Formation Pressures

Well 2/2-4

Depth	Hydrostatic mud pressures		Formation pressures		Comments
	Before	After			
(m RKB)	(psia)	(psia)	(psia)	(bar)	
Run 1A					
2086.5	4209.1	4207.8	3294.6	227.15	
2088.5	4210.8	4208.8	3296.6	227.29	
2108.5	4250.3	4248.5	3300.8	227.58	
2109.5	4252.1	4251.1	3302.6	227.71	
2113.5	4259.6	4258.6	3306.3	227.96	
2150.0	4332.6	4329.6	3357.1	231.46	
2177.0	4385.1	4382.1	3395.3	234.10	
2109.0	4243.1	4247.5	3301.0	227.60	Segregated sample*
2127.0	-	-	-	-	Bad seal
2127.5	-	-	-	-	Bad seal
2138.0	-	-	-	-	Bad seal
Run 3B					
3340.0	7120.3	7120.3	6696.1	461.68	
3425.0	7295.1	7295.2	6825.6	470.61	
3737.0	7942.3	7942.8	7404.1	510.49	Super charge?
3838.0	8154.1	8153.2	7620.8	525.43	
3863.0	8205.6	8204.5	7660.4	528.17	

REMARKS:

HP-crystal gauge

Temperature corrected pressures

KB = 26 m

* 2 3/4 gallon chamber gave 2 liters of mud and 25 cuft of gas.
1 gallon chamber sent to Geco for PVT analysis.

10.08.88 MU/EPF PGu

Table 5.2a FMT Pressures, Well 2/2-4

Formation Pressures

Well 2/2-4

Depth	Hydrostatic mud pressures		Formation pressures		Comments
	Before	After			
(m RKB)	(psia)	(psia)	(psia)	(bar)	
Run 3C					
3327.5	6923.8	6923.8	6681.3	460.66	
3340.0	6949.3	6949.5	6694.3	461.55	
3425.0	7127.1	7125.8	6825.1	470.57	
3480.0	7238.6	-	6910.1	476.43	
3520.0	7321.3	7321.4	6972.6	480.74	
3659.5	-	-	-	-	No seal
3597.0	7482.6	7480.8	7123.1	491.12	Super charge?
3737.0	7770.6	7768.8	7402.4	510.38	Super charge?
3775.0	-	-	-	-	No seal
3776.0	7848.4	7847.4	7538.8	519.78	Super charge?
3826.0	7951.3	7951.5	7596.4	523.75	
3831.0	7961.6	7961.5	7604.1	524.28	
3838.0	7977.1	7976.5	7618.0	525.24	
3863.0	8029.3	8027.8	7657.0	527.93	
3868.0	8039.8	8038.4	7665.8	528.54	
3593.0	7477.6	7476.8	7112.4	490.38	Super charge?

REMARKS:

HP-crystal gauge

Temperature corrected pressures

KB = 26 m

Table 5.2b FMT Pressures, Well 2/2-4

Fluid Analyses

Well 2/2-4

	mol %	weight %
N_2	1.16	1.91
CO_2	0.37	0.97
C_1	96.75	91.85
C_2	0.73	1.31
C_3	0.45	1.17
i-C_4	0.14	0.48
n-C_4	0.05	0.19
i-C_5	0.06	0.26
n-C_5	0.02	0.07
C_6	0.03	0.12
C_7	0.05	0.29
C_8	0.07	0.41
C_9	0.05	0.34
C_{10}+	0.07	0.63

Average molecular weight : 16.9
Molecular weight of C_{10}+ : 156
Gas gravity : 0.583

Table 5.3 **Gas Composition, Well 2/2-4**
FMT sample 2109 m RKB

11.08.88 ToK/EPR AMJo

SAGA PETROLEUM A.S.

6.2.1 MUD PROPERTIES, DAILY REPORT

Well no: 2/2-4

Date	Hole size	Hole depth	Mud weight	PV	YP	Gel strength	pH	Alkalinity Pf / Mf	Ca++ mg/l	Cl- mg/l	KCL ppb	Sand %	Solids %	Mudtype
880416	36	123.0	1.05											SPUD MUD
880417	36	207.0	1.05											SPUD MUD
880418	26	207.0	1.05	4	27	19/20	9.5							SPUD MUD
880419	17-1/2	400.0	1.13	4	25	18/21	8.6	0.1/0.2		14000				SPUD MUD
880420	17-1/2	770.0	1.12	4	25	18/21	8.1	0.1/0.1		16000				SPUD MUD
880421		770.0	1.12	5	21	17/21	8.1	0.0/0.1		16000				SPUD MUD
880422	26	915.0	1.15	4	20	16/25	8.0	0.0/0.1		18000				SPUD MUD
880423	26	915.0	1.15	4	20	16/25	8.0	0.0/0.1		18000				SPUD MUD
880424	17-1/2	915.0	1.15											KCL MUD
880425	17-1/2	1059.0	1.16	20	18	2/3	8.5	0.5/0.8	400	63000	40			KCL MUD
880426	17-1/2	1405.0	1.23	22	19	2/3	8.1	0.1/0.5	360	63000	44		11.0	KCL MUD
880427	17-1/2	1730.0	1.40	24	16	2/5	7.8	0.1/0.6	320	68000	44		18.0	KCL MUD
880428	17-1/2	1764.0	1.42	31	16	2/7	7.8	0.0/0.6	360	68000	45		18.0	KCL MUD
880429	17-1/2	1925.0	1.42	29	14	3/20	7.8	0.0/0.5	720	63000	43		18.0	KCL MUD
880430	17-1/2	2035.0	1.42	26	13	3/30	7.6	0.0/0.5	800	63000	45		18.5	KCL MUD
880501	17-1/2	2064.0	1.42	27	12	3/32	7.8	0.1/0.5	680	63000	43	0.1	18.5	KCL MUD
880502	17-1/2	2209.0	1.42	24	11	4/38	7.7	0.0/0.5	680	63000	44	0.3	19.0	KCL MUD
880503	17-1/2	2245.0	1.42	23	12	4/40	7.7	0.0/0.5	720	63000	44	0.3	19.0	KCL MUD
880504	17-1/2	2319.0	1.42	18	8	3/25	7.8	0.0/0.5	600	62000	43	0.2	18.5	KCL MUD
880505	17-1/2	2319.0	1.42	17	8	3/27	7.8	0.1/0.5	600	62000	42	0.1	19.0	KCL MUD
880506	17-1/2	2319.0	1.42	17	8	3/27	7.8	0.0/0.5	600	62000	42	0.1	19.0	KCL MUD
880507	17-1/2	2319.0	1.42	16	9	3/26	7.8	0.0/0.5	680	60000	44	0.1	19.0	KCL MUD
880508	12-1/4	2319.0	1.42	16	9	3/26	7.8	0.1/0.5	680	60000	44	0.1	19.0	KCL MUD
880509	12-1/4	2450.0	1.42	17	11	2/15	8.8	0.8/3.1	80	39000	28	0.1	18.0	KCL MUD
880510	12-1/4	2598.0	1.45	21	15	2/37	8.5	0.2/1.7	140	49000	30	0.1	18.5	KCL MUD
880511	12-1/4	2703.0	1.45	18	16	7/41	8.4	0.2/1.3	140	51000	32	0.1	19.0	KCL MUD
880512	12-1/4	2793.0	1.45	19	16	6/45	8.2	0.1/1.2	240	48000	30	0.1	18.5	KCL MUD
880513	12-1/4	2856.0	1.45	16	10	3/18	8.2	0.0/1.1	160	48000	30	0.1	18.5	KCL MUD
880514	12-1/4	2932.0	1.50	15	10	3/25	8.2	0.0/0.8	280	46000	29	0.1	20.5	KCL MUD
880515	12-1/4	3086.0	1.50	15	10	3/22	8.0	0.1/0.6	400	45000	30	0.1	19.5	KCL MUD
880516	12-1/4	3157.0	1.50	16	9	3/13	7.9	0.1/0.7	440	46000	29	0.1	20.0	KCL MUD

SAGA PETROLEUM A.S.

6.2.1 MUD PROPERTIES, DAILY REPORT

Well no: 2/2-4

Date	Hole size	Hole depth	Mud weight	PV	YP	Gel strength	pH	Alkalinity Pf / Mf	Ca++ mg/l	Cl- mg/l	KCL ppb	Sand %	Solids %	Mudtype
880517	12-1/4	3177.0	1.50	16	9	3/13	7.9	0.1/0.7	440	46000	29	0.1	20.0	KCL MUD
880518	12-1/4	3226.0	1.52	18	13	3/18	7.9	0.1/0.7	280	53000	28	0.1	21.0	KCL MUD
880519	12-1/4	3283.0	1.52	19	11	3/24	7.9	0.0/0.8	560	57000	25	0.1	21.5	KCL MUD
880520	12-1/4	3310.0	1.52	21	12	4/26	7.7	0.0/0.8	680	58000	25	0.1	22.0	KCL MUD
880521	12-1/4	3310.0	1.52	20	11	3/22	7.7	0.0/0.8	680	58000	24	0.1	22.0	KCL MUD
880522	12-1/4	3310.0	1.52	22	10	3/21	7.7	0.0/0.8	680	58000	23	0.2	22.0	KCL MUD
880523	12-1/4	3310.0	1.52	21	12	4/25	7.7	0.0/0.8	680	58000	23	0.2	22.0	KCL MUD
880524	8-1/2	3321.0	1.48	15	11	2/27	8.6	0.2/1.2	680	35000		0.3	20.0	GEL MUD
880525	8-1/2	3538.0	1.48	22	13	5/28	8.9	0.1/1.2	400	36000		0.2	21.5	GEL MUD
880526	8-1/2	3709.0	1.48	30	17	4/31	9.4	0.1/1.4		25000		0.1	21.5	GEL MUD
880527	8-1/2	3859.0	1.48	32	17	4/32	9.8	0.3/1.8		22000		0.3	21.0	GEL MUD
880528	8-1/2	3902.0	1.48	32	19	5/38	8.9	0.1/1.1		19000		0.3	21.0	GEL MUD
880529	8-1/2	4009.0	1.48	29	15	4/32	9.0	0.1/1.4		20000		0.3	21.0	GEL MUD
880530	8-1/2	4020.0	1.48	23	11	3/19	9.0	0.1/1.5		21000		0.3	21.0	GEL MUD
880531	8-1/2	4020.0	1.48	22	13	3/20	9.1	0.2/1.8		21000		0.3	21.0	GEL MUD
880601	8-1/2	4020.0	1.48	22	13	3/20	9.1	0.2/1.8		21000		0.3	21.0	GEL MUD
880602	8-1/2	4020.0	1.46	21	13	3/22	9.2	0.2/1.9		20000		0.3	20.0	GEL MUD
880603	8-1/2	4020.0	1.46	17	9	2/12	7.8	0.0/0.6		20000		0.3	20.0	GEL MUD
880604	PB	3295.0	1.46	20	11	5/38	10.8	0.3/2.2		21000		0.3	20.0	GEL MUD
880605	PB	3146.0	1.46	15	9	1/11	10.9	0.3/2.3		21000		0.3	20.0	GEL MUD
880606	PB	120.0	1.46	15	9	1/11	10.9	0.3/2.3		21000		0.3	20.0	GEL MUD

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6.2.2 MUD MATERIALS USED

Well no: 2/2-4

Materials	Unit	36 in hole	26 in hole	17-1/2 hole	12-1/4 hole	8-1/2 hole	Total
SAPP	50 KG	0	0	6	26	0	32
BARITE	M/T	0	25	275	430	183	913
BICARBONATE	50 KG	0	0	0	90	54	144
CAUSTIC SODA	25 KG	4	11	1	0	57	73
Antisol FL 30	25 kg	0	0	204	273	117	594
Magconol	25 l	0	0	0	1	1	2
Resinex	50 lb	0	0	0	0	160	160
Oilex	GALLO	0	0	1	3	2	6
Polysal	25 kg	0	0	0	293	102	395
DRILLING DETE	DRUM	0	0	0	15	0	15
POT.BICABONAT	50 kg	0	0	50	50	0	100
CF DESCO	25 lb	0	0	0	6	80	86
HEC	25 kg	9	0	0	0	0	9
HYDROCLORIC A	liter	0	0	0	200	0	200
SODA ASH	50 KG	2	5	0	0	0	7
BENTONITE	M/T	11	27	1	0	5	44
BENTONITE SX	50 KG	25	56	54	24	0	159
ANTISOL FL 30	25 KG	0	0	329	87	10	426
KCL - SXS	50 KG	0	0	246	104	0	350
KCL - BRINE	BBL	0	0	3748	1000	0	4748
XP-20	50 LB	0	0	0	0	160	160

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REPORT TYPE	REPORT NO.	DATE
	IFE/KR/F-88/114	1988-10-10
	REPORT TITLE VITRINITE REFLECTANCE, WELL 2/2-4 OFFSHORE NORWAY	DATE OF LAST REV. REV. NO.
	CLIENT Saga Petroleum A.S	NUMBER OF PAGES
	CLIENT REF. N. Mills	NUMBER OF ISSUES 13

SUMMARY

DISTRIBUTION

Saga Petroleum (10)
Throndsen, T.
File (2)

KEYWORDS

	NAME	DATE	SIGNATURE
PREPARED BY	Torbjørn Throndsen	1988-10-10	
REVIEWED BY			
APPROVED BY	Henning Qvale	1988-10-10	

1. INTRODUCTION

This report gives the results of a vitrinite reflectance study performed on 15 samples covering the depth interval from 1000 mrkb to 3900 mrkb in well 2/2-4 offshore Norway.

The most important aim of the study was to establish a reliable vitrinite reflectance versus depth profile of the well section. It was difficult to satisfy the aim due to extremely bad sample quality with respect to abundance and quality of vitrinite.

2. MATERIAL

The data being used in this study were obtained from analyses of 15 samples. The samples subjected for analyses were sidewall cores. The sample lithologies were mainly claystones and siltstones. All the samples proved to be extremely poor in vitrinite, and the vitrinite was of poor quality both with respect to particle size and particle surface quality.

3. ANALYTICAL TECHNIQUES

3.1 Vitrinite reflectance

Vitrinite reflectance is a standard parameter to assess the rank of coal, and it is widely used in petroleum exploration in geochemical studies as a reference indicator of organic maturity (Tissot and Welte, 1984) and in mathematical basin modelling as a calibration parameter for paleotemperature reconstruction (Lerche et al., 1984; Tissot and Welte, 1984; Yukler and Kokesh, 1984; Welte and Yalcin, 1986).

In this report the term 'vitrinite reflectance' is used throughout although strictly vitrinite, is defined only for the bituminous coal range for reflectance values above approximately Rm=0.50. The vitrinite precursor in the lower reflecting brown coal range is called 'humunite'.

Some of the samples being analysed for vitrinite reflectance in this study were not treated with any acid prior to further preparation; bulk rock material was embedded in a cold setting epoxy resin to make briquettes. These were subsequently ground flat and polished using 0.25 µm diamond paste and magnesium oxide as the two final steps. For other samples it was necessary to treat the material with hydrochloric and hydrofluoric acids prior to further preparative steps. These samples are marked * in Table 1.

The analytical equipment being used was a Zeiss MPM 03 photometer-microscope. Viewing and measurements were made through a Zeiss Epiplan Neofluoar 40/0.90 oil objective using immersion oil with refractive index n=1.518. The measurements were made through a green filter with peak transmission at 546 nm, and with a photometer sensitive field of about 2.5 µm in diameter. For photometer calibration two standards were used with reflectance in oil of Rm=0.588 and Rm=0.879 respectively. The readings were performed without a polarizer and

using a stationary stage. This has become more or less standard in vitrinite reflectance studies where clastic samples are to be analysed. This procedure is called measurement of random reflectance (Rm). This technique permits smaller particles to be measured which is important for clastic samples, and the results do not deviate significantly in precision from those obtained using a rotating stage technique. The reader is referred to Davis (1978), Ting (1978), Stach et al. (1982) and Bustin et al. (1985) for further information on these topics, and to Bostick (1971) and Bostick and Alpern (1977) for topics related to measurements on clastic samples. On each sample normally as many particles as possible up to 25 were measured. A representative population was selected among the readings based on observations made during measuring, and an arithmetic mean was calculated for this population. The principles for particle selection followed that of Bostick (1971, 1979) and Bostick and Alpern (1977).

4. RESULTS

The vitrinite reflectance results and interpretations are given in Table 1 (analytical data), Table 2 (interpreted vitrinite reflectance versus depth trend) and Figure 1. All the raw data including histograms are given in Appendix.

The vitrinite reflectance sample results are sufficiently reliable to indicate a vitrinite reflectance versus depth trend for the interval from 1000 mrkb to 3900 mrkb. It should, however, be kept in mind that the sample quality is extremely bad with respect to abundance and quality of the vitrinite, and that the number of samples included in the study is sparse. These factors of course affects the precision of the established trend.

5. CONCLUSION

The results from this study show that it has been possible to establish a vitrinite reflectance versus depth trend in well 2/2-4 from 1000 mrkb down to 3900 mrkb. However, the exact precision of the trend should be considered in light of the poor sample quality and the few samples subjected for analysis.

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Table 1. Vitrinite reflectance data, well 2/2-4.

WELL 2/2-4

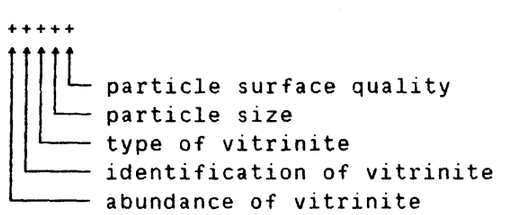
sample code IFE	sample depth mrkb	sample type	lithology	vitrinite reflectance Rm (N)	sample quality
SA 266	1000.0	swc	clst	0.33 (9)	-oo--
SA 267	1300.0	swc	clst	0.24 (18)-	-o---
SA 268	1505.0	swc	clst	0.26 (7)-	-o---
SA 269*	1640.0	swc	coal MA?	0.31 (25)	oo-o-
SA 270*	1807.0	swc	clst	0.39 (1)-	-oo--
SA 271*	2000.0	swc	clst	0.38 (2)-	-oo--
SA 272*	2197.0	swc	clst	0.26 (4)-	-----
SA 273*	2279.0	swc	clst	0.44 (14)-	o-+--
SA 274*	2430.0	swc	clst	0.38 (5)-	-----
SA 275*	2608.0	swc	clst	0.42 (11)	oo-oo
SA 276	2823.0	swc	clst	0.58 (3)	ooooo
SA 277	3218.0	swc	rd clst	----	barren
SA 278	3465.0	swc	sst/coal MA	0.37 (3)--	MA
SA 279	3717.0	swc	slst	0.70 (7)	ooooo
SA 280	3900.0	swc	clst	0.74 (12)	-oooo

LEGEND

Rm	: mean random reflectance in oil
N	: number of readings
+	: very good sample
-	: poor sample
--	: not vitrinite
M.A.	: mud additive
*	: sample treated with HCl and HF
clst	: claystone
slst	: siltstone

CODE FOR DATA QUALITY

The sample quality is characterised by five items as follows:



+ : may give a too high vitrinite reflectance value
o : have no effect on the resulting vitrinite reflectance value
- : may give a too low vitrinite reflectance value

An ideal sample is characterised as follows: ooooo

U-574

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

3

GEOCHEMICAL ANALYSIS
NOCS WELL 2/2-4

Client : Saga Petroleum

Authors: Kjell Arne Bakken
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Geolab Nor A/S
Hornebergveien 5
7038 TRONDHEIM
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Date : 22.07.88

INTRODUCTION

Geochemical analysis was performed for Saga Petroleum A/S on well 2/2-4 from the Norwegian Continental Shelf of the North Sea, in the Central Graben area to the north east of Torand Ekofisk. The block 2/2 is shown on Figure 1.

A total of 35 cutting samples was washed and lithologies described in the interval 2130 - 3911 m. In addition the following analyses were performed:

Composition of Headspace Gas	25 samples
Carbon Isotope Analysis of Headspace Gas	26 samples
Total Organic Carbon Content	23 samples
Rock-Eval Analysis	23 samples
Liquid Extraction/Medium Pressure Liquid Chromatography/Saturated and Aromatic Fraction Gas Chromatography	2 samples

No information on the Formation Tops/Geological Ages for the samples were supplied from Saga Petroleum A/S and the interpretation is therefore done on a lithological basis. The analytical programme was requested by Nigel Mills. The data is shown in Tables 1 - 7 and Figures 1 - 3. The gas chromatograms are enclosed at the back of the report.

2. ANALYSIS RESULTS AND DISCUSSION

The analysis results are described on a lithological/Total Organic Carbon content basis below.

2.1 Lithological Description and Total Organic Carbon Content

A total of 35 cutting samples was washed and described lithologically. The well appears to have been turbodrilled between 3767 m and 3875 m.

Interval A (2060 - 2130 m)

A total of 8 samples was analysed from this interval. The sequence consists of olive-grey to dusky yellowish brown claystone with generally good organic carbon content (1.39 - 1.76 %), one having a rich organic carbon content (TOC = 2.12 %) at 2060 m. Towards the bottom of the interval traces of dolomite and grey-brown sandstone were observed.

Interval B (3302 - 3314 m)

The dominant lithology in the interval is medium grey claystone which becomes darker, more organic-rich and stained towards the bottom of the interval. Variously coloured sandstone and white to pale red chalk is also observed. The organic carbon content is generally fair for the uppermost samples analysed (0.54 - 0.59 %) and rich for the lowermost samples (3.50 - 3.96 %).

EXPERIMENTAL PROCEDURES

Headspace gas analysis

The analysis is performed using a gas chromatograph with a 50 m capillary column, loop injector and flame ionisation detector. Helium is used as carrier gas.

Two cm^3 of headspace gas are removed from each sample can for chromatographic analysis of the C_1 to C_7 range of hydrocarbons.

Occluded gas analysis

The analysis is performed using a gas chromatograph with a 50 m capillary column, loop injector and flame ionisation detector. Helium is used as carrier gas.

The canned samples are washed in thermostatted water to remove drilling contaminants and sieved on a 2 mm mesh sieve to remove large, caved rock fragments. An aliquot (ca 25 mg) of sieved sample is crushed with 25 cm^3 water in an airtight ball mill. After crushing, 2 cm^3 of the released gas are removed from the ball mill for gas chromatographic analysis.

Total organic carbon (TOC) and total carbon analysis

This analysis is performed using a LECO CS244 Carbon Analyser.

Hand-picked lithologies from cutting samples are crushed with a mortar and pestle and approximately 200 mg (50 mg for coals) are accurately weighed into LECO crucibles. The samples are then treated three times with dilute hydrochloric acid, to remove oxidised (carbonate) carbon, and

washed four times with distilled water. The samples are dried on a hotplate at 60-70°C before analysis of total organic carbon. Total carbon is analysed on the same instrument using approximately 200 mg of untreated crushed whole rock. Oxidised (carbonate) carbon is calculated by difference.

Extractable Organic Matter (EOM) Analysis

Samples are selected for extraction on the basis of screening analysis. 10 - 20 g of whole rock are accurately weighed.

Extraction is carried out in a Tecator Soxtec HT extractor using 7% (v/v) methanol in dichloromethane as extraction solvent. Samples are boiled for 1 h and rinsed for 2 h. Samples with TOC greater than 10% are extracted a second time and the extracts combined. After filtration into a tared flask the solvent is removed by rotary evaporation at 200 mB and 35°C. The residue, dried to constant weight, is weighed to give the amount of EOM.

Separation of Asphaltenes

The EOM is dissolved in 1:3 (w:v) tetrahydrofuran in an tared flask and pentane added to precipitate asphaltenes. A minimum of 40 volumes of pentane per 1 volume of THF/EOM is used and the solution allowed to stand 8 h at room temperature in the dark. The solution is filtered and the precipitated asphaltenes returned to the original flask by dissolution in methanol (7% v/v)/dichloromethane. The asphaltene solution is evaporated to constant weight.

Liquid chromatographic separation

Chromatographic separation is performed using an MPLC system developed by the company. The EOM (after removal of asphaltenes) is injected into the MPLC and chromatographed using hexane as eluent. This effects a separation into saturated and aromatic fractions which are collected and concentrated on a rotary evaporator, at 35°C and 200 mB, to remove the bulk of the hexane. The fractions are then transferred to small tared vials and evaporated to dryness in a stream of nitrogen. The vials are re-weighed to obtain the weights of both fractions. The weight of the NSO fraction, which is retained on the chromatography column, is obtained by difference.

Gas chromatographic analyses

Saturated fraction

The instrument used for this analysis is a gas chromatograph with a 25 m OV1 column, split injector and FID detector. The carrier gas is helium and the temperature program runs isothermally at 60°C, for 2 minutes and then rises to 290°C at a rate of 4°C/min.

The sample of saturated fraction is diluted by 1:20 with hexane and a 1 microlitre aliquot of this is injected into the instrument.

Aromatic fraction

The instrument used is a gas chromatograph with a 25 m SE-54 capillary column, split injector and effluent splitter leading to FID and FPD detectors, allowing simultaneous analysis of hydrocarbons and sulphur compounds. The carrier

gas is helium and the temperature program runs from 60°C to 300°C at a rate of 4°C/min.

The sample of aromatic fraction is diluted by 1:20 with hexane and a 1 microlitre aliquot of this is injected into the instrument.

Whole Oil

Whole oil chromatograms are determined on a gas chromatograph fitted with a split injector, 25m SE54 capillary column and effluent splitter connected to FID and sulphur mode FPD detectors allowing simultaneous determination of hydrocarbons and sulphur compounds. Approximately 0.1 microlitres of whole oil are injected and the temperature program on the chromatograph runs from -10°C to 300°C at 4°C/min.

Rock Eval pyrolysis

This analysis is performed using a ROCK EVAL II Pyrolyser into which approximately 100 mg of crushed whole rock are loaded. Analysis involves heating the sample, from 300°C to 600°C, in an inert atmosphere (helium) to release naturally generated hydrocarbons (S1 peak) and then pyrolytically generated hydrocarbons (S2 peak), both of which are detected by an FID. In the temperature interval between 300°C and 390°C, the released gases are split and a proportion passed through a carbon dioxide trap, which is connected to a thermal conductivity detector (TCD). The value obtained from the TCD corresponds to the amount of oxygen contained in the kerogen of the sample and is reported as the S3 peak. The temperature corresponding to the maximum of the S_2 peak, T_{max}, is also recorded.

Thermal extraction/pyrolysis gas chromatography

The instrument used for this analysis is a gas chromatograph connected to a pyrolysis oven. A very small amount (2 mg) of whole rock sample is loaded into the oven and heated isothermally, at 300°C, for 3 minutes, during which time thermal extraction of the generated hydrocarbons occurs (equivalent to the S1 peak of Rock Eval). The released gases pass to a 15 m OV1 column with a nitrogen-cooled trap.

After 3 minutes the pyrolysis oven heats up to 510°C, at a rate of 40°C per minute, causing bound hydrocarbons to be released from the kerogen of the sample (equivalent to the S2 peak of Rock Eval). These gases are passed through a 25m DB1 capillary column with a nitrogen-cooled trap.

The temperature program for the chromatographic oven, in which both columns are situated, rises from 0°C to 290°C at a rate of 4°C/min. Both columns are linked to FID detectors.

Vitrinite reflectance analysis

Samples, in the form of small granules, are mounted in a fast setting resin. The resin blocks are ground on coarse corundum paper to expose the rock granule surfaces and then on three finer grades of corundum paper to improve these surfaces and reduce scratches. The resin blocks are finally polished on a rotating Selvyt-covered lap using two grades of polishing alumina. Isopropyl alcohol is used to lubricate the entire grinding and polishing process except in the case of coal samples, when water is used.

Reflectance measurements are taken under oil immersion (n =1.518) using a ZEISS MPM03 microscope photometer with a 546nm interference filter. The polished blocks are mounted on the microscope stage and scanned manually in order to locate and measure particles of vitrinite. An attempt is

made to obtain readings from 20 individual particles per sample but this is not always possible in samples with low amounts of phytoclasts.

Spore fluorescence colour

Samples are also analysed microscopically in U.V. light, using an exciter filter with a band pass of 400 - 440 nm and a barrier filter with a long pass of 470 nm, and the colour of the spore fluorescence is determined. This is used as an alternative maturity parameter to verify the result obtained from vitrinite reflectance and is reported on a numerical scale from 1 to 9:

Fluorescence Colour	Colour Index	Corresp. Vitrinite Reflectance
Green	1	0.2%
Green/Yellow	2	0.2/0.3%
Yellow	3	0.3%
Yellow/Orange	4	0.4%
Light Orange	5	0.5%
Mid-Orange	6	0.6%
Dark Orange	7	0.8%
Orange/Red	8	1.0%
Red 9	1.1%	

NB. This table only provides a rough correlation asvitrinite reflectance and spore fluorescence colour are both independently affected by factors such as depositional environment and catagenic history.

Preparation of Kerogen Concentrates

Samples are stirred for 16 h with 25 cm^3 concentrated hydrocloric acid at 35 - 40°C. The acid is decanted and the residue washed by stirring for 3 h with 25 cm^3 distilled water. The washing is repeated twice more.

If the concentrate is not being prepared for slides the residue is washed, rapidly, at this point, with 25 cm^3 dichloromethane.

25 cm^3 hydrofluoric acid are then added to the residue and the mixture stirred for 16 h at room temperature. The acid is decanted and the residue washed by stirring for 3 h with distilled water. The water washing is repeated three times with fresh aliquots of distilled water each time. The water is then decanted and the residue either dried in an oven at 40 - 50°C to constant weight, or, if slides are to be made, it is transferred to a microscope cover slip and dried on a hot bench at 40 -50°C.

Preparation of Slides

The dry kerogen concentrate is mounted on a slide in glycerine/gelatine and left to dry at room temperature overnight.

List of abbreviations used for lithology description
(sorted alphabetically)

ang	= angular
bar	= Baryte (mud additive)
bl	= blue/blueish
blk	= black
br	= brittle
brn	= brown/brownish
Ca	= Carbonate (Limestone/Chalk/Dolomite/Siderite)
calc	= calcareous
carb	= carbonaceous
cem	= cement used as additive (under "Cont") or to describe cemented S/Sst
Chert	= Chert
chk	= Chalk/chalky
cly	= clayey/shaley
cngl	= conglomeratic
Coal	= Coal
Coal-ad	= Coal-like additive (e.g. chromlignosulfonate)
Congl	= Conglomerate
Cont	= Contamination
crs	= coarse grained
cvd	= caved
dd	= dried drilling mud
dol	= Dolomite/dolomitic
drk	= dark (colour)
dsk	= dusky (colour)
evap	= Salt/Gypsum/Halite (natural "Other" or as additive "Cont")
f	= fine grained
fib	= fibres (mud additive/contamination)
fis	= fissile
fos	= fossiliferous
glauc	= Glauconite/glauconitic
gn	= green/greenish
gy	= grey/greyish
hd	= hard
ign	= Igneous (material derived from igneous source)
int	= percentage interpreted from logs
Kaolin	= Kaolin(ite)
kln	= kaolinitic
l	= loose
lam	= laminated/laminae
lt	= light (colour)
m	= medium (colour or grain size)

List of abbreviations used for lithology description
(sorted alphabetically)

Marl	= Marl (calcareous claystone/mudstone)
mic	= micaceous
Mica-ad	= Mica used as mud additive
mrl	= marly
No Mat.	= No material left after washing
ns	= nutshells (mud additive)
ol	= olive
ool	= Oolite/oolitic
or	= orange
Other	= Other lithology/mineral, specified after this word
pi	= pink/pinkish
pl	= pale (colour)
prp	= paint/rust/plastic contamination/additives
pu	= purple
pyr	= Pyrite/pyritic
red	= red/reddish
rnd	= round/rounded
s	= sandy
S/Sst	= Sand and/or sandstone
Sh/Clst	= Shale and/or claystone
sid	= Siderite/sideritic
sil	= siliceous/cherty
slt	= silty
Sltst	= Siltstone
st	= stained (with natural oil or oil-like additive)
tar-ad	= Tar-like additive (e.g. "Black Magic")
Tuff	= Tuff
tuff	= tuffaceous
v col	= Various colours
w	= white
wx	= waxy
y	= yellow/yellowish

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/2-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2060.00						001
		2.12	100	Sh/Clst: ol gy to dsk y brn		001-1L
2070.00						002
		1.68	100	Sh/Clst: ol gy to dsk y brn		002-1L
2080.00						003
		1.63	100	Sh/Clst: ol gy to dsk y brn		003-1L
			tr	Cont : prp		003-2L
2090.00						004
		1.56	100	Sh/Clst: ol gy to dsk y brn		004-1L
			tr	Cont : prp		004-2L
2100.00						005
		1.39	100	Sh/Clst: ol gy to dsk y brn		005-1L
2110.00						006
		1.64	100	Sh/Clst: ol gy to dsk y brn		006-1L
			tr	Ca : dsk y brn, dol		006-2L
2120.00						007
		1.76	100	Sh/Clst: ol gy to dsk y brn		007-1L
			tr	S/Sst : lt gy, cem		007-2L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/2-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2130.00						008
		1.49	100	Sh/Clst: ol gy to dsk y brn		008-1L
			tr	S/Sst : lt gy to drk y brn, cem		008-2L
3302.00						009
		0.54	90	Sh/Clst: m gy, calc		009-1L
			10	Ca : w to pl red, chk		009-2L
			tr	Sh/Clst: gy red		009-3L
3305.00						010
		0.59	80	Sh/Clst: m gy, calc, st		010-1L
			10	Ca : w to pl red, chk		010-2L
			10	S/Sst : v col, l		010-4L
			tr	Sh/Clst: gy red		010-3L
3310.00						011
		3.96	80	Sh/Clst: m gy to drk gy, calc, st		011-1L
			15	S/Sst : v col, l		011-4L
			5	Ca : w to pl red, chk		011-2L
			tr	Sh/Clst: gy red		011-3L
3314.00						012
			55	Cont : cem		012-4L
		3.50	40	Sh/Clst: m gy to drk gy, calc, st		012-1L
			5	S/Sst : v col, l		012-3L
			tr	Ca : w to pl red, chk		012-2L
			tr	Coal : blk		012-5L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/2-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3317.00						013
			55	S/Sst : v col, l		013-3L
			40	Coal : blk		013-5L
			5	Sh/Clst: m gy to drk gy, calc, st		013-1L
			tr	Ca : w to pl red, chk		013-2L
			tr	Cont : cem		013-4L
3320.00						014
			70	S/Sst : v col, l		014-3L
			20	Coal : blk		014-5L
			5	Sh/Clst: m gy to drk gy, calc, st		014-1L
			5	Cont : cem		014-4L
			tr	Ca : w to pl red, chk		014-2L
3323.00						015
			80	S/Sst : v col, l		015-3L
			5	Sh/Clst: m gy to drk gy, calc, st		015-1L
			5	Cont : cem		015-4L
			5	Coal : blk		015-5L
			5	Sh/Clst: lt gy, s		015-6L
			tr	Ca : w to pl red, chk		015-2L
3326.00						036
			55	S/Sst : v col, l		036-1L
			35	Coal : blk, brn blk		036-4L
			5	Sh/Clst: m gy to drk gy, calc, st		036-2L
			5	Sh/Clst: lt gy, s		036-3L
3758.00					trb	016
			90	S/Sst : w, l		016-1L
			5	Kaolin : w		016-2L
			5	Sh/Clst: lt gy to drk gy		016-3L
			tr	Coal : blk		016-4L
			tr	Cont : prp		016-5L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/2-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3767.00					trb	017
			60	S/Sst : w, l		017-1L
			20	Kaolin : w to m gy		017-2L
			15	Coal : blk		017-4L
			5	Sh/Clst: lt gy to drk gy		017-3L
			tr	Cont : prp		017-5L
3776.00					trb	018
			50	S/Sst : w, l		018-1L
			30	Kaolin : w to m gy		018-2L
			10	Sh/Clst: lt gy to drk gy		018-3L
			10	Coal : blk		018-4L
			tr	Cont : prp		018-5L
3785.00					trb	019
			45	S/Sst : w, l		019-1L
			35	Kaolin : w to m gy		019-2L
			15	Sh/Clst: m gy to drk gy		019-3L
			5	Coal : blk		019-4L
			tr	Cont : prp		019-5L
3794.00					trb	020
			40	S/Sst : w, l		020-1L
			35	Kaolin : w to m gy		020-2L
		0.53	20	Sh/Clst: m gy to drk gy		020-3L
			5	Coal : blk		020-4L
			tr	Cont : prp		020-5L
3803.00					trb	021
			45	S/Sst : w		021-1L
		0.63	35	Sh/Clst: drk gy		021-3L
			15	Kaolin : w to m gy		021-2L
			5	Coal : blk		021-4L
			tr	Cont : prp		021-5L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/2-4

Depth unit of measure: m

Depth Int	Depth Cvd	Type TOC%	%	Lithology description	Trb	Sample
3806.00					trb	034
			50	S/Sst : w		034-1L
			35	Sh/Clst: drk gy		034-3L
			10	Other : w, hd, br		034-6L
			5	Kaolin : w to m gy		034-2L
			tr	Coal : blk		034-4L
			tr	Cont : prp		034-5L
3812.00					trb	022
			50	S/Sst : w		022-1L
		0.62	40	Sh/Clst: drk gy		022-3L
			10	Kaolin : w to m gy		022-2L
			tr	Coal : blk		022-4L
3821.00					trb	023
		0.77	60	Sh/Clst: gy blk to drk gy		023-3L
			20	S/Sst : w		023-1L
			20	Kaolin : w to m gy		023-2L
			tr	Coal : blk		023-4L
			tr	Cont : prp		023-5L
3830.00					trb	024
			50	Other : w to lt gy, hd, br		024-2L
		0.86	45	Sh/Clst: gy blk to drk gy		024-3L
			5	S/Sst : w		024-1L
			tr	Coal : blk		024-4L
			tr	Cont : prp		024-5L
3839.00					trb	025
			40	Other : w to lt gy, hd, br		025-2L
			30	S/Sst : w		025-1L
		0.94	30	Sh/Clst: gy blk to drk gy		025-3L
			tr	Coal : blk		025-4L
			tr	Cont : prp		025-5L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/2-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3848.00					trb	026
			65	Other : w to lt gy, hd, br		026-2L
			20	S/Sst : w		026-1L
			15	Sh/Clst: gy blk to drk gy		026-3L
			tr	Coal : blk		026-4L
			tr	Cont : prp		026-5L
3857.00					trb	027
			45	S/Sst : w		027-1L
			45	Other : w to lt gy, hd, br		027-2L
			10	Sh/Clst: gy blk to drk gy		027-3L
			tr	Coal : blk		027-4L
			tr	Cont : prp		027-5L
3866.00					trb	028
			80	S/Sst : w		028-1L
			10	Other : w to lt gy, hd, br		028-2L
			10	Sh/Clst: gy blk to drk gy		028-3L
			tr	Coal : blk		028-4L
3875.00					trb	029
			40	S/Sst : w		029-1L
		1.46	40	Sh/Clst: gy blk to drk gy		029-3L
			10	Other : w to lt gy, hd, br		029-2L
			10	Coal : blk		029-4L
			tr	Cont : prp		029-5L
3884.00						030
		2.58	45	Sh/Clst: gy blk to brn blk to drk gy, mic		030-1L
			45	S/Sst : w, calc, cem		030-2L
			5	Coal : blk		030-3L
			5	Kaolin : w to m gy		030-4L
			tr	Cont : prp		030-5L

GEOLAB NOR
GEOCHEMICAL LABORATORIES OF NORWAY A/S

Table 1 : Lithology description for well NOCS 2/2-4

Depth unit of measure: m

Depth		Type			Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3893.00						031
	3.45		85	Sh/Clst: ol blk, mic, st		031-1L
			10	S/Sst : w, calc, cem		031-2L
			5	Kaolin : w to m gy		031-4L
			tr	Coal : blk		031-3L
			tr	Cont : prp		031-5L
3902.00						032
	70.60		50	Coal : blk		032-3L
			30	S/Sst : w to lt gy, calc, cem		032-2L
			20	Sh/Clst: ol blk to dsk y brn, mic		032-1L
			tr	Kaolin : w to m gy		032-4L
			tr	Cont : prp		032-5L
3911.00						033
	27.60		80	Sh/Clst: ol blk to m brn to dsk y brn		033-1L
			10	Coal : blk		033-3L
			5	S/Sst : w to lt gy, calc, cem		033-2L
			5	Cont : prp		033-5L
			tr	Kaolin : w to m gy		033-4L

Table 2 : Tabulation of headspace gas data for well NOCS 2/2-4.

Depth m	methane	ethane	propane	i-butane	n-butane	pentanes	hexanes	C1/(C2+C3)	C2/C1	C1/sumCn	iC4/nC4
2060.00	95.38	1.64	1.18	0.38	0.17	0.82	0.44	33.88	0.01	0.95	2.24
2070.00	95.49	1.51	1.09	0.53	0.12	0.57	0.67	36.56	0.02	0.96	4.42
2080.00	81.76	6.11	5.72	1.39	0.89	3.31	0.81	6.90	0.07	0.81	1.56
2090.00	88.30	4.08	2.80	1.00	0.66	2.43	0.71	12.82	0.04	0.88	1.52
2100.00	83.49	5.69	4.74	1.36	0.88	3.19	0.64	8.00	0.06	0.83	1.55
*2109.00	97.95	0.99	0.60	0.23	0.06	0.12	0.01	60.99	0.01	0.98	3.62
2110.00	73.99	9.13	8.17	3.15	1.36	3.20	0.96	4.27	0.12	0.74	2.32
2120.00	89.94	2.21	2.70	0.95	0.54	3.13	0.50	18.28	0.02	0.89	1.76
2130.00	78.91	6.76	6.74	2.24	0.96	3.30	1.05	5.83	0.08	0.78	2.33
3758.00	30.75	11.74	16.67	1.94	13.35	21.96	3.56	1.08	0.38	0.30	0.15
3767.00	32.59	12.77	11.24	1.87	10.31	17.61	13.57	1.35	0.39	0.32	0.18
3776.00	35.45	12.52	15.68	1.80	11.51	19.33	3.67	1.25	0.35	0.35	1.16
3785.00	33.07	9.08	13.00	2.15	10.77	20.05	11.82	1.49	0.27	0.33	0.20
3794.00	29.76	8.98	13.88	2.19	13.16	27.75	4.24	1.30	0.30	0.30	0.17
3803.00	Container broken during transport										
3812.00	24.06	6.83	11.12	2.16	13.95	32.25	4.43	1.34	0.28	0.24	0.15
3821.00	31.10	10.06	12.33	1.04	11.43	20.37	13.64	1.38	0.32	0.31	0.09
3830.00	24.94	8.83	14.72	2.61	15.21	29.76	3.89	1.05	0.35	0.25	0.17
3839.00	31.57	9.39	14.09	2.57	13.94	26.05	2.34	1.34	0.29	0.31	0.18
3848.00	Very low amount of gas										
3857.00	Very low amount of gas										
3866.00	23.74	10.67	23.66	3.48	17.16	17.48	3.78	0.69	0.44	0.23	0.20
3875.00	14.47	6.39	19.94	4.01	21.45	28.47	5.23	0.54	0.44	0.14	0.19
3884.00	13.20	9.16	25.22	5.42	20.03	22.67	4.27	0.38	0.69	0.13	0.27
3893.00	11.30	10.74	29.53	5.44	19.57	20.11	3.28	0.28	0.95	0.11	0.28
3902.00	64.07	18.67	10.34	1.45	3.00	1.82	0.63	2.20	0.29	0.64	0.48
3911.00	58.53	18.75	11.52	2.47	5.30	3.09	0.31	1.93	0.32	0.58	0.47

*2109 = Gas sample

Table 3 : Rock-Eval table for well NOCS 2/2-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2060.00	cut	Sh/Clst: ol gy to dsk y brn	0.04	2.63	0.70	3.76	2.12	124	33	2.7	0.01	432	001-1L
2070.00	cut	Sh/Clst: ol gy to dsk y brn	0.06	1.91	0.77	2.48	1.68	114	46	2.0	0.03	434	002-1L
2080.00	cut	Sh/Clst: ol gy to dsk y brn	0.03	1.62	0.58	2.79	1.63	99	36	1.6	0.02	434	003-1L
2090.00	cut	Sh/Clst: ol gy to dsk y brn	0.06	1.66	0.72	2.31	1.56	106	46	1.7	0.03	434	004-1L
2100.00	cut	Sh/Clst: ol gy to dsk y brn	0.05	1.35	0.80	1.69	1.39	97	58	1.4	0.04	433	005-1L
2110.00	cut	Sh/Clst: ol gy to dsk y brn	0.02	1.57	0.65	2.42	1.64	96	40	1.6	0.01	434	006-1L
2120.00	cut	Sh/Clst: ol gy to dsk y brn	0.02	1.43	0.64	2.23	1.76	81	36	1.4	0.01	435	007-1L
2130.00	cut	Sh/Clst: ol gy to dsk y brn	0.04	1.62	0.63	2.57	1.49	109	42	1.7	0.02	435	008-1L
3302.00	cut	Sh/Clst: m gy	0.10	0.34	2.01	0.17	0.54	63	372	0.4	0.23	425	009-1L
3305.00	cut	Sh/Clst: m gy	0.21	0.53	2.78	0.19	0.59	90	471	0.7	0.28	417	010-1L
3310.00	cut	Sh/Clst: m gy to drk gy	1.12	19.04	2.09	9.11	3.96	481	53	20.2	0.06	434	011-1L
3314.00	cut	Sh/Clst: m gy to drk gy	0.66	15.89	1.28	12.41	3.50	454	37	16.6	0.04	432	012-1L
3794.00	cut	Sh/Clst: m gy to drk gy	0.06	0.15	0.74	0.20	0.53	28	140	0.2	0.29	436	020-3L
3803.00	cut	Sh/Clst: drk gy	0.06	0.06	0.26	0.23	0.63	10	41	0.1	0.50	450	021-3L
3812.00	cut	Sh/Clst: drk gy	0.05	0.35	0.22	1.59	0.62	56	35	0.4	0.13	439	022-3L

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Table 3 : Rock-Eval table for well NOCS 2/2-4

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3821.00	cut	Sh/Clst: gy blk to drk gy	0.07	0.05	0.29	0.17	0.77	6	38	0.1	0.58	447	023-3L
3830.00	cut	Sh/Clst: gy blk to drk gy	0.10	0.45	0.27	1.67	0.86	52	31	0.6	0.18	439	024-3L
3839.00	cut	Sh/Clst: gy blk to drk gy	0.13	0.66	0.37	1.78	0.94	70	39	0.8	0.16	436	025-3L
3875.00	cut	Sh/Clst: gy blk to drk gy	0.33	2.17	0.41	5.29	1.46	149	28	2.5	0.13	440	029-3L
3884.00	cut	Sh/Clst: gy blk to brn blk to drk gy	1.01	7.18	0.77	9.32	2.58	278	30	8.2	0.12	437	030-1L
3893.00	cut	Sh/Clst: ol blk	1.57	10.97	0.95	11.55	3.45	318	28	12.5	0.13	437	031-1L
3902.00	cut	Coal : blk	16.48	114.81	8.51	13.49	70.60	163	12	131.3	0.13	446	032-3L
3911.00	cut	Sh/Clst: ol blk to m brn to dsk y brn	5.24	174.44	0.90	193.82	27.60	632	3	179.7	0.03	451	033-1L

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Table 3b : Rocke-Eval standards and calibration.

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		S1	S2	S3	Tmax
STD0	:	0.13	12.40	1.82	429
STD1	:	0.13	12.38	1.79	430
STD2	:	0.14	12.21	1.76	429

STD0 = Calibration "Standard as standard", first run in sequnce.
STD1 = Standard "Standard as sample", run after sample "3884"
STD2 = Standard " Standard as sample", run after all samples.

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Table 4 : Tabulation of carbon isotope data and C2+ data in headspace gas for well NOCS 2/2-4.

Depth m	d 13C C1	d 13C C2	d 13C C3	d 13C iC4	d 13C nC4	C2+ in %	del D C1
2060.00	-62.9					5	
2070.00	-64.9					4	
2080.00	-64.5					19	
2090.00	-64.1					12	
2100.00	-64.6					17	
*2109.00	-64.77	-38.8	-31.5	-27.9	-29.3	2	-188.7
2110.00	-64.7					26	
2120.00	-62.2					11	
2130.00	-64.1					22	
3758.00	-33.7					70	
3767.00	-34.4	-30.2	-29.6	-28.8	-28.6	68	
3776.00	-33.5					65	
3785.00	-34.2					67	
3794.00	-34.5	-29.4	-29.3	-31.5	-29.1	70	
3803.00	Container broken during transport						
3812.00	-36.4	-29.9	-29.8	-27.5	-28.9	76	
3821.00	-36.0					69	
3830.00	-35.1					71	
3839.00	-35.8					69	
3848.00	-29.2	Very low amount of gas					
3857.00	-27.2	Very low amount of gas					
3866.00	-28.2					77	
3875.00	-33.0					86	
3884.00	-41.6	-33.4	-30.9	-30.5	-30.8	87	
3893.00	-43.0					89	
3902.00	-43.3	-31.6	-28.1	-28.8	-28.7	36	
3911.00	-42.9					42	

Calculation of C2+ :

C2+ (%) = (1- C1/Sum Cn) * 100

*2109 = Gas sample

The sample from 2109 was analysed three times with the following delta 13C results for methane : -64.77/-64.77/-64.84

Table 5 a: Weight of EOM and Chromatographic Fraction for well NOCS 2/2-4

Depth unit of measure: m

Depth	Typ	Lithology	Rock Extracted (g)	EOM (mg)	Sat (mg)	Aro (mg)	Asph (mg)	NSO (mg)	HC (mg)	Non-HC (mg)	TOC(e) (%)	Sample
3310.00	cut	Sh/Clst: m gy to drk gy	3.3	12.4	1.2	1.2	1.1	8.9	2.4	10.0	3.96	011-1L
3821.00	cut	Sh/Clst: gy blk to drk gy	2.5	3.3	0.2	0.3	1.4	1.5	0.5	2.8	0.77	023-3L

Table 5 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 2/2-4

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
3310.00	cut	Sh/Clst: m gy to drk gy	3815	369	369	338	2738	738	3076	011-1L
3821.00	cut	Sh/Clst: gy blk to drk gy	1330	60	120	564	584	181	1149	023-3L

Table 5 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 2/2-4

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
3310.00	cut	Sh/Clst: m gy to drk gy	96.35	9.32	9.32	8.55	69.15	18.65	77.70	011-1L
3821.00	cut	Sh/Clst: gy blk to drk gy	172.81	7.86	15.71	73.31	75.93	23.57	149.25	023-3L

Table 5 d: Composition of material extracted from the rock (%) for well NOCS 2/2-4

Depth unit of measure: m

Depth	Typ	Lithology	Sat / EOM	Aro / EOM	Asph / EOM	NSO / EOM	HC / EOM	Non-HC / EOM	Sat / Aro	HC / Non-HC	Sample
3310.00	cut	Sh/Clst: m gy to drk gy	9.68	9.68	8.87	71.77	19.35	80.65	100.00	24.00	011-1L
3821.00	cut	Sh/Clst: gy blk to drk gy	4.55	9.09	42.42	43.94	13.64	86.36	50.00	15.79	023-3L

Table 6 : Saturated Hydrocarbon Ratios for well NOCS 2/2-4

Depth unit of measure: m

Depth	Typ	Lithology	Pristane / nC17	Pristane / Phytane	Pristane + Phytane / nC17 + nC18	Phytane / nC18	CPI	CPI2	Sample
3310.00	cut	Sh/Clst: m gy to drk gy	1.01	1.75	0.87	0.70	1.25	0.96	011-1L
3821.00	cut	Sh/Clst: gy blk to drk gy	0.66	2.30	0.49	0.31	1.25	1.06	023-3L

Table 7 : Aromatic Hydrocarbon Ratios for well NOCS 2/2-4

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	Rc	MPI2	DBT/P	4/1MDBT	(3+2)/1MDBT	Sample
3310.00	cut	Sh/Clst: m gy to drk gy	-	-	-	0.74	0.76	0.86	0.65	0.22	0.71	-	011-1L
3821.00	cut	Sh/Clst: gy blk to drk gy	-	-	-	0.80	0.60	0.76	0.59	0.27	1.86	0.94	023-3L