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Source-Rock Evaluation of Well 6407/1-3.

CLIENT/ OPPDRAGSGIVER

Statoil

RESPONSIBLE SCIENTIST/ PROSJEKTANSVARLIG

L. Leith

AUTHORS/ FORFATTERE

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SUMMARY/ SAMMENDRAG

The sequence was divided into six zones as follows:

Zone 1: 2275-2465m: Dominantly claystone; Type III/IV kerogen, marginally mature. Very poor oil/gas source potential.

Zone 2: 2476-2855m: Sandstone/claystone; Type III/IV kerogen, marginally mature, migrated bitumen. Very poor oil/gas source rock.

Zone 3: 2870-3490m: Claystone; Type III/IV kerogen, moderately mature. No significant oil/gas source potential

Zone 4: 3490-3625m: Claystone, organic rich; Type II and II/III, moderately mature. Good oil source potential.

Zone 5: 3640-4270m: Sandstone/claystone; Type III/II kerogen in claystone. Thermally mature. Limited oil source potential based on polated claystones. Gas potential at base of section.

Zone 6: 4270-4469m: Claystone/coal: Type III and III/II kerogen. Thermally mature. Good gas/condensate source.

KEY WORDS/ STIKKORD

Haltenbanken | 6407/1-3 | Source-Rock | Turbodrill-affects

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EXPERIMENTAL

Total Organic Carbon

Bulk samples were crushed in a centrifugal mill. Aliquots of the samples were then weighed into Leco crucibles and treated with hot 2N HCl to remove carbonate, and washed twice with distilled water to remove traces of HCl. The crucibles were then placed in a vacuum oven at 50°C and evacuated to 20mm Hg for 12 hrs. The total organic carbon (TOC) content of the dried samples was determined using a Leco EC12 carbon analyser.

Rock-Eval Pyrolysis

Crushed sample (100mg) was weighed into a platinum crucible the base and cover of which are made of sintered steel, and analysed on a Rock-Eval pyrolyser.

Vitrinite Reflectance

Vitrinite reflectance measurements of 4 of the samples, were done. The samples were mounted in Bakelite resin blocks; care being taken during the setting of the plastic to avoid temperatures in excess of 100°C. The samples were then ground, initially on a diamond lap followed by two grades of corundum paper. All grinding and subsequent polishing stages in the preparation were carried out using isopropyl alcohol as lubricant, since water leads to the swelling and disintegration of the clay fraction of the samples.

Polishing of the samples was performed on Selvyt cloths using three grades of alumina, 5/20, 3/50 and Gamma, followed by careful cleaning of the surface.

Reflectance determinations were carried out on a Leitz M.P.V. microphotometer under oil immersion, R.I. 1.518 at a wavelength of 546 nm. The surface of the polished block was searched by the operator for suitable areas of vitrinitic material in the sediment. The reflectance of the organic particle was determined relative to optical glass standards of known reflectance. Where possible, a minimum of twenty individual particles of vitrinite was measured.

The samples were also analysed in UV light, and the colour of the fluorescing material determined. Below, a scale comparing the vitrinite reflectance measurements and the fluorescence measurements is given.

VITRINITE REFLECTANCE R.AVER. 546 NM 1516	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10
% CARBON CONTENT DAF.	57	62	70	73	76	79	80.5	82.5	84	85.5
LIPTINITE FLUOR NM	725 750 790		820	840		860	890		940	
EXC. 400 nm BAR. 530 nm colour	G	$G/_Y$	Y	$Y/_O$	L.O	M.O.		D.O.		$O/_R$ R
zone	1	2	3	4	5	6		7		8 9

NOTE: Liptinite NM = Numerical measurements of overall spore colour and not peak fluorescence wavelength.

Relationship between liptinite fluorescence colour, vitrinite reflectance and carbon content is variable with depositional environment and catagenic history. The above is only a guide. Liptinite will often appear to process to deep orange colour and then fade rather than develop or O/R red shade. Termination of fluorescence is also variable.

Processing of Samples and Evaluation of Visual Kerogen

Crushed rock samples were treated with hydrochloric and hydrofluoric acids to remove the minerals. A series of microscopic slides contain strew mounts of the residue:

T-slide represents the total acid insoluble residue.
N-slide represents a screened residue (15µ mesh).
O-slide contains palynodebris remaining after flotation ($ZnBr_2$) to remove heavy minerals.
X-slides contain oxidized residues, (oxidizing may be required to

remove sapropel which embeds palynomorphs, or where high coalification prevents the identification of the various groups).

T and/or O slides are necessary to evaluate kerogen composition/-palynofacies which is closely related to sample lithology.

Screened or oxidized residues are normally required to concentrate the larger fragments, and to study palynomorphs (pollen, spores and dino-flagellates) and cuticles for paleodating and colour evaluation.

So far visual evaluation of kerogen has been undertaken from residues mounted in glycerine jelly, and studied by Leitz Dialux in normal light (halogene) using x10 and x63 objectives. By x63 magnification it is possible to distinguish single particles of diameters about 2 and, if required, to make a more refined classification of the screened residues (particles >15μ).

The colour evaluation is based on colour tones of spores and pollen (preferably) with supporting evidence from colour tones of other types of kerogen (woody material, cuticles and sapropel). These colours are dependant upon the maturity, but are also influenced by the paleo-environment (lithology of the rock, oxidation and decay processes). The colours and the estimated colour index of an individual sample may therefore differ from those of the neighbouring samples. The techniques in visual kerogen studies are adopted from Staplin (1969) and Burgess (1974).

In interpretation of the maturity from the estimated colour indices we follow a general scheme that is calibrated against vitrinite reflectance values (R_o).

Ro	0.45	0.6	0.9	1.0	1.3
colour index	2-	2	2+	3-	3
Maturity intervals	Moderate mature	Mature (oil window)			Condensate window

Extractable Organic Matter

Approximately 50gm of powdered rock was extracted by a ultrasonic probe for 3 minutes using dichloromethane (DCM) as solvent. The DCM used was of organic geochemical grade and blank analyses showed the occurrence of negligible amounts of contaminating hydrocarbons.

Activated copper fillings were used to remove any free sulphur from the samples.

The cuttings samples were extracted by careful washing with DCM, instead of using the ultrasonic probe on crushed samples. Prior to the washing the coaly part of the cuttings was removed by heavy liquid separation. In addition the water that filled the cans of 6 of the samples were extracted by shaking with DCM.

After extraction the solvent was removed on a Buchi Rotavapor and the amount of extractable organic matter (EOM) was determined.

Chromatographic Separation

The extractable organic matter (EOM) was separated into saturated fraction, aromatic fraction and non hydrocarbon fraction using a MPLC system with hexane as eluant (Radke et al., Anal. Chem., 1980). The various fractions were evaporated on a Buchi Rotavapor and transferred to glass vials and dried in stream of nitrogen. The two oils were separated using the same system.

Further separation of some of the aromatic fractions was performed by HPLC, into subfractions according to ring size.

Gas Chromatographic Analysis

The saturated hydrocarbon fractions were each diluted with n-hexane and analysed on a HP 5730A gas chromatograph, fitted with a 25m OV-101 fused silica capillary column. Hydrogen (0.7ml/min) was used as carrier gas.

Injections were performed in the split mode (1:20). The temperature program applied was 80^{o}C (2 min) to 260^{o}C at 4^{o}C/min.

The data processing for all the GC analyses was performed on a VG Multichrom System.

Pyrolysis Gas Chromatography (Py-GC Programmed)

Thermoextraction.

20-30 mg of whole rock sample was placed in a boat shaped sample probe and thermoextracted in a stream of helium at 300°C for 5 minutes.

Py-GC

20-30 mg of solvent- and thermoextracted whole rock sample was programmed pyrolysed in helium (260°C to 520°C at 35°C/min.) in a furnace type pyrolyzer. The outlet of the pyrolyzer was directly connected to a splitter (30:1) and a fused silica capillary column. The pyrolysis product was trapped in a cooled (liq. Nitrogen) U-shaped section at the front of the column.

The outlet of the splitter was directly connected to a FID detector and the course of the pyrolysis could be followed by the detector response of the bulk pyrolysis product (30:1) which was recorded as a broad peak. At the end of the pyrolysis the pyrolysis product was injected on to the capillary column at ambient temperature (by removing the nitrogen bath) and analysed under the GC conditions given below.

GC-conditions

Column: 25m OV-1, I.D. 0.3 mm, fused silica capillary column.
Carrier gas: Helium with inlet pressure 10 psi. Flow; ca. 1.5. ml/min.
Oven programme: 40° - 270°C at 4°C/min.

INTRODUCTION

This report has two objectives. The first is to evaluate the oil source potential of thegeological section (2275-TD at 4469m) penetrated by the Statoil 6407/1-3 well, which is located in the Haltenbanken area of the Norwegian North Sea (figure 1). The second objective is to examine the effects of turbo-drilling on cuttings samples with respect to their geochemistry.

In order to minimise the effects of caving material and turbo-drilling, where possible the source-rock evaluation has been based on sidewall core samples. The data from the sidewall cores are compared with the data from the turbo-drilled section (2806-3136m and 2214-3467m). This will allow an evaluation of turbo-drilling affects. Close attention is paid to the lower Jurassic carbonaceous shales and coals as requested by Statoil.

The source rock evaluation has been carried out using the analytical programme specified by Statoil. This analytical programme is detailed below.

Analysis/interval:	Sidewall core samples	Turbodrilled interval	4047-TD	Other samples	Total analyses
Headspace and occl. gas	-	50	28	12	90
Total Organic Carbon	52	50	28	12	142
Rock-Eval Pyrolysis	52	50	28	12	142
Visual Kerogen	20	20	10	10	60
Vitrinite Reflectance	30 samples selected over interval 500m-TD				
Extraction, Separation and saturate GC.	15 samples from intervals 3501-3600m and 3820m TD.				
Pyrolysis-GC	7	4	4	-	15

Source-Rock Evaluation

Based largely on lithological descriptions and the total organic carbon (TOC) content of the samples, the well section is separated into six zones as follows:

Zone 1: 2275-2465m
Zone 2: 2465-2855m
Zone 3: 2870-3490m
Zone 4: 3490-3625m
Zone 5: 3640-4270m
Zone 6: 4270-4469m (T.D.)

Vitrinite reflectance data were obtained for the interval between 450m and 2275m. These data are condsidered with the data from zone 1.

C_1-C_7 Light Hydrocarbon Analysis

The data obtained from the analysis of the C_1-C_7 hydrocarbon composition of the samples are presented in table 1.

Zone 1, 2275-2465m: A total of ten samples from this zone were analysed to determine the C_1-C_7 hydrocarbon composition of the samples. Three of the samples from the interval at 2300-2345m were found to have a very low C_1-C_7 content. The reason for this is uncertain, but does mean that the data from this interval are unreliable. The C_1-C_7 hydrocarbon fraction of the two samples at 2275-2300m is mostly methane very low amounts of C_4+ compounds. This is reflected in very low gas wetness values of 7.42% (2275-2290m) and 7.12% (2290-2300m). The C_1-C_7 hydrocarbon composition of the remaining five samples between 2345m and 2465m is predominantly methane, although substantial concentrations of C_2+ hydrocarbons are also present. This is reflected by higher gas wetness values which range between 23.77% at 2345-2360m and 42.51% at 2450-2465m. The iC_4/nC_4 values of these five samples range from 0.65 (2345-2360m) to 0.55 (2390-2405m). This would suggest that the samples are thermally mature, although the presence of migrated hydrocarbons would also explain these data.

Zone 2, 2476-2855m: Thirteen samples were analysed from this zone. The C_1-C_7 hydrocarbons in the interval at 2476-2585m are present in very high concentrations and C_2+ compounds are more more abundant than methane. This is reflected by relatively high gas wetness values of between 57.95% (2476-2495m) and 48.38% (2570-2585m). The low iC_4/nC_4 values of 0.5 (2476-2535m) and 0.56 (2570-2585m) suggest that the high gas wetness values may be due to the presence of liquid hydrocarbons. The next seven samples (2600-2795m) are characterised by C_1-C_7 concentrations which are nearly an order of magnitude less than was present in the previous samples. The C_2+ hydrocarbon concentration tends to decrease down the interval. iC_4/nC_4 ratios also tend to be higher in this part of the interval. The ratio values may reflect the maturity of the section more accurately. The data suggest that this interval is marginally mature with respect to the onset of oil generation.

The last two samples from the zone have C_1-C_7 concentrations which are an order of magnitude lower than the overlying samples. These samples were collected through an interval which had been drilled using a crystal M269L turbine core crusher. Despite the lower gas concentrations in

the samples, the C_2+ compounds are more abundant than methane and both of the samples have relatively high gas wetness values of 45.22% (2810-2825m) and 39.04% (2840-2855m). The iC_4/nC_4 ratios are lower than those observed in the immediately overlying samples, but are comparable to the values observed at the top of the section.

Zone 3, 2870-3490m: Twenty-one samples were collected from the zone. This zone was drilled using turbo-drilling techniques and a number of different bits wer used. The first six samples were drilled using a crystal M269L turbine core crusher bit. The C_1-C_7 hydrocarbons are present in similar concentrations to those which were observed in the samples at the base of the previous section. In the first two samples at 2840-2885m and 2900-2915m, C_{2+} compounds are more abundant than methane. This is reflected in relatively high gas wetness values of 38.01% and 43.26%, respectively. In the remaining four samples between 2930m and 3035m, methane is more abundant than the C_2+ compounds and gas wetness values fall to between 20.99% (2990-3005m) and 29.76% (2960-2975m). This is matched by an increase in iC_4/nC_4 ratio values relative to the two samples at the top of the section. This may be due to an increase in the heat generated by the turbo-drill bit with time. This would increase the methane content of the samples by cracking larger compounds.

The two samples between 3050m and 3095m were collected from an interval which had been penetrated by a Diamond Bohart LX13 Turbine Core Crush Type bit. In both of these samples, C_2+ compounds are more abundant than methane and gas wetness values have increased to about 50%. There is a drop in iC_4/nC_4 values relative to the overlying samples. This may indicate that this bit has less affect on the light hydrocarbon composition of the samples than the previous one.

The sample at 3110-3125m was collected from an interval penetrated by a crystal M260L conventional turbine bit. In this sample the C_2+ compounds and methane are present in equivalent concentrations. The sample has a reduced gas wetness value of 32.69% relative to the overlying two samples. The iC_4/nC_4 ratio is also higher then is seen in most of the overlying samples and may more accurately reflect the thermal maturity of the sample.

The samples between 3132.5m and 3215m have been drilled using a conventional Hughes XIG Tricone Rockbit. In these samples the C_2+ compounds are more abundant and the gas wetness values increase to between 50.25% (3132.5m-3155m) and 57.91% (3200-3215m). iC_4/nC_4 values for the bottom two samples in this section are 1.08 (3170-3185m) and 1.09 (3200-3215m) and may represent the true maturity of the section.

The remaining nine samples between 3220m and 3467m were collected from a section drilled with a crystal M269L Turbine Core Crusher bit. The samples tend to have roughly equivalent concentrations of methane and C_2+ compounds. Gas wetness values are significantly lower than those observed in the overlying section and decrease from 41.97% (3220-3240m) to 18.52% (3350-3365m). This is matched by a similar decrease in the iC_4/nC_4 ratio from 0.85 (3220-3240m) to 0.51% (3455-3467.5m), with the exception of an iC_4/nC_4 value of 1.43 at (3350-3365m). The general decrease in gas wetness and the iC_4/nC_4 ratio with increasing depth suggests that initially turbodrill affects are small, and that, with increasing time more heat is built up around the bit and affects become more significant.

Zone 4, 3490-3625m: Nine samples from this zone were analysed. In all of these samples, the C_2+ compounds are more abundant than methane. Gas wetness values increase rapidly towards the base of the section from 46.27% at 3495-3500m to 79.68% at 3607.5-3625m. This is matched by a very rapid decrease in the iC_4/nC_4 ratio from 0.54 at 3495-3500m to 0.24 at 3607.5-3625m. This suggests that the rocks in this section may be in the oil generation phase and may have already generated a moderate amount of oil.

Zone 5, 3640-4270m: Twenty-three samples from this zone were analysed for C_1-C_7 hydrocarbon composition. Based on these data, this zone can be separated into an upper unit at 3640-4165m and a lower unit at 4165-4270m. The upper unit is characterised by an abundant C_2-C_7 fraction relative to methane. The wetness values are relatively high and vary between values of 35.67% at 3640-3655m and 79.56% at 3970-3985m. High gas wetness values of greater than 60% occur between 3760m and 4150m. A gradual increase in the iC_4/nC_4 may be observed down the interval. iC_4/nC_4 values range from 0.19 at 3805-3820m to 0.36 at 4150-4165m. The data suggest that most of this upper unit has the correct maturity for oil generation or that there are non-indigenous hydrocarbons present in the oil.

The lower unit is characterised by the presence of very high concentrations of C_1-C_7 hydrocarbons in which methane is the dominant component. This latter feature is reflected by decreased gas wetness values relative to the upper unit. Gas wetness values vary from 44.15% (4240-4255m) and 43.91% (4165-4180m) to 27.70% (4255-4270m). These decreased gas wetness values are matched by increased iC_4/nC_4 ratios of between 0.36 (4165-4180m) and 0.73 (4240-4255m). The data from the lower unit suggest that some of the rocks may be generating a light gaseous or condensate-like product.

Zone 6, 4270-4469m: Fourteen samples were taken from this zone. The gas composition appears to continue the trend noted in the immediately overlying interval. The samples contain very high C_1-C_7 hydrocarbon concentrations which are dominated by the C_1-C_3 compounds, especially methane. This is reflected in the gas wetness values which vary from 45.55% at 4435-4450m to 32.68% at 4375-4390m. There is a general trend towards increasing gas wetness down the section. There is a general increase in the iC_4/nC_4 ratio down the interval from 0.39 at 4240-4285m to 0.99 at 4300-4315m.

Lithology and Total Organic Carbon

Where shales or claystones constitute greater than 10% of a sample they were analysed. Occasionally shales/claystones of different colours were picked and analysed separately. Similary, siltstones, where prominent were picked and analysed separately. Limestones and shaley or silty sandstones were also picked and analysed when they comprised greater than 10% of a sample. Clear sands and sandstones were not usually analysed. Only a few red-brown and green claystones were measured since they are generally poor in organic carbon. The lithology and total organic carbon (TOC) data for the samples are presented in table 2.

Zone 1, 2275-2465m: Ten cuttings samples and four sidewall core samples were analysed for lithology and total organic carbon (TOC) content. The cuttings samples are badly affected by casing cement contamination. The lithology of the cuttings samples and the sidewall core samples is medium grey or olive grey claystone. Caving material cannot be recognised from the available data.

TOC values for the cuttings samples vary between 0.12 wt% at 2420-2435m to 0.83 wt% at 2360-2375m, with an average value of 0.46 wt%. The TOC values of the sidewall cores vary from 0.22 wt% at 2367m to 1.30 wt% at 2333m, with an average value of 0.87 wt%. These data indicate that the section represented by zone 1 has poor to fair organic richness relative to that of an average argillaceous source rock (ca. 1.00 wt% TOC).

Zone 2, 2476-2855m: Thirteen cuttings samples and four sidewall core samples were evaluated for lithology and TOC. Between 2480m and 2735m, most of the cuttings samples are dominated by a fine grained, glauconitic sandstone. A medium grey claystone and a brownish dolomite/marl lithology are minor or secondary in these samples. The cuttings samples in this interval range from an olive grey sandstone to olive grey claystone lithology. In the remaining samples between 2750m and 2855m, the samples are dominated by medium grey to medium dark grey claystone. A fine grained sandstone lithology is secondary. The bottom two samples between 2810-2859m were collected from a section drilled by a Crystal M269L turbine core crusher turbo-drill bit. No turbo-drill affects are observed in the lithology of the samples. It is possible that the medium grey claystone lithology in the lower interval represents cavings based on differences relative to the sidewall core claystones.

TOC values for the cuttings samples vary between 0.65 wt% (2750-2765m) and 0.79 wt% (2660-2675m), with an average TOC value of 0.72 wt%. The TOC values of the sidewall core samples vary from 0.73 wt% (2476m) to 0.98 wt% (2507m), with an average value of 0.88 wt%. Since it is possible that the cuttings claystones represent cave material, evaluation is made on the core samples. Based on the sidewall core samples, this section has fair organic richness.

Zone 3, 2870-3490m: Twenty-one cuttings samples and eleven sidewall core samples were evaluated for lithology and TOC. This zone was drilled using a number of different turbo-drill bits. The zone will be split in five sections according to the different bits used.

a. Crystal M269L Turbine core crusher (2870-3051m): Six cuttings samples and one sidewall core sample were analysed. Black, cokey particles become increasingly predominant in the cuttings samples with increasing depth. Medium grey to medium dark grey claystone changes from being dominant between 2870m and 2975m to being secondary below 2875m. The sidewall core has a dark grey claystone lithology. The medium grey claystone cuttings may represent caving material.
TOC values for the cuttings samples vary from 0.59 wt% (2870-2885m) to 0.86 wt% (2990-3005m), with an average value of 0.72 wt%. The sidewall core sample has a TOC value of 1.01 wt%. The turbo-drilled particles have an average TOC value of 0.68 wt%, which suggests that one affect of turbo-drilling is a reduction in the TOC value of the sample. The medium dark grey claystone cuttings (av. TOC = 0.80 wt%) may be in situ and therefore, the decrease in TOC due to turbo-drilling would not be as drastic as suggested by the sidewall core.

b. Diamond Bohart LX13 Turbine Core Crusher type 2 (3051-3090m): Two cuttings samples and one sidewall core were evaluated from this interval. The cuttings samples are mostly medium grey to dark grey claystones with subsidiary light grey claystone, sandstone and limestone lithologies. Cokey, turbo-drilled fragments are minor. The sidewall core (3090m) is a dark grey claystone. Based on this, the angular medium grey claystone fragments in the cuttings may represent caving.

The TOC values of the cuttings lithologies range from 0.28 wt% to 0.80 wt% at 3050-3065m, with an average value of 0.63 wt%. The sidewall core sample has a TOC value of 0.95 wt%. The TOC values of the cuttings samples are lower than those of the sidewall core. This may be due to a number of causes, amongst which turbo-drill affects must be considered.

c. Crystal M-260L Conventional Turbine (3090-3136m): One cuttings sample of mostly medium light grey to dark grey claystone lithology was evaluated from this section. 5% of the sample is represented by cokey turbo-drilled particles. Based on the overlying interval, the angular medium grey claystone lithology may represent cavings. TOC values vary from 0.45 wt% in the medium grey - dark grey claystone to 0.76 wt% in the medium grey - light grey claystone lithology. No conclusions regarding turbo-drill affects can be made on this one sample.

d. Hughes XIG Tricone Rockbit (3136-3214m): Three cuttings samples and two sidewall core samples were evaluated. No obvious turbo-drill affected particles were observed in the cuttings samples. The cuttings samples are dominated by a medium dark grey claystone lithology with secondary medium grey - light grey claystone and sandstone lithologies. The sidewall core samples at 3160m and 3195m are dark grey to medium dark grey claystones. This suggests that the secondary claystone cuttings lithology is caved material.

The TOC values of the dark grey claystone cuttings vary from 0.84 wt% (3170-3185m) to 1.13 wt% (3200-3215m), with an average value of 0.95 wt%. The sidewall core samples have TOC values of 0.67 wt% (3160m) and 0.76% (3195m), with an average of 0.72 wt%. Turbodrilling affects are not obvious.

e. Crystal M269L Turbine Core Crusher (3214-3476m): Nine cuttings samples and seven sidewall core samples were evaluated from this interval. Most of the cuttings samples are dominated by black, cokey turbo-drilled particles. A medium dark grey claystone lithology varies from secondary to trace amounts. The sidewall cores are mainly medium dark grey to dark grey claystones. The secondary cuttings lithology probably represents remnants of the original formation.

TOC values for the turbo-drilled fragments vary from 0.35wt% (3425-2440m) to 0.72 wt% (3290-3305m), with an average value of 0.61 wt%. There is an overall decrease in the TOC values of the turbo-drilled fragments with increasing depth. The dark grey claystone cuttings vary in TOC from 0.73 wt% (3290-3305 wt%) to 0.81 wt% (3220-3240m), with an average value of 0.77 wt%. The sidewall core TOC values vary from 0.43 wt% (3280m) to 3.66 wt% (3424m), with an average value of 0.74 wt% (not including the high TOC at 3424m). The data suggest that turbo-drilling may have a small affect on the TOC of a sample.

Based on sidewall core data, the rocks in the interval represented by zone 3 have fair organic richness.

Zone 4, 3490-3625m: Nine cuttings samples and twenty-one sidewall cores were evaluated from this zone. The cuttings samples are dominated by a medium dark grey to brownish grey claystone lithology. Limestone lithologies occur in minor amounts in most of the samples. The sidewall core samples are mostly medium dark grey to greyish black claystones. The three sidewall core samples at 3506.9m, 3515m and 3520m are marls. Caving does not appear to be a significant problem in this section.

TOC values for the cuttings samples vary from 0.66 wt% (3590-3600m) to 7.33 wt% (3545-3550m) with an average value of 3.36 wt%. Between 3506.9m and 3520m, in the sidewall core samples have very low or non-existant TOC values. Excluding this interval, the TOC values of the sidewall cores vary from 0.71 wt% (3565m) to 6.70 wt% (3526m) with an average value of 3.36 wt%. This tends to suggest that the cuttings TOC values are representative of the section. Based on these data, this section has very good to excellent organic richness.

Zone 5, 3640-4270m: Twenty-three cuttings samples and twelve sidewall core samples were evaluated from this zone. Between 3640m and 4270m, the cuttings samples are dominated by a light grey to white sandstone lithology. Between 4180m and 4270m, coal becomes a secondary or minor component of the cuttings samples. The appearance of the coal coincides with the change in the C_1-C_7 hydrocarbon data. The majority of the sidewall core samples are olive grey sandstones or medium grey siltstones. Medium grey to dark grey claystone sidewall cores occur at 3725-2733m and at 4047m.

TOC values were determined mainly on the claystone lithologies in the cuttings samples. The cuttings TOC values vary from 0.18 wt% at 4180-4195m (sandstone) to 32.46 wt% at 4255-4270m. The average value of the claystones cuttings is 5.52 wt%. The TOC of the sidewall core section varies from 0.47 wt% at 3944m (sandstone) to 1.21 wt% at 3733-3739m (claystone/siltstone). The average TOC value of the claystones is 1.16 wt% and the average TOC value of the siltstones is 1.14 wt%, while the average TOC of the sandstones is 0.66 wt%. Based on the sidewall core and cuttings data, this section contains thin argillaceous intervals of good to excellent organic richness.

Zone 6, 4270-4469m: Fourteen cuttings samples were analysed from this section. These cuttings samples vary from being dominated by a dark brownish-grey claystone or coal at 4270-4390 and at 4450-4469m to being dominated by a sandstone lithology between 4390m and 4450m.

TOC values for the samples vary from 1.63 wt% (4315-4336m) to 22.97 wt% (4285-4300m). The TOC values were measured on the carbonaceous claystones which have an average TOC value of 7.73 wt%. Based on the data this zone has good to excellent organic richness.

Rock-Eval Pyrolysis

The Rock-Eval pyrolysis data for the samples are presented in table 3.

Zone 1, 2275-2465m: A total of fourteen cuttings and sidewall core samples were evaluated. S1 and S2 peak values in all of the samples are low, although production indices are generally high with an average value of 57. This suggests that most of the material appearing in the S1 peaks may represent non-indigenous material. Hydrogen Indices for the fourteen samples are low and a value of greater than 100 is only found in one sample at 2275-2290m. These values, associated with generally high oxygen index values would indicate a mixed type III/IV kerogen. The average T_{max} value for the interval is 426°C indicating low thermal maturity. Anomolous T_{max} values are found at 2300-2315m, 2315-2330m and at 2455m. These low values are due to either a low amount of pyrolysable kerogen in the sample or the possible presence of bitumen.

Zone 2, 2476-2855m: Ten cuttings and sidewall core samples are evaluated from this zone. S2 values are higher than were observed in the overlying zone and production indices are lower. The bottom two samples between 2810m and 2855m were collected from an interval penetrated by a crystal M269L turbine core crusher bit. These samples do not show any anomalies relative to the other samples in this sequence. Hydrogen Indices are mostly low with an average value of 70, which together with a relatively low oxygen Index suggest that type III/IV kerogen is predominant in this section. The interval has an average T_{max} of 426°C suggesting that the organic matter is marginally mature.

Zone 3, 2870-3490m: This section has been extensively drilled using turbodrilling techniques.

a) Crystal M-269L Turbine Core Crusher Bit (2806-3051m): Fourteen cuttings samples and one sidewall core samples were evaluated. Five cuttings samples were obviously turbo-drill affected and are characterized by extremely low S2 peak values and hydrogen indices of less then 3. Production indices in these samples range from 0.92 (3020-3035m) to 1.00 (2930-2945m) due to the low S2 peaks. The low S2 peak values suggest that very little pyrolysable material is left in the samples. T_{max} values are unreliable because of the low S2 peaks. The unaffected cuttings lithologies may contain some cav-

ing material and cannot be used for source rock evaluation. The sidewall core sample at 2870m has a low S2 of 0.13, relative to the turbodrilled fragments, but has a higher S2 value of 0.57. The hydrogen index of 56 suggests that, based on the sidewall core sample, the kerogen in this interval is mostly type III kerogen. The T_{max} value of 429°C suggests that the section is marginally mature.

b) Diamond Bohart LX13 Turbine Core Crush Type (3051-3090m): Three cuttings samples and one sidewall core were analysed. No obviously turbo-drilled lithology was analysed. The light grey claystone is probably caving. The two grey claystone samples have similar S1 and S2 peak values and very similar production indices. An average hydrogen index of 40 suggests that type III/IV kerogen is dominant in these samples. These two samples have an average T_{max} value 429°C. The sidewall core sample at 3090m has a similar S1 value to the cuttings, but a significantly higher S2 value of 0.85 and a relatively high hydrogen index of 89 which suggests the presence of type III kerogen. The T_{max} value of 428°C is similar to the average value for the two grey claystone cuttings samples. No obvious turbo-drill affects are present if the grey claystones are in situ.

c) Crystal M260L Conventional Turbine (3090-3136m): Two cuttings samples were taken from this section. The claystone cuttings all have similar Rock-Eval characteristics and it is difficult to distinguish caving material. The turbo-drilled lithology at 3110-3125m shows some thermal alteration effects, although these are not as severe as were observed using the crystal M269L turbine bit. Significant S2 (0.12) and hydrogen index (20) values were obtained from this sample. The production index of 0.70 is lower than was observed in the samples affected by the M-296L bit.

d) Hughes XIG Tricone Rockbit (3136-3214m): The three claystone cuttings samples show no obvious turbo-drill effects, the light grey-green claystone lithology has a low S2 value and hydrogen index value which is similar to that seen in the light grey claystone cuttings at 3050-3065m which may represent cavings material. The other two cuttings samples have similar Rock-Eval characteristics with an average S2 value of 0.51 and an average hydrogen index of 60. Both of these cuttings samples have low production indices of 0.29 (3136-3155m) and 0.26 (3170-3185m). The sidewall cores have

similar Rock-Eval characteristics. The sample at 3160m has a S2 value of 0.31 and a hydrogen index of 46 against values of 0.66 and 87 respectively for the sample at 3195m. Based on the sidewall core data from these samples, type III/IV kerogen is the main kerogen type in this interval. Sidewall core samples have an average T_{max} value of 430°C which agrees with an average grey claystones cuttings average T_{max} value of 433°C. This interval is marginally mature based on these data.

e) Crystal M269L Turbine Core Crusher (3214-3467m): Thirteen cuttings samples and seven sidewall core samples were evaluated from this interval. The obviously turbo-drill affected lithology shows similar Rock-Eval characteristics to these described in the previous interval drilled using this bit (2086-3051m). The sidewall core samples have fairly constant S1 peak values of between 0.18 at 3470m and 0.27 at 3462m. S2 values have a poor average value of 0.70. Hydrogen indices vary between 29 (3490m) and 85 (3424m) and suggest that the kerogen in the samples is mostly type III. Low production indices suggest that no migrated hydrocarbons are present in the interval. The sidewall core samples have an average T_{max} of 437°C which suggests that the interval is to moderately mature.

Zone 4, 3490-3625m: Thirty-two cuttings and sidewall core samples were evaluated from this zone. The four sidewall core samples between 3506.9m and 3520m are very organic lean and produce unreliable Rock-Eval results. Rock-Eval data from the samples between 3521.9m and 3540m show high S1 and S2 peak values and indicate that they may have good source potential. An average hydrogen index value of 386 suggests that the kerogen in this section is predominantly type II kerogen. Production indices are quite low and suggest that any bitumen in the samples is indigenous. Generally the remainder of the samples outside this interval have poor Rock-Eval results. Isolated intervals with high S2 peaks and good hydrogen indices occur at 3545-3550m and 3607.5-3625m. T_{max} values in this zone vary from 424°C at 3540m to 444°C at 3598m (excluding the organic lean interval at 3506.9-3520m). These data suggest that the section is approaching optimum thermal maturity for oil generation.

Zone 5, 3640-4270m: Thirty cuttings and sidewall core samples were evaluated from this zone. The sidewall core samples between 3847-3915m and 3944-3963m are sandstones. Otherwise the Rock-Eval analyses were made

on claystone lithologies in the samples. With the exception of an organic lean sandstone at 4180-4195m, the samples between 4150m and 4270m have the highest S2 peak values and hydrogen indices observed in this interval. An average hydrogen index of 263 suggests that the predominant kerogen type in these samples is type II/III kerogen. Production indices for the samples are fairly low, which suggests that the intervals have not generated a significant amount of bitumen at this time. T_{max} values between 441°C and 447°C suggest that the zone is thermally mature.

The remainder of the samples between 3460m and 4150m have lower S2 peak values than samples in the previously discussed section. The samples have an average hydrogen index of 198, suggesting the presence of type III/II kerogen. Intervals with fair petroleum potential values of 2-5 occur throughout the section. These rocks are thermally mature based on T_{max} values which vary from 431°C to 445°C (excluding data from the sandstone intervals which may have been calculated on bitumen).

Zone 6, 4270-4469m: Fourteen cuttings samples were evaluated from this zone. All of the samples in this section are organic-rich claystones or coals. The samples have good petroleum potential values in excess of 5 with the exception of a claystone sample at 4315-4330m. Most of the samples have low production indices of less than 0.17. The zone has an average hydrogen index of 207 which suggests that the organic matter in the samples is type III kerogen or a mixture of type II and type III kerogen. An average T_{max} value of 451°C suggests that the rocks are thermally mature.

Analysis in Reflected Light

The reflected light examination results are presented with the other maturation data in figure 4 and table 4.

Zone 1, 2275-2465m: Samples analysed from the section between 450m and 2275m will also be discussed here.

The four samples between 450m and 1600m have a sandstone lithology and contain no measurable vitrinite. Liptinite material present in the sample has a yellow to yellow/orange fluorescence in ultraviolet light. This suggests that the samples are largely immature. Similar liptinite fluorescence colours were observed in the following two samples at 1930-1960m and 2110-2140m. In these two samples it was possible to obtain some reflectance data, although the data from the 2110-2140 in sample is invalid due to the reworked nature of the vitrinite. The sample at 1930-1960m was found to have a reflectance value of 0.47% indicating that it is thermally immature.

The two samples at 2315-2330m and 2333m are mainly brown claystone. Liptinite and inertinite are the most common macerals. Reflectance values of 0.58% and 0.59% respectively were obtained from the samples. Liptinite macerals have a yellow/orange to light orange fluorescence in ultraviolet light. The data suggest that the rocks are marginally mature.

Zone 2, 2476-2855m: Two samples at 2695m and 2750-2765m were examined. These samples are mainly brown or grey claystones in which the most common macerals are inertinite, reworked vitrinite and liptinite. Indigenous vitrinite is often closely associated with liptinite and this may affect the reflectance measurements. Reflectance measurements of 0.57% (2695m) and 0.47% (2750-2765m) were obtained although the latter value is unreliable due to a low number of reflectance measurement. Liptinite maceral fluorescence in ultraviolet light varies from light orange to medium orange. The data indicate that the rocks have marginal thermal maturity.

Zone 3, 2870-3490m: Vitrinite reflectance measurements were taken on a number of claystone sidewall cores. The common macerals in these samples are liptinite and reworked vitrinite. Liptinite is often closely associated with the indigenous vitrinite. The reflectance values of the core samples vary from 0.58% at 2870m to 0.65% at 3462m indicating that the

base of the section has achieved moderate thermal maturity. Liptinite fluorescence in these samples varies from light orange to deep orange and supports the reflectance results.

Three turbo-drilled samples were analysed. One of the samples had been collected from a Diamond Bohart LX13 Turbine Core Crush at 3050-3065m. This sample had a dark grey, cokey appearance suggesting quite severe alteration. No recognisable organic matter survived in this sample. The other two samples at 3220-3240m and 3290-3305m were collected from rocks penetrated by a Crystal M269L Turbine Core Crusher bit. These samples have a similar appearance to the sample at 3050-3065m, although rare particles of vitrinite are present. Measurements taken on these samples suggest that turbo-drilling does not significantly affect the reflectance of any vitrinite which survives. However this material could also be artificially matured liptinite. It is difficult to be certain as the measured particles have no distinct habit.

Zone 4, 3490-3625m: Two samples at 3540m and 3607.5-3625m were examined. These samples are grey or brown claystones with abundant pyrite. The most common macerals are reworked vitrinite and liptinite. The liptinite is often closely associated with indigenous vitrinite. Reflectance values of 0.59% (3540m) and 0.60% (3607.5-3625m) indicate that the section has moderate thermal maturity. Liptinite macerals in ultra-violet light show light orange to medium orange fluorescence. This supports the conclusion based on the reflectance values.

Zone 5, 3640-4270m: Two sidewall core samples at 3733m and 4047m, and a cuttings sample at 3970-3985m were examined in reflected light. These samples vary from grey or brown claystone at 3733m to a mixed sandstone/siltstone lithology at 4047m. The most common macerals are liptinite and reworked vitrinite. Inertinite is common in the sample at 4047m. The close association of liptinite and indigenous vitrinite caused problems in some of the samples. Reflectance values of 0.59% (3733m), 0.56% (3970-3985m) and 0.59% (4047m) were obtained and suggest that the section is moderately mature. Liptinite fluorescence colours of light orange and medium orange support these data.

Zone 6, 4270-4469m: Two carbonaceous claystones at 4285-4300m and 4450-4465m were examined, along with two coal samples at 4345-4360m and 4420-4435m. Both of these lithologies have abundant indigenous vitrinite and

liptinite. In some of the carbonaceous claystone clasts, liptinite has been converted to pseudo-vitrinite. Reflectance values of 0.89% and 0.90% were obtained from the samples. This is a large increase relative to the reflectances obtained in the previous zone. This increase may be due to reduced liptinite affects on the vitrinite in the samples from zone 6. An alternative explanation is the existence of unconformity somewhere between 4047m and 4285m. Spore fluorescence colours vary from medium orange to orange/red and tend to support the vitrinite data.

Extraction and Chromatographic Separation

Extraction data are presented in table 5, 6, 7 and 8. The gas chromatograms of the samples are shown in figure 2 and chromatographic data for the samples are presented in table 9.

Zone 1, 2275-2465m: No samples from this interval were extracted on the instructions of Statoil.

Zone 2, 2476-2855m: No samples from this interval were extracted as instructed by Statoil.

Zone 3, 2870-3490m: No samples were extracted from this interval as instructed by Statoil.

Zone 4, 3490-3625m: Five sidewall core samples at 3504.5m, 3526m, 3535m, 3540m and 3565m were extracted to examine the extractable organic matter (EOM) present in the zone. The three samples between 3526m and 3540m were found to contain excellent EOM concentrations of 12115 ppm (3526m), 11366ppm (3535m) and 10316ppm (3540m). The samples at 3504.5m and 3565m have fair EOM concentrations of 853ppm and 726ppm respectively. When the EOM concentrations are expressed in mg/g TOC, the samples, with the exception of the sample at 3504.5m, have EOM concentrations which are typical of good to excellent oil source rocks. Hydrocarbon and liquid chromatography data for 3565m are unreliable due to insufficient sample recovery. The three samples between 3526m and 3540m have a good average HC concentration of 102.9 mg/g TOC.

The saturated hydrocarbon chromatograms of the samples at 3526-3540m are similar with a maximum about nC_{15}. The sample at 3540m shows a slight bimodality which may indicate an input of terrestrially-derived material into type II-derived material. The similarity of the three samples is emphasised by the similar pristane/phytane ratios of 1.1 (3326m), 1.1 (3535m) and 1.2 (3540). Pristane/phytane data for these three samples suggest a mildly reducing source depositional environment. These samples are mature based on carbon preference indices (CPI) which range from 0.8 (3526m) to 0.9 (3540m). The gas chromatogram of the 3504.5m sample is characterised by a very prominant pristane peak. This may suggest that the source material is terrestrially sourced or was deposited under oxidising conditions. CPI data for this sample indicate that it is near-

ly thermally mature. The remaining sample at 3565m has a gas chromatogram which shows a predominance of n-alkanes about nC_{26}. There may have been some reduction in the C_{10}-C_{23} n-alkanes and data from this sample must be interpreted carefully.

Zone 5, 3640-4270m: Two samples at 3928m and 4045-4060m were extracted and evaluated. These samples contain fair to good EOM concentrations of 596ppm and 1514ppm respectively. Due to a poor sample recovery, liquid chromatography data from the 3928m sample is unreliable. A hydrocarbon (HC) concentration of 64.6 mg/g TOC suggests that the 4045-4060m sample may be capable of significant oil generation. This sample has a high saturate hydrocarbon content of 48.3%.

The gas chromatogram of the saturate fraction in the 3928m sample has a mature, oil-like profile. The CPI value of 1.1 suggests that the extract is thermally mature. The gas chromatogram of the 4045-4060m sample is bimodal with maxima at the nC_{15} and nC_{25} n-alkane peaks. This suggests a mixed terrestrial and marine source input. Both of these samples have similar pristane/phytane ratios of 2.4 (3928m) and 2.7 (4045-4060m). The 4045-4060m sample appears to have received a greater terrestrial input then the 3928m sample.

Zone 6, 4270-4469m: Two coal cuttings sample at 4300-4315m and 4360-4375m, together with four carbonaceous claystone cuttings samples at 4285-4300m, 4390-4405m, 4420-4435m and 4450-4465m were extracted and analysed. The two coal samples produced high EOM concentrations of 55517ppm (4300-4315m) and 44388ppm (4360-4375m). HC concentrations of 9.9 mg/g TOC and 7.9 mg/g TOC respectively, suggest that these coals will not be significant oil source rocks. The carbonaceous claystones have good EOM concentrations which vary from 5328ppm (4285-4300m) to 2500ppm (4390-4405m). Based on HC concentrations of 21.8 mg/g TOC (4284-4300m), 27.1 mg/g TOC (4390-4405m) and 33.4 mg/g TOC (4420-4435m), the three intervals will not generate significant amounts of oil at the present time. The sample at 4450-4465m has a HC concentration of 57.0 mg/g TOC which suggests that it may be capable of significant oil generation. This latter sample has a high saturate hydrocarbon content of 55.1% relative to the average saturate content of 17.7% for the samples in this zone. The coal samples have very low saturated hydrocarbon contents of 3.5% (4300-4315m) and 2.3% (4360-4375m).

The gas chromatogram of the carbonaceous claystone at 4285-4300m has a distribution which is unimodal with a maximum about nC_{25}. This is typical of terrestrially-derived material. The coal sample gas chromatograms are different from one another. The 4300-4315m coal sample has an n-alkane distribution which has a maxima at nC_{14}. This distribution is more typical of type II kerogen and may represent a light generation product of the coal. The coal at 4360-4375m has a bimodal n-alkane distribution and has a relatively high isoprenoid composition. This might be expected in a coal which has had an input of type II kerogen. CPI data suggest that all three of these samples are thermally mature. The samples have pristane/phytane ratios of between 3.6 (4300-4315m) and 4.5 (4360-4375m). These high values are typical of terrestrially-derived material and suggest an oxidising depositional environment.

The gas chromatograms of the three carbonaceous claystones at 4390-4405m, 4420-4435m and 4450-4465m have roughly similar profiles with the maxima at the nC_{15} and nC_{25} peaks. With increasing depth in the section, the nC_{15} becomes more prominent. The pristane/phytane ratios of the maximum three samples are similar and vary from 4.1 at 4390-4405m to 3.7 at 4420-4435m. These high pristane/phytane ratios suggest that the saturate source material is more terrestrial in nature and may have been deposited under fairly oxidising conditions. The CPI values range between 1.0 and 1.1, and suggest that the extract is thermally mature.

Pyrolysis-GC

Mineral matrix affects on the pyrolysis resluts can be significant if the sample has a total organic carbon (TOC) value of less than 1.00 wt%. The pyrograms of the samples are shown in figure 3.

Zone 1, 2275-2465m: No samples were analysed for pyrolysis-gc.

Zone 2, 2476-2855m: One sample at 2810-2825m was analysed for pyrolysis-gc. The medium grey-dark grey claystone lithology was analysed. The pyrogram of the sample shows a short n-alkene/n-alkane homology ranging from C_7 to about C_{20}. The abundance of the alkanes is much higher than the corresponding alkenes. The abundance of aromatics is high. This is typical of aromatic type III and type IV (reworked) kerogen.

This sample was taken from the top of the section drilled using the crystal M269L turbine core crusher bit. No obvious turbo-drill effects are observed.

Zone 3, 2870-3490m:

a) Crystal M269L turbine core crusher (2806-3051m)
No samples from this interval were analysed for pyrolysis-GC owing to insufficient sample quantity.

b) Diamond Bohart LX13 Core Crush type (3051-3090m)
One sidewall core sample at 3090m was analysed using pyrolysis-GC methods. The resulting pyrogram is similar to the previously described sample and shows a type III or type III/IV kerogen fingerprint. No turbo-drill fragments were examined due to insufficient sample quantity.

c) Crystal M260L conventional turbine bit (3090-3136m)
One sample of turbo-drilled fragments from 3110-3215m was analysed. The fragmentogram is similar to that of the overlying interval and shows a type III or type III/IV kerogen fingerprint. Turbo-drill effects using this bit appear to be largely negligable with regards to pyrolysis-GC analysis.

d) Hughes XIG Tricone Rockbit (3136-3214m)
One cuttings sample at 3200-3215m was analysed using pyrolysis-GC. The pyrogram of the sample is similar to that of the overlying sample and shows a type III or type III/IV kerogen fingerprint.

e) Crystal M269L Turbine Core Crusher (3214-3467m)

One sample of turbo-drilled cuttings at 3220-3240m and two sidewall core samples were analysed from this interval. The sidewall core sample at 3230m was found to have a pyrogram which is similar to that of the previously described sample and shows a type III or type III/IV kerogen fingerprint. The pyrogram of the turbo-drilled cuttings at 3220-3240m shows a number of featuers. The pyrogram shows only traces of alkanes/alkenes and is dominated by low molecular weight aromatics. This agrees with the very low hydrogen index of 4 for the sample. There appears to be very little pyrolysable kerogen present in the sample which has most likely been caused by the turbo-drilling heat affect. The remaining sidewall core sample at 3424m has a pyrogram which shows an n-alkane/n-alkene homology ranging from C_7 to C_{29}. The intensity of the aliphatic homology falls off sharply with decreasing carbon number. The abundance of aromatics is relatively high, which suggests that a type III kerogen is present.

Zone 4, 3490-3625m: Two sidewall core samples were analysed from 3526m and 3530m. Both pyrograms are similar and show an n-alkane/n-alkene homology ranging from C_7 to about C_{24}. The abundance of aromatics is low relative to the aliphatics. These characteristics suggest the presence of type II kerogen in the samples.

Zone 5, 3640-4270m: Two sidewall cores at 3739m and 3928m together with a cuttings sample at 4150-4165m were analysed. All of the samples analysed are claystones. The pyrogram from the 3739m sample is similar to that described for the sample at 3424m and suggests that type III kerogen is present in the sample. The sample at 3928m has a pyrogram which is similar to those described from zone 4 and suggests the presence of a type II kerogen. The sample at 4150-4165m has a pyrogram which shows an n-alkene/n-alkane homology ranging from C_7 to about C_{30}. The abundance of phenols and naphthalenes is high relative to the aliphatic compounds. This latter feature is characteristic of type III kerogens. The strong aliphatic homology indicates an input of lipid-rich material. The pyrogram suggests a mixed type III/II kerogen.

Zone 6, 4270-4469m: Two carbonaceous claystone cuttings samples at 4285-4300m and 4375-4390m were analysed together with a coal cuttings sample at 4345-4360m. The two carbonaceous claystones and the coal sample have

similar pyrograms. The pyrograms show an n-alkene/n-alkane homology ranging from C_7 to about C_{29}. The abundance of phenol, naphthalenes and phenanthrenes is high relative to the aliphatic homology. The relative abundance of aromatics is higher than was observed in the sample at 4150-4165m. The pyrogram suggests the presence of type III kerogen.

Visual analyses in transmitted light

The organic material of well 6407/1-3 was evaluated on the basis of two batches of samples: 22 sidewall cores, spaced between 2333m and 4047m and 37 samples of selected lithologies from ditch cuttings, spaced between 2300m and 4469m. The data are presented in table 10.

The two batches were analysed individually and described in two sets of tables. They were presented together in the maturation diagram (sidewall cores marked by asteriscs to the left in each graph).

The well may be subdivided as following on the basis of colour indices and composition of organic material mainly in sidewall cores.

2315-3495.10m:
Colour index 1/1+. Small residues, dominantly of grey amorphous and dark woody material from a marine environment. Colour index: 1+/2-.

3526-3599m:
Rich residues dominated by woody and reworked material. Occasional coal layers. Stagnant bottom conditions.

3739m:
Colour index: 2.

3883-3928m:
Colour index: 1+/2-. Woody material and cuticles. Some reworked, oxidised remains.

3937-4165m:
Colour indices variable 1+/2-. A strong input of cuticular fragments.

The most obvious difference between ditch cuttings and sidewall cores was noted in the turbodrilled interval between 2915m and 3385m where organic remains in cuttings have been transformed into a homogeneous grey amorphous matrix with occasional embedded mineral crystals.

Organic material in sidewall cores, description of samples

B-1252 (2333m), B-1255 (2455m), B-1258 (2585m):
Small pyritic residues mostly of grey amorphous aggregates embedding mainly woody and reworked, dark woody material. Etched woody fragments were observed. Dinoflagellate cysts are well preserved but account for a small proportion of the total residues.
Colour index: 1+.

B-1260 (2870m), B-1261 (3090m), B-1263 (3195m), B-1264 (3230m):
Small residues, as above grey amorphous material but the terrestrial input (woody or reworked woody material) dominates. Structurally well preserved palynomorphs in all samples include spores, pollen and dinoflagellates. Cuticles are common in B-1263 and B-1264 but seem mechanically fragmented.
Colour index: 1+. Higher indices 1+/2-, 2-/2 and 2- were evaluated probably on material changed in an oxidative environment.

B-1265 (3280m):
Disperse material dominated by structured woody particles. Grey amorphous subordinate. Abundant, variably well preserved cysts. Some spores.
Colour index: 1+, 1+/2-, 2-. High indices evaluated as controlled by the environment.

B-1266 (3424m):
Coal fragments and other woody particles dominate. A rich assemblage of dinoflagellates is present together with some spores. Variably poor preservation.
Colour index: 2-/2, 2.

B-1267 (3462m), B-1268 (3470m); B-1271 (3495.10m):
Dark woody fragments are recorded together with, or embedded in, loose grey amorphous aggregates.
Colour index: 1+/2-, 2-/2, 2, 2+.

B-1279 (3526m), B-1282 (3535m)
Dense pyritic aggregates of granulate texture. Algal material as well as supposed cuticles were observed, but relative proportions are

uncertain. Palynomorphs like other remains were poorly preserved and did not allow recognition of forms.
Colour index: 2-.

B-1284 (3540m):
Coaly material, dominantly woody with traces of cuticles and palynomorphs.
Colour index: 2.

B-1287 (3555m), B-1291 (3599m):
Strongly degraded material. Loose pyritic, amorphous aggregates embed very thin poorly preserved cuticles, pollen and spores and degraded wood remains.
Colour index: 1+/2-.

B-1291 (3599m):
Resemblance with the samples described above, but increase of woody material, decrease of cuticles. Palynomorphs of poor to fair preservation.
Colour index: 2-/2, -2.

B-1294 (3739m):
Resemblance with 355m and 3599m above. Poorly sorted but more coarse material. Botryococcus. Palynomorphs poorly preserved.
Colour index: 2.

B-1296 (3883m), B-1298 (3928m):
Degraded and mechanically fragmented material. Poorly preserved cuticles, pollen and spores together with woody remains dominate the residues. Relatively are woody remains the dominant in the lower sample B-1298.
Colour index: 1+/2-, 2-/2.

B-1299 (3937m), B-1303 (4047m):
Degraded very thin cuticles, pollen and spores dominate together with degraded woody material. The residues are poorly sorted, and palynomorphs are of fairly poor preservation.
Colour index: 2-, 1+/2-. Colours are based on extremely thin walled grains, and thus the index may be to low as a parameter of maturation.

Organic Material in Cuttings Samples

B-1357 (2300m):
Woody material dominates in aggregates of flaky to granulate texture. Cuticles, pollen and spores are of fairly poor preservation.
Colour index: 1+.

B-1362 (2375m), B-1388 (2765m), B-1392 (2825m), B-1394 (2855m), claystone B-1398 (2915m):
Woody and reworked woody material account for same relative volume as grey amorphous material. Dinoflagellates, pollen and spores account for about 10 to 20 per cent.
Colour index: 1/1+, 1+, 1+/2-, 2-/2 variable, probably under control from the lithology.

B-1398 (2915m), B-1400 (2945m) x2, B-1404 (3005m) x2, B-1406 (3035m), B-1408 (3065m), B-1412 (3125m), B-1420 (3240m), B-1422 (3275m), B-1424 (3305m), B-1426 (3335m), B-1430 (3385m):
Turbodrilled material
The organic residues consist of grey amorphous aggregates. Structures or textures cannot be observed in transmitted light. The most characteristic feature is the well defined often angular scars within these aggregates. In some aggregates there are denser parts with a "gross morphology" reminding of structured woody material (B-1408, 3065m) and suggesting that primarily oxidised particles are more resistant. Occasionally small very thinwalled globular bodies may be observed.

The grey amorphous aggregates disintegrate easily into smaller rounded ones when the residues are sieved.
No colour evaluation was possible in this material.

B-1412 (3125m):
A very small sieved residue consisting of grey amorphous material as in the interval described above. In addition freshlooking dinoflagellate cysts.

B-1418 (3215m):
Strongly degraded, thinwalled material in a poorly sorted pyritic residue. Reworked, oxidised woody material and other wood remains dominate and

together with cuticles account for most of the material. Fairly well preserved palynomorphs.
Colour index: 1+, 1+/2-.

B-1450 (3580m):
The residue is poorly preserved and consists of very dark grey material evaluated as dominantly from woody sources.
Colour index: No determination was possible.

B-1452 (3600m):
Aggregates of light coloured material evaluated as dominantly woody, structured remains. Subordinate cuticles.
Colour index: 1+.

B-1470 (3925m):
Mostly discrete variably coloured often large woody particles, in an amorphous matrix. Cuticles are fairly common.
Colour index: 2, 2/2+.

B-1480 (4075m), B-1486 (4165m):
Strongly degraded poorly sorted material dominated by cuticles often as very large fragments.
Colour index: 2, 2/2+.

B-1495 (4300m):
Poorly sorted material with abundant cuticles as above, in this sample is mixed with some grey amorphous aggregates and with degraded/etched woody fragments.
Colour index: 2, 2/2+.

B-1496 (4315):
Very dark coaly fragments. No determination of composition nor colour indices.

B-1498 (4345m):
Poorly sorted material with abundant cuticles as in B-1495, and also in this sample mixed with grey amorphous material together with more fresh looking woody material.
Colour index: 2, 2/2+.

B-1500 (4375m):
Coaly, very dark and crisp material. No evaluation of composition nor colour index was possible.

B-1502 (4405m):
Aggregates of strongly degraded woody material and degraded sheets believed to have a cuticular origin. Poorly sorted residue.
Colour index: 2-.

B-1504 (4435m):
Aggregates as in B-1502 but seem richer in cuticles. Degraded woody material as above appear as fragments with granulate texture. Poor preservation.
Colour index: 2-.

B-1506 (4465m):
Aggregates with a flaky texture and partly a greyish colour seem to have a major input from degraded cuticles. Woody material is subordinate. Palynomorphs are poorly preserved.
Colour index: 2-/2, 2.

B-1507 (4469m):
The residue consists of coaly fragments.
Colour index could not be evaluated.

CONCLUSIONS

Source-Rock Evaluation of 6407/1-3

The analysed section is separated into six zones on the basis of lithology and total organic carbon (TOC) content.

Zone 1, 2275-2465m: The cuttings samples from this interval are badly contaminated with casing cement. The interval is dominated by medium grey or olive grey claystones of poor to fair organic richness. Light hydrocarbon (C_1-C_7) analysis indicates that the samples below 2345m have moderately high gas wetness values and mature iC_4/nC_4 ratios. Rock-Eval data suggest that the kerogen in this interval is mostly type IV kerogen of low thermal maturity (av. T_{max} = 426°C). Production indices and relatively high S2 values suggest that some non-indigenous hydrocarbons may be present in this interval. Reflected light examination of the samples indicates the presence of mostly inertinite and liptinite. The presence of inertinite is suggested by the Rock-Eval data. Vitrinite reflectance values of 0.58% and 0.59% suggest that this interval is marginally mature and agrees with the Rock-Eval data.

Zone 2, 2465-2855m: This interval has a predominantly fine grained, glauconitic sandstone lithology. Grey claystone becomes more common below 2750m. TOC data indicate that the claystones have fair organic richness. No sandstone samples were analysed for TOC. Light hydrocarbon data from the interval indicate high C_1-C_7 hydrocarbon concentrations with high gas wetness values and relatively low iC_4/nC_4 values above 2585m. In view of the predominantly sandstone lithology of this section, it is likely that these data represent non-indigenous hydrocarbons. Light hydrocarbons are less abundant below 2595m, gas wetness values are decreased and iC_4/nC_4 values are increased. Rock-Eval and pyrolysis-GC data suggest that a mixed type III/IV kerogen is present in the claystones. An average T_{max} value of 426°C suggests that the kerogen is marginally mature. Poor petroleum potential values indicate that the claystones are unlikely to generate significant amounts of oil or gas. Reflected light data indicate that inertinite and reworked vitrinite are common in the samples. Vitrinite reflectance data indicate that the interval is marginally mature, although the reflectance values may be slighted depressed due to liptinite affects.

Zone 3, 2870-3490m: This interval was turbo-drilled using a number of different bits and source-evaluation is largely based on sidewall core data. Light hydrocarbon data show variations which may be attributable to turbo-drill affects. The unaltered lithology is mostly grey claystone of fair organic richness. Rock-Eval and pyrolysis-GC data indicate that the kerogen in the claystone is type III or type III/IV kerogen. Petroleum potential data suggest that the claystones are poor oil source rocks T_{max} data suggest that the interval varies from marginal thermal maturity to moderate thermal maturity. In reflected light, the organic matter in the samples is seen to be mostly inertinite, reworked vitrinite and liptinite. Vitrinite reflectance values vary from 0.58% to 0.65% and indicate that the interval is moderately mature.

Zone 4, 3490-3625m: This interval contains mainly dark grey - brown or blackish grey claystones of generally good to very good organic richness. Light hydrocarbon concentrations are good between 3513m and 3560m and C_1-C_7 hydrocarbon data suggest that the section is mature. Rock-Eval and pyrolysis-GC data indicate the type II or type II/III kerogen is the main kerogen type in the samples. T_{max} data and petroleum potential data suggest that the interval is moderately mature and that the section between 3521.9m and 3550m has good to excellent oil/gas source potential. Reflected light examination of the samples indicates that the dominant organic matter types in the samples are liptinite and reworked vitrinite. Vitrinite reflectance values of between 0.59% and 0.60% were obtained from the samples. Liptinite affects on the indigenous vitrinite may have slightly decreased the observed vitrinite reflectance data. Extraction data for the interval indicate the presence of high extractable organic matter (EOM) concentrations between 3526m and 3540m. The gas chromatograms of these samples have a mature distribution which is typical of type II kerogen-derived material. Lower concentrations of EOM are found in the rest of the interval. Gas chromatograms from the rest of the interval suggest that this material has a higher input of terrestrially-derived material then the interval at 3526-3540m. This zone has good to excellent oil source potential.

Zone 5, 3640-4270m: The dominant lithology in this zone is a fine grained, light grey or white sandstone. Claystone and siltstone lithologies also occur in the intervals. Coal cuttings are found below 4150-4180m and appear to correlate with a change in the C_1-C_7 hydrocarbon composition. Above 4160m, the light hydrocarbon composition of the samples in-

dicates fairly high gas wetness values. Below 4160m the light hydrocarbon fraction is present in much higher concentrations and has low gas wetness values. These characteristics are probably due to the presence of the coal horizons. The claystones have fair to excellent organic richness while the sandstones have poor to fair organic richness. Rock-Eval and pyrolysis-GC data suggest that the kerogen in the claystone samples is mostly a mixture of type II and type III kerogen. Petroleum potential data suggest that a number of claystones may be potential oil/gas source rocks. T_{max} data and vitrinite reflectance data suggest that the interval is thermally mature. Fair concentrations of extractable material are found in some of the claystone intervals. The gas chromatograms obtained from the samples show bimodal n-alkane distributions which would agree with the mixed type II/III kerogen indicated by pyrolysis data. Generally, this interval has very poor oil source potential, although isolated claystone and coal horizons of good oil or gas potential do occur in the interval.

Zone 6, 4270-4469m: This zone contains a series of dark-grey carbonaceous claystones and coals. The claystones have good to excellent organic richness. The light hydrocarbons from the samples in this interval are generally present at high concentrations. The light hydrocarbons are dominated by the C_1-C_3 hydrocarbons, which suggests the presence of type III kerogen in the section. Rock-Eval and pyrolysis-GC data indicate that the section is mostly dominated by type III kerogen. Isolated horizons have a mixed type II/III kerogen type. T_{max} data and vitrinite reflectance data suggest that this interval is in the main phase of oil generation. The gas chromatograms of the samples have n-alkane distributions which suggest type III or a mixed type II/III source kerogen. Rock-Eval data and the concentration of EOM present in the samples suggest good source potential. The concentration of hydrocarbons in the samples is low and may indicate that the interval is more gas-prone.

Evaluation of Turbodrilling Affects

Evaluation of the affects of the different turbo-drill bits used in this well is hindered by the small intervals which were drilled using the different turbo-drill bits.

All of the light hydrocarbon data shows suggestions of turbo-drilling affects and one observation is that, with the Crystal M269L turbine core crusher bit, the turbo-drill affects become more pronounced the longer the bit is used. The smallest affect was observed when the Diamond Bohart LX14 bit, and the non-turbo-drill XJG Tricone bit were used. TOC results seem to be largely unaltered by the turbo-drilling. Noticeably more turbodrill affected fragments tended to appear in the cuttings samples with increasing time or depth. This feature is especially prominent with the Crystal M269L turbine core crusher bit. The Rock-Eval data shows dramatic turbo-drill affects in that very little pyrolysable kerogen appears to have remained in the samples. This observation is supported by pyrolysis-GC data. Rock-Eval data is least affected by the crystal M260L conventional turbine bit. Data is lacking for the Diamond Bohart LX13 bit. Reflected light studies tend to support the pyrolysis data and very little organic matter was observed in the samples. Reflected light data is sparse and restricted to samples affected by the Diamond Bohart LX13 bit and the M269L bit.

Examination of samples from the turbo-drilled interval in transmitted light showed widespread turbo-drilling affects. In all of the cuttings samples examined from this interval, the organic matter is present as largely structureless, grey, amorphous material. This observation is true for both the obviously turbo-drilled fragments and the apparently unaffected fragments. The affects appear to be the same with all the turbo-drill bits used in the well.

In summary, it is possible to observe that the most marked affects occurred when the crystal M269L turbine core crusher bit was used. These affects appear to become more intense with time. More data is required to properly evaluate the other turbo-drill bits.

TABLE I a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
B 1356	2290	34097	1721	718	277		313	36814	2716	7.38	
B 1357	2300	51253	2500	1038	375			55165	3913	7.09	
B 1358	2315										
B 1359	2330										
B 1360	2345										
B 1361	2360	27895	3064	2918	1049	1592	1162	36518	8623	23.61	0.66
B 1362	2375	3490	388	364	135	198	145	4576	1085	23.72	0.68
B 1364	2405	15660	2543	3118	1006	1814	1797	24141	8482	35.13	0.55
B 1366	2435	36622	5071	4722	1186	1979	1856	49580	12958	26.14	0.60
B 1368	2465	46449	10465	12042	3872	6539	12278	79366	32917	41.47	0.59
B 1370	2495	337722	106734	172519	61187	123138	267498	801300	463578	57.85	0.50
B 1372	2525	193198	67643	100424	31691	63571	135268	456527	263329	57.68	0.50
B 1374	2555	295847	92213	131768	40023	79683	124756	644533	348686	54.10	0.50
B 1376	2585	193350	53768	71244	20175	35937	62669	374474	181124	48.37	0.56
B 1378	2615	23508	6096	6887	1791	2517	4042	40798	17290	42.38	0.71
B 1379	2630	34654	8949	10059	2590	3626	5679	59879	25225	42.13	0.71
B 1382	2675	47572	6900	6016	1891	1786	3234	64165	16592	25.86	1.06
B 1384	2705	41437	6945	6171	1871	1740	3483	58165	16728	28.76	1.08
B 1386	2735	64492	14769	13743	3607	4600	9380	101211	36719	36.28	0.78
B 1388	2765	33128	5668	3760	1078	1045	3272	44680	11552	25.85	1.03
B 1390	2795	40180	5979	3283	963	693	2447	51096	10916	21.36	1.39
B 1392	2825	4890	843	919	362	456	659	7469	2579	34.53	0.79
B 1394	2855	6292	1428	1213	355	392	868	9681	3389	35.00	0.90

DATE : 7 - 2 - 84.

TABLE I a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

	IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
B	1396	2885	4428	879	899	306	323	755	6835	2407	35.22	0.95
B	1398	2915	3845	841	877	306	322	432	6191	2346	37.89	0.95
B	1400	2945	3302	465	415	171	128	306	4481	1179	26.31	1.33
B	1402	2975	5007	860	805	271	317	1313	7260	2253	31.03	0.86
B	1404	3005	3319	347	304	140	90	281	4199	881	20.97	1.55
B	1406	3035	2474	346	278	108	79	203	3285	811	24.69	1.38
B	1408	3065	1276	303	331	132	149	356	2191	915	41.78	0.89
B	1410	3095	778	188	186	78	65	164	1295	517	39.92	1.19
B	1412	3125	2223	383	279	114	76	183	3076	853	27.72	1.51
B	1414	3155	1580	413	679	281	520	2057	3473	1893	54.51	0.54
B	1416	3185	3531	846	1303	865	781	14059	7325	3794	51.80	1.11
B	1418	3215	2453	596	841	508	433	5552	4831	2377	49.21	1.17
B	1420	3240	1943	509	368	125	104	1009	3049	1106	36.27	1.20
B	1422	3275	2261	570	603	228	239	2426	3901	1640	42.04	0.95
B	1424	3305	2931	630	646	224	247	2046	4678	1747	37.35	0.91
B	1426	3335	4060	768	788	254	338	2252	6208	2148	34.60	0.75
B	1428	3365	3308	491	397	115	18	1062	4328	1020	23.57	6.55
B	1430	3385	1791	393	419	85	154	2409	2842	1051	36.98	0.55
B	1432	3410	3416	1041	895	229	268	959	5849	2434	41.60	0.86
B	1434	3440	3610	702	613	131	167	837	5223	1612	30.87	0.78
B	1436	3467	3203	550	505	114	178	845	4551	1348	29.62	0.64
B	1438	3500	9269	2832	2481	455	667	1054	15703	6434	40.97	0.68
B	1440	3525	19357	6180	7370	1238	3117	4405	37262	17905	48.05	0.40

DATE : 7 - 2 - 84.

TABLE I a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

	IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
B	1442	3530	28313	8999	16187	3219	8749	11004	65468	37155	56.75	0.37
B	1444	3540	51083	22274	36566	5729	17355	18623	133006	81924	61.59	0.33
B	1446	3550	5478	2062	2690	429	1059	1023	11718	6240	53.25	0.41
B	1448	3560	22541	5810	10216	2065	6787	9109	47420	24879	52.46	0.30
B	1450	3580	8114	3870	6145	1253	3527	4547	22910	14795	64.58	0.36
B	1452	3600	8582	1114	846	127	220	233	10890	2308	21.19	0.58
B	1454	3625	529	278	535	98	264	311	1704	1175	68.97	0.37
B	1456	3655		4	44	19	69	198	137	137	100.00	0.28
B	1458	3745	2971	817	1094	145	436	1046	5463	2493	45.62	0.33
B	1460	3775	681	234	213	22	68	90	1218	537	44.09	0.32
B	1463	3820	1175	399	338	21	96		2030	855	42.10	0.22
B	1467	3880	2503	1017	1153	161	618	1440	5451	2949	54.09	0.26
B	1470	3925	1291	524	1061	264	697	1193	3836	2546	66.36	0.38
B	1474	3985	374	253	510	89	314	699	1540	1166	75.70	0.28
B	1478	4045	658	380	411	62	172	336	1683	1025	60.91	0.36
B	1479	4060	713	458	425	68	164	281	1828	1114	60.97	0.41
B	1480	4075	1336	767	721	128	287	494	3240	1903	58.75	0.45
B	1481	4090	1631	931	800	116	275	484	3753	2122	56.55	0.42
B	1482	4105	577	517	566	99	228	375	1988	1410	70.95	0.43
B	1483	4120	663	479	514	74	199	399	1930	1267	65.63	0.37
B	1484	4125	231	110	108	16	35	38	499	268	53.74	0.47
B	1485	4150	88	39	29	4	7	7	167	79	47.34	0.57
B	1486	4165	4701	860	399	51	71	87	6082	1381	22.70	0.72

DATE : 7 - 2 - 84.

TABLE I a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

	IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
B	1487	4180	13584	3714	942	99	130	143	18469	4885	26.45	0.76
B	1488	4195	41506	8888	2410	196	275	293	53275	11769	22.09	0.71
B	1489	4210	55577	10830	2350	180	218	219	69154	13577	19.63	0.83
B	1490	4225	88803	14546	3195	264	313	336	107121	18318	17.10	0.85
B	1491	4240	50442	6488	1656	123	189	232	58898	8456	14.36	0.65
B	1492	4255	5767	1223	223	19	18	16	7249	1482	20.45	1.06
B	1493	4270	57438	12231	2515	217	231	205	72631	15193	20.92	0.94
B	1494	4285	195703	66012	14821	172	1603	2074	278310	82607	29.68	0.11
B	1495	4300	80036	26941	5868	536	492	467	113873	33837	29.71	1.09
B	1496	4315	82191	24515	4499	485	432	514	112122	29932	26.70	1.12
B	1497	4330	13603	3771	700	74	64	72	18212	4609	25.31	1.15
B	1498	4345	26007	6973	1244	116	106	125	34446	8439	24.50	1.10
B	1499	4360	25563	6274	1049	87	82	88	33055	7492	22.67	1.05
B	1500	4375	37159	10168	1652	138	125	100	49242	12083	24.54	1.11
B	1501	4390	103722	28124	5181	504	486	580	138018	34295	24.85	1.04
B	1502	4405	42429	13037	2699	241	271	432	58678	16248	27.69	0.89
B	1503	4420	28952	7412	1623	148	169	319	38304	9352	24.41	0.88
B	1504	4435	50148	15371	2572	219	220	341	68530	18382	26.82	0.99
B	1505	4450	12059	3811	650	68	58	101	16646	4587	27.56	1.17
B	1506	4465	36008	10857	1625	138	130	145	48758	12750	26.15	1.06
B	1507	4469	21183	5156	1110	66	109	144	27624	6441	23.32	0.60

DATE : 7 - 2 - 34.

TABLE I b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS .

	IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
B	1356	2290	38	7	7	6		14	58	20	34.57	
B	1357	2300	32	5	6	4	6	14	52	20	39.15	0.58
B	1358	2315	11					14	11		0.00	
B	1359	2330	15	2			6	24	23	8	34.40	0.00
B	1360	2345	12		3	4	15	335	35	23	64.84	0.28
B	1361	2360	24	6	20	13	42	152	105	81	76.89	0.30
B	1362	2375	25	6	17	9	29	128	87	62	71.59	0.32
B	1364	2405	13	5	24	14	50	150	106	93	87.79	0.28
B	1366	2435	43	34	139	77	226	600	519	476	91.75	0.34
B	1368	2465	280	184	447	252	757	4907	1919	1639	85.42	0.33
B	1370	2495	128	90	432	388	1153	9056	2191	2063	94.15	0.34
B	1372	2525	172	115	453	313	912	5785	1964	1793	91.27	0.34
B	1374	2555	138	62	244	171	557	4965	1173	1034	88.21	0.31
B	1376	2585	16	8	32	20	58	1531	134	118	88.15	0.34
B	1378	2615	227	143	422	205	511	4000	1508	1281	84.93	0.40
B	1379	2630	179	113	400	225	544	5413	1461	1282	87.74	0.41
B	1382	2675	241	72	148	77	141	3306	680	438	64.52	0.55
B	1384	2705	260	65	98	46	92	3939	562	302	53.71	0.50
B	1386	2735	109	37	106	59	129	1485	441	332	75.25	0.46
B	1388	2765	291	53	73	35	54	1761	506	215	42.43	0.64
B	1390	2795	288	65	123	57	111	1597	645	357	55.32	0.52
B	1392	2825	245	227	551	266	617	3619	1905	1660	87.13	0.43
B	1394	2855	144	85	249	127	272	2218	877	733	83.60	0.47

DATE : 7 - 2 - 84.

TABLE I b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS .

	IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
B	1396	2885	187	43	126	82	171	2393	609	422	69.31	0.48
B	1398	2915	352	131	285	139	299	3188	1205	854	70.83	0.47
B	1400	2945	641	83	82	43	69	396	918	277	30.16	0.62
B	1402	2975	1463	195	129	59	107	1417	1953	490	25.08	0.55
B	1404	3005	3318	471	217	73	121	442	4200	882	21.00	0.61
B	1406	3035	2758	363	206	79	139	778	3546	787	22.20	0.57
B	1408	3065	115	64	170	92	192	1090	634	519	81.81	0.48
B	1410	3095	137	72	159	82	146	1048	596	459	76.97	0.56
B	1412	3125	527	117	164	80	123	613	1011	483	47.84	0.65
B	1414	3155	129	68	139	67	185	2352	588	459	78.05	0.36
B	1416	3185	104	23	44	32	61	2395	264	160	60.71	0.53
B	1418	3215	99	29	63	40	69	1717	301	202	66.96	0.58
B	1420	3240	512	178	237	97	157	1322	1182	670	56.68	0.62
B	1422	3275	2718	277	149	55	105	886	3305	587	17.75	0.52
B	1424	3305	2417	286	165	62	127	924	3056	639	20.90	0.49
B	1426	3335	3175	266	211	78	152	826	3883	707	18.21	0.51
B	1428	3365	4469	414	178	55	101	655	5215	747	14.32	0.54
B	1430	3385	3043	241	82	25	51	554	3441	398	11.57	0.49
B	1432	3410	2107	225	206	63	144	726	2744	637	23.23	0.44
B	1434	3440	6845	426	340	96	235	903	7942	1097	13.82	0.41
B	1436	3467	5444	289	222	58	162	610	6176	732	11.85	0.36
B	1438	3500	310	359	830	156	469	709	2124	1814	85.40	0.33
B	1440	3525	1124	944	2947	615	2607	3588	8237	7114	86.36	0.24

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TABLE I b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS .

	IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
B	1442	3530	771	1305	5960	1783	8451	20561	18270	17499	95.78	0.21
B	1444	3540	1011	2796	10524	3618	15182	22350	33132	32120	96.95	0.24
B	1446	3550	2211	2453	7142	1964	8178	14944	21948	19737	89.93	0.24
B	1448	3560	564	599	3151	1476	6593	24175	12384	11820	95.44	0.22
B	1450	3580	551	585	2753	1045	4420	11266	9354	8802	94.10	0.24
B	1452	3600	1160	1288	2513	845	3294	11806	9099	7939	87.25	0.26
B	1454	3625	217	94	501	196	958	4750	1967	1750	88.96	0.20
B	1456	3655	429	24	30	9	38	148	531	101	19.08	0.23
B	1458	3745	411	217	528	96	521	2301	1772	1361	76.81	0.18
B	1460	3775	259	184	478	76	397	1363	1394	1134	81.40	0.19
B	1463	3820	325	151	645	110	593	2321	1824	1498	82.17	0.19
B	1467	3880	315	214	576	90	440	1660	1636	1321	80.72	0.21
B	1470	3925	246	126	521	129	633	2328	1655	1409	85.12	0.20
B	1474	3985	84	33	182	75	327	1502	700	617	88.05	0.23
B	1478	4045	470	192	542	122	528	2530	1854	1384	74.65	0.23
B	1479	4060	378	208	684	181	692	2799	2143	1765	82.36	0.26
B	1480	4075	265	197	542	140	532	1794	1676	1411	84.16	0.26
B	1481	4090	539	234	837	219	890	3891	2718	2179	80.17	0.25
B	1482	4105	377	188	683	193	730	2542	2171	1794	82.62	0.27
B	1483	4120	305	366	603	135	547	2282	1957	1652	84.40	0.25
B	1484	4125	482	230	532	139	536	1742	1918	1436	74.89	0.26
B	1485	4150	314	291	383	82	302	914	1373	1058	77.11	0.27
B	1486	4165	1476	1852	1328	138	461	761	5255	3779	71.91	0.30

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TABLE I b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS .

IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
B 1487	4180	8900	7792	3722	276	924	1182	21614	12714	58.82	0.30
B 1488	4195	20113	12611	8191	512	1439	1019	42867	22754	53.08	0.36
B 1489	4210	29638	14216	7215	470	880	447	52419	22781	43.46	0.53
B 1490	4225	33921	16389	10322	818	1171	384	62620	28700	45.83	0.70
B 1491	4240	36383	18359	11890	947	1651	769	69230	32847	47.45	0.57
B 1492	4255	24482	12514	8039	645	1235	731	46915	22433	47.82	0.52
B 1493	4270	28439	14912	9155	704	1302	757	54512	26073	47.83	0.54
B 1494	4285	31838	17060	10646	942	1250	383	61737	29898	48.43	0.75
B 1495	4300	28026	15363	9730	861	982	219	54962	26937	49.01	0.88
B 1496	4315	26962	14636	8790	1162	1238	312	52789	25827	48.92	0.94
B 1497	4330	68726	36750	22088	2803	3490	997	133855	65130	48.66	0.80
B 1498	4345	28612	15897	9517	1343	1696	518	57065	28453	49.86	0.79
B 1499	4360	29122	15977	9543	1155	1549	396	57347	28225	49.22	0.75
B 1500	4375	27357	15533	9321	1361	1748	431	55321	27963	50.55	0.78
B 1501	4390	32330	17586	11531	1172	1450	402	64069	31739	49.54	0.81
B 1502	4405	27904	15620	10924	1219	1638	563	57306	29401	51.31	0.74
B 1503	4420	33006	18645	12779	1448	2182	899	68061	35054	51.50	0.66
B 1504	4435	33725	18831	11571	1080	1421	510	66628	32902	49.38	0.76
B 1505	4450	33866	18526	12284	1224	1791	704	67691	33826	49.97	0.68
B 1506	4465	30032	16961	10472	1150	1472	421	60086	30055	50.02	0.78
B 1507	4469	25509	15326	9403	1035	1253	365	52528	27018	51.44	0.83

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TABLE I c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib) .

IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
B 1356	2290	34135	1728	725	283		327	36871	2736	7.42	
B 1357	2300	51284	2505	1043	379	6	14	55218	3933	7.12	60.46
B 1358	2315	11					14	11		0.00	
B 1359	2330	15	2			6	24	23	8	34.40	0.00
B 1360	2345	12		3	4	15	335	35	23	64.84	0.28
B 1361	2360	27919	3071	2938	1061	1634	1314	36623	8704	23.77	0.65
B 1362	2375	3515	394	382	145	227	272	4662	1147	24.61	0.64
B 1364	2405	15673	2547	3142	1021	1864	1948	24247	8575	35.36	0.55
B 1366	2435	36665	5103	4861	1264	2205	2456	50099	13435	26.82	0.57
B 1368	2465	46729	10648	12488	4124	7295	17186	81285	34556	42.51	0.57
B 1370	2495	337850	106824	172950	61575	124291	276554	803491	465640	57.95	0.50
B 1372	2525	193370	67758	100877	32004	64483	141053	458491	265121	57.82	0.50
B 1374	2555	295985	92275	137012	40194	80240	129721	645706	349721	54.16	0.50
B 1376	2585	193366	53776	71276	20195	35996	64200	374607	181242	48.38	0.56
B 1378	2615	23735	6239	7309	1995	3027	8042	42306	18570	43.90	0.66
B 1379	2630	34833	9062	10459	2815	4170	11092	61340	26506	43.21	0.68
B 1382	2675	47814	6973	6164	1967	1927	6540	64844	17031	26.26	1.02
B 1384	2705	41697	7011	6269	1917	1832	7423	58727	17030	29.00	1.05
B 1386	2735	64601	14807	13849	3666	4729	10865	101651	37050	36.45	0.78
B 1388	2765	33419	5721	3833	1113	1100	5033	45185	11766	26.04	1.01
B 1390	2795	40468	6044	3406	1020	804	4045	51741	11273	21.79	1.27
B 1392	2825	5135	1070	1469	627	1073	4278	9375	4240	45.22	0.58
B 1394	2855	6436	1513	1463	482	664	3086	10558	4122	39.04	0.73

TABLE I c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib) .

IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
B 1396	2885	4615	922	1025	389	494	3148	7444	2829	38.01	0.79
B 1398	2915	4197	971	1162	446	621	3621	7396	3199	43.26	0.72
B 1400	2945	3943	548	497	213	197	702	5399	1456	26.97	1.08
B 1402	2975	6471	1055	934	330	423	2730	9213	2742	29.76	0.78
B 1404	3005	6637	818	521	213	211	723	8400	1763	20.99	1.01
B 1406	3035	5233	709	484	188	218	981	6831	1598	23.40	0.86
B 1408	3065	1391	367	501	225	342	1446	2825	1434	50.77	0.66
B 1410	3095	915	260	345	160	211	1212	1891	975	51.59	0.76
B 1412	3125	2751	500	443	194	199	795	4087	1336	32.69	0.98
B 1414	3155	1709	481	818	348	706	4409	4061	2352	57.91	0.49
B 1416	3185	3634	869	1347	897	842	16454	7589	3955	52.11	1.07
B 1418	3215	2553	625	903	548	502	7269	5131	2579	50.25	1.09
B 1420	3240	2455	687	605	222	261	2331	4230	1775	41.97	0.85
B 1422	3275	4980	847	752	283	344	3312	7206	2226	30.90	0.82
B 1424	3305	5348	916	811	286	374	2970	7734	2386	30.85	0.77
B 1426	3335	7235	1034	999	331	491	3078	10091	2855	28.30	0.68
B 1428	3365	7777	904	575	169	118	1717	9544	1767	18.52	1.43
B 1430	3385	4834	633	501	110	205	2964	6283	1449	23.06	0.53
B 1432	3410	5522	1266	1101	292	411	1685	8593	3071	35.74	0.71
B 1434	3440	10455	1128	953	226	402	1740	13165	2710	20.58	0.56
B 1436	3467	8648	840	727	173	341	1455	10727	2080	19.39	0.51
B 1438	3500	9579	3191	3311	610	1136	1762	17827	8248	46.27	0.54
B 1440	3525	20480	7124	10316	1853	5725	7993	45499	25019	54.99	0.32

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TABLE I c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib) .

	IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
B	1442	3530	29084	10304	22147	5002	17200	31566	83738	54654	65.27	0.29
B	1444	3540	52094	25070	47090	9346	32537	40973	166138	114044	68.64	0.29
B	1446	3550	7689	4515	9832	2393	9237	15967	33666	25977	77.16	0.26
B	1448	3560	23106	6409	13367	3542	13381	33284	59804	36699	61.36	0.26
B	1450	3580	8666	4455	8898	2298	7947	15814	32263	23597	73.14	0.29
B	1452	3600	9742	2402	3360	972	3514	12038	19990	10247	51.26	0.28
B	1454	3625	746	372	1036	294	1223	5061	3671	2925	79.68	0.24
B	1456	3655	429	29	74	28	108	347	668	238	35.67	0.26
B	1458	3745	3382	1034	1622	241	957	3347	7235	3854	53.26	0.25
B	1460	3775	940	417	691	98	465	1453	2612	1671	64.00	0.21
B	1463	3820	1500	550	983	131	689	2321	3853	2353	61.06	0.19
B	1467	3880	2818	1231	1729	251	1058	3101	7087	4269	60.24	0.24
B	1470	3925	1537	650	1582	392	1330	3520	5491	3954	72.01	0.29
B	1474	3985	458	286	692	164	641	2202	2240	1782	79.56	0.26
B	1478	4045	1128	572	953	184	700	2867	3537	2409	68.11	0.26
B	1479	4060	1091	665	1109	249	856	3080	3971	2879	72.51	0.29
B	1480	4075	1602	964	1263	268	819	2288	4916	3314	67.41	0.33
B	1481	4090	2170	1165	1637	335	1164	4375	6471	4302	66.47	0.29
B	1482	4105	955	705	1249	292	958	2917	4159	3204	77.04	0.30
B	1483	4120	969	846	1117	210	747	2680	3888	2919	75.08	0.28
B	1484	4125	712	340	639	155	571	1780	2417	1705	70.52	0.27
B	1485	4150	402	330	412	86	310	921	1540	1138	73.88	0.28
B	1486	4165	6177	2712	1727	189	531	847	11337	5160	45.51	0.36

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TABLE I c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib) .

IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
B 1487	4180	22484	11506	4665	375	1054	1326	40083	17599	43.91	0.36
B 1488	4195	61619	21500	10600	709	1715	1312	96142	34523	35.91	0.41
B 1489	4210	85215	25045	9565	650	1098	666	121573	36358	29.91	0.59
B 1490	4225	122724	30934	13517	1082	1484	719	169741	47017	27.70	0.73
B 1491	4240	86825	24847	13546	1070	1841	1001	128128	41304	32.24	0.58
B 1492	4255	30249	13737	8261	664	1253	746	54164	23915	44.15	0.53
B 1493	4270	85877	27143	11669	921	1533	962	127143	41266	32.46	0.60
B 1494	4285	227541	83071	25468	1114	2853	2457	340047	112506	33.09	0.39
B 1495	4300	108062	42304	15598	1397	1475	686	168835	60773	36.00	0.95
B 1496	4315	109153	39151	13289	1647	1671	826	164911	55758	33.81	0.99
B 1497	4330	82329	40521	22788	2876	3554	1069	152068	69739	45.86	0.81
B 1498	4345	54619	22870	10761	1459	1802	643	91511	36892	40.31	0.81
B 1499	4360	54685	22251	10592	1242	1632	484	90401	35717	39.51	0.76
B 1500	4375	64516	25701	10973	1499	1873	531	104562	40046	38.30	0.80
B 1501	4390	136052	45710	16712	1676	1936	982	202087	66035	32.68	0.87
B 1502	4405	70334	28657	13624	1460	1909	995	115983	45650	39.36	0.76
B 1503	4420	61958	26057	14402	1596	2351	1218	106364	44406	41.75	0.68
B 1504	4435	83873	34201	14143	1299	1641	850	135157	51284	37.94	0.79
B 1505	4450	45925	22337	12935	1292	1849	805	84337	38412	45.55	0.70
B 1506	4465	66039	27818	12097	1288	1602	566	108844	42805	39.33	0.80
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1101	1343	509	80152	33459	41.75	0.81

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1356	2275-2290	0.52	60% Claystone, olive grey, brownish grey medium dark grey
		0.40	40% Claystone, light grey-very light grey, partly light greenish grey
B-1357	2290-2300	0.35	75% Claystone, light grey-very light grey
		0.79	20% Claystone, olive grey-brownish grey
			5% Claystone, medium dark grey-dark grey
B-1358	2300-2315	0.53	40% Claystone, medium grey
		0.22	40% Claystone, light grey, light greenish grey
			20% Casing Cement
B-1359	2315-2330		50% Casing Cement
		0.68	30% Claystone, medium grey (medium dark grey)
		0.20	20% Claystone, greenish grey-light greenish grey
B-1360	2330-2345		90% Casing Cement
			5% Claystone, medium grey
			5% Claystone, greenish grey-light greenish grey
B-1361	2345-2360		60% Casing Cement
			20% Claystone, medium grey-medium dark grey
			20% Claystone, light greenish grey, medium light grey
B-1362	2360-2375	0.83	40% Claystone, medium dark grey, (dark grey)
			40% Claystone, medium grey, greenish grey, light greenish grey
			20% Casing Cement
			Sm.am. Limestone (white), Sandstone (very fine)

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1364	2390-2405		50% Casing Cement 25% Claystone, greenish grey, light greenish grey, light grey 15% Limestone (white, off-white) 10% Pyrite Sm.am. Claystone (medium dark grey) Claystone (olive grey)
B-1366	2420-2435	0.12	85% Claystone, greenish grey, light greenish grey, medium grey, light grey 10% Casing Cement 5% Claystone, medium dark grey-dark grey Sm.am. Claystone (olive grey), Sandstone, Pyrite (abundant; Marl (reddish brown)
B-1368	2450-2465		90% Casing Cement 10% Claystone, medium grey Sm.am. Claystone, (greenish grey); Claystone, (medium dark grey-dark grey); Sandstone; Pyrite
B-1370	2480-2495		95% Sandstone, very fine-fine, glauconitic 5% Claystone, greenish grey, medium grey Sm.am. Pyrite (abundant); Casing Cement
B-1372	2510-2525		50% Sandstone, as above 50% ?Additives, white rounded fragments Sm.am. Pyrite; Limestone
B-1374	2540-2555		90% Sandstone, as above 10% Limestone, very light grey Sm.am. Pyrite; Casing Cement

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1376	2570-2585		90% Sandstone, as above 10% Marl, light brownish grey Sm.am. Pyrite
B-1378	2600-2615		90% Sandstone, as above 5% Marl, as above 5% Dolomite/Siderite, light brown/yellowish brown Sm.am. Pyrite; Claystone, light brown
B-1379	2615-2630	0.71	45% Sandstone, as above 45% Claystone, medium grey, partly silty 10% Marl, light brown Sm.am. Claystone, light brown; Pyrite; Claystone, greenish grey; Dolomite/Siderite
B-1382	2660-2675	0.79	60% Sandstone, as above 25% Marl, as above 15% Claystone, medium grey Sm.am. Dolomite/Siderite; Pyrite
B-1384	2690-2705		85% Sandstone, as above 10% Marl, as above 5% Claystone, medium grey-light grey Sm.am. Limestone; Dolomite/Siderite
B-1386	2720-2735		95% Sandstone, as above 5% Marl, as above Sm.am. Limestone; Dolomite/Siderite

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1388	2750-2765	0.65	60% Claystone, medium grey-medium dark grey 30% Sandstone, very fine, argillaceous, as above 10% Marl, light brown
B-1390	2780-2795	0.72	80% Claystone, medium grey - medium dark grey 15% Sandstone, as above 5% Marl, light brown
B-1392	2810-2825	0.71	90% Claystone, medium grey-medium dark grey 10% Sandstone, very fine
B-1394	2840-2855	0.76	95% Claystone, medium grey (medium dark grey) 5% Sandstone, very fine
B-1396	2870-2885	0.77	70% Claystone, medium dark grey, rounded fragments, disintegrates in 10% HCl,
		0.59	30% Claystone, medium grey
			Sm.am. Fragments affected by turbodrilling, dark grey
B-1398	2900-2915	0.73	60% Claystone, medium grey
		0.74	20% Claystone, medium dark grey, rounded fragments, partly disintegrated in 10% HCl
			10% Sandstone
		0.69	10% Fragments affected by turbodrilling, dark grey, coky

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1400	2930-2945	0.80	50% Claystone, medium dark grey, rounded fragments, disintegrated in 10% HCl,
		0.57	20% Claystone, medium grey
		0.59	20% Fragments affected by turbodrilling, dark grey, coky
			10% Sandstone
B-1402	2960-2975	0.83	70% Claystone, medium grey-medium dark grey, partly rounded fragments
		0.68	20% Fragments affected by turbodrilling, dark grey, coky
			10% Sandstone, light grey, argillaceous
B-1404	2990-3005	0.71	50% Fragments affected by turbodrilling, dark grey, coky
		0.86	45% Claystone, medium grey-medium dark grey, as above
			5% Sandstone, as above
B-1406	3020-3035	0.71	80% Fragments affected by turbodrilling, dark grey, coky
		0.81	15% Claystone, medium grey-medium dark grey, as above
			Sm.am. Sandstone

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1408	3050-3065	0.80	75% Claystone, medium grey, angular fragments, partly silty
		0.72	10% Claystone, medium grey-medium dark grey, rounded fragments,
		0.28	10% Claystone, light grey
			5% Sandstone, light grey, very fine, argillaceous
			Sm.am. Fragments affected by turbodrilling, dark grey
B-1410	3080-3095	0.71	80% Claystone, medium grey (medium dark grey), partly silty
			10% Sandstone, light grey, very fine, argillaceous
			5% Claystone, light grey
			5% Limestone, white, light brown
			Sm.am. Fragments affected by turbodrilling, dark grey, coky
B-1412	3110-3125	0.45	50% Claystone, medium grey, medium dark grey, rounded fragments
		0.76	30% Claystone, medium grey-light grey, greenish grey, angular fragments
		0.61	15% Sand/Sandstone
			5% Fragments affected by turbodrilling, dark grey, coky
B-1414	3132.2-3155	0.88	80% Claystone, medium dark grey, partly silty, partly micromicaceous
		0.21	15% Claystone, medium grey, light greenish grey
			5% Sandstone, light grey, very argillaceous

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1416	3170-3185	0.84	45% Claystone, medium dark grey, silty, partly micromicaceous 35% Claystone, medium grey-medium light grey, partly silty 20% Sandstone, light grey, very fine, argillaceous
B-1418	3200-3215	1.13	45% Claystone, medium dark grey, 40% Claystone, medium grey-medium light grey, partly silty 15% Sandstone, light grey, very fine, argillaceous
B-1420	3220-3240	0.70	40% Fragments affected by turbodrilling, medium dark grey-dark grey, coky
		0.81	45% Claystone, medium dark grey, angular fragments 10% Sandstone, as above 5% Claystone, medium grey-medium light grey
B-1422	3260-3275	0.62	80% Fragments affected by turbodrilling, medium dark grey-dark grey, coky
		0.79	15% Claystone, medium dark grey, silty, micromicaceous 5% Claystone, medium grey-medium light grey, partly rounded fragments Sm.am. Sandstone
B-1424	3290-3305	0.71	90% Fragments affected by turbodrilling, dark grey, coky
		0.73	10% Claystone, medium dark grey, as above Sm.am. Claystone (medium grey-medium light grey)

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1426	3320-3335	0.66	95% Fragments affected by turbodrilling, as above 5% Claystone, medium dark grey, as above Sm.am. Claystone, (medium grey-medium light grey)
B-1428	3350-3365	0.65	100% Fragments affected by turbodrilling Sm.am. Claystone (medium dark grey)
B-1430	3380-3385	0.68	100% Fragments affected by turbodrilling
B-1432	3395-3410	0.63	100% Fragments affected by turbodrilling Sm.am. Claystone, medium dark grey, silty, micromicaceous
B-1434	3425-3440	0.35 0.74	90% Fragments affected by turbodrilling 10% Claystone, medium dark grey, as above Sm.am. Claystone (medium grey-medium light grey)
B-1436	3455-3467.5	0.49	95% Fragments affected by turbodrilling 5% Claystone, medium dark grey, as above
B-1438	3485-3500	0.80	90% Claystone, grey-medium dark grey, grey, silty, partly micromicaceous 10% Claystone, light grey
B-1440	3515-3525	5.82	30% Claystone, dark grey-dark brownish grey, silty 30% Limestone, white 15% Claystone, light grey 15% Claystone, medium dark grey-medium grey 10% Claystone, dark reddish brown

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1442	3522.5-3530	7.06	80% Claystone, dark brownish grey, dark grey-greyish black
		0.92	10% Claystone, medium dark grey
			5% Claystone, medium grey-light grey
			5% Claystone, dark reddish brown
			Sm.am. Limestone, (white)
B-1444	3535-3540	5.70	95% Claystone, dark brownish grey-dark grey, greyish black, silty
			5% Claystone, medium dark grey
			Sm.am. Claystone, medium grey-light grey
B-1446	3545-3550	7.33	60% Claystone, medium dark grey, partly silty, partly micaceous
		4.67	35% Claystone, dark brownish grey-dark grey, silty
			5% Claystone, dark reddish brown
			Sm.am. Claystone, (light grey)
B-1448	3555-3566	0.69	65% Claystone, medium dark grey
			30% Claystone, dark brownish grey-dark grey
			5% Limestone, sideritic, dusky brown
B-1450	3570-3580	0.69	70% Claystone, medium dark grey
			25% Claystone, dark brownish grey-dark grey
			5% Limestone, sideritic
B-1452	3590-3600	0.66	50% Claystone, medium dark grey
			40% Claystone, dark brownish grey-dark grey
			5% Claystone, medium grey
			5% Limestone

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1454	3607.5-3625		30% Claystone, medium dark grey
		2.58	30% Claystone, dark brownish grey-dark grey-greyish black
			30% Sand/Sandstone, fine-medium
			10% Casing Cement
B-1456	3640-3655		95% Sandstone, light grey, clear, fine-medium
			5% Claystone, dark grey
B-1458	3730-3745	1.62	80% Claystone-Mudstone, medium dark grey-dark grey
			20% Sand/Sandstone
B-1460	3760-3775		70% Sand/Sandstone, white, clear
		1.56	30% Claystone-Mudstone, medium dark grey-dark grey, as above
3-1463	3805-3820		90% Sand/Sandstone
		1.63	10% Claystone-Mudstone, medium dark grey-dark grey, as above
B-1467	3865-3880		90% Casing Cement
			5% Sand/Sandstone
			5% Claystone-Mudstone, medium dark grey-dark grey
B-1470	3910-3925	0.94	80% Mudstone-Sandstone, medium dark grey
			20% Sandstone, light grey-white dark grey
B-1474	3970-3985		80% Casing Cement
		1.04	15% Mudstone-Claystone, medium dark grey-dark grey
			5% Sand/Sandstone, clear, white, light grey

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1478	4030-4045		95% Sandstone/Sand, white, light grey, clear, very fine-very coarse, calcite cemented 5% Claystone-Mudstone, medium dark grey-brownish grey, partly micaceous
B-1479	4045-4060	1.73	90% Sandstone/Sand, as above 10% Claystone-Mudstone, medium dark grey-dark brownish grey
B-1480	4060-4075	1.54	90% Sand/Sandstone, as above 10% Claystone-Mudstone, medium dark grey-dark brownish grey, as above
B-1481	4075-4090	2.24	90% Sand/Sandstone, as above 10% Claystone-Mudstone, medium dark grey-dark brownish grey, as above
B-1482	4090-4105	1.61	95% Sand/Sandstone, as above 5% Claystone-Mudstone, medium, dark grey-dark brownish grey, as above
B-1483	4105-4120		100% Sand/Sandstone, as above Sm.am. Claystone-Mudstone, as above
B-1484	4120-4135	1.57	90% Sand/Sandstone, as above 10% Claystone-Mudstone, medium, dark grey-dark brownish grey, as above
B-1485	4135-4150	3.48	90% Sand/Sandstone, as above 5% Claystone-Mudstone, medium dark grey-dark brownish grey, as above 5% Limestone, white

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1486	4150-4165	10.84	90% Sand/Sandstone, as above 10% Claystone-Mudstone, dark grey-medium dark grey-brownish grey, partly very micaceous Sm.am. Coal
B-1487	4165-4180	2.89	95% Sand/Sandstone 5% Mudstone, dark brownish grey, partly very micaceous Sm.am. Coal
B-1488	4180-4195	0.18	95% Sand/Sandstone, light grey, white, very fine-medium, calcite cemented 5% Coal Sm.am. Claystone-Mudstone, medium dark grey-brownish grey, partly very micaceous
B-1489	4195-4210	6.57	90% Sand/Sandstone, as above 5% Coal 5% Claystone-Mudstone, medium dark grey-dark brownish grey, as above
B-1490	4210-4225		95% Sand/Sandstone 5% Coal Sm.am. Claystone-Mudstone, as above
B-1491	4225-4246		85% Sand/Sandstone, as above 15% Coal Sm.am. Claystone-Mudstone, as above
B-1492	4240-4255	15.08	90% Sand/Sandstone, as above 5% Coal 5% Claystone-Mudstone, dark grey-medium dark grey-brownish grey

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1493	4255-4270		90% Sand/Sandstone, as above
			5% Coal
		32.46	5% Claystone-Mudstone, dark grey-dark brownish grey, greyish black
B-1494	4270-4285	12.59	40% Claystone, greyish black
			30% Coal
			30% Sandstone
B-1495	4285-4300	22.97	40% Claystone, dark grey-greyish black, carbonaceous
			40% Coal
			20% Sandstone
B-1496	4300-4315		50% Coal
		14.27	50% Claystone, dark grey-greyish black
			Sm.am. Sandstone
B-1497	4315-4330		60% Coal
		1.63	30% Claystone, dark brownish grey, carbonaceous
			10% Sandstone
B-1498	4330-4345	3.54	40% Claystone, dark brownish grey-brownish black, carbonaceous
			30% Coal
			30% Sandstone
B-1499	4345-4360		50% Coal
		4.26	30% Claystone, dark brownish grey-brownish black-dark grey, carbonaceus
			20% Sandstone

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1500	4360-4375		50% Coal
		5.21	45% Claystone, as above
			5% Sandstone
B-1501	4375-4390		40% Coal
		5.75	40% Claystone, as above
			20% Sandstone
A-1502	4390-4405		70% Sandstone
			15% Coal
		6.36	15% Claystone, dark grey-dark brownish grey-brownish black, carbonaceous
B-1503	4405-4420		70% Sandstone
		3.33	20% Claystone, as above
			10% Coal
B-1504	4420-4435		40% Coal
			30% Sandstone
		3.99	30% Claystone, as above
B-1505	4435-4450		80% Sandstone
			10% Coal
		2.91	10% Claystone, as above
B-1506	4450-4465		60% Coal
		7.17	20% Claystone, dark brownish grey-greyish black, carbonaceous
			20% Sandstone
B-1507	4465-4469		80% Coal
		14.20	15% Claystone, as above
			5% Sandstone

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Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1252	2333	1.30	Claystone, dark grey, non-calcareous
B-1253	2333.9	1.26	Claystone, dark grey, non-calcareous
B-1254	2367	0.22	Claystone, olive grey, slightly calcareous
B-1255	2455	0.71	Claystone, olive grey - dark olive grey, silty, with sandy lenses, slightly calcareous
B-1256	2476	0.73	Sandstone, olive grey, very fine, very argillaceous, non-calcareous
B-1257	2507	0.98	Claystone, dark olive grey, silty, with lenticular sand lamination, non-calcareous
B-1258	2585	0.93	Claystone/Sandstone, dark olive grey, silty, lenticular lamination, non-calcareous
B-1259	2695	0.86	Claystone/Sandstone, olive grey, silty, lenticular lamination, slightly calcareous
B-1260	2870	1.01	Claystone, dark grey, very silty, non-calcareous
B-1261	3090	0.95	Claystone, dark grey, silty, non-calcareous
B-1262	3160	0.67	Claystone, dark grey, silty, non-calcareous
B-1263	3195	0.76	Claystone, medium dark grey, silty, partly sandy, calcareous

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1264	3230	0.89	Claystone, medium dark grey, silty, non-calcareous, micromicaceous
B-1265	3280	0.43	Claystone, medium dark grey, slightly silty, non-calcareous, mud contaminated
B-1266	3424	3.66	Claystone/Siltstone, dark grey, with sandy laminae, micromicaceous, slightly calcareous
B-1267	3462	0.80	Claystone, medium dark grey, very mud contaminated
B-1268	3470	0.63	Claystone, medium dark grey, slightly silty, subfissile, micromicaceous, non-calcareous, mud contaminated
B-1269	3484	0.82	Claystone, dark grey, silty, subfissile, non-calcareous
B-1270	3490	0.86	Claystone, dark grey - non-calcareous
B-1271	3495.1	2.17	Claystone, greyish black, slightly silty, very calcareous
B-1272	3499	1.25	Claystone, dark grey, slightly silty, slightly micromicaceous, calcareous
B-1273	3504.5	5.75	Claystone, greyish black - black, silty, micromicaceous, partly calcareous
B-1274	3506.9	0.00	Marl, dark reddish brown, silty

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1275	3515	0.33	Marl, medium grey - medium grey, silty
B-1276	3518	0.01	Claystone, medium grey, slightly micaceous, very calcareous
B-1277	3520	0.00	Marl, light grey - grey
B-1278	3521.9	5.18	Claystone, dark grey, silty, subfissile, micromicaceous, slightly, micropyritic, non-calcareous
B-1279	3526	6.70	Claystone, dark grey - greyish black, slightly brownish, silty, subfissile, slightly calcareous
B-1280	3528	5.71	Claystone, greyish black, slightly brownish, silty, subfissile, non-calcareous
B-1281	3530	5.25	Claystone, dark grey, slightly brownish, silty, containing shell fragments
B-1282	3535	4.88	Claystone, dark grey, slightly brownish, silty, subfissile, non-calcareous
B-1283	3537	5.16	Claystone, dark grey, silty, micromicaceous, non-calcareous
B-1284	3540	4.43	Claystone, dark grey, silty, non-calcareous, containing abundant organic fragments
B-1285	3546	1.42	Claystone, dark olive grey, silty, micromicaceous, mud contaminated

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1286	3548	1.47	Claystone, dark olive grey, silty, micromicaceous, mud contaminated
B-1287	3555	1.09	Claystone, dark grey, slightly brownish, silty, micromicaceous, very fissile, slightly mud contaminated
B-1288	3565	0.71	Claystone, dark grey - dark olive grey, silty, micromicaceous, partly micropyritic, non-calcareous, mud contaminated
B-1289	3579.9	0.87	Claystone fragments in drilling mud, dark grey, silty, non-calcareous
B-1290	3598	2.03	Claystone, brownish black - greyish black, very silty, subfissile, slightly micromicaceous, partly micropyritic, non-calcareous
B-1291	3599	3.09	Claystone, dark grey - greyish black, slightly brownish, very silty, subfissile, slightly micromicaceous, partly micropyritic
B-1292	3725	1.18	Claystone, medium grey, very silty grading to siltstone, very micaceous, non-calcareous
B-1293	3733	1.21	Claystone, dark grey, silty, fissile, micromicaceous, non-calcareous, mud contaminated

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1294	3739	1.21	Siltstone, medium grey, clayey, containing scattered sand, very micaceous
B-1295	3847	0.53	Sandstone, olive grey, very fine, very argillaceous, slightly micromicaceous, non-calcareous
B-1296	3883	0.71	Sandstone, olive grey, very fine, very argillaceous, micromicaceous, disintegrates in 10% HCl
B-1297	3915	0.84	Sandstone, olive grey, dark grey, very fine, very argillaceous, micromicaceous, with lenses and laminae of white sandstone
B-1298	3928	1.10	Siltstone, olive grey, clayey, with lenses of white sandstone
B-1299	3937	1.11	Siltstone, olive grey, clayey, partly sandy, micromicaceous, non-calcareous
B-1300	3944	0.49	Sandstone, olive grey - light olive grey, very argillaceous, slightly micromicaceous, non-calcareous
B-1301	3963	0.63	Sandstone, light olive grey, argillaceous, slightly micromicaceous
B-1302	3982	0.77	Sandstone, olive grey, argillaceous, partly micaceous, with lenses and laminae of white (?kaolinitic) sandstone, mud contaminated

Lithology and Total Organic Carbon measurements

TABLE NO.: 2.
WELL NO.: 6407/1-3

Sample	Depth (m)	TOC	Lithology
B-1303	4047	1.10	Claystone, dark grey, silty, micromicaceous, non-calcareous, mud contaminated

TABLE 3.

D A T A F R O M R O C K E V A L P Y R O L Y S I S

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
B 1356	2290	0.26	0.23	0.00	0.40	57	0	0.49	0.53	420
		Clst lt - gy								
B 1356	2290	0.20	0.55	0.00	0.52	106	0	0.75	0.27	426
		Clst olv -brn - gy								
B 1357	2300	0.21	0.16	0.00	0.35	46	0	0.37	0.57	417
		Clst lt - gy								
B 1357	2300	0.18	0.38	0.00	0.79	48	0	0.56	0.32	427
		Clst brn - gy								
B 1358	2315	0.17	0.15	0.97	0.53	28	183	0.32	0.53	427
		Clst gy								
B 1358	2315	0.16	0.04	1.87	0.22	18	850	0.20	0.80	462
		Clst gn - lt - gy								
B 1359	2330	0.21	0.15	1.84	0.68	22	271	0.36	0.58	419
		Clst gy								
B 1359	2330	0.17	0.03	3.59	0.20	15	1795	0.20	0.85	383
		Clst gn - gy								
B 1252	2333	0.17	0.24	0.51	1.30	18	39	0.41	0.41	420
		SWC								
B 1253	2339.90	0.23	0.39	0.49	1.26	31	39	0.62	0.37	421
		SWC								
B 1254	2367	0.14	0.03	0.53	0.22	14	241	0.17	0.82	427
		SWC								
B 1362	2375	0.23	0.17	4.51	0.83	20	543	0.40	0.57	423
B 1366	2435	0.18	0.03	0.51	0.12	25	425	0.21	0.86	413
B 1255	2455	0.47	0.50	0.57	0.71	70	80	0.97	0.48	223
		SWC								
B 1256	2476	0.16	0.44	0.41	0.73	60	56	0.60	0.27	423
		SWC								
B 1257	2507	0.17	0.83	0.44	0.98	85	45	1.00	0.17	427
		SWC								
B 1258	2585	0.23	0.90	1.04	0.93	97	112	1.13	0.20	428
		SWC								
B 1379	2630	0.20	0.31	0.00	0.71	44	0	0.51	0.39	423
B 1382	2675	0.38	0.45	0.00	0.79	57	0	0.83	0.46	426
B 1259	2695	0.25	1.02	1.11	0.86	119	129	1.27	0.20	426
		SWC								
B 1388	2765	0.20	0.38	0.89	0.65	58	137	0.58	0.34	426
B 1390	2795	0.24	0.31	0.95	0.72	43	132	0.55	0.44	428
B 1392	2825	0.18	0.63	1.84	0.71	89	259	0.81	0.22	424

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TABLE 3.

D A T A F R O M R O C K E V A L P Y R O L Y S I S

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
B 1394	2855	0.17	0.36	0.81	0.76	47	107	0.53	0.32	426
B 1260	2870	0.13	0.57	0.50	1.01	56	50	0.70	0.19	429
		SWC								
B 1396	2885	0.16	0.21	0.44	0.77	27	57	0.37	0.43	429
		Clst	gy							
B 1396	2885	0.19	0.27	0.77	0.59	46	131	0.46	0.41	421
		Clst	gy							
B 1398	2915	0.20	0.34	1.40	0.73	47	192	0.54	0.37	426
		Clst	gy							
B 1398	2915	0.28	0.29	0.87	0.74	39	118	0.57	0.49	426
		Clst	gy							
B 1398	2915	0.25	0.01	0.29	0.69	1	42	0.26	0.96	417
			turb							
B 1400	2945	0.14	0.19	0.37	0.80	24	46	0.33	0.42	415
		Clst	gy							
B 1400	2945	0.09	0.15	0.79	0.57	26	139	0.24	0.38	424
		Clst	gy							
B 1400	2945	0.14	0.00	0.00	0.59	0	0	0.14	1.00	332
			turb							
B 1402	2975	0.16	0.45	0.00	0.83	54	0	0.61	0.26	431
		Clst	gy							
B 1402	2975	0.14	0.01	0.28	0.68	1	41	0.15	0.93	438
			turb							
B 1404	3005	0.17	0.41	0.16	0.86	48	19	0.58	0.29	431
		Clst	gy							
B 1404	3005	0.19	0.01	0.00	0.71	1	0	0.20	0.95	439
			turb							
B 1406	3035	0.16	0.42	0.82	0.81	52	101	0.58	0.28	432
		Clst	gy							
B 1406	3035	0.24	0.02	0.02	0.71	3	3	0.26	0.92	439
			turb							
B 1408	3065	0.16	0.28	0.86	0.80	35	108	0.44	0.36	431
		Clst	gy							
B 1408	3065	0.17	0.32	1.20	0.72	44	167	0.49	0.35	427
		Clst	gy							
B 1408	3065	0.11	0.06	2.22	0.28	21	793	0.17	0.65	424
		Clst	lt - gy							
B 1261	3090	0.19	0.85	0.59	0.95	89	62	1.04	0.18	428
		SWC								
B 1410	3095	0.15	0.32	1.90	0.71	45	268	0.47	0.32	428
B 1412	3125	0.19	0.32	1.59	0.45	71	353	0.51	0.37	430
		Clst	gy							
B 1412	3125	0.16	0.38	1.71	0.76	50	225	0.54	0.30	428
		Clst	gn - lt - gy							

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TABLE 3.

D A T A F R O M R O C K E V A L P Y R O L Y S I S

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
B 1412	3125	0.28	0.12 turb	1.95	0.61	20	320	0.40	0.70	425
B 1414	3155	0.21	0.52 Clst gy	1.71	0.88	59	194	0.73	0.29	434
B 1414	3155	0.14	0.05 Clst gn - lt - gy	4.25	0.21	24	2024	0.19	0.74	413
B 1262	3160	0.17	0.31 SWC	0.43	0.67	46	64	0.48	0.35	431
B 1416	3185	0.18	0.50	1.77	0.84	60	211	0.68	0.26	431
B 1263	3195	0.27	0.66 SWC	0.73	0.76	87	96	0.93	0.29	429
B 1418	3215	0.20	0.47	1.37	1.13	42	121	0.67	0.30	433
B 1264	3230	0.19	0.43 SWC	0.62	0.89	48	70	0.62	0.31	432
B 1420	3240	0.18	0.34 Clst gy	0.80	0.81	42	99	0.52	0.35	432
B 1420	3240	0.16	0.03 turb	0.31	0.70	4	44	0.19	0.84	440
B 1422	3275	0.19	0.37 Clst gy	0.95	0.79	47	120	0.56	0.34	434
B 1422	3275	0.24	0.02 turb	0.01	0.62	3	2	0.26	0.92	441
B 1265	3280	0.23	0.18 SWC	0.49	0.43	42	114	0.41	0.56	430
B 1424	3305	0.19	0.30 Clst gy	0.90	0.73	41	123	0.49	0.39	435
B 1424	3305	0.19	0.03 turb	0.15	0.71	4	21	0.22	0.86	444
B 1426	3335	0.11	0.01	0.32	0.66	2	48	0.12	0.92	341
B 1428	3365	0.15	0.02	0.24	0.65	3	37	0.17	0.88	418
B 1430	3385	0.11	0.05	0.39	0.68	7	57	0.16	0.69	305
B 1432	3410	0.15	0.01	0.00	0.63	2	0	0.16	0.94	263
B 1266	3424	1.45	3.11 SWC	0.74	3.66	85	20	4.56	0.32	440
B 1434	3440	0.15	0.29 Clst gy	0.35	0.74	39	47	0.44	0.34	436
B 1434	3440	0.11	0.01 turb	0.00	0.35	3	0	0.12	0.92	417
B 1267	3462	0.27	0.27 SWC	0.58	0.80	34	73	0.54	0.50	434

DATE : 6 - 3 - 84.

TABLE 3.

D A T A F R O M R O C K E V A L P Y R O L Y S I S

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
B 1436	3467.50	0.12	0.02	0.00	0.49	4	0	0.14	0.86	437
B 1268	3470	0.18	0.24	0.36	0.63	38	57	0.42	0.43	437
		SWC								
B 1269	3484	0.22	0.40	0.34	0.82	49	41	0.62	0.35	435
		SWC								
B 1270	3490	0.20	0.25	0.35	0.86	29	41	0.45	0.44	452
		SWC								
B 1271	3495.10	0.30	1.35	0.64	2.17	62	29	1.65	0.18	438
		SWC								
B 1272	3499	0.22	0.24	0.71	1.25	19	57	0.46	0.48	447
		SWC								
B 1438	3500	0.11	0.25	0.00	0.80	31	0	0.36	0.31	436
B 1273	3504.50	0.58	7.03	0.63	5.75	122	11	7.61	0.08	439
		SWC								
B 1274	3506.90	0.11	0.00	0.69	0.00	0	69000	0.11	1.00	441
		SWC								
B 1275	3515	0.15	0.02	0.60	0.33	6	182	0.17	0.88	397
		SWC								
B 1276	3518	0.12	0.00	0.52	0.01	0	5200	0.12	1.00	265
		SWC								
B 1277	3520	0.13	0.02	0.68	0.00	2000	68000	0.15	0.87	308
		SWC								
B 1278	3521.90	4.88	25.59	0.52	5.18	494	10	30.47	0.16	433
		SWC								
B 1440	3525	2.94	24.16	0.45	5.82	415	8	27.10	0.11	433
B 1279	3526	6.92	35.76	0.72	6.70	534	11	42.68	0.16	432
		SWC								
B 1280	3528	6.28	23.62	0.63	5.71	414	11	29.90	0.21	427
		SWC								
B 1281	3530	6.42	24.42	0.82	5.25	465	16	30.84	0.21	432
		SWC								
B 1442	3530	0.87	0.57	0.29	0.92	62	32	1.44	0.60	437
		Clst	gy							
B 1442	3530	4.58	29.32	0.62	7.06	415	9	33.90	0.14	431
		Clst	dk -brn -blk							
B 1282	3535	6.04	20.00	0.76	4.88	410	16	26.04	0.23	427
		SWC								
B 1283	3537	5.61	19.26	0.77	5.16	373	15	24.87	0.23	430
		SWC								
B 1284	3540	5.44	16.75	0.87	4.43	378	20	22.19	0.25	424
		SWC								
B 1444	3540	4.55	22.74	0.77	5.70	399	14	27.29	0.17	431

DATE : 6 - 3 - 84.

TABLE 3.

D A T A F R O M R O C K E V A L P Y R O L Y S I S

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
B 1285	3546	0.53	3.33	0.69	1.42	235	49	3.86	0.14	436
		SWC								
B 1286	3548	0.44	2.92	0.59	1.47	199	40	3.36	0.13	438
		SWC								
B 1446	3550	0.25	0.29	0.96	7.33	4	13	0.54	0.46	437
		Clst	dk - gy							
B 1446	3550	2.74	15.03	1.26	4.67	322	27	17.77	0.15	432
		Clst	dk -brn - gy							
B 1287	3555	0.31	1.20	0.46	1.09	110	42	1.51	0.21	435
		SWC								
B 1448	3560	0.19	0.22	0.90	0.69	32	130	0.41	0.46	436
B 1288	3565	0.37	1.25	0.47	0.71	176	66	1.62	0.23	433
		SWC								
B 1289	3579.90	0.22	0.43	0.41	0.87	49	47	0.65	0.34	432
		SWC								
B 1450	3580	0.16	0.27	0.60	0.69	39	87	0.43	0.37	434
B 1290	3598	0.47	1.11	0.57	2 OZ	55	28	1.58	0.30	444
		SWC								
B 1291	3599	0.68	2.95	0.42	3.09	95	14	3.63	0.19	441
		SWC								
B 1452	3600	0.14	0.26	0.49	0.66	39	74	0.40	0.35	436
B 1454	3625	0.89	6.83	0.78	2.58	265	30	7.72	0.12	437
B 1292	3725	0.34	0.54	0.41	1.18	46	35	0.88	0.39	431
		SWC								
B 1293	3733	0.52	2.02	0.52	1.21	167	43	2.54	0.20	444
		SWC								
B 1294	3739	0.40	2.74	0.55	1.21	226	45	3.14	0.13	444
		SWC								
B 1458	3745	0.46	3.47	0.38	1.62	214	23	3.93	0.12	445
B 1460	3775	0.42	4.08	0.31	1.56	262	20	4.50	0.09	445
B 1463	3820	0.39	2.52	0.19	1.63	155	12	2.91	0.13	444
B 1295	3847	0.23	0.30	0.31	0.53	57	58	0.53	0.43	435
		SWC								
B 1296	3883	0.35	1.02	0.44	0.71	144	62	1.37	0.26	438
		SWC								
B 1297	3915	0.40	1.74	0.52	0.84	207	62	2.14	0.19	441
		SWC								
B 1470	3925	0.31	1.43	0.19	0.94	152	20	1.74	0.18	441

DATE : 6 - 3 - 84.

TABLE 3.

D A T A F R O M R O C K E V A L P Y R O L Y S I S

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
B 1298	3928	0.61	4.71	0.57	1.10	428	52	5.32	0.11	438
		SWC								
B 1299	3937	0.45	2.76	0.54	1.11	249	49	3.21	0.14	441
		SWC								
B 1300	3944	0.27	0.93	0.31	0.49	190	63	1.20	0.22	439
		SWC								
B 1301	3963	0.34	1.20	1.49	0.63	190	237	1.54	0.22	444
		SWC								
B 1302	3982	0.47	1.26	1.33	0.77	164	173	1.73	0.27	444
		SWC								
B 1474	3985	0.37	2.46	0.24	1.04	237	23	2.83	0.13	444
B 1303	4047	0.53	2.83	0.48	1.10	257	44	3.36	0.16	442
		SWC								
B 1479	4060	0.60	3.19	0.54	1.73	184	31	3.79	0.16	443
B 1480	4075	0.44	2.10	0.46	1.54	136	30	2.54	0.17	443
B 1481	4090	0.78	3.35	0.46	2.24	150	21	4.13	0.19	441
B 1482	4105	0.59	2.43	0.36	1.61	151	22	3.02	0.20	442
B 1483	4120	0.05	0.03	0.24	0.01	300	2400	0.08	0.63	416
B 1484	4135	0.65	2.51	0.31	1.57	160	20	3.16	0.21	443
B 1485	4150	1.08	4.55	0.33	3.48	131	9	5.63	0.19	440
B 1486	4165	3.55	34.20	1.03	10.84	315	10	37.75	0.09	442
B 1487	4180	1.03	5.96	0.41	2.89	206	14	6.99	0.15	441
B 1488	4195	0.18	0.05	0.21	0.18	28	117	0.23	0.78	446
B 1489	4210	2.01	17.76	0.39	6.57	270	6	19.77	0.10	442
B 1492	4255	4.10	45.15	0.88	15.08	299	6	49.25	0.08	445
B 1493	4270	8.28	73.24	1.16	32.46	226	4	81.52	0.10	447
B 1494	4285	3.18	32.80	0.66	12.59	261	5	35.98	0.09	448
B 1495	4300	5.30	50.77	0.86	22.97	221	4	56.07	0.09	448
B 1496	4315	3.11	30.54	0.59	14.27	214	4	33.65	0.09	450

DATE : 6 - 3 - 84.

TABLE 3.

D A T A F R O M R O C K E V A L P Y R O L Y S I S

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
B 1497	4330	0.44	2.20	0.08	1.63	135	5	2.64	0.17	456
B 1498	4345	0.90	7.45	0.29	3.54	210	8	8.35	0.11	449
B 1499	4360	1.08	10.43	0.32	4.26	245	8	11.51	0.09	450
B 1500	4375	1.34	11.80	0.34	5.21	226	7	13.14	0.10	452
B 1501	4390	1.29	11.85	0.39	5.75	206	7	13.14	0.10	449
B 1502	4405	1.52	16.12	0.74	6.36	253	12	17.64	0.09	448
B 1503	4420	0.72	6.09	0.56	3.33	183	17	6.81	0.11	451
B 1504	4435	0.96	8.08	0.63	3.99	203	16	9.04	0.11	450
B 1505	4450	0.76	4.35	0.63	2.91	149	22	5.11	0.15	455
B 1506	4465	1.70	13.78	0.95	7.17	192	13	15.48	0.11	455
B 1507	4469	3.68	27.56	1.54	14.20	194	11	31.24	0.12	457

DATE : 6 - 3 - 84.

T A B L E 4.

TABULATION OF MATURITY DATA

IKU No.	DEPTH (m/ft)	VITRINITE REFLECTANCE Ro(%) and Counts	MATURATION INDEX (TAI)	FLUOR-ESCENCE
B 1305	500	N.D.P.	N.A.	3
B 1313	900	N.D.P.	N.A.	3
B 1320	1200	N.D.P.	N.A.	
B 1330	1600	N.D.P.	N.A.	3/4
B 1342	1960	0.47(2)	N.A.	3/4
B 1348	2140	0.80(1)	N.A.	3/4
B 1359	2330	0.58(6)	N.A.	4/5
B 1252	2333	0.59(2)	N.A.	4/5
B 1259	2695	0.57(11)	N.A.	5
B 1388	2765	0.47(3)	N.A.	5/6
B 1260	2870	0.58(11)	N.A.	4/5
B 1408	3065	N.D.P.	N.A.	9
B 1261	3090	0.56(10)	N.A.	4/5
B 1264	3230	0.57(5)	N.A.	5/7
B 1420	3240	0.56(1)	N.A.	5/6
B 1424	3305	0.61(1)	N.A.	
B 1266	3424	0.64(12)	N.A.	5
B 1267	3462	0.65(10)	N.A.	5/7
B 1284	3540	0.59(5)	N.A.	5/6
B 1454	3625	0.60(16)	N.A.	5/6
B 1293	3733	0.59(11)	N.A.	5/6
B 1470	3985	0.56(13)	N.A.	6
B 1303	4047	0.59(11)	N.A.	6

DATE : 12 - 3 - 84.

T A B L E 4.

TABULATION OF MATURITY DATA

IKU No.	DEPTH (m/ft)	VITRINITE REFLECTANCE Ro(%) and Counts	MATURATION INDEX (TAI)	FLUOR-ESCENCE
B 1495	4300	0.89(22)	N.A.	6
		–		
B 1499	4360	0.90(26)	N.A.	6/7
		–		
B 1504	4435	0.89(25)	N.A.	6/8
		–		
B 1506	4465	0.89(17)	N.A.	6/7
		–		

DATE : 12 - 3 - 84.

T A B L E : 5.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

IKU-No	DEPTH (m)	Rock Extr. (g)	EOM (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
B 1273	3504.50	9.7	8.3	1.9	2.5	4.4	3.9	6.18
B 1279	3526	2.1	25.2	5.7	7.5	13.2	12.0	6.94
B 1282	3535	4.6	51.6	10.7	13.7	24.4	27.2	5.24
B 1284	3540	1.6	16.3	3.3	5.1	8.4	7.9	4.60
B 1288	3565	2.3	1.7	4.0	0.7	4.7	-3.0	0.80
B 1298	3928	4.0	2.4	4.8	1.7	6.5	-4.1	0.96
B 1479	4060	3.8	5.8	2.8	2.0	4.8	1.0	1.94
B 1495	4300	3.5	18.7	3.1	4.3	7.4	11.3	9.23
B 1496	4315	1.5	80.5	2.8	6.2	9.0	71.5	62.40
B 1500	4375	2.0	87.0	2.0	5.0	7.0	80.0	44.96
B 1502	4405	3.5	8.7	1.5	2.9	4.4	4.3	4.67
B 1504	4435	2.3	6.7	1.3	2.2	3.5	3.2	4.56
B 1506	4465	4.5	13.8	7.6	3.8	11.4	2.4	5.01

DATE : 12 - 3 - 84.

T A B L E : 6.

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm OF rock)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
B 1273	3504.50	853	195	257	452	401
B 1279	3526	12115	2740	3606	6346	5769
B 1282	3535	11266	2336	2991	5328	5939
B 1284	3540	10316	2089	3228	5316	5000
B 1288	3565	726	1709	299	2009	-1282
B 1298	3928	596	1191	422	1613	-1017
B 1479	4060	1514	731	522	1253	261
B 1495	4300	5328	883	1225	2108	3219
B 1496	4315	55517	1931	4276	6207	49310
B 1500	4375	44388	1020	2551	3571	40816
B 1502	4405	2500	431	833	1264	1236
B 1504	4435	2913	565	957	1522	1391
B 1506	4465	3094	1704	852	2556	538

DATE : 12 - 3 - 84.

T A B L E : 7.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
B 1273	3504.50	13.8	3.2	4.2	7.3	6.5
B 1279	3526	174.6	39.5	52.0	91.4	83.1
B 1282	3535	215.0	44.6	57.1	101.7	113.3
B 1284	3540	224.3	45.4	70.2	115.6	108.7
B 1288	3565	90.8	213.7	37.4	251.1	-160.3
B 1298	3928	62.0	124.1	43.9	168.0	-106.0
B 1479	4060	78.1	37.7	26.9	64.6	13.5
B 1495	4300	57.7	9.6	13.3	22.8	34.9
B 1496	4315	89.0	3.1	6.9	9.9	79.0
P 1500	4375	98.7	2.3	5.7	7.9	90.8
B 1502	4405	53.5	9.2	17.8	27.1	26.5
B 1504	4435	63.9	12.4	21.0	33.4	30.5
B 1506	4465	61.8	34.0	17.0	51.0	10.7

DATE : 12 - 3 - 84.

T A B L E : 8.

COMPOSITION IN % OF MATERIAL EXTRACTED FROM THE ROCK

IKU-No	DEPTH (m)	Sat / EOM	Aro / EOM	HC / EOM	SAT / Aro	Non HC / EOM	HC / Non HC
B 1273	3504.50	22.9	30.1	53.0	76.0	47.0	112.8
B 1279	3526	22.6	29.8	52.4	76.0	47.6	110.0
B 1282	3535	20.7	26.6	47.3	78.1	52.7	89.7
B 1284	3540	20.2	31.3	51.5	64.7	48.5	106.3
B 1288	3565	235.3	41.2	276.5	571.4	-176.5	******
B 1298	3928	200.0	70.8	270.8	282.4	-170.8	******
B 1479	4060	48.3	34.5	82.8	140.0	17.2	480.0
B 1495	4300	16.6	23.0	39.6	72.1	60.4	65.5
B 1496	4315	3.5	7.7	11.2	45.2	88.8	12.6
B 1500	4375	2.3	5.7	8.0	40.0	92.0	8.8
B 1502	4405	17.2	33.3	50.6	51.7	49.4	102.3
B 1504	4435	19.4	32.8	52.2	59.1	47.8	109.4
B 1506	4465	55.1	27.5	82.6	200.0	17.4	475.0

DATE : 12 - 3 - 84.

T A B L E 9.

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

IKU No.	DEPTH (m)	PRISTANE / n-C17	PRISTANE / PHYTANE	CPI
B 1273	3504.50	2.7	7.3	1.2
B 1279	3526	0.7	1.1	0.8
B 1282	3535	0.9	1.1	0.9
B 1284	3540	0.7	1.2	0.9
B 1288	3565	0.7	1.8	1.2
B 1298	3928	0.6	2.4	1.1
B 1479	4060	0.4	2.7	1.2
B 1495	4300	0.8	4.1	1.1
B 1496	4315	0.6	3.6	1.0
B 1500	4375	1.4	4.5	1.0
B 1502	4405	0.6	4.1	1.1
B 1504	4435	0.5	3.7	1.0
B 1506	4465	0.5	3.9	1.0

DATE : 12 - 3 - 84.

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Sidewall core samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1252	2333	Am,Cy/W,WR!,P,S	F-M	variable	1+	Pyritic. Small rounded grey amorphous aggregates embedding woody and WR! All others are very subordinate. Grey, etched woody material.
B-1255	2455	Am,Cy/W,WR!	F-M	good	1+	Small residues. Grey very small light coloured aggregates. Etched woody light coloured fragments.
B-1258	2585	Am,Cy/W,WR!	F-M	good	1+	As above.
B-1260	2870	W,WR!,S/Am,Cy	F-M	good	1+	As above. Early Cretaceous cysts and spores.
B-1261	3090	WR!,W,P/Am,Cy	F-M	variable	1+	As above. Relative increase of dark woody material and more fluffy.
B-1263	3195	WR!,W,Cut,S,P,R/Am,Cy	F-M	good to fair	2-/2	Abundant pyrite. Dark structured woody material dominates. Structures very well preserved (spores!) but mechanical fragmentation. Oxidising environment.

ABBREVATIONS

Am	**Amorphous**	**Cy**	**Cysts, algae**	**W**	**Woody material**	**F**	**Fine**
He	**Herbaceous**	**P**	**Pollen grains**	**C**	**Coal**	**M**	**Medium**
Cut	**Cuticles**	**S**	**Spores**	**R!**	**Reworked**	**L**	**Large**

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Sidewall core samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1264	3230	WR!,W,Cut,S,P/Am,Cy	F-M	good	1+ 1+/2- 2-	Grey amorphous laminated to fluffy, loose aggregates.
B-1265	3280	WR!,W,S/Am,Cy	F-M	variable	1+ 1+/2- 2-	Disperse material. Structured woody particles dominate.
B-1266	3424	C,W,S/Am,Cy	F-M-L	fair to poor	2-/2 2	Woody fragments and fluffy amorphous as above. Rich and varied dinoflagellate assemblage.
B-1267	3462	WR!,W/Am,Cy	F		1+/2- 2-/2	Disperse or very loose grey amorphous aggregates and dark woody material.
B-1268	3470	WR!,W/Am,Cy	F-M	variable	1+ 2	Loose amorphous aggregates embedding structured woody material.
B-1271	3495.10	W,WR!,S,P/Am,Cy	F-M-L	variable	1+ 2/2+	As above pyritic aggregates embed structured woody material, mostly oxidised and fairly dark.

- 90 -

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Sidewall core samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1279	3526	Am,Cy,Algal/W,Cut	F-M	poor	?1+	Strongly degraded material as dense aggregates of granulate texture. Distinction of the origin (algal/cuticular) very low confidence.
B-1282	3535	Am,Algal,Cy/W,Cut,P	F-M	poor	?1+	As above chemical, mild oxidation does not affect the material which is light coloured and show strong light refraction.
B-1284	3540	C,W,Cut,P/Am	F-M	poor	2	Coaly material.
B-1287	3555	W,P,S,Cut/Am,Cy	F-M	fair to poor	1+/2-	Pyritic residue of strongly sapropelised material, partly as loose aggregates embedding thin films.
B-1291	3599	W,WR!,P,S/Am,Cy	F-M	poor to fair	2-/2 2	Abundant pyrite. Small woody fragments embedded by loose amorphous aggregates.

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Sidewall core samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1294	3739	WR!,Cut,W,P,S/Am	F-M-L	fair	2	Resemblance with samples above but increase of somewhat coarser material poorly sorted. Botryococcus.
B-1296	3883	W,Cut,P,S,WR!/Am	F-M	poor to fair	1+/2-	Pyritic, strongly sapropelised and mechanically fragmented. Thin cuticles, pollen spores of very light coloured apperance.
B-1298	3928	Cut,W,P,S/Am	F-M-L	poor	1+/2- 2-/2	Strongly sapropelised thin cuticles, pollen, spores. Structured woody material. Mechanically fragmented.
B-1299	3937	Cut,W,P,S/Am,Cy	F-M-L	poor-fair	1+/2-	Strongly sapropelised thin cuticles, pollen cysts, spores. Early Jurassic.
B-1303	4047	Cut,W,P,S/Am	F-M-L	poor-fair	1+/2- 2	Sapropelised thin walled flimsy, mostly cuticles and degraded woody material.

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Cuttings samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1357	2300	W,P,S,Cut/Am,Cy	F-M-L	poor to fair	1+	Dense but translucent aggregates of flaky to granulate texture.
B-1362	2375	Am,Cy/W,WR!,P	F-M	poor to fair	1/1+,1+/2-	Some rounded partly grey amorphous aggregates.
B-1388	2765	Am,Cy/W,WR!,P,S	F-M	variable	1/1+,1+,1+/2-	More well disperse with looser aggregates but same composition as above. A rich and varied cyst ass. Richer in WR! fragments.
B-1392	2825	WR!,W,P,S/Am,Cy	F-M	good to fair	1+,1+/2-	Very rich in pyrite. Small grey amorphous aggregates. Structured dark wood.
B-1394	2855	W,WR!,P,S/Am,Cy	F-M	good to fair	1/1+,1+,2-/2	Pyritic residue, well disperse with some small grey amorphous aggregates as above.
B-1398	2915 clst.	W,WR!,P,S/Am,Cy	F-M	good to fair	1/1+,1+,2-,2-/2	As above.

ABBREVATIONS

Am	**Amorphous**	**Cy**	**Cysts, algae**	**W**	**Woody material**	**F**	**Fine**
He	**Herbaceous**	**P**	**Pollen grains**	**C**	**Coal**	**M**	**Medium**
Cut	**Cuticles**	**S**	**Spores**	**R!**	**Reworked**	**L**	**Large**

120/h/ah/1

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Cuttings samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1398	2915 turbodr.	Am/W	F	poor	-	Dense grey aggregates. No structures but faint "hollows" of less density.
B-1400	2945 turbodr.	Am/W	F-M	poor	-	Aggregates as above grey amorphous with hollows. Woody material is observed, ?former structured. Occasional very small algae.
B-1400	clst.	*Am,W	F-M	-	-	Residue very small, resembles samples above the turbodrilled zone. Sieved residue reveals palynomorphs and dark woody fragments as above. In addition amorphous aggregates as for turbodrilled material.
B-1404	3005	Am,W clst.	F-M	-	-	Grey amorphous aggregates partly with embedded crystals, partly prints left by crystals.

ABBREVATIONS

Am	**Amorphous**	**Cy**	**Cysts, algae**	**W**	**Woody material**	**F**	**Fine**
He	**Herbaceous**	**P**	**Pollen grains**	**C**	**Coal**	**M**	**Medium**
Cut	**Cuticles**	**S**	**Spores**	**R!**	**Reworked**	**L**	**Large**

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Cuttings samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1404	3005 turbodr.	Am,W	F-M	-	-	As above. Sieving tends to enrich small rounded aggregates which may reflect some primary structures.
B-1406	3035	Am,W	F-M	-	-	Large aggregates. After sieving remains as described above.
B-1408	3065	Am/W	F-M	-	-	Large, grey amorphous, irregular aggregates. Apparently some parts (woody material) were less affected than in the layers above (higher maturity or primary oxidised material).
B-1412	3125	*Am,Cy	F-M	variable	-	*Grey amorphous aggregates artifacts and freshlooking dinoflagellate cysts. Small residue, sieved.
B-1418	3215	WR!,W,Cut,P,S/Am,Cy	F-M-L	good to fair	1+,1+/2-	Pyritic poorly sorted, strongly sapropelised material.

ABBREVATIONS

Am	**Amorphous**	**Cy**	**Cysts, algae**	**W**	**Woody material**	**F**	**Fine**
He	**Herbaceous**	**P**	**Pollen grains**	**C**	**Coal**	**M**	**Medium**
Cut	**Cuticles**	**S**	**Spores**	**R!**	**Reworked**	**L**	**Large**

120/h/ah/3

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Cuttings samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1420	3240	Am,W	F	-	-	Large grey amorphous aggregates. Woody structured material tentatively guessed from shape of some aggregates.
B-1422	3275	Am	F	-	-	Irregular large grey amorphous aggregates as above.
B-1424	3305	Am	F	-	-	As above.
B-1426	3335	Am,W	F	-	-	As above. More structures remain in the residue.
B-1430	3385	Am	F	-	-	As 3335m.
B-1438	3500	WR!,W,P,S/Am,Cy	F-M-L	good	1+/2-,2	Disperse material. Variably coloured structured woody fragments dominate. Long thin fibres, opaque. Palynomorphs are very thinwalled.

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Cuttings samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1440	3525	W,Cut,P,S/Am,Cy	F-M-L	?good	2	Variably coloured palynomorphs and cuticles as aggregates. Woody material seems very important.
B-1442	3530	Cut,W,P,S/Am	F-M-L	?poor - fair	2	Mixed colour (variable maturity effect). The material is crisp and sieving breaks the larger fragments which are of flaky to spongeous texture.
B-1446	3550	*WR!,Coal,Cy	F-M-L	good	1+/2-,2	*Sieved/screened residue. Variably coloured material. Cysts are partly excellently preserved. (Cretaceous).
B-1450	3580	C,Cut,P/Cy	F-M-L	poor	-	Partly very dark and grey material.
B-1452	3600	W,WR!,Cut,P,S/Am,Cy	F-M-L	fair to poor	1+,-	Pyritic aggregates and fairly light coloured structured material together with subordinate grey amorphous aggregates. Structured woody material.

ABBREVATIONS

Am	**Amorphous**	**Cy**	**Cysts, algae**	**W**	**Woody material**	**F**	**Fine**
He	**Herbaceous**	**P**	**Pollen grains**	**C**	**Coal**	**M**	**Medium**
Cut	**Cuticles**	**S**	**Spores**	**R!**	**Reworked**	**L**	**Large**

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Cuttings samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1470	3925	W,WR!,Cut,P/Am	F-M-L	fair to poor	2,2-/2+	Large woody structured fragments. Variably coloured, poorly sorted material. Disperse residue but an amorphous matrix. Some grey amorphous aggregates.
B-1480	4075	Cut,W,P,S/Am	F-M-L	poor to fair	2,2/2+	Strongly sapropelised material poorly sorted. Very large cuticular fragments.
B-1486	4165	Cut,W,P,S/Am	F-M-L	poor to fair	2,2/2+	Material as above, but denser aggregates and poorer preservation. Mostly thin walls.
B-1495	4300	W,Cut,P,S/Am	F-M-L	variable	2,2/2+	Sapropelised material, poorly sorted, together with grey amorphous aggregates and etched woody fragments.
B-1496	4315	Coal	-	-	-	

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 6407/1-3

Cuttings samples

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
B-1498	4345	W,Cut,P,S/Am	F-M-L	variable	2,2/2+	Material as in B-1495 a mixture of grey amorphous and degraded woody. Fresh looking cuticles and woody remains in same collection may indicate material from a different environment.
B-1500	4375	C	-	-	-	Coal sample very dark and crisp material.
B-1502	4405	W,Cut,P,S/Am	F-M-L	variable	2-	Strongly sapropelised material in aggregates. Large cuticular fragments. Resemblance with 4345m.
B-1504	4435	Cut,W,PS/Am	F-M-L	poor	2-	Very dark amorphous fragments.
B-1506	4465	Cut,W,P,S/Am	F-M-L	?poor	2-/2,2	Aggregates partly with a greyish appearance flaky.
B-1507	4469	C			-	Coaly fragments.

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

Figure 1.

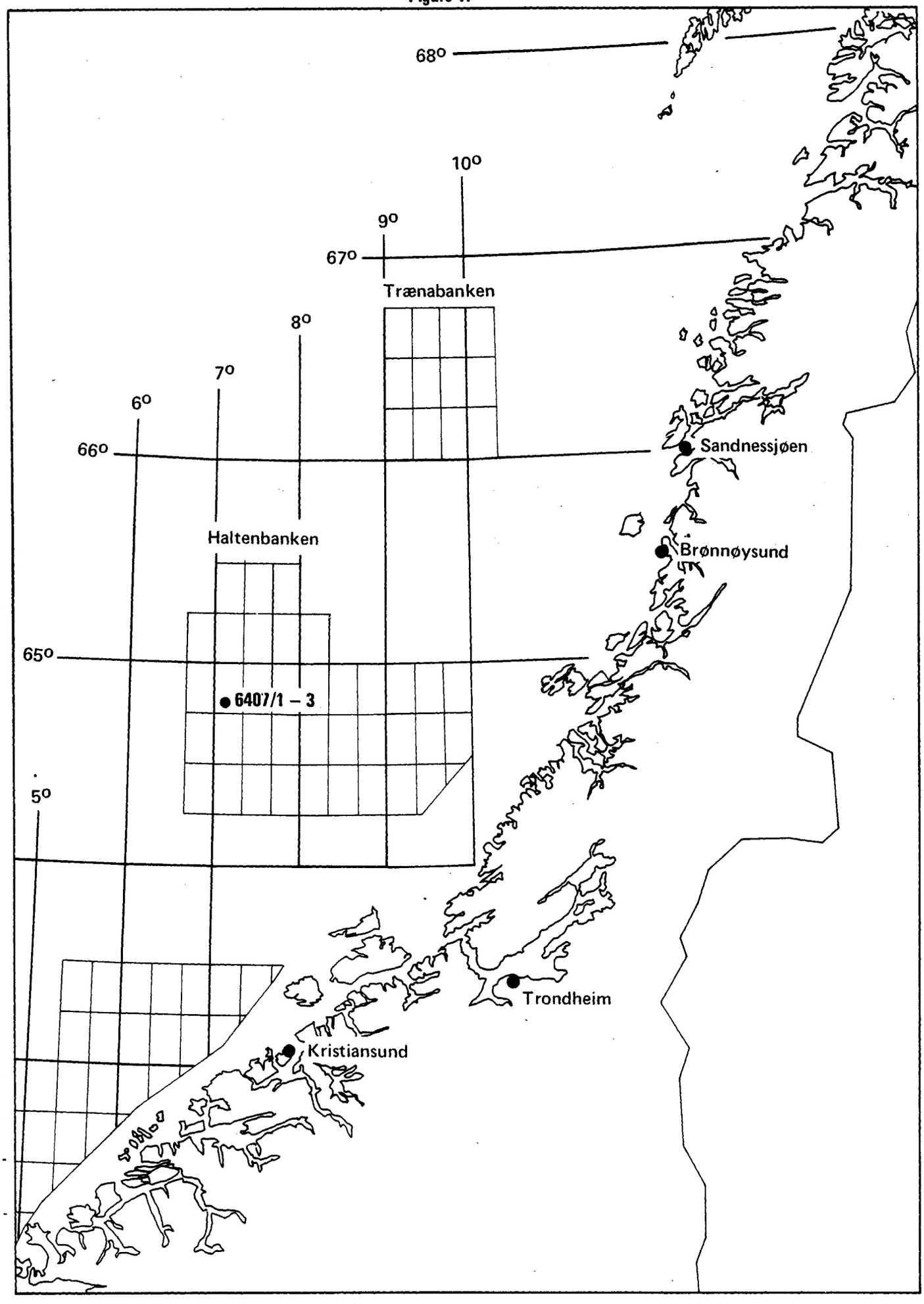
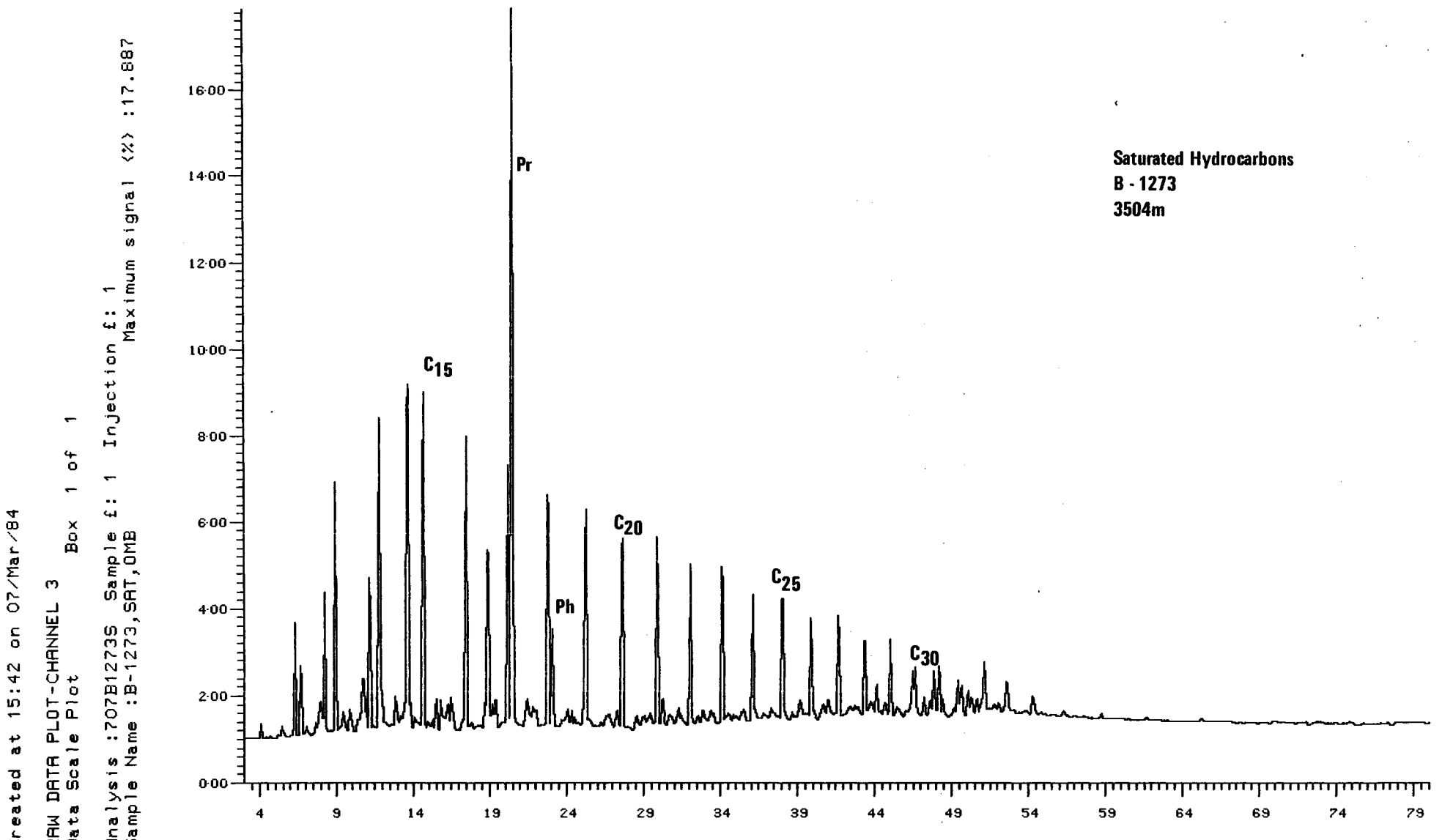

68°
10°
9°
67°
Trænabanken
8°
7°
6°
66°
Sandnessjøen
Haltenbanken
Brønnøysund
65°
6407/1 – 3
5°
Trondheim
Kristiansund

FIGURE 2

Gas Chromatograms of C_{10}+ Saturated Hydrocarbons

Pr = Pristane

Ph = Phytane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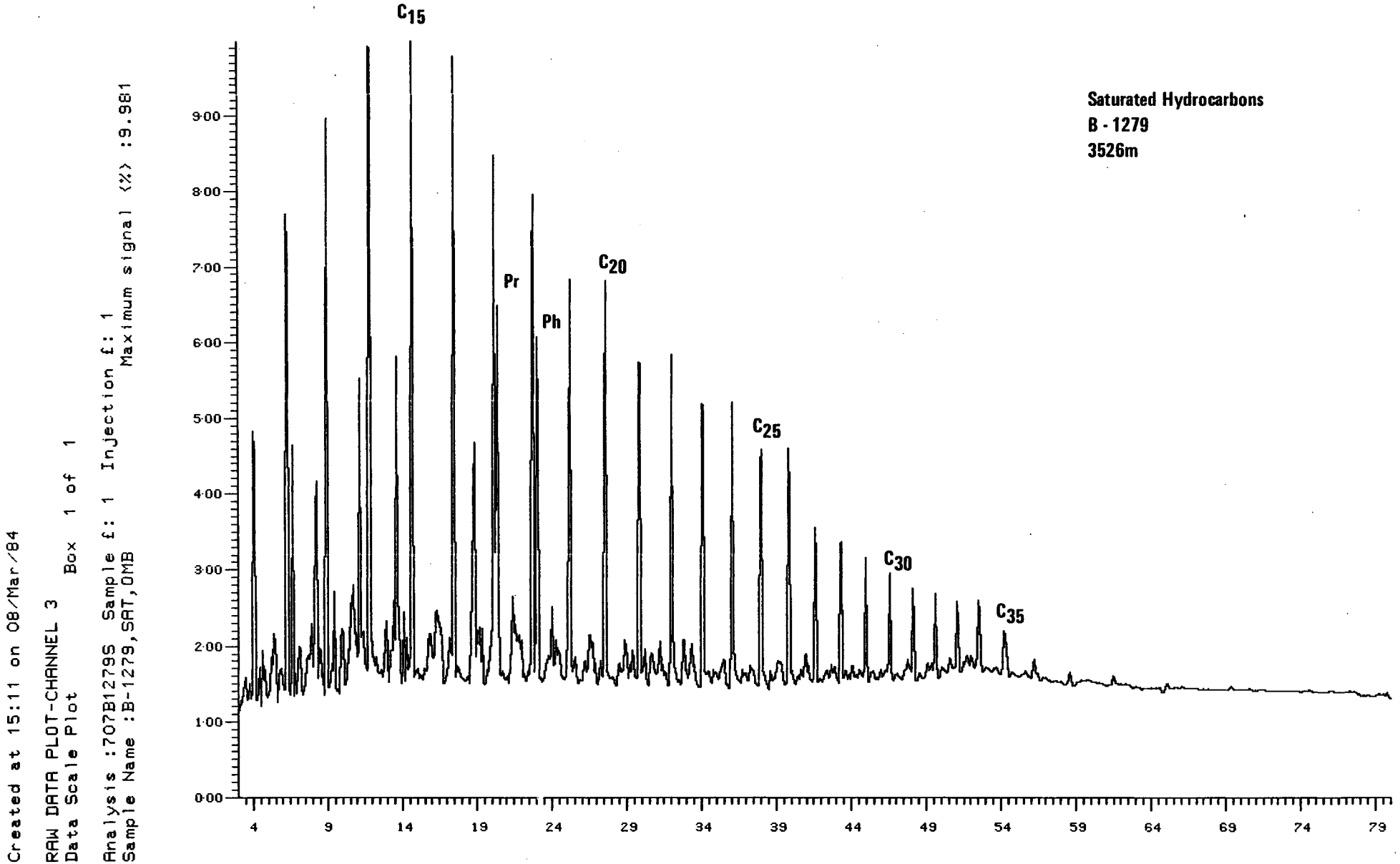
Data Scale Plot Box 1 of 1
Analysis :707B1273S Sample £: 1 Injection £: 1
Sample Name :B-1273,SAT,OMB Maximum signal (%) :17.887
16·00
14·00
12·00
10·00
8·00
6·00
4·00
2·00
0·00
4
9
14
19
24
29
34
39
44
49
54
59
64
69
74
79
Pr
Ph
C15
C20
C25
C30
Saturated Hydrocarbons
B - 1273
3504m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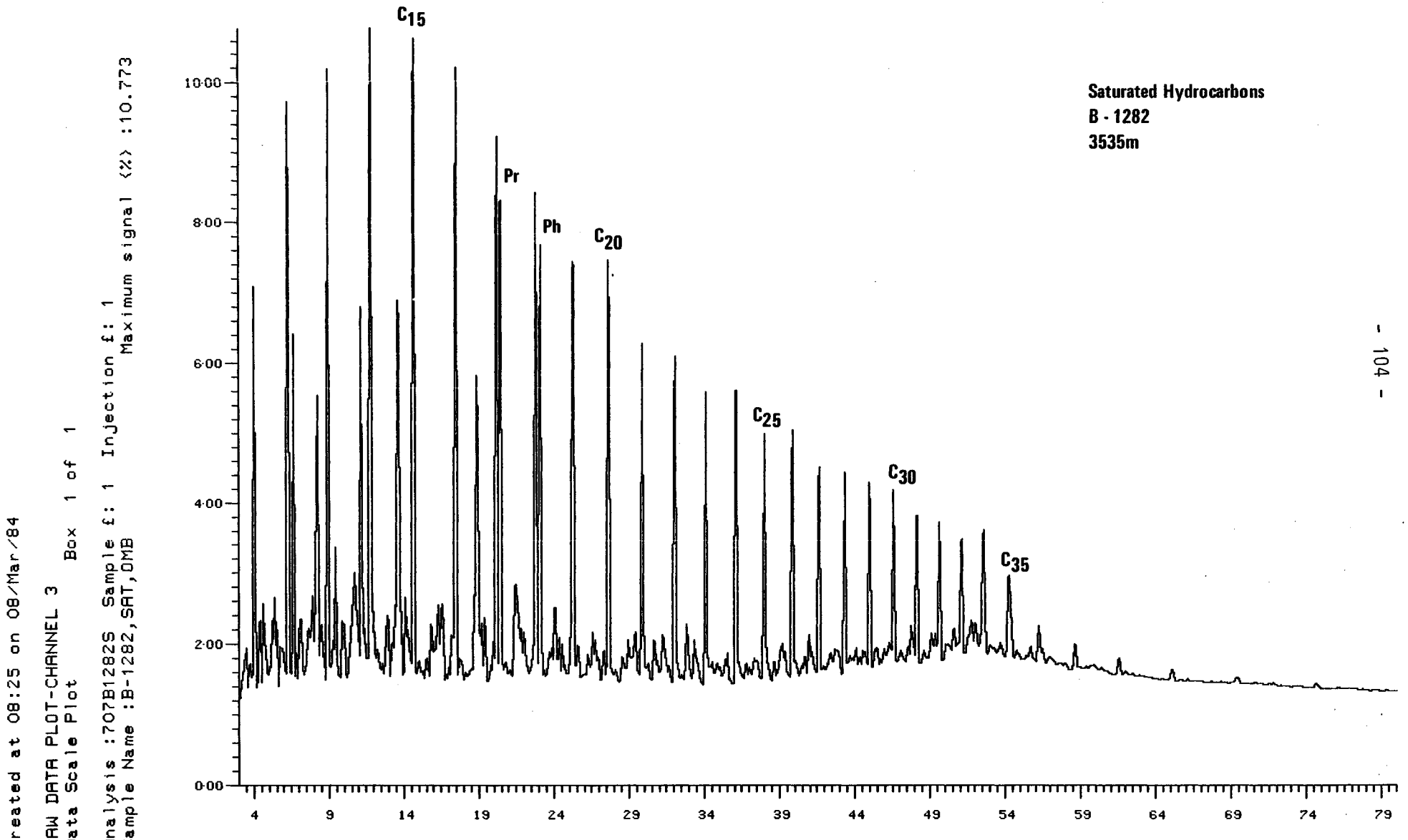
Data Scale Plot
Box 1 of 1
Analysis :707B1279S Sample £: 1 Injection £: 1
Sample Name :B-1279,SAT,OMB
Maximum signal (%) :9.981
Saturated Hydrocarbons
B - 1279
3526m
C15
Pr
Ph
C20
C25
C30
C35
9·00
8·00
7·00
6·00
5·00
4·00
3·00
2·00
1·00
0·00
4
9
14
19
24
29
34
39
44
49
54
59
64
69
74
79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Data Scale Plot
Box 1 of 1
Analysis :707B1282S Sample £: 1 Injection £: 1
Sample Name :B-1282,SAT,DMB
Maximum signal (%) :10.773
Saturated Hydrocarbons
B - 1282
3535m
C15
Pr
Ph
C20
C25
C30
C35
10·00
8·00
6·00
4·00
2·00
0·00
4
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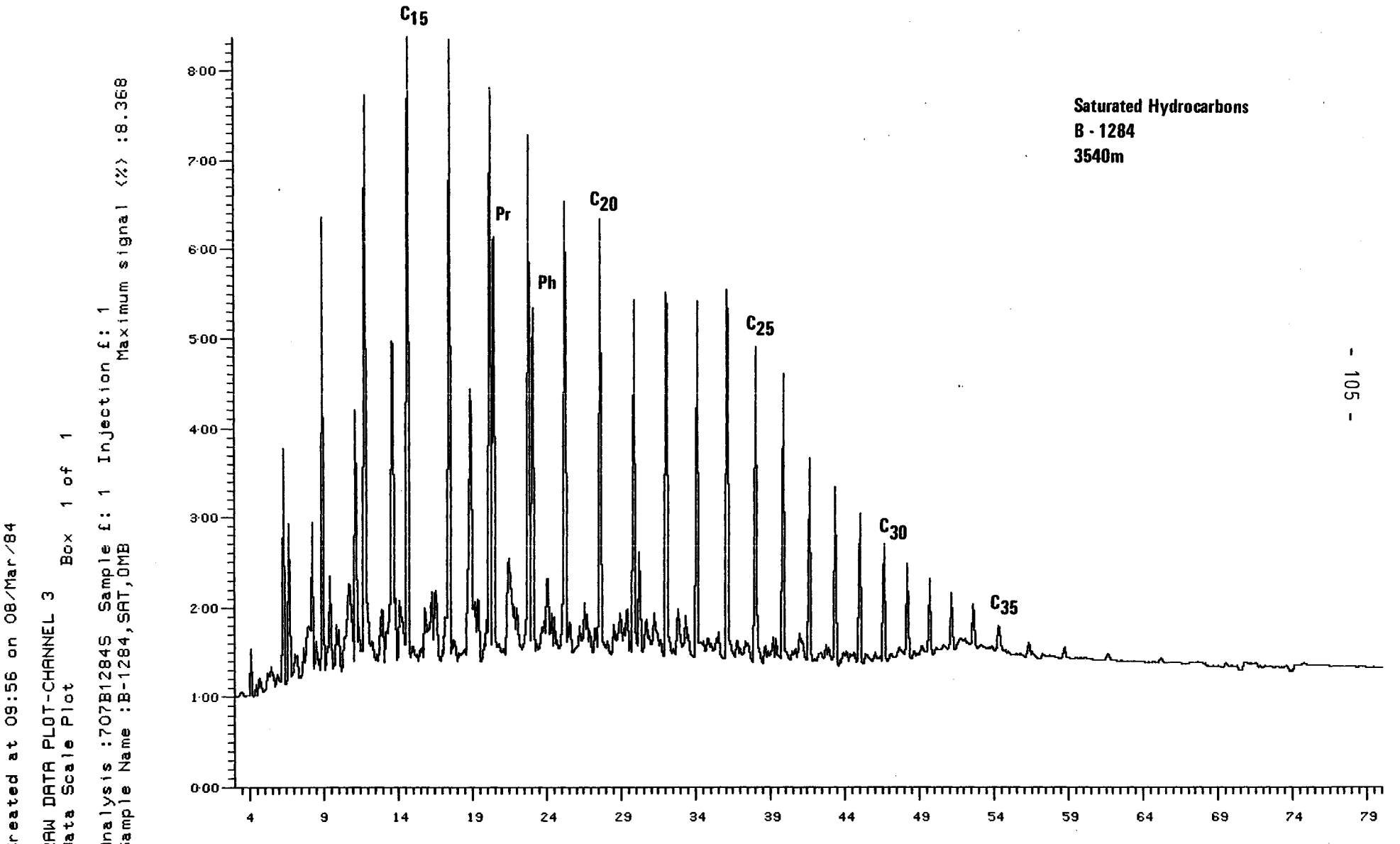
64
69
74
79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Data Scale Plot
Box 1 of 1
Analysis :707B1284S Sample £: 1 Injection £: 1
Sample Name :B-1284,SAT,DMB
Maximum signal (%) :8.368
Saturated Hydrocarbons
B - 1284
3540m
C15
Pr
Ph
C20
C25
C30
C35
8·00
7·00
6·00
5·00
4·00
3·00
2·00
1·00
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4
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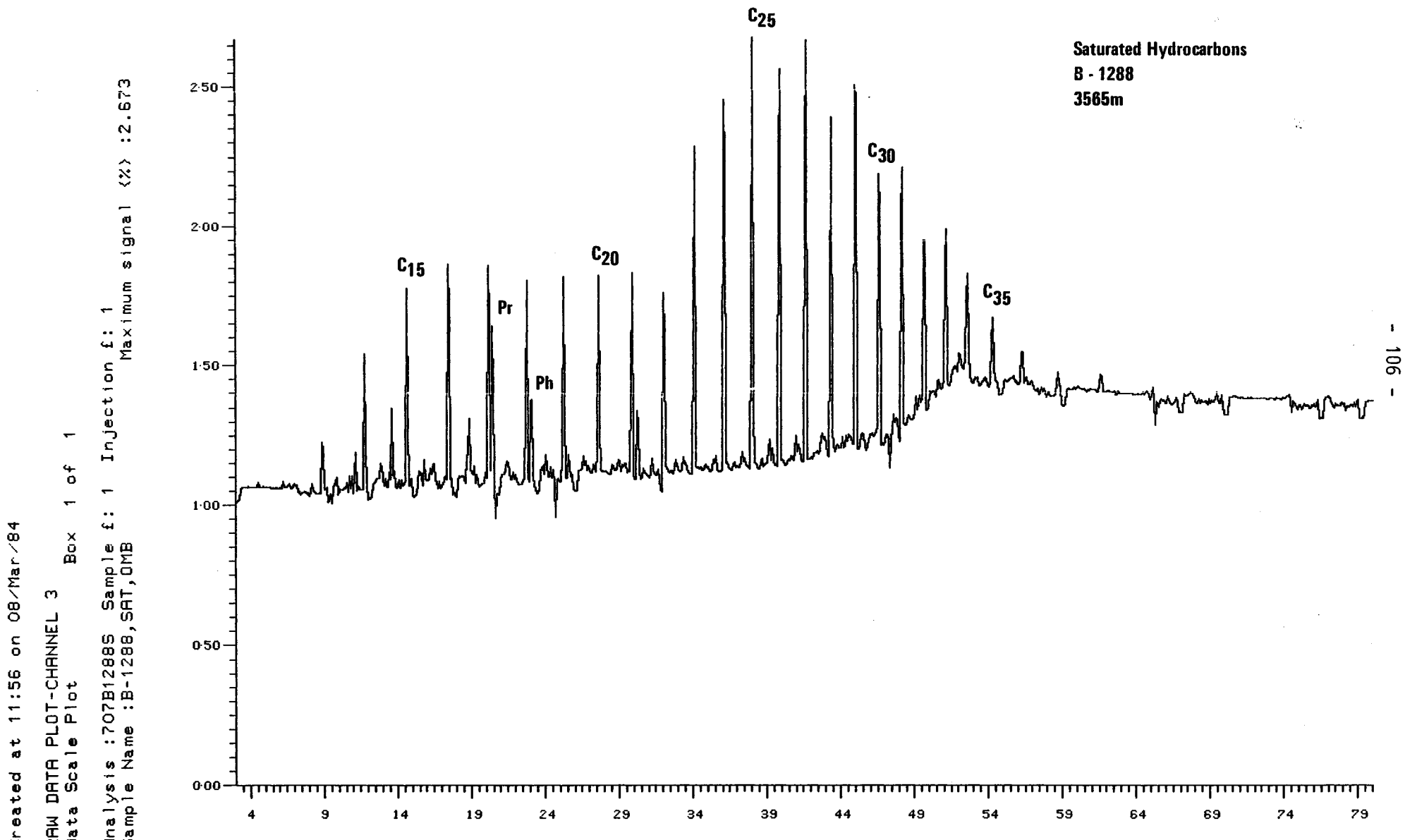
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Data Scale Plot
Box 1 of 1
Analysis :707B1288S Sample £: 1 Injection £: 1
Sample Name :B-1288,SAT,OMB
Maximum signal (%) :2.673
Saturated Hydrocarbons
B - 1288
3565m
C15
Pr
Ph
C20
C25
C30
C35
2·50
2·00
1·50
1·00
0·50
0·00
4
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14
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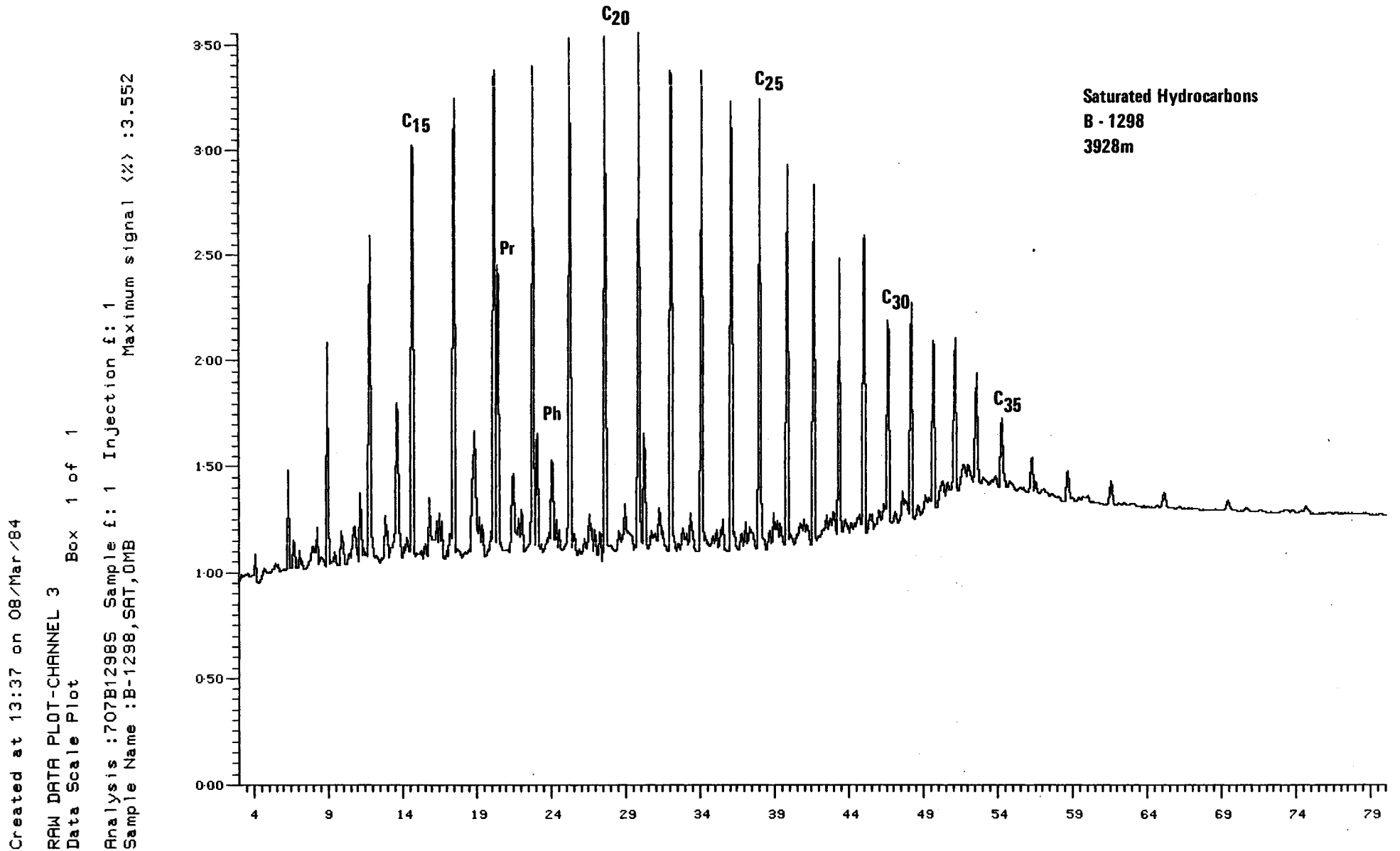
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Data Scale Plot
Box 1 of 1
Analysis :707B12985 Sample £: 1 Injection £: 1
Sample Name :B-1298,SAT,OMB
Maximum signal (%) :3.552
C15
Pr
Ph
C20
C25
C30
C35
Saturated Hydrocarbons
B - 1298
3928m
3·50
3·00
2·50
2·00
1·50
1·00
0·50
0·00
4
9
14
19
24
29
34
39
44
49
54
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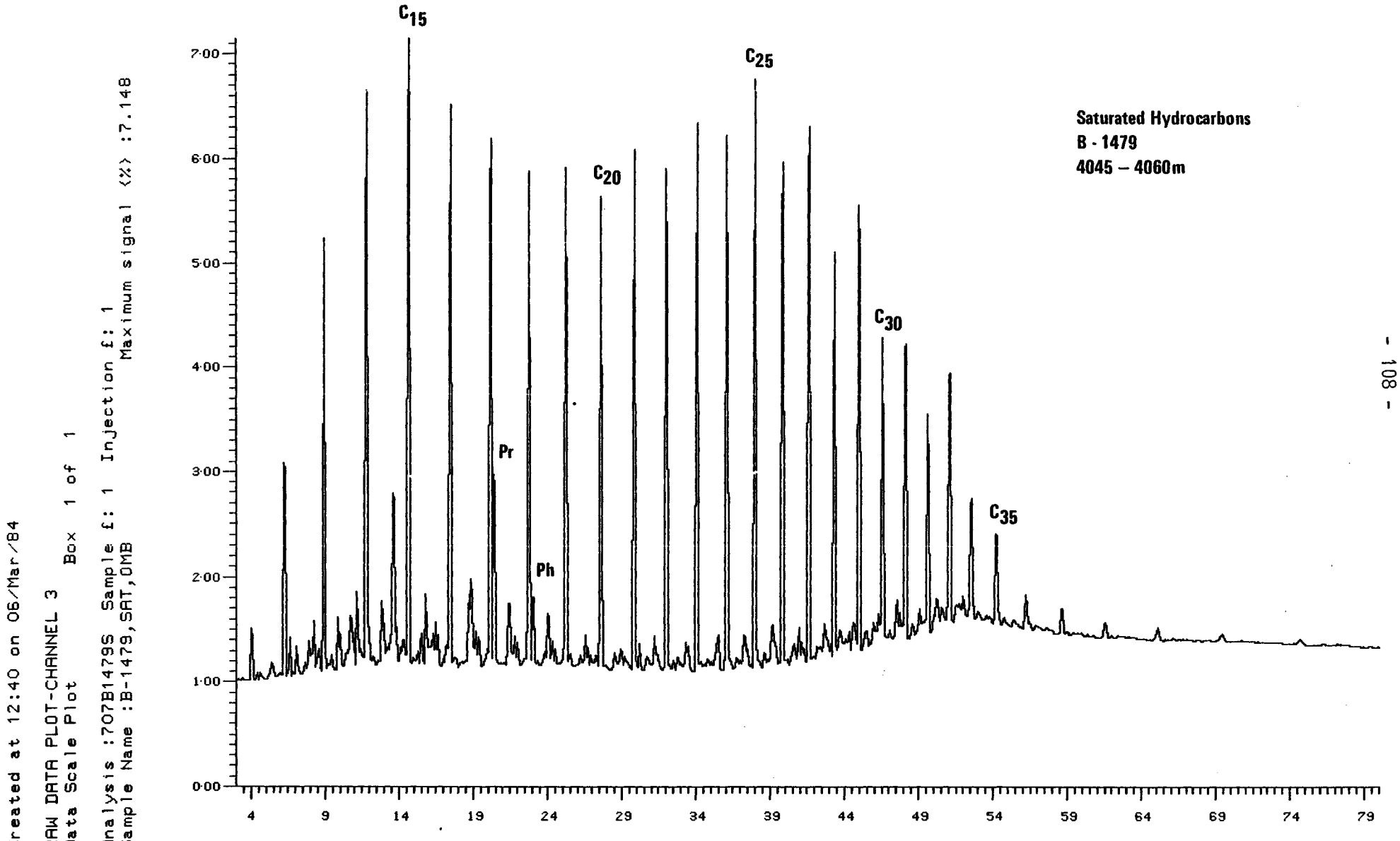
64
69
74
79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Data Scale Plot
Box 1 of 1
Analysis :707B1479S Sample £: 1 Injection £: 1
Sample Name :B-1479,SAT,OMB
Maximum signal (%) :7.148
C15
C20
C25
C30
C35
Pr
Ph
Saturated Hydrocarbons
B - 1479
4045 – 4060m
7·00
6·00
5·00
4·00
3·00
2·00
1·00
0·00
4
9
14
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34
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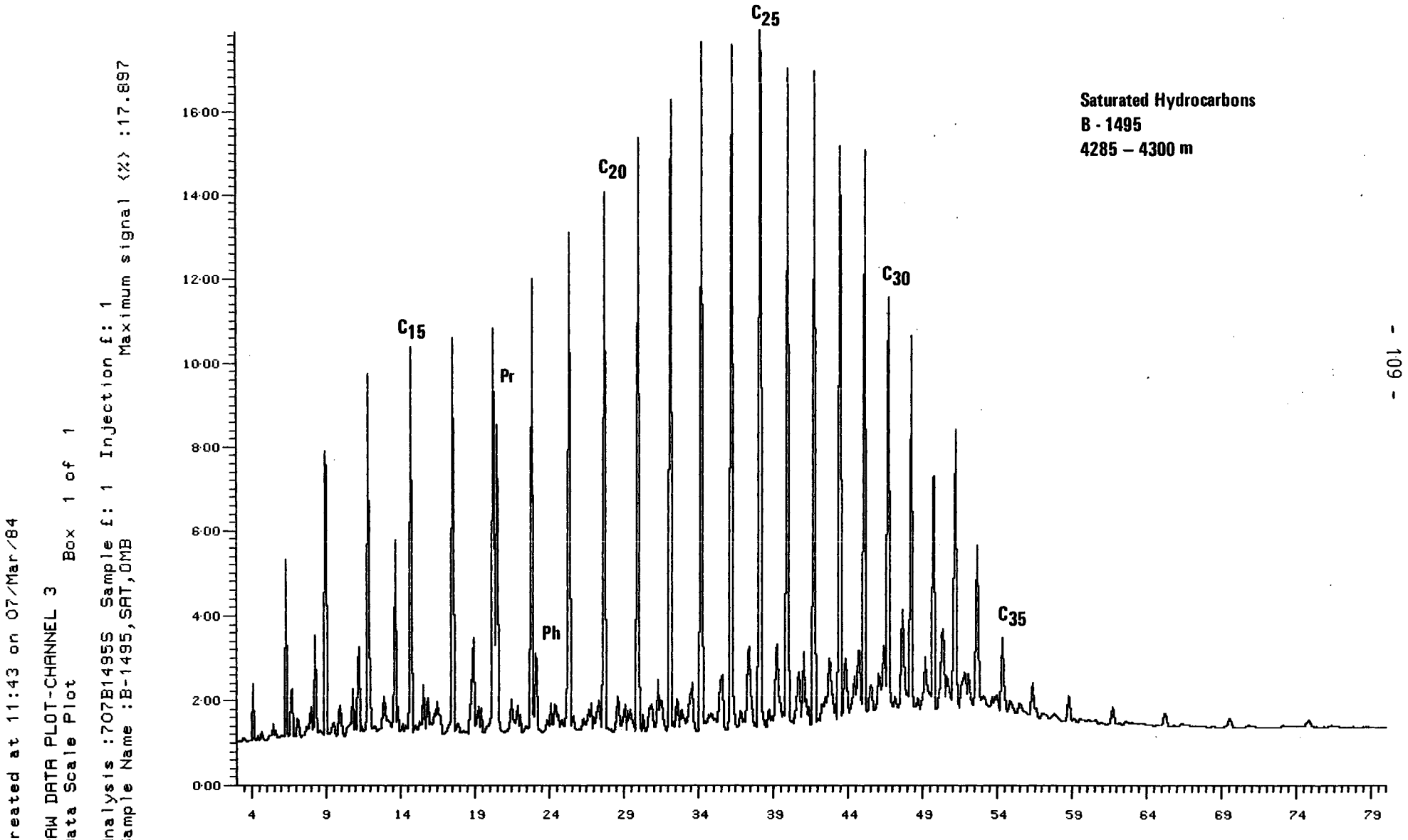
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Data Scale Plot
Box 1 of 1
Analysis :707B1495S Sample £: 1 Injection £: 1
Sample Name :B-1495,SAT,DMB
Maximum signal (%) :17.897
Saturated Hydrocarbons
B - 1495
4285 – 4300 m
C15
Pr
Ph
C20
C25
C30
C35
16·00
14·00
12·00
10·00
8·00
6·00
4·00
2·00
0·00
4
9
14
19
24
29
34
39
44
49
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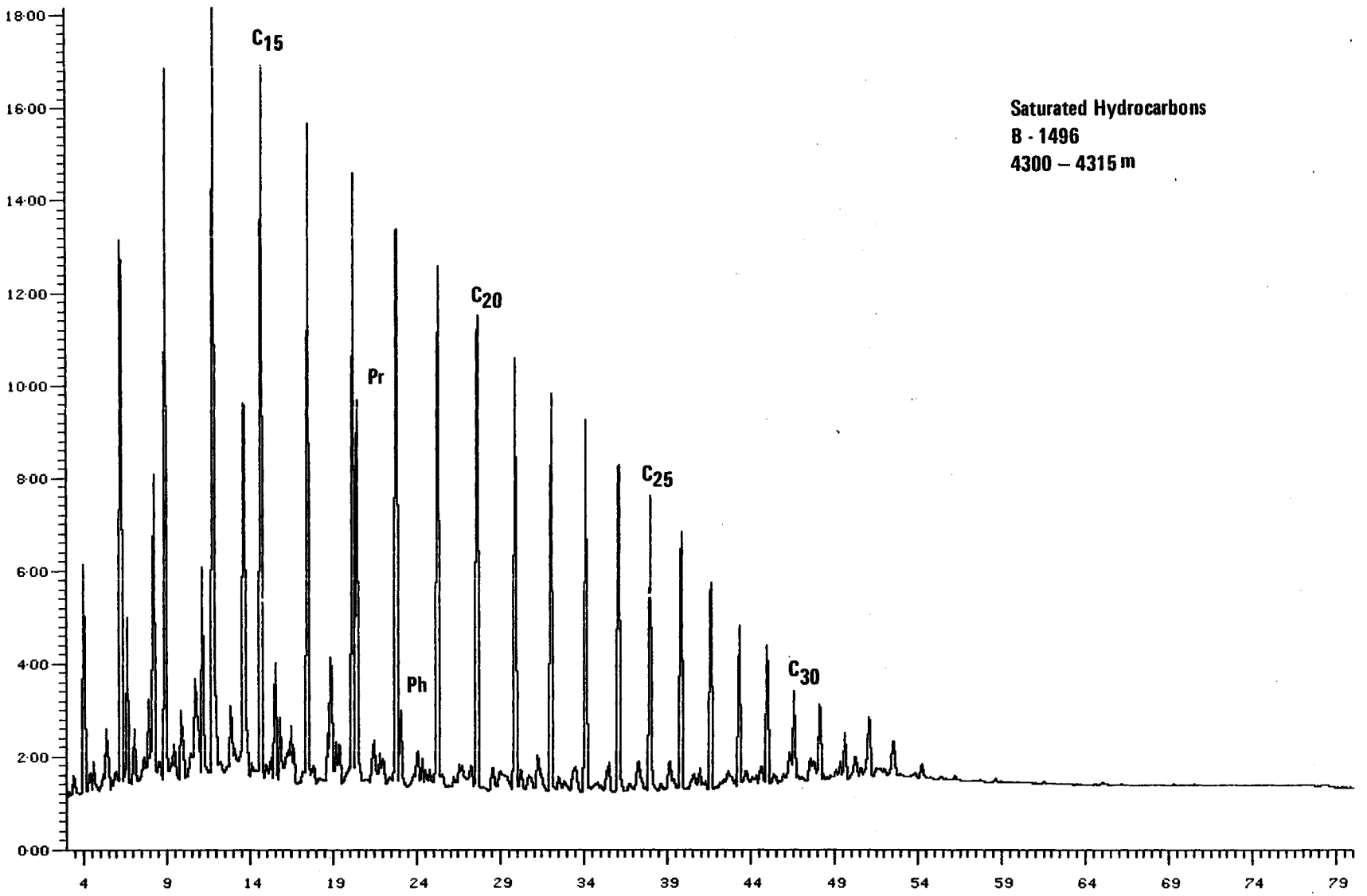
59
64
69
74
79

Created at 13:58 on 07/Mar/84
RAW DATA PLOT-CHANNEL 3
Data Scale Plot Box 1 of 1
Analysis :707B14965 Sample £: 1 Injection £: 1
Sample Name :B-1496,SAT,OMB Maximum signal (%) :18.164

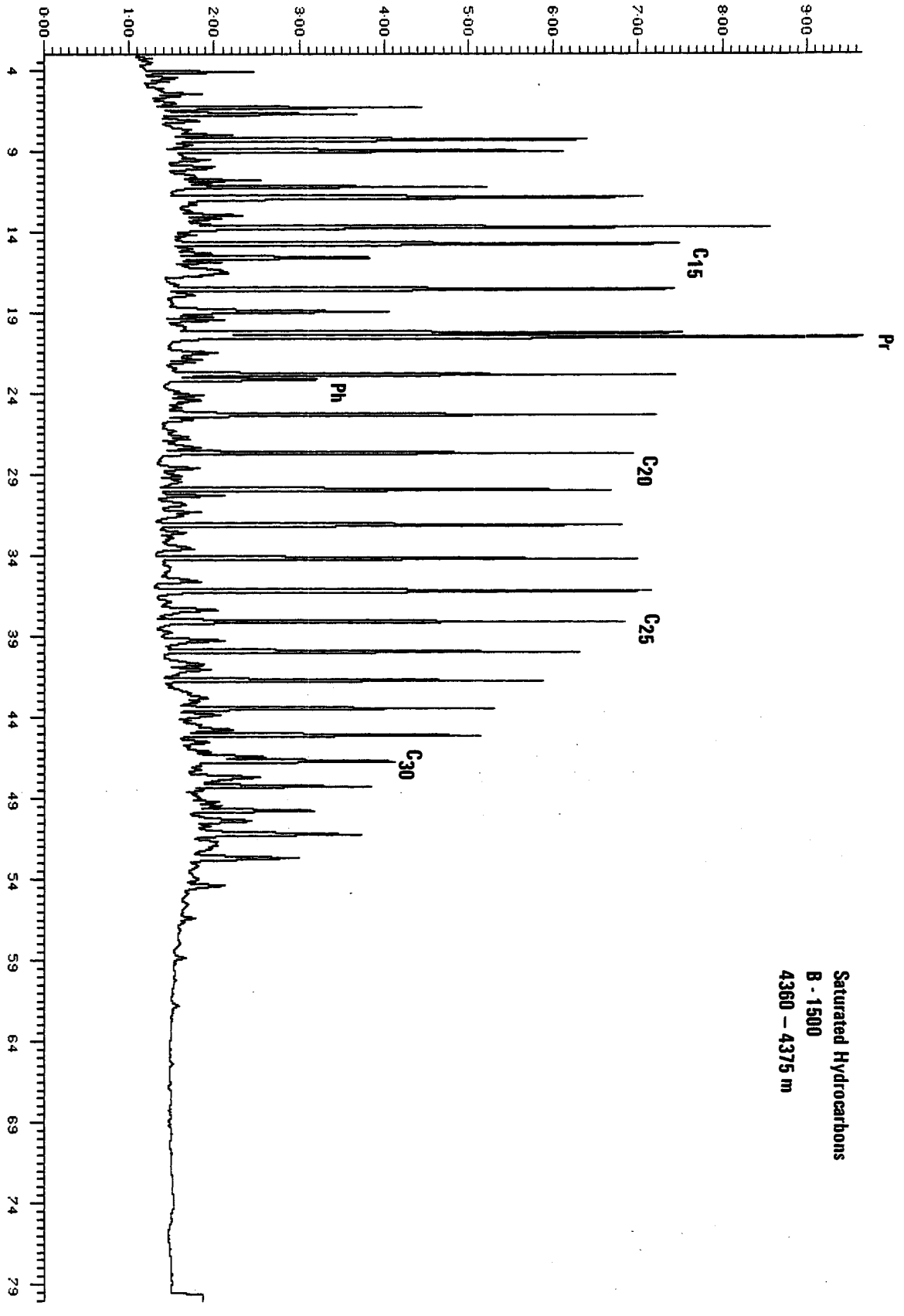


Saturated Hydrocarbons
B - 1496
4300 – 4315 m

Created at 14:01 on 06/Mar/84

RAW DATA PLOT-CHANNEL 3
Data Scale Plot Box 1 of 1

Analysis :707B1500S Sample £: 1 Injection £: 1
Sample Name :B-1500,SAT,OMB Maximum signal (%) :9.658

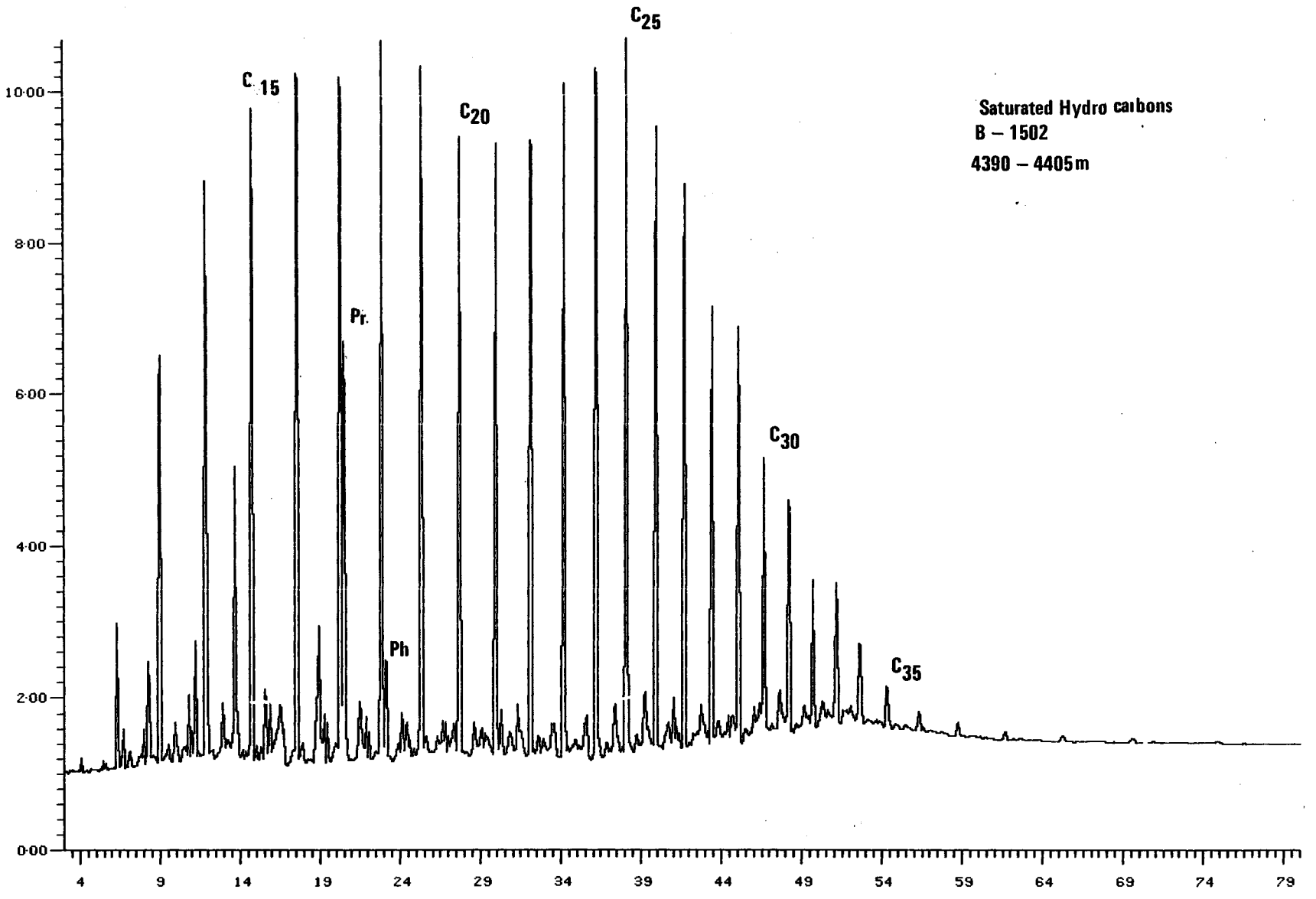


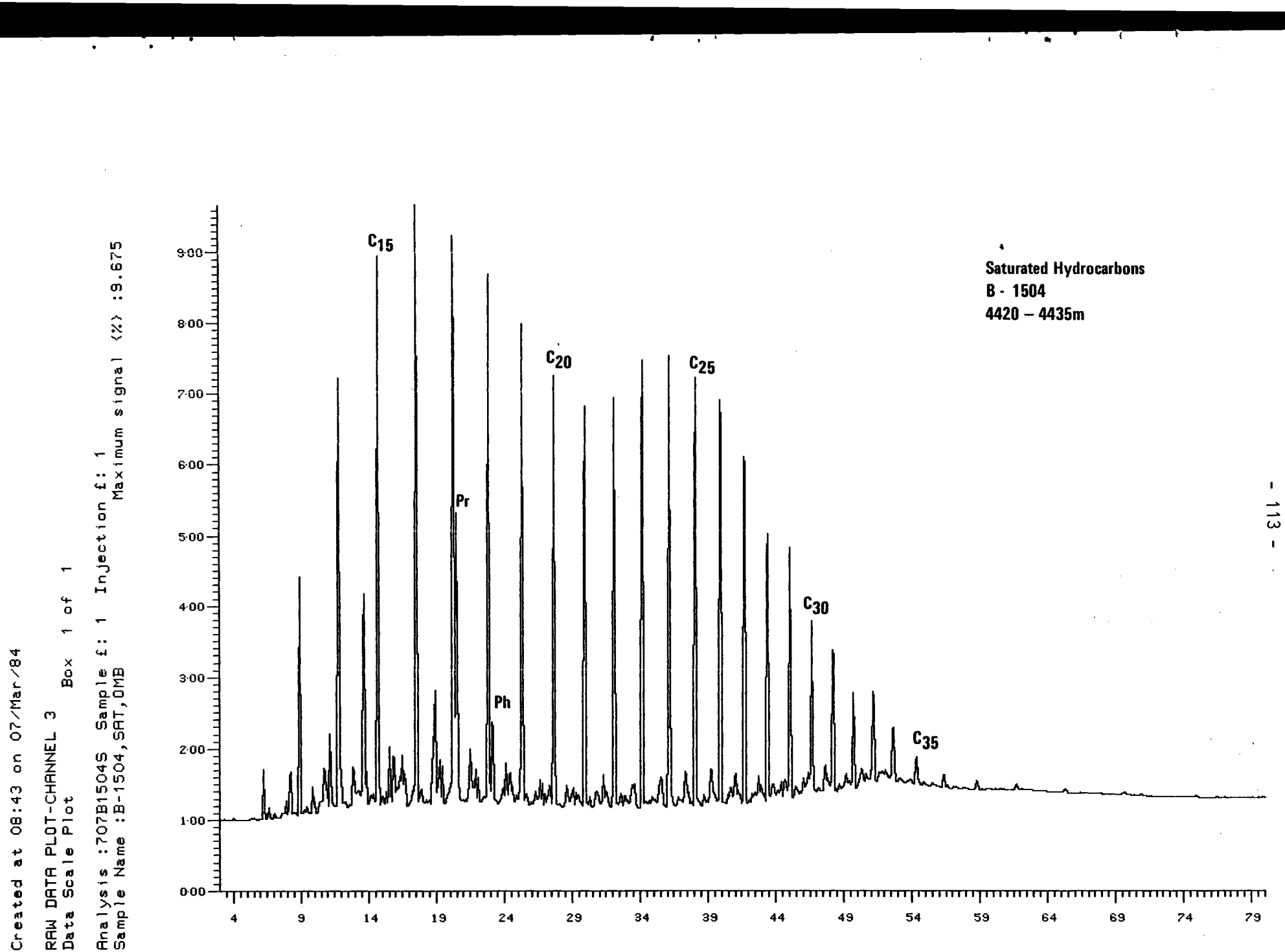
Saturated Hydrocarbons
B - 1500
4360 – 4375 m

Created at 16:04 on 06/Mar/84

RAW DATA PLOT-CHANNEL 3
Data Scale Plot Box 1 of 1

Analysis :707B1502S Sample £: 1 Injection £: 1
Sample Name :B-1502,SAT,OMB Maximum signal (%) :10.696

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Data Scale Plot Box 1 of 1
Analysis :707B1504S Sample £: 1 Injection £: 1
Sample Name :B-1504,SAT,DMB
Maximum signal (%) :9.675
Saturated Hydrocarbons
B - 1504
4420 – 4435m
C15
Pr
Ph
C20
C25
C30
C35
9·00
8·00
7·00
6·00
5·00
4·00
3·00
2·00
1·00
0·00
4
9
14
19
24
29
34
39
44
49
54
59
64
69
74
79

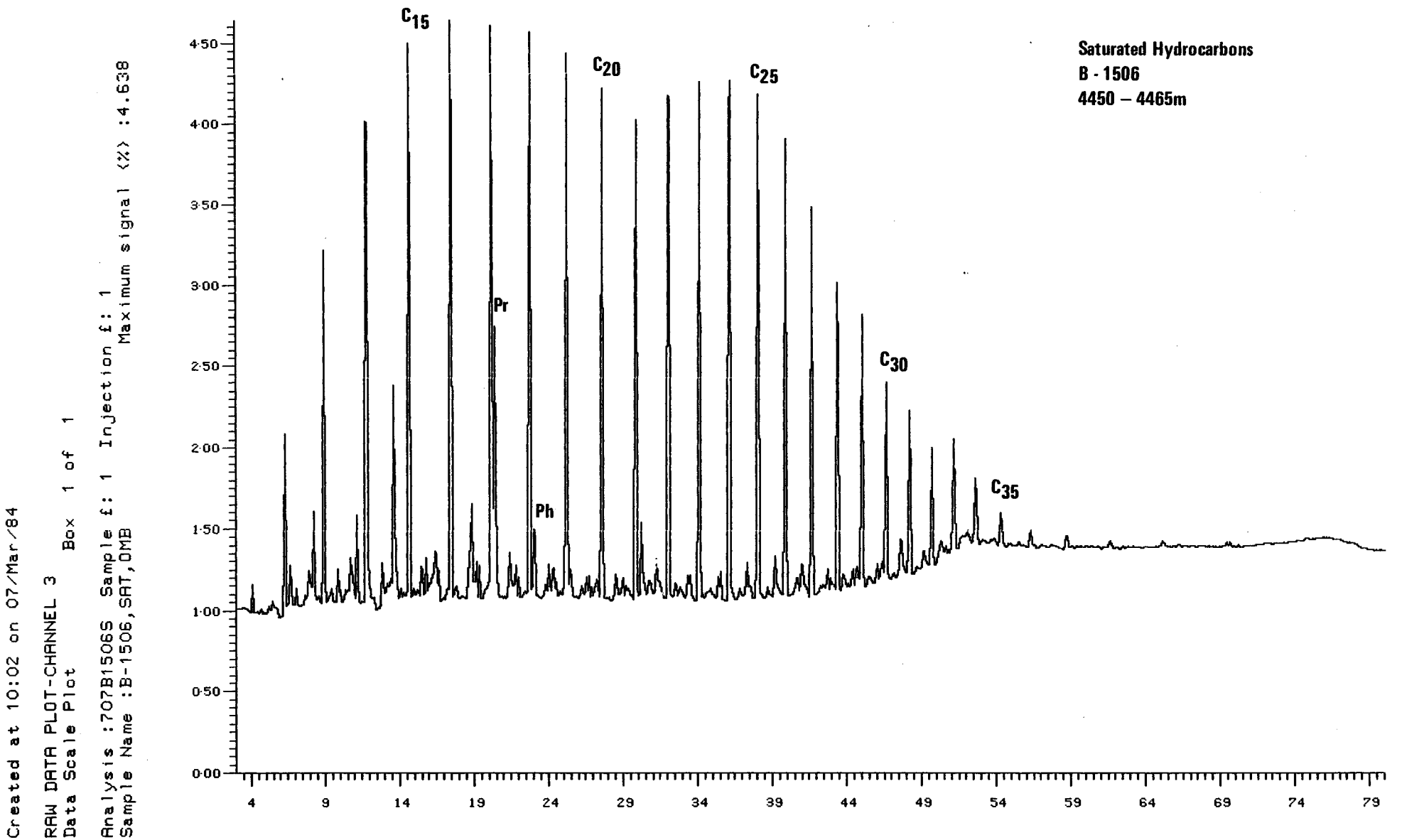
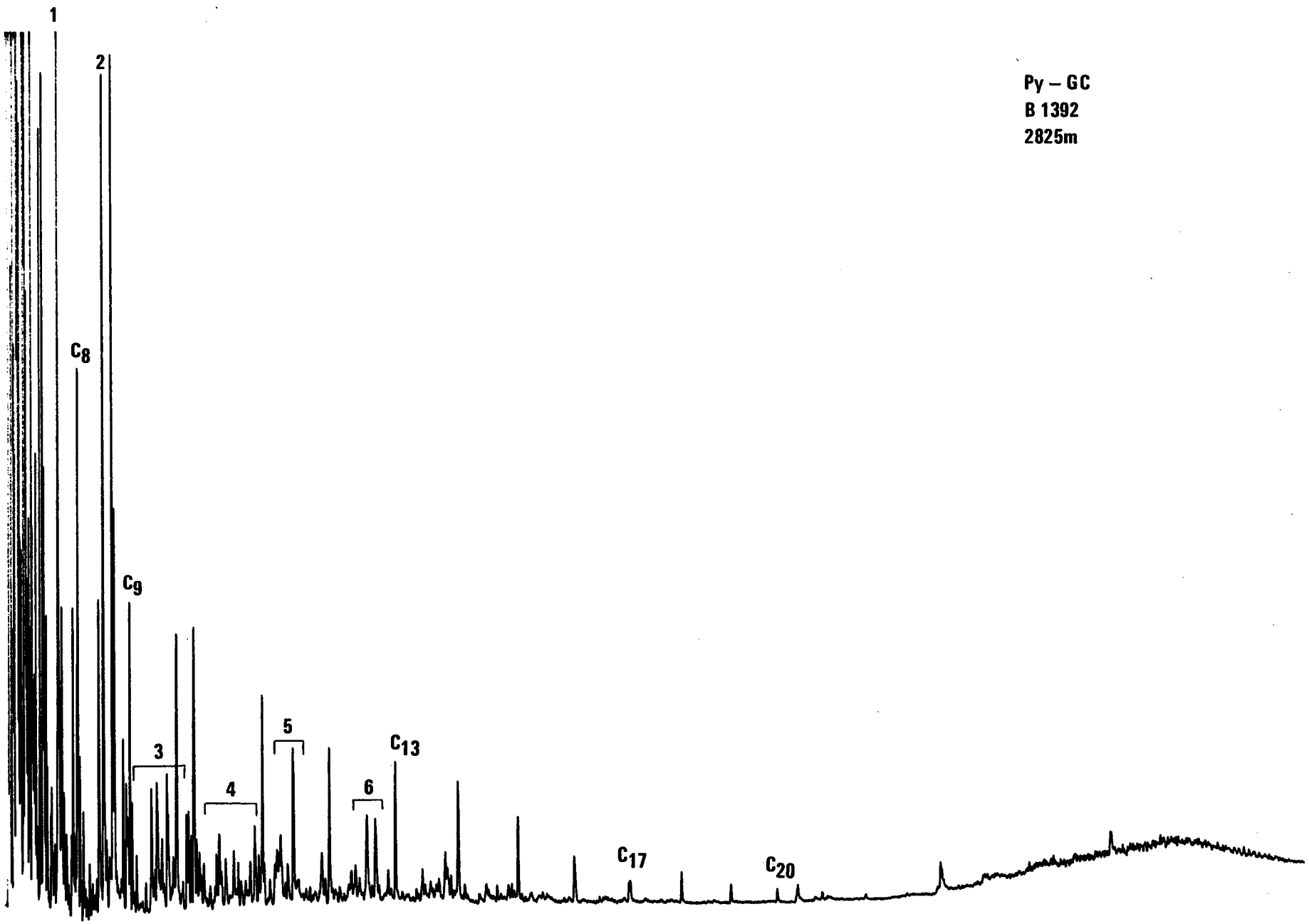

Created at 10:02 on 07/Mar/84
RAW DATA PLOT-CHANNEL 3
Data Scale Plot
Box 1 of 1
Analysis :707B1506S Sample £: 1 Injection £: 1
Sample Name :B-1506,SAT,DMB
Maximum signal (%) :4.638
Saturated Hydrocarbons
B - 1506
4450 – 4465m
C15
Pr
Ph
C20
C25
C30
C35
4·50
4·00
3·50
3·00
2·50
2·00
1·50
1·00
0·50
0·00
4
9
14
19
24
29
34
39
44
49
54
59
64
69
74
79

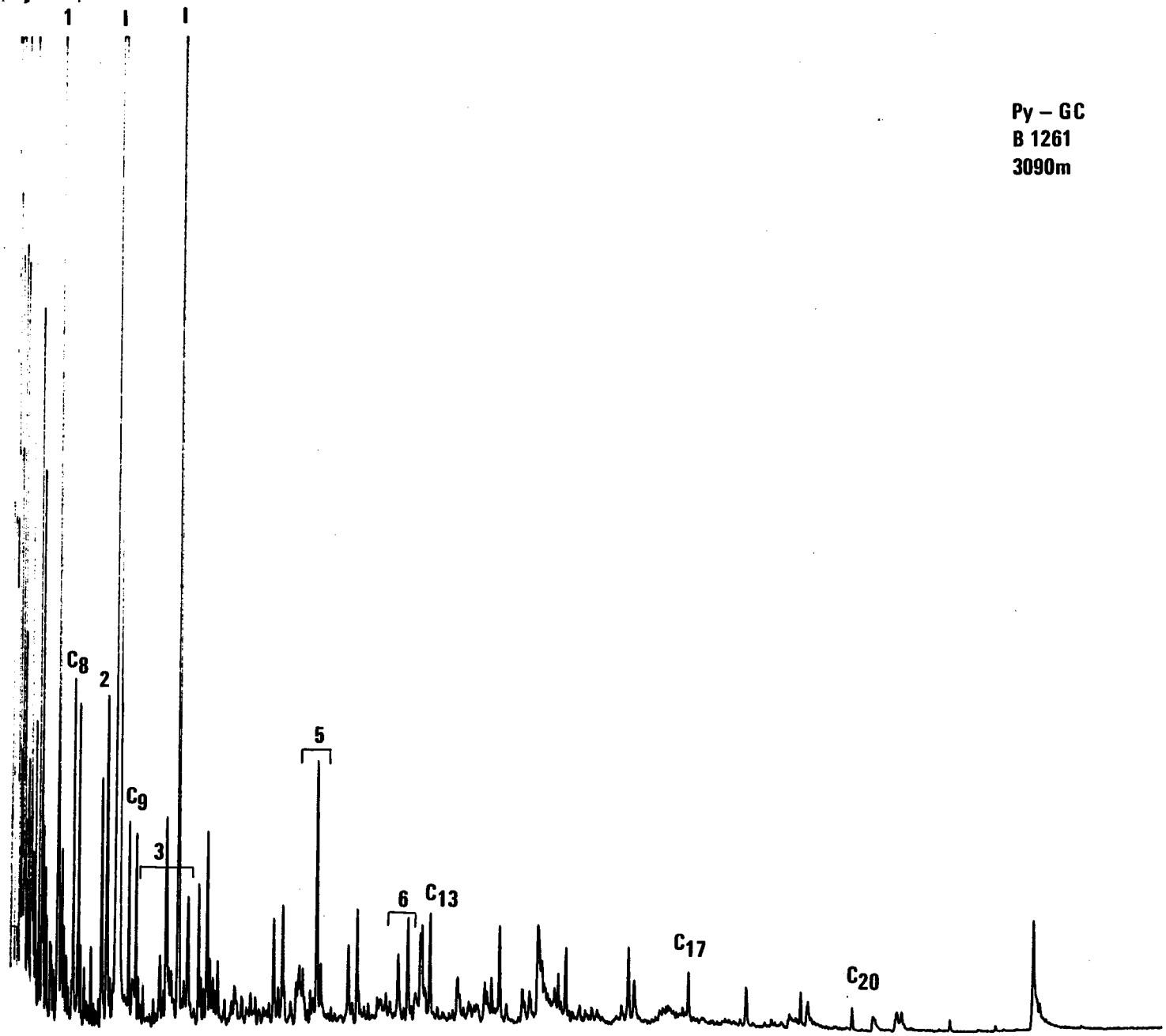
FIGURE 3

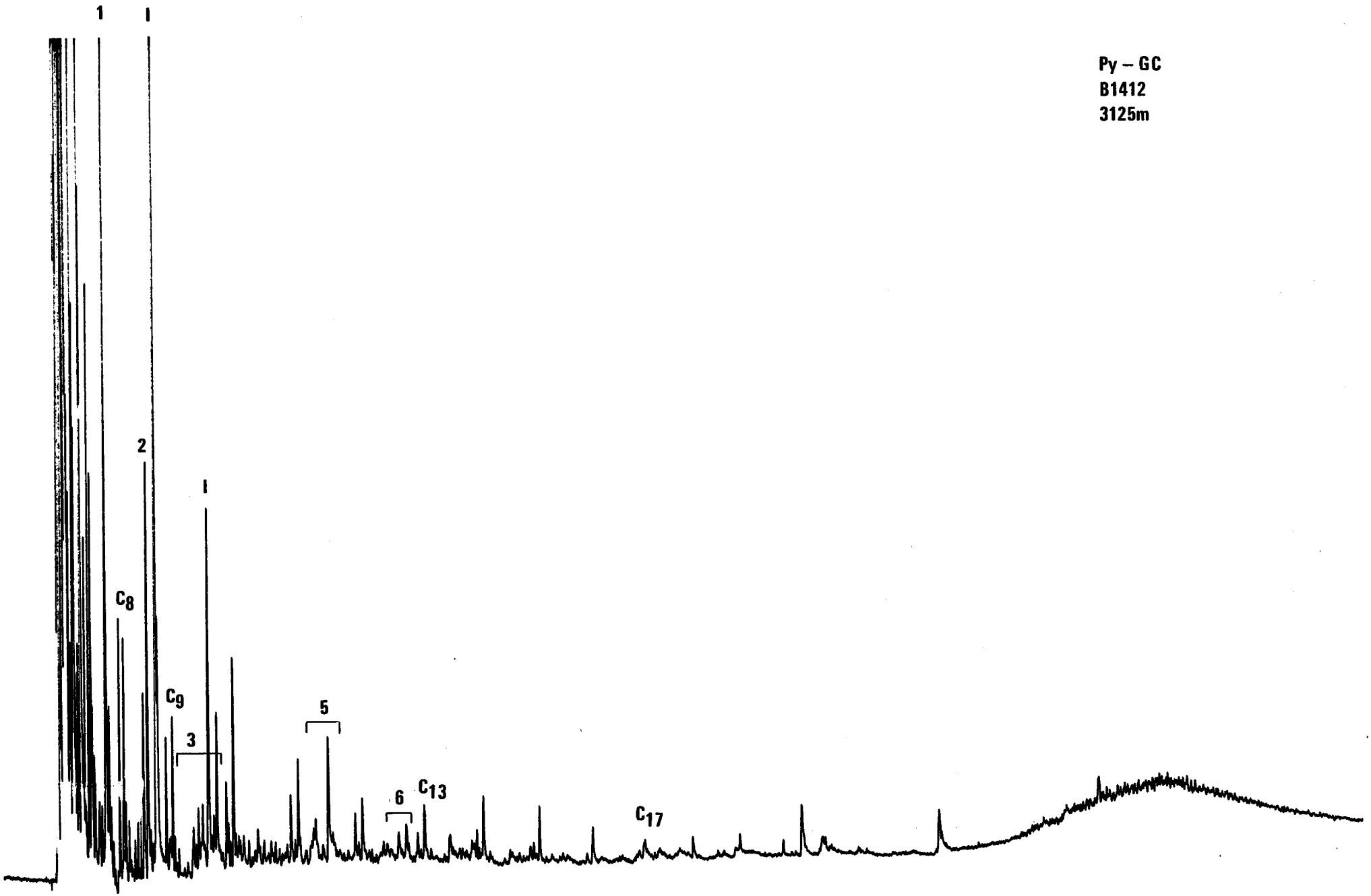
Pyrolysis-gas Chromatograms

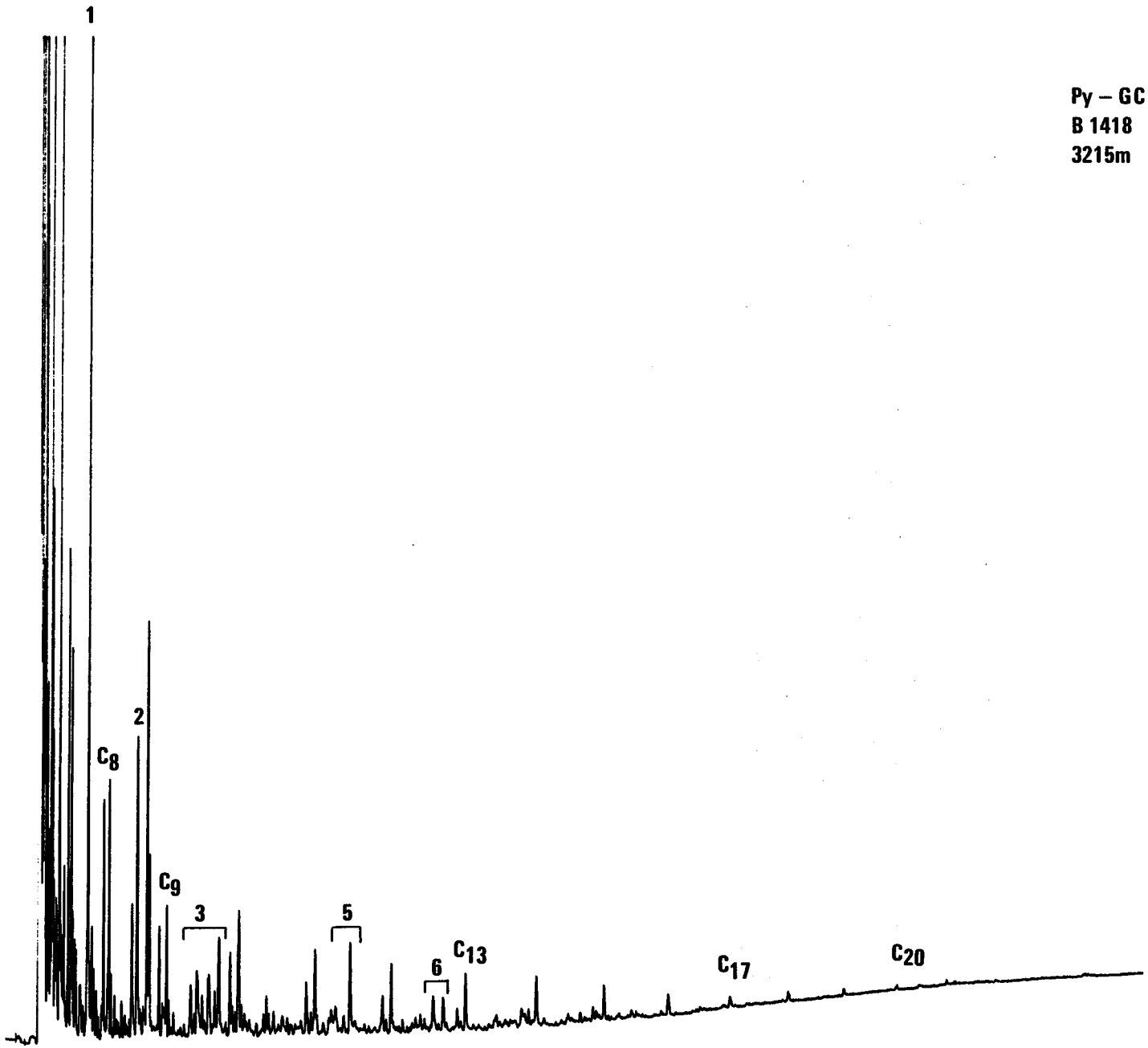
1 = toluene
2 = (m+p)-xylenes
3 = C_3-alkylbenzenes + phenol
4 = C_4-alkylbenzenes 0 methylphenols
5 = C_4- and C_5-alkylbenzenes + naphthalene
6 = 2- and 1-methylnaphthalene
7 = C_2-alkylnaphthalenes + C_{14}-alkene/alkane
8 = phenanthrene
9 = methylphenanthrenes
Pr = pristenes
C_7,C_8 etc. are alkene/alkane doublets of that carbon number
I = impurities

The peaks are identified on the basis of retention and mass spectrometric data of other kerogens.

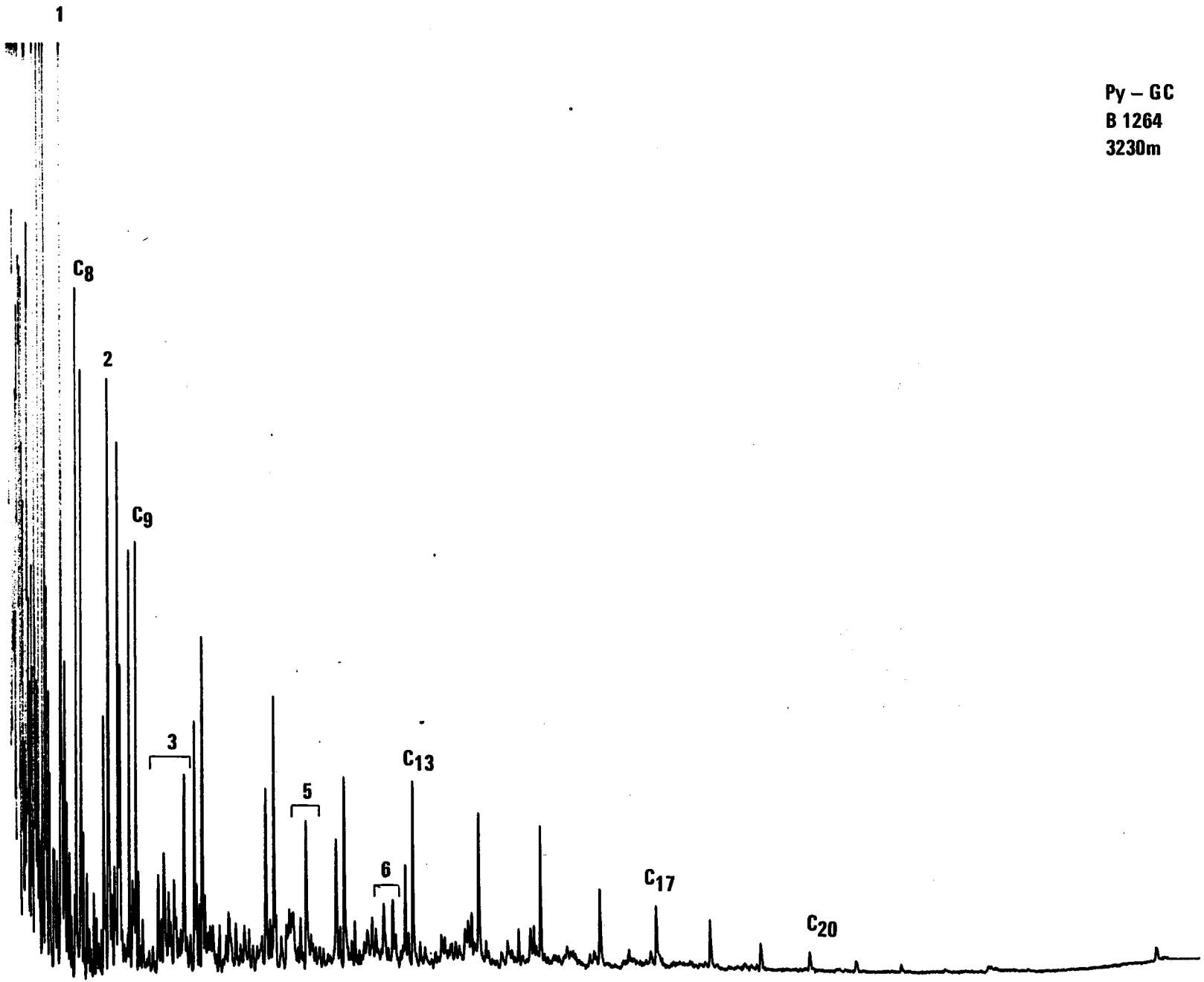

1
2
C8
C9
3
4
5
6
C13
C17
C20
Py – GC
B 1392
2825m

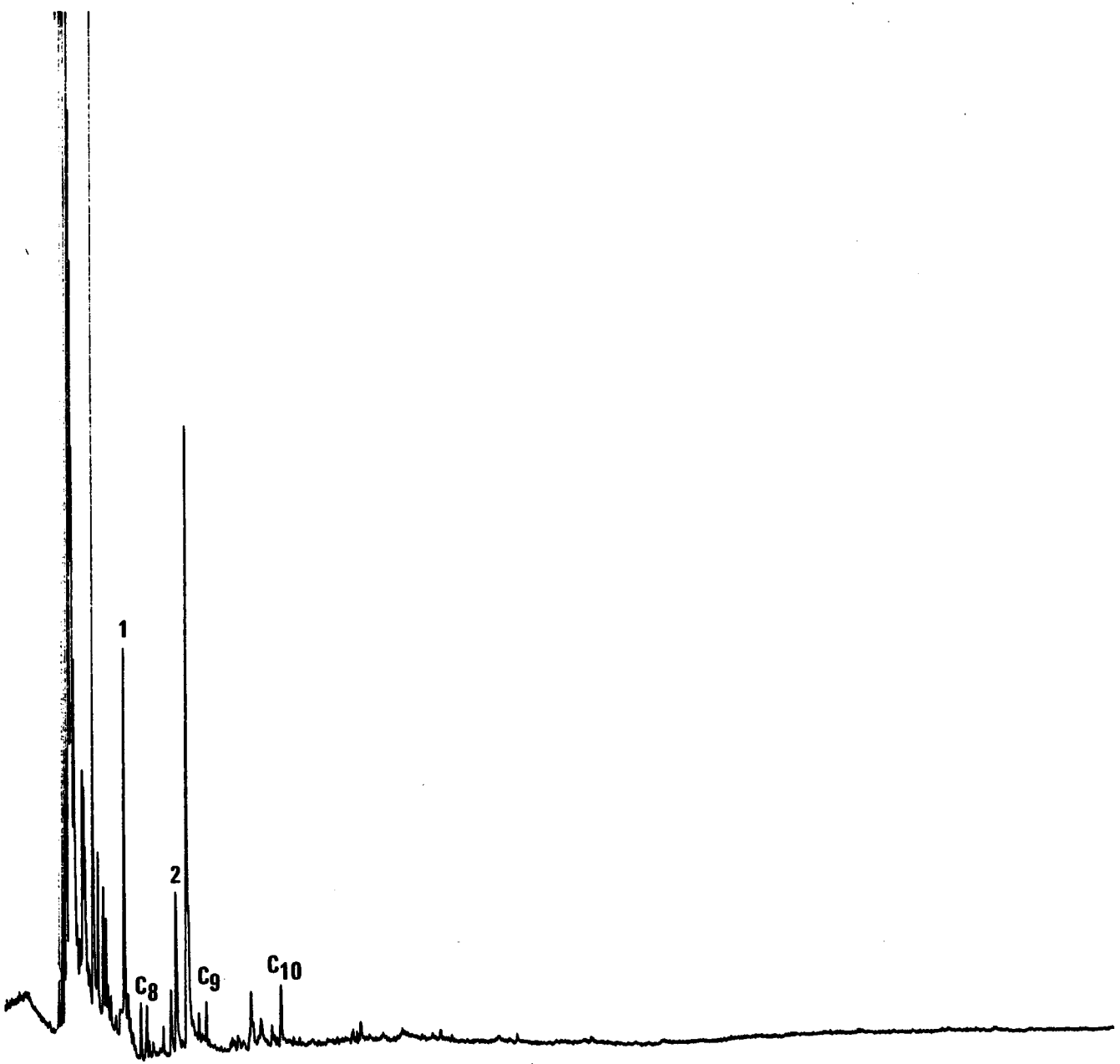

Py – GC
B 1261
3090m
1
C_8
2
C_9
3
5
6
C_{13}
C_{17}
C_{20}

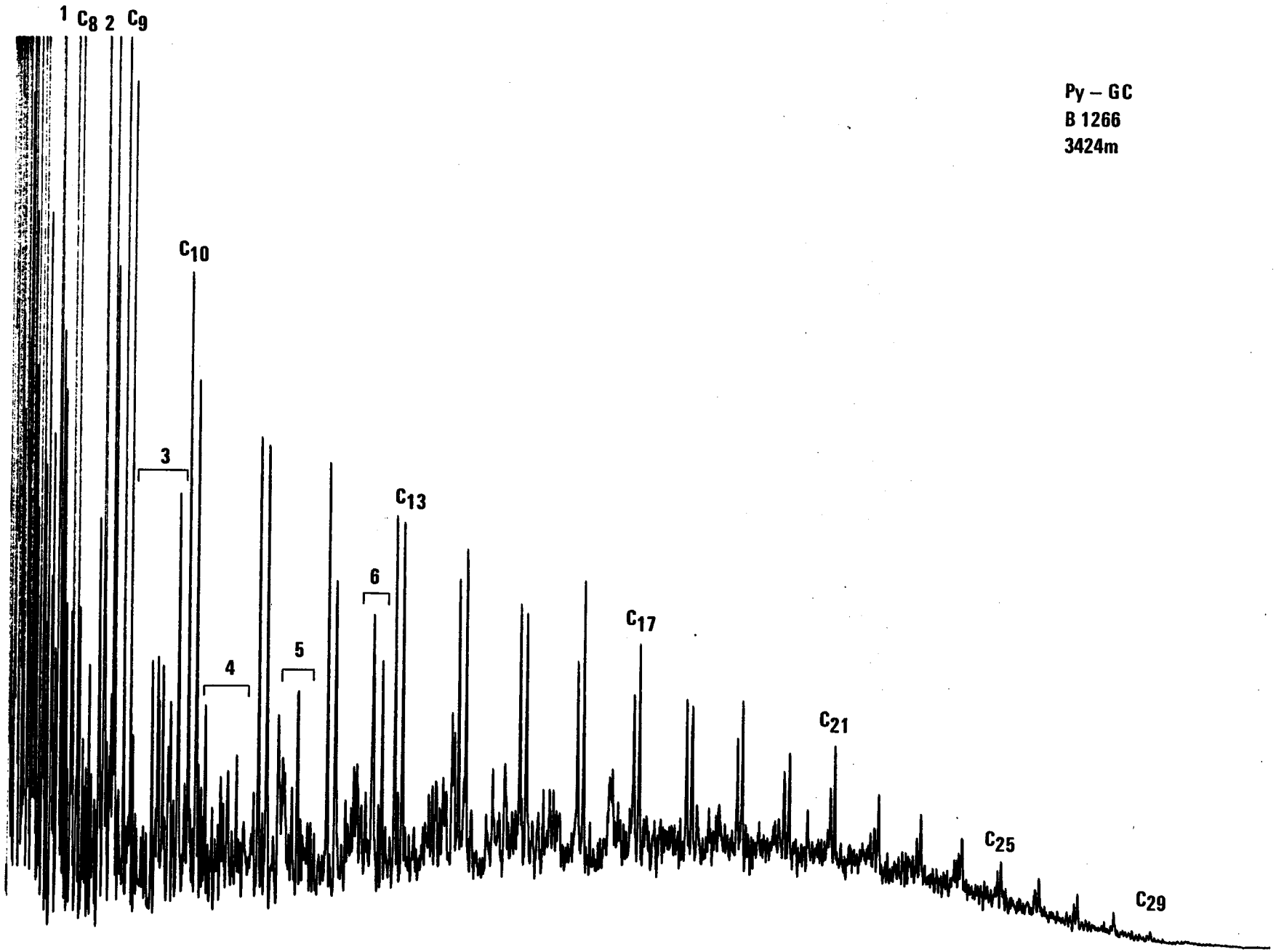

1
1
2
1
C_8
C_9
3
5
6
C_{13}
C_{17}
Py – GC
B1412
3125m

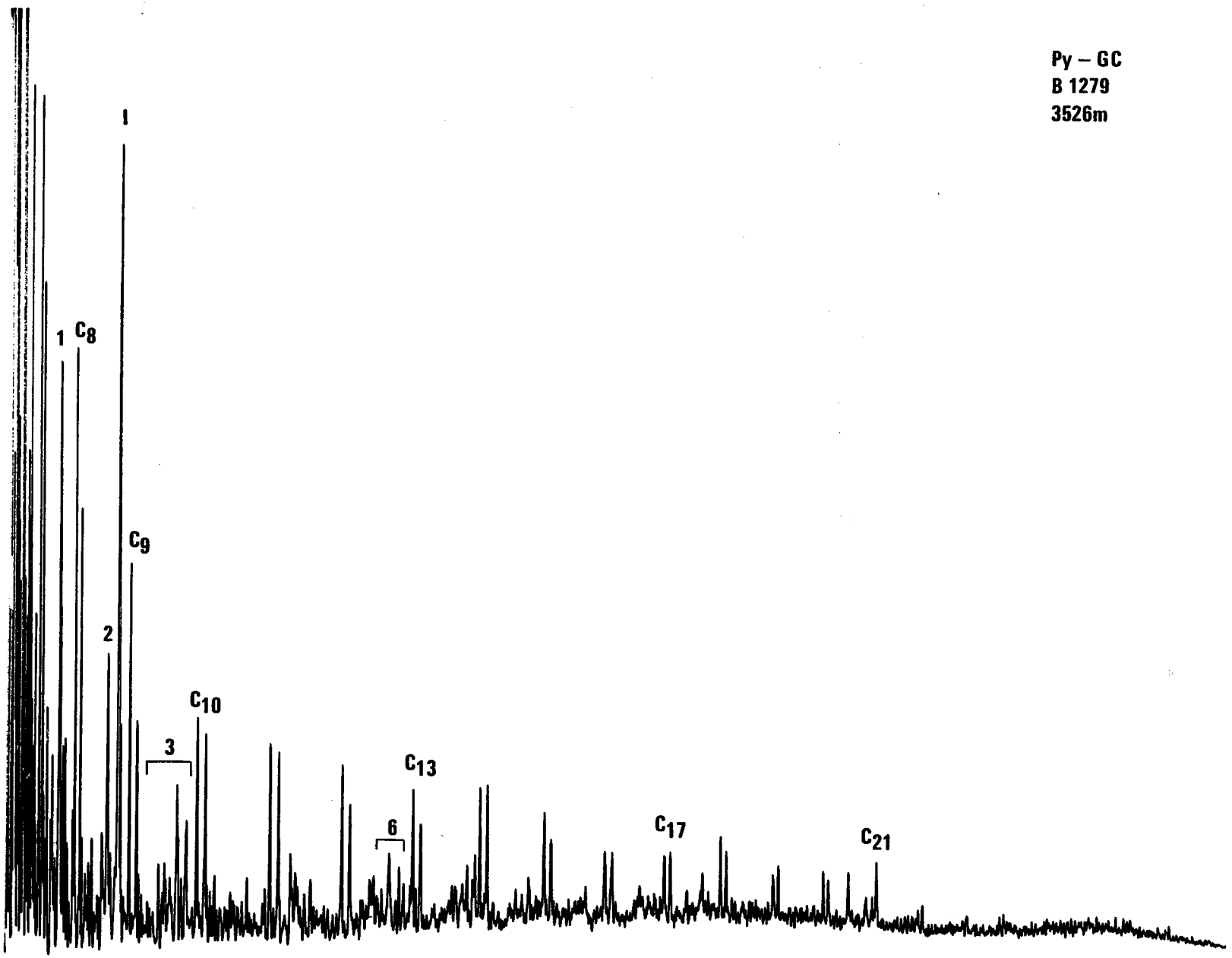


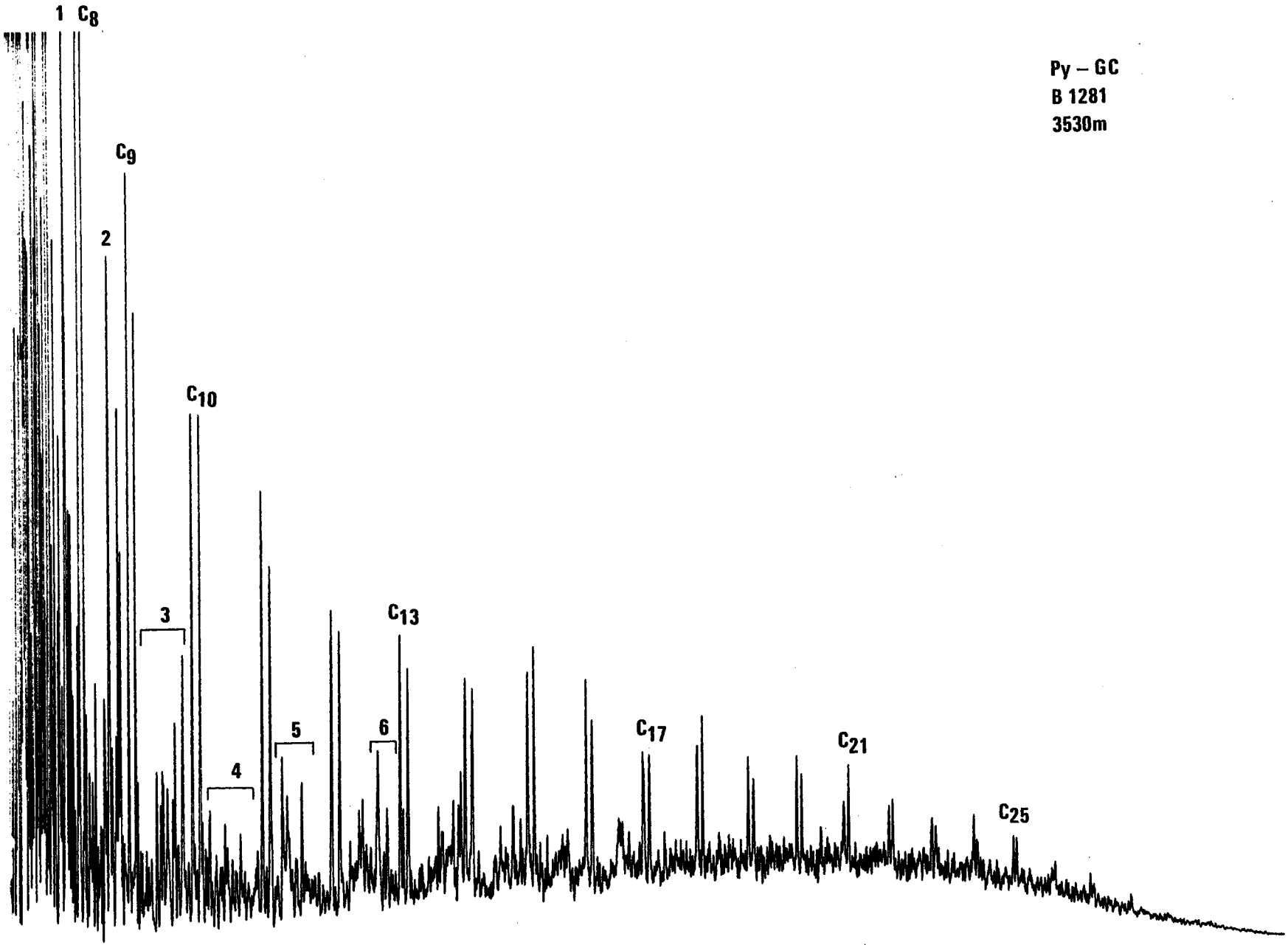
Py – GC
B 1418
3215m

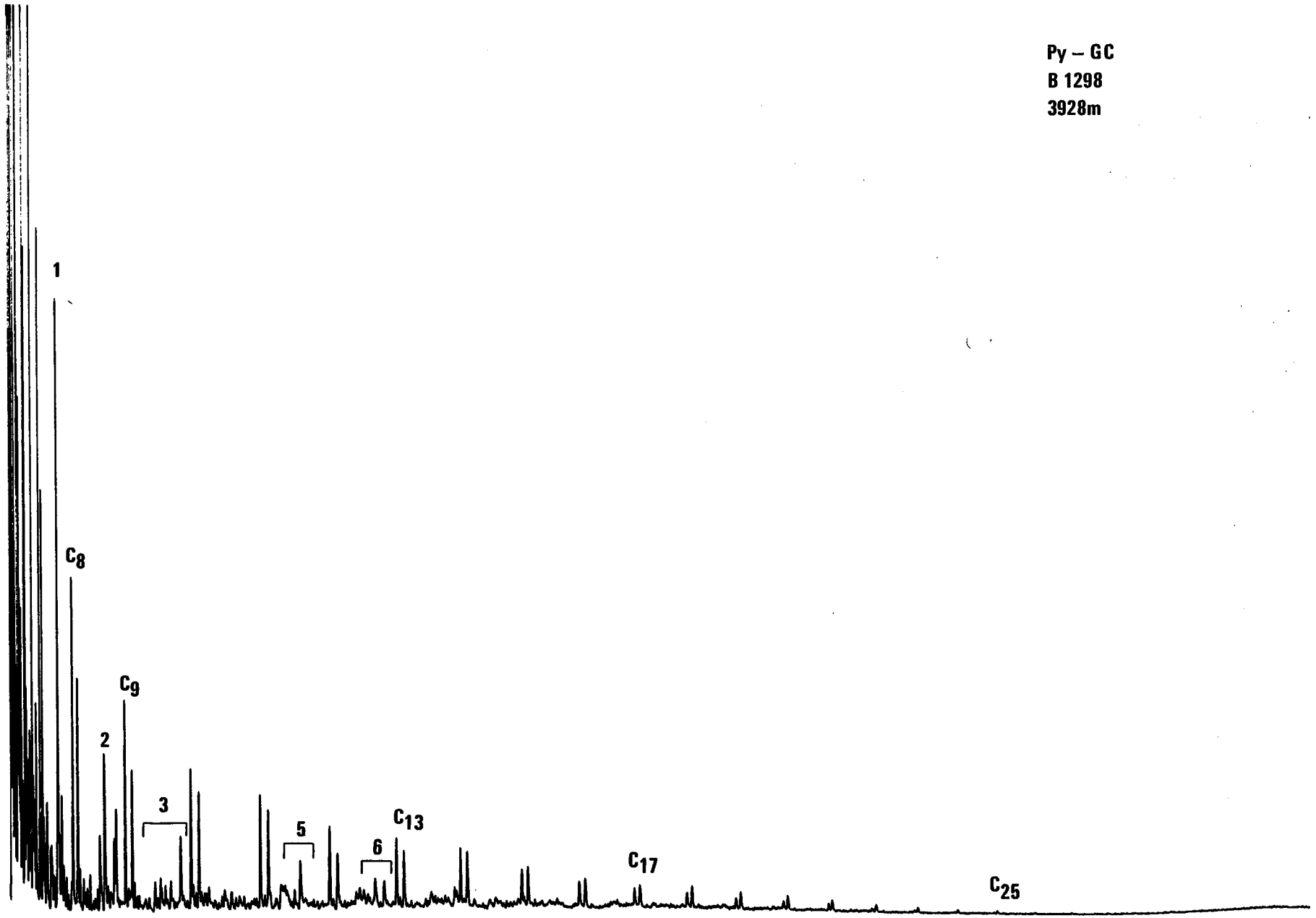

1
Py – GC
B 1264
3230m
C8
2
C9
3
5
C13
6
C17
C20

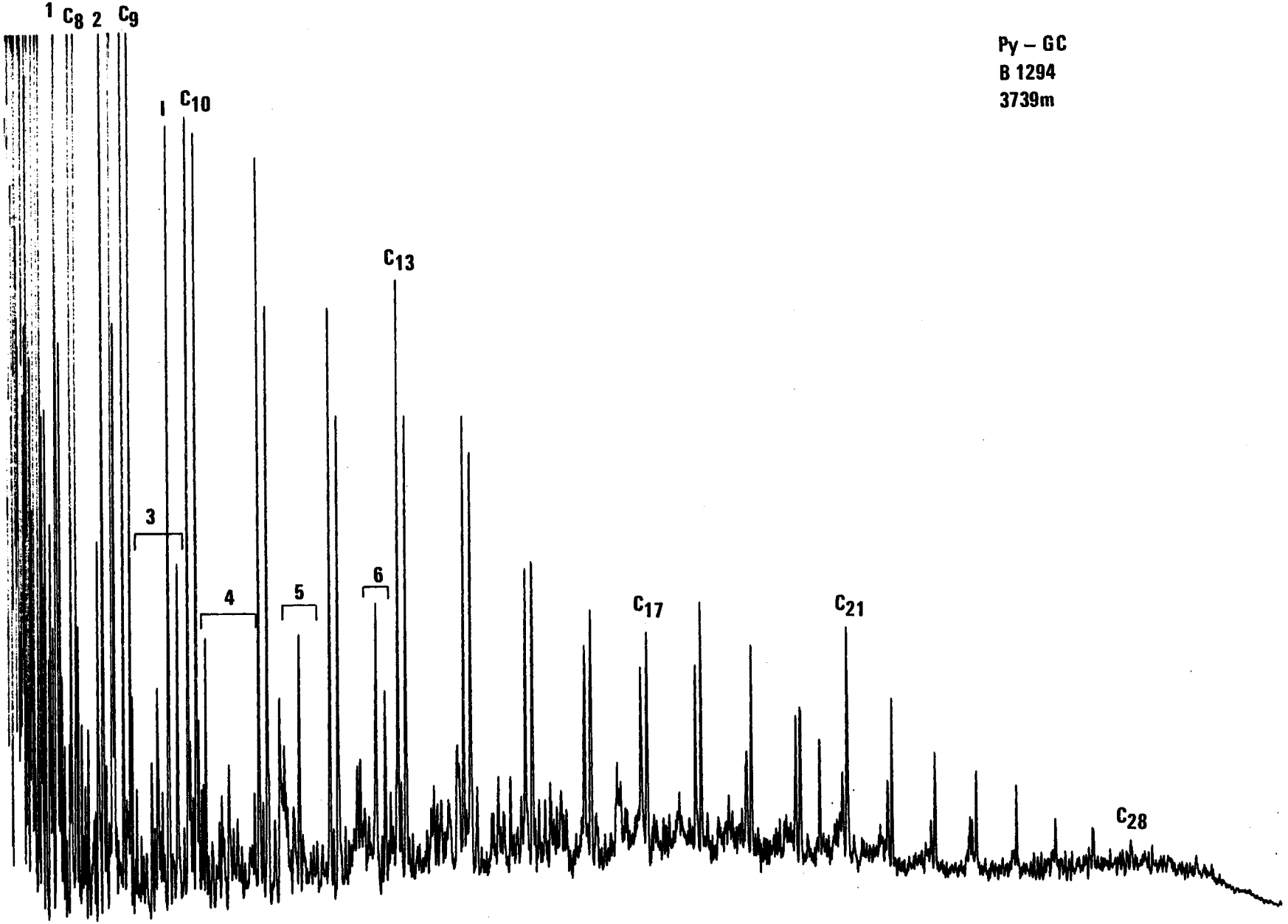

Py – GC
B 1420
3240m
1
2
C8
C9
C10

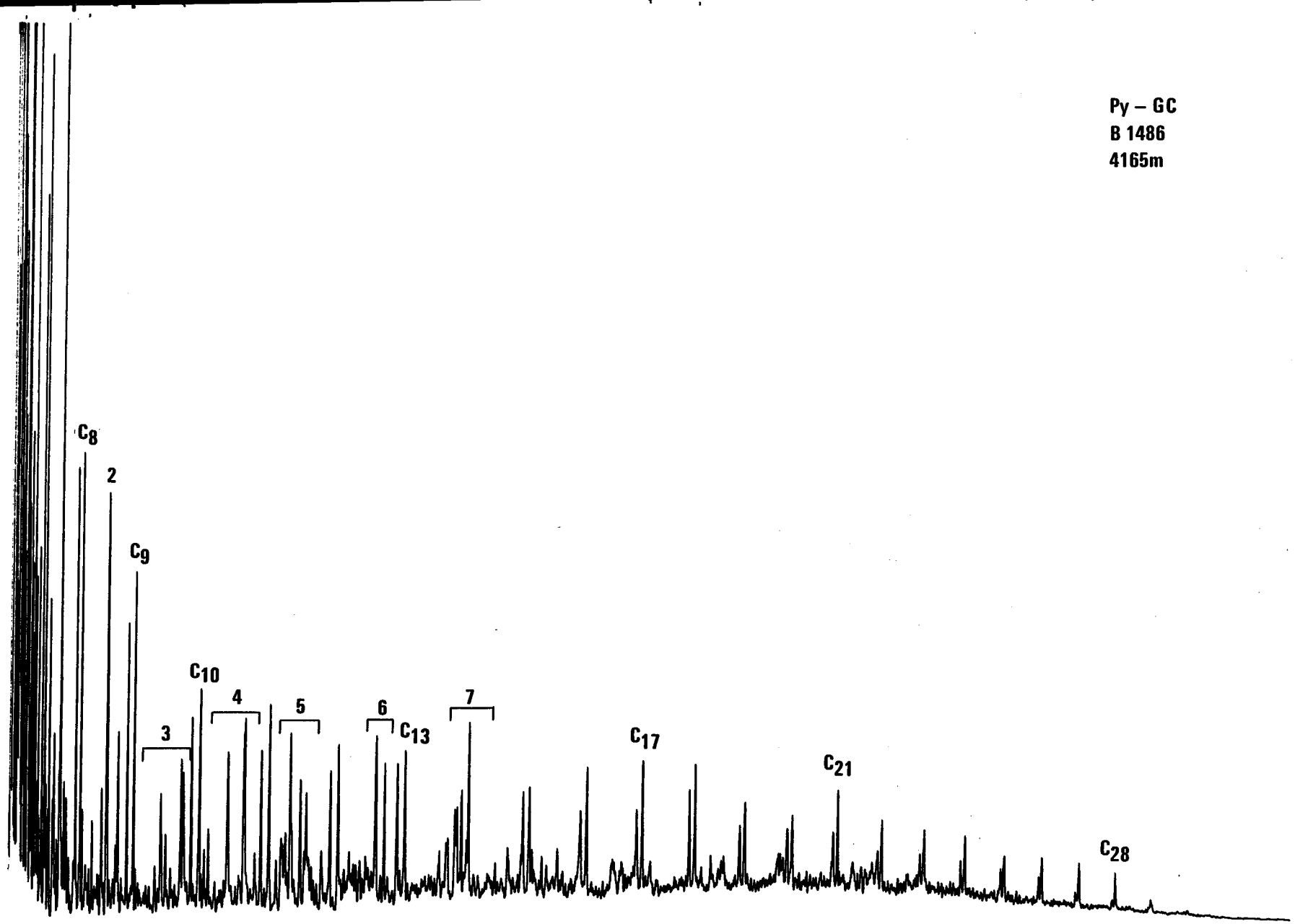

1
C_8
2
C_9
C_{10}
3
C_{13}
6
C_{17}
4
5
C_{21}
C_{25}
C_{29}
Py – GC
B 1266
3424m

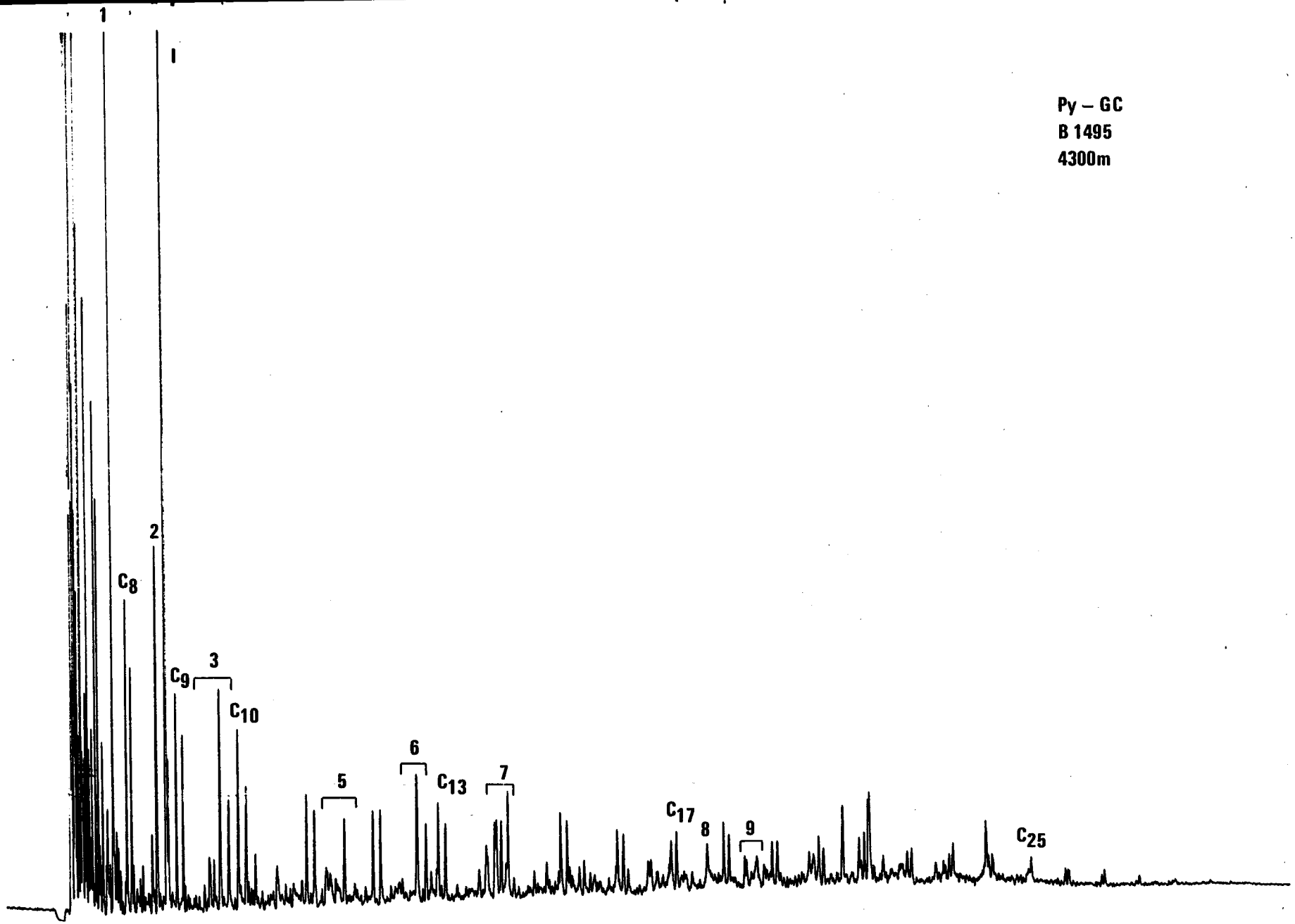

Py – GC
B 1279
3526m
1
1
C8
C9
2
C10
3
C13
6
C17
C21

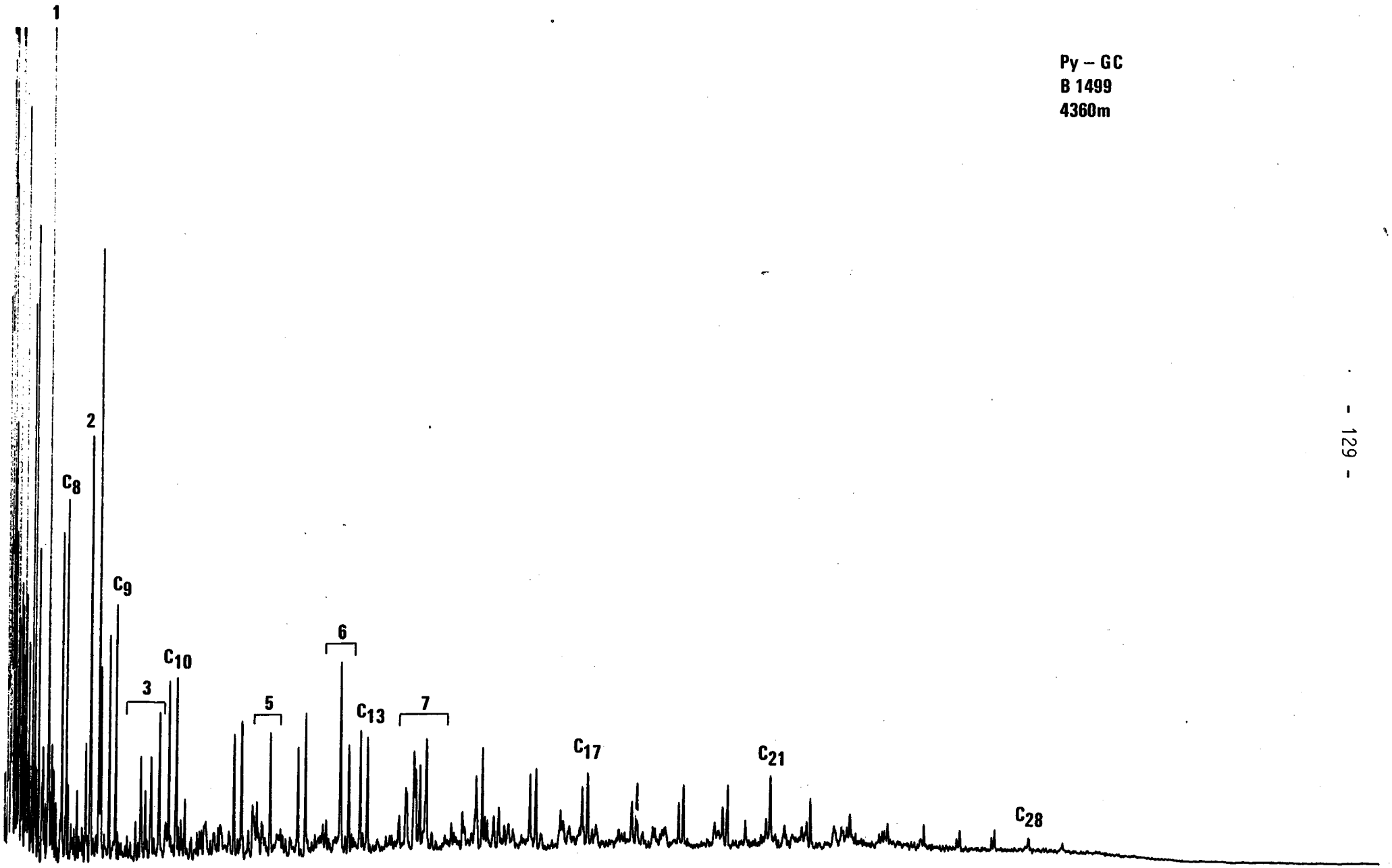

1 C8
C9
2
C10
3
C13
4
5
6
C17
C21
C25
Py – GC
B 1281
3530m


Py – GC
B 1298
3928m
1
C8
C9
2
3
5
6
C13
C17
C25


1
C_8
2
C_9
I
C_{10}
C_{13}
3
4
5
6
C_{17}
C_{21}
C_{28}
Py – GC
B 1294
3739m


Py – GC
B 1486
4165m
C8
2
C9
C10
3
4
5
6
C13
7
C17
C21
C28


1
I
Py – GC
B 1495
4300m
2
C8
C9
3
C10
5
6
C13
7
C17
8
9
C25


Py – GC
B 1499
4360m
1
2
C_8
C_9
C_{10}
3
5
6
C_{13}
7
C_{17}
C_{21}
C_{28}

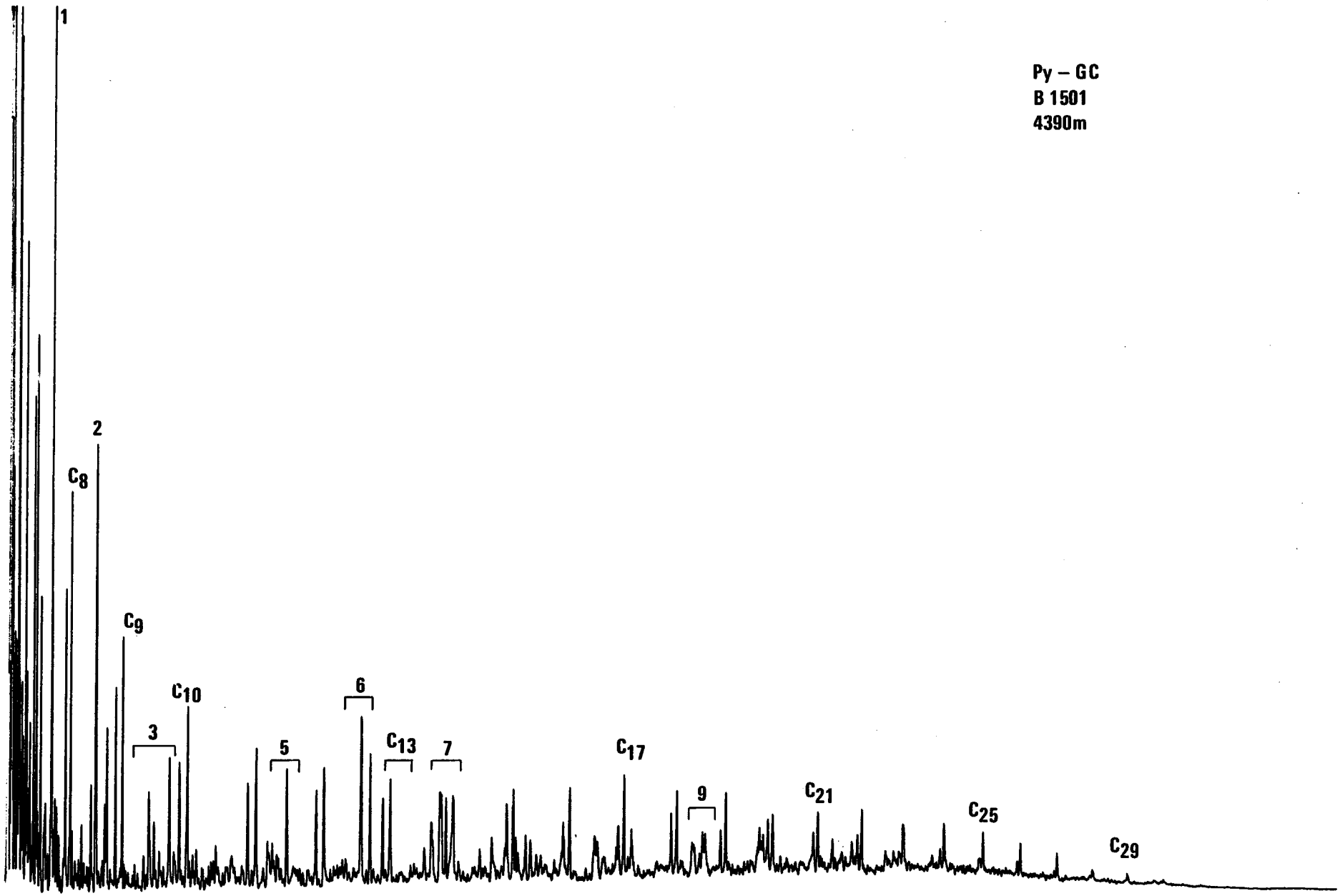

Py – GC
B 1501
4390m
1
2
C8
C9
C10
3
5
6
C13
7
C17
9
C21
C25
C29

FIGURE 4

VITRINITE REFLECTANCE HISTOGRAMS

Key:- A = Grey-black-brown claystone. Lower case letter is used when there is some uncertainty about whether the value is representative.

PP = Primary population

Y = Relevant population considered reasonably representative.

N = Not representative (caving, reworked, contaminant, drilling effects).

LOW+ HIGH = Population limits

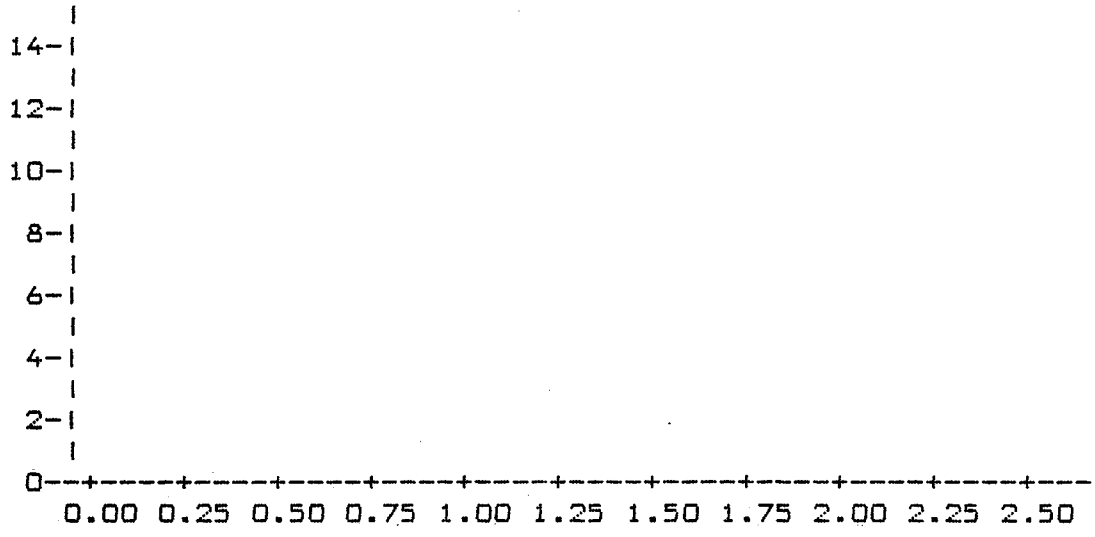
#VAL. = Number of measurements in that population.

Lithology cross-reference table

A = Clst. gy
B = Clst. dk gy
C = Clst. gn
D = Clst. bn
E = Clst. rd
F = Clst. calc.
G = Clst. carb.
H = Shale
I = Sandstone
J = Limestone
K = Coal
L = Lignite
M = Carbargillite
N = Siltstone
O = Bitumen
P = X

a,b etc. = same lithology as above but value not included in any population, possibly because suspected caving, reworking, contamination or other erroneous recordings.

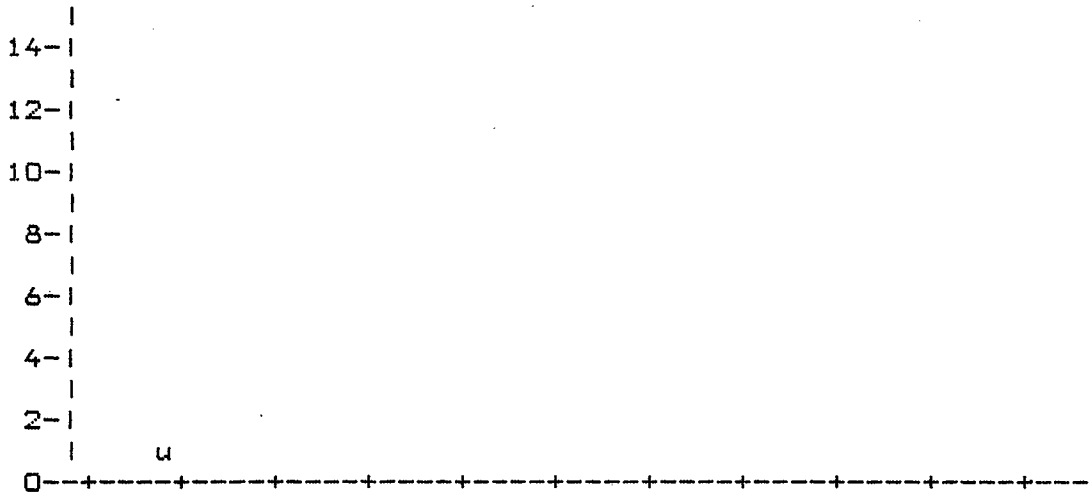
IKU# B 1305 500.0M 6407/1-3



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
			OVERALL	0	0.00	0.00

ORDERED VALUES FOLLOW:

IKU# B 1313 900.0M 6407/1-3

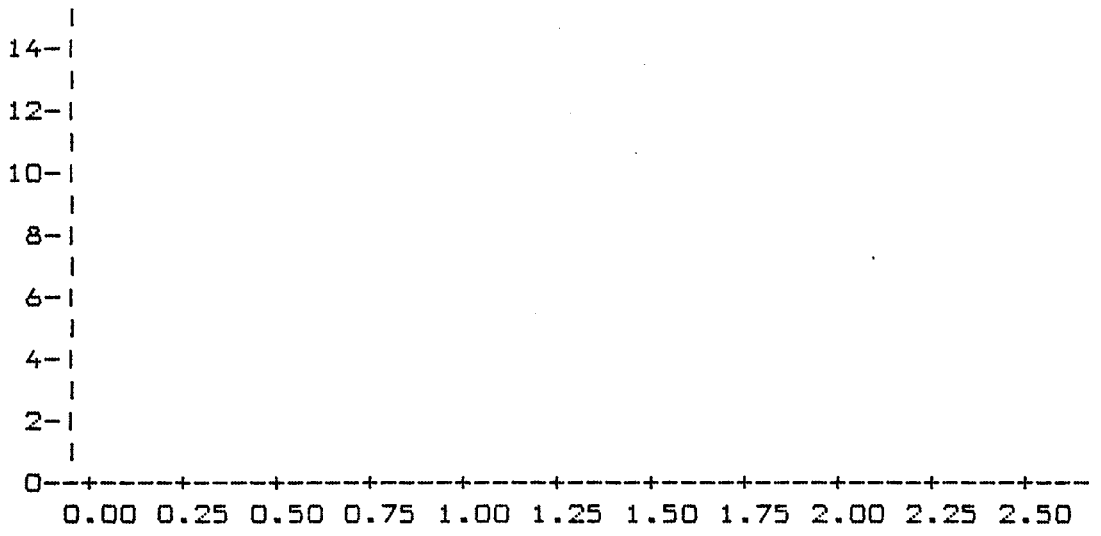


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
		OVERALL		1	0.21	0.00

ORDERED VALUES FOLLOW:

0.21u

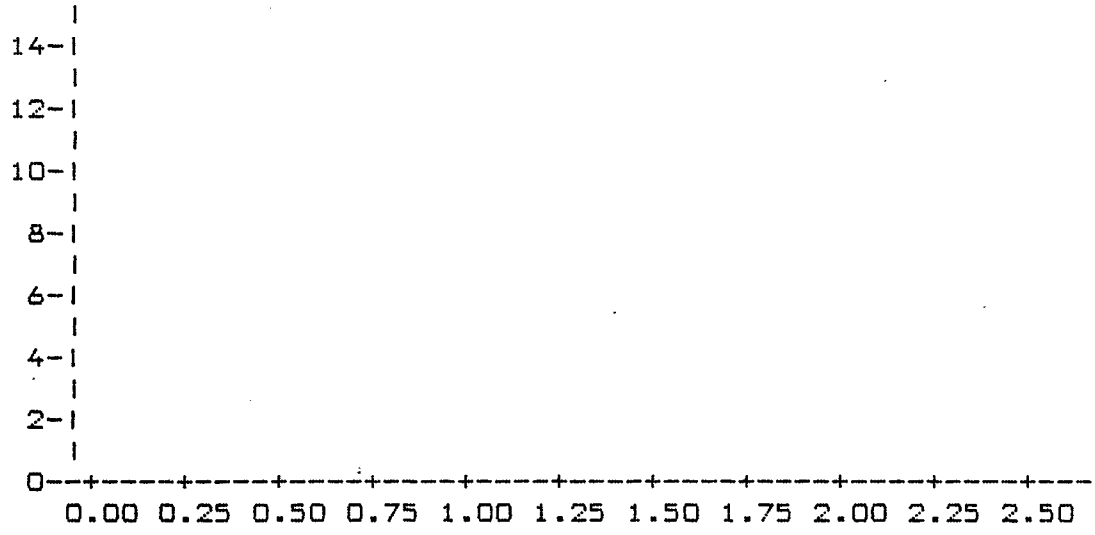
IKU# B 1320 1200.0M 6407/1-2



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
			OVERALL	0	0.00	0.00

ORDERED VALUES FOLLOW:

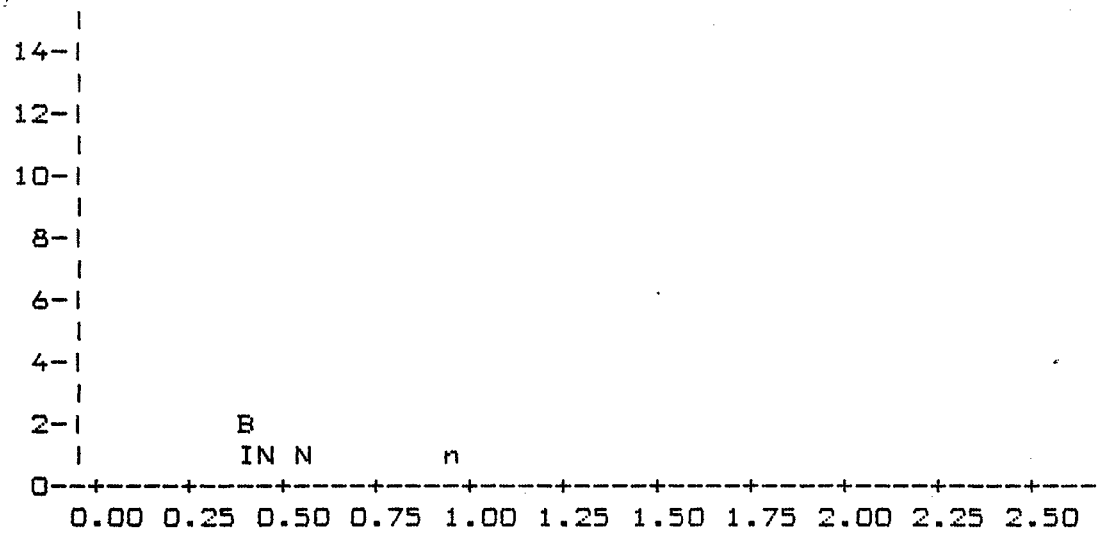
IKU# B 1330 1600.0M 6407/1-3



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
		OVERALL		0	0.00	0.00

ORDERED VALUES FOLLOW:

IKU# B 1342 1960.0M 6407/1-3

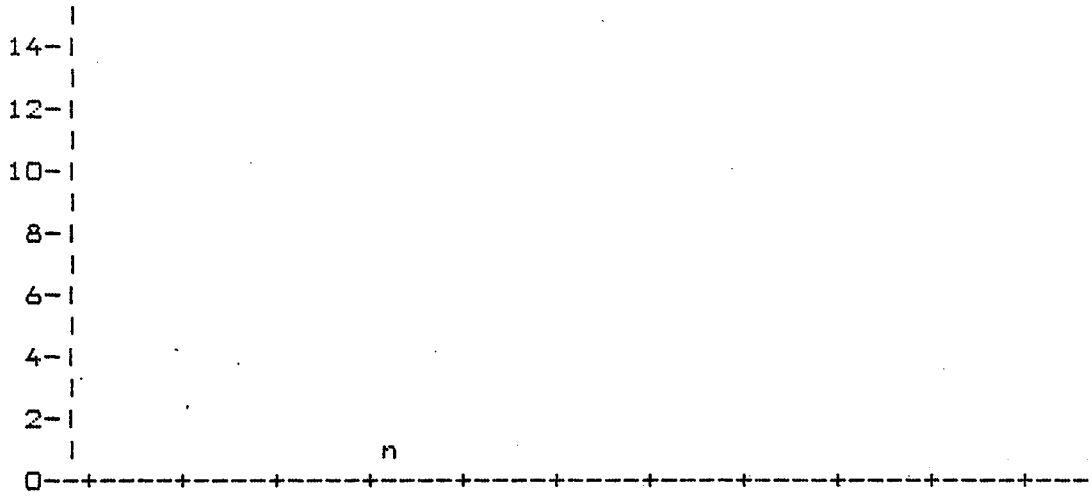


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.41	0.56	ALL	4	0.47	0.06
			OVERALL	5	0.57	0.23

ORDERED VALUES FOLLOW:

0.41B 0.43I 0.48N 0.55N 0.96n

IKU# B 1348 2140.0M 6407/1-3

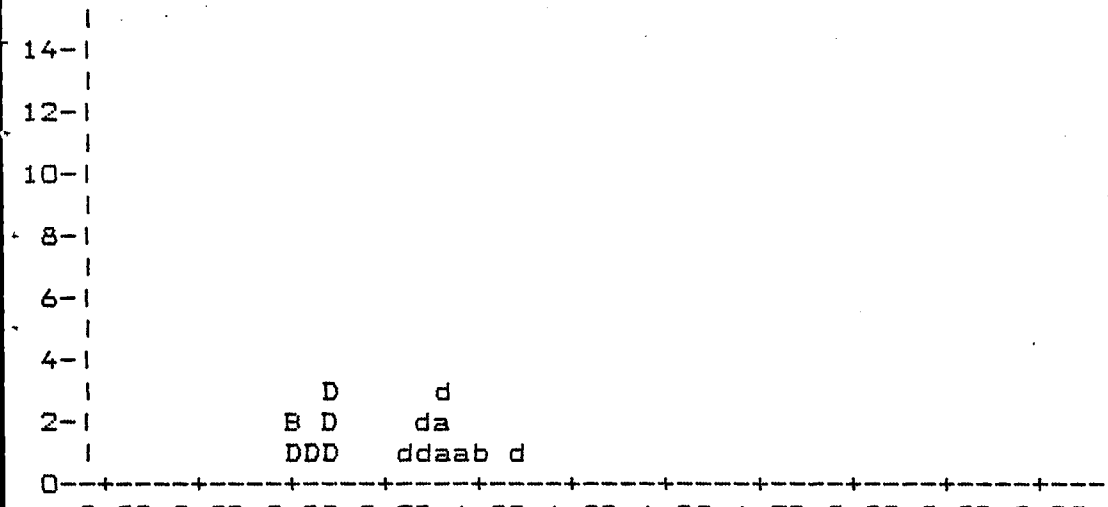


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
		OVERALL		1	0.80	0.00

ORDERED VALUES FOLLOW:

0.80n

IKU# B 1359 2330.0M 6407/1-3

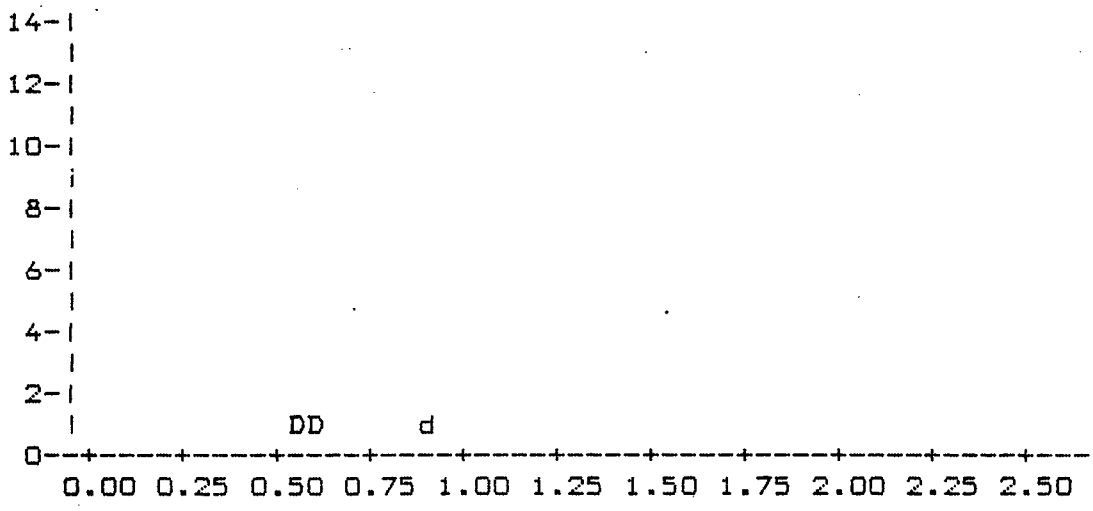


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.52	0.63	ALL	6	0.58	0.04
			OVERALL	15	0.79	0.19

ORDERED VALUES FOLLOW:

0.52D 0.54B 0.59D 0.60D 0.60D 0.62D 0.81d 0.87d 0.88d 0.91d 0.93a 0.94a 0.95a
1.04b 1.10d

IKU# B 1252 2333.0M 6407/1-3

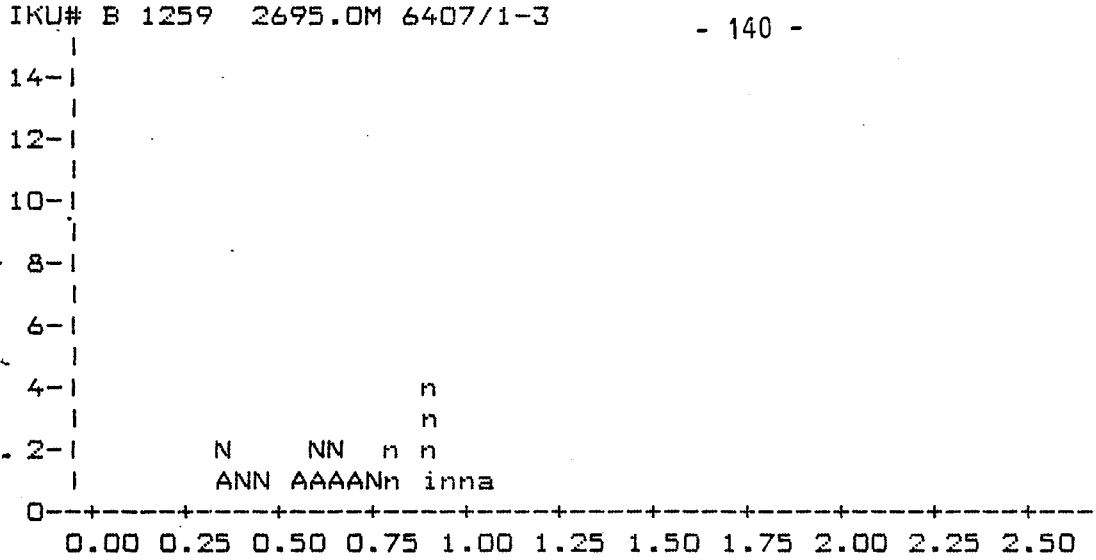


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.56	0.63	ALL	2	0.59	0.04
			OVERALL	3	0.70	0.20

ORDERED VALUES FOLLOW:

0.56D 0.62D 0.93d

IKU# B 1259 2695.0M 6407/1-3

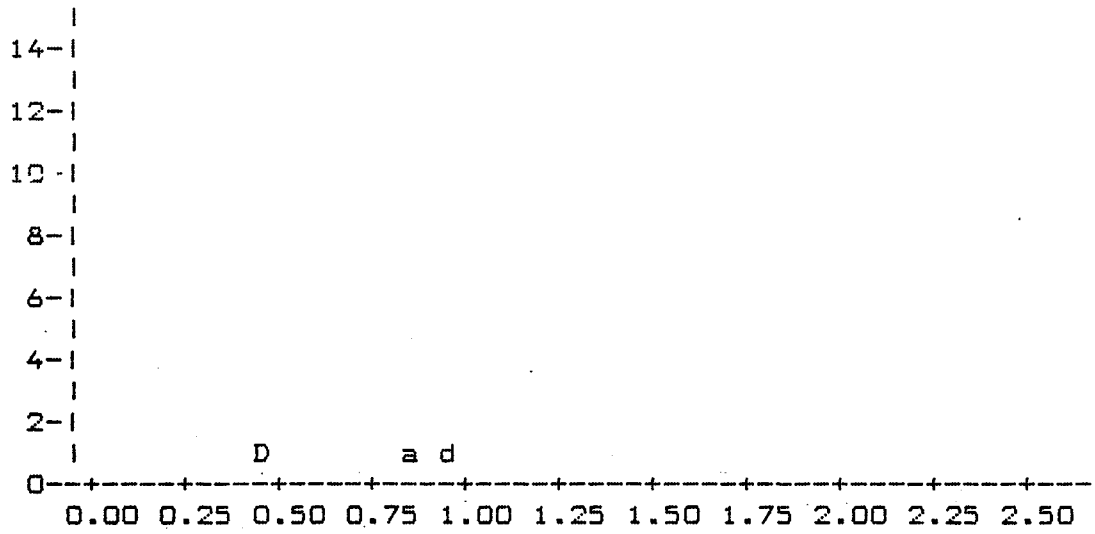


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.38	0.76	ALL	11	0.57	0.13
			OVERALL	20	0.73	0.22

ORDERED VALUES FOLLOW:

0.38A 0.39N 0.42N 0.46N 0.56A 0.63A 0.63N 0.66A 0.69N 0.70A 0.75N 0.83n 0.84n
0.90n 0.90n 0.92i 0.94n 0.95n 1.03n 1.08a

IKU# B 1388 2765.0M 6407/1-3

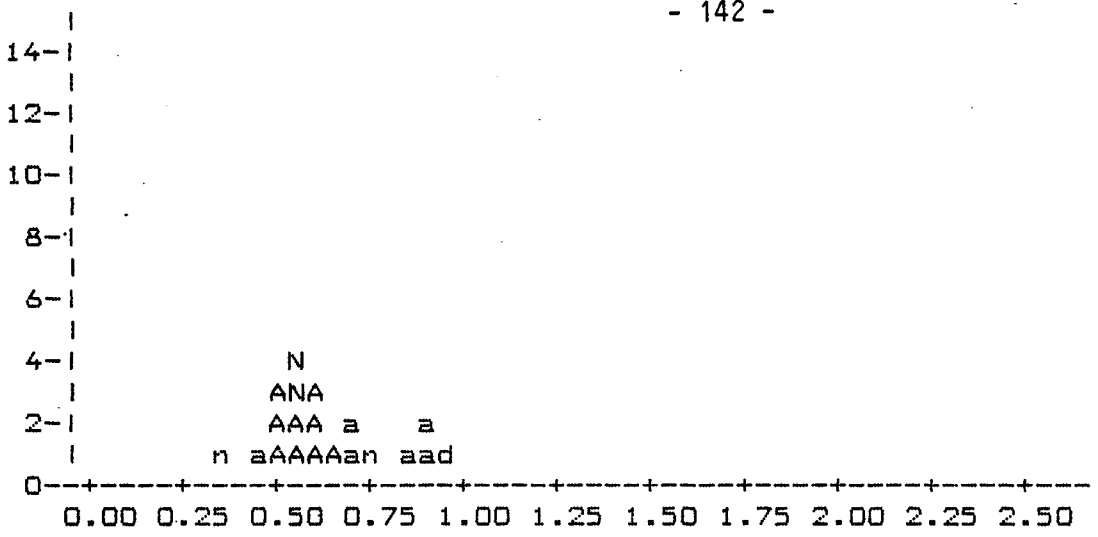


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.47	0.48	ALL	1	0.47	0.00
			OVERALL	3	0.76	0.26

ORDERED VALUES FOLLOW:

0.47D 0.86a 0.96d

IKU# B 1260 2870.0M 6407/1-3

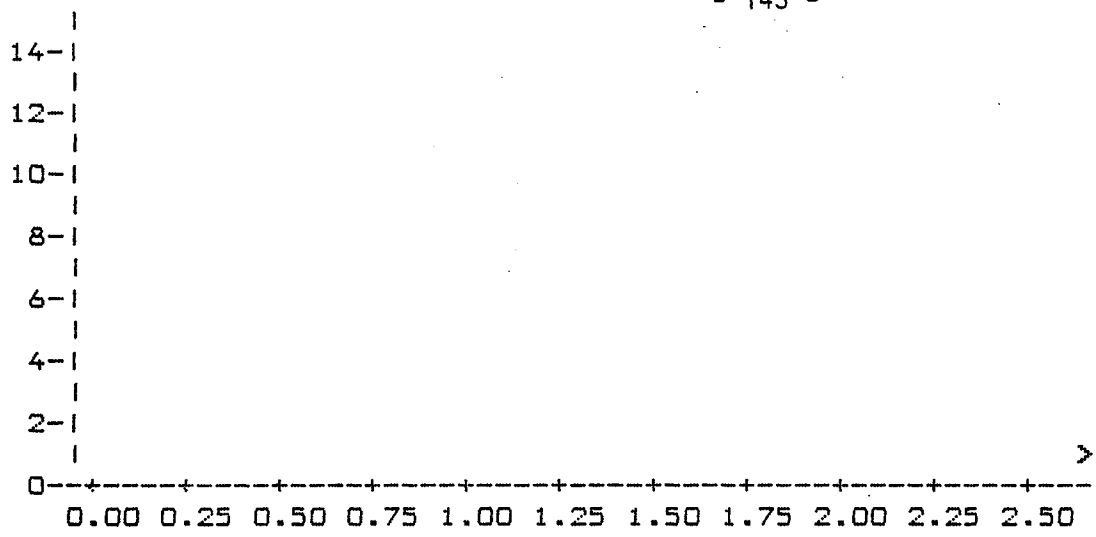


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.50	0.70	ALL	11	0.58	0.06
			OVERALL	20	0.65	0.17

ORDERED VALUES FOLLOW:

0.35n 0.45a 0.50A 0.50A 0.51A 0.55N 0.56A 0.56N 0.59A 0.61A 0.62A 0.64A 0.69A
0.70a 0.74a 0.75n 0.88a 0.91a 0.94a 0.99d

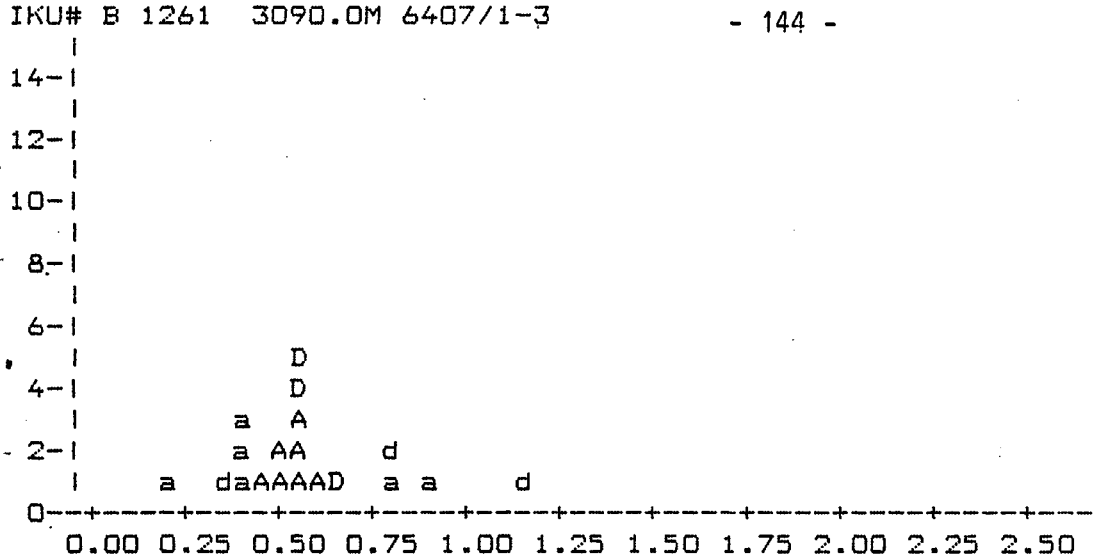
IKU# B 1408 3065.0M 6407/1-3



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
		OVERALL		1	3.65	0.00

ORDERED VALUES FOLLOW:

3.65u

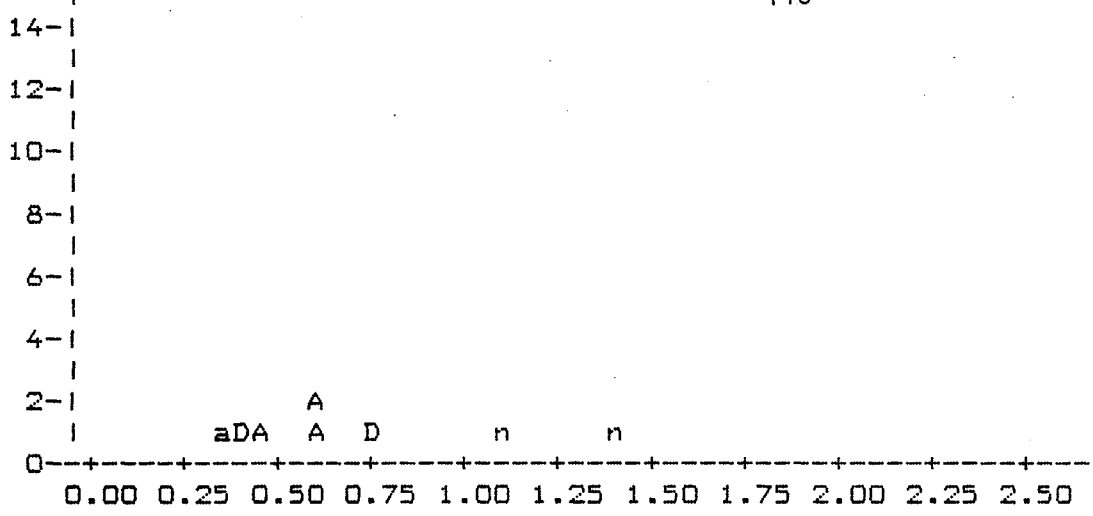


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.48	0.67	ALL	10	0.56	0.05
			OVERALL	19	0.59	0.22

ORDERED VALUES FOLLOW:

0.23a 0.36d 0.40a 0.42a 0.42a 0.48A 0.51A 0.54A 0.56A 0.56A 0.56D 0.58D 0.59A
0.60A 0.66D 0.80a 0.83d 0.92a 1.18d

IKU# B 1264 3230.0M 6407/1-3

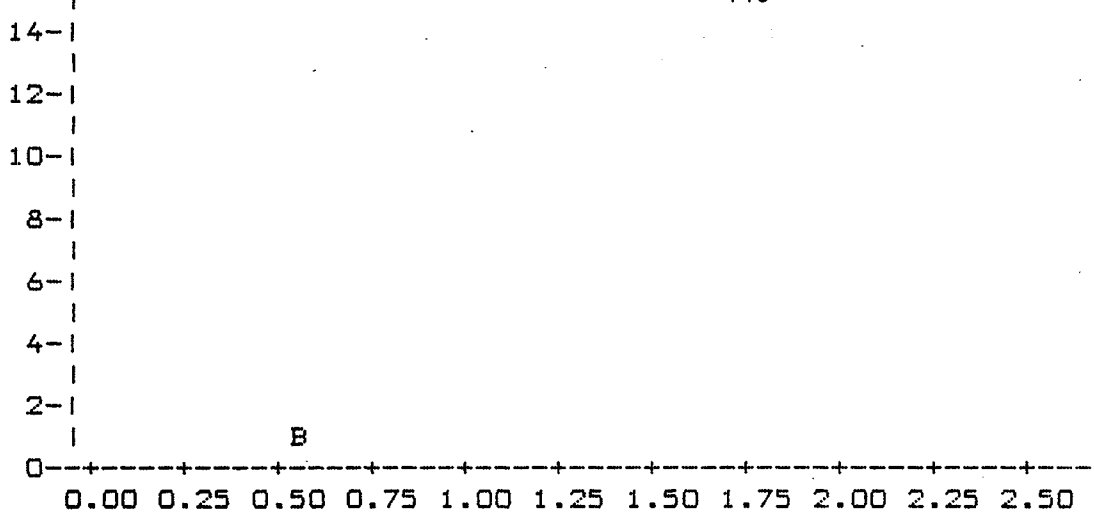


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.43	0.76	ALL	5	0.57	0.13
			OVERALL	8	0.72	0.37

ORDERED VALUES FOLLOW:

0.38a 0.43D 0.45A 0.60A 0.64A 0.75D 1.14n 1.40n

IKU# B 1420 3240.0M 6407/1-3

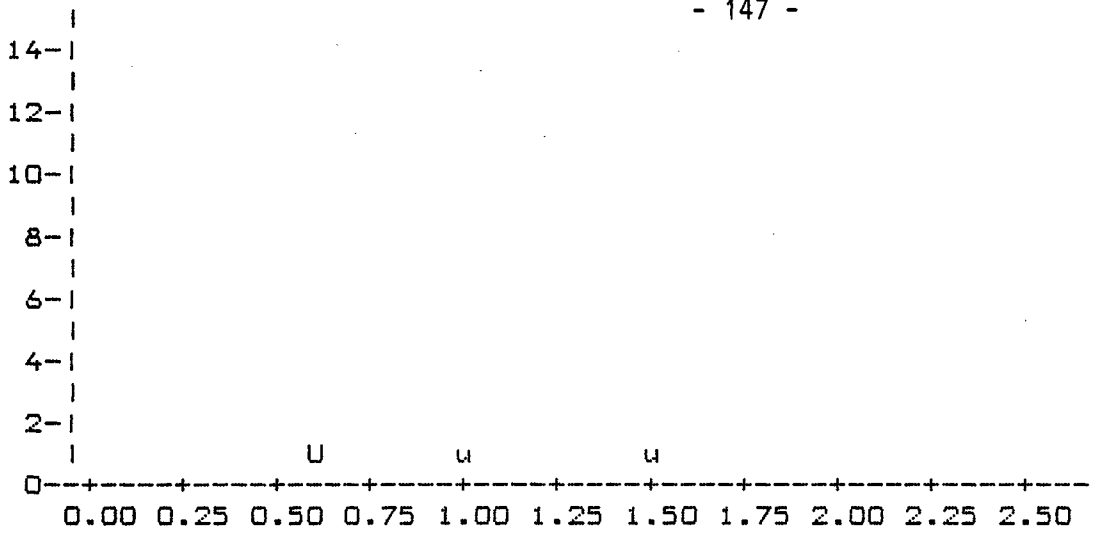


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.56	0.57	ALL	1	0.56	0.00
			OVERALL	1	0.56	0.00

ORDERED VALUES FOLLOW:

0.56B

IKU# B 1424 3305.0M 6407/1-3

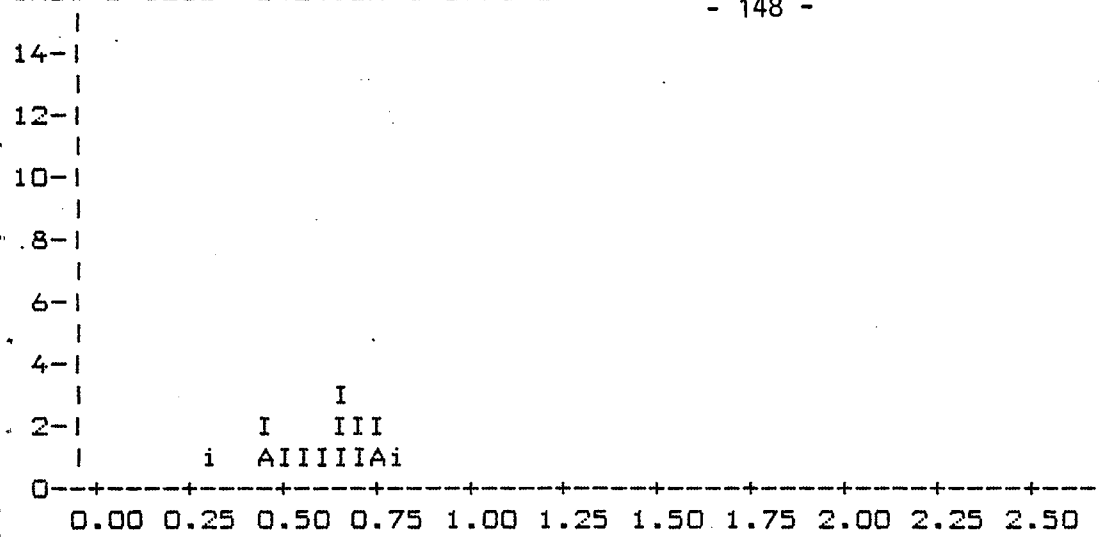


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.61	0.62	ALL	1	0.61	0.00
			OVERALL	3	1.05	0.45

ORDERED VALUES FOLLOW:

0.61U 1.03u 1.51u

IKU# B 1266 3424.0M 6407/1-3

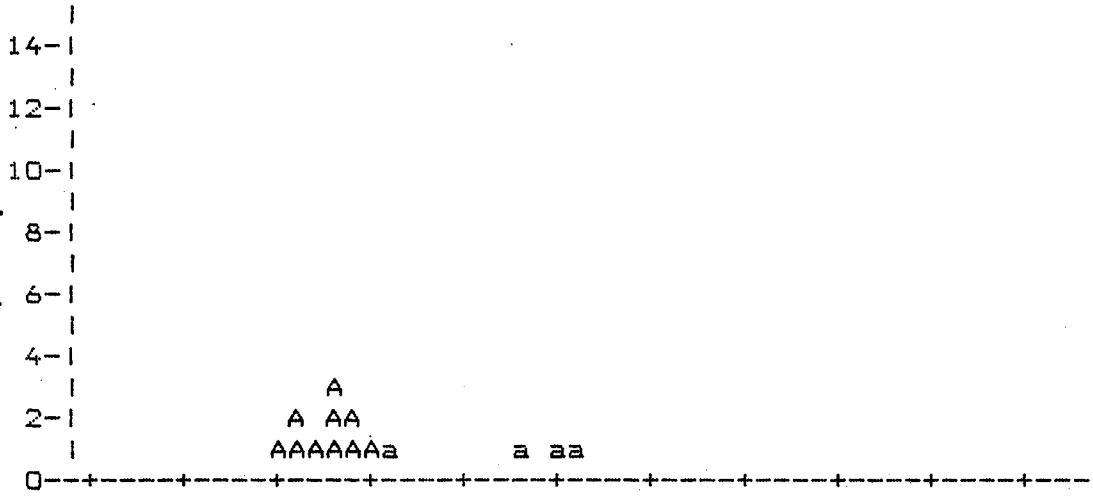


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.45	0.76	ALL	12	0.64	0.10
			OVERALL	14	0.63	0.14

ORDERED VALUES FOLLOW:

0.33i 0.45I 0.46A 0.54I 0.59I 0.64I 0.68I 0.68I 0.69I 0.70I 0.72I 0.75I 0.75A
0.80i

IKU# B 1267 3462.0M 6407/1-3

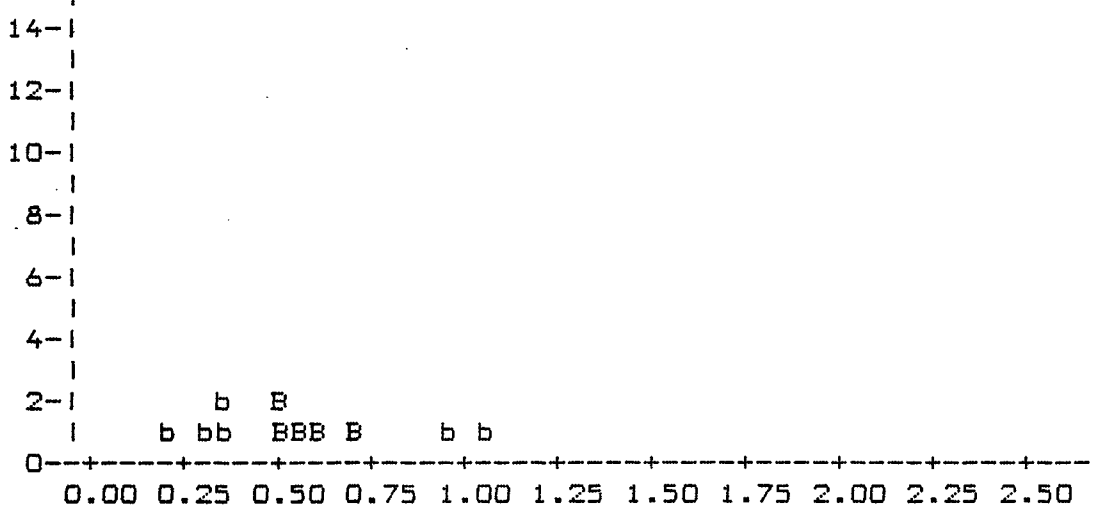


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.51	0.84	ALL	10	0.65	0.09
			OVERALL	14	0.79	0.27

ORDERED VALUES FOLLOW:

0.51A 0.55A 0.56A 0.62A 0.65A 0.66A 0.69A 0.70A 0.73A 0.79A 0.84a 1.16a 1.25a 1.34a

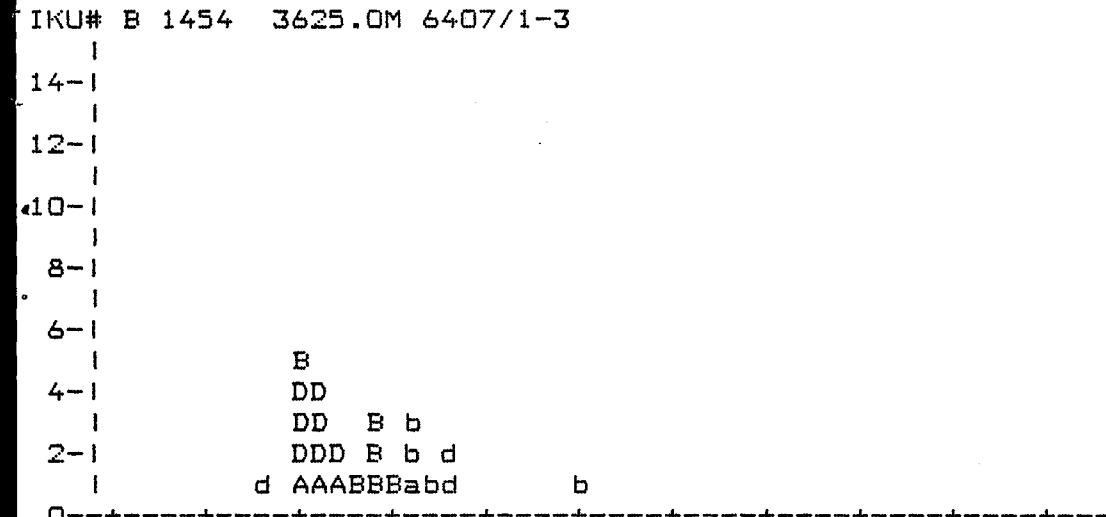
IKU# B 1284 3540.0M 6407/1-3



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.50	0.72	ALL	5	0.59	0.08
			OVERALL	11	0.57	0.26

ORDERED VALUES FOLLOW:

0.22b 0.34b 0.35b 0.38b 0.50B 0.52B 0.58B 0.62B 0.71B 0.95b 1.07b

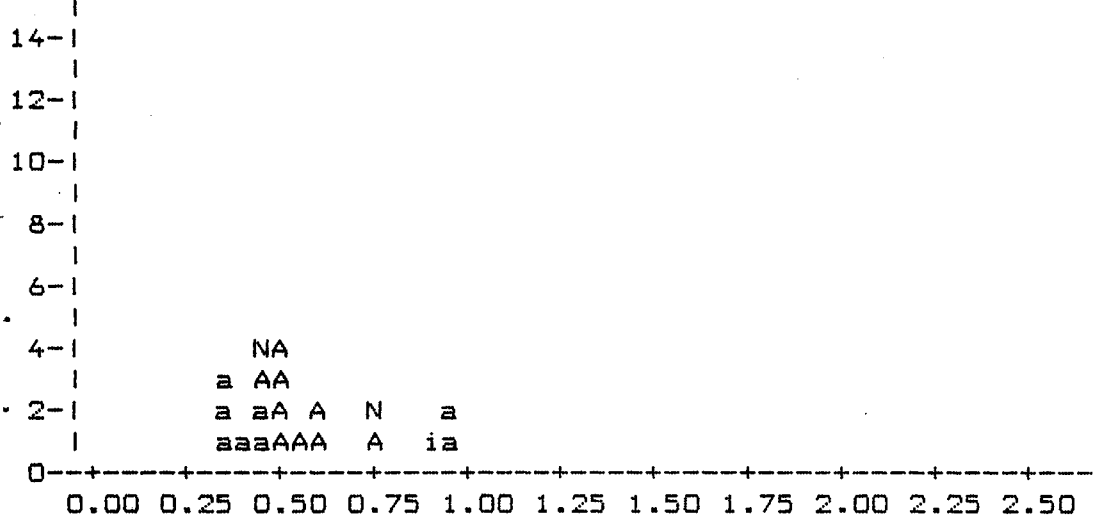


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.50	0.76	ALL	16	0.60	0.09
			OVERALL	24	0.69	0.19

ORDERED VALUES FOLLOW:

0.40d 0.50D 0.51B 0.51D 0.52A 0.53D 0.56D 0.57D 0.57D 0.58A 0.61D 0.61A 0.66B
0.71B 0.71B 0.73B 0.75B 0.81b 0.82b 0.84a 0.86b 0.90d 0.90d 1.28b

IKU# B 1293 3733.0M 6407/1-3

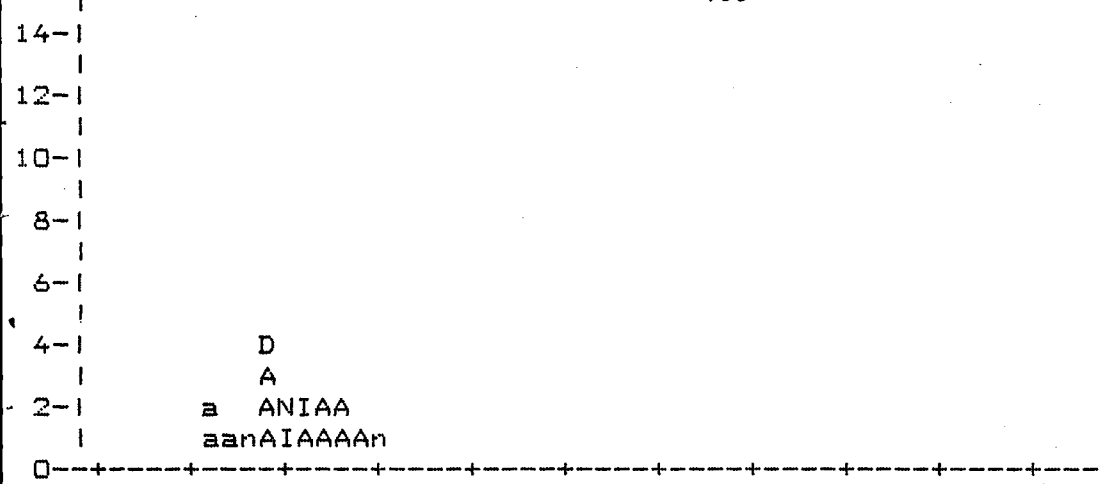


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.48	0.80	ALL	11	0.59	0.11
			OVERALL	20	0.59	0.20

ORDERED VALUES FOLLOW:

0.36a 0.37a 0.38a 0.43a 0.46a 0.46a 0.48N 0.49A 0.50A 0.51A 0.54A 0.54A 0.57A
0.62A 0.63A 0.78N 0.79A 0.90i 0.98a 0.99a

IKU# B 1470 3925.0M 6407/1-3

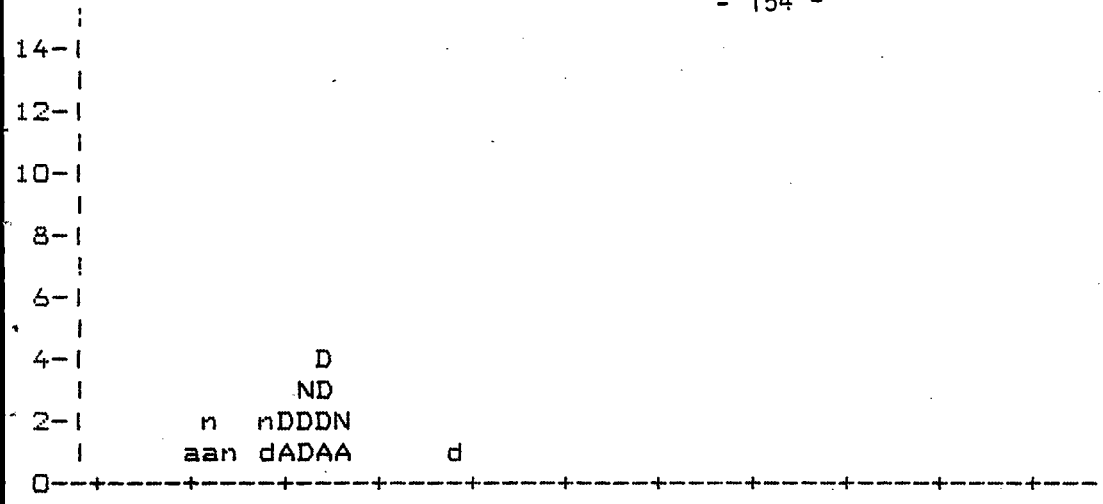


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.45	0.76	ALL	13	0.56	0.09
			OVERALL	18	0.53	0.13

ORDERED VALUES FOLLOW:

0.33a 0.33a 0.38a 0.40n 0.45A 0.46A 0.47A 0.49D 0.50N 0.53I 0.56I 0.58A 0.60A
0.61A 0.65A 0.69A 0.71A 0.76n

IKU# B 1303 4047.0M 6407/1-3

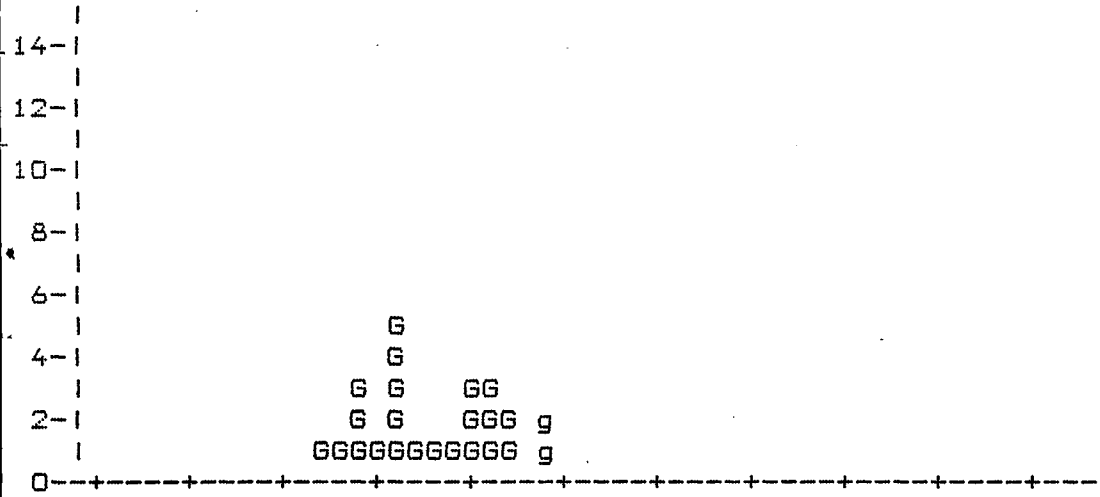


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.52	0.68	ALL	11	0.59	0.05
			OVERALL	18	0.54	0.16

ORDERED VALUES FOLLOW:

0.29a 0.32a 0.34n 0.39n 0.47n 0.49d 0.52A 0.54D 0.56D 0.56N 0.56D 0.60D 0.60D
0.62A 0.64D 0.65A 0.67N 0.97d

IKU# B 1495 4300.0M 6407/1-3

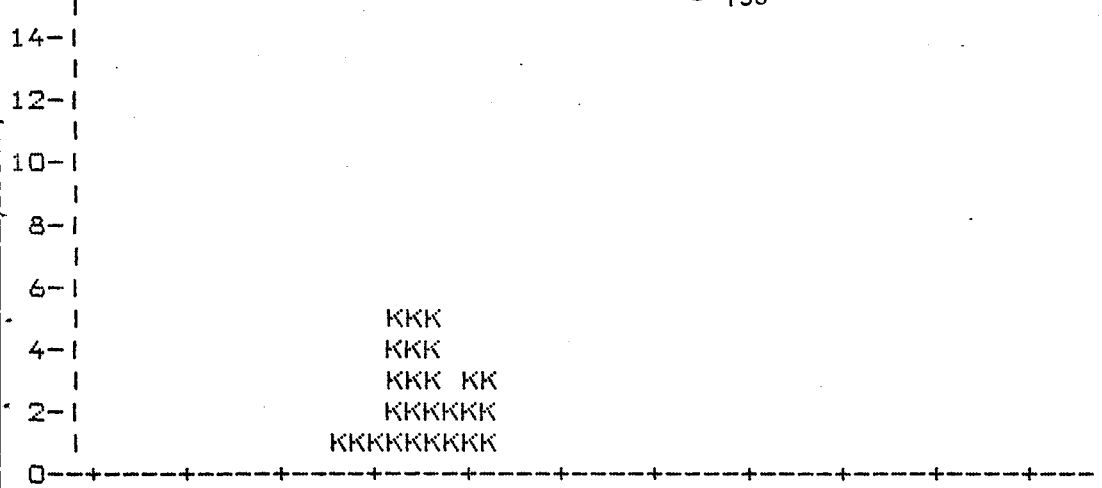


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.64	1.12	ALL	22	0.89	0.15
			OVERALL	24	0.91	0.17

ORDERED VALUES FOLLOW:

0.64G 0.66G 0.70G 0.72G 0.74G 0.76G 0.80G 0.82G 0.82G 0.83G 0.84G 0.87G 0.93G
0.97G 1.00G 1.01G 1.01G 1.05G 1.05G 1.05G 1.10G 1.11G 1.21g 1.22g

IKU# B 1499 4360.0M 6407/1-3

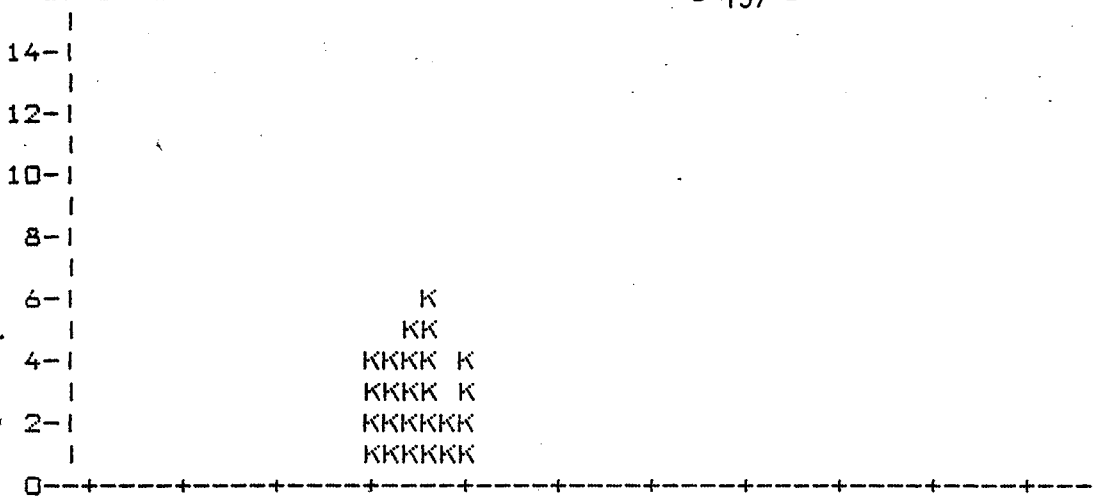


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.68	1.07	ALL	26	0.90	0.10
			OVERALL	26	0.90	0.10

ORDERED VALUES FOLLOW:

0.68K 0.73K 0.77K 0.80K 0.81K 0.81K 0.82K 0.83K 0.85K 0.86K 0.87K 0.89K 0.89K
0.91K 0.92K 0.92K 0.93K 0.93K 0.95K 0.97K 1.00K 1.01K 1.04K 1.05K 1.05K 1.06K

IKU# B 1504 4435.0M 6407/1-3

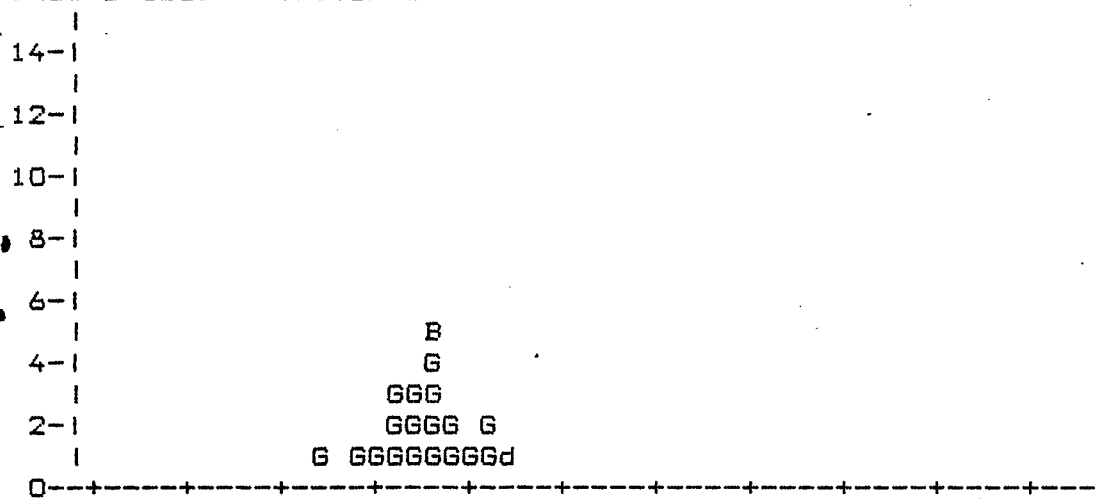


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.76	1.04	ALL	25	0.89	0.08
			OVERALL	25	0.89	0.08

ORDERED VALUES FOLLOW:

0.76K 0.77K 0.78K 0.79K 0.82K 0.83K 0.84K 0.84K 0.85K 0.85K 0.86K 0.89K 0.89K
0.91K 0.91K 0.92K 0.93K 0.93K 0.94K 0.97K 0.99K 1.00K 1.01K 1.03K 1.03K

IKU# B 1506 4465.0M 6407/1-3



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.62	1.10	ALL	19	0.89	0.11
			OVERALL	20	0.90	0.12

ORDERED VALUES FOLLOW:

0.62G 0.72G 0.75G 0.80G 0.83G 0.84G 0.86G 0.86G 0.89G 0.91G 0.91G 0.92B 0.92G
0.93G 0.95G 0.97G 1.01G 1.05G 1.09G 1.10d

Organic Geochemistry Department

C_{15}^{+} SATURATED HYDROCARBONS

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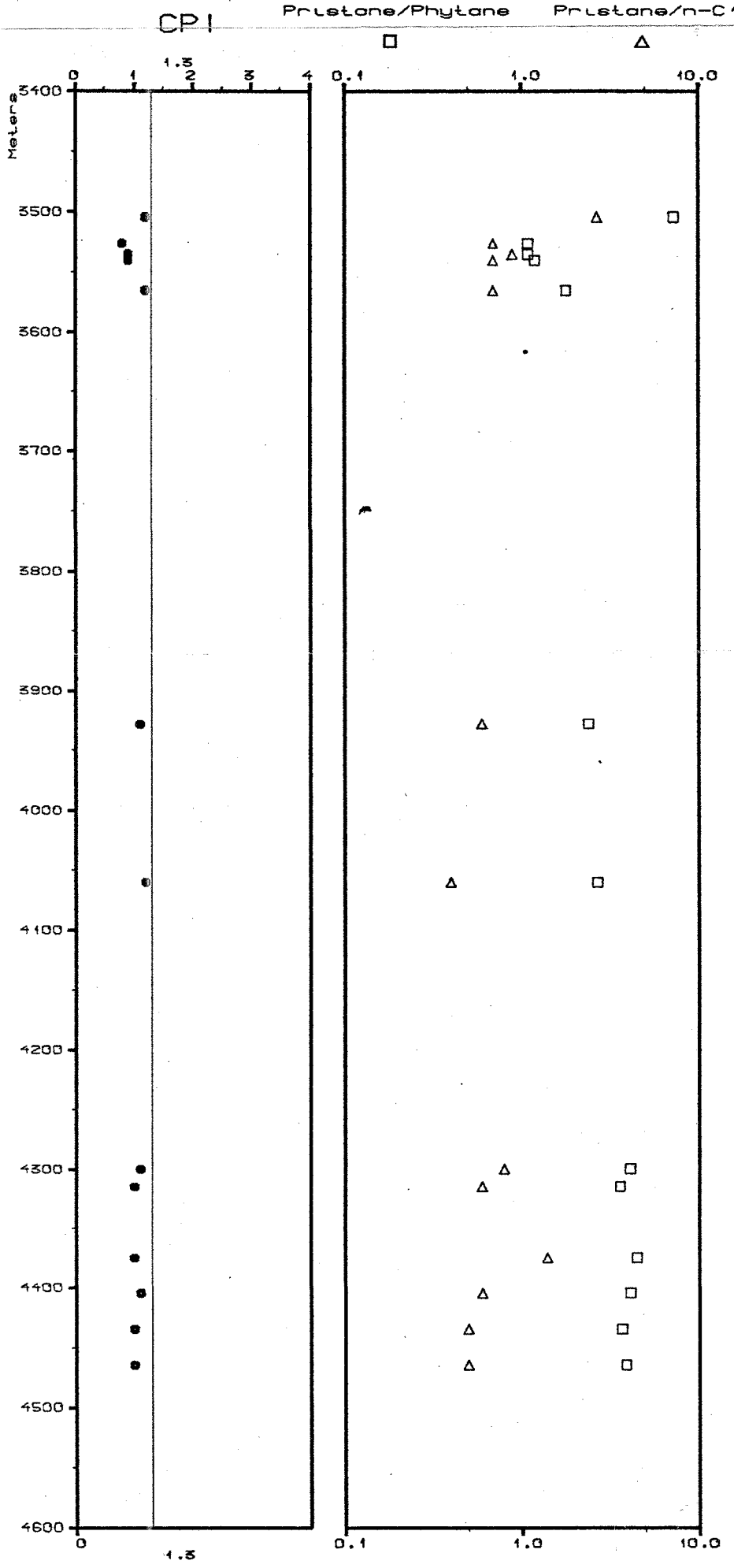

Organic Geochemistry Department

C_{15}^{+} HYDROCARBONS

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