Geochemistry Data Report - Well 9/4-5 (Kogge)

Applied Petroleum Technology AS
P. O. Box 123
2027 Kjeller
Norway

Address:	Applied Petroleum Technology AS P.O.Box 123 2027 Kjeller
Telephone:	+47 63 80 60 00
Telefax:	+47 63 80 11 38

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Authors

Per Erling Johannesen
Bine Nyjordet
Kristine Aasgaard
Kjell Urdal
Ingar Johansen
Ragnhild Nøst

	Name	Date	Signature
Reviewed by	Geir Hansen	2006-12-29	
Approved by	Tore Haaland	2006-12-29	

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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.

Deasphaltening

Extracts are evaporated almost to dryness before a small amount of dichloromethane (3 times the amount of EOM) is added. Pentane is added in access (40 times the volume of EOM and dichloromethane/oil). 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.

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. The separation between organic carbon and mineral carbon in the oxidation cycle is set automatically. As long as the CO signal in the IR-detector is greater than zero, the source of CO_2 is defined as organic. When the signal drops to zero, all remaining CO_2 is defined as coming from a mineral source. Normally this separation point is between 600-650 °C
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.)

GC analysis of gas components
Aliquots of the samples were transferred to exetainers. 0.1-1ml were sampled using a Gerstel MPS2 autosampler and injected into a Hewlett Packard 5890 Series II GC equipped with Porabond Q column, a flame ionisation detector (FID), a thermal conductivity detector (TCD) and a methylization unit. Hydrocarbons were measured by FID, CO_2 by metylization (to CH_4) and then FID and N_2 and O_2 by TCD.

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 CO_2 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 $\delta^{13}C$ 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).

GC of EOM and 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.)

GCMS of saturated 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. d4-27ααR is used as internal standard when quantitative results are requested.

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

GCMS of 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. D_8-naphthalene and D_{10}-phenanthrene are used as internal standards when quantitative results are required for the aromatic compounds.

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 glas 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.

PART 1 – Tables and Figures

Table 1. Number of analyses performed

Analysis	Cuttings	Core	Gas	Mud	Total
Lithology Description	32	3			35
Headspace gas	30				30
Gas composition			16		16
Stable isotopes of gas	10		13		23
TOC/Rock-Eval	32	1			33
GC of EOM		3		1	4
Pyrolysis GC	32	1			33
Thermal Extraction GC	1	2		1	4
GC of Saturated hydrocarbons	3				3
GC-MS of Saturated hydrocarbons	2				2
GC-MS of Aromatic hydrocarbons	2				2
Visual kerogen description	32	1			33
Vitrinite reflectance	32	1			33

Table 2. Lithology Description

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	%	Lithology	Attributes
9/4-5	DCG	743.7	771.1	34294A	95%	CONTAM	drill mud
9/4-5	DCG	743.7	771.1	34294B	5%	CLYST	lt gy, slty
9/4-5	DCG	1072.9	1100.3	34295	100 %	CLYST	gy- lt brn gy
9/4-5	DCG	1210.1	1237.5	34296	100 %	CLYST	lt gy, calc
9/4-5	DCG	2033.0	2060.4	34297A	90%	CLYST	md drk gy
9/4-5	DCG	2033.0	2060.4	34297B	10%	LST	pale y gy - lt or br, marly
9/4-5	DCG	2362.2	2389.6	34298A	100%	CLYST	md drk gy
9/4-5	DCG	2362.2	2389.6	34298B	trace	CHK	pale or brn
9/4-5	DCG	2581.7	2609.1	34299	100 %	CLYST	md drk gy- drk gy
9/4-5	DCG	2609.1	2636.5	34300	100 %	CLYST	md drk gy
9/4-5	DCG	2636.5	2664.0	34301A	50%	CLYST	md drk gy
9/4-5	DCG	2636.5	2664.0	34301B	50%	LST	pale or gy, marly
9/4-5	DCG	2773.7	2801.1	34302	100 %	LST	pale y w - lt gy
9/4-5	DCG	3212.6	3240.0	34303	100 %	LST	rd brn, marly
9/4-5	DCG	3377.2	3404.6	34304	100 %	LST	pale rd brn, marly
9/4-5	DCG	3843.5	3871.0	34305	100 %	LST	pale rd brn, marly
9/4-5	DCG	4200.1	4227.6	34306	100 %	LST	pale rd brn
9/4-5	DCG	4639.1	4666.5	34307A	80%	CLYST	pale rd brn - rd brn, calc
9/4-5	DCG	4639.1	4666.5	34307B	20%	CONTAM	turbodrill frags
9/4-5	DCG	4831.1	4858.8	34308A	90%	CLYST	pale rd brn- rd brn, calc
9/4-5	DCG	4831.1	4858.8	34308B	10%	CONTAM	turbodrill frag?
9/4-5	DCG	5078.0	5105.4	34309A	trace	CLYST	drk brn
9/4-5	DCG	5078.0	5105.4	34309B	100%	CONTAM	turbo drill frag
9/4-5	DCG	5078.0	5105.4	34309C	trace	SST	var brn, f
9/4-5	DCG	5187.7	5215.1	34310	100 %	LST	pale brn w- lt gy, marly
9/4-5	DCG	5215.1	5243.0	34311A	100%	CLYST	lt brn gy
9/4-5	DCG	5215.1	5243.0	34311B	trace	EVAP	salt
9/4-5	COPL	5296.32	5296.32	33955	100 %	SST	brn gy- drk gy, f, hrd
9/4-5	COCH	5296.40	5296.40	33956	100 %	CLYST	drk gy
9/4-5	COPL	5296.47	5296.47	33957	100 %	SST	drk brn gy, f. hrd
9/4-5	DCG	5306.6	5316.0	34312A	60%	CLYST	brn gy- md drk gy - drk gy
9/4-5	DCG	5306.6	5316.0	34312B	35%	LST	pale br - lt brn w, marl
9/4-5	DCG	5306.6	5316.0	34312C	5%	SST	var brn, f, slty
9/4-5	DCG	5315.7	5334.0	34313A	100%	CLYST	rd brn, slty
9/4-5	DCG	5315.7	5334.0	34313B	trace	SLST	rd brn
9/4-5	DCG	5315.7	5334.0	34313C	trace		Kaolinite (?)
9/4-5	DCG	5343.1	5371.0	34314A	50%	CLYST	brn gy, slty
9/4-5	DCG	5343.1	5371.0	34314B	50%	CONTAM	turbo drill frag
9/4-5	DCG	5489.4	5499.0	34315A	10%	SST	op- var brn, f- crs
9/4-5	DCG	5489.4	5499.0	34315B	90%		Kaolinite (?)
9/4-5	DCG	5498.6	5508.0	34316A	20%	SST	op - var gy brn, f, crs
9/4-5	DCG	5498.6	5508.0	34316B	80%		Kaolinite (?)
9/4-5	DCG	5535.2	5544.0	34317A	100%	CONTAM	bar, fib
9/4-5	DCG	5535.2	5544.0	34317B	trace	CLYST	m drk gy
9/4-5	DCG	5571.7	5581.0	34318A	5%	SST	op - var brn, l
9/4-5	DCG	5571.7	5581.0	34318B	95%		Kaolinite (?)
9/4-5	DCG	5590.0	5599.0	34319A	5%	SST	op- var brn, l
9/4-5	DCG	5590.0	5599.0	34319B	95%		Kaolinite (?)
9/4-5	DCG	5644.9	5654.0	34320A	40%	SST	op-var brn, l

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	%	Lithology	Attributes
9/4-5	DCG	5644.9	5654.0	34320B	20%	CLYST	md drk gy
9/4-5	DCG	5644.9	5654.0	34320C	40%		Kaolinite (?)
9/4-5	DCG	5681.5	5690.6	34783A	85%	SST	op- var brn gy, crs, l
9/4-5	DCG	5681.5	5690.6	34783B	15%		Kaolinite (?)
9/4-5	DCG	5681.5	5690.6	34783C	trace	CLYST	md drk gy
9/4-5	DCG	5727.2	5745.5	34784A	50%	SST	op- var brn, crs, l
9/4-5	DCG	5727.2	5745.5	34784B	30%		Kaolinite (?)
9/4-5	DCG	5727.2	5745.5	34784C	20%	CONTAM	drillmud, fibers
9/4-5	DCG	5727.2	5745.5	34784D	trace	CLYST	md drk gy
9/4-5	DCG	5782.1	5791.2	34785A	100%	CLYST	gy- w- lt gy (Kaolinite ?)
9/4-5	DCG	5782.1	5791.2	34785B	trace	CONTAM	drillmud, fibers
9/4-5	DCG	5809.5	5818.6	34786A	100%	CLYST	gy w- lt gy (Kaolinite ?)
9/4-5	DCG	5809.5	5818.6	34786B	trace	CLYST	md drk gy
9/4-5	DCG	5809.5	5818.6	34786C	trace	CONTAM	drillmud, fibers
9/4-5	DCG	5864.4	5873.5	34787A	100%	CLYST	gy w- lt gy (Kaolinite ?)
9/4-5	DCG	5864.4	5873.5	34787B	trace	CLYST	md drk gy
9/4-5	DCG	5864.4	5873.5	34787C	trace	CONTAM	drillmud

Table 3. 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
9/4-5	DCG	2609.1	34299	84.9	6.6	5.8	0.63	1.4	0.28	0.21	0.29	99.7	14.4	0.47	30166
9/4-5	DCG	3102.9	37855	5.9	6.4	1.3	0	0	0	0	86.3	13.7	56.5		343
9/4-5	DCG	4090.4	37856	0.02	4.7	0.83	0	0	0	0	94.4	5.6	99.6		646
9/4-5	DCG	4117.8	37857	23.4	5.4	1.1	0	0	0	0	70.1	29.9	21.6		577
9/4-5	DCG	4282.4	37858	38.9	6.1	1.3	0	0	0	0	53.7	46.3	15.9		665
9/4-5	DCG	4337.3	37859	41.3	11.6	0.28	0	0.72	0	0	46.1	53.9	23.4		553
9/4-5	DCG	4474.5	37860	13.9	3.6	1	0	0	0	0	81.4	18.6	25		543
9/4-5	DCG	4666.5	34307	62.8	10.8	2.6	0	0	0	0	23.7	76.3	17.6		435
9/4-5	DCG	4693.9	37861	17.6	3	0.63	0	0	0	0	78.8	21.2	17		383
9/4-5	DCG	4885.9	37862	0.8	0.07		0	0	0	0	99.1	0.87	7.6		1263
9/4-5	DCG	5078	37863	55.4	7.4	1.7	0	0.14	0	0	35.3	64.7	14.4		1229
9/4-5	Gas-bag	5188	34661	66.2	0.86	0.28	0	0	0	0	32.7	67.3	1.7		789
9/4-5	Gas-bag	5270	34662	68	0.73	0.09	0	0	0	0	31.2	68.8	1.2		1803
9/4-5	DCG	5272	33943	24.4	3	1	0.16	0.38	0	0	71.1	28.9	15.7	0.41	365
9/4-5	DCG	5275	33944	55.3	6.1	2.2	0.23	0.39	0	0	35.8	64.2	13.9	0.59	291
9/4-5	DCG	5279	33941	53.5	5.3	1.7	0.18	0.27	0	0	39	61	12.3	0.67	374
9/4-5	DCG	5289	33942	60.7	11	4	0.45	0.67	0	0	23.2	76.8	21	0.67	466
9/4-5	DCG	5293	33945	56.8	8.7	2.8	0.3	0.41	0	0	30.9	69.1	17.7	0.74	504
9/4-5	DCG	5295	33946	42.9	12.1	8.2	0.87	0.95	0	0	34.9	65.1	34	0.92	290
9/4-5	DCG	5316	34312	75.7	6.8	1.8	0.2	0.31	0	0	15.1	84.9	10.8	0.64	683
9/4-5	DCG	5326.5	33964	8.6	2.1	0.54	0	0	0	0	88.7	11.3	23.6		170
9/4-5	DCG	5334	34313	19.3	4.7	1.1	0	0	0	0	74.9	25.1	23.1		144
9/4-5	DCG	5354	33965	12.8	2.2	0.6	0	0	0	0	84.5	15.5	17.7		164
9/4-5	DCG	5363	33966	14.3	2.3	0.57	0	0	0	0	82.8	17.2	16.5		180
9/4-5	DCG	5371	34314	83.9	5.6	0.61	0	0	0	0	9.8	90.2	6.9		766
9/4-5	DCG	5499	34315	13.7	0.94	0	0	0	0	0	85.4	14.6	6.4		104
9/4-5	DCG	5508	34316	22.8	1.9	0	0	0	0	0	75.4	24.6	7.5		124
9/4-5	DCG	5544	34317	30	1.3	0	0	0	0	0	68.7	31.3	4.2		133
9/4-5	Gas-bag	5568.7	34663	88.4	1	0.05	0	0	0	0	10.5	89.5	1.2		4049
9/4-5	DCG	5581	34318	11	0.73	0	0	0	0	0	88.2	11.8	6.2		129
9/4-5	DCG	5599	34319	8.6	0.96	0	0	0	0	0	90.5	9.5	10.1		122
9/4-5	DCG	5654	34320	7.4	1.1	0	0	0	0	0	91.5	8.5	12.6		151
9/4-5	Gas-bag	5698.6	34213	3.8	0.78	0.28	0	0	0	0	95.2	4.8	21.8		337
9/4-5	Gas-bag	5704.1	34214	1.2	0.21	0.08	0	0	0	0	98.5	1.5	19.9		998
9/4-5	Gas-bag	5730	34291	3.8	0.78	0	0	0	0	0	95.4	4.6	16.9		302
9/4-5	Gas-bag	5731	34292	3.8	0.52	0	0	0	0	0	95.7	4.3	12.1		239
9/4-5	Gas-bag	5735.73	34664	74.7	0.83	0.08	0	0	0	0	24.4	75.6	1.2		1572
9/4-5	Gas-bag	5736	34293	35.5	0.55	0.15	0	0	0	0	63.8	36.2	1.9		547
9/4-5	Gas-bag	5752.19	34665	3.3	0.17	0.09	0	0	0	0	96.5	3.5	7.5		335
9/4-5	Gas-bag	5768.04	34666	1.6	0.06	0	0	0	0	0	98.4	1.6	3.6		1398
9/4-5	Gas-bag	5773.22	34667	9.3	0.35	0	0	0	0	0	90.3	9.7	3.6		241
9/4-5	Gas-bag	5787.24	34668	5.4	0.17	0	0	0	0	0	94.5	5.5	3		694
9/4-5	Gas-bag	5816	34715	64.6	0.13	0	0	0	0	0	35.3	64.7	0.2		1187
9/4-5	DCG	5818.6	34786	81.3	12.9	4.8	0	1	0	0	0	100	18.7	0	40
9/4-5	Gas-bag	5820.5	34716	87.1	0.95	0.13	0	0	0	0	11.9	88.1	1.2		2790
9/4-5	Gas-bag	5881.1	34717	42.1	1.2	0.41	0	0	0	0	56.3	43.7	3.7		551

Table 4. Gas Isotopes (δ13C (‰ PDB)

Well	Sample type	Lower Depth (m)	APT ID	C1 δ13C	C2 δ13C	C3 δ13C	i-C4 δ13C	n-C4 δ13C	Analysed date
9/4-5	DCG	2609	34299	-58.0	-39.4	-36.4		-33.5	27.06.2006
9/4-5	DCG	3102.9	37855P	-37.0					22.12.2006
9/4-5	DCG	4090.4	37856P	-42.0					22.12.2006
9/4-5	DCG	4117.8	37857P	-40.4					22.12.2006
9/4-5	DCG	4282.4	37858P	-42.8					22.12.2006
9/4-5	DCG	4337.3	37859P	-41.9					22.12.2006
9/4-5	DCG	4474.5	37860P	-38.7					22.12.2006
9/4-5	DCG	4693.9	37861P	-38.8					22.12.2006
9/4-5	DCG	4885.9	37862P	-45.2					22.12.2006
9/4-5	DCG	5078	37863P	-41.2					22.12.2006
9/4-5	Gas bag	5188	34661	-42.1					23.10.2006
9/4-5	Gas bag	5270	34662	-43.1					27.06.2006
9/4-5	Gas bag	5270	34662P	-43.1					23.10.2006
9/4-5	Gas bag	5568.7	34663	-42.9					27.06.2006
9/4-5	Gas bag	5568.7	34663P	-42.9					23.10.2006
9/4-5	Gas bag	5735.73	34664	-42.8					27.06.2006
9/4-5	Gas bag	5735.73	34664P	-42.8					23.10.2006
9/4-5	Gas bag	5736	34293P	-37.8					23.10.2006
9/4-5	Gas bag	5752.19	34665P	-26.8					23.10.2006
9/4-5	Gas bag	5816	34715P	-30.3					23.10.2006
9/4-5	Gas bag	5820.5	34716	-43.1					10.07.2006
9/4-5	Gas bag	5820.5	34716P	-43					23.10.2006
9/4-5	Gas bag	5881.1	34717P	-37.4					23.10.2006

P = PreConcentration of Gas prior to isotope analysis

Table 4b. Additional sampling information from the gas-bags

Well	Sample type	Lower Depth (m)	APT ID	Sampled Depth ft	Sample time; date - time	% Gas measured at well site
9/4-5	Gas-bag	5188	34661	17021	15.06.06-12:10	0.16
9/4-5	Gas-bag	5270	34662	17290	15.06.06-15:30	0.26
9/4-5	Gas-bag	5568.7	34663	18270	15.06.06-16:35	1.2
9/4-5	Gas-bag	5698.6	34213	18690	no info	
9/4-5	Gas-bag	5704.1	34214	18708	no info	
9/4-5	Gas-bag	5730	34291	18800	no info	
9/4-5	Gas-bag	5731	34292	18803	no info	
9/4-5	Gas-bag	5735.73	34664	18818	15.06.06-18:05	0.29
9/4-5	Gas-bag	5736	34293	18818	13.06.06-hh:min	0.1
9/4-5	Gas-bag	5752.19	34665	18872	16.06.06-15:35	0.03
9/4-5	Gas-bag	5768.04	34666	18924	17.06.06:14:10	0.039
9/4-5	Gas-bag	5773.22	34667	18941	17.06.06:19:40	0.06
9/4-5	Gas-bag	5787.24	34668	18987	18.06.06-10:18	0.04
9/4-5	Gas-bag	5816	34715	19082	19.06.06-17:30	0.04
9/4-5	Gas-bag	5820.5	34716	19096	22.06.06-09:40	1.07
9/4-5	Gas-bag	5881.1	34717	19295	24.06.06-13:15	0.09

Table 5. TOC and Rock-Eval data

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Tmax (°C)	PP (mg/g)	PI (wt ratio)	HI (mg HC/ g TOC)	OI (mg CO2/ g TOC)	TOC (%)
9/4-5	DCG	743.7	771.1	34294	2.30	1.60	1.55	428	3.90	0.59	102	99	1.57
9/4-5	DCG	1072.9	1100.3	34295	2.71	3.14	1.89	355	5.85	0.46	214	129	1.47
9/4-5	DCG	1210.1	1237.5	34296	1.77	1.19	1.44	377	2.96	0.60	90	109	1.32
9/4-5	DCG	2033.0	2060.4	34297	2.77	1.61	1.51	351	4.38	0.63	83	78	1.93
9/4-5	DCG	2362.2	2389.6	34298	3.72	4.57	1.04	434	8.29	0.45	231	53	1.98
9/4-5	DCG	2581.7	2609.1	34299	10.16	40.43	0.99	425	50.59	0.20	460	11	8.78
9/4-5	DCG	2609.1	2636.5	34300	7.94	25.80	0.57	423	33.74	0.24	422	9	6.12
9/4-5	DCG	2636.5	2664.0	34301	6.79	3.94	0.60	434	10.73	0.63	167	25	2.36
9/4-5	DCG	2773.7	2801.1	34302	5.66	13.44	0.74	428	19.10	0.30	307	17	4.38
9/4-5	DCG	3212.6	3240.0	34303	2.06	3.98	1.60	429	6.04	0.34	337	136	1.18
9/4-5	DCG	3377.2	3404.6	34304	2.39	2.93	1.05	431	5.32	0.45	225	81	1.30
9/4-5	DCG	3843.5	3871.0	34305	1.49	3.88	0.89	426	5.37	0.28	539	124	0.72
9/4-5	DCG	4200.1	4227.6	34306	1.87	5.27	1.26	434	7.14	0.26	471	113	1.12
9/4-5	DCG	4639.1	4666.5	34307	9.70	8.82	0.90	428	18.52	0.52	426	43	2.07
9/4-5	DCG	4831.1	4858.5	34308	5.56	5.49	0.59	428	11.05	0.50	395	42	1.39
9/4-5	DCG	5078.0	5105.4	34309	2.45	1.22	0.22	376	3.67	0.67	249	45	0.49
9/4-5	DCG	5187.7	5215.1	34310	7.61	5.92	0.73	436	13.53	0.56	370	46	1.60
9/4-5	DCG	5215.1	5243.0	34311	20.76	12.16	4.35	433	32.92	0.63	366	131	3.32
9/4-5	COCH	5296.4	5296.40	33956	0.30	1.18	0.62	470	1.48	0.20	56	30	2.09
9/4-5	DCG	5306.6	5316.0	34312	13.38	9.70	1.00	438	23.08	0.58	210	22	4.63
9/4-5	DCG	5315.7	5334.0	34313	12.72	8.41	0.96	434	21.13	0.60	282	32	2.98
9/4-5	DCG	5343.1	5371.0	34314	19.52	10.62	2.38	437	30.14	0.65	302	68	3.52
9/4-5	DCG	5489.4	5499.0	34315	13.53	5.87	0.79	436	19.40	0.70	298	40	1.97
9/4-5	DCG	5498.6	5508.0	34316	11.68	4.95	0.64	431	16.63	0.70	293	38	1.69
9/4-5	DCG	5535.2	5544.0	34317	12.78	14.17	1.23	431	26.95	0.47	304	26	4.66
9/4-5	DCG	5571.7	5581.0	34318	13.35	6.49	0.78	437	19.84	0.67	281	34	2.31
9/4-5	DCG	5590.0	5599.0	34319	8.46	6.47	0.71	431	14.93	0.57	387	43	1.67
9/4-5	DCG	5644.9	5654.0	34320	11.72	4.10	0.96	430	15.82	0.74	110	26	3.73
9/4-5	DCG	5681.5	5690.6	34783	4.21	4.28	0.46	433	8.49	0.50	379	41	1.13
9/4-5	DCG	5727.2	5745.5	34784	11.36	7.22	0.60	435	18.58	0.61	342	28	2.11
9/4-5	DCG	5782.1	5791.2	34785	14.96	9.34	0.90	437	24.30	0.62	338	33	2.76
9/4-5	DCG	5809.5	5818.6	34786	16.38	8.32	0.93	439	24.70	0.66	306	34	2.72
9/4-5	DCG	5864.4	5873.5	5873.5	10.10	5.13	0.53	433	15.23	0.66	267	28	1.92

Table 6. 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	n-Octene	mp-Xyl
9/4-5	DCG	743.7	771.1	34294	4.62	20.64	50.19	24.55	6.23	27.86	46.84	19.07	1.66e6	7.44e6	1.25e7	5.09e6	1.81e7	8.85e6	1.47e5	5.78e5	7.36e4	3.10e5
9/4-5	DCG	1072.9	1100.3	34295	1.81	56.62	36.41	5.16	1.99	62.18	33.52	2.31	9.93e5	3.11e7	1.68e7	1.16e6	2.00e7	2.83e6	1.79e5	1.25e5	8.36e4	1.43e5
9/4-5	DCG	1210.1	1237.5	34296	3.10	43.11	45.70	8.08	3.70	51.46	41.39	3.45	7.65e5	1.06e7	8.56e6	7.14e5	1.13e7	2.00e6	8.60e4	1.34e5	6.88e4	1.11e5
9/4-5	DCG	2033.0	2060.4	34297	1.58	51.56	45.19	1.67	1.76	57.37	39.69	1.18	3.73e5	1.21e7	8.40e6	2.49e5	1.06e7	3.92e5	2.17e4	1.93e5	2.41e4	4.28e4
9/4-5	DCG	2362.2	2389.6	34298	3.49	39.62	48.44	8.45	3.99	45.36	46.78	3.87	3.05e6	3.46e7	3.57e7	2.96e6	4.23e7	7.39e6	2.36e5	5.18e5	2.60e5	4.26e5
9/4-5	DCG	2581.7	2609.1	34299	3.96	16.73	36.86	42.45	6.96	29.42	49.71	13.91	1.89e7	8.00e7	1.35e8	3.78e7	1.76e8	2.03e8	2.73e6	2.63e6	1.83e6	2.52e6
9/4-5	DCG	2609.1	2636.5	34300	3.22	15.11	37.71	43.96	5.79	27.21	52.31	14.69	1.22e7	5.71e7	1.10e8	3.08e7	1.42e8	1.66e8	2.25e6	2.26e6	1.41e6	1.95e6
9/4-5	DCG	2636.5	2664.0	34301	2.90	23.01	47.42	26.68	3.99	31.67	51.55	12.80	2.31e6	1.84e7	2.99e7	7.43e6	3.79e7	2.13e7	4.63e5	7.65e5	2.82e5	5.29e5
9/4-5	DCG	2773.7	2801.1	34302	4.93	20.60	38.36	36.11	6.96	29.08	44.63	19.33	1.12e7	4.68e7	7.18e7	3.11e7	8.71e7	8.20e7	1.12e6	1.49e6	9.68e5	1.17e6
9/4-5	DCG	3212.6	3240.0	34303	2.09	19.58	49.19	29.14	2.70	25.34	53.57	18.39	1.08e6	1.01e7	2.13e7	7.33e6	2.54e7	1.50e7	7.92e5	5.99e5	5.08e5	2.89e5
9/4-5	DCG	3377.2	3404.6	34304	2.04	17.52	48.00	32.44	2.84	24.33	52.53	20.30	1.27e6	1.08e7	2.34e7	9.05e6	2.97e7	2.01e7	8.85e5	5.84e5	6.23e5	3.27e5
9/4-5	DCG	3843.5	3871.0	34305	2.09	16.71	48.44	32.77	2.84	22.70	53.53	20.93	1.66e6	1.33e7	3.12e7	1.22e7	3.84e7	2.60e7	1.09e6	7.89e5	7.60e5	4.42e5
9/4-5	DCG	4200.1	4227.6	34306	2.31	17.32	48.69	31.68	3.15	23.64	54.62	18.58	3.18e6	2.38e7	5.51e7	1.87e7	6.70e7	4.36e7	1.95e6	1.06e6	1.29e6	7.13e5
9/4-5	DCG	4639.1	4666.5	34307	2.58	15.97	48.56	32.89	3.51	21.70	53.25	21.53	3.81e6	2.36e7	5.78e7	2.34e7	7.17e7	4.85e7	1.79e6	1.30e6	1.30e6	8.95e5
9/4-5	DCG	4831.1	4858.5	34308	2.93	16.29	48.74	32.04	3.95	22.01	52.42	21.62	3.10e6	1.73e7	4.12e7	1.70e7	5.17e7	3.40e7	1.09e6	9.52e5	7.58e5	7.06e5
9/4-5	DCG	5078.0	5105.4	34309	2.58	20.73	63.18	13.51	2.51	20.13	53.36	24.00	3.36e5	2.69e6	7.14e6	3.21e6	8.21e6	1.76e6	3.12e4	1.41e5	2.66e4	1.05e5
9/4-5	DCG	5187.7	5215.1	34310	2.49	18.14	49.88	29.50	3.34	24.32	53.60	18.75	2.78e6	2.03e7	4.47e7	1.56e7	5.57e7	3.30e7	1.39e6	9.36e5	9.35e5	6.59e5
9/4-5	DCG	5215.1	5243.0	34311	2.28	19.20	56.61	21.90	2.87	24.13	60.89	12.11	5.04e6	4.24e7	1.07e8	2.13e7	1.25e8	4.84e7	2.87e6	1.92e6	1.84e6	1.26e6
9/4-5	COCH	5296.4	5296.40	33956	18.92	28.14	37.61	15.33	22.56	33.55	35.40	8.49	4.03e6	5.99e6	6.33e6	1.52e6	8.01e6	3.27e6	9.93e4	5.59e5	7.09e4	3.28e5
9/4-5	DCG	5306.6	5316.0	34312	3.39	18.06	46.14	32.41	4.58	24.39	51.20	19.82	4.73e6	2.52e7	5.29e7	2.05e7	6.44e7	4.52e7	1.85e6	1.38e6	1.22e6	9.06e5
9/4-5	DCG	5315.7	5334.0	34313	2.17	16.13	47.12	34.58	3.00	22.29	52.80	21.90	3.16e6	2.34e7	5.55e7	2.30e7	6.85e7	5.02e7	1.84e6	1.19e6	1.26e6	8.18e5
9/4-5	DCG	5343.1	5371.0	34314	2.57	15.98	50.82	30.63	3.53	22.00	59.08	15.38	5.00e6	3.11e7	8.36e7	2.18e7	9.90e7	5.97e7	2.37e6	1.78e6	1.64e6	1.18e6
9/4-5	DCG	5489.4	5499.0	34315	1.59	14.69	47.15	36.57	2.30	21.26	54.77	21.67	1.64e6	1.52e7	3.91e7	1.55e7	4.87e7	3.78e7	1.40e6	8.65e5	9.36e5	4.87e5
9/4-5	DCG	5498.6	5508.0	34316	1.84	15.87	47.78	34.51	2.54	21.97	55.51	19.98	2.43e6	2.10e7	5.31e7	1.91e7	6.33e7	4.57e7	1.86e6	1.07e6	1.26e6	6.33e5
9/4-5	DCG	5535.2	5544.0	34317	2.96	14.43	41.32	41.29	4.45	21.73	50.56	23.26	8.29e6	4.05e7	9.42e7	4.33e7	1.16e8	1.16e8	2.69e6	2.03e6	1.84e6	1.69e6
9/4-5	DCG	5571.7	5581.0	34318	1.80	13.86	45.00	39.34	2.62	20.25	53.93	23.20	2.49e6	1.92e7	5.12e7	2.20e7	6.24e7	5.45e7	1.53e6	1.13e6	1.08e6	6.21e5
9/4-5	DCG	5590.0	5599.0	34319	2.01	14.53	45.05	38.41	2.84	20.54	53.30	23.32	2.74e6	1.98e7	5.14e7	2.25e7	6.15e7	5.24e7	1.64e6	1.13e6	1.12e6	6.54e5
9/4-5	DCG	5644.9	5654.0	34320	1.92	14.47	45.87	37.74	2.69	20.23	54.07	23.01	2.47e6	1.85e7	4.95e7	2.11e7	5.88e7	4.84e7	1.49e6	1.02e6	1.09e6	6.05e5
9/4-5	DCG	5681.5	5690.6	34783	2.04	17.74	48.28	31.95	2.69	23.42	52.88	21.02	2.28e6	1.99e7	4.49e7	1.78e7	5.41e7	3.58e7	1.73e6	9.38e5	1.17e6	5.24e5

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	n-Octene	mp-Xyl
9/4-5	DCG	5727.2	5745.5	34784	2.13	16.56	49.68	31.63	2.86	22.26	55.10	19.79	2.96e6	2.31e7	5.72e7	2.05e7	6.93e7	4.41e7	1.45e6	1.39e6	1.02e6	8.07e5
9/4-5	DCG	5782.1	5791.2	34785	2.20	17.54	48.65	31.61	2.93	23.35	54.03	19.69	4.63e6	3.69e7	8.54e7	3.11e7	1.02e8	6.65e7	3.01e6	2.04e6	2.06e6	1.05e6
9/4-5	DCG	5809.5	5818.6	34786	1.98	17.77	48.93	31.32	2.60	23.39	54.23	19.78	3.46e6	3.11e7	7.22e7	2.63e7	8.57e7	5.49e7	2.65e6	1.73e6	1.83e6	8.04e5
9/4-5	DCG	5864.4	5864.4	34787	2.67	16.06	51.61	29.66	3.47	20.85	56.42	19.26	3.29e6	1.98e7	5.36e7	1.83e7	6.36e7	3.66e7	1.20e6	1.39e6	8.55e5	6.92e5

Table 7. 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+C27)
9/4-5	DCG	2609.1	2636.5	34300	1.64	0.12	0.17	0.69	2.08	0.98
9/4-5	DCG	2773.7	2801.1	34302	1.96	0.09	0.09	0.96	2.82	0.99
9/4-5	DCG	5343.1	5371.0	34314	0.77	0.01	0.01	1.28	2.96	1.00

Table 8. 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	Pr	n-C18	Ph	n-C19
9/4-5	DCG	2609.1	2636.5	34300	0.00e0	1.61e4	6.45e5	1.08e3	4.58e3	5.73e6	1.25e4	4.23e6	2.27e4	6.45e5	2.86e5	1.19e4	1.60e5	1.88e4	5.31e4	9.01e3	1.67e4
9/4-5	DCG	2773.7	2801.1	34302	0.00e0	9.94e2	1.81e5	1.90e2	1.82e3	2.56e6	7.16e3	2.41e6	1.32e4	4.13e5	1.99e5	8.71e3	1.14e5	1.04e4	3.90e4	3.70e3	1.10e4
9/4-5	DCG	5343.1	5371.0	34314	0.00e0	2.81e4	1.65e6	0.00e0	0.00e0	5.11e7	0.00e0	5.94e7	2.02e5	1.68e7	9.89e6	7.46e4	7.60e6	8.43e4	3.29e6	2.85e4	7.05e5

Table 8. continued, GC of saturated compounds (peak area)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	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	n-C35	n-C36
9/4-5	DCG	2609.1	2636.5	34300	6.52e3	3.65e3	2.23e3	2.14e3	1.59e3	1.82e3	1.32e3	2.76e3	5.30e2	1.55e3	8.35e2	9.69e2	1.68e3	7.67e2	0.00e0	2.99e2	0.00e0
9/4-5	DCG	2773.7	2801.1	34302	4.23e3	1.75e3	1.16e3	1.31e3	8.95e2	1.71e3	8.61e2	1.43e3	5.56e2	9.75e2	3.12e2	5.57e2	4.66e2	3.28e2	1.22e2	1.72e2	0.00e0
9/4-5	DCG	5343.1	5371.0	34314	1.26e5	3.07e4	1.68e4	8.93e3	8.82e3	6.29e3	5.64e3	3.36e3	3.87e3	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0

Table 9. 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	n-C19
9/4-5	DCG	2609.1	2636.5	34300	0.00e0	7.14e5	2.86e7	4.80e4	2.03e5	2.54e8	5.53e5	1.87e8	1.01e6	2.86e7	1.27e7	5.25e5	7.10e6	8.31e5	2.35e6	3.99e5	7.38e5
9/4-5	DCG	2773.7	2801.1	34302	0.00e0	2.82e4	5.15e6	5.38e3	5.17e4	7.26e7	2.03e5	6.83e7	3.74e5	1.17e7	5.63e6	2.47e5	3.24e6	2.96e5	1.11e6	1.05e5	3.13e5
9/4-5	DCG	5343.1	5371.0	34314	0.00e0	1.26e5	7.39e6	0.00e0	0.00e0	2.29e8	0.00e0	2.66e8	9.02e5	7.52e7	4.42e7	3.34e5	3.40e7	3.77e5	1.47e7	1.27e5	3.16e6

Table 9. continued, GC of saturated compounds (amounts in ng/g)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	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	n-C35	n-C36
9/4-5	DCG	2609.1	2636.5	34300	2.89e5	1.62e5	9.86e4	9.48e4	7.03e4	8.04e4	5.86e4	1.22e5	2.35e4	6.84e4	3.70e4	4.29e4	7.42e4	3.40e4	0.00e0	1.33e4	0.00e0
9/4-5	DCG	2773.7	2801.1	34302	1.20e5	4.97e4	3.28e4	3.71e4	2.54e4	4.86e4	2.44e4	4.05e4	1.58e4	2.77e4	8.86e3	1.58e4	1.32e4	9.30e3	3.45e3	4.88e3	0.00e0
9/4-5	DCG	5342.1	5371.0	34314	5.62e5	1.38e5	7.51e4	4.00e4	3.95e4	2.81e4	2.52e4	1.50e4	1.73e4	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0	0.00e0

Table 10. GCMS SIR of saturated compounds (parameters)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	%23:3	%28αβ	%30D	%27Ts	%22S	%29Ts	%20S	%ββ	%27dβS	%C27	%C29	28/29	24:4/23:3
9/4-5	DCG	2609.1	2636.5	34300	2.86	1.55	3.88	22.01	41.76	10.92	12.12	21.74	24.21	31.78	31.68	0.91	1.05
9/4-5	DCG	2773.7	2801.1	34302	2.91	1.24	1.61	2.56	54.70	2.57	26.97	34.85	7.30	15.67	57.17	0.51	1.14

%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	(29ααS/29ααS+29ααR)*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 11. GCMS SIR of saturated compounds (peak height)

m/e					177				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	29/3R
9/4-5	DCG	2609.1	2636.5	34300	0.00e0	0.00e0	0.00e0	6.43e5	8.19e4	4.05e5	3.27e5	2.79e5	9.81e4	5.14e4	5.74e4	2.93e5	5.43e4	5.52e4	1.04e5	5.76e4	6.99e4
9/4-5	DCG	2773.7	2801.1	34302	0.00e0	0.00e0	0.00e0	1.74e5	9.23e4	2.06e5	1.44e5	8.82e4	2.98e4	1.11e4	1.23e4	1.01e5	1.55e4	1.53e4	4.83e4	7.30e3	8.10e3

Table 11. continued, GCMS SIR of saturated compounds (peak height)

m/e					191																
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	29/3S	27Ts	27Tm	30/3R	30/3S	28αβ	25nor30αβ	29αβ	29Ts	30d	29βα	30Q	30αβ	30βα	31αβS	31αβR	30G
9/4-5	DCG	2609.1	2636.5	34300	8.63e4	5.69e5	2.02e6	9.33e4	1.60e5	1.48e5	0.00e0	4.30e6	1.16e6	3.81e5	1.26e6	0.00e0	9.44e6	1.98e6	2.86e6	3.10e6	1.25e6
9/4-5	DCG	2773.7	2801.1	34302	7.17e3	3.39e4	1.29e6	1.08e4	4.65e4	3.68e4	0.00e0	1.94e6	7.74e4	4.80e4	5.21e5	0.00e0	2.94e6	8.35e5	9.03e5	6.65e5	5.29e5

Table 11. continued, GCMS SIR of saturated compounds (peak height)

m/e					191									217							
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	31βα	32αβS	32αβR	33αβS	33αβR	34αβS	34αβR	35αβS	35αβR	21ααα	21βββ	22ααα	22βββ	27dβS	27dβR	27dαR	27dαS
9/4-5	DCG	2609.1	2636.5	34300	9.91e5	8.44e5	1.18e6	8.03e5	1.21e6	4.97e5	8.62e5	8.65e5	1.48e6	5.72e5	3.63e5	1.83e5	1.67e5	1.97e6	1.61e6	6.68e5	6.39e5
9/4-5	DCG	2773.7	2801.1	34302	2.86e5	3.33e5	2.76e5	1.29e5	1.06e5	6.25e4	5.43e4	3.96e4	3.06e4	1.20e4	1.57e4	6.18e3	7.10e3	2.27e4	1.37e4	7.00e3	6.63e3

Table 11. continued, GCMS SIR of saturated compounds (peak height)

m/e					217																
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	28dβS#1	28dβS#2	28dβR#1	28dβR#2	28dαR	27ααS	27ββR+29dβS	27ββS	28dαS	27ααR	29dβR	29dαR	28ααS	29dαS	28ββR	28ββS	28ααR
9/4-5	DCG	2609.1	2636.5	34300	9.72e5	9.53e5	7.34e5	9.50e5	5.49e5	1.60e6	1.42e6	4.05e5	3.58e5	4.57e6	1.52e6	6.96e5	3.48e5	6.28e5	9.58e5	7.20e5	2.72e6
9/4-5	DCG	2773.7	2801.1	34302	1.90e4	1.87e4	9.85e3	1.42e4	1.09e4	9.31e4	8.44e4	1.32e4	0.00e0	1.95e5	6.28e4	2.93e4	2.19e4	5.65e4	3.81e4	2.48e4	8.25e4

Table 11. continued, GCMS SIR of saturated compounds (peak height)

m/e					217								218								
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	29ααS	29ββR	29ββS	29ααR	30ααS	30ββR	30ββS	30ααR	27ββR	27ββS	28ββR	28ββS	29ββR	29ββS	30ββR	30ββS
9/4-5	DCG	2609.1	2636.5	34300	4.94e5	5.50e5	5.81e5	3.58e6	0.00e0	1.58e5	0.00e0	9.46e5	1.02e6	5.95e5	9.87e5	8.68e5	8.44e5	7.64e5	1.03e5	8.99e4
9/4-5	DCG	2773.7	2801.1	34302	5.77e4	6.32e4	5.13e4	1.56e5	0.00e0	0.00e0	0.00e0	3.82e3	3.46e4	1.59e4	4.44e4	4.31e4	9.95e4	8.48e4	0.00e0	0.00e0

Table 12. GCMS SIR of saturated compounds (amounts in ng/g)

m/e					177				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	29/3R
9/4-5	DCG	2609.1	2636.5	34300	0.00e0	0.00e0	0.00e0	8.15e3	1.04e3	5.13e3	4.15e3	3.53e3	1.24e3	6.51e2	7.28e2	3.72e3	6.88e2	7.00e2	1.32e3	7.30e2	8.85e2
9/4-5	DCG	2773.7	2801.1	34302	0.00e0	0.00e0	0.00e0	2.01e3	1.07e3	2.38e3	1.67e3	1.02e3	3.45e2	1.29e2	1.42e2	1.17e3	1.79e2	1.76e2	5.59e2	8.44e1	9.36e1

Table 12. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e					191																
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	29/3S	27Ts	27Tm	30/3R	30/3S	28αβ	25nor30αβ	29αβ	29Ts	30d	29βα	30Q	30αβ	30βα	31αβS	31αβR	30G
9/4-5	DCG	2609.1	2636.5	34300	1.09e3	7.22e3	2.56e4	1.18e3	2.02e3	1.88e3	0.00e0	5.45e4	1.47e4	4.83e3	1.60e4	0.00e0	1.20e5	2.51e4	3.62e4	3.92e4	1.58e4
9/4-5	DCG	2773.7	2801.1	34302	8.29e1	3.92e2	1.49e4	1.25e2	5.37e2	4.25e2	0.00e0	2.24e4	8.95e2	5.55e2	6.02e3	0.00e0	3.40e4	9.65e3	1.04e4	7.69e3	6.12e3

Table 12. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e					191									217							
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	31βα	32αβS	32αβR	33αβS	33αβR	34αβS	34αβR	35αβS	35αβR	21ααα	21βββ	22ααα	22βββ	27dβS	27dβR	27dαR	27dαS
9/4-5	DCG	2609.1	2636.5	34300	1.26e4	1.07e4	1.49e4	1.02e4	1.53e4	6.30e3	1.09e4	1.10e4	1.87e4	7.26e3	4.60e3	2.32e3	2.12e3	2.50e4	2.03e4	8.46e3	8.10e3
9/4-5	DCG	2773.7	2801.1	34302	3.30e3	3.85e3	3.18e3	1.49e3	1.23e3	7.22e2	6.27e2	4.58e2	3.54e2	1.39e2	1.82e2	7.14e1	8.21e1	2.62e2	1.58e2	8.09e1	7.66e1

Table 12. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e					217																
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	28dβS#1	28dβS#2	28dβR#1	28dβR#2	28dαR	27ααS	27ββR+29dβS	27ββS	28dαS	27ααR	29dβR	29dαR	28ααS	29dαS	28ββR	28ββS	28ααR
9/4-5	DCG	2609.1	2636.5	34300	1.23e4	1.21e4	9.30e3	1.20e4	6.96e3	2.03e4	1.81e4	5.14e3	4.54e3	5.80e4	1.93e4	8.82e3	4.41e3	7.96e3	1.21e4	9.13e3	3.44e4
9/4-5	DCG	2773.7	2801.1	34302	2.19e2	2.16e2	1.14e2	1.64e2	1.25e2	1.08e3	9.75e2	1.53e2	0.00e0	2.25e3	7.25e2	3.38e2	2.53e2	6.52e2	4.40e2	2.86e2	9.53e2

Table 12. continued, GCMS SIR of saturated compounds (amounts in ng/g)

m/e					217								218								
Well	Sample type	Upper Depth (m)	Upper Depth (m)	APT ID	29ααS	29ββR	29ββS	29ααR	30ααS	30ββR	30ββS	30ααR	27ββR	27ββS	28ββR	28ββS	29ββR	29ββS	30ββR	30ββS
9/4-5	DCG	2609.1	2609.1	34300	6.26e3	6.97e3	7.37e3	4.54e4	0.00e0	2.00e3	0.00e0	1.20e4	1.29e4	7.54e3	1.25e4	1.10e4	1.07e4	9.69e3	1.30e3	1.14e3
9/4-5	DCG	2773.7	2773.7	34302	6.67e2	7.31e2	5.93e2	1.81e3	0.00e0	0.00e0	0.00e0	4.41e1	4.00e2	1.84e2	5.14e2	4.98e2	1.15e3	9.80e2	0.00e0	0.00e0

Abbreviations of saturated biomarkers

17α(H), 21β(H)-25,28,30-trisnorhopane	25nor28αβ
17α, 21β-25,30-bisnorhopane	25nor29αβ
17α(H), 21β(H)-25-norhopane	25nor30αβ
17α, 21β, 22(R/S)-25-norhomohopane	25nor31αβ
$C_{19}H_{34}$ 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
18α(H)-22,29,30-trisnorneohopane	27Ts
17α(H)-22,29,30-trisnorhopane	27Tm
$C_{30}H_{56}$ tricyclic terpane	30/3R
$C_{30}H_{56}$ tricyclic terpane	30/3S
17α(H), 21β(H)-28,30-bisnorhopane	28αβ
17α(H), 21β(H)-30-norhopane	29αβ
18α(H)-30-norneohopane	29Ts
15α-methyl-17α(H)-27-norhopane (diahopane)	30d
17β(H), 21α(H)-30-norhopane (normoretane)	29βα
18α(H)-oleanane	30O
17α(H), 21β(H)-hopane	30αβ
17β(H), 21α(H)-hopane (moretane)	30βα
17α(H), 21β(H), 22(S)-homohopane	31αβS
17α(H), 21β(H), 22(R)-homohopane	31αβR
Gammacerane	30G
17β(H), 21α(H)-homohopane	31βα
17α(H), 21β(H), 22(S)-bishomohopane	32αβS
17α(H), 21β(H), 22(R)-bishomohopane	32αβR
17α(H), 21β(H), 22(S)-trishomohopane	33αβS

17α(H), 21β(H), 22(R)-trishomohopane	33αβR
17α(H), 21β(H), 22(S)-tetrakishomohopane	34αβS
17α(H), 21β(H), 22(R)-tetrakishomohopane	34αβR
17α(H), 21β(H), 22(S)-pentakishomohopane	35αβS
17α(H), 21β(H), 22(R)-pentakishomohopane	35αβR
C21-5α(H), 14α(H), 17α(H)-pregnane	21αα
C21-5α(H), 14β(H), 17β(H)-pregnane	21ββ
C22-5α(H), 14α(H), 17α(H)-pregnane	22αα
C22-5α(H), 14β(H), 17β(H)-pregnane	22ββ
13β(H), 17α(H), 20(S)-cholestane (diasterane)	27dβS
13β(H), 17α(H), 20(R)-cholestane (diasterane)	27dβR
13α(H), 17β(H), 20(R)-cholestane (diasterane)	27dαR
13α(H), 17β(H), 20(S)-cholestane (diasterane)	27dαS
24-methyl-13β(H), 17α(H), 20(S)-cholestane (diasterane)	28dβS
24-methyl-13β(H), 17α(H), 20(R)-cholestane (diasterane)	28dβR
24-methyl-13α(H), 17β(H), 20(R)-cholestane (diasterane)	28dαR
5α(H), 14α(H), 17α(H), 20(S)-cholestane	27ααS
5α(H), 14β(H), 17β(H), 20(R)-cholestane	27ββR
24-ethyl-13β(H), 17α(H), 20(S)-cholestane (diasterane)	29dβS
5α(H), 14β(H), 17β(H), 20(S)-cholestane	27ββS
24-methyl-13α(H), 17β(H), 20(S)-cholestane (diasterane)	28dαS
5α(H), 14α(H), 17α(H), 20(R)-cholestane	27ααR
24-ethyl-13β(H), 17α(H), 20(R)-cholestane (diasterane)	29dβR
24-ethyl-13α(H), 17β(H), 20(R)-cholestane (diasterane)	29dαR
24-methyl-5α(H), 14α(H), 17α(H), 20(S)-cholestane	28ααS
24-ethyl-13α(H), 17β(H), 20(S)-cholestane (diasterane)	29dαS
24-methyl-5α(H), 14β(H), 17β(H), 20(R)-cholestane	28ββR
24-methyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	28ββS
24-methyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	28ααR
24-ethyl-5α(H), 14α(H), 17α(H), 20(S)-cholestane	29ααS
24-ethyl-5α(H), 14β(H), 17β(H), 20(R)-cholestane	29ββR
24-ethyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	29ββS
24-ethyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	29ααR
24-propyl-5α(H), 14α(H), 17α(H), 20(S)-cholestane	30ααS
24-propyl-5α(H), 14β(H), 17β(H), 20(R)-cholestane	30ββR
24-propyl-5α(H), 14β(H), 17β(H), 20(S)-cholestane	30ββS
24-propyl-5α(H), 14α(H), 17α(H), 20(R)-cholestane	30ααR

Table 13. 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
9/4-5	DCG	2609.1	2636.5	34300	0.19	0.25	0.07	0.05	0.45	0.41	0.85	2.19	0.74	0.22	3.87	0.15
9/4-5	DCG	2773.7	2801.1	34302	0.59	0.12	0.07	0.13	2.12	0.32	1.25	2.04	0.78	0.05	0.08	0.39

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 14. GCMS SIR of aromatic compounds (peak height)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e 142: 2-MN	1-MN	m/e 156: 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	m/e 170: 1,3,7-TMN	1,3,6-TMN	1,3,5- + 1,4,6-TMN	2,3,6-TMN	1,2,7-TMN
9/4-5	DCG	2609.1	2636.5	34300	4.19e7	4.91e7	6.12e6	6.63e6	9.71e6	1.15e7	3.07e7	2.49e7	1.01e7	9.66e6	6.69e6	3.59e5	5.01e6	8.44e6	6.49e6	3.84e6	2.39e6
9/4-5	DCG	2773.7	2801.1	34302	1.63e7	1.31e7	1.81e6	1.31e6	3.14e6	3.49e6	9.59e6	1.03e7	4.23e6	3.25e6	2.36e6	1.13e5	1.67e6	2.71e6	2.97e6	1.53e6	1.05e6

Table 14. continued, GCMS SIR of aromatic compounds (peak height)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e 170: 1,6,7 + 1,2,6-TMN	1,2,4-TMN	1,2,5-TMN	m/e 178: P	m/e 192: 3-MP	2-MP	9-MP	1-MP	m/e 206: 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	m/e 206: 1,6- + 2,5- + 2,9-DMP	1,7-DMP	2,3-DMP	1,9- + 4,9- + 4,10-DMP	1,8-DMP
9/4-5	DCG	2609.1	2636.5	34300	3.90e6	1.48e6	3.40e6	1.02e7	3.95e6	4.02e6	6.39e6	4.88e6	1.14e6	1.14e6	6.19e5	3.93e6	1.70e6	1.69e6	6.59e5	1.07e6	6.33e5
9/4-5	DCG	2773.7	2801.1	34302	2.52e6	5.82e5	9.77e6	1.27e7	1.67e6	1.83e6	3.84e6	3.52e6	2.38e5	4.90e5	1.90e5	1.07e6	8.98e5	2.02e6	3.77e5	5.13e5	2.75e5

Table 14. continued, GCMS SIR of aromatic compounds (peak height)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e 206: 1,2-DMP	m/e 219: Retene	m/e 184: DBT	m/e 198: 4-MDBT	(3+2)-MDBT	1-MDBT	m/e 253: C21MA	C22MA	βSC27MA	βSC27DMA	βRC27MA+ βRC27DMA	αSC27MA	βSC28MA+ βSC28DMA+ αRC27DMA	αSC27DMA	αRC27MA	αSC28MA	βRC28MA+ βRC28DMA
9/4-5	DCG	2609.1	2636.5	34300	5.32e5	1.02e6	2.27e6	1.68e6	1.16e6	3.78e6	1.37e6	1.88e6	4.10e6	4.29e6	5.15e6	5.28e6	1.50e7	1.16e6	5.01e6	1.39e7	1.09e7
9/4-5	DCG	2773.7	2801.1	34302	8.69e5	2.05e7	5.94e5	4.64e5	2.55e5	2.18e5	7.39e4	3.09e4	1.23e4	3.54e4	3.12e4	1.68e4	2.44e5	7.24e4	2.08e4	6.43e4	1.69e5

Table 14. continued, GCMS SIR of aromatic compounds (peak height)

m/e					253				231							
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	βSC29MA+ βSC29DMA	αSC29MA	αRC28MA+ βRC29MA+ βRC29DMA	αRC29MA	C20TA	C21TA	SC26TA	RC26TA+ SC27TA	SC28TA	RC27TA	RC28TA
9/4-5	DCG	2609.1	2636.5	34300	7.88e6	5.63e6	1.08e7	5.01e6	6.47e5	3.52e5	1.91e6	6.30e6	1.50e6	2.60e6	1.94e6
9/4-5	DCG	2773.7	2801.1	34302	9.35e5	1.76e5	6.58e5	8.64e4	5.89e4	3.03e4	2.21e4	1.92e5	3.56e5	1.02e5	4.29e5

Table 15. GCMS SIR of aromatic compounds (amounts in ng/g)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e 142 2-MN	1-MN	m/e 156 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	m/e 170 1,3,7-TMN	1,3,6-TMN	1,3,5- + 1,4,6-TMN	2,3,6-TMN	1,2,7-TMN
9/4-5	DCG	2609.1	2636.5	34300	6.17e4	7.23e4	9.01e3	9.76e3	1.43e4	1.69e4	4.51e4	3.66e4	1.49e4	1.42e4	9.85e3	5.28e2	7.37e3	1.24e4	9.55e3	5.65e3	3.52e3
9/4-5	DCG	2773.7	2801.1	34302	2.06e4	1.66e4	2.29e3	1.65e3	3.97e3	4.41e3	1.21e4	1.30e4	5.35e3	4.11e3	2.98e3	1.43e2	2.11e3	3.43e3	3.76e3	1.93e3	1.32e3

Table 15. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e 170 1,6,7 + 1,2,6-TMN	1,2,4-TMN	1,2,5-TMN	m/e 178 P	m/e 192 3-MP	2-MP	9-MP	1-MP	m/e 206 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	m/e 206 1,6- + 2,5- + 2,9-DMP	1,7-DMP	2,3-DMP	1,9- + 4,9- + 4,10-DMP	1,8-DMP
9/4-5	DCG	2609.1	2636.5	34300	5.74e3	2.18e3	5.00e3	1.73e4	6.68e3	6.80e3	1.08e4	8.25e3	1.93e3	1.92e3	1.05e3	6.64e3	2.88e3	2.85e3	1.11e3	1.81e3	1.07e3
9/4-5	DCG	2773.7	2801.1	34302	3.18e3	7.36e2	1.23e4	1.86e4	2.45e3	2.68e3	5.63e3	5.17e3	3.49e2	7.18e2	2.79e2	1.57e3	1.32e3	2.96e3	5.53e2	7.51e2	4.04e2

Table 15. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

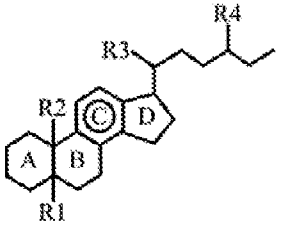
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	m/e 206 1,2-DMP	m/e 219 Retene	m/e 184 DBT	m/e 198 4-MDBT	(3+2)-MDBT	1-MDBT	m/e 253 C21MA	C22MA	βSC27MA	βSC27DMA	βRC27MA+ βRC27DMA	αSC27MA	βSC28MA+ βSC28DMA+ αRC27DMA	αSC27DMA	αRC27MA	αSC28MA	βRC28MA+ βRC28DMA
9/4-5	DCG	2609.1	2636.5	34300	8.99e2	1.73e3	3.83e3	2.84e3	1.96e3	6.39e3	2.43e3	3.35e3	7.28e3	7.63e3	9.15e3	9.38e3	2.66e4	2.05e3	8.89e3	2.47e4	1.93e4
9/4-5	DCG	2773.7	2801.1	34302	1.27e3	3.01e4	8.71e2	6.80e2	3.73e2	3.20e2	1.14e2	4.77e1	1.90e1	5.47e1	4.81e1	2.59e1	3.77e2	1.12e2	3.21e1	9.93e1	2.60e2

Table 15. continued, GCMS SIR of aromatic compounds (amounts in ng/g)

m/e					253				231						
Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	βSC29MA+ βSC29DMA	αSC29MA	αRC28MA+ βRC29MA+ βRC29DMA	αRC29MA	C20TA	C21TA	SC26TA	RC26TA+ SC27TA	SC28TA	RC27TA	RC28TA
9/4-5	DCG	2609.1	2636.5	34300	1.40e4	1.00e4	1.92e4	8.89e3	1.15e3	6.26e2	3.40e3	1.12e4	2.66e3	4.62e3	3.44e3
9/4-5	DCG	2773.7	2801.1	34302	1.44e3	2.72e2	1.02e3	1.33e2	9.09e1	4.68e1	3.41e1	2.96e2	5.49e2	1.57e2	6.62e2

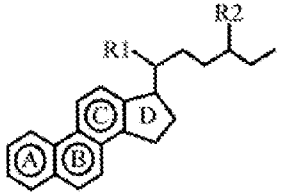
Abbreviation of aromatic biomarkers

C-ring monoaromatic steroid



Substituents				
R_1	R_2	R_3	R_4	Label
				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	RCH$_3$)	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_2H_5	βSC_{29}MA+
β(CH_3)	H	S(CH_3)	C_2H_5	βSC_{29}DMA
α(H)	CH_3	S(CH_3)	C_2H_5	αSC_{29}MA
α(H)	CH_3	R(CH_3)	CH_3	αRC_{28}MA+
β(H)	CH_3	R(CH_3)	C_2H_5	βRC_{29}MA+
β(CH_3)	H	R(CH_3)	C_2H_5	βRC_{29}DMA
α(H)	CH_3	R(CH_3)	C_2H_5	αRC_{29}MA

ABC-ring triaromatic steroids



Substituents		
R_1	R_2	Label
CH_3	H	C_{20}TA
CH_3	CH_3	C_{21}TA
S(CH_3)	C_6H_{13}	SC_{26}TA
R(CH_3)	C_6H_{13}	RC_{26}TA+
S(CH3)	C_7H_{15}	SC_{27}TA
S(CH_3)	C_8H_{17}	SC_{28}TA
R(CH_3)	C_7H_{15}	RC_{27}TA
R(CH_3)	C_8H_{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 16. Visual Kerogen Description

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	FA(%)	HA(%)	AL(%)	HE(%)	WO(%)	CO(%)	SCI
9/4-5	DCG	743.7	771.1	34294	5	60	10	10	10	5	2-4
9/4-5	DCG	1072.9	1100.3	34295	10	50	15	10	10	5	3-5
9/4-5	DCG	1210.1	1237.5	34296	20	50	10	10	5	5	3-5
9/4-5	DCG	2033.0	2060.4	34297	10	70	5	5	5	5	3-5
9/4-5	DCG	2362.2	2389.6	34298	20	55	10	5	5	5	3-5
9/4-5	DCG	2581.7	2609.1	34299	20	55	15	5	0	5	3-5
9/4-5	DCG	2609.1	2636.5	34300	30	15	25	25	5	0	4-6
9/4-5	DCG	2636.5	2664.0	34301	40	15	15	15	5	10	4-6
9/4-5	DCG	2773.7	2801.1	34302	20	25	15	15	15	10	5-7
9/4-5	DCG	3212.6	3240.0	34303	65	5	20	5	0	5	5-7
9/4-5	DCG	3377.2	3404.6	34304	65	5	20	5	0	5	5-7
9/4-5	DCG	3843.5	3871.0	34305	80	5	10	0	0	5	not determined
9/4-5	DCG	4200.1	4227.6	34306	60	20	10	5	0	5	6-8
9/4-5	DCG	4639.1	4666.5	34307	60	5	20	10	0	5	6-8
9/4-5	DCG	4831.1	4858.5	34308	60	5	20	10	0	5	6-8
9/4-5	DCG	5078.0	5105.4	34309	65	5	20	5	0	5	6-8
9/4-5	DCG	5187.7	5215.1	34310	30	5	30	30	0	5	6-8
9/4-5	DCG	5215.1	5243.0	34311	60	5	15	15	0	5	6-8
9/4-5	COCH	5296.4	5296.40	33956	5	60	5	15	5	10	6-8
9/4-5	DCG	5306.6	5316.0	34312	20	30	10	15	5	20	7-9
9/4-5	DCG	5315.7	5334.0	34313	65	10	10	10	0	5	7-9
9/4-5	DCG	5343.1	5371.0	34314	55	15	10	10	0	10	7-9
9/4-5	DCG	5489.4	5499.0	34315	50	5	15	15	0	15	7-9
9/4-5	DCG	5498.6	5508.0	34316	40	10	30	10	0	10	7-9
9/4-5	DCG	5535.2	5544.0	34317	60	25	10	0	0	5	not determined
9/4-5	DCG	5571.7	5581.0	34318	65	5	15	10	0	5	7-9
9/4-5	DCG	5590.0	5599.0	34319	65	5	15	10	0	5	7-9
9/4-5	DCG	5644.9	5654.0	34320	60	5	20	10	0	5	7-9
9/4-5	DCG	5681.5	5690.6	34783	55	5	30	5	0	5	not determined
9/4-5	DCG	5727.2	5745.5	34784	65	5	20	5	0	5	5-7?
9/4-5	DCG	5782.1	5791.2	34785	55	15	20	10	0	0	5-7
9/4-5	DCG	5809.5	5818.6	34786	45	15	25	10	0	5	5-7
9/4-5	DCG	5864.4	5873.5	34787	5	55	30	10	0	0	6-8?

Visual Kerogen typing by the relative composition of fluor-amorphous material (FA), amorphous material (HA), algae and dinoflagellates (AL), sporomorphs (HE), woody material – vitrinite precursor (WO), coal and non-translucent material (CO).

Table 17. Vitrinite Reflectance

Well	Sample type	Upper Depth (m)	Lower Depth (m)	APT ID	Sample prep.	%Lithology	%Ro	Std. dev.	No. of measurements	Quality rating	Overall quality	Comment
9/4-5	DCG	743.7	771.1	34294	HF	clyst	0.22	0.04	21	ooo-oo	M	
9/4-5	DCG	1072.9	1100.3	34295	HF	clyst	0.30	0.03	20	ooo-oo	M	
9/4-5	DCG	1210.1	1237.5	34296	HF	clyst	0.36	0.05	14	-±o-oo	P	See data sheet
9/4-5	DCG	2033.0	2060.4	34297	HF	clyst	0.26	0.03	4	-±o-oo	P	
9/4-5	DCG	2362.2	2389.6	34298	HF	clyst	0.54	0.04	10	-oo-oo	M	
9/4-5	DCG	2581.7	2609.1	34299	HF	clyst	0.49	0.07	16	-oo-oo	M	
9/4-5	DCG	2609.1	2636.5	34300	HF	clyst	0.45	0.06	18	ooo-oo	M	
9/4-5	DCG	2636.5	2664.0	34301	HF	clyst	0.52	0.03	7	-oo-oo	M	
9/4-5	DCG	2773.7	2801.1	34302	HF	clyst	0.43	0.05	17	-oo-oo	M	
9/4-5	DCG	3212.6	3240.0	34303	HF	lst	barren					
9/4-5	DCG	3377.2	3404.6	34304	HF	lst	barren					
9/4-5	DCG	3843.5	3871.0	34305	HF	lst	barren					
9/4-5	DCG	4200.1	4227.6	34306	HF	lst	0.79	0.00	1	-±o-oo	P	
9/4-5	DCG	4639.1	4666.5	34307	HF	lst	barren					
9/4-5	DCG	4831.1	4858.5	34308	HF	lst	barren					
9/4-5	DCG	5078.0	5105.4	34309	HF	lst	barren					
9/4-5	DCG	5187.7	5215.1	34310	HF	clyst/lst	1.15	0.31	4	-±±-oo	P	
9/4-5	DCG	5215.1	5243.0	34311	HF	clyst	1.31	0.20	8	-±o-oo	P	
9/4-5	COCH	5296.4	5296.40	33956	HF	clyst	1.53	0.16	20	ooo--o	M	Some HC staining
9/4-5	DCG	5306.6	5316.0	34312	HF	clyst	barren					See data sheet
9/4-5	DCG	5315.7	5334.0	34313	HF	clyst	barren					
9/4-5	DCG	5343.1	5371.0	34314	HF	clyst	barren					
9/4-5	DCG	5489.4	5499.0	34315	HF	clyst	1.42	0.00	1	-±o-oo	P	
9/4-5	DCG	5498.6	5508.0	34316	HF	clyst	barren					
9/4-5	DCG	5535.2	5544.0	34317	HF	clyst	barren					
9/4-5	DCG	5571.7	5581.0	34318	HF	clyst	barren					
9/4-5	DCG	5590.0	5599.0	34319	HF	clyst	barren					
9/4-5	DCG	5644.9	5654.0	34320	HF	clyst	1.43	0.00	1	-±o-oo	P	
9/4-5	DCG	5681.5	5690.6	34783	HF	sst	1.41	0.01	2	-±o-oo	P	
9/4-5	DCG	5727.2	5745.5	34784	HF	sst/kaolinite	barren					See data sheet
9/4-5	DCG	5782.1	5791.2	34785	HF	clyst	barren					
9/4-5	DCG	5809.5	5818.6	34786	HF	clyst	barren					
9/4-5	DCG	5864.4	5873.5	34787	HF	clyst	barren					

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		
clyst	Claystone	P	Poor	Bulk	Sample treated as bulk rock
sh	Shale	st	Hydrocarbon staining		
lst	Limestone				
coal	Coal				

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

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+	