

NORTH VIKING GRABEN
GEOCHEMICAL STUDY

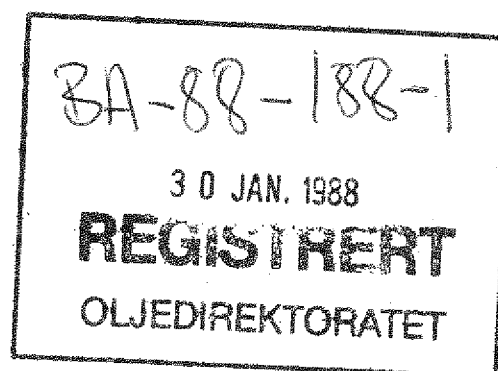
Well no. 31/4-3 NOCS

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INTRODUCTION

This well is from the Norwegian sector of the North Sea. It is within the Brage Field area to the east of the Bergen High on the Horda Platform. Brage oil is considered to be sourced from the Oseberg Kitchen (Thomas et al., 1985) by both upper and lower Jurassic shales.

A total of 283 samples were collected from the Norwegian Petroleum Directorate (NPD) in Stavanger. All the samples 1725 - 4981 m (T.D. RKB) were washed and described (bar one). The analysed interval in the Jurassic is from 1805 m to 4975 m at samples intervals of 3 metres in the Jurassic sequence. A careful selection of suitable samples was made for screening analysis i.e. TOC and Rock-Eval analysis. One hundred and seventy-two (172) samples were chosen for this analysis. Based on the results from this analysis, a number of samples were chosen for further analysis as indicated below.

Thermal extraction - pyrolysis - gas chromatography	55 samples
Extraction, MPLC fractionation, saturated and aromatic hydrocarbon gas chromatography	10 samples
Vitrinite reflectance microscopy	27 samples
Visual kerogen analysis	35 samples

A detailed list of which samples were analysed by which method is given in tables in the Appendix. Figure 1 shows the litho-variations based on wireline logs and some of the screening data for the analysed section of the well. It also shows the sample locations for follow-up analysis. Included in the figure are some of the problems and intervals of

interest (e.g. oil show intervals) which have affected the choice of samples for analysis.

LITHOLOGY AND TOTAL ORGANIC CARBON CONTENT

Tertiary (- 1965 m)

The Sele, Lista and Maureen Fms. were analysed (1774 m, 1810 m and 1940 m Fm. tops respectively).

The dominant lithology in the samples is green-grey to olive-grey claystones with traces of light olive-grey tuff. The claystones of the Sele Fm. and the top of the Lista Fm. (1800 - 1855 m) have TOC contents between 1 and 2%. Otherwise TOC contents are less than 1%.

Cretaceous (1965 - 2010 m)

The samples consist of green-grey to dark green-grey claystones and white limestones. The claystones have fair TOC contents, 0.6 - 0.7%. The limestones have less than 0.2% TOC.

Jurassic (2010 - 2879 m)

Draupne Formation (2010 - 2018 m)

The two samples of olive-black claystones which were analysed from this thin interval have TOC contents of 5.8 and 7.9%. There is also a considerable amount of caved Cretaceous claystones.

Heather Formation (2018 - 2327 m)

The samples in this interval are predominantly composed of sandstones and olive-grey siltstones and claystones. A

considerable amount of caved Cretaceous claystones are also present in the samples in the Heather sand sequence I, 2018 - 2082 m, and caved Heather siltstones and claystones can be found in the Heather sand sequence II (2136 - 2246 m).

Heather claystones/siltstones from 2083 - 2136 m contain from 0.7% to 6.9% TOC. The high values are for medium dark grey to black claystones, which are most probably caved Draupne Fm. claystones. Otherwise light grey to medium dark grey (mostly olive-green) shales have 1 - 2% TOC, occasionally there are some values greater than 2%.

The Heather claystones/siltstones below the Heather sand sequence II are mainly olive-grey in colour with 0.5 - 1% TOC.

Brent Group (2327 - 2411 m)

Mainly sandstones but with minor amounts of olive-grey to dark grey claystones and traces of coal. Most claystones have less than 1% TOC except for a carbonaceous claystone from 2348 - 2350 m which has 8.3% TOC.

Dunlin Group (2411 - 2702 m)

Similar to the Heather Fm. in that the sequence contains two sandstone sections - Dunlin sands I and II, which separate predominantly argillaceous sections. The mainly argillaceous intervals based on log data are:

1. 2411 - 2448 m
2. 2470 - 2543 m
3. 2577 - 2702 m

The claystones in these intervals are medium grey to medium

dark grey in section 1, medium grey to dark grey in section 2 and medium grey to olive-grey changing to medium dark grey towards the base of section 3.

The claystones in section 1 contain 0.6 - 1.6% TOC with most values being greater than 1%. Section 2 claystones are slightly richer, reaching 2% TOC in some intervals. Section 3 claystones/siltstones are more variable and can be further divided:

- 3.1. From 2578 - 2598 m. The claystones are similar in TOC content to section 2 above.
- 3.2. From 2598 - 2683 m. Consist mainly of light to medium dark grey siltstones which are poorer in TOC, i.e. 0.6 - 1.2%.
- 3.3. From 2683 - 2702 m. Claystones are similar to section 3.1 above with TOC contents from 1.4 - 1.8%.

Statfjord Formation (2702 - 2879 m)

This formation consists mainly of sandstones although there are medium dark grey claystones and coals. Claystones vary considerably in TOC content, probably due to the presence of coal as stringers, and unavoidably analysed along with the claystone. TOC contents of medium dark grey claystones vary from 1 - 8.2%. Below 2850 m the dominant claystones are mainly red and are virtually barren of organic matter (0.3% TOC). Samples from the Triassic and Permian intervals also consist mainly of red claystones and sandstones which are virtually barren.

ROCK-EVAL ANALYSIS

1. Kerogen Type and Richness

(Hydrogen Index, Oxygen Index and Petroleum Potential)

Tertiary (- 1965 m)

The green-grey to olive grey claystones in the Sele Fm. have type III kerogen with poor-fair gas potential (petroleum potentials 1 - 2). Claystones in the rest of the interval have type IV kerogen and they have a very poor potential as source rocks.

Cretaceous (1965 - 2010 m)

Claystones and limestones in this interval have type IV kerogen and virtually no source rock potential.

Draupne Formation (2010 - 2018 m)

The thin Draupne Fm. interval, 8 m thick, consists of olive-black claystones with type II/III kerogen (hydrogen index values of 300 - 400). Petroleum potentials of the two analysed samples are 17.8 and 28.6. These values are similar to the Draupne in 31/4-2. These claystones have a rich potential for oil and gas but less than graben trough and some flank wells.

Heather Formation (2018 - 2327 m)

On the Horda Platform the Heather Fm. is much sandier and siltier than within the graben and on the Bergen High. For instance even compared with the Heather Fm. in 31/4-2 it is

sandier.

The main argillaceous intervals are from 2083 - 2136 m and 2250 - 2327 m. The top interval does appear to have some source potential with hydrogen indices from 12 to 369 for the claystones. Thin isolated claystones in this interval have type III or II/III kerogen with petroleum potentials from 5 - 22. It is possible, however, that these claystone samples include Draupne cavings. The claystones/siltstones in the rest of the interval have mainly type IV kerogen with poor potentials.

Brent Group (2327 - 2411 m)

Olive-grey and dark grey claystones in this sandstone - dominated interval have mainly type IV kerogen with poor petroleum potentials (1). Thin carbonaceous claystones associated with coals have type II/III kerogen and rich petroleum potentials.

Dunlin Group (2411 - 2702 m)

This interval is quite different to that in 31/4-2. The sequence is much more silty and sandy. It does show the same changes as in 31/4-2 but generally the interval has a lower potential. The main argillaceous intervals discussed previously are;

1. 2411 - 2448 m: Mainly type III kerogen with petroleum potentials 1 - 3. The claystones have a fair potential as a source for wet gas. It can be correlated roughly with the top part of the Dunlin Gr. in 31/4-2.
2. 2470 - 2543 m: Claystones have type III or II/III kerogens with petroleum potentials from 2 - 7. They have a good potential for gas and condensate. They can be

roughly correlated with the type II kerogen claystones in the Dunlin Gr. in 31/4-2 between 2360 - 2460 m.

3. 2577 - 2702 m: The remainder of the claystones in this interval have mainly type III kerogens with petroleum potentials from 4 - 9 but the interval consists mainly of siltstones with type IV kerogen with petroleum potentials less than 1. The bottom 20 m of the claystone section shows an increase in petroleum potential (up to 10) and hydrogen indices > 200 which indicates type II/III kerogens with a good potential for gas-condensate.

Statfjord Formation (2702 - 2879 m)

Thin claystones and carbonaceous claystones associated with coals in this mainly sandstone sequence have a fair to rich petroleum potential (1 - 20) and type III or II/III kerogens (100 - 350 hydrogen index). They have a good potential together with the coals as source rocks for wet gas and condensate.

2. Generation and Migration

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

The Brage reservoir interval is within the Heather Fm. sandstones. Unfortunately most of this section was cored. Sandstones from above this interval show high production index values as do grey claystones below it. The claystones between the Dunlin sands have fairly high production index values for low mature claystones (compare with the same sequence in 31/4-2). Dunlin Gr. siltstones and Triassic red and grey claystones have high and very high production index values respectively. The S_1/TOC of the latter is also very high suggesting that abundant migrated bitumen may be present in these claystones.

The low production index values for the good source claystone sequences in the Draupne Fm. and Dunlin Gr. indicate that little or no hydrocarbon generation has occurred. The production index vs. depth is shown in Figure 2.

3. Maturity

Table 2, (Appendix) shows the Rock-Eval data for 31/4-3 including the Tmax data. Figure 3 shows the trend in Tmax with depth mainly for the Jurassic interval. The general trend over this section is 427°C to 433°C. High values > 435°C occur in the Brent Gr. and top part of the Dunlin Gr. and may be due to a major difference in organic matter type i.e. mainly terrestrial higher plants in this section compared to the rest of the Jurassic with mostly marine organic matter. The Jurassic section 2018 - 2879 m is moderate mature to early mature based on the estimated Tmax trend.

EXTRACTION DATA

Ten samples from the Jurassic sequence were extracted and fractionated by MPLC.

Draupne Formation (2010 - 2018 m)

No samples were analysed since the sample size was too small to obtain reliable results.

Heather Formation (2018 - 2327 m)

The two samples from this formation have good-rich abundance of EOM and fair-good EHC (1696 ppm EOM, 429 ppm HC and 929 ppm EOM, 279 ppm EHC). The EOM normalised to organic carbon is high for these two samples (> 100 mgs/g). This is high for moderate mature samples and suggests the presence of migrated bitumen.

Brent Group (2327 - 2411 m)

No samples were analysed since sandstones are dominant in the section and the claystones present in the samples were considered to be mostly cavings.

Dunlin Group (2411 - 2702 m)

Six samples from this interval were extracted. The abundance of EOM and EHC is quite varied. Two claystone samples with the least EOM (fair-good values, 308, 532 ppm) come from the top and bottom of the interval (2425 - 2445 m, 2685 - 2705 m). In the claystone section between the Dunlin sands I and II (2470 - 2543 m) the EOM content is higher (good-rich

values, 865 - 1016 ppm). Hydrocarbon contents are also higher in this section (280 - 442 ppm compared to 169 - 264 ppm, fair-good). When normalised to TOC, the EOM values are high for all the Dunlin samples (56 - 115) considering the low maturity. Hydrocarbon values vary from 20 - 88 and apart from the two highest values are more what would be expected for moderate mature claystones (20 - 40 mgs HC/gTOC).

Statfjord Formation (2702 - 2879 m)

Two claystone samples were analysed in this predominantly sandstone sequence. They have rich amounts of EOM and extractable hydrocarbons (EHC). EOM values normalised to gram TOC are very high (rich) and suggest the presence of migrated bitumen. The EHC values normalised to TOC are also high (rich).

Permo-Triassic (2879 m - TD)

No samples from this interval were extracted.

Saturated Hydrocarbons

Draupne Formation (2010 - 2018 m)

There was insufficient sample for extraction from this interval, however, thermal extraction gas chromatography was performed.

Heather Formation (2018 - 2327 m)

Two samples of Heather Fm. claystones were analysed. One, medium dark grey to black claystone sample from between the

Heather sands I and II (2083 - 2092 m), the other, light to medium dark grey shales directly above Heather sand II (2123 - 2138 m). The first has an n-alkane envelope from nC_{13} to nC_{36} with a maximum at nC_{17} and a prominent shoulder of n-alkanes from nC_{20} - nC_{27} (Figure 4). There appear to be abundant steranes/triterpanes in the n-alkane range from nC_{27} - nC_{32} . The second sample has an n-alkane envelope from nC_{12} - nC_{36}^+ , but is totally dominated by the n-alkanes ranging from nC_{12} - nC_{20} . This distribution is fairly typical of the C_{15}^+ hydrocarbon distribution of condensates and highly mature source rocks and diesel contamination of cuttings (narrow C_{15} - C_{20} alkane range, low pristane/ nC_{17} ratio) (Figure 5). In these immature shales this presumably indicates the presence of migrated hydrocarbons. The first sample has a hydrocarbon distribution typical for a moderate mature marine shale with a higher plant input. There is a slight even n-alkane preference between nC_{21} - nC_{26} and a low pristane/phytane ratio (~ 1.5), with prominent steranes/triterpanes which suggests that the organic matter was deposited in an anoxic environment.

Brent Group (2327 - 2411 m)

No samples from this interval were extracted since sandstones were seen to be dominant from examination of log data and the claystones present in the samples are, at least partly, cavings from higher formations.

Dunlin Group (2411 - 2702 m)

Six samples from this interval were analysed. They consist of olive-grey, medium grey, and medium dark grey claystones. The gas chromatograms show some similar features to the gas chromatograms of the two Heather samples. Three samples have mainly condensate range hydrocarbons, these are 2475 - 2495 m, 2500 - 2520 m and 2530 - 2543 m (Figure 6). They are

located between the base of the Dunlin sand II (2470 m) and the top of Dunlin sand I (2543 m). The whole of this shale sequence probably contains migrated hydrocarbons. The other samples (2425 - 2445 m, 2578 - 2598 m, 2685 - 2705 m) probably also contain minor amounts of migrated hydrocarbons, since the n-alkanes from nC_{13} to nC_{20} are dominant. However n-alkanes from nC_{20} - nC_{30} are more abundant and there is a distinct odd carbon number n-alkane preference from nC_{20} - nC_{32} and pristane/phytane ratios are greater than 2 (Figure 7). This data suggests a major terrestrial plant matter input to these claystones and that the depositional environment was only mildly anoxic.

Statfjord Formation (2702 - 2879 m)

Two samples from this formation were analysed, and both show mainly condensate-range n-alkanes which suggests the presence of migrated hydrocarbons, however, it is possible that these claystones are cavings from higher formations.

Triassic (2879 m)

No samples were analysed.

Aromatic Hydrocarbons

Draupne Formation (2010 - 2018 m)

No samples analysed.

Heather Formation (2018 - 2327 m)

Two samples from this formation were analysed. Both samples

are dominated by triaromatics, particularly phenanthrene (Figures 8 and 9). There is however, more of diaromatic compounds in the sample which is considered to be less contaminated by migrated hydrocarbons (i.e. 2083 - 2092 m, figure 9), based on the saturated hydrocarbon gas chromatogram (figure 7). The migrated hydrocarbons are therefore mainly saturated compounds. The MPI 1 ratio is 0.55 - 0.58 in these two samples which would indicate an equivalent vitrinite reflectance of 0.65 - 0.7% based on the plot of MPI 1 versus V.R. by Hall et al., (1985). This is high in comparison with the other maturity parameters for this well (Tmax, V.R., SCI etc.) and the MPI 1 is probably too high because of the presence of migrated hydrocarbons. The low $(3 + 2)/1$ MDBT ratio (< 1) is indicative of low maturity since this ratio soon exceeds one in moderate-early mature claystones with type II/III or III kerogen.

Brent Group (2327 - 2411 m)

No samples from this interval were analysed.

Dunlin Group (2411 - 2702 m)

Six samples from this interval were analysed. They show similar features to the two samples from the Heather Fm. The three samples which are considered to have abundant migrated hydrocarbons show more diaromatics (Figure 10) than the sample from the Heather Fm. which contained abundant migrated hydrocarbons. However, phenanthrene and C_1 -phenanthrenes still predominate, except for the deepest sample (2530 - 2643 m) in which C_1 - and C_2 -naphthalenes are more abundant. The high MNR ratio in this sample and the high MPI 1 ratio in all three samples (for the level of maturity) suggests that the diaromatics and part of the triaromatics are migrated hydrocarbons.

The two claystone samples from the lower intervals of the Dunlin Gr. (2578 - 2598 m and 2685 - 2705 m) also have abundant diaromatics. In this case it is considered that these hydrocarbons are indigenous to the sample (Figure 11). The main reasons for believing this are, that the samples have the lowest MPI 1 index values, equivalent to a vitrinite reflectance of 0.5 - 0.55% R_o , which agrees closely with the other maturity data. Also they have a prominent high molecular weight region which indicates the presence of abundant aromatised steranes and triterpanes.

Statfjord Formation (2702 - 2879 m)

The two samples from this sequence may be partly cavings from higher formations. They contain abundant migrated hydrocarbons as the high MPI values suggest (0.63, 0.69 equivalent to a vitrinite reflectance of $\sim 0.8\%$ R_o). Triaromatic and diaromatic hydrocarbons are dominant, and more diaromatics are present than in claystones with migrated hydrocarbons above this interval.

Permo-Triassic (2879 m - TD)

No samples were analysed.

Discussion of saturated and aromatic hydrocarbon variations

The saturated and aromatic hydrocarbon gas chromatograms and various parameters derived from them indicate that the hydrocarbons present in the Jurassic interval are a mixture. Gas chromatograms (Figures 4 - 11) from the Heather Fm. and Dunlin Gr. have been selected to illustrate this feature. The mixture consists of "migrated" condensate range (nC_{12} - nC_{20}) predominantly saturated hydrocarbons, and indigenous hydrocarbons which are composed of more high molecular

weight compounds.

The Heather claystone containing migrated hydrocarbons (2123 - 2138 m, figure 4) is the cap rock for the Brage reservoir. The other shale containing migrated hydrocarbons (2530 - 2543 m, figure 6) is situated above one of the Dunlin sands. In these latter samples there is more low molecular weight aromatic hydrocarbons (i.e. diaromatics) than in the Heather claystone. The reason for this difference is not known, but it might be that the Dunlin claystones are more porous (they are silty whereas the Heather claystones are not). Hence, absorption of aromatics by clay minerals is probably less effective in the Dunlin claystones. The two samples from Dunlin and Heather sequences with prominent nC_{20} - nC_{30} alkanes have been taken to represent mostly indigenous hydrocarbons. The aromatic hydrocarbons of those shales are dominated by C_3 -naphthalenes and triaromatic compounds, which suggests that the organic matter is either too poor to generate mono- and diaromatics or is not mature enough. The latter suggestion is considered most likely.

THERMAL EXTRACTION - GAS CHROMATOGRAPHY

A total of fifty five samples were analysed by thermal extraction - gas chromatography. The same samples were also pyrolysed. The results from the pyrolysis - gas chromatography are discussed separately, but will also be used in this section especially in connection with oil-show analysis.

Draupne Formation (2010 - 2018 m)

One sample from the Draupne Fm., 2012 m was analysed. This shows almost no hydrocarbons.

Heather Formation (2018 - 2327 m)

A total of twelve samples from the Heather Fm. were thermally extracted. The uppermost analysed sample, 2018 - 20 m shows a good abundance of thermally extractable material, especially n-alkanes in the nC_{11} - nC_{16} range, indicating that the kerogen has generated hydrocarbons. The six samples between 2024 m and 2118 m show only some very light compounds. Five of these samples were sandstones and the thermal extraction results show clearly that these samples do not contain migrated hydrocarbons. The sixth sample, a grey shale from 2118 m was found to contain kerogen type III. The thermogram shows that the kerogen in the sample has not started to generate hydrocarbons. The sample from 2122 - 2125 m is found to contain some hydrocarbons in the nC_{10} - nC_{18} range (Figure 12). The distribution is rather strange and could possibly be diesel. There is, however, no report that diesel was used in the mud in this well. The pyrogram shows this sample to contain kerogen type II/III or possibly asphaltenes. The thermally extracted hydrocarbons could possibly be generated in situ,

but the gas chromatographic pattern indicates that the hydrocarbons are more mature than what would be expected from the level of maturity found for this part of the well.

The four remaining samples from the Heather Fm. are either grey claystones or sandstones. In none of these samples were free hydrocarbons detected.

Brent Group (2327 - 2411 m)

Two samples from the Brent Gr. were analysed. The limestone from 2395 - 2398 m contains some high molecular weight material which could be a contaminant or migrated material. Otherwise only some low molecular weight material ($< nC_{10}$) is present. The heavy material found here is in good agreement with the pyrogram which indicates the presence of asphaltenes. This would indicate that the limestone contains some heavy migrated material. The sample from 2425 - 2428 m is barren.

Dunlin Group (2411 - 2702 m)

A total of twenty-five samples from the Dunlin Group were analysed. Most of the analysed samples were almost barren. This is especially the case for the samples down to 2508 m. This is in good agreement with the pyrograms which show this part of the section contains kerogen type III at the best. The samples between 2513 m and 2543 m contain some hydrocarbons in the nC_{13} - nC_{17} range (Figure 13). The pyrograms of these samples indicates that they contain either kerogen type III/II or asphaltenes.

The hydrocarbons present in the thermal extract show, however, a more mature pattern than that expected from in situ generated hydrocarbons from kerogen at the maturity level present in these samples. It is therefore more likely

that these hydrocarbons represent migrated hydrocarbons, probably a condensate.

The samples from 2577 - 2685 m are almost barren. Most of these samples are found to contain kerogen type IV in good agreement with the thermal extract data. For the samples from 2688 m down to 2705 m the amount of hydrocarbons in the thermograms increases with increasing depth. These samples are found to contain either kerogen type III or possibly III/II indicating that the hydrocarbons were generated in situ.

Statfjord Formation (2702 - 2879 m)

A total of six samples from the Statfjord Fm. were analysed. The samples down to 2828 m have only small amounts of thermally extractable hydrocarbons, mainly in the C_{13} - C_{19} range (Figure 14). These samples are all grey claystones with kerogen type III, and the thermally extracted hydrocarbons are believed to be generated in situ.

Permo-Triassic (2879 m - TD)

The samples from 2879 m to 4230 m are either red or medium grey claystone, siltstone or sandstone. All the samples, except the sample from 2879 m, have good abundances of C_{13} - C_{20} hydrocarbons (Figure 15). The thermograms are similar to those found when diesel is used. There is, however, no information that diesel was used in the mud down to 3500 m. It was earlier shown that reservoir rocks can lose almost all the hydrocarbons below C_{10} when brought to the surface (Bjørøy et al., 1985). This could then indicate that all the analysed samples from this section contain migrated hydrocarbons, probably a condensate. The variation of the gas chromatographic pattern for the different samples also indicates that it is not a mud additive. Below 3500 m

however oil was used in the mud and the hydrocarbons of the sample from 4230 m (Figure 16) are probably due to the presence of this oil on the cuttings. The samples above this for which migrated hydrocarbons were indicated may also be doubtful, if oil was used but not recorded in the mud log.

PYROLYSIS - GAS CHROMATOGRAPHY

A total of fifty-five (55) samples were pyrolysed and the pyrolysate analysed by capillary gas chromatography.

Draupne Formation (2010 - 2018 m)

The Draupne Fm. in this well is very thin, and two claystone samples were analysed. The top sample from 2012 m has a relatively high percentage of $C_1 - C_5$ compounds, and the pyrogram shows a high abundance of aromatic compounds and a low abundance of alkenes/alkanes, typical for kerogen type III. This is clearly unlike the characterisation based on hydrogen index. However, see discussion below on the Heather Fm. The second sample overlaps the top of the Heather Fm. and is included with the discussion on the Heather Fm.

Heather Formation (2018 - 2327 m)

A total of thirteen samples from the Heather Fm. were pyrolysed. These consist partly of samples from the silty claystone and partly from Heather Sand. The sampling interval of the top sample covers both Draupne and Heather Fms. and the sample is therefore mostly Draupne claystone. The percentage of $C_1 - C_5$ is only slightly less than the other Draupne Fm. sample, but the composition is quite different with a far larger abundance of alkenes/alkanes (Figure 17). This indicates kerogen type II/III. The next four samples are either sandstone or siltstone samples. The sandstone sample, 2030 m shows a good percentage of alkenes/alkanes which could indicate pyrolysis of asphaltenes.

The remaining three samples show very small amounts of pyrolysates, mostly $C_1 - C_6$, indicating that these are

capable of generating only gas. Two samples from 2115 - 2118 m, a siltstone and a claystone sample, were pyrolysed. The siltstone shows similar features to the samples above, i.e. virtually barren, while the claystone sample shows a pyrogram characteristic of type III kerogen. A similar feature is also found for the claystone sample from 2122 - 2125 m, possibly with an input of kerogen III/II or it could represent asphaltenes, while the claystones from 2130 - 2133 m and 2135 - 2138 m show pyrograms typical for type III kerogen. The pyrogram of the sandstones from 2140 - 2143 m and 2210 - 2213 m are dominated by low molecular weight compounds including aromatics together with some higher components. This probably represents kerogen type IV, and not asphaltenes.

Brent Group (2327 - 2411 m)

Two samples from the Brent Gr. were analysed. One siltstone from 2390 - 2393 m, and one limestone from 2395 - 2398 m were pyrolysed. The siltstone is almost barren, while the limestone clearly shows higher molecular weight alkanes, indicating that asphaltenes were pyrolysed.

Dunlin Group (2411 - 2702 m)

A total of twenty-five (25) samples from the Dunlin Group were pyrolysed. The pyrolysed samples can basically be divided into four groups, 2428 - 2495 m, 2503 - 2598 m, 2653 - 2683 m and 2688 - 2705 m (Figures 18 - 20).

The first group contains samples with 40 %+ of $C_1 - C_5$ hydrocarbons and pyrograms typical for kerogen type III.

The second group change slightly compared with samples from group 1 in that the percentage of $C_1 - C_5$ hydrocarbons is lower than 40% and also the amount of alkenes/alkanes

increases, while the amount of aromatic compounds decreases. This indicates a mixture of kerogen type III/II. Group 3 consists mainly of siltstones. The siltstones have the highest percentage of $C_1 - C_5$ (50%) with pyrograms indicating kerogen type IV. The samples in Group 4 have a $C_1 - C_5$ percentage of 40 % or less and a good abundance of alkenes/alkanes, indicating that these contain kerogen type III or III/II similar to group 2 interval claystones.

Statfjord Formation (2702 - 2879 m)

A total of six samples from the Statfjord Fm. were pyrolysed. The samples are all claystones and all have a $C_1 - C_5$ percentage of 40% or less, and a good abundance of higher alkenes/alkanes, apparently indicating the presence of kerogen type III/II.

Permo-Triassic (2879 m - TD)

A total of nine samples were pyrolysed. The analysed samples can be divided into two groups based on the results. The five samples between 2879 and 3023 m except the lowermost sample have very small amounts of material in the pyrograms, indicating that they are barren. The sample from 3020 - 3023 m contains some material, both light and heavier alkenes/alkanes possibly indicating the presence of asphaltenes or a contaminant. The analysed samples between 3120 and 4230 m have relatively large abundances of heavier alkanes, clearly indicating cracking of asphaltenes or a contaminant.

VITRINITE REFLECTANCE

Twenty-seven (27) samples were analysed ranging from 1730 to 4973 m (Table 10, Appendix). In general, the number of phytoclasts measured is low at the top and bottom of the sequence (1885 - 2333 m and 3213 - 4973 m) but generally around 20 in the middle. Lignite additive is present throughout most of the well but generally in small amounts and it was easily identifiable. The reflectance gradient is low down to 2800 m at which point it becomes steeper.

Reliable results suggest a maturity increase from approximately 0.45 - 0.50% at the top of the sequence to approximately mature to pre peak oil generation.

The oil window maturity level (0.6% R_o) is reached at about 2800 - 3000 m. Vitrinite reflectance values vs depth are shown in Figure 21.

Fluorescence colours suggest slightly lower maturities with 0.3 - 0.4% R_o equivalent at the top of the section and 0.5 - 0.6% R_o equivalent at 3000 m. No fluorescence is observed below this point.

VISUAL KEROGEN COMPOSITION

Thirty-five (35) samples were analysed in the interval 2012 - 2828 m (Table 11, Appendix).

All samples appear to be favourable for hydrocarbon generation with most falling in the mixed to mainly gas-prone category (Figure 22). However, some samples, notably in the interval 2503 - 2533 m appear to be oil-prone (additional samples at 2012m, 2020 m and 2125 m also appear to be mainly oil-prone material). Within the Liptinite group, liptodetrinite and spore/pollen components are present throughout. Amorphinite L is more sporadically present whilst algae are observed in the more oil-prone section (2513 - 2533 m) and dinoflagellates are present in a number of samples below 2513 m. The inertinite group IS represented by inertodetrinite throughout with semi-fusinite present in some samples towards the top and bottom OF the sequence. Fusinite was rarely identified.

Vitrodetrinite is consistently present and amorphinite-V occurs in most samples. Telinite is recognisable below approximately 2880 m. There is a general change from about 2538 m to a more "terrestrial" suite of samples (especially in the interval 2700 - 2785 m).

Spore colour indices were estimated from the visual kerogen slides where possible and suggest lower maturities than the vitrinite reflectance, predicting a range from approximately 0.3% R_o equivalent at about 2000 m to about 0.6% R_o equivalent at 3000 m (which would represent a high maturity gradient over the 1000 m).

CONCLUSIONS

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

1. Source Rock Potential

Cretaceous (- 2010 m)

Grey shales have very poor source rock potential, only for dry gas.

Jurassic (2010 - 2879 m)

Draupne Formation (2010 - 2018 m)

The Draupne Fm. consists mainly of black claystones with 5% TOC which are immature to moderate mature. The analysed samples contain kerogen type II/III and petroleum potentials of > 20 giving the formation a rich potential as a source rock for oil and gas.

Heather Formation (2018 - 2327 m)

Most of the Heather Fm. consists of massive sandstones and interbedded claystone/sandstone or siltstone. The whole of the formation is moderate mature based on a number of maturity parameters. The claystone samples throughout the Heather Fm. contain kerogen type III, with only a poor potential as a source rock for gas.

Brent Group (2327 - 2411 m)

The Brent Group in this well is rather shaly. This section of the well is moderate mature. The limestone at 2395 - 98 m shows indications of containing some heavy hydrocarbons/asphaltenes which could be migrated. The claystone in the Brent Gr. contains mainly kerogen type IV with no source rock potential.

Dunlin Group (2411 - 2702 m)

Most of the Dunlin Gr. consists of interbedded claystones/siltstones/sandstones. Various maturity parameters show that the formation is moderate mature. The claystone samples are found to contain kerogen type III with possibly some type III/II in parts, showing a moderate/good potential for gas and some oil. Some of the samples in the Dunlin Gr., especially those between 2510 - 2543 m, show evidence of migrated hydrocarbons or possibly a contaminant such as diesel.

Statfjord Formation (2702 - 2979 m)

The Statfjord Fm. consists mainly of sandstone with some interbedded claystones. The whole of the sequence is classified as mature. The claystones in the Statfjord Fm. contains kerogen type III with a low potential as a source rock for gas.

Permo-Triassic (2879 m - TD)

The Triassic and older rocks consists of red claystone, red siltstone and sandstone, with an oil window maturity. Almost all the analysed samples contain migrated hydrocarbons, most probably a condensate or contaminant hydrocarbons

(particularly below 3500 m).

2. Generation and Migration

Organic matter in source rock claystones, i.e. Viking and Dunlin Groups, has generated only small amounts of hydrocarbons. Migrated hydrocarbons appear to be present in certain sections of the Jurassic and Permo-Triassic sequences. Oil (presumably diesel) was present in the mud definitely below 3500 m and cuttings samples below this depth are contaminated.

3. Maturity

Based on optical and chemical maturity parameters the Jurassic sequence is immature to early mature.

Figure 1. NOCS WELL 31/4-3 (BRAGE)

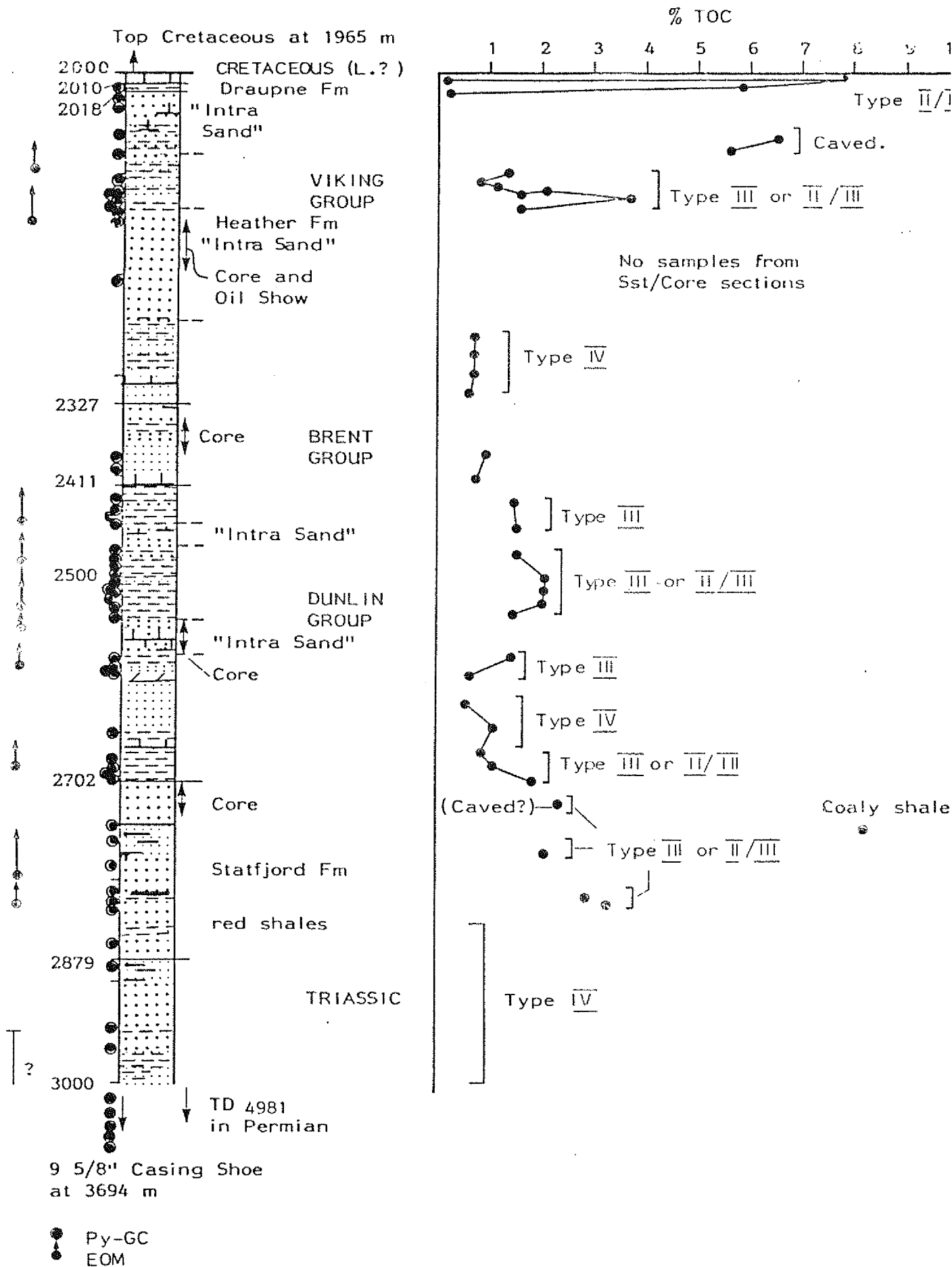


Figure 2. Production Index vs Depth
for well no. 31/4-3

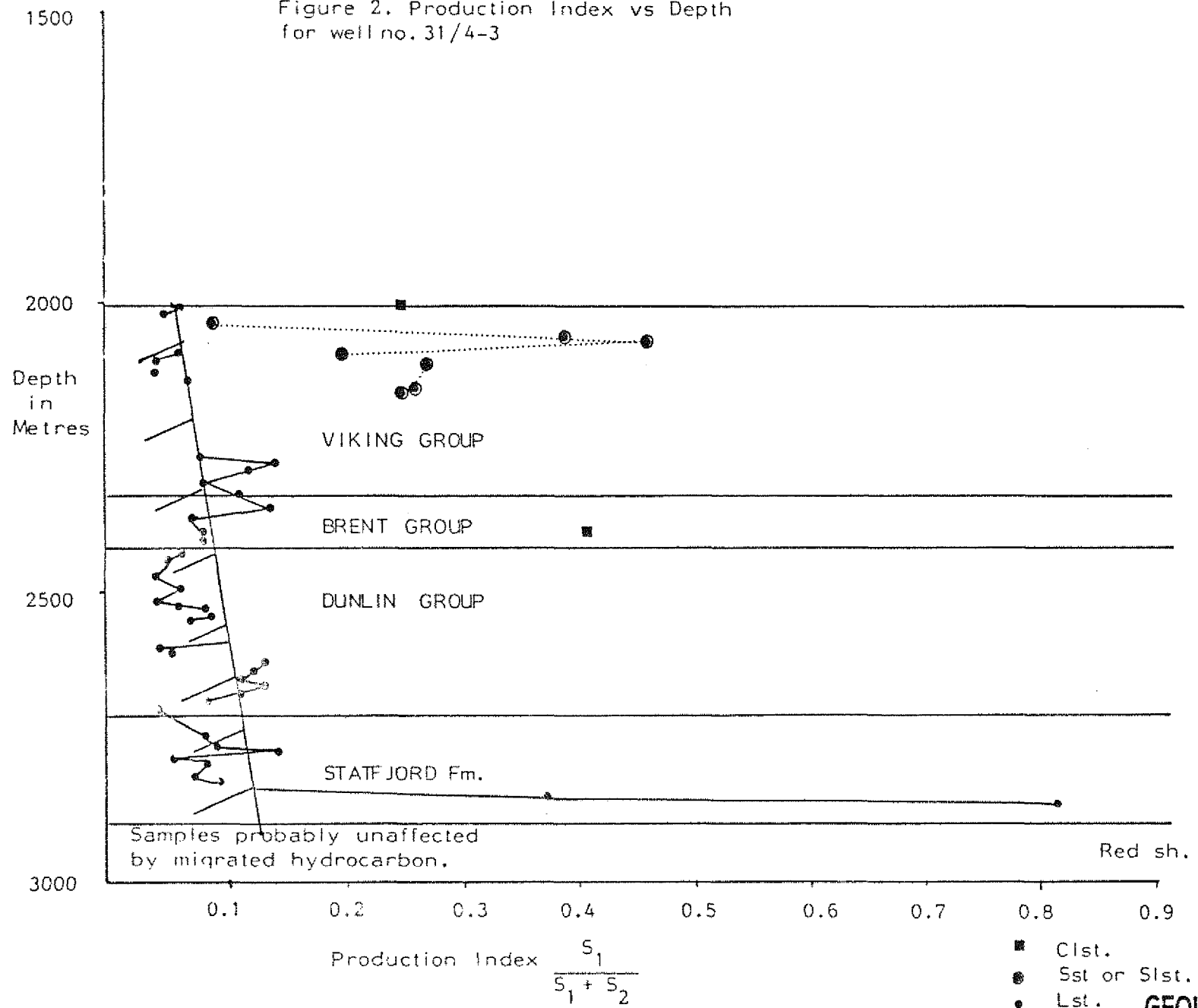
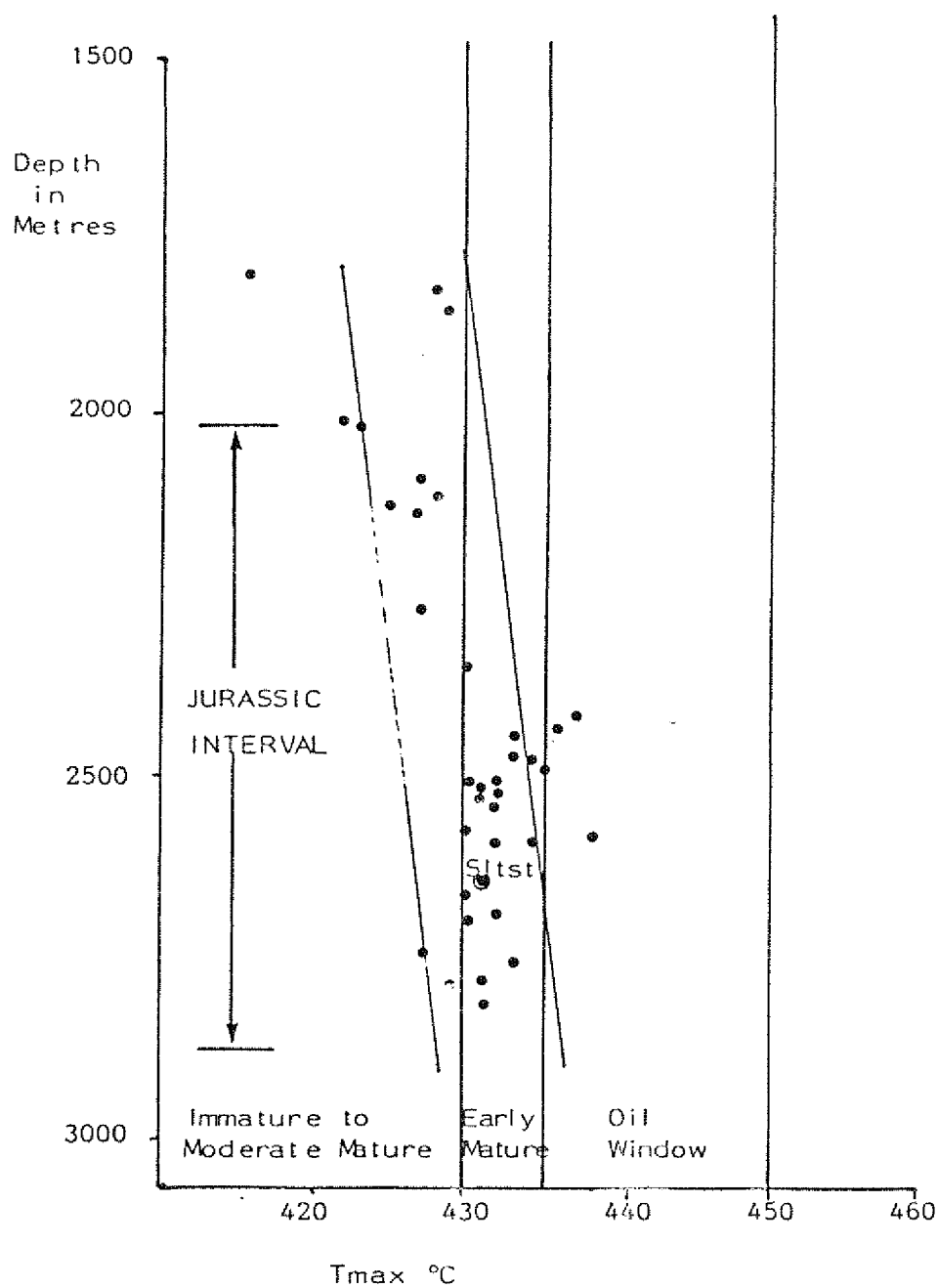


Figure 3. Tmax vs Depth
for well no. 31/4-3



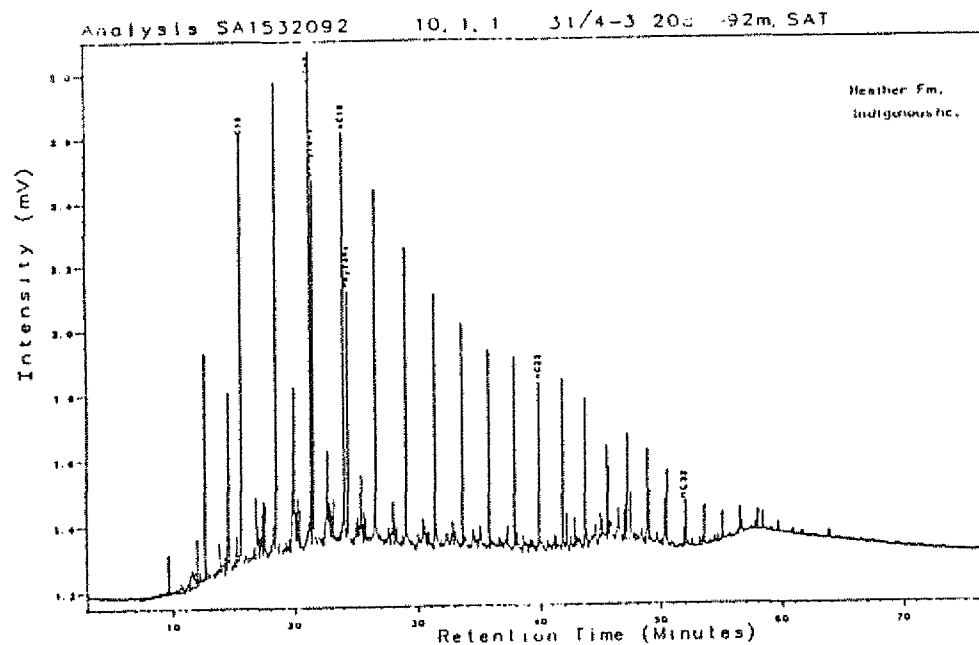


Figure 4. Saturated Hydrocarbon Gas Chromatogram of grey to black claystone from the Heather Fm.

Figure 5. Saturated Hydrocarbon Gas Chromatogram of light to medium dark grey clst. from the Heather Fm.

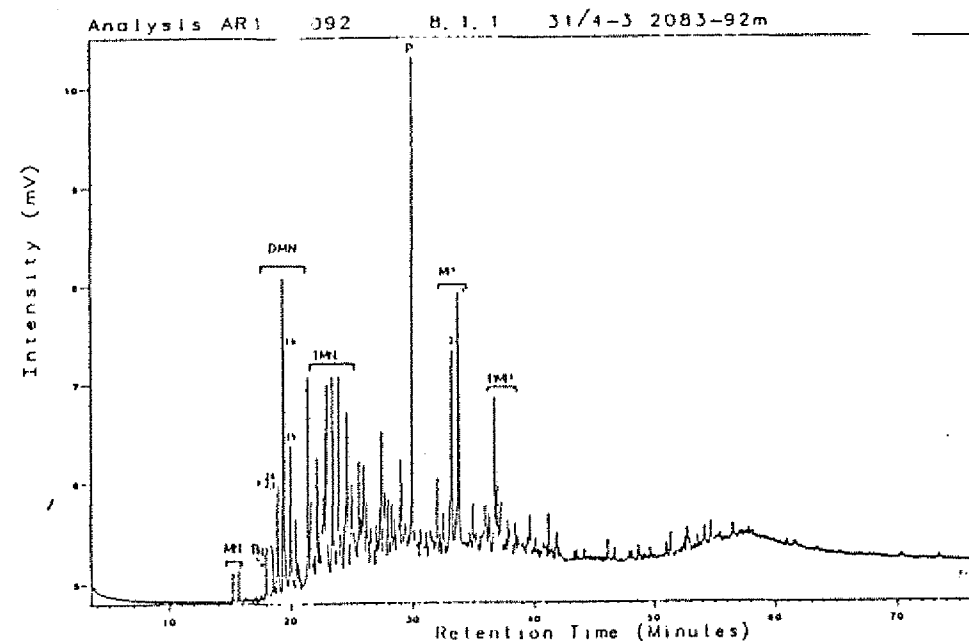
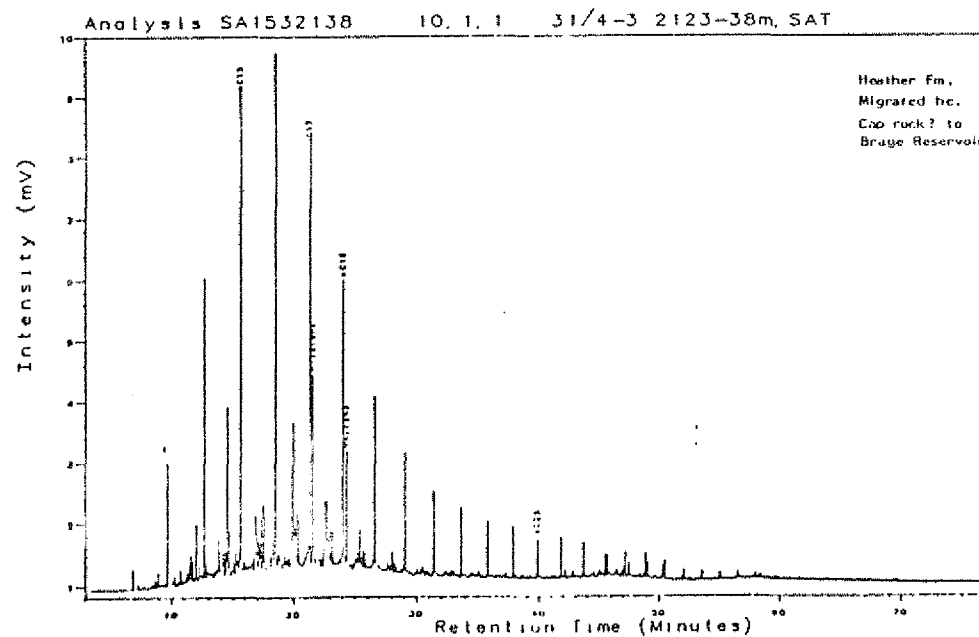
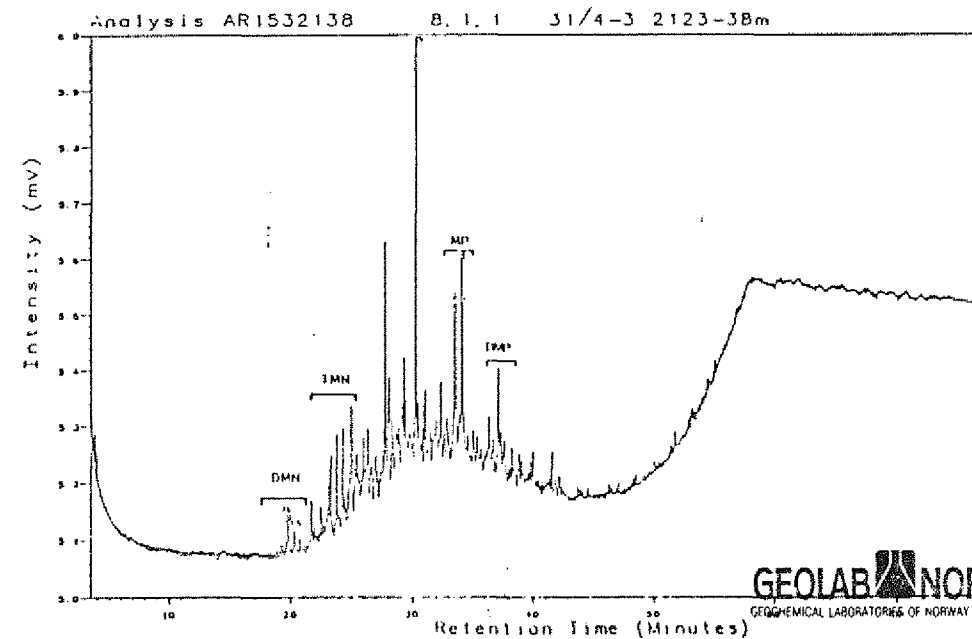


Figure 6. Aromatic Hydrocarbon Gas Chromatogram of dark grey to black claystone from the Heather Fm.

Figure 7. Aromatic Hydrocarbon Gas Chromatogram of light to medium dark grey clst. from the Heather Fm.



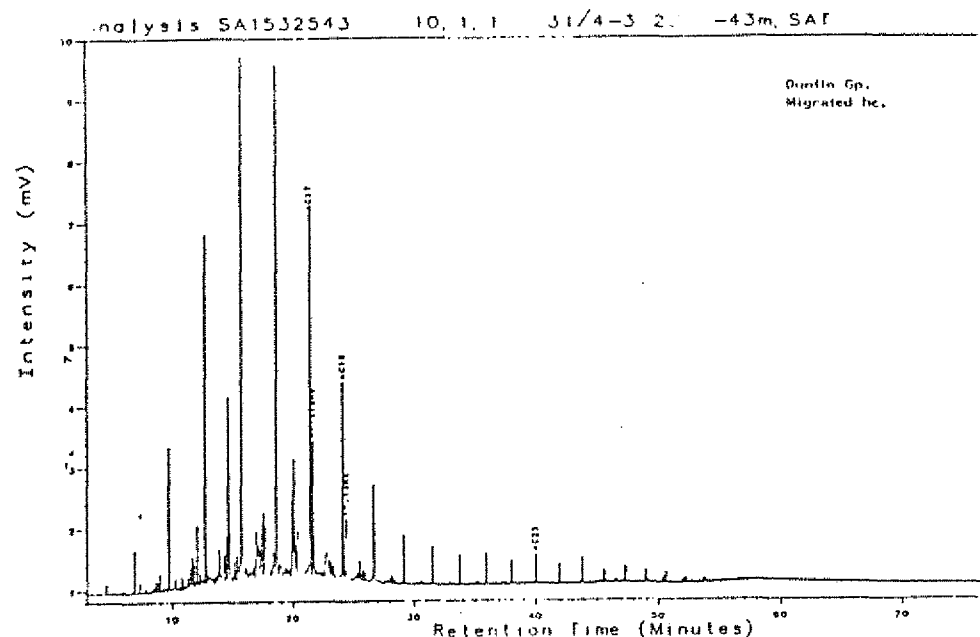


Figure 8. Saturated hydrocarbon Gas Chromatogram of Dunlin Claystone with migrated hydrocarbons.

Figure 9. Saturated hydrocarbon Gas Chromatogram of Dunlin Claystone, mostly indigenous hydrocarbons.

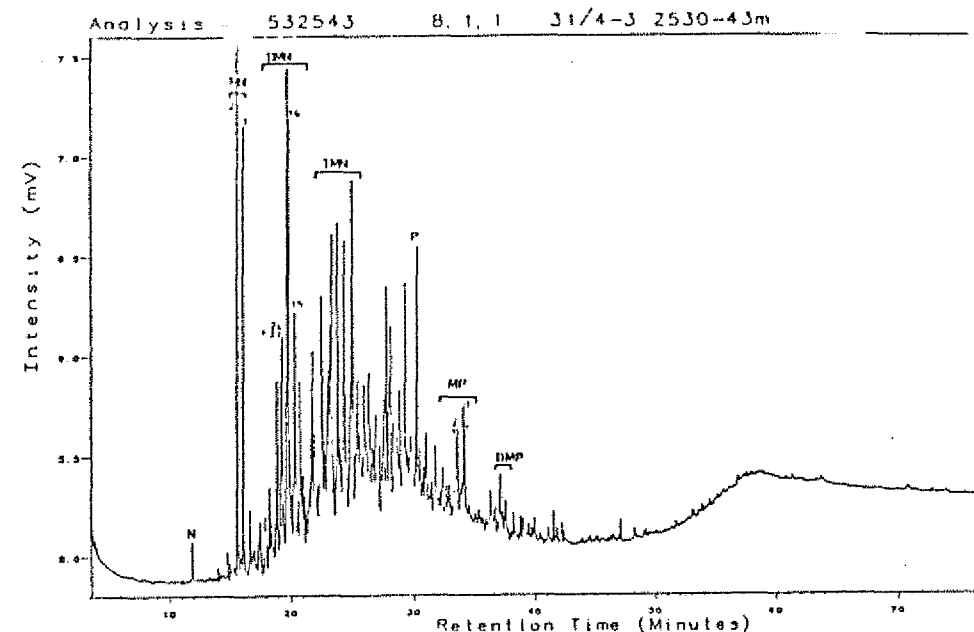
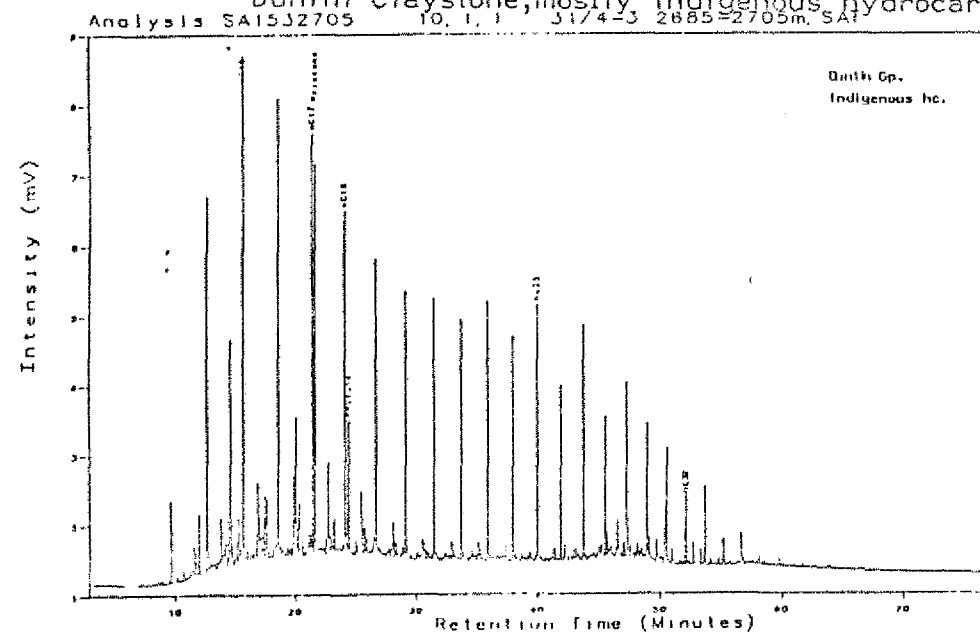
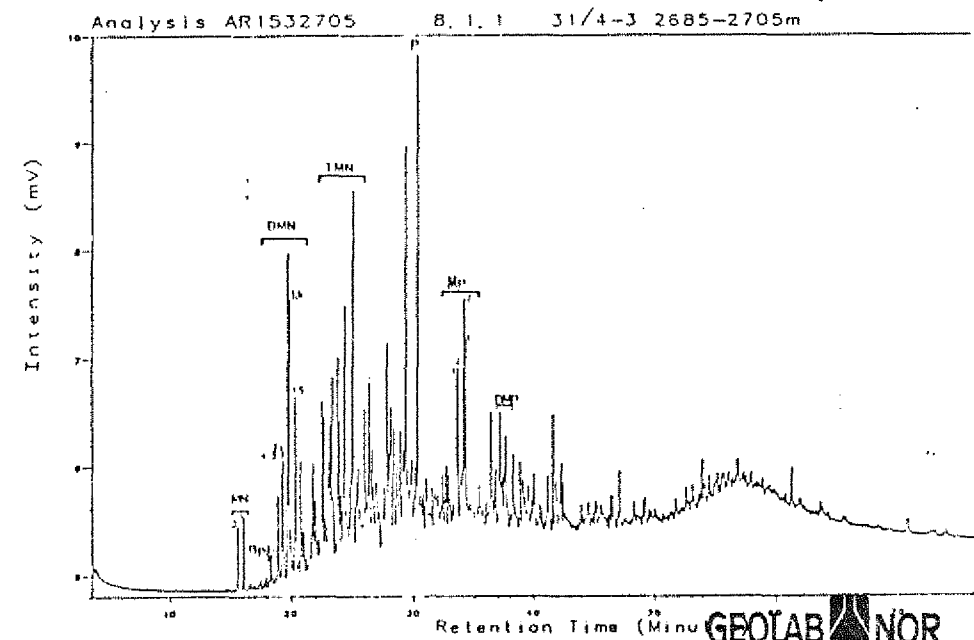


Figure 10. Aromatic Hydrocarbon Gas Chromatogram of Dunlin Claystone with migrated hydrocarbons.

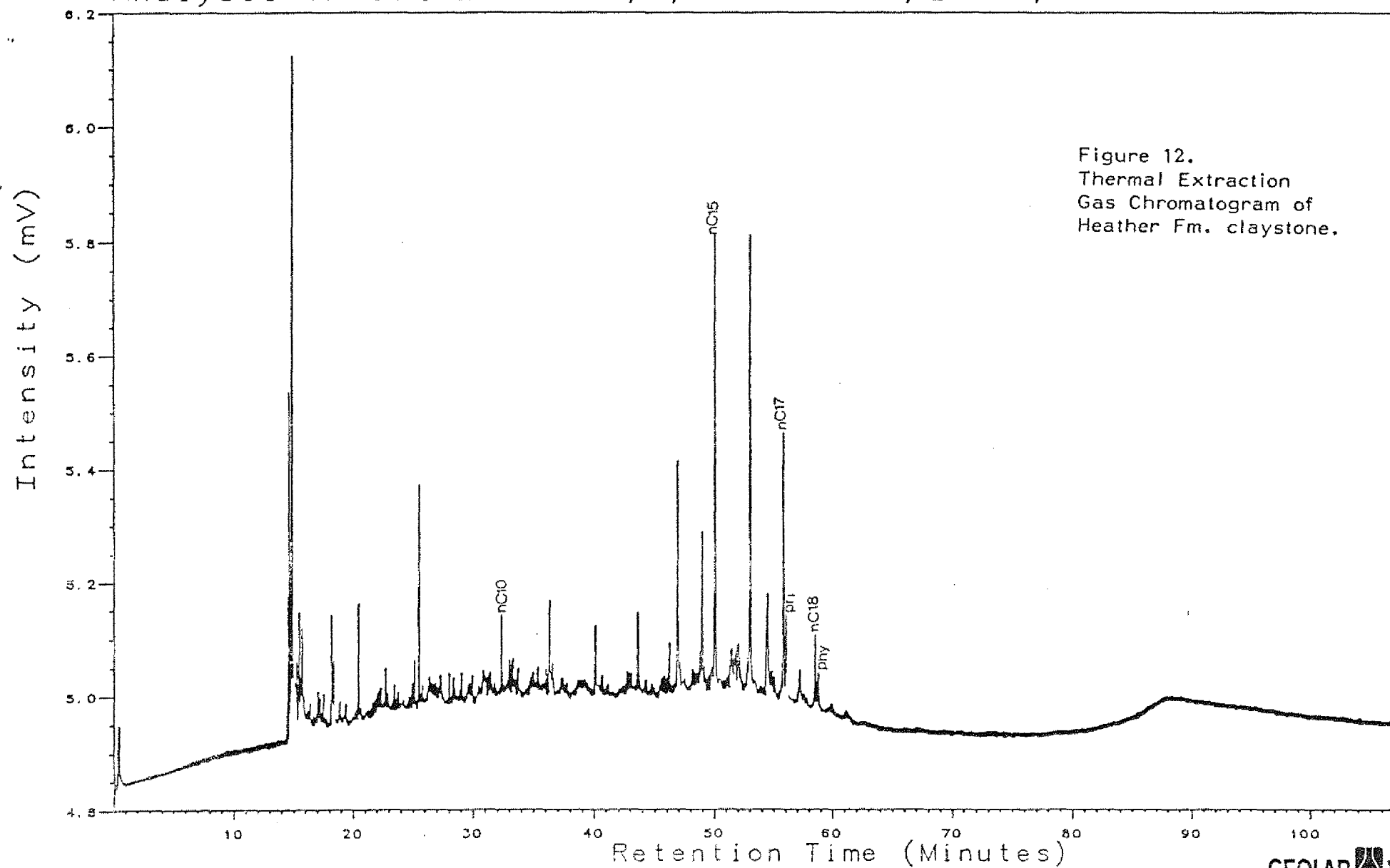
Figure 11. Aromatic Hydrocarbon Gas Chromatogram of Dunlin Claystone, mostly indigenous hydrocarbons.



Analysis TA1532125

12, 1, 1

31/4-3, 2125m, S1



Analysis TA1532520 12, 1, 1 31/4-3, 2520m, S1

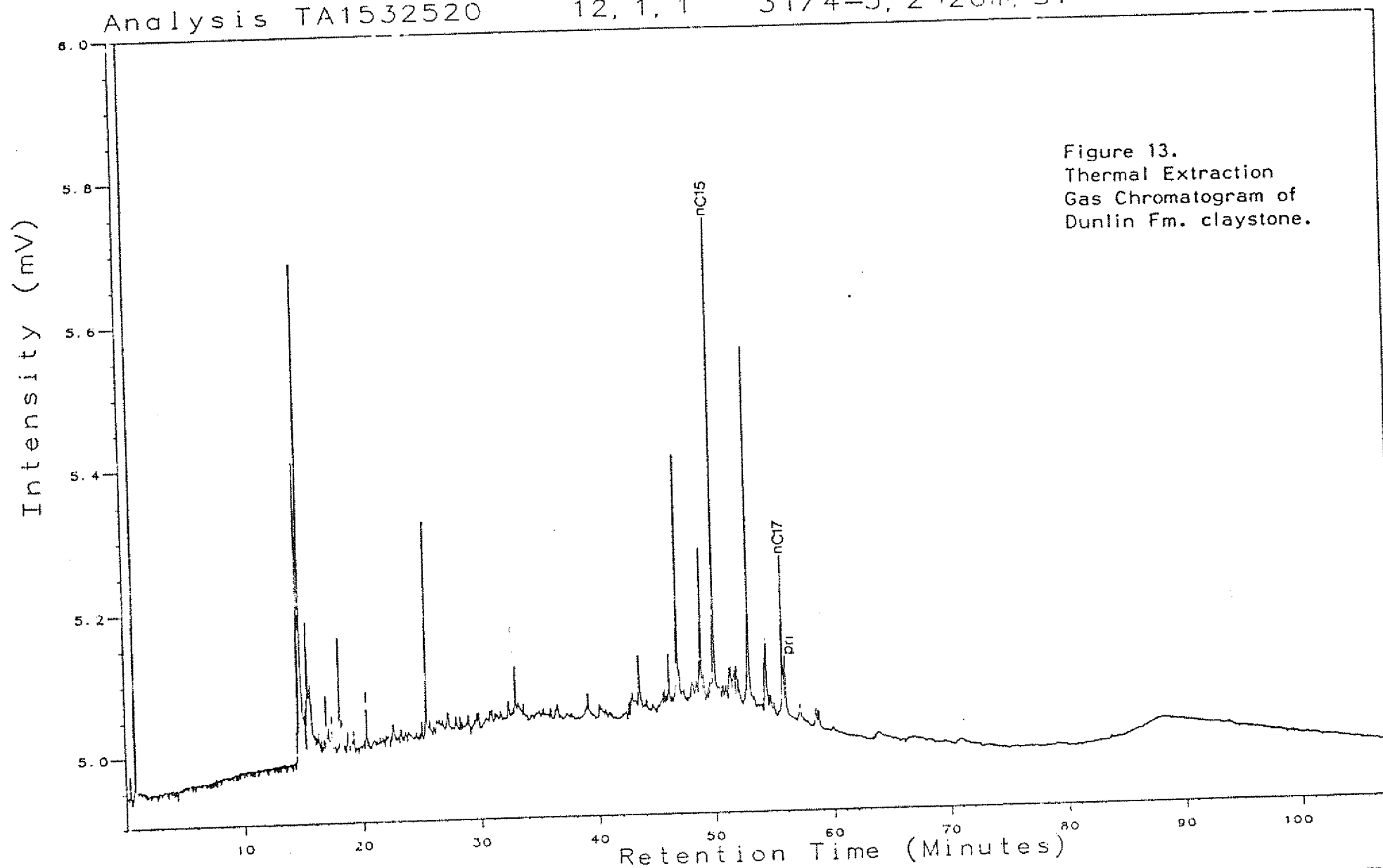


Figure 13.
Thermal Extraction
Gas Chromatogram of
Dunlin Fm. claystone.

Analysis TA1532750 12, 1, 1 31/4-3, 2750m, S1

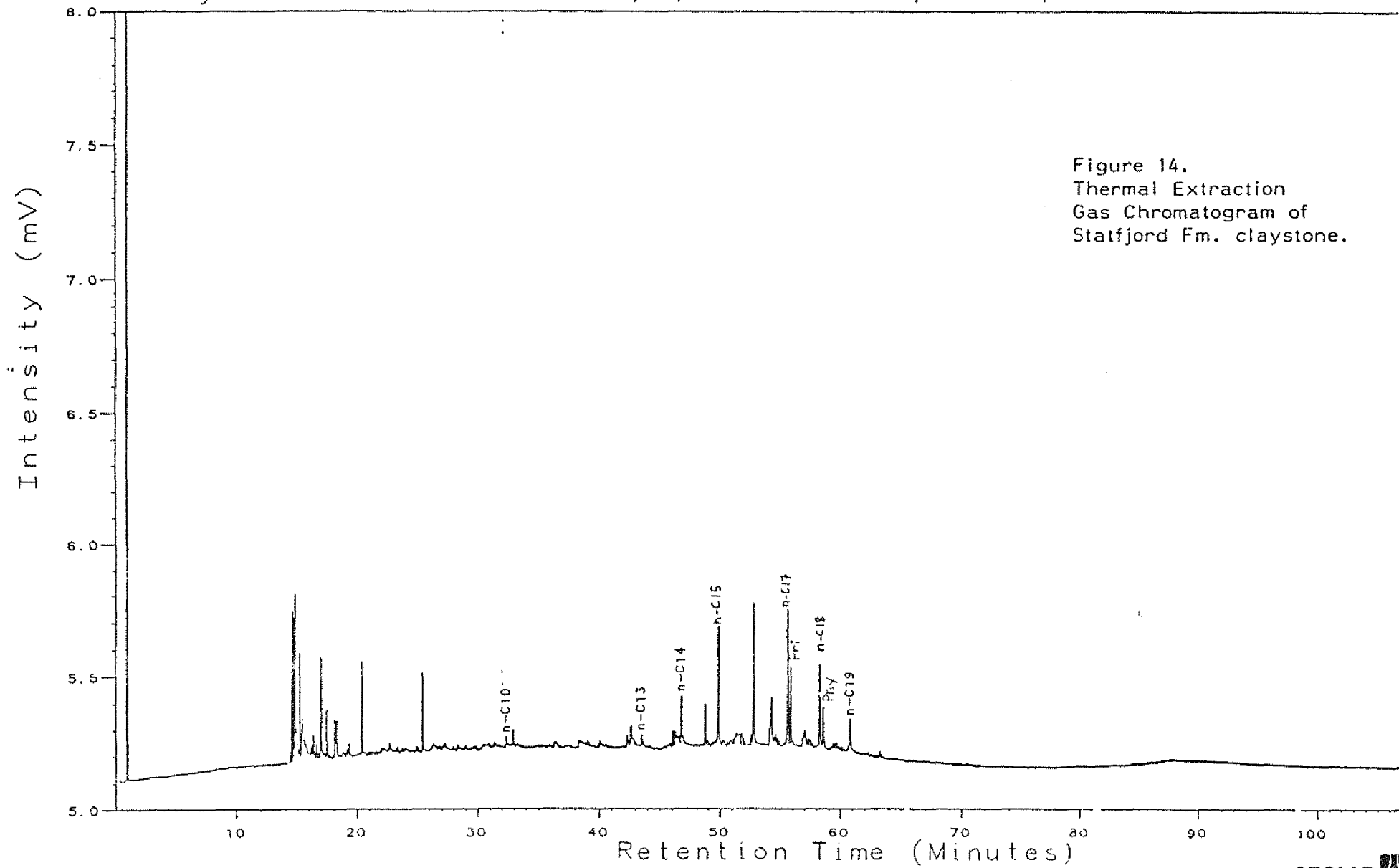


Figure 14.
Thermal Extraction
Gas Chromatogram of
Statfjord Fm. claystone.

Analysis TA1533023: 12, 1, 1 31/4-3, 3023m, S1

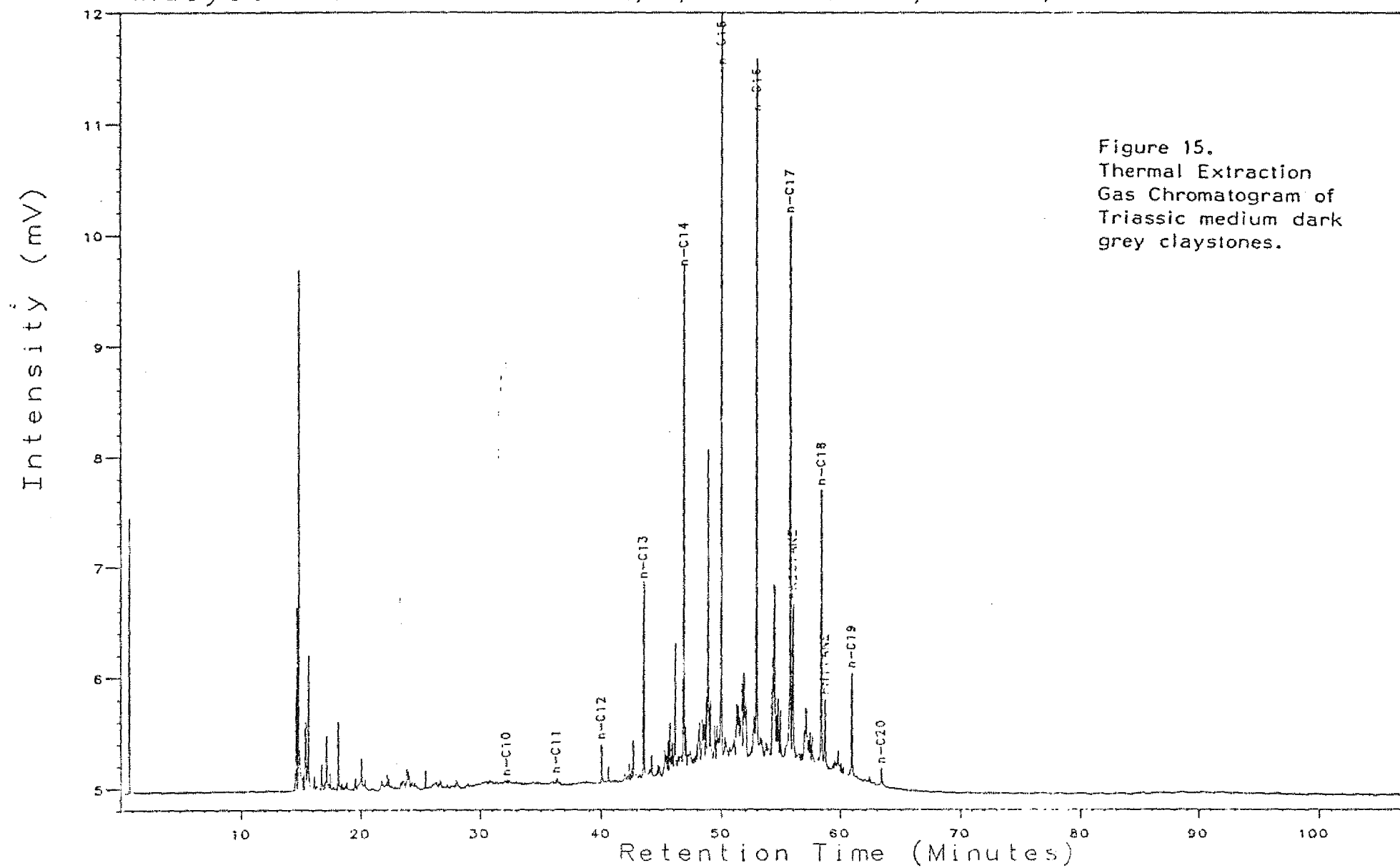


Figure 15.
Thermal Extraction
Gas Chromatogram of
Triassic medium dark
grey claystones.

Analysis TA1534230

12, 1, 1

31/4-3, 4230m, S1

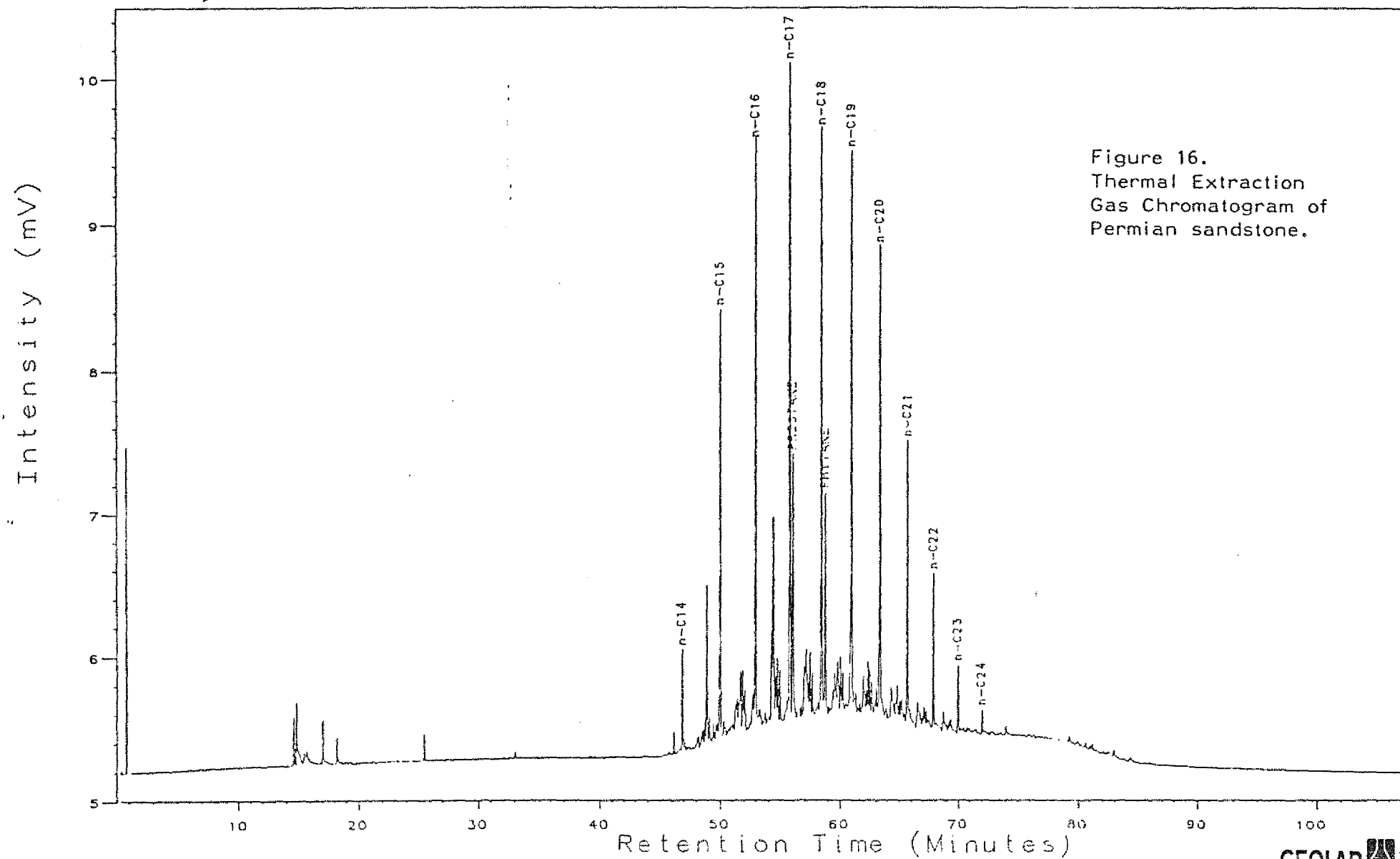
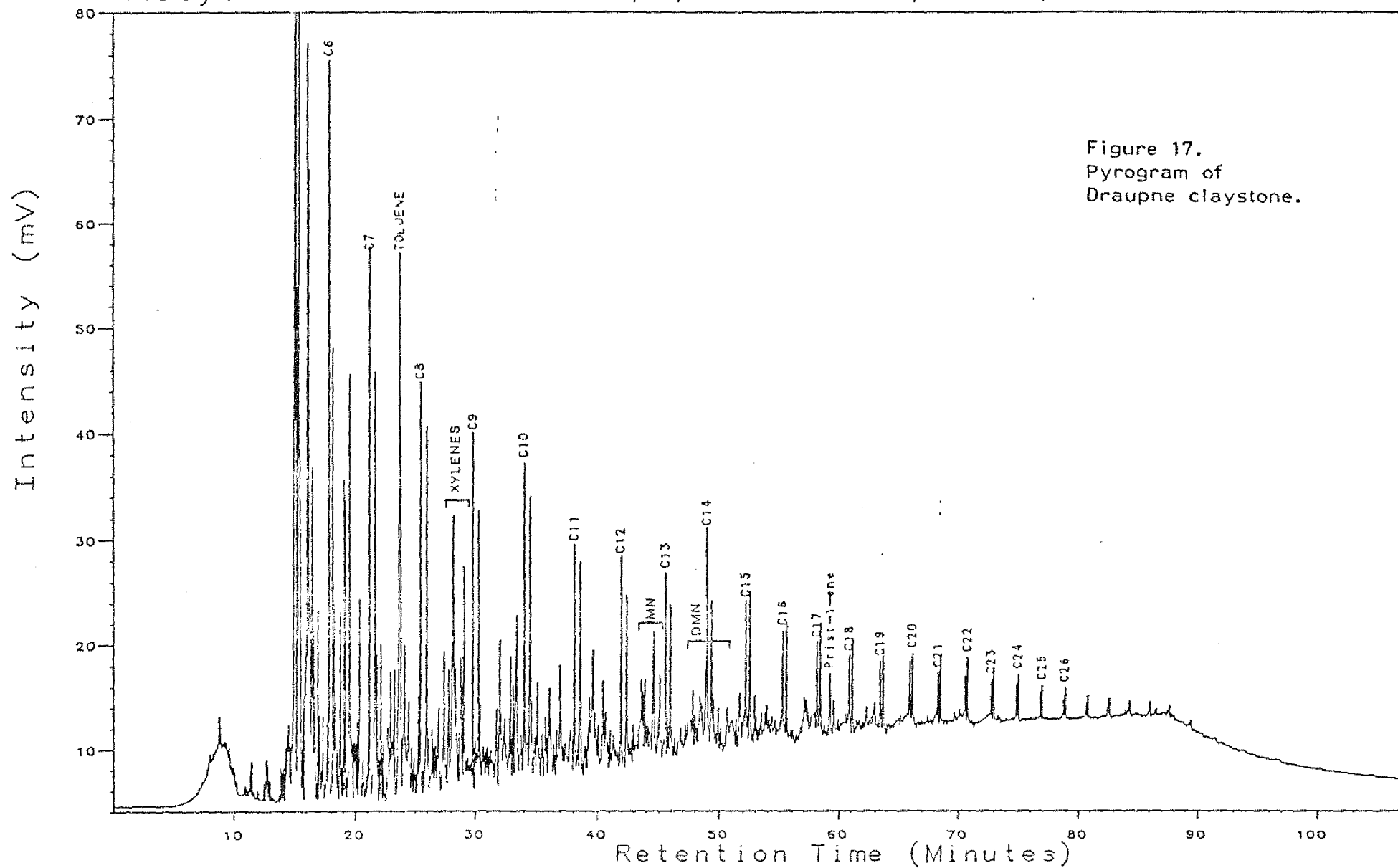


Figure 16.
Thermal Extraction
Gas Chromatogram of
Permian sandstone.

Analysis TA1532020

11, 1, 1

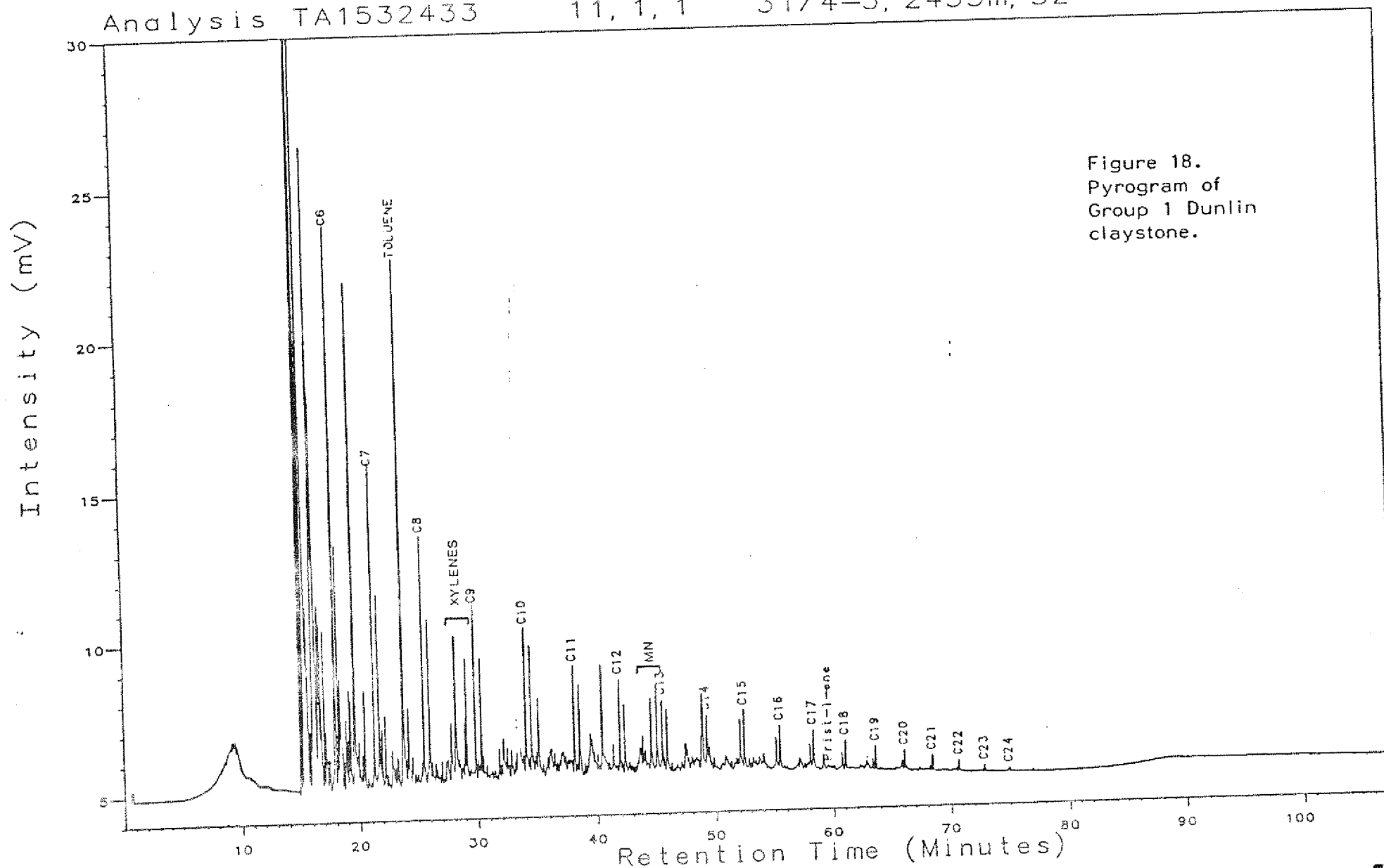
31/4-3, 2020m, S2



Analysis TA1532433

11, 1, 1

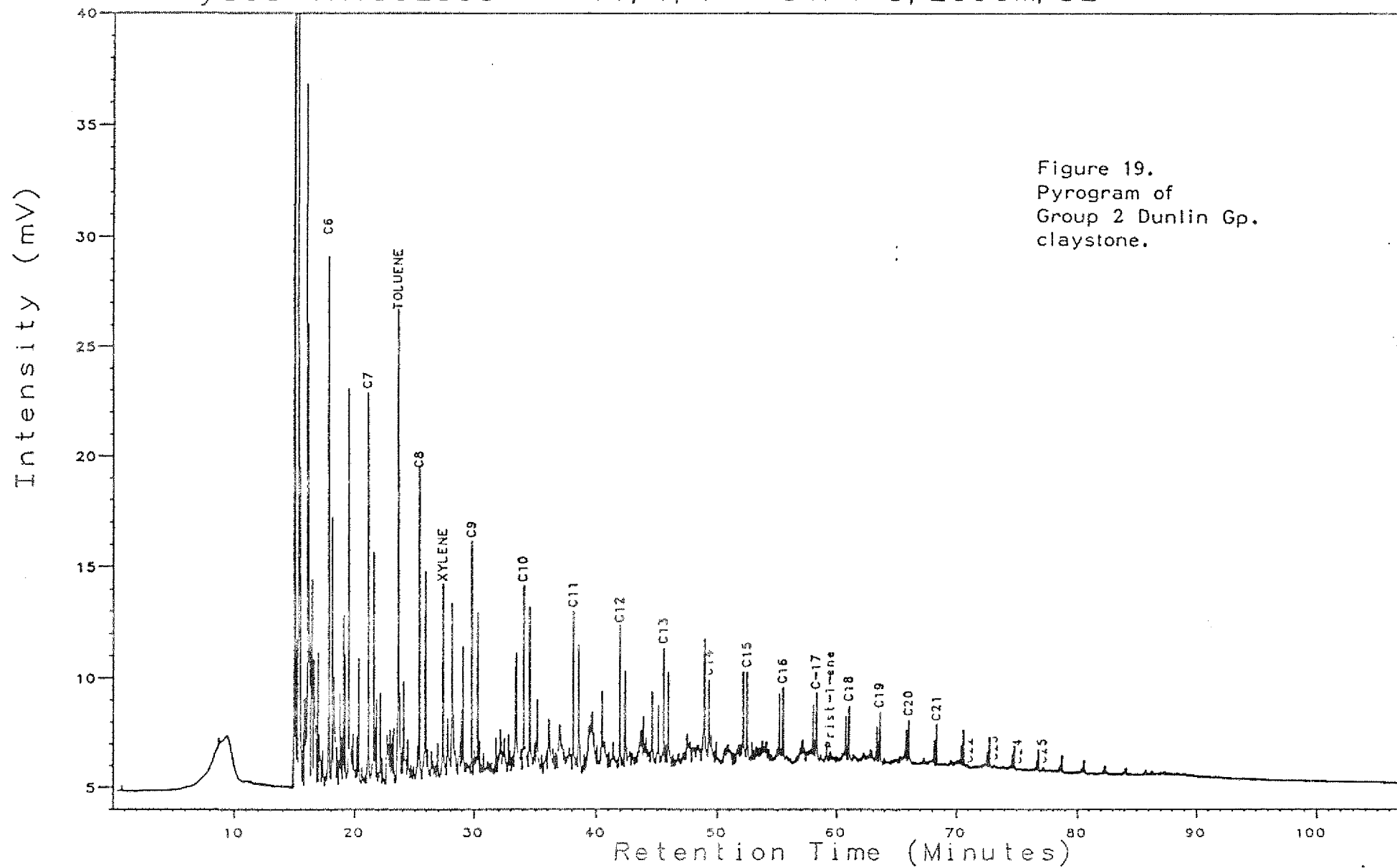
31/4-3, 2433m, S2



Analysis TA1532593

11, 1, 1

31/4-3, 2593m, S2



Analysis TA1532653

11, 1, 1

31/4-3, 2653m, S2

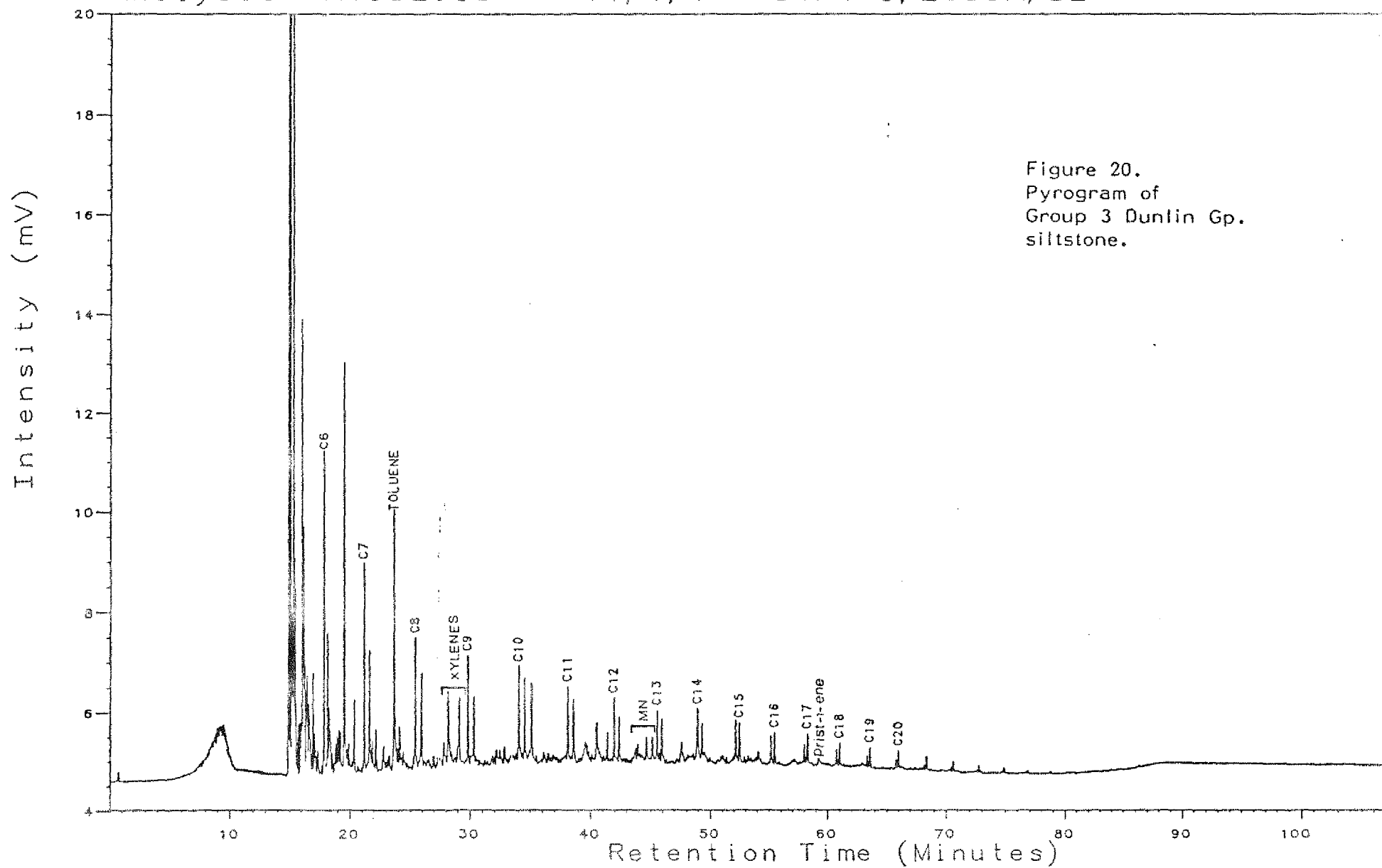
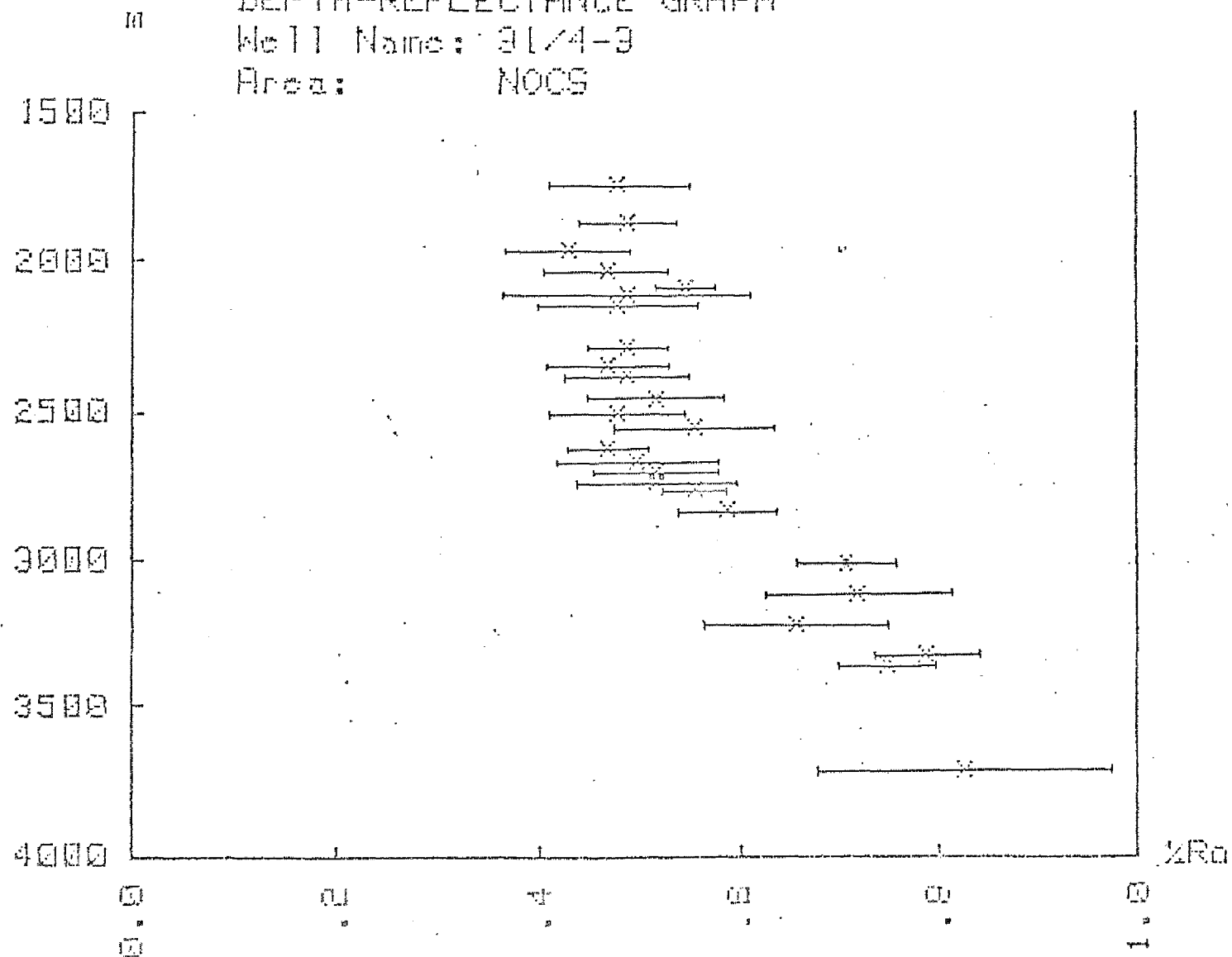


Figure 21.

DEPTH-REFLECTANCE GRAPH

Well Name: 31/4-3

Area: NOCS



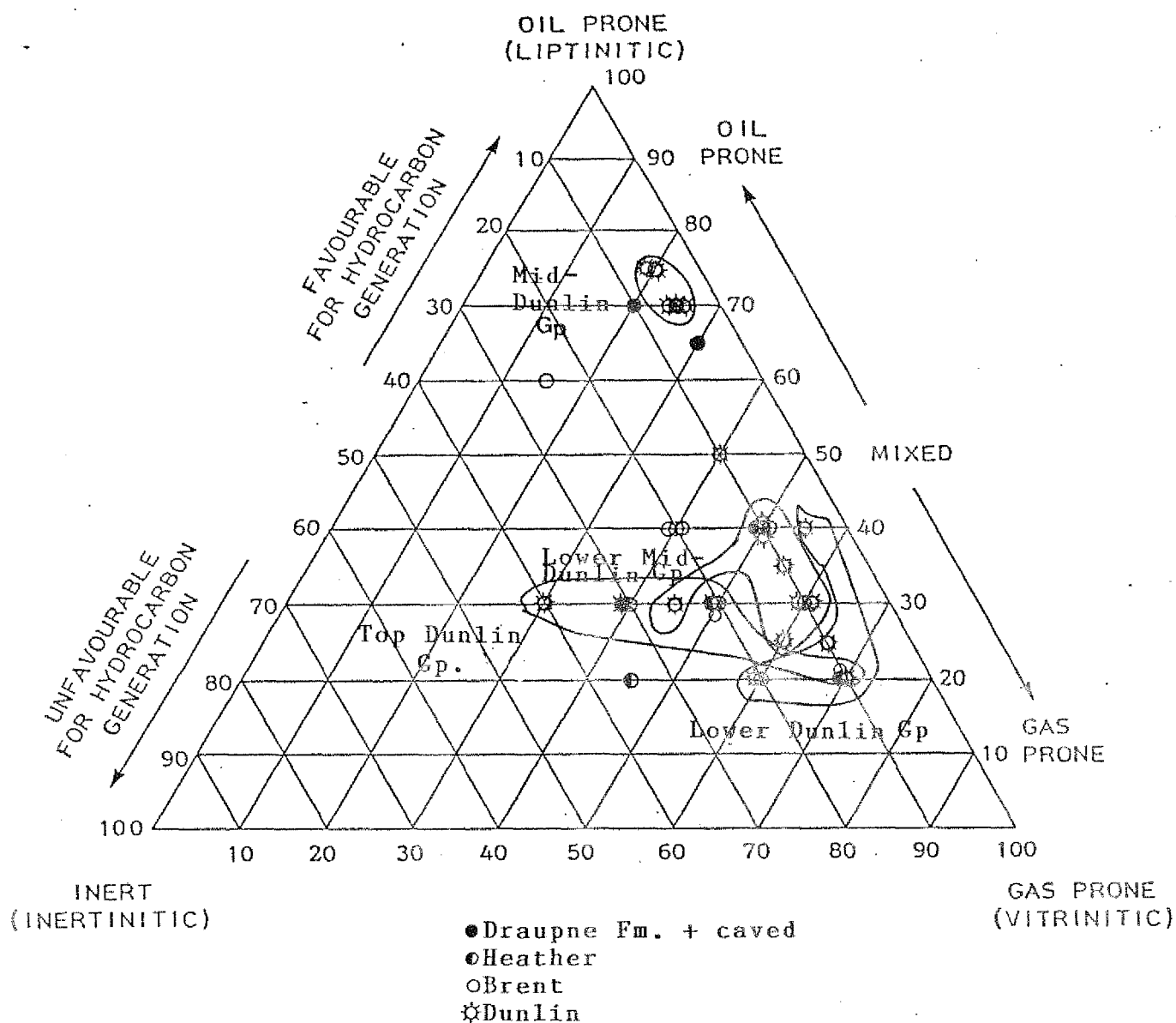


Figure 22. Visual Kerogen Composition Diagram, 31/4-3.

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1730.00				Rogl Bald Tert/Pale		001
		100		Sh/Clst: brn gy, ol gy, calc		001-1
			tr	Tuff : lt gn gy, lt y gy		001-2
			tr	Cont : prp		001-3
			tr	Other : pyr		001-4
1755.00				Rogl Bald Tert/Pale		002
		100		Sh/Clst: brn gy, ol gy, drk red brn, calc, slt		002-1
			tr	Ca : w		002-2
			tr	Tuff : lt gn gy, lt y gy		002-3
			tr	Cont : fib		002-4
			tr	Other : pyr		002-5
1780.00				Rogl Sele Tert/Pale		003
		90		Sh/Clst: gn gy, ol gy, slt		003-1
		5		Tuff : lt ol gy		003-2
		5		Ca : brn gy		003-3
			tr	Cont : Mica-ad, evap		003-4
			tr	Other : pyr		003-5
1805.00				Rogl Sele Tert/Pale		004
	1.46	100		Sh/Clst: gn gy, ol gy, slt		004-1
			tr	Tuff : lt gy		004-2
			tr	Ca : w		004-3
			tr	Cont : fib, evap		004-4
1830.00				Rogl List Tert/Pale		005
	1.08	100		Sh/Clst: brn gy, gn gy to ol gy, slt		005-1
cvd			tr	Tuff : lt ol gy		005-2
			tr	Ca : w, pyr		005-3
			tr	Cont : evap		005-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1855.00				Rogl List Tert/Pale		006
	1.30	100	Sh/Clst:	brn gy, gn gy to ol gy, glauc		006-1
			tr Ca	: lt ol gy		006-2
cvd			tr Tuff	: y gy		006-3
			tr Cont	: fib		006-4
			tr Other	: pyr		006-5
1880.00				Rogl List Tert/Pale		007
	0.64	90	Sh/Clst:	brn gy, gn gy, ol gy, slt		007-1
cvd		10	Tuff	: lt gy, lt gn gy		007-2
			tr Ca	: lt gy		007-3
			tr Cont	: Mica-ad, fib		007-4
1905.00				Rogl List Tert/Pale		008
	0.71	100	Sh/Clst:	brn gy, gn gy, ol gy, slt		008-1
			tr Ca	: lt gy		008-2
			tr Cont	: evap		008-3
1930.00				Rogl List Tert/Pale		009
	0.79	100	Sh/Clst:	brn gy, gn gy, ol gy, slt		009-1
			tr Ca	: lt gy		009-2
			tr Cont	: evap		009-3
1955.00				Rogl Maur Ter/Pale(Dani)		010
		100	Sh/Clst:	gn gy, ol gy		010-1
			tr Ca	: w, pyr		010-2
			tr Cont	: Coal-ad, prp, dd, evap		010-3
1958.00				Rogl Maur U.Cr?		011
	0.70	100	Sh/Clst:	gn gy, ol gy		011-1
			tr Ca	: w		011-2
			tr Tuff	: y gy		011-3
			tr Cont	: Coal-ad, prp		011-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1964.00				Rogl Maur U.Cr?		012
		0.09	50	Sh/Clst: gn gy to drk gn gy, calc		012-1
			50	Ca : w, glauc		012-2
			tr	Cont : prp, fib		012-3
1970.00				Shtl U.Cr		013
		0.12	70	Ca : w, glauc		013-1
cvd			30	Sh/Clst: gn gy to drk gn gy, calc		013-2
			tr	Cont : prp, fib		013-3
1978.00				Shtl U.Cr		014
		0.14	70	Ca : w, glauc		014-1
cvd			30	Sh/Clst: gn gy to drk gn gy, calc		014-2
			tr	Cont : prp		014-3
cvd			tr	Other : glauc		014-4
1984.00				Shtl U.Cr		015
		0.10	70	Ca : w, glauc		015-1
			30	Sh/Clst: gn gy to drk gn gy, calc		015-2
			tr	Cont : dd, evap		015-3
1988.00				Shtl U.Cr		016
		0.62	70	Sh/Clst: gn gy to drk gn gy, calc		016-1
			30	Ca : w, glauc		016-2
1996.00				Shtl U.Cr		017
			70	Sh/Clst: gn gy to drk gn gy, calc		017-2
			30	Ca : w, glauc		017-3
			tr	Cont : prp, dd		017-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2002.00			Sht1	U.Cr		018
		0.11	70 Ca	: w, slt, glauc		018-1
			30 Sh/Clst:	gn gy to drk gn gy		018-2
			tr Cont	: prp		018-3
			tr Other	: glauc		018-4
2008.00			Sht1	U.Cr		019
		0.67	80 Sh/Clst:	gn gy to ol gy		019-1
			20 Ca	: w		019-2
			tr Cont	: Coal-ad, prp, fib		019-3
			tr Other	: glauc		019-4
2012.00			Viki Drau	U.Ju/(L.Cr) L.Port-L.Berr		020
cvd			80 Sh/Clst:	gn gy to ol gy		020-1
		7.93	10 Sh/Clst:	ol blk		020-2
cvd			10 Ca	: w, glauc		020-3
			tr Cont	: Coal-ad, prp, dd		020-4
cvd			tr Other	: pyr		020-5
2020.00			Viki Drau	U.Ju/(L.Cr) L.Port-L.Berr		021
		5.82	40 Sh/Clst:	ol blk		021-1
cvd			40 Sh/Clst:	gn gy, ol gy		021-2
			20 Ca	: w, gy pi, lt ol gy		021-3
cvd			tr S/Sst	: lt gn gy, calc, glauc		021-4
			tr Cont	: Coal-ad		021-5
			tr Other	: pyr, glauc		021-6
2030.00			Viki Ihes	U.Ju/M.Kimm-L.Kimm		022
cvd			60 Sh/Clst:	gn gy to ol gy		022-2
cvd			30 Sh/Clst:	ol blk		022-3
cvd			10 Ca	: w, lt gy, m gy		022-4
		0.52	tr S/Sst	: lt gn gy, calc, glauc		022-5
			tr Other	: pyr, glauc		022-6
			tr Cont	: Coal-ad		022-8

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2036.00				Viki Ihes U.Ju/M.Kimm-L.Kimm		023
	cvd		60	Sh/Clst: gn gy to ol gy		023-1
	cvd		30	Sh/Clst: ol blk		023-2
		0.37	10	S/Sst : lt ol gy, calc, glauc		023-3
			tr Ca	: brn gy		023-4
			tr Cont	: prp		023-5
			tr Other	: pyr, glauc		023-6
2048.00				Viki Ihes U.Ju/M.Kimm-L.Kimm		024
	cvd		70	Sh/Clst: gn gy to ol gy, calc		024-1
	cvd		20	Sh/Clst: ol blk		024-2
		0.14	10	S/Sst : lt ol gy, calc, glauc		024-3
			tr Ca	: w		024-4
			tr Cont	: Coal-ad, Mica-ad		024-5
			tr Other	: pyr		024-6
2056.00				Viki Ihes U.Ju/M.Kimm-L.Kimm		025
	cvd		40	Sh/Clst: gn gy to ol gy, calc		025-1
			40	Cont : cem, prp, dd		025-5
	cvd		10	Sh/Clst: ol blk		025-2
		0.20	10	S/Sst : gn, l		025-3
			tr Ca	: lt gn gy		025-4
2064.00				Viki Ihes U.Ju/M.Kimm-L.Kimm		026
	cvd		70	Sh/Clst: gn gy to ol gy, calc		026-1
		0.26	15	S/Sst : lt ol gy, calc, mic, glauc, l		026-3
	cvd		10	Sh/Clst: ol blk		026-2
			5	Ca : w		026-4
			tr Cont	: Coal-ad, dd, evap		026-5
2068.00				Viki Ihes U.Ju/Oxfo		027
	cvd		70	Sh/Clst: gn gy to ol gy, calc		027-1
		0.31	20	S/Sst : lt ol gy, calc, mic, l		027-3
	cvd		10	Sh/Clst: blk to ol blk		027-2
			tr Ca	: w		027-4
			tr Cont	: Coal-ad		027-5
			tr Other	: pyr, glauc		027-6

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2076.00				Viki Ihes U.Ju/Oxfo		028
	cvd		40	Sh/Clst: gn gy to ol gy, calc		028-1
	cvd		40	Sh/Clst: blk to drk gy		028-2
		0.32	20	S/Sst : lt ol gy, calc, mic, l		028-3
			tr	Sltst : ol gy		028-4
			tr	Ca : w		028-5
			tr	Cont : Coal-ad		028-6
			tr	Other : glauc		028-7
2080.00				Viki Ihes U.Ju/Oxfo		029
		0.73	35	Sltst : ol gy		029-3
			30	Cont : cem, prp, dd, fib		029-6
	cvd		20	Sh/Clst: gn gy to ol gy, calc		029-1
	cvd		15	Sh/Clst: blk to drk gy		029-2
			tr	S/Sst : lt ol gy, glauc		029-4
			tr	Ca : w, brn gy		029-5
2085.00				Viki Heat U.Ju/Oxfo		030
	cvd		40	Sh/Clst: gn gy to ol gy, calc		030-1
		6.89	40	Sh/Clst: blk to m drk gy		030-2
		0.55	15	S/Sst : lt gy, mic, l		030-3
	cvd		5	Ca : w, y gy, lt gy		030-4
			tr	Cont : Mica-ad, fib		030-5
2092.00				Viki Heat U.Ju/Oxfo		031
	cvd		50	Sh/Clst: gn gy to ol gy, calc		031-1
		5.94	40	Sh/Clst: blk to m drk gy		031-2
		0.58	10	S/Sst : m gy, calc, l		031-3
			tr	S/Sst : lt gy to m gy		031-4
			tr	Cont : fib		031-5
			tr	Other : pyr		031-6

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2097.00				Viki Heat U.Ju/Oxfo		032
		1.39	50	Sh/Clst: gn gy to lt ol gy, m drk gy		032-1
		0.57	50	S/Sst : lt gy, calc, l		032-2
	cvd		tr	Ca : w, brn gy		032-3
			tr	Cont : prp		032-4
	cvd		tr	Coal		032-5
			tr	Other : pyr		032-6
2105.00				Viki Heat U.Ju/Oxfo		033
			60	Sh/Clst: gn gy to ol gy, calc		033-1
		0.90	40	Sltst : y gy, calc		033-2
	cvd		tr	Ca : w		033-3
			tr	Cont : prp, evap		033-4
			tr	Other : pyr		033-5
2110.00				Viki Heat U.Ju/Oxfo		034
		1.18	50	Sh/Clst: gn gy to ol gy		034-1
		0.58	50	Sltst : y gy, calc		034-2
			tr	Ca : ol gy, m gy		034-3
			tr	Cont : prp, fib		034-4
			tr	Other : pyr		034-5
2118.00				Viki Heat U.Ju/Oxfo		035
		0.99	50	Sltst : y gy, calc		035-2
		2.02	45	Sh/Clst: gn gy to ol gy, m gy, calc		035-1
	cvd		5	Ca : brn gy		035-3
			tr	Cont : prp, evap		035-4
			tr	Other : pyr		035-5
2125.00				Viki Heat U.Ju/Oxfo		036
		3.47	85	Sh/Clst: gn gy, lt gy to m gy, calc		036-1
			5	Sltst : y gy, calc		036-2
			5	S/Sst : m gy, calc, glauc		036-3
	cvd		5	Ca : w, glauc		036-4
			tr	Cont : prp, dd, fib		036-5
			tr	Other : pyr		036-6

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2133.00				Viki Heat U.Ju/Oxfo		037
		1.63	100	Sh/Clst: m lt gy to m drk gy, calc		037-1
				tr S/Sst : m gy, calc, glauc		037-2
				tr Ca : w to lt gy		037-3
				tr Cont : prp		037-4
				tr Other : pyr		037-5
2138.00				Viki Ihes U.Ju/Oxfo		038
		1.36	50	Sh/Clst: m lt gy to m drk gy, calc		038-1
				50 Ca : w		038-3
				tr Sltst : v col, calc, pyr, glauc		038-2
				tr Cont : prp		038-4
				tr Other : pyr, glauc		038-5
				tr Coal		038-6
2143.00				Viki Ihes U.Ju/Oxfo		039
	cvd		50	Sh/Clst: gn gy, m lt gy to m drk gy, calc		039-1
		0.56	50	S/Sst : m lt gy, calc, slt, l		039-2
	cvd			tr Ca : w		039-3
				tr Cont : Mica-ad, prp		039-4
				tr Coal		039-5
2150.00				Viki Ihes M.Ju/Bath?-Call		040
	cvd		50	Sh/Clst: m lt gy, calc, mic		040-1
		0.59	50	S/Sst : m lt gy, calc, slt, mic, glauc, l		040-2
				tr Cont : prp		040-3
				tr Other : pyr		040-4
				tr Coal		040-5
2195.00				Viki Ihes M.Ju/Bath?-Call		041
	cvd		90	Sh/Clst: brn gy, gn gy, lt gy to drk gy		041-1
			10	S/Sst : lt gy, calc, slt, mic, l		041-2
				tr Ca : lt gy		041-3
				tr Cont : Mica-ad, prp		041-4
				tr Other : pyr, glauc		041-5
				tr Coal		041-6

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2200.00				Viki Ihes M.Ju/Bath?-Call		042
	cvd	0.22	90	S/Sst : lt gy, calc, slt, mic		042-1
			10	Sh/Clst: ol gy, calc		042-2
			tr Ca	: brn gy		042-3
			tr Cont	: prp		042-4
			tr Other	: pyr, glauc		042-5
			tr Coal			042-6
2208.00				Viki Ihes M.Ju/Bath?-Call		043
			90	S/Sst : m lt gy, calc, pyr, slt, mic		043-1
			10	Sh/Clst: lt gy, calc		043-2
			tr Ca	: w		043-3
			tr Cont	: prp		043-4
			tr Other	: pyr		043-5
2213.00				Viki Ihes M.Ju/Bath?-Call		044
		0.34	90	S/Sst : m lt gy, calc, pyr, slt, mic		044-1
			10	Sh/Clst: lt gy, calc		044-2
			tr Ca	: w		044-3
			tr Cont	: prp		044-4
2218.00				Viki Ihes M.Ju/Bath?-Call		045
			90	S/Sst : m lt gy, calc, pyr, slt, mic		045-1
			10	Sh/Clst: brn gy, y gy, lt gy, calc		045-2
			tr Cont	: prp		045-3
			tr Other	: pyr		045-4
2230.00				Viki Ihes M.Ju/Bath?-Call		046
		0.31	100	S/Sst : m lt gy, calc, slt, mic		046-1
			tr Sh/Clst	: ol gy, slt		046-2
			tr Ca	: w, brn gy		046-3
			tr Cont	: cem, prp, dd		046-4
			tr Other	: pyr		046-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2240.00				Viki Ihes M.Ju/Bath?-Call		047
				90 S/Sst : m gy, calc, mic		047-1
				10 Sh/Clst: ol gy, calc		047-2
				tr Cont : prp, dd		047-3
2250.00				Viki Heat M.Ju/Bath?-Call		048
	0.41			90 S/Sst : m gy, calc, mic		048-1
				10 Sh/Clst: ol gy, calc		048-2
				tr Ca : w		048-3
				tr Cont : prp		048-4
2255.00				Viki Heat M.Ju/Bath?-Call		049
				50 S/Sst : m gy, calc, mic		049-1
				50 Sh/Clst: ol gy, calc, glauc		049-2
cvd				tr Ca : brn gy		049-3
				tr Cont : prp, dd		049-4
2265.00				Viki Heat M.Ju/Bath?-Call		050
	0.43			50 S/Sst : m gy, calc, mic		050-1
				50 Sh/Clst: ol gy to lt ol gy, calc		050-2
cvd				tr Ca : w		050-3
				tr Cont : prp, dd		050-4
2270.00				Viki Heat M.Ju/Bajo		051
	0.79			90 Sh/Clst: ol gy, calc, mic		051-1
				10 S/Sst : m gy, calc, mic		051-2
				tr Ca : w		051-3
2275.00				Viki Heat M.Ju/Bajo		052
	0.75			50 Sh/Clst: ol gy, calc		052-1
				50 S/Sst : m gy, calc, mic		052-2
				tr Ca : w		052-3
				tr Cont : prp, dd		052-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2280.00				Viki Heat M.Ju/Bajo		053
	0.65	80	Sh/Clst:	ol gy, lt gn gy, drk gy, calc		053-1
		20	S/Sst	: m gy, calc, mic		053-2
		tr	Cont	: prp, dd, fib		053-3
		tr	Other	: pyr		053-4
2285.00				Viki Heat M.Ju/Bajo		054
	0.89	80	Sh/Clst:	ol gy, calc		054-1
		20	S/Sst	: m gy, calc, mic		054-2
		tr	Ca	: w, brn gy		054-4
		tr	Cont	: prp, dd		054-5
2293.00				Viki Heat M.Ju/Bajo		055
	0.68	50	Sh/Clst:	ol gy, calc		055-1
		50	S/Sst	: m gy, calc, mic		055-2
		tr	Cont	: prp, dd		055-3
2298.00				Viki Heat M.Ju/Bajo		056
	0.78	50	Sh/Clst:	ol gy, calc		056-1
		50	Sh/Clst:	m gy, calc, mic		056-2
		tr	Ca	: w		056-4
		tr	Cont	: Coal-ad		056-5
2303.00				Viki Heat M.Ju/Bajo		057
	0.73	90	Sh/Clst:	lt ol gy, calc, slt		057-1
		10	S/Sst	: m gy, mic		057-2
		tr	Ca	: brn gy		057-3
		tr	Cont	: prp, dd, evap		057-4
		tr	Other	: pyr		057-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2310.00				Viki Heat M.Ju/E.Bajo		058
	0.68			50 Sh/Clst: ol gy		058-1
				30 Ca : w, y gy		058-2
				20 S/Sst : lt gy to m gy, calc, mic		058-3
				tr Cont : prp, dd		058-4
2315.00				Viki Heat M.Ju/E.Bajo		059
	0.71			50 Sh/Clst: ol gy, calc		059-1
				50 S/Sst : lt gy to m gy, calc, mic		059-2
				tr Ca : w		059-3
				tr Cont : prp, dd		059-4
2323.00				Viki Heat M.Ju/E.Bajo		060
	0.64			90 Sh/Clst: ol gy		060-1
				10 S/Sst : m gy, calc, mic		060-2
				tr Ca : w		060-3
				tr Cont : Coal-ad, dd, fib		060-4
2328.00				Viki Heat M.Ju/E.Bajo		061
	0.64			80 Cont : Coal-ad		061-3
				10 Sh/Clst: lt ol gy, calc		061-1
				10 S/Sst : lt gy to m gy, calc, mic		061-2
				tr Ca : w		061-4
				tr Cont : prp, dd, fib		061-5
2333.00				Bren M.Ju/E.Bajo		062
				80 Coal		062-3
				20 Sh/Clst: brn gy, lt ol gy, calc		062-1
				tr S/Sst : m lt gy, calc		062-2
				tr Cont : Coal-ad		062-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
2338.00		Bren		M.Ju/E.Bajo		063
		50	S/Sst	: m gy, calc, l		063-1
	0.74	35	Sh/Clst:	ol gy to lt ol gy, calc		063-2
	0.34	10	Ca	: w, brn gy, pyr		063-4
		5	Sh/Clst:	ol blk		063-3
		tr	Coal			063-5
		tr	Other	: pyr		063-6
2345.00		Bren		M.Ju/E.Bajo		064
		80	S/Sst	: m gy, l		064-1
	0.78	10	Sh/Clst:	lt ol gy, calc		064-2
		5	Sh/Clst:	ol blk, mic		064-3
		5	Coal			064-5
		tr	Ca	: w, pyr		064-4
		tr	Cont	: Coal-ad		064-6
2350.00		Bren		M.Ju/L.Toar-E.Bajo		065
	0.54	40	Sh/Clst:	gn gy, lt ol gy, calc		065-1
	8.26	20	Sh/Clst:	ol blk, mic		065-2
		20	S/Sst	: m gy, calc, l		065-3
		20	Coal			065-4
		tr	Other	: pyr		065-5
2355.00		Bren		M.Ju/L.Toar-E.Bajo		066
		90	Coal			066-4
	1.40	5	Sh/Clst:	lt ol gy, calc		066-1
		5	S/Sst	: lt gy, calc, l		066-3
		tr	Sh/Clst:	ol blk		066-2
		tr	Ca	: w		066-5
		tr	Cont	: Coal-ad, fib		066-6

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2370.00			Bren	M.Ju/L.Toar-E.Bajo		067
	cvd		60	S/Sst : m gy, mic		067-3
			30	Sh/Clst: gn gy, lt ol gy		067-1
			10	Ca : w		067-2
			tr	Cont : Mica-ad, prp		067-4
			tr	Coal		067-5
2373.00			Bren	M.Ju/L.Toar-E.Bajo		068
	cvd	1.04	60	Sh/Clst: lt ol gy to drk ol gy		068-1
			40	S/Sst : m gy		068-5
			tr	Ca : w		068-2
			tr	Cont : Mica-ad, prp, fib		068-3
			tr	Coal		068-4
2380.00			Bren	L.Ju/Toar		069
		0.56	90	Sh/Clst: lt ol gy to drk ol gy		069-1
			10	S/Sst : l		069-2
			tr	Ca : w, y gy		069-3
			tr	Cont : prp		069-4
			tr	Other : pyr		069-5
2385.00			Bren	L.Ju/Toar		070
		0.52	80	Sh/Clst: lt ol gy, drk ol gy		070-1
			20	S/Sst : m gy, pyr, mic, l		070-2
			tr	Ca : w		070-3
			tr	Cont : Mica-ad, prp, fib		070-4
			tr	Coal		070-5
2393.00 [*]			Bren	L.Ju/Toar		071
			70	S/Sst : m drk gy, mic, l		071-1
		0.88	20	Sltst : brn gy, dol		071-2
			10	Sh/Clst: lt ol gy to drk ol gy		071-3
			tr	Cont : Mica-ad, cem, dd, fib		071-4
			tr	Coal		071-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2398.00			Bren	L.Ju/Toar		072
		0.83	90 S/Sst	: l		072-1
			10 Ca	: w, y gy		072-2
			tr Sltst	: brn gy, calc, mic		072-3
			tr Sh/Clst	: lt gy to drk gy		072-4
			tr Cont	: dd		072-5
			tr Coal			072-6
2403.00			Bren	L.Ju/Toar		073
		0.72	90 S/Sst	: l		073-1
			10 Sh/Clst	: gn gy to ol gy		073-2
			tr Ca	: w to y gy		073-3
			tr Cont	: Mica-ad, prp, dd		073-4
			tr Coal			073-5
2410.00			Bren	L.Ju/Toar		074
		0.45	80 S/Sst	: l		074-1
			20 Sltst	: y gy, calc, mic		074-2
			tr Sh/Clst	: gn gy to ol gy		074-3
			tr Cont	: Mica-ad, prp		074-4
			tr Coal			074-5
			tr Other	: pyr		074-6
2415.00			Dunl	L.Ju/Toar		075
cvd		0.28	75 S/Sst	: l		075-1
cvd			20 S/Sst	: y gy, calc, slt, mic		075-2
			5 Sh/Clst	: gn gy to ol gy		075-3
			tr Cont	: dd, fib		075-4
cvd			tr Coal			075-5
			tr Other	: pyr		075-6

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2423.00			Dunl	L.Ju/Toar		076
	cvd		50	S/Sst : l		076-1
	cvd		30	S/Sst : lt gy, calc, pyr, slt, mic, glauc		076-2
			10	Sh/Clst: gn gy to ol gy		076-3
			10	Sltst : brn gy, pyr		076-4
			tr	Cont : Mica-ad, fib		076-5
	cvd		tr	Coal		076-6
			tr	Other : glauc		076-7
2428.00			Dunl	L.Ju/Toar		077
			70	S/Sst : m gy, slt, mic, l		077-1
		1.52	30	Sh/Clst: m drk gy, slt, mic		077-2
			tr	Sltst : brn gy, calc		077-3
			tr	Coal		077-4
2433.00			Dunl	L.Ju/Toar		078
			50	Sh/Clst: m gy to m drk gy, calc, mic		078-1
		1.31	50	S/Sst : m gy, calc, slt, glauc, l		078-2
			tr	Cont : Coal-ad, Mica-ad, prp, dd, fib		078-3
			tr	Other : pyr		078-4
2440.00			Dunl	L.Ju/Toar		079
			70	Sh/Clst: gn gy, m drk gy, calc, mic		079-1
		1.30	30	S/Sst : lt gy, calc, l		079-2
			tr	Ca : w, ol gy		079-3
			tr	Cont : Coal-ad, Mica-ad		079-4
			tr	Other : pyr		079-5
2445.00			Dunl	L.Ju/Toar		080
			80	Sh/Clst: gn gy, m drk gy, calc, mic		080-1
		1.55	10	S/Sst : lt gy to m gy, glauc		080-2
			10	Ca : w, y gy		080-3
			tr	Cont : Coal-ad, prp, dd, fib		080-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2453.00				Dunl Cook L.Ju/Toar		081
	cvd		80	S/Sst : y gy, calc, glauc, l		081-1
			20	Sh/Clst: m drk gy, mic		081-2
	cvd		tr	Sltst : brn gy, calc		081-3
			tr	Ca : w		081-4
			tr	Cont : prp		081-5
2460.00				Dunl Cook L.Ju/Toar		082
	cvd	0.12	90	S/Sst : y gy, calc, slt, l		082-1
			10	Sh/Clst: m drk gy, mic		082-2
	cvd		tr	Ca : w		082-3
			tr	Cont : Coal-ad, prp		082-4
2465.00				Dunl Cook L.Ju/Toar		083
			90	S/Sst : y gy, calc, slt, l		083-1
			10	Sh/Clst: m gy to m drk gy, mic		083-2
			tr	Sltst : brn gy, calc		083-3
			tr	Cont : Coal-ad, Mica-ad		083-4
			tr	Other : glauc		083-5
2473.00				Dunl L.Ju/Toar		084
	cvd		90	S/Sst : y gy, calc, slt, l		084-1
			10	Sh/Clst: m gy to m drk gy, mic		084-2
	cvd		tr	Ca : brn gy		084-3
			tr	Cont : dd		084-4
2478.00				Dunl L.Ju/Toar		085
	cvd	* 1.55	50	Sh/Clst: m drk gy, mic		085-1
			50	S/Sst : y gy, calc, l		085-2
			tr	Cont : Coal-ad, Mica-ad, fib		085-3

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2483.00			Dunl	L.Ju/Toar		086
	1.24	50	Sh/Clst:	ol gy, m gy to m drk gy, mic		086-1
		50	S/Sst	: gy to y gy, slt, mic		086-2
			tr Cont	: Coal-ad, Mica-ad, prp, fib		086-3
2490.00			Dunl	L.Ju/Toar		087
	1.40	50	Sh/Clst:	ol gy, m gy to m drk gy, mic		087-1
		50	S/Sst	: gy to y gy, slt, mic		087-2
			tr Cont	: Coal-ad, Mica-ad, prp, fib		087-3
2495.00			Dunl	L.Ju/Toar		088
	1.30	90	Sh/Clst:	ol gy, m gy, mic		088-1
		10	Sltst	: y gy, m gy, calc, s		088-2
			tr Ca	: brn gy		088-3
			tr Cont	: dd		088-4
2503.00			Dunl	L.Ju/Toar		089
	2.22	90	Sh/Clst:	ol gy, m gy, mic		089-1
		10	Sltst	: lt gy to m gy, calc, s		089-2
			tr Ca	: y gy		089-3
			tr Cont	: Mica-ad, prp, fib		089-4
2508.00			Dunl	L.Ju/Toar		090
	1.62	90	Sh/Clst:	drk gy to m drk gy, mic		090-1
		10	Sltst	: lt gy to m gy, calc		090-2
			tr Ca	: gy pi, m lt gy		090-3
			tr Cont	: dd, fib		090-4
			tr Coal			090-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2513.00			Dunl	L.Ju/Toar		091
	2.07	90	Sh/Clst:	ol gy, m drk gy, mic		091-1
		10	Sltst	: lt gy to m gy, calc		091-2
			tr Ca	: w, m lt gy		091-3
			tr Cont	: Mica-ad, dd, fib		091-4
2520.00			Dunl	L.Ju/Toar		092
	2.22	70	Sh/Clst:	ol gy, m drk gy, mic		092-1
	1.04	30	Sltst	: lt gy to m gy, calc		092-2
			tr Ca	: m drk gy		092-3
			tr Cont	: Coal-ad, Mica-ad		092-4
2525.00			Dunl	L.Ju/L.Plie		093
		50	Cont	: Coal-ad		093-4
	1.97	20	Sh/Clst:	ol gy, m drk gy, mic		093-1
	1.67	20	Sltst	: lt gy to m gy, calc		093-2
		10	Ca	: y gy, ol gy to lt gy		093-3
2533.00			Dunl	L.Ju/L.Plie		094
	1.95	90	Sh/Clst:	ol gy, mic		094-1
		5	Sltst	: lt gy to m gy, calc		094-2
		5	Ca	: y gy, ol gy		094-3
			tr Cont	: Coal-ad, dd, fib		094-4
2538.00			Dunl	L.Ju/L.Plie		095
	1.47	100	Sh/Clst:	ol gy		095-1
			tr S/Sst	: y gy, l		095-2
			tr Ca	: y gy		095-3
			tr Cont	: dd, fib		095-4
			tr Coal			095-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2543.00			Dunl	L.Ju/L.Plie		096
		2.09	100	Sh/Clst: drk gy, slt		096-1
				tr S/Sst : l		096-2
				tr Ca : drk gy		096-3
				tr Cont : prp, fib		096-4
2568.00			Dunl Cook	L.Ju/L.Plie		097
		0.23	50	S/Sst : y gy, calc, slt, l		097-1
	cvd		50	Sh/Clst: m gy, slt, mic		097-2
				tr Cont : prp		097-3
2573.00			Dunl Cook	L.Ju/L.Plie		098
		0.20	50	S/Sst : y gy, calc, slt, l		098-1
	cvd		50	Sh/Clst: m gy, slt, mic		098-2
				tr Cont : prp		098-3
2580.00			Dunl	L.Ju/L.Plie		099
		1.54	50	Sh/Clst: m gy, slt, mic		099-1
	cvd		50	S/Sst : y gy, calc, slt, mic, l		099-2
				tr Cont : prp		099-3
				tr Coal		099-4
2585.00			Dunl	L.Ju/L.Plie		100
			70	S/Sst : y gy, slt, mic, l		100-2
	cvd	1.30	30	Sh/Clst: m gy, calc, slt, mic		100-1
				tr Cont : prp, dd, fib		100-3
				tr Other : glauc		100-4
2593.00			Dunl	L.Ju/L.Plie		101
			70	S/Sst : y gy, calc, slt, mic, l		101-2
	cvd	1.76	30	Sh/Clst: m gy, calc, slt, mic		101-1
				tr Cont : prp		101-3
				tr Other : pyr		101-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
2598.00			Dunl	L.Ju/L.Plie		102
cvd	0.32	70	S/Sst	: y gy, calc, slt, mic, l		102-2
	1.69	30	Sh/Clst:	m gy, calc, slt, mic		102-1
			tr Ca	: brn gy		102-3
			tr Other	: gn, ool		102-4
2603.00			Dunl	L.Ju/L.Plie		103
	0.61	90	Sltst	: y gy to m gy, calc, mic		103-1
		10	Other	: gn, ool		103-3
			tr Sh/Clst:	ol gy		103-2
			tr Cont	: cem, prp		103-4
			tr Other	: pyr		103-5
2615.00			Dunl	L.Ju/L.Plie		104
	0.78	90	Sltst	: y gy to m gy, calc, mic		104-1
		10	Other	: gn, ool		104-3
			tr Sh/Clst:	lt gn gy		104-2
			tr Cont	: Mica-ad, prp, dd		104-4
2623.00			Dunl	L.Ju/E.Plie		105
	0.61	90	Sltst	: y gy to m gy, calc, mic		105-1
		10	Other	: gn, ool		105-3
			tr Sh/Clst:	lt ol gy		105-2
			tr Ca	: brn blk, dol		105-4
			tr Cont	: cem, prp, dd		105-5
2628.00			Dunl	L.Ju/E.Plie		106
	0.57	90	Sltst	: lt ol gy, calc, mic		106-1
		5	Ca	: ol gy		106-3
		5	Ca	: brn gy, dol		106-4
			tr Sh/Clst:	ol gy, mic		106-2
			tr Cont	: prp, fib		106-5
			tr Other	: gn, ool		106-6

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2633.00			Dunl	L.Ju/E.Plie		107
			50 Sltst	: ol gy, calc, mic		107-1
			50 Ca	: brn gy, dol		107-2
			tr Other	: gn, ool		107-3
			tr Cont	: Coal-ad, Mica-ad, prp, dd		107-4
2640.00			Dunl	L.Ju/E.Plie		108
	0.42		90 Sltst	: ol gy, calc, mic		108-1
			5 Ca	: brn gy, m gy		108-2
			5 Ca	: brn gy, dol		108-3
			tr Other	: gn, ool		108-4
			tr Cont	: Mica-ad, dd		108-5
2645.00			Dunl	L.Ju/E.Plie		109
	0.95		90 Sltst	: lt gy to m drk gy, calc, mic		109-1
			10 Sh/Clst	: m drk gy, slt, mic		109-2
			tr Ca	: brn gy, dol		109-3
			tr Other	: gn, ool		109-4
			tr Cont	: Mica-ad, prp, dd		109-5
2653.00			Dunl	L.Ju/E.Plie		110
	1.21		90 Sltst	: lt gy to m drk gy, calc, mic		110-1
			10 Sh/Clst	: m drk gy, slt		110-2
			tr Ca	: lt brn gy, dol		110-3
			tr Other	: gn, ool		110-4
			tr Cont	: Coal-ad, Mica-ad, prp, dd		110-5
2658.00			Dunl	L.Ju/E.Plie		111
	0.80		70 Sltst	: lt gy to m drk gy, calc, mic		111-1
			20 Ca	: brn gy to lt gy, m gy		111-3
			10 Sh/Clst	: brn gy, calc		111-2
			tr Other	: gn, ool		111-4
			tr Cont	: Coal-ad, Mica-ad, prp, fib		111-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2663.00			Dun1	L.Ju/E.Pl		112
	0.92		70 Cont	: Mica-ad, prp, dd, fib		112-5
			20 Sltst	: lt gy to m drk gy, calc, mic		112-1
			10 Sh/Clst	: brn gy, calc		112-2
			tr Ca	: w to y gy		112-3
			tr Ca	: brn gy, dol		112-4
2670.00			Dun1	L.Ju/E.Pl		113
	0.78		50 Sltst	: lt gy, calc, mic		113-1
			40 Cont	: Mica-ad, prp, dd, fib		113-5
			10 Sh/Clst	: brn gy, calc		113-2
			tr Ca	: w		113-3
			tr Ca	: brn gy, dol		113-4
2675.00			Dun1	L.Ju/E.Pl		114
	0.94		90 Sltst	: lt gy to m gy, calc, mic		114-1
			10 Sh/Clst	: drk brn gy, calc, mic		114-2
			tr Cont	: Mica-ad, fib		114-3
			tr Other	: pyr		114-4
2683.00			Dun1	L.Ju/Sine-E.Pl		115
	1.12		90 Sltst	: lt gy to m gy, calc		115-1
			10 Sh/Clst	: drk brn gy, calc, mic		115-2
cvd			tr Ca	: lt ol gy		115-3
			tr Cont	: Mica-ad, prp, fib		115-4
2688.00			Dun1	L.Ju/Sine-E.Pl		116
	1.40		50 Sh/Clst	: m drk gy, calc, mic		116-1
			50 Sltst	: lt gy, calc		116-2
			tr Cont	: Mica-ad, fib		116-3

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2693.00			Dunl	L.Ju/Sine-E.Plie		117
		1.79	70	Sh/Clst: m drk gy, calc, mic		117-1
			30	Sltst : lt gy, calc		117-2
			tr Ca	: brn gy, dol		117-3
			tr Cont	: prp, dd		117-4
2700.00			Dunl	L.Ju/Sine-E.Plie		118
		1.76	90	Sh/Clst: m drk gy, calc, mic		118-1
			10	Sltst : lt gy, calc, mic		118-2
			tr Cont	: Coal-ad, fib		118-3
			tr Other	: pyr		118-4
2705.00			Stat	L.Ju/Hett		119
			50	S/Sst : l		119-5
		2.19	40	Sh/Clst: m gy, Mica-ad		119-1
	cvd		10	Sltst : lt gy, calc, mic		119-2
			tr Cont	: Coal-ad, prp, dd		119-3
			tr Other	: glauc		119-4
2725.00			Stat	L.Ju/Hett		120
			80	S/Sst : l		120-2
		2.39	20	Sh/Clst: m lt gy to m drk gy, mic		120-1
			tr Cont	: Coal-ad, Mica-ad, prp, dd		120-3
2733.00			Stat	L.Ju/Hett		121
		0.21	80	S/Sst : w, cem, l		121-1
			20	Coal		121-2
			tr Sh/Clst:	lt gn gy, lt ol gy		121-3
			tr Cont	: cem, prp, fib		121-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2738.00				Stat L.Ju/Hett		122
			80	S/Sst : l		122-1
			20	Coal		122-2
			tr	Sh/Clst: lt ol gy		122-3
			tr	Sltst : lt gy, mic		122-4
			tr	Cont : fib		122-5
2743.00				Stat L.Ju/Hett		123
			50	S/Sst : l		123-1
			50	Coal		123-2
			tr	Sh/Clst: lt ol gy		123-3
			tr	Cont : Mica-ad		123-4
2750.00				Stat L.Ju/Hett		124
	8.20		70	S/Sst : w, pyr, l		124-1
			30	Sh/Clst: m drk gy, mic		124-2
			tr	Cont : Coal-ad, fib		124-3
2753.00				Stat Tria/Rhae?		125
			70	Coal		125-1
			20	S/Sst : w to lt gy, cem, l		125-2
			10	Sh/Clst: m drk gy, mic		125-3
2763.00				Stat Tria/Rhae?		126
	2.69		50	Coal		126-4
			20	Sh/Clst: m drk gy, mic		126-1
			20	S/Sst : w, mic, l		126-3
			10	Sh/Clst: ol gy		126-2
			tr	Ca : w		126-5
			tr	Cont : Mica-ad, fib		126-6
			tr	Other : pyr		126-7

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
2768.00			Stat Tria/Rhae?			127
	1.76	90	S/Sst : cem, l			127-1
		10	Sh/Clst: m drk gy, slt, mic			127-2
		tr	Coal			127-3
		tr	Cont : Mica-ad			127-4
		tr	Other : pyr			127-5
2773.00			Stat Tria/Rhae?			128
	2.19	90	S/Sst : w to drk gy, l			128-1
		10	Sh/Clst: m drk gy, slt, mic			128-2
		tr	Sh/Clst: ol gy			128-3
		tr	Other : pyr			128-4
2780.00			Stat Tria/Rhae?			129
		100	S/Sst : w, cem, l			129-1
		tr	Sh/Clst: ol gy, m drk gy			129-2
		tr	Coal			129-3
		tr	Cont : prp			129-5
		tr	Other : pyr			129-6
2785.00			Stat Tria/Rhae?			130
	1.00	90	S/Sst : w, mic, glauc, cem, l			130-1
	1.84	10	Sh/Clst: lt gy to m drk gy, mic			130-2
		tr	Cont : cem, prp			130-3
		tr	Other : pyr			130-4
		tr	Coal			130-5
2793.00			Stat Tria/Rhae?			131
	2.90	80	S/Sst : w to lt ol gy, calc, mic, l			131-1
		20	Sh/Clst: drk gy to m drk gy, mic			131-2
		tr	Ca : w, pyr			131-3
		tr	Cont : prp, dd, fib			131-4
		tr	Coal			131-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2798.00				Stat Tria/Rhae?		132
			100	S/Sst : l		132-1
			tr	Ca : w		132-2
			tr	Ca : brn gy, dol		132-3
			tr	Cont : prp		132-4
			tr	Coal		132-5
			tr	Other : pyr		132-6
2803.00				Stat Tria/Rhae?		133
			90	S/Sst : w to ol gy, mic, l		133-1
			10	Coal		133-3
			tr	Sh/Clst: drk gy to m drk gy		133-2
2810.00				Stat Tria/Rhae?		134
			80	S/Sst : l		134-1
			10	Sh/Clst: m gy to drk gy, mic		134-2
	1.28		10	Sh/Clst: ol gy		134-3
			tr	Sltst : lt gy, mic		134-4
			tr	Cont : prp, dd		134-5
2815.00				Stat Tria/Rhae?		135
			80	S/Sst : w, mic, cem, l		135-1
			10	Sh/Clst: m gy to drk gy, mic		135-2
	1.77		10	Sh/Clst: ol gy		135-3
	cvd		tr	Ca : w		135-4
			tr	Cont : prp		135-5
			tr	Coal		135-6
2823.00				Stat Tria/Rhae?		136
			2.90	90 Sh/Clst: m gy to drk gy, mic		136-1
			10	S/Sst : w, cem, l		136-3
			tr	Sh/Clst: ol gy		136-2
	cvd		tr	Ca : w		136-4
			tr	Cont : cem, prp		136-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2828.00				Stat Tria/Rhae?		137
		3.22	50	Sh/Clst: gy blk to m gy		137-1
		0.21	50	S/Sst : w, cem, l		137-2
			tr	Cont : Mica-ad, prp, dd		137-3
			tr	Coal		137-4
2833.00				Stat Tria/Rhae?		138
			50	S/Sst : w, cem, l		138-1
			50	Coal		138-2
			tr	Cont : prp, dd		138-3
2840.00				Stat Tria/Rhae?		139
			95	S/Sst : w, cem, l		139-1
			5	Sh/Clst: m drk gy, slt, mic		139-2
			tr	Cont : prp		139-3
			tr	Coal		139-4
			tr	Other : pyr		139-5
2845.00				Stat Tria/Rhae?		140
			50	S/Sst : w, mic, cem, l		140-1
			40	Coal		140-3
			10	Sh/Clst: m drk gy, slt		140-2
			tr	Cont : cem, prp		140-4
cvd			tr	Ca : lt gy		140-5
2853.00				Stat Tria/Rhae?		141
		0.37	100	Sh/Clst: red blk, ol gy, dsk red, mic		141-1
cvd *			tr	Ca : lt gy		141-2
			tr	Cont : prp, fib		141-3
			tr	Other : pyr		141-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2858.00				Stat Tria/Rhae?		142
	0.13	100	Sh/Clst:	red blk, ol gy, dsk red, mic		142-1
			tr S/Sst	: w, calc, l		142-2
cvd			tr Ca	: lt gy		142-3
			tr Coal			142-4
2863.00				Stat Tria/Rhae?		143
	0.29	50	Sh/Clst:	red blk, ol gy, dsk red, mic		143-1
		50	S/Sst	: w, calc, l		143-2
cvd			tr Ca	: brn gy		143-3
			tr Other	: pyr		143-4
2870.00				Stat Tria/Rhae?		144
	0.15	50	Sh/Clst:	red blk, ol gy, dsk red, mic		144-1
	0.16	30	S/Sst	: w, calc, glauc, l		144-2
	0.17	20	Ca	: w, gy pi, lt brn gy to m brn gy		144-3
2875.00				Stat Tria/Rhae?		145
	0.13	50	Sh/Clst:	red blk, ol gy, dsk red, mic		145-1
		50	S/Sst	: w, calc, l		145-2
			tr Ca	: lt gy to brn gy		145-3
			tr Cont	: prp, fib		145-4
2883.00			Hegr	Tria/Rhae?		146
		80	Sh/Clst:	red blk to dsk red, mic		146-1
		20	S/Sst	: w, calc, l		146-3
			tr Sh/Clst:	ol gy		146-2
*			tr Ca	: lt brn gy		146-4
			tr Other	: pyr		146-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2893.00			Hegr	Tria/Rhae?		147
	0.12	100		Sh/Clst: red blk to dsk red, mic		147-1
				tr Sh/Clst: ol gy		147-2
				tr S/Sst : w, calc		147-3
				tr Ca : lt brn gy		147-4
				tr Cont : prp, fib		147-5
2903.00			Hegr	Tria/Rhae?		148
		100		Sh/Clst: red blk to dsk red, mic		148-1
				tr Sh/Clst: ol gy		148-2
				tr S/Sst : w, calc		148-3
				tr Ca : w		148-4
				tr Cont : prp, dd, fib		148-5
2913.00			Hegr	Tria/Rhae?		149
		80		Sh/Clst: red blk to dsk red, mic		149-1
		20		S/Sst : w, calc, l		149-2
				tr Ca : w		149-3
				tr Cont : prp, dd		149-4
2923.00			Hegr	Tria/Rhae?		150
		50		S/Sst : l		150-1
		50		Coal		150-2
				tr Ca : lt brn gy		150-3
				tr Sh/Clst: red blk to dsk red, mic		150-4
2933.00			Hegr	Tria/Rhae?		151
	* 0.16	50		Sh/Clst: red blk, m gy, dsk red, mic		151-1
		50		S/Sst : w, calc, l		151-2
				tr Cont : Mica-ad		151-3
				tr Other : pyr		151-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2943.00			Hegr	Tria/Rhae?		152
			90	Sh/Clst: red blk, m gy, dsk red, mic		152-1
			10	S/Sst : w, calc, l		152-2
			tr	Cont : prp, dd		152-3
2953.00			Hegr	Tria/Rhae?		153
	0.13		90	Sh/Clst: red blk, m gy, dsk red, mic		153-1
			10	S/Sst : w, calc, l		153-3
	cvd		tr	Sh/Clst: ol gy		153-2
			tr	Cont : prp, dd, fib		153-4
2958.00			Hegr	Tria/Rhae?		154
			50	Sh/Clst: red blk, m gy, dsk red, mic		154-1
			50	S/Sst : w, pyr, l		154-3
	cvd		tr	Sh/Clst: ol gy		154-2
			tr	Ca : brn gy, m gy		154-4
			tr	Cont : prp, dd		154-5
2963.00			Hegr	Tria/Rhae?		155
int	0.15		50	Sh/Clst: red blk, m gy, dsk red, mic		155-1
int			50	S/Sst : w, calc, slt, l		155-3
	cvd		tr	Sh/Clst: ol gy		155-2
			tr	Ca : lt gy		155-4
			tr	Cont : cem, prp		155-5
2970.00			Hegr	Tria/Rhae?		156
	0.25		50	Sh/Clst: red blk, m gy, dsk red, mic		156-1
			50	S/Sst : l		156-3
	cvd		tr	Sh/Clst: ol gy		156-2
			tr	Ca : w		156-4
			tr	Cont : Mica-ad, cem, dd		156-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
2983.00		Hegr		Tria/Rhae?		157
		80	Cont	: dd		157-4
		10	Sh/Clst:	red blk, m gy, dsk red, mic		157-1
		10	S/Sst	: w, calc, l		157-3
cvd		tr	Sh/Clst:	ol gy		157-2
		tr	Coal			157-5
2993.00		Hegr		Tria/Rhae?		158
		90	Sh/Clst:	red blk, m gy, dsk red, mic		158-1
		10	Ca	: gy gn, brn gy, lt ol gy		158-3
cvd		tr	Sh/Clst:	ol gy		158-2
		tr	Coal			158-4
3003.00		Hegr		Tria/Rhae?		159
	0.64	80	Sh/Clst:	m drk gy		159-1
		10	Sh/Clst:	red blk, m gy, dsk red		159-2
		10	Ca	: lt ol gy		159-3
		tr	Cont	: prp		159-4
3013.00		Hegr		Tria/Rhae?		160
		90	Sh/Clst:	m drk gy		160-1
		10	Sh/Clst:	red blk, m gy, dsk red		160-2
		tr	Ca	: lt ol gy		160-3
		tr	S/Sst	: gn gy, l		160-4
		tr	Cont	: prp, dd		160-5
		tr	Coal			160-6
3023.00		Hegr		Tria/Rhae?		161
		60	Sh/Clst:	red blk, m gy, dsk red, mic		161-2
	0.73	20	Sh/Clst:	m drk gy		161-1
		20	S/Sst	: l		161-3
		tr	Ca	: brn gy		161-4
		tr	Cont	: dd		161-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3033.00		Hegr		Tria/Rhae?		162
				50 Sh/Clst: m drk gy		162-1
				50 Sh/Clst: red blk, m gy, dsk red, mic		162-2
				tr Ca : brn gy to lt ol gy		162-3
				tr S/Sst : gn gy, l		162-4
3043.00		Hegr		Tria/Rhae?		163
				50 Sh/Clst: m drk gy		163-1
				50 Sh/Clst: red blk, m gy, dsk red, mic		163-2
				tr Ca : brn gy to lt ol gy		163-3
				tr Sltst : y gy, mic, glauc		163-4
				tr Cont : prp		163-5
3053.00		Hegr		Tria/Rhae?		164
	0.29			50 Sh/Clst: red blk, ol gy, m gy, dsk red, mic		164-1
				50 S/Sst : gn gy, l		164-4
				tr Ca : lt ol gy, slt		164-2
				tr Cont : cem, prp		164-3
3063.00		Hegr		Tria/Rhae?		165
				50 S/Sst : gn gy, l		165-4
				45 Sh/Clst: red blk, ol gy, m gy, dsk red, mic		165-1
				5 Ca : w to gn gy		165-2
				tr Coal		165-3
3073.00		Hegr		Tria/Rhae?		166
				50 S/Sst : gn gy, l		166-4
				45 Sh/Clst: red blk, ol gy, m gy, dsk red, mic		166-1
				5 Ca : w to gn gy		166-2
				tr Cont : Mica-ad, prp, dd		166-3

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3083.00			Hegr	Tria/Rhae?		167
	0.30		50 S/Sst	: gn gy, l		167-4
			45 Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		167-1
			5 Ca	: w to gn gy		167-2
			tr Cont	: Mica-ad, prp, dd		167-3
3093.00			Hegr	Tria/Rhae?		168
			70 Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		168-1
			30 Ca	: w, gn gy		168-2
			tr S/Sst	: gn gy, glauc		168-3
			tr Cont	: cem, dd		168-4
3103.00			Hegr	Tria/Rhae?		169
			100 Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		169-1
			tr Ca	: w to gn gy		169-2
			tr S/Sst	: gn gy, glauc, l		169-3
			tr Sltst	: brn gy, mic		169-4
3113.00			Hegr	Tria/Rhae?		170
			50 Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		170-1
			50 S/Sst	: gn gy, glauc, l		170-3
			tr Ca	: w, gn gy		170-2
			tr Sltst	: brn gy, mic		170-4
			tr Cont	: fib		170-5
3123.00			Hegr	Tria/Rhae?		171
	0.31		50 S/Sst	: gn gy, glauc, l		171-4
			45 Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		171-1
			5 Ca	: w, y gy		171-2
			tr Cont	: fib		171-3

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3133.00			Hegr	Tria/Rhae?		172
			90	Sh/Clst: red blk, ol gy, m gy, dsk red, mic		172-1
			5	Ca : y gy		172-2
			5	Sltst : brn gy, gn gy, mic		172-3
			tr	Cont : Coal-ad, Mica-ad, dd		172-4
			tr	Other : pyr		172-5
3143.00			Hegr	Tria/Rhae?		173
	0.20		95	Sh/Clst: red blk, ol gy, m gy, dsk red, mic		173-1
			5	Sltst : gn gy, glauc		173-3
			tr	Ca : y gy		173-2
			tr	Cont : dd		173-4
			tr	Coal		173-5
3153.00			Hegr	Tria/Rhae?		174
			70	S/Sst : y gy, calc, cem		174-3
			30	Sh/Clst: red blk, ol gy, m gy, dsk red, mic		174-1
			tr	Ca : y gy		174-2
			tr	Cont : cem, fib		174-4
3163.00			Hegr	Tria/Rhae?		175
int			70	S/Sst : y gy, calc, cem		175-6
int	0.20		30	Sh/Clst: red blk, ol gy, m gy, dsk red, mic		175-1
			tr	Ca : y gy		175-2
			tr	Sltst : gn gy to lt ol gy, mic		175-3
			tr	Cont : dd		175-4
			tr	Coal		175-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3173.00			Hegr	Tria/Rhae?		176
	0.30	50	Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		176-1
		30	S/Sst	: w to y gy, calc, cem, l		176-2
		20	Cont	: dd		176-5
		tr	Ca	: y gy, ol gy		176-3
		tr	Sltst	: gn gy, mic		176-4
3183.00			Hegr	Tria/Rhae?		177
	0.37	95	Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		177-1
		5	Ca	: y gy, ol gy		177-2
		tr	Cont	: dd, fib		177-3
		tr	Coal			177-4
3193.00			Hegr	Tria/Rhae?		178
	0.31	95	Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		178-1
		5	Ca	: y gy, ol gy		178-2
		tr	Cont	: dd, fib		178-3
		tr	Coal			178-4
3203.00			Hegr	Tria/Rhae?		179
		40	Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		179-1
		40	S/Sst	: w to y gy, calc, cem, l		179-2
		10	Sltst	: gn gy, glauc		179-3
		10	Cont	: dd, fib		179-4
3213.00 [*]			Hegr	Tria/Rhae?		180
int		70	Sltst	: brn gy, gn gy, glauc		180-2
int		20	Sh/Clst:	red blk, ol gy, m gy, dsk red, mic		180-1
		10	Coal			180-4
		tr	Ca	: w to y gy		180-3
		tr	Cont	: fib		180-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3223.00			Hegr	Tria/Rhae?		181
int			50	Sh/Clst: red blk to dsk red, mic		181-1
int			40	Sltst : brn gy, gn gy, glauc		181-3
			10	Ca : brn gy		181-2
			tr	Coal		181-4
			tr	Cont : dd, fib		181-5
3233.00			Hegr	Tria/Rhae?		182
	0.28		50	Sh/Clst: red blk, ol gy, drk ol gy, dsk red, mic		182-1
	0.21		50	Sltst : brn gy, gn gy, glauc		182-2
			tr	Coal		182-3
			tr	Cont : dd		182-4
3243.00				Tria/Perm?-Tria		183
			50	Sh/Clst: red blk, dsk red, mic		183-1
			50	Cont : ns, dd, fib		183-2
3253.00				Tria/Perm?-Tria		184
			100	Sh/Clst: red blk, dsk red, mic		184-1
			tr	Ca : lt ol gy		184-2
			tr	Sltst : brn gy, mic		184-3
3263.00				Tria/Perm?-Tria		185
	0.21		80	Sh/Clst: red blk, ol gy to drk ol gy, dsk red, mic		185-1
			20	S/Sst : w to lt gy, calc, cem, l		185-2
			tr	Sltst : brn gy, mic		185-3
			tr	Cont : prp		185-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
3273.00			Tria/Perm?-Tria			186
			50 S/Sst	: w to pl red, calc, mic, cem		186-1
			50 Sh/Clst:	gy brn, slt, mic		186-2
			tr Ca	: w, glauc		186-3
			tr Coal			186-4
3283.00			Tria/Perm?-Tria			187
	0.77		80 S/Sst	: w to pl red, calc, mic, cem		187-1
			20 Sh/Clst:	gy brn, slt, mic		187-2
			tr Sltst	: gn gy to ol gy, mic		187-3
			tr Other	: pyr		187-4
3293.00			Tria/Perm?-Tria			188
			80 S/Sst	: w to pl red, calc, slt, mic		188-1
			10 Sh/Clst:	gy brn, slt, mic		188-2
			10 Coal			188-3
			tr Ca	: w		188-4
			tr Sltst	: ol gy		188-5
3303.00			Tria/Perm?-Tria			189
	0.76		90 S/Sst	: w to pl red, calc, mic, cem		189-1
			5 Sh/Clst:	gy brn, slt, mic		189-2
			5 Coal			189-3
			tr Sltst	: ol gy		189-4
			tr Ca	: w to lt brn		189-5
			tr Cont	: Mica-ad		189-6
3313.00			Tria/Perm?-Tria			190
			50 Sh/Clst:	gy brn, gn gy, slt, mic		190-1
			50 S/Sst	: w to pl red, calc, mic, cem		190-2
			tr Sltst	: ol gy		190-3
			tr Ca	: w		190-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
3323.00			Tria/Perm?-Tria			191
	0.19	50	Sh/Clst: gy brn, gn gy, slt, mic			191-1
		50	S/Sst : w to pl red, calc, mic, cem			191-2
		tr	Slstst : ol gy			191-3
		tr	Ca : w			191-4
3333.00			Tria/Perm?-Tria			192
		50	Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, mic			192-1
		50	S/Sst : w to pl red, calc, mic, cem			192-2
		tr	Ca : lt gy			192-3
		tr	Cont : prp, fib			192-4
		tr	Coal			192-5
3343.00			Tria/Perm?-Tria			193
		50	Sh/Clst: gy brn, gn gy, calc, slt, mic			193-1
		50	S/Sst : w to pl red, calc, mic, cem			193-2
		tr	Cont : Mica-ad, fib			193-3
		tr	Coal			193-4
		tr	Other : pyr			193-5
3353.00			Tria/Perm?-Tria			194
	0.83	80	S/Sst : w to pl red, calc, mic, cem			194-1
		15	Coal			194-2
		5	Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic			194-3
		tr	Ca : w			194-4
		tr	Cont : Mica-ad			194-5
3363.00			Tria/Perm?-Tria			195
		80	S/Sst : w to pl red, calc, mic, cem			195-1
		20	Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic			195-2
		tr	Ca : w			195-3
		tr	Coal			195-4
		tr	Cont : fib			195-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3373.00				Tria/Perm?-Tria		196
				50 S/Sst : w to pl red, calc, mic, cem		196-1
				50 Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic		196-2
				tr Ca : w		196-3
				tr Coal		196-4
3383.00				Tria/Perm?-Tria		197
	0.21			50 Sh/Clst: gy brn to dsk red, calc, mic		197-2
				40 S/Sst : w to pl red, calc, mic, cem		197-1
				10 Ca : w		197-3
				tr Coal		197-4
				tr Cont : Mica-ad, prp		197-5
3393.00				Tria/Perm?-Tria		198
				100 S/Sst : w to pl red, calc, mic, cem		198-1
				tr Sh/Clst: gy brn to dsk red, calc, mic		198-2
				tr Ca : w		198-3
				tr Coal		198-4
3403.00				Tria/Perm?-Tria		199
				50 S/Sst : w to pl red, calc, mic, cem		199-1
				50 Sh/Clst: gy brn to dsk red, calc, mic		199-2
				tr Ca : w, gy red, lt brn gy		199-3
				tr Cont : fib		199-4
				tr Coal		199-5
3428.00				Tria/Perm?-Tria		200
				95 Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic		200-1
				5 S/Sst : w to pl red, calc, mic, cem		200-2
				tr Ca : w, gy red		200-3
				tr Coal		200-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3453.00				Tria/Perm?-Tria		201
				50 Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic		201-1
				50 S/Sst : w to pl red, calc, mic, cem		201-2
				tr Ca : w to red blk		201-3
				tr Coal		201-4
				tr Cont : Mica-ad, fib		201-5
3478.00				Tria/Perm?-Tria		202
				80 Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic		202-1
				20 S/Sst : w to pl red, calc, mic, cem		202-2
				tr Ca : w		202-3
				tr Coal		202-4
3505.00				Tria/Perm?-Tria		203
				50 Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic		203-1
				50 S/Sst : w to pl red, calc, mic, cem		203-2
				tr Cont : prp, fib		203-3
				tr Coal		203-4
3530.00				Tria/Perm?-Tria		204
				50 Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic		204-1
				50 S/Sst : w to pl red, calc, mic, cem		204-2
				tr Cont : prp, fib		204-3
				tr Coal		204-4
3555.00				Tria/Perm?-Tria		205
				60 S/Sst : w to pl red, calc, mic, cem		205-2
				40 Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic		205-1
				tr Ca : red pi		205-3
				tr Cont : prp, fib		205-4
				tr Coal		205-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frn	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3580.00				Tria/Perm?-Tria		206
				60 S/Sst : w to pl red, calc, mic, cem		206-2
				40 Sh/Clst: brn gy, ol gy, drk ol gy, dsk		206-1
				red, calc, mic		
				tr Ca : red pi		206-3
				tr Cont : prp, fib		206-4
				tr Coal		206-5
3605.00				Tria/Perm?-Tria		207
				50 Sh/Clst: gy brn, ol gy, drk ol gy, dsk		207-1
				red, calc, mic		
				50 S/Sst : w to pl red, calc, mic, cem		207-2
				tr Ca : w to red pi		207-3
				tr Cont : prp, fib		207-4
				tr Coal		207-5
3630.00				Tria/Perm?-Tria		208
	0.10			60 Sh/Clst: gy brn, ol gy, drk ol gy, dsk		208-1
				red, calc, mic		
				40 S/Sst : w to pl red, calc, mic, cem		208-2
				tr Ca : w to red pi		208-3
				tr Cont : fib		208-4
				tr Coal		208-5
3655.00				Tria/Perm?-Tria		209
				50 Sh/Clst: gy brn, ol gy, drk ol gy, dsk		209-1
				red, calc, mic		
				50 S/Sst : w to pl red, calc, mic, cem		209-2
				tr Ca : w to red pi, ol gy		209-3
				tr Cont : prp, fib		209-4
				tr Coal		209-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3680.00				Tria/Perm?-Tria		210
			80	Other : red pi, mrl		210-1
			20	Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic		210-2
			tr	Coal		210-3
3705.00				Tria/Perm?-Tria		211
	0.11		90	Sh/Clst: gy brn, ol gy, drk ol gy, dsk red, calc, mic		211-1
			10	Other : red pi, mrl		211-2
			tr	Ca : gy red		211-3
3730.00				Tria/Perm?-Tria		212
			100	Cont : cem, prp, dd		212-1
3755.00				Tria/Perm?-Tria		213
			80	Cont : cem, prp, dd		213-1
			20	Sh/Clst: gy brn to dsk red, calc, mic		213-2
			tr	Other : red pi, mrl		213-3
3780.00				Tria/Perm?-Tria		214
			80	Cont : cem, prp, dd		214-1
			20	Sh/Clst: gy brn to dsk red, calc, mic		214-2
			tr	Other : red pi, mrl		214-3
3805.00				Tria/Perm?-Tria		215
			80	Cont : cem, prp, dd		215-1
			20	Sh/Clst: gy brn to dsk red, calc, mic		215-2
			tr	Other : red pi, mrl		215-3

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
3830.00				Tria/Perm?-Tria	trb	216
		100 Cont	:	cem, prp, dd		216-1
3855.00				Tria/Perm?-Tria	trb	217
		100 Cont	:	cem, prp, dd		217-1
3880.00				Tria/Perm?-Tria	trb	218
		100 Cont	:	cem, prp, dd		218-1
3905.00				Tria/Perm?-Tria	trb	219
		100 Cont	:	cem, prp, dd		219-1
3930.00				Tria/Perm?-Tria	trb	220
		60 S/Sst	:	w to pl red, calc, mic, cem		220-1
		20 Sh/Clst	:	gy brn to dsk red, calc, mic		220-2
		20 Cont	:	cem, prp, dd		220-4
		tr Other	:	red pi, mrl		220-3
3955.00				Tria/Perm?-Tria		221
		45 S/Sst	:	w to pl red, calc, mic, cem		221-1
		45 Sh/Clst	:	gy brn to dsk red, calc, mic		221-2
		10 Coal				221-5
		tr Other	:	red pi, mrl		221-3
		tr Cont	:	cem, prp, dd		221-4
3980.00				Tria/Perm?-Tria	trb	222
		50 Cont	:	cem, prp, dd		222-1
		25 S/Sst	:	pl red, calc, mic, cem		222-2
		25 Sh/Clst	:	gy brn to dsk red, calc, mic		222-3
		tr Coal				222-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4005.00				Tria/Perm?-Tria	trb	223
			100	Cont : cem, prp, dd		223-1
4030.00				Tria/Perm?-Tria		224
			45	S/Sst : pl red, calc, mic, cem		224-1
			45	Sh/Clst: gy brn to dsk red, calc, mic		224-2
			10	Other : red pi, mrl		224-3
			tr	Cont : prp, dd		224-4
			tr	Coal		224-5
4055.00				Tria/Perm?-Tria		225
			90	S/Sst : pl red, calc, mic, cem		225-1
			10	Sh/Clst: gy brn to dsk red, calc, mic		225-2
			tr	Other : red pi, mrl		225-3
			tr	Cont : prp, evap		225-4
4080.00				Tria/Perm?-Tria		226
			100	Sh/Clst: gy brn to dsk red, calc, mic		226-1
			tr	Ca : m pi		226-2
			tr	S/Sst : pl red, calc, mic, cem		226-3
			tr	Cont : fib		226-4
			tr	Coal		226-5
4105.00				Tria/Perm?-Tria		227
			50	S/Sst : pl red, calc, mic, cem		227-1
			50	Sh/Clst: gy brn to dsk red, calc, mic		227-2
			tr	Ca : red pi		227-3
			tr	Cont : prp, fib		227-4
			tr	Coal		227-5
			tr	Other : glauc		227-6

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4130.00				Tria/Perm?-Tria		228
				100 Sh/Clst: gy brn to dsk red, calc, mic		228-1
				tr S/Sst : pl red, calc, mic, cem		228-2
				tr Cont : prp, dd		228-3
				tr Coal		228-4
4155.00				Tria/Perm?-Tria		229
				70 S/Sst : pl red, calc, mic, cem		229-1
				30 Sh/Clst: gy brn to dsk red, calc, mic		229-2
				tr Other : red pi, mrl		229-3
				tr Cont : fib		229-4
				tr Coal		229-5
4180.00				Tria/Perm?-Tria		230
				80 S/Sst : pl red, calc, mic, cem		230-1
				20 Cont : Coal-ad		230-2
				tr Other : red pi, mrl		230-3
				tr Sh/Clst: gy brn to dsk red, calc, mic		230-4
				tr Cont : fib		230-5
4205.00				Tria/Perm?-Tria		231
				80 S/Sst : w to pl red, calc, mic, cem		231-1
				20 Cont : Coal-ad		231-2
				tr Sh/Clst: gy brn to dsk red, calc, mic		231-3
				tr Other : red pi, mrl		231-4
				tr Cont : fib		231-5
4230.00				Tria/Perm?-Tria		232
	0.13			70 S/Sst : w to pl red, calc, mic, cem		232-1
				20 Cont : Coal-ad		232-2
				10 Other : red pi, mrl		232-3
				tr Sh/Clst: gy brn to dsk red, calc, mic		232-4
				tr Cont : fib		232-5

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4255.00				Tria/Perm?-Tria		233
		100	Cont	: cem, prp, dd		233-1
4285.00				Tria/Perm?-Tria		234
		80	Cont	: cem, prp, dd		234-1
		20	Sh/Clst:	gy brn to dsk red, calc, mic		234-2
4310.00				Tria/Perm?-Tria		235
		100	Cont	: cem, prp, dd		235-1
4330.00				Tria/Perm?-Tria		236
		100	Cont	: cem, prp, dd		236-1
4360.00				Tria/Perm?-Tria		237
	2.30	100	Sh/Clst:	gy brn to dsk red, calc, mic		237-1
			tr S/Sst	: pl red, calc, mic, cem		237-2
			tr Cont	: prp, dd		237-3
4380.00				Tria/Perm?-Tria		238
		100	S/Sst	: w to pl red, calc, mic, cem		238-1
			tr Sh/Clst:	red blk, mic		238-2
			tr Cont	: Mica-ad, prp, fib		238-3
			tr Cont	: Coal-ad		238-4
4405.00				Tria/Perm?-Tria		239
		100	S/Sst	: w to pl red, calc, mic, cem		239-1
			tr Sh/Clst:	red blk, mic		239-2
			tr Cont	: Mica-ad, prp, fib		239-3
			tr Cont	: Coal-ad		239-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4450.00				Tria/Perm?-Tria		240
			90	S/Sst : v col gn, v col pi, calc		240-1
			10	Sh/Clst: red pi, calc, mic		240-2
			tr	Cont : Coal-ad		240-3
4455.00				Tria/Perm?-Tria		241
			90	S/Sst : v col gn, v col pi, calc		241-1
			10	Ca : w		241-2
			tr	Sh/Clst: red blk		241-3
			tr	Cont : prp		241-4
4475.00				Perm?		242
			70	Sh/Clst: red blk, slt, mic		242-1
			30	S/Sst : v col gn, v col pi		242-2
			tr	Cont : Mica-ad, dd		242-3
4505.00				Perm?		243
			50	S/Sst : v col gn, v col pi		243-1
			50	Sh/Clst: red blk, drk gy, slt, mic		243-2
			tr	Cont : dd, fib		243-3
			tr	Cont : Coal-ad		243-4
4530.00				Perm?		244
			50	Cont : prp, dd, fib		244-1
			40	S/Sst : v col gn, v col pi		244-2
			10	Sh/Clst: red blk, slt, mic		244-3
			tr	Cont : fib		244-4
4555.00				Perm?		245
	0.48		80	Sh/Clst: red blk, drk gy, slt, mic		245-1
			20	S/Sst : v col gn, v col pi		245-2
			tr	Cont : prp, dd, fib		245-3

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
4580.00				Perm?		246
		80	S/Sst	: v col gn, v col pi, calc		246-1
		20	Sh/Clst:	red blk, mic		246-2
		tr	Cont	: dd		246-3
4610.00				Perm?		247
	0.37	50	S/Sst	: v col gn, v col pi, calc		247-1
		50	Sh/Clst:	red blk, drk gy, slt, mic		247-2
		tr	Ca	: lt brn gy		247-3
		tr	Cont	: Coal-ad		247-4
4630.00				Perm?		248
		55	Sh/Clst:	red blk, slt, mic		248-2
		45	S/Sst	: v col gn, v col pi, slt		248-1
		tr	Ca	: w		248-3
4655.00				Perm?		249
		55	Sh/Clst:	red blk, slt, mic		249-2
		45	S/Sst	: v col gn, v col pi, slt		249-1
		tr	Ca	: w		249-3
4680.00				Perm?		250
		50	Sh/Clst:	gy red, red blk, calc, slt		250-1
		50	Ca	: w		250-2
		tr	Cont	: evap		250-3
		tr	Cont	: Coal-ad		250-4
4705.00				Perm?		251
		70	S/Sst	: red pi, calc		251-1
		30	Sh/Clst:	gy red to red blk, calc, slt		251-2
		tr	Ca	: w		251-3

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4730.00				Perm?		252
				100 S/Sst : gy pi, calc		252-1
				tr Sh/Clst: red blk to ol gy, calc, mic		252-2
4755.00				Perm?		253
				100 S/Sst : gy pi, calc		253-1
				tr Ca : w		253-2
				tr Cont : Mica-ad		253-3
				tr Cont : Coal-ad		253-4
4780.00				Perm?		254
				100 S/Sst : gy pi, calc		254-1
				tr Sh/Clst: gy red, slt, mic		254-2
				tr Cont : Mica-ad		254-3
4805.00				Perm?		255
				90 S/Sst : gy pi, calc		255-1
				10 Other : gy pi, mrl		255-2
				tr Sh/Clst: gy red to red blk, mic		255-3
				tr Cont : Mica-ad, prp, evap		255-4
				tr Cont : Coal-ad		255-5
4830.00				Perm?		256
				50 S/Sst : gy pi, calc		256-1
				50 Sh/Clst: gy red to red blk, slt, mic		256-2
				tr Cont : prp		256-3
4855.00				Perm?		257
				50 S/Sst : gy pi, calc		257-1
				50 Sh/Clst: gy red to red blk, slt, mic		257-2
				tr Cont : prp		257-3
				tr Cont : Coal-ad		257-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
4863.00				Perm?		258
		90	S/Sst	: v col gn, v col pi, calc		258-1
		10	Sh/Clst:	red blk, slt		258-2
		tr	Other	: red pi, mrl		258-3
		tr	Cont	: Mica-ad		258-4
4875.00				Perm?		259
		90	S/Sst	: red pi, calc		259-1
		10	Sh/Clst:	gn gy, red blk, slt, mic		259-2
		tr	Other	: red pi, mrl		259-3
		tr	Cont	: fib		259-4
4885.00				Perm?		260
		80	S/Sst	: v col gn, v col pi, calc		260-1
		20	Sh/Clst:	gy red to red blk, mic		260-2
		tr	Other	: red pi, mrl		260-3
		tr	Cont	: Coal-ad		260-4
4893.00				Perm?		261
		90	S/Sst	: v col gn, v col pi, calc		261-1
		10	Sh/Clst:	gy red to red blk, mic		261-2
		tr	Other	: red pi, mrl		261-3
4903.00				Perm?		262
		80	S/Sst	: v col gn, v col pi, calc		262-1
		10	Sh/Clst:	gy red, gn gy, red blk, mic		262-2
		10	Other	: red pi, mrl		262-3
4913.00				Perm?		263
		80	S/Sst	: v col gn, v col pi, calc		263-1
		20	Sh/Clst:	gy red, gn gy, red blk, mic		263-2
		tr	Other	: red pi, mrl		263-3
		tr	Cont	: prp, dd		263-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
4923.00				Perm?		264
		100	S/Sst	: v col gn, v col pi		264-1
			tr Sh/Clst:	gy red, gn gy, red blk, mic		264-2
			tr Other	: red pi, mrl		264-3
4933.00				Perm?		265
		80	S/Sst	: v col gn, v col pi, calc		265-1
		20	Sh/Clst:	gy red, gn gy, red blk, mic		265-2
			tr Other	: red pi, mrl		265-3
			tr Cont	: prp		265-4
			tr Cont	: Coal-ad		265-5
4943.00				Perm?		266
		80	S/Sst	: v col gn, v col pi, calc		266-1
		20	Sh/Clst:	gy red, gn gy, red blk, mic		266-2
			tr Cont	: fib		266-3
			tr Cont	: Coal-ad		266-4
4953.00				Perm?		267
		100	S/Sst	: v col gn, v col pi, calc		267-1
			tr Sh/Clst:	gy red, gn gy, red blk, mic		267-2
			tr Other	: red pi, mrl		267-3
4963.00				Perm?		268
	0.15	90	S/Sst	: v col gn, v col pi, calc		268-1
		5	Sh/Clst:	gy red, mic		268-2
		5	Other	: red pi, mrl		268-3
			tr Cont	: Coal-ad		268-4

Table 1 : Lithology description for well NOCS 31/4-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
4973.00				Perm?		269
	0.17	50	S/Sst	: v col gn, v col pi, calc		269-1
	0.41	50	Sh/Clst:	gy red, gn gy, red blk, mic		269-2
4975.00				Perm?	*	270
	0.17	50	S/Sst	: v col gn, v col pi, calc		270-1
	0.19	50	Sh/Clst:	gy red to red blk, mic		270-2
			tr Cont	: Mica-ad, prp		270-3

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
1805.00	cut	Sh/Clst: gn gy, ol gy	0.22	1.52	0.69	2.20	1.46	104	47	1.7	0.13	416	004-1
1830.00	cut	Sh/Clst: brn gy, gn gy to ol gy	0.10	0.89	1.26	0.71	1.08	82	117	1.0	0.10	428	005-1
1855.00	cut	Sh/Clst: brn gy, gn gy to ol gy	0.13	1.13	1.84	0.61	1.30	87	142	1.3	0.10	429	006-1
1880.00	cut	Sh/Clst: brn gy, gn gy, ol gy	0.05	0.20	1.50	0.13	0.64	31	234	0.3	0.20	429	007-1
1905.00	cut	Sh/Clst: brn gy, gn gy, ol gy	0.06	0.30	1.03	0.29	0.71	42	145	0.4	0.17	432	008-1
1930.00	cut	Sh/Clst: brn gy, gn gy, ol gy	0.05	0.23	0.87	0.26	0.79	29	110	0.3	0.18	431	009-1
1958.00	cut	Sh/Clst: gn gy, ol gy	0.03	0.18	0.73	0.25	0.70	26	104	0.2	0.14	432	011-1
1964.00	cut	Ca : w	-	-	0.35	-	0.09	-	389	-	-	437	012-2
1970.00	cut	Ca : w	0.01	0.03	0.61	0.05	0.12	25	508	-	0.25	448	013-1
1978.00	cut	Ca : w	0.01	0.01	0.51	0.02	0.14	7	364	-	0.50	389	014-1
1984.00	cut	Ca : w	0.01	0.03	0.53	0.06	0.10	30	530	-	0.25	383	015-1
1988.00	cut	Sh/Clst: gn gy to drk gn gy	0.06	0.18	0.64	0.28	0.62	29	103	0.2	0.25	430	016-1
2002.00	cut	Ca : w	0.01	0.03	0.61	0.05	0.11	27	555	-	0.25	440	018-1
2008.00	cut	Sh/Clst: gn gy to ol gy	0.06	0.18	0.71	0.25	0.67	27	106	0.2	0.25	424	019-1
2012.00	cut	Sh/Clst: ol blk	1.84	28.60	1.60	17.88	7.93	361	20	30.4	0.06	422	020-2

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2020.00	cut	Sh/Clst: ol blk	0.96	17.84	1.17	15.25	5.82	307	20	18.8	0.05	423	021-1
2030.00	cut	S/Sst : lt gn gy	0.12	1.20	1.15	1.04	0.52	231	221	1.3	0.09	418	022-5
2036.00	cut	S/Sst : lt ol gy	0.08	0.58	0.88	0.66	0.37	157	238	0.7	0.12	420	023-3
2048.00	cut	S/Sst : lt ol gy	0.03	0.01	0.58	0.02	0.14	7	414	-	0.75	426	024-3
2056.00	cut	S/Sst : gn	0.05	0.04	0.84	0.05	0.20	20	420	0.1	0.56	418	025-3
2064.00	cut	S/Sst : lt ol gy	0.11	0.17	0.28	0.61	0.26	65	108	0.3	0.39	429	026-3
2068.00	cut	S/Sst : lt ol gy	0.13	0.15	0.48	0.31	0.31	48	155	0.3	0.46	427	027-3
2076.00	cut	S/Sst : lt ol gy	0.05	0.15	0.37	0.41	0.32	47	116	0.2	0.25	432	028-3
2080.00	cut	Sltst : ol gy	0.16	0.50	2.98	0.17	0.73	68	408	0.7	0.24	428	029-3
2085.00	cut	Sh/Clst: blk to m drk gy	1.56	22.70	1.21	18.76	6.89	329	18	24.3	0.06	421	030-2
2085.00	cut	S/Sst : lt gy	0.09	0.38	0.55	0.69	0.55	69	100	0.5	0.19	433	030-3
2092.00	cut	Sh/Clst: blk to m drk gy	0.83	18.60	1.07	17.38	5.94	313	18	19.4	0.04	423	031-2
2092.00	cut	S/Sst : m gy	0.09	0.50	0.96	0.52	0.58	86	166	0.6	0.15	432	031-3
2097.00	cut	Sh/Clst: gn gy to lt ol gy, m drk gy	0.08	1.79	0.86	2.08	1.39	129	62	1.9	0.04	427	032-1
2097.00	cut	S/Sst : lt gy	0.08	0.30	0.99	0.30	0.57	53	174	0.4	0.21	424	032-2

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2105.00	cut	Sltst : y gy	0.27	0.56	8.11	0.07	0.90	62	901	0.8	0.33	423	033-2
2110.00	cut	Sh/Clst: gn gy to ol gy	0.07	0.14	1.64	0.09	1.18	12	139	0.2	0.33	430	034-1
2110.00	cut	Sltst : y gy	0.26	0.73	8.73	0.08	0.58	126	1505	1.0	0.26	429	034-2
2118.00	cut	Sh/Clst: gn gy to ol gy, m gy	0.23	5.37	0.80	6.71	2.02	266	40	5.6	0.04	428	035-1
2118.00	cut	Sltst : y gy	0.19	0.40	7.94	0.05	0.99	40	802	0.6	0.32	423	035-2
2125.00	cut	Sh/Clst: gn gy, lt gy to m gy	0.69	12.79	0.98	13.05	3.47	369	28	13.5	0.05	425	036-1
2133.00	cut	Sh/Clst: m lt gy to m drk gy	0.22	3.76	0.84	4.48	1.63	231	52	4.0	0.06	427	037-1
2138.00	cut	Sh/Clst: m lt gy to m drk gy	0.15	2.03	0.87	2.33	1.36	149	64	2.2	0.07	427	038-1
2143.00	cut	S/Sst : m lt gy	0.13	0.37	0.60	0.62	0.56	66	107	0.5	0.26	430	039-2
2150.00	cut	S/Sst : m lt gy	0.17	0.52	0.53	0.98	0.59	88	90	0.7	0.25	432	040-2
2200.00	cut	S/Sst : lt gy	0.01	0.08	0.43	0.19	0.22	36	195	0.1	0.11	429	042-1
2213.00	cut	S/Sst : m lt gy	0.11	0.28	0.54	0.52	0.34	82	159	0.4	0.28	434	044-1
2230.00	cut	S/Sst : m lt gy	0.03	0.11	0.71	0.15	0.31	35	229	0.1	0.21	428	046-1
2250.00	cut	S/Sst : m gy	0.04	0.25	0.82	0.30	0.41	61	200	0.3	0.14	432	048-1
2265.00	cut	S/Sst : m gy	0.04	0.26	0.83	0.31	0.43	60	193	0.3	0.13	434	050-1

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2270.00	cut	Sh/Clst: ol gy	0.04	0.48	0.76	0.63	0.79	61	96	0.5	0.08	427	051-1
2275.00	cut	Sh/Clst: ol gy	0.04	0.25	0.71	0.35	0.75	33	95	0.3	0.14	429	052-1
2280.00	cut	Sh/Clst: ol gy, lt gn gy, drk gy	0.02	0.15	0.66	0.23	0.65	23	102	0.2	0.12	429	053-1
2285.00	cut	Sh/Clst: ol gy	0.06	0.47	0.78	0.60	0.89	53	88	0.5	0.11	427	054-1
2293.00	cut	Sh/Clst: ol gy	0.03	0.17	0.75	0.23	0.68	25	110	0.2	0.15	429	055-1
2298.00	cut	Sh/Clst: ol gy	0.03	0.22	1.14	0.19	0.78	28	146	0.3	0.12	428	056-1
2303.00	cut	Sh/Clst: lt ol gy	0.02	0.23	0.58	0.40	0.73	32	79	0.3	0.08	429	057-1
2310.00	cut	Ca : w, y gy	0.11	0.60	3.47	0.17	0.68	88	510	0.7	0.15	426	058-2
2315.00	cut	Sh/Clst: ol gy	0.02	0.21	0.61	0.34	0.71	30	86	0.2	0.09	430	059-1
2323.00	cut	Sh/Clst: ol gy	0.02	0.17	0.61	0.28	0.64	27	95	0.2	0.11	429	060-1
2328.00	cut	Sh/Clst: lt ol gy	0.02	0.17	0.60	0.28	0.64	27	94	0.2	0.11	427	061-1
2338.00	cut	Sh/Clst: ol gy to lt ol gy	0.04	0.38	0.69	0.55	0.74	51	93	0.4	0.10	418	063-2
2338.00	cut	Ca : w, brn gy	0.06	0.20	2.81	0.07	0.34	59	826	0.3	0.23	430	063-4
2345.00	cut	Sh/Clst: lt ol gy	0.05	0.31	0.80	0.39	0.78	40	103	0.4	0.14	429	064-2
2350.00	cut	Sh/Clst: gn gy, lt ol gy	0.04	0.13	1.26	0.10	0.54	24	233	0.2	0.24	430	065-1

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2350.00	cut	Sh/Clst: ol blk	1.43	31.93	2.16	14.78	8.26	387	26	33.4	0.04	422	065-2
2355.00	cut	Sh/Clst: lt ol gy	0.07	1.26	0.83	1.52	1.40	90	59	1.3	0.05	430	066-1
2373.00	cut	Sh/Clst: lt ol gy to drk ol gy	0.06	0.76	0.58	1.31	1.04	73	56	0.8	0.07	435	068-1
2380.00	cut	Sh/Clst: lt ol gy to drk ol gy	0.03	0.19	0.73	0.26	0.56	34	130	0.2	0.14	426	069-1
2385.00	cut	Sh/Clst: lt ol gy, drk ol gy	0.02	0.23	0.43	0.53	0.52	44	83	0.3	0.08	431	070-1
2393.00	cut	Sltst : brn gy	0.20	0.55	6.16	0.09	0.88	63	700	0.8	0.27	426	071-2
2398.00	cut	Ca : w, y gy	0.94	1.38	5.88	0.23	0.83	166	708	2.3	0.41	411	072-2
2403.00	cut	Sh/Clst: gn gy to ol gy	0.03	0.34	0.58	0.59	0.72	47	81	0.4	0.08	431	073-2
2410.00	cut	Sltst : y gy	0.08	0.29	5.56	0.05	0.45	64	1236	0.4	0.22	436	074-2
2415.00	cut	S/Sst	0.03	0.13	1.23	0.11	0.28	46	439	0.2	0.19	428	075-1
2428.00	cut	Sh/Clst: m drk gy	0.10	1.61	0.71	2.27	1.52	106	47	1.7	0.06	437	077-2
2433.00	cut	Sh/Clst: m gy to m drk gy	0.10	1.64	0.83	1.98	1.31	125	63	1.7	0.06	435	078-1
2440.00	cut	Sh/Clst: gn gy, m drk gy	0.10	1.84	0.72	2.56	1.30	142	55	1.9	0.05	436	079-1
2445.00	cut	Sh/Clst: gn gy, m drk gy	0.15	2.85	0.59	4.83	1.55	184	38	3.0	0.05	433	080-1
2460.00	cut	S/Sst : y gy	-	-	0.30	-	0.12	-	250	-	-	436	082-1

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2478.00	cut	Sh/Clst: m drk gy	0.12	3.09	0.58	5.33	1.55	199	37	3.2	0.04	433	085-1
2483.00	cut	Sh/Clst: ol gy, m gy to m drk gy	0.12	2.34	0.61	3.84	1.24	189	49	2.5	0.05	434	086-1
2490.00	cut	Sh/Clst: ol gy, m gy to m drk gy	0.21	3.03	0.61	4.97	1.40	216	44	3.2	0.06	434	087-1
2495.00	cut	Sh/Clst: ol gy, m gy	0.15	3.32	0.48	6.92	1.30	255	37	3.5	0.04	435	088-1
2503.00	cut	Sh/Clst: ol gy, m gy	0.32	7.46	0.54	13.81	2.22	336	24	7.8	0.04	432	089-1
2508.00	cut	Sh/Clst: drk gy to m drk gy	0.25	5.30	0.69	7.68	1.62	327	43	5.6	0.05	430	090-1
2513.00	cut	Sh/Clst: ol gy, m drk gy	0.39	7.29	1.03	7.08	2.07	352	50	7.7	0.05	432	091-1
2520.00	cut	Sh/Clst: ol gy, m drk gy	0.44	6.94	1.17	5.93	2.22	313	53	7.4	0.06	431	092-1
2520.00	cut	Sltst : lt gy to m gy	0.22	2.03	2.05	0.99	1.04	195	197	2.3	0.10	427	092-2
2525.00	cut	Sh/Clst: ol gy, m drk gy	0.46	5.45	1.40	3.89	1.97	277	71	5.9	0.08	432	093-1
2525.00	cut	Sltst : lt gy to m gy	0.48	4.99	1.84	2.71	1.67	299	110	5.5	0.09	429	093-2
2533.00	cut	Sh/Clst: ol gy	0.49	6.08	1.74	3.49	1.95	312	89	6.6	0.07	431	094-1
2538.00	cut	Sh/Clst: ol gy	0.30	2.91	2.17	1.34	1.47	198	148	3.2	0.09	433	095-1
2543.00	cut	Sh/Clst: drk gy	0.45	5.64	1.62	3.48	2.09	270	78	6.1	0.07	432	096-1
2568.00	cut	S/Sst : y gy	0.02	0.07	1.22	0.06	0.23	30	530	0.1	0.22	436	097-1

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2573.00	cut	S/Sst : y gy	0.01	0.06	1.06	0.06	0.20	30	530	0.1	0.14	433	098-1
2580.00	cut	Sh/Clst: m gy	0.34	2.94	1.35	2.18	1.54	191	88	3.3	0.10	430	099-1
2585.00	cut	Sh/Clst: m gy	0.13	2.31	0.51	4.53	1.30	178	39	2.4	0.05	438	100-1
2593.00	cut	Sh/Clst: m gy	0.18	4.22	0.67	6.30	1.76	240	38	4.4	0.04	432	101-1
2598.00	cut	Sh/Clst: m gy	0.14	2.77	0.75	3.69	1.69	164	44	2.9	0.05	434	102-1
2598.00	cut	S/Sst : y gy	0.01	0.14	0.34	0.41	0.32	44	106	0.2	0.07	432	102-2
2603.00	cut	Sltst : y gy to m gy	0.06	0.41	3.27	0.13	0.61	67	536	0.5	0.13	435	103-1
2615.00	cut	Sltst : y gy to m gy	0.07	0.52	3.14	0.17	0.78	67	403	0.6	0.12	436	104-1
2623.00	cut	Sltst : y gy to m gy	0.06	0.41	4.01	0.10	0.61	67	657	0.5	0.13	438	105-1
2628.00	cut	Sltst : lt ol gy	0.07	0.31	5.21	0.06	0.57	54	914	0.4	0.18	434	106-1
2640.00	cut	Sltst : ol gy	0.07	0.34	4.41	0.08	0.42	81	1050	0.4	0.17	438	108-1
2645.00	cut	Sltst : lt gy to m drk gy	0.11	0.85	4.65	0.18	0.95	89	489	1.0	0.11	433	109-1
2653.00	cut	Sltst : lt gy to m drk gy	0.21	1.75	0.70	2.50	1.21	145	58	2.0	0.11	431	110-1
2658.00	cut	Sltst : lt gy to m drk gy	0.11	0.41	4.81	0.09	0.80	51	601	0.5	0.21	429	111-1
2663.00	cut	Sltst : lt gy to m drk gy	0.14	0.91	3.32	0.27	0.92	99	361	1.1	0.13	430	112-1

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2670.00	cut	Sltst : lt gy	0.08	0.63	2.35	0.27	0.78	81	301	0.7	0.11	429	113-1
2675.00	cut	Sltst : lt gy to m gy	0.10	0.80	1.89	0.42	0.94	85	201	0.9	0.11	435	114-1
2683.00	cut	Sltst : lt gy to m gy	0.11	1.35	0.67	2.01	1.12	121	60	1.5	0.08	433	115-1
2688.00	cut	Sh/Clst: m drk gy	0.11	2.16	0.65	3.32	1.40	154	46	2.3	0.05	432	116-1
2693.00	cut	Sh/Clst: m drk gy	0.17	3.94	0.54	7.30	1.79	220	30	4.1	0.04	431	117-1
2700.00	cut	Sh/Clst: m drk gy	0.20	4.19	0.49	8.55	1.76	238	28	4.4	0.05	431	118-1
2705.00	cut	Sh/Clst: m gy	0.25	6.48	0.47	13.79	2.19	296	21	6.7	0.04	430	119-1
2725.00	cut	Sh/Clst: m lt gy to m drk gy	0.40	7.50	0.59	12.71	2.39	314	25	7.9	0.05	427	120-1
2733.00	cut	S/Sst : w	0.01	0.08	0.57	0.14	0.21	38	271	0.1	0.11	429	121-1
2750.00	cut	Sh/Clst: m drk gy	1.53	17.19	0.82	20.96	8.20	210	10	18.7	0.08	427	124-2
2763.00	cut	Sh/Clst: m drk gy	0.35	5.52	1.15	4.80	2.69	205	43	5.9	0.06	433	126-1
2768.00	cut	Sh/Clst: m drk gy	0.16	1.63	1.85	0.88	1.76	93	105	1.8	0.09	433	127-2
2773.00	cut	Sh/Clst: m drk gy	0.20	1.29	0.93	1.39	2.19	59	42	1.5	0.13	430	128-2
2785.00	cut	S/Sst : w	-	-	0.35	-	1.00	-	35	-	-	434	130-1
2785.00	cut	Sh/Clst: lt gy to m drk gy	0.20	3.81	0.82	4.65	1.84	207	45	4.0	0.05	431	130-2

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2793.00	cut	Sh/Clst: drk gy to m drk gy	0.86	9.53	0.63	15.13	2.90	329	22	10.4	0.08	429	131-2
2810.00	cut	Sh/Clst: ol gy	0.08	1.04	0.74	1.41	1.28	81	58	1.1	0.07	438	134-3
2815.00	cut	Sh/Clst: ol gy	0.21	2.62	0.83	3.16	1.77	148	47	2.8	0.07	436	135-3
2823.00	cut	Sh/Clst: m gy to drk gy	0.69	6.48	0.97	6.68	2.90	223	33	7.2	0.10	431	136-1
2828.00	cut	Sh/Clst: gy blk to m gy	1.14	11.24	0.99	11.35	3.22	349	31	12.4	0.09	425	137-1
2828.00	cut	S/Sst : w	0.03	0.04	1.19	0.03	0.21	19	567	0.1	0.43	440	137-2
2853.00	cut	Sh/Clst: red blk, ol gy, dsk red	0.19	0.34	0.61	0.56	0.37	92	165	0.5	0.36	433	141-1
2858.00	cut	Sh/Clst: red blk, ol gy, dsk red	0.05	-	0.44	-	0.13	-	338	0.1	1.00	410	142-1
2863.00	cut	Sh/Clst: red blk, ol gy, dsk red	0.16	0.22	0.39	0.56	0.29	76	134	0.4	0.42	432	143-1
2870.00	cut	Sh/Clst: red blk, ol gy, dsk red	0.23	0.05	0.29	0.17	0.15	33	193	0.3	0.82	368	144-1
2870.00	cut	S/Sst : w	0.01	-	0.26	-	0.16	-	163	-	1.00	222	144-2
2870.00	cut	Ca : w, gy pi, lt brn gy to m brn gy	0.08	0.01	0.83	0.01	0.17	6	488	0.1	0.89	286	144-3
2875.00	cut	Sh/Clst: red blk, ol gy, dsk red	0.28	0.12	0.35	0.34	0.13	92	269	0.4	0.70	344	145-1
2893.00	cut	Sh/Clst: red blk to dsk red	0.28	0.05	0.34	0.15	0.12	42	283	0.3	0.85	337	147-1
2933.00	cut	Sh/Clst: red blk, m gy, dsk red	0.68	0.16	0.31	0.52	0.16	100	194	0.8	0.81	340	151-1

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2953.00	cut	Sh/Clst: red blk, m gy, dsk red	0.29	0.08	0.22	0.36	0.13	62	169	0.4	0.78	340	153-1
2963.00	cut	Sh/Clst: red blk, m gy, dsk red	0.53	0.11	0.32	0.34	0.15	73	213	0.6	0.83	344	155-1
2970.00	cut	Sh/Clst: red blk, m gy, dsk red	0.87	0.16	0.21	0.76	0.25	64	84	1.0	0.84	341	156-1
3003.00	cut	Sh/Clst: m drk gy	0.34	0.31	0.74	0.42	0.64	48	116	0.7	0.52	433	159-1
3023.00	cut	Sh/Clst: m drk gy	0.87	0.87	0.34	2.56	0.73	119	47	1.7	0.50	429	161-1
3053.00	cut	Sh/Clst: red blk, ol gy, m gy, dsk red	1.33	0.34	0.13	2.62	0.29	117	45	1.7	0.80	343	164-1
3083.00	cut	Sh/Clst: red blk, ol gy, m gy, dsk red	1.96	0.25	0.18	1.39	0.30	83	60	2.2	0.89	341	167-1
3123.00	cut	Sh/Clst: red blk, ol gy, m gy, dsk red	1.76	0.34	0.20	1.70	0.31	110	65	2.1	0.84	339	171-1
3143.00	cut	Sh/Clst: red blk, ol gy, m gy, dsk red	1.07	0.19	0.19	1.00	0.20	95	95	1.3	0.85	338	173-1
3163.00	cut	Sh/Clst: red blk, ol gy, m gy, dsk red	0.94	0.11	0.15	0.73	0.20	55	75	1.0	0.90	339	175-1
3173.00	cut	Sh/Clst: red blk, ol gy, m gy, dsk red	1.85	0.26	0.26	1.00	0.30	87	87	2.1	0.88	339	176-1
3183.00	cut	Sh/Clst: red blk, ol gy, m gy, dsk red	2.09	0.37	0.23	1.61	0.37	100	62	2.5	0.85	339	177-1

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3193.00	cut	Sh/Clst: red blk, ol gy, m gy, dsk red	1.68	0.17	0.20	0.85	0.31	55	65	1.8	0.91	341	178-1
3233.00	cut	Sh/Clst: red blk, ol gy, drk ol gy, dsk red	1.51	0.27	0.15	1.80	0.28	96	54	1.8	0.85	339	182-1
3233.00	cut	Sltst : brn gy, gn gy	0.62	0.11	0.18	0.61	0.21	52	86	0.7	0.85	347	182-2
3263.00	cut	Sh/Clst: red blk, ol gy to drk ol gy, dsk red	0.89	0.20	0.17	1.18	0.21	95	81	1.1	0.82	336	185-1
3283.00	cut	S/Sst : w to pl red	0.04	-	-	-	0.77	-	-	-	1.00	346	187-1
3303.00	cut	S/Sst : w to pl red	0.10	-	-	-	0.76	-	-	0.1	1.00	401	189-1
3323.00	cut	Sh/Clst: gy brn, gn gy	0.54	0.12	0.18	0.67	0.19	63	95	0.7	0.82	334	191-1
3353.00	cut	S/Sst : w to pl red	0.12	-	-	-	0.83	-	-	0.1	1.00	345	194-1
3383.00	cut	Sh/Clst: gy brn to dsk red	0.77	0.14	0.05	2.80	0.21	67	24	0.9	0.85	342	197-2
3630.00	cut	Sh/Clst: gy brn, ol gy, drk ol gy, dsk red	0.11	0.01	0.11	0.09	0.10	10	110	0.1	0.92	304	208-1
3705.00	cut	Sh/Clst: gy brn, ol gy, drk ol gy, dsk red	0.12	0.02	0.34	0.06	0.11	18	309	0.1	0.86	351	211-1
4230.00	cut	S/Sst : w to pl red	0.68	0.06	0.34	0.18	0.13	46	262	0.7	0.92	335	232-1
4360.00	cut	Sh/Clst: gy brn to dsk red	6.54	2.20	7.22	0.30	2.30	96	314	8.7	0.75	373	237-1

Table 2 : Rock-Eval table for well NOCS 31/4-3

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Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4555.00	cut	Sh/Clst: red blk, drk gy	3.64	0.55	0.34	1.62	0.48	115	71	4.2	0.87	353	245-1
4610.00	cut	Sh/Clst: red blk, drk gy	3.15	0.41	0.29	1.41	0.37	111	78	3.6	0.88	348	247-2
4963.00	cut	S/Sst : v col gn, v col pi	1.16	0.02	0.21	0.10	0.15	13	140	1.2	0.98	358	268-1
4973.00	cut	S/Sst : v col gn, v col pi	1.07	0.06	0.20	0.30	0.17	35	118	1.1	0.95	327	269-1
4973.00	cut	Sh/Clst: gy red, gn gy, red blk	2.13	0.33	0.99	0.33	0.41	80	241	2.5	0.87	360	269-2
4975.00	cut	S/Sst : v col gn, v col pi	1.10	0.04	0.21	0.19	0.17	24	124	1.1	0.96	293	270-1
4975.00	cut	Sh/Clst: gy red to red blk	1.32	0.19	0.25	0.76	0.19	100	132	1.5	0.87	353	270-2

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

Page: 1

Depth unit of measure: m

Depth	Typ	Lithology	Rock Extracted (g)	EOM (mg)	Sat (mg)	Aro (mg)	Asph (mg)	NSO (mg)	HC (mg)	Non-HC (mg)	TOC(e) (%)	Sample
2092.00	com	* Composite sample - see table 3 e *	2.2	3.8	0.7	0.2	1.5	1.4	0.9	2.9	1.40	271-0
2138.00	com	* Composite sample - see table 3 e *	8.6	8.0	1.6	0.8	0.1	5.5	2.4	5.6	0.70	272-0
2445.00	com	* Composite sample - see table 3 e *	2.3	0.7	0.5	0.1	0.1	-	0.6	0.1	0.30	273-0
2495.00	com	* Composite sample - see table 3 e *	7.3	6.3	1.1	1.0	0.4	3.8	2.1	4.2	0.80	274-0
2520.00	com	* Composite sample - see table 3 e *	6.1	6.2	1.1	1.1	0.7	3.3	2.2	4.0	0.90	275-0
2543.00	com	* Composite sample - see table 3 e *	25.5	23.2	7.4	3.8	0.9	11.1	11.2	12.0	0.90	276-0
2598.00	com	* Composite sample - see table 3 e *	12.1	7.1	1.9	1.2	0.5	3.5	3.1	4.0	0.70	277-0
2705.00	com	* Composite sample - see table 3 e *	6.4	3.4	0.6	0.5	0.4	1.9	1.1	2.3	0.70	278-0
2793.00	com	* Composite sample - see table 3 e *	6.5	8.4	1.9	1.1	0.4	5.0	3.0	5.4	0.80	279-0
2828.00	com	* Composite sample - see table 3 e *	13.1	11.2	4.4	1.7	0.4	4.7	6.1	5.1	0.70	280-0

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

Page: 1

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
2092.00	com	* Composite sample - see table 3 e *	1727	318	90	681	636	409	1318	271-0
2138.00	com	* Composite sample - see table 3 e *	930	186	93	11	639	279	651	272-0
2445.00	com	* Composite sample - see table 3 e *	304	217	43	43	-	260	43	273-0
2495.00	com	* Composite sample - see table 3 e *	863	150	136	54	520	287	575	274-0
2520.00	com	* Composite sample - see table 3 e *	1016	180	180	114	540	360	655	275-0
2543.00	com	* Composite sample - see table 3 e *	909	290	149	35	435	439	470	276-0
2598.00	com	* Composite sample - see table 3 e *	586	157	99	41	289	256	330	277-0
2705.00	com	* Composite sample - see table 3 e *	531	93	78	62	296	171	359	278-0
2793.00	com	* Composite sample - see table 3 e *	1292	292	169	61	769	461	830	279-0
2828.00	com	* Composite sample - see table 3 e *	854	335	129	30	358	465	389	280-0

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

Page: 1

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
2092.00	com	* Composite sample - see table 3 e *	123.38	22.73	6.49	48.70	45.45	29.22	94.16	271-0
2138.00	com	* Composite sample - see table 3 e *	132.89	26.58	13.29	1.66	91.36	39.87	93.02	272-0
2445.00	com	* Composite sample - see table 3 e *	101.45	72.46	14.49	14.49	-	86.96	14.49	273-0
2495.00	com	* Composite sample - see table 3 e *	107.88	18.84	17.12	6.85	65.07	35.96	71.92	274-0
2520.00	com	* Composite sample - see table 3 e *	112.93	20.04	20.04	12.75	60.11	40.07	72.86	275-0
2543.00	com	* Composite sample - see table 3 e *	101.09	32.24	16.56	3.92	48.37	48.80	52.29	276-0
2598.00	com	* Composite sample - see table 3 e *	83.83	22.43	14.17	5.90	41.32	36.60	47.23	277-0
2705.00	com	* Composite sample - see table 3 e *	75.89	13.39	11.16	8.93	42.41	24.55	51.34	278-0
2793.00	com	* Composite sample - see table 3 e *	161.54	36.54	21.15	7.69	96.15	57.69	103.85	279-0
2828.00	com	* Composite sample - see table 3 e *	122.14	47.98	18.54	4.36	51.25	66.52	55.62	280-0

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

Page: 1

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	
2092.00	com	* Composite sample - see table 3 e *	18.42	5.26	39.47	36.84	23.68	76.32	350.00	31.03	271-0
2138.00	com	* Composite sample - see table 3 e *	20.00	10.00	1.25	68.75	30.00	70.00	200.00	42.86	272-0
2445.00	com	* Composite sample - see table 3 e *	71.43	14.29	14.29	-	85.71	14.29	500.00	600.00	273-0
2495.00	com	* Composite sample - see table 3 e *	17.46	15.87	6.35	60.32	33.33	66.67	110.00	50.00	274-0
2520.00	com	* Composite sample - see table 3 e *	17.74	17.74	11.29	53.23	35.48	64.52	100.00	55.00	275-0
2543.00	com	* Composite sample - see table 3 e *	31.90	16.38	3.88	47.84	48.28	51.72	194.74	93.33	276-0
2598.00	com	* Composite sample - see table 3 e *	26.76	16.90	7.04	49.30	43.66	56.34	158.33	77.50	277-0
2705.00	com	* Composite sample - see table 3 e *	17.65	14.71	11.76	55.88	32.35	67.65	120.00	47.83	278-0
2793.00	com	* Composite sample - see table 3 e *	22.62	13.10	4.76	59.52	35.71	64.29	172.73	55.56	279-0
2828.00	com	* Composite sample - see table 3 e *	39.29	15.18	3.57	41.96	54.46	45.54	258.82	119.61	280-0

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

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
2085.00	2092.00	com	271-0	is composed of:	2085.00	cut	Sh/Clst: blk to m drk gy	030-2
					2092.00	cut	Sh/Clst: blk to m drk gy	031-2
2125.00	2138.00	com	272-0	is composed of:	2125.00	cut	Sh/Clst: gn gy, lt gy to m gy, calc	036-1
					2133.00	cut	Sh/Clst: m lt gy to m drk gy, calc	037-1
					2138.00	cut	Sh/Clst: m lt gy to m drk gy, calc	038-1
2428.00	2445.00	com	273-0	is composed of:	2428.00	cut	Sh/Clst: m drk gy, slt, mic	077-2
					2433.00	cut	Sh/Clst: m gy to m drk gy, calc, mic	078-1
					2440.00	cut	Sh/Clst: gn gy, m drk gy, calc, mic	079-1
					2445.00	cut	Sh/Clst: gn gy, m drk gy, calc, mic	080-1
2478.00	2495.00	com	274-0	is composed of:	2478.00	cut	Sh/Clst: m drk gy, mic	085-1
					2483.00	cut	Sh/Clst: ol gy, m gy to m drk gy, mic	086-1
					2490.00	cut	Sh/Clst: ol gy, m gy to m drk gy, mic	087-1
					2495.00	cut	Sh/Clst: ol gy, m gy, mic	088-1
2503.00	2520.00	com	275-0	is composed of:	2503.00	cut	Sh/Clst: ol gy, m gy, mic	089-1
					2508.00	cut	Sh/Clst: drk gy to m drk gy, mic	090-1
					2513.00	cut	Sh/Clst: ol gy, m drk gy, mic	091-1
					2520.00	cut	Sh/Clst: ol gy, m drk gy, mic	092-1

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

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
2533.00	2543.00	com	276-0	is composed of:	2533.00	cut	Sh/Clst: ol gy, mic	094-1
					2538.00	cut	Sh/Clst: ol gy	095-1
					2543.00	cut	Sh/Clst: drk gy, slt	096-1
2580.00	2598.00	com	277-0	is composed of:	2580.00	cut	Sh/Clst: m gy, slt, mic	099-1
					2585.00	cut	Sh/Clst: m gy, calc, slt, mic	100-1
					2593.00	cut	Sh/Clst: m gy, calc, slt, mic	101-1
					2598.00	cut	Sh/Clst: m gy, calc, slt, mic	102-1
2688.00	2705.00	com	278-0	is composed of:	2688.00	cut	Sh/Clst: m drk gy, calc, mic	116-1
					2693.00	cut	Sh/Clst: m drk gy, calc, mic	117-1
					2700.00	cut	Sh/Clst: m drk gy, calc, mic	118-1
					2705.00	cut	Sh/Clst: m gy, Mica-ad	119-1
2750.00	2793.00	com	279-0	is composed of:	2750.00	cut	Sh/Clst: m drk gy, mic	124-2
					2763.00	cut	Sh/Clst: m drk gy, mic	126-1
					2785.00	cut	Sh/Clst: lt gy to m drk gy, mic	130-2
					2793.00	cut	Sh/Clst: drk gy to m drk gy, mic	131-2
2815.00	2828.00	com	280-0	is composed of:	2815.00	cut	Sh/Clst: m gy to drk gy, mic	135-2
					2823.00	cut	Sh/Clst: m gy to drk gy, mic	136-1
					2828.00	cut	Sh/Clst: gy blk to m gy	137-1

Table 4 : Tabulation of data from the Gas Chromatogram for well NOCS 31/4-3

Page: 1

Depth unit of measure: m

Depth	Typ	Lithology	Pristane	Pristane	Pristane + Phytane	Phytane	CPI	Sample
			nC17	Phytane	nC17 + nC18	nC18		
2092.00	com	bulk	0.70	1.50	0.70	-	1.00	271-0
2138.00	com	bulk	0.40	1.70	0.40	-	1.10	272-0
2445.00	com	bulk	0.50	2.30	0.40	-	1.40	273-0
2495.00	com	bulk	0.50	2.20	0.50	-	1.30	274-0
2520.00	com	bulk	0.60	2.50	0.50	-	1.40	275-0
2543.00	com	bulk	0.40	2.20	0.40	-	1.20	276-0
2598.00	com	bulk	0.80	3.10	0.60	-	1.40	277-0
2705.00	com	bulk	0.90	2.90	0.70	-	1.30	278-0
2793.00	com	bulk	0.50	1.80	0.50	-	1.20	279-0
2828.00	com	bulk	0.40	1.60	0.40	-	1.30	280-0

Table 5 : Aromatic Hydrocarbon Ratios for well NOCS 31/4-3

Page: 1

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	DBT/P	4/1MDBT	(3+2)/1MDBT	Sample
2092.00	com	bulk	-	0.80	0.14	0.94	0.58	0.60	0.12	2.30	0.80	271-0
2138.00	com	bulk	-	-	-	1.00	0.55	0.57	0.11	1.00	1.00	272-0
2445.00	com	bulk	-	-	-	0.71	0.55	0.56	-	-	-	273-0
2495.00	com	bulk	-	-	0.32	1.00	0.56	0.57	-	-	-	274-0
2520.00	com	bulk	-	-	-	0.83	0.52	0.54	0.10	1.00	1.00	275-0
2543.00	com	bulk	1.20	-	-	0.95	0.54	0.61	-	-	-	276-0
2598.00	com	bulk	1.00	-	0.34	0.83	0.50	0.53	-	-	-	277-0
2705.00	com	bulk	1.00	-	0.25	0.88	0.51	0.55	-	-	-	278-0
2793.00	com	bulk	1.00	-	0.25	1.06	0.63	0.72	0.10	2.00	1.00	279-0
2828.00	com	bulk	1.10	1.00	-	1.26	0.69	0.81	0.10	4.30	1.30	280-0

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 31/4-3

Page: 1

Depth unit of measure: m

Depth	Typ Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	T _{max} (°C)	Sample
1730.00	cut bulk	0.48	20	0.05	3-4	-	-	001-0
1855.00	cut bulk	0.49	15	0.05	4	-	-	006-0
1958.00	cut bulk	0.43	7	0.06	4	-	-	011-0
2012.00	cut Sh/Clst: ol blk	-	-	-	-	2	422	020-2
2020.00	cut bulk	0.47	7	0.06	4	-	-	021-0
2020.00	cut Sh/Clst: ol blk	-	-	-	-	2	423	021-1
2076.00	cut bulk	0.55	5	0.03	4	-	-	028-0
2105.00	cut bulk	0.49	3	0.12	0	-	-	033-0
2118.00	cut Sh/Clst: gn gy to ol gy, m gy	-	-	-	-	3	428	035-1
2125.00	cut Sh/Clst: gn gy, lt gy to m gy	-	-	-	-	2-3	425	036-1
2133.00	cut Sh/Clst: m lt gy to m drk gy	-	-	-	-	2-3	427	037-1
2138.00	cut bulk	0.48	7	0.08	4-5	-	-	038-0
2138.00	cut Sh/Clst: m lt gy to m drk gy	-	-	-	-	2.5	427	038-1
2280.00	cut bulk	0.49	14	0.04	5	-	-	053-0

Table 6 : Thermal Maturity Data for well NOCS 31/4-3

Page: 2

Depth unit of measure: m

Depth	Typ Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	T _{max} (°C)	Sample
2333.00	cut bulk	0.47	13	0.03	5	-	-	062-0
2373.00	cut bulk	0.49	20	0.06	5-6	-	-	068-0
2428.00	cut Sh/Clst: m drk gy	-	-	-	-	3.5-4	437	077-2
2433.00	cut Sh/Clst: m gy to m drk gy	-	-	-	-	3.5-4	435	078-1
2440.00	cut Sh/Clst: gn gy, m drk gy	-	-	-	-	3.5	436	079-1
2445.00	cut bulk	0.52	20	0.07	5-6	-	-	080-0
2445.00	cut Sh/Clst: gn gy, m drk gy	-	-	-	-	3.5	433	080-1
2478.00	cut Sh/Clst: m drk gy	-	-	-	-	3-3.5	433	085-1
2483.00	cut Sh/Clst: ol gy, m gy to m drk gy	-	-	-	-	3.5	434	086-1
2490.00	cut Sh/Clst: ol gy, m gy to m drk gy	-	-	-	-	3.5	434	087-1
2495.00	cut bulk	0.48	13	0.07	4-5	-	-	088-0
2495.00	cut Sh/Clst: ol gy, m gy	-	-	-	-	4	435	088-1
2503.00	cut Sh/Clst: ol gy, m gy	-	-	-	-	4	432	089-1
2508.00	cut Sh/Clst: drk gy to m drk gy	-	-	-	-	3.5-4	430	090-1

Table 6 : Thermal Maturity Data for well NOCS 31/4-3

Page: 3

Depth unit of measure: m

Depth	Typ Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	T _{max} (°C)	Sample
2513.00	cut Sh/Clst: ol gy, m drk gy	-	-	-	-	3.5-4	432	091-1
2520.00	cut Sh/Clst: ol gy, m drk gy	-	-	-	-	4	431	092-1
2533.00	cut Sh/Clst: ol gy	-	-	-	-	4	431	094-1
2538.00	cut Sh/Clst: ol gy	-	-	-	-	4-4.5?	433	095-1
2543.00	cut bulk	0.56	17	0.06	4-5	-	-	096-0
2543.00	cut Sh/Clst: drk gy	-	-	-	-	4-4.5	432	096-1
2580.00	cut Sh/Clst: m gy	-	-	-	-	4.5?	430	099-1
2585.00	cut Sh/Clst: m gy	-	-	-	-	4.5	438	100-1
2593.00	cut Sh/Clst: m gy	-	-	-	-	4.5	432	101-1
2598.00	cut Sh/Clst: m gy	-	-	-	-	4.5	434	102-1
2615.00	cut bulk	0.47	20	0.04	4-5	-	-	104-0
2658.00	cut bulk	0.50	20	0.08	5	-	-	111-0
2688.00	cut Sh/Clst: m drk gy	-	-	-	-	4.5-5?	432	116-1
2693.00	cut bulk	0.52	21	0.06	5-6	-	-	117-0

Table 6 : Thermal Maturity Data for well NOCS 31/4-3

Page: 4

Depth unit of measure: m

Depth	Typ Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
2693.00	cut Sh/Clst: m drk gy	-	-	-	-	4.5	431	117-1
2700.00	cut Sh/Clst: m drk gy	-	-	-	-	4.5	431	118-1
2705.00	cut Sh/Clst: m gy	-	-	-	-	4-4.5	430	119-1
2725.00	cut bulk	0.52	21	0.08	5-6	-	-	120-0
2750.00	cut Sh/Clst: m drk gy	-	-	-	-	4.5	427	124-2
2753.00	cut bulk	0.56	26	0.03	5-6	-	-	125-0
2763.00	cut Sh/Clst: m drk gy	-	-	-	-	4.5-5	433	126-1
2785.00	cut Sh/Clst: lt gy to m drk gy	-	-	-	-	4.5	431	130-2
2815.00	cut Sh/Clst: ol gy	-	-	-	-	4.5-5	436	135-3
2823.00	cut bulk	0.59	16	0.05	6	-	-	136-0
2823.00	cut Sh/Clst: m gy to drk gy	-	-	-	-	5	431	136-1
2828.00	cut Sh/Clst: gy blk to m gy	-	-	-	-	4.5	425	137-1
3003.00	cut bulk	0.71	22	0.05	5-6	-	-	159-0
3103.00	cut bulk	0.72	19	0.09	0	-	-	169-0

Table 6 : Thermal Maturity Data for well NOCS 31/4-3

Page: 5

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
3213.00	cut	bulk	0.79	5	0.05	0	-	-	180-0
3213.00	cut	bulk	0.86	4	0.09	0	-	-	180-0
3353.00	cut	bulk	0.75	9	0.05	0	-	-	194-0
3705.00	cut	bulk	0.83	4	0.15	0	-	-	211-0

Table 7 : Visual Kerogen Composition Data for well NOCS 31/4-3

Page: 1

Depth unit of measure: m

Depth	Typ	Lithology	L I P T %	A m o r L t	L i p / D e l	S p t P o c l	C u t i n e	R e s i d u e	A l g i n a l	D i n c r i t	A B i t L	I N E R T %	F u s i n	S e m F u e n t s	I n t r e i n	M i c r o i	S c l e r o	B i t I	V I T R %	T e l l i n	C o l l i n	V i t t e n	A i m o r t V	B i t V	Sample
2012.00	cut	Sh/Clst: ol blk	70	*	*	*	*					10	*	*					20	?	*	*			020-2
2020.00	cut	Sh/Clst: ol blk	65		*	*						5		*					30	?	*	*			021-1
2118.00	cut	Sh/Clst: gn gy to ol gy, m gy	30		*	*	?					20							50		*	*			035-1
2125.00	cut	Sh/Clst: gn gy, lt gy to m gy	60	*	*	*	?					25	*	*					15		*	*			036-1
2133.00	cut	Sh/Clst: m lt gy to m drk gy	30	*	*	*						30	*	*					40		*	*			037-1
2138.00	cut	Sh/Clst: m lt gy to m drk gy	20	*	*							35		*					45		*	*			038-1
2428.00	cut	Sh/Clst: m drk gy	30		*	*						40	*	*	*				30		*				077-2
2433.00	cut	Sh/Clst: m gy to m drk gy	30		*	*			*			30	*	*	*				40		*				078-1
2440.00	cut	Sh/Clst: gn gy, m drk gy	30		*	*						20		*					50		*				079-1
2445.00	cut	Sh/Clst: gn gy, m drk gy	20	*	*	*						10		*					70		*	*			080-1
2478.00	cut	Sh/Clst: m drk gy	30		*	*	?					10	?	*					60		*	*			085-1
2483.00	cut	Sh/Clst: ol gy, m gy to m drk gy	35		*	*	?					10	*	*	*				55		*	*			086-1
2490.00	cut	Sh/Clst: ol gy, m gy to m drk gy	40		*	*	?					10		*					50		*	*			087-1

Table 7 : Visual Kerogen Composition Data for well NOCS 31/4-3

Page: 2

Depth unit of measure: m

Depth	Typ	Lithology	L I P T %	A m o r L t	L i p D e c l	S u t P i o c l	C R e s i d u e l n e	D i f f e r e n t i a l	A B i t L	I N E R T %	F u s i n s	S e m F u e t	I n t r i n s	M i c r o n	S c l e r o I	V I T R %	T e l l i n	C o l l i n	V i t r i n	A m o r b i t V	S m p l e
2495.00	cut	Sh/Clst: ol gy, m gy	40	?	*	*				10		*				50		*	*		088-1
2503.00	cut	Sh/Clst: ol gy, m gy	70	?	*	*				5		*				25		*	*		089-1
2508.00	cut	Sh/Clst: drk gy to m drk gy	75	*	*	*				5		*				20		*	*		090-1
2513.00	cut	Sh/Clst: ol gy, m drk gy	75	*	*	*	?	*	*	5		*				20		*	*		091-1
2520.00	cut	Sh/Clst: ol gy, m drk gy	70	?	*	*		*	?	5		*				25		*	*		092-1
2533.00	cut	Sh/Clst: ol gy	70	*	*	*		*	*	5		*				25		*	*		094-1
2538.00	cut	Sh/Clst: ol gy	40		*	*		?		20		*	*			40		*	*		095-1
2543.00	cut	Sh/Clst: drk gy	40	*	*	*		?	?	20		*				40		*	*		096-1
2580.00	cut	Sh/Clst: m gy	30		*	*	?			25	?	*	*			45	*	*	*		099-1
2585.00	cut	Sh/Clst: m gy	25		*	*		*		15		*	*			60	*	*	*		100-1
2593.00	cut	Sh/Clst: m gy	40		*	*		*		10		?	*			50	*	*	*		101-1
2598.00	cut	Sh/Clst: m gy	40		*	*	?	*		10		*				50	*	*	*		102-1
2688.00	cut	Sh/Clst: m drk gy	30	?	*	*				10		*				60		*	*		116-1

Table 7 : Visual Kerogen Composition Data for well NOCS 31/4-3

Page: 3

Depth unit of measure: m

Depth	Typ	Lithology	L	A	L	S	C		D		I		S	I	M	S		V		C	V	A			
			P	m	i	p	u	R	A	i	A	B	F	e	n	c	B	I	T	e	l	t	m	B	
			T	r	D	P	i	s	g	o	r	t	T	u	F	i	n	I	%	n	n	t	V	V	
			%	L	t	l	l	n	e	l	t	L	%	n	s	t	n	o	I	%	n	n	t	V	V
																								Smple	
2693.00	cut	Sh/Clst: m drk gy	40	*	*	*			*			5						55		*	*			117-1	
2700.00	cut	Sh/Clst: m drk gy	40		*	*	*		*			10	?	*	*			50	*		*	*		118-1	
2705.00	cut	Sh/Clst: m gy	50	*	*	*	?		*			10		?	*			40	*		*	*		119-1	
2750.00	cut	Sh/Clst: m drk gy	20		*	*	?					20	*	*				60	*	*	*			124-2	
2763.00	cut	Sh/Clst: m drk gy	20		*	*						10		*	*			70	*	*	*			126-1	
2785.00	cut	Sh/Clst: lt gy to m drk gy	30	*	*	*			?			10		*	?			60	?	?	*			130-2	
2815.00	cut	Sh/Clst: ol gy	25		*	*						10		?	*			65			*	*		135-3	
2823.00	cut	Sh/Clst: m gy to drk gy	20		?	*	*		*			20		*	*			60			*			136-1	
2828.00	cut	Sh/Clst: gy blk to m gy	40	*	*	*						20		*	*			40			*	*		137-1	

Table WELL 31/4-3
PYROLYSIS GC ON NON-EXTRACTED ROCK. VALUES FROM S2 PEAK.

DEPTH (m)	% C1-C5 of total	% C6+ of total
=====	=====	=====
2012	37	63
2020	35	65
2030	39	61
2064	50	50
2080	56	44
2105	61	39
2115	65	35
2118	32	68
2125	32	68
2133	39	61
2138	39	61
2143	50	50
2213	45	55
2393	46	54
2398	32	68
2428	42	58
2433	42	58
2440	41	59
2445	42	58
2478	37	63
2483	40	60

Table WELL 31/4-3
PYROLYSIS GC ON NON-EXTRACTED ROCK. VALUES FROM S2 PEAK.

DEPTH (m)	% C1-C5 of total	% C6+ of total
=====	=====	=====
2490	39	61
2495	34	66
2503	40	60
2508	31	69
2593	37	63
2513	37	63
2520	38	62
2533	38	62
2538	39	61
2543	41	59
2580	38	62
2585	36	64
2598	40	60
2653	50	50
2683	50	50
2688	41	59
2693	34	66
2700	39	61
2705	28	72
2750	42	58

Table WELL 31/4-3
PYROLYSIS GC ON NON-EXTRACTED ROCK. VALUES FROM S2 PEAK.

DEPTH (m)	% C1-C5 of total	% C6+ of total
=====		
2763	33	67
2785	36	64
2815	41	59
2823	36	64
2828	35	65
2870	54	46
2893	57	43
2953	51	49
2970	53	47
3023	38	62
3123	31	69
3233	44	56
3323	33	67
4230	43	57

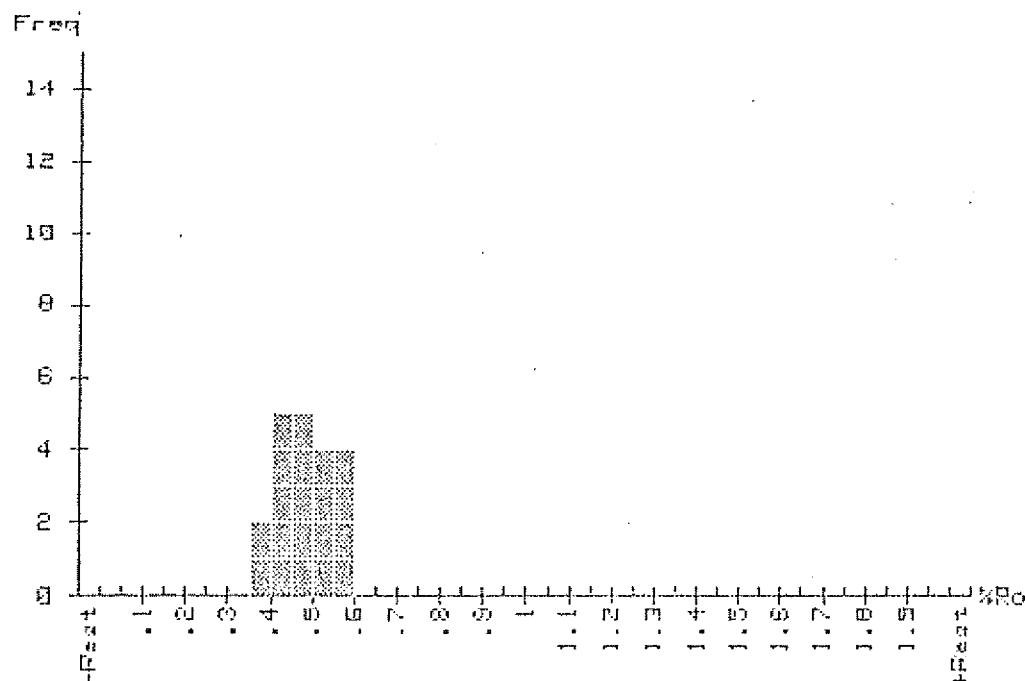
Table WELL 31/4-3

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

DEPTH (m)	% C1-C5 of total	% C6+ of total
=====	=====	=====
2092	18	82
2138	27	73
2445	38	62
2495	27	73
2520	25	75
2543	34	66
2598	38	62
2705	42	58
2793	43	57
2828	43	57

Histogram of vitrinite reflectance measurements

Sample No.: 1201 1 1A1
Well Name: 131/4-3
Depth: 11725-30M
Analyst: IJ MC
Date: 125 2 86

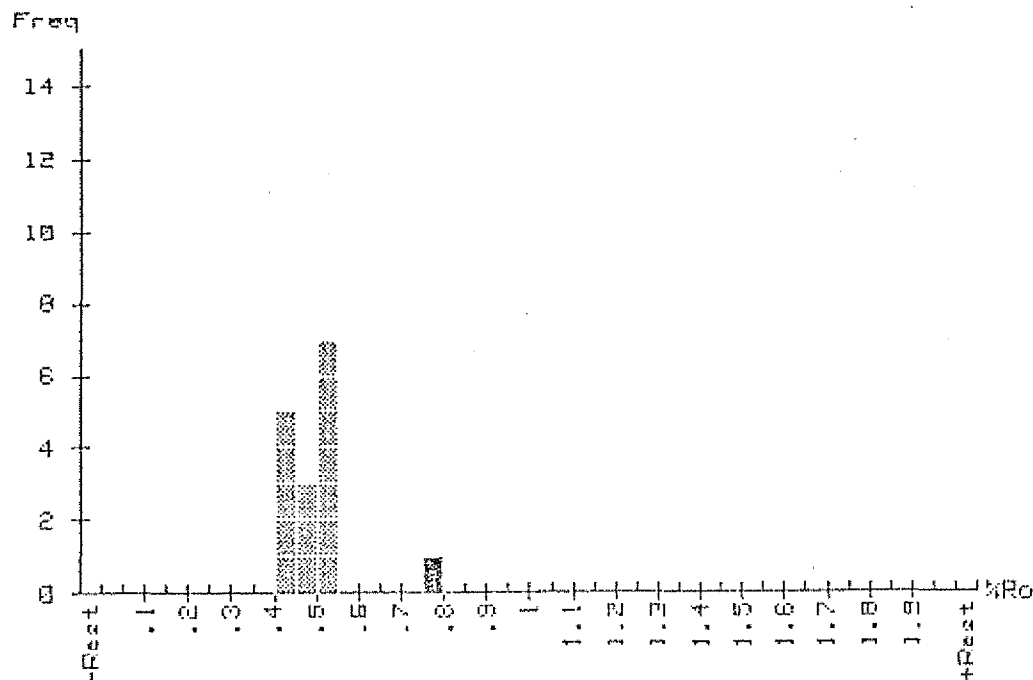


* Pop. 1 From .35 to .50 Mean= .48 St.D= .06 Total= 20

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.384	.388	.405	.411	.411	.415	.438	.460	.467	.481
10	.486	.497	.505	.525	.534	.546	.555	.558	.560	.586

Sample No.: 1202 1 1A1
Well Name: 131/4-3
Depth: 11850-55M
Analyst: IJ MC
Date: 125 2 86

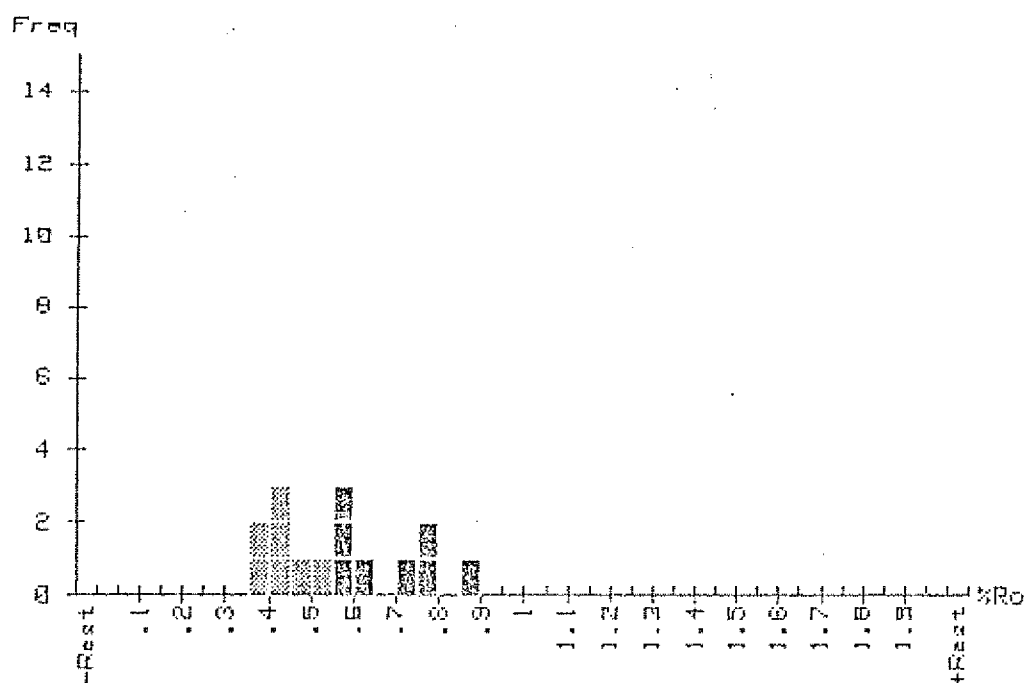


* Pop. 1 From .38 to .60 Mean= .49 St.D= .05 Total= 15
Pop. 2 From .73 to .83 Total= 0

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.405	.414	.420	.442	.449	.488	.489	.495	.505	.509
10	.515	.527	.533	.537	.548	.784				

Sample No.: 1203 1 1A1
Well Name: 131/4-3
Depth: 11956-58M
Analyst: IJ MC
Date: 126 2 86

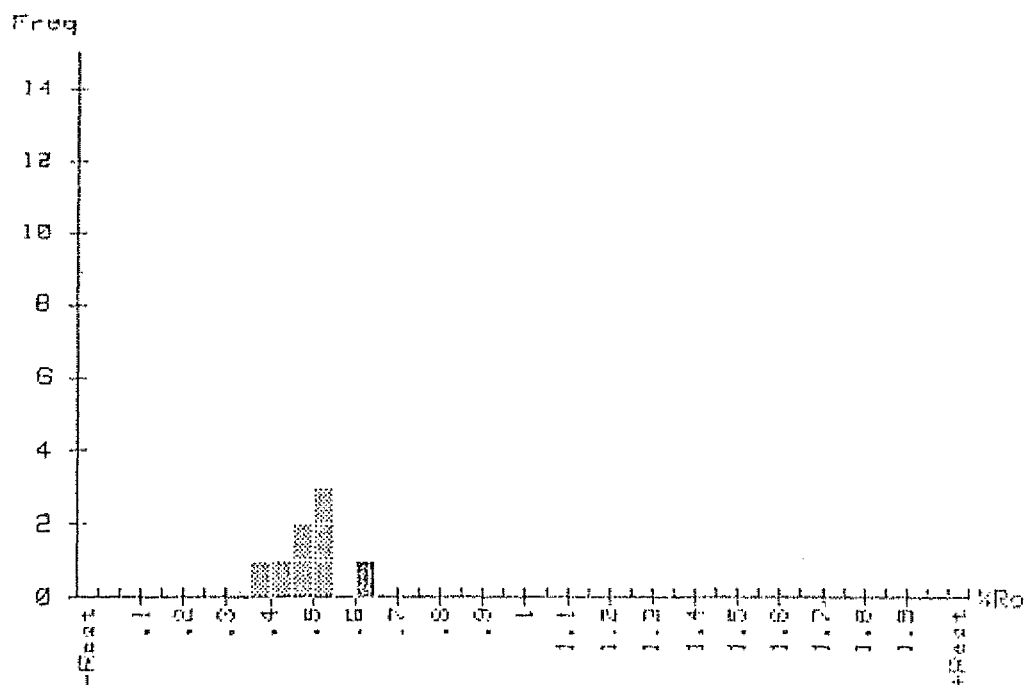


* Pop. 1 From .33 to .55 Mean= .43 St.D= .05 Total= 7
Pop. 2 From .55 to .98 Mean= .68 St.D= .11 Total= 8

The indigenous Population is marked '*'. *

	1	1	2	3	4	5	6	7	8	9	10
0	1	.352	.394	.421	.433	.443	.451	.533	.560	.573	.573
10	1	.623	.728	.770	.783	.851					

Sample No.: 1204 1 1A1
Well Name: 131/4-3
Depth: 12016-20M
Analyst: IJ MC
Date: 126 2 86

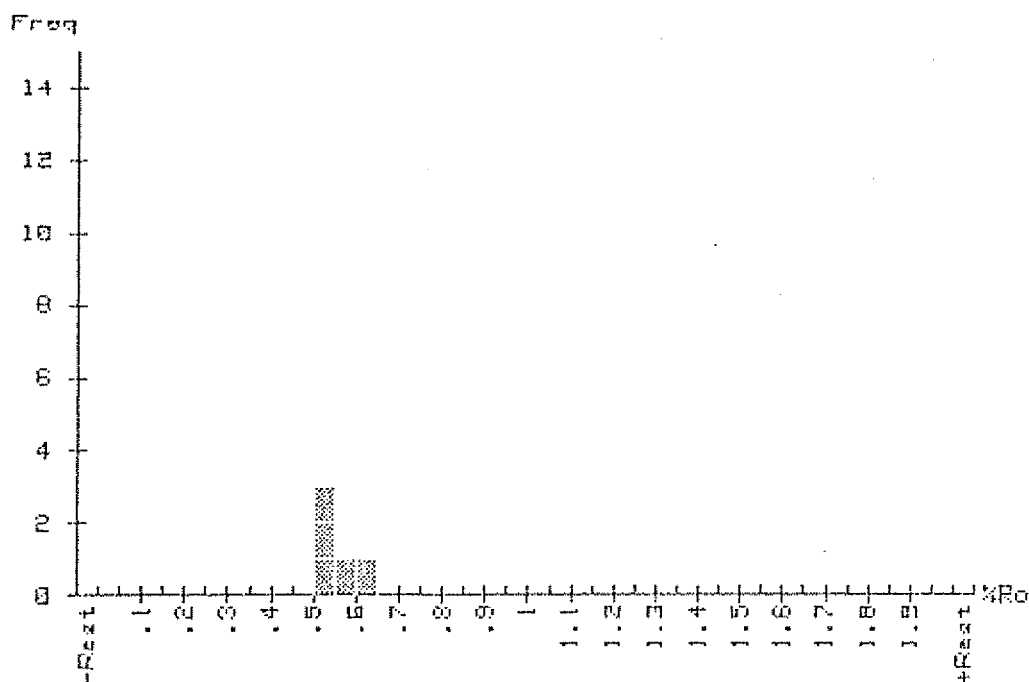


* Pop. 1 From .35 to .55 Mean= .47 St.D= .05 Total= 7
Pop. 2 From .55 to .73 Total= 0

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	1	.392	.401	.452	.471	.509	.519	.548	.642	

Sample No.: 1205 1 1A1
Well Name: 131/4-3
Depth: 12070-76M
Analyst: IJ MC
Date: 126 2 86

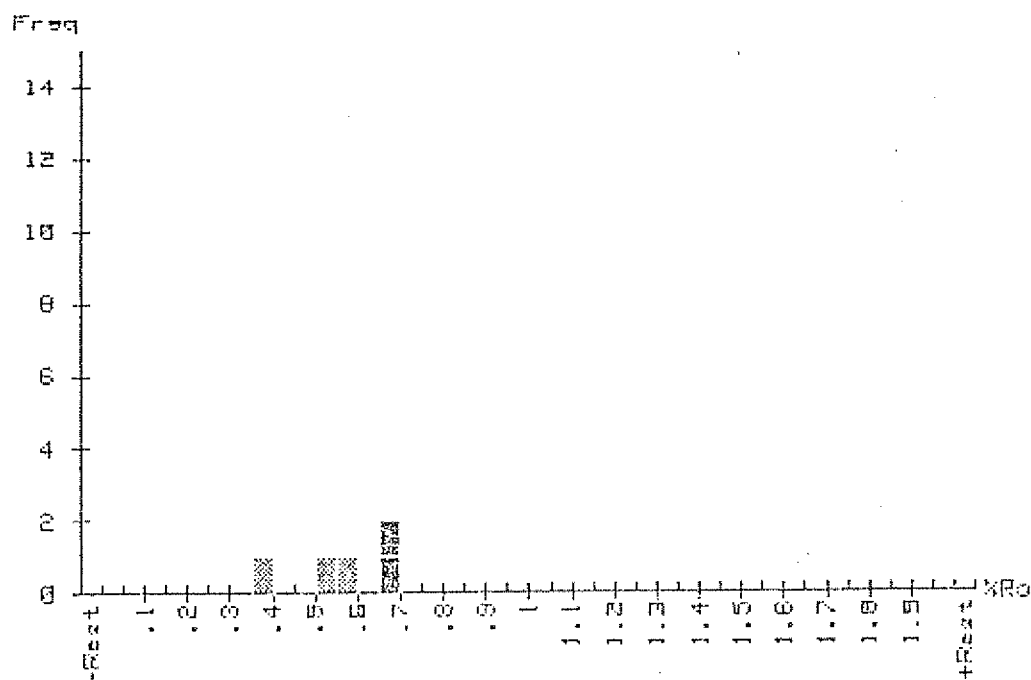


* Pop. 1 From .48 to .65 Mean= .55 St.D= .03 Total= 5

The indigenous Population is marked '*'. *

	1	2	3	4	5	6	7	8	9	10
0	.512	.533	.549	.555	.604					

Sample No.: 1205 1 1A1
Well Name: 131/4-3
Depth: 12102-05M
Analyst: 1J MC
Date: 12 3 86

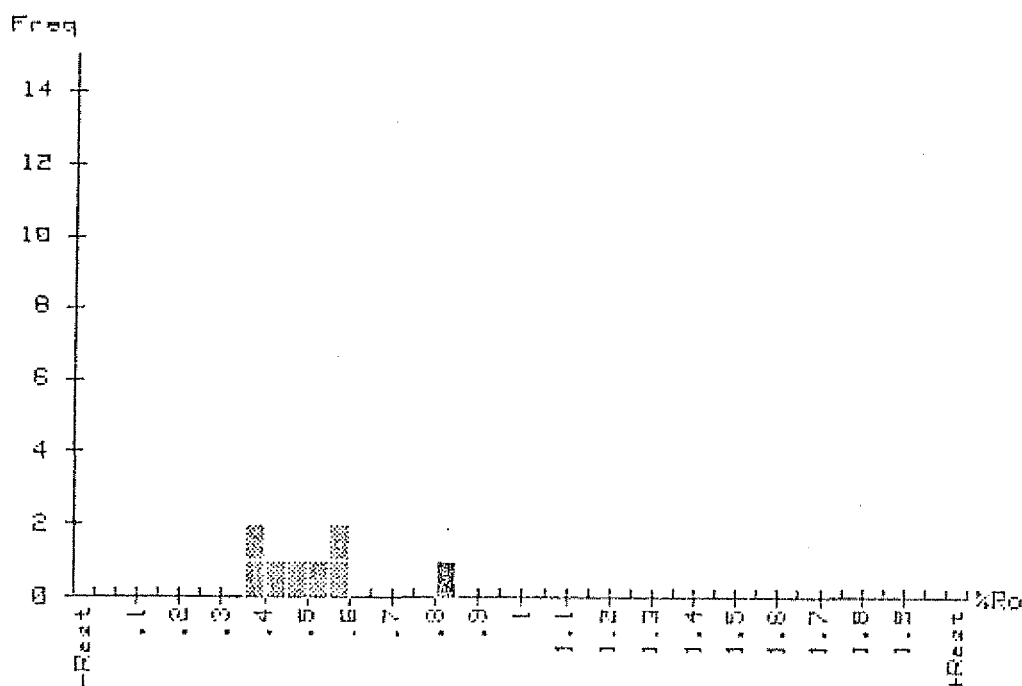


* Pop. 1 From .35 to .63 Mean= .49 St.D= .12 Total= 3
Pop. 2 From .63 to .75 Mean= .67 St.D= .02 Total= 2

The indigenous Population is marked '*!.

	1	2	3	4	5	6	7	8	9	10
0	.362	.530	.584	.651	.697					

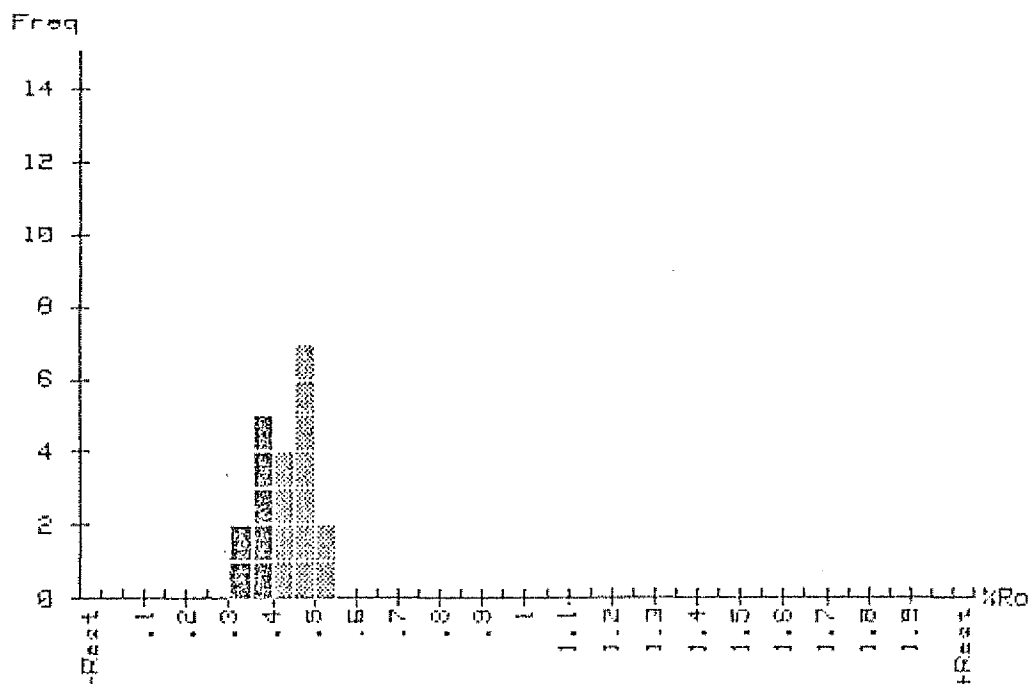
Sample No.: 1207 1 1A1
Well Name: 131/4-3
Depth: 12135-38M
Analyst: 1J MC
Date: 12 3 86



* Pop. 1 From .33 to .83 Mean= .49 St.D= .08 Total= 7
Pop. 2 From .78 to .93 Total= 0

The indigenous Population is marked '*'.

	1	1	2	3	4	5	6	7	8	9	10
0	1	.388	.398	.419	.431	.544	.553	.570	.835		

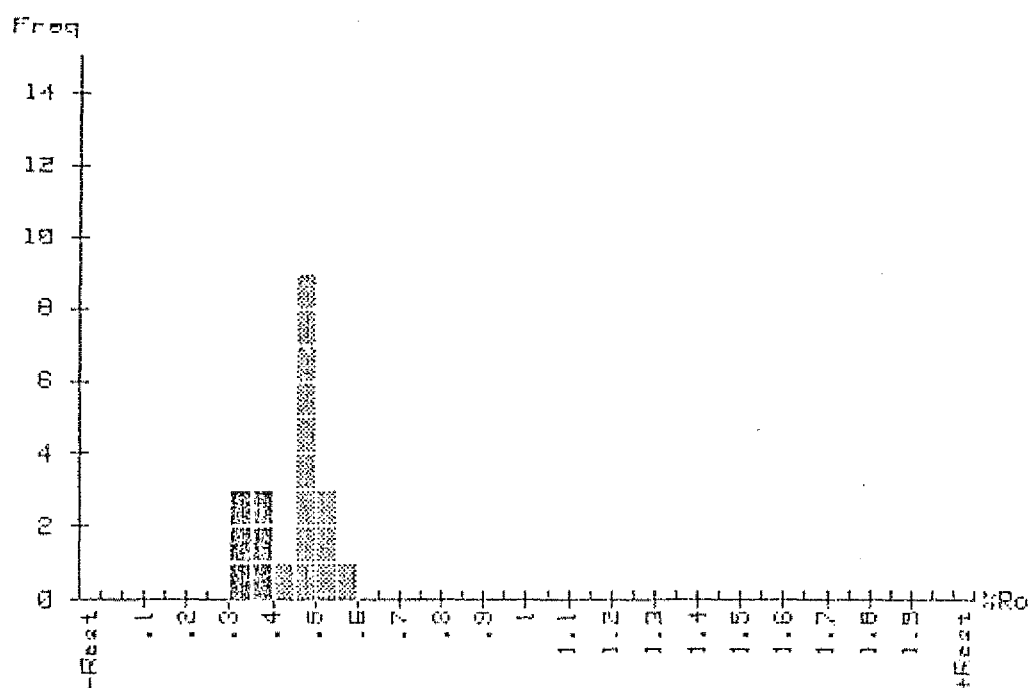


Pop. 1	From	.30 to	.40	Mean=	.36	St.D=	.02	Total=	7
* Pop. 2	From	.40 to	.55	Mean=	.47	St.D=	.03	Total=	13

The indigenous Population is marked '*'.
The indigenous population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.330	.340	.350	.359	.366	.367	.377	.428	.439	.447
10	.450	.451	.460	.461	.465	.468	.478	.479	.507	.523

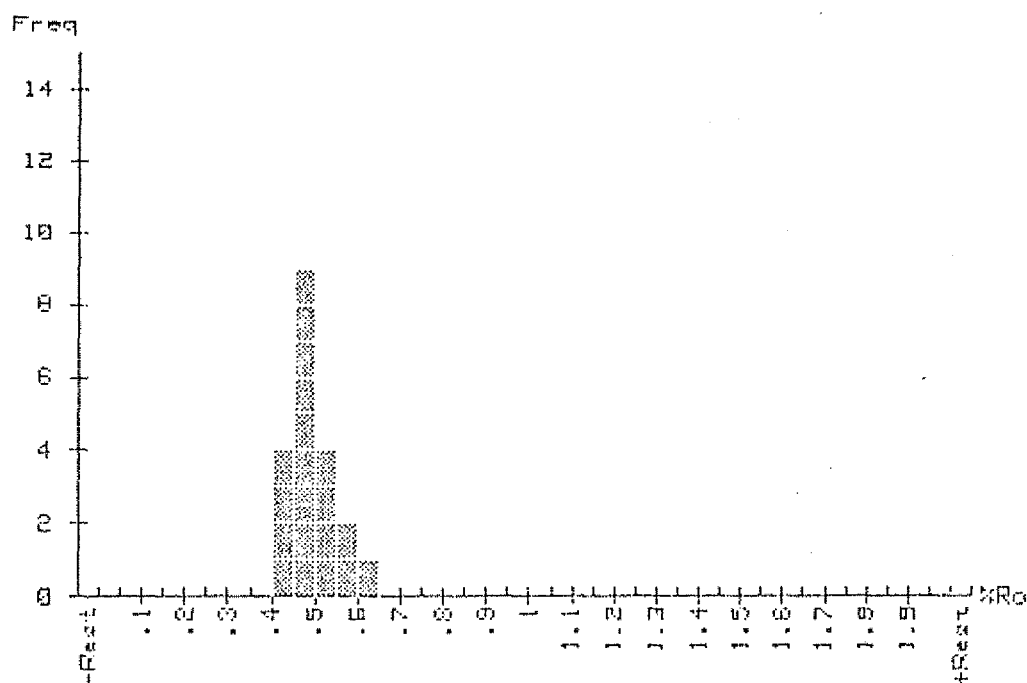
Sample No.: 1208 1 1A1
Well Name: 131/4-3
Depth: 12278-80M
Analyst: IJ MC
Date: 12 3 86



Pop. 1 From .30 to .40 Mean= .36 St.D= .03 Total= 6
* Pop. 2 From .40 to .60 Mean= .49 St.D= .04 Total= 14

The indigenous Population is marked '*'.

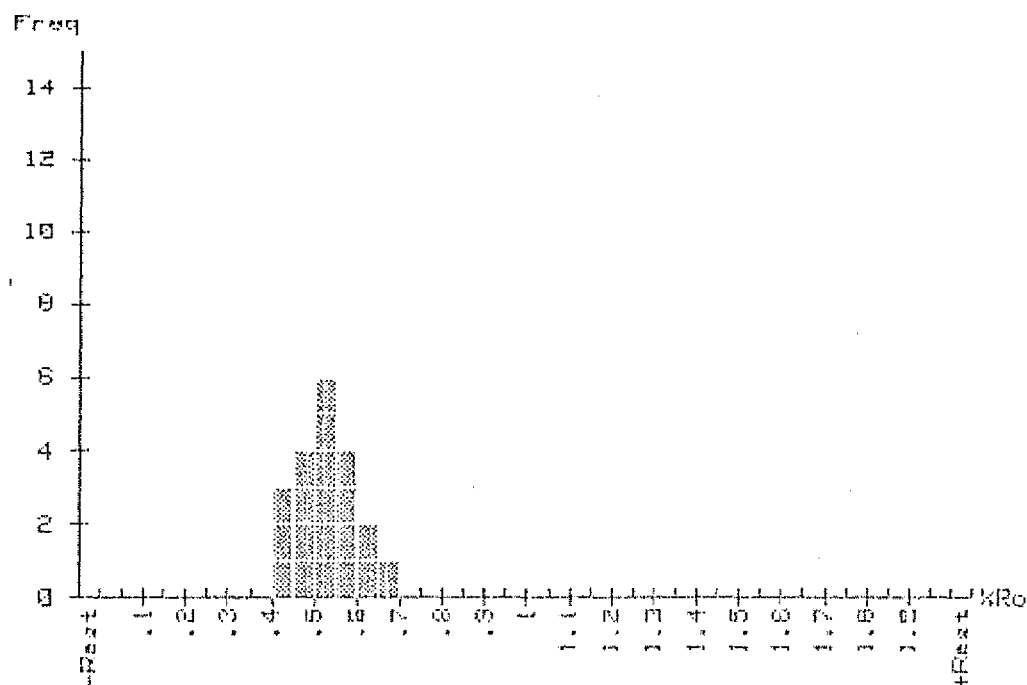
	1	2	3	4	5	6	7	8	9	10
0	.337	.340	.344	.372	.398	.397	.436	.454	.460	.466
10	.472	.472	.481	.484	.494	.498	.505	.526	.535	.575



The indigenous Population is marked '*'.
The indigenous population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.407	.417	.432	.441	.451	.454	.456	.459	.466	.465
10	.469	.471	.485	.501	.515	.534	.536	.575	.583	.606

Sample No.: 1211 1 1A1
Well Name: 131/4-3
Depth: 12443-45M
Analyst: TJ MC
Date: 12 3 86

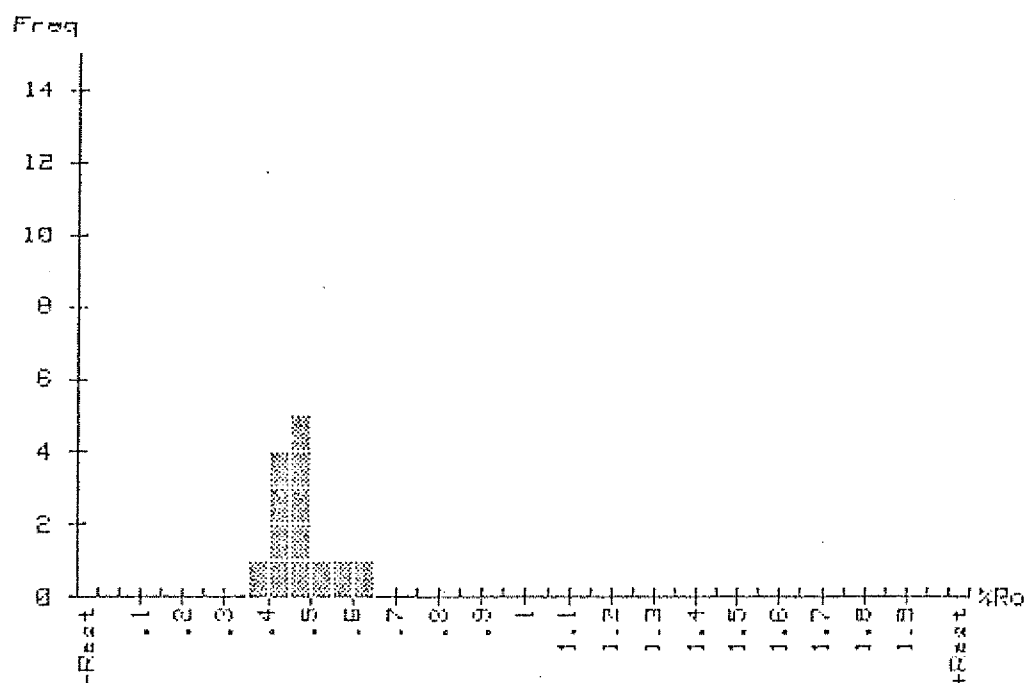


* Pop. 1 From .40 to .70 Mean= .52 St.D= .07 Total= 20

The indigenous Population is marked '*'.
 * * * * *

	1	2	3	4	5	6	7	8	9	10
0	.406	.417	.432	.450	.466	.469	.471	.511	.515	.519
10	.522	.527	.534	.573	.575	.583	.597	.601	.609	.657

Sample No.: 1212 1 1A1
Well Name: 131/4-3
Depth: 12493-95M
Analyst: IJ MC
Date: 13 3 86

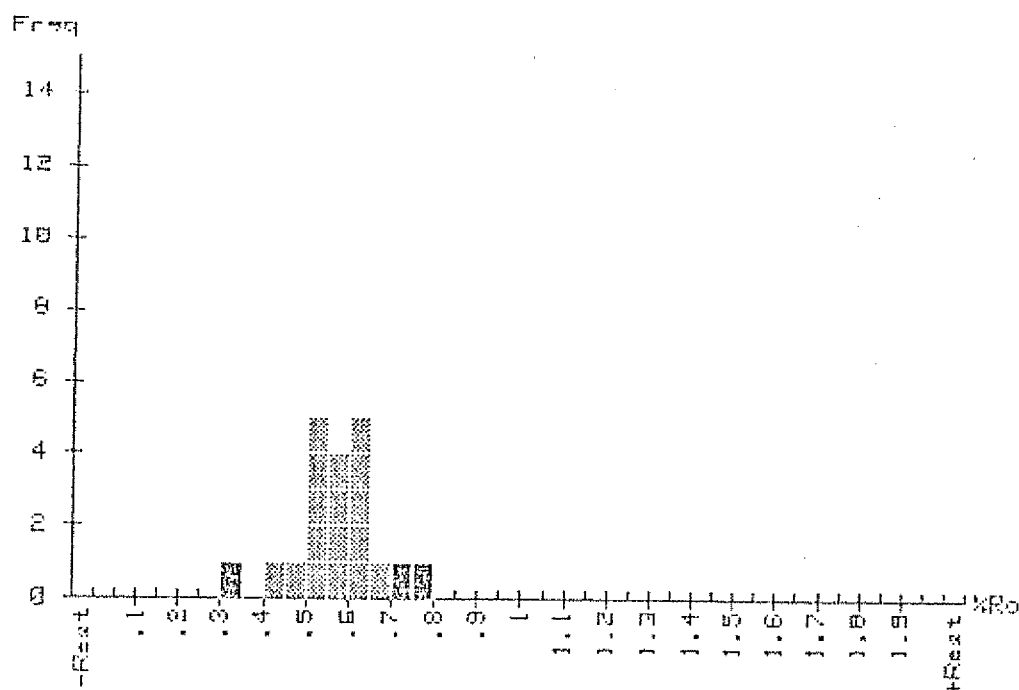


* Pop. 1 From .35 to .65 Mean= .48 St.D= .07 Total= 13

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.382	.432	.436	.435	.436	.462	.465	.465	.479	.489
10	.505	.589	.644							

Sample No.: 1213 1 (A)
Well Name: 131/4-3
Depth: 12540-43M
Analyst: IJ MC
Date: 13 3 86

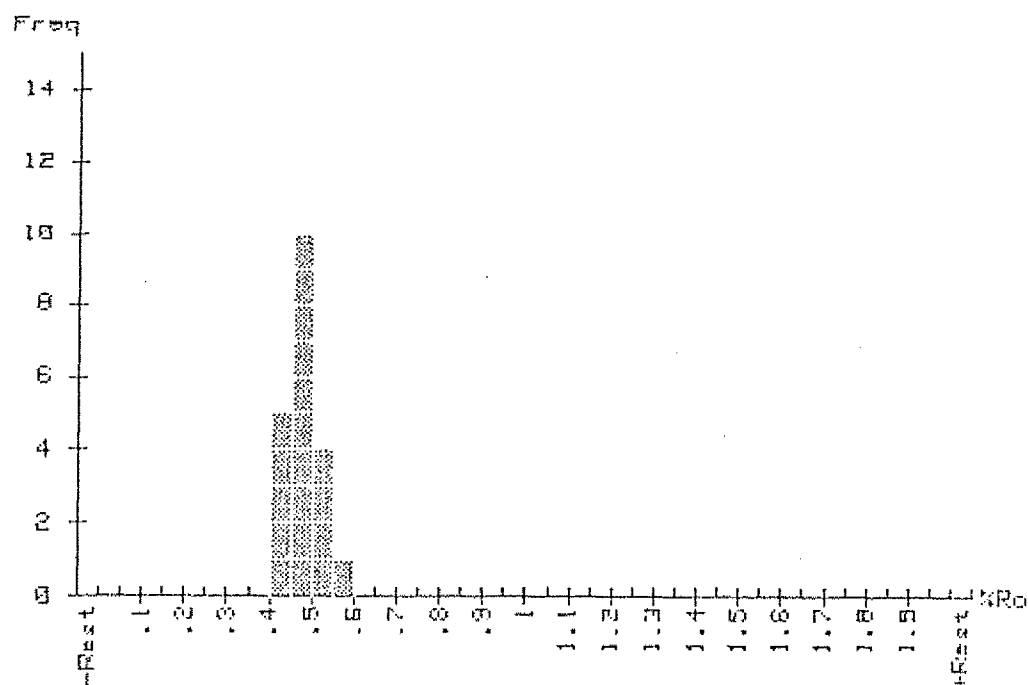


Pop. 1	From	.30 to	.35				Total=	1
* Pop. 2	From	.38 to	.70	Mean=	.56	St.D=	.06	Total= 17
Pop. 3	From	.70 to	.85	Mean=	.75	St.D=	.02	Total= 2

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.339	.434	.461	.516	.517	.523	.526	.540	.550	.566
10	.568	.569	.608	.614	.621	.621	.624	.679	.737	.771

Sample No.: 1214 1 1A1
Well Name: 131/4-3
Depth: 12613-15M
Analyst: IJ MC
Date: 13 3 86

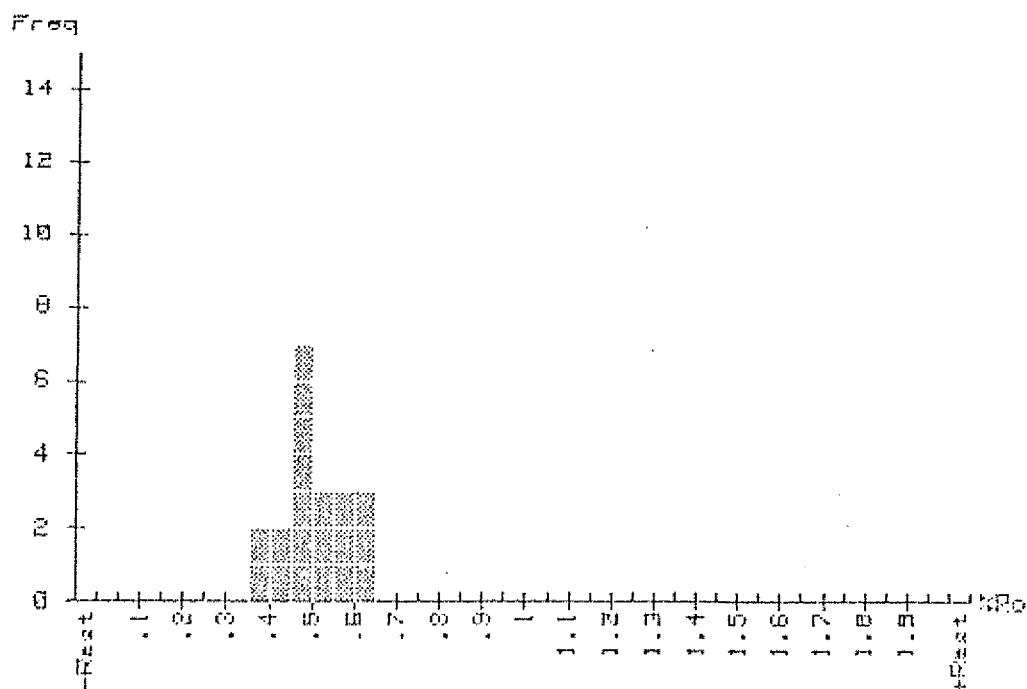


* Pop. 1 From .38 to .60 Mean= .47 St.D= .04 Total= 20

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.412	.422	.425	.439	.442	.451	.452	.455	.458	.469
10	.471	.475	.475	.486	.491	.511	.511	.533	.543	.578

Sample No.: 1215 1 1A1
Well Name: 131/4-3
Depth: 12655-58M
Analyst: IJ MC
Date: 13 3 86

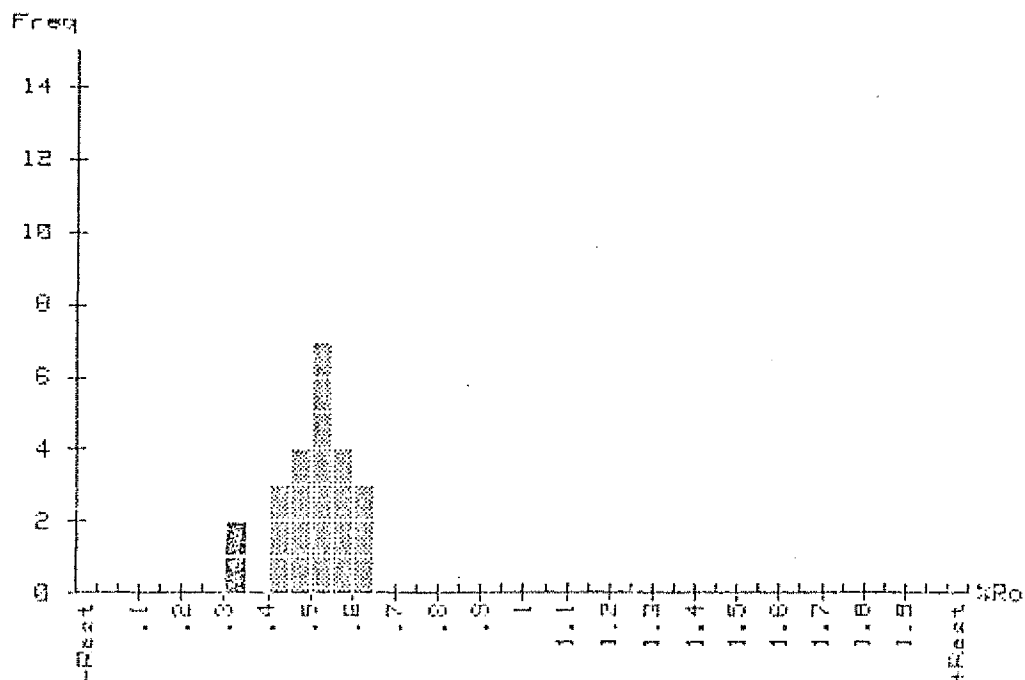


* Pop. 1 From .35 to .65 Mean= .50 St.D= .08 Total= 20

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.360	.375	.409	.436	.456	.458	.459	.469	.479	.479
10	.485	.510	.519	.539	.552	.562	.584	.617	.622	.627

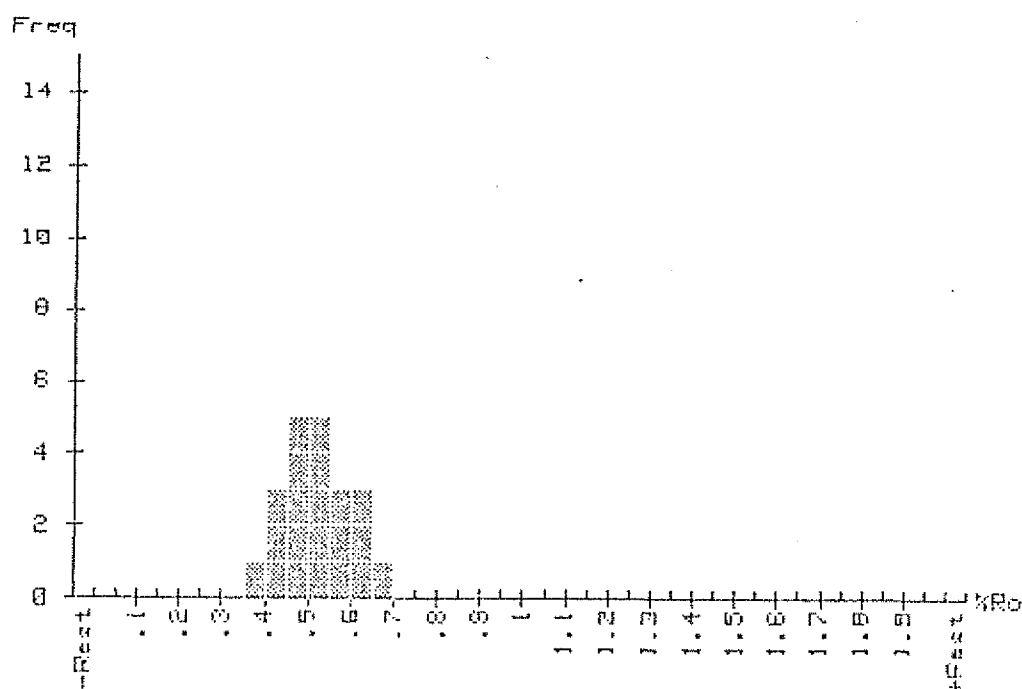
Sample No.: 1216 1 1A1
Well Name: 131/4-3
Depth: 12690-93M
Analyst: IJ MC
Date: 13 3 85



Pop. 1 From .30 to .39 Mean= .33 St.D= .03 Total= 2
* Pop. 2 From .38 to .70 Mean= .52 St.D= .06 Total= 21

The indigenous Population is marked '*',

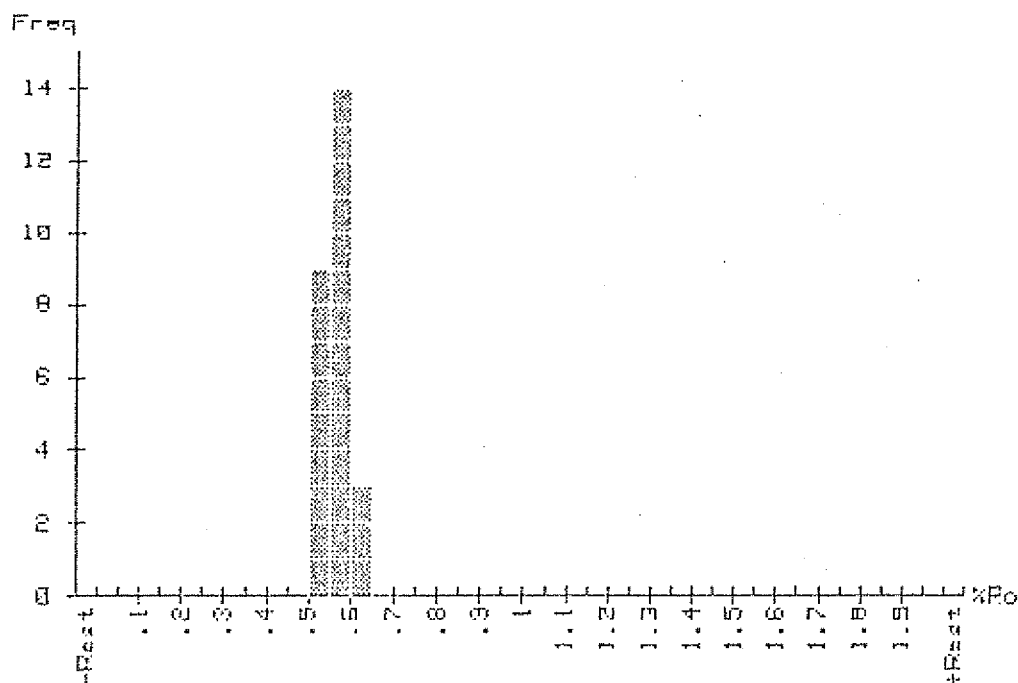
	1	2	3	4	5	6	7	8	9	10
0	.310	.350	.409	.416	.448	.454	.462	.463	.482	.501
10	.506	.507	.520	.526	.530	.547	.574	.575	.579	.598
20	.601	.604	.615							



The indigenous Population is marked '*'.
The indigenous population is marked '*'.

[illegible]

Sample No.: 1218 1 1A1
Well Name: 131/4-3
Depth: 12750-53M
Analyst: IJ MC
Date: 12 3 86

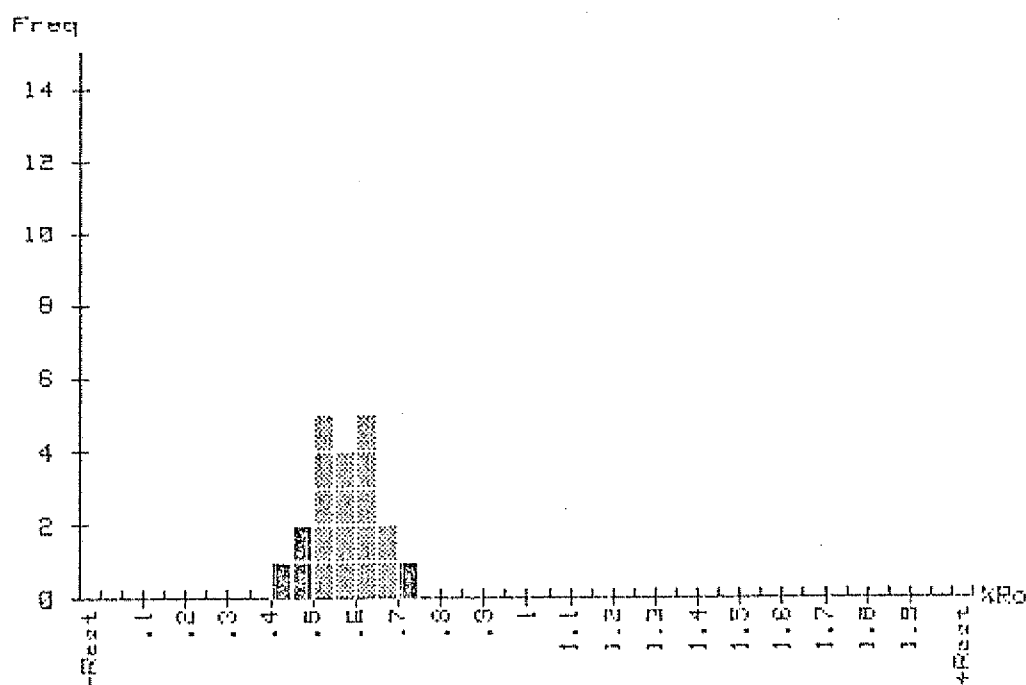


* Pop. 1 From .48 to .70 Mean= .56 St.D= .03 Total= 26

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.510	.517	.524	.527	.535	.541	.544	.546	.548	.551
10	.566	.566	.566	.567	.569	.570	.576	.582	.585	.586
20	.588	.592	.593	.603	.604	.607				

Sample No.: 1219 I IAI
Well Name: 131/4-3
Depth: 12820-23M
Analyst: IJ MC
Date: 13 3 86

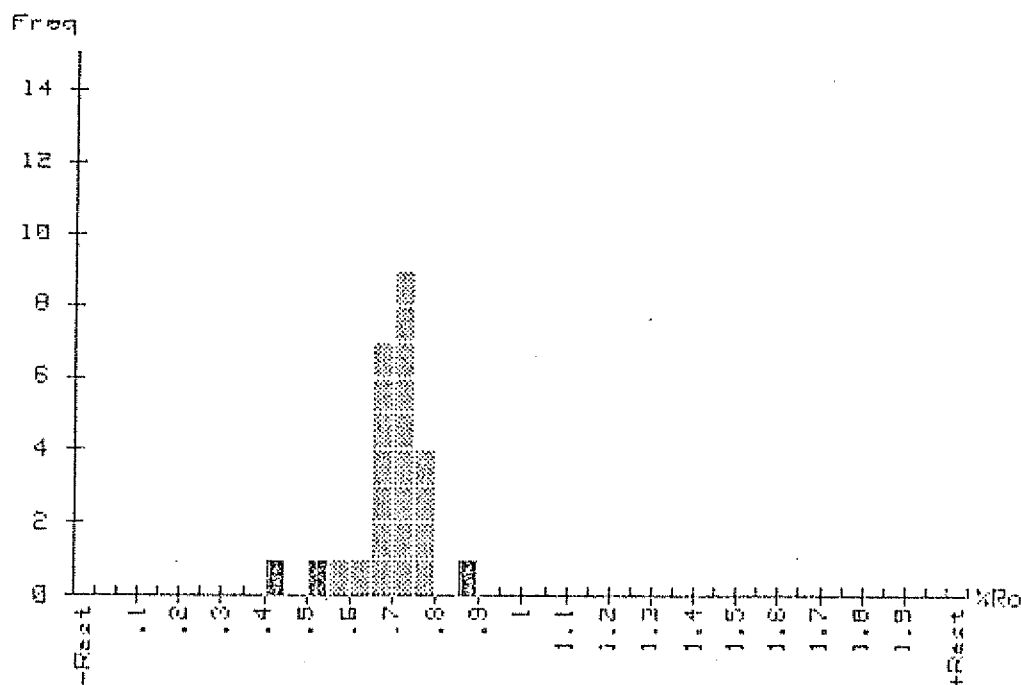


Pop. 1	From	.40 to	.50	Mean=	.45	St.D=	.03	Total=	3
* Pop. 2	From	.50 to	.70	Mean=	.59	St.D=	.05	Total=	16
Pop. 3	From	.70 to	.75					Total=	0

The indigenous Population is marked '*').

	1	2	3	4	5	6	7	8	9	10
0	.416	.467	.470	.521	.530	.536	.539	.549	.551	.554
10	.565	.595	.601	.621	.632	.646	.646	.657	.678	.723

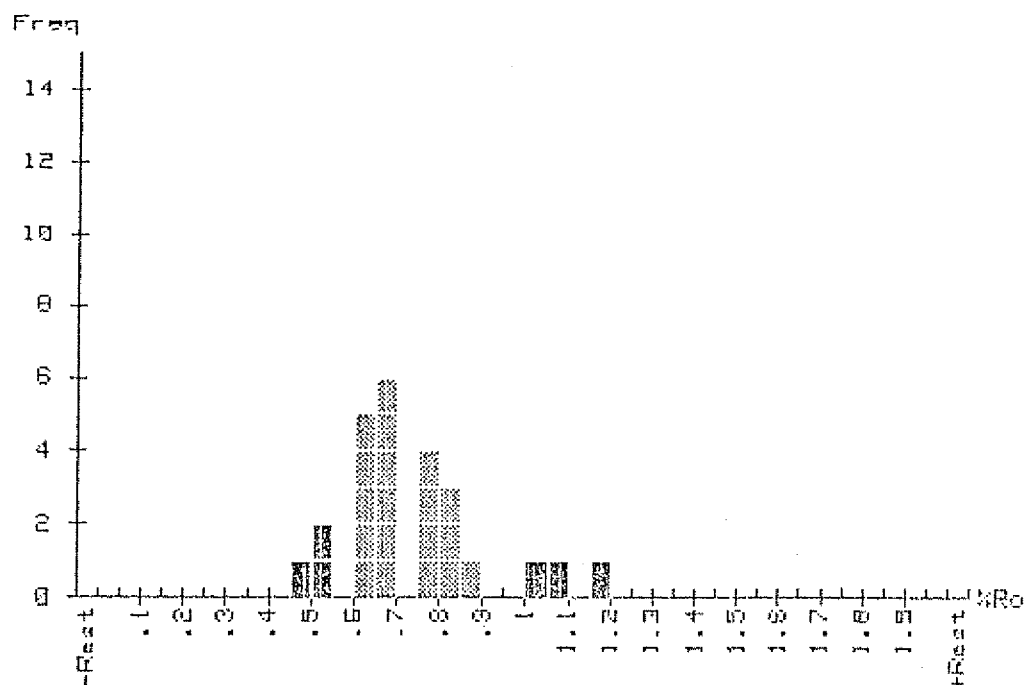
Sample No.: 1220 1 1A1
Well Name: 131/4-3
Depth: 13000-03
Analyst: 1J MC
Date: 14 3 86



Pop. 1	From	.40 to	.55	Mean=	.50	St.D=	.07	Total=	2
* Pop. 2	From	.55 to	.80	Mean=	.71	St.D=	.05	Total=	22
Pop. 3	From	.85 to	.90					Total=	0

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.445	.543	.589	.637	.659	.665	.665	.672	.679	.682
10	.698	.704	.726	.730	.730	.741	.743	.743	.743	.747
20	.753	.753	.763	.781	.884					

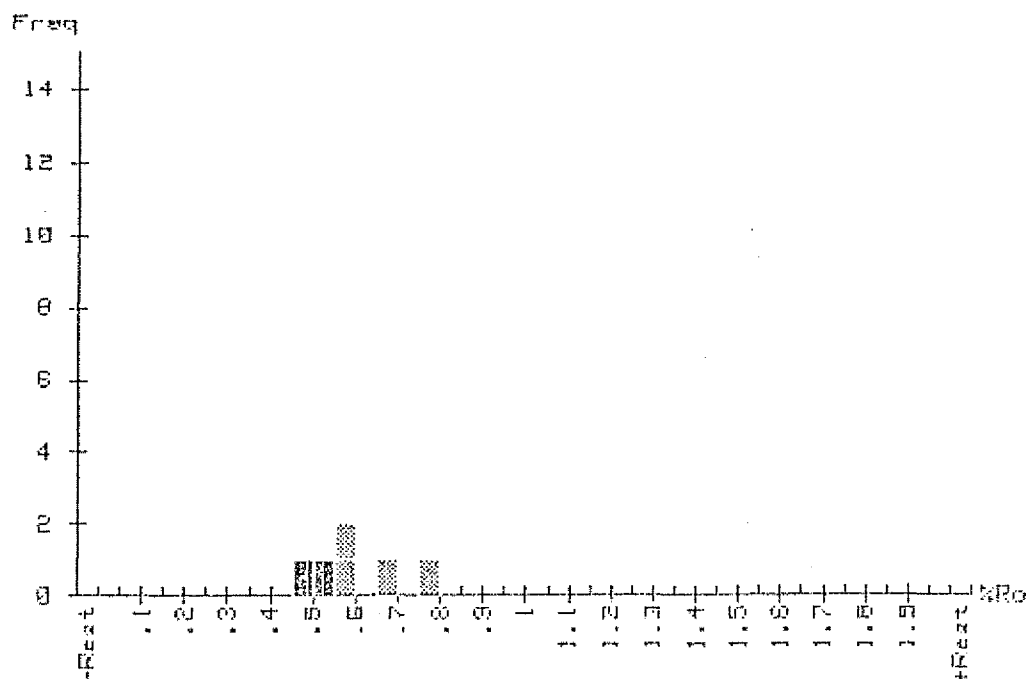


Pop. 1	From .45 to .55	Mean= .49	St.D= .03	Total= 3
* Pop. 2	From .60 to .90	Mean= .72	St.D= .09	Total= 19
Pop. 3	From 1.00 to 1.20	Mean= 1.09	St.D= .06	Total= 3

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.457	.508	.509	.615	.617	.632	.633	.637	.653	.674
10	.680	.680	.682	.700	.767	.774	.777	.788	.802	.824
20	.836	.899	1.039	1.070	1.157					

Sample No.: 1222 1 (AI)
Well Name: 131/4-3
Depth: 13210-13M
Analyst: IJ MC
Date: 14 3 86

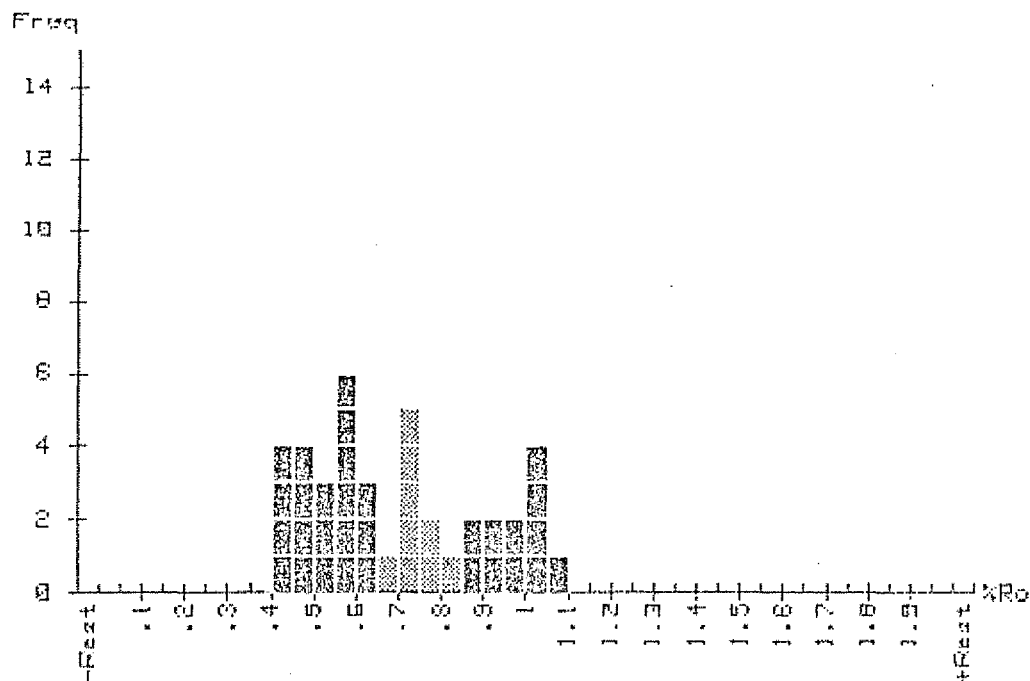


Pop. 1 From .45 to .55 Mean= .51 St.D= .05 Total= 2
* Pop. 2 From .55 to .80 Mean= .66 St.D= .05 Total= 4

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.467	.546	.585	.595	.689	.775				

Sample No.: 1224 1 1A1
Well Name: 131/4-3
Depth: 13350-53M
Analyst: IJ MC
Date: 14 3 86

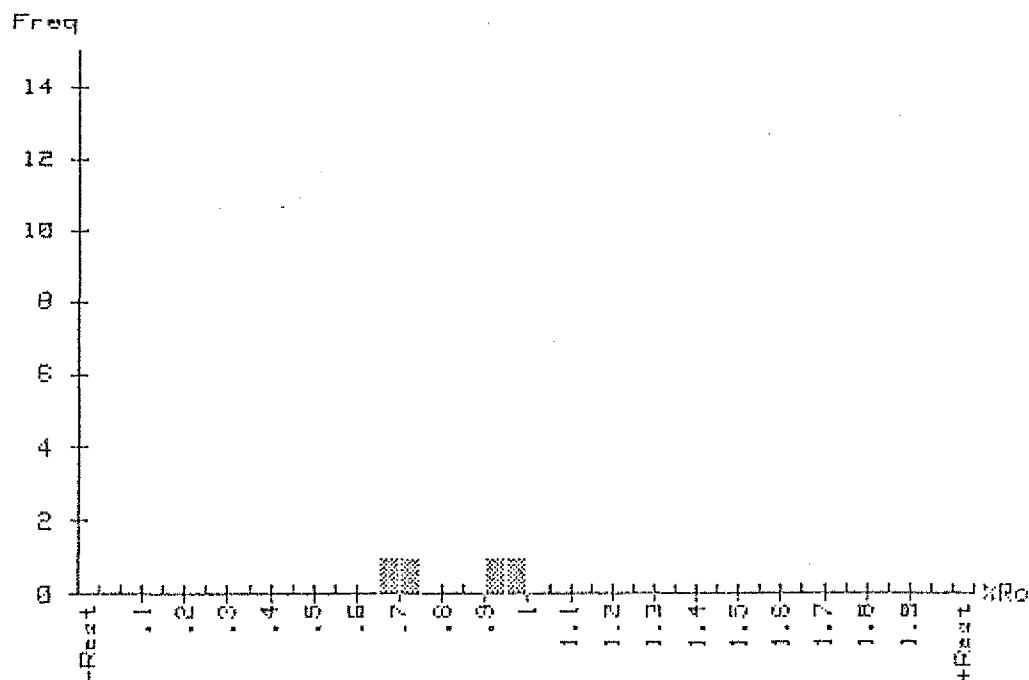


Pop. 1 From .40 to .65 Mean= .53 St.D= .07 Total= 20
* Pop. 2 From .65 to .85 Mean= .75 St.D= .05 Total= 9
Pop. 3 From .85 to 1.10 Mean= .98 St.D= .07 Total= 11

The indigenous Population is marked '*'.

	1	2	3	4	5	6	7	8	9	10
0	.414	.415	.424	.443	.467	.486	.497	.499	.501	.539
10	.549	.556	.563	.572	.579	.579	.598	.607	.623	.641
20	.684	.702	.703	.740	.745	.745	.788	.799	.829	.863
30	.899	.911	.928	.956	.992	1.029	1.032	1.035	1.040	1.074

Sample No.: 1225 1 1A1
Well Name: 131/4-3
Depth: 13700-05M
Analyst: IJ MC
Date: 15 3 86



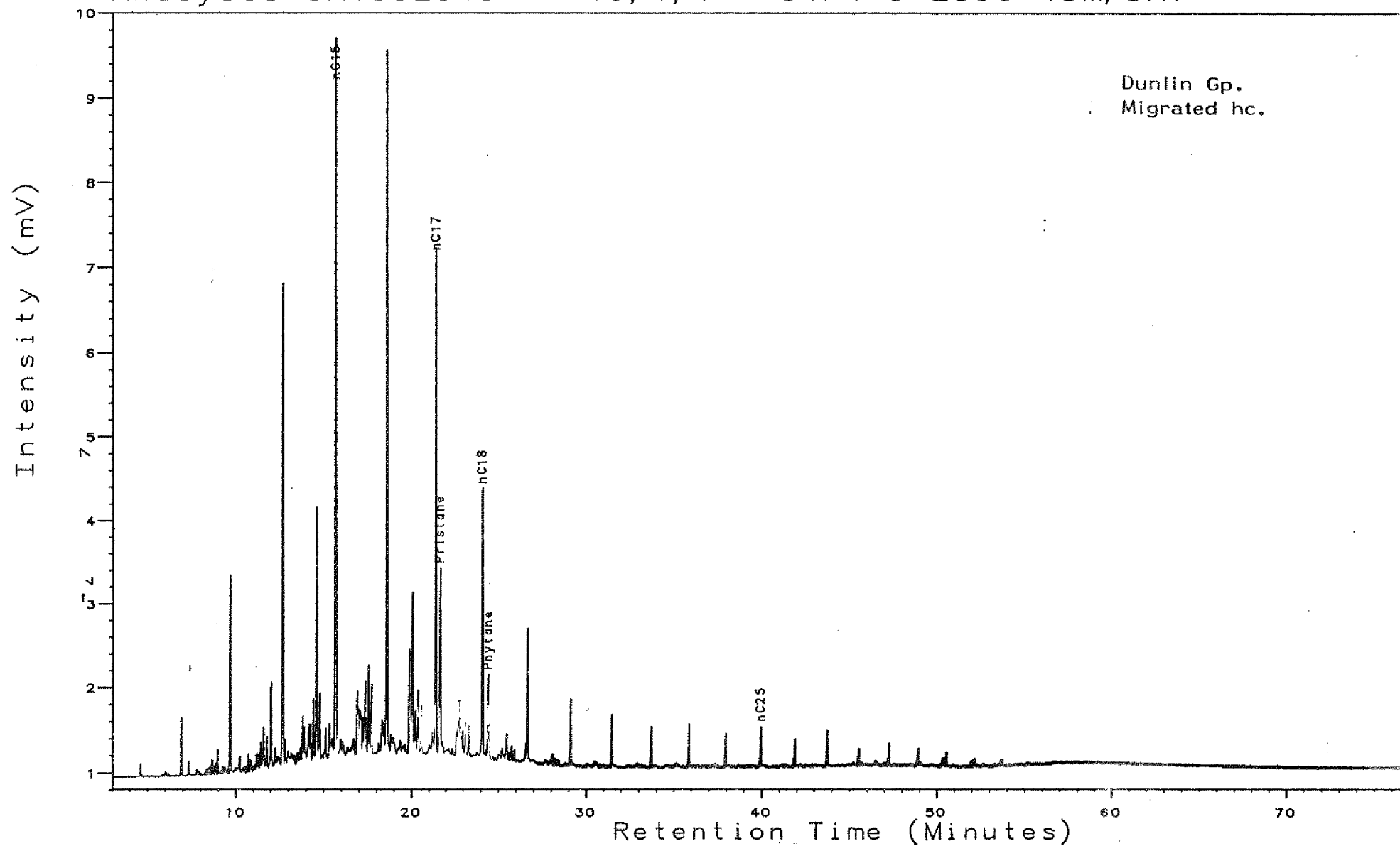
* Pop. 1 From .65 to 1.00 Mean= .83 St.D= .15 Total= 4

The indigenous Population is marked '*'. *

	1	2	3	4	5	6	7	8	9	10
0	.698	.710	.929	.999						

Saturated fraction gas chromatograms

Analysis SA1532543 10, 1, 1 31/4-3 2530-43m, SAT

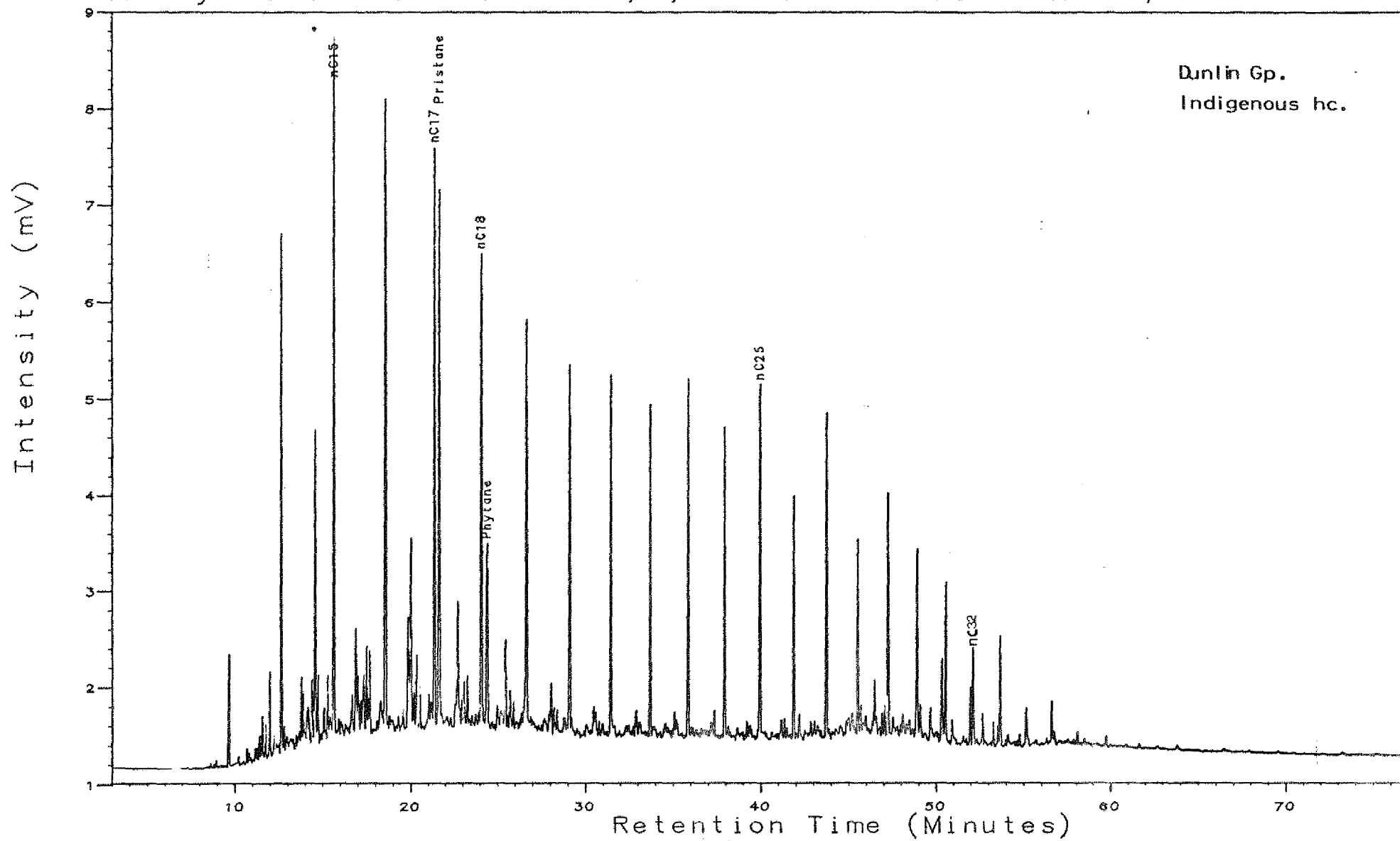


Analysis SA1532705

10, 1, 1

31/4-3 2685-2705m, SAT

Dunlin Gp.
Indigenous hc.

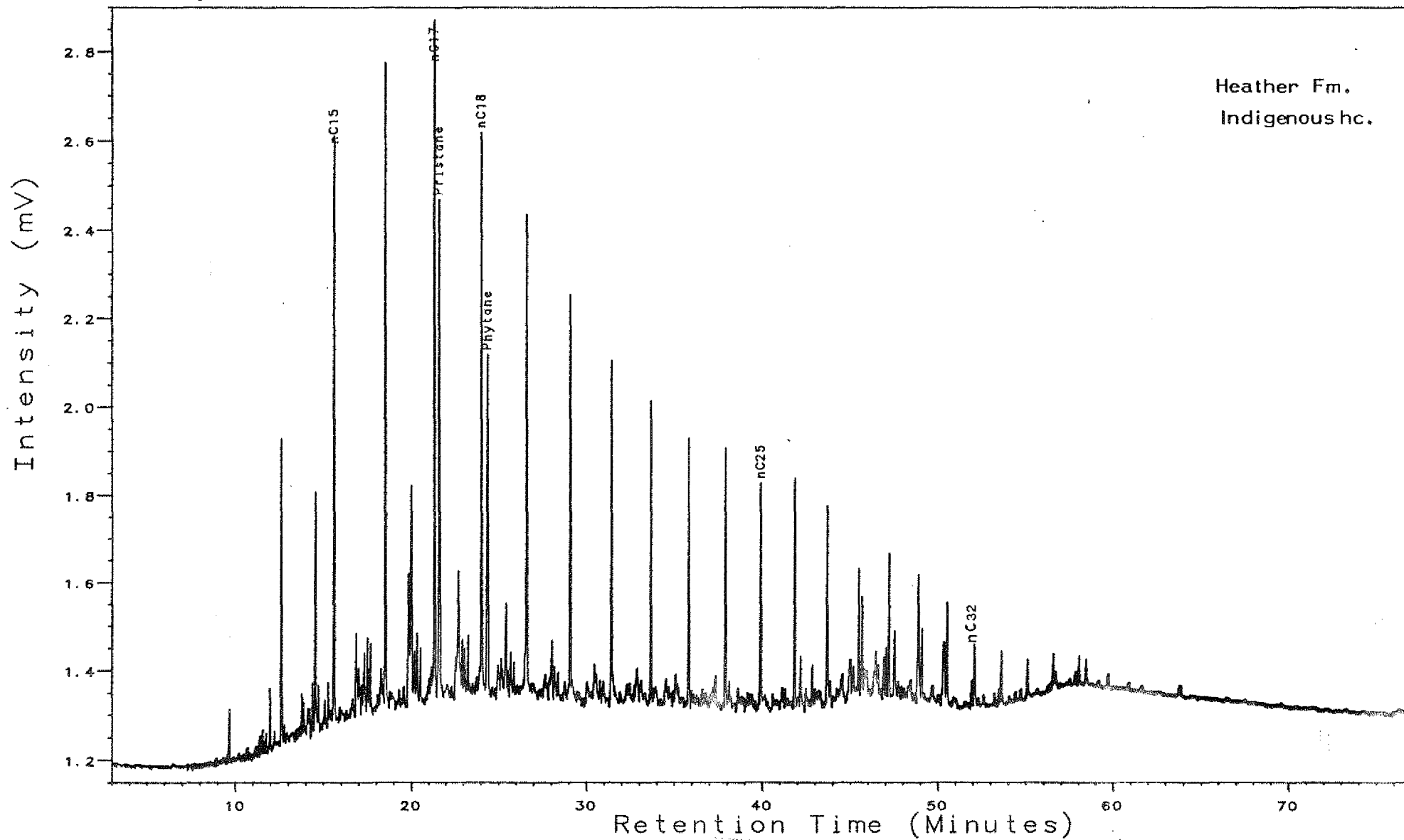


Analysis SA1532092

10, 1, 1

31/4-3 2083-92m, SAT

Heather Fm.
Indigenous hc.

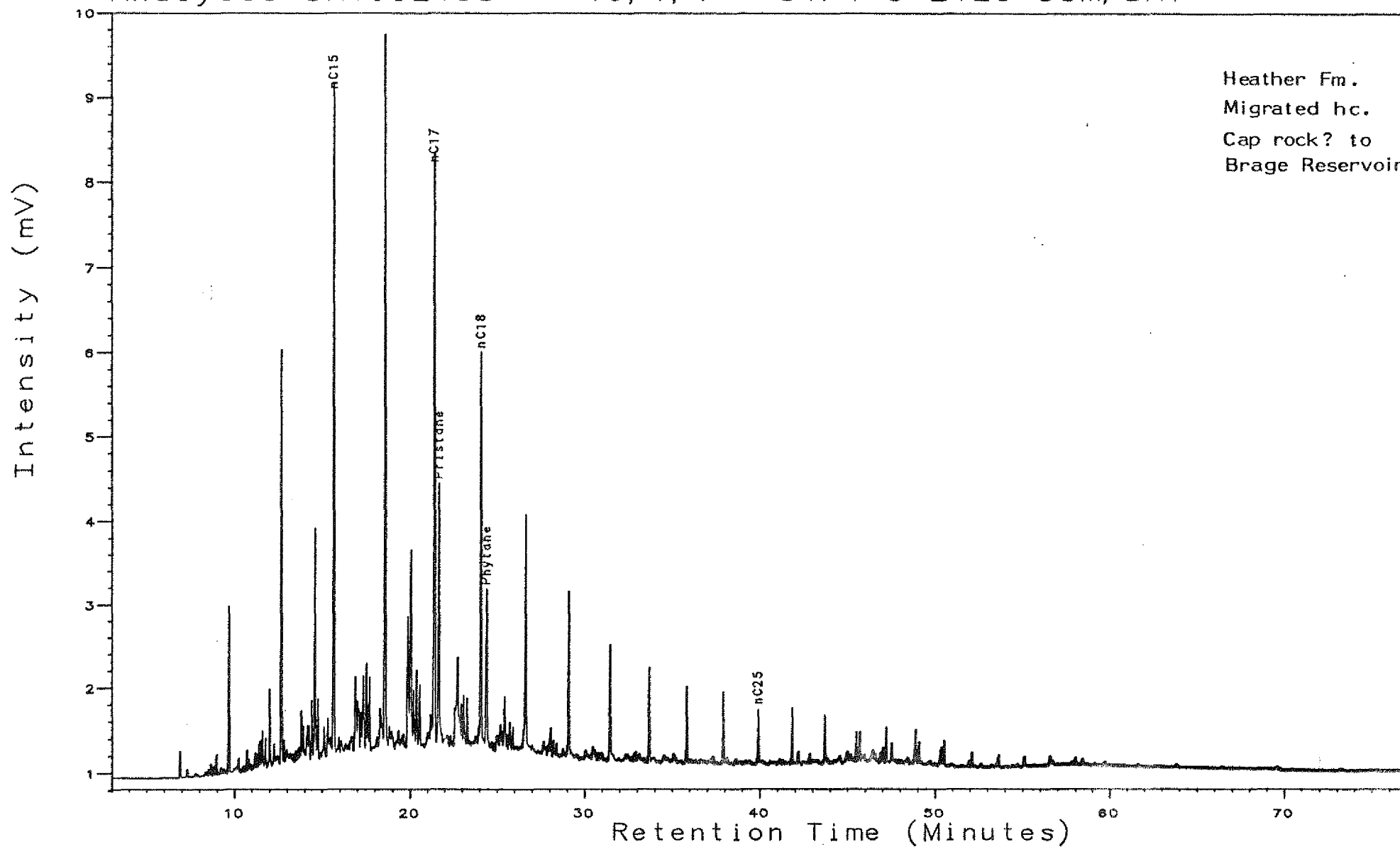


Analysis SA1532138

10, 1, 1

31/4-3 2123-38m, SAT

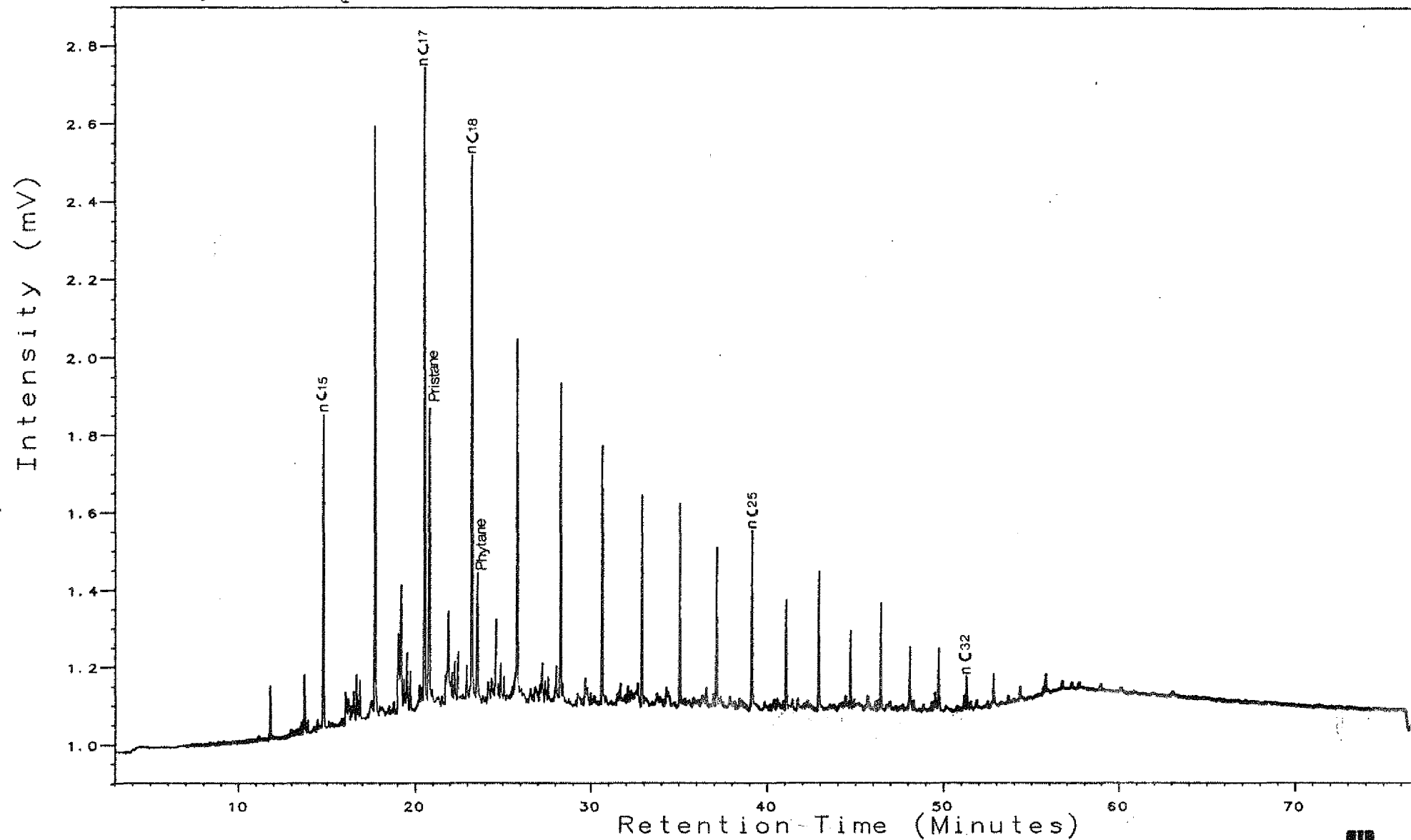
Heather Fm.
Migrated hc.
Cap rock? to
Brage Reservoir?



Analysis SA1532445

10, 1, 1

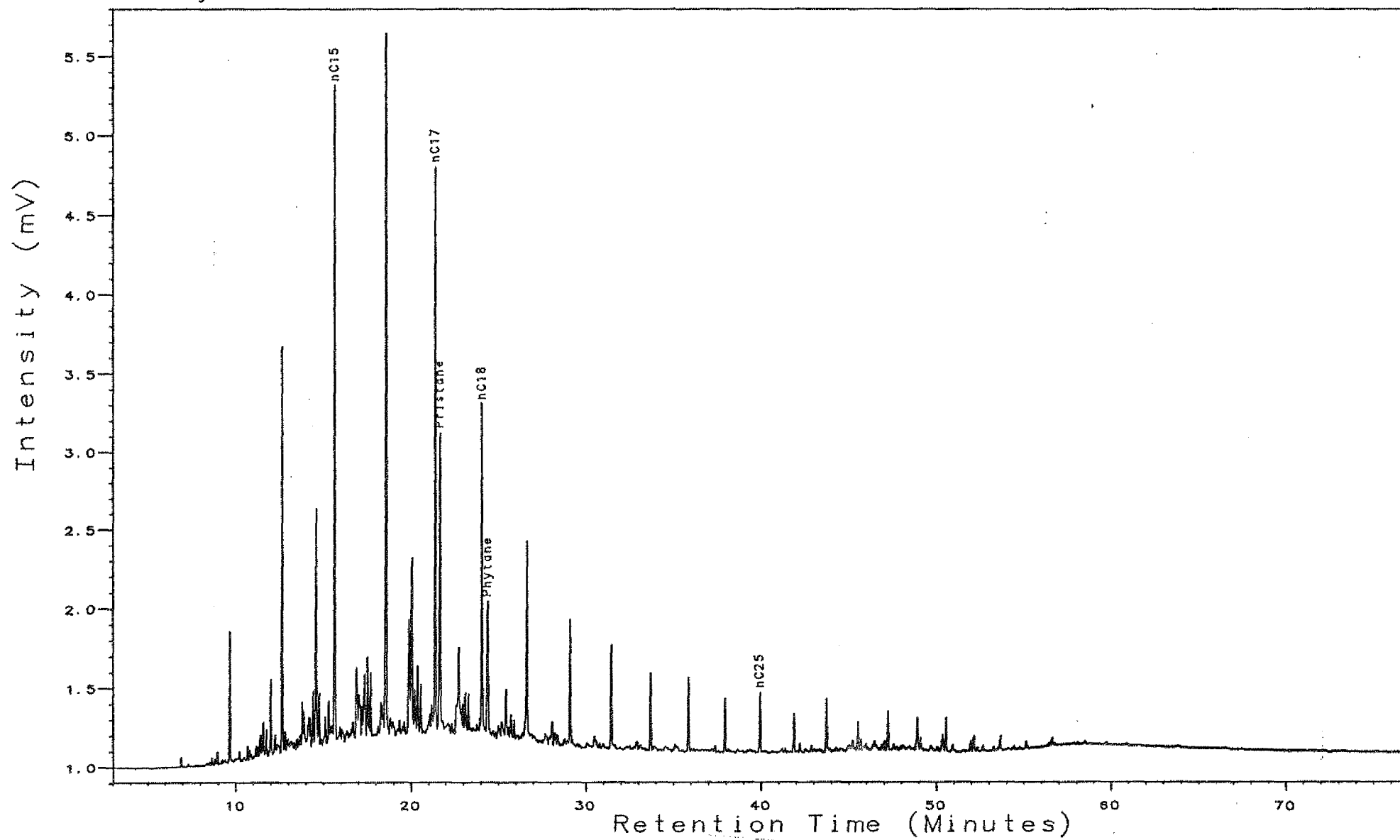
31/4-3 2425-45m, SAT



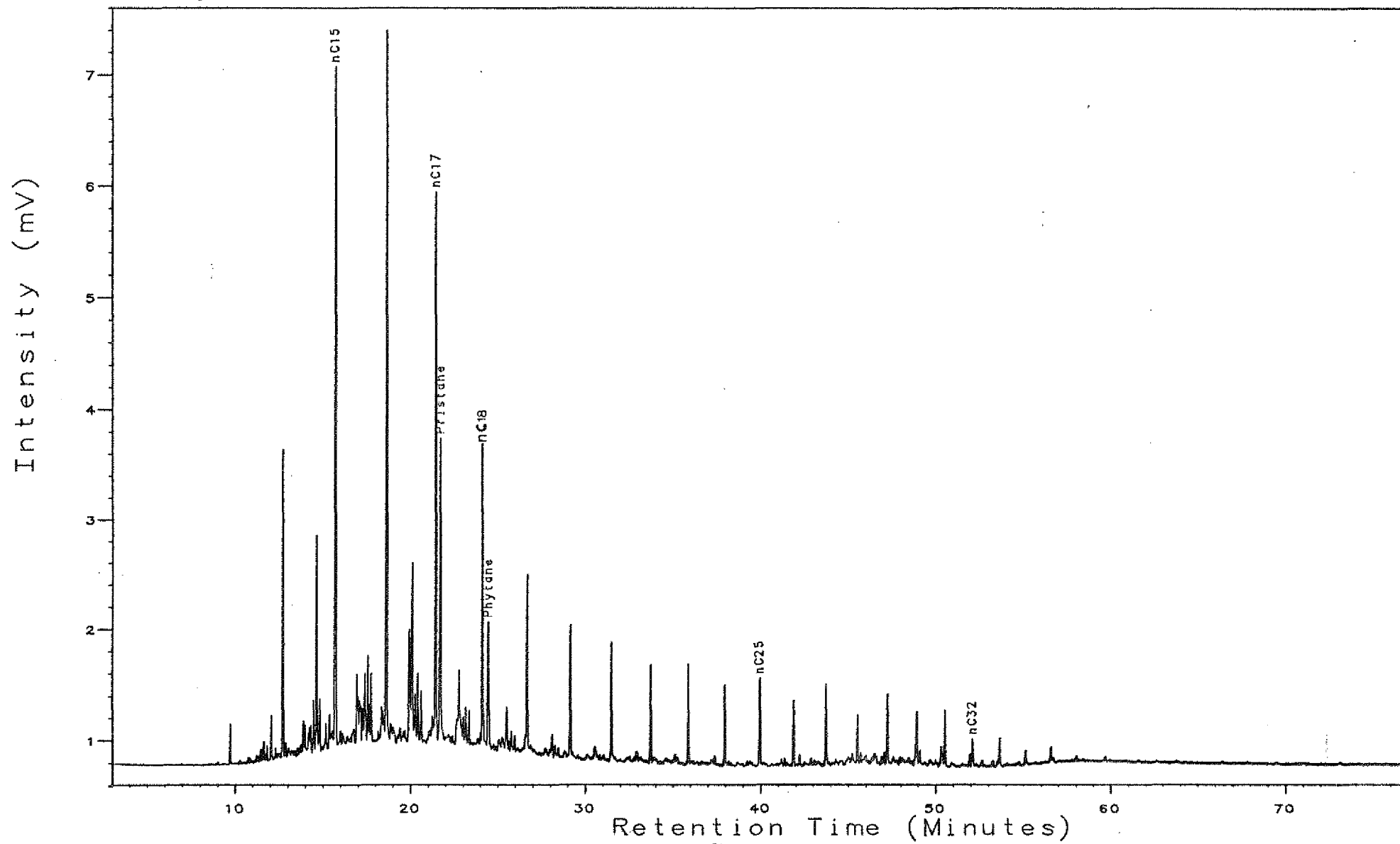
Analysis SA1532495

10, 1, 1

31/4-3 2475-95m, SAT



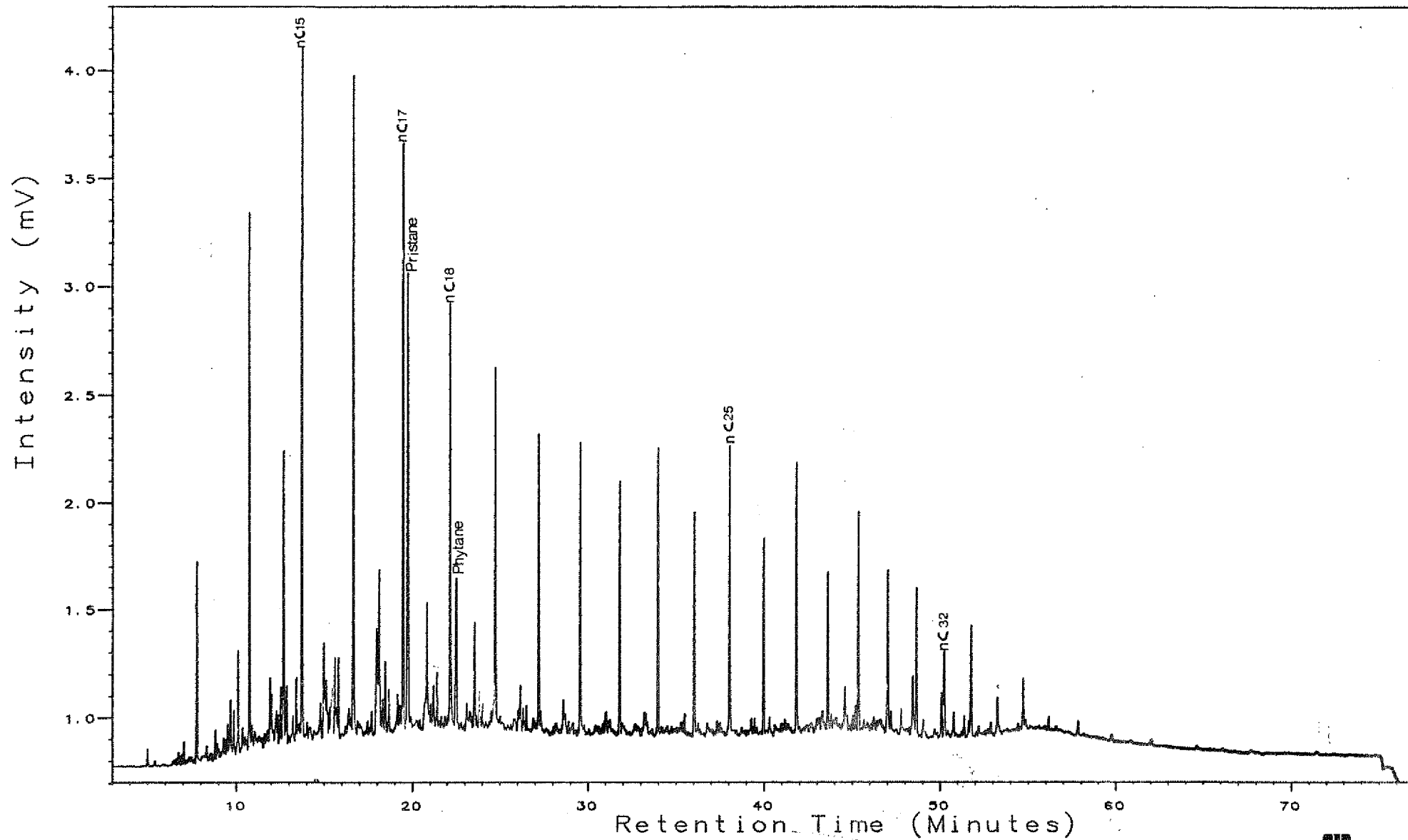
Analysis SA1532520 10, 1, 1 31/4-3 2500-20m, SAT



Analysis SA1532598

10, 1, 1

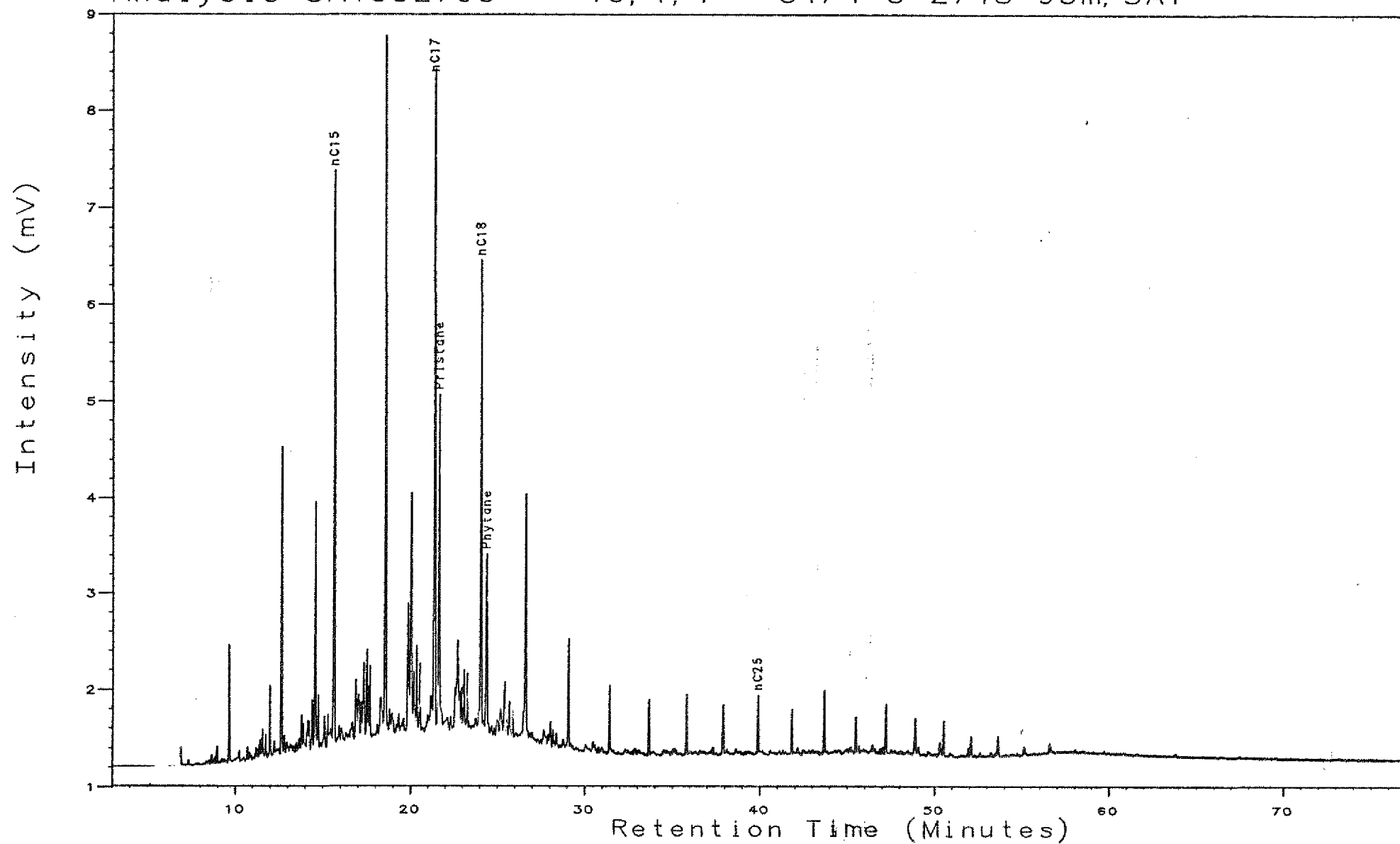
31/4-3 2578-98m, SAT



Analysis SA1532793

10, 1, 1

31/4-3 2748-93m, SAT



Analysis SA1532828

10, 1, 1

31/4-3 2813-28m, SAT

