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REPORT :

VITRINITE REFLECTANCE OF NOCS 34/7-14

CLIENT(S) :

SAGA PETROLEUM a/s

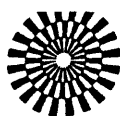
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Trondheim, 28.08.90

S/14/93-526040

VITRINITE REFLECTANCE OF NOCS 34/7-14 - (REANALYSIS RESULTS)

Please find enclosed the results of vitrinite reflectance reanalysis of the 13 cuttings samples for the well NOCS 34/7-14 that were recently sent by you. The samples in question cover the depth range of 1030-2517 m. The enclosures include a table with mean Ro values, histograms for the 13 cuttings samples and the two coal (core chips) samples, and a vitrinite reflectance versus depth plot.

In the report "Geochemical Analysis Report for Well NOCS 34/7-14" dated 10.02.90 submitted to Saga earlier this year, majority of the petrographical observations mentioned in the "Vitrinite Reflectance" section are still valid, but the earlier vitrinite reflectance values should be considered as null and void and replaced by the present readings. In any case, a short note on petrographical observations made during the present reanalysis follows.

The shallowest sample examined (1030 m) is very different from the rest of the samples in that it has a clear dominance of vitrinite over inertinite, although the overall phytoclast content is low. Bitumen staining is low, but occasionally moderately stained vitrinite particles are seen. The reliability of results from this sample is considered to be high.

In the following 11 samples (1150 - 2179 m) the overall maceral content is extremely low, with vitrinite being very rare or even absent. Thus no determination was possible in several cases.

The vitrinite quality is very poor and most vitrinite occurring in these samples seems to be reworked. No bitumen staining is observed.

The next two samples are core chips (2229.5 and 2272.3 m) and comprise of coal. Staining is moderate and the vitrinite gives

Table 1 : Thermal Maturity Data for well NOCS 34/7-14 REFUN

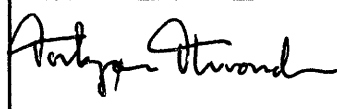
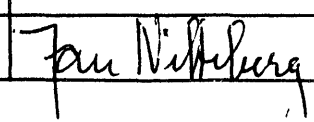
Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	T _{max} (°C)	Sample
1030.00	cut	bulk	0.24	13	0.05	-	-	-	0001-0B
1150.00	cut	bulk	0.41	3	0.03	-	-	-	0002-0B
1240.00	cut	bulk	NDP	-	-	-	-	-	0003-0B
1350.00	cut	bulk	0.35	4	0.05	-	-	-	0004-0B
1440.00	cut	bulk	NDP	-	-	-	-	-	0005-0B
1520.00	cut	bulk	NDP	-	-	-	-	-	0006-0B
1630.00	cut	bulk	0.51	2	0.01	-	-	-	0007-0B
1750.00	cut	bulk	NDP	-	-	-	-	-	0008-0B
1840.00	cut	bulk	0.40	4	0.04	-	-	-	0009-0B
1910.00	cut	bulk	0.52	2	0.03	-	-	-	0010-0B
2010.00	cut	bulk	0.29	5	0.05	-	-	-	0011-0B
2179.00	cut	bulk	0.50	2	0.01	-	-	-	0012-0B
2517.00	cut	bulk	0.43	5	0.04	-	-	-	0013-0B
2229.50	ccp	bulk	0.33	37	0.02	-	-	-	0001-0B
2272.30	ccp	bulk							
Coal Samples			0.34	39	0.05	-	-	-	0002-0B

NOTE : No determination was possible for the following samples
1240, 1440, 1520 and 1750 m.

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INTRODUCTION

This report gives the result of vitrinite reflectance analyses performed on seven samples from well 34/7-14 offshore Norway.

MATERIAL

The samples were provided from the client as polished pellets of bulk rock chips. Five of the preparations were light grey claystones whereas the remaining two were coals. The claystones were very poor or even barren of true vitrinite. The coals were rich in vitrinite, but the vitrinite appeared to be somewhat altered probably due to treatment during preparation or contamination by petroleum. No information was provided on the type of samples.

ANALYTICAL TECHNIQUES

The samples being analysed for vitrinite reflectance in this study were not treated with any acid prior to further preparation. Although the samples were submitted as polished pellets from the client they were re-impregnated and polished using 0.25 micron diamond paste and magnesium oxide as the two final steps.

The analytical equipment being used was a Zeiss MPM 03 photometer microscope equipped with an Epiplan-Neofluoar 40/0.90 oil objective. The sensitive measuring spot was about 2.5 micron in diameter, and the measurements were made through a green band pass filter (546 nm) and in oil immersion. The readings were made without a polarizer and using a stationary stage. On each sample around 25 points were measured if possible, and preferentially on telocollinite if available. A representative population was selected among the readings based on observations made while measuring, and an arithmetic mean was calculated for this population.

RESULTS

The vitrinite reflectance results are given in Table 1. Histograms for each sample with measuring results are given in Appendix.

Sample 1630 m: Light grey claystone barren of vitrinite and any organic particles.

Table 1. Vitrinite reflectance data well 34/7-14.

Well	Sample code IFE	Sample depth, type mrkb	Sample lithology	Vitrinite reflect. Rm (N)	Sample quality
34/7-14	SA 291	1630	claystone	barren	
	SA 292	1910	claystone	0.36 (1)	-oo-o
	SA 293	2010	claystone	0.38 (3)	-oooo
	SA 294	2179	claystone	barren	
	SA 295	2229.5	coal	0.34 (27)	oooo-
	SA 296	2272.3	coal	0.35 (26)	oooo-
	SA 297	2517	claystone	0.56 (3)	-++-o

LEGEND

Rm : mean random reflectance in oil
 N : number of readings

CODE FOR DATA QUALITY

The sample quality is characterized by five items as follows:

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- 1 : abundance of vitrinite
- 2 : identification of vitrinite
- 3 : type of vitrinite
- 4 : particle size
- 5 : particle surface quality

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

An ideal sample is characterized as follows: ooooo