

EP/S/EXP.Lab. n° 88/217RP

Pau , le November 1988

6406/8-1
HALTENBANKEN - NORWAY
Organic Matter Study

EP/S/EXP.Lab. n°88/217 RP

BA 89-0331-1
24 FEB. 1989
REGISTRERT
OLJEDIREKTORATET

**CONFIDENTIAL
NO REPRODUCTION**

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1 - INTRODUCTION

On well 6406/8-1 were performed :

- an optical study in reflected light and fluorescence, in order to get the maceral composition of the kerogen, and to draw the well maturation profile. The TAI evaluation was performed in transmitted light during the palynological study.
- a complete screening of the organic matter by use of thermal analyses (TOC measurement, Rock-Eval pyrolysis) as well as by Iatroscan method (fast measurement and composition of the chloroformic extract (*)).

The samples used in the organic geochemical study were chosen to have the best possible representativity of the shales encountered in this well. Their description is given in Table B1.

2 - OPTICAL STUDY OF ORGANIC MATTER IN REFLECTANCE-FLUORESCENCE

The data were obtained from 40 samples (7 cores, 11 SWC and 22 cuttings samples) ranging from 1545 m (Miocene) to 4935 m (Lias).

(*) See Appendix 1 for more details about this method.

The maturation data may be summarized as follows.

depth (m)	VRo %	T.A.I
SWC 1545	0.30	
SWC 1798	0.35	
SWC 2297	0.40	
SWC 2521.80		2,5
2600/20	0.50	
SWC 2660		2,5 ⁺
SWC 2780		2,5 ⁺ or 3 ⁻
2850	0.70	
SWC 2880		2,5 ⁺ or 3 ⁻
SWC 2990		2,5 ⁺ or 3 ⁻
SWC 3190		2,5 ⁺ or 3 ⁻
4100	0.90	
4120		3,5 to 4
4240	1.00	
K1 4370.90	1.10	
K1 4377.84		3,5 ⁺ to 4 ⁻
K4 4465.20		4
K6 4658.30		4 ⁻ to 4
4780		4 ⁻ to 4
4920		4 ⁻ to 4
4935	1.45	

LEGENDS OF TABLES AND FIGURES OF ORGANIC INVENTORY ANALYSES : ABBREVIATIONS, UNITS AND CUT OFFS

SAMPLE TYPE :

[CA=core; CL=sidewall core; D=cuttings without specification; DE=washed cuttings; ND=non washed cuttings]

[TE=outcrop; BO=mud; XX=other or undetermined]

Q : Contaminations or cavings [I=high; F=low; N=null or not detected]

IR : Insoluble residue after HCl attack (% weight of rock)

LECO TOC : Total organic carbon (% weight of rock)

ANALYSIS IOC : Insoluble organic carbon in chloroform (% weight of rock)

OC : Organic carbon without precision (total or insoluble)

ROCK EVAL Carried out on : [generally not performed if OC < .3%]

ANALYSIS RT : Total rock

RI_RT : Insoluble residue after HCl attack

RE : Rock extracted with chloroform

RI_RE : Rock extracted with chloroform, and after HCl attack

Measured parameters : [# : result not given because meaningless; <S (detection threshold): S1 or S2 or S3 lower than .05]

Tmax : Temperature of S2 peak (°C) [meaningless if S2 small, flat or plurimodal]

S1 : Free hydrocarbons in the rock (mgHC/g of rock) [meaningless if the analysis is performed on the extracted rock]

S2 : Hydrocarbons yielded by pyrolysis (mgHC/g of rock)

S3 : CO2 yielded by pyrolysis (mg CO2/g of rock) [meaningless if the mineral decomposition is obvious]

Calculated parameters :

PI : Production Index = $S1/(S1+S2)$ [# : meaningless if S1 and S2 < .2]

HI : Hydrogen Index = $(S2/OC) \times 100$ (mg HC/g OC)

OI : Oxygen Index = $(S3/OC) \times 100$ (mg CO2/g OC) ... [to be used with caution for analyses carried out on RT or RE if OC < 2%]

IATROSCAN Fast and non preparative analysis of the chloroformic extract (quantity and composition)

ANALYSIS EOM: Extractable organic matter with chloroform (% weight of rock) [<S if lower than .01%]

Normalized composition of the extract (% EOM) : [not performed if EOM < .03%]

SAT: Saturated hydrocarbons

ARO: Aromatic hydrocarbons

POL: Polar compounds (Resins+Asphaltenes)

HC : SAT+ARO (mg HC/g of rock)

TABLE: B1 6406/8-1

DESCRIPTION OF ANALYSED SAMPLES AND ORGANIC CARBON CONTENT

LAB. REF.	SAMPLE TYPE	DEPTHS Metres	IR %	TOC %	IOC %	L I T H O L O G Y
B07921	CL	1480.00	88.7	.73		LIGHT GREY-GREEN , SILTY SH.
B07922	CL	1509.00	87.6	.81		GREY SH.
B07923	CL	1545.00	85.6	1.00		BROWNISH-GREY SH.
B07924	CL	1585.00	91.0	2.03		LIGHT GREY-BEIGE , MICACEOUS SH.
B07925	CL	1674.50	87.6	1.52		LIGHT GREY-BEIGE , MICACEOUS SH.
B07926	CL	1730.50	88.1	2.95		GREY , MICACEOUS SH.
B07927	CL	1770.00	84.9	5.19		DARK BROWNISH-GREY SH.
B07928	CL	1798.00	88.4	5.99		DARK BROWNISH-GREY SH.
B07929	CL	1851.50	89.3	1.76		BROWNISH-BLACK SH.
B07930	CL	1901.50	89.8	2.52		DARK GREYISH-BROWN SH.
B07931	CL	1922.50	89.2	1.78		DARK BROWNISH-GREY SH.
B07932	CL	1948.20	89.2	3.92		DARK BROWNISH-GREY SH.
B07933	CL	1975.00	90.5	2.07		GREYISH-BROWN SH.
B07934	CL	1979.50	89.2	1.31		GREYISH-BROWN SH.
B07935	CL	1995.00	85.0	2.10		DARK BROWN SH.
B07936	CL	2015.20	93.0	2.69		DARK BROWN SH.
B07937	CL	2026.00	83.9	2.95		DARK BROWN SH.
B07938	CL	2046.50	81.8	4.56		DARK BROWN SH.
B07939	CL	2060.00	79.5	2.48		BROWN SH.
B07940	CL	2067.00	85.2	1.15		DARK BROWNISH-GREY SH.
B07941	CL	2086.50	81.8	.94		BROWNISH-GREY SH.
B07942	CL	2103.80	94.0	1.28		SOFT BROWNISH-BLACK SH.
B07943	CL	2106.70	87.7	.90		BROWNISH GREY SH.
B07944	CL	2120.30	84.9	.99		GREY SH.
B07945	CL	2154.50	89.4	.86		DARK GREY SH.
B07946	CL	2180.50	86.1	.76		GREY SH.
B07947	CL	2201.60	89.8	1.12		BROWNISH-GREY SH.
B07948	CL	2235.90	90.3	.98		GREY SH.
B07949	CL	2251.80	92.1	1.12		LIGHT BROWN SH.
B07950	CL	2274.60	88.5	.69		LIGHT BROWN SH.
B07951	CL	2297.00	89.1	.78		DARK GREY , SILTY SH.
B07952	CL	2321.50	92.1	.57		DARK GREY , SILTY SH.
B07953	CL	2360.30	90.2	1.19		DARK GREY , SILTY SH.
B07954	CL	2397.50	90.7	1.21		DARK GREY , SILTY SH.
B07955	CL	2412.00	86.5	.37		DARK GREY , SILTY SH.
B07956	CL	2431.00	87.2	.55		DARK GREY , SILTY SH.
B07957	CL	2442.80	86.6	.35		LIGHT BROWNISH-GREY SH.
B07958	CL	2453.60	86.8	.26		LIGHT GREENISH-GREY SH.
B07959	CL	2476.40	86.3	.61		GREY SH.
B07960	CL	2486.00	89.4	.16		GREY-GREENISH SH. , MICROPYRITE
B07961	CL	2494.50	88.5	.13		GREY-GREENISH SH.
B07962	CL	2521.80	85.1	3.23		DARK BROWN SH.
B07963	CL	2548.00	80.3	.15		REDISH-BROWN SH.
B07964	CL	2571.20	69.9	.21		GREENISH-GREY SH.
B07965	CL	2597.20	87.9	.28		LIGHT GREENISH-GREY SH.

TABLE: B1 (Continued) 6406/8-1

DESCRIPTION OF ANALYSED SAMPLES AND ORGANIC CARBON CONTENT

LAB. REF.	SAMPLE TYPE	DEPTHS Metres	IR %	TOC %	IOC %	LITHOLOGY
B07966	CL	2607.70	89.4	1.13		LIGHT GREY SH.
B07967	CL	2623.80	63.6	.41		LIGHT GREY SH.
B07968	CL	2660.00	85.4	1.60		LIGHT GREY CLAYST.
B07969	CL	2685.00	80.3	.75		LIGHT GREY CLAYST.
B07970	CL	2723.00	82.5	.44		GREY CLAYST.
B07971	CL	2745.00	82.1	1.17		LIGHT GREY CLAYST.
B07972	CL	2780.00	83.8	.78		GREY CLAYST.
B07973	CL	2800.00	88.7	.67		GREY CLAYST.
B07974	CL	2820.00	88.1	.60		GREY CLAYST.
B07975	CL	2850.00	87.5	.60		LIGHT GREY CLAYST.
B07976	CL	2900.00	86.3	.66		LIGHT GREY CLAYST.
B07977	CL	2950.00	86.4	.68		LIGHT GREY CLAYST.
B07978	CL	2990.00	86.9	.77		LIGHT GREY CLAYST.
B07979	CL	3050.00	85.9	.64		GREY CLAYST.
B07980	CL	3130.00	87.6	.84		DARK GREY-BROWNISH CLAYST.
B07981	CL	3190.00	83.3	1.03		DARK GREY CLAYST.
B07982	CL	3228.00	87.2	.80		BROWNISH-GREY CLAYST.
B07983	CL	3235.00	87.5	.84		GREY CLAYST.
B07984	CL	3260.00	77.2	.83		GREY CLAYST.
B08645	CL	3610.00		1.05		DARK GREY CLAYST.
B08646	CL	3665.00		.86		DARK GREY CLAYST.
B08647	CL	3725.00		.88		DARK GREY SH.
B08082	ND	3975.00	77.1	.69		DARK GREY SH.
B08648	CL	3987.00		.79		GREY CLAYST. / SH.
B08083	ND	3995.00	79.5	.68		DARK GREY SH.
B08649	CL	4020.00		.92		GREY CLAYST.
B08084	ND	4035.00	79.0	.75		DARK GREY SH.
B08650	CL	4092.00		.51		GREY MARL
B08085	ND	4100.00	58.5	1.15		DARK GREY SH. + BROWNISH MARL
B08086	ND	4140.00	71.6	1.22		DARK GREY SH. + BROWNISH MARL
B08087	ND	4155.00	74.9	1.24		DARK GREY SH. + BROWNISH MARL
B08088	ND	4190.00	77.1	1.57		DARK GREY SH. , SLIGHTLY CARB.
B08089	ND	4205.00	83.6	1.85		DARK GREY SH. , SLIGHTLY CARB.
B08090	ND	4225.00	52.5	1.31		DARK GREY SH. , SLIGHTLY CARB. + WHITE-LIGHT BEIGE LMST.
B08091	ND	4240.00	50.6	1.42		BROWNISH-GREY SH. / CLAYST.
B08092	ND	4250.00	49.2	1.32		BROWNISH-GREY SH. / CLAYST.
B08093	ND	4260.00	48.3	1.41		BROWNISH-GREY SH. / CLAYST. + LIGHT BROWN-BEIGE CLAYST.
B08094	ND	4280.00	52.3	.80		LIGHT BROWN-BEIGE SH. / CLAYST.
B08095	ND	4300.00	70.7	2.19		DARK GREY SH. + LIGHT BROWN-BEIGE CLAYST.
B08096	ND	4317.00	70.1	1.37		DARK GREY SH. + LIGHT BROWN-BEIGE CLAYST.
B08097	ND	4340.00	72.7	2.00		BROWNISH-GREY SH. / CLAYST.
B08098	ND	4360.00	72.5	1.53		DARK GREY SH. / CLAYST.
B07551	CA01	4370.90	96.6	80.79		COAL
B07552	CA01	4374.15	91.4	1.58		50% FINE SDST. + 50% THIN BLACK SHALY LAMINATIONS
B07553	CA01	4377.95	91.5	.90		50% FINE SDST. + 50% THIN BLACK SHALY LAMINATIONS

TABLE: B1 (Continued) 6406/8-1

DESCRIPTION OF ANALYSED SAMPLES AND ORGANIC CARBON CONTENT

LAB. REF.	SAMPLE TYPE	DEPTHS Metres	IR %	TOC %	IOC %	LITHOLOGY
B07554	CA02	4389.80	89.7	1.56		ALTERNATION OF BLACK SILTY SH. AND FINE MICACEOUS SDST.
B07555	CA02	4394.95	85.0	2.01		ALTERNATION OF BLACK SH. AND FINE SDST.
B07556	CA02	4401.40	96.3	.09		FINE WHITE SDST. , TRACES OF SH.
B07557	CA03	4423.40	92.6	2.25		SDST. WITH SHALY AND COALY LAMINAE
B07558	CA03	4424.57	92.3	1.62		BLACK SH. + LENTICULAR SDST.
B07559	CA04	4454.67	89.2	.17		FINE SDST. , TRACES OF SH.
B07560	CA04	4455.17	92.0	1.62		BLACK SH. WITH NODULE OF SDST.
B07561	CA05	4476.55	88.3	1.62		FINE MICACEOUS SDST. WITH BLACK SH. LAMINAE
B07562	CA05	4480.64	71.2	.24		FINE MICACEOUS SDST., WITH BLACK SH. LAMINAE WITH LESS SHALY LAMINAE
B07563	CA05	4486.29	92.7	3.17		50% BLACK SH. + 50% SDST.
B07564	CA05	4492.84	86.0	1.75		50% SDST. + BLACK SH. LAMINAE
B08099	ND	4510.00	91.3	1.30		DARK GREY SH. + 10% SDST.
B08100	ND	4550.00	87.7	.95		DARK GREY SH. + 10% SDST.
B08101	ND	4560.00	89.8	.63		DARK GREY SH. + 20% SDST.
B08102	ND	4580.00	88.6	.77		DARK GREY SH. + 20% SDST.
B08103	ND	4600.00	86.6	1.50		DARK GREY SH. + 20% SDST.
B08104	ND	4630.00	86.7	1.02		DARK GREY SH. + 20% SDST.
B07565	CA06	4651.20	90.1	.85		BLACK SILTY SH. + THIN SDST. LAMINAE
B07566	CA06	4653.35	87.1	.57		BLACK SILTY SH. + THIN SDST. LAMINAE
B07567	CA06	4654.60	94.1	.73		BLACK , HOMOGENEOUS SH.
B07568	CA06	4655.40	91.8	.62		BLACK SH. + THIN SDST. LAMINAE
B07569	CA06	4656.90	93.4	3.10		BLACK , HOMOGENEOUS SH.
B07570	CA06	4657.60	93.7	2.04		BLACK , HOMOGENEOUS SH.
B08105	ND	4665.00	87.7	1.13		DARK GREY SH. + 20% SDST.
B08106	ND	4675.00	90.8	.60		SDST. + 10-20% DARK GREY SH.
B08107	ND	4695.00	90.3	.51		SDST. + 10-20% DARK GREY SH.
B08108	ND	4710.00	89.8	.57		SDST. + 10-20% DARK GREY SH.
B08109	ND	4730.00	90.1	.42		SDST. + 10-20% DARK GREY SH.
B08110	ND	4745.00	88.7	.89		SDST. + 10-20% DARK GREY SH.
B08111	ND	4780.00	83.5	#		DARK GREY SH. + SDST. + POLLUTANTS MUD ADDITIVES
B08112	ND	4855.00	81.0	2.31		40% DARK GREY SH. + 60% SDST.
B08651	D	4900.00		#		SAND + SH. + POLLUTANTS
B08114	ND	4910.00	88.6	1.35		SAND + 10-20% SH.
B08115	ND	4920.00	89.4	2.16		SAND + 10-20% SH.
B08116	ND	4935.00	83.1	#		SAND + SH. + POLLUTANTS

RESULTS OF ORGANIC INVENTORY ANALYSIS

SAMPLE TYPE	Q	DEPTHS Metres	R O C K - E V A L								L E C O		I A T R O S C A N						
			on	Tmax	S1	S2	S3	PI	HI	OI	TOC	IOC	EOM	100(EOM/TOC)	SAT	ARO	POL	SAT/ARO	HC
CL	N	1480.00	RT	#	.15	.36	#	.29	49	#	.73		.025	3.4					
CL	N	1509.00	RT	#	.15	.15	1.30	#	19	160	.81		.013	1.6					
CL	N	1545.00	RT	#	.23	.38	1.45	.38	38	145	1.00		.015	1.5					
CL	N	1585.00	RT	411	.28	1.10	2.09	.20	54	103	2.03		.025	1.2					
CL	N	1674.50	RT	418	.27	1.15	#	.19	76	#	1.52		.018	1.2					
CL	N	1730.50	RT	#	.38	1.64	2.67	.19	56	91	2.95		.043	1.5	11.6	7.4	81.0	1.57	.08
CL	N	1770.00	RT	422	.50	4.85	5.34	.09	93	103	5.19		.056	1.1	12.9	6.5	80.6	1.98	.11
CL	N	1798.00	RT	411	.60	4.44	5.35	.12	74	89	5.99		.079	1.3	9.6	6.7	83.7	1.43	.13
CL	N	1851.50	RT	#	.26	.80	1.91	.25	45	109	1.76		.033	1.9	14.7	14.2	71.1	1.04	.10
CL	N	1901.50	RT	#	.27	1.48	1.91	.15	59	76	2.52		.045	1.8	14.8	12.3	72.9	1.20	.12
CL	N	1922.50	RT	#	.19	.70	1.46	.21	39	82	1.78		.030	1.7	14.2	12.4	73.4	1.15	.08
CL	N	1948.20	RT	#	.35	2.49	2.93	.12	64	75	3.92		.110	2.8	16.0	10.6	73.4	1.51	.29
CL	N	1975.00	RT	420	.16	1.21	2.12	.12	58	102	2.07		.030	1.4	13.7	6.0	80.3	2.28	.06
CL	N	1979.50	RT	#	.14	.38	2.02	.27	29	154	1.31		.018	1.4					
CL	N	1995.00	RT	420	.13	.92	1.98	.12	44	94	2.10		.024	1.1					
CL	N	2015.20	RT	#	.20	.99	1.90	.17	37	71	2.69		.030	1.1	14.8	12.3	72.9	1.20	.08
CL	N	2026.00	RT	415	.17	1.25	1.98	.12	42	67	2.95		.024	.8	#				
CL	N	2046.50	RT	421	.27	3.10	3.20	.08	68	70	4.56		.035	.8	14.1	11.6	74.3	1.22	.09
CL	N	2060.00	RT	423	.10	1.16	#	.08	47	#	2.48		.026	1.0					
CL	N	2067.00	RT	#	.05	.41	.74	.11	36	64	1.15		<S						
CL	N	2086.50	RT	#	.08	.14	1.26	#	15	134	.94		<S						
CL	N	2103.80	RT	#	.07	.37	1.00	.16	29	78	1.28		.021	1.6					
CL	N	2106.70	RT	#	.06	.20	.90	.23	22	100	.90		.012	1.3					
CL	N	2120.30	RT	#	.05	.16	.73	#	16	74	.99		.012	1.2					
CL	N	2154.50	RT	#	.06	.16	.92	#	19	107	.86		.015	1.7					
CL	N	2180.50	RT	#	.05	.13	.55	#	17	72	.76		.012	1.6					
CL	N	2201.60	RT	#	.09	.40	.73	.18	36	65	1.12		.033	2.9	15.0	14.5	70.5	1.03	.10
CL	N	2235.90	RT	#	.06	.25	.82	.19	26	84	.98		.028	2.9					
CL	N	2251.80	RT	#	.06	.28	.71	.18	25	63	1.12		.028	2.5					
CL	N	2274.60	RT	#	.07	.14	.61	#	20	88	.69		.013	1.9					
CL	N	2297.00	RT	#	.07	.17	.53	#	22	68	.78		.011	1.4					
CL	N	2321.50	RT	#	.05	.16	.56	#	28	98	.57		<S						
CL	N	2360.30	RT	#	.07	.35	.78	.17	29	66	1.19		.020	1.7					
CL	N	2397.50	RT	#	<S	.36	.56	#	30	46	1.21		.015	1.2					
CL	N	2412.00	RT	#	<S	.06	.36	#	16	97	.37		<S						
CL	N	2431.00	RT	#	.08	.09	.76	#	16	138	.55		<S						
CL	N	2442.80	RT	#	.05	<S	.40	#		114	.35		<S						
CL	N	2453.60									.26		<S						
CL	N	2476.40	RT	#	.05	.13	.40	#	21	66	.61		<S						
CL	N	2486.00									.16		<S						
CL	N	2494.50									.13		<S						
CL	N	2521.80	RT	419	.10	1.85	.66	.05	57	20	3.23		.046	1.4	8.9	26.5	64.6	.34	.16
CL	N	2548.00									.15		<S						
CL	N	2571.20									.21		<S						
CL	N	2597.20									.28		<S						

RESULTS OF ORGANIC INVENTORY ANALYSIS

SAMPLE TYPE	Q	DEPTHS Metres	ROCK - EVAL								LECO		I A T R O S C A N						
			on	Tmax	S1	S2	S3	PI	HI	OI	TOC	IOC	EOM	100(EOM/TOC)	SAT	ARO	POL	SAT/ARO	HC
CL	N	2607.70	RT	416	.15	.62	.73	.19	55	65	1.13		.026	2.3					
CL	N	2623.80	RT	#	.05	.06	#	#	15	#	.41		<S						
CL	N	2660.00	RT	#	.19	.79	.55	.19	49	34	1.60		.031	1.9	25.4	24.2	50.4	1.05	.15
CL	N	2685.00	RT	#	.07	.12	.62	#	16	83	.75		.015	2.0					
CL	N	2723.00	RT	#	.06	.07	.35	#	16	80	.44		<S						
CL	N	2745.00	RT	#	.08	.26	.49	.24	22	42	1.17		<S						
CL	N	2780.00	RT	#	.06	.17	.39	#	22	50	.78		.012	1.5					
CL	N	2800.00	RT	#	.06	.22	.24	.21	33	36	.67		.015	2.2					
CL	N	2820.00	RT	#	.06	.12	.23	#	20	38	.60		.010	1.7					
CL	N	2850.00	RT	#	.08	.11	.18	#	18	30	.60		.020	3.3					
CL	N	2900.00	RT	#	.14	.27	.75	.34	41	114	.66		<S						
CL	N	2950.00	RT	#	.09	.15	.36	#	22	53	.68		<S						
CL	N	2990.00	RT	#	.10	.20	.41	.33	26	53	.77		<S						
CL	N	3050.00	RT	#	.08	.11	.32	#	17	50	.64		<S						
CL	N	3130.00	RT	421	.11	.27	.52	.29	32	62	.84		<S						
CL	N	3190.00	RT	420	.10	.27	.41	.27	26	40	1.03		.023	2.2					
CL	N	3228.00	RT	#	.21	.26	1.04	.45	33	130	.80		.034	4.3	58.9	15.4	25.7	3.82	.25
CL	N	3235.00	RT	421	.16	.29	.39	.36	35	46	.84		.030	3.6	49.4	20.7	29.9	2.39	.21
CL	N	3260.00	RT	#	.12	.22	#	.35	27	#	.83		.064	7.7	48.0	17.0	35.0	2.82	.42
CL	N	3610.00	RT	435	.16	.59	.33	.21	56	31	1.05		.057	5.4	33.5	32.9	33.6	1.02	.38
CL	N	3665.00	RT	438	.11	.36	.50	.23	42	58	.86		.033	3.8	38.6	23.2	38.2	1.66	.20
CL	N	3725.00	RT	439	.12	.45	.55	.21	51	63	.88		.028	3.2	53.9	20.8	25.3	2.59	.21
ND	N	3975.00	RT	#	<S	<S	#	#	#	#	.69		.014	2.0	#	#	#	#	#
CL	N	3987.00	RT	441	.14	.49	.42	.22	62	53	.79		.058	7.3	55.5	25.5	19.0	2.18	.47
ND	N	3995.00	RT	#	<S	<S	#	#	#	#	.68		.014	2.1	#	#	#	#	#
CL	N	4020.00	RT	#	.09	.29	.28	.24	32	30	.92		.024	2.6	38.7	37.4	23.9	1.03	.18
ND	N	4035.00	RT	#	.07	<S	#	#	#	#	.75		.013	1.7	#	#	#	#	#
CL	N	4092.00	RT	#	.05	.17	.72	#	33	141	.51		.022	4.3	22.0	43.2	34.8	.51	.14
ND	N	4100.00	RT	#	.09	.28	1.74	.24	24	151	1.15		.037	3.2	46.6	27.5	25.9	1.69	.27
ND	N	4140.00	RT	#	.12	.14	1.80	#	11	148	1.22		.022	1.8					
ND	N	4155.00	RT	#	.11	.09	1.23	#	7	99	1.24		.021	1.7					
ND	N	4190.00	RT	#	.13	.19	1.37	#	12	87	1.57		.029	1.8	45.6	30.0	24.4	1.52	.22
ND	N	4205.00	RT	#	.13	.14	.65	#	8	35	1.85		.024	1.3					
ND	N	4225.00	RT	#	.27	.36	#	.43	27	#	1.31		.089	6.8	58.6	19.0	22.4	3.08	.69
ND	N	4240.00	RT	#	.21	.34	#	.38	24	#	1.42		.090	6.3	49.6	25.3	25.1	1.96	.67
ND	N	4250.00	RT	#	.16	.22	#	.42	17	#	1.32		.078	5.9	44.3	26.5	29.2	1.67	.55
ND	N	4260.00	RT	#	.30	.34	#	.47	24	#	1.41		.115	8.2	41.1	12.4	46.5	3.31	.62
ND	N	4280.00	RT	#	.23	.23	#	.50	29	#	.80		.045	5.6	61.6	17.9	20.6	3.44	.36
ND	N	4300.00	RT	#	.29	.54	#	.35	25	#	2.19		.111	5.1	49.2	16.9	33.9	2.91	.73
ND	N	4317.00	RT	#	.23	.46	#	.33	34	#	1.37		.156	11.4	54.5	20.0	25.5	2.72	1.16
ND	N	4340.00	RT	#	.17	.48	#	.26	24	#	2.00		.098	4.9	33.9	26.1	40.0	1.30	.59
ND	N	4360.00	RT	443	.19	.53	1.58	.26	35	103	1.53		.158	10.3	53.5	26.8	19.7	2.00	1.27
CA01	N	4370.90	RT	466	14.17	112.11	2.84	.11	139	4	80.79		1.585	2.0	10.2	42.8	46.9	.24	8.40
CA01	N	4374.15	RT	465	.29	.85	.19	.25	54	12	1.58		.066	4.2	17.0	47.6	35.4	.36	.43
CA01	N	4377.95	RT	465	.20	.43	.67	.32	48	74	.90		.039	4.4	23.5	48.1	28.4	.49	.28

APPENDIX B1

IATROSCAN ANALYSIS

Iatroscan analysis

It is a quick method, adapted by Elf Aquitaine, for the detection and quantitative evaluation of a mixture of components previously separated on a thin layer rod and detected by a FID (Flame ionisation detector). This technique enables the determination of :

- 1 - The bulk amount of extractable organic matter (EOM) from a rock.
- 2 - The proportion of saturated, aromatic and polar compounds.

The apparatus used, made by the Japanese Company Iatron Inc., is the Iatroscan TH10 analyzer, Mark IV.

This analysis is particularly useful for samples which are available in small quantity (c.a. 500 mg are sufficient).

Furthermore we use the same samples both for Rock-Eval and Iatroscan analyses in order to have a complete screening of the organic matter (kerogen and bitumen). This screening helps us to choose the best fitting samples for more detailed analyses (for example gas chromatography and computerized gas chromatography/mass spectrometry).