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NORTH VIKING GRABEN
GEOCHEMICAL STUDY

Well no. 30/6-4 NOCS

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INTRODUCTION

This well is from the Norwegian sector of the North Sea in the Bergen High and within the area of the Oseberg field.

A total of 155 samples was collected from the Norwegian Petroleum Directorate in Stavanger. All the samples were washed and described (2000 - 2939 m) RKB). The analysed interval is from 2370 - 2939 m RKB, the sample interval being 5 or 3 m.

A careful selection was made of suitable samples for screening analysis, i.e. TOC and Rock-Eval analyses. One hundred and four (104) samples were selected for these analyses and from the data obtained from the analysis a number of samples were chosen for further analysis as follows:

Thermal extraction - pyrolysis - gas chromatography	59 samples*
Extraction, MPLC fractionation, saturated and aromatic hydrocarbon gas chromatography	11 samples
Vitrinite reflectance microscopy	20 samples
Visual kerogen analysis	18 samples

* 11 samples were solvent extracted before pyrolysis gc.

Tables, listing in detail which sample 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 analysis. 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

Cretaceous (- 2415 m)

Only the lowermost 45 metres was analysed. The samples in this interval consist mainly of limestone and green-grey and light to medium dark grey claystones with < 0.6 % TOC.

Jurassic (2415 m - TD)

Draupne Formation (2415 - 2430 m)

Brown-black and dark grey-black claystones are the main lithology in the samples in this interval. There are also variable amounts of green-grey, red-brown and light grey to medium dark grey claystones which are considered to be mainly caved Cretaceous lithologies. The in-situ claystones from 2415 - 2420 m have TOC values of 7.9 and 8.2 %. The in-situ claystones from 2420 m to 2430 m have TOC values of 5.9 % and 5.3 %. The reason for the difference in TOC between the two intervals is not known. The whole interval can be classified as "hot shale", based on the gamma ray log.

Heather Formation (2430 - 2597 m)

The main lithology in samples of this interval is green-grey and olive-grey to light grey silty claystone and also some red-brown claystone. The top 70 m, in particular, include some dark grey-black claystones caved from the Draupne Fm. Below 2474 m there is also a variable amount of brown-grey to dark brown grey limestone. Below this depth some of the dark grey-black claystones are considered to be in-situ.

The main in-situ claystones have 0.3 % to 1.0 % TOC. The

limestones have from 0.7 % to 1.8 % TOC. Minor brown-grey claystones below 2560 metres have 0.3 % - 0.8 % TOC. The TOC of the dark grey-black claystones below 2500 m varies from 4 % to 5 %.

Brent Group (2597 - 2685 m)

This sequence consists mainly of sandstones, according to the log data. The sequence was cored in part (2638 - 2645 m, 2654 - 2643 m) and cuttings samples in these intervals are, therefore, not fully representative. Minor lithologies beside sandstone in the samples of this sequence are brown-grey claystones and black, carbonaceous claystones and coals. The brown-grey claystones have mainly 0.5 - 1.0 % TOC. Two black claystones have rich TOC contents of 5.2 % and 6.1 %. One sandstone was analysed, it has a TOC of 0.3 %.

Dunlin Group (2685 - 2942 m, TD)

Drake Formation (2685 - 2855 m)

The samples from the top part of this interval, from 2685 to 2768 m, consist mainly of light grey to medium grey claystones and siltstones with 0.1 % to 1.5 % TOC (mainly 0.5 - 1 %). In the interval from 2768 m to 2855 m, medium brown-grey to dark brown-grey and dusky yellow-brown claystones predominate. There are minor amounts of grey-brown and pale yellow-brown limestones associated with these claystones. The claystones have TOC values from 1.4 % to 3.3 %. The claystones show a gradual increase from 1.4 % at 2768 m to 3.3 % at 2804 m, then a gradual decrease to 2 % at 2855 m.

Cook Formation (2855 - 2895 m)

The samples consist of sandstones and some dark brown-grey to dusky yellow-brown claystones with 1 - 2 % TOC. The sandstones have less than 0.3 % TOC except for the top sample 2855 - 2858 m which has 0.6 % TOC.

Burton/Amundsen Formations (2895 - 2942 m)

The samples in this interval consist of medium to dark brown-grey and dusky yellow-brown claystones with 1.3 % - 1.5 % TOC. Total drilled depth is at 2942 m.

ROCK-EVAL ANALYSIS

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

Cretaceous (- 2415 m)

The petroleum potential (< 1) and hydrogen index (< 100) values of the claystone and limestone in this interval, are typical for type IV kerogen, with very poor potential for dry gas only.

Jurassic (2415 m - TD)

Draupne Formation (2415 - 2439 m)

The brown-black and dark grey-black claystones in the interval from 2415 m to 2420 m have petroleum potentials greater than 40 and hydrogen index values of 530 and 494 indicating that there is very rich, type II kerogen in these claystones. In the interval below this, from 2420 - 2430 m, similar claystones have petroleum potentials of 23 and 24 and hydrogen indices of 378 and 445, indicating rich kerogen type II or II/III. Both intervals clearly have a rich potential for oil and gas, but at higher maturities than have been reached in this well.

Heather Formation (2430 - 2597 m)

The main lithologies in the sequence (light grey to olive-grey claystones) have petroleum potentials < 1 and type IV kerogen (hydrogen indices less than 50). These

claystones have a very poor potential for dry gas. Dark grey-black claystones (below 2470 m) have petroleum potentials from 8-16 and type II/III kerogen (hydrogen index 158-338). They have a good-rich potential for condensate and gas and possibly some oil. Minor limestone beds contain type IV, rarely type III, kerogen with a poor potential for gas.

Brent Group (2597 - 2685 m)

Brown-grey claystones in samples in this interval, have petroleum potentials less than one and type IV kerogen. These claystones have very poor potential for dry gas. Thin coal and carbonaceous claystones are present in the upper part of the sequence (2597 - 2633 m) and the analysed samples have good-rich petroleum potentials (9,11 for claystones, 292 for coal) with type III or II/III kerogen. They have a rich potential as source rocks for gas and condensate.

Dunlin Group (2685 - 2942 m, TD)

Drake Formation (2685 - 2855 m)

Light grey to medium grey claystones in the interval from 2685 - 2768 m, have petroleum potentials mostly less than one. Kerogen is mostly type, IV but there is some type III. These claystones have a poor potential for dry gas. The dominant brown-grey to dark brown-grey and dusky yellow-brown claystones below 2768 m have petroleum potentials ranging from 3 - 14 and hydrogen indices from 246 - 452. The interval from 2768 to 2855 m can be divided into three, based on variations in TOC, petroleum potential and hydrogen index. Between 2768 m and 2780 m hydrogen indices are 200 - 300, i.e. type II/III kerogen. Between 2780 and 2810 m hydrogen indices are mostly 400+, i.e. type II

kerogen. Below 2810 m hydrogen indices of 334 to 448 indicate type II/III or II kerogen. The differences are more clearly seen using TOC and petroleum potential values, e.g.

	Average % TOC	Average Petroleum potential
1. 2768 - 2780 m	1.4 %	4.6 (range 3-7)
2. 2780 - 2810 m	2.6 %	11.3 (range 8-14)
3. 2810 - 2855 m	2.3 %	9.7 (range 6-10)

The interval from 2768 - 2855 m has a good-rich source rock potential for oil and gas.

Cook Formation (2855 - 2895 m)

The minor dark brown-grey claystones in this sequence have good source rock potential for oil and gas (petroleum potentials 6,9, hydrogen indices 389, 446).

Burton/Amundsen Formations (2895 - 2942 m, TD)

Medium to dark brown-grey and dusky yellow-brown claystones in this sequence, have petroleum potentials ranging from 2-6 and hydrogen indices from 216-379, i.e. type II/III kerogen. The claystones in this sequence have a fair to good potential as source rocks for gas/condensate and possibly some oil.

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

The high production index values in the Cretaceous (figure 2), are probably due to the presence of migrated

hydrocarbons. The reservoir section of the Oseberg field is between 2507 - 2685 m. No large amounts of migrated hydrocarbons were detected in this section. Presumably most good oil stained sandstones were removed by earlier investigators for analysis. The general run of production index values does not indicate that major hydrocarbon generation has occurred in either the Draupne claystones, or in the Dunlin Group claystones below 2768 m. Both sequences have low production index values, ranging from 0.03 to 0.07 for the more organic-rich samples.

Migrated hydrocarbons are present in the Cretaceous and, presumably, the Brent which is the reservoir for the Oseberg field.

3. Maturity (Tmax)

The estimated Tmax trend for the Jurassic interval, between 2415 - 2942 m (TD), is mainly from 425 to 435 (see figure 3), which suggests that the interval is moderate to early mature.

EXTRACTION DATA

Eleven (11) composite samples were extracted, fractionated and gas chromatograms were run of saturated and aromatic hydrocarbon fractions.

Cretaceous (- 2415 m)

No samples were analysed from the Cretaceous.

Jurassic (2415 m - TD)

Draupne Formation (2415 - 2430 m)

Two samples were analysed from this sequence.

The amounts of EOM in the Draupne Fm. samples are 4808 ppm and 3904 ppm, which indicates a rich source rock. The percentage of extractable hydrocarbons in the EOM are fairly low, 22 - 24 %, and suggest that the samples are immature for type II kerogen. Low EOM/TOC (63, 77 mgs/g) and HC/TOC (16,16) also indicate that little, or no,bitumen/hydrocarbon generation has occurred.

Heather Formation (2430 - 2597 m)

Three samples of dark-grey to black claystones from 2441 m, 2492 m and 2558 m were taken for extraction and analysis. The amount of EOM and total hydrocarbons is as high, or higher, than for the Draupne claystones (i.e. 4500 ppm, 9184 ppm and 3487 ppm respectively). Based on content of EOM, these are rich source rocks. Only the top sample has a similar percentage of extractable hydrocarbons to the

Draupne (20 %, and is probably, partly caved Draupne). The other two have < 10 % extractable hydrocarbons and this suggests they have a poorer hydrocarbon potential than the Draupne claystones.

Brent Group (2597 - 2685 m)

No samples from the reservoir interval were extracted.

Dunlin Group (2685 - 2942 m, TD)

Drake Formation (2685 - 2855 m)

Five composite samples were taken for extraction and analysis. These were from 2780 m, 2789 m, 2813 m, 2834 m and 2855 m. Although the TOC content is less than in the Draupne claystones, the amount of extractable bitumen is as high or higher for the 3 deepest samples (4449, 5482 and 5434 ppm EOM, respectively). The percentage of extractable hydrocarbons is low in all samples (23 %, 19 %, 25 %, 13 % and 15 %), which indicates that type II kerogen in these claystones is immature. Values of EOM to TOC are much higher than for the Draupne Fm. samples and range from 110-254 mgs EOM/g TOC and increase gradually from top to bottom of the interval below 2768 m. This range of values indicates rich source rocks. Values of extractable hydrocarbons normalised to TOC are low, but do show a slight increase down hole (from 25 to 38 mgs EHC/g TOC). This is probably due to improved kerogen quality, rather than increase in maturity. Bitumen generation appears to be further advanced in the Dunlin claystones than in the Draupne Fm.

Cook Formation (2855 - 2895 m)

No samples from the Cook Formation were analysed.

Burton/Amundsen Formations (2895 - 2942 m, TD)

One sample was extracted. The amount of extractable bitumen is as high as the upper analysed section of the Drake Fm. and suggests a similar source rock potential to that section. The amounts of EOM and EHC normalised to TOC are slightly higher (192 and 40, respectively) than in the upper analysed section of the Drake and suggest a slightly better source rock quality for the sample from the Burton/Amundsen Fm., than for the Drake Fm. above 2800 m.

Saturated Hydrocarbons

Cretaceous (- 2415 m)

No sample was analysed from the Cretaceous.

Jurassic (2415 - 2942 m, TD)

Draupne Formation (2415 - 2430 m)

The two samples are very similar in saturated hydrocarbon distribution. The n-alkane range is nC_{12} - nC_{20} with a maximum at nC_{14} - nC_{15}. The main features of these chromatograms are as follows:

1. Pristane/phytane ratio is fairly high (1.8)
2. CPI is greater than or equal to 1 between nC_{26} - nC_{30}
3. Abundant steranes and triterpanes (nC_{25} - nC_{37} region)

4. Pristane/nC_{17} ratios are greater than 1

These features (see figure 4) suggest that the hydrocarbons were derived from immature kerogen (as indicated by the abundant steranes and triterpanes). The low molecular weight hydrocarbons, i.e. nC_{12} - nC_{18} may be migrated hydrocarbons. These have probably affected pristane/nC_{17} and pristane/phytane ratios. Another possibility is that light hydrocarbon generation has begun, i.e. of hydrocarbons less than nC_{18} and that isoprenoid ratios are correct. If so, the isoprenoid ratios are not typical of the Draupne Fm. in other areas, e.g. in blocks 24 and 25 and in the East Shetland Basin. The relatively low amount of nC_{20+} hydrocarbons is then indicative of an organic matter with very little terrestrial input. From optical data it is probable that a very large part of the organic input is of liptinite material (algal?), and that the nC_{12} - nC_{18} hydrocarbons are an indication of this abundant liptinite material in the samples.

Heather Formation (2430 - 2597 m)

The top sample (2441 m) has a saturated hydrocarbon gas chromatogram very similar to the Draupne Fm., and it is considered to consist mostly of caved Draupne Fm. claystones. The main feature of the other two chromatograms include pristane/phytane > 2, pristane/nC_{17} < 1 and a distinct odd n-alkane preference between nC_{22} - nC_{34}. The n-alkane range is from nC_{13} - nC_{36} with the nC_{15} - nC_{20} alkanes dominant, and a maximum at nC_{16} or nC_{17}. These observations indicate a relatively greater input of terrestrial plant matter, than for the Draupne Fm. and the claystones are immature to moderate mature.

Brent Group (2597 - 2685 m)

No samples were analysed from this sequence.

Dunlin Group (2685 - 2942 m, TD)

Drake Formation (2685 - 2855 m)

Five samples from this sequence were extracted. All the samples come from the rich (in TOC) claystones below 2768 m which are Early Toarcian(?).

All the samples have an n-alkane envelope from nC_{13} - nC_{35} and a distinct odd n-alkane preference between nC_{23} - nC_{34} (figure 6). In all samples the pristane/phytane ratio is greater than 2. Normal alkanes in the range nC_{13} - nC_{20} dominate and there is a maximum between nC_{15} and nC_{17}. The dominance of nC_{15} - nC_{17} alkanes suggests that algal material may constitute a major part of the organic matter. The pristane/phytane ratios, in these relatively immature samples, suggest that the depositional environment was mildly anoxic, or that anoxic/oxic interface was close to the sediment surface/water interface.

The pristane/nC_{17} ratio is less than one, suggesting that hydrocarbon generation has begun.

Cook Formation (2855 - 2895 m)

No samples were analysed.

Amundsen/Burton Formations (2895 - 2942 m, TD)

One sample was analysed. The saturated hydrocarbon gas

chromatogram is very similar to those from the Drake Fm. The same conclusions made for those samples apply to this sample.

Aromatic Hydrocarbons

Cretaceous (- 2415 m)

No samples were analysed.

Jurassic (2415 m - TD)

Draupne Formation (2415 - 2430 m)

The two samples which were analysed have different aromatic hydrocarbon distributions. The top sample has a typical aromatic hydrocarbon distribution of an immature "hot shale" sample (figure 7). Alkyl naphthalenes are a relatively minor constituent. The gc is dominated by a large unresolved hump (which includes abundant aromatic sulphur compounds, DBT/phen* ratio is approximately 0.4. The main resolved components are phenanthrene and alkyl phenanthrenes, as well as trimethyl naphthalenes and aromatic steranes and triterpanes. The very low 4/1 and 3+2/1 MDBT ratios indicate that the kerogen is immature and depositional environment was anoxic. The second sample from 2424 -2429 m is more typical of the "cold shales". Alkyl naphthalenes dominate the resolved component of the gc (figure 8). Aromatic sulphur compounds are still present, but less than the other sample (DBT/phen* < 0.2). The low MNR, 4/1 and 3+2/1 MDBT ratios and abundant aromatic steranes and triterpanes, indicate that the sample is immature. MPI 1 ratios cannot be measured accurately, since 1-methyldibenzothiophene (1-MDBT) which elutes with the 3-methylphenanthrene, is much larger

than the latter compound.

* DBT/Phen = Dibenzothiophene/Phenanthrene

Heather Formation (2430 - 2597 m)

The general features of the aromatic hydrocarbon distribution of the two deeper samples from this sequence are similar to each other. The top sample (2441 m) resembles the deeper of the two Draupne Fm. claystones and is considered to consist mainly of caved Draupne claystone. The two samples from below this are dominated by a few resolved peaks and an unresolved hump. The dominant resolved components include: phenanthrene and methylphenanthrenes, plus unidentified peaks (marked with an asterisk in figure 9) in the tetramethylnaphthalene and aromatic sterane/triterpane zones. The distribution is typical of claystones with immature type III kerogens.

Brent Group (2597 - 2685 m)

No samples were extracted from this sequence.

Dunlin Group (2685 - 2942 m, TD)

Drake Formation (2685 - 2855 m)

The aromatic hydrocarbon distribution of the 5 samples in this formation are similar. The relative amount of alkyl naphthalenes is the main variable. In the sample shown in figure 10 they are fairly prominent, in others they are virtually absent. This is probably due to small variations in work-up procedure and to variable amounts produced from the kerogen in these claystones during early maturation of

the kerogen. Aromatic sulphur compounds and aromatic sterane and triterpanes are much less prominent than in the Draupne Fm. In addition, the prominent peaks noted in the tetramethylnaphthalene and aromatic sterane/triterpane zones of the Heather, and to a lesser extent in the Draupne Fm., are virtually absent in the Drake Fm., presumably this marks changes in organic input. Low 4/1 and 3+2/1 MDBT ratios indicate that the samples are still of low maturity.

Cook Formation (2855 - 2895 m)

No samples were analysed from this formation.

Burton/Amundsen Formations (2895 - 2942 m, TD)

The aromatic hydrocarbon distribution, of the one sample which was analysed, is very similar to those from the Drake Fm. The same conclusion can be made for both. The MPI 1 ratio of this sample (0.55) gives a calculated vitrinite reflectance of 0.65 - 0.7 % Ro, which is slightly lower than the observed vitrinite reflectance at this depth (0.75 %).

THERMAL EXTRACTION - GAS CHROMATOGRAPHY

Forty-eight (48) samples from the Jurassic sequence were analysed by thermal extraction gas chromatography.

Cretaceous (- 2415 m)

No samples were analysed.

Jurassic (2515 m - TD)

Draupne Formation (2415 - 2430 m)

Four samples were analysed from this sequence. These are from 2417 m, 2420 m, 2424 m and 2429 m. Although there are differences in petroleum potential and in the aromatic hydrocarbon distributions of the top and bottom samples, the thermal extract gas chromatograms are very similar (figure 11). They are characterised by a n-alkane envelope from nC_{10} - nC_{20} with a maximum at nC_{12} or nC_{13}. The n-alkane envelope is very narrow, and nC_{11} - nC_{14} alkanes are predominant. Isoprenoids. such as pristane and phytane, are relatively minor components. The distribution is indicative of immature claystones, in which nC_{15}+ components have not yet been generated in any quantity. Aromatics such as naphthalene and methylnaphthalenes are present, but are less than the n-alkanes, which is characteristic of type II/III or II kerogens. The lack of low molecular weight, material i.e. < nC_{10} is probably due to the long storage time before analysis.

Heather Formation (2430 - 2597 m)

Sixteen (16) samples were analysed from this interval. Nine (9) dark grey-black claystones, four (4) brown-grey limestones and three (3) lighter claystone types (light grey, olive-grey and brown-grey), were analysed. The dark grey-black claystones generally have thermal extracts similar to the Draupne Fm., the top three samples in particular (2432 m, 2436 m, 2441 m) and probably include some caved Draupne claystone. Below these the n-alkane distribution is still very similar to the Draupne claystone although aromatics such as naphthalene and methylnaphthalenes are generally slightly more prominent (e.g. see figure 12). The distribution is characteristic for immature type II/III kerogen. The thermal extraction chromatograms of the lighter-coloured claystones are different. They tend to have far fewer hydrocarbons (particularly the light grey claystones) and have a narrower envelope of n-alkanes than the dark grey-black claystones, e.g. nC_9 - nC_{15} or < nC_{12} for light grey claystone. The hydrocarbons, probably at least partially, represent migrated light hydrocarbons since the organic matter in these claystones has a very poor potential for hydrocarbon generation. The limestones have a similar hydrocarbon envelope to the dark grey-black claystones, but there are relatively more aromatic hydrocarbons (e.g. see figure 13) such as xylenes, naphthalenes (N) and methyl naphthalenes (MN). The n-alkane maximum in limestones is nC_{10} or nC_{11} rather than nC_{12} - nC_{13} as in claystones. The distribution is probably indicative of a type III kerogen with mainly wet gas potential.

Brent Group (2597 - 2685 m)

Two samples were thermally extracted. One coal from 2633 m and one black carbonaceous claystone from 2606 m. Both chromatograms are unlike those of dark grey-black claystones

in the Draupne and Heather Fms. The chromatograms of the coal and claystone are dominated by aromatics, mostly low molecular weight compounds in the case of the claystone (i.e. toluene, xylenes, naphthalene (N) and methyl naphthalenes (MN)), and include phenanthrene and methyl phenanthrenes in the case of the coal. These distributions are typical of kerogens derived from terrestrial land plant debris deposited in swamp environments. They will yield mostly gas at a higher level of maturity.

Dunlin Group (2685 - 2942 m, TD)

Drake Formation (2685 - 2855 m)

Twenty-two (22) claystone samples were thermally extracted. The dominant lithology, down to 2768 m, is light to medium grey claystone. Based on the thermal extracts, these claystones have only trace amounts of low molecular weight hydrocarbons (mainly less than nC_{15}), consisting mostly of n-alkanes from nC_{10} - nC_{15} and aromatics < nC_{10}. Where dark grey-black claystones have been analysed, similar chromatograms were obtained to those of the dark grey-black claystones from the Heather Fm.. The dominant lithology probably has very little hydrocarbon potential.

Below 2768 m the TOC-rich medium to dark brown-grey and dusky yellow-brown claystones have similar chromatograms to the Draupne samples. However, there are some differences. Normal alkanes are more prominent relative to pristane and phytane down to 2789 m. Pristane is much greater than phytane throughout, and there are more low molecular weight hydrocarbons (from 2768 m to 2789 m and below 2802 m). In addition, below 2789 metres aromatics such as naphthalene and methylnaphthalenes are more prominent than above 2789m.

The typical hydrocarbon distribution seen in the claystones

from 2768 - 2855 m is shown in figures 15, 16 and 17. Figure 15 represents the poorest type II/III kerogen at the top of the interval (2777 m). The sample with the richest, type II kerogen from 2807 m (figure 16) has a chromatogram which shows slightly more $C_{15}+$ hydrocarbons than samples above and below. The sample from 2852 m (figure 17) has type II kerogen but resembles the chromatogram from the top, in that aromatics and isoprenoids are less prominent.

Cook Formation (2855 - 2895 m)

Two samples were analysed. They have abundant low molecular weight compounds in the region of nC_8 - nC_{11} which may be from a contaminant. The sample from 2858 m is a sandstone, and the nC_{10} - nC_{16} component may be due, either to trace amounts of migrated hydrocarbons, or to indigenous organic matter in the sandstones.

The brown-grey to dark brown claystone from 2894 m is dominated by nC_{10} - nC_{20} alkanes, aromatics such as methylnaphthalenes. The isoprenoids, including pristane and phytane, are present in amounts typical for a mature source rock, e.g. pristane/nC_{17} ratio of approximately 0.5. This suggests that oil window mature hydrocarbons are present.

Burton/Amundsen Formations (2895 - 2942 m, TD)

The hydrocarbon distribution of the one analysed claystone and one carbonate is similar to those of the Heather Fm. dark grey-black claystones and carbonates and the poorer Drake Fm. claystones from 2766 - 2786 m and suggests similar kerogen type for this interval as in the Drake and Heather Fms.

PYROLYSIS - GAS CHROMATOGRAPHY

Fifty-three (53) samples were selected for analysis. Eleven of them were composite samples which were solvent extracted for EOM analysis, before pyrolysis was performed.

Cretaceous (- 2415 m)

No samples were analysed.

Jurassic (2415 - 2942 m, TD)

Draupne Formation (2415 - 2430 m)

Two composite, solvent extracted and four thermally extracted, brown-black to dark grey-black claystones were analysed by pyrolysis gas chromatography. All six samples have very similar pyrograms (figure 18). They have an alkene/alkane homology from C_1 - nC_{30}, with a large unresolved hump, up to nC_{30}. Xylene to oct-1-ene is lower than for many of the Draupne Fm. samples in other wells from this study. This suggests that the kerogens may be algal-rich in the Draupne Fm. of this well.

Heather Formation (2430 - 2597 m)

Sixteen (16) samples were analysed (3 thermally extracted and solvent extracted, before pyrolysis). The four pyrograms from 2432 - 2441 m of brown-black and dark grey-black claystones, are very similar in character to the Draupne claystone pyrograms, and are considered to be partly caved Draupne claystones. Pyrograms of dark grey-black claystones from 2453 m, 2480 m, 2492 m, 2534 m, 2558 m, 2576 m show

many similar features to each other. There is a clear alkene/alkane homology from C_1 - nC_{20}, as in the pyrograms of the Draupne claystones. However, the unresolved hump, especially above nC_{15}, is generally much reduced and aromatics such as xylene and methylnaphthalenes tend to be slightly more prominent, at least in some samples. Figures 19 and 20 show the two extremes, most of the pyrograms are intermediate in character to these two samples. They have a good oil potential but less than for the Draupne claystones.

Three brown-grey limestones were pyrolysed. The products indicate that these have some liquid hydrocarbon potential but pyrograms indicate less than for the dark grey-black claystones. The alkene/alkane homology is reduced in alkane range, particularly samples from 2867 m and 2888 m. Aromatics are much more prominent (e.g. xylenes and alkyl naphthalenes). The pyrolysis products indicate that the organic input was type III or type IV (in which only refractory organic matter - spores, inertinites etc. survived deposition). The pyrograms of olive-grey, light grey and brown-grey claystones show only trace amounts of C_1 - C_5, which make up 43 - 52 % of total pyrolysate. They are clearly poor gas source rocks.

Brent Group (2597 - 2685 m)

Two samples from this formation were pyrolysed. The pyrogram of the black carbonaceous claystone shows a prominent alkene/alkane homology up to nC_{30}. Aromatics and the unresolved hump are relatively minor. The trace is typical for an alginite-rich sample (particularly Botryococcus algae). The pyrogram of the coal is typical for a vitrinite coal with little or no waxy component. Aromatics and polar compounds (probably alkyl phenols) dominate the trace (figure 21), and the alkene/alkane homology is a very minor component. This coal has a poor potential for liquid hydrocarbons.

Dunlin Group (2685 - 2942 m, TD)

Drake Formation (2685 - 2855 m)

Five composite, solvent extracted, claystone samples and twenty-two (22) thermally extracted samples were analysed by pyrolysis-gas chromatography. The dominant light to medium grey claystones above 2768 m, contain type IV kerogen according to Rock-Eval data. The pyrograms confirm this, C_1 - C_5 hydrocarbons predominate (39 - 71 % of the total pyrolysis products) and aromatics and polar products are dominant up to nC_{15}. Little or no $C_{15}+$ hydrocarbon products were detected. The main types of organic matter present in these samples are, presumably, woody and inertinitic material.

Two dark grey-black claystones from 2735 m and 2756 m are very similar to those from the Heather Fm. and may be caved from the Heather Fm. The brown-grey siltstone from 2720 m is intermediate between the poor gas-prone light to medium grey claystones and the oil/gas prone dark grey-black claystones in that there is some liquid hydrocarbon potential up to nC_{20}. The siltstone has gas/condensate potential.

In the interval from 2768 m to 2855 m there is a considerable improvement in source rock potential. There is a gradual improvement in potential for liquid hydrocarbons from 2771 m to 2795 m. Below 2795 m pyrograms are fairly uniform and similar to the Draupne claystones. However, they do not represent caved Draupne Fm. claystones, since the well was cased at 2765 m. Figures 22, 23 and 24 show the changes which occur. The main changes are: an increase in the unresolved hump and in the prominence of the alkene/alkane homology, and a decrease in the relative amount of aromatics. The changes mark an improvement in oil potential. The solvent extracted samples over the same interval also show similar changes. There is a decrease in

the proportion of the C_1 - C_5 hydrocarbon component down the interval, levelling out between 2789 and 2813 m. There is, perhaps, a slight decrease in oil potential below 2807 m, shown by a slight relative increase in aromatics.

Cook Formation (2855 - 2895 m)

Two samples were analysed in this sequence. The sample from 2858 m is a sandstone. The distinct alkene/alkane homology in this sample could be partly due to migrated asphaltic material or to carbonaceous material present in the sandstones. The large high molecular weight unresolved hump is probably due, either to a residual asphaltic component, or to some heavy lubricant used during drilling the well. The pyrograms of the brown-grey to dark brown-grey claystone from 2894 m show that they have some liquid hydrocarbon potential. The main characteristics are: prominent alkene/alkane homology from C_1 to nC_{20}, above nC_{20} only the n-alkanes are prominent, and there is a decrease in the unresolved hump, finally, aromatics such as methylnaphthalenes are prominent. This is typical for a land plant dominated organic input with gas/condensate potential (i.e. type III or type II/III kerogen).

Burton/Amundsen Formations (2895 - 2942 m)

The pyrograms of three claystone samples in this formation are very similar to the Cook Fm. (figure 25) claystone and indicate a similar kerogen type in this formation.

VITRINITE REFLECTANCE

The vitrinite reflectance versus depth plot is shown in figure 26. Twenty samples were analysed from the interval 2050 m to 2950 m. Four samples were analysed from the Tertiary. All contain low to moderate amounts of bitumen stain and wisps with a trace of phytoclasts, which are largely composed of inertinite. Reflectance measurements are rather erratic but are, generally, around 0.35 %. In ultra-violet light low to moderate amounts of fluorescing organic matter are present including liptodetrinite, spores dinoflagelates and algal remnants. Spore fluorescence colour is highly variable and ranges from yellow to light orange.

One Cretaceous sample was analysed (2345 m). The sample is calcareous and slightly oxidised and contains no primary vitrinite. Spores are present which have yellow-orange to moderate orange colours in U.V. light. The spread of fluorescence colours may be due to the partial oxidation of the sediment.

The two Draupne samples (2417m and 2432 m) have reflectance values of 0.45 % and 0.42 %, respectively. The upper claystone is extremely rich in bitumen stain and wisps and contains a moderate amount of vitrinite which is, however, often low reflecting due to the high amounts of liptinite present. In U.V. light this sample is rich in fluorescing bitumen and amorphous organic matter/liptodetrinite and also contains tasmanites algae, red fluorescing resinous material, cuticle, dinoflagellates and spores. The amorphous organic matter is often arranged in laminae and contains liptodetrinite which appears to be largely of algal origin. The mid-orange spore fluorescence colour observed does not fit with the reflectance and has probably been affected by the presence of large amounts of algal material. The lower sample is very similar to the upper sample, but is less rich.

Four samples were analysed from the Heather Formation (2432 m to 2603 m). Organic matter is generally moderate in content and reflectance values appear to rise quite steeply from 0.42 % (2453 m) to 0.53 % (2534 m). There is a moderate to high amount of fluorescing organic matter present, which generally consists of semi-structured algae and liptodetrinite of algal origin. Tasmanites algae are present in all samples, as are spores. Spore fluorescence is again variable with yellow-orange to moderate orange colours present.

The two Brent samples (2606 m and 2633 m) contain organic rich claystone and coal clasts. Reflectance values of 0.53 % and 0.58 % were recorded, respectively, from high numbers of individual readings and bitumen staining and wisps are also high in both samples. In U.V. light many spores and a high amount of algal material are present. Spore fluorescence colours are light orange to moderate orange which agrees with the reflectance values.

Six samples were analysed from the Dunlin Group (2687 m to TD). All samples contain moderate amounts of bitumen staining and wisps, but low amounts of primary vitrinite, which is often of poor quality (i.e. small and affected by staining). Reflectance values for the upper three samples (2720 m to 2774 m) show a reasonable trend from 0.58 % to 0.62 % with depth but the lower three values show no trend and remain at approximately 0.58 %, which may indicate some degree of caving. Moderate to high amounts of fluorescing organic matter are present in all the Dunlin samples and this is composed of bitumen, semi-amorphous algal organic matter, Tasmanites algae, traces of cutinite and spores. Spore fluorescence colours vary between light orange and dark orange but are, generally, medium orange.

From the depth/reflectance plot a reasonable trend can be seen down to approximately 2800 m, after which the reflectance remains constant with depth. From the initial

gradient it appears that the well should have a reflectance of approximately 0.80 % at 3000 m.

VISUAL KEROGEN COMPOSITION

Seventeen samples from well NOCS 30/6-4 were examined in transmitted light. The majority of the samples were shale/claystone (with the exception of carbonates at 2480 m and 2507 m) and ranged from 2417 m (Draupne Fm.) to 2819 m (Drake Fm.).

The one sample from the Draupne Fm. (2417 m) is dominated by liptinite (75% mainly liptodetrinite and spore/pollen material), with secondary vitrinite (20 %, mainly detrital). Five of the six Heather formation samples have very mixed kerogen compositions (the sixth from 2507 m) could not be determined). The liptinite component is largest at the top of the sequence and lowest at the base but is mixed liptodetrinite and spore/pollen material throughout, with minor amorphous material. The vitrinite content ranges from 30 - 50% and is mainly detrital with occasional amorphous material and, towards the base, telinite and collinite. The inertinite content ranges from 20 to 60% (the latter value from the base sample at 2576 m) and is mixed semifusinite and inertodetrinite with traces of fusinite.

The Brent Group is represented by one sample (2606 m) which has an identical composition to the base Heather Formation sample.

Nine samples from the Drake Formation were analysed (for the sample from 2747 m no determination of composition could be made). The sequence can be divided into two sections: The upper part of the formation (2720 m to 2771 m) is dominated by vitrinite (50% to 60%, mixed constituents) with 20 to 30% liptinite (mainly detrital and spores/pollen). The lower part of the section (2783 m to 2819 m) is very much dominated by liptinite (60 to 90%, mainly spores/pollen and detrital) with secondary vitrinite (10 to 30% mixed detrital and amorphous). Provided that these samples are not caved,

they represent a potentially good source rock sequence as defined by visual kerogen.

As can be seen from figure 27 the samples from this well fall into three regions of the diagram. The samples most favourable for generation of mixed to oil products are: the Draupne sample, the top Heather sample and the samples from the lowermost section of the Drake. The lowermost Heather sample and the one Brent Group sample would be classified as "unfavourable for hydrocarbon generation to transitional for minor gas product". The remaining samples are favourable for generation of mixed products to gas.

CONCLUSIONS

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

1. Source Rock Potential

Cretaceous (- 2415 m)

Only the lower 45 m of the Cretaceous interval were analysed. The dominant lithology is limestone and light to medium dark grey and green-grey claystones with 0.6 % TOC. They have type IV kerogen and virtually no hydrocarbon potential.

Jurassic (2415 - 2942 m, TD)

Draupne Formation (2415 - 2430 m)

Brown-black and dark grey-black claystones in this interval have an average TOC over the whole interval of 6.8 % and average petroleum potential of 33. The highest TOC and petroleum potentials (8.1 % TOC, 43 petroleum potential) occur between 2415 - 2420 m in the top of the "hot shale" interval. The kerogen is type II above 2420 m and type II or II/III kerogen below this. The pyrolysis gc data indicate that the liquid hydrocarbon potential is similar throughout the formation and kerogen is probably alginite-rich. The visual kerogen data indicates samples are very rich in liptinite. The maturity of the sequence based on gc data and Rock-Eval Tmax is moderate mature, i.e. 0.5 % Ro. Optical data suggest a similar maturity.

Heather Formation (2430 - 2597 m)

The light to medium grey and olive-grey claystones, which constitute the main lithology in this sequence, have poor-fair (< 1 %) TOC values. Petroleum potentials are < 1 and the kerogen is mainly type IV. These have poor gas potential. Dark grey-black claystones are present probably as thin interbeds. These claystones have rich TOC contents varying from 4 - 6 %, with type II/III or III kerogen with variable source rock potential for condensate and gas, and also oil.

Brent Group (2597 - 2685 m)

The sequence consists mainly of sandstones. Dark grey to black claystones in this sequence have some oil potential where they are algal-rich. Coals appear to be essentially vitrinitic with mainly gas potential.

This is the reservoir interval of the Oseberg field, no oil stained sandstones were available for analysis.

Dunlin Group (2685 - 2942 m, TD)

Drake Formation (2685 - 2855 m)

The dominant lithology from 2685 - 2768 m is light to medium grey claystones, with some brown-grey siltstones. Below this, brown-grey to dark brown-grey and dusky yellow-brown claystones are dominant. Claystones above 2768 m have 0.5 - 1 % TOC and petroleum potentials less than 1. The kerogen type is these samples is mostly type IV but there is some type III in siltstones. Visual kerogen observations indicate that they are vitrinite - rich. The pyrolysis-gc indicates that these claystones have poor gas potential (minor

condensate potential in siltstones).

Below 2768 m and down to 2855 m the claystones (which have high gamma readings) have an average TOC of 2.3 % and petroleum potential of 9.4. The interval has been divided into three based on screening organic geochemical parameters, as follows:

		Average % TOC	Average Petroleum Potential
1.	2768 - 2780 m	1.4	4.6
2.	2780 - 2810 m	2.6	11.3
3.	2810 - 2850 m	2.3	9.7

The first interval has mainly type II/III kerogen, the rest type II/III or II kerogen. Pyrolysis gc data indicates that the two lower intervals are probably alginite-rich type II kerogen, and they have a rich potential for oil and gas. The top interval has a somewhat poorer potential for condensate and gas. Visual kerogen data indicates that the samples are liptinite-rich with a good potential for oil.

Gas chromatographic data indicates a moderate input of higher plant material (high CPI,small shoulder of high molecular weight n-alkanes between nC_{20} - nC_{35}). Maturity data appears to be high for the degree of kerogen degradation. This may be due to the nature of the organic matter (see discussion on generation and maturity).

Cook Formation (2855 - 2895 m)

Consists mostly of sandstones with some claystone beds. Claystones are similar in character to the lowest interval of the Drake Fm. claystone, with TOC and petroleum potentials from 1 - 2 % and 6 - 9, respectively. The claystones have pyrograms most like interval one, of the

rich Drake Fm. and have a similar hydrocarbon potential, i.e. mostly gas/condensate.

Burton/Amundsen Formations (2895 - 2942 m, TD)

Consists mostly of medium to dark brown-grey and dusky yellow-brown claystone with TOC values from 1.3 - 1.5 % and petroleum potentials from 2 - 6. Pyrolysis data indicates gas/condensate potential.

2. Generation and Migration

Production indices of the Draupne Fm. claystones are about 0.05 which is typical of immature samples. The samples are alginite-rich and would probably tend to be lower than for kerogens with more mixed, terrestrial and marine organic material. Gas chromatographic data (including abundant steranes and triterpanes, very low aromatic sulphur ratios, i.e. 4/1 and 3+2/1 MDBT (< 1) low methylnaphthalene ratio (< 1), low biomarker ratios) indicates the samples are immature to moderate mature. Bitumen generation is low (< 80 mgs EOM/g TOC), confirming that the Draupne is immature - moderate mature.

The presence of migrated light hydrocarbons in the Draupne claystones is suggested by the extreme front-end n-alkane bias (i.e. nC_{12} - nC_{18}), shown in saturated hydrocarbon gas chromatograms. The bias is probably partly due to the highly alginite-rich kerogens in these samples.

The Brent Group sequence of sandstones includes the reservoir interval of the Oseberg field, and oil shows were recorded on logs. No oil-stained sandstones were observed. The samples are poor.

The TOC-rich Dunlin Group claystones have production indices

less than 0.1 and major hydrocarbon generation has not begun (extractable hydrocarbon content mormalised to TOC is less than 40 mgs HC/g TOC). Bitumen generation has begun, as values up to 250 mgs EOM/g TOC were recorded.

Tmax in the Dunlin sequence varies from 430 - 440, and suggest that hydrocarbon generation should be more advanced. Tmax may be high due to large amount of alginite in some samples. Measurement of vitrinite reflectance on this sequence was difficult due to the large amounts of alginite and bitumen staining. Only vitrinite particles relatively unaffected by staining (and not associated with alginites and not reworked, higher reflecting vitrinite particles), were measured. Spore fluorescence values indicate a maturity range equivalent to 0.5 - 0.8 % Ro. Spore colouration values indicate a range equivalent to 0.58 - 0.65 % Ro. approximately. Clearly major hydrocarbon generation has not occurred in the analysed Jurassic sequence. The disparity between the chromatographic and Tmax maturity data is partly due to the algal-rich organic matter in the sequence.

3. Maturity

The estimated maturity range of the Jurassic sequence in this well is 0.45 % - 0.65 % Ro.

Figure 1. NOCS 30/6-4 (OSEBERG)

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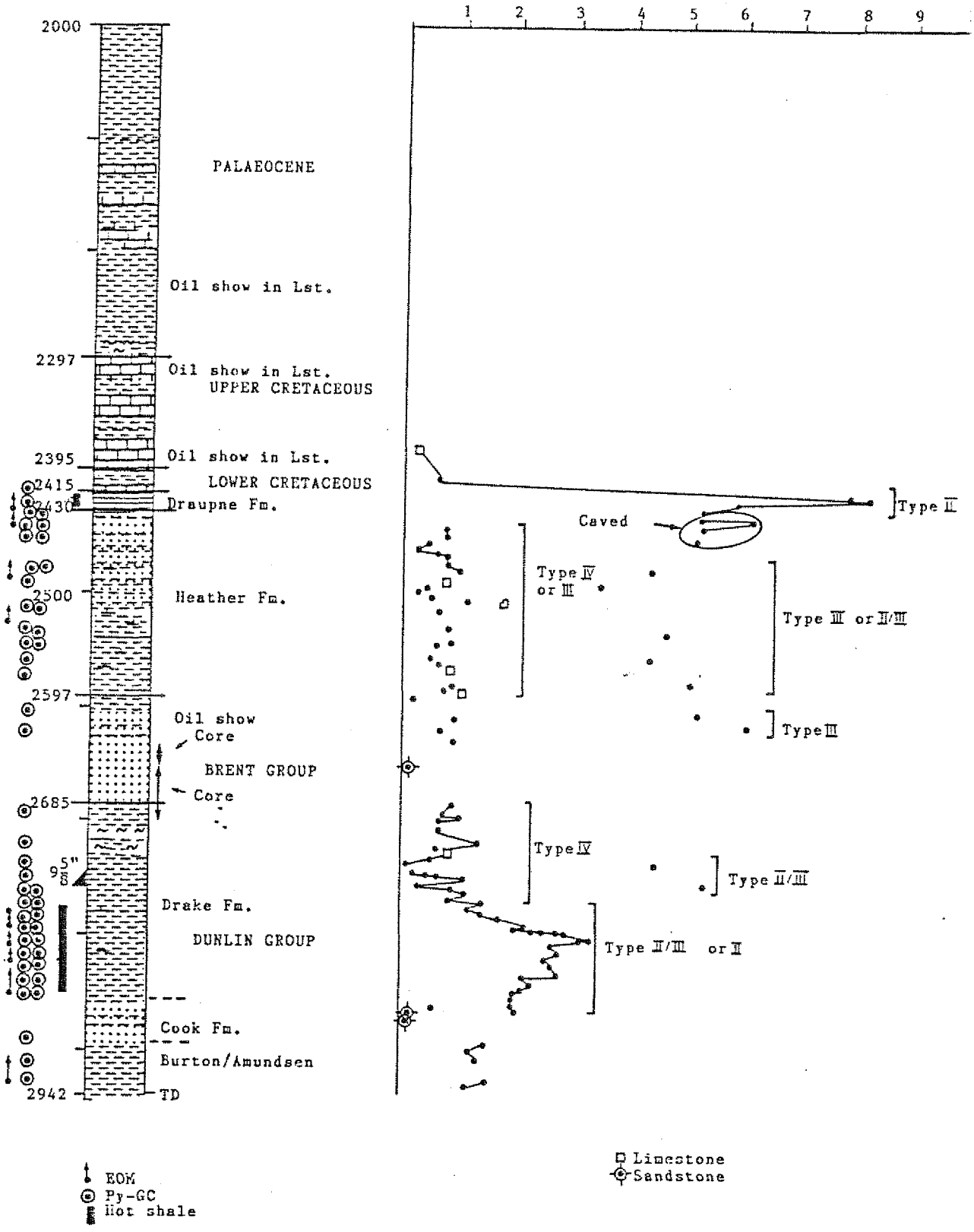


Figure 2 Production Index vs Depth
for Well no. 30/6-4.

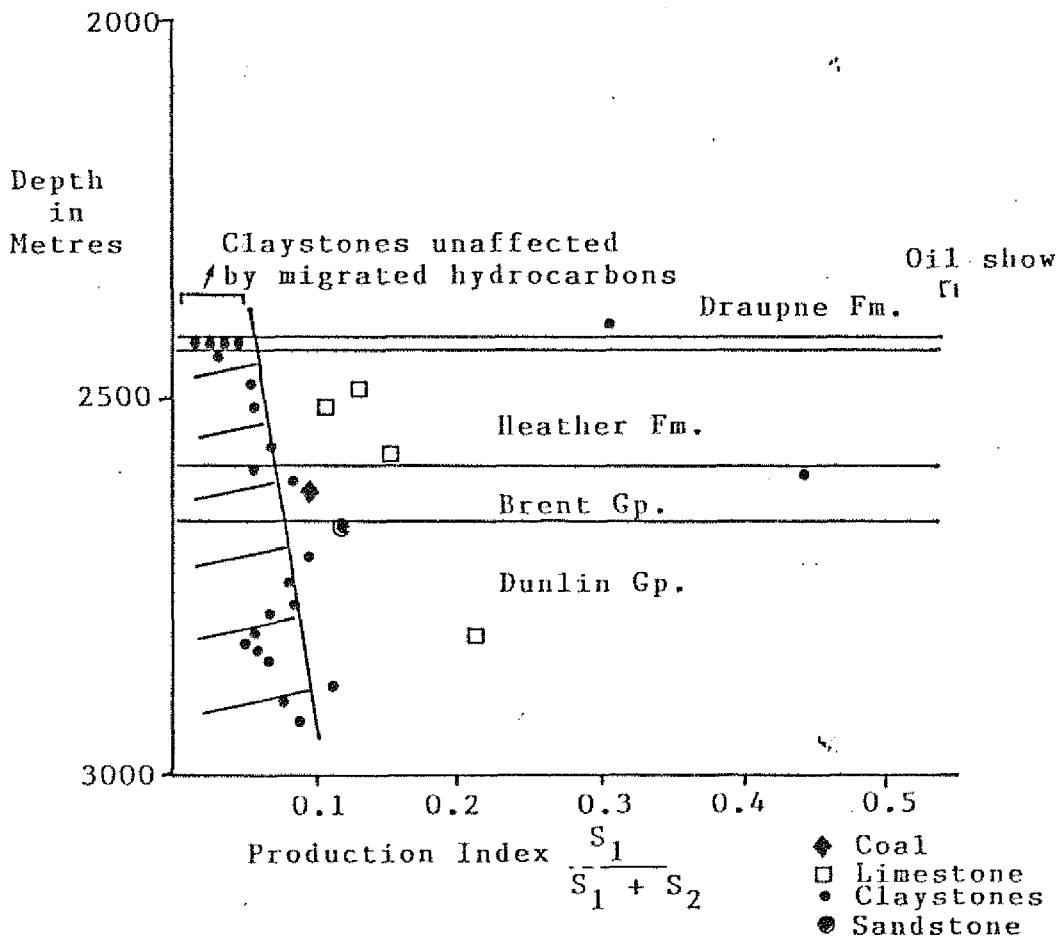
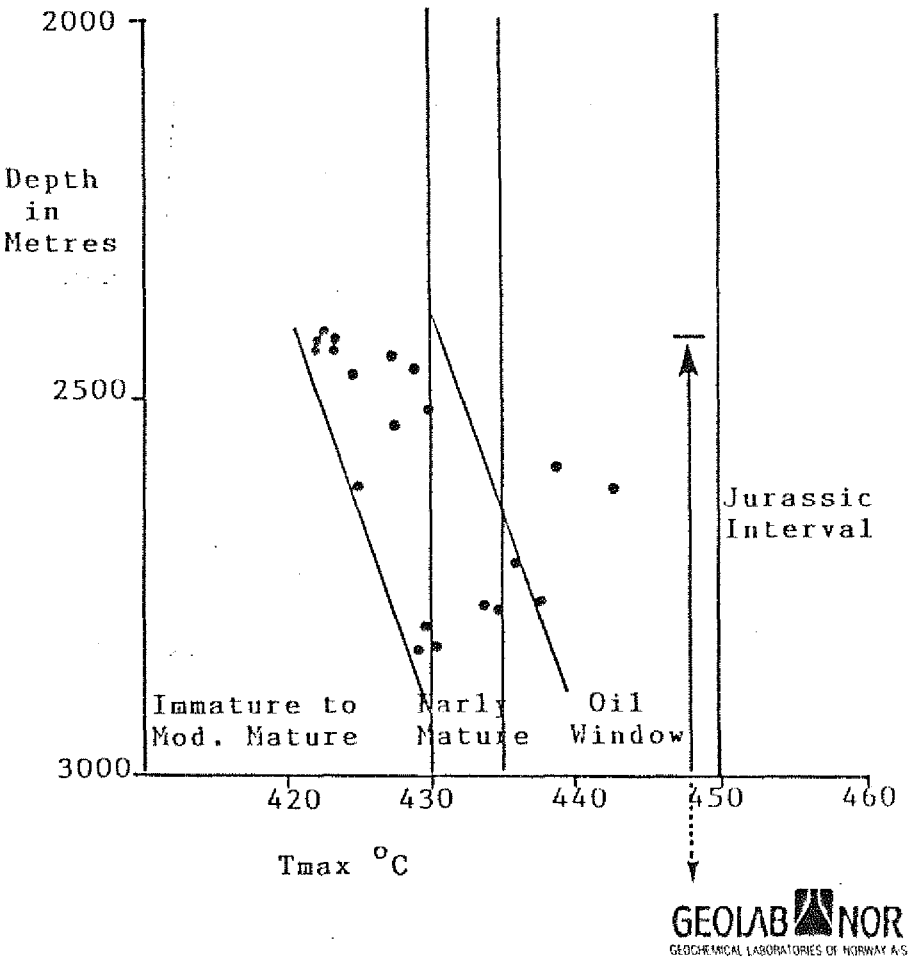


Figure 3. Tmax vs Depth
for Well no. 30/6-4.



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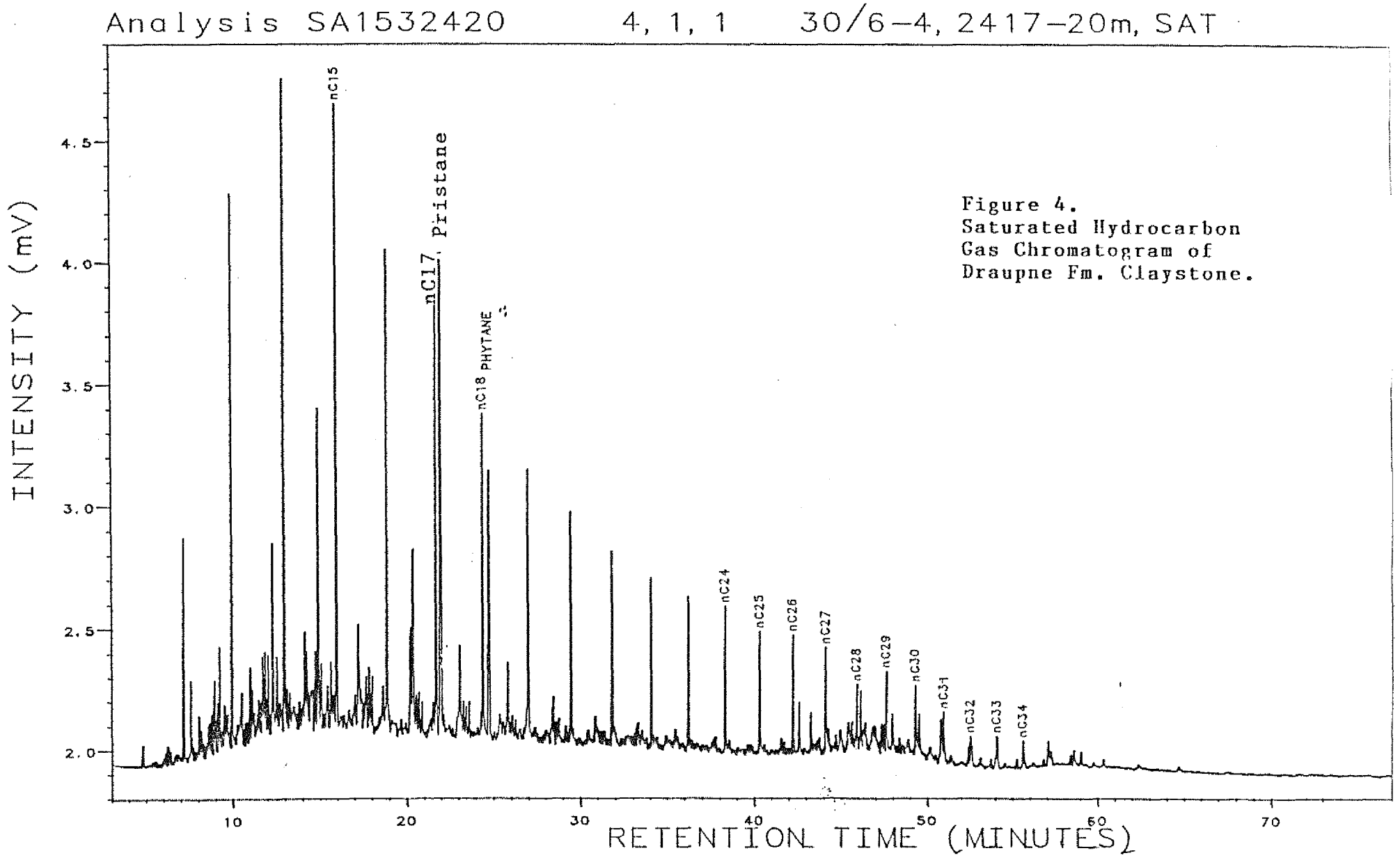

Figure 4.
Saturated Hydrocarbon
Gas Chromatogram of
Draupne Fm. Claystone.

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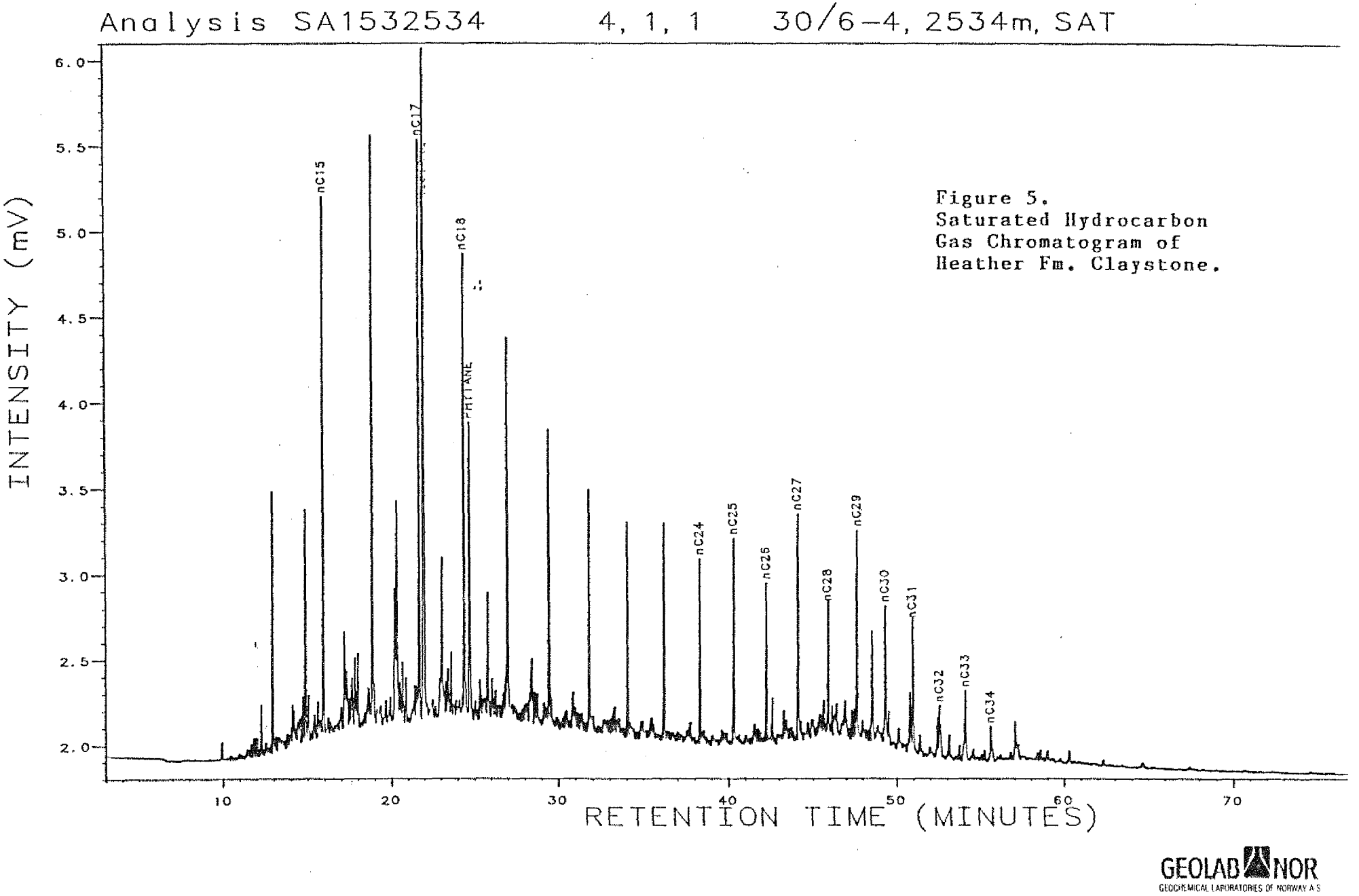

Figure 5.
Saturated Hydrocarbon
Gas Chromatogram of
Heather Fm. Claystone.

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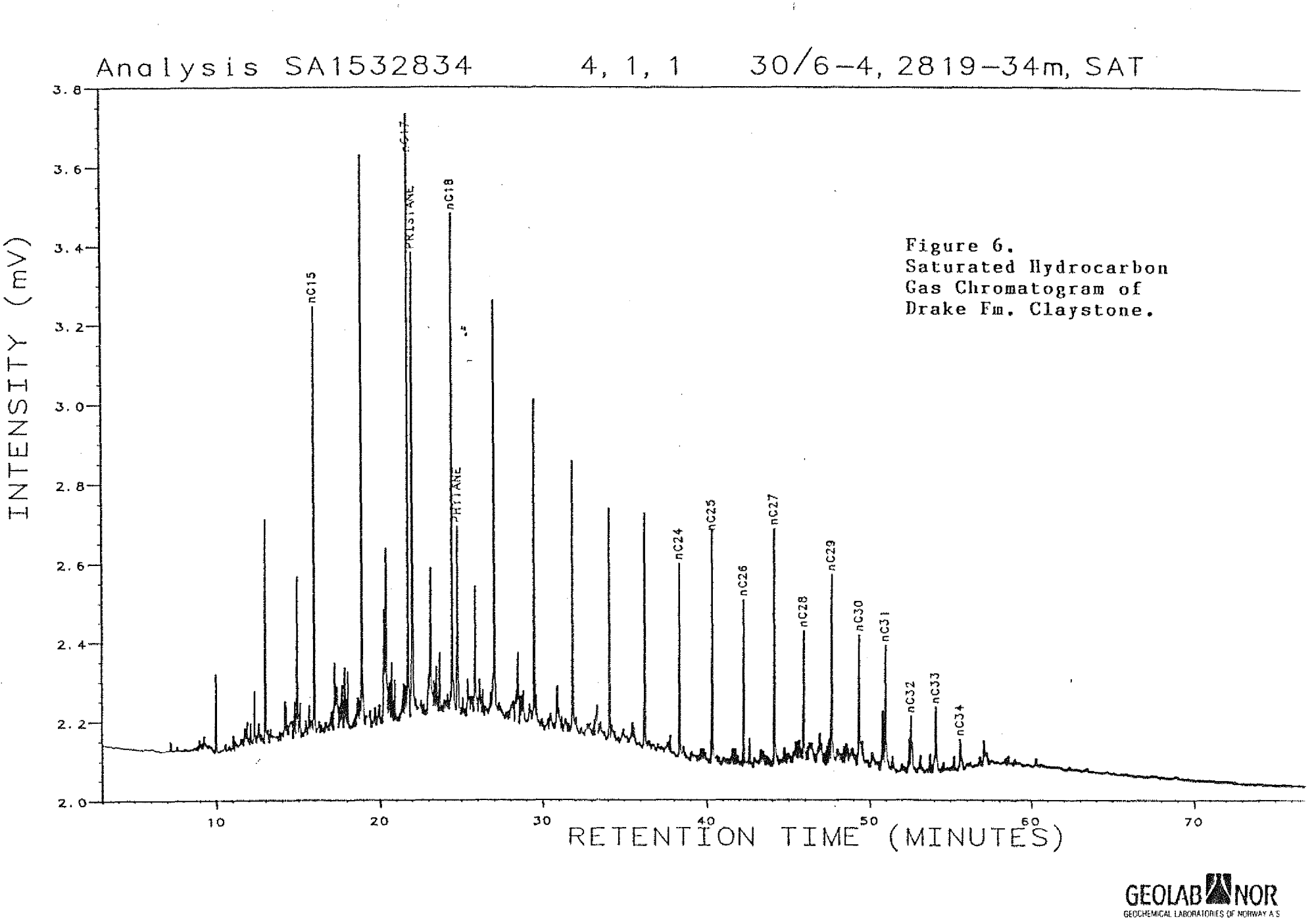

Figure 6.
Saturated Hydrocarbon
Gas Chromatogram of
Drake Fm. Claystone.

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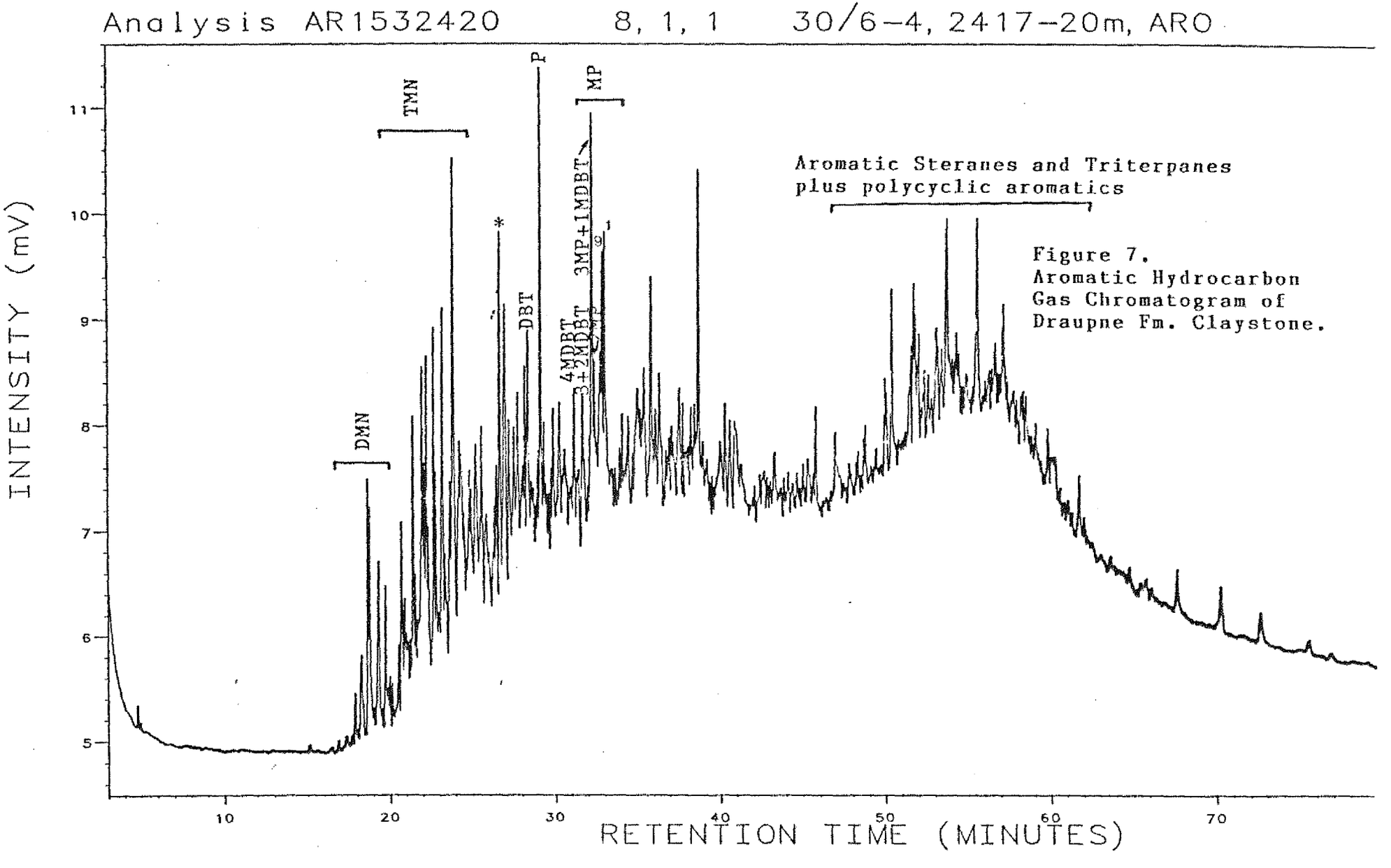

Figure 7.
Aromatic Hydrocarbon
Gas Chromatogram of
Draupne Fm. Claystone.

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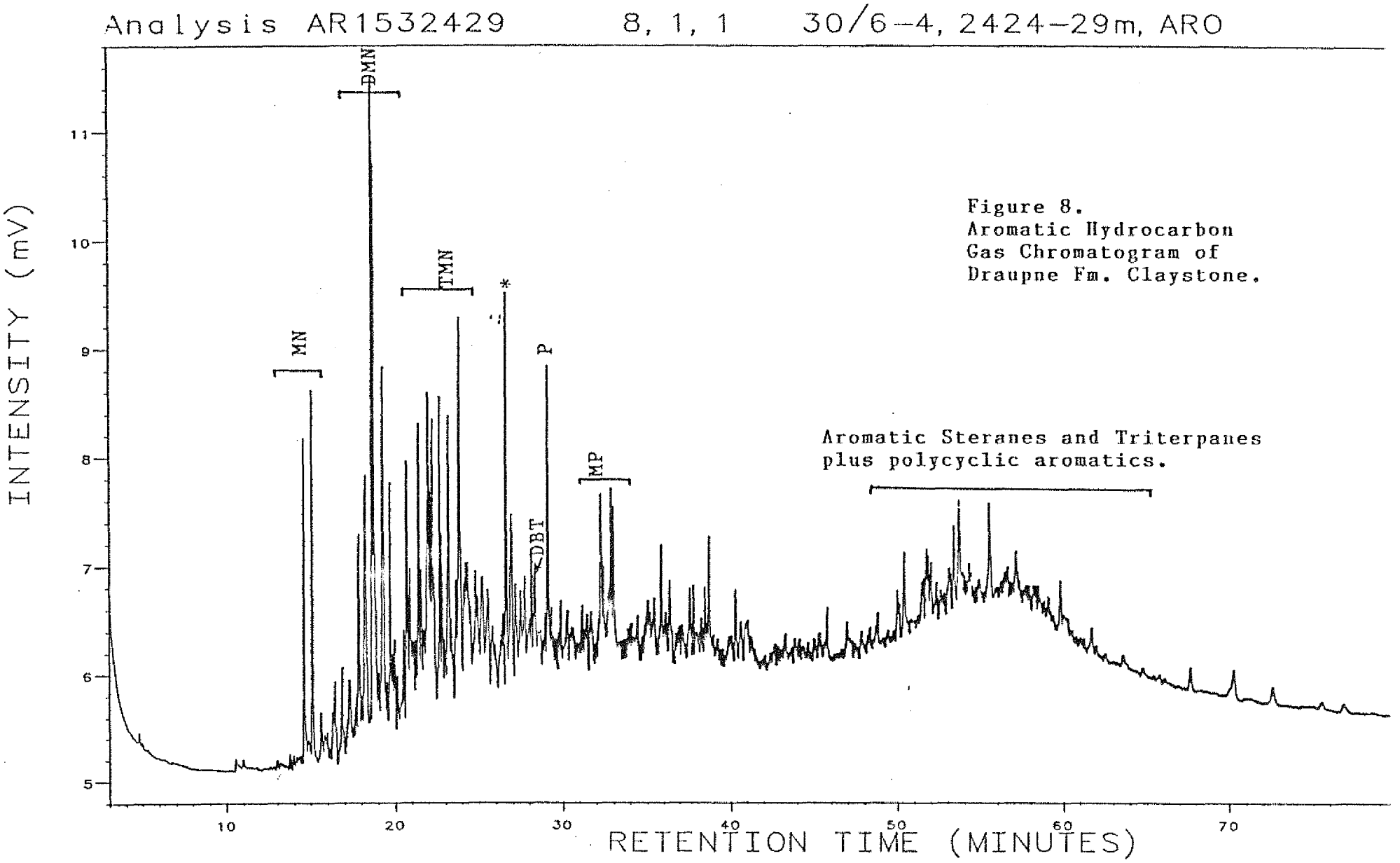

Figure 8.
Aromatic Hydrocarbon
Gas Chromatogram of
Draupne Fm. Claystone.

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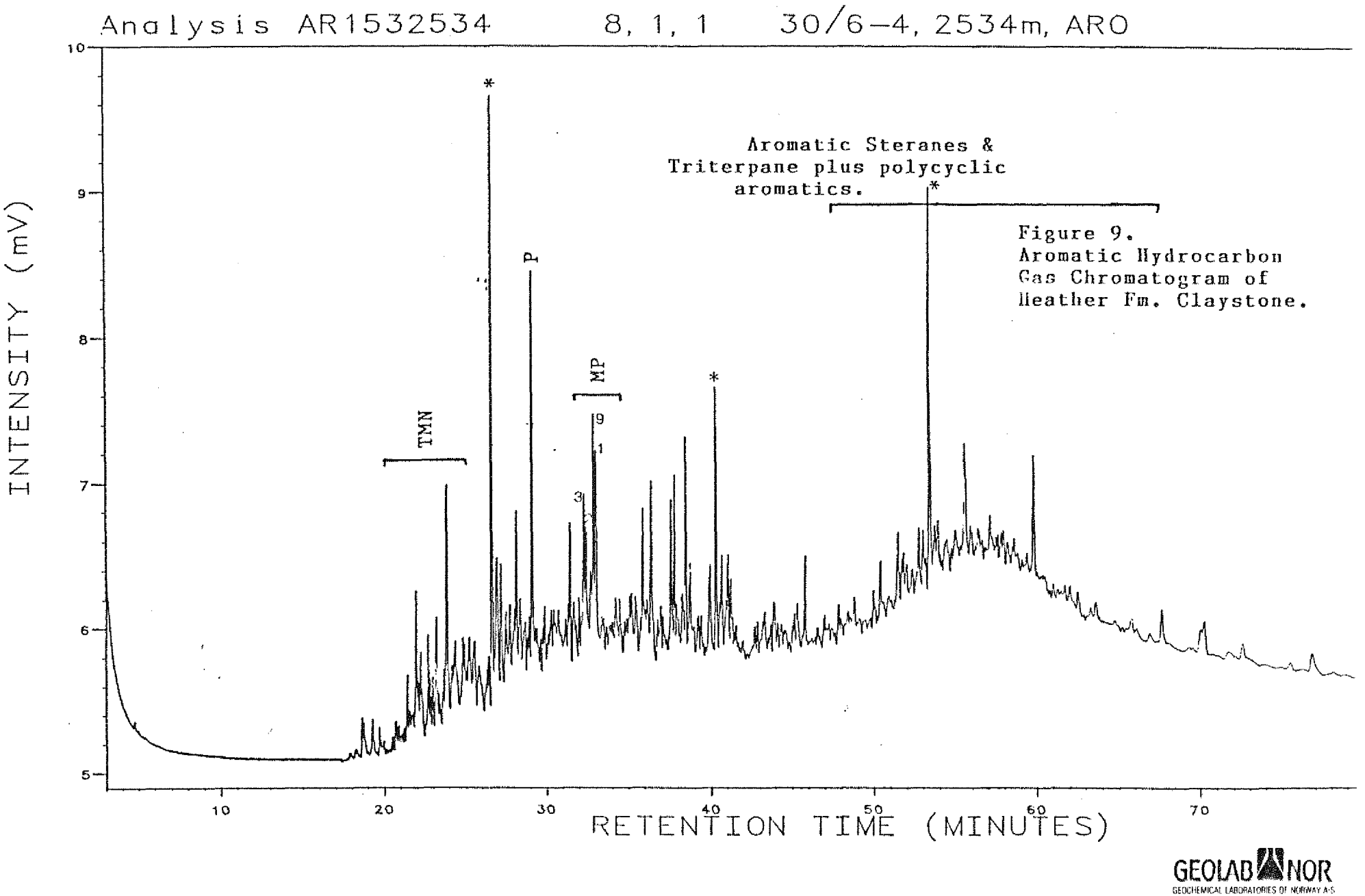

Figure 9.
Aromatic Hydrocarbon
Gas Chromatogram of
Heather Fm. Claystone.

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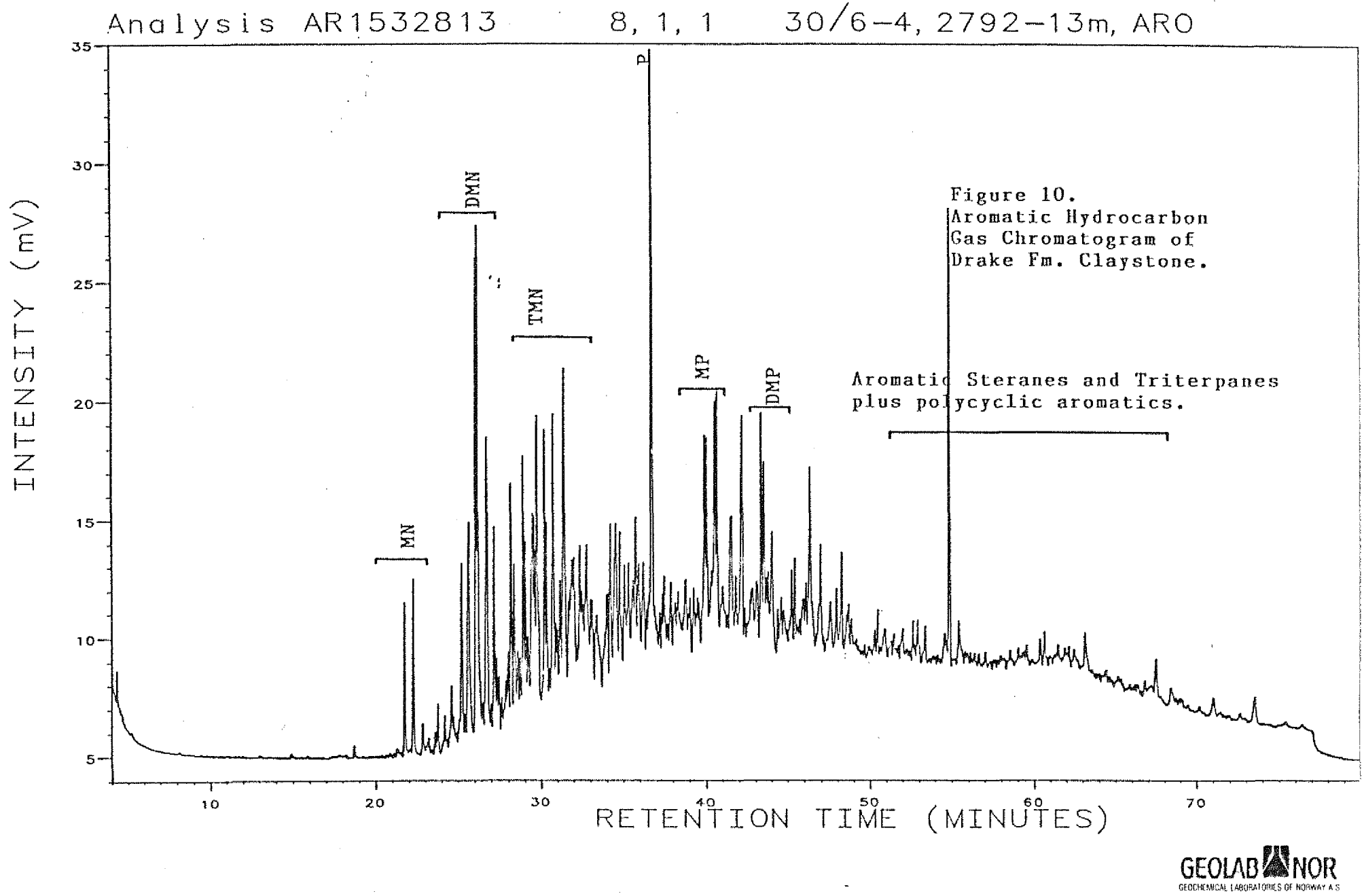

Figure 10.
Aromatic Hydrocarbon Gas Chromatogram of Drake Fm. Claystone.

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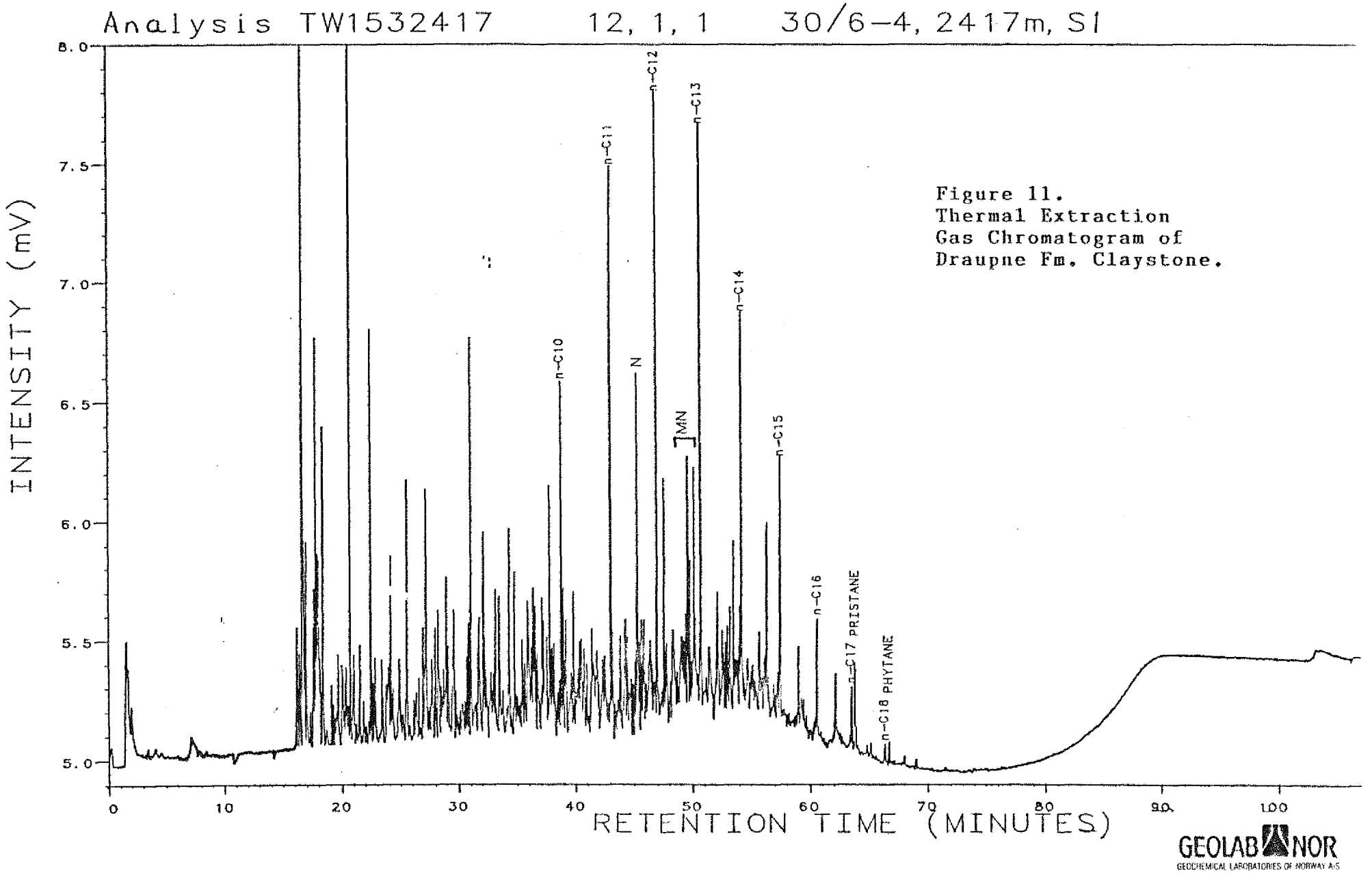

Figure 11.
Thermal Extraction
Gas Chromatogram of
Draupne Fm. Claystone.

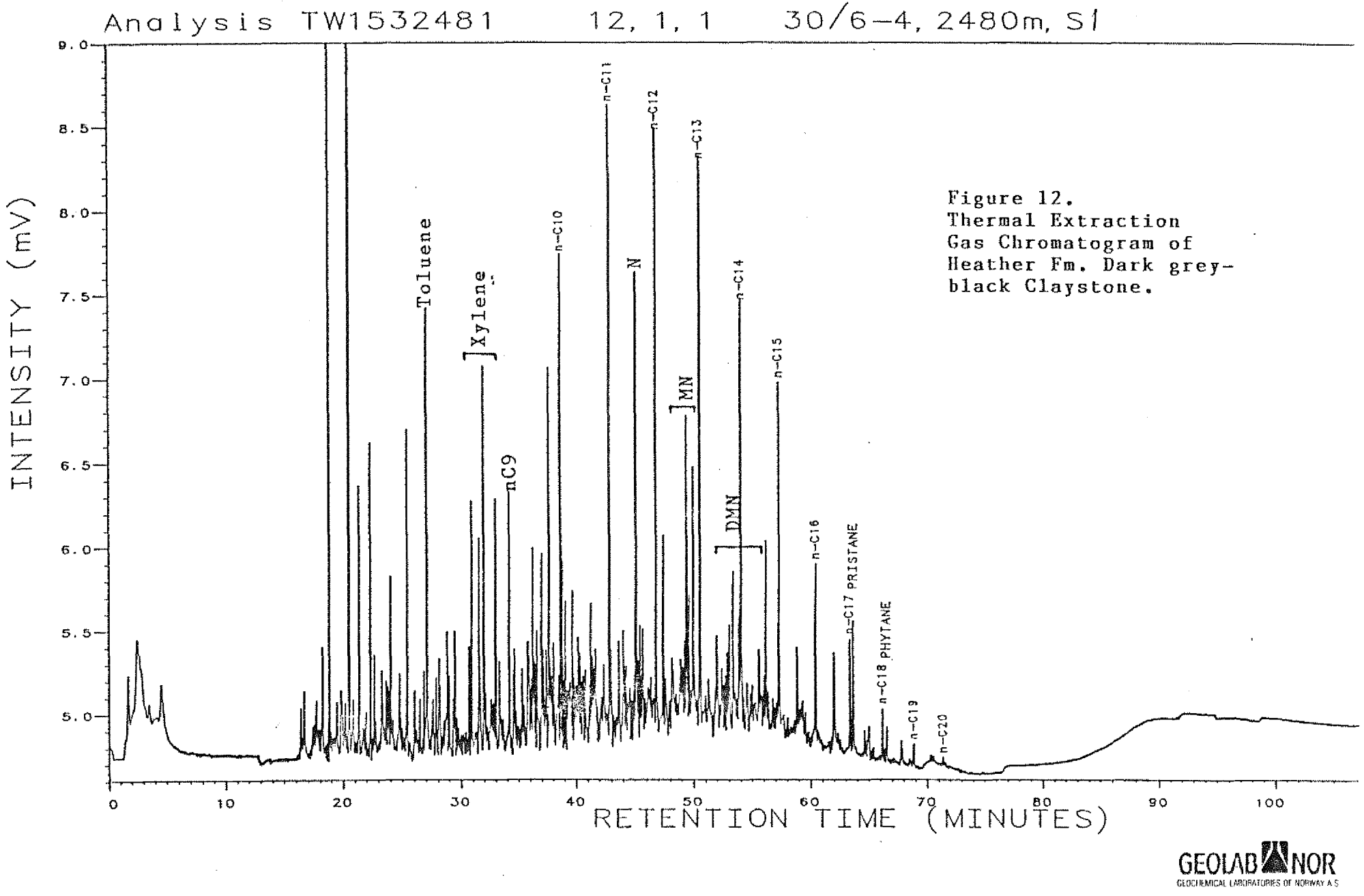

Figure 12.
Thermal Extraction Gas Chromatogram of Heather Fm. Dark grey-black Claystone.

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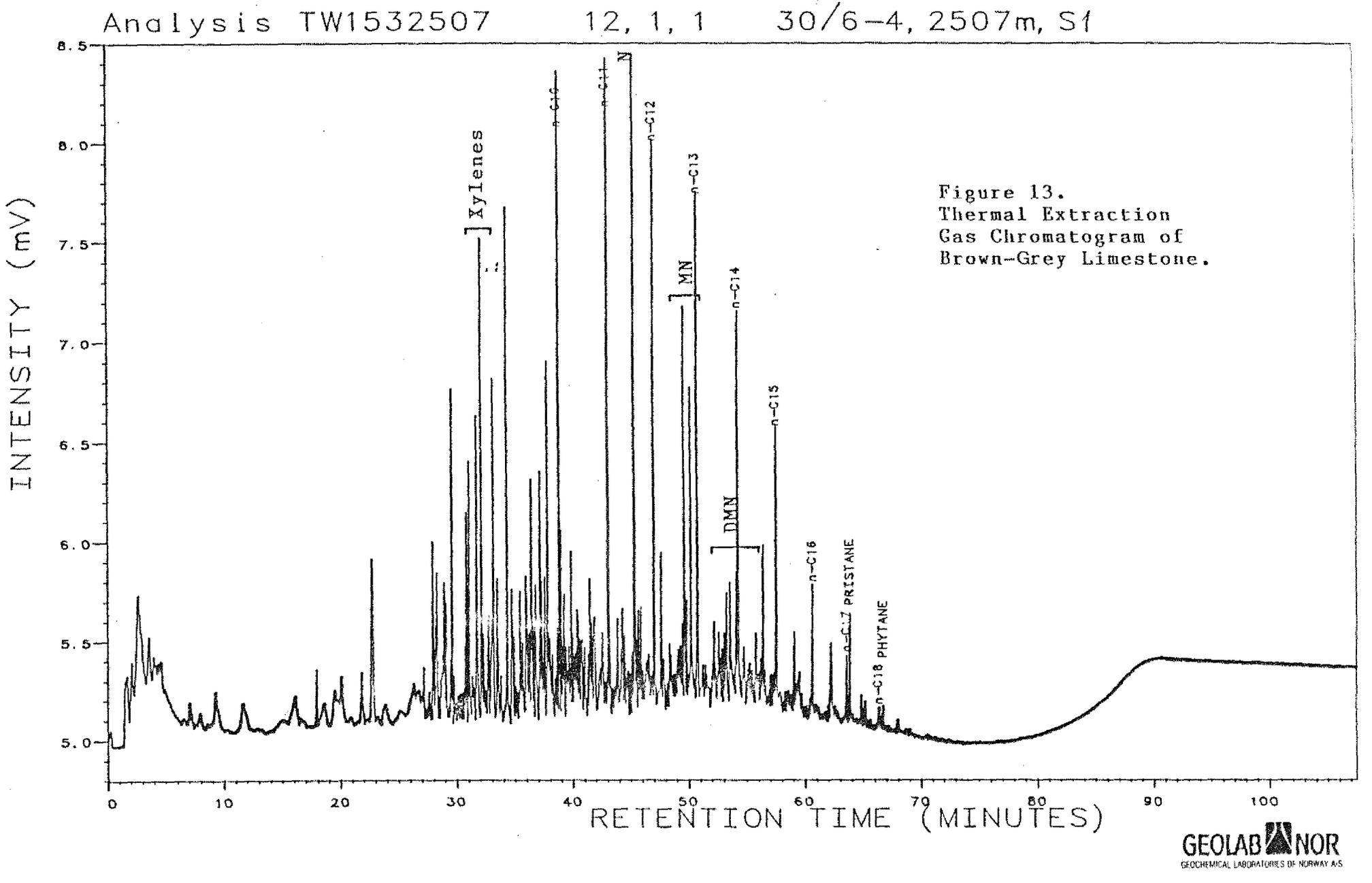

Figure 13.
Thermal Extraction
Gas Chromatogram of
Brown-Grey Limestone.

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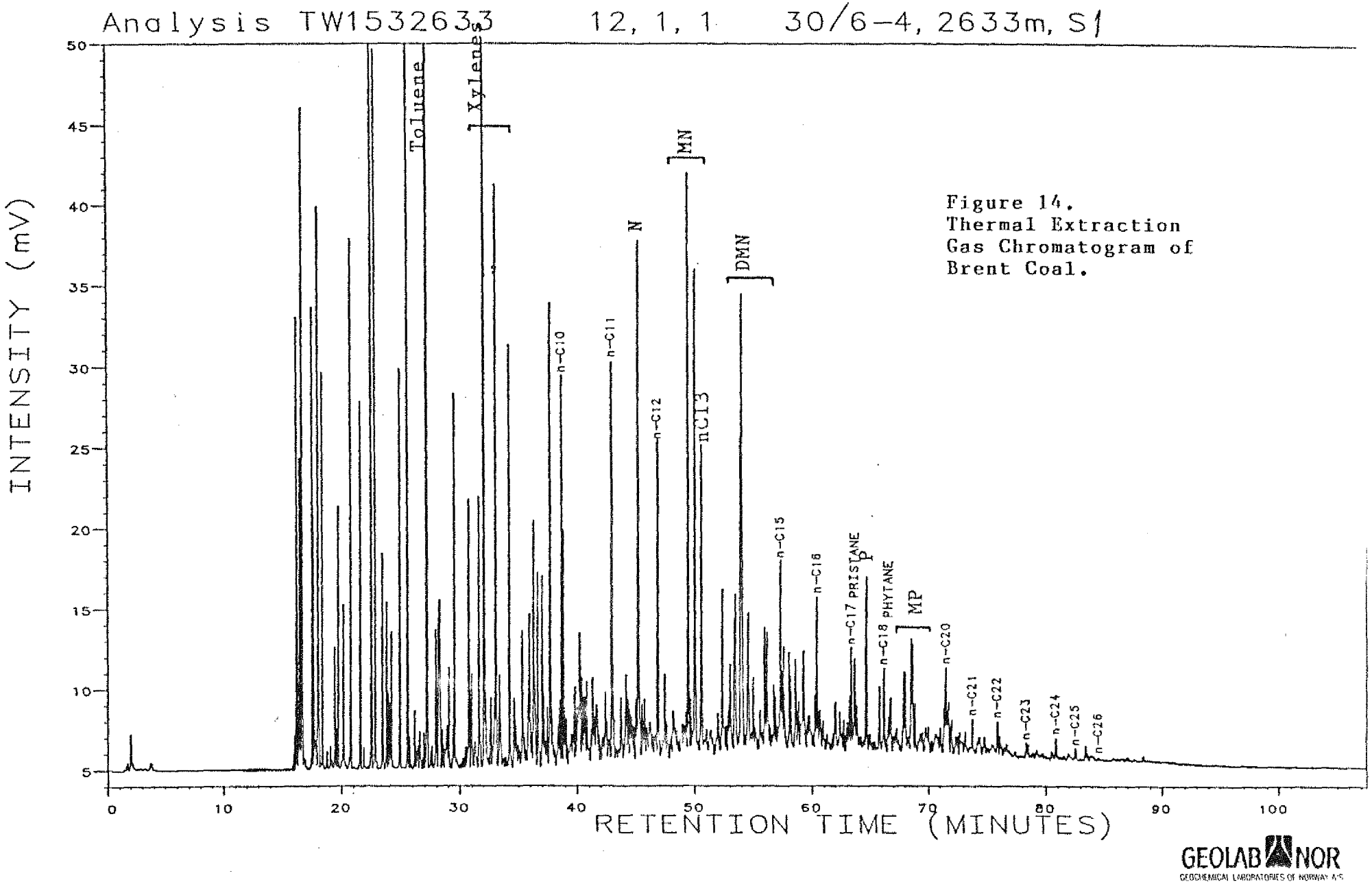

Figure 14.
Thermal Extraction
Gas Chromatogram of
Brent Coal.

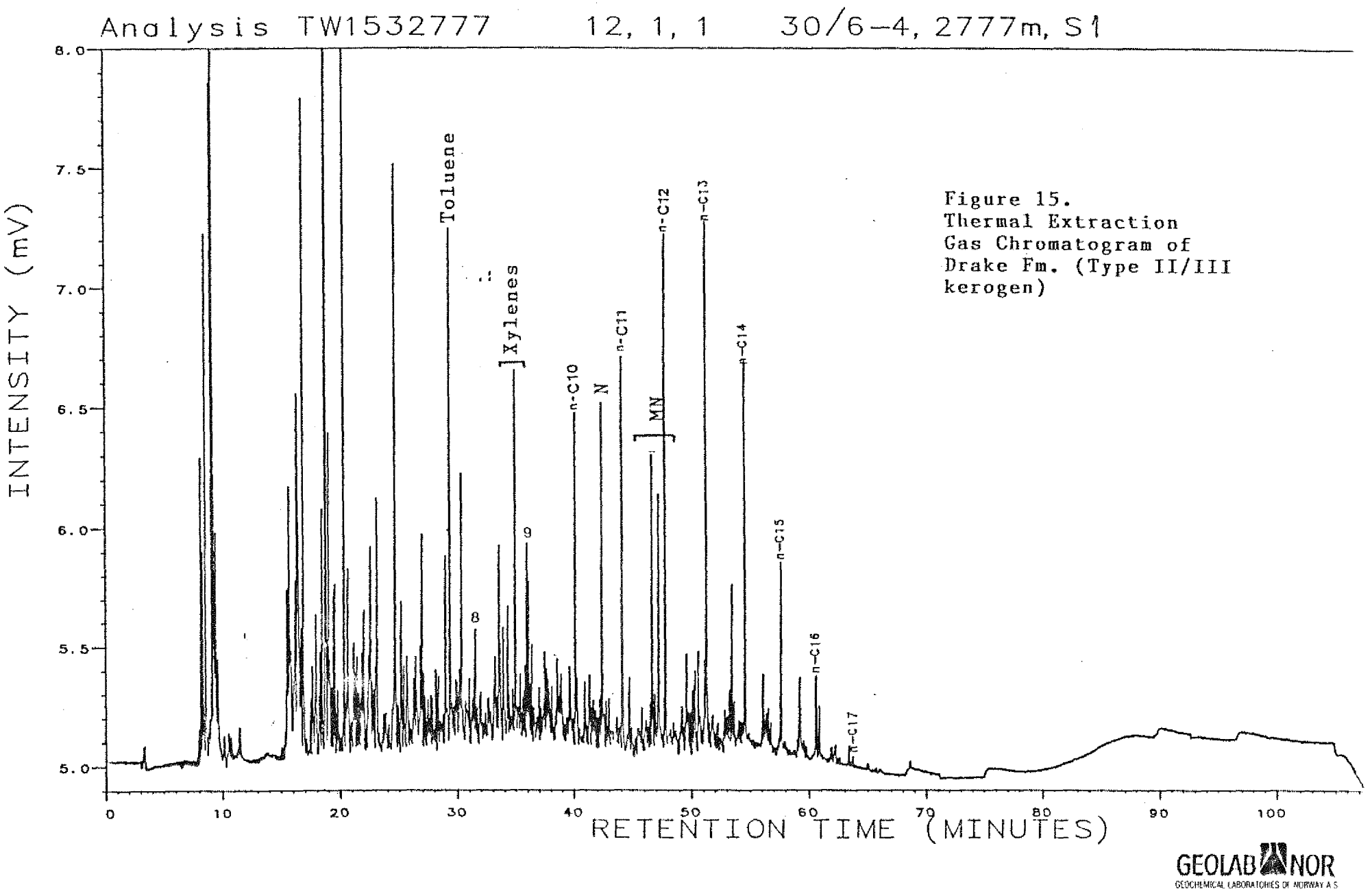

Figure 15.
Thermal Extraction Gas Chromatogram of Drake Fm. (Type II/III kerogen)

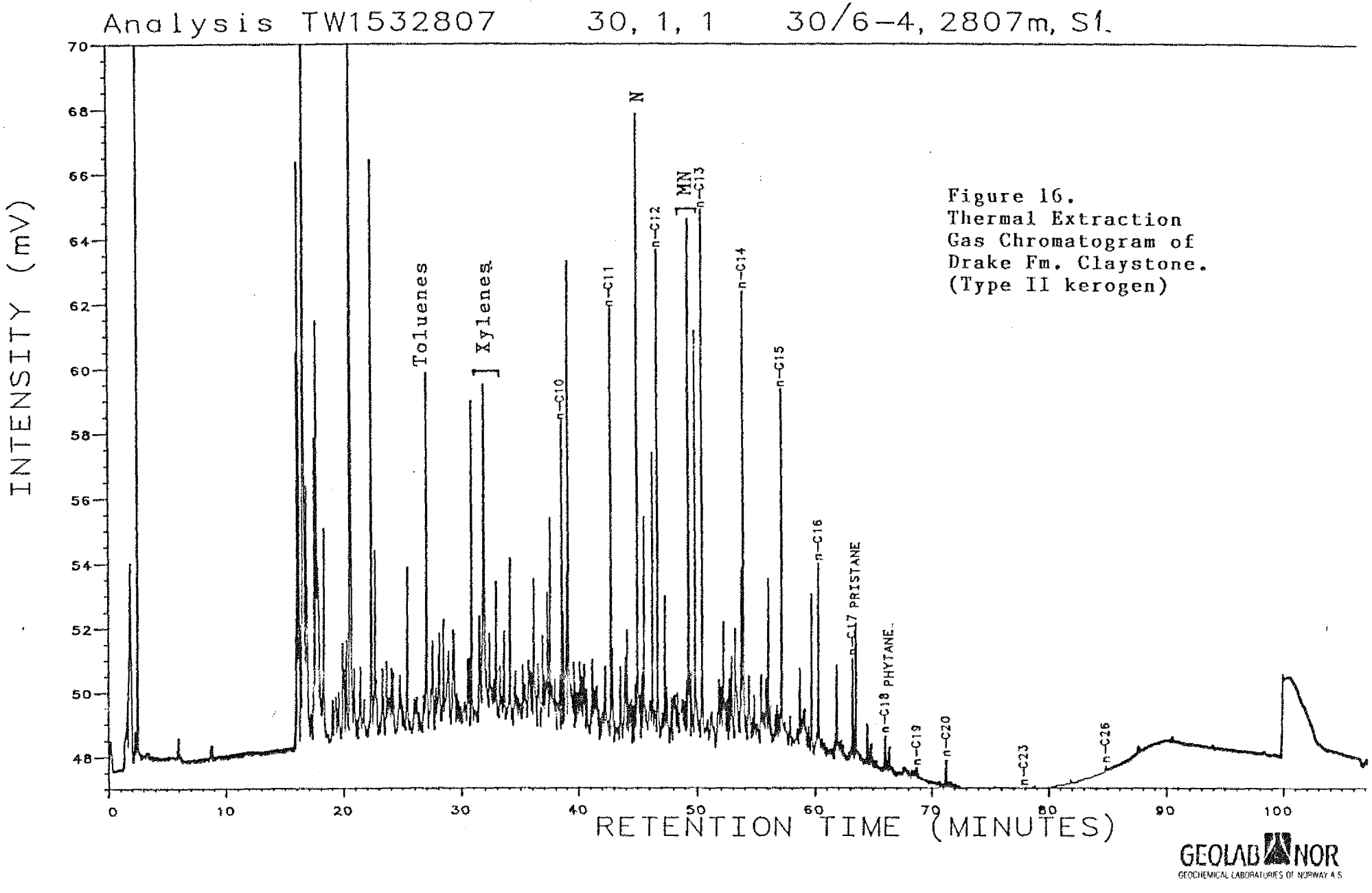

Figure 16.
Thermal Extraction
Gas Chromatogram of
Drake Fm. Claystone.
(Type II kerogen)

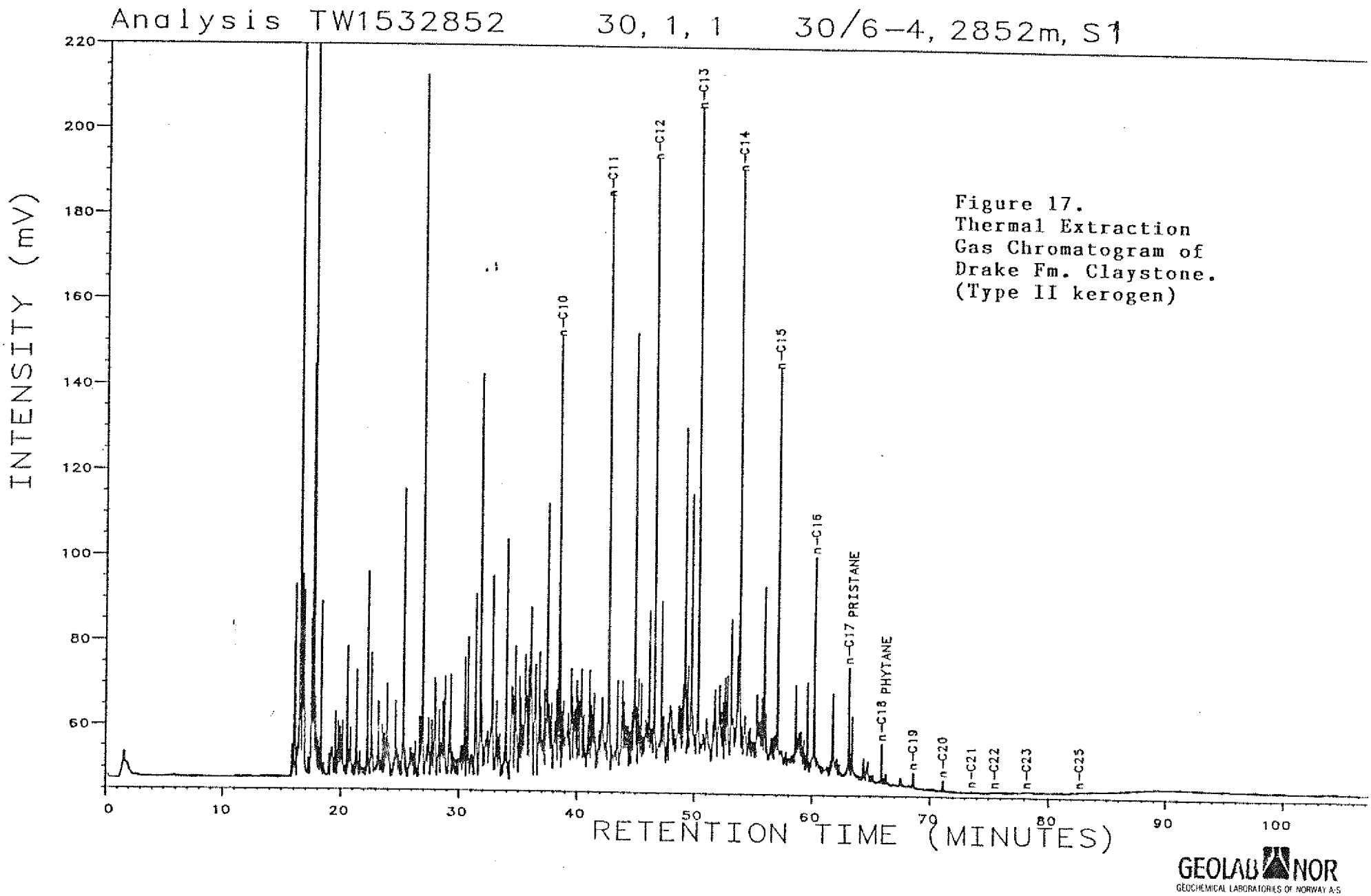

Figure 17.
Thermal Extraction
Gas Chromatogram of
Drake Fm. Claystone.
(Type II kerogen)

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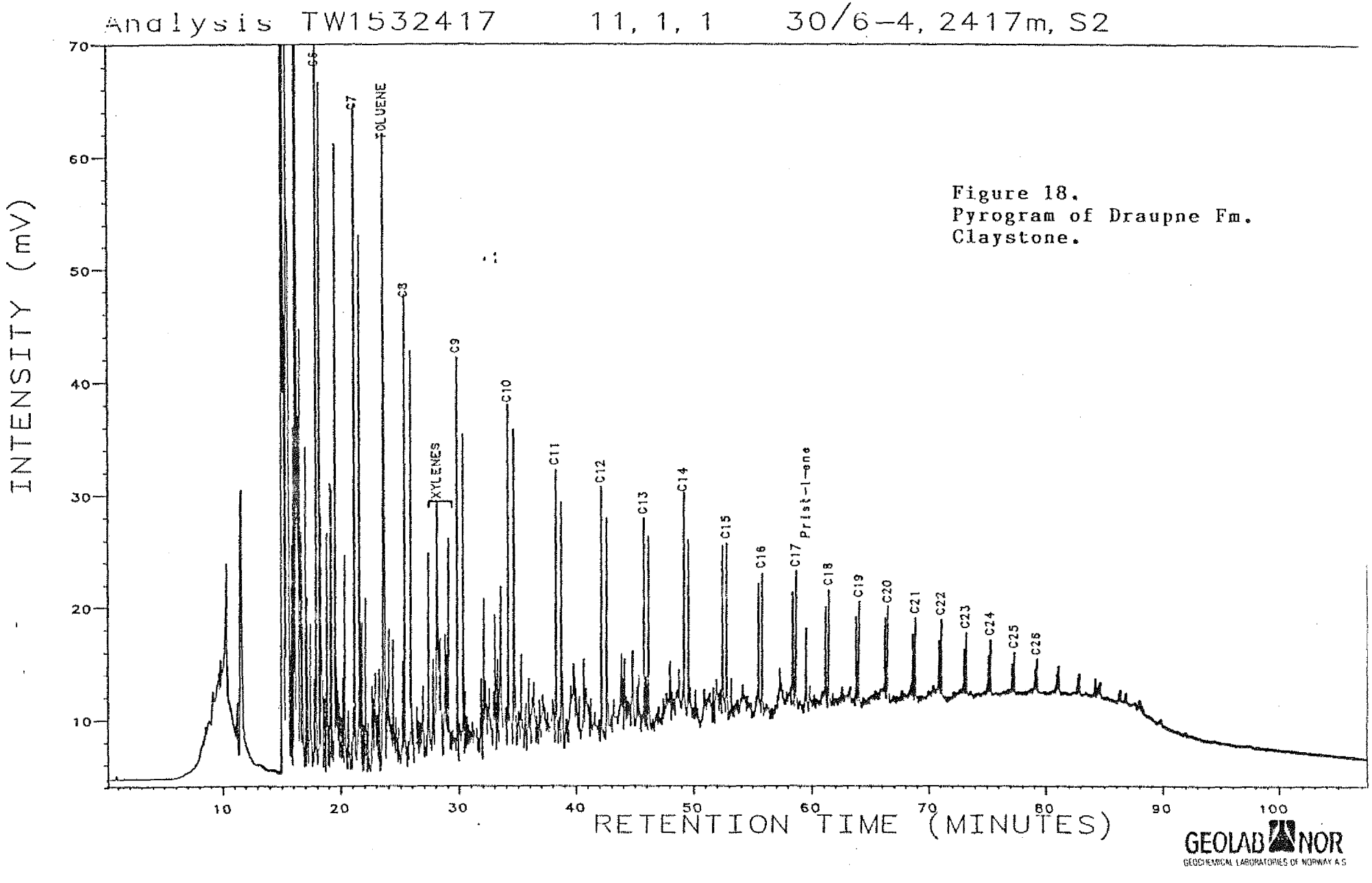

Figure 18.
Pyrogram of Draupne Fm.
Claystone.

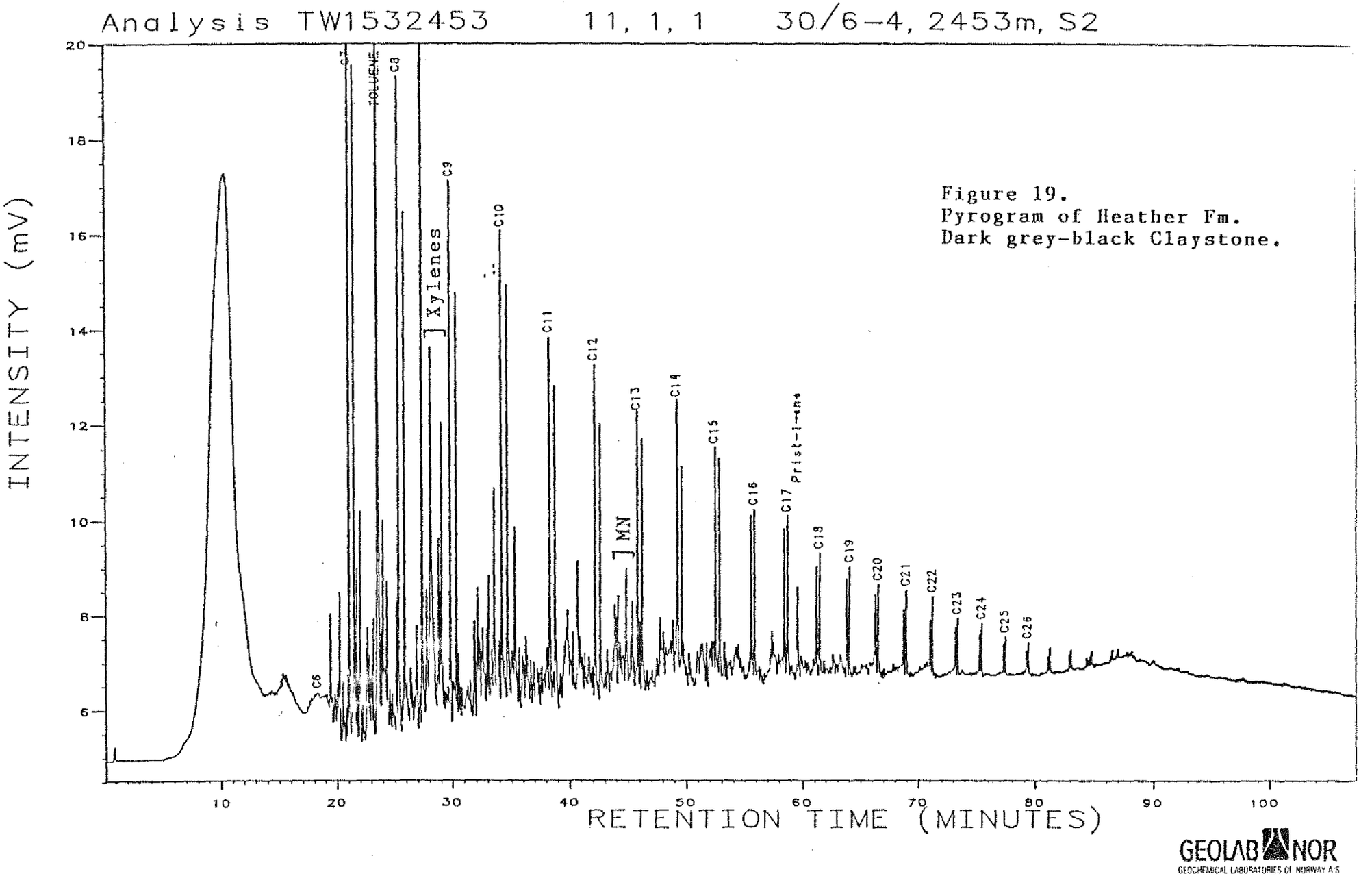

Figure 19.
Pyrogram of Heather Fm.
Dark grey-black Claystone.

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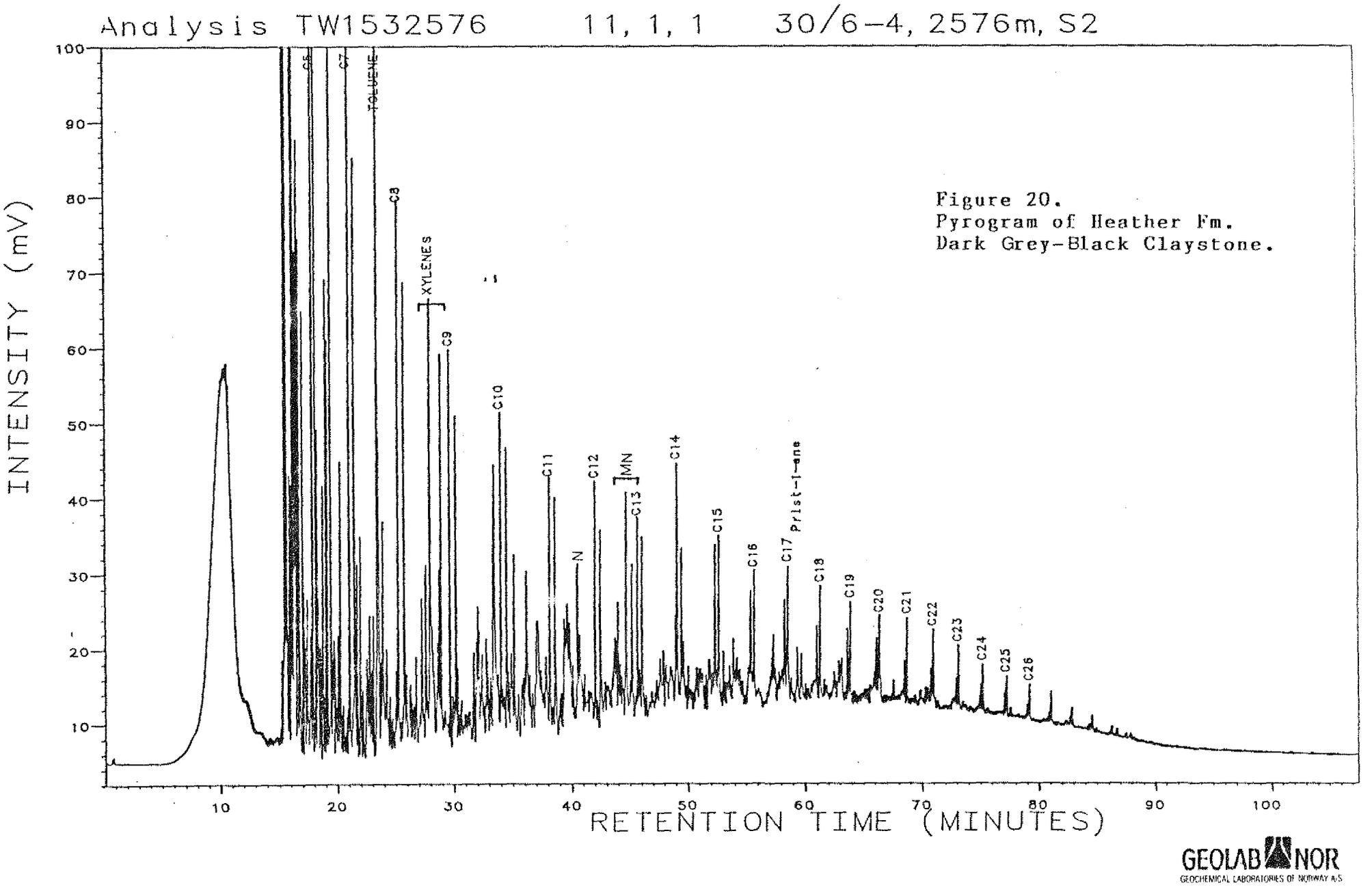

Figure 20.
Pyrogram of Heather Fm.
Dark Grey-Black Claystone.

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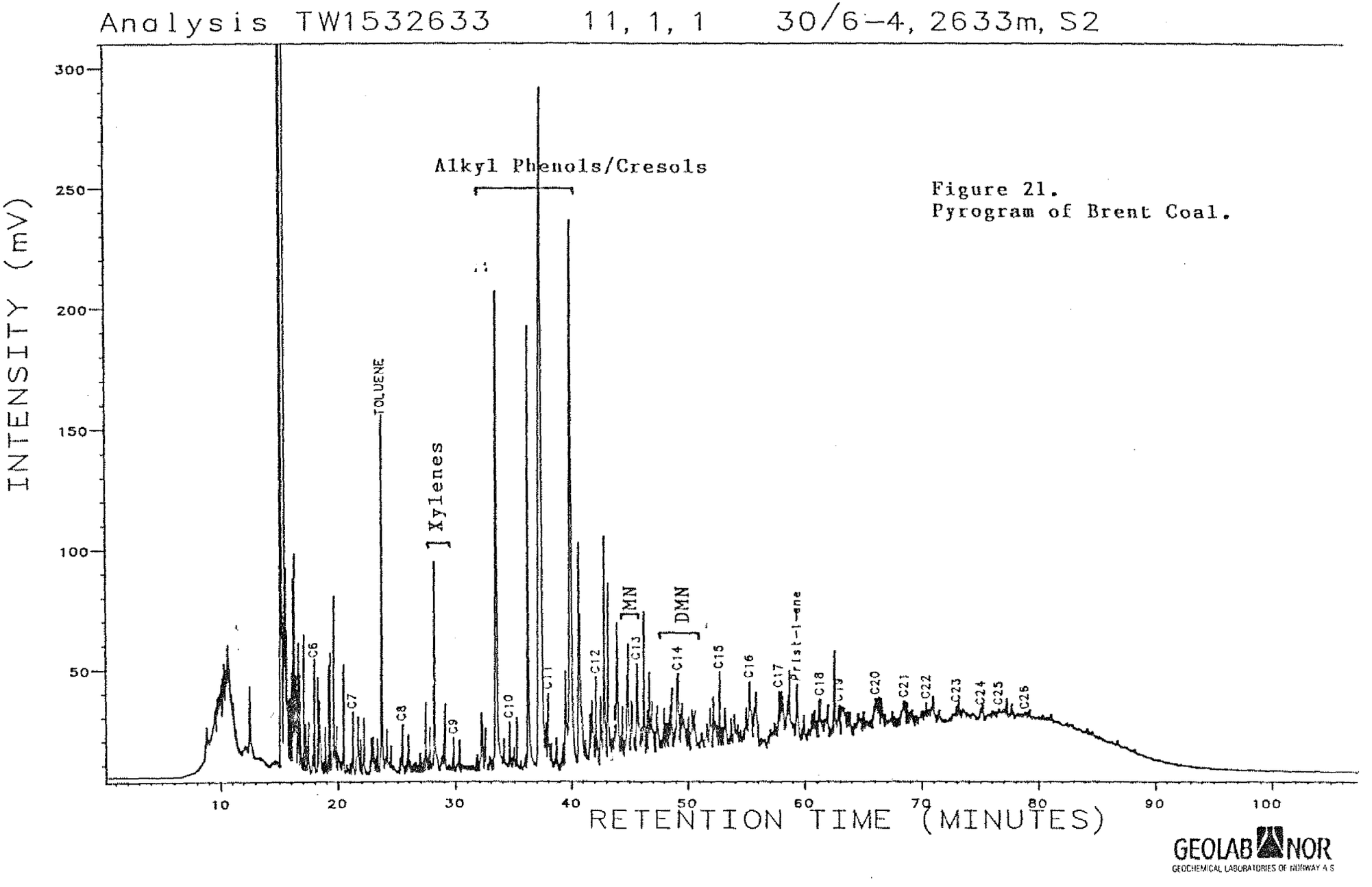

Figure 21.
Pyrogram of Brent Coal.

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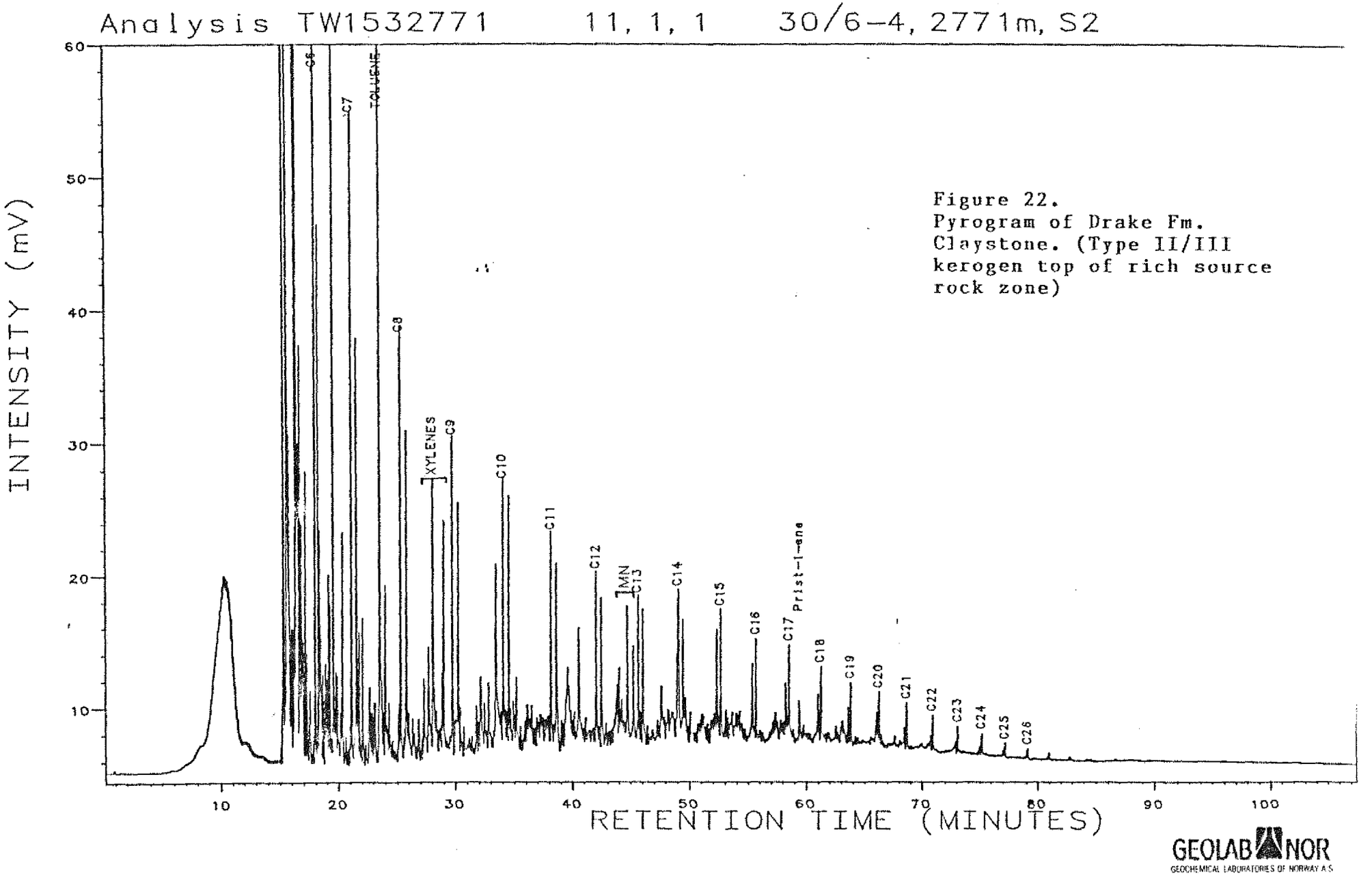

Figure 22.
Pyrogram of Drake Fm. Claystone. (Type II/III kerogen top of rich source rock zone)

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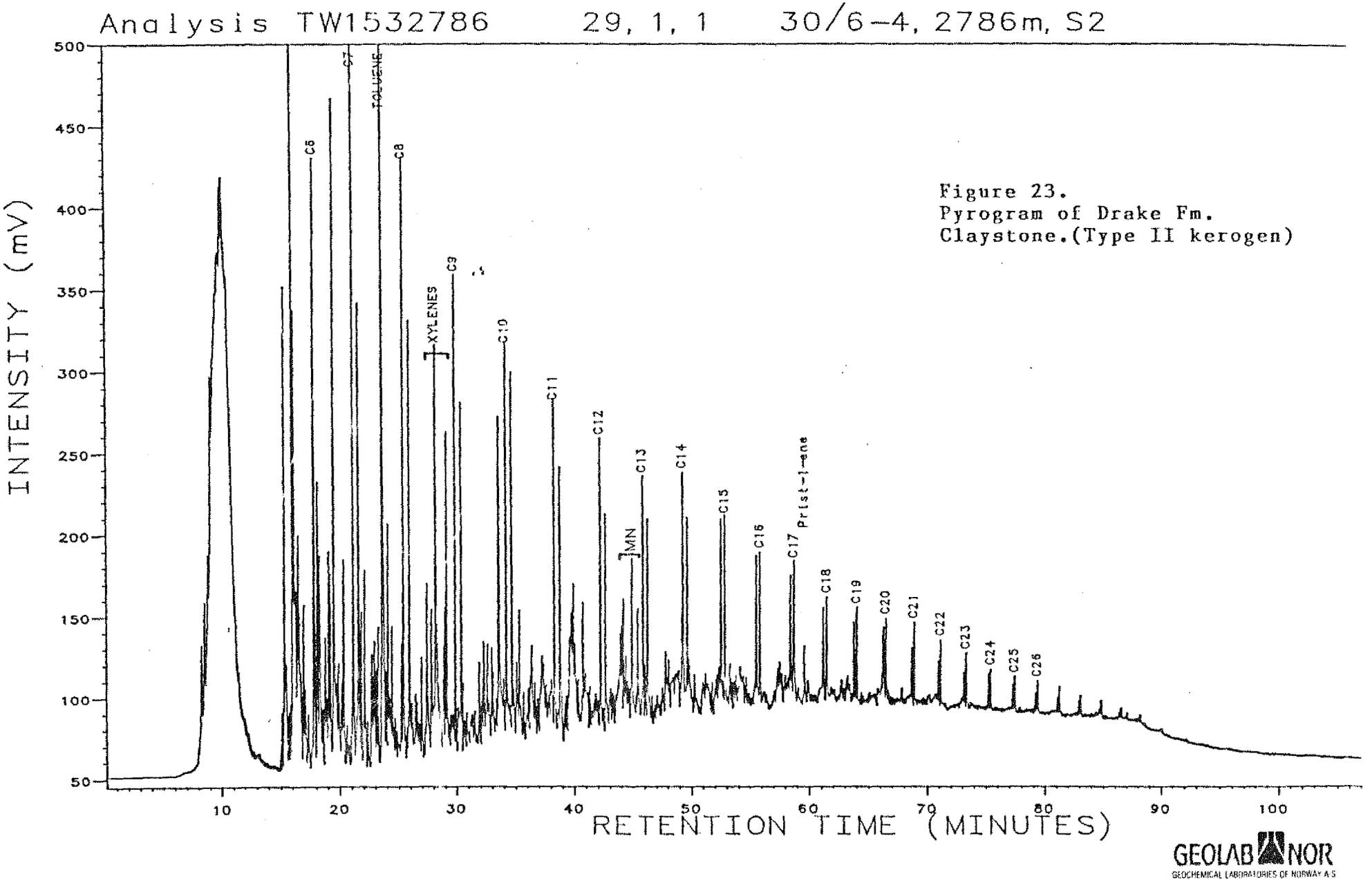


Figure 23.
Pyrogram of Drake Fm.
Claystone.(Type II kerogen)

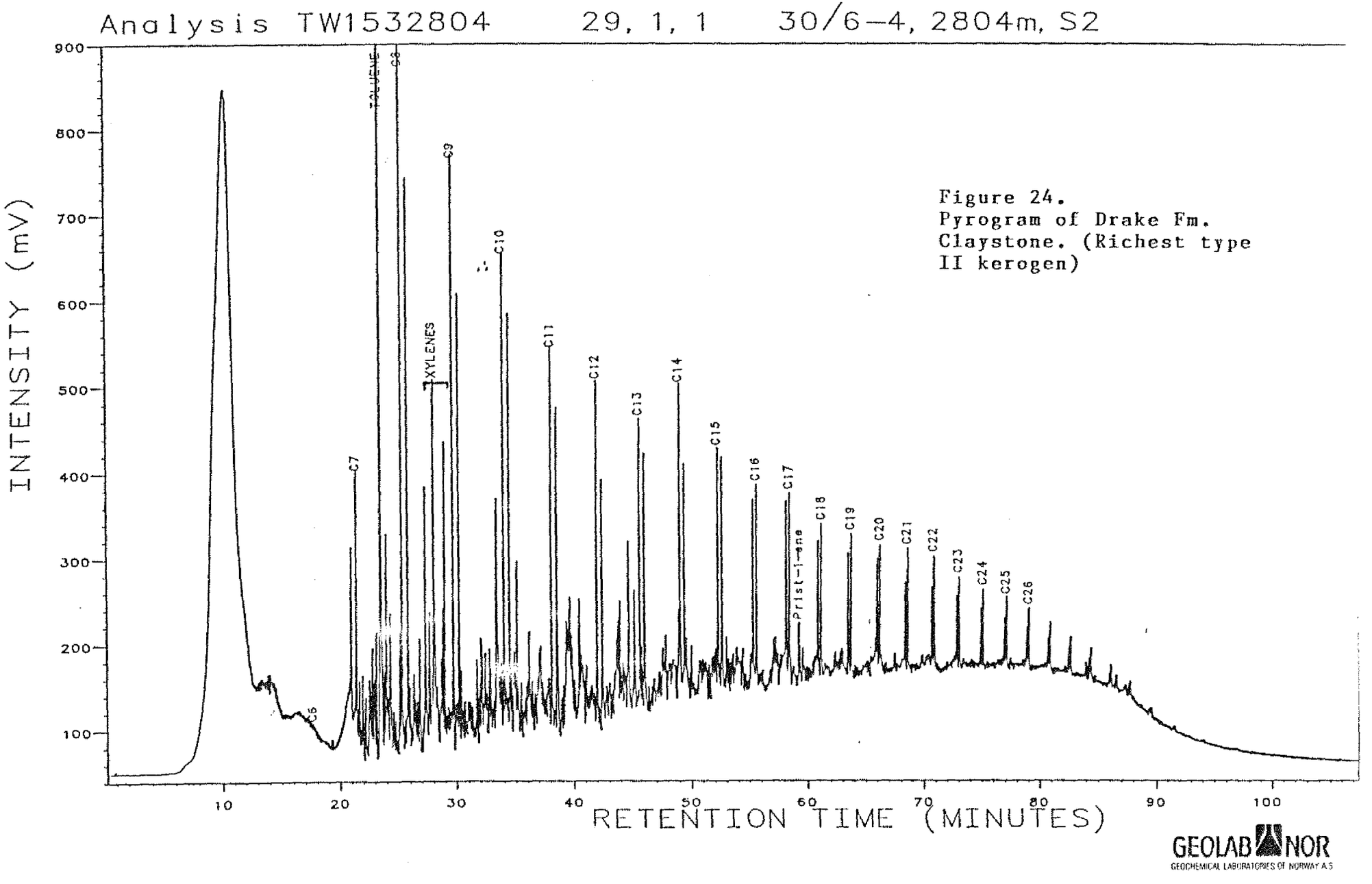


Figure 24.
Pyrogram of Drake Fm. Claystone. (Richest type II kerogen)

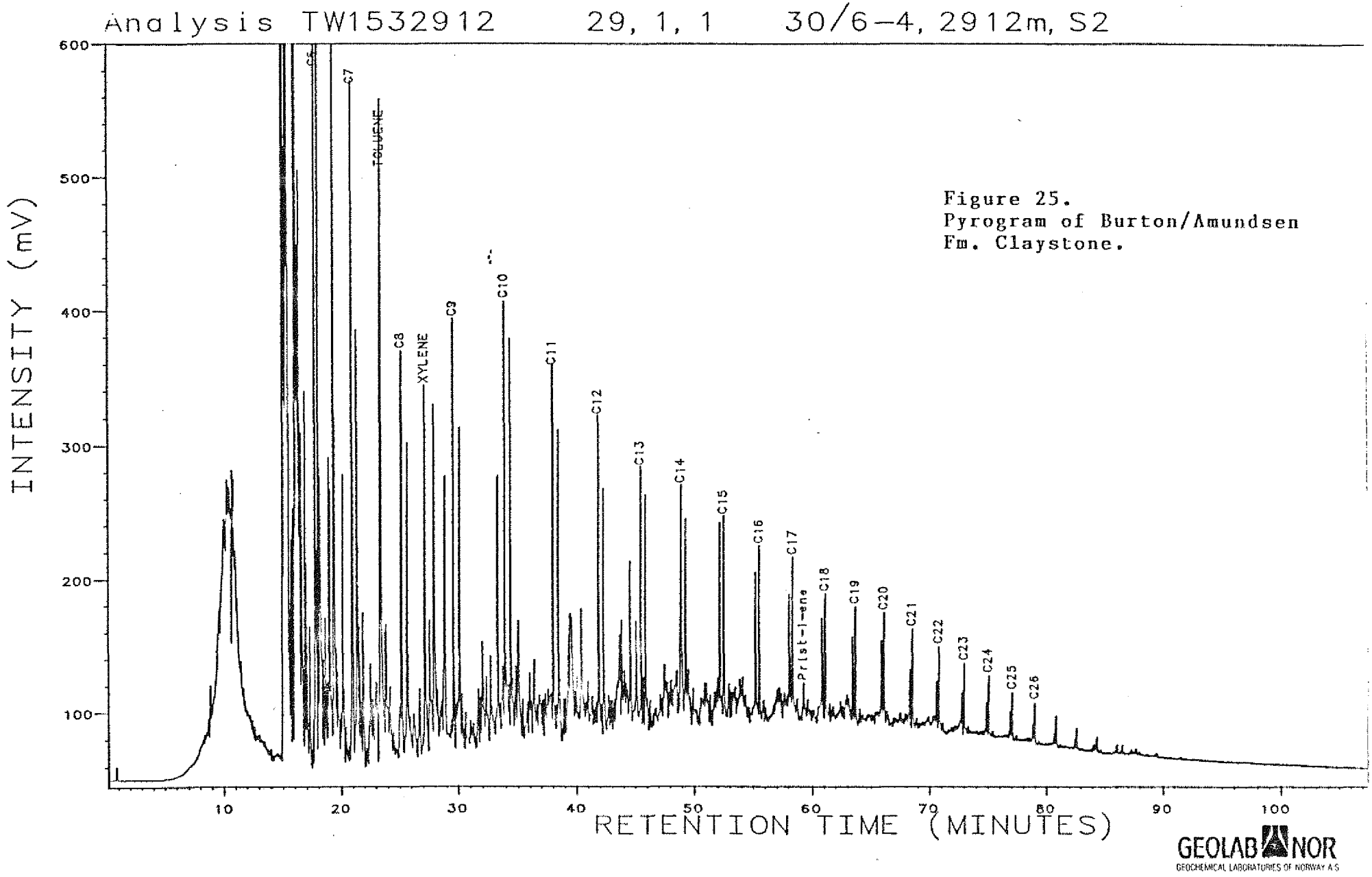


Figure 25.
Pyrogram of Burton/Amundsen Fm. Claystone.

Figure 26.

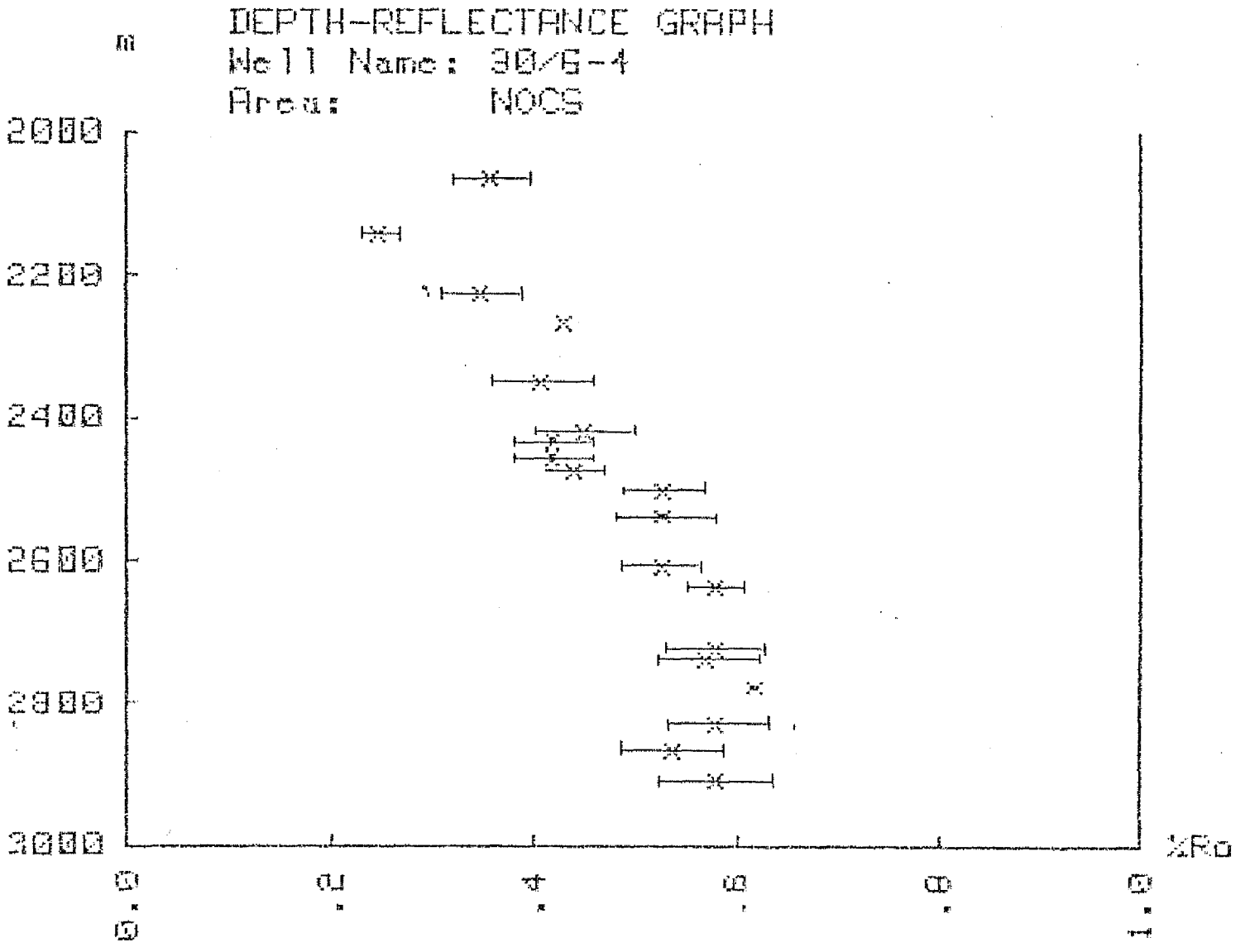
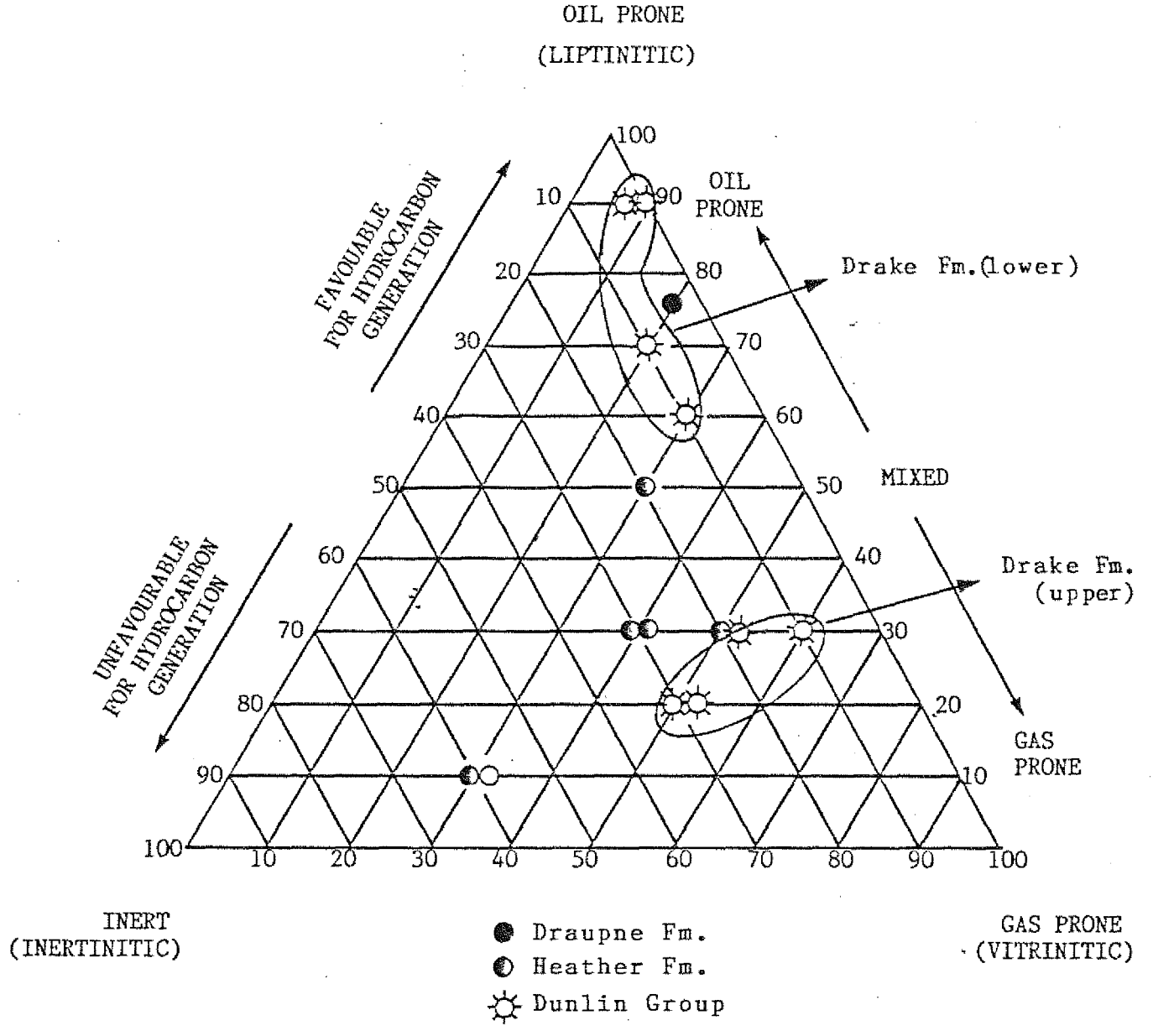


Figure 27. KEROGEN COMPOSITION AND POTENTIAL HYDROCARBON PRODUCTS FOR WELL NOCS 30/6-4.



GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Grp	Frm	Age	Trb	Sample	Lithology description
2000.00				Rogl	Bald	Tert		001	
			50					001-1	Sh/Clst: lt gy, lt brn gy, lt gn gy
			50					001-2	Sh/Clst: red brn
2021.00				Rogl	Bald	Tert		002	
			40					002-1	Sh/Clst: brn gy, red brn, s
			30					002-2	Sh/Clst: lt gy, lt brn gy, lt gn gy, dsk y brn, mic
			30					002-3	Ca : w, dol, chk
			tr					002-4	Cont : prp, fib
2042.00				Rogl	Bald	Tert		003	
			80					003-1	Sh/Clst: lt gy to m gy
			10					003-2	Sh/Clst: red brn
			10					003-3	Ca : w
2060.00				Rogl	Bald	Tert		004	
			90					004-1	Sh/Clst: lt gy to m gy, lt gn gy
			10					004-2	Ca : w
2081.00				Rogl	Bald	Tert		005	
			90					005-1	Sh/Clst: lt gy to m gy
			10					005-2	Sh/Clst: red brn
2102.00				Rogl	Bald	Tert		006	
			100					006-1	Sh/Clst: brn gy, lt gy to m gy, m drk gy

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2141.00				Rogl	Sele	Tert/Pale		007
			100	Sh/Clst: brn gy, lt gy to m gy, m drk gy, mic				007-1
2159.00				Rogl	Sele	Tert/Pale		008
			50	Sh/Clst: lt gy to m gy, pyr				008-1
			25	Sh/Clst: red brn, lt gn gy, mic				008-2
			25	Ca : w, lt gy				008-3
2180.00				Rogl	Sele	Tert/Pale		009
			80	Sh/Clst: brn gy, red brn, lt gn gy, mic				009-1
			20	Sh/Clst: lt gy to m gy				009-2
2198.00				Rogl	Sele	Tert/Pale		010
			50	Sh/Clst: lt gy to m gy				010-1
			40	Sh/Clst: brn gy, red brn, lt gn gy, mic				010-2
			10	Ca : w, dol				010-3
			tr	Cont : prp, dd				010-4
2222.00				Rogl	List	Tert/Pale		011
			50	Sh/Clst: lt gy to m gy				011-1
			30	Sh/Clst: brn gy, gn gy				011-2
			20	Ca : w, brn gy				011-3
2240.00				Rogl	List	Tert/Pale		012
			80	Sh/Clst: gn gy, lt gy, m gy				012-1
			20	Ca : w, brn gy				012-2

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2264.00			Rogl	List	Tert/Pale		013
		100	Sh/Clst: lt gy to m drk gy				013-1
2282.00			Rogl	List	Tert/Pale		014
		60	Sh/Clst: gn gy				014-1
		30	Sh/Clst: lt gy to m drk gy				014-2
		10	Ca : w, brn gy, calc, dol				014-3
2300.00			Rogl		U.Cr/Maa		015
		90	Ca : w, st, chk				015-1
		10	Sh/Clst: gn gy, red brn, lt gy to m drk gy, pyr				015-2
2315.00			Shtl		U.Cr/Camp		016
		95	Ca : w, st, chk				016-1
		5	Sh/Clst: gn gy, red brn, lt gy to m drk gy, pyr				016-2
		tr	Cont : Coal-ad				016-3
2330.00			Shtl		U.Cr/Camp		017
		90	Ca : w, st, chk				017-1
		10	Sh/Clst: gn gy, red brn, lt gy to m drk gy, pyr				017-2
2345.00			Shtl		U.Cr/Camp		018
		80	Sh/Clst: gn gy, red brn, lt gy to m drk gy, calc, pyr				018-1
		20	Ca : w, st, chk				018-2
		tr	Other : pyr				018-3

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2360.00				Shtl		U.Cr/Camp		019
			70	Ca	:	w		019-1
			30	Sh/Clst	:	gn gy, lt gy to m drk gy		019-2
2375.00				Shtl		U.Cr/Camp		020
		0.28	90	Ca	:	w, st, chk		020-1
			10	Sh/Clst	:	gn gy, lt gy to m drk gy		020-2
2390.00				Shtl		U.Cr/Camp		021
			60	Ca	:	w, chk		021-1
			40	Sh/Clst	:	gn gy, lt gy to m drk gy		021-2
2405.00				Crkn		L.Cr/E.Albi-Apti		022
			45	Sh/Clst	:	brn gy, red brn		022-1
		0.56	45	Sh/Clst	:	gn gy, lt gy to m drk gy		022-2
			10	Ca	:	w		022-3
2417.00				Viki Drau		U.Ju/Volg-Ryaz		023
		7.88	60	Sh/Clst	:	brn blk, drk gy blk, carb		023-1
			30	Sh/Clst	:	brn gy, gn gy, red brn, lt gy to m drk gy		023-2
			10	Ca	:	w		023-3
			tr	Cont	:	dd		023-4
2420.00				Viki Drau		U.Ju/Volg-Ryaz		024
		8.29	70	Sh/Clst	:	brn blk, drk gy blk, carb		024-1
	cvd		20	Sh/Clst	:	gn gy, red brn, lt gy to m drk gy		024-2
	cvd		10	Ca	:	w		024-3
			tr	Cont	:	dd		024-4

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Grp Frm Age / Lithology description	Trb	Sample
2424.00				Viki Drau U.Ju/Volg-Ryaz		025
		5.88	60	Sh/Clst: brn blk, drk gy blk		025-1
	cvd		40	Sh/Clst: gn gy, red brn, lt gy to m drk gy		025-2
2429.00				Viki Drau U.Ju/Volg-Ryaz		026
		5.30	70	Sh/Clst: brn blk, drk gy blk, carb, slt, s, mic		026-1
	cvd		30	Sh/Clst: gn gy, red brn, lt gy to m drk gy		026-2
2432.00				Viki Heat U.Ju/L.Oxfo-Kimm		027
			80	Sh/Clst: gn gy, red brn, lt gy to m drk gy, slt, s, mic		027-1
		5.32	20	Sh/Clst: drk gy blk, carb		027-2
2436.00				Viki Heat U.Ju/L.Oxfo-Kimm		028
		6.22	60	Sh/Clst: drk gy blk, carb, mic		028-1
			40	Sh/Clst: brn gy, gn gy, red brn, lt gy, m drk gy, slt, mic		028-2
			tr	Ca : w, lt gy		028-3
2441.00				Viki Heat U.Ju/L.Oxfo-Kimm		029
		5.26	60	Sh/Clst: drk gy blk, carb, mic		029-1
			30	Sh/Clst: brn gy, gn gy, red brn, lt gy to m gy, slt, mic		029-2
			10	Ca : w, lt gy		029-3
2444.00				Viki Heat U.Ju/L.Oxfo-Kimm		030
		0.67	80	Sh/Clst: gn gy, lt gy to m lt gy, calc, pyr, mic		030-1
			20	Sh/Clst: drk gy blk, carb, mic		030-2

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Grp	Frm	Age / Lithology description	Trb	Sample
2450.00						Viki Heat U.Ju/L.Oxfo-Kimm		031
		0.73	90			Sh/Clst: ol gy, lt gy to m lt gy, slt		031-1
			10			Sh/Clst: drk gy blk		031-2
			tr			S/Sst : gy w, mic, f		031-3
			tr			Ca : w		031-4
2453.00						Viki Heat U.Ju/L.Oxfo-Kimm		032
			60			Sh/Clst: gn gy, red brn, lt gy		032-1
		5.21	40			Sh/Clst: drk gy blk, mic		032-2
			tr			S/Sst : gy w, carb, mic		032-3
2459.00						Viki Heat U.Ju/L.Oxfo-Kimm		033
		0.43	90			Sh/Clst: gn gy, red brn, lt gy, calc, pyr		033-1
			10			Sh/Clst: drk gy blk, mic		033-2
			tr			S/Sst : gy w, carb, mic		033-3
2462.00						Viki Heat U.Ju/M.Oxfo-L.Oxfo		034
		0.26	80			Sh/Clst: gn gy, red brn, lt gy, calc, pyr		034-1
			20			Sh/Clst: drk gy blk, carb, mic		034-2
			tr			Ca : w		034-3
2465.00						Viki Heat U.Ju/M.Oxfo-L.Oxfo		035
		0.60	90			Sh/Clst: gn gy, red brn, lt gy		035-1
			10			Sh/Clst: drk gy blk, mic		035-2
2468.00						Viki Heat U.Ju/M.Oxfo-L.Oxfo		036
		0.68	90			Sh/Clst: gn gy, red brn, lt gy, mic		036-1
			10			Sh/Clst: drk gy blk, carb		036-2

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2471.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		037
			80	Sh/Clst: red brn, ol gy, lt gy, calc				037-1
			20	Sh/Clst: drk gy blk, mic				037-2
			tr	Ca : brn gy, calc, slt, s				037-3
			tr	Cont : prp				037-4
2474.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		038
		0.66	80	Sh/Clst: red brn, ol gy, lt gy, calc				038-1
			10	Sh/Clst: drk gy blk, mic				038-2
			10	Ca : brn gy, calc, slt, s				038-3
			tr	Cont : prp				038-4
2477.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		039
			60	Ca : brn gy, calc, slt, s				039-1
			20	Sh/Clst: gn gy, ol gy, lt gy				039-2
			10	S/Sst : brn gy, calc, mic				039-3
			10	Sh/Clst: drk gy blk, mic				039-4
2480.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		040
		0.97	60	Ca : brn gy, drk brn gy, slt, s, mic				040-1
			20	Sh/Clst: gn ol gy, lt gy				040-2
		4.35	20	Sh/Clst: dk lk, mic				040-3
2486.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		041
			40	Ca : brn gy, drk brn gy, slt, s, mic				041-1
			40	Sh/Clst: gn gy, ol gy, lt gy				041-2
			20	Sh/Clst: drk gy blk, slt, mic				041-3
2492.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		042
		0.65	50	Ca : brn gy, drk brn gy, slt, s, mic				042-1
			25	Sh/Clst: gn gy, ol gy, lt gy				042-2
		3.45	25	Sh/Clst: drk gy blk, slt, mic				042-3

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2495.00			Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		043
	0.36	60	Sh/Clst: gn gy, ol gy, lt gy				043-1
		30	Ca : brn gy, drk brn gy, slt, s, mic				043-2
		10	Sh/Clst: drk gy blk, slt, mic				043-3
2498.00			Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		044
	0.30	80	Sh/Clst: gn gy, ol gy, lt gy				044-1
		10	Ca : brn gy, drk brn gy, slt, s, mic				044-2
		10	Sh/Clst: drk gy blk, mic				044-3
2501.00			Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		045
	0.47	75	Sh/Clst: gn gy, ol gy, lt gy				045-1
		20	Ca : brn gy, drk brn gy, slt, s, mic				045-2
		5	Sh/Clst: drk gy blk, mic				045-3
2507.00			Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		046
		50	Sh/Clst: gn gy, ol gy, lt gy				046-1
	1.82	45	Ca : brn gy, drk brn gy, slt, s, mic				046-2
		5	Sh/Clst: drk gy blk, mic				046-3
2510.00			Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		047
		50	Sh/Clst: gn gy, red brn, ol gy, lt gy				047-1
		20	Ca : brn gy, drk brn gy, slt, s, mic				047-2
	1.10	20	Sh/Clst: brn gy, slt, mic				047-3
		10	Sh/Clst: drk gy blk, slt, mic				047-4
2513.00			Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		048
		80	Sh/Clst: gn gy, red brn, ol gy, lt gy				048-1
		20	Ca : brn gy, drk brn gy, slt, s, mic				048-2

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2519.00					Viki Heat U.Ju/M.Oxfo-L.Oxfo		049
	0.55	90	Sh/Clst: gn gy, lt gy				049-1
		5	Ca : gn gy, slt, mic				049-2
		5	Sh/Clst: drk gy blk, slt, mic				049-3
2525.00					Viki Heat U.Ju/M.Oxfo-L.Oxfo		050
		95	Sh/Clst: gn gy, red brn, lt gy				050-1
		5	Sh/Clst: drk gy blk, slt, mic				050-2
2531.00					Viki Heat U.Ju/M.Oxfo-L.Oxfo		051
	0.78	80	Sh/Clst: gn gy, lt gy				051-1
		20	Sh/Clst: drk gy blk, slt, mic				051-2
2534.00					Viki Heat U.Ju/M.Oxfo-L.Oxfo		052
		70	Sh/Clst: gn gy, lt gy				052-1
	4.72	30	Sh/Clst: drk gy blk, slt, mic				052-2
		tr	Ca : gn gy				052-3
2540.00					Viki Heat U.Ju/M.Oxfo-L.Oxfo		053
		80	Sh/Clst: gn gy, red brn, lt gy, calc				053-1
		20	Sh/Clst: drk gy blk, drk brn gy, slt, mic				053-2
		tr	Ca : w				053-3
2543.00					Viki Heat U.Ju/M.Oxfo-L.Oxfo		054
	0.82	95	Sh/Clst: gn gy, red brn, lt gy, calc				054-1
		5	Sh/Clst: drk gy blk, drk brn gy, slt, mic				054-2

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2546.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		055
		0.56	90	Sh/Clst: gn gy, red brn, lt gy, calc				055-1
			10	Sh/Clst: drk gy blk, drk brn gy, slt, mic				055-2
			tr	Other : pyr				055-3
2549.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		056
			90	Sh/Clst: gn gy, red brn, lt gy, calc				056-1
			10	Sh/Clst: drk gy blk, drk brn gy, slt, mic				056-2
2555.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		057
		0.46	80	Sh/Clst: gn gy, red brn, lt gy, calc				057-1
			20	Sh/Clst: drk gy blk, drk brn gy, slt, mic				057-2
2558.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		058
			70	Sh/Clst: gn gy, red brn, lt gy, calc				058-1
		4.37	20	Sh/Clst: drk gy blk, drk brn gy, slt, mic				058-2
			10	Ca : w, gy w, cly				058-3
2561.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		059
		0.64	80	Sh/Clst: brn gy, gn gy, lt gy, calc				059-1
			10	Sh/Clst: drk gy blk, drk brn gy, slt, mic				059-2
			10	Ca : w, gy w, cly				059-3
2563.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		060
			70	Sh/Clst: brn gy, gn gy, red brn, lt gy, calc				060-1
			10	Sh/Clst: drk gy blk, drk brn gy, slt, mic				060-2
			10	Ca : w, gy w, cly				060-3
			10	Cont : dd				060-4

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2567.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		061
			60	Sh/Clst: brn gy, gn gy, red brn, lt gy, calc				061-1
		0.80	30	Ca : w, gy w, brn gy, slt, s, mic				061-2
			10	Sh/Clst: drk gy blk, drk brn gy, slt, mic				061-3
2573.00				Viki	Heat	U.Ju/M.Oxfo-L.Oxfo		062
			60	Sh/Clst: brn gy, gn gy, red brn, lt gy, calc				062-1
			20	Ca : w, gy w, brn gy, slt, s, mic				062-2
			20	Sh/Clst: drk gy blk, drk brn gy, slt, mic				062-3
2576.00				Viki	Heat	U.Ju/E.Oxfo		063
			50	Sh/Clst: brn gy, gn gy, lt gy, calc				063-1
		5.08	30	Sh/Clst: drk gy blk, drk brn gy, slt, mic				063-2
			20	Ca : w, gy w, brn gy, s, mic				063-3
			tr	Other : pyr				063-4
2579.00				Viki	Heat	M.Ju/E.Call		064
		0.83	60	Sh/Clst: brn gy, gn gy, lt gy, calc				064-1
			20	Sh/Clst: drk gy blk, drk brn gy, slt, mic				064-2
			20	Ca : w, gy w, brn gy, s, mic				064-3
2582.00				Viki	Heat	M.Ju/E.Call		065
		0.72	50	Sh/Clst: brn gy, lt gy, calc				065-1
			20	Ca : w, gy w, brn gy, slt, s, mic				065-2
			20	Cont : dd				065-4
			10	Sh/Clst: drk gy blk, drk brn gy, slt, mic				065-3

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2585.00						Viki Heat M.Ju/E.Call		066
			50	Ca		: w, gy w, brn gy		066-1
			40	Sh/Clst		: brn gy, red brn, lt gy, calc		066-2
			10	Sh/Clst		: drk gy blk, drk brn gy, slt, mic		066-3
2588.00						Viki Heat M.Ju/E.Call		067
		1.00	70	Ca		: w, gy w, brn gy		067-1
			20	Sh/Clst		: brn gy, red brn, lt gy, calc		067-2
			10	Sh/Clst		: drk gy blk, drk brn gy, slt, mic		067-3
2591.00						Viki Heat M.Ju/E.Call		068
		0.32	50	Sh/Clst		: brn gy, red brn, lt gy, calc		068-1
			40	Ca		: w, gy w, brn gy		068-2
			10	Sh/Clst		: drk gy blk, drk brn gy, slt, mic		068-3
2597.00						Viki Heat M.Ju/E.Call		069
			30	S/Sst		: w, lt brn y, calc, f, crs, l		069-1
			20	Sh/Clst		: blk, carb		069-2
			20	Sh/Clst		: brn gy, red brn, lt gy, calc		069-3
			20	Ca		: w, gy w, brn gy		069-4
			10	Coal		: blk, cly		069-5
2603.00						Bren Ness M.Ju/E.Bajo-M.Bajo		070
			45	Sh/Clst		: brn gy, red brn, lt gy, calc		070-1
		0.45	35	S/Sst		: w, gy w, brn gy, lt brn y, calc, f, crs, l		070-2
			10	Sh/Clst		: blk, carb		070-3
			10	Sh/Clst		: drk gy blk, drk brn gy, mic		070-4

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2606.00				Bren Ness M.Ju/E.Bajo-M.Bajo				071
			50	Sh/Clst: brn gy, lt gy to m gy, wx				071-1
			20	Ca : w, gy w				071-2
		5.18	20	Sh/Clst: blk, carb				071-3
			10	Coal : blk, cly				071-4
			tr	Cont : prp				071-5
2612.00				Bren Ness M.Ju/E.Bajo-M.Bajo				072
		0.82	70	Sh/Clst: brn gy, lt gy to m gy, wx				072-1
			20	Sh/Clst: blk, carb				072-3
			10	Ca : w, gy w				072-2
2615.00				Bren Ness M.Ju/E.Bajo-M.Bajo				073
			60	Sh/Clst: gn gy, red brn, lt gy				073-1
			20	Sh/Clst: blk, carb				073-2
			10	Sh/Clst: brn gy, wx				073-3
			5	Ca : w, gy w				073-4
			5	S/Sst : w, l				073-5
2618.00				Bren Ness M.Ju/E.Bajo-M.Bajo				074
		6.11	50	Sh/Clst: blk, carb				074-2
			30	Sh/Clst: brn gy, carb, wx				074-3
			10	Sh/Clst: gn gy, red brn, lt gy				074-1
			10	Coal : blk				074-4
			tr	Ca : w				074-5
2621.00				Bren Ness M.Ju/E.Bajo-M.Bajo				075
		0.63	80	Sh/Clst: brn gy, lt gy to m gy, carb				075-1
			10	Sh/Clst: blk, carb				075-2
			10	Ca : w, gy w, lt brn gy				075-3
			tr	S/Sst : w, crs				075-4
			tr	Other : pyr				075-5

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2627.00				Bren	Ness	M.Ju/E.Bajo-M.Bajo		076
			85	Sh/Clst: brn gy, lt gy to m gy, lt brn gy, slt, mic				076-1
			10	Sh/Clst: blk, carb				076-2
			5	Ca : w				076-3
2630.00				Bren	Ness	M.Ju/E.Bajo-M.Bajo		077
		0.80	90	Sh/Clst: brn gy, lt brn gy, carb, slt, mic				077-1
			10	Sh/Clst: blk, carb				077-2
			tr	S/Sst : mic, f				077-3
2633.00				Bren	Etiv	M.Ju/E.Bajo-M.Bajo		078
	cvd		60	Sh/Clst: brn gy, lt brn gy, carb, slt, mic				078-1
	cvd		20	Sh/Clst: blk, carb				078-2
		70.37	20	Coal : blk				078-3
			tr	S/Sst : w, f				078-4
2636.00				Bren	Etiv	M.Ju/E.Bajo-M.Bajo		079
	cvd		90	Sh/Clst: brn gy, lt brn gy, carb, slt, mic				079-1
	cvd		10	Sh/Clst: drk gy blk, drk brn gy, slt, mic				079-2
			tr	Other : pyr				079-3
			tr	S/Sst : w, f, crs, l				079-4
2648.00				Bren	Etiv	M.Ju/E.Bajo-M.Bajo		080
	cvd		95	Sh/Clst: brn gy, lt gy to m gy, lt brn gy, carb, slt, mic, wx				080-1
	cvd		5	Sh/Clst: drk gy blk, drk brn gy, slt, mic				080-2
			tr	Coal : blk				080-3
			tr	S/Sst : w, f, crs, l				080-4

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2654.00				Bren	Etiv	M.Ju/E.Bajo-M.Bajo		081
	cvd		85	Sh/Clst: brn gy, lt gy to m gy, lt brn gy, carb				081-1
		0.29	5	S/Sst : w, crs, l				081-2
			5	Coal : blk				081-3
			5	Sh/Clst: red brn				081-4
2687.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		082
		0.89	85	Sh/Clst: gn gy, lt gy to m gy, mic				082-1
			5	Sh/Clst: drk gy blk, drk brn gy, slt, mic				082-2
			5	Sh/Clst: brn gy, red brn				082-3
	cvd		5	S/Sst : w, crs, l				082-4
2690.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		083
		0.80	85	Sh/Clst: brn gy, lt gy to m gy				083-1
			5	Sh/Clst: drk brn gy, slt, mic				083-2
			5	Sh/Clst: gn gy, red brn				083-3
	cvd		5	S/Sst : w, crs, l				083-4
2693.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		084
		0.97	80	Sh/Clst: brn gy, lt gy to m gy				084-1
	cvd		10	S/Sst : w, f, crs, l				084-4
			5	Sh/Clst: drk brn gy, slt, mic				084-2
			5	Sh/Clst: gn gy, red brn				084-3
2696.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		085
		0.65	70	Sh/Clst: brn gy, lt gy to m gy				085-1
			10	Sh/Clst: drk brn gy, slt, mic				085-2
			10	Ca : w				085-3
	cvd		5	S/Sst : w, crs, l				085-4
			5	Sh/Clst: gn gy, red brn				085-5

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2699.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		086
			50	Cont		: Coal-ad, prp		086-4
			30	Sh/Clst		: brn gy, lt gy to m gy		086-1
			10	Ca		: w		086-2
	cvd		10	S/Sst		: w, crs, l		086-3
2705.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		087
			60	Sh/Clst		: brn gy, lt gy to m gy, st		087-1
			30	Cont		: Coal-ad, dd		087-3
			10	Sltst		: lt brn gy, calc, mic		087-2
2711.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		088
		0.69	80	Sh/Clst		: brn gy, gn gy, red brn, lt gy		088-1
			10	Sltst		: lt brn gy, calc, mic		088-2
			10	Ca		: lt brn gy		088-3
2714.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		089
			50	Sh/Clst		: lt gy to drk gy, slt, s, mic		089-1
			30	Sh/Clst		: brn gy, red brn		089-2
			20	Ca		: w, lt brn gy, slt, mic		089-3
2720.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		090
		1.44	60	Sltst		: brn gy, lt gy to drk gy, calc, s, mic		090-1
			30	Sh/Clst		: brn gy, gn gy, red brn		090-2
			10	Ca		: w, lt brn gy, mic		090-3
2723.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		091
			50	Sltst		: brn gy, lt gy to drk gy, calc, s, mic		091-1
		0.62	50	Sh/Clst		: brn gy, gn gy		091-2
			tr	Ca		: w, lt brn gy, pl y brn		091-3
			tr	Sh/Clst		: drk brn gy, slt, mic		091-4

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2726.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		092
		0.66	40	Ca		: w, lt brn gy, pl y brn, calc, s, mic		092-3
			30	Sltst		: brn gy, lt gy to drk gy		092-1
			30	Sh/Clst		: brn gy, gn gy		092-2
2729.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		093
		0.51	70	Sh/Clst		: lt gy to m gy, lt gn gy, calc, slt		093-1
			20	S/Sst		: lt gy, calc, slt, mic, glauc, f		093-2
			5	Sh/Clst		: drk gy blk, drk brn gy, slt, mic		093-3
			5	Ca		: pl y brn, s		093-4
2732.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		094
			35	Sh/Clst		: lt gy to m gy, lt gn gy, calc, slt		094-1
		0.11	35	Sh/Clst		: gy brn		094-3
			15	S/Sst		: lt gy, calc, slt, mic, glauc, f		094-2
			10	Sh/Clst		: drk gy blk, drk brn gy, slt, mic		094-4
			5	Ca		: pl y brn, s		094-5
2735.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		095
			30	Sh/Clst		: gn gy, lt gy to m gy, lt gn gy		095-1
			30	S/Sst		: w, lt gy, calc, slt, mic, glauc, f		095-2
		4.52	20	Sh/Clst		: blk, drk gy blk, drk brn gy, slt, mic		095-3
			10	Ca		: pl y brn, s		095-4
			10	Cont		: prp, dd		095-5
2738.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		096
		0.28	85	Sh/Clst		: lt gy to m gy, lt gn gy		096-1
			5	S/Sst		: w, lt gy, calc, slt, mic, glauc, f		096-2
			5	Sh/Clst		: blk, drk gy blk, drk brn gy, slt, mic		096-3
			5	Sh/Clst		: gn gy		096-4
			tr	Cont		: prp, dd		096-5

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2741.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		097
	0.43	65	Sh/Clst: lt gy to m gy, calc				097-1
		20	Sh/Clst: gn gy, lt gn gy				097-2
		15	Sh/Clst: blk, drk gy blk, carb, mic				097-3
		tr	Coal : blk				097-4
		tr	S/Sst : w, f, crs, l				097-5
2744.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		098
	0.57	45	Sh/Clst: brn gy, gn gy, lt gn gy				098-1
		30	Sh/Clst: lt gy to m gy, calc				098-2
		20	S/Sst : w, calc, slt, mic, f, crs, l				098-3
		5	Sh/Clst: blk, drk gy blk, carb, mic				098-4
2747.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		099
	1.14	40	Sh/Clst: lt gy to m gy, calc				099-2
		35	Sh/Clst: brn gy, gn gy, lt gn gy				099-1
		20	S/Sst : w, calc, slt, mic, glauc, f, crs, l				099-3
		5	Ca : pl y brn				099-4
		tr	Cont : Coal-ad				099-5
2750.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		100
		70	Cont : Coal-ad, tar-ad				100-3
		20	Sh/Clst: lt gy to m gy, st				100-1
		10	S/Sst : w, calc, slt, mic, glauc, f, crs, l				100-2
2753.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		101
		50	Sh/Clst: lt gy to m gy, st				101-1
		20	Sh/Clst: brn gy, gn gy, lt gn gy				101-2
		20	Cont : Coal-ad, tar-ad				101-5
		5	S/Sst : w, calc, pyr, slt, mic, glauc, f				101-3
		5	Sh/Clst: blk, drk gy blk, mic				101-4

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2756.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		102
			40	Sh/Clst: lt gy to m gy, st				102-1
		0.34	40	Sh/Clst: brn gy, gn gy, lt gn gy				102-2
		5.36	10	Sh/Clst: blk, drk gy blk, mic				102-3
			10	Cont : Coal-ad, tar-ad				102-5
			tr	S/Sst : w, calc, slt, mic, glauc, f				102-4
2759.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		103
		0.82	45	Sh/Clst: lt gy to m gy				103-1
			45	Sh/Clst: brn gy, gn gy, lt gn gy				103-2
			10	Cont : Coal-ad, dd, tar-ad				103-3
2762.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		104
		1.07	60	Sh/Clst: lt gy to m gy				104-1
			20	Sh/Clst: brn gy, gn gy, lt gn gy				104-2
			20	Cont : Coal-ad, dd, tar-ad				104-3
2765.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		105
			50	Cont : cem				105-4
			30	Sh/Clst: dsk y brn, slt, mic				105-1
			15	Ca : w, gy brn				105-2
			5	S/Sst : w, gy brn, mic, f				105-3
2768.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		106
		0.83	60	Sh/Clst: dsk y brn, pyr, slt, s, mic				106-1
			40	Cont : cem				106-2
2771.00				Dunl	Drak	L.Ju/M.Toar-L.Toar		107
		1.37	70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, slt, mic				107-1
			30	Cont : prp, dd				107-2

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2774.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		108
	1.21	80	Sh/Clst: m brn gy to drk brn gy, dsk y brn, slt, s, mic				108-1
		10	Cont : prp, dd				108-2
		10	S/Sst : w, carb, mic				108-3
2777.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		109
	1.39	75	Sh/Clst: m brn gy to drk brn gy, dsk y brn, slt, s, mic				109-1
		10	S/Sst : w, carb, mic				109-2
		10	Ca : pl y brn				109-3
		5	Cont : prp, dd				109-4
2780.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		110
	1.68	80	Sh/Clst: m brn gy to drk brn gy, dsk y brn, slt, s, mic				110-1
		20	Cont : Coal-ad, prp, dd				110-2
2783.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		111
	2.29	70	Sh/Clst: dsk y brn, calc, slt, mic				111-1
		30	Cont : Coal-ad, prp, dd				111-2
2786.00			Dunl	Drak	L.Ju/M.Toar-L.Toar		112
	2.03	90	Sh/Clst: dsk y brn, calc, mic				112-1
		10	Cont : Coal-ad, prp, dd				112-2
2789.00			Dunl	Drak	L.Ju/E.Toar		113
	2.15	80	Sh/Clst: dsk y brn, calc, s, mic				113-1
		20	Cont : Coal-ad, prp, dd				113-2

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2792.00				Dunl	Drak	L.Ju/E.Toar		114
		2.46	80	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, mic				114-1
			20	Cont : Coal-ad, prp, dd				114-2
2795.00				Dunl	Drak	L.Ju/E.Toar		115
		2.69	70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic				115-1
			30	Cont : Coal-ad, prp				115-2
2798.00				Dunl	Drak	L.Ju/E.Toar		116
		2.80	90	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic				116-1
			10	Cont : Coal-ad, prp				116-2
2801.00				Dunl	Drak	L.Ju/E.Toar		117
			70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic				117-1
			20	Cont : Coal-ad, prp				117-3
			10	S/Sst : pl y brn, dol				117-2
2804.00				Dunl	Drak	L.Ju/E.Toar		118
		3.26	80	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic				118-1
			20	Cont : Coal-ad, prp				118-2
2807.00				Dunl	Drak	L.Ju/E.Toar		119
		3.03	80	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic				119-1
			20	Cont : Coal-ad, prp				119-2

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2810.00				Dunl	Drak	L.Ju/E.Toar		120
			70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic				120-4
		0.58	20	Ca : gy brn, pl y brn				120-2
			10	Cont : Coal-ad, prp, dd				120-3
2813.00				Dunl	Drak	L.Ju/E.Toar		121
		2.63	70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				121-1
			20	Ca : gy brn, pl y brn, dol				121-2
			10	Cont : Coal-ad, prp, dd				121-3
2816.00				Dunl	Drak	L.Ju/E.Toar		122
			50	Cont : Coal-ad, prp, dd				122-3
			30	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				122-1
			20	Ca : gy brn, pl y brn, dol				122-2
2819.00				Dunl	Drak	L.Ju/L.Plie		123
		2.70	80	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				123-1
			10	Ca : gy brn, pl y brn, dol				123-2
			10	Cont : Coal-ad, prp, dd				123-3
2822.00				Dunl	Drak	L.Ju/L.Plie		124
		2.50	60	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				124-1
			30	Cont : Coal-ad, prp, dd				124-3
			10	Ca : gy brn, pl y brn, dol				124-2

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2825.00			Dunl	Drak	L.Ju/L.Plie		125
	2.64	70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				125-1
		20	Cont : Coal-ad, prp, dd				125-3
		10	Ca : gy brn, pl y brn, dol				125-2
2828.00			Dunl	Drak	L.Ju/L.Plie		126
		60	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				126-1
		30	Cont : Coal-ad, prp, dd				126-3
		10	Ca : gy brn, pl y brn, dol				126-2
2831.00			Dunl	Drak	L.Ju/L.Plie		127
	2.67	70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				127-1
		10	Ca : gy brn, pl y brn, dol				127-2
		10	S/Sst : w, gy brn, mic, f				127-3
		10	Cont : Coal-ad, prp, dd				127-4
2834.00			Dunl	Drak	L.Ju/L.Plie		128
	2.17	90	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				128-1
		5	Ca : gy brn, pl y brn, dol				128-2
		5	Cont : Coal-ad, prp, dd				128-3
2837.00			Dunl	Drak	L.Ju/L.Plie		129
	2.29	90	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				129-1
		5	Ca : gy brn, pl y brn, dol				129-2
		5	Cont : Coal-ad, prp, dd				129-3

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth	Type		Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description				
2840.00			Dunl	Drak	L.Ju/L.Plie		130
		55	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				130-1
		40	Cont : Coal-ad, prp, dd				130-3
		5	Ca : gy brn, pl y brn, dol				130-2
2843.00			Dunl	Drak	L.Ju/L.Plie		131
		55	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				131-1
		40	Cont : Coal-ad, prp, dd				131-3
		5	Ca : gy brn, pl y brn, dol				131-2
2846.00			Dunl	Drak	L.Ju/L.Plie		132
	2.08	80	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				132-1
		20	Cont : Coal-ad, prp, dd				132-2
2849.00			Dunl	Drak	L.Ju/L.Plie		133
	1.97	70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				133-1
		30	Cont : Coal-ad, prp, dd				133-2
2852.00			Dunl	Drak	L.Ju/L.Plie		134
	1.98	90	Sh/Clst: drk brn gy, dsk y brn, calc, s, mic, st				134-1
		10	Cont : Coal-ad, prp, dd				134-2
2855.00			Dunl	Drak	L.Ju/L.Plie		135
	1.95	70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, pyr, s, st				135-1
		10	Ca : w, pl y brn, dol				135-2
		10	S/Sst : w, cly, mic, f				135-3
		10	Cont : Coal-ad, prp, dd				135-4

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2858.00				Dunl	Cook	L.Ju/E.Plie		136
			60	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, pyr, s, mic, st				136-1
		0.64	30	S/Sst : w, cly, mic, f				136-2
			10	Cont : Coal-ad, prp, dd				136-3
2861.00				Dunl	Cook	L.Ju/E.Plie		137
		1.94	80	Sh/Clst: drk brn gy, dsk y brn, calc, slt, mic, st				137-1
			10	Ca : w, pl y brn, dol				137-2
			10	Cont : Coal-ad, prp, dd				137-3
2864.00				Dunl	Cook	L.Ju/E.Plie		138
			60	Sh/Clst: drk brn gy, dsk y brn, calc, slt, mic, st				138-1
			20	S/Sst : w, pl y brn, calc, mic				138-3
			10	Ca : w, pl y brn, dol				138-2
			10	Cont : Coal-ad, prp, dd				138-4
2867.00				Dunl	Cook	L.Ju/E.Plie		139
			75	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				139-1
			10	Ca : w, pl y brn, dol				139-2
			10	S/Sst : w, gy brn, calc, cly, mic, f, st				139-3
			5	Cont : prp, dd				139-4
2870.00				Dunl	Cook	L.Ju/E.Plie		140
		0.19	60	S/Sst : w, gy brn, calc, s, mic, f, st, kln				140-2
			30	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				140-1
			10	Ca : w, pl y brn, dol				140-3

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2873.00				Dunl	Cook	L.Ju/E.Plie		141
		0.25	60	S/Sst		: w, gy brn, calc, s, mic, f, st, kln		141-2
			30	Sh/Clst		: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st		141-1
			10	Ca		: w, pl y brn, dol		141-3
2876.00				Dunl	Cook	L.Ju/E.Plie		142
			60	S/Sst		: w, gy brn, calc, s, mic, f, st, kln		142-2
			20	Sh/Clst		: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st		142-1
			10	Ca		: w, pl y brn, dol		142-3
			10	Cont		: dd		142-4
2879.00				Dunl	Cook	L.Ju/E.Plie		143
		0.25	50	S/Sst		: w, gy brn, calc, s, mic, f, st, kln		143-2
			40	Sh/Clst		: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st		143-1
			10	Ca		: w, pl y brn, dol		143-3
2885.00				Dunl	Cook	L.Ju/E.Plie		144
			50	Sh/Clst		: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st		144-1
			40	S/Sst		: w, gy brn, calc, cly, mic, f, st, kln		144-2
			10	Ca		: w, pl y brn, dol		144-3
2888.00				Dunl	Cook	L.Ju/E.Plie		145
			40	Sh/Clst		: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st		145-1
		0.29	40	S/Sst		: w, gy brn, calc, cly, mic, f, st, kln		145-2
			20	Ca		: w, pl y brn, dol		145-3
			tr	Cont		: fib		145-4

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A-S

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2894.00				Dunl	Cook	L.Ju/E.Plie		146
		1.51	60	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				146-1
			30	Cont : cem, dd, fib				146-3
			10	S/Sst : w, gy brn, calc, cly, mic, f, st				146-2
2900.00				Dunl	Am/b	L.Ju/E.Plie		147
		1.28	70	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				147-1
	cvd		10	S/Sst : w, gy brn, calc, cly, mic, f, st				147-2
			10	Ca : lt brn gy				147-3
			10	Cont : prp, dd				147-4
2906.00				Dunl	Am/b	L.Ju/E.Plie		148
			40	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				148-1
			40	Cont : Coal-ad, prp, dd				148-4
	cvd		10	S/Sst : w, gy brn, calc, cly, mic, f, st				148-2
			10	Ca : lt brn gy, pl y brn				148-3
2912.00				Dunl	Am/b	L.Ju/E.Plie		149
			40	Cont : Coal-ad, prp, dd				149-3
		1.36	30	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				149-1
		0.58	30	Ca : lt brn gy, pl y brn				149-2
2915.00				Dunl	Am/b	L.Ju/E.Plie		150
			60	Cont : Coal-ad, prp, dd				150-3
			20	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st				150-1
			20	Ca : lt brn gy, pl y brn				150-2

Table 1 : Lithology description for well NOCS 30/6-4

Depth unit of measure: m

Depth		Type		Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description				
2921.00				Dunl	Am/b	L.Ju/E.Plie		151
			40	Cont	:	Coal-ad, dd		151-4
			30	Ca	:	lt brn gy, pl y brn		151-2
			20	Sh/Clst	:	m brn gy to drk brn gy, dsk y brn, calc, s, mic, st		151-1
			10	S/Sst	:	w, f, crs, l		151-3
2927.00				Dunl	Am/b	L.Ju/E.Plie		152
		1.51	50	Sh/Clst	:	m brn gy to drk brn gy, dsk y brn, calc, s, mic, st		152-1
			30	S/Sst	:	w, lt brn gy, mic, f, crs, l		152-3
			10	Ca	:	lt brn gy, pl y brn		152-2
			10	Cont	:	Coal-ad, dd		152-4
2933.00				Dunl	Am/b	L.Ju/E.Plie		153
			50	Sh/Clst	:	m brn gy to drk brn gy, dsk y brn, calc, s, mic, st		153-1
			20	S/Sst	:	w, lt brn gy, mic, f, crs, l		153-3
			20	Cont	:	Coal-ad, dd		153-4
			10	Ca	:	lt brn gy, pl y brn		153-2
2936.00				Dunl	Am/b	L.Ju/E.Plie		154
			60	Cont	:	Coal-ad, dd		154-4
		1.15	20	Sh/Clst	:	lt brn gy to drk brn gy, dsk y brn, calc, s, mic, st		154-1
			10	Ca	:	lt brn gy, pl y brn		154-2
			10	S/Sst	:	w, lt brn gy, mic, f, crs, l		154-3
2939.00				Dunl	Am/b	L.Ju/L.Sine		155
			70	Cont	:	Coal-ad, Mica-ad, prp, dd, fib		155-4
			20	Sh/Clst	:	lt brn gy to drk brn gy, dsk y brn, calc, s, mic, st		155-1
			5	Ca	:	lt brn gy, pl y brn		155-2
			5	S/Sst	:	w, lt brn gy, mic, f, crs, l		155-3

Table 2 : Rock-Eval table for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2375.00	cut	Ca : w	0.38	0.28	1.00	0.28	0.28	100	357	0.7	0.58	411	020-1
2405.00	cut	Sh/Clst: gn gy, lt gy to m drk gy	0.08	0.19	0.85	0.22	0.56	34	152	0.3	0.30	424	022-2
2417.00	cut	Sh/Clst: brn blk, drk gy blk	1.45	41.77	1.25	33.42	7.88	530	16	43.2	0.03	423	023-1
2420.00	cut	Sh/Clst: brn blk, drk gy blk	1.76	40.93	1.57	26.07	8.29	494	19	42.7	0.04	424	024-1
2424.00	cut	Sh/Clst: brn blk, drk gy blk	1.06	22.24	1.45	15.34	5.88	378	25	23.3	0.05	424	025-1
2429.00	cut	Sh/Clst: brn blk, drk gy blk	0.84	23.58	1.77	13.32	5.30	445	33	24.4	0.03	423	026-1
2432.00	cut	Sh/Clst: drk gy blk	0.88	21.53	1.76	12.23	5.32	405	33	22.4	0.04	424	027-2
2436.00	cut	Sh/Clst: drk gy blk	1.04	26.83	1.68	15.97	6.22	431	27	27.9	0.04	424	028-1
2441.00	cut	Sh/Clst: drk gy blk	0.75	20.03	1.69	11.85	5.26	381	32	20.8	0.04	424	029-1
2444.00	cut	Sh/Clst: gn gy, lt gy to m lt gy	0.02	0.19	0.95	0.20	0.67	28	142	0.2	0.10	427	030-1
2450.00	cut	Sh/Clst: ol gy, lt gy to m lt gy	0.05	0.41	0.70	0.59	0.73	56	96	0.5	0.11	429	031-1
2453.00	cut	Sh/Clst: drk gy blk	0.70	18.56	1.24	14.97	5.21	356	24	19.3	0.04	423	032-2
2459.00	cut	Sh/Clst: gn gy, red brn, lt gy	0.02	0.09	0.73	0.12	0.43	21	170	0.1	0.18	427	033-1
2462.00	cut	Sh/Clst: gn gy, red brn, lt gy	0.02	0.09	0.71	0.13	0.26	35	273	0.1	0.18	431	034-1
2465.00	cut	Sh/Clst: gn gy, red brn, lt gy	0.02	0.21	0.53	0.40	0.60	35	88	0.2	0.09	428	035-1

Table 2 : Rock-Eval table for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2468.00	cut	Sh/Clst: gn gy, red brn, lt gy	0.03	0.23	0.49	0.47	0.68	34	72	0.3	0.12	428	036-1
2474.00	cut	Sh/Clst: red brn, ol gy, lt gy	0.02	0.18	0.54	0.33	0.66	27	82	0.2	0.10	428	038-1
2480.00	cut	Ca : brn gy, drk brn gy	0.11	0.64	0.84	0.76	0.97	66	87	0.8	0.15	429	040-1
2480.00	cut	Sh/Clst: drk gy blk	0.59	11.28	0.92	12.26	4.35	259	21	11.9	0.05	422	040-3
2492.00	cut	Ca : brn gy, drk brn gy	0.10	0.54	0.96	0.56	0.65	83	148	0.6	0.16	432	042-1
2492.00	cut	Sh/Clst: drk gy blk	0.55	10.96	1.21	9.06	3.45	318	35	11.5	0.05	425	042-3
2495.00	cut	Sh/Clst: gn gy, ol gy, lt gy	-	0.06	0.64	0.09	0.36	17	178	0.1	-	425	043-1
2498.00	cut	Sh/Clst: gn gy, ol gy, lt gy	0.02	0.10	0.72	0.14	0.30	33	240	0.1	0.17	420	044-1
2501.00	cut	Sh/Clst: gn gy, ol gy, lt gy	0.02	0.17	0.63	0.27	0.47	36	134	0.2	0.11	429	045-1
2507.00	cut	Ca : brn gy, drk brn gy	0.27	2.08	1.21	1.72	1.82	114	66	2.3	0.11	432	046-2
2510.00	cut	Sh/Clst: brn gy	0.05	0.77	1.18	0.65	1.10	70	107	0.8	0.06	430	047-3
2519.00	cut	Sh/Clst: gn gy, lt gy	0.02	0.14	0.58	0.24	0.55	25	105	0.2	0.13	429	049-1
2531.00	cut	Sh/Clst: gn gy, lt gy	0.08	0.45	0.52	0.87	0.78	58	67	0.5	0.15	429	051-1
2534.00	cut	Sh/Clst: drk gy blk	0.76	15.87	0.50	31.74	4.72	336	11	16.6	0.05	428	052-2
2543.00	cut	Sh/Clst: gn gy, red brn, lt gy	0.06	0.47	0.36	1.31	0.82	57	44	0.5	0.11	430	054-1

Table 2 : Rock-Eval table for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2546.00	cut	Sh/Clst: gn gy, red brn, lt gy	0.03	0.16	0.29	0.55	0.56	29	52	0.2	0.16	427	055-1
2555.00	cut	Sh/Clst: gn gy, red brn, lt gy	0.02	0.15	0.21	0.71	0.46	33	46	0.2	0.12	431	057-1
2558.00	cut	Sh/Clst: drk gy blk, drk brn gy	0.55	14.75	0.58	25.43	4.37	338	13	15.3	0.04	427	058-2
2561.00	cut	Sh/Clst: brn gy, gn gy, lt gy	0.03	0.27	0.39	0.69	0.64	42	61	0.3	0.10	431	059-1
2567.00	cut	Ca : w, gy w, brn gy	0.08	0.46	1.83	0.25	0.80	58	229	0.5	0.15	428	061-2
2576.00	cut	Sh/Clst: drk gy blk, drk brn gy	0.69	8.01	0.52	15.40	5.08	158	10	8.7	0.08	436	063-2
2579.00	cut	Sh/Clst: brn gy, gn gy, lt gy	0.06	0.25	1.13	0.22	0.83	30	136	0.3	0.19	429	064-1
2582.00	cut	Sh/Clst: brn gy, lt gy	0.05	0.32	0.53	0.60	0.72	44	74	0.4	0.14	430	065-1
2588.00	cut	Ca : w, gy w, brn gy	0.13	0.67	1.94	0.35	1.00	67	194	0.8	0.16	433	067-1
2591.00	cut	Sh/Clst: brn gy, red brn, lt gy	0.02	0.07	0.28	0.25	0.32	22	88	0.1	0.22	426	068-1
2603.00	cut	S/Sst : w, gy w, brn gy, lt brn y	0.07	0.32	2.43	0.13	0.45	71	540	0.4	0.18	430	070-2
2606.00	cut	Sh/Clst: blk	0.81	10.21	0.34	30.03	5.18	197	7	11.0	0.07	438	071-3
2612.00	cut	Sh/Clst: brn gy, lt gy to m gy	0.08	0.59	0.43	1.37	0.82	72	52	0.7	0.12	431	072-1
2618.00	cut	Sh/Clst: blk	0.89	7.71	1.75	4.41	6.11	126	29	8.6	0.10	442	074-2
2621.00	cut	Sh/Clst: brn gy, lt gy to m gy	0.04	0.36	4.62	0.08	0.63	57	733	0.4	0.10	438	075-1

Table 2 : Rock-Eval table for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2630.00	cut	Sh/Clst: brn gy, lt brn gy	0.04	0.33	0.31	1.06	0.80	41	39	0.4	0.11	433	077-1
2633.00	cut	Coal : blk	32.65	259.59	7.14	36.36	70.37	369	10	292.2	0.11	424	078-3
2654.00	cut	S/Sst : w	0.04	0.12	0.24	0.50	0.29	41	83	0.2	0.25	439	081-2
2687.00	cut	Sh/Clst: gn gy, lt gy to m gy	0.09	0.64	0.32	2.00	0.89	72	36	0.7	0.12	431	082-1
2690.00	cut	Sh/Clst: brn gy, lt gy to m gy	0.05	0.40	0.33	1.21	0.80	50	41	0.5	0.11	432	083-1
2693.00	cut	Sh/Clst: brn gy, lt gy to m gy	0.08	0.60	0.45	1.33	0.97	62	46	0.7	0.12	434	084-1
2696.00	cut	Sh/Clst: brn gy, lt gy to m gy	0.04	0.31	0.26	1.19	0.65	48	40	0.3	0.11	431	085-1
2711.00	cut	Sh/Clst: brn gy, gn gy, red brn, lt gy	0.08	0.35	0.23	1.52	0.69	51	33	0.4	0.19	434	088-1
2720.00	cut	Sltst : brn gy, lt gy to drk gy	0.24	2.15	0.22	9.77	1.44	149	15	2.4	0.10	436	090-1
2723.00	cut	Sh/Clst: brn gy, gn gy	0.05	0.25	0.45	0.56	0.62	40	73	0.3	0.17	431	091-2
2726.00	cut	Ca : w, lt brn gy, pl y brn	0.10	0.41	2.71	0.15	0.66	62	411	0.5	0.20	432	092-3
2729.00	cut	Sh/Clst: lt gy to m gy, lt gn gy	0.04	0.26	0.40	0.65	0.51	51	78	0.3	0.13	430	093-1
2732.00	cut	Sh/Clst: gy brn	0.01	0.03	0.23	0.13	0.11	27	209	-	0.25	410	094-3
2735.00	cut	Sh/Clst: blk, drk gy blk, drk brn gy	0.95	14.08	0.42	33.52	4.52	312	9	15.0	0.06	426	095-3
2738.00	cut	Sh/Clst: lt gy to m gy, lt gn gy	0.01	0.05	0.23	0.22	0.28	18	82	0.1	0.17	426	096-1

Table 2 : Rock-Eval table for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2741.00	cut	Sh/Clst: lt gy to m gy	0.03	0.17	0.24	0.71	0.43	40	56	0.2	0.15	432	097-1
2744.00	cut	Sh/Clst: brn gy, gn gy, lt gn gy	0.05	0.31	0.28	1.11	0.57	54	49	0.4	0.14	430	098-1
2747.00	cut	Sh/Clst: lt gy to m gy	0.07	0.72	0.50	1.44	1.14	63	44	0.8	0.09	421	099-2
2756.00	cut	Sh/Clst: brn gy, gn gy, lt gn gy	0.02	0.08	0.67	0.12	0.34	24	197	0.1	0.20	423	102-2
2756.00	cut	Sh/Clst: blk, drk gy blk	1.04	18.93	0.59	32.08	5.36	353	11	20.0	0.05	425	102-3
2759.00	cut	Sh/Clst: lt gy to m gy	0.06	0.33	0.52	0.63	0.82	40	63	0.4	0.15	432	103-1
2762.00	cut	Sh/Clst: lt gy to m gy	0.08	0.66	0.53	1.25	1.07	62	50	0.7	0.11	433	104-1
2768.00	cut	Sh/Clst: dsk y brn	0.37	0.93	5.64	0.16	0.83	112	680	1.3	0.28	354	106-1
2771.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.43	3.37	0.52	6.48	1.37	246	38	3.8	0.11	438	107-1
2774.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.23	3.00	0.38	7.89	1.21	248	31	3.2	0.07	440	108-1
2777.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.39	4.12	0.30	13.73	1.39	296	22	4.5	0.09	439	109-1
2780.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.48	6.41	0.30	21.37	1.68	382	18	6.9	0.07	434	110-1
2783.00	cut	Sh/Clst: dsk y brn	0.75	10.35	0.50	20.70	2.29	452	22	11.1	0.07	432	111-1

Table 2 : Rock-Eval table for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2786.00	cut	Sh/Clst: dsk y brn	0.60	9.04	0.48	18.83	2.03	445	24	9.6	0.06	435	112-1
2789.00	cut	Sh/Clst: dsk y brn	0.66	9.57	0.57	16.79	2.15	445	27	10.2	0.06	436	113-1
2792.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.53	7.71	1.02	7.56	2.46	313	41	8.2	0.06	429	114-1
2795.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.90	11.51	0.85	13.54	2.69	428	32	12.4	0.07	430	115-1
2798.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.72	9.70	1.04	9.33	2.80	346	37	10.4	0.07	429	116-1
2804.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	1.05	13.02	0.77	16.91	3.26	399	24	14.1	0.07	434	118-1
2807.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.95	13.69	1.02	13.42	3.03	452	34	14.6	0.06	436	119-1
2810.00	cut	Ca : gy brn, pl y brn	0.12	0.46	0.97	0.47	0.58	79	167	0.6	0.21	438	120-2
2813.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.82	11.05	0.67	16.49	2.63	420	25	11.9	0.07	432	121-1
2819.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.76	11.15	1.01	11.04	2.70	413	37	11.9	0.06	434	123-1
2822.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.68	10.53	1.32	7.98	2.50	421	53	11.2	0.06	434	124-1

Table 2 : Rock-Eval table for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2825.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.65	8.81	1.45	6.08	2.64	334	55	9.5	0.07	435	125-1
2831.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.58	8.86	1.24	7.15	2.67	332	46	9.4	0.06	429	127-1
2834.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.45	8.40	1.18	7.12	2.17	387	54	8.8	0.05	435	128-1
2837.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.54	9.75	1.25	7.80	2.29	426	55	10.3	0.05	437	129-1
2846.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.52	8.41	1.25	6.73	2.08	404	60	8.9	0.06	434	132-1
2849.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.47	6.92	1.14	6.07	1.97	351	58	7.4	0.06	436	133-1
2852.00	cut	Sh/Clst: drk brn gy, dsk y brn	0.56	8.34	1.24	6.73	1.98	421	63	8.9	0.06	435	134-1
2855.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.53	8.34	1.24	6.73	1.95	428	64	8.9	0.06	436	135-1
2858.00	cut	S/Sst : w	0.12	0.63	1.45	0.43	0.64	98	227	0.8	0.16	438	136-2
2861.00	cut	Sh/Clst: drk brn gy, dsk y brn	0.62	8.65	1.25	6.92	1.94	446	64	9.3	0.07	434	137-1
2870.00	cut	S/Sst : w, gy brn	0.02	0.11	0.88	0.13	0.19	58	463	0.1	0.15	441	140-2
2873.00	cut	S/Sst : w, gy brn	0.03	0.15	0.84	0.18	0.25	60	336	0.2	0.17	439	141-2

Table 2 : Rock-Eval table for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2879.00	cut	S/Sst : w, gy brn	0.04	0.17	0.63	0.27	0.25	68	252	0.2	0.19	433	143-2
2888.00	cut	S/Sst : w, gy brn	0.04	0.17	0.63	0.27	0.29	59	217	0.2	0.19	438	145-2
2894.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.74	5.88	0.87	6.76	1.51	389	58	6.6	0.11	435	146-1
2900.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.18	2.76	0.36	7.67	1.28	216	28	2.9	0.06	436	147-1
2912.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.41	4.67	0.67	6.97	1.36	343	49	5.1	0.08	436	149-1
2912.00	cut	Ca : lt brn gy, pl y brn	0.07	0.30	3.64	0.08	0.58	52	628	0.4	0.19	434	149-2
2927.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	0.47	5.73	0.75	7.64	1.51	379	50	6.2	0.08	437	152-1
2936.00	cut	Sh/Clst: lt brn gy to drk brn gy, dsk y brn	0.32	3.05	0.77	3.96	1.15	265	67	3.4	0.09	440	154-1

Table 3 a: Weight of EOM and Chromatographic Fraction for well NOCS 30/6-4

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
2420.00	com	* Composite sample - see table 3 e *	3.9	18.8	2.8	1.8	1.2	13.0	4.6	14.2	7.58	156-0
2429.00	com	* Composite sample - see table 3 e *	5.0	19.6	2.3	1.8	3.6	11.8	4.2	15.4	5.09	157-0
2441.00	com	* Composite sample - see table 3 e *	6.3	28.3	3.2	2.5	1.7	20.8	5.7	22.6	5.78	158-0
2492.00	com	* Composite sample - see table 3 e *	1.5	13.5	1.0	0.2	6.6	5.8	1.1	12.4	3.96	159-0
2534.00	cut	Sh/Clst: drk gy blk	4.6	15.9	0.7	0.7	13.5	1.0	1.4	14.5	4.01	052-2
2780.00	com	* Composite sample - see table 3 e *	10.3	17.1	2.8	1.1	4.2	8.9	3.9	13.2	1.52	162-0
2789.00	com	* Composite sample - see table 3 e *	6.4	18.0	2.0	1.4	3.4	11.2	3.4	14.6	2.27	163-0
2813.00	com	* Composite sample - see table 3 e *	4.6	20.6	1.5	3.7	6.2	9.2	5.1	15.5	2.96	164-0
2834.00	com	* Composite sample - see table 3 e *	2.9	15.9	1.0	1.0	6.3	7.6	2.1	13.8	2.15	165-0
2855.00	com	* Composite sample - see table 3 e *	2.3	12.5	1.0	0.8	2.6	8.0	1.9	10.6	2.14	166-0
2927.00	com	* Composite sample - see table 3 e *	3.6	11.0	1.9	0.5	2.1	6.5	2.4	8.6	1.61	168-0

Table 3 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
2420.00	com	* Composite sample - see table 3 e *	4808	721	455	317	3314	1176	3631	156-0
2429.00	com	* Composite sample - see table 3 e *	3904	466	364	719	2354	830	3073	157-0
2441.00	com	* Composite sample - see table 3 e *	4499	507	405	275	3311	912	3586	158-0
2492.00	com	* Composite sample - see table 3 e *	9183	653	129	4482	3918	782	8401	159-0
2534.00	cut	Sh/Clst: drk gy blk	3456	152	152	2934	217	304	3152	052-2
2780.00	com	* Composite sample - see table 3 e *	1666	271	112	413	869	384	1282	162-0
2789.00	com	* Composite sample - see table 3 e *	2790	303	221	530	1734	525	2265	163-0
2813.00	com	* Composite sample - see table 3 e *	4449	321	788	1343	1995	1110	3339	164-0
2834.00	com	* Composite sample - see table 3 e *	5482	362	362	2162	2596	724	4758	165-0
2855.00	com	* Composite sample - see table 3 e *	5434	452	360	1130	3491	813	4621	166-0
2927.00	com	* Composite sample - see table 3 e *	3055	527	138	583	1805	666	2388	168-0

Table 3 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
2420.00	com	* Composite sample - see table 3 e *	63.43	9.51	6.01	4.18	43.73	15.52	47.91	156-0
2429.00	com	* Composite sample - see table 3 e *	76.71	9.16	7.16	14.13	46.26	16.32	60.39	157-0
2441.00	com	* Composite sample - see table 3 e *	77.84	8.77	7.01	4.76	57.29	15.79	62.05	158-0
2492.00	com	* Composite sample - see table 3 e *	231.91	16.49	3.26	113.21	98.95	19.76	212.16	159-0
2534.00	cut	Sh/Clst: drk gy blk	86.20	3.79	3.79	73.19	5.42	7.59	78.61	052-2
2780.00	com	* Composite sample - see table 3 e *	109.65	17.89	7.37	27.19	57.20	25.26	84.38	162-0
2789.00	com	* Composite sample - see table 3 e *	122.94	13.39	9.77	23.36	76.43	23.15	99.78	163-0
2813.00	com	* Composite sample - see table 3 e *	150.31	10.87	26.63	45.39	67.42	37.51	112.81	164-0
2834.00	com	* Composite sample - see table 3 e *	255.01	16.84	16.84	100.56	120.77	33.68	221.33	165-0
2855.00	com	* Composite sample - see table 3 e *	253.96	21.13	16.86	52.82	163.15	37.99	215.97	166-0
2927.00	com	* Composite sample - see table 3 e *	189.79	32.78	8.63	36.23	112.15	41.41	148.38	168-0

Table 3 d: Composition of material extracted from the rock (%) for well NOCS 30/6-4

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
2420.00	com	* Composite sample - see table 3 e *	15.00	9.47	6.60	68.94	24.47	75.53	158.43	32.39	156-0
2429.00	com	* Composite sample - see table 3 e *	11.94	9.34	18.42	60.31	21.28	78.72	127.87	27.03	157-0
2441.00	com	* Composite sample - see table 3 e *	11.27	9.01	6.11	73.60	20.28	79.72	125.10	25.44	158-0
2492.00	com	* Composite sample - see table 3 e *	7.11	1.41	48.81	42.67	8.52	91.48	505.26	9.31	159-0
2534.00	cut	Sh/Clst: drk gy blk	4.40	4.40	84.91	6.29	8.81	91.19	100.00	9.66	052-2
2780.00	com	* Composite sample - see table 3 e *	16.32	6.73	24.80	52.16	23.04	76.96	242.61	29.94	162-0
2789.00	com	* Composite sample - see table 3 e *	10.89	7.94	19.00	62.17	18.83	81.17	137.06	23.20	163-0
2813.00	com	* Composite sample - see table 3 e *	7.23	17.72	30.19	44.85	24.95	75.05	40.82	33.25	164-0
2834.00	com	* Composite sample - see table 3 e *	6.60	6.60	39.43	47.36	13.21	86.79	100.00	15.22	165-0
2855.00	com	* Composite sample - see table 3 e *	8.32	6.64	20.80	64.24	14.96	85.04	125.30	17.59	166-0
2927.00	com	* Composite sample - see table 3 e *	17.27	4.55	19.09	59.09	21.82	78.18	380.00	27.91	168-0

Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 30/6-4

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
2417.00	2420.00	com	156-0	is composed of:	2417.00	cut	Sh/Clst: brn blk, drk gy blk, carb	023-1
					2420.00	cut	Sh/Clst: brn blk, drk gy blk, carb	024-1
2424.00	2429.00	com	157-0	is composed of:	2424.00	cut	Sh/Clst: brn blk, drk gy blk	025-1
					2429.00	cut	Sh/Clst: brn blk, drk gy blk, carb, slt, s, mic	026-1
2432.00	2441.00	com	158-0	is composed of:	2432.00	cut	Sh/Clst: drk gy blk, carb	027-2
					2436.00	cut	Sh/Clst: drk gy blk, carb, mic	028-1
					2441.00	cut	Sh/Clst: drk gy blk, carb, mic	029-1
2480.00	2492.00	com	159-0	is composed of:	2480.00	cut	Sh/Clst: drk gy blk, mic	040-3
					2492.00	cut	Sh/Clst: drk gy blk, slt, mic	042-3
2771.00	2780.00	com	162-0	is composed of:	2771.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, slt, mic	107-1
					2774.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, slt, s, mic	108-1
					2777.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, slt, s, mic	109-1
					2780.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, slt, s, mic	110-1

Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 30/6-4

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
2783.00	2789.00	com	163-0	is composed of:	2783.00	cut	Sh/Clst: dsk y brn, calc, slt, mic	111-1
					2786.00	cut	Sh/Clst: dsk y brn, calc, mic	112-1
					2789.00	cut	Sh/Clst: dsk y brn, calc, s, mic	113-1
2792.00	2813.00	com	164-0	is composed of:	2792.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, mic	114-1
					2795.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic	115-1
					2798.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic	116-1
					2804.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic	118-1
					2807.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic	119-1
					2813.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	121-1
2819.00	2834.00	com	165-0	is composed of:	2819.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	123-1
					2822.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	124-1
					2825.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	125-1
					2831.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	127-1
					2834.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	128-1

Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 30/6-4

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
2846.00	2855.00	com	166-0	is composed of:	2846.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	132-1
					2849.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	133-1
					2852.00	cut	Sh/Clst: drk brn gy, dsk y brn, calc, s, mic, st	134-1
					2855.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, pyr, s, st	135-1
2900.00	2927.00	com	168-0	is composed of:	2900.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	147-1
					2912.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	149-1
					2927.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn, calc, s, mic, st	152-1

Table 4 : Saturated Hydrocarbon Ratios for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	Pristane / nC17	Pristane / Phytane	Pristane + Phytane / nC17 + nC18	Phytane / nC18	CPI	Sample
2420.00	com	bulk	1.10	1.80	1.00	-	1.10	156-0
2429.00	com	bulk	1.10	1.70	1.00	-	1.20	157-0
2441.00	com	bulk	1.10	1.80	1.00	-	1.10	158-0
2492.00	com	bulk	1.00	2.10	0.80	-	1.40	159-0
2534.00	cut	Sh/Clst: drk gy blk	1.10	2.10	0.90	-	1.30	052-2
2780.00	com	bulk	0.60	1.80	0.50	-	1.30	162-0
2789.00	com	bulk	0.90	2.00	0.70	-	1.20	163-0
2813.00	com	bulk	0.80	2.50	0.70	-	1.30	164-0
2834.00	com	bulk	0.80	2.40	0.60	-	1.40	165-0
2855.00	com	bulk	0.70	2.00	0.60	-	1.40	166-0
2927.00	com	bulk	0.60	2.20	0.50	-	1.40	168-0

Table 5 : Aromatic Hydrocarbon Ratios for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	DBT/P	4/1MDBT	(3+2)/1MDBT	Sample
2420.00	com	bulk	-	0.49	-	0.76	0.97	0.71	0.60	0.15	0.14	156-0
2429.00	com	bulk	0.88	0.73	0.14	0.74	0.73	0.60	0.48	0.20	0.16	157-0
2441.00	com	bulk	1.06	0.78	0.16	0.63	0.70	0.45	0.39	0.16	0.13	158-0
2492.00	com	bulk	-	-	-	0.78	0.67	0.64	0.29	0.46	0.38	159-0
2534.00	com	bulk	-	0.28	-	0.53	0.42	0.37	0.22	0.36	0.33	160-0
2780.00	com	bulk	-	0.60	-	1.05	0.64	0.64	-	2.96	1.04	162-0
2789.00	com	bulk	0.85	0.77	0.14	0.86	0.69	0.69	1.00	1.67	0.36	163-0
2813.00	com	bulk	0.88	0.71	0.10	0.79	0.54	0.53	0.13	1.81	1.01	164-0
2834.00	com	bulk	-	-	-	0.79	0.54	0.54	0.09	1.22	0.86	165-0
2855.00	com	bulk	-	-	-	0.79	0.57	0.57	0.08	1.01	0.64	166-0
2927.00	com	bulk	-	-	-	0.78	0.57	0.59	0.08	2.02	1.14	167-0

List of aromatic maturity ratios

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

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

$$BPHR = \frac{\text{biphenyl}}{\text{1,6 dimethyl naphthalene}}$$

$$2/1MP = \frac{\text{2-methyl phenanthrene}}{\text{1-methyl phenanthrene}}$$

$$MPI1 = \frac{1.5 * (3 + \text{2-methyl phenanthrene})}{\text{phenanthrene + 9 + 1-methyl phenanthrene}}$$

$$MPI2 = \frac{3.0 * \text{2-methyl phenanthrene}}{\text{phenanthrene + 9 + 1-methyl phenanthrene}}$$

$$DBT/P = \frac{\text{dibenzothiophene}}{\text{phenanthrene}}$$

$$4/1MDBT = \frac{\text{4-methyl dibenzothiophene}}{\text{1-methyl dibenzothiophene}}$$

$$(3+2)/1MDBT = \frac{\text{3 + 2-methyl dibenzothiophene}}{\text{1-methyl dibenzothiophene}}$$

Table 6 : Thermal Maturity Data for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
2060.00	cut	bulk	0.36	10	0.04	3+4+5	-	-	004-0
2141.00	cut	bulk	0.25	8	0.02	4+5	-	-	007-0
2222.00	cut	bulk	0.35	2	0.04	5+6	-	-	011-0
2264.00	cut	bulk	0.43	2	0.00	5+6	-	-	013-0
2345.00	cut	bulk	0.41	5	0.05	4+5+6	-	-	018-0
2417.00	cut	bulk	0.45	9	0.05	5+6	-	-	023-0
2417.00	cut	Sh/Clst: brn blk, drk gy blk	-	-	-	-	3.5	423	023-1
2432.00	cut	bulk	0.42	7	0.04	5+6	-	-	027-0
2436.00	cut	Sh/Clst: drk gy blk	-	-	-	-	3.5	424	028-1
2453.00	cut	bulk	0.42	12	0.04	5+6	-	-	032-0
2471.00	cut	bulk	0.44	11	0.03	5+6	-	-	037-0
2480.00	cut	Ca : brn gy, drk brn gy	-	-	-	-	3.5	429	040-1
2498.00	cut	bulk	0.53	7	0.04	4+5	-	-	044-0
2507.00	cut	Ca : brn gy, drk brn gy	-	-	-	-	4	432	046-2

Table 6 : Thermal Maturity Data for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
2534.00	cut	bulk	0.53	4	0.05	5	-	-	052-0
2534.00	cut	Sh/Clst: gn gy, lt gy	-	-	-	-	4	-	052-1
2558.00	cut	Sh/Clst: drk gy blk, drk brn gy	-	-	-	-	4	427	058-2
2576.00	cut	Sh/Clst: drk gy blk, drk brn gy	-	-	-	-	5	436	063-2
2606.00	cut	bulk	0.53	34	0.04	5+6	-	-	071-0
2606.00	cut	Sh/Clst: blk	-	-	-	-	5.5	438	071-3
2633.00	cut	bulk	0.58	43	0.03	5+6	-	-	078-0
2720.00	cut	bulk	0.58	3	0.07	6	-	-	090-0
2720.00	cut	Sltst : brn gy, lt gy to drk gy	-	-	-	-	5.5	436	090-1
2735.00	cut	bulk	0.57	18	0.05	5+6+7	-	-	095-0
2735.00	cut	Sh/Clst: blk, drk gy blk, drk brn gy	-	-	-	-	5.5 - 6	426	095-3
2747.00	cut	Sh/Clst: lt gy to m gy	-	-	-	-	NDP	421	099-2
2756.00	cut	Sh/Clst: blk, drk gy blk	-	-	-	-	5.5	425	102-3
2771.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	-	-	-	-	6	438	107-1

Table 6 : Thermal Maturity Data for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
2774.00	cut	bulk	0.62	1	0.00	5+6	-	-	108-0
2783.00	cut	Sh/Clst: dsk y brn	-	-	-	-	5	432	111-1
2795.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	-	-	-	-	5	430	115-1
2807.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	-	-	-	-	5 - 5.5	436	119-1
2819.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	-	-	-	-	6?	434	123-1
2828.00	cut	bulk	0.58	8	0.05	5+6+7	-	-	126-0
2864.00	cut	bulk	0.54	17	0.05	5+6	-	-	138-0
2906.00	cut	bulk	0.58	9	0.06	5+6	-	-	148-0
2933.00	cut	bulk	NDP	-	-	5+6	-	-	153-0

Table 7 : Visual Kerogen Composition Data for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	LIPT %	Amor L	LipDet	Sp/Pol	Cuticl	Resin	Algae	DinoflAcrit	Bit L	INERT %	Fusin	Semi Fus	Sent Det	Micrin	Sclero	Bit I	VITR %	Telin	Colin	Vit Det	Amor V	Bit V	Smple
2417.00	cut	Sh/Clst: brn blk, drk gy blk	75	*	**	**			?	*		5		*	**				20			**	?		023-1
2436.00	cut	Sh/Clst: drk gy blk	50	*	**	*	?			*		20	?	*	**				30			**	*		028-1
2480.00	cut	Ca : brn gy, drk brn gy	30	*	**	*				*		30		*	**				40			**	*		040-1
2507.00	cut	Ca : brn gy, drk brn gy	NDP									NDP							NDP						046-2
2534.00	cut	Sh/Clst: gn gy, lt gy	30	*	**	**						30	*	**	*				40	?	?	**	*		052-1
2558.00	cut	Sh/Clst: drk gy blk, drk brn gy	30	?	**	**						20		*	*				50	*	*	**	*		058-2
2576.00	cut	Sh/Clst: drk gy blk, drk brn gy	10		**	*						60	*	**	*				30	*	*	**			063-2
2606.00	cut	Sh/Clst: blk	10		**	*						60	*	**	*				30	*	*	**			071-3
2720.00	cut	Sltst : brn gy, lt gy to drk gy	20	*	**	**						30		*	**				50		*	**			090-1
2735.00	cut	Sh/Clst: blk, drk gy blk, drk brn gy	30		**	*						10			*				60			*			095-3
2747.00	cut	Sh/Clst: lt gy to m gy	NDP									NDP							NDP						099-2
2756.00	cut	Sh/Clst: blk, drk gy blk	30		**	*						20			*				50	*	*	**	*		102-3
2771.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	20	*	**	**						30		*	**				50			*			107-1

Table 7 : Visual Kerogen Composition Data for well NOCS 30/6-4

Depth unit of measure: m

Depth	Typ	Lithology	LIPT %	Amor L	LipDet	Sp/Pol	Cutic l	Resin	Algae	Dinofl	Acrit	Bit L	INERT %	Fusin	SemFus	IntDet	Micrin	Sclero	Bit I	VITR %	Telin	Colin	Vitdet	Amorv	Bit V	Smple
2783.00	cut	Sh/Clst: dsk y brn	90	*	*	**							TR			*				10			*	*		111-1
2795.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	90		*	**	?			?			TR			*				10			*	*		115-1
2807.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	70	*	**	**							10			*				20			*	**		119-1
2819.00	cut	Sh/Clst: m brn gy to drk brn gy, dsk y brn	60	*	**	**							10			*				30			*	**		123-1

Table 8 WELL 30/6-4

PYROLYSIS GC ON NON-EXTRACTED ROCK. VALUES FROM S2 PEAK.

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DEPTH (m)	% C1-C5 of total	% C6+ of total
2417	21	79
2420	21	79
2424	21	79
2429	24	76
2432	15	85
2436	20	80
2441	17	83
2450	43	57
2453	38	62
2480 clst brn gy	45	55
2481 clst drk gy blk	23	77
2492	34	66
2507	35	65
2510	52	48
2531	47	53
2534	19	81
2558	21	79
2567	4	96
2576	25	75
2588	48	52
2606	31	69
2633	18	82
2693	54	46
2720	39	61
2735	27	73
2747	46	54
2756	22	78
2762	71	29
2768	59	41

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Table 8 WELL 30/6-4

PYROLYSIS GC ON NON-EXTRACTED ROCK. VALUES FROM S2 PEAK.

DEPTH (m)	% C1-C5 of total	% C6+ of total
2771	31	69
2777	31	69
2780	31	69
2786	21	79
2789	16	84
2795	21	79
2804	21	79
2807	20	80
2810	53	47
2813	20	80
2819	20	80
2831	21	79
2846	18	82
2852	14	86
2855	13	87
2858	28	72
2894	23	77
2912	26	74
2936	33	67

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GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 9 WELL 30/6-4

PYROLYSIS GC ON PRE-EXTRACTED ROCK. VALUES FROM S2 PEAK.

DEPTH (m)	% C1-C5 of total	% C6+ of total
2420	15	85
2429	17	83
2441	11	89
2492	21	79
2534	26	74
2780	32	68
2789	21	79
2813	18	82
2834	22	78
2855	23	77
2927	29	71

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Histogram of vitrinite reflectance measurements

GEOLAB NOR
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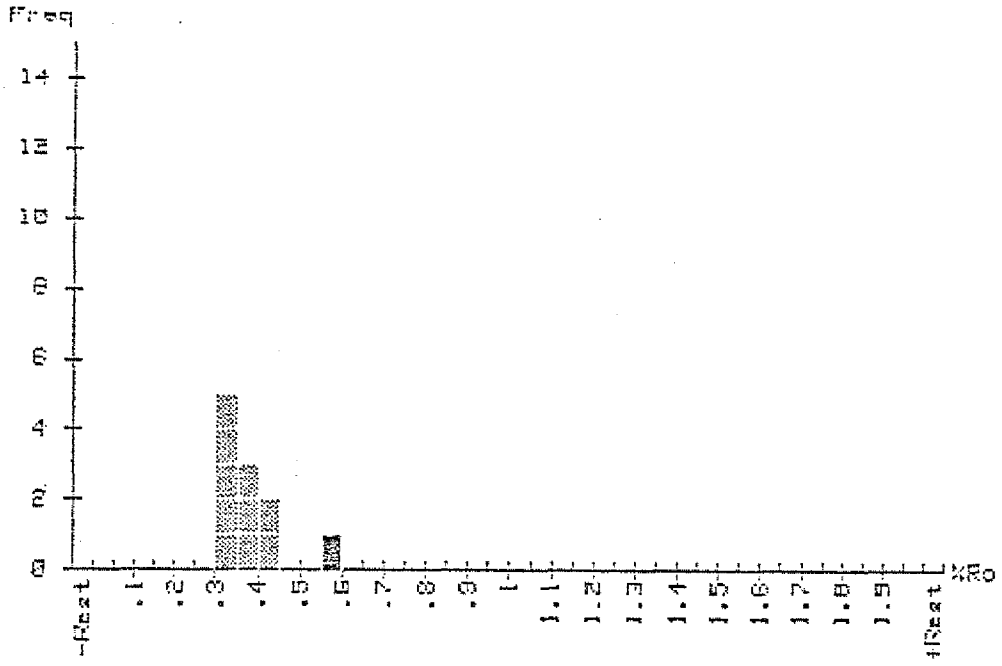
Sample No.: 1101 1 1D1
Well Name: 30/6-4
Depth: 12050M
Analyst: IJ MC
Date: 17 11 85



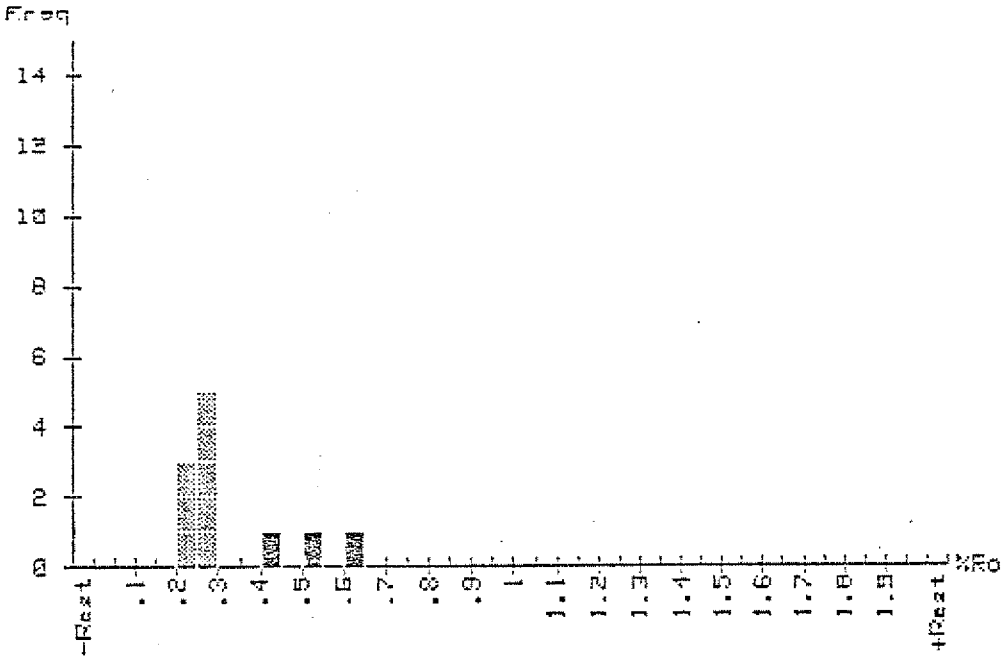
* Pop. 1 From .30 to .45 Mean= .36 St.D= .04 Total= 10
Pop. 2 From .55 to .60 Total= 0

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.310	.310	.337	.338	.339	.356	.360	.365	.413	.425
10	.572									

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: 1102 1 1D1
Well Name: 30/6-4
Depth: 2214M
Analyst: IJ MC
Date: 17 11 86



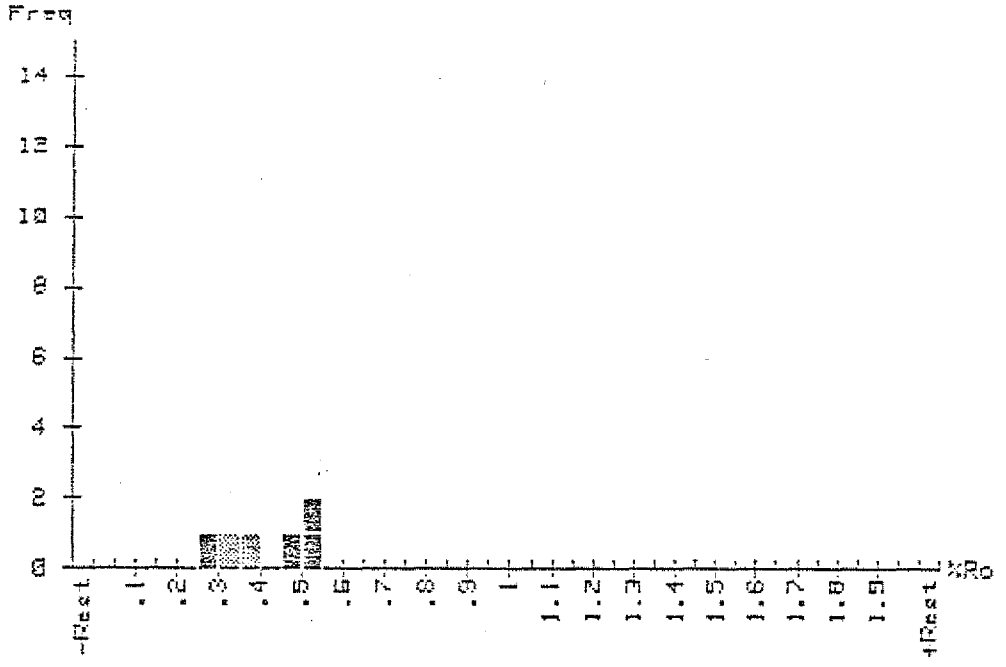
* Pop. 1	From	.20 to	.30	Mean=	.25	St.D=	.02	Total=	8
Pop. 2	From	.40 to	.65	Mean=	.53	St.D=	.08	Total=	3

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.226	.237	.248	.257	.259	.266	.269	.274	.449	.525
10	.607									

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: 1103 1 1D:
Well Name: 30/6-4
Depth: 3222M
Analyst: IJ MC
Date: 17 11 88



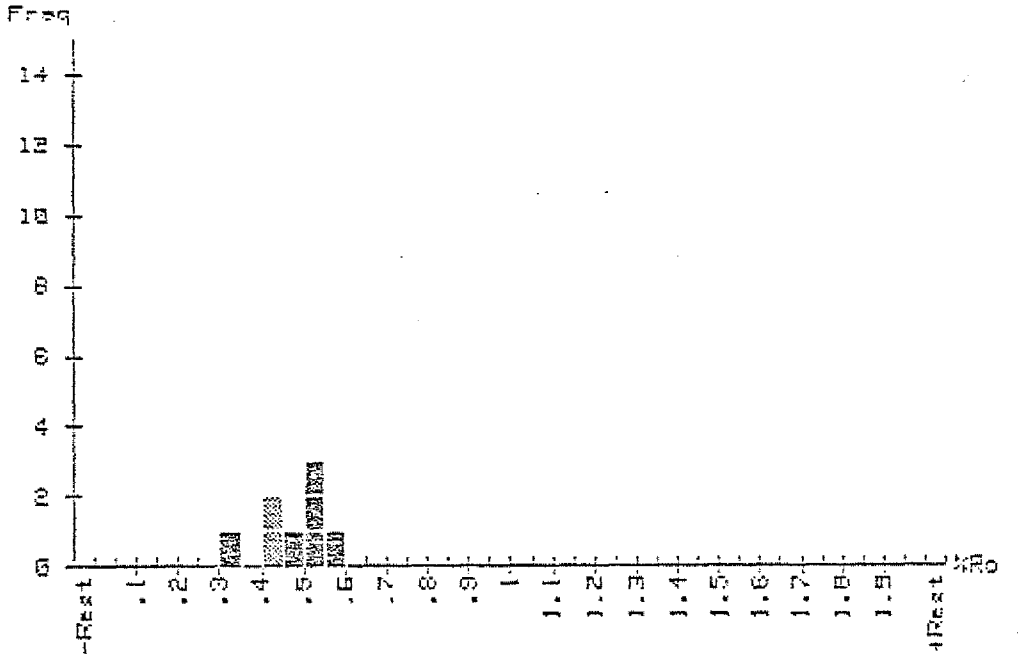
Pop.	1	From	.25 to	.30					Total=	1
* Pop.	2	From	.30 to	.40	Mean=	.35	St.D=	.04	Total=	2
Pop.	3	From	.45 to	.55	Mean=	.48	St.D=	.03	Total=	3

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.252	.321	.381	.457	.508	.515				

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: !104 ! (D)
Well Name: !30/6-4
Depth: !2254M
Analyst: !J MC
Date: !17 11 86



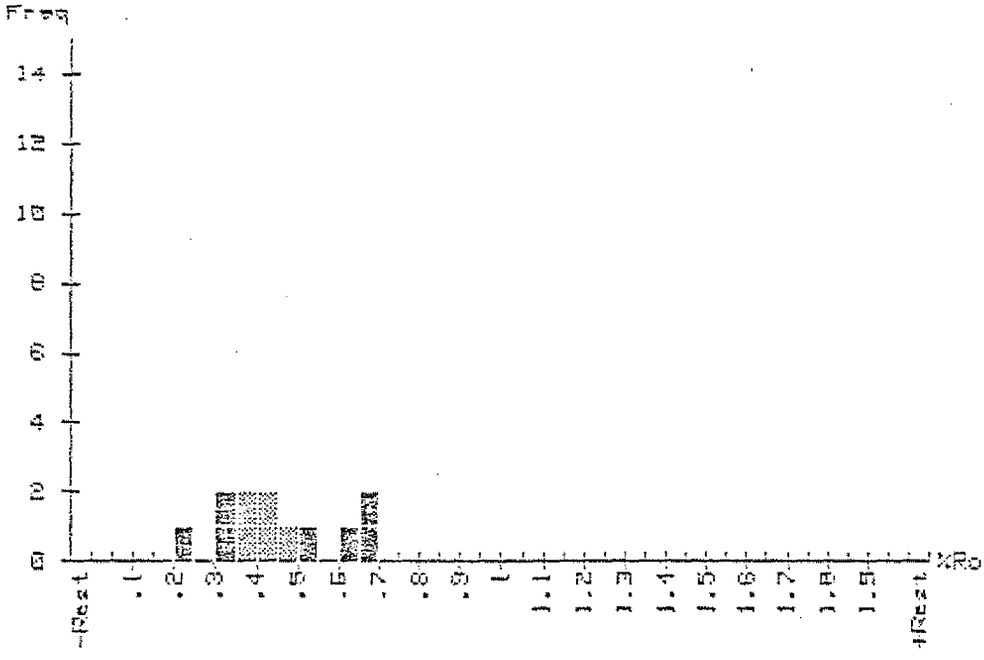
Pop. 1	From	.30	to	.35				Total=	1
* Pop. 2	From	.40	to	.45	Mean=	.43	St.D=	0.00	Total= 2
Pop. 3	From	.45	to	.60	Mean=	.53	St.D=	.04	Total= 5

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.312	.430	.435	.467	.527	.529	.543	.577		

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample no.: [illegible]
Well Name: 30/6-4
Depth: 2548M
Analysis: VR MC
Date: 17 11 95



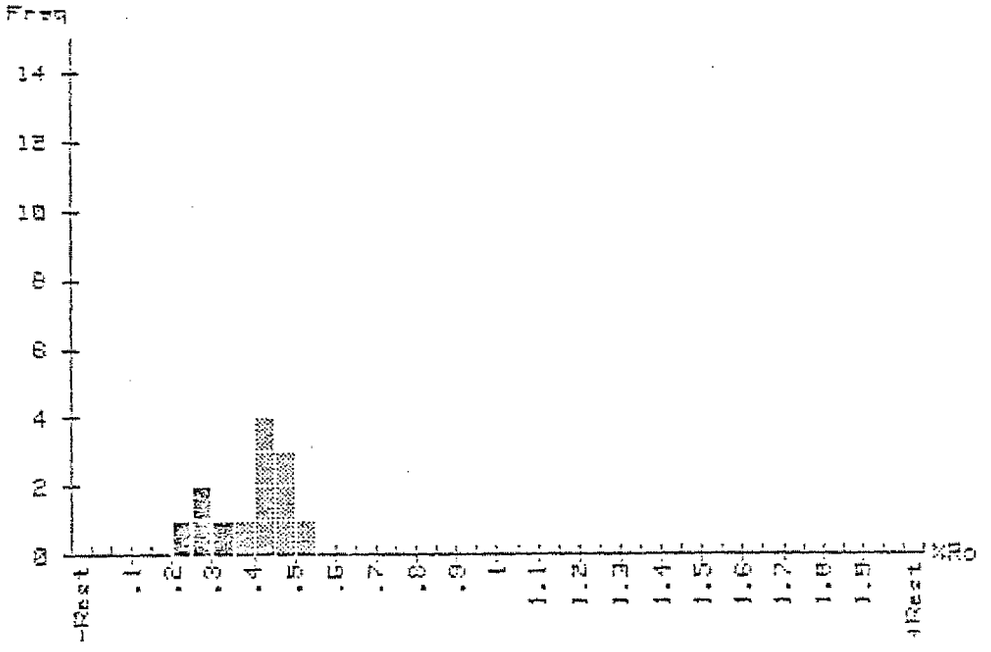
Pop. 1	From	.20 to	.35	Mean=	.28	St.D=	.05	Total=	3
* Pop. 2	From	.35 to	.50	Mean=	.41	St.D=	.05	Total=	5
Pop. 3	From	.50 to	.70	Mean=	.62	St.D=	.08	Total=	4

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.224	.301	.313	.356	.380	.420	.429	.486	.533	.611
10	.659	.678								

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: [illegible]
Well Name: [illegible]
Depth: [illegible]
Analyst: [illegible]
Date: [illegible]



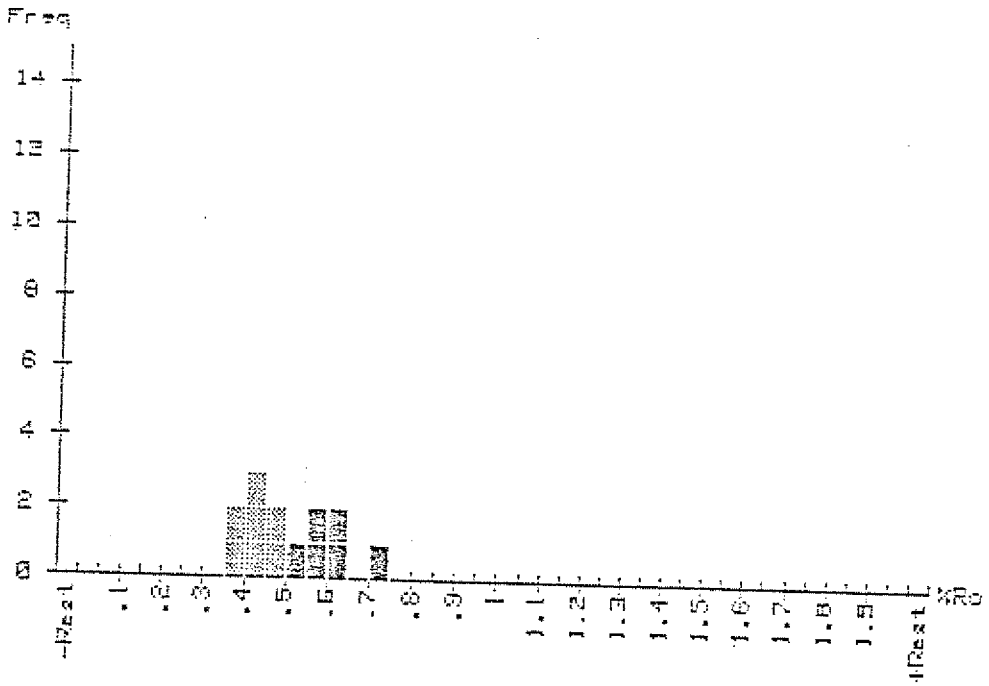
Pop. 1	From .20 to .35	Mean= .28	St.D= .04	Total= 4
* Pop. 2	From .35 to .55	Mean= .45	St.D= .05	Total= 9

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.244	.254	.280	.337	.368	.422	.425	.437	.438	.451
10	.470	.470	.548							

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: 1107 / ID:
Well Name: 30/6-4
Depth: 12402M
Analyst: MJ MC
Date: 17 11 98



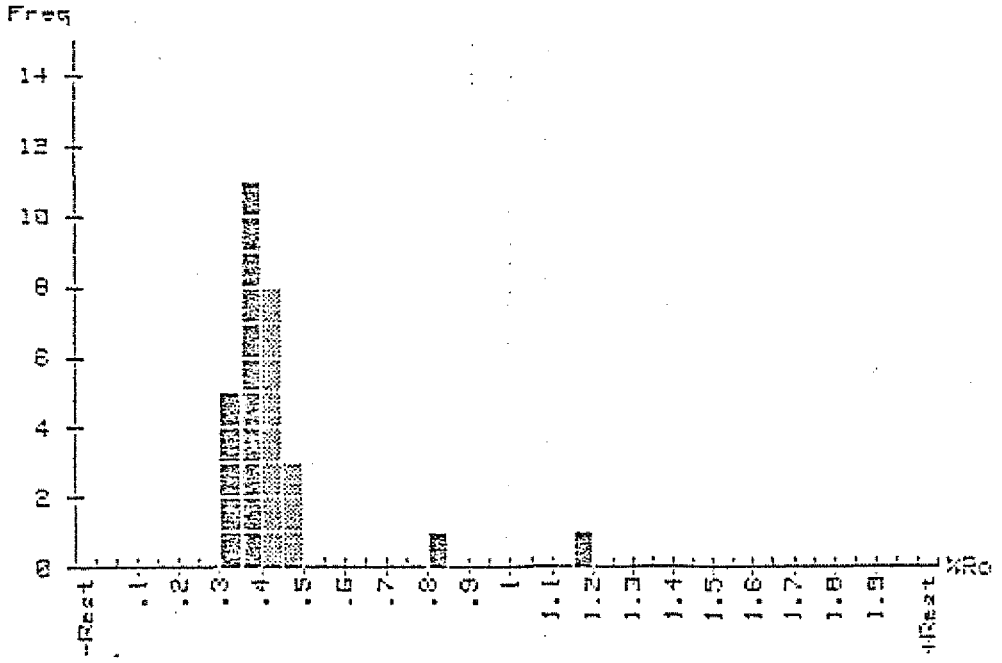
* Pop. 1	From	.35	to	.50	Mean=	.42	St.D=	.04	Total=	7
Pop. 2	From	.50	to	.75	Mean=	.60	St.D=	.07	Total=	6

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.379	.384	.401	.407	.414	.457	.471	.504	.555	.565
10	.607	.646	.702							

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Sample No.: 1105 1 1D1
Well Name: 130/6-4
Depth: 1247.1M
Analyst: IJ MC
Date: 17 11 85



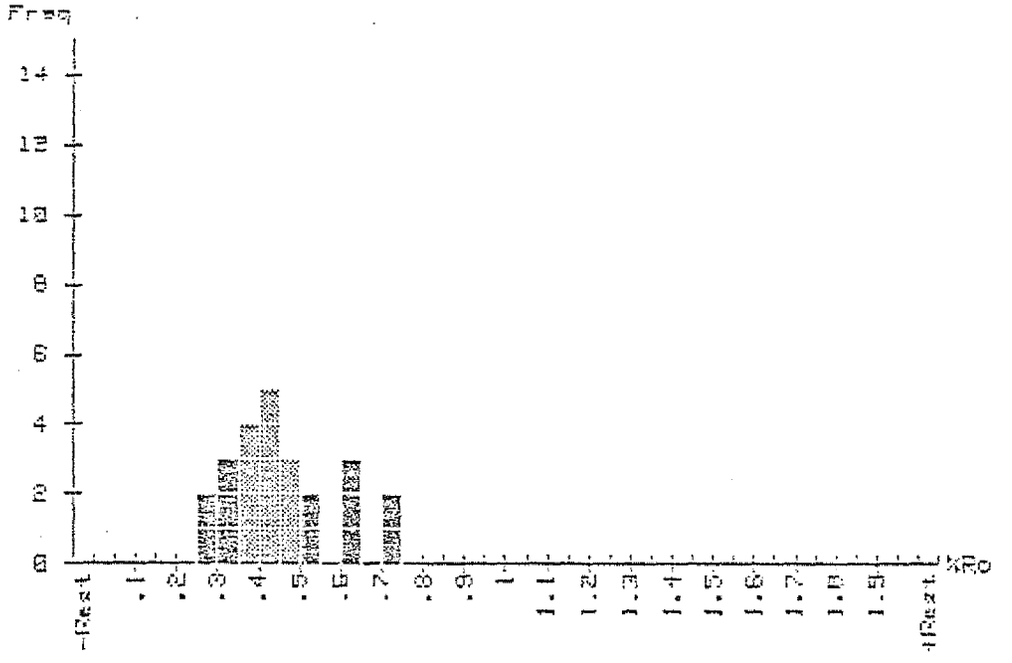
Pop.	1	From	.30	to	.40	Mean=	.36	St.D=	.02	Total= 16
* Pop.	2	From	.40	to	.50	Mean=	.44	St.D=	.03	Total= 11
Pop.	3	From	.80	to	1.20	Mean=	.99	St.D=	.25	Total= 2

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.309	.323	.340	.340	.343	.352	.354	.355	.356	.361
10	.364	.365	.367	.387	.395	.398	.403	.407	.413	.424
20	.425	.426	.439	.447	.455	.457	.494	.815	1.174	

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: [illegible]
Well Name: [illegible]
Depth: [illegible]
Analyst: [illegible]
Date: [illegible]



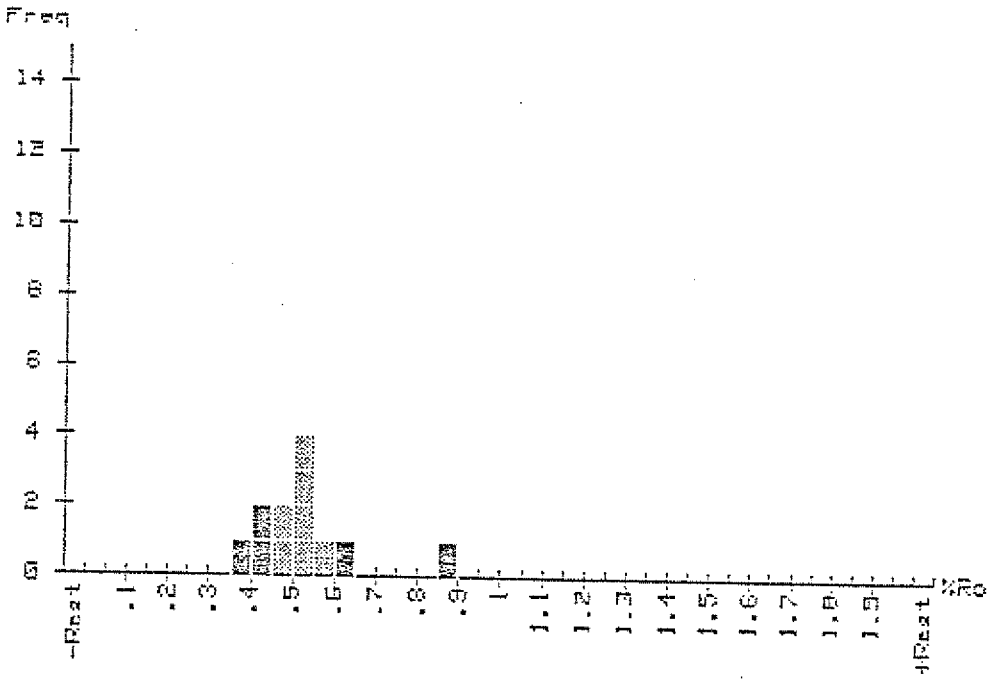
Pop.	1	From	.25	to	.35	Mean=	.31	St.D=	.02	Total= 5
* Pop.	2	From	.35	to	.50	Mean=	.42	St.D=	.04	Total= 12
Pop.	3	From	.50	to	.75	Mean=	.62	St.D=	.08	Total= 7

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.288	.299	.305	.311	.335	.367	.369	.381	.389	.403
10	.415	.431	.440	.442	.454	.454	.481	.511	.525	.614
20	.618	.629	.722	.727						

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: 1110 : 101
Well Name: 30/6-4
Depth: 12498M
Analyst: IJ MC
Date: 17 11 88



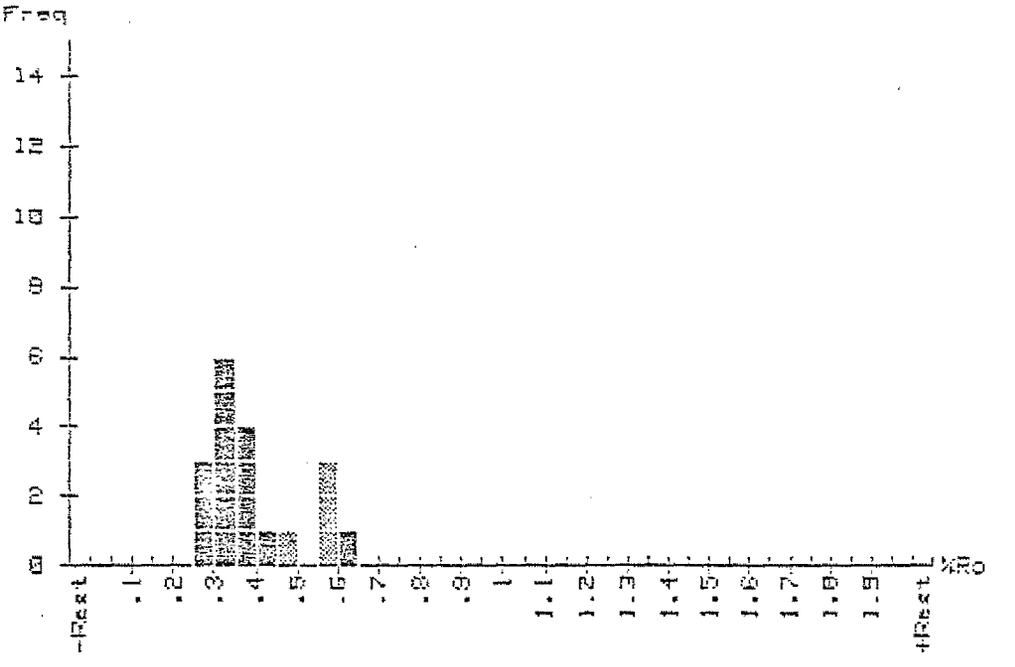
Pop.	1	From	.25 to	.45	Mean=	.40	St.D=	.03	Total=	3
* Pop.	2	From	.45 to	.60	Mean=	.53	St.D=	.04	Total=	7
Pop.	3	From	.60 to	.90	Mean=	.74	St.D=	.18	Total=	2

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.365	.410	.419	.471	.471	.523	.537	.542	.544	.598
10	.513	.863								

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: [11] [0]
Well Name: [30/5-4
Depth: [2523M
Analyst: [J MC
Date: [17 11 88



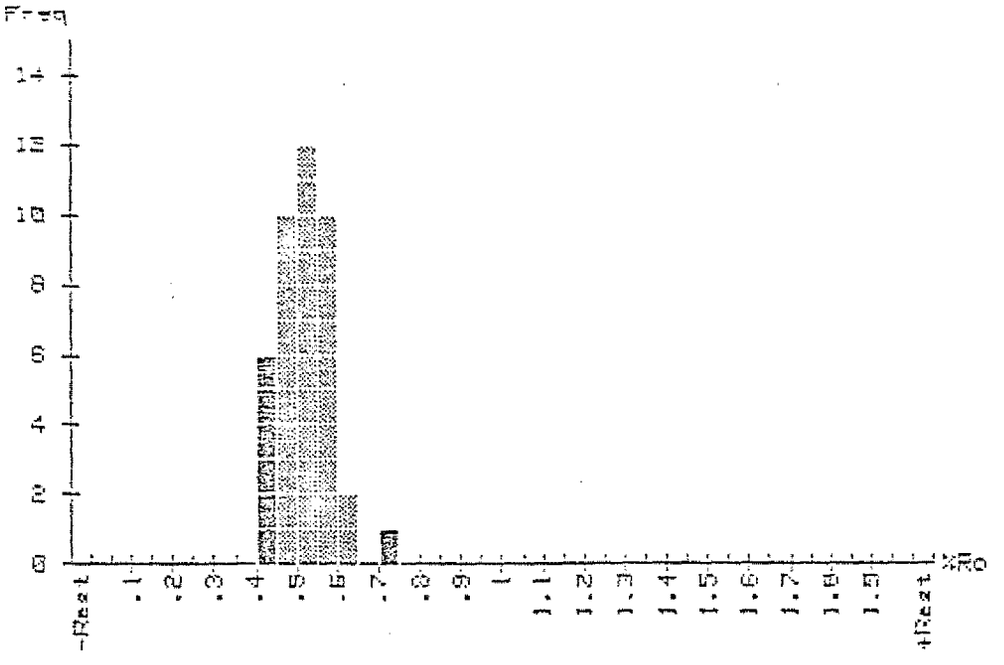
Pop. 1	From .25 to .45	Mean= .33	St.D= .04	Total= 14
* Pop. 2	From .45 to .60	Mean= .53	St.D= .05	Total= 4
Pop. 3	From .60 to .85			Total= 0

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.272	.285	.297	.300	.302	.310	.311	.313	.345	.350
10	.382	.391	.392	.410	.451	.550	.552	.560	.635	

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: 1112 / 1D:
Well Name: 30/6-4
Depth: 12365M
Analyst: IJ MC
Date: 17 11 86



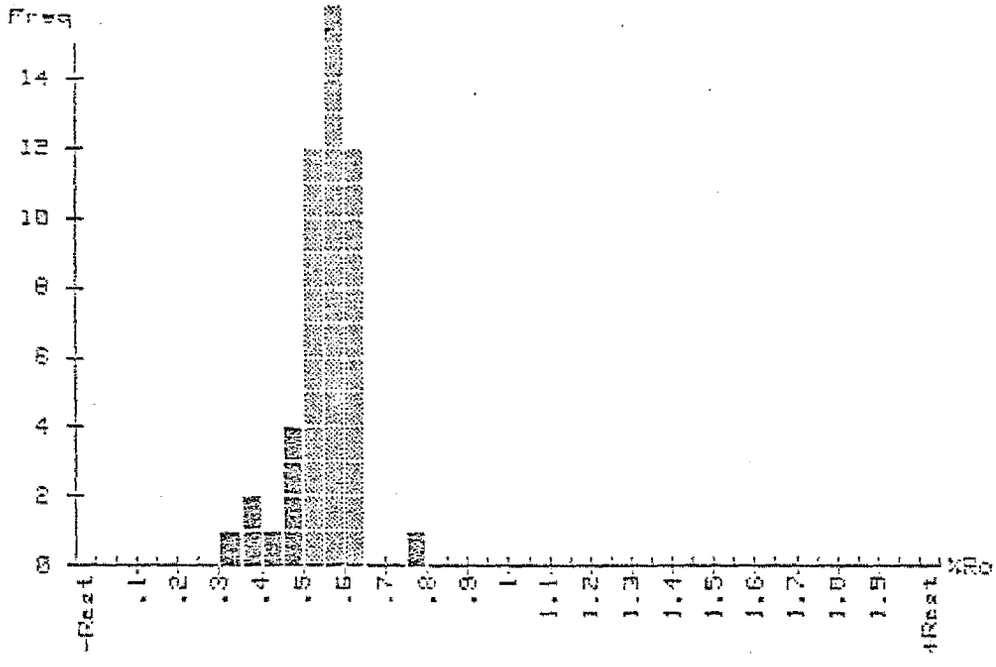
Pop. 1	From	.40	to	.45	Mean=	.43	St.D=	.01	Total= 6
* Pop. 2	From	.45	to	.55	Mean=	.53	St.D=	.04	Total= 34
Pop. 3	From	.70	to	.75					Total= 0

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.405	.421	.425	.429	.431	.440	.450	.452	.463	.471
10	.473	.483	.488	.488	.493	.497	.507	.511	.514	.521
20	.529	.531	.532	.534	.535	.539	.543	.543	.559	.561
30	.561	.565	.569	.571	.573	.584	.589	.600	.604	.610
40	.748									

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: 113 | 121
Well Name: 30/5-4
Depth: 3833M
Analyst: J MO
Date: 16 12 88



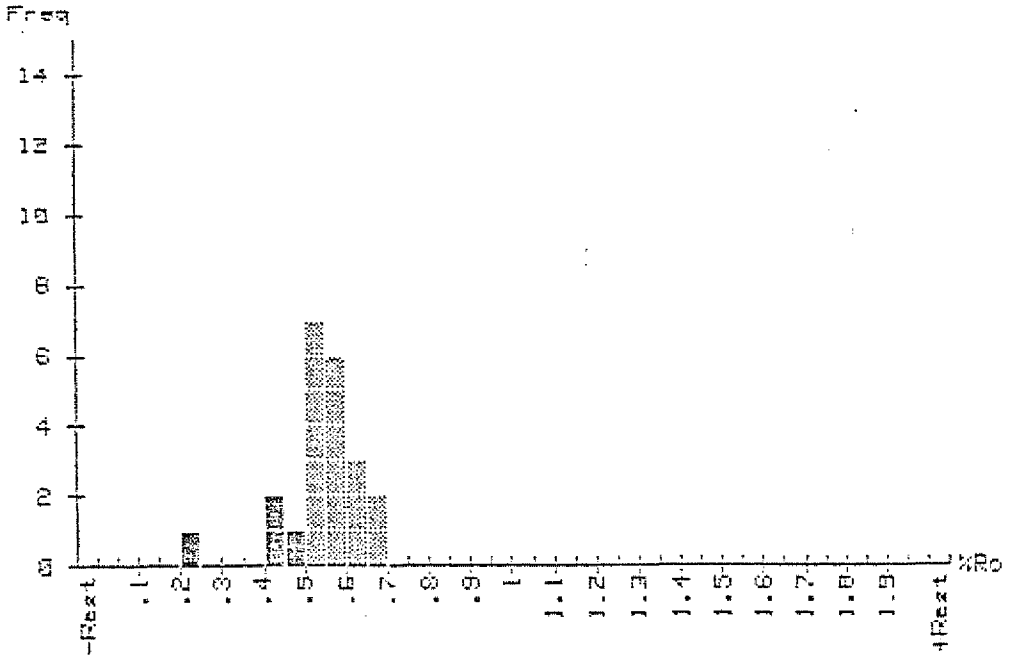
Pop. 1	From	.30	to	.50	Mean=	.42	St.D=	.05	Total= 8
* Pop. 2	From	.50	to	.65	Mean=	.58	St.D=	.03	Total= 43
Pop. 3	From	.75	to	.80					Total= 0

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.345	.355	.371	.428	.458	.458	.462	.483	.502	.515
10	.525	.531	.536	.538	.538	.541	.546	.545	.548	.550
20	.557	.562	.568	.568	.572	.572	.572	.574	.575	.577
30	.582	.582	.582	.583	.586	.587	.590	.590	.599	.603
40	.604	.606	.616	.618	.621	.621	.626	.627	.628	.632
50	.644	.760								

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: 1115 ! 1D1
Well Name: 30/6-4
Depth: 12735M
Analyst: JJ MO
Date: 17 11 85



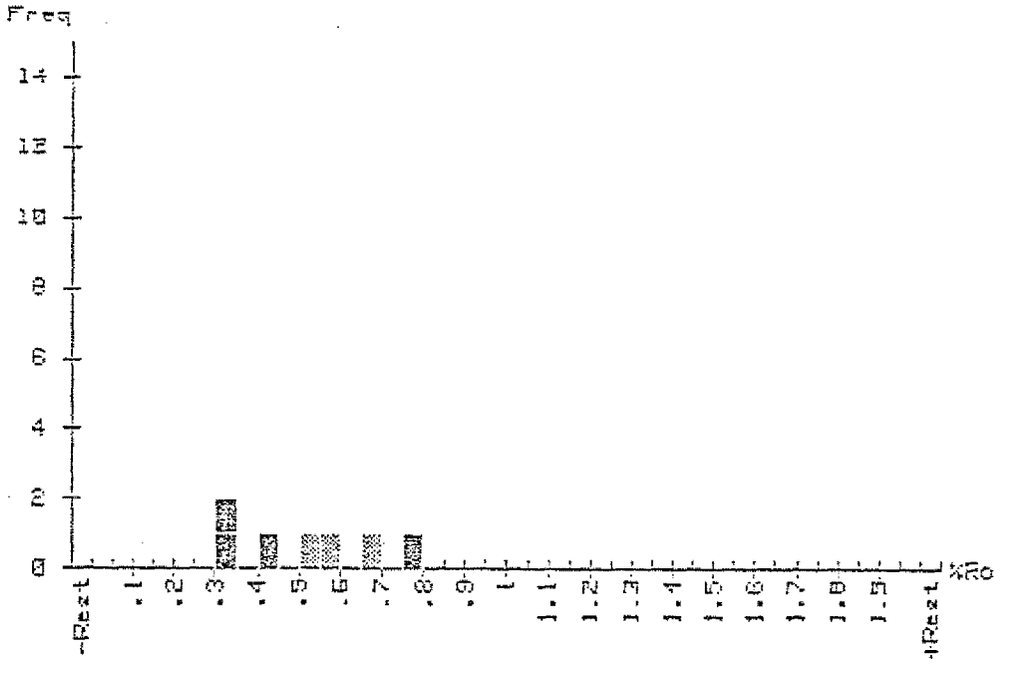
Pop. 1	From	.18 to	.50	Mean=	.40	St.D=	.12	Total=	4
* Pop. 2	From	.50 to	.70	Mean=	.57	St.D=	.05	Total=	18

The indigenous Population is marked '*'.

	! 1	2	3	4	5	6	7	8	9	10
0	! .228	.409	.447	.498	.501	.507	.511	.513	.529	.538
10	! .543	.552	.566	.577	.577	.584	.594	.622	.623	.626
20	! .660	.676								

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Sample No.: [illegible]
Well Name: 30/6-3
Depth: 12720M
Analyst: JJ MO
Date: 17 11 88



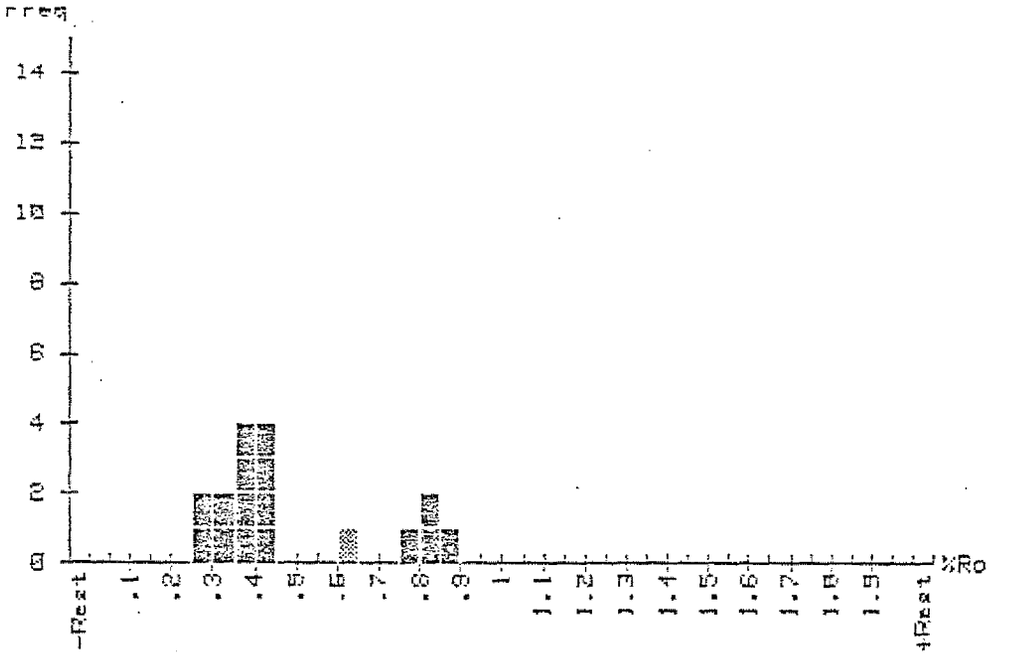
Pop.	1	From	.30	to	.45	Mean=	.37	St.D=	.06	Total=	3
* Pop.	2	From	.50	to	.70	Mean=	.58	St.D=	.07	Total=	3
Pop.	3	From	.75	to	.80					Total=	0

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.332	.337	.443	.531	.556	.654	.782			

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: [illegible]
Well Name: 30/6-4
Depth: 3774M
Analyst: LJ MC
Date: 17 11 88



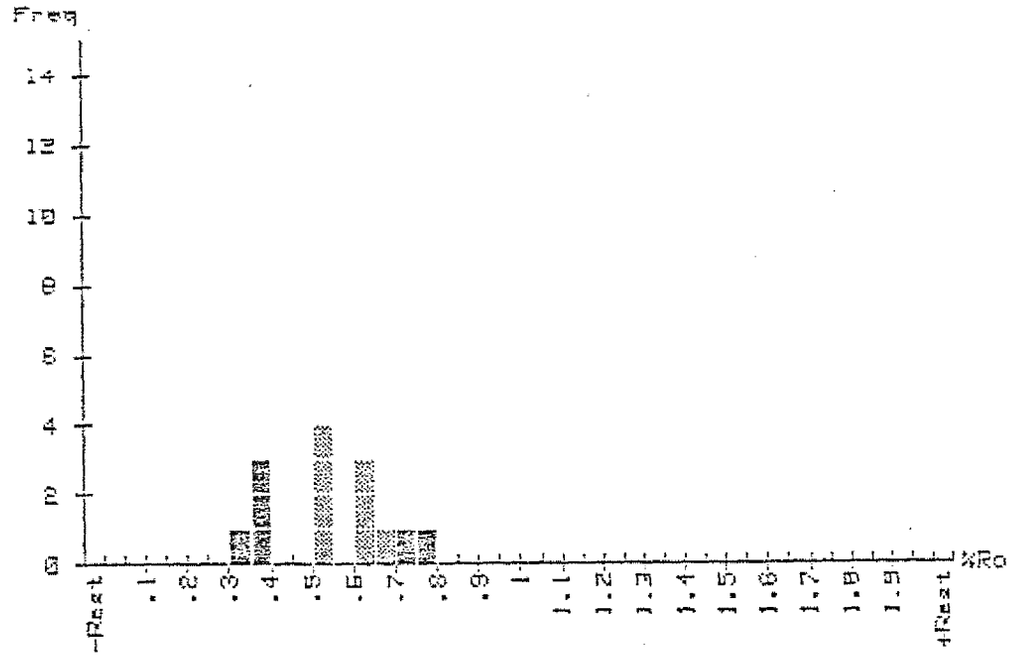
Pop.	1	From	.25	to	.45	Mean=	.36	St.D=	.05	Total= 12
* Pop.	2	From	.60	to	.65					Total= 1
Pop.	3	From	.75	to	.90	Mean=	.83	St.D=	.03	Total= 4

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.251	.298	.325	.348	.352	.358	.360	.381	.401	.403
10	.414	.417	.516	.778	.829	.831	.853			

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: [illegible]
Well Name: 6305/5-4
Depth: 12828M
Analyst: KJ MD
Date: 17 11 85



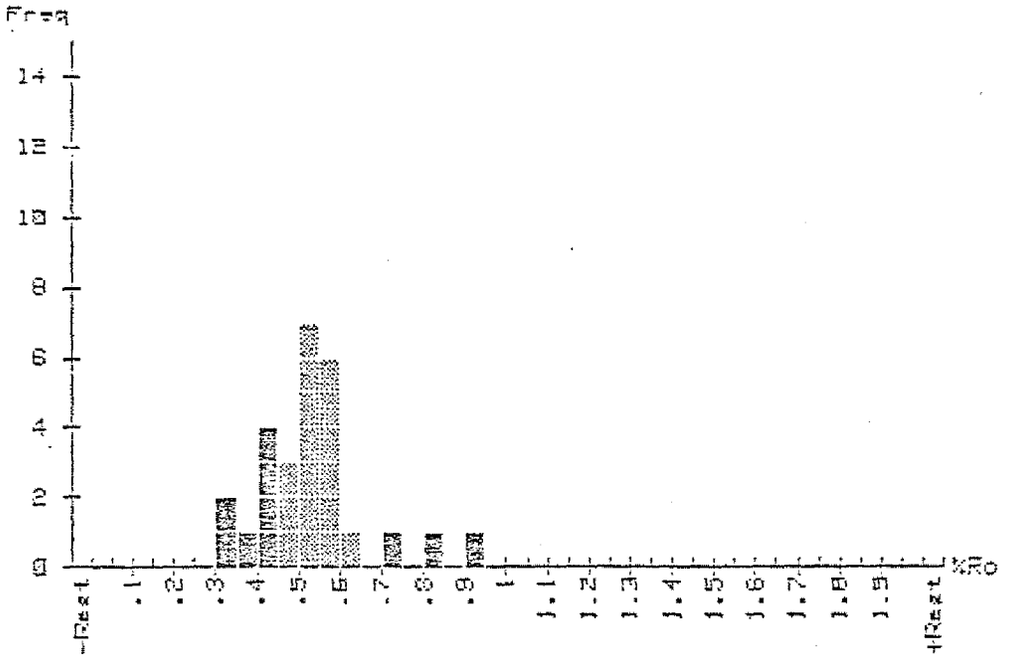
Pop.	1	From	.30 to	.40	Mean=	.35	St.D=	.02	Total=	4
* Pop.	2	From	.50 to	.70	Mean=	.58	St.D=	.05	Total=	8
Pop.	3	From	.70 to	.80	Mean=	.75	St.D=	.01	Total=	2

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.323	.352	.357	.369	.532	.538	.540	.547	.602	.614
10	.633	.661	.749	.761						

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Sample No.: [illegible]
Well Name: 30/6-4
Depth: 12564m
Analyst: IJ MC
Date: 17 11 95



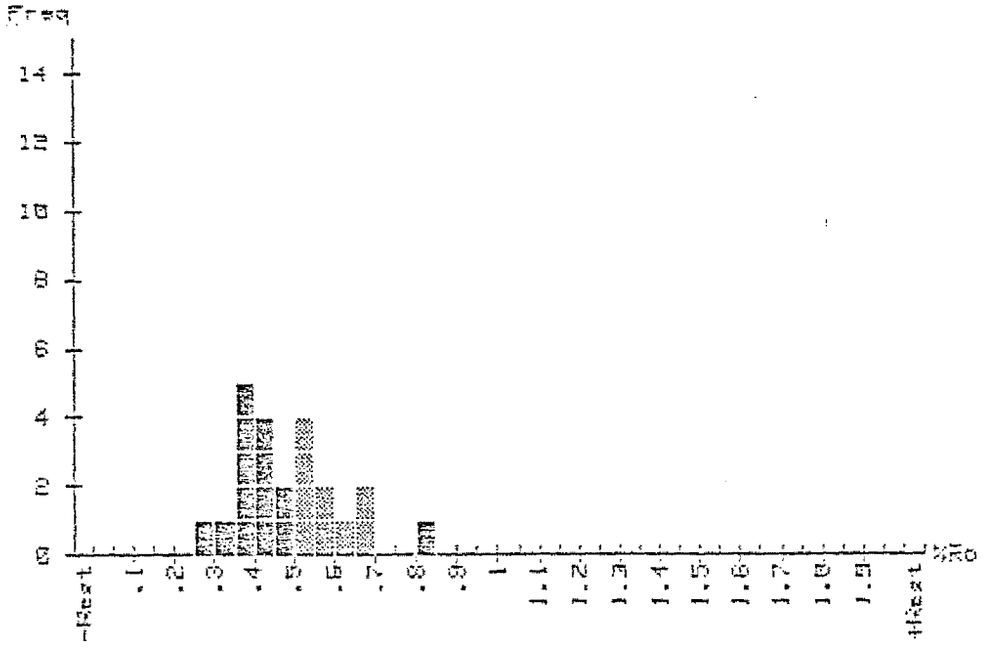
Pop.	1	From	.30	to	.45	Mean=	.38	St.D=	.05	Total= 7
* Pop.	2	From	.45	to	.65	Mean=	.54	St.D=	.05	Total= 17
Pop.	3	From	.65	to	.95	Mean=	.83	St.D=	.10	Total= 3

The indigenous Population is marked '*'.

	1	1	2	3	4	5	6	7	8	9	10
0		.310	.321	.385	.402	.403	.445	.445	.458	.471	.473
10		.501	.504	.512	.527	.538	.544	.547	.556	.560	.570
20		.576	.589	.594	.638	.736	.816	.534			

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Sample No.: 1115 | ID:
Well Name: 30/5-4
Depth: 12905M
Analyst: HJ MO
Date: 17 11 85



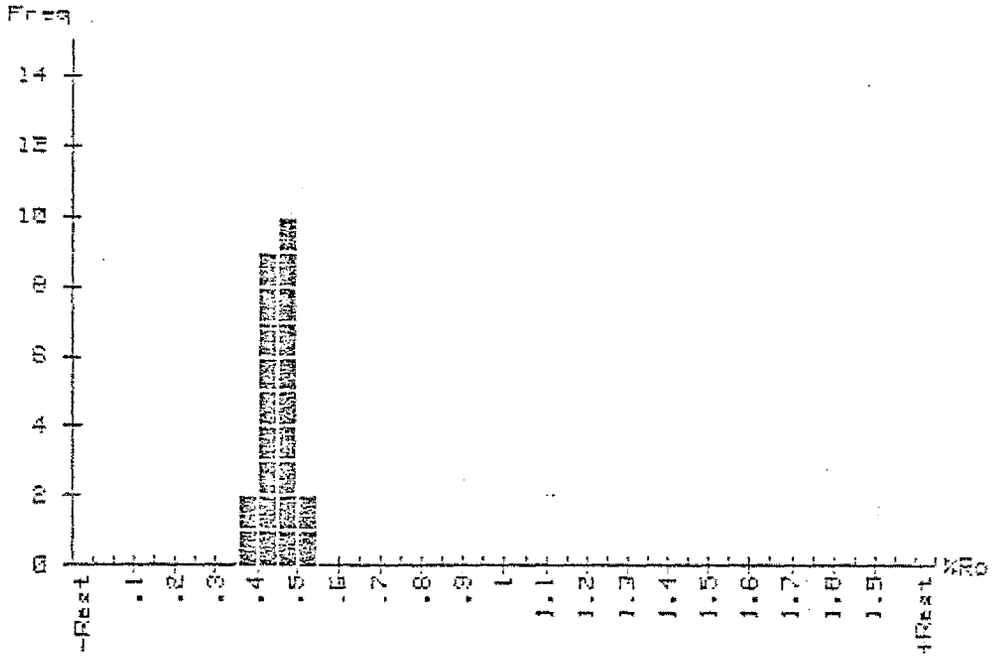
Pop. 1	From	.25 to	.50	Mean=	.39	St.D=	.05	Total=	13
* Pop. 2	From	.50 to	.70	Mean=	.58	St.D=	.06	Total=	8
Pop. 3	From	.80 to	.85					Total=	0

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.298	.346	.352	.358	.359	.360	.381	.402	.420	.443
10	.443	.456	.484	.510	.519	.523	.535	.554	.558	.614
20	.650	.689	.804							

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Sample No.: 1120 : 101
Well Name: 130/6-4
Depth: 12973M
Analyst: JJ MC
Date: 17 11 86



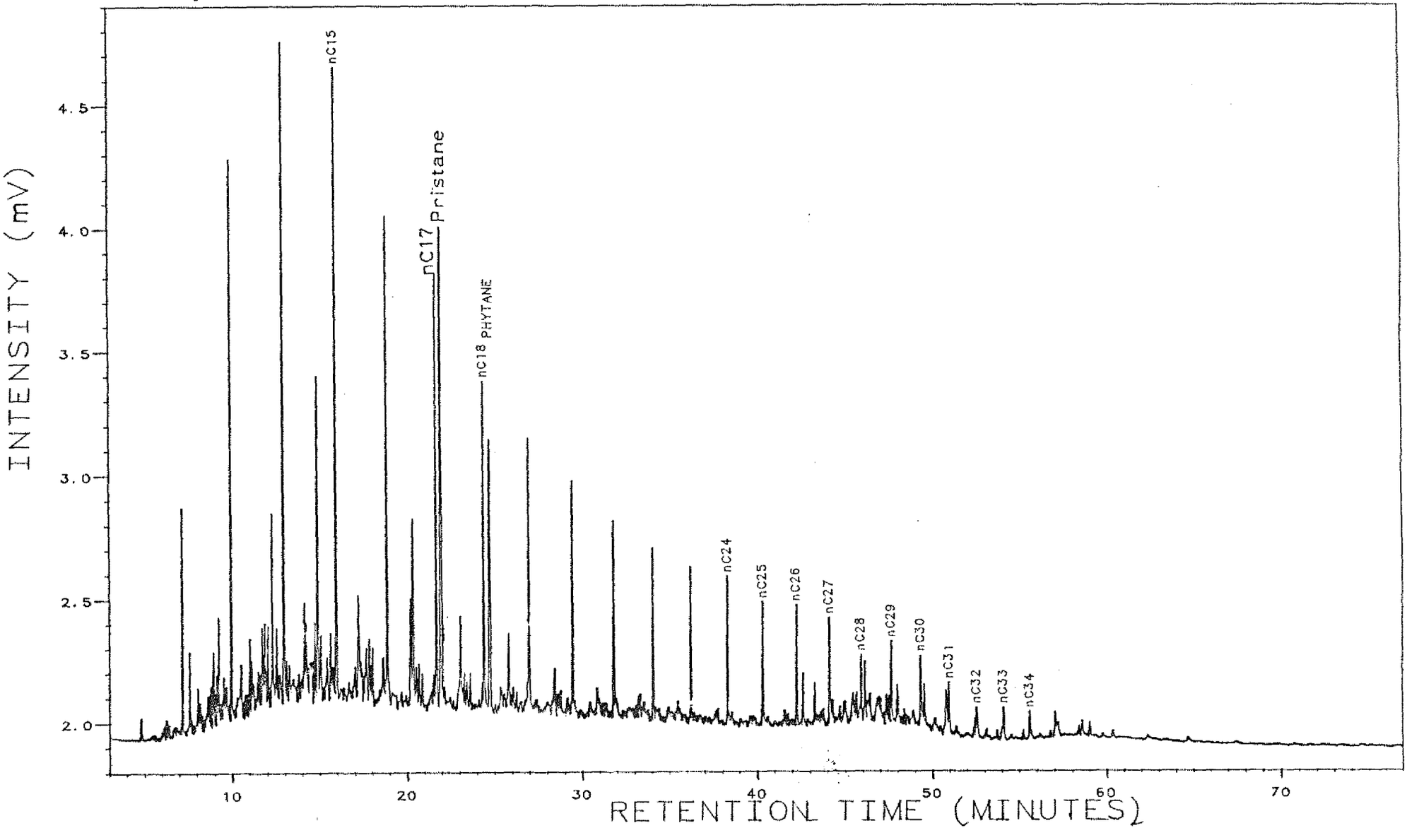
Pop. 1 From .35 to .55 Mean= .45 St.D= .04 Total= 23

The indigenous Population is marked '*'.

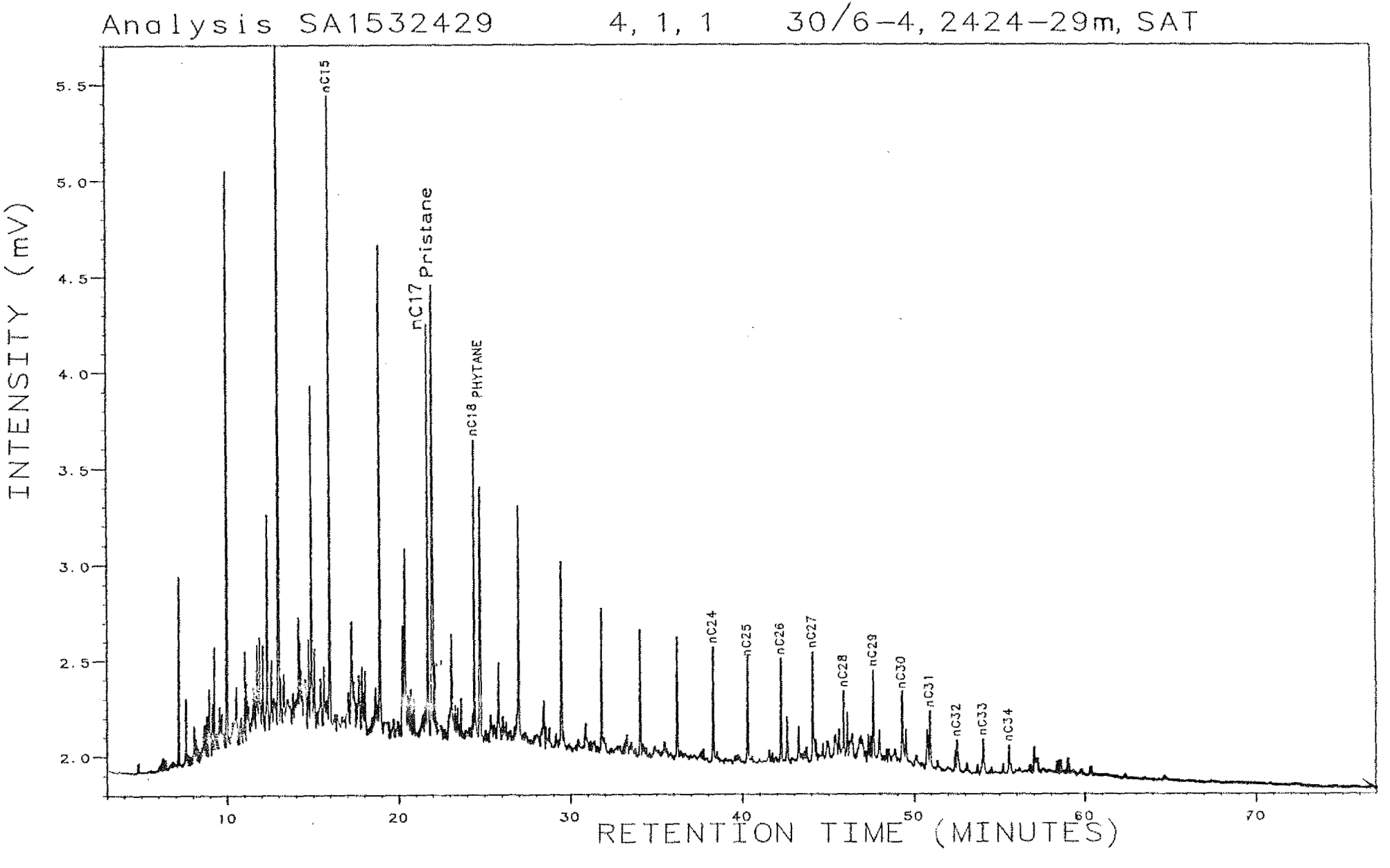
	1	2	3	4	5	6	7	8	9	10
0	.379	.395	.404	.405	.411	.415	.419	.424	.430	.435
10	.446	.450	.452	.452	.457	.471	.472	.480	.481	.490
20	.495	.504	.509							

Saturated fraction gas chromatograms

Analysis SA1532420 4, 1, 1 30/6-4, 2417-20m, SAT

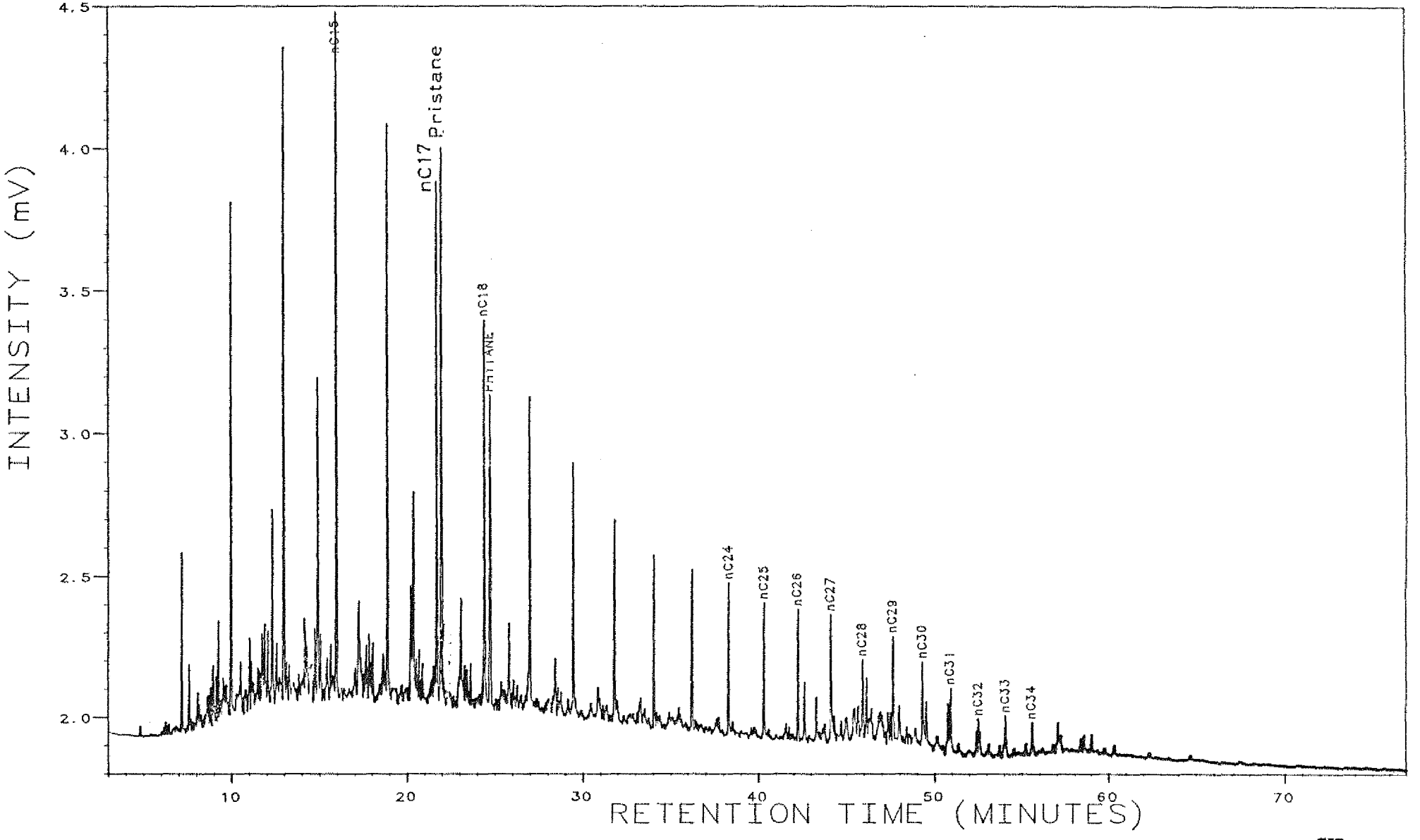


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S



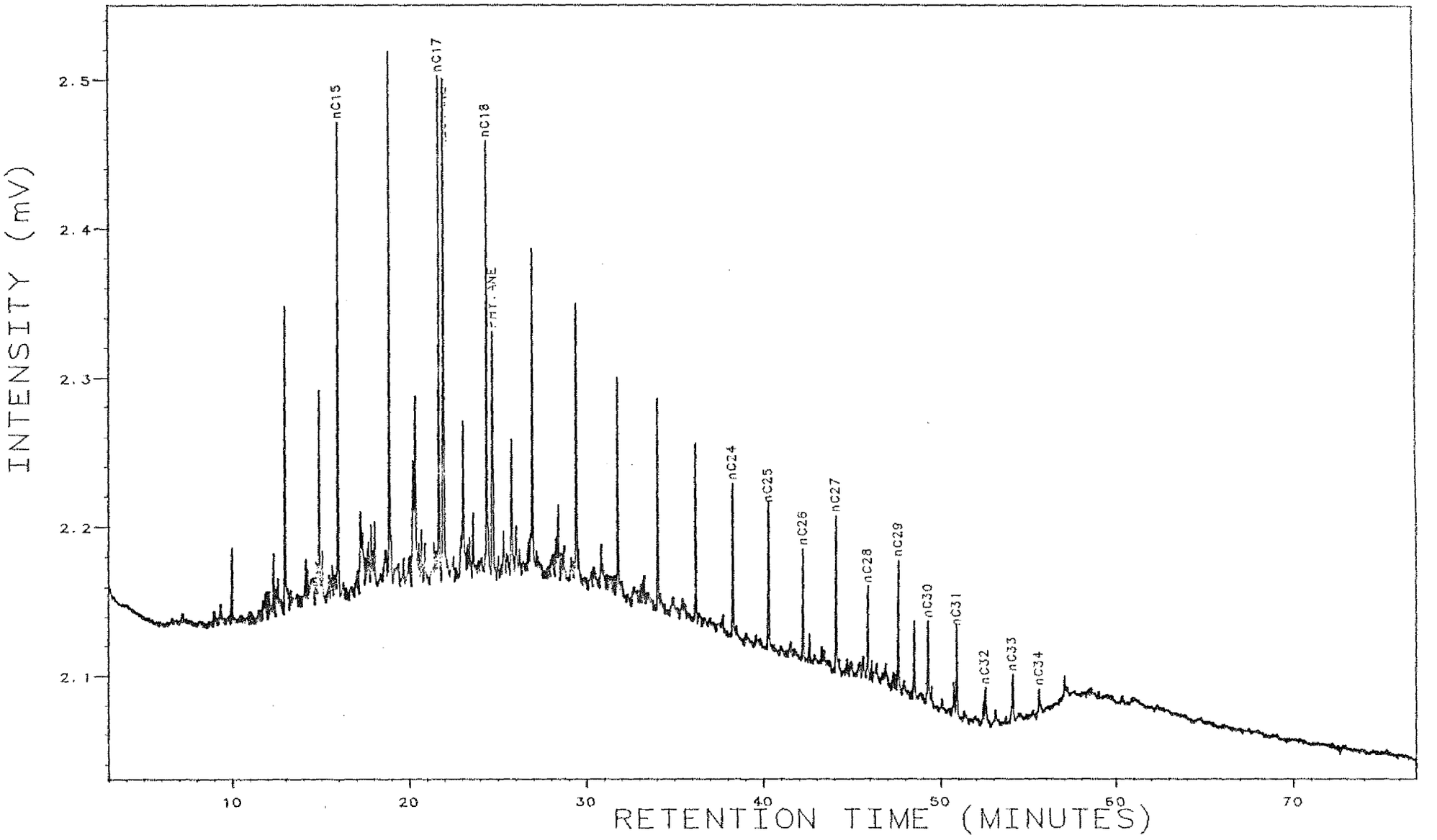
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Analysis SA1532441 4, 1, 1 30/6-4, 2432-41m, SAT

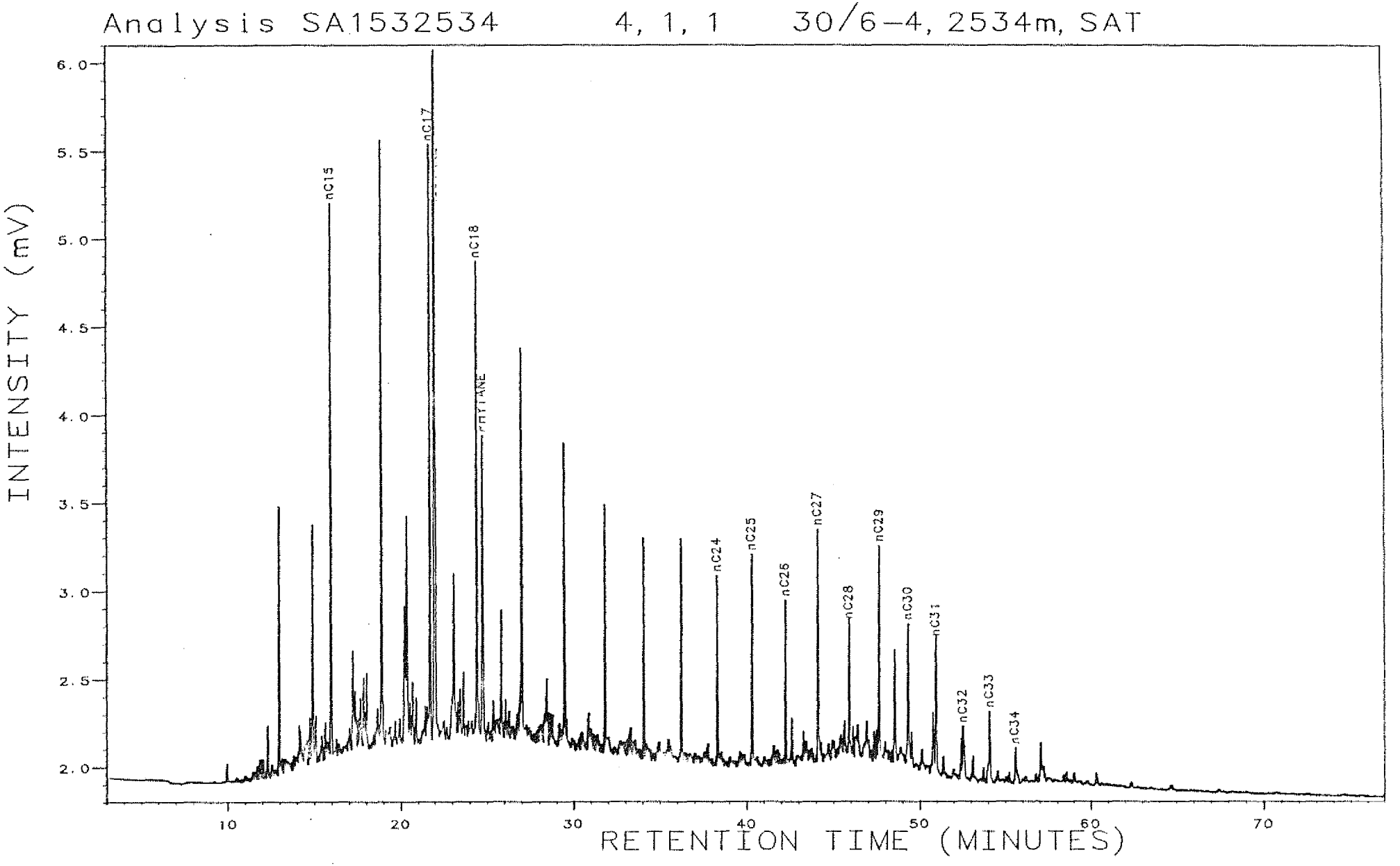


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

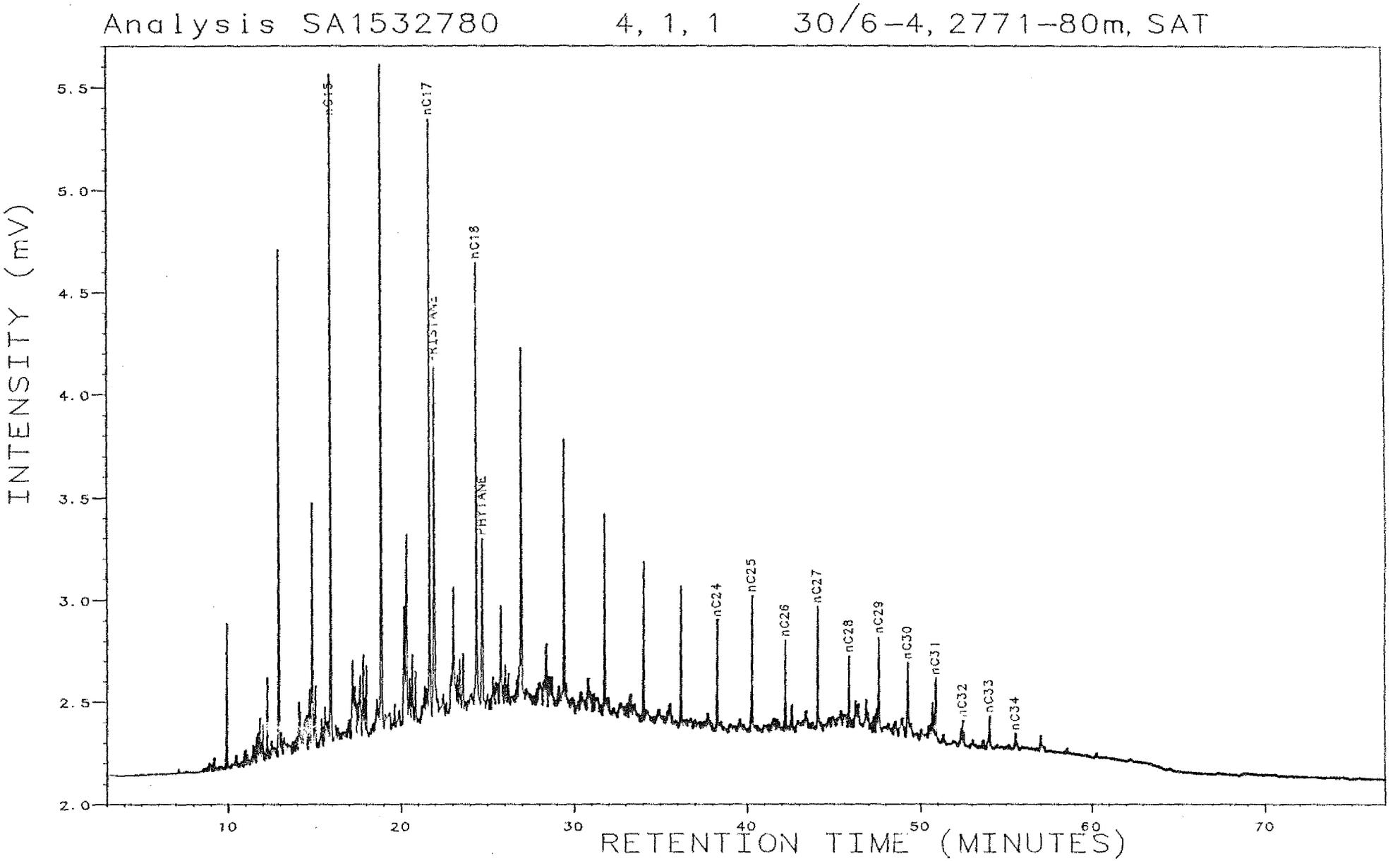
Analysis SA1532492 4, 1, 1 30/6-4, 2480-92m, SAT



GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

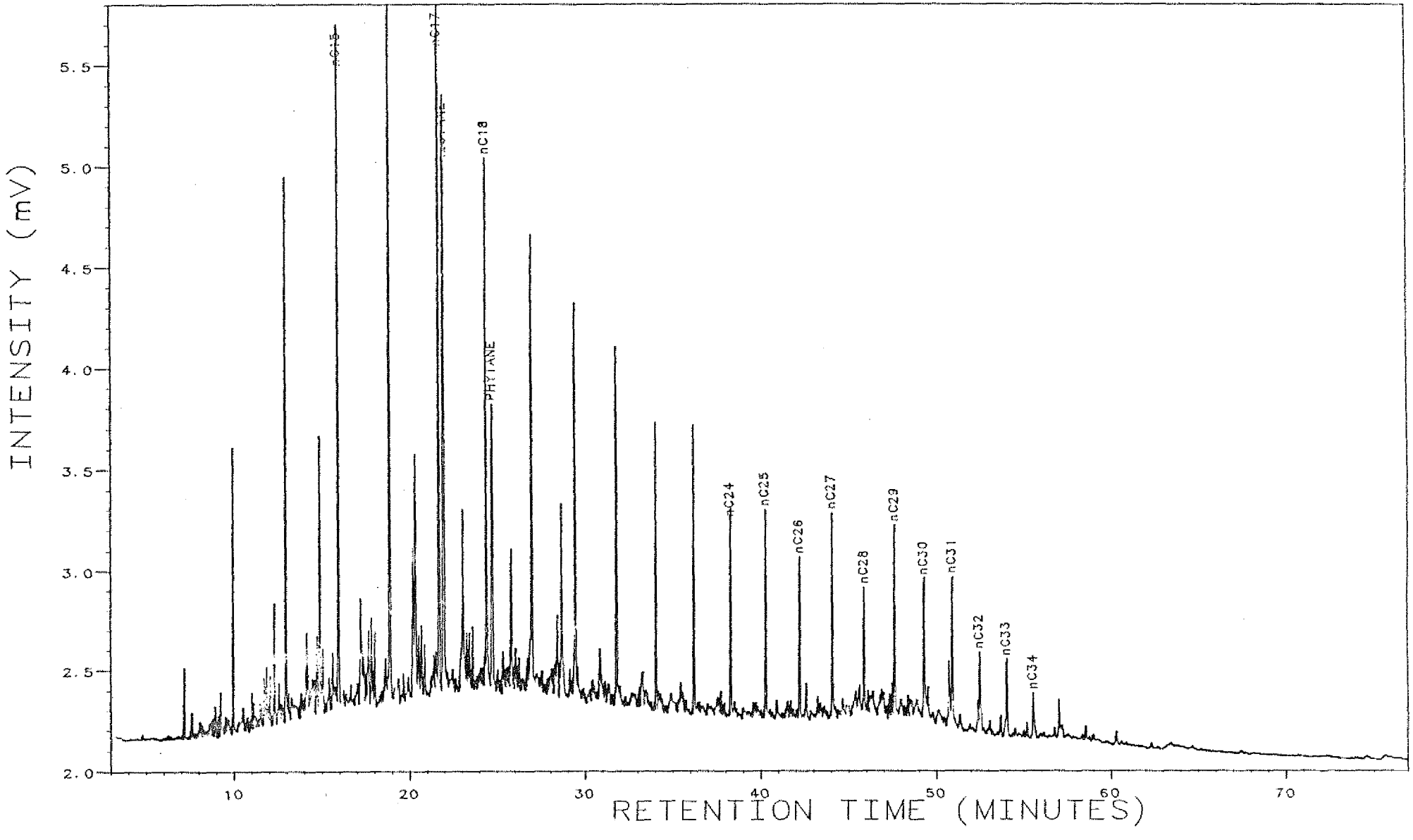


GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S



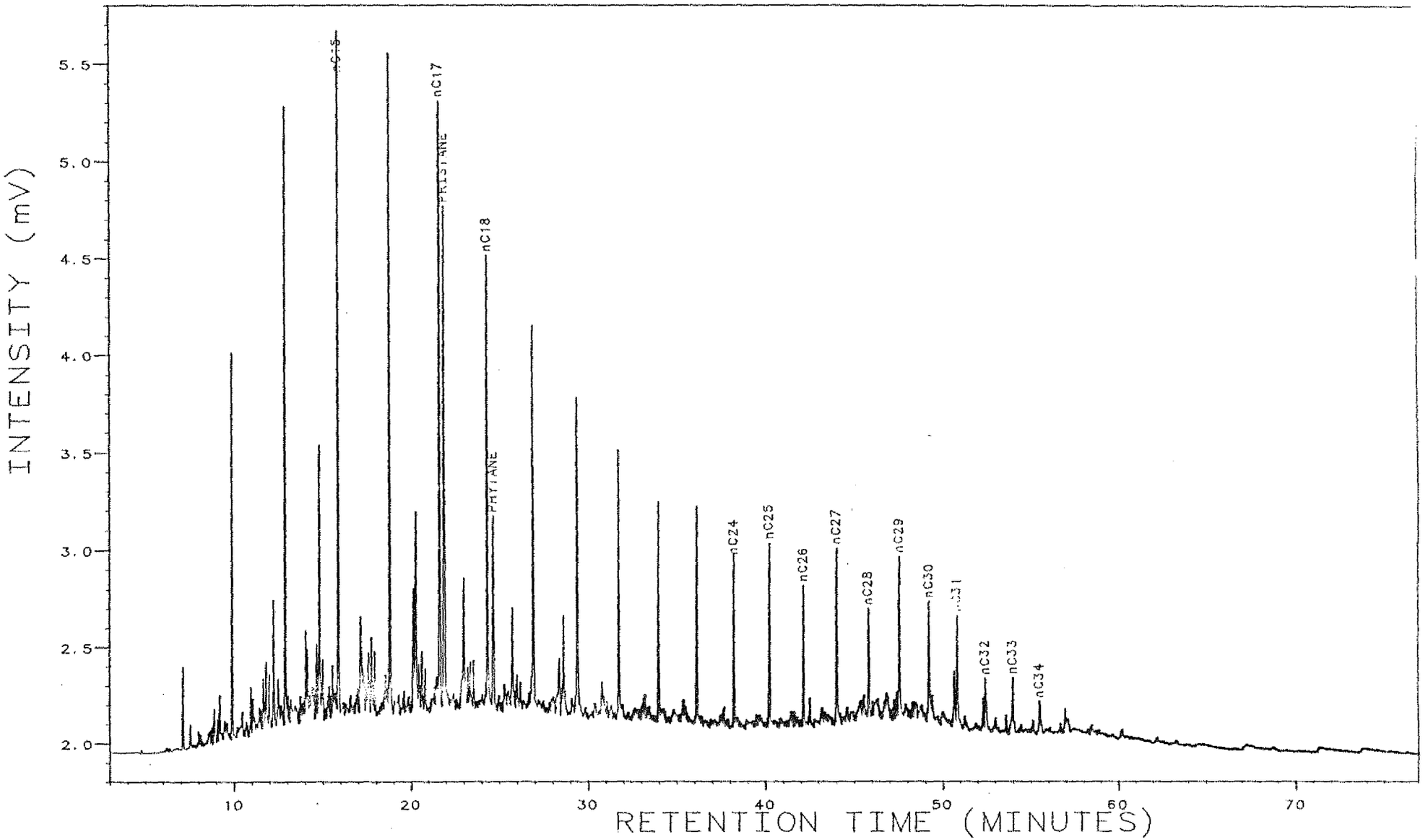
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Analysis SA1532789 4, 1, 1 30/6-4, 2783-89m, SAT



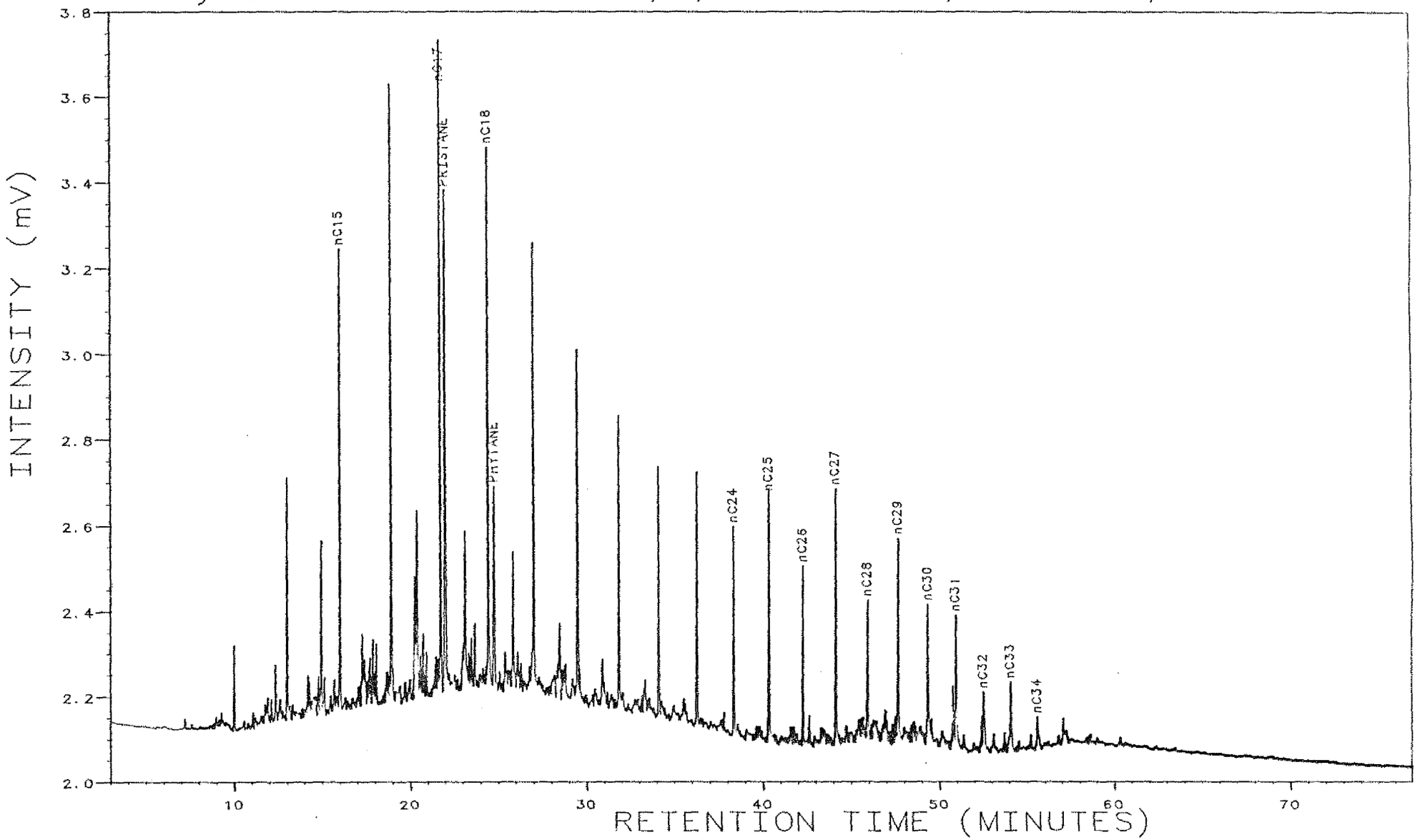
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Analysis SA1532813 4, 1, 1 30/6-4, 2792-2813m, SAT



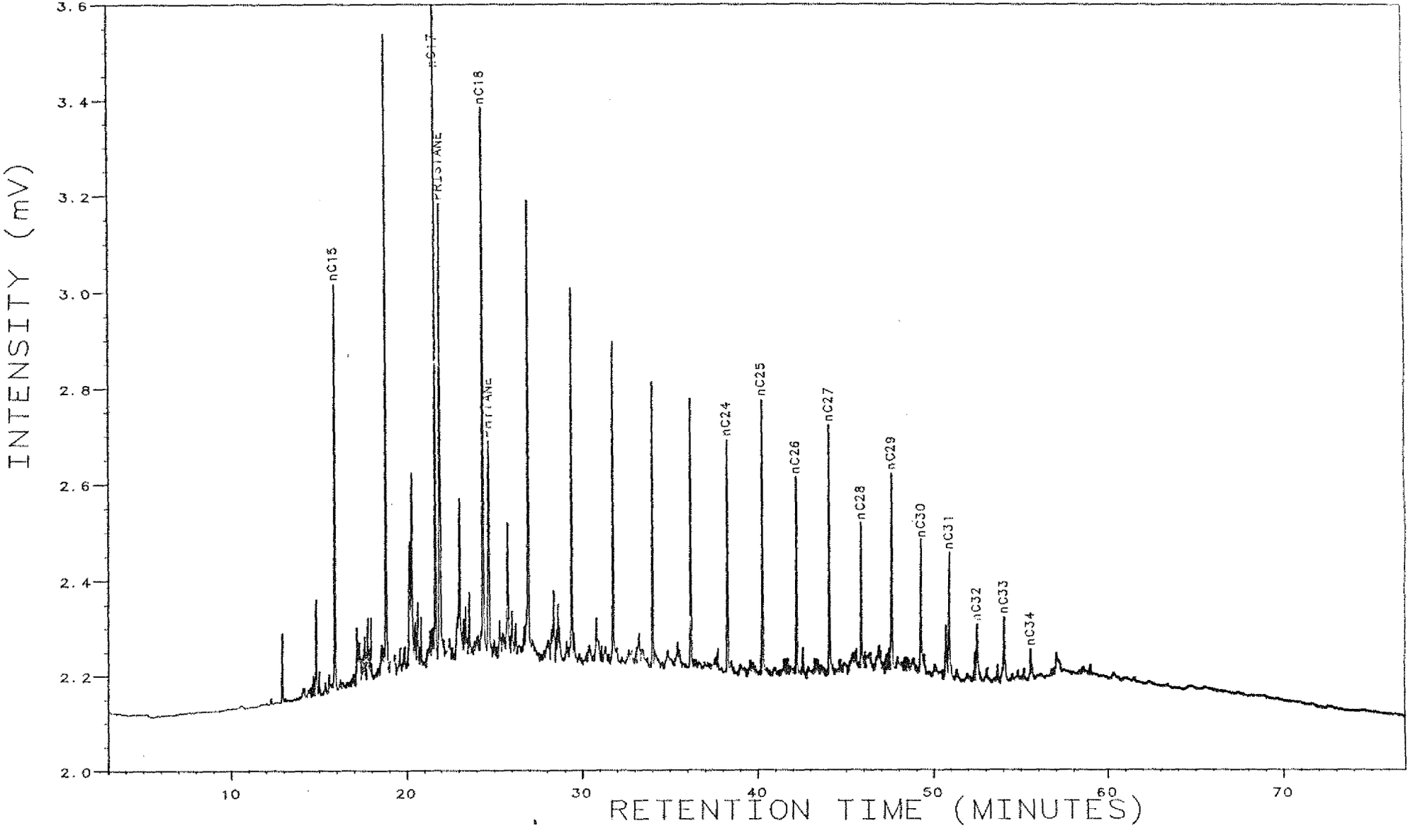
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S.

Analysis SA1532834 4, 1, 1 30/6-4, 2819-34m, SAT



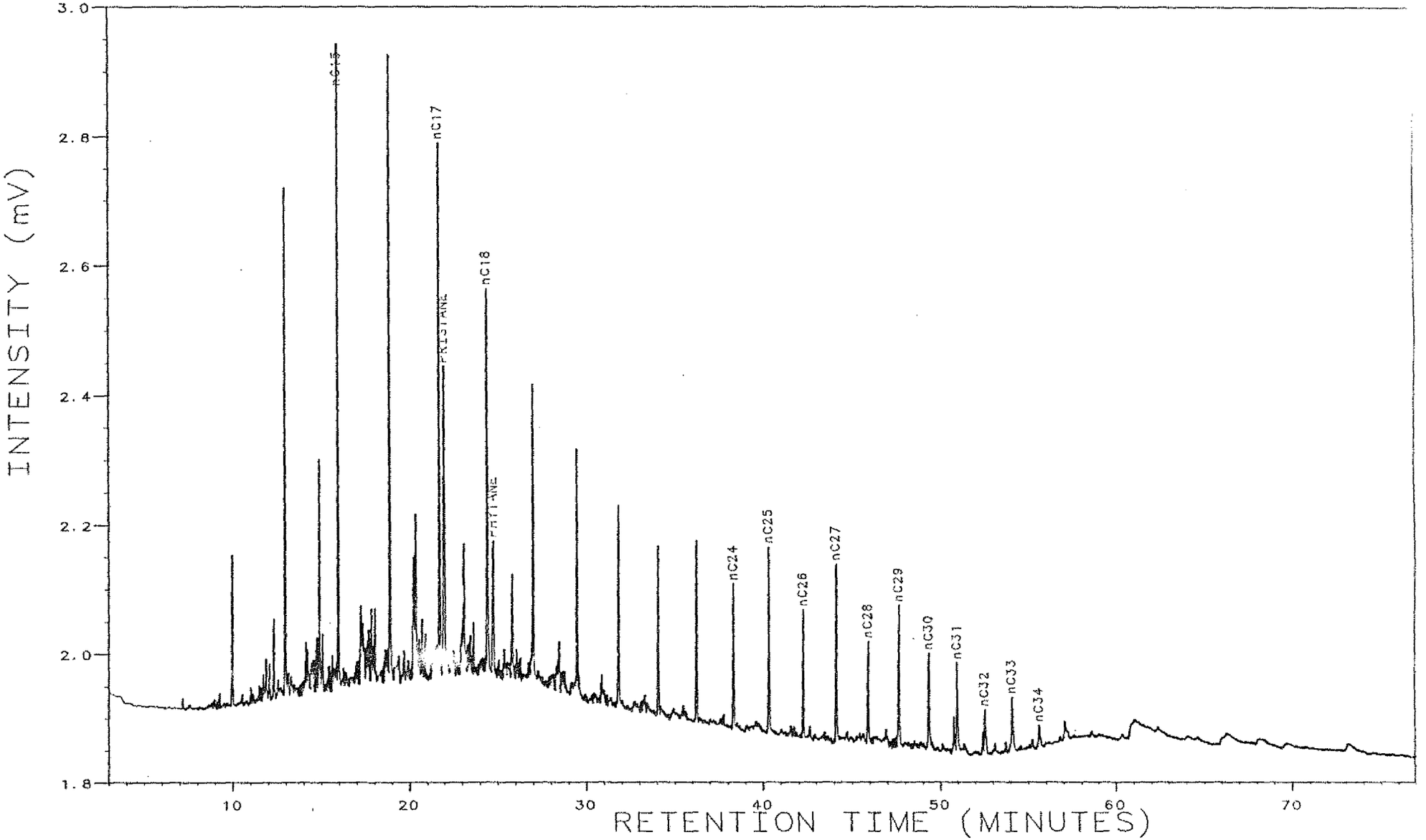
GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Analysis SA1532855 4, 1, 1 30/6-4, 2846-55m, SAT



GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S

Analysis SA1532927 4, 1, 1 30/6-4, 2900-27m, SAT



GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A.S