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PRE-CRETACEOUS HYDROCARBON POTENTIAL OF THE NORWEGIAN CENTRAL GRABEN

GEOCHEMICAL ANALYSIS
Well NOCS 3/7-3

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INTRODUCTION

General stratigraphic information for this well is given in the NPD Well Summary Sheets No 11. This data is used for the subdivision of the wells into zones of age, groups and formations. It was sometimes difficult to interpret this data, as the correlation between the tabulated data and the stratigraphic column given was poor.

The following stratigraphy is used (depth RKB):

Tertiary	? - 2907 m
Upper Cretaceous	2907 - 3280 m
Lower Cretaceous	3280 - 3432 m
Upper Jurassic	3432 - 3506 m
Middle Jurassic	Absent
Lower Jurassic	Absent
Triassic	Absent
Permian	3506 - 3542 m
Chalk Group	2818 - 3280 m
Ekofisk Formation	2828 - 2907 m
Tor Formation	2907 - 3119 m
Hod Formation	3119 - 3280 m
Cromer Knoll Group	3280 - 3432 m
Rødby Formation	Absent
Valhall Formation	3280 - 3325 m
Berriasian sandstone	3325 - 3432 m
Tyne Group	3432 - 3506 m
Mandal Formation	3432 - 3506 m
Zechstein Group	3506 - 3542 m

LITHOLOGY AND TOTAL ORGANIC CARBON CONTENT

Figure 1 shows the variation in TOC over the analysed interval of the well plotted with a generalized litho-stratigraphic column. Only the analysed section of the well is shown in this figure.

Tertiary (- 2907 m)

No subdivision of the Tertiary section was made above the Ekofisk Fm.. A total of 112 samples were described above the Ekofisk Fm..

The lithology of the zone above the Ekofisk Fm. consists mainly of various claystones of greyish, brownish and greenish colours. Small amounts of limestone are found throughout. At the top and bottom of the zone, sand/ sandstone is present. Six TOC analyses were performed. The TOC content is very variable, ranging from poor to rich. The richest value was found in a brownish black claystone from 1480 m (10.04 %) and in a brownish claystone from 1880 m (3.60 %). Good TOC values were found in two greyish claystones from 2015 m and 2190 m (1.31 % and 1.62 %), while the greyish sample from 2540 m has a fair TOC content (0.77 %). The brownish claystone from 2784 m has the lowest TOC content found in this zone (0.22 %).

Chalk Group (2818 - 3280 m)

Ekofisk Formation (2828 - 2907 m)

Thirteen samples were described. The formation consists mainly of a white to pinkish chalk, mixed with some green grey claystone. Only one TOC analysis was performed on

material from this formation. The greyish claystone from 2848 m has a fair TOC content (0.57 %).

Upper Cretaceous (2907 - 3280 m)

Chalk Group (2818 - 3280 m)

Tor Formation (2907 - 3119 m)

Eighteen samples were described, but only one sample (from 2908 m), was analysed. The lithology is almost entirely a white to pinkish chalk. In the upper sample (from 2908 m), some greyish claystone is also present. This claystone was analysed and it has a fair TOC content (0.62 %).

Hod Formation (3119 - 3280 m)

Twenty-six samples were described. The samples consist mainly of white and pinkish chalk mixed with a greyish and brownish claystone. The chalk seems to be stained with hydrocarbons (?) possibly in the form of a mud additive. Eight samples were analysed for TOC content of which seven were claystones and one was chalk.

The claystone samples all have fair to good TOC contents (range 0.61 % - 1.44 %), with the exception of the lowest analysed sample, from 3272 m, which has a rich TOC content (2.64 %). The analysed chalk (from 3260 m) has a poor TOC content (0.12 %).

Lower Cretaceous (3280 - 3432 m)

Cromer Knoll Group (3280 - 3432 m)

Valhall Formation (3280 - 3325 m)

Nine samples were described. The upper samples consist mostly of chalk of the same type as in the Hod Fm., changing downward to samples dominated by white sandstone. Minor amounts of greyish, greenish, brownish and reddish claystone are found throughout. Eight TOC analyses were performed, seven on claystones and one on a sandstone. The sandstone sample (from 3320 m) has a poor TOC content (0.12 %). The TOC content of the claystones is very variable ranging from poor to rich (0.12 % to 9.27 %). The greyish, greenish, brownish and reddish claystones from 3290 m, 3296 m, 3308 m and 3320 m all have a poor TOC content (0.12 % to 0.16 %) while the similar claystone from 3314 m has a fair TOC content (0.43 %). The reddish and brownish claystone from 3302 m has a good TOC content (1.81 %). However, the extremely low Tmax (383°C) of these samples indicates that this high content is due to contaminant organic material (e.g. "coal-additive"). The dark grey claystone from 3296 m has a rich TOC content (9.27 %).

Berriasian sandstone (3325 - 3432 m)

Twenty-one samples were described. Ten samples were analysed, of which seven were claystones and three were sandstones. The lithology is mostly a sandstone of various colours mixed with minor amounts of limestone (dolomite?) and various coloured claystones. Most of the analysed claystones are from the upper part of the section. The TOC content of the analysed claystones range from fair to rich (0.48 % - 3.06 %). The richest samples are found between

3332 m and 3362 m. The Tmax values of many of the samples (also of those with high TOC content) are suspiciously low, suggesting that a high proportion of contaminant organic material is present. The three analysed sandstone samples (from 3366 m, 3390 m and 3414 m) have a poor to fair TOC content (0.15 % - 0.48 %).

Upper Jurassic (3432 - 3506 m)

Tyne Group (3432 - 3506 m)

Mandal Formation (3432 - 3506 m)

Fourteen samples were analysed. The samples in this formation are mainly blackish claystone mixed with brownish dolomite. In the upper part of the formation sandstone and a greyish limestone are found. The sandstone is believed to be caved from the Berriasian sandstone unit above. The in-situ claystone seems to be somewhat more brownish in the upper part (3434 m - 3460 m) than in the lower part. Fourteen of the blackish claystone samples were analysed. They all have a rich TOC content (range 2.52 % - 3.38 %).

Permian (3506 - 3542 m, TD)

Zechstein Group (3506 - 3542 m)

Four samples from this interval have been described. However, all the described samples are believed to contain only caved material, mostly from the Mandal Fm.. The samples consist mostly of the same blackish claystone as found in the Mandal Fm., and the TOC content of all four analysed claystones is rich (range 2.06 % - 2.69 %). Some white

"kaolinite" is present in the samples. This is probably anhydrite from the uppermost part of the Zechstein Group and this material is probably the only in-situ material in the samples.

ROCK-EVAL ANALYSIS

1. Kerogen Type and Richness
(Hydrogen Index, Oxygen Index and Petroleum Potential)

Tertiary (- 2907 m)

A total of six samples have been analysed in the Tertiary section above the Ekofisk Fm.. All the analysed samples are claystones. The hydrogen indices range from 47 to 146 (where they can be calculated) and the oxygen indices range from 44 to 132. This indicates that the sample contains kerogen type III and IV. The samples containing kerogen type III are found above 2200 m. The samples above 2200 m have a variable petroleum potential ranging from poor to good (1.2 - 10.7 mg HC/g rock), the richest sample being the blackish claystone from 1480 m. The sample from 2540 m is the only one below 2200 m where the petroleum potential can be calculated. The potential for this sample is poor (0.4 mg HC/g rock).

Chalk Group (2818 - 3280 m)

Ekofisk Formation (2828 - 2907 m)

One claystone sample was analysed (from 2848 m). It has a hydrogen index of 25 and an oxygen index of 65 indicating kerogen type IV, and a poor petroleum potential (0.2 mg HC/g rock) implying that the sample has no potential for hydrocarbon generation.

Upper Cretaceous (2907 - 3280 m)

Chalk Group (2818 - 3280 m)

Tor Formation (2907 - 3119 m)

One claystone sample was analysed (from 2908 m). It has a hydrogen index of 37 and an oxygen index of 56 indicating kerogen type IV, with a poor petroleum potential (0.3 mg HC/g rock) implying that the sample has no potential for hydrocarbon generation.

Hod Formation (3119 - 3280 m)

Eight samples were analysed, of which seven are claystone and one is chalk. The six claystone samples in the interval 3161 m - 3247 m have hydrogen indices in the range 30 - 64 and oxygen indices in the range 52 - 71. This implies that the samples contain kerogen type IV. They all have poor petroleum potentials (0.2 - 1.0 mg HC/g rock). The chalk sample from 3260 m has an oxygen index of 758, while no hydrogen index could be calculated. The sample contains kerogen type IV. The petroleum potential for this sample could not be calculated. The last claystone sample (from 3272 m) has a hydrogen index of 266 and a oxygen index of 16 suggesting kerogen type II/III. The petroleum potential is good (10.5 mg HC/g rock).

Lower Cretaceous (3280 - 3432 m)

Cromer Knoll Group (3280 - 3432 m)

Valhall Formation (3280 - 3325 m)

Eight samples were analysed of which seven are claystone and one is a sandstone. All of the claystones (except the dark grey from 3296 m) have kerogen type IV (hydrogen indices in the range 10 to 50, oxygen indices in the range 34 to 280) and poor petroleum potentials (range 0.1 - 0.3 mg HC/g rock).The dark grey claystone from 3296 m has a hydrogen index of 233 and an oxygen index of 12 indicating kerogen type II/III and a rich petroleum potential (23.0 mg HC/g rock).

Berriasian Sandstone (3325 - 3432 m)

Ten samples have been analysed of which seven are claystones and three are sandstones. The claystone samples in the upper interval (3332 m - 3362 m) have hydrogen indices in the range 102 - 301 and oxygen indices in the range 14 - 44. The samples with the highest hydrogen indices are found towards the top of the unit. The petroleum potential is fair to good, with the richest samples towards the top of the unit. The claystone sample from the lower interval (from 3402 m) has a hydrogen index of 19 and an oxygen index of 188. The petroleum potential of this sample is poor. The three sandstone samples analysed in the lower interval have hydrogen indices ranging from 12 to 47 and oxygen indices ranging from 179 to 193. They all have poor petroleum potentials (0.1 - 0.2 mg HC/g rock).

Upper Jurassic (3432 - 3506 m

Tyne Group (3432 - 3506 m)

Mandal Formation (3432 - 3506 m)

Fourteen blackish claystone samples were analysed. The hydrogen indices range from 246 to 337, while the oxygen indices range from 8 to 19. This suggests that the samples contain kerogen type II/III with some of the samples possibly containing kerogen type II. The petroleum potential is good to rich (range 7.3 - 15.8 mg HC/g rock). The upper part of the formation seems to have a slightly better petroleum potential and a slightly better kerogen type (i.e. more towards type II) than the lower part of the formation.

Permian (3506 - 3542 m, TD)

Zechstein Group (3506 - 3542 m)

The four samples analysed from this section are believed to contain only caved material from the Mandal Fm.. The analytical results are similar to those from the Mandal Fm. (hydrogen indices 241 - 307, oxygen indices 7 - 12). The petroleum potential is slightly lower, (fair to good, ranging from 5.5 to 9.1 mg HC/g rock). This data is therefore applicable to the Mandal Fm. and not to the Zechstein Group.

2. Generation and Migration

(Production Index S1/(S1+S2) and S1/TOC)

The production index is fairly low down to about 3270 m, where the S1 and S2 values are above detection limit for the Rock-Eval instrument. The S1/TOC is also very low for all of these samples. No hydrocarbons are thought to have been generated in this interval, nor are any hydrocarbons believed to have migrated into this interval.

In the interval from about 3270 m to about 3330 m the production index is fairly variable, but it is less than 0.5 where reliable data is produced (i.e. S1 and S2 above detection limit of the Rock-Eval) and usually below 0.2. The S1/TOC is much less than one for all the samples, except the sample from 3272 m which has a S1/TOC of about 1.5. Some hydrocarbons might have been generated from a few of the samples in this zone.

In the interval from about 3330 m and down to 3432 m the production indices are generally fairly high, ranging from 0.27 to 0.61 and S1/TOC ratios ranging from about 0.5 to about 1.0. These data are believed to indicate the presence of migrated hydrocarbons (from the Mandal Fm.?), this is also supported by the very low Tmax values for some of the samples.

3. Maturity (Tmax)

Some of the analysed samples have extremely low Tmax values due to either very low S2 values or due to contaminant organic material (i.e. migrated hydrocarbons). The reliable Tmax values interpreted in a traditional manner, seem to indicate that the well is immature or moderately mature, at least down to the Mandal Fm.. The amounts of hydrocarbon generated are high and do not seem to be compatible with such a maturity evaluation.

The data from the Permian is not reliable and no knowledge of the maturity of the well below 3506 m can be gained from the available samples.

EXTRACTION DATA

Lower Cretaceous (3280 - 3432 m)

Berriasian Sandstone (3325 - 3432 m)

One samples was analysed. The sample is composed of material from the samples from 3320 m, 3332 m and 3338 m. The uppermost sample is therefore from the Valhall Fm., but as most of the material is from the Berriasian sandstone section, the sample will be treated as belonging to this section. The sample was analysed before any information about stratigraphy was available (due to the delayed publication of the NPD's well summary sheet no 11).

The extractable organic content (EOM) is rich for this sample (5294 ppm) as is the extractable hydrocarbon content (EHC) which is 1529 ppm. Normalized to TOC both EOM and EHC must be described as rich (705.88 mg EOM/g TOC and 203.92 mg EHC/g TOC respectively). The TOC normalized EOM and EHC values are very high for this section, compared with the rest of the well and since the maturity is low, these hydrocarbons must be migrated into the section. The extract seems to contain a fairly high proportion of saturated hydrocarbons, but is otherwise fairly similar in composition to the extracts of the Mandal Fm..

Upper Jurassic (3432 - 3506 m)

Mandal Formation (3432 - 3506 m)

The sample from 3508 m will be included in the Mandal Formation as most of the material is from samples within the Mandal Fm. (see table 3e) and the rest of the material in

the sample is strongly believed to be caved from the Mandal Fm..

Five blackish claystone samples were analysed. All the samples have a rich EOM (range 3047 - 5509 ppm) and rich EHC (range 11067 - 3774 ppm). Normalized to TOC the EOM is good for all the samples (range 122.38 - 166.46 mg EOM/g rock) and the EHC is also good for all the samples, except the one from 3460 m, which is rich. The EHC values for the good samples range from 38.47 to 47.30 mg HC/g rock, while the rich sample has 50.63 mg HC/g rock. The composition of the extracts are fairly similar for all the samples, except that the amount of saturated hydrocarbons seems to be somewhat higher for the lower three samples than for the upper two.

The lower values of EOM and EHC when normalized to TOC compared to the EOM and EHC when normalized to rock-weight might be due to the low maturity of the samples, i.e. much of the organic material has not yet been converted to hydrocarbons.

Permian (3506 - 3542 m, TD)

Zechstein Group (3506 - 3542 m)

Two blackish claystone samples were analysed (from 3528 m and 3522 m). They are both believed to represent material caved from the Mandal Fm., and the analytical results are similar. The EOM is rich for both samples (2638 and 2491 ppm) as is the EHC (1045 and 1411 ppm). Normalized to TOC the EOM is good for both samples (110.77 and 115.36 mg EOM/g TOC) while the EHC is good for the upper sample (43.93 mg HC/g TOC) and rich for the lower sample (50.02 mg HC/g TOC). The composition of the extracts are similar to those for the samples from the Mandal Fm.

No information about the in-situ Zechstein Group material can be gained from the data.

Saturated Hydrocarbons

Lower Cretaceous (3280 - 3432 m)

Berriasian Sandstone (3325 - 3432 m)

One sample was analysed. The claystone sample (from 3338 m) has a CPI index of 1.17. This could indicate a marine source of the hydrocarbons or fairly mature hydrocarbons. The ratio of pristane/nC_{17}, phytane/nC_{18} and the ratio of the two isoprenoids over the two n-alkanes, are all lower than in the Mandal Fm., suggesting that the sample from the Berriasian section contains hydrocarbons that are more mature than those in the Mandal Fm.. The pristane/phytane ratio is 1.27 and this indicates a fairly reducing environment for the formation of the hydrocarbons.

The saturated fraction chromatogram for this sample is different from the others in this well. It contains a relatively high proportion of the heavier hydrocarbons. After the nC_{25} peak there is a peak that probably represents phthalate. This is a contaminant, probably a mud additive. See Figure 4.

Upper Jurassic (3432 - 3506 m)

Mandal Formation (3432 - 3506 m)

Five samples were analysed. The claystones all have fairly low CPI indices (1.11 - 1.22) which probably indicates a

marine source for the hydrocarbons, as the maturity is not believed to be high enough to have reduced a typical odd-predominance of the CPI index of terrestrial material to these low ratios observed here. The pristane/nC_{17}, phytane/nC_{18} and the ratio of the two isoprenoids over the two n-alkanes, are all fairly constant for the samples of this formation and this indicates that the hydrocarbons are not very mature. The pristane/phytane ratios are fairly low and constant indicating a relatively reducing environment of deposition.

The five saturated fraction chromatograms are all fairly similar to each other. All five chromatograms contain fairly prominent isoprenoid peaks, although they decrease somewhat with depth. The lack of nC_{15} and nC_{16} hydrocarbons in some of the chromatograms are probably due to the work-up procedure. The chromatograms are typical of marine, "normal" hydrocarbons. See Figure 5 for a typical chromatogram.

Permian (3506 - 3542 m, TD)

Zechstein Group (3506 - 3542 m)

Two samples were analysed. These two claystones have analytical results very similar to the results for the lower samples of the Mandal Fm. The samples are regarded as caved from the Mandal Fm..

No information of the in-situ hydrocarbons of the Zechstein Group is therefore available.

Aromatic Hydrocarbons

Lower Cretaceous (3280 - 3432 m)

Berriasian Sandstone (3325 - 3432 m)

One sample was analysed (from 3338 m). The methyl phenanthrene ratios for this sample are fairly high suggesting that the hydrocarbons are fairly mature. The MPI1 index is 0.99 suggesting that the hydrocarbons were generated at a maturity equivalent to about 1.1 - 1.2 % vitrinite reflectance. This is considerably higher than the maturity of the Berriasian section and also much higher than the maturity of the Mandal Fm. below (see vitrinite chapter for discussion of maturity). The samples seem to contain more sulphur compounds than the samples from the Mandal Fm. as suggested by a DBT/P ratio of 0.39 for the Berriasian sample, which is about twice the value of the Mandal Fm. sample.

The aromatic chromatogram of this sample is very different to those of the Mandal Fm. samples. The chromatogram shows a very large unresolved "hump". This "hump" is probably due to complex organic compounds associated with the asphaltenes of this sample.

Otherwise the chromatogram seems to be dominated by the phenanthrenes. This indicates that the hydrocarbons are fairly mature as the phenanthrenes are produced by thermal degradation of kerogen. The sample seems to be lacking in the naphthalene compounds. This might be due to the work-up procedure or alternatively the sample contains heavy hydrocarbons from a more terrestrial type of source rock. The chromatogram can be seen in Figure 6.

Upper Jurassic (3432 - 3506 m)

Tyne Group (3432 - 3506 m)

Mandal Formation (3432 - 3506 m)

Five samples were analysed. The aromatic ratios are fairly similar for all the samples from this formation. The largest variation seems to be in the naphthalene ratios. This variation in the naphthalene ratios, and the variable amounts of naphthalenes in the different samples (as can be seen from the chromatograms) are due to the work up procedure and not to variations in the composition of the aromatic fraction of the hydrocarbons of these samples. The phenanthrene ratios are fairly low indicating that the samples are not very mature. The MPI1 index of these samples is compatible with a vitrinite reflectance of about 0.6 - 0.7 %. As this also seems to be about the maturity of the rock in this formation (see discussion in vitrinite section), it might be taken as an indication that these hydrocarbons are generated in-situ and not migrated into the formation. The relatively low maturity estimates of the hydrocarbons are also supported by the presence of aromatic steranes and triterpanes, especially in the upper samples. However, the aromatic steranes and triterpanes have almost disappeared in the lower samples. See Figure 7 for a typical chromatogram.

Permian (3506 - 3542 m, TD)

Zechstein Group (3506 - 3542 m)

Two samples were analysed. These two claystones are believed to represent caved material from the Mandal Fm.. Both the

aromatic ratios and the chromatograms are very similar to those found in the lower part of the Mandal Fm.. No real data of the Zechstein Group is available for interpretation.

THERMAL EXTRACTION - GAS CHROMATOGRAPHY

A total of nineteen samples were analysed.

Upper Cretaceous (2907 - 3280 m)

Chalk Group (2818 - 3280 m)

Hod Formation (3119 - 3280 m)

One claystone sample was analysed (from 3272 m). There are very few identifiable peaks in the chromatogram of this sample. The most prominent feature is a "hump" with a "shoulder" on the higher molecular weight side of it. The "hump" is believed to represent mostly migrated (residual, biodegraded?) hydrocarbons, while the "shoulder" might represent a mud additive. The sample is therefore believed to contain a mixture of migrated hydrocarbons and of organic mud-additives.

Lower Cretaceous (3280 - 3432 m)

Cromer Knoll Group (3280 - 3432 m)

Valhall Formation (3280 - 3325 m)

One claystone sample was analysed (from 3296 m). The chromatogram of this sample is very different to the one from the Hod Fm. sample. The distribution of hydrocarbons is bimodal with one peak around nC_{10} and one around nC_{19}. The isoprenoid peaks are prominent. The pristane peak is

extremely high suggesting a fairly oxic depositional environment. The high isoprenoid content suggests that the hydrocarbons are immature. The bimodal distribution of hydrocarbons suggests a terrestrial source for the hydrocarbons. The hydrocarbons are probably generated in-situ. See also pyrolysis gas chromatography section.

Berriasian Sandstone (3325 - 3432 m)

Eight samples were analysed, of which two are sandstones and six are claystones. The two claystones from 3332 m (one green grey and medium brown, one grey black and dark grey) have fairly similar chromatograms, although the greenish/brownish one has more lighter hydrocarbons (lighter than nC_{17}). Both samples are dominated by two "humps", one around nC_{19} - nC_{20} and one around 78 minutes retention time. The first "hump" is believed to represent migrated hydrocarbons (residual, biodegraded?), while the later "hump" is believed to represent some mud-additive. Very little, if any, of the hydrocarbons are generated in-situ.

The two claystone samples from 3338 m (one green grey and medium brown, one grey black and dark grey) have very similar chromatograms. Both chromatograms are dominated by a "hump" around nC_{23}. This is believed to represent migrated hydrocarbons (residual, biodegraded?). The green grey and medium brown claystone seems to have a high content of isoprenoids and a high ratio of pristane/nC_{17} and phytane/nC_{18}. This is opposed to the results of the chemical extraction data, which shows low pristane/nC_{17} and low phytane/nC_{18} ratios. The reason for this difference is not known, but contamination of the sample by mud additives might be the reason. The hydrocarbons of these samples are not believed to be generated in-situ. See also discussion in the pyrolysis gas chromatography section.

The chromatograms of the two claystone samples from 3348 m

and 3362 m are fairly similar. Both are are dominated by hydrocarbons in the nC_{14} - nC_{20} range. The upper sample seems to contain less of the lighter compounds in this range, than the lower sample. The chromatograms of both these samples are typical of very immature oils. Both samples are thought to contain mostly migrated hydrocarbons. See also discussion in pyrolysis gas chromatography section.

The two sandstone samples (from 3366 m and 3390 m) are practically barren of free hydrocarbons.

The Berriasian section seems to contain a mixture of migrated hydrocarbons and organic mud additives. The migrated hydrocarbons are of variable type, the ones from the upper part of the section seem to be heavier than those from the lower part. The hydrocarbons in the lower part (from 3348 m and down) are believed to be migrated from the Mandal Fm. below (see also discussion below).

Upper Jurassic (3432 - 3506 m)

Tyne Group (3432 - 3506 m)

Mandal Formation (3432 - 3506 m)

Seven samples were analysed, all dark claystones. The samples are clearly closely related, although variations exist.

The two upper samples (3434 m and 3446 m) are fairly similar, with the the most abundant hydrocarbons in the nC_{17} to nC_{19} range and with abundant isoprenoids. See example in Figure 8. The relatively low amounts of hydrocarbons lighter than nC_{17} were also noted for the saturated fraction gas chromatography analysis (see discussion above), but this

feature was believed to be due to the work up procedure. From the thermal extraction chromatogram this seems to be a real feature of the samples.

The chromatogram of the sample form 3460 m is fairly similar to the two above, although lighter hydrocarbons are more abundant.

The three chromatograms of the samples from 3466 m, 3478 m and 3490 m all display a bimodal distribution of hydrocarbons (see Figure 9 for example). This bimodal distribution is typical of hydrocarbons generated from a source rock that contains at least some kerogen type III.

The lowest sample (from 3502 m) has a unimodal distribution of hydrocarbons and the content of isoprenoids seems to be lower than in the other samples. The sample seems to be slightly more mature than the other samples.

The free hydrocarbons found in the Mandal Fm. are believed to have been generated in-situ. The hydrocarbons are fairly immature, but seem to become slightly more mature towards the base of the formation.

Permian (3506 - 3542 m, TD)

Zechstein Group (3506 - 3542 m)

Two samples were analysed (3514 m and 3522 m). Both samples represents material caved from the Mandal Fm. and do not give any information about the Zechstein Group.

PYROLYSIS - GAS CHROMATOGRAPHY

A total of nineteen samples were pyrolysed.

Upper Cretaceous (2907 - 3280 m)

Chalk Group (2818 - 3280 m)

Hod Formation (3119 - 3280 m)

One claystone sample was pyrolysed (3272 m). The pyrogram is typical of a sample containing a high proportion of heavy hydrocarbons. The pyrogram is typical of a sample containing very little kerogen, but it does contain products believed to be from the pyrolysis of heavy organic material. The source of the organic compounds is thought to be partly heavy hydrocarbons from migrated oil, partly mud additives.

Lower Cretaceous (3280 - 3432 m)

Cromer Knoll Group (3280 - 3432 m)

Valhall Formation (3280 - 3325 m)

One claystone sample was analysed (3296 m). The pyrogram of this sample represents in-situ kerogen. The pyrogram is characteristic of immature kerogen of type II/III.

Berriasian Sandstone (3325 - 3432 m)

Eight samples were analysed, two sandstones and six claystones. None of the samples (with the possible exception of the sample from 3362) contain any significant amount of in-situ kerogen. The pyrograms are typical of sample containing (heavy) migrated hydrocarbons and contaminants. The "hump" at the end of the pyrogram is especially characteristic of pyrolysis of heavy, free, hydrocarbons. The two sandstone samples are also practically barren of any pyrolysable material.

Upper Jurassic (3432 - 3506 m)

Tyne Group (3432 - 3506 m)

Mandal Formation (3432 - 3506 m)

Seven samples were analysed. They are all dark claystones. The calculated content of hydrocarbons from pyrolysis (see table 8) is very similar for all the samples, indicating that the composition of kerogen is fairly similar for all the samples. The pyrograms are all very similar - they contain alkene/alkane doublets in proportions which suggest that the kerogen is not very mature. The amount of heavier alkanes are relatively higher in the lower samples indicating a slightly higher maturity and/or a shift towards more kerogen type III than the upper samples. All the samples contain mixed type II/III kerogen that is fairly immature.

Permian (3506 - 3542 m, TD)

Zechstein Group (3506 - 3542 m)

Two samples from this formation were analysed (from 3514 m and 3522 m). The material is caved from the Mandal Fm. and the analysis gives no indication of the real composition of the Zechstein Group material.

VITRINITE REFLECTANCE ANALYSIS

Reflectance data can be found in Table 6.
A depth/reflectance profile appears in Figure 10.

Twenty-two samples were analysed from the well, covering the interval 1080 m to 3508 m.

The first 19 samples are from the Tertiary section of the well. The lithology is generally either silty or calcareous claystone and staining is generally moderate. The liptinite content is generally low and the phytoclast content is low to moderate, with a good proportion of vitrinite to inertinite. Consequently, high numbers of individual readings were possible, giving confident average values. Down to approximately 2100 m a regular, linear reflectance gradient is found, with values rising from just over 0.2 % Ro at 1000 m to 0.3 % Ro at 2000 m. Below this, average readings show a less even trend and two separate curves can be identified from the depth/reflectance profile. The higher curve connects values at 2180 m, 2300 m, 2600 m and 2700 m. Low reflecting vitrinite was observed in most of these samples and not measured. The lower curve connects values at 2400 m, 2500 m, 2800 m, 2900 m and 3241 m. The sample from 2400 m contains very small, poor vitrinites, whereas the sample from 2500 m contains a moderate amount of coaly clasts which may be additive. The samples from 2800 m and 2908 m contain a low amount of vitrinite which has a stained appearance. The lowermost Tertiary sample (3241 m) has a mixed lithology of limestone, calcareous claystone and chalk. The calcareous claystone is low in stain and liptinite wisps and contains only a trace of phytoclasts. Vitrinites are often stained in appearance and slightly translucent. Therefore, from the condition of the phytoclasts it seems that the higher values are to be relied on more than the lower values in this section of the well. This conclusion is further substantiated by the spore

fluorescence colour. This changes from yellow and yellow-orange at 2180 m to yellow-orange at 2500 m, becomes yellow-orange and light orange at 2800 m and light orange only from 2908 m onwards. This describes an increase in maturity which fits very well with the curve described by the higher reflectance values in the lower part of the Tertiary section.

One sample (3338 m) was analysed from the Cretaceous section of the well. The sample contains a mixture of sandstone, siltstone, oxidized claystone and chalk but vitrinites are only present in the siltstone fraction. A reflectance value of 0.59 % Ro was obtained from 6 readings, and although this is a low number of readings, the value fits well with the higher gradient found in the Tertiary section. No spores were identified in this sample. One sample (3434 m) was analysed from the Mandal Fm. The sample has a siltstone lithology with moderate staining and moderate liptinitic wisps, often forming laminae. The phytoclast content is low but a good proportion of vitrinite is present. This vitrinite, however, has a stained appearance and, indeed clasts with reflectances as low as 0.2 % are present alongside higher reflecting clasts. The average reflectance value of 0.51 %, obtained from 27 readings on the higher reflecting material, can, therefore, be presumed to be somewhat depressed. In U.V. light the sample contains a moderate amount of amorphous and semi-amorphous organic matter which generally has a bright yellow fluorescence colour reminiscent of algal organic matter. A few recognizable tasmanites algae were observed and it can be assumed therefore, that much of the degraded material present is from this source. The presence of tasmanites algal material is likely to have depressed the reflectance of vitrinite in this sample, although the plentiful light orange spores agree well with the measured value. The lowermost sample to be analysed (3508 m) is from the Zechstein interval. The sample contains silty claystone, limestone and sandstone. Phytoclasts are only present in the

silty claystone lithology which is remarkably similar in organic content to the previous Mandal Fm. sample. The reflectance value of 0.52 % obtained for this lithology is a further indication that it has indeed caved from the Mandal Fm..

From the depth/reflectance profile, if an allowance is made for the low reflectance values as described above, a fairly regular reflectance trend can be seen. A linear trend occurs in the upper part of the well, becoming more exponential below 2200 m. The well appears to become moderately mature at approximately 2500 m, and reaches maturity at approximately 3400 m. If the lower set of reflectance values are considered, moderate maturity is reached at 3000 m and the well becomes mature at approximately 3700 m.

VISUAL KEROGEN COMPOSITION

Nineteen samples from this well were examined in transmitted light. The samples range from 1480 m (Tertiary) to 3522 m (Zechstein). All of the samples are shale/claystone and most of the Lower Cretaceous, Jurassic and Permian samples are grey-black or grey-black and brown-black. Some of the Tertiary and Cretaceous claystones are lighter grey and green colours. The data is plotted in Figure 11.

Three samples from the Tertiary sequence were examined (1480 m, 1880 m and 2190 m). Vitrinite is very dominant in these samples (100 %, 90 % and 90 % respectively) and includes vitrodetrinite, collinite and amorphinite V. In the 1480 m sample there is only a trace of liptinite and inertinite. The sample from 1880 m has 10 % liptinite (detrital and spore/pollen with a trace of dinoflagellates) and a trace of inertinite. The lowermost sample (2190 m) contains approximately 5 % liptinite and 5 % inertinite. All of these samples have a generally immature appearance.

One sample from the Upper Cretaceous was examined (3272 m) and it is very similar to the Tertiary sample from 1880 m. Palynomorphs of SCI approximately 5 were observed but these are thought to be reworked.

Three samples from the Lower Cretaceous were examined. These samples are also dominated by vitrinite but less so than samples above. The two lowermost samples have low confidence due to poor kerogen recovery. The vitrinite content varies from 60 to 80 % and includes detrital and amorphous material. The inertinite content is 25 % in the uppermost sample but only 10 % in the two lowermost samples and is mainly inertodetrinite and semi-fusinite. The liptinite content is low (15 % in the upper and lower samples, 10 % in the middle sample) and includes liptinite, spore/pollen and dinoflagellates. A tentative SCI value of 4 - 4.5 is

estimated, suggesting a moderate mature sequence.

Nine samples from the Mandal Fm. were examined. There is a distinct improvement in kerogen quality in the upper part of this sequence. At the top of the sequence liptinite is dominant, this changes with depth to approximately equal amounts of liptinite and vitrinite and at the base of the section vitrinite becomes dominant. There is a general decrease in liptinite content, with depth, from 50 % to 25%, with a corresponding increase in vitrinite content from 40 % to 60 %. The vitrinite content comprises vitrodetrinite and amorphinite V throughout the sequence. The inertinite content is mainly inertodetrinite but with recognizable semi-fusinite, especially in the middle of the sequence.

The liptinite content is quite varied with amorphous, detrital and spore/pollen material present throughout and with algae observed especially in the middle of the sequence. The SCI estimates are quite varied, from 4.5 - 5 to 6, which is quite vague but suggests a maturity of moderate mature to early oil window maturity.

Three samples from the Zechstein sequence were analysed. These are all grey-black and brown-black claystones and are considered to be caved from the Mandal Fm.. The visual kerogen examination would support this. Liptinite contents vary from 25 % to 40 %, inertinite contents are approximately 15 % throughout and vitrinite contents are 40 % to 60 %.

GAS CHROMATOGRAPHY - MASS SPECTROMETRY

Three samples, all from the Mandal Fm., were analysed by GC - MS.

Saturated Hydrocarbons

Terpanes

The M/Z 163 fragmentograms show a series of terpanes and steranes for the three samples. The triterpanes are more abundant than the steranes in all of the samples and there are only small variations. The M/Z 177 fragmentograms show that the C_{29} $\alpha\beta$ hopane is the most abundant peak. The C_{29} $\beta\alpha$ hopane is quite abundant in all three samples, indicating a maturity lower than peak oil generation. The C_{27} and C_{29} rearranged steranes are quite abundant in the samples from 3446 m and 3508 m while the other steranes are minor. There is no indication of demethylated terpanes in these samples. The M/Z 191 fragmentograms vary considerably for the three samples. The sample from 3338 m shows that the tricyclic terpanes are abundant, with the C_{23} tricyclic terpane being nearly as abundant as the C_{29} $\alpha\beta$ hopane which in itself is nearly as abundant as C_{30} $\alpha\beta$ hopane. The C_{31} - C_{35} $\alpha\beta$ hopanes show a strange pattern, with the C_{31} components being smaller than the C_{32} components. The two other samples are almost identical, with C_{30} $\alpha\beta$ hopane being the largest peak and the C_{29} $\alpha\beta$ hopane one of the minor peaks. The tricyclic terpanes are very minor peaks in these fragmentograms. The variation seen here between the sample from 3338 m and the other two is not due to a maturity variation but due to a variation in the kerogen which generated the hydrocarbons in the different samples. The M/Z 205 fragmentograms show mainly the C_{31} components. Again, the samples from 3446 m and 3500 m have similar

patterns, except for a slightly lower abundance of the C_{31} βα hopane as compared with the C_{31} αβ hopanes in the sample from 3446 m compared with the sample from 3506 m. These two samples are completely different to the sample from 3338 m. Of the fragmentograms of the molecular ions, the M/Z 384 fragmentograms show a slight abundance of bisnorhopane in the sample from 3338 m, while this is not registered in the other samples. The rest of the fragmentograms verify what has been discussed above.

Steranes

The M/Z 149 fragmentograms show only a large peak with a retention time of approximately 28 minutes in the sample from 3338 m. This peak is also the largest peak in the sample from 3446 m, but here the steranes and triterpanes peaks are clearly seen, with a similar abundance of the largest sterane peaks and triterpane peaks, C_{27} and C_{29} rearranged steranes and C_{30} and C_{31} αβ hopanes respectively. The sample from 3508 m shows the unknown peak as a minor peak, whilst the rest of the pattern is similar to the pattern found for the sample from 3446 m, possibly with a slightly larger relative abundance of the steranes compared with the triterpanes.

The M/Z 189 fragmentograms show that the C_{27} and the C_{29} rearranged steranes are the major peaks. The relative abundance of C_{29} components increases with increasing depth. Similar is also recorded for the M/Z 259 fragmentograms with the exception of the sample from 3338 m, which shows a larger abundance of C_{29} rearranged steranes, compared to the C_{27} rearranged steranes, than what is found for the sample from 3446 m.

The M/Z 217 and 218 fragmentograms show a strong abundance of the C_{29} regular steranes in all three samples. They are lower than the C_{29} rearranged steranes but still quite

prominent. This would indicate a relatively large input of terrestrial matter in the kerogens that have generated the hydrocarbons in these samples. The fragmentograms of the molecular ions verify what has been discussed above.

Aromatic Hydrocarbons

Alkyl Benzenes

The M/Z 106 fragmentograms for the C_2 benzenes show a series of doublets and a single peak with a retention time of approximately 41 minutes for all three samples. The relative intensity of the single peak increases with increasing depth. The M/Z 134 fragmentograms for C_4 benzenes show two groups of peaks for all three samples. The front end group increases in relative intensity with increasing depth.

Naphthalenes

The M/Z 142 fragmentograms show that the methyl naphthalenes are affected by evaporation and further discussion is therefore not undertaken. The evaporation has also affected the C_2 naphthalenes in the sample from 3338 m. The other two samples show similar patterns for the C_2 naphthalenes in the M/Z 156 fragmentograms. The M/Z 170 fragmentograms show similar patterns for the C_3 naphthalenes in all three samples.

Phenanthrenes

The M/Z 178 fragmentograms show only the single peak for phenanthrenes for all three samples while the M/Z 192 fragmentograms show the two doublets for methyl phenanthrenes. The two doublets have approximately equal

peak height for all three samples. The M/Z 206 and 220 fragmentograms show similar patterns for C_2 and C_3 phenanthrenes for all three samples.

Dibenzothiophenes

The M/Z 198 fragmentograms show the triplet for methyl dibenzothiophenes. The peak for 4 methyl dibenzothiophene is the largest peak in all of the samples. In the samples from 3338 m the peak for 1 methyl dibenzothiophene is the smallest peak while in the samples from 3446 m and 3508 m the 1 methyl dibenzothiophene peak has the same peak height as the 3+2 methyl dibenzothiophene peak. This indicates that the hydrocarbons in the sample from 3338 m have a higher maturity than those in the two other samples. This might be due to this sample being contaminated by migrated hydrocarbons.

The M/Z 212 fragmentograms for C_2 dibenzothiophenes show some variations between the three samples. The peaks with lowest retention time have a lower relative abundance with increasing depth. It is presently not known what is causing this trend.

Aromatic Steranes

The M/Z 231 fragmentograms show some variation for the three samples. The samples from 3446 m and 3508 m are fairly similar, while the sample from 3338 m is quite different, both in the pattern of the C_{26} - C_{28} peaks and in the relative intensity of the C_{20} and C_{21} compounds. This is far higher in the sample from 3338 m than in the others. This indicates a higher maturity of the hydrocarbons found in this sample than in the other two samples. A similar pattern is also found in the M/Z 253 fragmentograms for the monoaromatic steranes. These data indicate that the sample

from 3338 m is contaminated with migrated hydrocarbons.

CONCLUSIONS

1. Source Rock Potential

Upper Cretaceous (2907 - 3280 m)

No potential source rock was found in the Upper Cretaceous section.

Lower Cretaceous (3280 - 3432 m)

Cromer Knoll Group (3280 - 3432 m)

Valhall Formation (3280 - 3325 m)

Very thin bands of claystone with some potential for hydrocarbons were found. The claystone is however, completely immature and the volume is probably extremely small.

Berriasian Sandstone (3325 - 3432 m)

No potential source rock was found in this section.

Upper Jurassic (3432 - 3506 m)

Tyne Group (3432 - 3506 m)

Mandal Formation (3432 - 3506 m)

The Mandal Formation dark claystones are potential source rocks for hydrocarbons. The formation is immature to moderately mature at the base. It has generated minor amounts of hydrocarbons. The kerogen is type II/III, giving the formation a mixed potential for generation of oil and gas.

Permian (3506 - 3542 m, TD)

Zechstein Group (3506 - 3542 m)

No information exists about the in-situ material of this group.

2. Generation and Migration

The upper part of the Berriasian sandstone unit contain a very heavy hydrocarbon compound. This is probably a combination of organic mud additives and heavy migrated hydrocarbons from a fairly mature source rock. The lower part of the Berriasian sandstone unit contains fairly immature hydrocarbons that have a composition fairly similar to the composition of hydrocarbons found in the Mandal Fm.. It is therefore likely that the hydrocarbons found in the lower part of the Berriasian section have been sourced from the Mandal Fm..

The Mandal Fm. has clearly begun generation of hydrocarbons. The formation seems to have generated a fair amount of hydrocarbons relative to its maturity.

3. Maturity

The well seems to be moderately mature down to the base of the Mandal Fm., where it might reach oil window maturity.

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
180.00						001
			100	Cont : cem		001-1L
280.00						002
			70	Ca : w, fos		002-1L
			30	S/Sst : w, lt gy, l		002-2L
380.00						003
			70	Ca : w, fos		003-1L
			30	S/Sst : w, lt gy, l		003-2L
480.00						004
			70	Ca : w, lt brn gy, fos		004-1L
			25	S/Sst : w, l		004-2L
			5	Sh/Clst: brn blk		004-3L
580.00						005
			40	Sh/Clst: m gy, mic		005-1L
			40	S/Sst : w, l		005-2L
			20	Cont : prp, dd		005-3L
680.00						006
			80	Cont : cem, prp, dd		006-3L
			10	Sh/Clst: m gy, mic		006-1L
			10	S/Sst : w, l		006-2L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
780.00						007
			100	Ca : lt brn gy, fos		007-1L
880.00						008
			60	Cont : Mica-ad, prp, dd		008-3L
			40	Sh/Clst: lt brn gy to drk brn gy, mic		008-1L
			tr	Ca : lt brn gy, fos		008-2L
980.00						009
			60	Cont : Mica-ad, prp, dd		009-3L
			40	Sh/Clst: lt brn gy to drk brn gy, mic		009-1L
			tr	Ca : lt brn gy, fos		009-2L
1080.00						010
			60	Sh/Clst: lt brn gy to drk brn gy, slt, mic		010-1L
			40	Cont : dd		010-2L
1180.00						011
			60	Sh/Clst: lt brn gy to drk brn gy, slt, mic		011-1L
			40	Cont : dd		011-2L
1280.00						012
			60	Sh/Clst: lt brn gy to drk brn gy, slt, mic		012-1L
			40	Cont : dd		012-2L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1380.00						013
			90	Sh/Clst: lt brn gy to m brn gy, slt, mic		013-1L
			10	Cont : dd		013-2L
1480.00						014
		10.04	80	Sh/Clst: brn blk, mic		014-1L
			20	Sh/Clst: gy pi, calc		014-2L
1580.00						015
			90	Sh/Clst: gy pi, lt brn gy, m brn gy, calc		015-1L
			10	Sh/Clst: brn blk, mic		015-2L
1680.00						016
			100	Sh/Clst: brn gy, mic		016-1L
1780.00						017
			100	Sh/Clst: brn gy, drk brn gy, mic		017-1L
1880.00						018
		3.60	90	Sh/Clst: brn gy, drk brn gy, mic		018-1L
			10	Ca : dsk y brn, dol		018-2L
1980.00						019
			90	Cont : cem		019-2L
			10	Sh/Clst: brn gy to drk brn gy, mic		019-1L

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2000.00						020
			70	Sh/Clst: lt gy to m gy		020-1L
			20	Sh/Clst: brn gy		020-2L
			10	Cont : cem, prp		020-3L
2005.00						021
			40	Sh/Clst: brn gy		021-1L
			40	Cont : cem, prp		021-3L
			20	Sh/Clst: lt gy to m gy		021-2L
2010.00						022
			40	Sh/Clst: brn gy		022-1L
			40	Cont : cem, prp		022-3L
			20	Sh/Clst: lt gy to m gy		022-2L
2015.00						023
		1.31	90	Sh/Clst: lt gy to m gy, lt ol gy		023-1L
			10	Cont : cem, prp, dd		023-2L
2020.00						024
			90	Sh/Clst: lt gy to m gy, lt ol gy		024-1L
			10	Cont : cem, prp, dd		024-2L
2025.00						025
			90	Sh/Clst: lt gy to m gy, lt ol gy		025-1L
			10	Cont : cem, prp, dd		025-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2030.00						026
			80	Cont : Mica-ad, cem, dd		026-2L
			20	Sh/Clst: drk y brn		026-1L
2040.00						027
			60	Cont : Mica-ad, cem, dd		027-2L
			40	Sh/Clst: drk y brn		027-1L
2050.00						028
			70	Sh/Clst: brn gy, lt brn gy, m gy, drk y brn		028-1L
			30	Cont : cem, prp, ns		028-2L
2060.00						029
			50	Sh/Clst: brn gy, lt brn gy, m gy, drk y brn		029-1L
			50	Cont : cem, prp, ns		029-2L
2070.00						030
			80	Sh/Clst: brn gy, lt brn gy, m gy, drk y brn		030-1L
			20	Cont : cem, prp, ns		030-2L
2080.00						031
			80	Sh/Clst: brn gy, lt brn gy, m gy, drk y brn		031-1L
			20	Cont : cem, prp, ns		031-2L

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2090.00						032
			80	Sh/Clst: brn gy, lt brn gy, m gy, drk y brn		032-1L
			20	Cont : cem, prp, ns		032-2L
2100.00						033
			60	Sh/Clst: brn gy, lt brn gy, m gy		033-1L
			40	Cont : cem, prp, ns		033-3L
			tr	Ca : drk y brn, dol		033-2L
2110.00						034
			80	Sh/Clst: brn gy, lt brn gy, m gy		034-1L
			20	Cont : cem, prp, ns		034-3L
			tr	Ca : drk y brn, dol		034-2L
2120.00						035
			80	Sh/Clst: brn gy, lt brn gy, m gy		035-1L
			20	Cont : cem, prp, ns		035-3L
			tr	Ca : drk y brn, dol		035-2L
2130.00						036
			80	Sh/Clst: brn gy, lt brn gy, m gy		036-1L
			20	Cont : cem, prp, ns		036-3L
			tr	Ca : drk y brn, dol		036-2L
2140.00						037
			50	Sh/Clst: lt gy to m gy, st		037-1L
			50	Cont : prp, dd		037-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type				Trb	Sample
Int	Cvd	TOC%	%	Lithology description			
2150.00							038
			50	Sh/Clst	: lt gy to m gy, st		038-1L
			40	Cont	: Mica-ad, prp, dd		038-3L
			10	Ca	: brn gy, drk y brn to pl y brn, dol		038-2L
2160.00							039
			50	Sh/Clst	: lt gy to m gy, st		039-1L
			40	Cont	: Mica-ad, prp, dd		039-3L
			10	Ca	: brn gy, drk y brn to pl y brn, dol		039-2L
2170.00							040
			80	Sh/Clst	: lt gy to m gy, pl ol gy, mic, st		040-1L
			20	Cont	: Mica-ad, prp, dd		040-3L
			tr	Ca	: drk y brn to pl y brn, dol		040-2L
2180.00							041
			80	Sh/Clst	: lt gy to m gy, pl ol gy, mic, st		041-1L
			20	Cont	: Mica-ad, prp, dd		041-3L
			tr	Ca	: drk y brn to pl y brn, dol		041-2L
2190.00							042
		1.62	60	Sh/Clst	: lt gy to m gy, pl ol gy, mic, st		042-1L
			40	Cont	: Mica-ad, prp, dd		042-2L
2200.00							043
			80	Sh/Clst	: lt gy to m gy, drk y brn to pl y brn		043-1L
			10	S/Sst	: w, calc, l		043-2L
			5	Other	: blk, hd		043-3L
			5	Cont	: prp, dd		043-4L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2210.00						044
			90	Cont : prp, dd		044-2L
			10	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		044-1L
2220.00						045
			70	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		045-1L
			30	Cont : prp, dd		045-2L
2230.00						046
			90	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		046-1L
			10	Cont : prp, dd		046-2L
2240.00						047
			50	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		047-1L
			50	Cont : prp, dd		047-2L
2250.00						048
			80	Cont : prp, dd		048-2L
			20	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		048-1L
2260.00						049
			80	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		049-1L
			10	Ca : w, pl y brn, dol		049-2L
			10	Cont : Mica-ad, prp, dd		049-3L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2270.00						050
			90	Cont : Mica-ad, prp, dd		050-2L
			10	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		050-1L
2280.00						051
			90	Cont : Mica-ad, prp, dd		051-2L
			10	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		051-1L
2290.00						052
			90	Cont : Mica-ad, prp, dd		052-2L
			10	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		052-1L
2300.00						053
			60	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		053-1L
			30	Ca : drk y brn to pl y brn, dol		053-2L
			10	Cont : prp, dd		053-3L
2310.00						054
			60	Sh/Clst: lt gy to m gy, drk y brn to pl y brn		054-1L
			30	Ca : drk y brn to pl y brn, dol		054-2L
			10	Cont : prp, dd		054-3L

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2320.00						055
			80	Sh/Clst: m gy, drk y brn to dsk y brn, slt, mic		055-1L
			10	Ca : drk y brn to pl y brn, dol		055-2L
			10	Cont : prp, dd		055-3L
2330.00						056
			80	Sh/Clst: m gy, drk y brn to dsk y brn, slt, mic		056-1L
			10	Ca : drk y brn to pl y brn, dol		056-2L
			10	Cont : prp, dd		056-3L
2340.00						057
			80	Sh/Clst: m gy, drk y brn to dsk y brn, slt, mic		057-1L
			10	Ca : drk y brn to pl y brn, dol		057-2L
			10	Cont : prp, dd		057-3L
2350.00						058
			80	Sh/Clst: gn gy, lt gy		058-1L
			10	Sh/Clst: drk y brn, dsk y brn, mic		058-2L
			10	Cont : prp, dd		058-4L
			tr	Ca : drk y brn to pl y brn, dol		058-3L
2360.00						059
			60	Sh/Clst: gn gy, lt gy		059-1L
			30	Sh/Clst: drk y brn, dsk y brn, mic		059-2L
			10	Cont : prp, dd		059-4L
			tr	Ca : drk y brn to pl y brn, dol		059-3L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2370.00						060
			60	Sh/Clst: gn gy, lt gy		060-1L
			30	Sh/Clst: drk y brn, dsk y brn, mic		060-2L
			10	Cont : prp, dd		060-4L
			tr	Ca : drk y brn to pl y brn, dol		060-3L
2380.00						061
			60	Sh/Clst: gn gy, lt gy		061-1L
			30	Sh/Clst: drk y brn, dsk y brn, mic		061-2L
			10	Cont : prp, dd		061-4L
			tr	Ca : drk y brn to pl y brn, dol		061-3L
2390.00						062
			60	Sh/Clst: gn gy, lt gy		062-1L
			30	Sh/Clst: drk y brn, dsk y brn, mic		062-2L
			10	Cont : prp, dd		062-4L
			tr	Ca : drk y brn to pl y brn, dol		062-3L
2400.00						063
			90	Sh/Clst: gn gy, lt gy		063-1L
			5	Sh/Clst: drk y brn, dsk y brn, mic		063-2L
			5	Cont : prp, dd		063-4L
			tr	Ca : drk y brn to pl y brn, dol		063-3L
2410.00						064
			90	Sh/Clst: gn gy, lt gy		064-1L
			5	Sh/Clst: drk y brn, dsk y brn, mic		064-2L
			5	Cont : prp, dd		064-4L
			tr	Ca : drk y brn to pl y brn, dol		064-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2420.00						065
			90	Sh/Clst: gn gy, lt gy		065-1L
			5	Sh/Clst: drk y brn, dsk y brn, mic		065-2L
			5	Cont : prp, dd		065-4L
			tr	Ca : drk y brn to pl y brn, dol		065-3L
2430.00						066
			60	Sh/Clst: gn gy, st		066-1L
			20	Ca : w, drk y brn, pl y brn, dol		066-2L
			10	Cont : dd		066-3L
			10	Sh/Clst: drk y brn, dsk y brn, mic		066-4L
2440.00						067
			60	Sh/Clst: gn gy, st		067-1L
			20	Ca : w, drk y brn, pl y brn, dol		067-2L
			10	Cont : dd		067-3L
			10	Sh/Clst: drk y brn, dsk y brn, mic		067-4L
2450.00						068
			60	Sh/Clst: gn gy, st		068-1L
			20	Cont : dd		068-4L
			10	Ca : w, drk y brn, pl y brn, dol		068-2L
			10	Sh/Clst: drk y brn, dsk y brn, mic		068-3L
2460.00						069
			60	Sh/Clst: gn gy, st		069-1L
			20	Cont : dd		069-4L
			10	Ca : w, drk y brn, pl y brn, dol		069-2L
			10	Sh/Clst: drk y brn, dsk y brn, mic		069-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2470.00						070
			50	Cont : Coal-ad, prp, dd		070-3L
			40	Sh/Clst: gn gy, st		070-1L
			10	Ca : w, pl y brn, dsk y brn, dol		070-2L
2480.00						071
			50	Cont : Coal-ad, prp, dd		071-3L
			40	Sh/Clst: gn gy, st		071-1L
			10	Ca : w, pl y brn, dsk y brn, dol		071-2L
2490.00						072
			75	Sh/Clst: gn gy, st		072-1L
			20	Cont : Coal-ad, prp, dd		072-3L
			5	Ca : w, pl y brn, dsk y brn, dol, st		072-2L
2500.00						073
			75	Sh/Clst: gn gy, st		073-1L
			20	Cont : Coal-ad, prp, dd		073-3L
			5	Ca : w, pl y brn, dsk y brn, dol, st		073-2L
2510.00						074
			75	Sh/Clst: gn gy, st		074-1L
			20	Cont : Coal-ad, prp, dd		074-3L
			5	Ca : w, pl y brn, dsk y brn, dol, st		074-2L
2520.00						075
			75	Sh/Clst: gn gy, st		075-1L
			20	Cont : Coal-ad, prp, dd		075-3L
			5	Ca : w, pl y brn, dsk y brn, dol, st		075-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2530.00						076
			75	Sh/Clst: gn gy, st		076-1L
			20	Cont : Coal-ad, prp, dd		076-3L
			5	Ca : w, pl y brn, dsk y brn, dol, st		076-2L
2540.00						077
		0.77	90	Sh/Clst: gn gy, lt gy to m gy, pl brn gy, st		077-1L
			5	Ca : w, pl y brn, dsk y brn, dol		077-2L
			5	Cont : Coal-ad, prp, dd		077-3L
2550.00						078
			90	Sh/Clst: gn gy, lt gy to m gy, pl brn gy, st		078-1L
			5	Ca : w, pl y brn, dsk y brn, dol		078-2L
			5	Cont : Coal-ad, prp, dd		078-3L
2560.00						079
			90	Sh/Clst: gn gy, lt gy to m gy, pl brn gy, st		079-1L
			5	Ca : w, pl y brn, dsk y brn, dol		079-2L
			5	Cont : Coal-ad, prp, dd		079-3L
2570.00						080
			70	Sh/Clst: gn gy, lt gy to m gy, pl brn gy, st		080-1L
			20	Cont : Coal-ad, tar-ad		080-3L
			10	Ca : w, pl red brn to dsk y brn, dol		080-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2580.00						081
			70	Sh/Clst: gn gy, lt gy to m gy, pl brn gy, st		081-1L
			20	Cont : Coal-ad, tar-ad		081-3L
			10	Ca : w, pl red brn to dsk y brn, dol		081-2L
2590.00						082
			70	Sh/Clst: gn gy, lt gy to m gy, pl brn gy, st		082-1L
			20	Cont : Coal-ad, tar-ad		082-3L
			10	Ca : w, pl red brn to dsk y brn, dol		082-2L
2600.00						083
			70	Sh/Clst: gn gy, lt gy to m gy, pl brn gy, st		083-1L
			20	Cont : Coal-ad, tar-ad		083-3L
			10	Ca : w, pl red brn to dsk y brn, dol		083-2L
2610.00						084
			90	Sh/Clst: gn gy, lt to m gy, st		084-1L
			5	Ca : w, pl red brn, dol		084-2L
			5	Cont : Coal-ad, dd, tar-ad		084-3L
2620.00						085
			50	Sh/Clst: gn gy, st		085-1L
			45	Cont : Coal-ad, dd, tar-ad		085-3L
			5	Ca : w, pl red brn, dol		085-2L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2630.00						086
			50	Sh/Clst: gn gy, st		086-1L
			45	Cont : Coal-ad, dd, tar-ad		086-3L
			5	Ca : w, pl red brn, dol		086-2L
2640.00						087
			50	Sh/Clst: gn gy, st		087-1L
			45	Cont : Coal-ad, dd, tar-ad		087-3L
			5	Ca : w, pl red brn, dol		087-2L
2650.00						088
			50	Cont : Coal-ad, dd, tar-ad		088-3L
			40	Sh/Clst: gn gy, lt gy to m gy, st		088-1L
			10	Ca : w, pl red brn, st		088-2L
2660.00						089
			50	Sh/Clst: gn gy, lt gy to m gy, st		089-1L
			40	Cont : Coal-ad, dd, tar-ad		089-3L
			10	Ca : w, pl red brn, st		089-2L
2670.00						090
			50	Sh/Clst: gn gy, lt gy to m gy, st		090-1L
			40	Cont : Coal-ad, dd, tar-ad		090-3L
			10	Ca : w, pl red brn, st		090-2L
2680.00						091
			60	Sh/Clst: gn gy, lt gy to m gy, st		091-1L
			30	Cont : Coal-ad, prp, dd		091-4L
			5	Sh/Clst: drk gy, mic		091-2L
			5	Ca : w, pl red brn		091-3L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2690.00						092
			60	Sh/Clst: gn gy, lt gy to m gy, st		092-1L
			30	Cont : Coal-ad, prp, dd		092-4L
			5	Sh/Clst: drk gy, mic		092-2L
			5	Ca : w, pl red brn		092-3L
2700.00						093
			60	Sh/Clst: gn gy, st		093-1L
			20	Sh/Clst: gy red, m brn		093-2L
			10	Cont : Coal-ad, prp, dd		093-5L
			5	Sh/Clst: drk gy, mic		093-3L
			5	Ca : w, pl red brn		093-4L
2710.00						094
			60	Sh/Clst: gn gy, st		094-1L
			20	Sh/Clst: gy red, m brn		094-2L
			10	Cont : Coal-ad, prp, dd		094-5L
			5	Sh/Clst: drk gy, mic		094-3L
			5	Ca : w, pl red brn		094-4L
2720.00						095
			50	Cont : Coal-ad, prp, dd		095-3L
			30	Sh/Clst: gn gy, lt gy to drk gy, st		095-1L
			20	Sh/Clst: m brn		095-2L
2730.00						096
			60	Cont : Coal-ad, prp, dd		096-3L
			30	Sh/Clst: gn gy, lt gy to drk gy, st		096-1L
			10	Sh/Clst: m brn		096-2L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2740.00						097
			55	Sh/Clst: ol gy, lt gy, m drk gy, lam, kln		097-1L
			40	Cont : Coal-ad, prp, dd		097-4L
			5	Sh/Clst: m brn		097-2L
			tr	S/Sst : w, f		097-3L
2745.00						098
			55	Sh/Clst: ol gy, lt gy, m drk gy, lam, kln		098-1L
			40	Cont : Coal-ad, prp, dd		098-4L
			5	Sh/Clst: m brn		098-2L
			tr	S/Sst : w, f		098-3L
2750.00						099
			40	Sh/Clst: gn gy, lt gn gy		099-1L
			40	Sh/Clst: m drk gy, mic		099-2L
			10	Cont : Coal-ad, prp, dd, tar-ad		099-5L
			5	Sh/Clst: ol gy, lt gy, lam, kln		099-3L
			5	Sh/Clst: m brn		099-4L
2756.00						100
			65	Sh/Clst: gn gy to m gn gy, ol gy, st		100-1L
			30	Cont : Coal-ad, prp, dd, tar-ad		100-3L
			5	Sh/Clst: brn brn, st		100-2L
2762.00						101
			65	Sh/Clst: gn gy to m gn gy, ol gy, st		101-1L
			30	Cont : Coal-ad, prp, dd, tar-ad		101-3L
			5	Sh/Clst: brn brn, st		101-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2768.00						102
			40	Sh/Clst: gn gy to m gn gy, ol gy, st		102-1L
			30	Cont : Coal-ad, prp, dd, tar-ad		102-4L
			20	Sh/Clst: m brn, st		102-2L
			10	Ca : w, s, glauc		102-3L
2774.00						147
			55	Sh/Clst: gn gy to m gn gy, st		147-1L
			30	Cont : Coal-ad, prp, dd, tar-ad		147-4L
			10	Sh/Clst: m brn		147-2L
			5	Ca : w, s, glauc		147-3L
2780.00						148
			70	Sh/Clst: gn gy to m gn gy, st		148-1L
			20	Sh/Clst: m brn		148-2L
			5	Ca : w, s, glauc		148-3L
			5	Cont : Coal-ad, prp, dd, tar-ad		148-4L
2784.00						149
			70	Sh/Clst: gn gy to m gn gy, st		149-1L
		0.22	20	Sh/Clst: m brn		149-2L
			5	Ca : w, s, glauc		149-3L
			5	Cont : Coal-ad, prp, dd, tar-ad		149-4L
2788.00						150
			40	Sh/Clst: gn gy to m gn gy, calc, s		150-1L
			40	Sh/Clst: m brn		150-2L
			15	S/Sst : w, calc, glauc, f, l		150-3L
			5	Cont : Coal-ad, prp, dd		150-5L
			tr	Ca : w		150-4L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2792.00						151
			40	Sh/Clst: gn gy to m gn gy, calc, s		151-1L
			40	Sh/Clst: m brn		151-2L
			15	S/Sst : w, calc, glauc, f, l		151-3L
			5	Cont : Coal-ad, prp, dd		151-5L
			tr	Ca : w		151-4L
2796.00						152
			40	Sh/Clst: gn gy to m gn gy, calc, s		152-1L
			40	Sh/Clst: m brn		152-2L
			15	S/Sst : w, calc, glauc, f, l		152-3L
			5	Cont : Coal-ad, prp, dd		152-5L
			tr	Ca : w		152-4L
2800.00						153
			40	Sh/Clst: gn gy to m gn gy, calc, s		153-1L
			40	Sh/Clst: m brn		153-2L
			15	S/Sst : w, calc, glauc, f, l		153-3L
			5	Cont : Coal-ad, prp, dd		153-5L
			tr	Ca : w		153-4L
2804.00						154
			40	S/Sst : w, calc, glauc, f, l		154-1L
			30	Sh/Clst: gn gy to m gn gy		154-2L
			30	Sh/Clst: m brn		154-3L
2810.00						155
			50	S/Sst : w, calc, glauc, f, l		155-1L
			30	Sh/Clst: ol gy, lt gy to drk gy		155-2L
			15	Sh/Clst: m brn		155-3L
			5	Cont : Coal-ad		155-4L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2816.00						156
			50	Sh/Clst: ol gy, lt gy to drk gy, calc		156-1L
			30	Ca : w, s, chk		156-2L
			10	Sh/Clst: m brn		156-3L
			10	S/Sst : w, calc, glauc, f, l		156-4L
2822.00						157
			50	Sh/Clst: m gy, m drk gy		157-1L
			30	Ca : w, chk		157-2L
			15	Sh/Clst: gn gy, ol gy, m brn		157-3L
			5	Cont : Coal-ad		157-4L
2828.00						158
			85	Ca : w, pl gy pi, st, chk		158-1L
			10	Sh/Clst: gn gy		158-2L
			5	Cont : Coal-ad, tar-ad		158-3L
2830.00						159
			60	Ca : w, pl gy pi, st, chk		159-1L
			30	Cont : Coal-ad, tar-ad		159-3L
			10	Sh/Clst: gn gy		159-2L
2848.00						160
		0.57	70	Sh/Clst: gn gy, ol gy, st		160-1L
			15	Ca : w, pl gy pi, st, chk		160-2L
			10	Sh/Clst: drk gy		160-3L
			5	Cont : Coal-ad, tar-ad		160-4L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2854.00						161
			80	Ca : w, pl gy pi, st, chk		161-1L
			15	Sh/Clst: gn gy, m gy to drk gy, st		161-2L
			5	Cont : Coal-ad, tar-ad		161-3L
2860.00						162
			80	Ca : w, pl gy pi, st, chk		162-1L
			15	Sh/Clst: gn gy, m gy to drk gy, st		162-2L
			5	Cont : Coal-ad, tar-ad		162-3L
2866.00						163
			80	Ca : w, pl gy pi, st, chk		163-1L
			15	Sh/Clst: gn gy, m gy to drk gy, st		163-2L
			5	Cont : Coal-ad, tar-ad		163-3L
2872.00						165
			80	Ca : w, pl gy pi, st, chk		165-1L
			15	Sh/Clst: gn gy, m gy to drk gy, st		165-2L
			5	Cont : Coal-ad, tar-ad		165-3L
2878.00						166
			80	Ca : w, pl gy pi, st, chk		166-1L
			15	Sh/Clst: gn gy, m gy to drk gy, st		166-2L
			5	Cont : Coal-ad, tar-ad		166-3L
2884.00						167
			80	Ca : w, pl gy pi, st, chk		167-1L
			15	Sh/Clst: gn gy, m gy to drk gy, st		167-2L
			5	Cont : Coal-ad, tar-ad		167-3L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2890.00						168
			80	Ca : w, pl gy pi, st, chk		168-1L
			15	Sh/Clst: gn gy, m gy to drk gy, st		168-2L
			5	Cont : Coal-ad, tar-ad		168-3L
2896.00						169
			80	Ca : w, pl gy pi, st, chk		169-1L
			20	Sh/Clst: gn gy, glauc		169-2L
			tr	Cont : tar-ad		169-3L
2902.00						170
			80	Ca : w, pl gy pi, st, chk		170-1L
			20	Sh/Clst: gn gy, glauc		170-2L
			tr	Cont : tar-ad		170-3L
2908.00						171
			80	Ca : w, pl gy pi, st, chk		171-1L
		0.62	20	Sh/Clst: gn gy, m gy, sil		171-2L
2914.00						172
			100	Ca : w, pl gy pi, st, chk		172-1L
			tr	Sh/Clst: gn gy, m gy, sil		172-2L
2920.00						173
			100	Ca : w, pl gy pi, st, chk		173-1L
			tr	Sh/Clst: gn gy, m gy, sil		173-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2926.00						174
			100	Ca : w, pl gy pi, st, chk		174-1L
			tr	Sh/Clst: gn gy, m gy, sil		174-2L
2932.00						175
			100	Ca : w, pl gy pi, st, chk		175-1L
			tr	Sh/Clst: gn gy, m gy, sil		175-2L
2938.00						176
			100	Ca : w, pl gy pi, st, chk		176-1L
			tr	Sh/Clst: gn gy, m gy, sil		176-2L
2944.00						177
			100	Ca : w, pl gy pi, st, chk		177-1L
			tr	Sh/Clst: gn gy, m gy, sil		177-2L
2950.00						178
			100	Ca : w, pl gy pi, st, chk		178-1L
			tr	Sh/Clst: gn gy, m gy, sil		178-2L
2956.00						179
			100	Ca : w, pl gy pi, st, chk		179-1L
			tr	Sh/Clst: gn gy, m gy, sil		179-2L
2962.00						180
			100	Ca : w, pl gy pi, st, chk		180-1L
			tr	Sh/Clst: gn gy, m gy, sil		180-2L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2968.00						181
			100	Ca : w, pl gy pi, st, chk		181-1L
			tr	Sh/Clst: gn gy, m gy, sil		181-2L
2974.00						182
			100	Ca : w, pl gy pi, st, chk		182-1L
			tr	Sh/Clst: gn gy, m gy, sil		182-2L
2994.00						183
			100	Ca : w, pl gy pi, st, chk		183-1L
			tr	Sh/Clst: gn gy, m gy, sil		183-2L
3015.00						184
			100	Ca : w, pl gy pi, st, chk		184-1L
			tr	Sh/Clst: gn gy, m gy, sil		184-2L
3036.00						185
			100	Ca : w, pl gy pi, st, chk		185-1L
			tr	Sh/Clst: gn gy, m gy, sil		185-2L
3057.00						186
			100	Ca : w, pl gy pi, st, chk		186-1L
			tr	Sh/Clst: gn gy, m gy, sil		186-2L
3078.00						187
			100	Ca : w, pl gy pi, st, chk		187-1L
			tr	Sh/Clst: gn gy, m gy, sil		187-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3099.00						188
			100	Ca : w, pl gy pi, st, chk		188-1L
			tr	Sh/Clst: gn gy, m gy, sil		188-2L
3120.00						189
			100	Ca : w, pl gy pi, st, chk		189-1L
			tr	Sh/Clst: gn gy, m gy, sil		189-2L
3141.00						190
			100	Ca : w, pl gy pi, st, chk		190-1L
			tr	Sh/Clst: gn gy, m gy, sil		190-2L
3150.00						195
			80	Ca : w, pl gy pi, st, chk		195-1L
			20	Sh/Clst: gn gy, m gy, sil		195-2L
3156.00						192
			100	Ca : w, pl gy pi, st, chk		192-1L
			tr	Sh/Clst: gn gy, m gy, sil		192-2L
3161.00						193
			95	Ca : w, pl gy pi, st, chk		193-1L
		0.82	5	Sh/Clst: gn gy, m brn, st		193-2L
3167.00						198
			100	Ca : w, pl gy pi, st, chk		198-1L
		0.96	tr	Sh/Clst: gn gy, m brn, st		198-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3173.00						199
			100	Ca : w, pl gy pi, st, chk		199-1L
			tr	Sh/Clst: gn gy, m brn, st		199-2L
3180.00						200
			100	Ca : w, pl gy pi, st, chk		200-1L
			tr	Sh/Clst: gn gy, m brn, st		200-2L
3186.00						201
			100	Ca : w, pl gy pi, st, chk		201-1L
			tr	Sh/Clst: gn gy, m brn, st		201-2L
3192.00						202
			100	Ca : w, pl gy pi, st, chk		202-1L
			tr	Sh/Clst: gn gy, m brn, st		202-2L
3198.00						203
			100	Ca : w, pl gy pi, st, chk		203-1L
			tr	Sh/Clst: gn gy, m brn, st		203-2L
3204.00						204
			95	Ca : w, pl gy pi, st, chk		204-1L
		1.12	5	Sh/Clst: gn gy, m brn, st		204-2L
3210.00						205
			95	Ca : w, pl gy pi, st, chk		205-1L
			5	Sh/Clst: gn gy, m brn, st		205-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3216.00						206
			95	Ca : w, pl gy pi, st, chk		206-1L
			5	Sh/Clst: gn gy, m brn, st		206-2L
3223.00						207
			95	Ca : w, pl gy pi, st, chk		207-1L
		1.44	5	Sh/Clst: gn gy, m brn, st		207-2L
3229.00						208
			95	Ca : w, pl gy pi, st, chk		208-1L
		0.74	5	Sh/Clst: gn gy, m brn, st		208-2L
3235.00						209
			95	Ca : w, pl gy pi, st, chk		209-1L
		0.74	5	Sh/Clst: gn gy, m brn, st		209-2L
3241.00						210
			95	Ca : w, pl gy pi, st, chk		210-1L
			5	Sh/Clst: gn gy, m brn, st		210-2L
3247.00						211
			95	Ca : w, pl gy pi, st, chk		211-1L
		1.12	5	Sh/Clst: gn gy, m brn, st		211-2L
3255.00						212
			100	Cont : cem		212-2L
			tr	Ca : w, pl gy pi, st, chk		212-1L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type				Trb	Sample
Int	Cvd	TOC%	%	Lithology description			
3260.00							213
		0.12	95	Ca	: w, pl gy pi, st, chk		213-1L
			5	Cont	: Coal-ad, cem, dd		213-2L
3266.00							214
			95	Ca	: w, pl gy pi, st, chk		214-1L
			5	Cont	: Coal-ad, cem, dd		214-2L
3272.00							215
			80	Ca	: w, pl gy pi, st, chk		215-1L
		2.64	15	Sh/Clst	: gn gy, lt gy to drk gy		215-2L
			5	Cont	: Coal-ad, cem, dd		215-3L
3284.00							216
			95	Ca	: w, pl gy pi, st, chk		216-1L
			5	Cont	: Coal-ad, tar-ad		216-2L
3290.00							217
			90	Ca	: w, lt brn, pl gy pi, st, chk		217-1L
		0.12	10	Sh/Clst	: gy red, m brn		217-2L
3296.00							218
			60	Ca	: w, lt brn, pl gy pi, st, ign		218-1L
		0.11	30	Sh/Clst	: gy red, m brn, st		218-2L
		9.27	5	Sh/Clst	: drk gy, st		218-3L
			5	Cont	: Coal-ad, prp, dd		218-4L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3302.00						219
			60	Ca : w, lt brn, pl gy pi, st, ign		219-1L
		1.81	30	Sh/Clst: gy red, m brn, st		219-2L
			5	Sh/Clst: drk gy, st		219-3L
			5	Cont : Coal-ad, prp, dd		219-4L
3308.00						220
			70	S/Sst : w, calc, glauc, f, crs		220-1L
		0.10	25	Sh/Clst: gn gy, m brn, glauc		220-2L
			5	Ca : w, pl gy pi, st		220-3L
			tr	Cont : Coal-ad, prp, dd		220-4L
3314.00						221
			70	S/Sst : w, calc, glauc, f, crs		221-1L
		0.43	25	Sh/Clst: gn gy, m brn, glauc		221-2L
			5	Ca : w, pl gy pi, st		221-3L
			tr	Cont : Coal-ad, prp, dd		221-4L
3320.00						103
		0.12	90	S/Sst : w, calc, glauc, f, crs		103-1L
		0.16	5	Sh/Clst: gn gy, m brn, glauc		103-2L
			5	Ca : w, pl gy pi, st		103-3L
			tr	Cont : Coal-ad, prp, dd		103-4L
3326.00						104
			90	S/Sst : w, calc, glauc, f, crs		104-1L
			5	Sh/Clst: gn gy, m brn, glauc		104-2L
			5	Ca : w, pl gy pi, st		104-3L
			tr	Cont : Coal-ad, prp, dd		104-4L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3332.00						105
			50	Cont : Coal-ad, Mica-ad, prp, fib		105-4L
			30	S/Sst : w, calc, glauc, f, crs		105-1L
		1.93	10	Sh/Clst: gn gy, m brn		105-2L
		2.05	10	Sh/Clst: gy blk, drk gy		105-3L
3338.00						106
			50	Cont : Coal-ad, Mica-ad, prp, fib		106-4L
			30	S/Sst : w, calc, glauc, f, crs		106-1L
		1.08	10	Sh/Clst: gn gy, m brn		106-2L
		1.79	10	Sh/Clst: gy blk, drk gy		106-3L
3348.00						107
			90	S/Sst : w, calc, glauc, f, kln		107-1L
		0.78	5	Sh/Clst: gn gy		107-2L
			5	Cont : Coal-ad, prp, dd, fib		107-3L
3354.00						108
			90	S/Sst : w, calc, glauc, f, kln		108-1L
			5	Sh/Clst: gn gy		108-2L
			5	Cont : Coal-ad, prp, dd, fib		108-3L
3362.00						109
			90	S/Sst : w, calc, glauc, f, kln		109-1L
		3.06	5	Sh/Clst: gn gy		109-2L
			5	Cont : Coal-ad, prp, dd, fib		109-3L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3366.00						110
		0.15	100	S/Sst : w, calc, glauc, f, kln		110-1L
3370.00						111
			100	S/Sst : w, calc, glauc, f, kln		111-1L
3374.00						112
			100	S/Sst : w, calc, glauc, f, kln		112-1L
3378.00						113
			95	S/Sst : w, calc, glauc, f, kln		113-1L
			5	Cont : dd, fib		113-2L
3382.00						114
			95	S/Sst : w, calc, glauc, f, kln		114-1L
			5	Cont : dd, fib		114-2L
3386.00						115
			95	S/Sst : w, gn gy, drk gn gy, calc, glauc, f, crs, kln		115-1L
			5	Ca : drk gn gy, cly, glauc, sil		115-2L
			tr	Cont : fib		115-3L
3390.00						116
		0.38	100	S/Sst : w, gn gy, drk gn gy, calc, glauc, f, crs, kln		116-1L
			tr	Sh/Clst: drk gn gy, cly, glauc, sil		116-2L
			tr	Cont : fib		116-3L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type				Trb	Sample
Int	Cvd	TOC%	%	Lithology description			
3394.00							117
			100	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		117-1L
			tr	Sh/Clst	: drk gn gy, cly, glauc, sil		117-2L
			tr	Cont	: fib		117-3L
3398.00							118
			100	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		118-1L
			tr	Sh/Clst	: drk gn gy, cly, glauc, sil		118-2L
			tr	Cont	: fib		118-3L
3402.00							119
			70	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		119-1L
			20	Ca	: drk gn gy, cly, dol, glauc, sil		119-2L
		0.48	5	Sh/Clst	: lt brn gy		119-3L
			5	Cont	: Coal-ad, prp, dd		119-4L
3406.00							122
			70	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		122-1L
			20	Ca	: drk gn gy, cly, dol, glauc, sil		122-2L
			5	Sh/Clst	: lt brn gy		122-3L
			5	Cont	: Coal-ad, prp, dd		122-4L
3410.00							123
			90	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		123-1L
			10	Ca	: drk gn gy, cly, dol, glauc, sil		123-2L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type				Trb	Sample
Int	Cvd	TOC%	%	Lithology description			
3414.00							124
		0.25	90	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		124-1L
			10	Ca	: drk gn gy, cly, dol, glauc, sil		124-2L
3418.00							125
			90	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		125-1L
			10	Ca	: drk gn gy, cly, dol, glauc, sil		125-2L
3422.00							126
			90	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		126-1L
			10	Ca	: drk gn gy, cly, dol, glauc, sil		126-2L
3426.00							127
			90	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		127-1L
			10	Ca	: drk gn gy, cly, dol, glauc, sil		127-2L
3430.00							128
			90	S/Sst	: w, gn gy, drk gn gy, calc, glauc, f, crs, kln		128-1L
			10	Ca	: drk gn gy, cly, dol, glauc, sil		128-2L
3434.00							129
	cvd		50	S/Sst	: gn gy, drk gn gy, calc, glauc, f		129-1L
		3.02	40	Sh/Clst	: gy blk, brn blk, mic		129-2L
			10	Ca	: drk gy, drk gn gy, cly, glauc		129-3L
			tr	Cont	: glauc		129-4L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3438.00						130
	cvd		70	S/Sst : gn gy, drk gn gy, calc, glauc, f		130-1L
		2.52	20	Sh/Clst: gy blk, brn blk, mic		130-2L
			5	Ca : drk gy, drk gn gy, cly, glauc		130-3L
			5	Cont : glauc		130-4L
3442.00						131
		3.24	80	Sh/Clst: gy blk, brn blk		131-1L
	cvd		20	S/Sst : gn gy, drk gn gy, calc, glauc, f		131-2L
3446.00						132
		2.60	90	Sh/Clst: gy blk, brn blk, mic		132-1L
	cvd		10	S/Sst : gn gy, drk gn gy, calc, glauc, f		132-2L
3450.00						133
		2.75	70	Sh/Clst: gy blk, brn blk		133-1L
			30	Cont : prp, dd		133-2L
3454.00						134
		3.23	70	Sh/Clst: gy blk, brn blk		134-1L
			30	Cont : prp, dd		134-2L
3460.00						135
		3.24	95	Sh/Clst: gy blk, brn blk		135-1L
			5	Cont : prp, dd		135-2L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3466.00						136
		4.30	60	Sh/Clst: gy blk, mic		136-1L
			35	Cont : dd		136-3L
			5	Ca : dsk y brn, dol		136-2L
3472.00						137
		3.26	60	Sh/Clst: gy blk, mic		137-1L
			35	Cont : dd		137-3L
			5	Ca : dsk y brn, dol		137-2L
3478.00						138
		3.38	60	Sh/Clst: gy blk, mic		138-1L
			35	Cont : dd		138-3L
			5	Ca : dsk y brn, dol		138-2L
3484.00						139
		2.52	60	Sh/Clst: gy blk, mic		139-1L
			35	Cont : dd		139-3L
			5	Ca : dsk y brn, dol		139-2L
3490.00						140
		2.56	60	Sh/Clst: gy blk, brn blk, pyr		140-1L
			20	Ca : dsk y brn, dol		140-2L
			20	Cont : dd		140-3L
3496.00						141
		3.06	60	Sh/Clst: gy blk, brn blk, pyr		141-1L
			20	Ca : dsk y brn, dol		141-2L
			20	Cont : dd		141-3L

Table 1 : Lithology description for well NOCS 3/7-3

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
3502.00						142
			50	Cont : dd		142-3L
		2.58	40	Sh/Clst: gy blk, brn blk, pyr		142-1L
			10	Ca : dsk y brn, dol		142-2L
3508.00						143
	cvd	2.69	70	Sh/Clst: gy blk, brn blk, pyr		143-1L
	cvd		30	S/Sst : w, pl gy pi, calc, f, crs, kln		143-2L
3514.00						144
			70	Other : w, s, kln		144-1L
	cvd	2.69	30	Sh/Clst: gy blk, brn blk		144-2L
3518.00						145
			50	Other : w, s, kln		145-1L
	cvd	2.06	50	Sh/Clst: gy blk, brn blk		145-2L
3522.00						146
			60	Other : w, s, kln		146-1L
	cvd	2.21	20	Sh/Clst: gy blk, brn blk		146-2L
			20	Cont : prp, dd		146-3L

Table 3 d: Composition of material extracted from the rock (%) for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	Sat EOM	Aro EOM	Asph EOM	NSO EOM	HC EOM	Non-HC EOM	Sat Aro	HC Non-HC	Sample
3338.00	com	Composite sample - see table 3 e	24.44	4.44	8.89	62.22	28.89	71.11	550.00	40.63	222-0B
3446.00	com	Composite sample - see table 3 e	13.79	14.94	6.90	64.37	28.74	71.26	92.31	40.32	223-0B
3460.00	com	Composite sample - see table 3 e	18.72	9.69	3.08	68.50	28.41	71.59	193.18	39.69	224-0B
3484.00	com	Composite sample - see table 3 e	22.52	12.61	5.41	59.46	35.14	64.86	178.57	54.17	225-0B
3496.00	com	Composite sample - see table 3 e	20.25	13.50	2.45	63.80	33.74	66.26	150.00	50.93	226-0B
3508.00	com	Composite sample - see table 3 e	23.76	14.36	3.31	58.56	38.12	61.88	165.38	61.61	227-0B
3518.00	com	Composite sample - see table 3 e	25.08	14.58	2.71	57.63	39.66	60.34	172.09	65.73	228-0B
3522.00	cut	Sh/Clst: gy blk, brn blk	21.68	21.68	3.10	53.54	43.36	56.64	100.00	76.56	146-2L

Table 3 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
3338.00	com	Composite sample - see table 3 e	705.88	172.55	31.37	62.75	439.22	203.92	501.96	222-0B
3446.00	com	Composite sample - see table 3 e	133.87	18.46	20.00	9.23	86.17	38.47	95.40	223-0B
3460.00	com	Composite sample - see table 3 e	166.46	31.16	16.13	5.13	114.03	47.30	119.16	224-0B
3484.00	com	Composite sample - see table 3 e	144.09	32.45	18.17	7.79	85.68	50.63	93.47	225-0B
3496.00	com	Composite sample - see table 3 e	125.10	25.33	16.88	3.07	79.82	42.21	82.89	226-0B
3508.00	com	Composite sample - see table 3 e	122.38	29.07	17.58	4.06	71.67	46.65	75.72	227-0B
3518.00	com	Composite sample - see table 3 e	110.77	27.79	16.15	3.00	63.83	43.93	66.84	228-0B
3522.00	cut	Sh/Clst: gy blk, brn blk	115.36	25.01	25.01	3.57	61.76	50.02	65.34	146-2L

Table 3 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
3338.00	com	Composite sample - see table 3 e	5294	1294	235	470	3294	1529	3764	222-0B
3446.00	com	Composite sample - see table 3 e	4123	568	616	284	2654	1184	2938	223-0B
3460.00	com	Composite sample - see table 3 e	5509	1031	533	169	3774	1565	3944	224-0B
3484.00	com	Composite sample - see table 3 e	5000	1126	630	270	2972	1756	3243	225-0B
3496.00	com	Composite sample - see table 3 e	3165	640	427	77	2019	1067	2097	226-0B
3508.00	com	Composite sample - see table 3 e	3047	723	437	101	1784	1161	1885	227-0B
3518.00	com	Composite sample - see table 3 e	2636	661	384	71	1519	1045	1590	228-0B
3522.00	cut	Sh/Clst: gy blk, brn blk	2491	540	540	77	1334	1080	1411	146-2L

Table 3 a: Weight of EOM and Chromatographic Fraction for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	Rock Extracted (g)	EOM (mg)	Sat (mg)	Aro (mg)	Asph (mg)	NSO (mg)	HC (mg)	Non-HC (mg)	TOC(e) (%)	Sample
3338.00	com	Composite sample - see table 3 e	0.9	4.5	1.1	0.2	0.4	2.8	1.3	3.2	0.75	222-0B
3446.00	com	Composite sample - see table 3 e	2.1	8.7	1.2	1.3	0.6	5.6	2.5	6.2	3.08	223-0B
3460.00	com	Composite sample - see table 3 e	8.2	45.4	8.5	4.4	1.4	31.1	12.9	32.5	3.31	224-0B
3484.00	com	Composite sample - see table 3 e	4.4	22.2	5.0	2.8	1.2	13.2	7.8	14.4	3.47	225-0B
3496.00	com	Composite sample - see table 3 e	10.3	32.6	6.6	4.4	0.8	20.8	11.0	21.6	2.53	226-0B
3508.00	com	Composite sample - see table 3 e	5.9	18.1	4.3	2.6	0.6	10.6	6.9	11.2	2.49	227-0B
3518.00	com	Composite sample - see table 3 e	11.2	29.5	7.4	4.3	0.8	17.0	11.7	17.8	2.38	228-0B
3522.00	cut	Sh/Clst: gy blk, brn blk	9.1	22.6	4.9	4.9	0.7	12.1	9.8	12.8	2.16	146-2L

Table 2 : Rock-Eval table for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3490.00	cut	Sh/Clst: gy blk, brn blk	1.00	6.82	0.27	25.26	2.56	266	11	7.8	0.13	431	140-1L
3496.00	cut	Sh/Clst: gy blk, brn blk	1.21	8.97	0.23	39.00	3.06	293	8	10.2	0.12	431	141-1L
3502.00	cut	Sh/Clst: gy blk, brn blk	0.92	6.78	0.32	21.19	2.58	263	12	7.7	0.12	429	142-1L
3508.00	cut	Sh/Clst: gy blk, brn blk	1.00	8.12	0.19	42.74	2.69	302	7	9.1	0.11	433	143-1L
3514.00	cut	Sh/Clst: gy blk, brn blk	1.00	8.25	0.21	39.29	2.69	307	8	9.3	0.11	431	144-2L
3518.00	cut	Sh/Clst: gy blk, brn blk	0.52	4.97	0.14	35.50	2.06	241	7	5.5	0.09	443	145-2L
3522.00	cut	Sh/Clst: gy blk, brn blk	0.55	5.35	0.26	20.58	2.21	242	12	5.9	0.09	440	146-2L

Table 2 : Rock-Eval table for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3366.00	cut	S/Sst : w	0.11	0.07	0.29	0.24	0.15	47	193	0.2	0.61	434	110-1L
3390.00	cut	S/Sst : w, gn gy, drk gn gy	0.11	0.07	0.68	0.10	0.38	18	179	0.2	0.61	350	116-1L
3402.00	cut	Sh/Clst: lt brn gy	0.09	0.09	0.90	0.10	0.48	19	188	0.2	0.50	296	119-3L
3414.00	cut	S/Sst : w, gn gy, drk gn gy	0.03	0.03	0.47	0.06	0.25	12	188	0.1	0.50	296	124-1L
3434.00	cut	Sh/Clst: gy blk, brn blk	1.12	9.92	0.57	17.40	3.02	328	19	11.0	0.10	428	129-2L
3438.00	cut	Sh/Clst: gy blk, brn blk	0.72	8.28	0.35	23.66	2.52	329	14	9.0	0.08	429	130-2L
3442.00	cut	Sh/Clst: gy blk, brn blk	1.36	9.63	0.54	17.83	3.24	297	17	11.0	0.12	428	131-1L
3446.00	cut	Sh/Clst: gy blk, brn blk	1.09	8.09	0.38	21.29	2.60	311	15	9.2	0.12	429	132-1L
3450.00	cut	Sh/Clst: gy blk, brn blk	1.17	8.90	0.44	20.23	2.75	324	16	10.1	0.12	429	133-1L
3454.00	cut	Sh/Clst: gy blk, brn blk	1.56	10.88	0.39	27.90	3.23	337	12	12.4	0.13	430	134-1L
3460.00	cut	Sh/Clst: gy blk, brn blk	1.46	10.53	0.42	25.07	3.24	325	13	12.0	0.12	428	135-1L
3466.00	cut	Sh/Clst: gy blk	2.31	13.46	0.67	20.09	4.30	313	16	15.8	0.15	427	136-1L
3472.00	cut	Sh/Clst: gy blk	1.15	8.12	0.42	19.33	3.26	249	13	9.3	0.12	435	137-1L
3478.00	cut	Sh/Clst: gy blk	1.08	8.31	0.52	15.98	3.38	246	15	9.4	0.12	433	138-1L
3484.00	cut	Sh/Clst: gy blk	0.69	6.58	0.23	28.61	2.52	261	9	7.3	0.09	433	139-1L

Table 2 : Rock-Eval table for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3272.00	cut	Sh/Clst: gn gy, lt gy to drk gy	3.48	7.03	0.42	16.74	2.64	266	16	10.5	0.33	420	215-2L
3290.00	cut	Sh/Clst: gy red, m brn	0.01	-	0.32	-	0.12	-	267	-	1.00	388	217-2L
3296.00	cut	Sh/Clst: gy red, m brn	0.01	0.04	0.28	0.14	0.11	36	255	0.1	0.20	263	218-2L
3296.00	cut	Sh/Clst: drk gy	1.38	21.64	1.12	19.32	9.27	233	12	23.0	0.06	422	218-3L
3302.00	cut	Sh/Clst: gy red, m brn	0.15	0.18	0.62	0.29	1.81	10	34	0.3	0.45	383	219-2L
3308.00	cut	Sh/Clst: gn gy, m brn	0.01	0.05	0.28	0.18	0.10	50	280	0.1	0.17	424	220-2L
3314.00	cut	Sh/Clst: gn gy, m brn	0.02	0.08	0.77	0.10	0.43	19	179	0.1	0.20	470	221-2L
3320.00	cut	S/Sst : w	0.07	-	0.46	-	0.12	-	383	0.1	1.00	295	103-1L
3320.00	cut	Sh/Clst: gn gy, m brn	0.04	0.05	0.32	0.16	0.16	31	200	0.1	0.44	445	103-2L
3332.00	cut	Sh/Clst: gn gy, m brn	5.95	5.80	0.47	12.34	1.93	301	24	11.8	0.51	343	105-2L
3332.00	cut	Sh/Clst: gy blk, drk gy	4.80	5.97	0.50	11.94	2.05	291	24	10.8	0.45	419	105-3L
3338.00	cut	Sh/Clst: gn gy, m brn	1.71	3.00	0.48	6.25	1.08	278	44	4.7	0.36	355	106-2L
3338.00	cut	Sh/Clst: gy blk, drk gy	1.76	4.65	0.51	9.12	1.79	260	28	6.4	0.27	426	106-3L
3348.00	cut	Sh/Clst: gn gy	0.91	1.57	0.26	6.04	0.78	201	33	2.5	0.37	344	107-2L
3362.00	cut	Sh/Clst: gn gy	0.83	3.13	0.44	7.11	3.06	102	14	4.0	0.21	430	109-2L

Table 2 : Rock-Eval table for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
1480.00	cut	Sh/Clst: brn blk	0.30	10.41	5.02	2.07	10.04	104	50	10.7	0.03	421	014-1L
1880.00	cut	Sh/Clst: brn gy, drk brn gy	0.19	5.25	1.60	3.28	3.60	146	44	5.4	0.03	422	018-1L
2015.00	cut	Sh/Clst: lt gy to m gy, lt ol gy	0.07	1.17	0.76	1.54	1.31	89	58	1.2	0.06	421	023-1L
2190.00	cut	Sh/Clst: lt gy to m gy, pl ol gy	0.11	1.91	0.75	2.55	1.62	118	46	2.0	0.05	424	042-1L
2540.00	cut	Sh/Clst: gn gy, lt gy to m gy, pl brn gy	0.03	0.36	0.48	0.75	0.77	47	62	0.4	0.08	420	077-1L
2784.00	cut	Sh/Clst: m brn	0.01	-	0.29	-	0.22	-	132	-	1.00	430	149-2L
2848.00	cut	Sh/Clst: gn gy, ol gy	0.02	0.14	0.37	0.38	0.57	25	65	0.2	0.13	423	160-1L
2908.00	cut	Sh/Clst: gn gy, m gy	0.03	0.23	0.35	0.66	0.62	37	56	0.3	0.12	420	171-2L
3161.00	cut	Sh/Clst: gn gy, m brn	0.04	0.33	0.45	0.73	0.82	40	55	0.4	0.11	423	193-2L
3167.00	cut	Sh/Clst: gn gy, m brn	0.08	0.57	0.50	1.14	0.96	59	52	0.6	0.12	421	198-2L
3204.00	cut	Sh/Clst: gn gy, m brn	0.08	0.65	0.68	0.96	1.12	58	61	0.7	0.11	424	204-2L
3223.00	cut	Sh/Clst: gn gy, m brn	0.07	0.92	0.87	1.06	1.44	64	60	1.0	0.07	423	207-2L
3235.00	cut	Sh/Clst: gn gy, m brn	0.02	0.22	0.40	0.55	0.74	30	54	0.2	0.08	423	209-2L
3247.00	cut	Sh/Clst: gn gy, m brn	0.03	0.49	0.79	0.62	1.12	44	71	0.5	0.06	426	211-2L
3260.00	cut	Ca : w, pl gy pi	0.02	-	0.91	-	0.12	-	758	-	1.00	405	213-1L

Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 3/7-3

Depth unit of measure: m

NOTE: Depths shown in tables 3 a to d correspond to the composite samples' lower depth.

Upper depth	Lower depth	Typ	Sample		Depth	Typ	Lithology	Sample
3320.00	3338.00	com	222-0B	is composed of:	3320.00	cut	Sh/Clst: gn gy, m brn, glauc	103-2L
					3332.00	cut	Sh/Clst: gn gy, m brn	105-2L
					3338.00	cut	Sh/Clst: gn gy, m brn	106-2L
3434.00	3446.00	com	223-0B	is composed of:	3434.00	cut	Sh/Clst: gy blk, brn blk, mic	129-2L
					3438.00	cut	Sh/Clst: gy blk, brn blk, mic	130-2L
					3442.00	cut	Sh/Clst: gy blk, brn blk	131-1L
					3446.00	cut	Sh/Clst: gy blk, brn blk, mic	132-1L
3450.00	3460.00	com	224-0B	is composed of:	3450.00	cut	Sh/Clst: gy blk, brn blk	133-1L
					3454.00	cut	Sh/Clst: gy blk, brn blk	134-1L
					3460.00	cut	Sh/Clst: gy blk, brn blk	135-1L
3466.00	3484.00	com	225-0B	is composed of:	3466.00	cut	Sh/Clst: gy blk, mic	136-1L
					3472.00	cut	Sh/Clst: gy blk, mic	137-1L
					3478.00	cut	Sh/Clst: gy blk, mic	138-1L
					3484.00	cut	Sh/Clst: gy blk, mic	139-1L
3490.00	3496.00	com	226-0B	is composed of:	3490.00	cut	Sh/Clst: gy blk, brn blk, pyr	140-1L
					3496.00	cut	Sh/Clst: gy blk, brn blk, pyr	141-1L
3502.00	3508.00	com	227-0B	is composed of:	3502.00	cut	Sh/Clst: gy blk, brn blk, pyr	142-1L
					3508.00	cut	Sh/Clst: gy blk, brn blk, pyr	143-1L

Depth unit of measure: m

NOTE: Depths shown in tables 3 a to d correspond to the composite samples' lower depth.

Upper depth	Lower depth	Typ	Sample		Depth	Typ	Lithology	Sample
3514.00	3518.00	com	228-0B	is composed of:	3514.00	cut	Sh/Clst: gy blk, brn blk	144-2L
					3518.00	cut	Sh/Clst: gy blk, brn blk	145-2L

Table 4 : Saturated Hydrocarbon Ratios for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	Pristane / nC17	Pristane / Phytane	Pristane + Phytane / nC17 + nC18	Phytane / nC18	CPI	Sample
3338.00	com	bulk	0.51	1.27	0.49	0.46	1.17	222-0B
3446.00	com	bulk	0.82	1.14	0.78	0.73	1.15	223-0B
3460.00	com	bulk	0.92	1.27	0.91	0.91	1.16	224-0B
3484.00	com	bulk	0.87	1.20	0.87	0.88	1.22	225-0B
3496.00	com	bulk	0.75	1.54	0.70	0.63	1.11	226-0B
3508.00	com	bulk	0.75	1.66	0.67	0.57	1.16	227-0B
3518.00	com	bulk	0.75	1.71	0.67	0.56	1.25	228-0B
3522.00	cut	Sh/Clst: gy blk, brn blk	0.70	1.77	0.62	0.51	1.09	146-2L

Table 5 : Aromatic Hydrocarbon Ratios for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	DBT/P	4/1MDBT	(3+2)/1MDBT	Sample
3338.00	com	bulk	-	-	-	1.03	0.99	0.89	0.39	4.20	1.18	222-0B
3446.00	com	bulk	-	1.84	-	0.65	0.61	0.53	0.19	1.64	0.48	223-0B
3460.00	com	bulk	0.74	2.18	0.06	0.66	0.61	0.55	0.16	1.89	0.42	224-0B
3484.00	com	bulk	0.93	2.47	0.10	0.66	0.61	0.54	0.16	2.19	0.50	225-0B
3496.00	com	bulk	0.78	2.06	0.10	0.63	0.60	0.52	0.17	2.01	0.59	226-0B
3508.00	com	bulk	0.74	2.01	0.08	0.60	0.56	0.50	0.13	2.02	0.48	227-0B
3518.00	com	bulk	1.01	2.24	0.12	0.64	0.59	0.53	0.16	1.99	0.57	228-0B
3522.00	cut	Sh/Clst: gy blk, brn blk	0.78	2.18	0.07	0.58	0.55	0.48	0.10	1.76	0.62	146-2L

Table 6 : Thermal Maturity Data for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
1080.00	cut	bulk	0.22	17	0.03	3	-	-	010-0B
1280.00	cut	bulk	0.21	22	0.03	0	-	-	012-0B
1480.00	cut	bulk	0.30	47	0.03	3	-	-	014-0B
1480.00	cut	Sh/Clst: brn blk	-	-	-	-	3	421	014-1L
1680.00	cut	bulk	0.27	23	0.04	3	-	-	016-0B
1780.00	cut	bulk	0.29	33	0.04	3	-	-	017-0B
1880.00	cut	bulk	0.30	27	0.03	3	-	-	018-0B
1880.00	cut	Sh/Clst: brn gy, drk brn gy	-	-	-	-	3	422	018-1L
1980.00	cut	bulk	0.31	18	0.03	0	-	-	019-0B
2080.00	cut	bulk	0.30	17	0.04	4	-	-	031-0B
2180.00	cut	bulk	0.35	10	0.06	3+4	-	-	041-0B
2190.00	cut	Sh/Clst: lt gy to m gy, pl ol gy	-	-	-	-	NDP	424	042-1L
2300.00	cut	bulk	0.39	16	0.05	4	-	-	053-0B
2400.00	cut	bulk	0.35	18	0.06	4	-	-	063-0B

Table 6 : Thermal Maturity Data for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
2500.00	cut	bulk	0.33	31	0.04	4	-	-	073-0B
2600.00	cut	bulk	0.42	4	0.06	4	-	-	083-0B
2700.00	cut	bulk	0.45	19	0.04	4	-	-	093-0B
2800.00	cut	bulk	0.38	4	0.03	4+5	-	-	153-0B
2908.00	cut	bulk	0.39	11	0.05	5	-	-	171-0B
3015.00	cut	bulk	NDP	-	-	0	-	-	184-0B
3141.00	cut	bulk	NDP	-	-	0	-	-	190-0B
3241.00	cut	bulk	0.41	15	0.07	0	-	-	210-0B
3272.00	cut	Sh/Clst: gn gy, lt gy to drk gy	-	-	-	-	NDP	420	215-2L
3296.00	cut	Sh/Clst: drk gy	-	-	-	-	4 4.5?	422	218-3L
3332.00	cut	Sh/Clst: gy blk, drk gy	-	-	-	-	NDP	419	105-3L
3338.00	cut	bulk	0.59	5	0.07	0	-	-	106-0B
3338.00	cut	Sh/Clst: gy blk, drk gy	-	-	-	-	NDP	426	106-3L
3434.00	cut	bulk	0.51	27	0.06	5	-	-	129-0B

Table 6 : Thermal Maturity Data for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
3434.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	4.5 - 5?	428	129-2L
3442.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	4.5 - 5?	428	131-1L
3450.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	NDP	429	133-1L
3454.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	4.5 - 5	430	134-1L
3460.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	5?	428	135-1L
3466.00	cut	Sh/Clst: gy blk	-	-	-	-	5?	427	136-1L
3472.00	cut	Sh/Clst: gy blk	-	-	-	-	6?	435	137-1L
3484.00	cut	Sh/Clst: gy blk	-	-	-	-	6?	433	139-1L
3496.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	NDP	431	141-1L
3508.00	cut	bulk	0.52	16	0.05	5	-	-	143-0B
3508.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6	433	143-1L
3514.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6?	431	144-2L
3522.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6	440	146-2L

Table 7 : Visual Kerogen Composition Data for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	LIPT %	Amor L	LipDet	Sp/Pol	Cuticl	Reisin	Algae	Dinofl	Acrit	Bit L	INERT %	Fusin	Semfus	Sntdet	Micrin	Sclero	Bit I	VITR %	Telin	Collin	Vitdet	Amor V	Bit V	Sample
1480.00	cut	Sh/Clst: brn blk	TR		*	*							TR			*				100		*				014-1L
1880.00	cut	Sh/Clst: brn gy, drk brn gy	10		*	*				*			TR		*	*				90		*	*			018-1L
2190.00	cut	Sh/Clst: lt gy to m gy, pl ol gy	5		*	?							5			*				90			**	*		042-1L
3272.00	cut	Sh/Clst: gn gy, lt gy to drk gy	10		**	*							TR							90			*	*		215-2L
3296.00	cut	Sh/Clst: drk gy	15		*	*				*			25		*	*				60			*	*		218-3L
3332.00	cut	Sh/Clst: gy blk, drk gy	10?										10?							80?						105-3L
3338.00	cut	Sh/Clst: gy blk, drk gy	15?										10?							75?						106-3L
3434.00	cut	Sh/Clst: gy blk, brn blk	50	*	*	*			?				10			*				40			*	*		129-2L
3442.00	cut	Sh/Clst: gy blk, brn blk	50	*	*	*			?				10			*				40			*	*		131-1L
3450.00	cut	Sh/Clst: gy blk, brn blk	40	*	**								10			*				50			*	**		133-1L
3454.00	cut	Sh/Clst: gy blk, brn blk	50	*	**	*			*				10			*				40			*	*		134-1L
3460.00	cut	Sh/Clst: gy blk, brn blk	40	*	**	*			**	*			20		*	*				40			*	*		135-1L
3466.00	cut	Sh/Clst: gy blk	40	*	**	*			**	*			20		*	*				40			*	*		136-1L

Table 7 : Visual Kerogen Composition Data for well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	LIPT %	Amor L	LipDet	Sp/Pol	Cutic l	Reisin	Algae	Dinofl	Acrit	Bit L	INERT %	Fusin	Semfus	IntDet	Micrin	Sclero	Bit I	VITR %	Telin	Collin	VitDet	Amor V	Bit V	Sample
3472.00	cut	Sh/Clst: gy blk	35		*	*			*				10		*	*				55			*	*		137-1L
3484.00	cut	Sh/Clst: gy blk	30	*	**	*			?				10		*	*				60			*	*		139-1L
3496.00	cut	Sh/Clst: gy blk, brn blk	25	*	**	*							15			*				60			*	*		141-1L
3508.00	cut	Sh/Clst: gy blk, brn blk	30	**	**	*			*				15		*	*				55			*	*		143-1L
3514.00	cut	Sh/Clst: gy blk, brn blk	45	*	*	**			*				15		*	**				40			*	*		144-2L
3522.00	cut	Sh/Clst: gy blk, brn blk	25		**	*							15		*	*				60			*	**		146-2L

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Table 8 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
3272.00	cut	Sh/Clst: gn gy, lt gy to drk gy	3.24	12.27	37.95	46.55	7.03	215-2L
3296.00	cut	Sh/Clst: drk gy	5.38	17.80	35.09	41.74	21.64	218-3L
3332.00	cut	Sh/Clst: gn gy, m brn	1.78	8.32	32.56	57.34	5.80	105-2L
3332.00	cut	Sh/Clst: gy blk, drk gy	1.98	9.83	24.38	63.82	5.97	105-3L
3338.00	cut	Sh/Clst: gn gy, m brn	1.78	9.48	33.79	54.95	3.00	106-2L
3338.00	cut	Sh/Clst: gy blk, drk gy	2.23	9.70	32.14	55.93	4.65	106-3L
3348.00	cut	Sh/Clst: gn gy	2.28	13.17	39.35	45.20	1.57	107-2L
3362.00	cut	Sh/Clst: gn gy	5.18	19.00	42.24	33.58	3.13	109-2L
3366.00	cut	S/Sst : w	15.87	45.71	30.05	8.37	0.07	110-1L
3390.00	cut	S/Sst : w, gn gy, drk gn gy	30.35	12.49	43.92	13.24	0.07	116-1L
3434.00	cut	Sh/Clst: gy blk, brn blk	3.18	13.29	38.42	45.12	9.92	129-2L
3446.00	cut	Sh/Clst: gy blk, brn blk	3.19	13.07	37.35	46.39	8.09	132-1L
3460.00	cut	Sh/Clst: gy blk, brn blk	2.93	12.46	36.11	48.50	10.53	135-1L
3466.00	cut	Sh/Clst: gy blk	2.97	12.77	33.44	50.82	13.46	136-1L
3478.00	cut	Sh/Clst: gy blk	3.45	13.84	36.30	46.42	8.31	138-1L

Table 8 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 3/7-3

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
3490.00	cut	Sh/Clst: gy blk, brn blk	3.30	14.58	36.82	45.30	6.82	140-1L
3502.00	cut	Sh/Clst: gy blk, brn blk	3.48	15.48	38.92	42.11	6.78	142-1L
3514.00	cut	Sh/Clst: gy blk, brn blk	2.84	13.25	37.39	46.52	8.25	144-2L
3522.00	cut	Sh/Clst: gy blk, brn blk	3.20	14.87	39.15	42.78	5.35	146-2L

Table 9: Variation in Triterpane Distribution for Well NOCS 3/7-3

Depth unit of measure: m

Depth	Lithology	B/A	B/B+A	B B+E+F	C/E	C/C+E	X/E	Z/E	Z/C	Z/Z+E	Q/E	E/E+F	C+D C+D+E+F	D+F/C+E	J1 J1+J2%	Sample
3338.00	Sh/Clst	1.12	0.53	0.24	0.86	0.46	0.04	0.05	0.06	0.05	0.32	0.90	0.45	0.09	56.25	222-0
3446.00	Sh/Clst	2.22	0.69	0.16	0.43	0.30	0.10	0.05	0.11	0.04	0.03	0.86	0.31	0.17	51.95	223-0
3508.00	Sh/Clst	2.00	0.67	0.17	0.04	0.04	0.10	0.03	0.88	0.03	0.03	0.86	0.08	0.21	53.33	227-0

Table 10: Variation in Sterane Distribution for Well NOCS 3/7-3

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Ratio6	Ratio7	Sample
3338.00	Sh/Clst	0.51	51.95	67.23	0.78	0.66	0.28	0.20	222-0
3446.00	Sh/Clst	0.71	44.44	61.24	1.11	0.64	0.22	0.17	223-0
3508.00	Sh/Clst	0.69	48.28	64.20	0.84	0.65	0.21	0.15	227-0

Ratio1: a / a + j
Ratio2: q / q + t * 100%
Ratio3: 2(r + s)/(q + t + 2(r + s)) * 100%
Ratio4: a + b + c + d / h + k + l + n
Ratio5: r + s / r + s + q
Ratio6: u + v / u + v + q + r + s + t
Ratio7: u + v / u + v + i + m + n + q + r + s + t

Table 11: Aromatisation of Steranes for Well NOCS 3/7-3

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Sample
3338.00	Sh/Clst	0.50	0.80	222-0
3446.00	Sh/Clst	0.58	0.70	223-0
3508.00	Sh/Clst	0.55	0.76	227-0

$$\text{Ratio1:} \quad \frac{C1+D1+E1+F1+G1+H1+I1}{C1+D1+E1+F1+G1+H1+I1 + c1+d1+e1+f1+g1}$$

Ratio2: g1 / g1 + I1

Table 12: Variation in Triaromatic Sterane Distribution for Well NOCS 3/7-3

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Sample
3338.00	Sh/Clst	0.44	0.41	0.25	0.23	0.38	222-0
3446.00	Sh/Clst	0.39	0.34	0.16	0.18	0.22	223-0
3508.00	Sh/Clst	0.35	0.27	0.14	0.15	0.24	227-0

Ratio1: a1 / a1 + g1
Ratio2: b1 / b1 + g1
Ratio3: a1 + b1 / a1 + b1 + c1 + d1 + e1 + f1 + g1
Ratio4: a1 / a1 + e1 + f1 + g1
Ratio5: a1 / a1 + d1

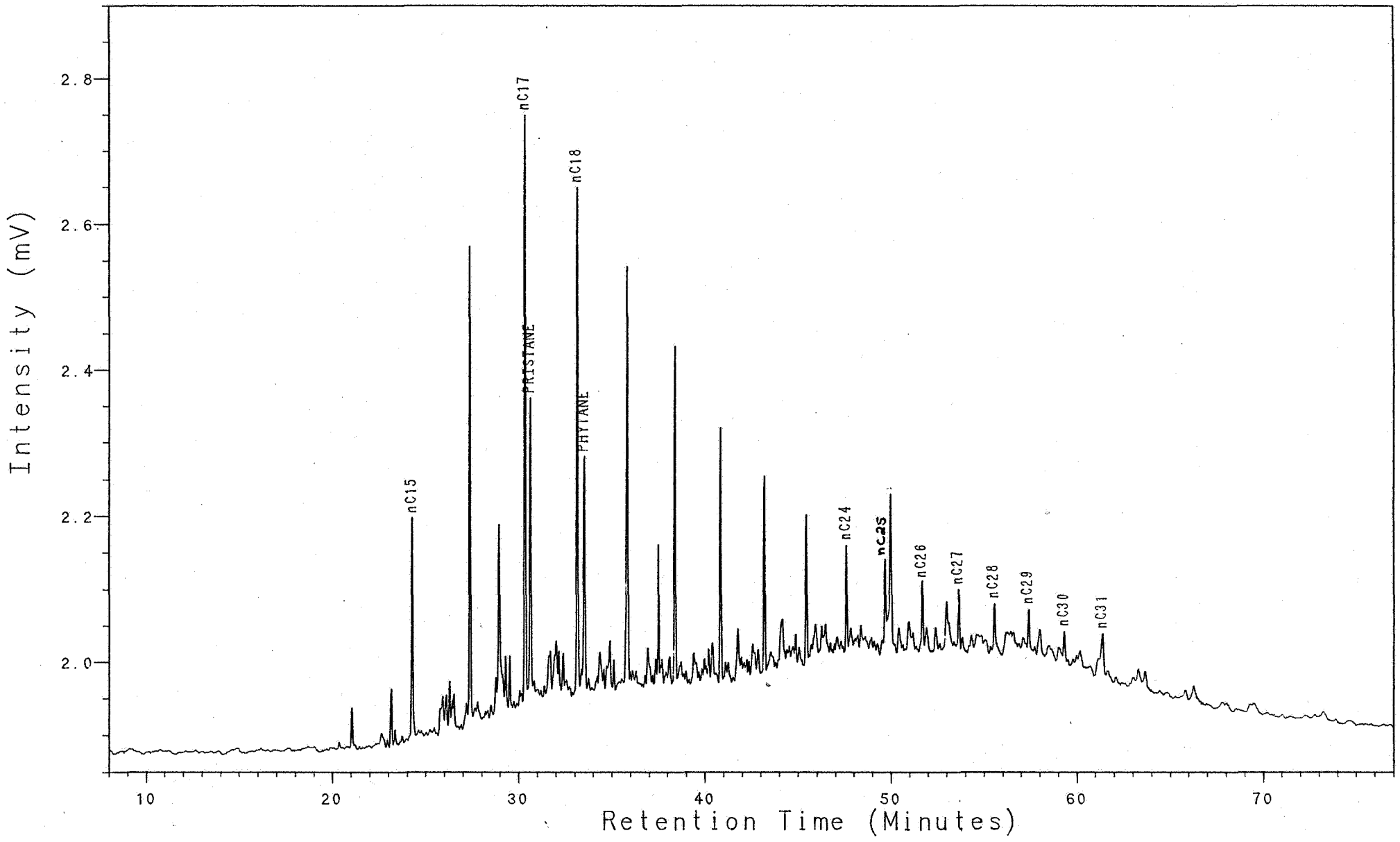
Table 13: Variation in Monoaromatic Sterane Distribution for Well NOCS 3/7-3

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Sample
3338.00	Sh/Clst	0.51	0.38	0.27	0.19	222-0
3446.00	Sh/Clst	0.27	0.16	0.16	0.12	223-0
3508.00	Sh/Clst	0.23	0.11	0.13	0.10	227-0

Ratio1: A1 / A1 + E1
Ratio2: B1 / B1 + E1
Ratio3: A1 / A1 + E1 + G1
Ratio4: A1+B1 / A1+B1+C1+D1+E1+F1+G1+H1+I1

Analysis SC072220B 5, 1, 1 3/7-3, 3338m, SAT



NOCS 3/7-3 3320-38m
SATURATED GC
CLST: gn gy, m brn

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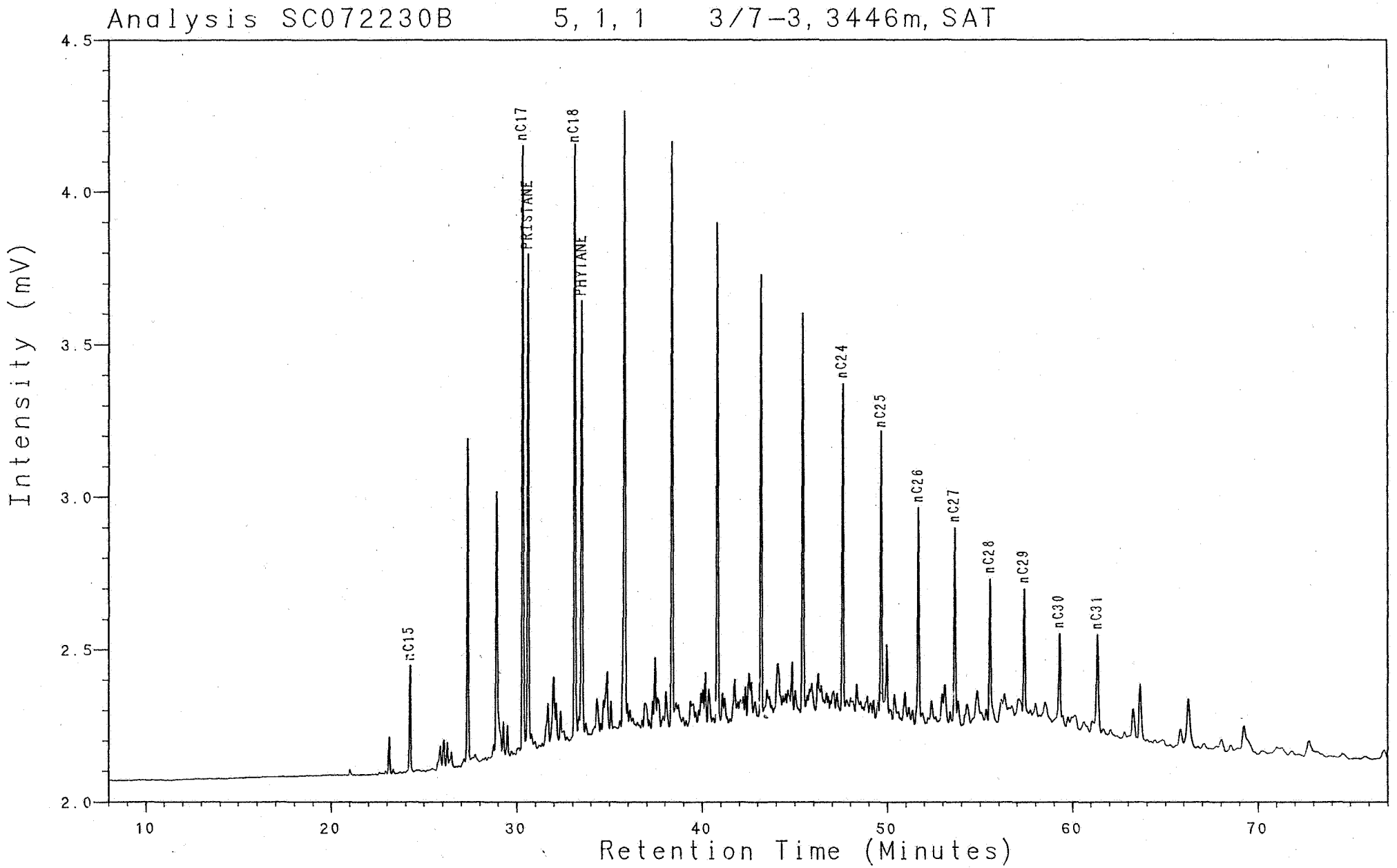

NOCS 3/7-3 3434-46m
SATURATED GC
CLST:gy blk,brn blk

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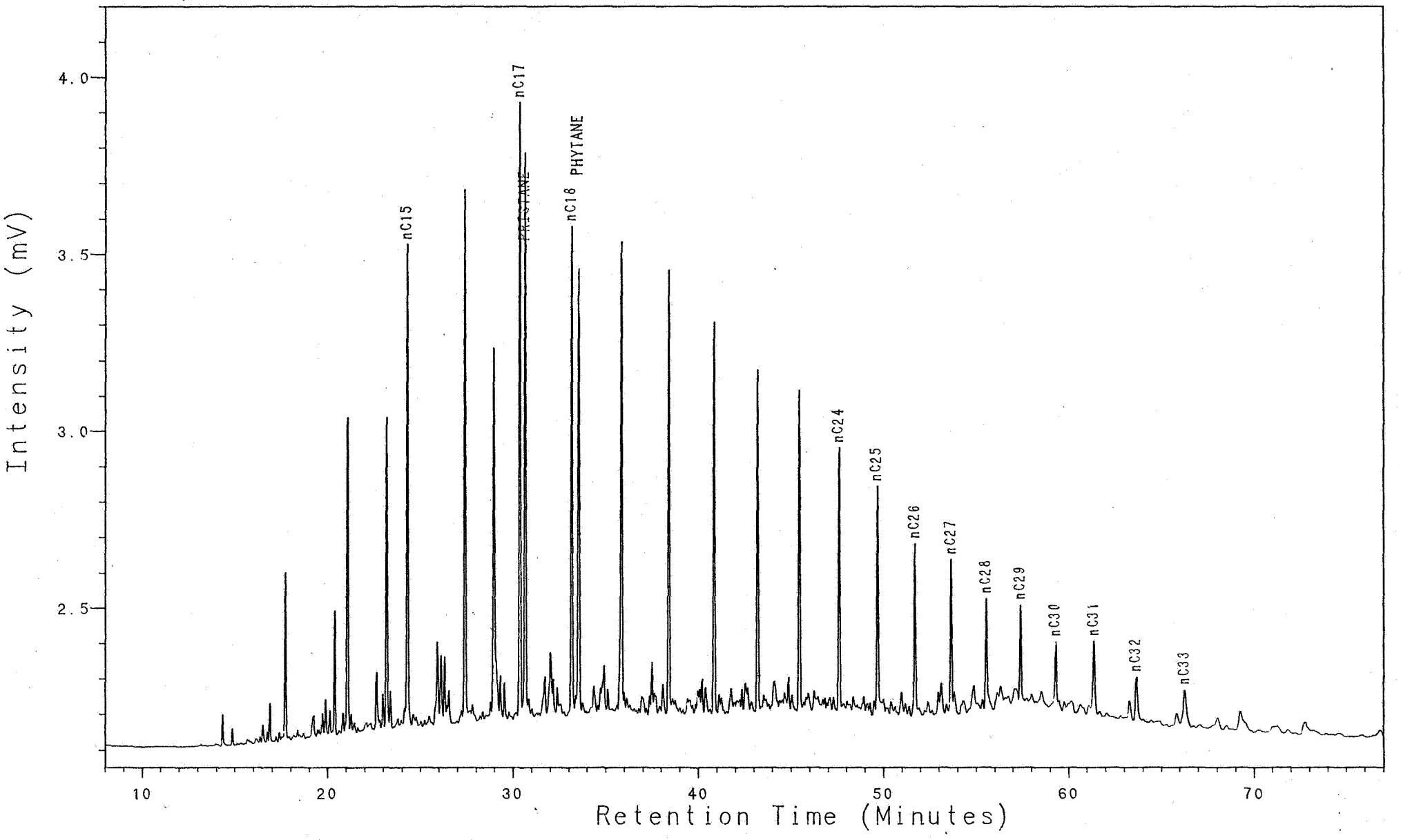
Analysis SC072240B 5, 1, 1 3/7-3, 3460m, SAT



NOCS 3/7-3 3450-60m
SATURATED GC
CLST:gy blk,brn blk

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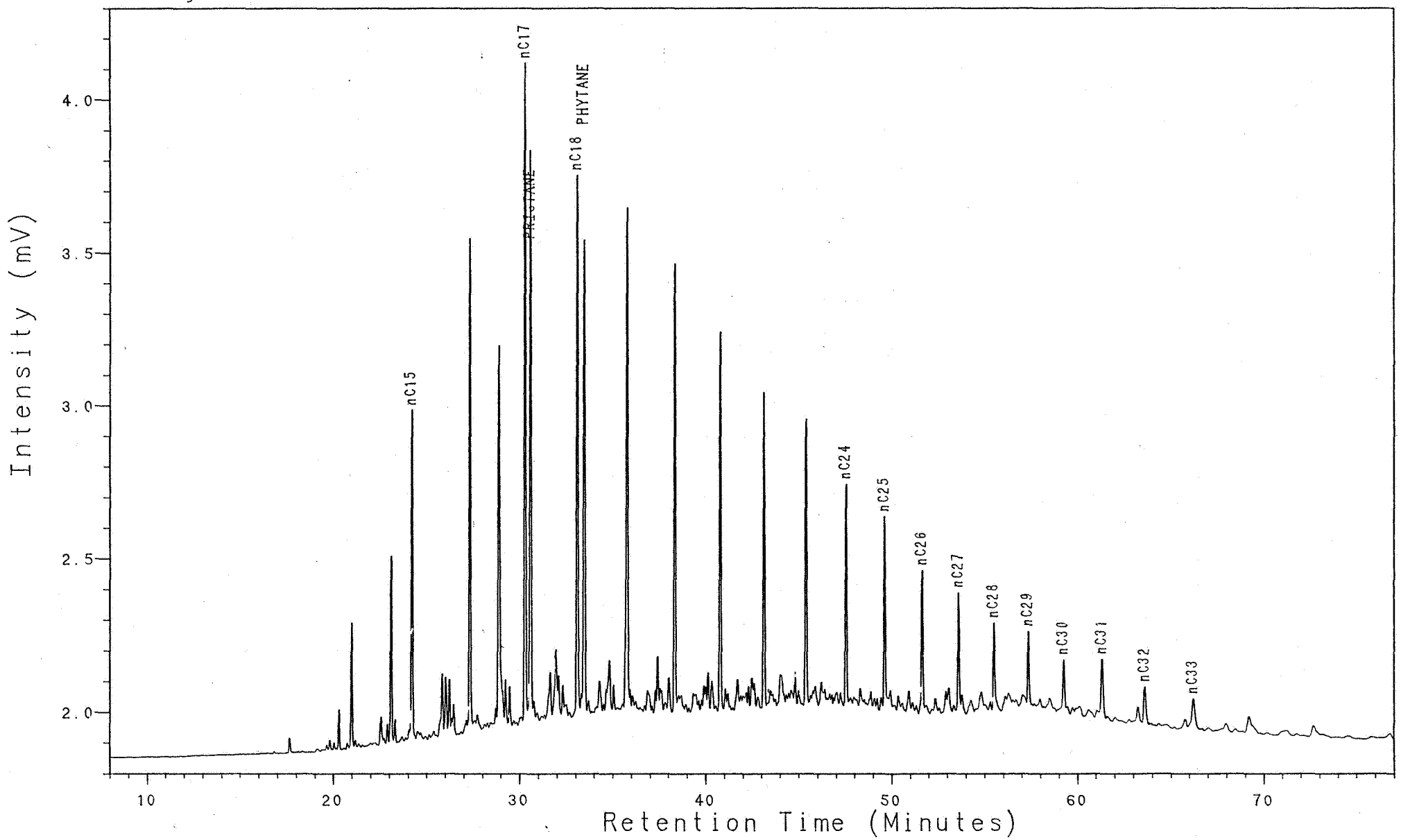
Analysis SC072250B 5, 1, 1 3/7-3, 3484m, SAT



NOCS 3/7-3 3466-84m
SATURATED GC
CLST: gy blk

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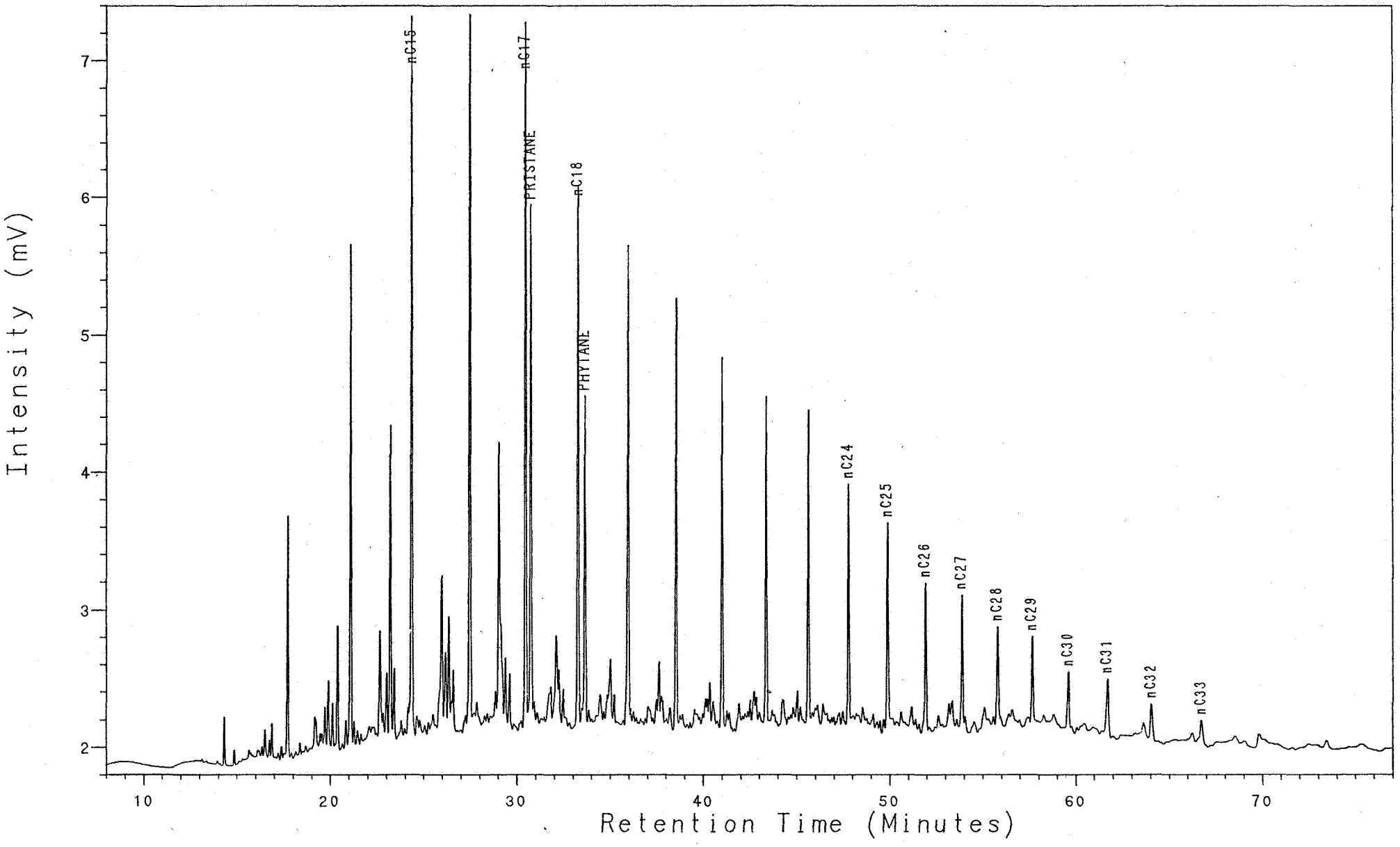
Analysis SC072260B 5, 1, 1 3/7-3, 3496m, SAT



NOCS 3/7-3 3490-96m
SATURATED GC
CLST:gy blk,brn blk

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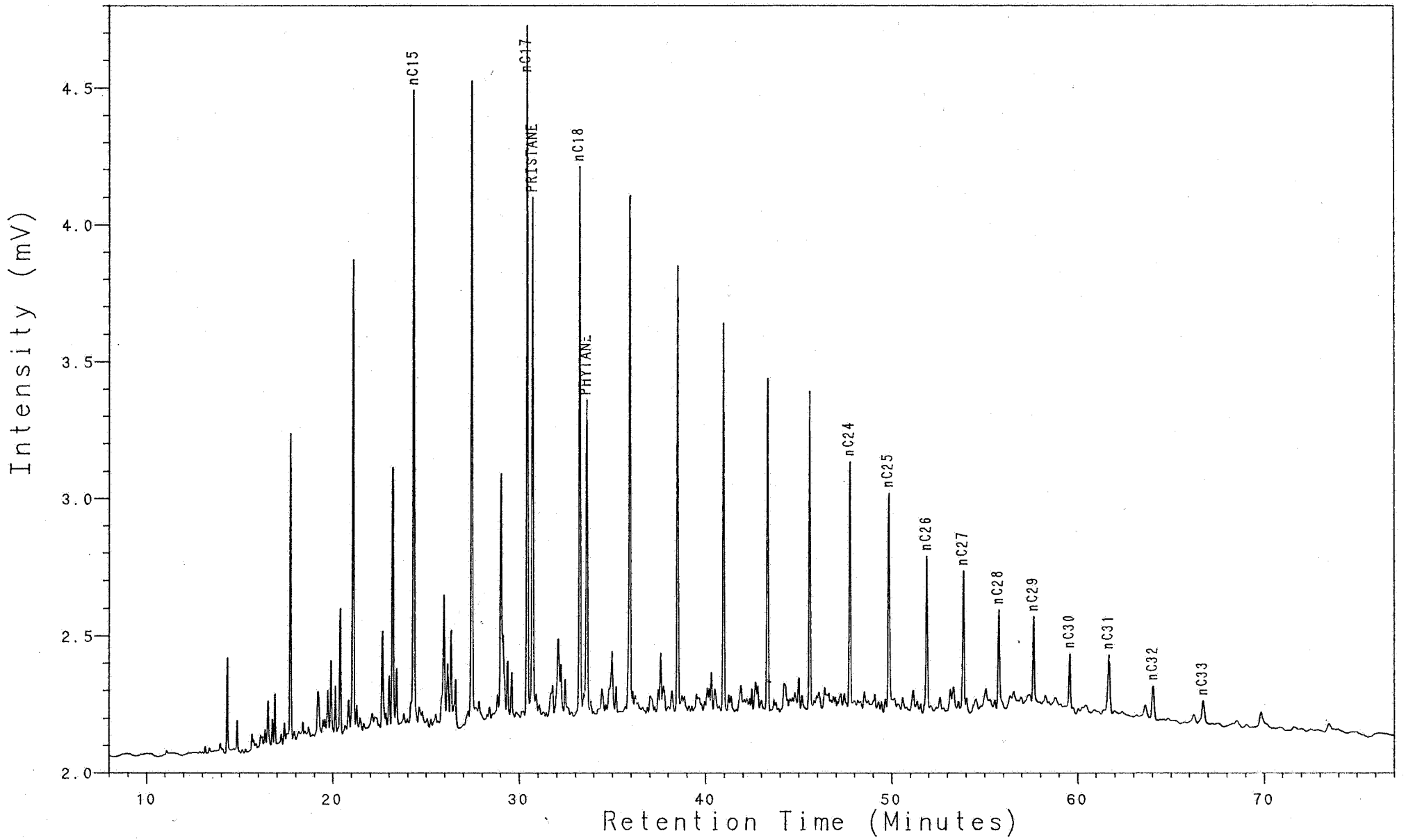
Analysis SC072270B 5, 1, 1 3/7-3, 3508m, SAT



NOCS 3/7-3 3502-08m
SATURATED GC
CLST:gy blk,brn blk

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Figure 11: Kerogen Composition and Potential Hydrocarbon Products

Well NOCS 3/7-3

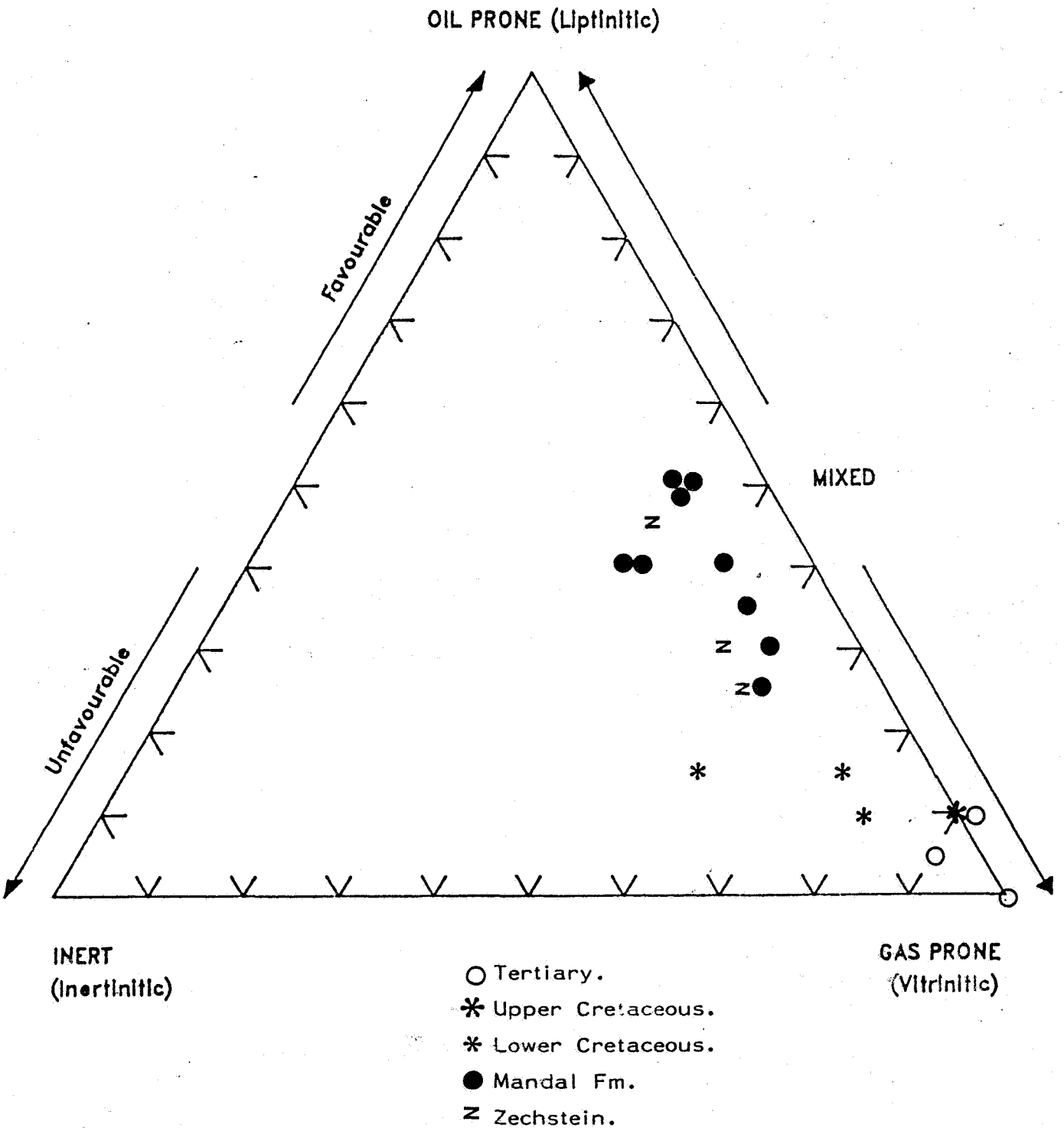

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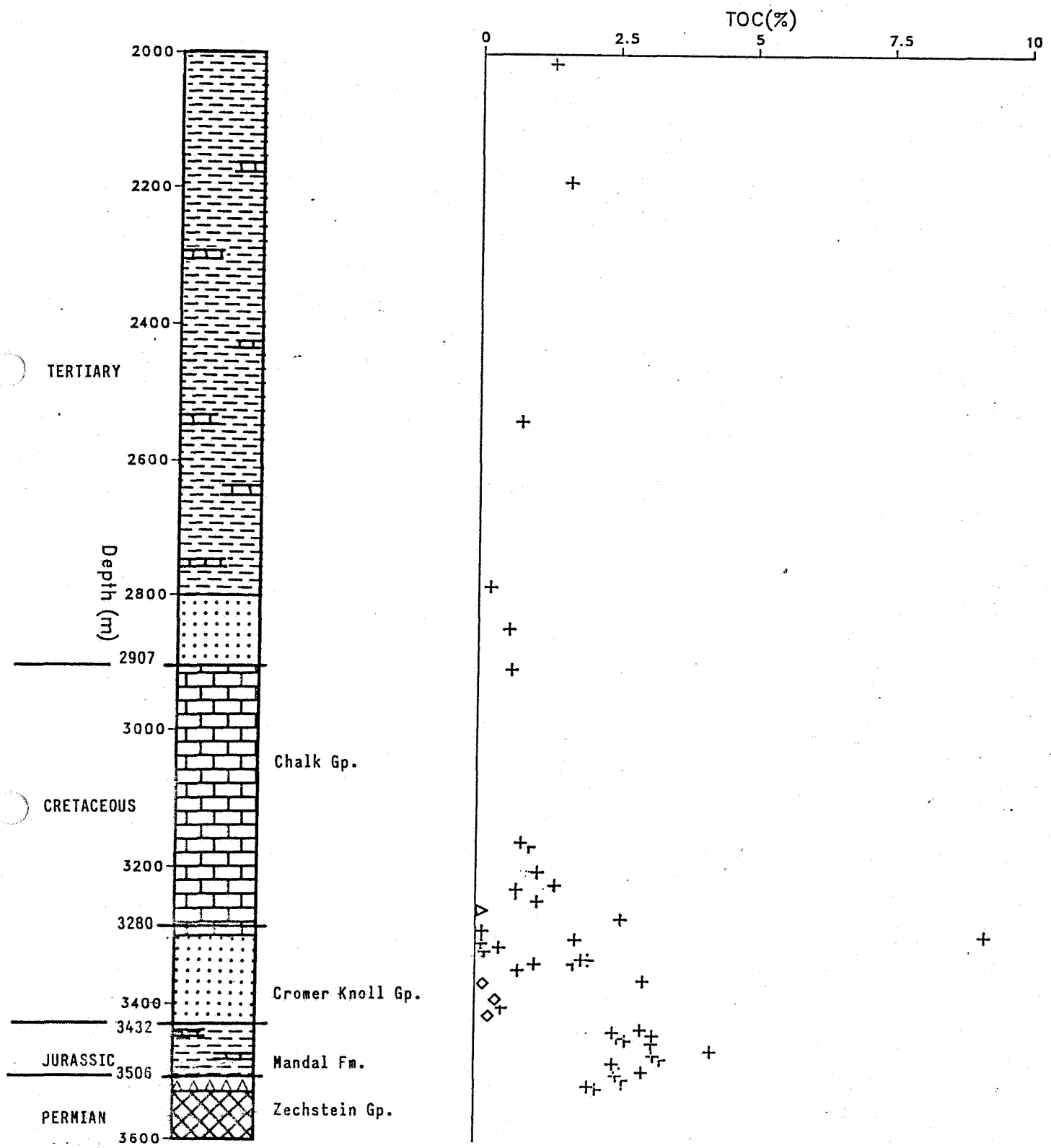
Figure: 1

Client: VARIOUS

TOC Data for Well NOCS 3/7–3



- Shales
- Siltstones
- Coals
- Carbonates
- Sandstones
- Anhydrite

Figure: 2

Client: VARIOUS

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Production Index Data for Well NOCS 3/7–3

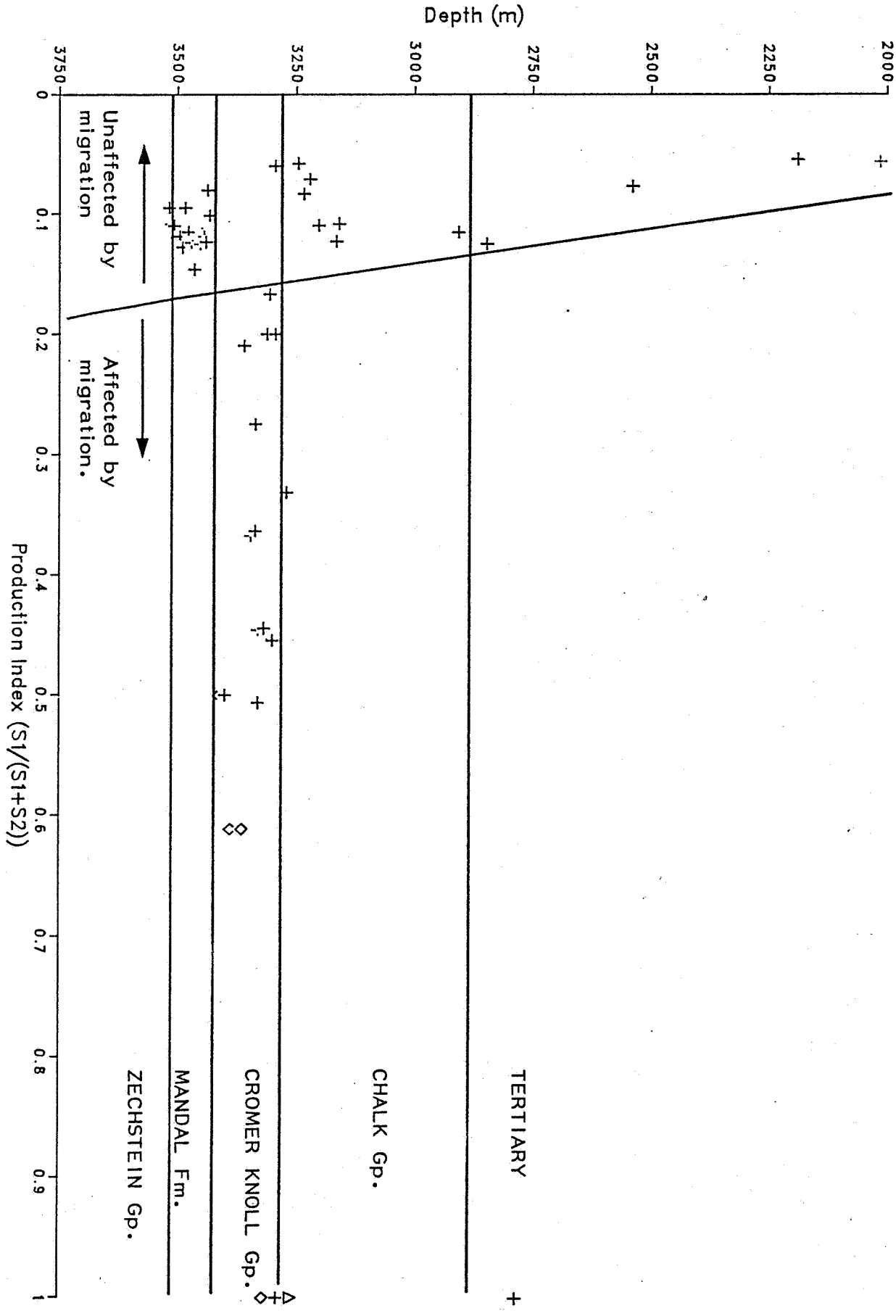
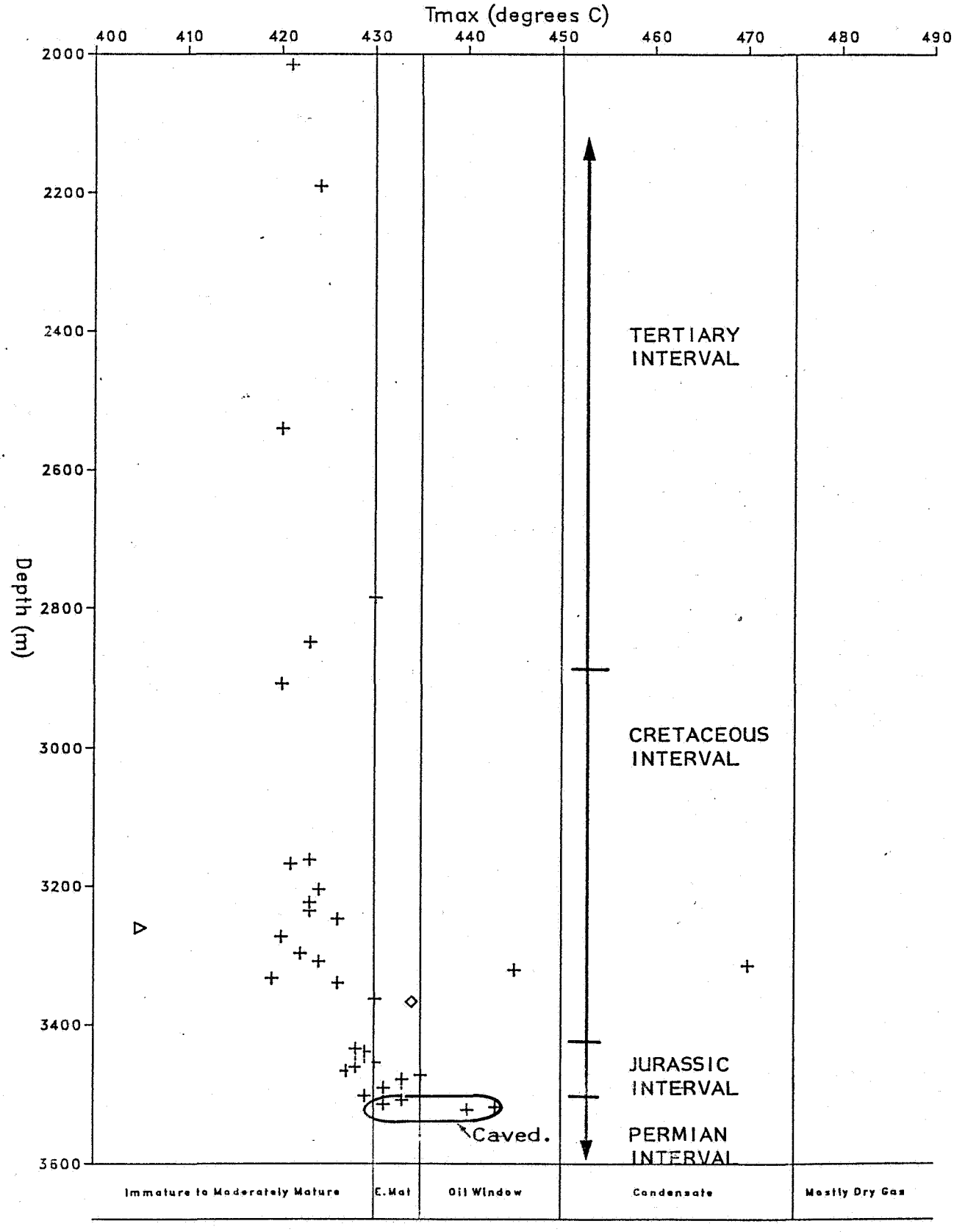


Figure: 3

Client: VARIOUS

Tmax Data for Well NOCS 3/7–3



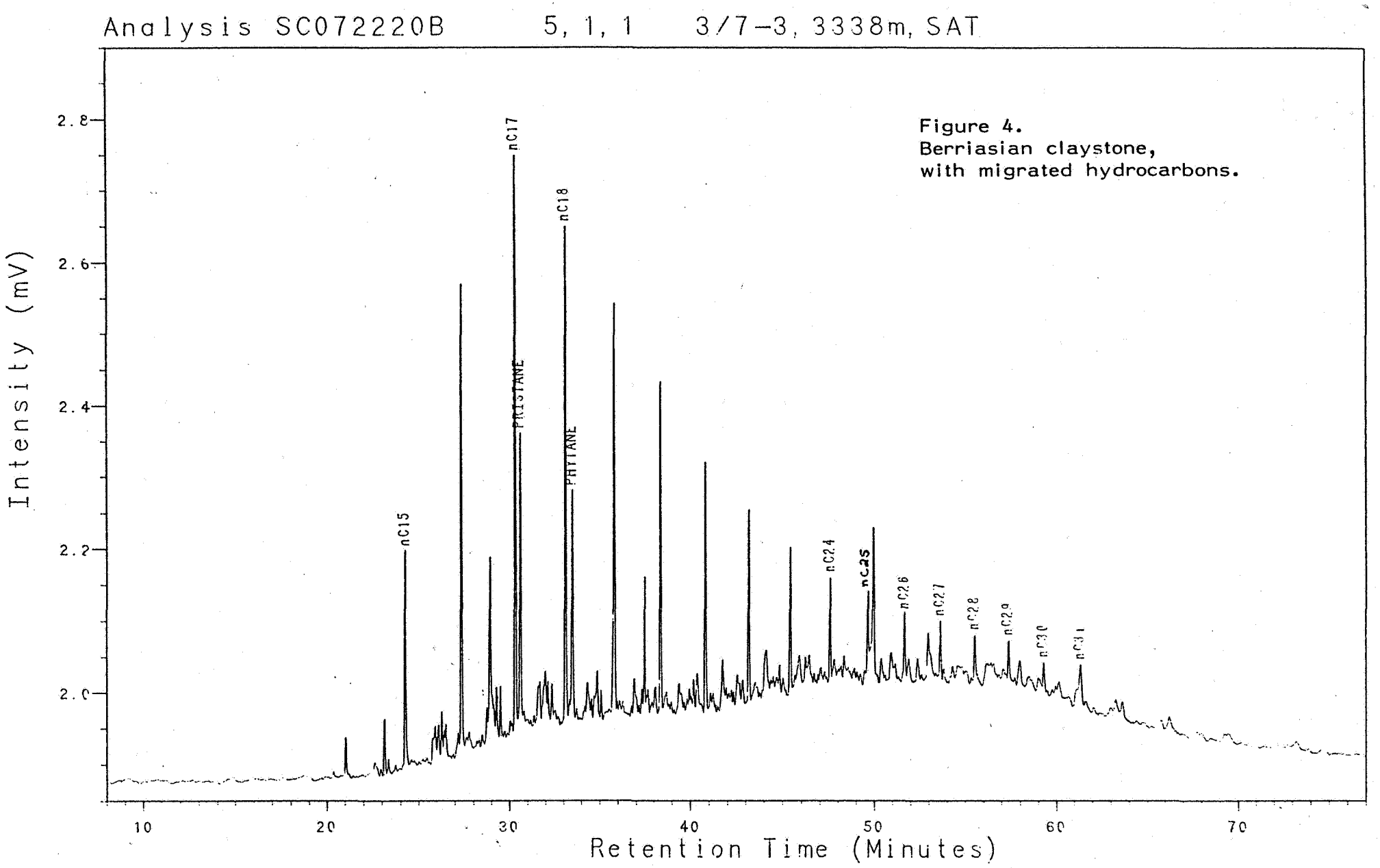


Figure 4.
Berriasian claystone,
with migrated hydrocarbons.

NOCS 3/7-3 3320-38m
SATURATED GC
CLST:gn gy,m brn

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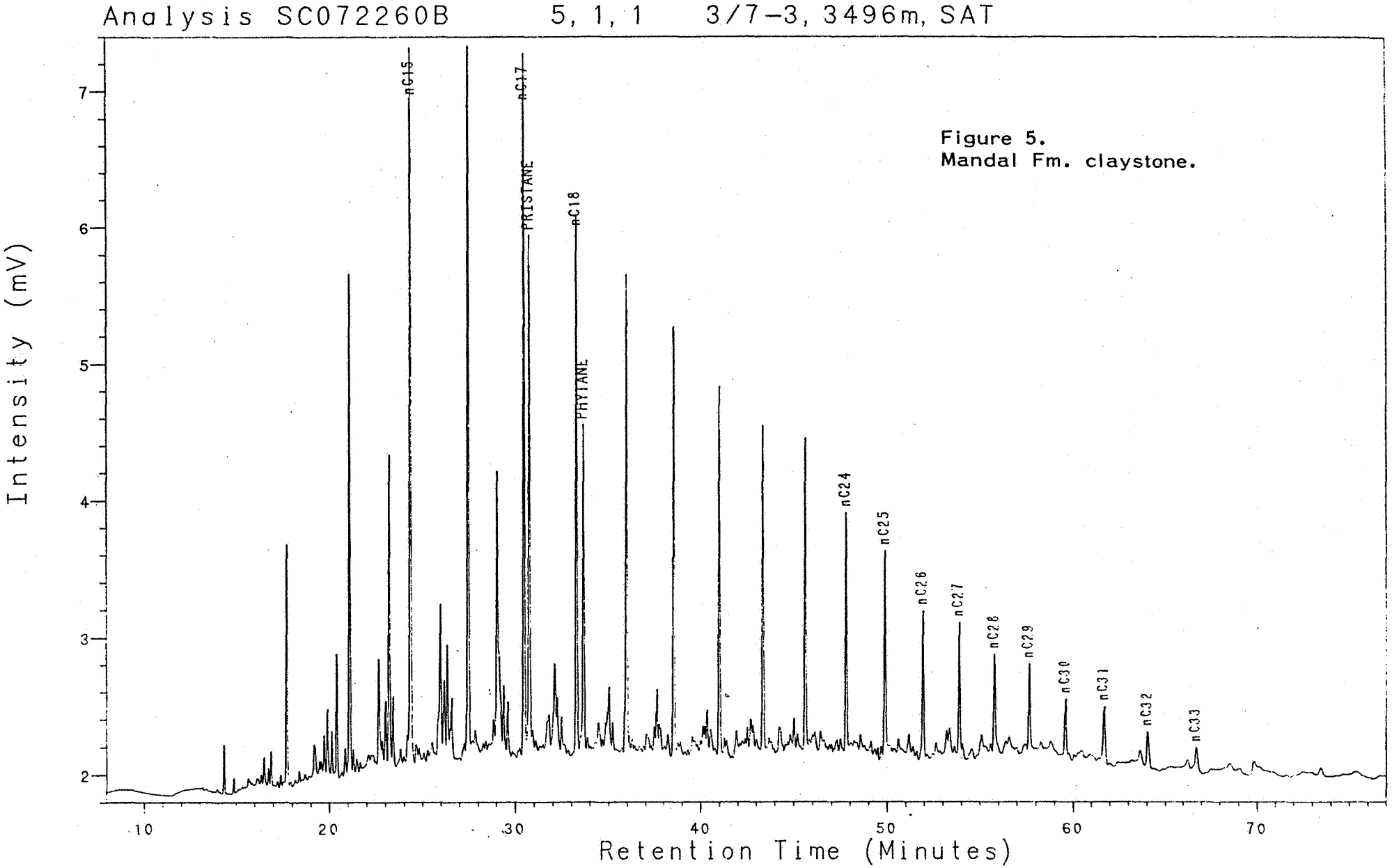

Figure 5.
Mandal Fm. claystone.

NOCS 3/7-3 3490-96m
SATURATED GC
CLST:gy blk,brn blk

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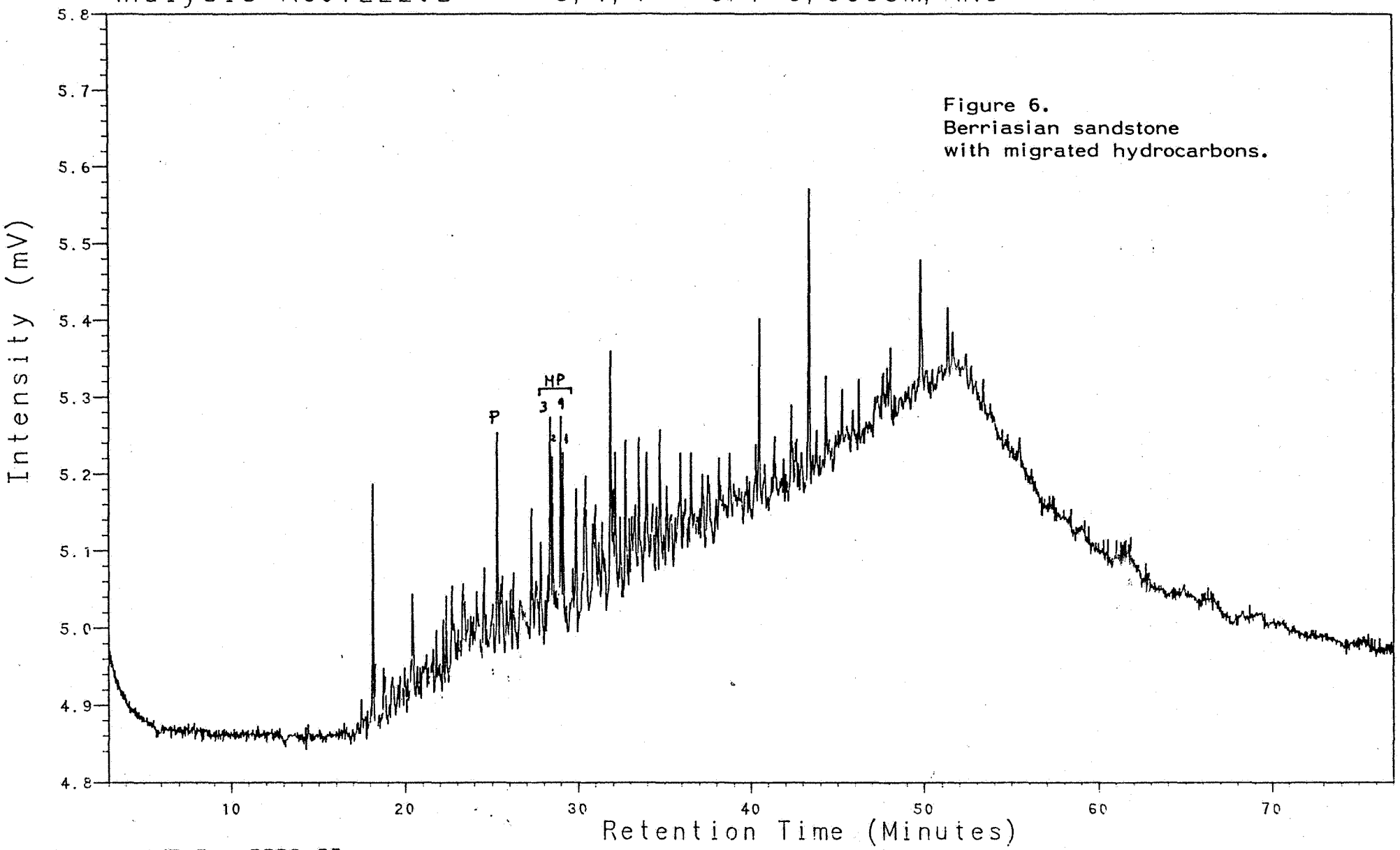

Figure 6.
Berriasian sandstone
with migrated hydrocarbons.

NOCS 3/7-3 3320-38m
AROMATIC GC (FID)
CLST:gn gy,m brn

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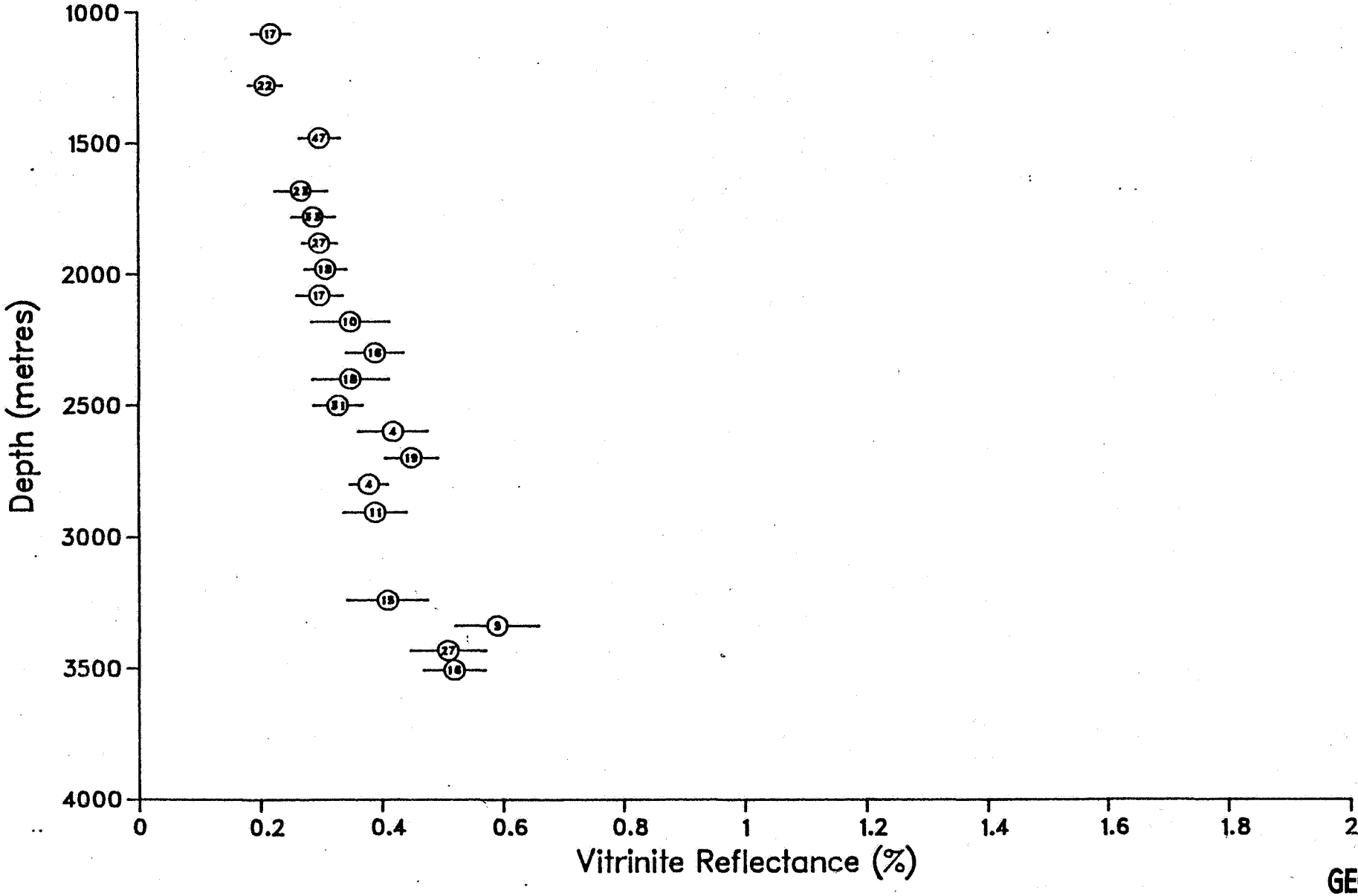
Figure 10: Vitrinite Reflectance versus Depth
Well NOCS 3/7–3



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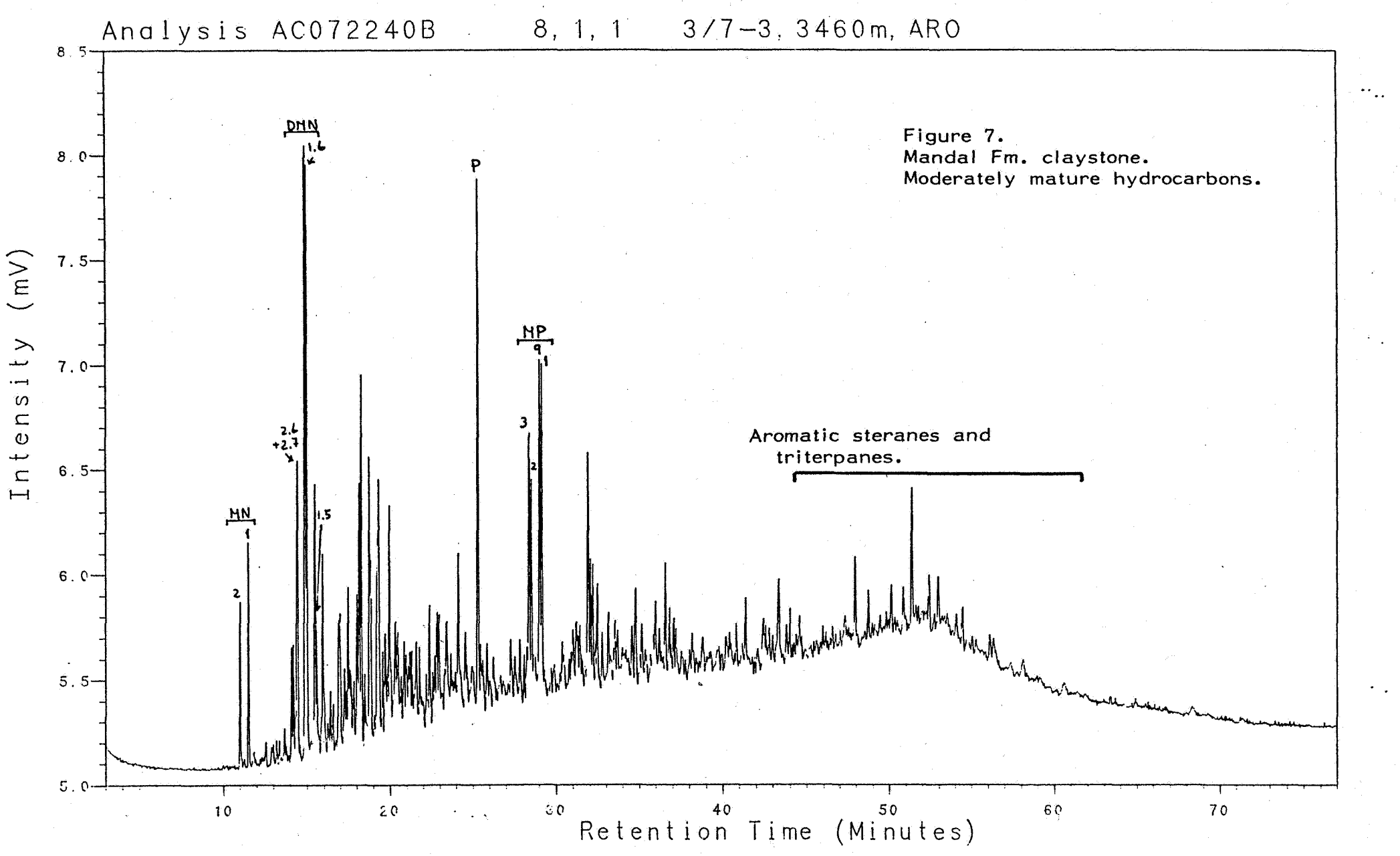

Figure 7.
Mandal Fm. claystone.
Moderately mature hydrocarbons.

NOCS 3/7-3 3450-60m
AROMATIC GC (FID)
CLST:gy blk,brn blk

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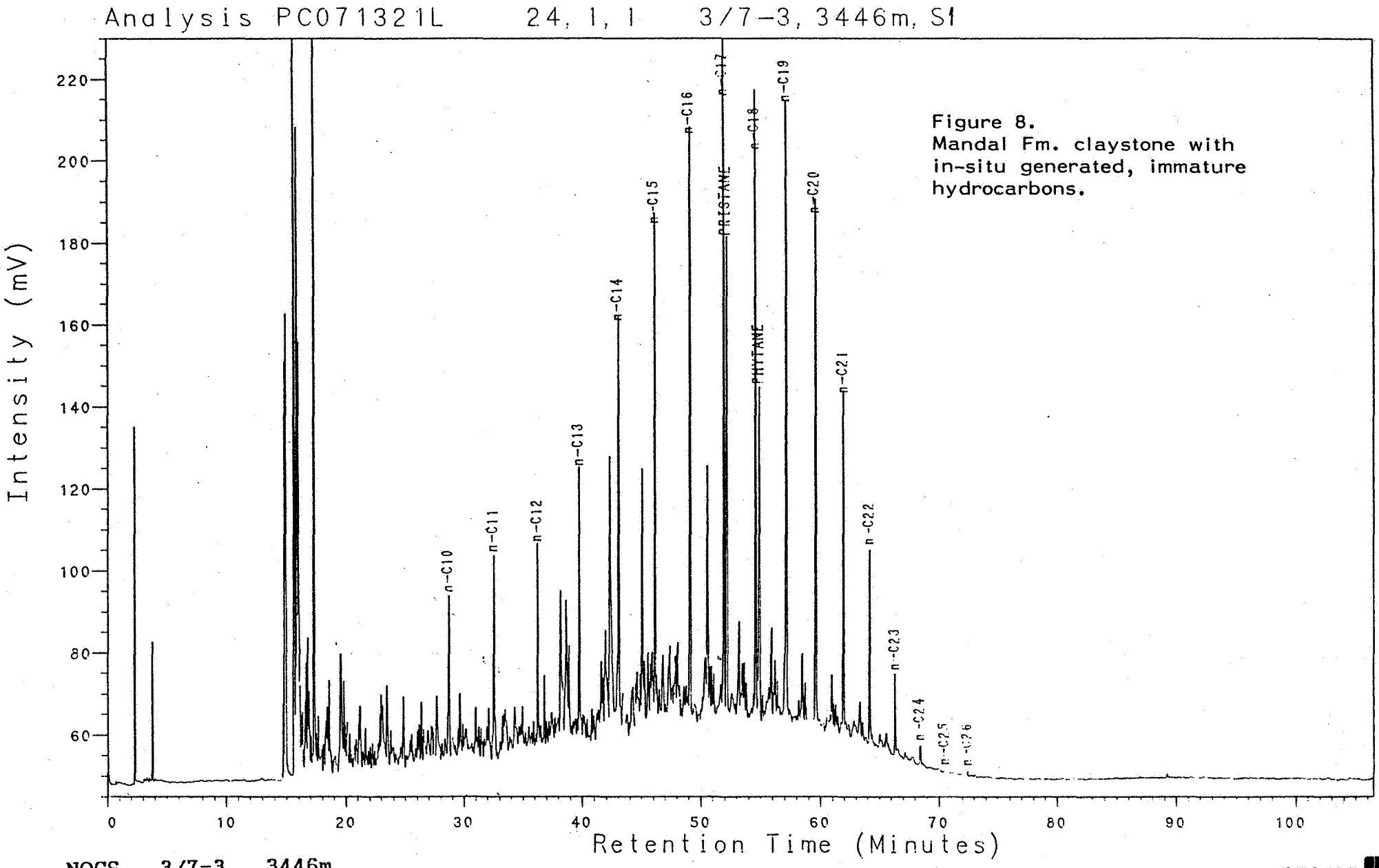

Figure 8.
Mandal Fm. claystone with in-situ generated, immature hydrocarbons.

NOCS 3/7-3 3446m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,brn blk

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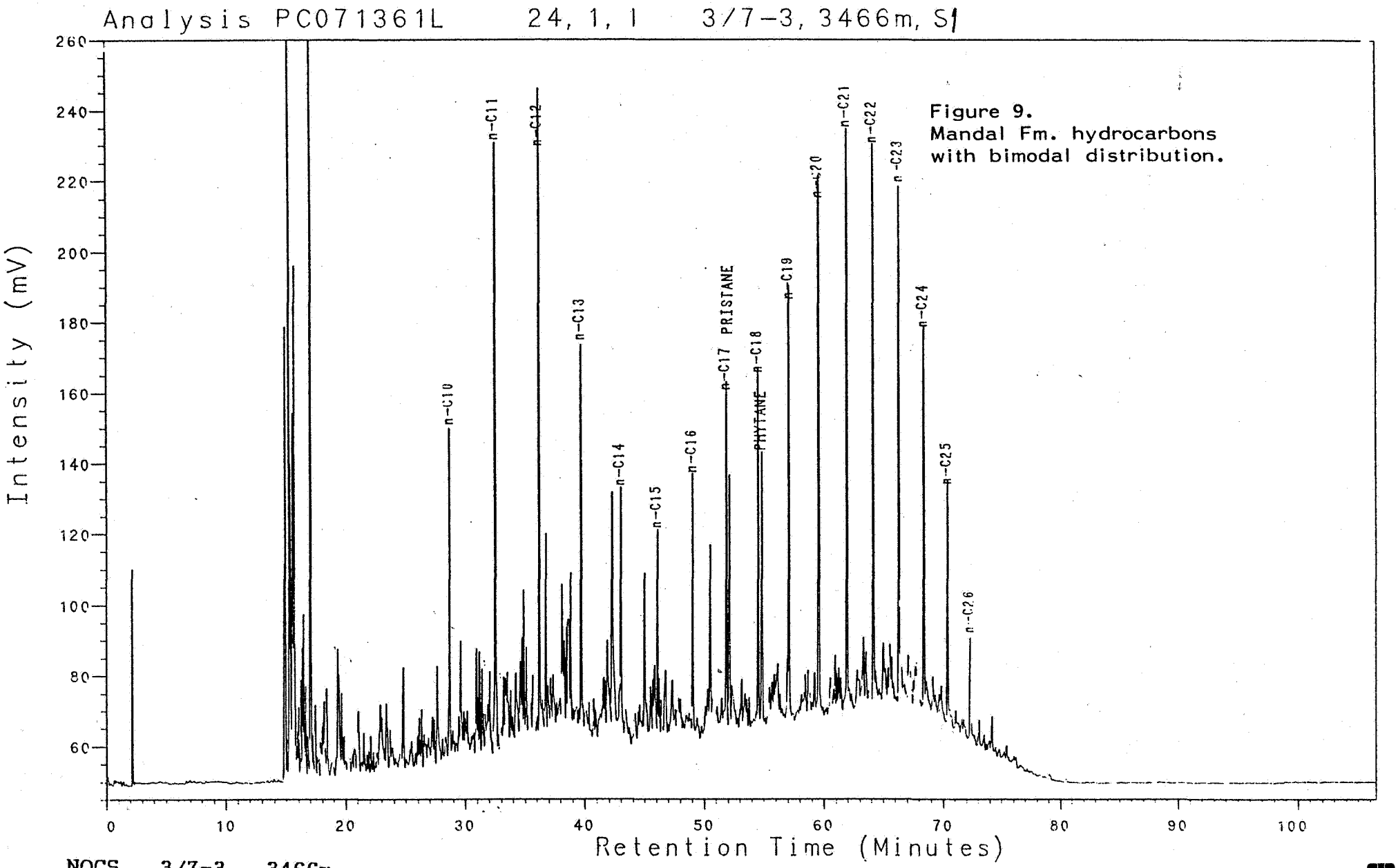

Figure 9.
Mandal Fm. hydrocarbons with bimodal distribution.

NOCS 3/7-3 3466m
THERMAL EXTRACTION GC (S1)
CLST: gy blk

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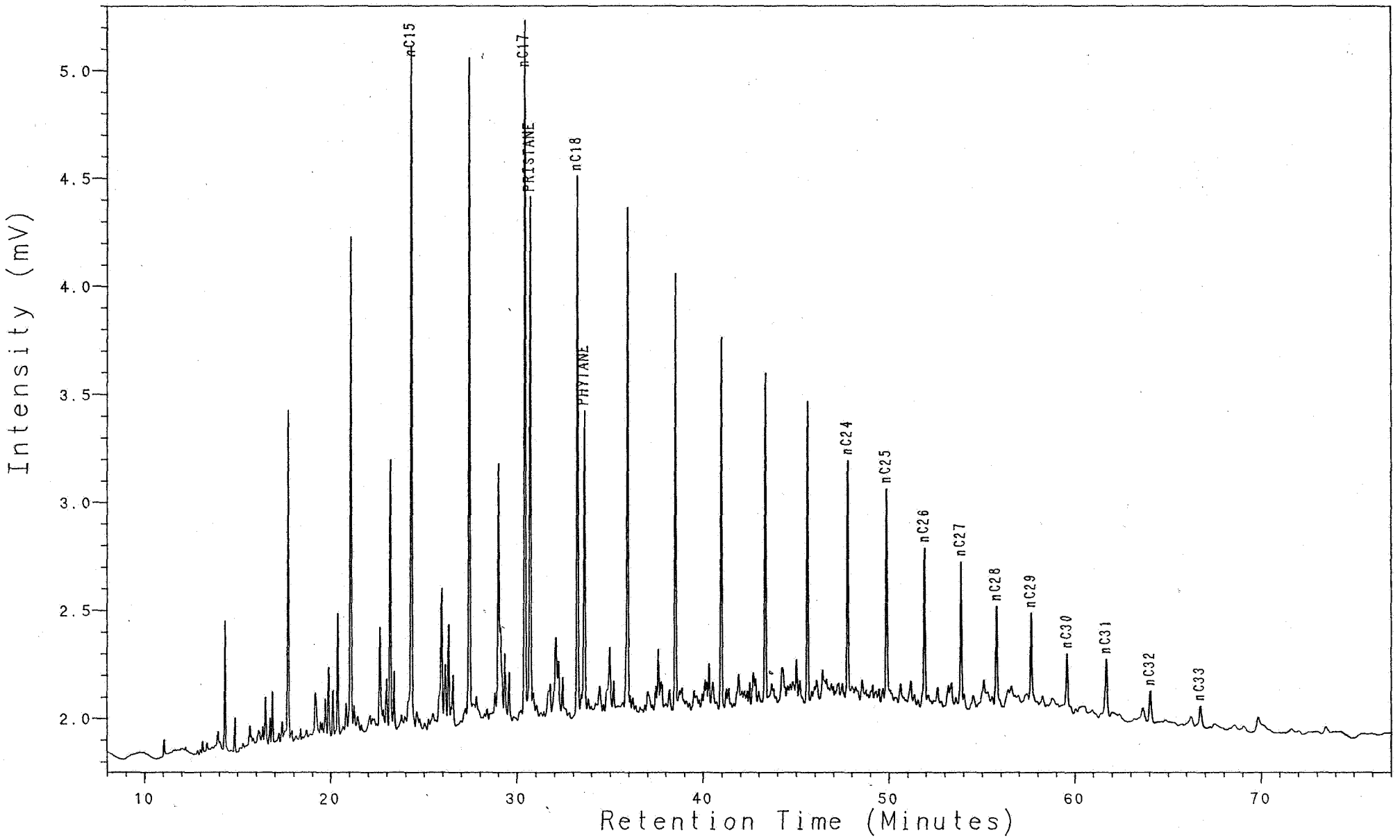
Analysis SC072280B 5, 1, 1 3/7-3, 3518m, SAT



NOCS 3/7-3 3514-18m
SATURATED GC
CLST:gy blk,brn blk

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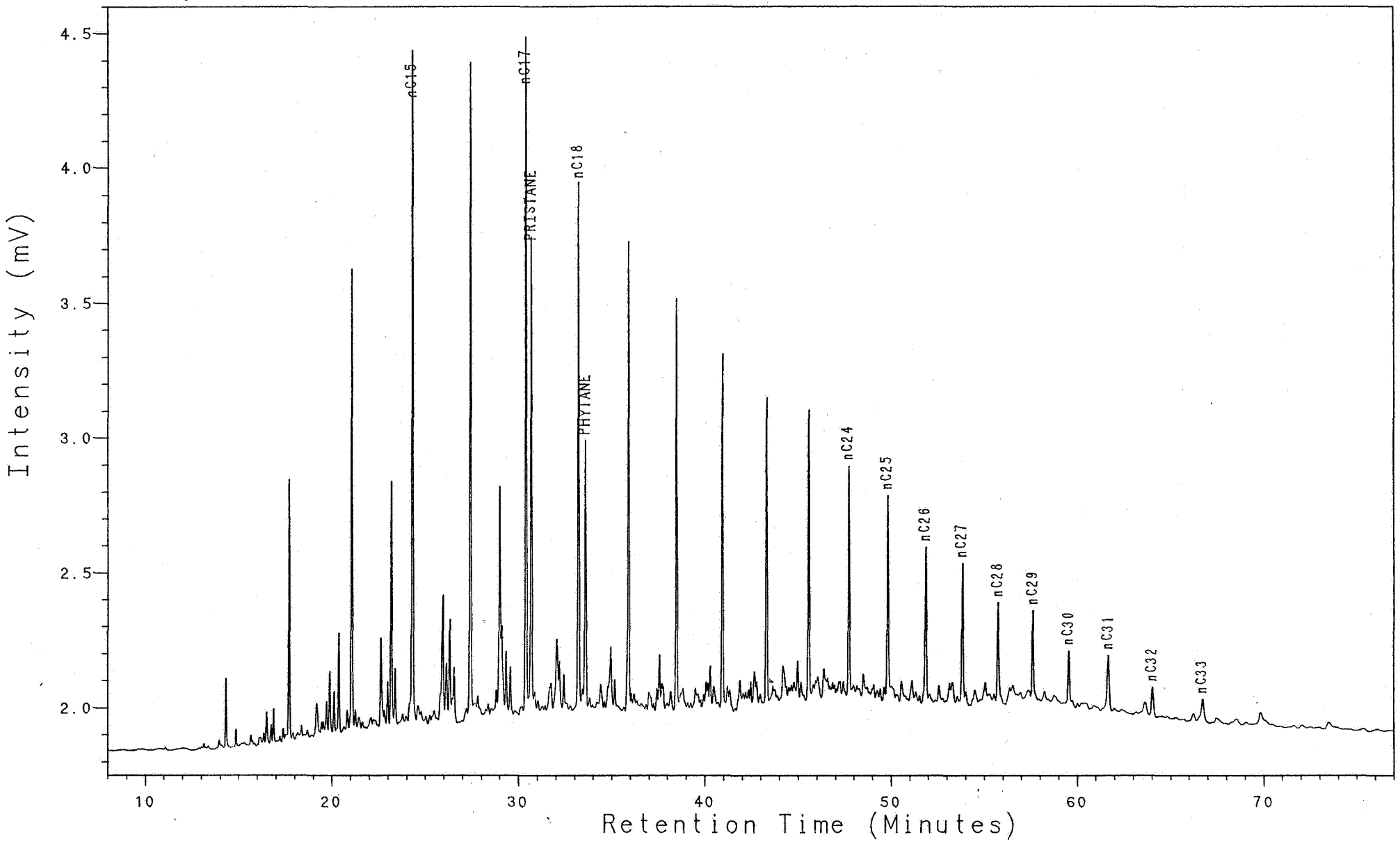
Analysis SC071462L 5, 1, 1 3/7-3, 3522m, SAT



NOCS 3/7-3 3522m
SATURATED GC
CLST:gy blk,brn blk

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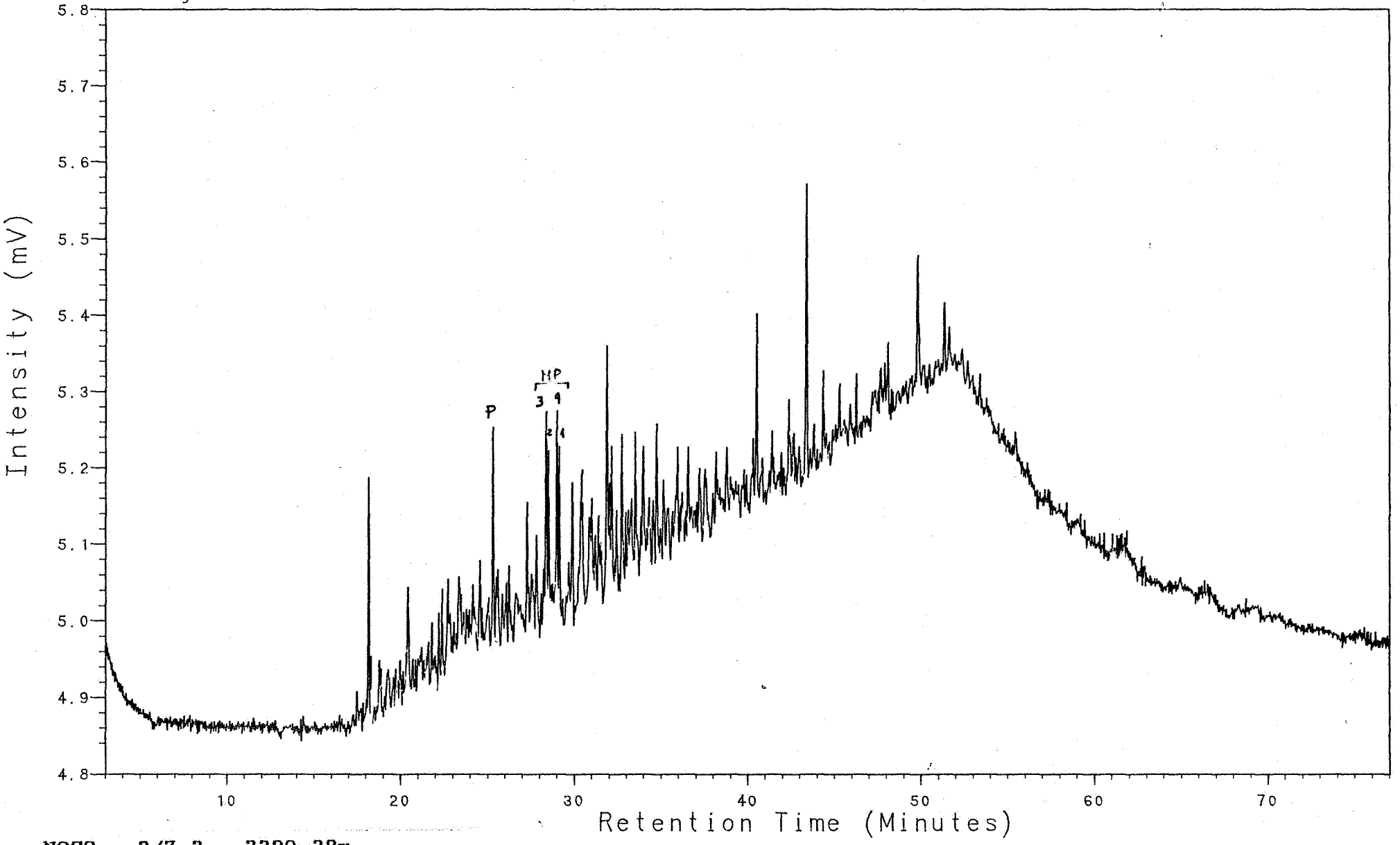
Analysis AC072220B 8, 1, 1 3/7-3, 3338m, ARO



NOCS 3/7-3 3320-38m
AROMATIC GC (FID)
CLST:gn gy,m brn

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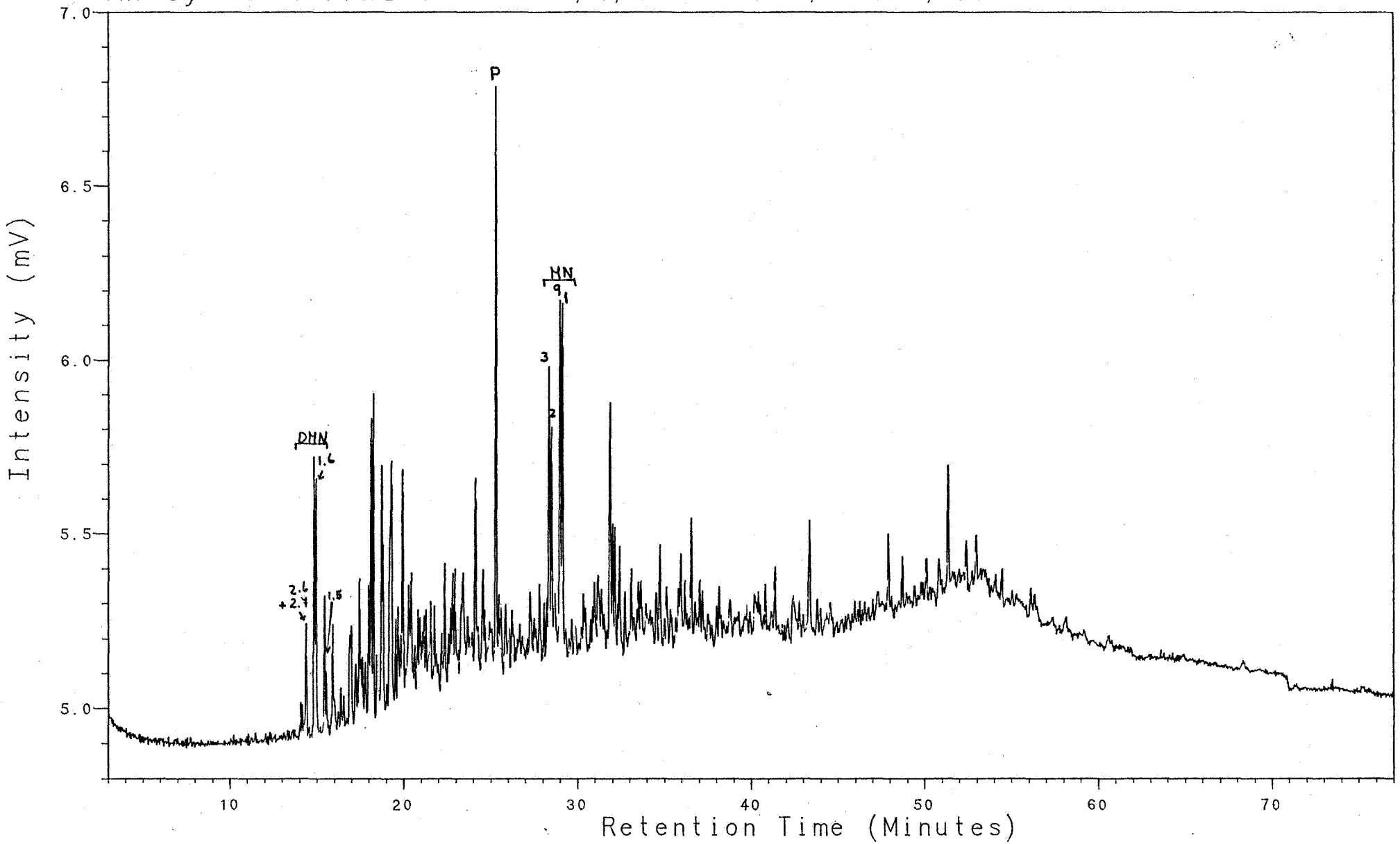
Analysis AC072230B 8, 1, 1 3/7-3, 3446m, ARO



NOCS 3/7-3 3434-46m
AROMATIC GC (FID)
CLST:gy blk,brn blk

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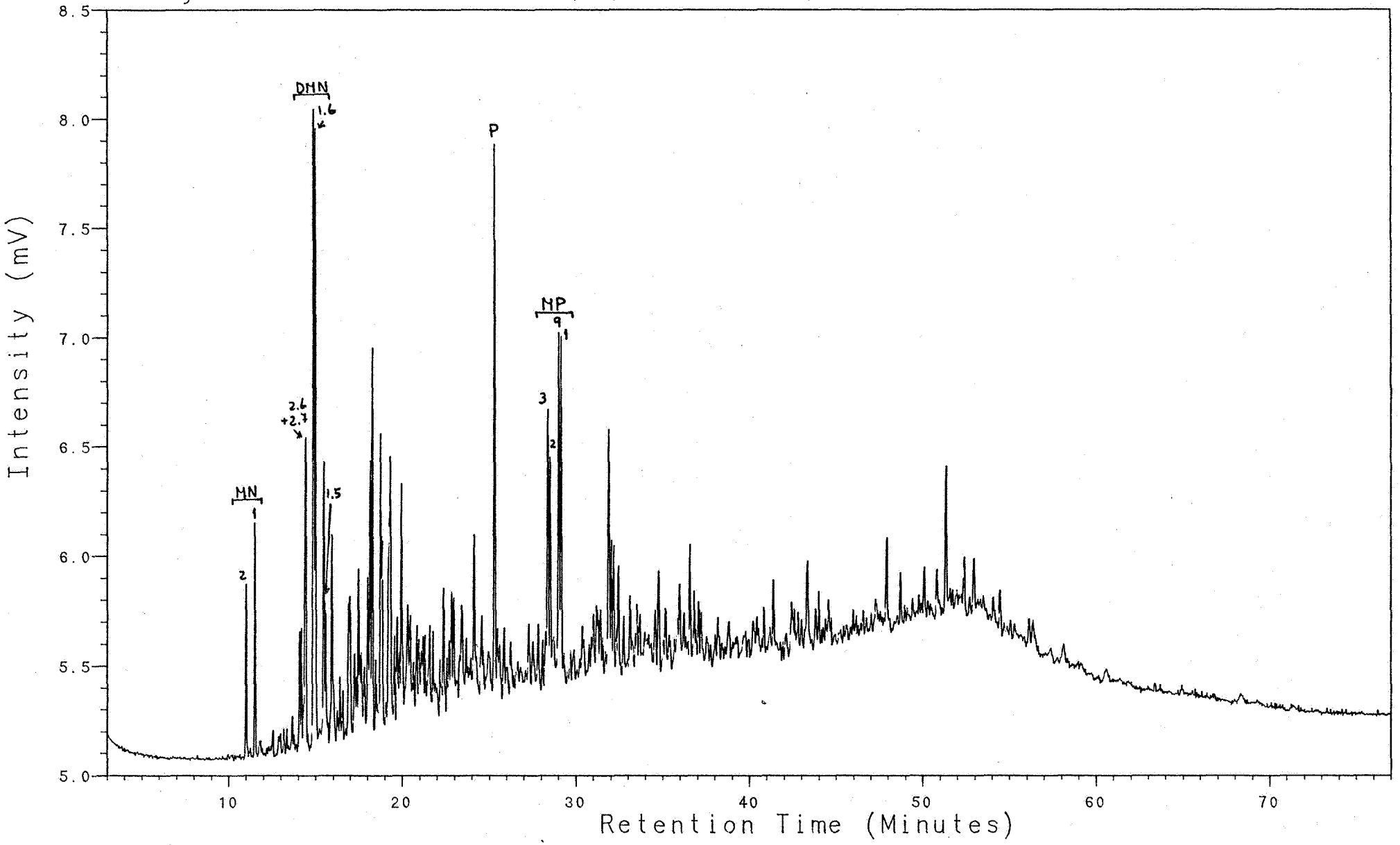
Analysis AC072240B 8, 1, 1 3/7-3, 3460m, ARO



NOCS 3/7-3 3450-60m
AROMATIC GC (FID)
CLST:gy blk,brn blk

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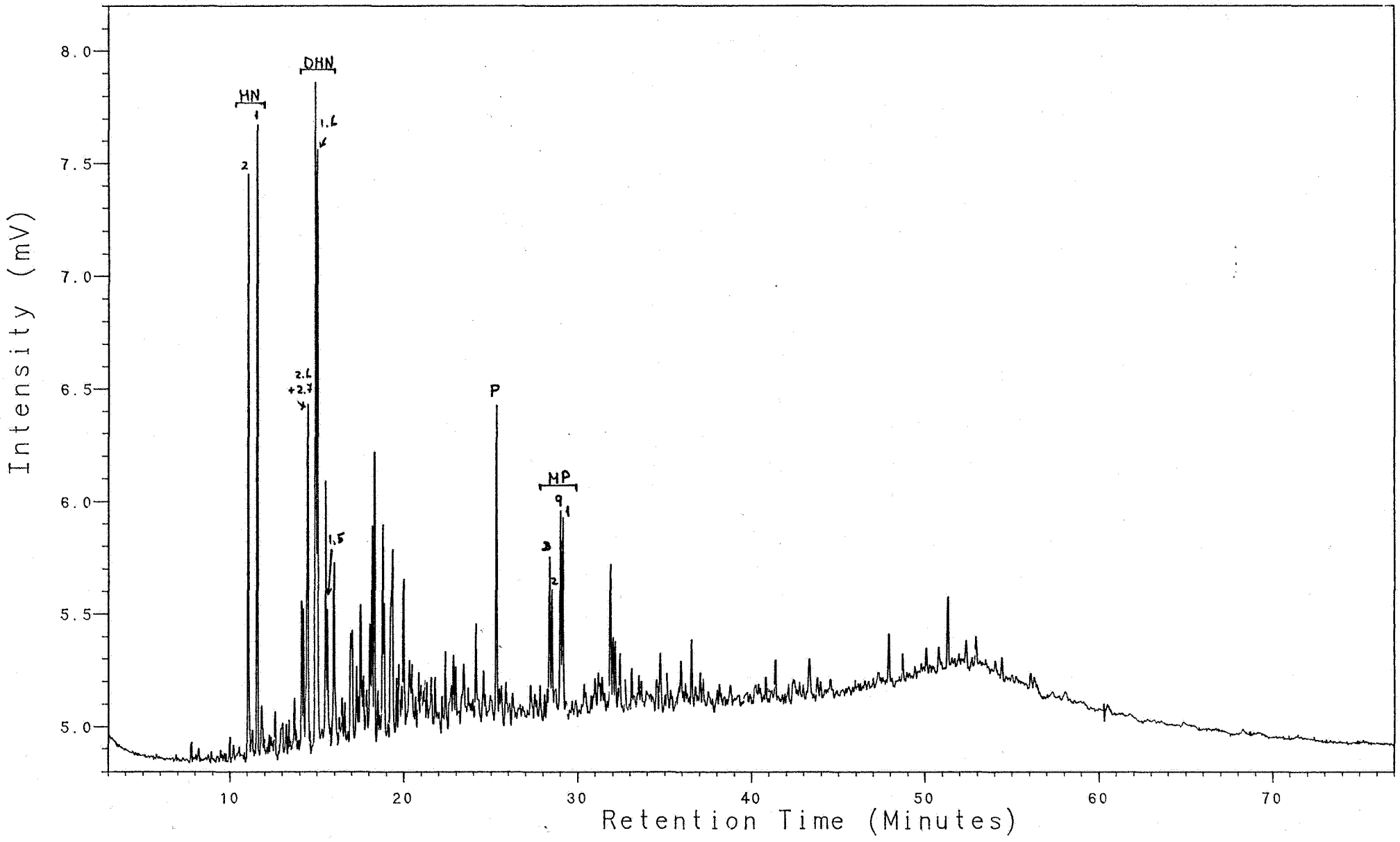
Analysis AC072250B 8, 1, 1 3/7-7, 3484m, ARO



NOCS 3/7-3 3466-84m
AROMATIC GC (FID)
CLST:gy blk

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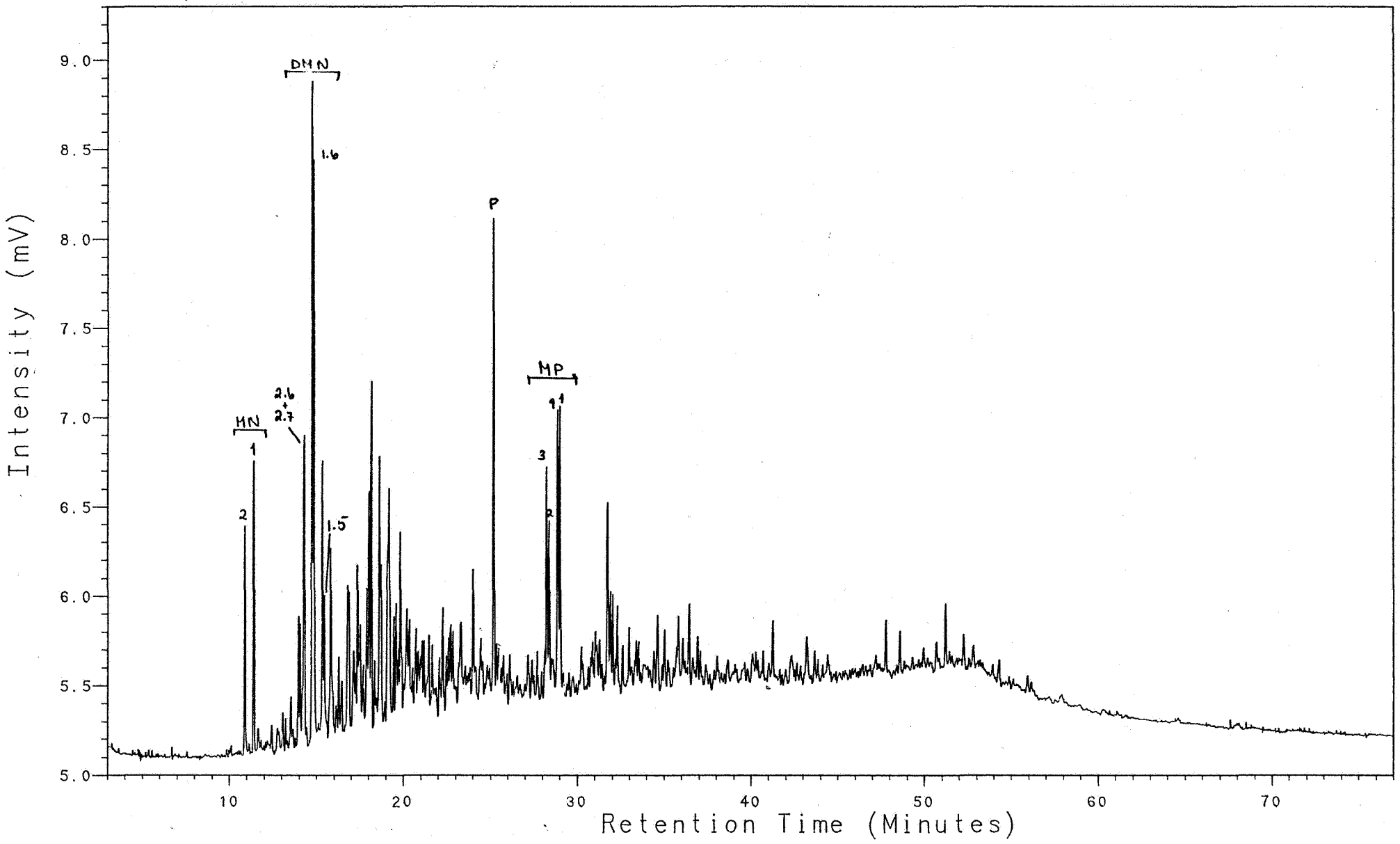
Analysis AC072260B 8, 1, 1 3/7-3, 3496m, ARO



NOCS 3/7-3 3490-96m
AROMATIC GC (FID)
CLST:gy blk,brn blk

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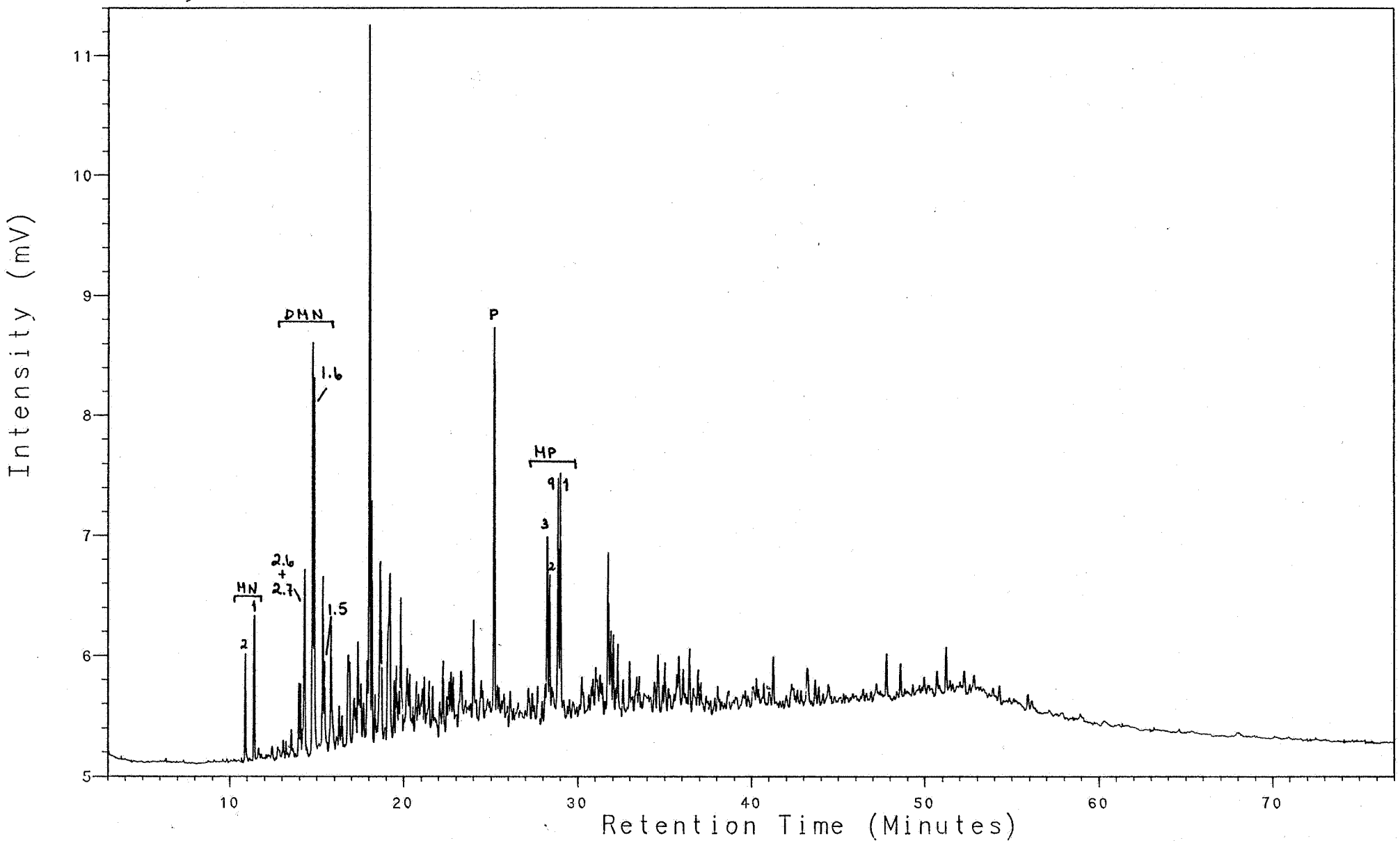
Analysis AC072270B 8, 1, 1 3/7-3, 3508m, ARO



NOCS 3/7-3 3502-08m
AROMATIC GC (FID)
CLST:gy blk,brn blk

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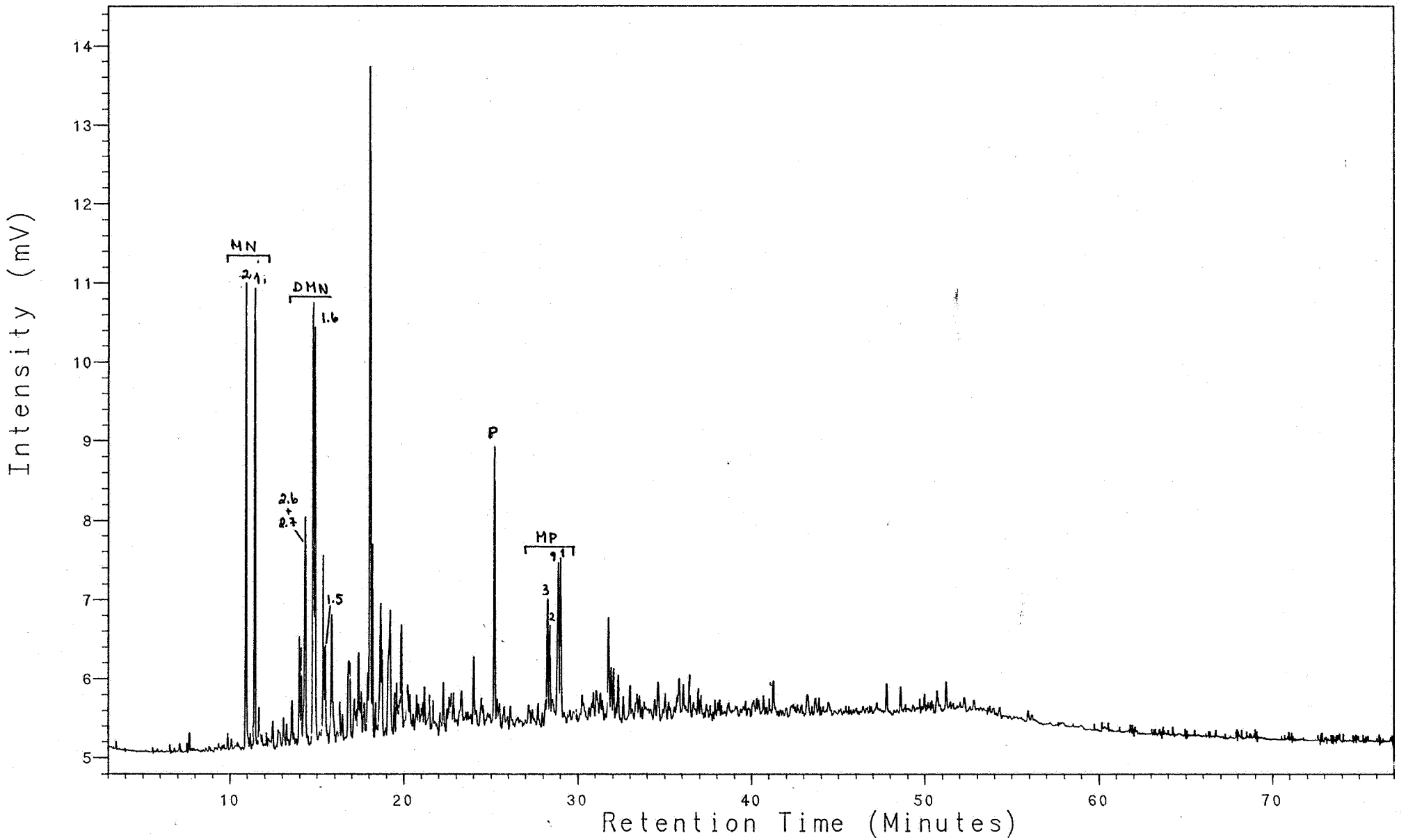
Analysis AC072280B 8, 1, 1 3/7-3, 3518m, ARO



NOCS 3/7-3 3514-18m
AROMATIC GC (FID)
CLST:gy blk,brn blk

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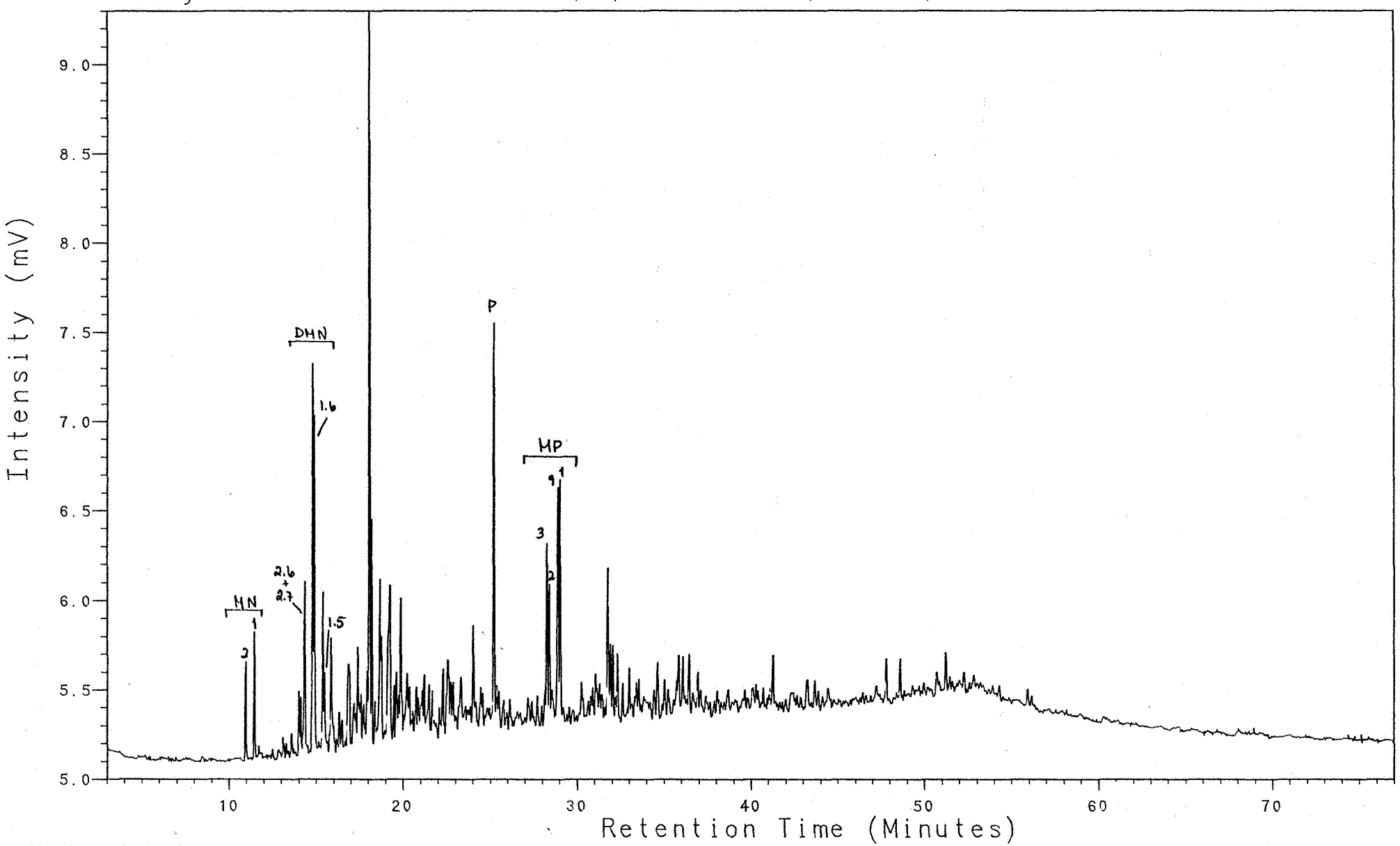
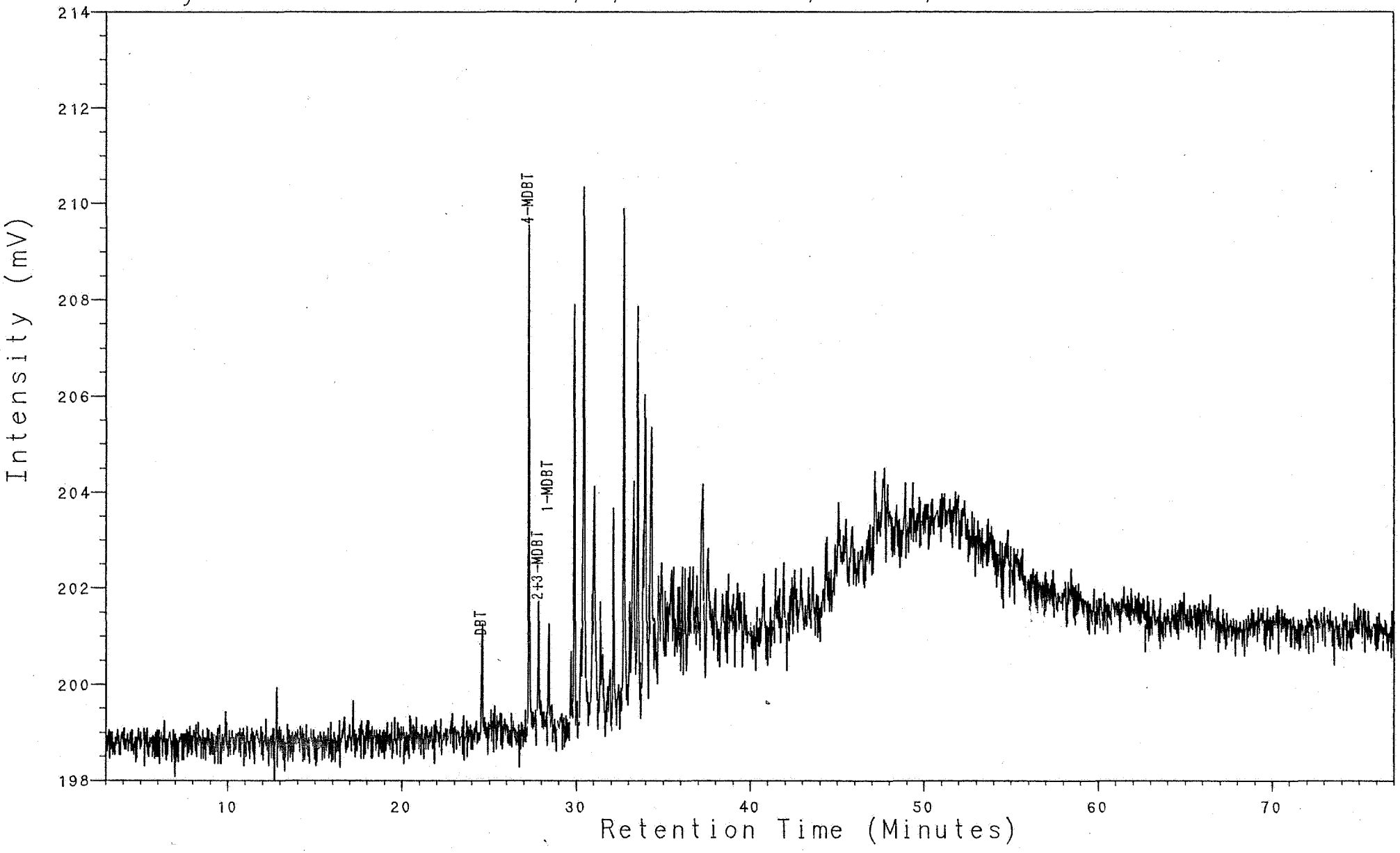
Analysis AC071462L 8, 1, 1 3/7-3, 3522m, ARO



NOCS 3/7-3 3522m
AROMATIC GC (FID)
CLST:gy blk,brn blk

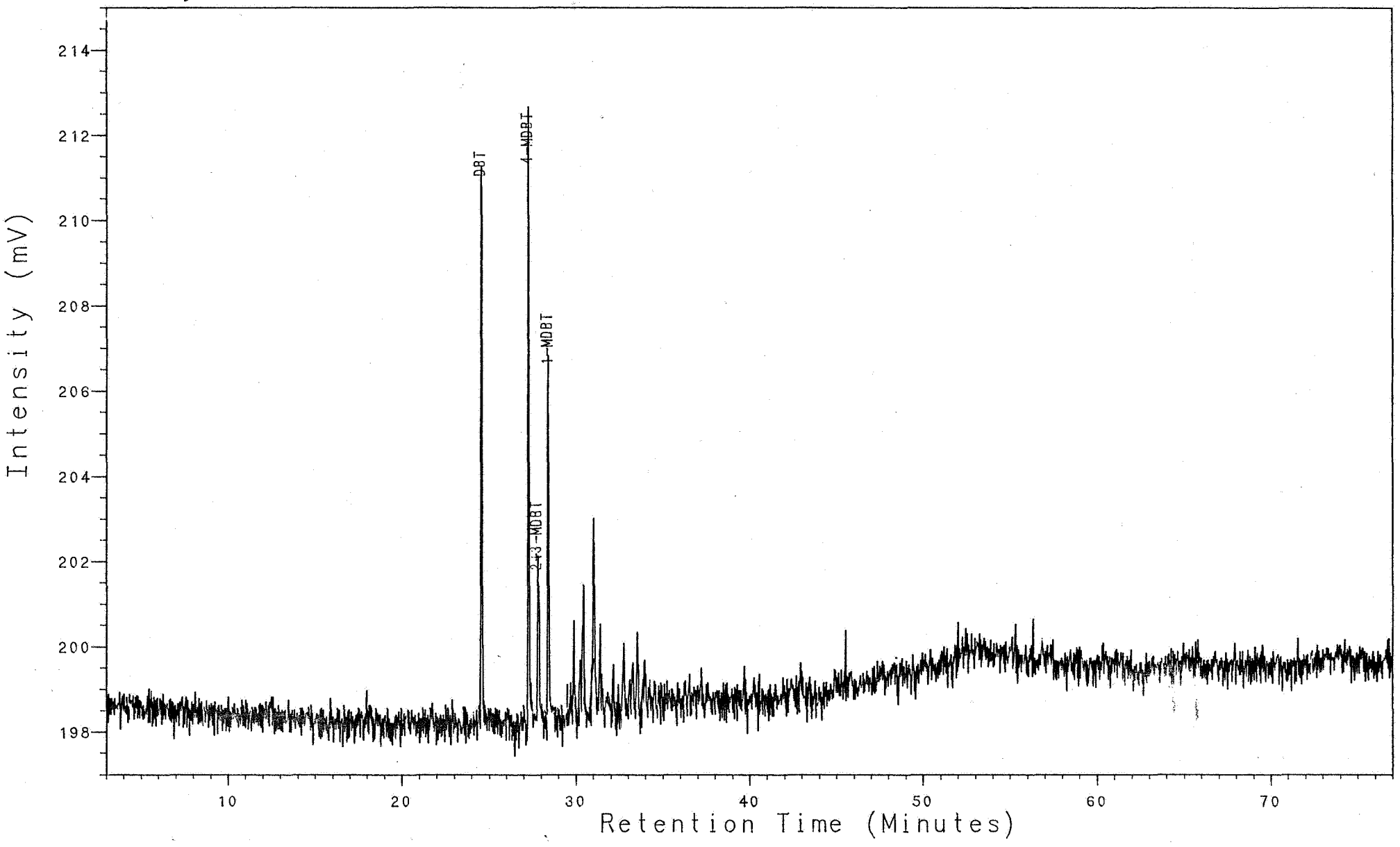
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3320-38m
AROMATIC GC (FPD)
CLST:gn gy,m brn

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

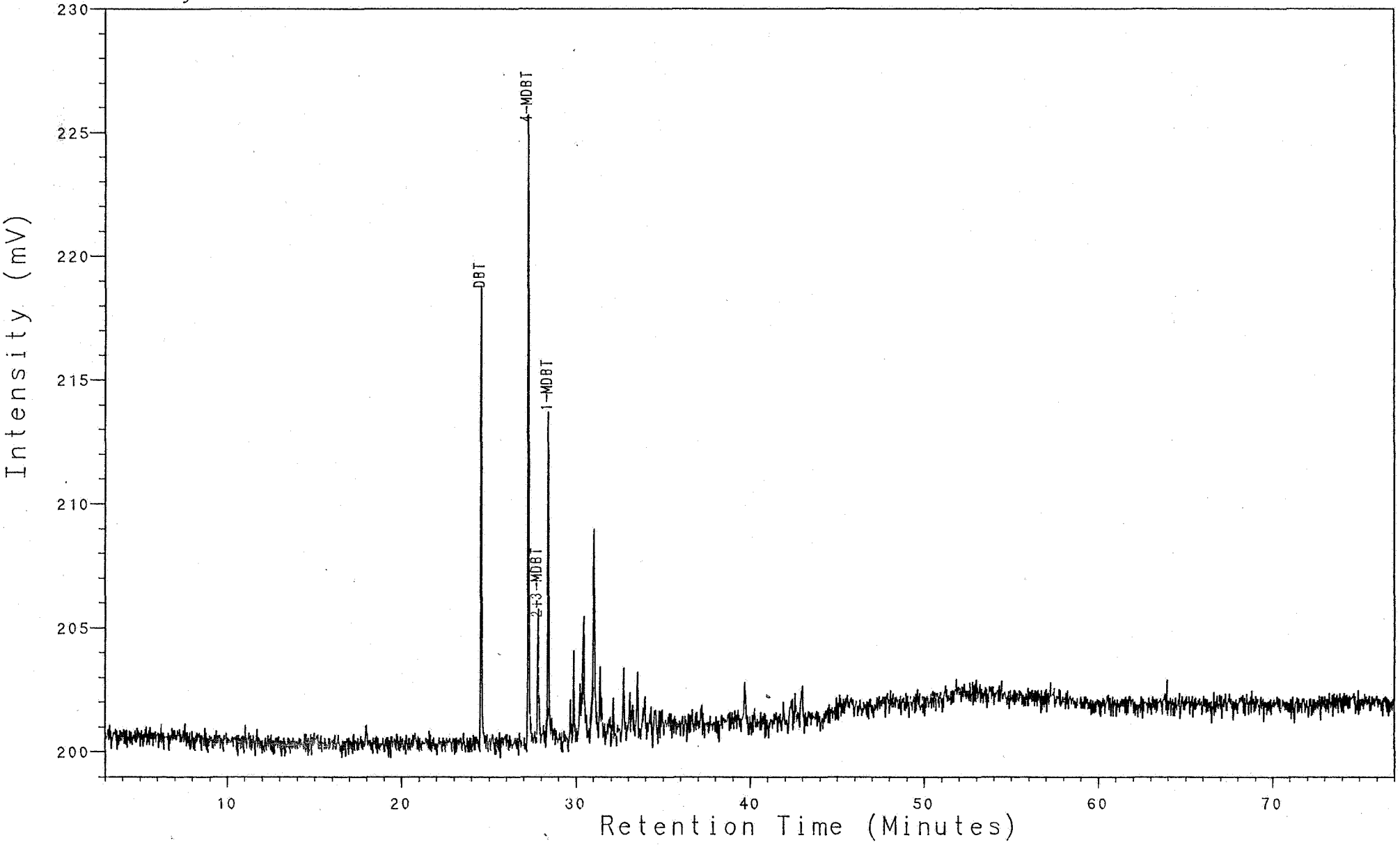
Analysis AC072230B 9, 1, 1 3/7-3, 3446m, ARO



NOCS 3/7-3 3434-46m
AROMATIC GC (FPD)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

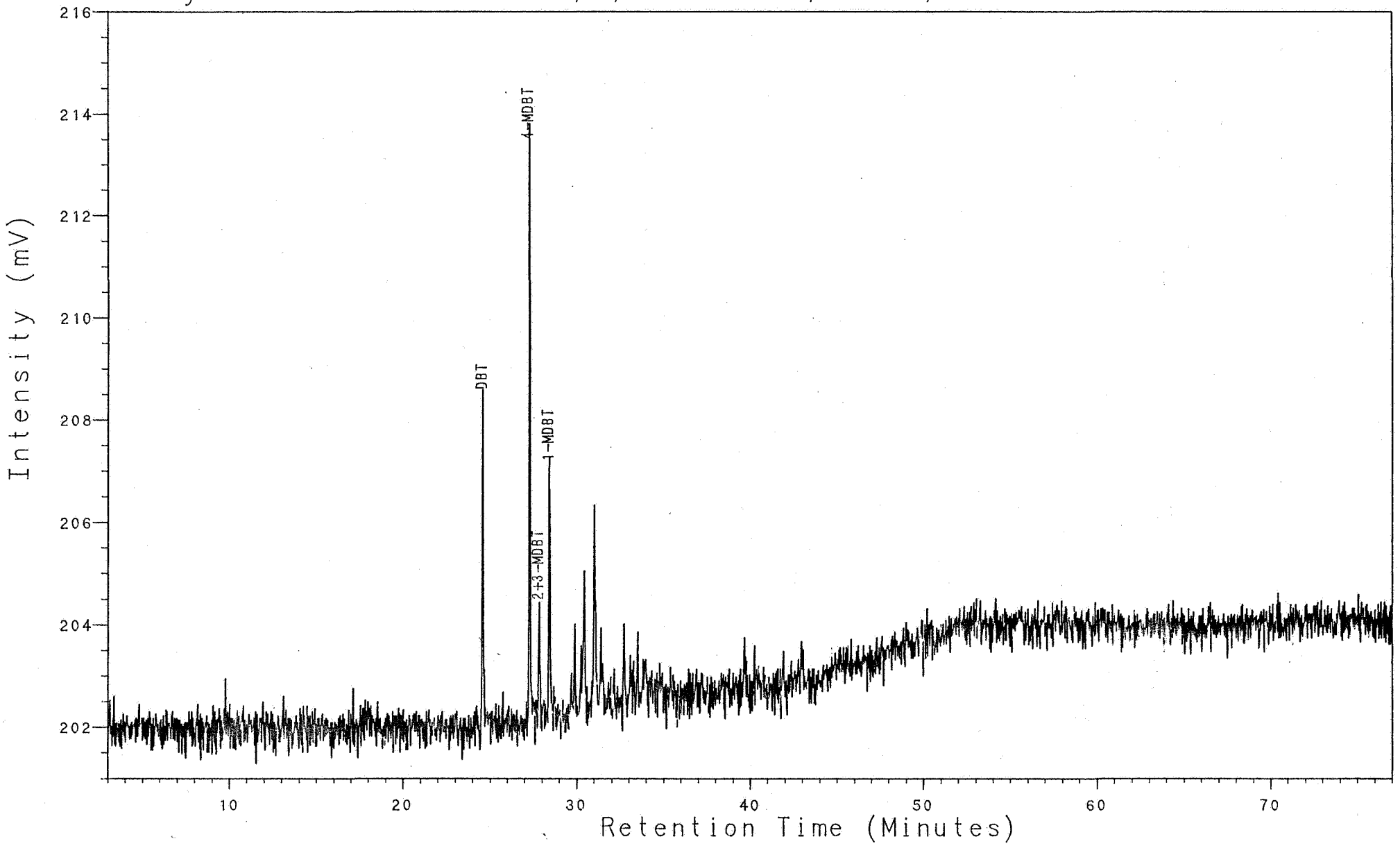
Analysis AC072240B 9, 1, 1 3/7-3, 3460m, ARO



NOCS 3/7-3 3450-60m
AROMATIC GC (FPD)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

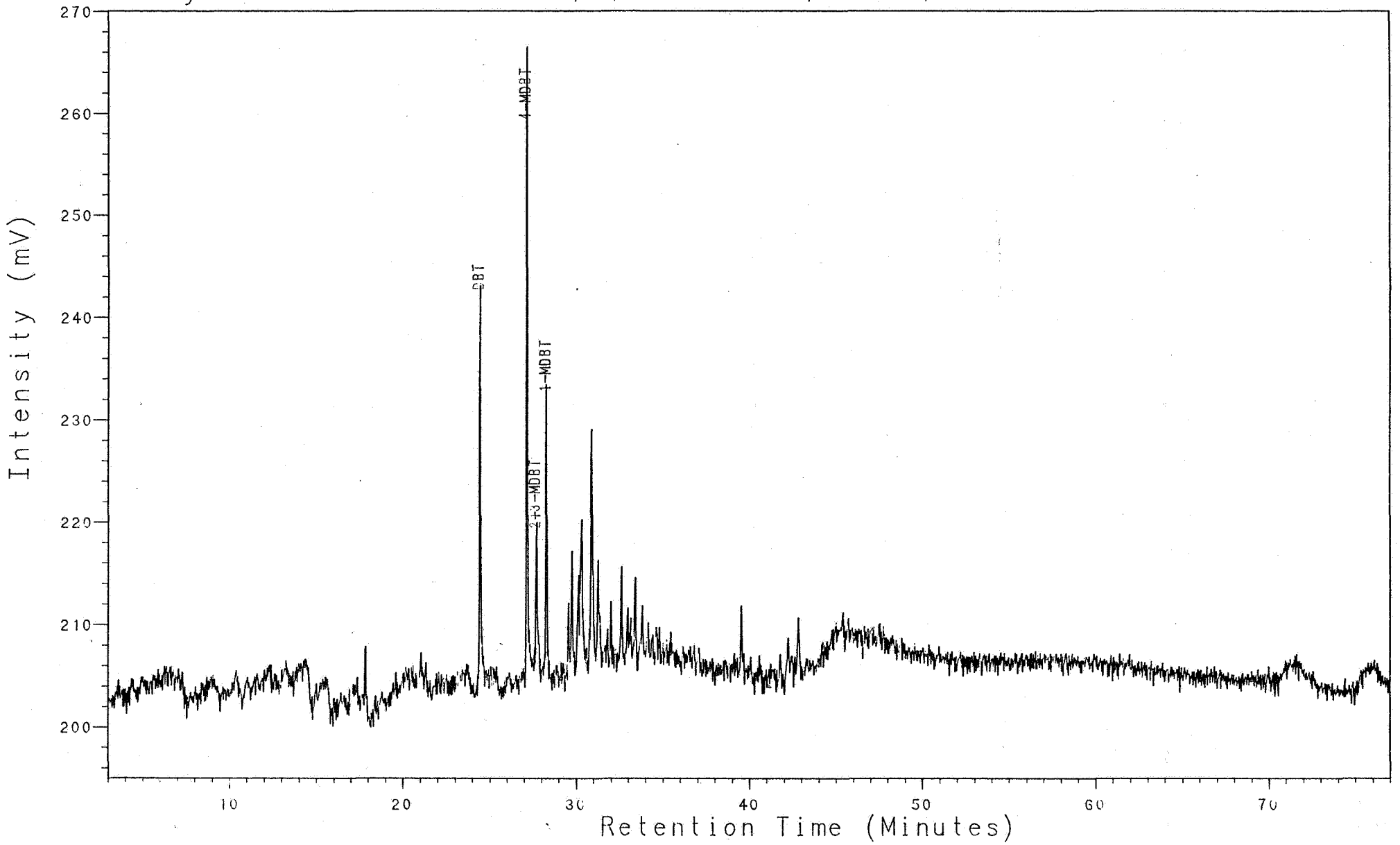
Analysis AC072250B 9, 1, 1 3/7-7, 3484m, ARO



NOCS 3/7-3 3466-84m
AROMATIC GC (FPD)
CLST:gy blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

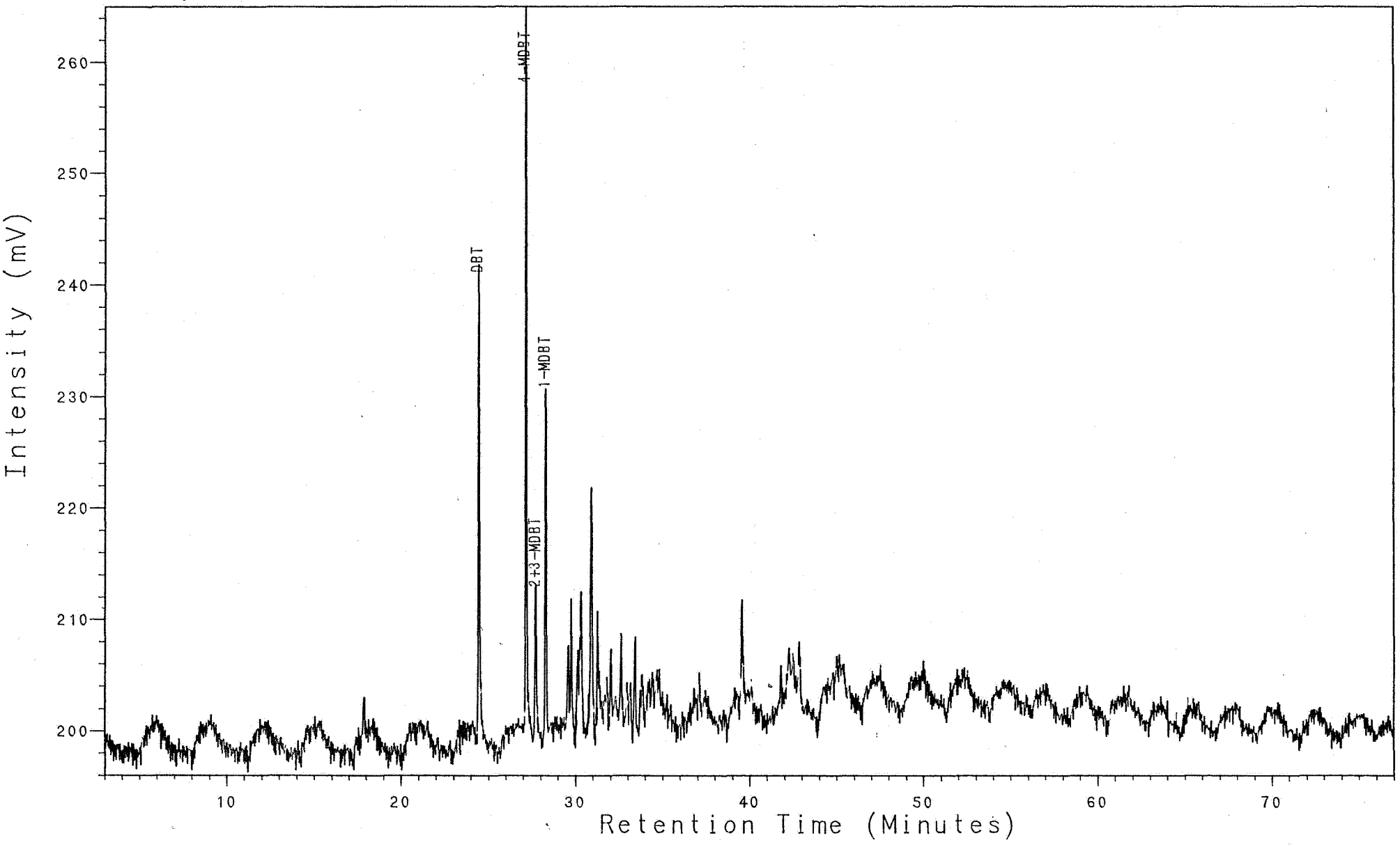
Analysis AC072260B 9, 1, 1 3/7-3, 3496m, ARO



NOCS 3/7-3 3490-96m
AROMATIC GC (FPD)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

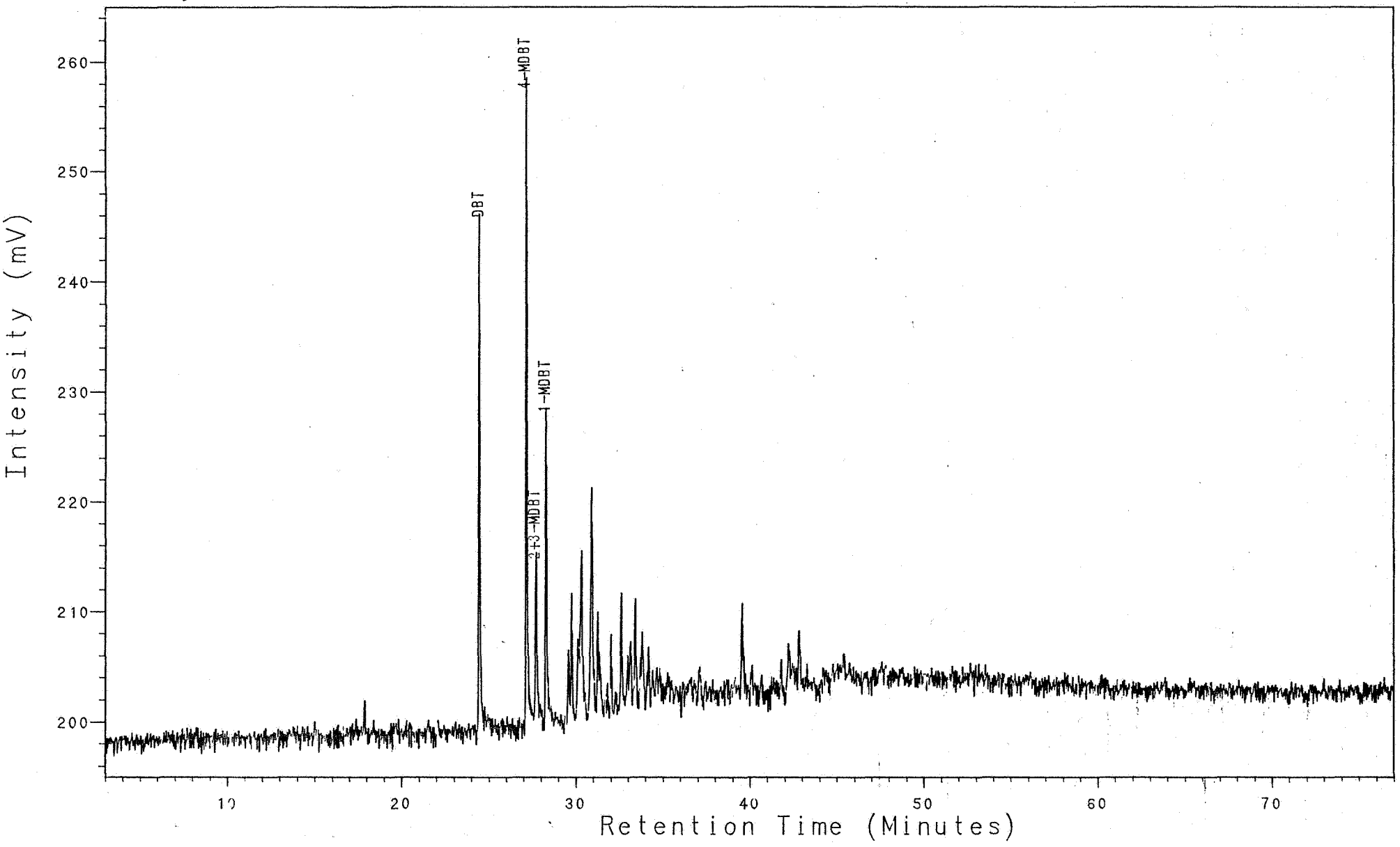
Analysis AC072270B 9, 1, 1 3/7-3, 3508m, ARO



NOCS 3/7-3 3502-08m
AROMATIC GC (FPD)
CLST:gy blk,brn blk

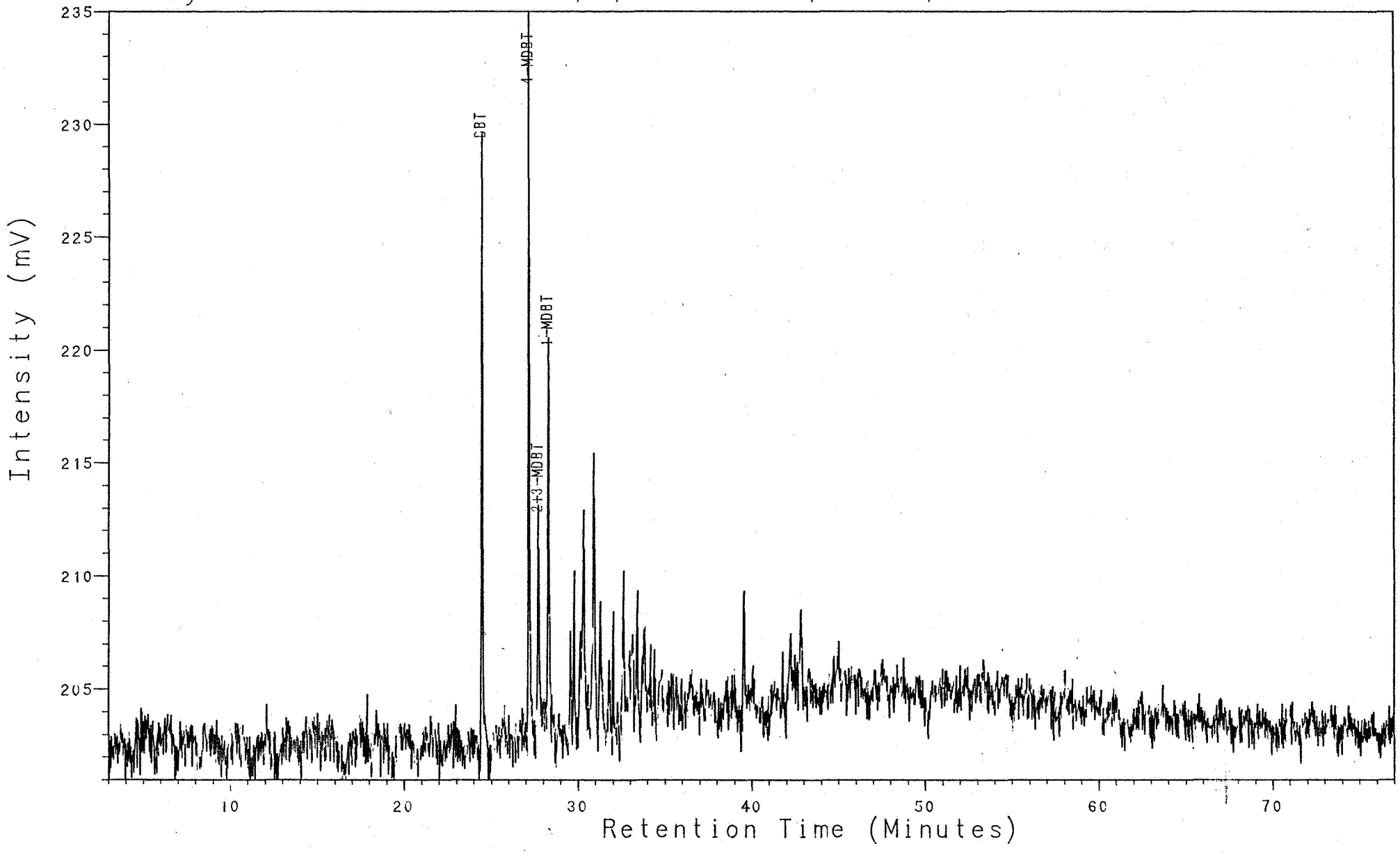
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis AC072280B 9, 1, 1 3/7-3, 3518m, ARO



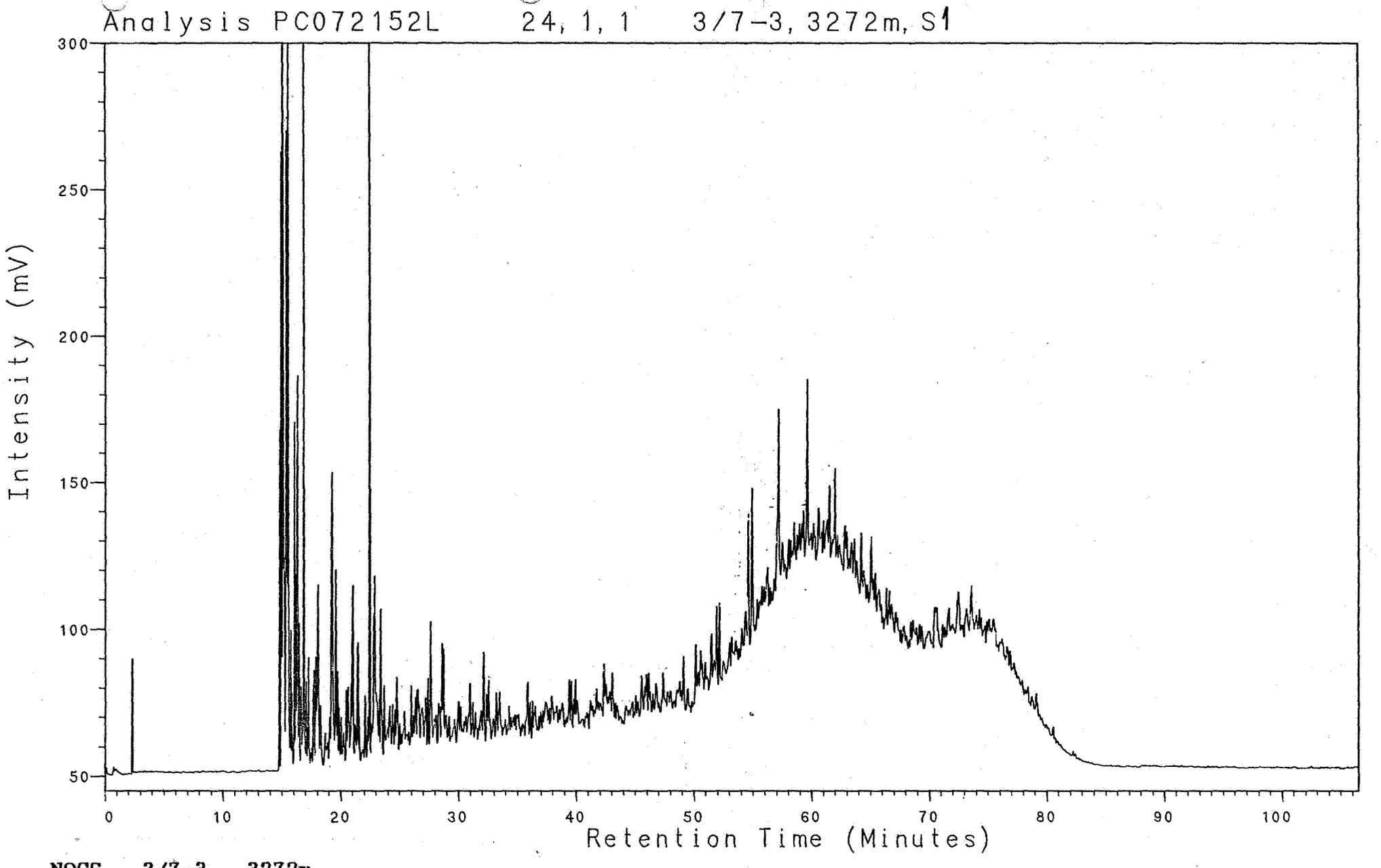
NOCS 3/7-3 3514-18m
AROMATIC GC (FPD)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



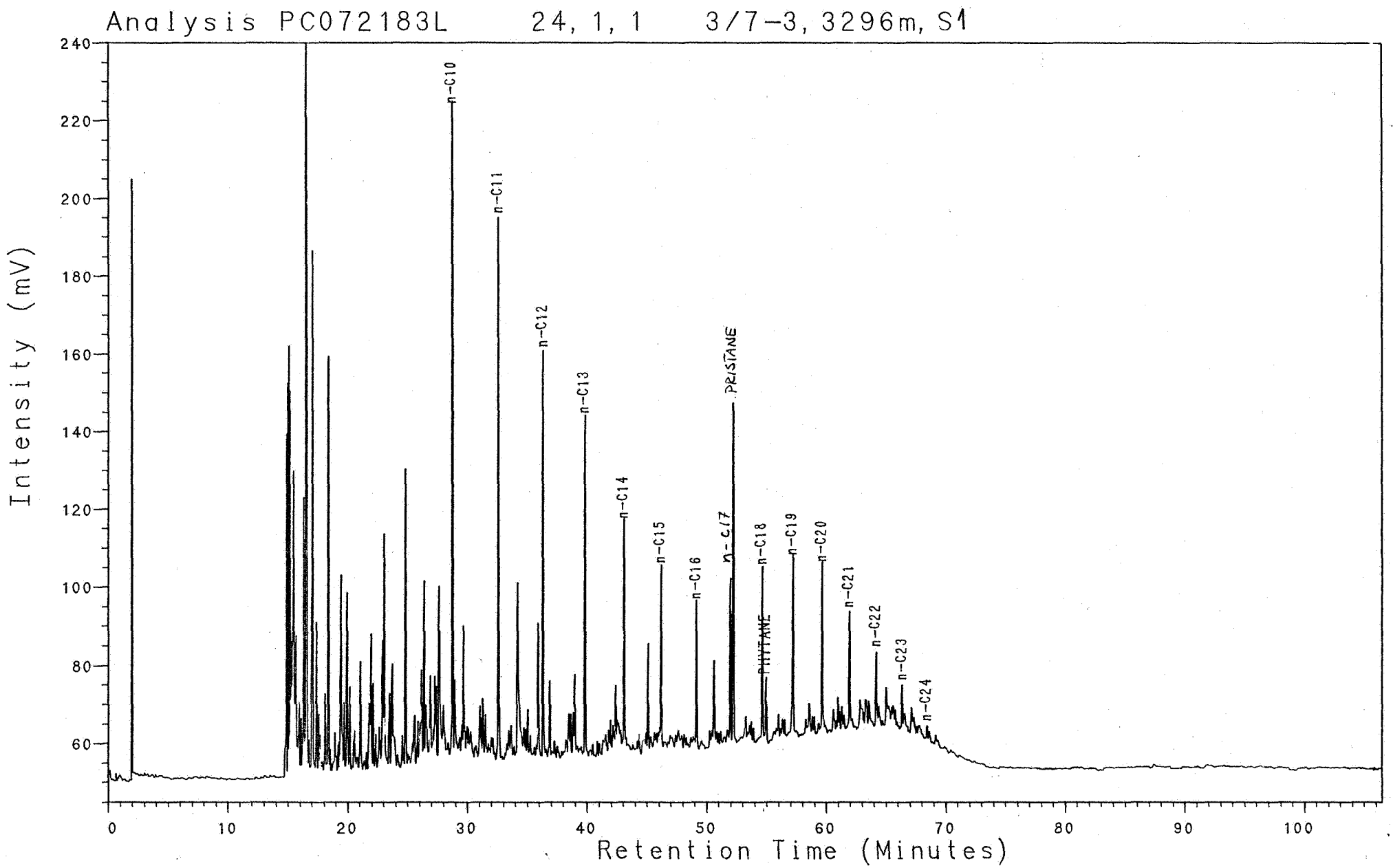
NOCS 3/7-3 3522m
AROMATIC GC (FPD)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3272m
THERMAL EXTRACTION GC (S1)
CLST:gn gy,lt gy to drk gy

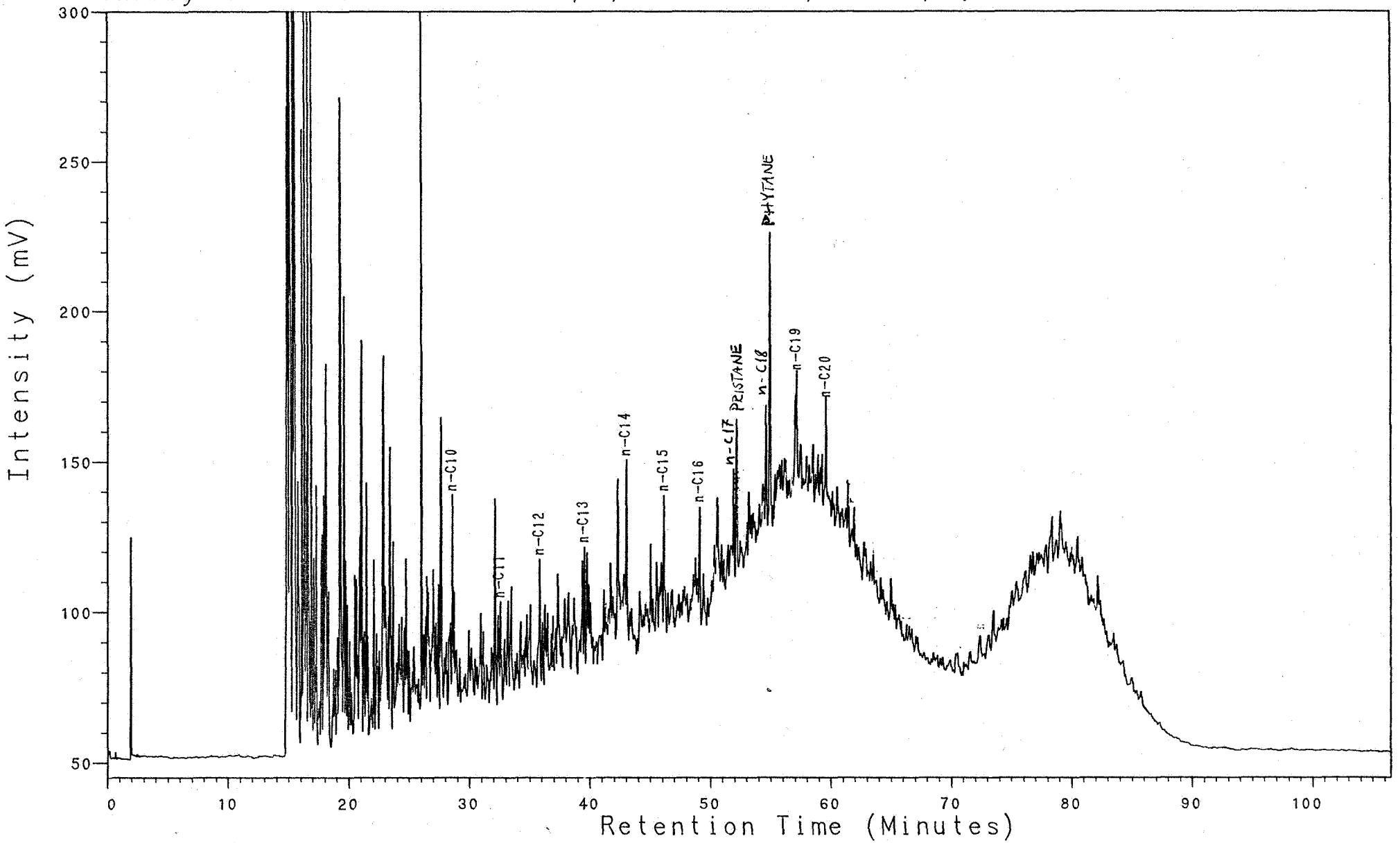
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3296m
THERMAL EXTRACTION GC (S1)
CLST:drk gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

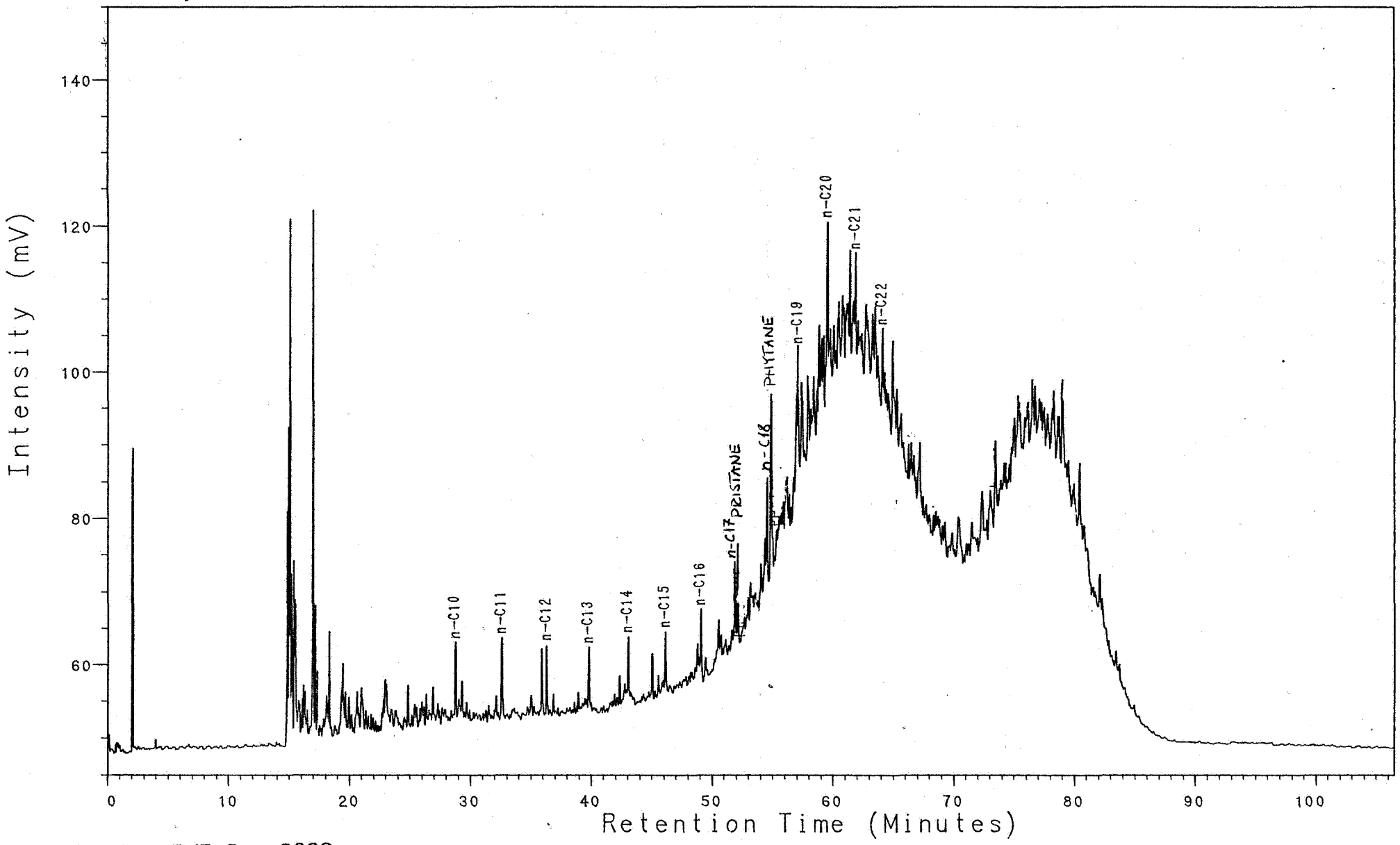
Analysis PC071052L 24, 1, 1 3/7-3, 3332m, S1



NOCS 3/7-3 3332m
THERMAL EXTRACTION GC (S1)
CLST:gn gy,m brn

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

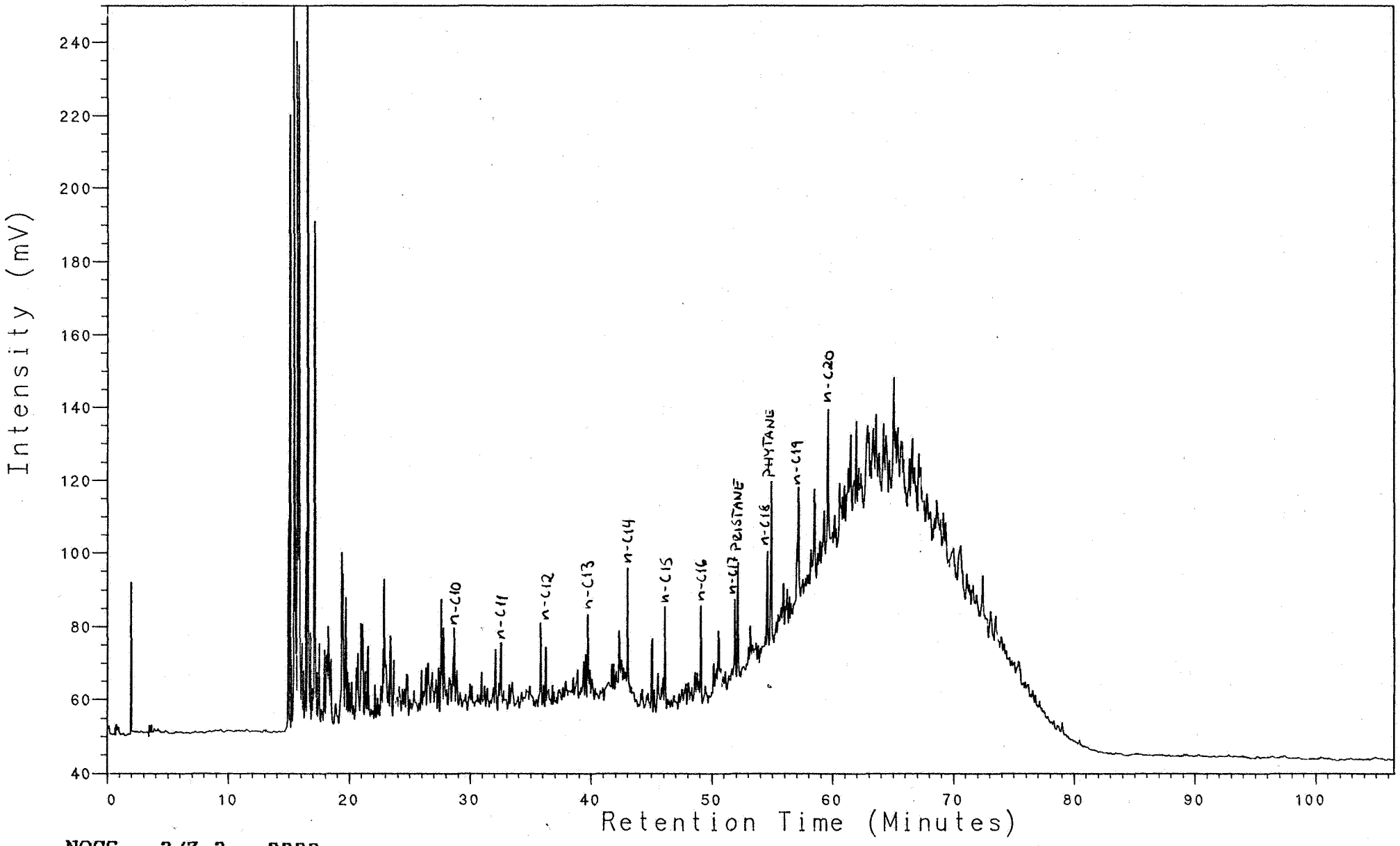
Analysis PC071053L 24, 1, 1 3/7-3, 3332m, S1



NOCS 3/7-3 3332m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,drk gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

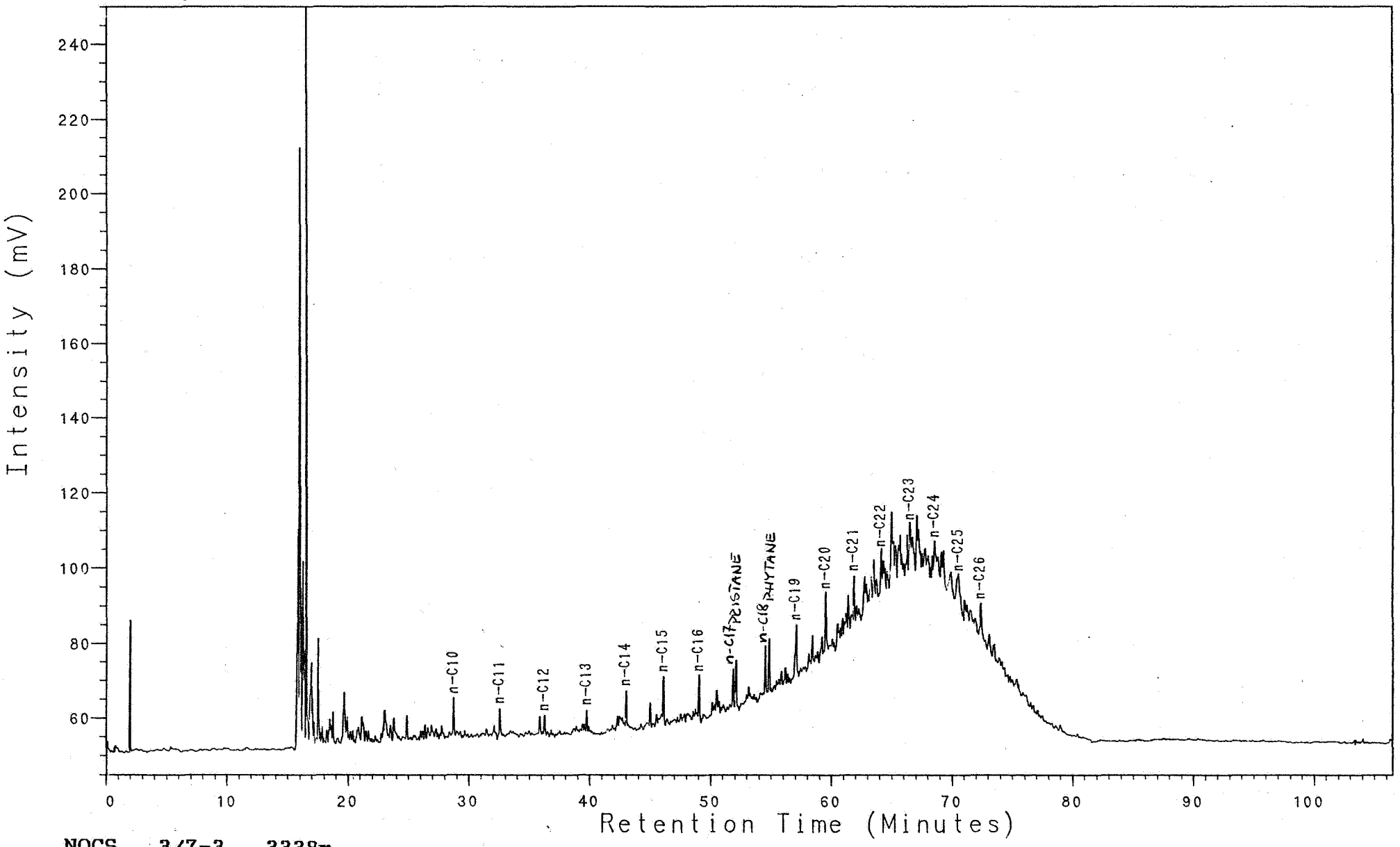
Analysis PC071062L 24, 1, 1 3/7-3, 3338m, S1



NOCS 3/7-3 3338m
THERMAL EXTRACTION GC (S1)
CLST:gn gy,m brn

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

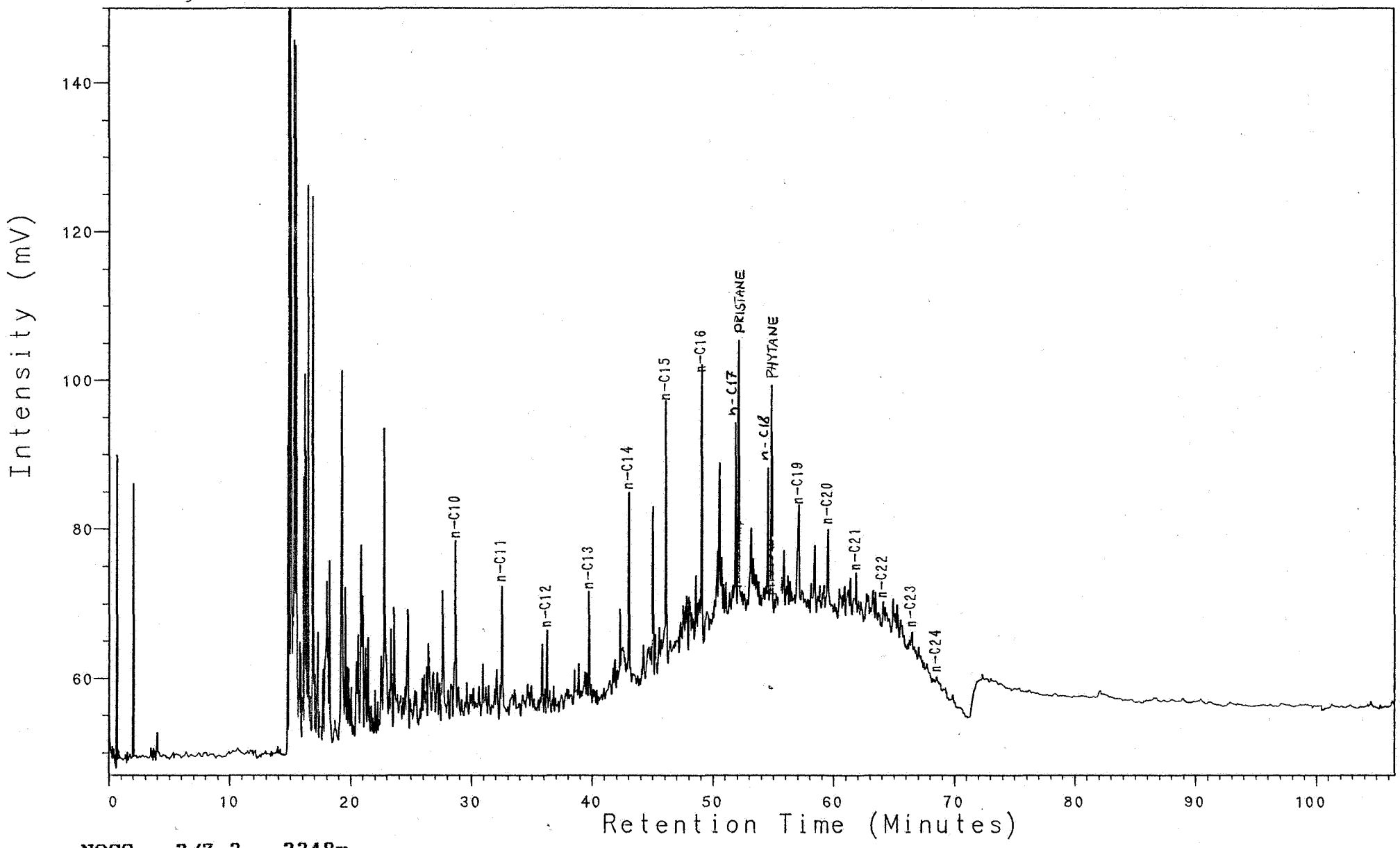
Analysis PC071063L 24, 1, 1 3/7-3, 3338m, S1



NOCS 3/7-3 3338m
THERMAL EXTRACTION GC (S1)
CLST: gy blk, drk gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

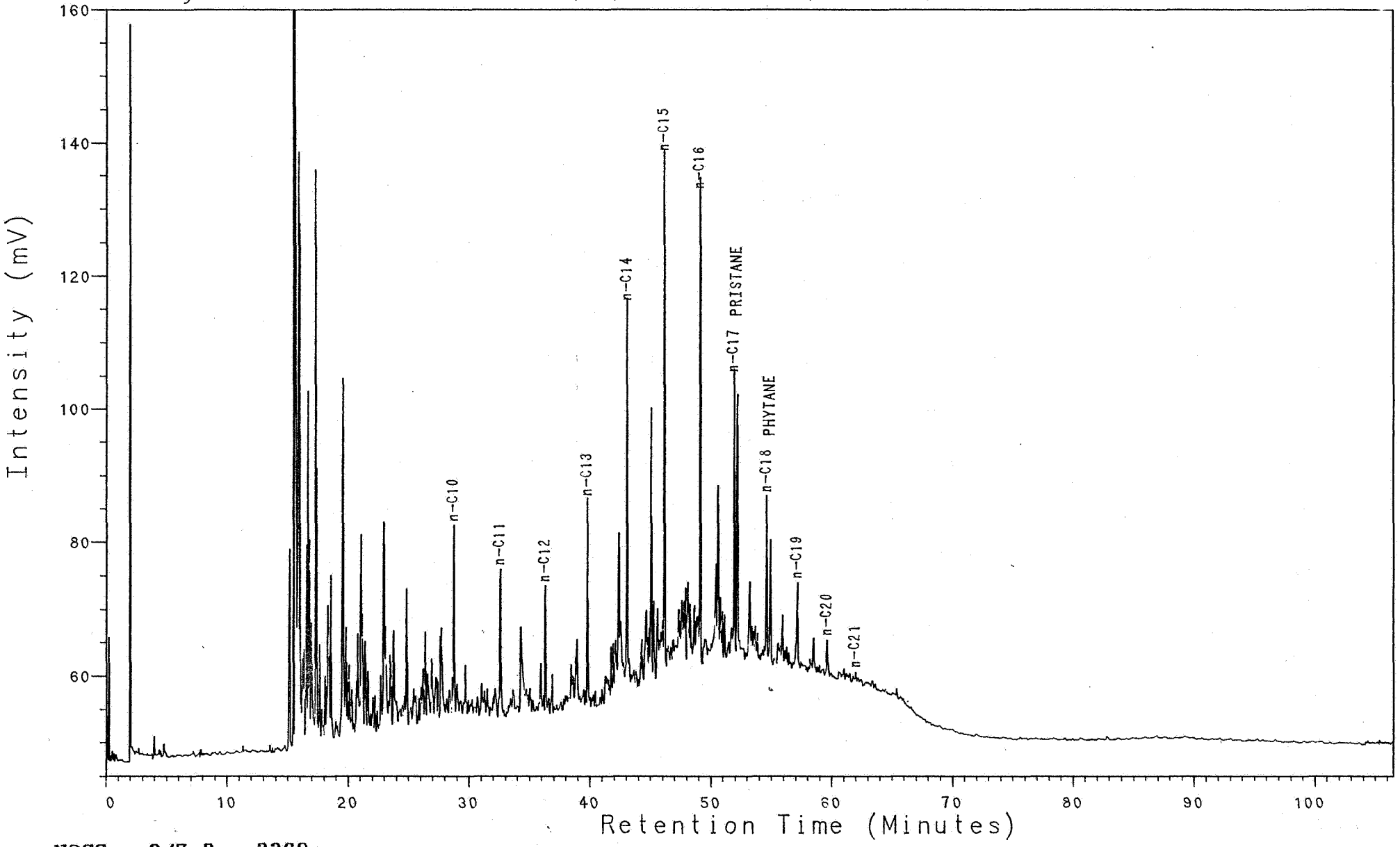
Analysis PC071072L 24, 1, 1 3/7-3, 3348m, S1



NOCS 3/7-3 3348m
THERMAL EXTRACTION GC (S1)
CLST:gn gy

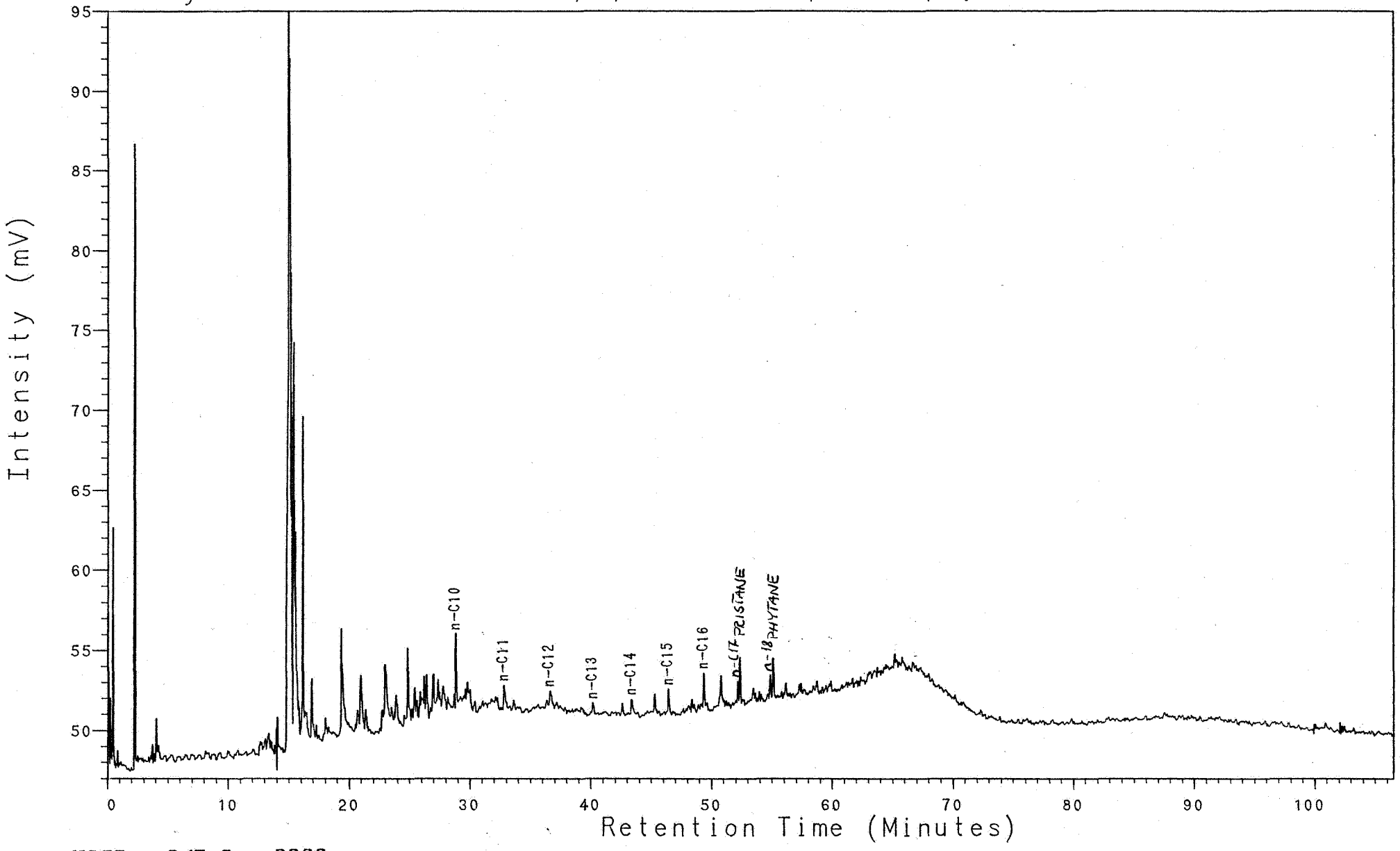
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis PC071092L 24, 1, 1 3/7-3, 3362m, S1



NOCS 3/7-3 3362m
THERMAL EXTRACTION GC (S1)
CLST:gn gy

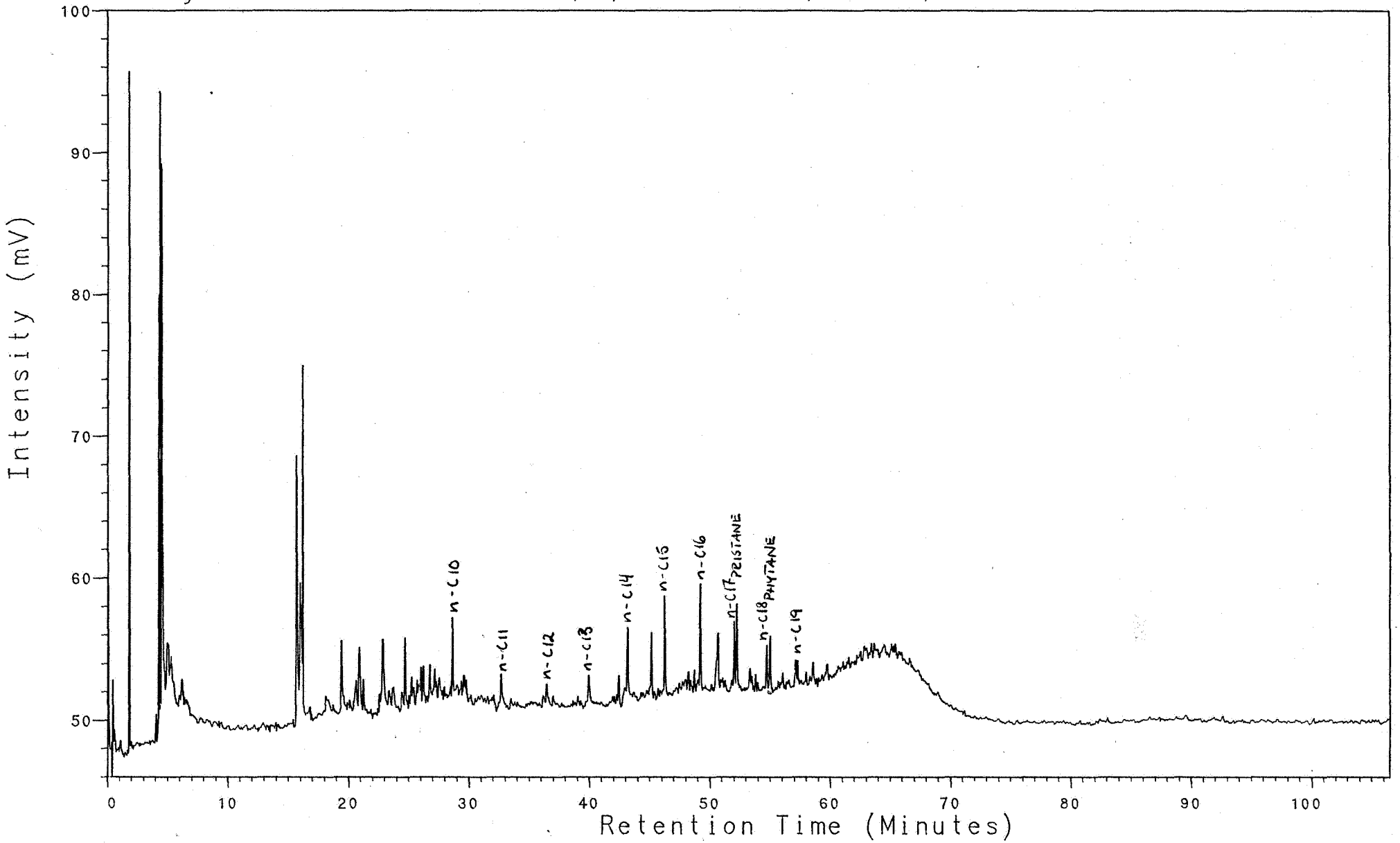
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3366m
THERMAL EXTRACTION GC (S1)
SST:w

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

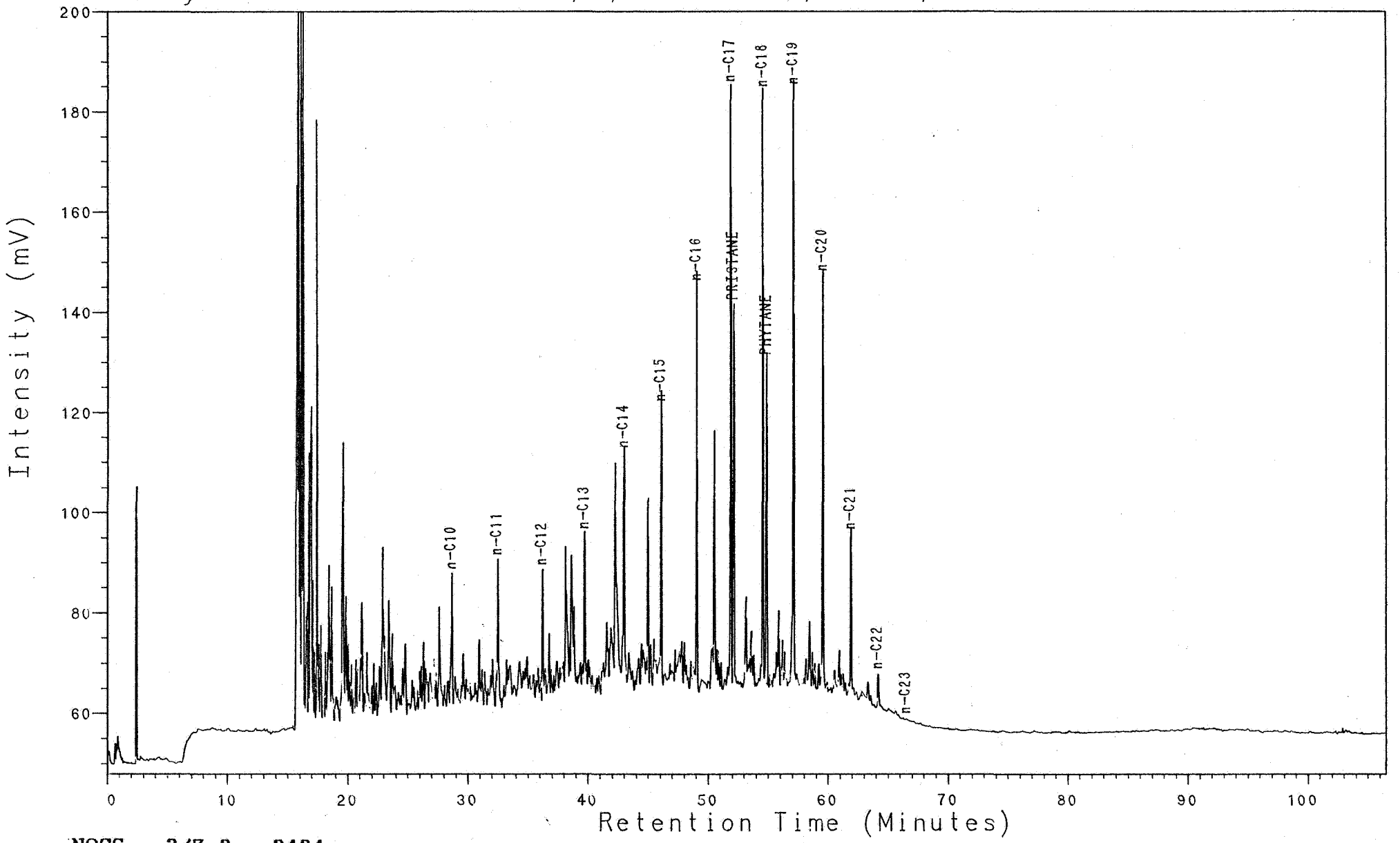
Analysis PC071161L 24, 1, 1 3/7-3, 3390m, S1



NOCS 3/7-3 3390m
THERMAL EXTRACTION GC (S1)
SST:w,gn gy,drk gn gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

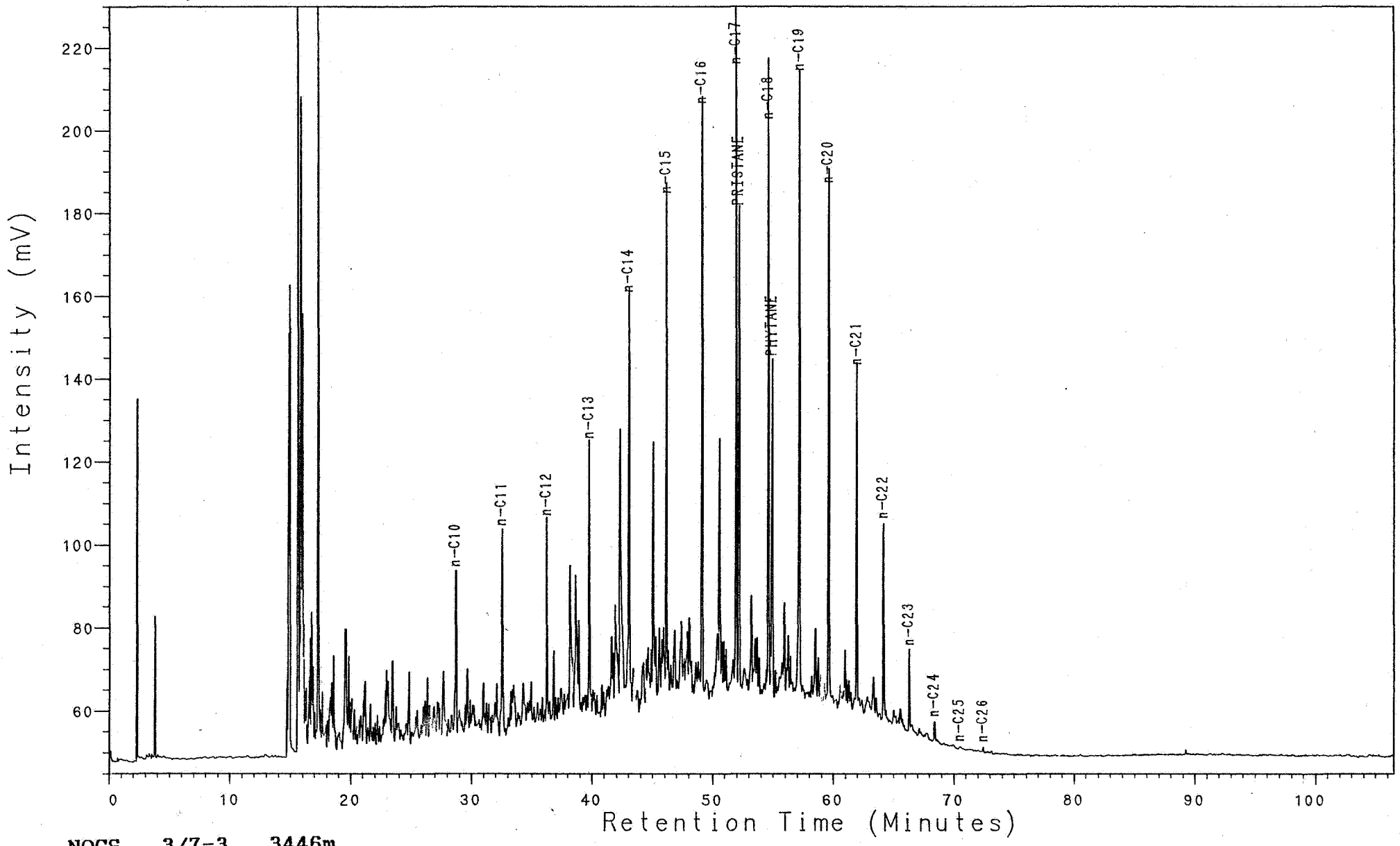
Analysis PC071292L 24, 1, 1 3/7-3, 3434m, S1



NOCS 3/7-3 3434m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

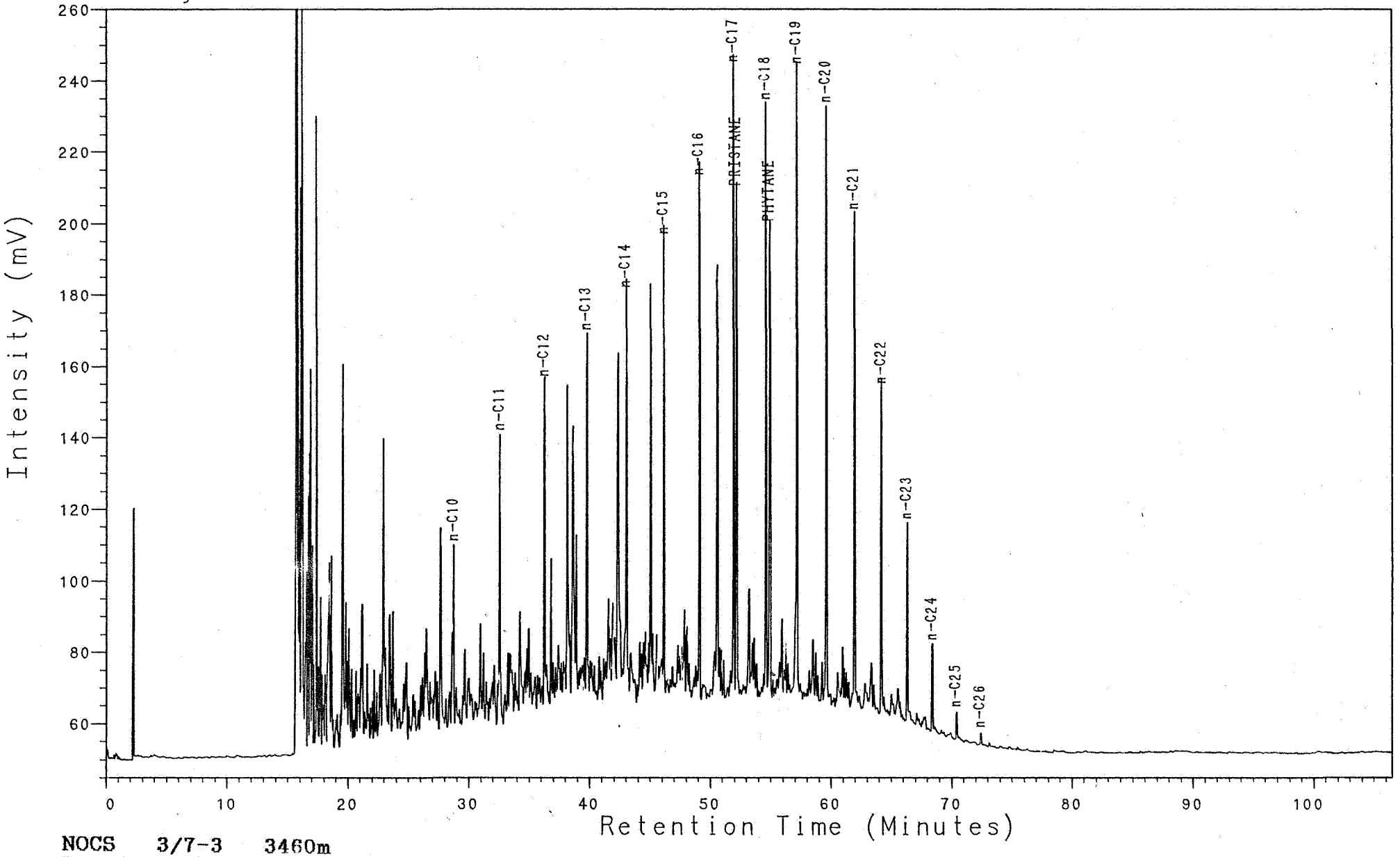
Analysis PC071321L 24, 1, 1 3/7-3, 3446m, S1



NOCS 3/7-3 3446m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

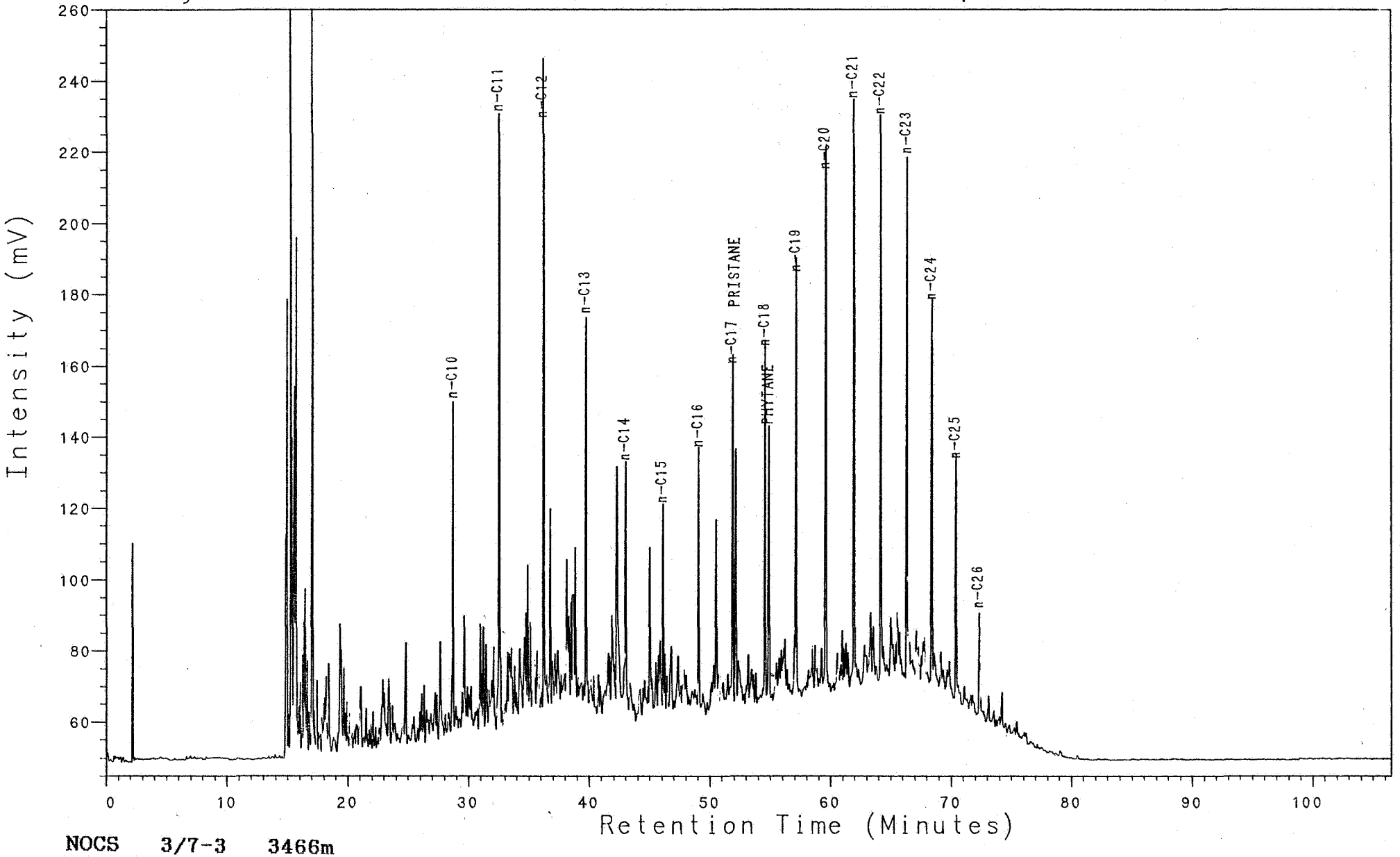
Analysis PC071351L 24, 1, 1 3/7-3, 3460m, S1



NOCS 3/7-3 3460m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

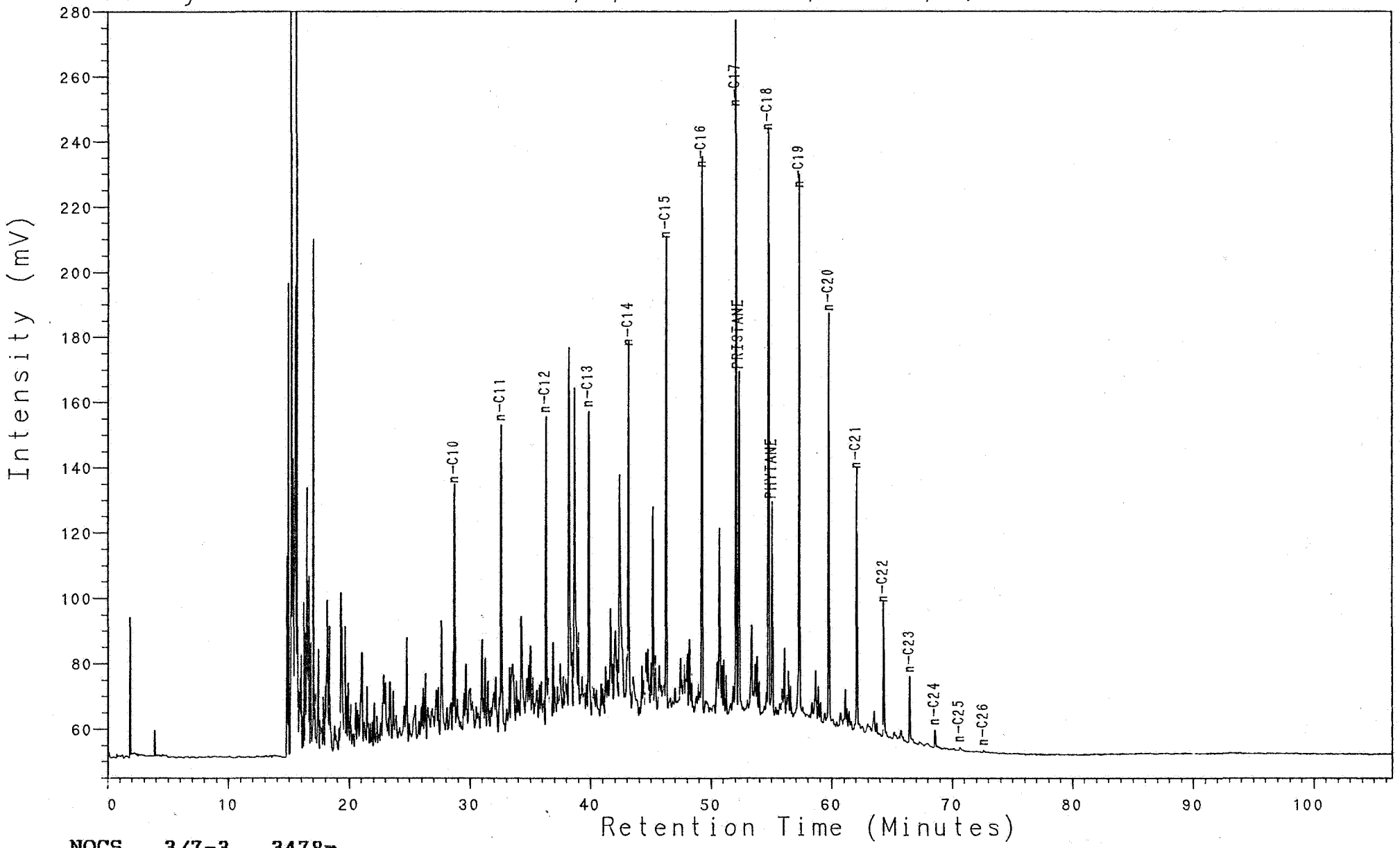
Analysis PC071361L 24, 1, 1 3/7-3, 3466m, S1



NOCS 3/7-3 3466m
THERMAL EXTRACTION GC (S1)
CLST:gy blk

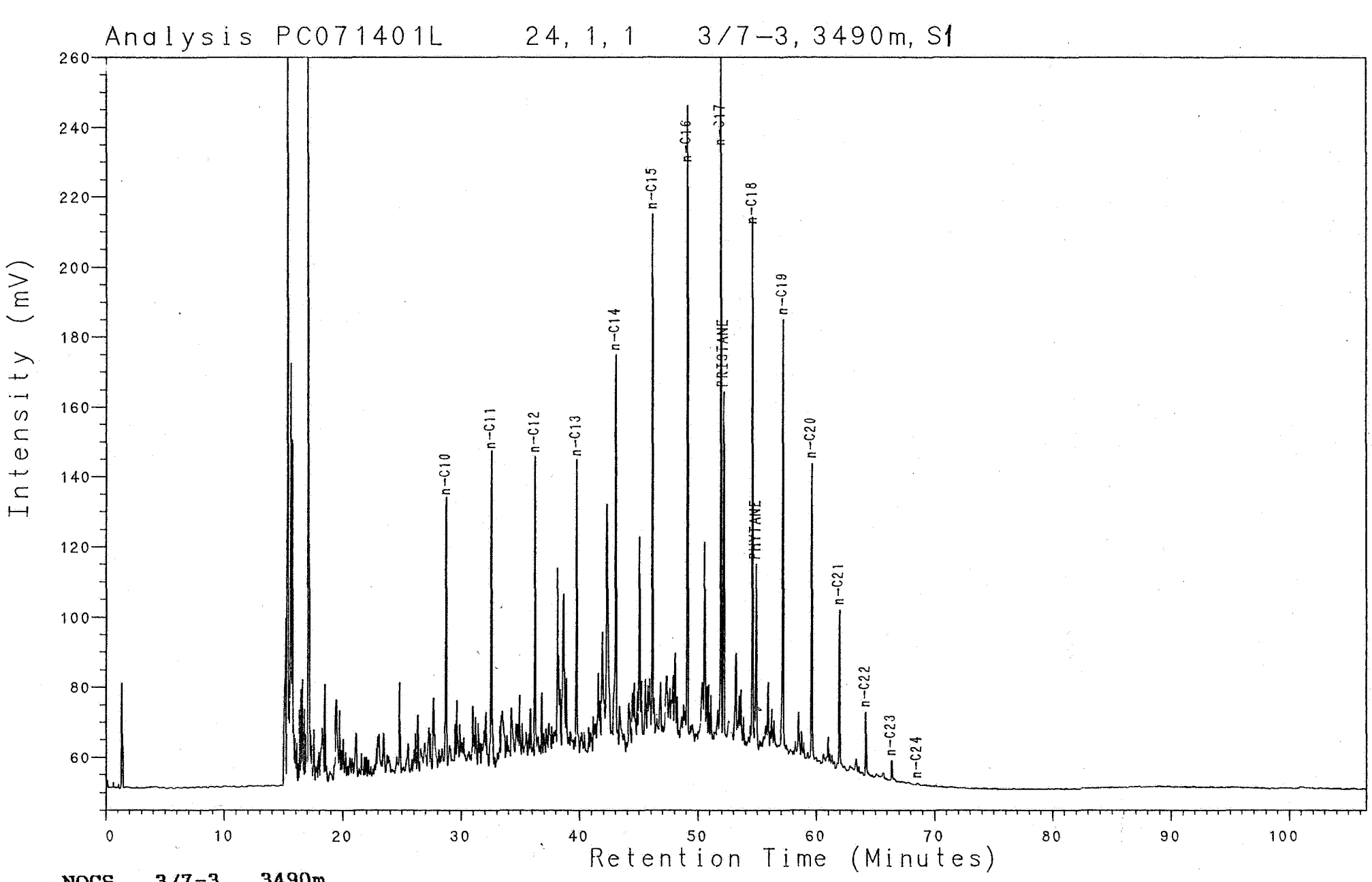
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis PC071381L 24, 1, 1 3/7-3, 3478m, S1



NOCS 3/7-3 3478m
THERMAL EXTRACTION GC (S1)
CLST:gy blk

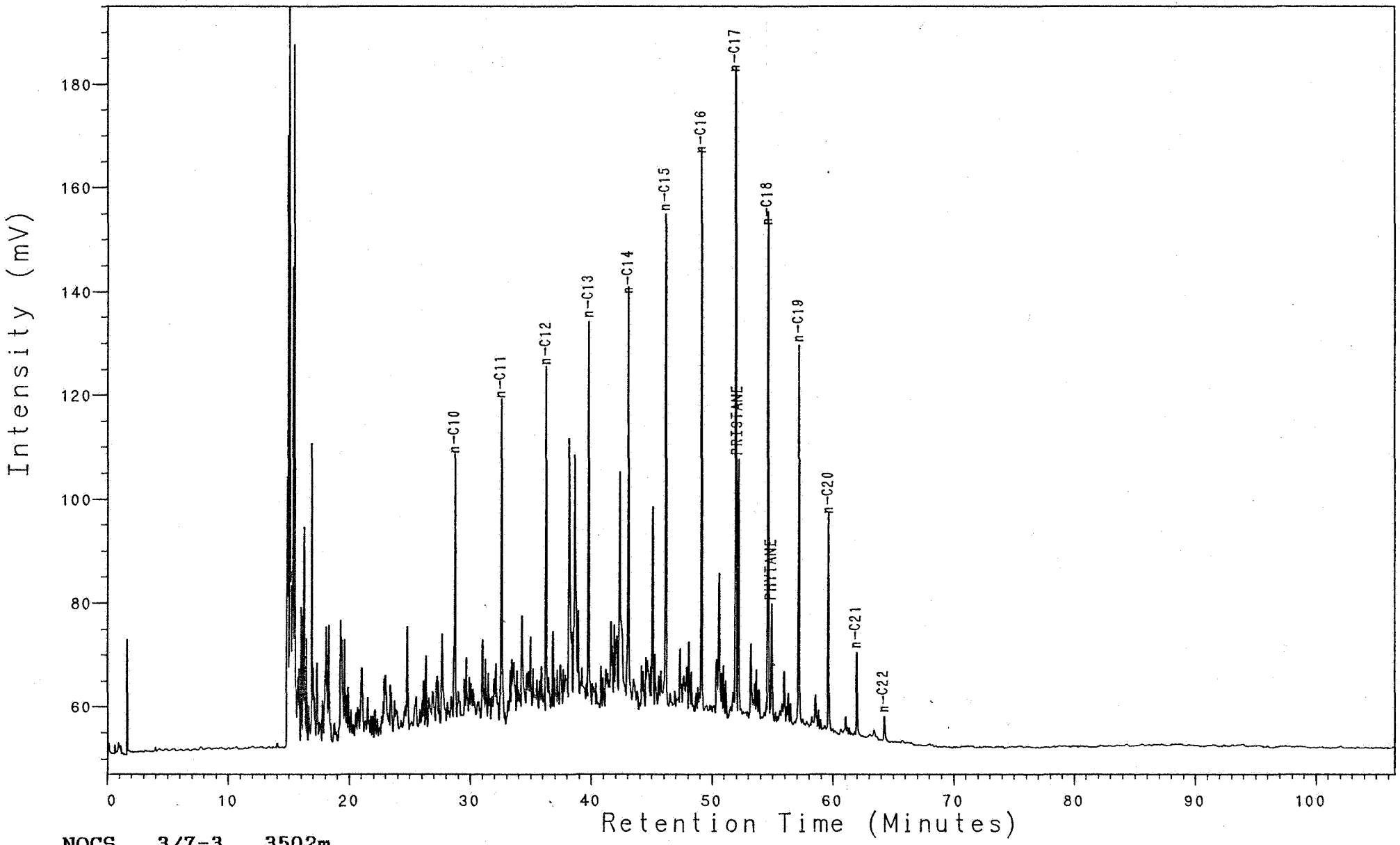
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3490m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

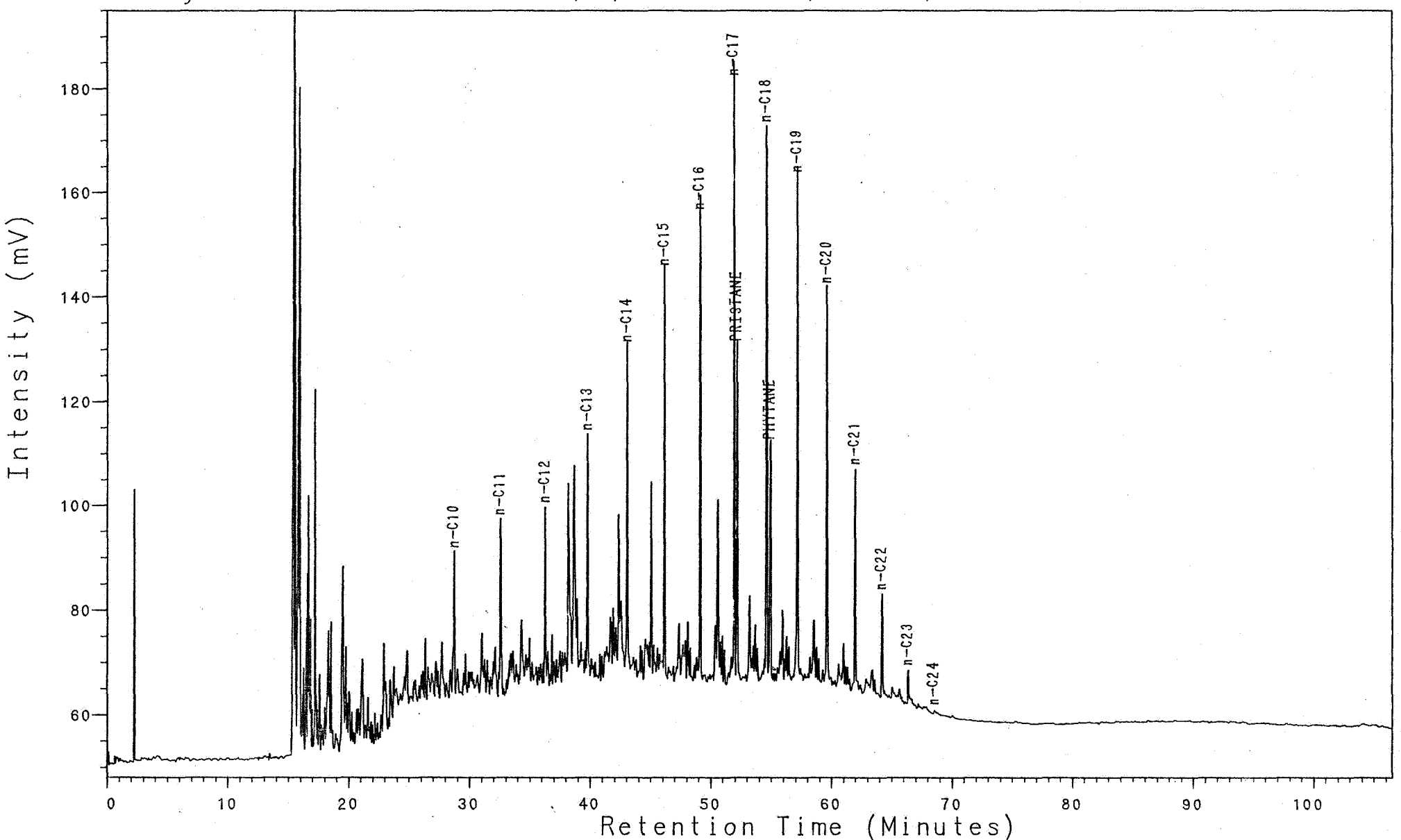
Analysis PC071421L 24, 1, 1 3/7-3, 3502m, S1



NOCS 3/7-3 3502m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

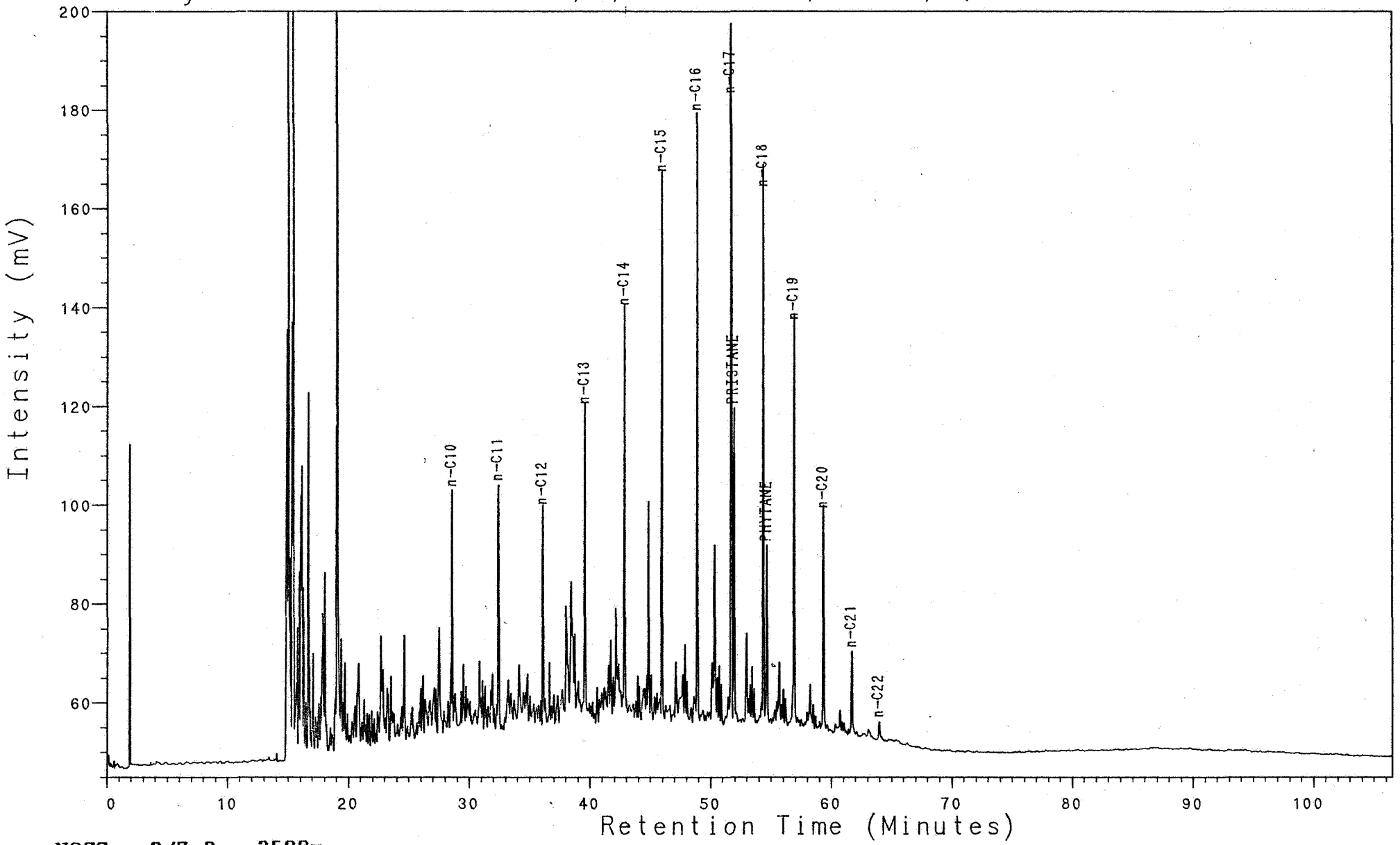
Analysis PC071442L 24, 1, 1 3/7-3, 3514m, S1



NOCS 3/7-3 3514m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

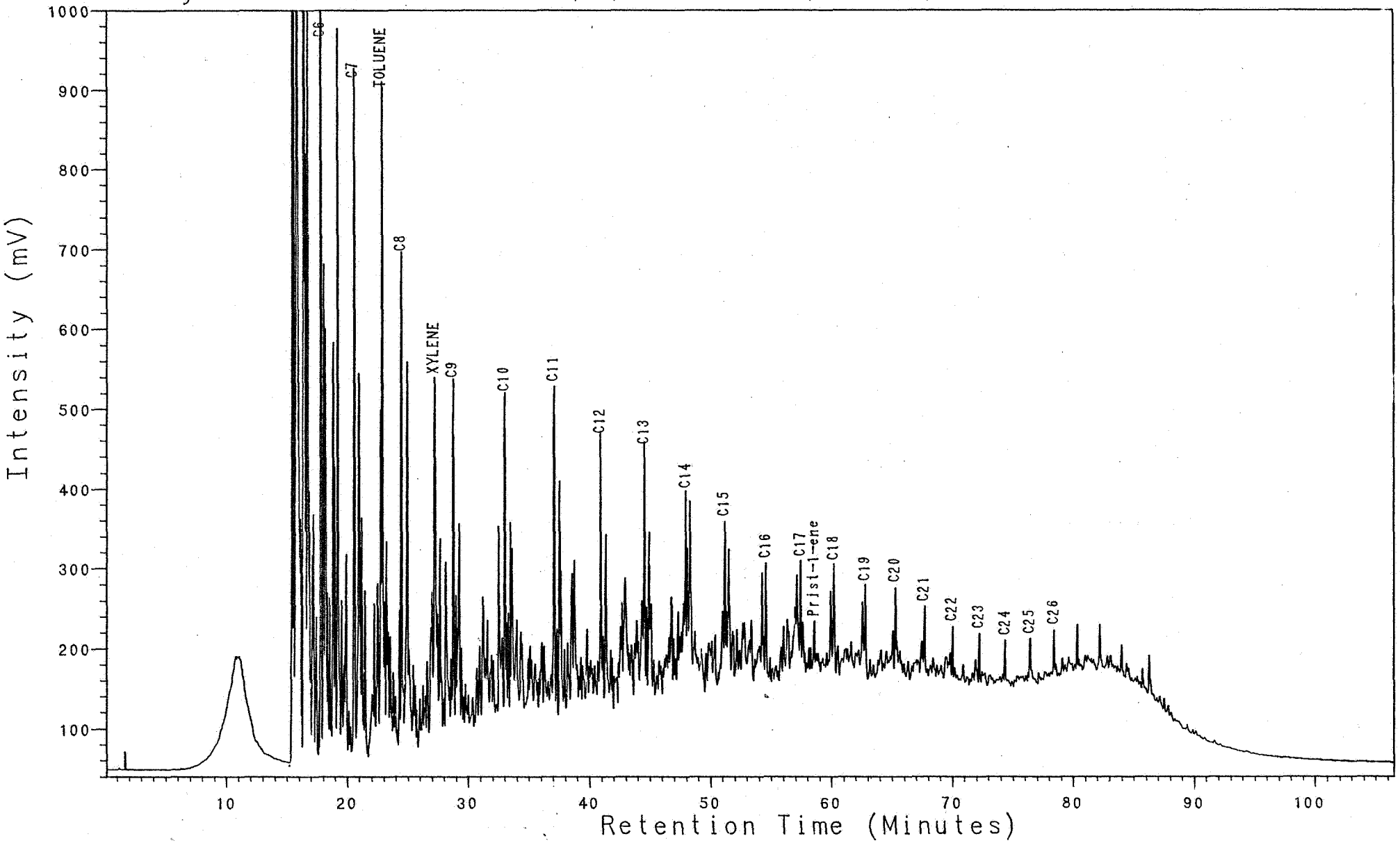
Analysis PC071462L 24, 1, 1 3/7-3, 3522m, S1



NOCS 3/7-3 3522m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

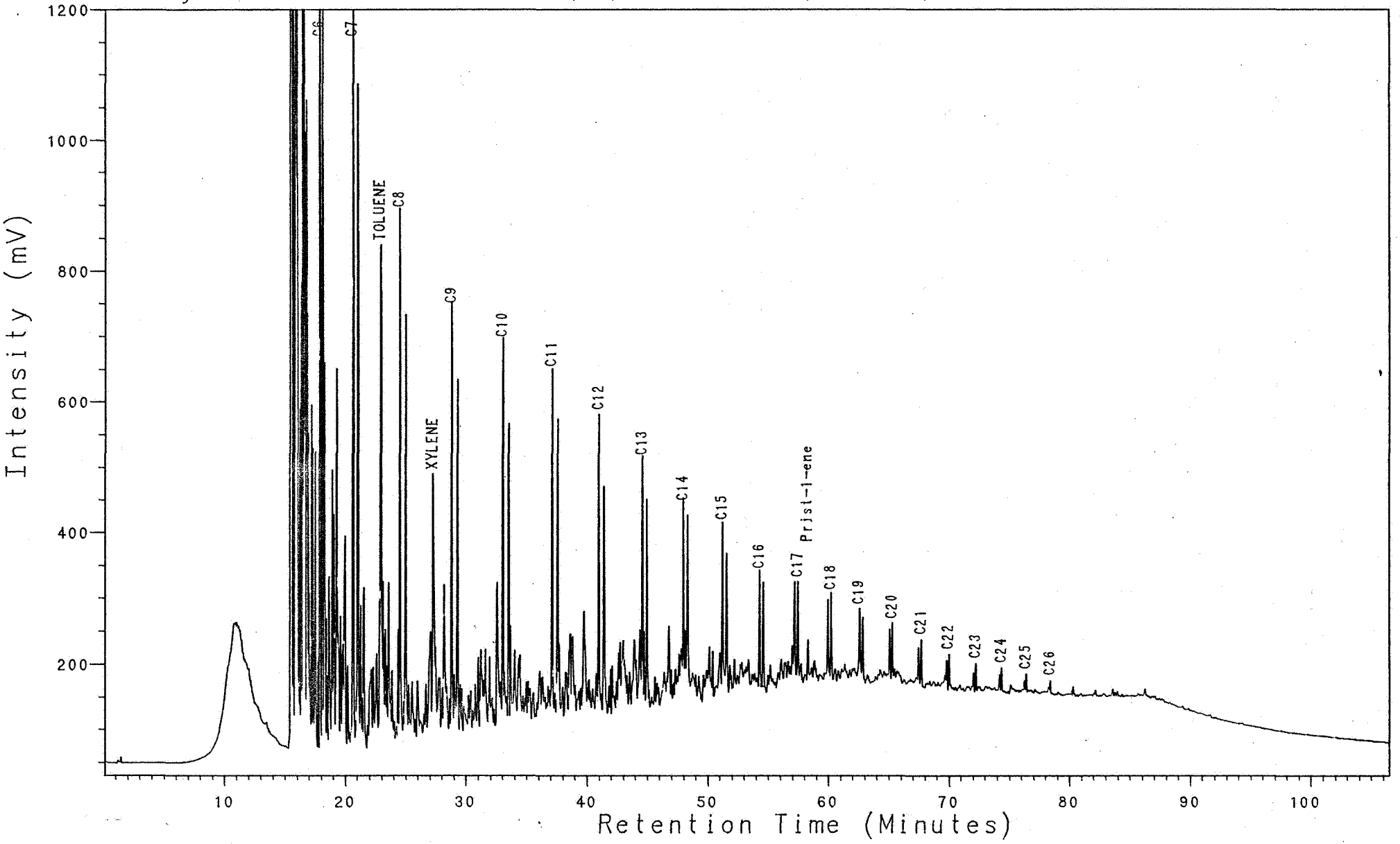
Analysis PC072152L 23, 1, 1 3/7-3, 3272m, S2



NOCS 3/7-3 3272m
PYROLYSIS GC (S2)
CLST:gn gy,lt gy to drk gy

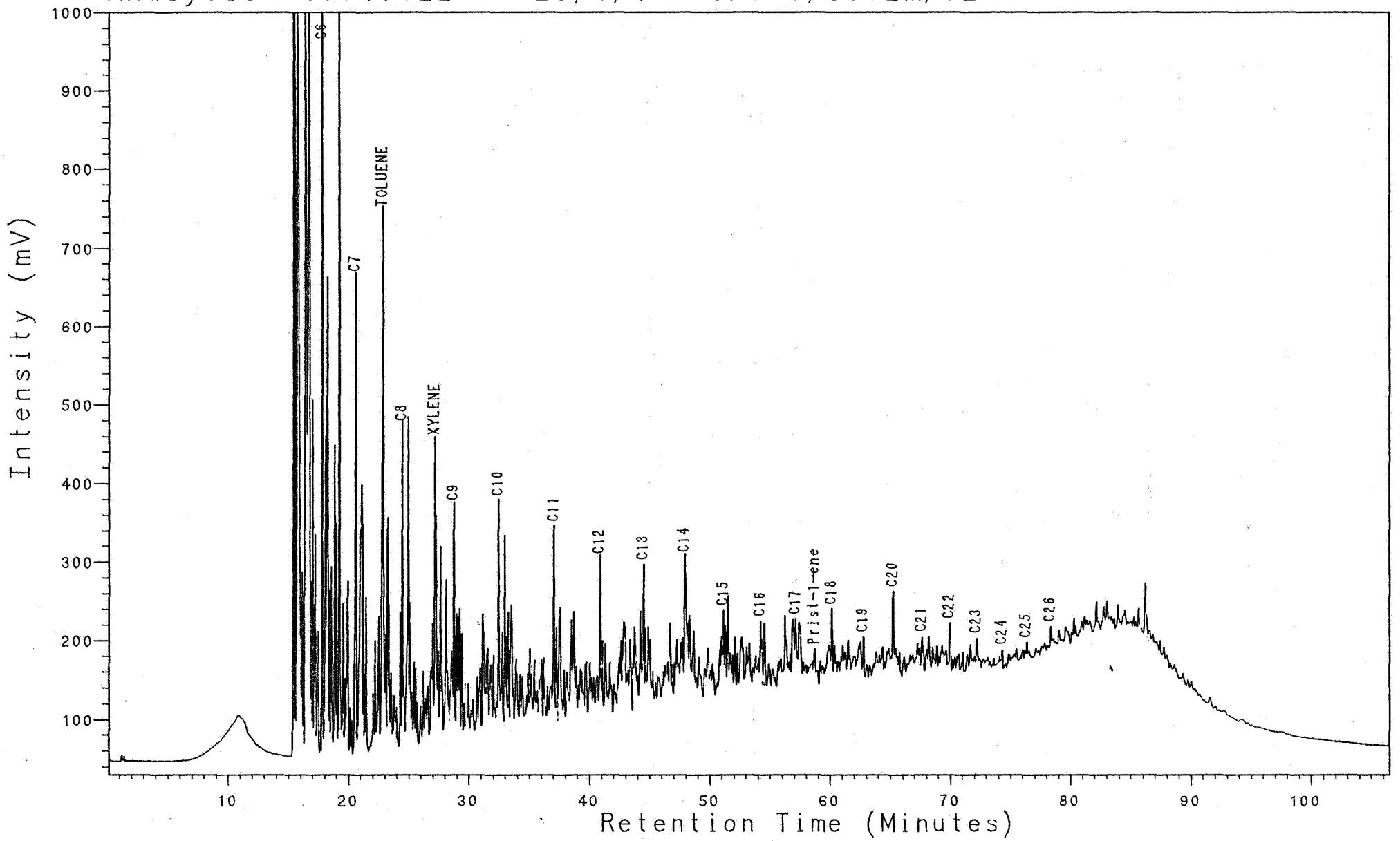
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis PC072183L 23, 1, 1 3/7-3, 3296m, S2



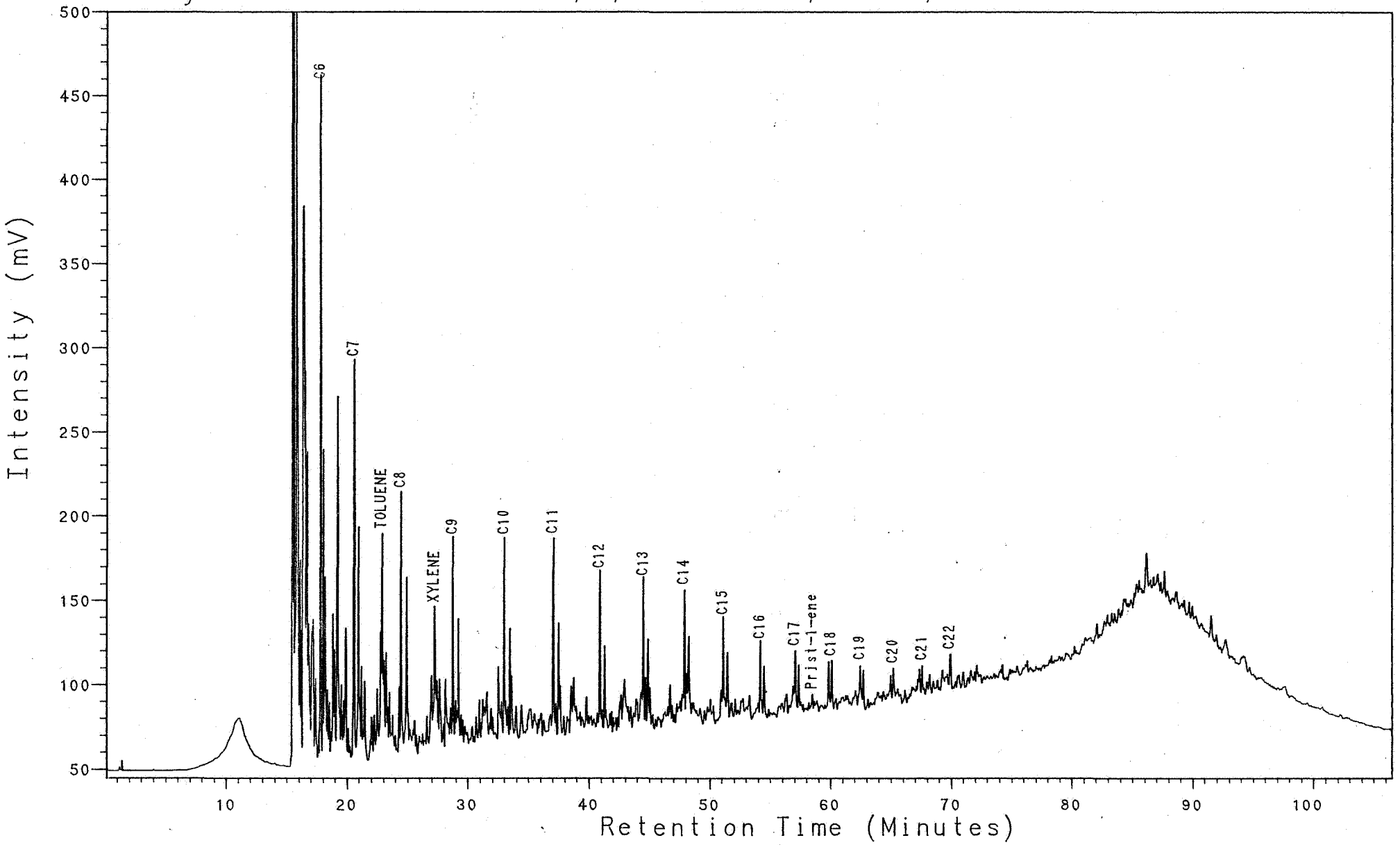
NOCS 3/7-3 3296m
PYROLYSIS GC (S2)
CLST:drk gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3332m
PYROLYSIS GC (S2)
CLST:gn gy,m brn

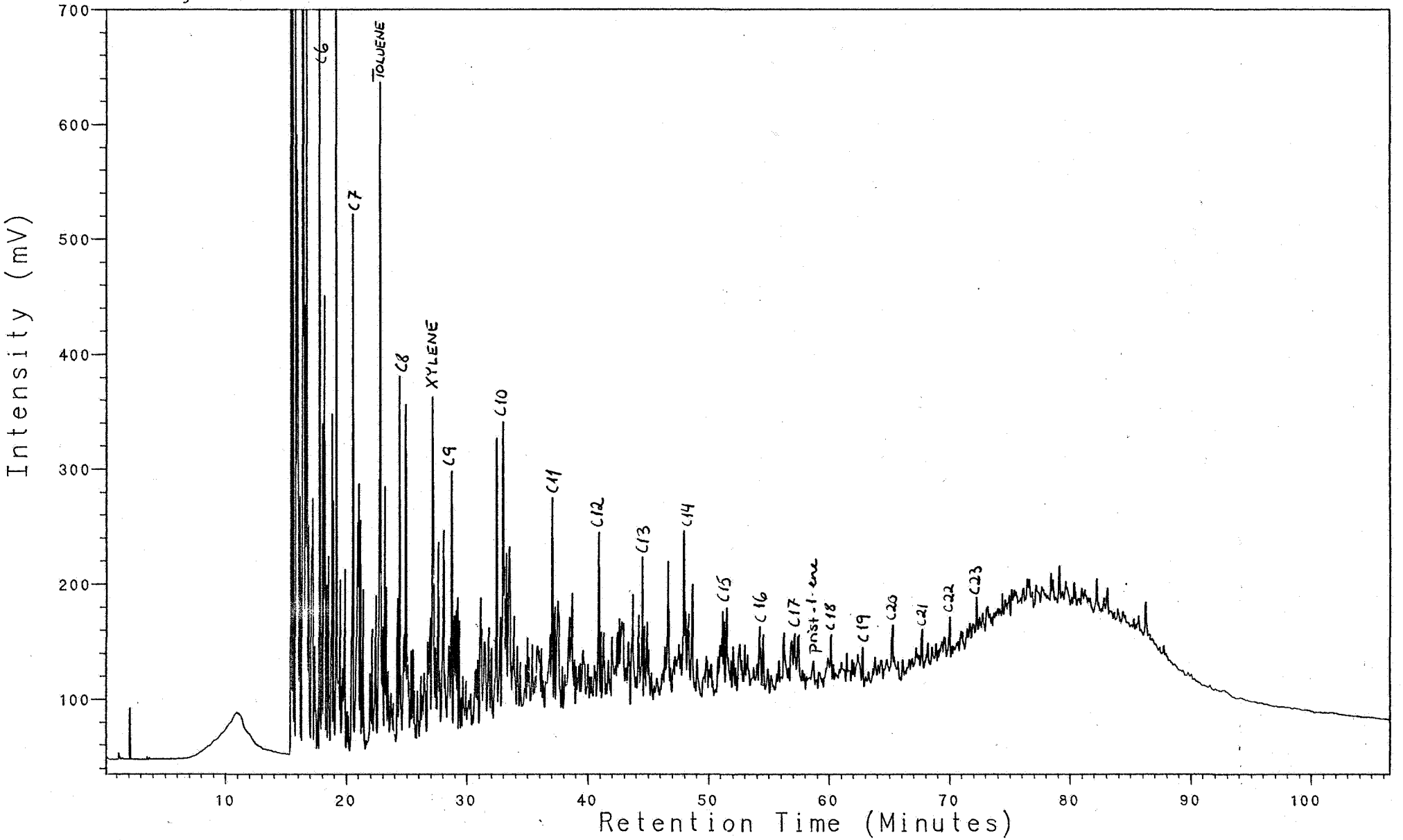
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3332m
PYROLYSIS GC (S2)
CLST:gy blk,drk gy

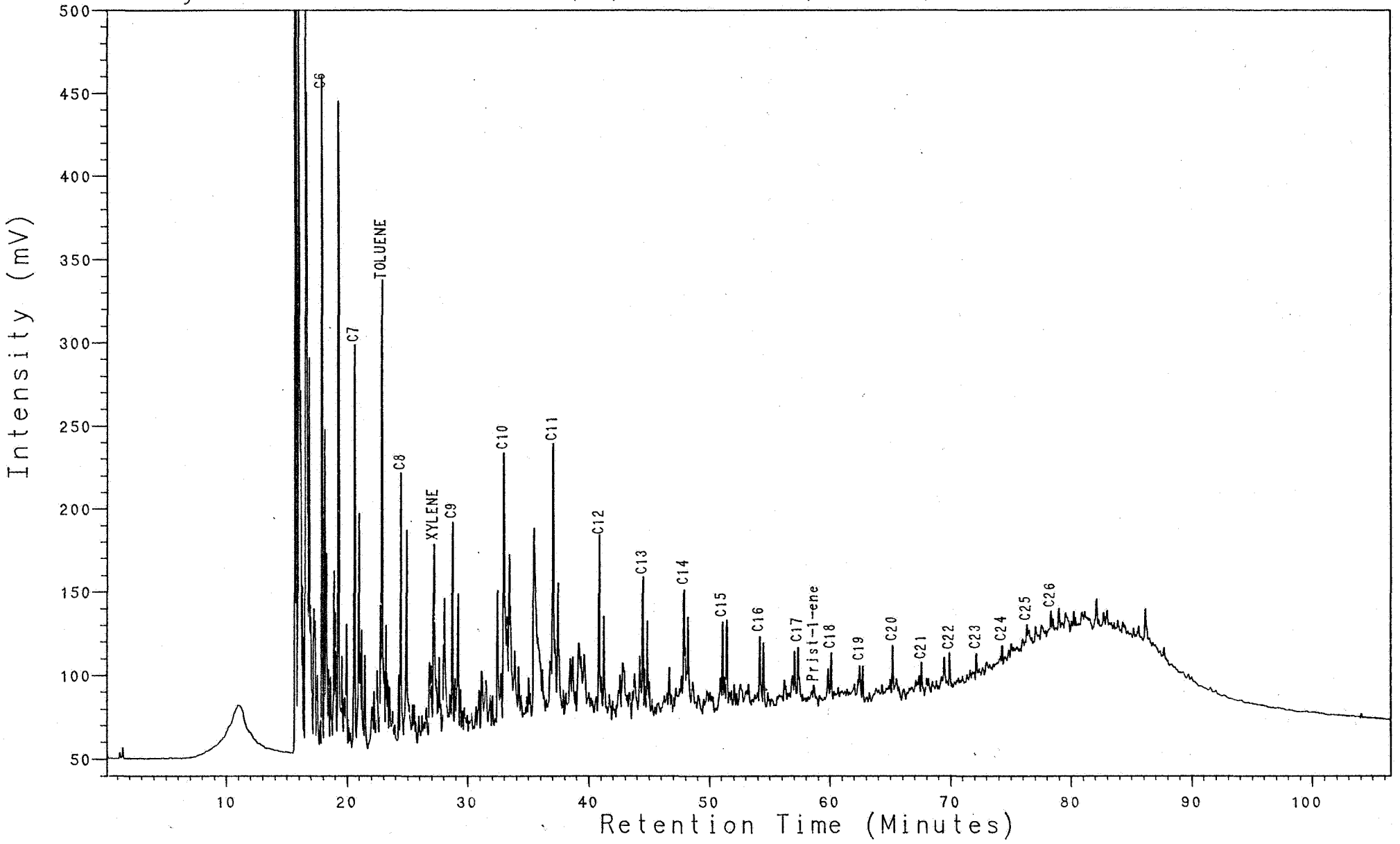
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis PC071062L 23, 1, 1 3/7-3, 3338m, S2



NOCS 3/7-3 3338m
PYROLYSIS GC (S2)
CLST:gn gy,m brn

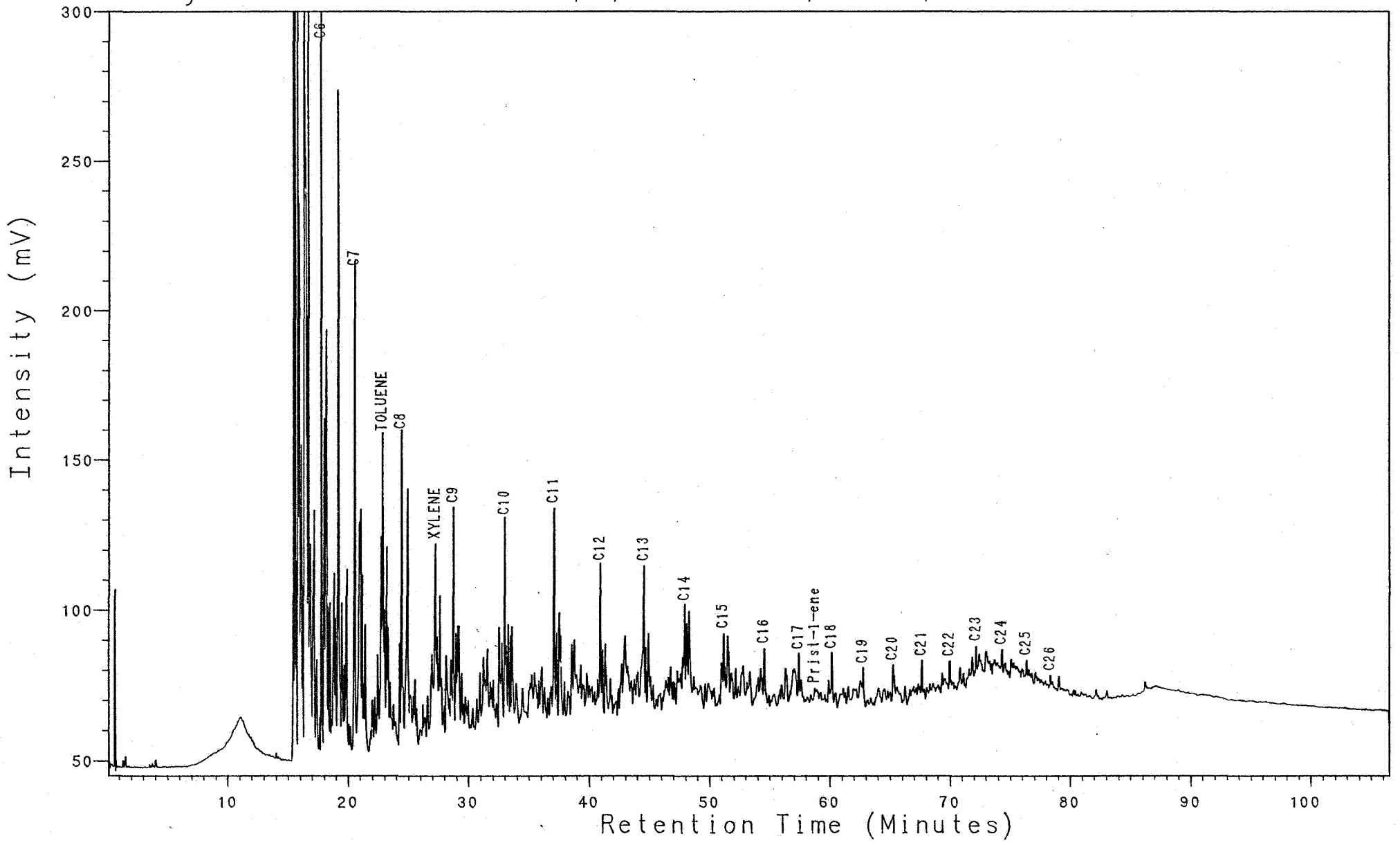
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3338m
PYROLYSIS GC (S2)
CLST:gy blk,drk gy

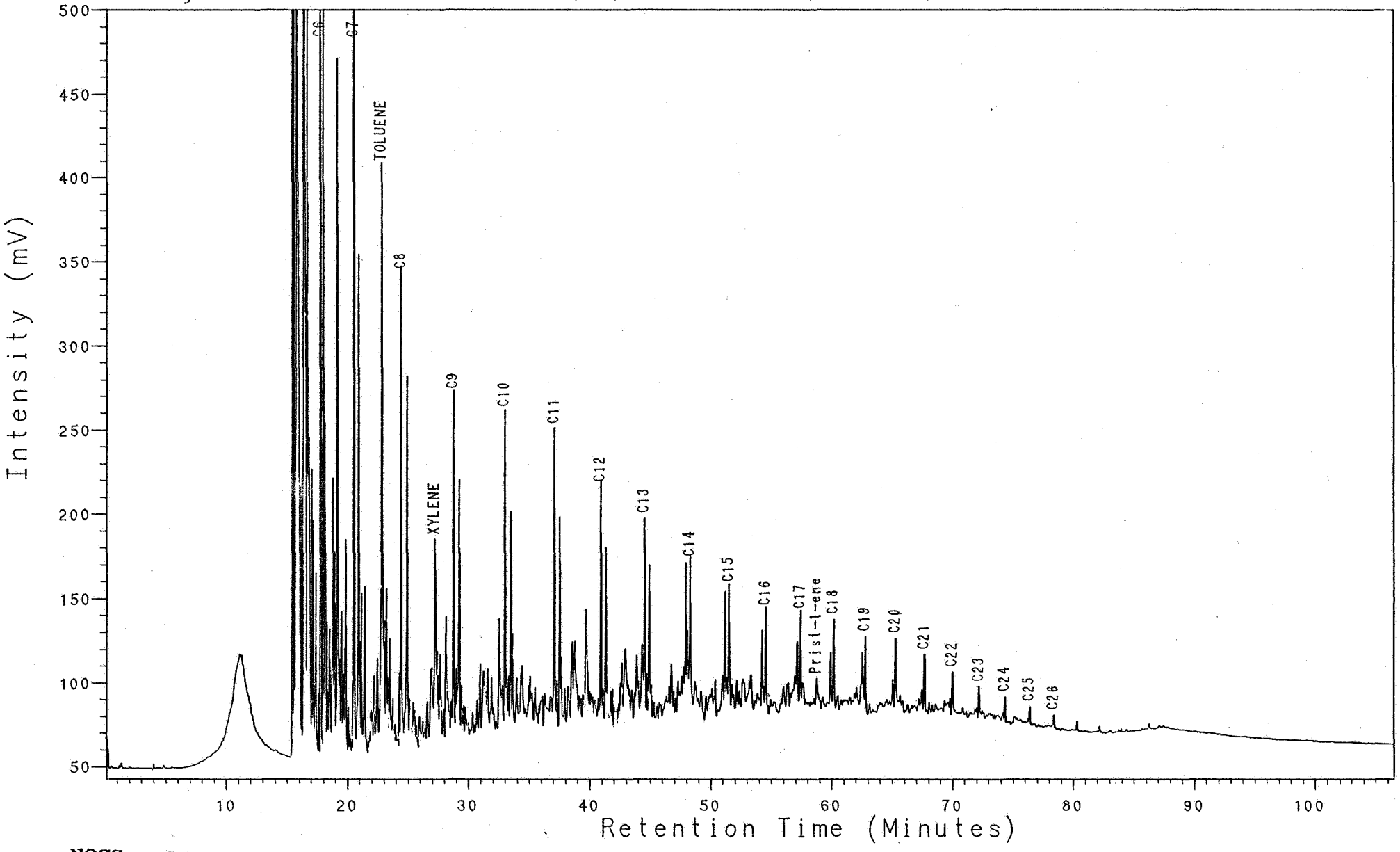
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis PC071072L 23, 1, 1 3/7-3, 3348m, S2



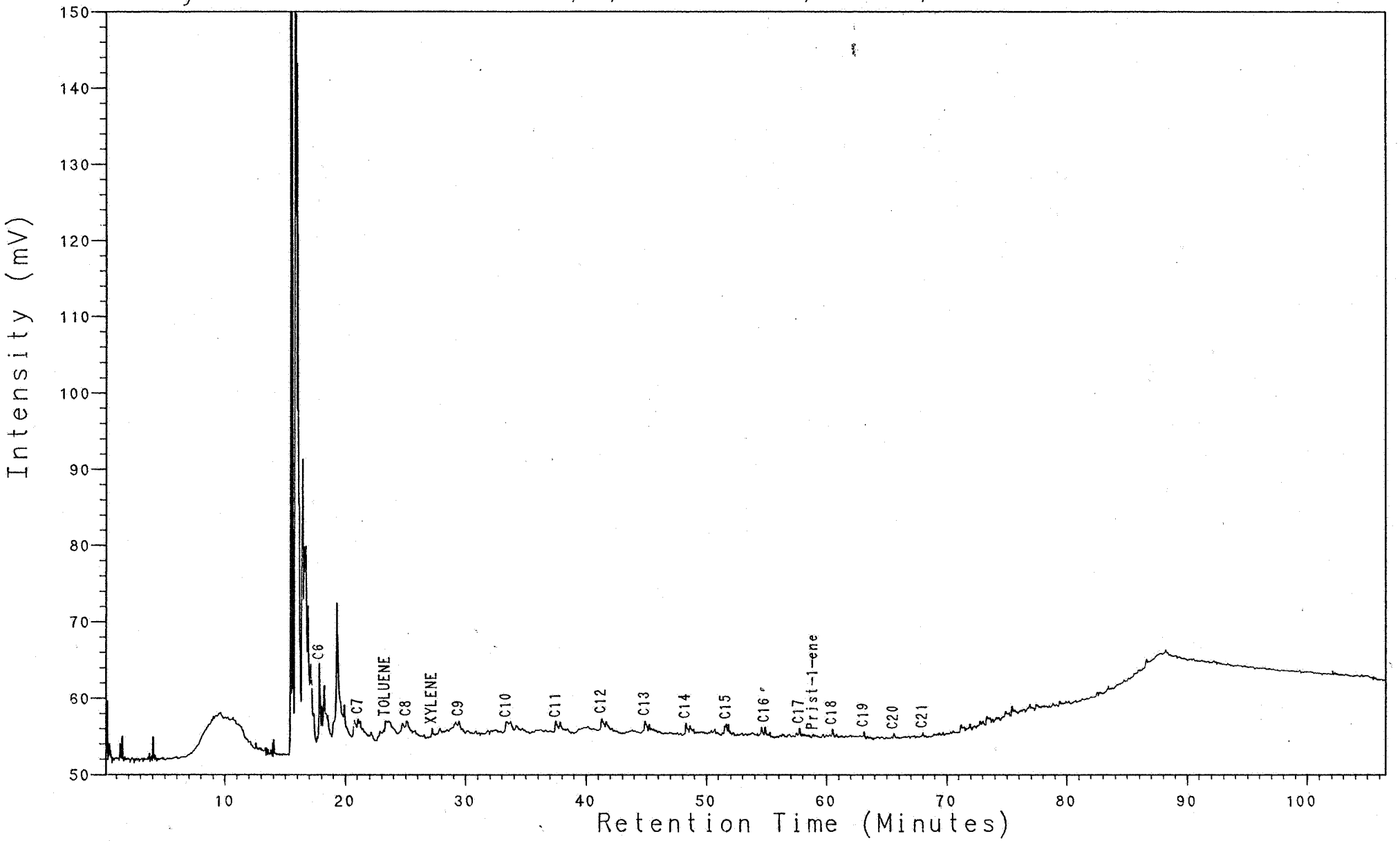
NOCS 3/7-3 3348m
PYROLYSIS GC (S2)
CLST: gn gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3362m
PYROLYSIS GC (S2)
CLST:gn gy

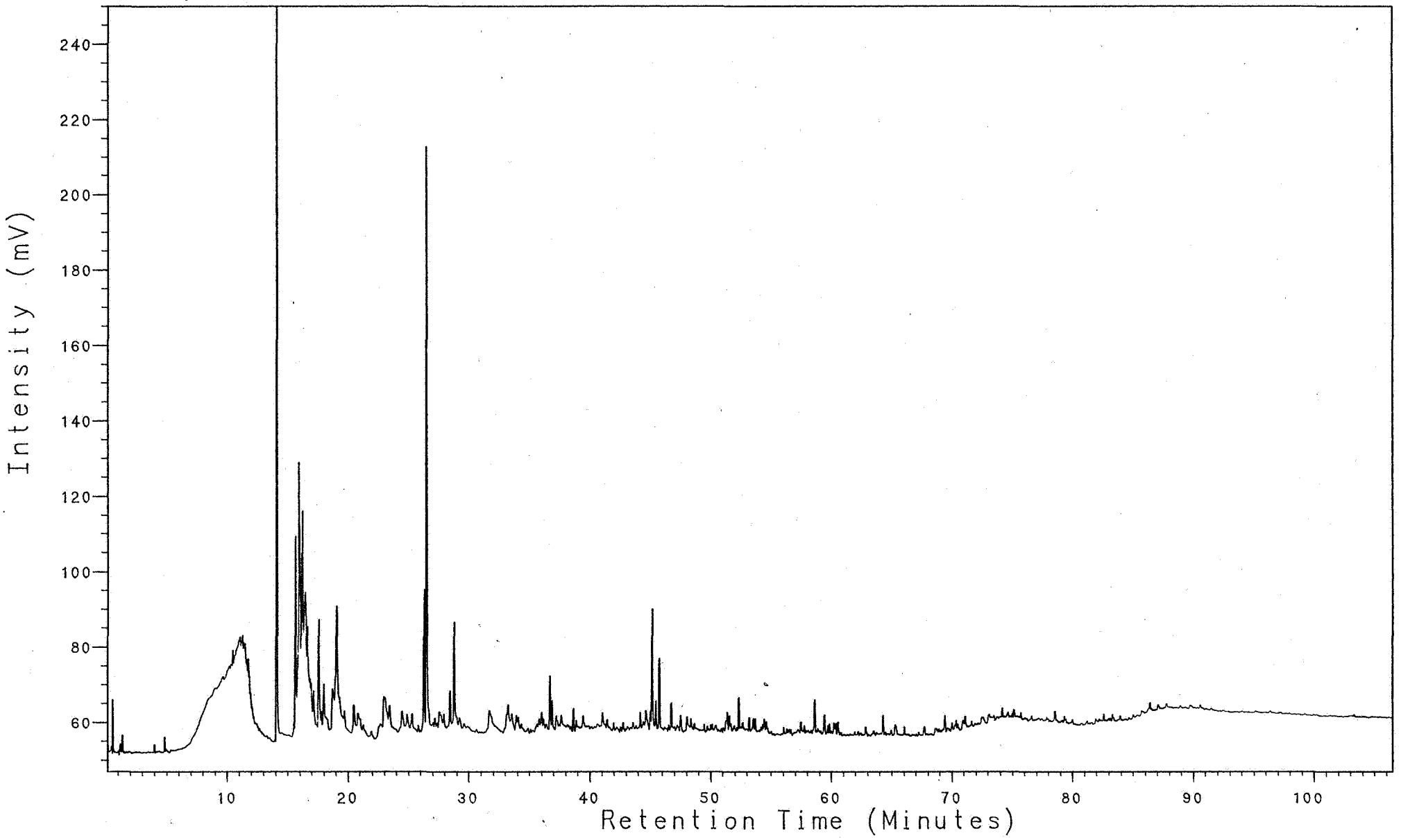
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3366m
PYROLYSIS GC (S2)
SST:w

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

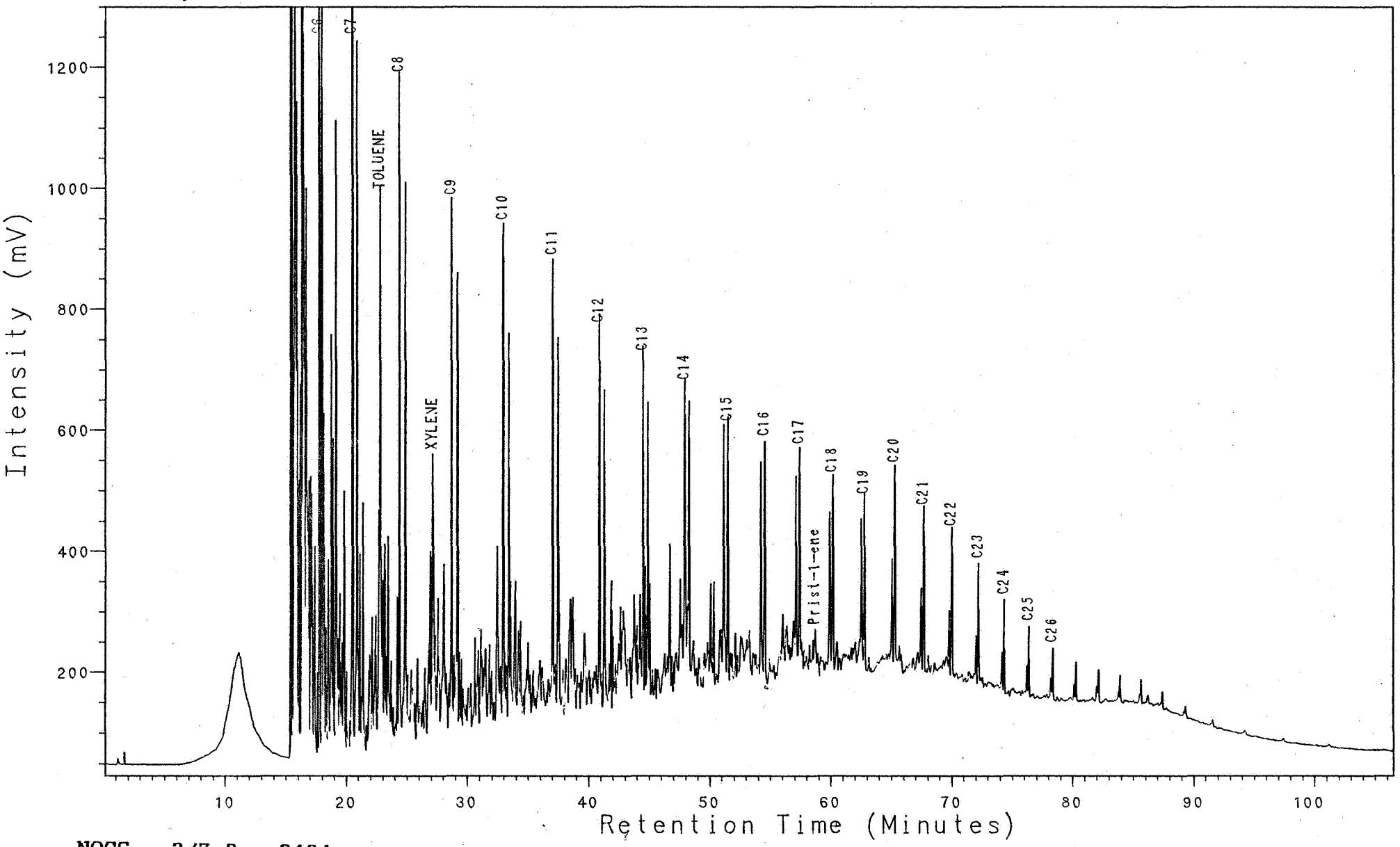
Analysis PC071161L 23, 1, 1 3/7-3, 3390m, S2



NOCS 3/7-3 3390m
PYROLYSIS GC (S2)
SST:w,gn gy,drk gn gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

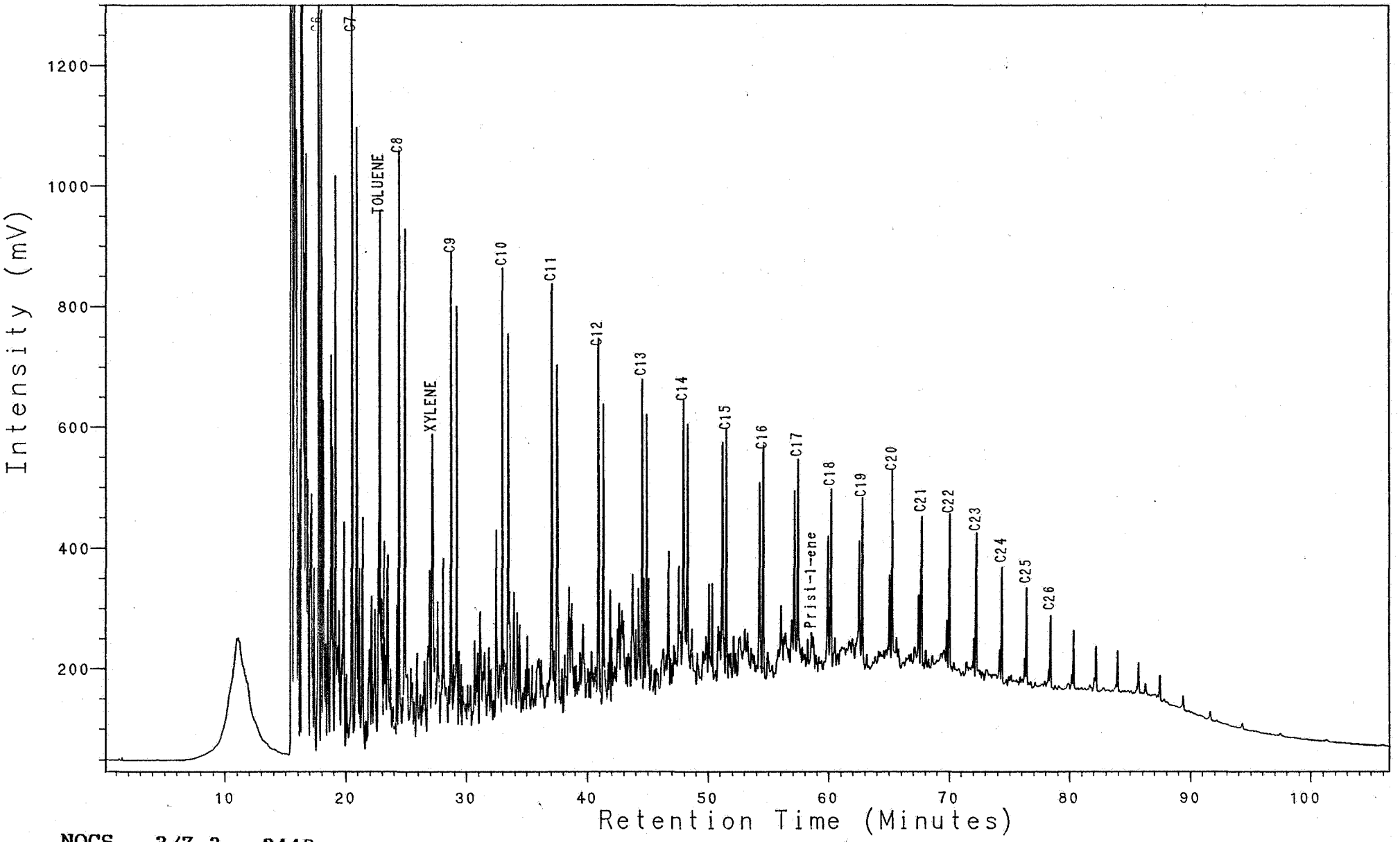
Analysis PC071292L 23, 1, 1 3/7-3, 3434m, S2



NOCS 3/7-3 3434m
PYROLYSIS GC (S2)
CLST: gy blk,brn blk

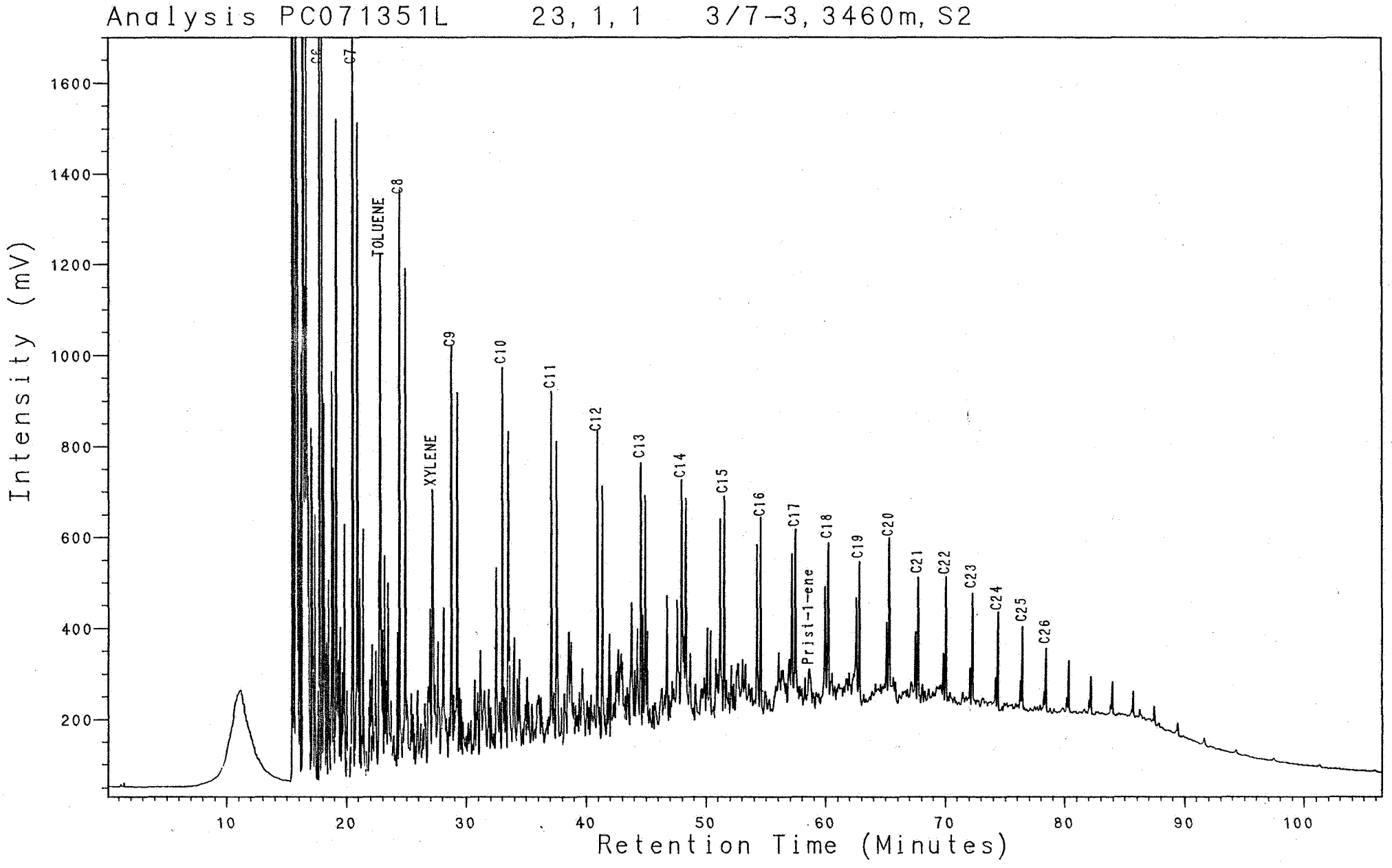
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis PC071321L 23, 1, 1 3/7-3, 3446m, S2



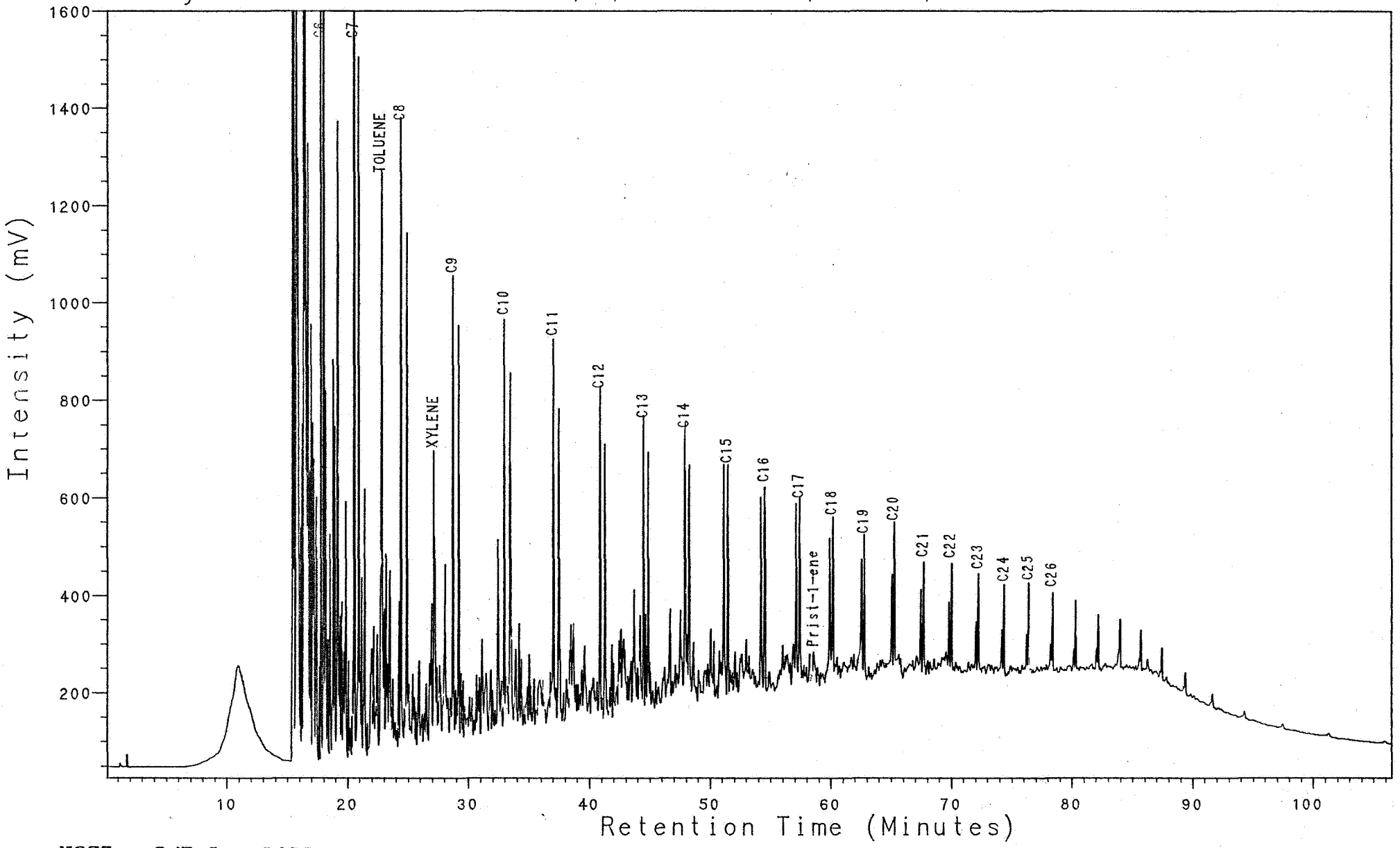
NOCS 3/7-3 3446m
PYROLYSIS GC (S2)
CLST: gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



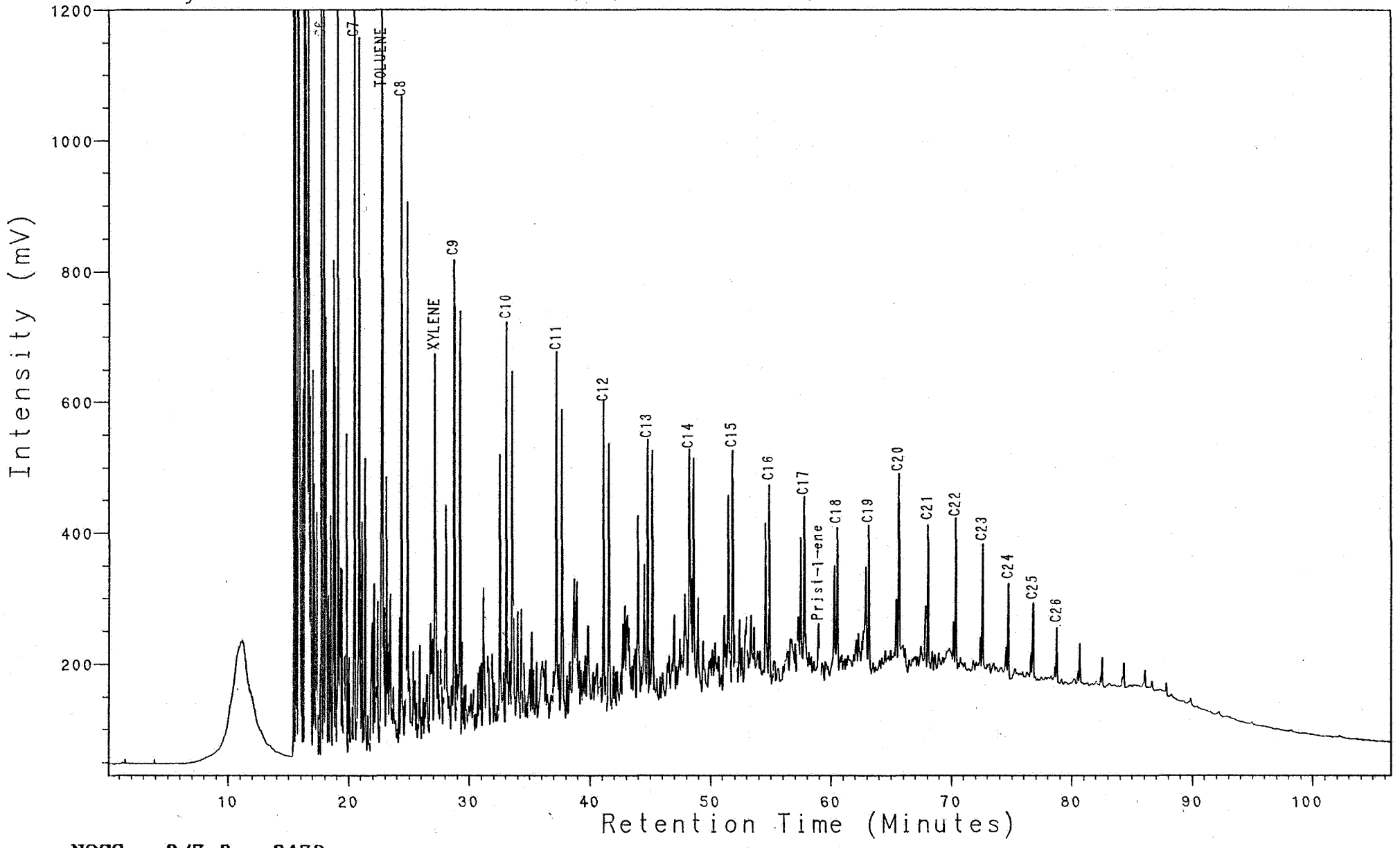
NOCS 3/7-3 3460m
PYROLYSIS GC (S2)
CLST: gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



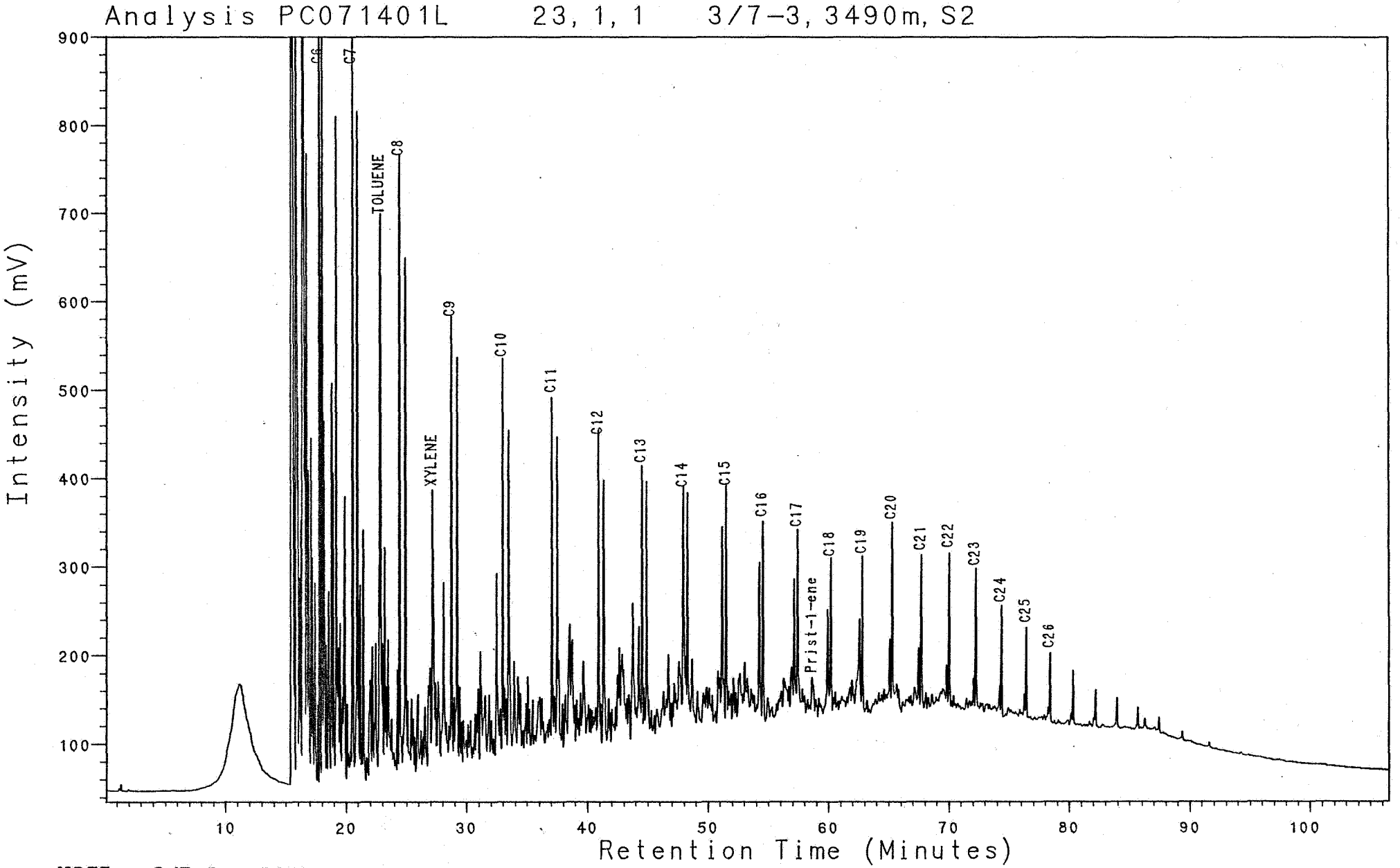
NOCS 3/7-3 3466m
PYROLYSIS GC (S2)
CLST: gy blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



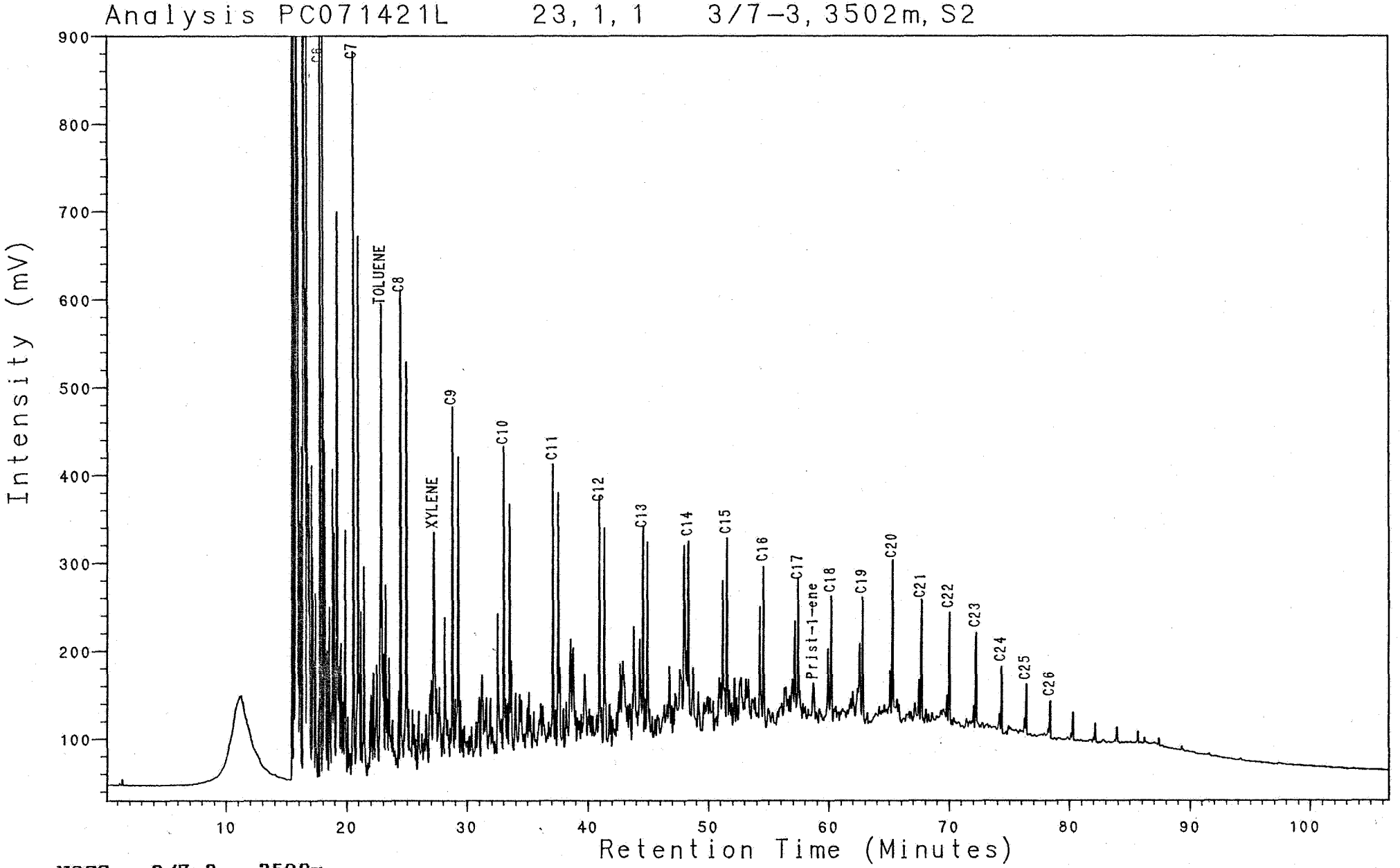
NOCS 3/7-3 3478m
PYROLYSIS GC (S2)
CLST: gy blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



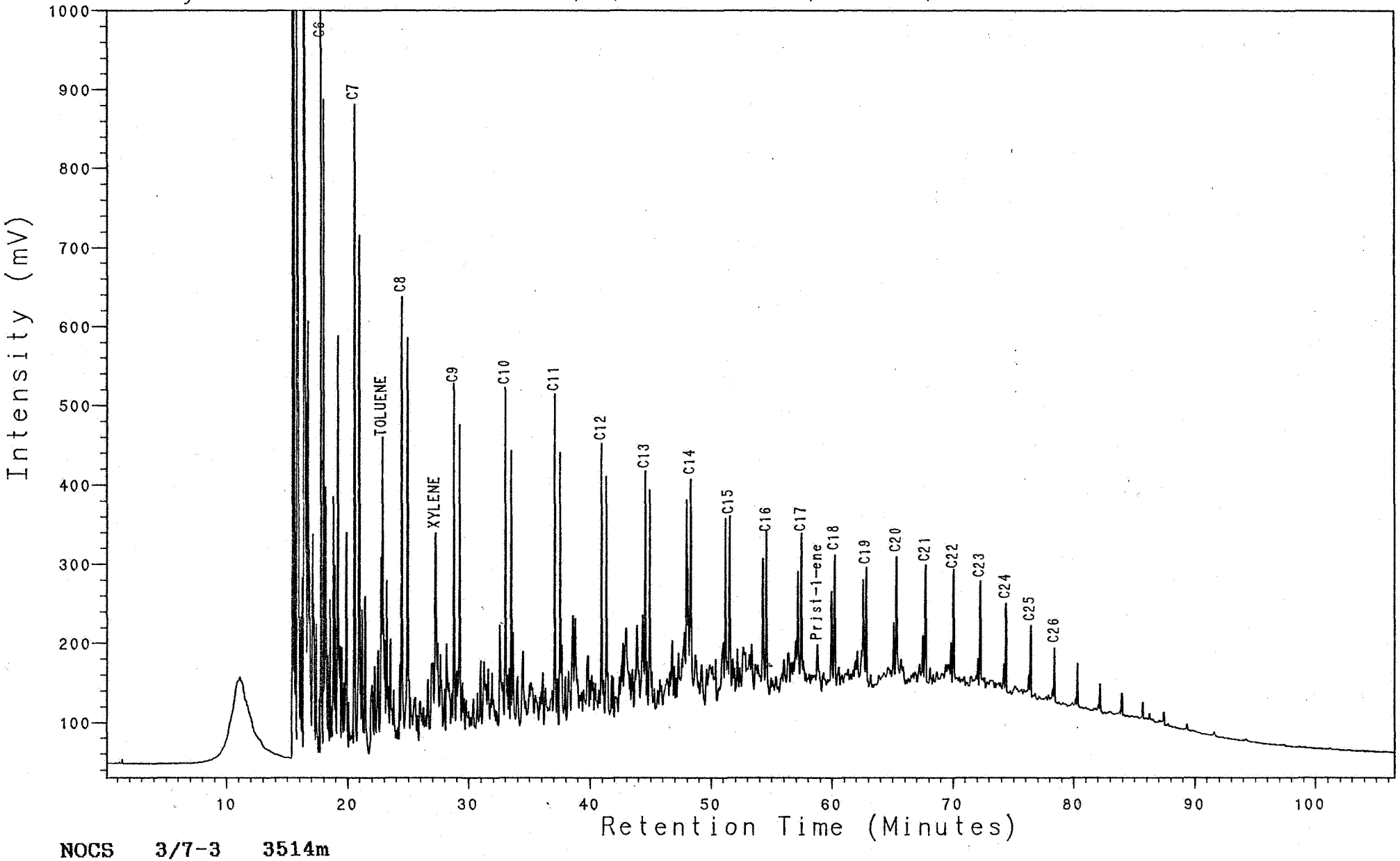
NOCS 3/7-3 3490m
PYROLYSIS GC (S2)
CLST: gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



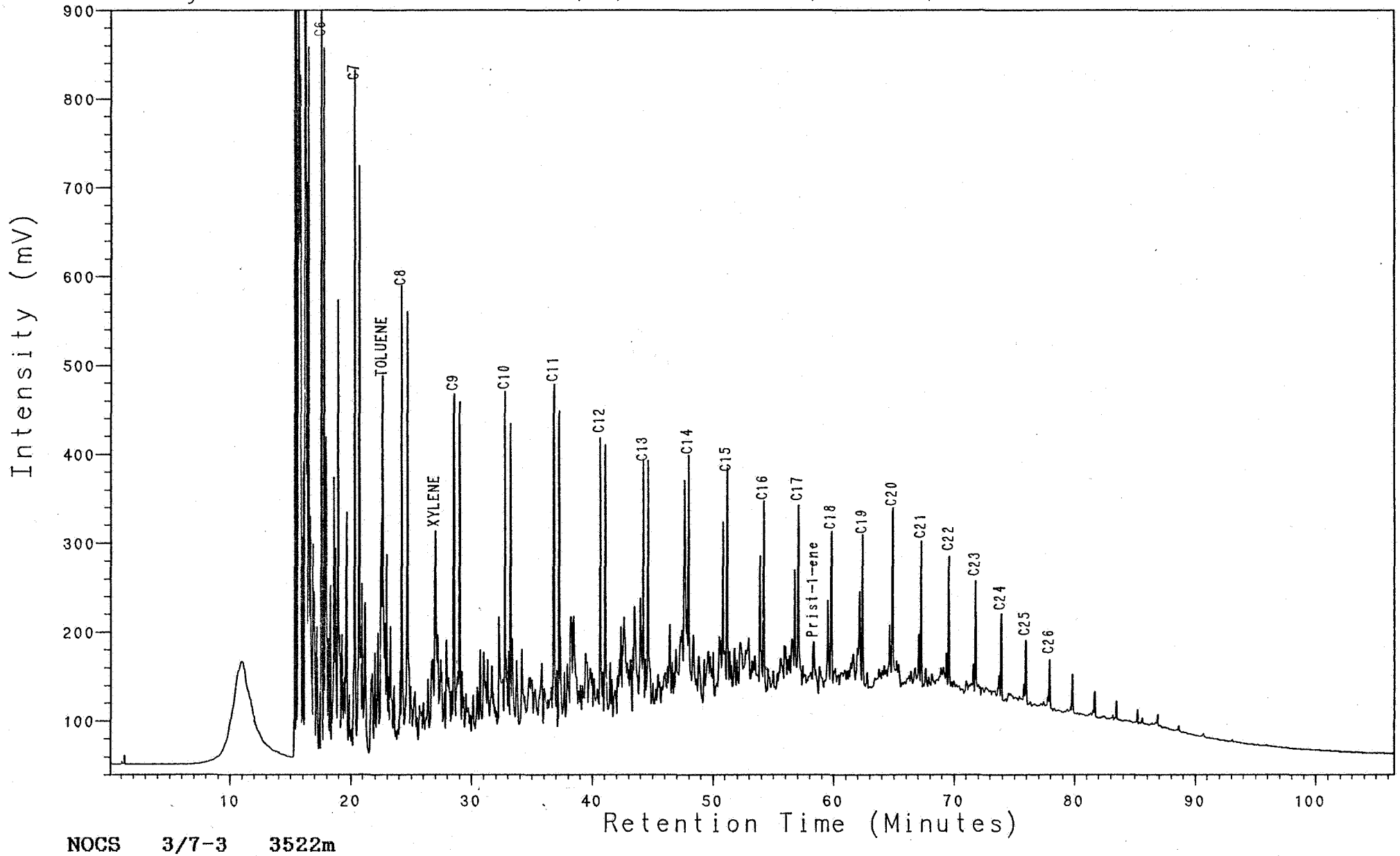
NOCS 3/7-3 3502m
PYROLYSIS GC (S2)
CLST: gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



NOCS 3/7-3 3514m
PYROLYSIS GC (S2)
CLST: gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S



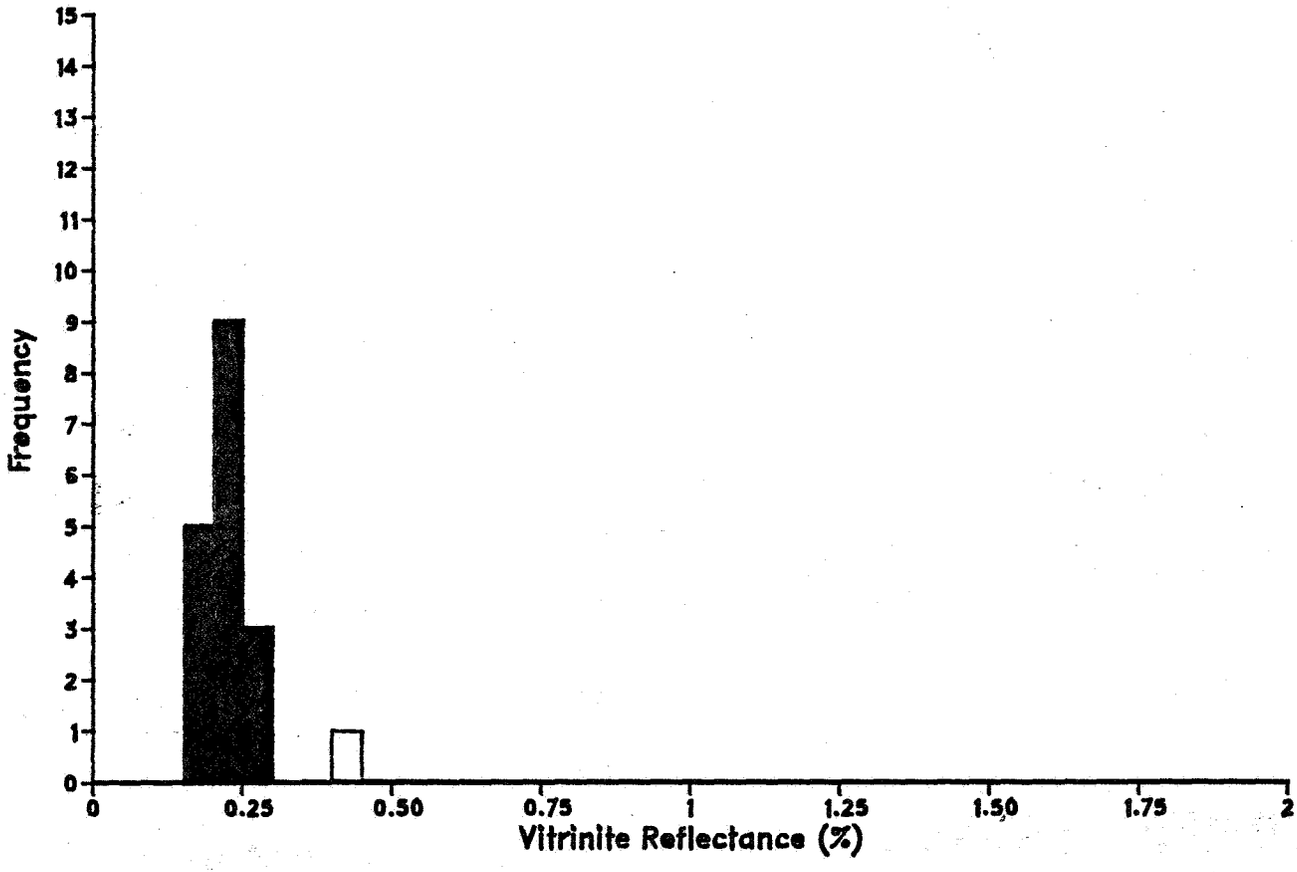
NOCS 3/7-3 3522m
PYROLYSIS GC (S2)
CLST: gy blk,brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 1080.00(m)
Sample: 10- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.150 to 0.300):	0.22	0.03	17
Population Two (from 0.400 to 0.450):	0.42	0.00	1

Readings:

0.154	0.180	0.189	0.193	0.194	0.205	0.209	0.210	0.215	0.215
0.217	0.219	0.226	0.235	0.255	0.259	0.292	0.416		

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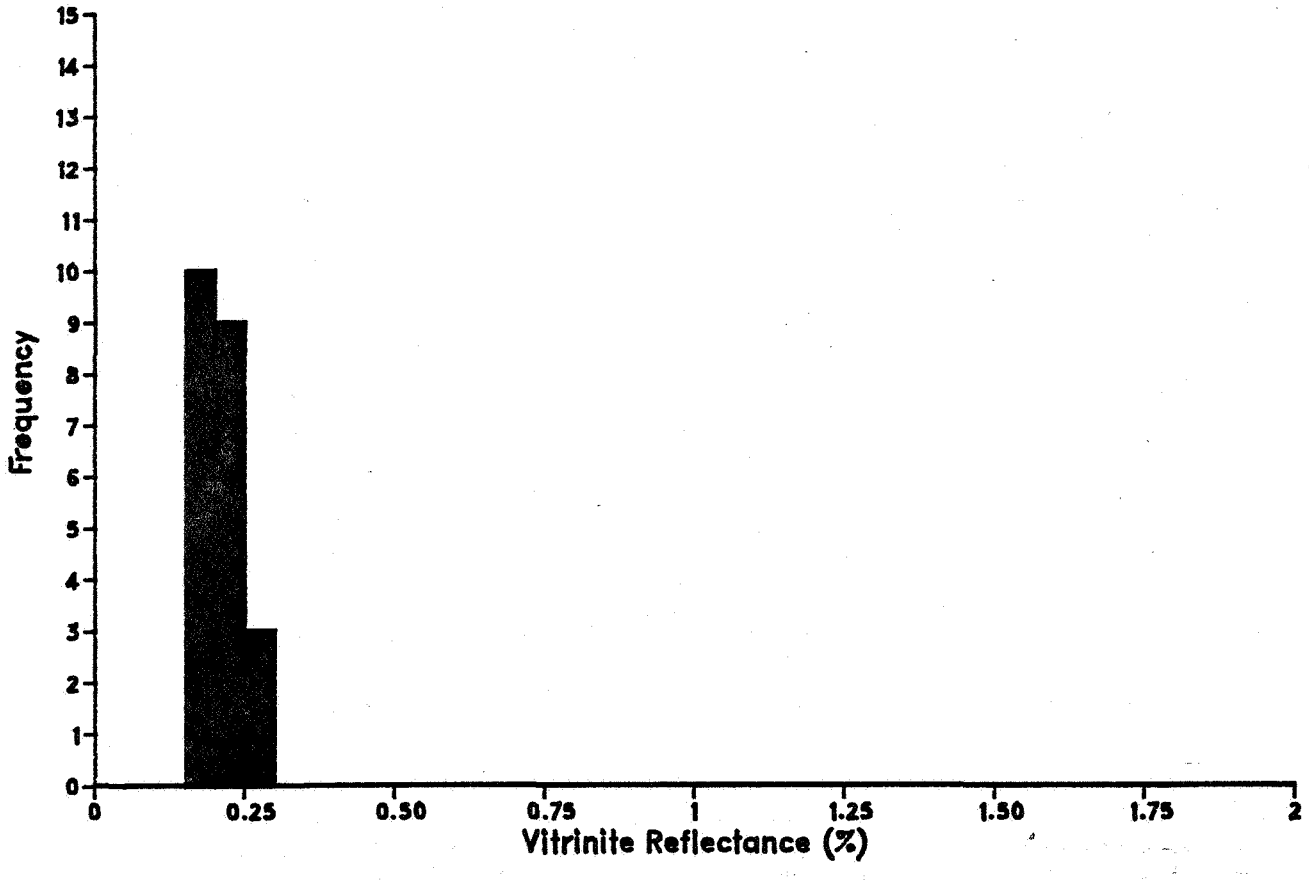
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 1280.00(m)
Sample: 12- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.150 to 0.300):	0.21	0.03	22

Readings:

0.166	0.176	0.176	0.178	0.180	0.180	0.191	0.193	0.196	0.200
0.202	0.205	0.206	0.207	0.220	0.228	0.231	0.232	0.233	0.254
0.254	0.263								

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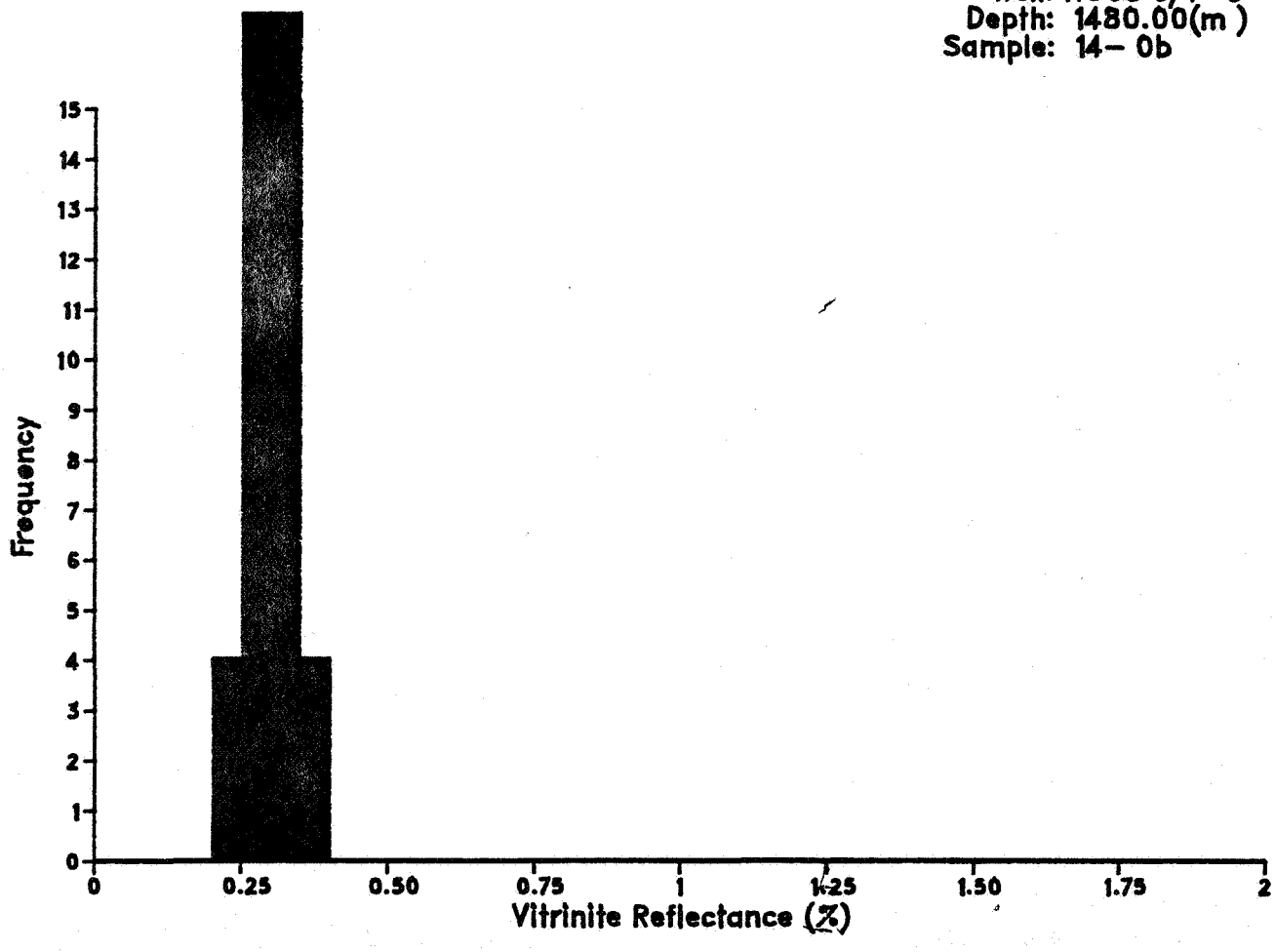
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 1480.00(m)
Sample: 14- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.200 to 0.400):	0.30	0.03	47

Readings:

0.225	0.232	0.244	0.246	0.250	0.256	0.256	0.258	0.258	0.264
0.280	0.287	0.288	0.291	0.292	0.292	0.294	0.295	0.297	0.298
0.298	0.298	0.301	0.302	0.303	0.304	0.304	0.305	0.306	0.306
0.307	0.307	0.308	0.313	0.313	0.317	0.318	0.318	0.319	0.320
0.321	0.326	0.329	0.357	0.362	0.362	0.395			

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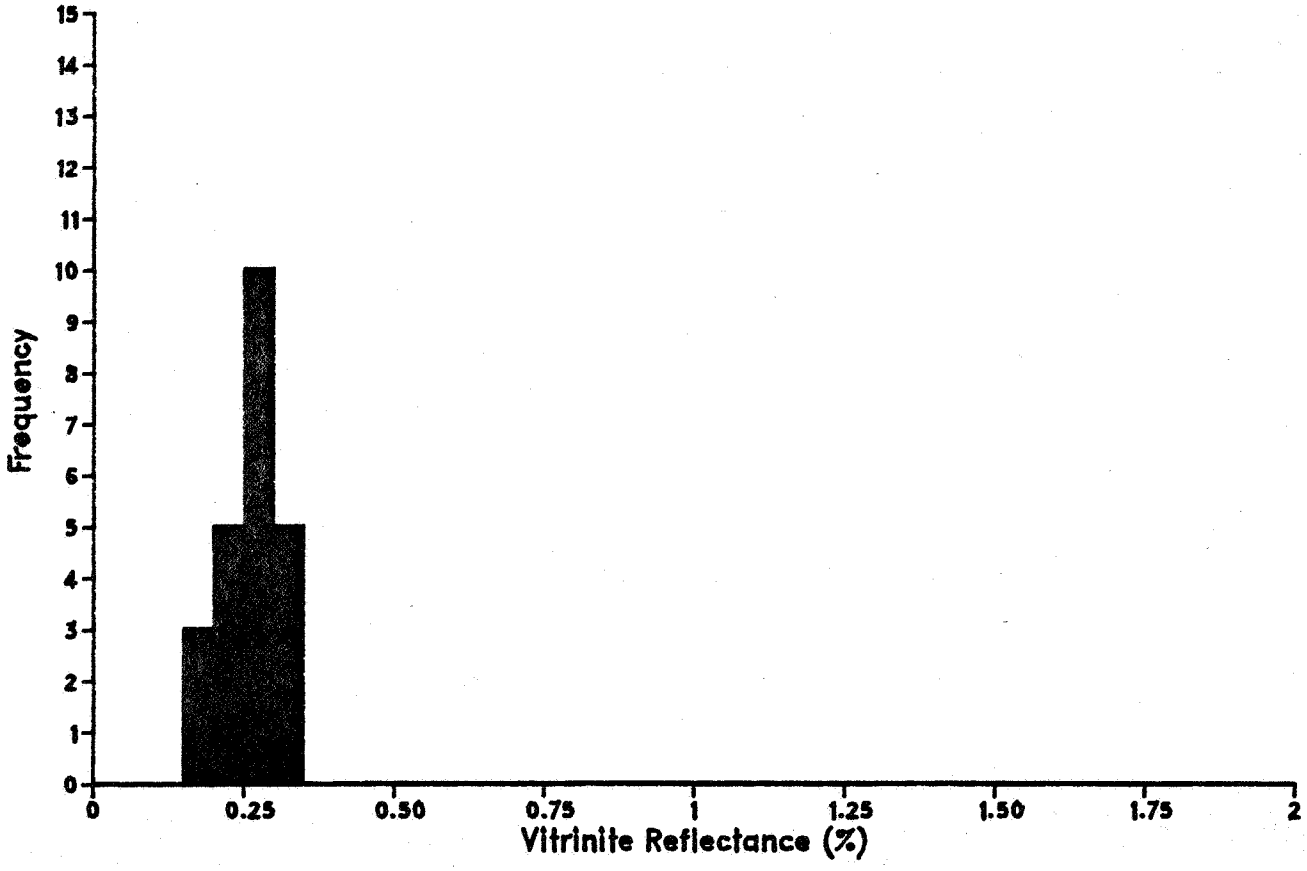
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 1680.00(m)
Sample: 16- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.150 to 0.350):	0.27	0.04	23

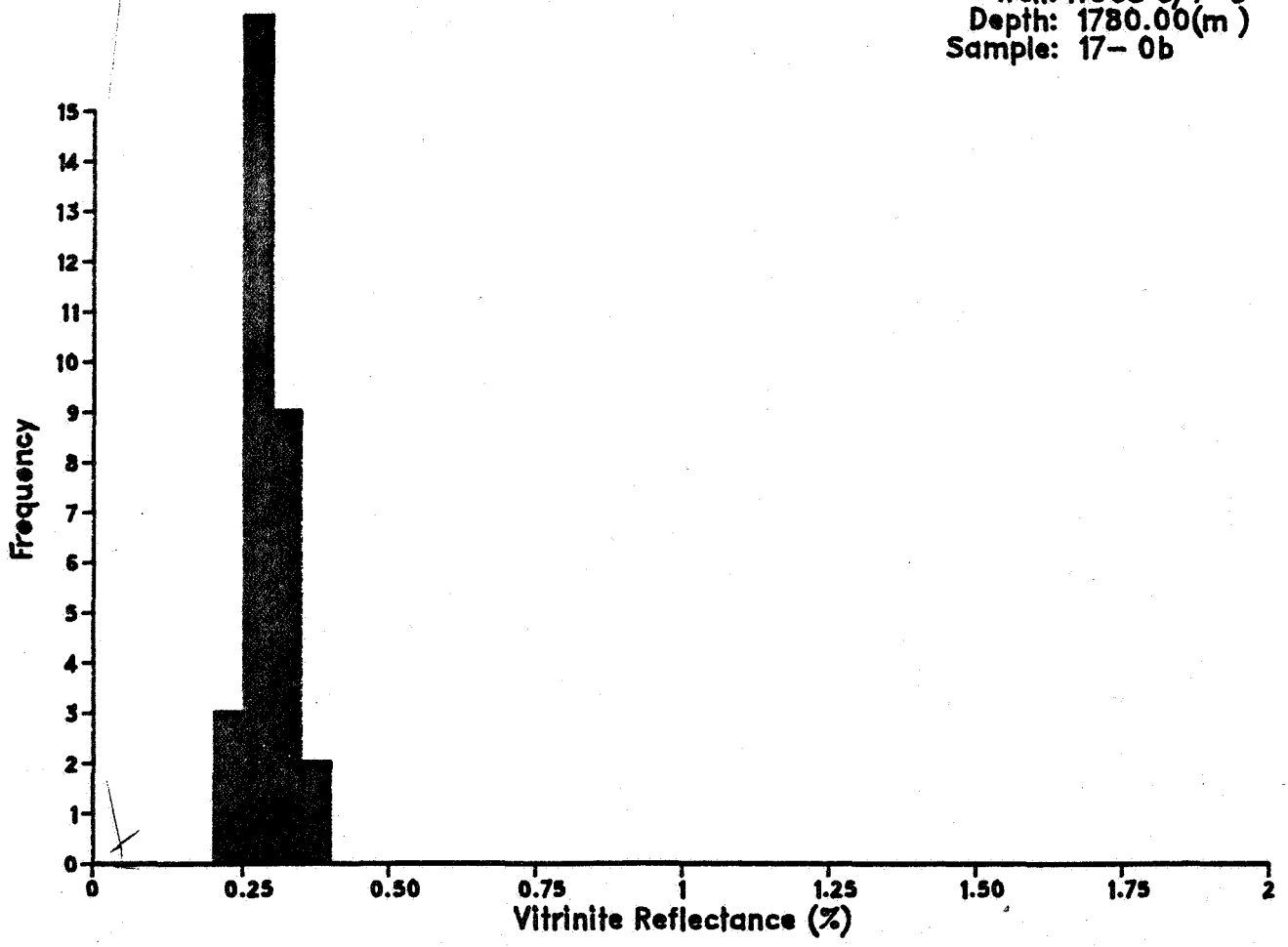
Readings:

0.190	0.193	0.196	0.214	0.232	0.242	0.243	0.246	0.267	0.268
0.273	0.283	0.283	0.284	0.285	0.293	0.293	0.297	0.302	0.307
0.332	0.341	0.341							

Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 1780.00(m)
Sample: 17- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.200 to 0.400):	0.29	0.04	33

Readings:

0.235	0.243	0.249	0.255	0.255	0.256	0.257	0.262	0.265	0.268
0.271	0.272	0.272	0.274	0.275	0.278	0.283	0.284	0.294	0.295
0.299	0.300	0.305	0.317	0.318	0.318	0.321	0.325	0.326	0.341
0.349	0.366	0.389							

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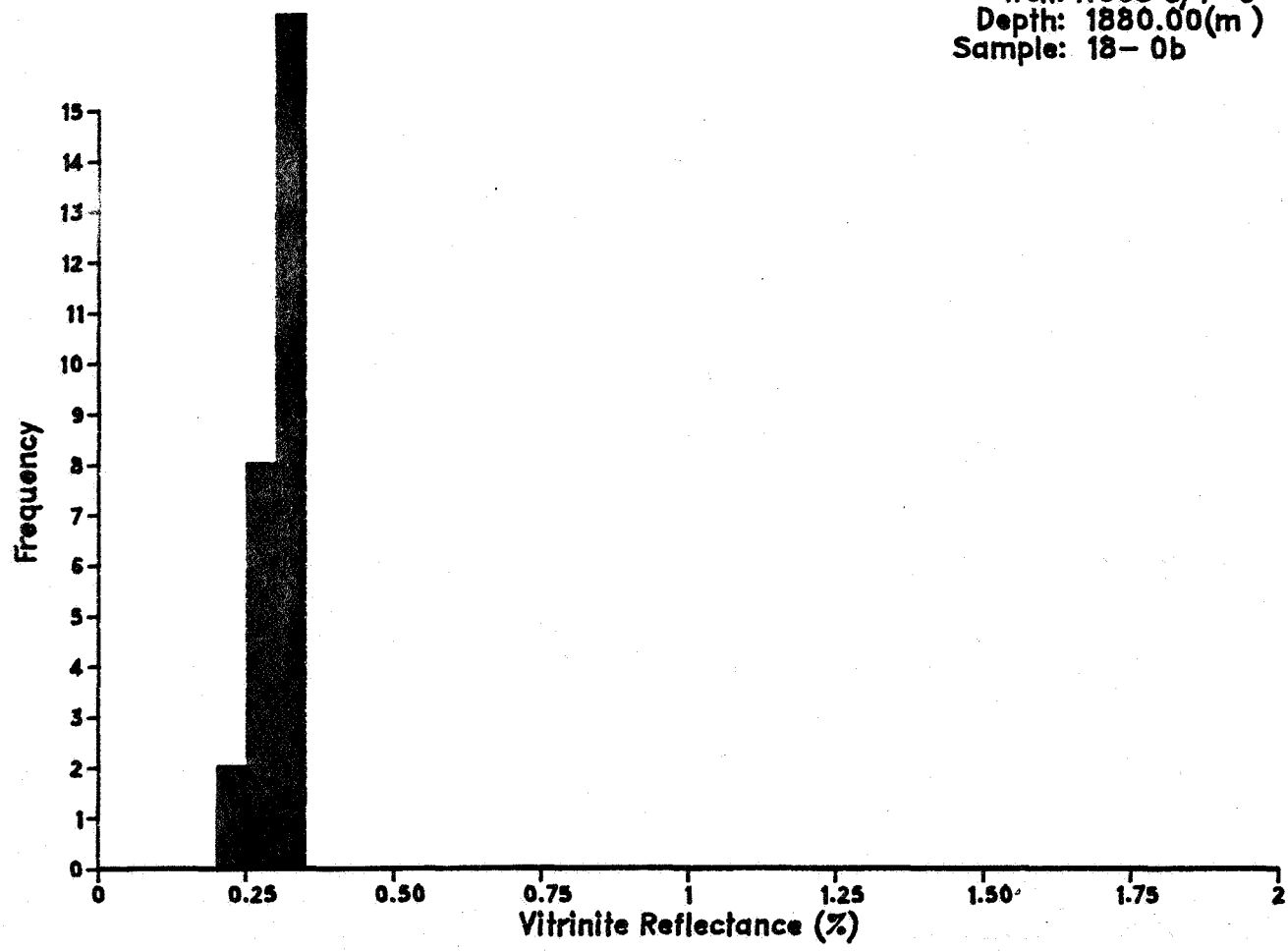
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 1880.00(m)
Sample: 18- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.175 to 0.350):	0.30	0.03	27

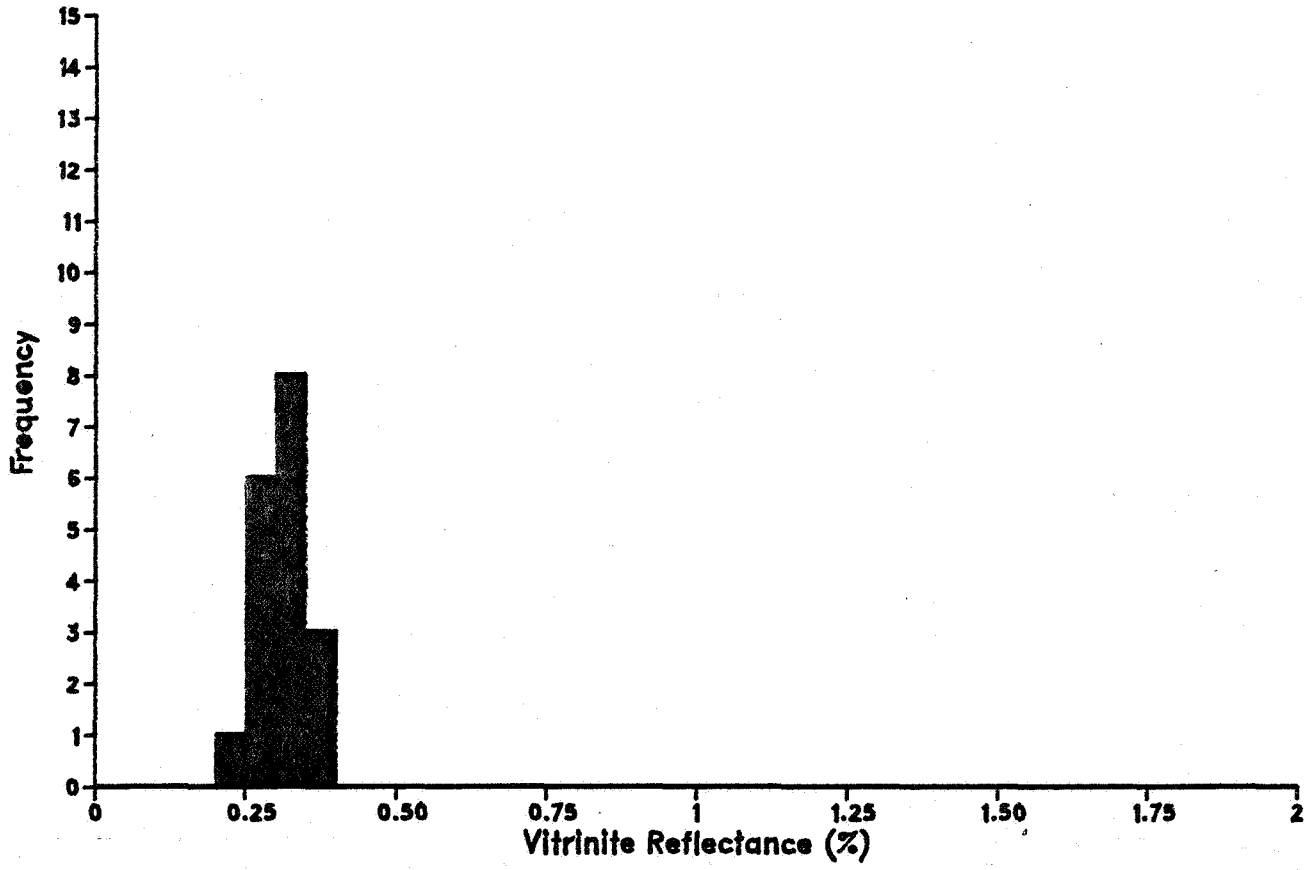
Readings:

0.236	0.242	0.251	0.270	0.275	0.282	0.287	0.290	0.292	0.299
0.302	0.303	0.304	0.307	0.310	0.316	0.320	0.324	0.325	0.325
0.325	0.326	0.328	0.329	0.330	0.341	0.344			

Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 1980.00(m)
Sample: 19- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.175 to 0.400):	0.31	0.03	18

Readings:

0.241	0.262	0.281	0.281	0.283	0.293	0.296	0.309	0.312	0.313
0.318	0.319	0.332	0.347	0.348	0.356	0.358	0.364		

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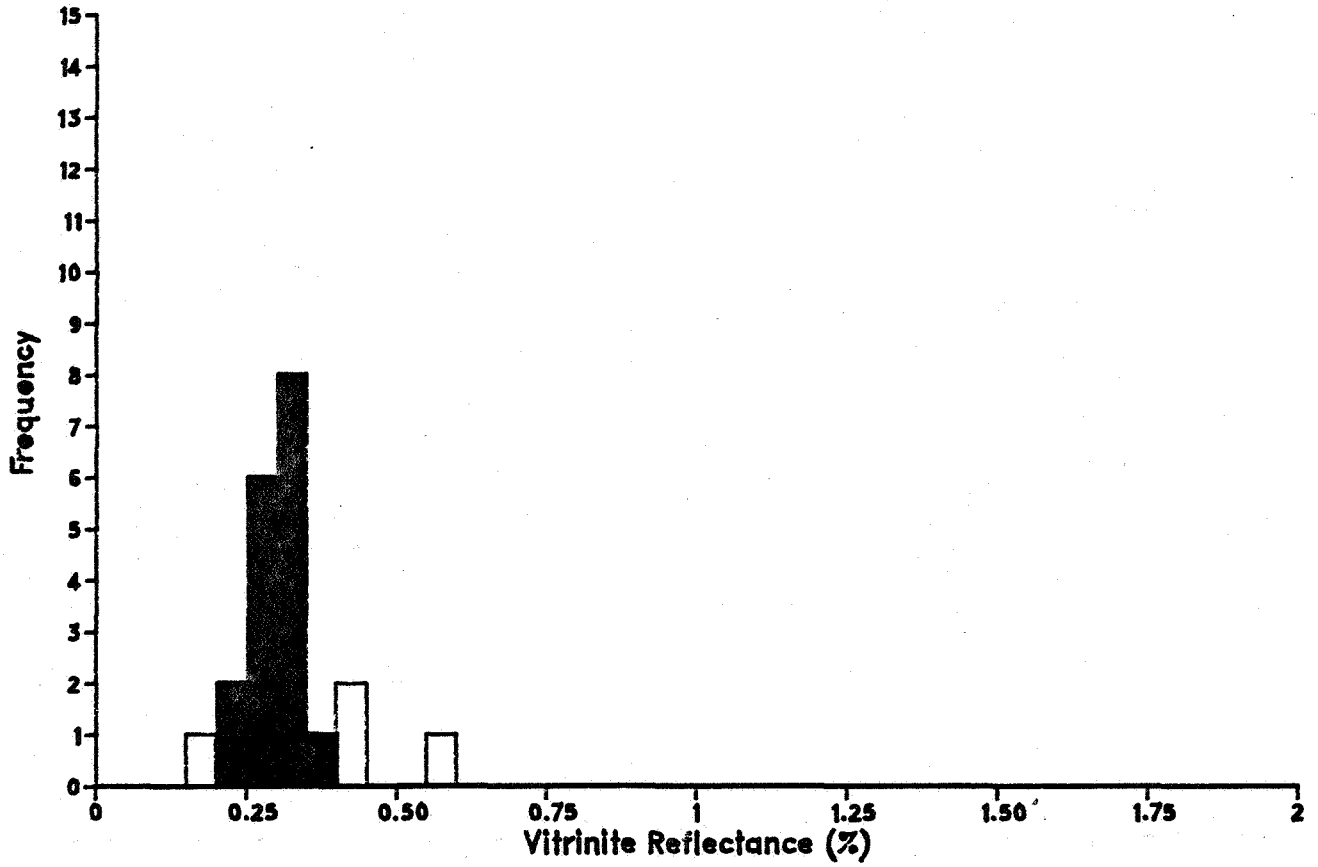
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 2080.00(m)
Sample: 31- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.200 to 0.400):	0.30	0.04	17
Population Two (from 0.150 to 0.200):	0.19	0.00	1
Population Three (from 0.400 to 0.600):	0.47	0.08	3

Readings:

0.193	0.236	0.240	0.259	0.266	0.279	0.284	0.293	0.298	0.306
0.307	0.313	0.323	0.331	0.343	0.348	0.349	0.364	0.419	0.425
0.557									

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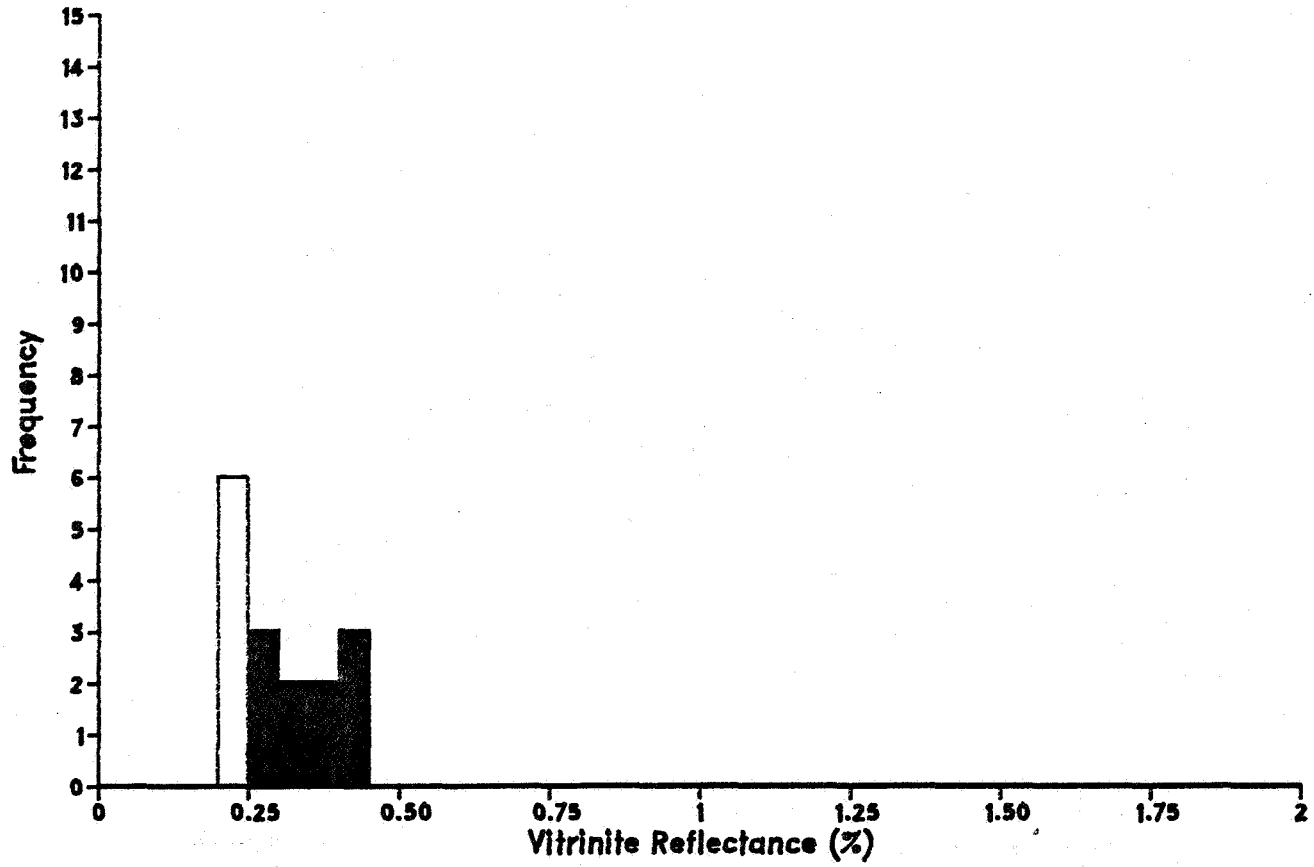
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 2180.00(m)
Sample: 41- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.250 to 0.450):	0.35	0.06	10
Population Two (from 0.200 to 0.250):	0.23	0.01	6

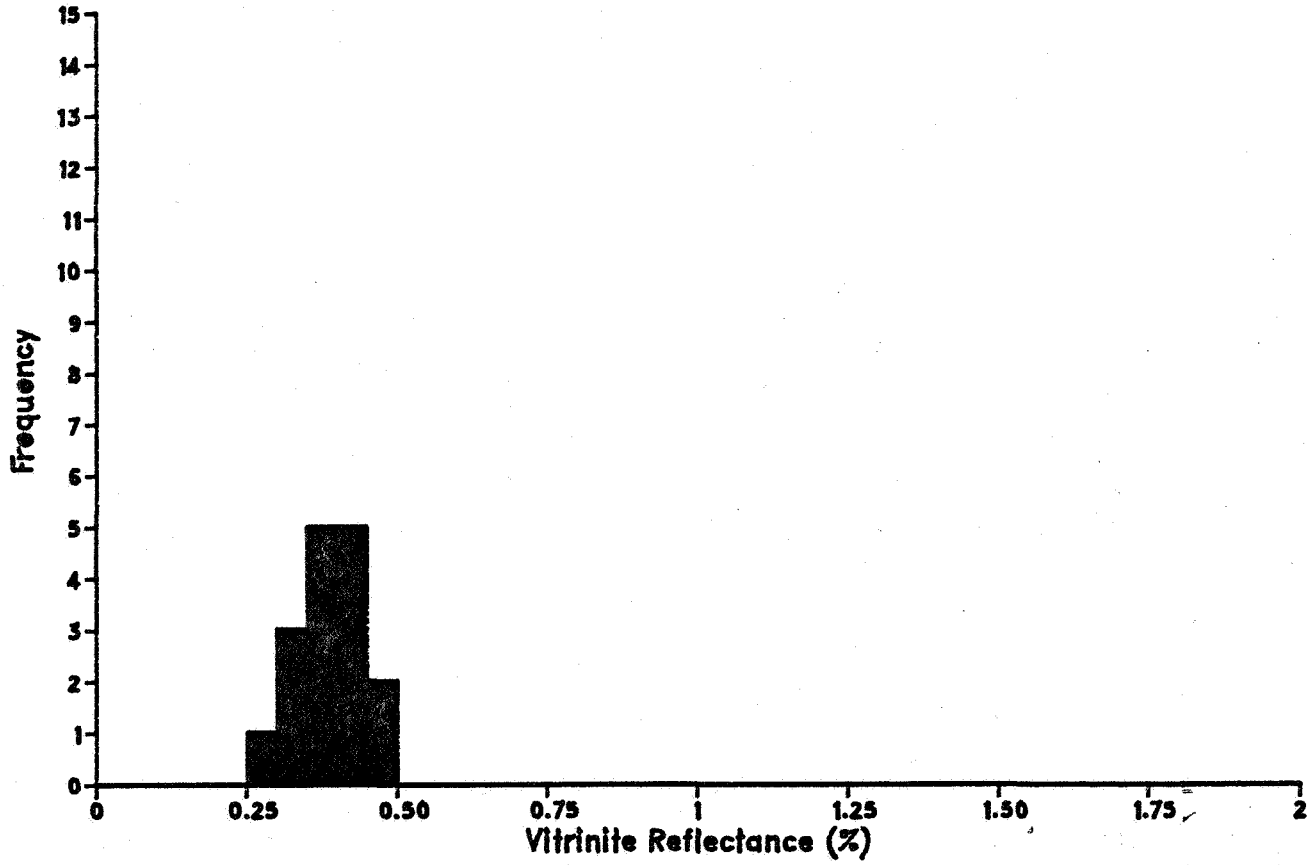
Readings:

0.210	0.223	0.224	0.226	0.240	0.246	0.260	0.276	0.281	0.337
0.342	0.355	0.371	0.409	0.433	0.437				

Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 2300.00(m)
Sample: 53- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.250 to 0.500):	0.39	0.05	16
Population Three (from 0.450 to 0.500):	0.46	0.00	2

Readings:

0.291	0.324	0.337	0.341	0.364	0.373	0.383	0.386	0.397	0.403
0.410	0.411	0.412	0.430	0.459	0.461				

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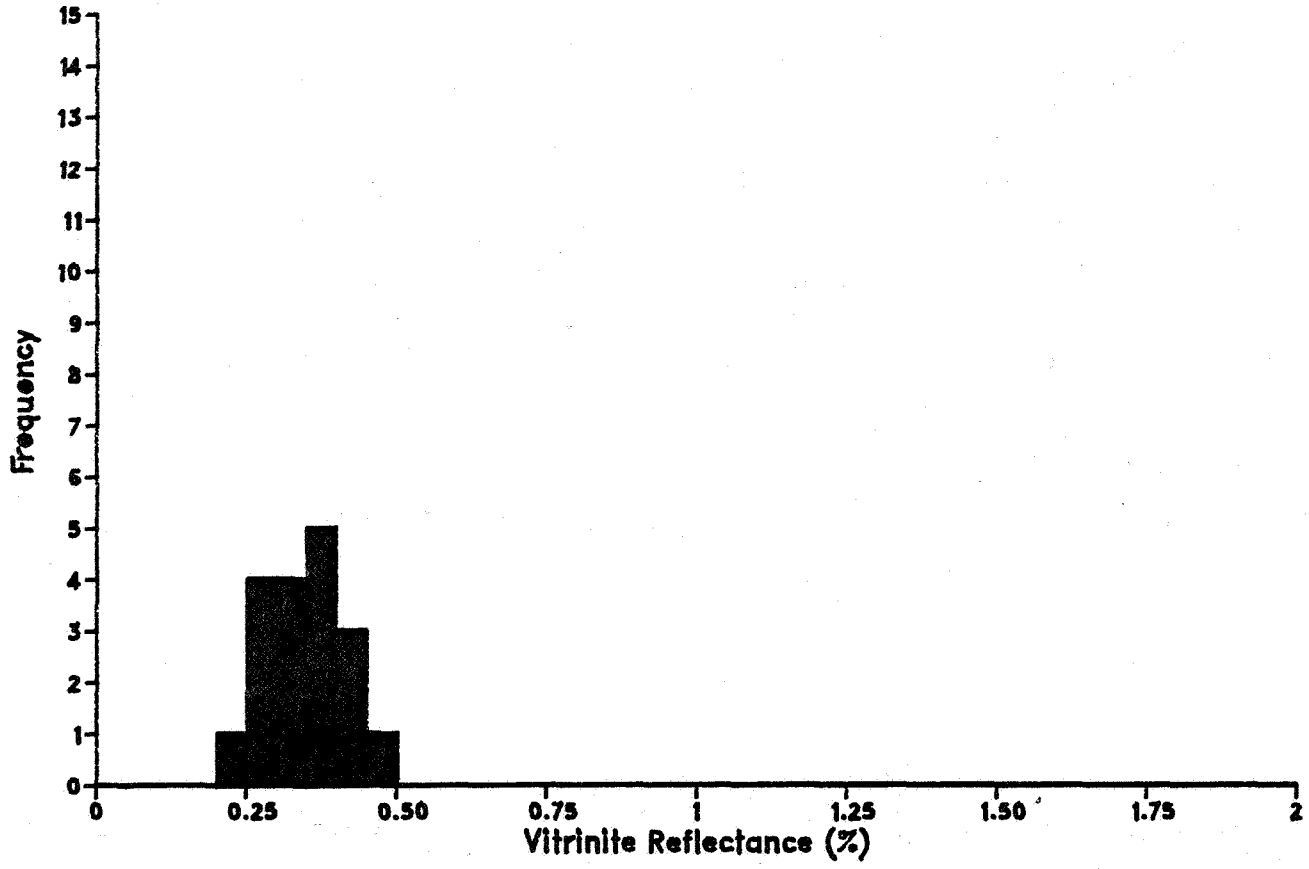
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 2400.00(m)
Sample: 63- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.200 to 0.500):	0.35	0.06	18

Readings:

0.234	0.276	0.285	0.293	0.298	0.311	0.315	0.317	0.319	0.355
0.372	0.384	0.392	0.396	0.407	0.428	0.434	0.458		

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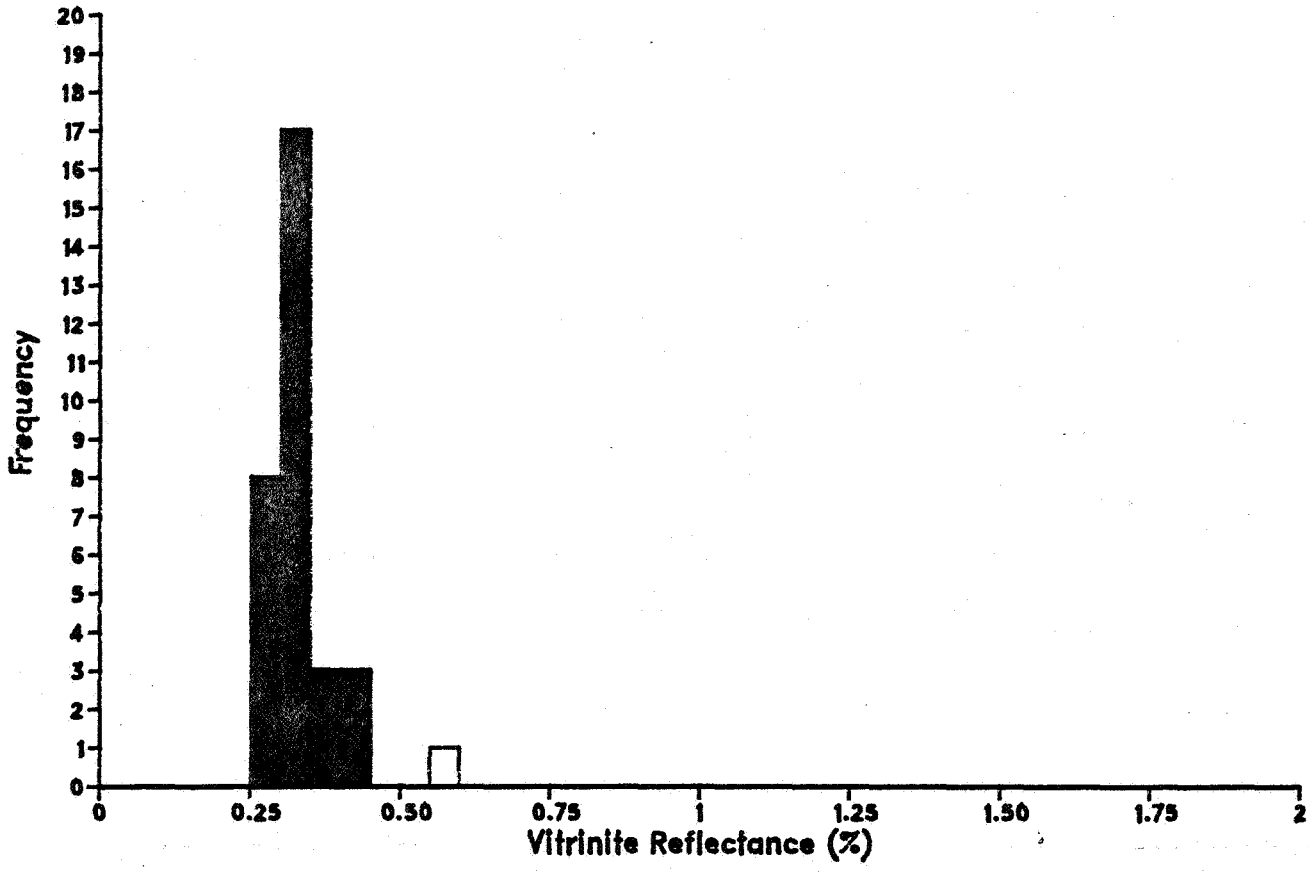
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 2500.00(m)
Sample: 73- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.250 to 0.450):	0.33	0.04	31
Population Two (from 0.550 to 0.600):	0.58	0.00	1

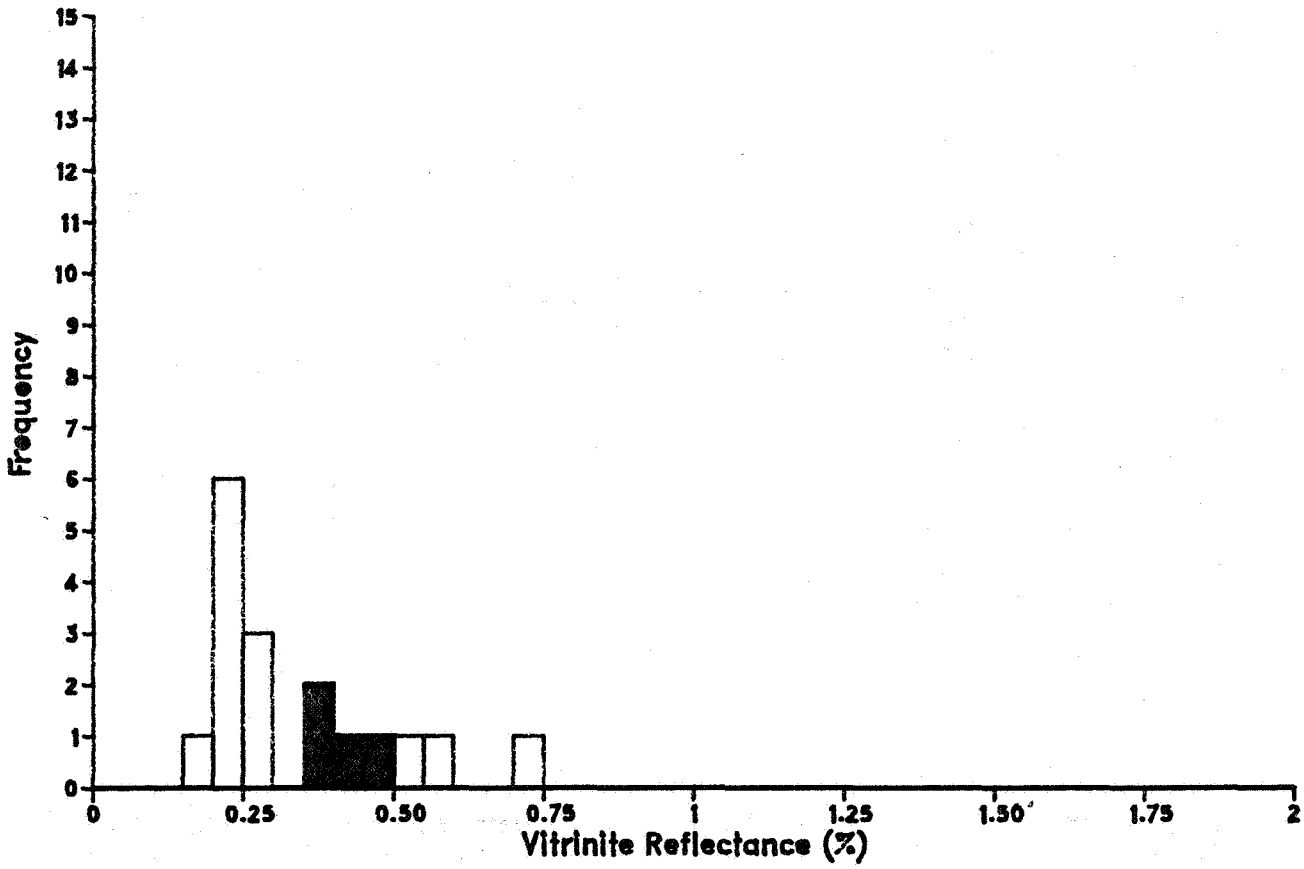
Readings:

0.251	0.272	0.274	0.284	0.286	0.293	0.293	0.299	0.306	0.307
0.308	0.313	0.318	0.320	0.322	0.326	0.330	0.332	0.334	0.336
0.338	0.339	0.340	0.341	0.347	0.357	0.365	0.382	0.405	0.413
0.414	0.576								

Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 2600.00(m)
Sample: 83- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.350 to 0.500):	0.42	0.06	4
Population Two (from 0.150 to 0.300):	0.23	0.03	10
Population Three (from 0.500 to 0.775):	0.61	0.10	3

Readings:

0.163	0.219	0.228	0.231	0.233	0.245	0.247	0.250	0.255	0.273
0.358	0.392	0.430	0.491	0.525	0.592	0.724			

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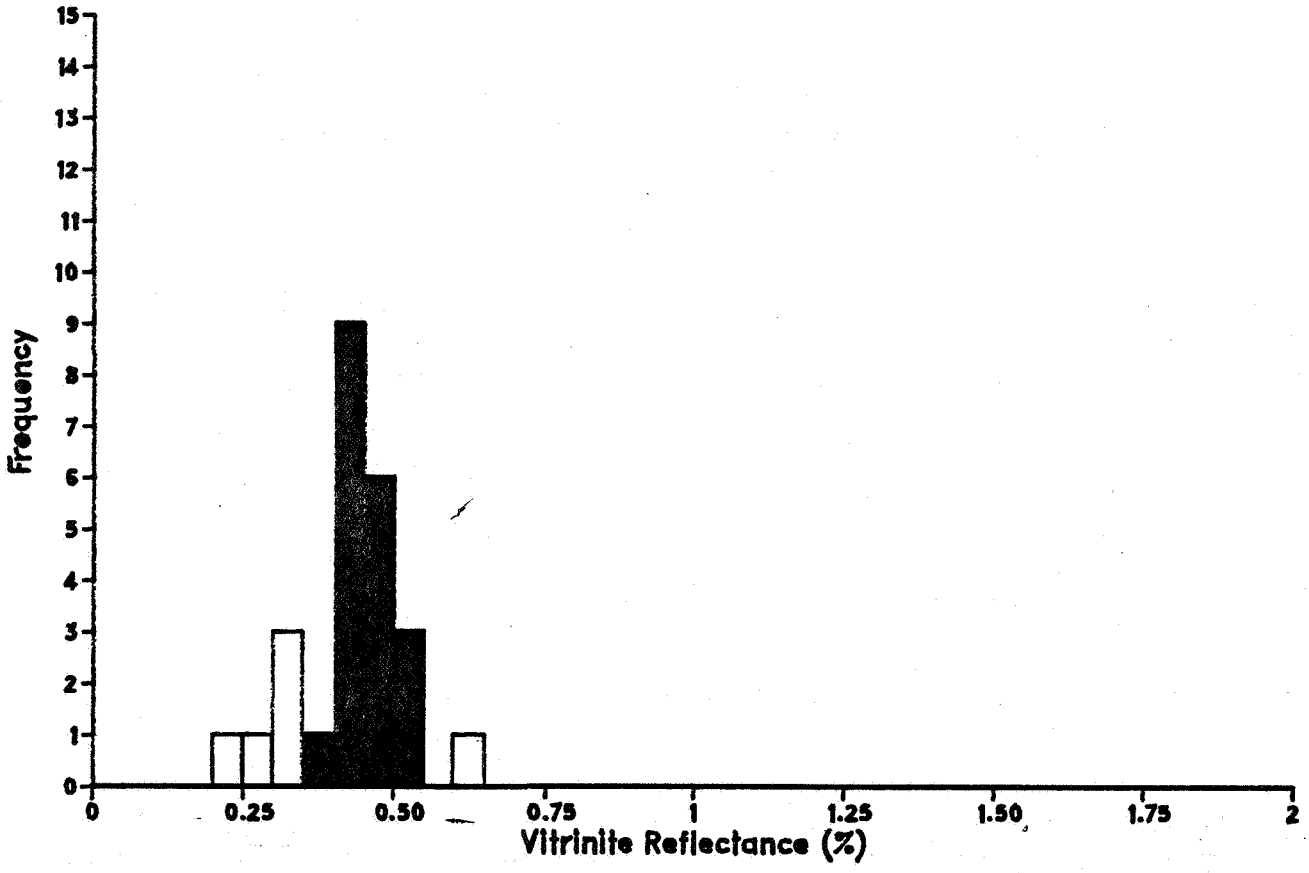
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 2700.00(m)
Sample: 93- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.350 to 0.550):	0.45	0.04	19
Population Two (from 0.200 to 0.350):	0.30	0.04	5
Population Three (from 0.600 to 0.650):	0.61	0.00	1

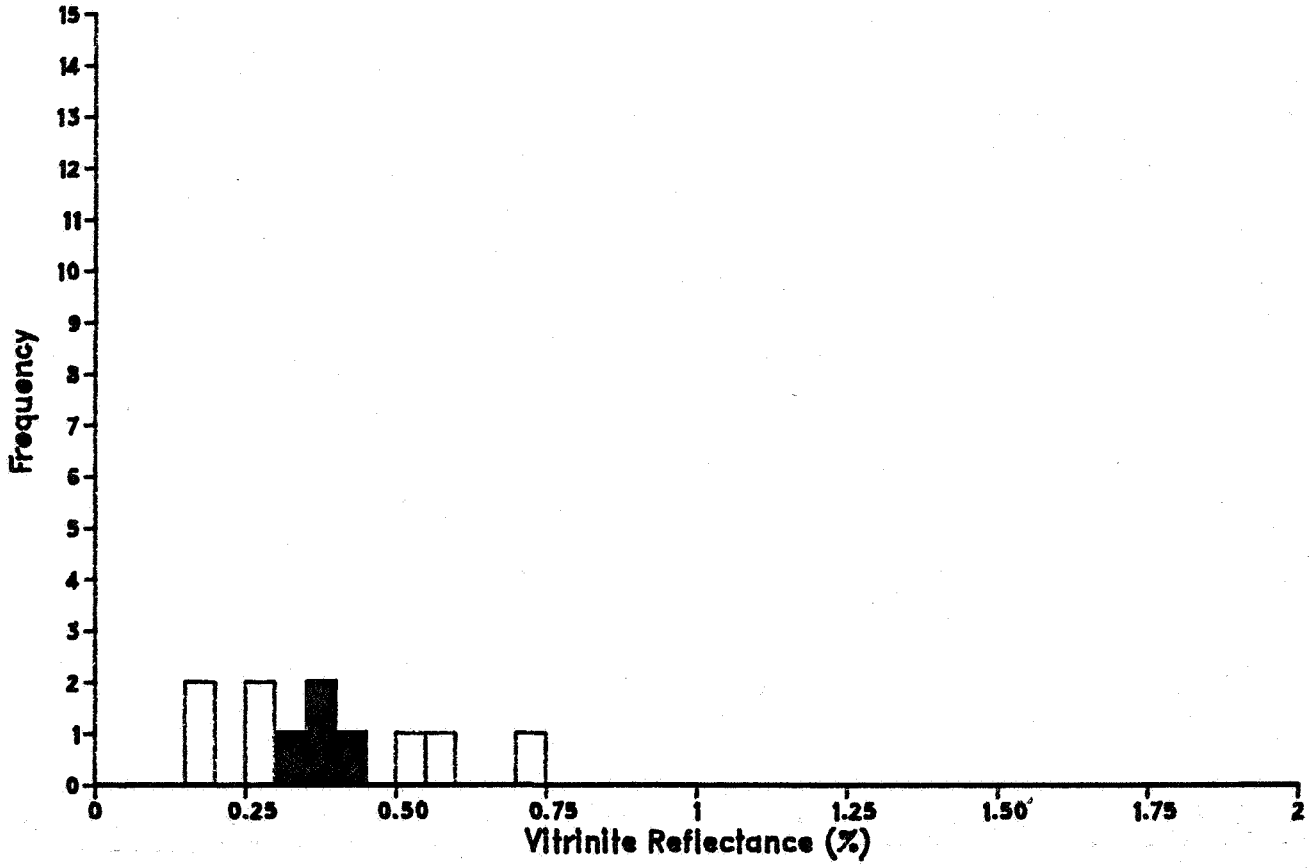
Readings:

0.244	0.278	0.307	0.314	0.336	0.369	0.404	0.409	0.410	0.426
0.428	0.431	0.432	0.443	0.444	0.457	0.461	0.463	0.466	0.475
0.479	0.517	0.521	0.549	0.607					

Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 2800.00(m)
Sample: 153- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.300 to 0.450):	0.38	0.03	4
Population Two (from 0.150 to 0.300):	0.23	0.06	4
Population Three (from 0.500 to 0.750):	0.62	0.12	3

Readings:

0.154 0.200 0.260 0.296 0.337 0.384 0.386 0.412 0.520 0.583 0.748

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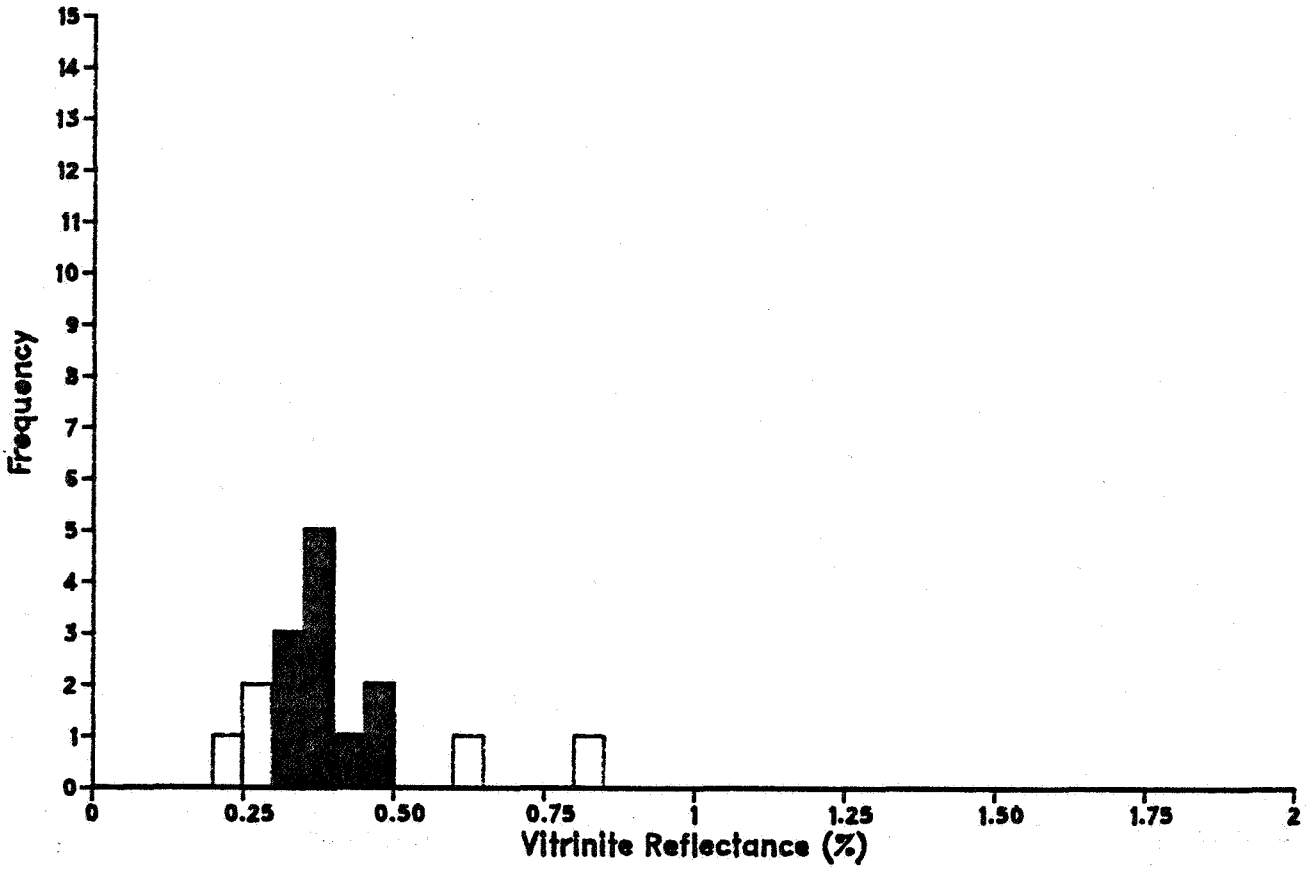
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 2908.00(m)
Sample: 171- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.300 to 0.500):	0.39	0.05	11
Population Two (from 0.200 to 0.300):	0.25	0.02	3
Population Three (from 0.600 to 0.875):	0.73	0.12	2

Readings:

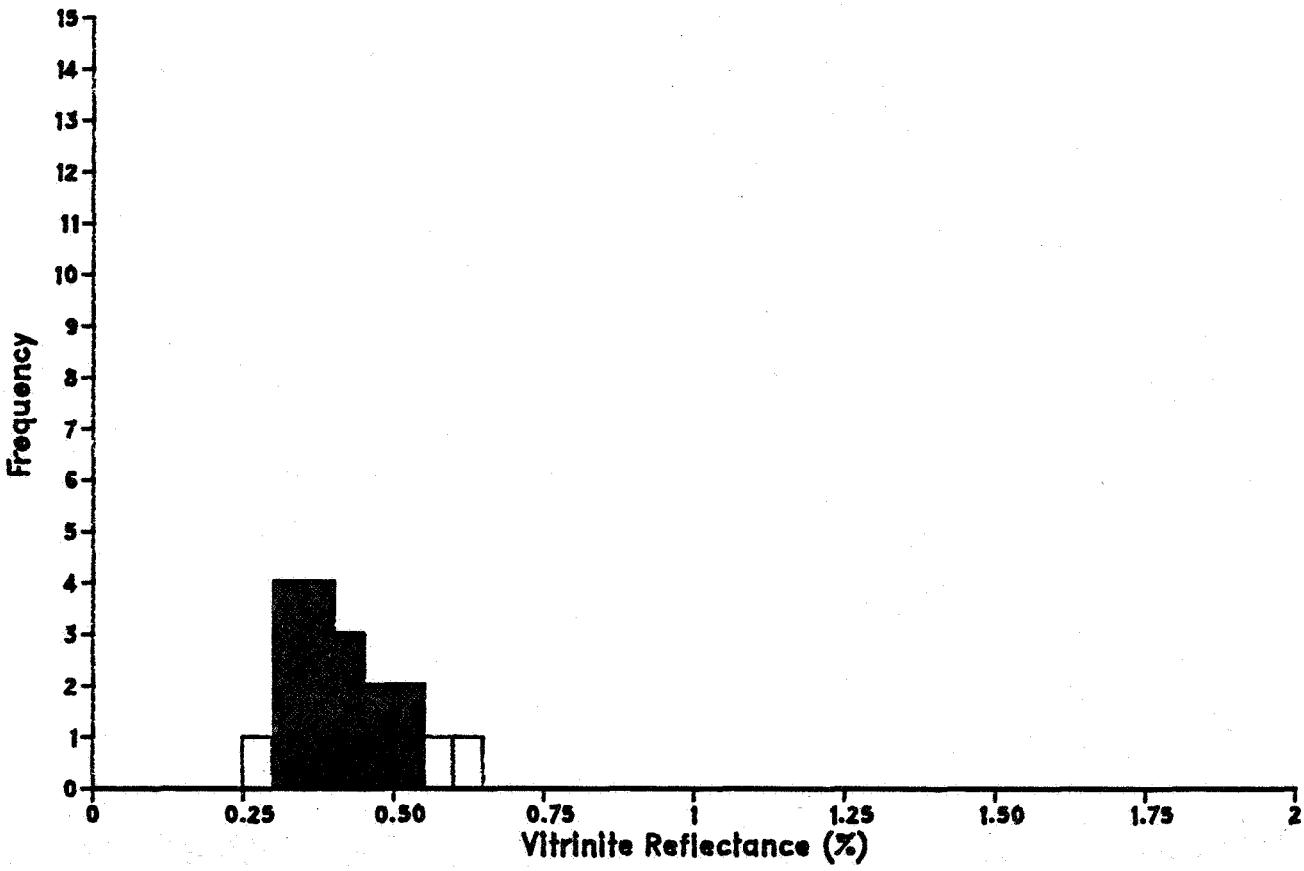
0.238	0.256	0.269	0.338	0.345	0.347	0.360	0.362	0.372	0.383
0.394	0.446	0.456	0.493	0.647	0.812				

GEOLAB NOR a/s – Geochemical Laboratories of Norway

Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 3241.00(m)
Sample: 210- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.300 to 0.550):	0.41	0.07	15
Population Two (from 0.250 to 0.300):	0.26	0.00	1
Population Three (from 0.550 to 0.650):	0.61	0.04	2

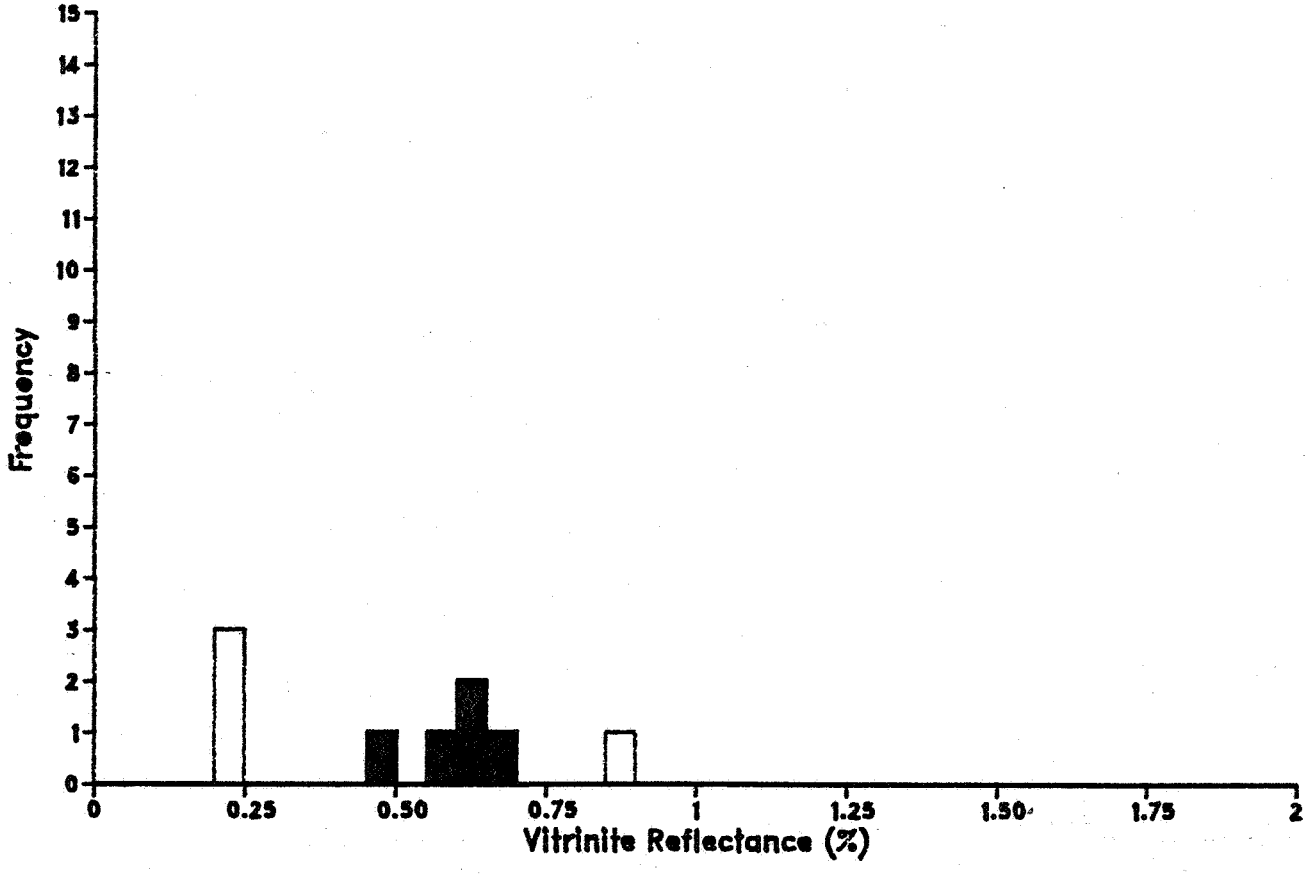
Readings:

0.260	0.336	0.339	0.343	0.347	0.352	0.354	0.368	0.374	0.430
0.433	0.435	0.488	0.493	0.501	0.514	0.576	0.638		

Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 3338.00(m)
Sample: 106- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.450 to 0.700):	0.59	0.07	5
Population Two (from 0.200 to 0.250):	0.22	0.02	3
Population Three (from 0.850 to 0.900):	0.88	0.00	1

Readings:

0.206 0.225 0.239 0.473 0.590 0.604 0.614 0.660 0.883

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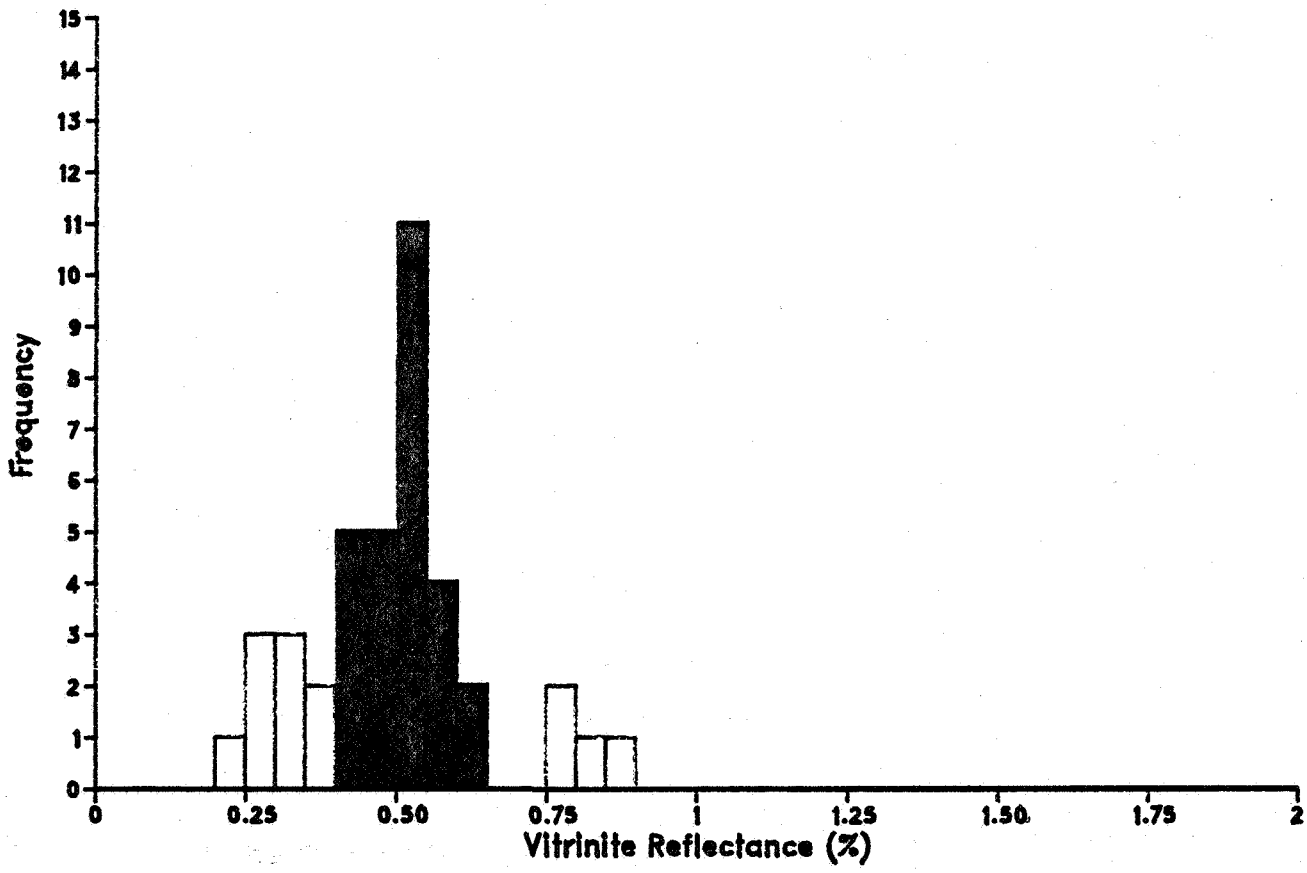
Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 3434.00(m)
Sample: 129- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.400 to 0.650):	0.51	0.06	27
Population Two (from 0.200 to 0.400):	0.30	0.05	9
Population Three (from 0.750 to 0.900):	0.81	0.05	4

Readings:

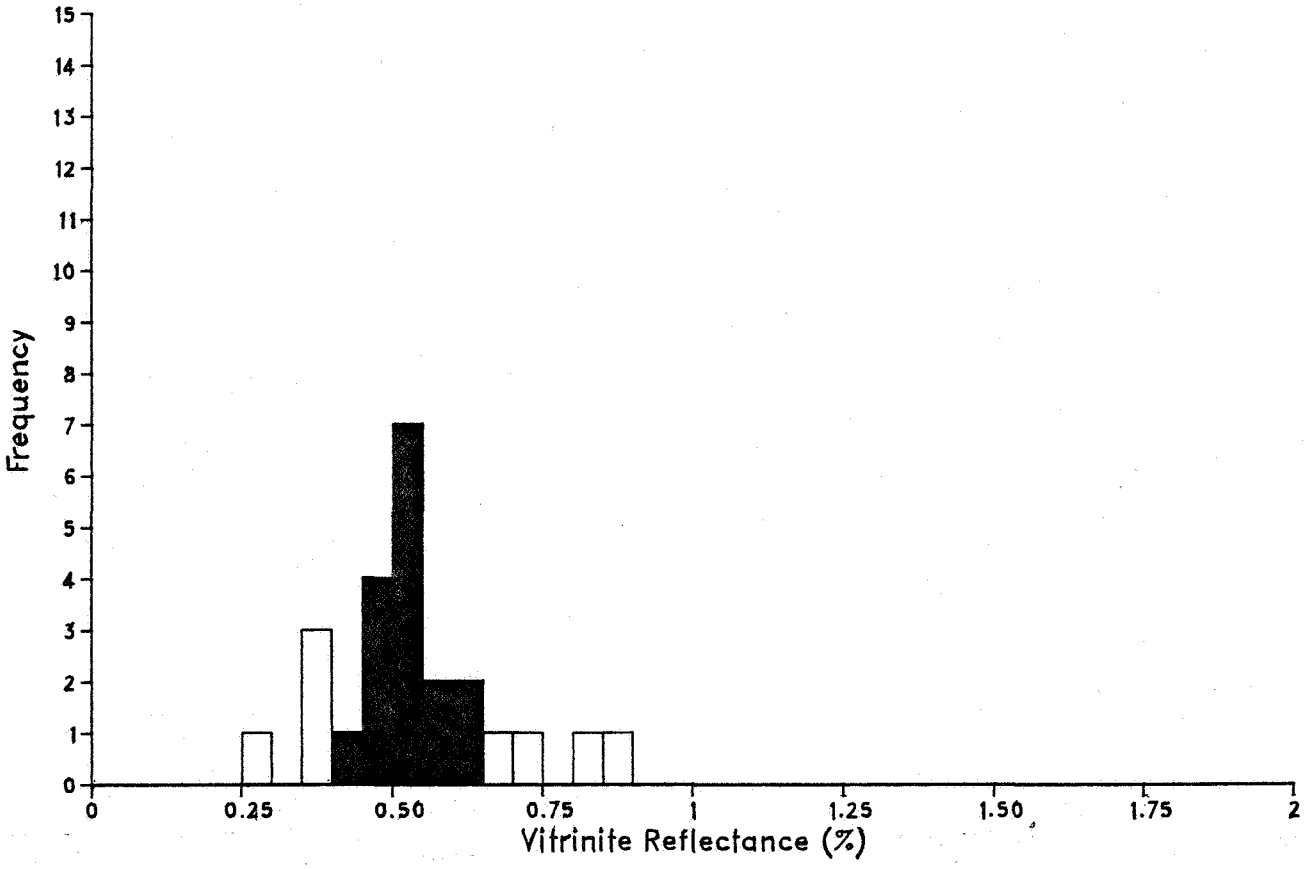
0.221	0.261	0.279	0.287	0.307	0.312	0.338	0.362	0.372	0.404
0.408	0.410	0.415	0.448	0.453	0.458	0.487	0.487	0.489	0.502
0.506	0.516	0.518	0.522	0.524	0.531	0.534	0.540	0.543	0.543
0.556	0.560	0.575	0.595	0.619	0.631	0.756	0.778	0.822	0.872

GEOLAB NOR a/s – Geochemical Laboratories of Norway

Vitrinite Reflectance Histogram

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Well: NOCS 3/7-3
Depth: 3508.00(m)
Sample: 143- 0b



Statistics:	Mean	St.Dev.	n
Indigenous Population (from 0.400 to 0.650):	0.52	0.05	16
Population Two (from 0.250 to 0.400):	0.36	0.06	4
Population Three (from 0.650 to 0.900):	0.77	0.08	4

Readings:

0.274	0.379	0.379	0.394	0.449	0.457	0.463	0.478	0.479	0.503
0.504	0.504	0.505	0.510	0.538	0.541	0.553	0.561	0.611	0.619
0.698	0.704	0.813	0.871						

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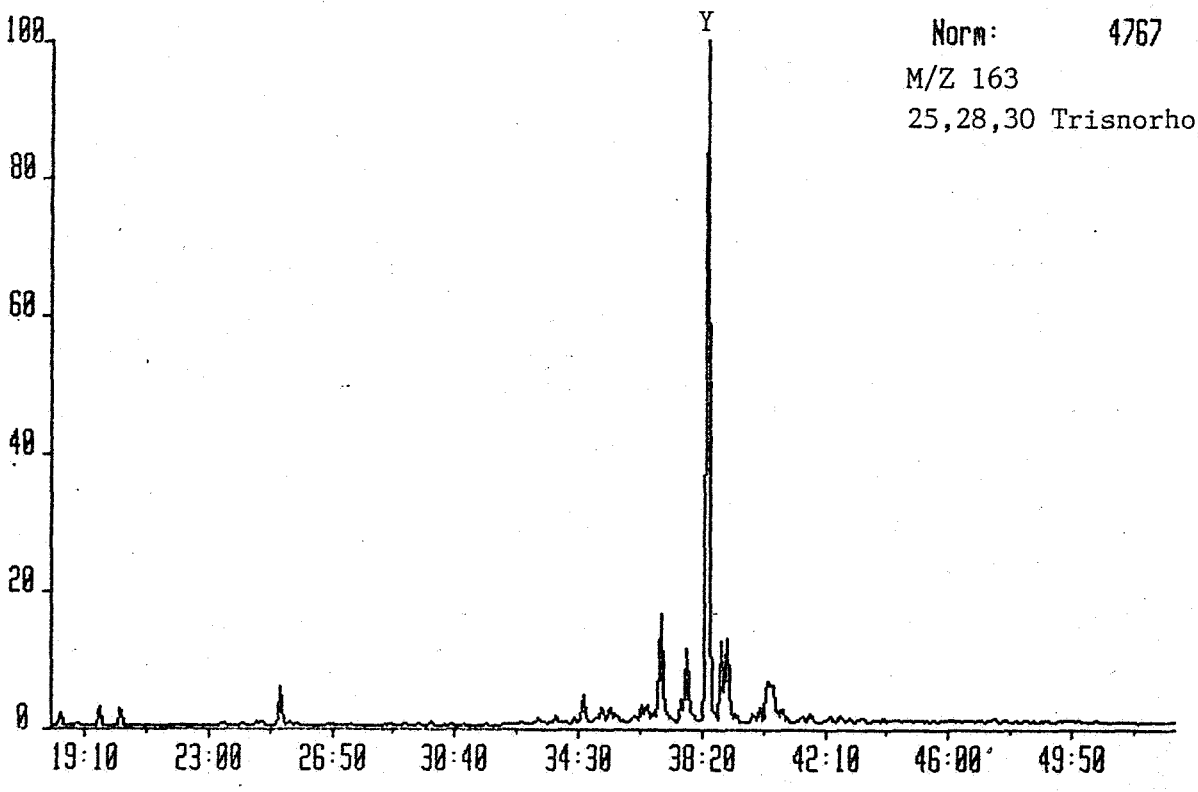
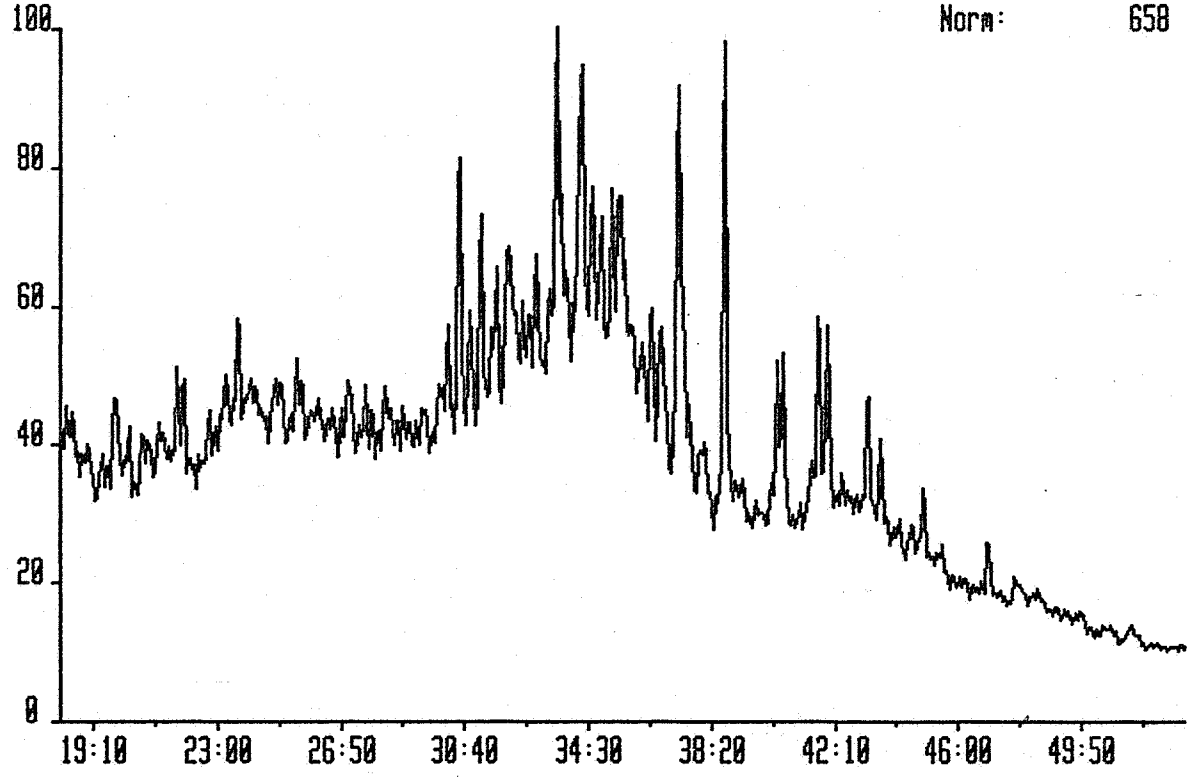
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

EXAMPLE OF PEAK IDENTIFICATION FOR 25, 28, 30 TRISNORHOPANE/MORETANE

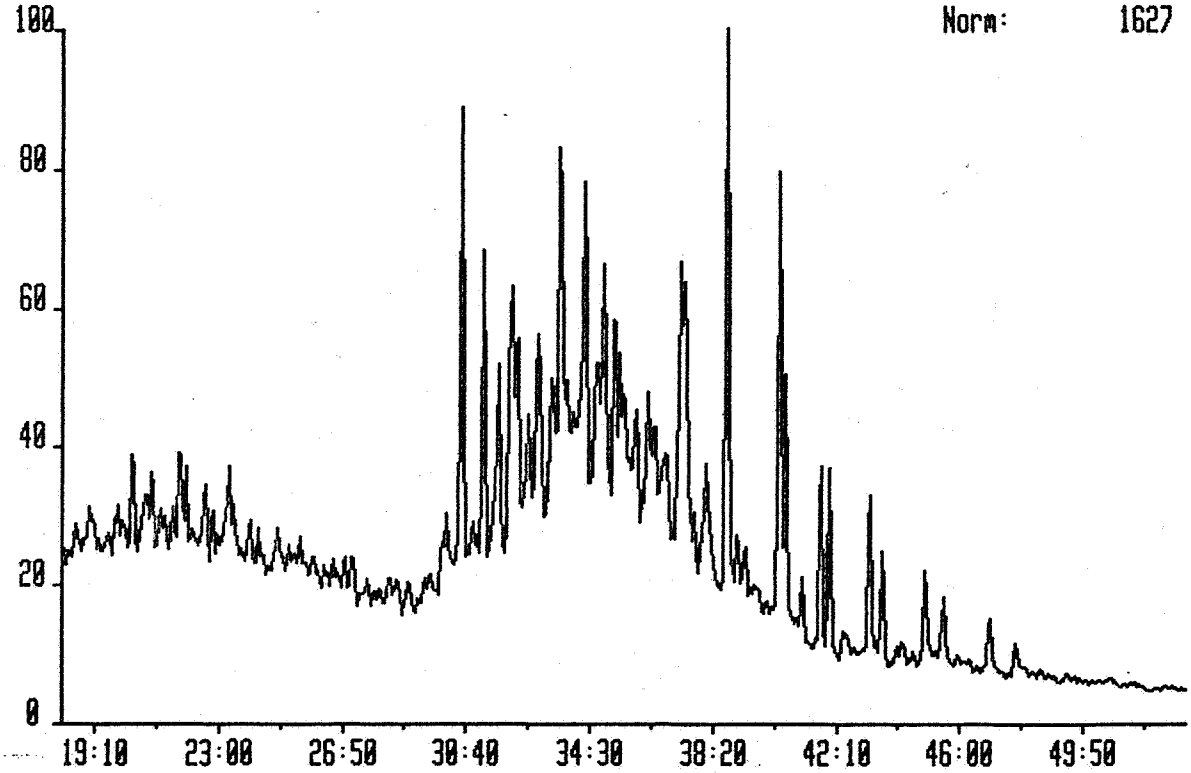


Norm: 4767
M/Z 163
25,28,30 Trisnorhopane/Moretane

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 163.1485
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

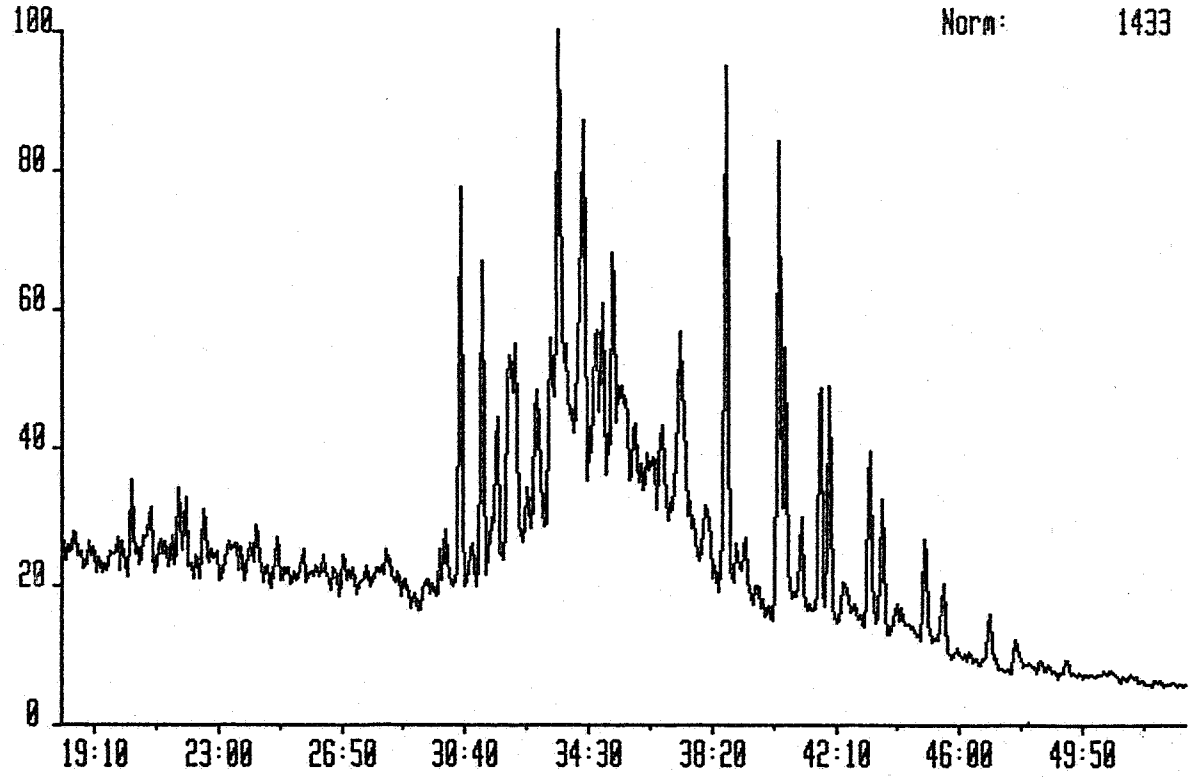


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 163.1485
Text:WELL 3/7-3,3446M, SATURATED FRACTION



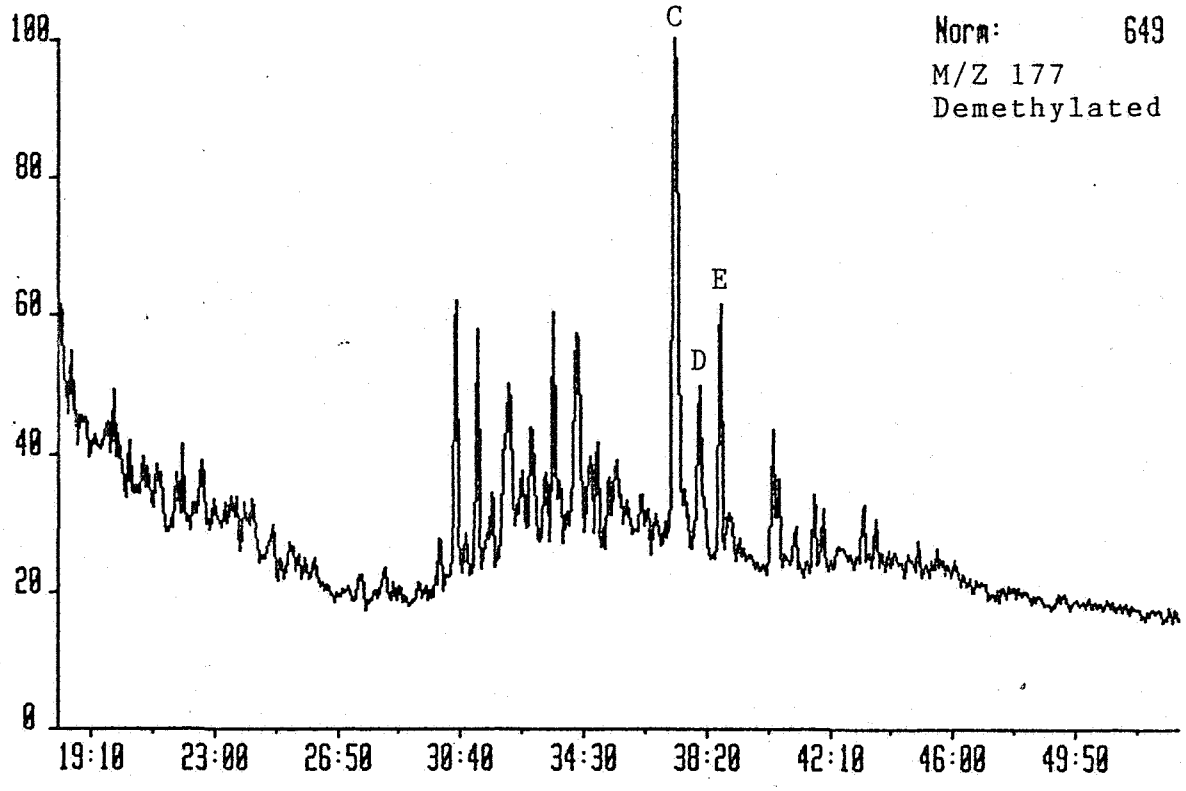
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 163.1485
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

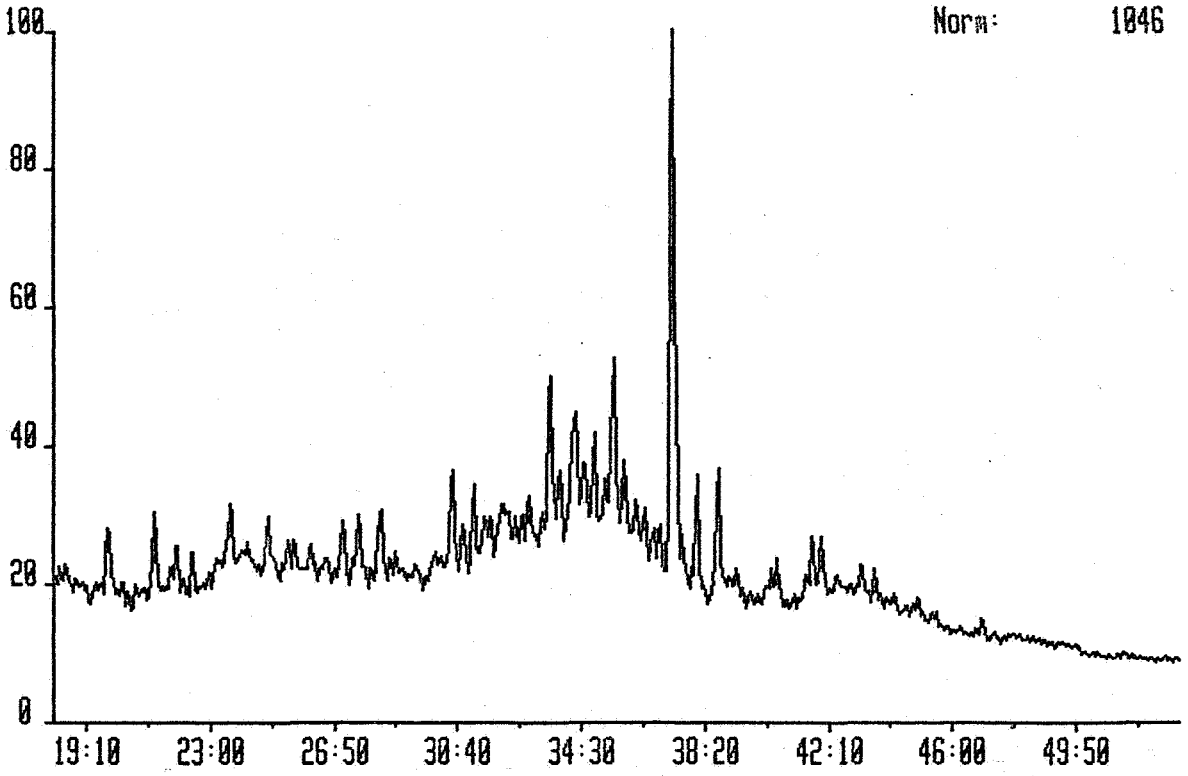


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

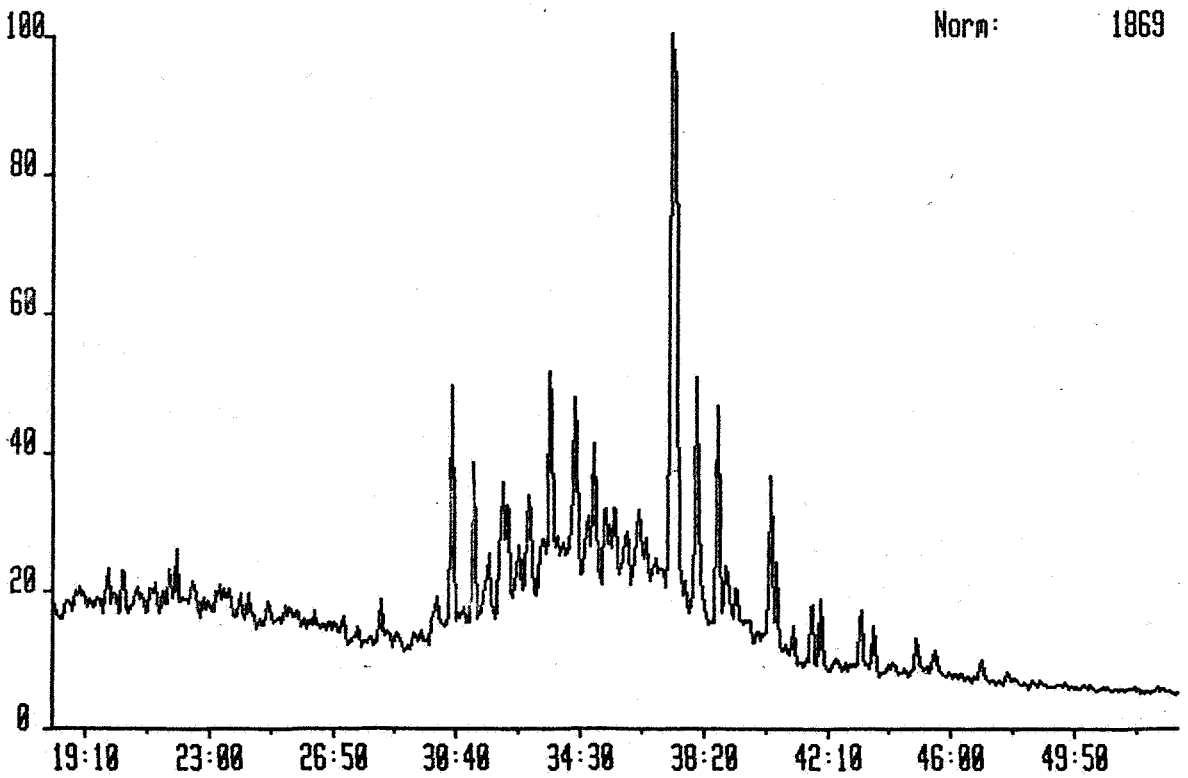
EXAMPLE OF PEAK IDENTIFICATION FOR DEMETHYLATED TRITERPANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 177.1642
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

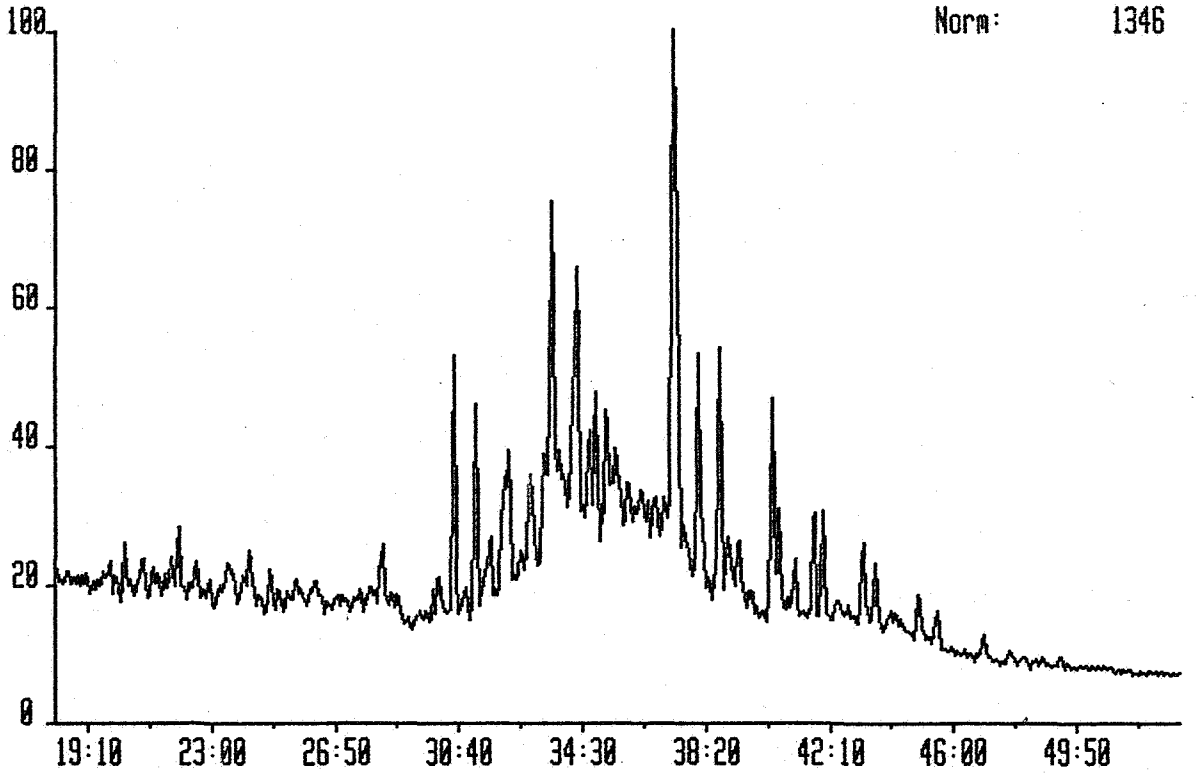


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 177.1642
Text:WELL 3/7-3,3446M, SATURATED FRACTION



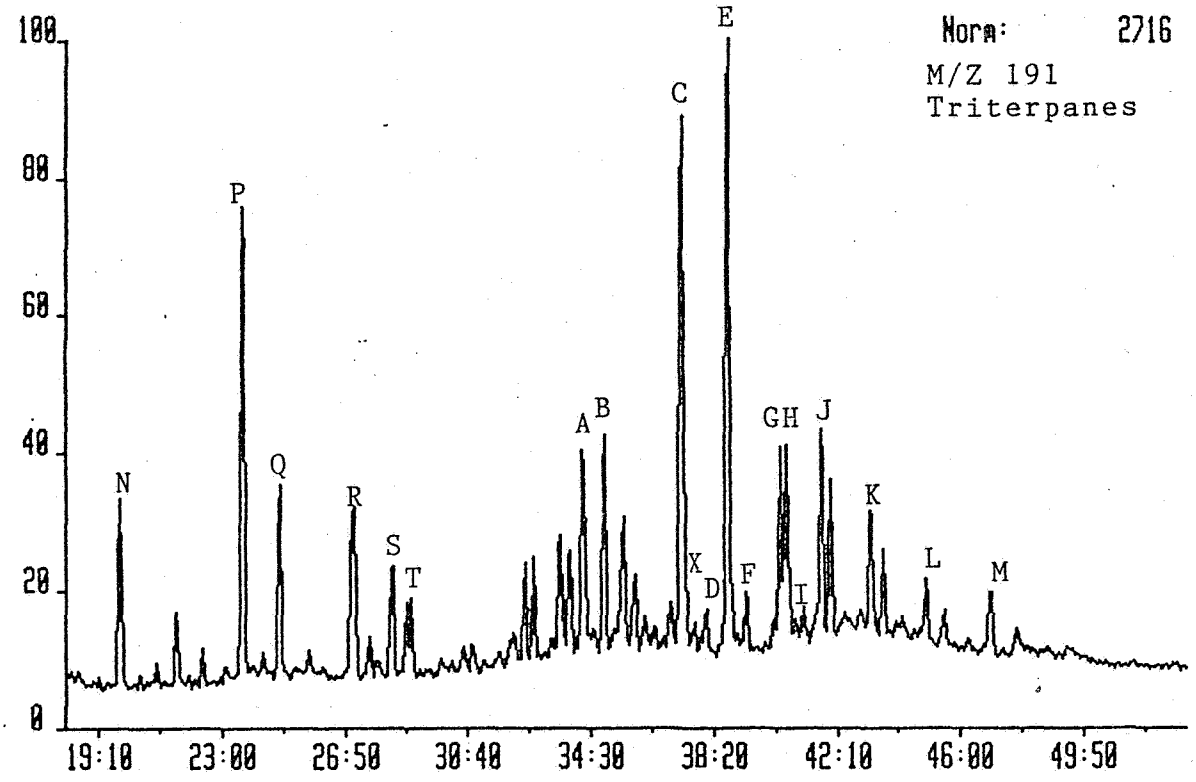
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 177.1642
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

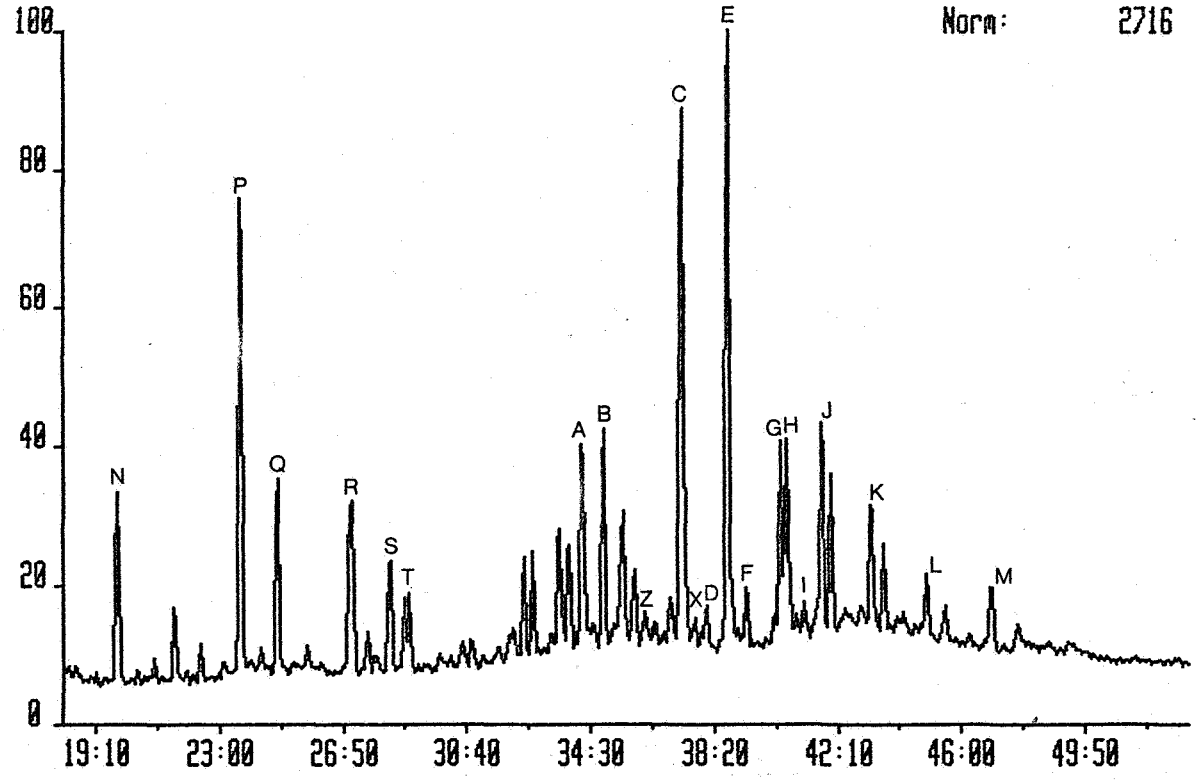


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

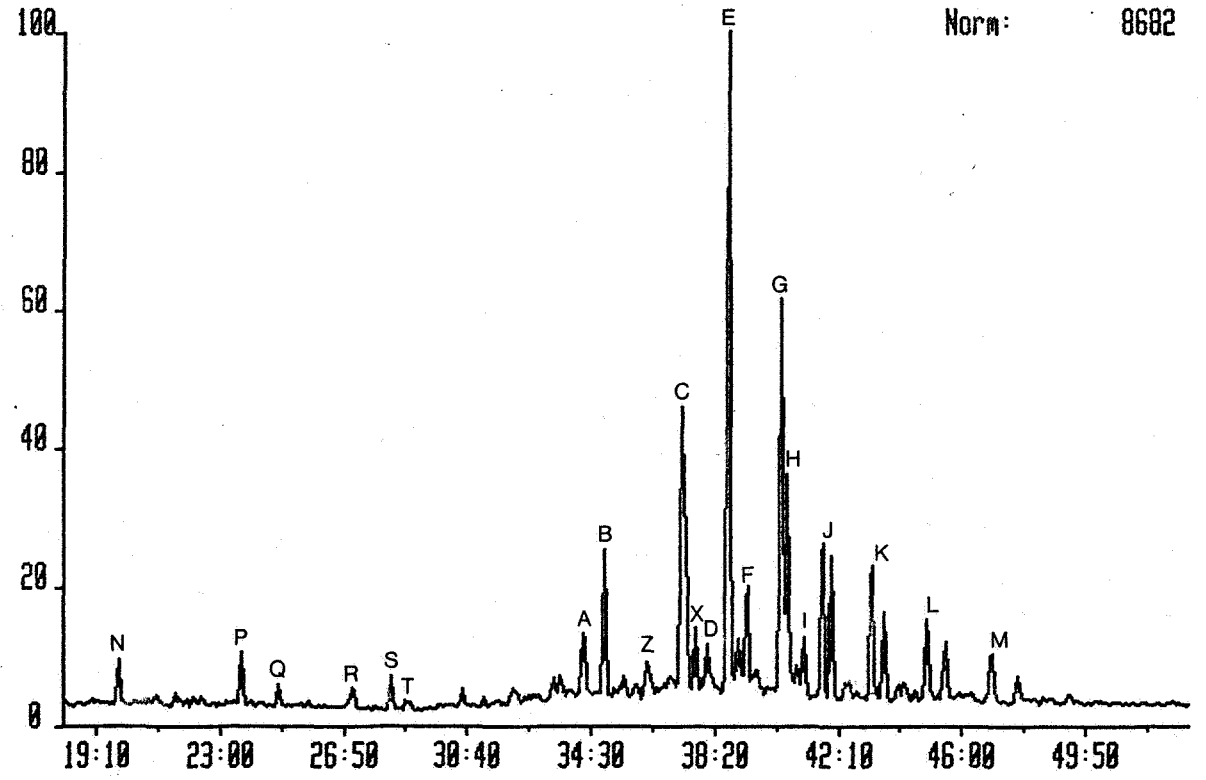
EXAMPLE OF PEAK IDENTIFICATION FOR TRITERPANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 191.1800
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

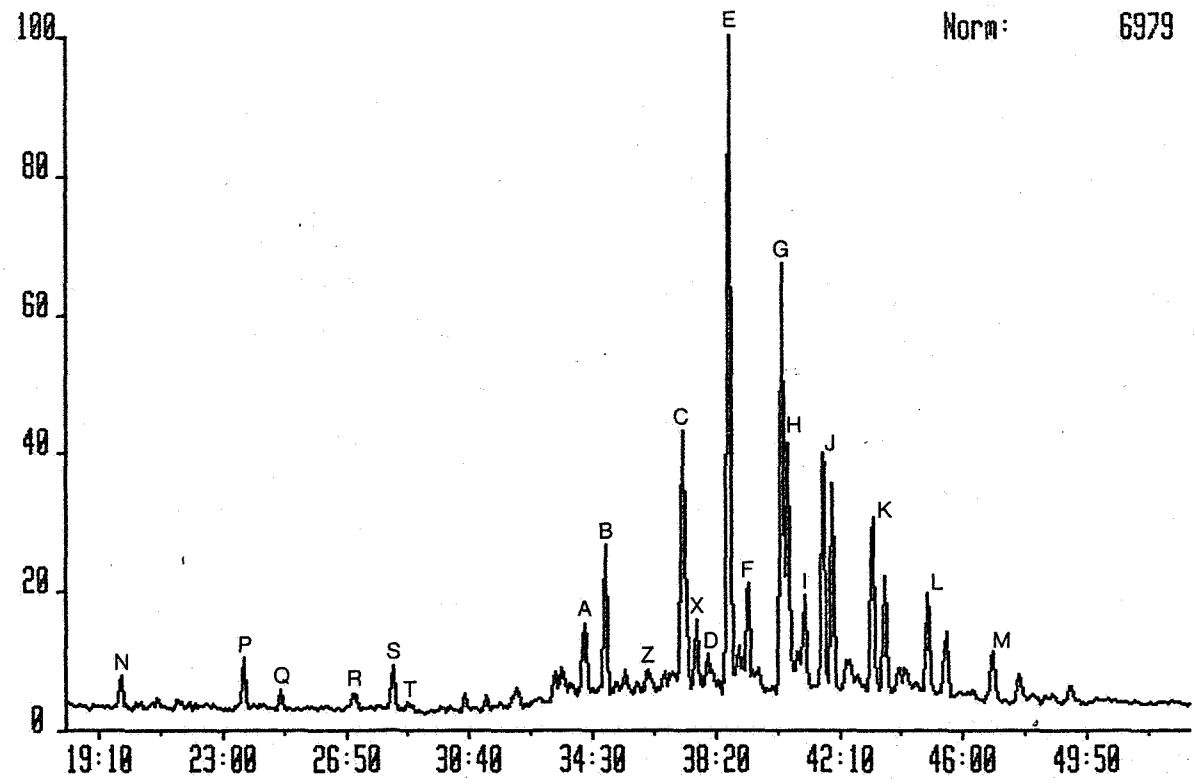


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 191.1800
Text:WELL 3/7-3,3446M, SATURATED FRACTION



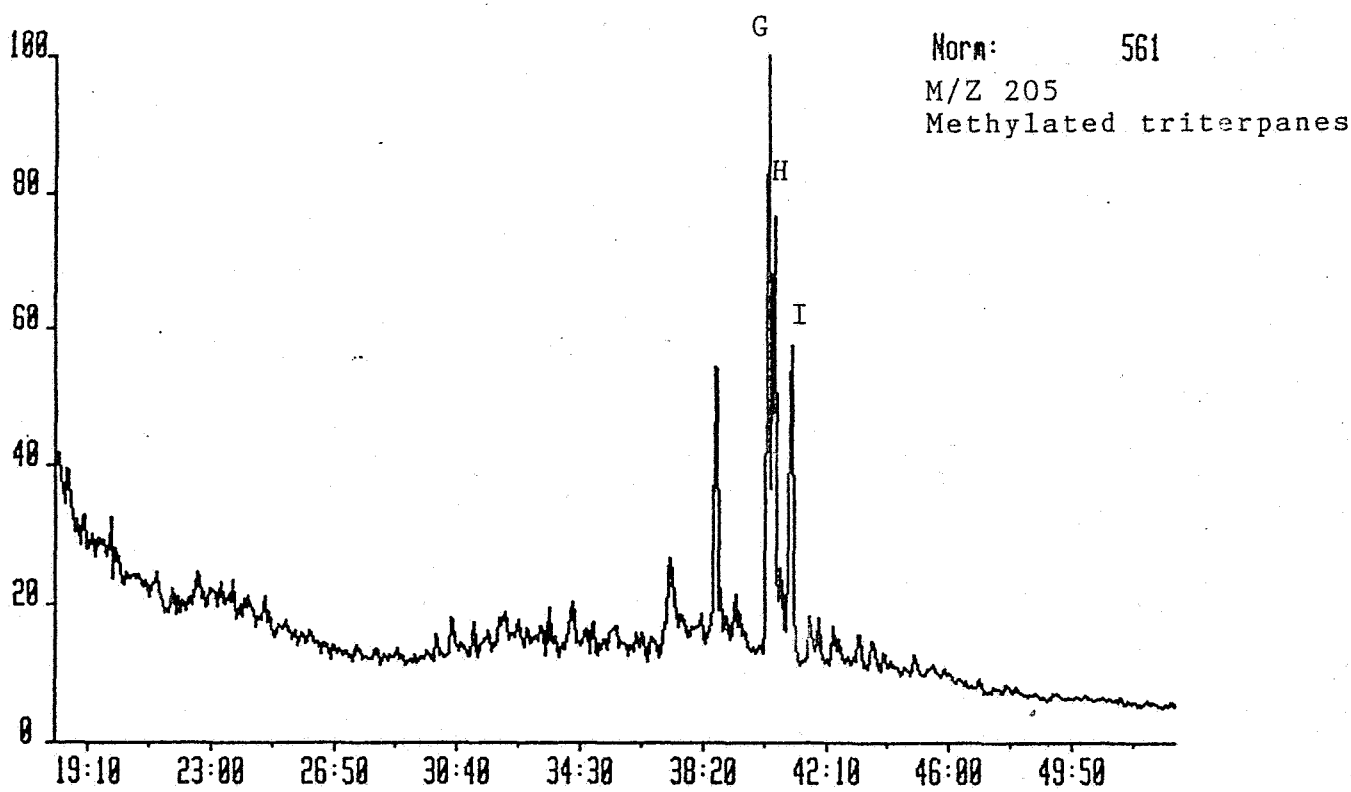
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 191.1800
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

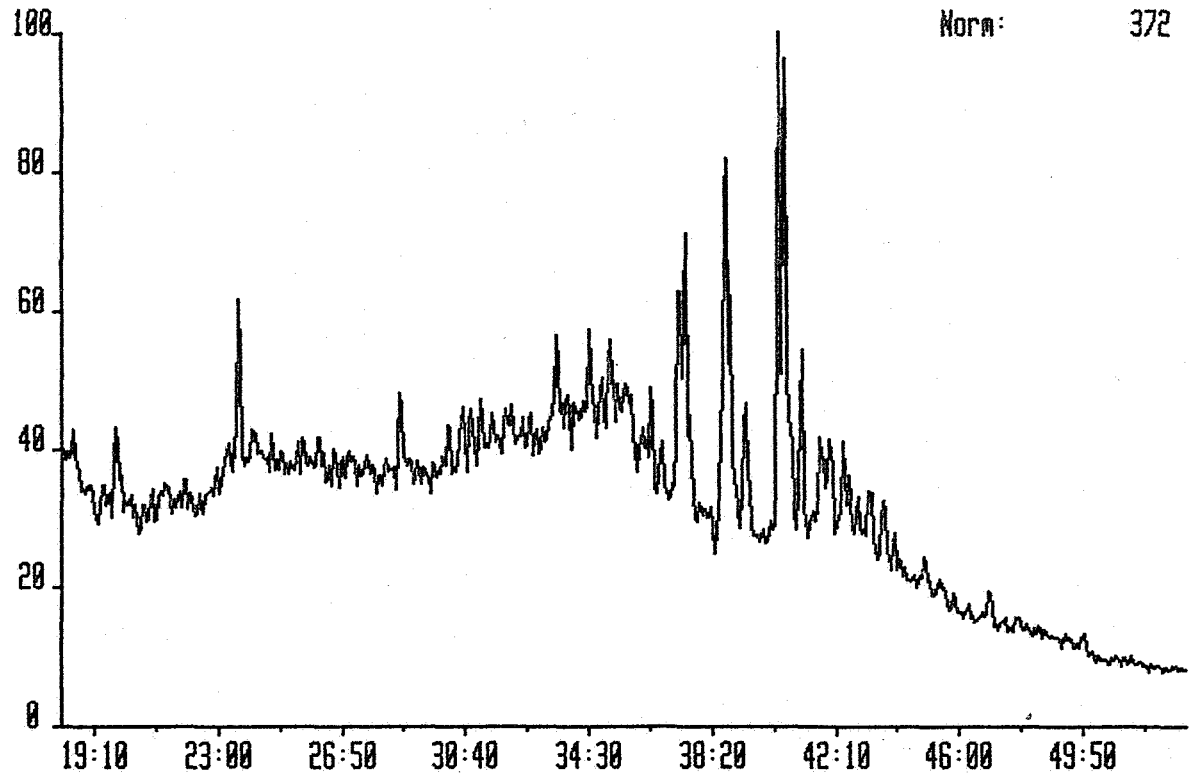


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

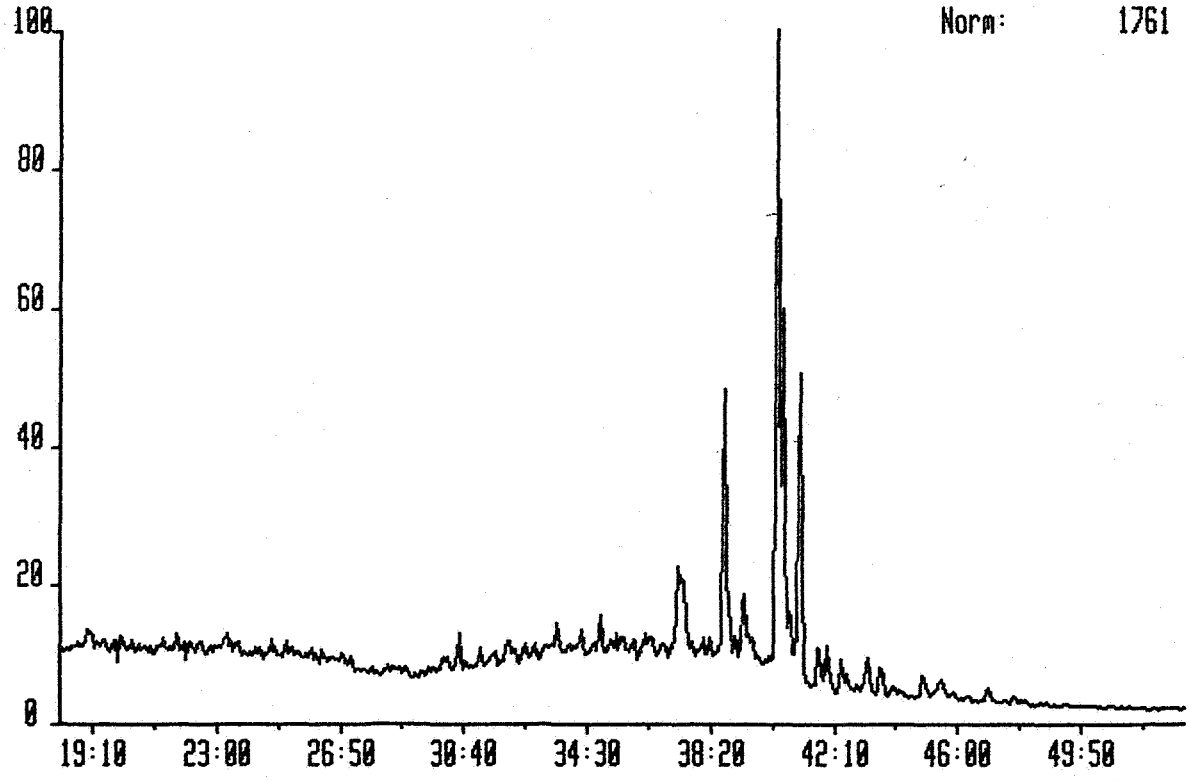
EXAMPLE OF IDENTIFICATION FOR METHYLATED TRITERPANES



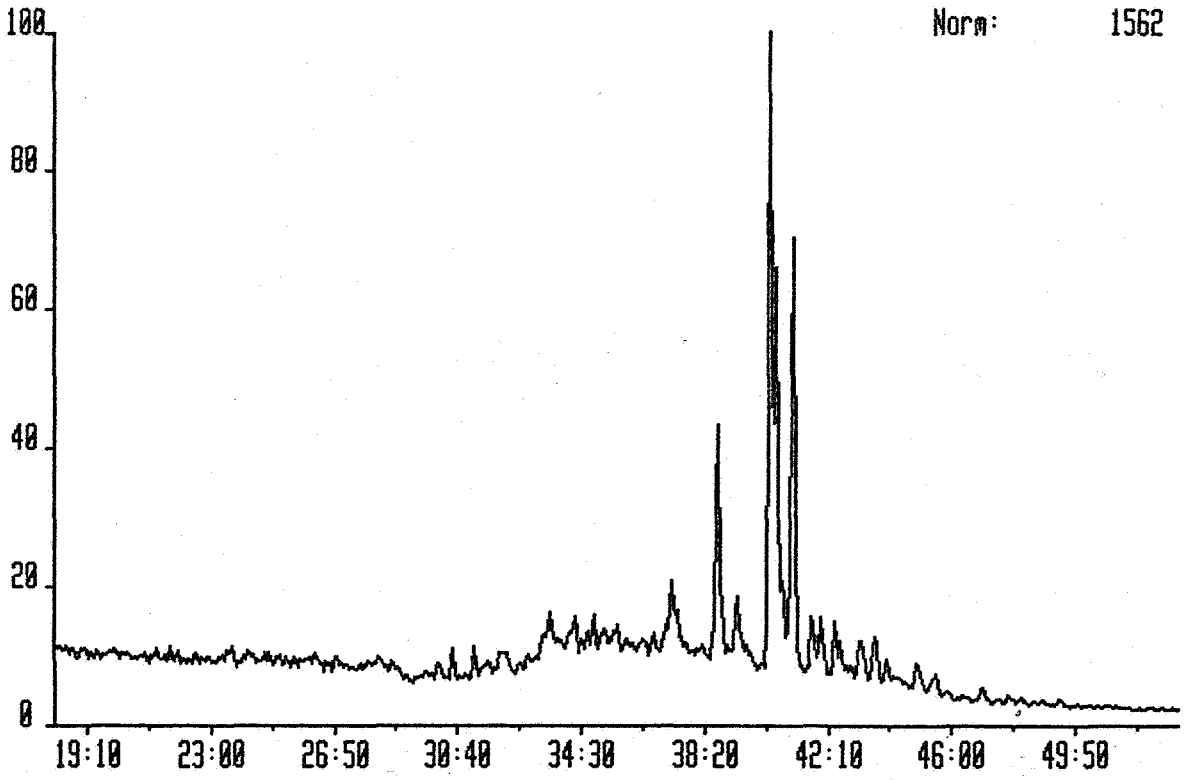
CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 205.1956
Text:WELL 3/7-3, 3338M, SATURATED FRACTION



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 205.1956
Text:WELL 3/7-3,3446M, SATURATED FRACTION

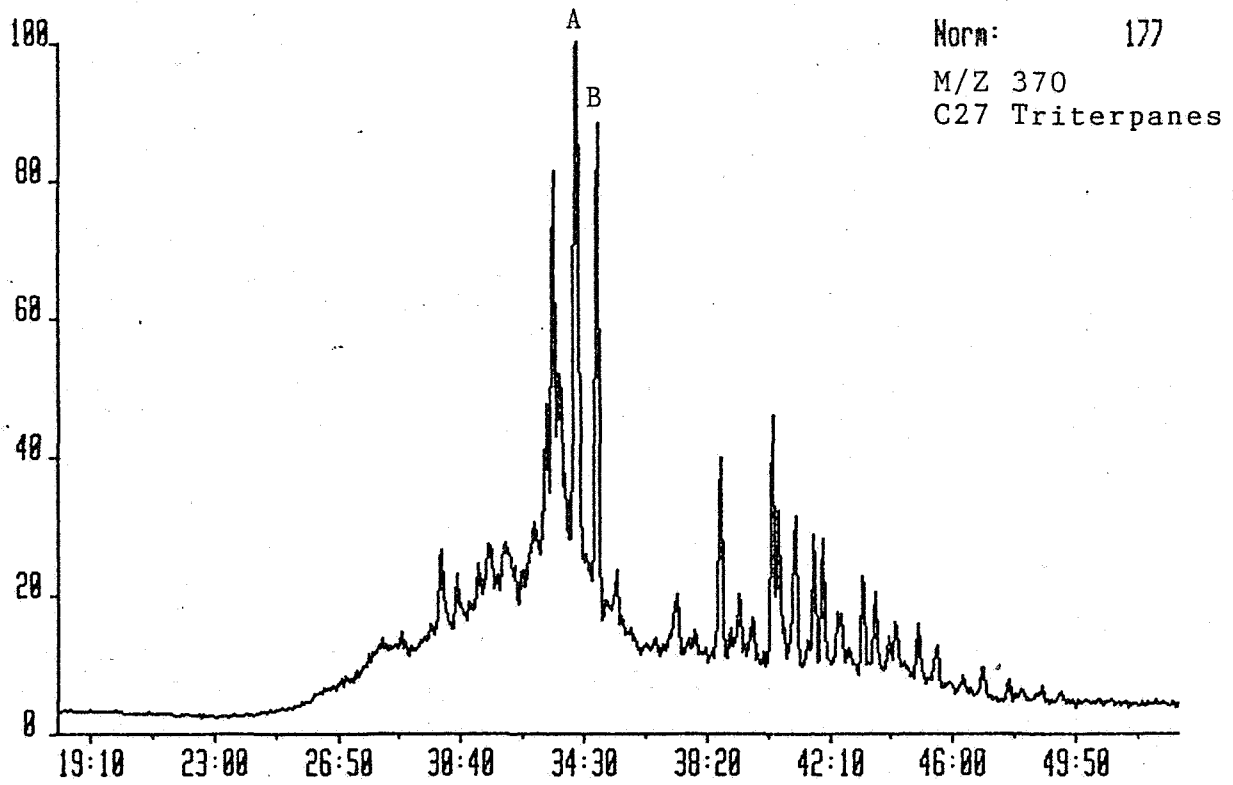


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 205.1956
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

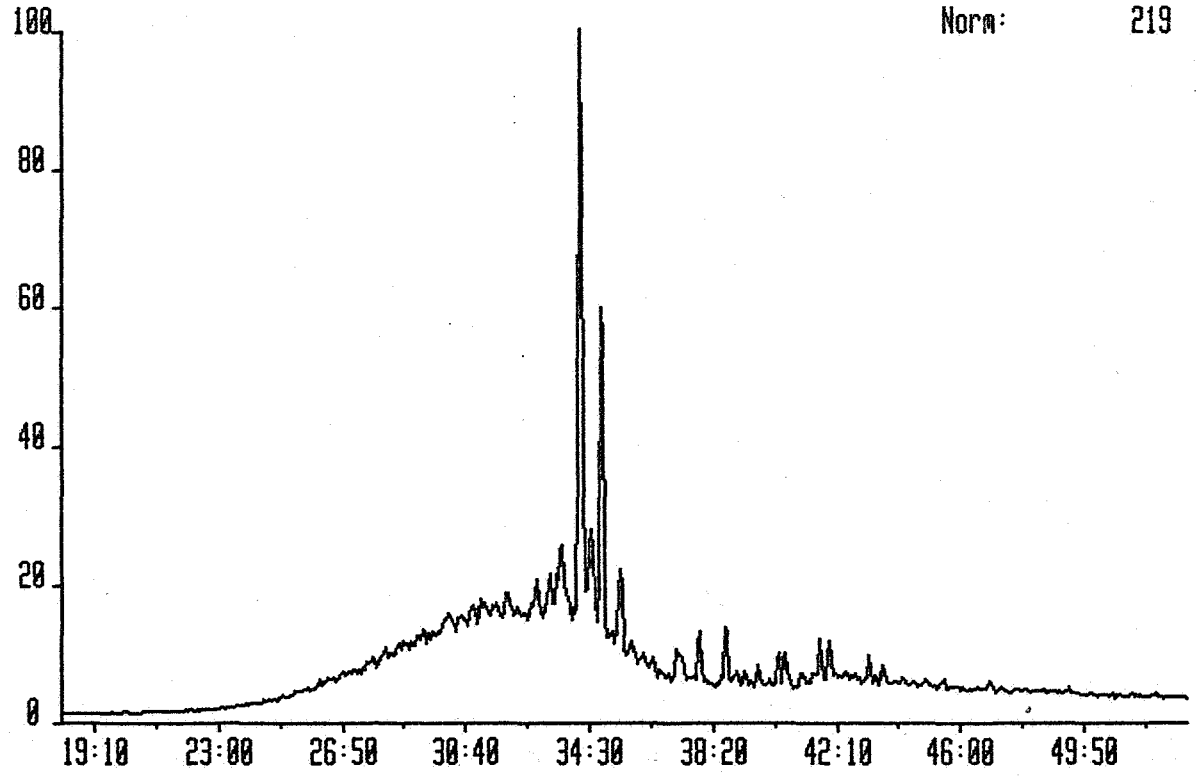


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

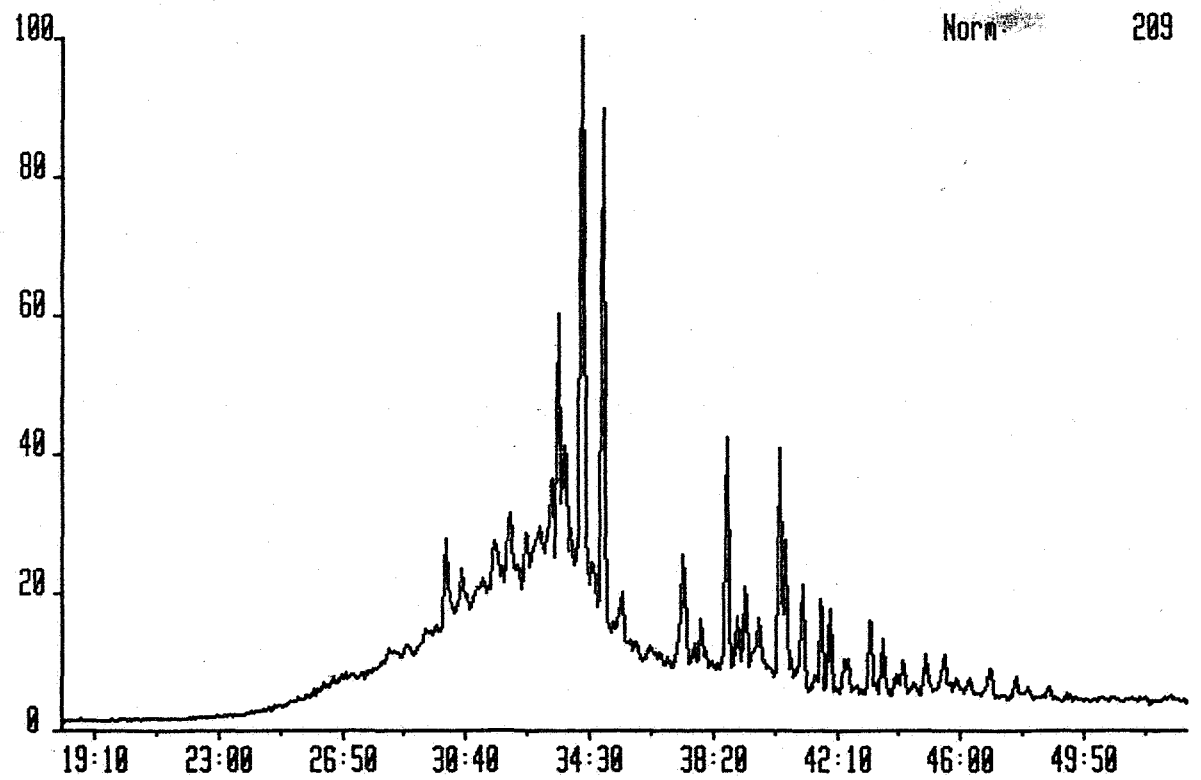
EXAMPLE OF PEAK IDENTIFICATION FOR C27 TRITERPANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 370.3608
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

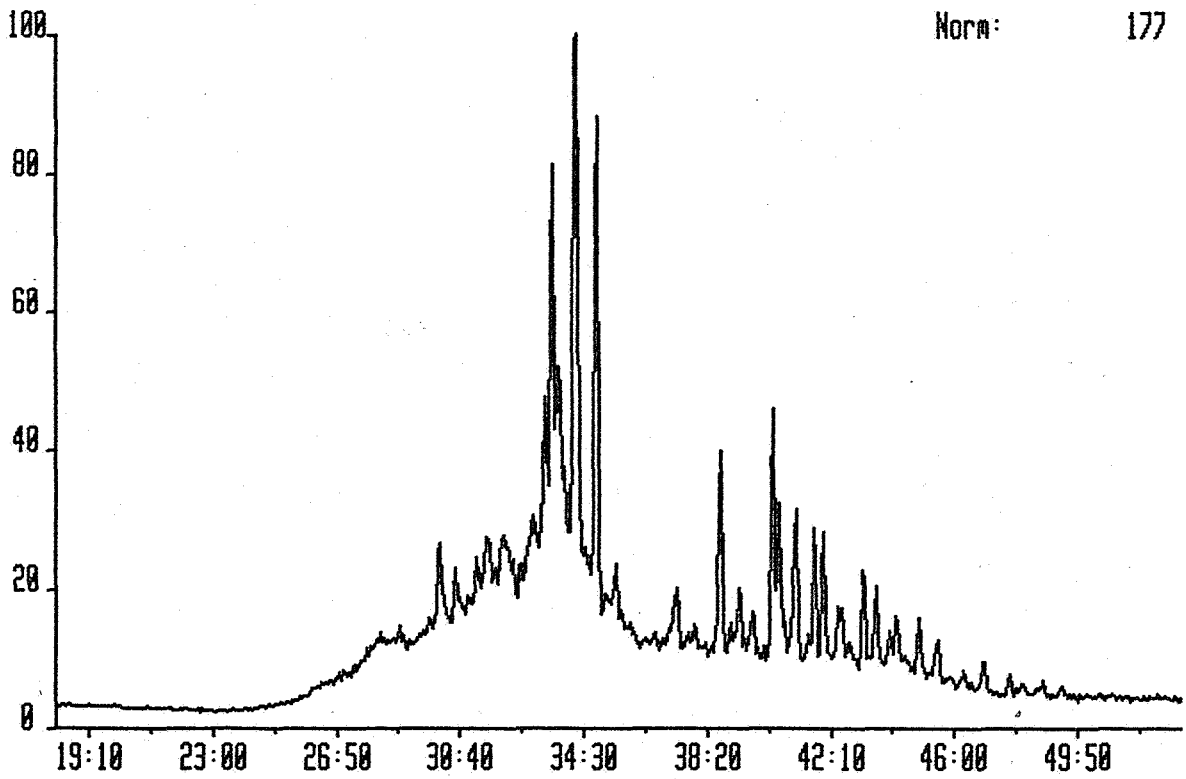


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 370.3608
Text:WELL 3/7-3,3446M, SATURATED FRACTION

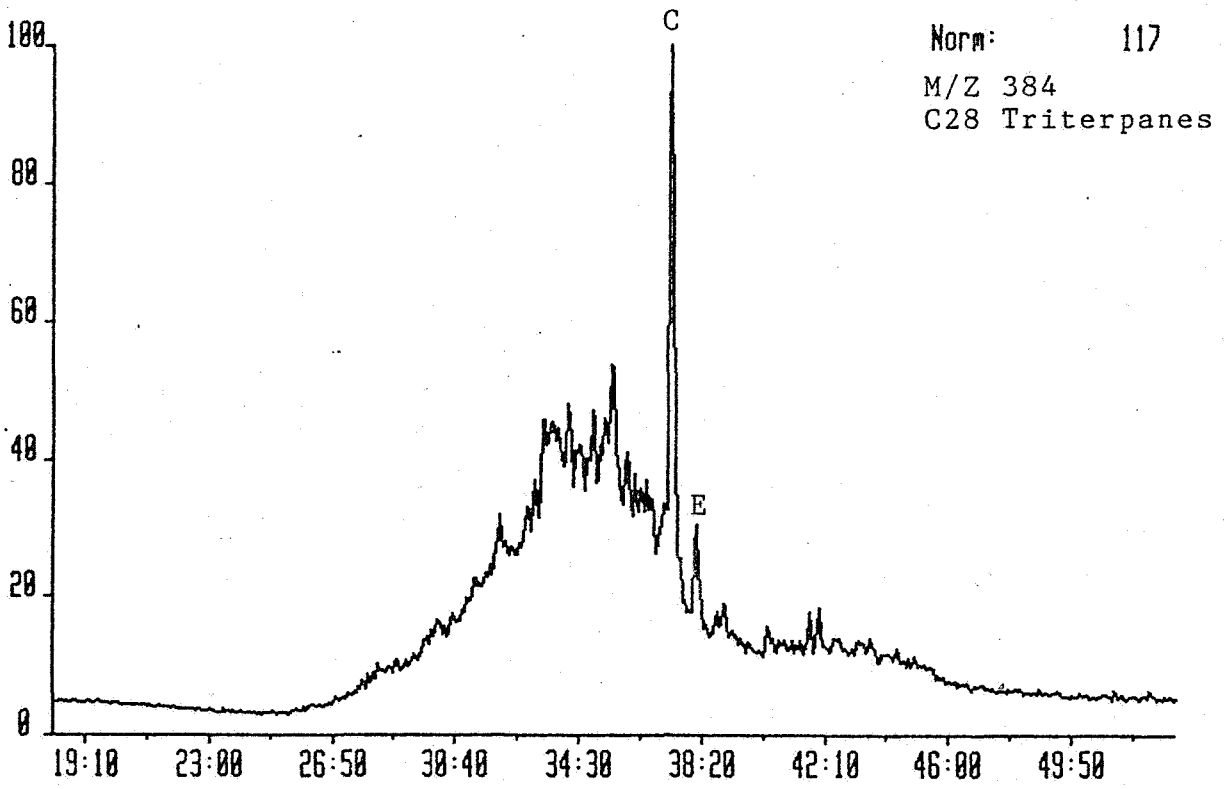


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

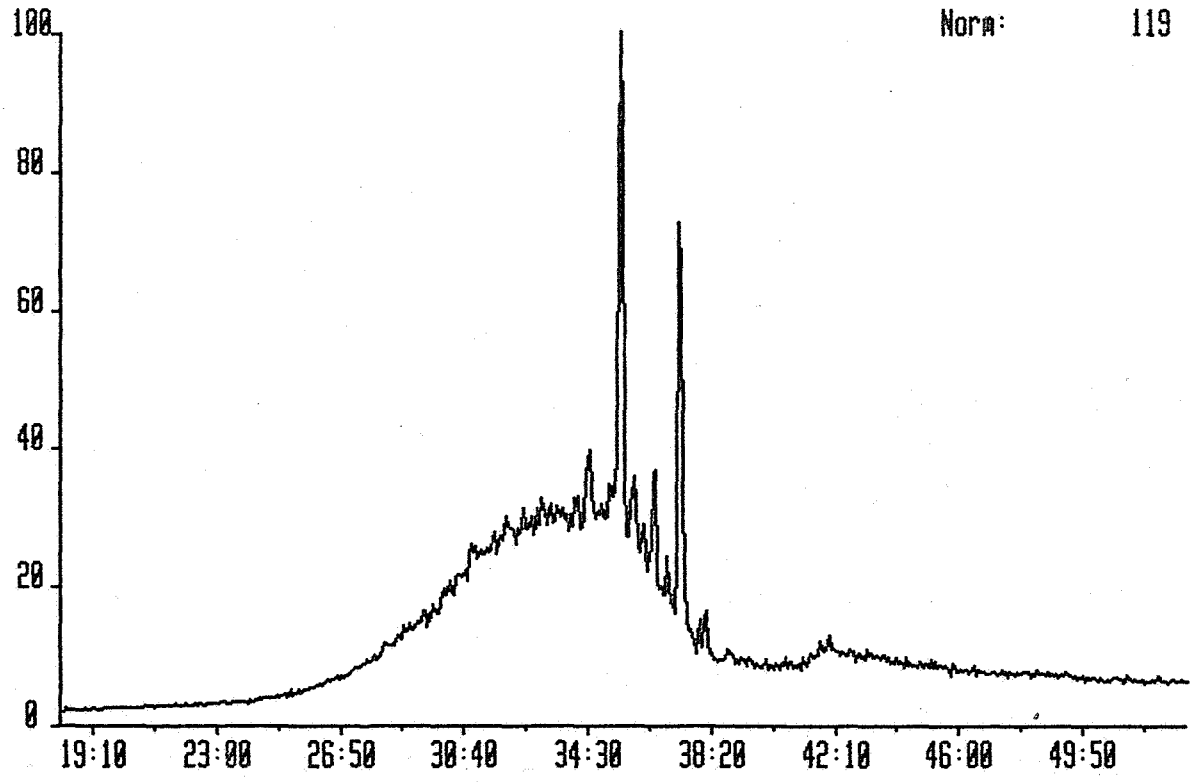
CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 370.3608
Text:WELL 3/7-3, 3508M, SATURATED FRACTION



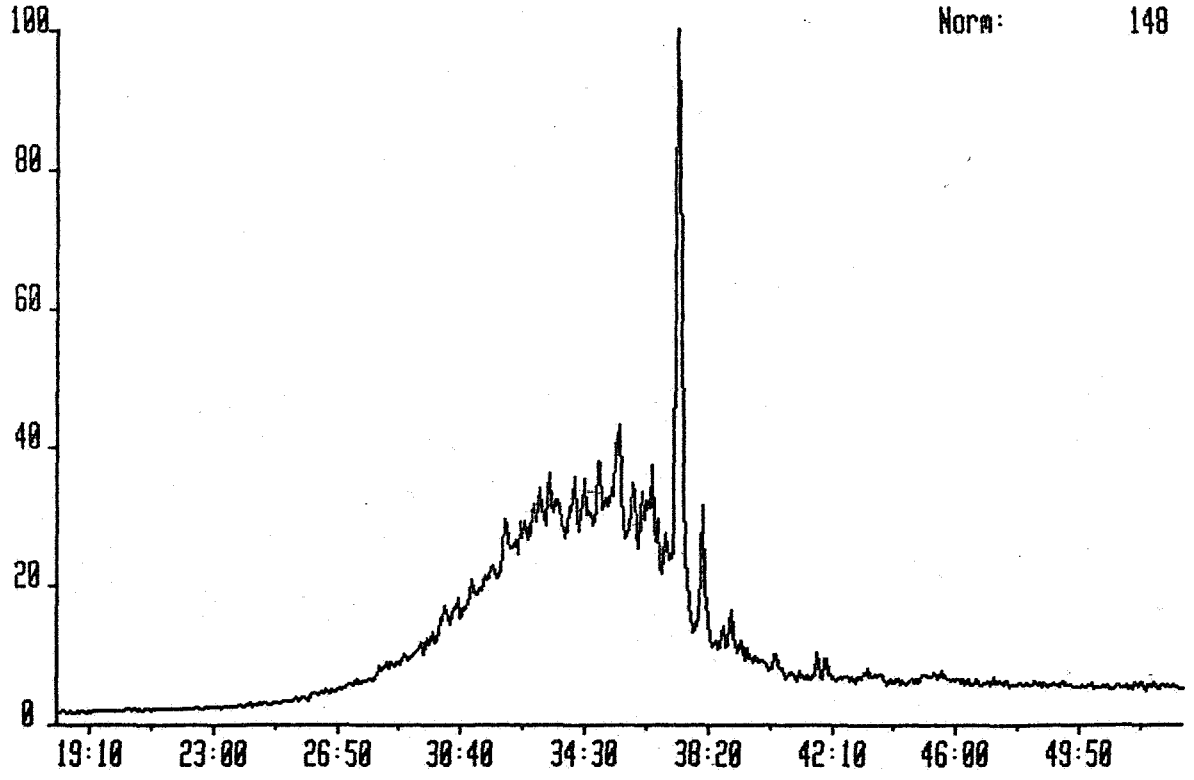
EXAMPLE OF PEAK IDENTIFICATION FOR C28 TRITERPANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 384.3757
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

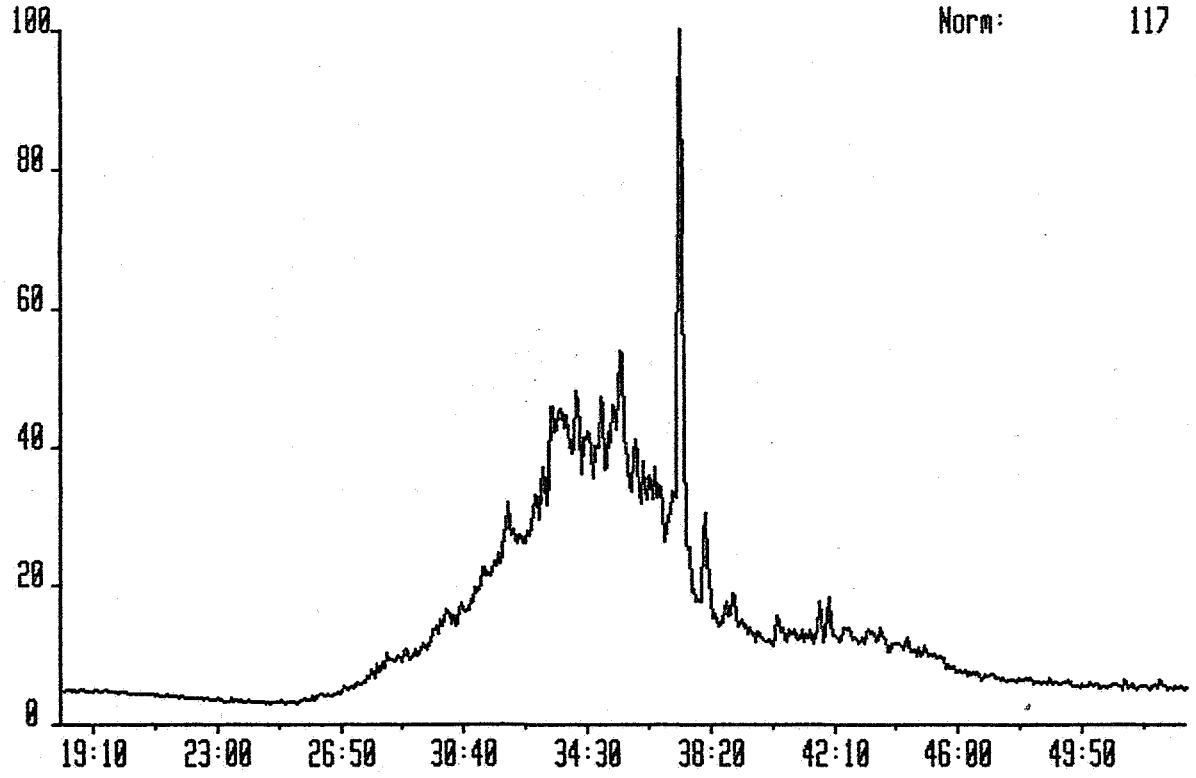


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 384.3757
Text:WELL 3/7-3,3446M, SATURATED FRACTION



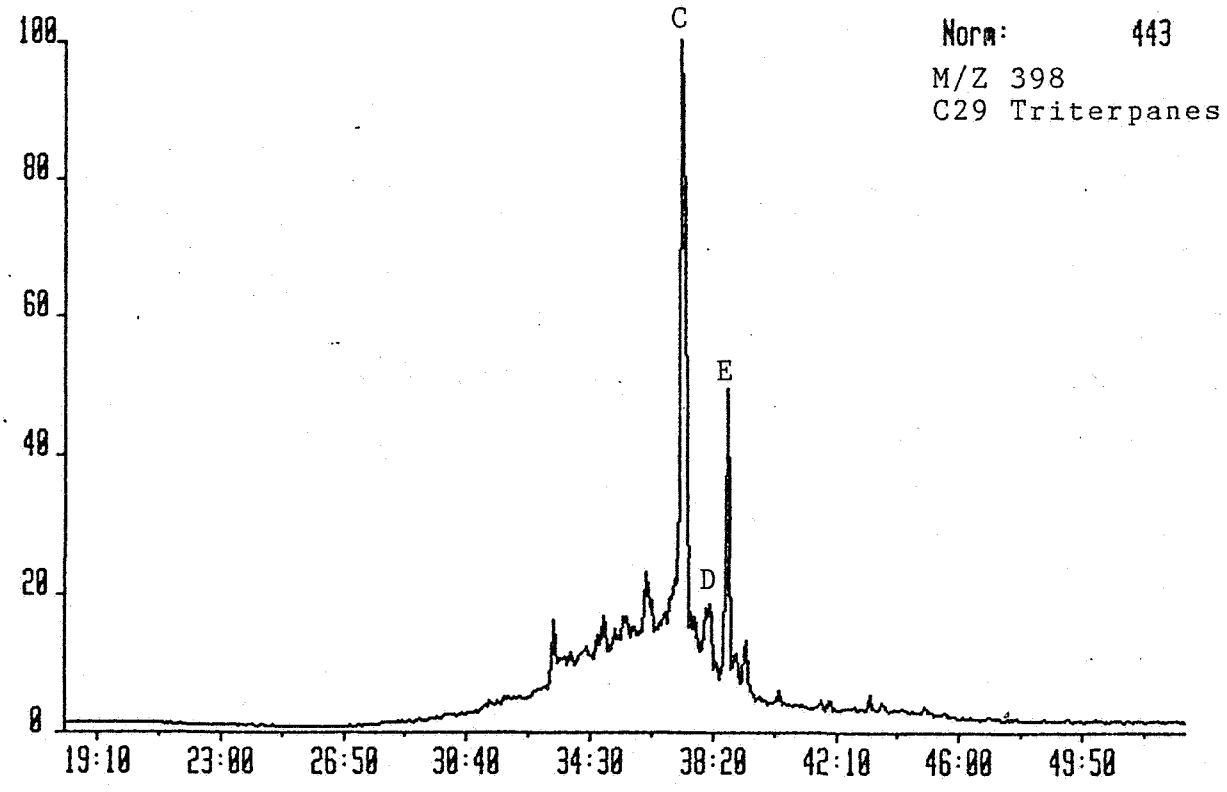
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 384.3757
Text:WELL 3/7-3, 3500M, SATURATED FRACTION

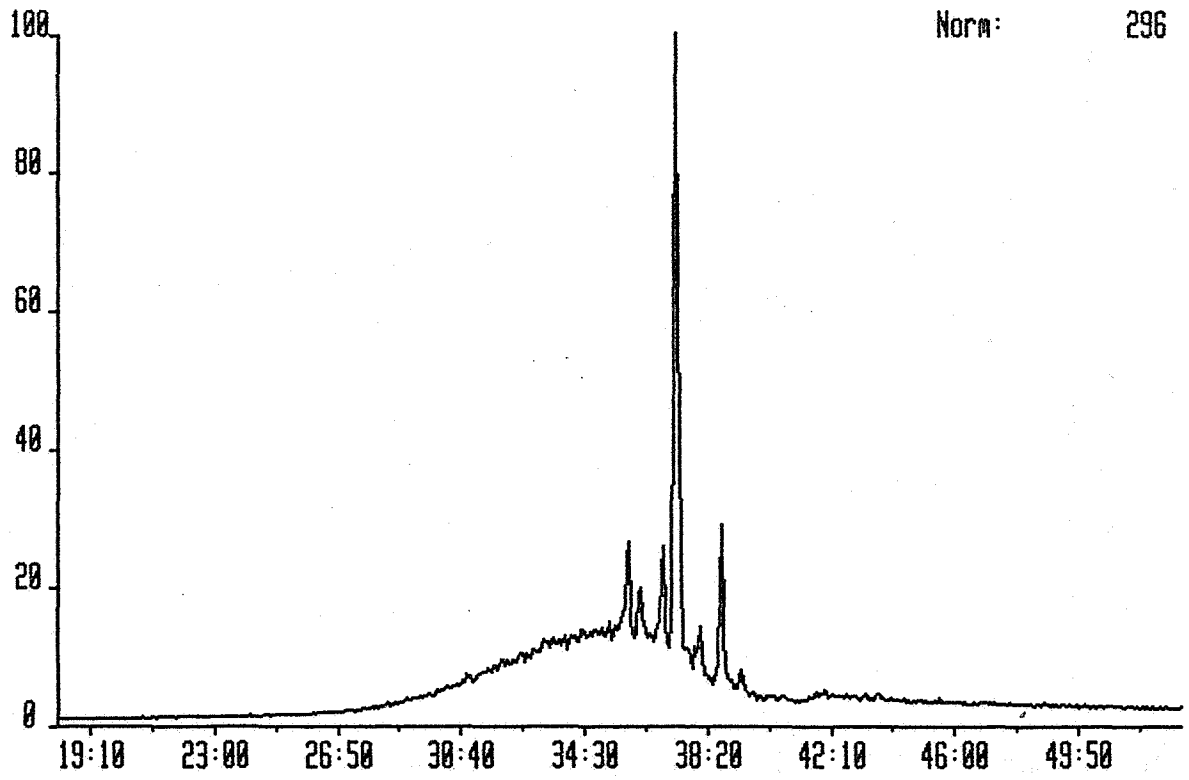


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

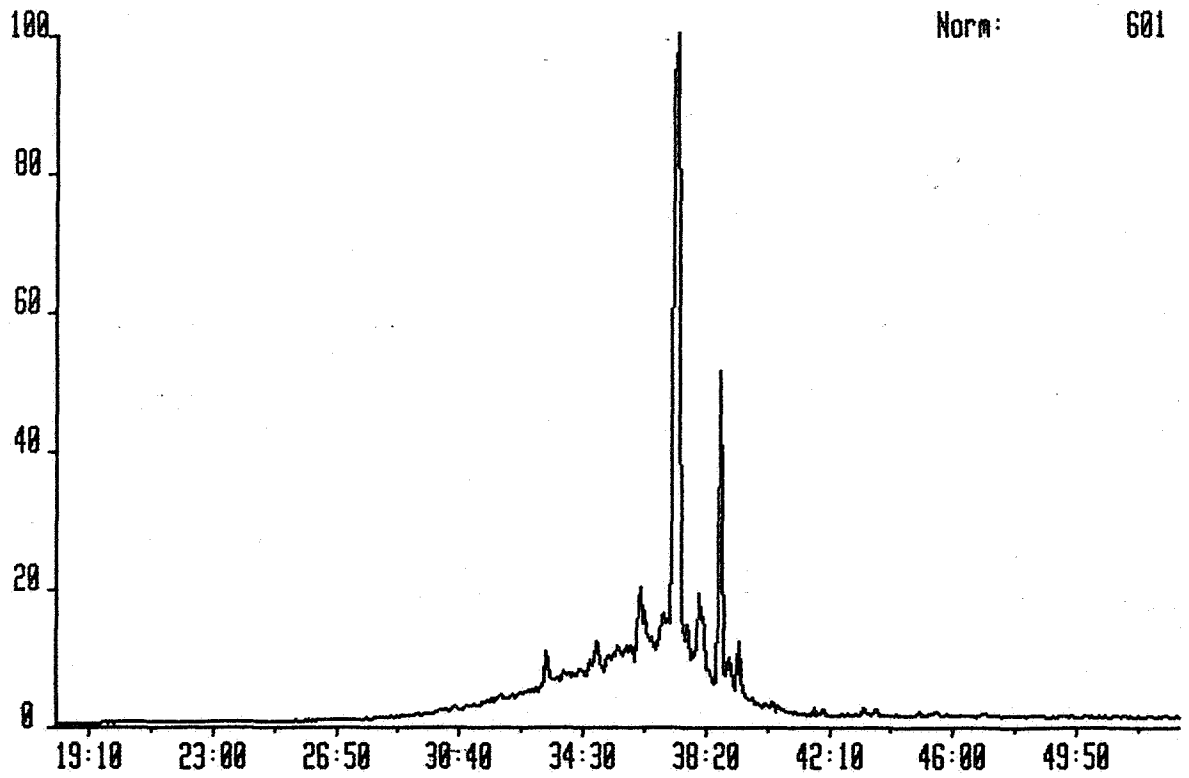
EXAMPLE OF PEAK IDENTIFICATION FOR C29 TRITERPANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 398.3914
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

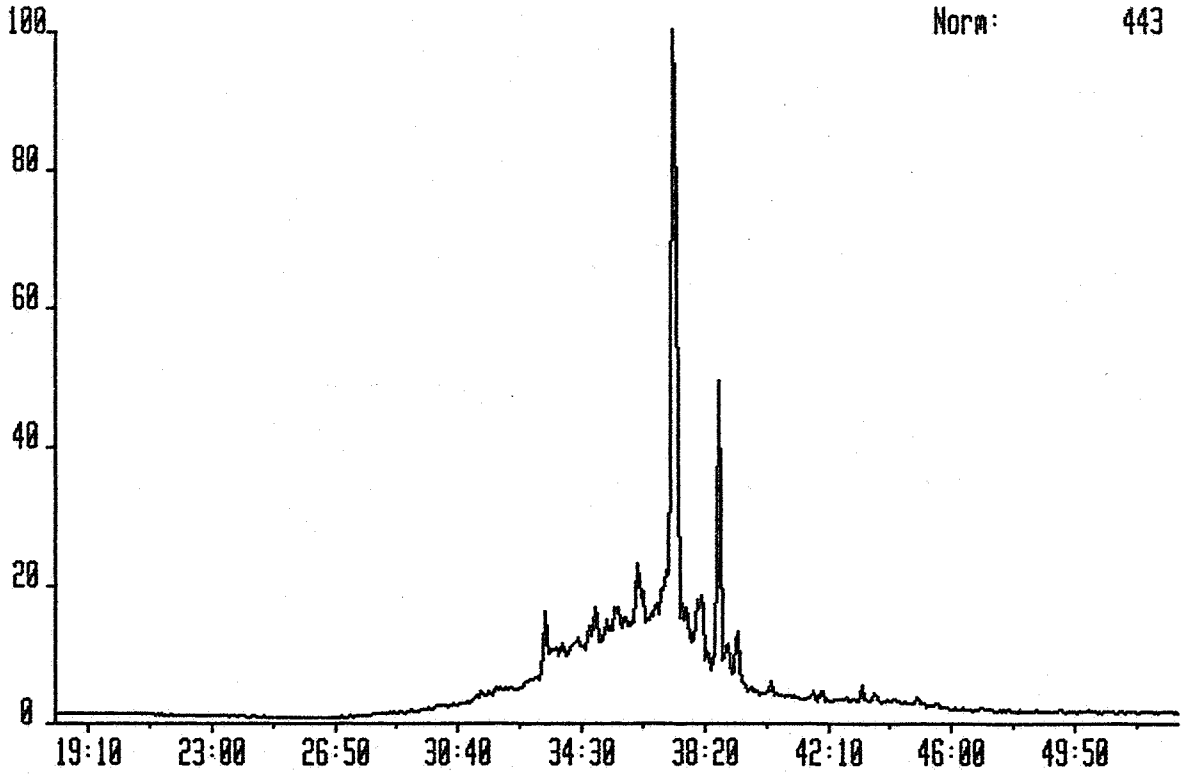


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 398.3914
Text:WELL 3/7-3,3446M, SATURATED FRACTION



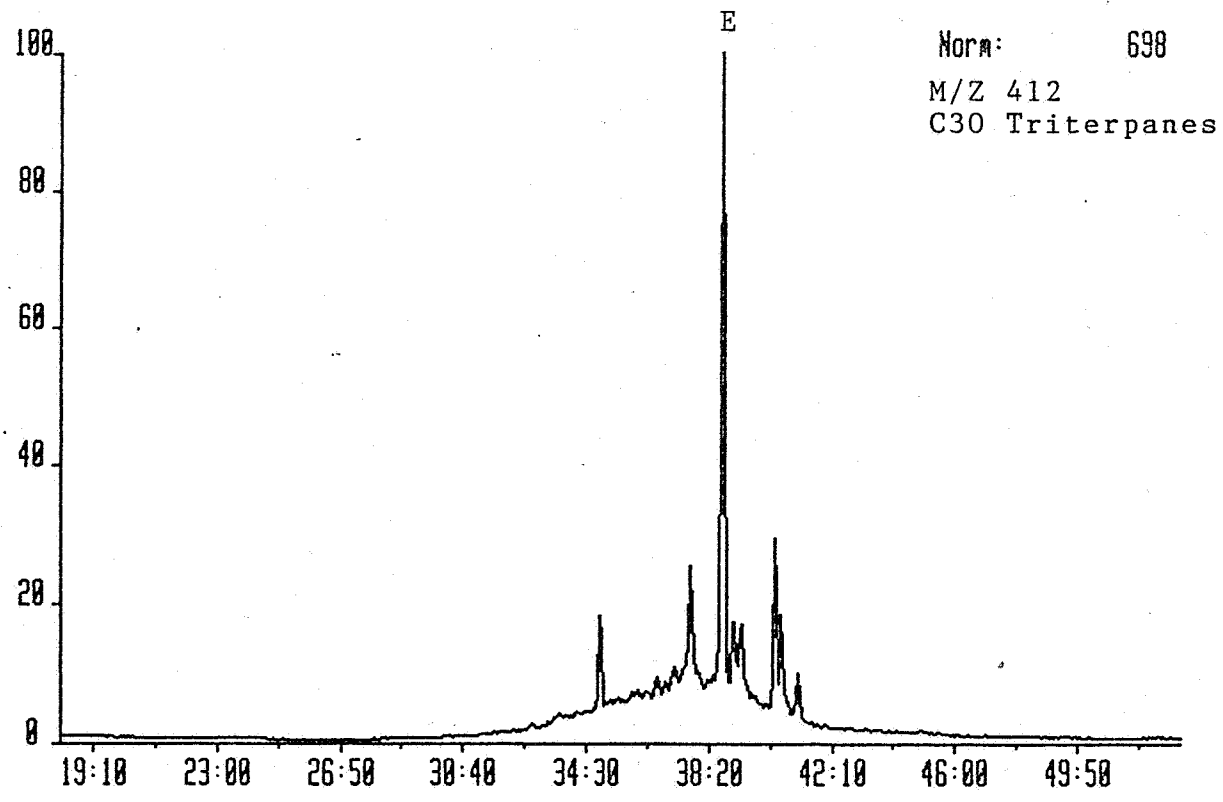
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 398.3914
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

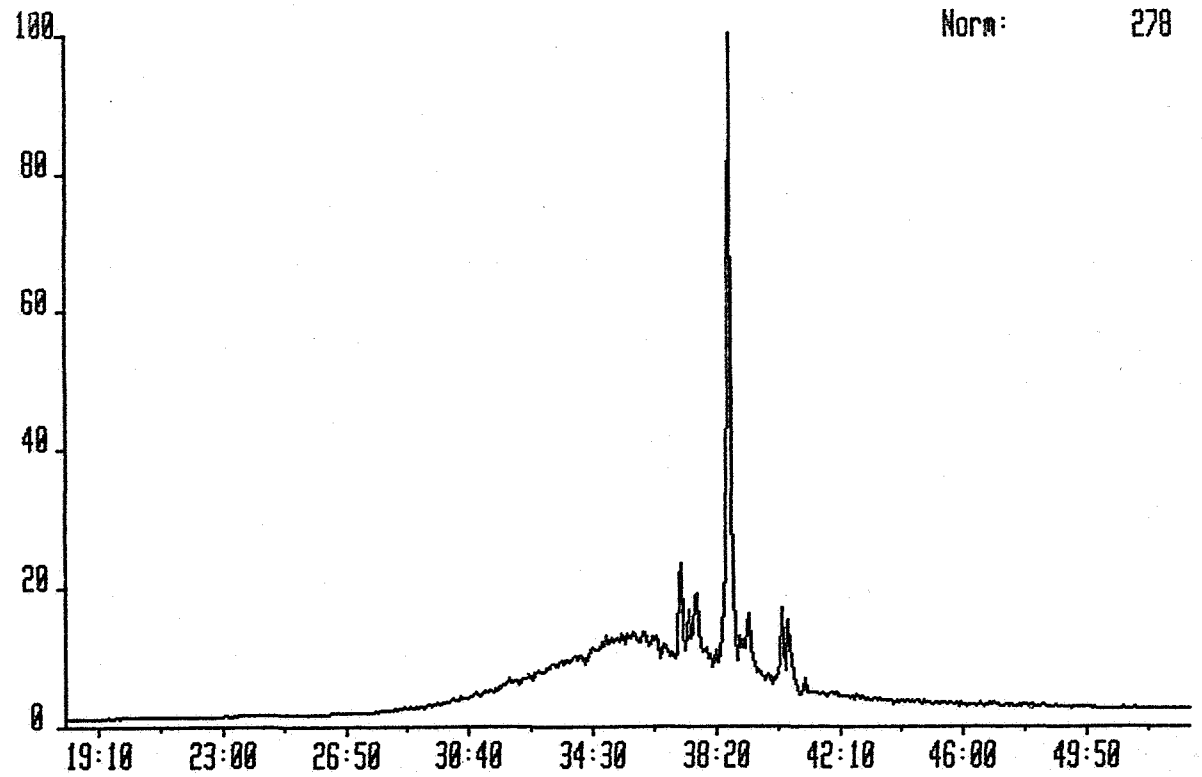


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

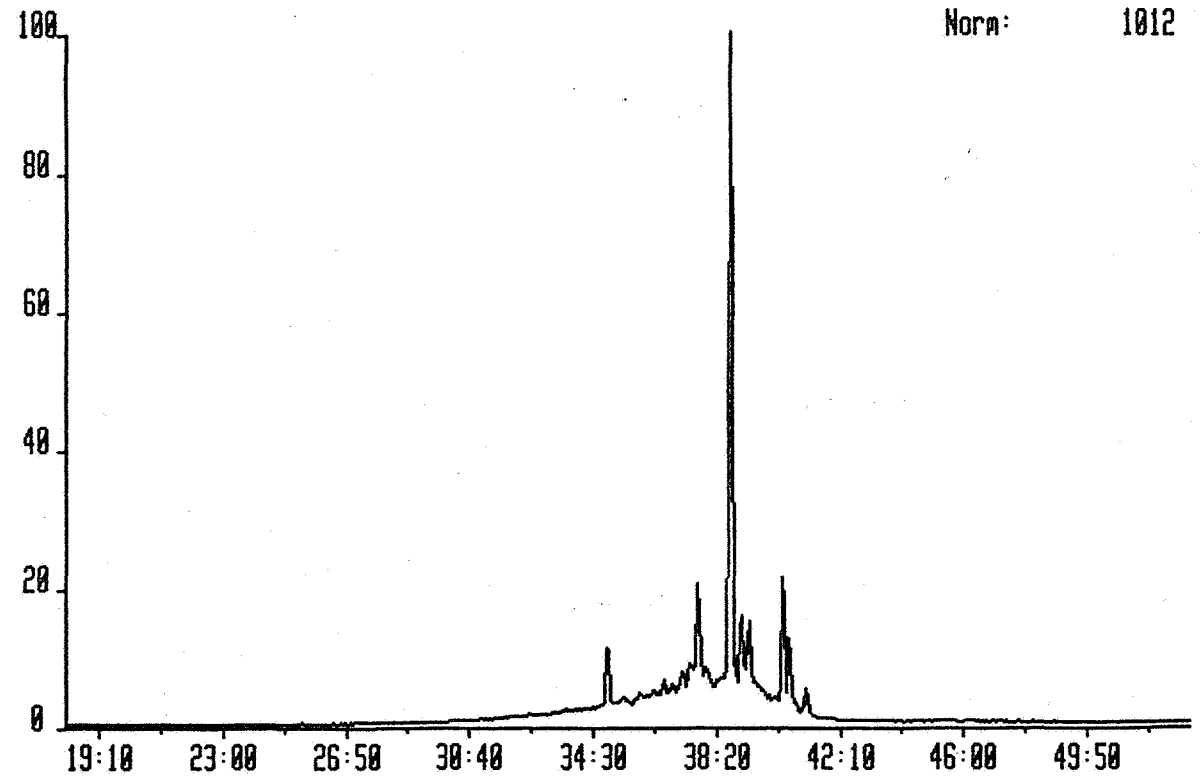
EXAMPLE OF PEAK IDENTIFICATION FOR C30 TRITERPANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 412.4069
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

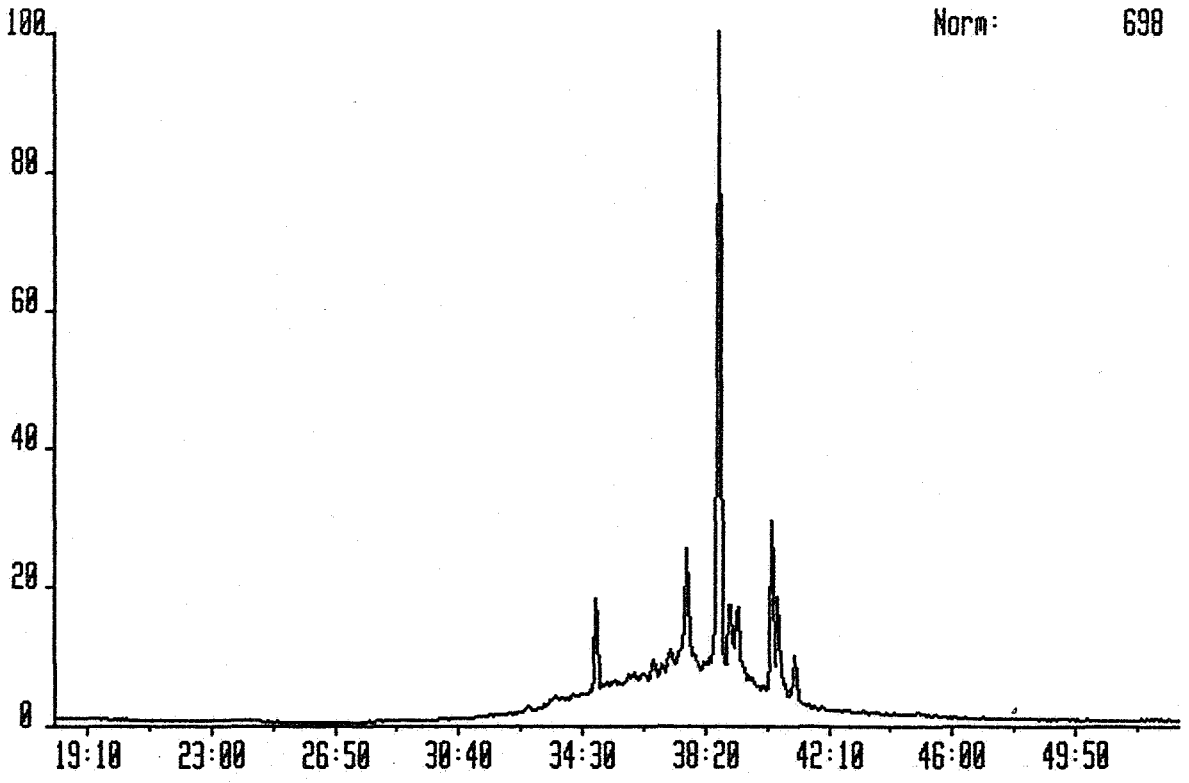


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 412.4069
Text:WELL 3/7-3,3446M, SATURATED FRACTION



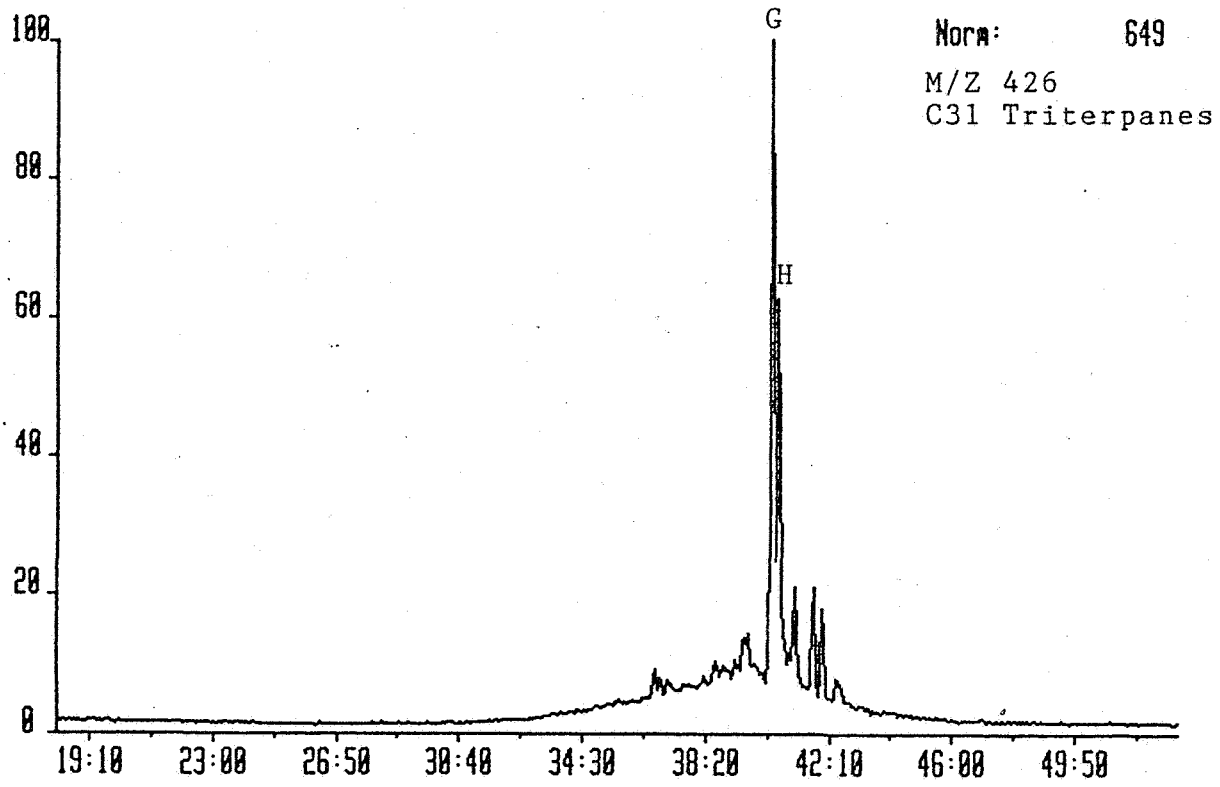
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 412.4069
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

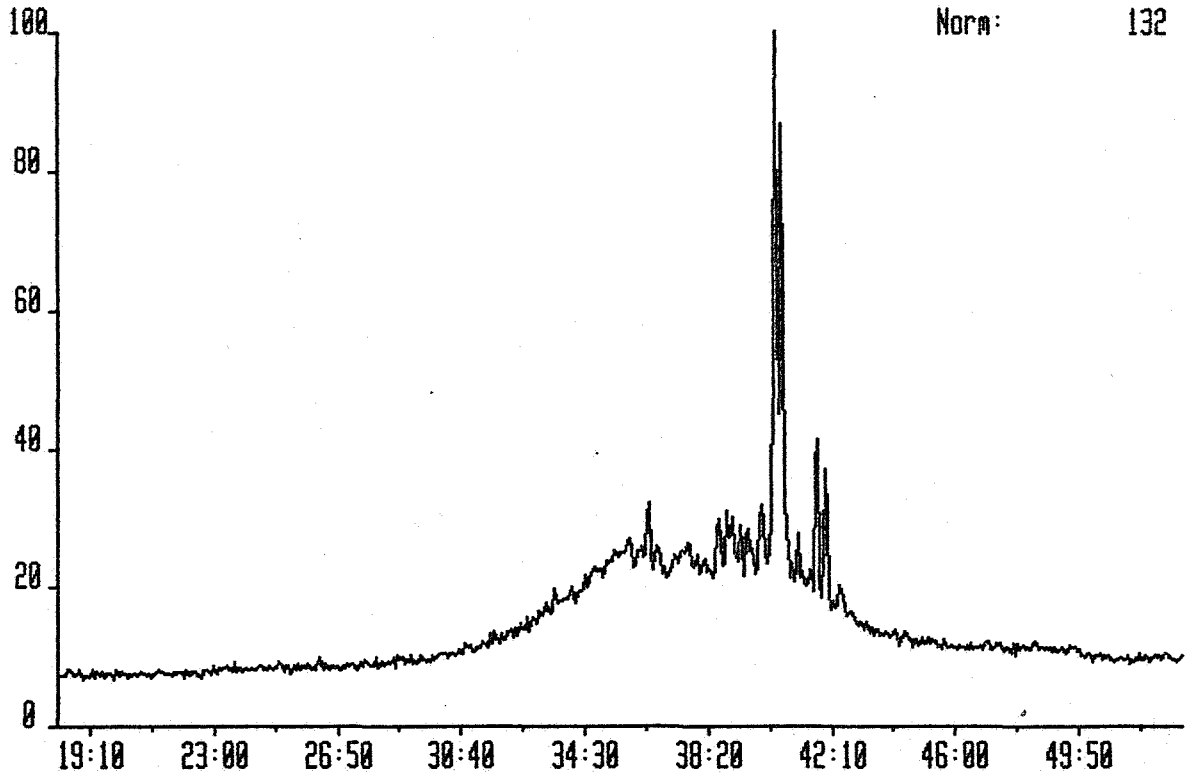


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

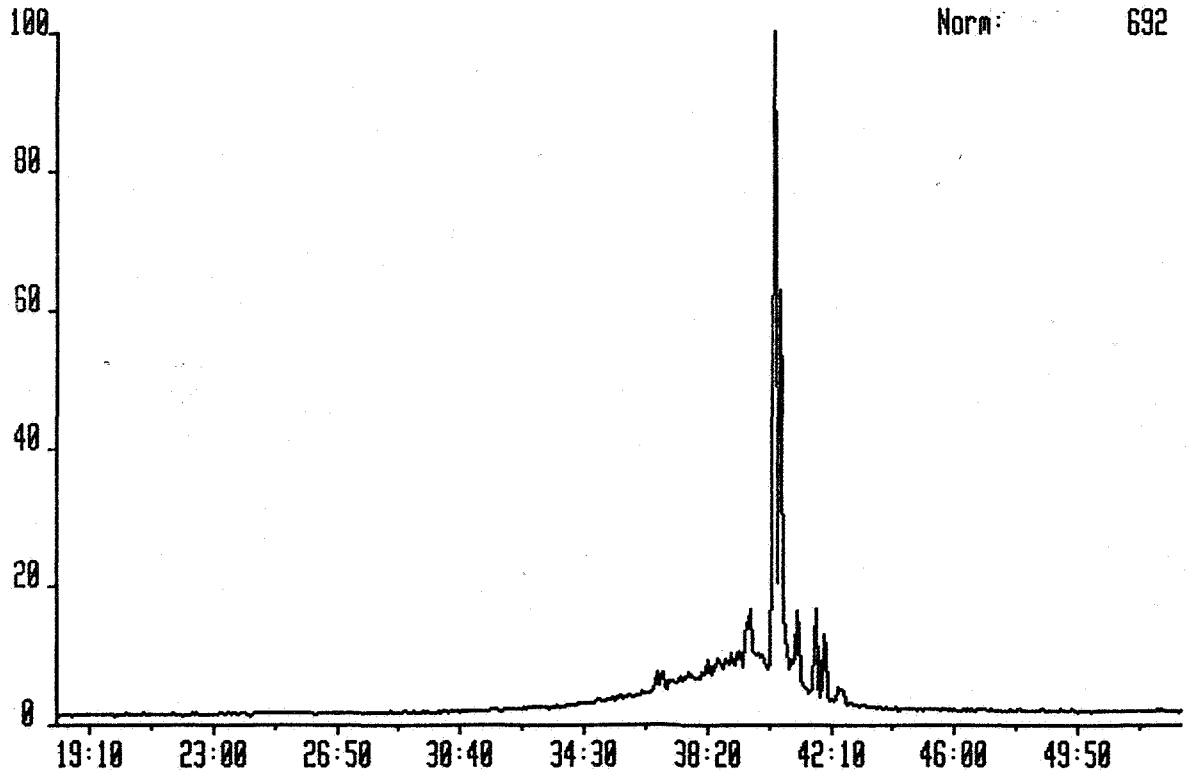
EXAMPLE OF PEAK IDENTIFICATION FOR C31 TRITERPANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 426.4226
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

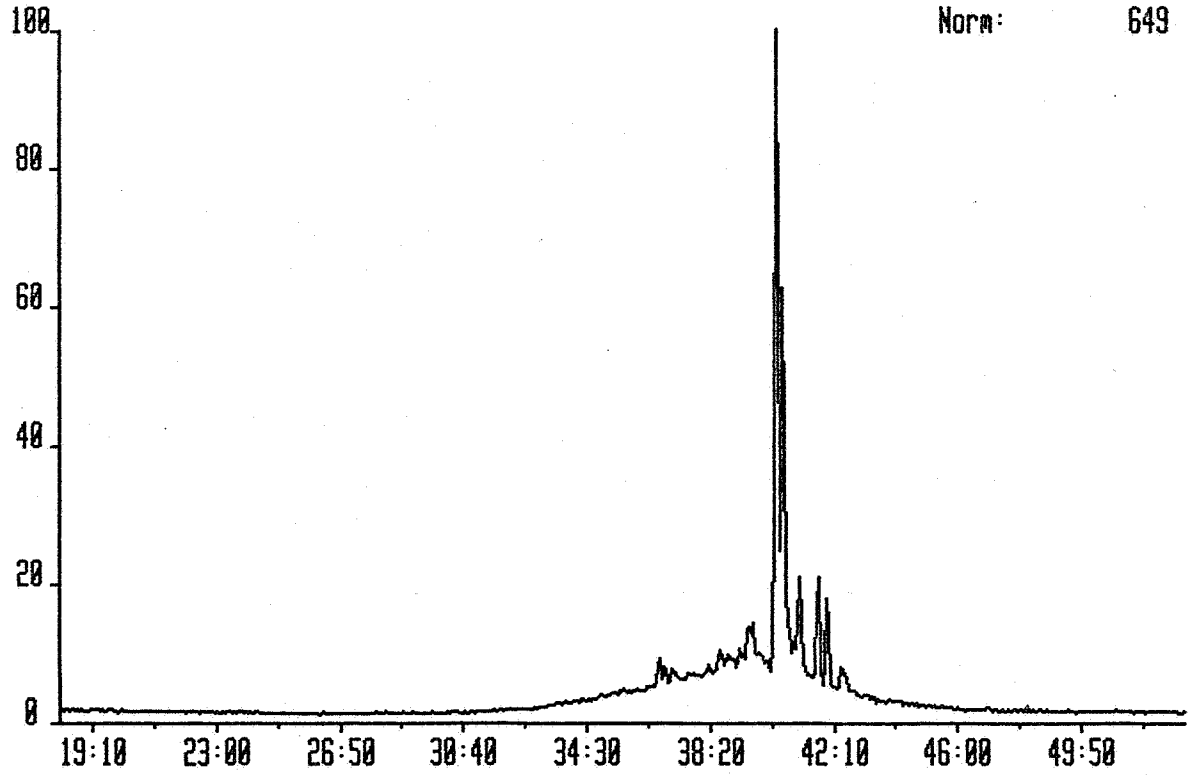


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 426.4226
Text:WELL 3/7-3,3446M, SATURATED FRACTION



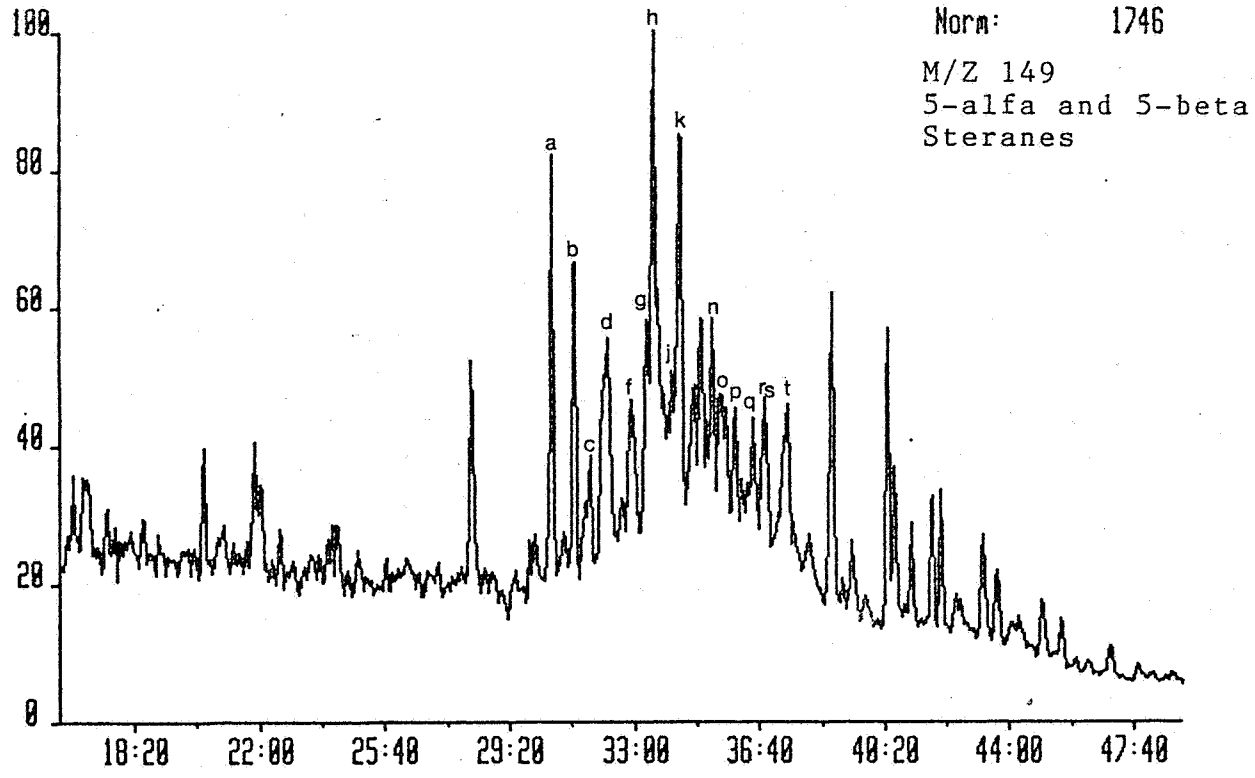
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 426.4226
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

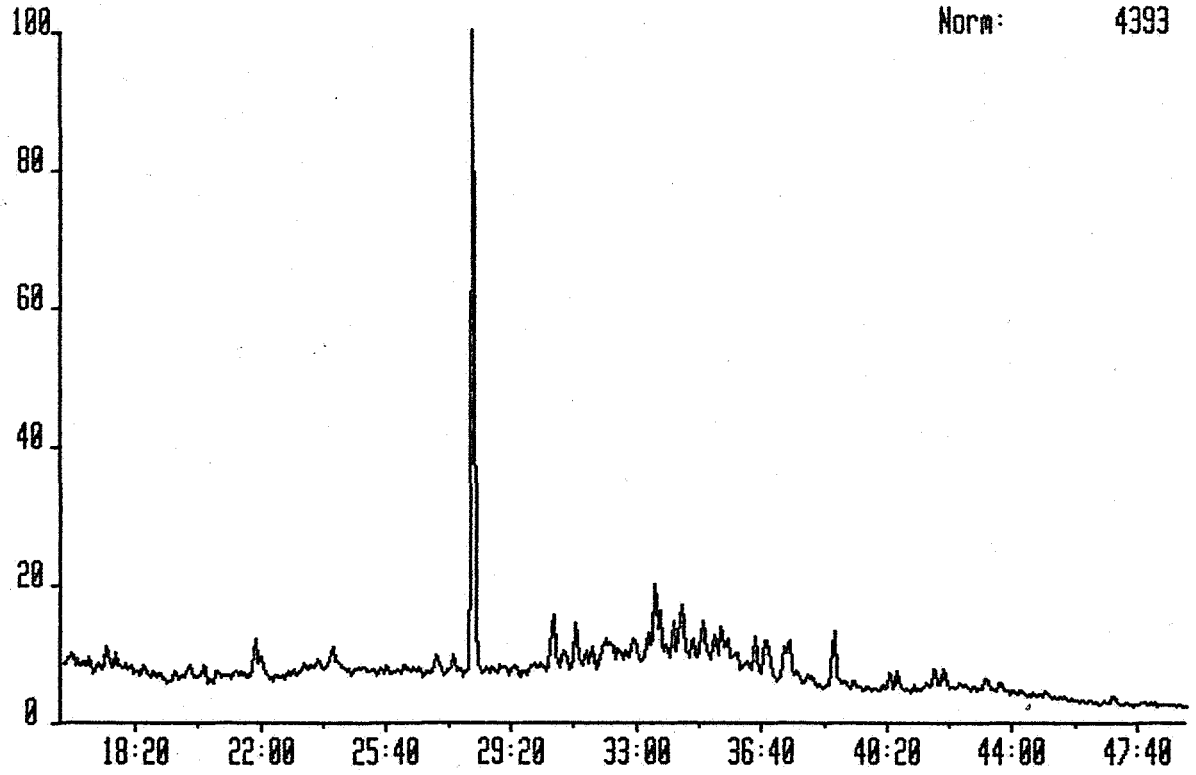


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

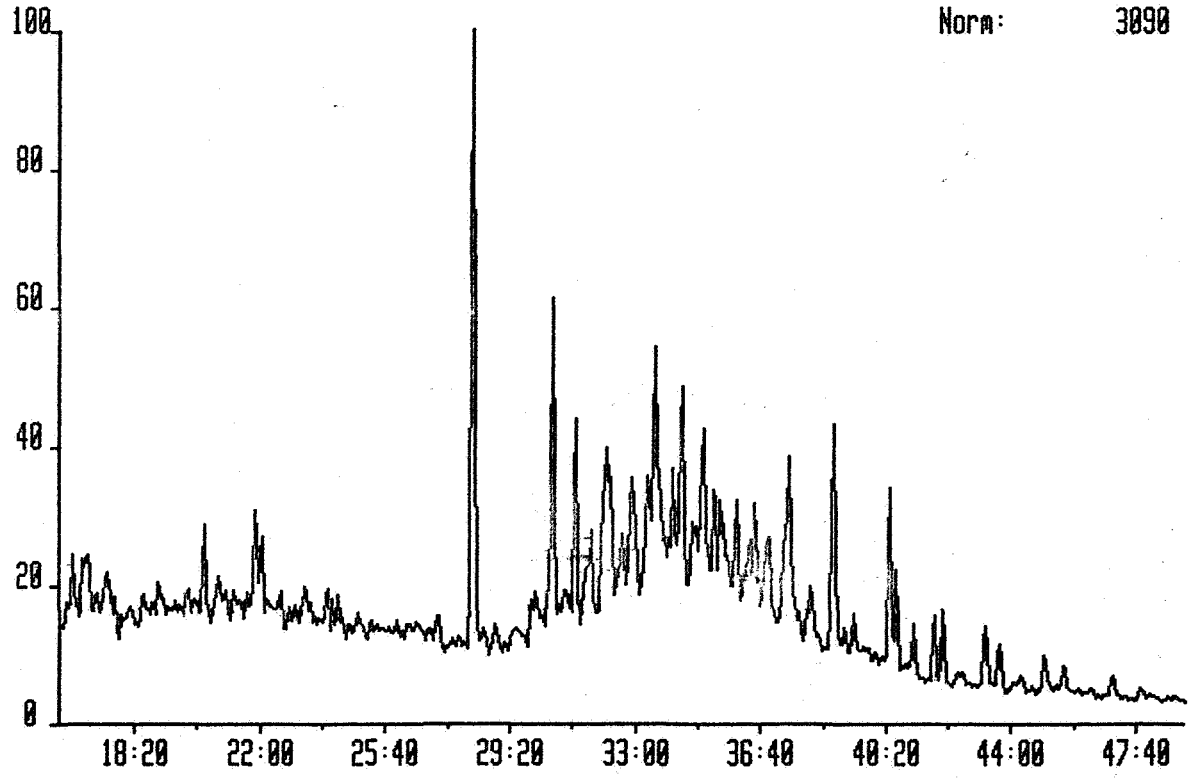
EXAMPLE OF PEAK IDENTIFICATION FOR 5-ALFA AND 5-BETA STERANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 149.1328
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

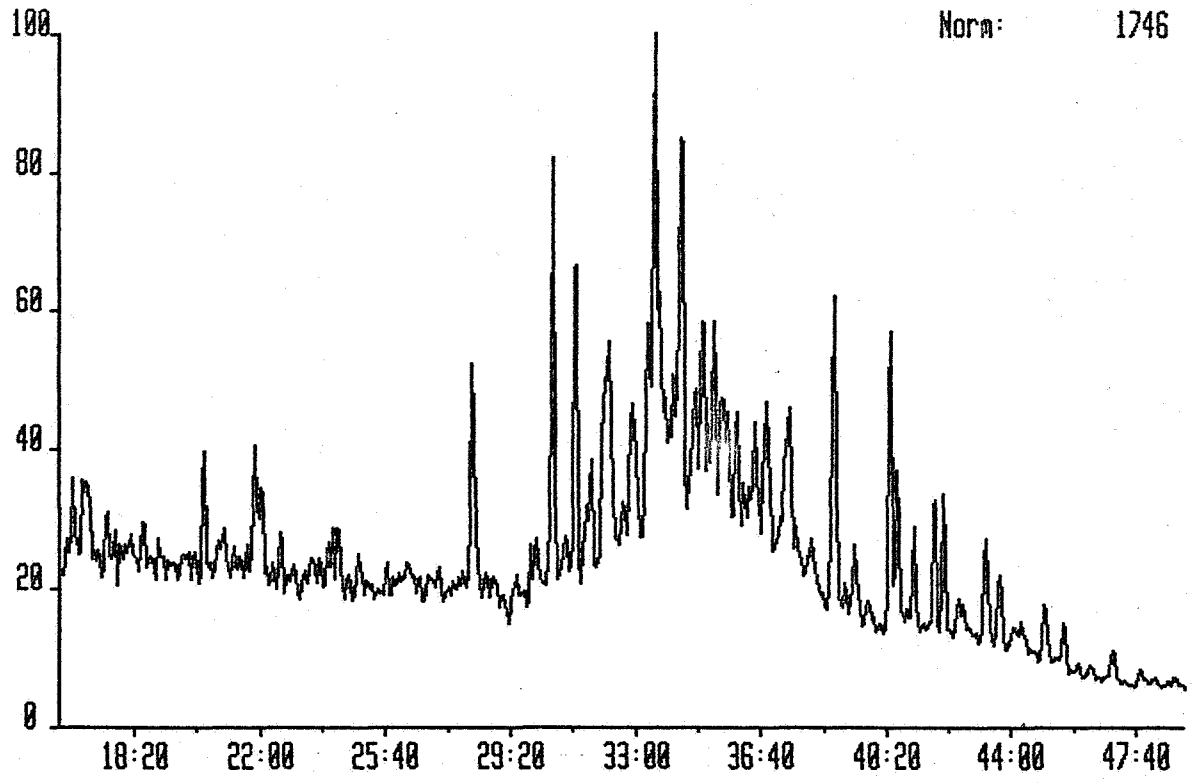


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 149.1328
Text:WELL 3/7-3,3446M, SATURATED FRACTION



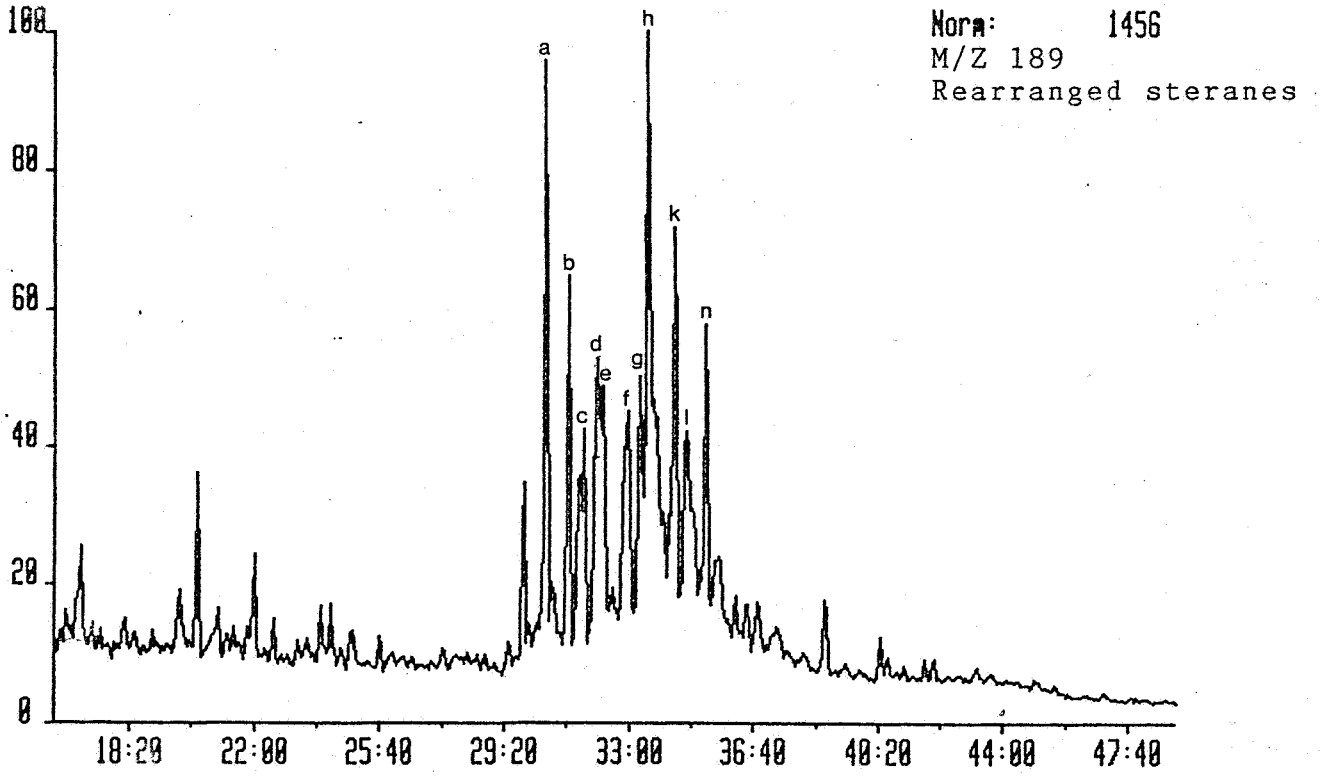
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 149.1328
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

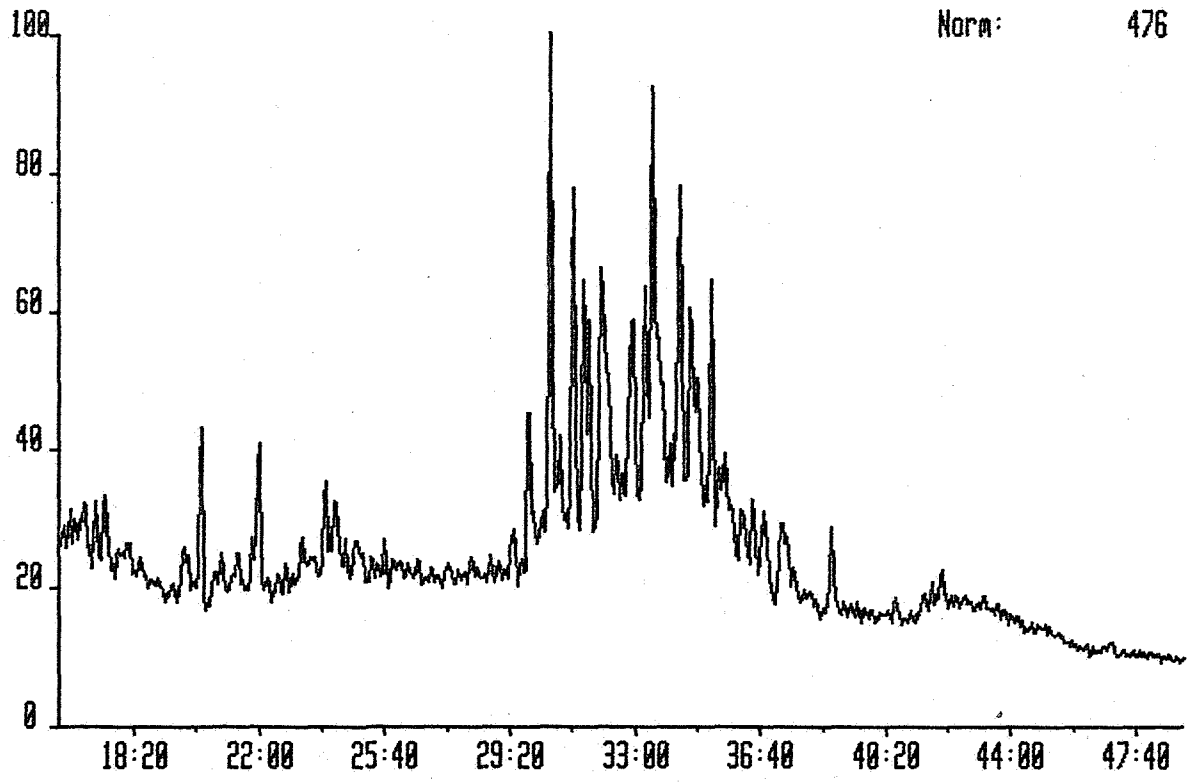


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

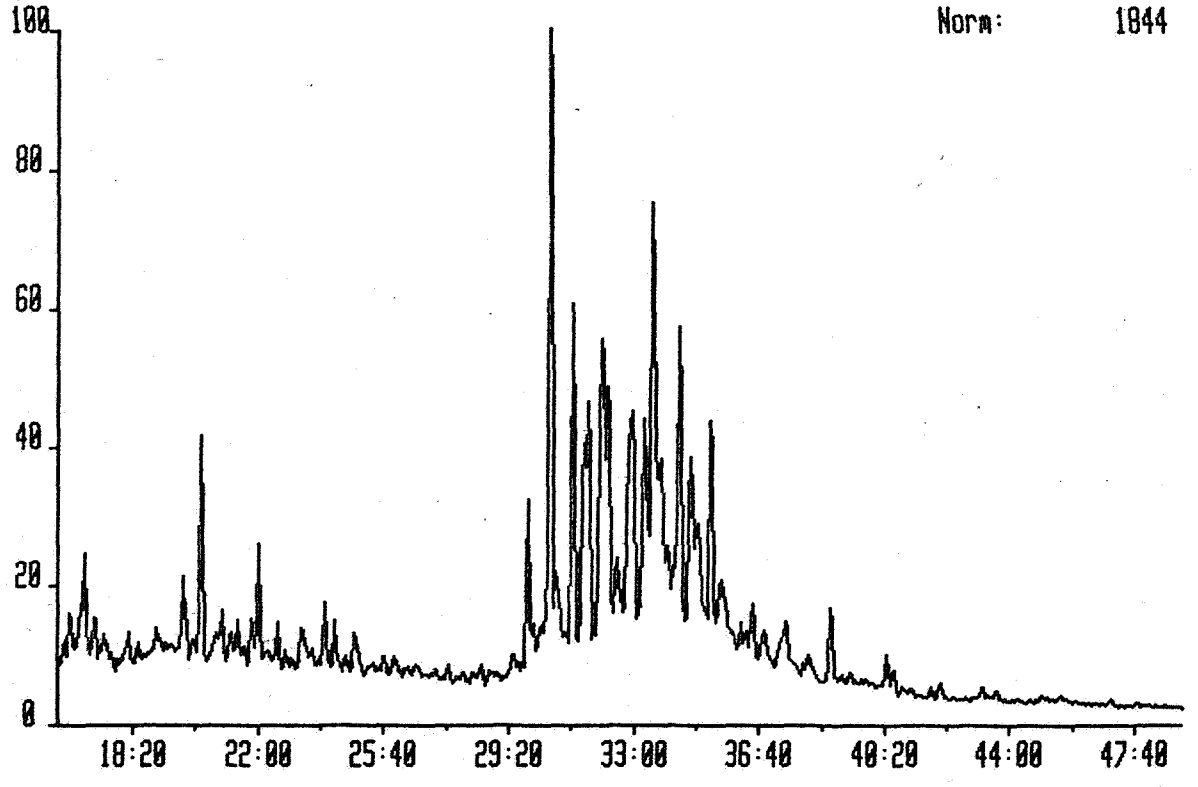
EXAMPLE OF PEAK IDENTIFICATION FOR REARRANGED STERANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 189.1643
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

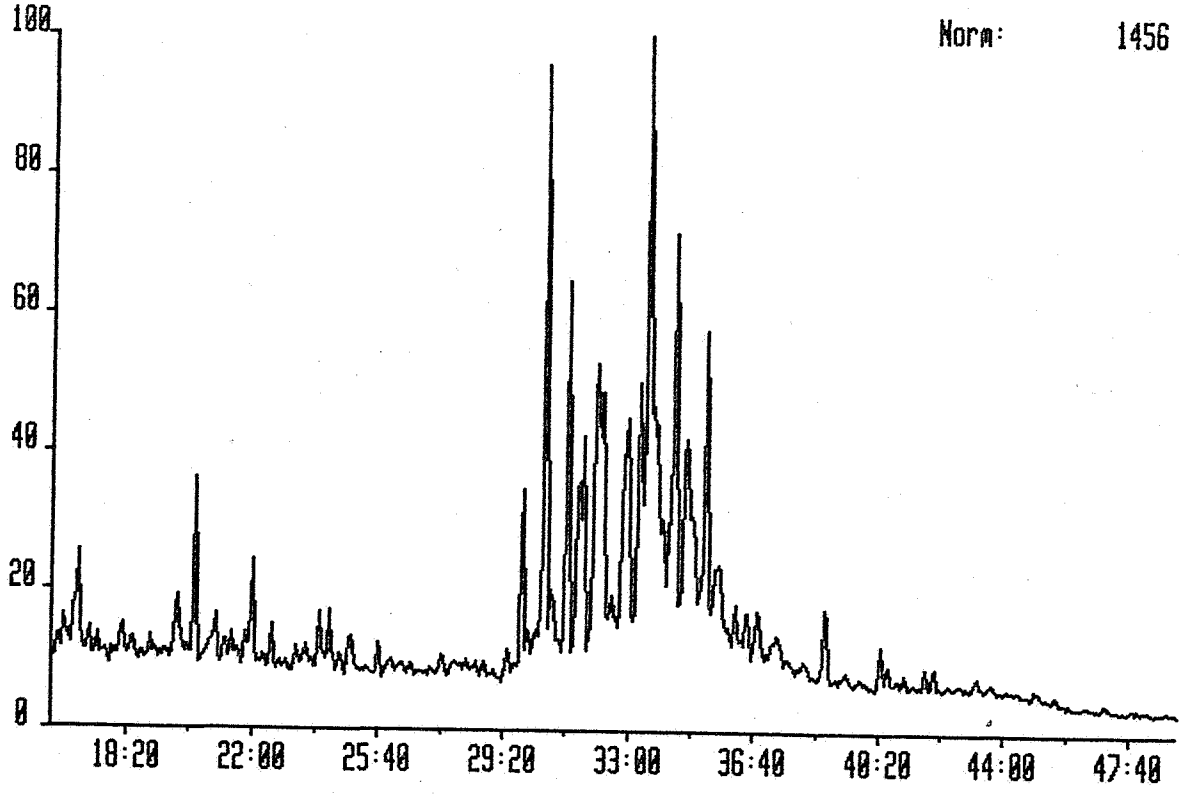


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 189.1643
Text:WELL 3/7-3,3446M, SATURATED FRACTION



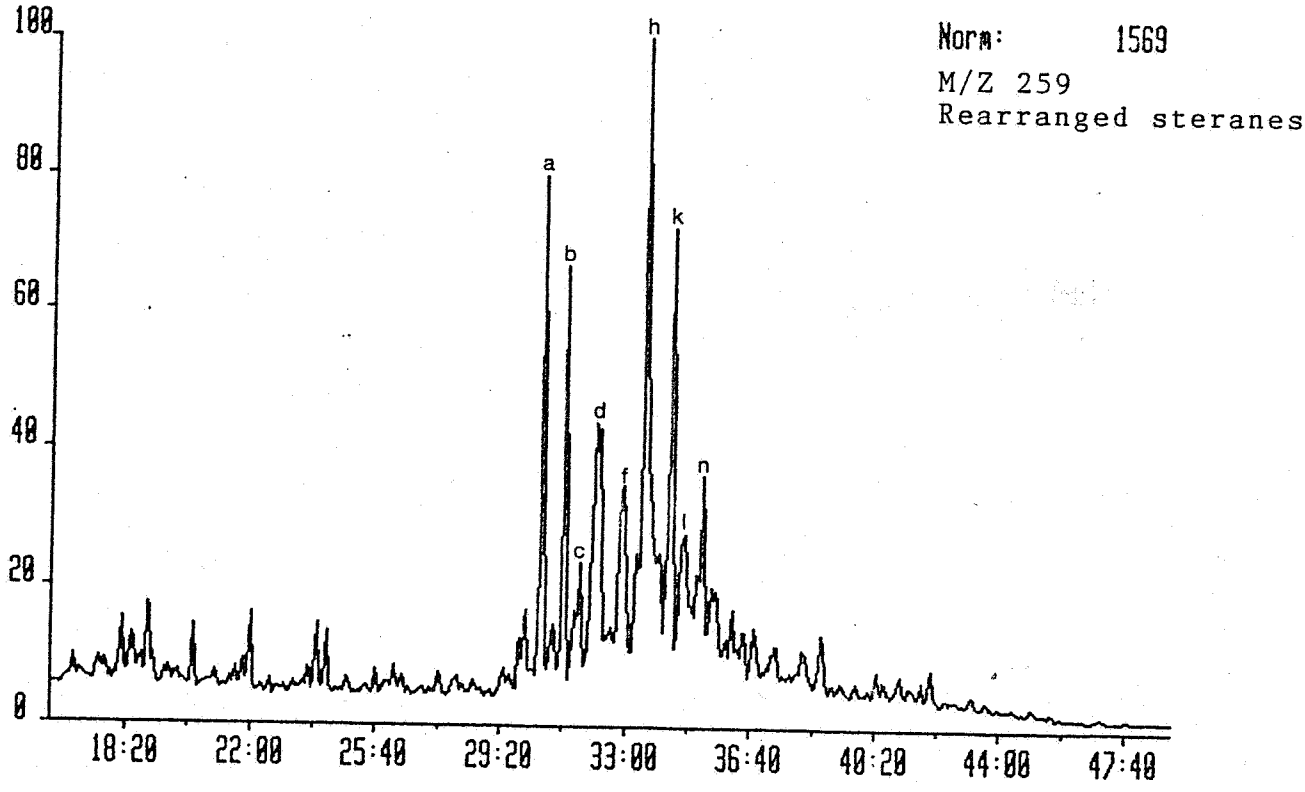
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 189.1643
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

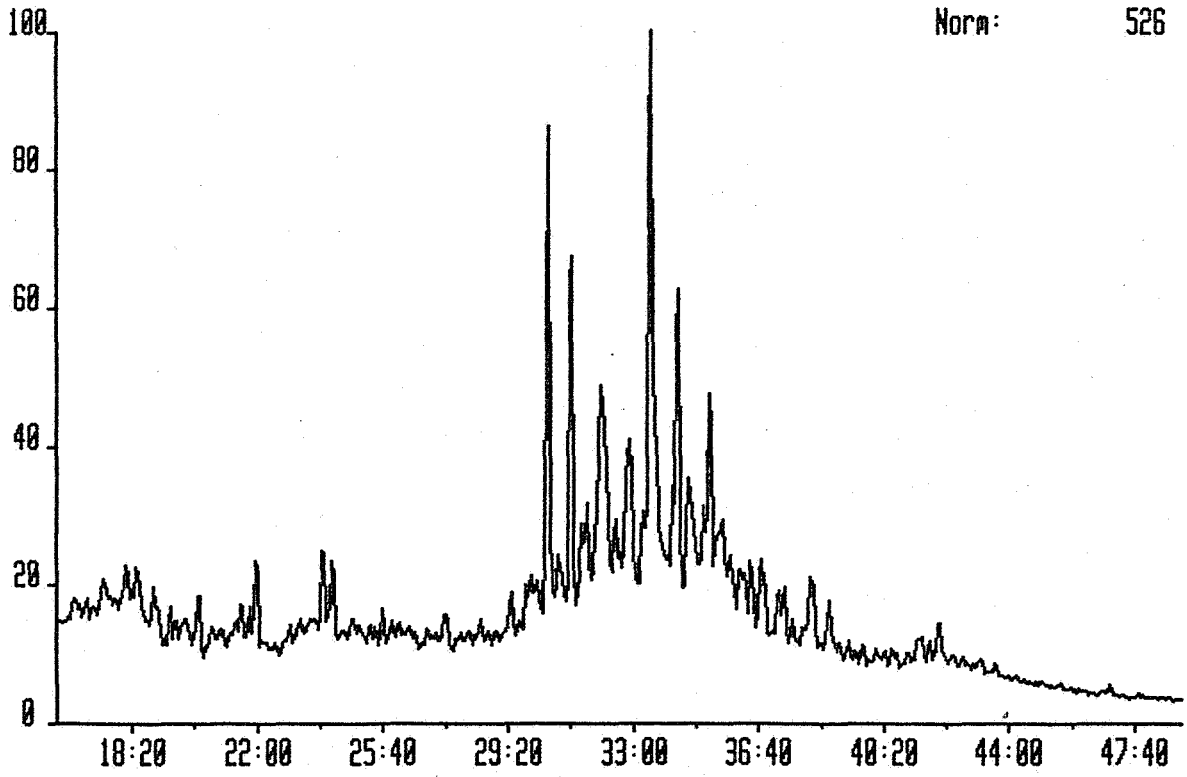


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

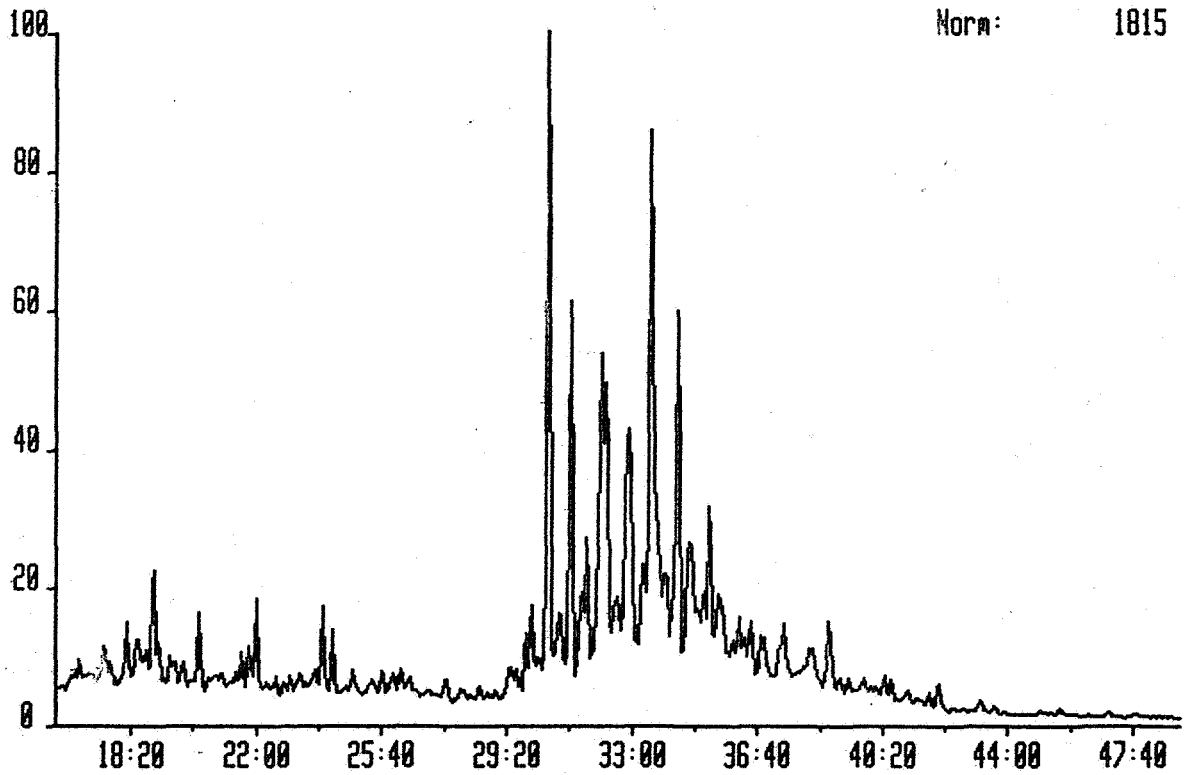
EXAMPLE OF PEAK IDENTIFICATION FOR REARRANGED STERANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 259.2427
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

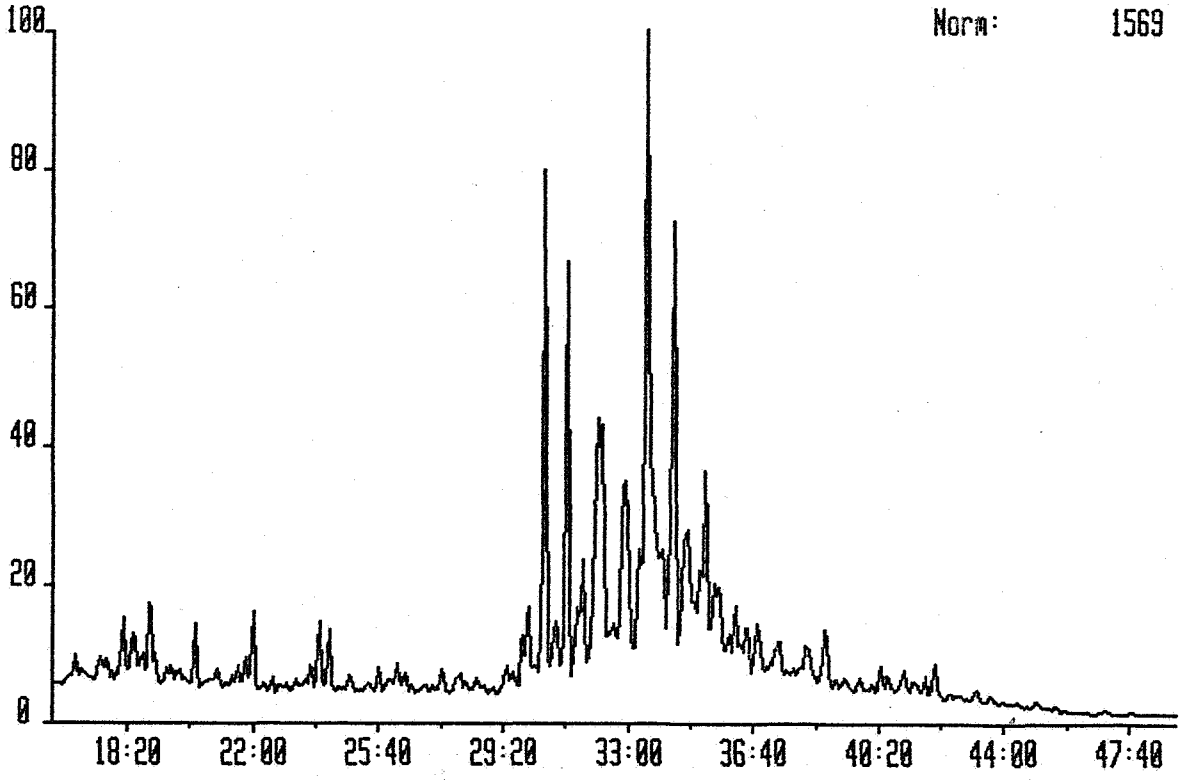


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 259.2427
Text:WELL 3/7-3,3446M, SATURATED FRACTION



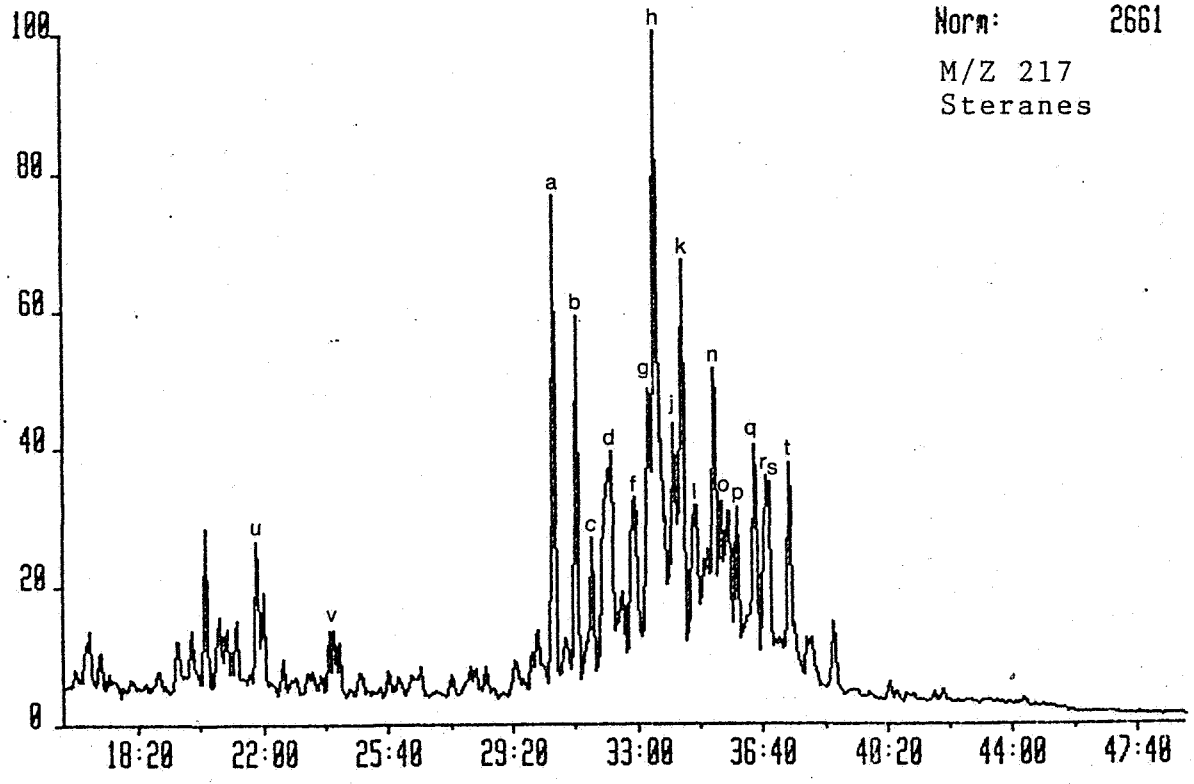
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 259.2427
Text:WELL 3/7-3, 3500M, SATURATED FRACTION



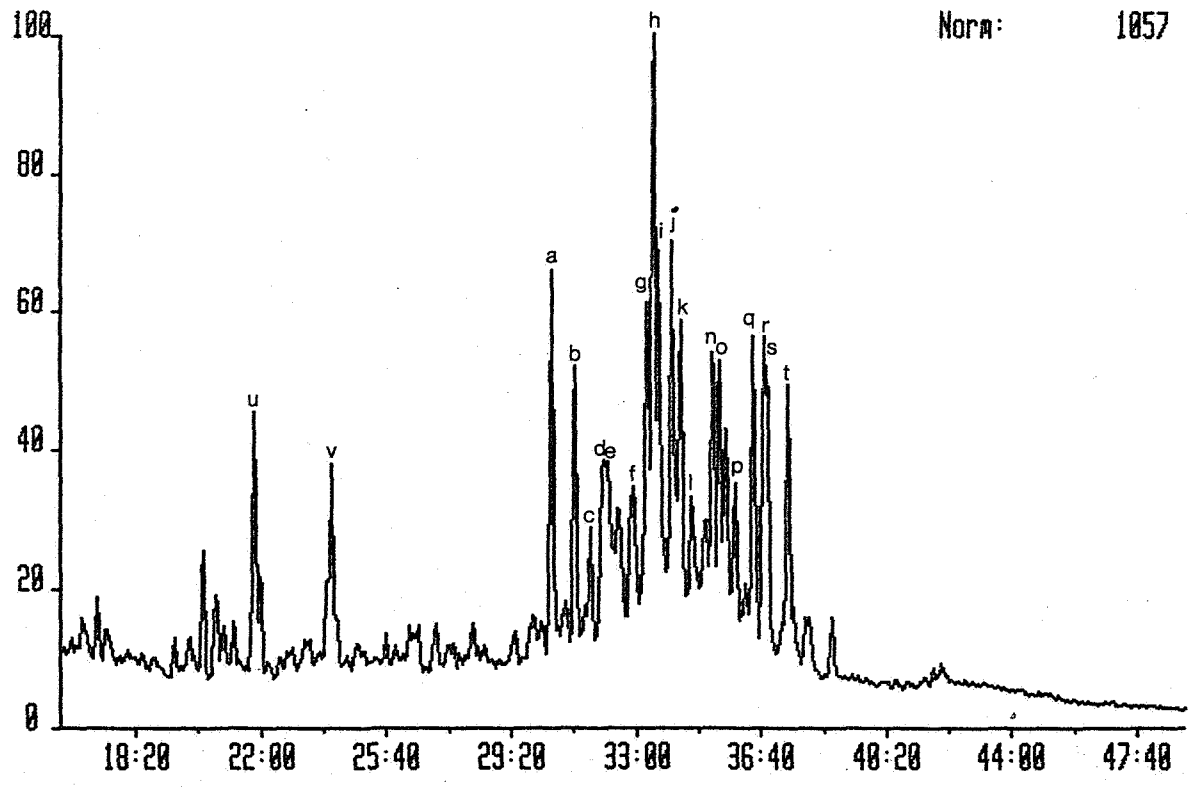
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

EXAMPLE OF PEAK IDENTIFICATION FOR STERANES

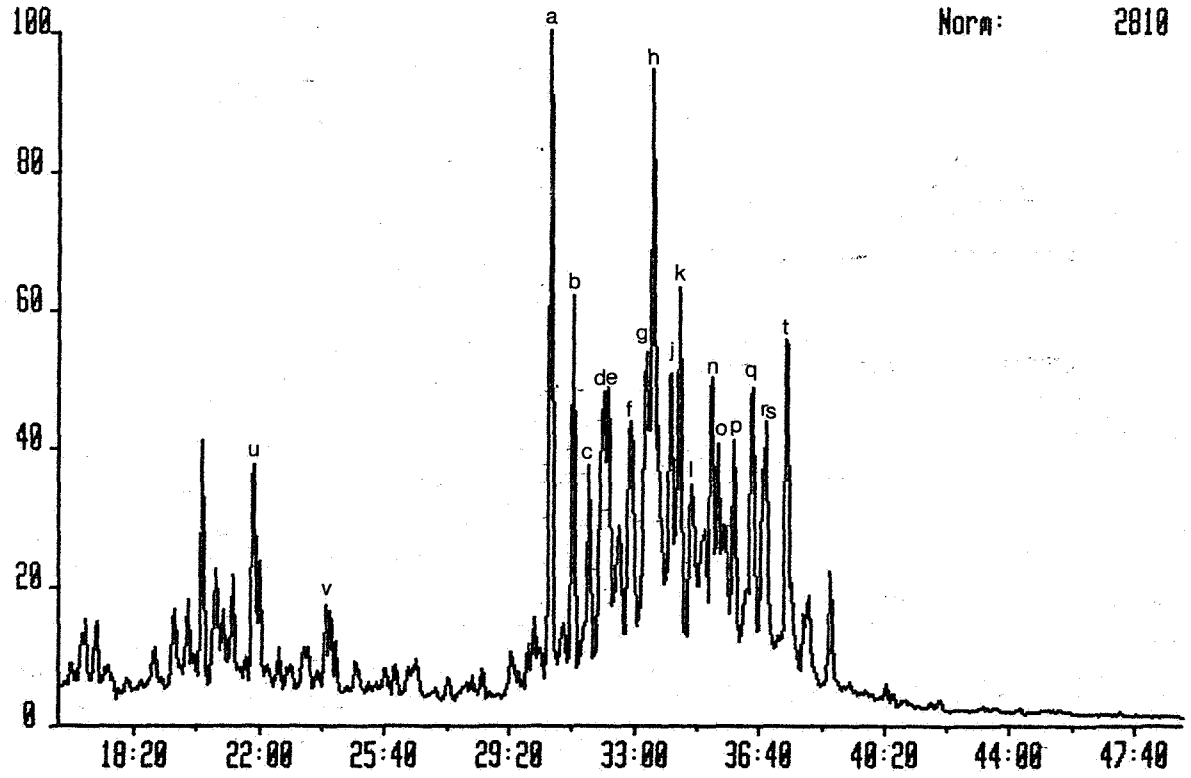


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 217.1956
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

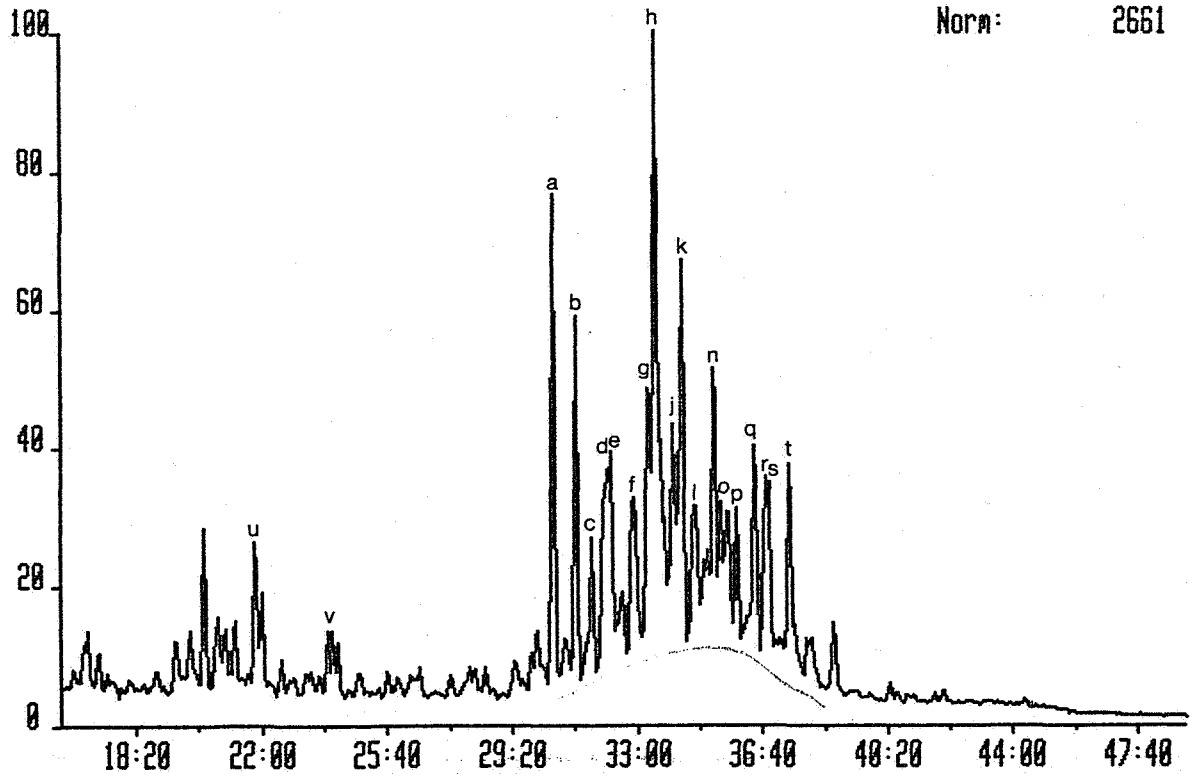


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 217.1956
Text:WELL 3/7-3,3446M, SATURATED FRACTION



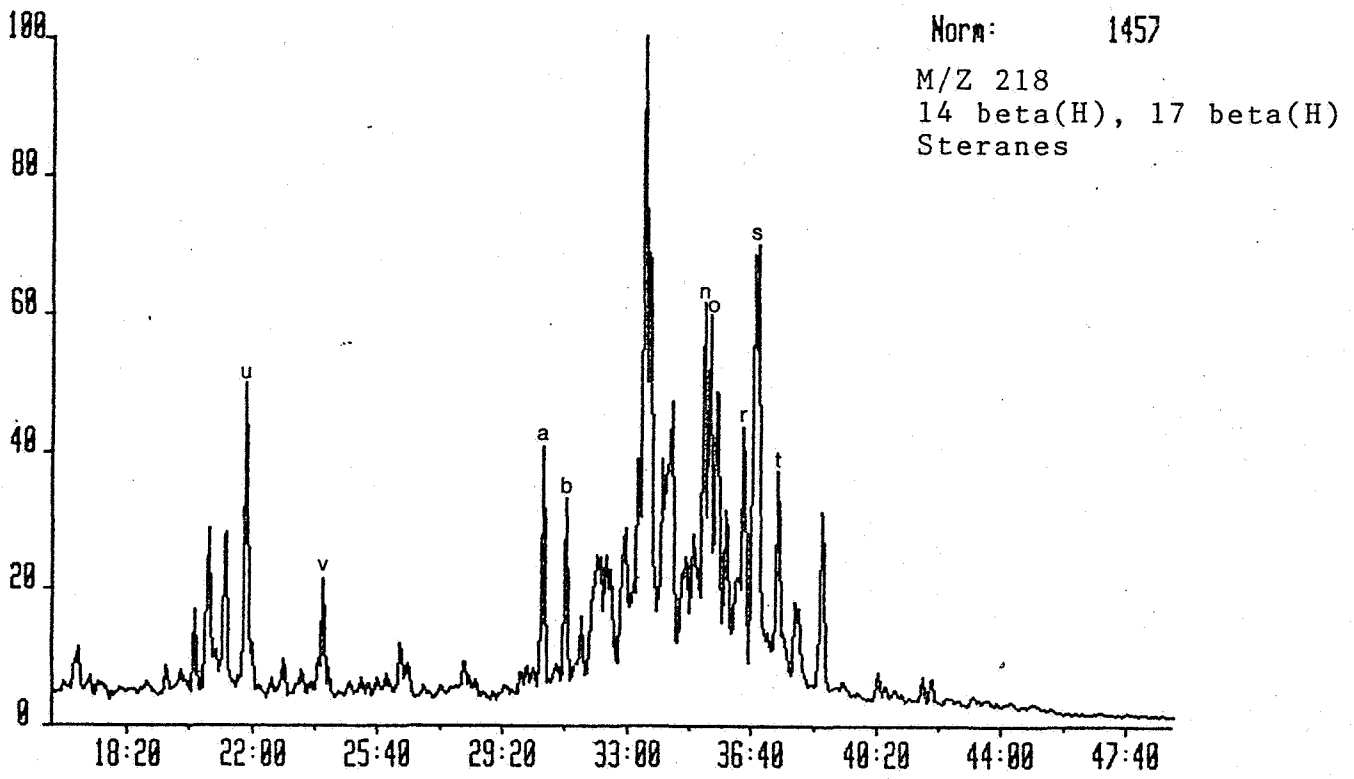
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 217.1956
Text:WELL 3/7-3, 3500M, SATURATED FRACTION

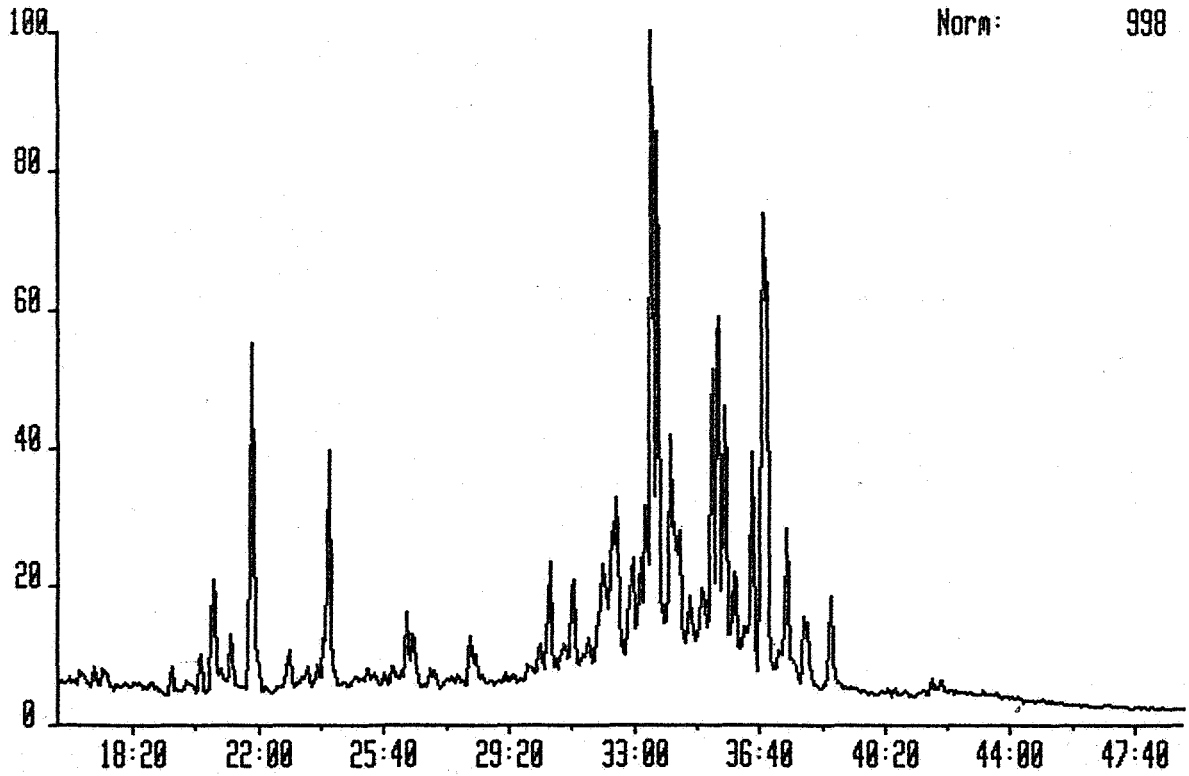


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

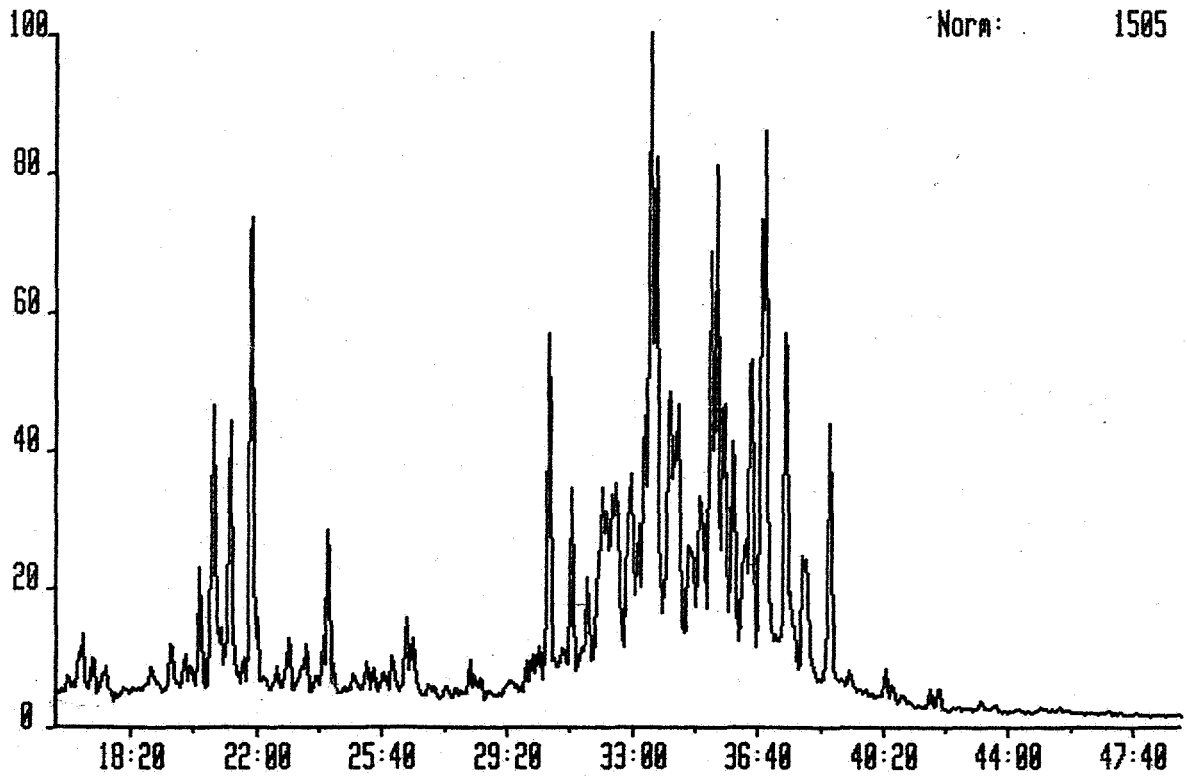
EXAMPLE OF PEAK IDENTIFICATION FOR 14 BETA(H), 17 BETA(H) STERANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 218.2034
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

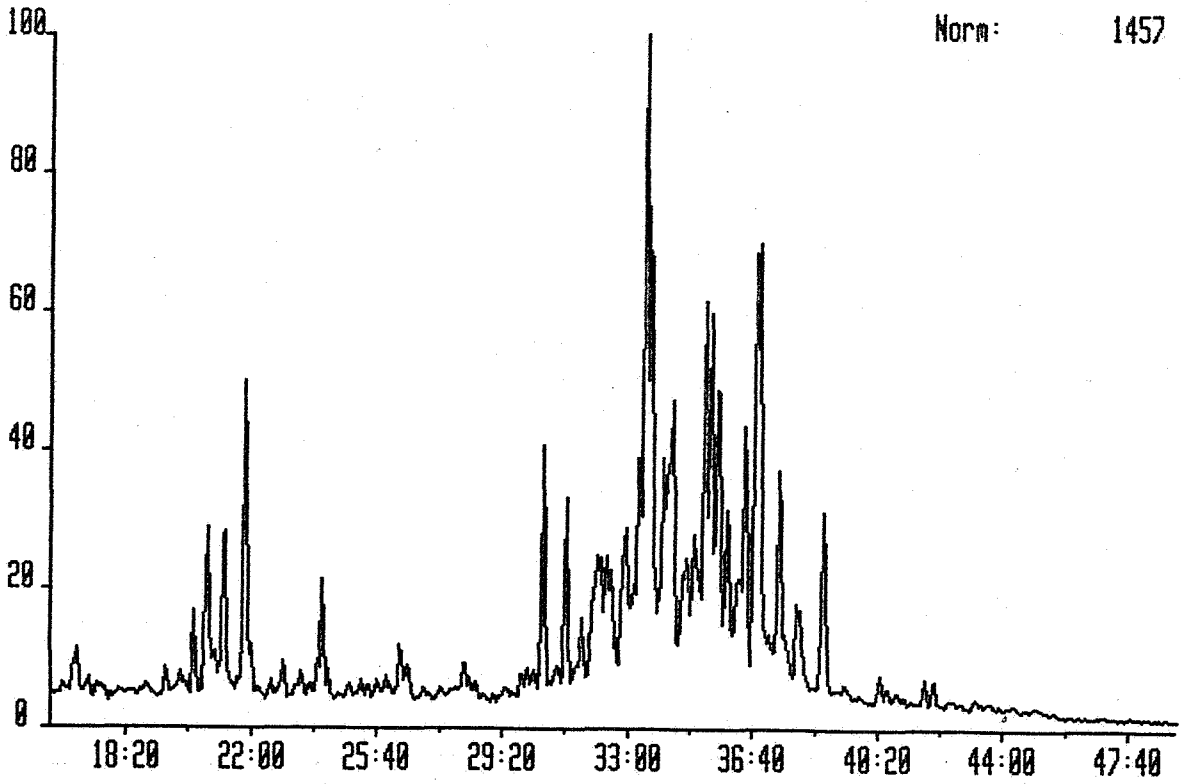


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 218.2034
Text:WELL 3/7-3,3446M, SATURATED FRACTION



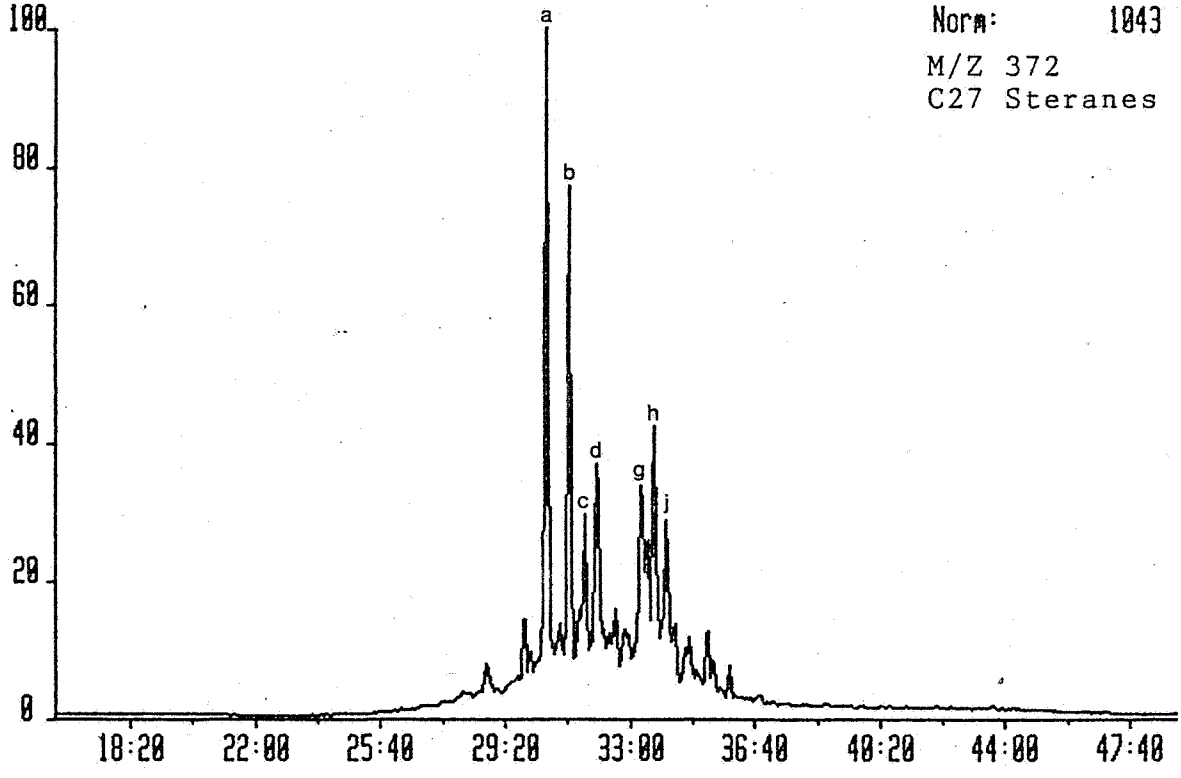
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 218.2034
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

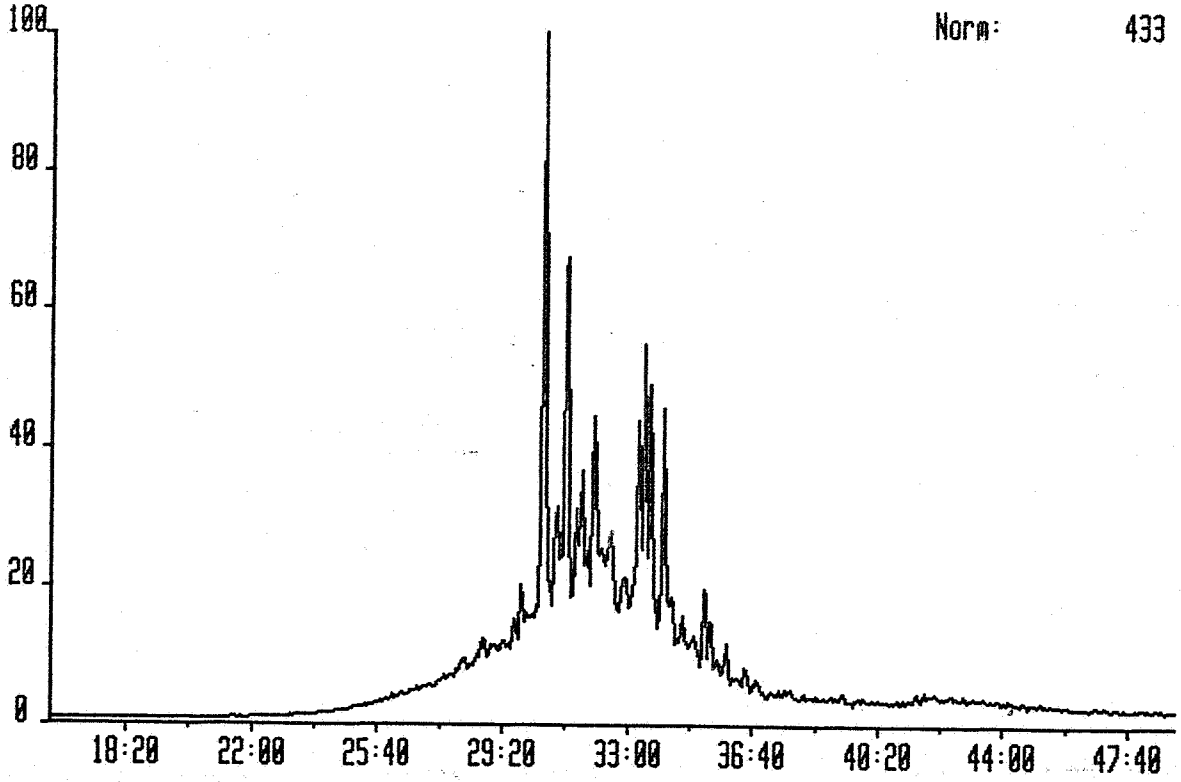


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

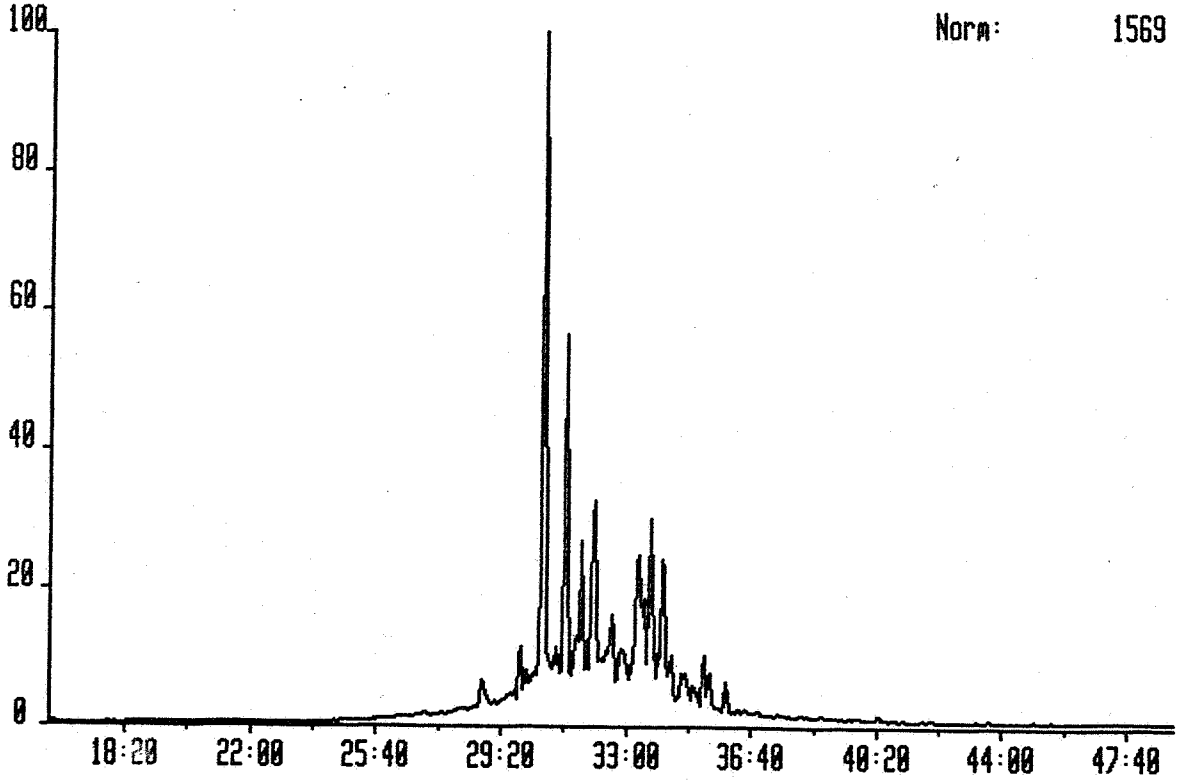
EXAMPLE OF PEAK IDENTIFICATION FOR C27 STERANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 372.3756
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

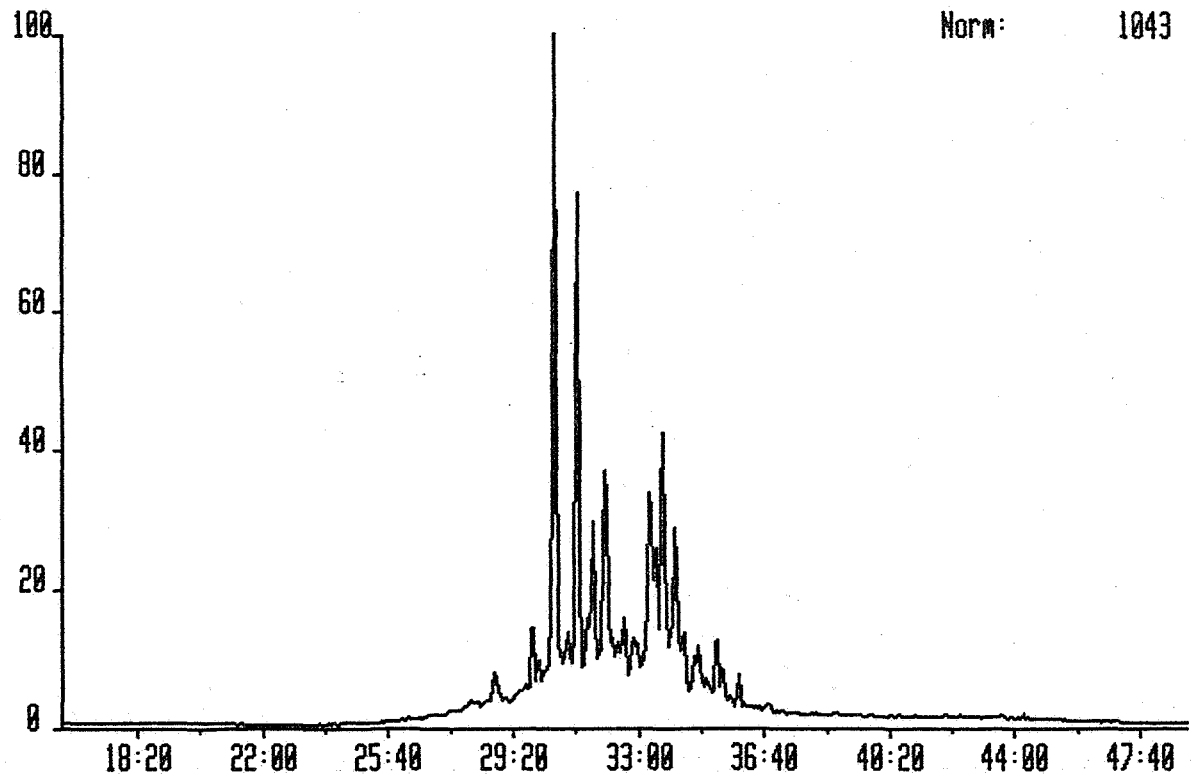


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 372.3756
Text:WELL 3/7-3,3446M, SATURATED FRACTION

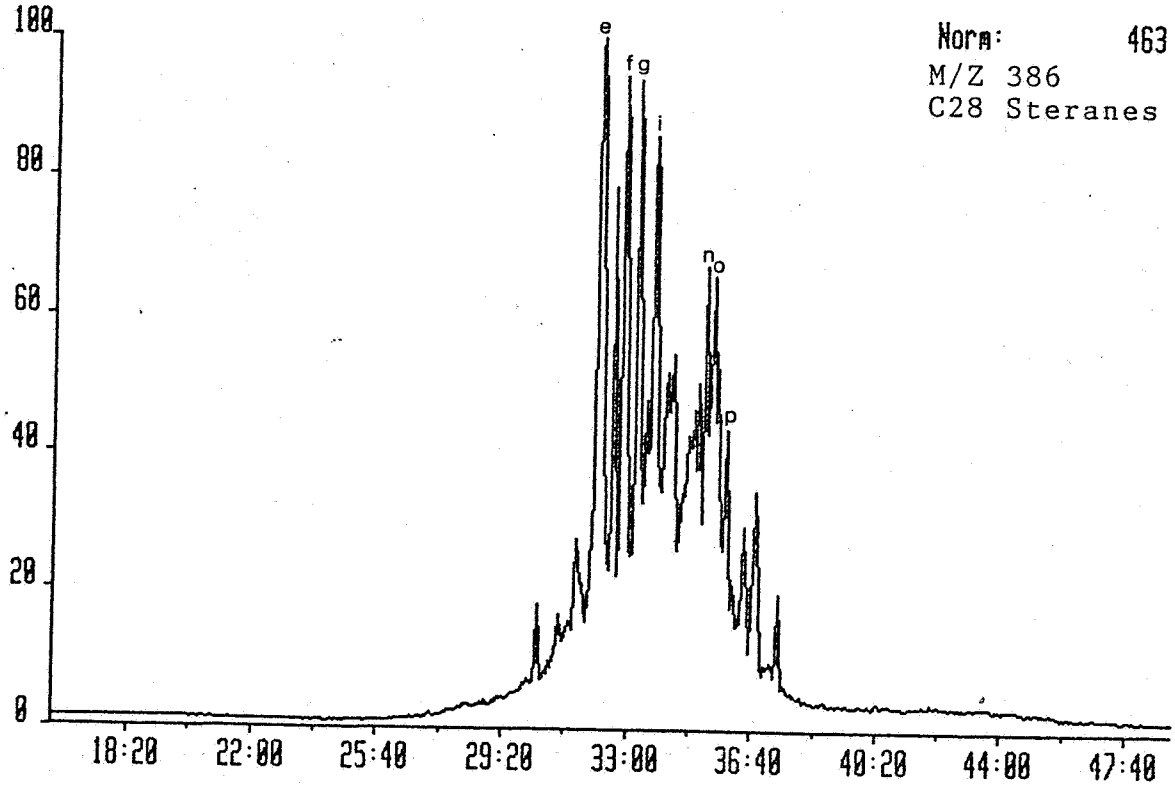


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

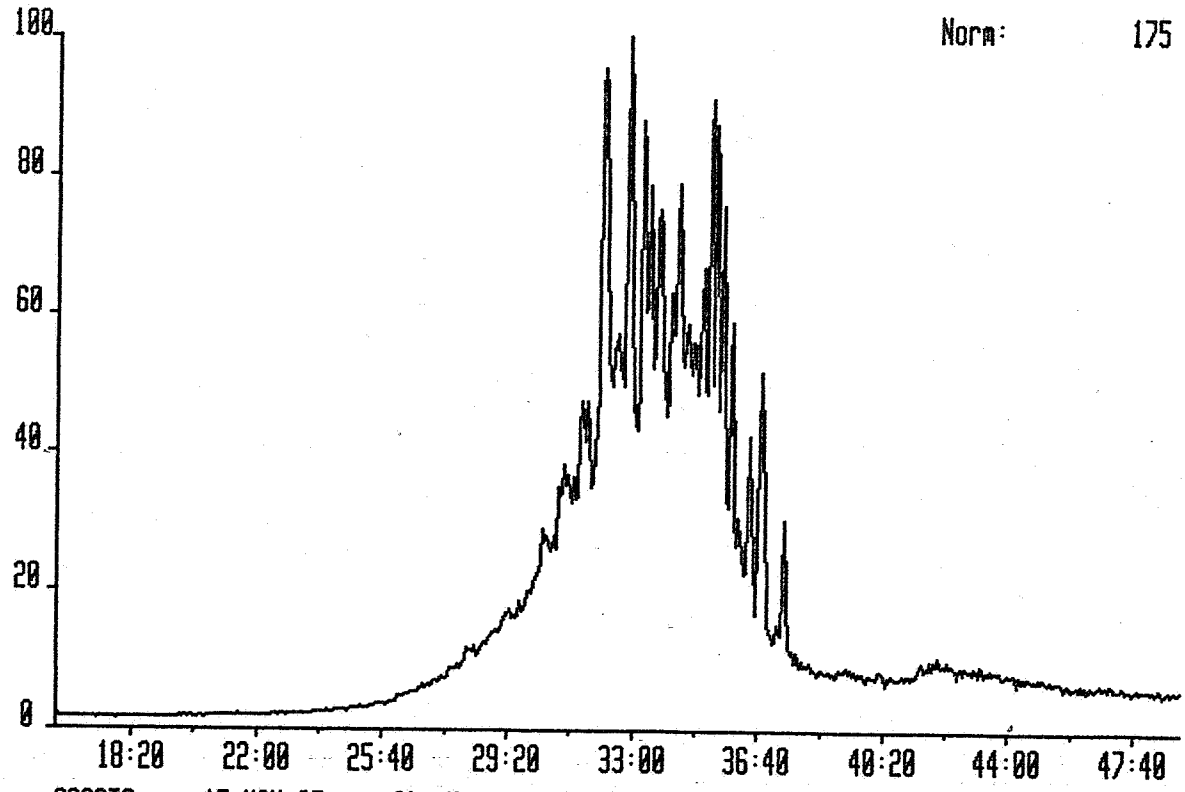
CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 372.3756
Text:WELL 3/7-3, 3500M, SATURATED FRACTION



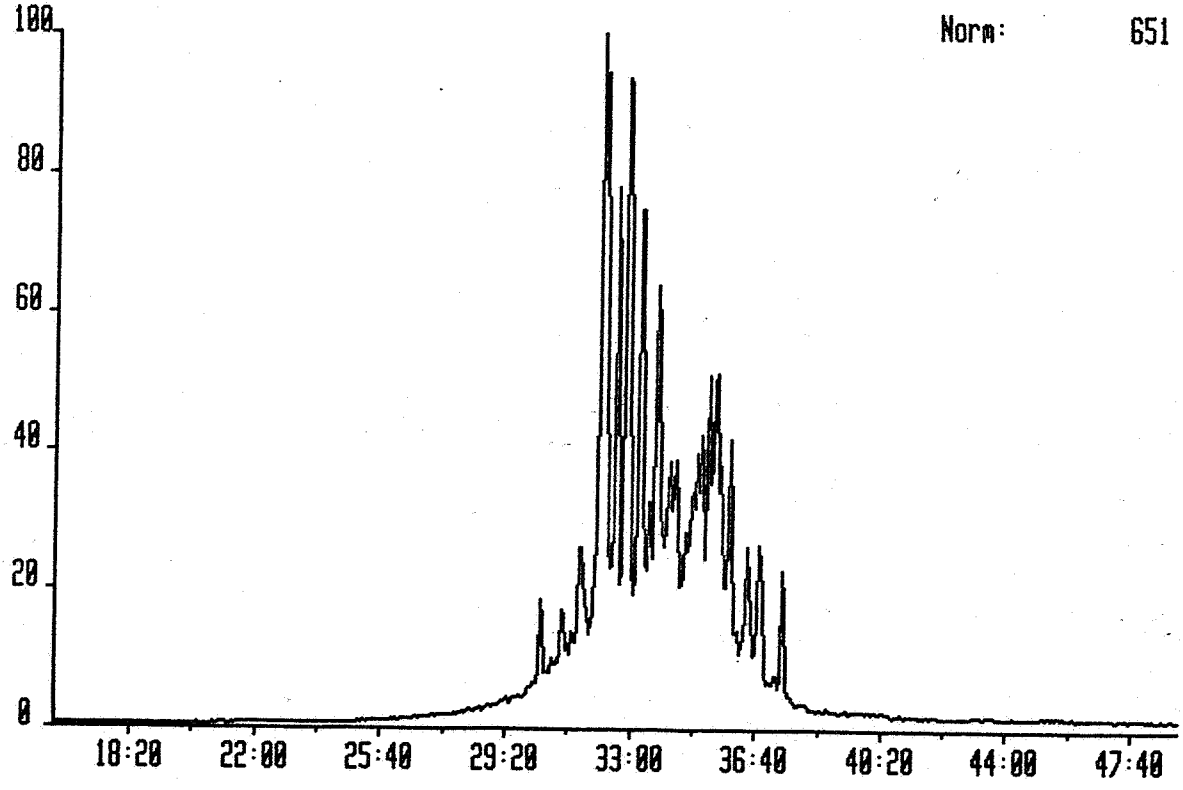
EXAMPLE OF PEAK IDENTIFICATION FOR C28 STERANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 386.3913
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

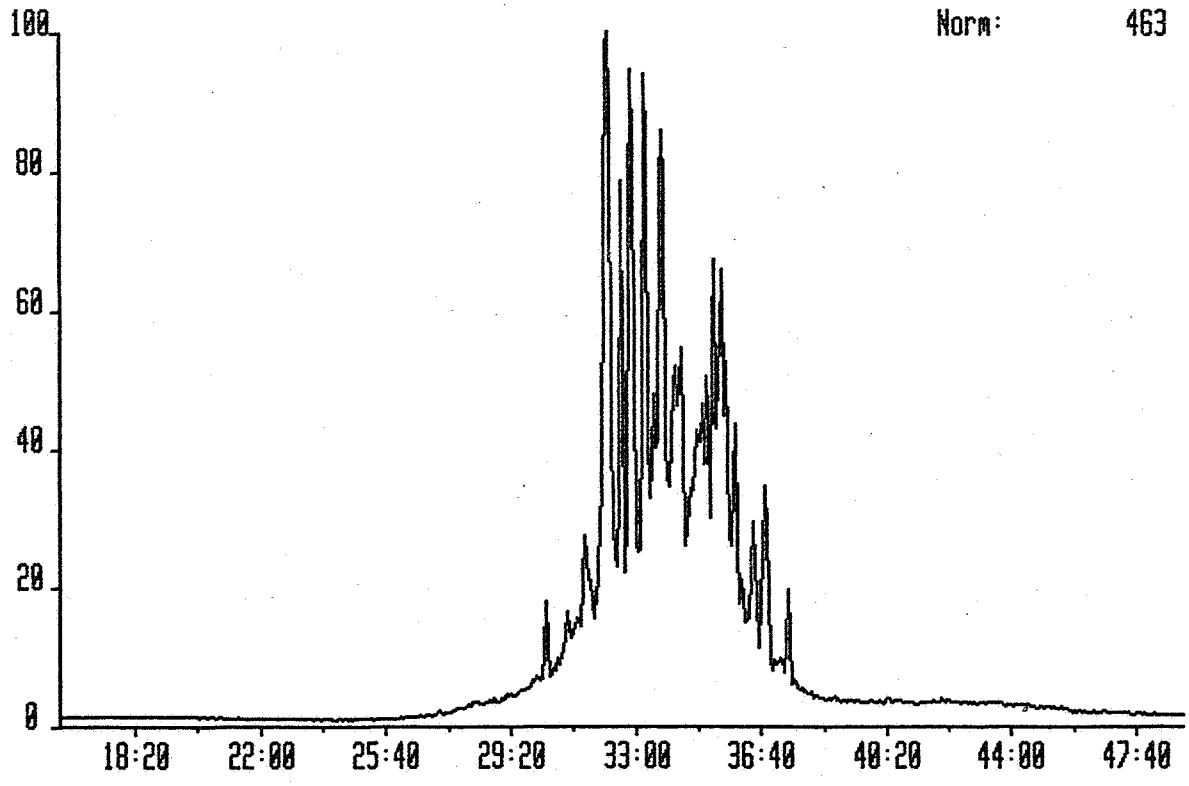


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 386.3913
Text:WELL 3/7-3,3446M, SATURATED FRACTION



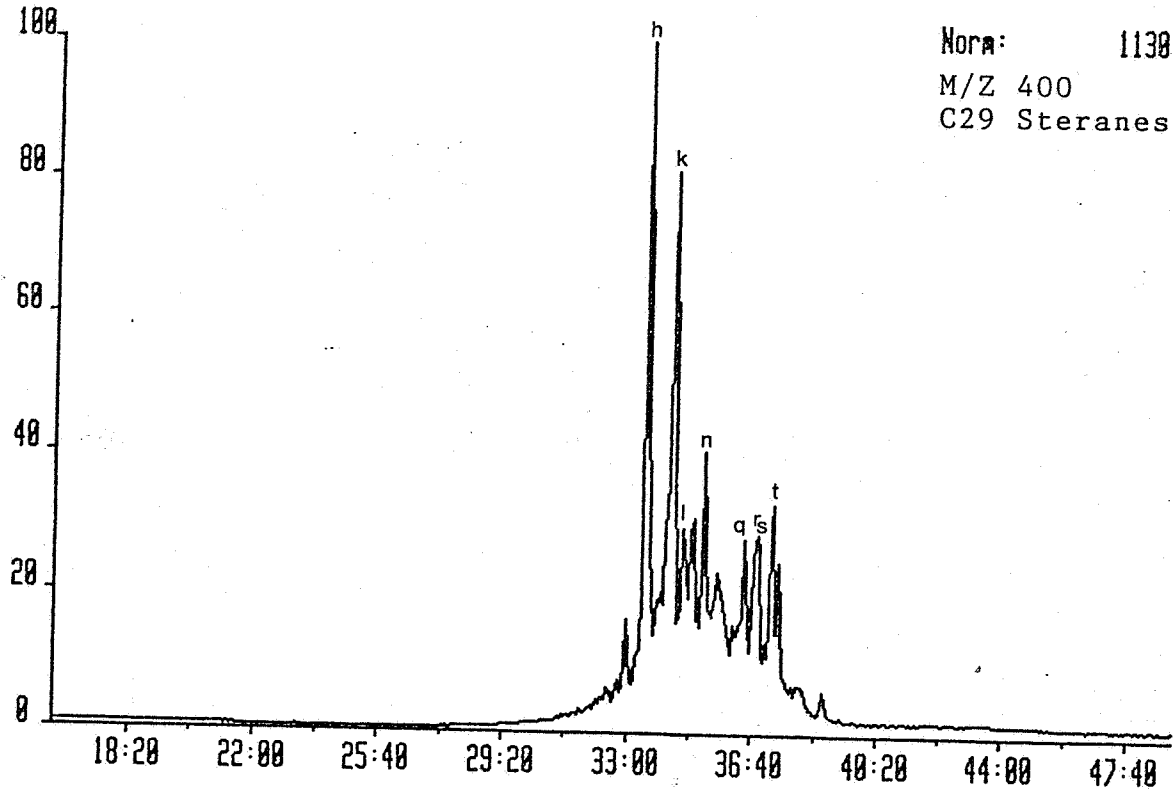
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 386.3913
Text:WELL 3/7-3, 3500M, SATURATED FRACTION

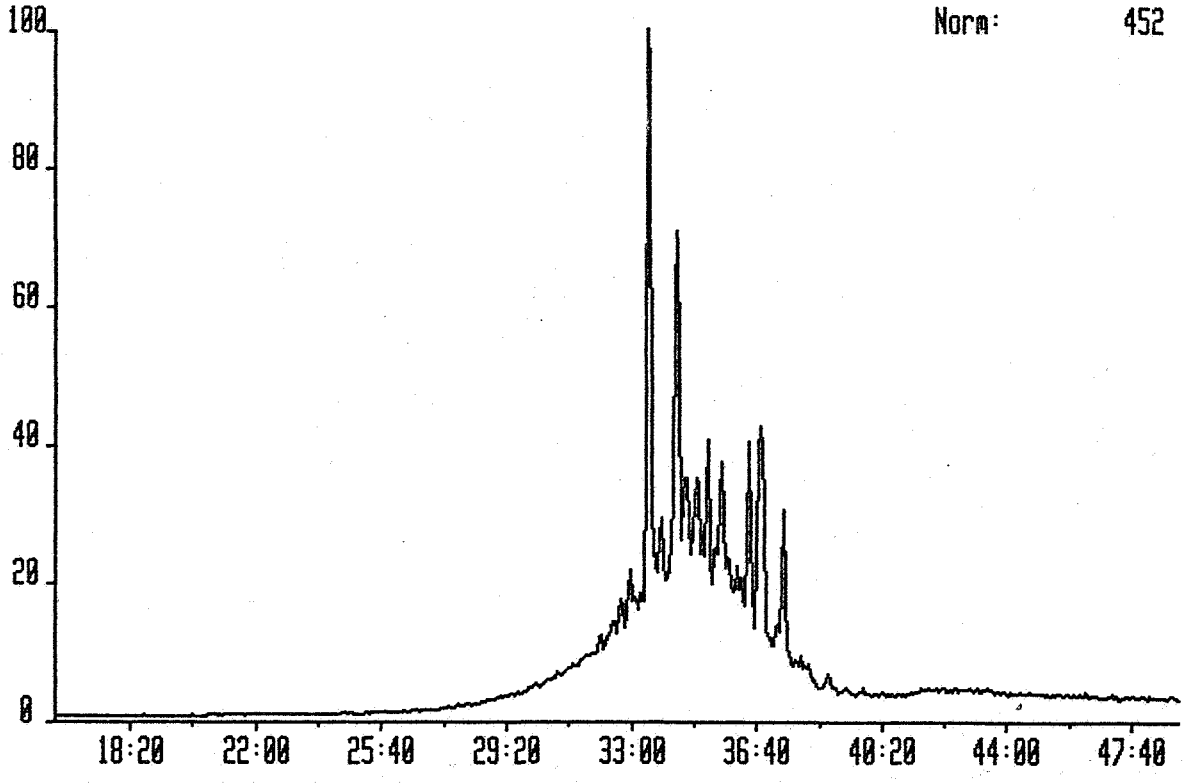


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

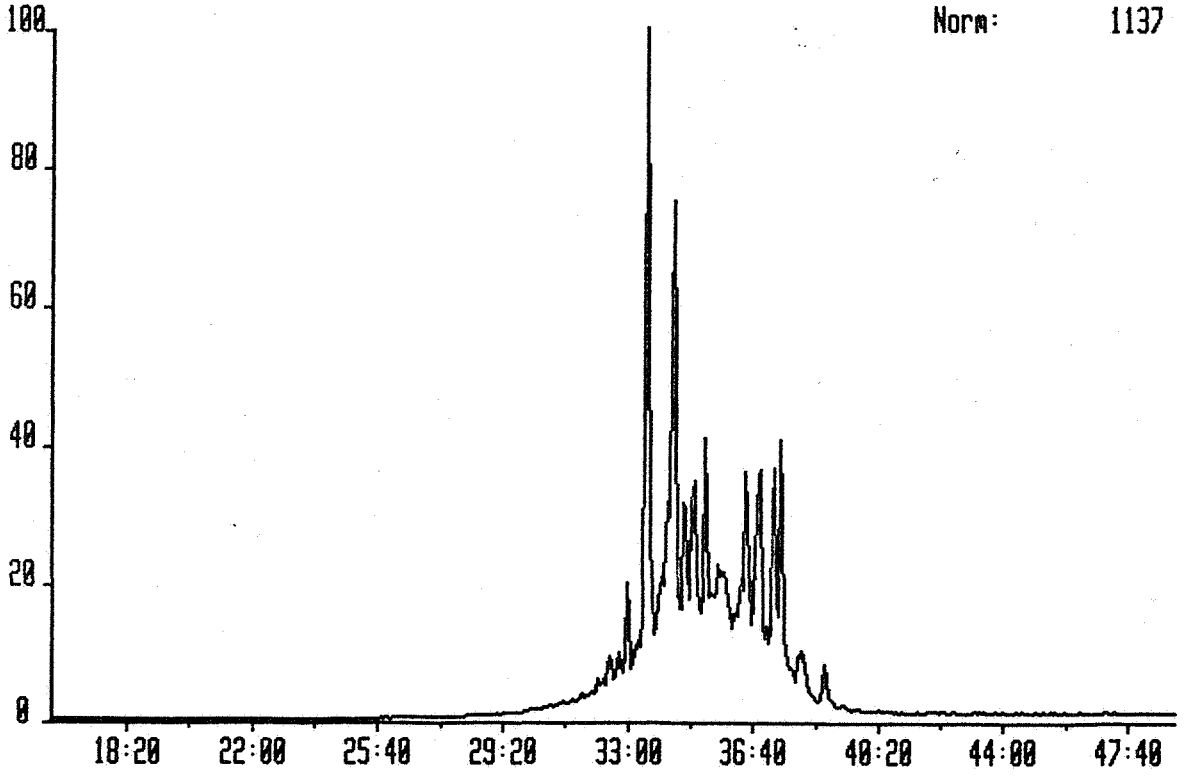
EXAMPLE OF PEAK IDENTIFICATION FOR C29 STERANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 400.4069
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

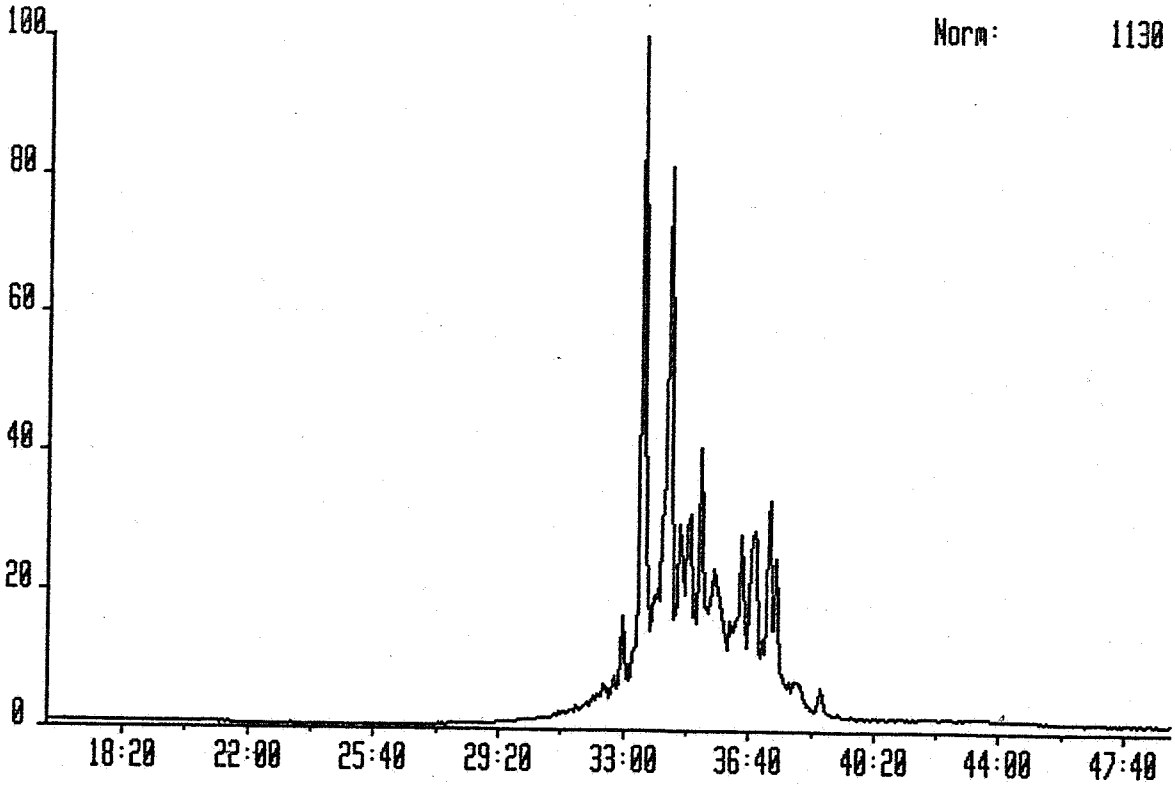


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 400.4069
Text:WELL 3/7-3,3446M, SATURATED FRACTION



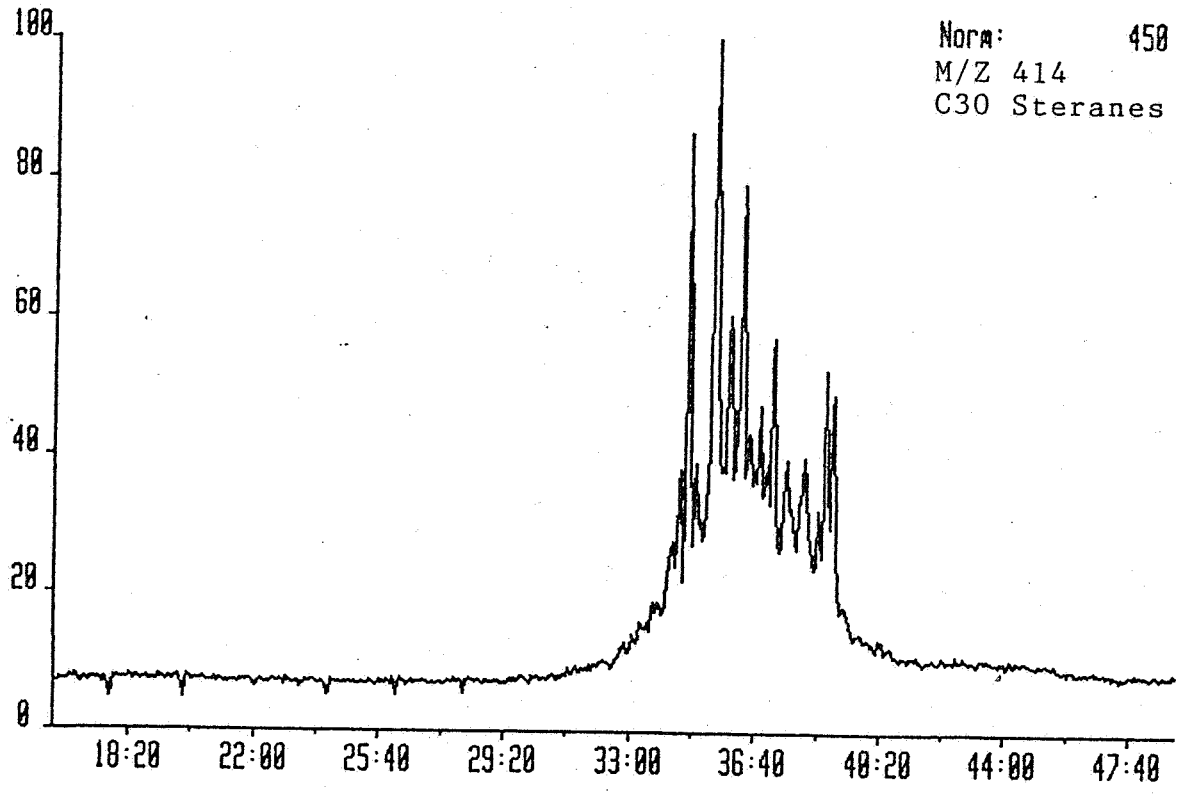
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 400.4069
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

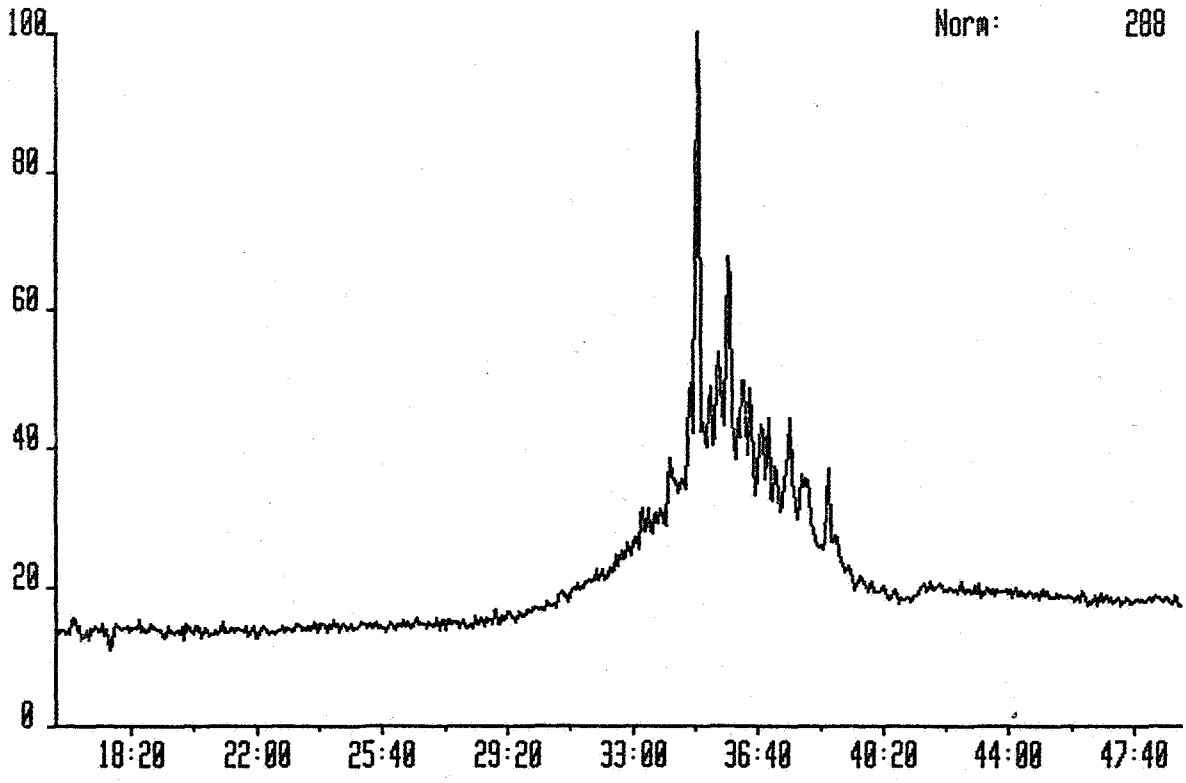


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

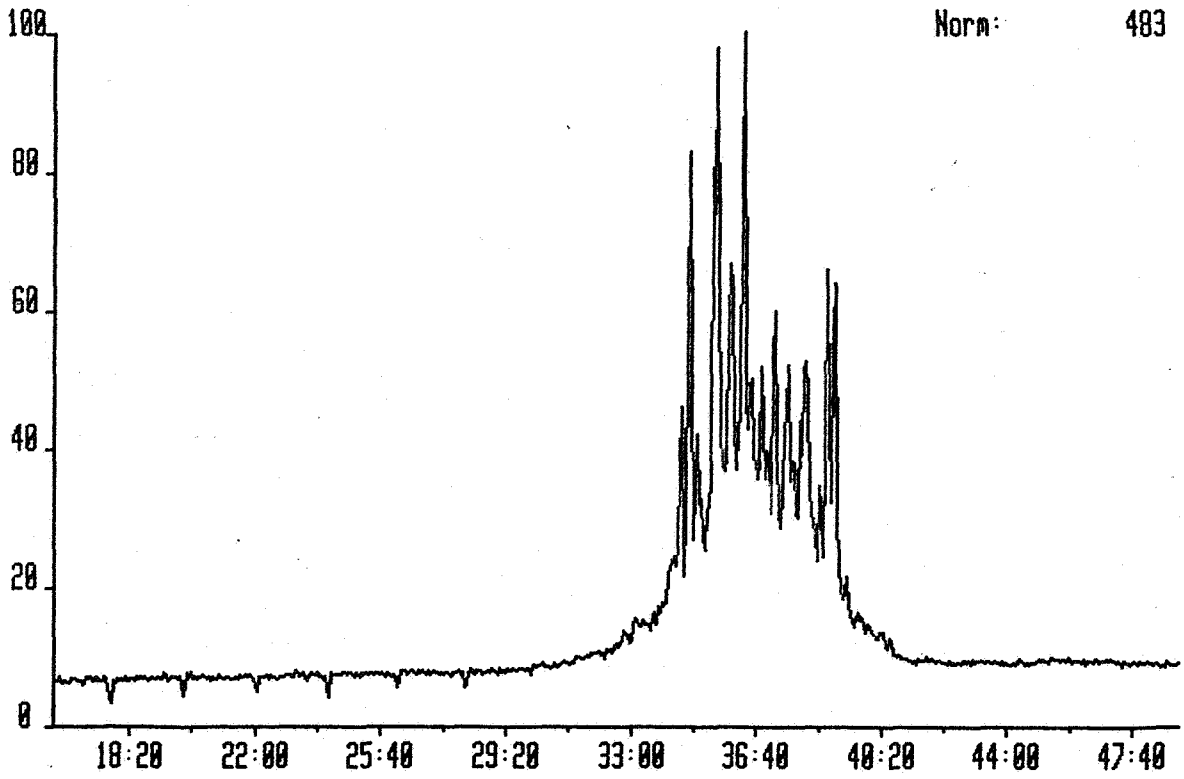
EXAMPLE OF PEAK IDENTIFICATION FOR C30 STERANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 414.4226
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

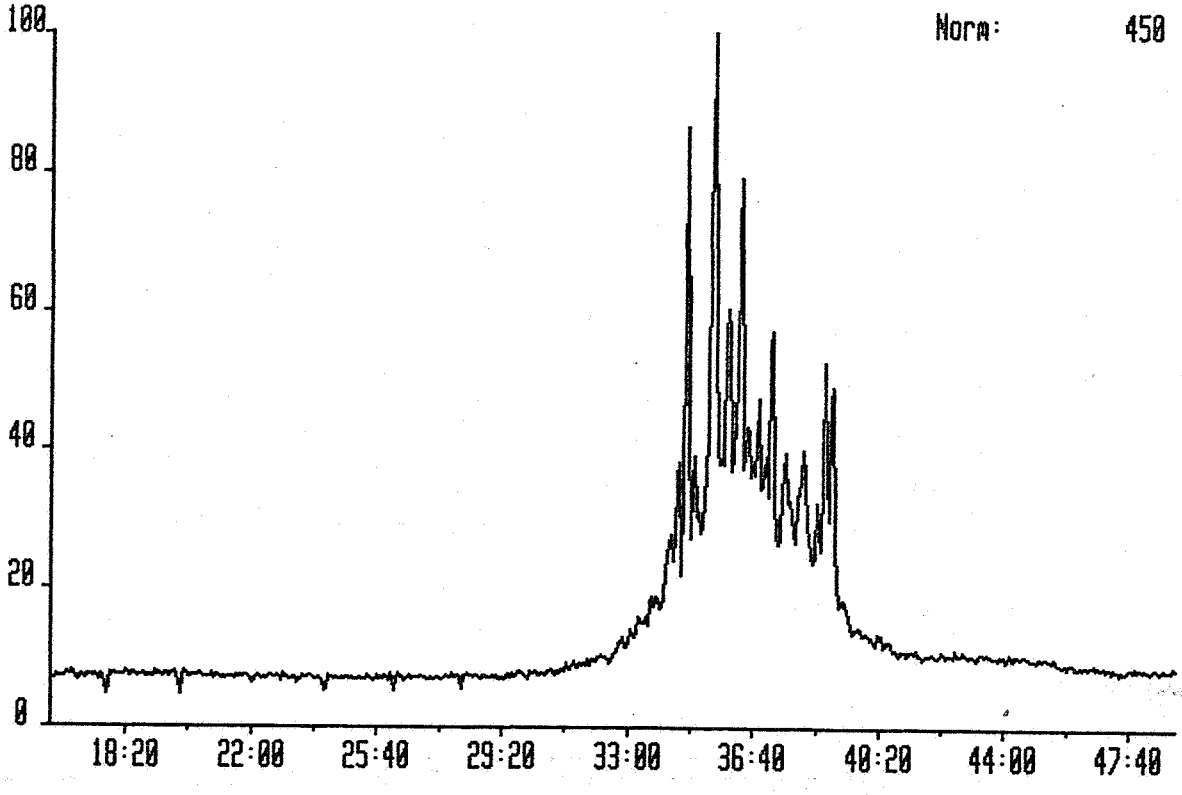


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 414.4226
Text:WELL 3/7-3,3446M, SATURATED FRACTION



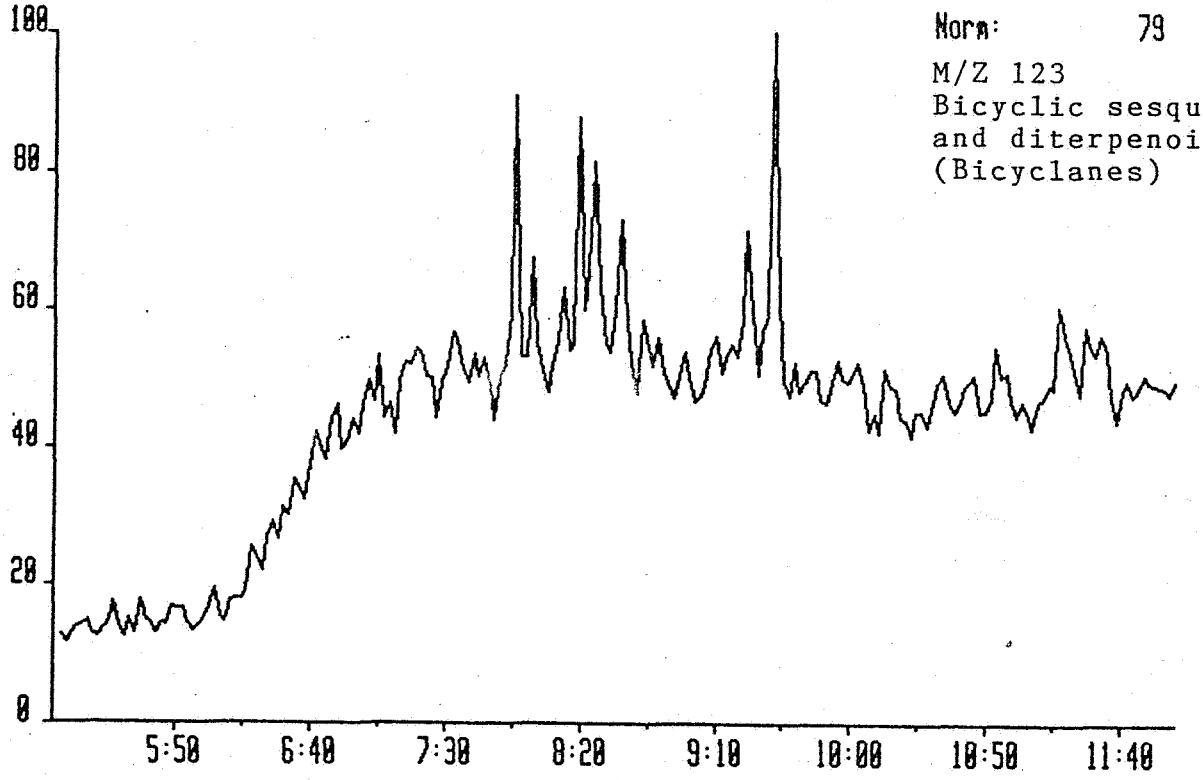
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 414.4226
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

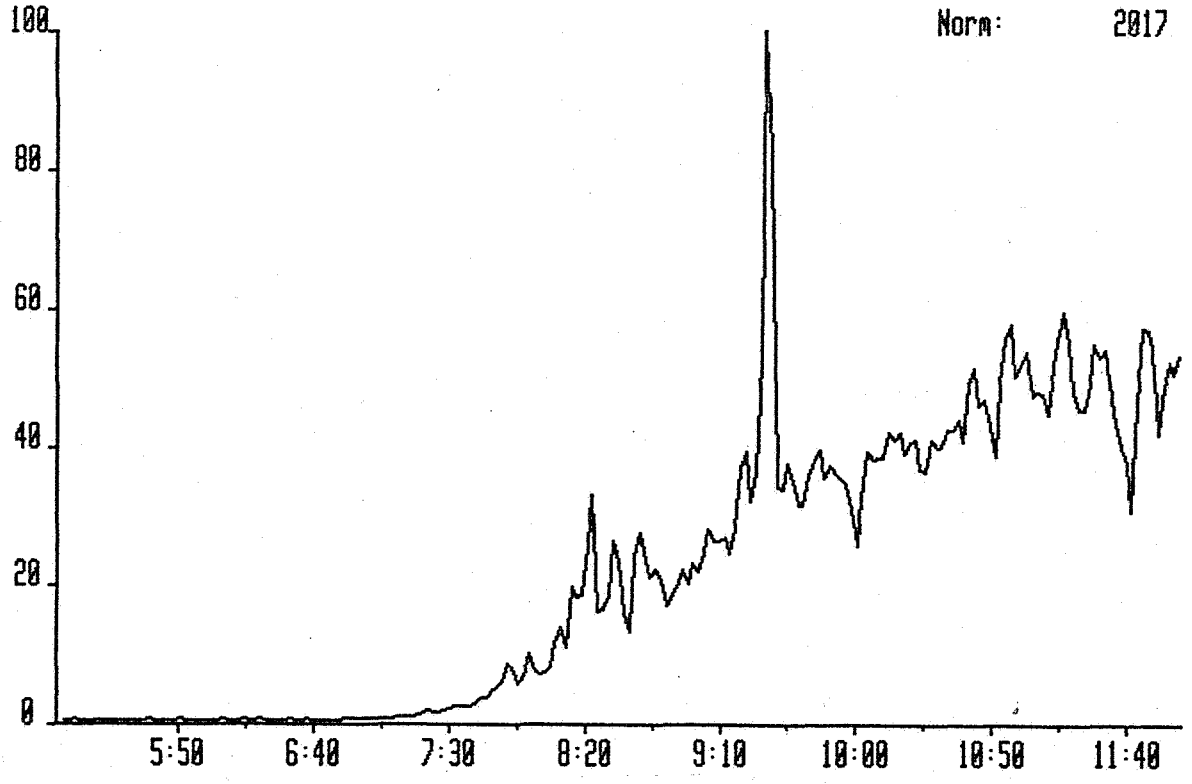


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

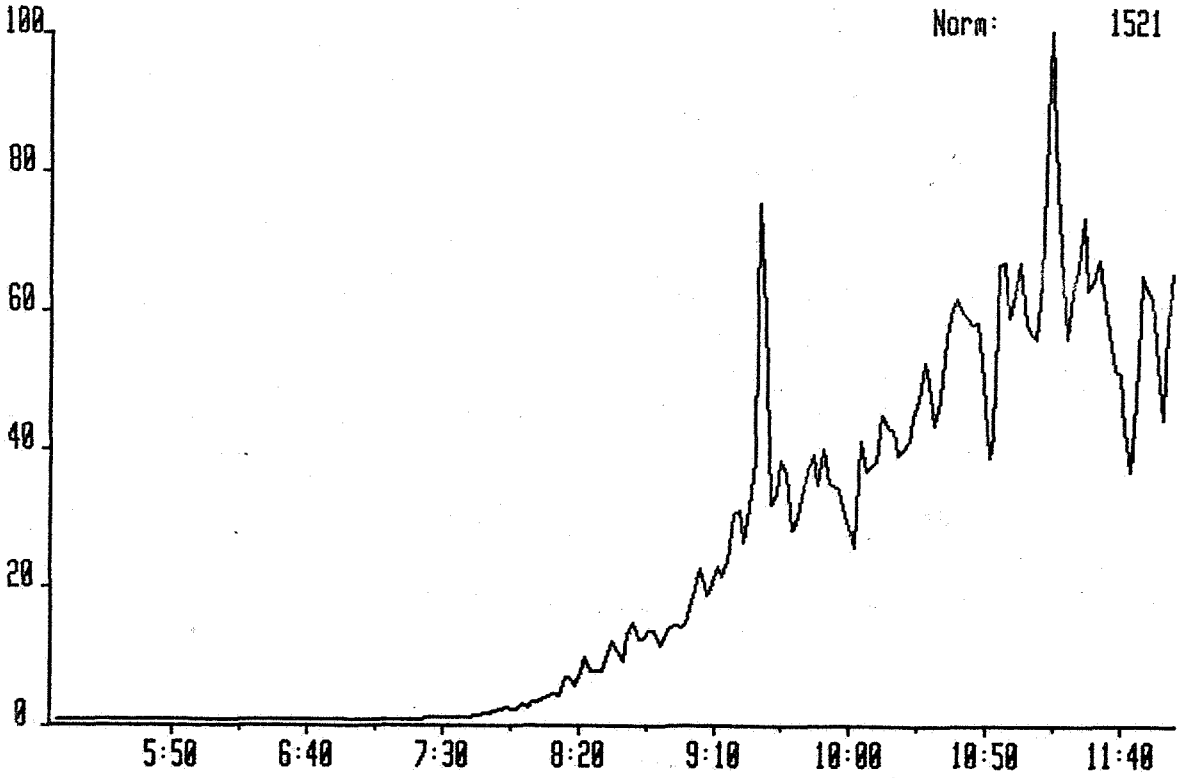
EXAMPLE OF PEAK IDENTIFICATION FOR BICYCLIC SESQUITERPENOIDS AND DITERPENOIDS (BICYCLANES)



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 123.1174
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

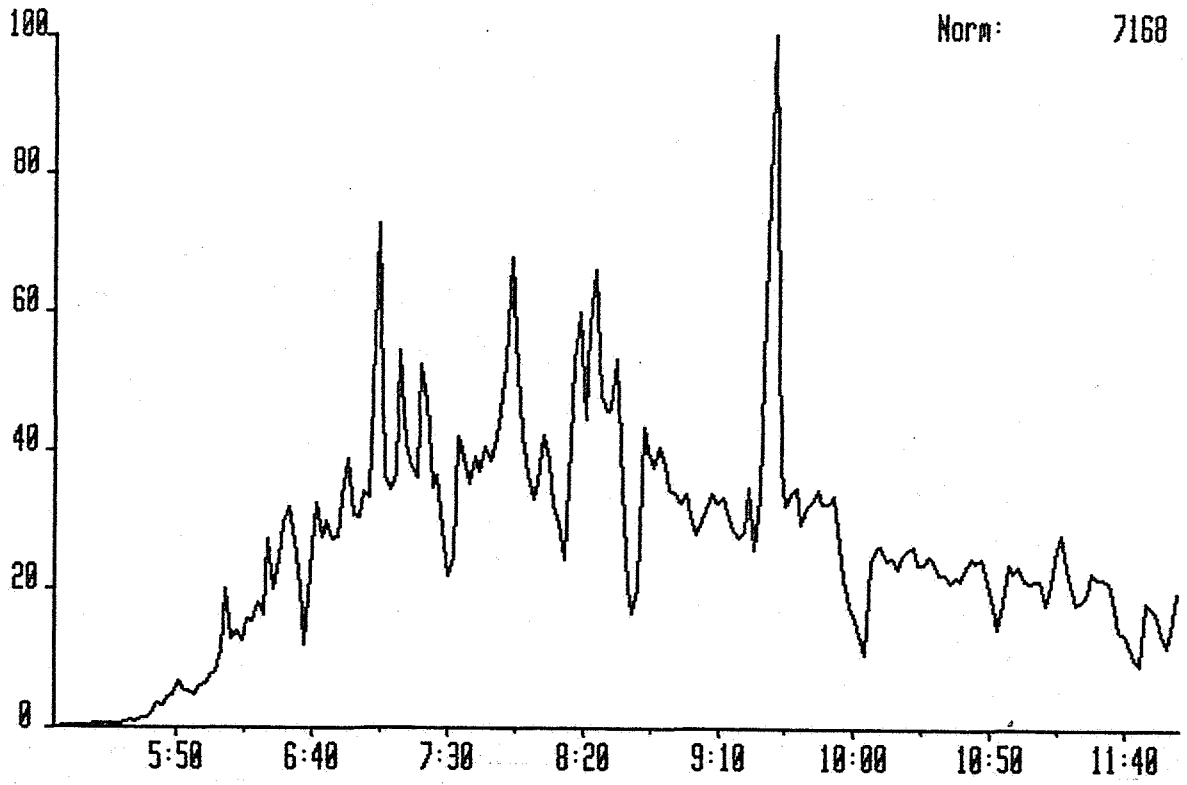


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 123.1174
Text:WELL 3/7-3,3446M, SATURATED FRACTION

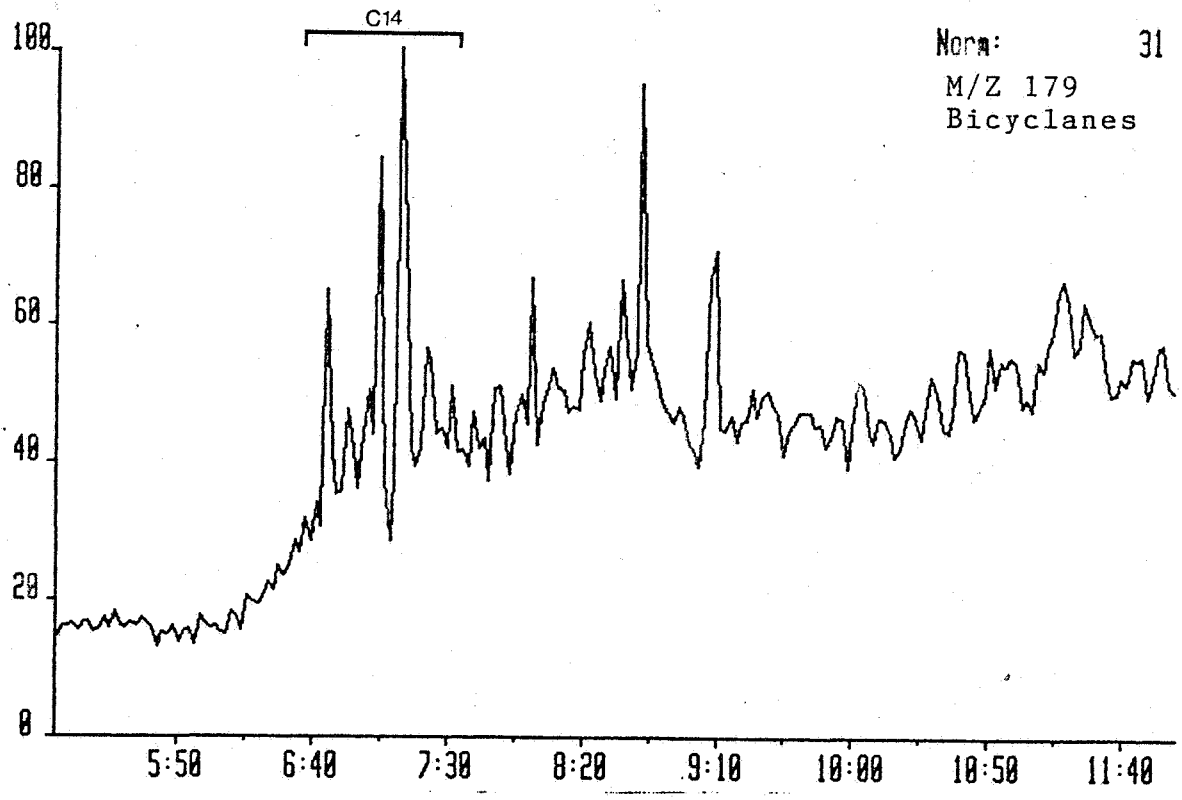


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

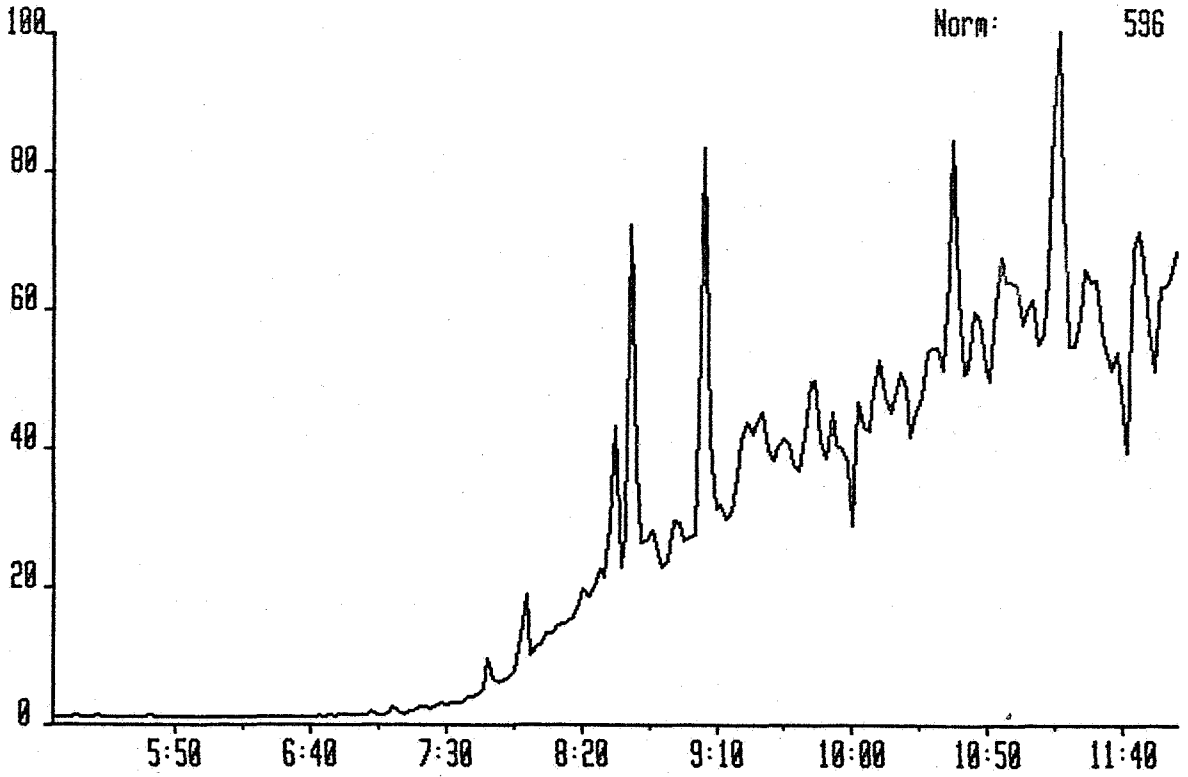
CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 123.1174
Text:WELL 3/7-3, 3500M, SATURATED FRACTION



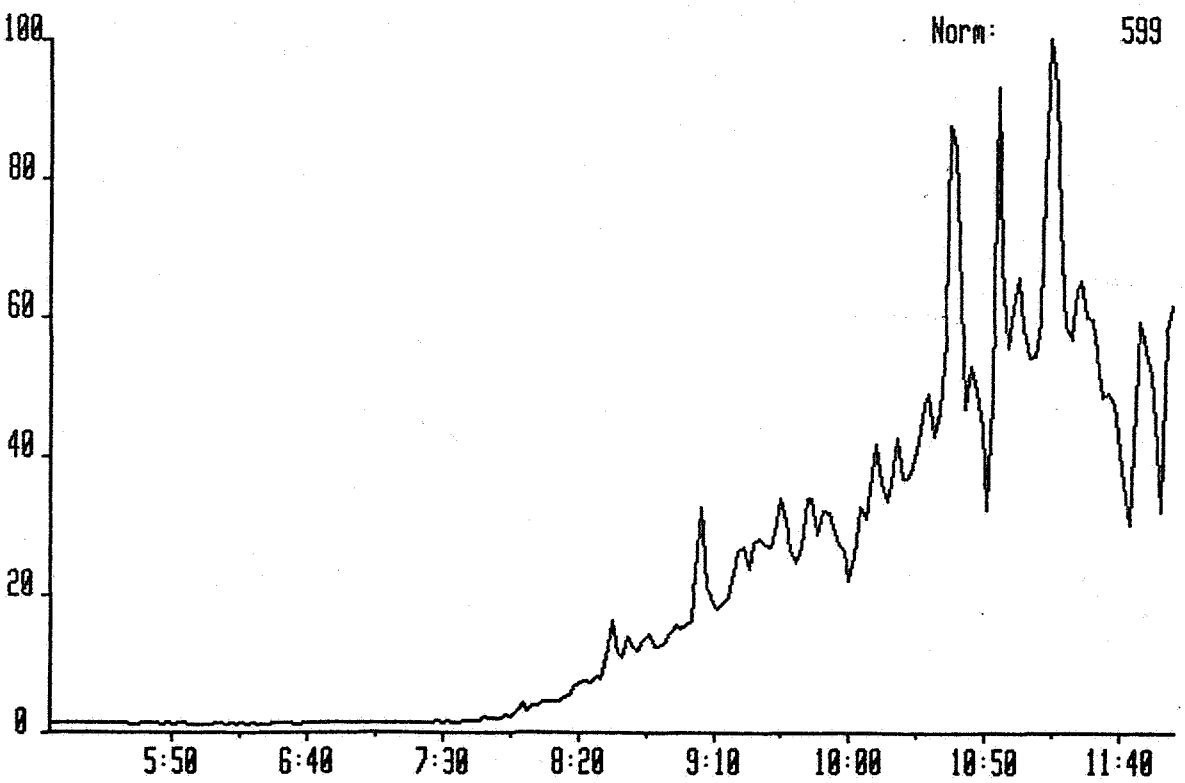
EXAMPLE OF PEAK IDENTIFICATION FOR BICYCLANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 179.1800
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

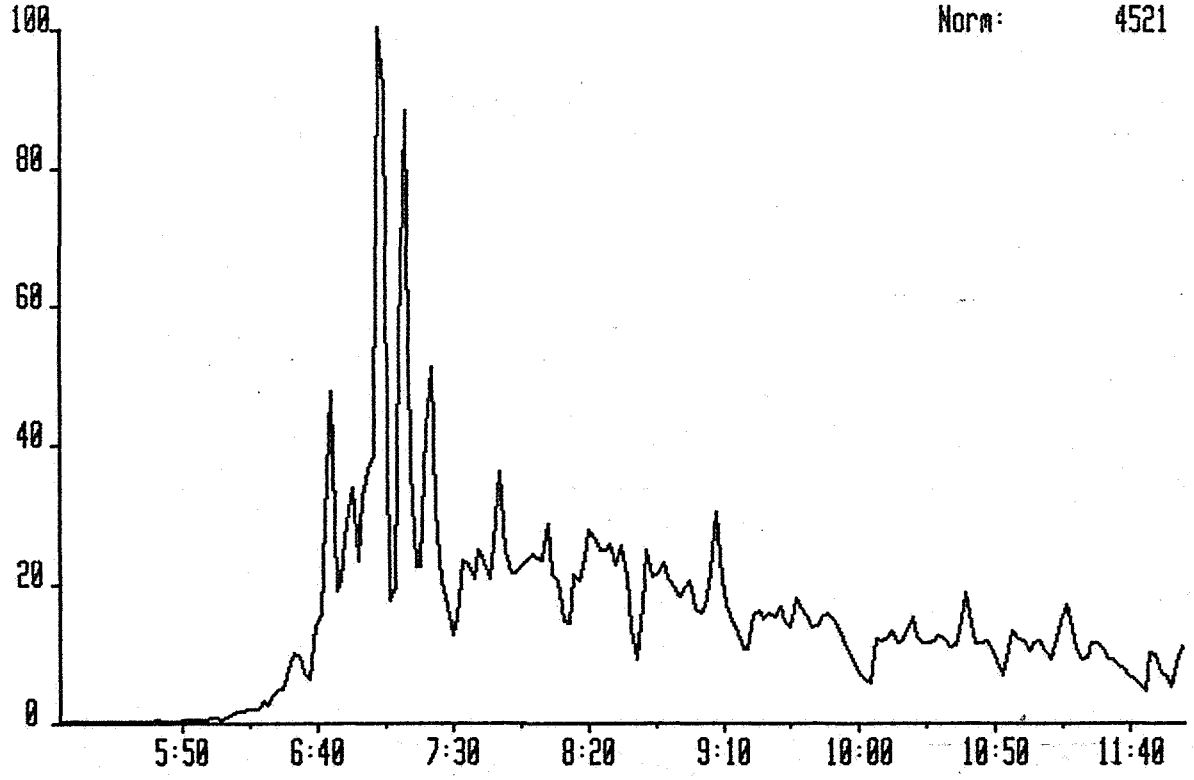


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 179.1800
Text:WELL 3/7-3,3446M, SATURATED FRACTION



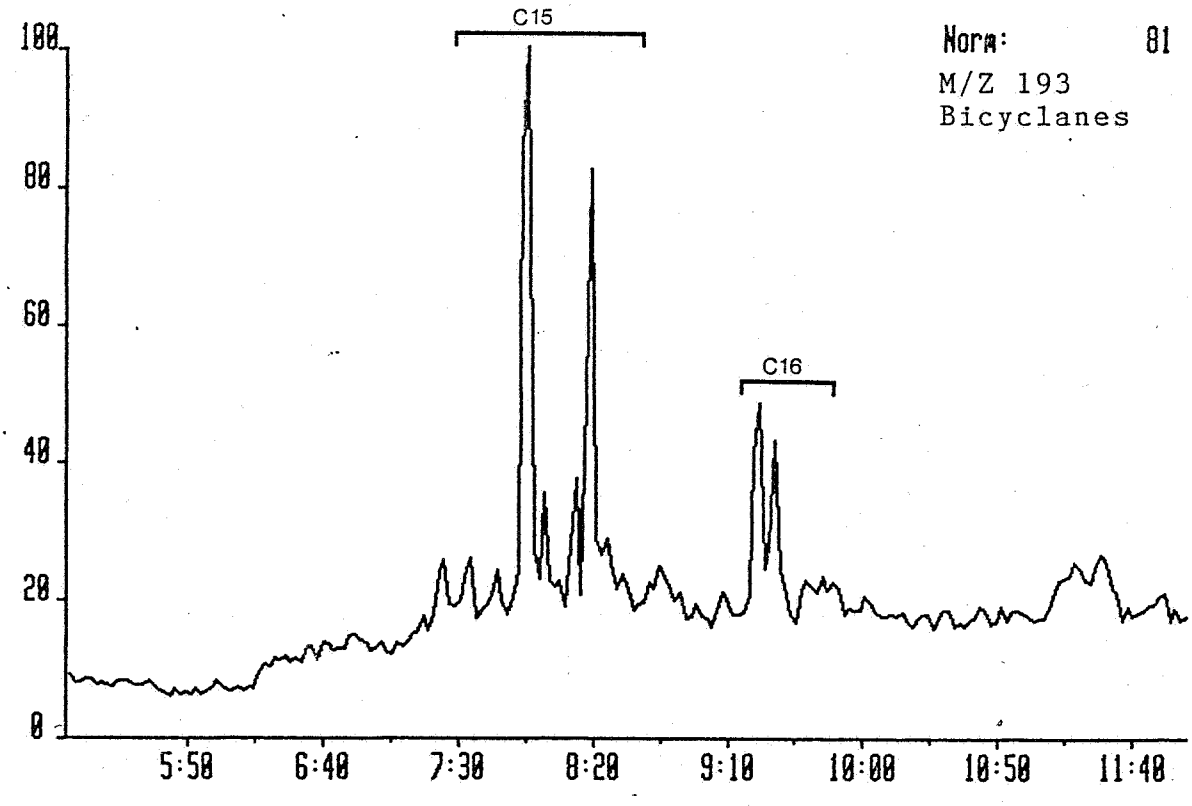
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 179.1800
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

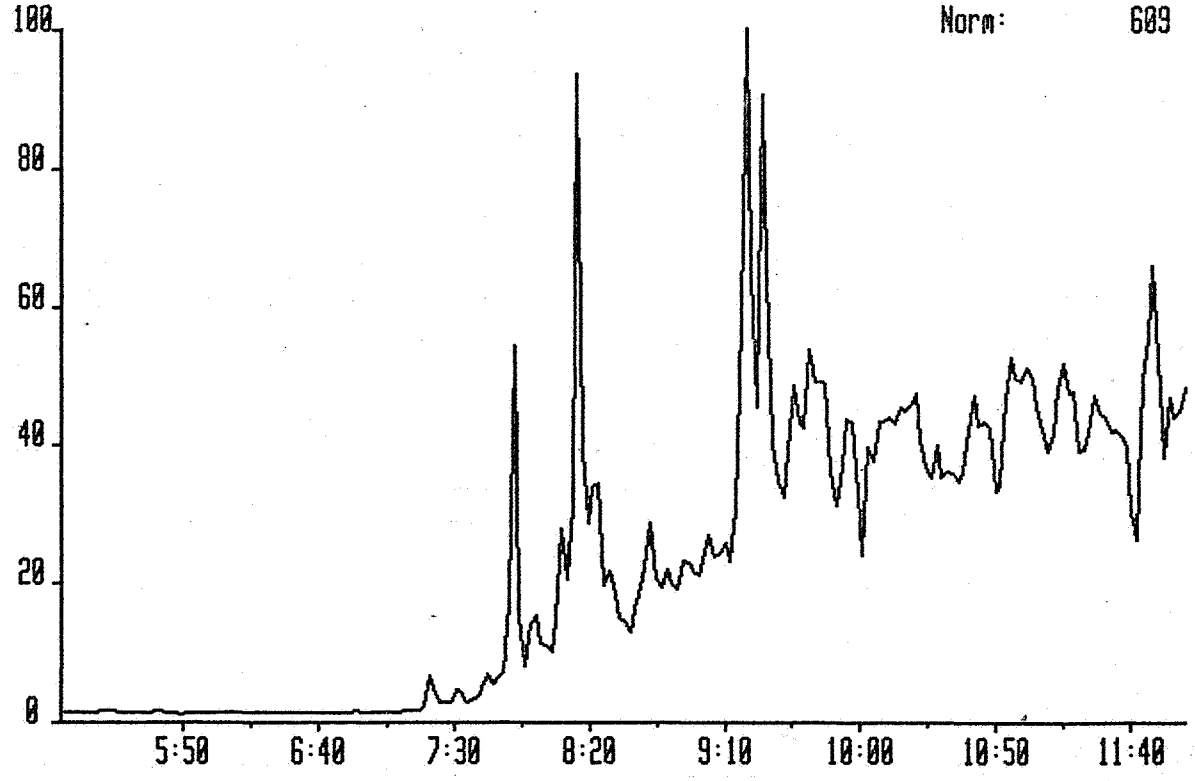


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

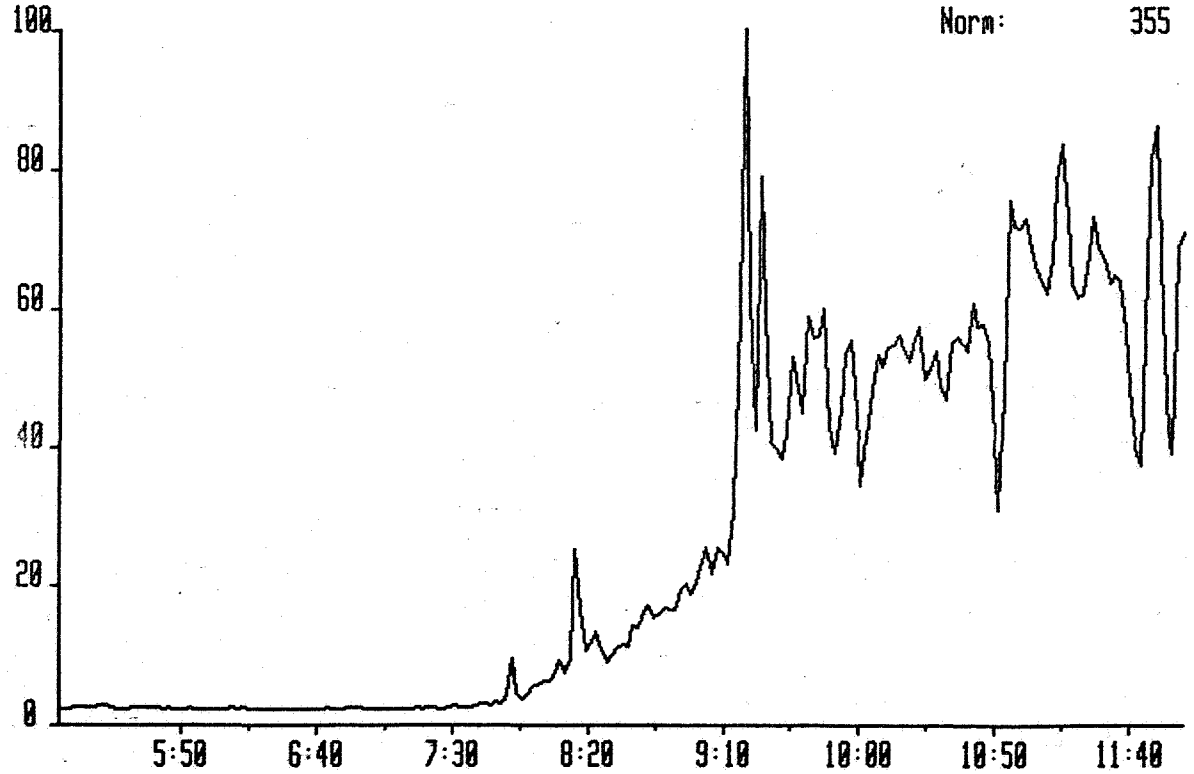
EXAMPLE OF PEAK IDENTIFICATION FOR BICYCLANES



CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 13 Injection 1 Group 1 Mass 193.1956
Text:WELL 3/7-3, 3338M, SATURATED FRACTION

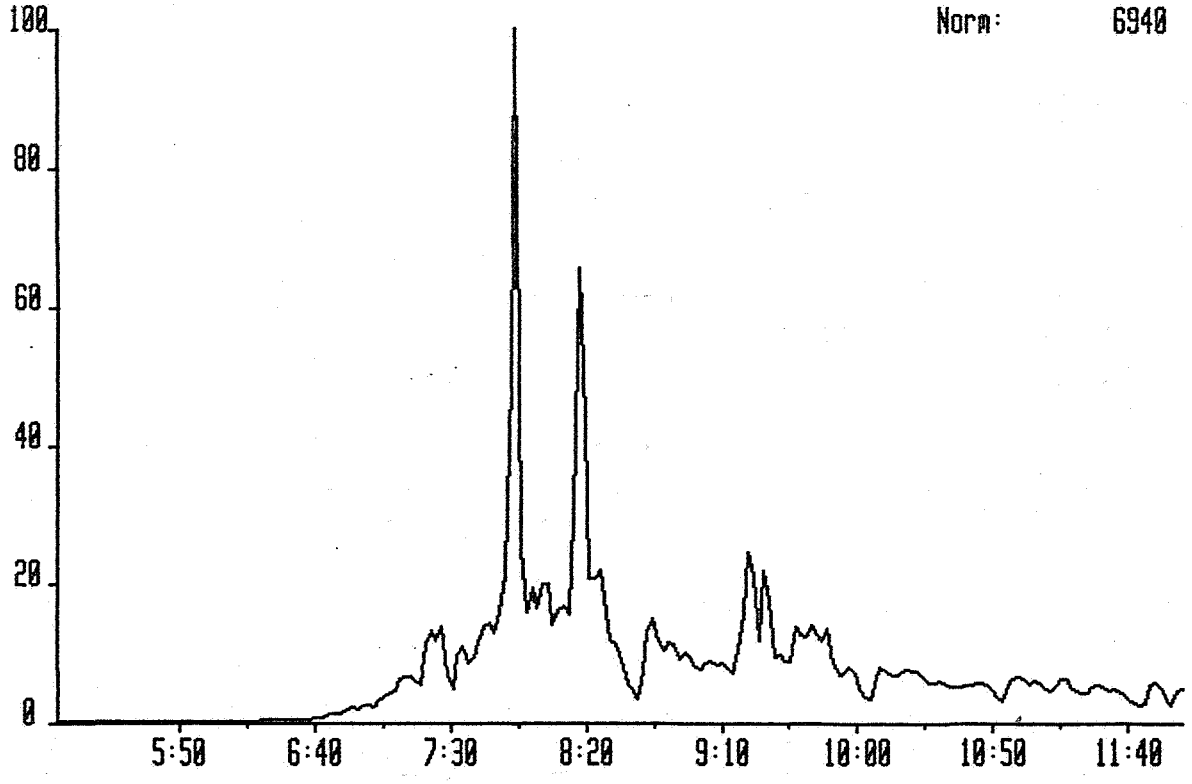


CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 14 Injection 1 Group 1 Mass 193.1956
Text:WELL 3/7-3,3446M, SATURATED FRACTION



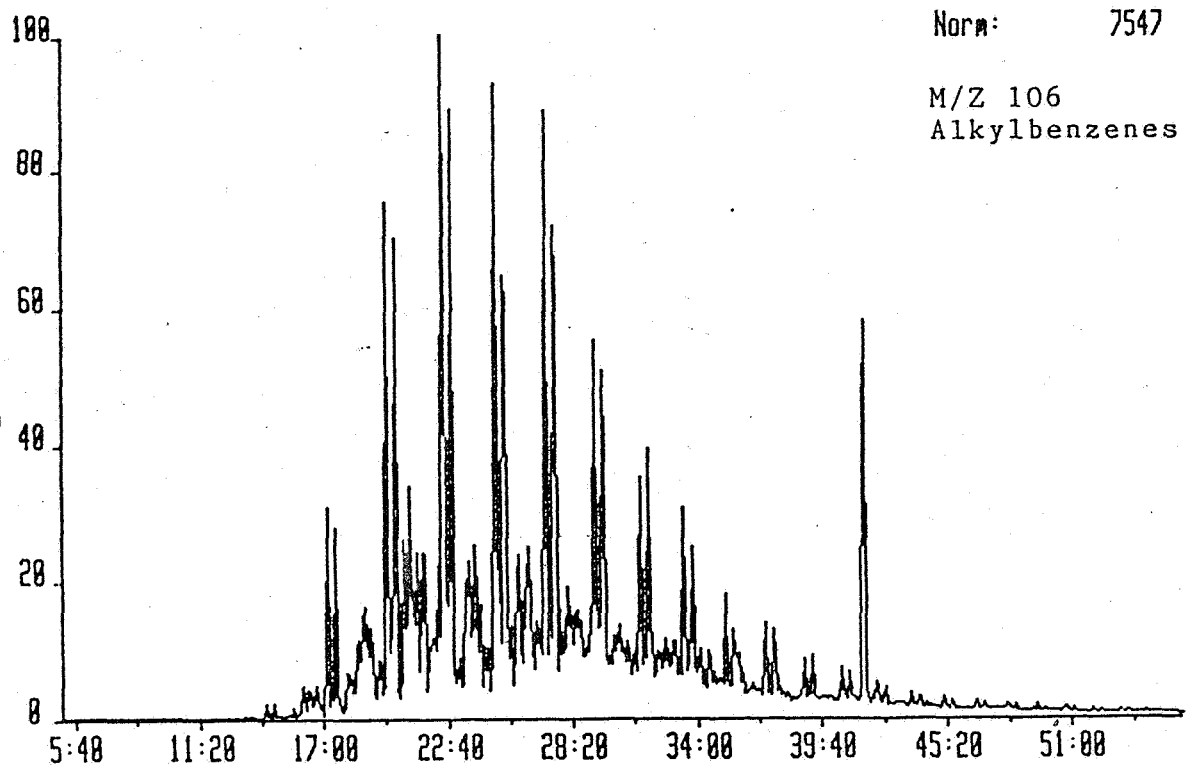
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGSAT2 15-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:SAT1
Sample 15 Injection 1 Group 1 Mass 193.1956
Text:WELL 3/7-3, 3508M, SATURATED FRACTION

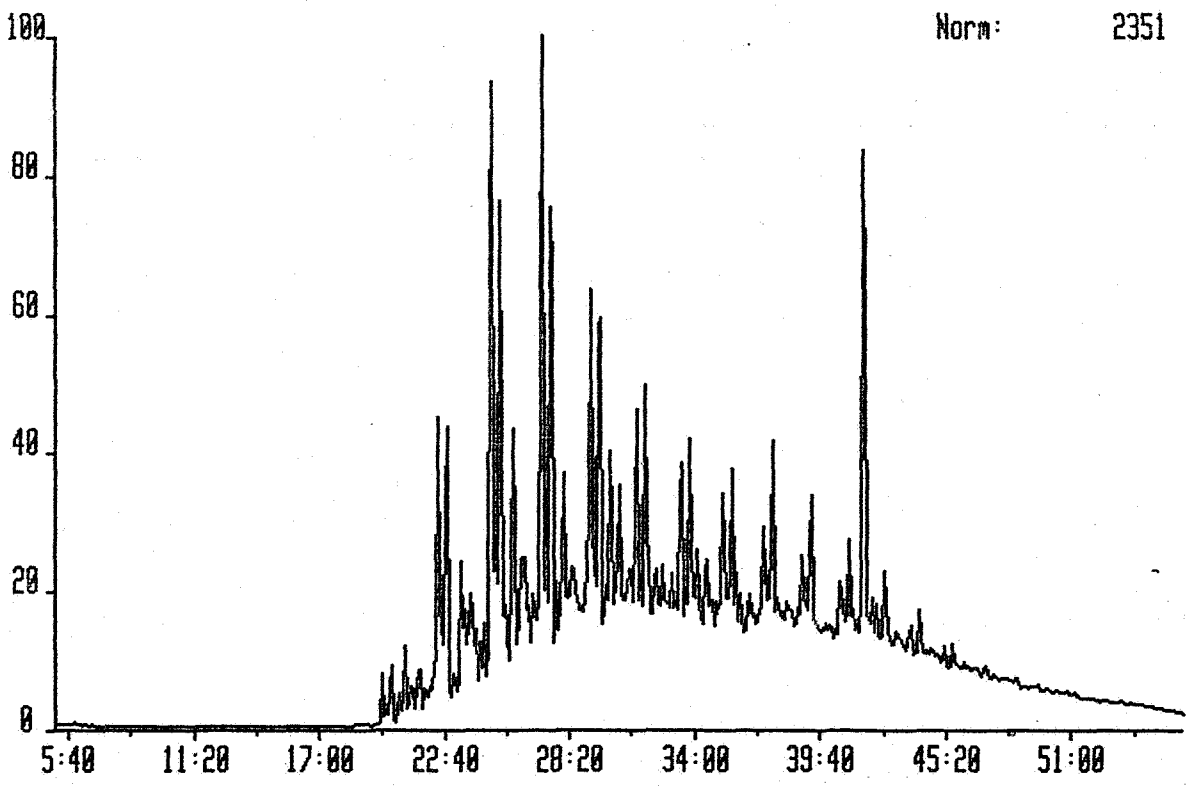


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

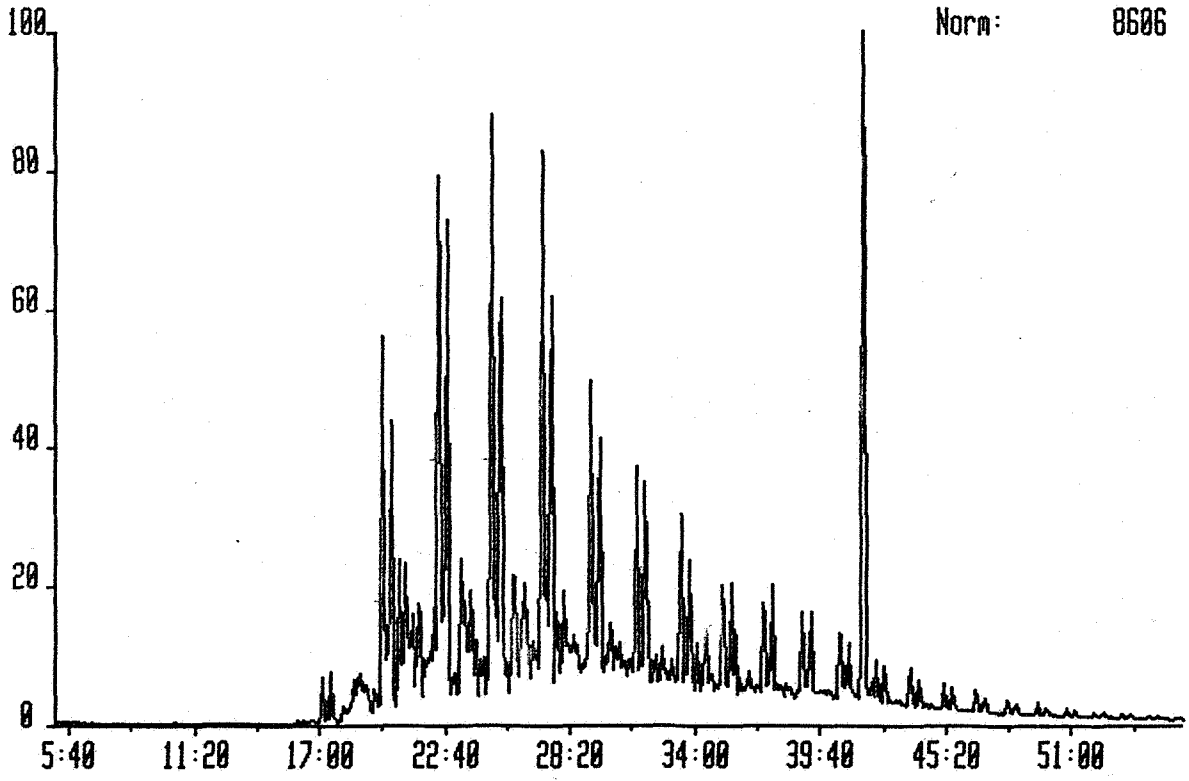
EXAMPLE OF PEAK IDENTIFICATION FOR ALKYLBENZENES.



CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 19 Injection 1 Group 1 Mass 106.0783
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

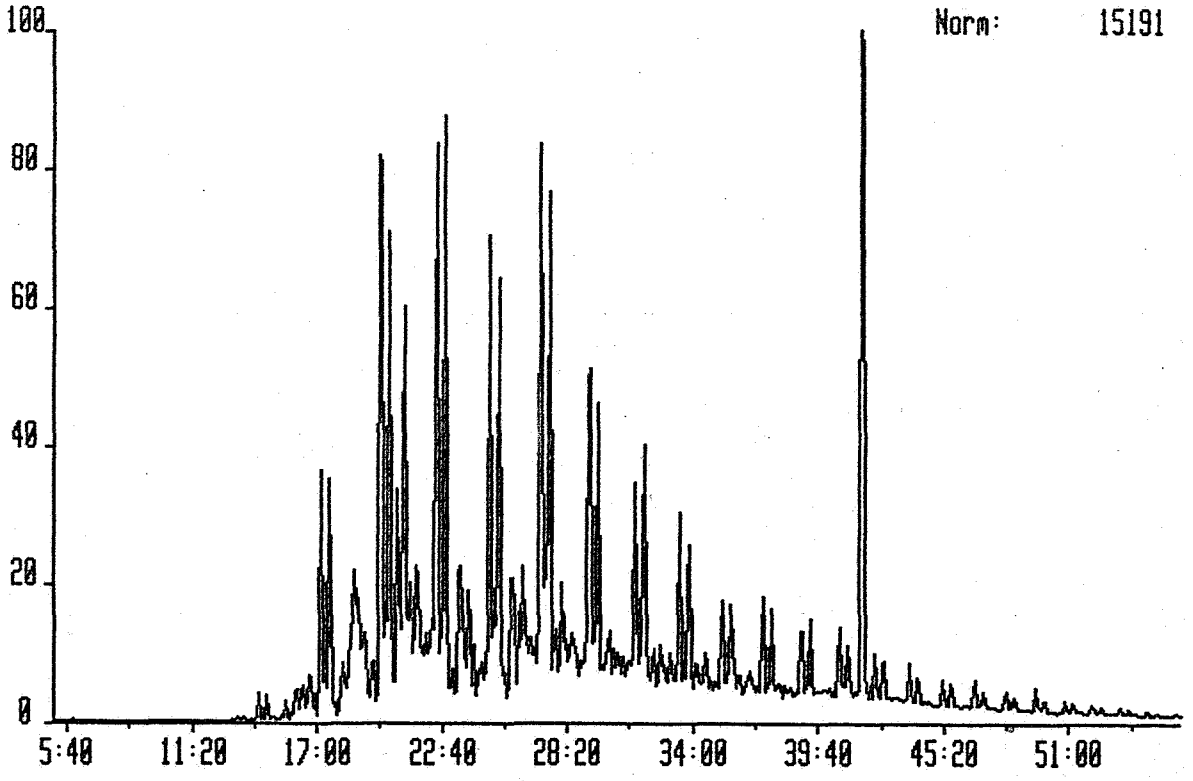


CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 20 Injection 1 Group 1 Mass 106.0783
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION



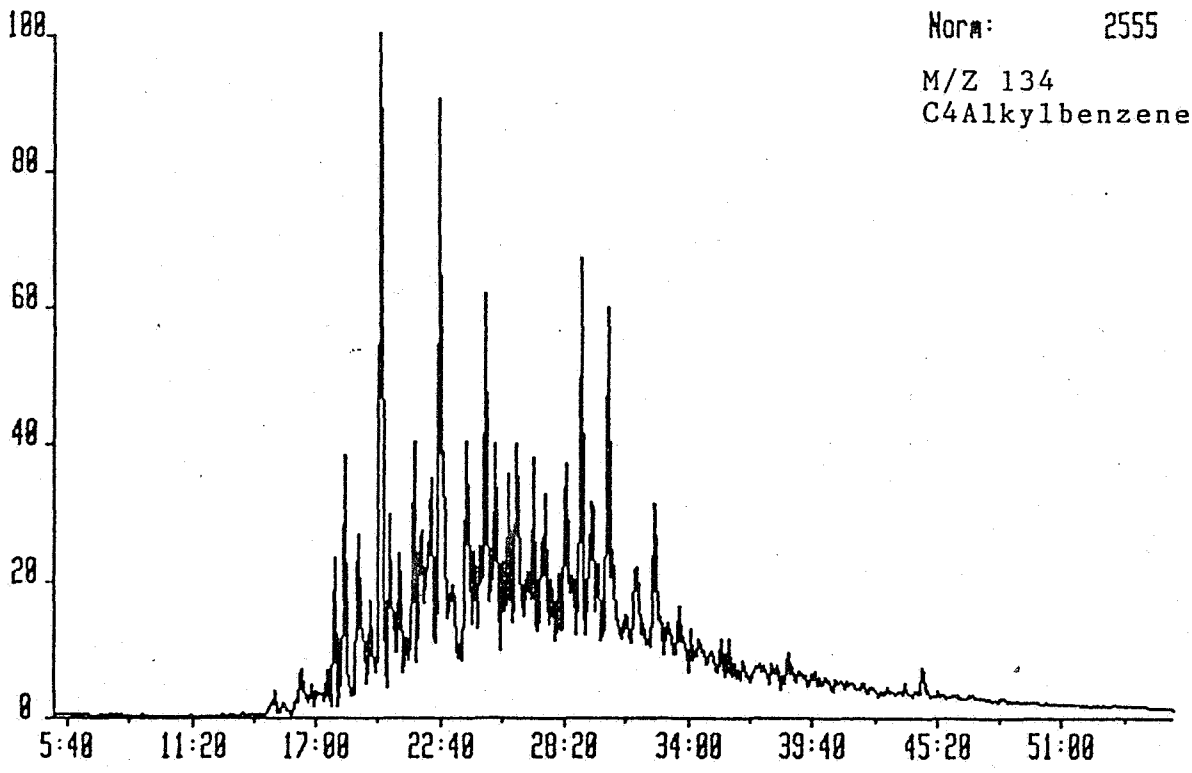
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 21 Injection 1 Group 1 Mass 106.0783
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION



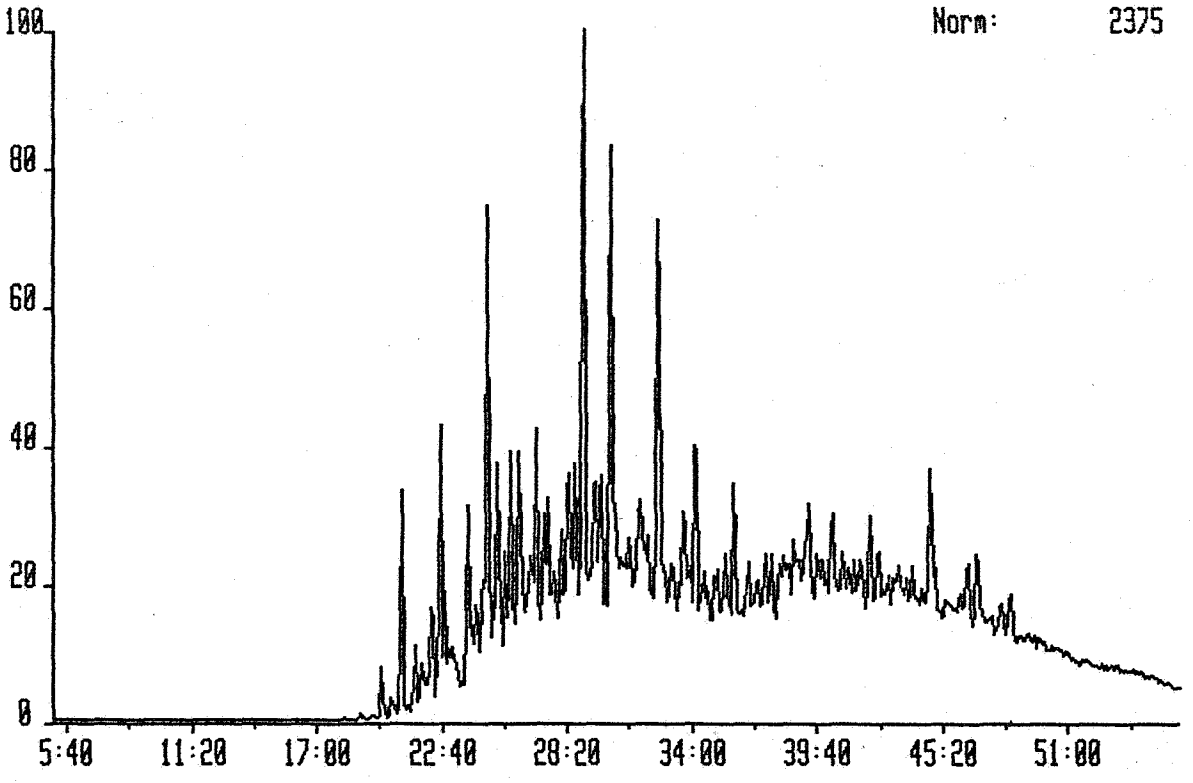
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

EXAMPL OF PEAK IDENTIFICATION FOR ALKYLBENZENES.

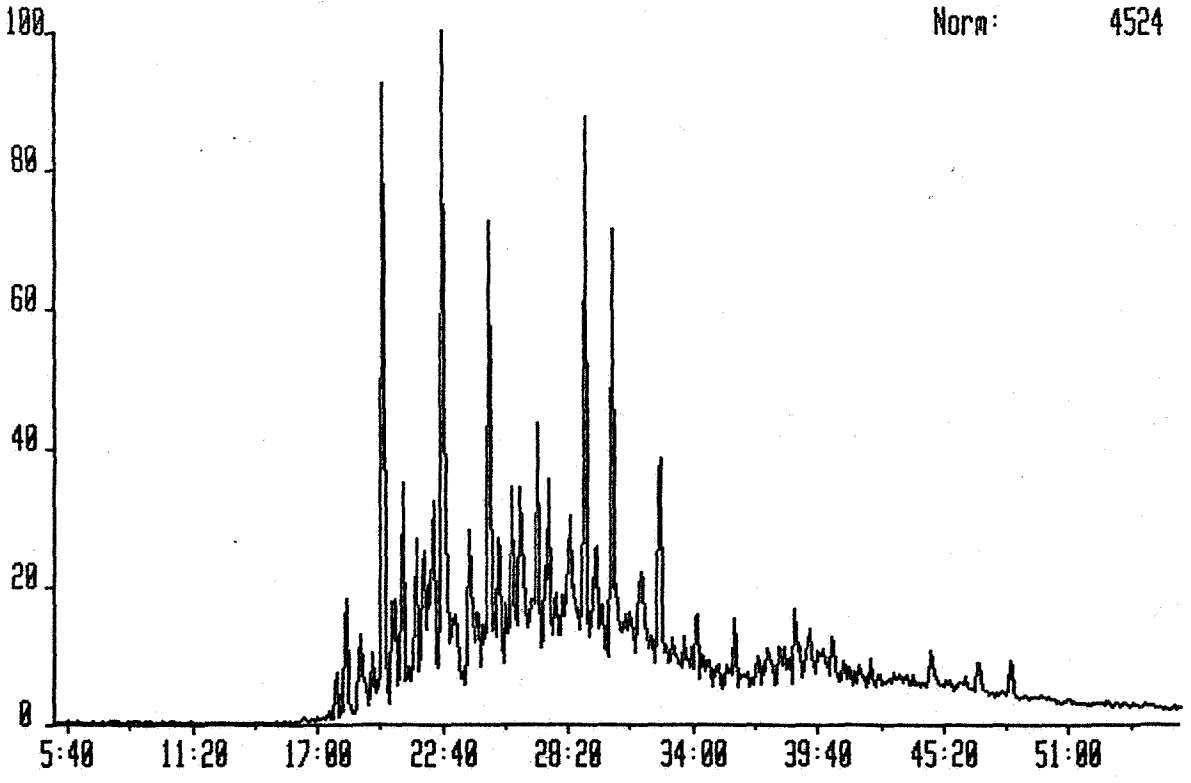


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 19 Injection 1 Group 1 Mass 134.1096
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

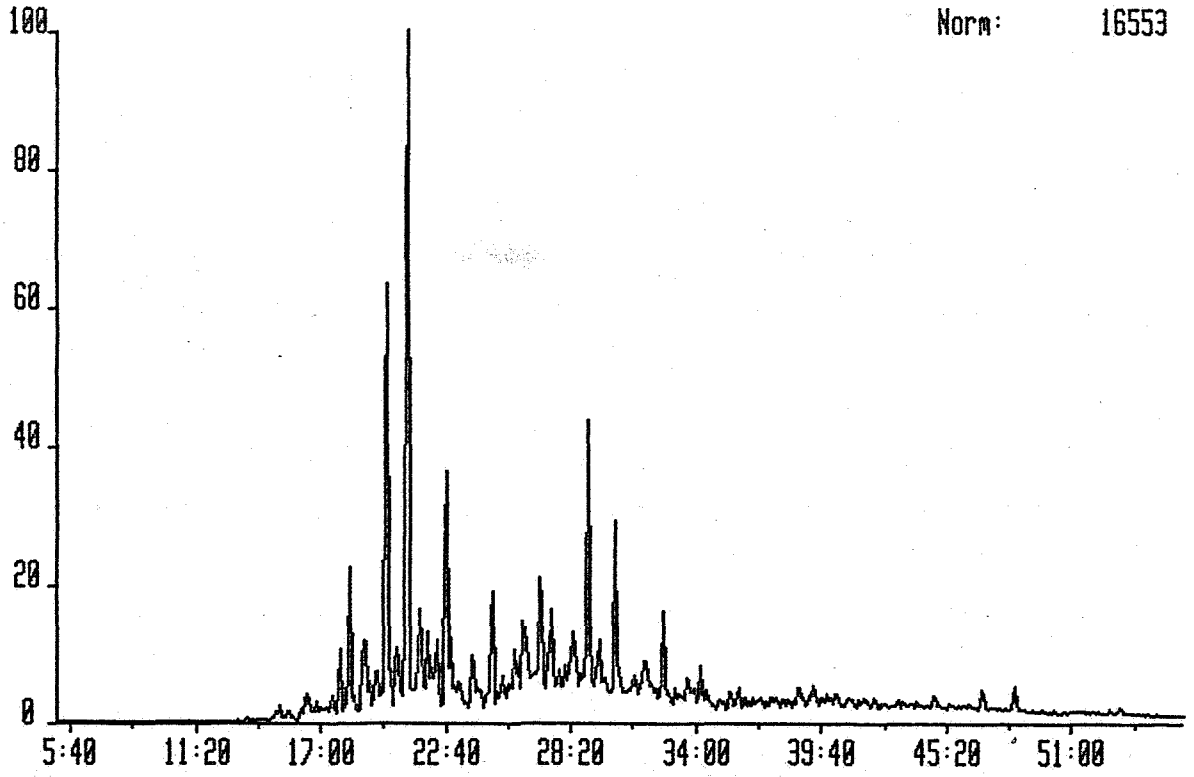


CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 20 Injection 1 Group 1 Mass 134.1096
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION



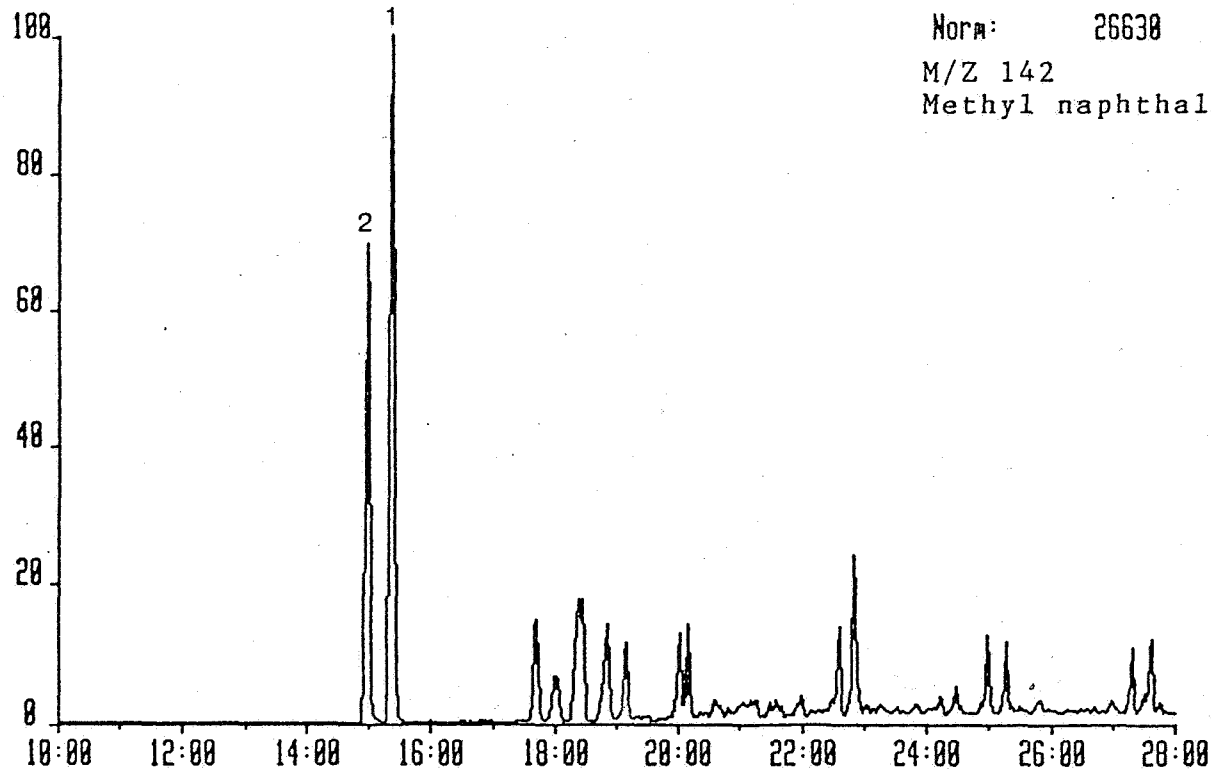
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 21 Injection 1 Group 1 Mass 134.1096
Text:WELL 3/7-3, 3500M, AROMATIC FRACTION



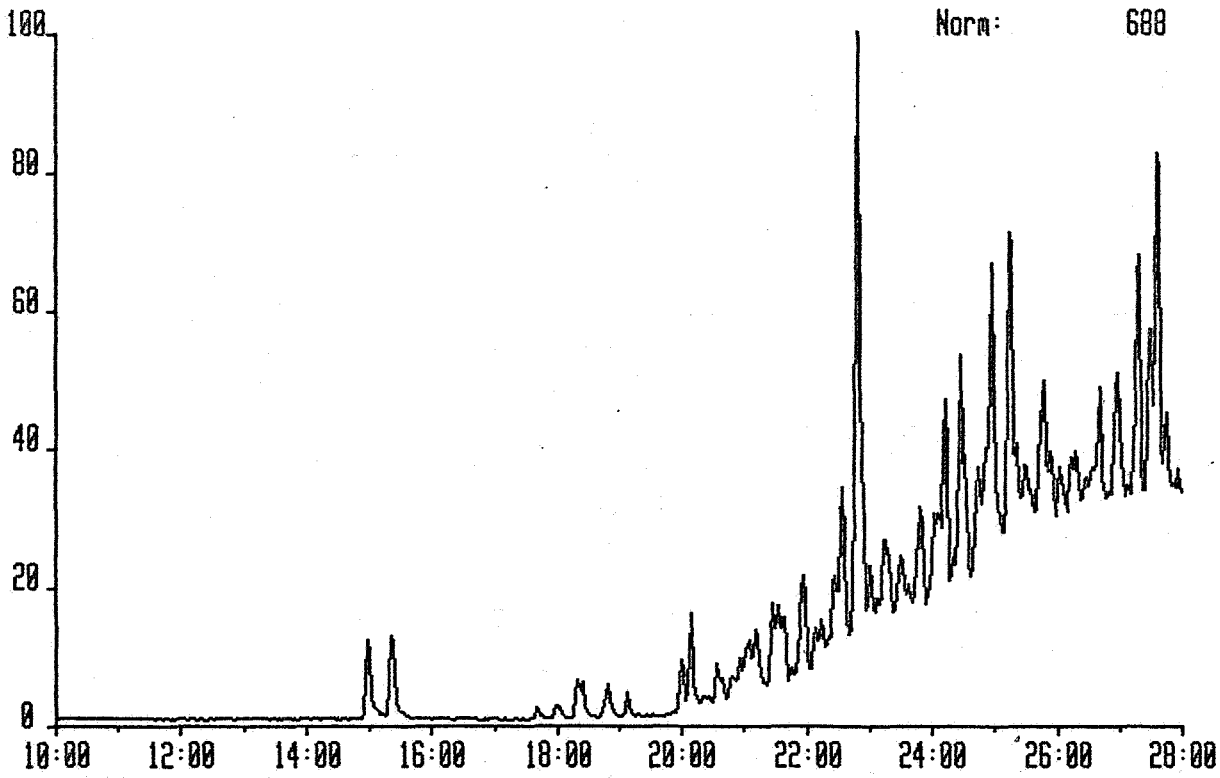
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

EXAPLE OF PEAK IDENTIFICATION FOR METHYL NAPHTHALENES.

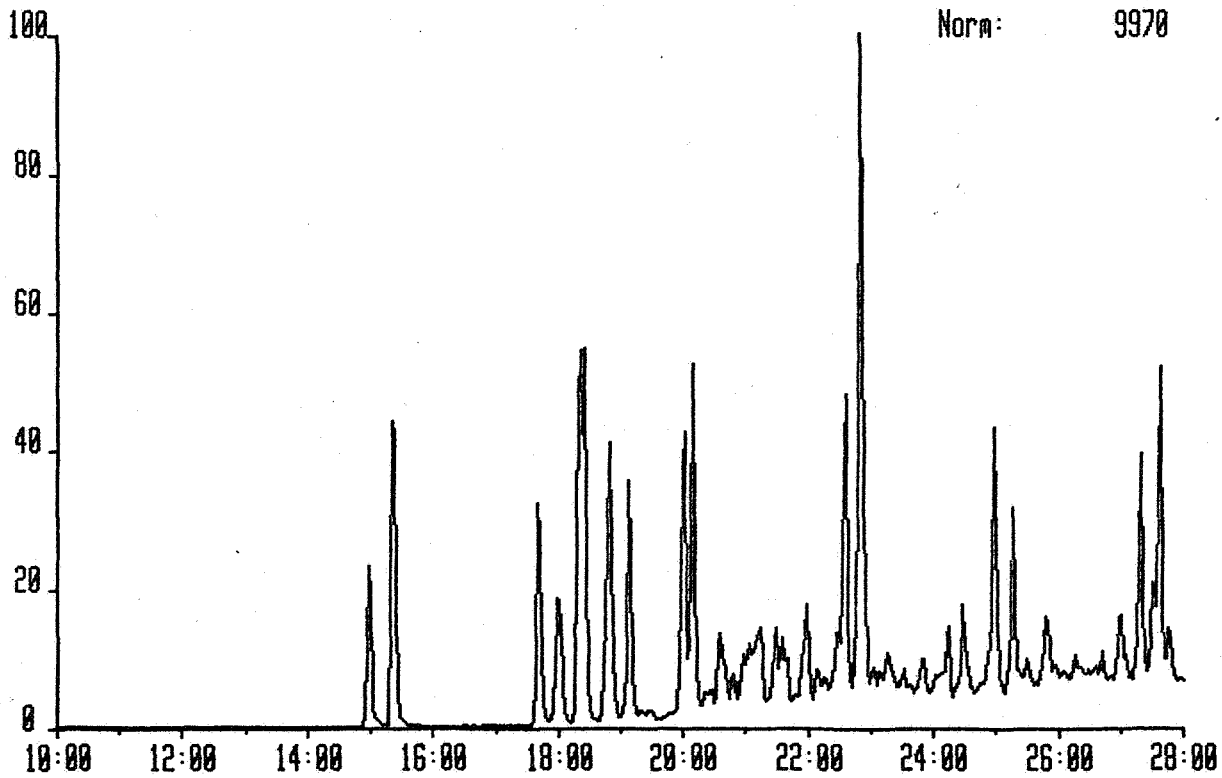


Norm: 26630
M/Z 142
Methyl naphthalenes

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 19 Injection 1 Group 1 Mass 142.0783
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

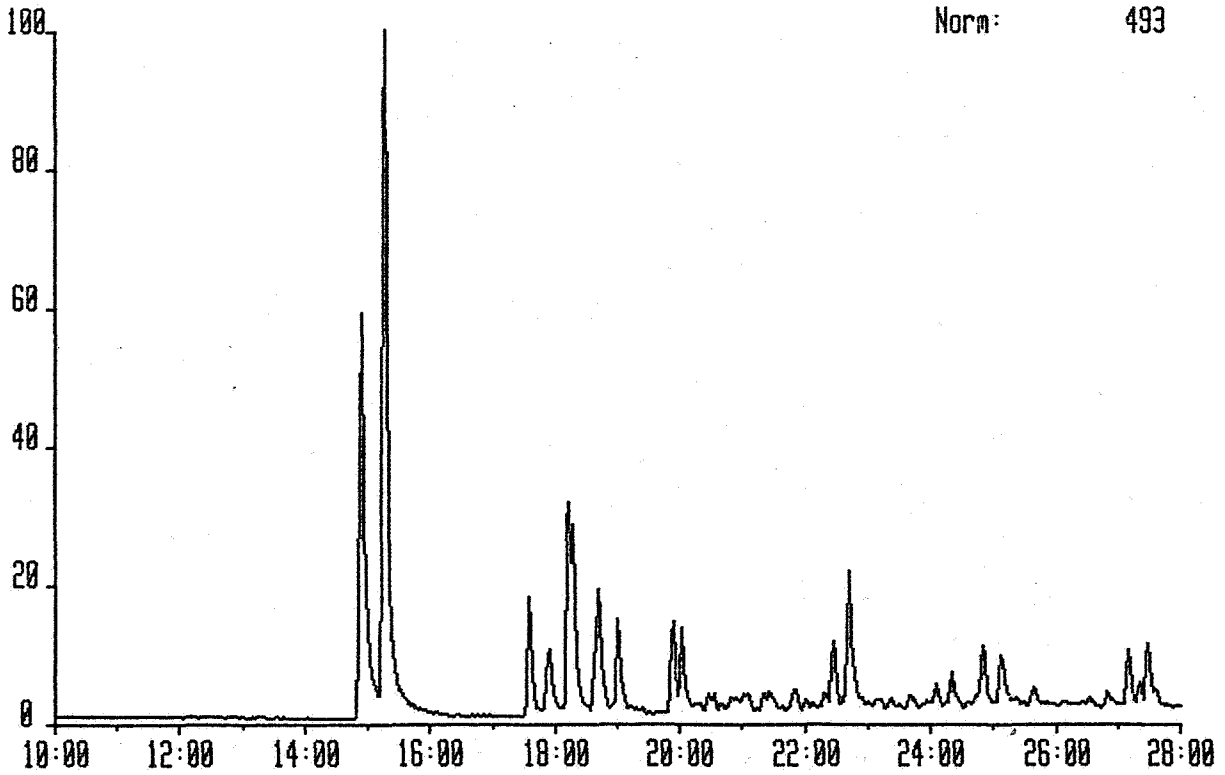


CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 20 Injection 1 Group 1 Mass 142.0783
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION

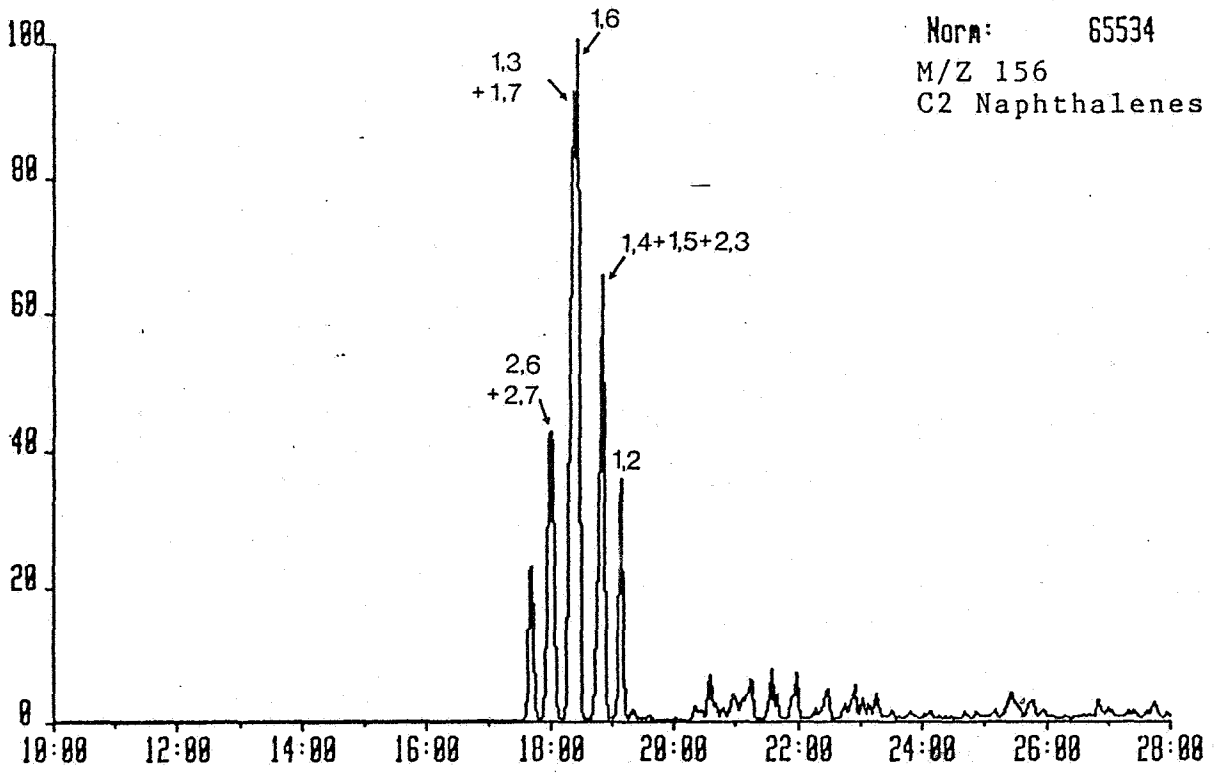


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO7 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 15 Injection 1 Group 1 Mass 142.0783
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION

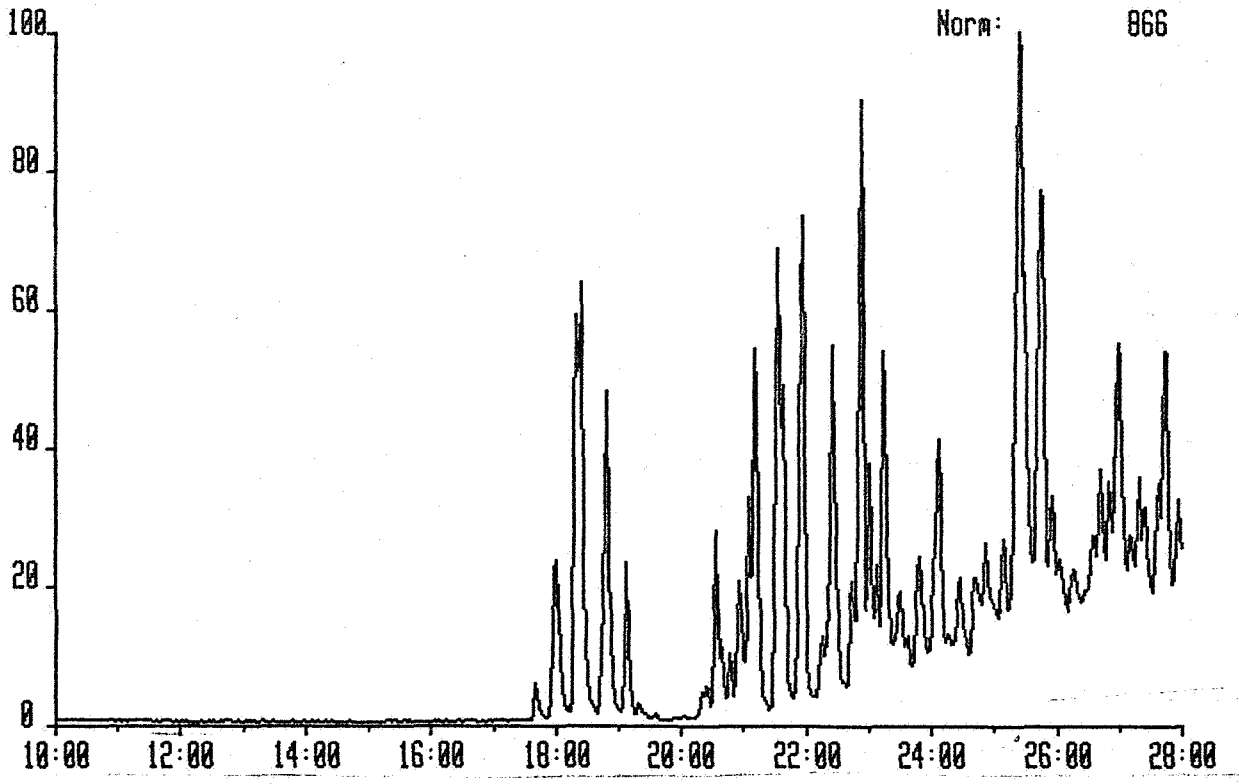


EXAMPLE OF PEAK IDENTIFICATION FOR C2 NAPHTHALENES.

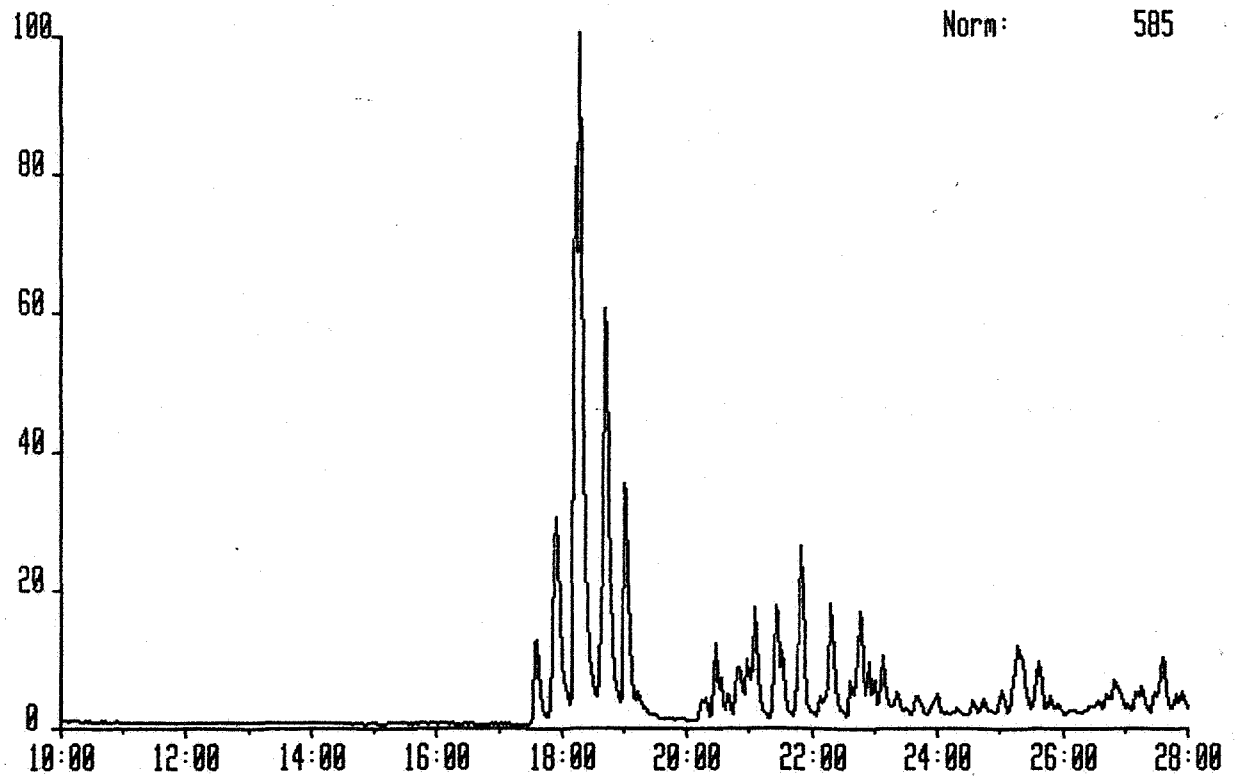


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGAR05 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 19 Injection 1 Group 1 Mass 156.0939
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

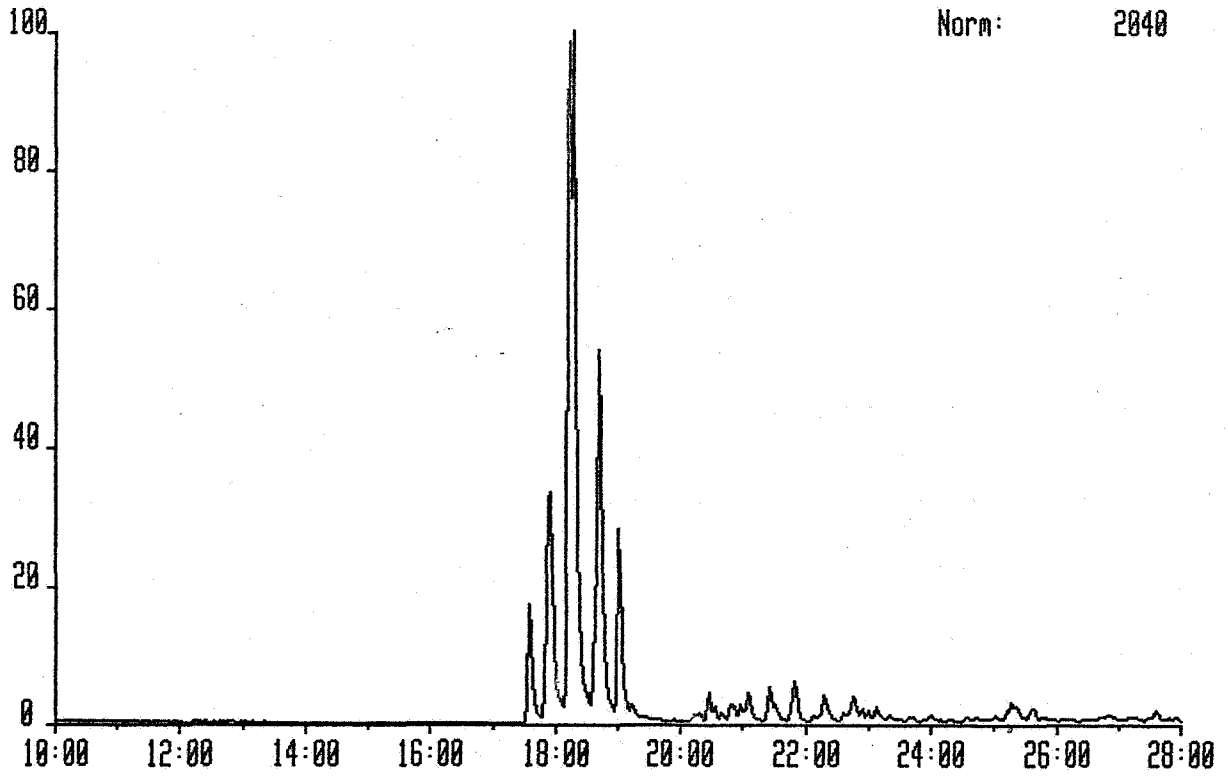


CGAR07 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 14 Injection 1 Group 1 Mass 156.0939
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION

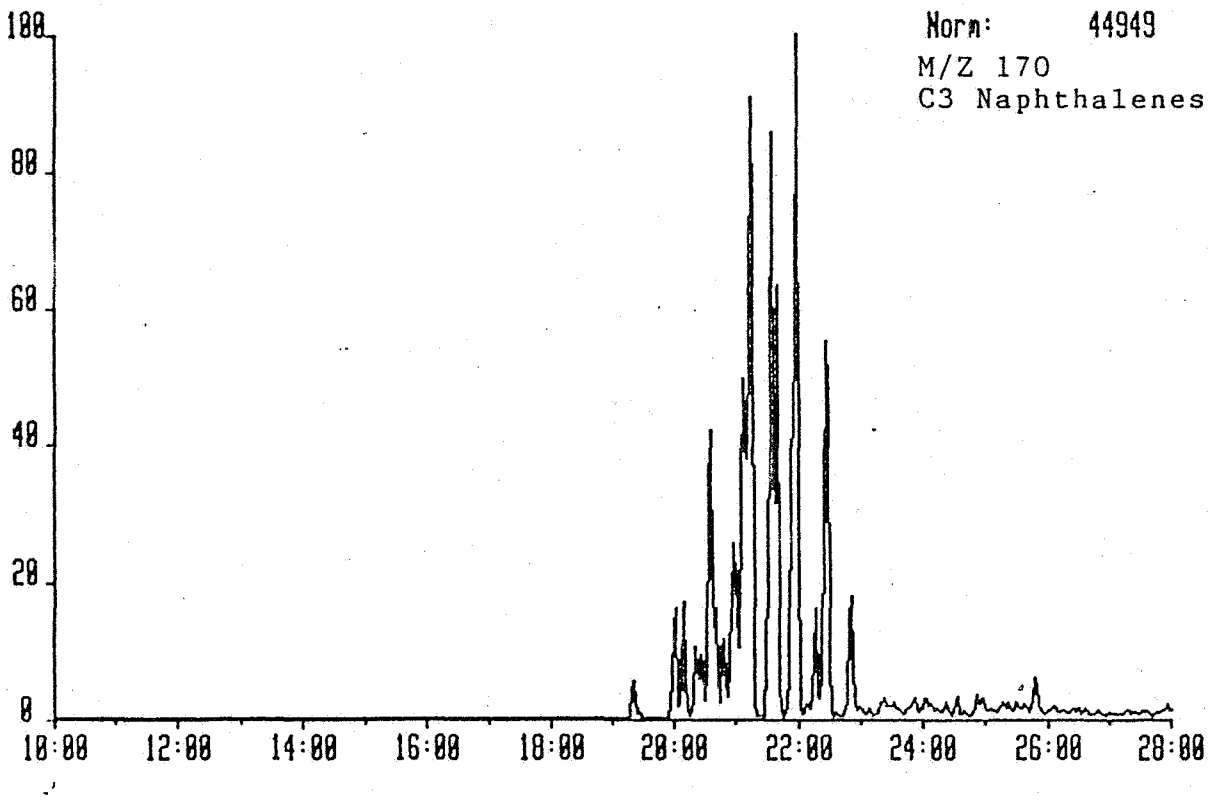


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO7 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 15 Injection 1 Group 1 Mass 156.0939
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION

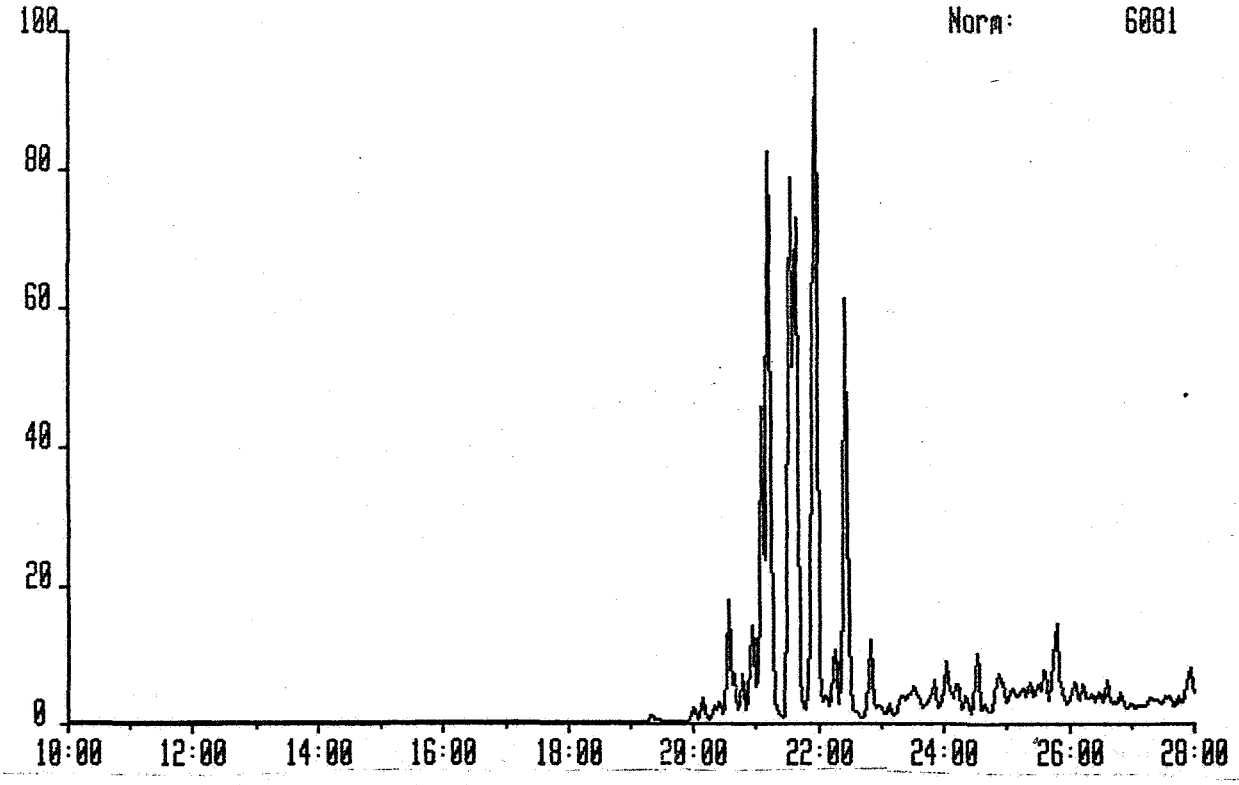


EXAMPLE OF PEAK IDENTIFICATION FOR C3 NAPHTHALENES.

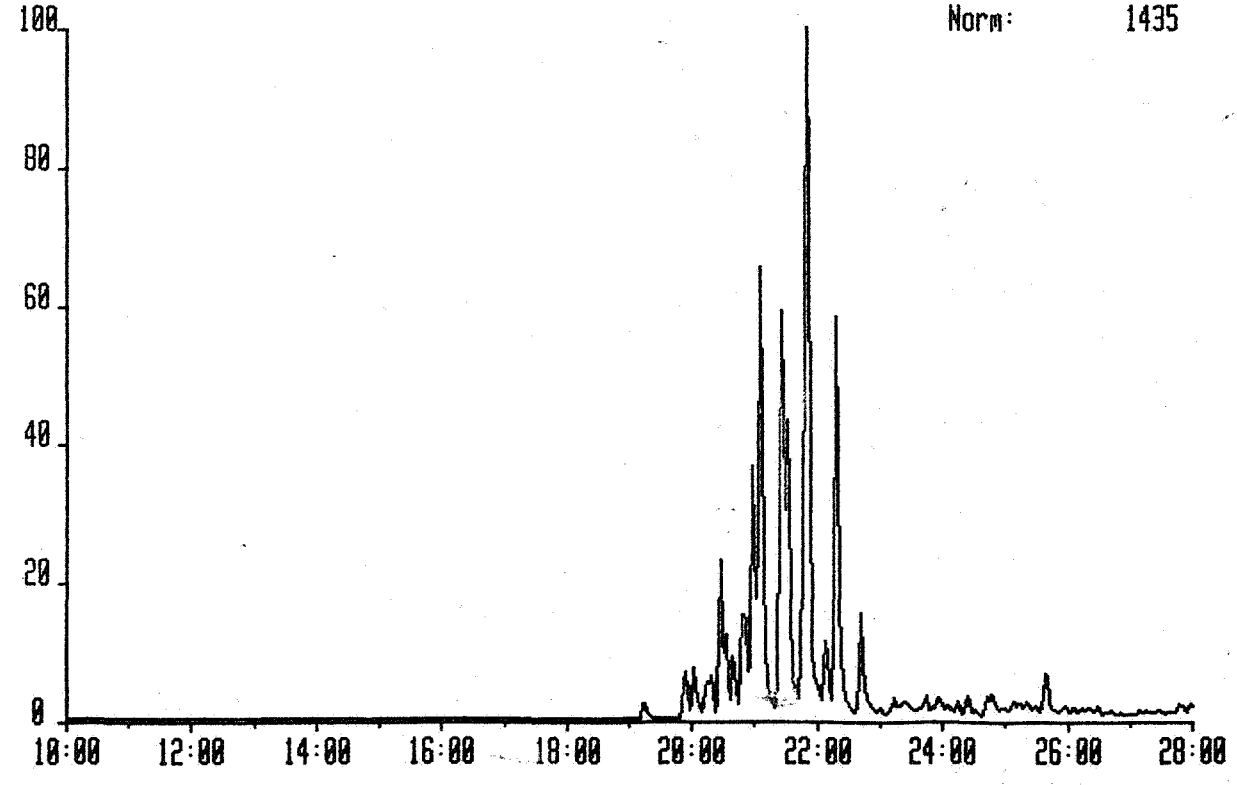


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGAR05 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 19 Injection 1 Group 1 Mass 170.1096
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

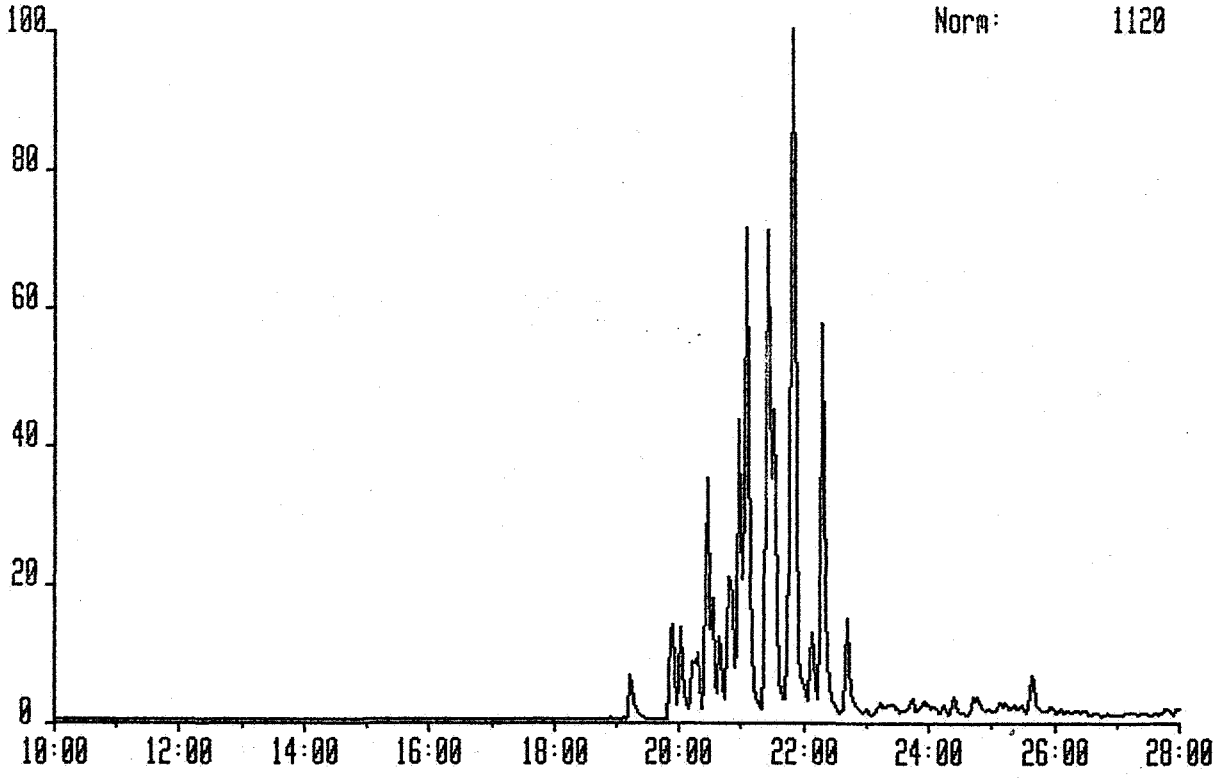


CGAR07 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 14 Injection 1 Group 1 Mass 170.1096
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION



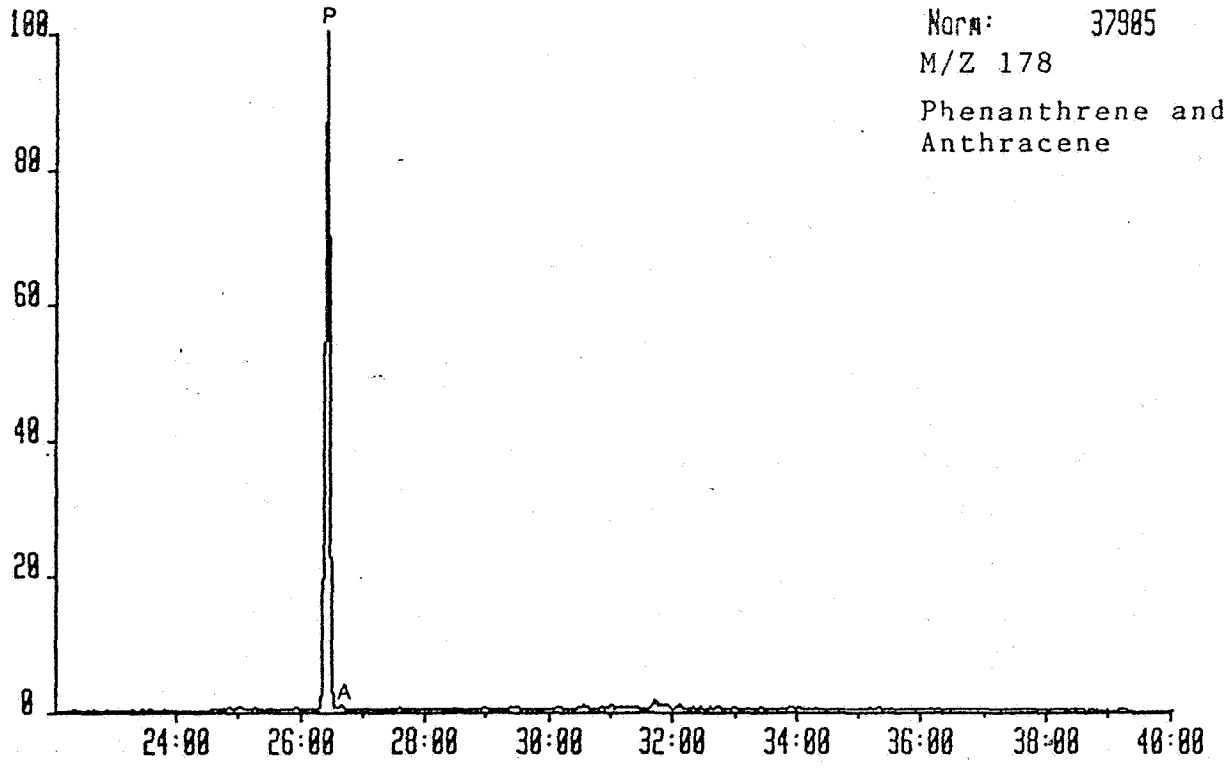
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO7 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 15 Injection 1 Group 1 Mass 170.1096
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION



GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

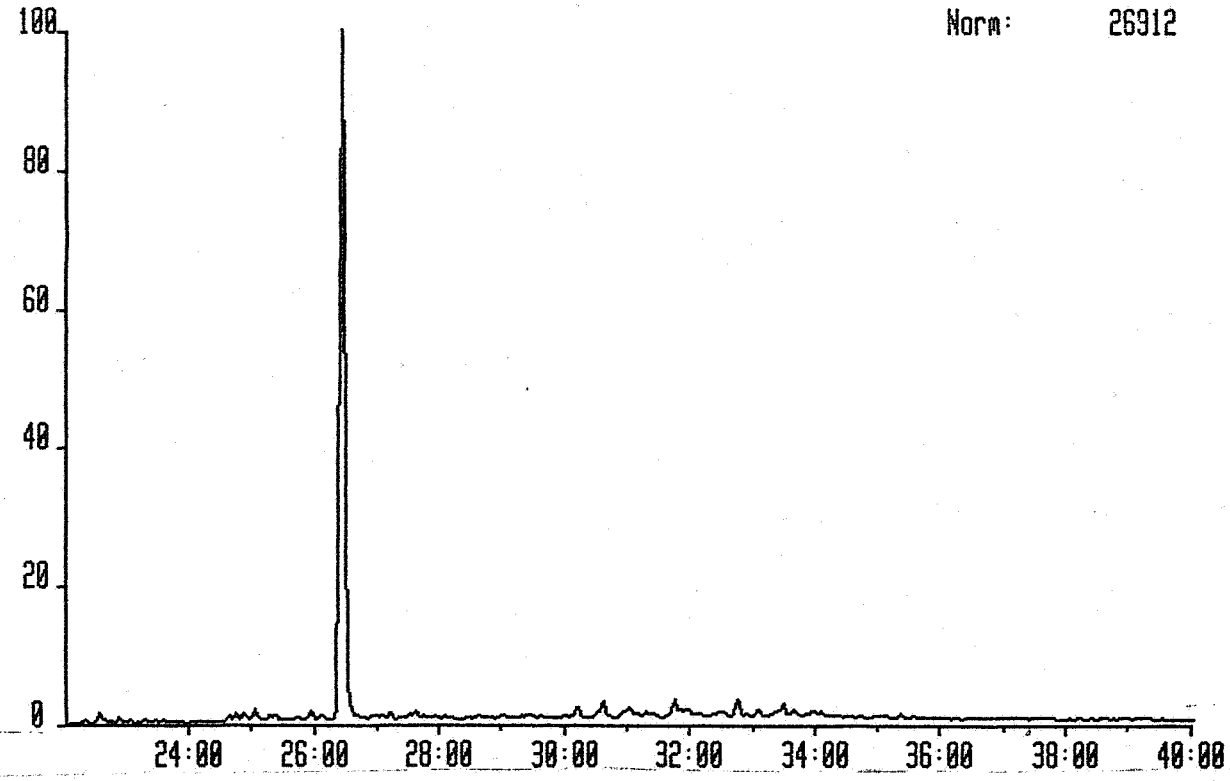
EXAMPLE OF PEAK IDENTIFICATION FOR PHENANTHRENE AND ANTHRACENE.



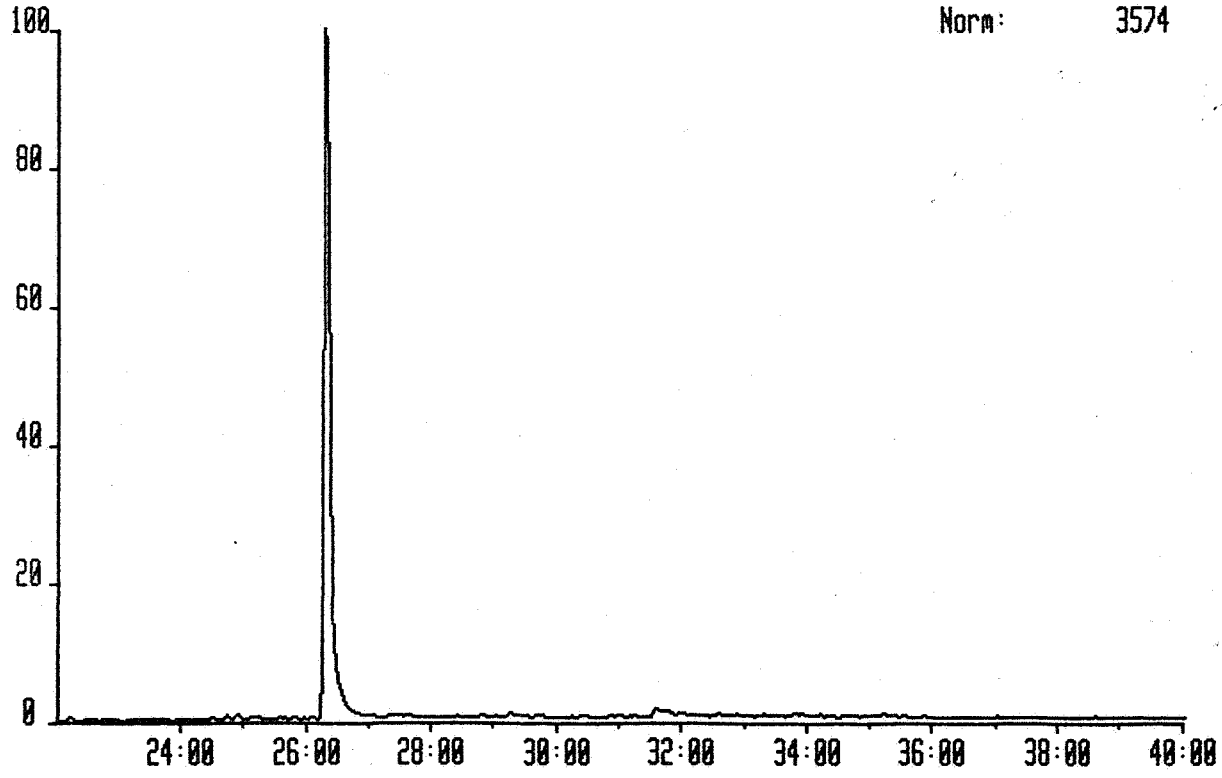
Norm: 37985
M/Z 178
Phenanthrene and
Anthracene

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGAR05 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 19 Injection 1 Group 1 Mass 178.0783
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

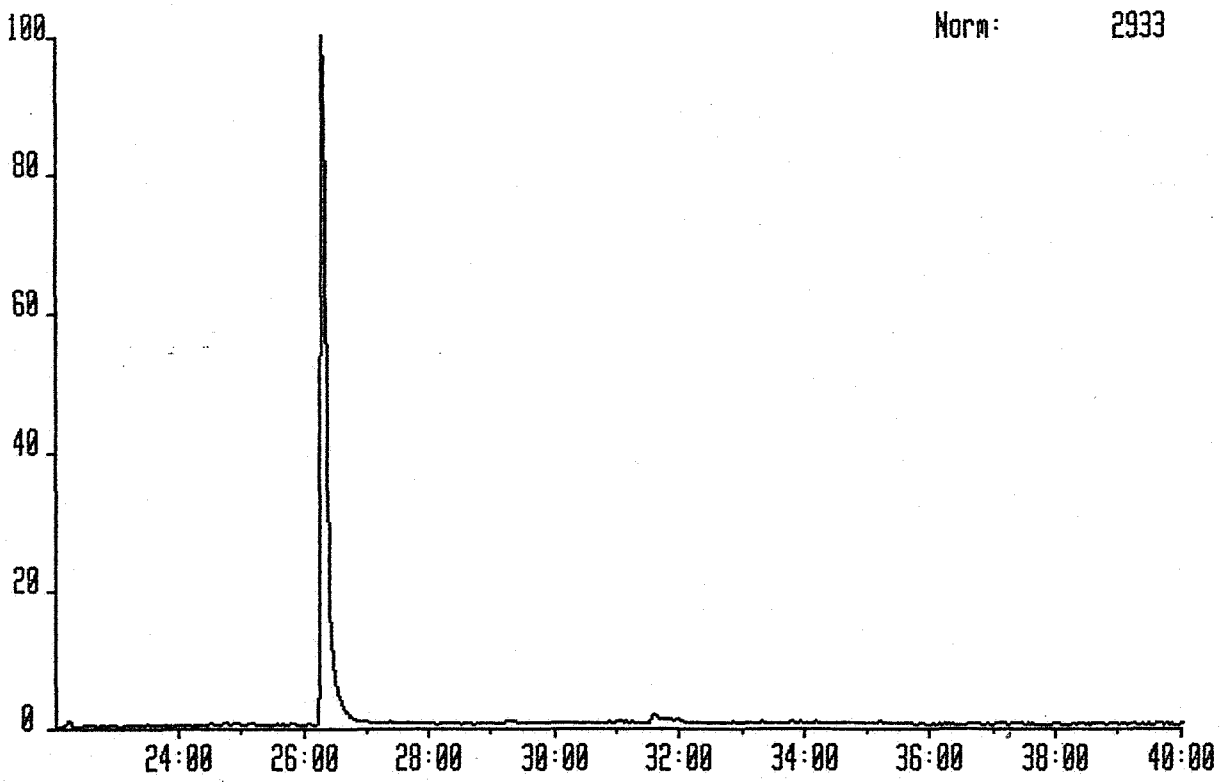


CGAR07 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 14 Injection 1 Group 1 Mass 178.0783
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION



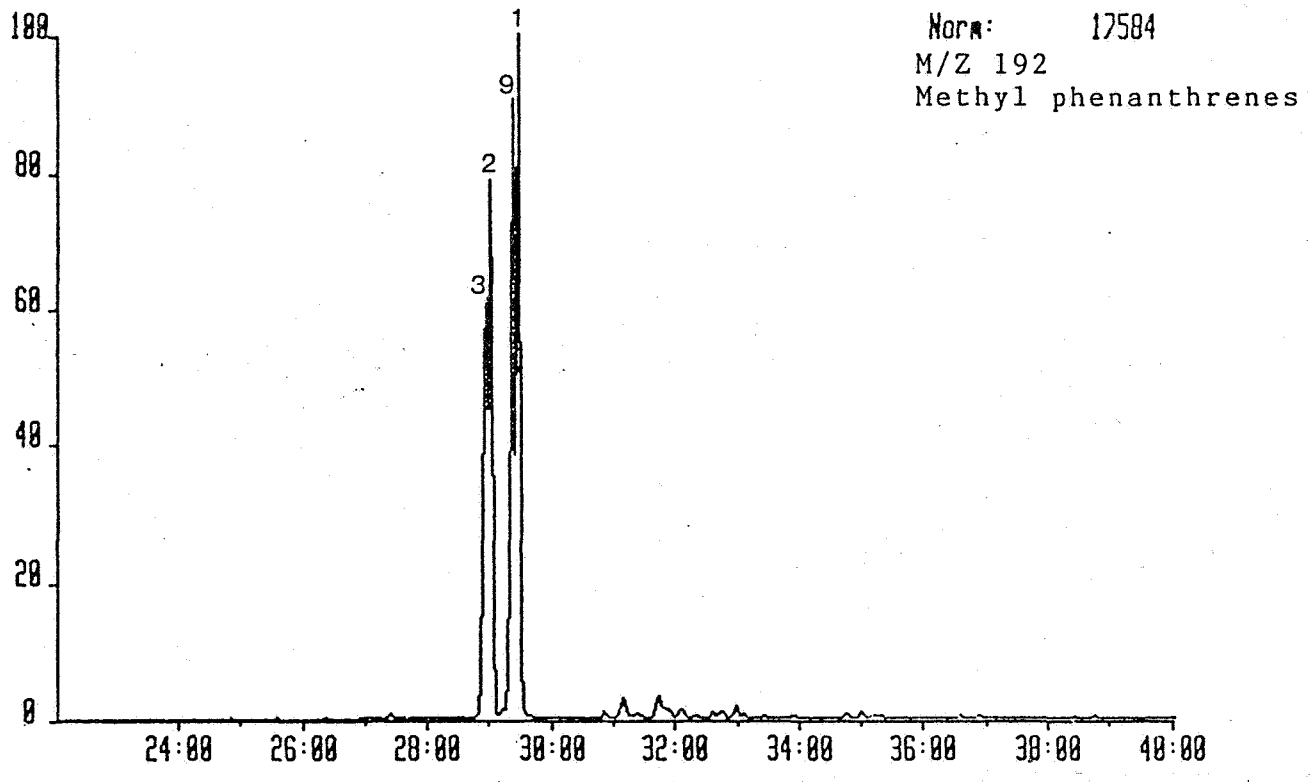
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO7 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 15 Injection 1 Group 1 Mass 178.0783
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION



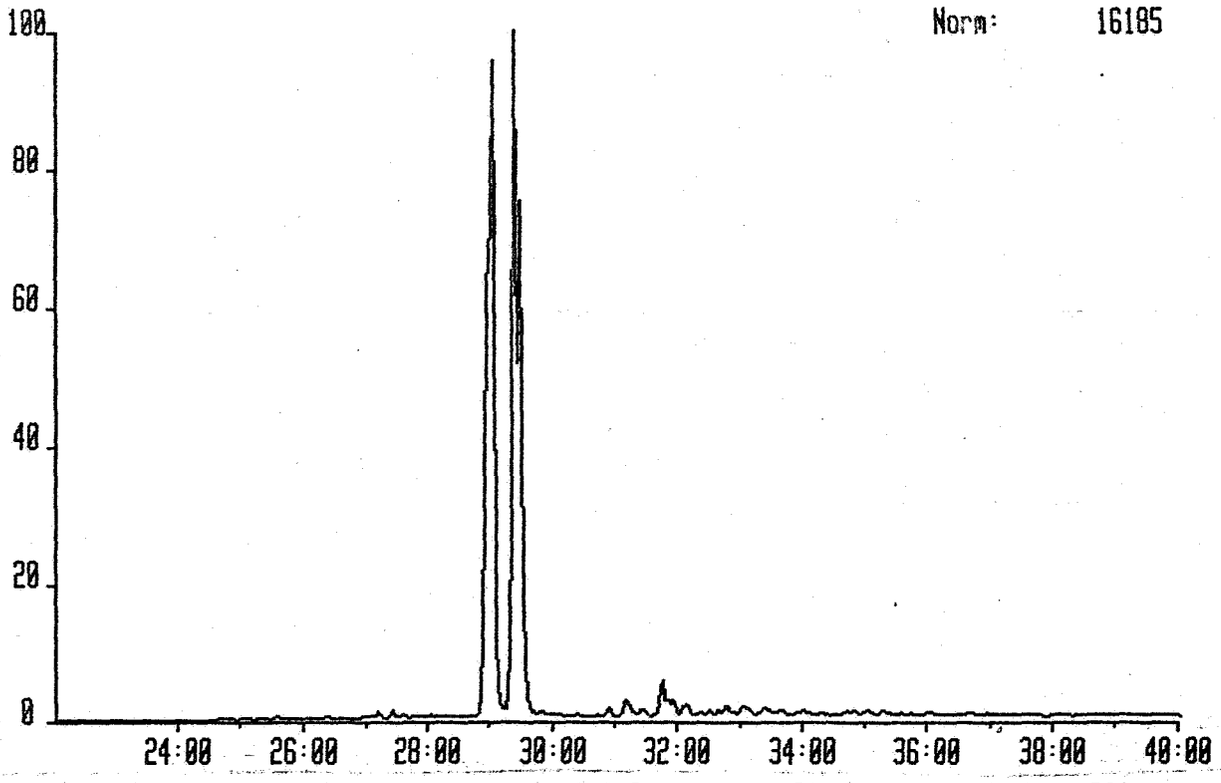
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

EXAMPLE OF PEAK IDENTIFICATION FOR METHYL PHENANTHRENES.

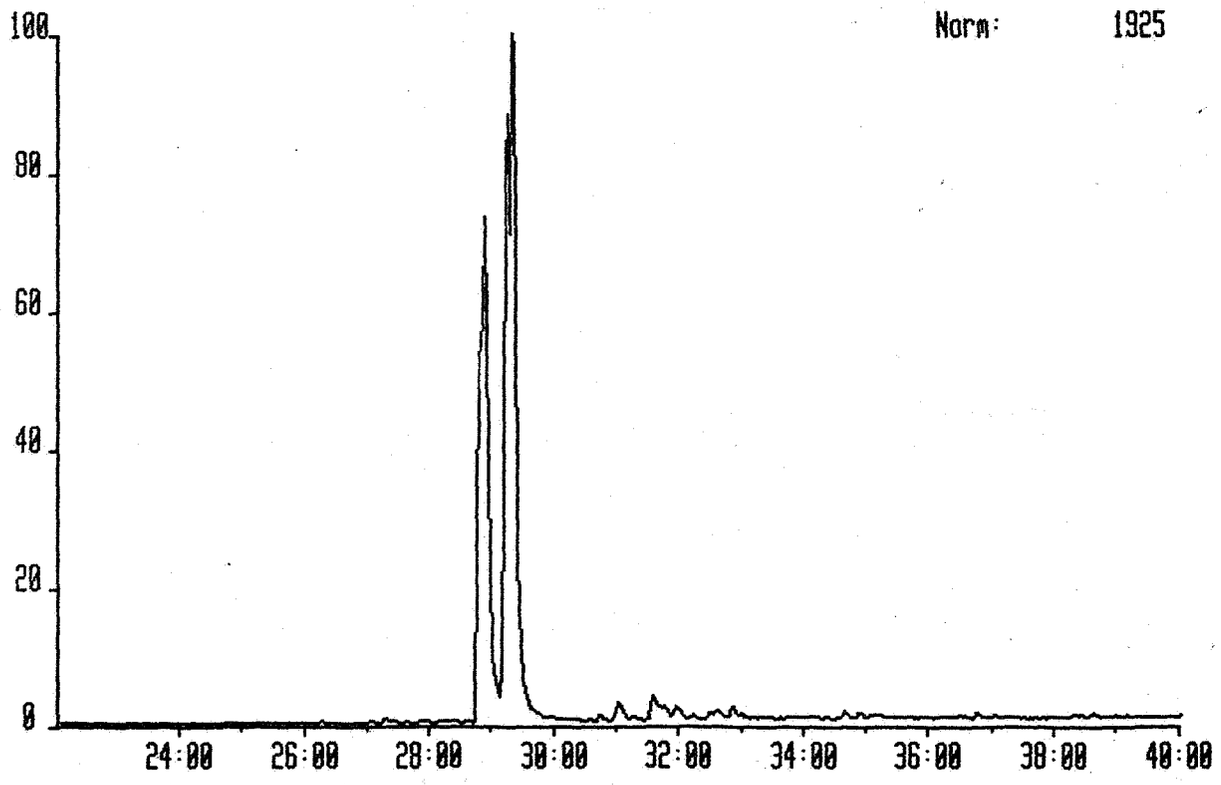


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 19 Injection 1 Group 1 Mass 192.0939
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

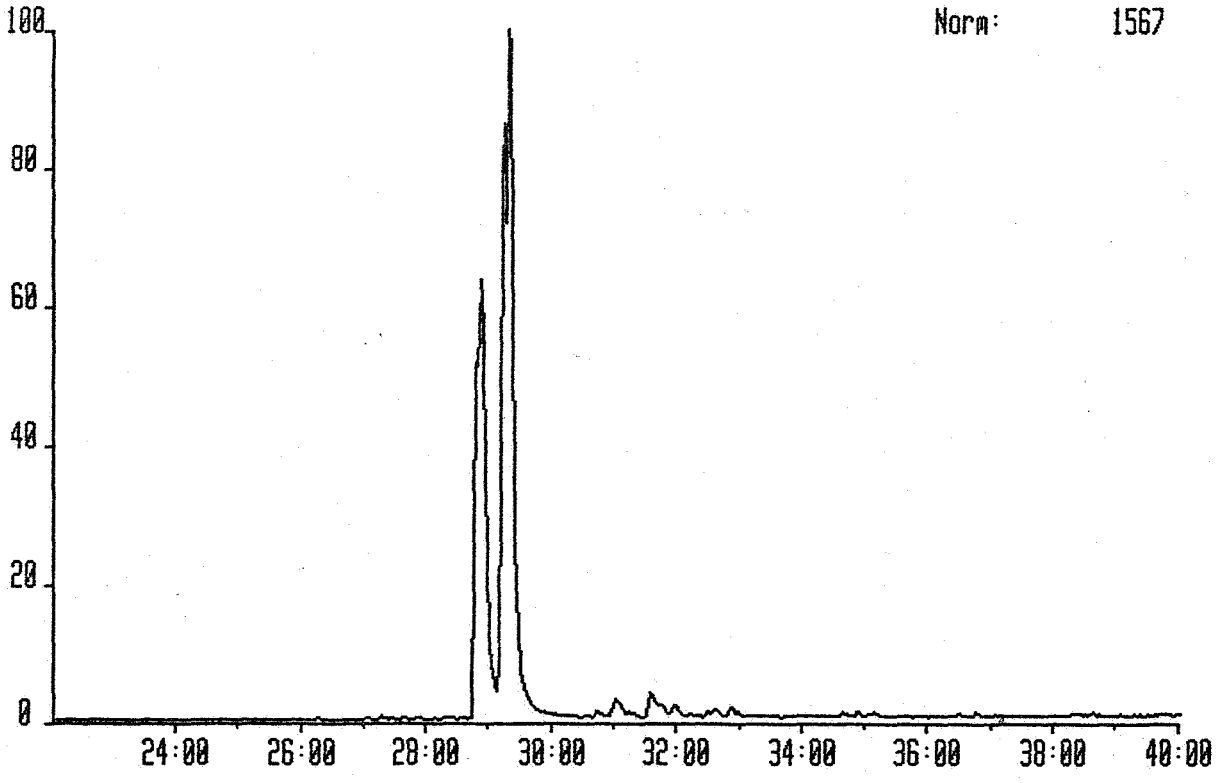


CGARO7 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 14 Injection 1 Group 1 Mass 192.0939
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION

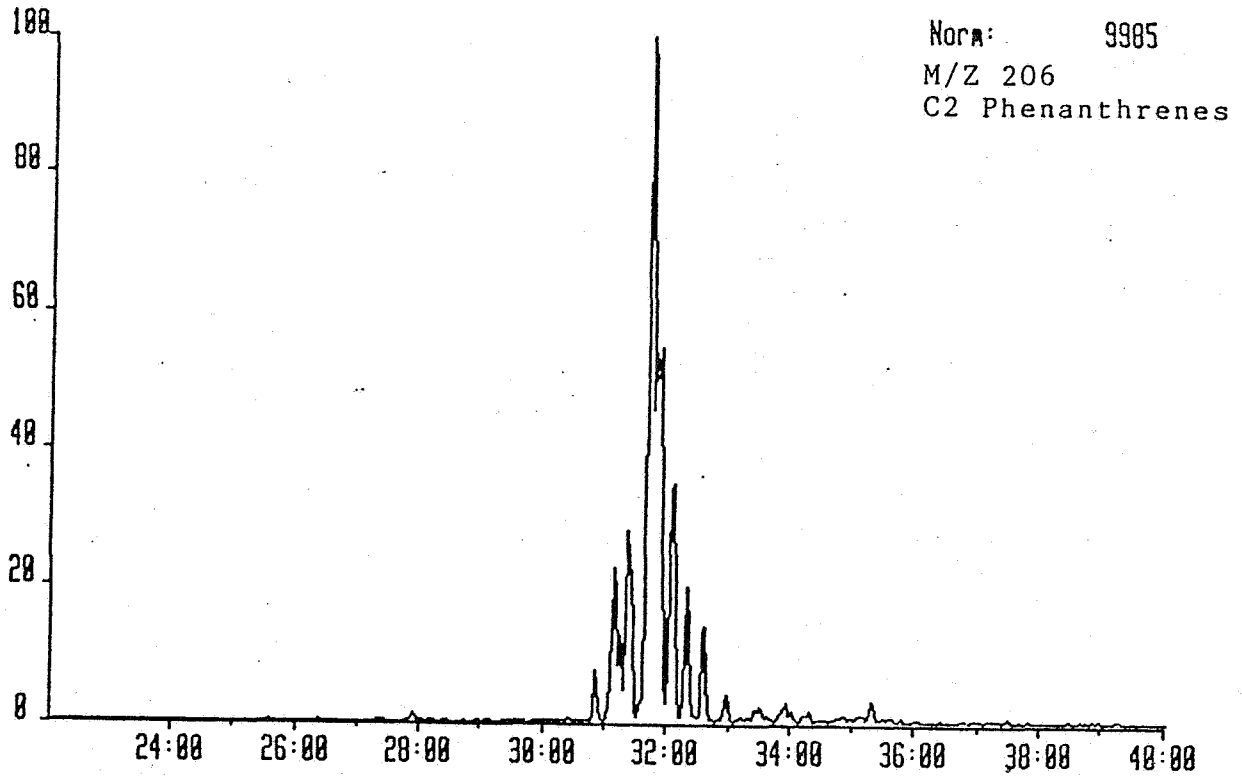


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO7 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 15 Injection 1 Group 1 Mass 192.0939
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION

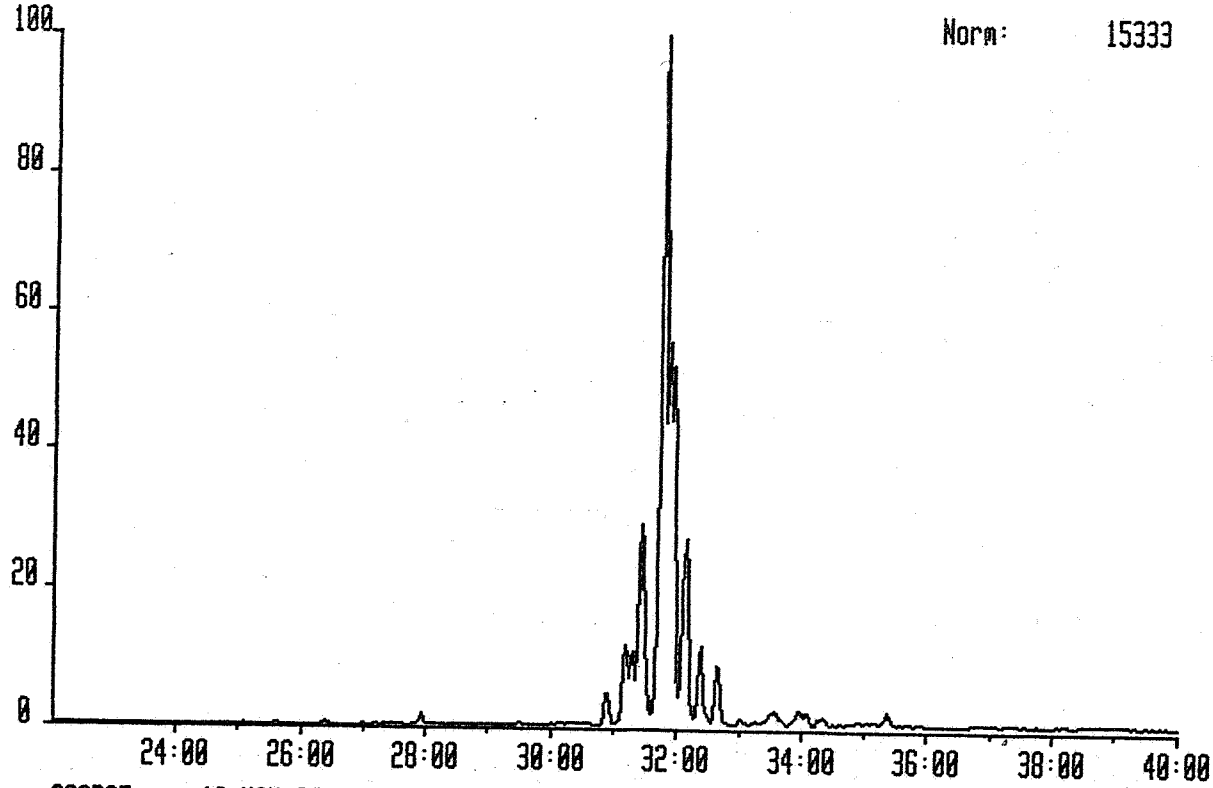


EXAMPLE OF PEAK IDENTIFICATION FOR C2 PHENANTHRENES.

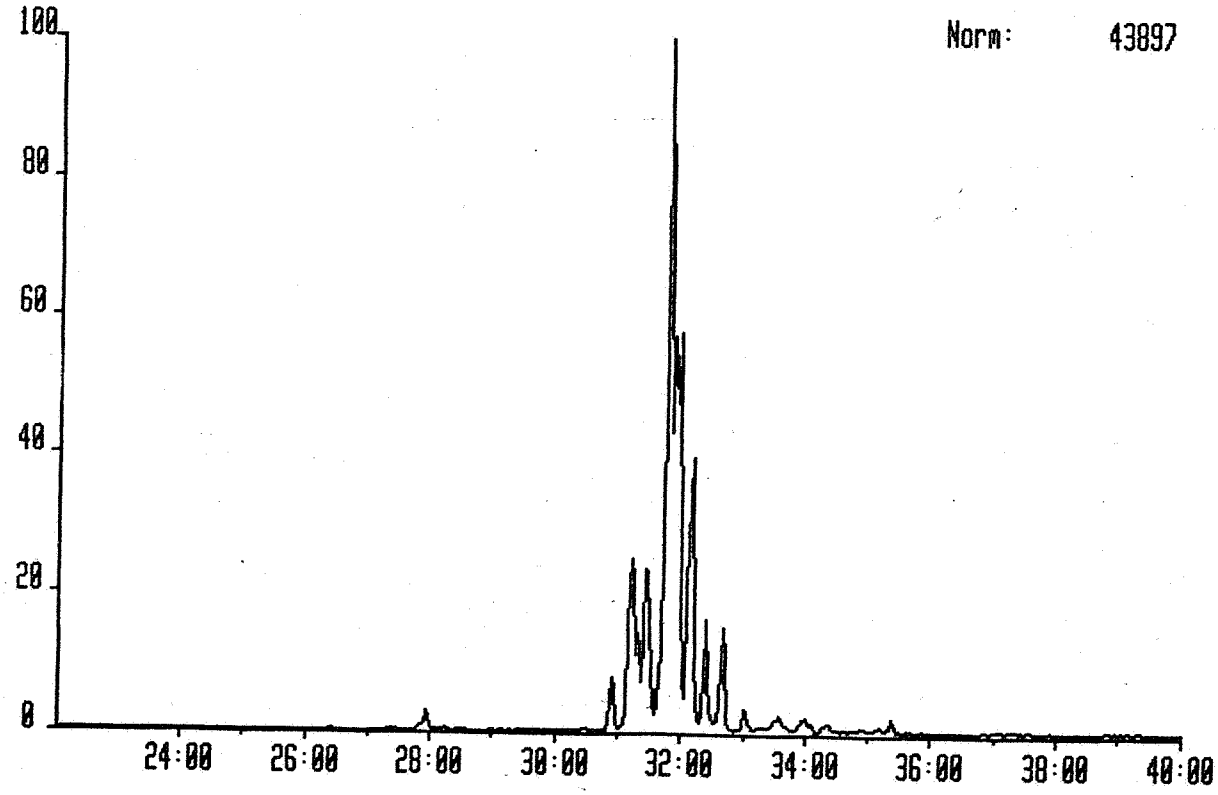


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 19 Injection 1 Group 1 Mass 206.1096
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

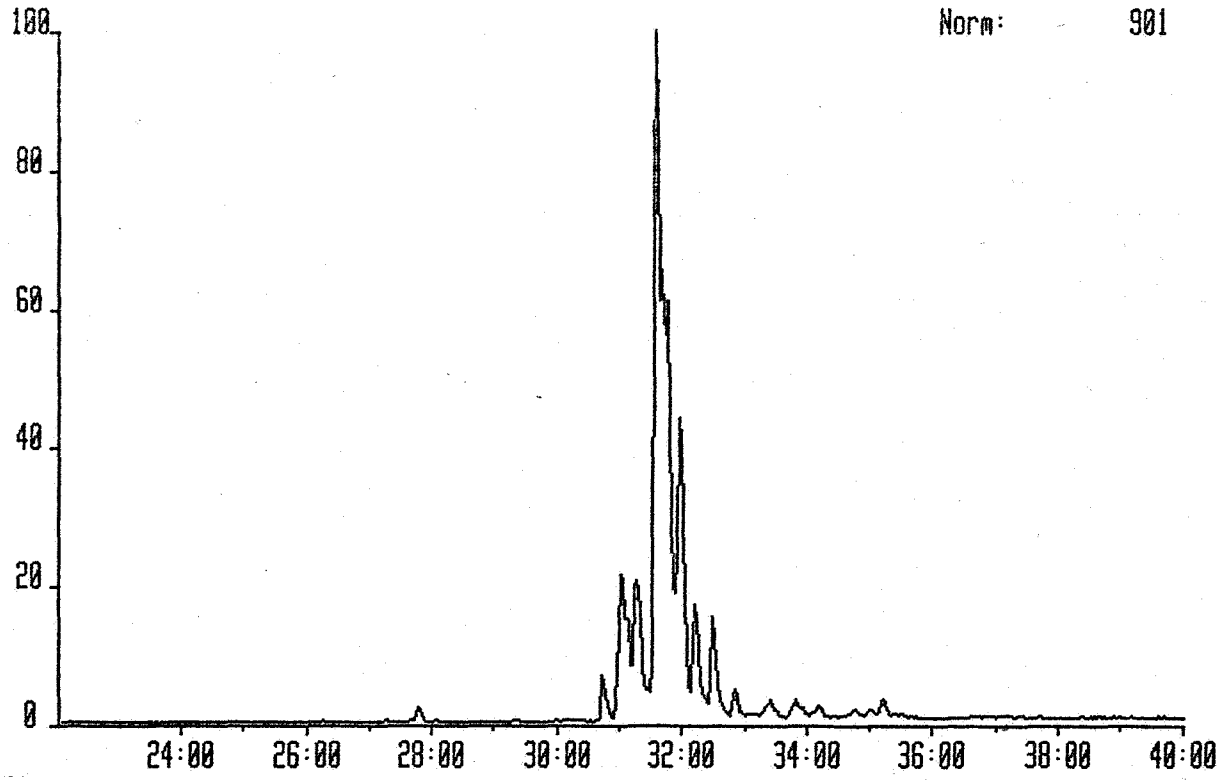


CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 20 Injection 1 Group 1 Mass 206.1096
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION

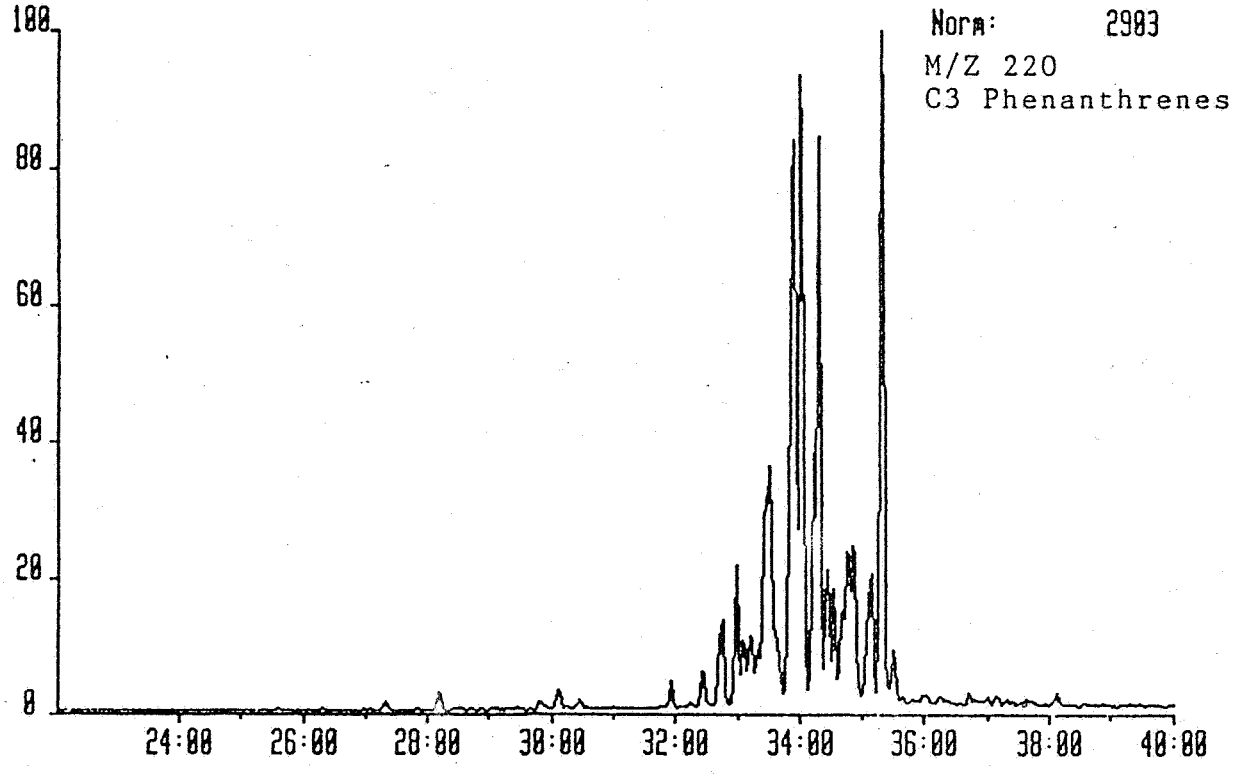


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO7 25-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 15 Injection 1 Group 1 Mass 206.1096
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION

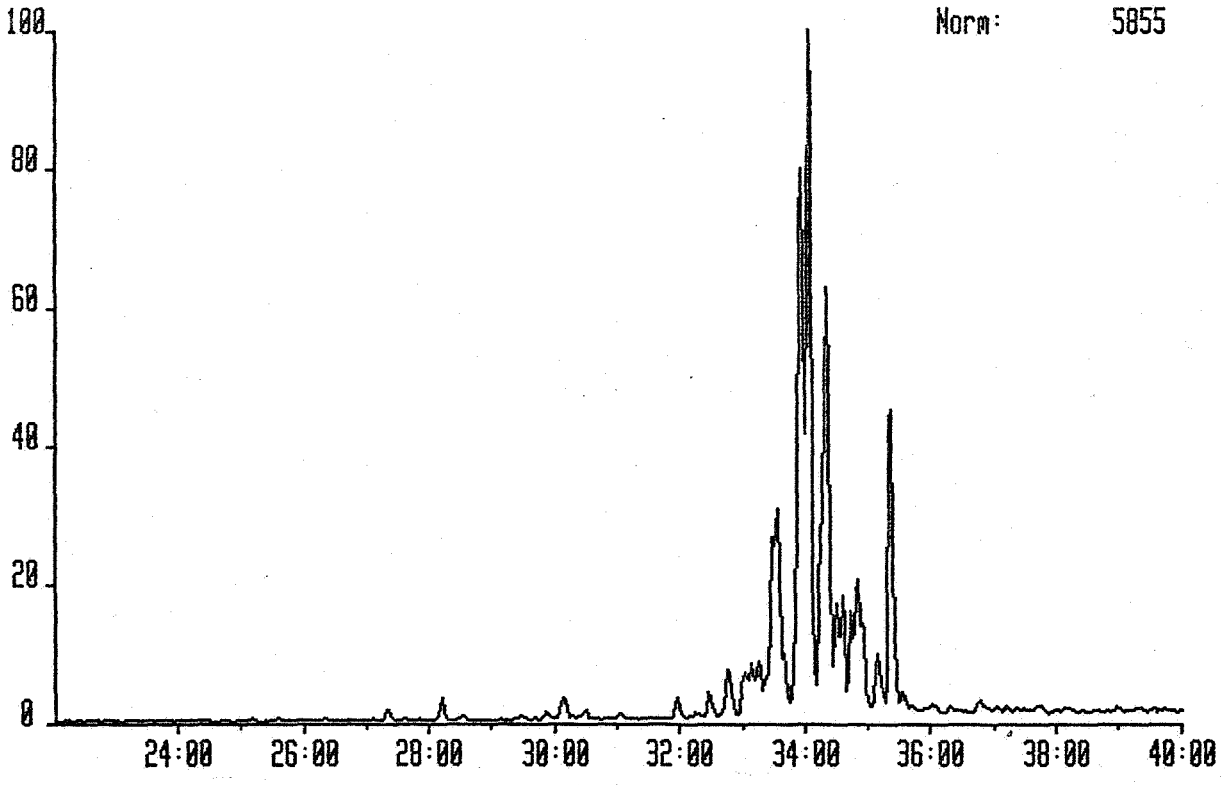


EXAMPLE OF PEAK IDENTIFICATION FOR C3 PHENANTHRENES.

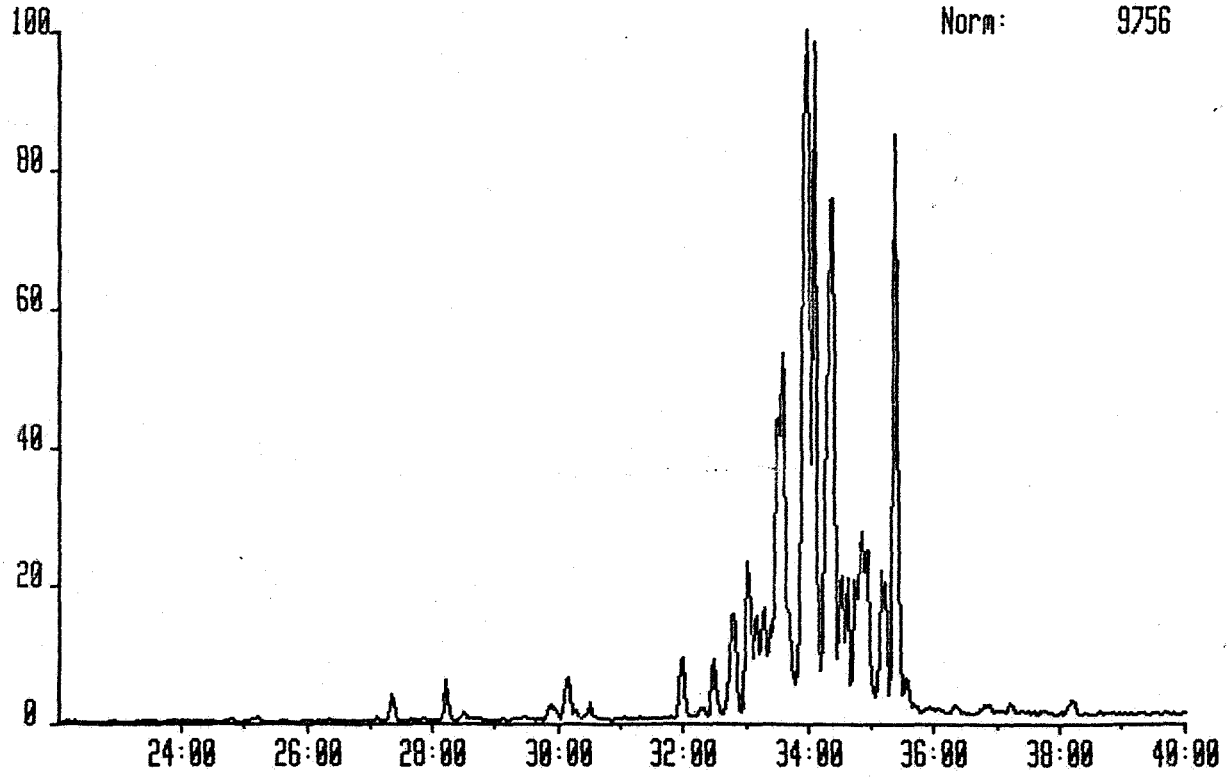


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 19 Injection 1 Group 1 Mass 220.1253
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

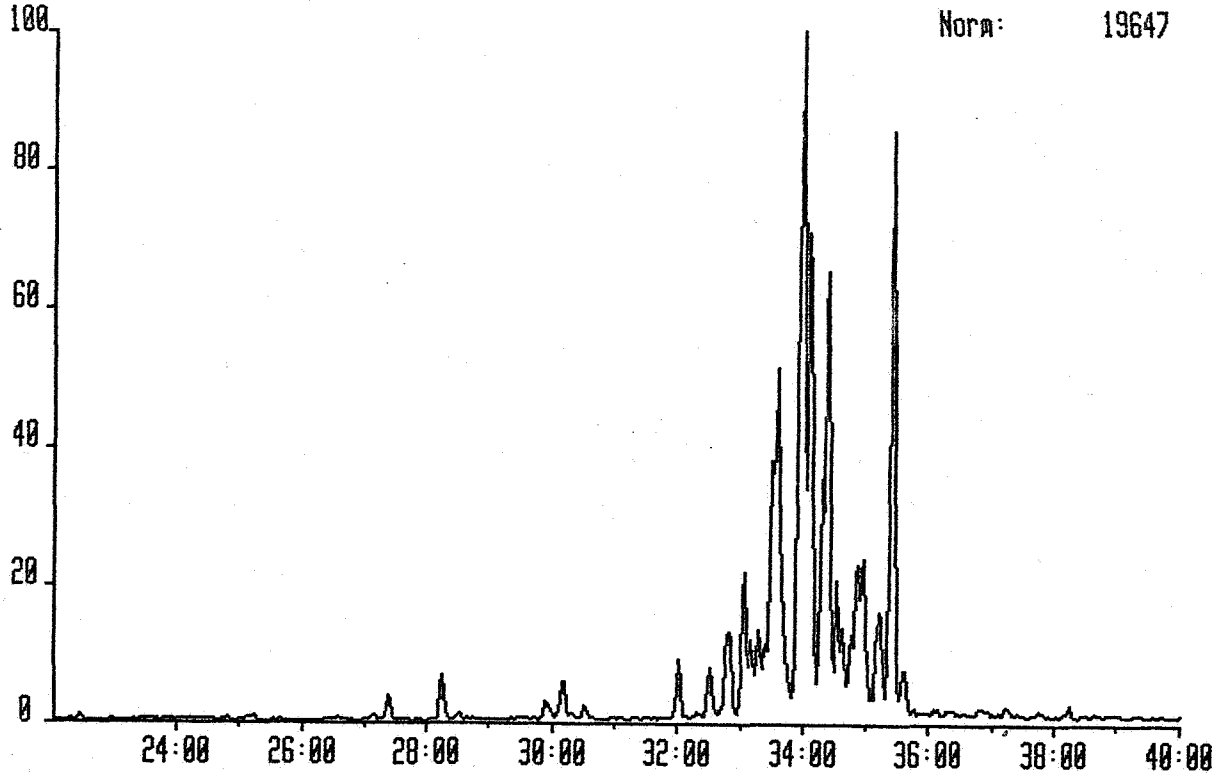


CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 20 Injection 1 Group 1 Mass 220.1253
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION



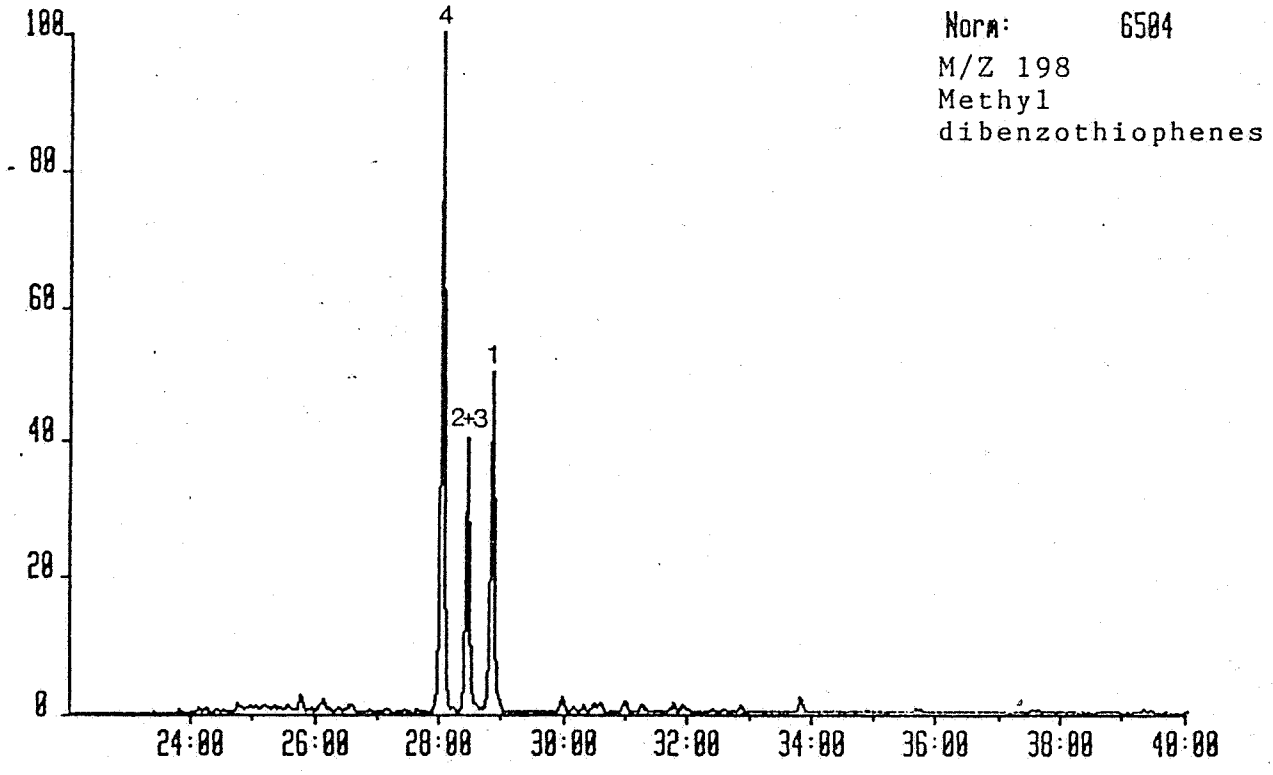
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 21 Injection 1 Group 1 Mass 220.1253
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION

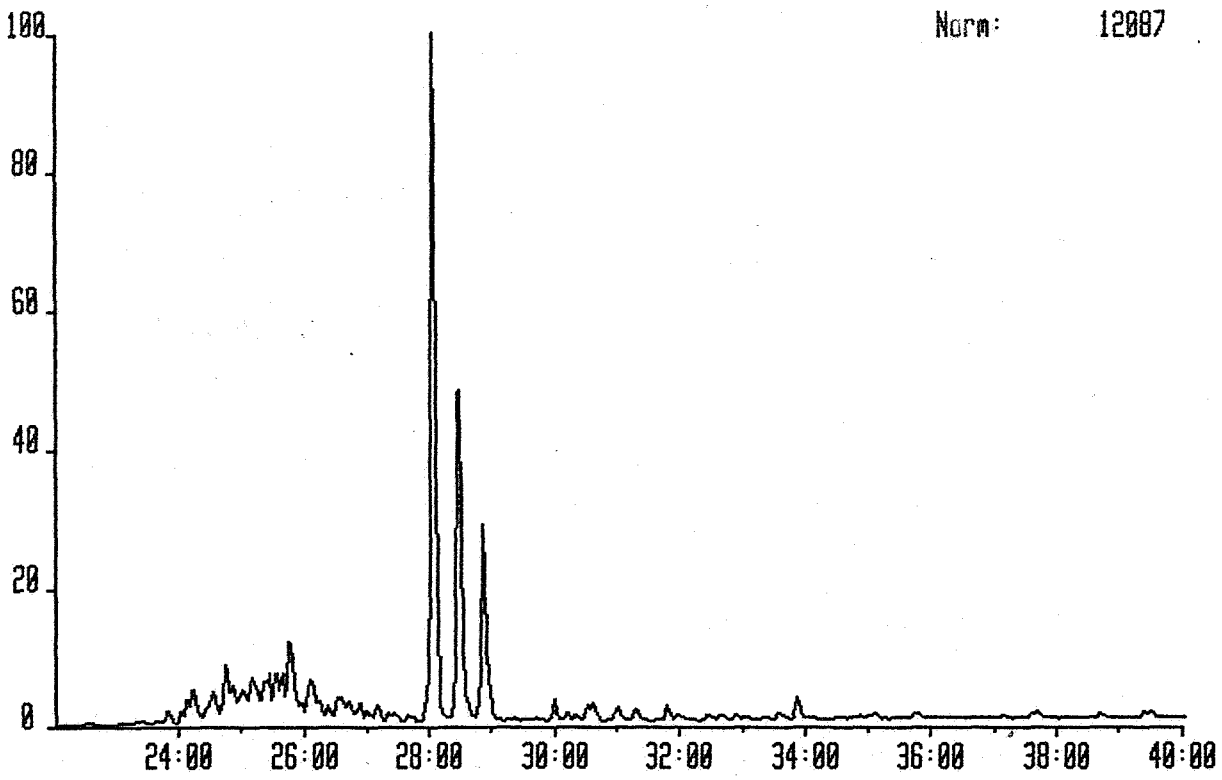


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

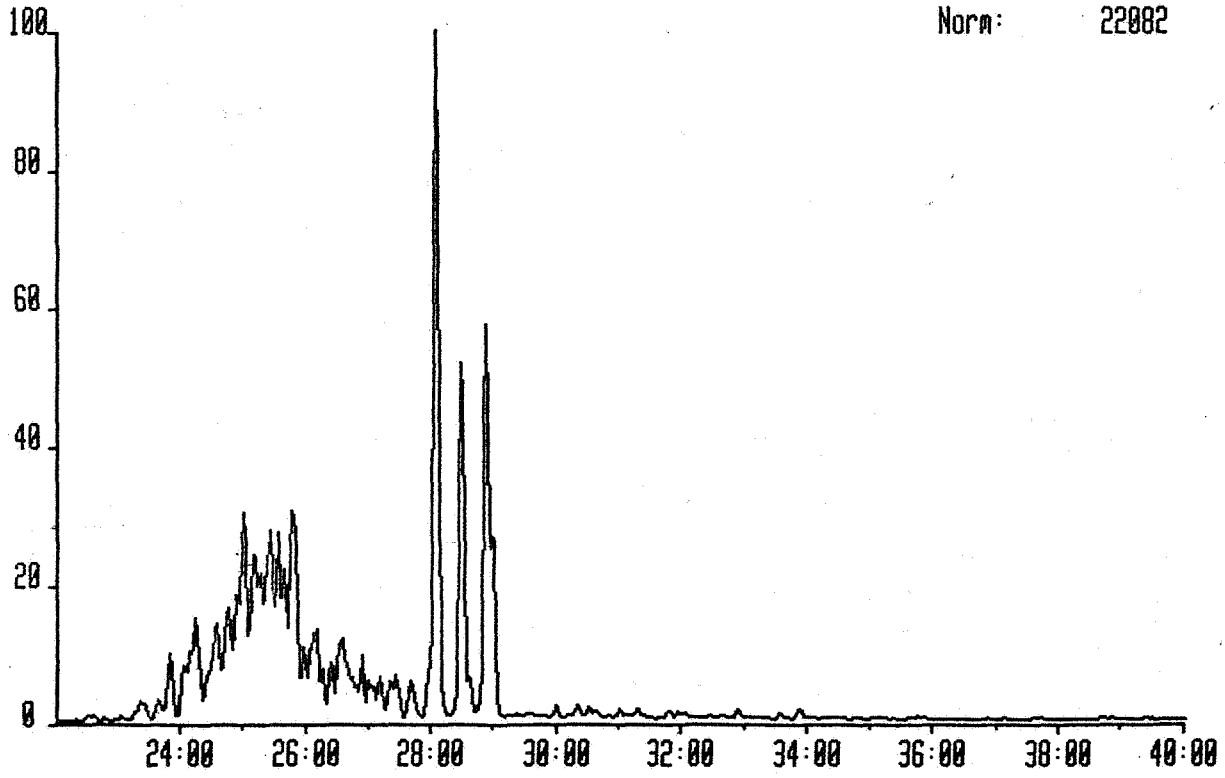
EXAMPLE OF PEAK IDENTIFICATION FOR METHYL DIBENZOTHIOPHENES.



CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 19 Injection 1 Group 1 Mass 198.0503
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

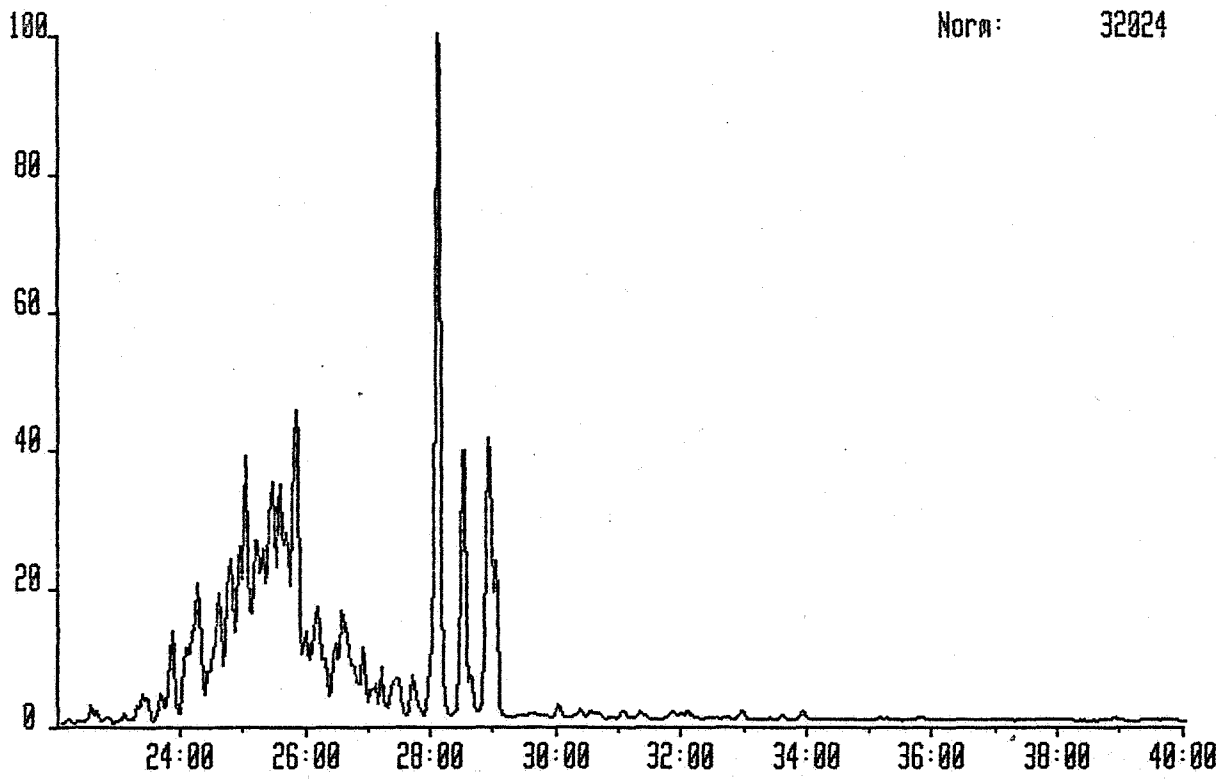


CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 20 Injection 1 Group 1 Mass 198.0503
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION



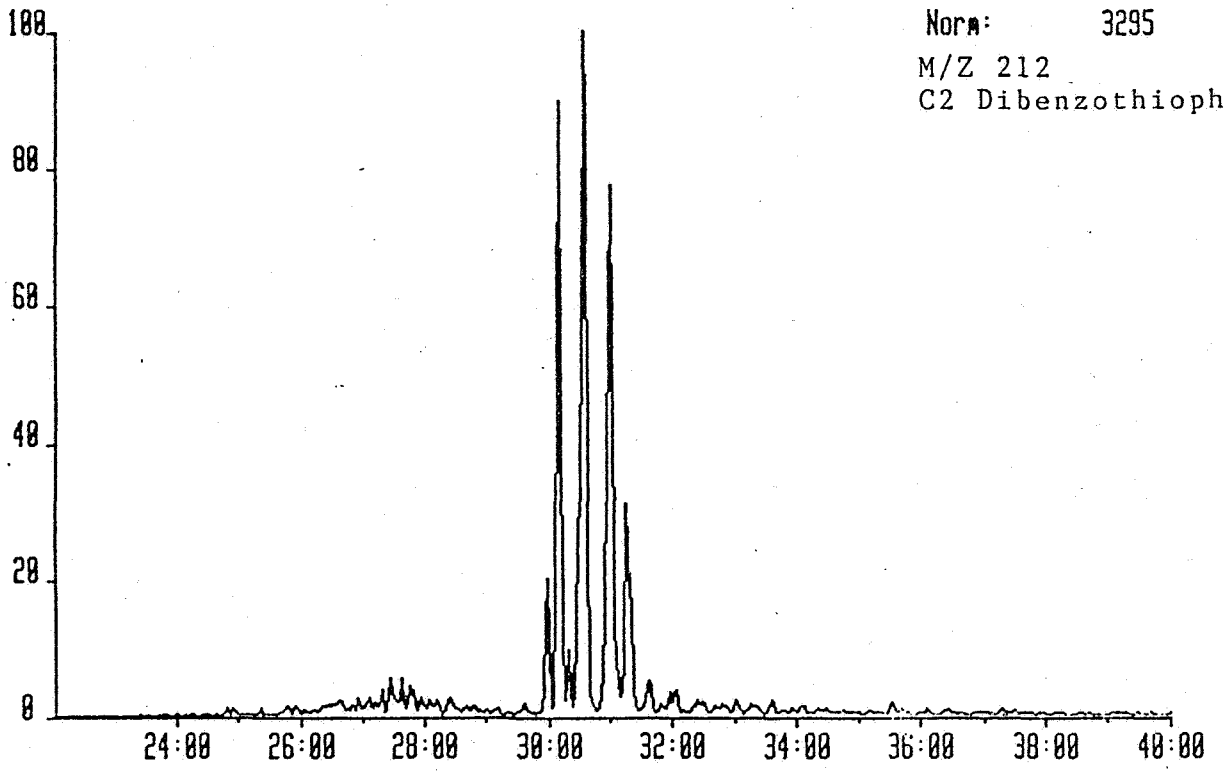
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 21 Injection 1 Group 1 Mass 198.0503
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION



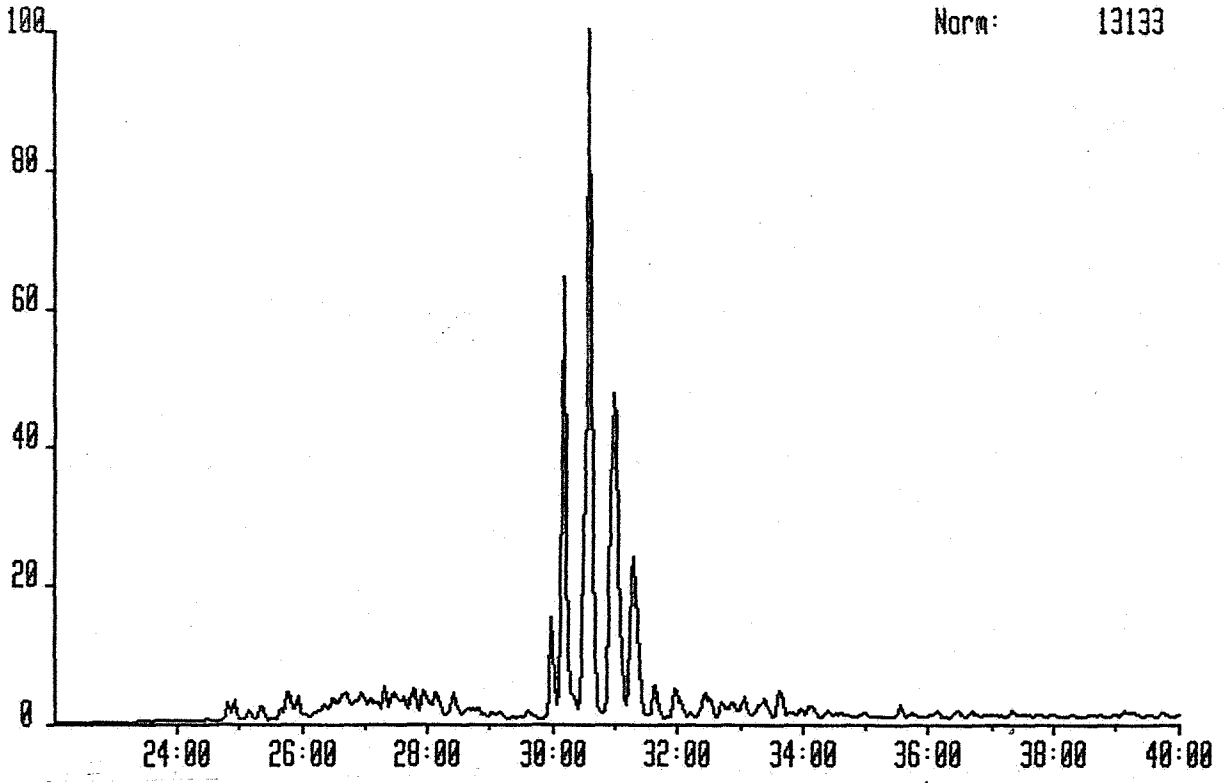
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

EXAMPLE OF PEAK IDENTIFICATION FOR C2 DIBENZOTHIOPHENES.

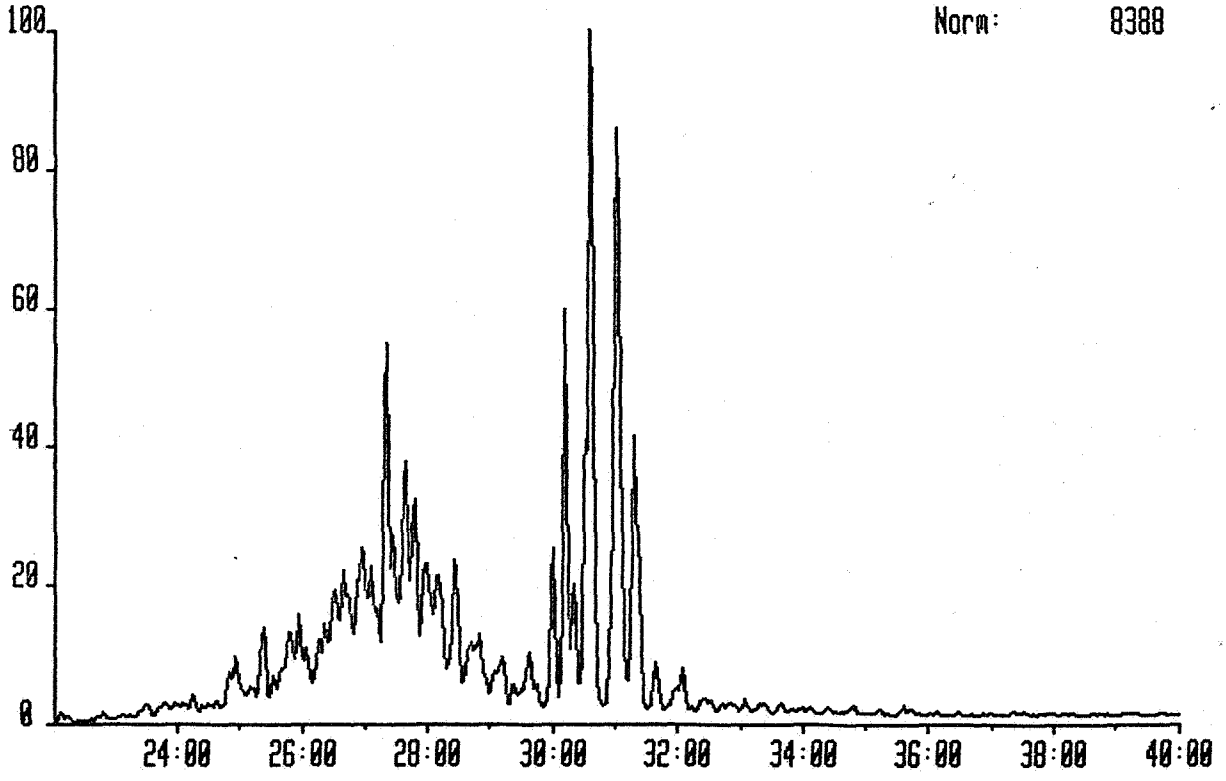


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGAR05 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 19 Injection 1 Group 1 Mass 212.0660
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

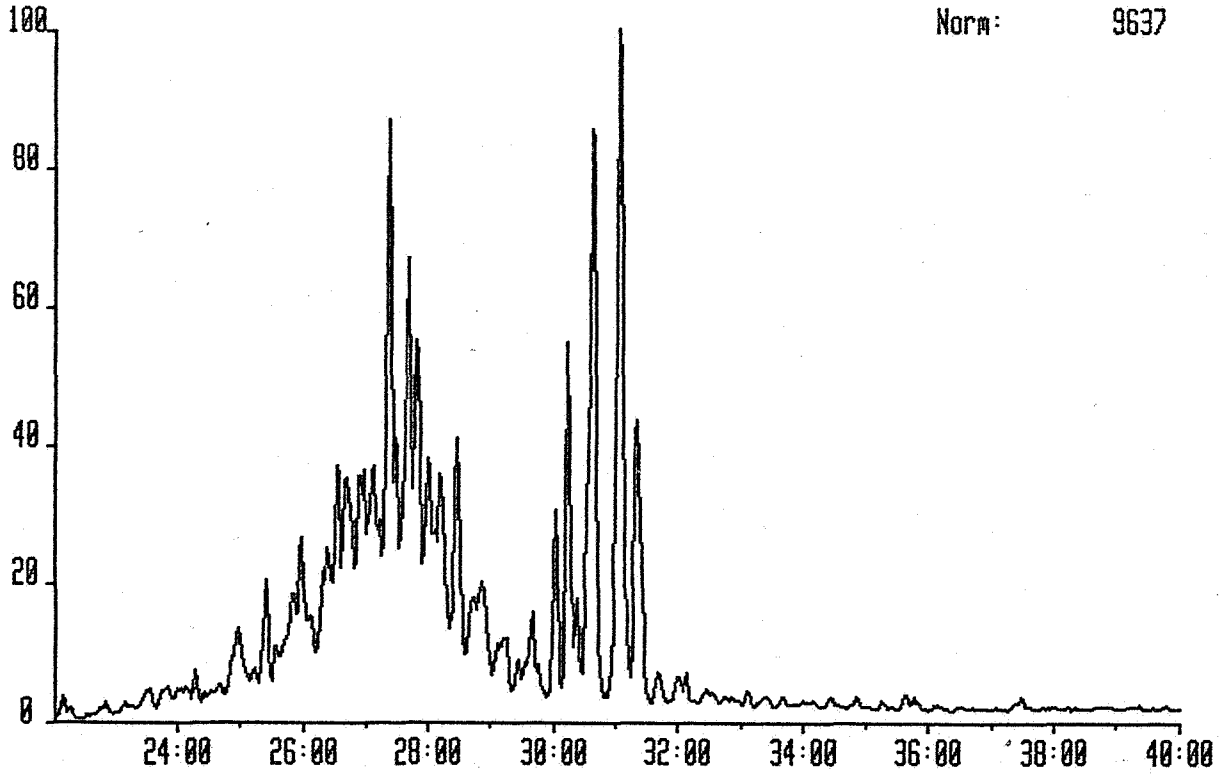


CGAR05 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 20 Injection 1 Group 1 Mass 212.0660
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION

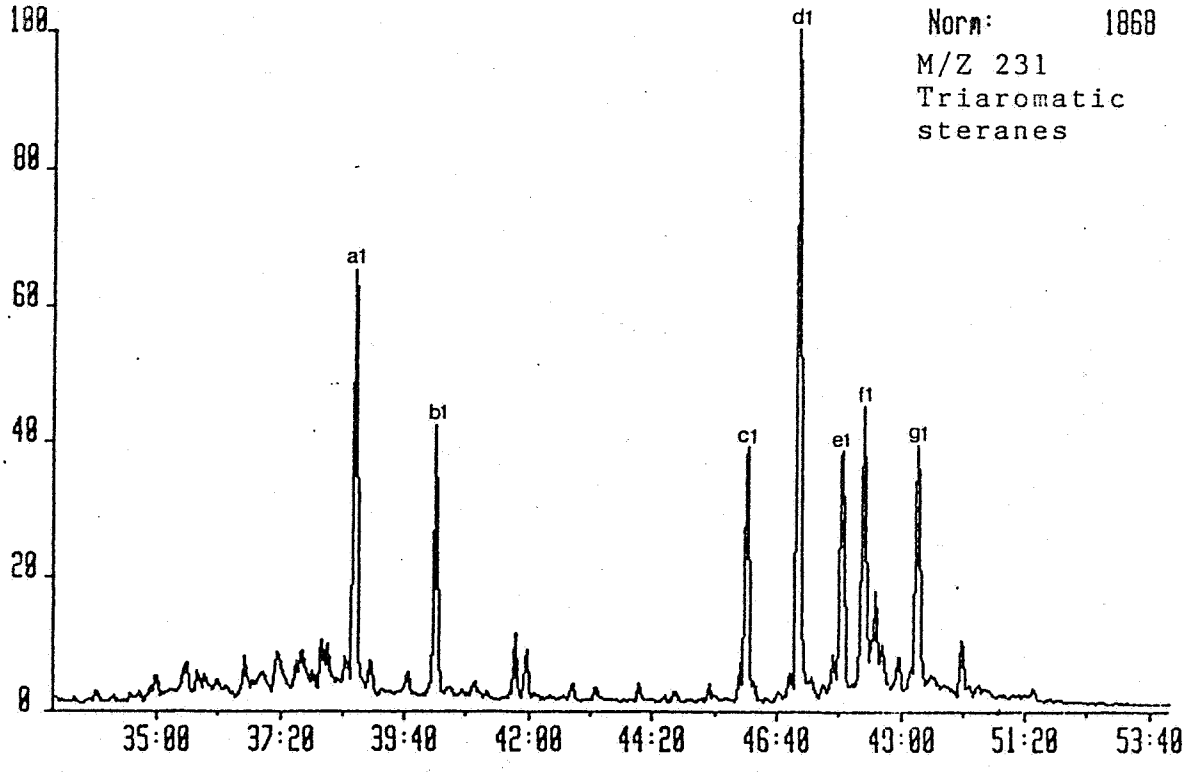


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 21 Injection 1 Group 1 Mass 212.0660
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION

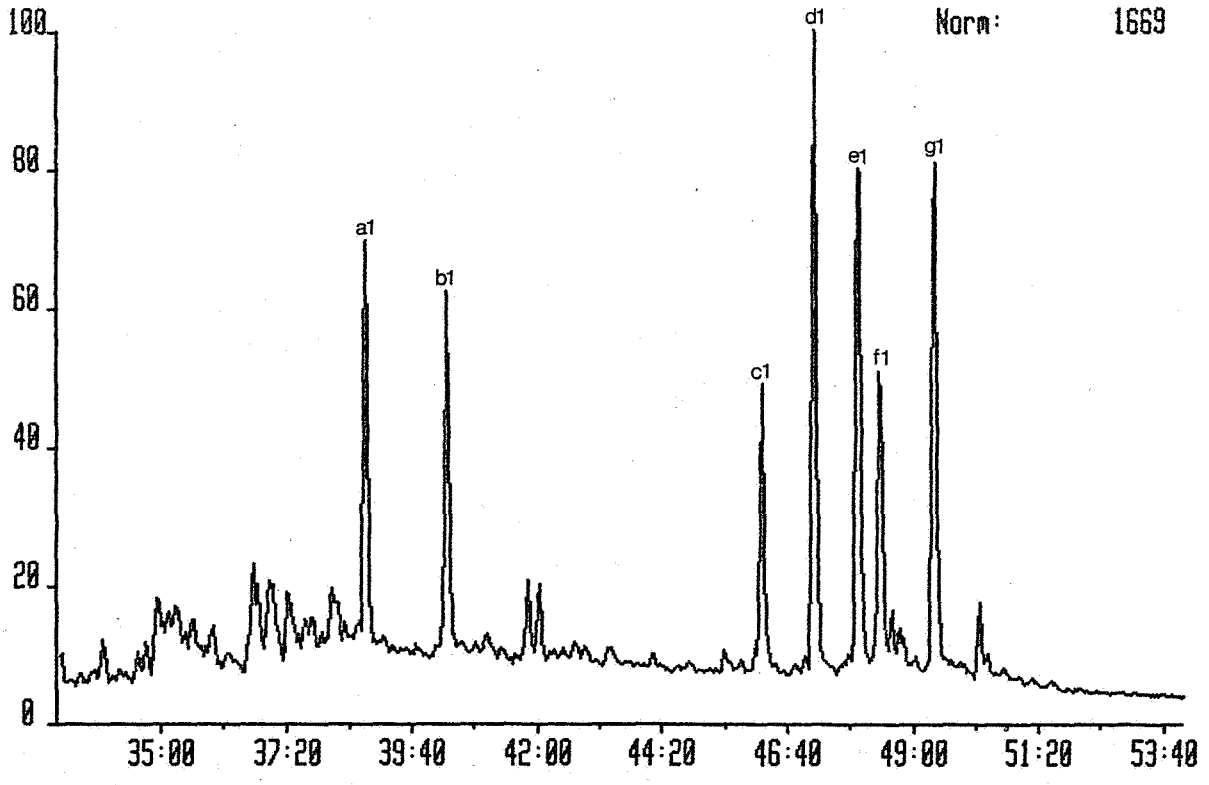


EXAMPLE OF PEAK IDENTIFICATION FOR TRIAROMATIC STERANES.

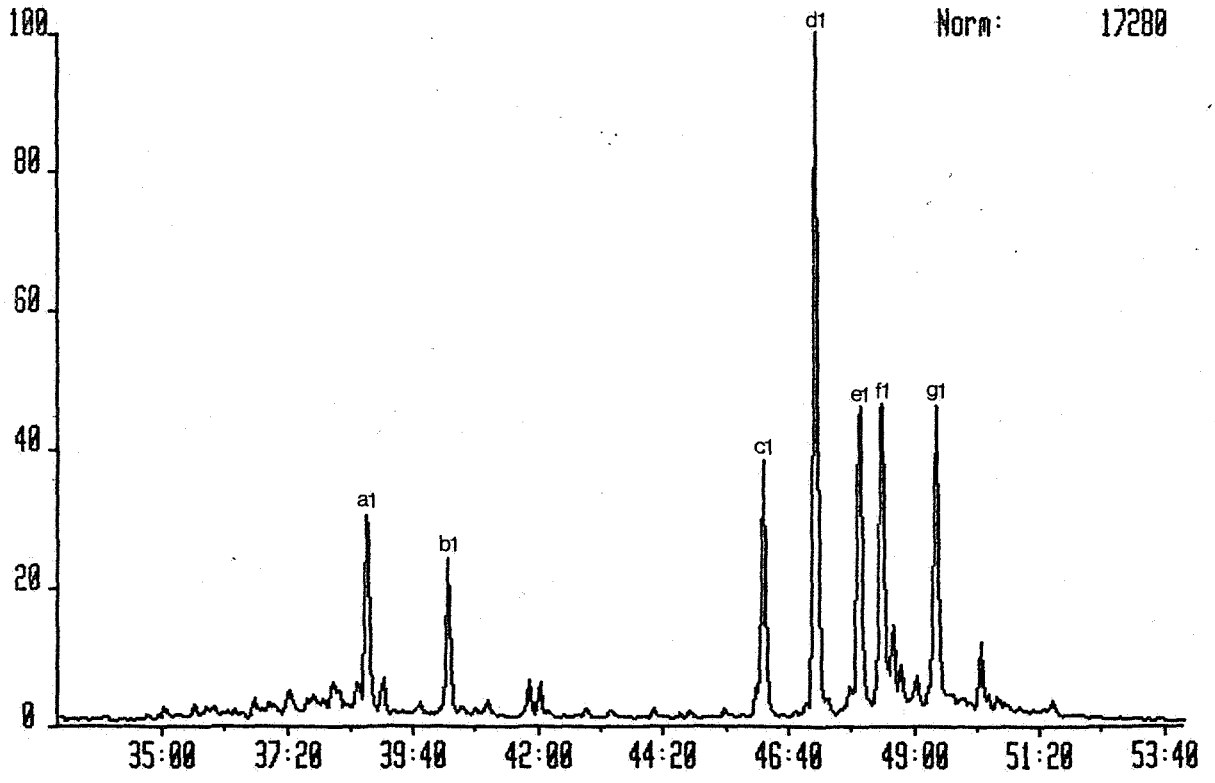


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGAR05 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 19 Injection 1 Group 1 Mass 231.1174
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION

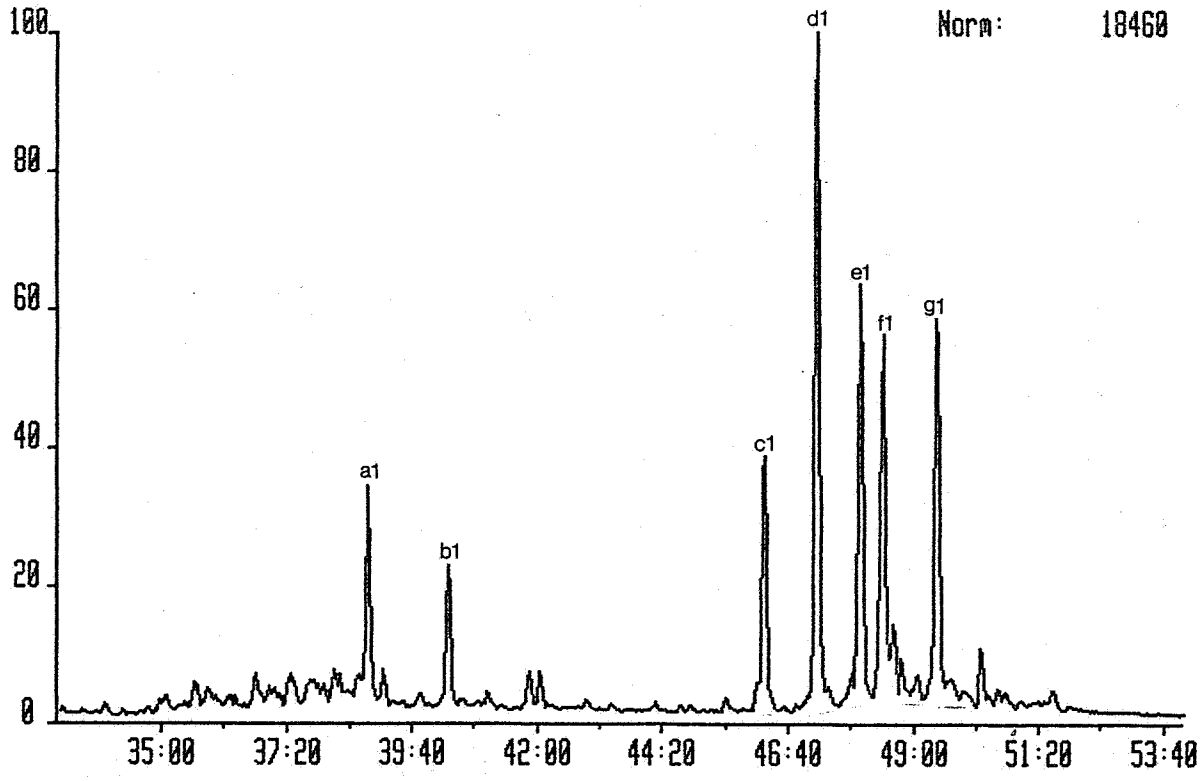


CGAR05 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 20 Injection 1 Group 1 Mass 231.1174
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION

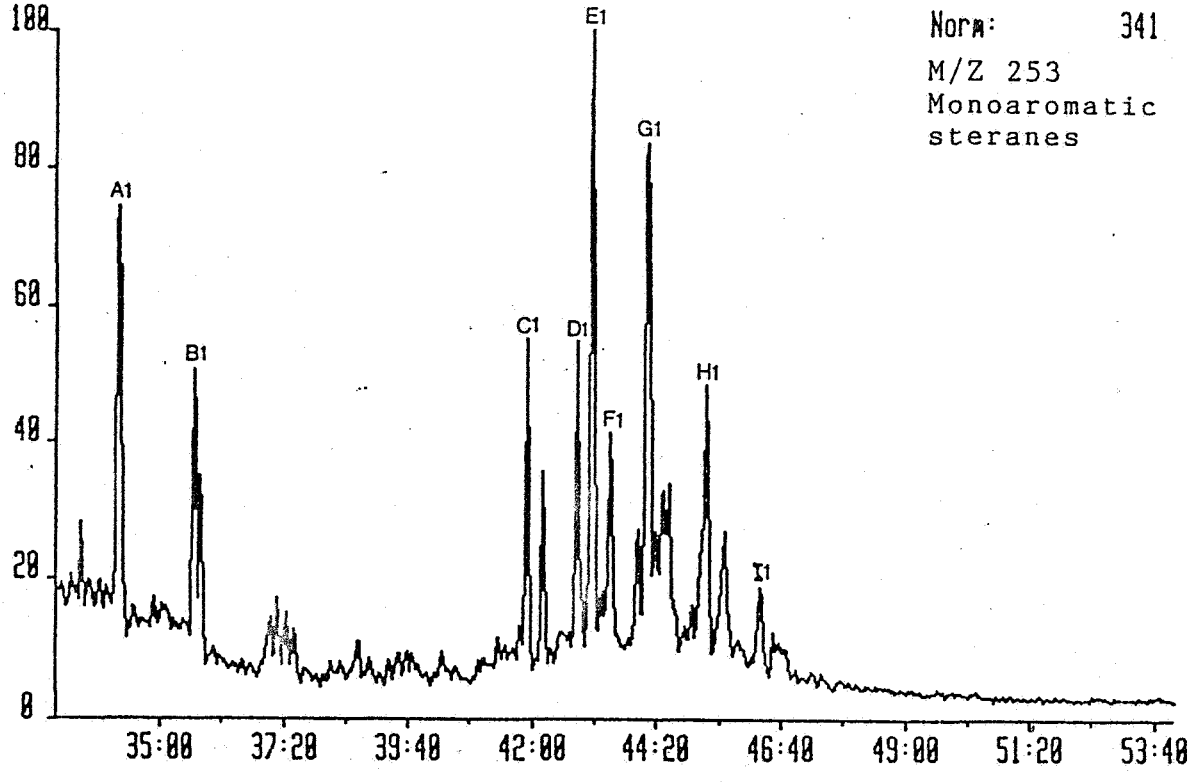


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGAR05 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:AR01
Sample 21 Injection 1 Group 1 Mass 231.1174
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION

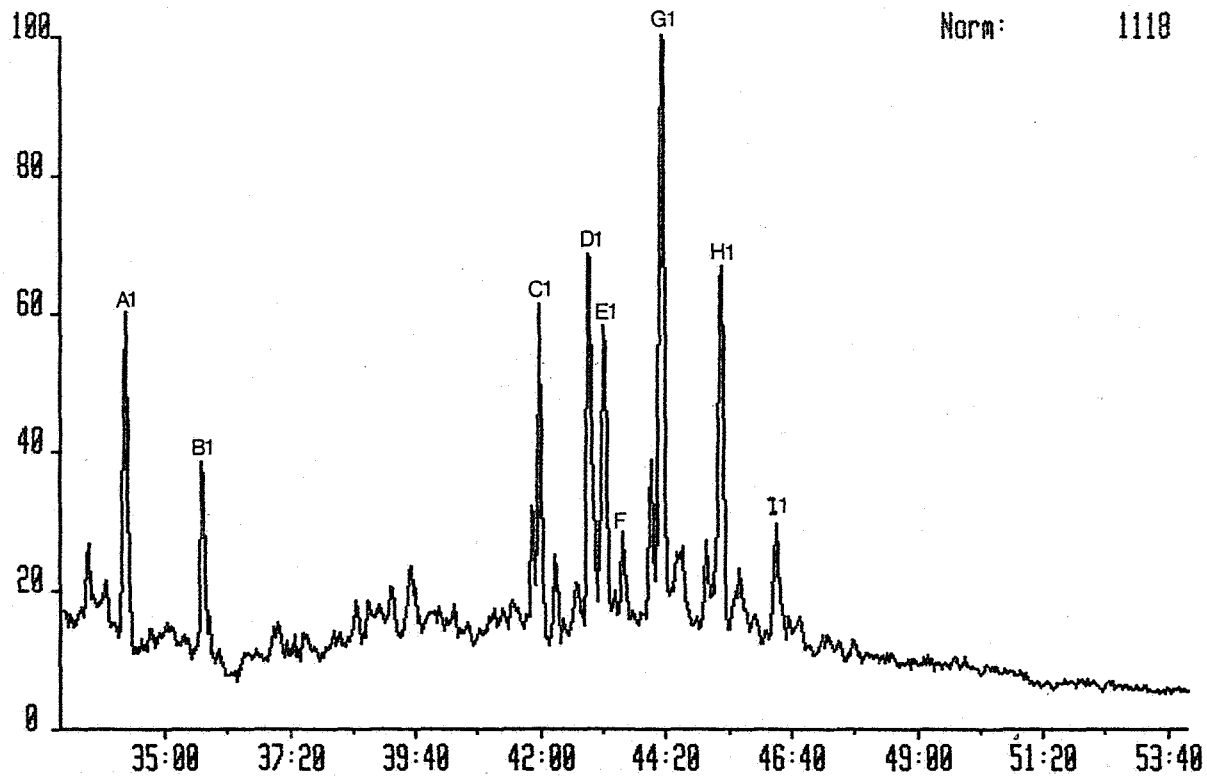


EXAMPLE OF PEAK IDENTIFICATION FOR MONOAROMATIC STERANES.

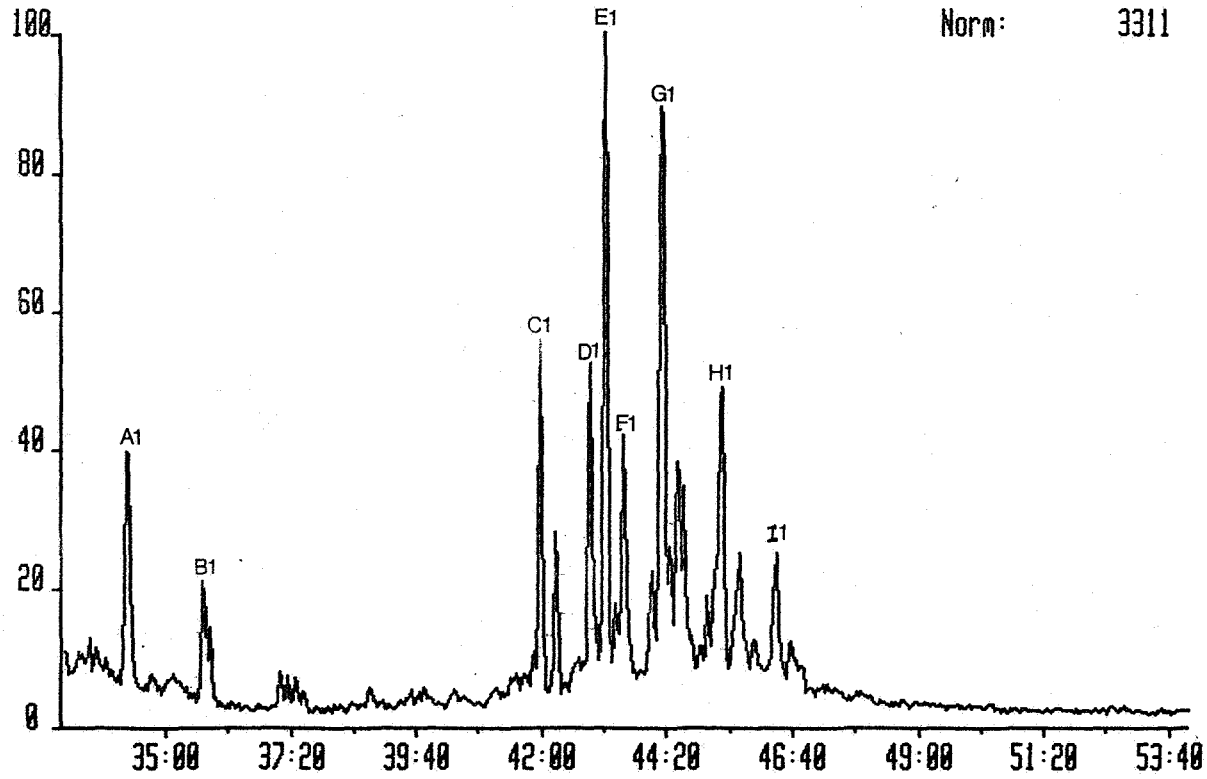


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 19 Injection 1 Group 1 Mass 253.1956
Text:WELL 3/7-3, 3338M, AROMATIC FRACTION



CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 20 Injection 1 Group 1 Mass 253.1956
Text:WELL 3/7-3, 3446M, AROMATIC FRACTION



GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

CGARO5 19-NOV-87 Sir:Magnetic TS250 Acnt:GEOLAB System:ARO1
Sample 21 Injection 1 Group 1 Mass 253.1956
Text:WELL 3/7-3, 3508M, AROMATIC FRACTION