

Geochemical Data Report
Well 7131/4-1 (Guovca)



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Table 1: Number of analyses performed

Analysis	Cuttings	SWC	Core	Fluid	Gas	Mud	Total
Lithology	7	29	23				59
Headspace	21						21
Gas composition					13		13
Stable isotopes of gas	2						2
Stable isotopes of fractions		1*5	5*5				30
TOC/Rock-Eval	7	26	9				42
Thermal extr. GC	2	7	16			4	29
Pyrolysis GC		2	3				5
Iatroscan	1	3	7			1	12
Extraction	1	3	7			1	12
Asphaltenes	1	3	7			1	12
MPLC	1	3	7			1	12
GC of Saturated hydrocarbons	1	2	7	1		1	12
GC of Aromatic hydrocarbons	1	2	7	1		1	12
GC-MS of Saturated hydrocarbons			5	1			6
GC-MS of Aromatic hydrocarbons			5	1			6
Visual kerogen description		2	2				4
Vitrinite reflectance	2	12	3				17



Table 2. Lithology Description

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	%	Lithology	Attributes
7131/4-1	SWC		818.50	27106	100 %	CLYST	drk gy- gy blk
7131/4-1	SWC		839	27107	100 %	CLYST	drk gy- gy blk
7131/4-1	DC		844	27099A	95%	CLYST	drk gy-gy blk
7131/4-1	DC		844	27099B	5%	CLYST	drk rd brwn
7131/4-1	DC		844	27099C	trace	LST	lt gy wh
7131/4-1	SWC		850.50	27108	100 %	CLYST	drk gy- gy blk
7131/4-1	SWC		861.90	27109	100 %	CLYST	drk gy- gy blk
7131/4-1	DC		868	27100A	100%	CLYST	drk gy- gy blk
7131/4-1	DC		868	27100B	trace	LST	lt gy wh
7131/4-1	SWC		877	27110	100 %	CLYST	drk gy- gy blk, slty
7131/4-1	SWC		878.50	27111	100 %	SST	op- lt gy w, f, md, l
7131/4-1	SWC		883	27112	100 %	SST	op- lt gy w, f, md, l
7131/4-1	SWC		894	27113	100 %	SST	op- lt gy w, f, md, crs, l
7131/4-1	SWC		907.50	27114	100 %	CLYST	drk gy
7131/4-1	SWC		911.50	27115	100 %	CLYST	drk gy- gy blk
7131/4-1	SWC		913	27116	100 %	SST	op- lt gy w, f, l
7131/4-1	COCH	915.72	915.73	27323	100 %	SST	op- pl or w, f
7131/4-1	COCH	918.60	918.65	27324	100 %	SST	op- pl or w, f-md, l
7131/4-1	COCH	919.50	919.53	27325	100 %	SST	op- pl or w, f-md, l
7131/4-1	COCH	920.60	920.65	27326	100 %	SST	op- pl or w, f, l
7131/4-1	COCH	921.77	921.82	27327	100 %	SST	op-pl or w, f- md , l
7131/4-1	COCH	922.22	922.28	27328	100 %	SST	op- pl or w, f-md, l
7131/4-1	COCH	923.30	923.36	27329	100 %	SST	op- pl or w, f-md, l
7131/4-1	COCH	924.05	924.09	27330	100 %	SST	op- pl or gy, crs, l
7131/4-1	COCH	924.58	924.59	27339	100 %	CLYST	blk,v crs snd
7131/4-1	COCH	924.92	924.93	27340	100 %	CLYST	drk gy, slty, hrd
7131/4-1	COCH	930.54	930.55	27341	100 %	CLYST	md drk gy
7131/4-1	COCH	933.91	933.93	27331	100 %	SLST	gy w
7131/4-1	COCH	939.80	939.80	27342	100 %	CLYST	Blck, hrd
7131/4-1	COCH	943.37	943.39	27332	100 %	SST	op- pl or gy, crs, l
7131/4-1	COCH	943.94	944.00	27333	100 %	SST	op- pl or gy, crs, l
7131/4-1	SWC		955.70	27117	100 %	CLYST	drk gy
7131/4-1	DC		970	27101A	75%	SST	op, f, crs, l
7131/4-1	DC		970	27101B	25%	CLYST	gy- md drk gy
7131/4-1	DC		970	27101C	trace	CLYST	rd brn- brn
7131/4-1	SWC		973.30	27118	100 %	SLST	op- ltgy w, s
7131/4-1	SWC		1014.80	27119	100 %	CLYST	drk gy- drk brn gy
7131/4-1	DC		1015	27102A	70%	SST	op, f, md, crs, l
7131/4-1	DC		1015	27102B	20%	CLYST	gy- pl brn gy- md drk gy, slty
7131/4-1	DC		1015	27102C	10%	SLST	lt gy
7131/4-1	SWC		1025.50	27120	100 %	CLYST	md drk gy
7131/4-1	SWC		1029.20	27121	100 %	CLYST	md drk gy
7131/4-1	SWC		1043.80	27122	100 %	SLST	gy
7131/4-1	SWC		1052.50	27123	100 %	CLYST	md drk gy - drk brn gy, slty
7131/4-1	SWC		1055	27124	100 %	CLYST	drk gy- drk brn gy, slty
7131/4-1	COCH	1070.37	1070.39	27334	100 %	SST	bl gy, hrd
7131/4-1	COCH	1080.03	1080.05	27335	100 %	SST	gy, f, hrd
7131/4-1	COCH	1088.47	1088.49	27343	100 %	CLYST	md drk gy
7131/4-1	COCH	1096.72	1096.74	27336A	100%	SST	op- lt gy, f, hrd



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Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	%	Lithology	Attributes
7131/4-1	COCH	1096.72	1096.74	27336B	trace	COAL	blk
7131/4-1	COCH	1108.56	1108.58	27337	100 %	SST	op- lt gy, f-md, hrd
7131/4-1	COCH	1112.34	1112.34	27338	100 %	SST	op- lt gy, f-md, l
7131/4-1	COCH	1115.15	1115.15	27344	100 %	CLYST	md drk gy, waxy
7131/4-1	COCH	1116.98	1117.00	27345	100 %	CLYST	drk gy- gy blk
7131/4-1	SWC		1168	27125	100 %	CLYST	md drk gy- drk gy, slty
7131/4-1	SWC		1197.50	27126	100 %	CLYST	drk gy
7131/4-1	SWC		1202.10	27127	100 %	CLYST	drk gy
7131/4-1	SWC		1213.50	27128	100 %	CLYST	md drk gy
7131/4-1	SWC		1221.90	27129	100 %	SLST	gy
7131/4-1	SWC		1231.50	27130	100 %	CLYST	md drk gy, slty
7131/4-1	SWC		1239.40	27131	100 %	CLYST	drk rd brn- brn
7131/4-1	SWC		1242	27132	100 %	CLYST	drk gy-gy blk
7131/4-1	SWC		1251	27133	100 %	CLYST	drk gy- gy blk
7131/4-1	DC		1261	27103A	80%	CLYST	var gy brn, slty
7131/4-1	DC		1261	27103B	20%	SLST	lt gy
7131/4-1	SWC		1268	27134A	50%	CLYST	drk gy
7131/4-1	SWC		1268	27134B	50%	SLST	lt gy
7131/4-1	DC		1282	27104A	70%	CLYST	var gy brn, slty
7131/4-1	DC		1282	27104B	10%	SLST	lt gy
7131/4-1	DC		1282	27104C	20%	SST	op, f, l
7131/4-1	DC		1294	27105A	80%	CLYST	gy - brn gy, slty
7131/4-1	DC		1294	27105B	20%	SLST	lt gy-gy

Table 3. GC of saturated compounds (parameters)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	CPI 1	Pr/n-C17	Ph/n-C18	(Pr/n-C17)/(Ph/n-C18)	Pr/Ph	n-C17/(n-C17+n-C27)
7131/4-1	SWC		839	27107	1.56				1.93	
7131/4-1	SWC		850.50	27108	1.47				1.36	
7131/4-1	DC		868	27100	1.32				1.26	
7131/4-1	COCH	918.60	918.65	27324	1.10				0.40	
7131/4-1	COCH	920.60	920.65	27326						
7131/4-1	COCH	922.22	922.28	27328					0.74	
7131/4-1	COCH	924.58	924.59	27339		0.62	0.76	0.81	0.65	1.00
7131/4-1	COCH	933.91	933.93	27331			1.54		1.64	
7131/4-1	COCH	939.80	939.80	27342	1.91				3.47	
7131/4-1	COCH	1116.98	1117.00	27345	1.59		4.20		2.28	
7131/4-1	SWC		1168	27125					0.72	
7131/4-1	Mud		911	27136	3.32	0.39	0.76	0.51	0.73	0.5



Table 4. GCMS SIR of saturated compounds (parameters)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	%23:3	%28ab	%30D	%27Ts	%22S	%29Ts	%20S	%bb	%27dbs	%C27	%C29	28/29	24:4/23:3
7131/4-1	SWC		850.50	27108	4.79	1.29	5.27	5.47	45.86	3.61	21.91	41.96	44.21	32.32	34.74	0.81	0.69
7131/4-1	COCH	918.60	918.65	27324	31.83	31.59	6.69	46.61	56.83	13.99	39.64	52.12	49.59	38.23	33.54	0.75	0.44
7131/4-1	COCH	922.22	922.28	27328	20.04	57.03	7.93	9.79	28.85	6.14	21.89	56.38	36.24	20.89	60.79	0.27	0.92
7131/4-1	COCH	924.58	924.59	27339	76.17	18.48	10.67	66.08	58.03	22.33	57.94	60.91	78.54	51.94	23.00	1.06	0.45
7131/4-1	COCH	933.91	933.93	27331	65.15	44.07	11.92	33.97	39.13	12.84	22.85	45.31	76.50	42.10	33.27	1.69	0.45
7131/4-1	COCH	1116.98	1117.00	27345	2.50	36.76	6.34	20.34	48.31	12.71	22.46	35.25	40.65	28.75	44.35	0.41	1.84

- %23:3 23:3/(23:3+30αβ)*100
- %28αβ 28αβ/(28αβ+30αβ)*100
- %30D 30D/(30D+30αβ)*100
- %27Ts 27Ts/(27Ts+27Tm)*100
- %22S (32αβS/(32αβS+32αβR))*100
- %29Ts (29Ts/29Ts+30αβ)*100
- %20S (29αS/29αS+29αR)*100
- %ββ (29ββ(R+S)/(29ββ(R+S)+29αα(R+S))*100
- %27dβS 27dβS/(27dβS+27αα(R+S))*100
- %C27 (27ββ(R+S)/(27ββ(R+S)+28ββ(R+S)+29ββ(R+S))*100
- %C29 (29ββ(R+S)/(27ββ(R+S)+28ββ(R+S)+29ββ(R+S))*100
- 28/29 (28αα(R+S)+28ββ(R+S))/(29αα(R+S)+29ββ(R+S))
- 24:4/23:3 24:4/23:3

Table 5. GCMS SIR of aromatic compounds (parameters)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	AROM2	Crack1	Crack2	MSAro1	MSAro2	MSAro3	MSAro4	MSAro5	MSAro6	MSAro7	MSAro8	MSAro9
7131/4-1	SWC		850.50	27108	0.19	0.32	0.09	0.08	0.39	0.37	0.97	2.99	0.55	0.57	1.96	0.14
7131/4-1	COCH	918.60	918.65	27324	0.10	0.53	0.25	0.07	2.58	0.41	1.50	2.81	1.45	0.05	2.51	0.06
7131/4-1	COCH	922.22	922.28	27328	0.42	0.81	0.70	0.42	3.01	0.31	0.56	1.34	0.64	0.01	0.97	0.15
7131/4-1	COCH	924.58	924.59	27339	0.34	0.36	0.19	0.17	3.56	0.40	1.58	3.81	0.93	0.04	3.00	0.32
7131/4-1	COCH	933.91	933.93	27331	0.41	0.76	0.55	0.36	3.25	0.28	0.12	1.27	0.72	0.01	1.47	0.14
7131/4-1	COCH	1116.98	1117.00	27345	0.36	0.45	0.24	0.19	2.84	0.41	1.71	3.62	0.95	0.02	2.37	0.27

AROM2: $(C_{20}TA+C_{21}TA+SC_{26}TA+RC_{26}TA+SC_{27}TA+SC_{28}TA+RC_{27}TA+RC_{28}TA)/(C_{20}TA+C_{21}TA+SC_{26}TA+RC_{26}TA+SC_{27}TA+SC_{28}TA+RC_{27}TA+RC_{28}TA+C_{21}MA+C_{22}MA+\beta SC_{27}MA+\beta RC_{27}MA+\beta RC_{27}DMA+\alpha SC_{27}MA+\beta SC_{28}MA+\beta SC_{28}DMA+\alpha RC_{27}DMA+\alpha SC_{27}DMA+\alpha RC_{27}MA+\alpha SC_{28}MA+\alpha SC_{29}MA+\alpha RC_{29}MA)$

Crack1: $(C_{20}TA)/(C_{20}TA+RC_{28}TA)$

Crack2: $(C_{20}TA+C_{21}TA)/(C_{20}TA+C_{21}TA+SC_{26}TA+RC_{26}TA+SC_{27}TA+SC_{28}TA+RC_{27}TA+RC_{28}TA)$

MSAro1: $(C_{21}MA+C_{22}MA)/(C_{21}MA+C_{22}MA+\beta SC_{27}MA+\beta RC_{27}MA+\beta RC_{27}DMA+\alpha SC_{27}MA+\beta SC_{28}MA+\beta SC_{28}DMA+\alpha RC_{27}DMA+\alpha SC_{27}DMA+\alpha RC_{27}MA+\alpha SC_{28}MA+\alpha SC_{29}MA+\alpha RC_{29}MA)$

MSAro2: 4-MDBT/1-MDBT

MSAro3: $(2-MP+3-MP)/(1-MP+2-MP+3-MP+9-MP)$

MSAro4: 2-MN/1-MN

MSAro5: $(2,6-DMN+2,7-DMN)/1,5-DMN$

MSAro6: 4-MDBT/DBT

MSAro7: DBT/P

MSAro8: 3-MP/Retene

MSAro9: $RC_{28}TA/(RC_{28}TA+\alpha RC_{28}MA+\beta RC_{29}MA+\beta RC_{29}DMA)$



Table 6. Gas Composition (volume-%)

Well	Sample type	Lower Depth (m)	APT ID	C1%	C2%	C3%	iC4%	nC4%	iC5%	nC5%	CO2%	Sum C1-C5	Wetness	iC4/nC4	ppm
7131/4-1	DCG	811	27139	34.4	2.8	5.3	2.0	2.9	1.6	1.5	49.6	50.4	27.3	0.69	392
7131/4-1	DCG	811	27139	1.8	0.18	0.16	0.08	0.10	0.07	0.10	97.5	2.5	22.5	0.80	859
7131/4-1	DCG	841	27140	77.9	4.6	5.5	2.4	2.7	1.7	0.67	4.5	95.5	16.3	0.89	3600
7131/4-1	DCG	841	27140	11.9	1.2	0.53	0.23	0.50	0.35	0.36	84.9	15.1	17.4	0.47	528
7131/4-1	Gas	860	27075	88.4	1.2	0.55	0.13	0.19	0.09	0.07	9.4	90.6	2.2	0.72	3350
7131/4-1	DCG	871	27141	94.1	3.1	1.6	0.51	0.38	0.20	0.07	0.13	99.9	5.5	1.3	247616
7131/4-1	DCG	871	27141	28.5	14.7	21.3	8.1	10.2	5.8	2.7	8.7	91.3	65.6	0.79	4419
7131/4-1	Gas	890	27076	66.7	1.0	0.53	0.23	0.30	0.16	0.15	30.9	69.1	3.1	0.75	874
7131/4-1	DCG	901	27142	86.3	6.1	3.5	1.4	1.2	0.70	0.26	0.50	99.5	12.4	1.2	35897
7131/4-1	DCG	901	27142	0.98	0.02	0.00	0.00	0.00	0.00	0.00	99.0	1.00	2.4		403
7131/4-1	Gas	920	27077	34.1	0.51	0.13	0.06	0.07	0.04	0.05	65.0	35.0	2.2	0.87	1617
7131/4-1	DCG	931	27143	63.1	6.7	5.3	4.2	3.6	3.3	1.4	12.4	87.6	23.9	1.2	1348
7131/4-1	DCG	931	27143	14.9	2.0	1.3	0.89	1.8	2.0	1.9	75.2	24.8	28.7	0.48	332
7131/4-1	Gas	950	27078	48.3	0.66	0.13	0.05	0.07	0.02	0.05	50.8	49.2	1.8	0.74	723
7131/4-1	DCG	961	27088	77.2	2.5	5.9	3.7	2.7	2.5	1.0	4.4	95.6	16.1	1.4	4195
7131/4-1	Gas	980	27079	74.6	0.80	0.17	0.05	0.06	0.04	0.05	24.2	75.8	1.4	0.86	1205
7131/4-1	DCG	991	27089												
7131/4-1	Gas	1010	27080	64.2	0.64	0.16	0.06	0.06	0.02	0.05	34.9	65.1	1.4	0.85	992
7131/4-1	DCG	1021	27090	77.0	3.0	5.2	2.5	1.5	1.2	0.38	9.3	90.7	13.6	1.7	6158
7131/4-1	Gas	1040	27081	73.4	0.66	0.14	0.05	0.05	0.02	0.05	25.6	74.4	1.2	0.95	937
7131/4-1	DCG	1051	27091	78.2	2.0	4.3	1.7	1.3	0.74	0.41	11.4	88.6	10.6	1.4	4045
7131/4-1	Gas	1070	27082	69.6	0.44	0.11	0.04	0.04	0.01	0.04	29.7	70.3	0.90	0.81	984
7131/4-1	DCG	1081	27092	71.4	1.3	5.4	3.6	4.0	3.8	2.1	8.4	91.6	16.7	0.91	1698
7131/4-1	Gas	1100	27083	70.1	0.82	0.18	0.05	0.05	0.02	0.03	28.7	71.3	1.5	0.91	943
7131/4-1	DCG	1111	27093	56.6	2.1	6.8	2.3	1.9	1.6	0.71	27.9	72.1	18.9	1.2	1370
7131/4-1	Gas	1130	27084	66.5	0.67	0.13	0.03	0.04	0.01	0.03	32.6	67.4	1.3	0.80	1021
7131/4-1	DCG	1141	27094	35.7	1.1	2.7	1.2	0.88	0.68	0.48	57.3	42.7	14.1	1.4	1504
7131/4-1	Gas	1160	27085	65.5	1.00	0.32	0.08	0.13	0.07	0.07	32.9	67.1	2.3	0.56	914
7131/4-1	Gas	1190	27086	58.7	0.50	0.13	0.00	0.00	0.03	0.06	40.6	59.4	1.1		962
7131/4-1	DCG	1201	27095	38.2	1.2	3.2	1.2	1.0	0.79	0.58	53.8	46.2	14.8	1.1	6106
7131/4-1	DCG	1231	27096	61.1	0.69	1.9	0.56	0.65	0.31	0.40	34.4	65.6	5.8	0.86	3876
7131/4-1	DCG	1261	27097	39.4	1.1	3.0	0.86	0.94	0.48	0.55	53.6	46.4	13.1	0.91	3104
7131/4-1	Gas	1280	27087	56.1	0.54	0.14	0.04	0.06	0.03	0.06	43.1	56.9	1.4	0.72	770
7131/4-1	DCG	1291	27098	90.6	0.98	1.5	0.43	0.35	0.12	0.15	5.9	94.1	3.4	1.2	14623

Table 7. Gas Isotopes ($\delta^{13}C$, ‰ PDB)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	C1 $\delta^{13}C$	C2 $\delta^{13}C$	C3 $\delta^{13}C$	iC4 $\delta^{13}C$	nC4 $\delta^{13}C$	CO2 $\delta^{13}C$	C1 δD
7131/4-1	DCG		811	27139							
7131/4-1	DCG		811	27139							
7131/4-1	DCG		841	27140							
7131/4-1	DCG		841	27140							
7131/4-1	Gas		860	27075							
7131/4-1	DCG		871	27141O							
7131/4-1	DCG		871	27141H	-52.1	-37.9					
7131/4-1	Gas		890	27076							
7131/4-1	DCG		901	27142O							
7131/4-1	DCG		901	27142H	-47.0	-35.6	-34.9				
7131/4-1	Gas		920	27077							
7131/4-1	DCG		931	27143							
7131/4-1	DCG		931	27143							
7131/4-1	Gas		950	27078							
7131/4-1	DCG		961	27088							
7131/4-1	Gas		980	27079							
7131/4-1	DCG		991	27089							
7131/4-1	Gas		1010	27080							
7131/4-1	DCG		1021	27090							
7131/4-1	Gas		1040	27081							
7131/4-1	DCG		1051	27091							
7131/4-1	Gas		1070	27082							
7131/4-1	DCG		1081	27092							
7131/4-1	Gas		1100	27083							
7131/4-1	DCG		1111	27093							
7131/4-1	Gas		1130	27084							
7131/4-1	DCG		1141	27094							
7131/4-1	Gas		1160	27085							
7131/4-1	Gas		1190	27086							
7131/4-1	DCG		1201	27095							
7131/4-1	DCG		1231	27096							
7131/4-1	DCG		1261	27097							
7131/4-1	Gas	1250	1280	27087							
7131/4-1	DCG		1291	27098							



Table 8. Isotopes of fractions, d13C (‰ PDB)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	$\delta^{13}C$ -Oil/EOM	$\delta^{13}C$ -Sat	$\delta^{13}C$ -Aro	$\delta^{13}C$ -Pol	$\delta^{13}C$ -Asp
7131/4-1	SWC		850.5	27108	-29.4	-31.2	-30.4	-30.0	-28.7
7131/4-1	COCH	918.6	918.65	27324	-31.2	-30.0	-29.9	-31.2	-31.5
7131/4-1	COCH	922.22	922.28	27328	-31.4	-29.9	-24.7	-31.3	-31.7
7131/4-1	COCH	924.58	924.59	27339	-27.1	-29.1	*	-30.1	-25.1
7131/4-1	COCH	933.91	933.93	27331	-30.3	-29.2	-25.8	-31.3	-29.5
7131/4-1	COCH	1116.98	1117	27345	-27.3	-29.9	-27.6	-28.8	-25.9

* Not enough material



Table 9. TOC and Rock-Eval data

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	S1 (mg/g)	S2 (mg/g)	Tmax (°C)	PP (mg/g)	PI (wt ratio)	HI (mg HC/g TOC)	TOC (%)
7131/4-1	SWC		818.50	27106	0.62	0.75	339	1.37	0.45	48	1.55
7131/4-1	SWC		839	27107	0.95	23.16	420	24.11	0.04	708	3.27
7131/4-1	SWC		839	27107X	0.26	23.14	418	23.40	0.01	598	3.87
7131/4-1	DC		844	27099	3.14	30.33	419	33.47	0.09	502	6.04
7131/4-1	DC		844	27099X	0.29	31.72	423	32.01	0.01	511	6.21
7131/4-1	SWC		850.50	27108	1.63	40.23	414	41.86	0.04	718	5.60
7131/4-1	SWC		850.50	27108X	0.30	41.31	420	41.61	0.01	838	4.93
7131/4-1	SWC		861.90	27109	0.66	24.09	418	24.75	0.03	390	6.18
7131/4-1	SWC		861.90	27109X	0.19	21.45	422	21.64	0.01	460	4.66
7131/4-1	DC		868	27100	2.65	32.69	421	35.34	0.07	766	4.27
7131/4-1	DC		868	27100X	0.31	30.10	420	30.41	0.01	660	4.56
7131/4-1	SWC		877	27110	1.04	1.10	373	2.14	0.49	116	0.95
7131/4-1	SWC		877	27110X	0.16	1.19	419	1.35	0.12	120	0.99
7131/4-1	SWC		907.50	27114	0.63	1.43	348	2.06	0.31	102	1.40
7131/4-1	SWC		911.50	27115	0.54	1.16	343	1.70	0.32	87	1.34
7131/4-1	COCH	924.58	924.59	27339	2.24	34.16	421	36.40	0.06	721	4.74
7131/4-1	COCH	924.58	924.59	27339C	3.93	46.83	423	50.76	0.08	775	6.04
7131/4-1	COCH	924.92	924.93	27340	0.32	4.52	430	4.84	0.07	93	4.85
7131/4-1	COCH	924.92	924.93	27340C	0.49	8.13	430	8.62	0.06	153	5.33
7131/4-1	COCH	930.54	930.55	27341	0.35	5.32	435	5.67	0.06	185	2.87
7131/4-1	COCH	939.80	939.80	27342	6.64	110.71	413	117.35	0.06	752	14.72
7131/4-1	SWC		955.70	27117	0.66	1.45	344	2.11	0.31	165	0.88
7131/4-1	SWC		973.30	27118	0.85	0.74	346	1.59	0.53	73	1.01
7131/4-1	SWC		1014.80	27119	0.10	0.49	371	0.59	0.17	91	0.54
7131/4-1	SWC		1025.50	27120	1.11	1.44	352	2.55	0.44	351	0.41
7131/4-1	SWC		1029.20	27121	0.32	0.57	422	0.89	0.36	238	0.24
7131/4-1	SWC		1052.50	27123	0.24	0.56	364	0.80	0.30	431	0.13
7131/4-1	SWC		1055	27124	0.15	0.48	412	0.63	0.24	600	0.08
7131/4-1	COCH	1088.47	1088.49	27343	0.07	0.48	442	0.55	0.13	38	1.25
7131/4-1	COCH	1115.15	1115.15	27344	0.24	1.00	352	1.24	0.19	152	0.66
7131/4-1	COCH	1116.98	1117.00	27345	0.42	23.32	433	23.74	0.02	521	4.48
7131/4-1	SWC		1168	27125	0.61	2.46	431	3.07	0.20	122	2.02
7131/4-1	SWC		1197.50	27126	0.34	0.95	349	1.29	0.26	264	0.36
7131/4-1	SWC		1202.10	27127	0.20	0.64	343	0.84	0.24	136	0.47
7131/4-1	SWC		1213.50	27128	0.52	1.45	488	1.97	0.26	659	0.22
7131/4-1	SWC		1231.50	27130	0.50	0.58	338	1.08	0.46	387	0.15
7131/4-1	SWC		1239.40	27131	0.46	0.91	342	1.37	0.34	607	0.15
7131/4-1	SWC		1242	27132	0.24	0.73	342	0.97	0.25	106	0.69
7131/4-1	SWC		1251	27133	0.23	1.13	436	1.36	0.17	135	0.84
7131/4-1	DC		1261	27103	0.31	1.68	440	1.99	0.16	111	1.51
7131/4-1	DC		1282	27104	0.40	1.64	418	2.04	0.20	100	1.64
7131/4-1	DC		1294	27105	0.20	0.58	351	0.78	0.26	112	0.52

X after APT ID – Measured on extracted material



Table 10. Thermal Extraction GC (peak area)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C10	n-C11	n-C12	n-C13	n-C14	n-C15	n-C16	n-C17	Ph	n-C18	Ph	n-C19	n-C20	n-C21	n-C22	n-C23
7131/4-1	SWC		878.50	27111	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		883	27112	0.00e0	0.00e0	1.80e3	3.34e3	3.51e3	0.00e0	2.15e3	1.44e3	0.00e0	1.02e3	0.00e0	9.51e2	9.42e2	1.04e3	7.12e2	0.00e0
7131/4-1	SWC		894	27113	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		913	27116	0.00e0	0.00e0	0.00e0	0.00e0	1.67e4	9.63e3	1.96e3	1.48e3	0.00e0	8.78e2	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	915.72	915.73	27323	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	918.60	918.65	27324	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	919.50	919.53	27325	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	920.60	920.65	27326	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	921.77	921.82	27327	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	923.30	923.36	27329	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	924.05	924.09	27330	0.00e0	2.03e3	0.00e0	0.00e0	5.11e4	5.09e4	2.46e4	3.58e4	0.00e0	3.68e4	2.13e4	3.57e4	1.92e4	5.96e3	0.00e0	0.00e0
7131/4-1	COCH	933.91	933.93	27331	0.00e0	0.00e0	0.00e0	1.10e3	1.75e3	0.00e0	5.16e2	7.03e2	0.00e0	4.24e2	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	943.37	943.39	27332	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	943.94	944.00	27333	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	DC		970	27101	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	DC		1015	27102	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		1043.80	27122	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1070.37	1070.39	27334	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1080.03	1080.05	27335	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1096.72	1096.74	27336	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1108.56	1108.58	27337	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1112.34	1112.34	27338	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		1221.90	27129	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		1268	27134	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		861	27135	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		911	27136	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		1061	27137	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		1171	27138	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0

Table 10. continued, Thermal Extraction GC (peak area)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C24	n-C25	n-C26	n-C27	n-C28	n-C29	n-C30	n-C31	n-C32	n-C33	n-C34	n-C35	n-C36
7131/4-1	SWC		878.50	27111	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		883	27112	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		894	27113	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		913	27116	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	915.72	915.73	27323	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	918.60	918.65	27324	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	919.50	919.53	27325	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	920.60	920.65	27326	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	921.77	921.82	27327	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	923.30	923.36	27329	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	924.05	924.09	27330	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	933.91	933.93	27331	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	943.37	943.39	27332	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	943.94	944.00	27333	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	DC		970	27101	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	DC		1015	27102	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		1043.80	27122	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1070.37	1070.39	27334	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1080.03	1080.05	27335	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1096.72	1096.74	27336	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1108.56	1108.58	27337	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	1112.34	1112.34	27338	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		1221.90	27129	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	SWC		1268	27134	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		861	27135	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		911	27136	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		1061	27137	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		1171	27138	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0



Table 11. Pyrolysis GC (peak area)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	%C1(UCM)	%C2-C5 (UCM)	%C6-C14 (UCM)	%C15+ (UCM)	%C1 (X-UCM)	%C2-C5 (X-UCM)	%C6-C14 (X-UCM)	%C15+ (X-UCM)	C1	C2-C5	C6-C14	C15+	C6-C14 (UCM)	C15+ (UCM)	n-Heptene	Tol
7131/4-1	SWC		850.50	27108	5.57	14.78	37.55	42.10	9.83	26.10	51.69	12.38	2.79e7	7.41e7	1.47e8	3.51e7	1.88e8	2.11e8	2.68e6	3.13e6
7131/4-1	COCH	918.60	918.65	27324	0.46	18.53	31.60	49.42	0.49	19.98	30.84	48.68	3.08e5	1.25e7	1.93e7	3.05e7	2.13e7	3.34e7	3.78e5	2.34e4
7131/4-1	COCH	924.58	924.59	27339	10.40	13.67	28.93	47.01	16.87	22.16	38.53	22.44	2.57e7	3.37e7	5.87e7	3.42e7	7.14e7	1.16e8	3.86e5	1.90e6
7131/4-1	COCH	1116.98	1117.00	27345	13.12	17.42	36.94	32.52	18.28	24.28	41.52	15.91	2.40e7	3.19e7	5.45e7	2.09e7	6.76e7	5.95e7	7.08e5	1.95e6
7131/4-1	SWC		1168	27125	6.20	29.89	45.70	18.21	7.82	37.72	45.93	8.53	3.62e6	1.74e7	2.12e7	3.95e6	2.67e7	1.06e7	2.99e5	6.55e5

Table 11. continued, Pyrolysis GC (peak area)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-Octene	mp-Xyl	Weight (mg)
7131/4-1	SWC		850.50	27108	1.58e6	2.86e6	0.0
7131/4-1	COCH	918.60	918.65	27324	2.68e4	0.00e0	0.0
7131/4-1	COCH	924.58	924.59	27339	1.87e5	1.51e6	0.0
7131/4-1	COCH	1116.98	1117.00	27345	5.06e5	1.51e6	0.0
7131/4-1	SWC		1168	27125	2.03e5	3.97e5	0.0



Table 12. Extraction, Asphaltene precipitation and Iatroscan data

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	Rock weight (g)	EOM (mg)	EOM (mg/kg Rock)	SAT (wt% of EOM/Oil)	ARO (wt% of EOM/Oil)	POL (wt% of EOM/Oil)	ASP (wt% of EOM/Oil)	HC (wt% of EOM/Oil)
7131/4-1	SWC		839	27107	2.021	24	11873	1.6	1.4	44.4	52.5	3.1
7131/4-1	SWC		850.50	27108	2.010	30	14928	0.6	1.1	35.7	62.7	1.7
7131/4-1	DC		868	27100	2.008	32	15933	1.3	1.2	65.3	32.2	2.5
7131/4-1	COCH	918.60	918.65	27324	20.749	17	819	0.0	0.0	0.0	75.9	
7131/4-1	COCH	920.60	920.65	27326	20.742	45	2169	2.0	0.0	61.1	36.9	2.0
7131/4-1	COCH	922.22	922.28	27328	20.351	41	2015	0.0	0.0	87.1	12.9	
7131/4-1	COCH	924.58	924.59	27339	2.004	27	13471	0.0	20.7	32.7	46.7	20.7
7131/4-1	COCH	933.91	933.93	27331	20.334	19	934	63.4	0.0	30.9	5.8	63.4
7131/4-1	COCH	939.80	939.80	27342	1.010	83	82154	13.9	15.6	6.4	64.1	29.5
7131/4-1	COCH	1116.98	1117.00	27345	2.008	17	8467	7.4	32.0	25.9	34.7	39.4
7131/4-1	SWC		1168	27125	9.953	39	3919	10.2	8.4	67.0	14.4	18.7
7131/4-1	Mud		911	27136	10.302	293	28440	0.6	0.0	92.9	6.5	0.6

Table 13. GC of saturated compounds (peak area)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C10	n-C11	n-C12	i-C13	i-C14	n-C13	i-C15	n-C14	i-C16	n-C15	n-C16	i-C18	n-C17	Ph	n-C18	Ph
7131/4-1	SWC		839	27107	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	2.29e4	0.00e0	0.00e0	1.60e4	0.00e0	1.26e5	0.00e0	6.54e4
7131/4-1	SWC		850.50	27108	0.00e0	0.00e0	0.00e0	1.16e4	1.40e4	2.58e4	2.48e4	4.52e4	3.66e4	2.36e4	2.62e4	3.37e4	0.00e0	1.47e5	0.00e0	1.09e5
7131/4-1	DC		868	27100	0.00e0	0.00e0	0.00e0	0.00e0	1.12e4	0.00e0	1.71e4	0.00e0	2.63e4	0.00e0	0.00e0	2.79e4	0.00e0	1.64e5	0.00e0	1.30e5
7131/4-1	COCH	918.60	918.65	27324	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	1.11e3	0.00e0	2.81e3
7131/4-1	COCH	920.60	920.65	27326	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	4.41e3	0.00e0	5.96e3
7131/4-1	COCH	924.58	924.59	27339	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	1.78e4	3.60e3	1.71e4	3.65e4	2.35e4	3.17e4	1.97e4	3.96e4	3.03e4
7131/4-1	COCH	933.91	933.93	27331	0.00e0	5.23e4	1.69e5	0.00e0	1.64e4	2.89e5	1.53e4	1.89e5	2.04e4	7.13e4	3.68e4	1.27e4	0.00e0	3.21e4	1.27e4	1.95e4
7131/4-1	COCH	939.80	939.80	27342	0.00e0	0.00e0	0.00e0	0.00e0	1.07e4	4.36e4	1.12e4	5.25e4	2.01e4	2.20e4	1.58e4	1.09e4	0.00e0	6.60e4	0.00e0	1.90e4
7131/4-1	COCH	1116.98	1117.00	27345	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	5.36e3	0.00e0	0.00e0	6.44e3	0.00e0	4.28e4	4.46e3	1.88e4
7131/4-1	SWC		1168	27125	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	1.73e3	0.00e0	2.41e3
7131/4-1	Mud		911	27136	0.00e0	1.67e3	2.91e2	0.00e0	0.00e0	1.77e3	0.00e0	8.21e3	0.00e0	3.90e3	2.44e3	0.00e0	1.57e3	6.14e2	1.11e3	8.45e2

Table 13. continued, GC of saturated compounds (peak area)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C19	n-C20	n-C21	n-C22	n-C23	n-C24	n-C25	n-C26	n-C27	n-C28	n-C29	n-C30	n-C31	n-C32	n-C33	n-C34
7131/4-1	SWC		839	27107	1.45e4	9.70e3	1.19e4	1.55e4	1.87e4	1.57e4	1.83e4	1.33e4	1.94e4	1.63e4	2.70e4	1.04e4	1.14e4	3.53e3	1.94e4	0.00e0
7131/4-1	SWC		850.50	27108	2.07e4	1.15e4	1.67e4	1.72e4	1.91e4	1.48e4	2.00e4	1.20e4	1.77e4	1.66e4	2.41e4	1.32e4	1.46e4	6.31e3	1.49e4	0.00e0
7131/4-1	DC		868	27100	2.56e4	1.92e4	2.73e4	2.60e4	2.47e4	2.19e4	2.32e4	1.70e4	2.07e4	2.44e4	3.38e4	1.61e4	1.73e4	8.35e3	2.23e4	1.03e4
7131/4-1	COCH	918.60	918.65	27324	0.00e0	0.00e0	4.10e3	7.35e3	7.04e3	8.30e3	7.04e3	6.01e3	5.14e3	3.75e3	3.81e3	2.65e3	2.11e3	1.28e3	1.16e3	0.00e0
7131/4-1	COCH	920.60	920.65	27326	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	924.58	924.59	27339	3.56e4	3.06e4	2.39e4	1.30e4	9.14e3	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	933.91	933.93	27331	1.67e4	1.68e4	1.23e4	7.48e3	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	939.80	939.80	27342	1.60e4	5.75e3	1.65e4	1.73e4	2.61e4	2.45e4	4.26e4	3.05e4	6.16e4	3.42e4	5.58e4	2.75e4	4.58e4	7.73e3	1.87e4	0.00e0
7131/4-1	COCH	1116.98	1117.00	27345	1.60e4	1.65e4	2.14e4	1.99e4	2.52e4	2.36e4	2.97e4	2.60e4	4.32e4	2.89e4	4.62e4	2.65e4	3.80e4	1.17e4	2.16e4	3.90e3

Geochemical Data Report Well 7131/4-1 (Guovca)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C19	n-C20	n-C21	n-C22	n-C23	n-C24	n-C25	n-C26	n-C27	n-C28	n-C29	n-C30	n-C31	n-C32	n-C33	n-C34
7131/4-1	SWC		1168	27125	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		911	27136	8.29e2	1.22e3	1.29e3	2.50e3	1.95e3	2.00e3	1.77e3	1.73e3	1.60e3	1.30e3	1.39e4	1.17e3	1.60e3	1.05e3	7.04e2	7.41e2

Table 13. continued, GC of saturated compounds (peak area)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C35	n-C36
7131/4-1	SWC		839	27107	1.63e4	0.00e0
7131/4-1	SWC		850.50	27108	0.00e0	0.00e0
7131/4-1	DC		868	27100	2.70e4	0.00e0
7131/4-1	COCH	918.60	918.65	27324	0.00e0	0.00e0
7131/4-1	COCH	920.60	920.65	27326		
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0
7131/4-1	COCH	924.58	924.59	27339	0.00e0	0.00e0
7131/4-1	COCH	933.91	933.93	27331	0.00e0	0.00e0
7131/4-1	COCH	939.80	939.80	27342	0.00e0	0.00e0
7131/4-1	COCH	1116.98	1117.00	27345	7.36e3	2.02e3
7131/4-1	SWC		1168	27125	0.00e0	0.00e0
7131/4-1	Mud		911	27136	0.00e0	0.00e0



Pt	n-C18	Ph
7.29e5	0.00e0	3.78e5
7.00e5	0.00e0	5.16e5
4.98e5	0.00e0	3.96e5
1.47e4	0.00e0	3.72e4
0.00e0	0.00e0	0.00e0
2.65e4	0.00e0	3.59e4
1.48e5	2.98e5	2.28e5
3.22e5	1.27e5	1.96e5
1.48e5	0.00e0	4.25e4
3.65e5	3.80e4	1.60e5
6.20e3	0.00e0	8.66e3
2.62e2	4.71e2	3.60e2

n-C32	n-C33	n-C34
2.04e4	1.12e5	0.00e0
3.00e4	7.06e4	0.00e0
2.54e4	6.80e4	3.12e4
1.70e4	1.54e4	0.00e0
0.00e0	0.00e0	0.00e0
0.00e0	0.00e0	0.00e0
0.00e0	0.00e0	0.00e0
0.00e0	0.00e0	0.00e0
1.73e4	4.18e4	0.00e0
9.95e4	1.84e5	3.32e4



Table 14. GC of saturated compounds (amounts in ng/g)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C10	n-C11	n-C12	i-C13	i-C14	n-C13	i-C15	n-C14	i-C16	n-C15	n-C16	i-C18	n-C17	Pr	n-C18	Ph
7131/4-1	SWC		839	27107	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	1.33e5	0.00e0	0.00e0	9.27e4	0.00e0	7.29e5	0.00e0	3.78e5
7131/4-1	SWC		850.50	27108	0.00e0	0.00e0	0.00e0	5.49e4	6.65e4	1.22e5	1.18e5	2.15e5	1.74e5	1.12e5	1.24e5	1.60e5	0.00e0	7.00e5	0.00e0	5.16e5
7131/4-1	DC		868	27100	0.00e0	0.00e0	0.00e0	0.00e0	3.39e4	0.00e0	5.21e4	0.00e0	8.00e4	0.00e0	0.00e0	8.50e4	0.00e0	4.98e5	0.00e0	3.96e5
7131/4-1	COCH	918.60	918.65	27324	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	1.47e4	0.00e0	3.72e4
7131/4-1	COCH	920.60	920.65	27326	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	2.65e4	0.00e0	3.59e4
7131/4-1	COCH	924.58	924.59	27339	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	1.34e5	2.71e4	1.29e5	2.75e5	1.77e5	2.38e5	1.48e5	2.98e5	2.28e5
7131/4-1	COCH	933.91	933.93	27331	0.00e0	5.25e5	1.70e6	0.00e0	1.65e5	2.90e6	1.53e5	1.90e6	2.05e5	7.16e5	3.70e5	1.28e5	0.00e0	3.22e5	1.27e5	1.96e5
7131/4-1	COCH	939.80	939.80	27342	0.00e0	0.00e0	0.00e0	0.00e0	2.39e4	9.76e4	2.51e4	1.18e5	4.50e4	4.92e4	3.54e4	2.45e4	0.00e0	1.48e5	0.00e0	4.25e4
7131/4-1	COCH	1116.98	1117.00	27345	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	4.56e4	0.00e0	0.00e0	5.49e4	0.00e0	3.65e5	3.80e4	1.60e5
7131/4-1	SWC		1168	27125	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	6.20e3	0.00e0	8.66e3
7131/4-1	Mud		911	27136	0.00e0	7.10e2	1.24e2	0.00e0	0.00e0	7.54e2	0.00e0	3.50e3	0.00e0	1.66e3	1.04e3	0.00e0	6.68e2	2.62e2	4.71e2	3.60e2

Table 14. continued, GC of saturated compounds (amounts in ng/g)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C19	n-C20	n-C21	n-C22	n-C23	n-C24	n-C25	n-C26	n-C27	n-C28	n-C29	n-C30	n-C31	n-C32	n-C33	n-C34
7131/4-1	SWC		839	27107	8.37e4	5.61e4	6.90e4	8.96e4	1.08e5	9.10e4	1.06e5	7.69e4	1.12e5	9.43e4	1.56e5	6.00e4	6.59e4	2.04e4	1.12e5	0.00e0
7131/4-1	SWC		850.50	27108	9.81e4	5.47e4	7.92e4	8.17e4	9.07e4	7.05e4	9.52e4	5.71e4	8.42e4	7.90e4	1.15e5	6.28e4	6.94e4	3.00e4	7.06e4	0.00e0
7131/4-1	DC		868	27100	7.80e4	5.85e4	8.31e4	7.90e4	7.52e4	6.66e4	7.05e4	5.16e4	6.29e4	7.43e4	1.03e5	4.89e4	5.28e4	2.54e4	6.80e4	3.12e4
7131/4-1	COCH	918.60	918.65	27324	0.00e0	0.00e0	5.43e4	9.74e4	9.33e4	1.10e5	9.32e4	7.96e4	6.81e4	4.97e4	5.04e4	3.52e4	2.79e4	1.70e4	1.54e4	0.00e0
7131/4-1	COCH	920.60	920.65	27326	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	924.58	924.59	27339	2.68e5	2.30e5	1.80e5	9.81e4	6.87e4	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	933.91	933.93	27331	1.68e5	1.69e5	1.24e5	7.52e4	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	COCH	939.80	939.80	27342	3.58e4	1.29e4	3.69e4	3.87e4	5.84e4	5.49e4	9.54e4	6.83e4	1.38e5	7.66e4	1.25e5	6.17e4	1.03e5	1.73e4	4.18e4	0.00e0
7131/4-1	COCH	1116.98	1117.00	27345	1.36e5	1.40e5	1.83e5	1.70e5	2.14e5	2.01e5	2.53e5	2.21e5	3.68e5	2.46e5	3.94e5	2.26e5	3.24e5	9.95e4	1.84e5	3.32e4



Geochemical Data Report Well 7131/4-1 (Guovca)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C19	n-C20	n-C21	n-C22	n-C23	n-C24	n-C25	n-C26	n-C27	n-C28	n-C29	n-C30	n-C31	n-C32	n-C33	n-C34
7131/4-1	SWC		1168	27125	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0
7131/4-1	Mud		911	27136	3.53e2	5.19e2	5.50e2	1.07e3	8.31e2	8.51e2	7.54e2	7.36e2	6.81e2	5.54e2	5.93e3	4.99e2	6.80e2	4.48e2	3.00e2	3.16e2

Table 14. continued, GC of saturated compounds (amounts in ng/g)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	n-C35	n-C36
7131/4-1	SWC		839	27107	9.44e4	0.00e0
7131/4-1	SWC		850.50	27108	0.00e0	0.00e0
7131/4-1	DC		868	27100	8.22e4	0.00e0
7131/4-1	COCH	918.60	918.65	27324	0.00e0	0.00e0
7131/4-1	COCH	920.60	920.65	27326	0.00e0	0.00e0
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0
7131/4-1	COCH	924.58	924.59	27339	0.00e0	0.00e0
7131/4-1	COCH	933.91	933.93	27331	0.00e0	0.00e0
7131/4-1	COCH	939.80	939.80	27342	0.00e0	0.00e0
7131/4-1	COCH	1116.98	1117.00	27345	6.27e4	1.73e4
7131/4-1	SWC		1168	27125	0.00e0	0.00e0
7131/4-1	Mud		911	27136	0.00e0	0.00e0

Table 15. GC of aromatic compounds (peak area)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	2-MN	1-MN	P	3-MP	2-MP	9-MP	1-MP
7131/4-1	SWC		839	27107	0	0	0	0	0	0	0
7131/4-1	SWC		850.50	27108	206172	197500	13429	58180	0	37579	8824
7131/4-1	DC		868	27100	55483	96978	22142	23237	14464	12837	7932
7131/4-1	COCH	918.60	918.65	27324	0	0	0	0	0	0	0
7131/4-1	COCH	922.22	922.28	27328	13820	35375	286647	44776	70137	160879	59159
7131/4-1	COCH	924.58	924.59	27339	0	0	0	0	0	0	0
7131/4-1	COCH	933.91	933.93	27331	11218	217431	736556	113694	225812	427779	187601
7131/4-1	COCH	939.80	939.80	27342	138955	136922	135974	39681	34072	66118	53994
7131/4-1	COCH	1116.98	1117.00	27345	81921	66435	82497	29649	37225	73452	48700
7131/4-1	SWC		1168	27125	39429	78148	22021	16007	10377	11290	0
7131/4-1	Mud		911	27136	0	0	0	0	0	0	0



Table 16. GCMS SIR of saturated compounds (peak height)

m/e						177				191				191						
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	25nor28αβ	25nor29αβ	25nor30αβ	25nor31αβ	19/3	20/3	21/3	23/3	24/3	25/3R	25/3S	24/4	26/3R	26/3S	28/3R	28/3S
7131/4-1	SWC		850.50	27108	0.00e0	0.00e0	0.00e0	1.46e6	1.42e5	3.80e5	8.67e5	1.03e6	7.20e5	3.25e5	3.66e5	7.14e5	3.89e5	2.15e5	1.69e5	3.08e5
7131/4-1	COCH	918.60	918.65	27324	5.20e5	3.00e5	2.47e5	6.55e5	9.83e4	3.86e5	1.10e6	3.97e6	2.32e6	8.64e5	8.50e5	1.73e6	5.94e5	5.30e5	3.15e5	2.67e5
7131/4-1	COCH	922.22	922.28	27328	4.21e5	0.00e0	1.87e5	4.60e5	3.73e6	8.13e5	6.91e5	1.44e6	6.93e5	2.57e5	1.76e5	1.32e6	1.25e5	1.60e5	1.03e5	0.00e0
7131/4-1	COCH	924.58	924.59	27339	5.61e5	3.48e5	1.75e5	3.25e5	5.04e5	1.19e6	2.89e6	1.21e7	8.06e6	3.22e6	3.24e6	5.47e6	1.99e6	1.85e6	7.52e5	6.07e5
7131/4-1	COCH	933.91	933.93	27331	0.00e0	3.06e7	4.93e5	3.75e5	6.01e6	1.15e6	2.09e6	8.57e6	5.65e6	2.16e6	2.08e6	3.88e6	1.20e6	1.18e6	4.39e5	4.78e5
7131/4-1	COCH	1116.98	1117.00	27345	5.80e5	3.82e6	2.42e6	4.43e6	4.40e5	7.63e5	1.07e6	1.41e6	1.03e6	5.57e5	4.88e5	2.60e6	4.96e5	5.01e5	5.32e5	3.38e5

Table 16. continued, GCMS SIR of saturated compounds (peak height)

m/e						191															
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	29/3R	29/3S	27Ts	27Tm	30/3R	30/3S	28αβ	25nor30αβ	29αβ	29Ts	30d	29βα	30O	30αβ	30βα	31αβS	
7131/4-1	SWC		850.50	27108	4.17e5	3.37e5	8.33e5	1.44e7	0.00e0	0.00e0	2.69e5	0.00e0	1.20e7	7.70e5	1.14e6	4.37e6	0.00e0	2.06e7	9.03e6	1.04e7	
7131/4-1	COCH	918.60	918.65	27324	3.56e5	3.35e5	1.58e6	1.81e6	2.86e5	2.29e5	3.93e6	3.49e5	4.30e6	1.38e6	6.09e5	6.05e5	0.00e0	8.50e6	1.26e6	2.81e6	
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0	4.17e5	3.85e6	0.00e0	0.00e0	7.62e6	2.73e5	2.79e6	3.75e5	4.94e5	1.49e6	0.00e0	5.74e6	2.41e6	1.96e6	
7131/4-1	COCH	924.58	924.59	27339	6.62e5	6.47e5	2.54e6	1.30e6	3.16e5	2.58e5	8.60e5	2.46e5	2.93e6	1.09e6	4.53e5	2.94e5	0.00e0	3.79e6	4.29e5	1.19e6	
7131/4-1	COCH	933.91	933.93	27331	7.64e5	2.06e5	2.18e6	4.23e6	0.00e0	2.89e6	3.61e6	5.17e5	3.00e6	6.75e5	6.20e5	8.24e5	0.00e0	4.58e6	1.35e6	1.59e6	
7131/4-1	COCH	1116.98	1117.00	27345	5.07e5	5.32e5	4.72e6	1.85e7	0.00e0	1.36e6	3.20e7	3.36e6	3.76e7	8.02e6	3.73e6	1.53e7	0.00e0	5.51e7	1.65e7	2.23e7	



Table 16. continued, GCMS SIR of saturated compounds (peak height)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e															
					31αβR	30G	31βα	32αβS	32αβR	33αβS	33αβR	34αβS	34αβR	35αβS	35αβR	217	217	217	217	
7131/4-1	SWC		850.50	27108	9.11e6	9.29e5	4.02e6	4.07e6	4.80e6	2.35e6	2.78e6	1.63e6	1.87e6	1.88e6	2.31e6	2.83e6	2.79e6	9.99e5	1.03e6	5.05e6
7131/4-1	COCH	918.60	918.65	27324	2.39e6	9.73e5	5.13e5	1.75e6	1.33e6	1.22e6	9.46e5	8.72e5	6.03e5	7.95e5	6.84e5	7.44e5	1.36e6	7.79e5	1.11e6	2.69e6
7131/4-1	COCH	922.22	922.28	27328	2.84e6	1.09e5	1.46e6	6.29e5	1.55e6	2.25e5	6.17e5	1.73e5	4.41e5	1.24e5	1.84e5	6.83e5	1.29e6	3.95e5	4.47e5	4.80e5
7131/4-1	COCH	924.58	924.59	27339	8.64e5	1.72e5	1.59e5	5.80e5	4.20e5	3.14e5	2.20e5	1.65e5	1.14e5	1.35e5	1.02e5	3.35e6	5.39e6	3.96e6	4.07e6	8.74e6
7131/4-1	COCH	933.91	933.93	27331	1.51e6	1.21e5	6.69e5	9.01e5	1.40e6	3.05e5	3.76e5	1.78e5	1.98e5	1.08e5	9.26e4	2.74e6	4.25e6	2.84e6	2.90e6	5.86e6
7131/4-1	COCH	1116.98	1117.00	27345	1.75e7	2.26e6	9.37e6	8.08e6	8.65e6	3.43e6	3.68e6	2.52e6	3.05e6	1.43e6	1.49e6	9.02e5	9.89e5	4.92e5	5.14e5	3.13e6

Table 16. continued, GCMS SIR of saturated compounds (peak height)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e															
					27dbR	27daR	27daS	28dbS#1	28dbS#2	28dbR#1	28dbR#2	28daR	27ααS	27ββR+29dbS	27ββS	28daS	27ααR	29dbR	29daR	28ααS
7131/4-1	SWC		850.50	27108	3.52e6	1.97e6	2.12e6	2.26e6	2.10e6	1.42e6	1.88e6	1.33e6	2.20e6	3.78e6	1.57e6	1.03e6	4.17e6	3.66e6	1.81e6	5.85e5
7131/4-1	COCH	918.60	918.65	27324	1.60e6	6.30e5	8.13e5	1.05e6	9.67e5	5.61e5	7.00e5	4.31e5	8.32e5	1.35e6	9.24e5	3.32e5	1.90e6	1.12e6	6.10e5	2.66e5
7131/4-1	COCH	922.22	922.28	27328	3.03e5	1.68e5	1.86e5	4.07e5	4.31e5	2.97e5	4.22e5	3.18e5	2.76e5	2.17e6	0.00e0	0.00e0	5.69e5	1.85e6	9.49e5	0.00e0
7131/4-1	COCH	924.58	924.59	27339	5.18e6	1.78e6	2.05e6	2.45e6	2.28e6	1.37e6	1.65e6	9.11e5	1.24e6	2.71e6	1.59e6	6.77e5	1.15e6	1.87e6	8.89e5	2.88e5
7131/4-1	COCH	933.91	933.93	27331	3.50e6	1.50e6	2.52e6	2.12e6	1.93e6	1.04e6	1.47e6	7.72e5	9.68e5	3.52e6	9.33e5	7.21e5	8.34e5	3.00e6	1.47e6	3.80e6
7131/4-1	COCH	1116.98	1117.00	27345	2.07e6	8.78e5	1.02e6	1.51e6	1.53e6	9.56e5	1.27e6	7.65e5	1.41e6	3.83e6	1.05e6	6.77e5	3.16e6	2.89e6	1.61e6	5.74e5



Table 16. continued, GCMS SIR of saturated compounds (peak height)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e															
					29daS	28βBR	28βBS	28ααR	29ααS	29βBR	29βBS	29ααR	30ααS	30βBR	30βBS	30ααR	27βBR	27βBS	28βBR	28βBS
7131/4-1	SWC		850.50	27108	1.79e6	2.47e6	2.03e6	2.11e6	1.13e6	1.78e6	1.93e6	4.01e6	8.47e5	7.62e5	0.00e0	1.28e6	2.92e6	2.37e6	2.77e6	2.63e6
7131/4-1	COCH	918.60	918.65	27324	4.44e5	8.03e5	9.12e5	7.15e5	6.84e5	9.46e5	9.33e5	1.04e6	4.91e5	3.01e5	2.51e5	3.20e5	1.62e6	1.40e6	1.06e6	1.17e6
7131/4-1	COCH	922.22	922.28	27328	1.10e6	3.67e5	2.74e5	2.56e5	3.13e5	9.21e5	9.28e5	1.12e6	2.71e5	0.00e0	0.00e0	0.00e0	7.05e5	1.67e5	3.83e5	3.82e5
7131/4-1	COCH	924.58	924.59	27339	7.48e5	7.96e5	1.05e6	4.00e5	5.43e5	7.44e5	7.17e5	3.94e5	2.26e5	2.02e5	1.60e5	1.06e5	2.89e6	2.43e6	1.21e6	1.36e6
7131/4-1	COCH	933.91	933.93	27331	0.00e0	1.22e6	6.17e5	5.79e5	4.61e5	8.74e5	7.97e5	1.56e6	0.00e0	1.20e5	3.50e5	8.07e4	1.81e6	1.27e6	9.53e5	8.51e5
7131/4-1	COCH	1116.98	1117.00	27345	1.57e6	1.63e6	1.28e6	2.27e6	2.03e6	2.32e6	2.59e6	7.00e6	1.59e6	4.36e5	3.74e5	7.42e5	2.07e6	1.53e6	1.72e6	1.66e6

Table 16. continued, GCMS SIR of saturated compounds (peak height)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e			
					29βBR	29βBS	30βBR	30βBS
7131/4-1	SWC		850.50	27108	2.81e6	2.88e6	5.30e5	4.68e5
7131/4-1	COCH	918.60	918.65	27324	1.35e6	1.30e6	3.13e5	3.39e5
7131/4-1	COCH	922.22	922.28	27328	1.33e6	1.21e6	0.00e0	0.00e0
7131/4-1	COCH	924.58	924.59	27339	1.19e6	1.16e6	2.27e5	2.23e5
7131/4-1	COCH	933.91	933.93	27331	1.27e6	1.17e6	1.42e5	1.90e5
7131/4-1	COCH	1116.98	1117.00	27345	2.87e6	2.69e6	3.77e5	3.57e5

Abbreviations of saturated biomarkers

17 α (H), 21 β (H)-25,28,30-trisnorhopane	25nor28 $\alpha\beta$
17 α (H), 21 β (H)-25-norhopane	25nor30 $\alpha\beta$
C ₁₉ H ₃₄ tricyclic terpane	19/3
C ₂₀ H ₃₆ tricyclic terpane	20/3
C ₂₁ H ₃₈ tricyclic terpane	21/3
C ₂₃ H ₄₂ tricyclic terpane	23/3
C ₂₄ H ₄₄ tricyclic terpane	24/3
C ₂₅ H ₄₆ tricyclic terpane	25/3R
C ₂₅ H ₄₆ tricyclic terpane	25/3S
C ₂₄ H ₄₂ tetracyclic terpane	24/4
C ₂₆ H ₄₈ tricyclic terpane	26/3R
C ₂₆ H ₄₈ tricyclic terpane	26/3S
C ₂₈ H ₅₂ tricyclic terpane	28/3R
C ₂₈ H ₅₂ tricyclic terpane	28/3S
C ₂₉ H ₅₄ tricyclic terpane	29/3R
C ₂₉ H ₅₄ tricyclic terpane	29/3S
18 α (H)-22,29,30-trisnorneohopane	27Ts
17 α (H)-22,29,30-trisnorhopane	27Tm
C ₃₀ H ₅₆ tricyclic terpane	30/3R
C ₃₀ H ₅₆ tricyclic terpane	30/3S
17 α (H), 21 β (H)-28,30-bisnorhopane	28 $\alpha\beta$
17 α (H), 21 β (H)-30-norhopane	29 $\alpha\beta$
18 α (H)-30-norneohopane	29Ts
15 α -methyl-17 α (H)-27-norhopane (diahopane)	30d
17 β (H), 21 α (H)-30-norhopane (normoretane)	29 $\beta\alpha$
18 α (H)-oleanane	30O
17 α (H), 21 β (H)-hopane	30 $\alpha\beta$
17 β (H), 21 α (H)-hopane (moretane)	30 $\beta\alpha$
17 α (H), 21 β (H), 22(S)-homohopane	31 $\alpha\beta$ S
17 α (H), 21 β (H), 22(R)-homohopane	31 $\alpha\beta$ R
Gammacerane	30G
17 β (H), 21 α (H)-homohopane	31 $\beta\alpha$
17 α (H), 21 β (H), 22(S)-bishomohopane	32 $\alpha\beta$ S
17 α (H), 21 β (H), 22(R)-bishomohopane	32 $\alpha\beta$ R
17 α (H), 21 β (H), 22(S)-trishomohopane	33 $\alpha\beta$ S
17 α (H), 21 β (H), 22(R)-trishomohopane	33 $\alpha\beta$ R

17 α (H), 21 β (H), 22(S)-tetrakishomohopane	34 $\alpha\beta$ S
17 α (H), 21 β (H), 22(R)-tetrakishomohopane	34 $\alpha\beta$ R
17 α (H), 21 β (H), 22(S)-pentakishomohopane	35 $\alpha\beta$ S
17 α (H), 21 β (H), 22(R)-pentakishomohopane	35 $\alpha\beta$ R
C21-5 α (H), 14 α (H), 17 α (H)-pregnane	21 $\alpha\alpha$
C21-5 α (H), 14 β (H), 17 β (H)-pregnane	21 $\beta\beta$
C22-5 α (H), 14 α (H), 17 α (H)-pregnane	22 $\alpha\alpha$
C22-5 α (H), 14 β (H), 17 β (H)-pregnane	22 $\beta\beta$
13 β (H), 17 α (H), 20(S)-cholestane (diasterane)	27d β S
13 β (H), 17 α (H), 20(R)-cholestane (diasterane)	27d β R
13 α (H), 17 β (H), 20(R)-cholestane (diasterane)	27d α R
13 α (H), 17 β (H), 20(S)-cholestane (diasterane)	27d α S
24-methyl-13 β (H), 17 α (H), 20(S)-cholestane (diasterane)	28d β S
24-methyl-13 β (H), 17 α (H), 20(R)-cholestane (diasterane)	28d β R
24-methyl-13 α (H), 17 β (H), 20(R)-cholestane (diasterane)	28d α R
5 α (H), 14 α (H), 17 α (H), 20(S)-cholestane	27 $\alpha\alpha$ S
5 α (H), 14 β (H), 17 β (H), 20(R)-cholestane	27 $\beta\beta$ R
24-ethyl-13 β (H), 17 α (H), 20(S)-cholestane (diasterane)	29d β S
5 α (H), 14 β (H), 17 β (H), 20(S)-cholestane	27 $\beta\beta$ S
24-methyl-13 α (H), 17 β (H), 20(S)-cholestane (diasterane)	28d α S
5 α (H), 14 α (H), 17 α (H), 20(R)-cholestane	27 $\alpha\alpha$ R
24-ethyl-13 β (H), 17 α (H), 20(R)-cholestane (diasterane)	29d β R
24-ethyl-13 α (H), 17 β (H), 20(R)-cholestane (diasterane)	29d α R
24-methyl-5 α (H), 14 α (H), 17 α (H), 20(S)-cholestane	28 $\alpha\alpha$ S
24-ethyl-13 α (H), 17 β (H), 20(S)-cholestane (diasterane)	29d α S
24-methyl-5 α (H), 14 β (H), 17 β (H), 20(R)-cholestane	28 $\beta\beta$ R
24-methyl-5 α (H), 14 β (H), 17 β (H), 20(S)-cholestane	28 $\beta\beta$ S
24-methyl-5 α (H), 14 α (H), 17 α (H), 20(R)-cholestane	28 $\alpha\alpha$ R
24-ethyl-5 α (H), 14 α (H), 17 α (H), 20(S)-cholestane	29 $\alpha\alpha$ S
24-ethyl-5 α (H), 14 β (H), 17 β (H), 20(R)-cholestane	29 $\beta\beta$ R
24-ethyl-5 α (H), 14 β (H), 17 β (H), 20(S)-cholestane	29 $\beta\beta$ S
24-ethyl-5 α (H), 14 α (H), 17 α (H), 20(R)-cholestane	29 $\alpha\alpha$ R
24-propyl-5 α (H), 14 α (H), 17 α (H), 20(S)-cholestane	30 $\alpha\alpha$ S
24-propyl-5 α (H), 14 β (H), 17 β (H), 20(R)-cholestane	30 $\beta\beta$ R
24-propyl-5 α (H), 14 β (H), 17 β (H), 20(S)-cholestane	30 $\beta\beta$ S
24-propyl-5 α (H), 14 α (H), 17 α (H), 20(R)-cholestane	30 $\alpha\alpha$ R



Table 17. GCMS SIR of saturated compounds (amounts in ng/g)

m/e						177				191				191						
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	25nor28αβ	25nor29αβ	25nor30αβ	25nor31αβ	19/3	20/3	21/3	23/3	24/3	25/3R	25/3S	24/4	26/3R	26/3S	28/3R	28/3S
7131/4-1	SWC		850.50	27108	0.00e0	0.00e0	0.00e0	3.64e3	3.55e2	9.48e2	2.16e3	2.58e3	1.80e3	8.11e2	9.15e2	1.78e3	9.72e2	5.36e2	4.23e2	7.68e2
7131/4-1	COCH	918.60	918.65	27324	5.13e2	2.95e2	2.44e2	6.46e2	9.69e1	3.81e2	1.08e3	3.91e3	2.29e3	8.51e2	8.38e2	1.71e3	5.86e2	5.23e2	3.11e2	2.63e2
7131/4-1	COCH	922.22	922.28	27328	2.25e2	0.00e0	1.00e2	2.46e2	1.99e3	4.35e2	3.69e2	7.69e2	3.71e2	1.38e2	9.41e1	7.04e2	6.69e1	8.53e1	5.50e1	0.00e0
7131/4-1	COCH	924.58	924.59	27339	1.27e3	7.89e2	3.96e2	7.37e2	1.14e3	2.69e3	6.55e3	2.75e4	1.83e4	7.31e3	7.35e3	1.24e4	4.51e3	4.20e3	1.70e3	1.38e3
7131/4-1	COCH	933.91	933.93	27331	0.00e0	9.65e4	1.55e3	1.18e3	1.90e4	3.62e3	6.59e3	2.70e4	1.78e4	6.81e3	6.57e3	1.22e4	3.78e3	3.73e3	1.38e3	1.51e3
7131/4-1	COCH	1116.98	1117.00	27345	1.94e3	1.28e4	8.08e3	1.48e4	1.47e3	2.55e3	3.57e3	4.73e3	3.44e3	1.86e3	1.63e3	8.71e3	1.66e3	1.68e3	1.78e3	1.13e3

Table 17. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e						191														
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	29/3R	29/3S	27Ts	27Tm	30/3R	30/3S	28αβ	25nor30αβ	29αβ	29Ts	30d	29βα	30O	30αβ	30βα	31αβS
7131/4-1	SWC		850.50	27108	1.04e3	8.41e2	2.08e3	3.60e4	0.00e0	0.00e0	6.72e2	0.00e0	3.01e4	1.92e3	2.86e3	1.09e4	0.00e0	5.14e4	2.26e4	2.61e4
7131/4-1	COCH	918.60	918.65	27324	3.51e2	3.30e2	1.56e3	1.78e3	2.82e2	2.26e2	3.87e3	3.44e2	4.24e3	1.36e3	6.01e2	5.96e2	0.00e0	8.38e3	1.24e3	2.78e3
7131/4-1	COCH	922.22	922.28	27328	0.00e0	0.00e0	2.23e2	2.06e3	0.00e0	0.00e0	4.07e3	1.46e2	1.49e3	2.01e2	2.64e2	7.95e2	0.00e0	3.07e3	1.29e3	1.05e3
7131/4-1	COCH	924.58	924.59	27339	1.50e3	1.47e3	5.76e3	2.96e3	7.17e2	5.86e2	1.95e3	5.57e2	6.65e3	2.47e3	1.03e3	6.67e2	0.00e0	8.60e3	9.73e2	2.70e3
7131/4-1	COCH	933.91	933.93	27331	2.41e3	6.50e2	6.87e3	1.33e4	0.00e0	9.10e3	1.14e4	1.63e3	9.45e3	2.13e3	1.96e3	2.60e3	0.00e0	1.45e4	4.27e3	5.01e3
7131/4-1	COCH	1116.98	1117.00	27345	1.69e3	1.78e3	1.58e4	6.19e4	0.00e0	4.55e3	1.07e5	1.12e4	1.26e5	2.68e4	1.25e4	5.12e4	0.00e0	1.84e5	5.53e4	7.46e4



Table 17. continued, GCMS SIR of saturated compounds (amounts in ng/g)
m/e

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID											217		217			
					31αβR	30G	31βα	32αβS	32αβR	33αβS	33αβR	34αβS	34αβR	35αβS	35αβR	21αα	21ββ	22αα	22ββ	27δβS
7131/4-1	SWC		850.50	27108	2.28e4	2.32e3	1.00e4	1.02e4	1.20e4	5.88e3	6.93e3	4.07e3	4.68e3	4.70e3	5.76e3	7.08e3	6.96e3	2.50e3	2.56e3	1.26e4
7131/4-1	COCH	918.60	918.65	27324	2.36e3	9.59e2	5.06e2	1.73e3	1.31e3	1.20e3	9.32e2	8.59e2	5.95e2	7.83e2	6.75e2	7.33e2	1.34e3	7.68e2	1.10e3	2.65e3
7131/4-1	COCH	922.22	922.28	27328	1.52e3	5.85e1	7.81e2	3.36e2	8.29e2	1.21e2	3.30e2	9.22e1	2.36e2	6.66e1	9.85e1	3.65e2	6.88e2	2.11e2	2.39e2	2.57e2
7131/4-1	COCH	924.58	924.59	27339	1.96e3	3.90e2	3.60e2	1.32e3	9.52e2	7.13e2	5.00e2	3.75e2	2.59e2	3.07e2	2.31e2	7.59e3	1.22e4	8.98e3	9.23e3	1.98e4
7131/4-1	COCH	933.91	933.93	27331	4.75e3	3.82e2	2.11e3	2.84e3	4.42e3	9.62e2	1.19e3	5.62e2	6.25e2	3.39e2	2.92e2	8.63e3	1.34e4	8.95e3	9.15e3	1.85e4
7131/4-1	COCH	1116.98	1117.00	27345	5.87e4	7.57e3	3.13e4	2.70e4	2.89e4	1.15e4	1.23e4	8.44e3	1.02e4	4.80e3	4.98e3	3.02e3	3.31e3	1.65e3	1.72e3	1.05e4

Table 17. continued, GCMS SIR of saturated compounds (amounts in ng/g)
m/e

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID																217	
					27δβR	27δaR	27δaS	28δβS#1	28δβS#2	28δβR#1	28δβR#2	28δaR	27ααS	27ββR+29δβS	27ββS	28δaS	27ααR	29δβR	29δaR	28ααS	
7131/4-1	SWC		850.50	27108	8.80e3	4.91e3	5.30e3	5.64e3	5.24e3	3.56e3	4.69e3	3.32e3	5.50e3	9.44e3	3.92e3	2.58e3	1.04e4	9.13e3	4.53e3	1.46e3	
7131/4-1	COCH	918.60	918.65	27324	1.58e3	6.21e2	8.01e2	1.04e3	9.54e2	5.53e2	6.90e2	4.25e2	8.20e2	1.33e3	9.11e2	3.27e2	1.87e3	1.10e3	6.01e2	2.62e2	
7131/4-1	COCH	922.22	922.28	27328	1.62e2	8.97e1	9.94e1	2.17e2	2.31e2	1.59e2	2.26e2	1.70e2	1.47e2	1.16e3	0.00e0	0.00e0	3.04e2	9.90e2	5.07e2	0.00e0	
7131/4-1	COCH	924.58	924.59	27339	1.17e4	4.04e3	4.64e3	5.56e3	5.18e3	3.12e3	3.74e3	2.07e3	2.81e3	6.15e3	3.61e3	1.54e3	2.61e3	4.23e3	2.02e3	6.54e2	
7131/4-1	COCH	933.91	933.93	27331	1.11e4	4.74e3	7.94e3	6.68e3	6.10e3	3.29e3	4.63e3	2.43e3	3.05e3	1.11e4	2.94e3	2.27e3	2.63e3	9.46e3	4.63e3	1.20e4	
7131/4-1	COCH	1116.98	1117.00	27345	6.92e3	2.94e3	3.42e3	5.05e3	5.13e3	3.20e3	4.25e3	2.56e3	4.73e3	1.28e4	3.50e3	2.27e3	1.06e4	9.67e3	5.40e3	1.92e3	



Table 17. continued, GCMS SIR of saturated compounds (amounts in ng/g)
m/e

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID													217	218		
					29daS	28βBR	28βSS	28ααR	29ααS	29βBR	29βSS	29ααR	30ααS	30βBR	30βSS	30ααR	27βBR	27βSS	28βBR	28βSS
7131/4-1	SWC		850.50	27108	4.48e3	6.17e3	5.07e3	5.26e3	2.81e3	4.45e3	4.83e3	1.00e4	2.11e3	1.90e3	0.00e0	3.20e3	7.30e3	5.92e3	6.91e3	6.56e3
7131/4-1	COCH	918.60	918.65	27324	4.38e2	7.92e2	8.99e2	7.05e2	6.75e2	9.32e2	9.20e2	1.03e3	4.84e2	2.97e2	2.48e2	3.16e2	1.60e3	1.38e3	1.05e3	1.15e3
7131/4-1	COCH	922.22	922.28	27328	5.86e2	1.96e2	1.47e2	1.37e2	1.68e2	4.93e2	4.96e2	5.98e2	1.45e2	0.00e0	0.00e0	0.00e0	3.77e2	8.94e1	2.05e2	2.04e2
7131/4-1	COCH	924.58	924.59	27339	1.70e3	1.80e3	2.38e3	9.07e2	1.23e3	1.69e3	1.63e3	8.94e2	5.11e2	4.59e2	3.62e2	2.40e2	6.55e3	5.51e3	2.74e3	3.08e3
7131/4-1	COCH	933.91	933.93	27331	0.00e0	3.86e3	1.94e3	1.82e3	1.45e3	2.76e3	2.51e3	4.91e3	0.00e0	3.80e2	1.10e3	2.54e2	5.71e3	4.01e3	3.00e3	2.68e3
7131/4-1	COCH	1116.98	1117.00	27345	5.24e3	5.45e3	4.27e3	7.60e3	6.78e3	7.78e3	8.66e3	2.34e4	5.30e3	1.46e3	1.25e3	2.48e3	6.94e3	5.13e3	5.75e3	5.54e3

Table 17. continued, GCMS SIR of saturated compounds (amounts in ng/g)
m/e

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	29βBR	29βSS	30βBR	30βSS
7131/4-1	SWC		850.50	27108	7.03e3	7.19e3	1.32e3	1.17e3
7131/4-1	COCH	918.60	918.65	27324	1.33e3	1.28e3	3.09e2	3.35e2
7131/4-1	COCH	922.22	922.28	27328	7.09e2	6.47e2	0.00e0	0.00e0
7131/4-1	COCH	924.58	924.59	27339	2.71e3	2.64e3	5.14e2	5.07e2
7131/4-1	COCH	933.91	933.93	27331	4.01e3	3.67e3	4.49e2	6.00e2
7131/4-1	COCH	1116.98	1117.00	27345	9.61e3	9.01e3	1.26e3	1.19e3



Table 18. GCMS SIR of aromatic compounds (peak height)

m/e				142		156								170		170				
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	2-MN	1-MN	2-EN	1-EN	2,6-DMN	2,7-DMN	1,3- + 1,7-DMN	1,6-DMN	2,3- + 1,4-DMN	1,5-DMN	1,2-DMN	1,8-DMN	1,3,7-TMN	1,3,6-TMN	1,3,5- + 1,4,6-TMN	2,3,6-TMN
7131/4-1	SWC		850.50	27108	4.80e8	4.95e8	6.16e7	4.94e7	7.90e7	8.34e7	1.87e8	1.65e8	9.88e7	5.43e7	7.48e7	6.69e6	3.44e7	5.72e7	5.22e7	3.39e7
7131/4-1	COCH	918.60	918.65	27324	8.12e5	5.43e5	6.91e4	5.36e4	1.57e5	2.28e5	4.34e5	3.23e5	2.10e5	1.37e5	9.69e4	0.00e0	1.93e5	2.72e5	2.86e5	1.74e5
7131/4-1	COCH	922.22	922.28	27328	1.51e7	2.70e7	9.75e6	6.13e6	5.75e6	1.18e7	2.11e7	1.12e7	3.23e7	1.31e7	1.04e7	9.82e5	6.93e6	1.37e7	1.82e7	6.67e6
7131/4-1	COCH	924.58	924.59	27339	4.84e6	3.06e6	4.09e5	2.23e5	1.28e6	1.53e6	2.62e6	1.82e6	1.33e6	7.40e5	4.23e5	1.77e4	9.58e5	1.25e6	1.22e6	8.78e5
7131/4-1	COCH	933.91	933.93	27331	1.46e7	1.22e8	1.43e7	1.06e7	1.26e7	2.50e7	5.64e7	2.92e7	6.72e7	2.96e7	2.15e7	2.11e6	1.63e7	2.87e7	3.77e7	1.46e7
7131/4-1	COCH	1116.98	1117.00	27345	3.75e8	2.20e8	4.05e7	1.88e7	4.69e7	5.97e7	1.47e8	9.83e7	7.92e7	2.94e7	3.33e7	2.62e6	2.70e7	4.25e7	3.85e7	2.62e7

Table 18. continued, GCMS SIR of aromatic compounds (peak height)

m/e						178		192				206		206						
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	1,2,7-TMN	1,6,7 + 1,2,6-TMN	1,2,4-TMN	1,2,5-TMN	P	3-MP	2-MP	9-MP	1-MP	2-EP+9-EP+3,6-DMP	1-EP	2,6- + 2,7- + 3,5-DMP	1,3- + 2,10- + 3,9- + 3,10-DMP	1,6- + 2,5- + 2,9-DMP	1,7-DMP	2,3-DMP
7131/4-1	SWC		850.50	27108	2.87e7	6.42e7	1.96e7	5.06e7	1.80e8	5.64e7	6.74e7	1.18e8	9.20e7	1.54e7	9.58e6	6.22e6	4.17e7	1.89e7	2.35e7	7.44e6
7131/4-1	COCH	918.60	918.65	27324	6.04e4	2.18e5	3.17e4	1.44e5	2.68e6	6.17e5	7.48e5	1.17e6	7.71e5	1.05e5	1.60e5	1.19e5	5.90e5	2.84e5	2.66e5	1.05e5
7131/4-1	COCH	922.22	922.28	27328	2.00e6	1.15e7	2.67e6	7.14e6	3.49e8	3.21e7	4.83e7	1.20e8	6.01e7	4.82e6	5.00e6	2.48e6	1.67e7	1.07e7	7.51e6	5.00e6
7131/4-1	COCH	924.58	924.59	27339	2.16e5	8.93e5	1.19e5	5.23e5	7.26e6	1.18e6	1.54e6	2.53e6	1.59e6	1.76e5	2.49e5	1.77e5	8.72e5	4.58e5	3.92e5	1.94e5
7131/4-1	COCH	933.91	933.93	27331	4.19e6	2.53e7	4.98e6	1.59e7	5.84e8	5.05e7	9.43e7	2.46e8	1.25e8	1.06e7	8.06e6	4.78e6	4.30e7	2.72e7	1.75e7	1.17e7
7131/4-1	COCH	1116.98	1117.00	27345	1.01e7	3.17e7	8.60e6	2.63e7	4.68e8	8.67e7	1.16e8	1.88e8	1.06e8	1.34e7	2.26e7	1.43e7	5.44e7	2.89e7	2.52e7	1.45e7

Table 18. continued, GCMS SIR of aromatic compounds (peak height)

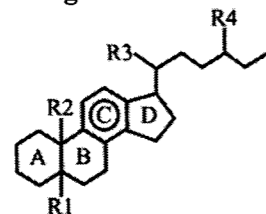
m/e		219										184		198		253				253			
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	1,9- + 4,9- + 4,10-DMP	1,8-DMP	1,2-DMP	Retene	DBT	4-MDBT	(3+2)-MDBT	1-MDBT	C21MA	C22MA	bSC27MA	bSC27DMA	bRC27MA+ bRC27DMA	aSC27MA	bSC28MA+ bSC28DMA + aRC27DMA	aSC27DMA			
7131/4-1	SWC		850.50	27108	1.60e7	9.85e6	1.11e7	2.88e7	1.02e8	5.58e7	5.29e7	1.42e8	3.96e7	3.95e7	5.16e7	1.30e8	1.34e8	7.78e7	2.67e8	3.30e7			
7131/4-1	COCH	918.60	918.65	27324	1.49e5	6.41e4	5.80e4	2.46e5	1.43e5	2.07e5	7.72e4	8.05e4	2.07e4	3.99e4	3.06e4	3.65e4	4.58e4	8.30e4	1.36e5	8.66e3			
7131/4-1	COCH	922.22	922.28	27328	8.14e6	4.49e6	2.23e6	3.31e7	4.89e6	3.13e6	1.82e6	1.04e6	3.29e5	2.50e5	1.15e4	4.62e4	4.73e4	2.03e4	2.44e5	5.68e4			
7131/4-1	COCH	924.58	924.59	27339	2.92e5	1.27e5	8.19e4	3.94e5	2.68e5	2.49e5	1.03e5	7.00e4	1.51e4	1.31e4	8.45e3	2.77e4	2.33e4	9.58e3	5.12e4	6.08e3			
7131/4-1	COCH	933.91	933.93	27331	2.68e7	1.25e7	5.66e6	3.43e7	7.42e6	5.33e6	2.76e6	1.64e6	5.98e5	3.51e5	2.67e4	1.50e5	1.47e5	3.96e4	5.42e5	2.23e5			
7131/4-1	COCH	1116.98	1117.00	27345	1.99e7	9.82e6	8.13e6	3.65e7	1.15e7	1.10e7	8.11e6	3.87e6	2.84e6	2.02e6	9.23e5	3.30e6	3.16e6	1.15e6	6.77e6	1.19e6			

Table 18. continued, GCMS SIR of aromatic compounds (peak height)

m/e		231										231		231				
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	aRC27MA	aSC28MA	bRC28MA+ bRC28DMA	bSC29MA+ bSC29DMA	aSC29MA	aRC28MA+ bRC29MA+ bRC29DMA	aRC29MA	C20TA	C21TA	SC26TA	RC26TA+ SC27TA	SC28TA	RC27TA	RC28TA
7131/4-1	SWC		850.50	27108	6.81e7	1.31e8	1.73e8	9.97e7	5.25e7	1.43e8	4.85e7	1.14e7	7.34e6	3.46e7	8.69e7	1.93e7	3.46e7	2.37e7
7131/4-1	COCH	918.60	918.65	27324	7.44e4	2.10e5	1.00e5	6.76e4	9.48e4	1.82e5	9.11e4	1.26e4	1.13e4	9.18e3	2.72e4	1.18e4	1.22e4	1.11e4
7131/4-1	COCH	922.22	922.28	27328	2.62e4	7.48e4	1.89e5	5.16e5	2.05e5	3.80e5	1.16e5	2.88e5	4.24e5	6.42e4	8.00e4	5.33e4	3.76e4	6.88e4
7131/4-1	COCH	924.58	924.59	27339	8.19e3	1.77e4	3.16e4	3.76e4	8.62e3	2.96e4	7.63e3	7.85e3	8.96e3	8.99e3	2.26e4	1.40e4	1.07e4	1.39e4
7131/4-1	COCH	933.91	933.93	27331	5.63e4	1.09e5	6.02e5	1.21e6	3.32e5	8.66e5	1.82e5	4.58e5	5.48e5	9.31e4	2.24e5	1.30e5	2.29e5	1.44e5
7131/4-1	COCH	1116.98	1117.00	27345	9.55e5	1.99e6	4.61e6	8.20e6	2.69e6	6.68e6	2.09e6	2.06e6	1.40e6	1.32e6	3.32e6	2.42e6	1.46e6	2.52e6

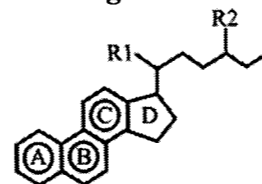
Abbreviation of aromatic biomarkers

C-ring monoaromatic steroid



R ₁	Substituents			Label
	R ₂	R ₃	R ₄	
				C ₂₁ MA
				C ₂₂ MA
β(H)	CH ₃	S(CH ₃)	H	βSC ₂₇ MA
β(CH ₃)	H	S(CH ₃)	H	βSC ₂₇ DMA
β(CH ₃)	H	R(CH ₃)	H	βRC ₂₇ DMA+
β(H)	CH ₃	R(CH ₃)	H	βRC ₂₇ MA
α(H)	CH ₃	S(CH ₃)	H	αSC ₂₇ MA
β(H)	CH ₃	S(CH ₃)	CH ₃	βSC ₂₈ MA+
α(CH ₃)	H	R(CH ₃)	H	αRC ₂₇ DMA+
β(CH ₃)	H	S(CH ₃)	CH ₃	βSC ₂₈ DMA
α(CH ₃)	H	S(CH ₃)	CH ₃	αSC ₂₇ DMA
α(H)	CH ₃	R(CH ₃)	H	αRC ₂₇ MA
α(H)	CH ₃	S(CH ₃)	CH ₃	αSC ₂₈ MA
β(H)	CH ₃	R(CH ₃)	CH ₃	βRC ₂₈ MA+
β(CH ₃)	H	R(CH ₃)	CH ₃	βRC ₂₈ DMA
β(H)	CH ₃	S(CH ₃)	C ₂ H ₅	βSC ₂₉ MA+
β(CH ₃)	H	S(CH ₃)	C ₂ H ₅	βSC ₂₉ DMA
α(H)	CH ₃	S(CH ₃)	C ₂ H ₅	αSC ₂₉ MA
α(H)	CH ₃	R(CH ₃)	CH ₃	αRC ₂₈ MA+
β(H)	CH ₃	R(CH ₃)	C ₂ H ₅	βRC ₂₉ MA+
β(CH ₃)	H	R(CH ₃)	C ₂ H ₅	βRC ₂₉ DMA
α(H)	CH ₃	R(CH ₃)	C ₂ H ₅	αRC ₂₉ MA

ABC-ring triaromatic steroids



Substituents		Label
R ₁	R ₂	
CH ₃	H	C ₂₀ TA
CH ₃	CH ₃	C ₂₁ TA
S(CH ₃)	C ₆ H ₁₃	SC ₂₆ TA
R(CH ₃)	C ₆ H ₁₃	RC ₂₆ TA+
S(CH ₃)	C ₇ H ₁₅	SC ₂₇ TA
S(CH ₃)	C ₈ H ₁₇	SC ₂₈ TA
R(CH ₃)	C ₇ H ₁₅	RC ₂₇ TA
R(CH ₃)	C ₈ H ₁₇	RC ₂₈ TA

Polycyclic aromatic hydrocarbons and sulphur compounds

MN	Methylnaphthalene
EN	Ethylnaphthalene
DMN	Dimethylnaphthalene
TMN	Trimethylnaphthalene
P	Phenanthrene
MP	Methylphenanthrene
EP	Ethylphenanthrene
DMP	Dimethylphenanthrene
DBT	Dibenzothiophene
MDBT	Methyldibenzothiophene



Table 19. GCMS SIR of aromatic compounds (amounts in ng/g)

m/e				142		156								170		170				
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	2-MN	1-MN	2-EN	1-EN	2,6-DMN	2,7-DMN	1,3- + 1,7-DMN	1,6-DMN	2,3- + 1,4-DMN	1,5-DMN	1,2-DMN	1,8-DMN	1,3,7-TMN	1,3,6-TMN	1,3,5- + 1,4,6-TMN	2,3,6-TMN
7131/4-1	SWC		850.50	27108	2.36e5	2.43e5	3.03e4	2.43e4	3.88e4	4.10e4	9.18e4	8.13e4	4.86e4	2.67e4	3.67e4	3.29e3	1.69e4	2.81e4	2.57e4	1.67e4
7131/4-1	COCH	918.60	918.65	27324	6.51e2	4.36e2	5.54e1	4.30e1	1.26e2	1.83e2	3.48e2	2.60e2	1.68e2	1.10e2	7.77e1	0.00e0	1.55e2	2.18e2	2.29e2	1.40e2
7131/4-1	COCH	922.22	922.28	27328	2.29e4	4.10e4	1.48e4	9.30e3	8.73e3	1.78e4	3.20e4	1.70e4	4.90e4	1.99e4	1.58e4	1.49e3	1.05e4	2.08e4	2.76e4	1.01e4
7131/4-1	COCH	924.58	924.59	27339	2.95e3	1.87e3	2.50e2	1.36e2	7.83e2	9.36e2	1.60e3	1.11e3	8.10e2	4.52e2	2.58e2	1.08e1	5.84e2	7.63e2	7.43e2	5.36e2
7131/4-1	COCH	933.91	933.93	27331	6.74e4	5.61e5	6.59e4	4.86e4	5.80e4	1.15e5	2.60e5	1.34e5	3.09e5	1.37e5	9.91e4	9.71e3	7.51e4	1.32e5	1.74e5	6.71e4
7131/4-1	COCH	1116.98	1117.00	27345	2.53e5	1.48e5	2.73e4	1.27e4	3.16e4	4.02e4	9.87e4	6.62e4	5.34e4	1.98e4	2.24e4	1.76e3	1.82e4	2.86e4	2.60e4	1.77e4

Table 19. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

m/e						178		192				206				206				
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	1,2,7-TMN	1,6,7 + 1,2,6-TMN	1,2,4-TMN	1,2,5-TMN	P	3-MP	2-MP	9-MP	1-MP	2-EP+9-EP+3,6-DMP	1-EP	2,6- + 2,7- + 3,5-DMP	1,3- + 2,10- + 3,9- + 3,10-DMP	1,6- + 2,5- + 2,9-DMP	1,7-DMP	2,3-DMP
7131/4-1	SWC		850.50	27108	1.41e4	3.15e4	9.66e3	2.48e4	6.32e4	1.98e4	2.37e4	4.14e4	3.23e4	5.39e3	3.36e3	2.18e3	1.46e4	6.65e3	8.25e3	2.61e3
7131/4-1	COCH	918.60	918.65	27324	4.85e1	1.75e2	2.55e1	1.15e2	2.35e3	5.40e2	6.55e2	1.02e3	6.75e2	9.22e1	1.40e2	1.04e2	5.17e2	2.48e2	2.33e2	9.22e1
7131/4-1	COCH	922.22	922.28	27328	3.03e3	1.74e4	4.05e3	1.08e4	4.48e5	4.13e4	6.21e4	1.55e5	7.73e4	6.19e3	6.43e3	3.19e3	2.14e4	1.38e4	9.65e3	6.42e3
7131/4-1	COCH	924.58	924.59	27339	1.32e2	5.45e2	7.28e1	3.19e2	4.62e3	7.52e2	9.81e2	1.61e3	1.01e3	1.12e2	1.58e2	1.13e2	5.55e2	2.92e2	2.49e2	1.23e2
7131/4-1	COCH	933.91	933.93	27331	1.93e4	1.16e5	2.29e4	7.31e4	1.89e6	1.63e5	3.05e5	7.97e5	4.03e5	3.42e4	2.61e4	1.55e4	1.39e5	8.80e4	5.66e4	3.79e4
7131/4-1	COCH	1116.98	1117.00	27345	6.78e3	2.14e4	5.79e3	1.77e4	2.78e5	5.16e4	6.91e4	1.12e5	6.32e4	7.98e3	1.35e4	8.49e3	3.24e4	1.72e4	1.50e4	8.59e3



Table 19. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e																
					1,9-+4,9-+4,10-DMP	1,8-DMP	1,2-DMP	Retene	DBT	4-MDBT	(3+2)-MDBT	1-MDBT	C21MA	C22MA	bSC27MA	bSC27DMA	bRC27MA+ bRC27DMA	aSC27MA	bSC28MA+ bSC28DMA+ aRC27DMA	aSC27DMA	
7131/4-1	SWC		850.50	27108	5.63e3	3.46e3	3.90e3	1.01e4	3.57e4	1.96e4	1.86e4	5.00e4	1.15e4	1.15e4	1.50e4	3.78e4	3.89e4	2.26e4	7.76e4	9.58e3	
7131/4-1	COCH	918.60	918.65	27324	1.30e2	5.61e1	5.08e1	2.15e2	1.25e2	1.82e2	6.76e1	7.05e1	1.65e1	3.17e1	2.43e1	2.90e1	3.64e1	6.60e1	1.08e2	6.89e0	
7131/4-1	COCH	922.22	922.28	27328	1.05e4	5.77e3	2.86e3	4.26e4	6.29e3	4.03e3	2.35e3	1.34e3	3.37e2	2.56e2	1.18e1	4.74e1	4.86e1	2.09e1	2.50e2	5.82e1	
7131/4-1	COCH	924.58	924.59	27339	1.86e2	8.11e1	5.22e1	2.51e2	1.71e2	1.59e2	6.53e1	4.45e1	8.88e0	7.73e0	4.99e0	1.64e1	1.37e1	5.65e0	3.02e1	3.59e0	
7131/4-1	COCH	933.91	933.93	27331	8.67e4	4.06e4	1.83e4	1.11e5	2.40e4	1.72e4	8.94e3	5.31e3	1.47e3	8.65e2	6.58e1	3.69e2	3.63e2	9.75e1	1.33e3	5.49e2	
7131/4-1	COCH	1116.98	1117.00	27345	1.18e4	5.84e3	4.83e3	2.17e4	6.87e3	6.53e3	4.82e3	2.30e3	1.58e3	1.12e3	5.14e2	1.84e3	1.76e3	6.42e2	3.77e3	6.63e2	

Table 19. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e													
					aRC27MA	aSC28MA	bRC28MA+ bRC28DMA	bSC29MA+ bSC29DMA	aSC29MA	aRC28MA+ bRC29MA+ bRC29DMA	aRC29MA	C20TA	C21TA	SC26TA	RC26TA+ SC27TA	SC28TA	RC27TA	RC28TA
7131/4-1	SWC		850.50	27108	1.98e4	3.81e4	5.03e4	2.89e4	1.52e4	4.14e4	1.41e4	3.32e3	2.13e3	1.01e4	2.52e4	5.61e3	1.01e4	6.89e3
7131/4-1	COCH	918.60	918.65	27324	5.91e1	1.67e2	7.98e1	5.37e1	7.54e1	1.45e2	7.25e1	1.01e1	8.96e0	7.30e0	2.16e1	9.39e0	9.69e0	8.79e0
7131/4-1	COCH	922.22	922.28	27328	2.69e1	7.67e1	1.94e2	5.30e2	2.11e2	3.90e2	1.19e2	2.96e2	4.35e2	6.59e1	8.21e1	5.47e1	3.85e1	7.06e1
7131/4-1	COCH	924.58	924.59	27339	4.83e0	1.04e1	1.87e1	2.22e1	5.09e0	1.74e1	4.50e0	4.63e0	5.29e0	5.30e0	1.33e1	8.29e0	6.33e0	8.17e0
7131/4-1	COCH	933.91	933.93	27331	1.38e2	2.68e2	1.48e3	2.97e3	8.18e2	2.13e3	4.49e2	1.13e3	1.35e3	2.29e2	5.52e2	3.21e2	5.63e2	3.53e2
7131/4-1	COCH	1116.98	1117.00	27345	5.31e2	1.11e3	2.57e3	4.56e3	1.50e3	3.72e3	1.16e3	1.15e3	7.81e2	7.37e2	1.85e3	1.35e3	8.14e2	1.40e3

Table 20. Visual Kerogen Description

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	FA(%)	HA(%)	AL(%)	HE(%)	WO(%)	CO(%)	SCI
7131/4-1	SWC		850.50	27108	5	50	10	10	5	20	3-5
7131/4-1	COCH	924.58	924.59	27339	5	10	0	5	20	60	3-5
7131/4-1	COCH	1116.98	1117.00	27345	15	20	15	10	10	30	3-5
7131/4-1	SWC		1168	27125	15	30	15	15	10	15	3-5

Table 21. Vitrinite Reflectance

Well	Sample type	Lower Depth (m)	APT ID	Sample prep.	%Lithology	%Ro	Std. dev.	No. of measurements	Quality rating	Overall quality	Comment
7131/4-1	SWC	818.50	27106	bulk	clst	0.42	0.05	3	-±0-00	P	See data sheet
7131/4-1	SWC	839	27107	bulk	clst	0.31	0.04	21	000-0+	G/M	
7131/4-1	SWC	850.50	27108	bulk	clst	0.32	0.03	22	000000	G	
7131/4-1	SWC	877	27110	bulk	clst	0.34	0.04	22	000-0+	M	
7131/4-1	SWC	911.50	27115	bulk	clst	0.35	0.05	13	-00-00	M	
7131/4-1	COCH	924.59	27339	bulk	clst/coal	0.39	0.04	20	000000	G	
7131/4-1	COCH	939.80	27342	bulk	coal	0.33	0.03	21	000000	G	
7131/4-1	SWC	973.30	27118	bulk	clst/slst	0.24	0.04	14	-0-000	P	See data sheet
7131/4-1	SWC	1029.20	27121	bulk	clst	barren					
7131/4-1	SWC	1055	27124	bulk	clst	barren					
7131/4-1	COCH	1117.00	27345	bulk	clst	0.49	0.04	21	000000	G	Dark, rich clst
7131/4-1	SWC	1168	27125	bulk	clst/slst	0.38	0.05	20	000--0	M	
7131/4-1	SWC	1197.50	27126	bulk	clst	0.39	0.10	3	-±0--0	P	
7131/4-1	SWC	1231.50	27130	bulk	slst/clst	barren					See data sheet
7131/4-1	SWC	1242	27132	bulk	clst	0.38	0.03	4	-±0--0	P	
7131/4-1	DC	1261	27103	bulk	clst	0.41	0.04	13	-00--0	M	
7131/4-1	DC	1294	27105	bulk	clst	0.55	0.08	10	-±0--0	P	

Legend to Vitrinite reflectance data

Lithology code		Sample quality		Sample preparation	
sst	Sandstone	G	Good	HF	Sample treatment with hydrofluoric acid prior to analysis
slst	Siltstone	M	Moderate	Bulk	Sample treated as bulk rock
clyst	Claystone	P	Poor		
sh	Shale	st	Hydrocarbon staining		
lst	Limestone				
coal	Coal				

Sample description and measurement evaluation (perfect sample characterised as: 000000)

Sign order	Parameter	Sign	Sign legend:
1	Abundance of vitrinite	-o	- May give too low vitrinite reflectance sample value
2	Identification of vitrinite	-o+	o Reliable vitrinite reflectance sample value
3	Type of vitrinite	-o+	+ May give too high vitrinite reflectance sample value
4	Vitrinite fragment size	-o	
5	Vitrinite surface quality	-o	
6	Abundance of pyrite	o+	

Table 22. Reference data for GC of Saturated Compounds measured on NSO-1

Variable	Permissible range	Most likely value	17:10:05	18:10:05
Pr/n-C17	0.55-0.66	0.60	0.57	0.59
n-C15/n-C20	1.4-2.0	1.8	1.5	1.5
n-C30/n-C20	0.20-0.32	0.29	0.26	0.31
n-C17/(n-C17+n-C27)	0.75-0.82	0.79	0.75	0.75

Table 23. Reference data for GC-MS of Saturated Compounds measured on NSO-1

Variable	Permissible range	Most likely value	19:10:05	20:10:05	21:10:05	21:10:05
[23/3]/30ab	0.04-0.09	0.07	0.05	0.06	0.05	0.06
35abR/30ab	0.06-0.13	0.08	0.09	0.07	0.08	0.08
25nor30ab/25nor28ab	0.3-0.8	0.5	0.78	0.78	0.71	0.69
29aaR/27dbS	0.2-0.6	0.3	0.30	0.28	0.28	0.28
29bbS/27bbR	0.7-1.2	0.9	1.03	1.01	1.03	0.98

Our column resolves the 25nor28 $\alpha\beta$ doublet, thus giving a value in the high-end region of the acceptable range specified by NIGOGA.

Table 24. Reference data for GC-MS of Aromatic Compounds measured on NSO-1

Variable	Permissible range	Most likely value	20:10:05	21:10:05	22:10:05	22:10:05
1-MP/P	0.53-0.70	0.59	0.62	0.61	0.63	0.65
A1/E1	0.3-0.7	0.5	0.48	0.50	0.50	0.50
a1/d1	0.2-0.4	0.31	0.36	0.37	0.38	0.40

Experimental Procedures

All procedures follow NIGOGA, 4th Edition. Below are brief descriptions of procedures/analytical conditions.

Sample preparation

Cuttings samples are washed in water to remove mud. When oil based mud is used, soap (Zalo) is added to the sample and the sample is washed thoroughly in warm water to remove mud and soap.

Extraction

A Soxtec Tecator instrument is used. Thimbles are pre extracted in dichloromethane with 7% (vol/vol) methanol, 10 min boiling and 20 min rinsing. The crushed sample is weighed accurately in the pre extracted thimbles and boiled for 1 hour and rinsed for 2 hours in approximately 80 cc of dichloromethane with 7% (vol/vol) methanol. Copper blades activated in concentrated hydrochloric acid are added to the extraction cups to cause free sulphur to react with the copper. An aliquot of 10% of the extract is transferred to a pre weighed bottle and evaporated to dryness. The amount of extractable organic matter is calculated from the weight of this 10% aliquot.

Deasphalting

The extract is evaporated almost to dryness before a small amount of dichloromethane (3 times the amount of EOM) is added. Then pentane is added in excess (40 times the volume of EOM and dichloromethane). The solution is stored for at least 12 hours in a dark place before the solution is filtered or centrifuged and the weight of the asphaltenes measured.

MPLC

The MPLC is constructed as described by Radke et al. (1980). The system includes two HPLC pumps, sample injector, sample collector, RI-detector, UV-detector and two packed columns. The pre column is filled with Kieselgel 100, which is heated at 600 °C for 2 hours to deactivate it. The main column is a LiChroprep Si60, which is heated at 120 °C for 2 hours to make it water free.

Approximately 30 mg of deasphalted oil or EOM diluted in 1 ml hexane is injected and separated into a saturated, an aromatic and a polar fraction.

TOC and Rock-Eval

A Rock-Eval 6 instrument is used. The analysis is performed in two steps, pyrolysis and oxidation, when TOC is measured. Jet-Rock 1 was run as every tenth sample and checked against the acceptable range given in NIGOGA.

Temperature programme

Pyrolysis: 300 °C (3 min.) - 25 °C/min. - 650 °C (0 min.)

Oxidation: 400 °C (3 min.) - 25 °C/min. - 850 °C (5 min.)

TEGC

A HP5890 II instrument with an MSSV injector and an FID is used. The column is a CP-Sil-5 CB-MS, length 25 m, i.d. 0.25 mm, film thickness 0.25 µm.

Throughout the thermal extraction the oven temperature remains at 330 °C. The sample tube is placed in the injector system and then broken. The released volatile products are collected in the cold trap for four minutes before being released into the GC column, whereupon the following temperature programme is run:

Initial temperature: 20 °C (5 min. from breaking of sample tube) – heating rate: 5 °C/min. – final holding temperature: 310 °C (13 min.)

A HP5890 II instrument with an MSSV injector and an FID is used. The column is a HP-1, length 50 m, i.d. 0.32 mm, film thickness 0.52 µm.

Throughout the thermal extraction the oven temperature remains at 300 °C. The sample tube is placed in the injector system and then broken when pressure have stabilised after 4 minutes. The released volatile products are collected in the cold trap for ten minutes before being released into the GC column, whereupon the following temperature programme is run:

Initial temperature: 40 °C (13 min. from breaking of sample tube)

Ramp 1: 5 °C/min. ⇒ 300 °C (25 min.)

Ramp 2: 5 °C/min. ⇒ 320 °C (10 min.)

PyGC

A HP5890 II instrument with an MSSV injector and an FID is used. The column is a CP-Sil-5 CB-MS, length 25 m, i.d. 0.25 mm, film thickness 0.25 µm.

The pyrolysis oven is preheated to 330 °C. The sample tube is placed in the injector system and then broken. The temperature is then increased to 600 °C at a rate of 25 °C/min. The pyrolysis products are collected in the cold trap for fourteen minutes before being released into the GC column, whereupon the following temperature programme is run:

Initial temperature: 20 °C (15 min. from breaking of sample tube) – heating rate: 5 °C/min. – final hold temperature: 310 °C (23 min.)

Iatroscan

An Iatroscan MK-5 (TLC/FID Analyser) instrument is used. 2 µl of extract or diluted oil is spotted on Chromarod S-III rods before elution in hexane (25 min), toluene (8 min) and dichloromethane with 7 % methanol (vol/vol). The solvent is allowed to evaporate before the rods are placed into the next elution chamber. Before running the rods in the analyser, the rods are heated for 90 sec. in a heating chamber at 60 °C.

GC analysis of gas components

Aliquots of 0.1-1 ml were sampled with a syringe for analysis on a Carlo Erba HRGC 5300 equipped with a Porabond Q column. The detection limit for the hydrocarbon gas components is 0.001 µl/ml using a flame ionisation detector (FID) and for CO₂ 0.05 µl/ml using a thermal conductivity detector (TCD/HWD).

Carbon isotope analysis of hydrocarbon compounds and CO₂

The carbon isotopic composition of the hydrocarbon gas components was determined by a GC-C-IRMS system. Aliquots were sampled with a syringe and analysed on a Trace GC2000, equipped with a Poraplot Q column, connected to a Delta plus XP IRMS. The components were burnt to CO₂ and water in a 1000 °C furnace over Cu/Ni/Pt. The water was removed by

Nafion membrane separation. Repeated analyses of standards indicate that the reproducibility of $\delta^{13}\text{C}$ values is better than 1 ‰ PDB (2 sigma).

Hydrogen isotope analysis of methane

The hydrogen isotopic composition of methane was determined by a GC-C-IRMS system. Aliquots were sampled with a GCPal and analysed on a Trace GC2000, equipped with a Poraplot Q column, connected to a Delta plus XP IRMS. The components were decomposed to H_2 and coke in a 1400 °C furnace. The international standard NGS-2 and an in-house standard (Std A) were used for testing accuracy and precision. The “true” value of NGS-2 is given to -172.5 ‰ V-SMOW (<http://deuterium.nist.gov/standards.html>). Repeated analyses of standards indicate that the reproducibility of δD values is better than 10 ‰ PDB (2 sigma).

Stable carbon isotope analysis of fractions

The samples are dissolved in a known amount of dichloromethane, and 1-2 mg of the sample (or as much as possible) is then transferred to a glass container. The solvent is evaporated in an oven at 50 °C. CuO and some silver wires are added to the containers, which are then sealed by melting in a vacuum. The samples are then combusted in an oven at 550 °C for 1 hour (Sofer, 1980). The combustion products CO_2 and H_2O are separated at -80°C before the isotopic ratio is determined on a Finnigan MAT 251 mass spectrometer.

A standard (NGS NSO-1, topped oil) is analysed for each 10th sample. The $\delta^{13}\text{C}$ value obtained for this standard is -28.77 ‰ PDB. The variation in the isotopic values for the standard by repeated analysis over a period of five years is ± 0.13 ‰.

GC of saturated fraction

A HP5890 II instrument is used. The column is a CP-Sil-5 CB-MS, length 60 m, i.d. 0.25 mm, film thickness 0.25 μm . C20D42 is used as an internal standards.

Temperature programme

50 °C (1 min.) - 4 °C/min. - 320 °C (25 min.)

GC of aromatic fraction

A HP5890 instrument is used. The column is a CP-Sil-5 CB-MS, length 60 m, i.d. 0.25 mm, film thickness 0.25 μm .

Temperature programme

50 °C (1 min.) - 4 °C/min. - 320 °C (25 min.)

GCMS of saturated and aromatic fractions

A Micromass ProSpec high resolution instrument is used. The instrument is tuned to a resolution of 3000 and data is acquired in Selected Ion Recording (SIR) mode. The column used is a 60 m CP-Sil-5 CB-MS with an i.d. of 0.25 mm and a film thickness 0.25 μm . $\text{D}_4\text{-}27\alpha\alpha\text{R}$ is used as internal standard when quantitative results are requested for the saturated compounds. $\text{D}_8\text{-naphthalene}$ and $\text{D}_{10}\text{-phenanthrene}$ are used as internal standards when quantitative results are required for the aromatic compounds. The aromatic and aliphatic fractions may be analysed together or separately.

Temperature programme

50 °C (1 min.) - 20 °C/min. - 120 °C - 2 °C/min - 320 °C (20 min.)

Vitrinite reflectance analysis

The samples are prepared either as “whole rock” or are treated with hydrochloric and hydrofluoric acid prior to further preparation. The aim of the acid treatment is to avoid soft and expanding mineral phases in order to ensure good polishing quality. The whole rock or the kerogen resulting from the acid treatment is embedded in an epoxy resin to make briquettes, ground flat and polished using 0.25 micron diamond paste and magnesium oxide as the two final steps.

The analytical equipment used is a Zeiss MPM 03 photometer microscope equipped with an Epiplan-Neofluar 40/0.90 oil objective. The sensitive measuring spot is kept constant for all measurements at about 2.5 micron in diameter. The measurements are made through a green band pass filter (546 nm) and in oil immersion (refractive index 1.515 at 18 °C). The readings are made without a polarizer and using a stationary stage. This procedure is called measurement of random reflectance (%Rm). The photometer is calibrated daily against a standard of known reflectance (%Rm = 0.588) and routinely (daily) checked against two other standards of significant different reflectances (%Rm = 0.879 and 1.696). A deviation from these values of less than ± 0.01 and ± 0.02 respectively is considered acceptable. The calibration is routinely checked during the course of measurements at least every hour, and a deviation of less than ± 0.005 is considered acceptable.

For each sample at least 20 points are measured if possible, and quality ratings are given to various important aspects, which may affect the measurements. These aspects are abundance of vitrinite, uncertainties in the identification of indigenous vitrinite, type of vitrinite, particle size, particle surface quality and abundance of pyrite.

Visual kerogen analysis

The samples are treated with hydrochloric and hydrofluoric acid to isolate the kerogen. The residual material for kerogen description is embedded on a cover glass, dried and finally mounted on an object glass using the preserving glue Entellan. The analytical equipment being used is a Zeiss MPM 03 photometer microscope equipped with a Neofluar 40/0.75 and a Neofluar 10/0.30 objective. UV light excitation and transmittent white light is used to make a visual classification of the kerogen.