

NORTH VIKING GRABEN  
GEOCHEMICAL STUDY

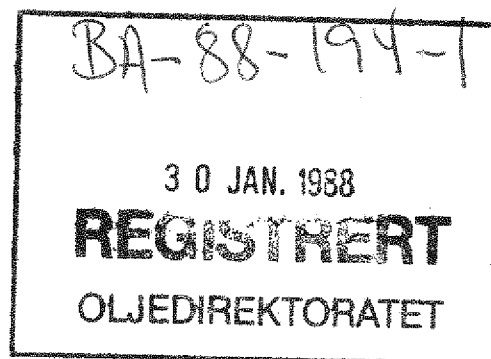
Well no. 31/4-2 NOCS

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INTRODUCTION

This well is from the Norwegian sector of the northern North Sea and is a dry well to the west of the Brage Field. It lies on the Horda platform to the east of the Bergen High. The source of the oils in the Brage field is believed to be Jurassic shales in the Oseberg Kitchen (Thomas et al., 1985), and the Troll Kitchen to the north (Field 1985).

A total of 136 samples was collected from the Norwegian Petroleum Directorate in Stavanger. All of the samples were washed and 131 were described. The analysed interval is from 2100 m - 2900 m (T.D. RKB) and the sample intervals are mainly 6 metres in the Jurassic section. A careful selection of suitable samples was made for screening analysis, i.e. TOC and Rock-Eval analysis. One hundred and nine samples (109) were selected for this analysis and from this data the number of samples for further analysis were chosen as indicated below:

|                                                                                             |            |
|---------------------------------------------------------------------------------------------|------------|
| Thermal extraction - pyrolysis -<br>gas chromatography                                      | 41 samples |
| Extraction, MPLC fractionation,<br>saturated and aromatic hydrocarbon<br>gas chromatography | 18 samples |
| Vitrinite reflectance microscopy                                                            | 21 samples |
| Visual kerogen analysis                                                                     | 22 samples |

Tables listing the samples and the results of the analysis are shown in the appendix. Figure 1 shows the litho-variations and some of the screening data for this well. The samples in this well are of good quality and variations in TOC can be clearly seen. The exception appears to be the Heather Fm.. Caved shales are present particularly

in the cored interval in the Heather Fm.. Contamination with coaly additive and other mud additives has also occurred in this interval.

## LITHOLOGY AND TOTAL ORGANIC CARBON CONTENT

Cretaceous (2043 - 2146 m),

The samples from the Upper Cretaceous interval which were analysed (2100 - 2146 m) consist of green-grey and medium grey claystones and white limestones. The bulked claystones have fair organic carbon contents, ranging from 0.5 - 0.8% (average 0.67% TOC). The limestones are virtually barren of organic carbon (< 0.1% TOC).

Jurassic (2146 - 2786 m)

## Draupne Formation (2146 - 2171 m)

The samples in this section consist of dark grey to olive-black, calcareous claystones which have rich organic carbon contents ranging from 4.4 - 6.3% (average 5%). Green-grey and medium grey claystones and white limestones in the samples of this interval are considered to be cavings from the Cretaceous.

## Heather Formation (2171 - 2325 m)

The samples can be divided into three intervals; two mainly claystone intervals separated by sandstones (the "Intra - Heather Sand"). The samples from the upper shale interval (2171 - 2190 m) are dominated by cavings from the Cretaceous and a coaly mud additive. In the sandstone sequence, which was partially cored and the top part of the lower claystone sequence (top, 2239 m), cavings of Draupne Fm. olive-black claystones are present. A mixture of claystones of different colours is present in samples throughout the Heather Fm. These colours range from green-grey to dark grey. The

organic carbon content of these bulked claystones is fairly uniform (fair, 0.5 - 0.8%, average 0.7%) down to 2304 m and then increases below this depth (good-rich, 1.4 - 2.1%, average 1.7%).

#### Brent Group (2235 - 2354 m)

This interval is thin and claystones are similar to those in the lower part of the Heather Fm. Sandstones dominate the samples. The organic carbon content of the shales varies from 1.8 - 2.8% (average 2.4%).

#### Dunlin Group (2354 - 2632 m)

This interval consists of two claystone intervals - the Drake and Amundsen Fm. separated by the Cook Fm. sandstones.

#### Drake Formation (2360 - 2479 m)

The claystones in this section change slightly downhole. Green-grey to olive black claystones dominate throughout. However, below 2444 m there are some dark yellow-brown claystones. Thin sandstones occur throughout the formation. Analysis of claystones was done on bulk samples. The claystones are richest in organic carbon at the top of the formation from 2354 - 2390 m with values ranging from 2 - 3% (average 2.6%). Below 2390 m, organic carbon values vary considerably 1.1 - 4.4 (average 2.0%). Thin beds with more than 3% were recorded in places (e.g. 2402 - 2408 m, and 2414 - 2420 m).

#### Cook Formation (2479 - 2533 m)

The Cook sandstone sequence or "Intra-Dunlin" sands was

partially cored (2490 - 2495 m). The claystones recorded in the samples are mainly caved from the Drake Fm. and have not therefore been analysed.

#### Burton - Amundsen Formation (2533 - 2635 m)

The samples in this interval consist mainly of claystones with small amounts of sandstone. The claystones vary in colour from grey-red, green, grey, brown and black. The bulked samples (excluding the grey-red variety) have good organic carbon contents ranging from 0.9% to 2.1% (average 1.5%).

#### Statfjord Formation (2635 - 2786 m)

Samples from this interval consist mostly of sandstones with minor claystones and traces of coal. The claystones vary in colour from green to black as in the Amundsen Fm. Organic carbon contents of the claystones above 2704 m range from 0.6 - 2.8% (average 1.8%). The organic carbon values are more variable than in the Amundsen Fm., probably due to coal stringers in some of the claystones. Below 2704 m TOC values are less variable (1 - 1.7%, average 1.3%).

#### Triassic (2786 - 2900 m)

Consists of dusky-red claystones (with poor TOC contents < 0.1%) and sandstones. Green, grey-brown and black claystones recorded in this section are most probably caved Dunlin Group.

## ROCK-EVAL ANALYSIS

### 1. Kerogen Type and Richness

(Hydrogen Index, Oxygen Index and Petroleum Potential)

#### Draupne Formation (2146 - 2171 m)

Dark grey to olive black claystones have hydrogen indices between 286 - 356 and petroleum potentials of 12.5 - 20.3. The petroleum potentials and hydrogen indices are lower than Draupne shales in other wells in the area. These claystones situated close to the Horda Platform were assessed as immature and the indications are that they have less potential than equivalent claystones within the graben or on the flanks of the graben. The kerogen is classified as type II/III.

#### Heather Formation (2171 - 2325 m)

There are minor amounts of dark grey to olive black claystone from 2190 - 2254 m. The dominant green-grey to medium grey claystones in this interval have only fair TOC down to 2304 m. The dark grey claystones in the bottom 20 m of this interval have good TOC contents. The minor dark grey to olive-black claystones have hydrogen indices between 294 - 358 and petroleum potentials from 7.8 to 17.1. These may be caved claystones from the Draupne Fm. The green-grey to medium grey claystones have very low hydrogen indices (< 70), high oxygen indices (22 - 115) and petroleum potentials generally < 0.5. These are type IV kerogens with virtually no hydrocarbon potential. The dark grey claystones in the bottom 20 metres interval have hydrogen indices from 133 - 227 and petroleum potentials from 2 - 5. These are mainly type III kerogens with some type II/III kerogen. These shales are a gas-condensate source.

#### Brent Group (2325 - 2360 m)

Dark grey claystones in this interval are similar to the samples from the bottom 20 metres of the Heather Fm. However, they do have slightly higher hydrogen indices and petroleum potentials (196 - 289 and 4-8 respectively).

#### Dunlin Group (2360 - 2635 m)

Olive-black claystones from 2360 - 2542 m have hydrogen indices from 174 - 367 and petroleum potentials from 3 - 16. These shales have a good-rich potential for gas and condensate if sufficiently deeply buried. There is a marked increase in hydrogen index values between 2432 - 2472 m, changing from 200 - 300 to 400 - 800. This indicates a change to type II or even type I kerogen, although organic carbon contents are generally less than 2%. Petroleum potentials are similar to the upper section and range from 6 - 12. They have a good to rich potential for oil and gas.

Between 2542 m and 2566 m bulked claystones in the Burton - Amundsen Fm. have hydrogen indices from 251 - 482 and petroleum potentials from 3 - 7. Therefore the top part of this interval is similar to the section from 2432 - 2474 m in having type II or II/III kerogen, with a good potential for oil and gas.

The remainder of the Dunlin Group claystones (2566 - 2635 m) have type III or IV kerogens (hydrogen indices 56 - 174) and petroleum potentials from 0.8 - 3.8. They have fair potential for mainly wet gas.

#### Statfjord Formation (2635 - 2786 m)

The claystones in this interval contain type III or IV kerogen with hydrogen indices varying from 74 - 212 and



petroleum potentials from 0.9 - 2.8.

## 2. Generation/Migration

(Production Index  $S_1/S_1+S_2$  and  $S_1/TOC$ )

The whole analysed interval has low production indices ( $< 0.1$  Figure 2) and  $S_1/TOC$  values which indicates that little or no generation or migration of hydrocarbons has occurred.

## 3. Maturity (Tmax)

Figure 3 shows the trend of Tmax with depth. The general trend for the Jurassic interval is from 422 at 2200 m to 432 at 2800 m, i.e. mature to early mature.

Higher Tmax values than these are probably measured on type III or IV kerogens.

## EXTRACTION DATA

A total of eighteen samples from the Jurassic sequence of well 31/4-2 were extracted and fractionated by MPLC.

### Draupne Formation (2146 - 2171 m)

One composite claystone sample covering the whole of the Draupne Fm. was extracted. It has a rich abundance of extractable organic matter (2327 ppm). However, based on EOM normalised to organic carbon the value is only classified as good (42). This together with the high concentration of NSO compounds indicates that the Draupne Fm. is immature, and that the kerogen has only generated a very small quantity of hydrocarbons.

### Heather Formation (2171 - 2325 m)

The Heather Fm. can be divided into three separate intervals based on the lithology, two mainly claystone intervals and one sandstone interval. Due to the poor quality of the samples in the upper shale sequence and coring in the Intra Heather sand, none of the samples from this interval were considered for analysis. One composite claystone sample from the lower part, consisting of picked cuttings from 2242 - 2324 m, was analysed. This sample shows similar extraction results to the Draupne Fm. sample.

### Brent Group (2325 - 2357 m)

The Brent Gr. consists mainly of sandstones with some thin interbedded claystones. Two claystone samples were extracted and both were found to have a fair/good abundance of EOM, both using ppm values and when normalized to organic carbon.

This indicates that the kerogen in these samples is different than that found in the Draupne and Heather Fms, i.e. it generates smaller amounts of material at low maturity than the Viking Group claystones.

#### Dunlin Group (2357 - 2635 m)

The Dunlin Gr. can be divided into three sections in this well, the Drake Fm. claystones down to 2479 m, the Cook Fm. sandstones between 2479 and 2533 m and the Burton/Amundsen Fm. claystones down to 2635 m. Six samples from the Drake Fm. were analysed. The samples show a variable abundance of EOM, 1400 - 3400 ppm. When normalized to organic carbon, the samples also show variable extractability, 52 - 87 mgs EOM/g TOC. The composition of the extract varies from sample to sample, indicating that there may be a significant variation in the type of kerogen generating the EOM.

None of the samples from the Cook Fm. were analysed, while three samples from the Burton/Amundsen Fm. were extracted. The abundance of the EOM varies considerably from 600 to 2600 ppm, decreasing with increasing depth. When the extract results are normalized to organic carbon, the variation is as great, 20 - 80 mgs/g, and again showing decrease with increasing depth. This suggests a decrease of the quality of the kerogen with increasing depth.

#### Statfjord Formation (2635 - 2786 m)

This formation consists mainly of sandstone with some interbedded claystones and coal. Five claystone samples were analysed. The abundance of EOM varies greatly from 700 to 2400 ppm. The organic carbon normalized values also show a wide variation from 40 to 121 mgs/g. One sample, 2764 - 2766 m has very high values for the organic normalized values as well as a very high percentage of hydrocarbons.

This indicates that this sample probably contains migrated hydrocarbons or contaminants. Some of the other samples might also be affected by migrated hydrocarbons, but this can only be resolved by further analysis.

### Saturated Hydrocarbons

The saturated hydrocarbon fraction of all the extracted samples were analysed by capillary gas chromatography.

#### Draupne Formation (2146 - 2171 m)

The gas chromatogram of the saturated hydrocarbon fraction of the one analysed sample from the Draupne Fm. shows a smooth front-biased n-alkane distribution, typical for well mature hydrocarbons, together with a large abundance of steranes/triterpanes typical for an immature sample (Figure 4). This discrepancy in pattern between the low molecular and high molecular weight saturated hydrocarbons indicates that the sample might be slightly contaminated by migrated hydrocarbons (probably a condensate) or diesel. This contamination is, however, minute and does not show up on the extraction or Rock-Eval data.

#### Heather Formation (2171 - 2325 m)

One sample from the Heather Fm. was analysed and found to have a gas chromatographic pattern similar to that for the Draupne Fm. sample.

#### Brent Group (2325 - 2357 m)

Two samples from the Brent Gr. were analysed, and show similar gas chromatographic patterns to the front-biased

n-alkane distribution of the Draupne and Heather Formation samples.

Dunlin Group (2357 - 2635 m)

The six analysed claystones from the Drake Fm. show a front-biased n-alkane distribution similar to that of the claystones from formations higher up in the well. Isoprenoid ratios and the relative abundance of higher molecular weight compounds, both n-alkanes and branched/cyclics, are, however, greater than the other samples (Figure 5). The three analysed claystones from the Burton/Amundsen Fm. have different gas chromatographic patterns, when compared to those higher up in the Dunlin Gr. and also when compared to each other. The sample from 2540 - 66 m has a front-biased n-alkane distribution with a good abundance of higher molecular weight n-alkanes (Figure 6). The special feature of this sample is the prominence of compounds between the n-alkanes in the C<sub>19</sub> - C<sub>30</sub> range. Compounds like these are normally not found in source rock extracts, and could be contaminants.

The abundance of these compounds is reduced in the next analysed sample (2570 - 2602 m) while the abundance of high molecular n-alkanes with a high CPI has increased. This would indicate a change in the type of organic matter to one richer in terrestrial plant matter. The sample from 2606 - 2626 m shows a further change, with a higher CPI (Figure 7) for the high molecular weight n-alkanes, indicating that the hydrocarbons are probably generated mainly from kerogen type III, possibly with an input from some lipid-rich source.

Statfjord Formation (2635 - 2786 m)

Five samples from the Statfjord Fm. were analysed. The samples show a significant variation in the saturated

hydrocarbon distribution. The sample from 2660 - 2668 m has a high pristane/ $nC_{17}$  ratio and a high CPI value (Figure 8). The hydrocarbons are probably representative of hydrocarbons generated from the kerogen in this sample. The samples from 2702 - 2734 m and 2738 - 2760 m have a lower pristane/ $nC_{17}$  ratio although still high CPI values. This suggests either that the kerogen type has changed or that the samples contain small amounts of migrated light hydrocarbons. The sample from 2764 - 2766 m has a similar isoprenoid and n-alkane distribution as samples above, but also has a large unresolved hump. This is the same sample that had a high abundance of extractable hydrocarbons. The gas chromatogram indicates these to be contaminants, possibly pipe dope. The lowest analysed sample from 2770 to 2784 m shows a similar saturated hydrocarbon distribution as higher up in the Statfjord Fm.

#### Aromatic Hydrocarbons

##### Draupne Formation (2146 - 2171 m)

The diaromatic hydrocarbons are the dominant compounds in the analysed sample from the Draupne Fm. This indicates the presence of mature hydrocarbons. The aromatic steranes/triterpanes are also abundant in the sample (Figure 9) indicating immaturity. This is basically the same situation as was found in the saturated hydrocarbon distribution. It implies that the sample might be contaminated with migrated hydrocarbons (condensate type) or diesel.

The sample also contains a large abundance of sulphur compounds. The large amount of the 1 - MDBT means that the MPI 1 ratio is difficult to measure. The 4/1 MDBT and (3+2)/1 MDBT ratios are very low for this sample indicating a low maturity. A (3+2)/1 MDBT ratio of < 1 is indicative of

low maturity since this ratio soon exceeds 1 at moderate maturity in shales with type II/III or type III kerogen.

#### Heather Formation (2172 - 2375 m)

The one analysed sample from the Heather Fm. has, on the whole, a very similar aromatic distribution to that of the Draupne Fm. sample. The abundance of aromatic compounds is far lower in the Heather Fm. sample compared with the Draupne Fm. sample, and slight differences in aromatic ratios indicates that aromatics have been generated from slightly different types of kerogen.

#### Brent Group (2325 - 2357 m)

The two analysed samples from the Brent Gr. show very different gas chromatographic patterns. The sample from 2332 - 40 m has a similar pattern to that registered for the Heather Fm. sample, while in the sample from 2344 - 2360 m the polyaromatic compounds dominate the picture. The various calculated ratios are, however, similar for the two samples, indicating that the loss of diaromatic compounds could be due to loss during the work-up process. The gas chromatograms of the sulphur compounds, show the samples to contain benzothiophenes, dibenzothiophene and methyl substituted dibenzothiophenes, while the dimethyl substituted dibenzothiophenes are minor. The sulphur pattern is typical for samples with low maturity.

#### Dunlin Group (2357 - 2635 m)

The analysed samples from the Dunlin Gr. consist of six samples from the Drake Fm. and three samples from the Burton/Amundsen Fm. The samples from the Drake Fm. show aromatic hydrocarbon distributions similar to the Heather

Fm. sample, with the exception that aromatic steranes and triterpanes are more abundant than in the Heather Fm. sample (Figure 10). The distribution of the sulphur compounds vary slightly for these samples. 1-methyl dibenzothiophenes is the dominant peak in all the samples and the low 4/1 MDBT and (3+2)/1 MDBT show that the samples are immature. There are also abundant benzothiophenes in all the samples. The ratio of benzothiophenes to dibenzothiophenes varies from sample to sample.

The aromatic hydrocarbon patterns of the three analysed samples from the Burton/Amundson Fm. show a large degree of variation. In all three samples the diaromatic compounds are most abundant, but there is a sharp increase in the abundance of the phenanthrenes in the lowermost sample. The sample from 2540 - 2566 m shows a very large unresolved envelope in the high molecular weight range. This is the same sample which had a large unresolved envelope in the gas chromatogram of the saturated hydrocarbons. This could be a feature of the kerogen in the sample, or contamination. The lowermost analysed sample has a small unresolved envelope where aromatic steranes and triterpanes are found. The gas chromatograms of the sulphur compounds show considerable variation between the samples. The uppermost analysed sample has a large unresolved envelope on the FID trace. It also shows a large unresolved envelope in the FPD trace, which indicates that the unresolved envelope is partly due to very complex sulphur compounds. It is, at present, not known what these compounds might be. Some of these compounds are also found in the sample below this. Otherwise this sample shows a similar trace to samples higher up in the well, in which the benzothiophenes and methyl substituted dibenzothiophenes are dominant. The lowermost analysed sample from this formation has only a minor abundance of dibenzothiophenes.



# Statfjord Formation (2635 - 2786 m)

The distribution of the aromatic hydrocarbons in the analysed sample from the Statfjord Fm. vary slightly from sample to sample. The relative abundance of triaromatic hydrocarbons, especially phenanthrene and methylphenanthrenes increases with increasing depth for the samples between 2660 - 2760 m. The distribution of the sulphur compounds vary especially in the abundance of dibenzothiophene relative to the methyl substituted dibenzothiophenes, in that the relative amount of methyl dibenzothiophenes decreases drastically over this range. There is, still, as in the samples from higher up in the well, a clear discrepancy between the maturity parameters measured on the sulphur compounds and those measured on the aromatic hydrocarbons. The sample from 2760 - 2766 m has a large unresolved envelope in the saturated hydrocarbons and aromatic hydrocarbons. The maturity parameters indicate a far higher maturity for this sample, which is due probably to contamination from diesel. The sample from 2770 - 2784 m shows phenanthrene as the most abundant compound together with abundant substituted naphthalenes, similar to that found higher up in the formation. The distribution of sulphur compounds is also similar to that found higher up in the formation.

## THERMAL EXTRACTION - GAS CHROMATOGRAPHY

Forty-one samples from the Jurassic and Triassic were analysed by this method and the results are as follows:

### Jurassic (2146 - 2726 m)

#### Draupne Formation (2146 - 2171 m)

Four dark grey/olive-black claystones were thermally extracted. The chromatograms show mainly low-medium molecular weight hydrocarbons, chiefly n-alkanes less than  $nC_{17}$  chain length. Hydrocarbons up to the  $nC_{20}$  alkane, and only minor amounts of isoprenoids and aromatics are also present (Figure 11). The distribution probably represents trace amounts of early generated hydrocarbons from immature marine kerogen type II/III found in these claystones, plus some migrated condensate-range hydrocarbons.

#### Heather Formation (2171 - 2325 m)

Four claystones were thermally extracted from this interval. The green-grey claystones above 2250 m have only trace amounts of n-alkanes from  $nC_{10}$  -  $nC_{20}$ . These are probably migrated hydrocarbons rather than generated in situ (Figure 12). The thermal chromatograms of dark grey claystones below 2310 m indicate similar organic material to that present in the Draupne shales.

#### Brent Group (2325 - 2357 m)

Two dark grey claystones were thermally extracted. The chromatograms are very similar to those from the Heather

sequence. The main n-alkane distribution varies slightly. In the sample from 2334 m the envelope is  $nC_{10} - nC_{19}$ , with a maximum at  $nC_{13}$ . In the sample from 2346 m the envelope is  $nC_{10} - nC_{17}$  with maximum at  $nC_{11}$  and  $nC_{13}$ . The lower interval sample has a slight odd n-alkane preference. This might be due to indigenous hydrocarbons, whereas the upper interval consists mostly of migrated hydrocarbons.

#### Dunlin Group (2357 - 2635 m)

Thirteen claystone samples from the Drake Formation (2357 - 2479 m) and nine claystone samples from the Burton - Amundsen formations (2533 - 2562 m) were thermally extracted. The thermal extract gas chromatograms of the Drake shales down to 2438 m are all very similar (Figure 13). They suggest a relative uniform kerogen type in this sequence (i.e. a uniform organic input into the area during deposition of these shales). The Burton - Amundsen claystones also show similar thermal extract gas chromatograms. The quantity of hydrocarbons is much reduced (Figure 14) and indicates a reduction in potential for this sequence.

#### Statfjord Formation (2635 - 2726 m)

Consists mainly of sandstones. The thin claystones in this sequence contain some coaly material or are completely organic poor, light-coloured shales. Seven claystone samples were analysed. Some have similar thermal extract gas chromatograms to the Dunlin shales. Others represent more coaly shales. Thermal extracts of coaly shales (e.g. 2686 m, 2766 m) indicate that there has been early generation of aromatics and isoprenoids as well as n-alkanes less than  $nC_{20}$ .

Triassic (2786 m - TD)

One red claystone which was analysed has mainly n-alkanes from  $nC_{10}$  to  $nC_{18}$  very similar to some non-coaly Statfjord claystones.

## PYROLYSIS - GAS CHROMATOGRAPHY

Forty-one samples were analysed, the results are as follows:

### Draupne Formation (2146 - 2171 m)

Four dark grey/olive black claystone samples were pyrolysed. The pyrograms reveal that the kerogen in these shales is type II or II/III. The prominent unresolved hump up to  $nC_{30}$ , the large alkene-alkane homology up to  $nC_{30}$  and the low amounts of aromatics relative to alkenes all suggest a marine type II kerogen (Figure 14). The prominent pristene peak suggests that the kerogens are immature to early mature.

### Heather Formation (2171 - 2325 m)

Four claystones from this sequence were pyrolysed. The two lowest (below 2300 m) samples show a distinct change from the upper two which appear to consist partly of caved Draupne claystones. The two samples below the Heather sands have a prominent alkene-alkane homology, but only to  $nC_{20}$  (Figure 15). The prominent unresolved hump up to  $nC_{30}$  seen in the Draupne samples is virtually absent. Aromatics are also more prominent than in the Draupne claystones. The kerogen in the lower part of the Heather is different to that in the Draupne claystones. It has a poorer potential for liquid hydrocarbons, and has mainly gas and condensate potential.

### Brent Group (2325 - 2357 m)

Two claystone samples were pyrolysed. The pyrograms indicate that they are probably caved from the Upper Jurassic

sequence and were not discussed further.

#### Dunlin Group (2357 - 2635 m)

Thirteen claystone samples from the Drake were pyrolysed (2357 - 2479 m). The pyrograms appear to have characteristics midway between the Draupne and lower Heather claystones (i.e. type II/III, Figure 16). They clearly have a good potential for liquid hydrocarbons as well as gas and condensate. Nine claystone samples from the Burton - Amundsen formations (2533 - 2562 m) have pyrograms which are similar to the Drake Fm. but with less material above  $nC_{20}$  (Figure 17). The organic input to all the shales in the Dunlin Group was probably fairly similar. They have slightly less liquid hydrocarbon potential than the Draupne shales based on the reduced size of the unresolved hump.

#### Statfjord Formation (2635 -2786 m)

Consists mainly of sandstones. The minor claystones have similar pyrograms to the Amundsen/Burton claystones. This is perhaps partially due to the presence of cavings in the Statfjord from the Amundsen/Burton Fm. It would appear that Statfjord claystones in this well have a good gas/condensate potential (if the good claystones are not caved).

## VITRINITE REFLECTANCE

Twenty-one samples were analysed, covering the interval 1935 - 2860 m (Table 10, Appendix). Most of the samples are quite good for this type of analysis although some reworked material ( $R_o = 0.8\%$ ) was observed at 1935 m and 2142 m and bitumen staining is moderate to high in much of the Jurassic section. In the two deepest samples no measurable vitrinite was recorded. Values seem to range from 0.5% at the top of the section to 0.6% at the base, suggesting that the sequence is moderate mature to borderline oil window maturity. Fluorescence colours change from yellow/orange and light orange at the top of the sequence to mid orange at the base. This would suggest slightly lower maturities at the top than the vitrinite reflectance records but approximately the same at the base. A plot of vitrinite reflectance data versus depth is shown in Figure 18.

## VISUAL KEROGEN COMPOSITION

Twenty-two (22) samples were analysed in the interval 2152 - 2784 m (Table 11, Appendix). As can be seen from Figure 19 all of these samples appear favourable for hydrocarbon generation. The majority appear to be most likely to produce oil and gas products or mainly gas. However, samples between 2444 m - 2560 m are mainly oil prone and 2444 m is the most oil-prone sample examined.

The interval 2444 - 2560 m is the richest in terms of hydrocarbon generation potential based on visual estimates. In addition to amorphinite L, liptodetrinite and spore/pollen, this section also contains some cuticle and some dinoflagellates. Throughout the whole of the section, liptodetrinite and spore/pollen are identified with amorphinite L observed in most samples but not identified at the base of the interval. Vitrinite occurs in the form of vitrodetrinite and amorphinite V throughout and traces of telinite can be distinguished at the top of the section. Fusinite is also identified at the top of the section whereas inertodetrinite is present throughout and semifusinite in most samples. The base of the section appears to be the most gas-prone. Spore colour indices range from 3 at the top of the section to 5.5 - 6 at the base. This implies a lower maturity at the top of the section than is measured by vitrinite reflectance but there is a good agreement at the base.



## CONCLUSIONS

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

### 1. Source Rock Potential

#### Cretaceous ( - 2146 m)

Grey claystones have very poor source rock potential.

#### Jurassic (2146 - 2786 m)

##### Draupne Formation (2146 - 2171 m)

The Draupne formation consists mainly of dark grey and olive-black claystones with an average TOC of 5% and an average petroleum potential of 17.2. These claystones are immature to moderate mature and they have type II/III kerogens with a rich potential as source rocks for gas/condensate and probably some oil at higher maturities.

##### Heather Formation (2171 - 2325 m)

No oil shows were recorded in sandstones and organic-poor claystones in this interval. Only the dark grey claystones in the bottom 20 m have any hydrocarbon potential. They have an average TOC of 1.7% and an average petroleum potential of 3.1. They are immature to moderate mature and have type III kerogen. The claystones in the bottom 20 m have a fair-good potential for gas and condensate.

Brent Group (2325 - 2354 m)

The interval consists mainly of sandstones. No oil shows were recorded and migrated hydrocarbons appear to be absent.

Dunlin Group (2354 - 2632 m)

There are two thick claystone intervals - Drake and Burton/Amundsen formations - separated by the sandstones of the Cook Formation. The Drake Formation (2360 - 2479 m) consists mainly of dark grey to olive black claystones and some dark yellow brown claystones. The average TOC of claystones is 2.2% and the average petroleum potential is 9. These claystones are moderate mature to early mature and have type II or II/III kerogen. The Drake claystones have a good-rich potential for oil and gas. The Burton - Amundsen claystones (2533 - 2632 m) vary in colour from light grey to black. The bulked claystones have an average TOC of 1.5% and an average petroleum potential of 3.1. These claystones contain mostly type III kerogen with a fair-good potential for gas and perhaps some condensate.

Statfjord Formation (2632 - 2786 m)

Minor light to dark grey claystones in this mainly sandstone interval are early mature and have an average TOC of 1.8% above 2704 m and 1.3% below 2704 m. The petroleum potentials of these claystones vary from 1-3. These claystones have type III or type IV kerogen and have a poor-fair gas potential.

Triassic (2786 m - TD)

This interval has only barren red beds. Black claystones observed in this section are probably caved.

## 2. Generation and Migration

Little or no hydrocarbon generation has occurred in the major source rock sequences (Viking and Dunlin Group claystones). There are traces of migrated hydrocarbons in the Jurassic sequence.

## 3. Maturity

Optical and chemical maturity parameters indicate that the Jurassic sequence is immature to early mature at the base (i.e. 0.5% - 0.6% Ro).

Figure 1. NOCS WELL 31/4-2

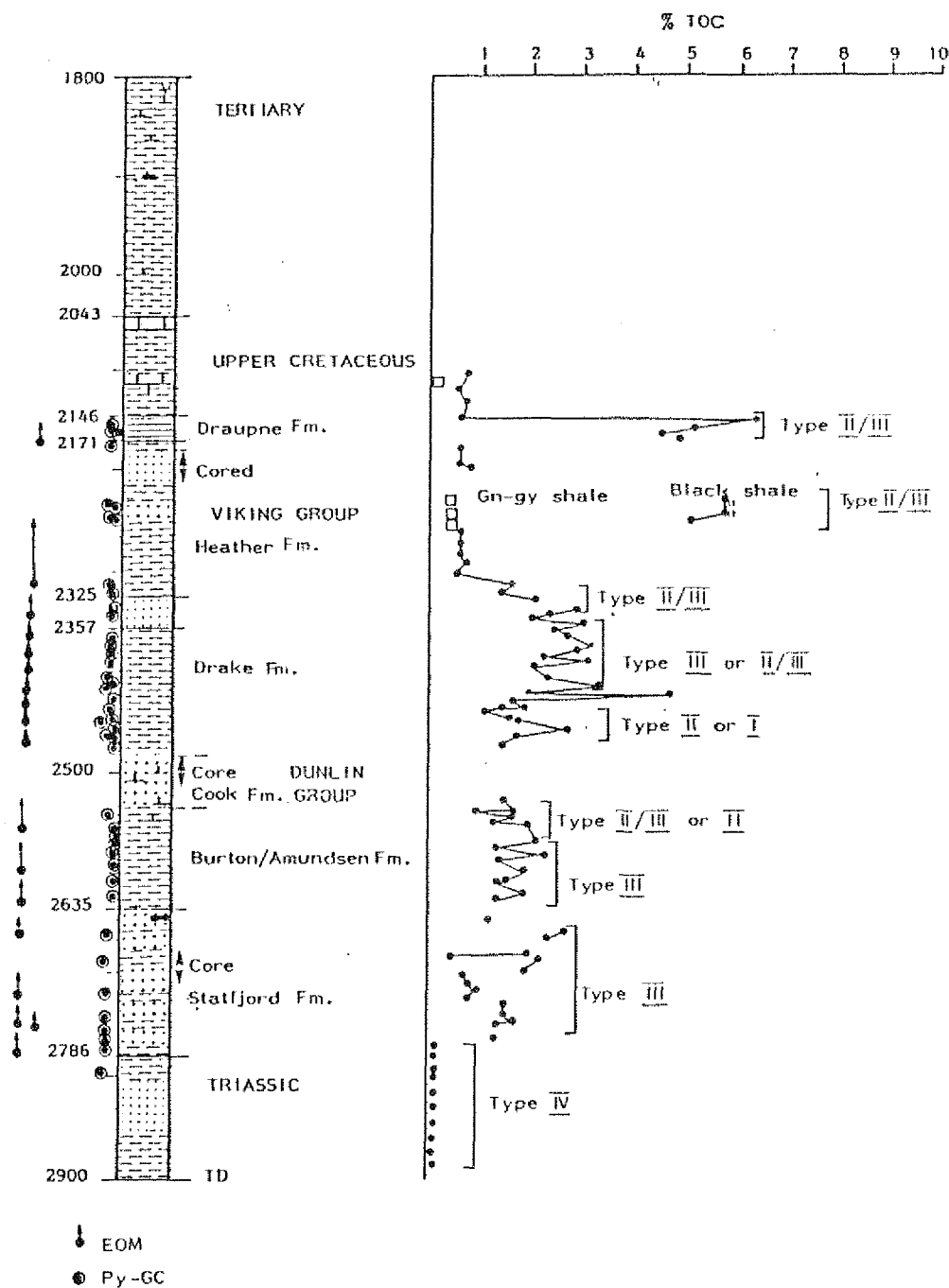


Figure 3. Tmax vs Depth  
for well no. 31/4-2.

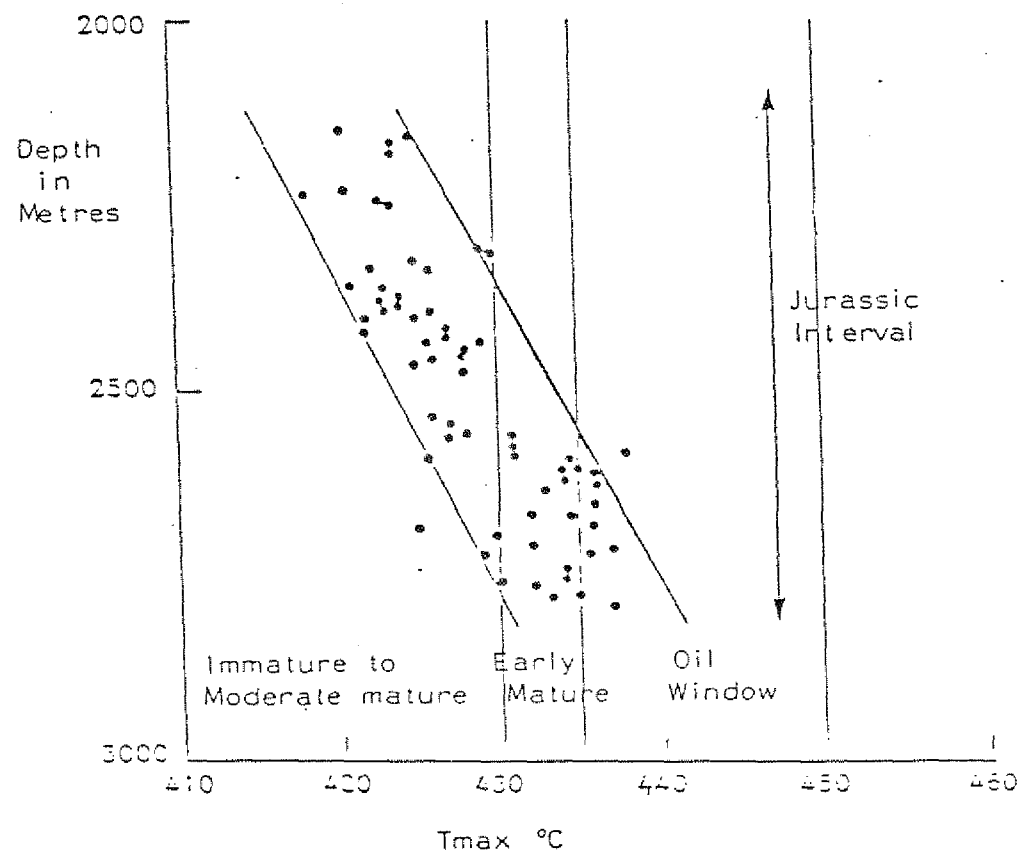
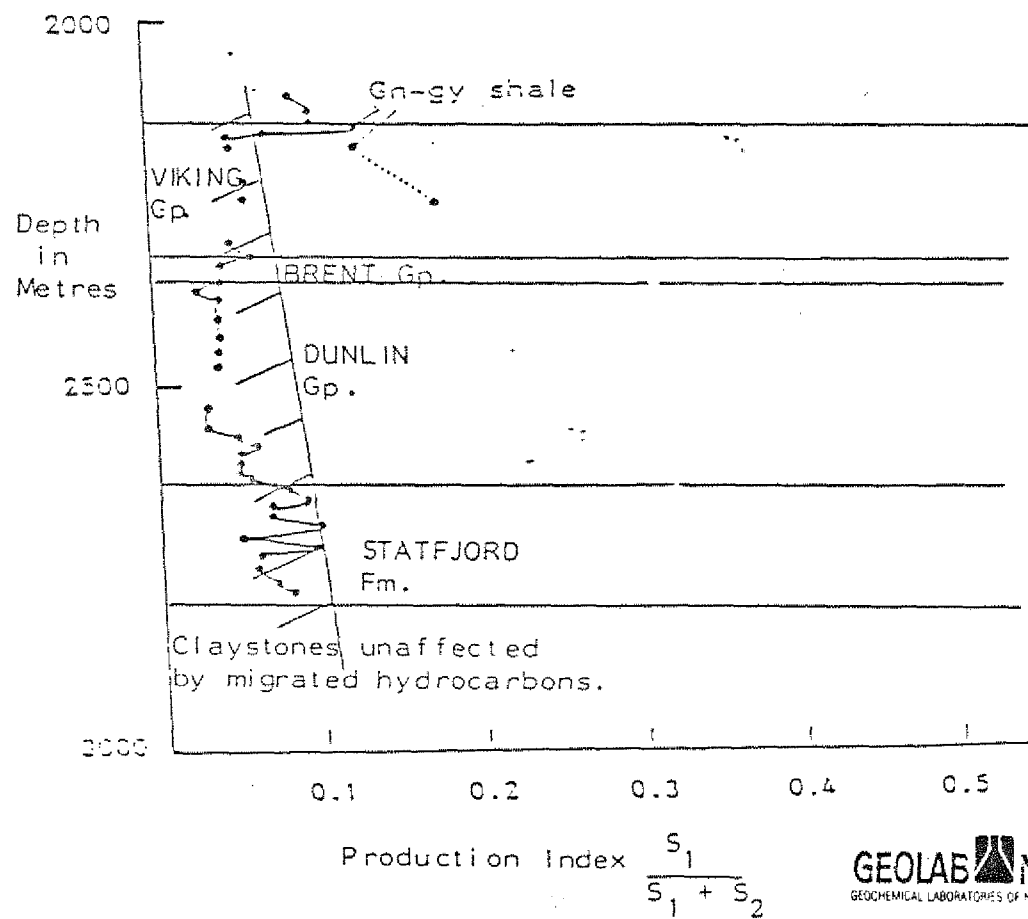


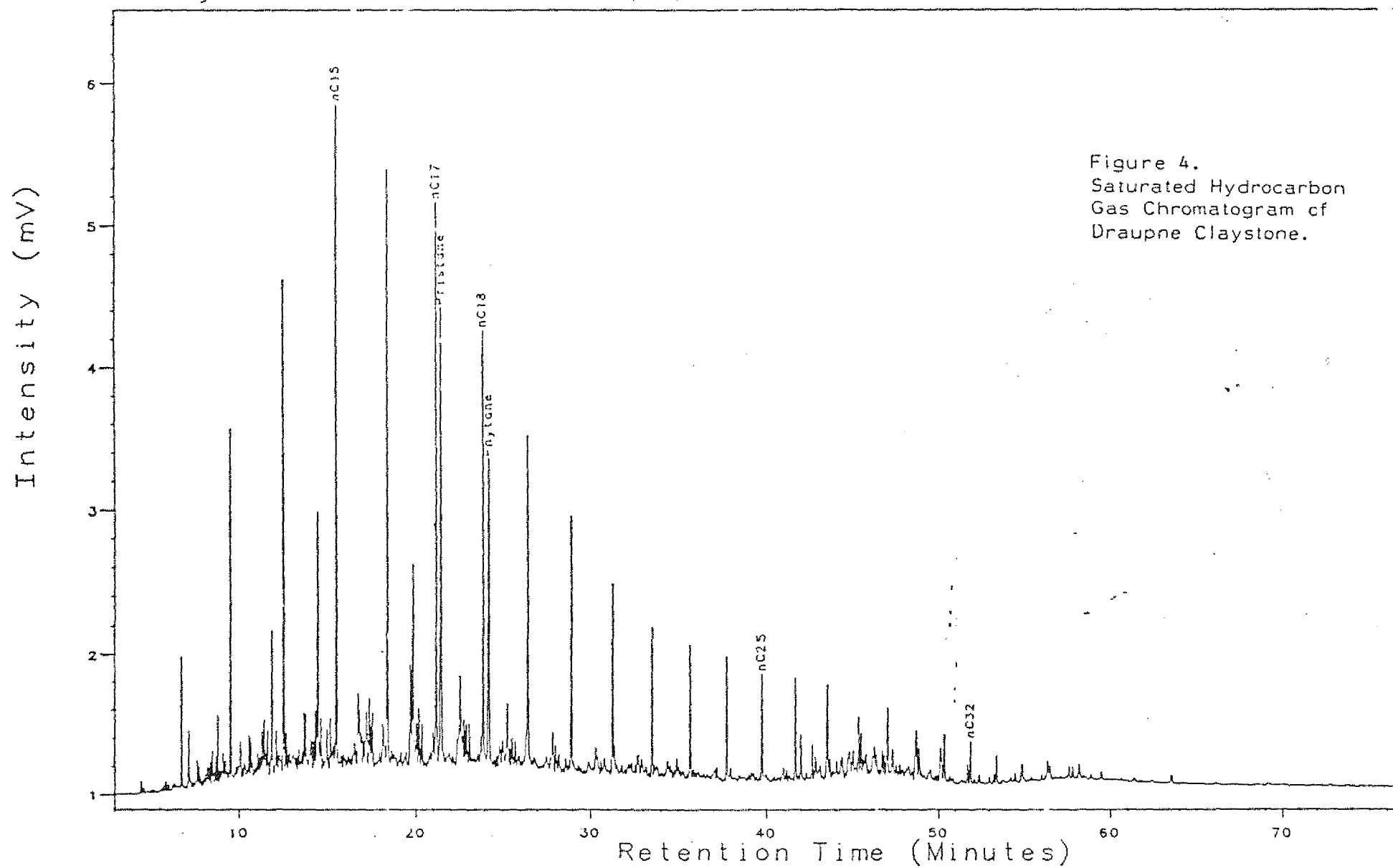
Figure 2. Production Index vs Depth  
for well no. 31/4-2.



Analysis SA1532172

10, 1, 1

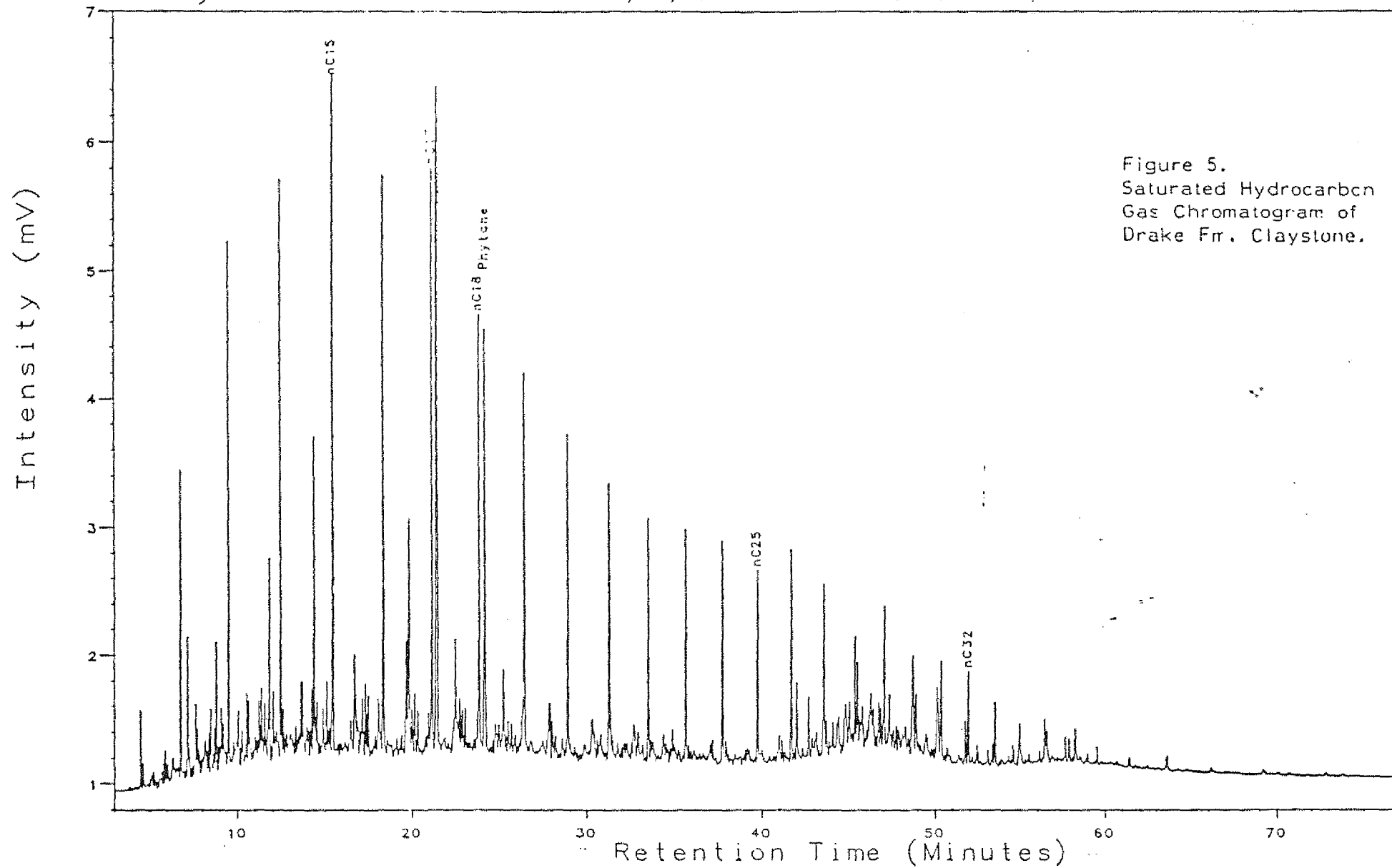
31/4-2 2172m, SAT



Analysis SA1532390

10, 1, 1

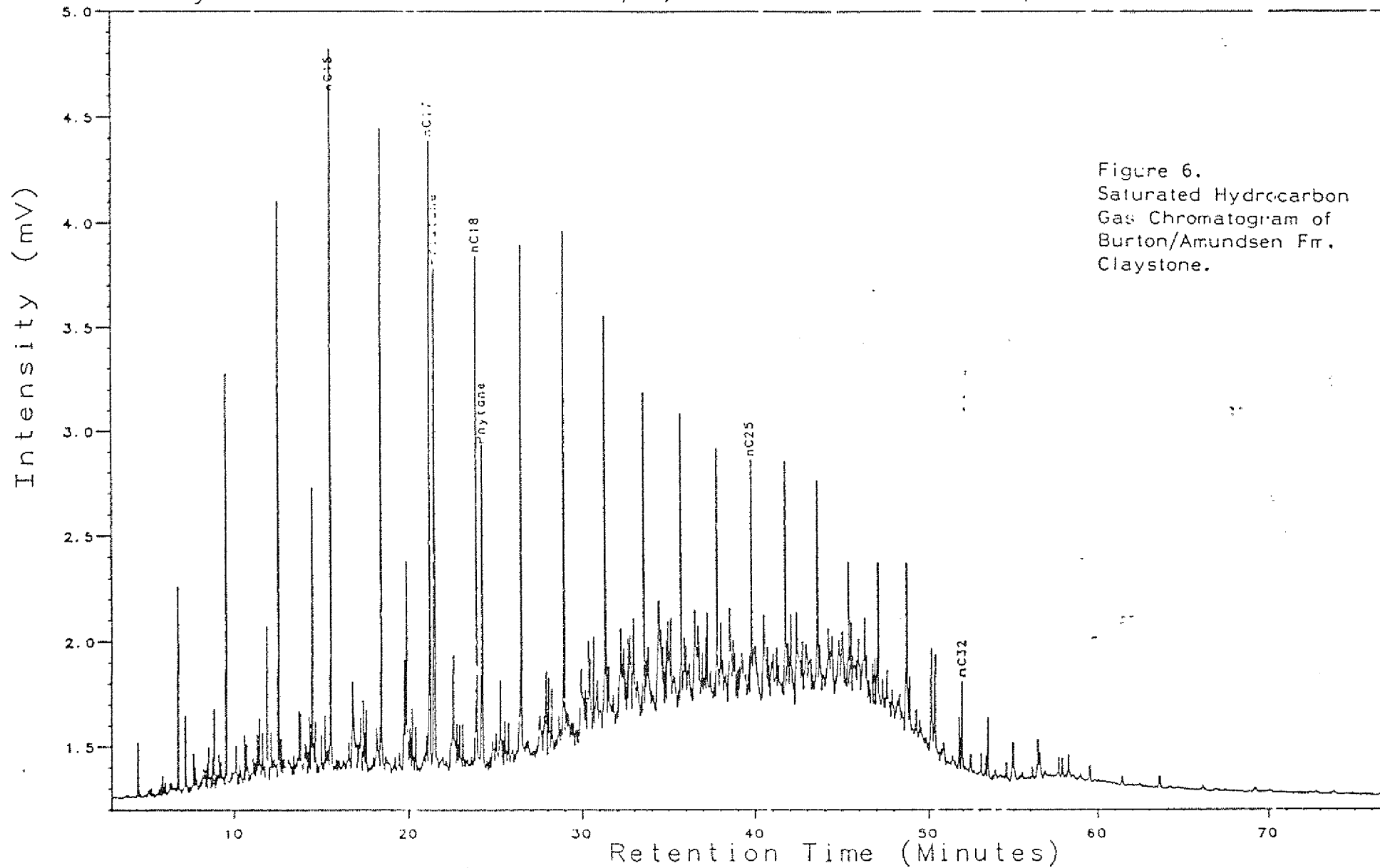
31/4-2 2390m, SAT



Analysis SA1532566

10, 1, 1

31/4-2 2566m, SAT

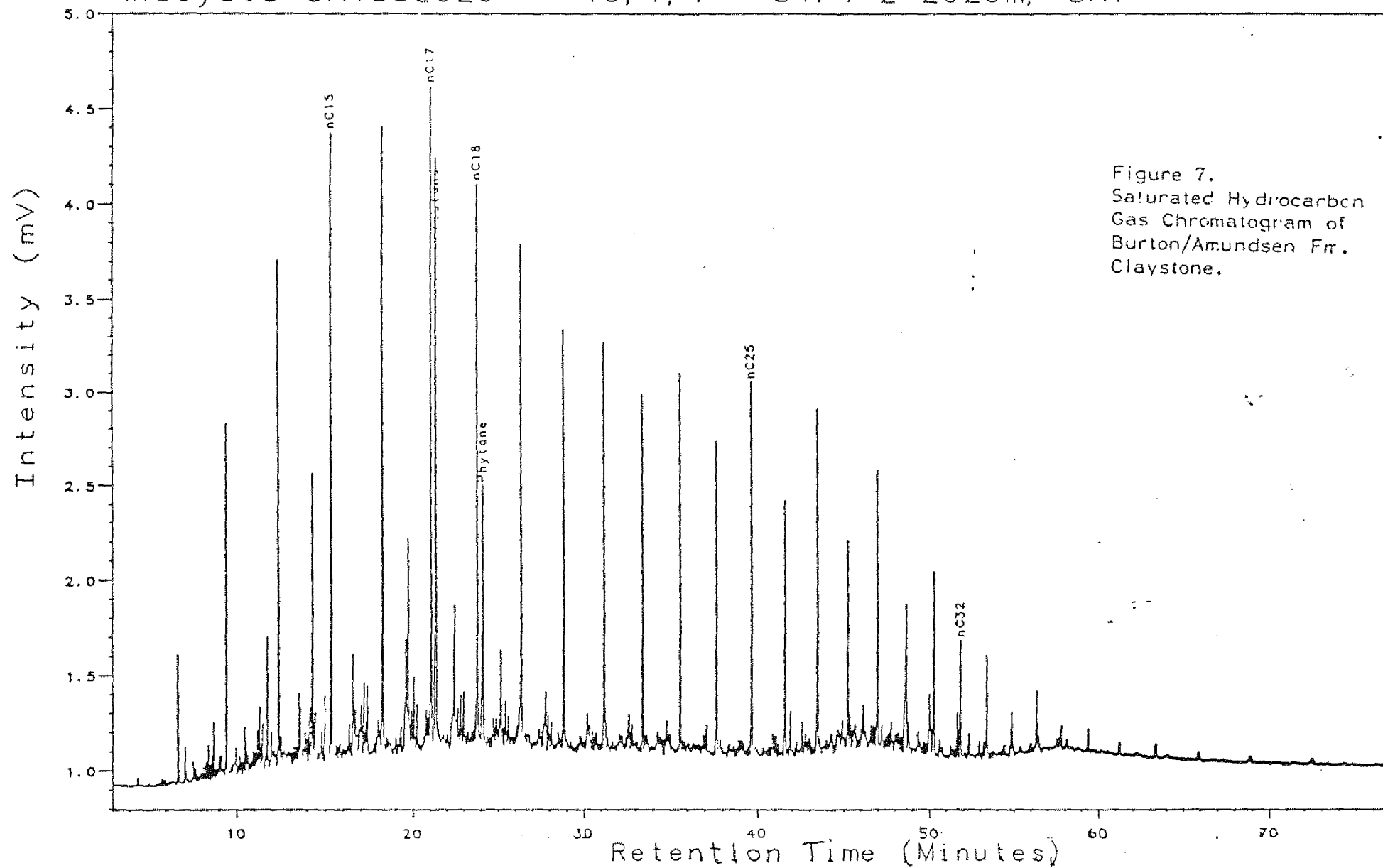




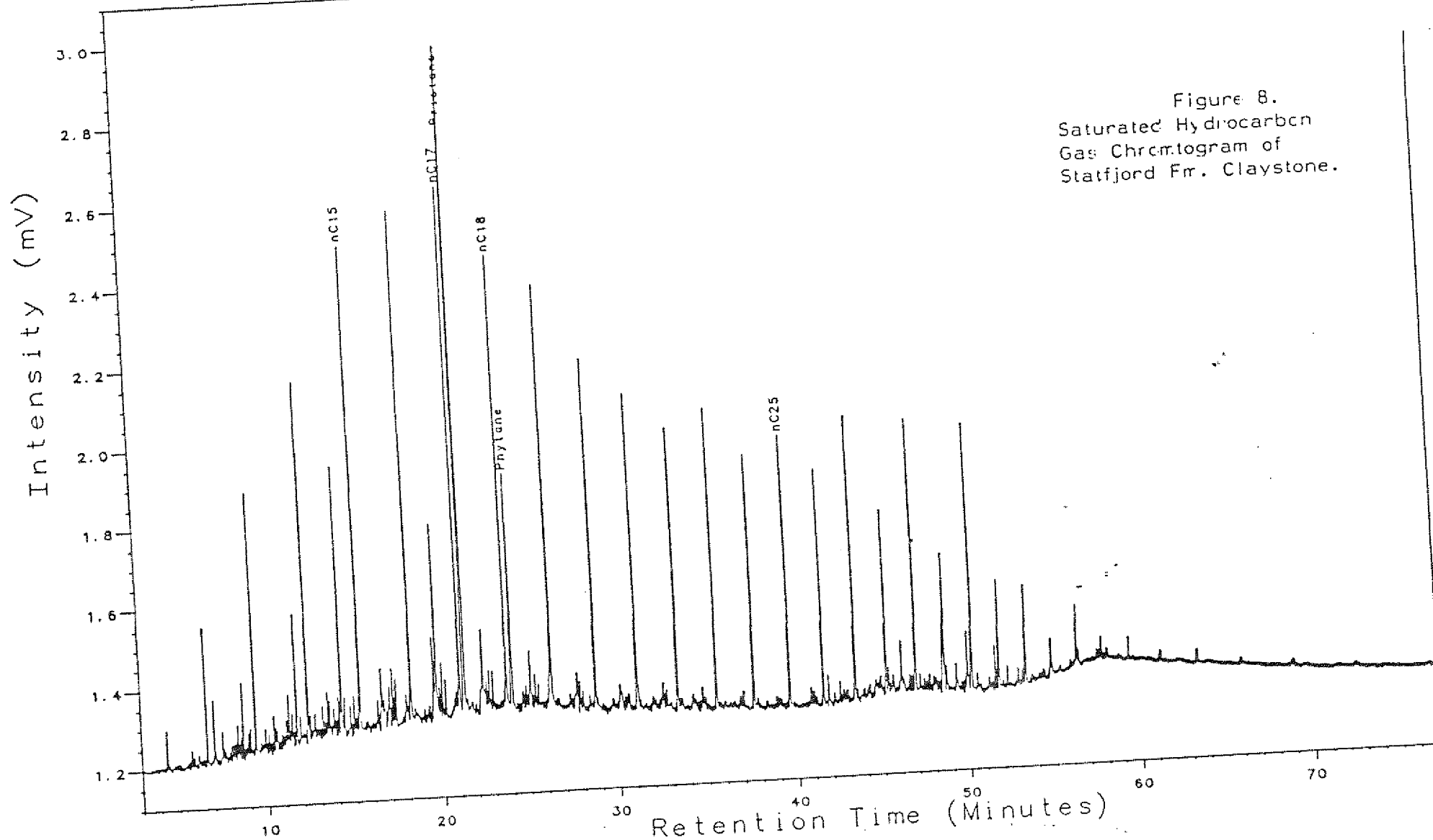
Analysis SA1532626

10, 1, 1

31/4-2 2626m, SAT



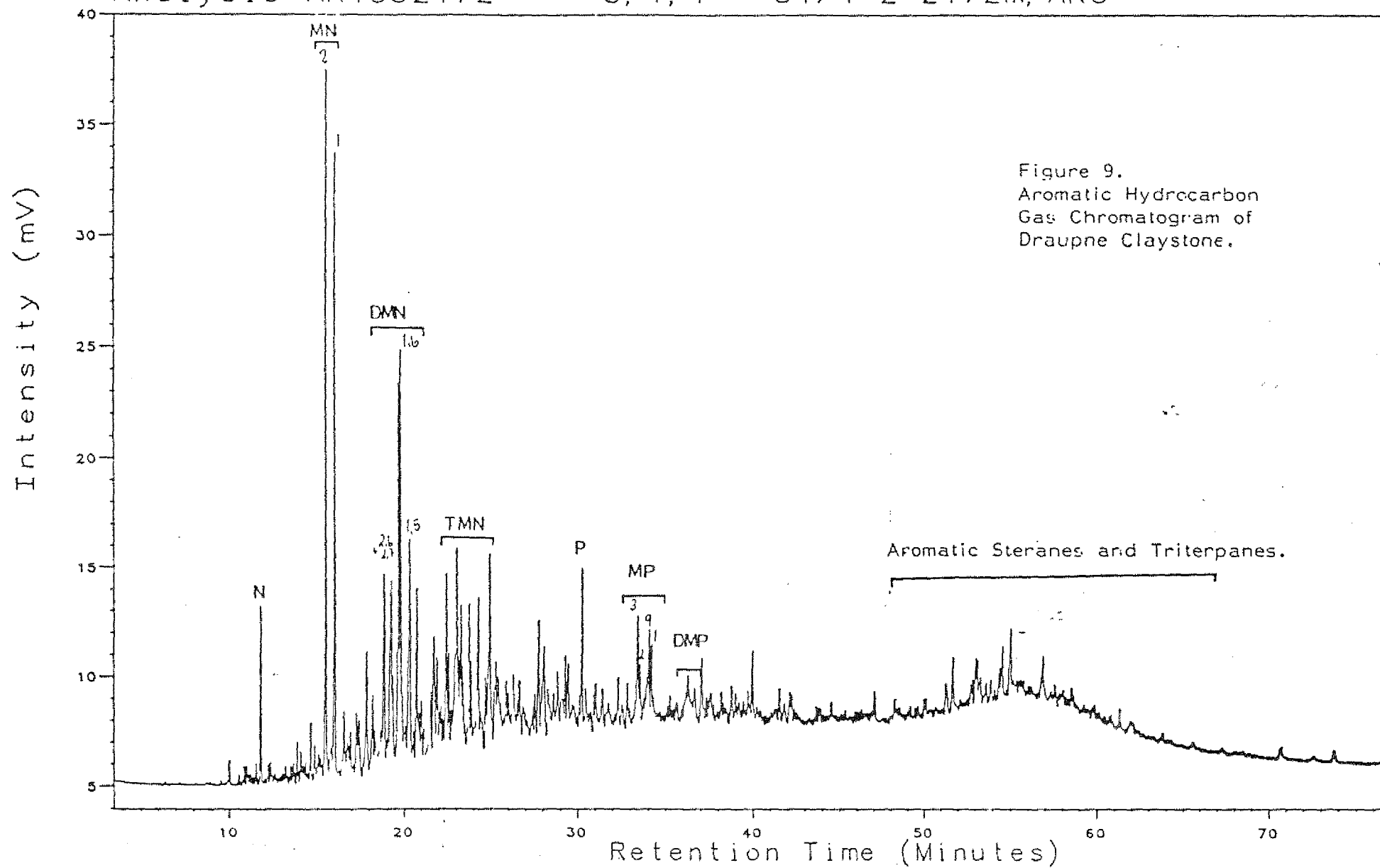
Analysis SA1532668 10, 1, 1 31/4-2 2668m, SAT



Analysis AR1532172

8, 1, 1

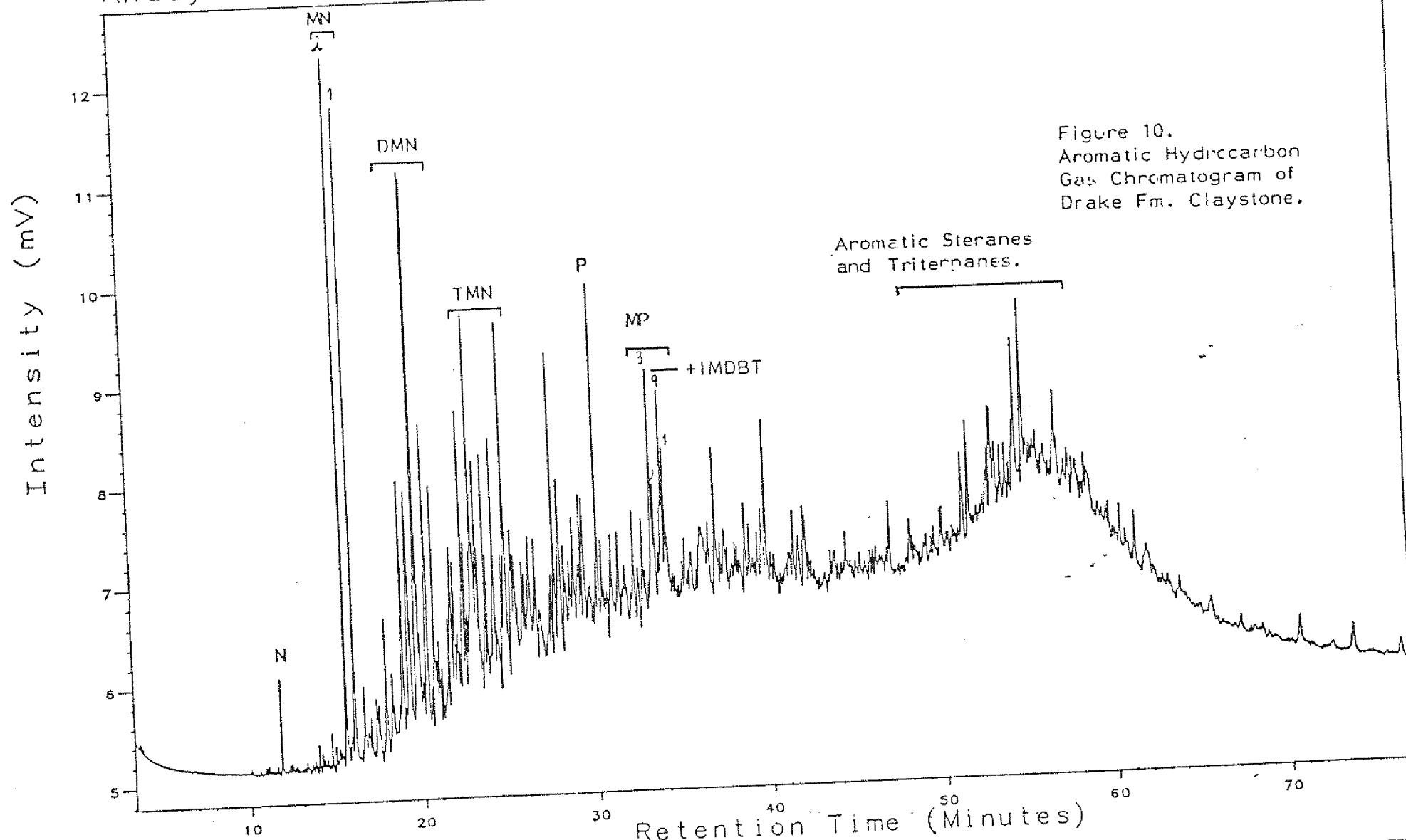
31/4-2 2172m, ARO



Analysis AR1532420

8, 1, 1

31/4-2 2420m, ARO



Analysis TD1532158 12, 1, 1 31/4-2, 2158m, S1

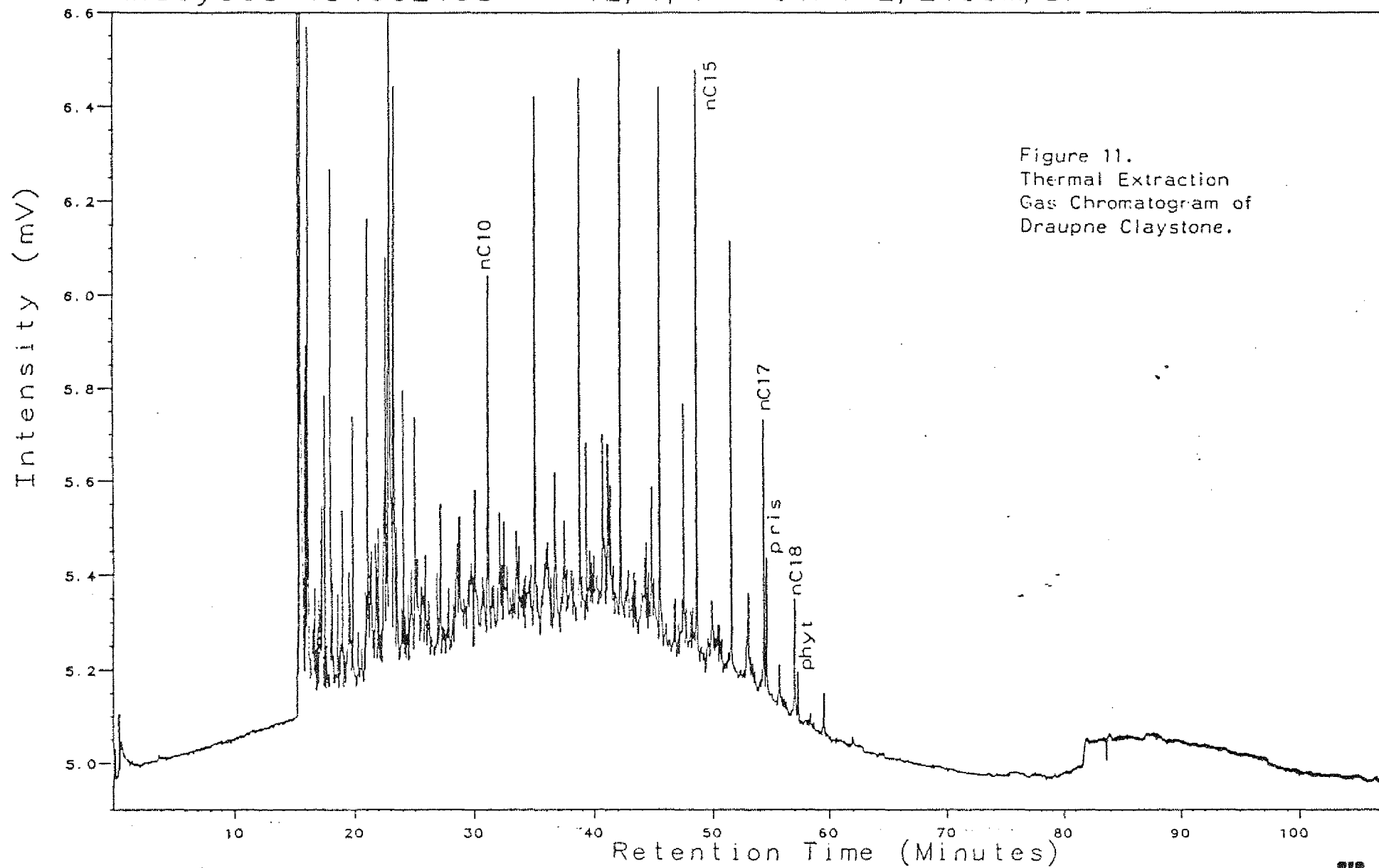


Figure 11.  
Thermal Extraction  
Gas Chromatogram of  
Draupne Claystone.

Analysis TD1532310 12, 1, 1 31/4-2, 2310m, S1

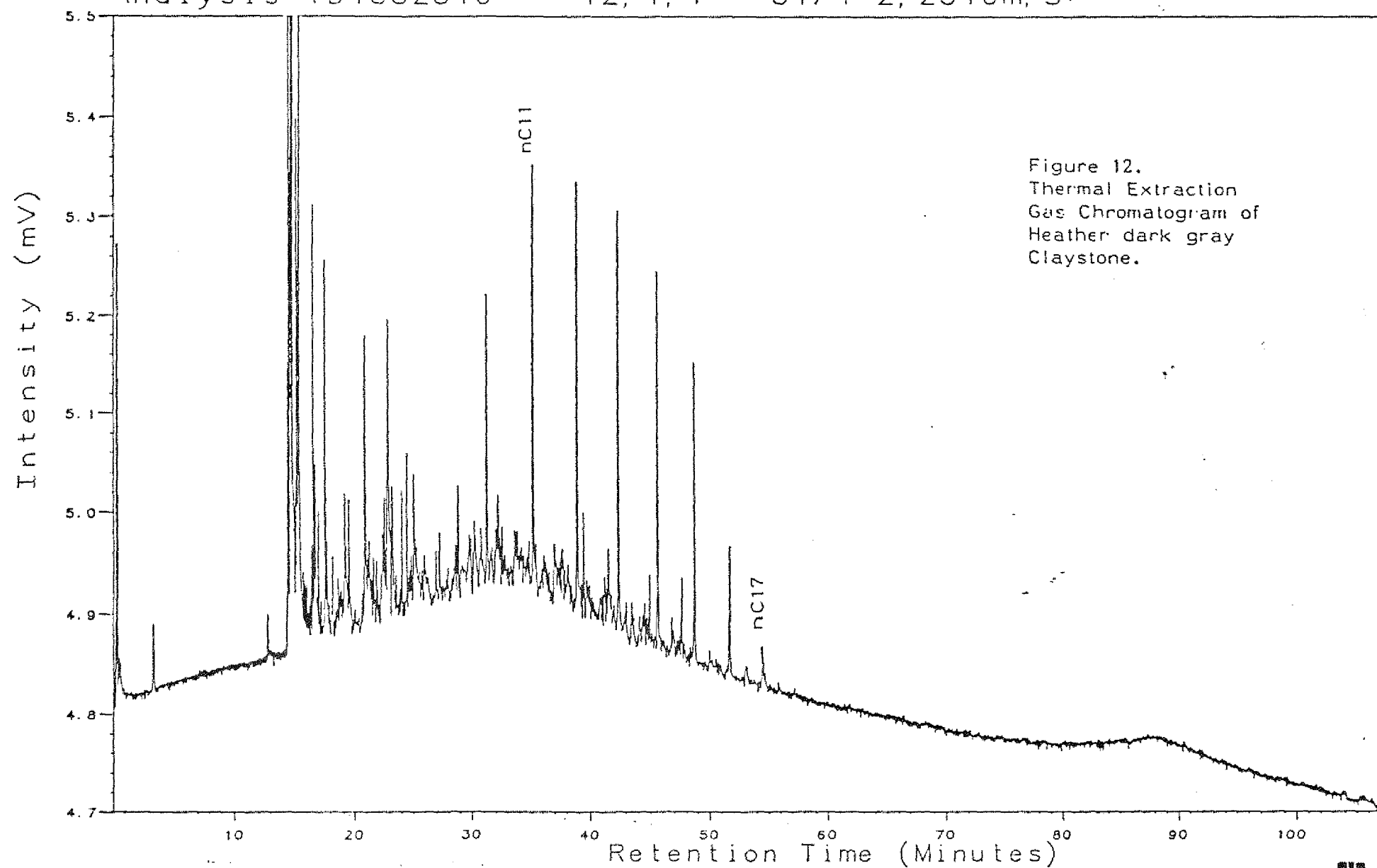


Figure 12.  
Thermal Extraction  
Gas Chromatogram of  
Heather dark gray  
Claystone.

Analysis ID 1532408

12, 1, 1

31/4-2, 2408m, S1.

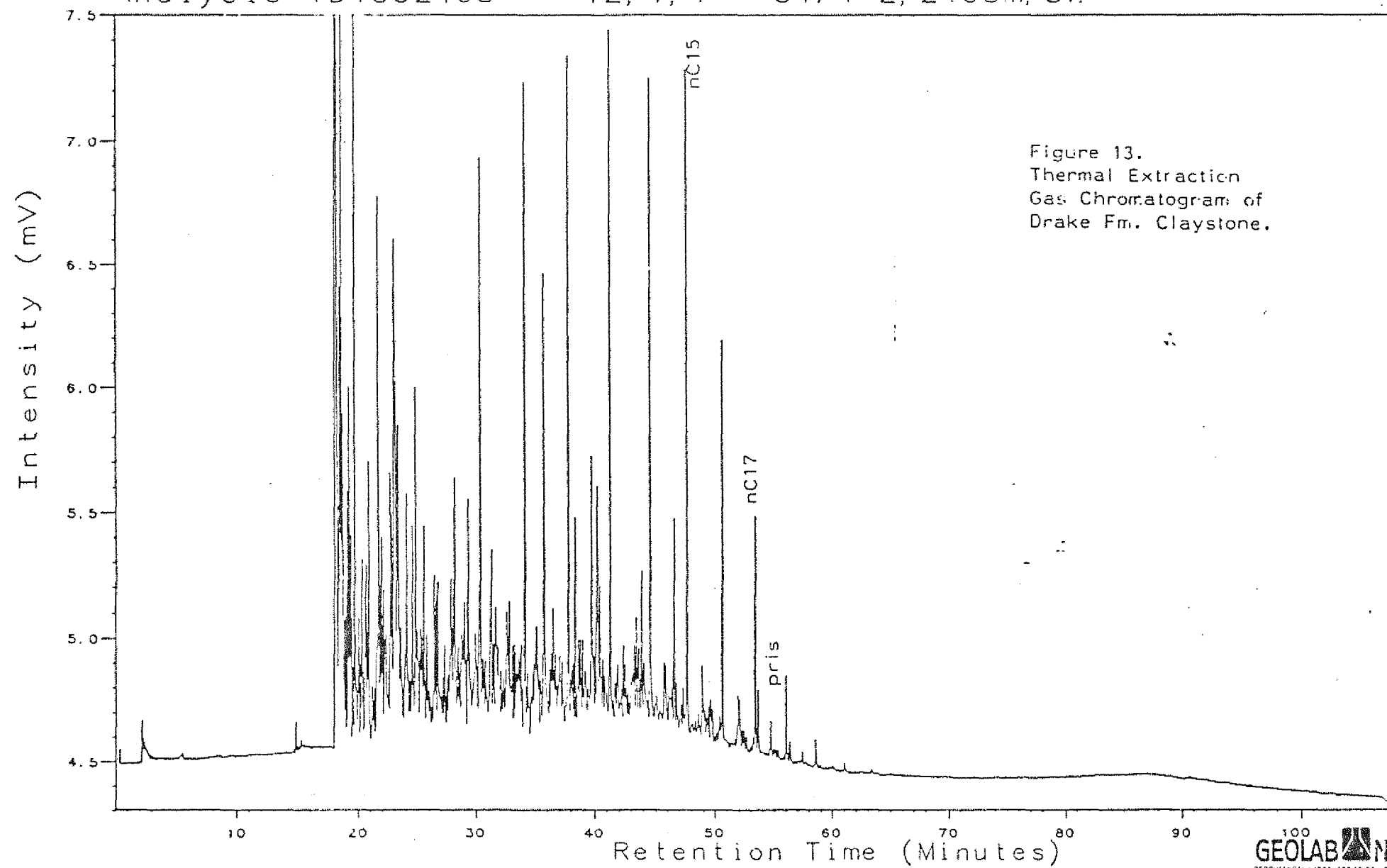
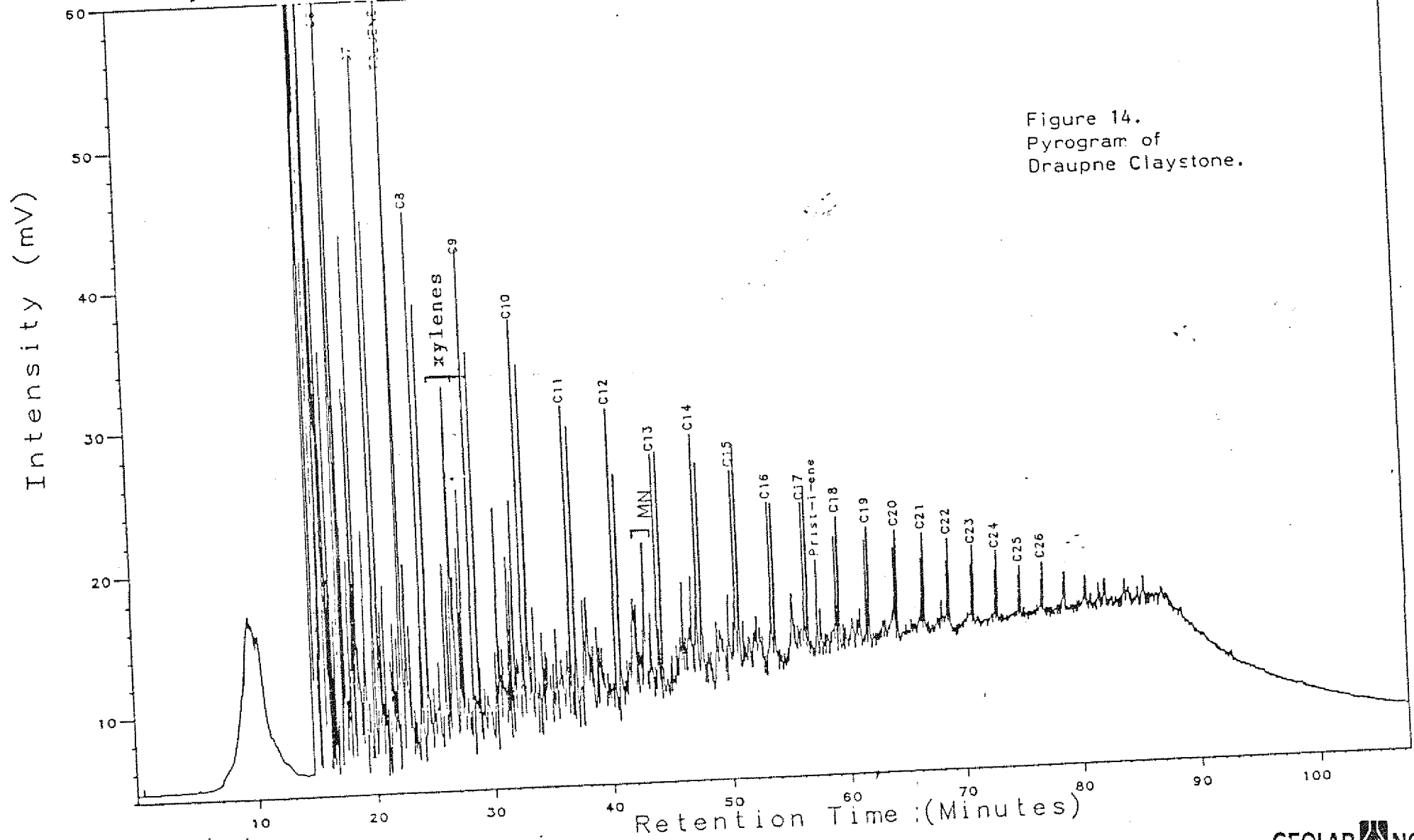


Figure 13.  
Thermal Extraction  
Gas Chromatogram of  
Drake Fm. Claystone.

Analysis TD1532152

11, 1, 1

31/4-2, 2152m, S2

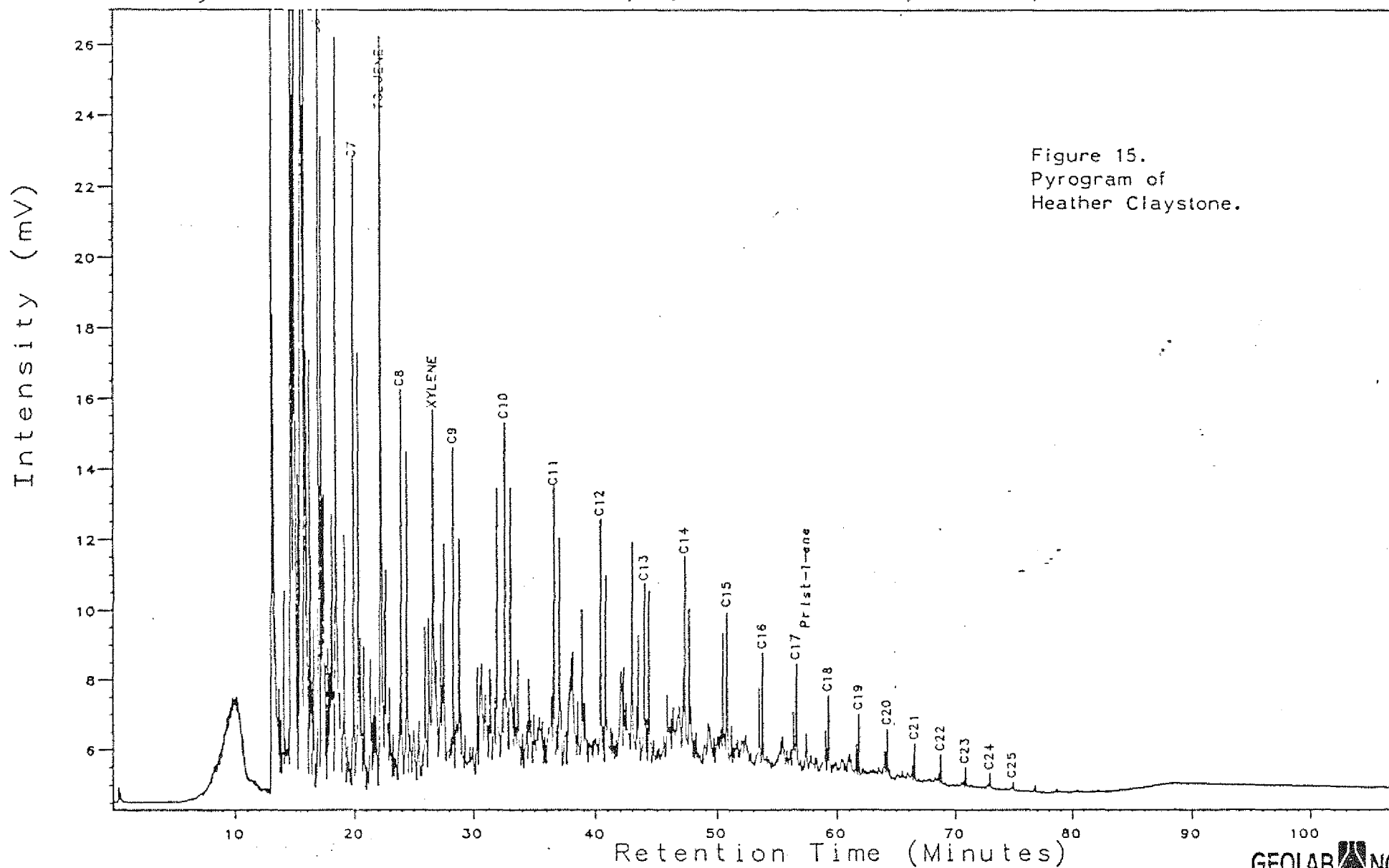




Analysis TD1532310

11, 1, 1

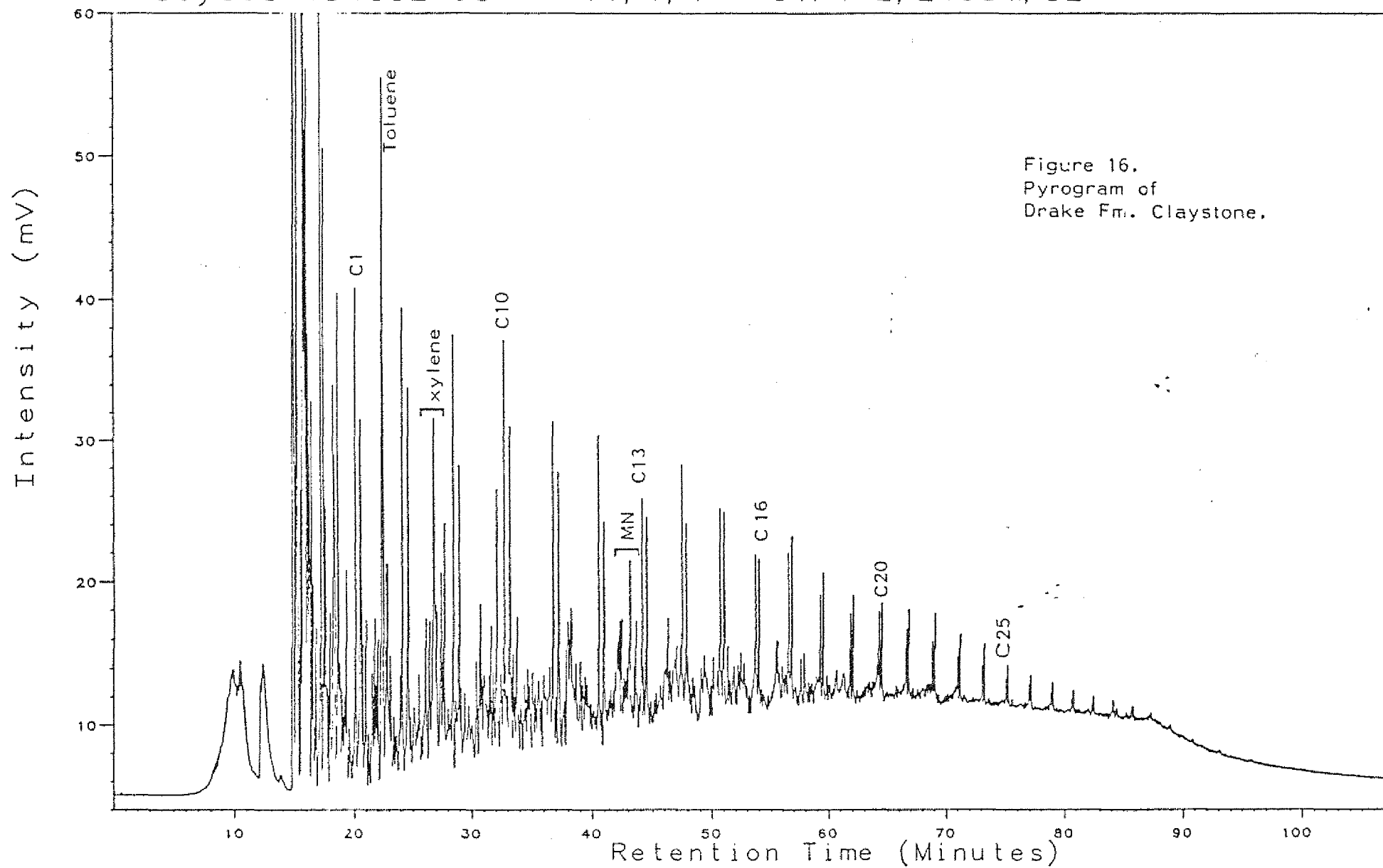
31/4-2, 2310m, S2



Analysis TD1532468

11, 1, 1

31/4-2, 2468m, S2



Analysis TD1532554

11, 1, 1

31/4-2, 2554m, S2

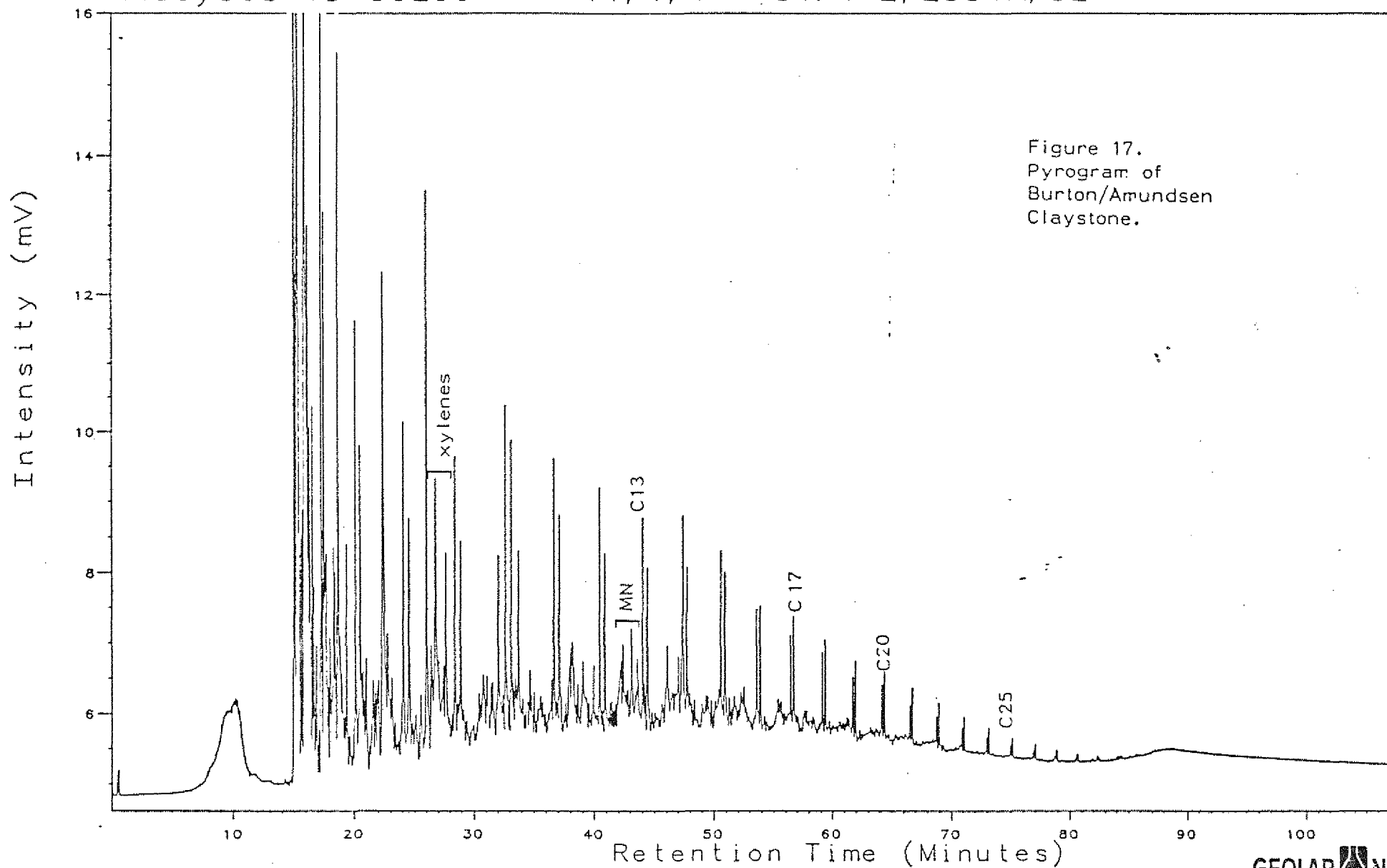


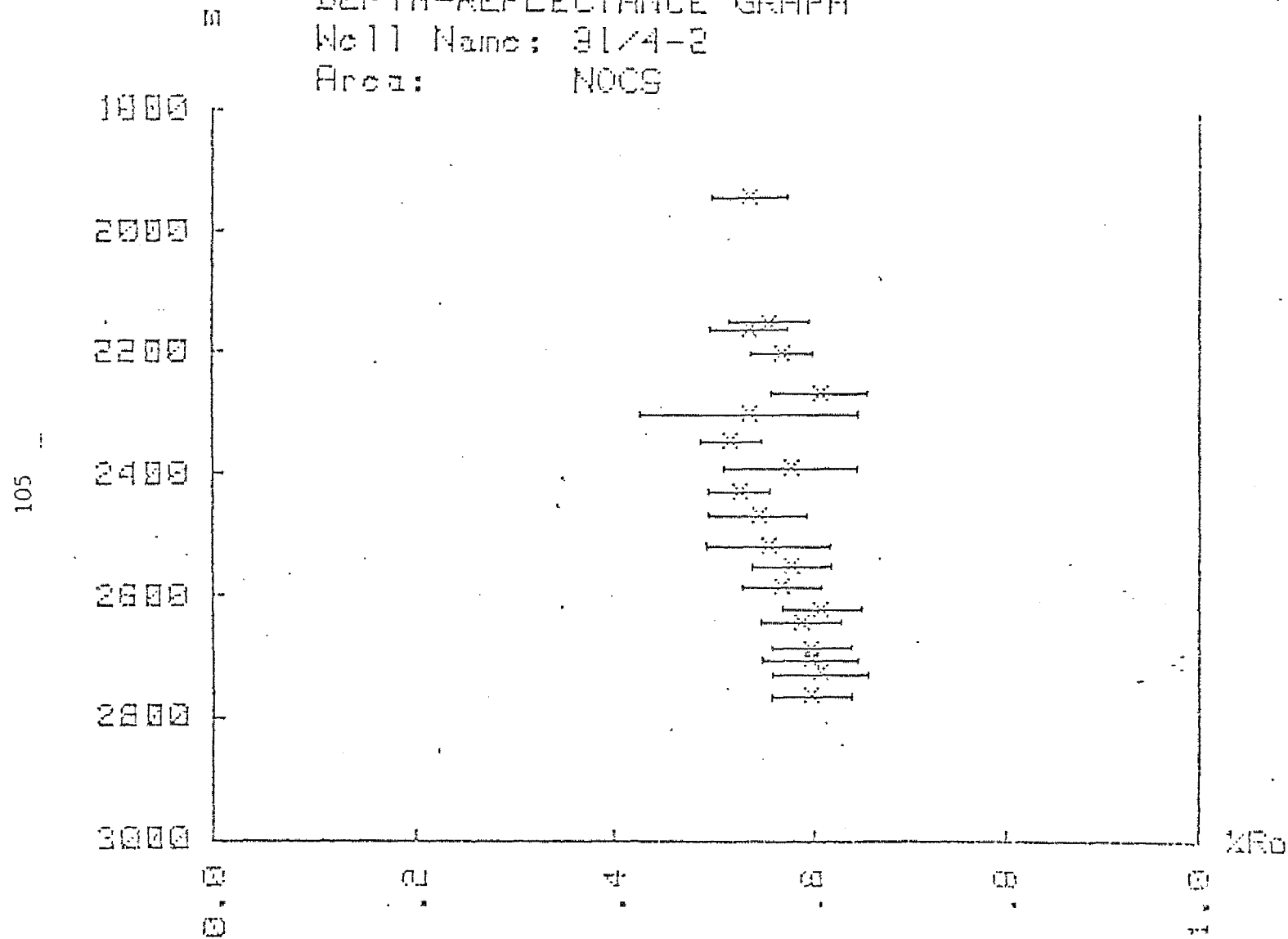
Figure 17.  
Pyrogram of  
Burton/Amundsen  
Claystone.

Figure 18.

DEPTH-REFLECTANCE GRAPH

Well Name: 31/4-2

Area: NOCS



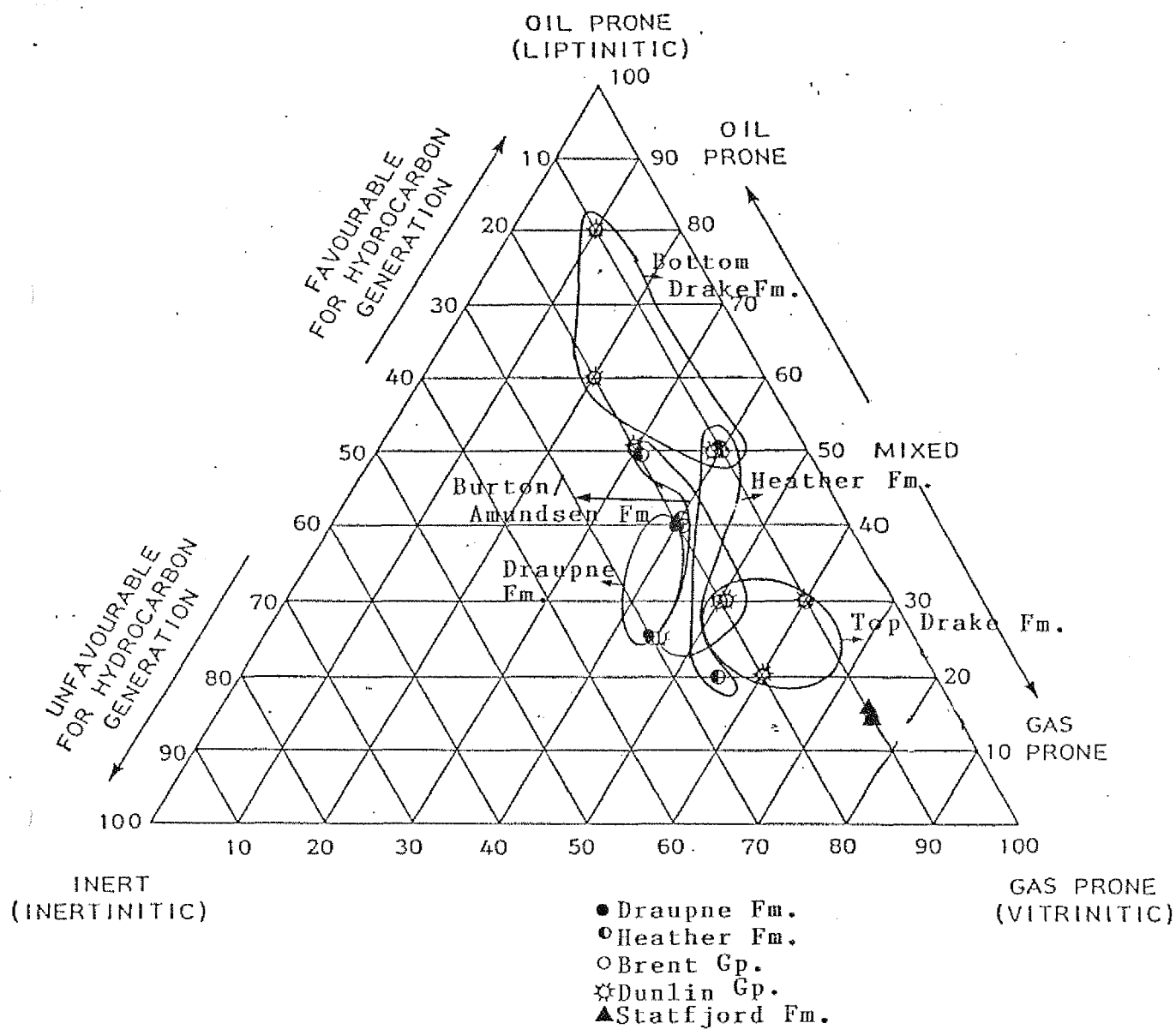


Figure 19. Visual Kerogen Composition Diagram for Well no. 31/4-2.

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm         | Age                      | Trb | Sample |
|---------|------|------|-------------|--------------------------|-----|--------|
| Int     | Cvd  | TOC% | %           | Lithology description    |     |        |
| 1790.00 |      |      | Hord        | Tert/Pale                |     | 001    |
|         |      |      | 50 Cont     | : Coal-ad                |     | 001-1  |
|         |      |      | 30 Sh/Clst: | brn gy, gn gy            |     | 001-2  |
|         |      |      | 20 Ca       | : y gy, lt ol gy         |     | 001-3  |
|         |      |      | tr Other    | : pyr                    |     | 001-4  |
| 1815.00 |      |      | Rogl Bald   | Tert/Pale                |     | 002    |
|         |      |      | 30 Cont     | : Coal-ad                |     | 002-1  |
|         |      |      | 25 Sh/Clst: | brn gy, gn gy            |     | 002-2  |
|         |      |      | 25 Ca       | : y gy, lt ol gy         |     | 002-3  |
|         |      |      | 20 Cont     | : prp, fib, evap         |     | 002-5  |
|         |      |      | tr Other    | : pyr                    |     | 002-4  |
| 1840.00 |      |      | Rogl Bald   | Tert/Pale                |     | 003    |
|         |      |      | 50 Sh/Clst: | lt ol gy, drk gn gy, pyr |     | 003-1  |
|         |      |      | 30 Cont     | : Coal-ad                |     | 003-2  |
|         |      |      | 10 Ca       | : y gy, lt ol gy         |     | 003-3  |
|         |      |      | 10 Cont     | : fib, evap              |     | 003-5  |
|         |      |      | tr Sh/Clst: | gy red                   |     | 003-4  |
| 1865.00 |      |      | Rogl Sele   | Tert/Pale                |     | 004    |
|         |      |      | 70 Sh/Clst: | gn gy, m gy, pyr         |     | 004-1  |
|         |      |      | 10 Ca       | : y gy                   |     | 004-2  |
|         |      |      | 10 Cont     | : Coal-ad                |     | 004-3  |
|         |      |      | 10 Cont     |                          |     | 004-4  |
| 1885.00 |      |      | Rogl Sele   | Tert/Pale                |     | 005    |
|         |      |      | 80 Sh/Clst: | gn gy, m gy, pyr         |     | 005-1  |
|         |      |      | 10 Ca       | : y gy                   |     | 005-2  |
|         |      |      | 10 Cont     | : prp, evap              |     | 005-3  |
|         |      |      | tr Other    | : pyr                    |     | 005-4  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                             | Trb | Sample |
|---------|------|------|-----|---------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description           |     |        |
| 1910.00 |      |      |     | Rogl List Tert/Pale             |     | 006    |
|         |      |      |     | 80 Sh/Clst: gn gy, m gy, pyr    |     | 006-1  |
|         |      |      |     | 10 Ca : y gy                    |     | 006-2  |
|         |      |      |     | 10 Cont : prp, evap             |     | 006-3  |
|         |      |      |     | tr Other : pyr                  |     | 006-4  |
| 1935.00 |      |      |     | Rogl List Tert/Pale             |     | 007    |
|         |      |      |     | 90 Sh/Clst: brn gy, gn gy, m gy |     | 007-5  |
|         |      |      |     | 10 Ca : y gy                    |     | 007-6  |
|         |      |      |     | tr Cont : Coal-ad               |     | 007-7  |
|         |      |      |     | tr Other : pyr, glauc           |     | 007-8  |
|         |      |      |     | tr Cont : prp, evap             |     | 007-9  |
| 1960.00 |      |      |     | Rogl List Tert/Pale             |     | 008    |
|         |      |      |     | 90 Sh/Clst: brn gy, gn gy, m gy |     | 008-1  |
|         |      |      |     | 10 Ca : y gy                    |     | 008-2  |
|         |      |      |     | tr Sh/Clst: gy red              |     | 008-3  |
|         |      |      |     | tr Other : pyr, glauc           |     | 008-4  |
|         |      |      |     | tr Cont : prp, evap             |     | 008-5  |
| 1985.00 |      |      |     | Rogl List Tert/Pale             |     | 009    |
|         |      |      |     | 90 Sh/Clst: brn gy, gn gy, m gy |     | 009-1  |
|         |      |      |     | 10 Ca : ol gy, dol              |     | 009-2  |
|         |      |      |     | tr Ca : y gy                    |     | 009-3  |
|         |      |      |     | tr Sh/Clst: gy red              |     | 009-4  |
|         |      |      |     | tr Cont : Coal-ad               |     | 009-5  |
|         |      |      |     | tr Other : pyr, glauc           |     | 009-6  |
|         |      |      |     | tr Cont : prp, evap             |     | 009-7  |
| 2010.00 |      |      |     | Rogl List Tert/Pale             |     | 010    |
|         |      |      |     | 90 Sh/Clst: brn gy, gn gy, m gy |     | 010-1  |
|         |      |      |     | 10 Ca : ol gy, dol              |     | 010-2  |
|         |      |      |     | tr Ca : y gy                    |     | 010-3  |
|         |      |      |     | tr Sh/Clst: gy red              |     | 010-4  |
|         |      |      |     | tr Cont : Coal-ad               |     | 010-5  |
|         |      |      |     | tr Other : pyr, glauc           |     | 010-6  |
|         |      |      |     | tr Cont : prp, evap             |     | 010-7  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                             | Trb | Sample |
|---------|------|------|-----|---------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description           |     |        |
| 2040.00 |      |      |     | Rogl List Tert/Pale             |     | 011    |
|         |      |      |     | 90 Sh/Clst: brn gy, gn gy, m gy |     | 011-1  |
|         |      |      |     | 10 Ca : ol gy, dol              |     | 011-2  |
|         |      |      |     | tr Ca : y gy                    |     | 011-3  |
|         |      |      |     | tr Sh/Clst: gy red              |     | 011-4  |
|         |      |      |     | tr S/Sst : lt gy, glauc, cem, l |     | 011-5  |
|         |      |      |     | tr Cont : Coal-ad               |     | 011-6  |
|         |      |      |     | tr Other : pyr, glauc           |     | 011-7  |
|         |      |      |     | tr Cont : prp, evap             |     | 011-8  |
| 2060.00 |      |      |     | Shtl U.Cr/L.Camp-Maas           |     | 012    |
|         |      |      |     | 50 Cont : Coal-ad               |     | 012-1  |
|         |      |      |     | 30 Sh/Clst: gn gy, m gy         |     | 012-2  |
|         |      |      |     | 20 Ca : w, ol gy, pyr           |     | 012-3  |
| 2082.00 |      |      |     | Shtl U.Cr/L.Camp-Maas           |     | 013    |
|         |      |      |     | 90 Sh/Clst: gn gy, m gy         |     | 013-1  |
|         |      |      |     | 10 Ca : w, m gy                 |     | 013-2  |
|         |      |      |     | tr Sltst : gn gy, glauc         |     | 013-3  |
|         |      |      |     | tr Other : pyr, glauc           |     | 013-4  |
|         |      |      |     | tr Cont : Coal-ad               |     | 013-5  |
| 2104.00 |      |      |     | Shtl U.Cr/L.Camp-Maas           |     | 014    |
|         | 0.72 |      |     | 80 Sh/Clst: gn gy, m gy         |     | 014-1  |
|         |      |      |     | 20 Ca : w, m gy                 |     | 014-2  |
|         |      |      |     | tr S/Sst : lt ol gy, calc, cem  |     | 014-3  |
|         |      |      |     | tr Sh/Clst: gy red              |     | 014-4  |
|         |      |      |     | tr Other : pyr, glauc           |     | 014-5  |
|         |      |      |     | tr Cont : Coal-ad               |     | 014-6  |
|         |      |      |     | tr Cont : evap                  |     | 014-7  |



Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp         | Frm                   | Age              | Trb | Sample |
|---------|------|-------------|-----------------------|------------------|-----|--------|
| Int Cvd | TOC% | %           | Lithology description |                  |     |        |
| 2114.00 |      | Sht1        |                       | U.Cr/L.Camp-Maas |     | 015    |
|         | 0.04 | 80 Ca       | :                     | w                |     | 015-5  |
|         |      | 20 Sh/Clst: | gn gy, m gy           |                  |     | 015-6  |
|         |      | tr Sh/Clst: | gy red                |                  |     | 015-7  |
|         |      | tr Other    | : glauc               |                  |     | 015-8  |
|         |      | tr Cont     | : Coal-ad             |                  |     | 015-9  |
| 2124.00 |      | Sht1        |                       | U.Cr/L.Camp-Maas |     | 030    |
|         |      | 50 Ca       | :                     | w                |     | 030-1  |
|         | 0.58 | 50 Sh/Clst: | gn gy, m gy           |                  |     | 030-2  |
|         |      | tr Other    | : glauc               |                  |     | 030-3  |
|         |      | tr Cont     | : Coal-ad             |                  |     | 030-4  |
|         |      | tr Cont     | : evap                |                  |     | 030-5  |
| 2134.00 |      | Crkn        |                       | L.Cr             |     | 016    |
|         | 0.71 | 70 Sh/Clst: | gn gy, m gy           |                  |     | 016-5  |
|         |      | 30 Ca       | :                     | w                |     | 016-6  |
|         |      | tr Sh/Clst: | gy red                |                  |     | 016-7  |
|         |      | tr Other    | : glauc               |                  |     | 016-8  |
|         |      | tr Cont     | : Coal-ad             |                  |     | 016-9  |
| 2142.00 |      | Crkn        |                       | L.Cr             |     | 017    |
|         | 0.72 | 80 Sh/Clst: | gn gy, m gy           |                  |     | 017-4  |
|         |      | 20 Ca       | :                     | w                |     | 017-5  |
|         |      | tr S/Sst    | : w to pl red         |                  |     | 017-6  |
|         |      | tr Other    | : pyr, glauc          |                  |     | 017-7  |
|         |      | tr Cont     | : Coal-ad             |                  |     | 017-8  |
|         |      | tr Cont     | : prp, fib            |                  |     | 017-9  |
| 2143.00 |      | Crkn        |                       | L.Cr             |     | 018    |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm                 | Age                             | Trb | Sample |
|---------|------|------|---------------------|---------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %                   | Lithology description           |     |        |
| 2146.00 |      |      | Crkn                | L.Cr                            |     | 019    |
|         |      | 0.58 | 90                  | Sh/Clst: gn gy, m gy            |     | 019-1  |
|         |      |      | 10                  | Ca : w                          |     | 019-2  |
|         |      |      | tr                  | S/Sst : w to pl red             |     | 019-3  |
|         |      |      | tr                  | Other : pyr, glauc              |     | 019-4  |
|         |      |      | tr                  | Cont : Coal-ad                  |     | 019-5  |
|         |      |      | tr                  | Cont : evap                     |     | 019-6  |
| 2152.00 |      |      | Viki Drau U.Ju/Kimm |                                 |     | 020    |
|         |      | 6.28 | 50                  | Sh/Clst: ol blk to drk gy, calc |     | 020-4  |
| cvd     |      | 0.74 | 40                  | Sh/Clst: gn gy, m gy            |     | 020-5  |
| cvd     |      |      | 10                  | Ca : w                          |     | 020-6  |
| cvd     |      |      | tr                  | Sh/Clst: gy red                 |     | 020-7  |
|         |      |      | tr                  | Other : pyr, glauc              |     | 020-8  |
|         |      |      | tr                  | Cont : Mica-ad, evap            |     | 020-9  |
| 2158.00 |      |      | Viki Drau U.Ju/Kimm |                                 |     | 021    |
|         |      | 5.06 | 50                  | Sh/Clst: ol blk to drk gy, calc |     | 021-4  |
| cvd     |      | 0.52 | 40                  | Sh/Clst: gn gy, m gy            |     | 021-5  |
| cvd     |      |      | 10                  | Ca : w                          |     | 021-6  |
| cvd     |      |      | tr                  | Sh/Clst: gy red                 |     | 021-7  |
|         |      |      | tr                  | Other : pyr, glauc              |     | 021-8  |
|         |      |      | tr                  | Cont : Coal-ad, Mica-ad, evap   |     | 021-9  |
| 2166.00 |      |      | Viki Drau U.Ju/Kimm |                                 |     | 022    |
|         |      | 4.37 | 50                  | Sh/Clst: ol blk to drk gy, calc |     | 022-4  |
| cvd     |      | 0.37 | 40                  | Sh/Clst: gn gy, m gy            |     | 022-5  |
| cvd     |      |      | 10                  | Ca : w                          |     | 022-6  |
| cvd     |      |      | tr                  | Sh/Clst: gy red                 |     | 022-7  |
|         |      |      | tr                  | Other : pyr, glauc              |     | 022-8  |
|         |      |      | tr                  | Cont : Coal-ad, Mica-ad, evap   |     | 022-9  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                             | Trb | Sample |
|---------|------|------|-----|---------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description           |     |        |
| 2172.00 |      |      |     | Viki Heat U.Ju/Kimm             |     | 023    |
|         |      | 4.90 | 50  | Sh/Clst: ol blk to drk gy, calc |     | 023-4  |
|         |      | 0.47 | 40  | Sh/Clst: gn gy, m gy            |     | 023-5  |
|         | cvd  |      | 10  | Ca : w                          |     | 023-6  |
|         | cvd  |      | tr  | Sh/Clst: gy red                 |     | 023-7  |
|         |      |      | tr  | Other : pyr, glauc              |     | 023-8  |
|         |      |      | tr  | Cont : Coal-ad, Mica-ad, evap   |     | 023-9  |
| 2178.00 |      |      |     | Viki Heat U.Ju/Kimm             |     | 024    |
|         |      |      | 80  | Cont : Coal-ad                  |     | 024-3  |
|         |      | 0.58 | 20  | Sh/Clst: gn gy, m gy            |     | 024-4  |
|         | cvd  |      | tr  | Ca : w                          |     | 024-5  |
|         | cvd  |      | tr  | Sh/Clst: gy red                 |     | 024-6  |
|         |      |      | tr  | Other : pyr                     |     | 024-7  |
| 2184.00 |      |      |     | Viki Heat U.Ju/Oxfo             |     | 025    |
|         |      |      | 60  | Cont : Coal-ad                  |     | 025-1  |
|         |      | 0.57 | 30  | Sh/Clst: gn gy, m gy            |     | 025-2  |
|         |      |      | 10  | Cont : prp, evap                |     | 025-5  |
|         | cvd  |      | tr  | Ca : w                          |     | 025-3  |
|         | cvd  |      | tr  | Sh/Clst: gy red                 |     | 025-4  |
| 2190.00 |      |      |     | Viki Heat U.Ju/Oxfo             |     | 026    |
|         |      |      | 40  | Cont : Coal-ad                  |     | 026-3  |
|         |      | 0.72 | 40  | Sh/Clst: gn gy, m drk gy        |     | 026-4  |
|         | cvd  | 0.14 | 10  | Sh/Clst: gy red                 |     | 026-5  |
|         |      |      | 10  | Cont : evap                     |     | 026-8  |
|         | cvd  |      | tr  | Ca : w                          |     | 026-6  |
|         |      |      | tr  | Other : pyr                     |     | 026-7  |
| 2196.00 |      |      |     | Viki Ihes U.Ju/Oxfo             |     | 027    |
|         | cvd  | 0.60 | 60  | Sh/Clst: gn gy, m gy            |     | 027-1  |
|         |      |      | 30  | Cont : Coal-ad                  |     | 027-2  |
|         | cvd  |      | 10  | Sh/Clst: ol blk to drk gy       |     | 027-3  |
|         |      |      | tr  | Cont : fib, evap                |     | 027-4  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp | Frm                          | Age | Trb | Sample |
|---------|------|-----|------------------------------|-----|-----|--------|
| Int Cvd | TOC% | %   | Lithology description        |     |     |        |
| 2204.00 |      |     | Viki Heat U.Ju/Oxfo          |     |     | 028    |
| cvd     | 0.57 | 60  | Sh/Clst: gn gy, m gy         |     |     | 028-3  |
|         |      | 20  | Cont : Coal-ad               |     |     | 028-4  |
| cvd     |      | 10  | Sh/Clst: ol blk to drk gy    |     |     | 028-5  |
|         |      | 10  | S/Sst : w to y gy, cem       |     |     | 028-6  |
|         |      | tr  | Cont : prp, evap             |     |     | 028-7  |
| 2230.00 |      |     | Viki Ihes U.Ju/L.Call-E.Oxfo |     |     | 029    |
| cvd     | 0.56 | 50  | Sh/Clst: gn gy, m gy         |     |     | 029-1  |
|         |      | 30  | S/Sst : w to y gy, calc, cem |     |     | 029-2  |
| cvd     | 5.29 | 20  | Sh/Clst: ol blk to drk gy    |     |     | 029-3  |
| cvd     |      | tr  | Ca : m gy                    |     |     | 029-4  |
| cvd     |      | tr  | Sh/Clst: gy red              |     |     | 029-5  |
|         |      | tr  | Other : pyr, glauc           |     |     | 029-6  |
|         |      | tr  | Cont : Coal-ad               |     |     | 029-7  |
|         |      | tr  | Cont : Mica-ad, evap         |     |     | 029-8  |
| 2238.00 |      |     | Viki Ihes U.Ju/L.Call-E.Oxfo |     |     | 031    |
| cvd     | 0.60 | 50  | Sh/Clst: gn gy, m gy         |     |     | 031-1  |
|         |      | 30  | S/Sst : w, y gy, calc, cem   |     |     | 031-2  |
| cvd     | 5.25 | 20  | Sh/Clst: ol blk, drk gy      |     |     | 031-3  |
| cvd     |      | tr  | Ca : m gy                    |     |     | 031-4  |
| cvd     |      | tr  | Sh/Clst: gy red              |     |     | 031-5  |
|         |      | tr  | Other : pyr, glauc           |     |     | 031-6  |
|         |      | tr  | Cont : Coal-ad               |     |     | 031-7  |
|         |      | tr  | Cont : Mica-ad, evap         |     |     | 031-8  |
| 2242.00 |      |     | Viki Heat M.Ju/L.Bath-M.Call |     |     | 032    |
|         |      | 70  | Cont : Coal-ad               |     |     | 032-1  |
|         | 0.68 | 20  | Sh/Clst: gn gy, m gy         |     |     | 032-2  |
|         | 5.01 | 10  | Sh/Clst: ol blk, drk gy      |     |     | 032-3  |
| cvd     |      | tr  | S/Sst : w, y gy, calc, cem   |     |     | 032-4  |
| cvd     |      | tr  | Sh/Clst: gy red              |     |     | 032-5  |
|         |      | tr  | Cont : prp, evap             |     |     | 032-6  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                          | Trb | Sample |
|---------|------|------|-----|------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description        |     |        |
| 2248.00 |      |      |     | Viki Heat M.Ju/L.Bath-M.Call |     | 033    |
|         |      |      | 70  | Cont : Coal-ad               |     | 033-1  |
|         |      | 0.65 | 20  | Sh/Clst: gn gy, m gy         |     | 033-2  |
|         |      | 6.07 | 10  | Sh/Clst: ol blk, drk gy      |     | 033-3  |
|         | cvd  |      | tr  | S/Sst : w, y gy, calc, cem   |     | 033-4  |
|         | cvd  |      | tr  | Sh/Clst: gy red              |     | 033-5  |
|         |      |      | tr  | Cont : prp, evap             |     | 033-6  |
| 2254.00 |      |      |     | Viki Heat M.Ju/L.Bath-M.Call |     | 034    |
|         |      |      | 90  | Sh/Clst: gn gy, m gy         |     | 034-1  |
|         |      | 0.61 | 10  | Cont : Coal-ad               |     | 034-2  |
|         |      |      | tr  | Sh/Clst: ol blk, drk gy      |     | 034-3  |
|         | cvd  |      | tr  | Sh/Clst: gy red              |     | 034-4  |
|         |      |      | tr  | Ca : w, y gy                 |     | 034-5  |
|         |      |      | tr  | Other : pyr                  |     | 034-6  |
|         |      |      | tr  | Cont : evap                  |     | 034-7  |
| 2262.00 |      |      |     | Viki Heat M.Ju/L.Bath-M.Call |     | 035    |
|         |      |      | 90  | Sh/Clst: gn gy, m gy         |     | 035-1  |
|         |      | 0.61 | 10  | Cont : Coal-ad               |     | 035-2  |
|         |      |      | tr  | Sh/Clst: ol blk, drk gy      |     | 035-3  |
|         | cvd  |      | tr  | Sh/Clst: gy red              |     | 035-4  |
|         |      |      | tr  | Ca : w, y gy                 |     | 035-5  |
|         |      |      | tr  | Other : pyr                  |     | 035-6  |
|         |      |      | tr  | Cont : evap                  |     | 035-7  |
| 2266.00 |      |      |     | Viki Heat M.Ju/L.Bath-M.Call |     | 036    |
|         |      |      | 90  | Sh/Clst: gn gy, m gy         |     | 036-1  |
|         |      | 0.72 | 10  | Cont : Coal-ad               |     | 036-2  |
|         |      |      | tr  | Sh/Clst: ol blk, drk gy      |     | 036-3  |
|         | cvd  |      | tr  | Sh/Clst: gy red              |     | 036-4  |
|         |      |      | tr  | S/Sst : w, y gy, calc, cem   |     | 036-5  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm      | Age                          | Trb | Sample |
|---------|------|------|----------|------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %        | Lithology description        |     |        |
| 2274.00 |      |      |          | Viki Heat M.Ju/L.Bath-M.Call |     | 037    |
|         | 0.67 | 90   | Sh/Clst: | gn gy, m gy                  |     | 037-1  |
|         |      | 10   | Cont     | : Coal-ad                    |     | 037-2  |
|         |      | tr   | Sh/Clst: | ol blk, drk gy               |     | 037-3  |
| cvd     |      | tr   | Sh/Clst: | gy red                       |     | 037-4  |
|         |      | tr   | S/Sst    | : w, y gy, calc, cem         |     | 037-5  |
|         |      | tr   | Ca       | : w, y gy                    |     | 037-6  |
|         |      | tr   | Other    | : pyr                        |     | 037-7  |
|         |      | tr   | Cont     | : prp, evap                  |     | 037-8  |
| 2280.00 |      |      |          | Viki Heat M.Ju/L.Bath-M.Call |     | 038    |
|         | 0.73 | 90   | Sh/Clst: | gn gy, m gy                  |     | 038-1  |
|         |      | 10   | Cont     | : Coal-ad                    |     | 038-2  |
|         |      | tr   | Sh/Clst: | ol blk, drk gy               |     | 038-3  |
| cvd     |      | tr   | Sh/Clst: | gy red                       |     | 038-4  |
|         |      | tr   | S/Sst    | : w, y gy, calc, cem         |     | 038-5  |
|         |      | tr   | Ca       | : w, y gy                    |     | 038-6  |
|         |      | tr   | Other    | : pyr                        |     | 038-7  |
|         |      | tr   | Cont     | : prp, evap                  |     | 038-8  |
| 2286.00 |      |      |          | Viki Heat M.Ju/L.Bath-M.Call |     | 039    |
|         | 0.76 | 90   | Sh/Clst: | gn gy, m gy                  |     | 039-1  |
|         |      | 10   | Cont     | : Coal-ad                    |     | 039-2  |
|         |      | tr   | Sh/Clst: | ol blk, drk gy               |     | 039-3  |
| cvd     |      | tr   | Sh/Clst: | gy red                       |     | 039-4  |
|         |      | tr   | S/Sst    | : w, y gy, calc, cem         |     | 039-5  |
|         |      | tr   | Ca       | : w, y gy, ol gy             |     | 039-6  |
|         |      | tr   | Other    | : pyr                        |     | 039-7  |
|         |      | tr   | Cont     | : prp, evap                  |     | 039-8  |
| 2292.00 |      |      |          | Viki Heat M.Ju/Bath          |     | 040    |
|         | 0.81 | 90   | Sh/Clst: | gn gy, m gy                  |     | 040-1  |
|         |      | 10   | Cont     | : Coal-ad                    |     | 040-2  |
|         |      | tr   | Sh/Clst: | ol blk, drk gy               |     | 040-3  |
| cvd     |      | tr   | Sh/Clst: | gy red                       |     | 040-4  |
|         |      | tr   | S/Sst    | : w, y gy, calc, cem         |     | 040-5  |
|         |      | tr   | Ca       | : w, y gy, ol gy             |     | 040-6  |
|         |      | tr   | Other    | : pyr                        |     | 040-7  |
|         |      | tr   | Cont     | : prp, evap                  |     | 040-8  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm      | Age                   | Trb | Sample |
|---------|------|------|----------|-----------------------|-----|--------|
| Int     | Cvd  | TOC% | %        | Lithology description |     |        |
| 2298.00 |      |      |          | Viki Heat M.Ju/Bath   |     | 041    |
|         | 0.60 | 90   | Sh/Clst: | gn gy, m gy           |     | 041-1  |
|         |      | 10   | Cont     | : Coal-ad             |     | 041-2  |
|         |      | tr   | Sh/Clst: | ol blk, drk gy        |     | 041-3  |
| cvd     |      | tr   | Sh/Clst: | gy red                |     | 041-4  |
|         |      | tr   | S/Sst    | : w, y gy, calc, cem  |     | 041-5  |
|         |      | tr   | Ca       | : w, y gy, ol gy      |     | 041-6  |
|         |      | tr   | Other    | : pyr                 |     | 041-7  |
|         |      | tr   | Cont     | : prp, evap           |     | 041-8  |
| 2304.00 |      |      |          | Viki Heat M.Ju/Bath   |     | 042    |
|         | 0.55 | 70   | Sh/Clst: | gn gy, m gy           |     | 042-1  |
|         |      | 20   | Cont     | : evap                |     | 042-6  |
|         |      | 10   | Cont     | : Coal-ad             |     | 042-2  |
|         |      | tr   | Sh/Clst: | ol blk, drk gy        |     | 042-3  |
| cvd     |      | tr   | Sh/Clst: | gy red                |     | 042-4  |
|         |      | tr   | S/Sst    | : w, y gy, calc, cem  |     | 042-5  |
| 2310.00 |      |      |          | Viki Heat M.Ju/Bath   |     | 043    |
|         | 1.49 | 90   | Sh/Clst: | gn gy, drk gy         |     | 043-1  |
|         |      | 10   | S/Sst    | : w, y gy, calc, cem  |     | 043-2  |
| cvd     |      | tr   | Sh/Clst: | gy red                |     | 043-3  |
|         |      | tr   | Cont     | : Coal-ad             |     | 043-4  |
|         |      | tr   | Other    | : pyr                 |     | 043-5  |
|         |      | tr   | Cont     | : prp, evap           |     | 043-6  |
| 2316.00 |      |      |          | Viki Heat M.Ju/Bajo   |     | 044    |
|         | 1.42 | 90   | Sh/Clst: | gn gy, drk gy         |     | 044-1  |
|         |      | 10   | S/Sst    | : w, y gy, calc, cem  |     | 044-2  |
| cvd     |      | tr   | Sh/Clst: | gy red                |     | 044-3  |
|         |      | tr   | Cont     | : Coal-ad             |     | 044-4  |
|         |      | tr   | Other    | : pyr                 |     | 044-5  |
|         |      | tr   | Cont     | : prp, evap           |     | 044-6  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp | Frm                        | Age | Trb | Sample |
|---------|------|-----|----------------------------|-----|-----|--------|
| Int Cvd | TOC% | %   | Lithology description      |     |     |        |
| 2324.00 |      |     | Viki Heat M.Ju/Bajo        |     |     | 045    |
|         | 2.09 | 90  | Sh/Clst: gn gy, drk gy     |     |     | 045-1  |
|         |      | 10  | S/Sst : w, y gy, calc, cem |     |     | 045-2  |
| cvd     |      | tr  | Sh/Clst: gy red            |     |     | 045-3  |
|         |      | tr  | Cont : Coal-ad             |     |     | 045-4  |
|         |      | tr  | Other : pyr                |     |     | 045-5  |
|         |      | tr  | Cont : prp, evap           |     |     | 045-6  |
| 2328.00 |      |     | Bren M.Ju/E.Bajo           |     |     | 046    |
|         |      | 40  | Sh/Clst: gn gy, drk gy     |     |     | 046-1  |
| cvd     |      | 40  | S/Sst : w, l               |     |     | 046-2  |
|         |      | 20  | Cont : prp, ns, fib, evap  |     |     | 046-5  |
|         |      | tr  | Cont : Coal-ad             |     |     | 046-3  |
|         |      | tr  | Other : pyr                |     |     | 046-4  |
| 2334.00 |      |     | Bren M.Ju/E.Bajo           |     |     | 047    |
|         | 2.76 | 80  | Sh/Clst: gn gy, drk gy     |     |     | 047-1  |
|         |      | 10  | S/Sst : w, l               |     |     | 047-2  |
|         |      | 10  | Cont : gy red              |     |     | 047-4  |
|         |      | tr  | Cont : Coal-ad             |     |     | 047-3  |
| 2340.00 |      |     | Bren M.Ju/E.Bajo           |     |     | 048    |
|         | 2.19 | 90  | Sh/Clst: gn gy, drk gy     |     |     | 048-1  |
|         |      | 10  | Cont : prp, ns, evap       |     |     | 048-5  |
|         |      | tr  | S/Sst : w, l               |     |     | 048-2  |
|         |      | tr  | Cont : Coal-ad             |     |     | 048-3  |
|         |      | tr  | Other : pyr                |     |     | 048-4  |
| 2346.00 |      |     | Bren M.Ju/E.Bajo           |     |     | 049    |
|         | 1.77 | 90  | Sh/Clst: gn gy, drk gy     |     |     | 049-1  |
|         |      | 10  | Cont : prp, ns, evap       |     |     | 049-5  |
|         |      | tr  | S/Sst : w, l               |     |     | 049-2  |
|         |      | tr  | Cont : Coal-ad             |     |     | 049-3  |
|         |      | tr  | Other : pyr                |     |     | 049-4  |



Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm       | Age                          | Trb | Sample |
|---------|------|------|-----------|------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %         | Lithology description        |     |        |
| 2354.00 |      |      | Bren      | M.Ju/E.Bajo                  |     | 050    |
|         |      | 2.70 | 50        | S/Sst : w, cem, l            |     | 050-1  |
|         |      |      | 40        | Sh/Clst: gn gy, drk gy       |     | 050-2  |
|         |      |      | 10        | Ca : w                       |     | 050-3  |
|         |      |      | tr        | Sh/Clst: gy red              |     | 050-4  |
|         |      |      | tr        | Other : pyr                  |     | 050-5  |
|         |      |      | tr        | Cont : Mica-ad               |     | 050-6  |
| 2360.00 |      |      | Dunl Drak | L.Ju/Toar                    |     | 051    |
|         | cvd  |      | 50        | S/Sst : w, cem, l            |     | 051-1  |
|         |      | 2.23 | 40        | Sh/Clst: gn gy, drk gy       |     | 051-2  |
|         | cvd  |      | 10        | Ca : w                       |     | 051-3  |
|         |      |      | tr        | Other : pyr, glauc           |     | 051-4  |
|         |      |      | tr        | Cont : Mica-ad               |     | 051-5  |
| 2366.00 |      |      | Dunl Drak | L.Ju/Toar                    |     | 052    |
|         |      | 2.61 | 90        | Sh/Clst: gn gy, ol blk, calc |     | 052-1  |
|         |      |      | 10        | S/Sst : w, cem, l            |     | 052-2  |
|         |      |      | tr        | Sh/Clst: gy red              |     | 052-3  |
|         |      |      | tr        | Other : pyr                  |     | 052-4  |
|         |      |      | tr        | Cont : Coal-ad               |     | 052-5  |
|         |      |      | tr        | Cont : prp, evap             |     | 052-6  |
| 2372.00 |      |      | Dunl Drak | L.Ju/Toar                    |     | 053    |
|         |      | 3.04 | 90        | Sh/Clst: gn gy, ol blk, calc |     | 053-1  |
|         |      |      | 10        | S/Sst : w, cem, l            |     | 053-2  |
|         |      |      | tr        | Sh/Clst: m gy brn, calc      |     | 053-3  |
|         |      |      | tr        | Other : pyr                  |     | 053-4  |
|         |      |      | tr        | Cont : Coal-ad               |     | 053-5  |
|         |      |      | tr        | Cont : Mica-ad               |     | 053-6  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm   | Age                          | Trb | Sample |
|---------|------|------|-------|------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %     | Lithology description        |     |        |
| 2378.00 |      |      |       | Dunl Drak L.Ju/Toar          |     | 054    |
|         | 2.84 | 90   |       | Sh/Clst: gn gy, ol blk, calc |     | 054-1  |
|         |      | 10   |       | Sh/Clst: gy red              |     | 054-2  |
|         |      | tr   | S/Sst | : w, cem, l                  |     | 054-3  |
|         |      | tr   | Other | : pyr                        |     | 054-4  |
|         |      | tr   | Cont  | : Coal-ad                    |     | 054-5  |
|         |      | tr   | Cont  | : Mica-ad, evap              |     | 054-6  |
| 2384.00 |      |      |       | Dunl Drak L.Ju/Toar          |     | 055    |
|         | 2.03 | 100  |       | Sh/Clst: gn gy, ol blk, calc |     | 055-1  |
|         |      |      | tr    | Sh/Clst: gy red              |     | 055-2  |
|         |      |      | tr    | S/Sst : w, cem, l            |     | 055-3  |
|         |      |      | tr    | Ca : w                       |     | 055-4  |
|         |      |      | tr    | Other : pyr                  |     | 055-5  |
|         |      |      | tr    | Cont : Coal-ad               |     | 055-6  |
|         |      |      | tr    | Cont : Mica-ad, prp, fib     |     | 055-7  |
| 2390.00 |      |      |       | Dunl Drak L.Ju/Toar          |     | 056    |
|         | 2.99 | 90   |       | Sh/Clst: gn gy, ol blk, calc |     | 056-1  |
|         |      | 10   |       | Sh/Clst: gy red              |     | 056-2  |
|         |      | tr   | S/Sst | : w, cem, l                  |     | 056-3  |
|         |      | tr   | Ca    | : w, dsk red                 |     | 056-4  |
|         |      | tr   | Cont  | : prp, evap                  |     | 056-5  |
| 2396.00 |      |      |       | Dunl Drak L.Ju/Toar          |     | 057    |
|         | 1.87 | 100  |       | Sh/Clst: gn gy, ol blk, calc |     | 057-1  |
|         |      |      | tr    | Sh/Clst: m gy brn            |     | 057-2  |
|         |      |      | tr    | Other : pyr                  |     | 057-3  |
|         |      |      | tr    | Cont : Coal-ad               |     | 057-4  |
|         |      |      | tr    | Cont : evap                  |     | 057-5  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp | Frm                            | Age | Trb | Sample |
|---------|------|-----|--------------------------------|-----|-----|--------|
| Int Cvd | TOC% | %   | Lithology description          |     |     |        |
| 2402.00 |      |     | Dunl Drak L.Ju/Toar            |     |     | 058    |
|         | 2.43 | 80  | Sh/Clst: gn gy, ol blk, calc   |     |     | 058-1  |
|         |      | 10  | S/Sst : w, cem, l              |     |     | 058-2  |
|         |      | 10  | Cont : Mica-ad, prp, evap      |     |     | 058-5  |
|         |      | tr  | Sh/Clst: gy red                |     |     | 058-3  |
|         |      | tr  | Cont : Coal-ad                 |     |     | 058-4  |
| 2408.00 |      |     | Dunl Drak L.Ju/Toar            |     |     | 059    |
|         | 3.16 | 80  | Sh/Clst: gn gy, ol blk, calc   |     |     | 059-1  |
|         |      | 10  | S/Sst : w, cem, l              |     |     | 059-2  |
|         |      | 10  | Cont : Mica-ad, prp, evap      |     |     | 059-5  |
|         |      | tr  | Sh/Clst: gy red                |     |     | 059-3  |
|         |      | tr  | Cont : Coal-ad                 |     |     | 059-4  |
| 2414.00 |      |     | Dunl Drak L.Ju/Toar            |     |     | 060    |
|         | 1.85 | 80  | Sh/Clst: gn gy, ol blk, calc   |     |     | 060-1  |
|         |      | 10  | S/Sst : w, cem, l              |     |     | 060-2  |
|         |      | 10  | Cont : Mica-ad, prp, evap      |     |     | 060-5  |
|         |      | tr  | Sh/Clst: gy red                |     |     | 060-3  |
|         |      | tr  | Cont : Coal-ad                 |     |     | 060-4  |
| 2420.00 |      |     | Dunl Drak L.Ju/Toar            |     |     | 061    |
|         | 4.36 | 80  | Sh/Clst: gn gy, ol blk, calc   |     |     | 061-1  |
|         |      | 10  | S/Sst : w, cem, l              |     |     | 061-2  |
|         |      | 10  | Cont : Mica-ad, prp, evap      |     |     | 061-5  |
|         |      | tr  | Sh/Clst: gy red                |     |     | 061-3  |
|         |      | tr  | Cont : Coal-ad                 |     |     | 061-4  |
| 2426.00 |      |     | Dunl Drak L.Ju/Toar            |     |     | 062    |
|         | 1.61 | 80  | Sh/Clst: gn gy, ol blk, calc   |     |     | 062-1  |
|         |      | 10  | S/Sst : w, cem, l              |     |     | 062-2  |
|         |      | 10  | Cont : Mica-ad, prp, fib, evap |     |     | 062-5  |
|         |      | tr  | Sh/Clst: gy red                |     |     | 062-3  |
|         |      | tr  | Cont : Coal-ad                 |     |     | 062-4  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm      | Age                                 | Trb | Sample |
|---------|------|------|----------|-------------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %        | Lithology description               |     |        |
| 2432.00 |      |      |          | Dunl Drak L.Ju/Toar                 |     | 063    |
|         | 1.74 | 80   | Sh/Clst: | gn gy, ol blk, calc                 |     | 063-1  |
|         |      | 10   | S/Sst    | : w, cem, l                         |     | 063-2  |
|         |      | 10   | Cont     | : Mica-ad, prp, evap                |     | 063-7  |
|         |      | tr   | Sh/Clst: | gy red                              |     | 063-3  |
|         |      | tr   | Ca       | : w, dsk red, dol                   |     | 063-4  |
|         |      | tr   | Other    | : pyr                               |     | 063-5  |
|         |      | tr   | Cont     | : Coal-ad                           |     | 063-6  |
| 2438.00 |      |      |          | Dunl Drak L.Ju/Toar                 |     | 064    |
|         | 1.50 | 80   | Sh/Clst: | gn gy, ol blk, calc, mic            |     | 064-1  |
|         |      | 10   | Sh/Clst: | gy red                              |     | 064-2  |
|         |      | 10   | S/Sst    | : w, cem, l                         |     | 064-3  |
|         |      | tr   | Other    | : pyr                               |     | 064-4  |
|         |      | tr   | Cont     | : Mica-ad, prp, evap                |     | 064-5  |
| 2444.00 |      |      |          | Dunl Drak L.Ju/Toar                 |     | 065    |
|         | 1.08 | 80   | Sh/Clst: | gn gy, ol blk, calc, mic            |     | 065-1  |
|         |      | 10   | Sh/Clst: | gy red                              |     | 065-2  |
|         |      | 10   | S/Sst    | : w, cem, l                         |     | 065-3  |
|         |      | tr   | Other    | : pyr                               |     | 065-4  |
|         |      | tr   | Cont     | : Mica-ad, prp, evap                |     | 065-5  |
| 2450.00 |      |      |          | Dunl Drak L.Ju/Toar                 |     | 066    |
|         | 1.52 | 80   | Sh/Clst: | gn gy, ol blk, drk y brn, calc, mic |     | 066-1  |
|         |      | 20   | S/Sst    | : w, cem, l                         |     | 066-2  |
|         |      | tr   | Sh/Clst: | gy red                              |     | 066-3  |
|         |      | tr   | Other    | : pyr                               |     | 066-4  |
|         |      | tr   | Cont     | : Coal-ad                           |     | 066-5  |
|         |      | tr   | Cont     | : Mica-ad, fib, evap                |     | 066-6  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                                          | Trb | Sample |
|---------|------|------|-----|----------------------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description                        |     |        |
| 2456.00 |      |      |     | Dunl Drak L.Ju/L.Plie                        |     | 067    |
|         | 1.70 |      | 80  | Sh/Clst: gn gy, ol blk, drk y brn, calc, mic |     | 067-1  |
|         |      |      | 20  | S/Sst : w, cem, l                            |     | 067-2  |
|         |      |      | tr  | Sh/Clst: gy red                              |     | 067-3  |
|         |      |      | tr  | Other : pyr                                  |     | 067-4  |
|         |      |      | tr  | Cont : Coal-ad                               |     | 067-5  |
|         |      |      | tr  | Cont : Mica-ad, fib, evap                    |     | 067-6  |
| 2462.00 |      |      |     | Dunl Drak L.Ju/L.Plie                        |     | 068    |
|         | 2.67 |      | 80  | Sh/Clst: gn gy, ol blk, drk y brn, calc, mic |     | 068-1  |
|         |      |      | 20  | S/Sst : w, cem, l                            |     | 068-2  |
|         |      |      | tr  | Sh/Clst: gy red                              |     | 068-3  |
|         |      |      | tr  | Other : pyr                                  |     | 068-4  |
|         |      |      | tr  | Cont : Coal-ad                               |     | 068-5  |
|         |      |      | tr  | Cont : Mica-ad, ns, fib, evap                |     | 068-6  |
| 2468.00 |      |      |     | Dunl Drak L.Ju/L.Plie                        |     | 069    |
|         | 1.47 |      | 70  | Sh/Clst: gn gy, ol blk, drk y brn, calc, mic |     | 069-1  |
|         |      |      | 20  | Cont : Mica-ad, ns, evap                     |     | 069-6  |
|         |      |      | 10  | S/Sst : w, cem, l                            |     | 069-2  |
|         |      |      | tr  | Sh/Clst: gy red                              |     | 069-3  |
|         |      |      | tr  | Other : pyr                                  |     | 069-4  |
|         |      |      | tr  | Cont : Coal-ad                               |     | 069-5  |
| 2474.00 |      |      |     | Dunl Drak L.Ju/L.Plie                        |     | 070    |
|         | 1.33 |      | 70  | Sh/Clst: gn gy, ol blk, drk y brn, calc, mic |     | 070-1  |
|         |      |      | 20  | Cont : Mica-ad, ns, fib                      |     | 070-6  |
|         |      |      | 10  | S/Sst : w, cem, l                            |     | 070-2  |
|         |      |      | tr  | Sh/Clst: gy red                              |     | 070-3  |
|         |      |      | tr  | Other : pyr                                  |     | 070-4  |
|         |      |      | tr  | Cont : Coal-ad                               |     | 070-5  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                                       | Trb | Sample |
|---------|------|------|-----|-------------------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description                     |     |        |
| 2480.00 |      |      |     | Dunl Cook L.Ju/L.Plie                     |     | 071    |
|         | cvd  |      |     | 60 S/Sst : w, mic, l                      |     | 071-1  |
|         |      |      |     | 40 Sh/Clst: gn gy, ol blk, drk y brn, mic |     | 071-2  |
|         |      |      |     | tr Cont : Coal-ad                         |     | 071-3  |
| 2486.00 |      |      |     | Dunl Cook L.Ju/L.Plie                     |     | 072    |
|         | cvd  |      |     | 80 S/Sst : w, mic, l                      |     | 072-1  |
|         |      |      |     | 20 Sh/Clst: gn gy, ol blk, drk y brn, mic |     | 072-2  |
|         |      |      |     | tr Cont : Coal-ad                         |     | 072-3  |
| 2498.00 |      |      |     | Dunl Cook L.Ju/L.Plie                     |     | 073    |
|         | cvd  |      |     | 50 S/Sst : w, lt gy, calc, mic, cem       |     | 073-1  |
|         | cvd  |      |     | 50 Sh/Clst: gn gy, ol blk, calc, mic      |     | 073-2  |
|         |      |      |     | tr Sh/Clst: gy red                        |     | 073-3  |
|         |      |      |     | tr Cont : prp, fib, evap                  |     | 073-4  |
| 2504.00 |      |      |     | Dunl Cook L.Ju/L.Plie                     |     | 074    |
|         | cvd  |      |     | 50 S/Sst : w, lt gy, calc, mic, cem       |     | 074-1  |
|         | cvd  |      |     | 50 Sh/Clst: gn gy, ol blk, calc, mic      |     | 074-2  |
|         |      |      |     | tr Sh/Clst: gy red                        |     | 074-3  |
|         |      |      |     | tr Cont : prp, fib, evap                  |     | 074-4  |
| 2510.00 |      |      |     | Dunl Cook L.Ju/L.Plie                     |     | 075    |
|         | cvd  | 0.08 |     | 50 S/Sst : w, lt gy, calc, mic, cem       |     | 075-1  |
|         | cvd  |      |     | 50 Sh/Clst: gn gy, ol blk, calc, mic      |     | 075-2  |
|         |      |      |     | tr Sh/Clst: gy red                        |     | 075-3  |
|         |      |      |     | tr Other : pyr                            |     | 075-4  |
|         |      |      |     | tr Cont : prp, fib, evap                  |     | 075-5  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                                  | Trb | Sample |
|---------|------|------|-----|--------------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description                |     |        |
| 2518.00 |      |      |     | Dunl Cook L.Ju/L.Plie                |     | 076    |
|         | cvd  |      | 50  | S/Sst : w, lt gy, calc, mic, cem     |     | 076-1  |
|         | cvd  |      | 50  | Sh/Clst: gn gy, ol blk, calc, mic    |     | 076-2  |
|         |      |      | tr  | Sh/Clst: gy red                      |     | 076-3  |
|         |      |      | tr  | Ca : w                               |     | 076-4  |
|         |      |      | tr  | Other : pyr                          |     | 076-5  |
|         |      |      | tr  | Cont : prp, fib, evap                |     | 076-6  |
| 2524.00 |      |      |     | Dunl Cook L.Ju/L.Plie                |     | 077    |
|         | cvd  |      | 50  | S/Sst : w, lt gy, calc, mic, cem     |     | 077-1  |
|         | cvd  |      | 50  | Sh/Clst: gn gy, ol blk, calc, mic    |     | 077-2  |
|         |      |      | tr  | Sh/Clst: gy red                      |     | 077-3  |
|         |      |      | tr  | Ca : w                               |     | 077-4  |
|         |      |      | tr  | Other : pyr                          |     | 077-5  |
|         |      |      | tr  | Cont : prp, fib, evap                |     | 077-6  |
| 2530.00 |      |      |     | Dunl Cook L.Ju/L.Plie                |     | 078    |
|         | cvd  |      | 70  | S/Sst : w, lt gy, calc, mic, cem     |     | 078-1  |
|         |      |      | 30  | Sh/Clst: gn gy, ol blk, calc, mic    |     | 078-2  |
|         |      |      | tr  | Cont : prp, ns, fib                  |     | 078-3  |
| 2536.00 |      |      |     | Dunl Amun L.Ju/L.Plie                |     | 079    |
|         | cvd  |      | 70  | S/Sst : w, lt gy, calc, mic, cem     |     | 079-1  |
|         |      |      | 30  | Sh/Clst: gn gy, ol blk, calc, mic    |     | 079-2  |
|         |      |      | tr  | Cont : prp, ns, fib                  |     | 079-3  |
| 2542.00 |      |      |     | Dunl Amun L.Ju/Sine-E.Plie           |     | 080    |
|         | cvd  | 1.53 | 90  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 080-1  |
|         |      |      | 10  | S/Sst : w, lt gy, calc, mic, cem     |     | 080-2  |
|         |      |      | tr  | Sh/Clst: gy red                      |     | 080-3  |
|         |      |      | tr  | Ca : lt gy                           |     | 080-4  |
|         |      |      | tr  | Other : pyr                          |     | 080-5  |
|         |      |      | tr  | Cont : prp, evap                     |     | 080-6  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frn      | Age                         | Trb | Sample |
|---------|------|------|----------|-----------------------------|-----|--------|
| Int     | Cvd  | TOC% | %        | Lithology description       |     |        |
| 2548.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 081    |
|         | 1.68 | 90   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 081-1  |
|         |      | 10   | Sh/Clst: | gy red                      |     | 081-2  |
|         |      | tr   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 081-3  |
|         |      | tr   | Ca       | : lt gy                     |     | 081-4  |
|         |      | tr   | Cont     | : prp, evap                 |     | 081-5  |
| 2554.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 082    |
|         | 0.90 | 80   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 082-1  |
|         |      | 10   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 082-2  |
|         |      | 10   | Cont     | : Mica-ad, evap             |     | 082-6  |
|         |      | tr   | Ca       | : w                         |     | 082-3  |
|         |      | tr   | Other    | : pyr                       |     | 082-4  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 082-5  |
| 2560.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 083    |
|         | 1.65 | 80   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 083-1  |
|         |      | 10   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 083-2  |
|         |      | 10   | Cont     | : Mica-ad, evap             |     | 083-7  |
|         |      | tr   | Sh/Clst: | gy red                      |     | 083-3  |
|         |      | tr   | Ca       | : w                         |     | 083-4  |
|         |      | tr   | Other    | : pyr                       |     | 083-5  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 083-6  |
| 2566.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 084    |
|         | 1.29 | 80   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 084-1  |
|         |      | 10   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 084-2  |
|         |      | 10   | Cont     | : Mica-ad, fib, evap        |     | 084-7  |
|         |      | tr   | Sh/Clst: | gy red                      |     | 084-3  |
|         |      | tr   | Ca       | : w                         |     | 084-4  |
|         |      | tr   | Other    | : pyr                       |     | 084-5  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 084-6  |



Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm      | Age                         | Trb | Sample |
|---------|------|------|----------|-----------------------------|-----|--------|
| Int     | Cvd  | TOC% | %        | Lithology description       |     |        |
| 2572.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 085    |
|         | 1.81 | 80   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 085-1  |
|         |      | 10   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 085-2  |
|         |      | 10   | Cont     | : Mica-ad, prp, fib, evap   |     | 085-7  |
|         |      | tr   | Sh/Clst: | gy red                      |     | 085-3  |
|         |      | tr   | Ca       | : w                         |     | 085-4  |
|         |      | tr   | Other    | : pyr                       |     | 085-5  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 085-6  |
| 2578.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 132    |
|         | 2.05 | 80   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 132-1  |
|         |      | 10   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 132-2  |
|         |      | 10   | Cont     | : Mica-ad, prp, fib, evap   |     | 132-7  |
|         |      | tr   | Sh/Clst: | gy red                      |     | 132-3  |
|         |      | tr   | Ca       | : w                         |     | 132-4  |
|         |      | tr   | Other    | : pyr                       |     | 132-5  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 132-6  |
| 2584.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 086    |
|         | 1.27 | 50   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 086-1  |
|         |      | 40   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 086-2  |
|         |      | 10   | Cont     | : Mica-ad, fib, evap        |     | 086-7  |
|         |      | tr   | Sh/Clst: | gy red                      |     | 086-3  |
|         |      | tr   | Ca       | : w, m gy                   |     | 086-4  |
|         |      | tr   | Other    | : pyr                       |     | 086-5  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 086-6  |
| 2592.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 087    |
|         | 2.18 | 50   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 087-1  |
|         |      | 40   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 087-2  |
|         |      | 10   | Cont     | : Mica-ad, fib, evap        |     | 087-7  |
|         |      | tr   | Sh/Clst: | gy red                      |     | 087-3  |
|         |      | tr   | Ca       | : w, m gy                   |     | 087-4  |
|         |      | tr   | Other    | : pyr                       |     | 087-5  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 087-6  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm      | Age                         | Trb | Sample |
|---------|------|------|----------|-----------------------------|-----|--------|
| Int     | Cvd  | TOC% | %        | Lithology description       |     |        |
| 2596.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 088    |
|         | 1.34 | 50   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 088-1  |
|         |      | 40   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 088-2  |
|         |      | 10   | Cont     | : Mica-ad, fib, evap        |     | 088-7  |
|         |      | tr   | Sh/Clst: | gy red                      |     | 088-3  |
|         |      | tr   | Ca       | : w, m gy                   |     | 088-4  |
|         |      | tr   | Other    | : pyr                       |     | 088-5  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 088-6  |
| 2602.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 089    |
|         | 1.72 | 80   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 089-1  |
|         |      | 10   | Sh/Clst: | gy red                      |     | 089-2  |
|         |      | 10   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 089-3  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 089-4  |
|         |      | tr   | Cont     | : Mica-ad, prp, fib         |     | 089-5  |
| 2608.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 090    |
|         | 1.28 | 80   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 090-1  |
|         |      | 10   | Sh/Clst: | gy red                      |     | 090-2  |
|         |      | 10   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 090-3  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 090-4  |
|         |      | tr   | Cont     | : Mica-ad, prp, fib         |     | 090-5  |
| 2614.00 |      |      |          | Dunl Amun L.Ju/Sine-E.Plle  |     | 091    |
|         | 1.18 | 80   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 091-1  |
|         |      | 10   | Sh/Clst: | gy red                      |     | 091-2  |
|         |      | 10   | S/Sst    | : w, lt gy, calc, mic, cem  |     | 091-3  |
|         |      | tr   | Ca       | : w                         |     | 091-4  |
|         |      | tr   | Cont     | : Coal-ad                   |     | 091-5  |
|         |      | tr   | Cont     | : Mica-ad, prp, fib         |     | 091-6  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm         | Age                         | Trb | Sample |
|---------|------|------|-------------|-----------------------------|-----|--------|
| Int     | Cvd  | TOC% | %           | Lithology description       |     |        |
| 2620.00 |      |      |             | Dunl Amun L.Ju/Sine-E.Plle  |     | 092    |
|         | 1.69 | 80   | Sh/Clst:    | gy, brn, gn, blk, calc, mic |     | 092-1  |
|         |      | 10   | Sh/Clst:    | gy red                      |     | 092-2  |
|         |      | 10   | S/Sst       | : w, lt gy, calc, mic, cem  |     | 092-3  |
|         |      |      | tr Ca       | : w                         |     | 092-4  |
|         |      |      | tr Cont     | : Coal-ad                   |     | 092-5  |
|         |      |      | tr Cont     | : Mica-ad, prp, fib         |     | 092-6  |
| 2626.00 |      |      |             | Dunl Amun L.Ju/Sine-E.Plle  |     | 093    |
|         | 1.34 | 80   | Sh/Clst:    | gy, brn, gn, blk, calc, mic |     | 093-1  |
|         |      | 10   | Sh/Clst:    | gy red                      |     | 093-2  |
|         |      | 10   | S/Sst       | : w, lt gy, calc, mic, cem  |     | 093-3  |
|         |      |      | tr Ca       | : w                         |     | 093-4  |
|         |      |      | tr Cont     | : Coal-ad                   |     | 093-5  |
|         |      |      | tr Cont     | : Mica-ad, prp, fib         |     | 093-6  |
| 2632.00 |      |      |             | Dunl Amun L.Ju/Sine-E.Plle  |     | 094    |
|         | 1.12 | 80   | Sh/Clst:    | gy, brn, gn, blk, calc, mic |     | 094-1  |
|         |      | 10   | Sh/Clst:    | gy red                      |     | 094-2  |
|         |      | 10   | S/Sst       | : w, lt gy, calc, mic, cem  |     | 094-3  |
|         |      |      | tr Ca       | : w                         |     | 094-4  |
|         |      |      | tr Cont     | : Coal-ad                   |     | 094-5  |
|         |      |      | tr Cont     | : Mica-ad, prp, fib         |     | 094-6  |
| 2638.00 |      |      |             | Stat L.Ju/Sine-E.Plle       |     | 095    |
|         |      | 90   | Coal        |                             |     | 095-1  |
|         |      | 10   | Sh/Clst:    | gy, brn, gn, blk, calc, mic |     | 095-2  |
| 2644.00 |      |      |             | Stat L.Ju/Sine-E.Plle       |     | 096    |
|         |      | 50   | Sh/Clst:    | gy, brn, gn, blk, calc, mic |     | 096-1  |
|         |      | 30   | Coal        |                             |     | 096-2  |
|         |      | 20   | S/Sst       | : w, lt gy, cem             |     | 096-3  |
|         |      |      | tr Sh/Clst: | gy red                      |     | 096-4  |
|         |      |      | tr Cont     | : prp, fib                  |     | 096-5  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm      | Age                         | Trb | Sample |
|---------|------|------|----------|-----------------------------|-----|--------|
| Int     | Cvd  | TOC% | %        | Lithology description       |     |        |
| 2650.00 |      |      |          | Stat L.Ju/Hett-Sine         |     | 097    |
|         | 1.15 | 40   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 097-1  |
|         |      | 30   | Coal     |                             |     | 097-2  |
|         |      | 30   | Cont     | : dd                        |     | 097-3  |
|         |      | tr   | Other    | : pyr                       |     | 097-4  |
| 2656.00 |      |      |          | Stat L.Ju/Hett-Sine         |     | 098    |
|         |      | 40   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 098-1  |
|         |      | 30   | Coal     |                             |     | 098-2  |
|         |      | 30   | Cont     | : dd                        |     | 098-3  |
|         |      | tr   | Other    | : pyr                       |     | 098-4  |
| 2662.00 |      |      |          | Stat L.Ju/Hett-Sine         |     | 099    |
| int     |      | 70   | S/Sst    | : w, cem, l                 |     | 099-2  |
| int     | 2.84 | 30   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 099-1  |
|         |      | tr   | Sh/Clst: | gy red                      |     | 099-3  |
|         |      | tr   | Coal     |                             |     | 099-4  |
|         |      | tr   | Cont     | : prp                       |     | 099-5  |
| 2668.00 |      |      |          | Stat L.Ju/Hett-Sine         |     | 100    |
| int     |      | 70   | S/Sst    | : w, cem, l                 |     | 100-2  |
| int     | 2.38 | 30   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 100-1  |
|         |      | tr   | Sh/Clst: | gy red                      |     | 100-3  |
|         |      | tr   | Coal     |                             |     | 100-4  |
|         |      | tr   | Cont     | : prp                       |     | 100-5  |
| 2674.00 |      |      |          | Stat L.Ju/Hett-Sine         |     | 101    |
| int     | 0.08 | 80   | S/Sst    | : w, cem, l                 |     | 101-1  |
| int     |      | 10   | Sh/Clst: | gy, brn, gn, blk, calc, mic |     | 101-2  |
|         |      | 10   | Coal     |                             |     | 101-3  |
|         |      | tr   | Ca       | : dsk y brn, dol            |     | 101-4  |
|         |      | tr   | Ca       | : w                         |     | 101-5  |
|         |      | tr   | Cont     | : prp, fib                  |     | 101-6  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                                  | Trb | Sample |
|---------|------|------|-----|--------------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description                |     |        |
| 2680.00 |      |      |     | Stat L.Ju/Hett-Sine                  |     | 102    |
| int     |      |      | 50  | S/Sst : w, cem, l                    |     | 102-2  |
|         |      |      | 30  | Coal                                 |     | 102-3  |
| int     | 1.85 |      | 20  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 102-1  |
|         |      |      | tr  | Ca : w                               |     | 102-4  |
|         |      |      | tr  | Cont : prp, fib                      |     | 102-5  |
| 2686.00 |      |      |     | Stat L.Ju/Hett-Sine                  |     | 103    |
| int     |      |      | 60  | S/Sst : w, cem, l                    |     | 103-2  |
| int     | 0.56 |      | 40  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 103-1  |
|         |      |      | tr  | Coal                                 |     | 103-3  |
|         |      |      | tr  | Other : pyr                          |     | 103-4  |
|         |      |      | tr  | Cont : prp, fib                      |     | 103-5  |
| 2692.00 |      |      |     | Stat L.Ju/Hett-Sine                  |     | 104    |
| int     |      |      | 70  | S/Sst : w, cem, l                    |     | 104-2  |
| int     | 2.17 |      | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 104-1  |
|         |      |      | tr  | Coal                                 |     | 104-3  |
|         |      |      | tr  | Other : pyr                          |     | 104-4  |
|         |      |      | tr  | Cont : prp, fib                      |     | 104-5  |
| 2698.00 |      |      |     | Stat L.Ju/Hett                       |     | 105    |
| int     |      |      | 60  | S/Sst : w, cem, l                    |     | 105-3  |
| int     |      |      | 20  | Coal                                 |     | 105-1  |
| int     |      |      | 20  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 105-2  |
|         |      |      | tr  | Cont : prp, dd, fib                  |     | 105-4  |
| 2704.00 |      |      |     | Stat L.Ju/Hett                       |     | 106    |
| int     |      |      | 70  | S/Sst : w, cem, l                    |     | 106-2  |
| int     | 1.94 |      | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 106-1  |
|         |      |      | tr  | Coal                                 |     | 106-3  |
|         |      |      | tr  | Other : pyr                          |     | 106-4  |
|         |      |      | tr  | Cont : prp, fib                      |     | 106-5  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                                  | Trb | Sample |
|---------|------|------|-----|--------------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description                |     |        |
| 2710.00 |      |      |     | Stat L.Ju/Hett                       |     | 107    |
| int     |      |      | 70  | S/Sst : w, cem, l                    |     | 107-2  |
| int     |      | 0.91 | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 107-1  |
|         |      |      | tr  | Sh/Clst: gy red                      |     | 107-3  |
|         |      |      | tr  | Coal                                 |     | 107-4  |
| 2716.00 |      |      |     | Stat L.Ju/Hett                       |     | 108    |
| int     |      |      | 70  | S/Sst : w, cem, l                    |     | 108-2  |
| int     |      | 0.97 | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 108-1  |
|         |      |      | tr  | Sh/Clst: gy red                      |     | 108-3  |
|         |      |      | tr  | Coal                                 |     | 108-4  |
| 2722.00 |      |      |     | Stat L.Ju/Hett                       |     | 109    |
| int     |      |      | 70  | S/Sst : w, cem, l                    |     | 109-2  |
| int     |      | 1.06 | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 109-1  |
|         |      |      | tr  | Sh/Clst: gy red                      |     | 109-3  |
|         |      |      | tr  | Ca : w                               |     | 109-4  |
|         |      |      | tr  | Coal                                 |     | 109-5  |
| 2728.00 |      |      |     | Stat L.Ju/Hett                       |     | 110    |
| int     |      |      | 60  | S/Sst : w, calc, l                   |     | 110-2  |
| int     |      |      | 40  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 110-1  |
|         |      |      | tr  | Ca : dsk y brn, dol                  |     | 110-3  |
|         |      |      | tr  | Coal                                 |     | 110-4  |
|         |      |      | tr  | Cont : prp                           |     | 110-5  |
| 2734.00 |      |      |     | Stat L.Ju/Hett                       |     | 111    |
| int     |      |      | 70  | S/Sst : w, calc, l                   |     | 111-2  |
| int     |      | 1.24 | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 111-1  |
|         |      |      | tr  | Ca : w                               |     | 111-3  |
|         |      |      | tr  | Coal                                 |     | 111-4  |
|         |      |      | tr  | Cont : prp, fib                      |     | 111-5  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                                  | Trb | Sample |
|---------|------|------|-----|--------------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description                |     |        |
| 2740.00 |      |      |     | Stat L.Ju/Hett                       |     | 112    |
| int     |      |      | 70  | S/Sst : w, calc, l                   |     | 112-2  |
| int     | 1.14 |      | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 112-1  |
|         |      |      | tr  | Ca : w                               |     | 112-3  |
|         |      |      | tr  | Coal                                 |     | 112-4  |
|         |      |      | tr  | Cont : prp, fib                      |     | 112-5  |
| 2748.00 |      |      |     | Stat L.Ju/Hett                       |     | 113    |
| int     |      |      | 70  | S/Sst : w, calc, l                   |     | 113-2  |
| int     | 1.55 |      | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 113-1  |
|         |      |      | tr  | Ca : w                               |     | 113-3  |
|         |      |      | tr  | Coal                                 |     | 113-4  |
|         |      |      | tr  | Cont : prp, fib                      |     | 113-5  |
| 2754.00 |      |      |     | Stat L.Ju/Hett                       |     | 114    |
|         |      |      | 100 | Coal                                 |     | 114-1  |
|         |      |      | tr  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 114-2  |
|         |      |      | tr  | Cont : Mica-ad                       |     | 114-3  |
| 2760.00 |      |      |     | Stat L.Ju/Hett                       |     | 115    |
| int     |      |      | 60  | S/Sst : w, calc, l                   |     | 115-2  |
| int     | 1.59 |      | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 115-1  |
|         |      |      | 10  | Sh/Clst: gy red                      |     | 115-3  |
|         |      |      | tr  | Coal                                 |     | 115-4  |
| 2766.00 |      |      |     | Stat L.Ju/Hett                       |     | 116    |
| int     |      |      | 60  | S/Sst : w, calc, l                   |     | 116-2  |
| int     | 1.70 |      | 20  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 116-1  |
|         |      |      | 20  | Cont : prp, ns, dd, fib              |     | 116-4  |
|         |      |      | tr  | Coal                                 |     | 116-3  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm | Age                                  | Trb | Sample |
|---------|------|------|-----|--------------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %   | Lithology description                |     |        |
| 2772.00 |      |      |     | Stat L.Ju/Hett                       |     | 117    |
| int     |      |      | 50  | S/Sst : w, cem, l                    |     | 117-3  |
| int     |      |      | 30  | Sh/Clst: dsk red, slt, mic           |     | 117-1  |
| int     | 1.64 |      | 20  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 117-2  |
|         |      |      | tr  | Coal                                 |     | 117-4  |
| 2778.00 |      |      |     | Stat L.Ju/Hett                       |     | 118    |
| int     |      |      | 50  | S/Sst : w, cem, l                    |     | 118-3  |
| int     |      |      | 30  | Sh/Clst: dsk red, slt, mic           |     | 118-1  |
| int     | 1.35 |      | 20  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 118-2  |
|         |      |      | tr  | Coal                                 |     | 118-4  |
|         |      |      | tr  | Other : pyr                          |     | 118-5  |
| 2784.00 |      |      |     | Stat L.Ju/Hett                       |     | 119    |
| int     |      |      | 50  | S/Sst : w, cem, l                    |     | 119-3  |
| int     | 0.11 |      | 30  | Sh/Clst: dsk red, slt, mic           |     | 119-1  |
| int     | 1.37 |      | 20  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 119-2  |
|         |      |      | tr  | Coal                                 |     | 119-4  |
|         |      |      | tr  | Cont : prp                           |     | 119-5  |
| 2790.00 |      |      |     | Hegr Tria                            |     | 120    |
|         |      |      | 40  | Sh/Clst: dsk red, slt, mic           |     | 120-1  |
| cvd     |      |      | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 120-2  |
|         |      |      | 30  | S/Sst : w, cem, l                    |     | 120-3  |
|         |      |      | tr  | Ca : w                               |     | 120-4  |
| cvd     |      |      | tr  | Coal                                 |     | 120-5  |
|         |      |      | tr  | Cont : prp                           |     | 120-6  |
| 2800.00 |      |      |     | Hegr Tria                            |     | 121    |
|         | 0.09 |      | 40  | Sh/Clst: dsk red, slt, mic           |     | 121-1  |
| cvd     | 0.69 |      | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 121-2  |
|         |      |      | 30  | S/Sst : w, cem, l                    |     | 121-3  |
|         |      |      | tr  | Ca : w                               |     | 121-4  |
| cvd     |      |      | tr  | Coal                                 |     | 121-5  |
|         |      |      | tr  | Cont : prp                           |     | 121-6  |



Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp  | Frm  | Age                                  | Trb | Sample |
|---------|------|------|------|--------------------------------------|-----|--------|
| Int     | Cvd  | TOC% | %    | Lithology description                |     |        |
| 2810.00 |      |      | Hegr | Tria                                 |     | 122    |
|         | cvd  |      | 60   | Sh/Clst: dsk red, slt, mic           |     | 122-1  |
|         |      |      | 30   | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 122-2  |
|         |      |      | 10   | S/Sst : w, cem, l                    |     | 122-3  |
|         |      |      | tr   | Ca : w                               |     | 122-4  |
|         | cvd  |      | tr   | Coal                                 |     | 122-5  |
| 2818.00 |      |      | Hegr | Tria                                 |     | 123    |
|         | cvd  | 0.03 | 80   | Sh/Clst: dsk red, slt, mic           |     | 123-1  |
|         |      |      | 20   | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 123-2  |
|         |      |      | tr   | S/Sst : w, cem, l                    |     | 123-3  |
| 2830.00 |      |      | Hegr | Tria                                 |     | 124    |
|         | cvd  |      | 80   | Sh/Clst: dsk red, slt, mic           |     | 124-1  |
|         |      |      | 10   | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 124-2  |
|         |      |      | 10   | S/Sst : w, cem, l                    |     | 124-3  |
|         | cvd  |      | tr   | Coal                                 |     | 124-4  |
| 2840.00 |      |      | Hegr | Tria                                 |     | 125    |
|         |      |      | 60   | Sh/Clst: dsk red, slt, mic           |     | 125-1  |
|         |      |      | 30   | S/Sst : w, cem, l                    |     | 125-2  |
|         | cvd  |      | 10   | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 125-3  |
|         | cvd  |      | tr   | Coal                                 |     | 125-4  |
| 2850.00 |      |      | Hegr | Tria                                 |     | 126    |
|         | cvd  | 0.03 | 90   | Sh/Clst: dsk red, slt, mic           |     | 126-1  |
|         |      |      | 10   | Sh/Clst: gy, brn, gn, blk, calc, mic |     | 126-2  |
|         |      |      | tr   | S/Sst : w, cem, l                    |     | 126-3  |

Table 1 : Lithology description for well NOCS 31/4-2

Depth unit of measure: m

| Depth   | Type | Grp | Frm                                  | Age  | Trb | Sample |
|---------|------|-----|--------------------------------------|------|-----|--------|
| Int Cvd | TOC% | %   | Lithology description                |      |     |        |
| 2860.00 |      |     | Hegr                                 | Tria |     | 127    |
|         | cvd  | 80  | Sh/Clst: dsk red, slt, mic           |      |     | 127-1  |
|         |      | 10  | Sh/Clst: gy, brn, gn, blk, calc, mic |      |     | 127-2  |
|         |      | 10  | S/Sst : w, cem, l                    |      |     | 127-3  |
| 2870.00 |      |     | Hegr                                 | Tria |     | 128    |
|         | cvd  | 60  | S/Sst : w, l                         |      |     | 128-1  |
|         |      | 30  | Sh/Clst: dsk red, slt, mic           |      |     | 128-2  |
|         |      | 10  | Sh/Clst: gy, brn, gn, blk, calc, mic |      |     | 128-3  |
|         |      | tr  | Ca : w                               |      |     | 128-4  |
| 2880.00 |      |     | Hegr                                 | Tria |     | 129    |
|         |      | 40  | Sh/Clst: dsk red, slt, mic           |      |     | 129-1  |
|         | 0.04 | 30  | Ca : w, lt gy                        |      |     | 129-2  |
|         |      | 20  | S/Sst : w, cem, l                    |      |     | 129-3  |
|         | cvd  | 10  | Sh/Clst: gy, brn, gn, blk, calc, mic |      |     | 129-4  |
|         |      | tr  | Other : pyr                          |      |     | 129-5  |
| 2890.00 |      |     | Hegr                                 | Tria |     | 130    |
|         |      | 40  | Sh/Clst: dsk red, slt, mic           |      |     | 130-1  |
|         |      | 30  | Ca : w, lt gy                        |      |     | 130-2  |
|         |      | 20  | S/Sst : w, cem, l                    |      |     | 130-3  |
|         | cvd  | 10  | Sh/Clst: gy, brn, gn, blk, calc, mic |      |     | 130-4  |
|         |      | tr  | Other : pyr                          |      |     | 130-5  |
| 2900.00 |      |     | Hegr                                 | Tria |     | 131    |
|         |      | 50  | Sh/Clst: dsk red, slt, mic           |      |     | 131-1  |
|         | 0.06 | 30  | Sh/Clst: gy, brn, gn, blk, calc, mic |      |     | 131-2  |
|         | 1.47 | 20  | S/Sst : w, cem, l                    |      |     | 131-3  |
|         |      | tr  | Ca : w                               |      |     | 131-4  |

Table 2 : Rock-Eval table for well NOCS 31/4-2

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Depth unit of measure: m

| Depth   | Typ | Lithology                 | S1   | S2    | S3   | S2/S3 | TOC  | HI  | OI   | PP   | PI   | Tmax | Sample |
|---------|-----|---------------------------|------|-------|------|-------|------|-----|------|------|------|------|--------|
| 2104.00 | cut | Sh/Clst: gn gy, m gy      | 0.04 | 0.41  | 0.93 | 0.44  | 0.72 | 57  | 129  | 0.4  | 0.09 | 434  | 014-1  |
| 2114.00 | cut | Ca : w                    | -    | -     | 0.58 | -     | 0.04 | -   | 1450 | -    | -    | 440  | 015-5  |
| 2124.00 | cut | Sh/Clst: gn gy, m gy      | 0.03 | 0.25  | 0.54 | 0.46  | 0.58 | 43  | 93   | 0.3  | 0.11 | 429  | 030-2  |
| 2134.00 | cut | Sh/Clst: gn gy, m gy      | 0.05 | 0.44  | 0.58 | 0.76  | 0.71 | 62  | 82   | 0.5  | 0.10 | 430  | 016-5  |
| 2142.00 | cut | Sh/Clst: gn gy, m gy      | 0.05 | 0.46  | 0.51 | 0.90  | 0.72 | 64  | 71   | 0.5  | 0.10 | 432  | 017-4  |
| 2146.00 | cut | Sh/Clst: gn gy, m gy      | 0.04 | 0.26  | 0.41 | 0.63  | 0.58 | 45  | 71   | 0.3  | 0.13 | 430  | 019-1  |
| 2152.00 | cut | Sh/Clst: ol blk to drk gy | 1.47 | 20.29 | 1.24 | 16.36 | 6.28 | 323 | 20   | 21.8 | 0.07 | 421  | 020-4  |
| 2152.00 | cut | Sh/Clst: gn gy, m gy      | 0.08 | 0.45  | 0.33 | 1.36  | 0.74 | 61  | 45   | 0.5  | 0.15 | 428  | 020-5  |
| 2158.00 | cut | Sh/Clst: ol blk to drk gy | 0.77 | 14.71 | 0.98 | 15.01 | 5.06 | 291 | 19   | 15.5 | 0.05 | 425  | 021-4  |
| 2158.00 | cut | Sh/Clst: gn gy, m gy      | 0.05 | 0.28  | 0.26 | 1.08  | 0.52 | 54  | 50   | 0.3  | 0.15 | 430  | 021-5  |
| 2166.00 | cut | Sh/Clst: ol blk to drk gy | 0.63 | 12.50 | 1.27 | 9.84  | 4.37 | 286 | 29   | 13.1 | 0.05 | 424  | 022-4  |
| 2166.00 | cut | Sh/Clst: gn gy, m gy      | 0.02 | 0.23  | 0.55 | 0.42  | 0.37 | 62  | 149  | 0.3  | 0.08 | 441  | 022-5  |
| 2172.00 | cut | Sh/Clst: ol blk to drk gy | 0.92 | 17.47 | 1.00 | 17.47 | 4.90 | 357 | 20   | 18.4 | 0.05 | 424  | 023-4  |
| 2172.00 | cut | Sh/Clst: gn gy, m gy      | 0.05 | 0.26  | 0.47 | 0.55  | 0.47 | 55  | 100  | 0.3  | 0.16 | 435  | 023-5  |
| 2178.00 | cut | Sh/Clst: gn gy, m gy      | 0.04 | 0.26  | 0.67 | 0.39  | 0.58 | 45  | 116  | 0.3  | 0.13 | 434  | 024-4  |

Table 2 : Rock-Eval table for well NOCS 31/4-2

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Depth unit of measure: m

| Depth   | Typ | Lithology                 | S1   | S2    | S3   | S2/S3 | TOC  | HI  | OI  | PP   | PI   | Tmax | Sample |
|---------|-----|---------------------------|------|-------|------|-------|------|-----|-----|------|------|------|--------|
| 2184.00 | cut | Sh/Clst: gn gy, m gy      | 0.04 | 0.28  | 0.69 | 0.41  | 0.57 | 49  | 121 | 0.3  | 0.13 | 432  | 025-2  |
| 2190.00 | cut | Sh/Clst: gn gy, m drk gy  | 0.06 | 0.31  | 0.52 | 0.60  | 0.72 | 43  | 72  | 0.4  | 0.16 | 428  | 026-4  |
| 2190.00 | cut | Sh/Clst: gy red           | 0.03 | 0.10  | 0.43 | 0.23  | 0.14 | 71  | 307 | 0.1  | 0.23 | 491  | 026-5  |
| 2196.00 | cut | Sh/Clst: gn gy, m gy      | 0.04 | 0.29  | 0.60 | 0.48  | 0.60 | 48  | 100 | 0.3  | 0.12 | 429  | 027-1  |
| 2204.00 | cut | Sh/Clst: gn gy, m gy      | 0.03 | 0.24  | 0.54 | 0.44  | 0.57 | 42  | 95  | 0.3  | 0.11 | 430  | 028-3  |
| 2230.00 | cut | Sh/Clst: gn gy, m gy      | 0.03 | 0.23  | 0.52 | 0.44  | 0.56 | 41  | 93  | 0.3  | 0.12 | 432  | 029-1  |
| 2230.00 | cut | Sh/Clst: ol blk to drk gy | 1.16 | 17.77 | 1.04 | 17.09 | 5.29 | 336 | 20  | 18.9 | 0.06 | 421  | 029-3  |
| 2238.00 | cut | Sh/Clst: gn gy, m gy      | 0.03 | 0.23  | 0.40 | 0.57  | 0.60 | 38  | 67  | 0.3  | 0.12 | 430  | 031-1  |
| 2238.00 | cut | Sh/Clst: ol blk, drk gy   | 1.21 | 18.81 | 1.10 | 17.10 | 5.25 | 358 | 21  | 20.0 | 0.06 | 418  | 031-3  |
| 2242.00 | cut | Sh/Clst: gn gy, m gy      | 0.06 | 0.34  | 0.59 | 0.58  | 0.68 | 50  | 87  | 0.4  | 0.15 | 430  | 032-2  |
| 2242.00 | cut | Sh/Clst: ol blk, drk gy   | 1.13 | 17.87 | 1.27 | 14.07 | 5.01 | 357 | 25  | 19.0 | 0.06 | 423  | 032-3  |
| 2248.00 | cut | Sh/Clst: gn gy, m gy      | 0.04 | 0.25  | 0.74 | 0.34  | 0.65 | 38  | 114 | 0.3  | 0.14 | 430  | 033-2  |
| 2248.00 | cut | Sh/Clst: ol blk, drk gy   | 1.08 | 17.85 | 2.28 | 7.83  | 6.07 | 294 | 38  | 18.9 | 0.06 | 423  | 033-3  |
| 2254.00 | cut | Sh/Clst: gn gy, m gy      | 0.04 | 0.19  | 0.14 | 1.36  | 0.61 | 31  | 23  | 0.2  | 0.17 | 421  | 034-1  |
| 2262.00 | cut | Sh/Clst: gn gy, m gy      | 0.04 | 0.41  | 0.19 | 2.16  | 0.61 | 67  | 31  | 0.4  | 0.09 | 428  | 035-1  |

Table 2 : Rock-Eval table for well NOCS 31/4-2

Page: 3

Depth unit of measure: m

| Depth   | Typ | Lithology              | S1   | S2   | S3   | S2/S3 | TOC  | HI  | OI | PP  | PI   | Tmax | Sample |
|---------|-----|------------------------|------|------|------|-------|------|-----|----|-----|------|------|--------|
| 2266.00 | cut | Sh/Clst: gn gy, m gy   | 0.04 | 0.28 | 0.27 | 1.04  | 0.72 | 39  | 38 | 0.3 | 0.13 | 428  | 036-1  |
| 2274.00 | cut | Sh/Clst: gn gy, m gy   | 0.04 | 0.28 | 0.25 | 1.12  | 0.67 | 42  | 37 | 0.3 | 0.13 | 428  | 037-1  |
| 2280.00 | cut | Sh/Clst: gn gy, m gy   | 0.04 | 0.38 | 0.25 | 1.52  | 0.73 | 52  | 34 | 0.4 | 0.10 | 426  | 038-1  |
| 2286.00 | cut | Sh/Clst: gn gy, m gy   | 0.04 | 0.33 | 0.23 | 1.43  | 0.76 | 43  | 30 | 0.4 | 0.11 | 428  | 039-1  |
| 2292.00 | cut | Sh/Clst: gn gy, m gy   | 0.05 | 0.41 | 0.21 | 1.95  | 0.81 | 51  | 26 | 0.5 | 0.11 | 429  | 040-1  |
| 2298.00 | cut | Sh/Clst: gn gy, m gy   | 0.02 | 0.23 | 0.20 | 1.15  | 0.60 | 38  | 33 | 0.3 | 0.08 | 427  | 041-1  |
| 2304.00 | cut | Sh/Clst: gn gy, m gy   | 0.02 | 0.21 | 0.33 | 0.64  | 0.55 | 38  | 60 | 0.2 | 0.09 | 428  | 042-1  |
| 2310.00 | cut | Sh/Clst: gn gy, drk gy | 0.11 | 2.11 | 0.37 | 5.70  | 1.49 | 142 | 25 | 2.2 | 0.05 | 429  | 043-1  |
| 2316.00 | cut | Sh/Clst: gn gy, drk gy | 0.12 | 1.89 | 0.36 | 5.25  | 1.42 | 133 | 25 | 2.0 | 0.06 | 430  | 044-1  |
| 2324.00 | cut | Sh/Clst: gn gy, drk gy | 0.31 | 4.76 | 0.32 | 14.88 | 2.09 | 228 | 15 | 5.1 | 0.06 | 425  | 045-1  |
| 2334.00 | cut | Sh/Clst: gn gy, drk gy | 0.34 | 7.99 | 0.61 | 13.10 | 2.76 | 289 | 22 | 8.3 | 0.04 | 422  | 047-1  |
| 2340.00 | cut | Sh/Clst: gn gy, drk gy | 0.16 | 4.31 | 0.82 | 5.26  | 2.19 | 197 | 37 | 4.5 | 0.04 | 426  | 048-1  |
| 2346.00 | cut | Sh/Clst: gn gy, drk gy | 0.16 | 4.28 | 0.66 | 6.48  | 1.77 | 242 | 37 | 4.4 | 0.04 | 426  | 049-1  |
| 2354.00 | cut | Sh/Clst: gn gy, drk gy | 0.28 | 7.48 | 0.81 | 9.23  | 2.70 | 277 | 30 | 7.8 | 0.04 | 423  | 050-2  |
| 2360.00 | cut | Sh/Clst: gn gy, drk gy | 0.21 | 5.37 | 0.87 | 6.17  | 2.23 | 241 | 39 | 5.6 | 0.04 | 421  | 051-2  |

Table 2 : Rock-Eval table for well NOCS 31/4-2

Page: 4

Depth unit of measure: m

| Depth   | Typ | Lithology                         | S1   | S2    | S3   | S2/S3 | TOC  | HI  | OI | PP   | PI   | Tmax | Sample |
|---------|-----|-----------------------------------|------|-------|------|-------|------|-----|----|------|------|------|--------|
| 2366.00 | cut | Sh/Clst: gn gy, ol blk            | 0.26 | 7.81  | 1.00 | 7.81  | 2.61 | 299 | 38 | 8.1  | 0.03 | 423  | 052-1  |
| 2372.00 | cut | Sh/Clst: gn gy, ol blk            | 0.31 | 10.49 | 1.14 | 9.20  | 3.04 | 345 | 38 | 10.8 | 0.03 | 424  | 053-1  |
| 2378.00 | cut | Sh/Clst: gn gy, ol blk            | 0.27 | 8.52  | 1.24 | 6.87  | 2.84 | 300 | 44 | 8.8  | 0.03 | 423  | 054-1  |
| 2384.00 | cut | Sh/Clst: gn gy, ol blk            | 0.30 | 7.17  | 0.75 | 9.56  | 2.03 | 353 | 37 | 7.5  | 0.04 | 424  | 055-1  |
| 2390.00 | cut | Sh/Clst: gn gy, ol blk            | 0.35 | 10.20 | 1.15 | 8.87  | 2.99 | 341 | 38 | 10.6 | 0.03 | 423  | 056-1  |
| 2396.00 | cut | Sh/Clst: gn gy, ol blk            | 0.18 | 3.87  | 0.90 | 4.30  | 1.87 | 207 | 48 | 4.0  | 0.04 | 426  | 057-1  |
| 2402.00 | cut | Sh/Clst: gn gy, ol blk            | 0.22 | 5.88  | 1.02 | 5.76  | 2.43 | 242 | 42 | 6.1  | 0.04 | 425  | 058-1  |
| 2408.00 | cut | Sh/Clst: gn gy, ol blk            | 0.42 | 11.13 | 1.25 | 8.90  | 3.16 | 352 | 40 | 11.6 | 0.04 | 422  | 059-1  |
| 2414.00 | cut | Sh/Clst: gn gy, ol blk            | 0.24 | 5.55  | 1.09 | 5.09  | 1.85 | 300 | 59 | 5.8  | 0.04 | 427  | 060-1  |
| 2420.00 | cut | Sh/Clst: gn gy, ol blk            | 0.67 | 16.04 | 1.30 | 12.34 | 4.36 | 368 | 30 | 16.7 | 0.04 | 422  | 061-1  |
| 2426.00 | cut | Sh/Clst: gn gy, ol blk            | 0.21 | 2.81  | 1.10 | 2.55  | 1.61 | 175 | 68 | 3.0  | 0.07 | 427  | 062-1  |
| 2432.00 | cut | Sh/Clst: gn gy, ol blk            | 0.15 | 3.33  | 1.25 | 2.66  | 1.74 | 191 | 72 | 3.5  | 0.04 | 429  | 063-1  |
| 2438.00 | cut | Sh/Clst: gn gy, ol blk            | 0.24 | 6.63  | 0.54 | 12.28 | 1.50 | 442 | 36 | 6.9  | 0.03 | 426  | 064-1  |
| 2444.00 | cut | Sh/Clst: gn gy, ol blk            | 0.34 | 8.73  | 0.85 | 10.27 | 1.08 | 808 | 79 | 9.1  | 0.04 | 428  | 065-1  |
| 2450.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn | 0.37 | 9.64  | 0.95 | 10.15 | 1.52 | 634 | 63 | 10.0 | 0.04 | 428  | 066-1  |

Table 2 : Rock-Eval table for well NOCS 31/4-2

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Depth unit of measure: m

| Depth   | Typ | Lithology                         | S1   | S2    | S3   | S2/S3 | TOC  | HI  | OI  | PP   | PI   | Tmax | Sample |
|---------|-----|-----------------------------------|------|-------|------|-------|------|-----|-----|------|------|------|--------|
| 2456.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn | 0.28 | 7.32  | 1.08 | 6.78  | 1.70 | 431 | 64  | 7.6  | 0.04 | 426  | 067-1  |
| 2462.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn | 0.52 | 12.36 | 1.24 | 9.97  | 2.67 | 463 | 46  | 12.9 | 0.04 | 425  | 068-1  |
| 2468.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn | 0.38 | 10.60 | 1.05 | 10.10 | 1.47 | 721 | 71  | 11.0 | 0.03 | 424  | 069-1  |
| 2474.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn | 0.23 | 5.57  | 0.98 | 5.68  | 1.33 | 419 | 74  | 5.8  | 0.04 | 428  | 070-1  |
| 2510.00 | cut | S/Sst : w, lt gy                  | 0.02 | 0.15  | 0.31 | 0.48  | 0.08 | 188 | 388 | 0.2  | 0.12 | 462  | 075-1  |
| 2542.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.19 | 5.85  | 0.88 | 6.65  | 1.53 | 382 | 58  | 6.0  | 0.03 | 426  | 080-1  |
| 2548.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.21 | 7.00  | 1.01 | 6.93  | 1.68 | 417 | 60  | 7.2  | 0.03 | 427  | 081-1  |
| 2554.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.17 | 4.34  | 0.85 | 5.11  | 0.90 | 482 | 94  | 4.5  | 0.04 | 428  | 082-1  |
| 2560.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.17 | 5.12  | 0.94 | 5.45  | 1.65 | 310 | 57  | 5.3  | 0.03 | 427  | 083-1  |
| 2566.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.11 | 3.24  | 0.77 | 4.21  | 1.29 | 251 | 60  | 3.3  | 0.03 | 431  | 084-1  |
| 2572.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.13 | 2.27  | 0.22 | 10.32 | 1.81 | 125 | 12  | 2.4  | 0.05 | 431  | 085-1  |
| 2578.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.16 | 3.57  | 0.38 | 9.39  | 2.05 | 174 | 19  | 3.7  | 0.04 | 431  | 132-1  |
| 2584.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.08 | 1.21  | 0.45 | 2.69  | 1.27 | 95  | 35  | 1.3  | 0.06 | 438  | 086-1  |
| 2592.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.17 | 3.61  | 0.77 | 4.69  | 2.18 | 166 | 35  | 3.8  | 0.04 | 421  | 087-1  |
| 2596.00 | cut | Sh/Clst: gy, brn, gn, blk         | 0.04 | 0.76  | 0.45 | 1.69  | 1.34 | 57  | 34  | 0.8  | 0.05 | 434  | 088-1  |

Table 2 : Rock-Eval table for well NOCS 31/4-2

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Depth unit of measure: m

| Depth   | Typ | Lithology                 | S1   | S2   | S3   | S2/S3 | TOC  | HI   | OI  | PP  | PI   | Tmax | Sample |
|---------|-----|---------------------------|------|------|------|-------|------|------|-----|-----|------|------|--------|
| 2602.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.11 | 2.55 | 0.37 | 6.89  | 1.72 | 148  | 22  | 2.7 | 0.04 | 435  | 089-1  |
| 2608.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.07 | 1.30 | 0.33 | 3.94  | 1.28 | 102  | 26  | 1.4 | 0.05 | 434  | 090-1  |
| 2614.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.07 | 1.14 | 0.26 | 4.38  | 1.18 | 97   | 22  | 1.2 | 0.06 | 436  | 091-1  |
| 2620.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.10 | 2.11 | 0.40 | 5.27  | 1.69 | 125  | 24  | 2.2 | 0.05 | 434  | 092-1  |
| 2626.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.08 | 1.73 | 0.37 | 4.68  | 1.34 | 129  | 28  | 1.8 | 0.04 | 436  | 093-1  |
| 2632.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.05 | 0.74 | 0.36 | 2.06  | 1.12 | 66   | 32  | 0.8 | 0.06 | 433  | 094-1  |
| 2650.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.07 | 0.86 | 0.21 | 4.10  | 1.15 | 75   | 18  | 0.9 | 0.08 | 436  | 097-1  |
| 2662.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.29 | 3.08 | 0.63 | 4.89  | 2.84 | 108  | 22  | 3.4 | 0.09 | 432  | 099-1  |
| 2668.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.21 | 2.86 | 0.44 | 6.50  | 2.38 | 120  | 18  | 3.1 | 0.07 | 434  | 100-1  |
| 2674.00 | cut | S/Sst : w                 | -    | 0.03 | -    | -     | 0.08 | 38   | -   | -   | -    | 464  | 101-1  |
| 2680.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.12 | 1.54 | 1.17 | 1.32  | 1.85 | 83   | 63  | 1.7 | 0.07 | 436  | 102-1  |
| 2686.00 | cut | Sh/Clst: gy, brn, gn, blk | 1.03 | 5.79 | 0.69 | 8.39  | 0.56 | 1034 | 123 | 6.8 | 0.15 | 425  | 103-1  |
| 2692.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.41 | 3.88 | 0.53 | 7.32  | 2.17 | 179  | 24  | 4.3 | 0.10 | 430  | 104-1  |
| 2704.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.21 | 4.13 | 0.34 | 12.15 | 1.94 | 213  | 18  | 4.3 | 0.05 | 432  | 106-1  |
| 2710.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.04 | 0.72 | 0.19 | 3.79  | 0.91 | 79   | 21  | 0.8 | 0.05 | 437  | 107-1  |



Table 2 : Rock-Eval table for well NOCS 31/4-2

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Depth unit of measure: m

| Depth   | Typ | Lithology                 | S1   | S2   | S3   | S2/S3 | TOC  | HI  | OI  | PP  | PI   | Tmax | Sample |
|---------|-----|---------------------------|------|------|------|-------|------|-----|-----|-----|------|------|--------|
| 2716.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.08 | 1.06 | 0.16 | 6.63  | 0.97 | 109 | 16  | 1.1 | 0.07 | 428  | 108-1  |
| 2722.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.12 | 1.15 | 0.20 | 5.75  | 1.06 | 108 | 19  | 1.3 | 0.09 | 436  | 109-1  |
| 2734.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.10 | 1.50 | 0.25 | 6.00  | 1.24 | 121 | 20  | 1.6 | 0.06 | 436  | 111-1  |
| 2740.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.10 | 1.53 | 0.21 | 7.29  | 1.14 | 134 | 18  | 1.6 | 0.06 | 434  | 112-1  |
| 2748.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.14 | 2.04 | 0.35 | 5.83  | 1.55 | 132 | 23  | 2.2 | 0.06 | 434  | 113-1  |
| 2760.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.13 | 1.96 | 0.32 | 6.13  | 1.59 | 123 | 20  | 2.1 | 0.06 | 430  | 115-1  |
| 2766.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.88 | 2.73 | 0.43 | 6.35  | 1.70 | 161 | 25  | 3.6 | 0.24 | 432  | 116-1  |
| 2772.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.14 | 2.00 | 0.28 | 7.14  | 1.64 | 122 | 17  | 2.1 | 0.07 | 435  | 117-2  |
| 2778.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.10 | 1.56 | 0.50 | 3.12  | 1.35 | 116 | 37  | 1.7 | 0.06 | 433  | 118-2  |
| 2784.00 | cut | Sh/Clst: dsk red          | 0.01 | 0.04 | 0.03 | 1.33  | 0.11 | 36  | 27  | 0.1 | 0.20 | 492  | 119-1  |
| 2784.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.13 | 1.51 | 0.31 | 4.87  | 1.37 | 110 | 23  | 1.6 | 0.08 | 437  | 119-2  |
| 2800.00 | cut | Sh/Clst: dsk red          | 0.01 | 0.05 | -    | -     | 0.09 | 56  | -   | 0.1 | 0.17 | 494  | 121-1  |
| 2800.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.06 | 0.50 | 0.17 | 2.94  | 0.69 | 72  | 25  | 0.6 | 0.11 | 434  | 121-2  |
| 2818.00 | cut | Sh/Clst: dsk red          | -    | 0.02 | 0.02 | 1.00  | 0.03 | 67  | 67  | -   | -    | 480  | 123-1  |
| 2850.00 | cut | Sh/Clst: dsk red          | -    | 0.02 | 0.05 | 0.40  | 0.03 | 67  | 167 | -   | -    | 485  | 126-1  |

Table 2 : Rock-Eval table for well NOCS 31/4-2

Page: 8

Depth unit of measure: m

| Depth   | Typ | Lithology                 | S1   | S2   | S3   | S2/S3 | TOC  | HI  | OI  | PP  | PI   | Tmax | Sample |
|---------|-----|---------------------------|------|------|------|-------|------|-----|-----|-----|------|------|--------|
| 2880.00 | cut | Ca : w, lt gy             | 0.01 | 0.04 | 0.02 | 2.00  | 0.04 | 100 | 50  | 0.1 | 0.20 | 497  | 129-2  |
| 2900.00 | cut | Sh/Clst: dsk red          | 0.03 | 0.04 | 0.39 | 0.10  | 0.06 | 67  | 650 | 0.1 | 0.43 | 455  | 131-1  |
| 2900.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.22 | 3.46 | 0.71 | 4.87  | 1.47 | 235 | 48  | 3.7 | 0.06 | 429  | 131-2  |

Table 3 a: Weight of EOM and Chromatographic Fraction for well NOCS 31/4-2

Page: 1

Depth unit of measure: m

| Depth   | Typ | Lithology                            | Rock<br>Extracted<br>(g) | EOM<br>(mg) | Sat<br>(mg) | Aro<br>(mg) | Asph<br>(mg) | NSO<br>(mg) | HC<br>(mg) | Non-HC<br>(mg) | TOC(e)<br>(%) | Sample |
|---------|-----|--------------------------------------|--------------------------|-------------|-------------|-------------|--------------|-------------|------------|----------------|---------------|--------|
| 2172.00 | com | * Composite sample - see table 3 e * | 12.0                     | 27.9        | 6.6         | 4.9         | 1.2          | 15.2        | 11.5       | 16.4           | 5.60          | 133-0  |
| 2324.00 | com | * Composite sample - see table 3 e * | 16.2                     | 40.7        | 7.9         | 7.6         | 2.9          | 22.3        | 15.5       | 25.2           | 4.10          | 134-0  |
| 2340.00 | com | * Composite sample - see table 3 e * | 11.6                     | 14.6        | 3.6         | 2.9         | 0.6          | 7.5         | 6.5        | 8.1            | 2.80          | 135-0  |
| 2360.00 | com | * Composite sample - see table 3 e * | 26.6                     | 24.2        | 4.3         | 3.1         | 1.4          | 15.4        | 7.4        | 16.8           | 2.20          | 136-0  |
| 2378.00 | com | * Composite sample - see table 3 e * | 29.4                     | 62.8        | 6.5         | 7.3         | 2.2          | 46.8        | 13.8       | 49.0           | 2.50          | 137-0  |
| 2390.00 | com | * Composite sample - see table 3 e * | 15.4                     | 52.6        | 5.2         | 6.0         | 2.6          | 38.8        | 11.2       | 41.4           | 4.10          | 138-0  |
| 2420.00 | com | * Composite sample - see table 3 e * | 19.0                     | 40.2        | 5.9         | 6.8         | 4.5          | 23.0        | 12.7       | 27.5           | 3.50          | 139-0  |
| 2432.00 | com | * Composite sample - see table 3 e * | 20.0                     | 28.2        | 6.2         | 6.0         | 1.8          | 14.2        | 12.2       | 16.0           | 2.80          | 140-0  |
| 2456.00 | com | * Composite sample - see table 3 e * | 11.0                     | 28.2        | 5.2         | 4.9         | 2.1          | 16.0        | 10.1       | 18.1           | 4.80          | 141-0  |
| 2474.00 | com | * Composite sample - see table 3 e * | 4.2                      | 9.6         | 2.5         | 1.9         | 1.2          | 4.0         | 4.4        | 5.2            | 4.50          | 142-0  |
| 2566.00 | com | * Composite sample - see table 3 e * | 12.2                     | 32.2        | 9.0         | 5.8         | 2.2          | 15.2        | 14.8       | 17.4           | 3.30          | 143-0  |
| 2602.00 | com | * Composite sample - see table 3 e * | 16.6                     | 21.0        | 4.3         | 3.8         | 3.8          | 9.1         | 8.1        | 12.9           | 2.70          | 144-0  |
| 2626.00 | com | * Composite sample - see table 3 e * | 10.1                     | 6.3         | 1.1         | 1.3         | 0.9          | 3.0         | 2.4        | 3.9            | 2.40          | 145-0  |
| 2668.00 | com | * Composite sample - see table 3 e * | 12.1                     | 25.9        | 2.4         | 5.4         | 5.9          | 12.2        | 7.8        | 18.1           | 3.80          | 146-0  |

Table 3 a: Weight of EOM and Chromatographic Fraction for well NOCS 31/4-2

Page: 2

Depth unit of measure: m

| Depth   | Typ | Lithology                            | Rock<br>Extracted<br>(g) | EOM<br>(mg) | Sat<br>(mg) | Aro<br>(mg) | Asph<br>(mg) | NSO<br>(mg) | HC<br>(mg) | Non-HC<br>(mg) | TOC(e)<br>(%) | Sample |
|---------|-----|--------------------------------------|--------------------------|-------------|-------------|-------------|--------------|-------------|------------|----------------|---------------|--------|
| 2734.00 | com | * Composite sample - see table 3 e * | 10.0                     | 8.6         | 1.6         | 1.0         | 0.9          | 5.1         | 2.6        | 6.0            | 2.00          | 147-0  |
| 2760.00 | com | * Composite sample - see table 3 e * | 10.0                     | 7.1         | 1.8         | 1.4         | 0.7          | 3.2         | 3.2        | 3.9            | 1.80          | 148-0  |
| 2766.00 | cut | Sh/Clst: gy, brn, gn, blk            | 3.0                      | 7.1         | 2.9         | 2.8         | 0.1          | 1.3         | 5.7        | 1.4            | 2.00          | 116-1  |
| 2784.00 | com | * Composite sample - see table 3 e * | 10.0                     | 8.3         | 4.4         | 1.7         | 1.4          | 0.8         | 6.1        | 2.2            | 1.70          | 149-0  |

Table 3 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 31/4-2

Page: 1

Depth unit of measure: m

| Depth   | Typ | Lithology                            | EOM  | Sat | Aro | Asph | NSO  | HC   | Non-HC | Sample |
|---------|-----|--------------------------------------|------|-----|-----|------|------|------|--------|--------|
| 2172.00 | com | * Composite sample - see table 3 e * | 2325 | 550 | 408 | 100  | 1266 | 958  | 1366   | 133-0  |
| 2324.00 | com | * Composite sample - see table 3 e * | 2512 | 487 | 469 | 179  | 1376 | 956  | 1555   | 134-0  |
| 2340.00 | com | * Composite sample - see table 3 e * | 1258 | 310 | 250 | 51   | 646  | 560  | 698    | 135-0  |
| 2360.00 | com | * Composite sample - see table 3 e * | 909  | 161 | 116 | 52   | 578  | 278  | 631    | 136-0  |
| 2378.00 | com | * Composite sample - see table 3 e * | 2136 | 221 | 248 | 74   | 1591 | 469  | 1666   | 137-0  |
| 2390.00 | com | * Composite sample - see table 3 e * | 3415 | 337 | 389 | 168  | 2519 | 727  | 2688   | 138-0  |
| 2420.00 | com | * Composite sample - see table 3 e * | 2115 | 310 | 357 | 236  | 1210 | 668  | 1447   | 139-0  |
| 2432.00 | com | * Composite sample - see table 3 e * | 1410 | 310 | 300 | 89   | 710  | 610  | 800    | 140-0  |
| 2456.00 | com | * Composite sample - see table 3 e * | 2563 | 472 | 445 | 190  | 1454 | 918  | 1645   | 141-0  |
| 2474.00 | com | * Composite sample - see table 3 e * | 2285 | 595 | 452 | 285  | 952  | 1047 | 1238   | 142-0  |
| 2566.00 | com | * Composite sample - see table 3 e * | 2639 | 737 | 475 | 180  | 1245 | 1213 | 1426   | 143-0  |
| 2602.00 | com | * Composite sample - see table 3 e * | 1265 | 259 | 228 | 228  | 548  | 487  | 777    | 144-0  |
| 2626.00 | com | * Composite sample - see table 3 e * | 623  | 108 | 128 | 89   | 297  | 237  | 386    | 145-0  |
| 2668.00 | com | * Composite sample - see table 3 e * | 2140 | 198 | 446 | 487  | 1008 | 644  | 1495   | 146-0  |
| 2734.00 | com | * Composite sample - see table 3 e * | 860  | 160 | 100 | 89   | 510  | 260  | 600    | 147-0  |

Table 3 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 31/4-2

Page: 2

Depth unit of measure: m

| Depth   | Typ | Lithology                            | EOM  | Sat | Aro | Asph | NSO | HC   | Non-HC | Sample |
|---------|-----|--------------------------------------|------|-----|-----|------|-----|------|--------|--------|
| 2760.00 | com | * Composite sample - see table 3 e * | 710  | 179 | 140 | 70   | 320 | 320  | 390    | 148-0  |
| 2766.00 | cut | Sh/Clst: gy, brn, gn, blk            | 2366 | 966 | 933 | 33   | 433 | 1900 | 466    | 116-1  |
| 2784.00 | com | * Composite sample - see table 3 e * | 830  | 440 | 170 | 140  | 79  | 610  | 219    | 149-0  |

Table 3 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 31/4-2

Page: 1

Depth unit of measure: m

| Depth   | Typ | Lithology                            | EOM   | Sat   | Aro   | Asph  | NSO   | HC    | Non-HC | Sample |
|---------|-----|--------------------------------------|-------|-------|-------|-------|-------|-------|--------|--------|
| 2172.00 | com | * Composite sample - see table 3 e * | 41.52 | 9.82  | 7.29  | 1.79  | 22.62 | 17.11 | 24.40  | 133-0  |
| 2324.00 | com | * Composite sample - see table 3 e * | 61.28 | 11.89 | 11.44 | 4.37  | 33.57 | 23.34 | 37.94  | 134-0  |
| 2340.00 | com | * Composite sample - see table 3 e * | 44.95 | 11.08 | 8.93  | 1.85  | 23.09 | 20.01 | 24.94  | 135-0  |
| 2360.00 | com | * Composite sample - see table 3 e * | 41.35 | 7.35  | 5.30  | 2.39  | 26.32 | 12.65 | 28.71  | 136-0  |
| 2378.00 | com | * Composite sample - see table 3 e * | 85.44 | 8.84  | 9.93  | 2.99  | 63.67 | 18.78 | 66.67  | 137-0  |
| 2390.00 | com | * Composite sample - see table 3 e * | 83.31 | 8.24  | 9.50  | 4.12  | 61.45 | 17.74 | 65.57  | 138-0  |
| 2420.00 | com | * Composite sample - see table 3 e * | 60.45 | 8.87  | 10.23 | 6.77  | 34.59 | 19.10 | 41.35  | 139-0  |
| 2432.00 | com | * Composite sample - see table 3 e * | 50.36 | 11.07 | 10.71 | 3.21  | 25.36 | 21.79 | 28.57  | 140-0  |
| 2456.00 | com | * Composite sample - see table 3 e * | 53.41 | 9.85  | 9.28  | 3.98  | 30.30 | 19.13 | 34.28  | 141-0  |
| 2474.00 | com | * Composite sample - see table 3 e * | 50.79 | 13.23 | 10.05 | 6.35  | 21.16 | 23.28 | 27.51  | 142-0  |
| 2566.00 | com | * Composite sample - see table 3 e * | 79.98 | 22.35 | 14.41 | 5.46  | 37.75 | 36.76 | 43.22  | 143-0  |
| 2602.00 | com | * Composite sample - see table 3 e * | 46.85 | 9.59  | 8.48  | 8.48  | 20.30 | 18.07 | 28.78  | 144-0  |
| 2626.00 | com | * Composite sample - see table 3 e * | 25.99 | 4.54  | 5.36  | 3.71  | 12.38 | 9.90  | 16.09  | 145-0  |
| 2668.00 | com | * Composite sample - see table 3 e * | 56.33 | 5.22  | 11.74 | 12.83 | 26.53 | 16.96 | 39.36  | 146-0  |
| 2734.00 | com | * Composite sample - see table 3 e * | 43.00 | 8.00  | 5.00  | 4.50  | 25.50 | 13.00 | 30.00  | 147-0  |

Table 3 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 31/4-2

Page: 2

Depth unit of measure: m

| Depth   | Typ | Lithology                            | EOM    | Sat   | Aro   | Asph | NSO   | HC    | Non-HC | Sample |
|---------|-----|--------------------------------------|--------|-------|-------|------|-------|-------|--------|--------|
| 2760.00 | com | * Composite sample - see table 3 e * | 39.44  | 10.00 | 7.78  | 3.89 | 17.78 | 17.78 | 21.67  | 148-0  |
| 2766.00 | cut | Sh/Clst: gy, brn, gn, blk            | 118.33 | 48.33 | 46.67 | 1.67 | 21.67 | 95.00 | 23.33  | 116-1  |
| 2784.00 | com | * Composite sample - see table 3 e * | 48.82  | 25.88 | 10.00 | 8.24 | 4.71  | 35.88 | 12.94  | 149-0  |



Table 3 d: Composition of material extracted from the rock (%) for well NOCS 31/4-2

Page: 1

Depth unit of measure: m

| Depth   | Typ | Lithology                            | Sat<br>EOM | Aro<br>EOM | Asph<br>EOM | NSO<br>EOM | HC<br>EOM | Non-HC<br>EOM | Sat<br>Aro | HC<br>Non-HC | Sample |
|---------|-----|--------------------------------------|------------|------------|-------------|------------|-----------|---------------|------------|--------------|--------|
| 2172.00 | com | * Composite sample - see table 3 e * | 23.66      | 17.56      | 4.30        | 54.48      | 41.22     | 58.78         | 134.69     | 70.12        | 133-0  |
| 2324.00 | com | * Composite sample - see table 3 e * | 19.41      | 18.67      | 7.13        | 54.79      | 38.08     | 61.92         | 103.95     | 61.51        | 134-0  |
| 2340.00 | com | * Composite sample - see table 3 e * | 24.66      | 19.86      | 4.11        | 51.37      | 44.52     | 55.48         | 124.14     | 80.25        | 135-0  |
| 2360.00 | com | * Composite sample - see table 3 e * | 17.77      | 12.81      | 5.79        | 63.64      | 30.58     | 69.42         | 138.71     | 44.05        | 136-0  |
| 2378.00 | com | * Composite sample - see table 3 e * | 10.35      | 11.62      | 3.50        | 74.52      | 21.97     | 78.03         | 89.04      | 28.16        | 137-0  |
| 2390.00 | com | * Composite sample - see table 3 e * | 9.89       | 11.41      | 4.94        | 73.76      | 21.29     | 78.71         | 86.67      | 27.05        | 138-0  |
| 2420.00 | com | * Composite sample - see table 3 e * | 14.68      | 16.92      | 11.19       | 57.21      | 31.59     | 68.41         | 86.76      | 46.18        | 139-0  |
| 2432.00 | com | * Composite sample - see table 3 e * | 21.99      | 21.28      | 6.38        | 50.35      | 43.26     | 56.74         | 103.33     | 76.25        | 140-0  |
| 2456.00 | com | * Composite sample - see table 3 e * | 18.44      | 17.38      | 7.45        | 56.74      | 35.82     | 64.18         | 106.12     | 55.80        | 141-0  |
| 2474.00 | com | * Composite sample - see table 3 e * | 26.04      | 19.79      | 12.50       | 41.67      | 45.83     | 54.17         | 131.58     | 84.62        | 142-0  |
| 2566.00 | com | * Composite sample - see table 3 e * | 27.95      | 18.01      | 6.83        | 47.20      | 45.96     | 54.04         | 155.17     | 85.06        | 143-0  |
| 2602.00 | com | * Composite sample - see table 3 e * | 20.48      | 18.10      | 18.10       | 43.33      | 38.57     | 61.43         | 113.16     | 62.79        | 144-0  |
| 2626.00 | com | * Composite sample - see table 3 e * | 17.46      | 20.63      | 14.29       | 47.62      | 38.10     | 61.90         | 84.62      | 61.54        | 145-0  |
| 2668.00 | com | * Composite sample - see table 3 e * | 9.27       | 20.85      | 22.78       | 47.10      | 30.12     | 69.88         | 44.44      | 43.09        | 146-0  |

Table 3 d: Composition of material extracted from the rock (%) for well NOCS 31/4-2

Page: 2

Depth unit of measure: m

| Depth   | Typ | Lithology                            | Sat   | Aro   | Asph  | NSO   | HC    | Non-HC | Sat    | HC     | Sample |
|---------|-----|--------------------------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
|         |     |                                      | EOM   | EOM   | EOM   | EOM   | EOM   | EOM    | Aro    | Non-HC |        |
| 2734.00 | com | * Composite sample - see table 3 e * | 18.60 | 11.63 | 10.47 | 59.30 | 30.23 | 69.77  | 160.00 | 43.33  | 147-0  |
| 2760.00 | com | * Composite sample - see table 3 e * | 25.35 | 19.72 | 9.86  | 45.07 | 45.07 | 54.93  | 128.57 | 82.05  | 148-0  |
| 2766.00 | cut | Sh/Clst: gy, brn, gn, blk            | 40.85 | 39.44 | 1.41  | 18.31 | 80.28 | 19.72  | 103.57 | 407.14 | 116-1  |
| 2784.00 | com | * Composite sample - see table 3 e * | 53.01 | 20.48 | 16.87 | 9.64  | 73.49 | 26.51  | 258.82 | 277.27 | 149-0  |

Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 31/4-2

Page: 1

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 |
|-------------|-------------|-----|--------|-----------------|---------|-----|---------------------------------|--------|
| 2152.00     | 2172.00     | com | 133-0  | is composed of: | 2152.00 | cut | Sh/Clst: ol blk to drk gy, calc | 020-4  |
|             |             |     |        |                 | 2158.00 | cut | Sh/Clst: ol blk to drk gy, calc | 021-4  |
|             |             |     |        |                 | 2166.00 | cut | Sh/Clst: ol blk to drk gy, calc | 022-4  |
|             |             |     |        |                 | 2172.00 | cut | Sh/Clst: ol blk to drk gy, calc | 023-4  |
| 2242.00     | 2324.00     | com | 134-0  | is composed of: | 2242.00 | cut | Sh/Clst: ol blk, drk gy         | 032-3  |
|             |             |     |        |                 | 2248.00 | cut | Sh/Clst: ol blk, drk gy         | 033-3  |
|             |             |     |        |                 | 2310.00 | cut | Sh/Clst: gn gy, drk gy          | 043-1  |
|             |             |     |        |                 | 2316.00 | cut | Sh/Clst: gn gy, drk gy          | 044-1  |
|             |             |     |        |                 | 2324.00 | cut | Sh/Clst: gn gy, drk gy          | 045-1  |
| 2334.00     | 2340.00     | com | 135-0  | is composed of: | 2334.00 | cut | Sh/Clst: gn gy, drk gy          | 047-1  |
|             |             |     |        |                 | 2340.00 | cut | Sh/Clst: gn gy, drk gy          | 048-1  |
| 2346.00     | 2360.00     | com | 136-0  | is composed of: | 2346.00 | cut | Sh/Clst: gn gy, drk gy          | 049-1  |
|             |             |     |        |                 | 2354.00 | cut | Sh/Clst: gn gy, drk gy          | 050-2  |
|             |             |     |        |                 | 2360.00 | cut | Sh/Clst: gn gy, drk gy          | 051-2  |
| 2366.00     | 2378.00     | com | 137-0  | is composed of: | 2366.00 | cut | Sh/Clst: gn gy, ol blk, calc    | 052-1  |
|             |             |     |        |                 | 2372.00 | cut | Sh/Clst: gn gy, ol blk, calc    | 053-1  |
|             |             |     |        |                 | 2378.00 | cut | Sh/Clst: gn gy, ol blk, calc    | 054-1  |

Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 31/4-2

Page: 2

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 |
|-------------|-------------|-----|--------|-----------------|---------|-----|----------------------------------------------|--------|
| 2384.00     | 2390.00     | com | 138-0  | is composed of: | 2384.00 | cut | Sh/Clst: gn gy, ol blk, calc                 | 055-1  |
|             |             |     |        |                 | 2390.00 | cut | Sh/Clst: gn gy, ol blk, calc                 | 056-1  |
| 2396.00     | 2420.00     | com | 139-0  | is composed of: | 2396.00 | cut | Sh/Clst: gn gy, ol blk, calc                 | 057-1  |
|             |             |     |        |                 | 2402.00 | cut | Sh/Clst: gn gy, ol blk, calc                 | 058-1  |
|             |             |     |        |                 | 2408.00 | cut | Sh/Clst: gn gy, ol blk, calc                 | 059-1  |
|             |             |     |        |                 | 2414.00 | cut | Sh/Clst: gn gy, ol blk, calc                 | 060-1  |
|             |             |     |        |                 | 2420.00 | cut | Sh/Clst: gn gy, ol blk, calc                 | 061-1  |
| 2426.00     | 2432.00     | com | 140-0  | is composed of: | 2426.00 | cut | Sh/Clst: gn gy, ol blk, calc                 | 062-1  |
|             |             |     |        |                 | 2432.00 | cut | Sh/Clst: gn gy, ol blk, calc                 | 063-1  |
| 2438.00     | 2456.00     | com | 141-0  | is composed of: | 2438.00 | cut | Sh/Clst: gn gy, ol blk, calc, mic            | 064-1  |
|             |             |     |        |                 | 2444.00 | cut | Sh/Clst: gn gy, ol blk, calc, mic            | 065-1  |
|             |             |     |        |                 | 2450.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn, calc, mic | 066-1  |
|             |             |     |        |                 | 2456.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn, calc, mic | 067-1  |
| 2462.00     | 2474.00     | com | 142-0  | is composed of: | 2462.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn, calc, mic | 068-1  |
|             |             |     |        |                 | 2468.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn, calc, mic | 069-1  |
|             |             |     |        |                 | 2474.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn, calc, mic | 070-1  |

Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 31/4-2

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 |
|-------------|-------------|-----|--------|-----------------|---------|-----|--------------------------------------|--------|
| 2542.00     | 2566.00     | com | 143-0  | is composed of: | 2542.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 080-1  |
|             |             |     |        |                 | 2548.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 081-1  |
|             |             |     |        |                 | 2554.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 082-1  |
|             |             |     |        |                 | 2560.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 083-1  |
|             |             |     |        |                 | 2566.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 084-1  |
| 2572.00     | 2602.00     | com | 144-0  | is composed of: | 2572.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 085-1  |
|             |             |     |        |                 | 2578.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 132-1  |
|             |             |     |        |                 | 2602.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 089-1  |
| 2608.00     | 2626.00     | com | 145-0  | is composed of: | 2608.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 090-1  |
|             |             |     |        |                 | 2620.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 092-1  |
|             |             |     |        |                 | 2626.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 093-1  |
| 2662.00     | 2668.00     | com | 146-0  | is composed of: | 2662.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 099-1  |
|             |             |     |        |                 | 2668.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 100-1  |
| 2704.00     | 2734.00     | com | 147-0  | is composed of: | 2704.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 106-1  |
|             |             |     |        |                 | 2716.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 108-1  |
|             |             |     |        |                 | 2722.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 109-1  |
|             |             |     |        |                 | 2734.00 | cut | Sh/Clst: gy, brn, gn, blk, calc, mic | 111-1  |

Table 3 e: List of composite samples appearing in the extraction tables for well NOCS 31/4-2

Page: 4

Depth unit of measure: m

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

| <u>Upper depth</u> | <u>Lower depth</u> | <u>Typ</u> | <u>Sample</u> |                 | <u>Depth</u> | <u>Typ</u> | <u>Lithology</u>                     | <u>Sample</u> |
|--------------------|--------------------|------------|---------------|-----------------|--------------|------------|--------------------------------------|---------------|
| 2740.00            | 2760.00            | com        | 148-0         | is composed of: | 2740.00      | cut        | Sh/Clst: gy, brn, gn, blk, calc, mic | 112-1         |
|                    |                    |            |               |                 | 2748.00      | cut        | Sh/Clst: gy, brn, gn, blk, calc, mic | 113-1         |
|                    |                    |            |               |                 | 2760.00      | cut        | Sh/Clst: gy, brn, gn, blk, calc, mic | 115-1         |
| 2772.00            | 2784.00            | com        | 149-0         | is composed of: | 2772.00      | cut        | Sh/Clst: gy, brn, gn, blk, calc, mic | 117-2         |
|                    |                    |            |               |                 | 2778.00      | cut        | Sh/Clst: gy, brn, gn, blk, calc, mic | 118-2         |
|                    |                    |            |               |                 | 2784.00      | cut        | Sh/Clst: gy, brn, gn, blk, calc, mic | 119-2         |

Table 4 : Tabulation of data from the Gas Chromatogram for well NOCS 31/4-2

Page: 1

Depth unit of measure: m

| Depth   | Typ | Lithology | Pristane | Pristane | Pristane + Phytane | Phytane | CPI  | Sample |
|---------|-----|-----------|----------|----------|--------------------|---------|------|--------|
|         |     |           | nC17     | Phytane  | nC17 + nC18        | nC18    |      |        |
| 2172.00 | com | bulk      | 0.80     | 1.50     | 0.77               | -       | 1.00 | 133-0  |
| 2324.00 | com | bulk      | 0.60     | 1.50     | 0.55               | -       | 1.00 | 134-0  |
| 2340.00 | com | bulk      | 0.70     | 1.50     | 0.64               | -       | 1.10 | 135-0  |
| 2360.00 | com | bulk      | 0.60     | 1.60     | 0.59               | -       | 1.00 | 136-0  |
| 2378.00 | com | bulk      | 0.90     | 1.60     | 0.80               | -       | 1.00 | 137-0  |
| 2390.00 | com | bulk      | 1.10     | 1.60     | 1.07               | -       | 1.00 | 138-0  |
| 2420.00 | com | bulk      | 0.90     | 1.50     | 0.85               | -       | 1.00 | 139-0  |
| 2432.00 | com | bulk      | 0.80     | 1.70     | 0.77               | -       | 1.10 | 140-0  |
| 2456.00 | com | bulk      | 0.90     | 1.50     | 0.88               | -       | 1.00 | 141-0  |
| 2474.00 | com | bulk      | 0.80     | 1.40     | 0.76               | -       | 1.00 | 142-0  |
| 2566.00 | com | bulk      | 0.80     | 1.60     | 0.73               | -       | 0.90 | 143-0  |
| 2602.00 | com | bulk      | 0.90     | 1.80     | 0.77               | -       | 1.10 | 144-0  |
| 2626.00 | com | bulk      | 0.90     | 2.30     | 0.69               | -       | 1.50 | 145-0  |
| 2668.00 | com | bulk      | 1.30     | 2.80     | 0.93               | -       | 1.60 | 146-0  |

Table 4 : Tabulation of data from the Gas Chromatogram for well NOCS 31/4-2

Page: 2

Depth unit of measure: m

| Depth   | Typ | Lithology                 | Pristane | Pristane | Pristane + Phytane | Phytane | CPI  | Sample |
|---------|-----|---------------------------|----------|----------|--------------------|---------|------|--------|
|         |     |                           | nC17     | Phytane  | nC17 + nC18        | nC18    |      |        |
| 2734.00 | com | bulk                      | 0.80     | 2.10     | 0.59               | -       | 1.60 | 147-0  |
| 2760.00 | com | bulk                      | 0.80     | 2.00     | 0.64               | -       | 1.60 | 148-0  |
| 2766.00 | cut | Sh/Clst: gy, brn, gn, blk | 0.50     | 1.90     | 0.42               | -       | 1.40 | 116-1  |
| 2784.00 | com | bulk                      | 0.60     | 2.00     | 0.53               | -       | 1.60 | 149-0  |



Table 5 : Aromatic Hydrocarbon Ratios for well NOCS 31/4-2

Page: 1

Depth unit of measure: m

| Depth   | Typ | Lithology | MNR  | DMNR | BPhR | 2/LMP | MPI1 | MPI2 | DBT/P | 4/LMDBT | (3+2)/LMDBT | Sample |
|---------|-----|-----------|------|------|------|-------|------|------|-------|---------|-------------|--------|
| 2172.00 | com | bulk      | 1.08 | 0.57 | 0.29 | 0.72  | 0.81 | 0.55 | 0.37  | 0.21    | 0.16        | 133-0  |
| 2324.00 | com | bulk      | 1.36 | 0.77 | 0.33 | 1.13  | 0.66 | 0.66 | 0.13  | 0.38    | 0.21        | 134-0  |
| 2340.00 | com | bulk      | 1.36 | 0.77 | 0.32 | 1.13  | 0.63 | 0.61 | 0.14  | 0.37    | 0.20        | 135-0  |
| 2360.00 | com | bulk      | -    | -    | -    | 1.11  | 0.69 | 0.65 | 0.15  | 0.60    | 0.30        | 136-0  |
| 2378.00 | com | bulk      | 1.30 | 0.69 | 0.25 | 0.95  | 0.60 | 0.45 | 0.25  | 0.21    | 0.16        | 137-0  |
| 2390.00 | com | bulk      | 1.12 | 0.58 | 0.40 | 0.72  | 0.76 | 0.47 | 0.34  | 0.17    | 0.14        | 138-0  |
| 2420.00 | com | bulk      | 1.08 | 0.60 | 0.25 | 0.77  | 0.76 | 0.49 | 0.35  | 0.21    | 0.18        | 139-0  |
| 2432.00 | com | bulk      | 1.13 | 0.60 | 0.26 | 0.92  | 0.62 | 0.51 | 0.27  | 0.28    | 0.19        | 140-0  |
| 2456.00 | com | bulk      | 1.15 | 0.56 | 0.27 | 0.86  | 0.65 | 0.49 | 0.27  | 0.24    | 0.16        | 141-0  |
| 2474.00 | com | bulk      | 1.15 | 0.56 | 0.28 | 0.92  | 0.66 | 0.49 | -     | 0.25    | 0.20        | 142-0  |
| 2566.00 | com | bulk      | 1.09 | 0.57 | 0.27 | 0.80  | 0.65 | 0.52 | -     | 0.17    | 0.14        | 143-0  |
| 2602.00 | com | bulk      | 1.24 | 0.59 | 0.21 | 0.92  | 0.59 | 0.55 | -     | 0.28    | 0.21        | 144-0  |
| 2626.00 | com | bulk      | 1.18 | 0.55 | 0.11 | 0.82  | 0.53 | 0.51 | -     | 0.50    | 0.35        | 145-0  |
| 2668.00 | com | bulk      | 1.17 | 0.51 | 0.19 | 0.92  | 0.50 | 0.58 | -     | 0.50    | 0.44        | 146-0  |
| 2734.00 | com | bulk      | 1.20 | 0.63 | 0.39 | 0.93  | 0.54 | 0.56 | -     | 1.24    | 0.50        | 147-0  |

Table 5 : Aromatic Hydrocarbon Ratios for well NOCS 31/4-2

Page: 2

Depth unit of measure: m

| Depth   | Typ | Lithology                 | MNR  | DMNR | BPhR | 2/1MP | MPI1 | MPI2 | DBT/P | 4/1MDBT | (3+2)/1MDBT | Sample |
|---------|-----|---------------------------|------|------|------|-------|------|------|-------|---------|-------------|--------|
| 2760.00 | com | bulk                      | 1.11 | 0.56 | 0.49 | 0.93  | 0.54 | 0.56 | -     | 1.59    | 0.50        | 148-0  |
| 2766.00 | cut | Sh/Clst: gy, brn, gn, blk | 1.00 | 0.48 | 0.19 | 1.02  | 0.67 | 0.71 | -     | 5.68    | 1.00        | 116-1  |
| 2784.00 | com | bulk                      | 1.11 | 0.61 | 0.21 | 0.95  | 0.57 | 0.60 | -     | 1.35    | 0.67        | 149-0  |

List of aromatic maturity ratios

|             |   |                                                                                                           |
|-------------|---|-----------------------------------------------------------------------------------------------------------|
| MNR         | = | $\frac{2\text{-methyl naphthalene}}{1\text{-methyl naphthalene}}$                                         |
| DMNR        | = | $\frac{2,6 + 2,7\text{-dimethyl naphthalene}}{1,5\text{-dimethyl naphthalene}}$                           |
| BPHR        | = | $\frac{\text{biphenyl}}{1,6 \text{ dimethyl naphthalene}}$                                                |
| 2/1MP       | = | $\frac{2\text{-methyl phenanthrene}}{1\text{-methyl phenanthrene}}$                                       |
| MPI1        | = | $\frac{1.5 * (3 + 2\text{-methyl phenanthrene})}{\text{phenanthrene} + 9 + 1\text{-methyl phenanthrene}}$ |
| MPI2        | = | $\frac{3.0 * 2\text{-methyl phenanthrene}}{\text{phenanthrene} + 9 + 1\text{-methyl phenanthrene}}$       |
| DBT/P       | = | $\frac{\text{dibenzothiophene}}{\text{phenanthrene}}$                                                     |
| 4/1MDBT     | = | $\frac{4\text{-methyl dibenzothiophene}}{1\text{-methyl dibenzothiophene}}$                               |
| (3+2)/1MDBT | = | $\frac{3 + 2\text{-methyl dibenzothiophene}}{1\text{-methyl dibenzothiophene}}$                           |

Table 6 : Thermal Maturity Data for well NOCS 31/4-2

Page: 1

Depth unit of measure: m

| Depth   | Typ | Lithology                 | Vitrinite<br>Reflectance<br>(%) | Number of<br>Readings | Standard<br>Deviation | Spore<br>Fluorescence<br>Colour | SCI   | T <sub>max</sub><br>(°C) | Sample |
|---------|-----|---------------------------|---------------------------------|-----------------------|-----------------------|---------------------------------|-------|--------------------------|--------|
| 1935.00 | cut | bulk                      | 0.54                            | 16                    | 0.04                  | 4-5                             | -     | -                        | 007-0  |
| 2142.00 | cut | bulk                      | 0.56                            | 18                    | 0.04                  | 4-5                             | -     | -                        | 017-0  |
| 2152.00 | cut | Sh/Clst: ol blk to drk gy | -                               | -                     | -                     | -                               | 3-3.5 | 421                      | 020-4  |
| 2158.00 | cut | bulk                      | 0.54                            | 17                    | 0.04                  | 4-5                             | -     | -                        | 021-0  |
| 2166.00 | cut | Sh/Clst: ol blk to drk gy | -                               | -                     | -                     | -                               | 3     | 424                      | 022-4  |
| 2196.00 | cut | bulk                      | 0.57                            | 9                     | 0.03                  | 5                               | -     | -                        | 027-0  |
| 2230.00 | cut | Sh/Clst: ol blk to drk gy | -                               | -                     | -                     | -                               | 3     | 421                      | 029-3  |
| 2242.00 | cut | Sh/Clst: ol blk, drk gy   | -                               | -                     | -                     | -                               | 3.5   | 423                      | 032-3  |
| 2266.00 | cut | bulk                      | 0.61                            | 19                    | 0.05                  | 0                               | -     | -                        | 036-0  |
| 2292.00 | cut | bulk                      | 0.54                            | 4                     | 0.11                  | 4-5                             | -     | -                        | 040-0  |
| 2316.00 | cut | Sh/Clst: gn gy, drk gy    | -                               | -                     | -                     | -                               | 3.5-4 | 430                      | 044-1  |
| 2334.00 | cut | Sh/Clst: gn gy, drk gy    | -                               | -                     | -                     | -                               | 3.5?  | 422                      | 047-1  |
| 2340.00 | cut | bulk                      | 0.52                            | 11                    | 0.03                  | 0                               | -     | -                        | 048-0  |
| 2360.00 | cut | Sh/Clst: gn gy, drk gy    | -                               | -                     | -                     | -                               | 3.5?  | 421                      | 051-2  |

Table 6 : Thermal Maturity Data for well NOCS 31/4-2

Page: 2

Depth unit of measure: m

| Depth Typ Lithology                           | Vitrinite<br>Reflectance<br>(%) | Number of<br>Readings | Standard<br>Deviation | Spore<br>Fluorescence<br>Colour | SCI   | T <sub>max</sub><br>(°C) | Sample |
|-----------------------------------------------|---------------------------------|-----------------------|-----------------------|---------------------------------|-------|--------------------------|--------|
| 2378.00 cut Sh/Clst: gn gy, ol blk            | -                               | -                     | -                     | -                               | 3.5   | 423                      | 054-1  |
| 2384.00 cut bulk                              | 0.58                            | 12                    | 0.07                  | 5-6                             | -     | -                        | 055-0  |
| 2402.00 cut Sh/Clst: gn gy, ol blk            | -                               | -                     | -                     | -                               | 4     | 425                      | 058-1  |
| 2414.00 cut Sh/Clst: gn gy, ol blk            | -                               | -                     | -                     | -                               | 4     | 427                      | 060-1  |
| 2420.00 cut bulk                              | 0.53                            | 9                     | 0.03                  | 4-5                             | -     | -                        | 061-0  |
| 2432.00 cut Sh/Clst: gn gy, ol blk            | -                               | -                     | -                     | -                               | NDP   | 429                      | 063-1  |
| 2444.00 cut Sh/Clst: gn gy, ol blk            | -                               | -                     | -                     | -                               | 3.5-4 | 428                      | 065-1  |
| 2456.00 cut Sh/Clst: gn gy, ol blk, drk y brn | -                               | -                     | -                     | -                               | 4     | 426                      | 067-1  |
| 2462.00 cut bulk                              | 0.55                            | 15                    | 0.05                  | 0                               | -     | -                        | 068-0  |
| 2468.00 cut Sh/Clst: gn gy, ol blk, drk y brn | -                               | -                     | -                     | -                               | 4     | 424                      | 069-1  |
| 2510.00 cut bulk                              | 0.56                            | 20                    | 0.06                  | 5                               | -     | -                        | 075-0  |
| 2542.00 cut bulk                              | 0.58                            | 18                    | 0.04                  | 5                               | -     | -                        | 080-0  |
| 2548.00 cut Sh/Clst: gy, brn, gn, blk         | -                               | -                     | -                     | -                               | 4-4.5 | 427                      | 081-1  |
| 2560.00 cut Sh/Clst: gy, brn, gn, blk         | -                               | -                     | -                     | -                               | 4.5-5 | 427                      | 083-1  |

Table 6 : Thermal Maturity Data for well NOCS 31/4-2

Page: 3

Depth unit of measure: m

| Depth   | Typ Lithology                 | Vitrinite<br>Reflectance<br>(%) | Number of<br>Readings | Standard<br>Deviation | Spore<br>Fluorescence<br>Colour | SCI   | T <sub>max</sub><br>(°C) | Sample |
|---------|-------------------------------|---------------------------------|-----------------------|-----------------------|---------------------------------|-------|--------------------------|--------|
| 2578.00 | cut bulk                      | 0.57                            | 8                     | 0.04                  | 5                               | -     | -                        | 132-0  |
| 2578.00 | cut Sh/Clst: gy, brn, gn, blk | -                               | -                     | -                     | -                               | 5     | 431                      | 132-1  |
| 2608.00 | cut Sh/Clst: gy, brn, gn, blk | -                               | -                     | -                     | -                               | 5.5   | 434                      | 090-1  |
| 2614.00 | cut bulk                      | 0.61                            | 10                    | 0.04                  | 5-6                             | -     | -                        | 091-0  |
| 2638.00 | cut bulk                      | 0.59                            | 49                    | 0.04                  | 6                               | -     | -                        | 095-0  |
| 2668.00 | cut Sh/Clst: gy, brn, gn, blk | -                               | -                     | -                     | -                               | 5.5   | 434                      | 100-1  |
| 2680.00 | cut bulk                      | 0.60                            | 35                    | 0.04                  | 5-6                             | -     | -                        | 102-0  |
| 2698.00 | cut bulk                      | 0.60                            | 36                    | 0.05                  | 6                               | -     | -                        | 105-0  |
| 2722.00 | cut bulk                      | 0.61                            | 24                    | 0.05                  | 6                               | -     | -                        | 109-0  |
| 2722.00 | cut Sh/Clst: gy, brn, gn, blk | -                               | -                     | -                     | -                               | NDP   | 436                      | 109-1  |
| 2760.00 | cut bulk                      | 0.60                            | 13                    | 0.04                  | 6                               | -     | -                        | 115-0  |
| 2760.00 | cut Sh/Clst: gy, brn, gn, blk | -                               | -                     | -                     | -                               | 5.5-6 | 430                      | 115-1  |
| 2784.00 | cut Sh/Clst: gy, brn, gn, blk | -                               | -                     | -                     | -                               | NDP   | 437                      | 119-2  |
| 2790.00 | cut bulk                      | NDP                             | -                     | -                     | 0                               | -     | -                        | 120-0  |

Table 6 : Thermal Maturity Data for well NOCS 31/4-2

Page: 4

Depth unit of measure: m

| Depth   | Typ | Lithology | Vitrinite<br>Reflectance<br>(%) | Number of<br>Readings | Standard<br>Deviation | Spore<br>Fluorescence<br>Colour | SCI | Tmax<br>(°C) | Sample |
|---------|-----|-----------|---------------------------------|-----------------------|-----------------------|---------------------------------|-----|--------------|--------|
| 2860.00 | cut | bulk      | NDP                             | -                     | -                     | 0                               | -   | -            | 127-0  |

Table 7 : Visual Kerogen Composition Data for well NOCS 31/4-2

Page: 1

Depth unit of measure: m

| Depth   | Typ | Lithology                         | L<br>I<br>P<br>T<br>% | A<br>m<br>o<br>r<br>L<br>t | L<br>i<br>p<br>/<br>D<br>e<br>t | S<br>C<br>u<br>t<br>P<br>i<br>c<br>l<br>l | C<br>R<br>e<br>s<br>i<br>n<br>e | D<br>A<br>i<br>n<br>c<br>o<br>r<br>f<br>i<br>t | B<br>i<br>t<br>L | I<br>N<br>E<br>R<br>T<br>% | F<br>u<br>s<br>i<br>n | S<br>e<br>m<br>F<br>u<br>e<br>n | I<br>n<br>t<br>D<br>r<br>e<br>i<br>n | M<br>i<br>c<br>r<br>o<br>I | S<br>c<br>l<br>e<br>r<br>I | B<br>i<br>t<br>I | V<br>I<br>T<br>R<br>% | T<br>e<br>l<br>l<br>i<br>n | C<br>o<br>l<br>l<br>i<br>n | V<br>i<br>t<br>D<br>r<br>e<br>V | A<br>m<br>o<br>r<br>i<br>t<br>V | B<br>i<br>t<br>V | Sample |
|---------|-----|-----------------------------------|-----------------------|----------------------------|---------------------------------|-------------------------------------------|---------------------------------|------------------------------------------------|------------------|----------------------------|-----------------------|---------------------------------|--------------------------------------|----------------------------|----------------------------|------------------|-----------------------|----------------------------|----------------------------|---------------------------------|---------------------------------|------------------|--------|
| 2152.00 | cut | Sh/Clst: ol blk to drk gy         | 40                    | *                          | *                               | *                                         |                                 | *                                              |                  | 20                         | *                     | *                               | ?                                    |                            |                            |                  |                       | 40                         | *                          |                                 | *                               |                  | 020-4  |
| 2166.00 | cut | Sh/Clst: ol blk to drk gy         | 25                    | *                          |                                 | *                                         | ?                               |                                                |                  | 30                         | *                     | *                               |                                      |                            |                            |                  |                       | 45                         | *                          |                                 | *                               |                  | 022-4  |
| 2230.00 | cut | Sh/Clst: ol blk to drk gy         | 50                    | *                          | *                               | *                                         | ?                               |                                                |                  | 10                         |                       | *                               | *                                    |                            |                            |                  |                       | 40                         |                            | *                               | *                               |                  | 029-3  |
| 2242.00 | cut | Sh/Clst: ol blk, drk gy           | 50                    | *                          | *                               | *                                         | ?                               | *                                              |                  | 10                         | *                     | *                               | *                                    |                            |                            |                  |                       | 40                         | *                          | *                               | *                               |                  | 032-3  |
| 2316.00 | cut | Sh/Clst: gn gy, drk gy            | 20                    |                            | *                               | *                                         |                                 |                                                |                  | 25                         |                       | *                               | *                                    |                            |                            |                  |                       | 55                         | *                          | *                               | *                               |                  | 044-1  |
| 2334.00 | cut | Sh/Clst: gn gy, drk gy            | 40                    | *                          | *                               | *                                         |                                 |                                                |                  | 20                         |                       | ?                               | *                                    |                            |                            |                  |                       | 40                         |                            | *                               | *                               |                  | 047-1  |
| 2360.00 | cut | Sh/Clst: gn gy, drk gy            | 40                    | *                          | *                               | *                                         |                                 |                                                |                  | 20                         |                       |                                 | *                                    |                            |                            |                  |                       | 40                         |                            | *                               | *                               |                  | 051-2  |
| 2378.00 | cut | Sh/Clst: gn gy, ol blk            | 30                    | *                          | *                               | *                                         |                                 |                                                |                  | 20                         |                       | *                               | *                                    |                            |                            |                  |                       | 50                         |                            | *                               | *                               |                  | 054-1  |
| 2402.00 | cut | Sh/Clst: gn gy, ol blk            | 20                    | *                          | *                               | *                                         |                                 |                                                |                  | 20                         |                       | *                               | *                                    |                            |                            |                  |                       | 60                         |                            | *                               | *                               |                  | 058-1  |
| 2414.00 | cut | Sh/Clst: gn gy, ol blk            | 30                    | *                          | *                               | *                                         |                                 |                                                |                  | 10                         |                       | *                               | *                                    |                            |                            |                  |                       | 60                         |                            | *                               | *                               |                  | 060-1  |
| 2432.00 | cut | Sh/Clst: gn gy, ol blk            | NDP                   |                            |                                 |                                           |                                 |                                                |                  | NDP                        |                       |                                 |                                      |                            |                            |                  |                       | NDP                        |                            |                                 |                                 |                  | 063-1  |
| 2444.00 | cut | Sh/Clst: gn gy, ol blk            | 80                    | *                          | *                               | *                                         |                                 |                                                |                  | 10                         |                       | *                               | *                                    |                            |                            |                  |                       | 10                         |                            | *                               | *                               |                  | 065-1  |
| 2456.00 | cut | Sh/Clst: gn gy, ol blk, drk y brn | 60                    | *                          | *                               | *                                         |                                 |                                                |                  | 20                         |                       | *                               | *                                    |                            |                            |                  |                       | 20                         |                            | *                               | *                               |                  | 067-1  |



Table 7 : Visual Kerogen Composition Data for well NOCS 31/4-2

Page: 2

Depth unit of measure: m

| Depth   | Typ | Lithology                       | L<br>I<br>P<br>T<br>% | A<br>m<br>o<br>r<br>L<br>t | L<br>i<br>p<br>D<br>e<br>t | S<br>p<br>/<br>P<br>o<br>l | C<br>u<br>t<br>P<br>i<br>c<br>l | R<br>e<br>s<br>i<br>n | A<br>l<br>g<br>a<br>l | D<br>i<br>n<br>o<br>f<br>l | A<br>c<br>c<br>i<br>t<br>L | I<br>N<br>E<br>R<br>T<br>% | F<br>u<br>s<br>i<br>n | S<br>e<br>m<br>t<br>F<br>u<br>e<br>t | I<br>n<br>c<br>r<br>e<br>i<br>n | M<br>i<br>c<br>r<br>o<br>I | S<br>c<br>l<br>e<br>r<br>I | B<br>i<br>t<br>% | V<br>I<br>T<br>R<br>% | T<br>e<br>l<br>l<br>i<br>n | C<br>o<br>l<br>l<br>i<br>n | V<br>i<br>t<br>D<br>r<br>V | A<br>m<br>o<br>r<br>V | B<br>i<br>t<br>V | Smple |
|---------|-----|---------------------------------|-----------------------|----------------------------|----------------------------|----------------------------|---------------------------------|-----------------------|-----------------------|----------------------------|----------------------------|----------------------------|-----------------------|--------------------------------------|---------------------------------|----------------------------|----------------------------|------------------|-----------------------|----------------------------|----------------------------|----------------------------|-----------------------|------------------|-------|
| 2468.00 | cut | Sh/Clst: gy, ol blk, drk y brn. | 50                    | *                          | *                          | *                          |                                 |                       |                       | *                          |                            | 10                         |                       | *                                    |                                 |                            |                            |                  | 40                    |                            | *                          | *                          |                       |                  | 069-1 |
| 2548.00 | cut | Sh/Clst: gy, brn, gn, blk       | 50                    | *                          | *                          | *                          | *                               |                       |                       | ?                          |                            | 20                         |                       | *                                    | *                               |                            |                            |                  | 30                    |                            | *                          | ?                          |                       |                  | 081-1 |
| 2560.00 | cut | Sh/Clst: gy, brn, gn, blk       | 50                    | *                          | *                          | *                          | *                               |                       |                       | *                          |                            | 20                         |                       | *                                    | *                               |                            |                            |                  | 30                    |                            | *                          | *                          |                       |                  | 083-1 |
| 2578.00 | cut | Sh/Clst: gy, brn, gn, blk       | 30                    | *                          | *                          | *                          | ?                               |                       |                       |                            |                            | 20                         |                       | *                                    |                                 |                            |                            |                  | 50                    |                            | *                          | *                          |                       |                  | 132-1 |
| 2608.00 | cut | Sh/Clst: gy, brn, gn, blk       | 25                    |                            | *                          | *                          |                                 |                       |                       |                            |                            | 30                         |                       | *                                    | *                               |                            |                            |                  | 45                    |                            | *                          | *                          |                       |                  | 090-1 |
| 2668.00 | cut | Sh/Clst: gy, brn, gn, blk       | 15                    |                            | ?                          | *                          | *                               |                       |                       |                            |                            | 10                         |                       | *                                    | *                               |                            |                            |                  | 75                    | *                          | *                          | ?                          |                       |                  | 100-1 |
| 2722.00 | cut | Sh/Clst: gy, brn, gn, blk       | NDP                   |                            |                            |                            |                                 |                       |                       |                            |                            | NDP                        |                       |                                      |                                 |                            |                            |                  | NDP                   |                            |                            |                            |                       |                  | 109-1 |
| 2760.00 | cut | Sh/Clst: gy, brn, gn, blk       | 15                    |                            | *                          | *                          |                                 |                       |                       |                            |                            | 10                         |                       | *                                    | *                               |                            |                            |                  | 75                    | ?                          | *                          | *                          |                       |                  | 115-1 |
| 2784.00 | cut | Sh/Clst: gy, brn, gn, blk       | NDP                   |                            |                            |                            |                                 |                       |                       |                            |                            | NDP                        |                       |                                      |                                 |                            |                            |                  | NDP                   |                            |                            |                            |                       |                  | 119-2 |

Table WELL 31/4-2  
PYROLYSIS GC ON NON-EXTRACTED ROCK. VALUES FROM S2 PEAK.

| DEPTH<br>(m) | % C1-C5<br>of total | % C6+<br>of total |
|--------------|---------------------|-------------------|
| =====        |                     |                   |
| 2152         | 15                  | 85                |
| 2158         | 24                  | 76                |
| 2166         | 21                  | 79                |
| 2172         | 29                  | 71                |
| 2230         | 33                  | 67                |
| 2238         | 30                  | 70                |
| 2310         | 26                  | 74                |
| 2324         | 27                  | 73                |
| 2334         | 24                  | 76                |
| 2346         | 19                  | 81                |
| 2360         | 26                  | 74                |
| 2372         | 24                  | 76                |
| 2384         | 21                  | 79                |
| 2396         | 32                  | 68                |
| 2408         | 29                  | 71                |
| 2420         | 15                  | 85                |
| 2432         | 24                  | 76                |
| 2438         | 28                  | 72                |
| 2444         | 31                  | 69                |
| 2450         | 25                  | 75                |
| 2456         | 28                  | 72                |

Table                      WELL 31/4-2  
 PYROLYSIS GC ON PRE-EXTRACTED ROCK. VALUES FROM S2 PEAK.

| DEPTH<br>(m) | % C1-C5<br>of total | % C6+<br>of total |
|--------------|---------------------|-------------------|
| =====        |                     |                   |
| 2334         | 30                  | 70                |
| 2340         | 28                  | 72                |
| 2346         | 39                  | 61                |
| 2354         | 31                  | 69                |
| 2360         | 24                  | 76                |
| 2366         | 25                  | 75                |
| 2372         | 21                  | 79                |
| 2378         | 35                  | 65                |
| 2384         | 20                  | 80                |
| 2390         | 19                  | 81                |
| 2396         | 23                  | 77                |
| 2408         | 23                  | 77                |
| 2420         | 17                  | 83                |
| 2426         | 46                  | 54                |
| 2432         | 24                  | 76                |
| 2444         | 26                  | 74                |
| 2456         | 26                  | 74                |
| 2468         | 33                  | 67                |
| 2474         | 22                  | 78                |
| 2542         | 25                  | 75                |
| 2548         | 11                  | 89                |
| 2560         | 20                  | 80                |

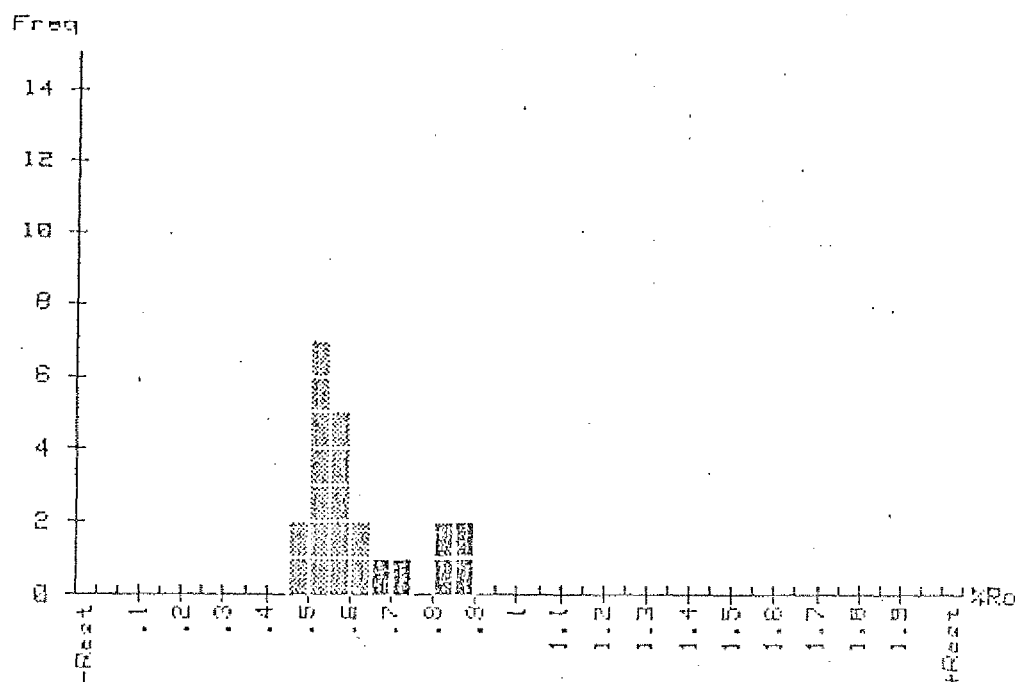
Table WELL 31/4-2

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

| DEPTH<br>(m) | % C1-C5<br>of total | % C6+<br>of total |
|--------------|---------------------|-------------------|
| =====        |                     |                   |
| 2566         | 39                  | 61                |
| 2572         | 35                  | 65                |
| 2578         | 25                  | 75                |
| 2602         | 37                  | 63                |
| 2608         | 38                  | 62                |
| 2620         | 49                  | 51                |
| 2626         | 46                  | 54                |
| 2668         | 38                  | 62                |
| 2734         | 43                  | 57                |
| 2760         | 34                  | 66                |
| 2766         | 54                  | 46                |
| 2784         | 35                  | 65                |

Histogram of vitrinite reflectance measurements

Sample No.: 1401 1 1A1  
Well Name: 131/4-2  
Depth: 11935M  
Analyst: IJ MC  
Date: 112 3 86

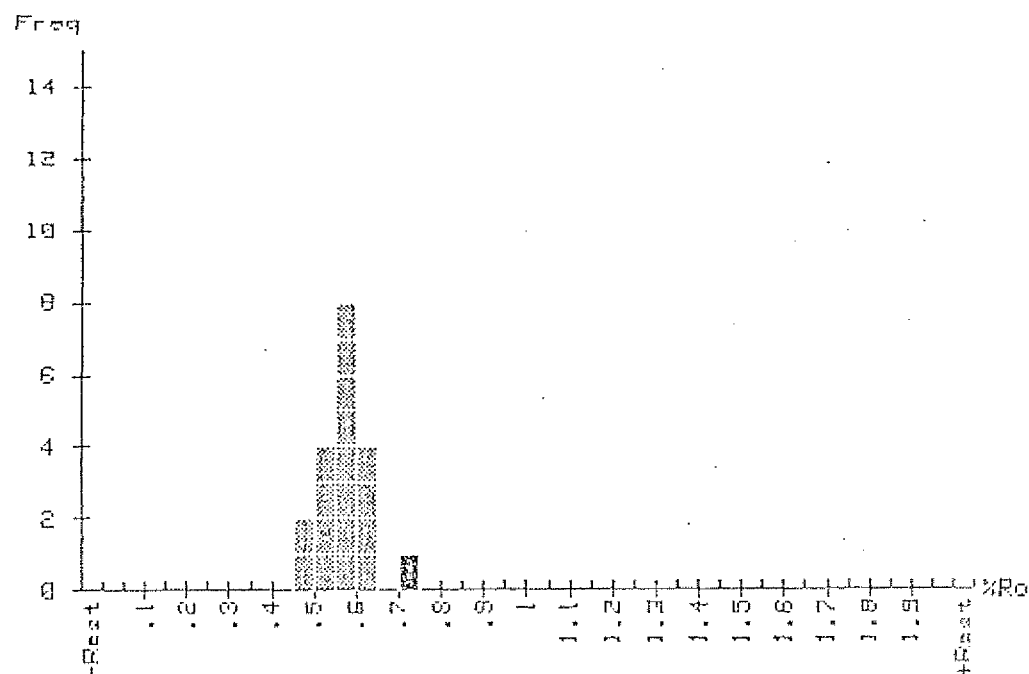


\* Pop. 1 From .45 to .65 Mean= .54 St.D= .04 Total= 16  
Pop. 2 From .65 to .90 Mean= .80 St.D= .08 Total= 6

The indigenous Population is marked '\*',

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .474 | .487 | .513 | .517 | .518 | .527 | .536 | .536 | .540 | .550 |
| 10 | .559 | .569 | .570 | .577 | .604 | .611 | .700 | .700 | .806 | .841 |
| 20 | .866 | .882 |      |      |      |      |      |      |      |      |

Sample No.: 1402 1 1A1  
Well Name: 131/4-2  
Depth: 12142M  
Analyst: IJ MC  
Date: 112 3 86



\* Pop. 1 From .45 to .68 Mean= .56 St.D= .04 Total= 15  
Pop. 2 From .68 to .78 Total= 0

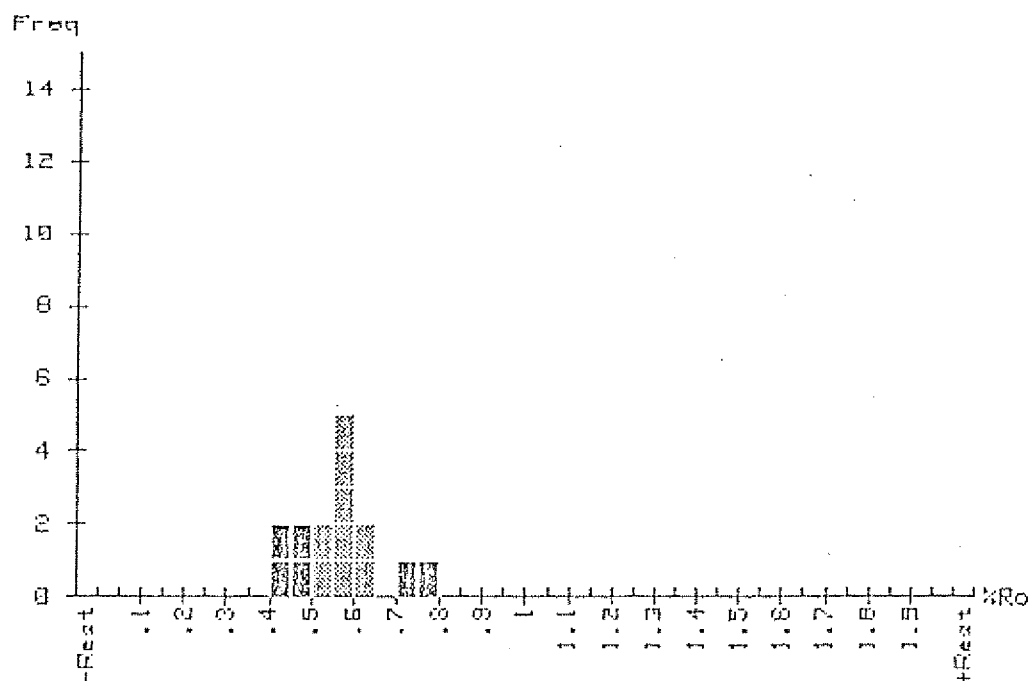
The indigenous Population is marked '\*'.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .472 | .490 | .518 | .518 | .544 | .550 | .559 | .565 | .565 | .569 |
| 10 | .578 | .585 | .586 | .587 | .600 | .610 | .624 | .630 | .727 |      |





Sample No.: 1404 1 1A1  
Well Name: 131/4-2  
Depth: 12195M  
Analyst: 1J MC  
Date: 112 3 86

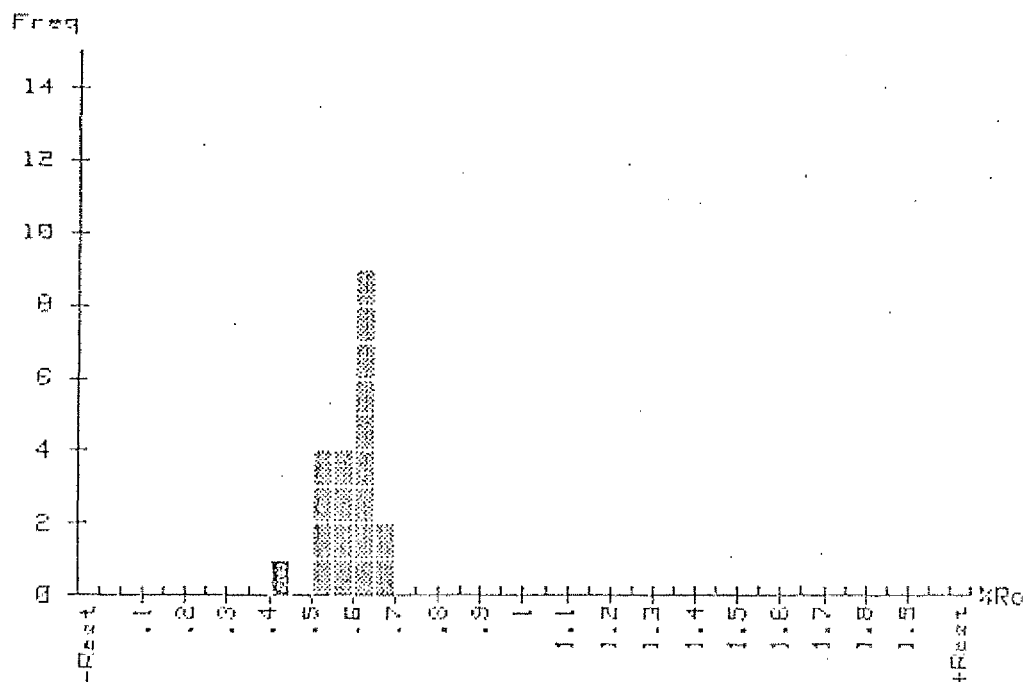


|          |      |        |     |       |     |       |     |        |   |
|----------|------|--------|-----|-------|-----|-------|-----|--------|---|
| Pop. 1   | From | .40 to | .50 | Mean= | .46 | St.D= | .03 | Total= | 4 |
| * Pop. 2 | From | .50 to | .65 | Mean= | .57 | St.D= | .03 | Total= | 9 |
| Pop. 3   | From | .70 to | .80 | Mean= | .74 | St.D= | .05 | Total= | 2 |

The indigenous Population is marked '\*'.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .425 | .448 | .480 | .492 | .535 | .541 | .556 | .571 | .577 | .579 |
| 10 | .580 | .611 | .614 | .701 | .775 |      |      |      |      |      |

Sample No.: 1405 1 1A1  
Well Name: 131/4-2  
Depth: 12266M  
Analyst: IJ MC  
Date: 112 3 86

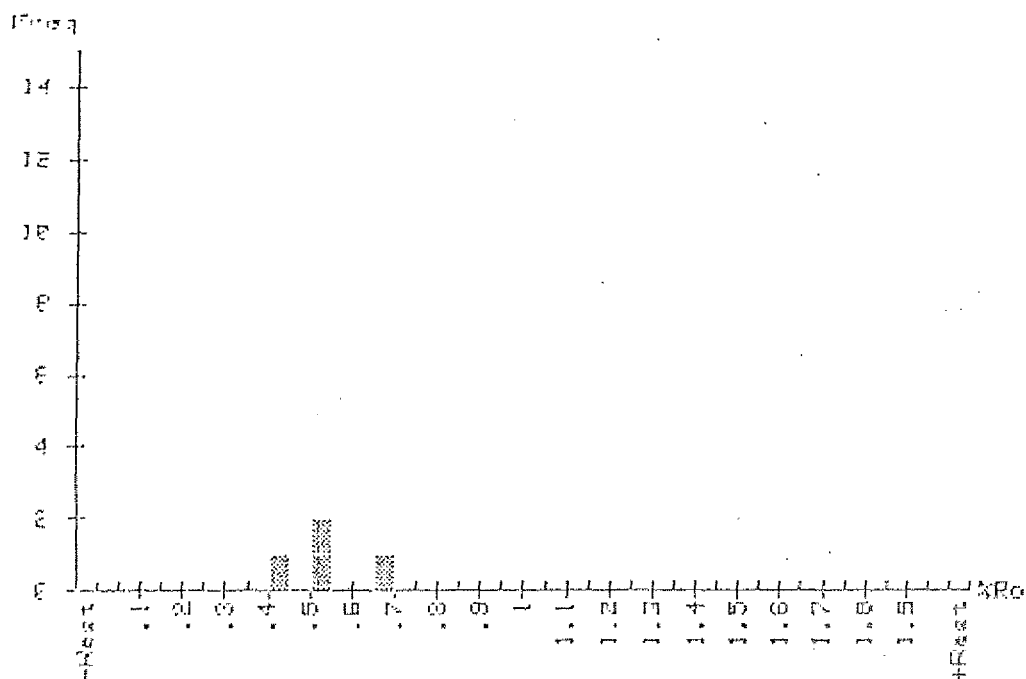


Pop. 1 From .40 to .45 Total= 1  
\* Pop. 2 From .50 to .70 Mean= .61 St.D= .05 Total= 19

The indigenous Population is marked '\*'. .

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .427 | .531 | .536 | .542 | .547 | .579 | .582 | .583 | .597 | .600 |
| 10 | .609 | .609 | .620 | .627 | .628 | .633 | .646 | .649 | .680 | .699 |

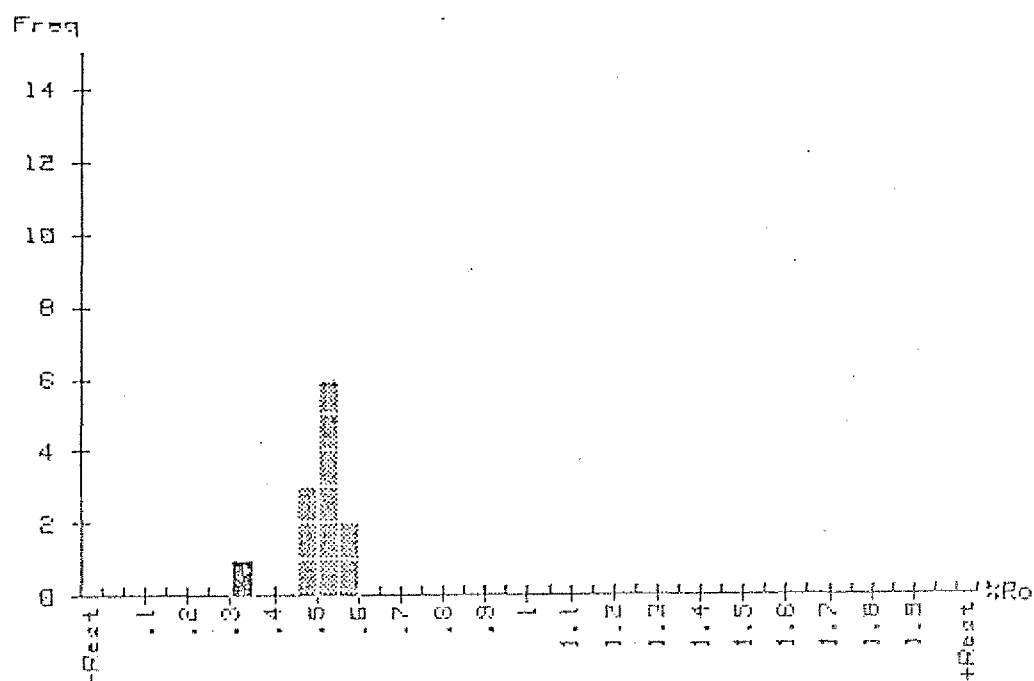
Sample No.: 1406 1 1A1  
Well Name: 131/4-2  
Depth: 12292M  
Analyst: J MC  
Date: 113 3 86



\* Pop. 1 From .40 to .70 Mean= .54 St.D= .11 Total= 4

The indigenous Population is marked '\*'.  
 1 2 3 4 5 6 7 8 9 10  
 0 .443 .501 .502 .696

Sample No.: 1407 1 1A1  
Well Name: 131/4-2  
Depth: 12340M  
Analyst: IJ MC  
Date: 113 3 86

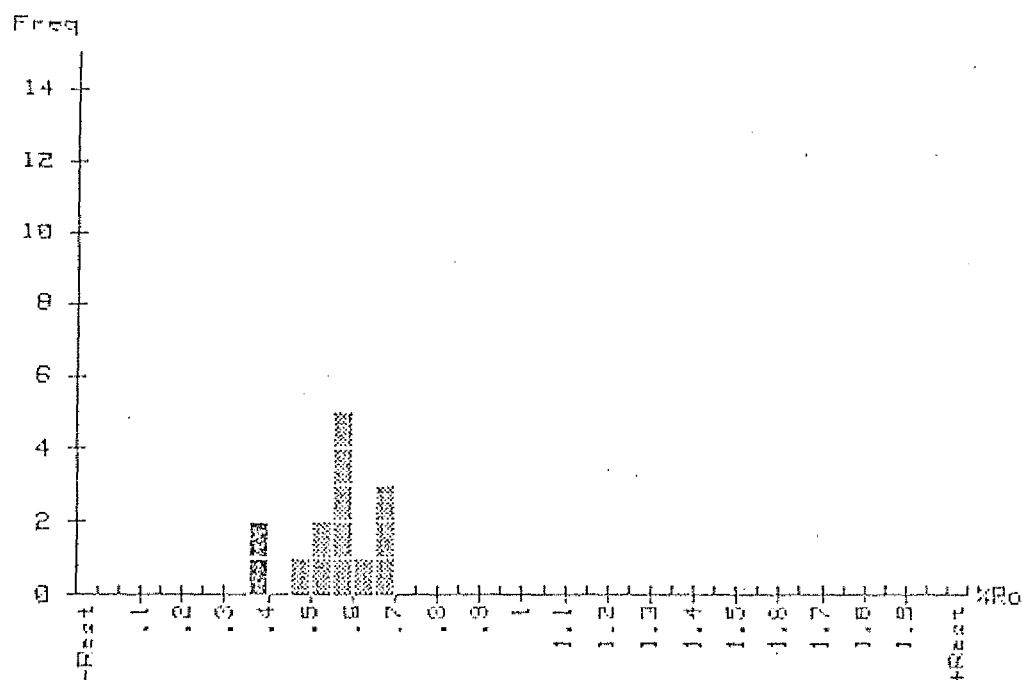


Pop. 1 From .28 to .35 Total= 1  
\* Pop. 2 From .45 to .60 Mean= .52 St.D= .03 Total= 11

The indigenous Population is marked '\*'.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .310 | .483 | .484 | .492 | .502 | .512 | .519 | .530 | .543 | .544 |
| 10 | .563 | .565 |      |      |      |      |      |      |      |      |

Sample No.: 1408 : 1A1  
Well Name: 131/4-2  
Depth: 12384M  
Analyst: IJ MC  
Date: 113 3 86

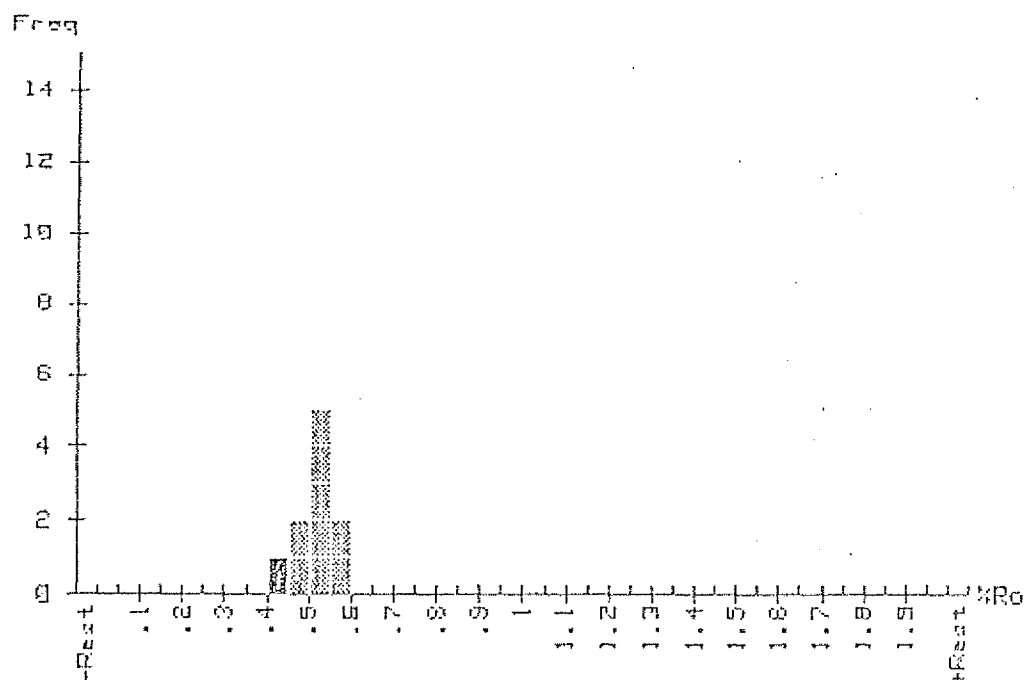


Pop. 1 From .35 to .40 Mean= .38 St.D= .01 Total= 2  
\* Pop. 2 From .40 to .70 Mean= .58 St.D= .07 Total= 12

The indigenous Population is marked '\*'.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .372 | .387 | .476 | .508 | .517 | .552 | .553 | .559 | .576 | .586 |
| 10 | .601 | .665 | .690 | .693 |      |      |      |      |      |      |

Sample No.: 1409 .1 1A1  
Well Name: 131/4-2  
Depth: 12420M  
Analyst: IJ MC  
Date: 113 3 86

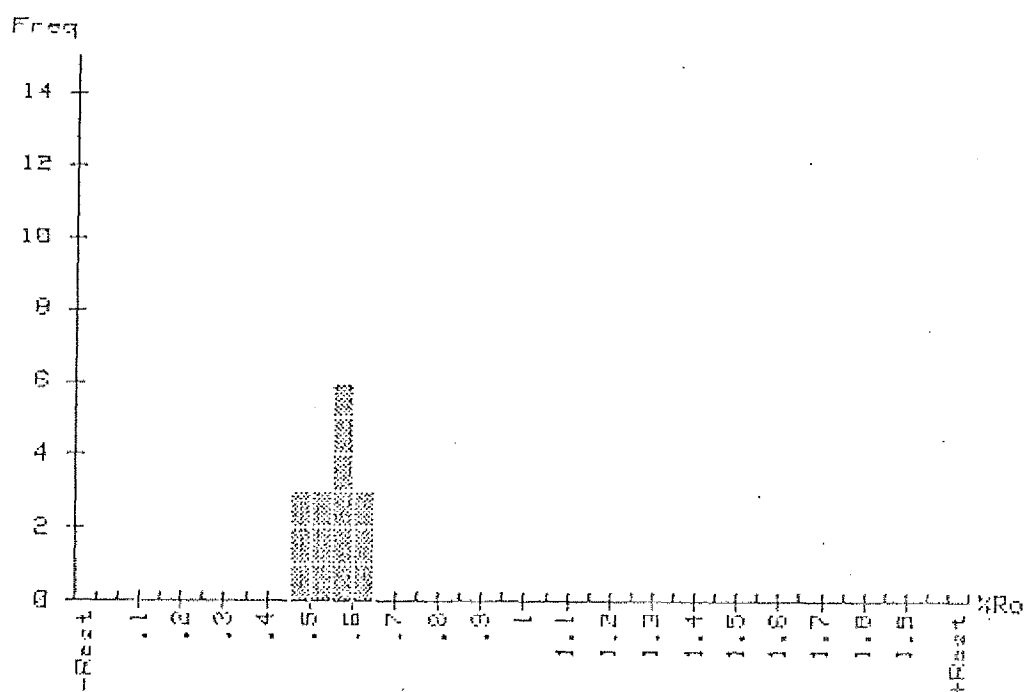


Pop. 1 From .40 to .45 Total= 1  
\* Pop. 2 From .45 to .50 Mean= .53 St.D= .03 Total= 9

The indigenous Population is marked '\*'.

|   | 1 | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|---|---|------|------|------|------|------|------|------|------|------|------|
| 0 | 1 | .446 | .466 | .486 | .519 | .521 | .528 | .547 | .550 | .553 | .560 |

Sample No.: 1410 1 1A1  
Well Name: 131/4-2  
Depth: 12462M  
Analyst: 1J MC  
Date: 113 3 86

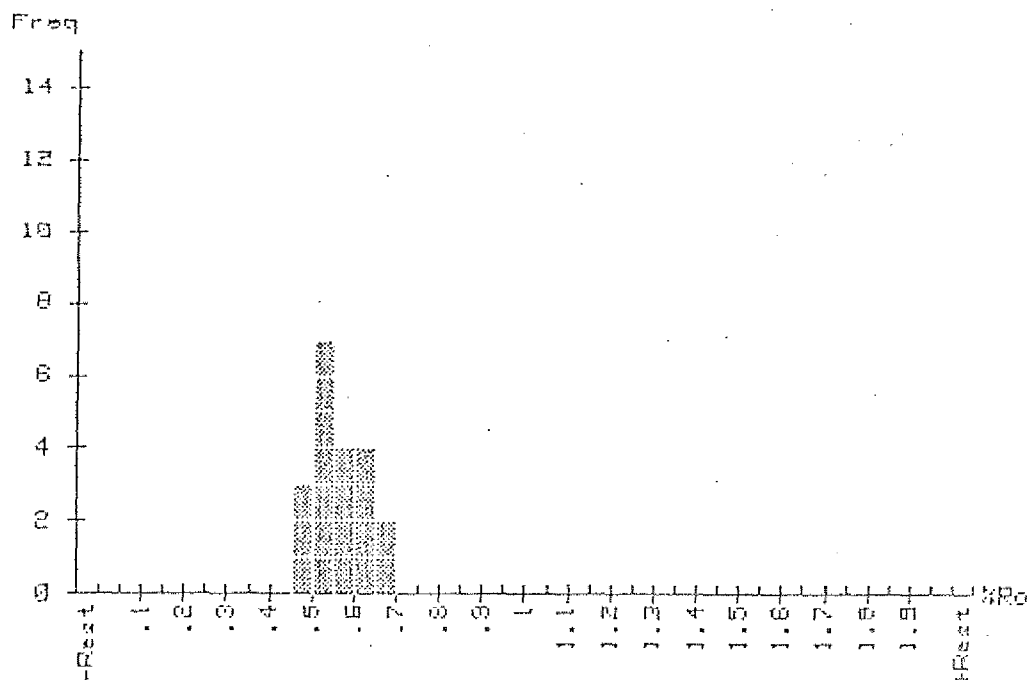


\* Pop. 1 From .45 to .65 Mean= .55 St.D=. .05 Total= 15

The indigenous Population is marked '\*'.

|    | 1 | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|---|------|------|------|------|------|------|------|------|------|------|
| 0  | 1 | .456 | .481 | .489 | .514 | .533 | .548 | .552 | .555 | .559 | .571 |
| 10 | 1 | .574 | .592 | .607 | .619 | .636 |      |      |      |      |      |

Sample No.: 1411 1 1A1  
Well Name: 131/4-2  
Depth: 12510M  
Analyst: IJ MC  
Date: 113 3 86



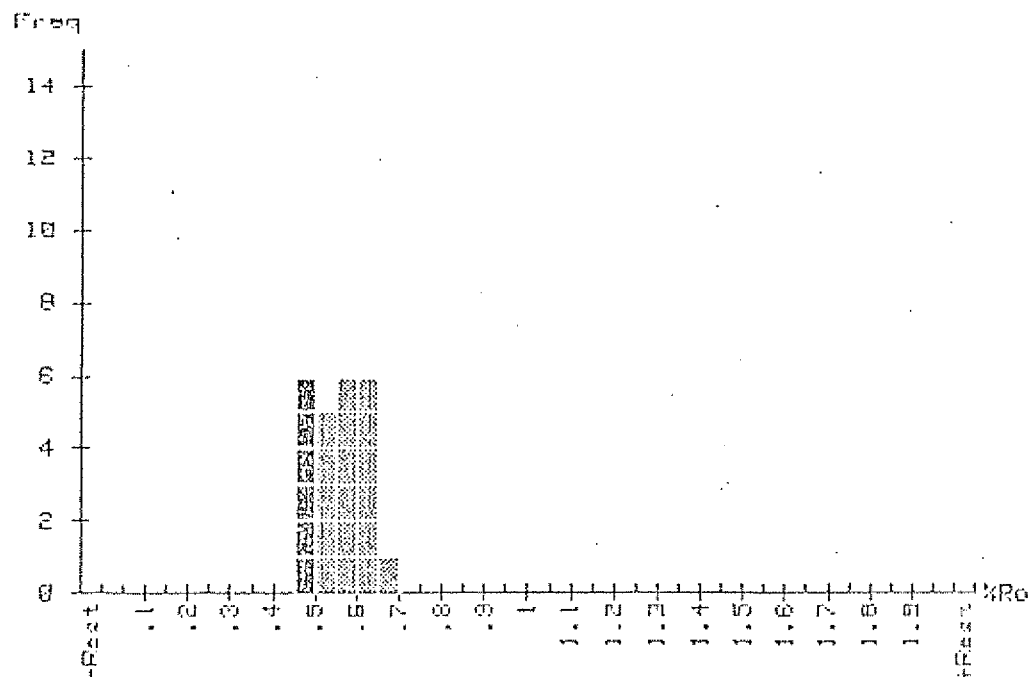
\* Pop. 1 From .45 to .70 Mean= .55 St.D= .06 Total= 20

The indigenous Population is marked '\*'.

|    | 1 | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|---|------|------|------|------|------|------|------|------|------|------|
| 0  | 1 | .471 | .476 | .498 | .502 | .514 | .515 | .519 | .526 | .542 | .544 |
| 10 | 1 | .560 | .567 | .582 | .582 | .607 | .625 | .636 | .638 | .653 | .677 |



Sample No.: 1412 1 1A1  
Well Name: 131/4-2  
Depth: 12542M  
Analyst: J MC  
Date: 113 3 86

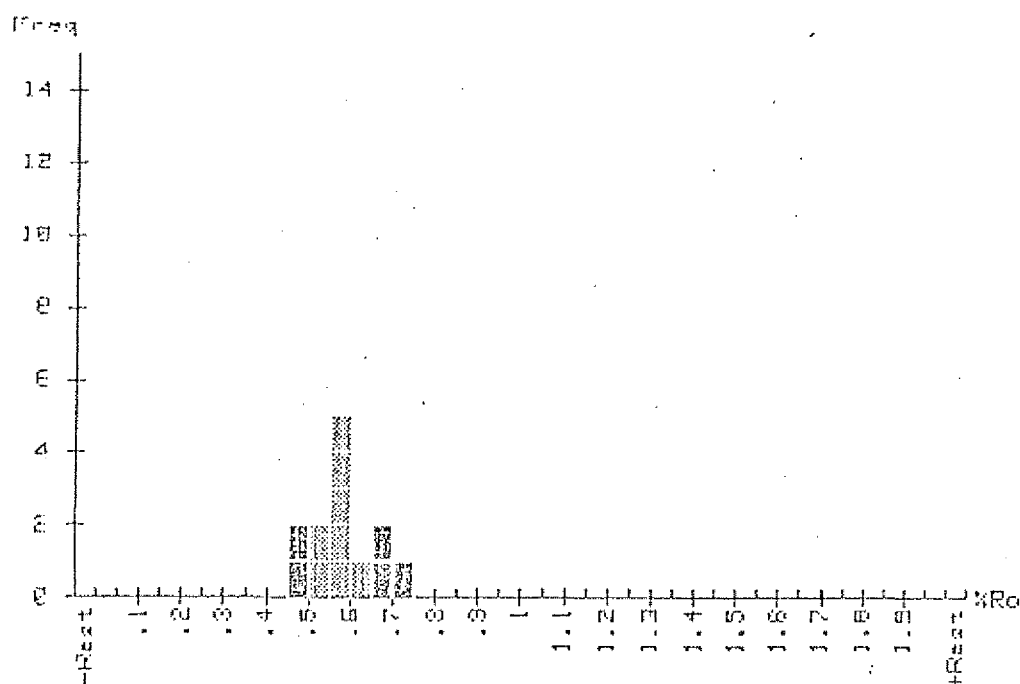


Pop. 1 From .45 to .50 Mean= .48 St.D= .01 Total= 6  
\* Pop. 2 From .50 to .70 Mean= .58 St.D= .04 Total= 18

The indigenous Population is marked '\*'.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .457 | .476 | .481 | .484 | .486 | .497 | .509 | .523 | .539 | .547 |
| 10 | .548 | .554 | .554 | .564 | .574 | .579 | .580 | .602 | .602 | .604 |
| 20 | .607 | .614 | .624 | .661 |      |      |      |      |      |      |

Sample No.: 1413 1 1A1  
Well Name: 131/4-2  
Depth: 12578M  
Analyst: HJ MC  
Date: 113 3 86

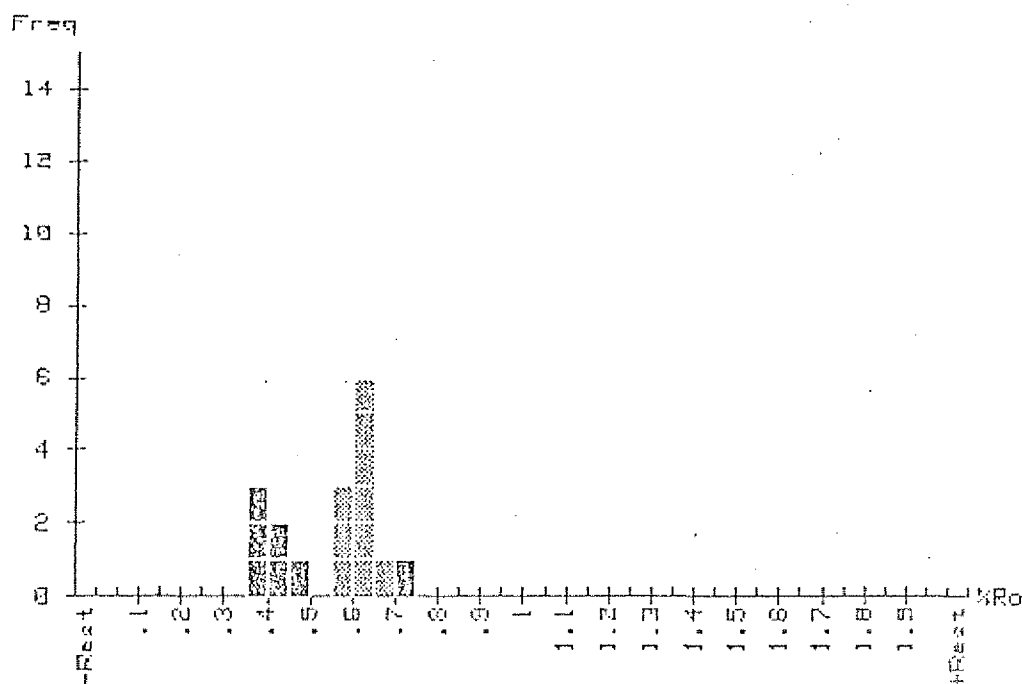


Pop. 1 From .45 to .50 Mean= .47 St.D= .02 Total= 2  
\* Pop. 2 From .50 to .65 Mean= .57 St.D= .04 Total= 8  
Pop. 3 From .65 to .75 Mean= .69 St.D= .04 Total= 3

The indigenous Population is marked '\*'.  
.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .454 | .479 | .504 | .535 | .570 | .572 | .586 | .587 | .593 | .621 |
| 10 | .657 | .677 | .726 |      |      |      |      |      |      |      |

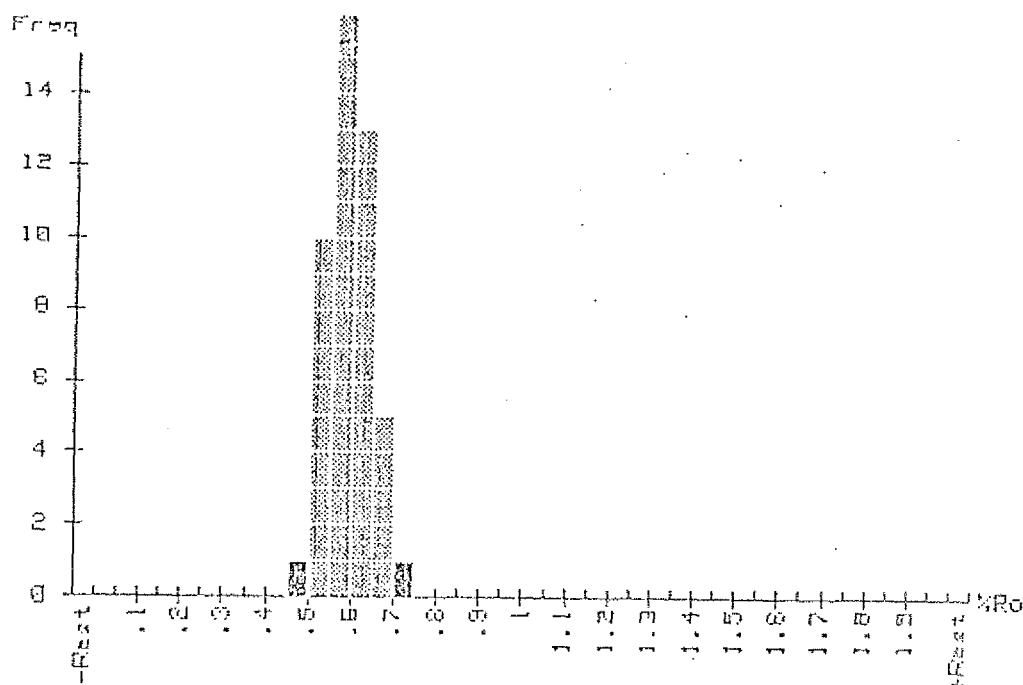
Sample No.: 1414 1 101  
Well Name: 131/4-2  
Depth: 12614M  
Analyst: IJ MC  
Date: 113 3 85



Pop. 1 From .35 to .50 Mean= .40 St.D= .04 Total= 6  
\* Pop. 2 From .55 to .70 Mean= .61 St.D= .04 Total= 10  
Pop. 3 From .70 to .75 Total= 0

The indigenous Population is marked '\*'.  
.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .353 | .372 | .390 | .417 | .443 | .454 | .554 | .568 | .573 | .600 |
| 10 | .609 | .614 | .623 | .644 | .649 | .655 | .707 |      |      |      |

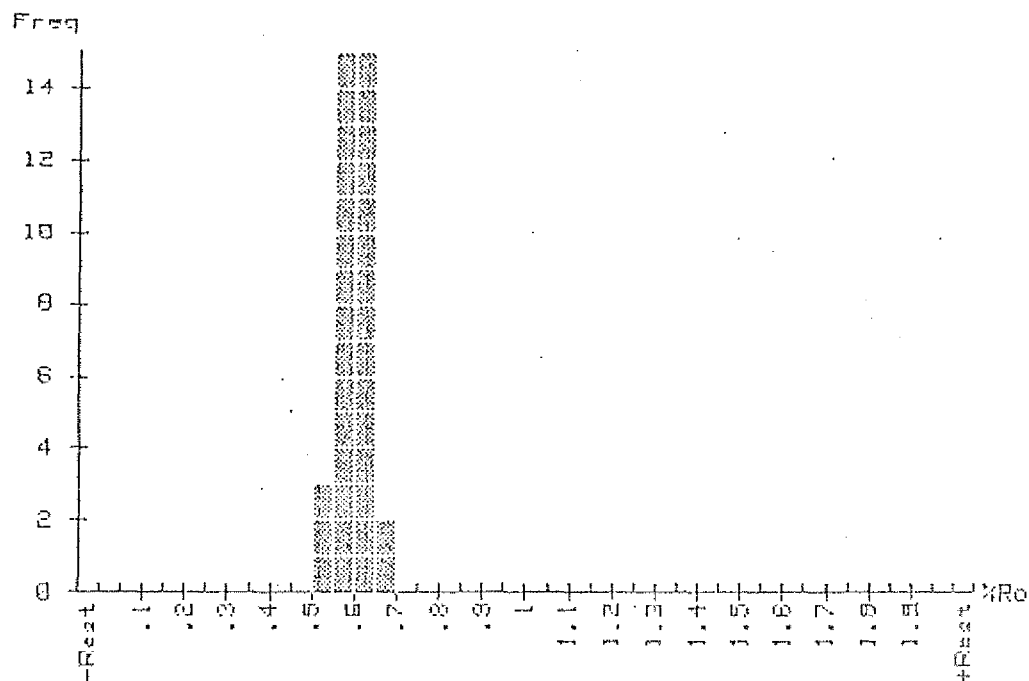


|          |                                     |           |
|----------|-------------------------------------|-----------|
| Pop. 1   | From .45 to .50                     | Total= 1  |
| * Pop. 2 | From .50 to .70 Mean= .59 St.D= .04 | Total= 49 |
| Pop. 3   | From .70 to .75                     | Total= 0  |

The indigenous Population is marked '\*'.

[illegible]

Sample No.: 1415 1 1A1  
Well Name: 131/4-2  
Depth: 12580M  
Analyst: 1J MC  
Date: 113 3 86

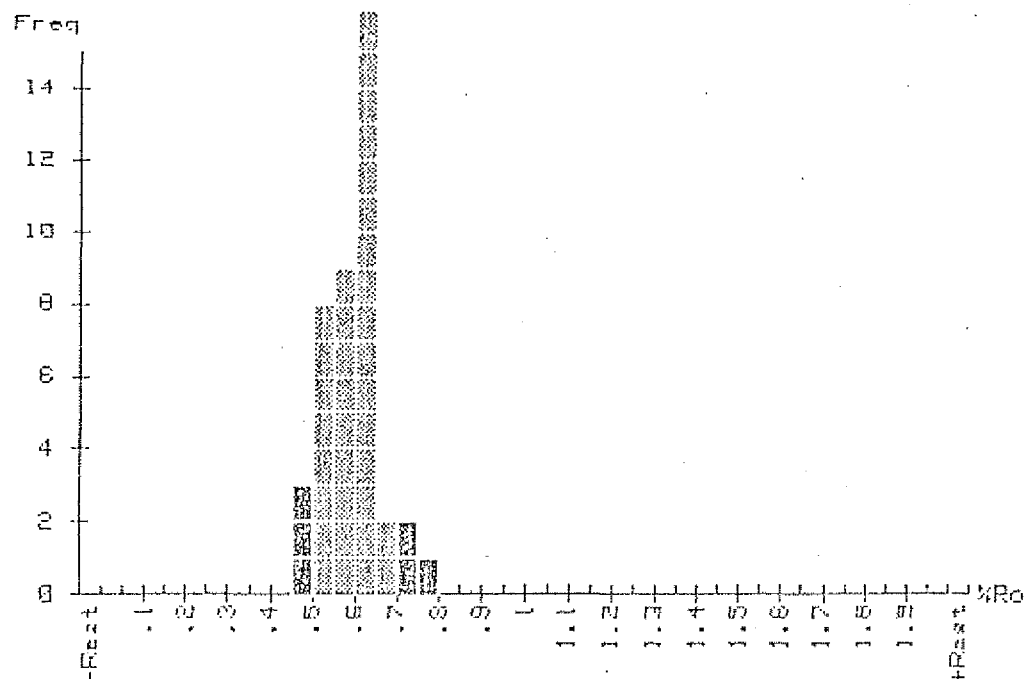


\* Pop. 1 From .50 to .70 Mean= .60 St.D= .04 Total= 35

The indigenous Population is marked '\*'.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .515 | .520 | .549 | .558 | .566 | .588 | .569 | .572 | .572 | .573 |
| 10 | .583 | .590 | .592 | .592 | .593 | .594 | .595 | .596 | .603 | .608 |
| 20 | .609 | .610 | .617 | .620 | .623 | .624 | .626 | .634 | .634 | .635 |
| 30 | .643 | .645 | .648 | .653 | .679 |      |      |      |      |      |

Sample No.: 1417 1 1A1  
Well Name: 131/4-2  
Depth: 12698M  
Analyst: IJ MC  
Date: 113 3 86

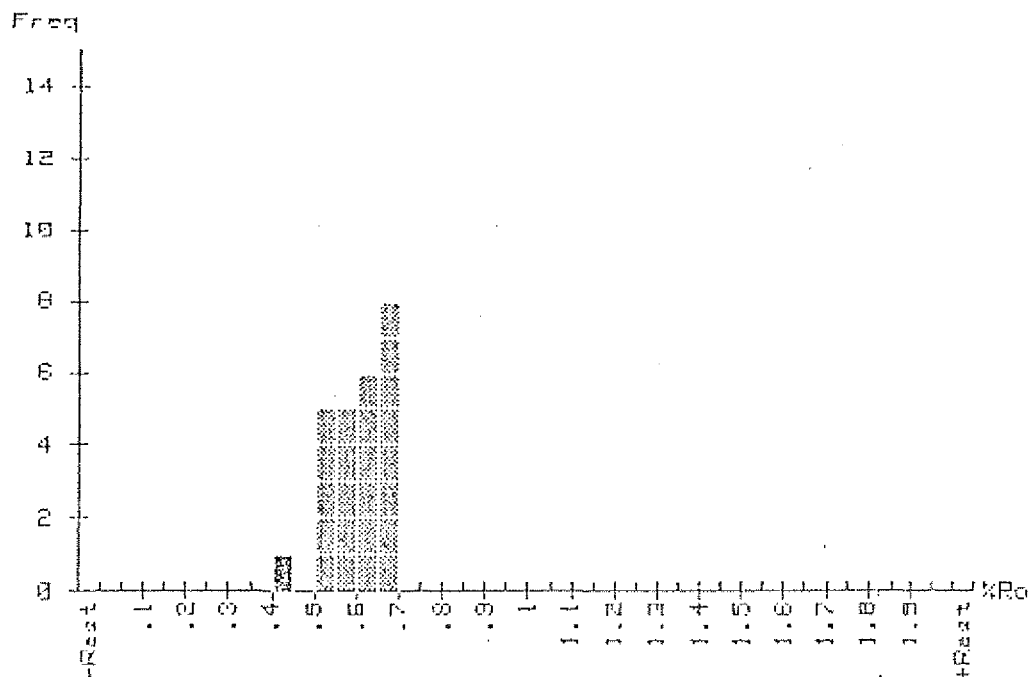


|          |      |        |     |       |     |       |     |        |    |
|----------|------|--------|-----|-------|-----|-------|-----|--------|----|
| Pop. 1   | From | .45 to | .50 | Mean= | .48 | St.D= | .02 | Total= | 3  |
| * Pop. 2 | From | .50 to | .70 | Mean= | .60 | St.D= | .05 | Total= | 36 |
| Pop. 3   | From | .70 to | .80 | Mean= | .73 | St.D= | .03 | Total= | 3  |

The indigenous Population is marked '\*'.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .456 | .476 | .495 | .503 | .504 | .514 | .539 | .539 | .539 | .546 |
| 10 | .548 | .554 | .563 | .567 | .568 | .568 | .584 | .584 | .586 | .593 |
| 20 | .607 | .609 | .620 | .628 | .629 | .631 | .631 | .632 | .636 | .637 |
| 30 | .638 | .640 | .641 | .642 | .645 | .646 | .646 | .660 | .662 | .704 |
| 40 | .744 | .754 |      |      |      |      |      |      |      |      |

Sample No.: 1418 1 1A1  
Well Name: 131/4-2  
Depth: 12722M  
Analyst: IJ MC  
Date: 113 3 86

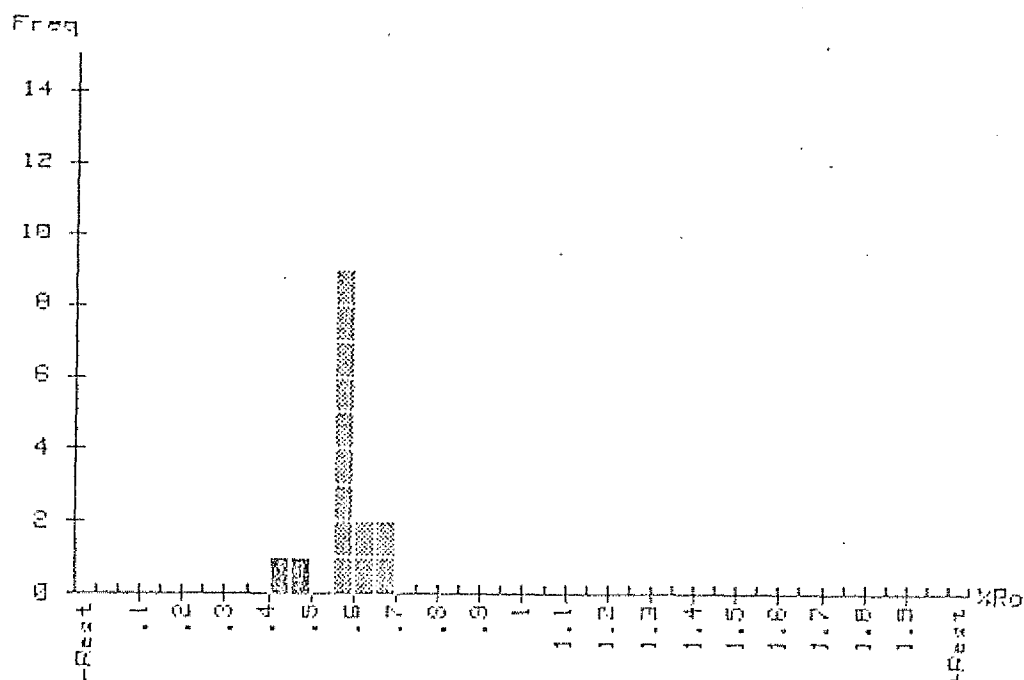


Pop. 1 From .40 to .45 Total= 1  
\* Pop. 2 From .50 to .70 Mean= .61 St.D= .05 Total= 24

The indigenous Population is marked '\*'.

|    | 1 | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|---|------|------|------|------|------|------|------|------|------|------|
| 0  | 1 | .408 | .513 | .527 | .539 | .540 | .541 | .556 | .573 | .582 | .594 |
| 10 | 1 | .596 | .611 | .620 | .621 | .631 | .639 | .646 | .653 | .655 | .655 |
| 20 | 1 | .655 | .661 | .666 | .669 | .672 |      |      |      |      |      |

Sample No.: 1419 1 1A1  
Well Name: 131/4-2  
Depth: 12760M  
Analyst: IJ MC  
Date: 113 3 85



Pop. 1 From .40 to .50 Mean= .44 St.D= .04 Total= 2  
\* Pop. 2 From .55 to .70 Mean= .60 St.D= .04 Total= 13

The indigenous Population is marked '\*'.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----|------|------|------|------|------|------|------|------|------|------|
| 0  | .412 | .469 | .551 | .560 | .561 | .567 | .587 | .595 | .597 | .599 |
| 10 | .599 | .605 | .612 | .659 | .671 |      |      |      |      |      |

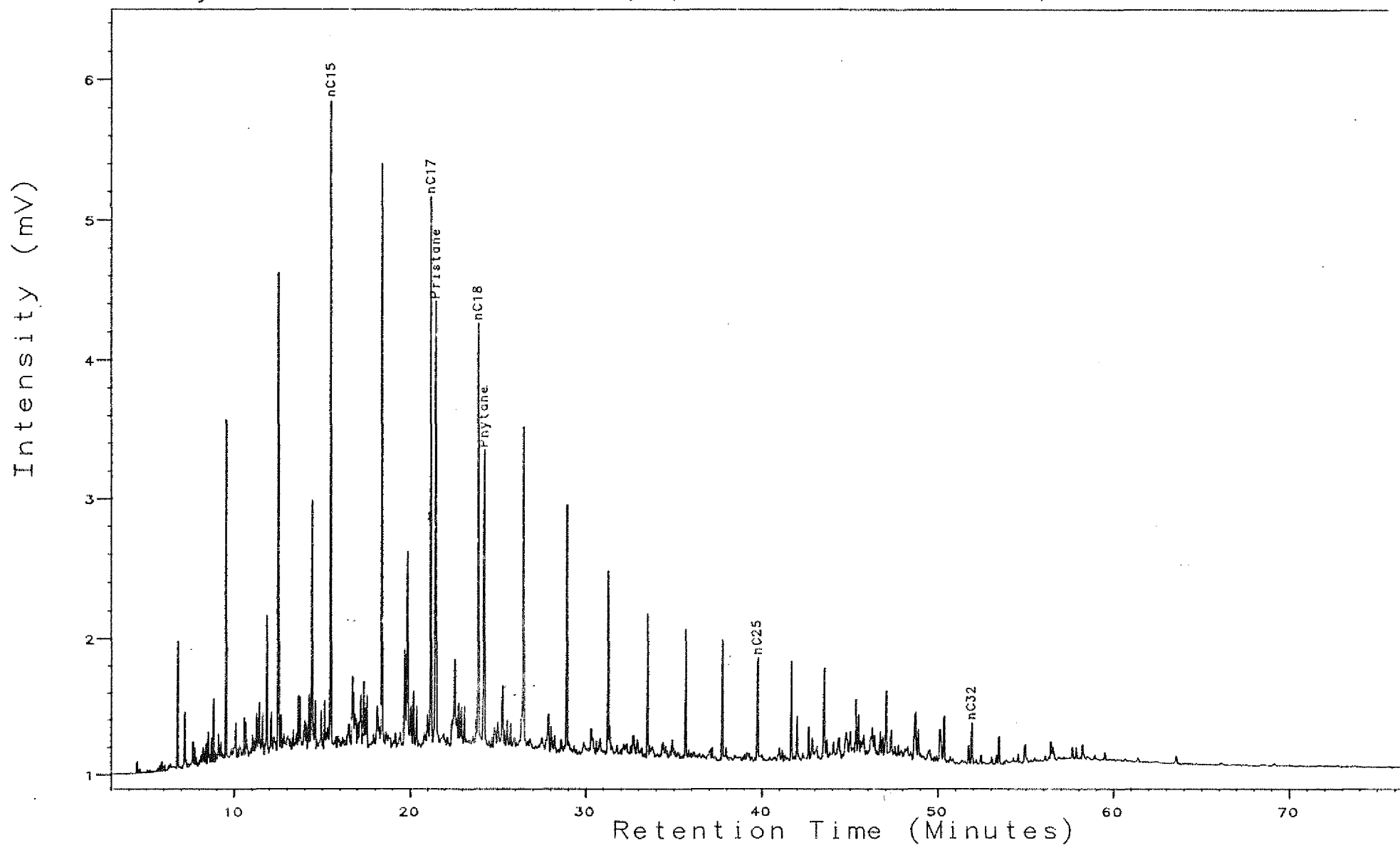


Saturated fraction gas chromatograms

Analysis SA1532172

10, 1, 1

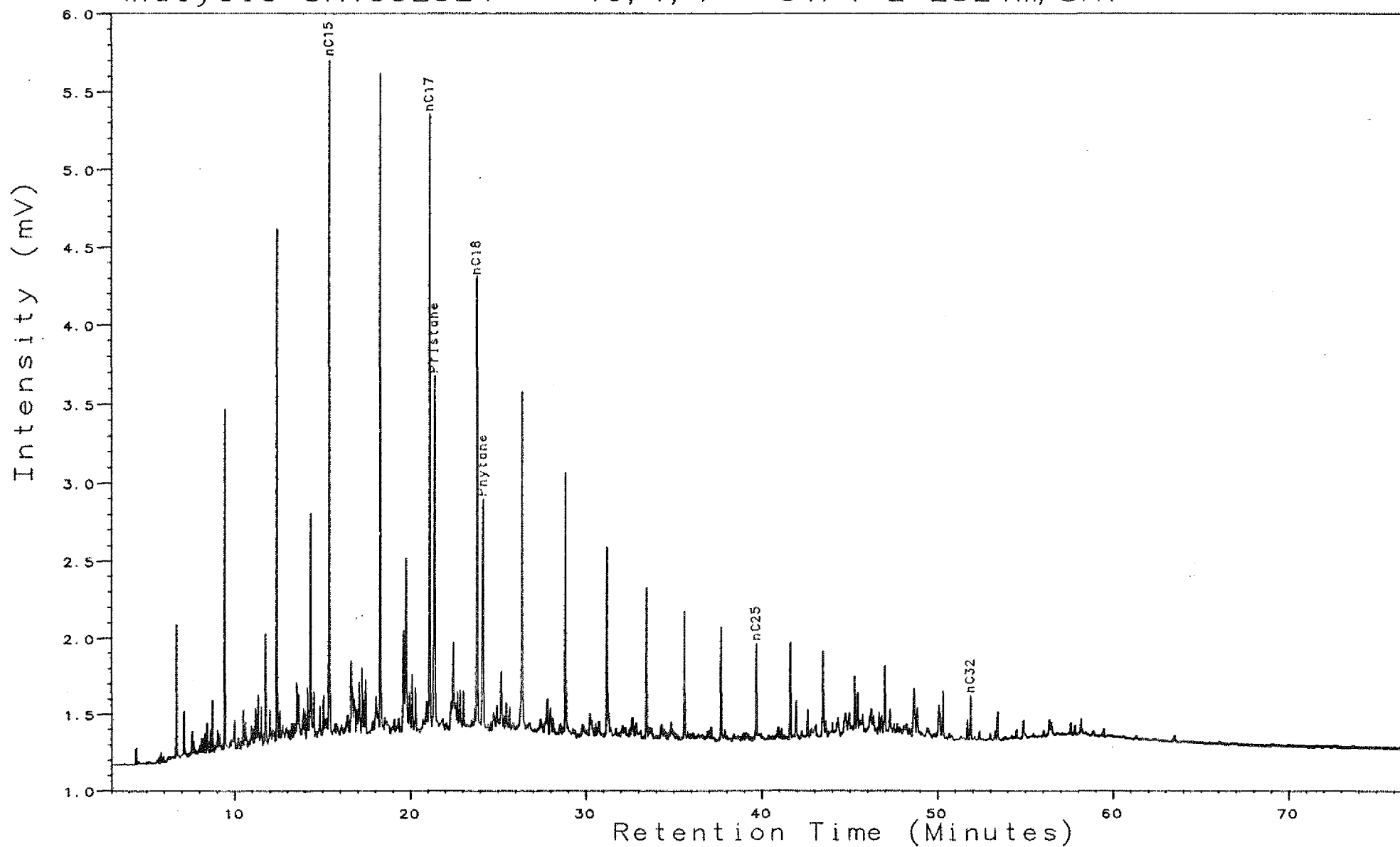
31/4-2 2172m, SAT



Analysis: SA1532324

10, 1, 1

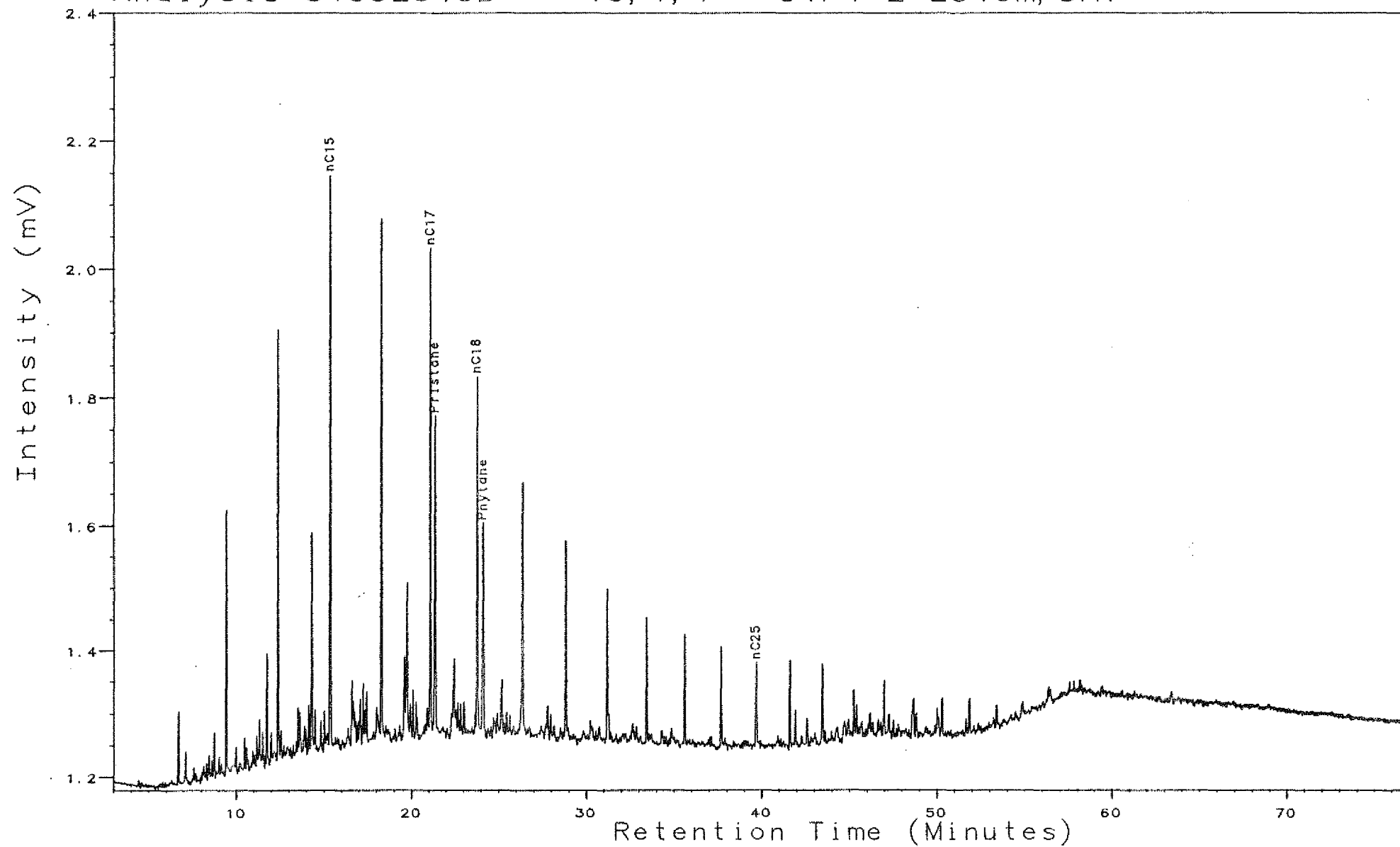
31/4-2 2324m, SAT



Analysis S1532340B

10, 1, 1

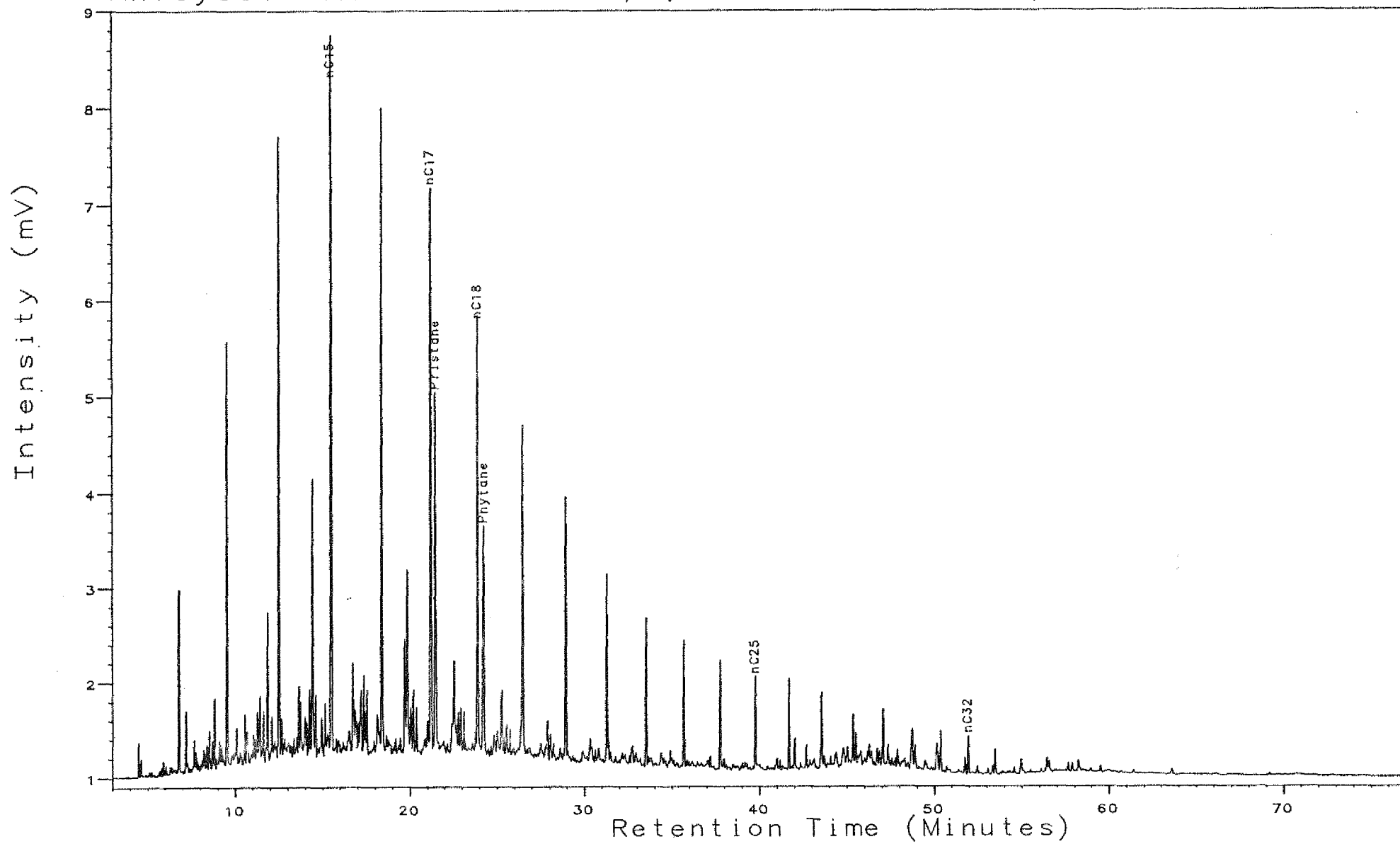
31/4-2 2340m, SAT



Analysis SA1532360

10, 1, 1

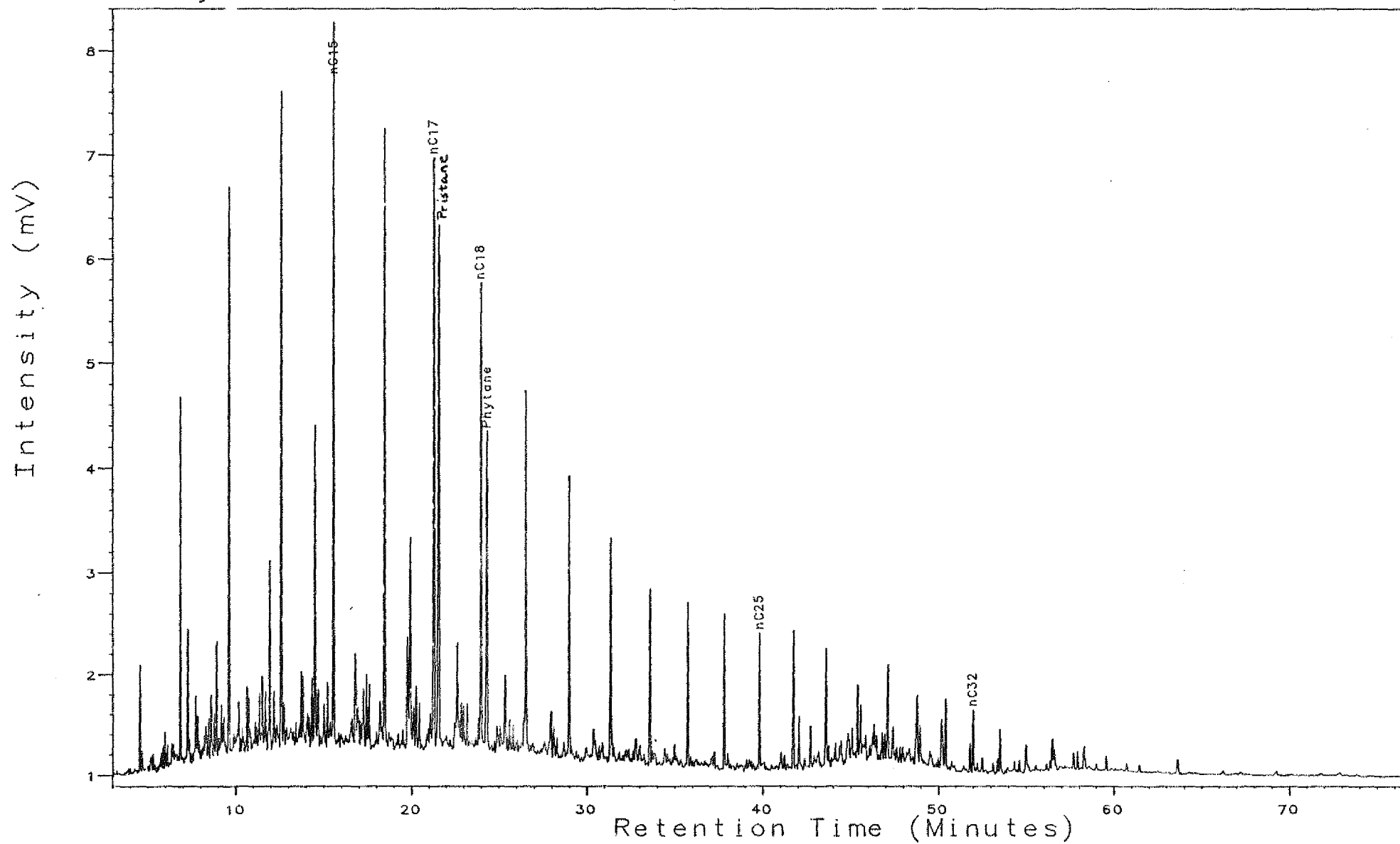
31/4-2 2360m, SAT



Analysis SA1532378

10, 1, 1

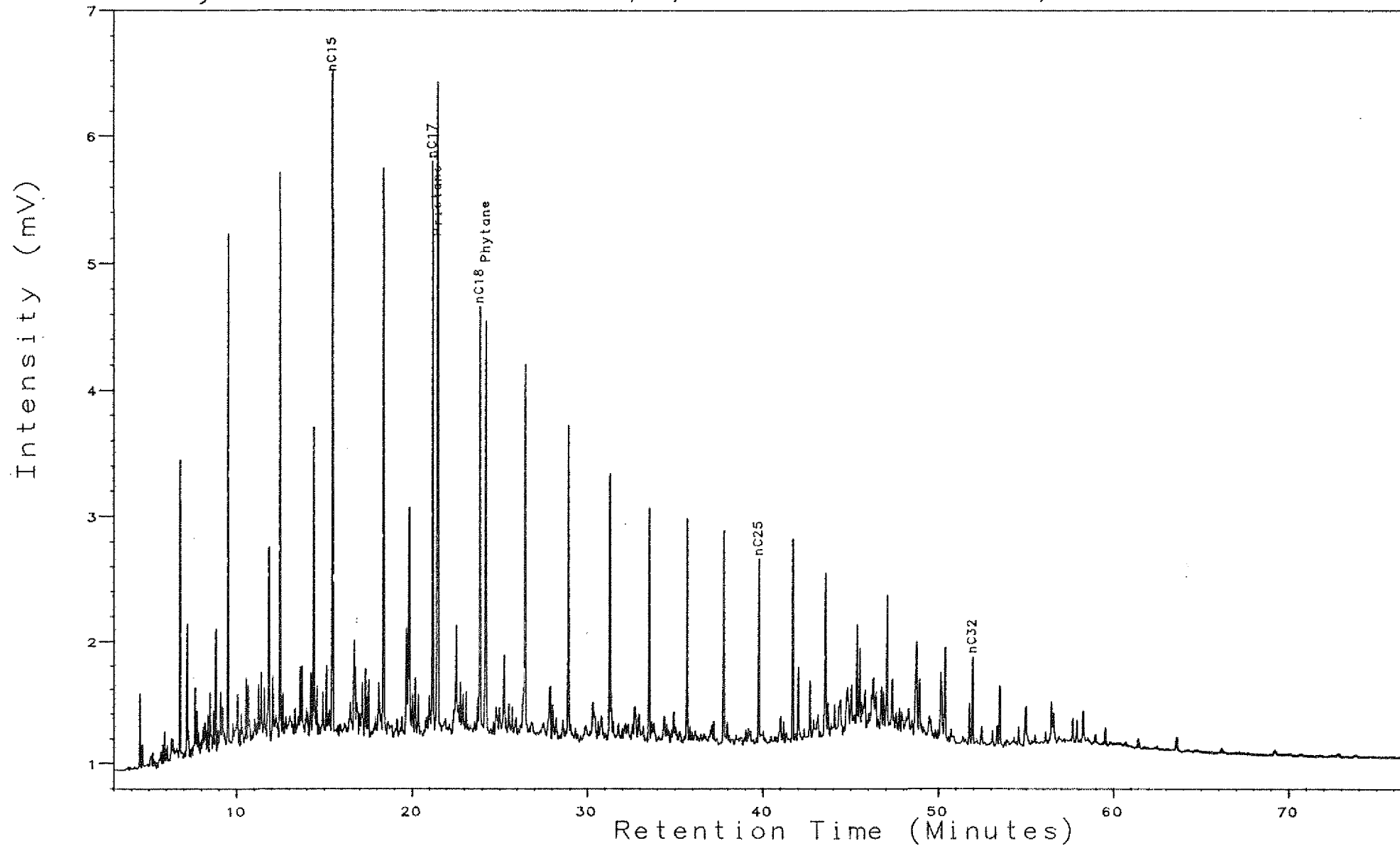
31/4-2 2378m, SAT



Analysis SA1532390

10, 1, 1

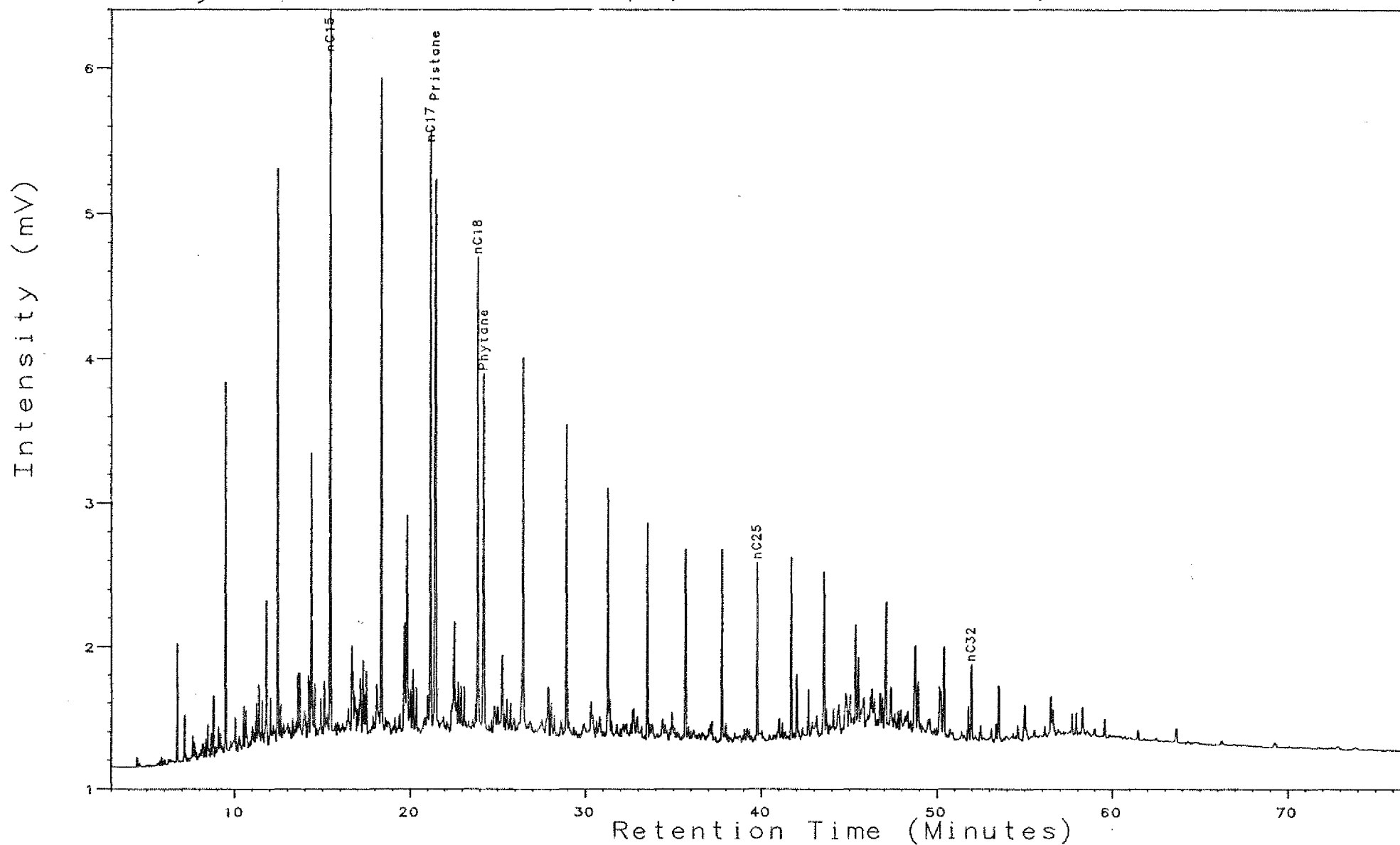
31/4-2 2390m, SAT



Analysis SA1532420

10, 1, 1

31/4-2 2420m, SAT

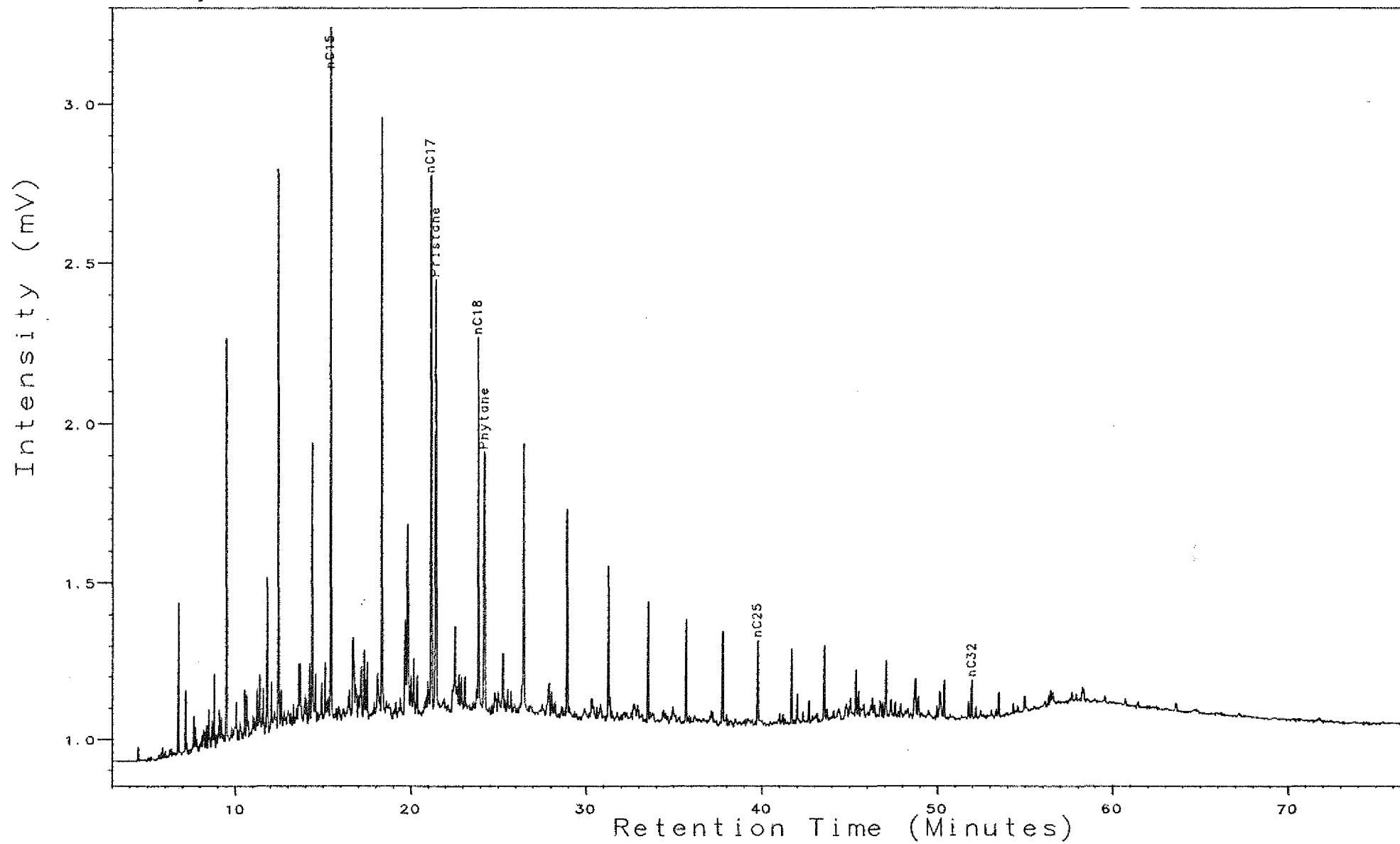




Analysis SA1532432

10, 1, 1

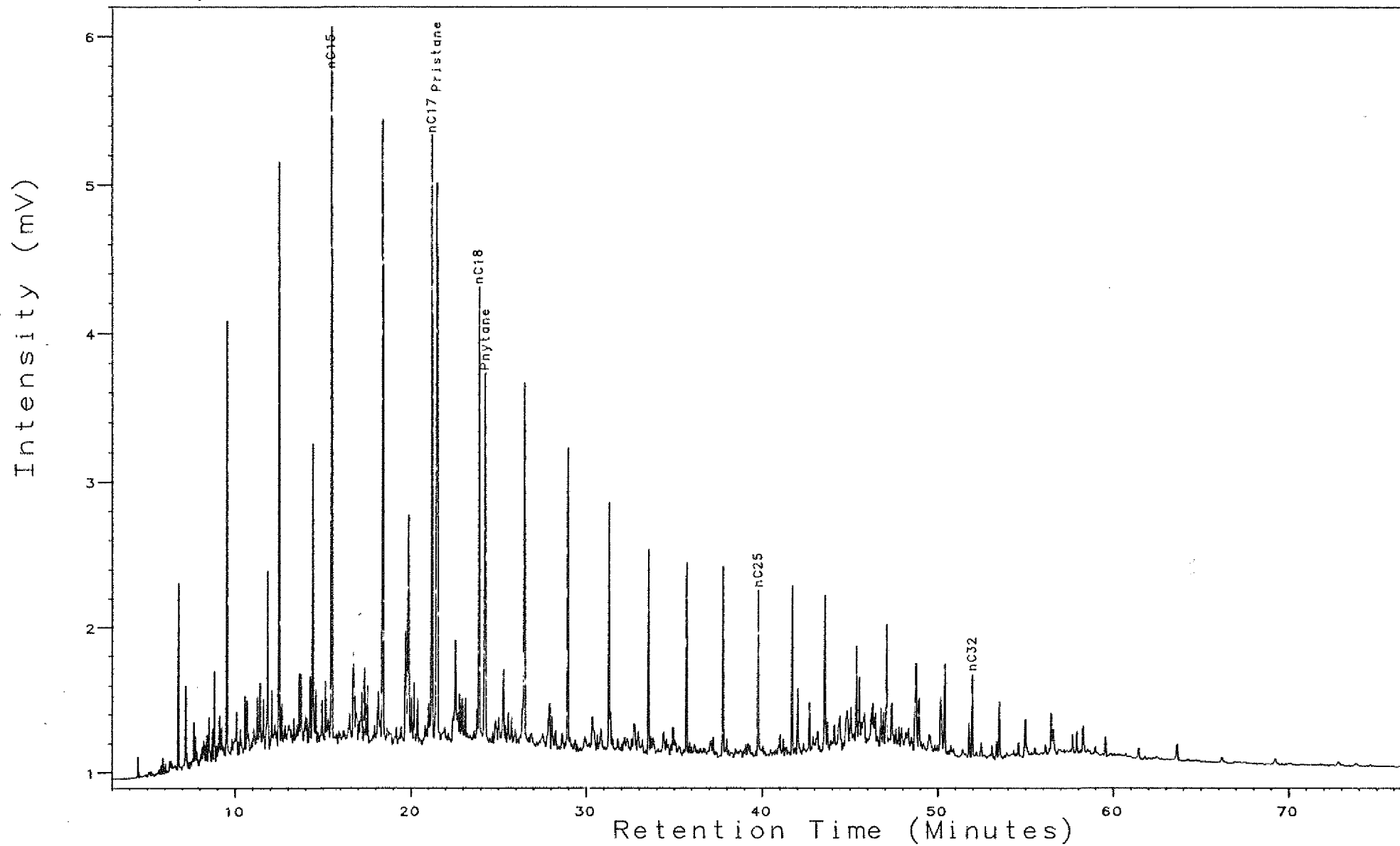
31/4-2 2432m, SAT



Analysis: SA1532456

10, 1, 1

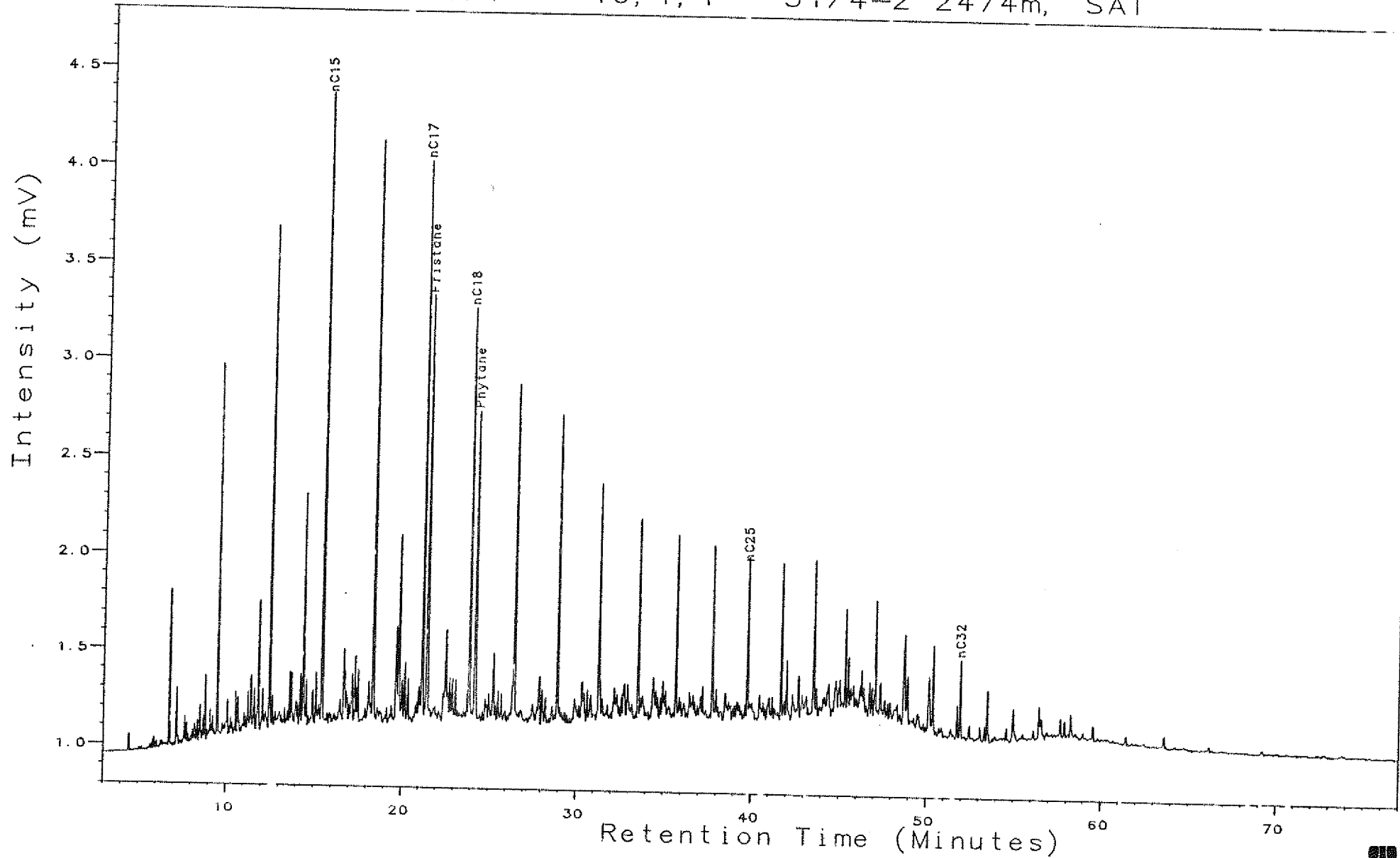
31/4-2 2456m, SAT

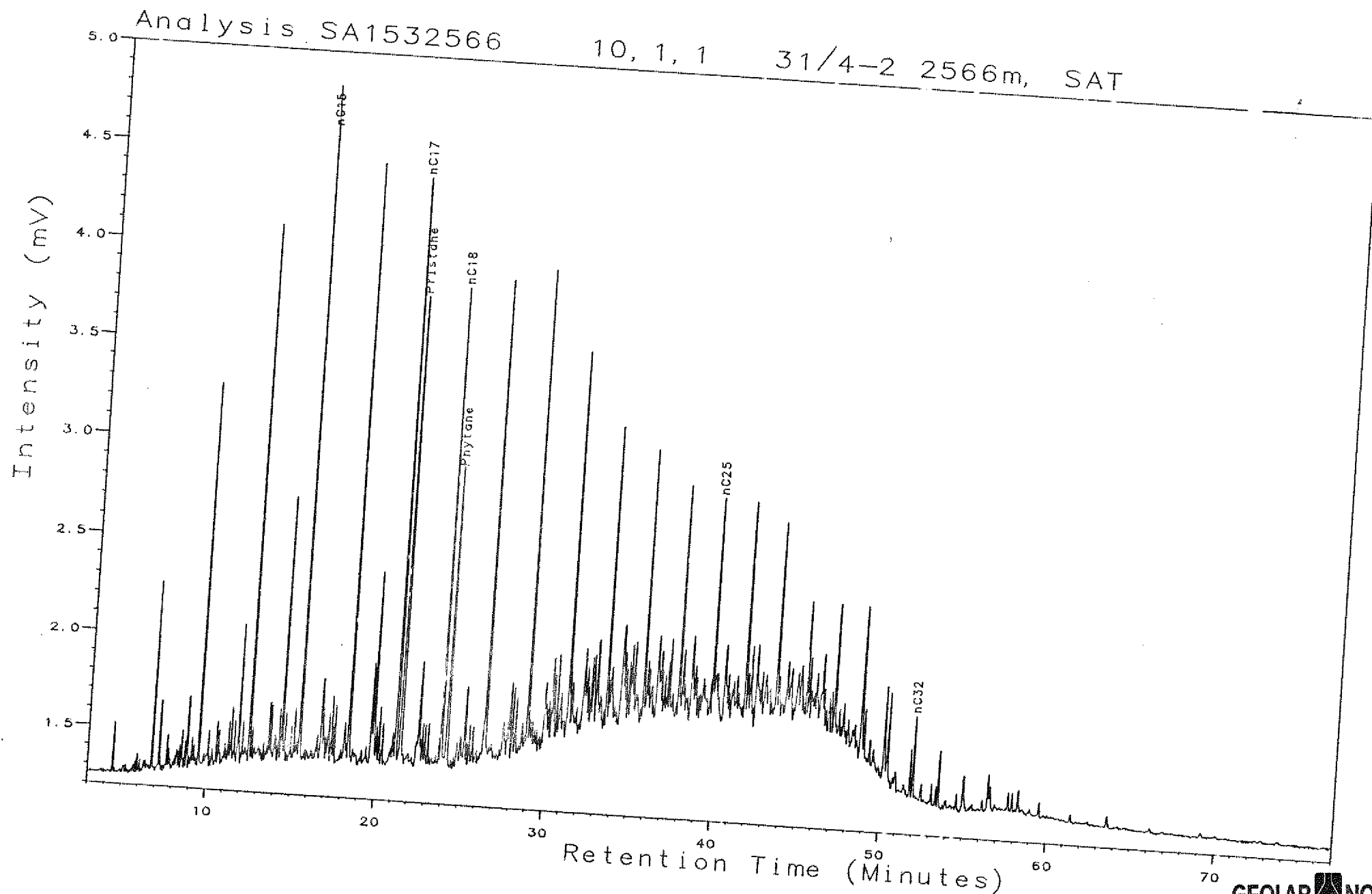


Analysis SA1532474

10, 1, 1

31/4-2 2474m, SAT

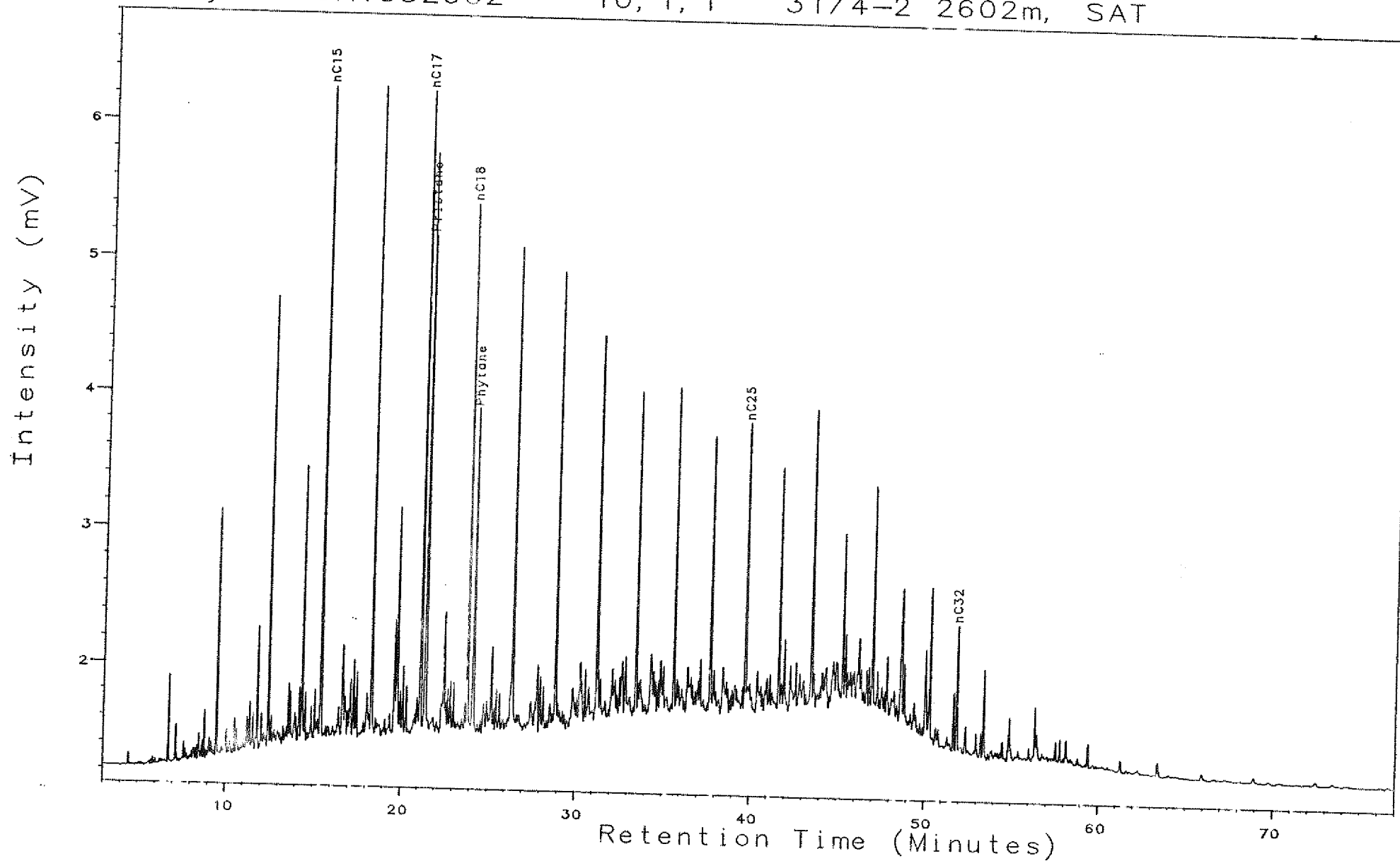




Analysis SA1532602

10, 1, 1

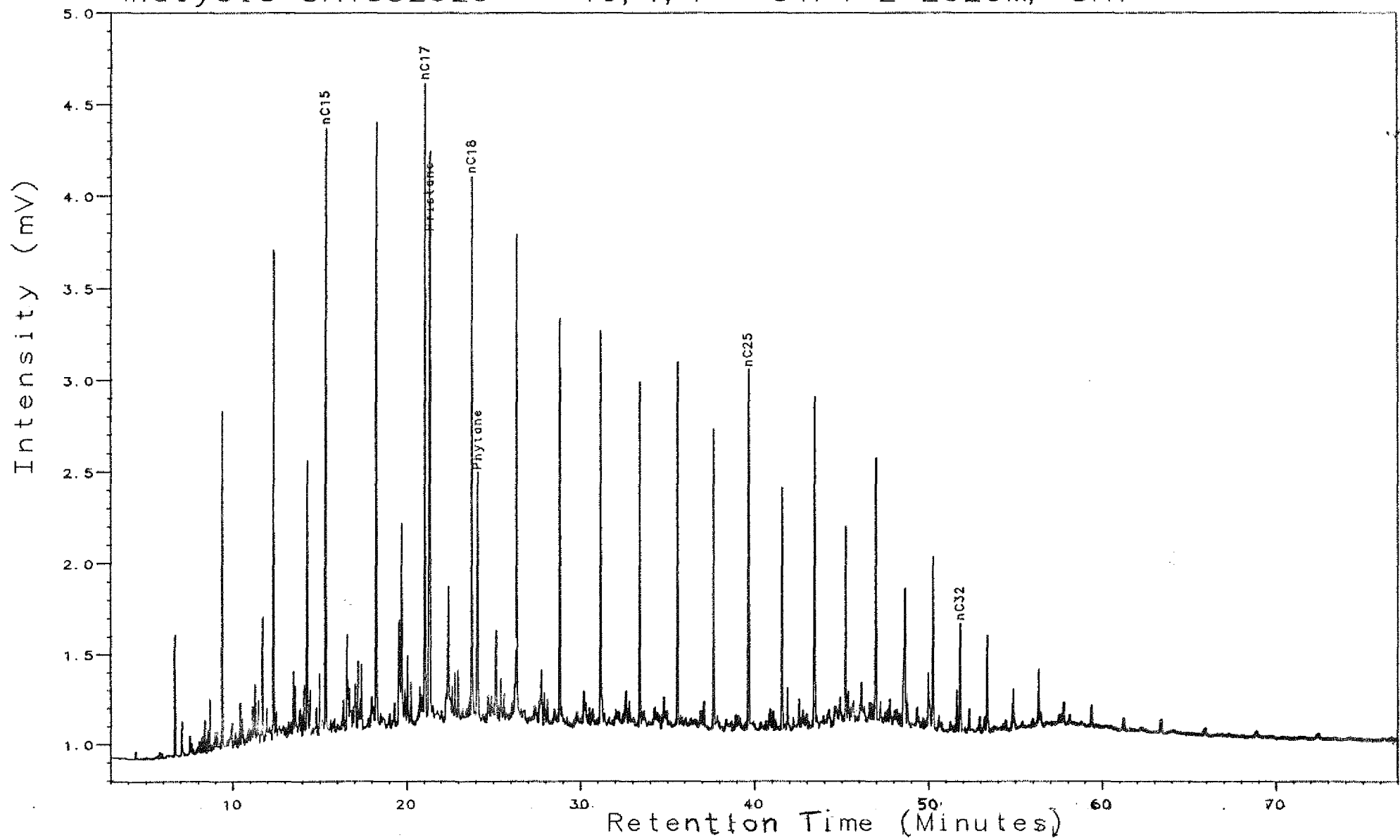
31/4-2 2602m, SAT



Analysis SA1532626

10, 1, 1

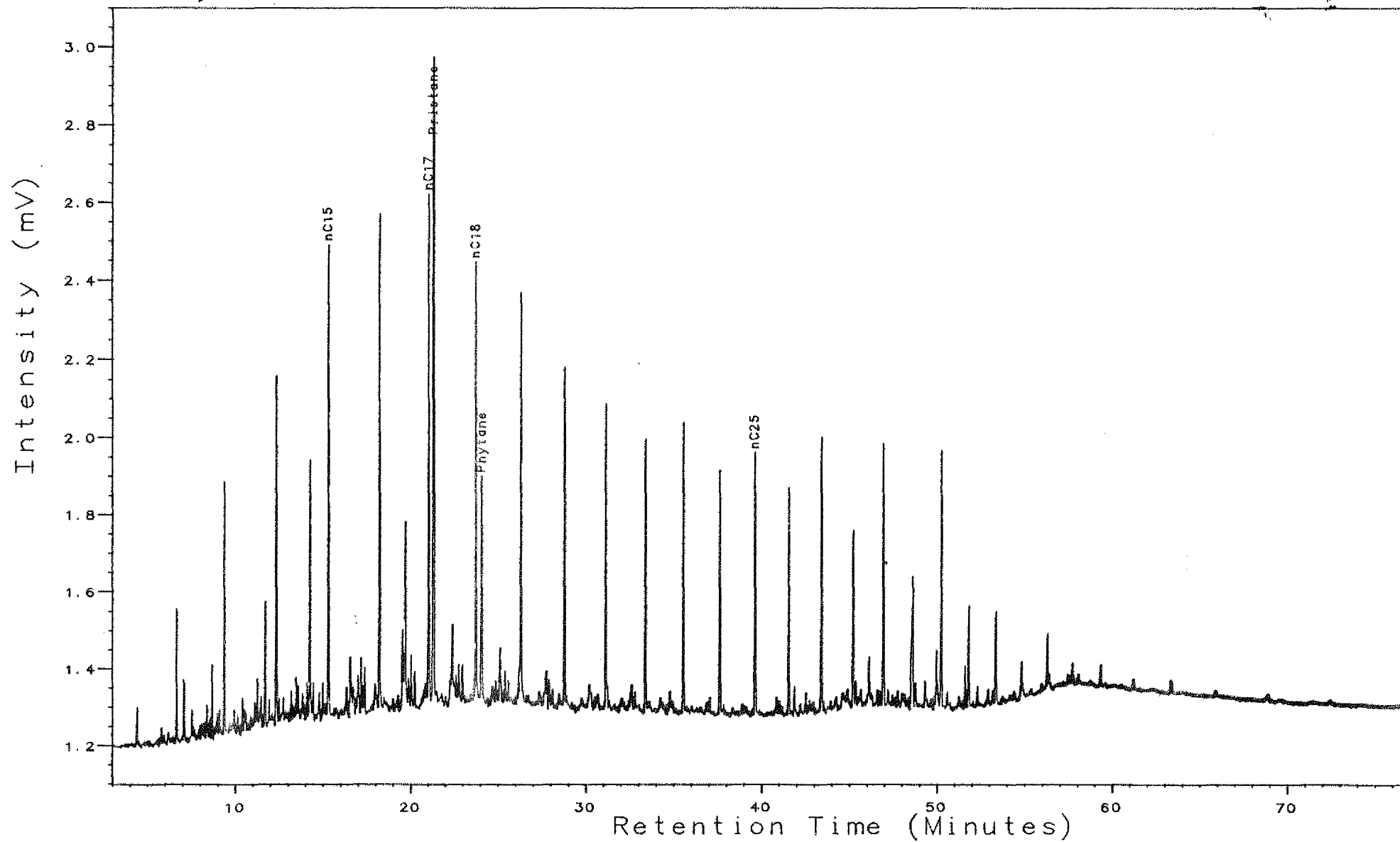
31/4-2 2626m, SAT



Analysis SA1532668

10, 1, 1

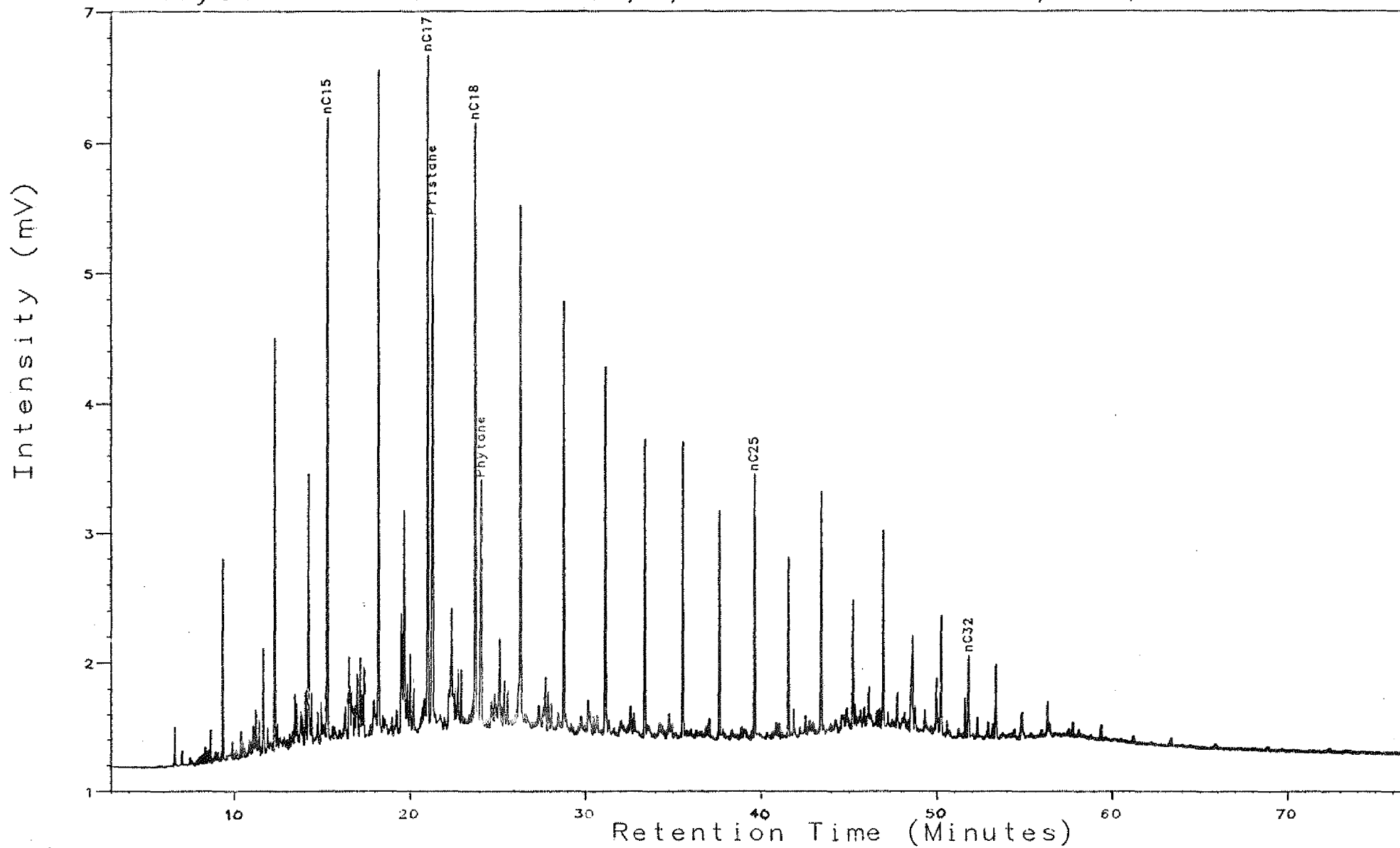
31/4-2 2668m, SAT



Analysis SA1532734

10, 1, 1

31/4-2 2734m, SAT

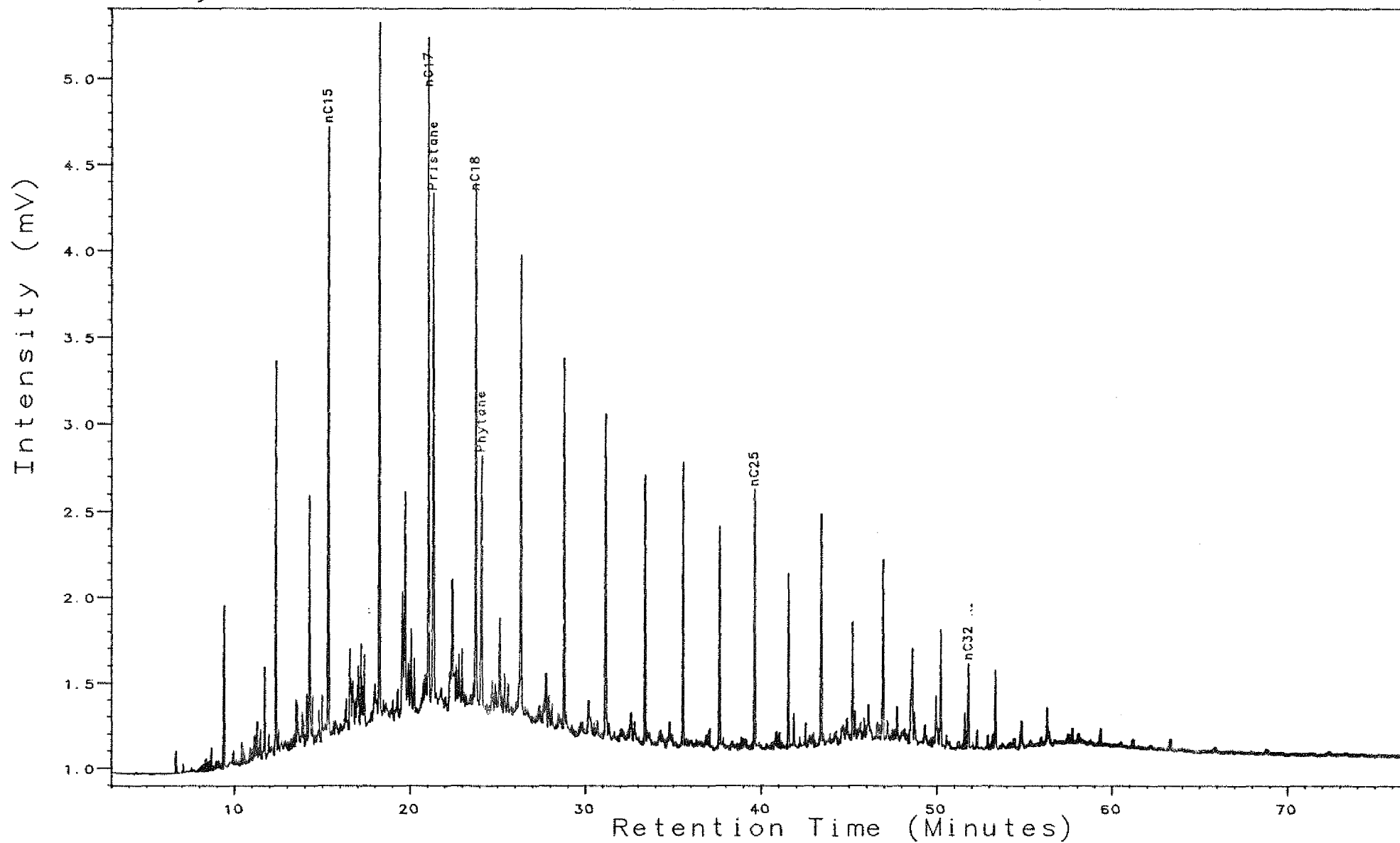




Analysis: SA1532760

10, 1, 1

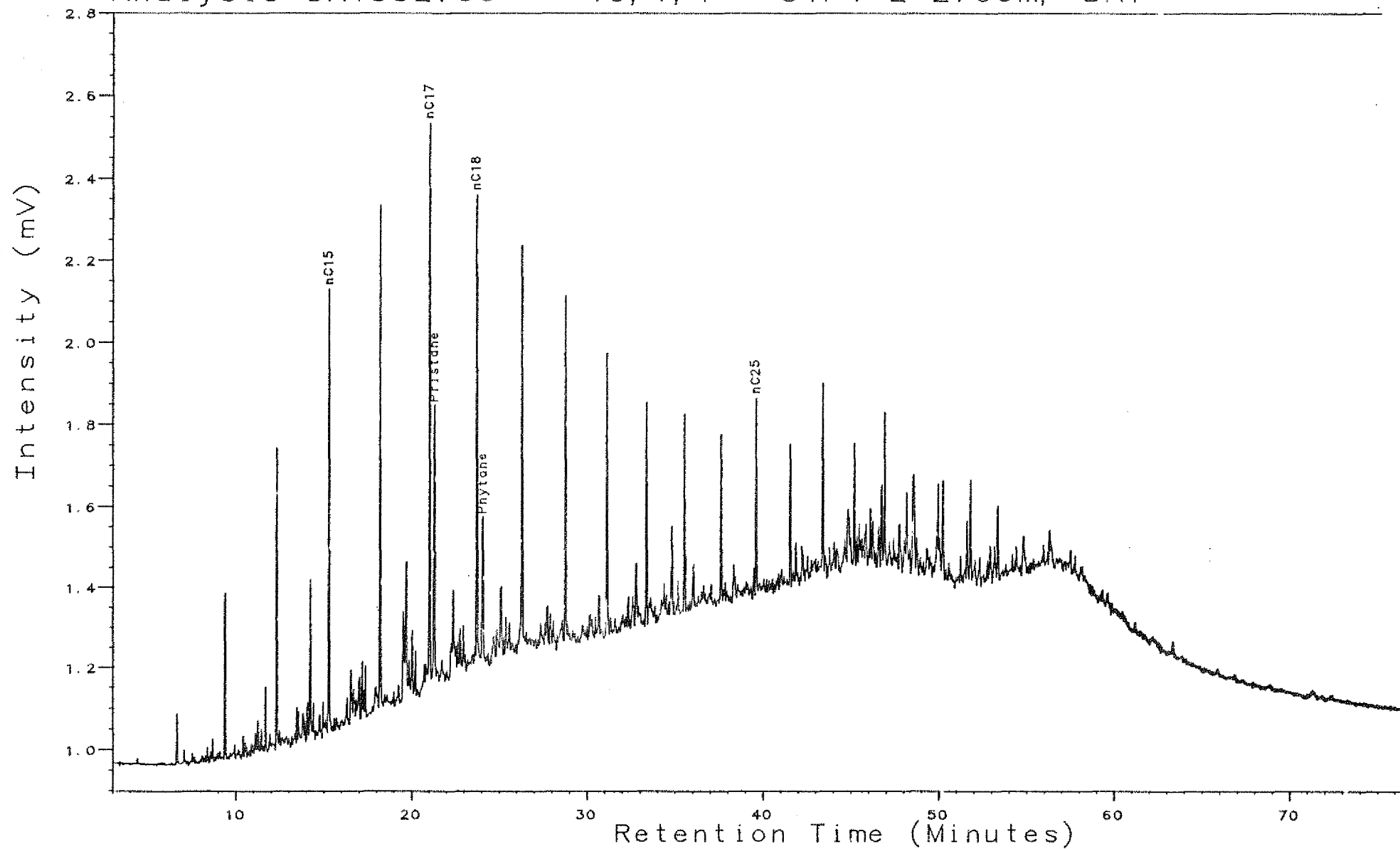
31/4-2 2760m, SAT



Analysis SA1532766

10, 1, 1

31/4-2 2766m, SAT



Analysis SA1532784

10, 1, 1

31/4-2 2784m, SAT

