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PRE-CRETACEOUS HYDROCARBON POTENTIAL OF THE NORWEGIAN CENTRAL GRABEN

GEOCHEMICAL ANALYSIS
Well NOCS 2/7-15

Authors: Malvin Bjorøy
Peter B. Hall
Kjell Arne Bakken
Rita Løberg
Josan McDermott
Nigel Mills

Geolab Nor A/S
Hornebergveien 5
7038 Trondheim
Norway

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INTRODUCTION

This well is from the Norwegian sector of the North Sea in the area of the ELDFISK field.

A total of 166 samples were collected from the Norwegian Petroleum Directorate in Stavanger. All the samples were washed and described (3395 - 4422 m RKB). The analysed interval is from 3395 - 4422 m RKB, the sample interval being mainly 3 or 6 m.

A careful selection was made of suitable samples from screening analysis, i.e. TOC and Rock-Eval analyses. One hundred and fifty (150) samples were selected for these analyses and from the data obtained a number of samples were chosen for further analysis as follows:

Thermal extraction - pyrolysis - gas chromatography	77 samples
Extraction, MPLC fractionation, saturated and aromatic hydrocarbon gas chromatography	16 samples
Vitrinite reflectance microscopy	26 samples
Visual kerogen analysis	29 samples

Tables, listing in detail which samples were analysed and the results from the analyses, are shown in the appendix.

Figure 1 shows the litho-variations and some of the screening data for the analysed section of the well and also the location of samples for follow-up analyses. Included in the figure are some of the problems and intervals of interest which have affected the choice of samples for analysis.

LITHOLOGY AND TOTAL ORGANIC CARBON CONTENT

Tertiary (- 3008 m)

No samples were analysed. The samples in this interval consist mainly of claystones based on wireline logs and NPD summary sheets.

Cretaceous (3008 - 3584 m)

Between 3395 - 3505 m carbonates are the dominant lithology in the samples.

Two medium grey to dark grey limestone samples from the top of the Lower Cretaceous were analysed (3401 - 3419 m). These carbonates have quite high TOC values of 1.3 % and 1.1 % (good), which may be due to the presence of migrated hydrocarbons. Shales in this sequence are mainly light to medium grey with some grey-red. Below 3437 m dark grey to black calcareous shales are present. Six samples were analysed between 3437 and 3505 m.

Below 3500 m sixteen samples of mainly dark grey to black and dusky yellow-brown shales were analysed. The TOC content roughly increases with depth to 3500 m, from about 2 % to 5 % (i.e. the TOC content of these shales is rich). Below 3500 m, to 3551 m, the dusky yellow-brown claystones have mainly rich TOC contents between 2 - 3 %, except for the sample from 3551 m which has only 1.1 % TOC. Between 3551 - 3575 m claystones are mostly olive-grey with less than 1 % TOC (poor - fair). At the base of the Cretaceous interval (3575 - 3584 m) brown-black shales are present which have rich TOC contents, with one value of 5.1 % TOC recorded at 3581 m.

Jurassic (3584 - 4423 m, TD)

Tyne Group (3584 - 4423 m, TD)

Mandal Formation (3584 - 3676 m)

Apart from the sample at the top of the formation with 4.8 % TOC (at 3584 m), the brown-black shales in the rest of the sequence have rich TOC contents, but less than 4 %. The main range of values is from 2.5 % to 3.7 %.

Farsund Formation (3676 - 4131 m)

The well was cased near the base of the Mandal Fm. so that no caving of these shales into the Farsund Fm. can have occurred. Unfortunately, the top 100 metres of the cuttings samples in the Farsund Fm. are badly contaminated with additive. However, it is probable that the dominant dark grey and grey-black shales (some medium grey - dark grey) are relatively similar in TOC content throughout the whole of the Farsund Fm. The TOC content is mainly rich, with 2 % to 3 % TOC, except for some intervals which have only good TOC values, generally in the range 1.6 % to 2.0 %. There also appear to be thin intervals in which the TOC content is much richer, i.e. greater than 5 %. These may be due to the presence, on the cuttings, of a tar-like mud additive. There are also minor interbeds of dusky yellow-brown carbonates and sandstone. The TOC content of the carbonates appears to be mainly good (~ 1 - 1.5 % TOC). There is a slight increase in the TOC content of the dominant shales with depth.

Eldfisk Formation (4131 - 4185 m)

The samples in this interval consist mainly of shales and

minor amounts of carbonates similar to those in the Farsund Fm. They also show no difference in TOC content.

Haugesund Formation (4185 - 4423 m, TD)

Similar dark grey and grey-black shales and dusky yellow-brown carbonates are found in this formation as in the Farsund Fm. The main TOC range is, however, slightly higher, rarely dropping below 2 %.

ROCK-EVAL ANALYSIS

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

Cretaceous (3008 - 3584 m)

Two carbonates from near the top of the Lower Cretaceous were analysed. These have petroleum potentials less than one and kerogen type IV (with hydrogen indices less than 60). The organic material in these samples may consist of residual migrated hydrocarbons in part.

The dark grey, black and dusky yellow-brown shales below this have fair to rich petroleum potentials which vary from 2.3 to 21.7. The highest values (> 10) were recorded between 3468 m and 3492 m and 3575 - 3581 m. The S_1 values of these samples are very high and may represent shales enriched in migrated hydrocarbons. Apart from these shales, which have hydrogen indices greater than 200 and hence have type II/III kerogen, the rest of the shales have mainly type III kerogen (i.e. hydrogen indices from 100 - 200). It is possible that source hydrocarbon generation has occurred in these shales so that the original kerogen type in all the shales may have been type II/III.

Jurassic (3584 - 4423 m, TD)

Tyne Group (3584 - 4423 m, TD)

Mandal Formation (3584 - 3676 m)

Apart from the sample at the top of the sequence, with a

petroleum potential of 17.3, the rest of the grey-black and brown-black shales in this formation have petroleum potentials ranging roughly from 9 to 15 and type II/III kerogen. Major hydrocarbon generation is considered to have occurred, so that in some shales the original kerogen type was probably type II. However, peak oil generation has probably not been attained so that the kerogen quality may not have been as good as in other wells of the Central Graben.

The shales still have a good-rich potential for oil and gas.

Farsund Formation (3676 - 4131 m)

The petroleum potentials of the dark grey and grey-black shales in this formation range from 5 to 6.4. There are some values slightly less than 5 and greater than 10 (even up to 14) but the main range is from 5 to 10. Kerogen type is II/III or III but mainly the former. The main hydrogen index range is 200 - 250 but was probably higher before hydrocarbon generation, although the kerogen was probably not type II before hydrocarbon generation. The carbonates in this formation have petroleum potentials less than 5 and type III kerogen.

The dominant shales in this formation still have a fair to good gas and oil potential.

Eldfisk Formation (4131 - 4185 m)

The shales are very similar to the Farsund Fm. shales.

Haugesund Formation (4185 - 4423 m, TD)

The petroleum potentials and hydrogen indices of the shales

in this formation are very similar to the Farsund Fm. shales, except that hydrogen indices are slightly lower probably due to increased thermal degradation of the kerogens at the greater depths attained by the shales.

2. Generation and Migration
(Production Index $S_1/(S_1+S_2)$ and S_1/TOC)

The production index values seen in figure 2 are highest in the Cretaceous section directly above the Mandal Fm. This is probably partly due to migrated hydrocarbons generated in the Jurassic sequence. In the Jurassic sequence production index values vary from 0.2 to 0.45. The variation is probably due to depletion and enrichment in hydrocarbons in particular zones. The main production index range of the Jurassic is between 0.2 and 0.3 and indicates that major hydrocarbon generation has taken place. Peak oil generation has probably been reached at about 4000 metres.

3. Maturity (Tmax)

The estimated Tmax trend for the Jurassic interval, between 3600 and 4400 m, is mainly from 430 to 445 (see Figure 3), which suggests that the interval is early mature to late mature. Low values of Tmax (below 435) in the interval from 3800 - 4000 m are probably due to measurement on asphaltic material generated from the kerogen, as well as the kerogens in these shales, which are probably at the peak oil generation stage.

EXTRACTION DATA

Sixteen composite samples from the Cretaceous and Jurassic were extracted, fractionated and gas chromatograms were run of saturated and aromatic hydrocarbon fractions. Extraction data figures can be found in the appendix.

Cretaceous (3008 - 3584 m)

Two dark grey to black shales were extracted and analysed from the Cretaceous. These were from 3492 m and 3517 m. The amount of EOM and extractable hydrocarbons in both is very high (16777 and 9411 ppm EOM and 7777 and 5058 ppm HC respectively). They are both rich source rocks based on the soluble bitumen classification. They are also richer than the underlying Jurassic shales. This suggests that either, bitumen from the Jurassic has migrated into these shales, or that the Cretaceous shales generate more hydrocarbons per gram carbon at lower temperatures than do the Jurassic shales. The very high EOM values normalized to TOC (e.g. > 400 mgs EOM/g TOC) are suggestive of the presence of migrated bitumen.

Jurassic (3584 - 4423 m, TD)

Tyne Group (3584 - 4423 m, TD)

Mandal Formation (3584 - 3676 m)

Two grey-black and brown-black shale samples were extracted (one of which overlaps with the top of the Farsund Fm.)

The two samples have similar EOM contents (~ 7-8000 ppm -

i.e. rich), but the upper sample (from 3618 m) has only half the amount of extractable hydrocarbons of the lower sample (from 3682 m). Both values (1955 ppm as against 3840 ppm) indicate that the shales are rich source rocks. The difference in amounts of extractable hydrocarbons is also distinct in the values normalized to TOC (56 mgs HC/g TOC compared to 118 mgs HC/g TOC). It may be due to hydrocarbon depletion of the upper sample (i.e. expulsion of hydrocarbons has occurred in this sample). The percentage of saturated hydrocarbons is also considerably lower than most other samples (i.e. 18 % compared to values from 30 - 40 %). This may also be due to expulsion from the shales between 3587 m and 3618 m. It is interesting to note that this section of the Mandal Fm. includes thin silty and sandy members interbedded with the dominant grey-black and brown-black shales. They may have served as conduits for the expelled hydrocarbons.

Farsund Formation (3676 - 4131 m)

Seven dark grey to brown-black shales and one medium grey to dark grey shale sample were extracted. Excluding the deepest sample interval (4066 - 4111 m) the rest of the samples have similar amounts of EOM and extractable hydrocarbons (i.e. from 4900 - 7000 ppm EOM and 1900 - 2800 ppm HC). All shales are classified as rich. Similarly when values are normalized to TOC (210 - 280 mgs EOM/g TOC and 100 - 140 mgs HC/g TOC) highest values are recorded for the one medium grey to dark grey shale. It is considered that these shales, which also have the highest percentage of extractable hydrocarbons, are stained with migrated hydrocarbons from the richer shales above and below them.

The deepest analysed sample is almost twice as rich in EOM and extractable hydrocarbons as the rest. This is due the presence of shale with much higher TOC contents but similar organic matter composition. The slightly low EOM and

extractable hydrocarbon contents normalized to TOC, relative to the other samples, may be due to incomplete extraction of this much richer sample.

Eldfisk Formation (4131 - 4185 m)

One sample consisting of silty grey-black and brown-black shales was analysed. The amount of EOM and extractable hydrocarbons indicates a rich source rock (9203 ppm EOM, 2217 ppm HC). The relatively low percentage of saturated hydrocarbons (18 %) may be due to depletion caused by expulsion of hydrocarbons into silty beds present in this formation. A similar suggestion was made for the upper part of the Mandal Formation.

Haugesund Formation (4185 - 4423 m, TD)

Three grey-black, brown-black shales were extracted and analysed. The amount of EOM and extractable hydrocarbons in these shales is generally higher than most other Jurassic shales. This is probably due to higher TOC contents in these Haugesund Fm. shales. All extraction data indicates rich source rocks. The amounts of extractable hydrocarbons normalized to TOC are lower than in most of the Jurassic shales in the Farsund Fm. except those shales regarded to be depleted in hydrocarbons. The Haugesund Fm. shales may also be depleted in hydrocarbons. Another possibility it that the coal additive may be intimately mixed with cuttings so that they have been included in the sample which has been extracted.

Saturated Hydrocarbons

Figures 4 to 7 show the saturated hydrocarbon gas chromatograms selected for the following discussion. All the

gas chromatograms can be found in the appendix.

Cretaceous (3008 - 3584 m)

The saturated hydrocarbon gas chromatograms of the two Cretaceous shales are very similar. They display a smooth front-end biased n-alkane envelope in the range nC_{13} - nC_{35} (Figure 4). The n-alkane maximum is at nC_{17} and there is a very slight odd n-alkane preference from nC_{20} - nC_{26}. There is a pronounced n-alkane shoulder over this range. The dominant isoprenoids are pristane and phytane. The C_{16} and C_{18} compounds are also prominent. The pristane/nC_{17} and phytane/nC_{18} ratios are low (less than 0.6). These characteristics are typical of mature marine source rocks with a significant terrestrial input. The low pristane/phytane ratio (~ 1.2) is typical of source rocks deposited in highly anoxic environments.

Jurassic (3584 - 4423 m, TD)

Tyne Group (3584 - 4423 m, TD)

Mandal Formation (3584 - 3676 m, TD)

The gas chromatograms of the two brown-black shales in this interval are virtually identical to the two in the Cretaceous interval. The main difference is that n-alkanes between nC_{15} - nC_{17} are relatively less abundant in the upper sample from the Mandal Fm. (Figure 5) than in either the Cretaceous samples or the lower Mandal Fm. sample. This may be due to expulsion of the low molecular weight hydrocarbons from the upper shale sample of the Mandal Fm.

Farsund Formation (3676 - 4131 m)

The gas chromatograms of the eight shale samples in this interval are similar to the Mandal Fm. except that the high molecular weight n-alkane "shoulder" from nC_{20} - nC_{26} is much more prominent and pristane/nC_{17} and phytane/nC_{18} values are higher (0.7 - 0.8 compared to 0.5 - 0.6) in the Farsund Fm. shales (Figure 6). This suggests that although the depositional environment was similar in the two formations, a larger terrestrial plant input is indicated for the Farsund Fm. shales.

Eldfisk Formation (4131 - 4185 m)

The gas chromatogram of the silty shale from this formation is similar to those of the Farsund Fm. shales except that isoprenoids and other branched alkanes are much more prominent in the Eldfisk Fm. sample. This may be due to preferential expulsion of n-alkanes over branched alkanes.

Haugesund Formation (4185 - 4423 m, TD)

The gas chromatograms of the shallowest analysed shale sample from this formation is similar to the Eldfisk Fm. (Figure 7). The other two are more similar to the Farsund Fm. in that the isoprenoids are much less prominent, relative to n-alkanes, unlike the Eldfisk Fm. shale.

Aromatic Hydrocarbons

Figures 8a to 10b show the aromatic hydrocarbon gas chromatograms selected for the following discussion. All the gas chromatograms can be found in the appendix.

Cretaceous (3008 - 3584 m)

Of the two analysed shales, the shallower sample from 3492 m is much richer in alkyl naphthalenes. The distribution of alkyl phenanthrenes is not typical of reservoired hydrocarbons or common mature source rocks. The distribution is more typical of residual migrated hydrocarbons. In the FPD chromatogram the 4 methyl dibenzothiophene peak is very much larger than the other methyl dibenzothiophenes. This is common in mature source rocks and oils. The 1 methyl dibenzothiophene peak is larger than the 3+2 methyl dibenzothiophene peak (Figure 8b), which is often seen in highly anoxic shales and limestones even at high maturities.

Jurassic (3584 - 4423 m, TD)

Tyne Group (3584 - 4423 m, TD)

Mandal Formation (3584 - 3676 m)

Both shale samples from this formation have unusual aromatic hydrocarbon distributions. The common aromatics such as alkyl naphthalenes and phenanthrenes are dominated by a few peaks of unidentified compounds. These are not the same in both chromatograms. It is suspected that they are contaminants, at least in part. The alkyl naphthalene/phenanthrene distribution appears to be similar to the Cretaceous samples. The FPD traces are only different to the Cretaceous samples in that the 1 methyl dibenzothiophene is considerably larger than the 2+3 isomers. The distribution is typical of shales in a highly anoxic environment, but probably less mature than the Cretaceous samples.

Farsund Formation (3676 - 4131 m)

The aromatic hydrocarbon gas chromatograms of the eight analysed shale samples are all very similar. Alkyl naphthalenes (MN, DMN, TMN), dominate in every chromatogram, with only one major peak showing a decrease with depth (Figure 9a). Alkyl phenanthrenes are secondary in abundance. Aromatic steranes and triterpanes are present at the high molecular weight end of the chromatogram (Figure 9a). These decrease in relative abundance with increasing depth, except for the sample from 4011 m. The exception may be due to loss of lower molecular weight aromatics in the work-up procedure. No significant changes appear to occur in the common aromatic ratios recorded in Table 5, suggesting that only small changes in maturity occur over this interval.

The FPD trace is similar to the Mandal Fm. shales and suggests a similar depositional environment for both sequences.

Eldfisk Formation (4131 - 4185 m)

The aromatic hydrocarbon pattern of the one analysed sample is very similar to those of the Farsund Fm. shales.

Haugesund Formation (4185 - 4423 m, TD)

The main differences between this formation and the overlying formations is that the high molecular weight component of the gas chromatograms is much reduced relative to the alkyl naphthalenes and phenanthrenes (Figure 10a). In addition, there are distinct changes in aromatic ratios, showing a marked increase in maturity towards the base of the analysed interval. Particularly noticeable is the increase in the methyl dibenzothiophene and the dimethyl naphthalene ratio (DMNR) distribution (e.g. Figure 10b).

THERMAL EXTRACTION - GAS CHROMATOGRAPHY

Seventy-seven (77) samples were analysed by thermal extraction gas chromatography. Selected thermal extract gas chromatograms used in the following discussion are shown in Figures 11 to 17. All the gas chromatograms can be found in the appendix.

Cretaceous (3008 - 3584 m)

Ten, mainly dark grey-black, shales from the lower part of the interval were analysed.

Apart from the brown-black shale immediately above the Jurassic sequence and a light grey shale from 3575 m, the shales have two main hydrocarbon patterns, which are dominated by n-alkanes from nC_{10} - nC_{30}. The dominant pattern is a n-alkane envelope from nC_{10} - nC_{30} with a maximum around nC_{20} - nC_{23}. There is a pronounced unresolved hump within the maximum range. The pristane/phytane ratio is about 1 and isoprenoid/ n-alkane values are less than one (Figure 11). This is typical for residual mature migrated hydrocarbons. The second hydrocarbon pattern is one of a similar n-alkane envelope but with a maximum at a lower molecular weight, i.e. nC_{15} - nC_{17} (Figure 12). There is a secondary maximum at higher molecular weight, or a "tail" of n-alkanes up to about nC_{33}. This distribution may represent a mixture of residual migrated hydrocarbons with a maximum around nC_{15} - nC_{17} and in-situ sourced hydrocarbons of higher molecular weight. It is also possible that diesel hydrocarbons have contaminated the cuttings giving rise to the lower molecular weight n-alkanes in all samples. The chromatogram of the light coloured shale from 3575 m may be representative of such contamination. The sample below this (3581 m) consists of brown-black shales similar in character to the underlying Mandal Fm. Indeed, Rock-Eval data also

suggests that this is part of the Mandal Fm. The main n-alkane distribution of the thermal extract of this sample is bimodal, with maxima at nC_{13} - nC_{14} and nC_{23}. The n-alkane range is nC_{10} to nC_{30}. There is a large unresolved hump which reaches a maximum at about nC_{25} (Figure 13). The distribution is typical of mature type II kerogen which is partly depleted of low molecular weight hydrocarbons, i.e. particularly < nC_{13}.

Jurassic (3584 - 4423 m, TD)

Tyne Group (3584 - 4423 m, TD)

Mandal Formation (3584 - 3676 m)

Five samples of the grey-black and brown-black shales in this formation were analysed. Three n-alkane envelopes can be found! The main n-alkane range in all three is nC_{11} to nC_{26} but the maximum is different. In shales from 3593 m, 3630 m and 3648 m the maximum is nC_{15}(or nC_{14}), in 3642 m it is at nC_{19} and in 3612 m it is bimodal at nC_{15} and nC_{20}. It is considered that these distributions represent shales with mature type II kerogen, which are depleted to a variable extent.

Figure 13, which actually represents a sample from the Cretaceous (directly overlying the Mandal Fm). is taken to be most representative of the Mandal Fm..

Farsund Formation (3676 - 4131 m)

Thirty-eight, mainly shale, samples, which comprehensively cover the whole formation, have been analysed. Similar hydrocarbon distributions to those seen in the Mandal Fm.

are seen in these samples. Figures 14 and 15 show typical examples. The example of the dominant distribution, Figure 14, consists mainly of n-alkanes from nC_{12} - nC_{30} with the distribution clearly skewed towards the higher molecular weight n-alkanes (maximum is between nC_{19} - nC_{22}). The second main distribution, of which Figure 15 is an example, contains more n-alkanes between nC_{12} - nC_{19} than the other distribution. It is considered that both distributions represent mature source rocks which originally had type II/III or even type II kerogens, which are partly depleted in low molecular weight hydrocarbons (i.e. < nC_{20}).

The dark yellow-brown carbonate, from 3283 m, has a quite different thermal extract to the grey-black shales in this formation. Aromatic and polar compounds are prominent in the n-alkane range from nC_{17} - nC_{18}. The main n-alkane range is between nC_{18} - nC_{30} with a maximum at nC_{23}. The distribution is typical of samples with mainly terrestrial plant debris.

It is noticeable that without exception the pristane/phytane ratio is close to one. This suggests a similar environment throughout deposition of the sequence. Shales towards the base of the Farsund Fm. (4094 - 4120 m) appear to be richer in low molecular weight n-alkanes (i.e. nC_{10} - nC_{15}) than the rest of the sequence (e.g. Figure 16 from 4099 m). This suggests that expulsion has not occurred from these shales, or that the shales are stained with low molecular weight n-alkanes, or possibly that generation of more low molecular weight hydrocarbons from partially depleted shales has occurred. Note that below this material and in the Eldfisk Fm., there is a return to the more typical "depleted" shale pattern.

Eldfisk Formation (4131 - 4185 m)

Four grey-black silty shales were analysed. The dominant hydrocarbons are n-alkanes from nC_{11} - nC_{26} with a

relatively uniform peak height from nC_{13} - nC_{22}. Isoprenoids appear to become increasingly more prominent down this sequence (and also into the Haugesund Fm.). Figure 17 shows the sample from 4184 m. It is thought that preferential expulsion of n-alkanes over isoprenoids may be partly responsible for the apparent enrichment in isoprenoids (which is also seen in some of the Farsund Fm. shales).

Haugesund Formation (4185 - 4423 m, TD)

Twenty samples were analysed from this interval. The two main hydrocarbon distributions seen in the Farsund Fm. (Figures 14 and 15), are also present in most samples from this formation. At the top of the formation and toward the base of the well, samples are similar to the Eldfisk Fm., in that isoprenoids are much more prominent relative to adjacent n-alkanes. This may be due to preferential expulsion of low molecular weight n-alkanes as previously mentioned.

PYROLYSIS - GAS CHROMATOGRAPHY

Seventy-seven samples were selected for analysis. The pyrograms are shown in the appendix. Selected pyrograms for the following discussion are shown in Figures 18 to 22.

Cretaceous (3008 - 3584 m)

Ten samples were pyrolysed. There are two main pyrogram patterns in the Cretaceous shales. Most pyrograms are typical for organic matter derived from terrestrial organic material (Figure 18). The dominant hydrocarbons of this pattern are in the C_1 - C_7 range. There is also a slight alkene-alkane homology up to C_{17} and alkyl naphthalenes between nC_{12} - nC_{17}. There is also a distinct n-alkane envelope between nC_{20} - nC_{30} with a maximum around nC_{22} - nC_{25}. This last feature is probably due to staining from migrated hydrocarbons, which is retained on the mineral matrix even after thermal extraction. The kerogen in these shales is only capable of producing gas and perhaps condensate - range hydrocarbons.

The pyrograms of the other samples from 3474 m, 3486 m and 3581 m have a more prominent alkene/alkane homology from C_2 - C_{25} and a prominent unresolved hump, which reaches a maximum at about nC_{25} (Figure 19). Aromatics such as the alkyl naphthalenes are, however, still prominent. The pyrogram pattern is typical of marine type II/III (almost type II) kerogen. These shales still show the n-alkane envelope from nC_{20} - nC_{30} derived presumably from staining of the samples by migrated hydrocarbons.

Jurassic (3584 - 4423 m, TD)

Tyne Group (3584 - 4423 m, TD)

Mandal Formation (3584 - 3676 m)

Two samples were pyrolysed. The pyrogram patterns are all very similar to the Cretaceous shales with type II/III kerogen. It is considered that these shales originally contained type II kerogens which have generated (and expelled) a significant part of their hydrocarbon potential. Figure 20 shows a typical example from this formation. The n-alkane envelope from nC_{20} - nC_{30} may be due to hydrocarbons generated from the kerogens in these shales. The large unresolved hump present in the pyrograms suggests that a major part of the oil potential is still to be produced from the kerogens in these shales.

Farsund Formation (3676 - 4131 m)

Thirty-eight samples, mainly shales, were pyrolysed. The pyrograms are very similar, in most cases, to the Mandal Fm. examples, except that the unresolved hump is much reduced in the Farsund Fm. shale pyrograms (Figure 21). This probably marks a change from type II kerogen in the Mandal Fm. to type II/III in the Farsund Fm.

Certain sections of the Farsund Fm. shales appear to be poorer quality or better quality than normal. This is indicated by the relative amounts of aromatics compared to the alkene/alkane homology and the unresolved hump. Aromatics are most abundant in the poor quality kerogens as in the shale from 3740 m (Figure 22). These samples may not have expelled any (or very little) liquid hydrocarbons. Other samples are probably contaminated with mud additive

(e.g. sample from 3770 m, with a large, high molecular weight, unresolved hump). The pyrogram of the carbonate from 3782 m is dominated by aromatics and polar compounds and C_1 - C_2 hydrocarbons and clearly has mainly gas potential. The better quality kerogens have pyrograms which most resemble the Mandal Fm. shale pyrograms. This indicates kerogen types which, before major hydrocarbon generation, were type II (particularly below 4000 m).

Eldfisk Formation (4131 - 4185 m)

The pyrogram patterns of the four analysed shales are very similar to the dominant pattern in the Farsund Fm. shales and this suggests a similar kerogen type is present in both formations.

Haugesund Formation (4185 - 4423 m)

This sequence is similar to the Eldfisk Fm. except that aromatics are, perhaps, relatively more prominent. This is probably partly due to increased maturity (and hence enhanced thermal alteration) and to a slightly poorer kerogen type than in the Eldfisk Fm.

VITRINITE REFLECTANCE ANALYSIS

Reflectance data can be found in Table 6. A depth/reflectance profile appears in Figure 23.

A total of 26 samples was analysed from the well, covering the interval 871 m to 4422 m. The upper fourteen samples are from the Tertiary section of the well. Lithologies are generally claystone, silty claystone and calcareous claystone with some limestone. Bitumen staining and liptinitic wisps are present in variable amounts throughout the Tertiary section and are high in places. Phytoclasts are present in low to trace amounts but there is generally a high proportion of vitrinite, allowing high numbers of readings to be taken. As a result of this a very regular increase in reflectance is found for this section, with values rising from approximately 0.25 % at 1000 m to approximately 0.4 % at 2900 m. Spore fluorescence colour changes from green-yellow to yellow-orange and light orange with depth over this section of the well, generally agreeing well with the maturity indicated by reflectance data, but in the lowermost Tertiary sample (2883 m) indicating a higher maturity of approximately 0.50 % Ro.

Four samples were analysed from the Cretaceous section of the well. Lithologies for all four samples are largely chalk with a small amount of calcareous claystone. No vitrinite was located in any of the samples but light orange spores were identified in the uppermost sample (3075 m), indicating a maturity equivalent to approximately 0.50 % Ro.

The lower eight samples analysed are from the Jurassic section of the well. The uppermost (3642 m) is from the Mandal Fm. and contains glauconitic claystone and sandstone and a trace of caved chalk. In the claystone, staining is moderate and liptinitic wisps are present in moderate to high amounts. Phytoclast content is low and phytoclasts are

almost entirely composed of inertinite. A reflectance value of 0.48 % was obtained from 18 readings this agrees with the observed light orange spore fluorescence colour. In U.V. light a moderate to high amount of fluorescing organic matter can be seen. This is largely bituminite and semi-amorphous material but a number of tasmanites algae are also present. With these liptinitic associations one would expect the vitrinite in this sample to have a depressed reflectance.

Four samples were analysed from the Farsund Fm.. The lithology throughout is glauconitic, silty claystone/ siltstone with some sandstone. The uppermost sample (3740 m) contains a low amount of bitumen staining and liptinitic wisps. Only a trace of phytoclasts are present and a reflectance value of 0.48 % was obtained from only 9 readings. In U.V. light a low to moderate amount of fluorescing organic matter is present, largely consisting of bituminite but also including liptodetrinite and light orange fluorescing spores. The reflectance value is exactly the same as found for the Mandal Fm. sample and appears therefore to be rather low for this depth. The second Farsund Fm. sample is much richer in organic matter, having moderate to high staining, moderate liptinitic matter, forming laminae and a low amount of phytoclasts. A good proportion of the vitrinite present is low reflecting and, excluding this material, a reflectance value of 0.49 % was obtained from 14 readings. In U.V. light a moderate to high amount of fluorescing organic matter can be seen. This is mainly composed of semi-amorphous organic matter and bituminite, but liptodetrinite, tasmanites algae and spores are also present. A large amount of fluorescing, hydrocarbon-rich fluids pass from the cuttings into the immersion oil during viewing. The presence of tasmanites algae, free hydrocarbons and the large amounts of liptinitic organic matter would be expected to depress the reflectance of vitrinite in this sample. Spores have light orange and moderate orange fluorescence colours indicating a maturity

more in the region of 0.55 % to 0.60 % Ro.

The third Farsund Fm. sample (3971 m) has low to moderate staining and contains a low to moderate amount of liptinitic material in blobs and laminae. A low to trace amount of phytoclasts is present, of which a small percentage are vitrinites. Of these vitrinites, however, the majority are low-reflecting. After much searching a reasonable amount of higher-reflecting vitrinite was found and this gave a reflectance value of 0.60 %. In U.V. light a moderate amount of fluorescing organic matter is present and this generally consists of semi-amorphous material and bituminite. Spores, again, have light orange and moderate orange fluorescence colours, agreeing well with the measured reflectance. The lowermost Farsund Fm. sample (4093 m) has a high amount of staining which is often dense and very dark and a high amount of liptinitic laminae. Only a trace of phytoclasts are present and a rather low value of 0.58 % was obtained from the higher reflecting vitrinites, low reflecting material being excluded from the measurements. In U.V. light there is a high amount of very dull intensity fluorescence, from matrix bituminite. A large amount of fluorescing hydrocarbon-rich fluids pass from the cuttings into the immersion oil, making viewing of the sample very difficult. However, a moderate amount of semi-amorphous organic matter was seen, along with a number of tasmanites remains. One would expect, from the presence of tasmanites and the high amount of liptinites and free hydrocarbons, that vitrinite in this sample would have a depressed reflectance.

The lowest three samples in the well are from the Haugesund Fm. and have silty claystone lithologies. All have high to extremely high amounts of staining and liptinitic material and generally low amounts of phytoclasts. The uppermost sample (4221 m) has a reflectance value of 0.68 %, whereas the following sample gives a value of 0.66 %, which is comparatively low and may indicate caving. The lowermost sample (4422 m) has a reflectance of 0.79 %. In U.V. light,

observation was made difficult by the high amounts of fluorescing liquids expelled from the cuttings. It was possible to see, however, that all three samples contain high amounts of bituminite and semi-amorphous organic matter and also a number of tasmanites-type algae. Thus reflectances for these three samples could also be expected to be depressed.

From the depth/reflectance profile, a very straight, linear gradient can be seen for the Tertiary section of the well. This gradient becomes more exponential below 3600 m and is also complicated by low values. Taking the higher values for the Jurassic section of the well, a smooth curve which fits well with the post-Cretaceous gradient, is obtained. From this curve the well reaches moderate maturity at approximately 2900 m, becomes mature at approximately 4000 m and is expected to reach peak oil generation at approximately 4600 m.

It must be borne in mind, however, that all Jurassic samples are very rich in liptinite and most contain tasmanites algal material. It is therefore possible that the maturity is higher than indicated by reflectance in the Jurassic section of the well.

VISUAL KEROGEN COMPOSITION

Twenty-nine samples from this well were examined in transmitted light. The samples range from 3474 m (Cretaceous) to 4422 m (Haugesund Fm.). All of the samples are shale/claystone and they are generally grey-black or brown-black. The data is plotted in figure 24.

Four samples from the Cretaceous section were examined. The data is quite varied and the samples were poor, so low confidence is attached to the results. Apart from the lowermost sample (3581 m), which is brown-black, the samples are black, dark grey and dusky yellow-brown. The concentrates were generally poor quality (especially 3474 m and 3539 m). Vitrinite is dominant in all of the samples apart from 3581 m. It varies from 40 % (at 3492 m) to 80 % (at 3539 m). In the three uppermost samples the proportions of liptinite and inertinite are approximately equal (25 % in 3474 m, 30 % in 3492 m and 10 % in 3539 m). The vitrinite is generally both detrital and amorphous whilst the liptinite content includes amorphous, detrital and spore/pollen material.

The lowermost sample (3581 m) is dominated by liptinite (60 %) with secondary vitrinite (30 %). The liptinite content is quite varied and includes algae. The sample is similar to normal Mandal Fm. samples.

A spore/colour index of 5 is tentatively suggested for this sequence. This implies moderate maturity.

Four samples from the Mandal Fm. were examined. These are grey-black claystones, typical for this formation. Apart from the sample from 3630 m which appears to contain about 50 % vitrinite, the samples are dominated by liptinite. The liptinite content ranges from 30 % at 3630 m to 65 % at 3612 m and generally contains detrital, amorphous, spore/

pollen and some algal material. The vitrinite content ranges from 25 % at 3612 m to 50 % at 3630 m and includes both detrital and amorphous material. The inertinite content is 10 % in all samples apart from 3630 m where it is 20 %. The SCI values for this sequence average around 5.5 (moderate mature).

Eleven samples from the Farsund Fm. were examined. The samples were generally grey-black or grey-black and brown-black and dark grey claystones. The compositions are quite varied but apart from in the sample from 3715 m, which is dominantly liptinite (50 %) and the samples from 3893 m and 4130 m (which contain equal amounts of liptinite and vitrinite - 40 %), the samples are dominantly vitrinite. No determination was possible for the sample from 3770 m. The vitrinite contents range from 35 % (3715 m) to 90 % (4099 m) but are generally in the range 40 - 55 %. The vitrinite contains both detrital and amorphous material throughout. The liptinite contents range from 5 % (4099 m) to 50 % (3715 m) but are generally 25 - 40 %. The samples generally contain both detrital and spore/pollen material, but amorphous material and algae are occasionally observed. The inertinite content ranges from 5 % (4099 m) to 30 % (3965 m and 4047 m) but is generally 20 or 30 %. The maturity appears to be SCI 5.5 at the top of the section but possibly 5.5 - 6.0 at the base. The samples do not appear to be as oil prone as the Mandal Fm. samples but some element of caving can not be discounted.

Three samples from the Eldfisk Fm. were examined. Vitrinite is the dominant component in these sample (mainly amorphous but also detrital) and ranges from 45 % (in both 4142 m and 4172 m) to 60 % (in 4184 m). The liptinite content is 30 % in the two uppermost samples (4142 m and 4172 m) and 20 % in the sample from 4184 m and includes both detrital and spore/pollen material with amorphous material also present at 4184 m. The inertinite content is 25 % in the two uppermost samples and 20 % in the lower sample, comprising

inertodetrinite and semi-fusinite in all three. The SCI appears to be around 6 - 6.5 which suggests early oil window maturity.

Seven samples from the Haugesund Fm. were examined. Apart from the sample from 4340 m, for which no determination was possible, all of the claystones analysed are grey-black and brown-black. Vitrinite is dominant throughout (55 % at 4264 m to 75 % at 4422 m) and mainly detrital and amorphous. There is a general decrease in the proportion of liptinite with depth from 30 % at 4221 m to 5 % at 4422 m. In the uppermost four samples liptinite is more abundant than inertinite but in the lowermost two samples the reverse is true. The liptinite component is mainly liptodetrinite and spore/pollen material but amorphinite L is also observed. Spore colour indices are generally 6.5 which suggests a maturity with the oil window approaching peak oil generation for type II kerogen.

GAS CHROMATOGRAPHY - MASS SPECTROMETRY

Eight samples, one from the Cretaceous, one from the Mandal Fm., four from the Farsund Fm. and two from the Haugesund Fm., in this well, were analysed.

Saturated Hydrocarbons

Terpanes

The M/Z 163 fragmentograms show that the triterpane signals are more abundant than the sterane signals. Of these, the C_{30} αβ hopane has the largest peak. Of the steranes the rearranged steranes are the most abundant. There are only small differences between the samples, except for the samples from the Haugesund Fm. which show a larger relative abundance of the steranes as compared to the triterpanes. The M/Z 177 fragmentograms mainly show the C_{29} αβ hopane. The C_{29} αβ hopane and C_{30} αβ hopane are also clearly recognized, whilst in most of the samples the steranes are only minor components. The M/Z 198 fragmentograms show a strong resemblance between the different samples with mainly pentacyclic triterpanes and only minor peaks from the tricyclic components. The 17 α trisnorhopane and 18 α trisnorneohopane have approximately equal peak height for all the samples, giving a T_M/T_S ratio of 1. The only real difference between the eight samples is a larger relative abundance of C_{29} αβ hopane in the sample from 3783 m in the Farsund Fm. compared with the other samples. The M/Z 205 fragmentograms mainly show C30 αβ hopane and the C_{31} components. Again, there is only minor variation between the different samples.

The M/Z 384 fragmentograms show a small amount of bisnorhopane in all the samples. Apart from this, the

different fragmentograms of the molecular ions verify what has been discussed above.

Steranes

The M/Z 149 fragmentograms show some differences between the analysed samples. The sample from the Cretaceous interval, 3577 m, mainly shows a large peak with a retention time of approximately 28 minutes, whilst the C_{27} - C_{29} steranes have only minor peaks. In the sample from the Mandal Fm., 3618 m, the triterpane peaks are the largest peaks. Of the steranes the C_{27} rearranged steranes are the largest peaks. The samples from the Farsund and Haugesund Fms. vary only slightly. The M/Z 189 fragmentograms show that the C_{27} rearranged steranes are the largest components for all the analysed samples. There are only minor variations for the analysed samples. The same is also found for the M/Z 259 fragmentograms for the rearranged steranes. The M/Z 217 and M/Z 218 fragmentograms show a large variation in the relative abundance of the C_{21} and C_{22} steranes. There is no regularity in this variation. The signals of the C_{27} - C_{29} steranes also vary significantly for the different samples. The Cretaceous sample shows that the C_{27} rearranged steranes are the most abundant, whilst the Mandal Fm. sample and the uppermost Farsund Fm. sample, 3783 m, show the C_{29} regular steranes to be most abundant. These samples also have the lowest abundance of C_{21} and C_{22} steranes. The large C_{29} sterane peaks indicate that these samples have a large input of terrestrial material. The rest of the Farsund Fm. samples and the Haugesund Fm. samples, again, show that the C_{27} rearranged steranes are the largest peak. The patterns for these samples are not very different for the Cretaceous sample. The fragmentograms of the molecular ions verify what has been discussed above, i.e. a larger percentage of regular steranes in the Mandal Fm. sample and the uppermost sample in the Farsund Fm. and a large abundance of the C_{29} regular steranes in particularly the Mandal Fm. samples.

Aromatic Hydrocarbons

Alkyl Benzenes

The M/Z 106 fragmentograms show the typical series of doublets together with a single peak with a retention time of approximately 41 minutes. This peak is of moderate height in the Mandal Fm. sample. The peak is far larger for the uppermost sample in the Farsund Fm. and shows a decrease with increasing depth for the Farsund Fm. and Haugesund Fm. samples. The M/Z 134 fragmentograms show only a large abundance of peaks which can not be separated from the background noise for most of the samples. In the Farsund Fm. samples the peaks are more distinctive and two groups of peaks can be identified. There is some variation between these two groups for the different samples, but due to the uncertainties discussed above, further discussion is not undertaken.

Naphthalenes

The M/Z 142 fragmentograms show some effects from evaporation on the methyl naphthalenes and these are not discussed further. The M/Z 156 fragmentograms for the C_2 naphthalenes only show minor variation for the analysed samples, whilst the M/Z 170 fragmentograms for the C_3 naphthalenes show a strong variation, especially in the relative abundance of the single peak with a retention time of approximately 22.5 minutes. This is minor for the sample from the Mandal Fm., but one of the largest peaks in the uppermost analysed sample in the Farsund Fm., 3618 m. The relative abundance decreases with increasing depth for the Farsund Fm. and Haugesund Fm. samples.

Phenanthrenes

The M/Z 178 fragmentograms show the single peak for phenanthrene for all the analysed samples, whilst the M/Z 192 fragmentograms show the two doublets for methyl phenanthrenes. The 3+2 methyl phenanthrene doublet has an abundance of approximately 60 % of the 1+9 methyl phenanthrene doublet. There are only minor variations for the analysed samples. The M/Z 206 fragmentograms show only minor variation for the C_2 phenanthrenes in the analysed samples, whilst the M/Z 220 fragmentograms for the C_3 phenanthrenes show significant variations. The single peak with a retention time of approximately 35.5 minutes is only a minor peak in the Mandal Fm. sample, whilst it is the largest peak in the uppermost analysed sample in the Farsund Fm., 3618 m. The intensity of this peak decreases with increasing depth for the Farsund and Haugesund Fms. samples.

Dibenzothiophenes

The M/Z 198 fragmentograms show some variation for the different samples. All of them show the triplet for the methyl dibenzothiophenes, with 4 methyl dibenzothiophene as the smallest peak. This is clearly seen for the Mandal Fm. sample, whilst the uppermost analysed Farsund Fm. sample shows that an unknown peak with a retention time of approximately 25 minutes dominates the fragmentograms. The methyl dibenzothiophene peaks are only minor. The other samples from the Farsund Fm. show a "shoulder" on the 1 methyl dibenzothiophene peak. This decreases with increasing depth for the Farsund Fm. and it is not registered for the Haugesund Fm. samples. The M/Z 212 fragmentograms for the C_2 dibenzothiophenes show some variation in the relative peak height for some of the peaks. The variation is not regular and therefore not discussed any further.

Aromatic Steranes

The M/Z 231 fragmentograms for the triaromatic steranes show that the C_{20} and C_{21} components have the largest peaks in the Mandal Fm. sample, whilst they are minor peaks for the Farsund Fm. samples. This is normally maturity related and would indicate that the hydrocarbons in the Mandal Fm. samples have a higher maturity than the Farsund Fm. samples. The uppermost sample in the Haugesund Fm., 4111 m, again shows that the C_{20} and C_{21} components have the largest peaks, whilst the rest of the Haugesund Fm. shows similar intensities to the Farsund Fm. samples. The C_{26} - C_{28} pattern is fairly similar for all the analysed samples. The M/Z 253 fragmentograms, representing the monoaromatic steranes, show that the C_{21} and C_{22} components have the largest peaks for the Mandal Fm. samples, whilst the abundance is far lower for the Farsund Fm. and Haugesund Fm. samples, except for the sample from 4111 m in the Haugesund Fm.. This is in good agreement with the triaromatic sterane data. The C_{27} - C_{28} components show similar patterns for the analysed samples. The sample from 3618 m in the Farsund Fm. is difficult to evaluate due to a peak with a retention time of approximately 34 minutes which completely dominates the fragmentograms.

CONCLUSIONS

Based on the various analyses undertaken on the samples from this well, the following conclusions were made:

1. Source Rock Potential

Cretaceous (3008 - 3584 m)

Only samples below 3395 m were analysed. In this interval carbonates and shales have mainly poor to fair gas (and minor condensate) potential. Two exceptions to this are in the interval from 3468 - 3492 m and a single sample interval directly overlying the Jurassic Mandal Fm. The shales in these intervals have type II/III kerogens which have yielded a substantial amount of liquid hydrocarbons. They still have a good-rich potential for oil and gas. All the samples in the Cretaceous are considered to be stained with migrated hydrocarbons probably from mature Jurassic shales as in this well.

Jurassic (3584 - 4423 m, TD)

Tyne Group (3584 - 4423 m, TD)

Mandal Formation (3584 - 3876 m)

The brow-black and grey-black shales in this formation have type II/III kerogen based on Rock-Eval data. Substantial liquid hydrocarbon generation has occurred so that originally kerogens were probably type II. The shales still have a good-rich potential for oil and gas.

Farsund Formation (3676 - 4131 m)

This formation consists mainly of grey-black and dark grey shales with minor thin carbonate beds. The shales have lower TOC contents than the Mandal Fm. shales and have kerogen type II/III with a fair to good gas and condensate potential. It is considered that a substantial amount of liquid hydrocarbons has already been generated. Before thermal degradation, the kerogens were probably mainly type II/III, but some beds of shale with type II (below 4000 m in particular) and type III, were also present.

Carbonates have type III kerogen with a poor-fair gas potential.

Eldfisk Formation (4131 - 4185 m)

This formation is similar in kerogen type and richness to the Farsund Fm. and hence has fair to good gas/condensate potential.

Haugesund Formation (4185 - 4423 m)

This formation is similar in richness and kerogen type to the Farsund Fm., perhaps overall slightly richer.

2. Generation and Migration

The analysed Cretaceous (below 3400 m) and Jurassic shales have generated a substantial part of their liquid hydrocarbon potential. The whole sequence of shales from 3400 - 4423 m is stained by migrated hydrocarbons and in part by hydrocarbons from mud additives. Some sections of the shales adjacent to the more permeable sequences, e.g. silty and sandy shales in the Mandal and Eldfisk Fms. appear

to be partly depleted in hydrocarbons, particularly low molecular weight hydrocarbons less than nC_{15}.

Hydrocarbons in the shales are typically front end - biased with a "shoulder" of n-alkanes from nC_{20}- nC_{30}. Aromatic hydrocarbons are dominated by alkyl naphthalenes and phenanthrenes. Low pristane/phytane values (~ 1) and 3+2/1 MDBT (methyldibenzothiophene) ratios less than 1, indicate that the shales throughout the Jurassic were deposited in highly anoxic environments.

3. Maturity

The estimated maturity range of the analysed sequence in this well is, early to late mature, i.e. 0.6 % to 0.9 % Ro.

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Figure: 1

Client: VARIOUS

TOC Data for Well NOCS 2/7–15

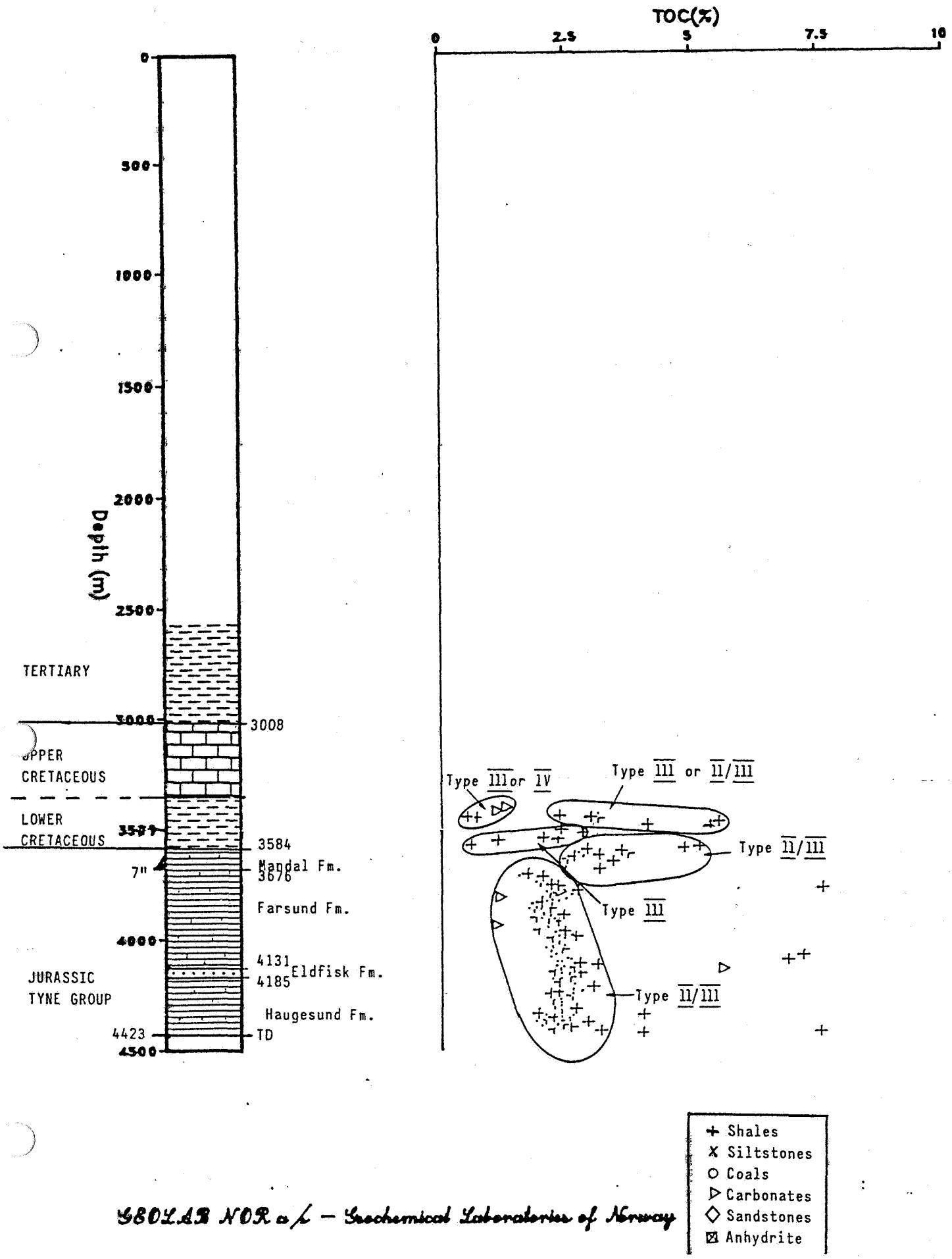

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Figure: 2

Client: VARIOUS

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Production Index Data for Well NOCS 2/7-15

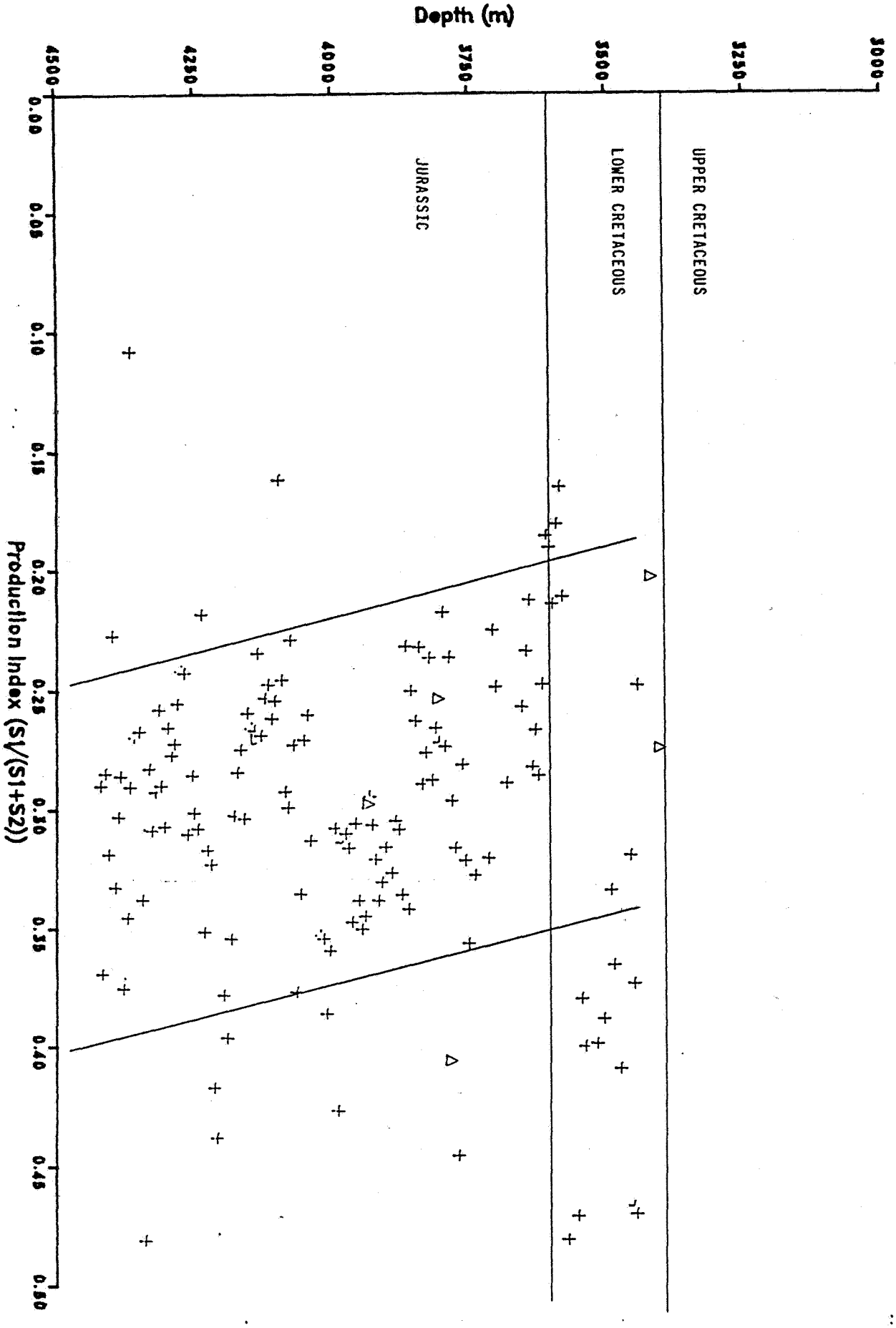

Figure: 3

Client: VARIOUS

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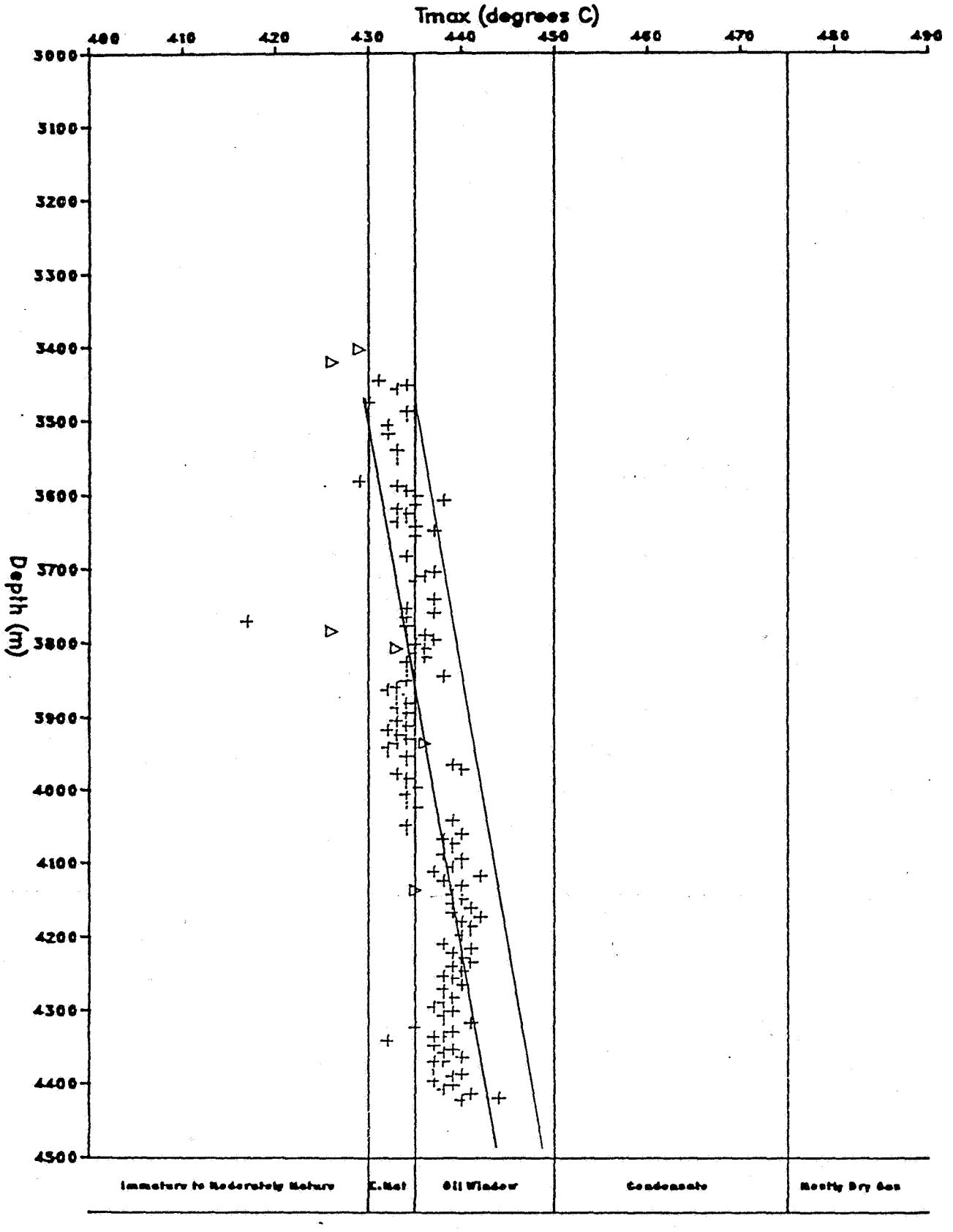
Tmax Data for Well NOCS 2/7–15



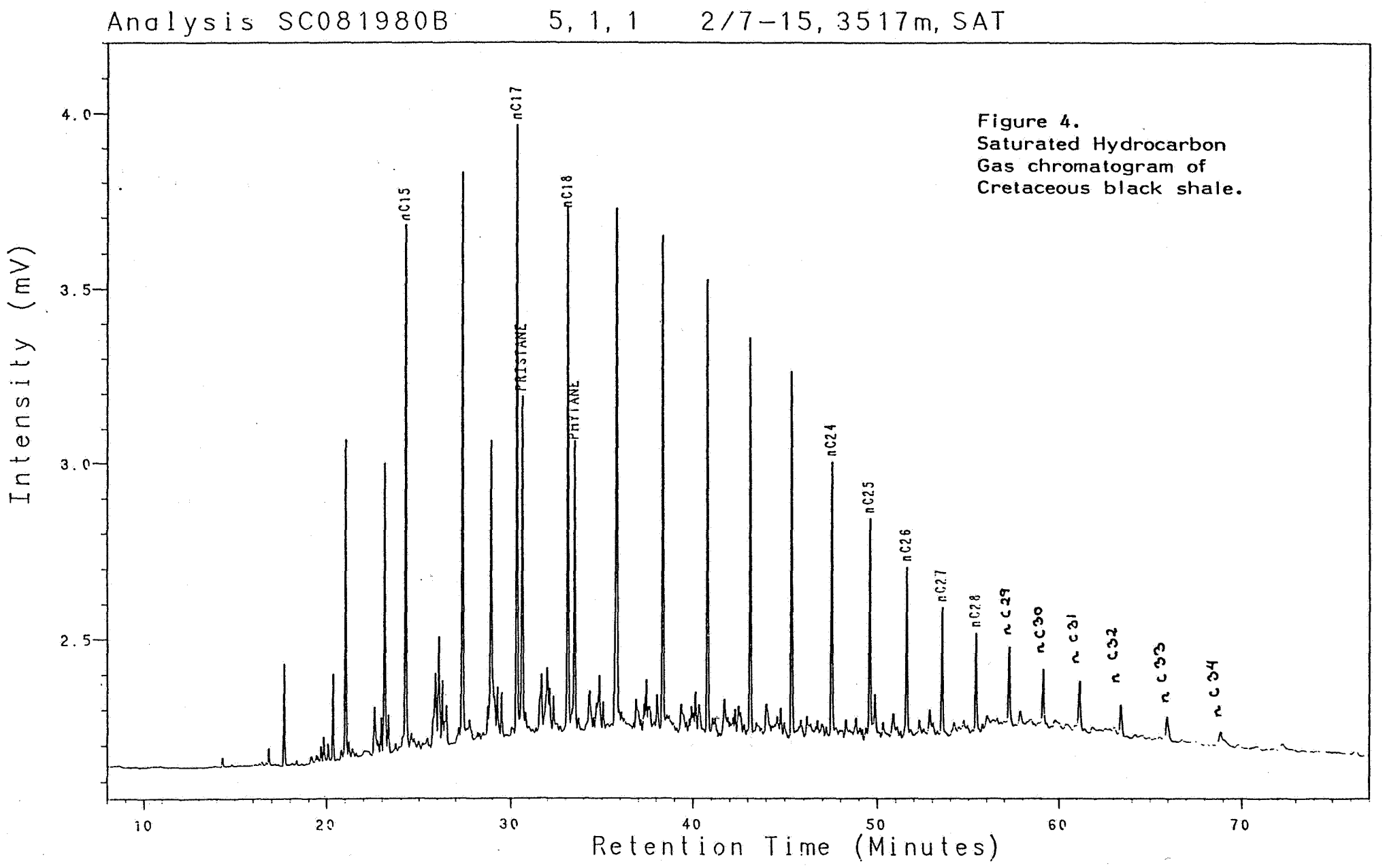


Figure 4.
Saturated Hydrocarbon
Gas chromatogram of
Cretaceous black shale.

NOCS 2/7-15 3505-17m
SATURATED GC
CLS: drk gy, dsk y brn

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Analysis SC081820B 5, 1, 1 2/7-15, 3593-3618m, SA

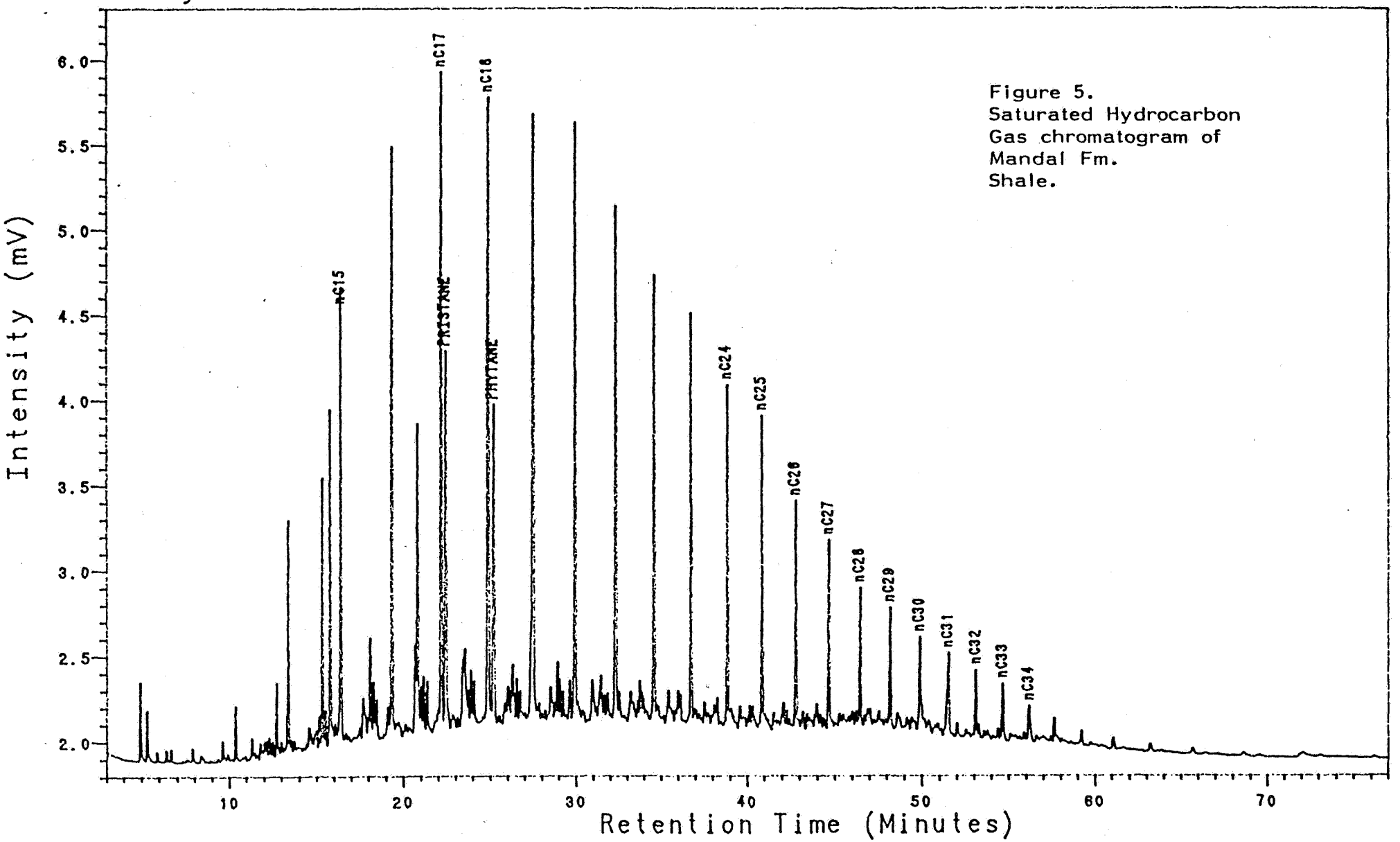

Figure 5.
Saturated Hydrocarbon
Gas chromatogram of
Mandal Fm.
Shale.

NOCS 2/7-15 3593-3618m
SATURATED GC
CLS: gy blk, brn blk

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Analysis SA2433893 5, 1, 1 2/7-15, 3874-93m, SA

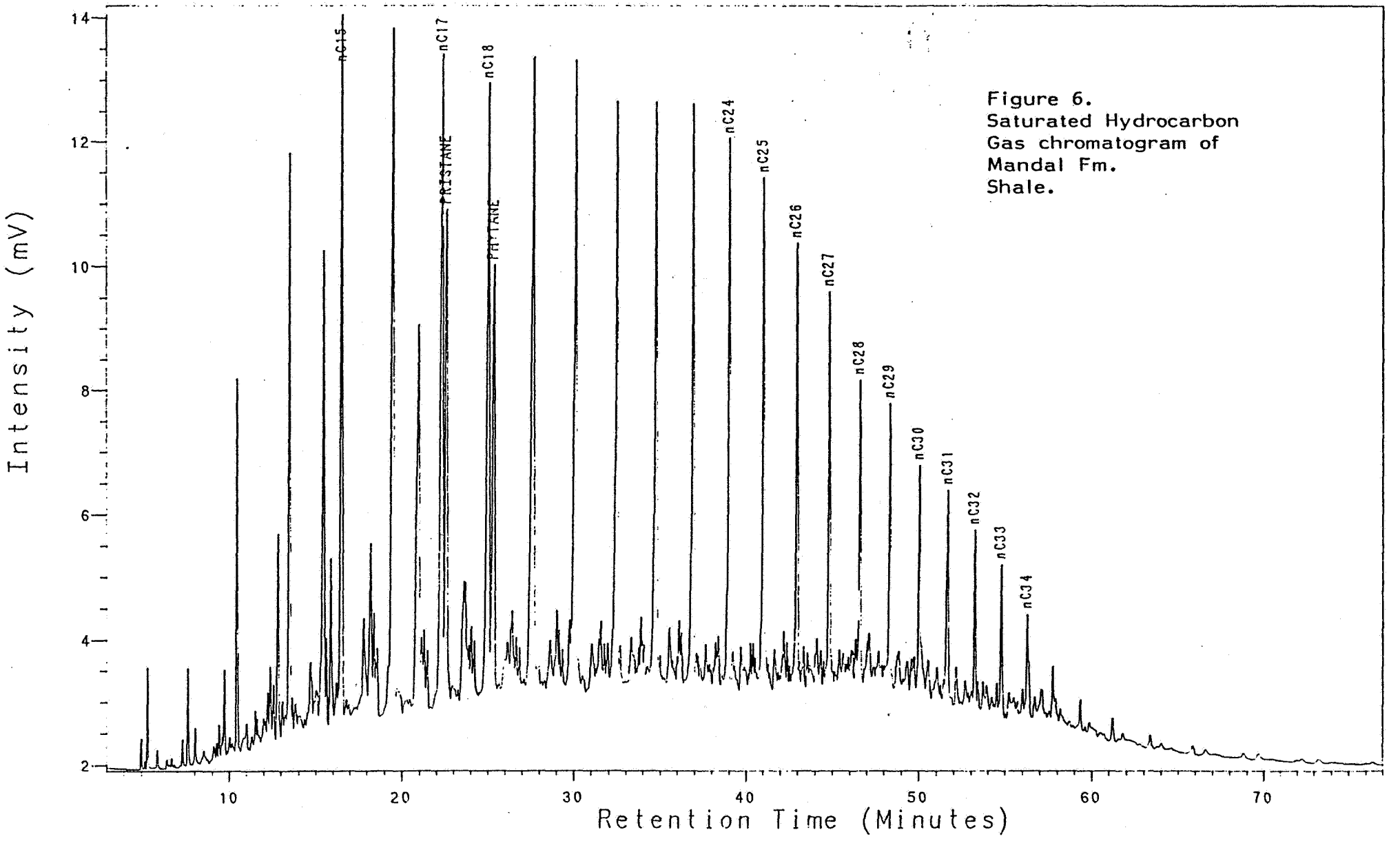

Figure 6.
Saturated Hydrocarbon
Gas chromatogram of
Mandal Fm.
Shale.

NOCS 2/7-15 3874-93m
SATURATED GC
CLS: gy blk, brn blk

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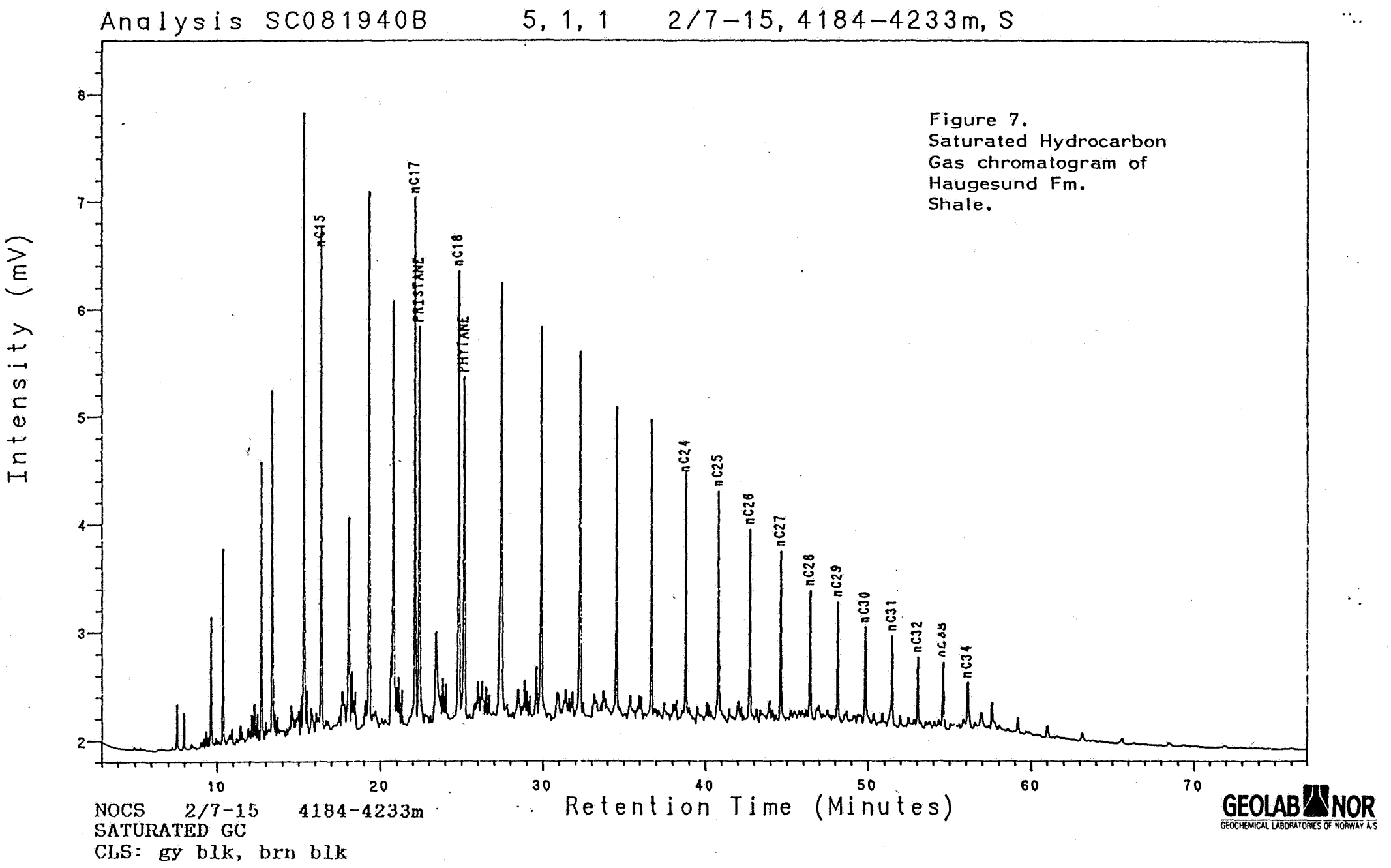

Figure 7.
Saturated Hydrocarbon
Gas chromatogram of
Haugesund Fm.
Shale.

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Analysis AC081970B 8, 1, 1 2/7-15, 3492m, ARO

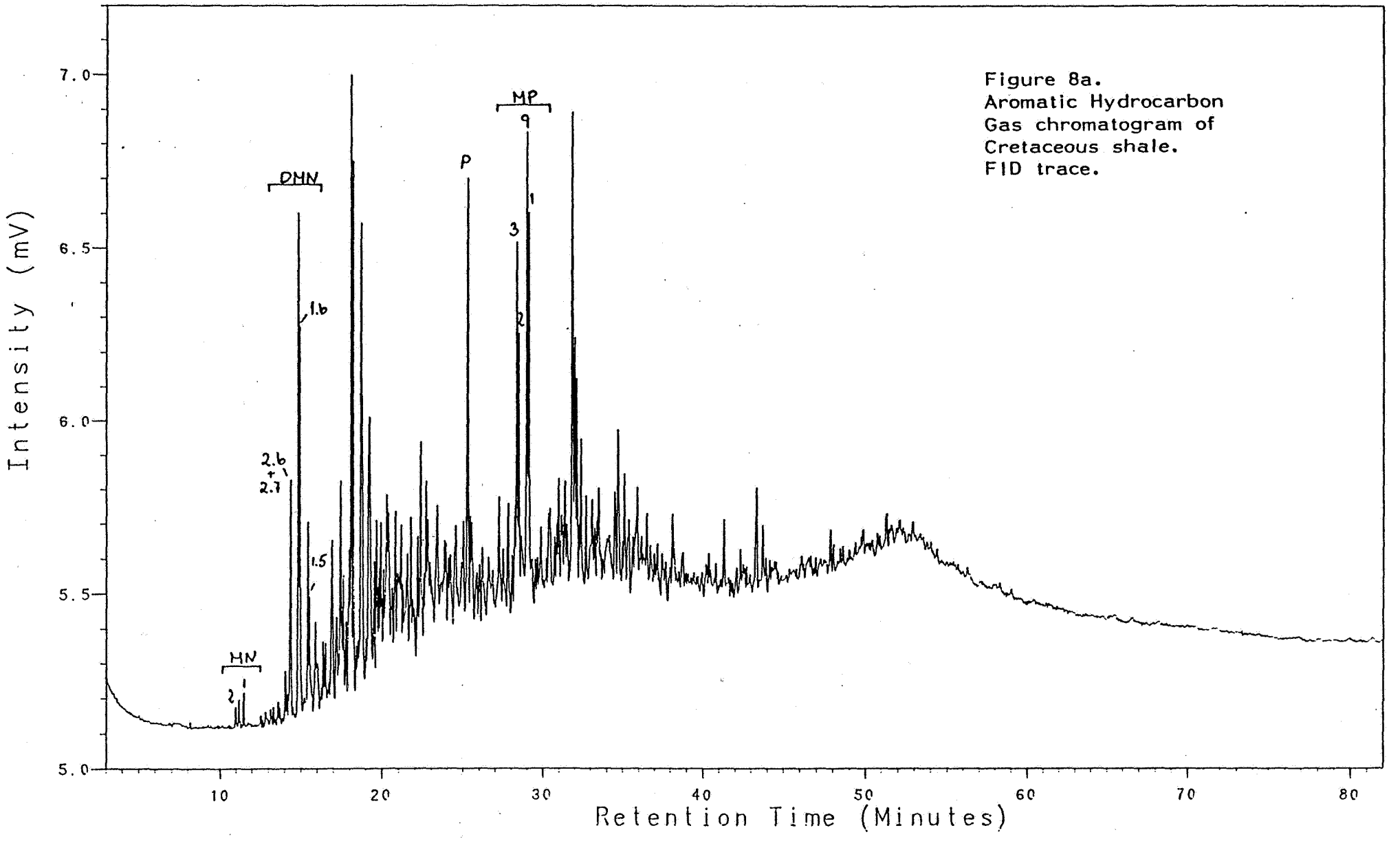

Figure 8a.
Aromatic Hydrocarbon
Gas chromatogram of
Cretaceous shale.
FID trace.

NOCS 2/7-15 3474-92m
AROMATIC GC (FID)
CLS: blk, drk gy, dsk y brn

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Analysis AC081970B 9, 1, 1 2/7-15, 3492m, ARO

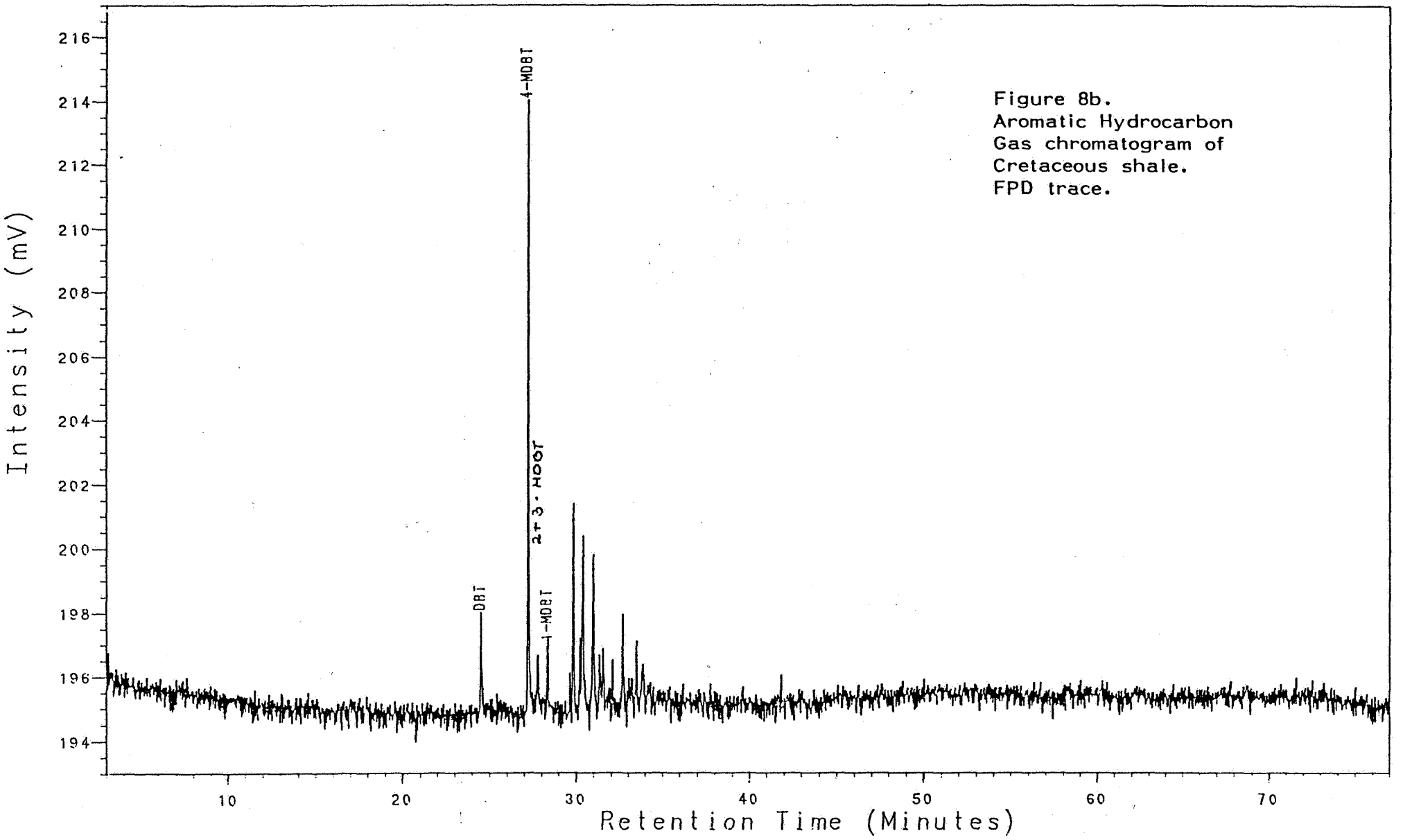

Figure 8b.
Aromatic Hydrocarbon
Gas chromatogram of
Cretaceous shale.
FPD trace.

NOCS 2/7-15 3474-92m
AROMATIC GC (FPD)
CLS: blk, drk gy, dsk y brn

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Analysis AR2433990 8, 1, 1 2/7-15, 3941-90m, ARO

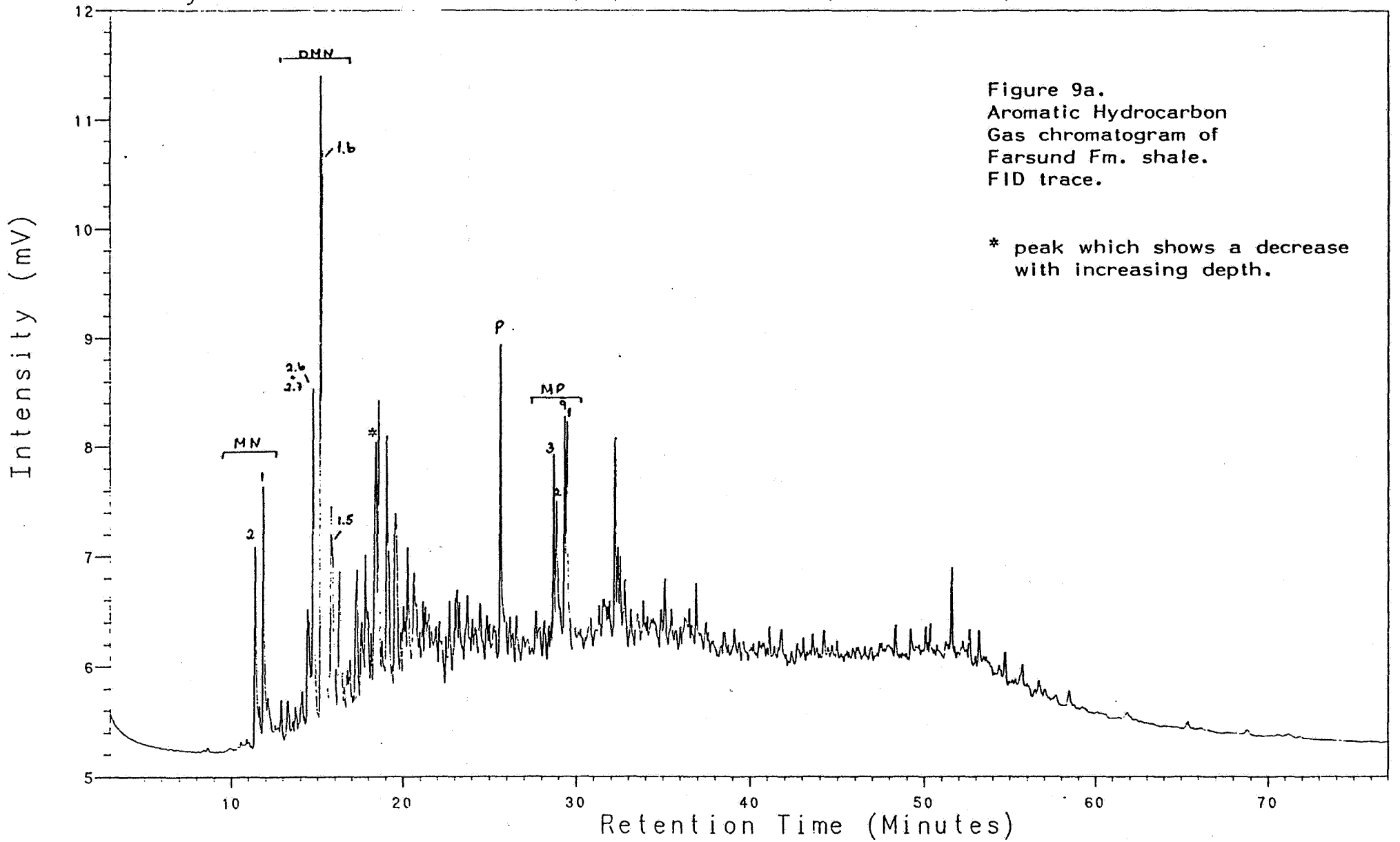

Figure 9a.
Aromatic Hydrocarbon
Gas chromatogram of
Farsund Fm. shale.
FID trace.

* peak which shows a decrease with increasing depth.

NOCS 2/7-15 3941-90m
AROMATIC GC (FID)
CLS: gy blk, brn blk, drk gy to m
drk gy

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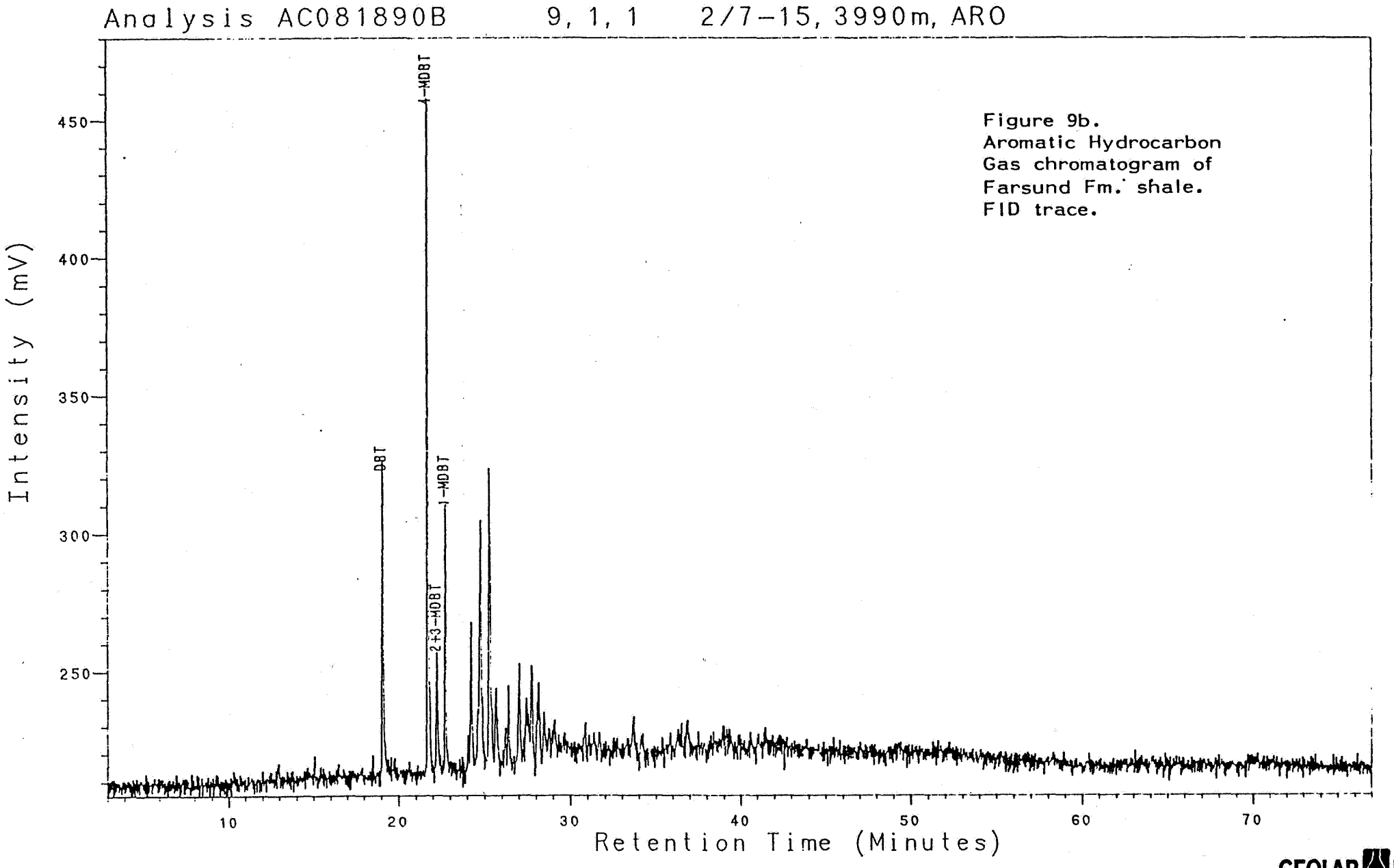

Figure 9b.
Aromatic Hydrocarbon
Gas chromatogram of
Farsund Fm. shale.
FID trace.

NOCS 2/7-15 3941-90m
AROMATIC GC (FPD)
CLS: gy blk, brn blk, drk gy to m

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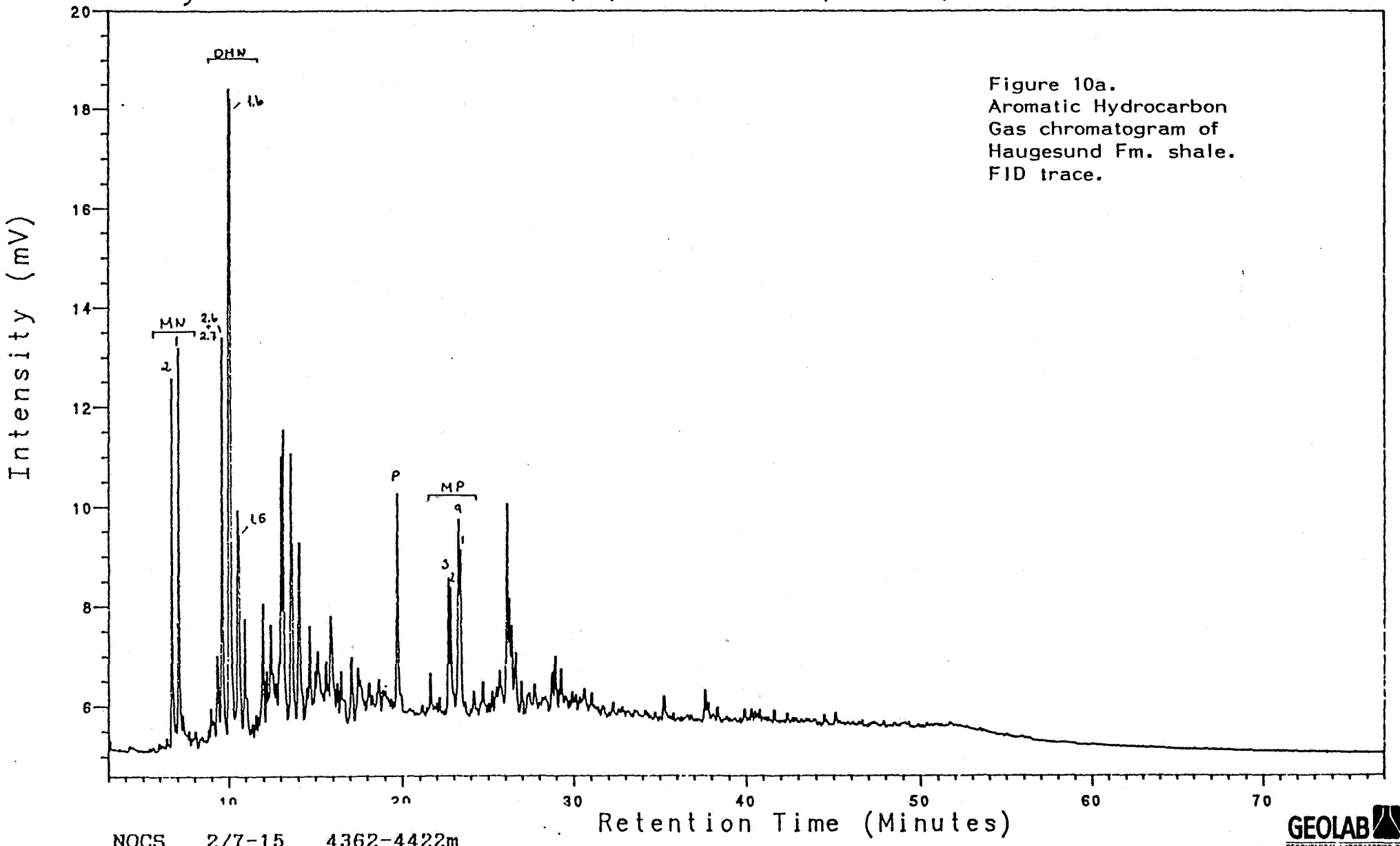

Figure 10a.
Aromatic Hydrocarbon
Gas chromatogram of
Haugesund Fm. shale.
FID trace.

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

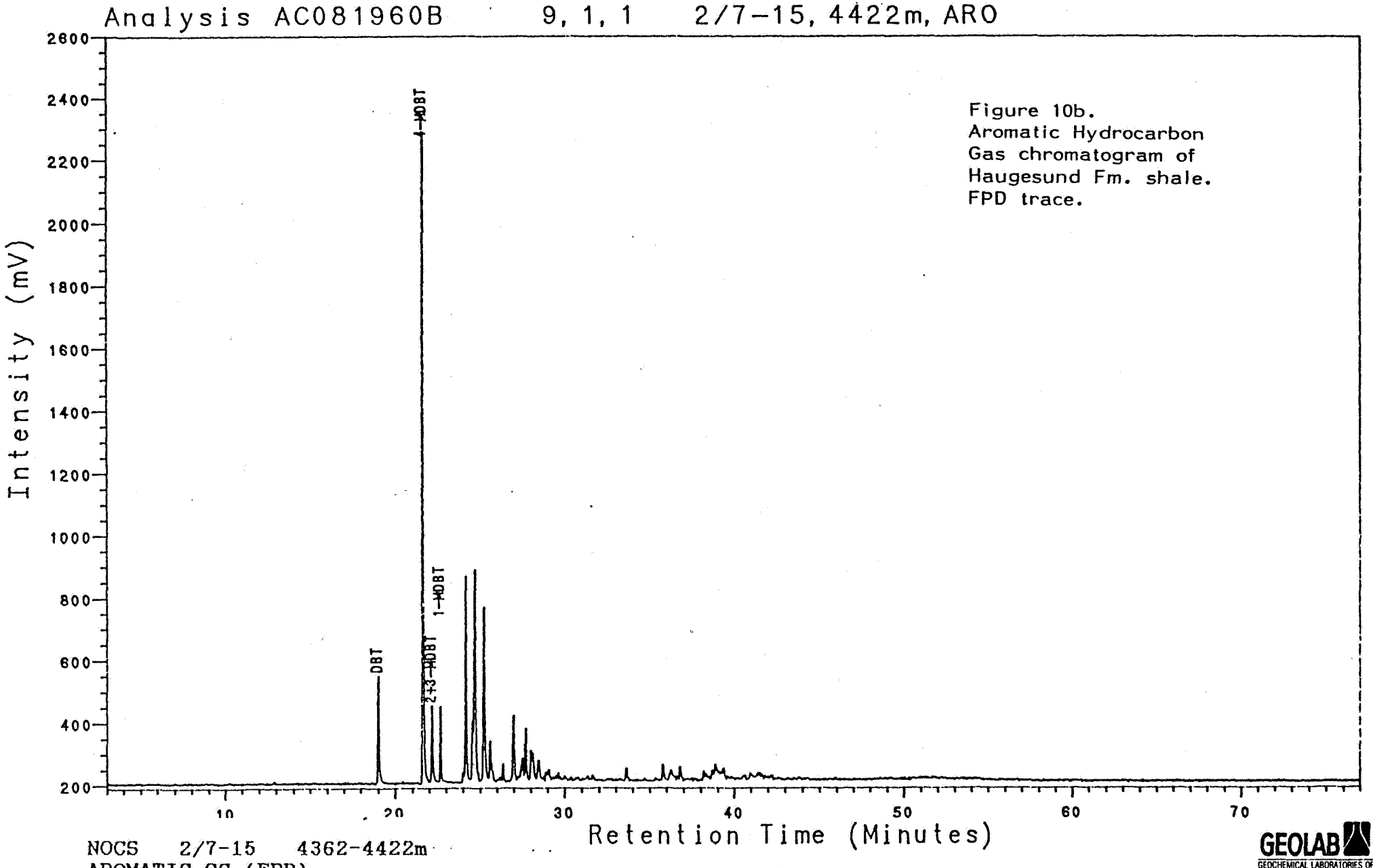

Figure 10b.
Aromatic Hydrocarbon
Gas chromatogram of
Haugesund Fm. shale.
FPD trace.

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

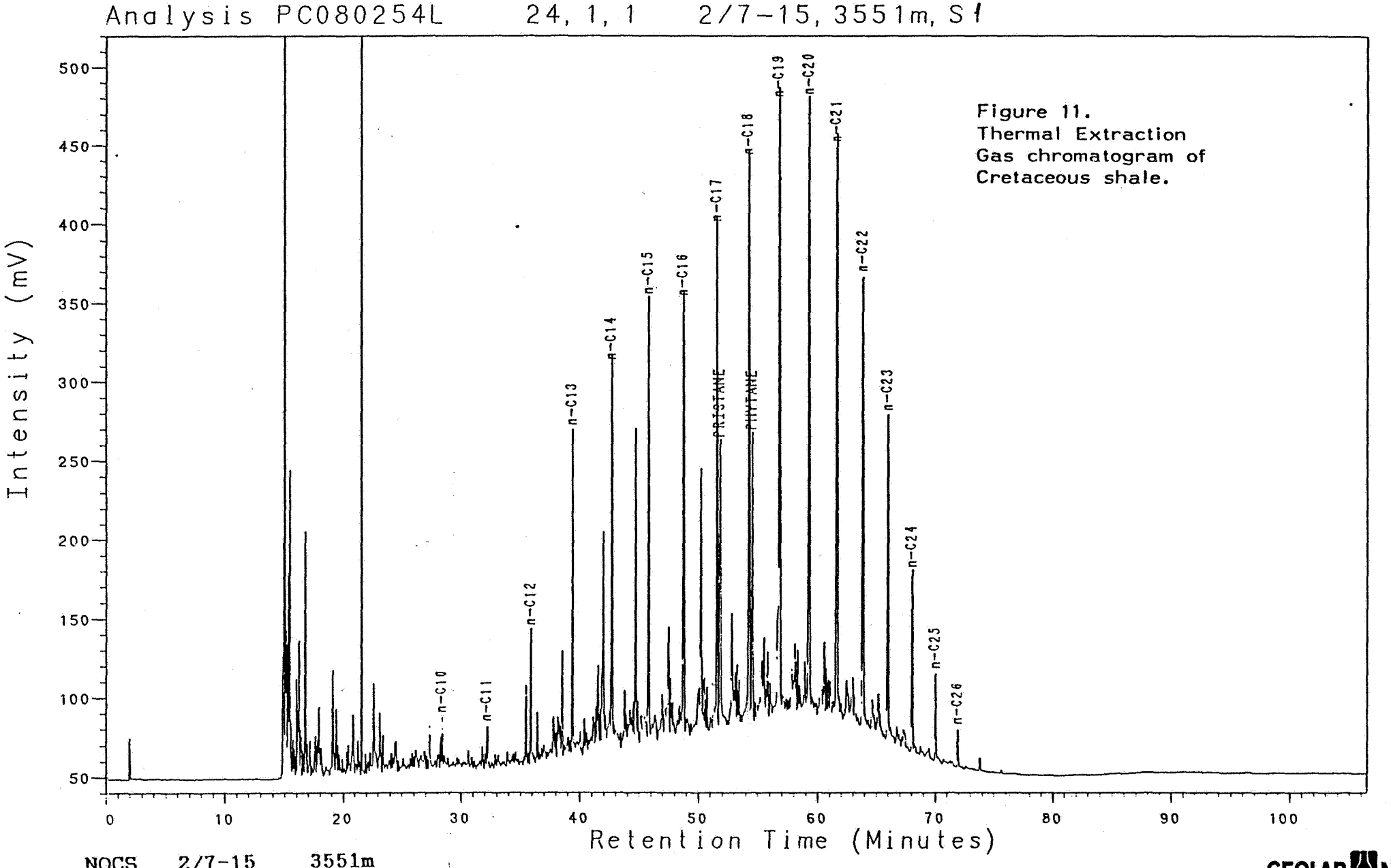

Figure 11.
Thermal Extraction
Gas chromatogram of
Cretaceous shale.

NOCS 2/7-15 3551m
THERMAL EXTRACTION GC (S1)
CLST:dsk y brn

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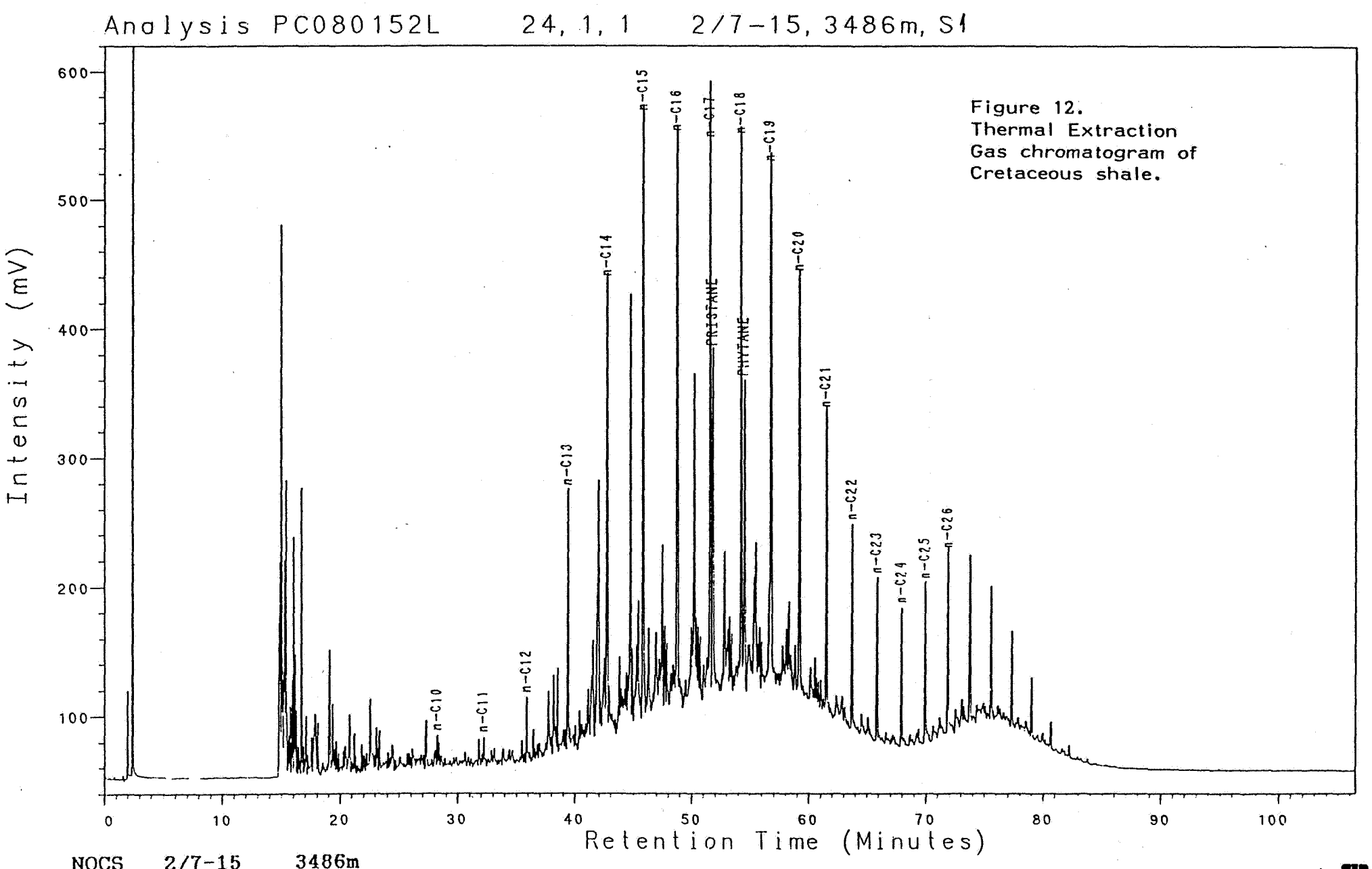

Figure 12.
Thermal Extraction
Gas chromatogram of
Cretaceous shale.

NOCS 2/7-15 3486m
THERMAL EXTRACTION GC (S1)
CLST:blk, drk gy, dsk y brn

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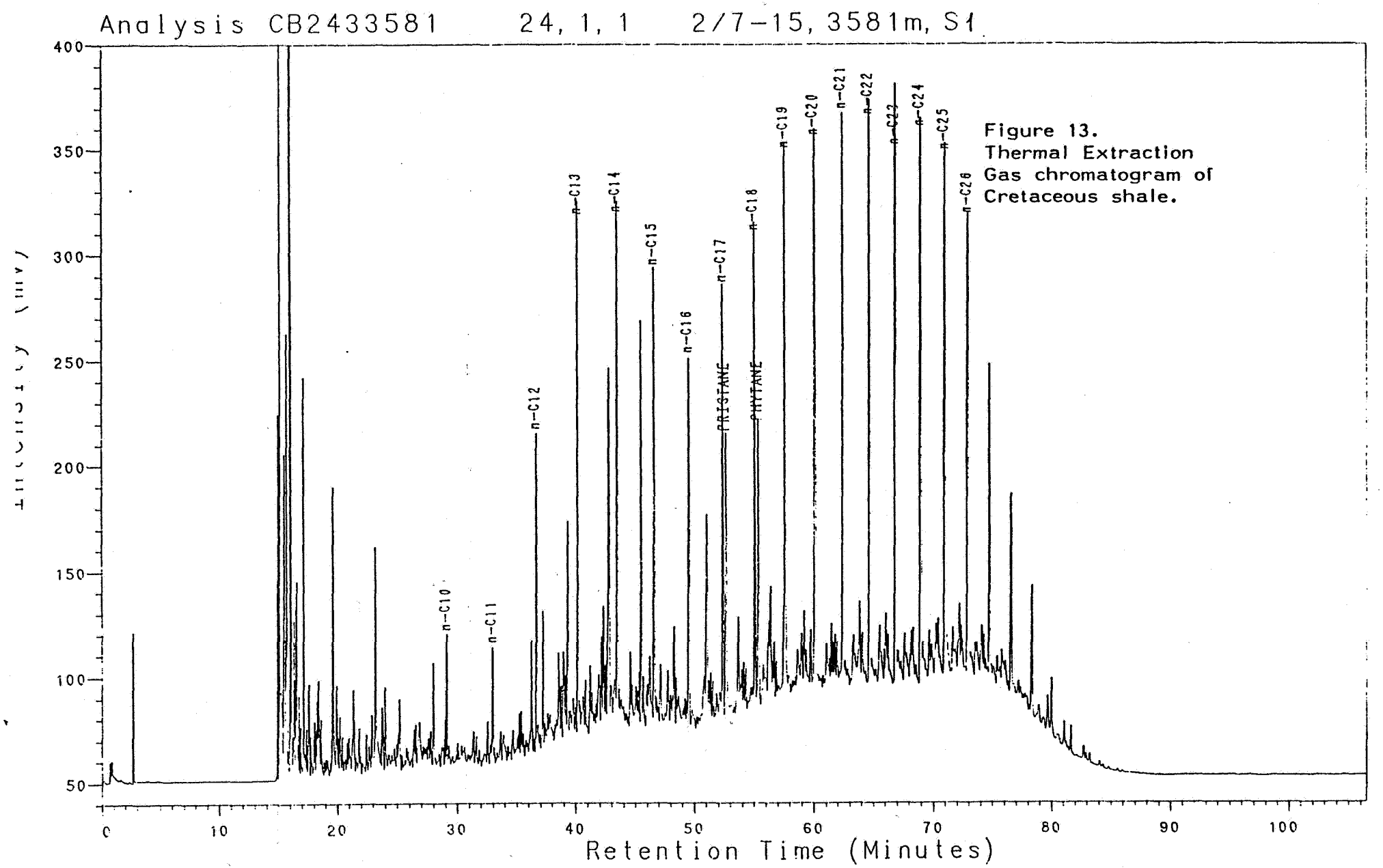

Figure 13.
Thermal Extraction
Gas chromatogram of
Cretaceous shale.

NOCS 2/7-15 3581m
THERMAL EXTRACTION GC (S1)
CLST:brn blk

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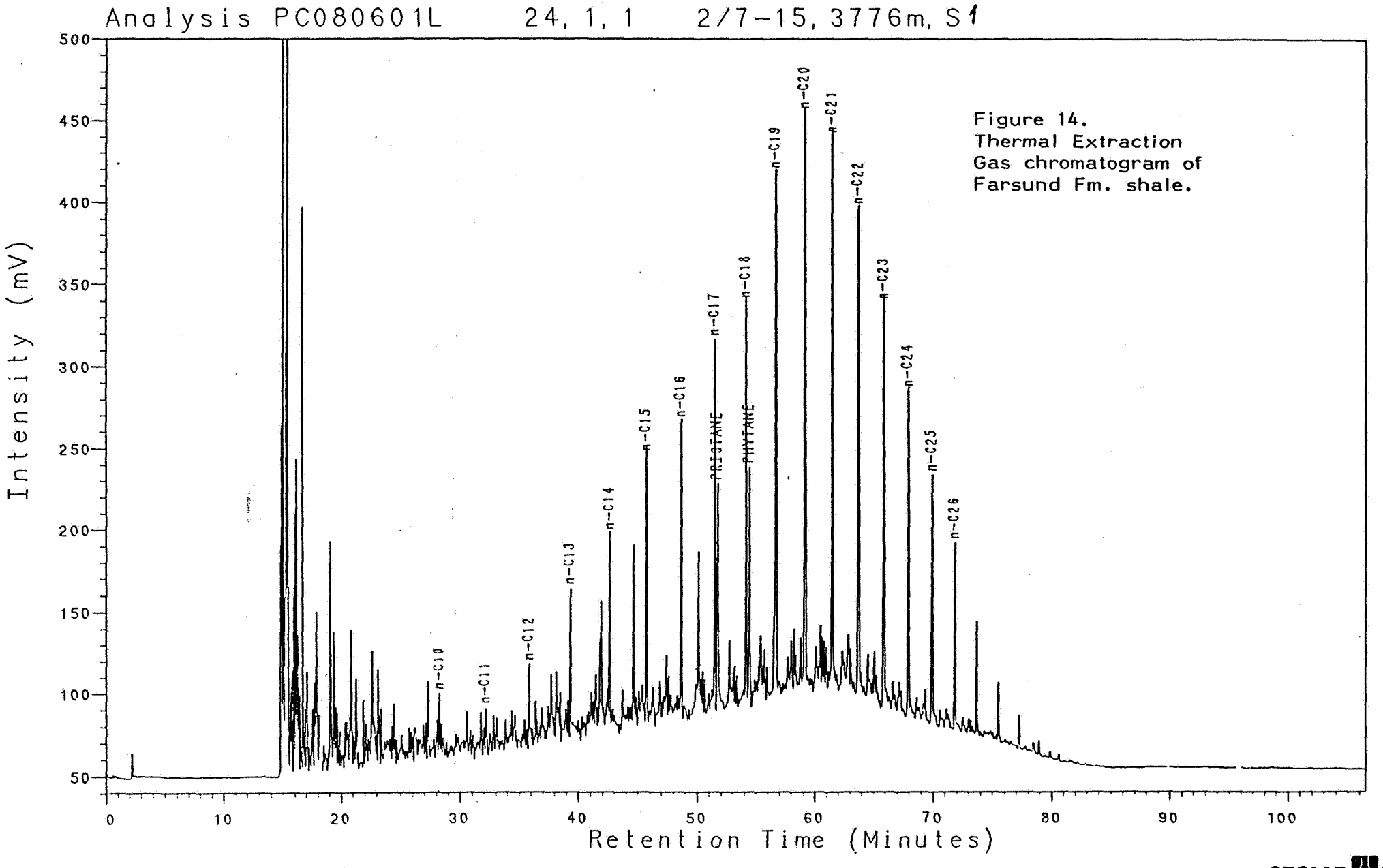

Figure 14.
Thermal Extraction
Gas chromatogram of
Farsund Fm. shale.

NOCS 2/7-15 3776m
THERMAL EXTRACTION GC (S1)
CLST: gy blk, drk gy to m drk gy

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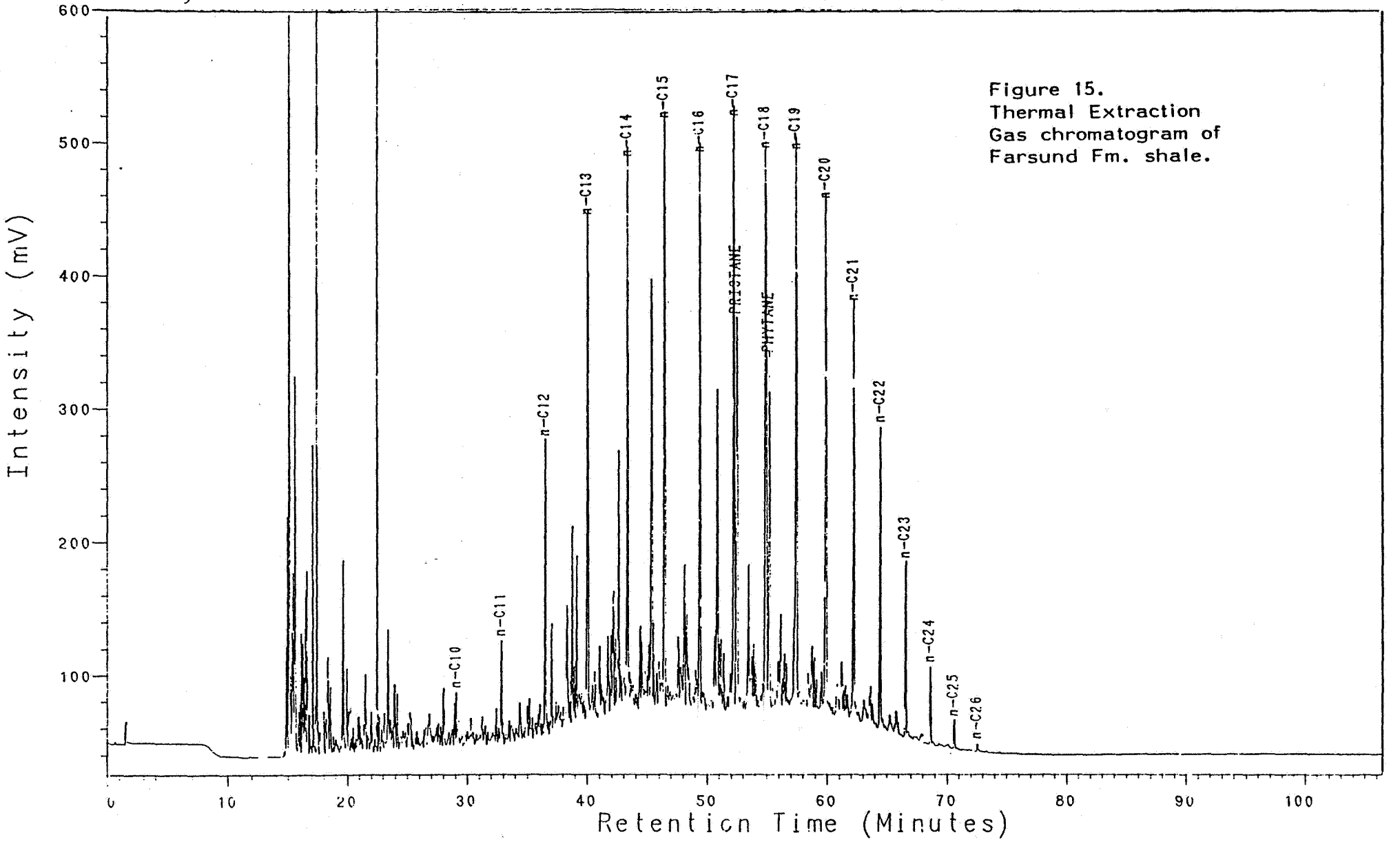

Figure 15.
Thermal Extraction
Gas chromatogram of
Farsund Fm. shale.

NOCS 2/7-15 3831m
THERMAL EXTRACTION GC (S1)
CLST:gy blk,drk gy to m drk gy

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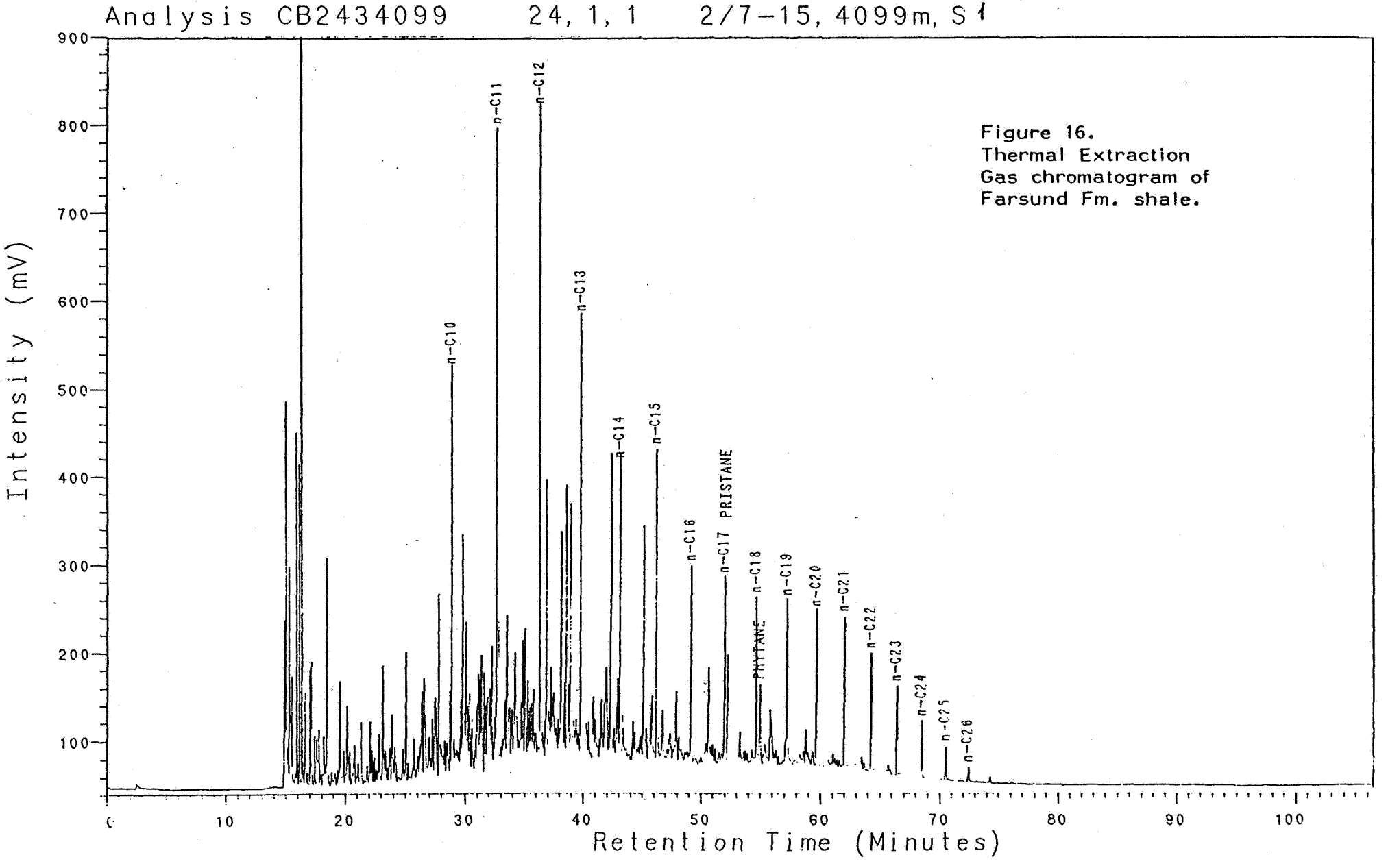

Figure 16.
Thermal Extraction
Gas chromatogram of
Farsund Fm. shale.

NOCS 2/7-15 4099m
THERMAL EXTRACTION GC (S1)
CLST: gy blk, m gy blk

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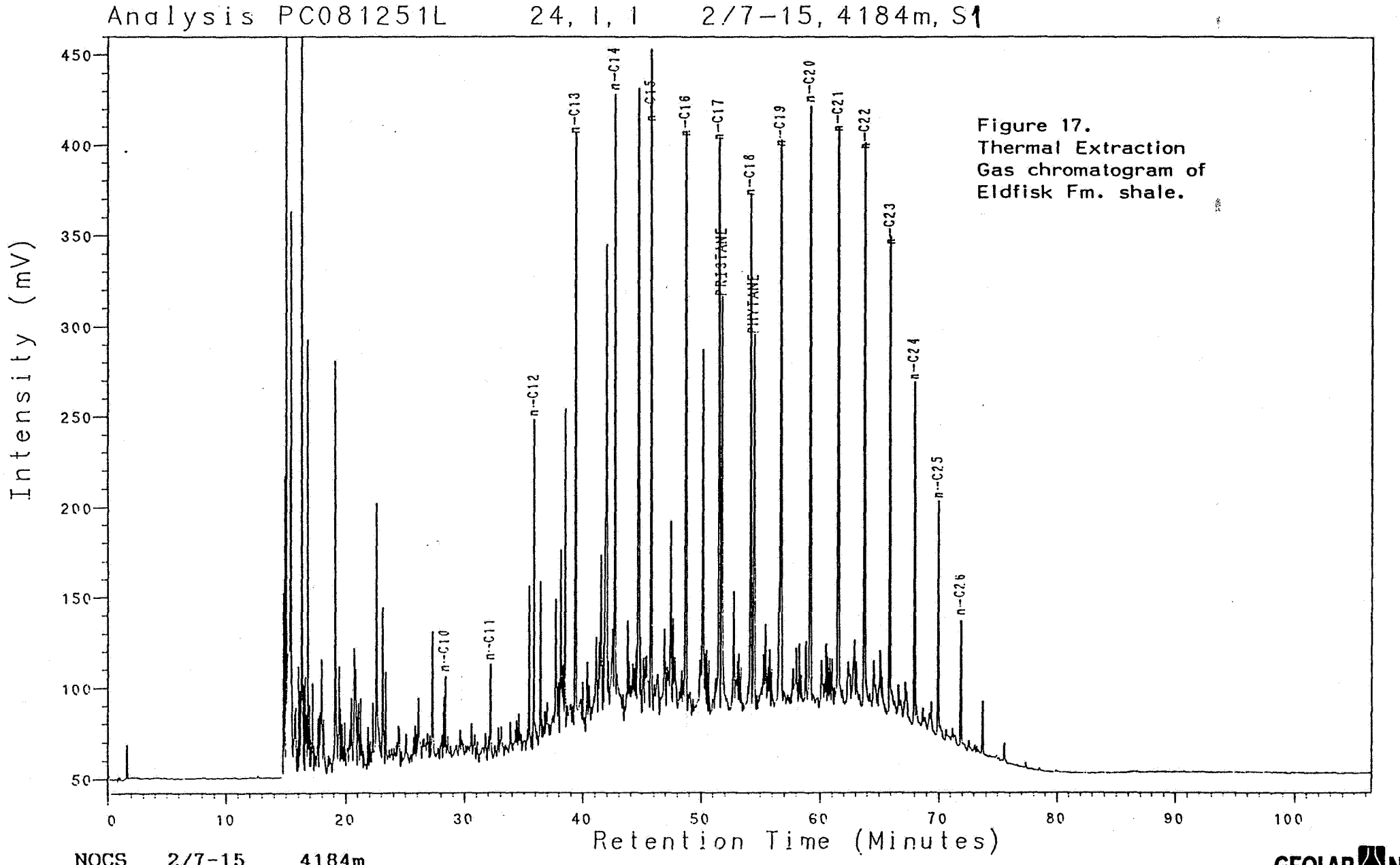

Figure 17.
Thermal Extraction
Gas chromatogram of
Eldfisk Fm. shale.

NOCS 2/7-15 4184m
THERMAL EXTRACTION GC (S1)
CI-ST:gy blk, brn blk

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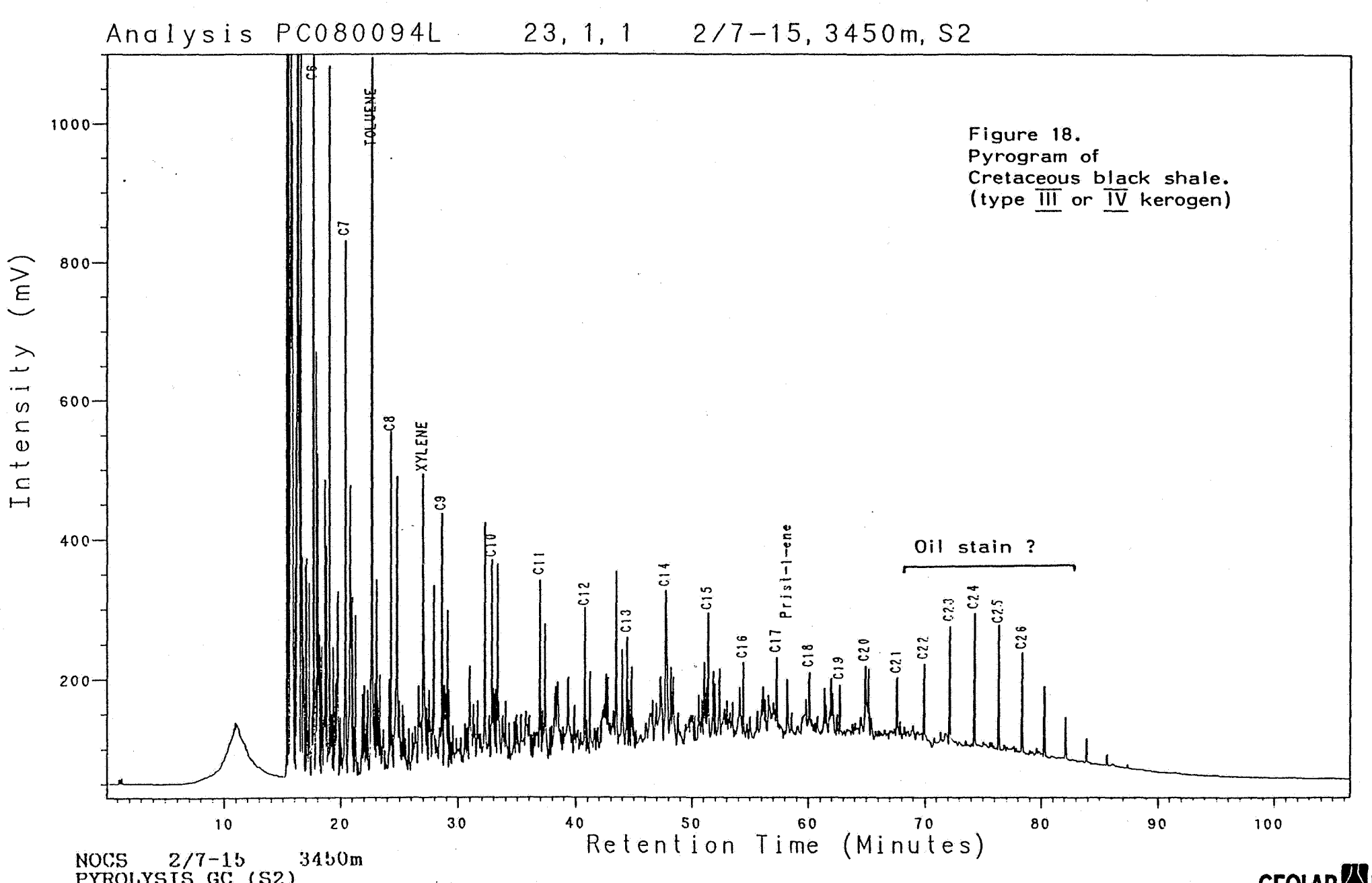

Figure 18.
Pyrogram of
Cretaceous black shale.
(type III or IV kerogen)

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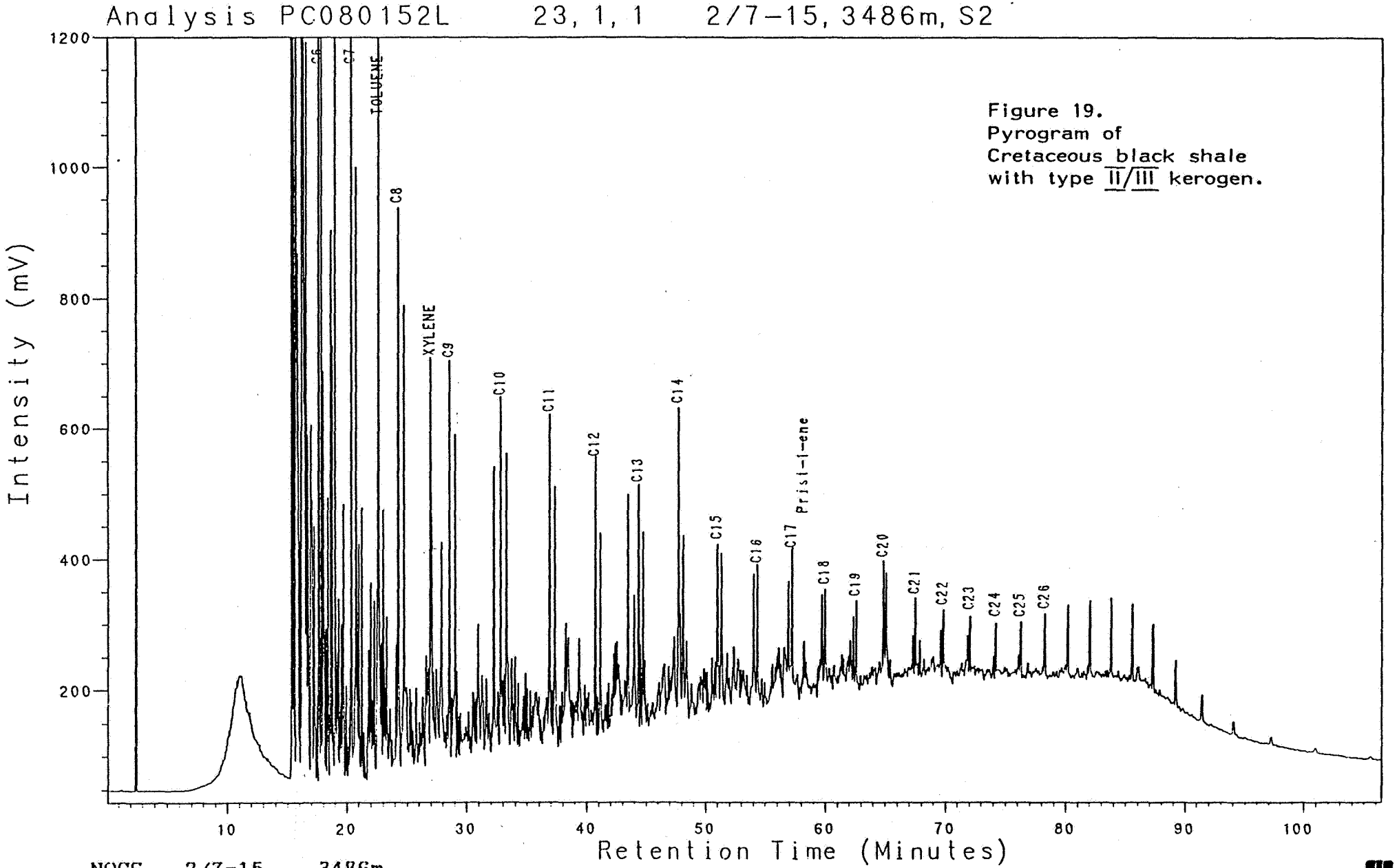

Figure 19.
Pyrogram of
Cretaceous black shale
with type II/III kerogen.

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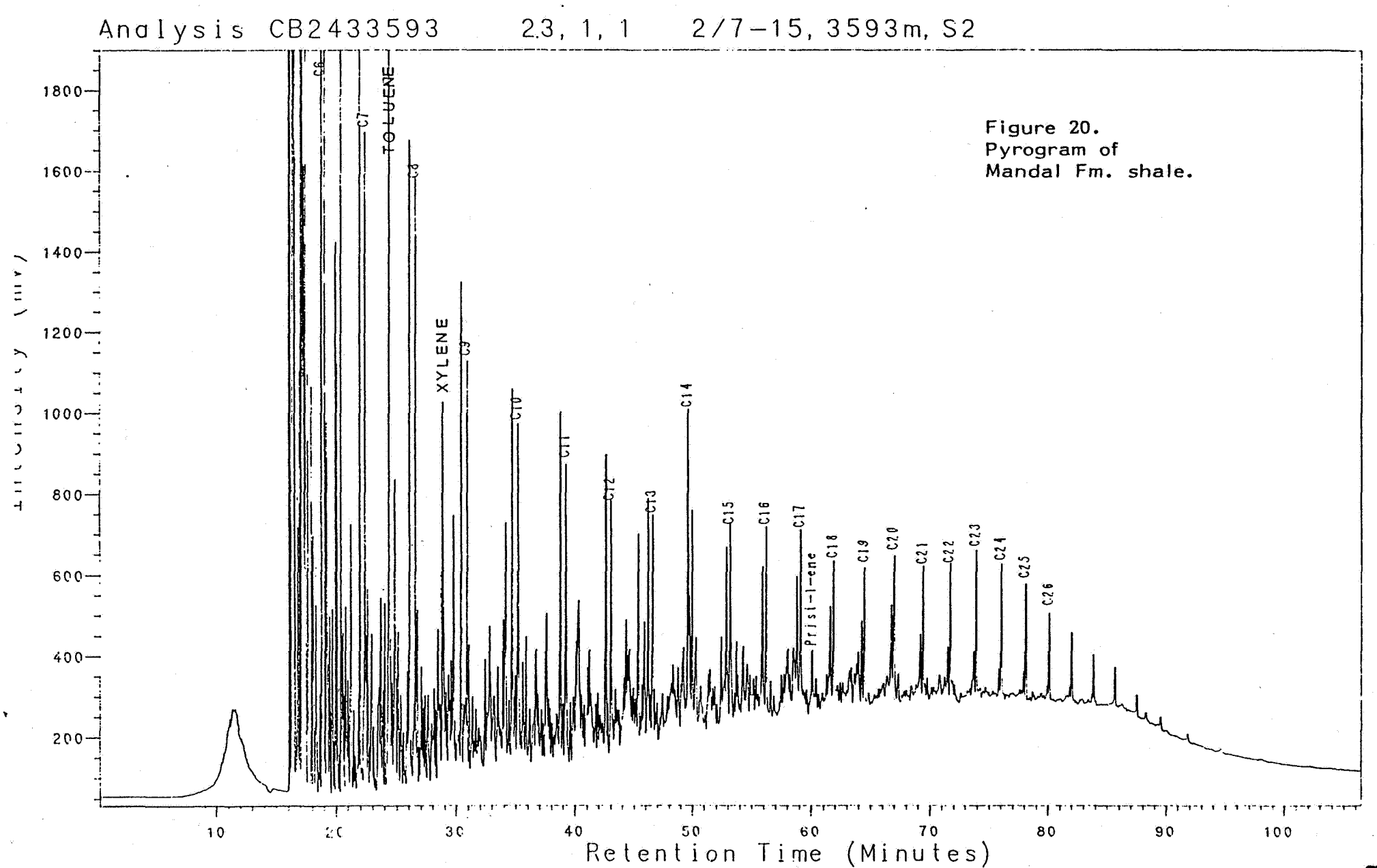

Figure 20.
Pyrogram of
Mandal Fm. shale.

NOCS 2/7-15 3593m
PYROLYSIS GC (S2)
CLST:gy blk,brn blk

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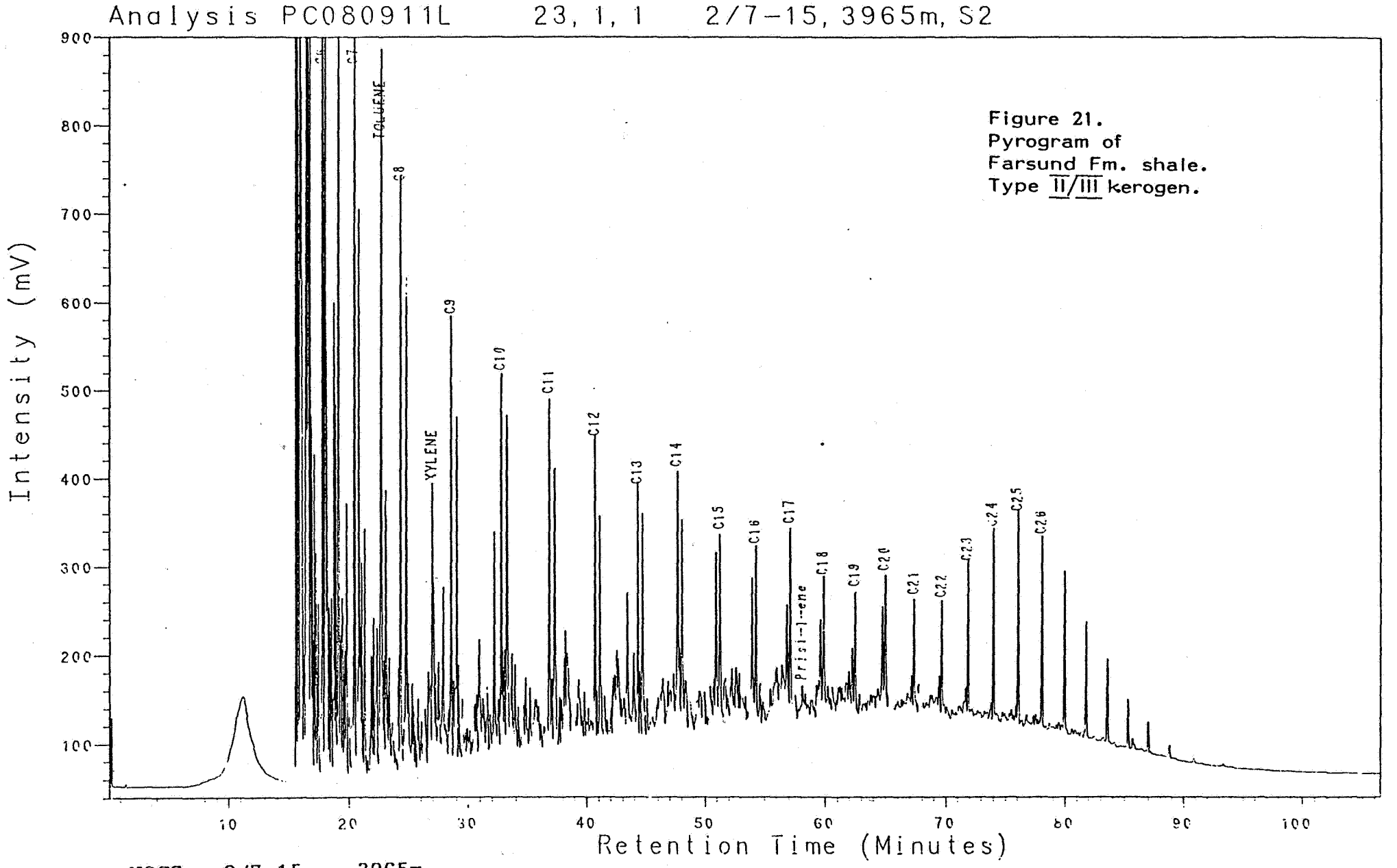

Figure 21.
Pyrogram of
Farsund Fm. shale.
Type II/III kerogen.

NOCS 2/7-15 3965m
PYROLYSIS GC (S2)
CLST:gy blk, brn blk, drk gy
to m drk gy

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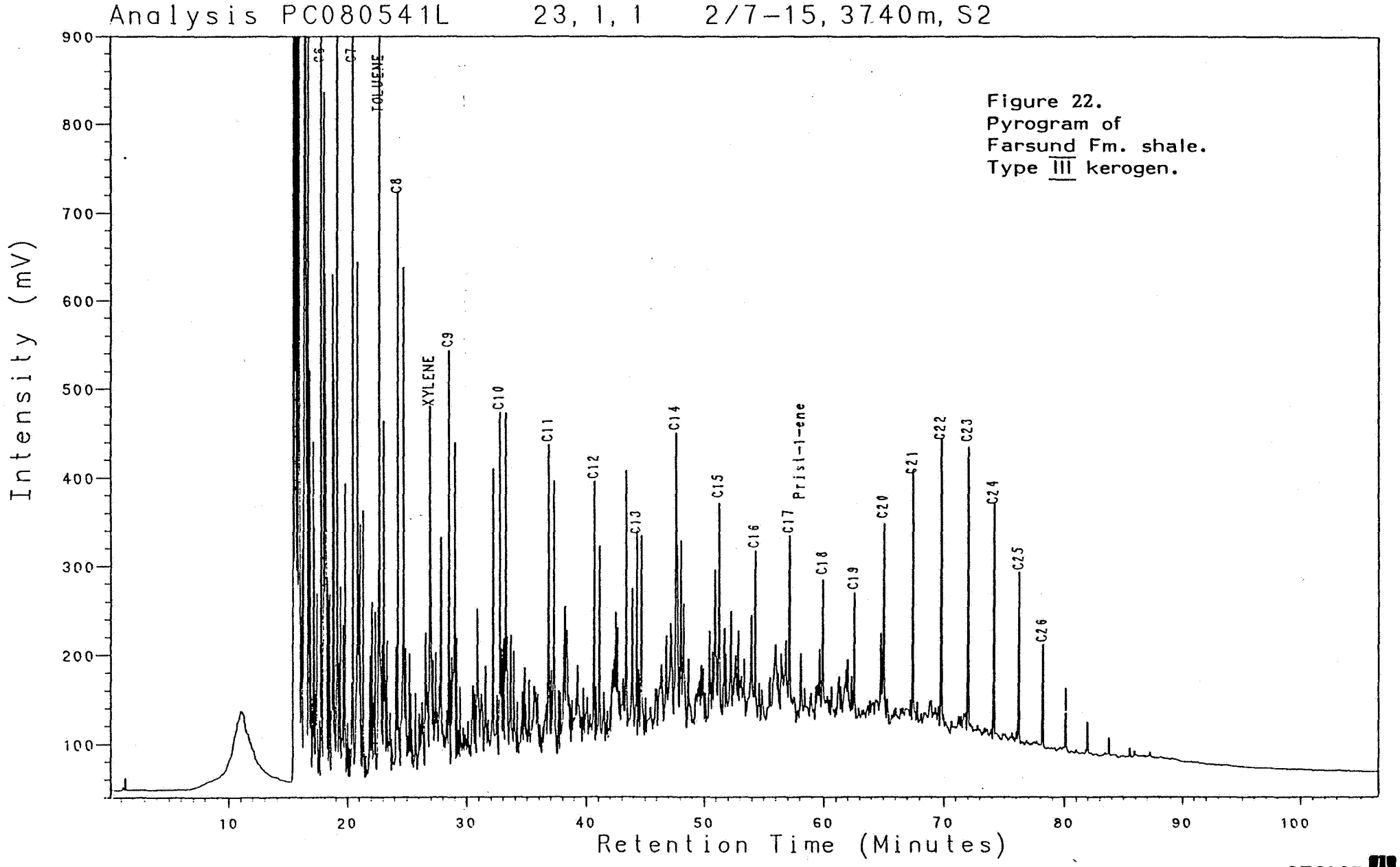

Figure 22.
Pyrogram of
Farsund Fm. shale.
Type III kerogen.

NOCS 2/7-15 3740m
PYROLYSIS GC (S2)
CLST: gy blk, drk gy

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Figure 23: Vitrinite Reflectance versus Depth
Well NOCS 2/7–15

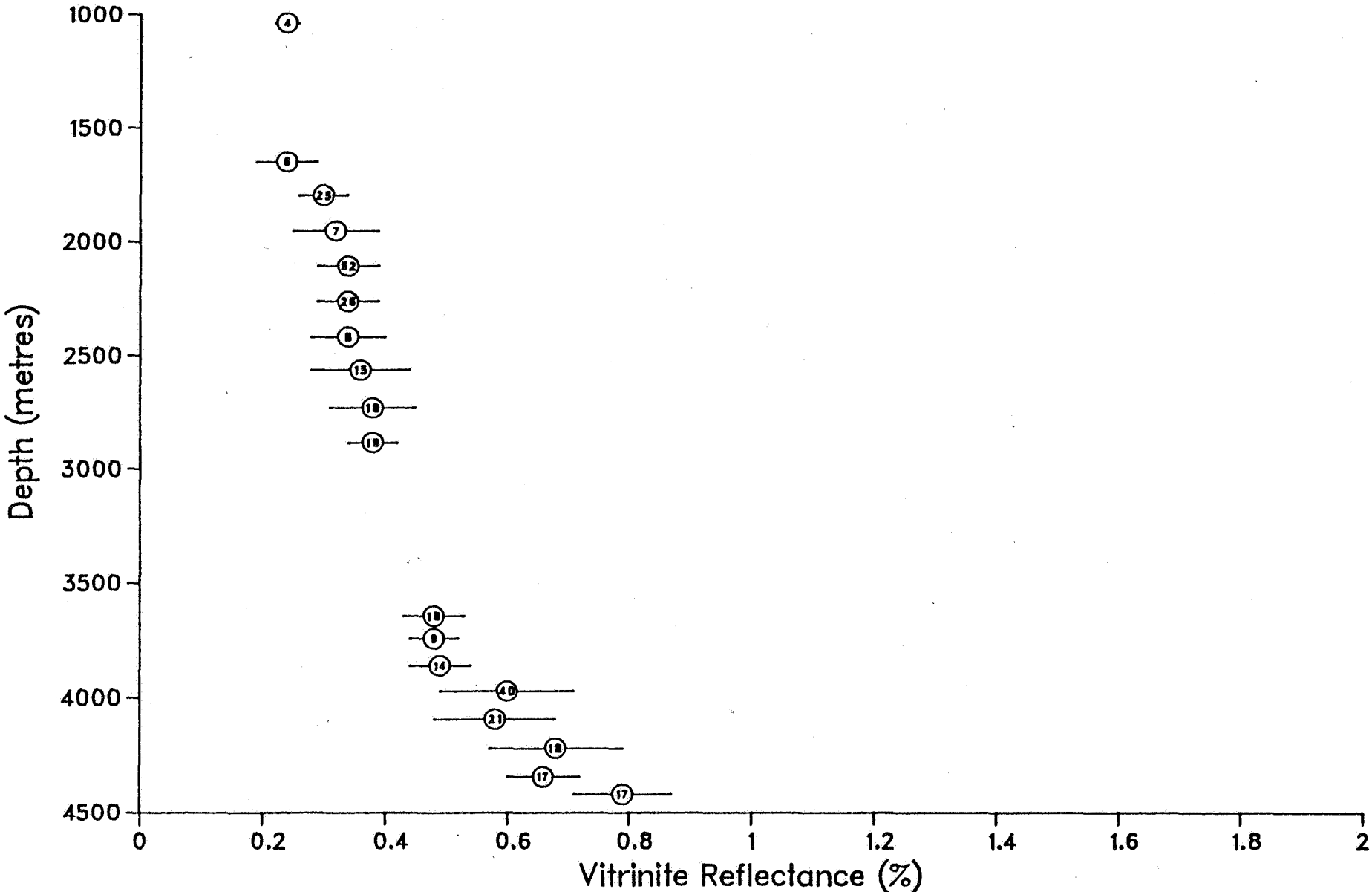

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Figure 24: Kerogen Composition and Potential Hydrocarbon Products

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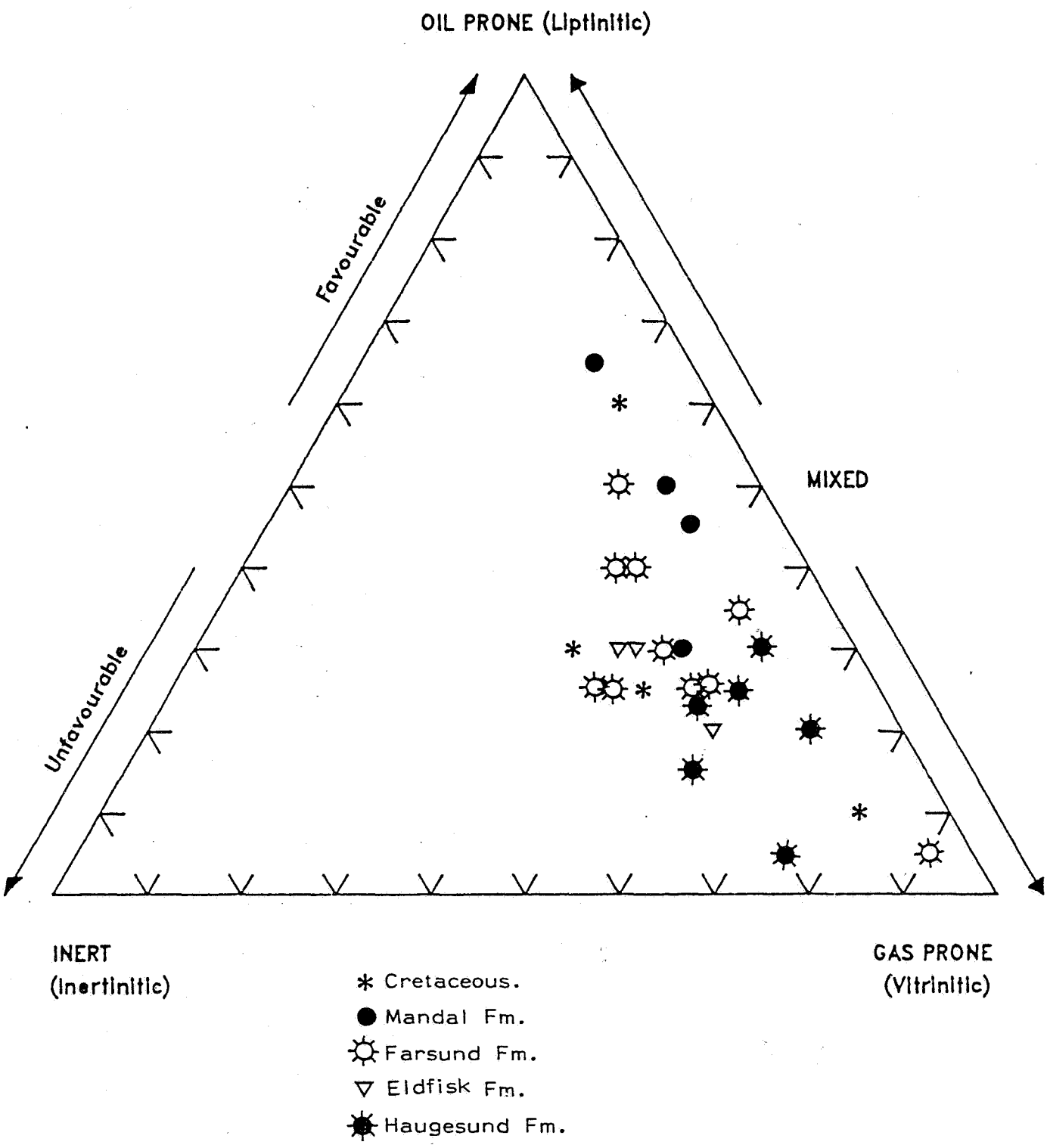
Well NOCS 2/7-15



Appendix 1

Tables

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
3401.00						001
			70	Ca : w, lt gy, hd, chk		001-1L
		1.30	30	Ca : m gy to drk gy, pyr, cly, lam		001-2L
			tr	Sh/Clst: gy red		001-3L
3407.00						002
			90	Ca : w, lt gy, hd, chk		002-1L
			10	Ca : m gy to drk gy, pyr, cly, lam		002-2L
3413.00						003
			80	Ca : w, hd, chk		003-1L
			10	Cont : Mica-ad, prp, dd, fib		003-4L
			5	Ca : m gy to drk gy, pyr, cly, lam		003-2L
			5	Sh/Clst: gy red, pl gn gy, calc		003-3L
3419.00						004
			90	Ca : w, pl gn gy, calc, pyr		004-1L
		1.11	10	Ca : gy blk, m gy to drk gy, pyr		004-2L
3425.00						005
			90	Sh/Clst: lt gy to m gy, calc, fis		005-1L
			10	Ca : w		005-2L
			tr	Sh/Clst: blk		005-3L
3431.00						006
			70	Sh/Clst: lt gy to m gy, calc, fis		006-1L
			25	Cont : dd		006-3L
			5	Ca : w		006-2L

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3437.00						007
			70	Ca : w, chk		007-1L
			20	Sh/Clst: lt gy to m gy, calc, pyr, glauc		007-2L
			10	Sh/Clst: gy red, brn gy, slt, s, glauc		007-3L
			tr	Sh/Clst: blk, calc, lam		007-4L
			tr	Cont : Mica-ad		007-5L
3444.00						008
			60	Ca : w, chk		008-1L
		0.50	20	Sh/Clst: lt gy to m gy, calc, pyr, glauc		008-2L
			15	Sh/Clst: gy red, brn gy		008-3L
		2.34	5	Sh/Clst: drk gy, blk, calc, pyr, lam		008-4L
			tr	Cont : Mica-ad		008-5L
3450.00						009
		0.69	50	Sh/Clst: ol gy, lt gy to m gy, pl gn gy, calc		009-1L
			30	Ca : w, gy pi, pl y brn		009-2L
			10	Sh/Clst: gy red, brn gy		009-3L
		2.96	10	Sh/Clst: drk gy, blk, calc, pyr, slt, lam		009-4L
			tr	Cont : Mica-ad		009-5L
3456.00						010
			50	Sh/Clst: lt gy to m gy		010-1L
			30	Ca : w, pl y brn		010-2L
		3.10	10	Sh/Clst: drk gy, blk, calc, pyr, slt, lam		010-3L
			10	Sh/Clst: gy red, brn gy		010-4L
			tr	Cont : Mica-ad, dd		010-5L

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3462.00						011
			90	Ca : w, pl y brn		011-1L
			10	Sh/Clst: lt gy to drk gy		011-2L
3468.00						012
			90	Ca : w, pl y brn		012-1L
			10	Sh/Clst: lt gy to drk gy		012-2L
3474.00						013
			80	Ca : w, pl y brn, cly		013-1L
		5.49	10	Sh/Clst: blk, drk gy, calc		013-2L
			10	Cont : dd		013-3L
3480.00						014
			95	Ca : w, pl y brn, cly		014-1L
			5	Sh/Clst: blk, drk gy, calc		014-2L
3486.00						015
			60	Ca : w, lt gy, pl y brn		015-1L
		4.08	20	Sh/Clst: blk, drk gy, dsk y brn, calc, pyr		015-2L
			20	Sh/Clst: lt gy to m gy, calc		015-3L
3492.00						016
			50	Ca : w, lt gy, pl y brn		016-1L
			20	Sh/Clst: lt gy to m gy, calc		016-2L
		5.31	20	Sh/Clst: blk, drk gy, dsk y brn		016-3L
			10	Cont : Mica-ad, prp, dd		016-5L
			tr	Sh/Clst: gy red		016-4L

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3498.00						017
			50	Ca : w, lt gy, pl y brn		017-1L
			20	Sh/Clst: lt gy to m gy, calc		017-2L
			20	Sh/Clst: blk, drk gy, dsk y brn		017-3L
			10	Cont : Mica-ad, prp, dd		017-5L
			tr	Sh/Clst: gy red		017-4L
3505.00						018
			70	Ca : w, lt gy, pl y brn		018-1L
			20	Sh/Clst: lt gy to m gy, calc		018-2L
		2.36	10	Sh/Clst: drk gy, dsk y brn		018-3L
3511.00						019
			40	Sh/Clst: lt gy to m gy, calc		019-1L
			40	Cont : Coal-ad, prp, dd, fib		019-3L
			20	Ca : w, lt gy, pl y brn		019-2L
3517.00						020
			70	Ca : w, lt gy, pl y brn		020-1L
			20	Sh/Clst: lt gy, m gy, calc		020-2L
		2.79	10	Sh/Clst: drk gy, dsk y brn		020-3L
3526.00						021
			80	Sh/Clst: lt gy to m gy, calc		021-1L
			20	Ca : w, pl y brn		021-2L
			tr	Sh/Clst: drk gy, calc		021-3L
			tr	Cont : prp		021-4L

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Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3532.00						022
			80	Sh/Clst: lt gy to m gy, calc		022-1L
			20	Ca : w, pl y brn		022-2L
			tr	Sh/Clst: drk gy, calc		022-3L
			tr	Cont : prp		022-4L
3539.00						023
			60	Sh/Clst: lt gy to m gy, calc, fos		023-1L
		2.01	30	Sh/Clst: dsk y brn		023-2L
			10	Ca : w, pl y brn, calc		023-3L
3545.00						024
			60	Sh/Clst: lt gy to m gy, calc		024-1L
			20	Ca : w, pl y brn		024-2L
		2.30	20	Sh/Clst: dsk y brn, calc		024-3L
3551.00						025
			50	Sh/Clst: lt gy to m gy, calc		025-1L
			20	Ca : w		025-2L
			20	Sh/Clst: gy red, brn gy		025-3L
		1.11	10	Sh/Clst: dsk y brn, calc		025-4L
3557.00						026
			60	Sh/Clst: lt gy to m gy, calc		026-1L
			30	Sh/Clst: gy red, brn gy		026-2L
			10	Ca : w, lt gy		026-3L

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Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3563.00						027
			60	Sh/Clst: lt gy to m gy, calc		027-1L
			30	Sh/Clst: gy red, brn gy		027-2L
			10	Ca : w, lt gy		027-3L
3569.00						028
		0.58	80	Sh/Clst: ol gy, lt gy to m gy, calc		028-1L
			10	Sh/Clst: gy red, brn gy		028-2L
			10	Ca : w, lt gy		028-3L
3575.00						029
			50	Cont : dd		029-4L
		0.57	40	Sh/Clst: ol gy, lt gy to m gy, calc		029-1L
			10	Ca : w, lt gy		029-2L
			tr	Sh/Clst: gy red		029-3L
3581.00						030
		5.10	40	Sh/Clst: brn blk, pyr, slt, s		030-1L
	cvd		40	Sh/Clst: lt gy to m gy, calc		030-2L
			10	S/Sst : lt brn, pyr		030-3L
			10	Cont : dd, evap		030-5L
	cvd		tr	Ca : w		030-4L
3587.00						031
		4.80	40	Sh/Clst: brn blk, pyr, slt, s		031-1L
	cvd		20	Sh/Clst: lt gy to m gy, calc		031-2L
			20	Cont : dd, evap		031-5L
			10	S/Sst : lt brn, pyr		031-3L
	cvd		10	Ca : w		031-4L

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Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
3593.00						032
	cvd		40	Sh/Clst: gy red, lt gy to m gy		032-1L
		2.89	30	Sh/Clst: gy blk, brn blk, slt, s		032-2L
			10	S/Sst : lt brn gy		032-3L
	cvd		10	Ca : w		032-4L
			10	Cont : prp, dd		032-5L
3600.00						033
	cvd		40	Sh/Clst: gy red, lt gy to m gy		033-1L
		3.56	30	Sh/Clst: gy blk, brn blk, slt, s		033-2L
			10	S/Sst : lt brn gy		033-3L
	cvd		10	Ca : w		033-4L
			10	Cont : prp, dd		033-5L
3606.00						034
	cvd		40	Sh/Clst: gy red, lt gy to m gy		034-1L
		2.80	30	Sh/Clst: gy blk, brn blk, slt, s		034-2L
			10	S/Sst : lt brn gy		034-3L
	cvd		10	Ca : w		034-4L
			10	Cont : prp, dd		034-5L
3612.00						035
		3.69	40	Sh/Clst: gy blk, brn blk, calc, pyr, slt, s		035-1L
	cvd		30	Sh/Clst: lt gy to m gy		035-2L
			20	S/Sst : lt brn gy, calc, slt, cly		035-3L
	cvd		10	Ca : w		035-4L
3618.00						036
		3.12	80	Sh/Clst: gy blk, brn blk, fis		036-1L
	cvd		10	Sh/Clst: gy red, lt gy to m gy		036-2L
	cvd		5	Ca : w		036-3L
			5	Cont : prp		036-4L

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Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type				Trb	Sample
Int	Cvd	TOC%	%	Lithology description			
3624.00							037
		2.62	80	Sh/Clst:	gy blk, brn blk, fis		037-1L
	cvd		10	Sh/Clst:	gy red, lt gy to m gy		037-2L
	cvd		5	Ca :	w		037-3L
			5	Cont :	prp		037-4L
3630.00							038
		2.66	60	Sh/Clst:	gy blk, brn blk, fis		038-1L
	cvd		20	Sh/Clst:	lt gy to m gy, calc		038-2L
			20	S/Sst :	lt brn gy, calc, pyr, slt		038-3L
3636.00							039
		2.49	60	Sh/Clst:	gy blk, brn blk, dol, fis		039-1L
			20	Ca :	brn blk, drk y brn, cly, dol, hd		039-2L
	cvd		10	Sh/Clst:	lt gy to m gy, calc		039-3L
			10	S/Sst :	lt brn gy, calc, pyr, slt		039-4L
3642.00							040
		2.53	70	Sh/Clst:	gy blk, brn blk, dol, fis		040-1L
			10	Ca :	brn blk, drk y brn, cly, dol, hd		040-2L
	cvd		10	Sh/Clst:	lt gy to m gy, calc		040-3L
	cvd		10	Ca :	w		040-4L
3648.00							041
		3.39	50	Sh/Clst:	gy blk, fis		041-1L
			30	Sh/Clst:	lt gy to m gy, calc		041-2L
			10	S/Sst :	lt brn gy, calc, slt		041-3L
			10	Cont :	dd		041-4L

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Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3655.00						042
		2.45	50	Sh/Clst: gy blk, fis		042-1L
	cvd		20	Sh/Clst: lt gy to m gy, calc		042-2L
			20	Cont : prp, dd		042-4L
			10	S/Sst : lt brn gy, calc, slt		042-3L
3670.00						043
			90	Cont : Mica-ad		043-3L
			5	Sh/Clst: gy blk		043-1L
	cvd		5	Sh/Clst: lt gy to m gy		043-2L
3676.00						044
			95	Cont : Coal-ad, Mica-ad, ns		044-3L
			5	Sh/Clst: gy blk		044-1L
	cvd		tr	Sh/Clst: lt gy to m gy		044-2L
3682.00						045
			95	Cont : Coal-ad, Mica-ad, ns		045-3L
		3.12	5	Sh/Clst: gy blk		045-1L
	cvd		tr	Sh/Clst: lt gy to m gy		045-2L
3688.00						046
			95	Cont : Coal-ad, Mica-ad, ns		046-3L
			5	Sh/Clst: gy blk		046-1L
	cvd		tr	Sh/Clst: lt gy to m gy		046-2L
3694.00						047
			95	Cont : Coal-ad, Mica-ad, ns		047-3L
			5	Sh/Clst: gy blk		047-1L
	cvd		tr	Sh/Clst: lt gy to m gy		047-2L

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GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
3703.00						048
		1.70	50	Sh/Clst: gy blk		048-1L
			50	Cont : cem		048-2L
3709.00						049
		1.64	70	Sh/Clst: gy blk		049-1L
			30	Cont : Mica-ad, cem, ns, dd		049-2L
3715.00						050
			70	Cont : Mica-ad, cem, prp, ns, dd		050-2L
		1.99	30	Sh/Clst: gy blk		050-1L
3722.00						051
			100	Cont : Mica-ad		051-2L
			tr	Sh/Clst: gy blk		051-1L
3728.00						052
			100	Cont : Mica-ad		052-2L
			tr	Sh/Clst: gy blk		052-1L
3734.00						053
			100	Cont : Mica-ad		053-2L
			tr	Sh/Clst: gy blk		053-1L
3740.00						054
		1.94	80	Sh/Clst: gy blk, drk gy		054-1L
			20	Cont : Mica-ad, cem, prp, ns		054-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
3746.00						055
			100	Cont : Mica-ad, cem, prp, ns		055-2L
			tr	Sh/Clst: gy blk, drk gy		055-1L
3752.00						056
			90	Cont : Mica-ad, cem, prp, ns, dd		056-2L
		2.16	10	Sh/Clst: gy blk, drk gy		056-1L
3758.00						057
			90	Cont : Mica-ad, cem, prp, ns, dd		057-2L
		2.31	10	Sh/Clst: gy blk, drk gy		057-1L
3764.00						058
			90	Cont : Mica-ad, cem, prp, ns, dd		058-2L
		2.08	10	Sh/Clst: gy blk, drk gy		058-1L
3770.00						059
			60	Cont : tar-ad, dd		059-2L
		7.54	40	Sh/Clst: drk gy		059-1L
3776.00						060
		2.69	90	Sh/Clst: gy blk, drk gy to m drk gy		060-1L
			10	Cont : Coal-ad, Mica-ad, prp, dd		060-2L
3783.00						061
		2.41	55	Sh/Clst: gy blk, drk gy		061-1L
			30	Sh/Clst: m drk gy		061-2L
		2.37	10	Ca : drk y brn, dol		061-3L
			5	Cont : prp, dd		061-4L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
3789.00						062
		2.14	90	Sh/Clst: gy blk, drk gy, calc		062-1L
			5	Ca : drk y brn, calc, slt		062-2L
			5	Cont : Mica-ad, prp, dd		062-3L
3795.00						063
		2.47	80	Sh/Clst: gy blk, drk gy, calc		063-1L
			20	Cont : Mica-ad		063-2L
3801.00						064
		2.20	70	Sh/Clst: gy blk, drk gy, dsk y brn, calc		064-1L
			20	Sh/Clst: m drk gy		064-2L
			10	Cont : Mica-ad		064-3L
3807.00						065
		2.31	65	Sh/Clst: gy blk, drk gy		065-1L
		1.17	25	Ca : dsk brn, dsk y brn, dol		065-2L
			10	Sh/Clst: ol gy, m drk gy		065-3L
			tr	Cont : Mica-ad, prp, dd		065-4L
3813.00						066
		2.37	40	Sh/Clst: gy blk, drk gy		066-1L
			30	Ca : dsk brn, dsk y brn, dol		066-2L
			20	Cont : Mica-ad, prp, dd		066-4L
			10	Sh/Clst: ol gy, m drk gy		066-3L
3819.00						067
		2.37	75	Sh/Clst: ol gy, m drk gy to drk gy, gy blk		067-1L
			10	S/Sst : w, f, l		067-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		067-4L
			5	Ca : dsk brn, dsk y brn, dol		067-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type				Trb	Sample
Int	Cvd	TOC%	%	Lithology description			
3825.00							068
		2.17	80	Sh/Clst	: gy blk, drk gy to m drk gy		068-1L
			15	Cont	: Mica-ad, dd		068-3L
			5	Ca	: m drk gy, dol		068-2L
3831.00							069
		1.97	80	Sh/Clst	: gy blk, drk gy to m drk gy		069-1L
			15	Cont	: Mica-ad, dd		069-3L
			5	Ca	: m drk gy, dol		069-2L
3837.00							070
		1.86	80	Sh/Clst	: gy blk, brn blk, drk gy to m drk gy, dol		070-1L
			10	Cont	: Mica-ad, dd		070-4L
			5	Ca	: m drk gy, dol		070-2L
			5	S/Sst	: brn gy, dol		070-3L
3844.00							071
		1.95	85	Sh/Clst	: gy blk, brn blk, drk gy to m drk gy, dol		071-1L
			5	Ca	: dsk y brn, dol		071-2L
			5	S/Sst	: lt gy to m gy, slt, dol		071-3L
			5	Cont	: Mica-ad, dd		071-4L
3850.00							072
		1.99	70	Sh/Clst	: gy blk, brn blk, drk gy to m drk gy		072-1L
			10	Ca	: dsk y brn, dol		072-2L
			10	S/Sst	: lt gy to m gy, slt, dol		072-3L
			10	Cont	: Coal-ad, Mica-ad, dd, tar-ad		072-4L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3859.00						073
		1.82	50	Sh/Clst: gy blk, brn blk, drk gy to m drk gy		073-1L
			30	Cont : Coal-ad, Mica-ad, dd, tar-ad		073-4L
			10	Ca : dsk y brn, dol		073-2L
			10	S/Sst : lt gy to m gy, slt, dol		073-3L
3862.00						074
		2.15	50	Sh/Clst: gy blk, brn blk, drk gy to m drk gy		074-1L
			30	Cont : Coal-ad, Mica-ad, dd, tar-ad		074-4L
			10	Ca : dsk y brn, dol		074-2L
			10	S/Sst : lt gy to m gy, slt, dol		074-3L
3868.00						075
		1.86	80	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		075-1L
			10	Ca : dsk y brn, dol		075-2L
			5	S/Sst : lt gy to m gy, calc, f		075-3L
			5	Cont : Mica-ad, prp, dd		075-4L
3874.00						076
		2.02	80	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		076-1L
			10	Ca : dsk y brn, dol		076-2L
			5	S/Sst : lt gy to m gy, calc, f		076-3L
			5	Cont : Mica-ad, prp, dd		076-4L
3880.00						077
		2.14	70	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		077-1L
			10	Ca : dsk y brn, dol		077-2L
			10	S/Sst : lt gy to m gy, calc, f		077-3L
			10	Cont : Mica-ad, prp, dd		077-4L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type				Trb	Sample
Int	Cvd	TOC%	%	Lithology description			
3886.00							078
		1.99	55	Sh/Clst	gy blk, brn blk, drk gy to m drk gy, dol		078-1L
			15	Ca	dsk y brn, dol		078-2L
			15	S/Sst	lt gy to m gy, calc, f		078-3L
			15	Cont	Mica-ad, prp, dd		078-4L
3892.00							079
			70	Sh/Clst	gy blk, brn blk, calc		079-1L
			30	Cont	dd, tar-ad		079-2L
3893.00							080
		2.41	70	Sh/Clst	gy blk, brn blk, calc		080-1L
			30	Cont	dd, tar-ad		080-2L
3904.00							081
		1.86	50	Sh/Clst	gy blk, brn blk, drk gy to m drk gy, dol		081-1L
			30	Ca	dsk y brn, dol		081-2L
			20	Cont	Coal-ad, dd		081-4L
			tr	S/Sst	lt gy, dsk y brn, calc, slt		081-3L
3911.00							082
		2.11	50	Sh/Clst	gy blk, brn blk, drk gy to m drk gy, dol		082-1L
			30	Ca	dsk y brn, dol		082-2L
			20	Cont	Coal-ad, dd		082-4L
			tr	S/Sst	lt gy, dsk y brn, calc, slt		082-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3917.00						083
		2.05	50	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		083-1L
			30	Ca : dsk y brn, dol		083-2L
			20	Cont : Coal-ad, dd		083-4L
			tr	S/Sst : lt gy, dsk y brn, calc, slt		083-3L
3923.00						084
		2.30	50	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		084-1L
			30	Ca : dsk y brn, dol		084-2L
			20	Cont : Coal-ad, dd		084-4L
			tr	S/Sst : lt gy, dsk y brn, calc, slt		084-3L
3929.00						085
		2.11	50	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		085-1L
			30	Ca : dsk y brn, dol		085-2L
			20	Cont : Coal-ad, dd		085-4L
			tr	S/Sst : lt gy, dsk y brn, calc, slt		085-3L
3935.00						086
		2.04	70	Sh/Clst: gy blk, brn blk, dol		086-1L
		1.10	20	Ca : brn blk, dsk y brn, dol		086-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd, tar-ad		086-3L
3941.00						087
		2.05	50	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		087-1L
			20	Ca : brn blk, dsk y brn		087-2L
			20	S/Sst : brn gy, calc, slt, dol, l		087-3L
			10	Cont : Coal-ad, Mica-ad, prp, dd		087-4L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3947.00						088
		2.11	80	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		088-1L
			10	Ca : brn blk, dsk y brn		088-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		088-3L
3953.00						089
		2.09	80	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		089-1L
			10	Ca : brn blk, dsk y brn		089-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		089-3L
3959.00						090
		1.91	80	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		090-1L
			10	Ca : brn blk, dsk y brn		090-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		090-3L
3965.00						091
		2.43	80	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol		091-1L
			10	Ca : brn blk, dsk y brn		091-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		091-3L
3971.00						092
		2.31	70	Sh/Clst: gy blk, brn blk, drk gy to m drk gy		092-1L
			30	Cont : Mica-ad, prp, dd		092-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3977.00						093
		2.41	60	Sh/Clst: gy blk, brn blk, drk gy to m drk gy		093-1L
			20	Ca : lt brn gy, dsk y brn, slt, s, dol		093-2L
			20	Cont : Mica-ad, prp, dd		093-3L
3983.00						094
		2.47	50	Sh/Clst: gy blk, brn blk, drk gy to m drk gy		094-1L
			40	Cont : Mica-ad, prp, dd		094-3L
			10	Ca : lt brn gy, dsk y brn, slt, s, dol		094-2L
3990.00						095
		2.66	50	Sh/Clst: gy blk, brn blk, drk gy to m drk gy		095-1L
			40	Cont : Mica-ad, prp, dd		095-3L
			10	Ca : lt brn gy, dsk y brn, slt, s, dol		095-2L
3996.00						096
		2.18	80	Sh/Clst: drk gy to m drk gy		096-1L
			10	Ca : lt brn gy, dsk y brn, dol		096-2L
			10	Cont : Mica-ad, prp, dd		096-3L
4005.00						097
		2.31	80	Sh/Clst: drk gy to m drk gy		097-1L
			20	Cont : Mica-ad, prp, dd		097-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type				Trb	Sample
Int	Cvd	TOC%	%	Lithology description			
4011.00							098
		2.41	80	Sh/Clst:	drk gy to m drk gy		098-1L
			20	Cont :	Mica-ad, prp, dd		098-2L
4017.00							099
		2.33	90	Sh/Clst:	gy blk, brn blk, drk gy to m drk gy		099-1L
			10	Cont :	Coal-ad, Mica-ad, dd		099-2L
4023.00							100
		2.20	80	Sh/Clst:	gy blk, brn blk, drk gy to m drk gy		100-1L
			20	Cont :	Coal-ad, Mica-ad, dd		100-2L
4041.00							101
		2.15	90	Sh/Clst:	gy blk, brn blk, drk gy to m drk gy		101-1L
			10	Cont :	Coal-ad, Mica-ad, dd		101-2L
4047.00							102
		2.39	80	Sh/Clst:	gy blk, brn blk, drk gy to m drk gy		102-1L
			15	Cont :	Mica-ad, prp, dd		102-3L
			5	S/Sst :	w, lt brn gy		102-2L
4053.00							103
		2.28	90	Sh/Clst:	gy blk, brn blk, drk gy to m drk gy		103-1L
			10	Cont :	Mica-ad, prp, dd		103-3L

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GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4059.00						104
		2.36	70	Sh/Clst: gy blk, brn blk, drk gy to m drk gy		104-1L
			30	Cont : Mica-ad, prp, dd		104-3L
4066.00						105
		2.31	50	Sh/Clst: gy blk, brn blk, drk gy to m drk gy		105-1L
			50	Cont : Mica-ad, prp, dd		105-3L
4072.00						106
		2.33	50	Sh/Clst: gy blk, brn blk		106-1L
			30	Sh/Clst: drk gy to m drk gy		106-2L
			10	Ca : brn blk, dsk y brn		106-3L
			10	Cont : Mica-ad, prp, dd		106-5L
			tr	S/Sst		106-4L
4078.00						107
		7.16	60	Sh/Clst: gy blk, m gy blk		107-1L
			20	Sh/Clst: drk gy to m drk gy		107-2L
			20	Cont : dd		107-3L
4081.00						108
		2.27	60	Sh/Clst: gy blk, m gy blk, dol		108-1L
			20	Cont : Mica-ad, prp, dd		108-4L
			10	Sh/Clst: drk gy to m drk gy		108-2L
			10	Ca : gy blk, dsk y brn, dol		108-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4087.00						109
		2.38	40	Sh/Clst: gy blk, m gy blk, dol		109-1L
			40	Sh/Clst: drk gy to m drk gy		109-2L
			10	Ca : gy blk, dsk y brn, dol		109-3L
			10	Cont : Mica-ad, prp, dd		109-4L
4093.00						110
		2.45	40	Sh/Clst: gy blk, m gy blk, dol		110-1L
			40	Sh/Clst: drk gy to m drk gy		110-2L
			10	Ca : gy blk, dsk y brn, dol		110-3L
			10	Cont : Mica-ad, prp, dd		110-4L
4099.00						111
		6.86	40	Sh/Clst: gy blk, m gy blk		111-1L
			40	Cont : Mica-ad, dd		111-4L
			10	Sh/Clst: drk gy to m drk gy		111-2L
			10	Ca : w, dsk y brn, calc, slt, dol		111-3L
4105.00						112
		2.43	80	Sh/Clst: gy blk, m gy blk		112-1L
			10	Sh/Clst: drk gy to m drk gy		112-2L
			5	Ca : w, dsk y brn, calc, slt, dol		112-3L
			5	Cont : Mica-ad, dd		112-4L
4111.00						113
		2.73	80	Sh/Clst: gy blk, m gy blk		113-1L
			10	Sh/Clst: drk gy to m drk gy		113-2L
			5	Ca : w, dsk y brn, calc, slt, dol		113-3L
			5	Cont : Mica-ad, dd		113-4L

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4117.00						114
		3.08	80	Sh/Clst: gy blk, m gy blk		114-1L
			10	Sh/Clst: drk gy to m drk gy		114-2L
			5	Ca : w, dsk y brn, calc, slt, dol		114-3L
			5	Cont : Mica-ad, dd		114-4L
4123.00						115
		2.35	60	Sh/Clst: gy blk, brn blk, carb, pyr		115-1L
			30	Sh/Clst: drk gy to m drk gy		115-2L
			5	Ca : w, dsk y brn, calc, slt, dol		115-3L
			5	Cont : Mica-ad, prp, dd		115-4L
4130.00						116
		2.61	60	Sh/Clst: gy blk, brn blk, carb, pyr		116-1L
			30	Sh/Clst: drk gy to m drk gy		116-2L
			5	Ca : w, dsk y brn, calc, slt, dol		116-3L
			5	Cont : Mica-ad, prp, dd		116-4L
4136.00						117
			30	Sh/Clst: drk gy to m drk gy		117-1L
		2.38	30	Sh/Clst: gy blk, brn blk, calc, dol		117-2L
		5.59	30	Ca : lt brn gy, dsk y brn, slt, dol		117-3L
			10	Cont : Coal-ad, Mica-ad, prp, dd		117-4L
4142.00						118
			30	Sh/Clst: drk gy to m drk gy		118-1L
		2.51	30	Sh/Clst: gy blk, brn blk, calc, dol		118-2L
			30	Ca : lt brn gy, dsk y brn, slt, dol		118-3L
			10	Cont : Coal-ad, Mica-ad, prp, dd		118-4L

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
4148.00						119
		2.22	40	Sh/Clst: gy blk, brn blk, slt, s, dol		119-1L
			30	Sh/Clst: drk gy to m drk gy		119-2L
			30	Cont : Coal-ad, Mica-ad, prp, prp, tar-ad		119-3L
4154.00						120
		2.75	50	Sh/Clst: gy blk, brn blk, slt, s, dol		120-1L
			30	Sh/Clst: drk gy to m drk gy		120-2L
			10	Ca : brn blk, dsk y brn, dol		120-3L
			10	Cont		120-4L
4160.00						121
		2.20	50	Sh/Clst: gy blk, brn blk, slt, s, dol		121-1L
			30	Sh/Clst: drk gy to m drk gy		121-2L
			10	Ca : brn blk, dsk y brn, dol		121-3L
			10	Cont		121-4L
4166.00						122
		2.16	50	Sh/Clst: gy blk, brn blk, slt, s, dol		122-1L
			30	Sh/Clst: drk gy to m drk gy		122-2L
			10	Ca : brn blk, dsk y brn, dol		122-3L
			10	Cont		122-4L
4172.00						123
		2.54	50	Sh/Clst: gy blk, brn blk, slt, s, dol		123-1L
			30	Sh/Clst: drk gy to m drk gy		123-2L
			10	Ca : brn blk, dsk y brn, dol		123-3L
			10	Cont		123-4L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4178.00						124
		2.48	50	Sh/Clst: gy blk, brn blk, slt, s, dol		124-1L
			30	Sh/Clst: drk gy to m drk gy		124-2L
			10	Ca : brn blk, dsk y brn, dol		124-3L
			10	Cont		124-4L
4184.00						125
		2.61	50	Sh/Clst: gy blk, brn blk, slt, s, dol		125-1L
			40	Sh/Clst: drk gy to m drk gy		125-2L
			10	Cont : Mica-ad, prp, dd		125-3L
4191.00					trb	126
		2.59	50	Sh/Clst: gy blk, brn blk, slt, s, dol		126-1L
			40	Sh/Clst: drk gy to m drk gy		126-2L
			10	Cont : Mica-ad, prp, dd		126-3L
4197.00					trb	127
		2.32	50	Sh/Clst: gy blk, brn blk, slt, s, dol		127-1L
			40	Sh/Clst: drk gy to m drk gy		127-2L
			10	Cont : Mica-ad, prp, dd		127-3L
4209.00					trb	128
		2.59	80	Sh/Clst: gy blk, brn blk		128-1L
			20	Cont : prp, dd		128-2L
4215.00					trb	129
		2.99	80	Sh/Clst: gy blk, brn blk		129-1L
			20	Cont : prp, dd		129-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4221.00						130
		2.98	80	Sh/Clst: gy blk, brn blk		130-1L
			20	Cont : prp, dd		130-2L
4227.00						131
		2.60	70	Sh/Clst: gy blk, brn blk		131-1L
			10	Ca : brn blk, dsk y brn, slt, dol		131-2L
			10	Sh/Clst: drk gy to m drk gy, fis		131-3L
			10	Cont : Mica-ad, dd		131-4L
4233.00						132
		2.67	70	Sh/Clst: gy blk, brn blk		132-1L
			10	Ca : brn blk, dsk y brn, slt, dol		132-2L
			10	Sh/Clst: drk gy to m drk gy, fis		132-3L
			10	Cont : Mica-ad, dd		132-4L
4239.00						133
		2.30	80	Sh/Clst: gy blk, brn blk		133-1L
			10	Sh/Clst: drk gy to m drk gy		133-2L
			10	Cont : Mica-ad, dd		133-3L
4245.00						134
		2.14	70	Sh/Clst: gy blk, brn blk		134-1L
			20	Sh/Clst: drk gy to m drk gy		134-2L
			10	Cont : Mica-ad, dd		134-3L
4252.00						135
		2.35	50	Sh/Clst: gy blk, brn blk		135-1L
			30	Cont : Coal-ad, Mica-ad, prp, dd		135-3L
			20	Sh/Clst: drk gy to m drk gy		135-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4255.00						136
		2.57	70	Sh/Clst: gy blk, brn blk		136-1L
			20	Sh/Clst: drk gy to m drk gy		136-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		136-3L
4264.00						137
		2.38	70	Sh/Clst: gy blk, brn blk		137-1L
			20	Sh/Clst: drk gy to m drk gy		137-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		137-3L
4270.00						138
		2.46	70	Sh/Clst: gy blk, brn blk		138-1L
			20	Sh/Clst: drk gy to m drk gy		138-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		138-3L
4276.00						139
		2.18	70	Sh/Clst: gy blk, brn blk		139-1L
			20	Sh/Clst: drk gy to m drk gy		139-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		139-3L
4282.00						140
		2.35	70	Sh/Clst: gy blk, brn blk		140-1L
			20	Sh/Clst: drk gy to m drk gy		140-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		140-3L
4288.00						141
		2.42	70	Sh/Clst: gy blk, brn blk		141-1L
			20	Sh/Clst: drk gy to m drk gy		141-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		141-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4294.00						142
		2.23	60	Sh/Clst: gy blk, brn blk		142-1L
			30	Cont : dd		142-4L
			10	Sh/Clst: drk gy to m drk gy		142-2L
			tr	Ca : brn blk, dol		142-3L
4300.00						143
		2.19	70	Sh/Clst: gy blk, brn blk		143-1L
			20	Cont : dd		143-4L
			10	Sh/Clst: drk gy to m drk gy		143-2L
			tr	Ca : brn blk, dol		143-3L
4306.00						144
		2.21	70	Sh/Clst: gy blk, brn blk		144-1L
			20	Cont : dd		144-4L
			10	Sh/Clst: drk gy to m drk gy		144-2L
			tr	Ca : brn blk, dol		144-3L
4312.00						145
		2.65	70	Sh/Clst: gy blk, brn blk		145-1L
			20	Cont : dd		145-4L
			10	Sh/Clst: drk gy to m drk gy		145-2L
			tr	Ca : brn blk, dol		145-3L
4316.00						146
		2.38	70	Sh/Clst: gy blk, brn blk		146-1L
			20	Cont : dd		146-4L
			10	Sh/Clst: drk gy to m drk gy		146-2L
			tr	Ca : brn blk, dol		146-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4322.00						147
			70	Sh/Clst: drk gy to m drk gy, fis		147-1L
		2.58	20	Sh/Clst: gy blk, brn blk		147-2L
			10	Cont : prp, dd		147-3L
4328.00						148
			70	Sh/Clst: drk gy to m drk gy, fis		148-1L
		2.39	20	Sh/Clst: gy blk, brn blk		148-2L
			10	Cont : prp, dd		148-3L
4334.00						149
		1.90	50	Sh/Clst: drk gy to m drk gy, fis		149-1L
			30	Cont : Coal-ad, Mica-ad, prp, dd		149-3L
		2.51	20	Sh/Clst: gy blk, brn blk		149-2L
4340.00						150
			50	Cont : Coal-ad, Mica-ad, prp, dd		150-3L
		3.99	40	Sh/Clst: drk gy to m drk gy, fis		150-1L
			10	Sh/Clst: gy blk, brn blk		150-2L
4346.00						151
		2.54	80	Sh/Clst: gy blk, drk gy to m drk gy, fis		151-1L
			20	Cont : Coal-ad, Mica-ad, prp, dd		151-2L
4352.00						152
		2.21	70	Sh/Clst: drk gy to m drk gy, fis		152-1L
			20	Cont : Coal-ad, Mica-ad, prp, dd		152-4L
			10	Sh/Clst: gy blk, brn blk		152-2L
			tr	Ca : brn blk, dol		152-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4356.00						153
		2.19	50	Sh/Clst: drk gy to m drk gy, fis		153-1L
			30	Sh/Clst: gy blk, brn blk		153-2L
			20	Cont : Coal-ad, Mica-ad, prp, dd		153-4L
			tr	Ca : brn blk, dol		153-3L
4362.00					trb	154
		2.05	70	Sh/Clst: gy blk, brn blk		154-1L
			20	Cont : Coal-ad, Mica-ad, prp, dd		154-3L
			10	Sh/Clst: drk gy to m drk gy		154-2L
4368.00						155
		1.96	70	Sh/Clst: drk gy to m drk gy, fis		155-1L
		2.29	20	Sh/Clst: gy blk, brn blk		155-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		155-3L
4372.00						156
		2.89	60	Sh/Clst: gy blk, brn blk		156-1L
			20	Sh/Clst: drk gy to m drk gy, fis		156-2L
			20	Cont : Coal-ad, Mica-ad, prp, dd		156-4L
			tr	Ca : brn blk, dol		156-3L
4380.00						157
		2.89	40	Sh/Clst: gy blk, brn blk		157-1L
			30	Sh/Clst: drk gy to m drk gy, fis		157-2L
			30	Cont : Coal-ad, Mica-ad, prp, dd		157-4L
			tr	Ca : brn blk, dol		157-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4386.00						158
		2.40	90	Sh/Clst: gy blk, brn blk		158-1L
			5	Sh/Clst: drk gy to m drk gy, fis		158-2L
			5	Cont : Coal-ad, Mica-ad, prp, dd		158-4L
			tr	Ca : brn blk, dol		158-3L
4389.00						159
		2.34	80	Sh/Clst: gy blk, brn blk		159-1L
			15	Cont : Coal-ad, Mica-ad, prp, dd		159-4L
			5	Sh/Clst: drk gy to m drk gy, fis		159-2L
			tr	Ca : brn blk, dol		159-3L
4395.00						160
		2.56	80	Sh/Clst: gy blk, brn blk		160-1L
			15	Cont : Coal-ad, Mica-ad, prp, dd		160-4L
			5	Sh/Clst: drk gy to m drk gy, fis		160-2L
			tr	Ca : brn blk, dol		160-3L
4401.00						161
		2.50	90	Sh/Clst: gy blk, brn blk		161-1L
			5	Sh/Clst: drk gy to m drk gy, fis		161-2L
			5	Cont : Coal-ad, Mica-ad, prp, dd		161-4L
			tr	Ca : brn blk, dol		161-3L
4407.00						162
		2.20	90	Sh/Clst: gy blk, brn blk		162-1L
			5	Sh/Clst: drk gy to m drk gy, fis		162-2L
			5	Cont : Coal-ad, Mica-ad, prp, dd		162-4L
			tr	Ca : brn blk, dol		162-3L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/7-15

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4413.00						163
		3.14	80	Sh/Clst: gy blk, brn blk		163-1L
			10	Sh/Clst: drk gy to m drk gy, fis		163-2L
			10	Cont : Coal-ad, Mica-ad, prp, dd		163-4L
			tr	Ca : brn blk, dol		163-3L
4419.00						164
		7.50	90	Sh/Clst: gy blk, brn blk		164-1L
			5	Sh/Clst: drk gy to m drk gy, fis		164-2L
			5	Cont : Coal-ad, Mica-ad, prp, dd		164-4L
			tr	Ca : brn blk, dol		164-3L
4422.00						165
		3.98	90	Sh/Clst: gy blk, brn blk		165-1L
			5	Sh/Clst: drk gy to m drk gy, fis		165-2L
			5	Cont : Coal-ad, Mica-ad, prp, dd		165-4L
			tr	Ca : brn blk, dol		165-3L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3401.00	cut	Ca : m gy to drk gy	0.20	0.53	0.44	1.20	1.30	41	34	0.7	0.27	429	001-2L
3419.00	cut	Ca : gy blk, m gy to drk gy	0.16	0.63	0.43	1.47	1.11	57	39	0.8	0.20	426	004-2L
3444.00	cut	Sh/Clst: lt gy to m gy	0.30	0.34	0.21	1.62	0.50	68	42	0.6	0.47	337	008-2L
3444.00	cut	Sh/Clst: drk gy, blk	0.81	2.46	0.47	5.23	2.34	105	20	3.3	0.25	431	008-4L
3450.00	cut	Sh/Clst: ol gy, lt gy to m gy, pl gn gy	0.95	1.09	0.33	3.30	0.69	158	48	2.0	0.47	338	009-1L
3450.00	cut	Sh/Clst: drk gy, blk	2.53	4.26	0.67	6.36	2.96	144	23	6.8	0.37	434	009-4L
3456.00	cut	Sh/Clst: drk gy, blk	1.79	3.83	0.77	4.97	3.10	124	25	5.6	0.32	433	010-3L
3474.00	cut	Sh/Clst: blk, drk gy	8.88	12.86	1.30	9.89	5.49	234	24	21.7	0.41	430	013-2L
3486.00	cut	Sh/Clst: blk, drk gy, dsk y brn	4.83	8.41	1.10	7.65	4.08	206	27	13.2	0.36	434	015-2L
3492.00	cut	Sh/Clst: blk, drk gy, dsk y brn	5.76	11.53	1.00	11.53	5.31	217	19	17.3	0.33	434	016-3L
3505.00	cut	Sh/Clst: drk gy, dsk y brn	2.12	3.35	0.65	5.15	2.36	142	28	5.5	0.39	432	018-3L
3517.00	cut	Sh/Clst: drk gy, dsk y brn	2.77	4.19	0.76	5.51	2.79	150	27	7.0	0.40	432	020-3L
3539.00	cut	Sh/Clst: dsk y brn	2.24	3.37	0.69	4.88	2.01	168	34	5.6	0.40	433	023-2L
3545.00	cut	Sh/Clst: dsk y brn	2.18	3.57	0.73	4.89	2.30	155	32	5.8	0.38	433	024-3L
3551.00	cut	Sh/Clst: dsk y brn	1.09	1.23	0.56	2.20	1.11	111	50	2.3	0.47	433	025-4L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3569.00	cut	Sh/Clst: ol gy, lt gy to m gy	0.47	0.51	0.36	1.42	0.58	88	62	1.0	0.48	337	028-1L
3575.00	cut	Sh/Clst: ol gy, lt gy to m gy	0.74	0.59	0.29	2.03	0.57	104	51	1.3	0.56	343	029-1L
3581.00	cut	Sh/Clst: brn blk	4.32	16.18	0.77	21.01	5.10	317	15	20.5	0.21	429	030-1L
3587.00	cut	Sh/Clst: brn blk	2.84	14.43	1.10	13.12	4.80	301	23	17.3	0.16	433	031-1L
3593.00	cut	Sh/Clst: gy blk, brn blk	2.19	9.96	0.76	13.11	2.89	345	26	12.2	0.18	434	032-2L
3600.00	cut	Sh/Clst: gy blk, brn blk	2.76	10.14	1.19	8.52	3.56	285	33	12.9	0.21	435	033-2L
3606.00	cut	Sh/Clst: gy blk, brn blk	1.88	8.01	0.34	23.56	2.80	286	12	9.9	0.19	438	034-2L
3612.00	cut	Sh/Clst: gy blk, brn blk	2.66	11.70	0.59	19.83	3.69	317	16	14.4	0.19	435	035-1L
3618.00	cut	Sh/Clst: gy blk, brn blk	3.12	9.49	0.36	26.36	3.12	304	12	12.6	0.25	433	036-1L
3624.00	cut	Sh/Clst: gy blk, brn blk	2.80	7.01	0.44	15.93	2.62	268	17	9.8	0.29	434	037-1L
3630.00	cut	Sh/Clst: gy blk, brn blk	2.63	7.25	0.56	12.95	2.66	273	21	9.9	0.27	434	038-1L
3636.00	cut	Sh/Clst: gy blk, brn blk	2.41	6.14	0.73	8.41	2.49	247	29	8.6	0.28	433	039-1L
3642.00	cut	Sh/Clst: gy blk, brn blk	1.84	6.83	0.81	8.43	2.53	270	32	8.7	0.21	435	040-1L
3648.00	cut	Sh/Clst: gy blk	3.05	10.00	0.58	17.24	3.39	295	17	13.1	0.23	437	041-1L
3655.00	cut	Sh/Clst: gy blk	2.07	5.99	0.50	11.98	2.45	244	20	8.1	0.26	435	042-1L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3682.00	cut	Sh/Clst: gy blk	3.44	8.48	0.72	11.78	3.12	272	23	11.9	0.29	434	045-1L
3703.00	cut	Sh/Clst: gy blk	1.40	4.24	1.09	3.89	1.70	249	64	5.6	0.25	437	048-1L
3709.00	cut	Sh/Clst: gy blk	1.07	3.69	0.44	8.39	1.64	225	27	4.8	0.22	436	049-1L
3715.00	cut	Sh/Clst: gy blk	2.81	5.98	0.40	14.95	1.99	301	20	8.8	0.32	435	050-1L
3740.00	cut	Sh/Clst: gy blk, drk gy	2.08	4.28	0.55	7.78	1.94	221	28	6.4	0.33	437	054-1L
3752.00	cut	Sh/Clst: gy blk, drk gy	2.64	4.78	0.70	6.83	2.16	221	32	7.4	0.36	434	056-1L
3758.00	cut	Sh/Clst: gy blk, drk gy	2.89	6.12	0.57	10.74	2.31	265	25	9.0	0.32	437	057-1L
3764.00	cut	Sh/Clst: gy blk, drk gy	1.87	4.79	0.55	8.71	2.08	230	26	6.7	0.28	434	058-1L
3770.00	cut	Sh/Clst: drk gy	28.58	35.68	1.63	21.89	7.54	473	22	64.3	0.44	417	059-1L
3776.00	cut	Sh/Clst: gy blk, drk gy to m drk gy	3.39	7.36	0.58	12.69	2.69	274	22	10.8	0.32	434	060-1L
3783.00	cut	Sh/Clst: gy blk, drk gy	2.31	5.50	0.49	11.22	2.41	228	20	7.8	0.30	434	061-1L
3783.00	cut	Ca : drk y brn	2.48	3.64	0.82	4.44	2.37	154	35	6.1	0.41	426	061-3L
3789.00	cut	Sh/Clst: gy blk, drk gy	1.50	4.85	0.71	6.83	2.14	227	33	6.3	0.24	436	062-1L
3795.00	cut	Sh/Clst: gy blk, drk gy	2.10	5.58	0.58	9.62	2.47	226	23	7.7	0.27	437	063-1L
3801.00	cut	Sh/Clst: gy blk, drk gy, dsk y brn	1.41	5.08	0.49	10.37	2.20	231	22	6.5	0.22	435	064-1L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3807.00	cut	Sh/Clst: gy blk, drk gy	1.97	5.28	0.60	8.80	2.31	229	26	7.3	0.27	436	065-1L
3807.00	cut	Ca : dsk brn, dsk y brn	0.54	1.59	0.65	2.45	1.17	136	56	2.1	0.25	433	065-2L
3813.00	cut	Sh/Clst: gy blk, drk gy	1.97	5.45	0.51	10.69	2.37	230	22	7.4	0.27	435	066-1L
3819.00	cut	Sh/Clst: ol gy, m drk gy to drk gy, gy blk	2.19	5.43	1.11	4.89	2.37	229	47	7.6	0.29	436	067-1L
3825.00	cut	Sh/Clst: gy blk, drk gy to m drk gy	1.43	4.62	0.79	5.85	2.17	213	36	6.0	0.24	434	068-1L
3831.00	cut	Sh/Clst: gy blk, drk gy to m drk gy	1.70	4.46	0.62	7.19	1.97	226	31	6.2	0.28	434	069-1L
3837.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.67	4.11	0.63	6.52	1.86	221	34	5.8	0.29	434	070-1L
3844.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.37	4.54	0.23	19.74	1.95	233	12	5.9	0.23	438	071-1L
3850.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.77	4.97	0.49	10.14	1.99	250	25	6.7	0.26	434	072-1L
3859.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.39	4.17	0.48	8.69	1.82	229	26	5.6	0.25	433	073-1L
3862.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.56	4.94	0.63	7.84	2.15	230	29	7.5	0.34	432	074-1L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3868.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.07	3.55	0.54	6.57	1.86	191	29	4.6	0.23	433	075-1L
3874.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.24	4.44	0.61	7.28	2.02	220	30	6.7	0.34	433	076-1L
3880.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.12	4.77	0.59	8.08	2.14	223	28	6.9	0.31	434	077-1L
3886.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.01	4.60	0.57	8.07	1.99	231	29	6.6	0.30	433	078-1L
3893.00	cut	Sh/Clst: gy blk, brn blk	2.92	6.03	0.58	10.40	2.41	250	24	9.0	0.33	434	080-1L
3904.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.78	3.87	0.55	7.04	1.86	208	30	5.7	0.32	433	081-1L
3911.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.09	4.24	0.66	6.42	2.11	201	31	6.3	0.33	434	082-1L
3917.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.06	4.04	0.59	6.85	2.05	197	29	6.1	0.34	432	083-1L
3923.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.29	4.86	0.41	11.85	2.30	211	18	7.2	0.32	433	084-1L
3929.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.86	4.22	0.51	8.27	2.11	200	24	6.1	0.31	434	085-1L
3935.00	cut	Sh/Clst: gy blk, brn blk	1.52	3.65	0.48	7.60	2.04	179	24	5.2	0.29	433	086-1L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3935.00	cut	Ca : brn blk, dsk y brn	0.63	1.49	0.39	3.82	1.10	135	35	2.1	0.30	436	086-2L
3941.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.28	4.34	0.49	8.86	2.05	212	24	6.6	0.34	432	087-1L
3947.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.32	4.31	0.53	8.13	2.11	204	25	6.6	0.35	432	088-1L
3953.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.27	4.45	0.54	8.24	2.09	213	26	6.7	0.34	434	089-1L
3959.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.67	3.80	0.52	7.31	1.91	199	27	5.5	0.31	434	090-1L
3965.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.83	5.33	0.42	12.69	2.43	219	17	8.2	0.35	439	091-1L
3971.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.12	4.60	0.39	11.79	2.31	199	17	6.7	0.32	440	092-1L
3977.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.33	5.20	0.41	12.68	2.41	216	17	7.5	0.31	433	093-1L
3983.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.27	4.97	0.59	8.42	2.47	201	24	7.2	0.31	434	094-1L
3990.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	5.27	7.09	0.87	8.15	2.66	267	33	12.4	0.43	434	095-1L
3996.00	cut	Sh/Clst: drk gy to m drk gy	2.01	4.53	0.61	7.43	2.18	208	28	6.5	0.31	435	096-1L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4005.00	cut	Sh/Clst: drk gy to m drk gy	2.56	4.57	0.74	6.18	2.31	198	32	7.1	0.36	434	097-1L
4011.00	cut	Sh/Clst: drk gy to m drk gy	3.14	5.00	0.69	7.25	2.41	207	29	8.1	0.39	434	098-1L
4017.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.69	4.91	0.61	8.05	2.33	211	26	7.6	0.35	434	099-1L
4023.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.35	4.32	0.72	6.00	2.20	196	33	6.7	0.35	435	100-1L
4041.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.64	3.61	0.53	6.81	2.15	168	25	5.3	0.31	439	101-1L
4047.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.66	4.73	0.47	10.06	2.39	198	20	6.4	0.26	434	102-1L
4053.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	1.54	4.15	0.53	7.83	2.28	182	23	5.7	0.27	434	103-1L
4059.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.52	5.00	0.48	10.42	2.36	212	20	7.5	0.34	440	104-1L
4066.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.81	4.65	0.54	8.61	2.31	201	23	7.5	0.38	438	105-1L
4072.00	cut	Sh/Clst: gy blk, brn blk	2.17	5.79	0.41	14.12	2.33	248	18	8.0	0.27	439	106-1L
4078.00	cut	Sh/Clst: gy blk, m gy blk	4.90	16.52	0.67	24.66	7.16	231	9	21.4	0.23	439	107-1L
4081.00	cut	Sh/Clst: gy blk, m gy blk	2.09	4.91	0.54	9.09	2.27	216	24	7.0	0.30	439	108-1L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4087.00	cut	Sh/Clst: gy blk, m gy blk	2.19	5.31	0.44	12.07	2.38	223	18	7.5	0.29	438	109-1L
4093.00	cut	Sh/Clst: gy blk, m gy blk	1.72	5.29	0.39	13.56	2.45	216	16	7.0	0.25	440	110-1L
4099.00	cut	Sh/Clst: gy blk, m gy blk	3.20	16.64	0.67	24.84	6.86	243	10	19.8	0.16	440	111-1L
4105.00	cut	Sh/Clst: gy blk, m gy blk	1.75	5.14	0.46	11.17	2.43	212	19	6.9	0.25	439	112-1L
4111.00	cut	Sh/Clst: gy blk, m gy blk	1.93	5.45	0.42	12.98	2.73	200	15	7.4	0.26	437	113-1L
4117.00	cut	Sh/Clst: gy blk, m gy blk	2.48	7.55	0.42	17.98	3.08	245	14	10.0	0.25	442	114-1L
4123.00	cut	Sh/Clst: gy blk, brn blk	2.00	5.90	0.41	14.39	2.35	251	17	7.9	0.25	438	115-1L
4130.00	cut	Sh/Clst: gy blk, brn blk	2.22	6.04	0.46	13.13	2.61	231	18	8.3	0.27	440	116-1L
4136.00	cut	Sh/Clst: gy blk, brn blk	1.55	5.06	0.45	11.24	2.38	213	19	6.6	0.23	440	117-2L
4136.00	cut	Ca : lt brn gy, dsk y brn	3.57	9.64	1.04	9.27	5.59	172	19	13.2	0.27	435	117-3L
4142.00	cut	Sh/Clst: gy blk, brn blk	2.12	5.83	0.43	13.56	2.51	232	17	7.9	0.27	439	118-2L
4148.00	cut	Sh/Clst: gy blk, brn blk	1.79	4.95	0.30	16.50	2.22	223	14	6.7	0.27	440	119-1L
4154.00	cut	Sh/Clst: gy blk, brn blk	2.13	6.09	0.34	17.91	2.75	221	12	8.2	0.26	439	120-1L
4160.00	cut	Sh/Clst: gy blk, brn blk	2.27	5.21	0.32	16.28	2.20	237	15	7.5	0.30	441	121-1L
4166.00	cut	Sh/Clst: gy blk, brn blk	1.87	4.94	0.31	15.94	2.16	229	14	6.8	0.27	439	122-1L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4172.00	cut	Sh/Clst: gy blk, brn blk	2.41	6.07	0.40	15.18	2.54	239	16	8.5	0.28	442	123-1L
4178.00	cut	Sh/Clst: gy blk, brn blk	2.56	5.91	0.36	16.42	2.48	238	15	8.5	0.30	440	124-1L
4184.00	cut	Sh/Clst: gy blk, brn blk	3.14	5.73	0.46	12.46	2.61	220	18	8.9	0.35	441	125-1L
4191.00	cut	Sh/Clst: gy blk, brn blk	3.83	5.84	0.44	13.27	2.59	225	17	9.7	0.40	441	126-1L
4197.00	cut	Sh/Clst: gy blk, brn blk	3.24	5.33	0.48	11.10	2.32	230	21	8.6	0.38	440	127-1L
4209.00	cut	Sh/Clst: gy blk, brn blk	4.57	5.87	0.38	15.45	2.59	227	15	10.4	0.44	438	128-1L
4215.00	cut	Sh/Clst: gy blk, brn blk	4.80	6.71	0.21	31.95	2.99	224	7	11.5	0.42	441	129-1L
4221.00	cut	Sh/Clst: gy blk, brn blk	3.83	8.04	0.36	22.33	2.98	270	12	11.9	0.32	439	130-1L
4227.00	cut	Sh/Clst: gy blk, brn blk	3.20	6.91	0.39	17.72	2.60	266	15	10.1	0.32	440	131-1L
4233.00	cut	Sh/Clst: gy blk, brn blk	3.75	6.93	0.49	14.14	2.67	260	18	10.7	0.35	441	132-1L
4239.00	cut	Sh/Clst: gy blk, brn blk	1.14	4.09	0.58	7.05	2.30	178	25	5.2	0.22	439	133-1L
4245.00	cut	Sh/Clst: gy blk, brn blk	2.03	4.57	0.46	9.93	2.14	214	21	6.6	0.31	440	134-1L
4252.00	cut	Sh/Clst: gy blk, brn blk	2.36	5.48	0.41	13.37	2.35	233	17	7.8	0.30	438	135-1L
4255.00	cut	Sh/Clst: gy blk, brn blk	2.37	5.93	0.47	12.62	2.57	231	18	8.3	0.29	439	136-1L
4264.00	cut	Sh/Clst: gy blk, brn blk	2.59	5.76	0.38	15.16	2.38	242	16	8.4	0.31	440	137-1L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4270.00	cut	Sh/Clst: gy blk, brn blk	1.74	5.43	0.35	15.51	2.46	221	14	7.2	0.24	438	138-1L
4276.00	cut	Sh/Clst: gy blk, brn blk	1.75	5.49	0.07	78.43	2.18	252	3	7.2	0.24	438	139-1L
4282.00	cut	Sh/Clst: gy blk, brn blk	2.10	6.12	0.32	19.13	2.35	260	14	8.2	0.26	439	140-1L
4288.00	cut	Sh/Clst: gy blk, brn blk	2.31	6.17	0.45	13.71	2.42	255	19	8.5	0.27	438	141-1L
4294.00	cut	Sh/Clst: gy blk, brn blk	1.50	3.91	0.58	6.74	2.23	175	26	5.4	0.28	437	142-1L
4300.00	cut	Sh/Clst: gy blk, brn blk	2.00	5.54	0.53	10.45	2.19	253	24	7.5	0.27	439	143-1L
4306.00	cut	Sh/Clst: gy blk, brn blk	1.70	3.84	0.68	5.65	2.21	174	31	5.5	0.31	438	144-1L
4312.00	cut	Sh/Clst: gy blk, brn blk	2.54	6.23	0.55	11.33	2.65	235	21	8.8	0.29	438	145-1L
4316.00	cut	Sh/Clst: gy blk, brn blk	2.23	6.42	0.62	10.35	2.38	270	26	8.7	0.26	441	146-1L
4322.00	cut	Sh/Clst: gy blk, brn blk	2.35	5.68	0.32	17.75	2.58	220	12	8.0	0.29	435	147-2L
4328.00	cut	Sh/Clst: gy blk, brn blk	2.35	5.26	0.35	15.03	2.39	220	15	7.6	0.31	439	148-2L
4334.00	cut	Sh/Clst: drk gy to m drk gy	1.35	3.03	0.66	4.59	1.90	159	35	4.4	0.31	438	149-1L
4334.00	cut	Sh/Clst: gy blk, brn blk	1.77	4.49	0.75	5.99	2.51	179	30	6.3	0.28	437	149-2L
4340.00	cut	Sh/Clst: drk gy to m drk gy	11.28	12.18	1.32	9.23	3.99	305	33	23.5	0.48	432	150-1L
4346.00	cut	Sh/Clst: gy blk, drk gy to m drk gy	2.58	5.06	0.86	5.88	2.54	199	34	7.6	0.34	437	151-1L

Table 2 : Rock-Eval table for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4352.00	cut	Sh/Clst: drk gy to m drk gy	1.68	4.61	0.64	7.20	2.21	209	29	6.3	0.27	439	152-1L
4356.00	cut	Sh/Clst: drk gy to m drk gy	1.40	3.84	0.73	5.26	2.19	175	33	5.2	0.27	438	153-1L
4362.00	cut	Sh/Clst: gy blk, brn blk	1.62	4.39	0.50	8.78	2.05	214	24	6.0	0.27	440	154-1L
4368.00	cut	Sh/Clst: drk gy to m drk gy	0.47	3.88	0.65	5.97	1.96	198	33	4.3	0.11	438	155-1L
4368.00	cut	Sh/Clst: gy blk, brn blk	1.83	4.47	0.43	10.40	2.29	195	19	6.3	0.29	437	155-2L
4372.00	cut	Sh/Clst: gy blk, brn blk	2.91	5.52	0.65	8.49	2.89	191	22	8.4	0.35	437	156-1L
4380.00	cut	Sh/Clst: gy blk, brn blk	3.71	6.17	0.53	11.64	2.89	213	18	9.9	0.38	437	157-1L
4386.00	cut	Sh/Clst: gy blk, brn blk	2.39	5.97	0.29	20.59	2.40	249	12	8.4	0.29	440	158-1L
4389.00	cut	Sh/Clst: gy blk, brn blk	2.63	6.05	0.33	18.33	2.34	259	14	8.7	0.30	439	159-1L
4395.00	cut	Sh/Clst: gy blk, brn blk	3.23	6.48	0.48	13.50	2.56	253	19	9.7	0.33	437	160-1L
4401.00	cut	Sh/Clst: gy blk, brn blk	1.84	6.26	0.50	12.52	2.50	250	20	8.1	0.23	439	161-1L
4407.00	cut	Sh/Clst: gy blk, brn blk	1.88	4.02	0.63	6.38	2.20	183	29	5.9	0.32	438	162-1L
4413.00	cut	Sh/Clst: gy blk, brn blk	3.03	7.61	0.44	17.30	3.14	242	14	10.6	0.28	441	163-1L
4419.00	cut	Sh/Clst: gy blk, brn blk	7.22	12.33	0.55	22.42	7.50	164	7	19.5	0.37	444	164-1L
4422.00	cut	Sh/Clst: gy blk, brn blk	3.37	8.26	0.69	11.97	3.98	208	17	11.6	0.29	440	165-1L

Table 3 a: Weight of EOM and Chromatographic Fraction for well NOCS 2/7-15

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
3492.00	com	Composite sample - see table 3 e	0.9	15.1	5.6	1.4	0.6	7.5	7.0	8.1	3.87	197-0B
3517.00	com	Composite sample - see table 3 e	0.9	8.0	2.6	1.7	0.4	3.3	4.3	3.7	2.13	198-0B
3618.00	com	Composite sample - see table 3 e	1.8	14.0	2.5	1.0	0.2	10.3	3.5	10.5	3.44	182-0B
3682.00	com	Composite sample - see table 3 e	2.8	20.1	8.4	2.2	0.7	8.8	10.6	9.5	3.26	183-0B
3783.00	com	Composite sample - see table 3 e	10.0	61.0	23.2	5.2	0.8	31.8	28.4	32.6	2.27	184-0B
3813.00	com	Composite sample - see table 3 e	9.4	46.4	18.2	4.3	0.6	23.3	22.5	23.9	2.32	185-0B
3893.00	com	Composite sample - see table 3 e	9.3	52.0	21.5	4.8	0.6	25.1	26.3	25.7	2.40	187-0B
3935.00	com	Composite sample - see table 3 e	7.5	43.3	17.2	3.7	5.7	16.7	20.9	22.4	2.39	188-0B
3990.00	com	Composite sample - see table 3 e	7.6	48.9	19.2	4.2	1.1	24.4	23.4	25.5	2.50	189-0B
4011.00	com	Composite sample - see table 3 e	3.3	22.7	9.0	2.6	1.4	9.7	11.6	11.1	2.51	190-0B
4066.00	com	Composite sample - see table 3 e	9.4	50.3	18.2	4.9	0.6	26.6	23.1	27.2	2.47	191-0B
4111.00	com	Composite sample - see table 3 e	5.9	69.8	22.1	7.0	2.3	38.4	29.1	40.7	6.18	192-0B
4178.00	com	Composite sample - see table 3 e	9.3	85.5	15.8	4.8	1.6	63.3	20.6	64.9	4.99	193-0B
4233.00	com	Composite sample - see table 3 e	8.4	100.3	29.8	6.7	2.0	61.8	36.5	63.8	4.85	194-0B

Table 3 a: Weight of EOM and Chromatographic Fraction for well NOCS 2/7-15

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
4334.00	com	Composite sample - see table 3 e	10.4	96.9	29.3	3.0	3.3	61.3	32.3	64.6	4.85	195-0B
4422.00	com	Composite sample - see table 3 e	10.8	108.7	35.2	7.0	3.2	63.3	42.2	66.5	5.20	196-0B

Table 3 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
3492.00	com	Composite sample - see table 3 e	16777	6222	1555	666	8333	7777	9000	197-0B
3517.00	com	Composite sample - see table 3 e	9411	3058	2000	470	3882	5058	4352	198-0B
3618.00	com	Composite sample - see table 3 e	7865	1415	539	112	5797	1955	5910	182-0B
3682.00	com	Composite sample - see table 3 e	7282	3043	797	253	3188	3840	3442	183-0B
3783.00	com	Composite sample - see table 3 e	6087	2315	518	79	3173	2834	3253	184-0B
3813.00	com	Composite sample - see table 3 e	4930	1934	456	63	2476	2391	2539	185-0B
3893.00	com	Composite sample - see table 3 e	5615	2321	518	64	2710	2840	2775	187-0B
3935.00	com	Composite sample - see table 3 e	5781	2296	493	761	2229	2790	2990	188-0B
3990.00	com	Composite sample - see table 3 e	6408	2516	550	144	3197	3066	3342	189-0B
4011.00	com	Composite sample - see table 3 e	6984	2769	799	430	2984	3569	3415	190-0B
4066.00	com	Composite sample - see table 3 e	5368	1942	522	64	2838	2465	2902	191-0B
4111.00	com	Composite sample - see table 3 e	11850	3752	1188	390	6519	4940	6910	192-0B
4178.00	com	Composite sample - see table 3 e	9203	1700	516	172	6813	2217	6986	193-0B
4233.00	com	Composite sample - see table 3 e	11954	3547	798	238	7370	4345	7609	194-0B

Table 3 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
4334.00	com	Composite sample - see table 3 e	9308	2814	288	317	5888	3102	6205	195-0B
4422.00	com	Composite sample - see table 3 e	10055	3256	649	296	5853	3905	6149	196-0B

Table 3 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
3492.00	com	Composite sample - see table 3 e	433.53	160.78	40.20	17.23	215.33	200.98	232.56	197-0B
3517.00	com	Composite sample - see table 3 e	441.87	143.61	93.90	22.09	182.27	237.50	204.36	198-0B
3618.00	com	Composite sample - see table 3 e	228.64	41.15	15.68	3.27	168.54	56.83	171.81	182-0B
3682.00	com	Composite sample - see table 3 e	223.39	93.36	24.45	7.78	97.80	117.81	105.58	183-0B
3783.00	com	Composite sample - see table 3 e	268.19	102.00	22.86	3.52	139.81	124.86	143.33	184-0B
3813.00	com	Composite sample - see table 3 e	212.54	83.37	19.70	2.75	106.73	103.06	109.48	185-0B
3893.00	com	Composite sample - see table 3 e	233.98	96.74	21.60	2.70	112.94	118.34	115.64	187-0B
3935.00	com	Composite sample - see table 3 e	241.88	96.08	20.67	31.84	93.29	116.75	125.13	188-0B
3990.00	com	Composite sample - see table 3 e	256.36	100.66	22.02	5.77	127.92	122.67	133.68	189-0B
4011.00	com	Composite sample - see table 3 e	278.27	110.33	31.87	17.16	118.91	142.20	136.07	190-0B
4066.00	com	Composite sample - see table 3 e	217.34	78.64	21.17	2.59	114.93	99.81	117.53	191-0B
4111.00	com	Composite sample - see table 3 e	191.76	60.71	19.23	6.32	105.49	79.94	111.81	192-0B
4178.00	com	Composite sample - see table 3 e	184.44	34.08	10.35	3.45	136.55	44.44	140.00	193-0B
4233.00	com	Composite sample - see table 3 e	246.49	73.14	16.47	4.92	151.97	89.60	156.89	194-0B

Table 3 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
4334.00	com	Composite sample - see table 3 e	191.92	58.03	5.94	6.54	121.41	63.97	127.95	195-0B
4422.00	com	Composite sample - see table 3 e	193.38	62.62	12.49	5.69	112.57	75.11	118.27	196-0B

Table 3 d: Composition of material extracted from the rock (%) for well NOCS 2/7-15

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
3492.00	com	Composite sample - see table 3 e	37.09	9.27	3.97	49.67	46.36	53.64	400.00	86.42	197-0B
3517.00	com	Composite sample - see table 3 e	32.50	21.25	5.00	41.25	53.75	46.25	152.94	116.22	198-0B
3618.00	com	Composite sample - see table 3 e	18.00	6.86	1.43	73.71	24.86	75.14	262.50	33.08	182-0B
3682.00	com	Composite sample - see table 3 e	41.79	10.95	3.48	43.78	52.74	47.26	381.82	111.58	183-0B
3783.00	com	Composite sample - see table 3 e	38.03	8.52	1.31	52.13	46.56	53.44	446.15	87.12	184-0B
3813.00	com	Composite sample - see table 3 e	39.22	9.27	1.29	50.22	48.49	51.51	423.26	94.14	185-0B
3893.00	com	Composite sample - see table 3 e	41.35	9.23	1.15	48.27	50.58	49.42	447.92	102.33	187-0B
3935.00	com	Composite sample - see table 3 e	39.72	8.55	13.16	38.57	48.27	51.73	464.86	93.30	188-0B
3990.00	com	Composite sample - see table 3 e	39.26	8.59	2.25	49.90	47.85	52.15	457.14	91.76	189-0B
4011.00	com	Composite sample - see table 3 e	39.65	11.45	6.17	42.73	51.10	48.90	346.15	104.50	190-0B
4066.00	com	Composite sample - see table 3 e	36.18	9.74	1.19	52.88	45.92	54.08	371.43	84.93	191-0B
4111.00	com	Composite sample - see table 3 e	31.66	10.03	3.30	55.01	41.69	58.31	315.71	71.50	192-0B
4178.00	com	Composite sample - see table 3 e	18.48	5.61	1.87	74.04	24.09	75.91	329.17	31.74	193-0B
4233.00	com	Composite sample - see table 3 e	29.67	6.68	1.99	61.66	36.35	63.65	444.18	57.11	194-0B

Table 3 d: Composition of material extracted from the rock (%) for well NOCS 2/7-15

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
4334.00	com	Composite sample - see table 3 e	30.24	3.10	3.41	63.26	33.33	66.67	976.67	50.00	195-0B
4422.00	com	Composite sample - see table 3 e	32.38	6.46	2.94	58.22	38.84	61.16	501.42	63.51	196-0B

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Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 2/7-15

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
3474.00	3492.00	com	197-0B	is composed of:	3474.00	cut	Sh/Clst: blk, drk gy, calc	013-2L
					3486.00	cut	Sh/Clst: blk, drk gy, dsk y brn, calc, pyr	015-2L
					3492.00	cut	Sh/Clst: blk, drk gy, dsk y brn	016-3L
3505.00	3517.00	com	198-0B	is composed of:	3505.00	cut	Sh/Clst: drk gy, dsk y brn	018-3L
					3517.00	cut	Sh/Clst: drk gy, dsk y brn	020-3L
3593.00	3618.00	com	182-0B	is composed of:	3593.00	cut	Sh/Clst: gy blk, brn blk, slt, s	032-2L
					3600.00	cut	Sh/Clst: gy blk, brn blk, slt, s	033-2L
					3606.00	cut	Sh/Clst: gy blk, brn blk, slt, s	034-2L
					3612.00	cut	Sh/Clst: gy blk, brn blk, calc, pyr, slt, s	035-1L
					3618.00	cut	Sh/Clst: gy blk, brn blk, fis	036-1L
3624.00	3682.00	com	183-0B	is composed of:	3624.00	cut	Sh/Clst: gy blk, brn blk, fis	037-1L
					3630.00	cut	Sh/Clst: gy blk, brn blk, fis	038-1L
					3636.00	cut	Sh/Clst: gy blk, brn blk, dol, fis	039-1L
					3642.00	cut	Sh/Clst: gy blk, brn blk, dol, fis	040-1L
					3648.00	cut	Sh/Clst: gy blk, fis	041-1L
					3655.00	cut	Sh/Clst: gy blk, fis	042-1L
					3682.00	cut	Sh/Clst: gy blk	045-1L

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
3703.00	3783.00	com	184-0B	is composed of:	3703.00	cut	Sh/Clst: gy blk	048-1L
					3709.00	cut	Sh/Clst: gy blk	049-1L
					3715.00	cut	Sh/Clst: gy blk	050-1L
					3740.00	cut	Sh/Clst: gy blk, drk gy	054-1L
					3752.00	cut	Sh/Clst: gy blk, drk gy	056-1L
					3758.00	cut	Sh/Clst: gy blk, drk gy	057-1L
					3764.00	cut	Sh/Clst: gy blk, drk gy	058-1L
					3776.00	cut	Sh/Clst: gy blk, drk gy to m drk gy	060-1L
					3783.00	cut	Sh/Clst: gy blk, drk gy	061-1L
3789.00	3813.00	com	185-0B	is composed of:	3789.00	cut	Sh/Clst: gy blk, drk gy, calc	062-1L
					3795.00	cut	Sh/Clst: gy blk, drk gy, calc	063-1L
					3801.00	cut	Sh/Clst: gy blk, drk gy, dsk y brn, calc	064-1L
					3807.00	cut	Sh/Clst: gy blk, drk gy	065-1L
					3813.00	cut	Sh/Clst: gy blk, drk gy	066-1L
3874.00	3893.00	com	187-0B	is composed of:	3874.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	076-1L
					3880.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	077-1L
					3886.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	078-1L
					3893.00	cut	Sh/Clst: gy blk, brn blk, calc	080-1L

Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 2/7-15

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
3904.00	3935.00	com	188-0B	is composed of:	3904.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	081-1L
					3911.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	082-1L
					3917.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	083-1L
					3923.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	084-1L
					3929.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	085-1L
					3935.00	cut	Sh/Clst: gy blk, brn blk, dol	086-1L
3941.00	3990.00	com	189-0B	is composed of:	3941.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	087-1L
					3947.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	088-1L
					3953.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	089-1L
					3959.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	090-1L
					3965.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy, dol	091-1L
					3971.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	092-1L
					3977.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	093-1L
					3983.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	094-1L

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
					3990.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	095-1L
3996.00	4011.00	com	190-0B	is composed of:	3996.00	cut	Sh/Clst: drk gy to m drk gy	096-1L
					4005.00	cut	Sh/Clst: drk gy to m drk gy	097-1L
					4011.00	cut	Sh/Clst: drk gy to m drk gy	098-1L
4017.00	4066.00	com	191-0B	is composed of:	4017.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	099-1L
					4023.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	100-1L
					4041.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	101-1L
					4047.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	102-1L
					4053.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	103-1L
					4059.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	104-1L
					4066.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	105-1L
4072.00	4111.00	com	192-0B	is composed of:	4072.00	cut	Sh/Clst: gy blk, brn blk	106-1L
					4081.00	cut	Sh/Clst: gy blk, m gy blk, dol	108-1L
					4087.00	cut	Sh/Clst: gy blk, m gy blk, dol	109-1L
					4093.00	cut	Sh/Clst: gy blk, m gy blk, dol	110-1L
					4105.00	cut	Sh/Clst: gy blk, m gy blk	112-1L
					4111.00	cut	Sh/Clst: gy blk, m gy blk	113-1L

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
4117.00	4178.00	com	193-0B	is composed of:	4117.00	cut	Sh/Clst: gy blk, m gy blk	114-1L
					4123.00	cut	Sh/Clst: gy blk, brn blk, carb, pyr	115-1L
					4130.00	cut	Sh/Clst: gy blk, brn blk, carb, pyr	116-1L
					4136.00	cut	Sh/Clst: gy blk, brn blk, calc, dol	117-2L
					4142.00	cut	Sh/Clst: gy blk, brn blk, calc, dol	118-2L
					4148.00	cut	Sh/Clst: gy blk, brn blk, slt, s, dol	119-1L
					4154.00	cut	Sh/Clst: gy blk, brn blk, slt, s, dol	120-1L
					4160.00	cut	Sh/Clst: gy blk, brn blk, slt, s, dol	121-1L
					4166.00	cut	Sh/Clst: gy blk, brn blk, slt, s, dol	122-1L
					4172.00	cut	Sh/Clst: gy blk, brn blk, slt, s, dol	123-1L
					4178.00	cut	Sh/Clst: gy blk, brn blk, slt, s, dol	124-1L
4184.00	4233.00	com	194-0B	is composed of:	4184.00	cut	Sh/Clst: gy blk, brn blk, slt, s, dol	125-1L
					4191.00	cut	Sh/Clst: gy blk, brn blk, slt, s, dol	126-1L
					4197.00	cut	Sh/Clst: gy blk, brn blk, slt, s, dol	127-1L
					4209.00	cut	Sh/Clst: gy blk, brn blk	128-1L
					4215.00	cut	Sh/Clst: gy blk, brn blk	129-1L
					4221.00	cut	Sh/Clst: gy blk, brn blk	130-1L
					4227.00	cut	Sh/Clst: gy blk, brn blk	131-1L
					4233.00	cut	Sh/Clst: gy blk, brn blk	132-1L
4239.00	4334.00	com	195-0B	is composed of:	4239.00	cut	Sh/Clst: gy blk, brn blk	133-1L
					4245.00	cut	Sh/Clst: gy blk, brn blk	134-1L
					4252.00	cut	Sh/Clst: gy blk, brn blk	135-1L
					4255.00	cut	Sh/Clst: gy blk, brn blk	136-1L
					4264.00	cut	Sh/Clst: gy blk, brn blk	137-1L
					4270.00	cut	Sh/Clst: gy blk, brn blk	138-1L
					4276.00	cut	Sh/Clst: gy blk, brn blk	139-1L

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
					4282.00	cut	Sh/Clst: gy blk, brn blk	140-1L
					4288.00	cut	Sh/Clst: gy blk, brn blk	141-1L
					4294.00	cut	Sh/Clst: gy blk, brn blk	142-1L
					4300.00	cut	Sh/Clst: gy blk, brn blk	143-1L
					4306.00	cut	Sh/Clst: gy blk, brn blk	144-1L
					4312.00	cut	Sh/Clst: gy blk, brn blk	145-1L
					4316.00	cut	Sh/Clst: gy blk, brn blk	146-1L
					4322.00	cut	Sh/Clst: gy blk, brn blk	147-2L
					4328.00	cut	Sh/Clst: gy blk, brn blk	148-2L
					4334.00	cut	Sh/Clst: gy blk, brn blk	149-2L
4362.00	4422.00	com	196-0B	is composed of:	4362.00	cut	Sh/Clst: gy blk, brn blk	154-1L
					4368.00	cut	Sh/Clst: gy blk, brn blk	155-2L
					4372.00	cut	Sh/Clst: gy blk, brn blk	156-1L
					4380.00	cut	Sh/Clst: gy blk, brn blk	157-1L
					4386.00	cut	Sh/Clst: gy blk, brn blk	158-1L
					4389.00	cut	Sh/Clst: gy blk, brn blk	159-1L
					4395.00	cut	Sh/Clst: gy blk, brn blk	160-1L
					4401.00	cut	Sh/Clst: gy blk, brn blk	161-1L
					4407.00	cut	Sh/Clst: gy blk, brn blk	162-1L
					4413.00	cut	Sh/Clst: gy blk, brn blk	163-1L
					4422.00	cut	Sh/Clst: gy blk, brn blk	165-1L

Table 4 : Saturated Hydrocarbon Ratios for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	Pristane nC17	Pristane Phytane	Pristane + Phytane nC17 + nC18	Phytane nC18	CPI	Sample
3492.00	com	bulk	0.53	1.17	0.52	0.52	1.02	197-0B
3517.00	com	bulk	0.55	1.16	0.55	0.55	1.13	198-0B
3618.00	com	bulk	0.57	1.19	0.54	0.51	1.19	182-0B
3682.00	com	bulk	0.56	1.19	0.55	0.55	1.01	183-0B
3783.00	com	bulk	0.68	1.19	0.67	0.65	1.09	184-0B
3813.00	com	bulk	0.68	1.25	0.66	0.64	1.10	185-0B
3893.00	com	bulk	0.78	1.11	0.76	0.73	1.05	187-0B
3935.00	com	bulk	0.77	1.12	0.77	0.78	1.07	188-0B
3990.00	com	bulk	0.65	1.08	0.66	0.67	1.10	189-0B
4011.00	com	bulk	0.66	1.18	0.66	0.66	1.01	190-0B
4066.00	com	bulk	0.68	1.18	0.67	0.65	1.01	191-0B
4111.00	com	bulk	0.63	1.17	0.62	0.62	1.11	192-0B
4178.00	com	bulk	0.85	1.18	0.82	0.79	1.10	193-0B
4233.00	com	bulk	0.76	1.14	0.77	0.77	1.08	194-0B

Table 4 : Saturated Hydrocarbon Ratios for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	Pristane / nC17	Pristane / Phytane	Pristane + Phytane / nC17 + nC18	Phytane / nC18	CPI	Sample
4334.00	com	bulk	0.59	1.28	0.55	0.52	1.10	195-0B
4422.00	com	bulk	0.52	1.42	0.49	0.44	1.06	196-0B

Table 5 : Aromatic Hydrocarbon Ratios for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	DBT/P	4/1MDBT	(3+2)/1MDBT	Sample
3492.00	com	bulk	0.59	2.04	0.06	0.71	0.73	0.63	0.26	4.70	0.81	197-0B
3517.00	com	bulk	-	-	-	0.75	0.78	0.66	0.22	-	-	198-0B
3618.00	com	bulk	-	-	-	0.60	0.63	0.60	0.10	1.36	0.23	182-0B
3682.00	com	bulk	0.35	1.13	-	0.74	0.67	0.69	0.19	2.19	0.46	183-0B
3783.00	com	bulk	0.85	1.74	0.10	0.68	0.70	0.60	0.17	2.00	0.59	184-0B
3813.00	com	bulk	0.87	1.58	0.09	0.67	0.64	0.56	0.16	2.18	0.44	185-0B
3893.00	com	bulk	0.89	1.83	0.07	0.71	0.62	0.58	0.15	2.70	0.49	187-0B
3935.00	com	bulk	0.82	1.38	0.08	0.80	0.72	0.69	0.28	2.71	0.54	188-0B
3990.00	com	bulk	0.79	2.19	0.08	0.71	0.71	0.63	0.24	2.42	0.48	189-0B
4011.00	com	bulk	0.68	1.47	0.07	0.70	0.69	0.63	0.18	2.86	0.58	190-0B
4066.00	com	bulk	0.82	1.85	0.07	0.70	0.67	0.61	0.13	2.63	0.51	191-0B
4111.00	com	bulk	0.88	1.74	0.06	0.70	0.67	0.62	0.18	4.12	0.56	192-0B
4178.00	com	bulk	0.77	1.69	0.06	0.65	0.64	0.60	0.12	3.19	0.52	193-0B
4233.00	com	bulk	0.84	2.55	0.06	0.75	0.68	0.65	0.23	4.39	0.67	194-0B
4334.00	com	bulk	0.65	1.26	0.04	0.75	0.71	0.70	0.22	4.38	0.70	195-0B

Table 5 : Aromatic Hydrocarbon Ratios for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	DBT/P	4/1MDBT	(3+2)/1MDBT	Sample
4422.00	com	bulk	0.92	3.30	0.05	0.80	0.71	0.69	0.19	8.34	1.01	196-0B

Table 6 : Thermal Maturity Data for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
871.00	cut	bulk	NDP	-	-	3	-	-	166-0B
1036.00	cut	bulk	0.24	4	0.02	-	-	-	167-0B
1182.00	cut	bulk	NDP	-	-	0	-	-	168-0B
1338.00	cut	bulk	NDP	-	-	3	-	-	169-0B
1494.00	cut	bulk	NDP	-	-	3	-	-	170-0B
1649.00	cut	bulk	0.24	6	0.05	-	-	-	171-0B
1795.00	cut	bulk	0.30	25	0.04	-	-	-	172-0B
1951.00	cut	bulk	0.32	7	0.07	-	-	-	173-0B
2106.00	cut	bulk	0.34	32	0.05	-	-	-	174-0B
2262.00	cut	bulk	0.34	26	0.05	-	-	-	175-0B
2417.00	cut	bulk	0.34	8	0.06	-	-	-	176-0B
2563.00	cut	bulk	0.36	15	0.08	-	-	-	177-0B
2728.00	cut	bulk	0.38	18	0.07	-	-	-	178-0B
2883.00	cut	bulk	0.38	19	0.04	-	-	-	179-0B

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
3075.00	cut	bulk	NDP	-	-	5	-	-	180-0B
3272.00	cut	bulk	NDP	-	-	0	-	-	181-0B
3425.00	cut	bulk	NDP	-	-	0	-	-	005-0B
3474.00	cut	Sh/Clst: blk, drk gy	-	-	-	-	NDP	430	013-2L
3492.00	cut	Sh/Clst: blk, drk gy, dsk y brn	-	-	-	-	5	434	016-3L
3532.00	cut	bulk	NDP	-	-	0	-	-	022-0B
3539.00	cut	Sh/Clst: dsk y brn	-	-	-	-	NDP	433	023-2L
3581.00	cut	Sh/Clst: brn blk	-	-	-	-	5	429	030-1L
3593.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	5 - 5.5?	434	032-2L
3612.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	5.5?	435	035-1L
3630.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6?	434	038-1L
3642.00	cut	bulk	0.48	18	0.05	-	-	-	040-0B
3648.00	cut	Sh/Clst: gy blk	-	-	-	-	5.5 - 6	437	041-1L
3682.00	cut	Sh/Clst: gy blk	-	-	-	-	5.5?	434	045-1L

Table 6 : Thermal Maturity Data for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
3715.00	cut	Sh/Clst: gy blk	-	-	-	-	5.5?	435	050-1L
3740.00	cut	bulk	0.48	9	0.04	-	-	-	054-0B
3770.00	cut	Sh/Clst: drk gy	-	-	-	-	NDP	417	059-1L
3801.00	cut	Sh/Clst: gy blk, drk gy, dsk y brn	-	-	-	-	5.5	435	064-1L
3850.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	-	-	-	-	5.5	434	072-1L
3859.00	cut	bulk	0.49	14	0.05	-	-	-	073-0B
3893.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	5.5 - 6	434	080-1L
3965.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	-	-	-	-	6 (6.5?)	439	091-1L
3971.00	cut	bulk	0.60	40	0.11	-	-	-	092-0B
3990.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	-	-	-	-	5.5 - 6	434	095-1L
4047.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	-	-	-	-	5.5 - 6	434	102-1L
4093.00	cut	bulk	0.58	21	0.10	-	-	-	110-0B

Table 6 : Thermal Maturity Data for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
4099.00	cut	Sh/Clst: gy blk, m gy blk	-	-	-	-	NDP	440	111-1L
4130.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6 - 6.5	440	116-1L
4142.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6 - 6.5	439	118-2L
4172.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6 - 6.5	442	123-1L
4184.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6.5?	441	125-1L
4221.00	cut	bulk	0.68	18	0.11	-	-	-	130-0B
4221.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6.5	439	130-1L
4264.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6.5	440	137-1L
4282.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6?	439	140-1L
4316.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	6.5 - 7	441	146-1L
4340.00	cut	Sh/Clst: drk gy to m drk gy	-	-	-	-	NDP	432	150-1L
4346.00	cut	bulk	0.66	17	0.06	-	-	-	151-0B
4389.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	NDP	439	159-1L
4422.00	cut	bulk	0.79	17	0.08	-	-	-	165-0B

Table 6 : Thermal Maturity Data for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
4422.00	cut	Sh/Clst: gy blk, brn blk	-	-	-	-	NDP	440	165-1L

Table 7 : Visual Kerogen Composition Data for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	LIPT %	Amor L	Lip Det	Sp/Pol	Cut Incl	Res ine	Alg ae	Dinof lt	Acrit	Bit L	INERT %	Fus in	Sem Fus	Sent Det	Mic rin	Scler oI	Bit	VITR %	Tell in	Col lin	Vit Det	Amor V	Bit V	Sample
3474.00	cut	Sh/Clst: blk, drk gy	25?										25?							50?						013-2L
3492.00	cut	Sh/Clst: blk, drk gy, dsk y brn	30	*	*	**				?			30	*	**	*				40			*	*		016-3L
3539.00	cut	Sh/Clst: dsk y brn	10?										10?							80?						023-2L
3581.00	cut	Sh/Clst: brn blk	60	*	**	*	?		*				10			*				30			*	**		030-1L
3593.00	cut	Sh/Clst: gy blk, brn blk	50	*	**	*							10		*	*				40			*	*		032-2L
3612.00	cut	Sh/Clst: gy blk, brn blk	65	*	**	*			*				10		*	*				25			*	**		035-1L
3630.00	cut	Sh/Clst: gy blk, brn blk	30	*	*	**			?				20	*	*	**				50			*	*		038-1L
3648.00	cut	Sh/Clst: gy blk	45	*	*	*			?				10		*	*				45			*	*		041-1L
3682.00	cut	Sh/Clst: gy blk	35?		*	**			*				10			*				55			*	*		045-1L
3715.00	cut	Sh/Clst: gy blk	50	*	*	**			?				15	?	*	*				35			*	*		050-1L
3770.00	cut	Sh/Clst: drk gy	NDP										NDP							NDP						059-1L
3801.00	cut	Sh/Clst: gy blk, drk gy, dsk y brn	30		*	*							20		*	*				50			*	*		064-1L
3850.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	25		*	*							20		*	*				55			*	*		072-1L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 7 : Visual Kerogen Composition Data for well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	LIPT %	Amor L	LipDet	Sp/Pol	Cuticl	Resin	Algae	Dinofl	Acrit	BitL	INERT %	Fusin	Semfus	IntDet	Mincrin	Sclero	BitI	VITR %	Telin	Colln	VitDet	Amorv	BitV	Sample
3893.00	cut	Sh/Clst: gy blk, brn blk	40		*	**			*				20	*	*	*				40			*	*		080-1L
3965.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	25	*	**	*							30	*	*	**				45			*	**		091-1L
3990.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	25	*	**	*							20			*				55			*	*		095-1L
4047.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	25	*	**	*			*				30	*	*	*				45			*	*		102-1L
4099.00	cut	Sh/Clst: gy blk, m gy blk	5		*								5			*				90		**	**	*		111-1L
4130.00	cut	Sh/Clst: gy blk, brn blk	40		**	*			*				20		*	*				40			*	**		116-1L
4142.00	cut	Sh/Clst: gy blk, brn blk	30		*	*							25		*	*				45			*	**		118-2L
4172.00	cut	Sh/Clst: gy blk, brn blk	30		*	*							25		*	*				45			*	**		123-1L
4184.00	cut	Sh/Clst: gy blk, brn blk	20	*	*	*							20		*	*				60			*	*		125-1L
4221.00	cut	Sh/Clst: gy blk, brn blk	30	*	*	**							10			*				60			*	*		130-1L
4264.00	cut	Sh/Clst: gy blk, brn blk	25	*	**	*							20			*				55			*	*		137-1L
4282.00	cut	Sh/Clst: gy blk, brn blk	25		**	*			*				15			*				60			*	**		140-1L
4316.00	cut	Sh/Clst: gy blk, brn blk	20		*	*							10		*	*				70			*	*		146-1L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Depth unit of measure: m

Depth	Typ	Lithology	LIPT %	Amor L	Lipdet	Sp/Pol	Cuticl	Reisine	Algae	Dinoflt	Acrit	Bitl L	INERT %	Fusin	Semifus	Inertd	Mineir	Sclero	Bitl I	VITR %	Telin	Colline	Vitdet	Amorv	Bitv	Sample
4340.00	cut	Sh/Clst: drk gy to m drk gy	NDP										NDP							NDP						150-1L
4389.00	cut	Sh/Clst: gy blk, brn blk	15	*	**	*							25		*	**				60			*	**		159-1L
4422.00	cut	Sh/Clst: gy blk, brn blk	5		**	*							20	*	**	**				75		*	**	*		165-1L

Table 8 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
3450.00	cut	Sh/Clst: drk gy, blk	3.52	16.26	40.72	39.50	4.26	009-4L
3456.00	cut	Sh/Clst: drk gy, blk	4.31	23.47	41.13	31.09	3.83	010-3L
3474.00	cut	Sh/Clst: blk, drk gy	3.08	13.88	33.80	49.24	12.86	013-2L
3486.00	cut	Sh/Clst: blk, drk gy, dsk y brn	3.91	14.81	31.98	49.30	8.41	015-2L
3505.00	cut	Sh/Clst: drk gy, dsk y brn	3.41	17.09	42.67	36.83	3.35	018-3L
3517.00	cut	Sh/Clst: drk gy, dsk y brn	3.71	17.01	39.36	39.92	4.19	020-3L
3539.00	cut	Sh/Clst: dsk y brn	3.83	16.81	38.01	41.35	3.37	023-2L
3551.00	cut	Sh/Clst: dsk y brn	5.07	22.29	47.82	24.82	1.23	025-4L
3575.00	cut	Sh/Clst: ol gy, lt gy to m gy	2.12	20.29	56.00	21.60	0.59	029-1L
3581.00	cut	Sh/Clst: brn blk	1.99	11.47	34.05	52.50	16.18	030-1L
3593.00	cut	Sh/Clst: gy blk, brn blk	2.42	12.01	38.07	47.50	9.96	032-2L
3612.00	cut	Sh/Clst: gy blk, brn blk	2.39	12.07	37.84	47.70	11.70	035-1L
3630.00	cut	Sh/Clst: gy blk, brn blk	2.87	15.69	38.54	42.91	7.25	038-1L
3642.00	cut	Sh/Clst: gy blk, brn blk	2.80	14.51	38.83	43.86	6.83	040-1L
3648.00	cut	Sh/Clst: gy blk	2.66	13.80	36.84	46.71	10.00	041-1L

Table 8 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
3682.00	cut	Sh/Clst: gy blk	2.56	14.45	36.27	46.72	8.48	045-1L
3715.00	cut	Sh/Clst: gy blk	2.64	13.72	40.13	43.51	5.98	050-1L
3740.00	cut	Sh/Clst: gy blk, drk gy	2.96	15.67	42.89	38.48	4.28	054-1L
3758.00	cut	Sh/Clst: gy blk, drk gy	2.52	14.02	40.64	42.83	6.12	057-1L
3770.00	cut	Sh/Clst: drk gy	1.47	12.69	20.49	65.35	35.68	059-1L
3776.00	cut	Sh/Clst: gy blk, drk gy to m drk gy	2.45	13.34	37.24	46.97	7.36	060-1L
3783.00	cut	Ca : drk y brn	6.61	14.92	57.54	20.93	3.64	061-3L
3789.00	cut	Sh/Clst: gy blk, drk gy	3.25	17.29	43.09	36.38	4.85	062-1L
3801.00	cut	Sh/Clst: gy blk, drk gy, dsk y brn	3.68	18.46	41.30	36.56	5.08	064-1L
3813.00	cut	Sh/Clst: gy blk, drk gy	3.26	16.42	41.87	38.45	5.45	066-1L
3819.00	cut	Sh/Clst: ol gy, m drk gy to drk gy, gy blk	2.55	14.71	38.05	44.69	5.43	067-1L
3831.00	cut	Sh/Clst: gy blk, drk gy to m drk gy	2.16	15.79	39.41	42.64	4.46	069-1L
3850.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.72	15.98	40.55	40.75	4.97	072-1L

Table 8 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
3862.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.93	15.10	39.65	42.32	4.94	074-1L
3874.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	3.30	16.78	39.91	40.01	4.44	076-1L
3880.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.83	16.35	41.93	38.89	4.77	077-1L
3893.00	cut	Sh/Clst: gy blk, brn blk	2.54	15.43	39.45	42.58	6.03	080-1L
3911.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	3.06	15.87	42.09	38.99	4.24	082-1L
3923.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.87	15.56	41.55	40.03	4.86	084-1L
3929.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	3.24	14.68	42.71	39.38	4.22	085-1L
3935.00	cut	Sh/Clst: gy blk, brn blk	3.53	17.96	43.89	34.62	3.65	086-1L
3941.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	3.07	15.14	40.38	41.40	4.34	087-1L
3953.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	3.08	18.88	40.04	38.00	4.45	089-1L
3965.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.98	14.24	40.08	42.70	5.33	091-1L

Table 8 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
3977.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.86	14.95	36.54	45.64	5.20	093-1L
3990.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.04	12.44	31.78	53.74	7.09	095-1L
3996.00	cut	Sh/Clst: drk gy to m drk gy	2.90	15.06	39.95	42.09	4.53	096-1L
4011.00	cut	Sh/Clst: drk gy to m drk gy	2.81	15.55	38.82	42.82	5.00	098-1L
4017.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.73	14.51	37.54	45.22	4.91	099-1L
4023.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	2.89	15.01	36.74	45.37	4.32	100-1L
4047.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	3.25	18.77	41.74	36.24	4.73	102-1L
4059.00	cut	Sh/Clst: gy blk, brn blk, drk gy to m drk gy	3.22	15.96	38.64	42.18	5.00	104-1L
4072.00	cut	Sh/Clst: gy blk, brn blk	2.86	15.18	41.33	40.63	5.79	106-1L
4078.00	cut	Sh/Clst: gy blk, m gy blk	4.05	15.83	35.64	44.48	16.52	107-1L
4087.00	cut	Sh/Clst: gy blk, m gy blk	3.20	15.80	38.87	42.13	5.31	109-1L
4099.00	cut	Sh/Clst: gy blk, m gy blk	3.96	19.05	33.86	43.12	16.64	111-1L

Table 8 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
4117.00	cut	Sh/Clst: gy blk, m gy blk	2.95	14.44	37.88	44.74	7.55	114-1L
4130.00	cut	Sh/Clst: gy blk, brn blk	3.13	15.32	38.36	43.19	6.04	116-1L
4142.00	cut	Sh/Clst: gy blk, brn blk	2.64	17.05	39.29	41.02	5.83	118-2L
4160.00	cut	Sh/Clst: gy blk, brn blk	3.18	16.07	40.04	40.71	5.21	121-1L
4172.00	cut	Sh/Clst: gy blk, brn blk	3.08	17.38	39.97	39.56	6.07	123-1L
4184.00	cut	Sh/Clst: gy blk, brn blk	2.90	14.99	38.05	44.06	5.73	125-1L
4197.00	cut	Sh/Clst: gy blk, brn blk	2.91	16.56	41.59	38.94	5.33	127-1L
4209.00	cut	Sh/Clst: gy blk, brn blk	2.61	12.92	35.78	48.69	5.87	128-1L
4221.00	cut	Sh/Clst: gy blk, brn blk	2.46	11.97	35.40	50.18	8.04	130-1L
4233.00	cut	Sh/Clst: gy blk, brn blk	2.62	13.92	35.79	47.67	6.93	132-1L
4252.00	cut	Sh/Clst: gy blk, brn blk	3.26	16.00	38.59	42.15	5.48	135-1L
4264.00	cut	Sh/Clst: gy blk, brn blk	4.04	19.10	43.33	33.53	5.76	137-1L
4288.00	cut	Sh/Clst: gy blk, brn blk	2.70	15.57	40.86	40.87	6.17	141-1L
4300.00	cut	Sh/Clst: gy blk, brn blk	2.75	14.65	38.05	44.55	5.54	143-1L
4316.00	cut	Sh/Clst: gy blk, brn blk	2.72	15.54	39.59	42.15	6.42	146-1L

Table 8 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
4322.00	cut	Sh/Clst: gy blk, brn blk	2.84	14.63	38.62	43.90	5.68	147-2L
4334.00	cut	Sh/Clst: gy blk, brn blk	3.01	16.73	44.46	35.80	4.49	149-2L
4340.00	cut	Sh/Clst: drk gy to m drk gy	1.24	8.76	19.24	70.76	12.18	150-1L
4352.00	cut	Sh/Clst: drk gy to m drk gy	2.87	15.29	39.18	42.67	4.61	152-1L
4362.00	cut	Sh/Clst: gy blk, brn blk	2.75	13.77	40.54	42.94	4.39	154-1L
4372.00	cut	Sh/Clst: gy blk, brn blk	2.62	14.04	38.87	44.47	5.52	156-1L
4389.00	cut	Sh/Clst: gy blk, brn blk	2.48	12.35	37.76	47.41	6.05	159-1L
4401.00	cut	Sh/Clst: gy blk, brn blk	2.93	15.42	39.41	42.24	6.26	161-1L
4413.00	cut	Sh/Clst: gy blk, brn blk	2.60	10.47	36.86	50.06	7.61	163-1L
4419.00	cut	Sh/Clst: gy blk, brn blk	4.68	19.49	34.79	41.04	12.33	164-1L
4422.00	cut	Sh/Clst: gy blk, brn blk	3.36	16.58	36.46	43.60	8.26	165-1L

Table 9: Variation in Triterpane Distribution for Well NOCS 2/7-15

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
3517.00	Sh/Clst	0.69	0.41	0.11	0.52	0.34	0.10	-	-	-	0.10	0.89	0.34	0.12	56.52	198-0
3618.00	Sh/Clst	1.08	0.52	0.13	0.48	0.32	0.03	-	-	-	0.03	0.90	0.33	0.12	57.63	182-0
3783.00	Sh/Clst	1.05	0.51	0.18	0.78	0.44	0.06	-	-	-	0.07	0.84	0.43	0.17	55.81	184-0
3893.00	Sh/Clst	1.07	0.52	0.13	0.49	0.33	0.03	-	-	-	0.07	0.90	0.33	0.11	54.84	187-0
4011.00	Sh/Clst	1.00	0.50	0.14	0.45	0.31	0.04	-	-	-	0.08	0.91	0.31	0.10	57.38	190-0
4111.00	Sh/Clst	0.57	0.37	0.11	0.42	0.30	0.05	-	-	-	0.07	0.92	0.29	0.08	60.00	192-0
4233.00	Sh/Clst	0.68	0.40	0.13	0.56	0.36	0.06	-	-	-	0.12	0.90	0.36	0.10	52.94	194-0
4422.00	Sh/Clst	0.59	0.37	0.13	0.42	0.30	0.06	-	-	-	0.15	0.91	0.30	0.10	48.28	196-0

Table 10: Variation in Sterane Distribution for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Ratio6	Ratio7	Sample
3517.00	Sh/Clst	0.63	48.84	69.93	1.09	0.70	0.35	0.30	198-0
3618.00	Sh/Clst	0.36	40.46	53.21	0.93	0.58	0.22	0.16	182-0
3783.00	Sh/Clst	0.44	42.17	58.43	0.87	0.63	0.25	0.18	184-0
3893.00	Sh/Clst	0.51	48.92	57.14	1.00	0.58	0.39	0.32	187-0
4011.00	Sh/Clst	0.53	45.87	61.75	0.93	0.64	0.38	0.30	190-0
4111.00	Sh/Clst	0.60	51.16	72.26	0.99	0.72	0.54	0.48	192-0
4233.00	Sh/Clst	0.60	46.62	66.16	0.99	0.68	0.49	0.44	194-0
4422.00	Sh/Clst	0.64	44.66	69.62	1.11	0.72	0.49	0.44	196-0

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

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Table 11: Aromatisation of Steranes for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Sample
3517.00	Sh/Clst	0.45	0.73	198-0
3618.00	Sh/Clst	0.12	0.94	182-0
3783.00	Sh/Clst	0.58	0.65	184-0
3893.00	Sh/Clst	0.58	0.67	187-0
4011.00	Sh/Clst	0.56	0.68	190-0
4111.00	Sh/Clst	0.51	0.75	192-0
4233.00	Sh/Clst	0.50	0.74	194-0
4422.00	Sh/Clst	0.53	0.71	196-0

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

Ratio2: g1 / g1 + I1

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Table 12: Variation in Triaromatic Sterane Distribution for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Sample
3517.00	Sh/Clst	0.73	0.70	0.46	0.47	0.57	198-0
3618.00	Sh/Clst	0.45	0.36	0.19	0.22	0.29	182-0
3783.00	Sh/Clst	0.41	0.34	0.17	0.19	0.24	184-0
3893.00	Sh/Clst	0.46	0.43	0.19	0.21	0.26	187-0
4011.00	Sh/Clst	0.51	0.48	0.23	0.25	0.30	190-0
4111.00	Sh/Clst	0.66	0.65	0.41	0.38	0.54	192-0
4233.00	Sh/Clst	0.58	0.55	0.30	0.31	0.40	194-0
4422.00	Sh/Clst	0.53	0.53	0.28	0.27	0.36	196-0

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

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Table 13: Variation in Monoaromatic Sterane Distribution for Well NOCS 2/7-15

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Sample
3517.00	Sh/Clst	0.71	0.61	0.52	0.43	198-0
3618.00	Sh/Clst	0.56	0.42	0.31	0.24	182-0
3783.00	Sh/Clst	0.47	0.31	0.28	0.20	184-0
3893.00	Sh/Clst	0.44	0.29	0.28	0.22	187-0
4011.00	Sh/Clst	0.55	0.40	0.37	0.28	190-0
4111.00	Sh/Clst	0.56	0.42	0.40	0.30	192-0
4233.00	Sh/Clst	0.55	0.41	0.38	0.30	194-0
4422.00	Sh/Clst	0.48	0.36	0.34	0.27	196-0

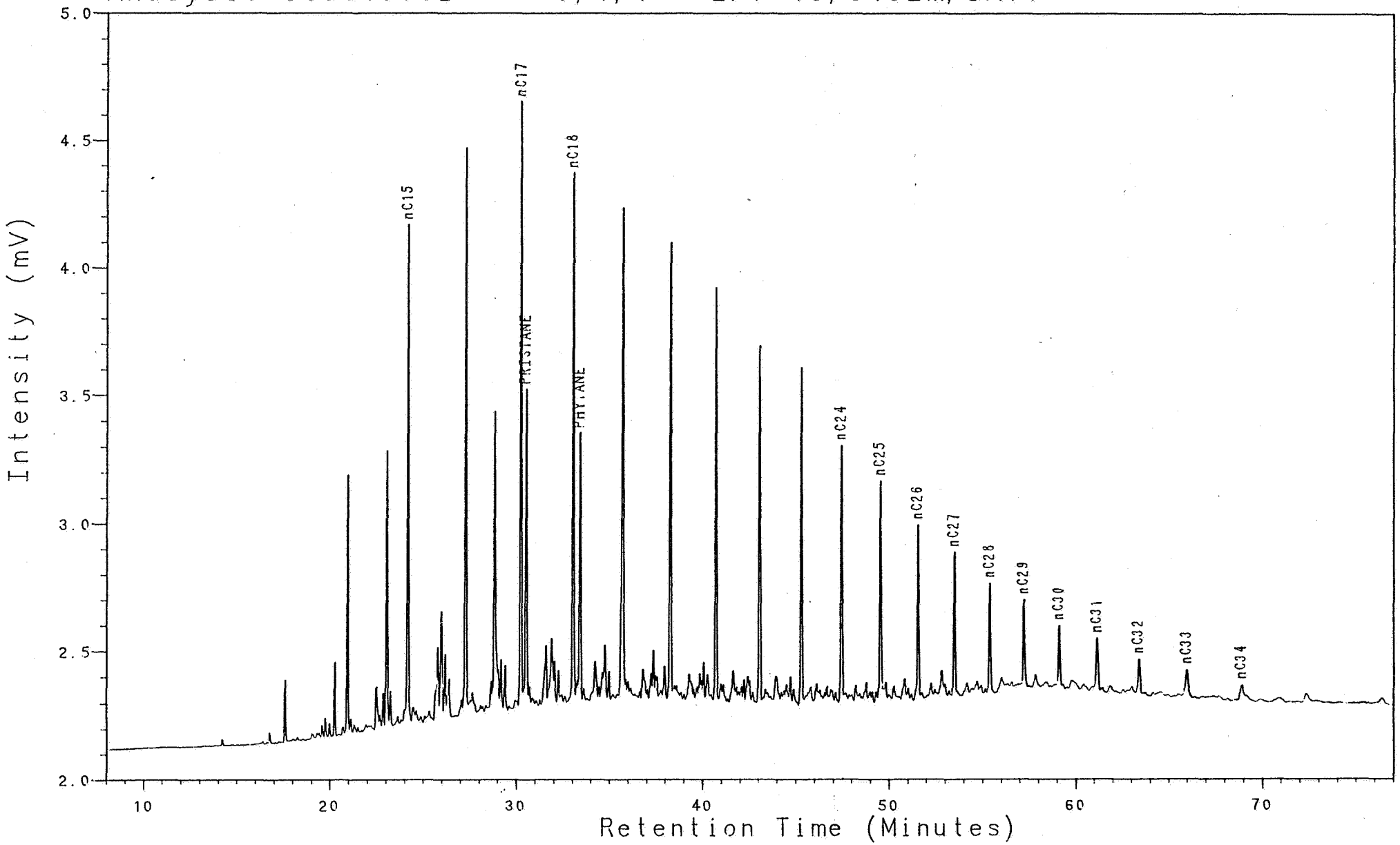
Ratio1: A1 / A1 + E1
Ratio2: B1 / B1 + E1
Ratio3: A1 / A1 + E1 + G1
Ratio4: A1+B1 / A1+B1+C1+D1+E1+F1+G1+H1+I1

APPENDIX 2

Histograms

Saturated Fraction Chromatograms (FID)

Analysis SC081970B 5, 1, 1 2/7-15, 3492m, SATT



NOCS 2/7-15 3474-92m
SATURATED GC
CLST: blk, drk gy, dsk y brn

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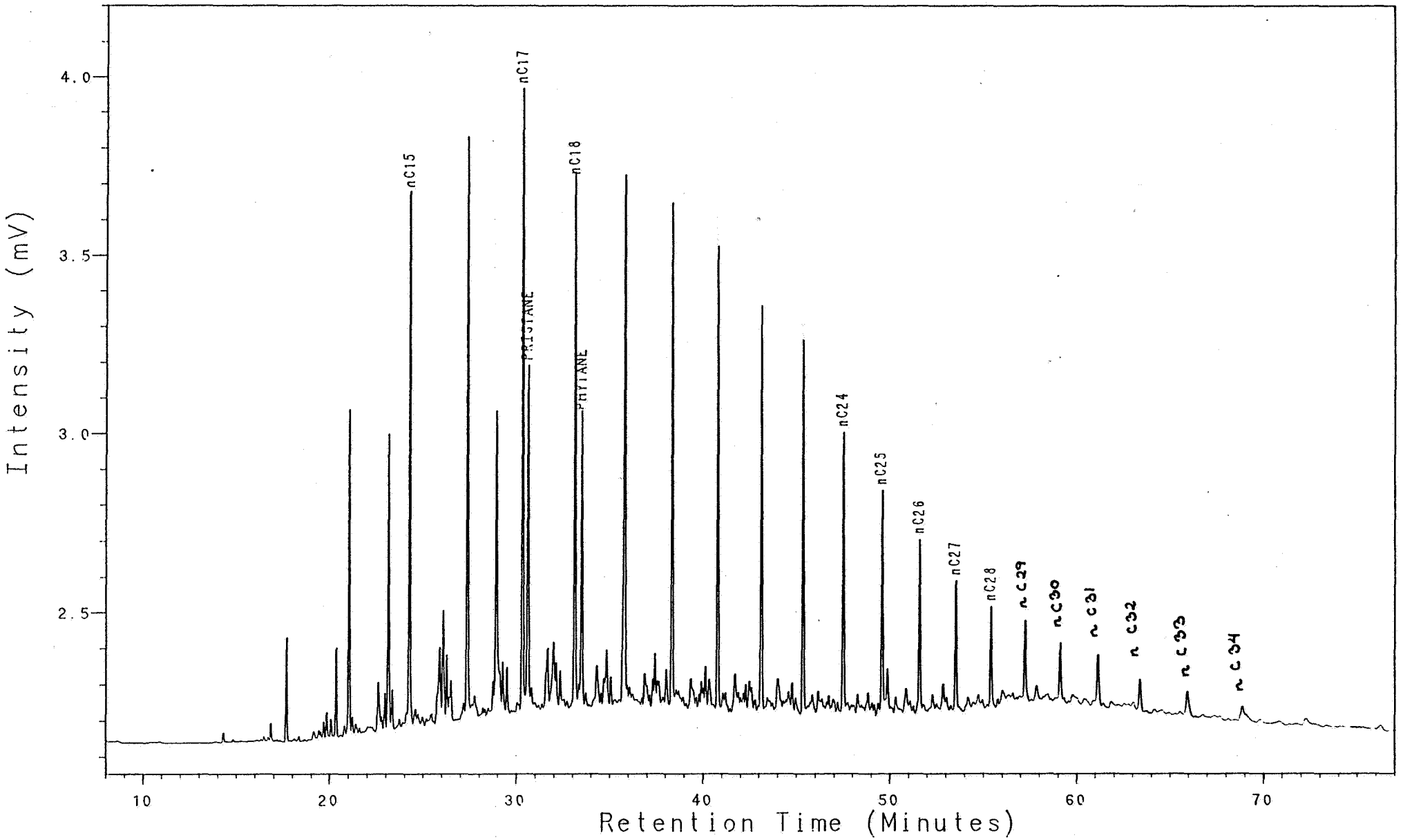
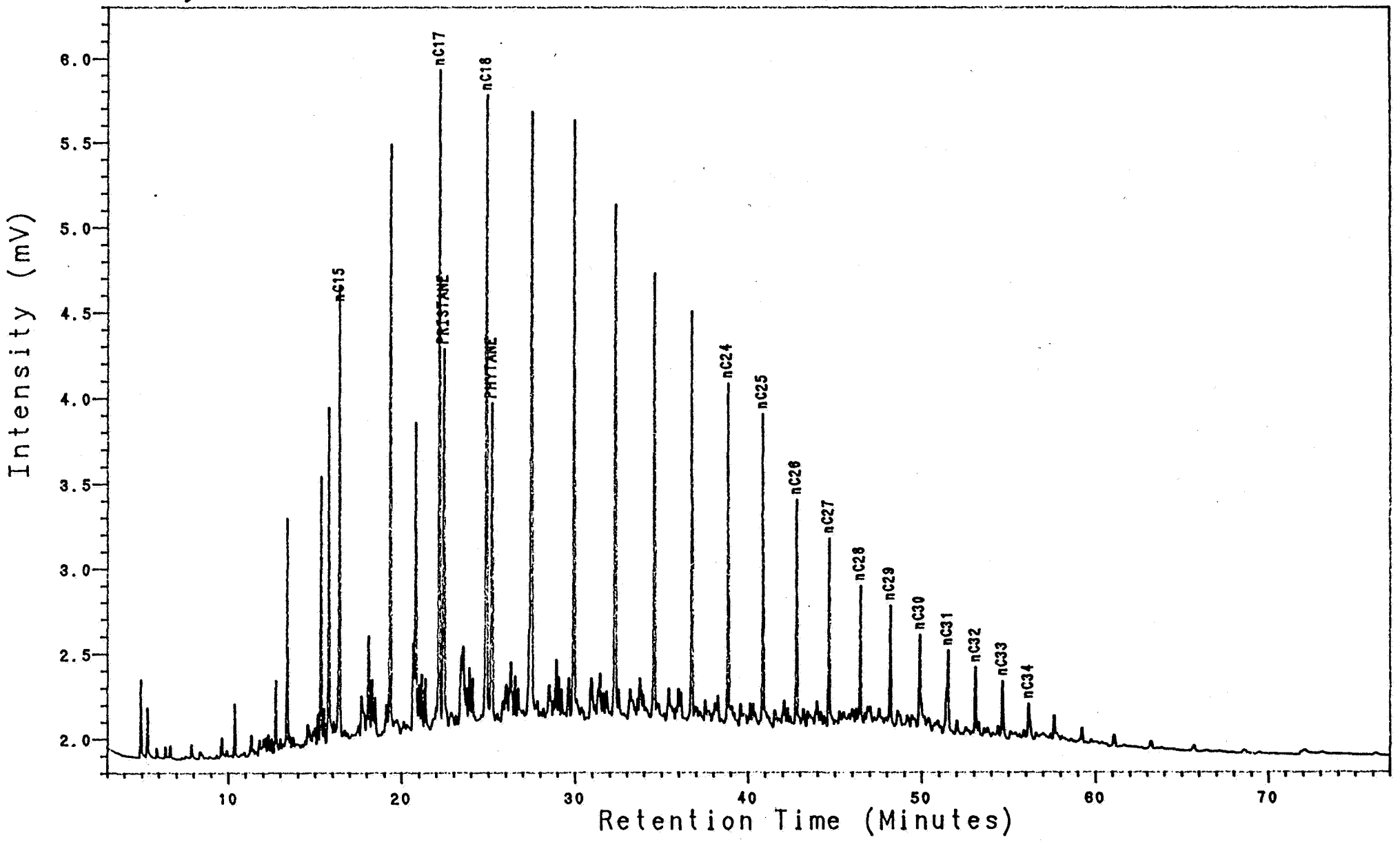
Analysis SC081980B 5, 1, 1 2/7-15, 3517m, SAT



NOCS 2/7-15 3505-17m
SATURATED GC
CLST: drk gy, dsk y brn

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

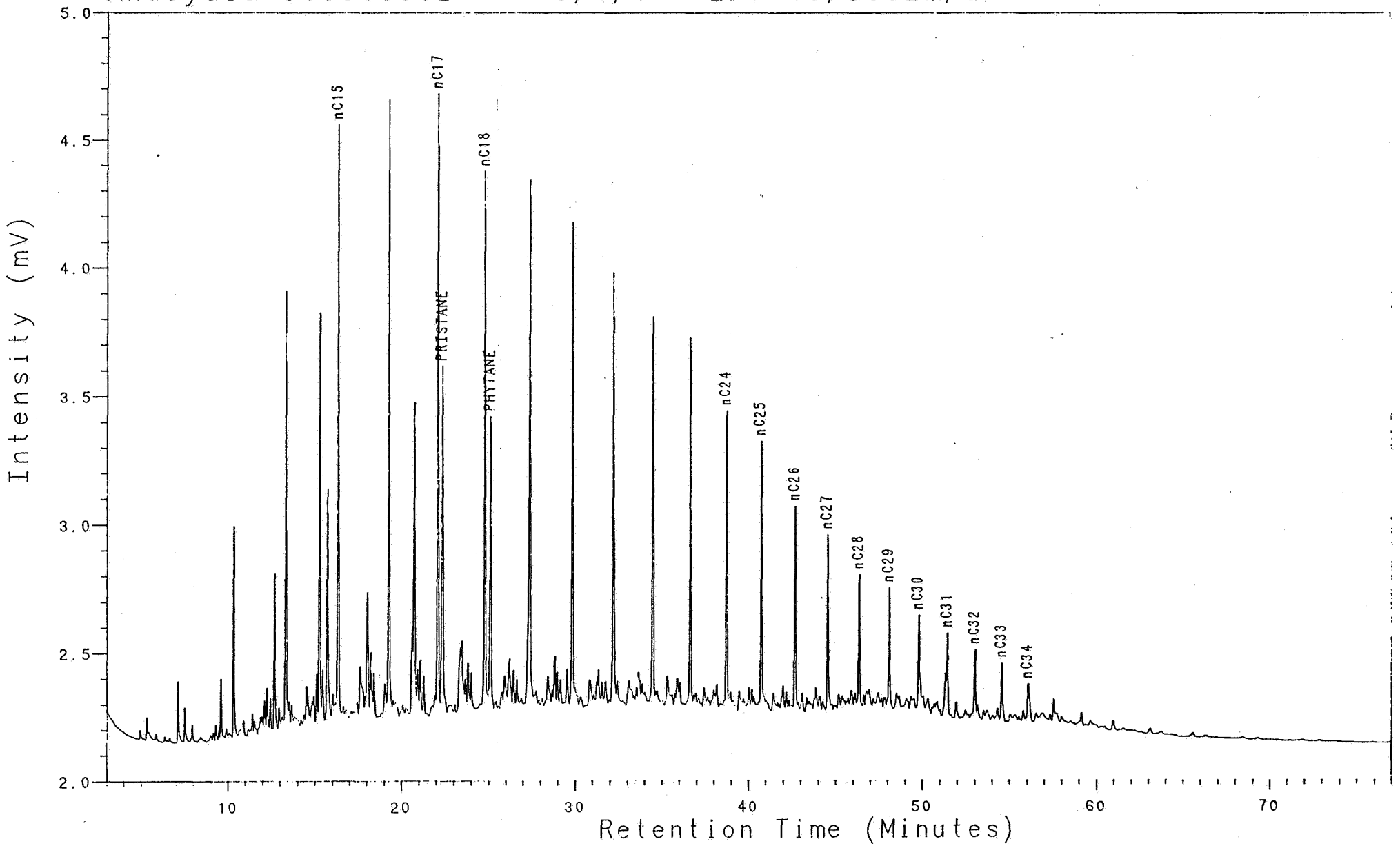
Analysis SC081820B 5, 1, 1 2/7-15, 3593-3618m, SA



NOCS 2/7-15 3593-3618m
SATURATED GC
CLST: gy blk, brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Analysis SC081830B 5, 1, 1 2/7-15, 3682m, SAT



NOCS 2/7-15 3624-82m
SATURATED GC
CLST: gy blk

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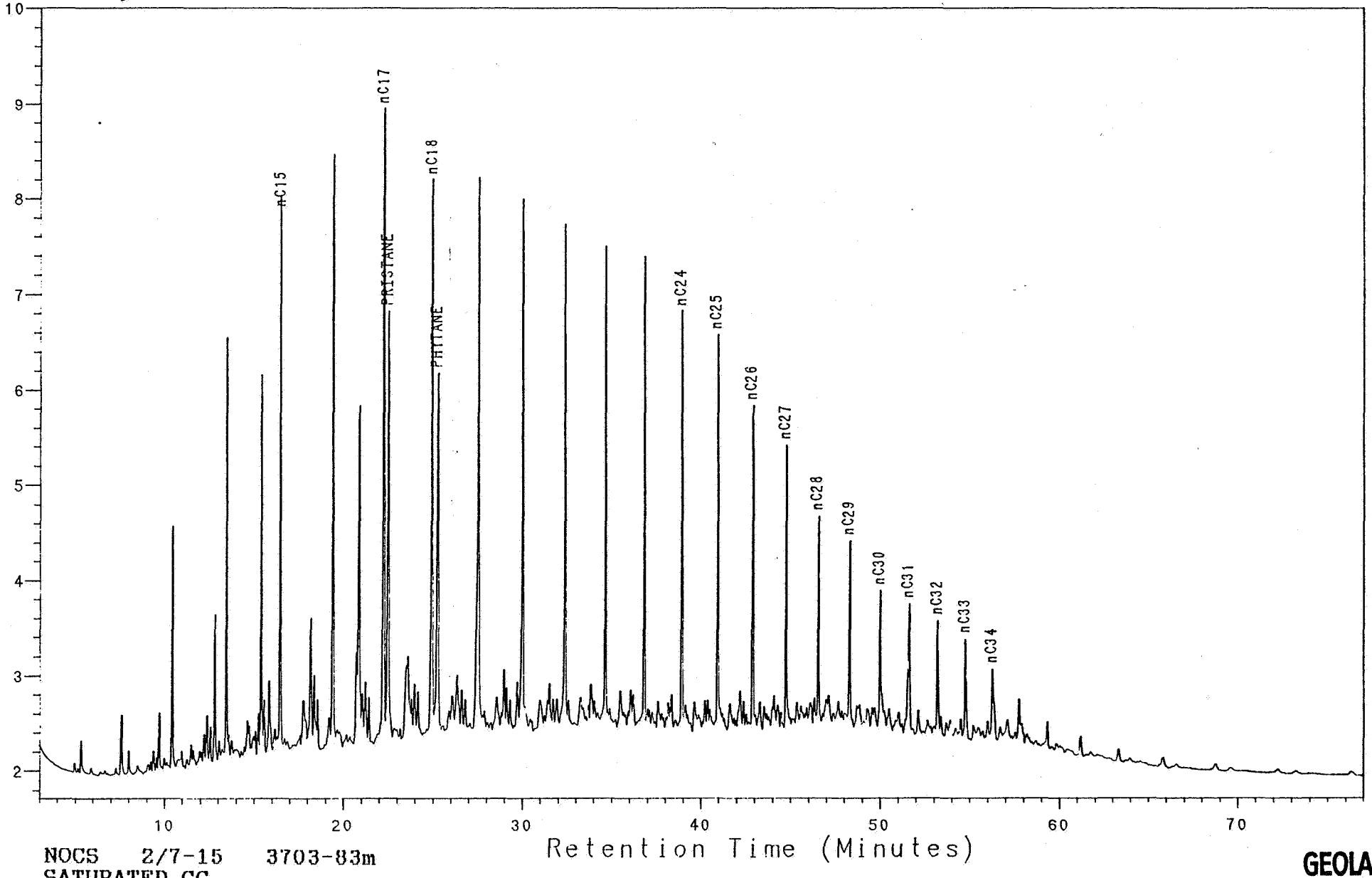
GEOCHEMICAL LABORATORIES OF NORWAY A.S

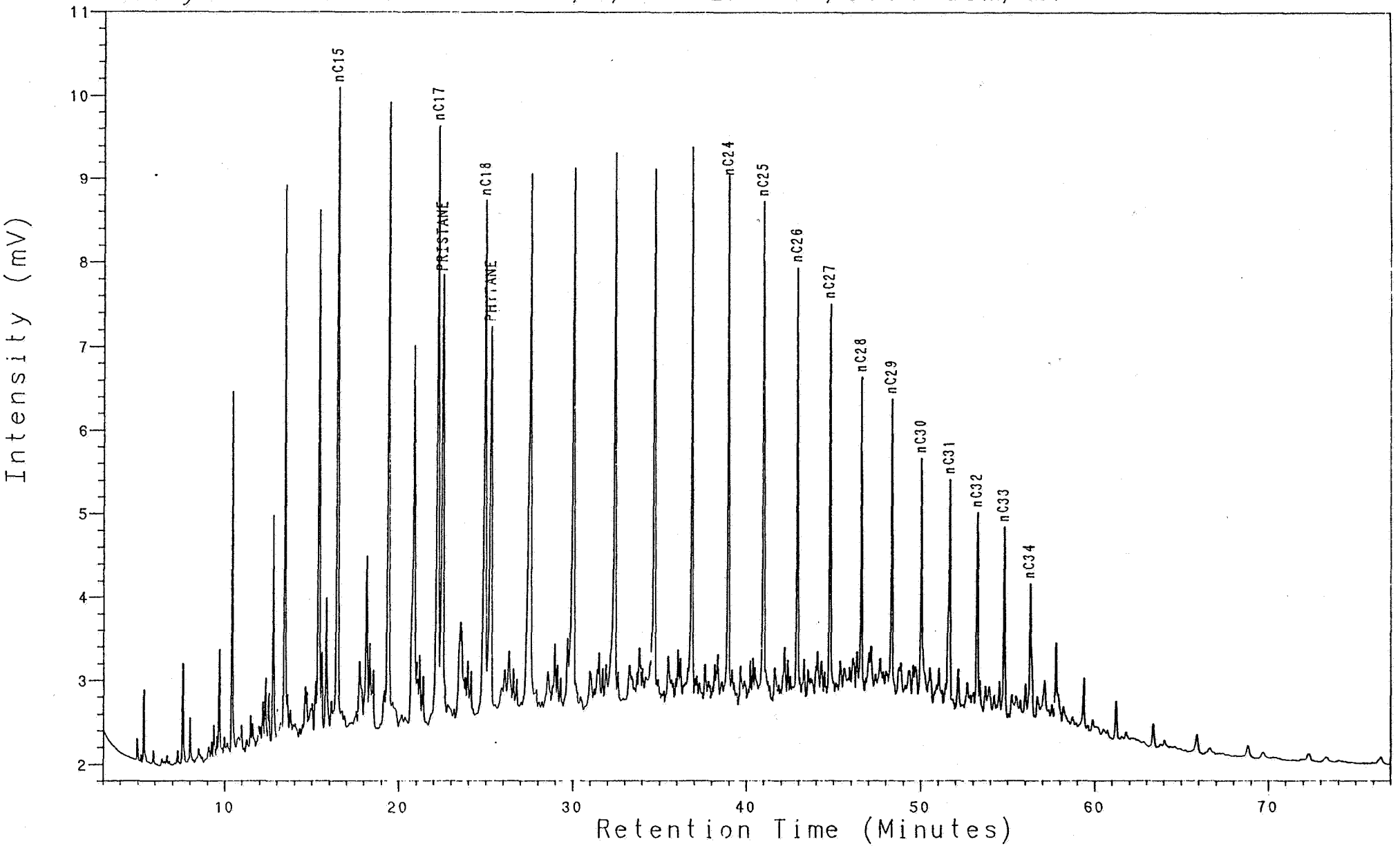
Analysis SA2433783 5, 1, 1 2/7-15, 3703-83m, SA



NOCS 2/7-15 3703-83m
SATURATED GC
CLST: gy blk, drk gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis SA2433935 5, 1, 1 2/7-15, 3904-35m, SA



NOCS 2/7-15 3904-35m
SATURATED GC
CLST: gy blk, brn blk, drk gy to m
drk gy

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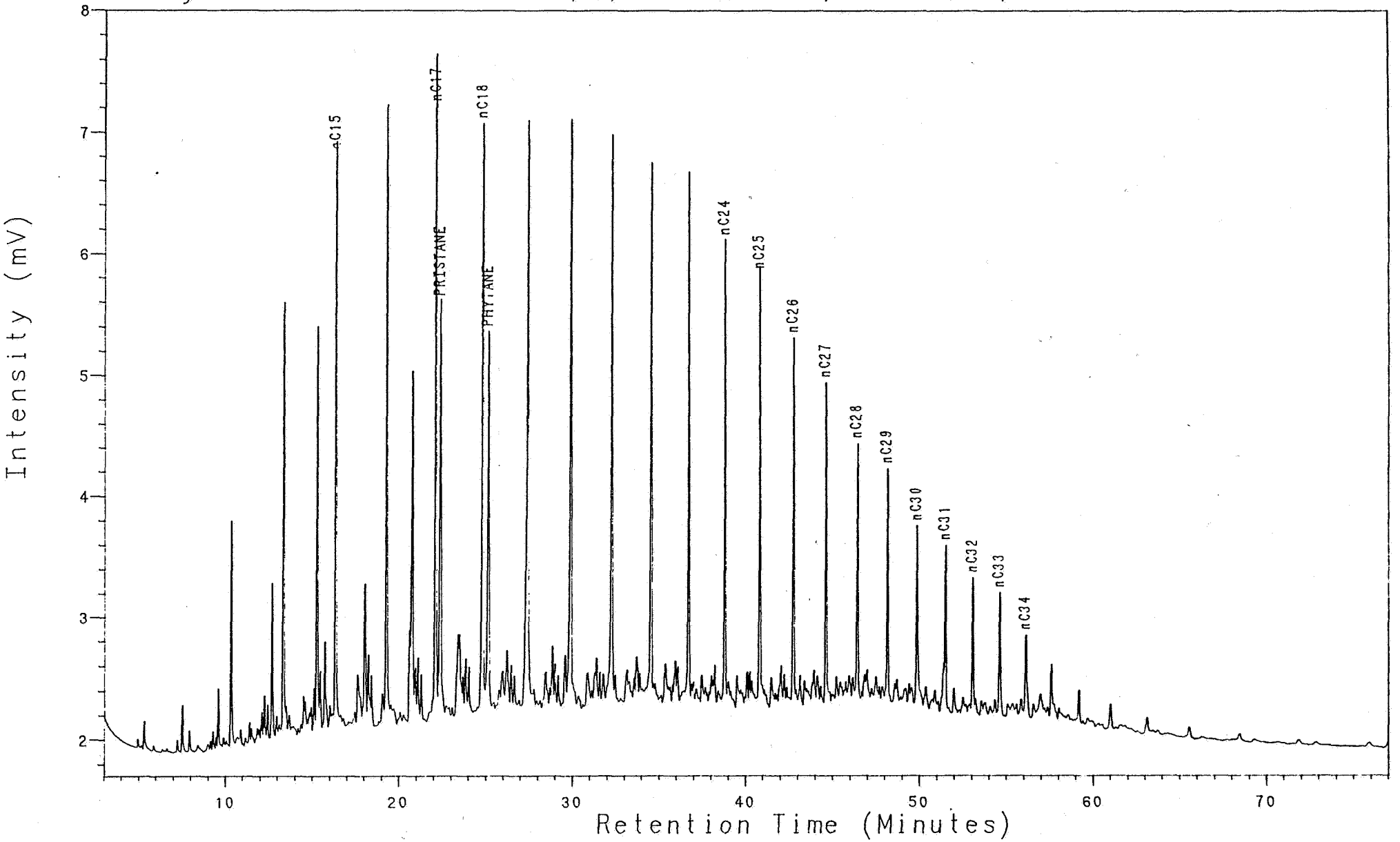
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis SA2433990 5, 1, 1 2/7-15, 3941-90m, SA



NOCS 2/7-15 3941-90m
SATURATED GC
CLST: gy blk, brn blk, drk gy to m
drk gy

GEOLAB NOR
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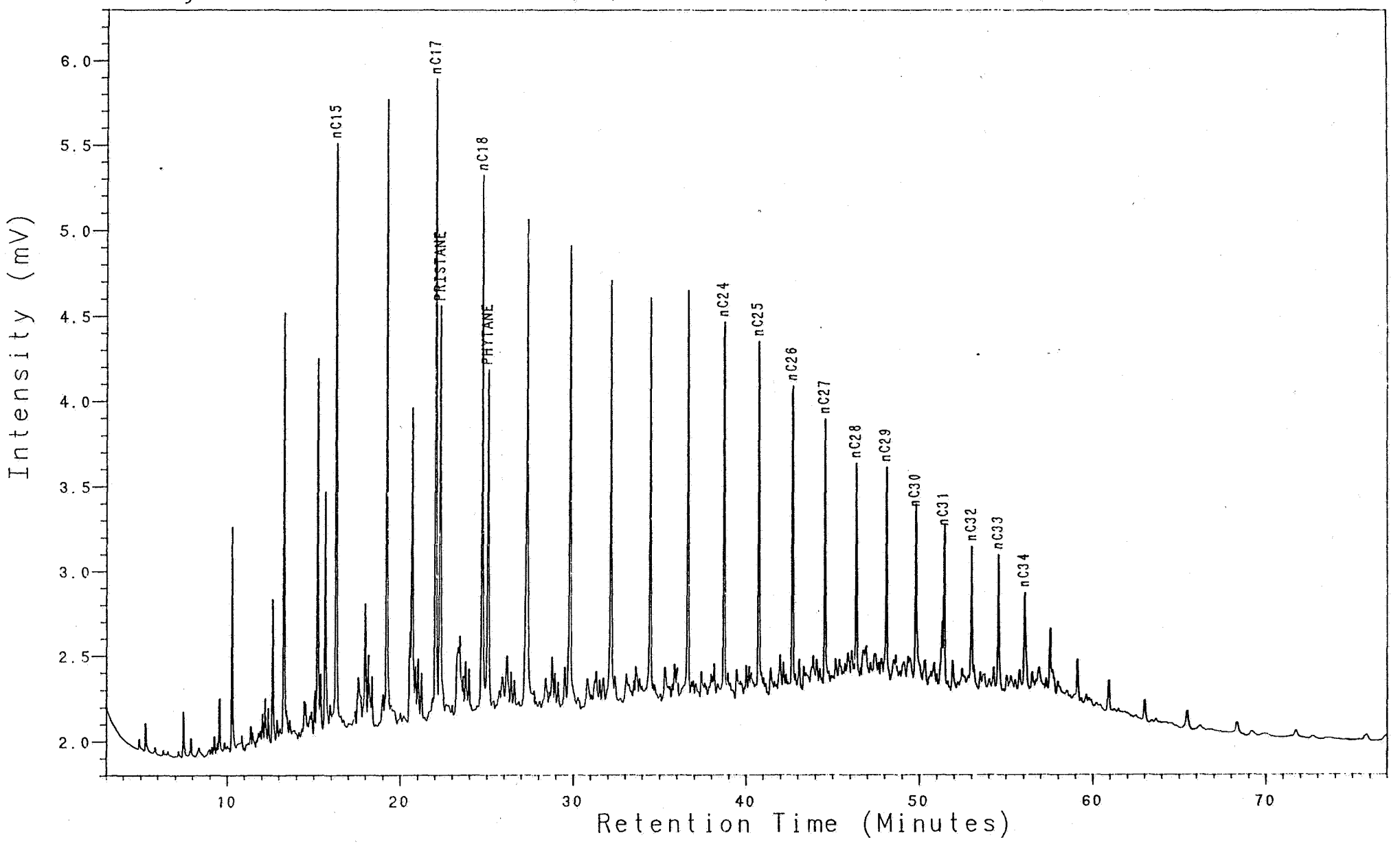
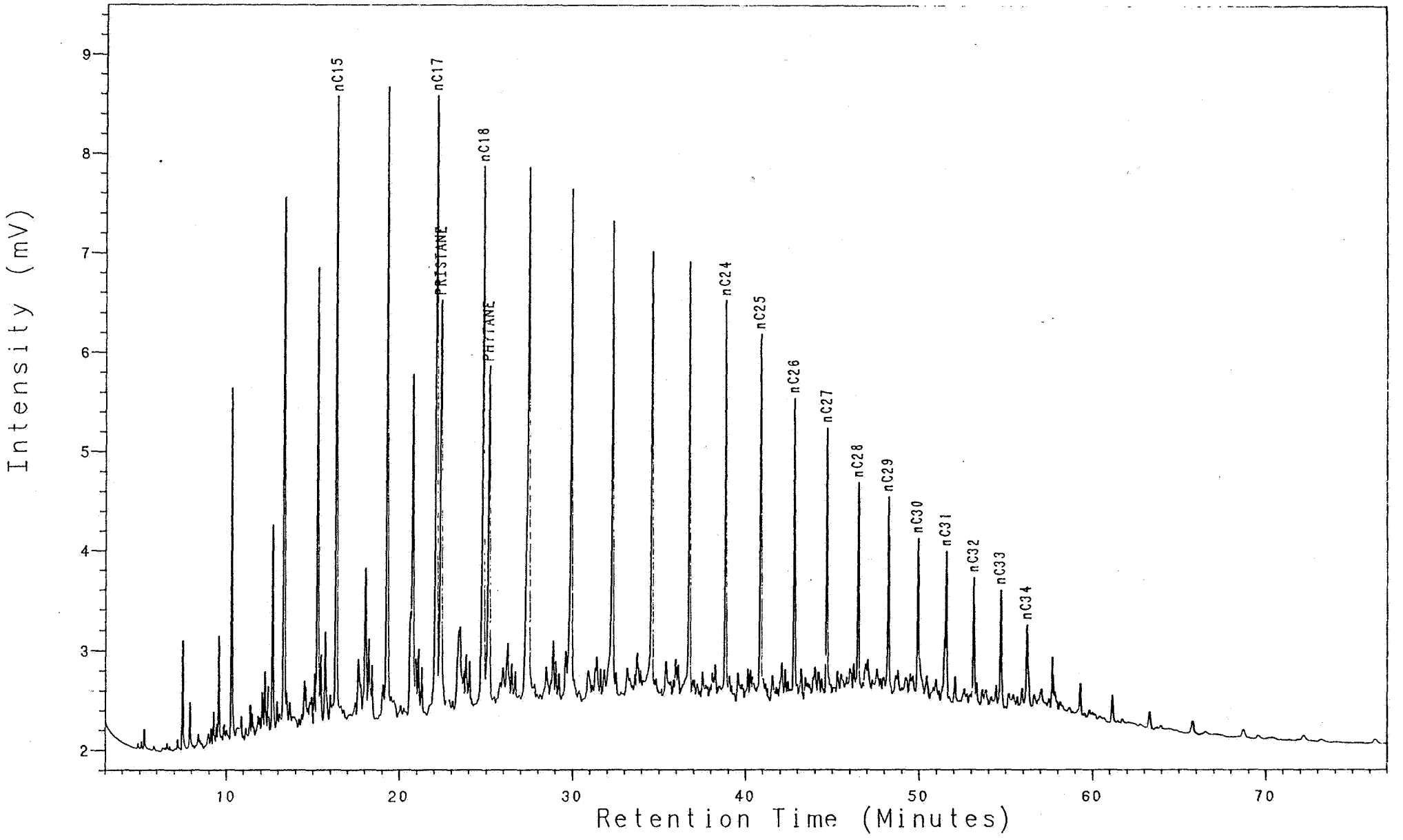
Analysis SA2434011 5, 1, 1 2/7-15, 3996-4011m, SA



NOCS 2/7-15 3996-4011m
SATURATED GC
CLST: drk gy to m drk gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

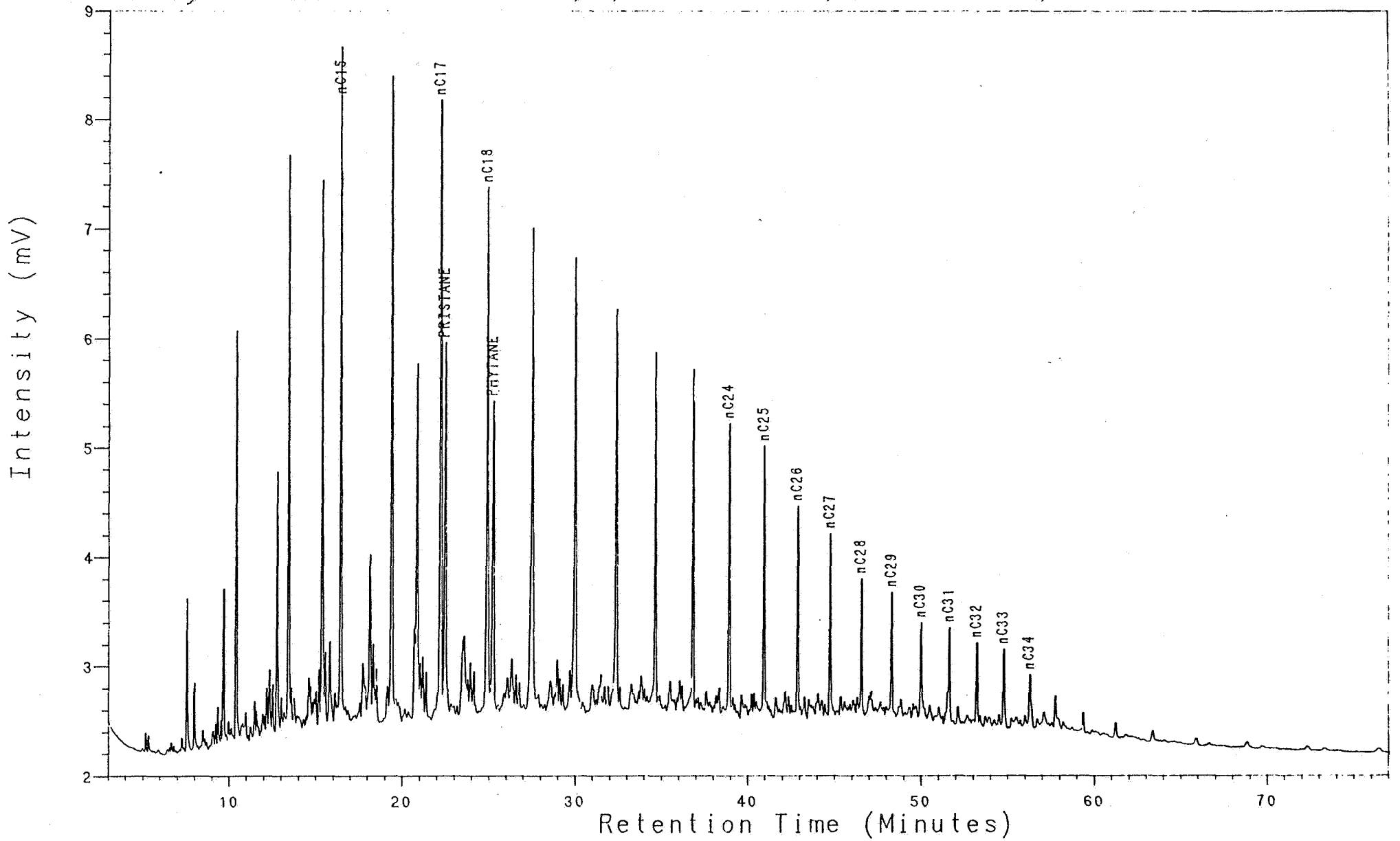
Analysis SA2434066 5, 1, 1 2/7-15, 4017-66m, SA



NOCS 2/7-15 4017-66m
SATURATED GC
CLST: gy blk, brn blk, drk gy to m
drk gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

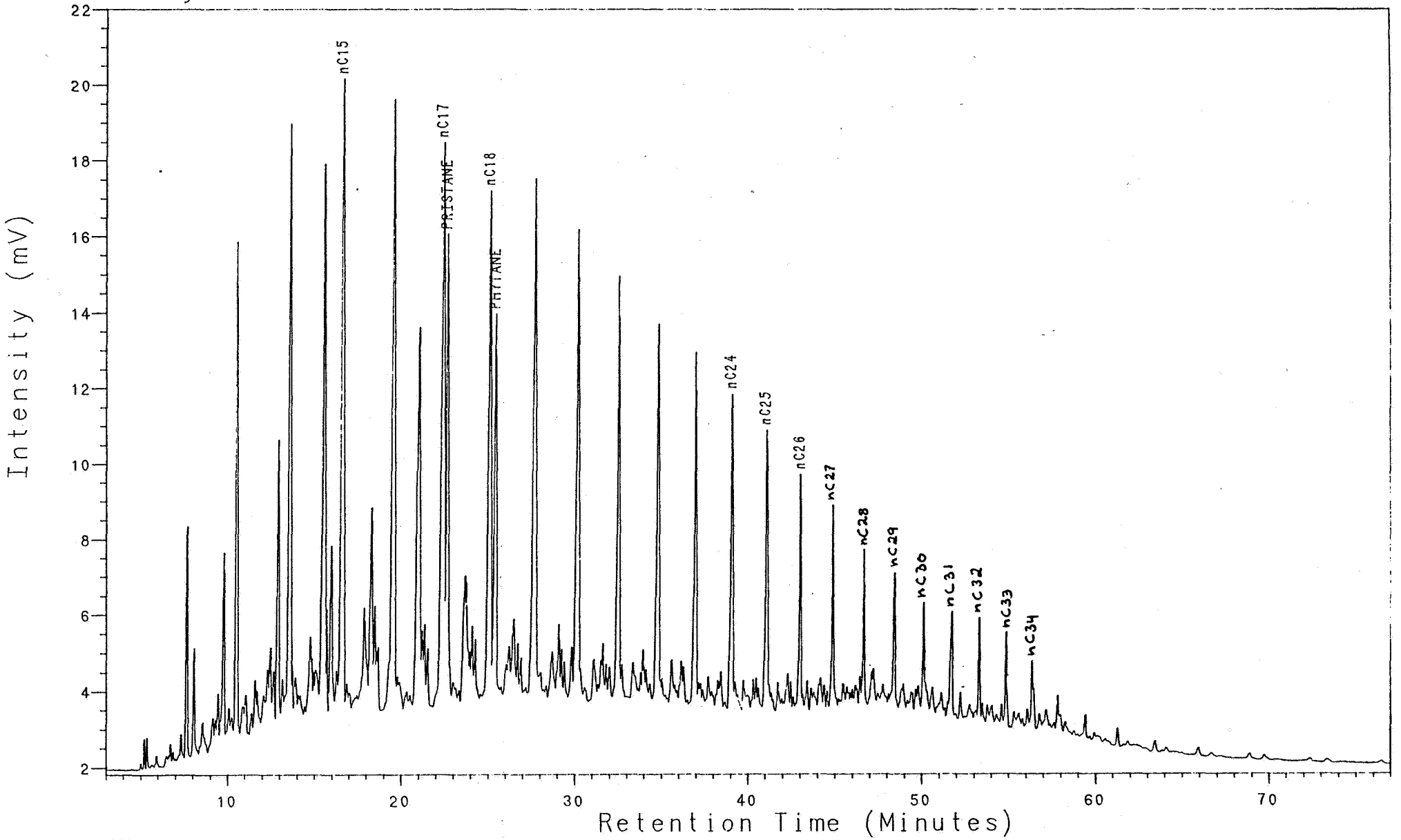
Analysis SA2434111 5, 1, 1 2/7-15, 4072-4111m, SA



NOCS 2/7-15 4072-4111m
SATURATED GC
CLST: gy blk, m gy blk, brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

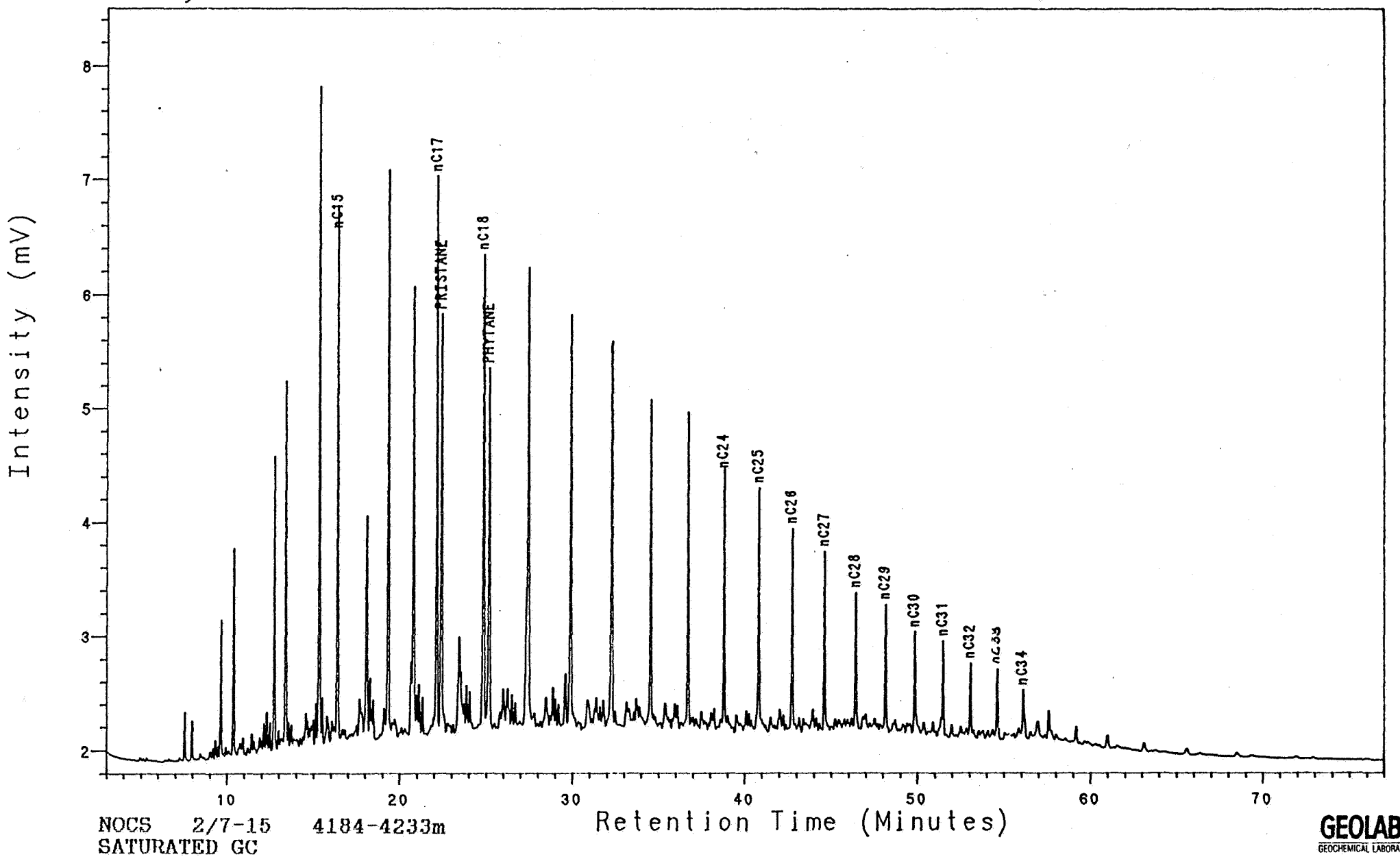
Analysis SA2434178 5, 1, 1 2/7-15, 4117-78m, SAT



NOCS 2/7-15 4117-78m
SATURATED GC
CLST: gy blk, m gy blk, brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

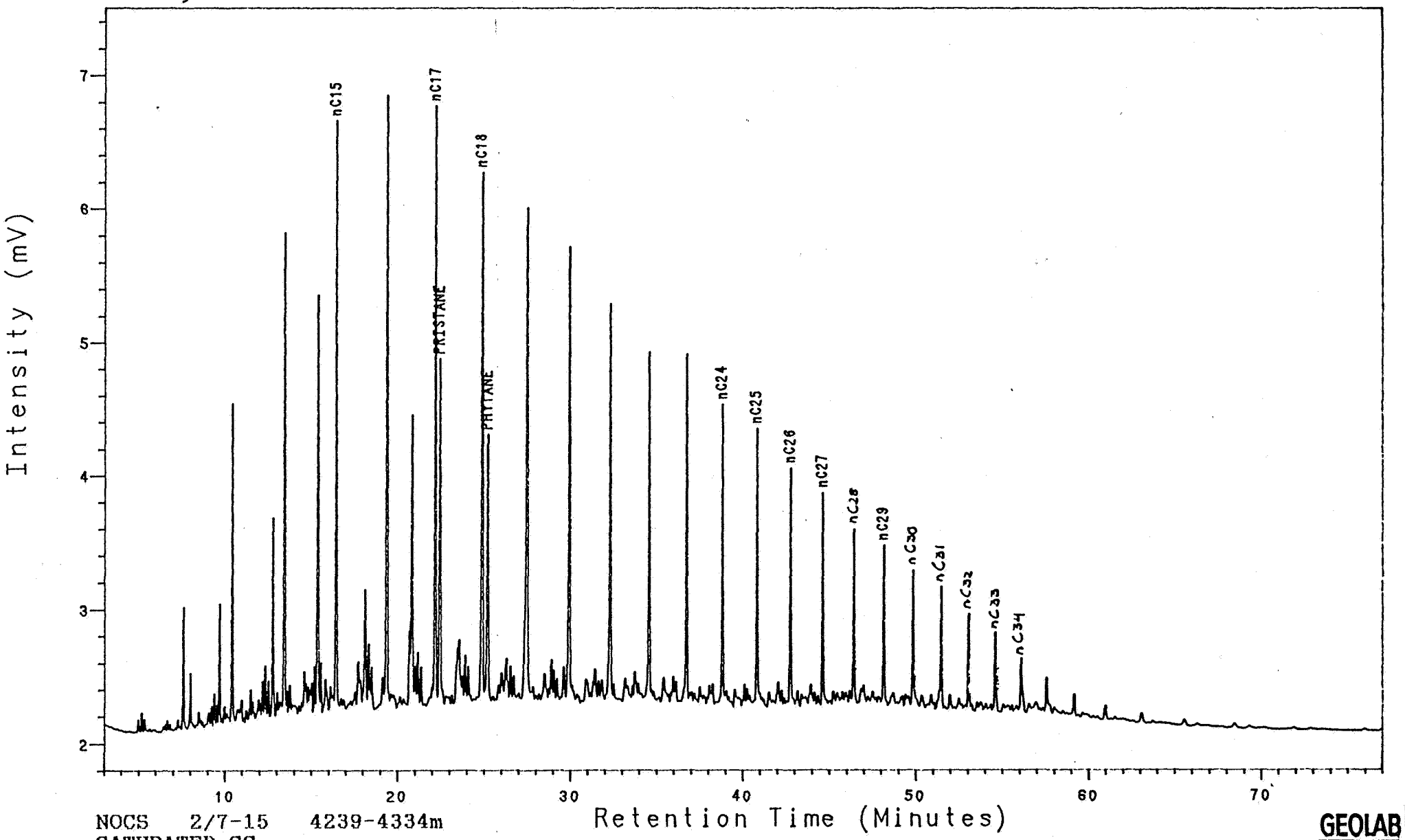
Analysis SC081940B 5, 1, 1 2/7-15, 4184-4233m, S



NOCS 2/7-15 4184-4233m
SATURATED GC
CLST: gy blk, brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

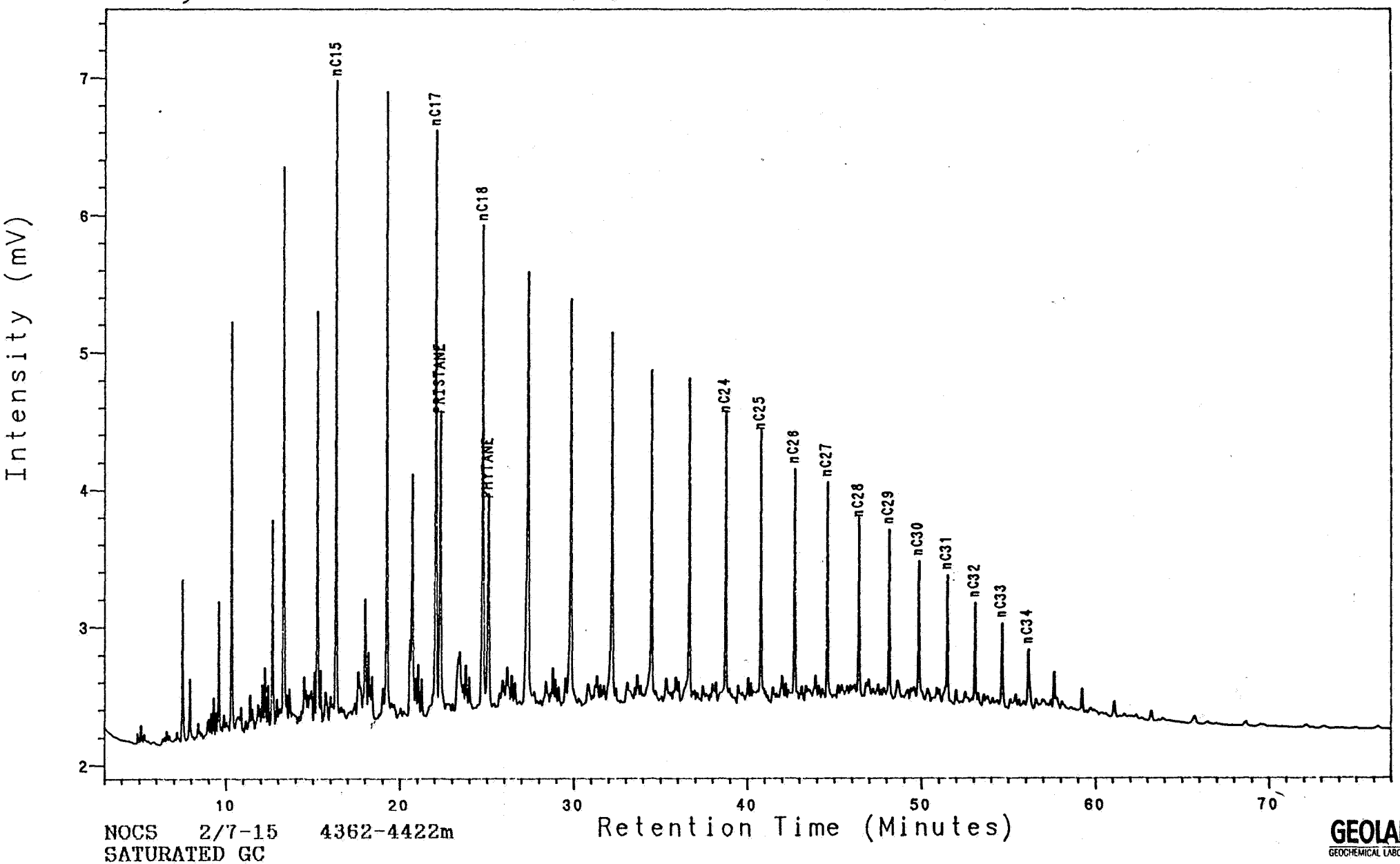
Analysis SC081950B 5, 1, 1 2/7-15, 4239-4334m, S



NOCS 2/7-15 4239-4334m
SATURATED GC
CLST: gy blk, brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

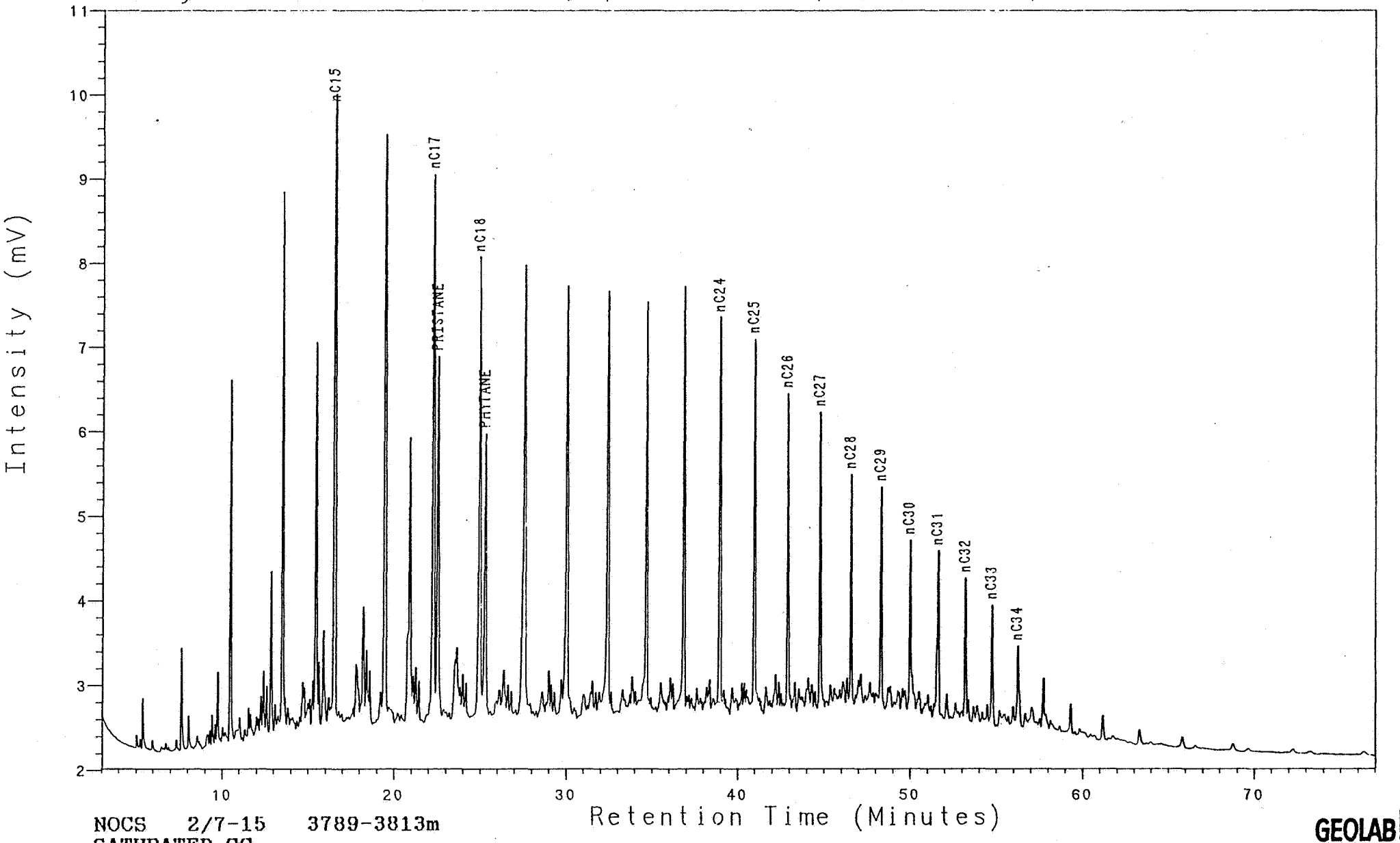
Analysis SC081960B 5, 1, 1 2/7-15, 4422m, SAT



NOCS 2/7-15 4362-4422m
SATURATED GC
CLST: gy blk, brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

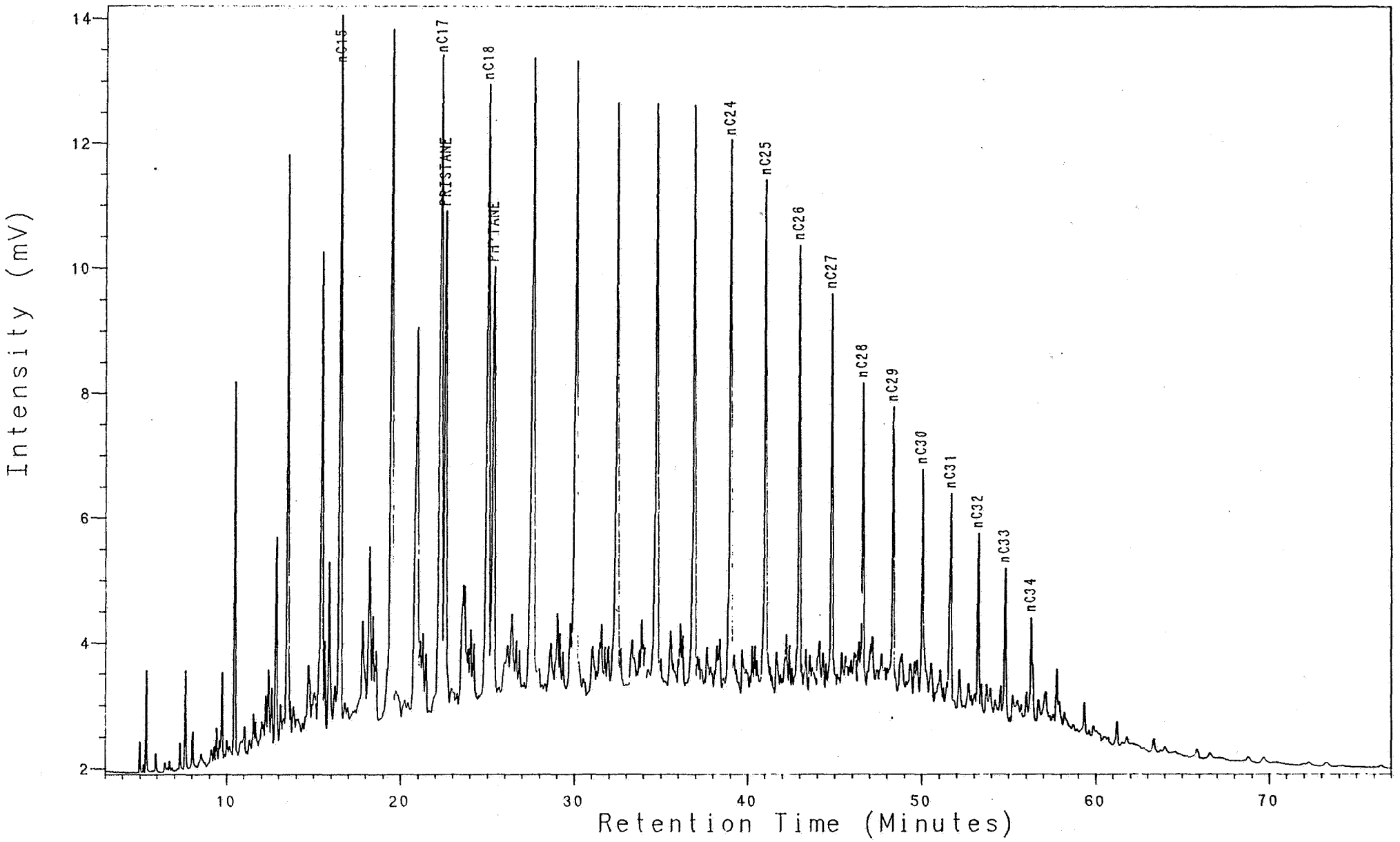
Analysis SA2433813 5, 1, 1 2/7-15, 3789-3813m, SA



NOCS 2/7-15 3789-3813m
SATURATED GC
CLST: gy blk, drk gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Analysis SA2433893 5, 1, 1 2/7-15, 3874-93m, SA



NOCS 2/7-15 3874-93m
SATURATED GC
CLST: gy blk, brn blk

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S