

PETROLEUM GEOCHEMICAL
SCREENING ANALYSES
AND
VITRINITE REFLECTANCE
OF WELLS
2/7-2, 2/7-9, 2/7-19

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Well NOCS 2/7-2

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INTRODUCTION

The well NOCS 2/7-2 is situated to the west of the Valhall field in the South Central Graben. This was drilled to a total depth of 3965 m in 1971, reaching basaltic volcanics of Permian (?) age, and was plugged/abandoned as a dry hole.

Thirty-nine samples were lithologically described from the well, covering the interval 2004 - 3963.6 m, including three core samples from the basal volcanics. From these, twenty-three samples were subjected to screening analyses (TOC and Rock-Eval) and 18 samples were chosen for vitrinite reflectance microscopy.

General well details are as follows:

Position	: 56°16'00.85"N	Casing points:	129 m RKB
	03°09'09.04"E		587 m
Elevation	: 27 m		1589 m
Water depth	: 71 m		3189 m
Classification:	Dry, P & A		

The following stratigraphic sub-division, based on logs and NPD data, is used in this report:

Lower Cretaceous

Cromer Knoll Group 2950 - ~3840 m

Upper Jurassic

Tyne Group ~3840 - 3875 m

Mandal Formation ~3840 - 3875 m

Middle Jurassic (?)

Indeterminate Sand Unit 3875 - 3900 m

Permian (?)

Indeterminate Sand Unit

3900 - 3941 m

Basalt Volcanics

3941 - 3965 m, TD

SCREENING ANALYSES
(TOC and Rock-Eval)

A total of 23 samples was subjected to screening analyses, covering the interval 3003.8 - 3963.6 m. The results are discussed according to the stratigraphic units of the well, the screening data being listed in Table 2 and plotted against depth in Figures 1, 2 and 3, while Figure 4 shows a crossplot of Tmax and Hydrogen Index. TOC data is also included with the lithological descriptions, Table 1.

Source Rock Potential

Lower Cretaceous

Cromer Knoll Group (2950 - ~ 3840 m)

Three samples were analysed here, two core-chip carbonates and a light grey/greyish pink/red shale. Although the carbonates have high hydrogen indices suggestive of type II-III kerogen and all three samples have rich TOC contents (for carbonates/marls), this is almost certainly due not to kerogen, but to the presence of pyrolysable asphaltenes from migrated oils. As such these lithologies have no source rock potential.

Upper Jurassic

Tyne Group (~ 3840 - 3875 m)

Mandal Formation (~ 3840 - 3875 m)

The Mandal Fm. consists of soft, dusky yellow-brown to brownish black carbonaceous shale/claystone having rich TOC contents of 5.5 - 9.1 % TOC. These have consistently rich petroleum potentials of 27 - 28 mg HC/g rock and high hydrogen indices ranging 203 - 346 mg HC/g TOC, indicating type II/III kerogen and very good potential for generation of oil and gas.

Middle Jurassic (?)

Indeterminate Sand Unit (3875 - 3900 m)

This interval has cuttings samples overwhelmingly dominated by white to light grey/pale yellow-brown, mainly coarse cemented sandstone. In addition, there occur minor amounts of (?) caved shales similar to the Mandal Fm. and greyish/red shales. The eight sandstones analysed here obviously have no source rock potential.

Permian (?)

Indeterminate Sand Unit (3900 - 3941 m)

The cuttings samples from this interval contain mainly white to greyish red sandstone, mainly cemented, with locally equivalent amounts of greyish red, grey and greenish grey

marl/marly shale.

Again, the five sandstones analysed here have no source rock potential. The two shales/marls analysed have fair/good TOC contents for such lithologies, 0.49 and 0.52 %, but poor petroleum potentials of 1.3 and 1.8 mg HC/g rock. Their hydrogen indices, of 57 and 90 mg HC/g TOC, suggest only kerogen type IV with no inherent source potential.

Volcanic Unit (3941 - 3945 m)

No source potential.

Generation and Migration

(S_1 , Production Index, S_1/S_1+S_2)

The production indices (Figure 2) for the Mandal Fm., which is the only source rock unit present in this well, are moderate at 0.30 - 0.35, indicating that this unit has commenced generation of hydrocarbons, i.e. mature to well-mature, although still having the bulk of its potential remaining.

The production indices of the Lower Cretaceous carbonates and the marly shale are all very high (0.74 - 0.89) due to the presence of free, probably migrated hydrocarbons. These are abundant in the carbonates and significant in the marl. The samples from the sandstone (Middle Jurassic) and sandstone/marl/shale units (Permian) all have high production indices, ranging 0.50 - 1.00 and 0.51 - 0.79 respectively. In about 50 % of the samples these high indices are due to the low S_2 values. However, in the upper sand unit, in the samples between approximately 3884 m and 3950 m, the sandstones having production indices ranging ~ 0.6 - 0.7 have S_1

values indicating the presence of minor migrated or contaminant free hydrocarbons. Also, and particularly in the lower sand/marl/shale unit, the majority of samples have S_1 values clearly showing the presence of minor to moderately abundant amounts of free hydrocarbons. The presence of asphaltenes from residual oils in both of these units is suggested by the commonly high hydrogen indices, these often being in the range of 100 - 200 mg HC/g TOC, which cannot be explained by the presence of any coaly particles in the sandstones. Moreover, the sandstone at 3925.8 m is recorded in the lithological description as being stained. This "staining" has the appearance of black bitumen forming micro-veinlets and filling interstitial cavities.

In the underlying basaltic volcanic unit, one of the core-chip samples analysed (that from near TD) shows the presence of minor migrated or contaminant free hydrocarbons, the hydrogen index of this sample possibly indicates the presence of asphaltenes from residual oil. The core-chip sample from 3955.2 m has a high hydrogen index due only to a very low TOC content.

Maturity (Tmax)

The Tmax data (Figure 3) from the well shows no maturity trend, but this is to be expected since almost all the samples analysed are of sandstone, carbonate or marl which give unreliable and very variable results. The three Mandal Fm. shales plot in the middle of the oil window for kerogen type II, such that these appear to be well-mature, in agreement with the production index data.

VITRINITE REFLECTANCE

A total of 18 whole rock samples from the depth interval of 2004 - 3938 m were analysed for thermal maturity in the well NOCS 2/7-2. The samples covered the entire Lower Cretaceous, Upper Jurassic and Middle Jurassic section. In addition, part of Indeterminate Sand Unit of Permian age (?) was also studied. The thermal maturity data obtained is presented in Table 3, while Figure 5 shows a plot of vitrinite reflectance versus depth.

In general, the upper half of the analysed section is reasonably enriched in phytoclasts and has good quality vitrinite. In contrast, the lower half is highly depleted in any phytoclasts and in particular vitrinite is extremely rare. Despite attempts to obtain at least a few readings in these lean samples, no determination was possible in three of the samples (3796, 3864.8 and 3938 m). The samples were also examined using blue light excitation. No determination of spore fluorescence colour was possible in the majority of the samples, as practically no spores were observed. The two estimates presented in the thermal maturity table are mostly based on the fluorescence intensity of the algal material and dinoflagellates. Therefore, the overall reliability of fluorescence data is very low.

The five topmost samples (2004 - 2394 m) of Upper Cretaceous age (?) are very similar in character and have low to moderate phytoclast contents, almost 90 % of which are of poor to medium quality vitrinite and the remaining 10 % inertinite. The particle size varies from small to medium. Bitumen staining is generally low, but occasionally occurs to a moderate extent. In the sample from 2394 m in particular, staining is occasionally strong around vitrinite particles.

The following eight samples (2509 - 3796 m) are of Lower Cretaceous age and from the Cromer Knoll Gp. The overall phytoclast content is low to very low and the content seems to drop with increasing depth. Often the samples contain mixed lithologies making it difficult to assign the indigenous population. Although the overall maceral content is low, vitrinite is however the dominant maceral (over 70 %) as compared to inertinite. The quality of vitrinite is moderate and the particle size small to medium. Bitumen staining is low, except in the 2509 m and 2917 m samples, where it is moderate. Due to intense sample mixing (caving?), the reliability of the average R_o is lowered.

Of the two samples from the Indeterminate Sand Unit (Middle Jurassic?) (3864.8 and 3870.9 m), no determination was possible in the former. The sample from 3870.90 m gave very confusing results in that the average R_o of the dominant population is very low (0.35 % R_o). From the microscope observation of the lithology, it is certain that there are not cavings from shallow depths (3000 - 3300 m) which gave R_o in the same range. The overall phytoclast content is extremely low, but vitrinite is the dominant maceral. Bitumen staining also remains low.

The three deepest samples analysed are from the Indeterminate Sand Unit of Permian (?) age (3901.4, 3916.7 and 3938 m). Of these, no determination was possible from the sample from 3938 m. In the remaining two, the overall maceral content is extremely low and the lithology very mixed. At least two types of claystones (reflecting red and white) dominate in the sample. The vitrinite quality is mediocre and the particle size small. Staining is low.

Based on petrographical observations and reliability of individual data sets, a thermal maturity trend is proposed, as shown in Figure 5. Accordingly, the well is estimated to reach marginal maturity (R_o 0.5 %) at about 2600 m and the top of the oil window (R_o 0.6 %) is estimated to be at a

depth of 2970 m. The floor of the oil window (Ro 1.0 %) is estimated to be at 3640 m. Apparently, the number of control points in the oil window section is very limited and hence its interpretation must be made with caution.

CONCLUSIONS

The following conclusions can be made based on the screening and vitrinite reflectance analyses performed on well NOCS 2/7-2:

Source Rock Potential

The sole unit having source rock potential is the Mandal Fm., this having a rich TOC content (~ 6 - 9 %), consistently rich petroleum potential (~ 28 mg HC/g rock) due to its content of anoxic marine type II/III kerogen. This has excellent potential for mixed oil and gas generation.

The other units analysed are mainly sand units.

Generation and Migration

The Mandal Fm. is within the upper section of the oil window according to the production indices of 0.30 - 0.35, and therefore presently generating significant amounts of hydrocarbons, though not at peak oil. However, see maturity discussion below, where it is concluded that the Mandal Fm. has already expelled hydrocarbons.

Migrated or contaminant hydrocarbons are abundant in the Lower Cretaceous section, particularly in the carbonates. The Middle Jurassic sandstones (Indeterminate Unit) contain minor free hydrocarbons between ~ 3884 and 3950 m. The sands, marls and shales registered in the Permian (?) interval also contain minor to moderately abundant free hydrocarbons which may be asphaltenic, i.e. representing

residual oils. The sandstone cuttings here are visibly stained and veined by black bituminous matter. Beneath this the core-chip samples of the Permian (?) basaltic volcanics locally also show evidence of possible residual oils. Follow-up analyses are required to resolve whether the bulk of free hydrocarbons present are contaminants or migrated hydrocarbons.

Maturity

No maturity trend could be assessed from Tmax data since most of the units in this well are of sandstone or marls/carbonates which yield unreliable data. The Mandal Fm. appears to be in the oil window however, which agrees with the production index data.

The maturity trend according to vitrinite reflectance data suggests the top of the oil window (Ro 0.6 %) to occur at approximately 2670 m, i.e. above the Cromer Knoll Gp., while the oil floor (Ro 1.0 %) is estimated to be at ~ 3640 m, i.e. above the top of the Upper Jurassic. This data contradicts the production index and Tmax data and is based on good measurements in the upper half of the well, but poor measurements due to lean samples in the lower half. It is possible however that the Tmax values are lowered by the presence of asphaltenes, while the production index values may be low due to expulsion already having occurred from the Mandal Fm. This key difference can only be resolved by follow-up analyses, however the maturity of the well according to vitrinite reflectance is considered to be acceptable, such that the Mandal Fm. in this well probably lies at condensate window maturity.

Figure: 1

Client: AMOCO

TOC Data for Well NOCS 2/7-2

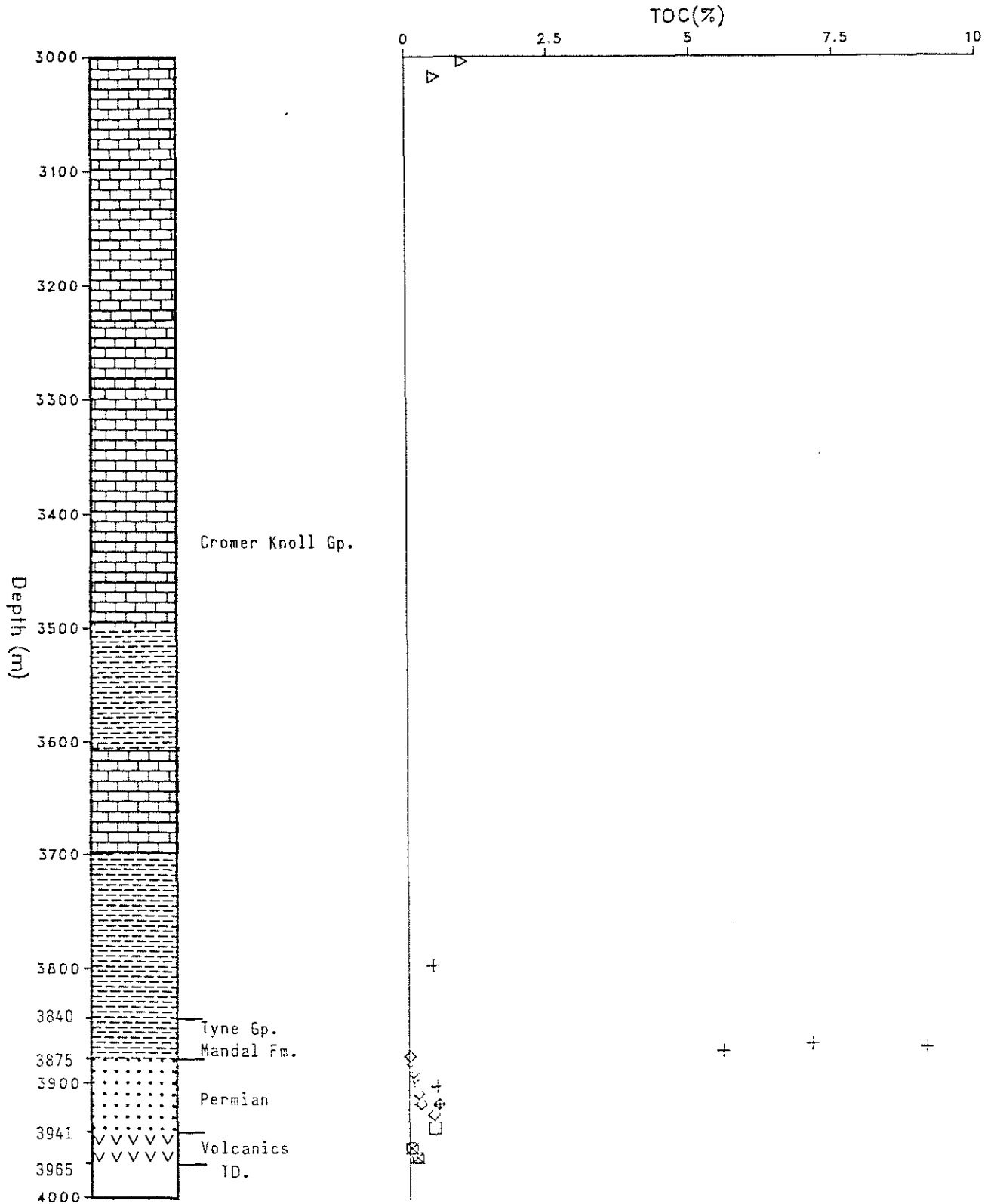


Figure: 2

Client: AMOCO

Production Index Data for Well NOCS 2/7-2

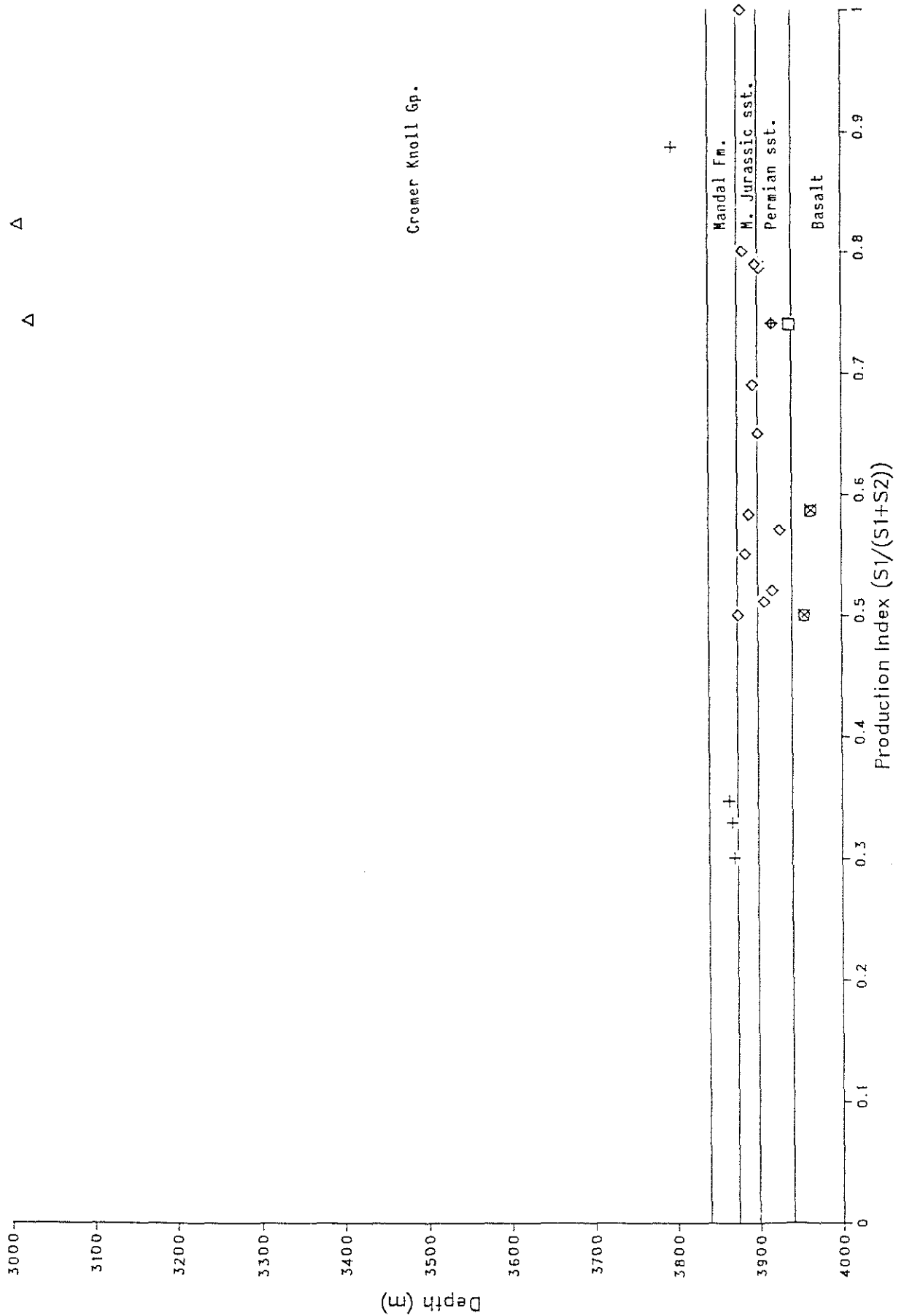


Figure: 3

Client: AMOCO

Tmax Data for Well NOCS 2/7-2

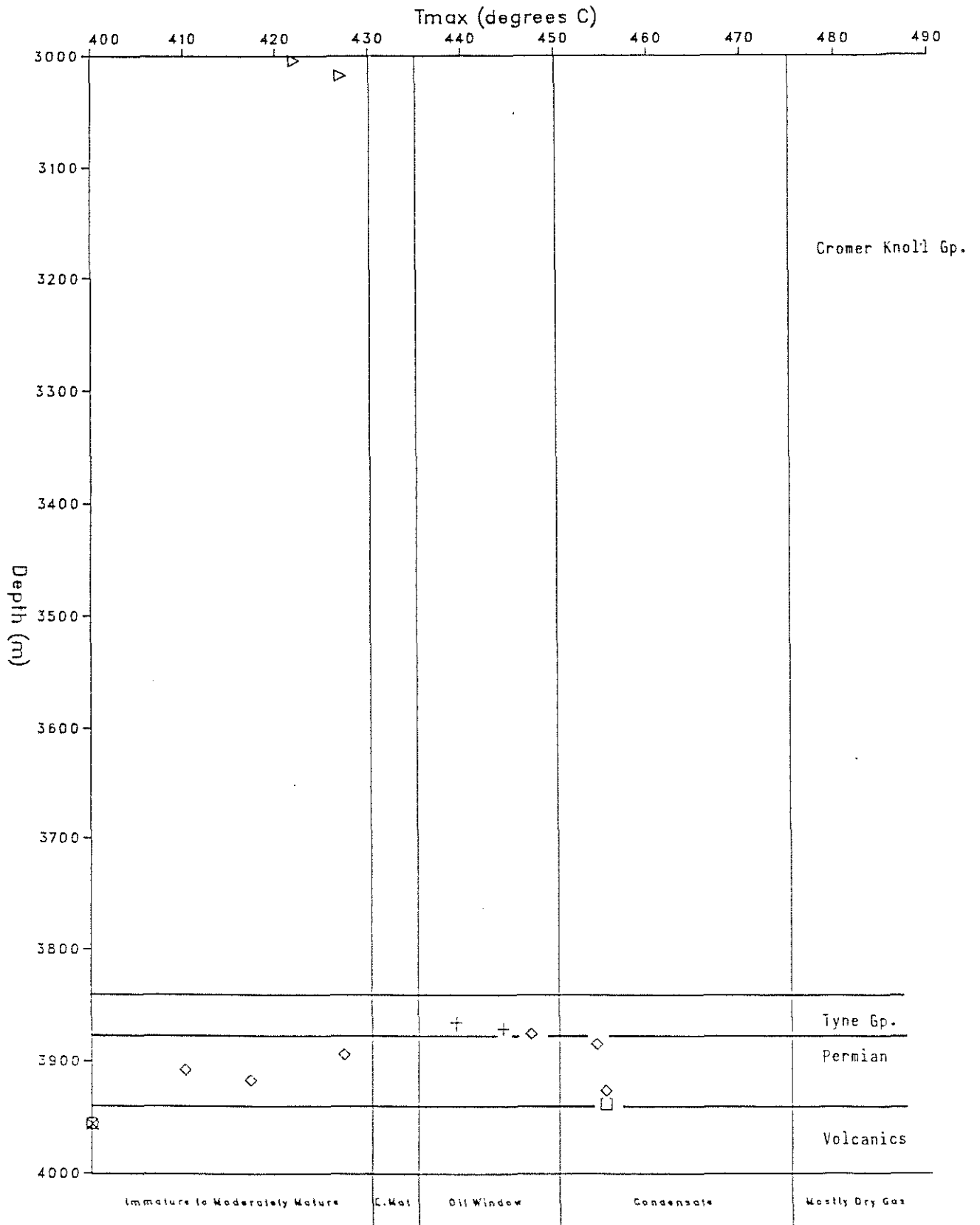


Figure 4 : Hydrogen Index v.s. Tmax values
 Well NOCS 2/7-2

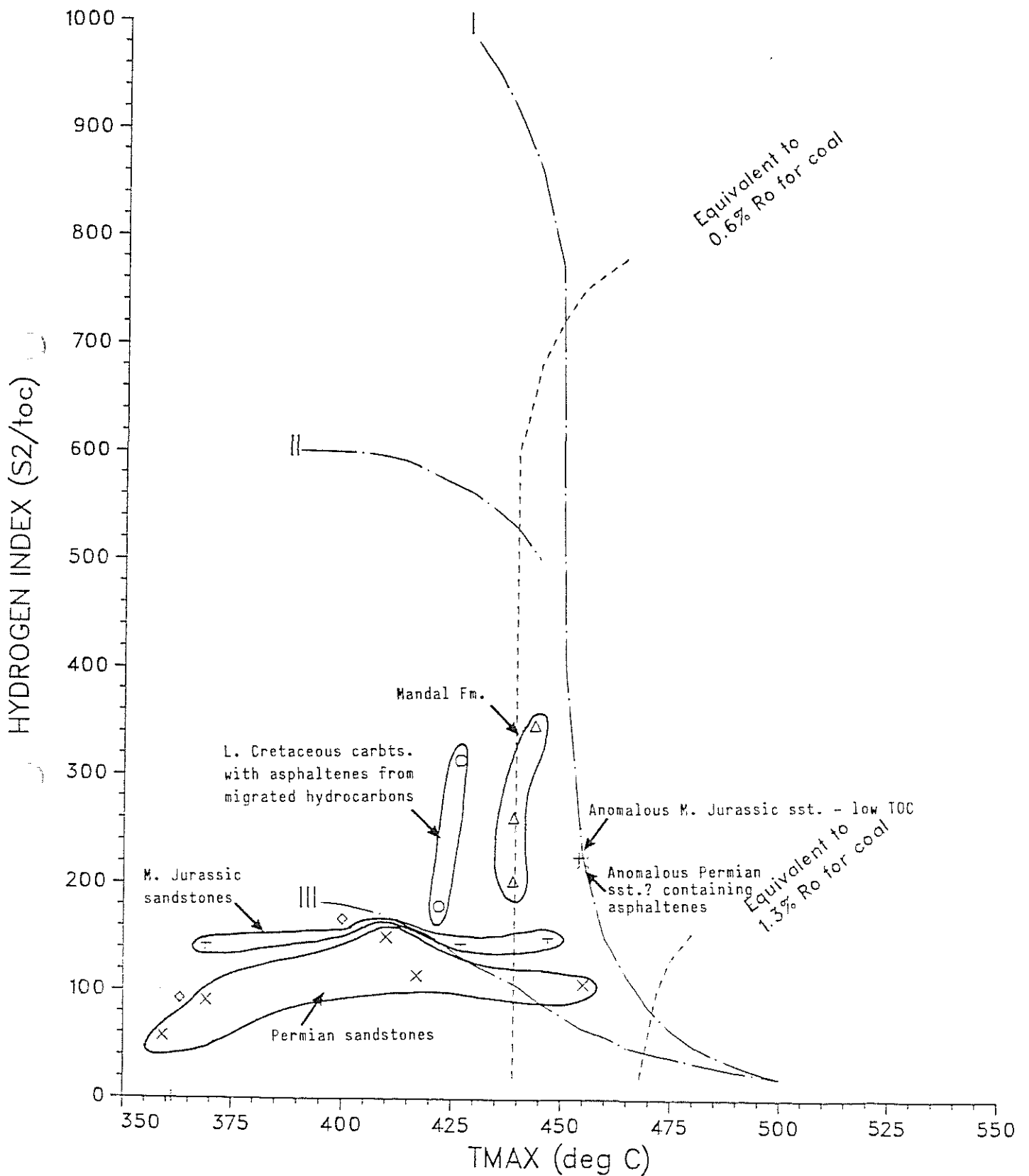


Figure 5: VITRINITE REFLECTANCE VERSUS DEPTH
 WELL NOCS 2/7-2

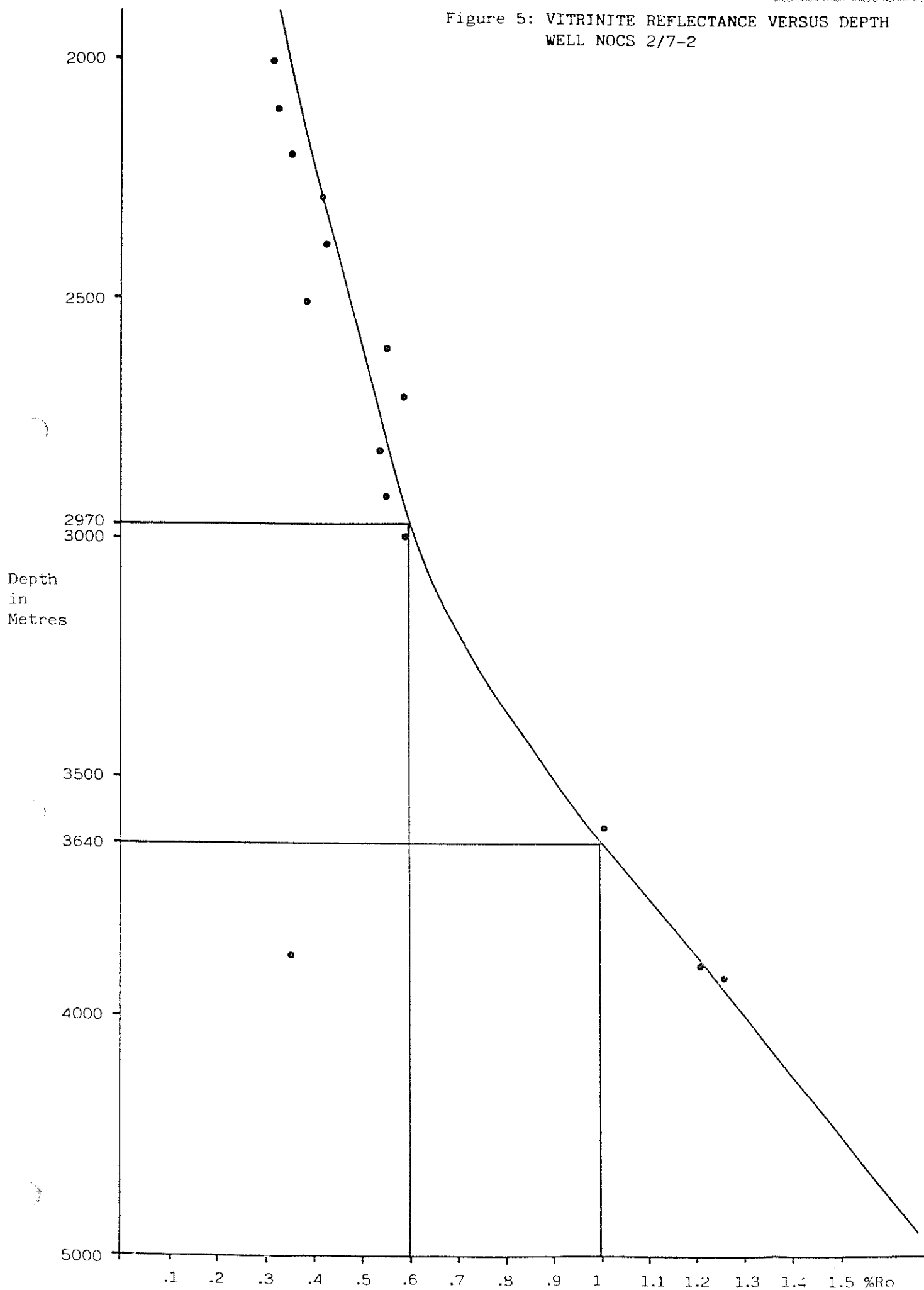


Table 1 : Lithology description for well NOCS 2/7-2

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2004.00				Tertiary		0020
			100	Sh/Clst: gy brn to dsk brn, slt		0020-1L
				tr Cont : evap		0020-2L
2105.00				Tertiary		0021
			80	Slstst : pl brn to brn gy		0021-3L
			20	Sh/Clst: gy brn to dsk brn, slt		0021-1L
				tr Cont : evap		0021-2L
2205.00				Tertiary		0022
			100	Slstst : pl brn to brn gy		0022-3L
				tr Sh/Clst: gy brn to dsk brn, slt		0022-1L
				tr Cont : evap		0022-2L
				tr S/Sst : gy red		0022-4L
2286.00				Tertiary		0023
			100	slstst : pl brn to brn gy		0023-3L
				tr Sh/Clst: gy brn to dsk brn, slt		0023-1L
				tr Cont : evap		0023-2L
2394.00				Tertiary		0024
			50	Sh/Clst: gy brn to dsk brn, slt		0024-1L
			50	Slstst : pl brn to brn gy		0024-3L
				tr Cont : evap		0024-2L

Table 1 : Lithology description for well NOCS 2/7-2

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
2509.00				Tertiary		0025
			50 Sltst	: gy brn to dsk brn		0025-1L
			50 Sltst	: pl brn to brn gy		0025-3L
			tr Cont	: evap		0025-2L
2609.00				Tertiary		0026
			100 Sh/Clst:	pl brn to brn gy to pl ol		0026-1L
2710.00				Tertiary		0027
			100 sltst	: brn gy to gy brn to pl ol, s		0027-1L
			tr Cont	: evap		0027-2L
2816.00				Tertiary		0028
			100 Sh/Clst:	pl brn to gy brn to pl ol, slt		0028-1L
2917.00				Tertiary		0029
			80 Sh/Clst:	pl brn to gy brn to pl ol, slt		0029-1L
			20 Cont	: st		0029-3L
			tr Sh/Clst:	gy red		0029-2L
			tr S/Sst	: drk gy		0029-4L
			tr Ca	: or gy		0029-5L
3002.00				U.Cretaceous(?)		0030
			60 Sh/Clst:	pl brn to gy brn to pl ol, slt		0030-1L
			40 Ca	: w to lt or, chk		0030-3L
			tr Sh/Clst:	gy red		0030-2L

Table 1 : Lithology description for well NOCS 2/7-2

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3003.80	ccp			U.Cretaceous(?)		0041
		1.01	100 Ca	: w to lt or, chk		0041-1L
3017.80	ccp			U.Cretaceous(?)		0042
		0.51	100 Ca	: w to lt or, chk		0042-1L
3022.70	ccp			U.Cretaceous(?)		0043
			100 Ca	: w to lt or, chk		0043-1L
3027.30	ccp			U.Cretaceous(?)		0044
			100 Ca	: w to lt or, chk		0044-1L
3045.00				U.Cretaceous(?)		0031
			100 Ca	: w to lt or, chk		0031-3L
			tr Sh/Clst:	pl brn to gy brn to pl ol, slt		0031-1L
			tr Sh/Clst:	gy red		0031-2L
3143.00				U.Cretaceous(?)		0032
	cvd		50 Sh/Clst:	pl brn to gy brn to pl ol to m		0032-1L
				gy, slt		
			50 Ca	: w to lt or, chk		0032-3L
			tr Sh/Clst:	gy red		0032-2L
3219.00				U.Cretaceous(?)		0033
			80 Ca	: w to lt or, chk		0033-3L
			20 Cont	: cem, prp		0033-4L
	cvd		tr Sh/Clst:	pl brn to gy brn to pl ol to m		0033-1L
				gy, slt		
			tr Sh/Clst:	gy red		0033-2L

Table 1 : Lithology description for well NOCS 2/7-2

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
3316.00				U.Cretaceous(?)		0034
		100 Ca		: w to lt or, chk		0034-1L
3389.00				U.Cretaceous(?)		0035
		100 Ca		: w to lt or, chk		0035-1L
		tr Cont		: prp		0035-2L
3508.00				U.Cretaceous(?)		0036
		100 Ca		: w to lt or, chk		0036-1L
		tr Cont		: prp		0036-2L
3606.00				U.Cretaceous(?)		0037
		90 Cont		: prp, dd		0037-2L
		10 Sh/Clst		: lt gy to m gy, mrl		0037-3L
		tr Ca		: w to lt or, chk		0037-1L
3703.00				U.Cretaceous(?)		0038
		100 Ca		: w to lt or, chk		0038-1L
		tr Sh/Clst		: lt gy to drk gy		0038-2L
3796.00				U.Cretaceous(?)		0039
	0.42	65 Sh/Clst		: lt gy to gy pi to gy red, mrl		0039-3L
		15 Ca		: w to lt or, chk		0039-1L
		10 Sh/Clst		: m gy to drk gy		0039-2L
		10 Cont		: dd		0039-4L

Table 1 : Lithology description for well NOCS 2/7-2

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3864.80				Tyne Mand U.Jurassic		0002
	7.07	90		Sh/Clst: dsk y brn to brn blk, carb, sft		0002-3L
		5		Sh/Clst: gy red		0002-1L
		5		Cont : evap		0002-2L
3867.90				Tyne Mand U.Jurassic		0001
	9.07	90		Sh/Clst: dsk y brn to brn blk, carb, sft		0001-3L
		5		Sh/Clst: gy red		0001-1L
		5		Cont : evap		0001-2L
3870.90				Tyne Mand U.Jurassic		0003
	5.50	100		Sh/Clst: dsk y brn to brn blk, carb, sft		0003-3L
		tr		Sh/Clst: gy red		0003-1L
		tr		Cont : evap		0003-2L
3875.50				Jurassic(?)		0004
	0.02	90		S/Sst : w to lt gy to pl y brn, crs, cem		0004-4L
		10		Sh/Clst: dsk y brn to brn blk, carb, sft		0004-3L
		tr		Sh/Clst: gy red		0004-1L
		tr		Cont : evap		0004-2L
3880.10				Jurassic(?)		0005
	0.01	95		S/Sst : w to lt gy to pl y brn, crs, cem		0005-4L
		5		Sh/Clst: dsk y brn to brn blk, carb, sft		0005-3L
		tr		Sh/Clst: gy red		0005-1L
		tr		Cont : fib		0005-2L

Table 1 : Lithology description for well NOCS 2/7-2

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3881.60				Jurassic(?)		0010
	0.01	100	S/Sst	: w to lt gy to pl y brn, crs, cem, l		0010-3L
			tr Cont	: fib		0010-1L
			tr Sh/Clst:	dsk y brn to brn blk, carb, sft		0010-2L
			tr Sh/Clst:	gy red		0010-4L
3884.60				Jurassic(?)		0006
	0.04	90	S/Sst	: w to lt gy to pl y brn, crs, cem		0006-4L
			5 Sh/Clst:	gy red		0006-1L
			5 Sh/Clst:	dsk y brn to brn blk, carb, sft		0006-3L
			tr Cont	: fib		0006-2L
3889.30				Jurassic(?)		0011
	0.07	100	S/Sst	: w to lt gy to pl y brn, crs, cem, l		0011-3L
			tr Cont	: fib		0011-1L
			tr Sh/Clst:	dsk y brn to brn blk, carb, sft		0011-2L
			tr Sh/Clst:	gy red		0011-4L
3893.80				Jurassic(?)		0007
	0.09	100	S/Sst	: w to lt gy to pl y brn, cem		0007-4L
			tr Sh/Clst:	gy red		0007-1L
			tr Cont	: fib		0007-2L
			tr Sh/Clst:	dsk y brn to brn blk, carb, sft		0007-3L
3895.00				Jurassic(?)		0040
		100	S/Sst	: lt brn gy, cem		0040-5L
			tr Ca	: w to lt or, chk		0040-1L
			tr Sh/Clst:	m gy to drk gy		0040-2L
			tr Sh/Clst:	lt gy to gy pi to gy red, mrl		0040-3L
			tr Cont	: fib		0040-4L

Table 1 : Lithology description for well NOCS 2/7-2

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3896.80				Jurassic(?)		0008
	0.09	100	S/Sst	: w to lt gy to pl y brn, cem		0008-4L
			tr Sh/Clst:	gy red		0008-1L
			tr Cont	: fib		0008-2L
			tr Sh/Clst:	dsk y brn to brn blk, carb, sft		0008-3L
3900.00				Permian(?)		0012
	0.08	100	S/Sst	: w to lt gy to pl y brn to gy red,		0012-3L
				crs, cem, l		
			tr Cont	: fib		0012-1L
			tr Sh/Clst:	dsk y brn to brn blk, carb, sft		0012-2L
			tr Sh/Clst:	gy red		0012-4L
3901.40				Permian(?)		0009
	0.08	50	S/Sst	: w to gy red, cem, l		0009-3L
	0.49	50	Sh/Clst:	gy red, lt gy to brn gy to lt gn		0009-4L
				gy, mrl		
			tr Cont	: fib		0009-1L
			tr Sh/Clst:	dsk y brn to brn blk, carb, sft		0009-2L
3907.50				Permian(?)		0013
	0.16	95	S/Sst	: w to gy red, cem		0013-2L
		5	Sh/Clst:	gy red, lt gn gy		0013-3L
			tr Sh/Clst:	dsk y brn to brn blk, carb, sft		0013-1L
3916.70				Permian(?)		0014
	0.21	50	S/Sst	: w to gy red, cem		0014-2L
	0.52	40	Marl	: gy red, lt gn gy		0014-3L
		10	Ca	: w		0014-4L
			tr Sh/Clst:	dsk y brn to brn blk, carb, sft		0014-1L

Table 1 : Lithology description for well NOCS 2/7-2

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample	
Int Cvd	TOC%	%	Lithology description				
3925.80				Permian(?)		0015	
	0.43	95	S/Sst	: w to gy red, st, cem		0015-2L	
		5	Marl	: gy red, lt gn gy		0015-3L	
		tr	Sh/Clst:	dsk y brn to brn blk, carb, sft		0015-1L	
		tr	Ca	: w		0015-4L	
3938.00				Permian(?)		0016	
		95	S/Sst	: w to gy red, crs, cem, l		0016-2L	
	0.43	5	Marl	: gy red, lt gn gy		0016-3L	
			bulk			0016-0B	
		tr	Sh/Clst:	dsk y brn to brn blk, carb, sft		0016-1L	
		tr	Ca	: w		0016-4L	
3955.20	ccp			Permian(?)		0017	
	0.03	100	Volc	: gy red, fe		0017-1L	
3960.20	ccp			Permian(?)		0018	
		100	Volc	: drk gn gy to gy red, fe		0018-1L	
3963.60	ccp			Permian(?)		0019	
	0.13	100	Volc	: drk gn gy to gy red, fe		0019-1L	

Table 2 : Rock-Eval table for well NOCS 2/7-2

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3003.80	ccp	Ca : w to lt or	8.50	1.81	0.52	3.48	1.01	179	51	10.3	0.82	422	0041-1L
3017.80	ccp	Ca : w to lt or	4.63	1.60	0.43	3.72	0.51	314	84	6.2	0.74	427	0042-1L
3796.00	cut	Sh/Clst: lt gy to gy pi to gy red	1.97	0.25	0.94	0.27	0.42	60	224	2.2	0.89	344	0039-3L
3864.80	cut	Sh/Clst: dsk y brn to brn blk	9.80	18.45	2.37	7.78	7.07	261	34	28.3	0.35	439	0002-3L
3867.90	cut	Sh/Clst: dsk y brn to brn blk	9.04	18.41	2.22	8.29	9.07	203	24	27.5	0.33	439	0001-3L
3870.90	cut	Sh/Clst: dsk y brn to brn blk	8.17	19.02	2.68	7.10	5.50	346	49	27.2	0.30	444	0003-3L
3875.50	cut	S/Sst : w to lt gy to pl y brn	0.03	0.03	0.06	0.50	0.02	150	300	0.1	0.50	447	0004-4L
3880.10	cut	S/Sst : w to lt gy to pl y brn	0.03	-	-	-	0.01	-	-	-	1.00	361	0005-4L
3881.60	cut	S/Sst : w to lt gy to pl y brn	0.04	0.01	-	-	0.01	100	-	0.1	0.80	297	0010-3L
3884.60	cut	S/Sst : w to lt gy to pl y brn	0.11	0.09	0.02	4.50	0.04	225	50	0.2	0.55	454	0006-4L
3889.30	cut	S/Sst : w to lt gy to pl y brn	0.14	0.10	0.02	5.00	0.07	143	29	0.2	0.58	369	0011-3L
3893.80	cut	S/Sst : w to lt gy to pl y brn	0.29	0.13	0.02	6.50	0.09	144	22	0.4	0.69	427	0007-4L
3896.80	cut	S/Sst : w to lt gy to pl y brn	0.15	0.04	-	-	0.09	44	-	0.2	0.79	344	0008-4L
3900.00	cut	S/Sst : w to lt gy to pl y brn to gy red	0.26	0.14	0.11	1.27	0.08	175	138	0.4	0.65	370	0012-3L

Table 2 : Rock-Eval table for well NOCS 2/7-2

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3901.40	cut	S/Sst : w to gy red	0.11	0.03	-	-	0.08	38	-	0.1	0.79	322	0009-3L
3901.40	cut	Sh/Clst: gy red, lt gy to brn gy to lt gn gy	1.06	0.28	0.27	1.04	0.49	57	55	1.3	0.79	359	0009-4L
3907.50	cut	S/Sst : w to gy red	0.25	0.24	0.03	8.00	0.16	150	19	0.5	0.51	410	0013-2L
3916.70	cut	S/Sst : w to gy red	0.26	0.24	0.03	8.00	0.21	114	14	0.5	0.52	417	0014-2L
3916.70	cut	Marl : gy red, lt gn gy	1.34	0.47	0.30	1.57	0.52	90	58	1.8	0.74	369	0014-3L
3925.80	cut	S/Sst : w to gy red	1.26	0.95	0.06	15.83	0.43	221	14	2.2	0.57	455	0015-2L
3938.00	cut	bulk	1.31	0.46	0.29	1.59	0.43	107	67	1.8	0.74	455	0016-0B
3955.20	ccp	Volc : gy red	0.05	0.05	0.19	0.26	0.03	167	633	0.1	0.50	400	0017-1L
3963.60	ccp	Volc : drk gn gy to gy red	0.17	0.12	0.23	0.52	0.13	92	177	0.3	0.59	363	0019-1L

VITRINITE REFLECTANCE

Table 3:

NOCS 2/7-2

Depth unit of measure: m

Well/Loc. Code: D83

Project: 2668

Depth	S-Tp	F-Tp	Lithology	Ro(av)	n	sd	Fluor	Histo	Table	Sample	Transfer
2004.00	cut	b	bulk	0.32	20	0.05	3?			0020-0B	
2105.00	cut	b	bulk	0.33	14	0.05	NDP			0021-0B	
2205.00	cut	b	bulk	0.36	2	0.04	NDP			0022-0B	
2286.00	cut	b	bulk	0.42	5	0.02	4			0023-0B	
2394.00	cut	b	bulk	0.43	12	0.04	NDP			0024-0B	
2509.00	cut	b	bulk	0.39	19	0.04	5??			0025-0B	
2609.00	cut	b	bulk	0.56	2	0.04	NDP			0026-0B	
2710.00	cut	b	bulk	0.59	8	0.08	NDP			0027-0B	
2816.00	cut	b	bulk	0.54	4	0.07	NDP			0028-0B	
2917.00	cut	b	bulk	0.55	2	0.14	6??			0029-0B	
3002.00	cut	b	bulk	0.59	4	0.05	NDP			0030-0B	
3606.00	cut	b	bulk	1.01	8	0.04	NDP			0037-0B	
3796.00	cut	b	bulk	NDP			NDP			0039-0B	

VITRINITE REFLECTANCE

NOCS 2/7-2

Depth unit of measure: m

Project: 2668

Table 3:

Well/Loc. Code: D83

Depth	S-Tp	F-Tp	Lithology	Ro(av)	n	sd	Fluor	Histo	Table	Sample	Transfer
3864.80	cut	b	bulk	NDP			7-8??			0002-0B	
3870.90	cut	b	bulk	0.35	6	0.02	NDP			0003-0B	
3901.40	cut	b	bulk	1.21	6	0.05	NDP			0009-0B	
3916.70	cut	b	bulk	1.26	4	0.07	NDP			0014-0B	
3938.00	cut	b	bulk	NDP			NDP			0016-0B	

Well NOCS 2/7-9

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ENCLOSURE

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INTRODUCTION

The well NOCS 2/7-9 is situated between the Eldfisk and Valhall fields in the South Central Graben. This was drilled to a total depth of 4448 m in 1974, reaching Middle Jurassic (?) sediments and was plugged/abandoned as an appraisal well.

Sixty-three cuttings samples were lithologically described, covering the interval 2006 - 4413.5 m, from which 43 samples were selected for screening analyses (TOC and Rock-Eval) and 23 samples were chosen for vitrinite reflectance microscopy.

General well details are as follows:

Position	: 56°19'50.60"N	Casing points:	145 m RKB
	03°14'29.30"E		501 m
Elevation	: 37 m		1226 m
Water depth:	71 m		2745 m
Status	: P & A oil discovery	Liner :	4064 m

The following stratigraphic sub-division, based on logs and NPD data, is used in this report:

Upper Cretaceous/Lower Palaeocene

Chalk Group 3075 - 3900 m

Lower Cretaceous

Cromer Knoll Group 3900 - 4090 m

Rødby Formation 3900 - 3962 m

Valhall Formation 3962 - 4090 m

Upper Jurassic

Tyne Group

(Indeterminate units) 4090 - 4448, TD

SCREENING ANALYSES

(TOC and Rock-Eval)

A total of 43 samples was subjected to TOC and Rock-Eval analyses, covering the interval 3185 - 4413.5 m. The results are discussed according to the stratigraphic units of the well, the screening data being listed in Table 2 and plotted against depth in Figures 1, 2 and 3; while Figure 4 shows a crossplot of Tmax versus Hydrogen Index. TOC data is also included with the lithological descriptions, Table 1.

Source-Rock Potential

Upper Cretaceous

Chalk Group (3075 - 3900 m)

Two samples of carbonate were analysed here. These have no source rock potential, the locally high hydrogen indices here being due to traces of either migrated hydrocarbons or contaminants.

Lower Cretaceous

Cromer Knoll Group (3900 - 4090 m)

The Cromer Knoll Gp. consists of the Rødby and Valhall Fms. Only one sample was examined from the former, this containing mainly light orange to orange-grey carbonate with abundant brownish/medium grey and greyish red shale/claystone. The bulk analysis performed here shows a fair/good

TOC content for such a lithology, 0.73 %. The hydrogen index of 100 mg HC/g TOC is similarly somewhat high, though the petroleum potential is poor at 1.5 mg HC/g rock. The data suggests the lithologies of the Rødby Fm. to have no indigenous potential for significant hydrocarbon generation.

The underlying Valhall Fm. appears to consist mainly of brownish/olive-grey, greyish red and dusky yellow-green silty shale/claystone, though many of the cuttings samples here contain abundant/dominant amounts of indurated rock fragments indicating turbodrilling, while the two lowermost samples contain abundant contamination presumably associated with the liner set at 4064 m.

The shales analysed have consistently fair TOC contents of 0.35 - 0.75 %, with hydrogen indices ranging 69 - 147 mg HC/g TOC indicating type IV/III kerogen. The petroleum potentials of these are generally poor, averaging around 1 mg HC/g rock, such that the Valhall Fm. can be practically discounted as a source rock.

Upper Jurassic

Tyne Group (4090 - 4448 m, TD)

Indeterminate Unit (4090 - 4448 m, TD)

The Tyne Gp. of this well is rather unusual (for the Upper Jurassic) from the cuttings samples, which throughout contain mainly medium/light brownish grey and greyish red marls, ranging to similarly coloured calcareous, silty and sandy shales with depth. If caving is discounted (there are no casing points below 4064 m, in the overlying unit) this would suggest the Tyne Gp. to consist mainly of shallow-water, often well oxidized calcareous sediments. The occur-

rence of accessory dark grey to dusky yellow-brown silty/sandy shales suggests the presence of fine laminae of more organic-rich sediments which are more typical of the Tyne Gp.. The two lowermost samples are strongly contaminated, though only by circulation-loss prevention agents (nutshells, micas). Many of the samples analysed in this interval are bulk samples since these are considered best representative of the apparently rapid variations in the sediments. Picking of cuttings for analysis was carried out as carefully as possible to avoid contamination.

The TOC contents of these sediments, range overwhelmingly poor to fair, 0.13 - 0.46 %, though the four lowermost samples have poor to rich contents, 0.46 - 2.87 %, possibly in part due to contamination. The hydrogen indices range 53 - 172 mg HC/g TOC, averaging around 100 mg HC/g TOC, which suggests kerogen transitional between types IV and III. The petroleum potentials of these sediments are likewise poor, mainly 0.2 - 1.7 mg HC/g rock, five samples in the lower part of the interval (4355.6 m and below) having fair/good potentials ranging 2.2 - 10.0 mg HC/g rock. Overall the screening data suggests that the Tyne Gp. sediments have potential only for small amounts of gas.

Generation and Migration

(S_1 , Production Index, S_1/S_1+S_2)

The well does not contain any source rock units of interest, such that generation will not be discussed.

The Upper Cretaceous carbonates have high production indices, 0.54 and 0.88, which cannot be explained by very low S_2 values. These are therefore interpreted to contain small amounts of free hydrocarbons, either migrated or contaminants.

The production index data (Figure 2) for the Lower Cretaceous shale lithologies ranges 0.32 - 0.72, i.e. moderately high to very high. These cannot by any means be explained by low S_2 values, which can often give high production indices in poor quality source rock units, and the data is therefore interpreted to suggest the presence of minor to abundant amounts of migrated or contaminant hydrocarbons throughout the Valhall Fm. and at least also in the lower levels of the Rødby Fm. This is corroborated by the good S_1 values in these intervals. The locally elevated hydrogen indices, particularly that of the carbonate sample from 4081.3 m, also suggest the presence of asphaltenes from residual oils (though some contaminants can also result in such). The production indices of the Tyne Gp. sediments are also all high, mainly 0.7 - 0.8, and likewise these cannot be explained by low S_2 values (apart perhaps for the samples 4145.3 m and 4163.5 m). The Tyne Gp. is therefore also considered to contain minor to abundant amounts of migrated or contaminant hydrocarbons throughout, also corroborated by generally good S_1 values.

The occurrence of free hydrocarbons generally throughout both the Valhall Fm. and the Tyne Gp., over an interval of about 330 m, may point towards contamination rather than natural (migrated) hydrocarbons, although widespread contamination does not appear to be visibly evident from examination of the cuttings. In addition, the production index depth plot shows a rudimentary trend of increase with increasing depth. This would appear to rule out both caving and contamination from mud-additives. The trend shown is similar to that expected for source rocks of increasing maturity, which evidently do not exist in this well. One possible explanation is that the well is drilled into a palaeo-high, with unusual shallow-water conditions in the Upper Jurassic which was flanked by deep basins having marine oil-prone sediments more typical of the Mandal Fm. which have generated and expelled oils into the palaeo-high.

There are no records of the mud type used in this well in the NPD (vol. 5) records, though a DST test performed at 4313 - 4356 m (in the Tyne Gp.) registered a flow of 226 BOPD of 45.1° API oil. It is therefore probable that most of the well samples are stained by migrated and reservoir hydrocarbons. Interestingly, from the hydrogen index data there do not appear to be any major amounts of pyrolysable asphaltenes present from residual oils, apart perhaps from minor amounts at ~ 3970 - 3980 m in the Cromer Knoll Gp. and at the Upper Jurassic/Lower Cretaceous boundary. Thermal extraction/pyrolysis GC analysis is necessary to resolve the above uncertainties.

Maturity (Tmax)

The Tmax data for the well, Figure 3, is sparse since most of the data lies below 400°C. No maturity trend can be established from this data.

VITRINITE REFLECTANCE

A total of 23 samples from the depth interval at 2006 m to 4410 m was analysed for thermal maturity in the well NOCS 2/7-9. The samples covered the stratigraphic range from Upper Cretaceous/Lower Palaeocene to Upper Jurassic. The thermal maturity data is presented in Table 3, while Figure 5 shows the plot of vitrinite reflectance versus depth. The overall sample quality becomes poorer with depth, shown by sample mixing and a resulting spread in data becoming very acute in the lower half of the analysed section.

The four shallowest samples (2006 - 2298 m) of Tertiary age have low to very low phytoclast contents, nearly all of which are of small to medium sized vitrinite clasts. The quality of vitrinite varies from good at 2006 m to very poor at 2298 m, exhibiting a gradual but steady change. Bitumen staining is moderate in all samples, especially around the vitrinite particles. In fluorescence mode very few fluorescing liptinites are seen, most of which are alginites. Spores are very rare.

The next five samples (2399 - 2782 m), also of Tertiary age, have extremely low maceral content and vitrinite, which is almost absent, is of very poor quality and small size, staining is mostly low but occasionally moderate around vitrinite particles in samples from 2399 and 2490 m. Nearly all vitrinite present in these samples seems to be reworked, except in the 2490 m sample. Fluorescing macerals include alginite and dinoflagellates, but spores are very rare.

No determination was possible for the sample from 2591 m.

The following two samples of Upper Cretaceous/Lower Palaeocene age (3088 and 3743 m) also have very low phytoclast contents and vitrinite occurs in only trace amounts. The

lithology is very mixed and hence two distinct populations result. The vitrinite is of poor, or at best medium quality and of small size, staining being low. Observed liptinites in blue light excitation include minor alginite, dinoflagellates and very few spores.

The next four samples (3971.5 - 4081.3 m) are of Lower Cretaceous age and there is a systematic change in their phytoclast content. It is very low in the sample from 3971.5 m, but gradually increases until it is high in the sample from 4081.3 m. The percentage of vitrinite is much higher (60 - 80 %) in the samples from 3971.5 and 4081.3 m, but only traces of vitrinite occur in the two samples in between. The quality is however, consistently poor. The lithology however is very mixed in all four, resulting in two main populations. Bitumen staining is low in all the four samples. No special features were observed in the light excitation mode.

The remaining eight samples (4117.8 - 4410.5 m) are of Upper Jurassic age (Tyne Gp., Indeterminate Units) and the majority of them have extremely low phytoclast contents, except in samples from 4117.8 and 4383 m, where the content is medium. In addition, the lithology of the samples is very mixed, dominated mostly by red and white claystones under reflected white light. Vitrinite, which occurs only in traces, is generally of poor quality. Bitumen staining remains consistently low. The reliability of data from these samples is considered to be very low.

Based on the petrographical observations and reliability of individual data sets, a thermal maturity curve is proposed as shown in Figure 5. Apparently, the well tends to become increasingly mature after about 3500 m. Accordingly, the well is estimated to reach marginal maturity (Ro 0.5 %) at around 3000 m and the top of the oil window (Ro 0.6 %) is expected to be at a depth of 3600 m. The oil floor (Ro 1.0 %) is estimated to be at around 4210 m.

CONCLUSIONS

The following conclusions can be made following the screening and vitrinite reflectance analyses performed on well NOCS 2/7-9:

Source Rock Potential

No units having any source rock potential were encountered in this well. Even though present, the Upper Jurassic Tyne Gp. occurs as an indeterminate unit represented in cuttings by lithologies of apparent terrestrial origin, variously (light) coloured shales having only thin organic-rich laminae, which is unusual for this group in the North Sea.

Generation and Migration

No significant hydrocarbons have or could be generated from the shales in this well.

In the Upper Cretaceous the carbonates contain apparently small amounts of either migrated or contaminant hydrocarbons. These become minor to abundant throughout the Lower Cretaceous section where screening data also suggests the possibility of asphaltenes from residual oils. The same is the case for the Tyne Gp. sediments analysed, i.e. minor to abundant migrated (? residual) or contaminant hydrocarbons.

Follow-up analyses are required to resolve these questions, however contaminants are not particularly evident in the cuttings samples.

Maturity

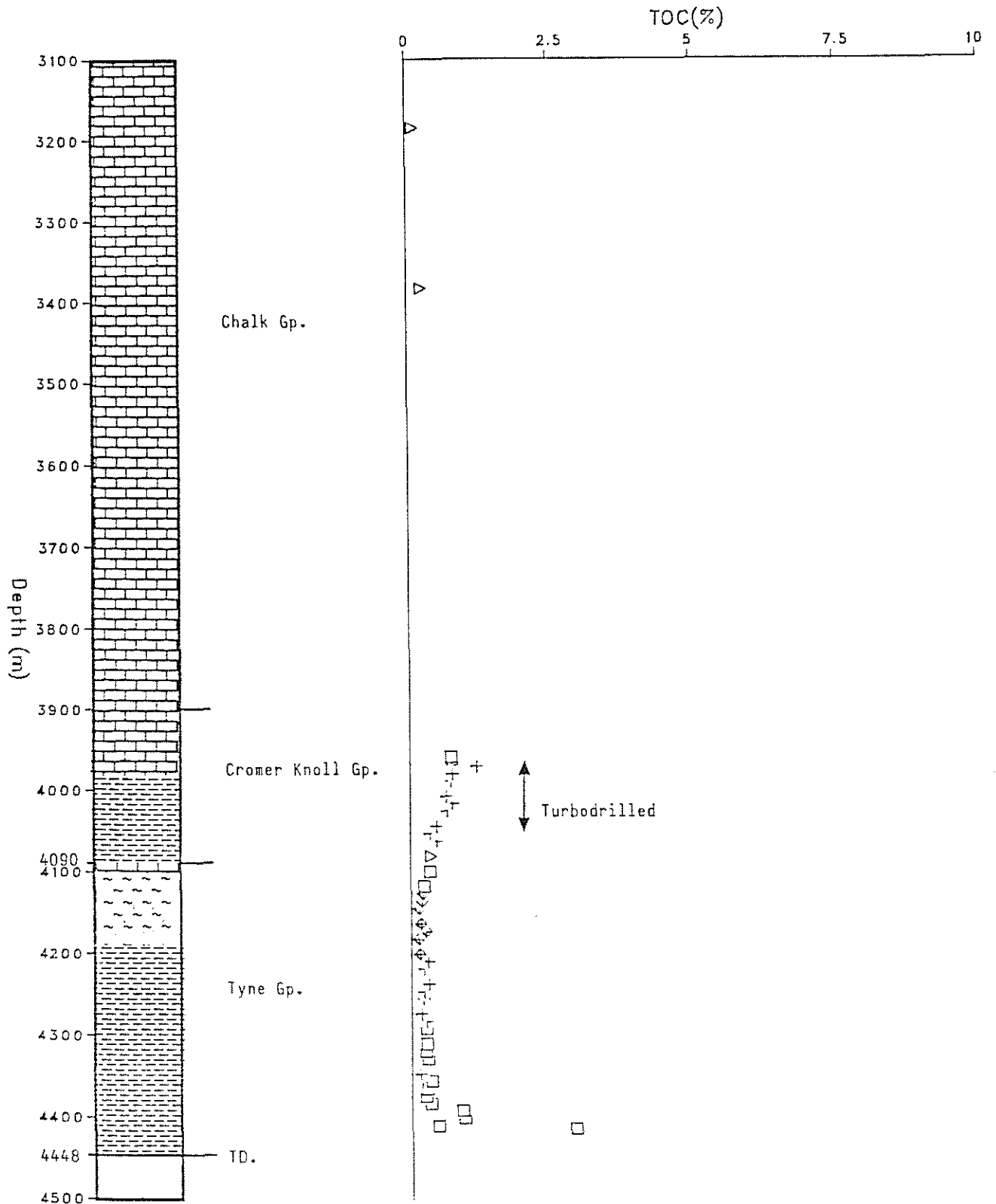
No maturity trend can be extracted from Tmax data, due to the poor pyrolysate yields throughout, giving unreliable and low temperatures (mainly below 400°C) which could also at least locally be exaggerated by the presence of asphaltenes.

Vitrinite reflectance data suggests the top of the oil window (Ro 0.6 %) to occur at approximately 3600 m, i.e. above the top of the Cromer Knoll Gp., and the base (Ro 1.0 %) to be at ~ 4210 m, i.e. within the Tyne Gp.

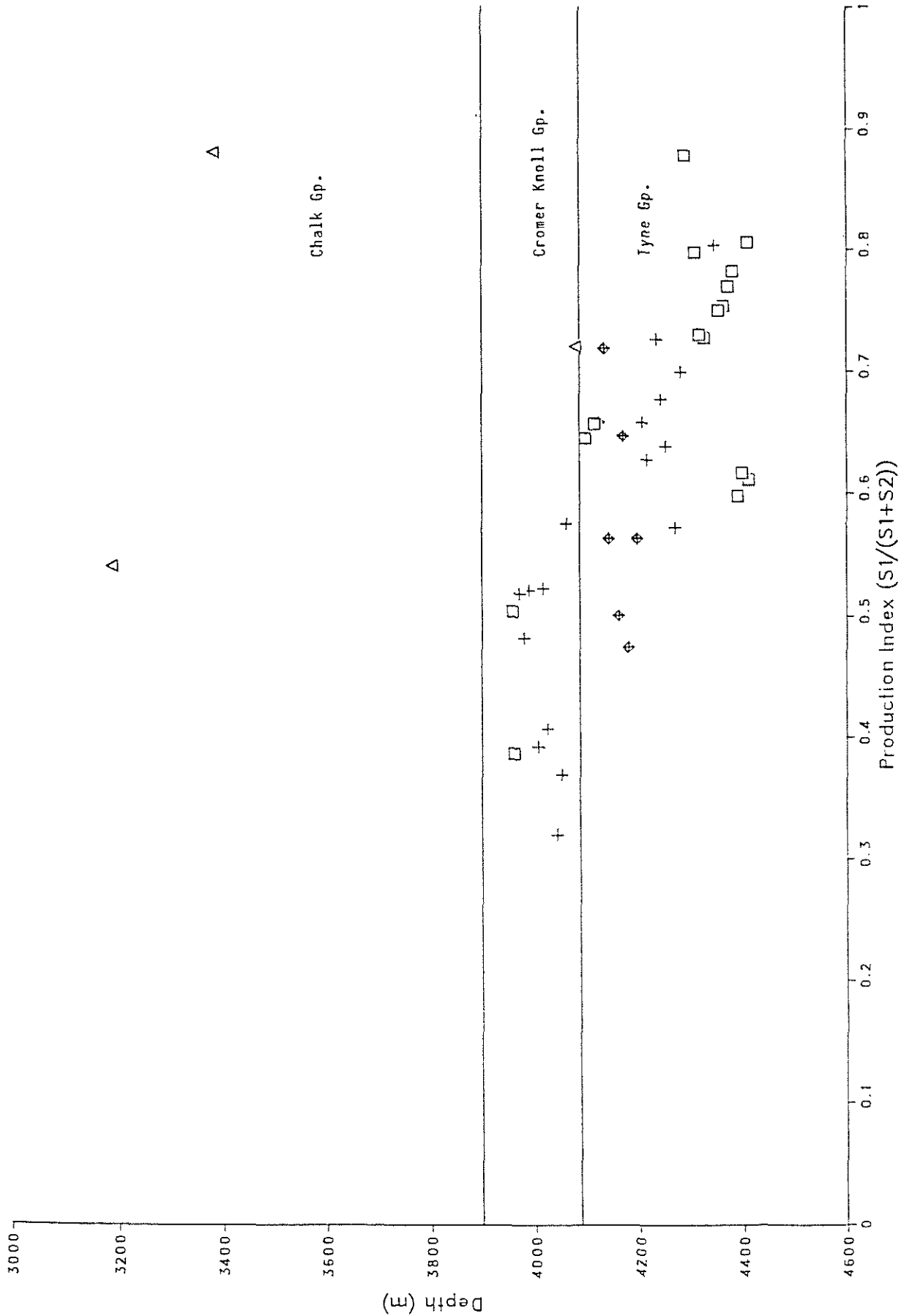
Figure: 1

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TOC Data for Well NOCS 2/7-9



Production Index Data for Well NOCS 2/7-9



Tmax Data for Well NOCS 2/7-9

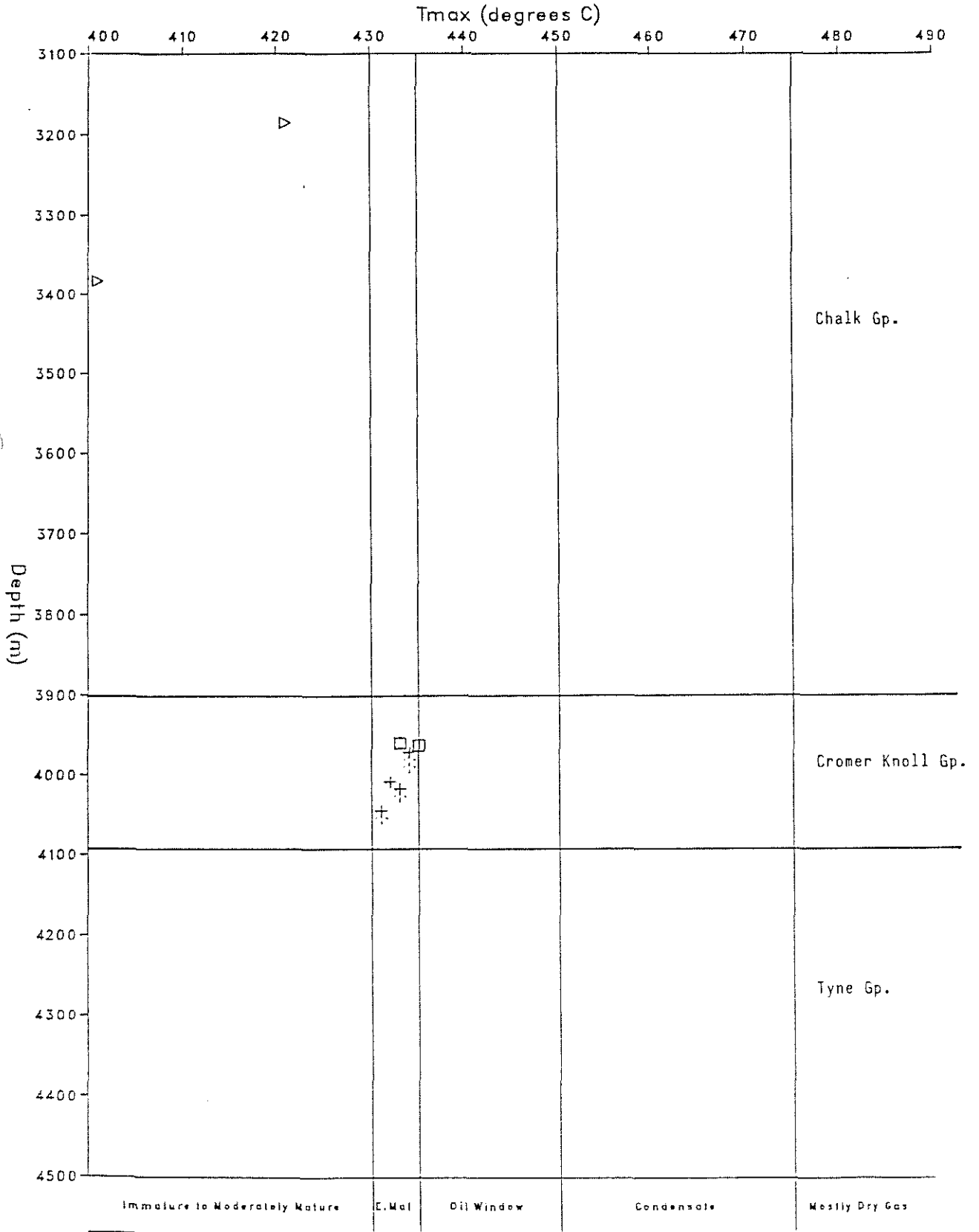


Figure 4 : Hydrogen Index v.s. Tmax values
Well NOCS 2/7-9

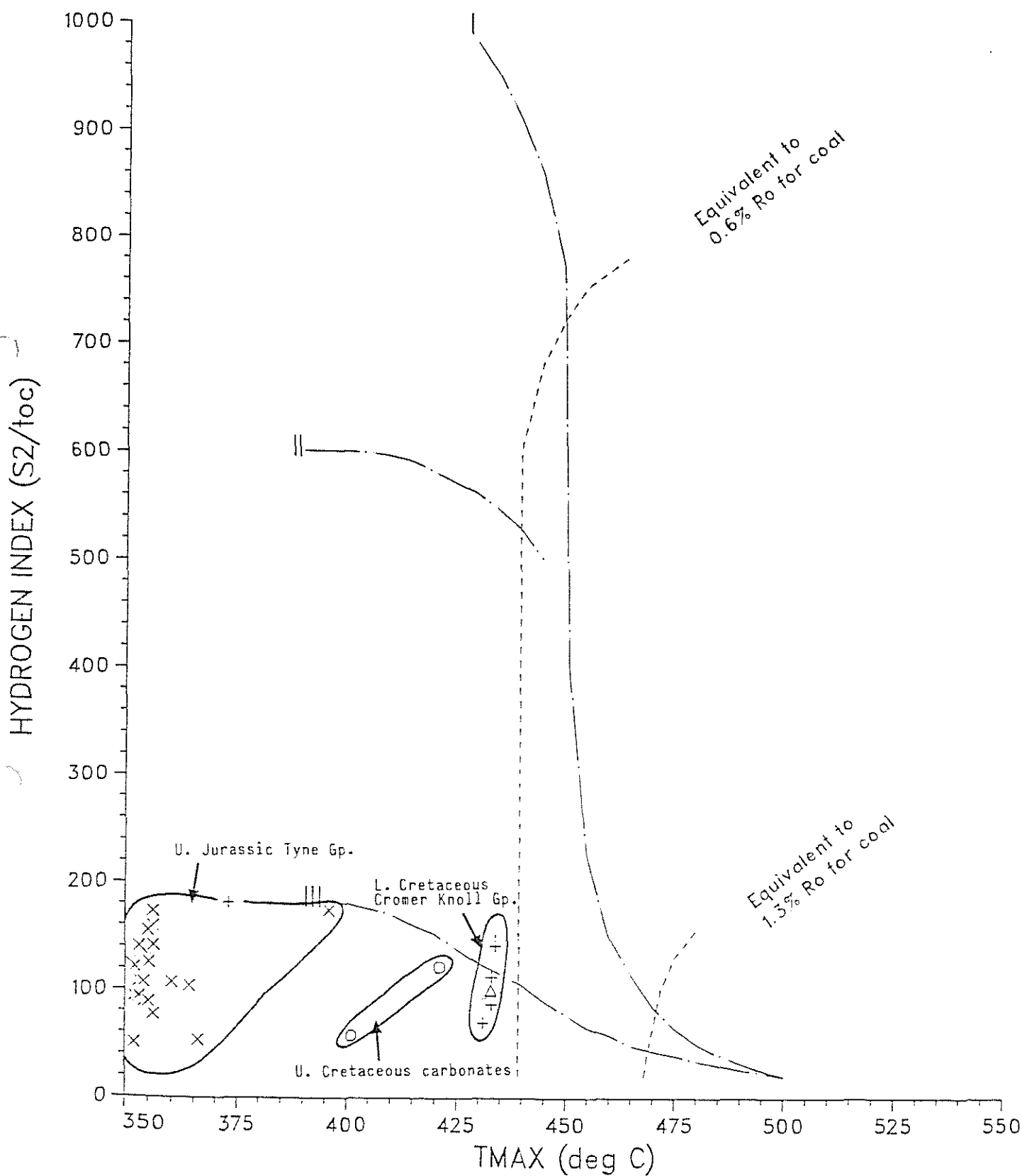


Figure 5: VITRINITE REFLECTANCE VERSUS DEPTH
 WELL NOCS 2/7-9

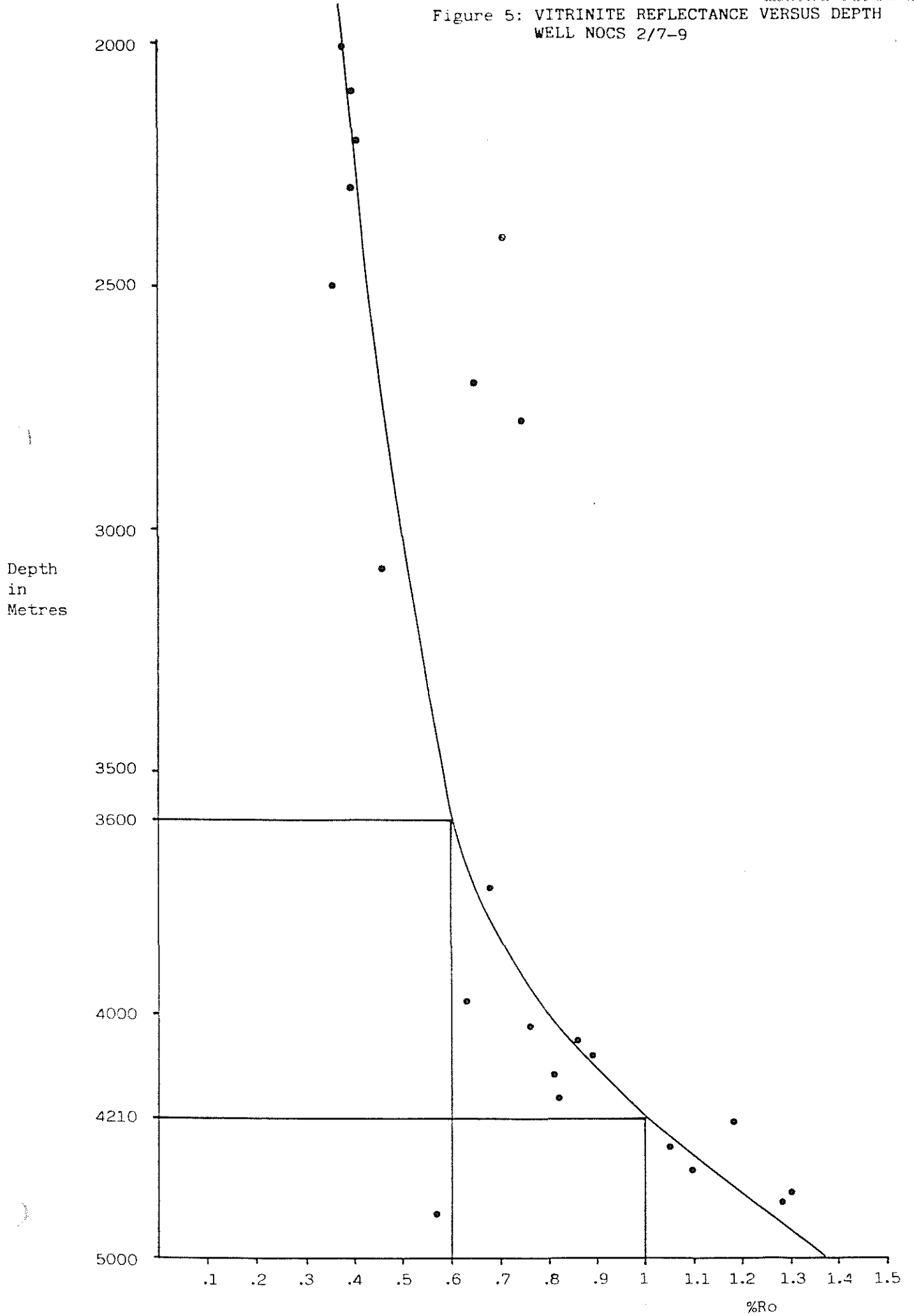


Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
2006.00				Tertiary:Oligocene		0047
		100	Sltst	: gy brn to dsk brn		0047-1L
2097.00				Tertiary:Oligocene		0048
		100	Sltst	: gy brn to dsk brn		0048-1L
2198.00				Tertiary:Oligocene		0049
		100	Sltst	: pl y brn to gy brn		0049-1L
2298.00				Tertiary:Oligocene		0050
		50	Sltst	: pl y brn to gy brn to m gy		0050-1L
		50	Cont	: dd		0050-2L
2399.00				Tertiary:Oligocene		0051
		100	Sltst	: pl y brn to gy brn to m gy		0051-1L
			tr Cont	: dd		0051-2L
			tr Ca	: m brn		0051-3L
2490.00				Tertiary:Oligocene		0052
		95	Sltst	: pl y brn to gy brn to m gy		0052-1L
		5	Cont	: evap		0052-2L
			tr Ca	: m brn		0052-3L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2591.00				Tertiary:Eocene		0053
				90 Sh/Clst: m gy to brn gy, slt		0053-1L
				10 Cont : dd, evap		0053-2L
2691.00				Tertiary:Eocene		0054
				50 Sh/Clst: m gy to brn gy, slt		0054-1L
				50 Cont : dd		0054-2L
2782.00				Tertiary:Eocene		0055
				85 Sh/Clst: m gy to brn gy, slt		0055-1L
				15 Cont : cem, dd, evap		0055-2L
2996.00				Tertiary:Palaeocene		0056
				55 Cont : cem, dd, evap		0056-2L
				45 Sh/Clst: lt gy to gn gy, gy red		0056-3L
				tr Sh/Clst: m gy to brn gy, slt		0056-1L
3088.00				U.Cretaceous(?)		0064
				60 Sh/Clst: lt gy to gn gy, gy red		0064-3L
				25 Cont : cem, dd, evap		0064-2L
				15 Ca : w to lt gy		0064-4L
				tr Sh/Clst: m gy to brn gy, slt		0064-1L
3185.00				U.Cretaceous		0057
	0.14	100	Ca	: w to or gy, chk		0057-4L
			tr	Sh/Clst: m gy to brn gy, slt		0057-1L
			tr	Cont : prp		0057-2L
			tr	Sh/Clst: lt gy to gn gy, gy red		0057-3L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
3286.00				U.Cretaceous		0058
		100	Ca	: w to or gy, chk		0058-2L
			tr Sh/Clst:	lt gy to gn gy, gy red		0058-1L
3383.00				U.Cretaceous		0059
	0.26	100	Ca	: w to or gy, chk		0059-2L
			tr Sh/Clst:	lt gy to gn gy, gy red		0059-1L
3450.00				U.Cretaceous		0060
		80	Ca	: w to or gy, chk		0060-2L
		20	Sh/Clst:	lt gy to gn gy, calc		0060-1L
3676.00				U.Cretaceous		0061
		90	Ca	: w to or gy, chk		0061-2L
		10	Sh/Clst:	lt gy to gn gy, calc		0061-1L
3743.00				U.Cretaceous		0062
		50	Sltst	: lt gy to gn gy, brn gy, calc		0062-1L
		50	Ca	: w to or gy, chk		0062-2L
3874.00				U.Cretaceous		0063
		70	Ca	: w to or gy, chk		0063-2L
		30	Sltst	: lt gy to gn gy, brn gy, calc		0063-1L
			tr Sh/Clst:	drk gy		0063-3L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology	description	
3959.40				Crom Rødb	L.Cretaceous	0001
	0.73		75	Ca	: lt or to or gy	0001-2L
			25	Sh/Clst:	brn gy to m gy, gy red	0001-1L
				bulk		0001-0B
			tr	Cont	: prp	0001-3L
3962.40				Crom Valh	L.Cretaceous	0002
	0.74		65	Ca	: lt or to or gy	0002-2L
			35	Sh/Clst:	brn gy to pl ol, gy red	0002-1L
				bulk		0002-0B
			tr	Cont	: prp	0002-3L
3971.50				Crom Valh	L.Cretaceous	0003
	1.17		70	Sh/Clst:	brn gy to pl ol to m gy, gy red,	0003-1L
				slt		
			15	Cont	: prp, fib	0003-3L
			15	Other	: lt gy, trbofgs	0003-4L
			tr	Ca	: lt or to or gy	0003-2L
3980.70				Crom Valh	L.Cretaceous	0004
	0.75		55	Sh/Clst:	lt ol gy to dsk y gn to brn gy,	0004-1L
				gy red, slt		
			45	Other	: m gy, trbofgs	0004-4L
			tr	Ca	: w	0004-2L
			tr	Cont	: prp, fib	0004-3L
3989.80				Crom Valh	L.Cretaceous	0005
	0.72		80	Other	: m gy, trbofgs	0005-4L
			20	Sh/Clst:	lt ol gy to dsk y gn to brn gy,	0005-1L
				gy red, slt		
			tr	Ca	: w	0005-2L
			tr	Cont	: prp, fib	0005-3L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
3999.00			Crom	Valh	L.Cretaceous	0006
		85	Other	:	m gy, trbofgs	0006-4L
		10	Sh/Clst:	lt ol gy to	dsk y gn to brn gy,	0006-1L
				gy red, slt		
		5	Cont	:	prp, fib	0006-3L
		tr	Ca	:	w	0006-2L
4008.10			Crom	Valh	L.Cretaceous	0007
		95	Other	:	m gy, trbofgs	0007-4L
		5	Sh/Clst:	lt ol gy to	dsk y gn to brn gy,	0007-1L
				gy red, slt		
		tr	Ca	:	w	0007-2L
		tr	Cont	:	prp, fib	0007-3L
4017.30			Crom	Valh	L.Cretaceous	0008
	0.75	55	Sh/Clst:	lt ol gy to	dsk y gn to brn gy,	0008-1L
				gy red, slt		
		35	Other	:	m gy, trbofgs	0008-4L
		10	Cont	:	prp, fib	0008-3L
		tr	Ca	:	w	0008-2L
4026.40			Crom	Valh	L.Cretaceous	0009
		75	Other	:	m gy, trbofgs	0009-4L
	0.65	25	Sh/Clst:	lt ol gy to	dsk y gn to brn gy,	0009-1L
				gy red, slt		
		tr	Ca	:	w	0009-2L
		tr	Cont	:	prp, fib	0009-3L
4035.60			Crom	Valh	L.Cretaceous	0010
		95	Other	:	m gy, trbofgs	0010-4L
		5	Sh/Clst:	lt ol gy to	dsk y gn to brn gy,	0010-1L
				gy red, slt		
		tr	Ca	:	w	0010-2L
		tr	Cont	:	prp, fib	0010-3L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology	description	
4044.70				Crom Valh L.Cretaceous		0011
	0.46		55	Other	: m gy, gy red, trbofgs	0011-4L
			45	Sh/Clst:	gy red, lt ol gy to dsk y gn to brn gy, slt	0011-1L
				tr Ca	: w	0011-2L
				tr Cont	: prp, fib	0011-3L
				tr Sh/Clst:	drk gy	0011-5L
4053.80				Crom Valh L.Cretaceous		0012
	0.35		90	Sh/Clst:	brn gy, lt ol gy to dsk y gn, lt gy, gy red	0012-1L
			10	Ca	: w	0012-2L
				tr Cont	: prp, fib	0012-3L
				tr Other	: m gy, gy red, trbofgs	0012-4L
				tr Sh/Clst:	drk gy to dsk y brn	0012-5L
4063.00				Crom Valh L.Cretaceous		0013
	0.46		65	Sh/Clst:	brn gy, lt ol gy to dsk y gn, lt gy, gy red	0013-1L
			25	Other	: m gy, gy red, trbofgs	0013-4L
			10	Ca	: w	0013-2L
				tr Cont	: prp, fib	0013-3L
				tr Sh/Clst:	drk gy to dsk y brn	0013-5L
4072.10				Crom Valh L.Cretaceous		0014
			75	Cont	: Mica-ad, prp, dd, fib	0014-3L
			15	Sh/Clst:	brn gy, lt ol gy to dsk y gn, lt gy, gy red	0014-1L
			10	Other	: m gy, gy red, trbofgs	0014-4L
				tr Ca	: w	0014-2L
				tr Sh/Clst:	drk gy to dsk y brn	0014-5L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4081.30				Crom Valh L.Cretaceous		0015
		0.36		45 Ca : w to lt gy, mrl		0015-2L
				30 Other : m gy, gy red, trbofgs		0015-4L
				20 Cont : prp, ns, fib		0015-3L
				5 Sh/Clst: drk gy to dsk y brn		0015-5L
				tr Sh/Clst: brn gy, lt ol gy to dsk y gn, lt gy, gy red		0015-1L
4090.40				Tyne Jurassic		0016
				100 Cont : dd		0016-3L
				tr Sh/Clst: brn gy, lt ol gy to dsk y gn, lt gy, gy red		0016-1L
				tr Ca : w to lt gy, mrl		0016-2L
				tr Other : m gy, gy red, trbofgs		0016-4L
				tr Sh/Clst: drk gy to dsk y brn		0016-5L
4100.00				Tyne Jurassic		0018
				50 Ca : w to lt gy, mrl		0018-2L
				45 Marl : lt gy to lt brn gy, gy red		0018-1L
				5 Cont : prp		0018-3L
		0.34		bulk		0018-0B
				tr Other : m gy, gy red, trbofgs		0018-4L
				tr Sh/Clst: drk gy to dsk y brn		0018-5L
4117.80				Tyne Jurassic		0019
				50 Ca : w to lt gy, mrl		0019-2L
				45 Marl : lt gy to lt brn gy, gy red		0019-1L
				5 Cont : prp		0019-3L
		0.23		bulk		0019-0B
				tr Other : m gy, gy red, trbofgs		0019-4L
				tr Sh/Clst: drk gy to dsk y brn		0019-5L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
4127.00			Tyne		Jurassic	0017
	0.20	90	Marl	:	lt gy to lt brn gy, gy red	0017-1L
		5	Ca	:	w to lt gy, mrl	0017-2L
		5	Cont	:	prp	0017-3L
			tr Other	:	m gy, gy red, trbofgs	0017-4L
			tr Sh/Clst:	:	drk gy to dsk y brn	0017-5L
4136.10			Tyne		Jurassic	0020
	0.18	95	Marl	:	lt gy to lt brn gy, gy red	0020-1L
		5	Ca	:	w to lt gy, mrl	0020-2L
			tr Cont	:	prp	0020-3L
			tr Other	:	m gy, gy red, trbofgs	0020-4L
			tr Sh/Clst:	:	drk gy to dsk y brn	0020-5L
4145.30			Tyne		Jurassic	0021
	0.14	100	Marl	:	lt gy to lt brn gy, gy red	0021-1L
			tr Ca	:	w to lt gy, mrl	0021-2L
			tr Cont	:	prp	0021-3L
			tr Other	:	m gy, gy red, trbofgs	0021-4L
4163.60			Tyne		Jurassic	0022
	0.17	100	Marl	:	lt gy to lt brn gy, gy red	0022-1L
			tr Ca	:	w to lt gy, mrl	0022-2L
			tr Cont	:	prp	0022-3L
			tr Other	:	m gy, gy red, trbofgs	0022-4L
			tr Sh/Clst:	:	drk gy to dsk y brn	0022-5L
4172.70			Tyne		Jurassic	0023
	0.26	100	Marl	:	lt gy to lt brn gy, gy red	0023-1L
			tr Ca	:	w to lt gy, mrl	0023-2L
			tr Cont	:	prp	0023-3L
			tr Other	:	m gy, gy red, trbofgs	0023-4L
			tr Sh/Clst:	:	drk gy to dsk y brn	0023-5L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4181.90				Tyne	Jurassic	0024
	0.13	100	Marl	:	lt gy to lt brn gy, gy red	0024-1L
			tr Ca	:	w to lt gy, mrl	0024-2L
			tr Cont	:	prp	0024-3L
			tr Other	:	m gy, gy red, trbofgs	0024-4L
			tr Sh/Clst:	:	drk gy to dsk y brn	0024-5L
4200.10				Tyne	Jurassic	0025
	0.15	100	Marl	:	lt brn gy, gy red	0025-1L
			tr Ca	:	w to lt gy, mrl	0025-2L
			tr Cont	:	prp	0025-3L
4209.30				Tyne	Jurassic	0026
	0.29	100	Sh/Clst:	:	lt brn gy, gy red, calc	0026-1L
			tr Ca	:	w to lt gy, mrl	0026-2L
			tr Cont	:	prp	0026-3L
			tr Sh/Clst:	:	drk gy to dsk y brn	0026-4L
4218.40				Tyne	Jurassic	0027
	0.22	100	Sh/Clst:	:	lt brn gy, gy red, calc	0027-1L
			tr Ca	:	w to lt gy, mrl	0027-2L
			tr Cont	:	prp	0027-3L
			tr Sh/Clst:	:	drk gy to dsk y brn	0027-4L
4236.70				Tyne	Jurassic	0028
	0.30	100	Sh/Clst:	:	lt brn gy, gy red, calc	0028-1L
			tr Ca	:	w to lt gy, mrl	0028-2L
			tr Cont	:	prp	0028-3L
			tr Sh/Clst:	:	drk gy to dsk y brn	0028-4L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4245.90				Tyne Jurassic		0029
	0.22	100		Sh/Clst: m gy to lt brn gy, gy red, calc tr Ca : w to lt gy, mrl tr Cont : prp tr Sh/Clst: drk gy to dsk y brn		0029-1L 0029-2L 0029-3L 0029-4L
4255.00				Tyne Jurassic		0030
	0.20	100		Sh/Clst: m gy to lt brn gy, gy red, calc tr Ca : w to lt gy, mrl tr Cont : prp tr Sh/Clst: drk gy to dsk y brn		0030-1L 0030-2L 0030-3L 0030-4L
4273.30				Tyne Jurassic		0031
	0.17	100		Sh/Clst: m gy to lt brn gy, gy red, calc tr Ca : w to lt gy, mrl tr Cont : prp tr Sh/Clst: drk gy to dsk y brn		0031-1L 0031-2L 0031-3L 0031-4L
4282.40				Tyne Jurassic		0032
	0.26	100		Sh/Clst: m gy to lt brn gy, gy red, calc, slt tr Ca : w to lt gy, mrl tr Cont : prp tr Sh/Clst: drk gy to dsk y brn tr S/Sst : gy red		0032-1L 0032-2L 0032-3L 0032-4L 0032-5L
4291.60				Tyne Jurassic		0033
		95		Sh/Clst: m gy to lt brn gy, gy red, calc, slt		0033-1L
	0.25	5		S/Sst : gy red, m gy, cem bulk tr Cont : prp tr Sh/Clst: drk gy to dsk y brn		0033-4L 0033-0B 0033-2L 0033-3L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample	
Int Cvd	TOC%	%	Lithology description				
4309.90			Tyne		Jurassic	0034	
		90	Sh/Clst:	m gy to lt brn gy, gy red, calc, slt		0034-1L	
		5	Sh/Clst:	drk gy to dsk y brn, slt, s		0034-3L	
	0.26	5	S/Sst :	gy red, cem		0034-4L	
			bulk			0034-0B	
		tr	Cont	: prp		0034-2L	
4319.00			Tyne		Jurassic	0035	
		90	Sh/Clst:	m gy to lt brn gy, gy red, calc, slt		0035-1L	
		5	Sh/Clst:	drk gy to dsk y brn, slt, s		0035-3L	
	0.24	5	S/Sst :	gy red, cem		0035-4L	
			bulk			0035-0B	
		tr	Cont	: prp		0035-2L	
4328.20			Tyne		Jurassic	0036	
		95	Sh/Clst:	m gy to lt brn gy, gy red, calc, slt		0036-1L	
		5	S/Sst :	gy red, cem		0036-4L	
	0.28		bulk			0036-0B	
		tr	Cont	: prp		0036-2L	
		tr	Sh/Clst:	drk gy to dsk y brn, slt, s		0036-3L	
4346.50			Tyne		Jurassic	0037	
	0.15	100	Sh/Clst:	m gy to lt brn gy, gy red, calc, slt		0037-1L	
			tr	Cont : prp		0037-2L	
			tr	Sh/Clst: drk gy to dsk y brn, slt, s		0037-3L	
			tr	S/Sst : gy red, cem		0037-4L	

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
4355.60			Tyne	Jurassic		0038
		90	Sh/Clst: m gy to lt brn gy, gy red, calc, slt			0038-1L
		5	Sh/Clst: drk gy to dsk y brn, slt, s			0038-3L
	0.34	5	S/Sst : gy red, cem			0038-4L
			bulk			0038-0B
		tr	Cont : prp			0038-2L
4364.70			Tyne	Jurassic		0039
		90	Sh/Clst: m gy to lt brn gy, gy red, calc, slt			0039-1L
		5	Sh/Clst: drk gy to dsk y brn, slt, s			0039-3L
	0.27	5	S/Sst : gy red, cem			0039-4L
			bulk			0039-0B
		tr	Cont : prp			0039-2L
4373.90			Tyne	Jurassic		0040
		85	Sh/Clst: m gy to lt brn gy, gy red, calc, slt			0040-1L
		10	Sh/Clst: drk gy to dsk y brn, slt, s			0040-3L
	0.24	5	S/Sst : gy red, cem			0040-4L
			bulk			0040-0B
		tr	Cont : prp			0040-2L
		tr	Coal : blk			0040-5L
4383.00			Tyne	Jurassic		0041
		90	Sh/Clst: m gy to lt brn gy, gy red, calc, slt			0041-1L
		5	Sh/Clst: drk gy to dsk y brn, slt, s			0041-3L
	0.33	5	S/Sst : gy red, cem			0041-4L
			bulk			0041-0B
		tr	Cont : prp			0041-2L

Table 1 : Lithology description for well NOCS 2/7-9

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
4392.20			Tyne	Jurassic		0042
			75	Sh/Clst: m gy to lt brn gy, gy red, calc, slt		0042-1L
			15	S/Sst : gy red, cem		0042-4L
	0.89		10	Sh/Clst: drk gy to dsk y brn, slt, s		0042-3L
				bulk		0042-0B
			tr	Cont : prp		0042-2L
4401.30			Tyne	Jurassic		0043
			80	Sh/Clst: m gy to lt brn gy, gy red, calc, slt		0043-1L
			10	Sh/Clst: drk gy to dsk y brn, slt, s		0043-3L
	0.92		10	S/Sst : gy red, cem		0043-4L
				bulk		0043-0B
			tr	Cont : prp		0043-2L
4410.50			Tyne	Jurassic		0044
			80	Cont : ns		0044-2L
			15	Sh/Clst: m gy to lt brn gy, gy red, calc, slt		0044-1L
	0.46		5	Sh/Clst: drk gy to dsk y brn, slt, s		0044-3L
				bulk		0044-0B
			tr	S/Sst : gy red, cem		0044-4L
4413.50			Tyne	Jurassic		0045
			80	Cont : ns, Mica-ad		0045-2L
			10	Sh/Clst: m gy to lt brn gy, gy red, calc, slt		0045-1L
			5	Sh/Clst: drk gy to dsk y brn, slt, s		0045-3L
	2.87		5	S/Sst : gy red, cem		0045-4L
				bulk		0045-0B

Table 2 : Rock-Eval table for well NOCS 2/7-9

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3185.00	cut	Ca : w to or gy	0.20	0.17	0.70	0.24	0.14	121	500	0.4	0.54	421	0057-4L
3383.00	cut	Ca : w to or gy	1.10	0.15	1.07	0.14	0.26	58	412	1.3	0.88	401	0059-2L
3959.40	cut	bulk	0.74	0.73	1.11	0.66	0.73	100	152	1.5	0.50	433	0001-0B
3962.40	cut	bulk	0.44	0.70	1.04	0.67	0.74	95	141	1.1	0.39	435	0002-0B
3971.50	cut	Sh/Clst: brn gy to pl ol to m gy, gy red	1.77	1.65	0.94	1.76	1.17	141	80	3.4	0.52	434	0003-1L
3980.70	cut	Sh/Clst: lt ol gy to dsk y gn to brn gy, gy red	1.02	1.10	1.31	0.84	0.75	147	175	2.1	0.48	434	0004-1L
3989.80	cut	Sh/Clst: lt ol gy to dsk y gn to brn gy, gy red	0.77	0.71	0.87	0.82	0.72	99	121	1.5	0.52	434	0005-1L
4008.10	com	bulk	0.38	0.59	0.82	0.72	0.64	92	128	1.0	0.39	432	0046-0B
4017.30	cut	Sh/Clst: lt ol gy to dsk y gn to brn gy, gy red	0.71	0.65	0.77	0.84	0.75	87	103	1.4	0.52	433	0008-1L
4026.40	cut	Sh/Clst: lt ol gy to dsk y gn to brn gy, gy red	0.50	0.73	0.93	0.78	0.65	112	143	1.2	0.41	433	0009-1L
4044.70	cut	Sh/Clst: gy red, lt ol gy to dsk y gn to brn gy	0.15	0.32	0.61	0.52	0.46	70	133	0.5	0.32	431	0011-1L
4053.80	cut	Sh/Clst: brn gy, lt ol gy to dsk y gn, lt gy, gy red	0.14	0.24	0.58	0.41	0.35	69	166	0.4	0.37	431	0012-1L

Table 2 : Rock-Eval table for well NOCS 2/7-9

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4063.00	cut	Sh/Clst: brn gy, lt ol gy to dsk y gn, lt gy, gy red	0.50	0.37	0.58	0.64	0.46	80	126	0.9	0.57	348	0013-1L
4081.30	cut	Ca : w to lt gy	1.67	0.65	0.72	0.90	0.36	181	200	2.3	0.72	373	0015-2L
4100.00	cut	bulk	1.07	0.59	1.62	0.36	0.34	174	476	1.7	0.64	396	0018-0B
4117.80	cut	bulk	0.44	0.23	0.76	0.30	0.23	100	330	0.7	0.66	348	0019-0B
4127.00	cut	Marl : lt gy to lt brn gy, gy red	0.25	0.13	0.71	0.18	0.20	65	355	0.4	0.66	348	0017-1L
4136.10	cut	Marl : lt gy to lt brn gy, gy red	0.28	0.11	0.56	0.20	0.18	61	311	0.4	0.72	349	0020-1L
4145.30	cut	Marl : lt gy to lt brn gy, gy red	0.09	0.07	0.46	0.15	0.14	50	329	0.2	0.56	352	0021-1L
4163.60	cut	Marl : lt gy to lt brn gy, gy red	0.09	0.09	0.55	0.16	0.17	53	324	0.2	0.50	366	0022-1L
4172.70	cut	Marl : lt gy to lt brn gy, gy red	0.42	0.23	0.67	0.34	0.26	88	258	0.6	0.65	355	0023-1L
4181.90	cut	Marl : lt gy to lt brn gy, gy red	0.09	0.10	0.60	0.17	0.13	77	462	0.2	0.47	356	0024-1L
4200.10	cut	Marl : lt brn gy, gy red	0.18	0.14	0.48	0.29	0.15	93	320	0.3	0.56	353	0025-1L

Table 2 : Rock-Eval table for well NOCS 2/7-9

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4209.30	cut	Sh/Clst: lt brn gy, gy red	0.96	0.50	0.55	0.91	0.29	172	190	1.5	0.66	356	0026-1L
4218.40	cut	Sh/Clst: lt brn gy, gy red	0.52	0.31	0.66	0.47	0.22	141	300	0.8	0.63	356	0027-1L
4236.70	cut	Sh/Clst: lt brn gy, gy red	1.11	0.42	0.57	0.74	0.30	140	190	1.5	0.73	353	0028-1L
4245.90	cut	Sh/Clst: m gy to lt brn gy, gy red	0.71	0.34	0.71	0.48	0.22	155	323	1.0	0.68	355	0029-1L
4255.00	cut	Sh/Clst: m gy to lt brn gy, gy red	0.44	0.25	0.62	0.40	0.20	125	310	0.7	0.64	355	0030-1L
4273.30	cut	Sh/Clst: m gy to lt brn gy, gy red	0.20	0.15	0.56	0.27	0.17	88	329	0.4	0.57	354	0031-1L
4282.40	cut	Sh/Clst: m gy to lt brn gy, gy red	0.79	0.34	0.49	0.69	0.26	131	188	1.1	0.70	355	0032-1L
4291.60	cut	bulk	1.36	0.19	0.33	0.58	0.25	76	132	1.6	0.88	348	0033-0B
4309.90	cut	bulk	1.10	0.28	0.42	0.67	0.26	108	162	1.4	0.80	350	0034-0B
4319.00	cut	bulk	0.78	0.29	0.49	0.59	0.24	121	204	1.1	0.73	352	0035-0B
4328.20	cut	bulk	0.77	0.29	0.38	0.76	0.28	104	136	1.1	0.73	364	0036-0B
4346.50	cut	Sh/Clst: m gy to lt brn gy, gy red	0.57	0.14	0.43	0.33	0.15	93	287	0.7	0.80	352	0037-1L
4355.60	cut	bulk	1.61	0.54	0.45	1.20	0.34	159	132	2.2	0.75	356	0038-0B
4364.70	cut	bulk	0.64	0.21	0.39	0.54	0.27	78	144	0.8	0.75	344	0039-0B
4373.90	cut	bulk	1.00	0.30	0.36	0.83	0.24	125	150	1.3	0.77	351	0040-0B

Table 2 : Rock-Eval table for well NOCS 2/7-9

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4383.00	cut	bulk	1.18	0.33	0.37	0.89	0.33	100	112	1.5	0.78	348	0041-0B
4392.20	cut	bulk	1.41	0.95	1.59	0.60	0.89	107	179	2.4	0.60	354	0042-0B
4401.30	cut	bulk	1.59	0.99	1.84	0.54	0.92	108	200	2.6	0.62	353	0043-0B
4410.50	cut	bulk	2.03	0.49	0.55	0.89	0.46	107	120	2.5	0.81	360	0044-0B
4413.50	cut	bulk	6.12	3.90	5.77	0.68	2.87	136	201	10.0	0.61	355	0045-0B

VITRINITE REFLECTANCE

NOCS 2/7-9

Depth unit of measure: m

Table 3:
Well/Loc. Code: D84

Project: 2668

Depth	S-Tp	F-Tp	Lithology	Ro(av)	n	sd	Fluor	Histo	Table	Sample	Transfer
2006.00	cut b		bulk	0.38	14	0.05	NDP			0047-0B	
2097.00	cut b		bulk	0.40	17	0.05	3-4			0048-0B	
2198.00	cut b		bulk	0.41	4	0.08	3-4			0049-0B	
2298.00	cut b		bulk	0.40	5	0.05	NDP			0050-0B	
2399.00	cut b		bulk	0.71	4	0.06	4??			0051-0B	
2490.00	cut b		bulk	0.36	6	0.03	NDP			0052-0B	
2591.00	cut b		bulk	NDP			5-6?			0053-0B	
2691.00	cut b		bulk	0.65	4	0.00	NDP			0054-0B	
2782.00	cut b		bulk	0.75	3	0.08	6?			0055-0B	
3088.00	cut b		bulk	0.46	3	0.04	6??			0064-0B	
3743.00	cut b		bulk	0.68	6	0.10	NDP			0062-0B	
3971.50	cut b		bulk	0.63	6	0.06	???			0003-0B	
4017.30	cut b		bulk	0.76	2	0.00	NDP			0008-0B	

VITRINITE REFLECTANCE

NOCS 2/7-9

Depth unit of measure: m

Table 3:
Well/Loc. Code: D84

Project: 2668

Depth	S-Tp	F-Tp	Lithology	Ro(av)	n	sd	Fluor	Histo	Table	Sample	Transfer
4053.80	cut	b	bulk	0.86	2	0.01	NDP			0012-0B	
4081.30	cut	b	bulk	0.89	11	0.07	"			0015-0B	
4117.80	com	b	bulk	0.81	8	0.05	"			0065-0B	
4172.70	cut	b	bulk	0.82	2	0	"			0023-0B	
4218.40	cut	b	bulk	1.18	4	0.04	"			0027-0B	
4273.30	cut	b	bulk	1.05	3	0.09	"			0031-0B	
4319.00	cut	b	bulk	1.10	2	0.11	"			0035-0B	
4364.70	cut	b	bulk	1.30	1	0	"			0039-0B	
4383.00	cut	b	bulk	1.28	6	0.09	"			0041-0B	
4410.50	cut	b	bulk	0.57	2	0.01	"			0044-0B	

Well NOCS 2/7-19

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INTRODUCTION

The well NOCS 2/7-19 is situated to the south-west of the Eldfisk field in the South Central Graben. This was drilled to a total depth of 4876 m in 1981, reaching strata of Lower Jurassic (?) age, and was plugged/abandoned as an oil discovery, though no DST tests were carried out.

Seventy-two samples were lithologically described, covering the interval 2551 - 4876 m, from which 42 samples were selected for screening analyses (TOC and Rock-Eval) and 19 samples were chosen for vitrinite reflectance microscopy.

General well details are as follows:

Position	: 56°20'18.36"N	Casing points:	154 m RKB
	3°6'13.61"E		586 m
Elevation	: 25 m		1586 m
Water depth	: 73 m		3780 m
Classification:	Susp. oil discovery	Liner:	4872 m

The following stratigraphic sub-division, based on data from the NPD, is used in this report:

Upper Cretaceous

Chalk Group	3143 - 4212 m
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Lower Cretaceous

Cromer Knoll Group	4212 - 4586 m
Rødby Formation	4212 - 4468 m
Valhall Formation	4468 - 4586 m

Upper Jurassic

Tyne Group	4586 - 4810 m
Mandal Formation	4586 - 4603 m
Farsund Formation	4603 - 4694 m

Haugesund Formation	4694 - 4715 m
Eldfisk Formation	4715 - 4810 m
<u>Middle Jurassic</u>	
Vestland Group	4810 - 4840 m
Bryne Formation	4810 - 4840 m
<u>Permian (?)</u>	4840 - 4876 m, TD

SCREENING ANALYSES
(TOC and Rock-Eval)

A total of 42 samples was subjected to screening analyses of the 72 samples examined, covering the interval 3144 - 4876 m. The results are discussed according to the stratigraphic units of the well, the screening data being listed in Table 2 and plotted against depth in Figures 1, 2 and 3; while Figure 4 shows a crossplot of Tmax and hydrogen index. TOC data is also included with the lithological descriptions, Table 1.

Source Rock Potential

Upper Cretaceous

Chalk Group (3143 - 4212 m)

Two carbonate core-chip samples were analysed here, mainly for detection/characterisation of any migrated hydrocarbons. These have absolutely no source potential.

Lower Cretaceous

Cromer Knoll Group (4212 - 4586 m)

Rødby Formation (4212 - 4468 m)

This interval has cuttings dominated by indurated rock fragments indicative of turbodrilling. The indigenous lithology appears to be medium to dark grey shale/claystone, two

of which were analysed. These have fair TOC contents (0.54, 0.64 %), but low hydrogen indices (31,18 mg HC/g TOC indicative of barren type IV kerogen and poor petroleum potentials (0.8, 0.5 mg HC/g rock), which eliminate the Rødby Fm. shales as source rocks. The hydrogen index data in particular however may have been decreased by turbodrilling.

Valhall Formation (4468 - 4586 m)

The cuttings samples from the Valhall Fm. interval similarly contain mainly turbodrilled fragments. The indigenous lithology in the majority of samples appears to be shale/claystone similar to that above, also tending to light grey in colour. However, in one sample (4538 m) light grey fine, loose sand is dominant. The amount of caving in this section is unknown, but could be considerable.

The two lowermost samples have abundant amounts of dusky yellow-brown/brownish black soft carbonaceous shale/claystone typical of that of the Mandal Fm., such that the stratigraphic tops available may require scrutiny.

The six grey shales analysed here have data similar to that of the overlying shales, i.e. indicating type IV kerogen with poor petroleum potentials, such that the generative potential of the Valhall Fm. is apparently negligible. Again however, turbodrilling may have affected these lithologies.

The two lower carbonaceous shales have higher, good to rich, TOC contents of 1.2, 5.9 %. These have marginally fair to good petroleum potentials of 2 - 11 mg HC/g rock, though poor hydrogen indices of 30 and 89 mg HC/g TOC, indicating the equivalent of type IV kerogen. This lithology has at present an apparently poor potential, which may be a result of the high maturity at this depth (according to Tmax within the condensate window), also possibly due to heating of the

cuttings during turbodrilling.

Upper Jurassic

Tyne Group (4586 - 4810 m)

Mandal Formation (4586 - 4603 m)

The four samples described from the Mandal Fm. interval unfortunately contain mainly caved lithologies or turbo-drilled fragments. Only one sample was analysed, a dusky yellow-brown/brownish black carbonaceous shale similar to that in the lowest part of the Valhall Fm. interval. Indurated fragments of the same colour, showing that this formation has been turbodrilled occur here. Picking of this lithology for analysis was carried out carefully to avoid inclusion of obviously indurated cuttings, however it is still possible that such drilling has had an unseen effect on the geochemistry of the sample.

The dark shale analysed has a marginally rich TOC content (2.1 %); a fair petroleum potential (3.8 mg HC/g rock) and a low hydrogen index indicating the present equivalent of type IV kerogen (66 mg HC/g TOC) with virtually insignificant remaining potential for economic hydrocarbon generation. This could be as much a maturation effect as the effect of turbodrilling.

Farsund Formation (4603- 4694 m)

The nine samples described here are dominated by light brownish grey and medium/dark grey calcareous shales, apart from in the three uppermost samples which contain dominant, partly indurated carbonaceous shales similar to those from

the Mandal Fm. Abundant amounts of the latter occur throughout however. The darker shales have analytical results similar to those in the Mandal Fm., i.e. good to marginally rich TOC contents, but low hydrogen indices and poor/fair petroleum potentials.

The lighter, grey shales have poor/fair TOC contents (0.28 - 0.62 %) and low hydrogen indices (18 - 29 mg HC/g TOC) and poor (\leq 0.8 mg HC/g rock) petroleum potentials.

The Farsund Fm. could consist of a mixture of these shales. The NPD summary logs (Vol. 12) indicate quite variably coloured shales, however some of the carbonaceous shales may still be caved from the Mandal Fm. If both types are present, then the Farsund Fm. sediments represent quite variable depositional/input conditions. The low content of pyrolysable matter in the lighter shales is reflected in their low Tmax temperature, which could however also be decreased due to staining with asphaltenes. The lighter shales are probably not caved from above the Upper Jurassic since the Cromer Knoll Gp. was evidently turbodrilled and such indurated cuttings do not occur in the samples from the Farsund Fm. interval. It is possible that the sedimentary conditions indicated in the Farsund Fm. of this well are intermediary between those shown in the Tyne Gp. of wells NOCS 2/7-9 and 2/7-2 (see individual reports), where 2/7-19 shows Tyne Gp. deposition intermediate between reductive basinal, marine (type II/III kerogen) (2/7-2) and shallow-water marine, carbonate-rich, oxidative (type III-IV kerogen) (2/7-9).

Haugesund Formation (4694 - 4715 m)

Only one cuttings sample was described from this interval, 4702 m, this being similar to the overlying samples in containing roughly equivalent amounts of dark carbonaceous

shale and lighter calcareous shale.

The dark shale has similar screening results to those of the overlying formations and the same conclusions apply. The lighter shale also has similar results to similar shales in the Farsund Fm. and the same conclusions apply.

Eldfisk Formation (4715 - 4810 m)

The six cuttings samples examined from the Eldfisk Fm. contain mainly either brownish black turbodrilled fragments or a light to medium grey calcareous shale. Abundant carbonaceous shale, apparently unaffected by turbodrilling, occurs in the two lowermost samples. Two samples each of the light and dark shales were analysed.

The results for the carbonaceous shale are somewhat different to those of the overlying, outwardly similar shales, having rich TOC contents (2.91, 3.05 %), higher hydrogen indices (107, 112 mg HC/(g TOC) indicating a present equivalent of kerogen type III and higher, good petroleum potentials of 8.6 and 7.2 mg HC/g rock. It is possible that these shales are caved, and more accurately represent the Mandal and/or Farsund Fms. than those found in cuttings further up in the well which are more affected by turbodrill heating. These have presently moderate potential for gaseous hydrocarbons, and may originally have had a significantly greater potential.

The light/medium grey calcareous shales, which are perhaps more typical of the Eldfisk Fm. (which is itself typically a sand unit with light shale intercalations), contain poor TOC contents of 0.28, 0.49 %. The hydrogen indices here are very low, 37 - 39 mg HC/g TOC and the petroleum potentials are poor, 0.7 - 1.0 mg HC/g rock. This data shows the Eldfisk Fm. to have no source rock potential.

Middle Jurassic

Vestland Group (4810 - 4840 m)

Bryne Formation (4810 - 4840 m)

Three samples were described here, these being clearly dominated by dusky yellow/brownish black sandy carbonaceous siltstone. There also occur accessory to moderately abundant amounts of light-coloured shale similar to that above and white/light grey carbonate.

On analysis the three siltstones have rich TOC contents of 3.78 - 7.30 % hydrogen indices ranging 106 - 110 mg HC/g TOC indicating the present equivalent of kerogen type III and good petroleum potentials of 7.8 - 13.8 mg HC/g rock.

The siltstones of the Bryne Fm. would therefore appear to have moderate to good potential for the generation of gas, although their proportions present in the probably otherwise mainly sandy Bryne Fm. are unknown.

Permian (?) (4840 - 4876 m, TD)

Five samples were examined from this interval, these being composed of variable mixtures of white/light grey carbonate, light grey calcareous shale similar to that above and carbonaceous silty shale, also similar to those above. Analyses of all three main lithologies were undertaken.

The carbonaceous shale has data similar to that of the overlying siltstones, though being somewhat less carbonaceous, having rich TOC contents and kerogen type III. These may well be caved.

The light-coloured shales, similar to those from the Eldfisk Fm., have poor TOC contents and kerogen type IV. Also these may well be caved. One carbonate analysed has a fair TOC content for a carbonate, 0.24 %, but a poor petroleum potential and only kerogen type IV.

Generation and Migration

(S_1 , Production Index, S_1/S_1+S_2)

The production indices (Figure 2) are generally high throughout the analysed interval, ranging 0.44 - 0.89 and mainly around 0.6 - 0.8. Apart from in the case of the Permian (?) carbonate, these cannot be explained by very low S_2 values. S_1 values are in addition generally high throughout the analysed interval.

The Upper Cretaceous carbonates have locally high production indices, but only due to low S_2 values and it is concluded that the chalky carbonates here contain no migrated hydrocarbons. In the case of the Lower Cretaceous shales and the shales of the Eldfisk Fm., which have probably never been good source rocks, it is proposed that this reflects either staining by migrated hydrocarbons, hydrocarbons from a reservoir in the well or contamination.

In the case of what were originally probably good source rocks in this well, i.e. taking into account the probable high maturity of these, the Mandal, Farsund, ? Haugesund and possibly also the carbonaceous silty seams within the Bryne Fm. may well contain mixtures of the above in addition to locally generated hydrocarbons.

Follow-up analyses are required to resolve these possibilities.

Maturity

The maturity profile of the analysed section of this well according to T_{max} (Figure 3) will necessarily be rather vague due to a) the thermal effects of turbodrilling in the Lower Cretaceous/Upper Jurassic and b) the obviously advanced maturity at which stage T_{max} becomes less reliable, certainly more erratic due to the lower amplitude of the S_2 peak. The depth plot however does yield a rudimentary trend below the Cretaceous, confirming the condensate-window maturity of the units here. The samples which are plotted in the Upper Jurassic are the dark shales, the lighter shales present here in the Farsund - Eldfisk interval having T_{max} temperatures below 400°C . By extrapolation the top of the oil window (435°C) can be very tentatively estimated to be around 4250 m.

VITRINITE REFLECTANCE

A total of 19 samples from the depth interval at 2551 to 4861 m was analysed for thermal maturity, using reflected white light for vitrinite reflectance and blue light excitation for spore fluorescence. The samples covered a stratigraphic range from Lower Tertiary to Permian. The vitrinite reflectance data obtained is presented in Table 3. Figure 5 shows a plot of vitrinite reflectance versus depth. In general, the well (especially the top half of the analysed section, i.e. until about 4300 m) is almost barren of any phytoclasts, not to mention vitrinite. But despite this difficulty, attempts were made to obtain at least 3 - 5 measurements. In any case, the reliability of data from such samples is very low.

The five shallowest samples (2551 - 3115 m) of Tertiary age (?) have extremely low maceral contents and are almost devoid of any vitrinite. The vitrinite quality is poor to very poor and particle size small. There is no sign of any bitumen staining either. Under fluorescence light, only minor alginite and amorphous material was seen, while few scattered spores were observed. Overall liptinite content is low to very low.

The next sample (3609 m) and the sole representative for Upper Cretaceous (Chalk Gp.) is very similar to the five samples described above. However, in this case practically no fluorescing liptinites were observed.

The next six samples (4318 - 4583 m) are of Upper Jurassic age and have medium phytoclast content, except in the 4583 m sample, where the overall maceral content is very low. However, vitrinite occurs only in traces in all the samples as compared to inertinite which makes up practically 100 %. The vitrinite quality is poor, or at best medium and the

particle size varies from small to medium. Bitumen staining remains consistently low. The overall sample quality in this set of six samples is poor, with extensive sample mixing observed in the majority of samples. Liptinitic content is also very low, with no positive interpretation possible.

No determination was possible in the sample from 4602 m, as the sample contained 100 % turbodrilled, i.e. thermally altered, fragments. The following sample (4650 m), also of Upper Jurassic age and from the Farsund Fm., has medium amounts of macerals, but vitrinite is at best only 5 %, the remaining 95 % being inertinite. The vitrinite quality is poor to medium and particle size small. No staining is observed. In fluorescence mode, no distinct liptinites are observed.

The following two Upper Jurassic samples (4724 and 4772 m) are from the Eldfisk Fm. and have low to very low phytoclast contents. Vitrinite, which occurs in traces, is of poor quality and small size, staining is low. The liptinite content is also very negligible.

The next sole representative of Middle Jurassic (Vestland Gp., Bryne Fm.) (4821 m) has a medium to high phytoclast content, but vitrinite is at best 5 %, while inertinite is 95 % of the total phytoclasts. Lithology is of very mixed type, with dominance of two types: 1) normal shale, 2) more coaly type shale. In addition, fragments which appear to be a result of turbodrilling also occur. The vitrinite quality remains medium and staining low. The two litho-types give two distinct populations. The normal shale a population of Ro 1.17 and 1.50 %, while the coaly type 0.98 %.

The deepest sample analysed (4861 m), of Permian age (?), also has very low phytoclast content and traces of vitrinite. The vitrinite quality is poor and staining is low. The data obtained is considered to have low

reliability.

Based on petrographical observations and the thermal maturity data obtained, a thermal maturity trend is proposed as shown in Figure 5. According to the suggested trend, the well reaches marginal maturity (R_o 0.5 %) at ca 2700 m and the onset of significant oil generation (R_o 0.6 %) is estimated to be at 3075 m. The bottom of the oil window (R_o 1.0 %) is thought to be at approximately 4110 m. Taking into consideration the reliability of individual data sets of the samples in this section, plus the very limited number of control points, one must exercise caution while interpreting the suggested depths.

CONCLUSIONS

The following conclusions can be made based on the results of screening and vitrinite reflectance analyses performed on well NOCS 2/7-19:

Source Rock Potential

All geochemical analyses on this well are rendered difficult to interpret due to caving and turbodrilling. The well does not appear to contain any source rock units with any significant remaining potential. This could be an effect either of natural maturity or thermal alteration by turbodrilling or both.

In the Upper Jurassic Tyne Gp. the most prolific lithologies are dark shales with only gas potential (kerogen type III+, good petroleum potentials of ~ 7 - 9 mg HC/g rock and rich TOC contents of ~ 3 %) which occur as cuttings in the Eldfisk Fm. interval. These may be caved however and be more representative of the Mandal Fm. The latter appears to be mainly indurated by turbodrilling in this well, as is almost the whole of the Lower Cretaceous section. Dark shales similar to the Mandal Fm. also occur in the lowermost parts of the Lower Cretaceous section. The Farsund and Haugesund Fms. have cuttings dominated by light coloured, organically lean, calcareous shales with subordinate dark shales similar to those of the Mandal Fm., together with indurated (turbo-drilled) cuttings. The amount of caving here is also unknown.

Otherwise the Middle Jurassic Bryne Fm. contains sandy carbonaceous siltstone containing the present equivalent of kerogen type III (rich TOC of 4 - 7 %, good petroleum

potentials of 8 - 14 mg HC/g TOC) with generally moderate/good gas potential. These siltstones however may be volumetrically subordinate within the Bryne Sand Fm.

Generation and Migration

Production indices and S_1 values are generally high throughout the analysed interval of this well. In the Upper Cretaceous carbonates and the Permian (?) carbonates however, this data is spurious (mainly due to low S_2 levels) such that these contain neither significant generated nor migrated hydrocarbons. The Upper Jurassic Tyne Gp. shales/siltstones and the siltstones of the Middle Jurassic Bryne Fm. have probably generated significant amounts of hydrocarbons, though the data is degraded by turbodrilling. These units probably contain mixtures of migrated and/or hydrocarbons carried by the drillmud from a reservoir unit in the well. The amounts of real contaminants present are not known, and the nature of the abundant free hydrocarbons present can only be resolved by follow-up analyses.

Maturity

Tmax data yields only a rudimentary trend, due to both the thermal alteration effects of turbodrilling and the natural high maturity of the section analysed, tentatively suggesting the top of the oil window to occur at approximately 4250 m.

The more reliable vitrinite data gives a much different estimate, but is still however based on lean vitrinite populations. This suggests the top of the oil window (R_o 0.6 %) to occur at about 3075 m, i.e. above the Upper

Cretaceous, and the oil floor (Ro 1.0 %) to occur at ~ 4110 m in the Upper Cretaceous. This would entail the Upper Jurassic source rock units to lie at least at gas window maturity and probably post-mature. Such a maturity curve does not agree with the production index data or the remaining potentials recorded in the well, which may however be affected by the presence of both free hydrocarbons and pyrolysable matter/asphaltenes or contaminants. All considered, the vitrinite data is thought to give a better estimation for the oil window.

Figure: 1

Client: AMOCO

TOC Data for Well NOCS 2/7-19

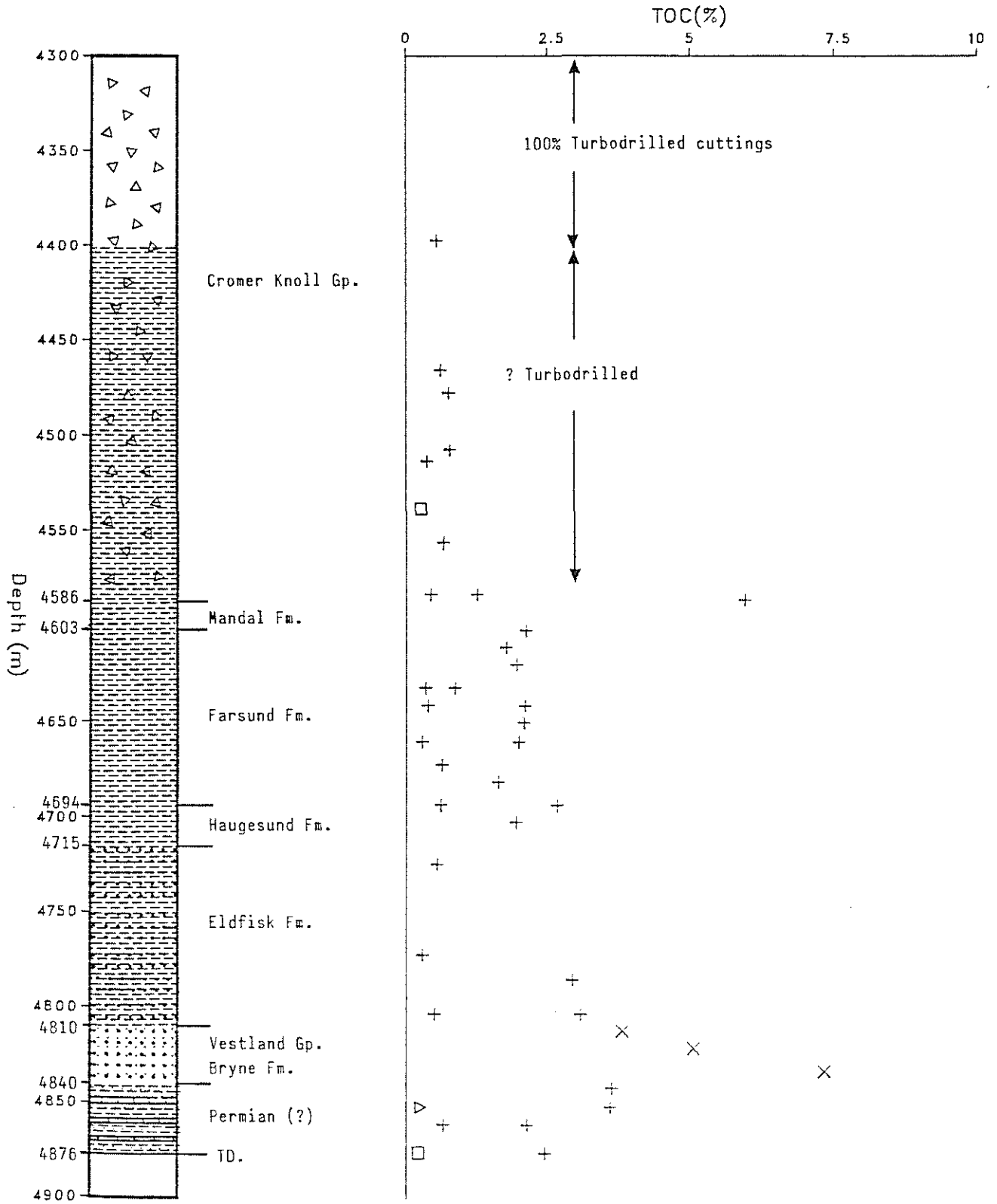


Figure: 2

Client: AMOCO

Production Index Data for Well NOCS 2/7-19

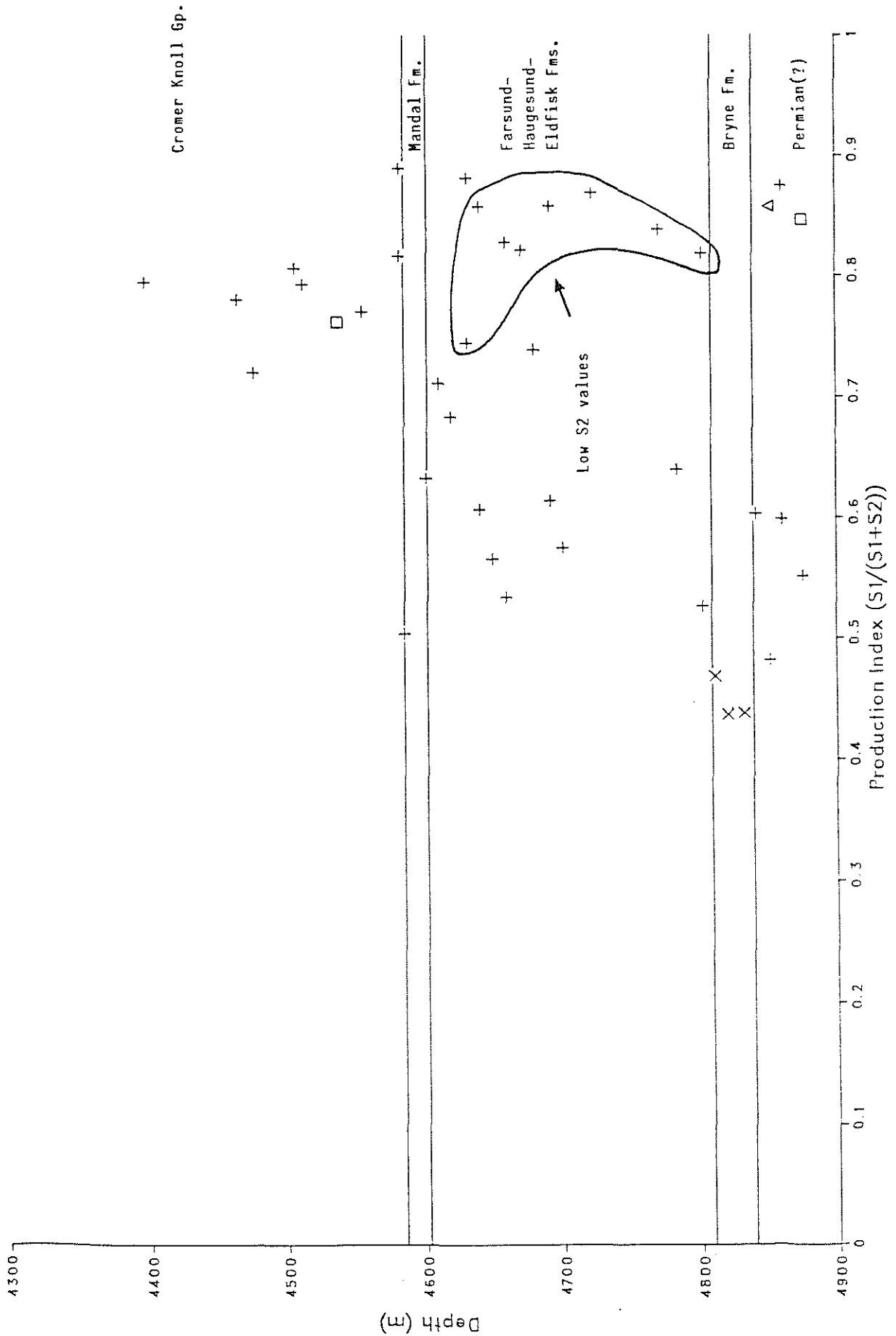


Figure: 3

Client: AMOCO

Tmax Data for Well NOCS 2/7-19

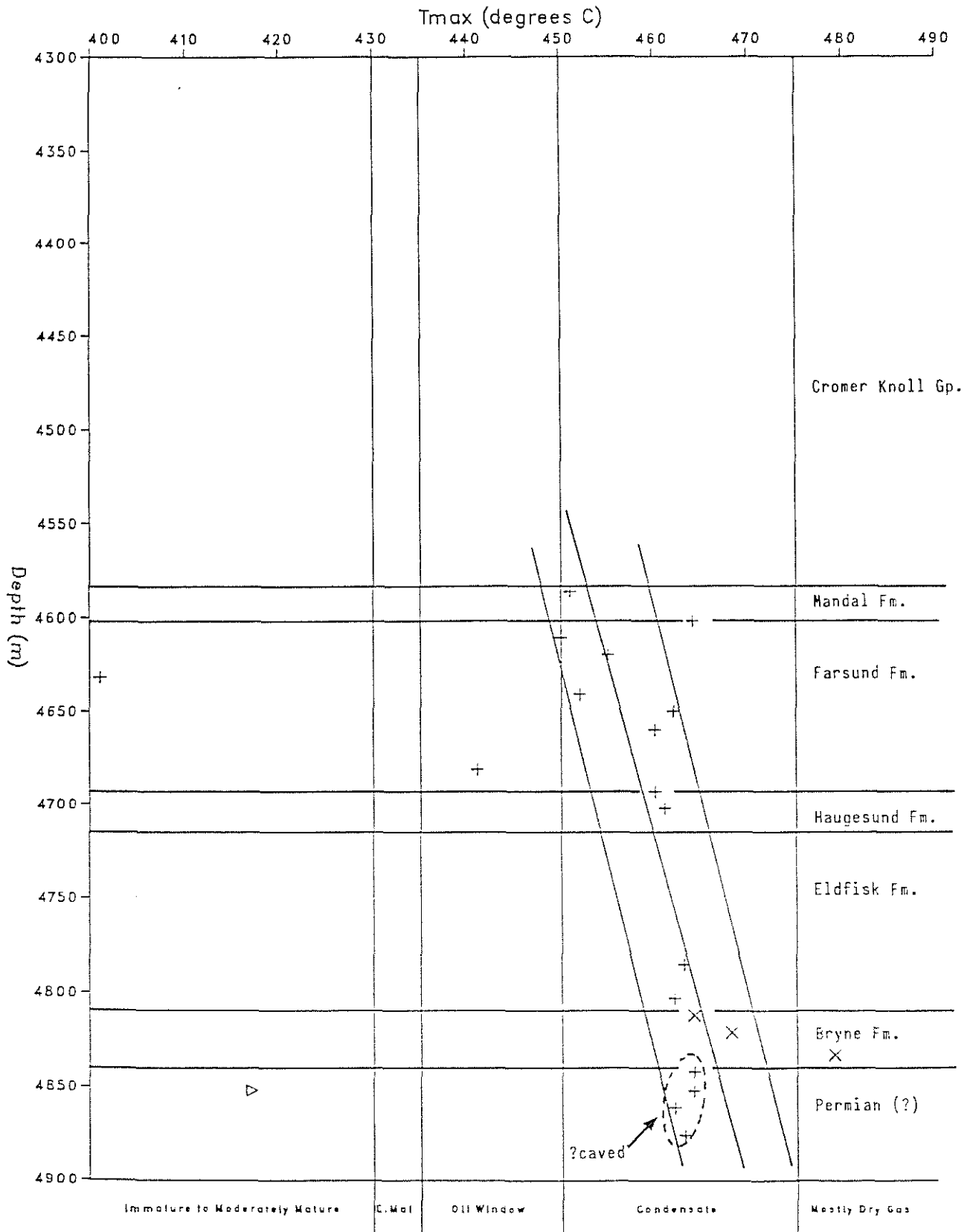


Figure 4 : Hydrogen Index v.s. Tmax values
Well NOCS 2/7-19

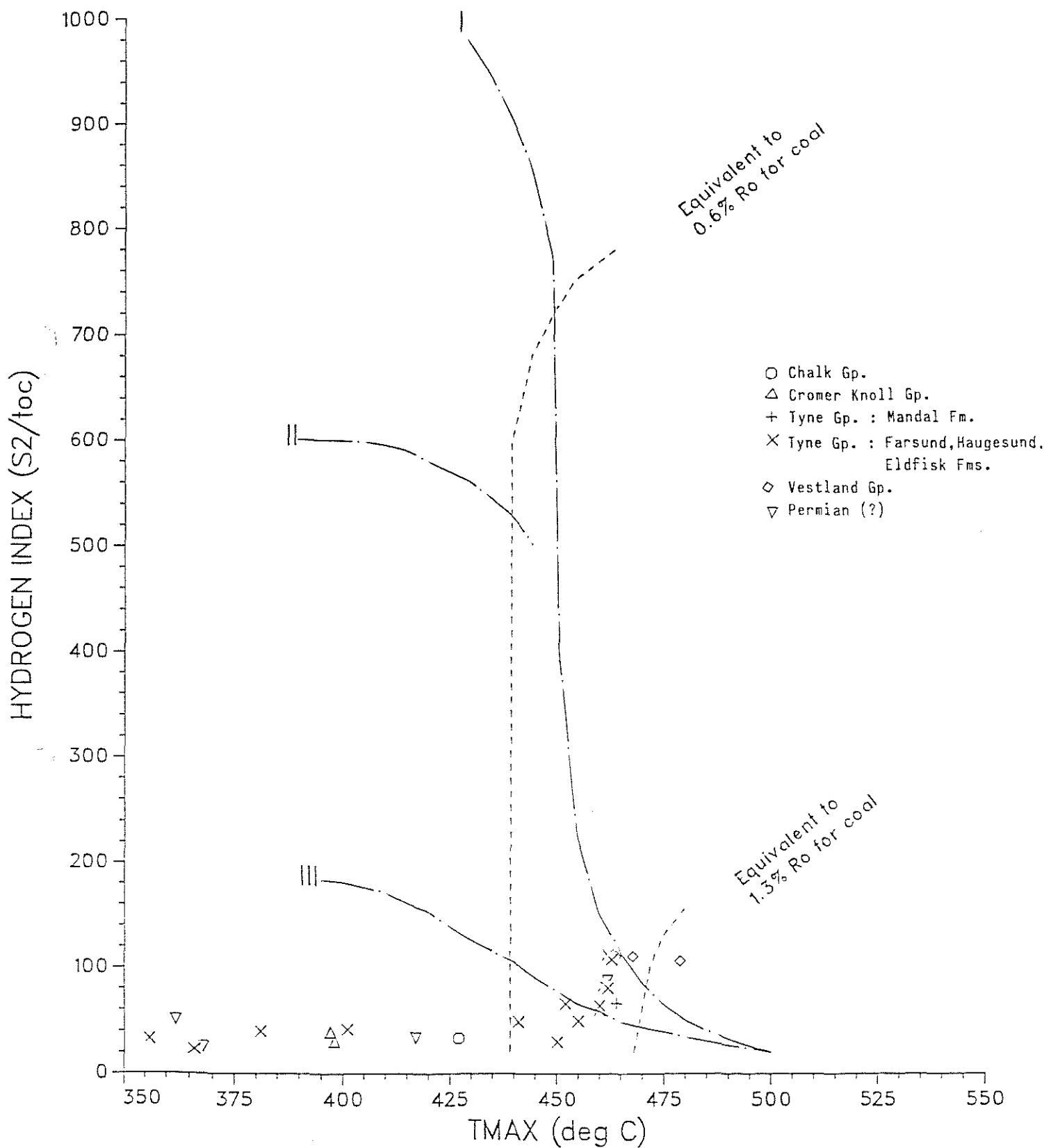


Figure 5: VITRINITE REFLECTANCE VERSUS DEPTH
 WELL NOCS 2/7-19

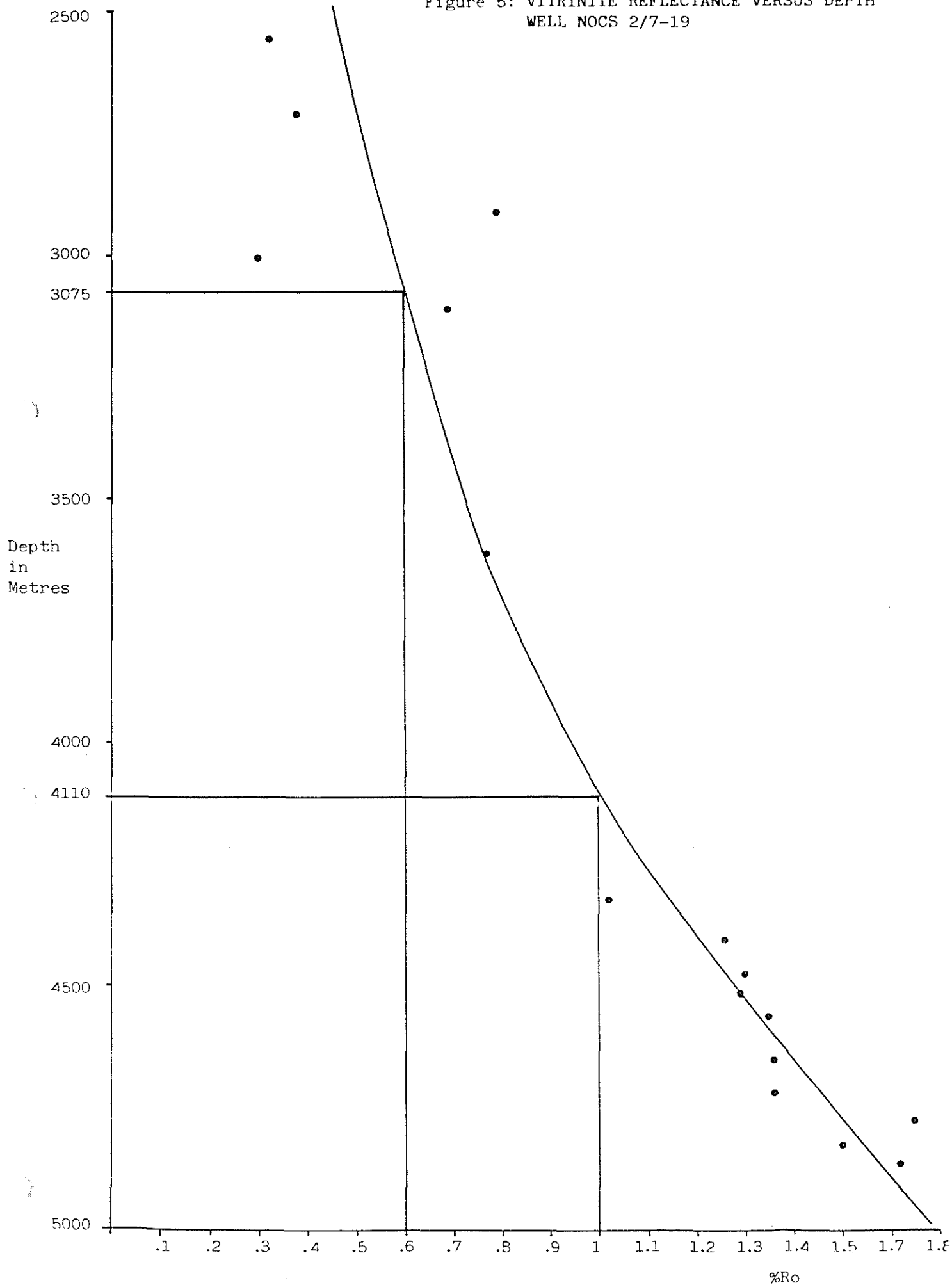


Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology	description		
2551.00		Hrdl		Oligocene		0058
		100	Sltst	: m gy		0058-1L
2606.00		Hrdl		Oligocene		0059
		65	Sltst	: gy brn to m gy		0059-1L
		35	Ca	: or gy		0059-2L
		tr	Cont	: prp		0059-3L
2707.00		Hrdl		Oligocene		0060
		60	Ca	: or gy		0060-2L
		40	Sltst	: gy brn to m gy		0060-1L
		tr	Cont	: prp		0060-3L
2810.00		Hrdl		Oligocene		0061
		85	Sh/Clst:	pl y brn to y gy, gn gy, slt		0061-1L
		15	Ca	: or gy		0061-2L
		tr	Cont	: prp		0061-3L
2908.00		Hrdl		Oligocene		0062
		90	Sh/Clst:	lt gy to m gy, slt		0062-1L
		10	Cont	: dd		0062-3L
		tr	Ca	: or gy		0062-2L
3005.00		Rogl	Bald	Palaeocene		0063
		80	Sh/Clst:	lt gy to m gy, gy gn, drk gy		0063-1L
		20	Cont	: st, dd		0063-3L
		tr	Ca	: or gy		0063-2L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3115.00				Rogl List Palaeocene		0064
			100	Sh/Clst: lt gy to drk gy, gy gn, gy red tr Cont : prp		0064-1L 0064-2L
3144.00	ccp			Chlk Ekof U.Cretaceous		0077
		0.03	100	Ca : w, hd, chk		0077-1L
3148.90	ccp			Chlk Ekof U.Cretaceous		0076
			100	Ca : w, hd, chk		0076-1L
3154.10	ccp			Chlk Ekof U.Cretaceous		0079
			100	Ca : w, hd, chk		0079-1L
3158.60	ccp			Chlk Ekof U.Cretaceous		0078
		0.02	100	Ca : w, hd, chk		0078-1L
3207.00				Chlk Tor U.Cretaceous		0065
			90	Ca : w to lt or blk, chk		0065-3L
			10	Sh/Clst: lt gy to drk gy, gy gn, gy red tr Cont : prp		0065-1L 0065-2L
3316.00				Chlk Tor U.Cretaceous		0066
			90	Ca : w to lt or blk, chk		0066-3L
			10	Sh/Clst: lt gy to drk gy, gy gn, gy red tr Cont : prp		0066-1L 0066-2L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample	
Int Cvd	TOC%	%	Lithology description				
3402.00			Chlk Tor		U.Cretaceous		0067
		100	Ca	:	w to lt or blk, chk		0067-3L
			tr Sh/Clst:		lt gy to drk gy, gy gn, gy red		0067-1L
			tr Cont	:	prp		0067-2L
3499.00			Chlk Hod		U.Cretaceous		0068
		100	Ca	:	w to gy pi, chk		0068-3L
			tr Sh/Clst:		lt gy to drk gy, gy gn, gy red		0068-1L
			tr Cont	:	prp		0068-2L
3609.00			Chlk Hod		U.Cretaceous		0069
		85	Ca	:	w to gy pi, chk		0069-3L
		15	Sh/Clst:		lt gy to drk gy, gy gn, gy red		0069-1L
			tr Cont	:	prp		0069-2L
3700.00			Chlk Hod		U.Cretaceous		0070
		95	Ca	:	w to gy pi, chk		0070-3L
		5	Sh/Clst:		lt gy to drk gy, gy gn, gy red		0070-1L
			tr Cont	:	prp		0070-2L
3803.00			Chlk Hod		U.Cretaceous		0071
		100	Cont	:	Mica-ad, cem		0071-2L
			tr Sh/Clst:		lt gy to drk gy, gy gn, gy red		0071-1L
			tr Ca	:	w to gy pi, chk		0071-3L
3901.00			Chlk Hod		U.Cretaceous		0072
		80	Ca	:	w to gy pi, chk		0072-3L
		15	Cont	:	Mica-ad, cem, prp, fib, tar-ad		0072-2L
		5	Sh/Clst:		lt gy to drk gy, gy gn, gy red		0072-1L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4013.00			Chlk	Hod	U.Cretaceous	0074
			90	Ca	: w to gy pi, chk	0074-3L
			10	Other	: m gy, trbofgs	0074-4L
			tr	Sh/Clst:	lt gy to drk gy, gy gn, gy red	0074-1L
			tr	Cont	: Mica-ad, cem, prp, fib, tar-ad	0074-2L
4108.00			Chlk	Hod	U.Cretaceous	0075
			100	Other	: m gy, trbofgs	0075-4L
			tr	Sh/Clst:	lt gy to drk gy, gy gn, gy red	0075-1L
			tr	Cont	: Mica-ad, cem, prp, fib, tar-ad	0075-2L
			tr	Ca	: w to gy pi, chk	0075-3L
4209.00			Chlk	Hidr	U.Cretaceous	0073
			100	Other	: m gy, trbofgs	0073-4L
			tr	Sh/Clst:	lt gy to drk gy, gy gn, gy red	0073-1L
			tr	Cont	: Mica-ad, cem, prp, fib, tar-ad	0073-2L
			tr	Ca	: w to gy pi, chk	0073-3L
4266.00			Crom	Rødb	L.Cretaceous	0036
			100	Other	: gy red, trbofgs	0036-1L
4277.00			Crom	Rødb	L.Cretaceous	0037
			100	Other	: lt gy to m gy, gy red, trbofgs	0037-1L
4285.00			Crom	Rødb	L.Cretaceous	0038
			100	Other	: lt gy to m gy, trbofgs	0038-1L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4290.00				Crom Rødb L.Cretaceous		0039
			100	Other : lt gy to m gy, trbofgs		0039-1L
4306.00				Crom Rødb L.Cretaceous		0040
			100	Other : m gy, trbofgs		0040-1L
4318.00				Crom Rødb L.Cretaceous		0041
			90	Other : m gy, trbofgs		0041-1L
			10	Sh/Clst: m gy to drk gy		0041-2L
4336.00				Crom Rødb L.Cretaceous		0042
			100	Other : drk gy, trbofgs		0042-1L
				tr Sh/Clst: drk gy		0042-2L
4346.00				Crom Rødb L.Cretaceous		0043
			100	Other : drk gy, trbofgs		0043-1L
				tr Sh/Clst: drk gy		0043-2L
4355.00				Crom Rødb L.Cretaceous		0044
			90	Other : drk gy, trbofgs		0044-1L
			10	Sh/Clst: drk gy		0044-2L
4364.00				Crom Rødb L.Cretaceous		0045
			100	No Mat.		0045-1L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4376.00				Crom Rødb L.Cretaceous		0046
			90	Other : m gy, trbofgs		0046-1L
			10	Sh/Clst: m gy to drk gy		0046-2L
4385.00				Crom Rødb L.Cretaceous		0047
			95	Other : m gy, trbofgs		0047-1L
			5	Sh/Clst: m gy to drk gy		0047-2L
4397.00				Crom Rødb L.Cretaceous		0048
		0.54	55	Other : m gy, trbofgs		0048-1L
			45	Sh/Clst: m gy to drk gy		0048-2L
			tr	Cont : prp, fib		0048-3L
4407.00				Crom Rødb L.Cretaceous		0049
			85	Other : m gy, trbofgs		0049-1L
			15	Sh/Clst: m gy to drk gy		0049-2L
			tr	Cont : prp, fib		0049-3L
4416.00				Crom Rødb L.Cretaceous		0050
			90	Other : m gy, trbofgs		0050-1L
			10	Sh/Clst: m gy to brn gy to drk gy		0050-2L
			tr	Cont : prp, fib		0050-3L
4428.00				Crom Rødb L.Cretaceous		0051
			95	Other : lt gy to m gy, trbofgs		0051-1L
			5	Sh/Clst: m gy to brn gy to drk gy		0051-2L
			tr	Cont : prp, fib		0051-3L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology	description	
4437.00				Crom Rødb L.Cretaceous		0052
			100	Other : lt gy to m gy, trbofgs		0052-1L
				tr Sh/Clst: m gy to brn gy to drk gy		0052-2L
				tr Cont : prp, fib		0052-3L
4465.00				Crom Rødb L.Cretaceous		0053
			70	Other : lt gy to m gy, trbofgs		0053-1L
	0.61		30	Sh/Clst: m gy to brn gy to drk gy		0053-2L
				tr Cont : prp, fib		0053-3L
				tr Sh/Clst: gy red		0053-4L
4477.00				Crom Valh L.Cretaceous		0054
			75	Other : lt gy to m gy, trbofgs		0054-1L
	0.75		25	Sh/Clst: m gy to brn gy to drk gy		0054-2L
				tr Cont : prp, fib		0054-3L
				tr Sh/Clst: gy red		0054-4L
4486.00				Crom Valh L.Cretaceous		0055
			95	Other : lt gy to m gy, trbofgs		0055-1L
			5	Sh/Clst: m gy to brn gy to drk gy		0055-2L
				tr Cont : prp, fib		0055-3L
				tr Sh/Clst: gy red		0055-4L
4495.00				Crom Valh L.Cretaceous		0056
			95	Other : lt gy to m gy, trbofgs		0056-1L
			5	Sh/Clst: m gy to brn gy to drk gy		0056-2L
				tr Cont : prp, fib		0056-3L
				tr Sh/Clst: gy red		0056-4L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4507.00				Crom Valh L.Cretaceous		0001
	0.77			70 Other : lt gy, trbofgs		0001-3L
				25 Sh/Clst: m gy to drk gy		0001-1L
				5 Marl : lt gy to m gy to gy gn		0001-2L
				tr Sh/Clst: gy red		0001-4L
				tr Cont : prp		0001-5L
4513.00				Crom Valh L.Cretaceous		0002
	0.37			60 Other : lt gy, trbofgs		0002-3L
				25 Sh/Clst: lt gy to m gy to gy gn, calc		0002-2L
				15 Sh/Clst: m gy to drk gy		0002-1L
				tr Sh/Clst: gy red		0002-4L
				tr Cont : prp, fib		0002-5L
4525.00				Crom Valh L.Cretaceous		0003
				85 Other : lt gy, trbofgs		0003-3L
				10 Sh/Clst: lt gy to m gy to gy gn, calc		0003-2L
				5 Sh/Clst: m gy to drk gy		0003-1L
				tr Sh/Clst: gy red		0003-4L
				tr Cont : prp, fib		0003-5L
4538.00				Crom Valh L.Cretaceous		0004
	0.26			85 S/Sst : lt gy, f, l		0004-6L
				10 Sh/Clst: lt gy to m gy to gy gn, calc		0004-2L
				5 Other : lt gy, trbofgs		0004-3L
				bulk		0004-0B
				tr Sh/Clst: m gy to drk gy		0004-1L
				tr Sh/Clst: gy red		0004-4L
				tr Cont : prp, fib		0004-5L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample	
Int Cvd	TOC%	%	Lithology description				
4547.00			Crom	Valh	L.Cretaceous	0005	
		95	Other	:	lt gy, trbofgs	0005-3L	
		5	Sh/Clst:	m gy to drk gy		0005-1L	
		tr	Sh/Clst:	lt gy to m gy to gy gn, calc		0005-2L	
		tr	Sh/Clst:	gy red		0005-4L	
		tr	Cont	:	prp, fib	0005-5L	
4556.00			Crom	Valh	L.Cretaceous	0006	
	0.65	70	Other	:	lt gy, trbofgs	0006-3L	
		25	Sh/Clst:	m gy to drk gy		0006-1L	
		5	Sh/Clst:	lt gy to m gy to gy gn, calc		0006-2L	
		tr	Sh/Clst:	gy red		0006-4L	
		tr	Cont	:	prp, fib	0006-5L	
4583.00			Crom	Valh	L.Cretaceous	0007	
	0.43	65	Sh/Clst:	lt gy to m gy to drk gy, calc		0007-1L	
	1.24	20	Sh/Clst:	dsk y brn to brn blk, carb, sft		0007-5L	
		15	Other	:	lt gy, trbofgs	0007-2L	
		tr	Sh/Clst:	gy red		0007-3L	
		tr	Cont	:	prp, fib	0007-4L	
4586.00			Crom	Valh	L.Cretaceous	0033	
	5.94	75	Sh/Clst:	lt gy to m gy to drk gy, calc		0033-1L	
		25	Sh/Clst:	dsk y brn to brn blk, carb, sft		0033-4L	
		tr	Sh/Clst:	gy red		0033-2L	
		tr	Cont	:	prp, fib	0033-3L	
4589.00			Tyne	Mand	U.Jurassic	0034	
		100	Sh/Clst:	lt gy to m gy to drk gy, calc		0034-1L	
		tr	Sh/Clst:	gy red		0034-2L	
		tr	Cont	:	prp, fib	0034-3L	
		tr	Sh/Clst:	dsk y brn to brn blk, carb, sft		0034-4L	

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4593.00				Tyne Mand U.Jurassic		0008
				60 Sh/Clst: lt brn gy to m gy to drk gy, calc		0008-1L
				40 Other : lt gy, trbofgs		0008-2L
				tr Sh/Clst: gy red		0008-3L
				tr Cont : prp, fib		0008-4L
				tr Sh/Clst: dsk y brn to brn blk, carb, sft		0008-5L
4602.00				Tyne Mand U.Jurassic		0009
	2.10		55	Sh/Clst: dsk y brn to brn blk, carb, trbofgs		0009-5L
			25	Sh/Clst: lt brn gy to m gy to drk gy, calc		0009-1L
			20	Other : lt gy, trbofgs		0009-2L
			tr	Sh/Clst: gy red		0009-3L
			tr	Cont : prp, fib		0009-4L
4611.00				Tyne Fars U.Jurassic		0010
	1.76		85	Sh/Clst: dsk y brn to brn blk, carb, trbofgs		0010-4L
			10	Sh/Clst: lt gy		0010-5L
			5	Other : lt gy, trbofgs		0010-2L
			tr	Sh/Clst: lt brn gy to m gy to drk gy, calc		0010-1L
			tr	Cont : prp, fib		0010-3L
4620.00				Tyne Fars U.Jurassic		0011
	1.94		85	Sh/Clst: dsk y brn to brn blk, carb, trbofgs		0011-4L
			15	Sh/Clst: lt brn gy to m gy to drk gy, calc		0011-1L
			tr	Other : lt gy, trbofgs		0011-2L
			tr	Cont : prp, fib		0011-3L
			tr	Sh/Clst: lt gy, calc		0011-5L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4632.00				Tyne Fars U.Jurassic		0012
	0.34		50	Sh/Clst: lt brn gy to m gy to drk gy, calc		0012-1L
	0.85		50	Sh/Clst: dsk y brn to brn blk, carb		0012-3L
				tr Cont : prp, fib		0012-2L
				tr Sh/Clst: lt gy, calc		0012-4L
4641.00				Tyne Fars U.Jurassic		0013
	0.38		85	Sh/Clst: lt brn gy to m gy to drk gy		0013-1L
	2.08		15	Sh/Clst: dsk y brn to brn blk, carb		0013-3L
				tr Cont : prp, fib		0013-2L
				tr Sh/Clst: lt gy, calc		0013-4L
4650.00				Tyne Fars U.Jurassic		0014
			70	Sh/Clst: lt brn gy to m gy to drk gy		0014-1L
	2.06		25	Sh/Clst: dsk y brn to brn blk, carb		0014-3L
			5	Sh/Clst: lt gy, calc		0014-4L
				tr Cont : prp, fib		0014-2L
4660.00				Tyne Fars U.Jurassic		0015
	0.28		65	Sh/Clst: lt brn gy to m gy to drk gy		0015-1L
	1.97		20	Sh/Clst: dsk y brn to brn blk, carb		0015-3L
			15	Sh/Clst: lt gy to m gy, calc		0015-4L
				tr Cont : prp, fib		0015-2L
4672.00				Tyne Fars U.Jurassic		0016
	0.62		90	Sh/Clst: lt brn gy to m gy to drk gy		0016-1L
			5	Sh/Clst: dsk y brn to brn blk, carb		0016-3L
			5	Sh/Clst: lt gy to m gy, calc		0016-4L
				tr Cont : prp, fib		0016-2L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
4681.00			Tyne Fars U.Jurassic			0017
	1.61	55	Sh/Clst: lt brn gy to m gy to drk gy			0017-1L
		40	Sh/Clst: dsk y brn to brn blk, carb, trbofgs			0017-3L
		5	Sh/Clst: lt gy to m gy, calc			0017-4L
		tr	Cont : prp, fib			0017-2L
		tr	Sh/Clst: gy red			0017-5L
4693.00			Tyne Fars U.Jurassic			0018
	0.60	55	Sh/Clst: lt brn gy to m gy to drk gy			0018-1L
	2.65	35	Sh/Clst: dsk y brn to brn blk, carb			0018-3L
		10	Sh/Clst: lt gy to m gy, calc			0018-4L
		tr	Cont : prp, fib			0018-2L
		tr	Sh/Clst: gy red			0018-5L
4702.00			Tyne Haug U.Jurassic			0019
	1.92	55	Sh/Clst: dsk y brn to brn blk, sft			0019-3L
		40	Sh/Clst: lt brn gy to m gy to drk gy			0019-1L
		5	Sh/Clst: lt gy to m gy, calc			0019-4L
		tr	Cont : prp, fib			0019-2L
		tr	Sh/Clst: gy red			0019-5L
4724.00			Tyne Eldf U.Jurassic			0020
		85	Sh/Clst: lt brn gy to m gy to drk gy			0020-1L
		10	Sh/Clst: lt gy to m gy, calc			0020-4L
		5	Sh/Clst: dsk y brn to brn blk, sft			0020-3L
		tr	Cont : prp, fib			0020-2L
		tr	Sh/Clst: gy red			0020-5L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4733.00				Tyne Eldf U.Jurassic		0021
			100	Other : brn blk, trbofgs		0021-6L
				tr Sh/Clst: lt brn gy to m gy to drk gy		0021-1L
				tr Cont : prp, fib		0021-2L
				tr Sh/Clst: dsk y brn to brn blk		0021-3L
				tr Sh/Clst: lt gy to m gy, calc		0021-4L
				tr Sh/Clst: gy red		0021-5L
4763.00				Tyne Eldf U.Jurassic		0022
			100	Other : brn blk, trbofgs		0022-6L
				tr Sh/Clst: lt brn gy to m gy to drk gy		0022-1L
				tr Cont : prp, fib		0022-2L
				tr Sh/Clst: dsk y brn to brn blk		0022-3L
				tr Sh/Clst: lt gy to m gy, calc		0022-4L
				tr Sh/Clst: gy red		0022-5L
4772.00				Tyne Eldf U.Jurassic		0023
	0.28		65	Sh/Clst: lt gy to m gy, calc		0023-3L
			25	Sh/Clst: lt brn gy to m gy to drk gy		0023-1L
			10	Ca : w to lt gy		0023-5L
				tr Cont : prp, fib		0023-2L
				tr Other : brn blk, trbofgs		0023-4L
4785.00				Tyne Eldf U.Jurassic		0024
	2.91		50	Sh/Clst: lt gy to m gy, calc		0024-3L
			25	Sh/Clst: dsk y brn to brn blk, carb		0024-5L
			15	Ca : w to lt gy		0024-4L
			10	Sh/Clst: lt brn gy to m gy to drk gy		0024-1L
				tr Cont : prp, fib		0024-2L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample	
Int Cvd	TOC%	%	Lithology description				
4803.00			Tyne Eldf U.Jurassic				0025
	0.49	55	Sh/Clst: lt gy to m gy, calc				0025-3L
	3.05	20	Sh/Clst: dsk y brn to brn blk, carb				0025-5L
		15	Sh/Clst: lt brn gy to m gy to drk gy				0025-1L
		10	Ca : w to lt gy				0025-4L
		tr	Cont : prp, fib				0025-2L
		tr	S/Sst : w, cem				0025-6L
4812.00			Vest Bryn M.Jurassic				0026
	3.78	75	Sltst : dsk y brn to brn blk, carb, s				0026-5L
		10	Sh/Clst: lt gy to m gy, calc				0026-3L
		10	Ca : w to lt gy				0026-4L
		5	Sh/Clst: lt brn gy to m gy to drk gy				0026-1L
		tr	Cont : prp, fib				0026-2L
		tr	S/Sst : w, cem				0026-6L
4821.00			Vest Bryn M.Jurassic				0027
	5.02	65	Sltst : dsk y brn to brn blk, carb, s				0027-5L
		20	Ca : w to lt gy				0027-4L
		15	Sh/Clst: lt gy to m gy, calc				0027-3L
		tr	Sh/Clst: lt brn gy to m gy to drk gy				0027-1L
		tr	Cont : prp, fib				0027-2L
		tr	S/Sst : w, cem				0027-6L
4833.00			Vest Bryn M.Jurassic				0028
	7.30	80	Sltst : dsk y brn to brn blk, carb, s				0028-5L
		10	Sh/Clst: lt gy to m gy, calc				0028-3L
		10	Ca : w to lt gy				0028-4L
		tr	Sh/Clst: lt brn gy to m gy to drk gy				0028-1L
		tr	Cont : Mica-ad, prp, fib				0028-2L
		tr	S/Sst : w, cem				0028-6L

Table 1 : Lithology description for well NOCS 2/7-19

Depth unit of measure: m

Depth	Type	Grp	Frn	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4842.00				Permian(?)		0029
	3.60		70	Sh/Clst: dsk y brn to brn blk, carb, slt		0029-5L
			20	Ca : w to lt gy		0029-4L
			10	Sh/Clst: lt gy to m gy, calc		0029-3L
			tr	Sh/Clst: lt brn gy to m gy to drk gy		0029-1L
			tr	Cont : Mica-ad, prp, fib		0029-2L
			tr	S/Sst : w, cem		0029-6L
4852.00				Permian(?)		0030
	0.24		50	Ca : w to lt gy, s		0030-4L
	3.57		30	Sh/Clst: dsk y brn to brn blk, carb, slt		0030-5L
			20	Sh/Clst: lt gy to m gy, calc		0030-3L
			tr	Sh/Clst: lt brn gy to m gy to drk gy		0030-1L
			tr	Cont : Mica-ad, ns, fib		0030-2L
			tr	S/Sst : w, cem		0030-6L
4861.00				Permian(?)		0031
	0.63		55	Sh/Clst: lt gy to m gy, calc		0031-3L
	2.10		40	Sh/Clst: dsk y brn to brn blk, carb, slt		0031-5L
			5	Ca : w to lt gy, s		0031-4L
			tr	Sh/Clst: lt brn gy to m gy to drk gy		0031-1L
			tr	Cont : Mica-ad, ns, fib		0031-2L
			tr	S/Sst : w, cem		0031-6L
4876.00				Permian(?)		0032
	2.42		75	Sh/Clst: dsk y brn to blk, carb, slt		0032-4L
			10	Sh/Clst: lt gy to m gy, calc		0032-2L
			10	Ca : w to lt gy, s		0032-3L
			5	Coal : blk		0032-6L
			tr	Cont : Mica-ad, ns, fib		0032-1L
			tr	S/Sst : w, cem		0032-5L

Table 2 : Rock-Eval table for well NOCS 2/7-19

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3144.00	ccp	Ca : w	0.02	0.01	0.57	0.02	0.03	33	1900	-	0.67	427	0077-1L
3158.60	ccp	Ca : w	-	-	0.47	-	0.02	-	2350	-	-	-	0078-1L
4397.00	cut	Sh/Clst: m gy to drk gy	0.66	0.17	0.19	0.89	0.54	31	35	0.8	0.80	338	0048-2L
4465.00	cut	Sh/Clst: m gy to brn gy to drk gy	0.39	0.11	0.21	0.52	0.61	18	34	0.5	0.78	-	0053-2L
4477.00	cut	Sh/Clst: m gy to brn gy to drk gy	0.54	0.21	0.22	0.95	0.75	28	29	0.8	0.72	-	0054-2L
4507.00	cut	Sh/Clst: m gy to drk gy	1.17	0.28	0.19	1.47	0.77	36	25	1.4	0.81	333	0001-1L
4513.00	cut	Sh/Clst: lt gy to m gy to gy gn	0.46	0.12	0.19	0.63	0.37	32	51	0.6	0.79	347	0002-2L
4538.00	cut	bulk	0.32	0.10	0.96	0.10	0.26	38	369	0.4	0.76	397	0004-0B
4556.00	cut	Sh/Clst: m gy to drk gy	0.74	0.22	0.21	1.05	0.65	34	32	1.0	0.77	-	0006-1L
4583.00	cut	Sh/Clst: lt gy to m gy to drk gy	1.29	0.16	0.21	0.76	0.43	37	49	1.4	0.89	-	0007-1L
4583.00	cut	Sh/Clst: dsk y brn to brn blk	1.65	0.37	0.23	1.61	1.24	30	19	2.0	0.82	398	0007-5L
4586.00	cut	Sh/Clst: dsk y brn to brn blk	5.38	5.29	0.84	6.30	5.94	89	14	10.7	0.50	451	0033-4L
4602.00	cut	Sh/Clst: dsk y brn to brn blk	2.38	1.38	0.44	3.14	2.10	66	21	3.8	0.63	464	0009-5L
4611.00	cut	Sh/Clst: dsk y brn to brn blk	1.28	0.52	0.71	0.73	1.76	30	40	1.8	0.71	450	0010-4L
4620.00	cut	Sh/Clst: dsk y brn to brn blk	2.05	0.95	0.55	1.73	1.94	49	28	3.0	0.68	455	0011-4L

Table 2 : Rock-Eval table for well NOCS 2/7-19

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4632.00	cut	Sh/Clst: lt brn gy to m gy to drk gy	0.74	0.10	0.46	0.22	0.34	29	135	0.8	0.88	302	0012-1L
4632.00	cut	Sh/Clst: dsk y brn to brn blk	1.02	0.35	0.23	1.52	0.85	41	27	1.4	0.74	401	0012-3L
4641.00	cut	Sh/Clst: lt brn gy to m gy to drk gy	0.66	0.11	0.22	0.50	0.38	29	58	0.8	0.86	-	0013-1L
4641.00	cut	Sh/Clst: dsk y brn to brn blk	2.10	1.36	0.38	3.58	2.08	65	18	3.5	0.61	452	0013-3L
4650.00	cut	Sh/Clst: dsk y brn to brn blk	2.15	1.65	0.41	4.02	2.06	80	20	3.8	0.57	462	0014-3L
4660.00	cut	Sh/Clst: lt brn gy to m gy to drk gy	0.24	0.05	0.40	0.13	0.28	18	143	0.3	0.83	-	0015-1L
4660.00	cut	Sh/Clst: dsk y brn to brn blk	1.43	1.25	0.33	3.79	1.97	63	17	2.7	0.53	460	0015-3L
4672.00	cut	Sh/Clst: lt brn gy to m gy to drk gy	0.64	0.14	0.35	0.40	0.62	23	56	0.8	0.82	366	0016-1L
4681.00	cut	Sh/Clst: dsk y brn to brn blk	2.20	0.78	0.35	2.23	1.61	48	22	3.0	0.74	441	0017-3L
4693.00	cut	Sh/Clst: lt brn gy to m gy to drk gy	0.66	0.11	0.46	0.24	0.60	18	77	0.8	0.86	302	0018-1L
4693.00	cut	Sh/Clst: dsk y brn to brn blk	2.51	1.58	0.45	3.51	2.65	60	17	4.1	0.61	460	0018-3L
4702.00	cut	Sh/Clst: dsk y brn to brn blk	2.15	1.59	0.29	5.48	1.92	83	15	3.7	0.57	461	0019-3L

Table 2 : Rock-Eval table for well NOCS 2/7-19

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
4724.00	com	bulk	1.12	0.17	0.48	0.35	0.53	32	91	1.3	0.87	356	0080-0B
4772.00	cut	Sh/Clst: lt gy to m gy	0.57	0.11	0.27	0.41	0.28	39	96	0.7	0.84	381	0023-3L
4785.00	cut	Sh/Clst: dsk y brn to brn blk	5.53	3.11	0.30	10.37	2.91	107	10	8.6	0.64	463	0024-5L
4803.00	cut	Sh/Clst: lt gy to m gy	0.81	0.18	0.29	0.62	0.49	37	59	1.0	0.82	349	0025-3L
4803.00	cut	Sh/Clst: dsk y brn to brn blk	3.78	3.41	0.37	9.22	3.05	112	12	7.2	0.53	462	0025-5L
4812.00	cut	Sltst : dsk y brn to brn blk	3.67	4.17	0.45	9.27	3.78	110	12	7.8	0.47	464	0026-5L
4821.00	cut	Sltst : dsk y brn to brn blk	4.29	5.54	0.44	12.59	5.02	110	9	9.8	0.44	468	0027-5L
4833.00	cut	Sltst : dsk y brn to brn blk	6.02	7.74	0.60	12.90	7.30	106	8	13.8	0.44	479	0028-5L
4842.00	cut	Sh/Clst: dsk y brn to brn blk	5.81	3.83	0.41	9.34	3.60	106	11	9.6	0.60	464	0029-5L
4852.00	cut	Ca : w to lt gy	0.48	0.08	0.40	0.20	0.24	33	167	0.6	0.86	417	0030-4L
4852.00	cut	Sh/Clst: dsk y brn to brn blk	3.50	3.77	0.47	8.02	3.57	106	13	7.3	0.48	464	0030-5L
4861.00	cut	Sh/Clst: lt gy to m gy	1.11	0.16	0.22	0.73	0.63	25	35	1.3	0.87	368	0031-3L
4861.00	cut	Sh/Clst: dsk y brn to brn blk	2.74	1.84	0.48	3.83	2.10	88	23	4.6	0.60	462	0031-5L
4876.00	cut	Sh/Clst: dsk y brn to blk	3.14	2.56	0.52	4.92	2.42	106	21	5.7	0.55	463	0032-4L
4876.00	com	bulk	0.55	0.10	0.34	0.29	0.20	50	170	0.7	0.85	362	0057-0B

Table 2 : Rock-Eval table for well NOCS 2/7-19
Page: 4

Depth unit of measure: m

max	Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	T
	Sample												

Table 2 : Rock-Eval table for well NOCS 2/7-19

Page: 4

Depth unit of measure: m

	Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	T
max	Sample												
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VITRINITE REFLECTANCE

NOCS 2/7-19

Depth unit of measure: m

Table 3:

Well/Loc. Code: D85

Project: 2668

Depth	S-Tp	F-Tp	Lithology	Ro(av)	n	sd	Fluor	Histo	Table	Sample	Transfer
2551.00	cut	b	bulk	0.32	2	0.00	3			0058-0B	
2707.00	cut	b	bulk	0.38	6	0.05	3-4			0060-0B	
2908.00	cut	b	bulk	0.79	5	0.05	3-4?			0062-0B	
3005.00	cut	b	bulk	0.30	5	0.05	4?			0063-0B	
3115.00	cut	b	bulk	0.69	7	0.07	4-5			0064-0B	
3609.00	cut	b	bulk	0.77	3	0.02	NDP			0069-0B	
4318.00	cut	b	bulk	1.02	4	0.09	6??			0041-0B	
4397.00	cut	b	bulk	1.26	6	0.03	6?			0048-0B	
4465.00	cut	b	bulk	1.30	10	0.06	6-7?			0053-0B	
4507.00	cut	b	bulk	1.29	14	0.09	7?			0001-0B	
4556.00	cut	b	bulk	1.35	12	0.09	7?			0006-0B	
4583.00	cut	b	bulk	0.75	5	0.08	7-8?			0007-0B	
4602.00	cut	b	bulk	Turbo Frags.			NDP			0009-0B	

VITRINITE REFLECTANCE

NOCS 2/7-19

Depth unit of measure: m

Table 3:

Well/Loc. Code: D85

Project: 2668

Depth	S-Tp	F-Tp	Lithology	Ro(av)	n	sd	Fluor	Histo	Table	Sample	Transfer
4650.00	cut	l	Sh/Clst: lt brn gy to m gy to drk gy	1.36	8	0.10	NDP			0014-1L	
4650.00	cut	l	Sh/Clst: dsk y brn to brn blk				Turbo Frags.			0014-3L	
4724.00	com	b	bulk	1.36	8	0.04	NDP			0080-0B	
4772.00	cut	b	bulk	1.65	9	0.10	NDP			0023-0B	
4821.00	cut	b	bulk	1.50	5	0.06	NDP			0027-0B	
4861.00	cut	b	bulk	1.62	5	0.08	NDP			0031-0B	