2.4.4 RFT Measurement

The Repeat Formation Tester was run twice to measure formation pressures and take samples in the event of presence of hydrocarbons. Run 3A which is in the lower Cretaceous comprises 15 tests of which six were not representative. A plot of pressure versus depth (figure) gave a gradient of 1.5 psi/m which is clearly indicating water. A smaple taken at 3243 mRK contained a mixture of water and filtrate.

In run 5B which is in the Lower Cretaceous a total of 6 pressure tests were measured. A plot of pressure versus depth gives a gradient of (1.57 psi/m).

Repeat Formation Tester

Depth	Hydrostatic Pressure	Formation Pressure
3235.5	5896	4766
3243.0	5911	4744
3252.0	5933	4772
3267.0	5959	-
3267.5	5954	4801
3286.5	5992	-
3287.5	5987	-
3287.5	5988	-
3303.0	6018	-
3317.0	6041	4851
3330.0	6169	-
3324.0	6167	4888
3347.0	6100	4909
3347.0	6144	4937
3397.0	6201	4954

Repeat Formation Tester

Depth	Hydrostatic Pressure	Formation Pressure
3482.5	6401	5069
3442.5	6414	5086
3529.5	6494	5144
3561.0	6552	5187
3592.0	6608	5253
3598.0	6617	5253

3.4.4.

Mud recap 35/3-5

Table 3.3.

Casing Interval		Total	30"	20"	13 3/8"	9 5/8"	8½" hole
Material	Unit weight	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
Barite	mt	773,5	56	195	197	252	73,5
Wyoming Bentonite	mt	85	31	47	2	5	
Wyoming Bentonite	50 kg	705		80		434	191
Milgel	50 kg	386	69	317			
Caustic Soda	25 kg	531	13	57	78	310	76
Bicarbonated Soda	50 kg	26		5		14	7
Gypsum	40 kg	219		142	73	4	
Milpolymer 302	25 kg	261		66	142	53	
Drispac Superlo	50 lb	128			85	43	
Drispac Regular	50 lb	54				54	
CMC hi vis	25 kg	119			32	56	
CMC lo vis	25 kg	222			24	168	30
Unical	25 kg	282				231	51
Liqcon	50 lb	273				198	75
Drillaid	25 kg	21	4			17	
LD-8	5 gal	26				11	15
Anconol deformer	20 ltr	13					13
DM detergent	55 gal	6			4	2	
Milplug	25 kg	23		23			
Milmica	25 kg	64		64			
Kwickseal	40 lb	78		78			
Lubrisal	55 gal	4			4		

IKU

Confidential

INSTITUTT FOR KONTINENTALSOKKELUNDERSØKELSER

CONTINENTAL SHELF INSTITUTE

Håkon Magnussons gt. 1B — N-7000 Trondheim — Telephone (075) 15660 — Telex 55548

BA 83-6325-1

REPORT TITLE/ TITTEL

GC-MS analyses of 3 samples from well 35/3-5

CLIENT/ OPPDRAGSGIVER

Saga Petroleum A/S

RESPONSIBLE SCIENTIST/ PROSJEKTANSVARLIG

M. Bjorøy

AUTHORS/ FORFATTERE

L. Schou and E. Rustad

DATE/ DATO	REPORT NO./ RAPPORT NR.	NO. OF PAGES/ ANT. SIDER	NO. OF ENCLOSURES/ ANT. BILAG
17.12.82	0-469/2/82	15	

SUMMARY/ SAMMENDRAG

Two claystone and one sandstone sample were analysed by GC-MS. Migrated hydrocarbons were found in the sandstone sample. Due to contamination by refined hydrocarbons of the claystone samples, no correlation between the three samples was performed.

KEY WORDS/ STIKKORD

Well 35/3-5

Norwegian Continental Shelf

GC-MS

IKU

CONTENTS

EXPERIMENTAL

Extraction and GC.

This was performed as described in Bjorøy et al., 1982.

Gas chromatographic-mass spectrometric analysis

The analyses were performed on a VG 70-70H GC-MS/DS applying multiple ion detection (MID) with a scan cycle time of approximately 1 sec and an ion source temperature of 200°C. Three samples were analysed for triterpanes (m/e 191) and steranes (m/e 217) in the saturated fractions, and for aromatic steranes (m/e 231, 239 and 253) in the aromatic fractions. The Varian Model 3700 GC was fitted with a 20m OV-1 fused silica column and the injections were performed in split mode. The temperature of the GC oven was programmed from 150°C to 270°C at 4°C/min.
The ratios from the mass chromatograms were all calculated from the peak heights in the appropriate chromatograms.

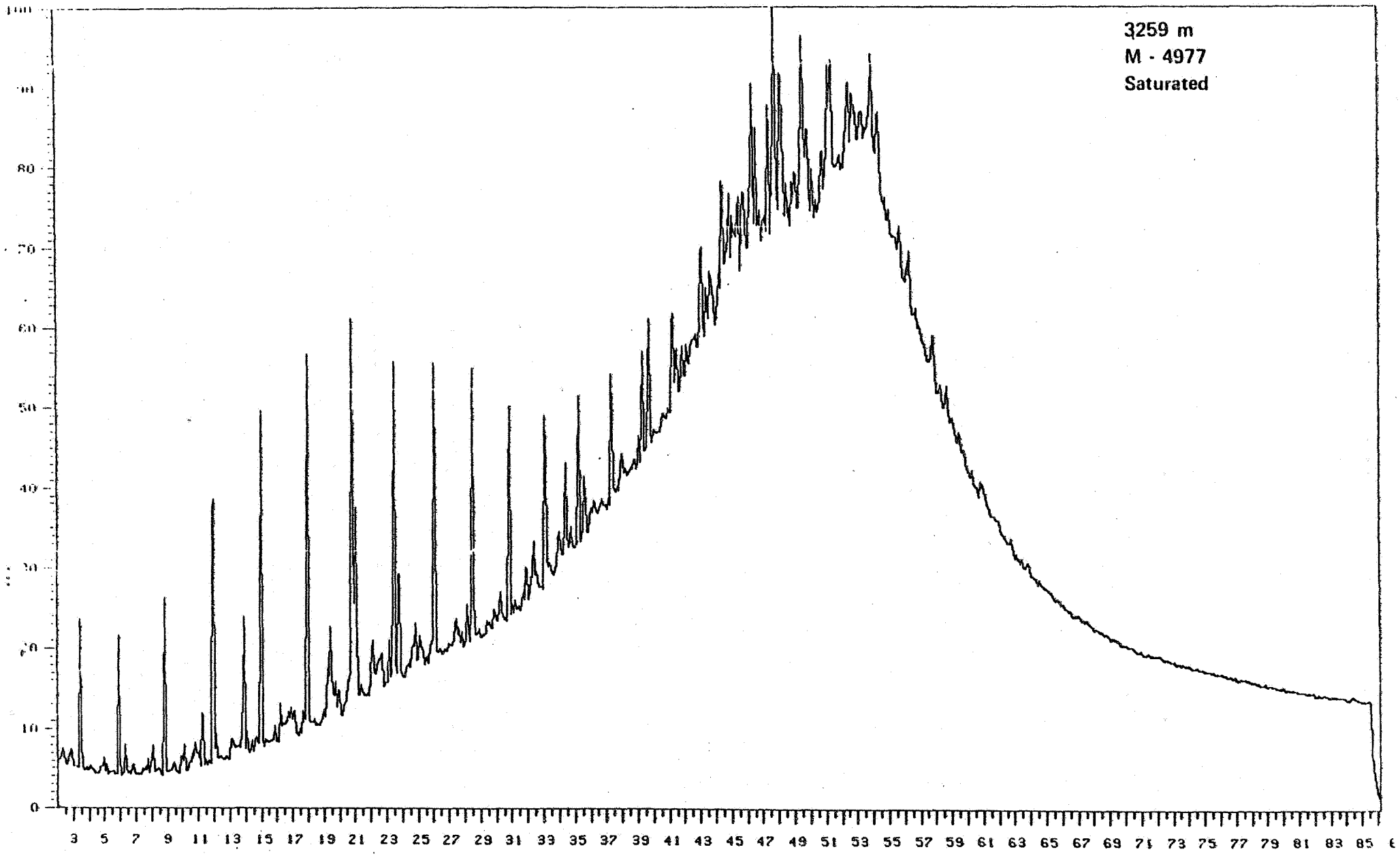
CONCLUSION

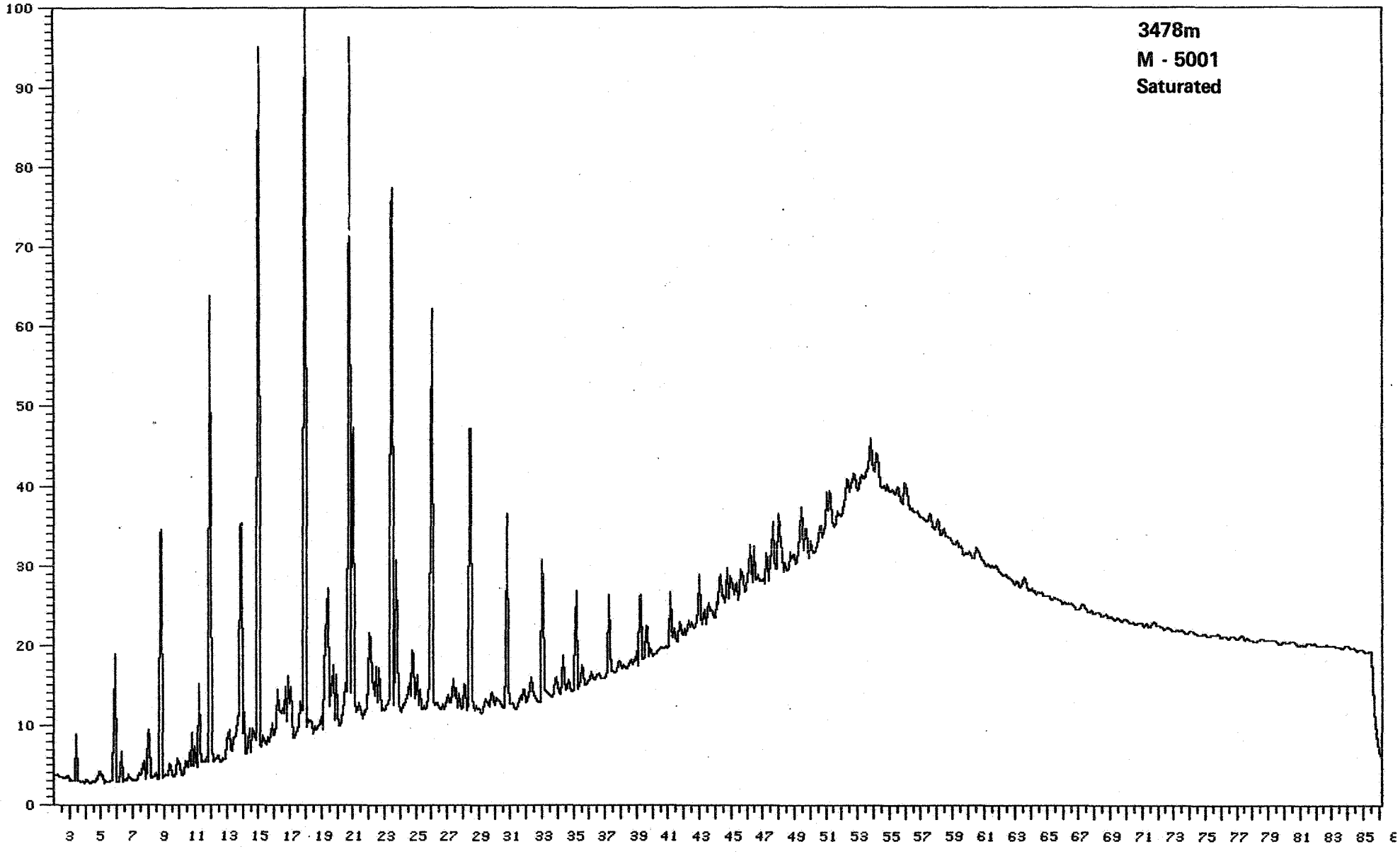
Both the GC and GC-MS data indicate that there are migrated hydrocarbons in the analysed sandstone sample (M-4973, 3223m). Based on the GC-MS analysis the hydrocarbons in the 3 samples can be said to be of nearly the same maturity, the sandstone sample possibly slightly less mature than the claystones. Due to the claystone samples being contaminated by refined hydrocarbons, it is, however, difficult to tell if the assigned maturity is the true maturity for these samples. Thus the data should not be applied to correlate the hydrocarbons found in the sandstone sample, with the claystones.

REFERENCE

M. Bjorøy, et al., 1982: "Source Rock Analysis of Well 35/3-5". Report O-469/1/82.

Figure 1. Saturated hydrocarbon GC.


3259 m
M - 4977
Saturated
0
10
20
30
40
50
60
70
80
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85


3478m
M - 5001
Saturated
100
90
80
70
60
50
40
30
20
10
0
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85

GC-MS CHROMATOGRAMS

Figure 2. Triterpanes m/e 191

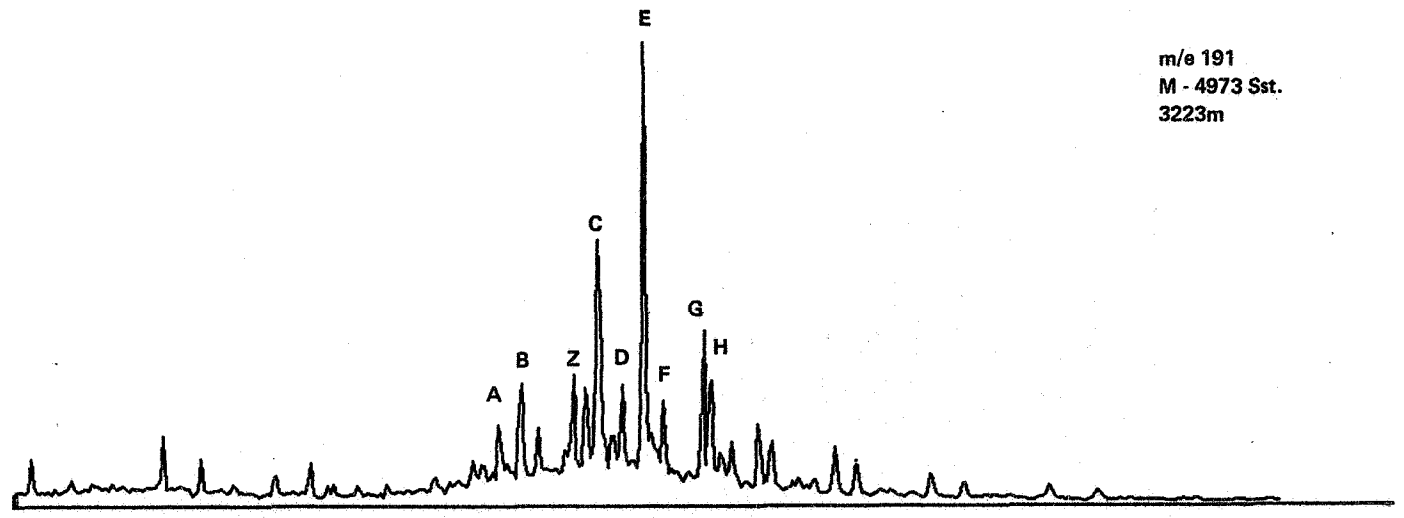
A = 18α(H) - trisnorneohopane
B = 17α(H) - trisnorhopane
C = 17α(H), 21β(H) - norhopane ($\alpha\beta$-C_{29})
D = 17β(H), 21α(H) - norhopane ($\beta\alpha$-C_{29})
E = 17α(H), 21β(H) - hopane ($\alpha\beta$-C_{30})
F = 17β(H), 21α(H) - hopane ($\beta\alpha$-C_{30})
G = 17α(H), 21β(H) - homohopane, 22S ($\alpha\beta$-C_{31})
H = 17α(H), 21β(H) - homohopane, 22R ($\alpha\beta$-C_{31})
Z = C_{28} - triterpane

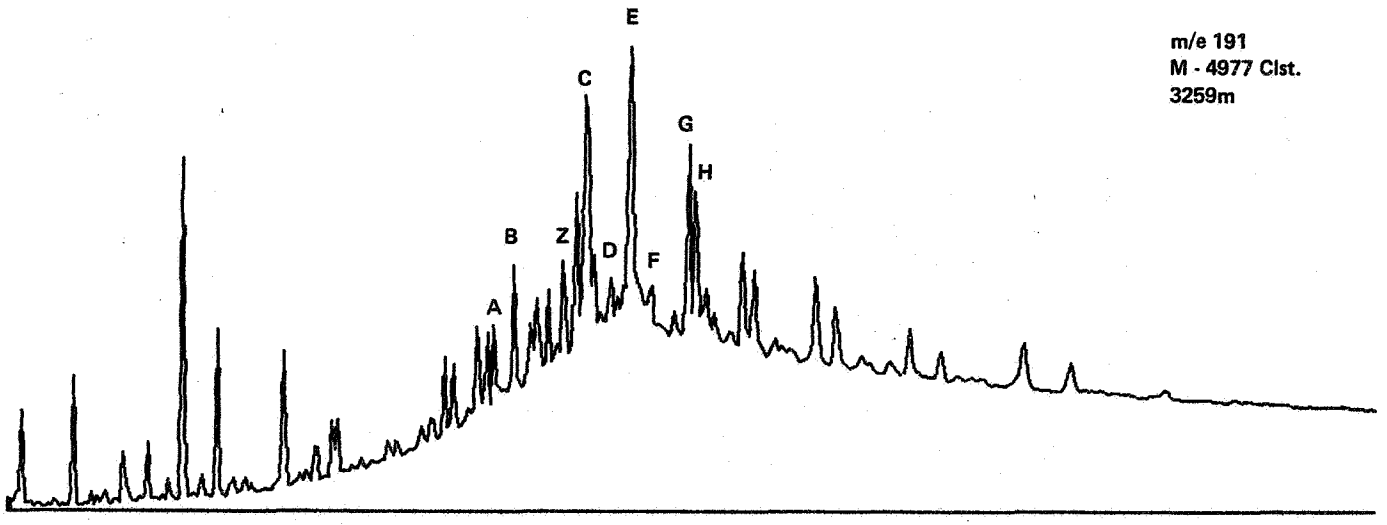
Figure 3. Steranes m/e 217

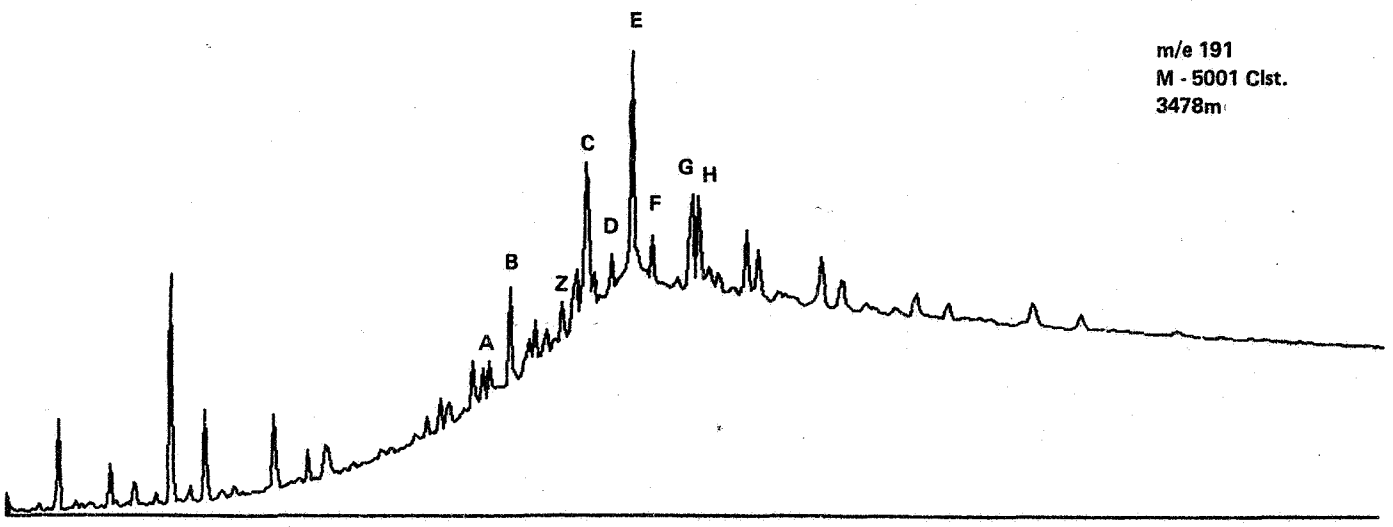
q = 14α(H), 17α(H) - C_{29} - sterane, 20S
r,s = 14β(H), 17β(H) - C_{29} - steranes, 20S + 20R
t = 14α(H), 17α(H) - C_{29} - sterane, 20R

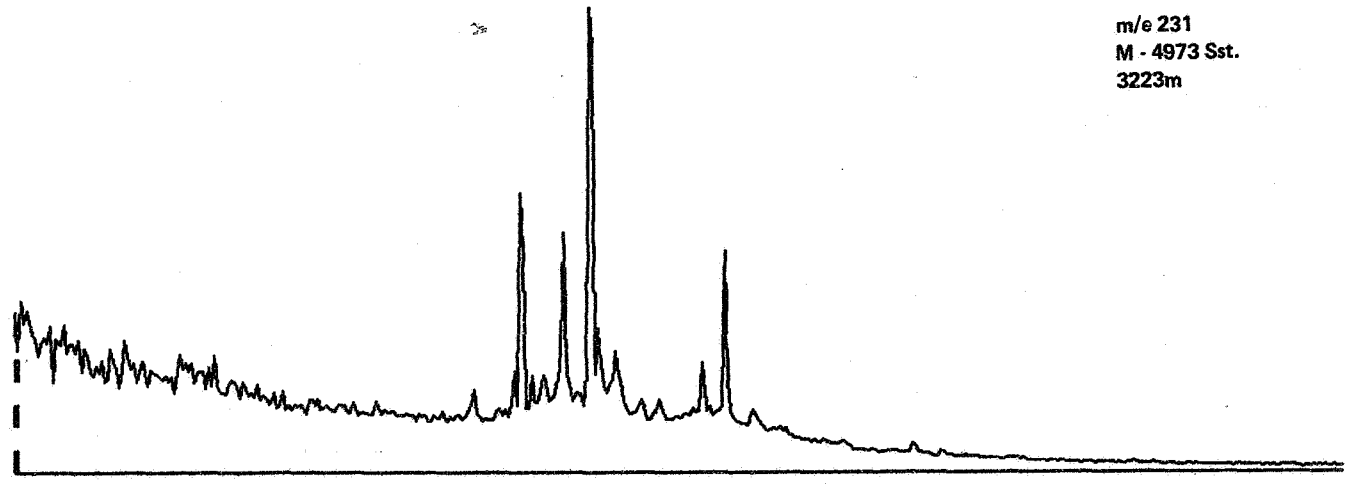
Figure 4. Monoaromatic steranes m/e 253

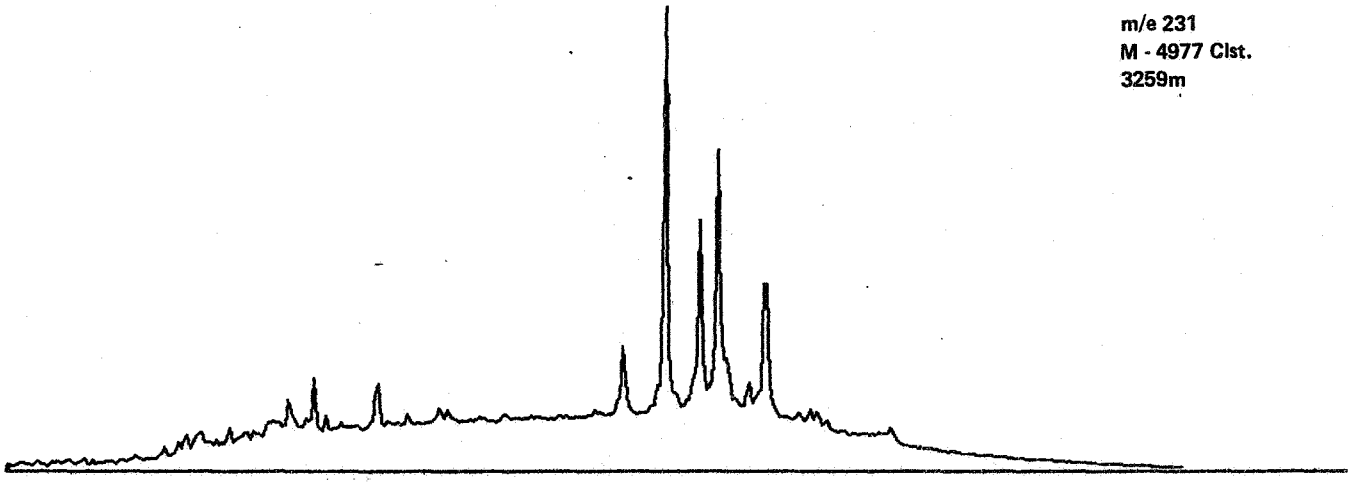
Figure 5. Triaromatic steranes m/e 231

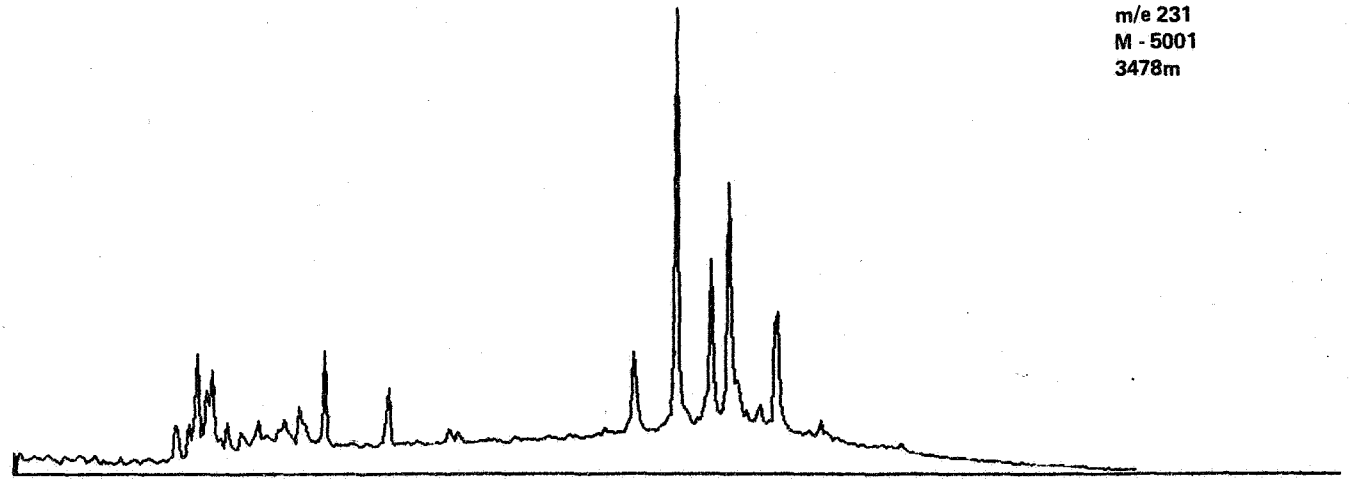

E
C
G
B
Z
D
H
A
F
m/e 191
M - 4973 Sst.
3223m


E
C
G
H
B
Z
D
F
A
m/e 191
M - 4977 Clst.
3259m


E
C
G
H
F
D
B
Z
A
m/e 191
M - 5001 Clst.
3478m


m/e 231
M - 4973 Sst.
3223m


m/e 231
M - 4977 Clst.
3259m


m/e 231
M - 5001
3478m

.3

IKU

Confidential

INSTITUTT FOR KONTINENTALSOKKELUNDERSØKELSER

CONTINENTAL SHELF INSTITUTE

Håkon Magnussons gt. 1B — N-7000 Trondheim — Telephone (075) 15660 — Telex 55548

REPORT TITLE/ TITTEL

Source Rock Analysis of well 35/3-5

BA 82-6035-1

11 OKT. 1982

REGISTRERT

CLASSIFICATION

CLIENT/ OPPDRAGSGIVER

Saga Petroleum A/S

RESPONSIBLE SCIENTIST/ PROSJEKTANSVARLIG

Malvin Bjorøy

AUTHORS/ FORFATTERE

M. Bjorøy, N. Mills, T.M. Rønningsland, H. Solli, J.O. Vigran, Å.S. Aakre

DATE/ DATO 82/10	REPORT NO./RAPPORT NR.	NO. OF PAGES/ ANT.SIDER	NO. OF ENCLOSURES/ ANT. BILAG
1.10.82	0-469/1/82	101	7

KEY WORDS/ STIKKORD

Well 35/3-5

Norwegian Continental Shelf

Source rock

Evaluation

CONTENTS

EXPERIMENTAL AND DESCRIPTION OF INTERPRETATION LEVELS

Headspace Gas Analysis

One ml. of the headspace gas from each of the cans was analysed gas chromatographically for light hydrocarbons. The results are shown in Table 1a. The canned samples were washed with temperated water on 4, 2, 1 and 0.125 mm sieves to remove drilling mud and thereafter dried at 35°C.

Occluded Gas

An aliquot of the 1-2 mm fraction of each sample before drying was crushed in water using an airtight ball mill, and one ml. of the headspace analysed chromatographically. The results are shown in Table 1b.

Total Organic Carbon (TOC)

Picked cuttings of the various lithologies in each sample was crushed in a centrifugal mill. Aliquots of the samples were then weighed into Leco crucibles and treated with hot 2N HCl to remove carbonate and washed twice with distilled water to remove traces of HCl. The crucibles were then placed in a vacuum oven at 50°C and evacuated to 20 mm Hg for 12 hrs. The samples were then analysed on a Leco E C 12 carbon analyser, to determine the total organic carbon (TOC).

Extractable Organic Matter (EOM)

From the TOC results samples were selected for extraction. Of the selected samples, approximately 100 gm of each was extracted in a flow through system (Radke et al,, 1978, Anal. Chem. 49, 663-665) for 10 min. using dichloromethane (DCM) as solvent. The DCM used as solvent was distilled in an all glass apparatus to remove contaminants.

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

After extraction, the solvent was removed on a Buchi Rotavapor and transferred to a 50 ml flask. The rest of the solvent was then removed and the amount of extractable organic matter (EOM) determined.

Chromatographic Separation

The extractable organic matter (EOM) was separated into saturated fraction, aromatic fraction and non hydrocarbon fraction using a MPLC system with hexane as eluant (Radke et al., Anal. Chem., 1980). The various fractions were evaporated on a Buchi Rotavapor and transferred to glassvials and dried in a stream of nitrogen. The various results are given in Table III-VI.

Gas Chromatographic Analyses

The saturated and aromatic hydrocarbon fractions were each diluted with n-hexane and analysed on a HP 5730 A gas chromatograph, fitted with a 25 m OV101 glass capillary column and an automatic injection system. Hydrogen (0.7 ml/min.) was used as carrier gas and the injection was performed in the split mode (1:20).

Vitrinite Reflectance

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

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

Reflectance determinations were carried out on a Leitz M.P.V. microphotometer under oil immersion, R.I. 1.518 at a wavelength of 546 nm.

The surface of the polished block was searched by the operator for suitable areas of vitrinitic material in the sediment. The reflectance of the organic particle was determined relative to optical glass standards of known reflectance. Where possible, a minimum of twenty individual particles of vitrinite was measured, although in many cases this number could not be achieved.

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

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

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

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

Processing of Samples and Evaluation of Visual Kerogen

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

T-slide represents the total acid insoluble residue.
N-slide represents a screened residue (15µ mesh).
O-slide contains palynodebris remaining after flotation ($ZnBr_2$) to remove heavy minerals.
X-slides contain oxidized residues, (oxidizing may be required to remove sapropel which embeds palynomorphs, or where high coalification prevents the identification of the various groups).

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

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

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

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

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

Ro	0.45	0.6	0.9	1.0	1.3
colour index	2-	2	2+	3-	3

Rock-Eval Pyrolysis

100 mg crushed sample was put into a platinum crucible whose bottom and cover are made of sintered steel and analysed on a Rock-Eval pyrolyser.

Pyrolysis-Gas Chromatography (Py-GC)

Kerogen concentrates were prepared by treating whole crushed rock with HCl and HF. Solvent (MeOH and DCM) extracted kerogen concentrates were suspended in MeOH and microgram quantities were added to the platinum ribbon pyrolyser. the kerogens were flash pyrolysed in tandem with gas chromatography (Py-GC).

Instrumentation:
CDS Pyroprobe 120 interfaced to a Varian 3700 gas chromatograph via a glass lined stainless steel tubing (GLT). The capillary column was connected to the GLT via a splitter.

Pyrolysis conditions: 600^{o}C in nitrogen for 5 sec.
GC conditions:
Column: 25m OV-101 fused silica capillary. I.D. 0.20 mm.
Carrier gas: Nitrogen with inlet pressure 12 psi; 0.6 ml/min.
Oven program: 40^{o}C hold for 1 min; to 260^{o}C at 4^{o}C/min.
Split: 1:40.

RESULTS AND DISCUSSION

Analysis of Light Hydrocarbons

Based on the analysis of headspace and cuttings gas, together with the lithological description, the analysed sequence of the well 2000 - 4110m is divided into ten (10) zones.

Zone A: 2000 - 2340m.
Zone B: 2340 - 2370m.
Zone C: 2370 - 2650m.
Zone D: 2650 - 2710m.
Zone E: 2710 - 2863m.
Zone F: 2863 - 3296m.
Zone G: 3296 - 3386m.
Zone H: 3386 - 3847m.
Zone I: 3847 - 4063m.
Zone J: 4063 - 4110m.

Zone A; 2000 - 2340m.
This zone consists mainly of grey claystones grading to silty claystone and siltstone with an occasional limestone band. The percentage of the non-claystone lithology increases with increasing depth. The lowest two samples in this zone also contain some sandstone. The results from the gas analyses are very variable throughout the zone although except for the sample from 2240 - 2250m, no sharp changes are seen. The sample from 2240 - 2250m shows a sharp increase both in the amount of C_1 - C_4 hydrocarbons and in the wetness of the gas compared with samples above and below. There is no significant change in the lithological composition to explain these changes. The concentration of both the C_1 - C_4 and the C_{5+} hydrocarbons are relatively low throughout the zone, especially for the lowest 100m section. The data from the gas analysis indicates that the zone is relatively immature with a poor/fair generation potential for hydrocarbons.

Zone B; 2340 - 2370m.
This zone consists of grey claystones with 15 - 20% of sandstone. The abundance of light hydrocarbons, especially C_1 - C_4, increases sharply

compared with zone A, although the wetness is almost constant. The increase in light hydrocarbons could indicate small amounts of reservoired hydrocarbons in the sandstone.

Zone C; 2370 - 2650m.
The main lithology of this zone is grey claystone as for the two zones above, with small amounts of siderite, limestone, marly siltstone and sandstone. The percentage of sandstones is high (40%) for the sample from 2520 - 2530m. The abundance of light hydrocarbons, both C_1 - C_4 and C_{5+}, is low throughout the zone. The wetness of the gas stays relatively constant, approximately 20% throughout the zone. The iso-butane/n-butane ratio (iC_4/nC_4) is variable, but on the whole is very high, indicating either low maturity or biodegradation. The reason for the variability in the iC_4/nC_4 ratio could be the low concentration of these compounds making the ratio values doubtful.

Zone D; 2650 - 2710m.
The samples from this zone consist entirely of grey, non-calcareous to calcareous claystones. The uppermost sample in the zone shows a sharp increase in the abundance of both C_1 - C_4 and C_{5+} hydrocarbons compared with zone C, increasing slightly to 2690m, then decreasing to 2700m. The wetness of the gas is similar to the zone above, but the iC_4/nC_4 ratio is erratic. The various results indicate that the zone is immature, possibly with a different kerogen in the claystone than in the zone above.

Zone E; 2710 - 2863m.
Again a zone with 100% grey, non-calcareous to calcareous claystones. The abundance of light hydrocarbons is significant lower than that found for the samples in zone D. The wetness of the gas shows a significant drop compared with zone D and the iC_4/nC_4 ratio shows a gentle decrease with increasing depth.

Zone F; 2863 - 3386m.
This zone consists of 100% grey, grading to dark grey, calcareous grading to non-calcareous claystone, silty in part. The abundance of C_1 - C_4 hydrocarbons is low for most of the zone with a general decrease with increasing depth. The abundance of the C_{5+} hydrocarbons is also relatively low, but higher throughout the zone than for zone

E. The wetness of the gas is, however, significantly higher than in any of the zones above, either indicating an increase in maturity or a change in kerogen type. The iC_4/nC_4 shows a gentle decrease with increasing depth.

Zone G; 3296 - 3386m.
From 3296m, the lithology changes from 100% claystone to a mixture of claystone and sandstone with 100% sandstone from 3322m. The light hydrocarbon data are very similar to those for the lowest part of zone F, suggesting that the sandstone does not contain any migrated hydrocarbons.

Zone H; 3386 - 3847m.
The lithology of this zone is variable from almost 100% sand/sandstone to almost 100% clay-siltstone. The percentage of the different lithologies varies from sample to sample which indicates an interbedded sequence of sandstone/siltstone/claystone. The results from the gas analysis show only minor variation from sample to sample, except the samples from 3630 - 3650m which have slightly higher abundances of C_1 - C_4 hydrocarbons, although the abundance of C_{5+} hydrocarbons is poor.

Zone I; 3847 - 4063m.
The lithology of the upper few samples from this zone is similar to zone H, changing to mostly claystone/siltstone below 3890m to 4018m (80% or higher of this lithology down to 4018m). Below 4018m there is a larger percentage of sandstones. The main reason to separate zone I from zone H is the increase in the abundance of C_{5+} hydrocarbons recorded from 3847m. This factor, associated with the general increase in the abundance or C_1 - C_4 hydrocarbons clearly separates this from the zones above. The wetness of the gas shows a slight increase and the iC_4/nC_4 shows a slight decrease.

Zone J; 4063 - 4110m.
The main lithology in this zone is sand/sandstone. The abundance of both the C_1 - C_4 and the C_{5+} hydrocarbons and the wetness of the gas show a sharp drop compared with zone I. This suggests that sandstones in this zone does not contain any migrated hydrocarbons.

TABLE I a.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4847	2010	394	19	22	43	17	36	495	101	20.35	2.57
M4849	2030	219	20	22	10	17	55	288	69	24.00	.62
M4851	2050	834	30	75	31	30	211	1001	167	16.67	1.05
M4853	2070	1753	88	91	79	20	68	2031	278	13.70	3.92
M4855	2090	2817	137	140	96	58	114	3248	431	13.27	1.65
M4857	2110	3079	180	167	89	68	112	3584	505	14.09	1.30
M4859	2130	2647	81	160	105	79	153	3072	425	13.84	1.33
M4861	2150	2229	59	126	68	58	102	2541	312	12.27	1.17
M4863	2170	1448	34	61	31	26	40	1599	151	9.47	1.21
M4865	2190	1671	41	85	56	45	97	1898	227	11.98	1.24
M4867	2210	1177	75	186	61	89	174	1588	412	25.92	.69
M4869	2230	64		18	57	24	177	164	100	61.01	2.35
M4871	2250	1017	49	59	54	34	162	1213	196	16.13	1.61
M4873	2270	O P E N	L I D .								
M4875	2290	205	11	17	14	9	104	255	50	19.56	1.54
M4877	2310	153	12	20	11	6	36	201	49	24.27	2.00
M4880	2340	2236	113	126	88	42	155	2604	369	14.16	2.09
M4881	2350	1566	178	110	100	52	210	2006	440	21.93	1.91
M4883	2370	836	48	48	39	20	329	990	154	15.59	1.97
M4885	2390	240	13	13	11	5	16	281	41	14.60	2.36
M4887	2410	84	5	6	7	2	13	104	20	19.32	2.65
M4889	2430	386	26	31	35	16	8	494	108	21.87	2.19
M4891	2450	360	22	19	14	6	32	421	61	14.51	2.26
M4893	2470	299	23	24	18	9	27	373	75	19.99	1.92
M4895	2490	589	45	61	46	25	1	766	177	23.12	1.79

TABLE I a.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4897	2510	505	52	67	40	28	37	692	187	27.06	1.44
M4899	2530	431	30	34	19	12	15	527	96	18.17	1.53
M4901	2550	334	48	33	15	9	17	440	105	23.96	1.68
M4903	2570	129	18	10	6	3	17	165	36	21.87	1.86
M4905	2590	512	78	42	22	11	117	666	153	23.03	1.94
M4907	2610	307	48	19	10	4	10	387	80	20.77	2.62
M4909	2630	198	30	22	12	6	9	269	71	26.49	1.95
M4911	2650	1873	283	186	131	63	710	2537	664	26.16	2.07
M4913	2670	2519	409	292	161	85	403	3467	947	27.33	1.88
M4915	2690	6922	162	136	87	41	275	7347	426	5.79	2.12
M4917	2710	4029	136	93	49	23	65	4331	302	6.97	2.09
M4919	2730	910	32	25	14	7	16	987	78	7.85	1.99
M4921	2750	1509	113	66	19	17	4	1723	215	12.46	1.10
M4923	2770	698	79	52	28	15		872	174	19.94	1.78
M4925	2790	313	53	27	11	6	11	410	97	23.62	1.74
M4927	2809	1080	112	56	24	9	23	1282	201	15.71	2.63
M4929	2827	1300	98	60	14	15	38	1486	186	12.54	.93
M4931	2845	613	44	22	8	5	11	692	79	11.38	1.47
M4933	2863	1882	159	110	43	31	53	2225	343	15.43	1.39
M4935	2881	1205	227	219	49	38	53	1738	533	30.68	1.31
M4937	2899	988	175	157	34	24	26	1378	390	28.32	1.41
M4939	2917	2694	431	302	47	49	44	3523	829	23.52	.96
M4941	2935	507	137	153	29	21	15	846	340	40.15	1.40
M4943	2953	110	39	53	10	10	115	222	112	50.34	1.06
M4945	2971	1312	314	377	54	48	43	2105	793	37.67	1.13

TABLE I a.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4947	2989	1160	251	282	36	26	18	1755	595	33.90	1.40
M4949	3007	633	96	80	11	8	13	827	194	23.49	1.46
M4951	3025	2148	471	453	56	54	22	3182	1034	32.50	1.04
M4953	3043	1002	151	234	41	40	13	1468	466	31.74	1.03
M4955	3061	1115	210	222	39	31	18	1618	503	31.06	1.27
M4957	3079	1286	470	823	157	149	247	2885	1599	55.42	1.06
M4959	3097	579	134	229	54	45	66	1041	462	44.36	1.18
M4961	3115	29	9	21	6	7	12	72	43	59.44	.89
M4963	3133	553	157	188	40	32	51	971	418	43.06	1.24
M4965	3151	323	108	122	26	17	25	596	273	45.75	1.47
M4967	3169	62	21	29	8	6	8	126	64	50.73	1.25
M4969	3187	48	23	30	9	10	63	119	71	59.60	.93
M4971	3205	411	148	125	29	30	58	742	332	44.67	.98
M4973	3223	45	22	35	8	13	29	123	78	63.32	.61
M4975	3241	121	33	30	5	6	7	195	74	38.10	.89
M4977	3259	36	6	5	1	1	1	49	13	27.12	.98
M4980	3286	89	27	25	4	5	6	151	62	40.81	.83
M4981	3295	87	38	26	4	4	2	158	72	45.32	.86
M4983	3313	171	64	28	4	3	3	270	99	36.68	1.12
M4985	3331	422	139	63	8	10	11	642	220	34.31	.84
M4987	3349	465	107	59	7	10	62	647	181	28.05	.67
M4989	3367	199	109	71	8	21	33	408	209	51.23	.37
M4991	3386	1382	273	122	17	18	18	1811	428	23.66	.94
M4993	3403	3124	648	273	40	38	77	4123	998	24.22	1.07
M4995	3424	550	210	68	6	6	9	840	290	34.52	.93

TABLE I a.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4997	3442	1277	355	75	6	6	15	1720	443	25.75	1.12
M4999	3460	1417	504	120	8	9	21	2058	641	31.16	.92
M5001	3478	1217	999	374	24	38	141	2652	1435	54.09	.63
M5003	3496	3358	1923	629	38	59	35	6007	2649	44.10	.64
M5005	3514	1984	1233	361	25	31	132	3633	1649	45.40	.81
M5007	3532	2385	1079	280	18	27	15	3789	1403	37.05	.67
M5009	3550	1479	570	291	20	35	32	2395	915	38.22	.57
M5011	3568	2850	1050	404	26	37	21	4367	1517	34.74	.71
M5013	3586	1201	491	111	6	6	5	1816	615	33.86	.92
M5015	3604	1742	636	143	7	8	9	2535	794	31.30	.95
M5017	3622	2440	606	100	5	5	4	3156	716	22.69	1.05
M5019	3640	6375	1145	294	22	20	6	7857	1482	18.86	1.09
M5021	3658	4132	787	363	48	58	25	5388	1256	23.31	.83
M5023	3671	2660	576	285	36	44	47	3601	940	26.11	.82
M5025	3694	2345	683	415	69	68	27	3580	1235	34.50	1.00
M5027	3712	1545	303	141	18	20	12	2028	482	23.79	.90
M5029	3730	1255	445	397	56	93	56	2245	990	44.11	.60
M5032	3766	2949	860	580	61	99	84	4548	1600	35.17	.62
M5033	3775	2999	1083	990	108	206	167	5386	2387	44.33	.52
M5035	3793	1468	481	458	51	71	74	2529	1061	41.95	.71
M5037	3811	3501	1117	1279	125	241	103	6262	2762	44.10	.52
M5039	3829	2288	782	1060	119	252	115	4501	2213	49.17	.47
M5042	3847	2005	862	1233	96	268	105	4464	2459	55.08	.36
M5044	3865	6857	2086	3051	286	747	313	13027	6170	47.36	.38
M5046	3883	80	44	99	11	33	34	267	187	70.02	.33

TABLE I a.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M5048	3901	8938	2133	1990	135	269	74	13465	4527	33.62	.50
M5050	3919	6903	1472	1177	76	154	55	9781	2878	29.43	.49
M5053	3946	5893	1476	1408	142	300	218	9218	3325	36.07	.47
M5054	3955	3494	1057	1221	188	344	251	6305	2810	44.57	.55
M5056	3973	3083	1247	1589	180	475	331	6575	3491	53.10	.38
M5058	3991	3457	995	978	107	260	178	5797	2340	40.36	.41
M5060	4009	1549	683	794	99	261	277	3386	1837	54.26	.38
M5062	4027	5121	1391	1158	109	233	184	8012	2891	36.08	.47
M5064	4045	5801	1496	1153	131	237	193	8817	3016	34.21	.55
M5066	4063	6093	1477	1280	127	289	336	9265	3173	34.24	.44
M5068	4081	688	213	191	20	45	50	1157	469	40.51	.45
M5070	4099	1019	292	248	26	51	38	1636	617	37.70	.51
M5072	4110	1063	299	250	26	50	20	1687	624	37.01	.51

TABLE I b.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4847	2010	44	15	15	3	13	72	90	46	51.33	.20
M4849	2030	34		6		4	292	43	9	21.25	.00
M4851	2050	31	3	3			650	37	6	17.37	1.00
M4853	2070	79	33	52	17	10	253	191	112	58.74	1.63
M4855	2090	126	18	13	6	9	397	171	45	26.44	.63
M4857	2110	88	10	7	7	6	199	118	30	25.47	1.16
M4859	2130	117	96	84	16	34		347	230	66.27	.48
M4861	2150	115	26	9		5		155	40	25.81	.01
M4863	2170	76	33	39	17	28	34	194	118	60.67	.61
M4865	2190	338	230	244	108	107	40	1027	689	67.08	1.01
M4867	2210	97	26	19	7	12	14	160	63	39.29	.57
M4869	2230	58	12	8	3	7	13	89	30	34.00	.52
M4871	2250	222	67	60	60	29	48	438	217	49.44	2.08
M4873	2270	O P E N		L I D .							
M4875	2290	55	13	13	5	7	2	93	38	40.80	.77
M4877	2310	37	6	3				45	9	19.17	1.00
M4880	2340	46	7	10	18	8	27	89	42	47.87	2.37
M4881	2350	42	8		3			54	11	21.02	$$$$
M4883	2370	32	6	3	4	3	6	49	16	33.88	1.05
M4885	2390	254	60	52	44	20	55	430	175	40.84	2.23
M4887	2410	54	11	8	7	8	22	88	34	39.15	.99
M4889	2430	58	11	7	6	7	19	89	30	34.18	.92
M4891	2450	40	9	6	5	6	14	66	26	39.48	.90
M4893	2470	36	6	6	6	4	9	58	21	37.11	1.36
M4895	2490	17	3	2	2	3	5	27	10	36.46	.77

TABLE I b.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4897	2510	47	8	8	10	13	26	85	38	44.94	.74
M4899	2530	50	7	7	7	10	21	81	31	38.06	.76
M4901	2550	40	8	9	6	8	17	72	32	43.95	.74
M4903	2570	82	13	6		7	37	108	26	24.30	.01
M4905	2590	82	13	7	5	6	18	112	31	27.27	.77
M4907	2610	173	26	34				233	60	25.80	1.00
M4909	2630	66	10	7	5	8	26	96	30	31.10	.63
M4911	2650	141	21	7			33	170	28	16.62	1.00
M4913	2670	590	44	17		20	147	672	81	12.09	.01
M4915	2690	1350	515	874	410	375	598	3524	2174	61.69	1.09
M4917	2710	866	86	28				980	114	11.64	1.00
M4919	2730	102	12	10	4	10	21	139	37	26.63	.45
M4921	2750	808	41	59	42	26	71	976	168	17.24	1.60
M4923	2770	1050	49	35	10	16	30	1160	110	9.50	.63
M4925	2790	568	28	14	6	13	39	630	62	9.79	.48
M4927	2809	1320	261	297	96	51	68	2025	706	34.84	1.88
M4929	2827	1337	70	25	5	17	24	1452	115	7.94	.27
M4931	2845	1266	61	53	22	26	47	1428	162	11.36	.82
M4933	2863	2920	94	30	9	17	33	3070	150	4.89	.53
M4935	2881	1172	64	185	86	124	214	1631	459	28.14	.69
M4937	2899	223	74	227	93	155	240	773	549	71.09	.60
M4939	2917	136	151	525	201	325	426	1337	1202	89.85	.62
M4941	2935	80	55	231	75	143	180	584	504	86.27	.53
M4943	2953	68	40	200	63	116	120	488	420	86.07	.55
M4945	2971	68	46	200	58	100	104	472	404	85.63	.58

TABLE I b.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4947	2989	75	45	193	43	80	63	436	361	82.78	.54
M4949	3007	94	126	420	97	191	201	928	833	89.82	.51
M4951	3025	89	122	398	91	178	178	878	789	89.84	.51
M4953	3043	89	53	263	66	155	160	625	536	85.82	.42
M4955	3061	96	73	243	58	130	152	599	504	84.05	.45
M4957	3079	473	336	562	229	327	756	1927	1454	75.44	.70
M4959	3097	84	30	114	41	87	136	356	272	76.44	.47
M4961	3115	83	29	124	52	109	173	396	313	79.15	.47
M4963	3133	75	34	128	45	101	153	383	308	80.39	.45
M4965	3151	64	28	85	29	59	86	265	201	75.91	.50
M4967	3169	116	33	104	41	85	118	379	263	69.42	.48
M4969	3187	115	43	102	43	91	172	394	279	70.85	.47
M4971	3205	102	46	106	37	85	287	377	275	72.94	.44
M4973	3223	138	41	97	35	97	442	409	271	66.16	.37
M4975	3241	75	21	39	14	33	119	182	107	58.89	.43
M4977	3259	82	20	27	8	22	42	158	77	48.42	.38
M4980	3286	191	28	47	13	32	61	310	119	38.38	.39
M4981	3295	187	80	79	16	36	44	398	211	52.95	.44
M4983	3313	235	226	167	33	62	75	722	487	67.50	.53
M4985	3331	93	67	89	15	45	61	310	217	70.07	.34
M4987	3349	179	61	87	16	48	65	390	212	54.25	.33
M4989	3367	196	52	73	13	39	44	374	177	47.50	.33
M4991	3386	144	139	168	27	81	82	559	415	74.23	.33
M4993	3403	123	132	140	21	64	67	480	356	74.27	.33
M4995	3424	97	150	136	19	48	44	450	353	78.36	.39

TABLE I b.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4997	3442	252	877	404	43	89	54	1664	1412	84.87	.49
M4999	3460	139	685	410	32	83	37	1349	1211	89.72	.38
M5001	3478	73	192	199	17	56	25	537	464	86.45	.31
M5003	3496	70	97	90	7	20	16	284	214	75.27	.34
M5005	3514	290	221	209	23	54	50	797	507	63.61	.43
M5007	3532	400	613	391	35	99	75	1539	1138	73.97	.36
M5009	3550	148	467	428	29	127	95	1199	1051	87.64	.23
M5011	3568	151	476	452	32	143	89	1255	1104	87.94	.23
M5013	3586	172	667	401	30	80	48	1349	1178	87.29	.37
M5015	3604	245	773	422	32	84	50	1556	1311	84.27	.37
M5017	3622	228	641	351	27	64	42	1311	1083	82.62	.41
M5019	3640	3242	1919	1263	200	314	261	6937	3695	53.26	.64
M5021	3658	658	827	888	131	350	333	2854	2196	76.93	.37
M5023	3671	284	444	492	64	207	157	1491	1207	80.96	.31
M5025	3694	275	226	330	70	187	308	1088	813	74.75	.37
M5027	3712	374	431	498	69	224	244	1595	1221	76.55	.31
M5029	3730	265	356	529	84	293	315	1528	1262	82.63	.29
M5032	3766	387	590	910	119	430	352	2435	2048	84.11	.28
M5033	3775	235	396	672	89	328	264	1720	1485	86.33	.27
M5035	3793	248	380	802	112	430	385	1973	1725	87.43	.26
M5037	3811	241	297	826	124	528	585	2015	1774	88.06	.24
M5039	3829	216	320	1065	178	762	830	2541	2325	91.51	.23
M5042	3847	206	278	1092	191	869	990	2636	2430	92.19	.22
M5044	3865	896	965	3034	574	2228	2944	7696	6800	88.36	.26
M5046	3883	337	446	2167	398	1708	4162	5056	4719	93.33	.23

TABLE I b.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M5048	3901	829	1884	4849	661	2508	2155	10730	9901	92.28	.26
M5050	3919	965	1953	4624	597	2250	1942	10389	9423	90.71	.27
M5053	3946	449	782	1748	246	928	973	4153	3704	89.18	.27
M5054	3955	1093	1061	2111	346	1173	1213	5785	4692	81.11	.30
M5056	3973	255	639	1901	326	1389	1652	4510	4255	94.35	.24
M5058	3991	434	812	2048	372	1615	2021	5281	4847	91.79	.23
M5060	4009	172	231	699	133	608	1034	1843	1671	90.67	.22
M5062	4027	406	696	1365	200	840	1023	3507	3100	88.41	.24
M5064	4045	499	860	1552	246	948	1311	4104	3606	87.85	.26
M5066	4063	297	545	1053	155	569	557	2619	2322	88.64	.27
M5068	4081	319	489	929	142	495	581	2375	2056	86.55	.29
M5070	4099	114	171	357	55	226	318	924	810	87.61	.25
M5072	4110	65	84	172	26	108	139	455	390	85.69	.24

TABLE I c.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4847	2010	438	35	37	45	30	108	586	147	25.14	1.51
M4849	2030	253	20	28	10	20	347	332	78	23.64	.51
M4851	2050	865	34	78	31	30	861	1038	173	16.70	1.05
M4853	2070	1832	121	143	96	31	321	2222	390	17.57	3.14
M4855	2090	2943	155	152	102	67	512	3419	476	13.93	1.51
M4857	2110	3167	190	174	96	74	311	3702	535	14.45	1.29
M4859	2130	2764	177	245	121	113	154	3419	655	19.16	1.07
M4861	2150	2344	85	136	68	63	102	2696	352	13.05	1.08
M4863	2170	1524	66	101	48	54	73	1793	269	15.01	.90
M4865	2190	2009	271	329	164	152	136	2925	916	31.32	1.08
M4867	2210	1274	101	205	68	101	187	1748	475	27.15	.68
M4869	2230	122	12	27	61	31	190	252	130	51.53	1.96
M4871	2250	1239	117	119	115	63	209	1651	412	24.97	1.83
M4873	2270	O P E N		L I D .							
M4875	2290	260	24	30	19	15	106	348	88	25.25	1.21
M4877	2310	189	18	23	11	6	36	247	58	23.33	2.00
M4880	2340	2282	121	136	105	49	182	2693	411	15.27	2.13
M4881	2350	1608	185	110	103	52	210	2060	451	21.91	1.97
M4883	2370	868	54	51	43	23	335	1039	171	16.44	1.83
M4885	2390	494	72	65	55	24	71	711	216	30.46	2.25
M4887	2410	138	17	14	14	10	35	192	55	28.39	1.40
M4889	2430	444	37	38	41	23	28	583	138	23.74	1.82
M4891	2450	399	31	26	19	12	47	486	87	17.88	1.59
M4893	2470	335	29	30	24	14	36	431	96	22.29	1.74
M4895	2490	606	48	63	48	28	6	792	187	23.57	1.68

TABLE I c.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4897	2510	552	60	75	50	41	63	778	226	29.03	1.22
M4899	2530	481	37	41	26	22	37	607	126	20.81	1.19
M4901	2550	375	56	42	21	17	34	511	137	26.77	1.22
M4903	2570	211	31	16	6	10	53	273	62	22.83	.58
M4905	2590	594	92	49	26	17	135	778	184	23.64	1.53
M4907	2610	479	73	54	10	4	10	620	140	22.66	2.57
M4909	2630	264	40	29	17	14	35	365	101	27.70	1.21
M4911	2650	2014	304	192	131	63	743	2706	692	25.56	2.07
M4913	2670	3110	453	309	161	105	550	4138	1029	24.86	1.53
M4915	2690	8271	677	1009	497	416	873	10871	2600	23.91	1.20
M4917	2710	4895	222	121	49	24	66	5311	416	7.83	2.08
M4919	2730	1011	45	35	18	17	37	1126	114	10.16	1.09
M4921	2750	2317	153	125	61	44	74	2700	383	14.19	1.40
M4923	2770	1748	129	87	38	31	30	2032	284	13.98	1.20
M4925	2790	882	81	41	17	20	50	1040	159	15.25	.89
M4927	2809	2400	373	353	120	60	91	3307	907	27.43	1.99
M4929	2827	2637	168	84	18	32	61	2939	302	10.26	.58
M4931	2845	1879	105	75	30	32	58	2120	241	11.37	.93
M4933	2863	4802	254	139	52	48	86	5296	494	9.32	1.09
M4935	2881	2377	291	404	135	162	268	3369	992	29.45	.84
M4937	2899	1211	249	384	127	180	266	2151	940	43.68	.71
M4939	2917	2830	582	827	248	373	469	4860	2030	41.77	.66
M4941	2935	587	192	384	105	163	195	1431	844	58.98	.64
M4943	2953	178	79	253	74	126	236	710	532	74.89	.59
M4945	2971	1380	360	577	112	148	147	2577	1197	46.46	.76

TABLE I c.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4947	2989	1235	296	475	79	106	80	2191	956	43.62	.75
M4949	3007	727	222	499	108	198	214	1755	1028	58.56	.55
M4951	3025	2237	593	851	147	231	200	4060	1823	44.90	.64
M4953	3043	1091	204	496	107	195	173	2093	1002	47.89	.55
M4955	3061	1211	283	465	97	161	170	2217	1006	45.39	.60
M4957	3079	1759	806	1385	386	476	1003	4812	3053	63.44	.81
M4959	3097	663	164	343	95	132	202	1397	734	52.54	.72
M4961	3115	112	38	145	57	115	185	468	356	76.11	.50
M4963	3133	628	191	316	86	133	204	1354	726	53.61	.64
M4965	3151	387	136	207	55	76	110	861	474	55.03	.72
M4967	3169	178	54	133	49	92	126	505	327	64.76	.53
M4969	3187	163	66	132	52	101	235	513	350	68.24	.51
M4971	3205	513	193	231	66	115	345	1119	606	54.19	.58
M4973	3223	184	63	132	43	110	472	532	349	65.50	.40
M4975	3241	195	54	69	19	38	126	377	181	48.14	.50
M4977	3259	117	26	32	9	23	43	207	90	43.39	.41
M4980	3286	280	55	72	17	38	67	461	181	39.18	.45
M4981	3295	274	118	105	19	40	45	556	282	50.78	.49
M4983	3313	406	289	195	36	66	78	992	586	59.12	.56
M4985	3331	514	207	153	23	55	72	952	437	45.95	.43
M4987	3349	644	167	146	22	57	127	1037	393	37.91	.39
M4989	3367	395	161	145	20	60	77	781	386	49.45	.34
M4991	3386	1526	412	289	43	99	100	2369	843	35.58	.44
M4993	3403	3248	779	412	61	102	143	4602	1355	29.43	.60
M4995	3424	648	360	204	24	54	53	1290	643	49.82	.45

TABLE I c.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M4997	3442	1529	1232	480	50	94	69	3384	1855	54.82	.53
M4999	3460	1556	1189	531	40	92	58	3408	1852	54.35	.43
M5001	3478	1290	1191	573	41	94	166	3189	1899	59.54	.44
M5003	3496	3428	2020	719	45	79	51	6291	2863	45.51	.56
M5005	3514	2274	1454	570	48	85	182	4430	2156	48.68	.57
M5007	3532	2786	1692	671	53	125	90	5327	2542	47.71	.42
M5009	3550	1627	1036	718	49	162	127	3594	1966	54.71	.30
M5011	3568	3001	1527	857	59	179	110	5623	2621	46.62	.33
M5013	3586	1372	1159	512	36	86	53	3165	1793	56.64	.42
M5015	3604	1986	1409	565	39	92	59	4091	2105	51.45	.42
M5017	3622	2667	1247	451	32	69	46	4466	1799	40.28	.46
M5019	3640	9617	3064	1556	222	334	267	14794	5177	34.99	.66
M5021	3658	4790	1614	1251	179	408	357	8242	3452	41.88	.44
M5023	3671	2944	1020	777	100	251	204	5091	2147	42.17	.40
M5025	3694	2620	909	745	139	255	335	4668	2048	43.88	.54
M5027	3712	1919	734	639	87	243	256	3623	1704	47.02	.36
M5029	3730	1520	802	925	140	386	371	3773	2253	59.71	.36
M5032	3766	3336	1450	1490	180	528	436	6984	3648	52.24	.34
M5033	3775	3234	1479	1662	197	535	431	7106	3873	54.50	.37
M5035	3793	1716	861	1260	163	501	459	4501	2786	61.88	.33
M5037	3811	3741	1414	2104	250	769	688	8277	4536	54.80	.32
M5039	3829	2504	1102	2126	297	1014	946	7042	4538	64.45	.29
M5042	3847	2211	1140	2325	287	1137	1096	7100	4889	68.86	.25
M5044	3865	7753	3050	6085	859	2976	3257	20723	12970	62.59	.29
M5046	3883	418	490	2266	409	1741	4195	5324	4906	92.16	.23

TABLE I c.

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

IKU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M5048	3901	9767	4017	6839	796	2777	2229	24196	14428	59.63	.29
M5050	3919	7868	3424	5801	673	2403	1997	20170	12302	60.99	.28
M5053	3946	6342	2258	3155	388	1228	1191	13371	7029	52.57	.32
M5054	3955	4587	2118	3332	534	1517	1464	12090	7502	62.06	.35
M5056	3973	3338	1886	3490	507	1864	1983	11084	7746	69.88	.27
M5058	3991	3891	1808	3026	478	1875	2200	11078	7187	64.88	.25
M5060	4009	1721	914	1493	232	869	1311	5228	3508	67.09	.27
M5062	4027	5527	2088	2522	309	1072	1207	11519	5991	52.01	.29
M5064	4045	6300	2356	2705	376	1185	1504	12922	6622	51.25	.32
M5066	4063	6390	2022	2333	281	858	893	11884	5494	46.23	.33
M5068	4081	1008	702	1121	162	540	631	3532	2524	71.47	.30
M5070	4099	1134	463	605	81	277	356	2560	1426	55.71	.29
M5072	4110	1128	383	422	51	158	159	2142	1015	47.36	.33

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4847	2000-2010	0.82	97%	Claystone, some grading to Siltstone, grey, slightly glauconitic and sandy occasionally
			3%	Siderite, yellowbrown
M-4849	2020-30	0.87	93%	Claystone, some grading to very silty, grey
			7%	Siderite
			sm.am.	Sandstone, very fine/fine; Pyrite
M-4851	2040-50	0.87	97%	Claystone as above
			3%	Siderite, yellowbrown
M-4853	2060-70	0.82	97%	Claystone as above
			3%	Siderite (slightly contaminated by additives)
M-4855	2080-90	0.76	92%	Claystone, grey as above
			4%	Siderite
			4%	Limestone, white
			sm.am.	Sandstone, glauconitic
M-4857	2100-10	0.77	92%	Claystone, as above
			8%	Siderite, yellowbrown; Limestone, white; Marl, light grey; Calcite; (some mud cake)

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4859	2120-30	0.75	82%	Claystone, some grading to very silty, occasionally silt/sand lenses, grey
			10%	Limestone, white
			5%	Marl, light grey
			3%	Siderite
M-4861	2140-50	0.67	85%	Claystone as above
			15%	Calcite, fibrous,yellow-brown; Siderite; Marl; Limestone; rare glauconitic Sandstone; Pyrite
M-4863	2160-70	0.75	85%	Claystone, as above
			10%	Siderite
			5%	Limestone to Marl
			sm.am.	Pyrite
M-4865	2180-90	0.77	85%	Claystone, as above
			10%	Siderite
			5%	Limestone to Marl
M-4867	2200-10	0.75	80%	Claystone, as above, silt to very fine sand laminae
			20%	Siderite
			sm.am.	Marl and Limestone
M-4869	2220-30	0.88	80%	Claystone, as above
			20%	Siderite, yellowbrown
			sm.am.	Marl to Limestone, light grey to white

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4871	2240-50	0.75	75%	Claystone, grey
			25%	Siderite; some Calcite and Limestone (very small sample)
M-4873	2260-70	0.79	75%	Claystone, occasionally very silty, grey
		0.22	25%	Limestone, white
M-4875	2280-90	0.77	95%	Claystone, as above
			5%	Limestone
			sm.am.	Siderite
M-4877	2300-10	0.69	80%	Claystone, grey, as above
			5%	Limestone, white to light grey
			15%	Sandstone, fine to medium, white, glauconitic, slightly calcareous
			sm.am.	Marl; Siderite
M-4880	2330-40	0.60	75%	Claystone, grey as above
			20%	Sandstone, as above
			5%	Limestone; Siderite; Calcite (fibrous)
M-4881	2340-50	0.64	80%	Claystone, grey as above
			20%	Sandstone, as above, white
			sm.am.	Limestone; Marl
M-4883	2360-70	0.60	85%	Claystone, as above
			15%	Sandstone, as above
			sm.am.	Marl; Siderite

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology
M-4885	2380-90	0.59	90% Claystone 5% Sandstone, as above 5% Limestone and Marl, as above
M-4887	2400-10	0.47	85% Claystone, grey, occasionally some calcareous 5% Sandstone, fine, white 5% Limestone to Marl, white to light grey 5% Calcareous Siltstone, light grey/grey
M-4889	2420-30	0.52	90% Claystone, silty, slightly to very calcareous, grey to light grey 10% Limestone to Marl; Sandstone
M-4891	2440-50	0.40	90% Claystone, as above 5% Limestone/Marl, white/light grey 5% Sandstone, white
M-4893	2460-70	0.56 0.16	80% Claystone, as above, glauco-mitic sand lenses 20% Marl/Limestone, silty, as above
M-4895	2480-90	0.61	86% Claystone, grey, non-to slightly calcareous 7% Sandstone, fine, slightly calcareous, glauconitic, white 7% Limestone/Marl, silty, white/light grey

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4897	2500-10	0.57	85%	Claystone, grey, non-calcareous to some calcareous
			10%	Marl/Siltstone, light grey
			5%	Limestone, white
			sm.am.	Sandstone
M-4899	2520-30	0.62	60%	Claystone, grey, occasionally glauconitic/sandy
		0	40%	Sandstone, fine to medium glauconitic, grading to Limestone, light grey to white
M-4901	2540-50	0.53	85%	Claystone, silty, grey, grading to dark grey
		0.08	15%	Sandstone to Limestone, as above, as laminae in Claystone (Deformation due to turbrodrill observed)
M-4903	2560-70	0.70	100%	Calcareous Claystone to Marl, grey, slightly brownish
			sm.am.	Limestone (affected by turbodrill)
M-4905	2580-90	0.40	100%	Claystone,non-to very calcareous, grey to light grey (strongly deformed by turbodrill)
M-4907	2600-10	0.44	100%	Claystone, grey, some light grey, non-to very calcareous (strongly deformed by turbodrill)

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4909	2620-30	0.51	93%	Claystone, grey, non-to some calcareous
			5%	Sandstone, white as above
			2%	Limestone, white/light grey, marly
				(some deformation by turbo-drill)
M-4911	2640-50	0.69	95%	Claystone, as above
			5%	Marl to Limestone
				(Largely deformed by turbo-drill)
M-4913	2660-70	0.55	100%	Claystone, grey to dark grey, non-to very calcereous, strong-ly deformed by turbodrill
M-4915	2680-90	0.54	100%	Claystone, grey, non-calcareous to calcareous, strongly deform-ed by turbodrill
M-4917	2700-10	1.22	100%	Claystone, grey as above
			sm.am.	Marl
M-4919	2720-30	0.63	95%	Claystone, grey, partly calcare-ous
			5%	Marl, light grey
M-4921	2740-50	0.70	100%	Claystone, grey to dark grey, partly calcareous, strongly de-formed by turbodrill
M-4923	2760-70	0.80	100%	Claystone, as above

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4925	2780-90	0.58	100%	Claystone, grey, non-calcareous to calcareous, partly deformed by turbodrill
M-4927	2800-09	0.70	100%	Claystone, as above, mostly deformed by turbodrill
M-4929	2818-27	1.05	100%	Claystone, as above, strongly deformed by turbodrill
M-4931	2836-45	0.74	100%	Claystone, as above
M-4933	2854-63	0.73	100%	Claystone, as above
M-4935	2872-2881	0.90	100%	Claystone, grey, non-calcareous to calcareous
M-4937	2890-99	1.02	100%	Claystone, grey, grading to dark grey, as above
M-4939	2908-17	1.02	100%	Claystone, grey calcareous to dark grey/grey non-calcareous
			sm.am.	Sandstone, fine-medium, slightly glauconitic, calcareous
M-4941	2926-35	0.90	100%	Claystone, as above
M-4943	2944-53	1.33	100%	Claystone, grey, grading to dark grey, as above
M-4945	2962-71	1.90	100%	Claystone, as above
M-4947	2980-89	1.90	100%	Claystone, as above

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4949	2998-3007	1.28	100%	Claystone, silty, grey to dark grey, calcareous
			sm.am.	Sandstone, as above
M-4951	3016-25	1.00	98%	Claystone, grey grading to dark grey, calcareous grading to non-calcareous
			2%	Sandstone, fine-medium, some calcareous, some glauconitic
M-4953	3034-43	1.97	100%	Claystone, as above
			sm.am.	Sandstone
M-4955	3052-61	0.74	97%	Claystone, as above
			3%	Sandstone, as above, rare coarse glassy angular grains
			sm.am.	Limestone
M-4957	3070-79	0.86	100%	Claystone, as above, some oil-staining
			sm.am.	Sandstone
M-4959	3088-97	0.70	100%	Claystone, as above
			sm.am.	Marl, brownish light grey
M-4961	3106-15	0.59	100%	Claystone, as above
M-4963	3124-3133	0.53	98%	Claystone, slightly to very calcareous, grey
			2%	Sand/Sandstone
			sm.am.	Siderite

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4965	3142-51	1.02	100%	Claystone, as above
			sm.am.	Sandstone, dark grey/black Claystone
M-4967	3160-69	0.72	98%	Claystone, grey, very silty and very calcareous, some grading to silty Marl (brownish)
			2%	Sandstone, some glauconitic
			sm.am.	Limestone, brown (contaminated by additives)
M-4969	3178-87	1.24	100%	Claystone, as above, occasionally sandy, slightly to very calcareous
			sm.am.	Sandstone; Marl/Limestone, browngrey
M-4971	3196-3205	0.64	97%	Claystone, variably silty, slightly to very calcareous, grey
			3%	Sandstone, fine, glauconitic and calcareous
M-4973	3214-23	0.79	85%	Claystone, as above
		0.28	15%	Sand/Sandstone, fine to medium
M-4975	3232-41	0.68	70%	Claystone, grey calcareous, some dark grey non-calcareous and very silty
			30%	Sand/Sandstone, fine-coarse

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4977	3250-59		75%	Sand, as above, subangular - subrounded
		0.82	25%	Claystone, as above, sm.am. dark Shale
M-4980	3277-86	0.85	70%	Claystone, as above, sm.am. dark Shale
			30%	Sand, as above (contaminated by additives)
M-4981	3286-95	0.80	90%	Claystone, as above, grey to light grey
			7%	Sand/Sandstone, as above
		2.49	3%	Shale, dark grey/black, silty
M-4983	3304-13	0.75	50%	Claystone, as above
			45%	Sand/Sandstone
		1.63	5%	Shale, as above
M-4985	3322-31	-	95%	Sand, medium, white, slightly glauconitic, angular/subangular
			5%	Claystone
M-4987	3340-49	-	95%	Sand, as above
			5%	Claystone, as above
M-4989	3358-67	-	100%	Sand, as above sm.am. Claystone
M-4991	3376-85	0.01	85%	Sand/Sandstone medium to coarse, some glauconitic
		1.94	15%	Shale/Claystone, very silty, micaceous, dark grey
			sm.am.	Claystone, grey

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-4993	3394-3403	1.81	90% 10% Sm.am.	Sand, medium to coarse, white Shale/Claystone; dark grey Claystone, grey
M-4995	3415-24	1.83	60% 40%	Silt/Clay-stone, dark grey, grey (partly calcareous) Sandstone
M-4997	3433-42	1.67	75% 25%	Silt/Clay-stone, variably fissile (shaly), dark grey, micromicaceous Sandstone, medium, light grey
M-4999	3451-60	1.75	65% 35%	Shale, dark grey to black, silty Sand/Sandstone, medium to coarse
M-5001	3469-78	1.68	60% 40%	Shale, grey to dark grey Sand/Sandstone, as above
M-5003	3487-96	1.67	85% 15%	Sand/Sandstone, medium to very coarse, white Shale/Claystone, grey to dark grey, silty
M-5005	3505-14	1.83	60% 40%	Sand/Sandstone, as above Shale to Claystone, grey to dark grey (occassionally black)

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology
M-5007	3523-32	1.97	50% Shale/Claystone grading to Siltstone, grey to dark grey (occassionally black) 50% Sand/Sandstone, medium to very coarse
M-5009	3541-50	1.65	25% Shale/Claystone as above, micromicaceous 75% Sand/Sandstone as above
M-5011	3559-68	1.85	40% Shale to Claystone grading to Siltstone, dark grey to grey, occasionally black, micromicaceous 60% Sand/Sandstone, as above
M-5013	3577-86	2.05	60% Clay/Silt-stone, dark grey, micromicaceous, shaly 40% Sand/Sandstone
M-5015	3595-3604	2.23	20% Clay/Silt-stone, shaly, as above 80% Sand/Sandstone
M-5017	3613-22	2.15	75% Shale/Clay/Silt-stone, dark grey, micromicaceous 25% Sand/Sandstone
M-5019	3631-40	1.88	65% Shale/Clay/Silt-stone, as above 35% Sandstone, fine-coarse, occassionally very coarse, light grey
M-5021	3649-3658	2.05	50% Shale/Clay/Silt-stone, as above 50% Sandstone, as above

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-5023	3667-76	2.07	30%	Shale/Clay/Silt-stone, as above
			70%	Sandstone, medium to coarse
M-5025	3685-94	1.86	20%	Shale/Clay/Silt-stone, as above
			80%	Sand/Sandstone, medium-very coarse
			sm.am.	?Chamosite ooliths, grey green; ?Siderite, brown
M-5027	3703-12	0.30	85%	Sand/Sandstone, calcareous
		2.02	15%	Shale/Clay/Silt-stone, as above
			sm.am.	?Siderite, yellowish brown, grading to Limestone/Siltstone
M-5029	3721-30	1.75	45%	Shale/Clay/Silt-stone, as above
			45%	Sand/Sandstone
			10%	Siderite grading to Siltstone/ Limestone, yellowish brown to grey
M-5032	3757-66	1.59	92%	Shale/Clay/Silt-stone, as above, dark grey
			8%	Sandstone, some grading to Limestone (brownish)
M-5033	3766-75	1.81	83%	Shale/Clay/Silt-stone, as above
			15%	Sandstone, medium to coarse
			2%	?Siderite, browngrey
M-5035	3784-93	1.41	80%	Shale/Clay/Silt-stone dark grey as above
			20%	Sandstone, as above, white - light grey

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-5037	3802-11	1.58	82%	Shale/Clay/Silt-stone
			15%	Sandstone
			3%	?Siderite
M-5039	3820-29	1.52	72%	Shale/Clay/Silt-stone, dark grey as above, some grey
			25%	Sandstone, calcareous
			3%	?Siderite
M-5042	3838-47	1.77	75%	Clay/Shale/Silt-stone, as above
			10%	Sandstone, medium to very coarse, light grey - white
			15%	Limestone, silty, to Siderite, light browngrey - brown
M-5044	3856-65	2.43	30%	Clay/Shale/Silt-stone, as above
			65%	Sandstone, as above
			5%	Siderite/Limestone
M-5046	3874-83	2.27	75%	Clay/Silt-stone, dark grey (to black), grey, micromicaceous, partly some sandy
			20%	Sandstone, medium - very coarse, some fine
			5%	?Siderite
M-5048	3892-3901	3.16	95%	Clay/Silt-stone, dark grey, micromicaceous
			5%	Sandstone
M-5050	3910-19	1.81	92%	Clay/Silt-stone, as above
			5%	Sandstone
			3%	?Siderite
			sm.am.	Pyrite

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC	Lithology	
M-5053	3937-46	1.88	90%	Clay/Silt-stone, dark grey (some grading to black), occasionally coaly, grey
			5%	Sandstone
			5%	Siderite
			sm.am.	Coal
M-5054	3946-55	1.83	90%	Clay/Silt-stone, as above
			5%	Sandstone
			5%	Siderite
			sm.am.	Coal
				(mud cake contamination)
M-5056	3964-73	1.60	90%	Clay/Siltstone, some sandy, dark grey to grey
			10%	Sandstone, very fine to medium
			sm.am.	Siderite
M-5058	3982-91	1.98	95%	Siltstone to Clay/Siltstone, occasionally sandy, dark grey grading to grey
			5%	Sandstone
M-5060	4000-09	0.31	90%	Sandstone, calcareous cemented, white-light grey, very fine - medium
		2.75	10%	Siltstone to Clay/Silt-stone, as above
M-5062	4018-27		50%	Sandstone, very fine to coarse
		2.16	50%	Clay/Siltstone as above

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.:
WELL NO.: 35/3-5

Sample	Depth (m)	TOC		Lithology
M-5064	4036-45	2.31	65%	Clay/Silt-stone, dark grey, micaceous
			35%	Sandstone, white to grey, very fine to coarse, some muscovitic, obs chloritic
			sm.am.	Siderite
M-5066	4054-63	2.83	50%	Clay/Siltstone, as above
			50%	Sandstone, as above
			sm.am.	Siderite, Pyrite
M-5068	4072-81		84%	Sand/Sandstone, angular - very angular, white, medium to very coarse, slightly micaceous
		2.67	15%	Clay/Silt-stone, as above
			1%	Siderite, brown to dark brown
M-5070	4090-99		83%	Sand, very angular, but with abundant crystalline rock fragments containing chlorite to chloritedominated grains, some fragments (loose chloritic) may suggest drilling into basement, great fragments of quartz-dom, gneiss
		2.28	15%	Clay/Siltstone, as above
			2%	Siderite
M-5072	4108-10	-		The sample consists of chlorite gneiss and quartz, assumed representing basement rocks

T A B L E : 3.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

IKU-No	DEPTH (m)	Rock Extr. (g)	EOM (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
M 4857	2110	34.1	5.0	1.2	0.7	1.9	3.1	1.0
M 4917	2710	48.5	13.6	2.1	4.2	6.3	7.3	6.3
M 4945	2971	49.1	13.5	3.1	2.1	5.2	8.3	2.1
M 4969	3187	49.4	9.7	1.8	2.6	4.4	5.3	1.3
M 4973	3223	46.0	10.0	2.8	2.2	5.0	5.0	0.9
M 4977	3259	38.1	41.7	16.3	13.8	30.1	11.6	1.2
M 4995	3424	39.8	10.0	3.1	2.5	5.6	4.4	1.8
M 5001	3478	18.4	16.3	7.0	5.1	12.1	4.2	2.1
M 5005	3514	12.3	8.8	2.9	1.9	4.8	4.0	2.2
M 5007	3532	32.3	9.5	3.0	2.4	5.4	4.1	1.8
M 5025	3694	18.0	8.0	1.8	1.9	3.7	4.3	2.1
M 5035	3793	35.0	23.0	4.9	5.5	10.4	12.6	1.8
M 5048	3901	38.5	40.2	7.3	9.0	16.3	23.9	2.8
M 5066	4063	24.2	15.0	3.0	3.2	6.2	8.8	3.6

DATE : 27 - 9 - 82.

T A B L E : 4.

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm OF rock)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
M 4857	2110	147	35	21	56	91
M 4917	2710	280	43	87	130	151
M 4945	2971	275	63	43	106	169
M 4969	3187	196	36	53	89	107
M 4973	3223	217	61	48	109	109
M 4977	3259	1094	428	362	790	304
M 4995	3424	251	78	63	141	111
M 5001	3478	886	380	277	658	228
M 5005	3514	715	236	154	390	325
M 5007	3532	294	93	74	167	127
M 5025	3694	444	100	106	206	239
M 5035	3793	657	140	157	297	360
M 5048	3901	1044	190	234	423	621
M 5066	4063	620	124	132	256	364

DATE : 27 - 9 - 82.

T A B L E : 5.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
M 4857	2110	14.7	3.5	2.1	5.6	9.1
M 4917	2710	4.5	0.7	1.4	2.1	2.4
M 4945	2971	13.1	3.0	2.0	5.0	8.0
M 4969	3187	15.1	2.8	4.0	6.9	8.3
M 4973	3223	24.2	6.8	5.3	12.1	12.1
M 4977	3259	91.2	35.7	30.2	65.8	25.4
M 4995	3424	14.0	4.3	3.5	7.8	6.1
M 5001	3478	42.2	18.1	13.2	31.3	10.9
M 5005	3514	32.5	10.7	7.0	17.7	14.8
M 5007	3532	16.3	5.2	4.1	9.3	7.1
M 5025	3694	21.2	4.8	5.0	9.8	11.4
M 5035	3793	36.5	7.8	8.7	16.5	20.0
M 5048	3901	37.3	6.8	8.3	15.1	22.2
M 5066	4063	17.2	3.4	3.7	7.1	10.1

DATE : 27 - 9 - 82.

T A B L E : 6.

COMPOSITION IN % OF MATERIAL EXTRACTED FROM THE ROCK

IKU-No	DEPTH (m)	Sat / EOM	Aro / EOM	HC / EOM	SAT / Aro	Non HC / EOM	HC / Non HC
M 4857	2110	24.0	14.0	38.0	171.4	62.0	61.3
M 4917	2710	15.4	30.9	46.3	50.0	53.7	86.3
M 4945	2971	23.0	15.6	38.5	147.6	61.5	62.7
M 4969	3187	18.6	26.8	45.4	69.2	54.6	83.0
M 4973	3223	28.0	22.0	50.0	127.3	50.0	100.0
M 4977	3259	39.1	33.1	72.2	118.1	27.8	259.5
M 4995	3424	31.0	25.0	56.0	124.0	44.0	127.3
M 5001	3478	42.9	31.3	74.2	137.3	25.8	288.1
M 5005	3514	33.0	21.6	54.5	152.6	45.5	120.0
M 5007	3532	31.6	25.3	56.8	125.0	43.2	131.7
M 5025	3694	22.5	23.8	46.3	94.7	53.8	86.0
M 5035	3793	21.3	23.9	45.2	89.1	54.8	82.5
M 5048	3901	18.2	22.4	40.5	81.1	59.5	68.2
M 5066	4063	20.0	21.3	41.3	93.8	58.7	70.5

DATE : 27 - 9 - 82.

T A B L E 7.

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

IKU No.	DEPTH (m)	PRISTANE / n-C17	PRISTANE / PHYTANE	CPI
M 4857	2110	1.0	3.4	1.4
M 4917	2710	1.1	2.2	1.8
M 4945	2971	1.2	3.4	1.3
M 4969	3187	1.8	2.9	1.4
M 4973	3223	1.3	3.6	1.2
M 4977	3259	0.7	1.9	1.4
M 4995	3424	0.8	2.5	1.2
M 5001	3478	0.6	1.9	1.0
M 5005	3514	1.2	3.4	1.1
M 5007	3532	1.1	2.3	1.2
M 5025	3694	2.1	4.5	1.2
M 5035	3793	1.3	5.4	1.3
M 5048	3901	2.1	5.5	1.3
M 5066	4063	1.5	4.8	1.2

DATE : 29 - 9 - 82.

Visual Kerogen Analysis

TABLE NO.: VIII
SECTION.: 35/3-5

Sample	Height	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
M-4857	2110	WR!, W, P, S/Am Cy	F-M	fair to good	1+, 1+/2-	Mostly well dispersed material. Some pyrite. Abundant inertinite or reworked woody material. Very small indigenous vitrinite particles.
M-4917	2700-2710	Am/W	F-M	poor	1+/2-	Small rounded aggregates of granulate structure. Some vitrinite and resin fragments. Strongly degraded material.
M-4945	2962-2971	WR!, W, P, S/Am, Cy	F-M	good to fair	1/1+, 2	Pyrite is fairly abundant in a well dispersed residue. Abundant inertinite and reworked semifusinite/fusinite. To dark to be indigenous. Cysts seem somewhat stained. Some walnut shells.

BBREVATIONS

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

047/g/ah/1

Visual Kerogen Analysis

TABLE NO.:
SECTION.: 35/3-5

Sample	Height	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
M-4965	3142-3151	WR!, W/Am, Cy (R? Cy)	F-M	good	1/1+, 2-/2	Abundant pyrite. Amorphous material as loose aggregates. Two cyst assemblages, either mixed lithologies or reworking. Inertinite and rew. semifusinite/fusinite.
M-4969(A)	3178-3187	WR!, W/Am, Cy (R! Cy)	F-M	good	1+ - 1+/2-	Indigenous vitrinite is probably subordinate. WR! includes inertinite, vitrinite and semifusinite/-fusinite.
M-4969	3178-3187	W, WR!, P/Am, Cy	F-M	good to fair	1/1+, 1+/2-	Sparse residue. Some mudadd (nut shells). Etched indigenous vitrinite is subordinate. Abundant pyrite. Indigenous semifusinite.
M-4973(A)	3214-3223	W, WR!/Am, Cy	F-M	good	2-, 2-/2	Loose aggregates. Abundant pyrite. Foramlinings, hyphae. Well preserved Cretaceous cysts. Resembles the residue above.

ABBREVATIONS

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

047/g/ah/2

IKU

Visual Kerogen Analysis

TABLE NO.:
SECTION.: 35/3-5

Sample	Height	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
M-4973(B) cl.st.	3223	W, WR!, Cut, P/Am, Cy	F-M	good	1/1+, 1+/2-	Botryococcus. Fossils as in M-4973A. Very abundant pyrite! Terrestrial material more varied . Etched vitrinite.
M-4977	3250-3259	W, WR!, Cut, P/Am, Cy	F-M	good to fair	1/1+, 1+ - 1+/2-	Aggregates of organic/-unorganic material. Material related to M-4972 A and B. Aggregates.
M-4995	3424	W, WR!, Cut, P/Am, Cy	F-M	good to fair	1+, 1+/2-	Woody material includes fairly large fragments of semifusinite/fusinite. Fungi hyphae and pyrite.
M-5001	3469-3478	W, WR!, Cut, P/Am, Cy	F-M-L	good	1/1+, 2-/2, 2	Woody material is very varied and well preserved and probably reflects a very specialized, partly oxidative environment. Some etched vitrinite.

ABBREVATIONS

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

Visual Kerogen Analysis

TABLE NO.:
SECTION.: 35/3-5

Sample	Height	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
M-5005	3514-	W, WR!, Cut, P/Am, Cy	F-M-L	good	2-/2	Abundant pyrite, cysts less abundant than above. Resemblance with woody material of M-5001, but less variation.
M-5007	3523-3532	WR!, W, Cut, P/Am, Cy	F-M-L	good	2-/2	
M-5025	3685-3694	W, Cut, WR!, P, S/Am, Cy	F-M-L	good	2-/2 - 2	Abundant pyrite. Varied and well preserved woody remains. Tough cuticular fragments. Mainly indigenous material.
M-5035	3793	W, Cut, WR!, P, S/Am, Cy	F-M-L	good to fair	1/1+, 2-/2 - 2	As in M-5025 cysts are in relatively low numbers. An oxidative environment.
M-5048	3901	Cut, W, P,S, WR!/Am	F-M-L	fair to poor	2-/2 - 2	Strong sapropelisation. Abundant but poorly preserved cuticles dominate.
M-5060	4063	Cut, W, S, P, WR!/Am	F-M-L	fair	2-/2 - 2	Abundant spores, pollen, cuticles. Abundant Botryococcus colonies. Mainly indigenous sapropelized material.

ABBREVATIONS

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

IKU

VITRINITE REFLECTANCE MEASUREMENTS

TABLE NO.: IX

WELL NO. 35/3-5

Sample	Depth (m)	Vitrinite reflectance	Fluorescence in UV light	Exinite content
M-4847	2000-2010	0.50 (1)	Nil	Nil
M-4869	2220-2230	0.61 (3)	Dull mineral fluorescence	Nil
M-4885	2380-2390	0.53 (7)	Nil	Nil
M-4899	2520-2530	0.68 (3)	Dull green minerals and one mid-orange spore	Trace (?)
M-4917	2700-2710	N.D.P.	Nil	NIl
M-4945	2962-2971	0.62 (7)	Nil	Nil
M-4959	3088-3097	0.50 (15)	Nil	Nil
M-4969	3178-3187	0.57 (7)	Nil	Nil
M-4981	3286-3295	0.58 (13)	Nil	Nil
M-4995	3412-3421	0.56 (9)	Nil	Nil
M-5013	3577-3586	0.60 (1)	Nil	Nil

IKU

VITRINITE REFLECTANCE MEASUREMENTS

TABLE NO.:

WELL NO. 35/3-5

Sample	Depth (m)	Vitrinite reflectance	Fluorescence in UV light	Exinite content
M-5032	3757-3766	0.59 (25)	Strong green mineral fluorescence, orange bitumen and yellow spores	Low
M-5048	3892-3901	0.57 (20)	Low-orange spores	Trace
M-5058	3982-3991	0.67 (19)	Yellow algae and low-orange and mid-orange spores	Moderate to abundant
M-5066	4054-4063	0.53 (22)	Green/yellow algae and dull bitumen fluorescence	Trace-low

TABLE X

ROCK EVAL PYROLYSES

35/3-5

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	OIL OF GAS CONTENT S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
M 4857	2110	0.03	0.00	0.89	0.77	0	116	0.03	1.00	300
M 4869	2230	0.05	0.10	0.76	0.88	11	86	0.15	0.33	421
M 4877	2310	0.05	0.00	0.52	0.69	0	75	0.05	1.00	300
M 4889	2430	0.02	0.00	0.40	0.52	0	77	0.02	1.00	300
M 4897	2510	0.02	0.11	0.85	0.57	19	149	0.13	0.15	428
M 4903	2570	0.10	0.07	1.45	0.70	10	207	0.17	0.59	420
M 4917	2710	0.13	0.14	1.44	1.22	11	118	0.27	0.48	430
M 4929	2870	0.11	0.11	1.37	1.05	10	130	0.22	0.50	423
M 4939	2917	0.02	0.80	0.76	1.02	78	75	0.82	0.02	432
M 4945	2971	0.04	0.66	1.89	1.90	35	99	0.70	0.06	427
M 4965	3151	0.09	0.20	1.31	1.02	20	128	0.29	0.31	429
M 4969	3187	0.11	0.36	2.37	1.24	29	191	0.47	0.23	430
M 4973	3223	0.12	0.19	0.93	0.79	24	118	0.31	0.39	431
M 4977	3259	0.04	0.18	0.60	0.82	22	73	0.22	0.18	423
M 4981	3295	0.11	0.17	0.61	0.80	21	76	0.28	0.39	422
M 4981	3295	0.51	5.26	0.48	2.49	211	19	5.77	0.09	432
M 4991	3385	Sh 0.08	1.57	0.44	1.94	81	23	1.65	0.05	434
M 4995	3424	Sh 0.29	0.80	0.56	1.83	44	31	1.09	0.27	429
M 4999	3460	0.13	0.42	0.33	1.75	24	19	0.55	0.24	438
M 5001	3478	0.08	0.25	0.68	1.67	15	41	0.33	0.24	442
M 5003	3496	0.10	0.31	0.71	1.67	19	43	0.41	0.24	434
M 5005	3514	0.14	0.31	0.71	1.83	17	39	0.45	0.31	439
M 5007	3532	0.14	0.48	0.62	1.97	24	31	0.62	0.23	437

DATE : 31 - 3 - 82.

TABLE X

ROCK EVAL PYROLYSES 35/3-5

IKU No.	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	OIL OF GAS CONTENT S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
M 5009	3550	0.15	0.25	0.42	1.65	15	25	0.40	0.37	435
M 5013	3586	0.10	0.41	0.41	2.05	20	20	0.51	0.20	438
M 5017	3622	0.14	0.68	0.54	2.15	32	25	0.82	0.17	437
M 5021	3658	0.06	0.56	0.26	2.05	27	13	0.62	0.10	437
M 5025	3694	0.19	0.46	0.26	1.86	25	14	0.65	0.29	439
M 5029	3730	0.42	0.37	0.62	1.75	21	35	0.79	0.53	439
M 5033	3775	0.18	0.66	0.42	1.81	36	23	0.84	0.21	440
M 5035	3793	0.27	0.95	0.48	1.41	67	34	1.22	0.22	439
M 5039	3829	0.07	0.99	0.24	1.52	65	16	1.06	0.07	440
M 5042	3847	0.25	1.79	0.63	1.77	101	36	2.04	0.12	435
M 5046	3883	0.63	2.94	0.62	2.27	130	27	3.57	0.18	436
M 5048	3901	0.45	4.40	0.59	3.16	139	19	4.85	0.09	437
M 5043	3946	0.27	2.15	0.57	1.88	114	30	2.42	0.11	439
M 5056	3973	0.31	2.46	0.48	1.60	154	30	2.77	0.11	444
M 5058	3991	0.18	2.78	0.79	1.98	140	40	2.96	0.06	445
M 5062	4027	0.32	2.84	0.25	2.16	131	12	3.16	0.10	436
M 5064	4045	0.39	3.25	0.37	2.31	141	16	3.64	0.11	444
M 5066	4063	0.44	4.94	0.40	2.63	188	15	5.38	0.08	439

DATE : 31 - 8 - 82.