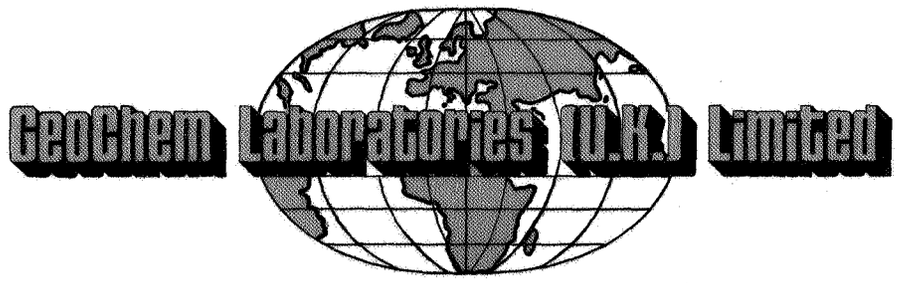

GEOCHEMICAL SERVICE REPORT

Prepared for

STATOIL

GEOCHEMICAL EVALUATION OF STATOIL'S 7120/7-1 WELL,
TROMS CONCESSION, OFFSHORE NORWAY

January 1983

CHESTER STREET · CHESTER CH4 8RD · ENGLAND

BA - 83-2166

725.3

GEOCHEMICAL EVALUATION OF STATOIL'S 7120/7-1 WELL, TROMS CONCESSION, OFFSHORE NORWAY

SUMMARY

The Tertiary (320-980 metres) and Cretaceous mudstones and shales, down to 1920± metres (Campanian - Late Barremian), are poor immature source rocks which, in general, have a minimal potential for gas and minor associated liquids. A modest improvement is apparent in the Barremian-Hauterivian shales at 1920-2250± metres. They change from poor to fair to fair with good interbeds at 2130± metres and have a potential for gas and light oil.

Dark brownish grey and dark grey shales within the Upper Jurassic (2250-2415± metres) have an excellent potential for light-medium gravity crude oil. Minor hydrocarbon generation is occurring on-structure but significant generation will commence below 3000± metres in their down dip lateral equivalents. In the mature state these shales would make associated reservoirs highly prospective for gas and oil - the top of the oil window cannot, however, be predicted from available data.

Shales occurring within the Lower Jurassic and Triassic sandstones at 2495-2840± metres are commonly fair to good, with scattered very good interbeds, source rocks. They have a potential for gas and light oil but due to their marginal maturity only minor hydrocarbon generation is taking place on-structure.

Scattered kicks of dry gas were detected in the Tertiary (320-980± metres). Apart from a fairly strong show at 1785-1920± metres only significant traces of moderately wet gas were observed in the Cretaceous sediments. Strong shows of wet gas/condensate occur throughout the Upper Jurassic (2250-2415± metres) and shows of somewhat drier gas are present in the underlying sequence of sandstones and shales. A show of waxy oil was detected at 2510-2525± metres. Migrated hydrocarbons associated with the Cretaceous and Jurassic sediments are believed to be the result of generation in more mature equivalents of the host sediments down dip. The strength of the show at 1785-1920± metres suggests an improvement in source richness as well. A unique source is postulated for the waxy oil at 2510-2525± metres.

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INTRODUCTION

This report presents a geochemical evaluation of the section between 320 metres and 2840 metres in the Statoil 2170/7-1 well drilled offshore northern Norway.

This study was designed to investigate the hydrocarbon potential of the section in terms of source richness and maturity and to detect and characterise shows of migrated hydrocarbons. The analytical format is in accordance with a proposal dated 28th July 1982.

The project was authorised by Dr. D. South, Section Manager, Statoil Forus.

A. ANALYTICAL

A total of one hundred and sixty three (163) canned ditch cuttings and nine (9) sidewall core samples were received from the 320-2840± metres interval. The samples apart from a gap at 2415-2495± metres were composited over intervals of fifteen (15) metres. The sidewall cores were from 1115-2394± metre interval.

The samples at 320-500± metres at ±830-2265± metres and below 2690± metres were finely ground and this has hindered the selection of particular lithologies for analysis.

The samples, analysed in accordance with the above proposal were screened using the light hydrocarbon and organic carbon data. A total of one hundred and sixty three light hydrocarbons analyses, two hundred and ninety two organic carbon determinations, one hundred and ninety nine mini-pyrolysis analyses, fifty seven visual kerogen analyses, forty four vitrinite reflectance determinations, forty extractions with chromatography, forty paraffin-naphthene analyses, twenty eight pyrolysis-GC analyses and ten detailed gasoline range analyses (free of charge) were performed in this study.

The data are listed in tables 1 through 9 and presented graphically in figures 1 through 9.

A brief description of the analytical techniques employed is included in the back of this report.

B. GENERAL INFORMATION

Ten (10) copies of this report have been forwarded to Dr. D. South, at Statoil Statoil Forus, together with the kerogen slides. A copy of the data has been retained by Geochem for future consultation with authorised Statoil personnel.

The remaining sample material will be handled as directed.

All of the results relating to this study are regarded as highly confidential and are proprietary to Statoil.

RESULTS AND INTERPRETATION

Each of the parameters relevant to the evaluation of the section between 320 metres and 2840 meters will be considered in turn then and collectively to form the "Conclusions".

A. ZONATION

This zonation is based upon breaks in the geochemical and stratigraphic data. A total of seven (7) zones are recognised.

Zone A (320-980± metres) is composed of Tertiary (Pliocene and, at 390-980± metres, Eocene-Paleocene) sediments. At the top of this zone sandstones are interbedded with olive grey mudstones. They pass, below 485± metres to an interval dominated by light olive grey mudstones, or in the basal 75± metres light and very light grey mudstones.

The C_1-C_4 hydrocarbons in this zone are commonly of poor abundance, with good (14521-18339 ppm at 320-365± metres) and fair to good (1072-17701 ppm at 485-680± metres and at 6876-11369 ppm at 815-860± metres) intervals. Within the richer intervals the gases are dry (less than 26.9% C_{2+} hydrocarbons) but gas wetness values of 51.8-81.4% are not uncommon in the leaner sediments. Isobutane to normal butane ratios vary erratically between 0.28 and 3.08 - the intervals of wet gas generally having values of less than 1.0. Traces (less than 40 ppm) of the heavier gasoline range hydrocarbons are present in this zone.

The Cretaceous (980-2250± metres) sediments are, lithologically, relatively uniform and divisions within this zone are therefore based upon light hydrocarbon and organic carbon data.

Zone B extends from 980± metres down to 1578± metres and, above 1260± metres, is dominated by medium to medium light grey shaly mudstones of Campanian - Cenomanian age. Significant cherts and, at 1085-1100± metres, minor limestones are also present. Medium dark to medium grey shales (Albian) are interbedded

with medium grey to light olive grey mudstones and minor chert below 1260± metres.

The gaseous (C_1-C_4) hydrocarbons peak at 1160-1190± metres (11617-15189 ppm) but are generally fair (1080-7763 ppm) with poor intervals above 1235± metres. Below this depth gas abundance diminishes from 8064 ppm down to 286 ppm with increasing depth. Gas wetness values vary erratically between 19.9% and 74.8% although the richest intervals are dry to marginally wet (26.4-34.2% C_{2+} hydrocarbons). The ratio of isobutane to normal butane is uncorrelated with gas wetness, varying between 0.30 and 3.12 (generally less than 1.0), C_5-C_7 hydrocarbons are sparse indeed (less than 102 ppm).

Zone C^1 (1578-1785± metres), corresponding to the early-middle Albian, consists of interbedded medium dark to medium grey shales and lighter coloured (shaly) mudstones.

The gases although richer than hitherto at (591)1779-9808 ppm are dry to marginally wet (27.7-40.2% C_{2+} hydrocarbons) with two intervals of wet gas (63.8% at 1665± metres and 65.9% at 1755± metres). Negligible traces (less than 55 ppm) of C_5-C_7 hydrocarbons are present. Isobutane to normal butane ratios range narrowly between 0.56 and 0.99.

Zone C^2 (1785-1920± metres) is a sequence of medium to dark grey shales and medium grey (shaly) mudstones of Aptian-Barremian age.

This zone is characterised by good (4669-18194 ppm, generally greater than 10,000 ppm) abundances of moderately wet (33.9-58.4%) gas but only traces (1-27 ppm) of gasoline range hydrocarbons. Isobutane to normal butane ratios are generally less than unity (0.58-1.08).

Zone D lies between 1920± metres and 2250± metres and is composed of Barremian-Hauterivian sediments. They largely consist of medium grey to brownish grey silty shales and mudstones although minor to significant quantities of (caved ?) medium dark grey shale and, in the basal 30± metres, traces of limestone are also present.

The C_1-C_4 hydrocarbons at (803)1096-11494 ppm are generally less abundant but wetter (46.9-91.2% C_{2+} hydrocarbons) than those in Zone C^2. Isobutane to normal butane ratios are somewhat lower (0.40-0.73) than those in the overlying sediments. Gasoline range hydrocarbons continue to be sparse at 2-239 ppm.

Zone E (2250-2415± metres) corresponds to the Upper-Middle Jurassic (Ryazanian to Oxfordian) and consists of interbedded medium-dark grey and dark brownish grey (silty) shales. Significant light grey siltstones are present above 2265± metres and further traces of light olive grey siltstone occur in the lowermost sample.

This zone is rich in wet gas. The C_1-C_4 fraction 17685-60688 ppm is very wet, containing (with one exception) 80.4-94.9% C_{2+} hydrocarbons. Isobutane to normal butane ratios drop to 0.21-0.36 within this interval. C_5-C_7 hydrocarbons commonly exceed 1000 ppm (1911-9172 ppm) although leaner intervals with values of less than 530 ppm are also present.

Zone F extends from the gap at 2415-2495± metres down to the deepest sample at 2840± metres. The sediments are mainly from the Lower Jurassic (Pliensbachian? to Hettangian) but enter the Triassic (Rhaetic) in the basal 40± metres. This interval is largely composed of sandstones within which are numerous interbeds of dark grey shale (caved?) and siltstone (at 2720-2765± metres).

The sandstones between 2495± metres and 2660± metres generally yielded a pale cut but those at 2510-2540± metres produced a white fluorescence in addition to a stronger cut.

Apart from scattered fair intervals, with abundances of 3219-8959 ppm, the C_1-C_4 hydrocarbons generally exceed 10,000 ppm (12382-71091 ppm). Gas wetness varies irregularly between 17.2% and 76.4% although values of greater than 50% are uncommon. At 116-2838 ppm the gasoline range hydrocarbons are poor with few fair interbeds (2838 ppm at 2510± metres and 1643 ppm at 2660± metres). Isobutane to normal butane ratios

(0.26-0.47) are somewhat higher than those in Zone E.

B. AMOUNT AND TYPE OF ORGANIC MATTER

The amount of organic matter within a sediment is measured by its organic carbon content. Average shales contain approximately one percent organic carbon, and this is the standard to which these samples will be compared.

Organic matter type influences not only source richness but also the character of the hydrocarbon product (oil, gas) and the response of the organic matter to thermal maturation. Richness and oiliness decrease in the order: amorphous-algal-herbaceous-woody. Wood has a primary (but not exclusive) potential for gas whilst inertinitic (oxidised, mineral charcoal) material has only a limited hydrocarbon potential.

Within Zone A the olive grey mudstones have, in general, average (0.73-1.35%) organic carbon contents but between 485± metres and 810± metres they are leaner at (0.28)0.40-0.90(1.16)% whilst the very light grey mudstones below this depth are leaner still (0.12-0.30%). A modest improvement is apparent (to 0.61-0.80%) in the light grey mudstones at 905-980± metres. Above 1370± metres Zone B is characterised by medium to medium light grey and light olive grey mudstones, shaly mudstones and shales whose organic carbon contents range from (0.31)0.58% up to 1.27%. In the basal 200± metres the medium dark to medium grey shales are somewhat richer with values of 1.05-1.38%. Similar shales are interbedded with lighter coloured mudstones in Zones C^1 and C^2, they contain 1.21-2.61% and 0.62-2.52%, 3.20% at 1851 metres, organic carbon respectively.

Organic matter consisting chiefly of herbaceous, inertinitic and woody kerogen is present in the Zone A mudstones. A similar type of organic matter occurs in the sediments of Zones B to C^2 although, with few exceptions, inertinite is the largest fraction of the total organic matter. Substantial proportions of disseminated amorphous (poor quality) material were observed in the mudstones at 950-965± metres and at 1055-1070± metres; amorphous and algal debris are, normally, minor components.

The brownish grey (silty) mudstones and shales within Zone D have above average (1.53-2.74%) organic carbon contents whereas the interbedded medium dark grey shales are somewhat richer at 2.06-4.05%. Richer still are the medium dark grey to brownish grey silty shales in Zone E at 3.08-10.50% organic carbon and the dark to medium dark grey shales (above 2280± metres) also have well

above average (2.50-3.52%) organic carbon contents. Within Zone F the dark grey shales contain 2.42-6.00% (9.20% at 2645-2660± metres) organic carbon but appear to be largely caved. Lighter grey silts at 2690-2765± metres are leaner with values of 0.82-1.56%.

A mixed assemblage of woody, amorphous, inertinitic and herbaceous kerogen types is present in the shales and mudstones above 2070± metres within Zone D. Amorphous organic matter is relatively minor at 2070-2130± metres but this fraction becomes increasingly abundant (dominant at 2160-2235± metres) below this depth, the balance consisting of woody, inertinitic and herbaceous debris. Organic matter composed chiefly of amorphous and algal, with significant herbaceous and woody but, in general, minor inertinitic, kerogen is present in the dark to medium dark grey shales and brownish black mudstones of Zone E. There are, however, a few interbeds of mudstone (e.g. at 2355-2370± metres, at 2385± metres and at 2394± metres) in which inertinite is a significant fraction of the total organic matter. Mainly inertinitic and woody, with significant amounts of amorphous, herbaceous and algal, kerogen are present in the dark grey shales of Zone F. The amorphous fraction of the organic matter in Zones D to F is generally of good quality (oil prone) and includes partially developed (from herbaceous or algal) material.

C. LEVEL OF THERMAL MATURATION

The level of thermal maturation has been evaluated by the visual kerogen (spore colour) and vitrinite reflectance methods.

Maturation indices (based upon spore colour) increase, almost inperceptably, from 1+ to a maximum value of 2- within the analysed section. Reworked herbaceous kerogen at 2-, and greater, was observed in many of the samples and as a consequence the depth at which 2- first occurs cannot be identified with confidence. A depth of 2500± metres is suggested although this transition could occur as high as 2300± metres.

Herbaceous, amorphous and algal kerogen is marginally mature and starts to generate minor volumes of liquid hydrocarbons at an index of 2-. The corresponding value for woody, and inertinitic organic matter is 2. The sediments are, therefore, totally immature down to approximately 2500± metres and only minor hydrocarbon generation will occur, on structure, below this depth.

Vitrinite reflectance values ranging from 0.30% Ro up to 1.23% Ro do not, when plotted, show a clearly defined trend against depth. The spread of reflectance values, apparent as several distinct populations in both sidewall core and cuttings samples, is believed to be due to reworked organic matter. However a trend, ranging from 0.33% Ro at 400± metres to 0.45% Ro at 2250± metres up to a maximum value of 0.5% Ro at 2800± metres, is apparent. This trend, supported by both sidewall core (no cavings) and cuttings samples, is believed to represent the maturation level of the fresh indigenous organic matter in the analysed sediments.

A maturation index of 2- (from spore colour) normally correlates with a mean vitrinite reflectance of 0.45% Ro. The depth at which this maturation level is achieved varies from 2500± metres (possibly up to 2300± metres) on the visual kerogen scale to approximately 2250± metres on the vitrinite data. This discrepancy is attributed to the high proportion of reworked, including low reflectance (0.48-0.50% Ro), woody organic matter in the sediments. The concensus of the two methods is that the transition to marginal maturity may occur as high as 2250± metres and has certainly taken place by 2500± metres. Significant liquid hydrocarbon generation will not therefore occur within the analysed section although an extrapolation of the vitrinite data suggests that this will commence below approximately 3000 metres.

D. SOURCE RICHNESS

Preliminary assessments of present and potential source richness are based upon the abundance of light hydrocarbons and organic carbon, respectively.

Kicks in the hydrocarbon gases at 320-365± metres, intermittantly between 515± metres and 650± metres and at 815-860± metres suggest possible fair to good intervals but Zone A, generally, is a poor hydrocarbon source. By the same criterion Zone B is rated as fair, with occasional good interbeds above 1235± metres and poor to fair below this depth, Zones C^1 and D are fair, Zone C^2 is good whilst Zones E and F are good to very good and occasionally rich with scattered fair intervals in the latter. Out of place gases are common (see Section E) and the light hydrocarbon data will, therefore, result in an optimistic assessment of source richness.

Organic carbon contents suggest that the mudstones of Zones A and B are potentially fair source rocks whereas the shales and mudstones of Zones C^1 and

C^2 are good, Zone D is good to very good and Zones E and F are very good to rich. In Zones A to C^2 these ratings are optimistic since the predominant inertinitic and woody organic matter has a relatively low hydrocarbon potential.

The abundance of indigenous C_{15+} hydrocarbons is a function of source richness. Less than 239 ppm, and generally less than 100 ppm, C_{15+} hydrocarbons were extracted from the dominant mudstones and shaly mudstones, in Zones A to C^2. The "richer" samples, and many of the leaner ones, produced paraffin-naphthene traces which resemble a mixture of immature source indigenous species (odd carbon paraffin preference at 710-995± metres and at 1160-1460± metres) and drilling introduced hydrocarbons, whose baseline hump and smooth paraffin distribution (suggesting maturity) are inconsistent with immature source rocks. Source indigenous hydrocarbons are sparse indeed and Zones A to C^2 are, therefore, assigned a poor rating. Hydrocarbon yields of 356-677 ppm in Zone D and of 410-1733 ppm in Zone E suggest that good to very good and rich source rocks are present. However hydrocarbon to total extract ratios of greater than 40% indicate enhancement of the indigenous species by out of place hydrocarbons (see Section E). An intense pristane peak and marked odd carbon preference in the paraffins reflect contributions from comparatively immature indigenous hydrocarbons. These are estimated at 200-450 ppm - corresponding to a fair to good rating for Zones D and E. Using a similar argument, the indigenous hydrocarbons (variously) enhanced by crude oil and drilling introduced contaminants, are estimated to be less than 250 ppm (fair source potential) in the Zone F shales.

The pyrolysis analysis measures source richness under optimum conditions of maturity. Fair interbeds yielding more than 2000 ppm pyrolysate are few in Zones A to C^2 (e.g. at 455-470± metres, at 1250-1265± metres, at 1620± metres and at 1851± metres). With these exceptions the sediments down to 1920± metres are poor potential source rocks. Pyrolysate yields improve somewhat in Zone D although the fair (2145-2787 ppm pyrolysate) and good (4157-4843 ppm pyrolysate) interbeds chiefly occur below 2070± metres. Zone E is characterised by good to very good and rich shales and silty shales which yielded 3236-12956 ppm pyrolysate, the richest intervals occur at 2310-2325± metres, at 2340-2370± metres and at 2385-2415± metres. These sediments are not uniformly rich since scattered fair interbeds with values of 2273-2916 ppm are also present. The Zone F shales vary in richness although pyrolysate yields of 3066-7521 ppm, indicating good to very good source rocks are common.

Pyrolysis-GC analyses were performed upon selected samples in order to ascertain the nature of their potential hydrocarbon products (gas, condensate or oil). Mudstones represented by the sample at 410-425± metres generated traces in which methane is followed by a series of hydrocarbons (mainly aromatic) extending to beyond nC_{15}. These sediments have a potential for light oil but the prevalent mudstones and shales in Zones A to C^2 would, if mature, generate gas and minor condensate. Within Zone D, down to 2200± metres, the dark grey and brownish grey (silty) shales produced a series of paraffin and olefin double peaks extending to nC_{20}- they have a potential for light oil. Below this depth, in Zones D to F, the range of hydrocarbons, in all but a few silty shales at 2690-2765± metres, extends out to approximately nC_{25}; indicating a potential for a light-medium gravity crude oil.

To summarise:

- the mudstones and shales down to 1920± metres are, apart from scattered fair interbeds, poor source rocks. They have a potential for gas and minor associated liquids or, at 410-425± metres (for example), gas and light oil.
- Zone D (1920-2250± metres) has a poor to fair, occasionally good, potential for light oil.
- Zone E 2250-2415± metres is potentially a good to very good, with rich interbeds, oil (and gas) source.
- the shaly interbeds within Zone F are generally fair oil prone source rocks with scattered poor and good intervals. Their value as a source is doubtful since they appear to be largely caved.

F. MIGRATED HYDROCARBONS

Beds of sandstone, representing potential reservoir facies, occur above 485 metres and below 2495± metres. Sandstones at 2495-2660± metres generally yielded a weak cut but those at 2510-2540± metres produced a stronger cut and a white fluorescence.

Kicks of dry gas were detected at 320-365± metres, at 485-680± metres and at 815-860± metres in Zone A. Migrated liquid hydrocarbons, however, are not indicated in this interval - a conclusion which is supported by the C_{15+} hydrocarbon data. Further kicks of dry to marginally wet gas were detected at 1160-1190± metres and at 1220-1235± metres but the gaseous hydrocarbons in

Zone B are generally poor to fair and believed to be source indigenous. The heavier C_{15+} hydrocarbons are relatively sparse (29-201 ppm) and in the richer, and many of the leaner samples, the immature source-indigenous species have been enhanced by drilling contaminants.

Fair and good shows of moderately wet gas were observed in Zones C^1 and C^2 respectively. The host sediments (shales and shaly mudstones) have a poor hydrocarbon potential and are immature - which suggests that gases have diffused into the section. C_{15+} hydrocarbons are sparse (less than 160 ppm) and from the paraffin-naphthene traces appear to be largely drilling introduced - migrated crude oil is not suspected.

Within Zones A to C^2 the mudstones and shales are generally poor source rocks and, furthermore, are immature suggesting that the gases in this interval were generated off structure. More mature, and probably richer, down dip equivalents of the host sediments are believed to be the source of these gases. The underlying shales and mudstones (in Zones D to F) are generally oil prone and therefore less likely to be associated with the gas shows in Zones C^1 to C^2.

The C_1-C_4 hydrocarbons in Zone D although only of fair abundance are wetter (43.1-91.2% C_{2+} hydrocarbons) than expected for immature sediments - suggesting maturity, and therefore, out of place hydrocarbons. The C_{15+} hydrocarbons at 356-677 ppm are significantly richer than hitherto and, furthermore, commonly exceed 40% (34.9-60.1%) of the total extract. Strong pristane peaks and a marked odd carbon paraffin preference in the traces below 2080± metres suggests contributions from immature indigenous species but the paraffin-naphthene chromatograms at 1950-2040± metres resemble a medium gravity paraffinic crude oil. The near absence of C_5-C_7 hydrocarbons (less than 239 ppm) in Zone D is inconsistent with shows of migrated crude oil - suggesting that the "shows" are in fact due to drilling introduced lubricating oil. Lost circulation material (metal turnings, cement and paint) in these samples suggests that the oil may be associated with a casing paint. On balance, therefore, the C_1-C_7 and C_{15+} hydrocarbon data indicate fair to good shows of wet gas in Zone D and that migrated crude oil, if present at all, could only occur in trace amounts. These wet gas shows appear, since the host sediments are immature, to be the result of hydrocarbon generation off structure. However the marked difference in isobutane to normal butane ratios indicates that they are unrelated to those in Zone E.

Zone E is characterised by very strong shows (17685-60688 ppm) of wet gas and

less abundant (with two exceptions, 1434-9172 ppm) gasoline range hydrocarbons. However, although the C_{15+} hydrocarbons are relatively abundant (410-1733 ppm) and enhanced by non indigenous species (hydrocarbon to total extract ratios commonly exceed 40%), they appear to be a mixture of immature source indigenous hydrocarbons and traces of drilling introduced contamination. The host sediments dominantly dark brownish grey (silty) shales are capable of generating light to medium gravity crude oil but lack the necessary maturity to do so on structure. A proportion of the gas is due to in situ generation but the low isobutane to normal butane ratios and extreme wetness (indicating maturity) suggest that hydrocarbons, originating in more mature down dip equivalents of the richer silty shales, have diffused into the section. These sediments clearly have the potential to source commercial volumes of gas/condensate, in addition to crude oil.

Strong shows of gas were detected within Zone F, notably at 2555-2615± metres and at 2645-2705± metres. The gases are drier than those in Zone E, rarely exceeding 50% wetness and, with two exceptions, are associated with less than 1000 ppm gasoline range hydrocarbons. At 2510-2525± metres gas wetness reaches 76% and the gasolines 2838 ppm. The C_{15+} hydrocarbons extracted from the sands in this interval are also abundant (1923 ppm) and resemble a moderately mature, waxy, oil. The light and heavy hydrocarbon data indicate that this show does not extend into the underlying sequence of sands and shales. Substantial baseline humps, due to drilling mud additives, are present in the C_{15+} paraffin-naphthene traces below 2600± metres. At 2570-2585± metres, however, the paraffins resemble those at 2025-2040± metres and, although similar to crude oil, are believed to be drilling introduced. A conclusion which is supported by the light hydrocarbon data.

Detailed gasoline range analyses were, due to the sparcity, of this fraction possible only in Zones E and F. These data display an underlying similarity in their gross hydrocarbon distributions, and in the ratios of selected components, the range of values for individual hydrocarbons is also lower than normal. This comparative uniformity in the gasoline range analyses suggests a similar source type for the wet gas/condensate shows in Zones E and F.

The waxy oil at 2510-2525± metres has a marked odd carbon paraffin preference, suggesting moderate maturity and a localised movement of hydrocarbons. A facies change off structure is also indicated since the Zone F shales generally have a potential for a light-medium gravity oil.

Summarising:

- intermittant kicks of dry gas were detected within Zones A and B.
- fair and good shows of moderately wet gas occur in Zones C^1 and C^2 respectively.
- fair, occasionally good, shows of wet to very wet gas are present in Zone D.
- Zone E is characterised by very strong shows of very wet gas and associated liquids.
- strong shows of moderately wet gas occur within Zone F.
- a show of 'young' waxy oil was detected at 2510-2525± metres.

F. CONCLUSIONS

The section between 320 metres and 2840 metres in the 7120/7-1 well has been evaluated. Seven (7) zones are recognised within the analysed section.

Zone A (320-980± metres) is largely composed of Tertiary (Pliocene to Late Paleocene) mudstones although sandstones and traces of basalt are also present above 485± metres. The mudstones are generally olive grey but become lighter in colour with increasing depth. Their organic carbon contents range from 0.12% up to 1.35% but above 485± metres and below 620± metres commonly exceed 0.5%. Organic matter, consisting chiefly of inertinitic, herbaceous and woody debris, is totally immature and furthermore has a minimal potential for gas and condensate/gas and light oil at 410-425± metres. Zone A is therefore rated as a poor, immature source for gas and associated liquids.

Breaks in the geochemical data were used to subdivide the Cretaceous sediments between 980± metres and 2250 metres.

Zone B lies between 980± metres and 1578± metres, and down to 1260± metres is dominated by medium to medium light grey shaly mudstones of Campanian - Cenomanian age. Minor cherts and, at 1085-1100± metres thin limestones are present in the mudstones. They overlie a sequence (Albian) of medium dark to medium grey shales, medium grey to light olive grey mudstones and minor cherts. The dominant mudstones and shales contain 0.56-1.38% organic carbon although their are a few interbeds of pale grey mudstones and minor limestones with values of less than 0.5%. Despite organic carbon values which are

commonly above "average", the organic matter, composed largely of inertinite, with significant herbaceous and woody kerogen, has a poor potential; for gas, or in the scattered fair interbeds (at 1055-1070± metres and at 1250-1265± metres), gas and condensate. Grossly Zone B is a poor immature gas source of minimal exploration value.

Zone C^1 (1578-1785± metres) is composed of Early Albian medium dark to medium grey shales, and medium grey to olive grey and medium light grey shaly mudstones. Organically the shales and mudstones resemble those in basal Zone B, containing 1.21-1.81% and 0.68-1.38% organic carbon, respectively. Their immature organic matter largely consists of inertinite, with significant proportions of woody and herbaceous debris. Amorphous (often of poor quality) and algal kerogen is sparse in Zones A to C^2. Due to the abundance of inertinite, which has a limited hydrocarbon potential, the shales and shaly mudstones of Zone C^1 have a poor (poor to fair at 1620± metres) potential for gas.

Zone C^2 (corresponding to the Albo-Aptian to Late Barrremian) lies between 1785± metres and 1920± metres and comprises of interbedded medium dark grey shales and medium grey shaly mudstones. Although organic carbon contents are above average (1.28-3.22%) the sediments contain the same mixture of inertinitic, woody and herbaceous kerogen that is present in the overlying intervals. Furthermore this organic matter is totally immature on structure and has not started to generate hydrocarbons. Zone C^2, therefore, has a negligible potential, for gas and minor associated liquids.

Zone D (1920-2250± metres) is composed of sediments of Barremian - Hauterivian age. Medium brownish grey (silty) mudstones and shales predominate although interbeds of medium dark grey shale and traces of limestone (in the basal 30± metres) are also present. Organic carbon contents vary between 1.53% and 2.74% in the brownish grey mudstones and shales but improve, to 2.50-3.52%, in the medium dark grey interbeds. A mixture of woody amorphous inertinitic and herbaceous kerogen is present in the sediments above 2130± metres. Below this depth the organic matter is grossly similar but contains increasing amounts of amorphous material. The mudstones and shales within Zone D have a potential for gas and light oil which improves from poor to fair to fair with good interbeds above and below 2130± metres, respectively. They do not quite achieve marginal maturity on structure and have not, therefore, started to generate hydrocarbons.

Scattered kicks of dry to marginally wet gas were detected in Zones A and B, fair shows of marginally wet gas occur in Zone C^1 and strong shows of somewhat wetter gas in Zone C^2. The gas shows are slightly weaker in Zone D although these gases are wet to very wet. The very good to rich Upper Jurassic shales (at 2250-2415± metres) represent a possible source for the gases in Zones A to D but the low isobutane to normal butane ratios encountered in Zone E differ markedly from those in the overlying sediments. The interbeds of good shale in basal Zone D cannot be discounted since they have a potential for gas and oil. The strength of the gas shows in Zone C^2, however, suggests that their lateral equivalents off structure may not only be more mature but richer too.

Zone E lies between 2250± metres and 2415± metres and largely consists of Upper Jurassic (Ryazanian to Oxfordian) shales, and in the top sample, minor light grey siltstones. The dominant dark brownish grey (silty) shales are rich (3.08-10.50% organic carbon) in a mixed assemblage of amorphous, inertinitic, herbaceous and woody (± algal) kerogen types. Minor hydrocarbon generation is occurring on structure, significant generation will commence off structure below approximately 3000± metres but the depth at which the "oil window" is penetrated cannot be predicted from the available data. The Upper Jurassic shales are a potentially very good to rich source for light-medium gravity crude oil, and gas/condensate. In the mature state they would make associated reservoirs highly prospective. There is evidence (see below) that generation is occurring in their more mature lateral equivalents off structure.

Zone F, extending from below the sampling gap at 2415-2495± metres down to the deepest sample at 2840± metres, is composed of Lower Jurassic (Pleinsbachian? - Hettangian) and, below 2799 metres, Triassic (Rhaetic) sediments. Sandstones are interbedded with dark grey shales and, at 1720-1765± metres, siltstones within this interval. The shales appear to be abundantly caved and are, therefore difficult to evaluate. They have similar organic carbon contents (2.42-6.00%, 9.2% at 2645-2660± metres) to those in Zone E but their organic matter, however, contains a higher proportion of inertinitic and woody debris. For this reason they are assumed to be, in part at least, indigenous to Zone F. In addition to the woody and inertinitic material these shales contain significant proportions of marginally mature amorphous and herbaceous (± algal) kerogen, which is generating minor volumes of liquid hydrocarbons. Burial to below approximately 3000± metres would be necessary before significant hydrocarbon could commence. The dark grey shales within Zone F are variable in richness but commonly have a fair to good, and occasionally very good, potential for gas

and light oil. There are however poor interbeds and the silts at 1720-1765± metres are also assigned a poor rating.

Strong shows of very wet gas (80-95% C_{2+} hydrocarbons) and associated liquid hydrocarbons occur throughout Zone E. These gases are a mixture of source indigenous and migrated hydrocarbons. Their extreme wetness and low isobutane to normal butane ratios suggest that the latter predominate. The source of these gases is believed to be the more mature off structure equivalents of the richer Upper Jurassic silty shales. The heavy hydrocarbons in this interval are part source indigenous and part drilling introduced, migrated crude oil is not suspected.

Strong shows of somewhat drier gas are present in Zone F, peaking at 2555-2615± metres and at 2645-2705± metres. An enhancement in gas wetness and in gasoline range hydrocarbons abundance correlates with a show of waxy crude oil in the sands at 2510-2525± metres. Isobutane to normal butane ratios are higher and gas wetness values lower than in Zone E, suggesting a disparate source. The Zone F shales have a potential for light oil and gas and their more mature equivalents down dip have, most probably, sourced the gases in this zone. The presence of a "young" waxy oil at 2510-2525± metres, due it is believed to a localised movement of hydrocarbons, indicates a second, distinct but (possibly) volumetrically limited, source facies.

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-001	320-335m	A 75% Sand, unconsolidated, med. grained, subangular, fairly well sorted, white	N9	
		B 15% Mudstone, blocky, soft, non-calc., minor cavings, med. olive grey	5Y5/1	1.00
		C 10% Basalt, blocky, hard, greyish black	N2	
		Minor other igneous. Minor LCM		
692-002	335-350m	A 60% Sand, as 692-001A	N9	
		B 40% Mudstone, as 692-001B, mod. caved	5Y5/1	0.82
		Minor basalt. Minor LCM		
692-003	350-365m	A 50% Sand, unconsolidated, med. to coarse grained, subangular, poorly sorted, clear, white	N9	
		B 45% Mudstone, blocky, soft to mod. hard, non-calc., mod. caved, med. olive grey	5Y5/1	0.73
		C 5% Basalt, blocky, hard, greyish black	N2	
		Minor LCM		
692-004	365-380m	A 60% Sand, as 692-003A	N9	
		B 35% Mudstone, as 692-003B, mod. caved	5Y5/1	0.80
		C 5% Basalt, as 692-003C	N2	
		Minor LCM		
692-005	380-395m	A 70% Sand, as 692-003A	N9	
		B 30% Mudstone, as 692-003B, mod. caved	5Y5/1	1.28,1.34
		Minor basalt. Minor LCM		
692-006	395-410m	A 55% Mudstone, blocky to subfissile, shaly in part, soft, non-calc., mod. caved, med. olive grey	5Y5/1	1.35
		B 45% Sand, as 692-003A	N9	
		Minor basalt. Minor LCM		
692-007	410-425m	A 70% Sand, as 692-003A	N9	
		B 30% Mudstone, as 692-006A, mod. caved	5Y5/1	1.33
		Minor basalt		
692-008	425-440m	A 75% Mudstone, blocky to subfissile, soft, non-calc., mod. to abundantly caved, med. olive grey	5Y5/1	1.26
		B 25% Sand, as 692-003A	N9	
		Minor basalt. Minor other mudstone		
692-009	440-455m	A 90% Mudstone, as 692-008A, mod. caved	5Y5/1	1.13
		B 10% Sand, as 692-003A	N9	
		Minor other mudstone		
692-010	455-470m	A 65% Mudstone, as 692-008A, mod. caved	5Y5/1	0.88
		B 35% Sand, as 692-003A	N9	
692-011	470-485m	A 75% Mudstone, as 692-008A, mod. to abundantly caved	5Y5/1	0.93,0.89
		B 25% Sand, as 692-003A	N9	
		Minor other mudstone. Minor pyrites		
692-012	485-500m	A 75% Mudstone, blocky to subfissile, soft, non-calc., mod. caved, med. olive grey	5Y5/1	0.62

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-012	485-500m	B 15% Mudstone, blocky, mod. hard, non-calc., mostly caved, med. light grey	N6	0.47
		C 10% Chert, blocky, hard, dusky yellowish grey		
		Minor sand and pyrites		
692-013	500-515m	A 98% Mudstone, blocky, soft, non-calc., mod. to abundantly caved, light olive grey	5Y6/1	0.41
		Minor other mudstone		
692-014	515-530m	A 98% Mudstone, as 692-013A, mod. to abundantly caved	5Y6/1	0.40
		Minor other mudstone		
692-015	530-545m	A 98% Mudstone, as 692-013A, mod. caved	5Y6/1	0.40
		Minor other mudstone		
692-016	545-560m	A 80% Mudstone, blocky to subfissile, shaly, soft to mod. hard, non-calc., mod. caved, light to light olive yellowish grey	N7-5Y7/1	0.27,0.30
		B 20% Mudstone, as 692-013A, mostly caved	5Y6/1	0.30
692-017	560-575m	A 95% Mudstone, as 692-016A, mod. to abundantly caved	N7-5Y7/1	0.39
		B 5% Mudstone, as 692-013A, caved	5Y6/1	
692-018	575-595m	A 95% Mudstone, blocky, soft, non-calc., mod. to abundantly caved, med. light to light olive grey	N6-5Y6/1	0.46
		B 5% Mudstone, as 692-013A, caved	5Y6/1	
692-019	590-605m	A 65% Mudstone, blocky, soft, non-calc., mod. to abundantly caved, light olive grey	5Y6/1	0.44
		B 35% Mudstone, blocky, soft to mod. hard, non-calc., mod. caved, med. light grey	N6	0.42
692-020	605-620m	A 70% Mudstone, as 692-019A, mod. caved	5Y6/1	0.44,0.43
		B 30% Mudstone, as 692-019B, mod. caved	N6	
692-021	620-635m	A 90% Mudstone, blocky, soft, non-calc., mod. to abundantly caved, light olive to light olive yellowish grey	5Y6/1-5Y7/1	0.57
		B 10% Mudstone, blocky, soft, non-calc., caved, med. to med. olive grey	N5-5Y5/1	0.90
692-022	635-650m	A 95% Mudstone, as 692-021A, mod. to abundantly caved	5Y6/1-5Y7/1	0.68
		B 5% Mudstone, as 692-021B, mostly caved	N5-5Y5/1	0.64
692-023	650-665m	A 98% Mudstone, as 692-021A, mod. caved	5Y6/1-5Y7/1	0.62,0.63
		Minor other mudstone		
692-024	665-680m	A 85% Mudstone, blocky, soft, non-calc., mod. caved, light olive to yellowish grey	5Y7/1	0.57

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Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-024	665-680m	B 15% Siltstone, blocky, mod. hard, non-calc., minor chloritisation, light grey Minor cavings Minor other mudstone and sand	N7	0.42
692-025	680-695m	A 98% Mudstone, blocky, soft, non-calc., mod. to abundantly caved, light olive to yellowish grey Minor siltstone	5Y7/1	0.59
692-026	695-710m	A 98% Mudstone, blocky, soft, non-calc., mod. caved, light to light olive yellowish grey Minor other mudstone	N7-5Y7/1	0.73
692-027	710-725m	A 98% Mudstone, as 692-026A, mod. to abundantly caved Minor other mudstone	N7-5Y7/1	0.78
692-028	725-740m	A 98% Mudstone, as 692-026A, mod. to abundantly caved Minor other mudstone	N7-5Y7/1	0.85,0.85
692-029	740-755m	A 98% Mudstone, blocky, soft, non-calc., mod. caved, light to light olive yellowish grey Minor other mudstone	N7-5Y7/1	0.88
692-030	755-790m	A 98% Mudstone, as 692-029A, mod. to abundantly caved Minor other mudstone	N7-5Y7/1	1.16
692-031	770-785m	A 98% Mudstone, as 692-029A, mostly caved	N7-5Y7/1	1.11
692-032	785-800m	A 98% Mudstone, blocky, soft to mod. hard, non-calc., abundantly caved, light grey	N7	0.98
692-033	800-815m	A 98% Mudstone, as 692-032A, abundantly caved	N7	0.86
692-034	815-830m	A 98% Mudstone, as 692-032A, abundantly caved	N7	0.88,0.92
692-035	830-845m	A 98% Mudstone, as 692-032A, abundantly caved Minor other mudstone	N7	1.05
692-036	845-860m	A 98% Mudstone, as 692-032A, abundantly caved Minor other mudstone	N7	0.75
692-037	860-875m	A 95% Mudstone, blocky, soft to mod. hard, non-calc., mod. to abundantly caved, light to light olive yellowish grey B 5% Chert, blocky, hard, light olive to yellowish grey Minor sand and other mudstone	N7-5Y7/1 5Y7/1	0.85
692-038	875-890m	A 98% Mudstone, as 692-037A, mod. caved Minor other mudstone	N7-5Y7/1	0.73

Abbreviations = **arena**ceous, **argil**laceous, **calc**areous, Cut, **dolo**mitic, Fluorescence, **foram**inifera, **foss**iliferous
Lost Circulation Material, **mod**erately, **occ**asionally, **sl**ightly, **v**ery

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-039	890-905m	A 98% Mudstone, blocky, soft to mod. hard, non-calc., mod. caved, light to light olive yellowish grey Minor other mudstone	N7-5Y7/1	0.88
692-040	905-920m	A 70% Mudstone, blocky, mod. hard, non-calc., mod. caved, light grey	N7	0.82,0.78
		B 30% Mudstone, blocky, mod. hard, non-calc., very light grey Minor cavings	N8	0.44
692-041	920-935m	A 70% Mudstone, as 692-040A, mod. to abundantly caved	N7	0.77
		B 30% Mudstone, as 692-040B, mod. caved	N8	0.33
692-042	935-950m	A 65% Mudstone, blocky, mod. hard, non-calc., mod. caved, very light grey	N8	0.30
		B 30% Mudstone, as 692-040A, mod. caved	N7	0.61
		C 5% Mudstone, blocky, mod. hard, non-calc., minor cavings, pale red	5R6/2	0.30,0.29
692-043	950-965m	A 65% Mudstone, shaly, blocky, mod. hard, non-calc., light grey	N7	0.65
		B 35% Mudstone, as 692-042A, mod. caved Minor other mudstone Minor LCM	N8	0.23
692-044	965-980m	A 80% Mudstone, as 692-043A, minor cavings	N7	0.77
		B 20% Mudstone, as 692-042A, minor cavings Minor other mudstone	N8	0.12
692-045	980-995m	A 95% Shaly mudstone, blocky to subfissile, mod. hard, non-calc., minor cavings, med. grey	N5	0.85
		B 5% Mudstone, as 692-042A, caved Minor other mudstone	N8	
692-046	995-1010m	A 65% Mudstone, blocky, soft to mod. hard, v. sl. calc., mod. caved, light to light olive yellowish grey	N7-5Y7/1	0.33,0.37
		B 35% Mudstone, blocky, mod. hard, v. sl. calc., mod. to abundantly caved, med. grey Minor other caved mudstone	N5	
692-047	1010-025m	A 98% Mudstone, as 692-046A, mod. caved Minor other caved mudstone	N7-5Y7/1	0.63
692-048	1025-040m	A 98% Mudstone, blocky to subfissile, sl. shaly, soft to mod. hard, non-calc., mod. caved, med. to med. light grey Minor other mudstone - caved. Minor pyrites	N5-6	0.58
692-049	1040-055m	A 98% Mudstone, as 692-048A, mod. caved Minor other mudstone - caved. Minor pyrites	N5-6	0.67
692-050	1055-070m	A 75% Shaly mudstone, platy to subfissile, mod. hard, non-calc., minor cavings, med. light grey	N6	0.65

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-050	1055-070m	B 25% Mudstone, blocky, mod. hard, calcite inclusions, sl. calc.?, light grey Minor calcite (fibrous) Minor other mudstone	N7	1.00
692-051	1070-085m	A 85% Shaly mudstone, platy to subfissile, mod. hard, brittle, non-calc., mod. caved, med. light grey	N6	0.59,0.62
		B 15% Mudstone, as 692-050B, minor cavings Minor calcite, pyrites and other mudstone	N7	0.69
692-052	1085-100m	A 95% Shaly mudstone, as 692-051A, mod. caved	N6	0.88
		B 5% Limestone, blocky, sl. arg., minor styolites, mod. caved, light to very light grey Minor pyrites, calcite and other mudstone	N7-8	0.40
692-053	1100-115m	A 90% Shaly mudstone, platy to subfissile, soft to mod. hard, v. sl. calc. to non-calc., mod. caved, med. to med. light grey	N5-6	0.62
		B 10% Chert, blocky, hard, med. brownish grey Minor pyrites and calcite	5YR5/1	
692-164 SWC	1115m	A 98% Shaly mudstone, subfissile, soft, v. sl. calc. to non-calc., med. to med. olive grey	N5-5Y5/1	1.40
692-054	1115-130m	A 85% Shaly mudstone, as 692-053A, mod. caved	N5-6	0.65
		B 15% Chert, as 692-053B Minor pyrites	5YR5/1	
692-055	1130-145m	A 95% Shaly mudstone, as 692-053A, mod. caved	N5-6	0.90,0.92
		B 5% Chert, as 692-053B Minor pyrites and other mudstone	5YR5/1	
692-056	1145-160m	A 95% Shaly mudstone, as 692-053A, mod. to abundantly caved	N5-6	0.73
		B 5% Chert, as 692-053B Minor pyrites and other mudstone	5YR5/1	
692-057	1160-175m	A 98% Shaly mudstone, platy to subfissile, soft to mod. hard, non-calc., mod. caved, med. to med. light grey Minor chert, limestone and pyrites	N5-6	0.93
692-058	1175-190m	A 98% Shaly mudstone, as 692-057A, mod. caved Minor caved mudstone and pyrites	N5-6	1.01
692-059	1190-205m	A 95% shaly mudstone, as 692-057A, mod. caved	N5-6	0.93
		B 5% Chert, blocky, hard, med. brownish grey Minor pyrites and other mudstone - caved	5YR5/1	

Abbreviations = **arena**ceous, **argil**laceous, **calc**areous, Cut, **dolo**mitic, Fluorescence, **foram**inifera, **fossil**iferous
Lost Circulation Material, **mod**erately, **occ**asionally, **sl**ightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-060	1205-220m	A 98% Shaly mudstone, blocky to subfissile, soft to mod. hard, non-calc., mod. caved, med. grey Minor chert, pyrites and other mudstone	N5	1.24
692-061	1220-235m	A 98% Shaly mudstone, as 692-060A, mod. caved Minor chert and other mudstone	N5	1.12
692-062	1235-250m	A 98% Shaly mudstone, as 692-060A, abundantly caved Minor chert and pyrites	N5	0.91
692-063	1250-265m	A 80% Shale, subfissile, soft to mod. hard, non-calc., minor cavings, med. grey	N5	1.27
		B 20% Shaly mudstone, as 692-060A, mod. caved Minor pyrites and chert	N5	0.31
692-064	1265-280m	A 50% Shale, as 692-063A, mod. caved	N5	1.17
		B 45% Mudstone, blocky to subfissile, soft to mod. hard, non-calc., mod. caved, med. to med. olive grey	N5-5Y5/1	0.69
		C 5% Chert, blocky, hard, med. brownish grey Minor calcite, pyrites and other mudstone - caved	5YR5/1	
692-065	1280-295m	A 80% Shale, as 692-063A, mod. caved	N5	1.04
		B 20% Mudstone, as 692-064B, mod. caved Minor pyrite and other mudstone	N5-5Y5/1	0.56
692-066	1295-310m	A 90% Shale, as 692-063A, mod. caved	N5	1.04
		B 10% Mudstone, as 692-064B, mod. caved Minor pyrite and other mudstone	N5-5Y5/1	0.68,0.74
692-067	1310-325m	A 85% Shale, as 692-063A, mod. caved	N5	0.92
		B 15% Mudstone, as 693-064B, mod. caved Minor pyrites and calcite	N5-5Y5/1	0.62
692-068	1325-340m	A 98% Shale, platy to subfissile, soft to mod. hard, non-calc., mod. caved, med. to med. light grey Minor pyrites and mudstone	N5-6	0.84
692-069	1340-355m	A 98% Shale, as 692-068A, mod. caved Minor mudstone and pyrites	N5-6	0.83
692-070	1355-370m	A 98% Shale, as 692-068A, mod. caved Minor mudstone and pyrites	N5-6	1.02
692-071	1370-385m	A 98% Shale, platy to subfissile, mod. hard, non-calc., mod. caved, med. dark to med. grey Minor mudstone and pyrites	N4-5	1.05,1.06
692-072	1385-400m	A 95% Shale, as 692-071A, mod. caved	N4-5	1.07
		B 5% Chert, blocky, hard, very dusky greyish red Minor pyrites and mudstone Minor LCM	10R3/2	

Abbreviations = **arena**ceous, **argil**laceous, **calc**areous, **Cut**, **dol**omitic, Fluorescence, **foram**inifera, **foss**iliferous
Lost Circulation Material, **mod**erately, **occ**asionally, **sl**ightly, very

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ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-073	1400-415m	A 95% Shale, platy to subfissile, mod. hard, non-calc., mod. caved, med. dark to med. grey	N4-5	1.10
		B 5% Chert, blocky, hard, very dusky greyish red	10R3/2	
		Minor mudstone and pyrites Minor LCM		
692-074	1415-430m	A 98% Shale, as 692-073A, minor cavings	N4-5	1.10
		Minor pyrites, chert and mudstone Minor LCM		
692-075	1430-445m	A 95% Shale, as 692-073A, minor cavings	N4-5	1.19
		B 5% Chert, as 692-073B	10R3/2	
		Minor pyrites and mudstone		
692-076	1445-460m	A 95% Shale, platy to subfissile, mod. hard, non-calc., minor cavings, med. grey	N5	1.25
		B 5% Chert, blocky, hard, med. brownish grey	5YR5/1	
		Minor mudstone		
692-077	1460-475m	A 70% Shale, as 692-076A, minor cavings	N5	1.23,1.17
		B 30% Mudstone, blocky, soft to mod. hard, non-calc., med. light to light olive grey	N6-5Y6/1	0.99
		Minor chert. Minor LCM		
692-078	1475-490m	A 70% Shale, as 692-076A, minor cavings	N5	1.29
		B 30% Mudstone, as 692-077B, minor cavings	N6-5Y6/1	1.07
		Minor LCM		
692-079	1490-505m	A 75% Shale, as 692-076A, minor cavings	N5	1.26
		B 25% Mudstone, as 692-077B, minor cavings	N6-5Y6/1	1.07
		Minor LCM		
692-080	1505-520m	A 75% Shale, as 692-076A, minor cavings	N5	0.92,1.16
		B 25% Mudstone, as 692-077B, minor cavings	N6-5Y6/1	1.12
		Minor LCM		
692-081	1520-535m	A 80% Shale, platy to subfissile, soft to mod. hard, non-calc., mod. caved, med. dark to med. grey	N4-5	1.38
		B 20% Mudstone, blocky, soft to mod. hard, non-calc., mod. caved, med. light to light olive grey	N6-5Y6/1	0.89
		Minor caved mudstone. Minor LCM		
692-082	1535-550m	A 75% Shale, as 692-081A, mod. caved	N4-5	1.33
		B 25% Shaly mudstone, subfissile to blocky, soft to mod. hard, non-calc., minor cavings, med. to med. olive grey	N5-5Y5/1	0.62
		Minor LCM		
692-083	1550-565m	A 70% Shale, as 692-081A, mod. caved	N4-5	1.22,1.24
		B 30% Shaly mudstone, as 692-082B, mod. caved	N5-5Y5/1	0.61
		Minor other mudstone		
692-084	1565-578m	A 70% Shale, as 692-081A, mod. caved	N4-5	1.15

Abbreviations = **arena**ceous, **argil**laceous, **calc**areous, Cut, **dolo**mitic, Fluorescence, **foram**inifera, **foss**iliferous
Lost Circulation Material, **mod**erately, **occ**asionally, **sl**ightly, **v**ery

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-084	1565-578m	B 30% Shaly mudstone, subfissile to blocky, soft to mod. hard, non-calc., mod. caved, med. to med. olive grey Minor other mudstone	N5-5Y5/1	0.84
692-085	1578-590m	A 65% Shale, platy to subfissile, mod. hard, non-calc., mod. caved, med. dark to med. grey	N4-5	1.81
		B 35% Shaly mudstone, blocky to subfissile, soft to mod. hard, non-calc., mod. caved, med. to med. olive grey Minor other mudstone	N5-5Y5/1	1.18
692-086	1590-605m	A 75% Shale, as 692-085A, mod. caved	N4-5	1.31,1.31
		B 25% Shaly mudstone, as 692-085B, mod. caved Minor other mudstone	N5-5Y5/1	1.18
692-087	1605-620m	A 85% Shale, as 692-085A, mod. caved	N4-5	1.40
		B 15% Shaly mudstone, as 692-085B, mod. caved Minor other mudstone and drilling mud Minor LCM	N5-5Y5/1	
692-165 SWC	1620m	A 98% Shale, subfissile, soft to mod hard, non-calc., med. grey	N5	1.61
692-088	1620-635m	A 90% Shale, as 692-085A, mod. caved	N4-5	1.40
		B 10% Shaly mudstone, as 692-085B, mod. caved Minor other mudstone. Minor LCM	N55Y5/1	1.03
692-089	1635-650m	A 85% Shale, platy to subfissile, mod. hard, non-calc., mod. to abundantly caved, med. dark grey	N4	1.36
		B 15% Shaly mudstone, blocky to subfissile, soft to mod. hard, non-calc., mod. caved, med. light grey Minor pyrites and other mudstone	N6	1.02,1.02
692-090	1650-665m	A 80% Shale, as 692-089A, mod. to abundantly caved	N4	1.53
		B 20% Shaly mudstone, as 692-089B, minor cavings Minor other mudstone Minor LCM	N6	1.00
692-091	1665-680m	A 70% Shale, as 692-089A, mod. to abundantly caved	N4	1.32
		B 30% Shaly mudstone, as 692-089B, mod. caved Minor other mudstone Minor LCM	N6	0.68
692-092	1680-695m	A 85% Shale, thinly fissile, mod. hard, brittle, non-calc., mod caved, med. dark grey	N4	1.39
		B 15% Mudstone, blocky to subfissile, soft to mod. hard, non-calc., mod. caved, med. light grey / Minor other mudstone	N6	0.72,0.70

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-093	1695-710m	A 75% Shale, thinly fissile, mod. hard, brittle, non-calc., mod. caved, med. dark grey	N4	1.38
		B 25% Mudstone, blocky to subfissile, soft to mod. hard, non-calc., mod. caved, med. light grey Minor LCM	N6	1.06
692-094	1710-725m	A 75% Shale, as 692-093A, mod. caved	N4	1.21
		B 25% Mudstone, as 692-093B, mod. caved	N6	0.80
692-095	1725-740m	A 65% Shale, as 692-093A, mod. caved	N4	1.38
		B 35% Mudstone, as 692-093B, mod. caved Minor other mudstone	N6	
692-096	1740-755m	A 60% Shaly mudstone, blocky to subfissile, soft to mod. hard, non-calc., mod. caved, med. grey	N5	1.02,1.02
		B 40% Shale, platy, mod. hard, brittle, non-calc., minor cavings, med. dark grey Minor other mudstone	N4	1.81
692-097	1755-770m	A 80% Shaly mudstone, as 692-096A, mod. caved	N5	1.07
		B 20% Shale, as 692-096B, mod. caved Minor pyrites and other mudstone	N4	1.32
692-098	1770-785m	A 65% Shaly mudstone, as 692-096A, mod. caved	N5	0.91
		B 35% Shale, as 692-096B, mod. caved Minor pyrites and other mudstone	N4	1.55
692-099	1785-800m	A 55% Shale, platy, mod. hard, brittle, non-calc., minor cavings, med. dark grey	N4	1.76,1.76
		B 45% Mudstone, blocky to subfissile, mod. hard, non-calc., minor cavings, med. grey Minor limestone and pyrites	N5	1.35
692-100	1800-815m	A 70% Shale, as 692-099A, mod. caved	N4	1.57
		B 30% Mudstone, as 692-099B, minor cavings Minor limestone and pyrites	N5	1.62
692-101	1815-830m	A 60% Shale, as 692-099A, mod. caved	N4	1.86
		B 40% Mudstone, as 692-099B, minor cavings Minor limestone	N5	1.28
692-102	1830-845m	A 70% Shale, as 692-099A, mod. caved	N4	1.79,1.91
		B 30% Mudstone, as 692-099B, minor cavings Minor sand, limestone and pyrites	N5	2.09
692-166 SWC	1851m	A 98% Shaly mudstone, blocky to subfissile, soft to mod. hard, non-calc., pale banding, med. to med. brownish grey	N5-5YR5/1	3.22,3.15
692-103	1845-860m	A 60% Shale, platy, mod. hard, brittle, non-calc., mod. caved, med. dark grey	N4	1.72,1.70

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-103	1845-860m	B 40% Mudstone, blocky, soft to mod. hard, non-calc., minor cavings, med. dark to med. grey Minor limestone and sand	N4-5	1.92
692-104	1860-875m	A 55% Shale, platy, mod. hard, brittle, non-calc., mod. caved, med. dark grey	N4	1.70
		B 45% Mudstone, blocky, soft to mod. hard, non-calc., minor cavings, med. dark to med. grey Minor pyrites	N4-5	1.72
692-105	1875-890m	A 60% Mudstone, blocky, mod. hard, sl. calc. to non-calc., minor cavings, med. grey	N5	2.25
		B 40% Shale, platy, mod. hard, brittle, non-calc., mod. caved, med. dark grey Minor limestone and pyrites	N4	2.10
692-106	1890-905m	A 50% Mudstone, as 692-105A, minor cavings	N5	1.84
		B 50% Shale, as 692-105B, mod. caved Minor other mudstone and limestone	N4	2.32,2.34
692-107	1905-920m	A 50% Mudstone, as 692-105A, minor cavings	N5	2.52
		B 50% Shale, as 692-105B, mod. caved Minor pyrites. Minor drilling mud	N4	1.94
692-108	1917-935m	A 50% LCM - cement		
		B 30% Shale, platy to subfissile, mod. hard, brittle, non-calc., mod. caved, med. dark grey	N4	2.61
		C 20% Mudstone, blocky, soft to mod. hard, v. sl. calc. to non-calc., mod. caved, med. grey	N5	2,17,2.17
692-109	1935-950m	A 40% Silty mudstone, blocky to platy, soft to mod. hard, v. sl. calc., minor cavings, med. to med. brownish grey	N5-5YR5/1	2.38
		B 35% Shale, as 692-108B, mod. caved	N4	2.79
		C 25% LCM - cement and metal		
692-110	1950-965m	A 65% Silty mudstone, as 692-109A, minor cavings	N5-5YR5/1	2.33
		B 25% Shale, as 692-108B, minor cavings	N4	2.57,2.62
		C 10% LCM - cement, metal and paint		
692-111	1965-980m	A 70% Silty mudstone, as 692-109A, minor cavings	N5-5YR5/1	2.22
		B 20% Shale, as 692-108B, mod. caved	N4	2.69
		C 10% LCM - metal, paint and cement		
692-112	1980-995m	A 80% Silty mudstone, as 692-109A, mod. caved	N5-5YR5/1	2.65
		B 20% Shale, as 692-108B, mostly caved Minor LCM	N4	2.60
692-113	1995-2010m	A 80% Silty mudstone, as 692-109A, minor cavings	N5-5YR5/1	1.59,2.55
		B 20% Shale, as 692-108B, mostly caved Minor LCM	N4	2.44

Abbreviations = **arena**ceous, **argil**laceous, **calc**areous, Cut, **dolo**mitic, Fluorescence, **foram**inifera, **fossil**iferous
Lost Circulation Material, **mod**erately, **occ**asionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-114	2010-025m	A 75% Silty mudstone, blocky, soft, v. sl. calc., minor cavings, med. to med. brownish grey	N5-5YR5/1	2.33
		B 25% Shale, platy to subfissile, brittle, non-calc., mod. caved, med. dark grey LCM - metal turnings	N4	2.60
692-115	2025-040m	A 80% Silty mudstone, as 692-114A, minor cavings	N5-5YR5/1	2.22
		B 20% Shale, as 692-114B, mod. caved Minor LCM	N4	2.76
692-116	2040-055m	A 90% Silty mudstone, as 692-114A, minor cavings	N5-5YR5/1	2.00,1.99
		B 10% Shale, as 692-114B, mod. caved Minor LCM	N4	2.45
692-117	2055-070m	A 80% Silty mudstone, as 692-114A, minor cavings	N5-5YR5/1	2.29
		B 20% Shale, as 692-114B, mod. caved Minor LCM - metal turnings	N4	2.39
692-118	2070-085m	A 75% Silty mudstone, grading to siltstone, blocky, soft, v. sl. calc., minor cavings, med. brownish grey	5YR5/1	1.53
		B 15% Shale, platy to subfissile, brittle, non-calc., mod. caved, med. dark grey	N4	2.31
		C 10% LCM - metal turnings and plastic		
692-119	2085-100m	A 85% Silty mudstone, grading to siltstone, blocky to platy, soft, non-calc., mod. caved, med. brownish grey	5YR5/1	2.74
		B 15% Shale, platy, brittle, non-calc., mostly caved, med. dark grey Minor pyrites and sand LCM - metal turnings	N4	2.33
692-120	2100-115m	A 75% Silty mudstone, as 692-119A, mod.	5YR5/1	2.32
		B 20% Shale, as 692-119B, minor cavings	N4	2.74
		C 5% LCM - metal turnings and plastic		
692-121	2115-130m	A 85% Silty mudstone, as 692-119A, mod. caved	5YR5/1	2.14
		B 10% Shale, as 692-119B, minor cavings	N4	2.69
		C 5% LCM - metal turnings		
692-122	2130-145m	A 80% Silty shale, subfissile to blocky, soft, non-calc., minor cavings, brownish grey	5YR4/1	2.52
		B 10% Shale, platy to thinly fissile, brittle, non-calc., minor cavings, med. dark grey	N4	2.33
		C 10% LCM - metal turnings and plastic Minor pyrites and siltstone		
692-167 SWC	2143m	A 98% Shale, subfissile, mod. hard, non-calc., med. light to light brownish grey	N6-5YR6/1	2.29

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-123	2145-160m	A 90% Silty shale, subfissile to blocky, soft, non-calc., minor cavings, brownish grey	5YR4/1	2.43
		B 5% Shale, platy to thinly fissile, brittle, non-calc., mod. caved, med. dark grey	N4	2.06
		C 5% LCM - metal turnings and plastic		
692-124	2160-175m	A 65% Silty shale, subfissile, soft, non-calc., minor cavings, brownish grey	5YR4/1	2.26,2.24
		B 30% Shale, subfissile, blocky in part, mod. hard, non-calc., minor cavings, med. dark grey	N4	3.32
		C 5% LCM - metal turnings Minor drilling mud		
692-125	2175-190m	A 75% Silty shale, as 692-124A, minor cavings	5YR4/1	2.33
		B 25% Shale, as 692-124B, minor cavings	N4	3.10
		Minor LCM - metal turnings, rubber and mud		
692-126	2190-205m	A 70% Shale, subfissile, soft, sl. silty, non-calc., mod. caved, med. brownish grey	5YR5/1	2.17,2.19
		B 30% Shale, platy to thinly fissile, brittle, non-calc., minor cavings, med. dark grey	N4	4.05
		Minor limestone. Minor LCM		
692-127	2205-220m	A 55% Shale, as 692-126A, minor cavings	5YR5/1	2.43
		B 45% Shale, as 692-126B, mod. caved	N4	3.73
		Minor limestone. Minor LCM and mud.		
692-128	2220-235m	A 60% Shale, thinly fissile, brittle, non-calc., mod. caved, med. dark to dark grey	N4-3	3.34,3.37
		B 35% Shale, sl. silty, blocky, soft to mod. hard, non-calc., mod. caved, brownish grey	5YR4/1	1.94
		C <5% Limestone, blocky, mod. hard, very light grey	N8	
		LCM - metal and rubber		
692-129	2235-250m	A 70% Shale, as 692-128A, mod. caved	N4-3	3.52
		B 30% Siltstone, blocky to subfissile, soft to mod. hard, v. sl. calc., light grey	N7	2.65
		Minor limestone and mudstone Minor LCM		
692-168 SWC	2249m	A 98% Shaly mudstone, blocky, soft to mod. hard, non-calc., light olive grey	5Y6/1	1.03
692-130	2250-265m	A 55% Shale, as 692-128A, mod. caved	N4-3	2.33,2.85
		B 35% Shale, sl. silty, subfissile to blocky, soft to mod. hard, non-calc., minor cavings, brownish to dark brownish grey	5YR4/1-5YR3/1	3.50
		C 10% Siltstone, as 692-129B	N7	2.47
		Minor limestone. Minor LCM		

Abbreviations = **arena**ceous, **argil**laceous, **calc**areous, **Cut**, **dolo**mitic, **F**luorescence, **foram**inifera, **foss**iliferous
Lost Circulation Material, **mod**erately, **occ**asionally, **sl**ightly, **v**ery

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-131	2265-280m	A 75% Silty shale, platy to subfissile, soft, non-calc., minor cavings, med. dark to brownish grey	N4-5YR4/1	3.08
		B 25% Shale, thinly fissile, brittle, non-calc., minor cavings, dark grey	N3	2.49
		Minor siltstone and other shale		
692-169 SWC	2282m	A 98% Silty mudstone, blocky to subfissile, soft to mod. hard, sl. silty, non-calc., sl. oil stain?, dark brownish to dark olive grey	5YR3/1-5Y3/1	4.43
692-132	2280-295m	A 95% Silty shale, as 692-131A, minor cavings	N4-5YR4/1	4.07,4.00
		B 5% Shale, as 692-131B, mod. caved	N3	2.80
		Minor siltstone and other shale		
692-133	2295-310m	A 98% Silty shale, as 692-131A, minor cavings	N4-5YR4/1	4.56
		Minor shale and siltstone		
		Minor LCM		
692-134	2310-325m	A 98% Silty shale, as 692-131A, minor cavings	N4-5YR4/1	4.93
		Minor shale and siltstone		
		Minor LCM		
692-135	2325-340m	A 98% Silty shale, platy to subfissile, soft, non-calc., mod. caved, dark to dark brownish grey	N3-5YR3/1	4.42,4.36
		Minor shale		
		Minor LCM		
692-136	2340-355m	A 90% Silty shale, subfissile, soft to mod. hard, non-calc., mod. caved, med. dark to brownish grey	N4-5YR4/1	4.34
		B 10% Shale, platy to thinly fissile, brittle, non-calc., mostly caved, dark grey	N3	
		Minor other shale		
692-137	2355-370m	A 98% Silty shale, as 692-136A, mod. caved	N4-5YR4/1	6.44
		Minor other shale		
		Minor LCM		
692-170 SWC	2376m	A 98% Silty mudstone, blocky to platy, mod. hard, non-calc., sl. oil stain?, dark brownish grey	5YR3/1	9.54
692-138	2370-385m	A 98% Silty shale, as 692-136A, mod. caved	N4-5YR4/1	7.94
		Minor other shale		
		Minor LCM		
692-171 SWC	2385m	A 98% Silty mudstone, subfissile, mod. hard, non-calc., sl. oil stain?, dark brownish to brownish grey	5YR3/1-5YR4/1	6.25,6.34
692-139	2385-400m	A 98% Shale, sl. silty, subfissile, soft to mod. hard, non-calc., mod. caved, oil stain, dark brownish grey	5YR3/1	10.50
		Minor other shale. Minor LCM		

Abbreviations = **arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous**
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-172 SWC	2394m	A 98% Silty mudstone, subfissile, mod. hard, non-calc., sl. oil stain, dark brownish to brownish grey	5YR3/1-5YR4/1	3.90
692-140	2400-415m	A 55% Shale, sl. silty, subfissile, soft to mod. hard, non-calc., minor cavings, med. dark to brownish grey	N4-5YR4/1	8.10
		B 40% Shale, thinly fissile, brittle, non-calc., minor cavings, dark grey	N3	2.85
		C 5% Siltstone, blocky, mod. hard, v. sl. calc., light olive yellowish grey to light brownish pinkish grey	5Y7/1-5YR7/1	
		Minor LCM		
692-141	2495-510m	A 60% Shale, platy to thinly fissile, non-calc., mod. caved, med. dark grey	N4	2.87,2.86
		B 40% Sandstone, unconsolidated in part, fine to medium grained, subrounded-subangular, v. pale cut, pinkish grey	5YR8/1	
		Minor other shale		
692-142	2510-525m	A 90% Sandstone, as 692-141B, pale white F., strong cut	5YR8/1	
		B 10% Shale, platy to thinly fissile, brittle, non-calc., mod. caved, dark to med. dark grey	N3-4	3.21
692-143	2525-540m	A 90% Sandstone, as 692-141B, pale white F., strong cut	5YR8/1	
		B 10% Shale, as 692-142B, mostly caved	N3-4	2.65
692-144	2540-555m	A 95% Sandstone, blocky, unconsolidated in part, fine grained, subangular, fairly well sorted, sl. calc. matrix, v. pale cut, pinkish grey	5YR8/1	
		B 5% Shale, platy, mod. hard, brittle, non-calc., mostly caved, dark grey	N3	4.17
692-145	2555-570m	A 95% Sandstone, as 692-144A, mod. caved, v. pale cut	5YR8/1	
		B 5% Shale, as 692-144B, mostly caved	N3	6.00
692-146	2570-585m	A 95% Sandstone, as 692-144A, mod. caved, v. pale cut	5YR8/1	
		B 5% Shale, as 692-144B, mostly caved	N3	2.63
		Minor other shale		
692-147	2585-600m	A 85% Sandstone, blocky, fine grained, sub-angular, fairly well sorted, sl. calc. matrix, v. pale cut, pinkish grey	5YR8/1	
		B 15% Shale, platy to thinly fissile, brittle, non-calc., mod. caved, dark grey	N3	2.33,2.35
		Minor coal (caved) and other shale		
		Minor LCM		
692-148	2600-630m	A 75% Sandstone, as 692-147A, v. pale cut	5YR8/1	
		B 25% Shale, as 692-147B, mod. to abundantly caved	N3	3.22

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-149	2615-630m	A 90% Sandstone, blocky, fine grained, subangular, fairly well sorted, sl. calc. matrix, pale cut, pinkish grey	5YR8/1	
		B 10% Shale, platy to thinly fissile, brittle, non-calc., mostly caved, dark grey	N3	2.59
692-150	2630-645m	A 95% Sandstone, as 692-149A, pale cut	5YR8/1	
		B 5% Shale, as 692-149B, mostly caved Minor other shale Minor LCM	N3	3.75
692-151	2645-660m	A 95% Sandstone, as 692-149A, pale cut	5YR8/1	
		B 5% Shale, as 692-149B, mostly caved Minor other shale Minor LCM	N3	9.20
692-152	2660-675m	A 90% Shale, platy to thinly fissile, mod. hard, brittle, non-calc., mod. to abundantly caved, dark to med. dark grey	N3-4	2.92,2.97
		B 10% Sandstone, as 692-149A Minor pyrites and other shale	5YR8/1	
692-153	2675-690m	A 95% Shale, as 692-152A, mod. to abundantly caved	N3-4	2.44
		B 5% Sandstone, as 692-149A Minor pyrites and other shale Minor LCM	5YR8/1	
692-154	2690-705m	A 55% Shale, as 692-152A, mod. caved	N3-4	3.52
		B 30% Silty shale, blocky, hard, non-calc., TURBODRILLED, med. dark to dark grey	N4-3	1.56
		C 10% Sandstone, as 692-149A	5YR8/1	
		D 5% LCM - fibre, rubber and paint Minor pyrites		
692-155	2705-720m	A 60% Shale, as 692-152A, mod. caved	N3-4	2.92
		B 20% Silty shale, as 692-154B, TURBO-DRILLED	N4-3	1.16
		C 15% Sandstone, as 692-149A	5YR8/1	
		D 5% LCM - as 692-154D Minor pyrites and sand		
692-156	2720-735m	A 85% Shale, subfissile to platy, mod. hard, brittle, non-calc., mod. caved, med. dark grey	N4	2.79,2.82
		B 25% Siltstone, blocky, hard, non-calc., TURBODRILLED, med. dark to med. grey	N4-5	0.93
		C 15% Sandstone, blocky, fine grained, sub-angular, well sorted, v. sl. calc. matrix, pinkish grey	5YR8/1	
		D 5% LCM - fibre and rubber Minor pyrites		
692-157	2735-750m	A 65% Siltstone, as 692-156B, TURBODRILLED	N4-5	0.82
		B 25% Shale, as 692-156A, mod. caved	N4	2.49
		C 10% LCM - rubber and fibre Minor pyrites		

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
692-158	2750-765m	A 70% Shale, thinly fissile to subfissile, brittle, non-calc., mod. caved, med. dark grey	N4	2.40,2.44
		B 15% Siltstone, blocky, hard, non-calc., TURBODRILLED, med. dark to med. grey	N4-5	0.93
		C 10% Sand, unconsolidated, medium grained, subrounded, clear, white	N9	
		D 5% Sandstone, blocky, fine grained, subangular, well sorted, v. sl. calc. matrix, pinkish grey	5YR8/1	
692-159	2765-780m	A 80% Shale, as 692-158A, mod. caved	N4	2.47
		B 15% Sandstone, as 692-158D	5YR8/1	
		C 5% Siltstone, as 692-158B, TURBODRILLED	N4-5	
		LCM - rubber and paint		
692-160	2780-795m	A 55% Shale, as 692-158A, mod. to abundantly caved	N4	2.71
		B 45% Sandstone, blocky, fine grained, subnagular, well sorted, white to pinkish grey	N9-5YR8/1	
		Minor other shale		
		Minor LCM		
692-161	2795-810m	A 65% Sandstone, as 692-160A	N4	
		B 35% Shale, platy, mod. hard, brittle, non-calc., mod. caved, med. dark grey	N4	5.01
		LCM - rubber and fibre		
692-162	2810-825m	A 50% Sandstone, as 692-160A	N4	
		B 50% Shale, as 692-161B, mod. to abundantly caved	N4	3.23
		Minor other shale		
		Minor LCM		
692-163	2825-840m	A 80% Sandstone, as 692-160A	N4	
		B 10% Shale, as 692-161B, mod. to abundantly caved	N4	1.90,1.86
		C 10% LCM - fibre		

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 2A
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-001	320-335	13223	3	3	1	1	13232	9	0.1	4	1.92
692-002	335-350	14319	4	3	0	0	14327	7	0.1	1	3.84
692-003	350-365	11586	4	4	1	0	11596	10	0.1	1	3.12
692-004	365-380	198	8	1	0	0	207	10	4.6	2	0.96
692-005	380-395	150	3	2	0	0	157	6	4.1	4	0.96
692-006	395-410	32	2	4	0	0	38	7	17.3	6	0.96
692-007	410-425	19	17	3	0	0	38	19	50.6	1	0.00
692-008	425-440	18	17	3	0	0	38	20	53.0	0	0.00
692-009	440-455	11	12	9	8	4	45	34	75.2	8	1.92
692-010	455-470	16	18	16	2	2	54	38	70.8	2	0.96
692-011	470-485	44	16	5	0	0	67	23	34.2	1	0.96
692-012	485-500	9	4	7	16	18	53	44	83.5	1	0.89
692-013	500-515	6180	1345	380	60	64	8029	1849	23.0	7	0.94
692-014	515-530	11641	2269	249	56	43	14256	2616	18.3	1	1.31
692-015	530-545	1393	270	30	12	7	1712	320	18.7	1	1.72
692-016	545-560	1787	164	40	14	14	2019	232	11.5	0	0.97
692-017	560-575	13688	570	248	76	85	14668	980	6.7	8	0.89
692-018	575-590	2206	82	35	15	13	2352	145	6.2	0	1.13
692-019	590-605	1746	37	21	16	9	1829	84	4.6	1	1.83
692-020	605-620	5851	86	66	89	27	6121	270	4.4	3	3.26
692-021	620-635	3221	137	85	38	19	3499	278	8.0	2	1.98
692-022	635-650	11323	168	111	64	33	11698	375	3.2	1	1.94
692-023	650-665	886	15	17	6	4	928	42	4.5	5	1.60
692-024	665-680	4742	142	105	26	22	5038	296	5.9	0	1.17
692-025	680-695	71	1	5	1	1	79	9	11.0	0	0.96
692-026	695-710	75	17	33	19	22	167	92	54.9	12	0.85
692-027	710-725	198	92	123	10	10	433	235	54.3	12	0.97
692-028	725-740	58	25	26	6	4	119	61	51.4	5	1.61
692-029	740-755	252	5	2	1	1	261	9	3.6	0	0.97
692-030	755-770	87	27	0	0	0	115	27	23.7	0	0.00

TABLE 2A
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-032	785-800	89	26	9	1	1	125	36	28.9	33	0.97
692-033	800-815	4	1	6	0	0	12	8	64.5	8	0.97
692-034	815-830	8149	1281	766	102	219	10518	2369	22.5	7	0.47
692-035	830-845	6026	1027	685	103	196	8037	2011	25.0	10	0.53
692-036	845-860	4648	692	495	70	185	6090	1441	23.7	8	0.38
692-037	860-875	8	4	12	1	1	26	18	68.6	2	0.48
692-038	875-890	31	1	0	0	0	32	2	4.9	0	0.97
692-039	890-905	101	22	14	2	4	143	42	29.6	1	0.50
692-040	905-920	137	31	19	4	9	200	63	31.5	2	0.43
692-041	920-935	9	1	0	0	0	10	1	11.1	0	0.95
692-042	935-950	13	2	4	1	1	20	7	35.3	0	0.95
692-043	950-965	61	9	11	3	7	90	29	32.6	1	0.42
692-044	965-980	47	2	8	2	3	61	15	24.1	5	0.95
692-045	980-995	3173	672	743	167	351	5106	1934	37.9	7	0.47
692-046	995-1010	3983	438	474	58	139	5092	1109	21.8	11	0.42
692-047	1010-1025	20	7	16	5	12	60	41	67.6	6	0.42
692-048	1025-1040	4248	584	570	117	264	5784	1535	26.5	15	0.44
692-049	1040-1055	38	19	12	8	7	83	45	54.4	15	1.19
692-050	1055-1070	4837	443	348	106	221	5956	1119	18.8	60	0.48
692-051	1070-1085	5351	595	506	128	287	6867	1516	22.1	11	0.44
692-052	1085-1100	1351	279	359	85	191	2265	914	40.3	7	0.44
692-053	1100-1115	3	13	0	0	0	17	13	79.2	0	0.95
692-054	1115-1130	938	150	128	46	56	1318	380	28.8	3	0.82
692-055	1130-1145	2456	642	597	189	272	4156	1700	40.9	5	0.69
692-056	1145-1160	9	1	6	3	6	24	16	64.2	2	0.57
692-057	1160-1175	10207	1222	1099	418	560	13506	3299	24.4	7	0.75
692-058	1175-1190	7014	1140	1057	360	514	10086	3072	30.5	25	0.70
692-059	1190-1205	499	118	257	96	201	1171	672	57.4	9	0.47
692-060	1205-1220	1493	327	330	83	129	2362	869	36.8	1	0.65

TABLE 2A
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-061	1220-1235	7227	871	770	212	303	9382	2156	23.0	3	0.70
692-062	1235-1250	522	124	172	69	61	949	427	45.0	5	1.13
692-063	1250-1265	1187	196	199	76	88	1745	559	32.0	2	0.86
692-064	1265-1280	4781	529	554	180	245	6290	1509	24.0	10	0.74
692-065	1280-1295	1570	194	145	47	51	2007	437	21.8	0	0.93
692-066	1295-1310	2382	236	180	67	64	2930	548	18.7	0	1.05
692-067	1310-1325	8	4	9	41	25	87	78	90.5	0	1.63
692-068	1325-1340	2080	198	172	61	64	2575	494	19.2	1	0.96
692-069	1340-1355	26	1	30	1	1	58	32	55.5	0	0.85
692-070	1355-1370	4830	570	418	129	124	6072	1242	20.5	0	1.04
692-071	1370-1385	1314	239	231	69	52	1905	590	31.0	0	1.33
692-072	1385-1400	2385	461	337	89	79	3351	966	28.8	1	1.14
692-073	1400-1415	133	37	19	8	2	199	66	33.4	2	4.04
692-074	1415-1430	17	7	9	4	5	42	25	59.4	1	0.80
692-075	1430-1445	85	50	87	34	32	288	203	70.6	0	1.07
692-076	1445-1460	1877	203	168	43	40	2331	455	19.5	0	1.07
692-077	1460-1475	576	77	56	17	17	744	168	22.6	0	1.01
692-078	1475-1490	53	9	17	7	9	95	42	44.3	2	0.77
692-079	1490-1505	407	103	105	32	27	674	267	39.6	2	1.17
692-080	1505-1520	243	80	68	21	22	435	191	44.0	1	0.99
692-081	1520-1535	5	1	3	1	1	11	6	51.3	0	0.78
692-082	1535-1550	188	60	60	18	17	343	155	45.1	1	1.10
692-083	1550-1565	103	30	27	8	8	177	74	41.6	1	1.05
692-084	1565-1578	11	3	4	1	1	20	8	42.9	0	0.85
692-085	1578-1590	1209	229	158	40	37	1674	464	27.7	0	1.08
692-086	1590-1605	1659	231	135	32	25	2081	422	20.3	0	1.24
692-087	1605-1620	1478	231	157	31	22	1919	441	23.0	2	1.41
692-088	1620-1635	1308	260	165	36	29	1798	490	27.3	0	1.22
692-089	1635-1650	3598	821	448	91	73	5030	1432	28.5	0	1.25
692-090	1650-1665	1550	154	237	48	38	2027	478	23.6	54	1.27

TABLE 2A
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-091	1665-1680	95	30	9	12	4	149	55	36.6	0	2.82
692-092	1680-1695	2385	461	298	51	44	3239	854	26.4	0	1.14
692-093	1695-1710	448	77	40	6	4	575	127	22.1	0	1.45
692-094	1710-1725	2219	473	349	71	57	3169	951	30.0	1	1.24
692-095	1725-1740	2391	517	368	73	61	3409	1018	29.9	1	1.20
692-096	1740-1755	5136	897	494	107	93	6727	1591	23.6	0	1.15
692-097	1755-1770	292	65	43	9	7	416	124	29.8	0	1.34
692-098	1770-1785	4017	990	669	132	115	5924	1907	32.2	1	1.15
692-099	1785-1800	6395	1746	1324	216	171	9852	3457	35.1	5	1.26
692-100	1800-1815	4779	1069	744	130	113	6836	2057	30.1	2	1.15
692-101	1815-1830	1494	454	379	63	55	2444	951	38.9	0	1.14
692-102	1830-1845	7679	1368	824	122	101	10093	2415	23.9	1	1.22
692-103	1845-1860	2518	532	300	43	35	3427	909	26.5	1	1.22
692-104	1860-1875	5831	1497	839	125	106	8397	2566	30.6	1	1.18
692-105	1875-1890	9303	2415	1827	245	246	14036	4734	33.7	4	1.00
692-106	1890-1905	6021	1619	1456	243	237	9577	3556	37.1	5	1.02
692-107	1905-1920	5758	1639	1383	313	265	9358	3600	38.5	1	1.18
692-108	1917-1935	11	16	28	14	10	79	68	86.2	1	1.41
692-109	1935-1950	5	7	9	2	2	26	20	78.8	0	0.72
692-110	1950-1965	60	36	66	12	14	188	129	68.3	0	0.82
692-111	1965-1980	27	14	32	7	10	89	62	69.4	0	0.71
692-112	1980-1995	113	72	126	22	29	361	248	68.6	3	0.76
692-113	1995-2010	120	63	118	25	32	359	239	66.4	1	0.79
692-114	2010-2025	3499	873	986	163	135	5655	2157	38.1	3	1.21
692-115	2025-2040	2762	832	1006	149	125	4874	2112	43.3	1	1.19
692-116	2040-2055	1013	341	577	94	87	2111	1099	52.0	3	1.08
692-117	2055-2070	245	62	102	19	17	444	200	44.9	0	1.16
692-118	2070-2085	1777	487	733	124	112	3233	1456	45.0	0	1.11
692-119	2085-2100	2199	530	556	89	73	3448	1248	36.2	1	1.21
692-120	2100-2115	638	255	567	100	120	1679	1041	62.0	6	0.83

TABLE 2A
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-121	2115-2130	2288	475	908	173	192	4035	1748	43.3	7	0.90
692-122	2130-2145	131	63	160	35	44	432	302	69.8	4	0.80
692-123	2145-2160	5	2	3	0	0	11	6	53.8	1	1.17
692-124	2160-2175	2425	577	1117	218	258	4595	2170	47.2	14	0.84
692-125	2175-2190	41	23	43	14	23	144	102	71.1	10	0.62
692-126	2190-2205	45	19	31	3	6	104	59	56.5	1	0.56
692-127	2205-2220	3079	621	611	62	83	4456	1377	30.9	3	0.75
692-128	2220-2235	1140	627	380	39	58	2243	1103	49.2	1	0.66
692-129	2235-2250	4929	870	754	71	134	6758	1829	27.1	2	0.53
692-130	2250-2265	890	405	839	83	288	2505	1615	64.5	9	0.29
692-131	2265-2280	5627	2235	4739	443	1445	14490	8863	61.2	46	0.31
692-132	2280-2295	7076	3486	6152	574	2030	19317	12241	63.4	216	0.28
692-133	2295-2310	643	510	1183	116	456	2908	2265	77.9	108	0.25
692-134	2310-2325	1769	1382	3171	365	1358	8045	6276	78.0	75	0.27
692-135	2325-2340	706	759	2047	200	890	4603	3896	84.7	371	0.22
692-136	2340-2355	1638	1628	3520	350	1508	8644	7006	81.1	610	0.23
692-137	2355-2370	212	229	842	143	602	2028	1816	89.6	321	0.24
692-138	2370-2385	233	270	498	65	293	1359	1126	82.8	221	0.22
692-139	2385-2400	391	472	1132	138	496	2630	2239	85.1	197	0.28
692-140	2400-2415	167	282	481	48	217	1195	1029	86.1	149	0.22
692-141	2495-2510	2341	756	713	86	199	4096	1755	42.8	186	0.43
692-142	2510-2525	475	263	412	85	190	1425	950	66.7	243	0.45
692-143	2525-2540	5931	2248	1016	112	282	9589	3658	38.2	256	0.40
692-144	2540-2555	686	262	120	18	59	1145	459	40.1	68	0.31
692-145	2555-2570	7607	1686	885	135	369	10682	3075	28.8	300	0.37
692-146	2570-2585	18829	2600	826	103	259	22616	3788	16.7	244	0.40
692-147	2585-2600	8101	1389	664	94	183	10431	2330	22.3	140	0.51
692-148	2600-2615	8218	1973	1349	137	297	11974	3755	31.4	200	0.46
692-149	2615-2630	587	299	251	29	67	1231	645	52.4	53	0.43
692-150	2630-2645	8767	1424	508	53	114	10865	2098	19.3	74	0.46

TABLE 2A
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-151	2645-2660	18567	2207	723	62	142	21700	3133	14.4	91	0.43
692-152	2660-2675	50515	2795	3134	276	552	57273	6758	11.8	928	0.50
692-153	2675-2690	15970	3688	2952	271	603	23485	7514	32.0	306	0.45
692-154	2690-2705	7768	2122	1891	195	440	12417	4648	37.4	215	0.44
692-155	2705-2720	6019	1539	1519	152	337	9566	3547	37.1	135	0.45
692-156	2720-2735	5749	2244	1902	164	390	10449	4700	45.0	170	0.42
692-157	2735-2750	12693	1231	664	69	154	14811	2118	14.3	77	0.45
692-158	2750-2765	6390	1337	1131	110	232	9199	2809	30.5	115	0.47
692-159	2765-2780	95	54	87	12	29	277	182	65.6	27	0.42
692-160	2780-2795	6667	1872	660	43	84	9325	2658	28.5	30	0.51
692-161	2795-2810	10808	2372	1066	78	178	14502	3694	25.5	78	0.44
692-162	2810-2825	681	237	174	13	26	1131	450	39.8	12	0.51
692-163	2825-2840	5646	1285	444	32	49	7457	1811	24.3	17	0.65

TABLE 2B
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-001	320-335	2377	14	4	4	2	2401	24	1.0	4	1.92
692-002	335-350	3992	16	3	0	0	4012	19	0.5	3	1.92
692-003	350-365	2917	6	1	0	0	2925	8	0.3	2	0.96
692-004	365-380	160	8	5	0	0	174	13	7.7	10	0.96
692-005	380-395	146	5	0	0	0	151	5	3.6	3	0.00
692-006	395-410	139	45	30	4	2	220	81	36.7	0	1.92
692-007	410-425	53	34	23	4	4	117	64	54.7	0	0.87
692-008	425-440	46	58	81	31	38	254	208	81.8	1	0.80
692-009	440-455	48	31	82	39	72	272	224	82.4	7	0.54
692-010	455-470	66	21	51	41	87	265	199	75.1	1	0.47
692-011	470-485	15	8	38	32	70	162	147	90.8	8	0.46
692-012	485-500	698	297	237	45	136	1412	714	50.6	1	0.33
692-013	500-515	382	177	66	20	27	672	290	43.2	1	0.75
692-014	515-530	2082	584	66	45	37	2815	732	26.0	10	1.23
692-015	530-545	1017	299	47	22	26	1411	394	27.9	7	0.85
692-016	545-560	569	95	42	18	27	751	182	24.3	2	0.65
692-017	560-575	819	43	58	39	30	990	170	17.2	6	1.30
692-018	575-590	812	50	41	23	39	965	153	15.8	0	0.60
692-019	590-605	503	32	16	8	5	564	61	10.8	4	1.48
692-020	605-620	158	30	32	40	14	274	116	42.2	0	2.74
692-021	620-635	300	28	16	22	8	374	75	19.9	0	2.69
692-022	635-650	1377	51	33	22	15	1498	121	8.1	8	1.43
692-023	650-665	116	16	8	2	2	144	28	19.3	0	1.44
692-024	665-680	214	7	13	4	9	248	33	13.4	2	0.46
692-025	680-695	86	4	4	4	2	101	15	14.9	7	1.61
692-026	695-710	61	9	31	17	25	143	82	57.4	10	0.67
692-027	710-725	47	12	54	17	24	155	108	69.9	7	0.71
692-028	725-740	57	21	61	20	51	210	152	72.7	10	0.40
692-029	740-755	9	2	1	0	0	13	4	29.7	0	0.97
692-030	755-770	47	11	33	18	64	172	126	73.0	2	0.28

TABLE 2B
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-031	770-785	16	6	13	4	10	49	33	67.1	14	0.39
692-032	785-800	21	4	18	15	16	73	52	70.7	1	0.92
692-033	800-815	29	4	20	13	20	86	58	66.8	2	0.66
692-034	815-830	417	105	136	50	142	851	434	51.0	3	0.35
692-035	830-845	201	81	103	22	74	480	279	58.2	1	0.29
692-036	845-860	391	115	118	45	118	787	396	50.4	30	0.38
692-037	860-875	21	3	1	0	0	25	4	14.7	4	0.97
692-038	875-890	47	8	7	1	1	63	17	26.4	0	0.64
692-039	890-905	55	9	19	3	4	89	34	38.6	3	0.67
692-040	905-920	76	18	19	6	23	142	66	46.2	3	0.26
692-041	920-935	69	28	1	0	0	99	30	30.1	0	0.95
692-042	935-950	53	4	1	0	0	58	5	9.3	2	0.95
692-043	950-965	60	4	4	1	2	71	11	15.6	1	0.48
692-044	965-980	167	5	5	3	4	184	17	9.2	1	0.67
692-045	980-995	923	157	210	79	237	1607	684	42.6	0	0.33
692-046	995-1010	650	86	82	17	63	899	248	27.6	19	0.27
692-047	1010-1025	514	89	98	112	207	1020	505	49.6	36	0.54
692-048	1025-1040	293	19	75	22	72	481	188	39.2	76	0.30
692-049	1040-1055	253	38	26	73	33	423	170	40.2	33	2.21
692-050	1055-1070	372	54	51	14	55	546	174	31.8	43	0.26
692-051	1070-1085	424	69	129	209	65	896	472	52.7	1	3.23
692-052	1085-1100	170	42	74	10	70	366	197	53.7	2	0.15
692-053	1100-1115	238	81	66	167	54	605	368	60.7	0	3.12
692-054	1115-1130	289	107	271	99	204	970	681	70.2	12	0.49
692-055	1130-1145	505	196	978	141	393	2212	1707	77.2	41	0.36
692-056	1145-1160	1337	176	1067	190	490	3260	1923	59.0	87	0.39
692-057	1160-1175	750	206	263	123	341	1683	933	55.5	29	0.36
692-058	1175-1190	632	218	250	140	292	1532	900	58.7	14	0.48
692-059	1190-1205	80	62	60	101	215	519	438	84.5	24	0.47
692-060	1205-1220	879	253	389	151	398	2069	1191	57.5	19	0.38

TABLE 2B

CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-061	1220-1235	583	138	205	85	215	1227	643	52.4	4	0.40
692-062	1235-1250	290	102	245	79	196	912	622	68.2	24	0.40
692-063	1250-1265	208	78	106	79	140	611	404	66.0	11	0.56
692-064	1265-1280	935	229	285	120	205	1774	839	47.3	9	0.58
692-065	1280-1295	432	107	173	114	128	954	522	54.7	1	0.89
692-066	1295-1310	249	42	74	29	54	447	198	44.4	4	0.54
692-067	1310-1325	176	82	42	25	45	370	195	52.6	0	0.57
692-068	1325-1340	206	48	64	25	48	391	185	47.4	2	0.51
692-069	1340-1355	247	55	115	46	86	549	302	55.1	1	0.54
692-070	1355-1370	832	204	304	74	135	1549	718	46.3	2	0.55
692-071	1370-1385	181	72	148	52	96	549	367	67.0	0	0.54
692-072	1385-1400	279	127	201	67	131	804	525	65.3	1	0.52
692-073	1400-1415	90	25	74	27	64	280	191	68.0	1	0.43
692-074	1415-1430	97	19	74	37	72	299	202	67.6	0	0.51
692-075	1430-1445	63	19	97	49	68	296	233	78.8	2	0.73
692-076	1445-1460	444	101	174	55	101	875	431	49.3	1	0.55
692-077	1460-1475	412	123	203	66	129	933	521	55.9	0	0.51
692-078	1475-1490	100	16	85	38	60	299	200	66.7	6	0.64
692-079	1490-1505	210	105	179	45	86	625	415	66.4	6	0.52
692-080	1505-1520	202	78	152	46	78	555	353	63.6	1	0.59
692-081	1520-1535	103	27	77	24	45	275	173	62.7	3	0.52
692-082	1535-1550	226	80	123	35	57	520	294	56.5	1	0.61
692-083	1550-1565	92	34	66	16	33	240	148	61.8	0	0.48
692-084	1565-1578	252	63	100	12	42	470	217	46.3	0	0.29
692-085	1578-1590	155	57	94	27	46	379	224	59.1	0	0.58
692-086	1590-1605	1000	238	204	73	80	1596	595	37.3	8	0.91
692-087	1605-1620	335	148	248	41	107	878	543	61.9	5	0.38
692-088	1620-1635	474	204	253	59	101	1092	618	56.6	0	0.58
692-089	1635-1650	164	108	178	26	52	528	365	69.0	1	0.50
692-090	1650-1665	237	123	212	47	84	702	465	66.3	1	0.56

TABLE 2B
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-091	1665-1680	119	64	154	39	66	442	323	73.0	0	0.58
692-092	1680-1695	335	144	222	42	70	814	479	58.8	2	0.60
692-093	1695-1710	1662	544	465	64	85	2819	1158	41.1	3	0.75
692-094	1710-1725	1019	357	446	76	120	2017	999	49.5	4	0.64
692-095	1725-1740	653	314	405	78	137	1586	934	58.9	3	0.57
692-096	1740-1755	1398	571	691	154	267	3081	1683	54.6	2	0.58
692-097	1755-1770	314	185	556	113	194	1363	1049	77.0	10	0.58
692-098	1770-1785	1494	652	788	121	230	3285	1791	54.5	2	0.53
692-099	1785-1800	1040	856	1330	197	349	3772	2733	72.4	5	0.56
692-100	1800-1815	1717	1100	1412	217	321	4767	3050	64.0	0	0.68
692-101	1815-1830	449	479	907	123	267	2224	1776	79.8	1	0.46
692-102	1830-1845	4192	1505	1584	296	298	7875	3683	46.8	0	0.99
692-103	1845-1860	2828	1801	2261	277	453	7620	4791	62.9	1	0.61
692-104	1860-1875	3442	2071	2130	303	493	8439	4998	59.2	26	0.62
692-105	1875-1890	1168	1078	1412	161	337	4157	2989	71.9	7	0.48
692-106	1890-1905	1460	936	1661	237	414	4709	3249	69.0	5	0.57
692-107	1905-1920	602	488	863	122	233	2309	1707	73.9	26	0.52
692-108	1917-1935	101	41	501	119	255	1018	917	90.1	4	0.47
692-109	1935-1950	65	27	446	83	157	777	712	91.6	10	0.53
692-110	1950-1965	355	472	1562	197	374	2960	2605	88.0	14	0.53
692-111	1965-1980	187	229	817	121	248	1602	1415	88.3	7	0.49
692-112	1980-1995	368	587	249	47	65	1317	949	72.0	5	0.72
692-113	1995-2010	353	257	888	130	254	1883	1530	81.2	28	0.51
692-114	2010-2025	1339	846	1663	223	404	4475	3136	70.1	0	0.55
692-115	2025-2040	953	1029	2237	271	504	4995	4041	80.9	6	0.54
692-116	2040-2055	447	354	1089	144	294	2329	1882	80.8	11	0.49
692-117	2055-2070	639	522	1318	144	318	2942	2302	78.3	3	0.45
692-118	2070-2085	1400	705	1794	254	480	4634	3234	69.8	2	0.53
692-119	2085-2100	1570	1196	2364	271	486	5887	4317	73.3	5	0.56
692-120	2100-2115	501	282	1227	200	432	2643	2142	81.0	2	0.46

TABLE 2B
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-121	2115-2130	432	308	1320	200	430	2690	2258	83.9	25	0.47
692-122	2130-2145	226	227	1108	210	450	2221	1995	89.8	5	0.47
692-123	2145-2160	155	103	728	148	359	1493	1338	89.6	78	0.41
692-124	2160-2175	896	518	1814	329	647	4204	3308	78.7	44	0.51
692-125	2175-2190	537	429	2077	365	756	4165	3628	87.1	68	0.48
692-126	2190-2205	1571	1147	4055	369	717	7859	6289	80.0	33	0.52
692-127	2205-2220	763	430	1190	95	307	2785	2022	72.6	17	0.31
692-128	2220-2235	2123	764	1417	68	181	4553	2431	53.4	238	0.38
692-129	2235-2250	1607	826	1656	153	494	4736	3129	66.1	22	0.31
692-130	2250-2265	2585	1481	6178	843	4093	15180	12596	83.0	1902	0.21
692-131	2265-2280	2661	2909	15359	2385	10066	33380	30718	92.0	250	0.24
692-132	2280-2295	3171	3819	21557	2457	10368	41371	38200	92.3	1858	0.24
692-133	2295-2310	1478	2262	14406	2470	11854	32471	30993	95.4	422	0.21
692-134	2310-2325	1070	1954	15415	2553	12119	33112	32041	96.8	1359	0.21
692-135	2325-2340	1490	2428	16070	2973	14184	37145	35654	96.0	8801	0.21
692-136	2340-2355	1173	2619	15462	3121	14094	36469	35296	96.8	8180	0.22
692-137	2355-2370	2151	4755	21173	3225	13216	44520	42369	95.2	5593	0.24
692-138	2370-2385	4384	8554	26853	3429	12392	55612	51228	92.1	4202	0.28
692-139	2385-2400	5655	8887	17258	1897	6993	40690	35035	86.1	2334	0.27
692-140	2400-2415	2441	4313	13861	2073	7680	30368	27927	92.0	3314	0.27
692-141	2495-2510	652	345	820	156	473	2446	1794	73.3	639	0.33
692-142	2510-2525	657	243	905	451	1114	3370	2713	80.5	2594	0.40
692-143	2525-2540	549	928	852	107	357	2793	2244	80.3	371	0.30
692-144	2540-2555	1501	735	505	58	236	3034	1533	50.5	271	0.24
692-145	2555-2570	961	413	445	102	428	2348	1387	59.1	625	0.24
692-146	2570-2585	1344	744	644	120	375	3226	1882	58.3	512	0.32
692-147	2585-2600	1642	772	832	148	422	3816	2174	57.0	649	0.35
692-148	2600-2615	837	550	1137	169	626	3319	2483	74.8	514	0.27
692-149	2615-2630	855	358	478	60	237	1988	1133	57.0	208	0.25
692-150	2630-2645	1830	1105	800	75	286	4097	2267	55.3	243	0.26

TABLE 2B
CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-151	2645-2660	2945	721	556	65	214	4501	1556	34.6	188	0.30
692-152	2660-2675	4636	2352	4766	645	1420	13819	9183	66.4	714	0.45
692-153	2675-2690	2132	1541	3165	406	1100	8345	6212	74.4	627	0.37
692-154	2690-2705	5735	1111	2422	315	835	10418	4683	45.0	480	0.38
692-155	2705-2720	2488	834	2154	317	828	6620	4132	62.4	498	0.38
692-156	2720-2735	4513	931	1869	258	659	8229	3716	45.2	334	0.39
692-157	2735-2750	3585	562	452	59	183	4840	1256	25.9	182	0.32
692-158	2750-2765	1530	833	2117	342	880	5702	4172	73.2	600	0.39
692-159	2765-2780	4535	789	2112	347	900	8682	4147	47.8	483	0.39
692-160	2780-2795	6051	6636	3436	226	552	16902	10850	64.2	209	0.41
692-161	2795-2810	2140	1650	2210	295	974	7269	5129	70.6	597	0.30
692-162	2810-2825	362	389	1193	161	637	2741	2379	86.8	427	0.25
692-163	2825-2840	2377	2438	1556	101	263	6734	4358	64.7	100	0.38

TABLE 2C
TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS (2A + 2B)

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-001	320-335	15599	18	8	5	3	15632	33	0.2	8	1.92
692-002	335-350	18312	19	7	1	0	18339	27	0.1	4	2.51
692-003	350-365	14504	11	5	1	0	14521	17	0.1	2	2.16
692-004	365-380	358	16	6	1	1	381	23	6.0	12	0.96
692-005	380-395	296	9	2	0	0	308	12	3.9	7	0.96
692-006	395-410	171	48	34	4	2	258	87	33.8	6	1.77
692-007	410-425	72	50	25	4	4	155	83	53.7	2	0.87
692-008	425-440	64	75	85	31	38	293	228	78.0	1	0.80
692-009	440-455	59	43	91	47	76	317	258	81.4	15	0.62
692-010	455-470	82	39	67	43	89	319	237	74.4	3	0.48
692-011	470-485	59	24	43	33	71	229	170	74.3	8	0.46
692-012	485-500	706	300	244	60	153	1465	758	51.8	2	0.39
692-013	500-515	6561	1522	445	80	91	8700	2139	24.6	8	0.89
692-014	515-530	13723	2853	315	101	79	17071	3348	19.6	11	1.27
692-015	530-545	2410	569	77	34	33	3124	714	22.8	9	1.04
692-016	545-560	2356	259	82	32	41	2770	414	14.9	2	0.76
692-017	560-575	14507	614	306	115	115	15658	1150	7.3	14	1.00
692-018	575-590	3018	132	76	38	52	3317	298	9.0	0	0.74
692-019	590-605	2249	69	38	24	14	2394	145	6.1	5	1.69
692-020	605-620	6009	116	98	129	42	6395	385	6.0	3	3.08
692-021	620-635	3520	165	101	60	27	3873	353	9.1	2	2.19
692-022	635-650	12700	219	144	85	48	13197	496	3.8	9	1.78
692-023	650-665	1002	31	25	8	5	1072	70	6.5	5	1.55
692-024	665-680	4957	150	118	30	31	5285	329	6.2	3	0.97
692-025	680-695	157	6	9	5	4	180	24	13.2	7	1.38
692-026	695-710	136	26	65	36	47	310	174	56.0	22	0.76
692-027	710-725	245	104	177	27	35	588	343	58.4	19	0.79
692-028	725-740	115	45	87	26	54	329	214	64.9	16	0.49
692-029	740-755	261	7	3	2	2	274	13	4.8	0	0.97
692-030	755-770	134	38	33	18	64	287	153	53.3	2	0.28

TABLE 2 C
TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS (2A + 2B)

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-031	770-785	16	6	13	4	10	49	33	67.1	14	0.39
692-032	785-800	111	30	26	15	17	199	88	44.3	34	0.92
692-033	800-815	33	6	26	14	21	98	65	66.5	9	0.66
692-034	815-830	8567	1386	902	152	362	11369	2802	24.6	9	0.42
692-035	830-845	6226	1108	787	125	270	8517	2291	26.9	10	0.46
692-036	845-860	5039	807	614	115	303	6876	1838	26.7	39	0.38
692-037	860-875	30	7	12	1	1	51	21	41.8	6	0.55
692-038	875-890	77	9	7	1	1	96	18	19.1	0	0.67
692-039	890-905	155	31	32	5	8	232	77	33.0	4	0.58
692-040	905-920	213	48	38	10	33	342	128	37.6	5	0.30
692-041	920-935	78	29	1	0	0	109	31	28.4	0	0.95
692-042	935-950	66	6	5	1	1	78	12	15.9	2	0.95
692-043	950-965	121	13	15	4	8	161	40	25.1	2	0.43
692-044	965-980	214	7	13	5	7	246	32	13.0	6	0.78
692-045	980-995	4096	830	953	246	589	6713	2618	39.0	7	0.42
692-046	995-1010	4633	524	556	75	202	5991	1358	22.7	30	0.37
692-047	1010-1025	534	95	115	117	219	1080	546	50.6	42	0.53
692-048	1025-1040	4541	604	645	139	336	6265	1724	27.5	90	0.41
692-049	1040-1055	291	57	39	81	40	506	215	42.6	48	2.04
692-050	1055-1070	5210	497	399	121	276	6502	1292	19.9	102	0.44
692-051	1070-1085	5775	665	635	337	352	7763	1988	25.6	12	0.96
692-052	1085-1100	1521	321	433	95	261	2631	1110	42.2	9	0.36
692-053	1100-1115	241	93	67	167	54	622	381	61.2	0	3.12
692-054	1115-1130	1227	257	400	144	259	2288	1061	46.4	15	0.56
692-055	1130-1145	2961	838	1575	330	665	6369	3407	53.5	46	0.50
692-056	1145-1160	1345	177	1073	193	496	3284	1939	59.0	89	0.39
692-057	1160-1175	10957	1428	1362	541	901	15189	4232	27.9	36	0.60
692-058	1175-1190	7646	1358	1307	500	807	11617	3972	34.2	39	0.62
692-059	1190-1205	580	181	317	196	417	1690	1110	65.7	33	0.47
692-060	1205-1220	2371	581	719	234	526	4431	2060	46.5	20	0.44

TABLE 2 C

TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS (2A + 2B)

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-061	1220-1235	7810	1009	974	297	518	10609	2799	26.4	7	0.57
692-062	1235-1250	812	227	417	148	257	1861	1049	56.4	28	0.57
692-063	1250-1265	1394	275	305	154	228	2356	962	40.8	12	0.68
692-064	1265-1280	5716	759	838	300	451	8064	2348	29.1	19	0.67
692-065	1280-1295	2001	301	318	161	179	2960	959	32.4	1	0.90
692-066	1295-1310	2631	278	254	96	118	3377	747	22.1	4	0.82
692-067	1310-1325	184	86	52	66	70	457	273	59.8	0	0.95
692-068	1325-1340	2286	246	236	86	112	2966	680	22.9	3	0.77
692-069	1340-1355	273	56	145	47	87	607	335	55.1	1	0.54
692-070	1355-1370	5662	774	722	204	260	7621	1959	25.7	2	0.78
692-071	1370-1385	1496	310	379	121	148	2453	958	39.0	0	0.82
692-072	1385-1400	2663	588	537	157	209	4154	1491	35.9	1	0.75
692-073	1400-1415	222	62	94	36	66	479	257	53.6	3	0.54
692-074	1415-1430	114	26	84	41	77	341	227	66.6	1	0.53
692-075	1430-1445	147	68	185	83	100	583	436	74.8	2	0.84
692-076	1445-1460	2321	304	342	98	141	3207	886	27.6	1	0.70
692-077	1460-1475	988	200	259	83	146	1676	689	41.1	0	0.57
692-078	1475-1490	153	25	103	45	69	395	242	61.3	8	0.66
692-079	1490-1505	617	208	284	77	113	1299	682	52.5	7	0.68
692-080	1505-1520	445	158	220	67	99	990	545	55.0	1	0.68
692-081	1520-1535	108	28	80	24	46	286	178	62.2	3	0.53
692-082	1535-1550	415	140	182	53	74	864	449	52.0	1	0.72
692-083	1550-1565	195	63	93	24	41	417	222	53.3	1	0.59
692-084	1565-1578	264	66	104	13	43	490	226	46.1	0	0.30
692-085	1578-1590	1365	286	252	67	84	2053	689	33.5	0	0.80
692-086	1590-1605	2659	469	338	105	106	3677	1018	27.7	8	0.99
692-087	1605-1620	1813	379	404	72	129	2797	984	35.2	7	0.56
692-088	1620-1635	1781	464	418	95	131	2889	1108	38.3	0	0.73
692-089	1635-1650	3761	929	626	117	125	5558	1797	32.3	1	0.94
692-090	1650-1665	1787	277	449	95	122	2729	943	34.5	55	0.78

TABLE 2C
TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS (2A + 2B)

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-091	1665-1680	214	94	162	50	71	591	377	63.8	0	0.71
692-092	1680-1695	2720	605	520	93	115	4053	1333	32.9	2	0.81
692-093	1695-1710	2109	621	505	70	89	3394	1285	37.9	3	0.78
692-094	1710-1725	3237	830	795	147	177	5186	1949	37.6	4	0.83
692-095	1725-1740	3044	832	772	151	197	4996	1952	39.1	4	0.76
692-096	1740-1755	6534	1468	1185	261	360	9808	3274	33.4	3	0.72
692-097	1755-1770	606	250	599	122	201	1779	1173	65.9	10	0.61
692-098	1770-1785	5511	1642	1458	253	345	9209	3698	40.2	3	0.73
692-099	1785-1800	7435	2602	2654	413	520	13624	6189	45.4	10	0.79
692-100	1800-1815	6497	2169	2157	347	434	11603	5106	44.0	2	0.80
692-101	1815-1830	1942	932	1285	187	322	4669	2726	58.4	2	0.58
692-102	1830-1845	11870	2873	2408	418	398	17968	6098	33.9	1	1.05
692-103	1845-1860	5346	2332	2561	319	488	11047	5700	51.6	2	0.65
692-104	1860-1875	9273	3568	2969	428	599	16837	7564	44.9	27	0.72
692-105	1875-1890	10471	3493	3239	407	583	18194	7723	42.4	11	0.70
692-106	1890-1905	7482	2555	3117	480	652	14286	6805	47.6	11	0.74
692-107	1905-1920	6360	2127	2246	435	499	11667	5307	45.5	27	0.87
692-108	1917-1935	112	57	530	133	265	1096	984	89.8	5	0.50
692-109	1935-1950	71	34	454	85	159	803	732	91.2	10	0.53
692-110	1950-1965	415	508	1628	209	389	3149	2734	86.8	14	0.54
692-111	1965-1980	214	243	849	127	258	1691	1477	87.3	7	0.49
692-112	1980-1995	482	659	375	68	94	1678	1196	71.3	8	0.73
692-113	1995-2010	474	320	1007	155	286	2242	1768	78.9	29	0.54
692-114	2010-2025	4837	1719	2649	386	539	10130	5293	52.2	3	0.72
692-115	2025-2040	3715	1860	3244	420	629	9869	6154	62.4	7	0.67
692-116	2040-2055	1460	695	1666	238	381	4440	2980	67.1	15	0.63
692-117	2055-2070	884	583	1420	164	335	3386	2502	73.9	3	0.49
692-118	2070-2085	3178	1192	2527	379	592	7867	4690	59.6	2	0.64
692-119	2085-2100	3770	1726	2919	360	560	9335	5565	59.6	6	0.64
692-120	2100-2115	1139	537	1794	300	552	4322	3183	73.7	8	0.54

TABLE 2 C
TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS (2A + 2B)

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-121	2115-2130	2719	783	2228	373	622	6725	4005	59.6	32	0.60
692-122	2130-2145	357	290	1268	245	494	2653	2296	86.6	9	0.50
692-123	2145-2160	160	105	731	148	360	1504	1344	89.4	79	0.41
692-124	2160-2175	3321	1095	2931	547	905	8799	5478	62.3	58	0.60
692-125	2175-2190	579	452	2120	379	779	4309	3730	86.6	79	0.49
692-126	2190-2205	1616	1166	4086	373	723	7964	6348	79.7	33	0.52
692-127	2205-2220	3841	1052	1802	156	389	7241	3399	46.9	20	0.40
692-128	2220-2235	3263	1392	1797	107	239	6797	3534	52.0	239	0.45
692-129	2235-2250	6536	1696	2410	224	628	11494	4957	43.1	24	0.36
692-130	2250-2265	3474	1886	7018	926	4381	17685	14211	80.4	1911	0.21
692-131	2265-2280	8289	5144	20098	2829	11511	47870	39581	82.7	297	0.25
692-132	2280-2295	10247	7305	27708	3031	12397	60688	50441	83.1	2074	0.24
692-133	2295-2310	2121	2772	15589	2586	12311	35379	33258	94.0	530	0.21
692-134	2310-2325	2840	3337	18586	2918	13476	41156	38317	93.1	1434	0.22
692-135	2325-2340	2197	3187	18117	3173	15074	41748	39551	94.7	9172	0.21
692-136	2340-2355	2811	4247	18982	3471	15602	45113	42302	93.8	8790	0.22
692-137	2355-2370	2363	4984	22015	3368	13818	46548	44185	94.9	5914	0.24
692-138	2370-2385	4617	8825	27350	3493	12685	56971	52354	91.9	4422	0.28
692-139	2385-2400	6046	9359	18390	2036	7489	43321	37274	86.0	2530	0.27
692-140	2400-2415	2607	4595	14343	2121	7897	31563	28956	91.7	3463	0.27
692-141	2495-2510	2993	1101	1533	242	672	6541	3548	54.2	824	0.36
692-142	2510-2525	1132	507	1317	536	1304	4795	3663	76.4	2838	0.41
692-143	2525-2540	6480	3175	1868	220	639	12382	5902	47.7	627	0.34
692-144	2540-2555	2187	996	625	76	295	4179	1992	47.7	338	0.26
692-145	2555-2570	8567	2099	1330	236	797	13029	4462	34.2	925	0.30
692-146	2570-2585	20173	3344	1469	222	634	25842	5670	21.9	755	0.35
692-147	2585-2600	9743	2160	1496	243	605	14247	4504	31.6	789	0.40
692-148	2600-2615	9055	2523	2486	306	923	15293	6238	40.8	713	0.33
692-149	2615-2630	1442	656	729	89	304	3219	1778	55.2	262	0.29
692-150	2630-2645	10597	2529	1308	127	401	14962	4365	29.2	316	0.32

TABLE 2 C

TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS (2A + 2B)

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
692-151	2645-2660	21512	2928	1279	126	356	26201	4689	17.9	279	0.35
692-152	2660-2675	55151	5148	7900	920	1972	71091	15940	22.4	1643	0.47
692-153	2675-2690	18103	5229	6117	677	1704	31830	13727	43.1	933	0.40
692-154	2690-2705	13503	3233	4314	510	1275	22834	9331	40.9	695	0.40
692-155	2705-2720	8507	2373	3672	469	1165	16185	7678	47.4	633	0.40
692-156	2720-2735	10262	3175	3770	422	1049	18678	8416	45.1	504	0.40
692-157	2735-2750	16277	1793	1116	127	337	19651	3374	17.2	259	0.38
692-158	2750-2765	7921	2169	3248	451	1112	14901	6981	46.8	714	0.41
692-159	2765-2780	4630	843	2199	359	928	8959	4329	48.3	510	0.39
692-160	2780-2795	12719	8508	4096	269	636	26227	13508	51.5	238	0.42
692-161	2795-2810	12949	4022	3276	373	1151	21771	8822	40.5	675	0.32
692-162	2810-2825	1042	626	1367	174	663	3872	2830	73.1	439	0.26
692-163	2825-2840	8023	3723	2000	133	313	14191	6168	43.5	116	0.42

TABLE 3

DETAILED GASOLINE (C4-C7) ANALYSIS

GEOCHEM SAMPLE NUMBER	130	131	132	135	136	138
DEPTH	2250-2265m	2265-2280m	2280-2295m	2325-2340m	2340-2355m	2370-2385m
Isobutane	7.75	8.86	5.24	3.95	0.31	2.34
n-butane	14.12	13.22	11.58	13.02	9.70	15.88
Isopentane	10.28	10.99	7.10	8.44	18.30	2.34
n-pentane	12.24	12.20	11.10	11.53	8.61	14.09
2,2-dimethylB	0.21	0.15	0.10	0.16	0.04	0.07
cyclopentane(CP)	2.64	3.54	4.94	2.52	3.88	0.99
2,3-dimethylB	0.07	0.05	0.03	0.00	0.01	0.06
2-methylP	4.73	5.47	4.75	4.76	5.07	4.57
3-methylP	3.13	3.72	4.26	3.30	3.50	3.85
n-hexane	5.51	6.21	6.46	6.06	6.54	6.44
methylCP(MCP)	6.33	8.11	8.95	8.46	8.90	7.88
2,2-dimethylP	0.25	0.21	0.11	0.39	0.11	0.27
2,4-dimethylP	0.06	0.05	0.02	0.00	0.00	0.02
2,2,3-trimethylB	0.00	0.00	0.00	0.00	0.00	0.00
benzene	2.93	1.92	2.99	3.41	1.85	2.05
cyclohexane(CH)	7.52	7.46	9.48	8.41	8.26	8.23
3,3-dimethylP	0.00	0.00	0.00	0.00	0.00	0.00
1,1-dimethylCP	0.00	0.00	0.00	0.00	0.00	0.00
2-methylH	1.90	1.62	3.31	2.78	2.57	3.21
2,3-dimethylP	0.05	0.06	0.03	0.00	0.02	0.02
3-methylH	1.34	1.11	1.94	1.78	1.76	2.42
1,c,3-dimethylCP	1.01	1.05	1.40	1.57	1.37	2.46
1,t,3-dimethylCP	0.95	0.95	1.42	1.44	1.24	2.08
1,t,2-dimethylCP	2.02	2.06	2.72	3.50	2.96	3.61
3-ethylP	0.04	0.06	0.00	0.00	0.01	0.06
n-heptane	2.17	1.65	2.18	2.56	2.27	2.71
methylCH(MCH)	8.84	6.69	8.59	9.67	8.43	10.83
1,c,2-dimethylCP	0.00	0.00	0.07	0.00	0.05	0.19
toluene	3.91	2.57	1.20	2.29	4.27	3.34
ABUNDANCE	2000	1066	2250	5992	8067	5127
nC7/C7nap x100	16.93	15.35	15.37	15.81	16.15	14.14
MCP/Bz	2.16	4.23	2.99	2.48	4.80	3.85
MH/DMCP	0.81	0.67	0.94	0.70	0.77	0.68
nC6/MCP	0.87	0.77	0.72	0.72	0.74	0.82
%n-PARAFFINS	34.05	33.28	31.33	33.17	27.12	39.12
%iso-PARAFFINS	29.80	32.36	26.91	25.57	31.68	19.24
% NAPHTHENES	29.31	29.87	37.57	35.56	35.07	36.25
% AROMATICS	6.84	4.49	4.19	5.70	6.13	5.39

TABLE 3

DETAILED GASOLINE (C4-C7) ANALYSIS

GEOCHEM SAMPLE NUMBER	142	144	152	161
DEPTH	2510-2525m	2540-2555m	2660-2675m	2795-2810m
isobutane	3.56	9.62	12.24	15.12
n-butane	7.41	13.40	15.64	24.11
isopentane	10.08	8.32	11.67	7.86
n-pentane	7.65	11.17	11.22	10.83
2,2-dimethylB	0.70	0.08	0.26	0.13
cyclopentane(CP)	1.92	3.19	2.32	1.97
2,3-dimethylB	0.38	1.42	0.10	0.24
2-methylP	7.16	4.11	4.56	3.49
3-methylP	3.95	2.34	2.68	2.10
n-hexane	5.51	4.83	4.64	5.75
methylCP(MCP)	5.92	5.78	4.40	3.26
2,2-dimethylP	0.64	0.23	0.23	0.23
2,4-dimethylP	0.16	0.06	0.08	0.08
2,2,3-trimethylB	0.00	0.00	0.00	0.00
benzene	1.56	2.38	3.24	5.13
cyclohexane(CH)	7.88	7.75	5.89	5.63
3,3-dimethylP	0.00	0.00	0.00	0.00
1,1-dimethylCP	0.00	0.00	0.00	0.00
2-methylH	4.90	2.44	1.87	1.48
2,3-dimethylP	0.09	0.04	0.06	0.10
3-methylH	3.31	1.14	1.23	0.93
1,c,3-dimethylCP	1.50	0.54	0.86	0.49
1,t,3-dimethylCP	1.09	0.51	0.81	0.47
1,t,2-dimethylCP	2.32	1.50	1.66	0.92
3-ethylP	0.34	0.00	0.05	0.05
n-heptane	3.97	2.83	1.89	2.27
methylCH(MCH)	13.82	13.14	8.10	6.87
1,c,2-dimethylCP	1.51	0.00	0.26	0.31
toluene	2.69	3.19	4.05	0.19
ABUNDANCE	3010	604	1398	1203
nC7/C7nap x100	19.61	18.03	16.18	25.10
MCP/Bz	3.80	2.43	1.36	0.63
MH/DMCP	1.28	1.40	0.86	1.10
nC6/MCP	0.93	0.84	1.06	1.77
%n-PARAFFINS	24.54	32.23	33.39	42.96
%iso-PARAFFINS	35.27	29.79	35.03	31.80
% NAPHTHENES	35.95	32.41	24.29	19.92
% AROMATICS	4.24	5.57	7.29	5.32

TABLE 4
KEROGEN TYPE AND MATURATION

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION					THERMAL MATURATION INDEX
		TYPES 40%; 10–40%; 10%	REMARKS	REWORKED (%)	PARTICLE SIZE	PRESERV-ATION	
692-002B	335-350m	I;W-H;Am*-Al	*poor quality, dark, disseminated. H at 2-.	60	M	F-G	1+
692-006A	395-410m	-;H-W-I;Al-Am		35	F-M	F-G	1+
692-009A	440-455m	W;H-Al-I;Am	fungal spores. H reworked.	25	F-M	F	1+
692-014A	515-530m	-;I-H-W-Al;Am	H at 2-.	45	F-M	F-G	1+
692-022A	635-650m	H-I;W-Am*-Al;-	*disseminated, poor quality.	40	F-C	F	1+
692-027A	710-725m	H-I;W;Am-Al	H at 2- and 2.	40	M	F-G	1+
692-030A	755-770m	I;W-Am*-H;Al	*very poor quality, dark, disseminated. Fungal spores.	55	F-M	P-F	1+/1+ to 2-
692-034A	815-830m	I;W-H;Am-H		75	F-M	F-G	1+/1+ to 2-
692-039A	890-905m	I;W-H-Am*;Al	*poor quality, disseminated.	75	F-M	F-G	1+ to 2-
692-043A	950-965m	Am*;I;W-H-Al	*disseminated, poor quality.	15	F-M	P-F	1+ to 2-
692-045A	980-995m	I;W-H-Am*;Al	*as 043A.	60	F-M	P-F	1+ to 2-
692-050B	1055-070m	Am*;I;W-Al-H	*as 043A.	25	F-M	P-F	1+
692-052A	1085-100m	I;W-H;Al-Am		70	M	P-F	1+
692-164A SWC	1115m	I;W-H-Am*;Al	*poor quality, dark, disseminated. H at 2- and 2.	75	F-C	F	1+
692-055A	1130-145m	I;W-H;Al-Am	H at 2- to 2.	80	F-C	F	1+ to 2-
692-057A	1160-175m	I;W-H;Al-Am		70	M	F	1+
692-060A	1205-220m	I;W-H;Al-Am	H at 2- to 2.	75	M	F	1+
692-063A	1250-265m	I;W-H-Am*;Al	*poor quality, dark, disseminated.	70	F-C	F-G	1+
692-066A	1295-310m	I;W-H;Al-Am		70	M	F	1+
692-070A	1355-370m	I;W-H;Al-Am		80	M	F-G	1+
692-074A	1415-430m	I;W;H-Al-Am	H at 2- to 2.	85	M	F	1+

Algal, Amorphous, Herbaceous, Inertinite, Resin, Wood

postscript = coarse, cuticle, cysts, degraded, fine, other,. structured, spore-pollen, thick-walled, unstructured

TABLE 4
KEROGEN TYPE AND MATURATION

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION					THERMAL MATURATION INDEX
		TYPES 40%; 10–40%; 10%	REMARKS	REWORKED (%)	PARTICLE SIZE	PRESERV-ATION	
692-076A	1445-460m	I;W-H;Al-Am	H at 2-.	70	M	F	1+/1+ to 2-
692-079B	1490-505m	I;W-H;Am-Al		65	F-M	F	1+ to 2- max.
692-081A	1535-550m	I;W-H-Am*;Al	*poor quality, dark, disseminated.	70	F-C	P-F	1+ to 2-
692-085A	1578-590m	I;W-Am*-H;Al	H at 2-. *disseminated, poor quality.	65	F-M	F	1+ to 2-
692-087A	1605-620m	I;W;H-Al-Am		85	M	F	1+
692-165A SWC	1620m	I;W-H;Am	H at 2- and 2.	90	M	F	1+/1+ to 2-
692-089A	1635-650m	I;W;H-Al-Am		85	M	F-G	1+
692-092A	1680-695m	I;W-H;Al		85	M	F-G	1+
692-096B	1740-755m	I-W;H;Al-Am		80	M	F-G	1+
692-099A	1785-800m	I;W-H;Al-Am		80	M	F-G	1+/1+ to 2-
692-166A SWC	1881m	I-W;H;Am-Al		85	M-C	F	1+ to 2-
692-103A	1845-860m	I-W;H;Al-Am	H at 2-.	70	M	F-G	1+/1+ to 2-
692-105A	1875-890m	I;W-H;Al-Am	H at 2.	80	F-C	F	1+ to 2-
692-109A	1935-950m	-;W-Am*-I-H;Al	material at 2-. *includes incompletely developed material.	45	M	F	1+ to 2-
692-113A	1995-2010m	-;Am*-I-W-H**;Al	*disseminated, includes incompletely developed material. **includes material passing to Am.	40	F-M	P-F	1+ to 2-(?)
692-115B	2025-040m	-;Am*-W-I-H;Al	*as 113A.	50	F-M	F	1+ to 2-
692-119A	2085-100m	I-W;H;Am-Al	dominant H at 2-.	70	M	F-G	1+ to 2-
692-122A	2130-145m	W-I;H;Am	material at 2- and 2- to 2.	70	M	F-G	1+/1+ to 2-
692-167A SWC	2143m	-;I-W-H-Am*;Al	*not prime quality. H dominantly 2-.	60	F-M	F	1+ to 2-(?)
692-126B	2190-205m	Am*;W-I-H;Al	*includes incompletely developed material.	50	M	F-G	1+ to 2-

Algal, Amorphous, Herbaceous, Inertinite, Resin, Wood

postscript = coarse, cuticle, cysts, degraded, fine, other,. structured, spore-pollen, thick-walled, unstructured

TABLE 4
KEROGEN TYPE AND MATURATION

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION					THERMAL MATURATION INDEX
		TYPES 40%; 10–40%; 10%	REMARKS	REWORKED (%)	PARTICLE SIZE	PRESERV-ATION	
692-128A	2220-235m	Am*;-;W-Al-H-I	*includes incompletely developed material.	10	F-C	F	1+ to 2-(?)
692-168A SWC	2249m	-;W-Am*-I-H;Al	*finely disseminated, poor quality.	50	F-M	F	1+ to 2-(?)
692-130B	2250-265m	Am*;W-H-I;Al	*as 128A.	40	F-M	P-F	1+ to 2-
692-169A SWC	2282m	Al*-H*;W-Am*;I	*includes material passing to Am.	10	M-C	F-G	1+ to 2-
692-133A	2295-310m	Am*;H-W-Al-I;-	*frequently incompletely developed.	25	F-M	F	1+ to 2-/2- max.
692-137A	2355-370m	I;W-H-Al*;Am*	dominant H at 2-, H at 2- to 2. *includes Al passing to Am.	70	M	F	1+ to 2-(?)
692-170A SWC	2376m	Am*;W-Al-H-I;-	*frequently incompletely developed.	25	F-M	F	1+ to 2-(?)
692-171A SWC	2385m	I;Am*-Al**-W-H**;-	*as 170A. **includes material passing to Am.	50	F-M	F	2-
692-139A	2385-400m	Al*;Am*-I-W-H;-	*as 137A.		F-C	F	2-(?)
692-172A SWC	2394m	I;W-Am*-Al*-H;-	*includes material passing to Am.	60	F-C	F	2-
692-141A	2495-510m	I-W;Am*-Al*-H;-	*as 137A.	55	M	F	2- max.
692-148B	2600-615m	I-W;H-Am*;Al	*includes incompletely developed material. Cavings?	65	M	F	2-
692-152A	2660-675m	W-I;Am*-H;Al	*as 148B.	60	F-M	F	2-
692-157A	2735-750m	Am*;-;I-W-H-Al	*poor quality, degraded, disseminated.	15	F-M	P	2-(?)
692-159A	2765-780m	I;W-Am-H;Al		60	F-M	F	2-
692-161B	2795-810m	-;I-Am*-W-Al*-H;-	*includes material passing to Am.	40	F-VC	P-F	2-

Algal, Amorphous, Herbaceous, Inertinite, Resin, Wood

postscript = coarse, cuticle, cysts, degraded, fine, other,. structured, spore-pollen, thick-walled, unstructured

TABLE 5
VITRINITE REFLECTANCE DATA

GEOCHEM SAMPLE NUMBER	DEPTH	SAMPLE TYPE	AVERAGE REFLECTIVITY Ro (%), (NUMBER OF PARTICLES)				REMARKS
			1	2	3	4	
692-002B	335-350m	WR	0.35(12)	0.49(3)	0.70(1)	-	
692-006A	395-410m	WR	0.33(36)	-	-	-	
692-014A	515-530m	WR	0.60(1)	0.86(4)	-	-	
692-022A	635-650m	WR	0.30(3)	0.67(6)	-	-	
692-027A	710-725m	WR	0.30(3)	0.68(13)	0.85(4)	-	
692-030A	755-770m	WR	0.32(7)	0.59(4)	0.74(4)	-	
692-034A	815-830m	WR	0.38(2)	0.46(5)	0.65(6)	0.89(2)	
692-039A	890-905m	WR	0.39(9)	0.52(2)	0.88(19)	-	
692-045A	980-995m	WR	0.93(11)	-	-	-	
692-050B	1055-070m	WR	0.33(2)	0.77(16)	1.00(2)	-	
692-164A SWC	1115m	WR	0.37(5)	0.52(1)	0.95(13)	1.18(1)	
692-057A	1160-175m	WR	0.33(1)	0.45(2)	0.72(10)	1.03(4)	
692-060A	1205-220m	WR	0.35(3)	0.74(15)	0.96(2)	-	
692-063A	1250-265m	WR	0.59(8)	0.94(12)	-	-	
692-070A	1355-370m	WR	0.36(5)	0.52(4)	0.77(15)	1.03(6)	
692-076A	1445-460m	WR	0.40(7)	0.71(18)	0.91(5)	1.11(1)	
692-081A	1520-535m	KC	0.36(5)	0.54(29)	0.74(6)	-	
692-085A	1578-570m	KC	0.38(2)	0.57(14)	0.84(9)	-	
692-165A SWC	1620m	KC	0.82(5)	1.10(25)	-	-	
692-089A	1635-650m	KC	0.64(16)	1.01(32)	-	-	
692-092A	1680-695m	WR	0.71(10)	0.91(15)	-	-	
692-096B	1740-755m	WR	0.68(5)	0.96(11)	-	-	
692-099A	1785-800m	KC	0.48(10)	0.61(5)	0.95(15)	-	
692-166A SWC	1851m	KC	0.50(11)	0.65(27)	0.80(2)	-	
692-103A	1845-860m	KC	0.47(6)	0.58(4)	0.93(11)	1.13(7)	
692-109A	1935-950m	KC	0.46(11)	0.67(29)	0.95(5)	-	
692-113A	1995-2010m	KC	0.45(21)	0.55(14)	0.67(1)	-	
692-119A	2085-100m	KC	0.41(3)	0.58(21)	0.84(4)	-	
692-122A	2130-145m	WR	0.42(1)	0.64(15)	1.06(1)	-	
692-167A SWC	2143m	KC	0.70(23)	0.94(7)	-	-	
692-126B	2190-205m	KC	0.45(1)	0.66(7)	0.94(7)	-	
692-168A SWC	2249m	WR	0.51(6)	0.76(4)	0.95(10)	-	
692-169A SWC	2282m	KC	0.46(45)	0.57(3)	-	-	
692-133A	2295-310m	KC	0.46(30)	-	-	-	
692-137A	2355-370m	KC	0.43(30)	-	-	-	
692-170A SWC	2376m	KC	0.46(25)	0.54(5)	-	-	
692-171A SWC	2385m	KC	0.82(20)	1.01(6)	1.21(8)	-	

CT—ditch cuttings; **CO**—core; **WR**—whole rock; **KC**—kerogen concentrate. Colours — spore fluorescence. *Reworked

TABLE 5

VITRINITE REFLECTANCE DATA

GEOCHEM SAMPLE NUMBER	DEPTH	SAMPLE TYPE	AVERAGE REFLECTIVITY Ro (%), (NUMBER OF PARTICLES)				REMARKS
			1	2	3	4	
692-139A	2385-400m	KC	0.44(30)	0.60(6)	-	-	
692-172A SWC	2394m	KC	0.50(3)	0.91(26)	1.21(11)	-	
692-141A	2495-510m	WR	0.68(20)	0.96(10)	-	-	
692-152A	2660-675m	KC	0.47(15)	0.65(15)	-	-	
692-157A	2735-750m	WR	0.75(2)	1.12(1)	-	-	
692-159A	2765-780m	KC	0.51(3)	0.81(13)	1.23(4)	-	
692-161B	2795-810m	KC	0.66(52)	0.94(2)	-	-	

CT—ditch cuttings; **CO**—core; **WR**—whole rock; **KC**—kerogen concentrate. Colours — spore fluorescence. *Reworked

TABLE 6a

CONCENTRATION (PPM) OF EXTRACTED C_{15+} MATERIAL IN ROCK

GEOCHEM SAMPLE NUMBER	DEPTH	TOTAL EXTRACT	HYDROCARBONS			NON HYDROCARBONS			
			Paraffin - Naphthenes	Aromatics	TOTAL	Precipitd. Asphaltenes	Eluted NSO's	Non-eluted NSO's	Sulphur
692-002	335-350	647	132	107	239	284	67	19	38
692-009	440-445	668	78	74	152	350	91	70	5
692-012	485-500	227	35	26	61	93	33	36	4
692-014	515-530	532	77	46	123	331	71	7	0
692-022	635-650	2105	68	30	99	1932	45	25	5
692-027	710-725	530	52	63	115	253	98	64	0
692-030	755-770	287	51	45	96	131	39	21	0
692-034	815-830	268	24	50	75	114	48	32	0
692-045	980-995	331	68	44	112	156	36	21	6
692-050	1055-1070	281	77	59	136	93	47	5	0
692-055	1130-1145	74	15	14	29	30	15	1	0
692-057	1160-1175	187	36	31	67	75	39	5	1
692-060	1205-122	301	49	48	97	108	64	32	0
692-063	1250-1265	420	51	47	98	221	43	50	9
692-070	1355-1370	457	104	69	174	138	113	34	0
692-076	1445-1460	405	145	56	201	111	73	12	8
692-079	1490-1505	95	16	16	32	28	26	9	0
692-085	1578-1590	193	41	28	70	68	39	13	3
692-089	1635-1650	150	15	13	28	69	32	22	0
692-096	1740-1755	580	48	18	66	444	25	45	0
692-097	1755-1770	232	35	27	61	123	31	17	0
692-099	1785-1800	460	47	49	97	312	28	24	0
692-104	1860-1875	433	90	71	160	228	31	14	0
692-110	1950-1965	1169	482	183	665	317	163	24	0
692-113	1995-2010	1417	348	329	677	499	207	34	0
692-115	2025-2040	592	273	83	356	176	44	16	0
692-119	2085-2100	1369	257	230	487	731	135	16	0
692-123	2145-2160	905	244	153	398	404	69	35	0
692-126B	2190-2205	1540	113	425	538	885	81	37	0
692-130	2250-2265	1334	135	321	456	573	102	102	102
692-133	2295-2310	3593	655	1078	1733	1452	242	165	0
692-136	2340-2355	1161	258	342	600	299	145	117	0
692-139	2385-2400	943	155	256	410	425	56	52	0
692-142A	2510-2525	2275	1602	321	1923	180	56	116	0
692-146	2570-2585	767	160	146	306	406	39	16	0
692-148A	2600-2615	429	53	45	99	208	38	85	0
692-150A	2630-2645	418	83	36	119	221	33	45	0
692-152A	2660-2675	1748	192	284	477	1124	102	46	0
692-156	2720-2735	1240	346	287	632	470	110	27	0
692-161	2795-2810	418	63	58	121	247	36	14	0

TABLE 6b

COMPOSITION (NORMALISED %) OF C_{15+} MATERIAL EXTRACTED FROM ROCK

GEOCHEM SAMPLE NUMBER	DEPTH	HYDROCARBONS		NON HYDROCARBONS			
		Paraffin – Naphthenes	Aromatics	Preciptd. Asphaltenes	Eluted NSO's	Non eluted NSO's	Sulphur
692-002	335-350	20.43	16.57	43.86	10.29	3.00	5.86
692-009	440-445	11.65	11.07	52.43	13.59	10.49	0.78
692-012	485-500	15.25	11.58	40.96	14.69	15.82	1.69
692-014	515-530	14.44	8.63	62.32	13.38	1.23	0.00
692-022	635-650	3.25	1.43	91.75	2.13	1.20	0.23
692-027	710-725	9.80	11.82	47.84	18.44	12.10	0.00
692-030	755-770	17.73	15.84	45.63	13.48	7.33	0.00
692-034	815-830	9.06	18.75	42.50	17.81	11.87	0.00
692-045	980-995	20.48	13.44	47.14	10.79	6.39	1.76
692-050	1055-1070	27.27	21.09	33.09	16.73	1.82	0.00
692-055	1130-1145	20.27	18.24	40.54	19.59	1.35	0.00
692-057	1160-1175	19.21	16.77	40.24	20.73	2.74	0.30
692-060	1205-122	16.40	15.86	36.02	21.24	10.48	0.00
692-063	1250-1265	12.18	11.17	52.54	10.15	11.93	2.03
692-070	1355-1370	22.77	15.18	30.10	24.61	7.33	0.00
692-076	1445-1460	35.78	13.73	27.45	18.14	2.94	1.96
692-079	1490-1505	17.02	17.02	29.79	27.13	9.04	0.00
692-085	1578-1590	21.40	14.74	35.44	20.35	6.67	1.40
692-089	1635-1650	9.70	8.86	45.99	21.10	14.35	0.00
692-096	1740-1755	8.23	3.08	76.61	4.37	7.71	0.00
692-097	1755-1770	14.89	11.52	53.09	13.20	7.30	0.00
692-099	1785-1800	10.24	10.76	67.73	6.15	5.12	0.00
692-104	1860-1875	20.69	16.34	52.57	7.25	3.16	0.00
692-110	1950-1965	41.23	15.69	27.10	13.94	2.05	0.00
692-113	1995-2010	24.54	23.25	35.20	14.61	2.39	0.00
692-115	2025-2040	46.03	14.02	29.75	7.51	2.69	0.00
692-119	2085-2100	18.75	16.80	53.39	9.90	1.17	0.00
692-123	2145-2160	27.01	16.92	44.61	7.64	3.82	0.00
692-126B	2190-2205	7.35	27.59	57.42	5.25	2.40	0.00
692-130	2250-2265	10.10	24.06	42.96	7.63	7.63	7.63
692-133	2295-2310	18.23	30.01	40.41	6.74	4.61	0.00
692-136	2340-2355	22.21	29.45	25.73	12.49	10.11	0.00
692-139	2385-2400	16.41	27.09	45.10	5.91	5.49	0.00
692-142A	2510-2525	70.42	14.09	7.91	2.47	5.12	0.00
692-146	2570-2585	20.86	19.05	52.90	5.06	2.12	0.00
692-148A	2600-2615	12.43	10.54	48.38	8.92	19.73	0.00
692-150A	2630-2645	19.96	8.52	52.91	7.85	10.76	0.00
692-152A	2660-2675	10.98	16.27	64.28	5.86	2.60	0.00
692-156	2720-2735	27.87	23.12	37.93	8.88	2.20	0.00
692-161	2795-2810	15.06	13.93	59.21	8.54	3.26	0.00

TABLE 7

SIGNIFICANT RATIOS (%) OF C_{15+} FRACTIONS AND ORGANIC CARBON

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC CARBON (wt. %)	HYDROCARBONS / TOTAL EXTRACT	HYDROCARBONS / ORG. CARBON	TOTAL EXTRACT / ORG. CARBON	P-NAPHTHENES / AROMATICS
692-002	335-350	0.82	37.00	2.92	7.89	1.23
692-009	440-445	1.53	22.72	0.99	4.37	1.05
692-012	485-500	0.57	26.84	1.07	3.98	1.32
692-014	515-530	0.69	23.06	1.78	7.71	1.67
692-022	635-650	0.62	4.68	1.59	33.95	2.27
692-027	710-725	0.94	21.61	1.22	5.64	0.83
692-030	755-770	1.10	33.57	0.88	2.61	1.12
692-034	815-830	0.88	27.81	0.85	3.05	0.48
692-045	980-995	0.80	33.92	1.40	4.14	1.52
692-050	1055-1070	0.70	48.36	1.94	4.02	1.29
692-055	1130-1145	0.84	38.51	0.34	0.88	1.11
692-057	1160-1175	0.73	35.98	0.92	2.56	1.15
692-060	1205-122	0.96	32.26	1.01	3.14	1.03
692-063	1250-1265	0.85	23.35	1.15	4.94	1.09
692-070	1355-1370	0.94	37.96	1.85	4.87	1.50
692-076	1445-1460	0.98	49.51	2.05	4.13	2.61
692-079	1490-1505	0.95	34.04	0.34	1.00	1.00
692-085	1578-1590	1.00	36.14	0.70	1.93	1.45
692-089	1635-1650	1.03	18.57	0.27	1.46	1.10
692-096	1740-1755	1.06	11.31	0.62	5.47	2.67
692-097	1755-1770	1.14	26.40	0.54	2.03	1.29
692-099	1785-1800	1.35	21.00	0.72	3.41	0.95
692-104	1860-1875	1.44	37.02	1.11	3.01	1.27
692-110	1950-1965	1.51	56.92	4.40	7.74	2.63
692-113	1995-2010	1.71	47.79	3.96	8.28	1.06
692-115	2025-2040	1.46	60.06	2.44	4.06	3.28
692-119	2085-2100	1.26	35.55	3.86	10.86	1.12
692-123	2145-2160	1.57	43.93	2.53	5.76	1.60
692-126B	2190-2205	3.60	34.93	1.49	4.28	0.27
692-130	2250-2265	1.98	34.16	2.30	6.74	0.42
692-133	2295-2310	3.67	48.24	4.72	9.79	0.61
692-136	2340-2355	4.12	51.66	1.46	2.82	0.75
692-139	2385-2400	8.49	43.50	0.48	1.11	0.61
692-142A	2510-2525	0.36	84.51	53.41	63.20	5.00
692-146	2570-2585	0.87	39.91	3.52	8.81	1.10
692-148A	2600-2615	0.19	22.97	5.19	22.59	1.18
692-150A	2630-2645	0.16	28.48	7.44	26.12	2.34
692-152A	2660-2675	2.52	27.26	1.89	6.94	0.67
692-156	2720-2735	1.56	50.99	4.05	7.95	1.21
692-161	2795-2810	2.21	28.99	0.55	1.89	1.08

TABLE 8
PYROLYSIS RESULTS

Del på 1000 → mg HC/g rock (‰)

GEOCHEM SAMPLE NUMBER	DEPTH	WT. % ORGANIC CARBON (OC)	WT. PPM		RATIOS		Tmax (°C) Pyrolysate
			Thermal Bitumen (P1)	Pyrolysate (P2)	$\frac{P1}{P1+P2}$	$\frac{P2}{OC}$	
692-001B	320-335	1.00	88	1174	0.07	0.12	120
692-002B	335-350	0.82	59	603	0.09	0.07	
692-003B	350-365	0.73	5	177	0.03	0.02	
692-004B	365-380	0.80	3	628	0.00	0.08	
692-005B	380-395	1.28	37	1419	0.03	0.11	
692-006A	395-410	1.35	7	1474	0.00	0.11	
692-007B	410-425	1.33	102	1851	0.05	0.14	
692-008A	425-440	1.26	71	1764	0.04	0.14	
692-009A	440-455	1.13	258	1637	0.14	0.14	
692-010A	455-470	0.88	89	2016	0.04	0.23	
692-011A	470-485	0.93	18	941	0.02	0.10	
692-012A	485-500	0.62	85	911	0.09	0.15	
692-013A	500-515	0.41	26	472	0.05	0.12	
692-014A	515-530	0.40	51	375	0.12	0.09	
692-015A	530-545	0.40	61	1069	0.05	0.27	
692-016A	545-560	0.27	76	581	0.12	0.22	
692-017A	560-575	0.39	44	969	0.04	0.25	
692-018A	575-590	0.46	12	1016	0.01	0.22	
692-019A	590-605	0.44	57	808	0.07	0.18	
692-020A	605-620	0.44	20	465	0.04	0.11	
692-021A	620-635	0.57	43	778	0.05	0.14	
692-022A	635-650	0.68	16	1808	0.01	0.27	
692-023A	650-665	0.62	71	945	0.07	0.15	
692-024A	665-680	0.57	51	767	0.06	0.13	
692-025A	680-695	0.59	10	604	0.02	0.10	
692-026A	695-710	0.73	5	455	0.01	0.06	
692-027A	710-725	0.78	13	830	0.02	0.11	
692-028A	725-740	0.85	8	846	0.01	0.10	
692-029A	740-755	0.88	5	768	0.01	0.09	
692-030A	755-770	1.16	8	699	0.01	0.06	
692-031A	770-785	1.11	10	807	0.01	0.07	
692-0032	785-800	0.98	4	1360	0.00	0.14	
692-033A	800-815	0.86	4	812	0.00	0.09	
692-034A	815-830	0.88	5	702	0.01	0.08	
692-035A	830-845	1.05	96	1458	0.06	0.14	
692-036A	845-860	0.75	5	612	0.01	0.08	
692-037A	860-875	0.85	8	557	0.01	0.07	
692-038A	875-890	0.73	4	911	0.00	0.12	
692-039A	890-905	0.88	10	1049	0.01	0.12	
692-040A	905-920	0.82	13	430	0.03	0.05	
692-041A	920-935	0.77	14	537	0.02	0.07	
692-042A	935-950	0.30	14	373	0.04	0.12	
692-043A	950-965	0.65	2	387	0.01	0.06	
692-044A	965-980	0.77	4	252	0.02	0.03	
692-045A	980-995	0.85	2	439	0.00	0.05	
692-046A	995-1010	0.33	5	259	0.02	0.08	
692-047A	1010-1025	0.63	3	169	0.02	0.03	
692-048A	1025-1040	0.58	6	154	0.04	0.03	
692-049A	1040-1055	0.67	1	343	0.00	0.05	
692-050A	1055-1070	0.65	11	1155	0.01	0.18	
692-050B	1055-1070	1.00	14	2202	0.01	0.22	

Thermal Bitumen (Peak 1) evolved up to 340°C. Pyrolysate (Peak 2) evolved 340 – 550°C.

TABLE 8
PYROLYSIS RESULTS

GEOCHEM SAMPLE NUMBER	DEPTH	WT. % ORGANIC CARBON (OC)	WT. PPM		RATIOS		Tmax (°C) Pyrolysate
			Thermal Bitumen (P1)	Pyrolysate (P2)	$\frac{P1}{P1+P2}$	$\frac{HI}{\frac{P2}{OC}}$	
692-051A	1070-1085	0.59	11	348	0.03	0.06	
692-052A	1085-1100	0.88	5	587	0.01	0.07	
692-053A	1100-1115	0.62	6	273	0.02	0.04	
692-054A	1115-1130	0.65	11	646	0.02	0.10	
692-164A	1115	1.40	109	399	0.21	0.03	
692-055A	1130-1145	0.90	5	434	0.01	0.05	
692-056A	1145-1160	0.73	4	394	0.01	0.05	
692-057A	1160-1175	0.93	3	704	0.00	0.08	
692-058A	1175-1190	1.01	4	777	0.00	0.08	
692-059A	1190-1205	0.93	10	973	0.01	0.10	
692-060A	1205-1220	1.24	2	1373	0.00	0.11	
692-061A	1220-1235	1.12	12	1402	0.01	0.13	
692-062A	1235-1250	0.91	20	908	0.02	0.10	
692-063A	1250-1265	1.27	17	2491	0.01	0.20	
692-064A	1265-1280	1.17	4	1442	0.00	0.12	
692-064B	1265-1280	0.69	9	540	0.02	0.08	
692-065A	1280-1295	1.04	22	1607	0.01	0.15	
692-066A	1295-1310	1.04	13	869	0.01	0.08	
692-067A	1310-1325	0.92	5	376	0.01	0.04	
692-068A	1325-1340	0.84	2	343	0.01	0.04	
692-069A	1340-1355	0.83	3	296	0.01	0.04	
692-070A	1355-1370	1.02	3	562	0.01	0.06	
692-071A	1370-1385	1.05	6	520	0.01	0.05	
692-072A	1385-1400	1.07	5	599	0.01	0.06	
692-073A	1400-1415	1.10	14	532	0.02	0.05	
692-074A	1415-1430	1.10	8	489	0.02	0.04	
692-075A	1430-1445	1.19	3	559	0.01	0.05	
692-076A	1445-1460	1.25	3	693	0.00	0.06	
692-077A	1460-1475	1.23	2	702	0.00	0.06	
692-077B	1460-1475	0.99	2	448	0.00	0.05	
692-078A	1475-1490	1.29	1	759	0.00	0.06	
692-079A	1490-1505	1.26	3	667	0.00	0.05	
692-079B	1490-1505	1.07	15	626	0.02	0.06	
692-080A	1505-1520	0.92	4	867	0.00	0.09	
692-081A	1520-1535	1.38	4	742	0.01	0.05	
692-081B	1520-1535	0.89	5	344	0.01	0.04	
692-082A	1535-1550	1.33	5	988	0.01	0.07	
692-083A	1550-1565	1.22	5	690	0.01	0.06	
692-084A	1565-1578	1.15	4	778	0.01	0.07	
692-085A	1578-1590	1.81	15	896	0.02	0.05	
692-085B	1578-1590	1.18	1	767	0.00	0.07	
692-086A	1590-1605	1.31	4	699	0.01	0.05	
692-086B	1590-1605	1.18	4	980	0.00	0.08	
692-087A	1605-1620	1.40	1	728	0.00	0.05	
692-088A	1620-1635	1.40	11	682	0.02	0.05	
692-165A	1620	1.61	132	2090	0.06	0.13	
692-089B	1635-1650	1.36	8	461	0.02	0.03	
692-090A	1650-1665	1.53	2	564	0.00	0.04	
692-090B	1650-1665	1.00	4	704	0.01	0.07	
692-091A	1665-1680	1.32	6	634	0.01	0.05	

Thermal Bitumen (Peak 1) evolved up to 340°C. Pyrolysate (Peak 2) evolved 340 – 550°C.

TABLE 8
PYROLYSIS RESULTS

GEOCHEM SAMPLE NUMBER	DEPTH	WT. % ORGANIC CARBON (OC)	WT. PPM		RATIOS		Tmax (°C) Pyrolysate
			Thermal Bitumen (P1)	Pyrolysate (P2)	$\frac{P1}{P1+P2}$	$\frac{P2}{OC}$	
692-092A	1680-1695	1.39	6	570	0.01	0.04	
692-093A	1695-1710	1.38	6	475	0.01	0.03	
692-093B	1695-1710	1.06	5	607	0.01	0.06	
692-094A	1710-1725	1.21	1	492	0.00	0.04	
692-095A	1725-1740	1.38	5	482	0.01	0.03	
692-096A	1740-1755	1.02	2	521	0.00	0.05	
692-096B	1740-1755	1.81	13	621	0.02	0.03	
692-097A	1755-1770	1.07	3	553	0.01	0.05	
692-098A	1770-1785	0.91	6	561	0.01	0.06	
692-098B	1770-1785	1.55	250	1004	0.20	0.06	
692-099A	1785-1800	1.76	9	947	0.01	0.05	
692-100A	1800-1815	1.57	13	706	0.02	0.04	
692-100B	1800-1815	1.62	7	857	0.01	0.05	
692-101A	1815-1830	1.86	9	981	0.01	0.05	
692-102A	1830-1845	1.79	6	989	0.01	0.06	
692-103B	1845-1860	1.92	5	828	0.01	0.04	
692-103A	1845-1860	1.72	10	1118	0.01	0.07	
692-166A	1851	3.22	277	2351	0.11	0.07	
692-104A	1860-1875	1.70	11	596	0.02	0.04	
692-104B	1860-1875	1.72	6	751	0.01	0.04	
692-105A	1875-1890	2.25	9	1387	0.01	0.06	
692-105B	1875-1890	2.10	9	816	0.01	0.04	
692-106A	1890-1905	1.84	8	1441	0.01	0.08	
692-107A	1905-1920	2.52	5	1457	0.00	0.06	
692-108B	1917-1935	2.17	27	1591	0.02	0.07	
692-109A	1935-1950	2.38	2	1883	0.00	0.08	
692-109B	1935-1950	2.79	18	2336	0.01	0.08	
692-110A	1950-1965	2.33	3	1625	0.00	0.07	
692-111A	1965-1980	2.22	5	1568	0.00	0.07	
692-112A	1980-1995	2.65	14	2004	0.01	0.08	
692-112B	1980-1995	2.60	4	1694	0.00	0.07	
692-113A	1995-2010	2.59	1	1869	0.00	0.07	
692-114A	2010-2025	2.33	4	1763	0.00	0.08	
692-115A	2025-2040	2.22	6	1919	0.00	0.09	
692-115B	2025-2040	2.76	14	2459	0.01	0.09	
692-116A	2040-2055	2.00	14	1992	0.01	0.10	
692-117A	2055-2070	2.29	12	1468	0.01	0.06	
692-118A	2070-2085	1.53	2	1322	0.00	0.09	
692-118B	2070-2085	2.31	3	2207	0.00	0.10	
692-119A	2085-2100	2.74	4	2145	0.00	0.08	
692-120A	2100-2115	2.32	2	1900	0.00	0.08	
692-120B	2100-2115	2.74	7	2416	0.00	0.09	
692-121A	2115-2130	2.14	3	1988	0.00	0.09	
692-122A	2130-2145	2.52	6	2183	0.00	0.09	
692-167A	2143	2.29	14	1349	0.01	0.06	
692-123A	2145-2160	2.43	10	1800	0.01	0.07	
692-124A	2160-2175	2.26	5	2299	0.00	0.10	
692-124B	2160-2175	3.32	154	4842	0.03	0.15	
692-125A	2175-2190	2.33	19	2318	0.01	0.10	
692-126A	2190-2205	2.17	100	1514	0.06	0.07	
692-126B	2190-2205	4.05	66	4157	0.02	0.10	

Thermal Bitumen (Peak 1) evolved up to 340°C. Pyrolysate (Peak 2) evolved 340 – 550°C.

TABLE 8
PYROLYSIS RESULTS

GEOCHEM SAMPLE NUMBER	DEPTH	WT. % ORGANIC CARBON (OC)	WT. PPM		RATIOS		Tmax (°C) Pyrolysate
			Thermal Bitumen (P1)	Pyrolysate (P2)	P1 / P1 + P2	P2 / OC	
692-127A	2205-2220	2.43	1	2436	0.00	100	0.10
692-127B	2205-2220	3.73	45	4843	0.01	130	0.13
692-128A	2220-2235	3.34	6	2787	0.00	83	0.08
692-129A	2235-2250	3.52	4	3236	0.00	92	0.09
692-129B	2235-2250	0.25	11	160	0.07		0.06
692-168A	2249	1.03	19	2600	0.01	252	0.25
692-130A	2250-2265	2.53	2	2273	0.00	90	0.09
692-130B	2250-2265	3.50	339	6517	0.05	186	0.19
692-131A	2265-2280	3.08	259	2916	0.08	95	0.09
692-132A	2280-2295	4.07	164	4654	0.03	114	0.11
692-169A	2282	4.43	2028	9595	0.17	217	0.22
692-133A	2295-2310	4.56	872	7202	0.11	158	0.16
692-134A	2310-2325	4.93	240	10152	0.02	206	0.21
692-135A	2325-2340	4.42	287	6089	0.05	138	0.14
692-136A	2340-2355	4.34	463	9296	0.05	214	0.21
692-137A	2355-2370	6.44	1301	12679	0.09	197	0.20
692-138A	2370-2385	7.94	1185	5844	0.17	74	0.07
692-170A	2376	9.54	1537	5110	0.23	54	0.05
692-139A	2385-2400	10.50	536	9069	0.06	86	0.09
692-171A	2385	6.24	779	5279	0.13	85	0.08
692-172A	2394	3.90	81	2117	0.04	54	0.05
692-140A	2400-2415	8.10	608	12956	0.04	160	0.16
692-141A	2495-2510	2.87	84	1292	0.06	45	0.05
692-142B	2510-2525	3.21	240	1764	0.12	55	0.05
692-143B	2525-2540	2.65	23	2627	0.01	99	0.10
692-144B	2540-2555	4.17	45	7403	0.01	178	0.18
692-145B	2555-2570	6.00	47	6849	0.01	114	0.11
692-146B	2570-2585	2.63	731	4419	0.14	168	0.17
692-147B	2585-2600	2.33	91	2171	0.04	93	0.09
692-148B	2600-2615	3.22	253	2916	0.08	91	0.09
692-149B	2615-2630	2.59	192	3185	0.06	123	0.12
692-150B	2630-2645	3.75	340	3923	0.08	105	0.10
692-151B	2645-2660	9.20	769	7521	0.09	82	0.08
692-152A	2660-2675	2.92	297	2239	0.12	77	0.08
692-153A	2675-2690	2.44	252	2809	0.08	115	0.12
692-154A	2690-2705	3.54	656	3698	0.15	105	0.10
692-154B	2690-2705	1.56	204	759	0.21	49	0.05
692-155A	2705-2720	2.92	181	2094	0.08	72	0.07
692-156A	2720-2735	2.79	423	3066	0.12	110	0.11
692-156B	2720-2735	0.93	195	818	0.19	88	0.09
692-157A	2735-2750	0.82	195	844	0.19	103	0.10
692-158A	2750-2765	2.40	263	1848	0.12	77	0.08
692-159A	2765-2780	2.47	357	2944	0.11	119	0.12
692-160A	2780-2795	2.71	254	2296	0.10	85	0.08
692-161B	2795-2810	5.01	505	6059	0.08	121	0.12
692-162B	2810-2825	3.23	226	3898	0.05	121	0.12
692-163B	2825-2840	1.90	163	1052	0.13	55	0.06

Thermal Bitumen (Peak 1) evolved up to 340°C. Pyrolysate (Peak 2) evolved 340 — 550°C.

TABLE 9

COMPOSITION (NORMALISED %) OF C_{15+} PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-002	-009	-012	-014	-022	-027	-030	-034
DEPTH	335-350m	440-455m	485-500m	515-530m	635-650m	710-725m	755-770m	815-830m
SAMPLE TYPE								
nC_{15}	0.00	0.00	0.00	0.11	0.13	0.13	0.09	0.00
nC_{16}	3.89	1.39	1.21	0.11	1.73	0.27	1.00	0.00
nC_{17}	11.40	10.99	12.55	3.99	9.57	4.77	8.33	2.29
nC_{18}	13.35	20.58	20.38	16.53	19.68	18.83	13.03	10.96
nC_{19}	12.42	14.60	14.57	11.97	16.76	11.54	12.94	11.53
nC_{20}	10.66	12.93	11.88	11.74	13.16	11.01	12.31	12.68
nC_{21}	9.08	9.46	10.12	11.40	10.51	10.34	10.14	11.44
nC_{22}	7.41	7.37	8.50	10.38	8.78	10.21	8.05	9.63
nC_{23}	6.77	5.84	7.02	8.89	6.65	9.95	8.05	9.53
nC_{24}	5.38	4.45	5.13	6.73	4.12	6.37	4.98	6.86
nC_{25}	5.28	4.31	3.78	6.16	3.06	6.76	7.60	7.72
nC_{26}	4.73	2.92	2.16	4.22	1.99	3.85	3.89	4.77
nC_{27}	3.99	1.81	1.08	3.76	1.33	3.05	5.52	6.01
nC_{28}	2.41	1.11	0.54	1.71	0.53	1.46	1.36	1.72
nC_{29}	1.85	0.56	0.27	1.03	0.40	0.53	1.18	2.29
nC_{30}	0.65	0.42	0.13	0.46	0.40	0.27	0.63	1.33
nC_{31}	0.28	0.42	0.13	0.34	0.40	0.13	0.45	0.76
nC_{32}	0.19	0.28	0.13	0.11	0.27	0.13	0.18	0.19
nC_{33}	0.09	0.28	0.13	0.11	0.27	0.13	0.09	0.10
nC_{34}	0.09	0.14	0.13	0.11	0.13	0.13	0.09	0.10
nC_{35}	0.09	0.14	0.13	0.11	0.13	0.13	0.09	0.10
PARAFFIN	33.58	31.51	37.56	31.87	33.69	23.75	36.23	34.34
ISOPRENOID	4.67	3.51	3.80	2.43	4.12	2.83	3.84	1.64
NAPHTHENE	61.75	64.99	58.64	65.70	62.19	73.42	59.93	64.03
CPI INDEX A	1.08	1.06	1.07	1.11	1.08	1.17	1.39	1.27
CPI INDEX B	1.15	1.15	1.22	1.30	1.18	1.36	1.90	1.62
PRISTANE/PHYTANE	0.92	0.86	0.79	0.46	0.77	0.48	0.63	0.28
PRISTANE/nC_{17}	0.59	0.47	0.35	0.60	0.56	0.81	0.49	0.46

TABLE 9

COMPOSITION (NORMALISED %) OF C_{15+} PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-045	-050	-055	-057	-060	-063	-070	-076
DEPTH	980-995m	1055-1070m	1130-1145m	1160-1175m	1205-1220m	1250-1265m	1355-1370m	1445-1460m
SAMPLE TYPE								
nC_{15}	0.00	0.11	0.21	0.11	0.12	0.10	0.09	0.25
nC_{16}	1.23	1.35	0.42	0.22	1.70	1.15	2.63	5.44
nC_{17}	7.86	6.42	0.95	4.65	11.53	7.88	8.95	13.65
nC_{18}	11.95	14.30	2.65	14.60	17.84	14.04	12.89	18.96
nC_{19}	11.05	15.54	6.46	15.93	12.26	13.08	12.19	14.16
nC_{20}	10.80	15.43	10.48	14.16	9.22	11.54	11.32	9.99
nC_{21}	9.25	12.73	11.85	11.50	7.52	10.10	9.39	7.71
nC_{22}	8.67	8.78	12.80	9.29	6.67	8.65	8.33	6.70
nC_{23}	7.94	6.53	11.64	7.85	6.43	8.27	7.46	5.82
nC_{24}	6.71	4.73	9.52	5.86	5.10	6.35	5.70	4.42
nC_{25}	6.30	4.17	8.99	4.76	5.34	6.54	5.44	4.05
nC_{26}	5.16	3.27	7.72	3.43	4.25	4.42	4.21	2.65
nC_{27}	4.91	2.82	6.56	3.43	4.61	3.08	3.77	2.53
nC_{28}	3.36	1.46	3.81	1.77	2.55	2.21	2.54	1.39
nC_{29}	2.54	1.24	3.49	1.33	2.31	1.35	2.37	1.26
nC_{30}	1.06	0.45	1.05	0.44	1.21	0.58	1.05	0.38
nC_{31}	0.57	0.23	0.74	0.22	0.73	0.29	0.96	0.13
nC_{32}	0.25	0.11	0.21	0.11	0.24	0.10	0.35	0.13
nC_{33}	0.25	0.11	0.21	0.11	0.12	0.10	0.18	0.13
nC_{34}	0.08	0.11	0.11	0.11	0.12	0.10	0.09	0.13
nC_{35}	0.08	0.11	0.11	0.11	0.12	0.10	0.09	0.13
PARAFFIN	24.03	33.01	18.14	37.81	31.31	36.14	38.04	38.60
ISOPRENOID	2.18	2.68	0.33	3.30	3.76	3.47	4.07	4.88
NAPHTHENE	73.79	64.31	81.53	58.89	64.93	60.39	57.89	56.52
CPI INDEX A	1.05	1.13	1.06	1.10	1.12	1.10	1.07	1.09
CPI INDEX B	1.17	1.22	1.22	1.27	1.28	1.18	1.23	1.32
PRISTANE/PHYTANE	0.85	0.44	0.55	0.39	1.02	0.79	0.85	0.85
PRISTANE/nC_{17}	0.53	0.39	0.67	0.52	0.53	0.54	0.55	0.43

TABLE 9

COMPOSITION (NORMALISED %) OF C_{15+} PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-079	-085	-089	-096	-097	-099	-104	-110
DEPTH	1490–1505m	1578–1590m	1635–1650m	1740–1755m	1755–1770m	1785–1800m	1860–1875m	1950–1965m
SAMPLE TYPE								
nC_{15}	0.10	0.11	0.11	0.00	0.08	0.23	0.58	1.56
nC_{16}	0.49	0.22	0.53	0.92	1.30	4.60	3.79	4.95
nC_{17}	1.27	3.85	4.96	4.70	6.10	8.36	8.31	7.75
nC_{18}	3.80	12.98	14.03	9.51	11.37	11.35	12.26	9.97
nC_{19}	8.37	15.95	14.87	9.92	10.45	10.66	11.85	9.90
nC_{20}	12.17	14.96	13.50	13.91	10.14	9.89	11.36	9.64
nC_{21}	13.73	13.31	11.60	14.83	9.99	8.97	9.88	8.86
nC_{22}	13.44	11.77	10.02	13.60	9.69	8.28	8.23	7.69
nC_{23}	12.76	10.23	9.60	10.63	9.69	8.44	7.90	7.49
nC_{24}	10.03	6.49	7.81	8.49	8.70	7.06	6.26	6.84
nC_{25}	9.35	5.06	6.22	6.34	7.93	7.06	5.76	6.12
nC_{26}	5.74	2.31	3.16	3.48	5.49	4.68	4.44	5.08
nC_{27}	4.38	1.32	1.69	1.74	4.50	4.29	3.79	4.63
nC_{28}	2.24	0.44	0.63	0.82	2.14	2.61	2.22	3.32
nC_{29}	1.17	0.33	0.42	0.41	1.37	1.38	1.48	2.74
nC_{30}	0.39	0.11	0.21	0.20	0.38	1.23	0.91	1.43
nC_{31}	0.19	0.11	0.21	0.10	0.31	0.38	0.49	0.98
nC_{32}	0.10	0.11	0.11	0.10	0.15	0.23	0.25	0.46
nC_{33}	0.10	0.11	0.11	0.10	0.08	0.15	0.08	0.26
nC_{34}	0.10	0.11	0.11	0.10	0.08	0.08	0.08	0.20
nC_{35}	0.10	0.11	0.11	0.10	0.08	0.08	0.08	0.13
PARAFFIN	31.91	40.71	32.02	41.94	38.60	45.40	38.20	56.29
ISOPRENOID	0.81	2.82	2.63	3.04	4.36	6.37	4.40	5.46
NAPHTHENE	67.28	56.47	65.35	55.02	57.04	48.22	57.40	38.25
CPI INDEX A	1.13	1.13	1.10	1.06	1.09	1.12	1.10	1.05
CPI INDEX B	1.30	1.51	1.40	1.26	1.29	1.17	1.15	1.14
PRISTANE/PHYTANE	0.53	0.40	0.70	1.09	1.18	2.10	1.55	1.44
PRISTANE/nC_{17}	0.69	0.51	0.68	0.80	1.00	1.14	0.84	0.74

TABLE 9

COMPOSITION (NORMALISED %) OF C_{15+} PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-113	-115	-119	-123	-126B	-130	-133	-136
DEPTH	1995-2010m	2025-2040m	2085-2100m	2145-2160m	2190-2205m	2250-2265m	2295-2310m	2340-2355m
SAMPLE TYPE								
nC_{15}	5.64	1.51	5.45	5.99	6.58	10.11	10.13	8.99
nC_{16}	7.67	4.65	8.39	8.63	8.97	11.01	8.91	8.91
nC_{17}	8.04	6.11	8.74	8.75	8.72	10.00	7.43	8.91
nC_{18}	7.91	7.74	9.64	8.75	9.47	8.88	7.52	8.29
nC_{19}	7.42	8.02	9.50	8.27	8.97	8.54	7.35	7.91
nC_{20}	7.30	8.07	9.50	7.97	7.98	7.64	6.62	7.30
nC_{21}	7.61	8.46	10.06	7.25	8.23	7.42	6.45	7.60
nC_{22}	8.16	8.30	8.87	7.31	7.41	7.30	6.05	6.45
nC_{23}	7.98	8.35	8.67	6.59	7.49	7.08	6.70	6.61
nC_{24}	7.42	7.79	6.29	6.23	6.42	5.96	5.88	6.07
nC_{25}	6.87	6.84	5.66	5.93	6.17	5.62	5.56	5.45
nC_{26}	5.89	6.00	3.56	4.61	4.53	3.93	4.41	4.61
nC_{27}	4.97	5.49	2.66	4.43	3.70	3.26	4.74	4.30
nC_{28}	3.62	4.20	1.40	3.42	2.30	1.80	3.76	3.07
nC_{29}	2.02	3.59	0.84	2.70	1.40	0.90	3.59	2.46
nC_{30}	0.80	2.07	0.35	1.32	0.74	0.34	1.96	1.23
nC_{31}	0.37	1.35	0.14	0.96	0.33	0.11	1.31	0.92
nC_{32}	0.12	0.73	0.07	0.42	0.25	0.11	0.74	0.54
nC_{33}	0.06	0.39	0.07	0.24	0.16	0.00	0.57	0.23
nC_{34}	0.06	0.22	0.07	0.18	0.08	0.00	0.25	0.08
nC_{35}	0.06	0.11	0.07	0.06	0.08	0.00	0.08	0.08
PARAFFIN	57.43	55.06	47.75	44.87	43.75	56.72	41.76	42.91
ISOPRENOID	5.81	5.52	6.07	5.48	7.31	10.77	7.34	7.34
NAPHTHENE	36.75	39.41	46.18	49.65	48.95	32.50	50.90	49.74
CPI INDEX A	1.02	1.04	1.15	1.02	1.11	1.09	1.09	1.08
CPI INDEX B	1.08	1.09	1.26	1.17	1.16	1.21	1.17	1.13
PRISTANE/PHYTANE	2.11	2.09	2.64	2.00	2.83	3.57	2.21	2.14
PRISTANE/nC_{17}	0.85	1.11	1.06	0.93	1.42	1.48	1.63	1.31

TABLE 9

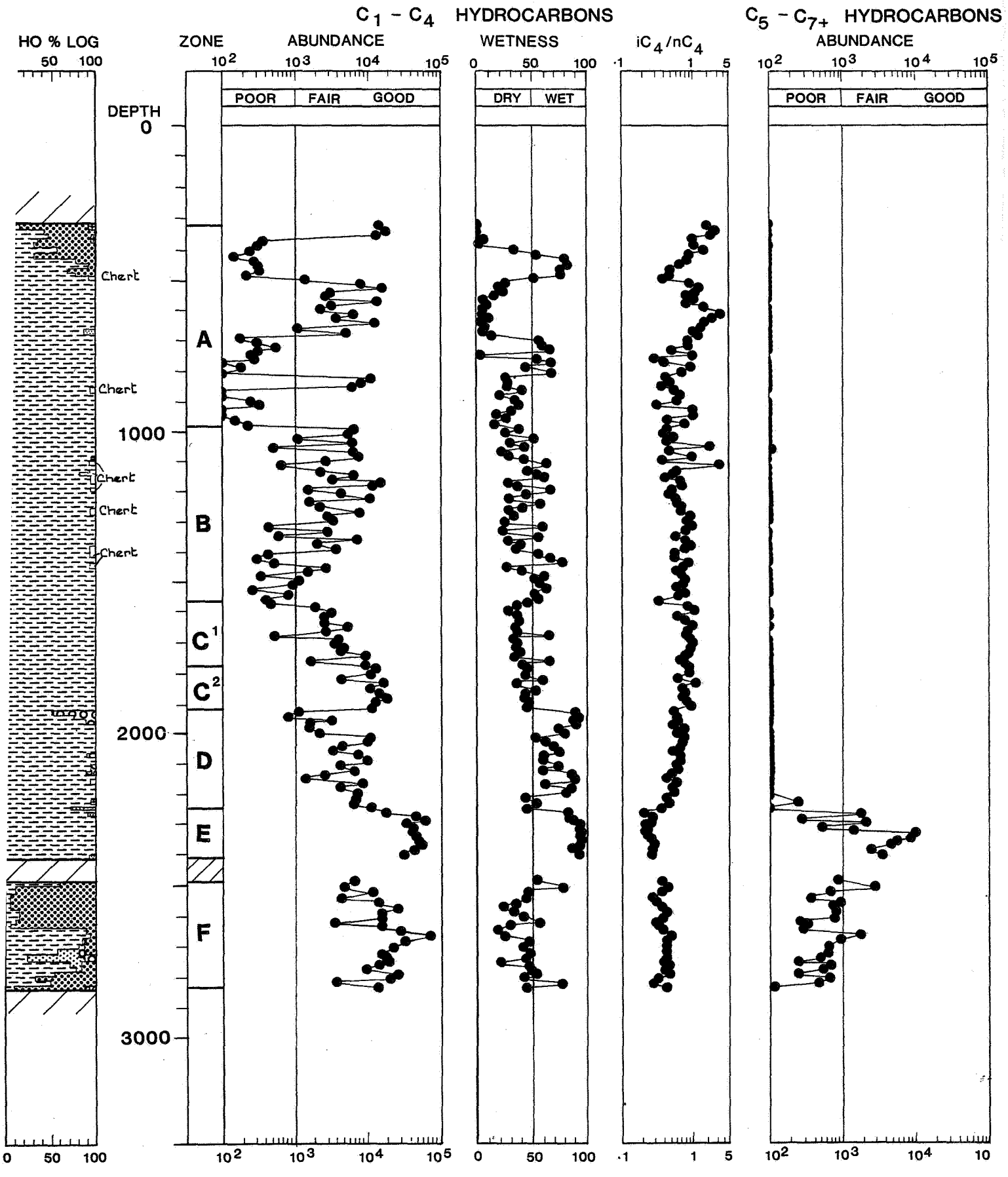
COMPOSITION (NORMALISED %) OF C_{15+} PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-139	-142A	-146	-148A	-150A	-152A	-156	-161
DEPTH	2385-2400m	2510-2525m	2570-2585m	2600-2615m	2630-2645m	2660-2675m	2720-2735m	2795-2810m
SAMPLE TYPE								
nC_{15}	9.69	0.25	7.46	5.64	10.07	5.17	7.38	7.11
nC_{16}	9.16	0.44	7.70	10.86	14.87	7.58	8.34	9.04
nC_{17}	7.56	0.69	8.23	10.66	11.78	8.67	8.46	10.03
nC_{18}	7.79	1.14	8.81	12.19	12.59	9.11	8.40	9.77
nC_{19}	7.79	1.90	8.87	9.53	8.01	8.89	7.26	8.64
nC_{20}	7.10	3.03	7.93	7.89	6.98	7.87	6.35	7.71
nC_{21}	6.72	4.61	8.17	8.50	8.01	8.60	6.23	7.38
nC_{22}	6.79	6.57	7.81	8.40	8.35	7.65	6.05	6.78
nC_{23}	6.41	8.28	7.81	8.30	7.09	8.24	6.17	6.78
nC_{24}	5.73	9.48	6.93	7.38	5.38	6.27	5.50	6.11
nC_{25}	5.42	9.03	6.29	4.82	3.09	6.63	5.26	5.51
nC_{26}	4.66	9.35	4.11	2.87	1.49	4.66	4.84	4.72
nC_{27}	4.43	9.10	3.53	1.13	0.92	4.66	4.96	4.52
nC_{28}	3.89	8.02	2.53	0.82	0.34	2.84	3.99	2.52
nC_{29}	3.28	7.58	1.70	0.31	0.23	1.90	3.57	1.59
nC_{30}	1.68	5.31	0.82	0.20	0.23	0.73	2.24	0.73
nC_{31}	1.07	5.12	0.65	0.10	0.11	0.15	1.81	0.53
nC_{32}	0.46	3.22	0.29	0.10	0.11	0.15	1.21	0.27
nC_{33}	0.23	3.22	0.18	0.10	0.11	0.07	0.97	0.13
nC_{34}	0.08	2.40	0.12	0.10	0.11	0.07	0.79	0.07
nC_{35}	0.08	1.26	0.06	0.10	0.00	0.07	0.24	0.07
PARAFFIN	39.90	53.88	53.32	32.96	30.16	39.72	23.53	32.77
ISOPRENOID	6.94	0.61	2.66	2.97	3.11	5.59	2.56	2.57
NAPHTHENE	53.15	45.51	44.02	64.07	66.74	54.69	73.90	64.66
CPI INDEX A	1.02	1.01	1.08	1.01	1.04	1.19	1.05	1.08
CPI INDEX B	1.11	1.07	1.21	1.08	1.29	1.26	1.11	1.17
PRISTANE/PHYTANE	1.85	1.57	2.40	1.84	2.60	3.49	2.27	2.58
PRISTANE/nC_{17}	1.49	1.00	0.43	0.55	0.63	1.26	0.89	0.56

GURE 1

C_1-C_7 HYDROCARBONS

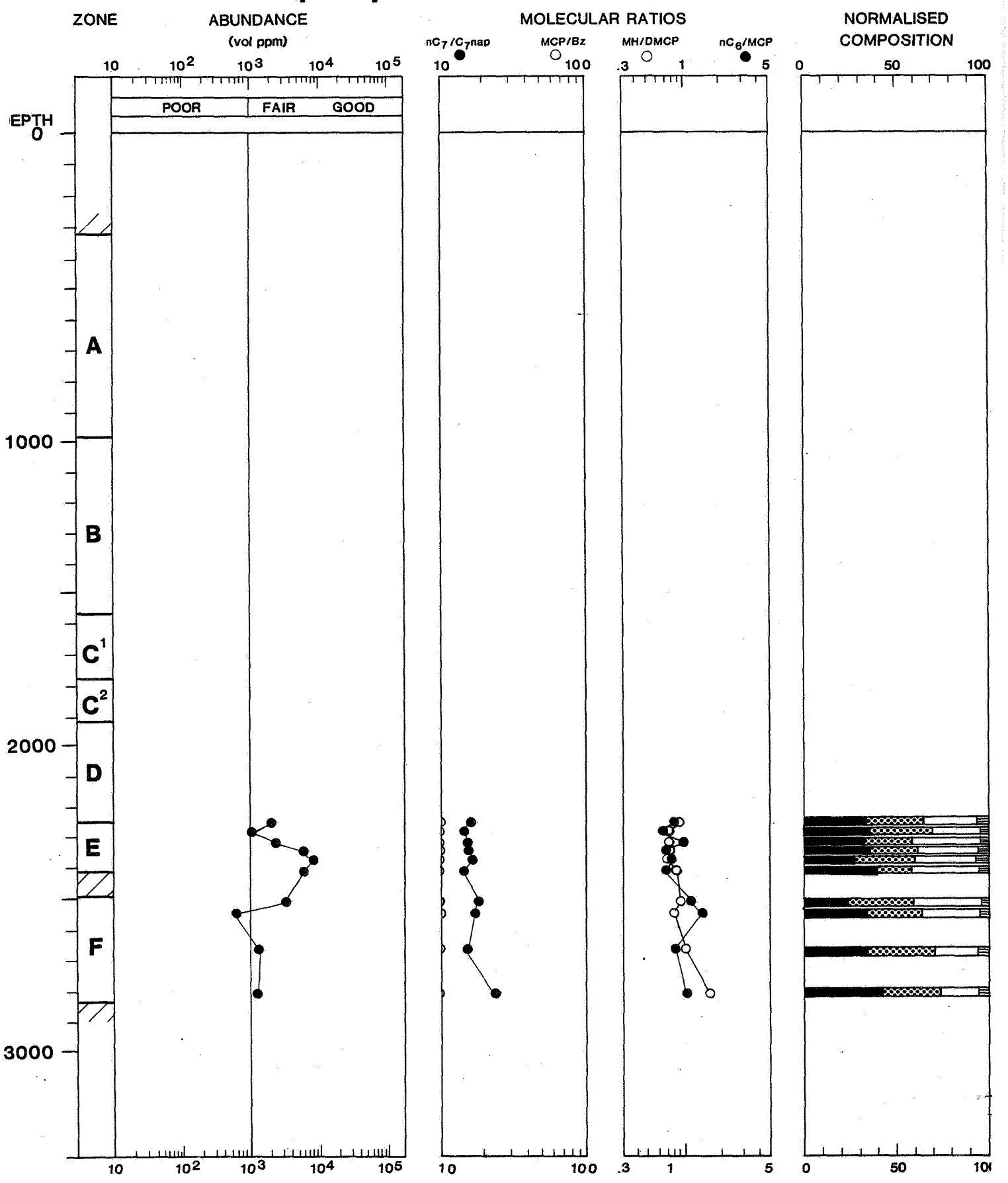
WELL 7120/7-1



Carbonate
Shale/Mudstone
Siltstone
Evaporite
Sandstone/Sand
Coal
Igneous
L.C.M.

iC_4 - ISOBUTANE
nC_4 - NORMAL BUTANE
ABUNDANCE - VOLUME PPM OF ROCK
WETNESS - % C_2-C_4 IN C_1-C_4

IGURE 2 $C_4 - C_7$ HYDROCARBONS WELL 7120/7-1



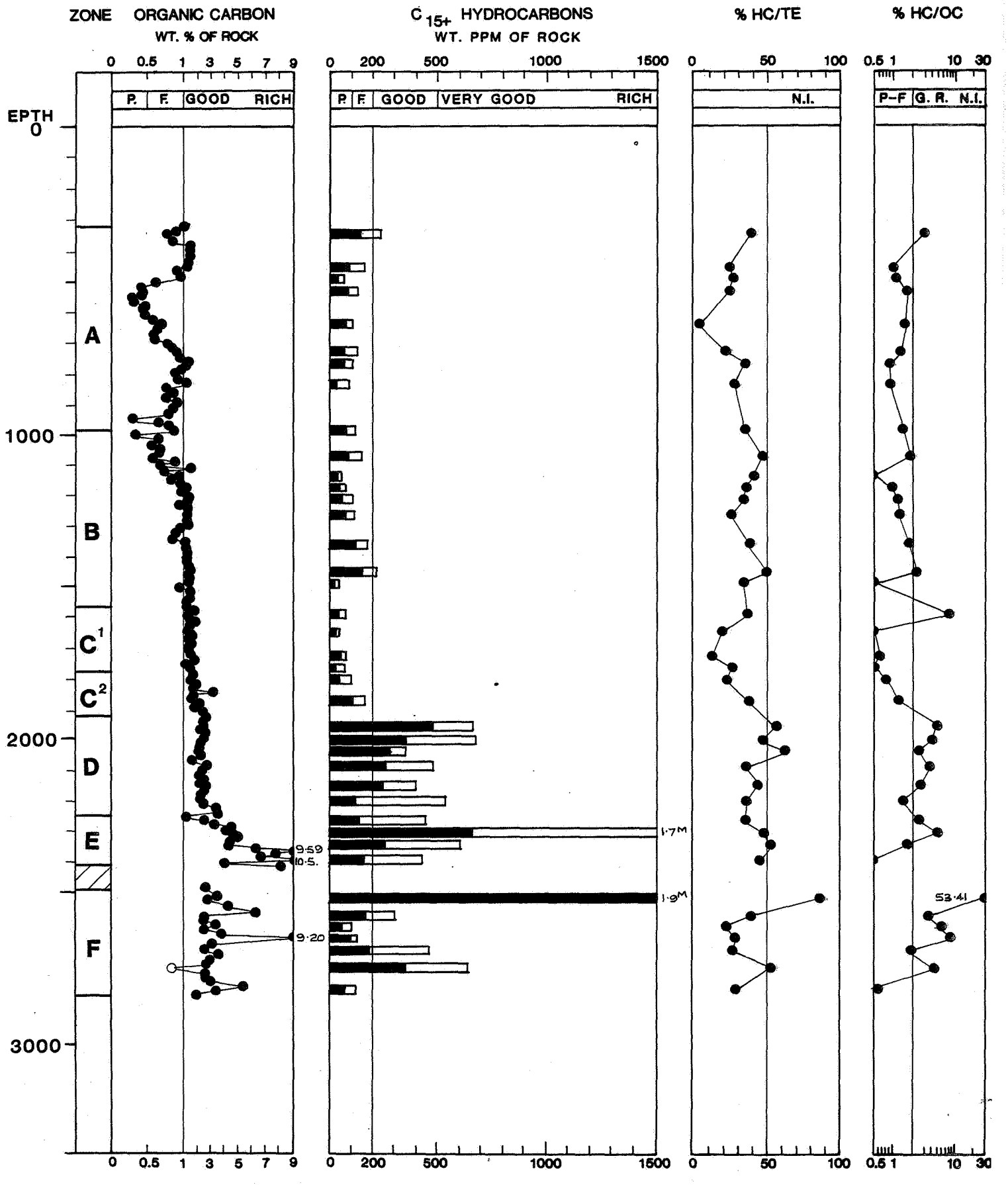
ppm values expressed as volumes

of gas per million volumes of sediment

nC_6 – Normal Hexane
nC_7 – Normal Heptane (x 100)
MCP – Methylcyclopentane
Bz – Benzene
MH – 2 – Plus 3 – Methylhexane
DMCP – Total Dimethylcyclopentanes
C_7 nap – Sum of C_7 Naphthenes

NORMAL PARAFFINS
ISOPARAFFINS
NAPHTHENES
AROMATICS

IGURE 3 **RICHNESS** WELL 7120/7-1

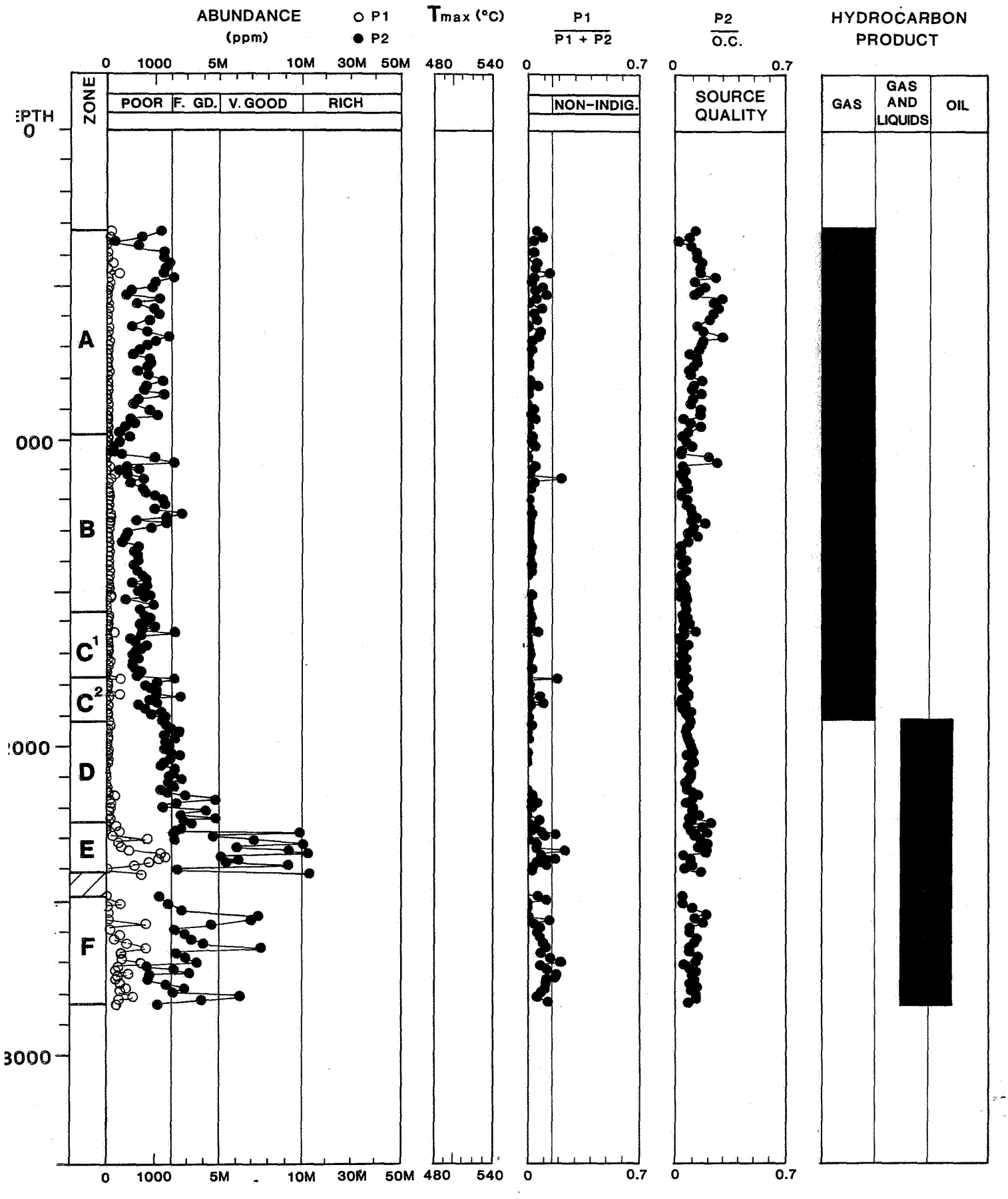


● SHALE
○ OTHER LITHOLOGIES

P - N – PARAFFIN - NAPHTHENES
AROM – AROMATICS
HC – C_{15+} HYDROCARBONS
OC – ORGANIC CARBON
TE – TOTAL C_{15+} EXTRACT

P – POOR
F – FAIR
G – GOOD
R – RICH
N.I. – NON-INDIGENOUS HYDROCARBONS

GURE 4 **PYROLYSIS** WELL 7120/7-1



M - 1000

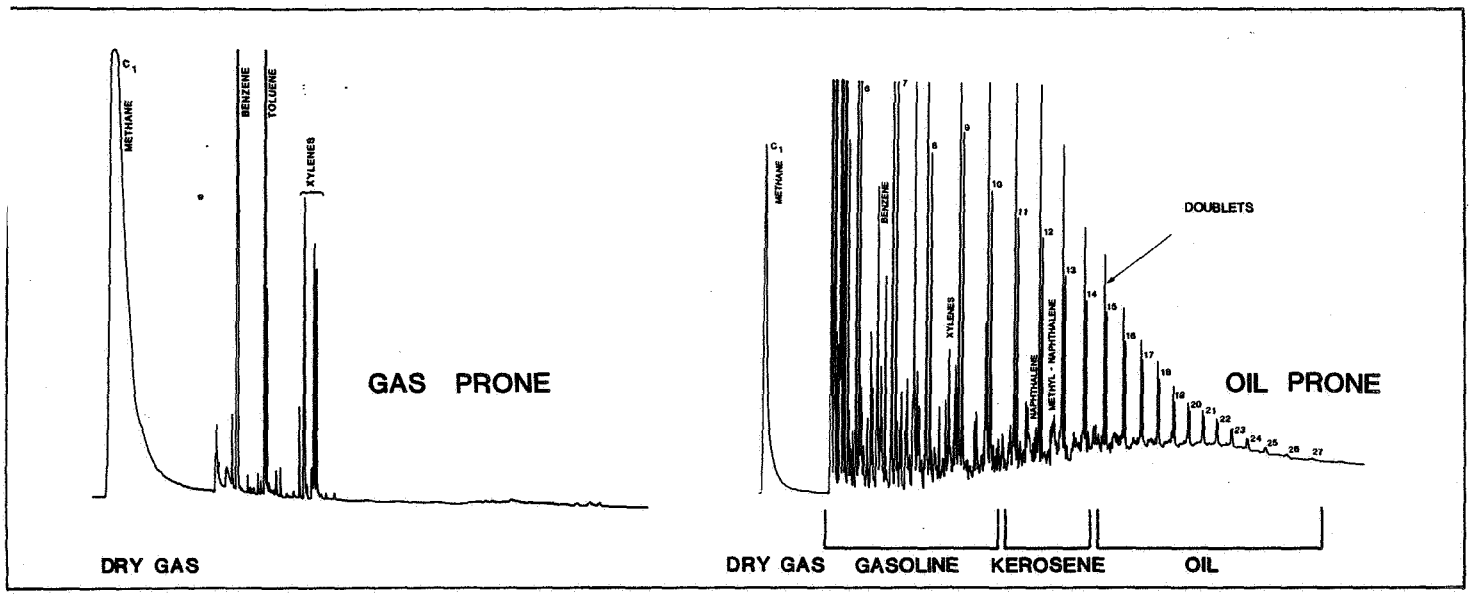
P1 — THERMAL BITUMEN

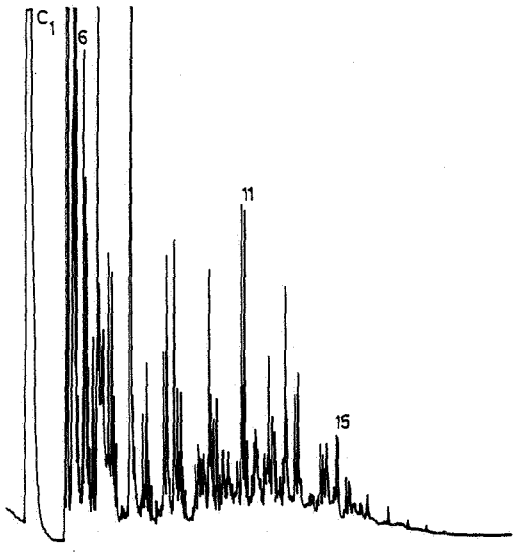
P2 — PYROLYSATE

O.C. — ORGANIC CARBON

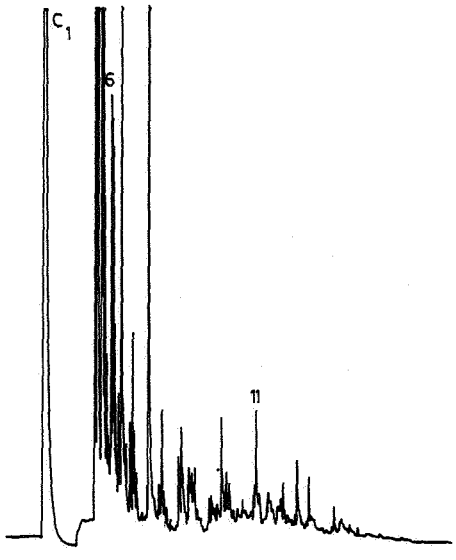
NON-INDIG. — NON-INDIGENOUS HYDROCARBONS (SHOWS OR CONTAMINATION)

FIGURE 5a **PYROLYSIS GC** WELL 7120/7-1

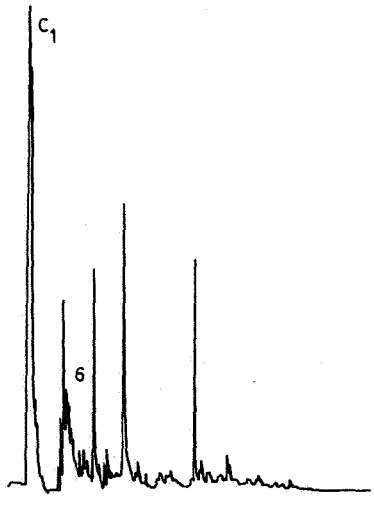




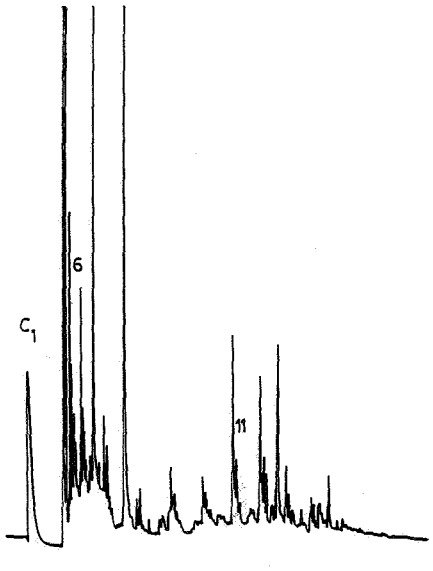
410–425m B



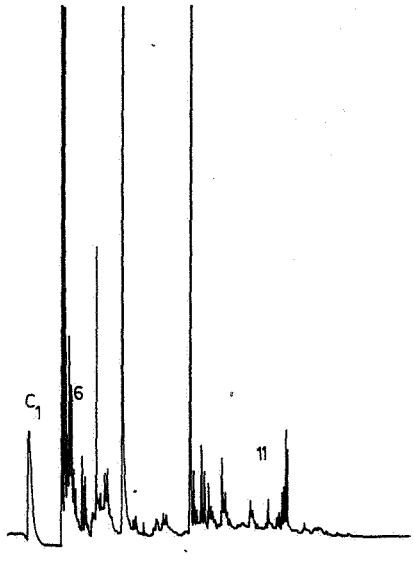
455–470m A



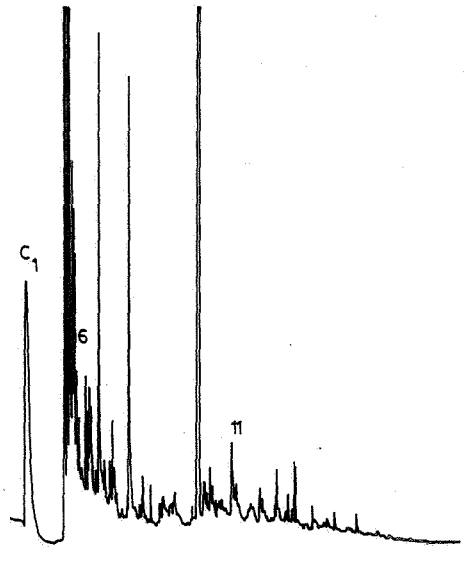
635–650m A



830–845m A



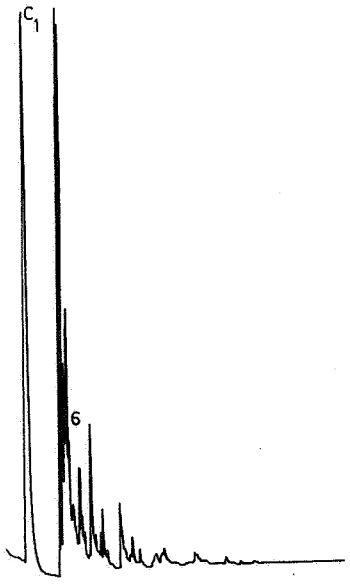
1055–1070m B



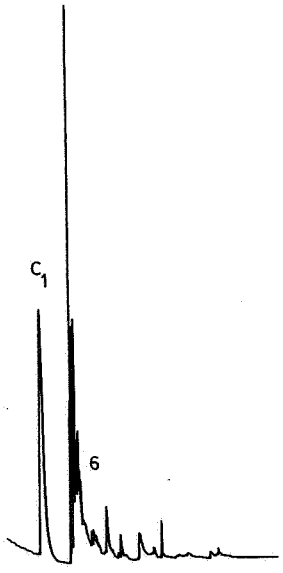
1205–1220m A

FIGURE 5b **PYROLYSIS GC** WELL 7120/7-1

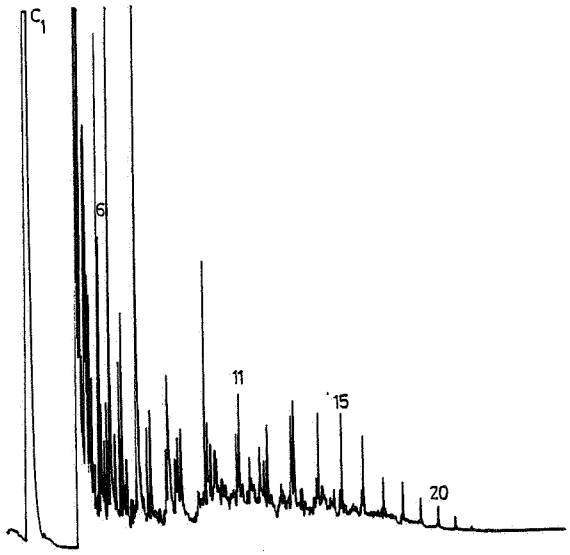
1250–1265m A



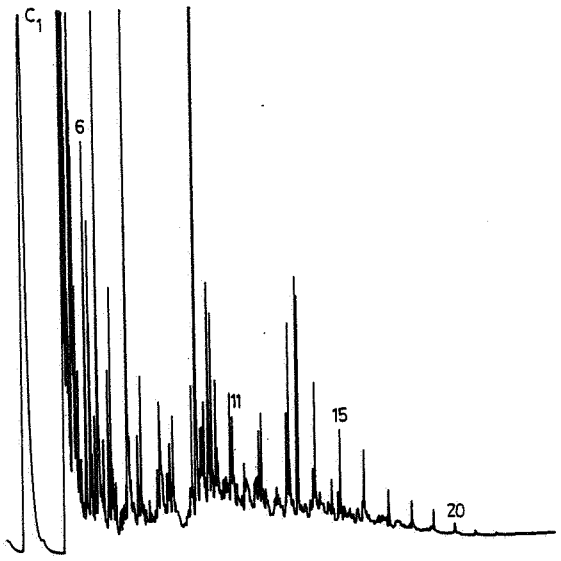
1520–1535m A



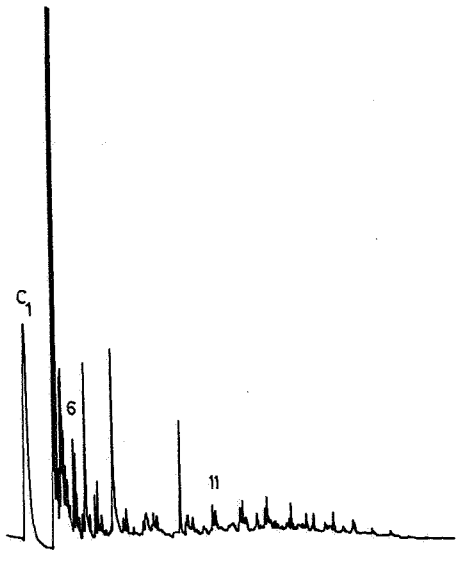
1680–1695m A



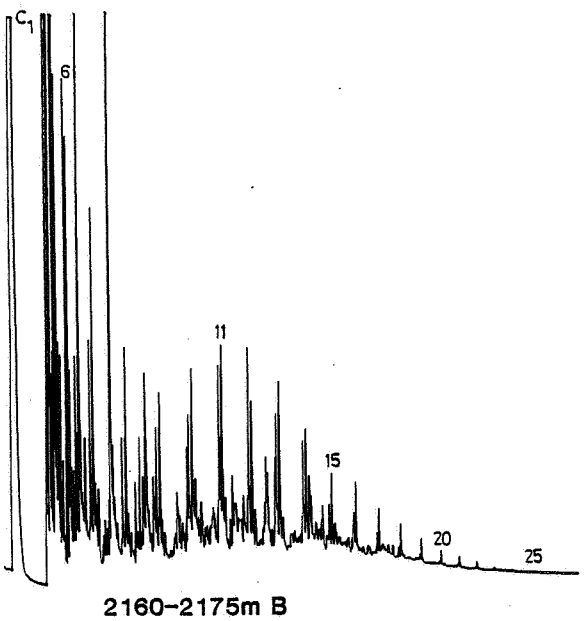
1995–2010m A



2025–2040m B

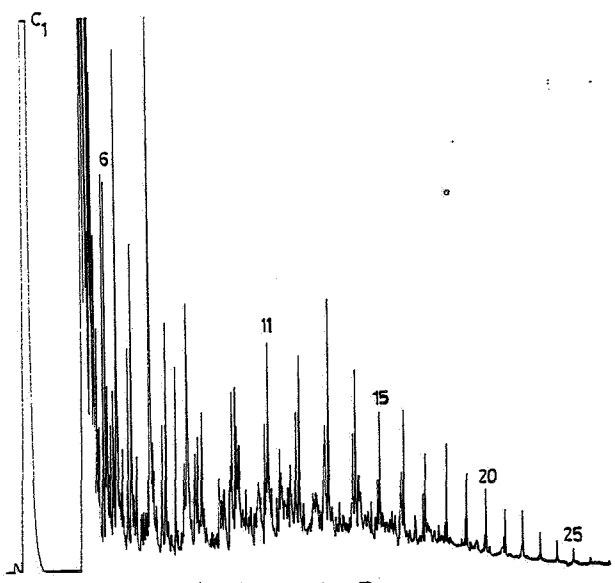


2085–2100m A

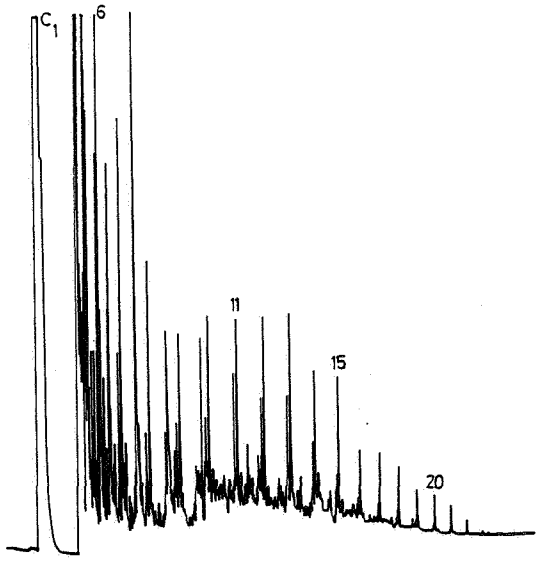


2160–2175m B

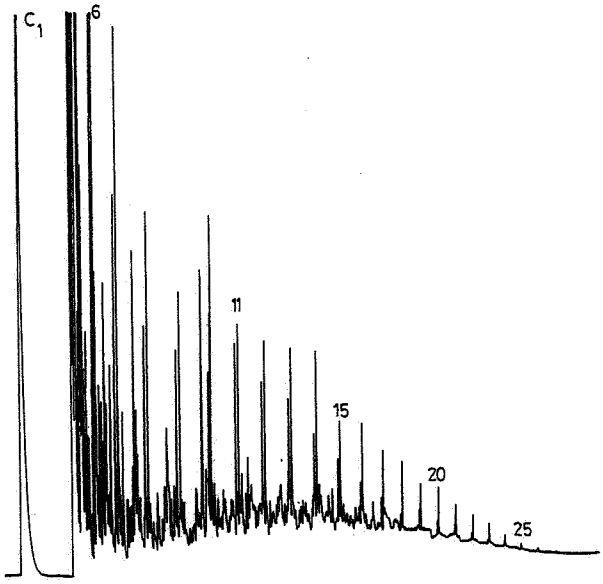
FIGURE 5c **PYROLYSIS GC** WELL 7120/7-1



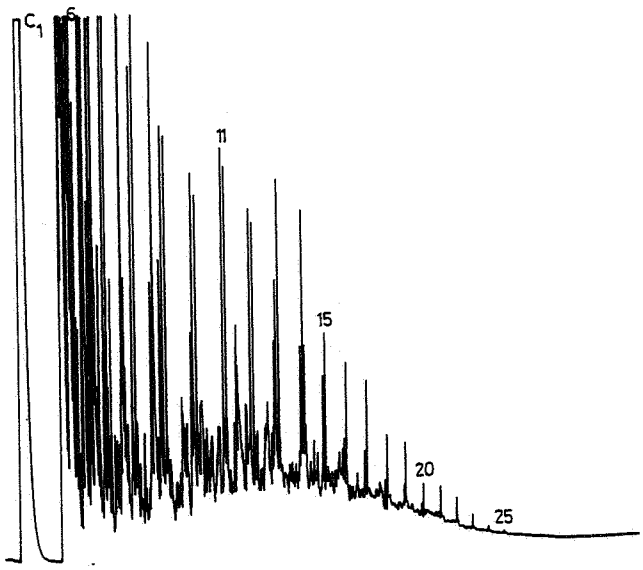
2190–2205m B



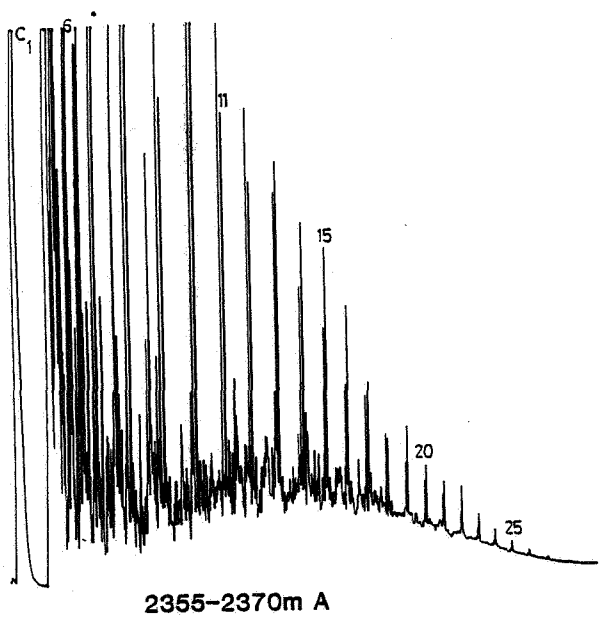
2220–2235m A



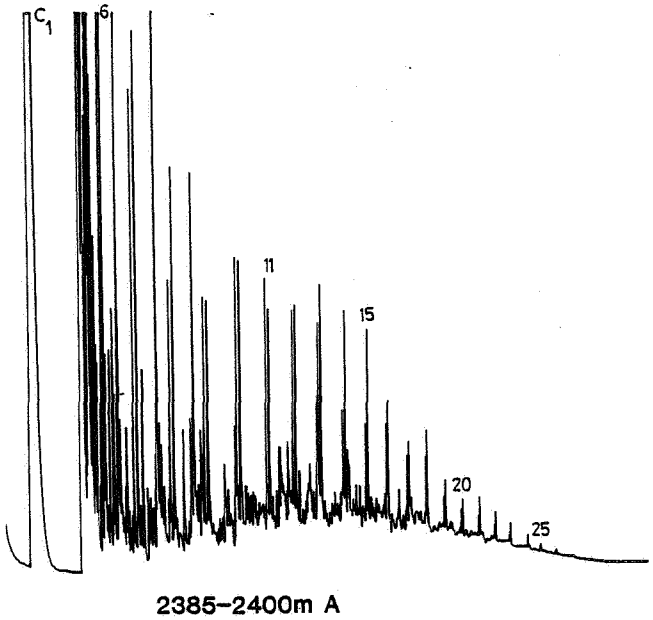
2250–2265m B



2295–2310m A

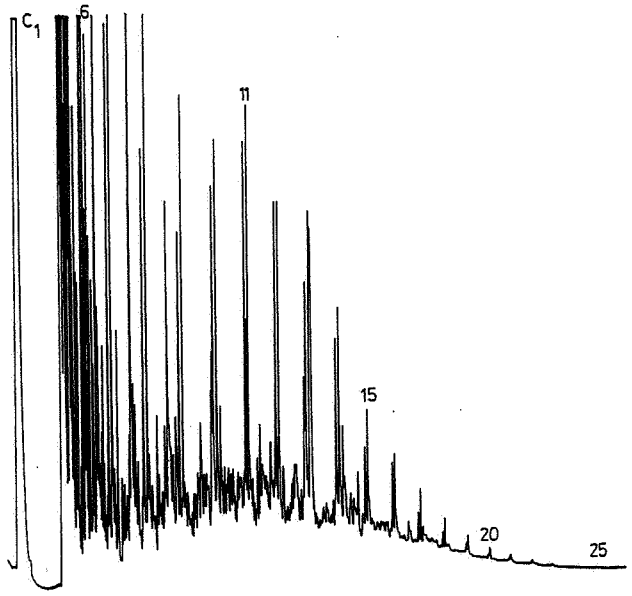


2355–2370m A

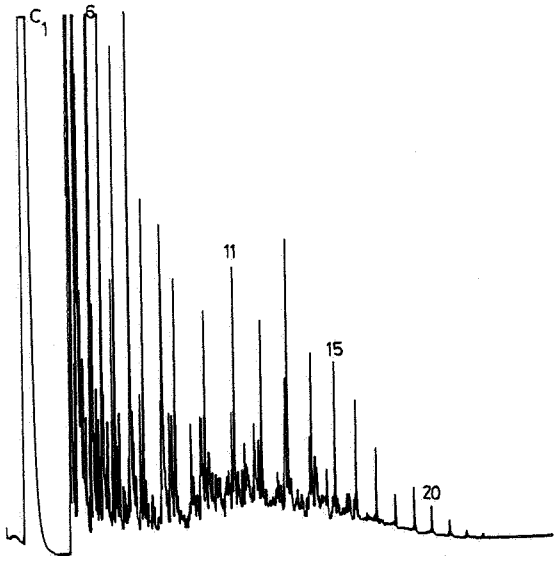


2385–2400m A

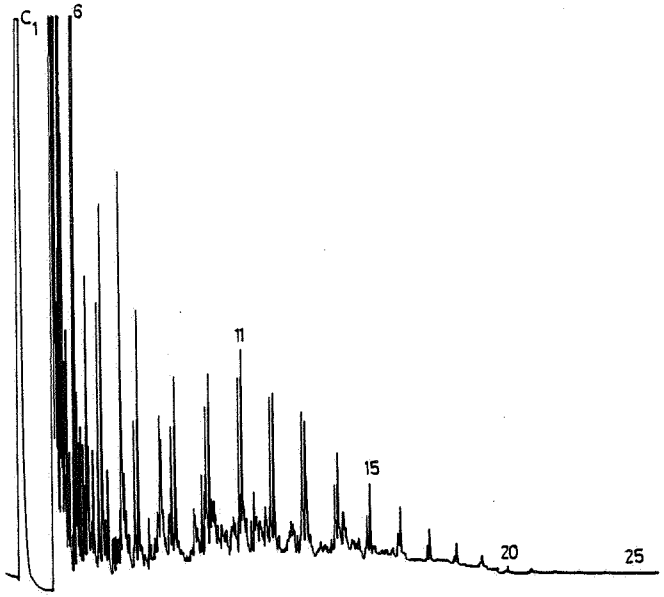
FIGURE 5d **PYROLYSIS GC** WELL 7120/7-1



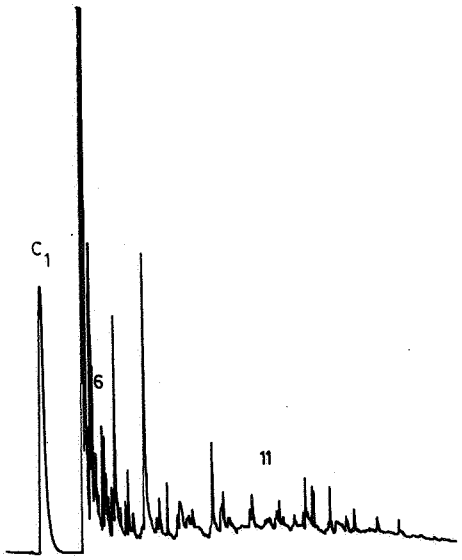
2400-2415m A



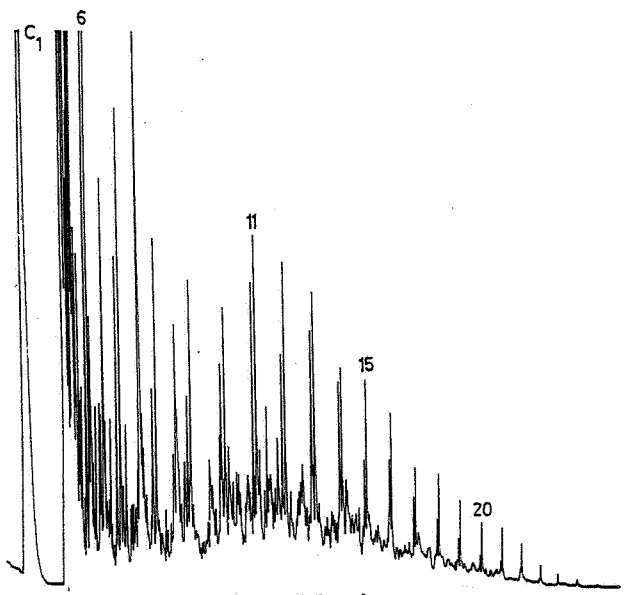
2495-2510m A



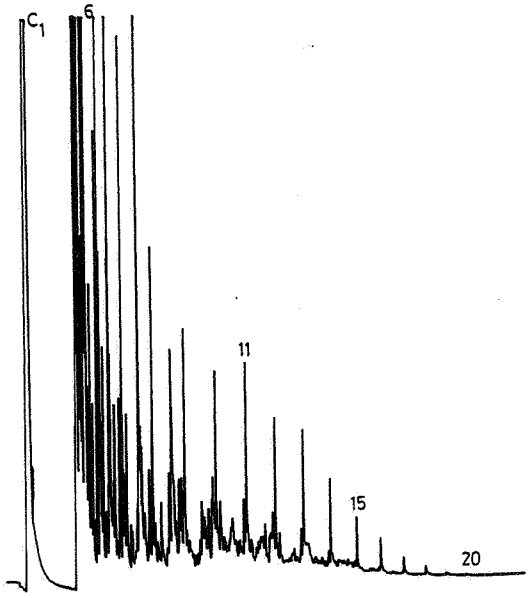
2540-2555m B



2600-2615m B

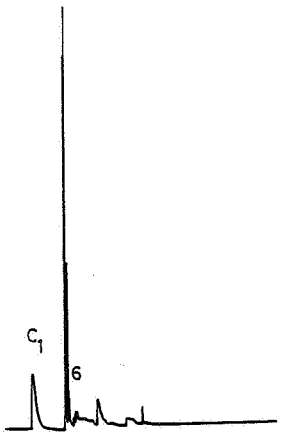


2660-2675m A

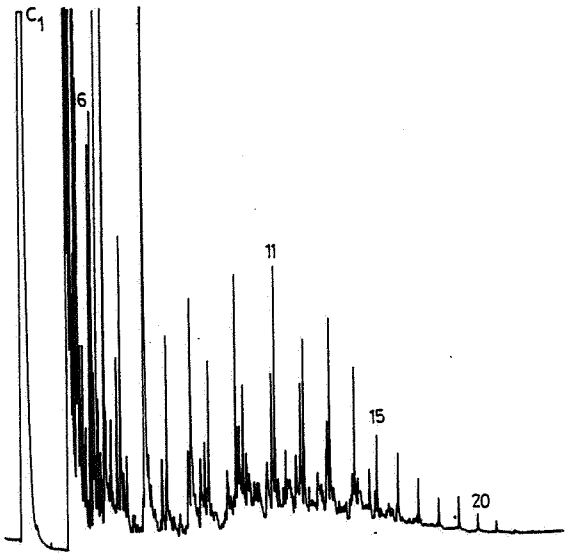


2720-2735m A

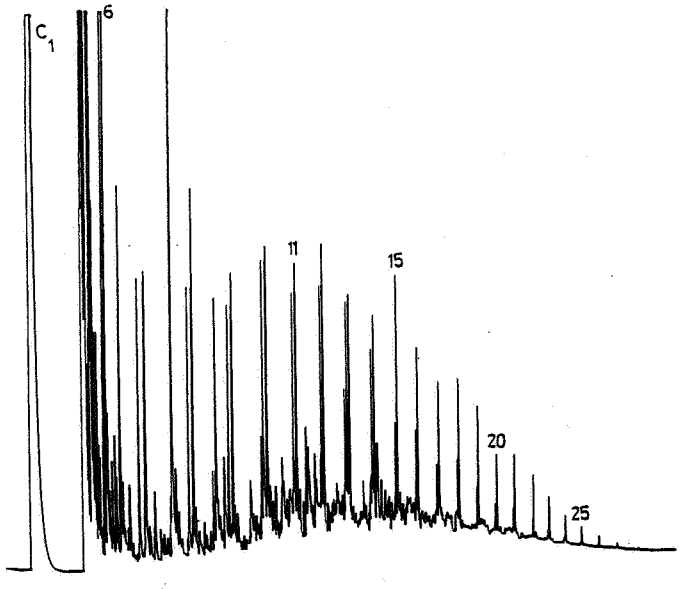
FIGURE 5e **PYROLYSIS GC** WELL 7120/7-1



2735-2750m A

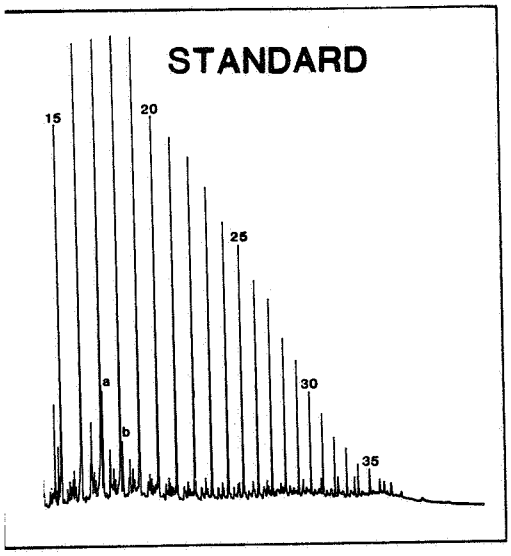


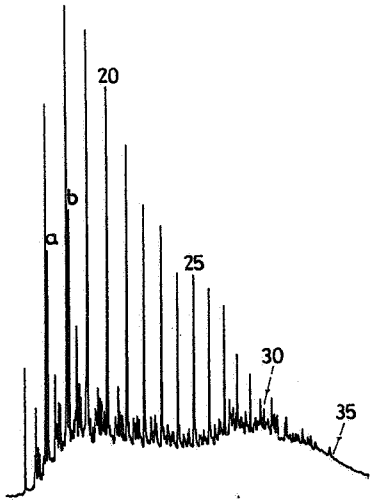
2765-2780m A



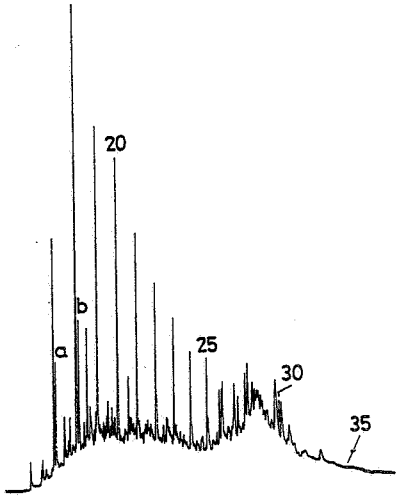
2795-2810m B

FIGURE 6a C_{15+} PARAFFIN - NAPHTHENES WELL 7120/7-1

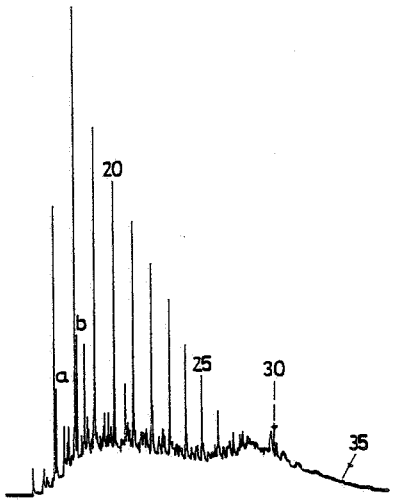




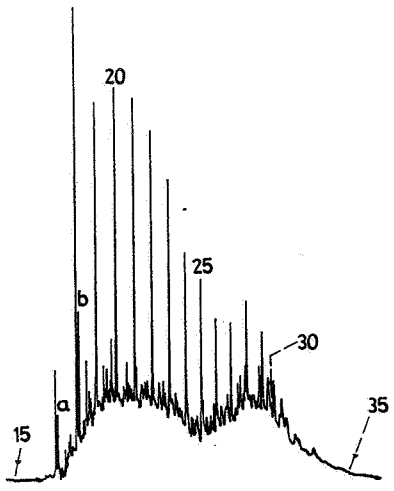
335-350m



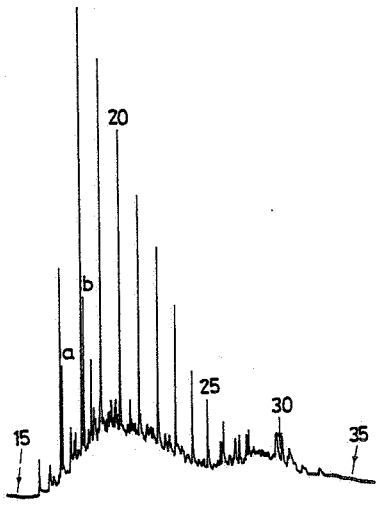
440-455m



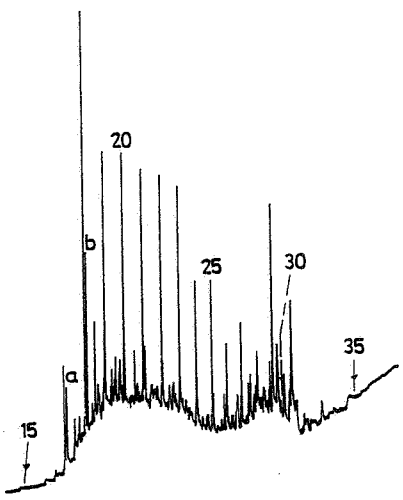
485-500m



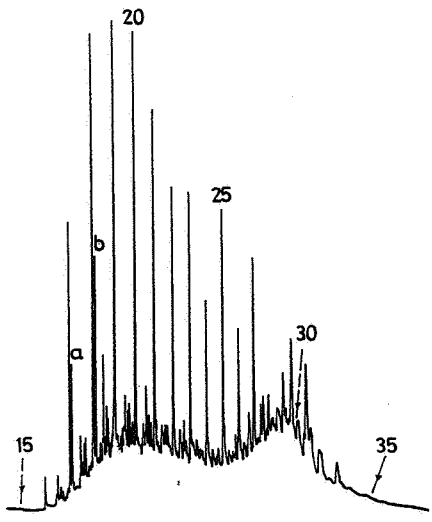
515-530m



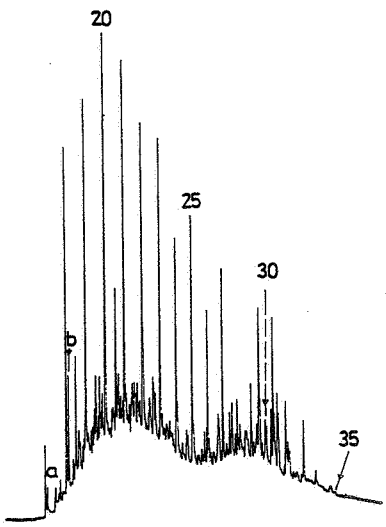
635-650m



710-725m



755-770m

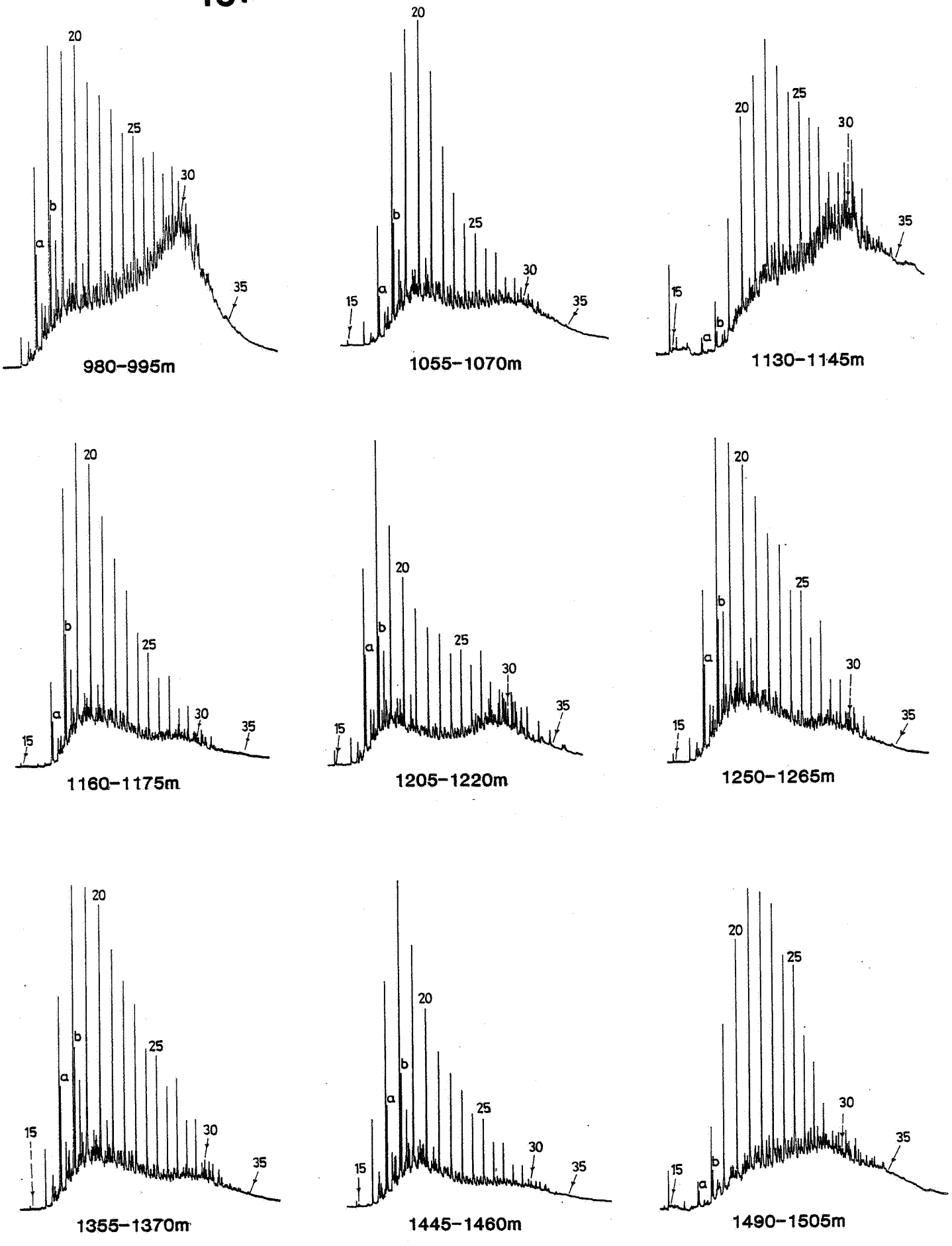


815-830m

a - PRISTANE
b - PHYTANE

CARBON NUMBERS OF NORMAL PARAFFINS INDICATED (20 - nC_{20})

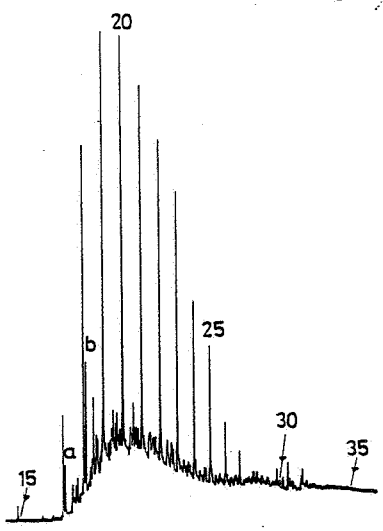
FIGURE 6b C_{15+} PARAFFIN - NAPHTHENES WELL 7120/7-1



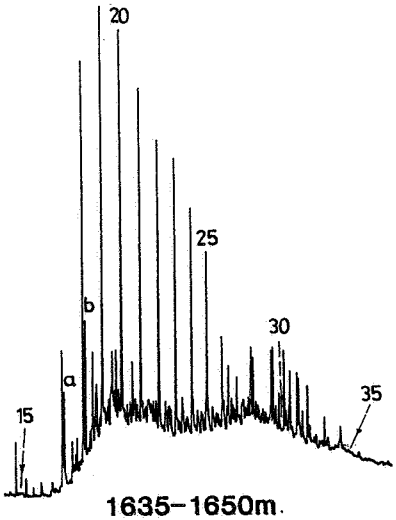
a – PRISTANE
b – PHYTANE

CARBON NUMBERS OF NORMAL PARAFFINS INDICATED (20 – nC_{20})

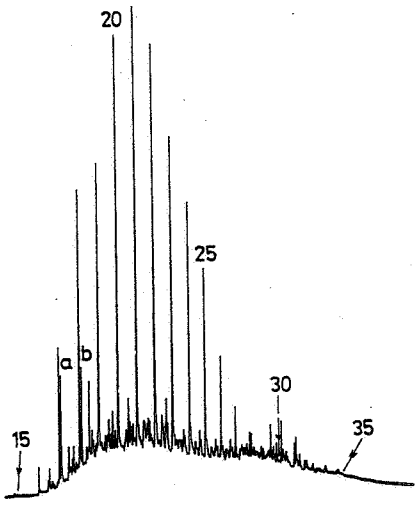
FIGURE 6c C_{15+} PARAFFIN - NAPHTHENES WELL 7120/7-1



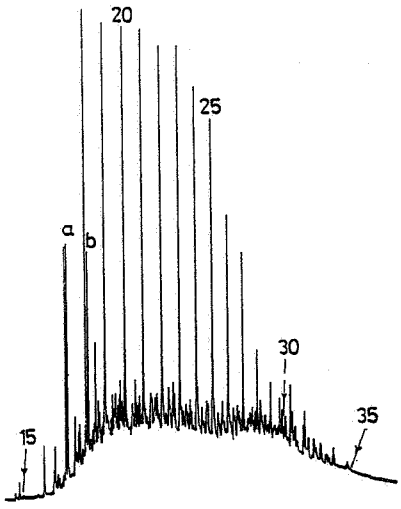
1578–1590m



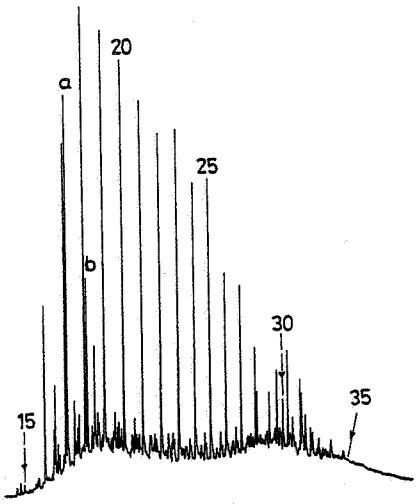
1635–1650m



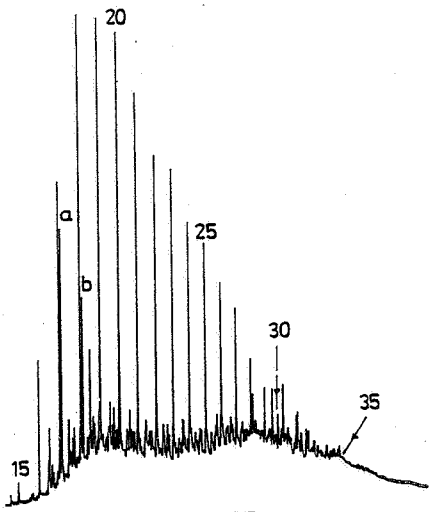
1740–1755m



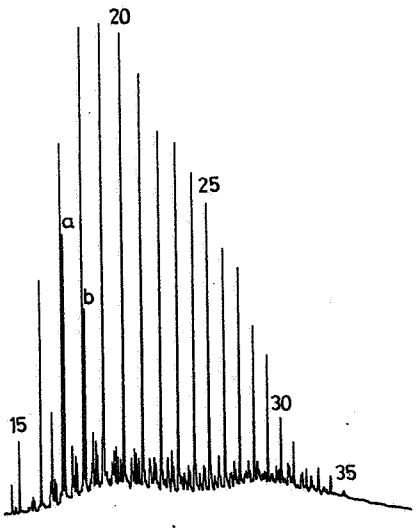
1755–1770m



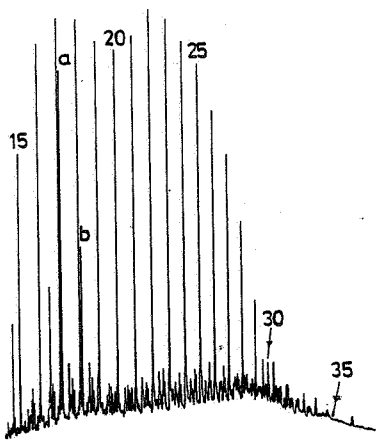
1785–1800m



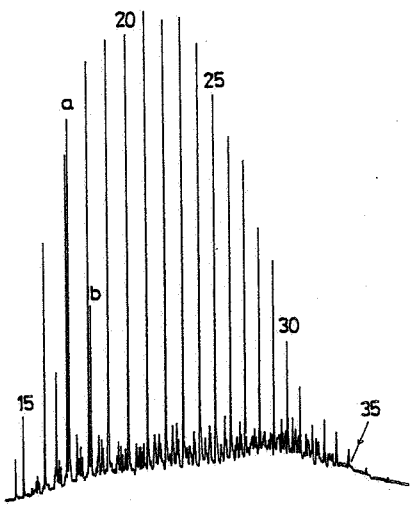
1860–1875m



1950–1965m



1995–2010m

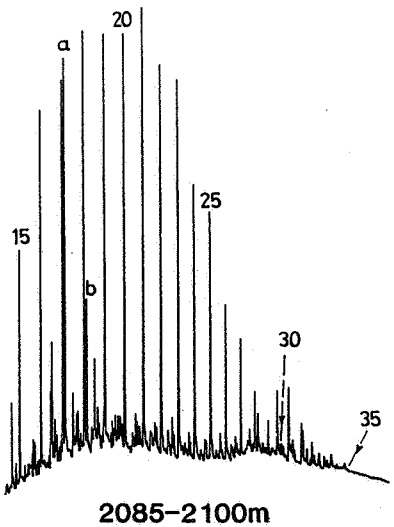


2025–2040m

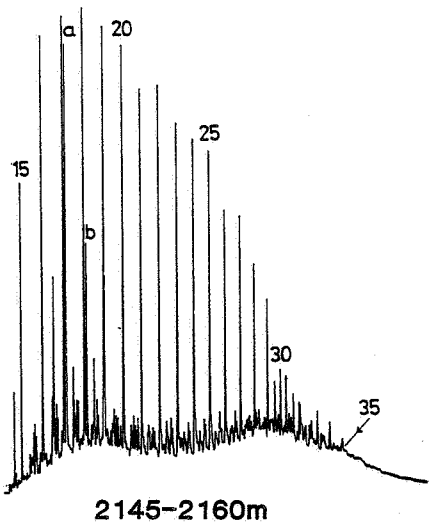
a – PRISTANE
b – PHYTANE

CARBON NUMBERS OF NORMAL PARAFFINS INDICATED (20 – nC_{20})

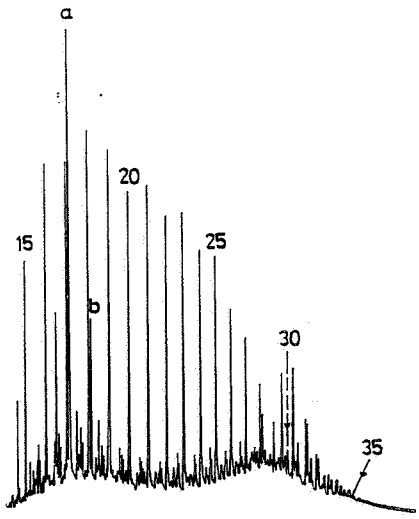
FIGURE 6d C_{15+} PARAFFIN - NAPHTHENES WELL 7120/7-1



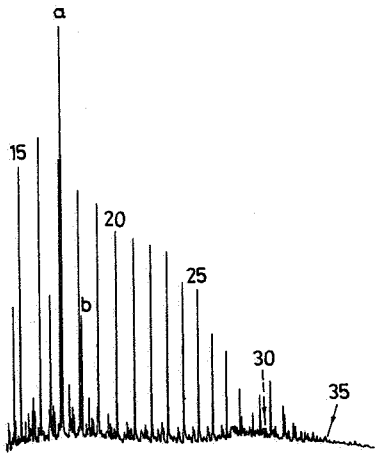
2085–2100m



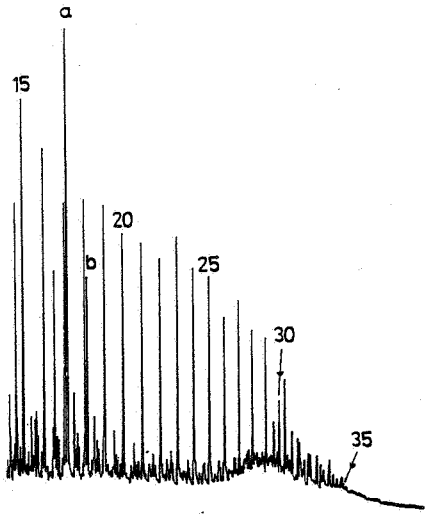
2145–2160m



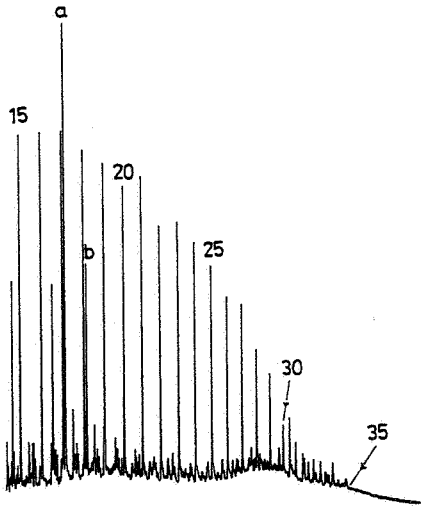
2190–2205m B



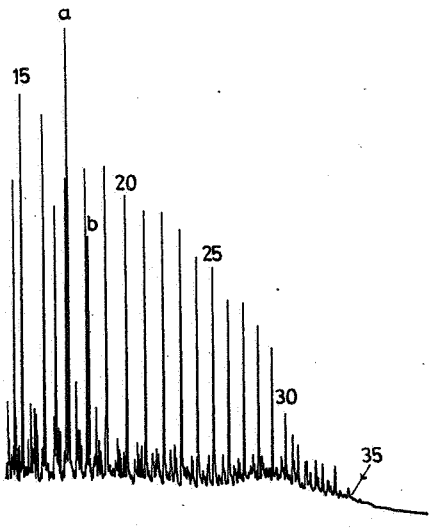
2250–2265m



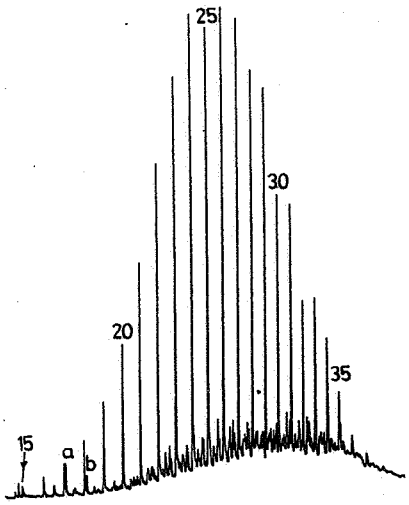
2295–2310m



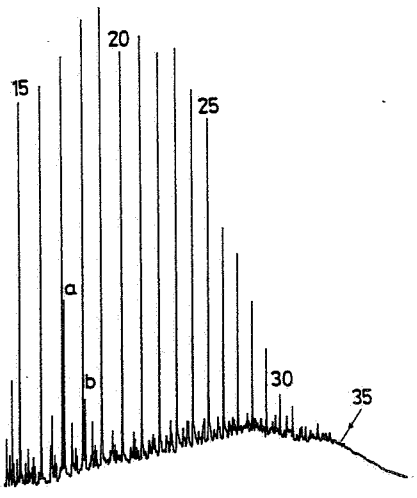
2340–2355m



2385–2400m



2510–2525m A

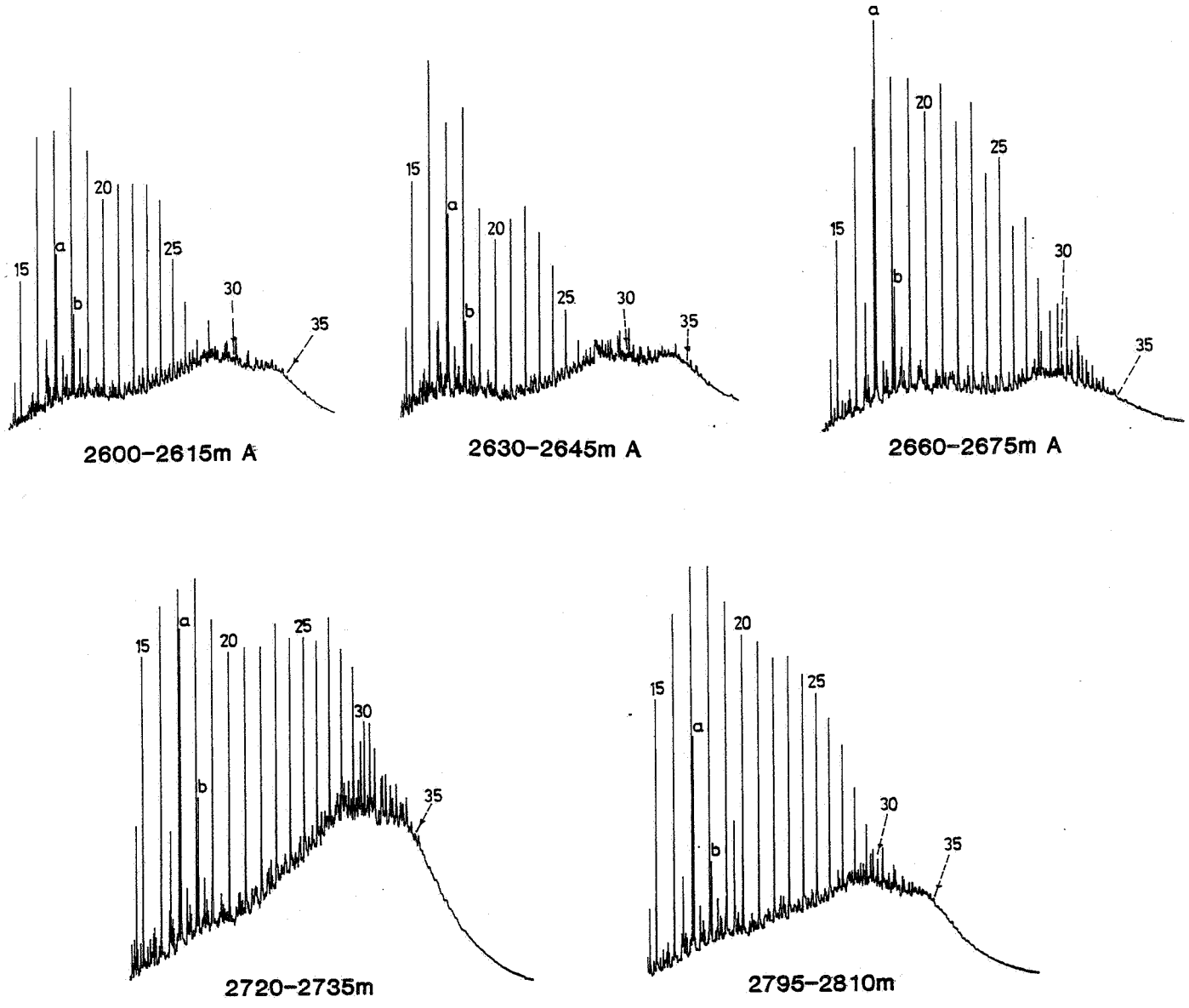


2570–2585m

a – PRISTANE
b – PHYTANE

CARBON NUMBERS OF NORMAL PARAFFINS INDICATED (20 – nC_{20})

FIGURE 6e C_{15+} PARAFFIN - NAPHTHENES WELL 7120/7-1



a – PRISTANE
b – PHYTANE

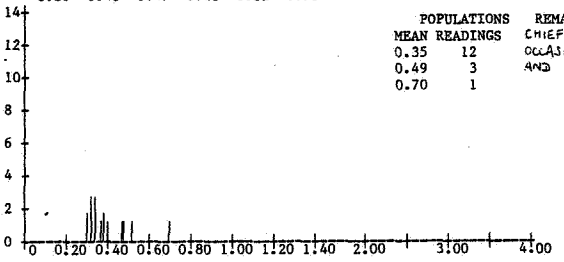
CARBON NUMBERS OF NORMAL PARAFFINS INDICATED (20 – nC_{20})

FIGURE 7a VITRINITE REFLECTANCE WELL 7120/7-1

SAMPLE 692-002B DEPTH 335-350 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.30 0.31 0.32 0.33 0.33 0.34 0.35 0.35 0.37 0.38
0.39 0.40 0.47 0.48 0.52 0.70

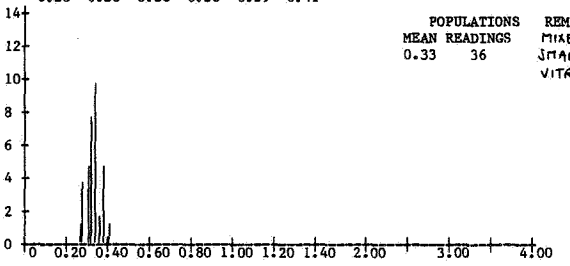
POPULATIONS MEAN READINGS		REMARKS
0.35	12	CHIEFLY INERTINITE
0.49	3	OCCASIONAL VITRINITE
0.70	1	AND BITUMEN



SAMPLE 692-006A DEPTH 395-410 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.27 0.28 0.29 0.29 0.29 0.31 0.31 0.31 0.31 0.31
0.32 0.32 0.32 0.32 0.32 0.32 0.33 0.33 0.34 0.34
0.34 0.34 0.35 0.35 0.35 0.35 0.35 0.35 0.36 0.36
0.38 0.38 0.38 0.38 0.39 0.41

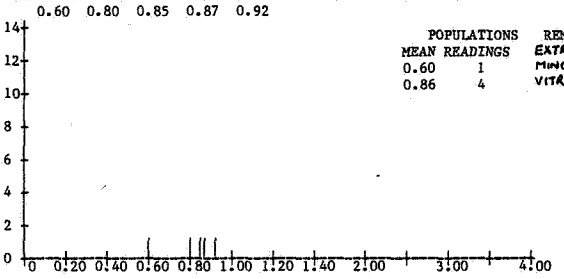
POPULATIONS MEAN READINGS		REMARKS
0.33	36	MIXED ASSEMBLAGE. SMALL SCATTERED VITRINITE PARTICLES



SAMPLE 692-014A DEPTH 515-530 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.60 0.80 0.85 0.87 0.92

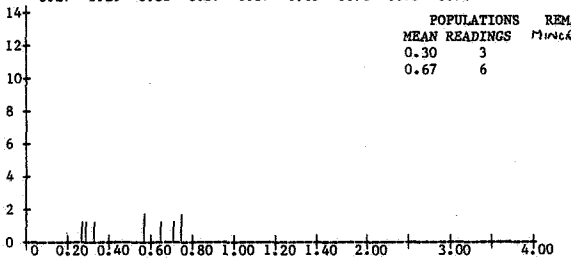
POPULATIONS MEAN READINGS		REMARKS
0.60	1	EXTREMELY LEAN. MINOR REWORKED
0.86	4	VITRINITE.



SAMPLE 692-022A DEPTH 635-650 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.27 0.29 0.33 0.57 0.57 0.65 0.71 0.75 0.76

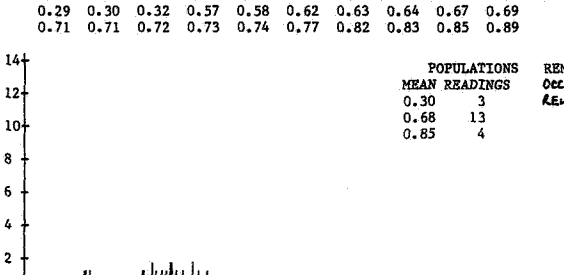
POPULATIONS MEAN READINGS		REMARKS
0.30	3	MINOR VITRINITE
0.67	6	



SAMPLE 692-027A DEPTH 710-725 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.29 0.30 0.32 0.57 0.58 0.62 0.63 0.64 0.67 0.69
0.71 0.71 0.72 0.73 0.74 0.77 0.82 0.83 0.85 0.89

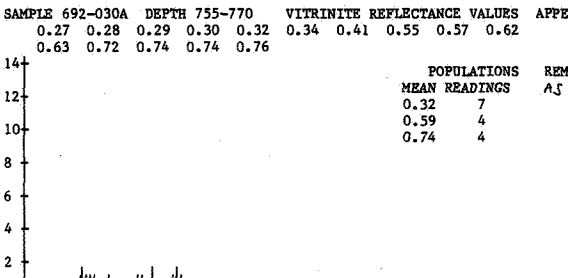
POPULATIONS MEAN READINGS		REMARKS
0.30	3	OCCASIONAL VITRINITE.
0.68	13	REWORKING APPARENT.
0.85	4	



SAMPLE 692-030A DEPTH 755-770 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.27 0.28 0.29 0.30 0.32 0.34 0.41 0.55 0.57 0.62
0.63 0.72 0.74 0.74 0.76

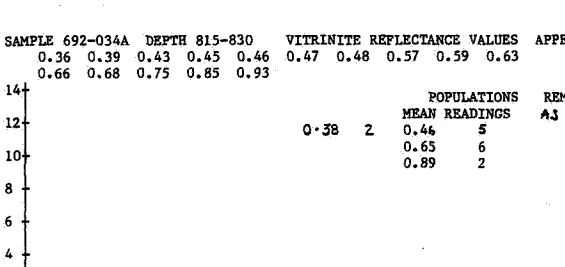
POPULATIONS MEAN READINGS		REMARKS
0.32	7	AS 692-027A
0.59	4	
0.74	4	



SAMPLE 692-034A DEPTH 815-830 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.36 0.39 0.43 0.45 0.46 0.47 0.48 0.57 0.59 0.63
0.66 0.68 0.75 0.85 0.93

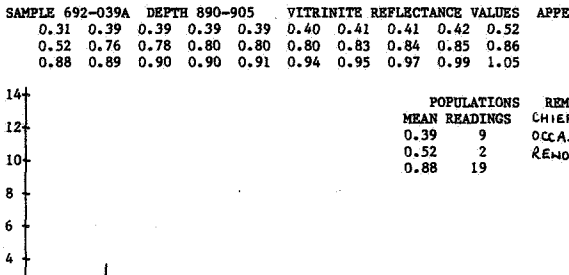
POPULATIONS MEAN READINGS		REMARKS
0.38 2	0.46 5	AS 692-027A
	0.65 6	
	0.89 2	



SAMPLE 692-039A DEPTH 890-905 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.31 0.39 0.39 0.39 0.39 0.40 0.41 0.41 0.42 0.52
0.52 0.76 0.78 0.80 0.80 0.80 0.83 0.84 0.85 0.86
0.88 0.89 0.90 0.90 0.91 0.94 0.95 0.97 0.99 1.05

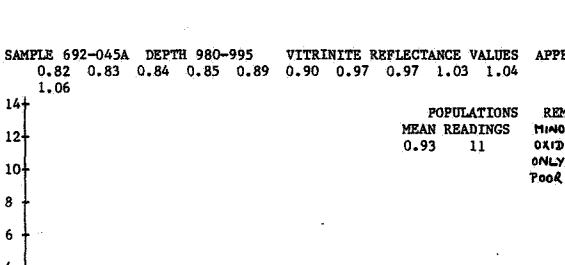
POPULATIONS MEAN READINGS		REMARKS
0.39	9	CHIEFLY INERTINITE.
0.52	2	OCCASIONAL VITRINITE.
0.88	19	REWORKING APPARENT.



SAMPLE 692-045A DEPTH 980-995 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.82 0.83 0.84 0.85 0.89 0.90 0.97 0.97 1.03 1.04
1.06

POPULATIONS MEAN READINGS		REMARKS
0.93	11	MINOR REWORKED/ OXIDISED VITRINITE ONLY. POOR SAMPLE.



SAMPLE 692-050B DEPTH 1055-1070 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.33 0.34 0.62 0.70 0.70 0.70 0.73 0.73 0.74 0.75
0.77 0.77 0.81 0.81 0.84 0.86 0.87 0.91 0.99 1.02

POPULATIONS MEAN READINGS		REMARKS
0.33	2	CHIEFLY INERTINITE.
0.77	16	SCATTERED VITRINITE -
1.00	2	GENERALLY REWORKED.

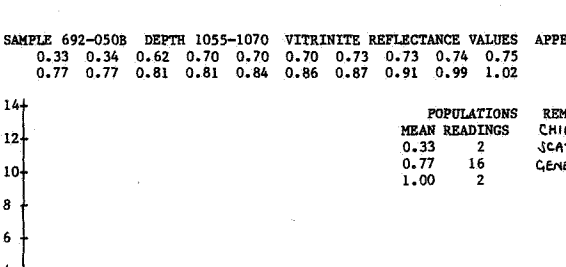


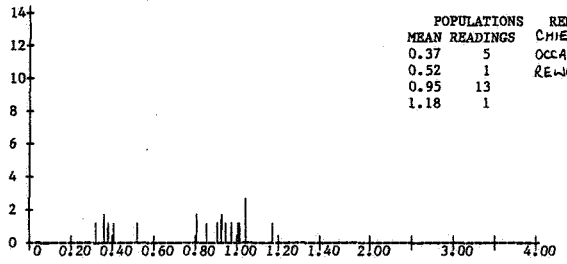
FIGURE 7b VITRINITE REFLECTANCE WELL 7120/7-1

SAMPLE 692-164A DEPTH 1115 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.32 0.36 0.37 0.38 0.41 0.52 0.81 0.81 0.86 0.91
0.93 0.93 0.95 0.98 1.01 1.02 1.05 1.05 1.05 1.18

POPULATIONS MEAN READINGS	
0.37	5
0.52	1
0.95	13
1.18	1

REMARKS: CHIEFLY INERTINITE. OCCASIONAL VITRINITE. REWORKING APPARENT.

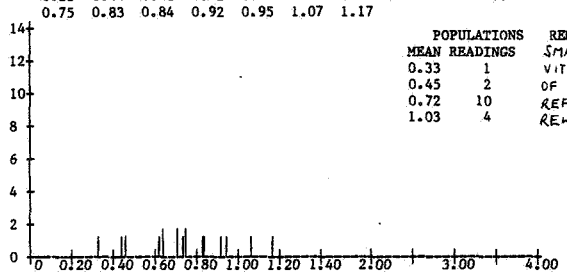


SAMPLE 692-057A DEPTH 1160-1175 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.33 0.44 0.46 0.62 0.64 0.64 0.71 0.71 0.74 0.75
0.75 0.83 0.84 0.92 0.95 1.07 1.17

POPULATIONS MEAN READINGS	
0.33	1
0.45	2
0.72	10
1.03	4

REMARKS: SMALL SCATTERED VITRINITE PARTICLES OF VARIABLE REFLECTANCE. REWORKING.

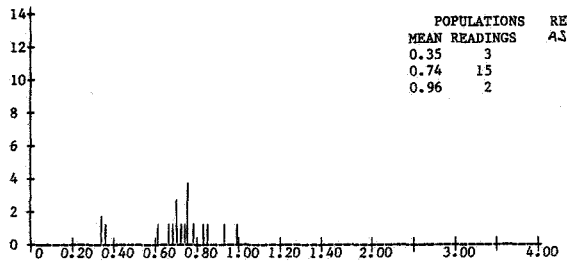


SAMPLE 692-060A DEPTH 1205-1220 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.34 0.35 0.36 0.61 0.66 0.68 0.70 0.71 0.71 0.72
0.74 0.75 0.76 0.77 0.77 0.78 0.83 0.85 0.93 0.99

POPULATIONS MEAN READINGS	
0.35	3
0.74	15
0.96	2

REMARKS: AS 692-057A

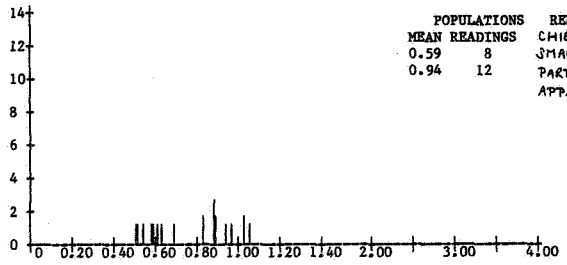


SAMPLE 692-063A DEPTH 1250-1265 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.51 0.52 0.55 0.59 0.60 0.62 0.64 0.70 0.84 0.84
0.89 0.89 0.89 0.90 0.91 0.95 0.98 1.04 1.05 1.07

POPULATIONS MEAN READINGS	
0.59	8
0.94	12

REMARKS: CHIEFLY INERTINITE. SMALL VITRINITE PARTICLES - REWORKING APPARENT.

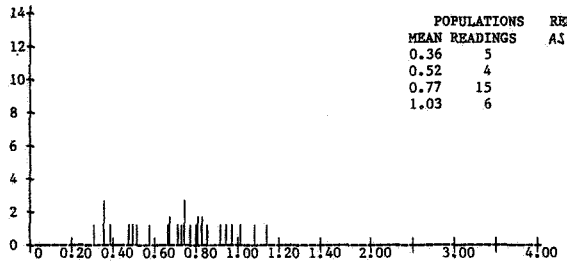


SAMPLE 692-070A DEPTH 1355-1370 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.31 0.36 0.36 0.37 0.39 0.48 0.50 0.52 0.58 0.67
0.68 0.69 0.72 0.74 0.75 0.76 0.77 0.78 0.81 0.82
0.83 0.84 0.85 0.87 0.93 0.96 0.99 1.03 1.10 1.16

POPULATIONS MEAN READINGS	
0.36	5
0.52	4
0.77	15
1.03	6

REMARKS: AS 692-060A

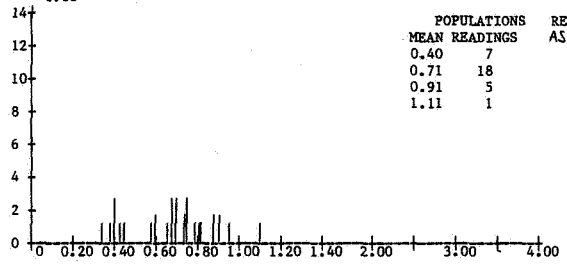


SAMPLE 692-076A DEPTH 1445-1460 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.34 0.38 0.40 0.40 0.40 0.43 0.45 0.58 0.60 0.61
0.66 0.68 0.68 0.69 0.70 0.71 0.71 0.74 0.74 0.75
0.75 0.75 0.79 0.81 0.82 0.88 0.89 0.91 0.91 0.96
1.11

POPULATIONS MEAN READINGS	
0.40	7
0.71	18
0.91	5
1.11	1

REMARKS: AS 692-060A

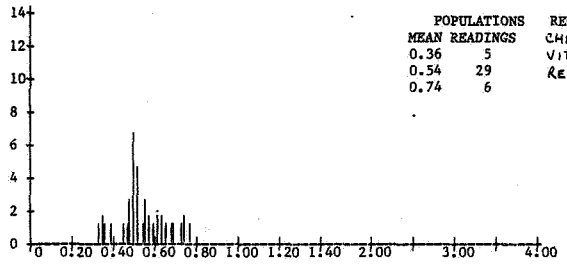


SAMPLE 692-081A DEPTH 1520-1535 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.33 0.35 0.35 0.36 0.39 0.45 0.47 0.48 0.48 0.48
0.50 0.50 0.50 0.51 0.51 0.51 0.51 0.52 0.52 0.52
0.52 0.53 0.55 0.56 0.56 0.57 0.58 0.59 0.60 0.62
0.62 0.64 0.65 0.66 0.69 0.70 0.74 0.75 0.77 0.78

POPULATIONS MEAN READINGS	
0.36	5
0.54	29
0.74	6

REMARKS: CHIEFLY INERTINITE. VITRINITE GENERALLY REWORKED.

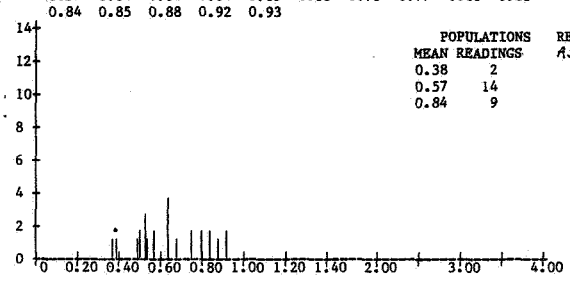


SAMPLE 692-085A DEPTH 1578-1590 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.37 0.39 0.49 0.50 0.50 0.53 0.53 0.53 0.54 0.57
0.57 0.64 0.64 0.64 0.65 0.68 0.75 0.77 0.80 0.81
0.84 0.85 0.88 0.92 0.93

POPULATIONS MEAN READINGS	
0.38	2
0.57	14
0.84	9

REMARKS: AS 692-081A

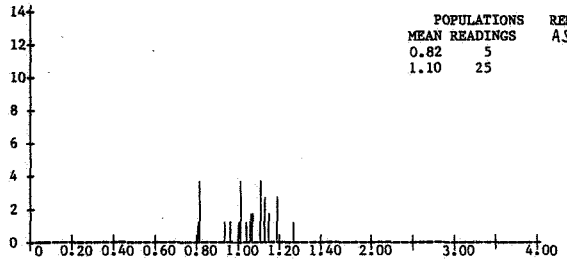


SAMPLE 692-165A DEPTH 1620 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.81 0.82 0.82 0.83 0.83 0.94 0.97 1.01 1.02 1.02
1.03 1.03 1.05 1.07 1.07 1.08 1.08 1.12 1.12 1.12
1.13 1.14 1.14 1.15 1.16 1.17 1.20 1.20 1.21 1.28

POPULATIONS MEAN READINGS	
0.82	5
1.10	25

REMARKS: AS 692-164A



SAMPLE 692-089A DEPTH 1635-1650 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.52 0.52 0.59 0.59 0.59 0.59 0.66 0.66 0.66 0.66
0.67 0.67 0.71 0.71 0.74 0.74 0.82 0.82 0.84 0.84
0.85 0.85 0.93 0.93 0.96 0.96 1.01 1.01 1.02 1.02
1.03 1.03 1.04 1.04 1.07 1.07 1.07 1.07 1.08 1.08
1.08 1.08 1.08 1.08 1.10 1.10 1.12 1.12

POPULATIONS MEAN READINGS	
0.64	16
1.01	32

REMARKS: AS 692-081A

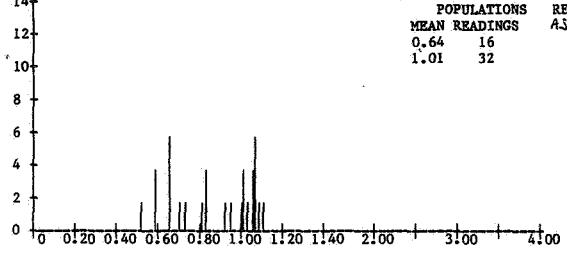
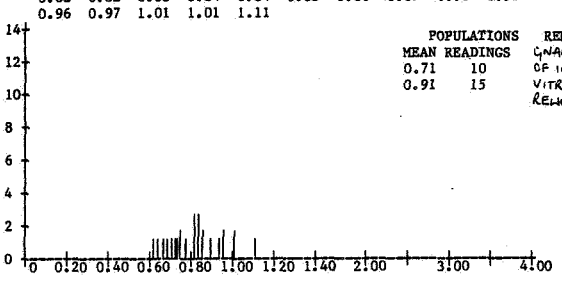


FIGURE 7c VITRINITE REFLECTANCE WELL 7120/7-1

SAMPLE 692-092A DEPTH 1680-1695 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.62 0.64 0.67 0.69 0.71 0.73 0.74 0.75 0.75 0.78
0.82 0.82 0.83 0.84 0.84 0.85 0.86 0.87 0.90 0.94
0.96 0.97 1.01 1.01 1.11

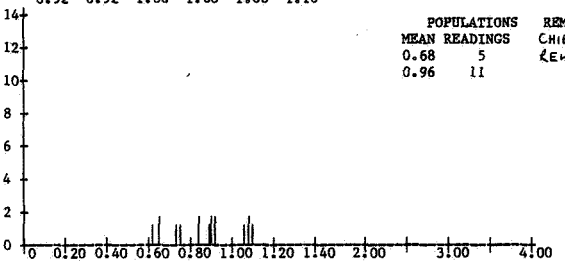
POPULATIONS MEAN READINGS		REMARKS
0.71	10	GNARLED PARTICLES OF INERTINITE AND VITRINITE. REWORKING APPARENT.
0.91	15	



SAMPLE 692-096B DEPTH 1740-1755 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.62 0.65 0.65 0.73 0.75 0.84 0.85 0.89 0.90 0.91
0.92 0.92 1.06 1.08 1.08 1.10

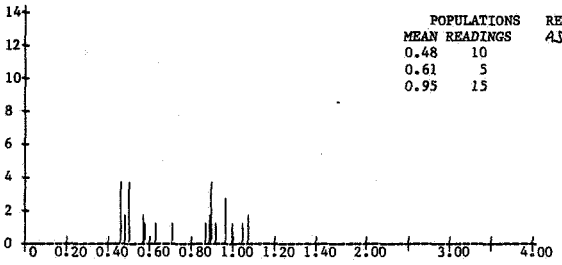
POPULATIONS MEAN READINGS		REMARKS
0.68	5	CHIEFLY INERTINITE. REWORKING.
0.96	11	



SAMPLE 692-099A DEPTH 1785-1800 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.46 0.46 0.47 0.47 0.48 0.48 0.50 0.50 0.50 0.50
0.57 0.57 0.58 0.63 0.71 0.87 0.89 0.89 0.90 0.90
0.90 0.91 0.92 0.97 0.97 0.97 1.00 1.05 1.08 1.08

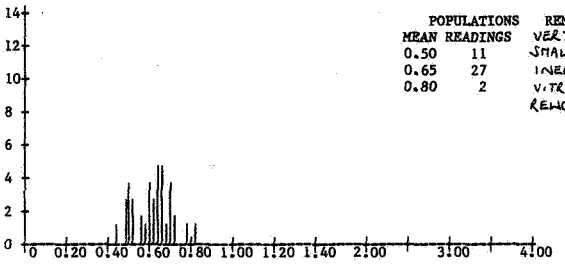
POPULATIONS MEAN READINGS		REMARKS
0.48	10	AS 692-081A
0.61	5	
0.95	15	



SAMPLE 692-166A DEPTH 1851 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.44 0.49 0.49 0.49 0.50 0.50 0.50 0.51 0.52 0.53
0.53 0.56 0.57 0.58 0.60 0.60 0.61 0.61 0.62 0.63
0.63 0.64 0.64 0.65 0.65 0.65 0.66 0.66 0.67 0.67
0.67 0.68 0.70 0.70 0.71 0.71 0.72 0.73 0.78 0.82

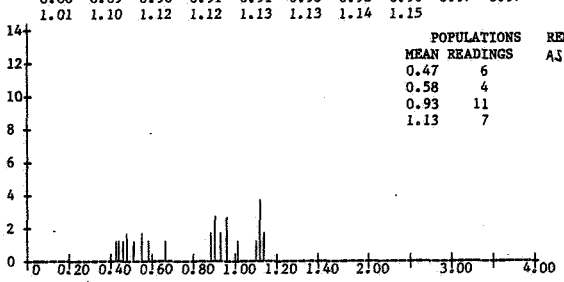
POPULATIONS MEAN READINGS		REMARKS
0.50	11	VERY DOMINANTLY SMALL PARTICLES OF INERTINITE AND VITRINITE. REWORKING APPARENT.
0.65	27	
0.80	2	



SAMPLE 692-103A DEPTH 1845-1860 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.43 0.44 0.46 0.48 0.49 0.51 0.55 0.55 0.58 0.66
0.88 0.89 0.90 0.91 0.91 0.93 0.93 0.96 0.97 0.97
1.01 1.10 1.12 1.12 1.13 1.13 1.14 1.15

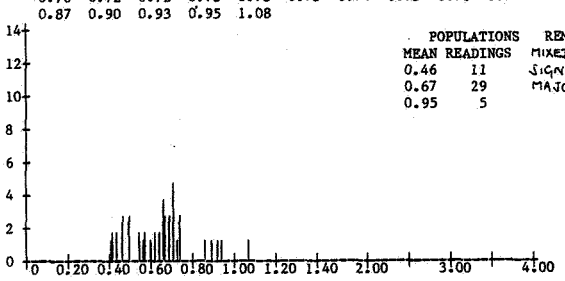
POPULATIONS MEAN READINGS		REMARKS
0.47	6	AS 692-081A
0.58	4	
0.93	11	
1.13	7	



SAMPLE 692-109A DEPTH 1935-1950 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.41 0.42 0.43 0.44 0.45 0.47 0.47 0.47 0.50 0.51
0.51 0.55 0.55 0.57 0.58 0.58 0.61 0.63 0.63 0.65
0.65 0.67 0.67 0.67 0.67 0.68 0.68 0.69 0.70 0.70
0.70 0.72 0.72 0.73 0.73 0.73 0.74 0.75 0.76 0.77
0.87 0.90 0.93 0.95 1.08

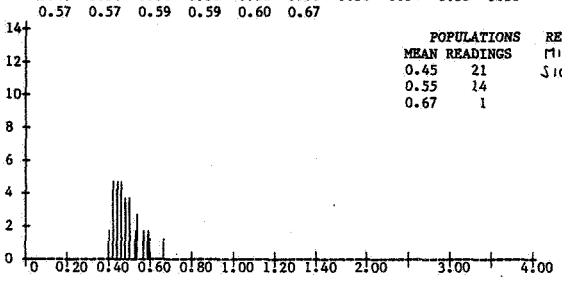
POPULATIONS MEAN READINGS		REMARKS
0.46	11	MIXED ASSEMBLAGE. SIGNIFICANT TO MAJOR VITRINITE.
0.67	29	
0.95	5	



SAMPLE 692-113A DEPTH 1995-2010 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.40 0.41 0.42 0.42 0.43 0.43 0.43 0.44 0.44 0.45
0.45 0.45 0.46 0.46 0.47 0.47 0.47 0.48 0.49 0.49
0.49 0.50 0.50 0.51 0.51 0.53 0.53 0.54 0.55 0.55
0.57 0.57 0.59 0.59 0.60 0.67

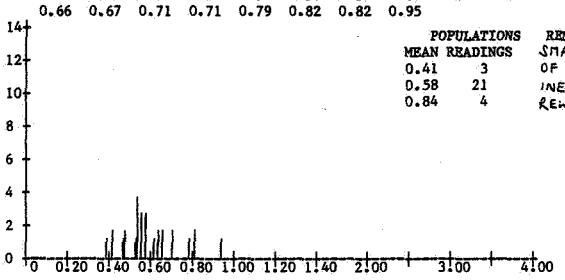
POPULATIONS MEAN READINGS		REMARKS
0.45	21	MIXED ASSEMBLAGE. SIGNIFICANT VITRINITE.
0.55	14	
0.67	1	



SAMPLE 692-119A DEPTH 2085-2100 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.39 0.42 0.42 0.47 0.48 0.48 0.53 0.54 0.54 0.55
0.55 0.56 0.57 0.57 0.58 0.58 0.59 0.62 0.64 0.64
0.66 0.67 0.71 0.71 0.79 0.82 0.82 0.95

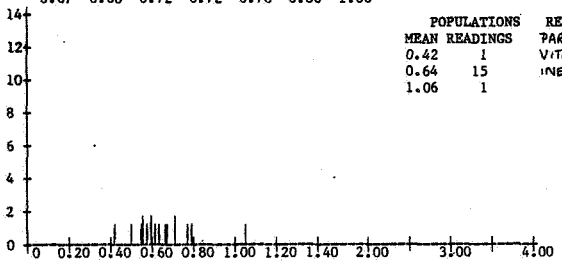
POPULATIONS MEAN READINGS		REMARKS
0.41	3	SMALL PARTICLES OF VITRINITE AND INERTINITE. REWORKING APPARENT.
0.58	21	
0.84	4	



SAMPLE 692-122A DEPTH 2130-2145 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.42 0.50 0.55 0.56 0.57 0.58 0.60 0.61 0.62 0.64
0.67 0.68 0.72 0.72 0.78 0.80 1.06

POPULATIONS MEAN READINGS		REMARKS
0.42	1	PARTICLES OF VITRINITE AND INERTINITE.
0.64	15	
1.06	1	



SAMPLE 692-167A DEPTH 2143 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.59 0.59 0.60 0.64 0.65 0.66 0.67 0.67 0.67 0.69
0.69 0.70 0.71 0.71 0.74 0.74 0.74 0.75 0.75 0.78
0.79 0.79 0.81 0.87 0.92 0.92 0.94 0.96 0.98 1.01

POPULATIONS MEAN READINGS		REMARKS
0.70	23	MIXED ASSEMBLAGE. SIGNIFICANT TO MAJOR VITRINITE.
0.94	7	

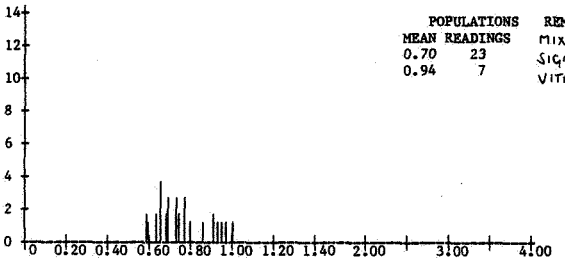
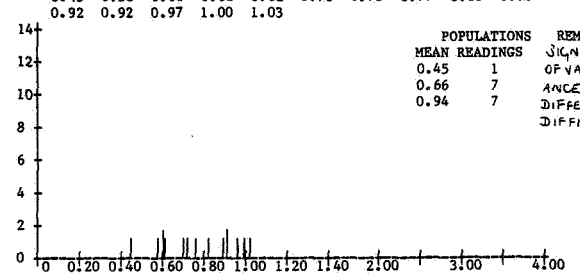


FIGURE 7d VITRINITE REFLECTANCE WELL 7120/7-1

SAMPLE 692-126B DEPTH 2190-2205 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.45 0.58 0.61 0.61 0.62 0.71 0.73 0.77 0.83 0.90
0.92 0.92 0.97 1.00 1.03

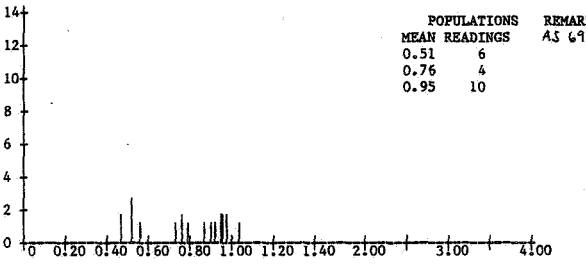


POPULATIONS MEAN READINGS	
0.45	1
0.66	7
0.94	7

REMARKS: SIGNIFICANT VITRINITE OF VARIABLE REFLECTANCE. DIFFERENTIATION DIFFICULT.

SAMPLE 692-168A DEPTH 2249 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.47 0.47 0.52 0.53 0.53 0.56 0.73 0.76 0.77 0.79
0.87 0.90 0.92 0.95 0.95 0.96 0.96 0.98 0.99 1.04

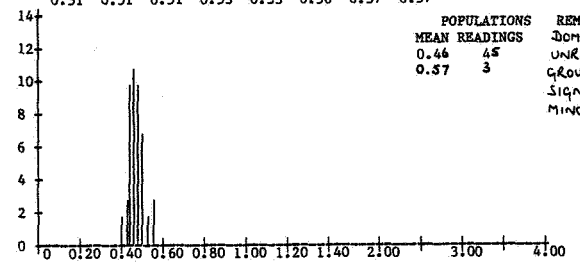


POPULATIONS MEAN READINGS	
0.51	6
0.76	4
0.95	10

REMARKS: AS 692-168A

SAMPLE 692-169A DEPTH 2282 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.40 0.41 0.43 0.43 0.43 0.44 0.44 0.44 0.44 0.45
0.45 0.45 0.45 0.45 0.45 0.46 0.46 0.46 0.46 0.46
0.46 0.47 0.47 0.47 0.47 0.47 0.48 0.48 0.48 0.48
0.48 0.48 0.48 0.49 0.49 0.49 0.50 0.50 0.50 0.50
0.51 0.51 0.51 0.53 0.53 0.56 0.57 0.57

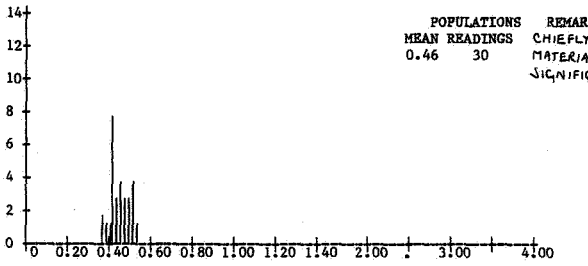


POPULATIONS MEAN READINGS	
0.46	45
0.57	3

REMARKS: DOMINANTLY UNRECOGNISABLE GROUNDMASS: SIGNIFICANT VITRINITE. MINOR INERTINITE.

SAMPLE 692-133A DEPTH 2295-2310 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.37 0.37 0.39 0.41 0.42 0.42 0.42 0.42 0.42 0.43
0.43 0.43 0.44 0.45 0.45 0.46 0.46 0.47 0.47 0.48
0.49 0.49 0.50 0.50 0.51 0.52 0.52 0.53 0.53 0.54

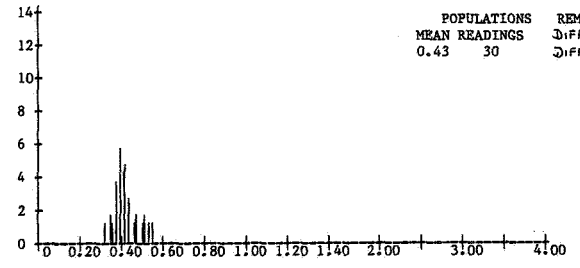


POPULATIONS MEAN READINGS	
0.46	30

REMARKS: CHIEFLY AMORPHOUS MATERIAL. SIGNIFICANT VITRINITE.

SAMPLE 692-137A DEPTH 2355-2370 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.32 0.35 0.35 0.36 0.38 0.38 0.38 0.39 0.40 0.40
0.40 0.41 0.41 0.41 0.42 0.42 0.43 0.43 0.43 0.44
0.45 0.45 0.47 0.48 0.48 0.51 0.52 0.53 0.54 0.56

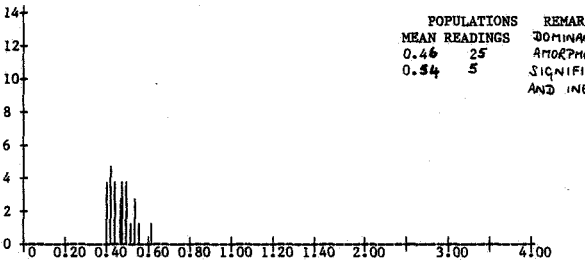


POPULATIONS MEAN READINGS	
0.43	30

REMARKS: DIFFERENTIATION DIFFICULT.

SAMPLE 692-170A DEPTH 2376 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.40 0.41 0.41 0.41 0.42 0.42 0.43 0.43 0.43 0.44
0.44 0.45 0.45 0.47 0.47 0.47 0.48 0.48 0.49 0.49
0.50 0.50 0.50 0.51 0.52 0.54 0.54 0.55 0.56 0.62

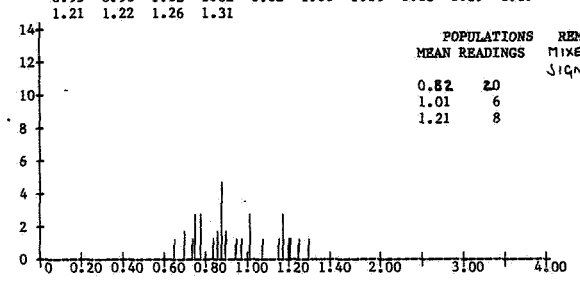


POPULATIONS MEAN READINGS	
0.46	25
0.54	5

REMARKS: DOMINANTLY ALGAL/AMORPHOUS MATERIAL. SIGNIFICANT VITRINITE AND INERTINITE.

SAMPLE 692-171A DEPTH 2385 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.65 0.70 0.70 0.74 0.75 0.76 0.77 0.78 0.78 0.79
0.84 0.86 0.87 0.88 0.88 0.88 0.89 0.89 0.90 0.90
0.95 0.98 1.02 1.02 1.02 1.08 1.16 1.18 1.19 1.19
1.21 1.22 1.26 1.31

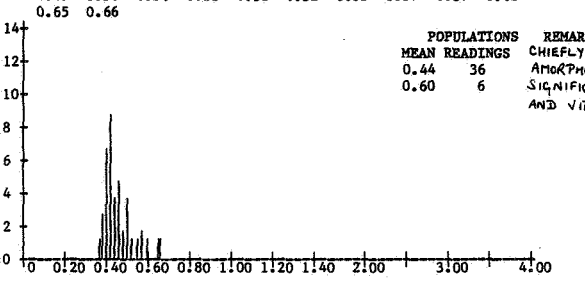


POPULATIONS MEAN READINGS	
0.82	20
1.01	6
1.21	8

REMARKS: MIXED ASSEMBLAGE. SIGNIFICANT VITRINITE.

SAMPLE 692-139A DEPTH 2385-2400 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.37 0.38 0.39 0.39 0.40 0.40 0.40 0.41 0.41 0.41
0.41 0.42 0.42 0.42 0.42 0.42 0.43 0.43 0.43 0.43
0.44 0.44 0.44 0.45 0.46 0.46 0.46 0.46 0.47 0.48
0.49 0.50 0.50 0.51 0.51 0.52 0.55 0.57 0.57 0.60
0.65 0.66

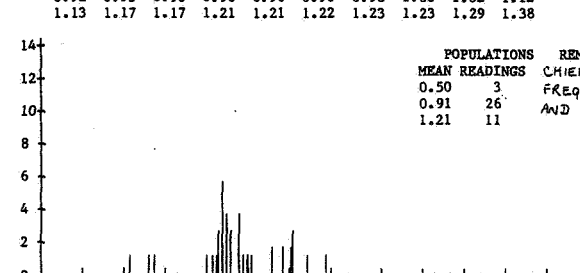


POPULATIONS MEAN READINGS	
0.44	36
0.60	6

REMARKS: CHIEFLY ALGAL-AMORPHOUS MATERIAL. SIGNIFICANT INERTINITE AND VITRINITE.

SAMPLE 692-172A DEPTH 2394 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.43 0.52 0.55 0.80 0.83 0.85 0.86 0.87 0.87 0.88
0.88 0.88 0.88 0.88 0.88 0.90 0.90 0.90 0.91 0.92
0.92 0.93 0.96 0.96 0.96 0.96 0.98 1.00 1.02 1.12
1.13 1.17 1.17 1.21 1.21 1.22 1.23 1.23 1.29 1.38

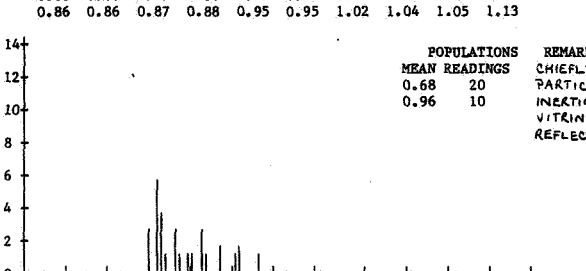


POPULATIONS MEAN READINGS	
0.50	3
0.91	26
1.21	11

REMARKS: CHIEFLY INERTINITE. FREQUENT VITRINITE AND GROUNDMASS.

SAMPLE 692-141A DEPTH 2495-2510 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.60 0.61 0.61 0.64 0.64 0.64 0.64 0.65 0.65 0.66
0.66 0.66 0.67 0.68 0.73 0.73 0.73 0.75 0.79 0.81
0.86 0.86 0.87 0.88 0.95 0.95 1.02 1.04 1.05 1.13



POPULATIONS MEAN READINGS	
0.68	20
0.96	10

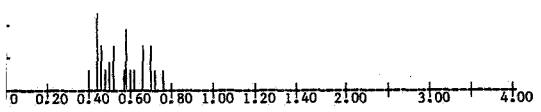
REMARKS: CHIEFLY GNARLED PARTICLES OF INERTINITE AND VITRINITE OF VARIABLE REFLECTANCE.

FIGURE 7e VITRINITE REFLECTANCE WELL 7120/7-1

PLE 692-152A DEPTH 2660-2675 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.40	0.44	0.44	0.45	0.45	0.45	0.46	0.47	0.47	0.48
0.50	0.50	0.52	0.53	0.53	0.57	0.58	0.58	0.59	0.59
0.60	0.62	0.66	0.66	0.67	0.70	0.70	0.70	0.72	0.76

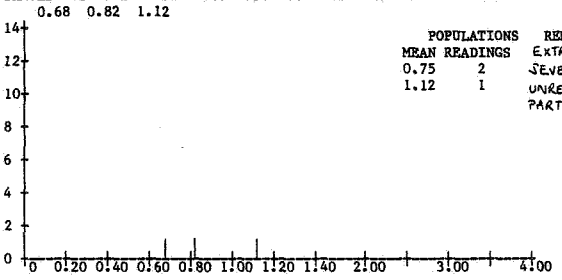
POPULATIONS MEAN	READINGS	REMARKS
0.47	15	MIXED. SIGNIFICANT TO MAJOR VITRINITE.
0.65	15	



SAMPLE 692-157A DEPTH 2735-2750 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.68	0.82	1.12

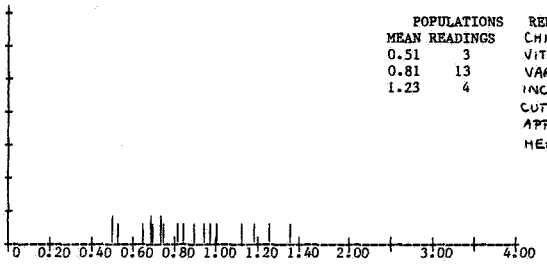
POPULATIONS MEAN	READINGS	REMARKS
0.75	2	EXTREMELY LEAN - SEVERAL SMALL UNRECOGNISABLE PARTICLES MEASURED
1.12	1	



MPLE 692-159A DEPTH 2765-2780 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.50	0.50	0.53	0.65	0.69	0.69	0.70	0.74	0.74	0.75
0.82	0.85	0.90	0.95	0.98	1.01	1.13	1.19	1.26	1.36

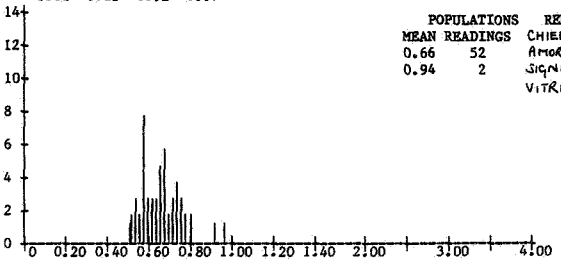
POPULATIONS MEAN	READINGS	REMARKS
0.51	3	CHIEFLY INERTINITE. VITRINITE OF VARIABLE REFLECTANCE INCLUDING COALY CUTTINGS OF BRECCIATE APPEARANCE, POSSIBLY HEAT AFFECTED.
0.81	13	
1.23	4	



SAMPLE 692-161B DEPTH 2795-2810 VITRINITE REFLECTANCE VALUES APPEARANCE IN UV

0.51	0.52	0.53	0.54	0.55	0.55	0.56	0.57	0.58	0.58
0.59	0.59	0.59	0.59	0.59	0.59	0.60	0.61	0.61	0.62
0.62	0.62	0.64	0.64	0.65	0.66	0.66	0.66	0.67	0.67
0.68	0.69	0.69	0.69	0.69	0.69	0.70	0.71	0.72	0.72
0.72	0.74	0.74	0.74	0.74	0.76	0.77	0.77	0.78	0.79
0.81	0.81	0.92	0.97						

POPULATIONS MEAN	READINGS	REMARKS
0.66	52	CHIEFLY ALGAL/ AMORPHOUS MATERIAL. SIGNIFICANT TO MAJOR VITRINITE.
0.94	2	



IGURE 8 ORGANIC FACIES & MATURITY WELL 7120/7-1

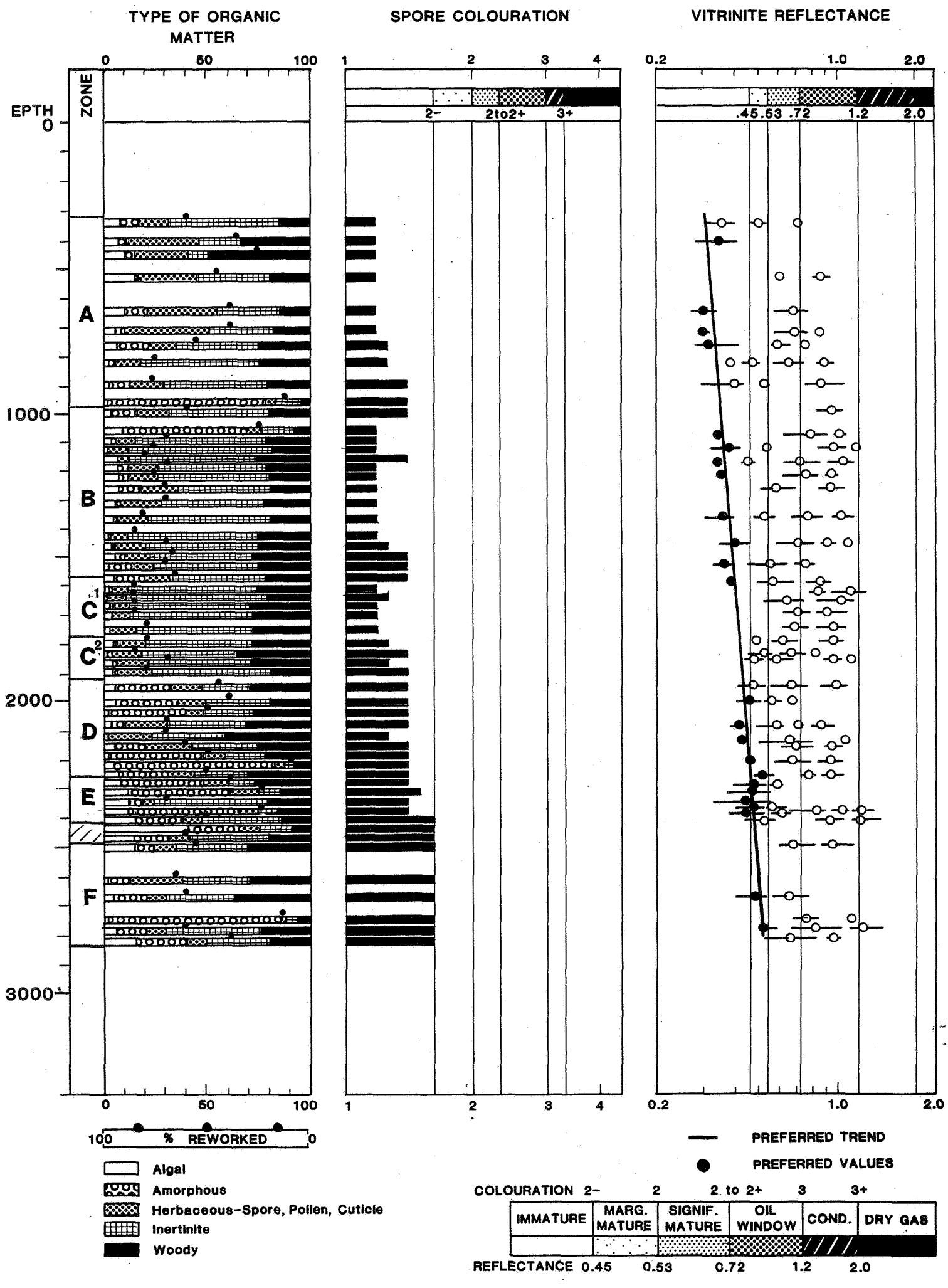
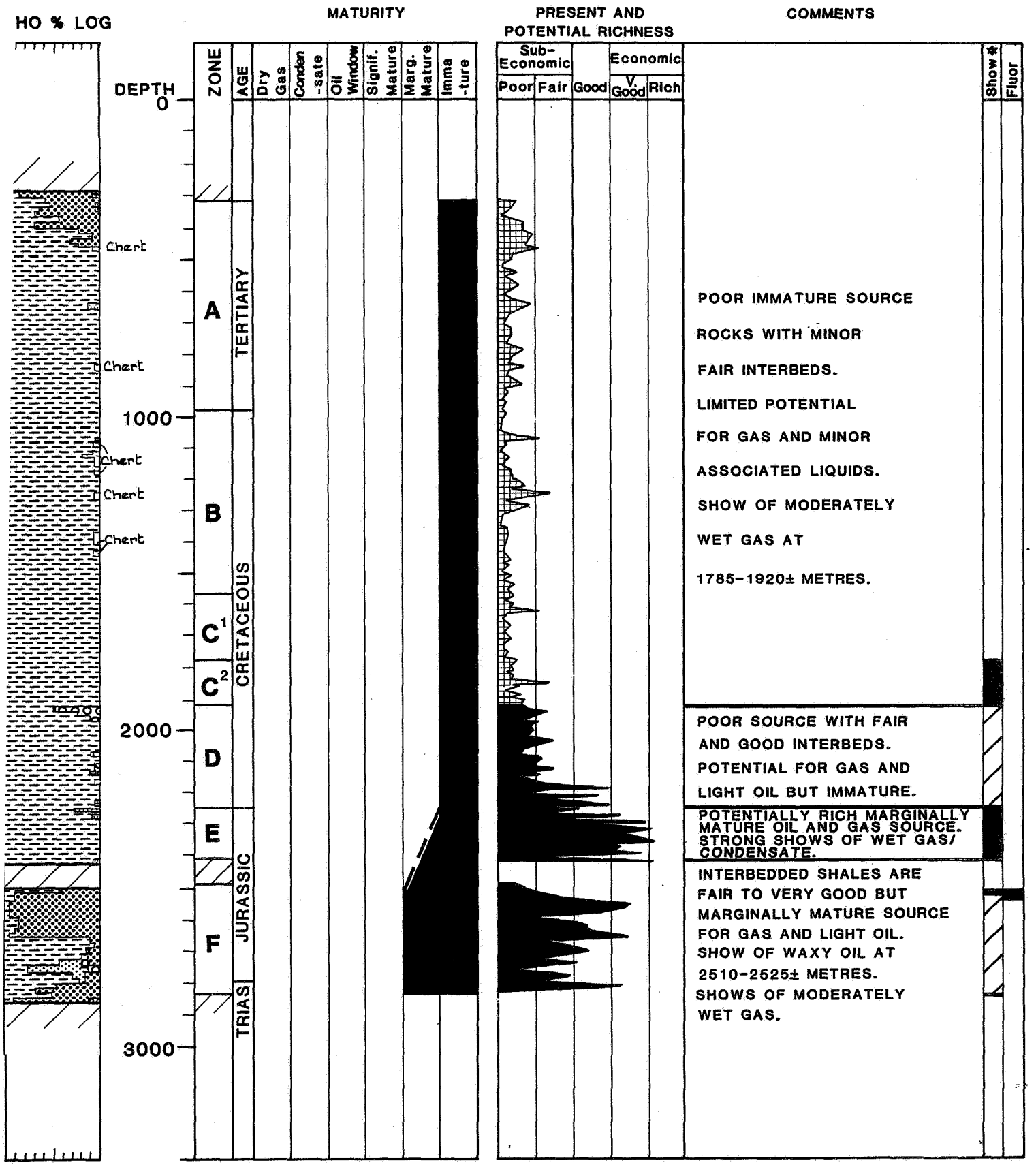


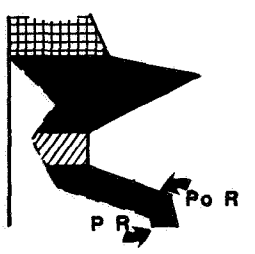
FIGURE 9

RATING

WELL 7120/7-1



Carbonate
Shale/Mudstone
Siltstone
Evaporite
Sand
Coal
Igneous
L.C.M.



GAS PRONE
GAS AND CONDENSATE
OIL PRONE
Shows Recognised by Analysis
Po R Potential Richness
PR Present Richness

BRIEF DESCRIPTION OF THE ANALYSES PERFORMED BY GEOCHEM

"Screen Analyses" are described in sections A, C and D, "Sample Preparation" in section B, "Follow-up Analyses" in sections E through K and "Correlation Studies" in section L. The analyses can be run on either core or cuttings material with the proviso that samples must be canned for the C_1-C_7 analysis and should be canned (or at least wet) for the C_4-C_7 analysis. The other analyses can be run on both canned and bagged samples.

A) C_1-C_7 LIGHT HYDROCARBON ANALYSIS

The abundance and composition of the C_1-C_7 hydrocarbons in sediments reflects their source richness, maturity and the character of the hydrocarbons they can yield. Most importantly, it is extremely sensitive to the presence of migrated hydrocarbons and is an excellent method for their detection. As it provides the information on most of the critical parameters and is also economical, this analysis is excellent for screening samples to decide which of them merit further analysis.

During the time which elapses betwwen the collection of the sample at the wellsite and its analysis in the laboratory, a fraction of the total gas passes from the rock to the air space at the top of the can. For this reason, both the air space and the cuttings are analysed.

The analysis involves the gas chromatographic separation of the individual C_1-C_4 gaseous hydrocarbons (methane, ethane, propane, isobutane and normal butane) and a partial resolution of the C_5-C_7 gasoline-range hydrocarbons (for their complete resolution see Section E). The ppm abundance of the five gases and of the total C_5-C_7 hydrocarbons are calculated from their electronically integrated peak areas (<u>not</u> from peak height) by comparison with a standard.

In the report, the following data are tabulated: the abundance and composition of the air space gas, of the cuttings gas and of the combined air space and cuttings gases. The combined results are also presented graphically.

B) SAMPLE WASHING AND HAND PICKING

All of the analyses described in subsequent sections are run on washed and hand picked samples.

Cuttings are washed to remove the drilling mud, care being taken not to remove soft clays and fine sand during the washing procedure. Using the C_1-C_7 hydrocarbon data profile of the well, or the organic carbon profile (if this analysis is used for screening), electric logs (if supplied) and the appearance of the cuttings under the binocular microscope, samples are selected to represent the lithological and geochemical zones penetrated by the well. These samples are then carefully hand picked and the lithology of the uncaved material is described. It is these samples which are submitted for further analysis.

Sample material remaining after analysis is retained for six months. Unless instructions are received to the contrary, Geochem Laboratories may then destroy the samples.

Our reports incorporate a gross lithological description of <u>all</u> the samples which have been analysed and litho percentage logs. As screen analyses are recommended at narrow intervals, a complete lithological profile is obtained.

C) ORGANIC CARBON ANALYSIS

The organic carbon content of a rock is a measure of its total organic richness. Combined with the visual kerogen, C_1-C_7, C_4-C_7, pyrolysis and C_{15+} analyses, the organic carbon content is used to evaluate the potential (not necessarily actual) hydrocarbon source richness of the sediment. This analysis is an integral part of a total evaluation and it can also be used as an economical screen analysis for dry samples (when the C_1-C_7 analysis cannot be used).

Hand picked samples are dried, crushed and then acidised to remove the inorganic calcium and magnesium carbonates. The actual analysis involves combustion in a Leco carbon analyser. Blanks, standards and duplicates are run routinely for purposes of quality control at no extra cost to the client.

The data are tabulated and presented diagramatically in our reports in a manner which facilitates comparison with the gross lithology (see Section B) of the samples.

D) MINI-PYROLYSIS

An ideal screen analysis which provides a definitive measure of potential source richness upon those samples whose organic carbon contents suggest fair or good source potential. This is described in detail in section K.

E) DETAILED C_4-C_7 HYDROCARBON ANALYSIS

The abundance and composition of the C_4-C_7 gasoline-range hydrocarbons in sediments reflects their source quality, level of thermal maturation and organic facies. In addition, the data also reveal the presence of migrated hydrocarbons and can be used for crude oil-parent source rock correlation studies.

This powerful analysis, performed upon hand picked lithologies, is employed as a follow-up to confirm the potential of samples which have been selected using the initial screen analysis. It is used in conjunction with the organic carbon, visual kerogen and C_{15+} analyses.

The individual normal paraffins, isoparaffins, naphthenes and aromatics with between four and seven carbon atoms in the molecule (but also including toluene) are resolved by capillary gas chromatography and their peak areas electronically integrated.

Normalised compositions, selected ratios and the ppm abundance of the total gasoline-range fraction are tabulated in the report and also presented graphically.

F) KEROGEN TYPE AND MATURATION

Kerogen is the insoluble organic matter in rocks. Visual examination of the kerogen gives a direct measure of thermal maturity and of the composition of the organic matter (organic facies) and indicates the source quality of the sediment - which is confirmed using the organic carbon, light hydrocarbon, pyrolysis and C_{15+} analyses.

The type of hydrocarbon (oil or gas) generated by a source rock is a function of the types and level of thermal maturation of the organic matter which are present. Both of these parameters are measured directly by this method.

Kerogen is separated from the inorganic rock matrix by acid digestion and flotation methods which avoid oxidation of the organic matter. It is then mounted on a glass slide and examined at high and low magnifications with a Leitz microscope. Chemical methods measure the total kerogen population but, with this technique, individual particles can be selected for examination and spurious material identified. This is particularly valuable in reworked, contaminated and turbodrilled sediments.

The following data are generated: the types of organic matter present and their relative abundances, an estimate of the proportion of reworked material, preservation state, the thermal maturity of the non-reworked organic matter using the spore colouration technique.

Our maturation scale has been developed to digitise small but recognisable changes in organic matter colouration resulting from increasing maturity and to place particular emphasis upon the immature to mature transition. In the absence of a universal colouration scale, the most significant points on our scale have been calibrated against equivalent vitrinite reflectance values. The following maturation stages are recognised at the low end of the scale:-

a) immature; thermal index less than 2- (0.45% Ro)
b) marginally mature; indices between 2- and 2. Minor hydrocarbon generation from amorphous and herbaceous ($\pm$ algal) organic matter
c) mature; indices between 2 (0.53% Ro) and 2 to 2+ (0.72% Ro), significant generation from amorphous, algal and herbaceous organic matter but wood only marginally mature
d) oil window; indices of 2 to 2+ (0.72% Ro) through to 3 (1.2% Ro). Peak hydrocarbon generation.

The condensate zone starts at a thermal index of 3 whilst indices of 3+ (2.0% Ro) and higher indicate the eometamorphic dry gas stage.

A total of fourteen types of organic matter are sought based upon the major categories of algal, amorphous, herbaceous (spore, pollen, cuticle), wood, inertinite and resin. This detail is essential for a proper understanding of hydrocarbon source potential as the different sub-groups within each category have different properties.

Upon completion of the study, the kerogen slides are sent to the client.

G) VITRINITE REFLECTANCE

Vitrinite reflectance is an alternative/confirmatory method for evaluating thermal maturation which is used in conjection with the visual kerogen analysis. The reflectivity of vitrinite macerals increases in response to thermal alteration and is used to define maturation levels and, by projection, to predict maturity at depth or the thicknesses of section removed by erosion.

Measurements are made upon kerogen separations in conjunction with polished whole rock samples. In general, this analysis is performed upon the same samples as the visual kerogen analysis, thus facilitating a direct comparison of the two sets of results.

If possible, forty to fifty measurements are taken per sample - unless the sediments are organically lean, vitrinite is sparse or only a single uniform population is present. The data are plotted in a histogram which distinguishes the indigenous vitrinite from possible reworked or caved material. Averages are calculated for each population. Comments upon exinite fluorescence and upon the character of the phytoclasts are noted on the histograms. The reports contain the tabulated data, histograms and the reflectivities plotted against depth.

The vitrinite and visual kerogen techniques provide mutually complementary information upon maturity, organic matter type and diagenesis.

H) C_{15+} EXTRACTION, DEASPHALTENING AND CHROMATOGRAPHIC SEPARATION

Sections "A" and "E" dealt with analyses covering the light end of the hydrocarbon spectrum. This section is concerned with the solvent extractable organic material in the rock with more than fourteen carbon atoms in the molecule (i.e. the heavy end). The amount and composition of this extract indicates source richness and type, the level of thermal maturation and the possible presence of migrated hydrocarbons.

These results are integrated with those derived from the pyrolysis, visual kerogen, organic carbon and light hydrocarbon analyses.

The techniques involved in this analysis employ pure solvents and have been designed to give reproducible results. Hand picked samples are ground and then solvent extracted in a soxhlet apparatus, or by blending, with dichloromethane (the solvent system can be adapted to client's specifications). After asphaltene precipitation, the total extract is separated by column chromatography or high pressure liquid chromatography into the following fractions: paraffin-naphthene hydrocarbons, aromatic hydrocarbons, eluted NSO's (nitrogen-, sulphur-, and oxygen- containing non-hydrocarbons) and non-eluted NSO's. Note that the non-hydrocarbons are split into three fractions and not reported as a gross value. These fractions can be submitted for further analyses (carbon isotopes, gas chromatography, high mass spectroscopy) including correlation studies.

For convenience and thoroughness, the data are reported in three formats: the weights of the fractions, ppm abundances and normalised percentage compositions. The data are also presented diagramatically.

J) GC ANALYSIS OF C_{15+} PARAFFIN-NAPHTHENE HYDROCARBONS

The gas chromatographic configurations of the heavy C_{15+} paraffin-naphthene hydrocarbons reflect source type, the degree of thermal maturation and the presence and character of migrated hydrocarbons or contamination.

Not only is this analysis an integral part of any source rock study but it also provides a fingerprint for correlation purposes and helps to define the geochemical/palynological environmental character of the source rocks from which crude oils were derived.

The paraffin-naphthene hydrocarbons obtained by column chromatography are separated by high resolution capillary chromatography. Excellent resolution of the individual normal paraffins, isoprenoids and significant individual isoparaffins and naphthenes is achieved. Runs are normally terminated at nC_{35}. A powerful in-house microprocessor system is being introduced to correct for the change in response factor with chain length.

The normal paraffin carbon preference indices (C.P.I.) indicate if odd (values in excess of 1) or even (values less than 1) normal paraffins are dominant. Strong odd preferences (± strong pristane peaks) are characteristic of immature land plant organic matter whilst even preferences (± strong phytane peaks) suggest a reducing environment of deposition. With increasing maturity, values approach 1.0 and oils are typically close to 1.0. The indices are calculated using the following formulae:

$$C.P.I_A = \frac{\frac{C_{21} + C_{23} + C_{25} + C_{27}}{C_{20} + C_{22} + C_{24} + C_{26}} + \frac{C_{21} + C_{23} + C_{25} + C_{27}}{C_{22} + C_{24} + C_{26} + C_{28}}}{2}$$

$$C.P.I_B = \frac{\frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{24} + C_{26} + C_{28} + C_{30}} + \frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{26} + C_{28} + C_{30} + C_{32}}}{2}$$

Chromatograms are reproduced in the report for use as visual fingerprints and in addition, the following data are tabulated: normalised normal paraffin distributions; proportions of paraffins, isoprenoids and naphthenes in the total paraffin-naphthene fraction; C.P.I_A and C.P.I_B; pristane to phytane ratio; pristane to nC_{17} ratio.

K) PYROLYSIS

The process of thermal maturation can be simulated in the laboratory by pyrolysis, which involves heating the sample under specified conditions and measuring the oil-like material which is freed/generated from the rock. With this analysis, the potential richness of immature sediments can be determined and, by coupling the pyrolysis unit to a gas chromatograph, the liberated material can be characterised. These results are correlated with those obtained from the organic carbon, kerogen and C_{15+} analyses.

Small amounts of powdered sample are heated in helium to release the thermal bitumen (up to 340°C) and pyrolysate (340-550°C). The thermal bitumen correlates with the solvent extractable material (see above) whilst the pyrolysate fraction does not exist in a "free" state but is generated from the kerogen, thus simulating maturation in the subsurface. Abundances (weight ppm of rock) are measured with a flame ionisation detector against a standard. Thermal bitumen includes source indigenous, contaminant and migrated hydrocarbons but the pyrolysate abundance is a measure of ultimate source richness. The capillary gas chromatogram of the pyrolysate is used to evaluate the character of the parent organic matter and whether it is oil or gas prone. Peak temperature(s) of pyrolysate evolution is recorded. Carbon dioxide can be measured if requested but is normally ignored as the separation of the organic and inorganic species has been found to be artificial and unreliable.

Pyrolysate yields provide a definitive measure of potential source richness which avoids the ambiguities of the organic carbon data and the problem of contamination. This analysis is also used to evaluate the quality and character of the organic matter and the degree to which it has realised its ultimate hydrocarbon potential. Geochem does not employ the pyrolysis technique to evaluate maturation, preferring the kerogen and vitrinite reflectance analyses which avoid the problem of reworking and hence, are more reliable.

Capillary chromatograms produced for the pyrolysate hydrocarbons range from C_1 (methane) out towards C_{35} but exhibit considerable variations. They are used to define whether a source rock will yield oil, condensate or gas. With this new technique, it is now possible to complete the evaluation of a source rock.

The data are tabulated and presented graphically. MINI-PYROLYSIS includes ppm thermal bitumen and ppm pyrolsate. PYROLYSIS also provides the above together with the temperature of peak pyrolysate evolution. The capillary chromatograms of the pyrolysate obtained by PYROLYSIS-GC are reproduced in the report. The Mini-Pyrolysis analysis is recommended as a screening technique.

L) CORRELATION STUDY ANALYSES

Oil to oil and oil to parent source rock correlation studies require high resolution analytical techniques. This requirement is satisfied by some of the analyses discussed above but others have been selected specifically for correlation work. Many of these analyses also provide information upon the character of the environment of deposition of the parent source rocks.

- detailed C_4-C_7 hydrocarbon (gasoline range) analysis. See Section E. Although these hydrocarbons can be affected by migrational/alteration processes, they commonly provide a very useful correlation parameter.
- capillary gas chromatography of the C_{15+} paraffin-naphthenes. See section J. The branched±normal paraffin distributions are used to "fingerprint" the samples.
- capillary chromatograms of whole oils and of the C_{8+} fraction of source rocks.
- capillary gas chromatography of C_{15+} aromatic hydrocarbons. Separate chromatograms of the hydrocarbons and of the sulphur-bearing species are reproduced.
- high pressure liquid chromatograms.
- mass spectrometric carbon isotope analyses of crude oil and rock extract fractions and of kerogen separations. A powerful tool for comparing hydrocarbons and correlating hydrocarbons to organic matter. With this technique the problem of source rock contamination can be avoided. The data are recorded on x-y or Galimov plots.
- mass fragmentograms (mass chromatograms) of fragment ions characteristic of selected hydrocarbon groups such as the steranes and terpanes. The fragmentograms provide a convenient and simple means of presenting detailed mass spectrometric data and are used as a sophisticated fingerprinting technique. This provides the ultimate resolution for correlating hydrocarbons and facilitates the examination of hydrocarbon classes.
- vanadium and nickel contents.

Suites of (rather than single) analyses are employed in correlation studies, the actual selection depending upon the complexity of the problem. See also section N.

M) ANALYSES FOR SPECIAL CASES

M-1) ELEMENTAL KEROGEN ANALYSIS

This analysis evaluates source quality, whether the sediments are oil or gas prone, the character of the organic matter and its level of thermal maturation. It is the chemical equivalent of the visual kerogen analysis. The pyrolysis analysis is generally preferred to this technique, both methods providing similar information.

M-2) SULPHUR ANALYSIS

The abundance of sulphur in source rocks and crude oils.

M-3) CARBONATE CONTENT

The mineral carbonate content of sediments is determined by acid treatment. These data are particularly useful when used in conjunction with organic carbon contents as a screening technique.

M-4) NORMAL PARAFFIN ANALYSIS

Following the removal of the branched paraffins and naphthenes from the total paraffin-naphthene fraction, a chromatogram of the normal paraffins is obtained. The resulting less complicated chromatogram facilitates the examination of normal paraffin distributions.

M-5) SOLID BITUMEN EVALUATION

Residual solid bitumen after crude oil is generated by three prime processes: the action of waters, gas deasphalting, thermal alteration. Thus it provides a means of determing the reservoir history of a crude and of evaluating whether adjacent traps will or will not be prospective for oil. In carbonate sections, where organic matter is sometimes sparse, this technique is also used to evaluate thermal maturation levels.

The analysis involves the determination of the solubility (in CS_2) of the solid bitumen and of the atomic hydrogen to carbon ratio of the insoluble fraction.

N) CRUDE OIL ANALYSIS

N-1) API GRAVITY

This can be performed upon large (hydrometer) and small (SG bottle, pycnometer) samples and even upon stains extracted from sediments (refractive index).

N-2) SULPHUR CONTENTS (ASTM E30-47)

N-3) POUR POINT (ASTM D97-66, IP15/67)

N-4) VISCOSITY (ASTM D445-72, IP71/75)

N-5) FRACTIONAL DISTILLATION

Graph of cumulative distillation yield against temperature. Five percent cuts taken for further analysis. Mass spectrometric studies of these fractions provide a detailed picture of the distribution of paraffins and of the various naphthene and aromatic groups within a crude, which is useful both for correlation and for refinery evaluation purposes.