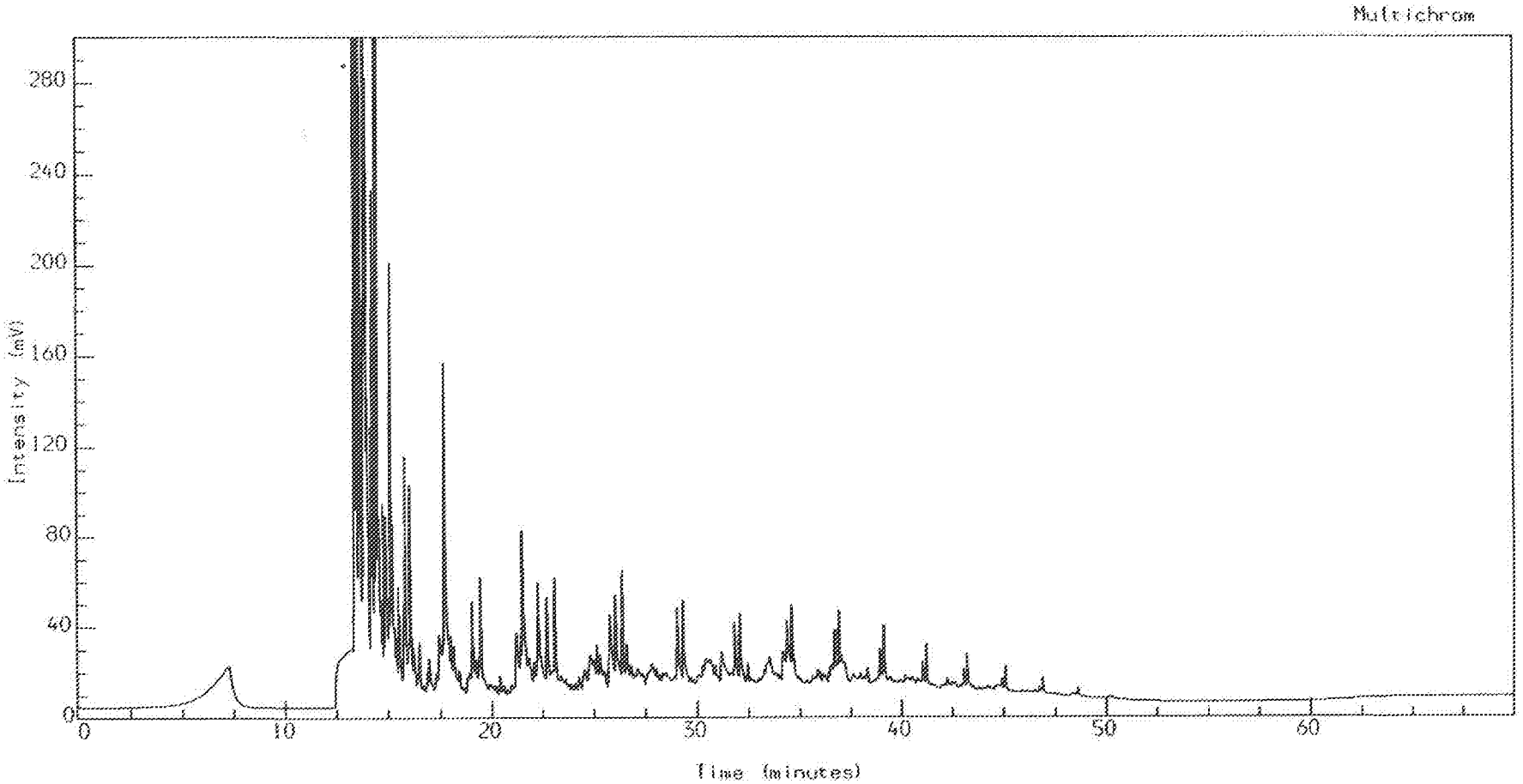
Calibration :

Run Sequence : PYRO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 9 D340803P,3,1.

34/8-3 2837 M DC Amount : 1.000



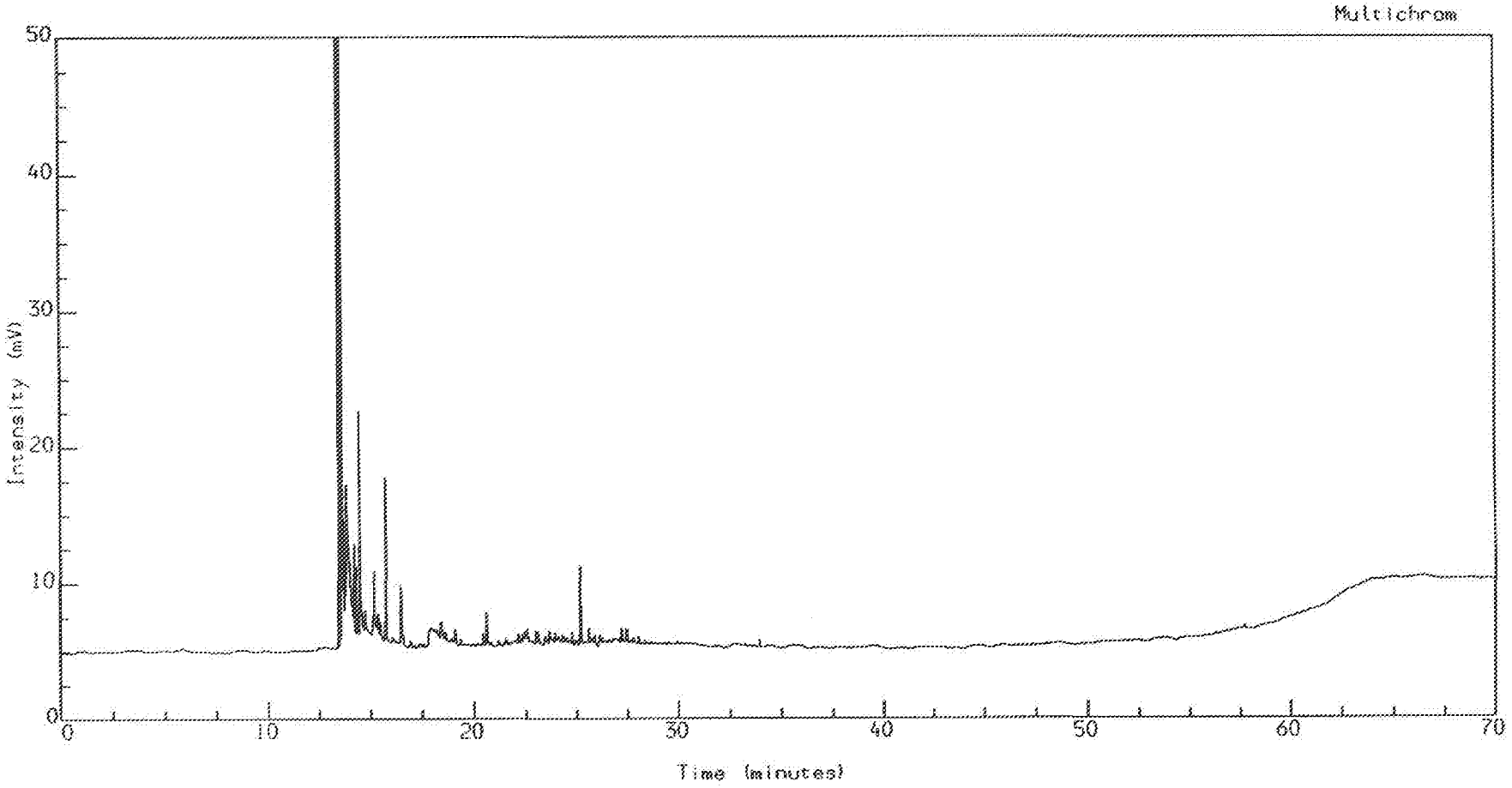
Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 29-AUG-1989 at 14:10
Reported on 30-AUG-1989 at 09:05

Method : PYRO
Calibration :
Run Sequence : PYRO

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]CHEMISTRY

Analysis Name : [PETRO] 9 A340803A_P.3.1.

34/8-3A 2990 M SWC. Amount : 1.000.

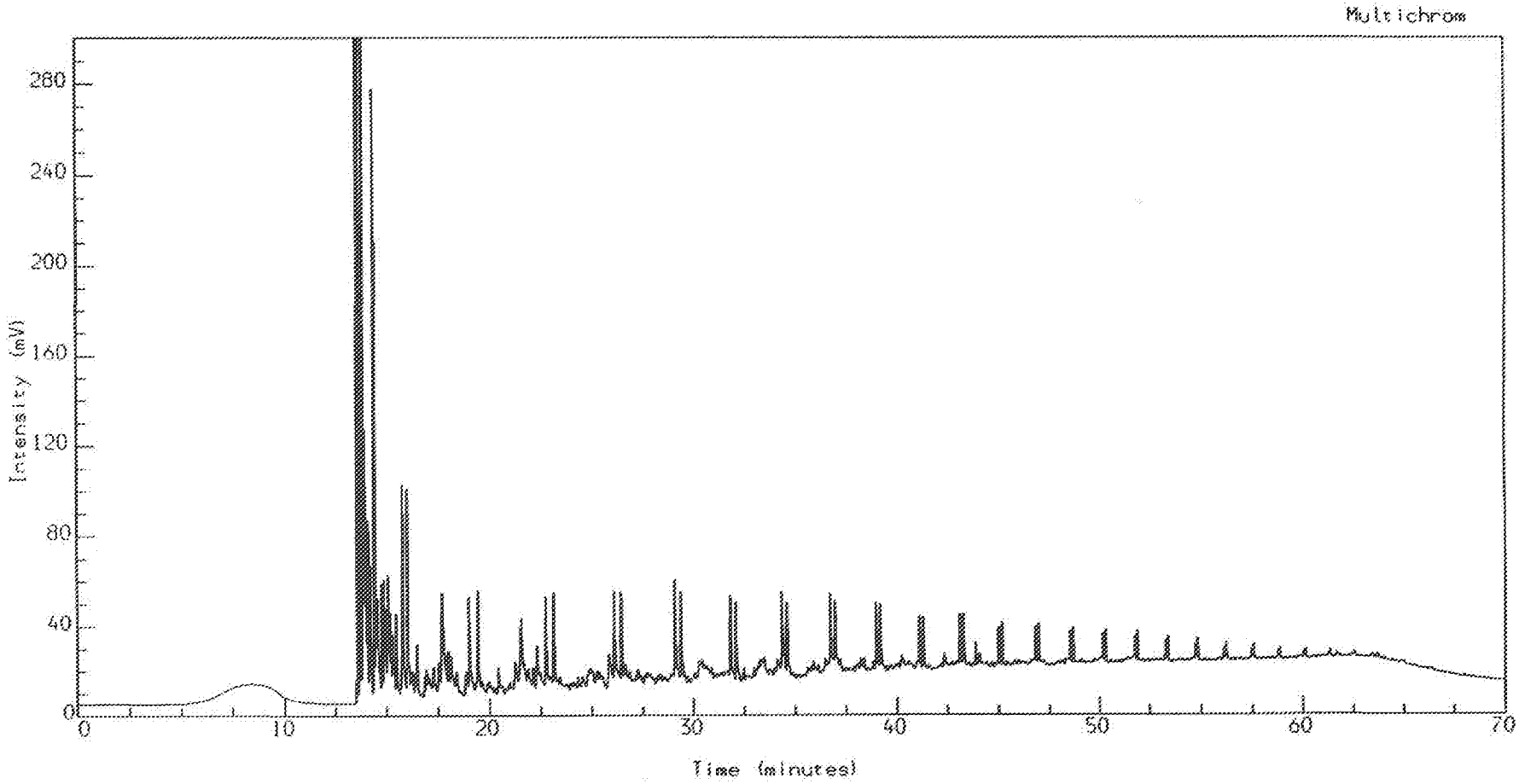


Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 27-JUL-1989 at 12:11
Reported on 27-JUL-1989 at 15:43

Method : PYRO
Calibration :
Run Sequence : PYRO

Analysis Name : [PETRO] 9 A340803A_P.4.1.

34/8-3A 3005 M SWC. Amount : 1.000.



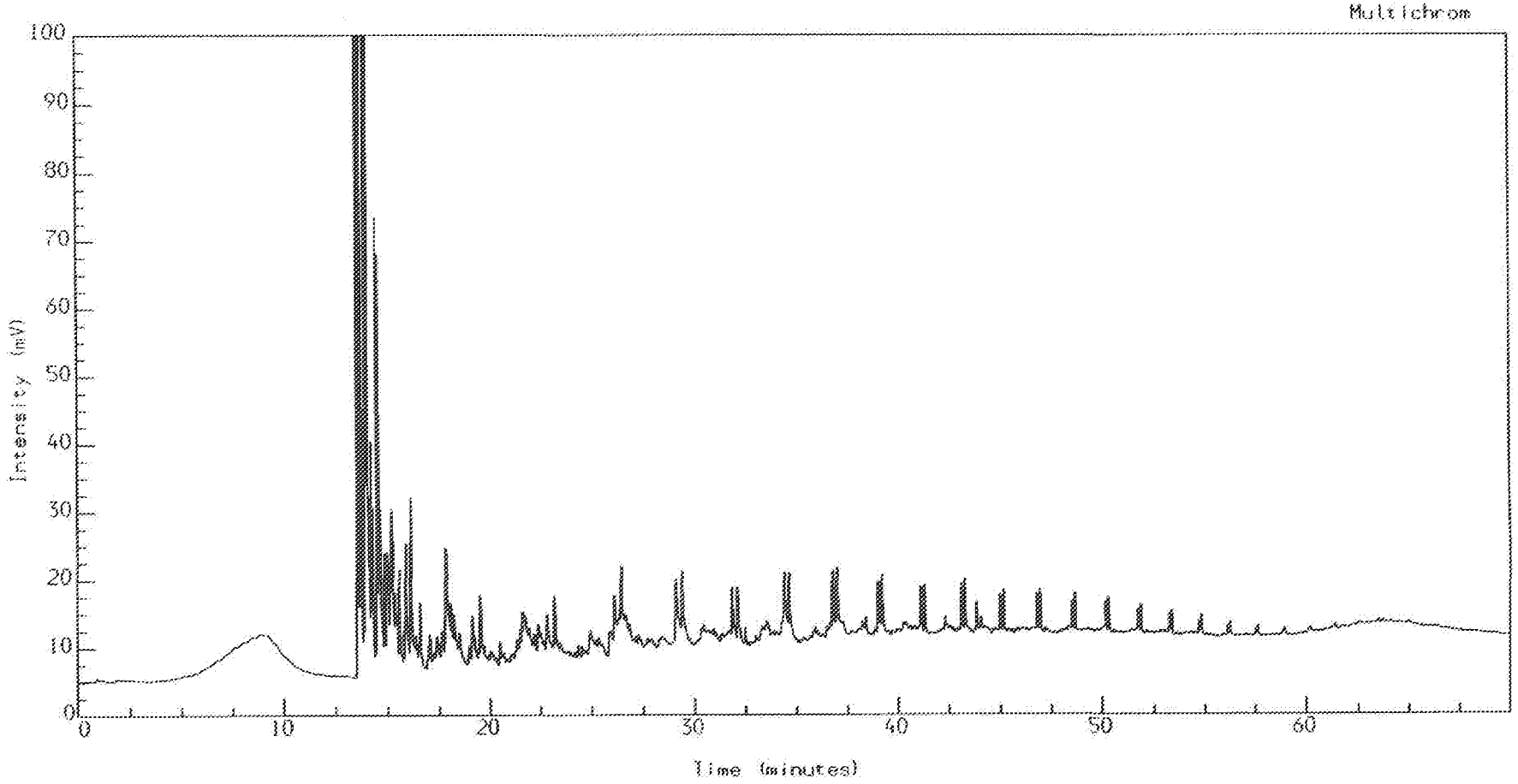
Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 27-JUL-1989 at 13:42
Reported on 27-JUL-1989 at 15:55

Method : PYRO
Calibration :
Run Sequence : PYRO

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]HEMISTRY

Analysis Name : [PETRO] 9 B340803A_P.3.1.

34/8-3A 3007 M DC Amount : 1.000



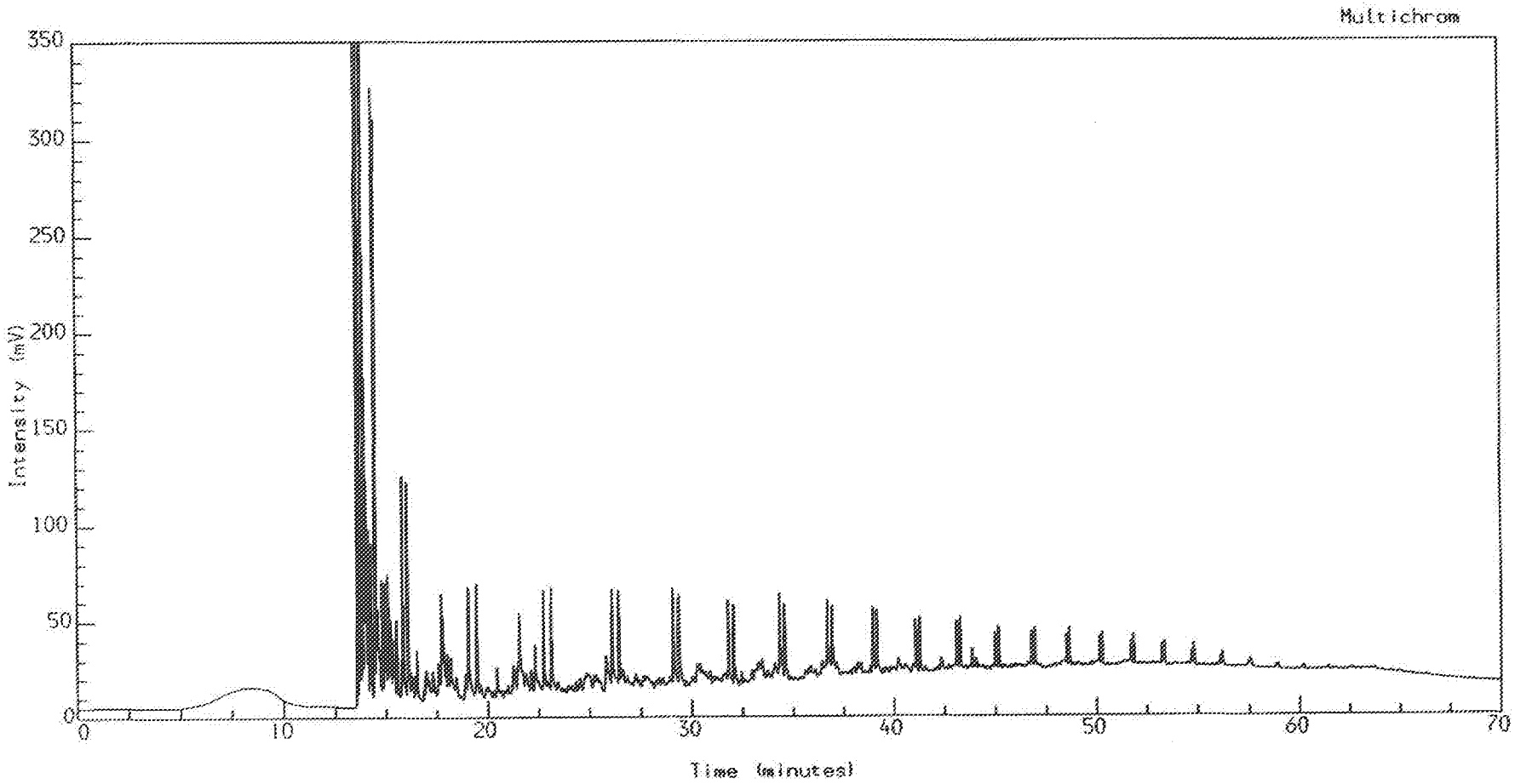
Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 21-AUG-1989 at 14:38
Reported on 22-AUG-1989 at 13:18

Method : PYRO
Calibration :
Run Sequence : PYRO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 9 A340803A_P.S.1.

34/8-3A 3007.5 M SWC. Amount : 1.000.

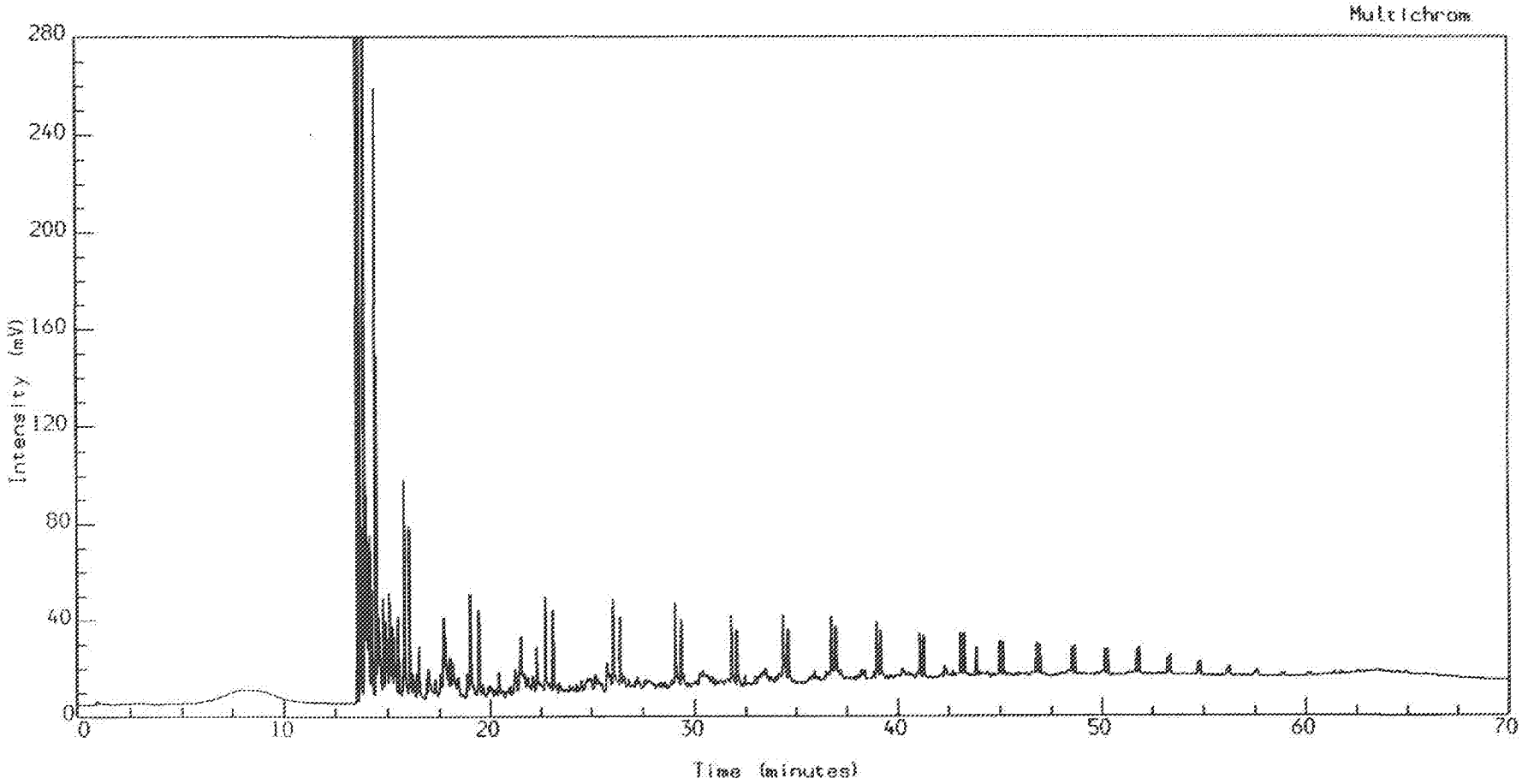


Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 27-JUL-1989 at 15:24
Reported on 28-JUL-1989 at 08:20

Method : PYRO
Calibration :
Run Sequence : PYRO

Analysis Name : [PETRO] 9 A340803A_P.6.1.

34/8-3A 3008 M SWC. Amount : 1.000.



Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 28-JUL-1989 at 07:59
Reported on 28-JUL-1989 at 10:31

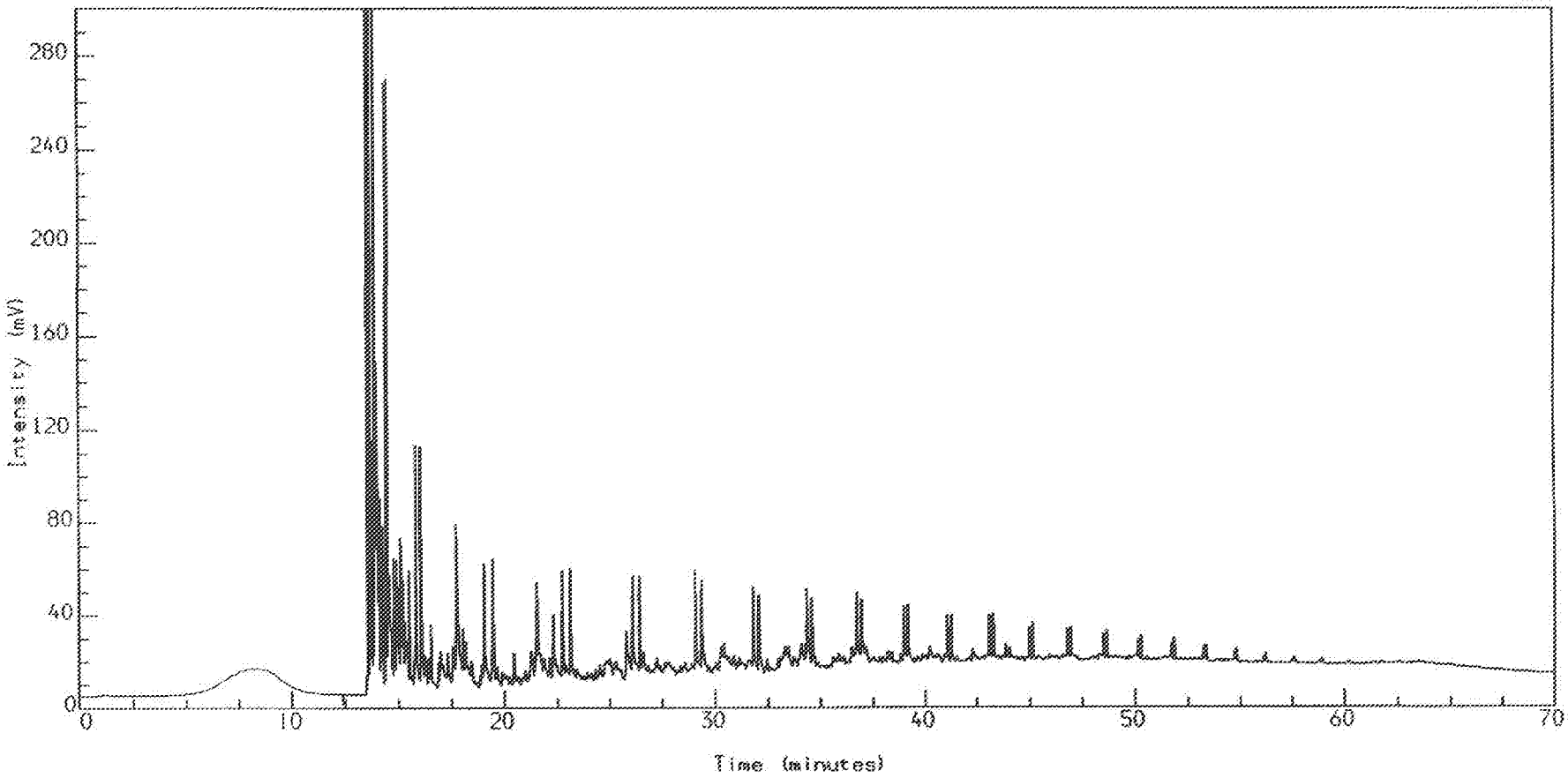
Method : PYRO
Calibration :
Run Sequence : PYRO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 9 A340803A_P.7.1.

34/8-3A 3011 M SWC. Amount : 1.000.

Multichrom



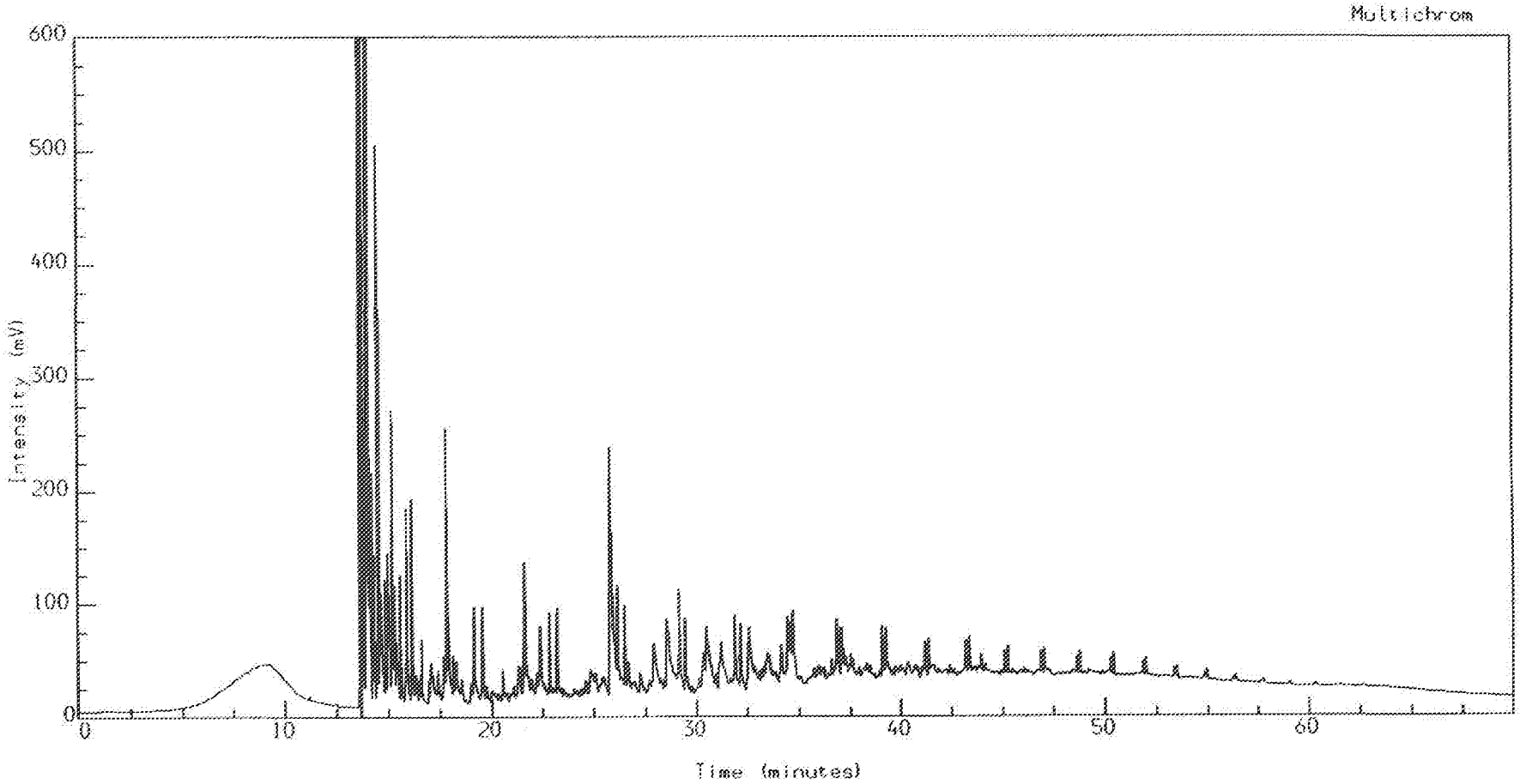
Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 28-JUL-1989 at 09:46
Reported on 28-JUL-1989 at 12:12

Method : PYRO
Calibration :
Run Sequence : PYRO

NORSK HYDRO F-BERGEN. PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 9 B340803A_P.4.1.

34/8-3A 3010-3012 M Dc Amount : 1.000



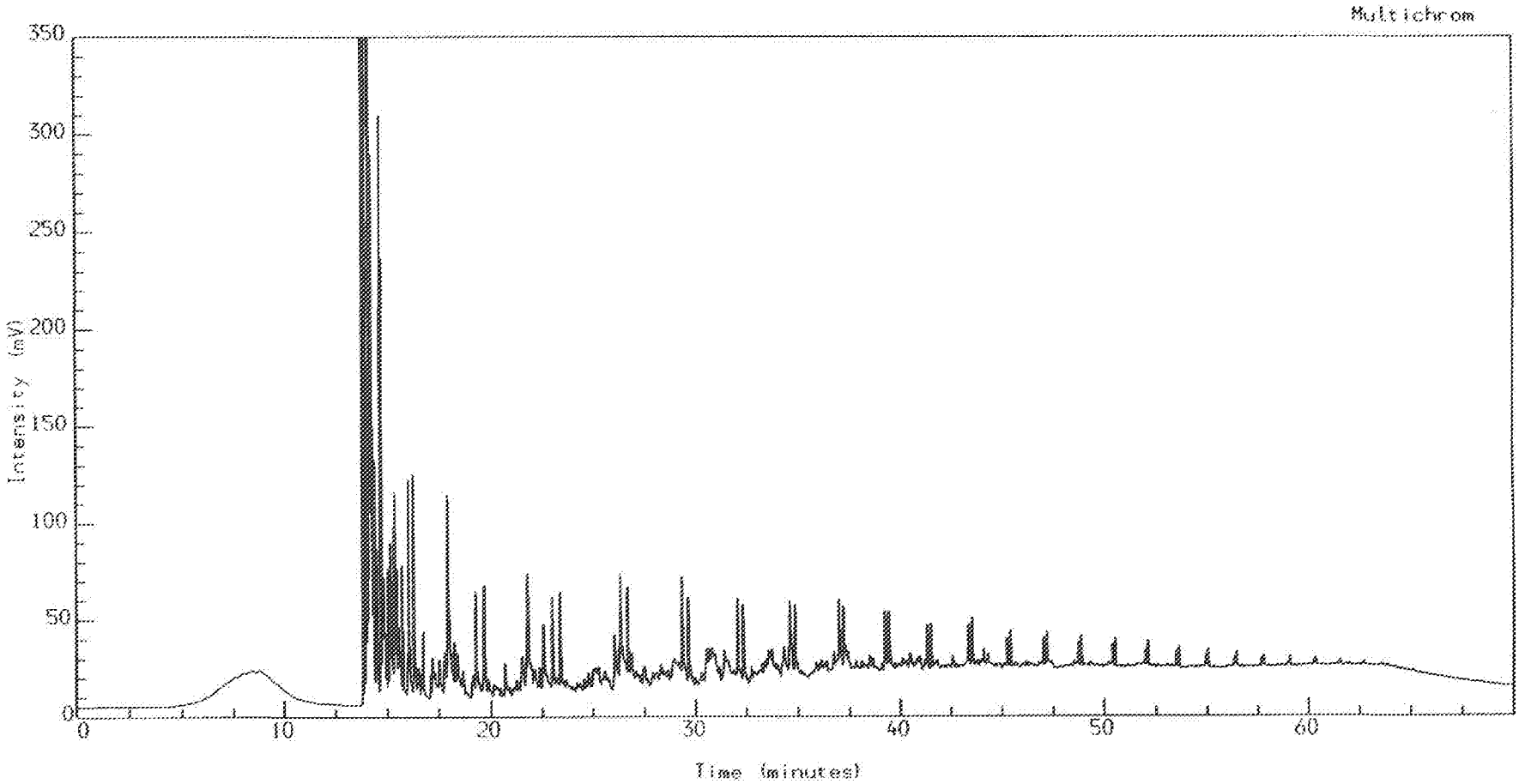
Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 22-AUG-1989 at 12:00
Reported on 22-AUG-1989 at 13:32

Method : PYRO
Calibration :
Run Sequence : PYRO

NOR.. HYDRO F-BERGEN. PETROLEUM GE..HEMISTRY

Analysis Name : [PETRO] 9 B340803A_P.5.1.

34/8-3A 3015 M DC Amount : 1.000



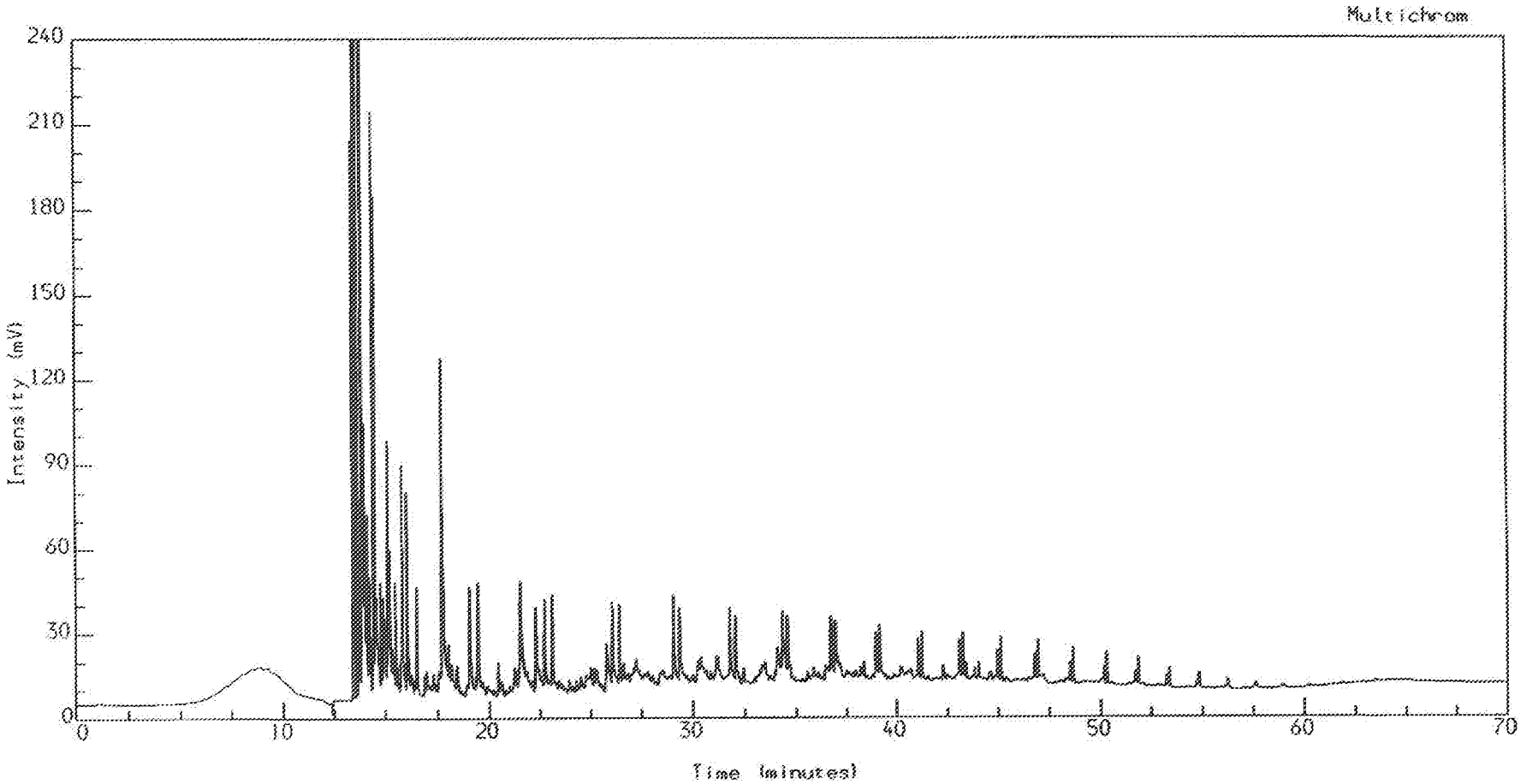
Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 22-AUG-1989 at 13:30
Reported on 22-AUG-1989 at 15:30

Method : PYRO
Calibration :
Run Sequence : PYRO

NOR.. HYDRO F-BERGEN, PETROLEUM GE..HEMISTRY

Analysis Name : [PETRO] 9 A340803A_P,8,1.

34/8-3A 3016 M SWC. Amount : 1.000. Page 1 (of 1)



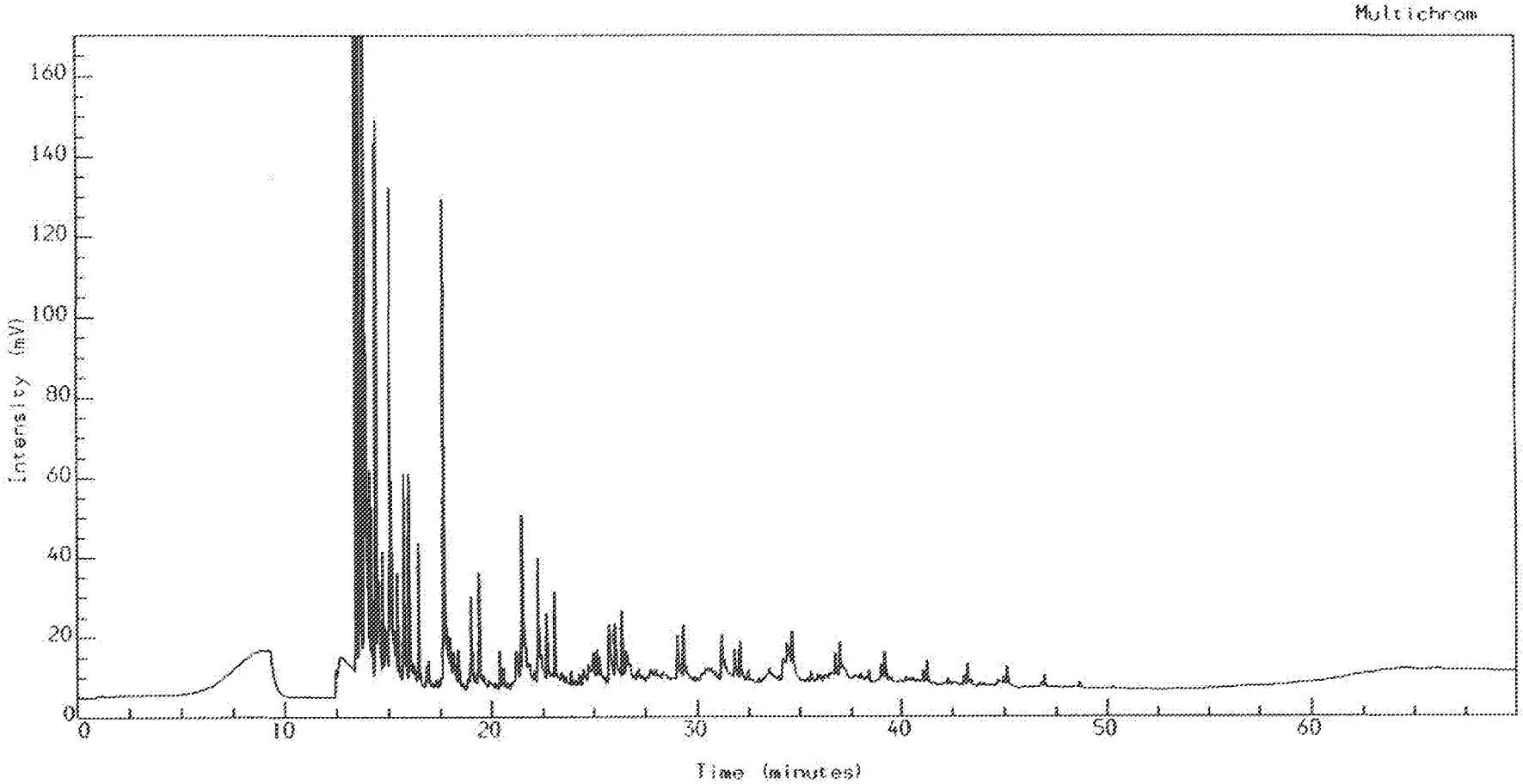
Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 28-JUL-1989 at 12:06
Reported on 28-JUL-1989 at 13:23

Method : PYRO
Calibration :
Run Sequence : PYRO

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]CHEMISTRY

Analysis Name : [PETRO] 9 A540803A_P.9.1.

34/8-3A 3018 M SWC Amount : 1.000



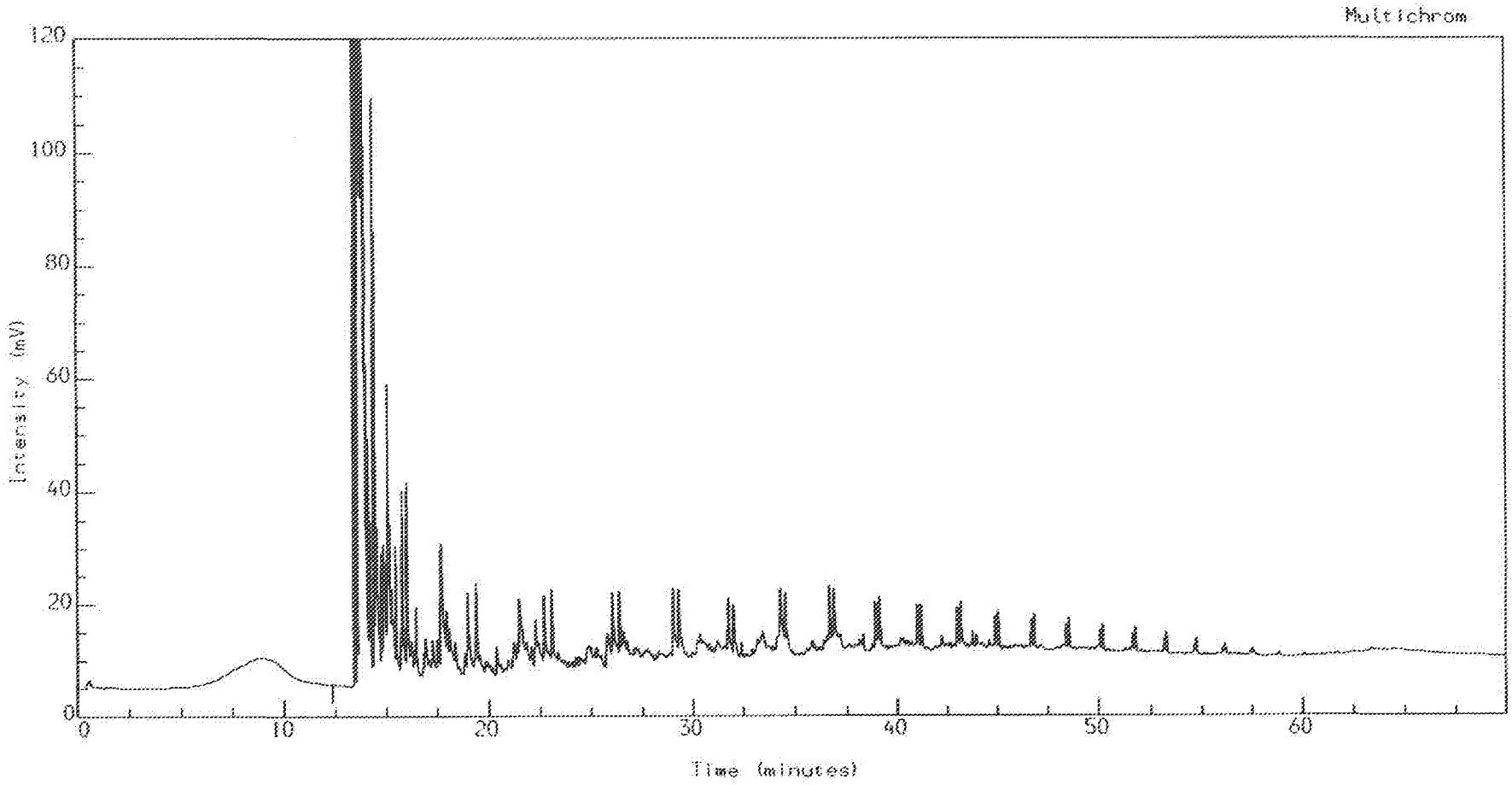
Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 31-JUL-1989 at 08:17
Reported on 31-JUL-1989 at 15:38

Method : PYRO
Calibration :
Run Sequence : PYRO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 9 CS40803P.1.1.

34/8-3A 5020 M DC Amount : 1.000



Instrument : HP5890

Channel Title : PYROLYSIS FID

Lims ID :

Acquired on 25-AUG-1989 at 14:15

Reported on 25-AUG-1989 at 11:59

Method : PYRO

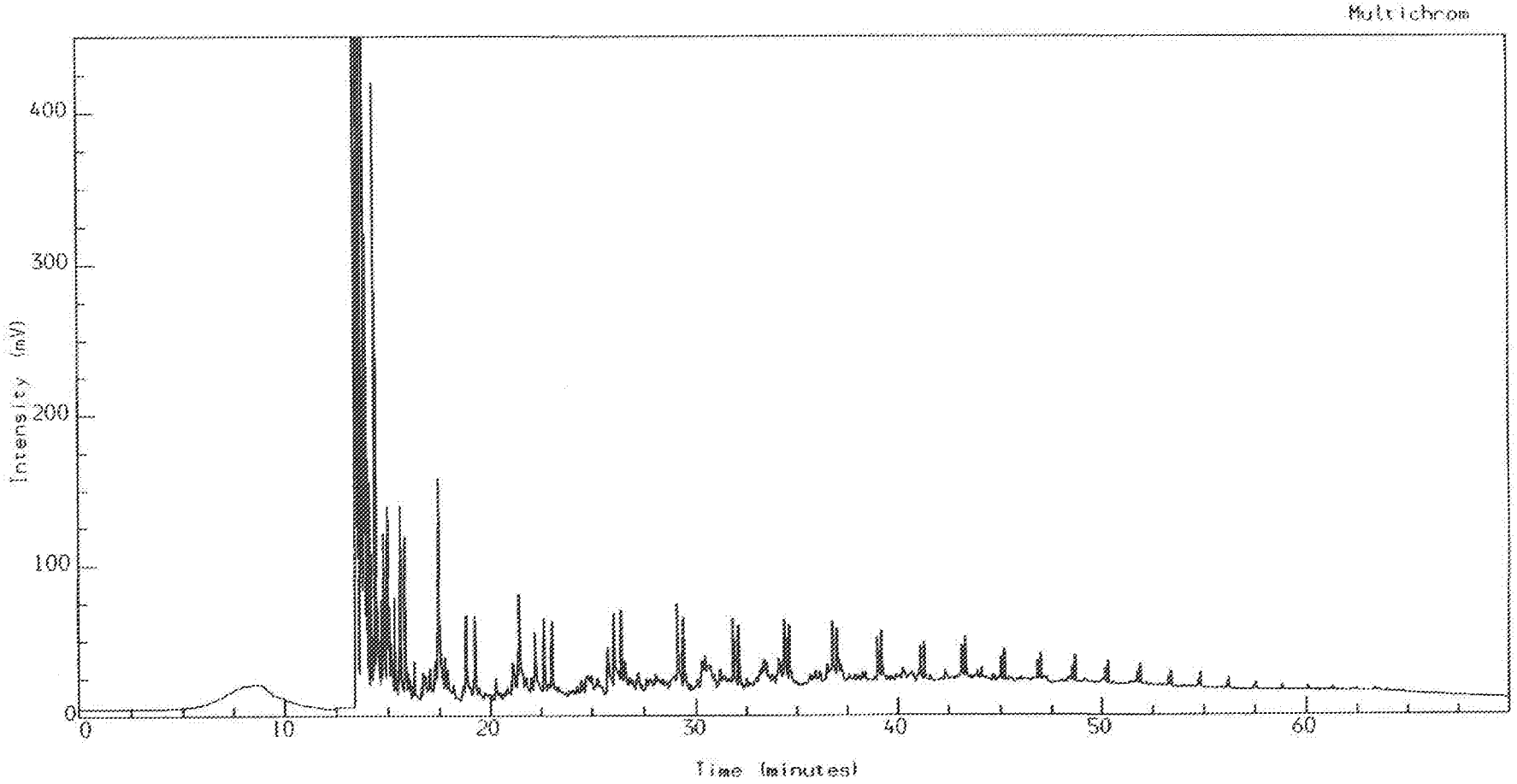
Calibration :

Run Sequence : PYRO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 9 C340803P.2.1.

34/8-3A 3022 M DC Amount : 1.000



Instrument : HP5890

Channel Title : PYROLYSIS FID

Lims ID :

Acquired on 25-AUG-1989 at 15:44

Reported on 25-AUG-1989 at 12:39

Method : PYRO

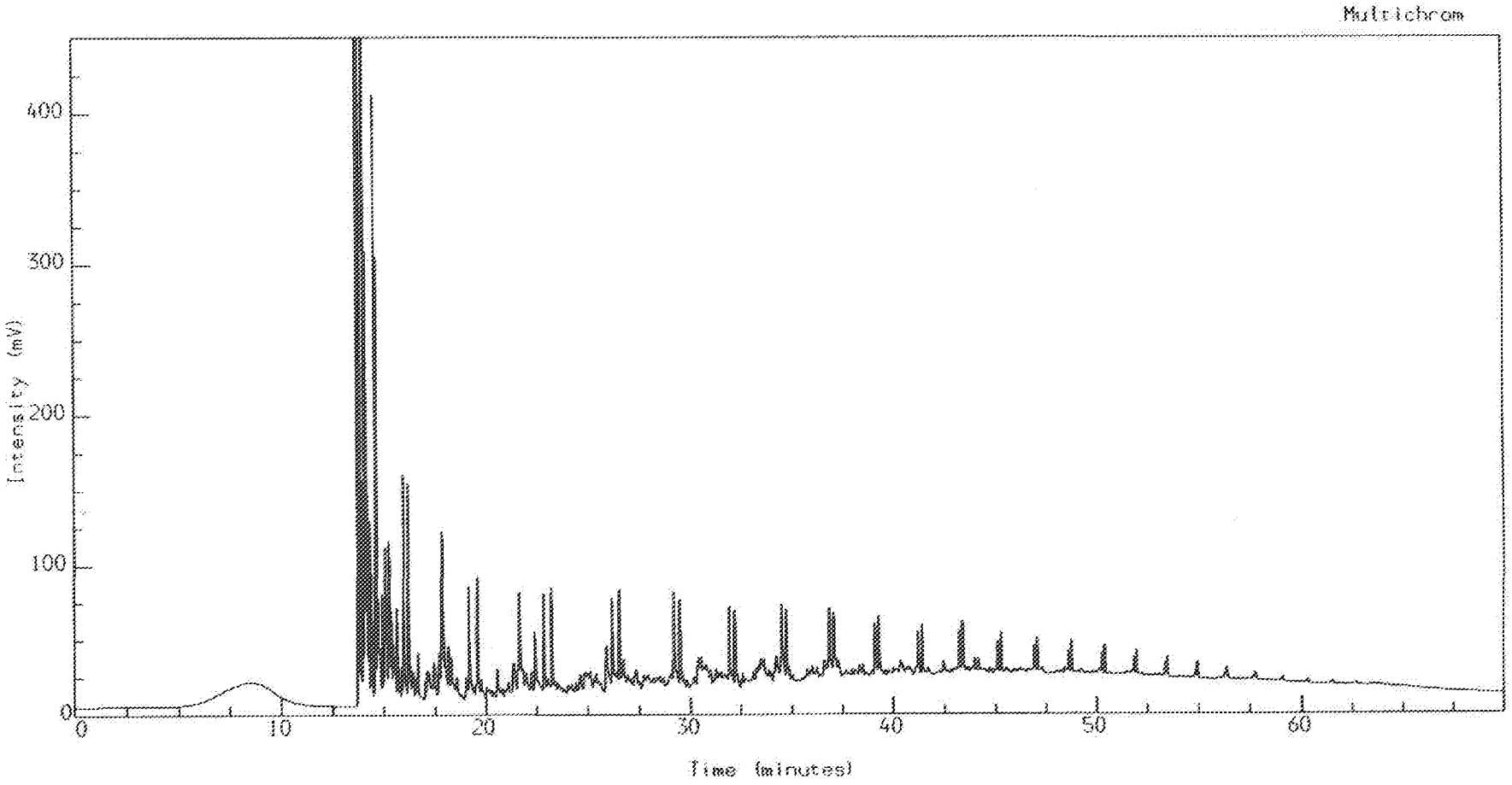
Calibration :

Run Sequence : PYRO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 9 C340803P.3.1.

34/8-3A 3025 M DC Amount : 1.000



Instrument : HP5890

Channel Title : PYROLYSIS FID

Lims ID :

Acquired on 24-AUG-1989 at 15:35

Reported on 25-AUG-1989 at 12:42

Method : PYRO

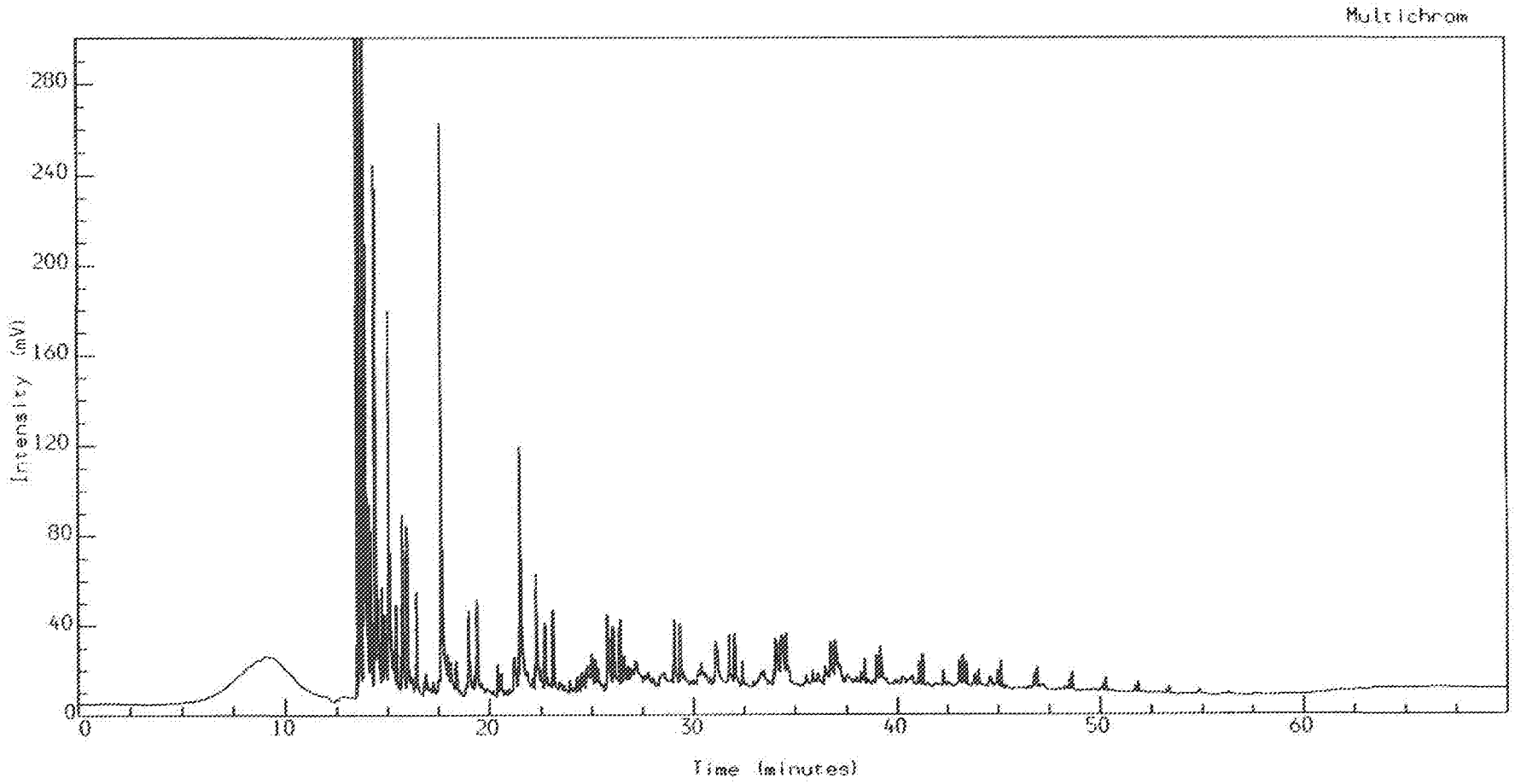
Calibration :

Run Sequence : PYRO

NOR[illegible] HYDRO F-BERGEN, PETROLEUM GE[illegible]CHEMISTRY

Analysis Name : [PETRO] 9 A340803A_P.10,1.

34/8-3A 3023 M SWC Amount : 1.000



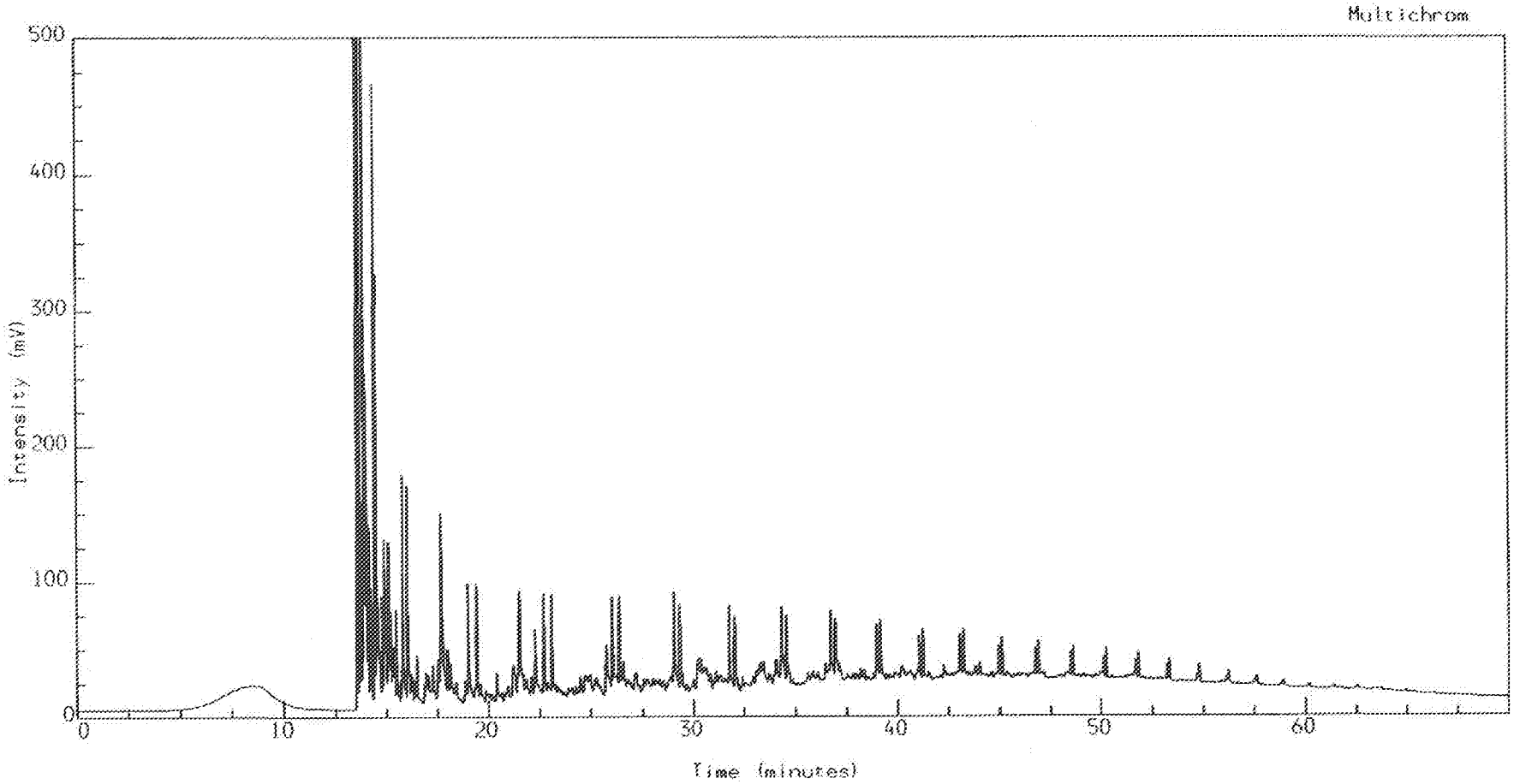
Instrument : HP5890
Channel Title : PYROLYSIS FID
Lims ID :
Acquired on 31-JUL-1989 at 11:52
Reported on 31-JUL-1989 at 15:42

Method : PYRO
Calibration :
Run Sequence : PYRO

NORSK HYDRO F-BERGEN, PETROLEUM GECHEMISTRY

Analysis Name : [PETRO] 9 C340803P.4.1.

34/8-3A 3027 M DC Amount : 1.000



Instrument : HP5890

Channel Title : PYROLYSIS FID

Lims ID :

Acquired on 25-AUG-1989 at 09:31

Reported on 25-AUG-1989 at 12:45

Method : PYRO

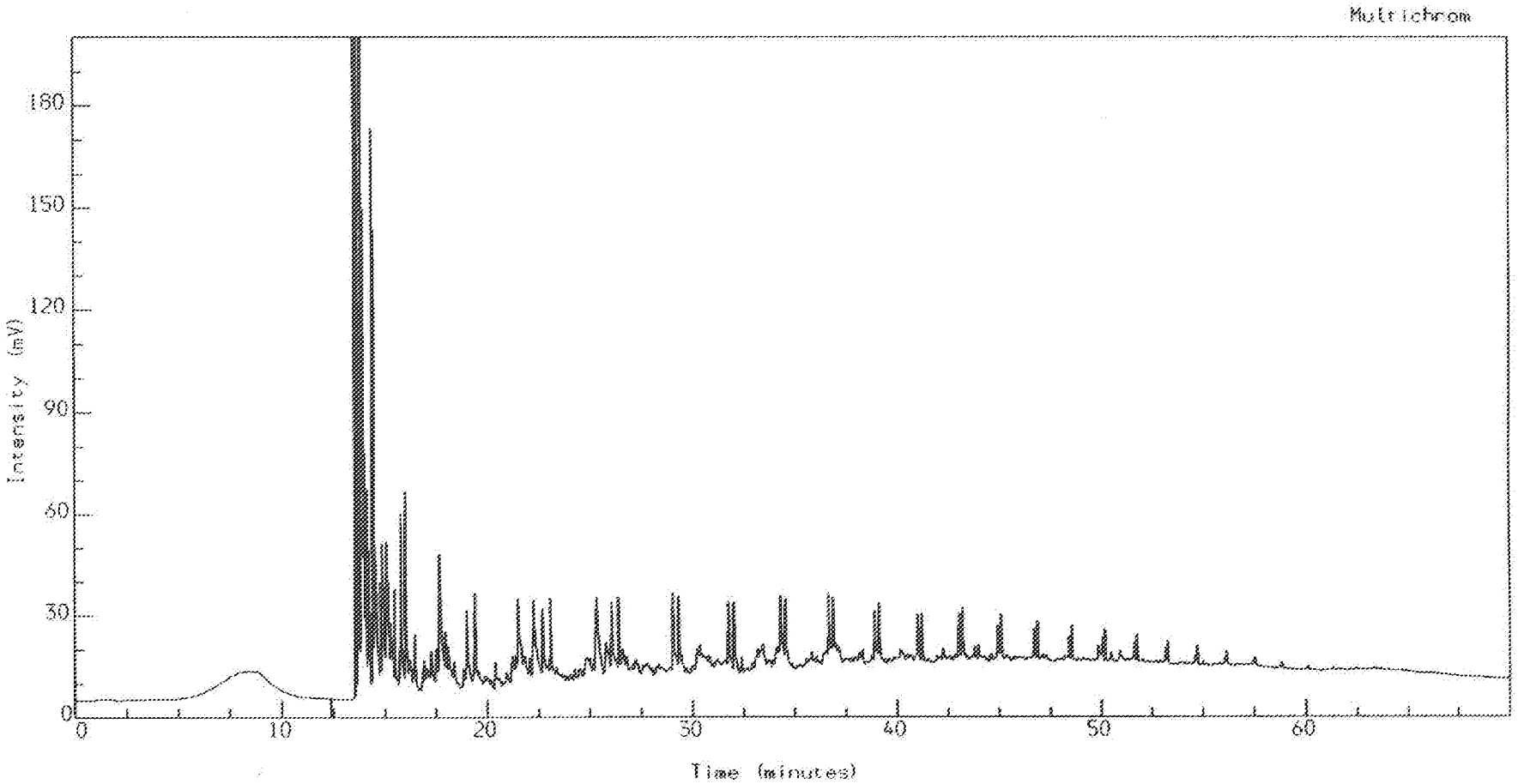
Calibration :

Run Sequence : PYRO

NOR.. HYDRO F-BERGEN, PETROLEUM GE..CHEMISTRY

Analysis Name : [PETRO] 9 C340803P.5.1.

34/8-3A 3030 M DC Amount : 1.000



Instrument : HP5890

Channel Title : PYROLYSIS FID

Lims ID :

Acquired on 25-AUG-1989 at 11:40

Reported on 25-AUG-1989 at 13:15

Method : PYRO

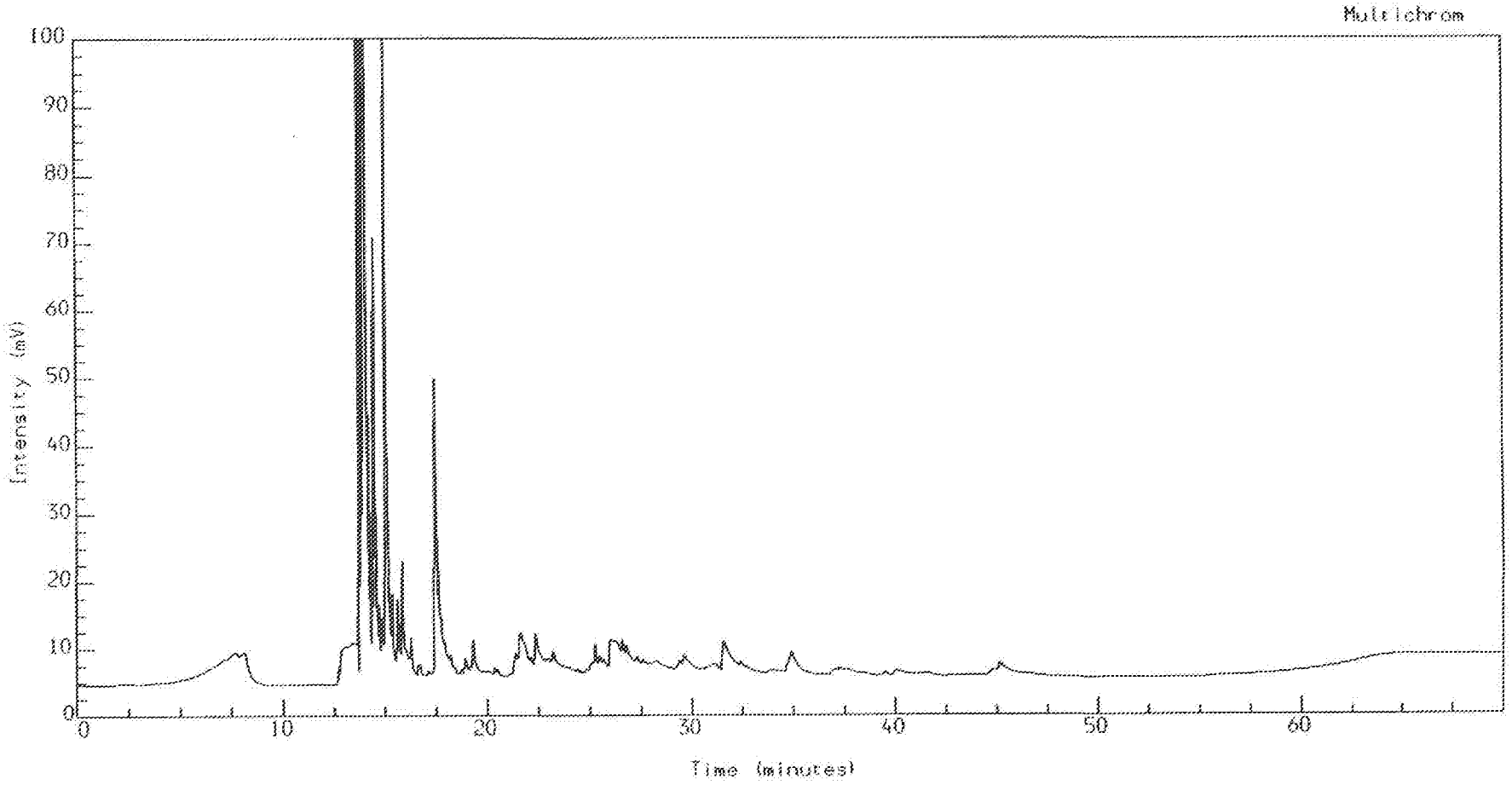
Calibration :

Run Sequence : PYRO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 9 C340803P.6.1.

34/8-3A 3032 M DC Amount : 1.000



Instrument : HP5890

Channel Title : PYROLYSIS FID

Lims ID :

Acquired on 25-AUG-1989 at 13:08

Reported on 29-AUG-1989 at 09:32

Method : PYRO

Calibration :

Run Sequence : PYRO

APPENDIX V Chromatograms and fragmentograms

Oils 34/8–1 and 3

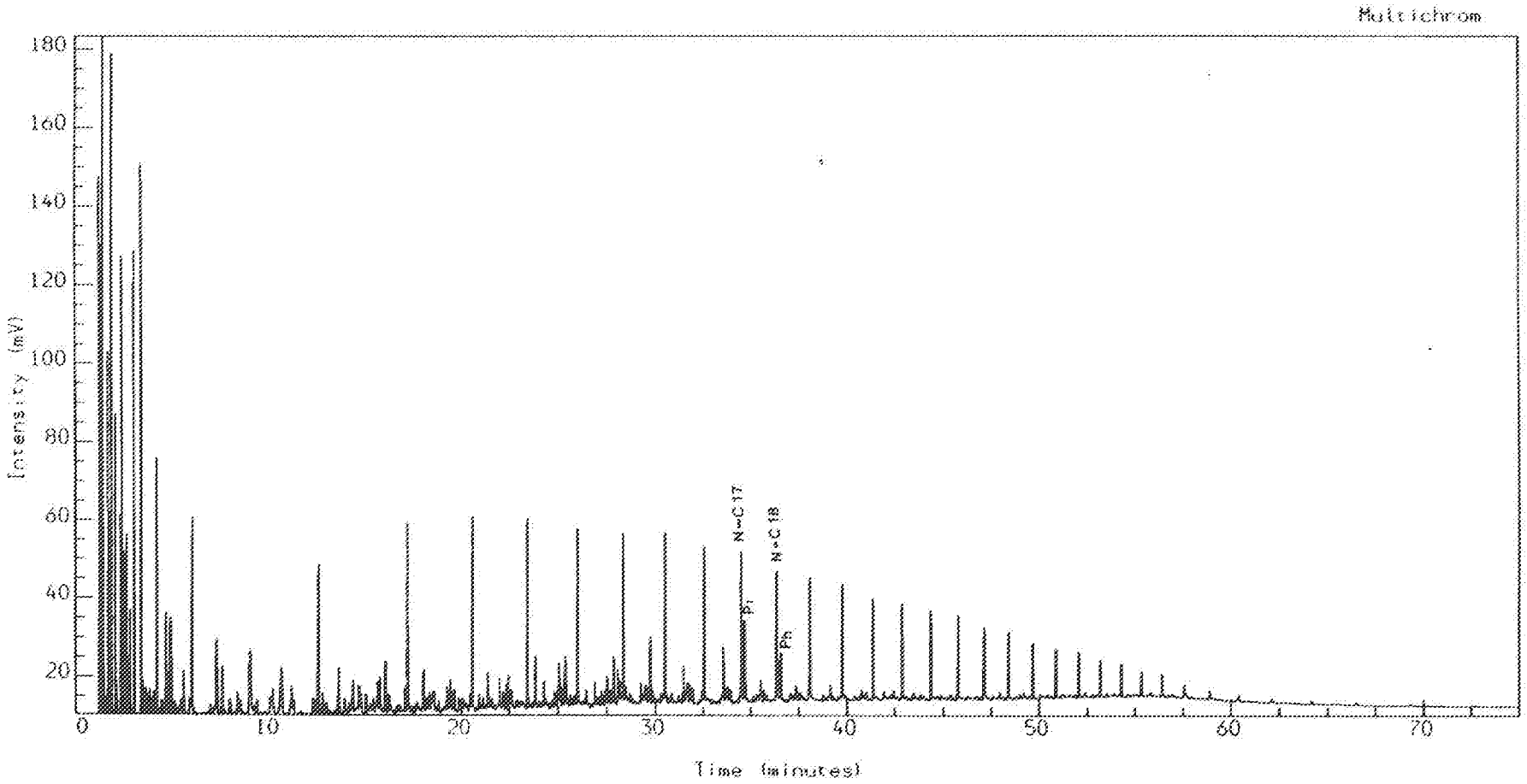
CHROMATOGRAMS

WHOLE OIL

NORSK HYDRO E-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 3 TESTOIL.2.1.

34/8-1 DST 2 Amount : 1.000



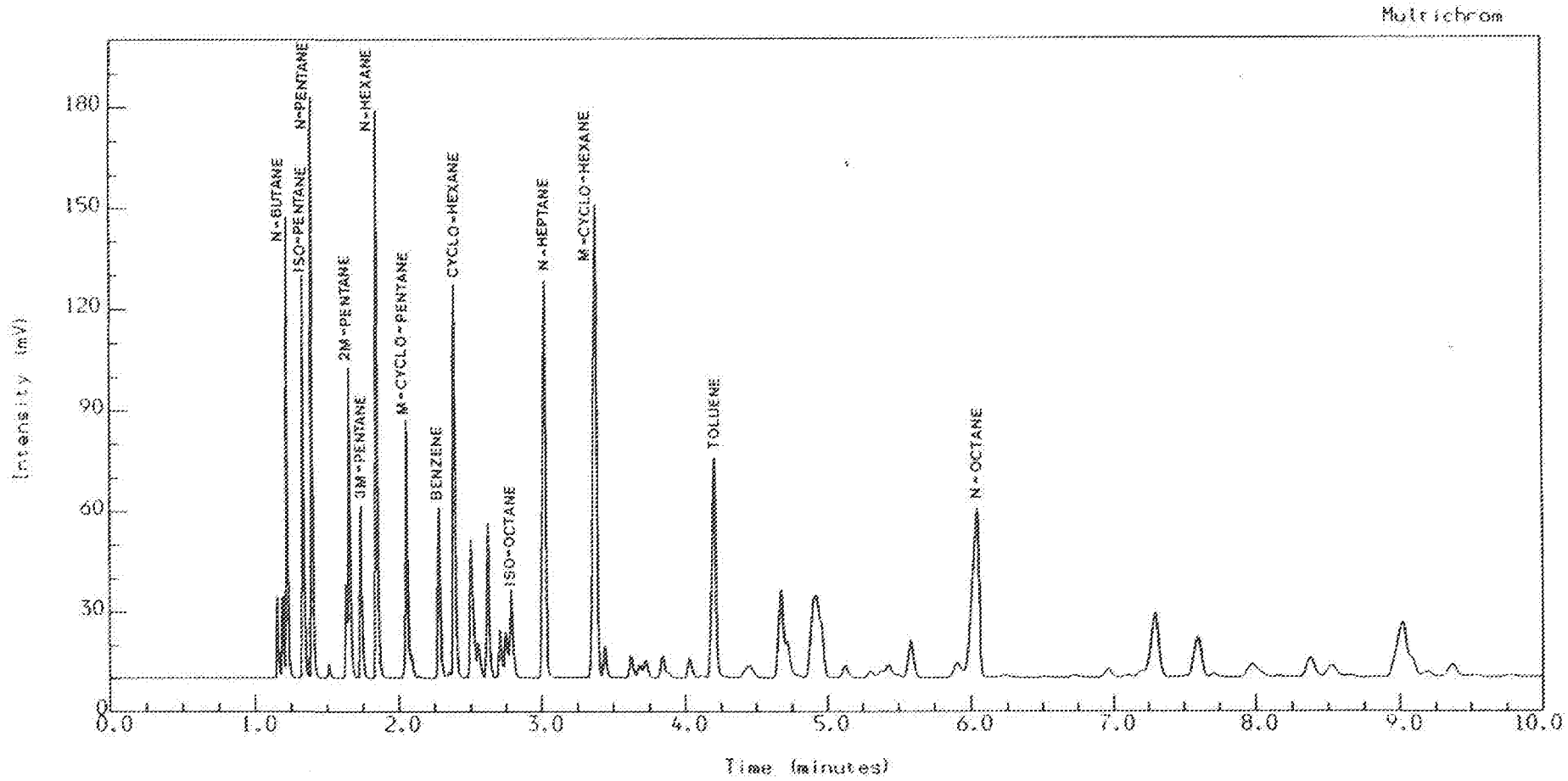
Instrument : HP5880
Channel Title : HP5880 GC
Lims ID :
Acquired on 30-AUG-1989 at 12:13
Reported on 30-AUG-1989 at 14:18

Method : OIL
Calibration : OIL
Run Sequence : OIL

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 3 TESTOIL.2.1.

34/8-1 DST 2 Amount : 1.000



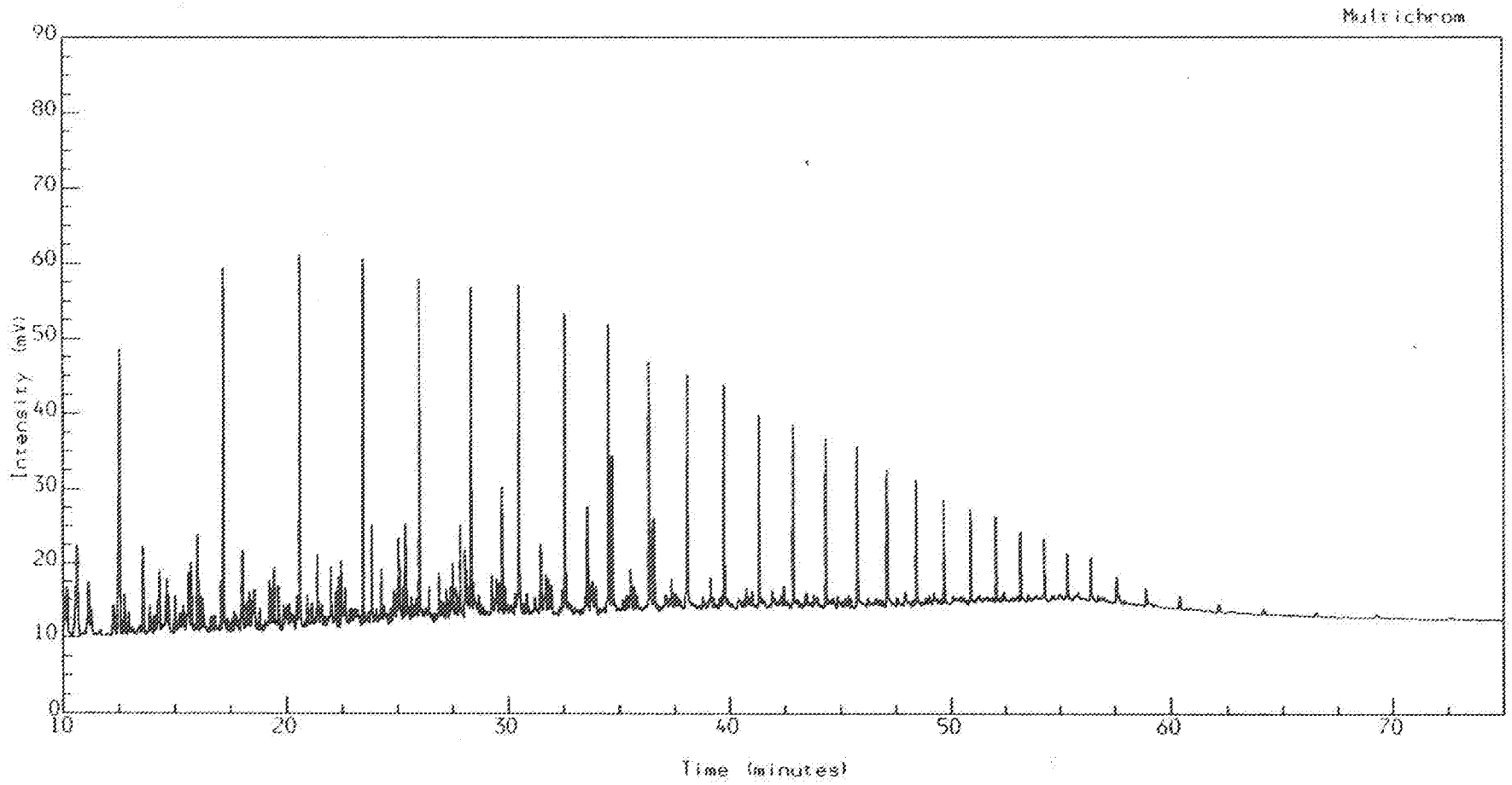
Instrument : HP5880
Channel Title : HP5880 GC
Lims ID :
Acquired on 30-AUG-1989 at 12:13
Reported on 30-AUG-1989 at 14:38

Method : OIL
Calibration : OIL
Run Sequence : OIL

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 3 TESTOIL,2,1.

34/8-1 DST 2 Amount : 1.000



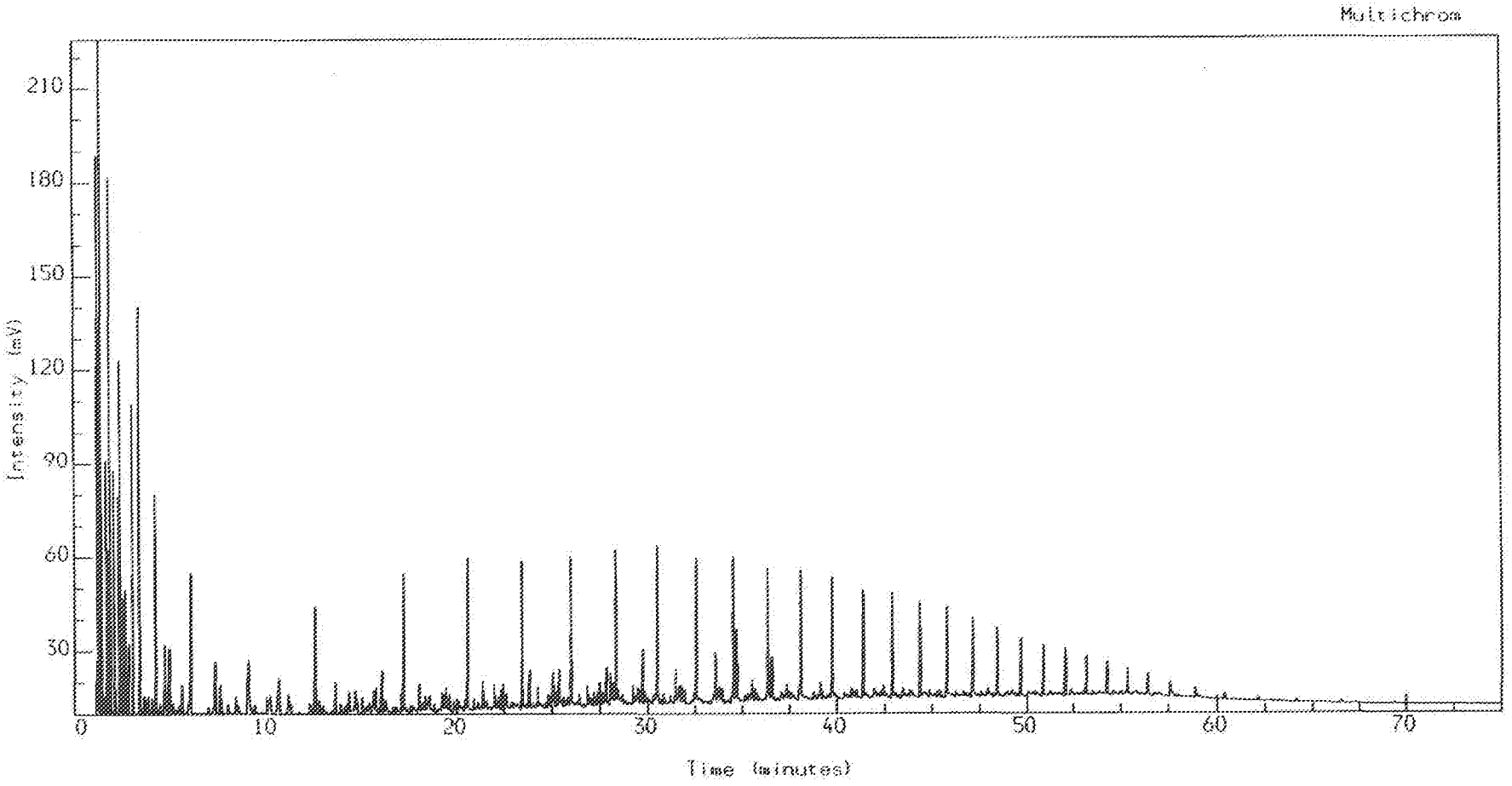
Instrument : HP5880
Channel Title : HP5880 GC
Lims ID :
Acquired on 30-AUG-1989 at 12:13
Reported on 1-SEP-1989 at 15:55

Method : OIL
Calibration : OIL
Run Sequence : OIL

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 3 B3408013W.2.1.

34/8-3 DST1 Amount : 1.000



Instrument : HP5880

Channel Title : HP5880 GC

Lims ID :

Acquired on 28-AUG-1989 at 13:58

Reported on 28-AUG-1989 at 16:21

Method : OIL

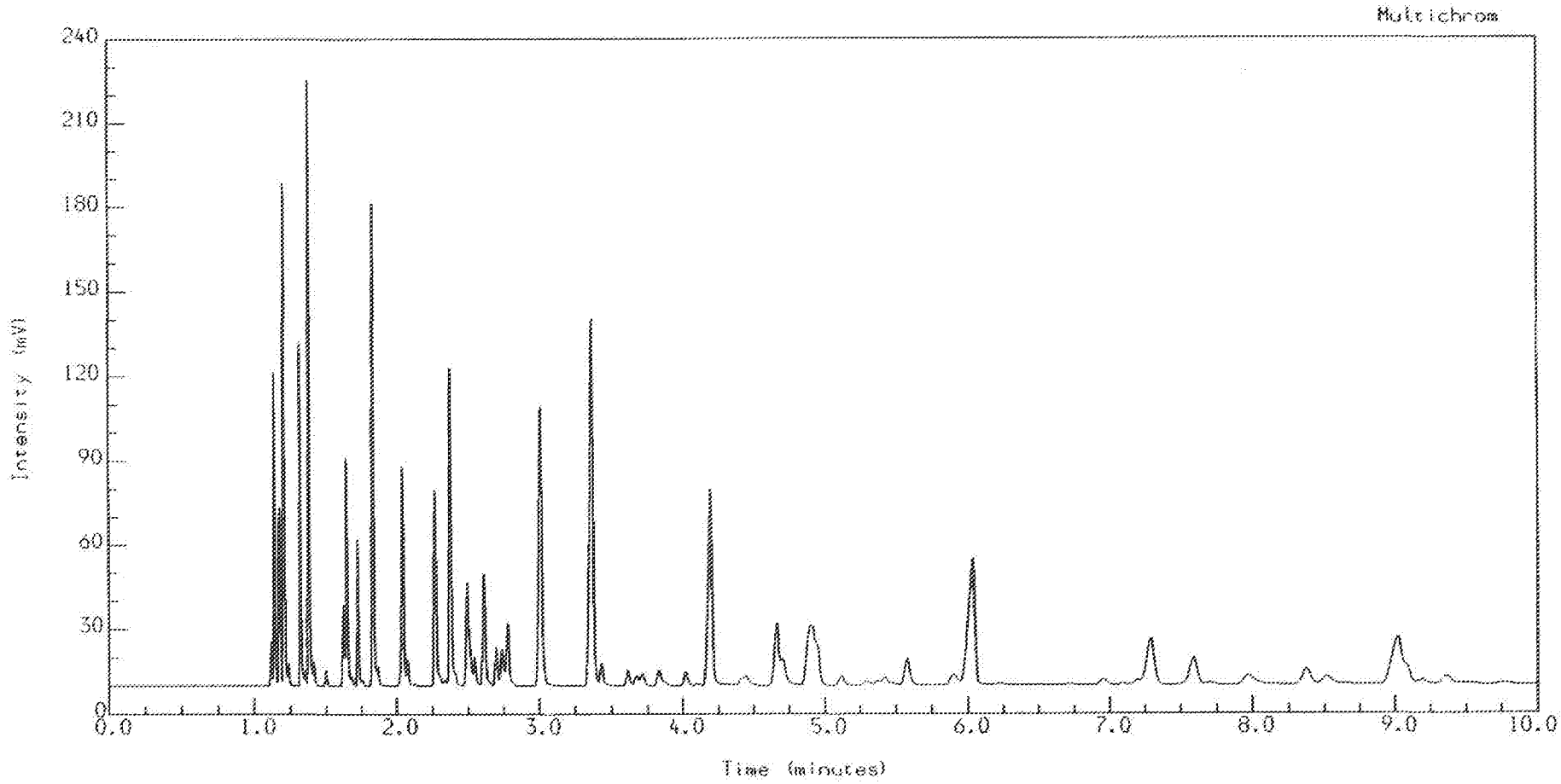
Calibration : OIL

Run Sequence : OIL

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 3 B3408013W,2,1.

34/8-3 DST1 Amount : 1.000



Instrument : HP5880

Channel Title : HP5880 GC

Lims ID :

Acquired on 28-AUG-1989 at 13:58

Reported on 29-AUG-1989 at 12:59

Method : OIL

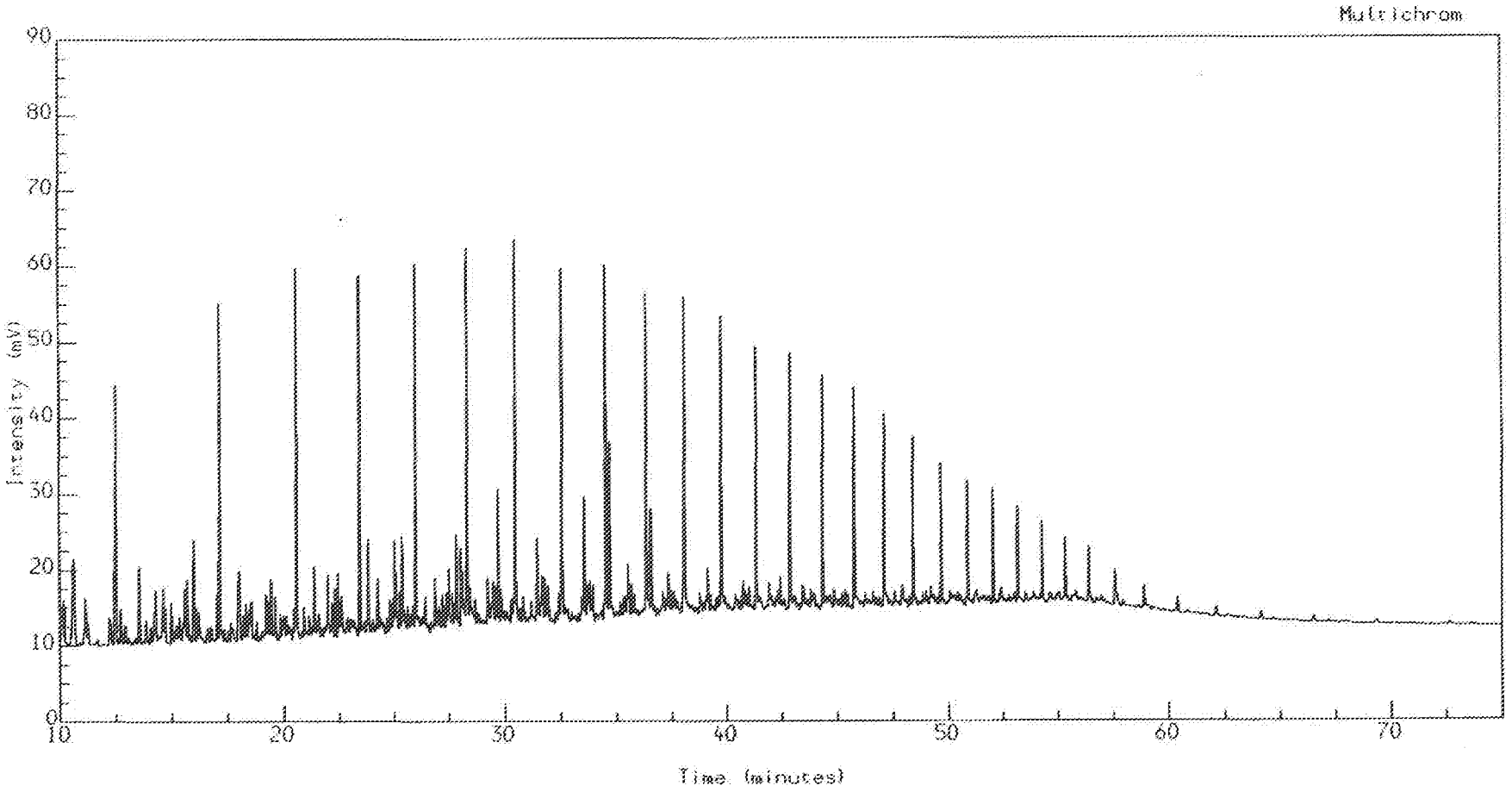
Calibration : OIL

Run Sequence : OIL

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 3 B3408013W.2.1.

34/8-3 DST1 Amount : 1.000



Instrument : HP5880

Channel Title : HP5880 GC

Lims ID :

Acquired on 28-AUG-1989 at 13:58

Reported on 29-AUG-1989 at 13:02

Method : OIL

Calibration : OIL

Run Sequence : OIL

CHROMATOGRAMS

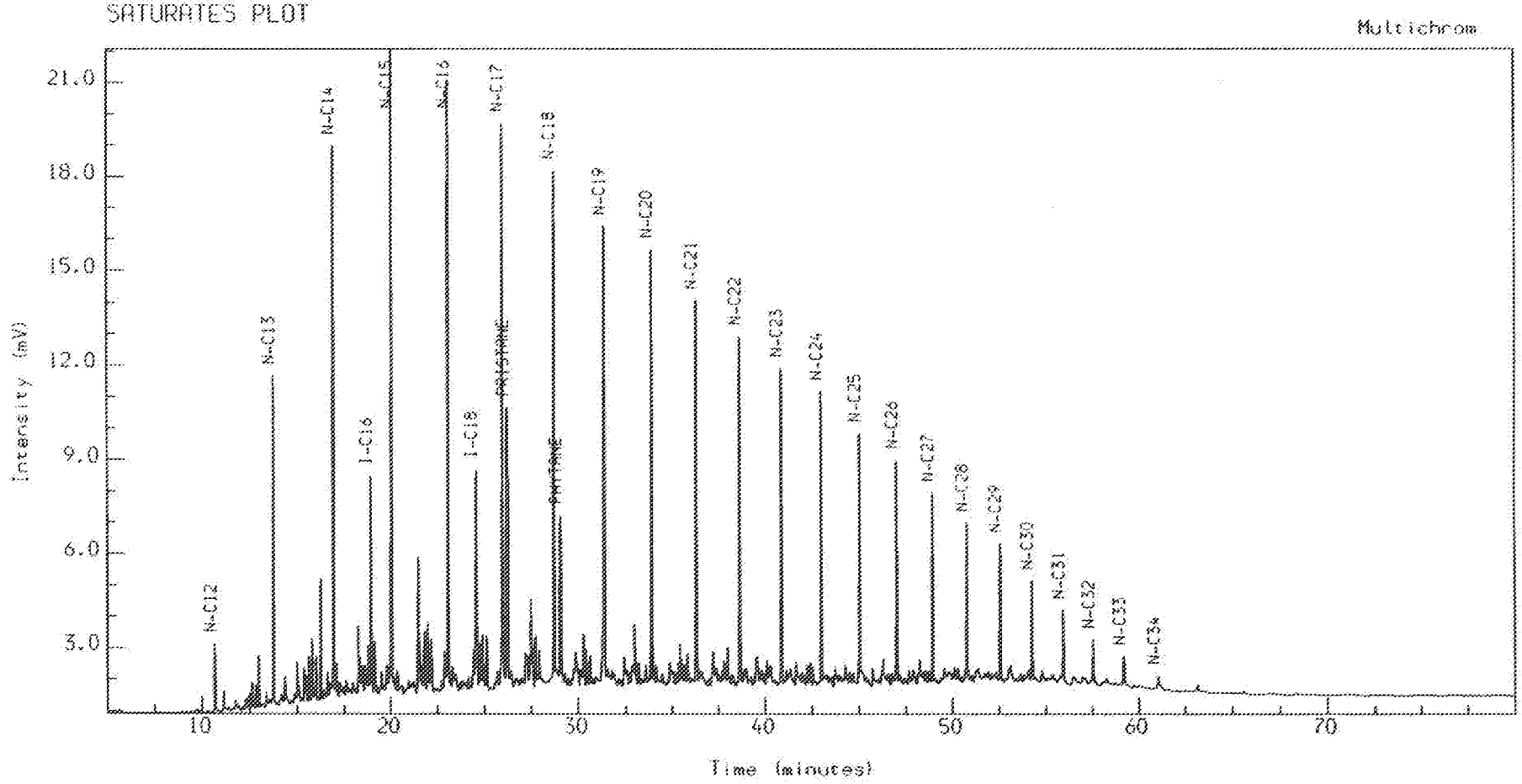
SATURATED FRACTIONS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 A340803S,3,1.

34/8-1 DST2 SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 18-AUG-1989 at 16:16

Reported on 21-AUG-1989 at 10:51

Method : MSDS

Calibration : MSDS

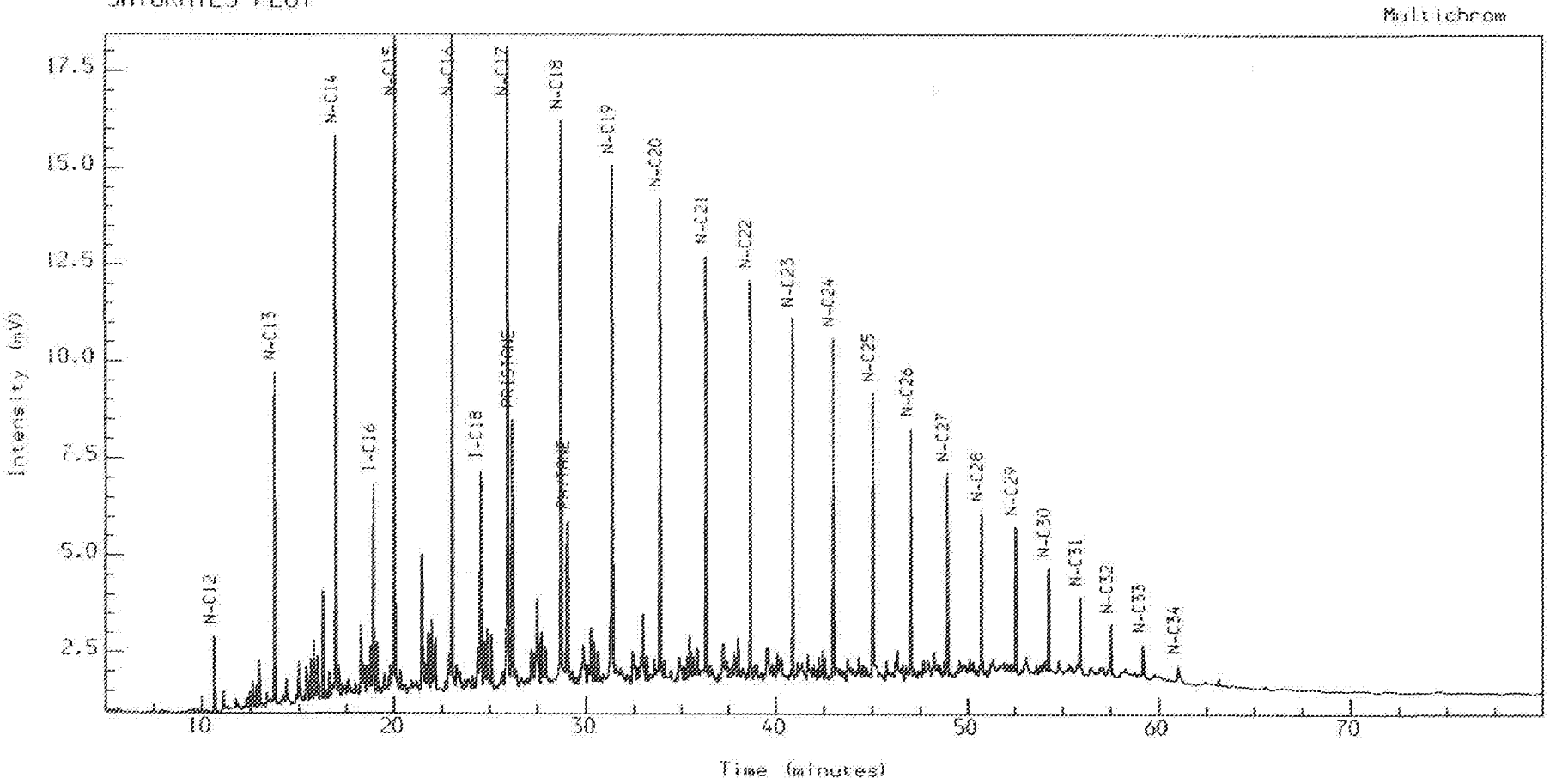
Run Sequence : MSDS

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 7 A340803S.4.1.

34/8-3 DST1 SAT Amount : 1.000

SATURATES PLOT



Instrument : HP5890

Channel Title : MSD

Lims ID :

Acquired on 18-AUG-1989 at 17:47

Reported on 21-AUG-1989 at 10:55

Method : MSDS

Calibration : MSDS

Run Sequence : MSDS

CHROMATOGRAMS

AROMATIC FRACTIONS

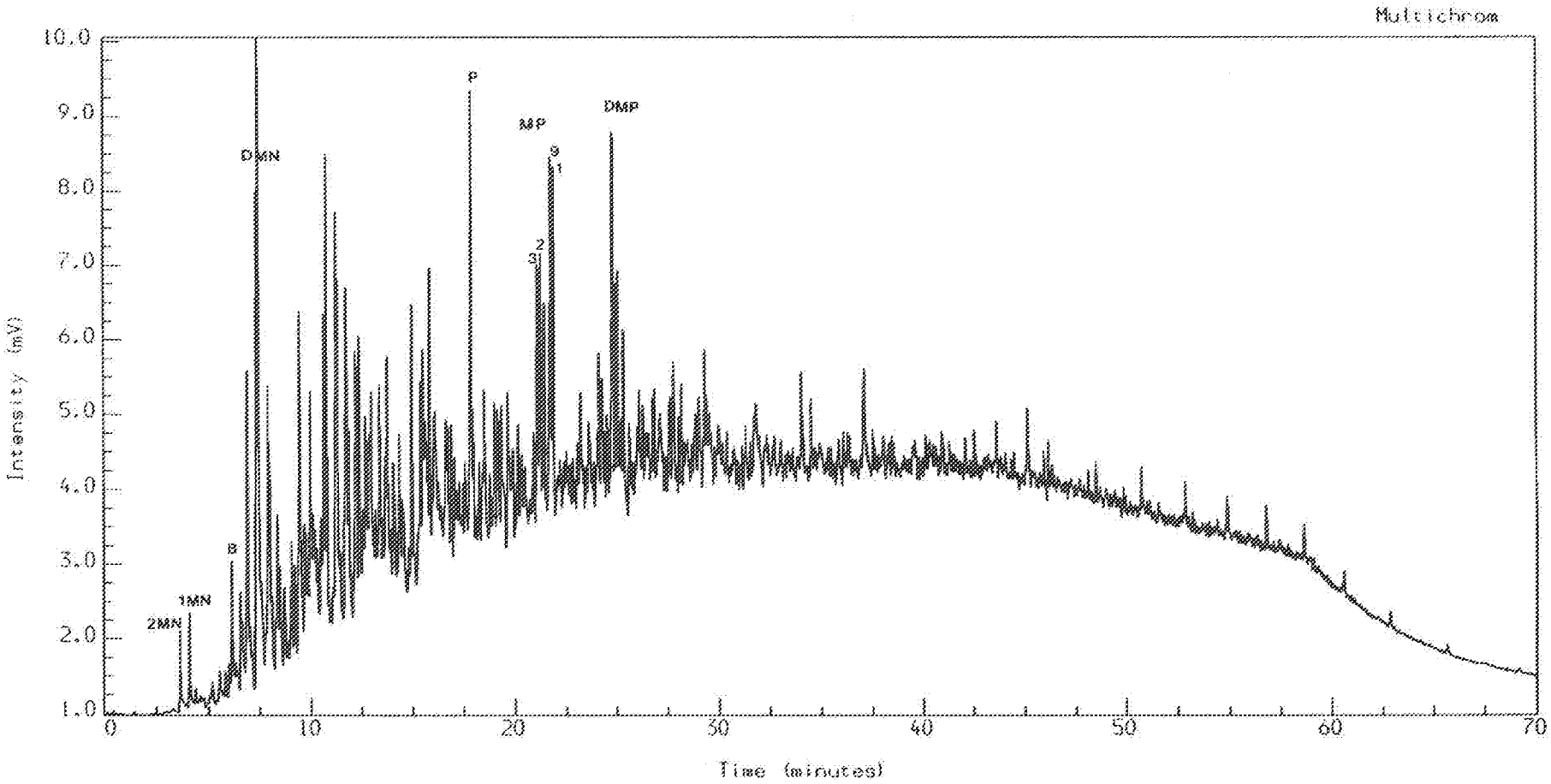
IDENTIFICATION OF AROMATIC HYDROCARBONS

N	Naphtalene
MN	MethylNaphtalenes
B	Biphenyl
DMN	DiMethylNaphtalenes
P	Phenantrene
MP	MethylPhenantrenes
DMP	DiMethylPhenantrenes

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] 1 A340803A.1.1.

34/8-1 DST2 ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 18-AUG-1989 at 13:37

Reported on 21-AUG-1989 at 15:28

Method : ARO

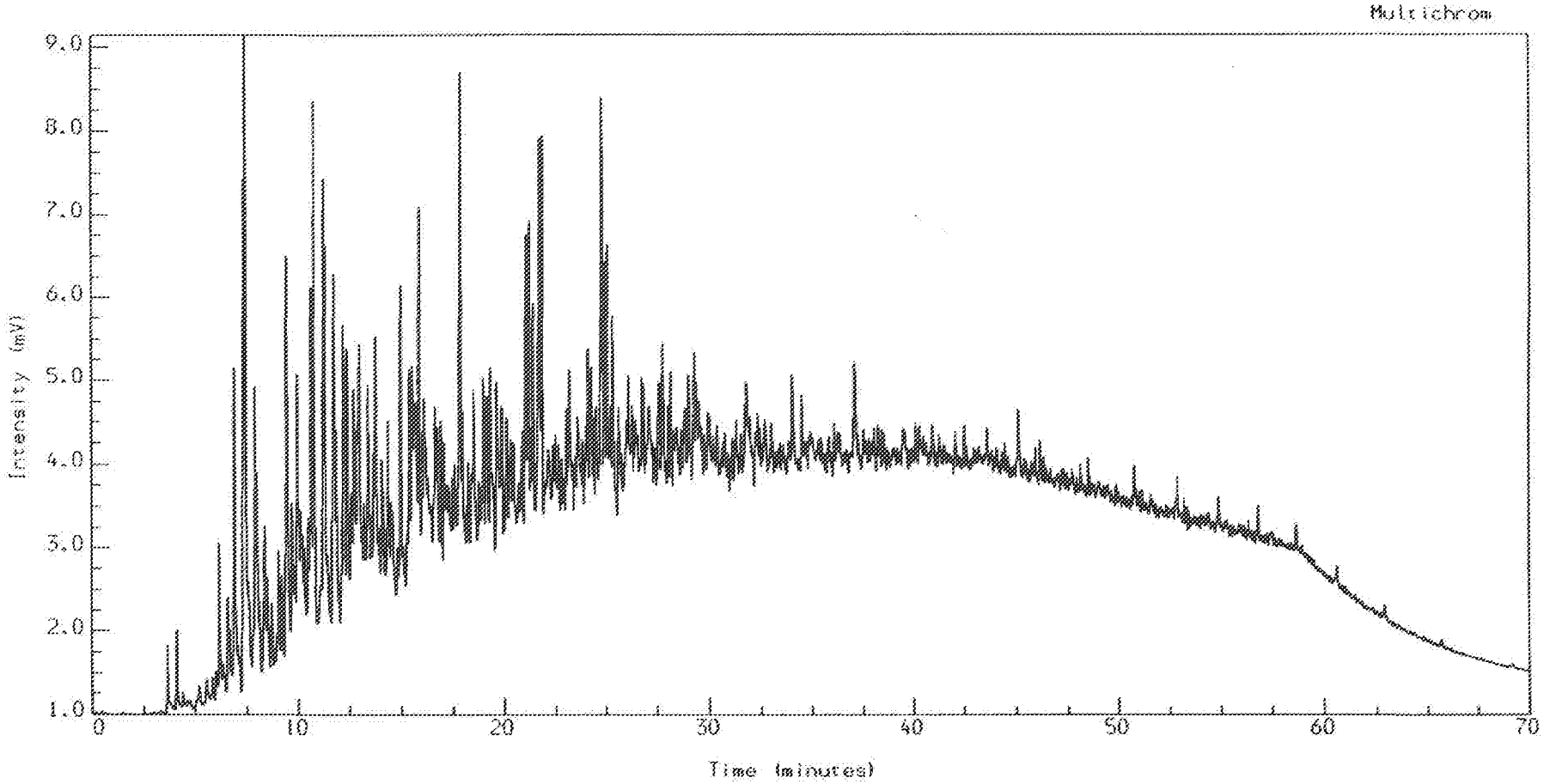
Calibration : ARO

Run Sequence : ARO

NORSK HYDRO F-BERGEN, PETROLEUM GEOCHEMISTRY

Analysis Name : [PETRO] I A540803A.2.1.

34/8-3 DST1 ARO Amount : 1.000



Instrument : HP5880

Channel Title : HP5880A GC

Lims ID :

Acquired on 18-AUG-1989 at 15:17

Reported on 21-AUG-1989 at 15:31

Method : ARO

Calibration : ARO

Run Sequence : ARO

FRAGMENTOGRAMS

SATURATED FRACTIONS

m/z 217 – STERANES

m/z 191 – TRITERPANES

IDENTIFICATION OF BIOLOGICAL MARKERS

Triterpanes (m/z 191):

Numbers from **18** to **35** corresponds to the carbon number of the molecule, the following capital letter identifies the stereochemistry and/or the number of rings.

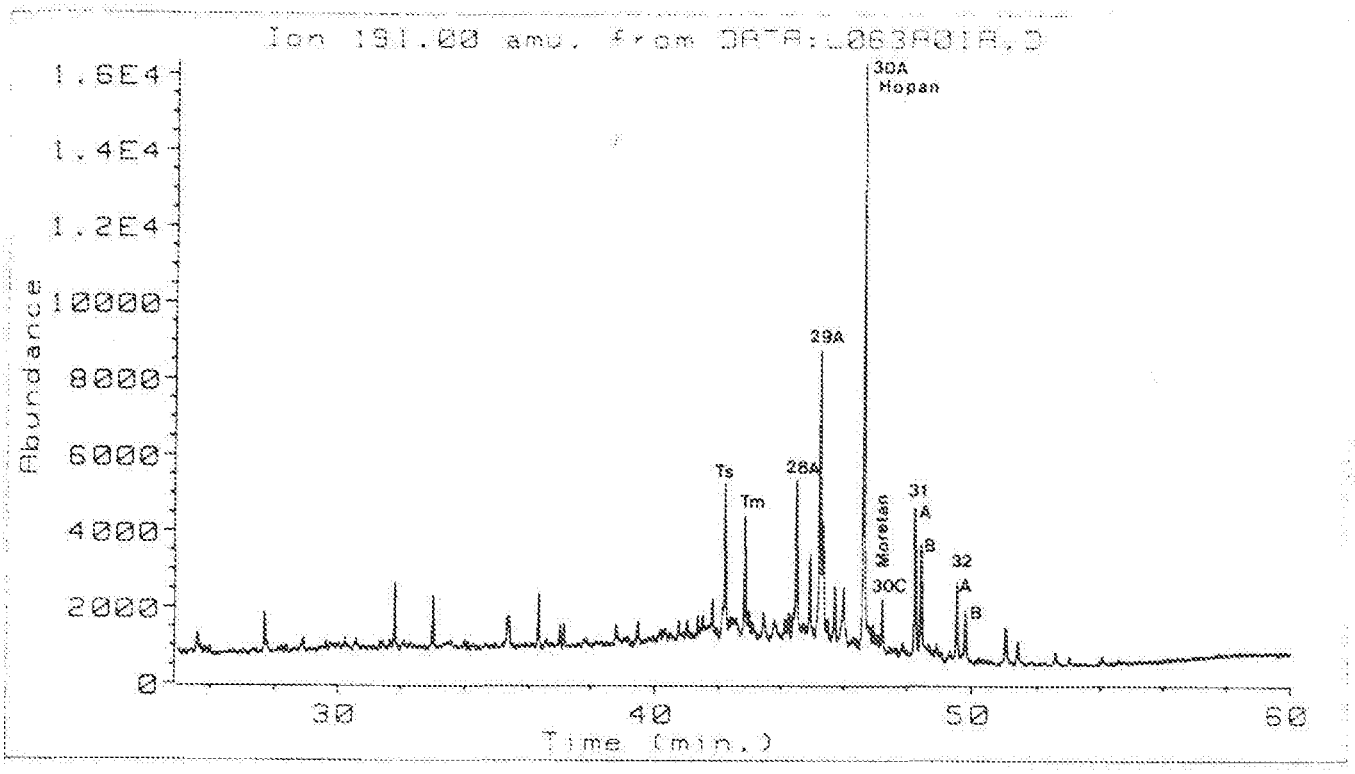
A 17α(H)-hopanes (I) 22S
B 17α(H)-hopanes 22R
C 17β(H)-moretanes (II) 22S
D 17β(H)-moretanes 22R
E 17β(H)-hopanes (III)
F Neohopanes (IV)
G Gammacerane (V)
H $\Delta^{13,18}$-hopenes (VI)
I 25-norhopanes (VII)
L Lupane (VIII)
O 18α(H)-oleanane (IX)
X Tetracyclic terpanes (X)
Y Tricyclic terpanes (XI)

Steranes (m/z 217):

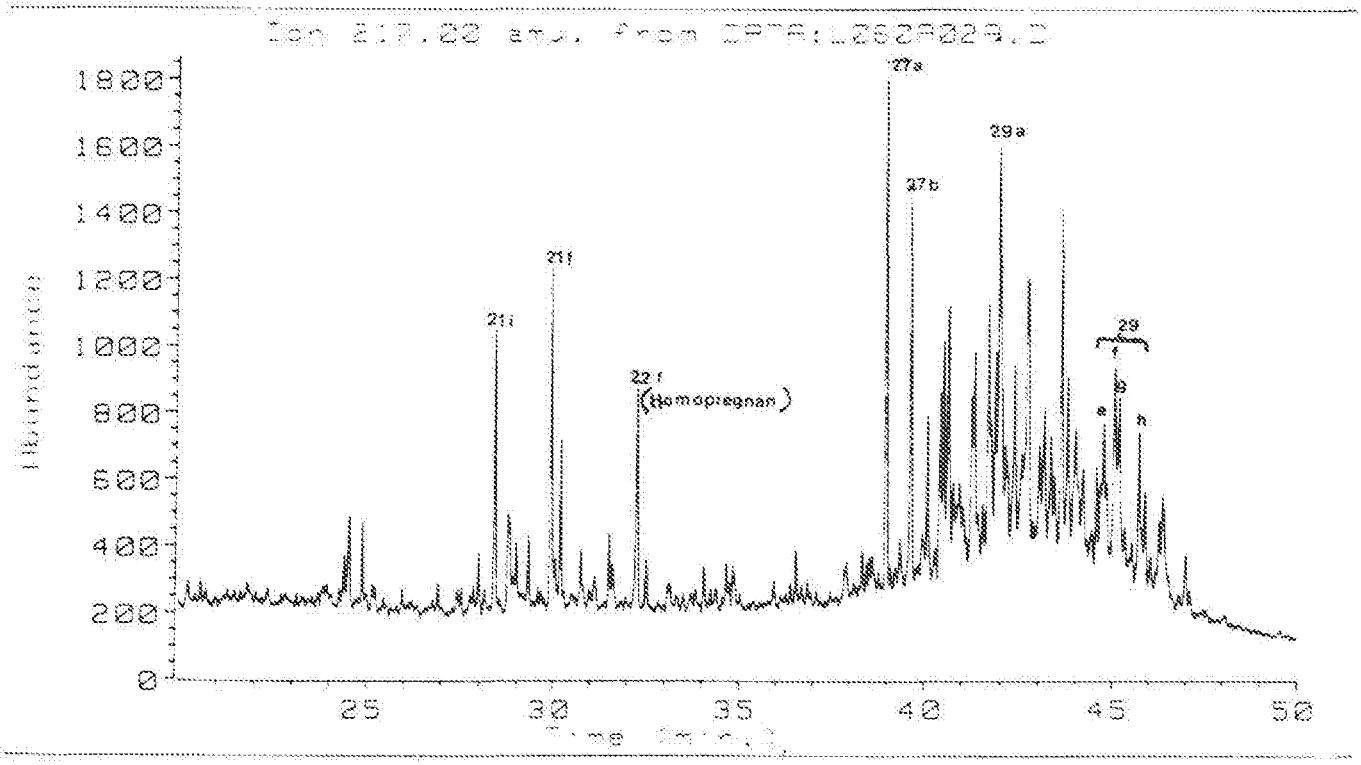
Numbers from **20** to **30** corresponds to the carbon number of the molecules, the following small letter identifies the stereochemistry.

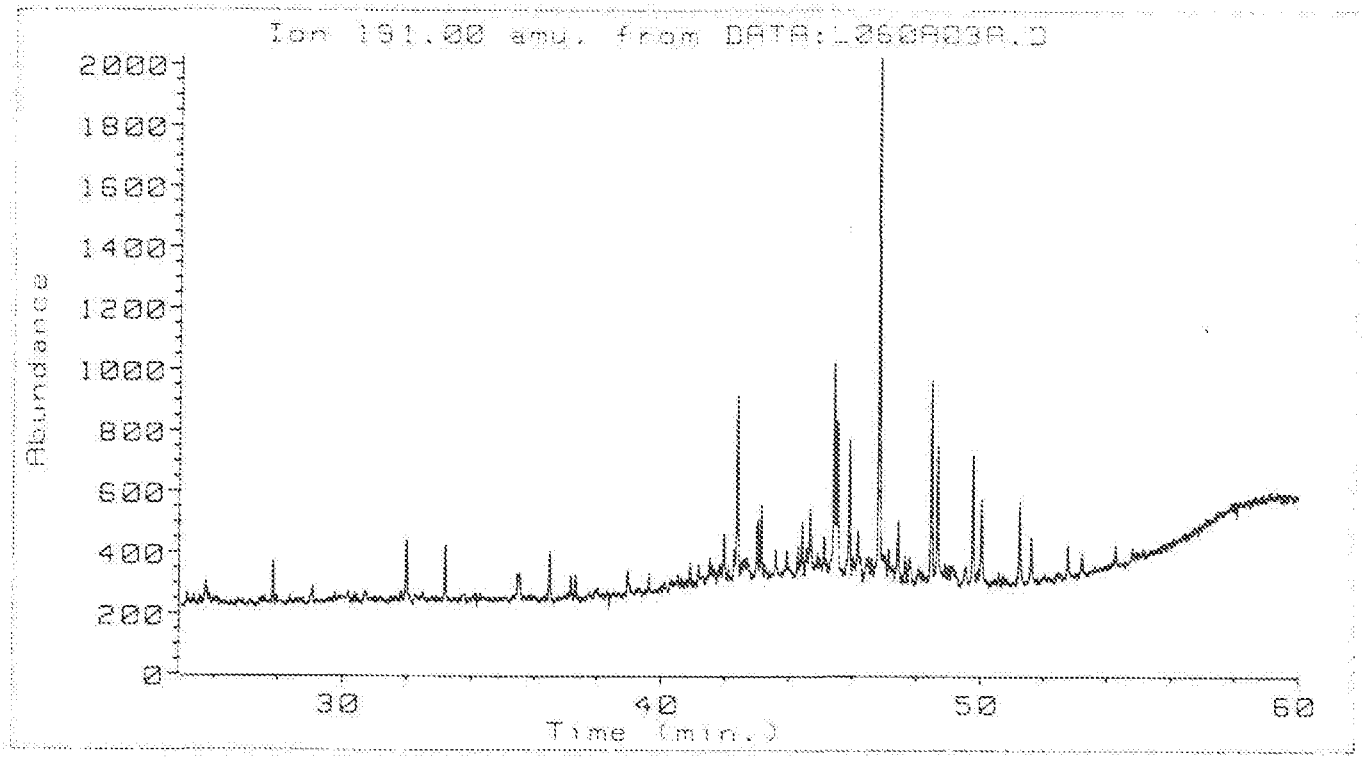
a 13β(H),17α(H)-diasteranes 20S (1)
b 13β(H),17α(H)-diasteranes 20R (2)
c 13α(H),17β(H)-diasteranes 20S (3)
d 13α(H),17β(H)-diasteranes 20R (4)
e 5α(H),14α(H),17α(H)-steranes 20S (5)
f 5α(H),14β(H),17β(H)-steranes 20R (6)
g 5α(H),14β(H),17β(H)-steranes 20S (7)
h 5α(H),14α(H),17α(H)-steranes 20R (8)
i 5β(H),14α(H),17α(H)-steranes (9)
k 4-methylsteranes (10)

Examples: **31B** corresponds to 17α(H)-homohopane 22R
29e corresponds to ααα-ethylcholestane 20S

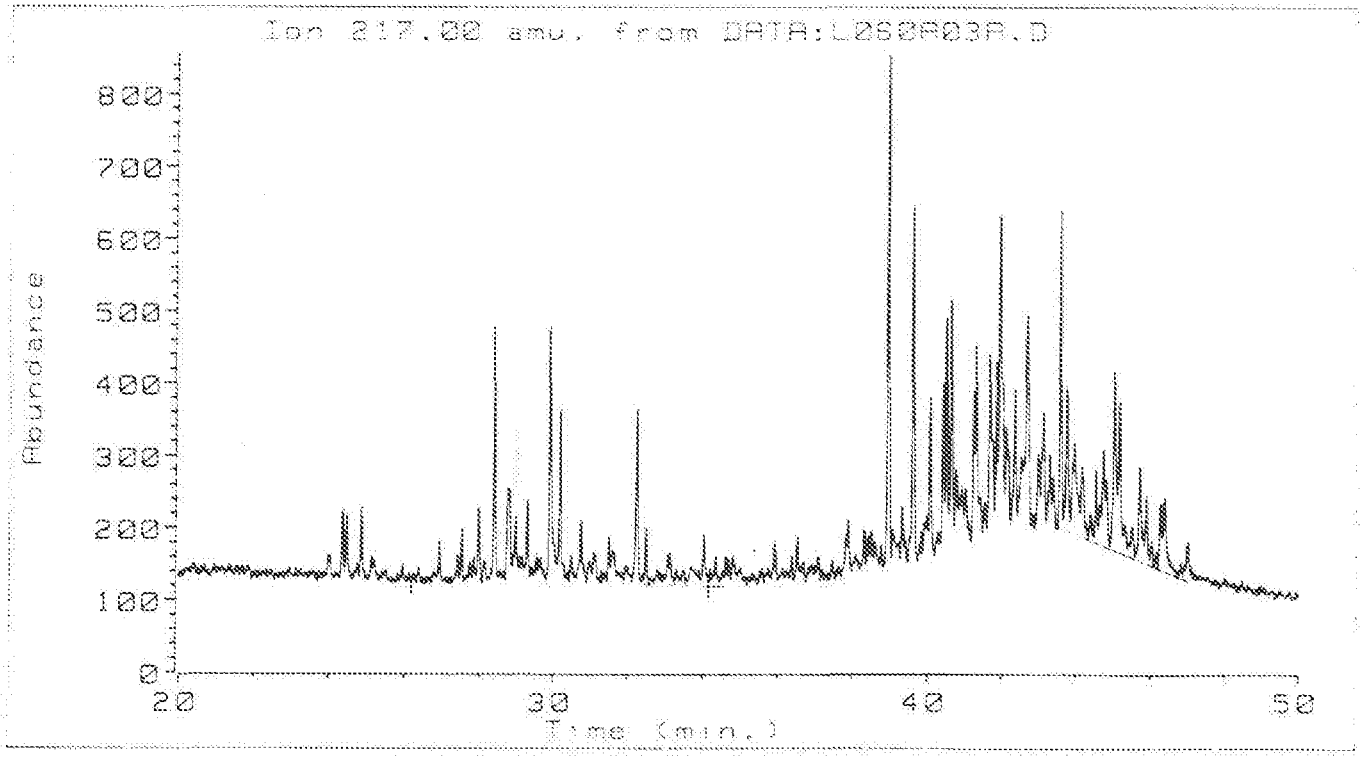


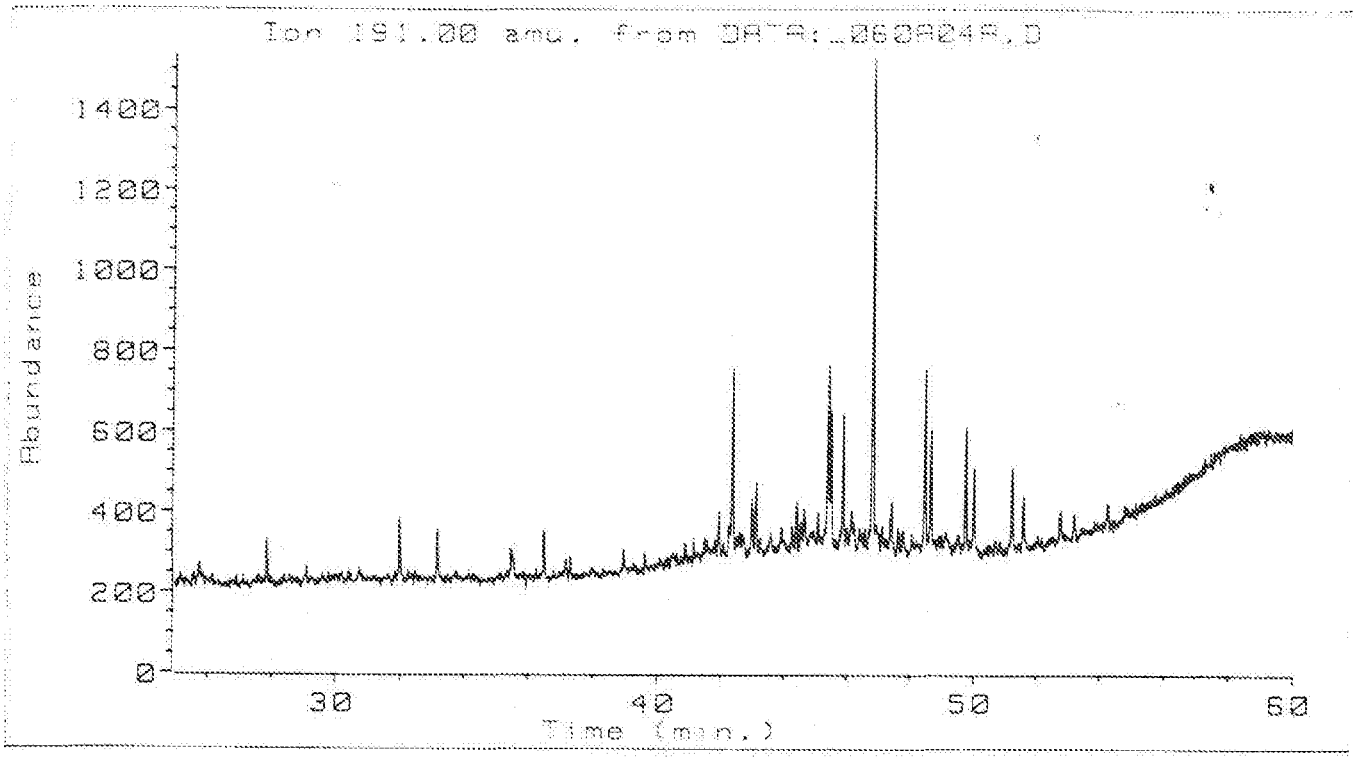
BIOMSTANDARD





WELL 34/8-1 DST 2





WELL 34/8-3 DST 1