MUD DATA 25/12-1

DEPTH INTERVAL	WEIGHT psi/1000ft	VISCOSITY sec. MF	WATER LOSS cc API	FANN PROPERTIES			pH	SOLIDS %	Cl ppm	Ca/Mg ppm
				Plastic Viscosity	Yield point	Gels 0/10 min.				
0 - 803	Seawater,	wt 458 psi/1000ft.								
803 - 1520	478	42	Seawater/bentonite suspension				9.2			
520 - 4481'	500	48	12.4	20	10	3/7	9	8	19000	1700
481'-6031'	500	48-55	13.8-15	11-18	8-14	2/7	9.5	10	19000	1000
031'-6515'	530	46-54	5.8-14.5	15-20	12-20	4/14	8.5-9	15	17000	1100-850
515'-7629'	530	45	5.6-6.4	11	14	2/11	10	9	18000	800-900
'629'-9400' (TD)	550	48-54	4-5.2	20-26	8-14	2/8	8.5-10	11-13	16400-18000	1200-320

TOTAL CHEMICAL CONSUMPTION

Well 25/12-1

Chemicals	Unit	Unit Cost*	Consumption	Total Cost
Zeogel	50 lbs	21.95	1163	25.527,85
Bentonite	50 kg	30.35	610	18.513,50
Drillaid	25 kg	51.18	790	40.432,20
Dextrid	50 lbs	115.53	307	35.467,71
Caustic Soda	50 kg	74.54	153	11.404,62
Flosal	50 lbs	73.92	87	6.431,04
Sod. Bic.	50 kg	37.58	21	789,18
Mica (f)	25 kg	42.95	50	2.147,50
Mica (c)	25 kg	42.95	67	2.877,65
Fibertex	20 kg	51.86	10	518,60
Kwick Seal	40 lbs	102.20	32	3.270,40
Al. Stearate	25 kg	137.70	3	413,10
CMC (HV)	25 kg	109.37	285	31.170,45
CMC (LV)	25 kg	109.37	183	20.014,71
Pipelax	55 gal.	2.710.68	2	5.421,36
Wallnut (c)	25 kg	48.44	80	3.875,20
Wallnut (f)	25 kg	48.44		
Diesel oil	bbl	0.28	136	38,08
Barytes	ST	429.24	346	148.517,04
Fer-O-Bar	ST	371,88	110	40.906,80
			TOTAL	397.736,99

* All cost figures in Nkr, $1 = Nkr 5.6

Depth of well : 9400 ft
Days on well : 99
Mud cost/ft : 42,31
Mud cost/day : kr 4.017,55

Mud losses surface : 3600 bbls
Mud losses subsurface : 900 bbls

Centrifuge	62 days á kr 308,-	kr 19.096,-
Mud Engineer	84 days á kr 896,-	kr 75.264,-
Total Chemical Consumption		kr 397,736,99
GRAND TOTAL		kr 492.096,99

Technical Service Report February 1974

RKTR 0050.74

SOURCE ROCK AND DOM EVALUATION WELL 25/12-1, NORWAY

by

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Sponsor: SIPM-EP/ a/s Norske Shell

In co-operation with:

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Investigation

912.416

Throughout the report the words 'Shell' and 'Group' are used collectively in relation to companies associated together under the name of the Royal Dutch/Shell Group of Companies.

KONINKLIJKE/SHELL
EXPLORATIE EN PRODUKTIE LABORATORIUM
RIJSWIJK, THE NETHERLANDS

CONTENTS

KEYWORDS

Source rock, Carbonization, DOM, well 25/12-1, Norway

I. INTRODUCTION

Geochemical investigations have been carried out on a suite of samples from the well as mentioned on the title page.

These investigations have been carried out to evaluate the presence and quality of source-rock layers, to establish the DOM trend and indicate the zone of possible oil and/or gas generation at the location of the well.

II. EVALUATION OF SOURCE-ROCK PROPERTIES

a. Source-rock indications

These indications have been determined by pyrolysis-sniffing[1] of the original samples. Moderate to high indications may indicate genuine source-rock properties or migrated oil or may be due to the presence of contaminants such as diesel oil used in the drilling fluid. To distinguish between the first possibility and the latter two, original samples with strong indications are remeasured after extraction with chloroform. Intervals or samples with high indications after extraction are investigated microscopically to ensure that the high values indicate genuine source-rock properties and are not due to contaminants insoluble in chloroform (such as walnut shells or other lost circulation material of an organic nature).

The results are given in the geochemical log (enclosure 1). For the location of the well see figure 1.

b. Type of organic matter

The type of organic matter present in the samples was determined by pyrolysis/gas solid chromatography[2,3]. This is an empirical method in which the organic matter is ranked on the basis of its hydrogen content. The hydrogen content is lowest for organic matter of humic type and increases in order of the types: mainly humic, mixture, mainly kerogenous and kerogenous. Organic matter of humic type is a precursor of gas. Organic matter of mainly humic

type is also a precursor of gas; if sufficient quantities are present it may also yield oil. Organic matter of mixed type is a precursor of light oil (usually of a paraffinic nature) and gas. Organic matter of mainly kerogenous and kerogenous types are precursors of oil and gas.

The results have been included in the geochemical log.

III. DEGREE OF ORGANIC METAMORPHISM

a. Results

DOM values have been determined by measurement of vitrinite relfectance[4].

The results are plotted as a function of depth in figure 2 in the form of DOM histograms. Any histogram that could not be accommodated on figure 2 is given in subsequent figures.

In general, the mode value of the histogram may or may not represent the true DOM of the stratum from which the sample is taken. The DOM obtained from cuttings may have been influenced by vitrite from cavings. Alternatively, the DOM may refer to reworked, resedimented or allochthonous vitrinite. However, it is probable that the DOM obtained for samples with histograms that have a rather sharp mode value does represent the true-layer DOM.

b. Compatible DOM

The compatible DOM is that which is in accordance with the present subsurface temperature and age of the formation in question. Knowledge of the compatible DOM is required to indicate the zone of possible oil generation (so-called cooking pot).

The dashed line in figure 2 indicates the compatible DOM trend based on[5-7] the present subsurface temperature gradient as indicated in the last figure. The temperature gradient is based on BHTs measured during logging after applying the so-called Middle East correction[8]. If only a solid line is given in figure 2, the compatible DOM coincides with the true-layer DOM trend.

The compatible DOM values 60 and 75 indicate the limits of the zone in which oil generation may take place. Source rocks for oil located within these limits are expected to generate oil. The major gas generation takes place below the level indicated by the compatible DOM 75.

In those cases where it can be assumed that the strata are presently at their maximum depth of burial, the compatible DOM also indicates the predicted true-layer DOM.

c. True-layer DOM

The true-layer DOM is the DOM that a humic coal would have when subjected to the same burial/temperature history as the formation in question.

The solid line in figure 2 is considered to indicate the trend of the true-layer DOM. It is based on those DOM values that are believed to be reliable. In this connection it can be remarked [9] that the standard deviation in the DOM measurement, including the variability occurring in nature, is 4 DOM units. The shape of the line, that is the rate of DOM increase as a function of DOM, is based on accumulated experience.

If the area has been uplifted, in the sense that the strata were once at greater depth, or if they have been at higher temperature, the true-layer DOM is higher than the compatible DOM. Source rocks with a true-layer DOM between 60 and 75 are mature for oil. If these source rocks have been uplifted, the true-layer DOM is incompatible.

Mature source rocks for oil have generated oil when the relevant strata have dropped below the level of the compatible DOM 60. Mature source rocks for oil lying outside the interval between the compatible DOM 60 and 75 levels are not expected to generate oil at present.

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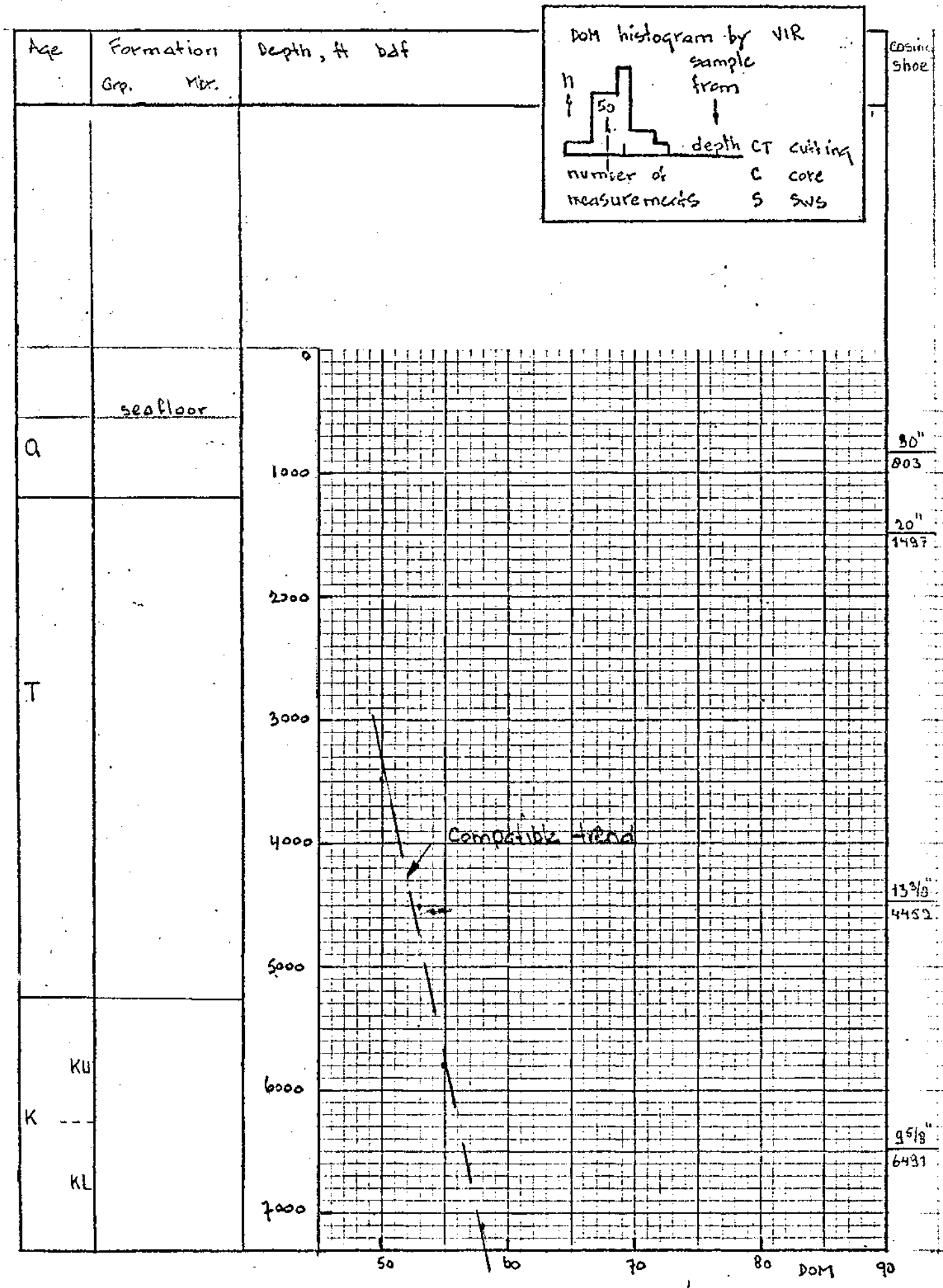
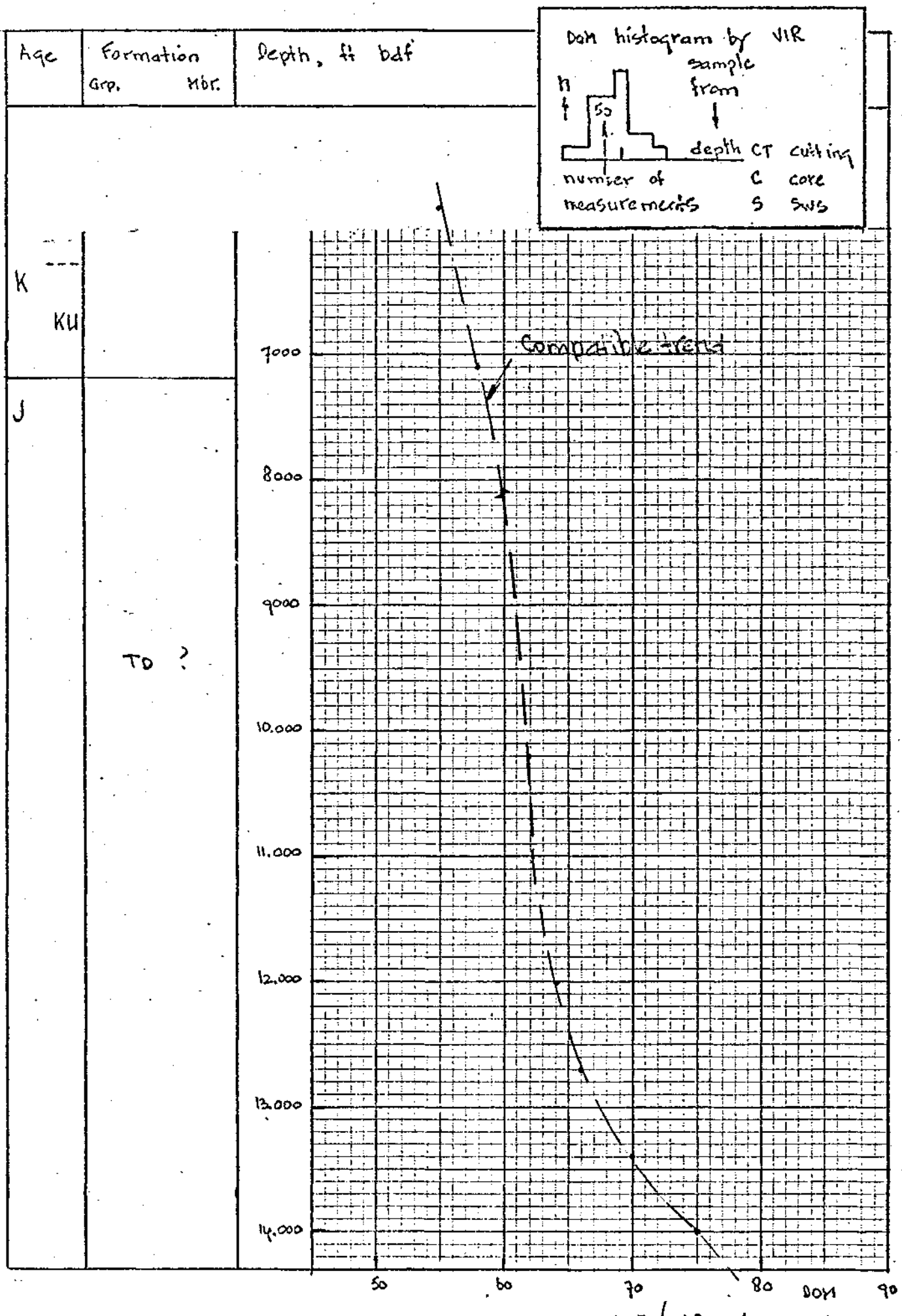


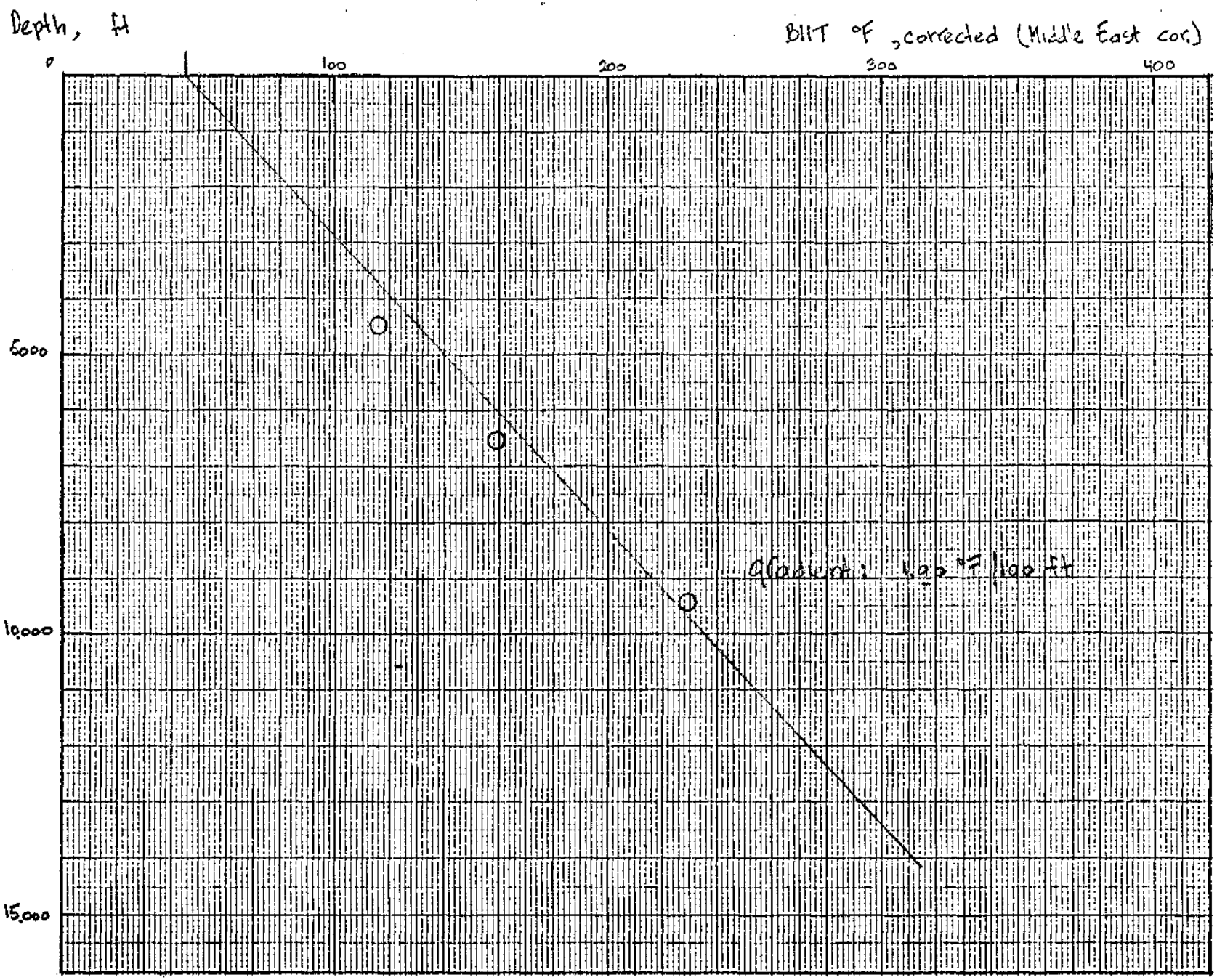
DOM AS A FUNCTION OF DEPTH, WELL 25/12_1

FIG: 2.9



DOM AS A FUNCTION OF DEPTH, WELL 25/12-1

FIG: 2b



Subsurface temperature as a function of depth.

Well 25/12-1

Fig. 3

REGEO-GEOCHEMICAL

Country: NORWAY

Sheet 1 of 1

E102 E 02 49 19 N 59 01 47

R101 00 25 112-1

R101 90 RKTR 00 50.74 EP DATE: 74 02 REIMAN/DIJELWART

		Depth bdf	Identifier 9	Identifier 10	Depth unit	Source rock ind.	Type of organic matter	DOM Compatible	DOM True Uncomf.
GC01		N****	N	N	Z	N**	ZZ*N,**Z	N*	N*Z
		3800	0	1	F	P		50	
		5800	0					55	
		7100	0					58	
		8000	0					60	
		11000	0					62	
		12000	0					64	
		12700	0					66	
		13400	0					70	
		14000	0					75	
		6100	1						
		7190	1			0			
		7540	1			700	K		
		8020	1			150	K		

This data sheet is added to facilitate those who wish to plot source rock and DOM information by computer. Information on the program is available from Central Offices, The Hague.

GEOCHEMICAL LOG

SCALE 1:5000

WELL 25/12_1

AGE		FORMATION	DEPTH IN FT	LITHOLOGY	DOM	SOURCE ROCK INDICATION OF ORIGINAL SAMPLE 100 200 300 400 500 600	SOURCE ROCK INDICATION OF SAMPLE AFTER EXTRACTION WITH CHLOROFORM 100 200 300 400 500 600	DEPTH IN FT	ORGANIC CARBON %wt.	TYPE OF ORGANIC MATTER
			0				VALUES SMALLER THAN 30 ARE CONSIDERED NOT TO BE OF SIGNIFICANCE	0		
Q			500	Seafloor				500		
	PS		1000					1000		
	?									
	PL		1500					1500		
T			2000					2000		
			2500					2500		
	MI		3000					3000		
			3500					3500		
	?									
	OL		4000					4000		
	?									
	?									
	EO		4500					4500		
			5000					5000		
	PC									
	MA		5500					5500		
Ku										
	CA									
	SA		6000					6000		
K	? CE									
	?									
KL	AB		6500					6500		
	AP									
	HT		7000					7000		KEROGENOUS
J	? JU									KEROGENOUS
										KEROGENOUS
			7500					7500		KEROGENOUS
							INTERVAL 7190 - 8020 FT CONTAINS SOURCE ROCKS FOR OIL.			
			8000					8000		KEROGENOUS
			8500					8500		
			9000					9000		
			9500							
			10000							

Koninklijke/Shell
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GEOCHEMICAL LOG
OF
25/12_1
NORWAY

Author: Dlw | Date: 22.2.74
Rep: RKTR 0050.74 | Encl: 1 | Draw.no: I

9.12.416