

T A B L E O F C O N T E N T S

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1. MATURITY

This account describes the results from a maturity study, using vitrinite reflectance, undertaken on well 34/7-4 offshore Norway. The study is carried out on sidewall cores and conventional cores exclusively. This sampling procedures has been relatively successful yielding material of acceptable quality for vitrinite reflectance analysis.

1.1 Maturity profile

Vitrinite reflectance versus depth profiles are presented in Appendix together with further sample details and some characteristic maturity features.

Koch (1974) mentioned that to draw a fully reliable vitrinite reflectance versus depth gradient, which should be the goal of every maturity study using vitrinite reflectance, it is preferential to have at least two reliable data points every 100 m. The data coverage presented in this report does not fulfill this demand. This is due to unfavourable lithologies in certain intervals barren of reliable vitrinite particles. This should be kept in mind when the reliability of the maturity gradient is considered. The average curve drawn through the profile is weighed against the good quality data and from general experience from the area. Extrapolation of the average curve to the sea bed indicates a hypothetical minimum value of $R_o = 0.20$ which is suggested by Dow (1977) to be the absolute minimum value close to the surface.

The vitrinite reflectance increases continuously and steeply with depth reaching the top of the immature transitional zone ($R_o = 0.35$) with possibilities for some early wet gas generation (Heroux et al. 1979, Leythaeuser et al. 1979, Connan and Cassou, 1980) at approximately 1600 m and the early mature zone ($R_o = 0.55$) around 2800 m.

2. METHODICAL ASPECTS

2.1 General

The vitrinite reflectance method has proven to be an indispensable tool in organic geochemical studies, and particularly in source rock studies for the assessment of the hydrocarbon maturation potential. The method has also proven to be a useful tool in solving certain geological problems related to geothermal effects. It is when properly interpreted probably the best maturity indicator available today: It is discriminatory, measurements are carried out by photometry providing objective, accurate and highly reproducible data, it is useful over a very wide range of maturation and is particularly useful in the maturation range of interest in exploration for hydrocarbons, it is applicable to most sedimentary rock types, it has largely been standardized for the last 20 years, correlated with physical and chemical parameters of coals and hydrocarbon generation in source rocks, and thoroughly tested on an international scale to provide a high degree of accuracy and reproducibility. The method and various aspects have been described by McCartney and Ergun (1958, 1967), Kötter (1960), Murchison (1964), De Vries and Bokhoven (1968) and Teichmüller (1971). Various aspects of the application of vitrinite reflectance to vitrinitic material finely disseminated in clastic sediments have been thoroughly treated by Bostick (1971, 1979), Bostick and Foster (1975), Dow (1977), Robert (1980) and Teichmüller (1971). A paper by Bostick and Alpern (1977) explains the principles of sampling, preparation and constituent selection for vitrinite reflectance measurements.

The vitrinite reflectance method was originally designed for rank determinations on coals which offer the ultimate sample quality for such studies: coals, unless weathered, thermally affected or of very low rank, provide nearly always excellent and very reliable vitrinite reflectance data. When the method was extended from coals to finely

disseminated organic material in clastic sediments, a huge advance was made in the practical applicability of the method especially concerning source rock studies. This important extension, however, introduced certain limitations which it is important to be aware of when vitrinite reflectance data obtained from clastic sediments are to be interpreted. Vitrinite reflectance data of this type which are reliable and readily interpreted, are relatively rare, poor and even barren samples are very frequent. This is due to a number of factors including type of lithology selected for study, small particle size, poor particle quality, bitumen staining, low reflecting vitrinite, weathering, lack of vitrinite, difficult identification of vitrinite, high pyrite contents and cavings.

2.2 Techniques used in this study

Normal palynological preparation techniques were used to concentrate the organic matter from the sediments. Crushed samples were dissolved in hydrofluoric acid after any carbonates had been removed with hydrochloric acid and washing. The samples were not subjected to any oxidative or heating treatment. The remaining organic residues were then embedded in a cold setting epoxy resin to make briquettes, which were subsequently ground flat and polished.

Equipment used was a Zeiss MPM 03 photometermicroscope. Viewing and measurements were made through a Zeiss Epiplan-Neofluoar 40/0.90 oil objective using oil immersion with refractive index $n = 1.518$. Measurements were made through a green filter with peak transmission at 546 nm, and the photometer sensitive field was about 2.5 μm in diameter. For photometer calibration a Schott safir glass-standard with reflectance of $R_0 = 0.588$ was used. The readings were carried out using a stationary stage. This has become more or less standard in vitrinite reflectance determinations on clastic samples. It is far less time consuming, permits smaller particles to be measured and the results obtained do not deviate significantly from those obtained using a rotating stage as long as the vitrinite reflectance values

stay below $R_o = 1.4$ (De Vries and Bokhoven, 1968). None of the samples analysed in this study exceeded this value. On each sample as many particles as possible up to 50 were measured. The readings were presented in histograms, a representative population was selected for each sample from observations made during measuring, and an arithmetically mean was calculated from this population and interpreted as the representative vitrinite reflectance value.

3. REFERENCES

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4. ABBREVIATIONS IN APPENDIX TABLES

swe	-	sidewall core
core	-	conventional core
clst	-	claystone
-	-	sample without any vitrinite
HF	-	sample preparations of HF-residue

WELL 34/7-4

VITRINITE REFLECTANCE

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro	Preparation
SA 113	1966.0	swc	clst	0.42 (7)	HF
SA 112	2018.0	swc	clst	0.35 (7)	HF
SA 111	2070.0	swc	clst	0.35 (2)	HF
SA 110	2125.0	swc	clst	0.58 (1)-	HF
SA 109	2170.0	swc	clst	0.41 (7)	HF
SA 108	2426.0	swc	clst	0.39 (1)	HF
SA 107	2482.0	swc	clst	0.35 (1)	HF
SA 106	2490.0	swc	clst	0.47 (6)	HF
SA 105	2518.0	swc	clst	-	HF
SA 104	2518.0	swc	clst	0.53 (4)	HF
SA 90	2538.5	core	clst	-	HF
SA 88	2540.0	core	clst	-	HF
SA 84	2541.0	core	clst	-	HF
SA 103	2542.0	swc	clst	0.99 (50)-	HF
SA 92	2545.0	core	clst	0.50 (24)	HF
SA 93	2545.0	core	clst	0.55 (7)	HF
SA 89	2548.5	core	clst	0.30 (50)-	HF
SA 91	2551.5	core	clst	0.53 (4)	HF
SA 86	2552.5	core	clst	0.48 (8)	HF
SA 85	2555.5	core	clst	-	HF
SA 87	2557.0	core	clst	-	HF
SA 102	2652.0	swc	clst	0.60 (8)-	HF
SA 101	2567.0	swc	clst	-	HF
SA 100	2573.0	swc	clst	-	HF
SA 99	2621.0	swc	clst	-	HF
SA 98	2651.0	swc	clst	-	HF
SA 97	2660.0	swc	clst	-	HF
SA 96	2673.0	swc	clst	-	HF
SA 95	2689.0	swc	clst	-	HF
SA 94	2708.0	swc	clst	-	HF

WELL 34/7-4

SOME MATURITY CHARACTERISTICS

Depth at:

Ro = 0.35 : 1600 m

Ro = 0.55 : 2800 m

Ro = 0.70 : -

Vitrinite reflectance (Ro) at depth:

1000 m : 0.29

2000 m : 0.41

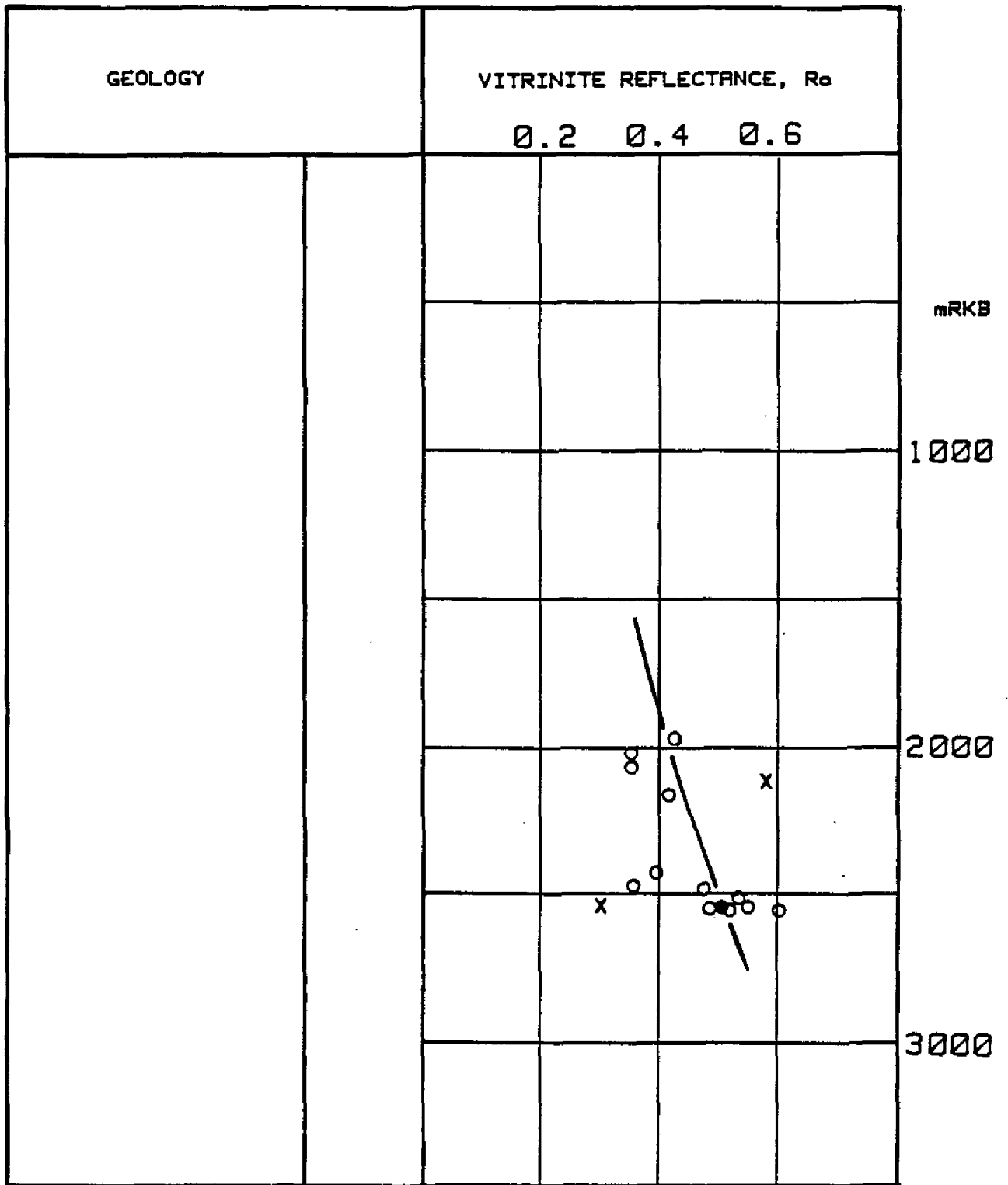
3000 m : 0.59

Vitrinite reflectance gradient (Ro/100 m)

0.30 - 0.50 : 0.014

0.30 - 0.80 : -

34/7-4



- LESS THAN 10 READINGS PER SAMPLE
- MORE THAN 10 READINGS PER SAMPLE
- X NOT VITRINITE

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 113	1966.0	swc	clst	0.42 (7)	HF
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Comments:

Claystone, relatively rich in organic particles, contains some vitrinite of acceptable quality.

HISTOGRAM 17.4.1985

Channel	Symbol	# Meas.	Mean	St.Dev.	Coeff. of Var.
RS 34/7-4,1966.0a,SWC	ooooo	51	.735	.290	.3951

Class	Counts	Perc.	'ooooo'=1%
Below	0	0.00	
.15	1	1.96	oooooooooooo
.20	0	0.00	
.25	0	0.00	
.30	1	1.96	oooooooooooo
.35	3	5.88	oooooooooooooooooooooooooooooooooooo
.40	3	5.88	oooooooooooooooooooooooooooooooooooo
.45	3	5.88	oooooooooooooooooooooooooooooooooooo
.50	4	7.84	oooooooooooooooooooooooooooooooooooo
.55	4	7.84	oooooooooooooooooooooooooooooooooooo
.60	3	5.88	oooooooooooooooooooooooooooooooooooo
.65	2	3.92	oooooooooooooooooooooooooooo
.70	6	11.76	oooooooooooooooooooooooooooooooooooo
.75	4	7.84	oooooooooooooooooooooooooooooooooooo
.80	1	1.96	oooooooooooo
.85	4	7.84	oooooooooooooooooooooooooooooooooooo
.90	3	5.88	oooooooooooooooooooooooooooooooooooo
.95	0	0.00	
1.00	3	5.88	oooooooooooooooooooooooooooooooooooo
1.05	2	3.92	oooooooooooooooooooooooooooo
1.10	0	0.00	
1.15	0	0.00	
1.20	1	1.96	oooooooooooo
1.25	0	0.00	
1.30	2	3.92	oooooooooooooooooooooooooooo
1.35	0	0.00	
1.40	0	0.00	
1.45	0	0.00	
1.50	0	0.00	
1.55	0	0.00	
1.60	0	0.00	
1.65	0	0.00	
1.70	1	1.96	oooooooooooo
Above	0	0.00	

L I S T 17.4.1985

Channel: R5 34/7-4, 1966.0m, SWC

No. of Measurements: 51
Mean: .735
Standard Deviation: .290
Coeff. of Variation: .3951

# Meas.	Value
1	.177
2	.544
3	.348
4	1.002
5	.457
6	1.318
7	.591
8	1.089
9	.893
10	1.017
11	.719
12	1.205
13	.737
14	.900
15	1.743
16	.791
17	.508
18	.926
19	.744
20	.766
21	.562
22	.806
23	.541
24	.748
25	1.075
26	.730
27	1.038
28	.944
29	.886
30	.791
31	.606
32	.868
33	1.311
34	.526
35	.497
36	.635
37	.439
38	.399
39	.799
40	.868
41	.472
42	.388
43	.377
44	.435
45	.424
46	.715
47	.682
48	.628
49	.690
50	.588
51	.551

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
SA 112	2018.0	swc	clst	0.35 (7)	HF

Comments:

Claystone, contains some vitrinite of acceptable quality, dominated by inertinitic material.

HISTOGRAM 24.4.1985

Channel Symbol # Meas. Mean St.Ddev. Coeff. of Var.

 R4 34/7-4,2018.0m,SWC xxxxx 48 .842 .301 .3577

Class	Counts	Perc.	'xxxxx'=1%
Below	0	0.00	
.25	2	4.17	xxxxxxxxxxxxxxxxxxxx
.30	1	2.08	xxxxxxxxxx
.35	3	6.25	xxxxxxxxxxxxxxxxxxxx
.40	1	2.08	xxxxxxxxxx
.45	1	2.08	xxxxxxxxxx
.50	1	2.08	xxxxxxxxxx
.55	2	4.17	xxxxxxxxxxxxxxxxxxxx
.60	2	4.17	xxxxxxxxxxxxxxxxxxxx
.65	1	2.08	xxxxxxxxxx
.70	2	4.17	xxxxxxxxxxxxxxxxxxxx
.75	2	4.17	xxxxxxxxxxxxxxxxxxxx
.80	6	12.50	xx
.85	2	4.17	xxxxxxxxxxxxxxxxxxxx
.90	4	8.33	xx
.95	6	12.50	xx
1.00	1	2.08	xxxxxxxxxx
1.05	2	4.17	xxxxxxxxxxxxxxxxxxxx
1.10	0	0.00	
1.15	3	6.25	xxxxxxxxxxxxxxxxxxxx
1.20	1	2.08	xxxxxxxxxx
1.25	1	2.08	xxxxxxxxxx
1.30	1	2.08	xxxxxxxxxx
1.35	2	4.17	xxxxxxxxxxxxxxxxxxxx
1.40	1	2.08	xxxxxxxxxx
Above	0	0.00	

L I S T 24.4.1985

Channel: R4 34/7-4, 2018.0m, SWC

No. of Measurements: 48
Mean: .842
Standard Deviation: .301
Coeff. of Variation: .3577

# Meas.	Value
1	1.372
2	.522
3	.926
4	.822
5	.747
6	.987
7	.383 ●
8	1.169
9	.990
10	.433 ●
11	.980
12	.565
13	.762
14	.283 ●
15	1.058
16	.276 ●
17	1.251
18	.697
19	.587
20	.705
21	.751
22	.994
23	1.301
24	.833
25	.976
26	.812
27	1.094
28	.955
29	.919
30	.894
31	.815
32	1.012
33	.315 ●
34	.630
35	.397 ●
36	.855
37	.830
38	1.233
39	1.176
40	1.358
41	.644
42	.919
43	.490
44	.915
45	1.412
46	.819
47	.355 ●
48	1.183

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 111 2070.0 swc clst 0.35 (2) HF

Comments:

Claystone, poor in organic particles and totally dominated by inertinite. Two low reflecting particles could be vitrinite.

H I S T O G R A M 17.4.1985

Channel Symbol # Meas. Mean St.Ddev. Coeff. of Var.

R2 34/7-4,2070.0a,SHC +++++ 13 .763 .265 .3472

Class Counts Perc. '+'=1%

Below	0	0.00	
.30	1	7.69	+++++++
.35	1	7.69	+++++++
.40	0	0.00	
.45	0	0.00	
.50	0	0.00	
.55	0	0.00	
.60	1	7.69	+++++++
.65	1	7.69	+++++++
.70	2	15.38	+++++
.75	4	30.77	+++++
.80	0	0.00	
.85	0	0.00	
.90	0	0.00	
.95	0	0.00	
1.00	1	7.69	+++++++
1.05	1	7.69	+++++++
1.10	0	0.00	
1.15	0	0.00	
1.20	0	0.00	
1.25	1	7.69	+++++++
Above	0	0.00	

L I S T 17.4.1985

Channel: R2 34/7-4,2070.0m,SWC

No. of Measurements: 13
Mean: .763
Standard Deviation: .265
Coeff. of Variation: .3472

# Meas.	Value
1	.788
2	.722
3	1.071
4	.617
5	.719
6	1.046
7	.384 ●
8	.755
9	.682
10	.759
11	.312 ●
12	.766
13	1.300

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 110	2125.0	swc	clst	0.58 (1)-	HF
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Comments:

Claystone, poor in organic particles and totally dominated by inertinite. No vitrinite.

H I S T O G R A M 22.4.1985

Channel	Symbol	# Meas.	Mean	St.Ddev.	Coeff. of Var.
R3 34/7-4,2125.0m,SWC	#####	7	.754	.182	.2412

Class	Counts	Perc.	'#' = 1%
Below	0	0.00	
.55	1	14.29	#####
.60	0	0.00	
.65	3	42.86	#####
.70	0	0.00	
.75	2	28.57	#####
.80	0	0.00	
.85	0	0.00	
.90	0	0.00	
.95	0	0.00	
1.00	0	0.00	
1.05	0	0.00	
1.10	1	14.29	#####
Above	0	0.00	

L I S T 22.4.1985

Channel: R3 34/7-4,2125.0m,SWC
 No. of Measurements: 7
 Mean: .754
 Standard Deviation: .182
 Coeff. of Variation: .2412

# Meas.	Value
1	.689
2	.769
3	.682
4	.664
5	.577
6	1.140
7	.754

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 109 2170.0 swc clst 0.41 (7) HF

Comments:

Claystone, relatively rich in organic particles of good quality, but identification is difficult. Ro=0.41 is a good interpretation.

H I S T O G R A M 22.4.1985

Channel	Symbol	# Meas.	Mean	St.Ddev.	Coeff. of Var.
R2 34/7-4,2170.0m,SWC	+++++	50	.599	.170	.2832

Class	Counts	Perc.	'+++++'=1%
Below	0	0.00	
.25	1	2.00	+++++
.30	0	0.00	
.35	3	6.00	+++++
.40	4	8.00	+++++
.45	6	12.00	+++++
.50	9	18.00	+++++
.55	5	10.00	+++++
.60	7	14.00	+++++
.65	3	6.00	+++++
.70	5	10.00	+++++
.75	2	4.00	+++++
.80	0	0.00	
.85	2	4.00	+++++
.90	0	0.00	
.95	1	2.00	+++++
1.00	1	2.00	+++++
1.05	1	2.00	+++++
Above	0	0.00	

L I S T 22.4.1985

Channel: R2 34/7-4, 2170.0m, SWC

No. of Measurements: 50
Mean: .599
Standard Deviation: .170
Coeff. of Variation: .2832

# Meas.	Value
1	.682
2	.581
3	.613
4	.967
5	.859
6	.595
7	.725
8	1.083
9	.650
10	.289
11	.866
12	.682
13	.437 ●
14	.408 ●
15	.415 ●
16	.610
17	.487
18	.538
19	.722
20	.505
21	.567
22	.433 ●
23	.361 ●
24	.646
25	.502
26	.509
27	.794
28	.520
29	.779
30	.502
31	.545
32	.397 ●
33	.512
34	.577
35	.491
36	.393 ●
37	.556
38	.451
39	.747
40	.520
41	.646
42	.469
43	.650
44	.722
45	.603
46	.686
47	1.032
48	.715
49	.455
50	.458

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 108	2426.0	swc	clst	0.39 (1)	HF
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Comments:

Claystone, totally dominated by inertinitic material. One particle with Ro=0.39 could be true but seems a little low.

HISTOGRAM 24.4.1985

Channel Symbol # Meas. Mean St.Ddev. Coeff. of Var.

 R2 34/7-4,2426.0m,SWC +++++ 30 .922 .251 .2721

Class Counts Perc. '+++++'=1%

Class	Counts	Perc.	'+++++'=1%
Below	0	0.00	
.35	1	3.33	+++++
.40	0	0.00	
.45	0	0.00	
.50	0	0.00	
.55	3	10.00	+++++
.60	0	0.00	
.65	1	3.33	+++++
.70	2	6.67	+++++
.75	3	10.00	+++++
.80	2	6.67	+++++
.85	1	3.33	+++++
.90	2	6.67	+++++
.95	4	13.33	+++++
1.00	4	13.33	+++++
1.05	1	3.33	+++++
1.10	2	6.67	+++++
1.15	0	0.00	
1.20	1	3.33	+++++
1.25	1	3.33	+++++
1.30	0	0.00	
1.35	0	0.00	
1.40	1	3.33	+++++
1.45	0	0.00	
1.50	1	3.33	+++++
Above	0	0.00	

L I S T 24.4.1985

Channel: R2 34/7-4, 2426.0m, SWC

No. of Measurements: 30
 Mean: .922
 Standard Deviation: .251
 Coeff. of Variation: .2721

# Meas.	Value
1	.780
2	.951
3	1.147
4	.572
5	1.065
6	.572
7	.840
8	1.012
9	.390
10	.872
11	1.430
12	.840
13	.776
14	.783
15	.919
16	.722
17	.912
18	1.037
19	.726
20	.676
21	.583
22	1.022
23	1.101
24	1.222
25	.962
26	.962
27	1.272
28	1.033
29	1.508
30	.980

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 107 2482.0 swc clst 0.35 (1) HF

Comments:

Claystone, totally dominated by inertinitic material. One particle with Ro=0.35 could be true but seems a little too low.

H I S T O G R A M 22.4.1985

Channel Symbol # Meas. Mean St.Dev. Coeff. of Var.

 R4 34/7-4,2482.0m,SWC xxxxx 29 1.041 .269 .2588

Class	Counts	Perc.	'xxxxx'=1Z
Below	0	0.00	
.30	1	3.45	xxxxxxxxxxxxxxxx
.35	0	0.00	
.40	0	0.00	
.45	0	0.00	
.50	0	0.00	
.55	0	0.00	
.60	1	3.45	xxxxxxxxxxxxxxxx
.65	1	3.45	xxxxxxxxxxxxxxxx
.70	2	6.90	xx
.75	2	6.90	xx
.80	1	3.45	xxxxxxxxxxxxxxxx
.85	0	0.00	
.90	2	6.90	xx
.95	1	3.45	xxxxxxxxxxxxxxxx
1.00	0	0.00	
1.05	4	13.79	xx
1.10	3	10.34	xx
1.15	2	6.90	xx
1.20	2	6.90	xx
1.25	3	10.34	xx
1.30	2	6.90	xx
1.35	1	3.45	xxxxxxxxxxxxxxxx
1.40	0	0.00	
1.45	0	0.00	
1.50	0	0.00	
1.55	1	3.45	xxxxxxxxxxxxxxxx
Above	0	0.00	

L I S T 22.4.1985

Channel: R4 34/7-4, 2482.0m, SWC

No. of Measurements: 29
Mean: 1.041
Standard Deviation: .269
Coeff. of Variation: .2588

# Meas.	Value
1	.850
2	1.082
3	.915
4	1.260
5	1.359
6	1.319
7	.777
8	.730
9	1.239
10	1.577
11	.628
12	1.086
13	.650
14	1.115
15	1.137
16	1.221
17	1.086
18	1.173
19	1.271
20	.995
21	1.104
22	.741
23	1.061
24	.345
25	.763
26	1.191
27	1.322
28	.941
29	1.257

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 106 2490.0 swc clst 0.47 (6) HF

Comments:

Claystone, relatively rich in organic particles, but identification is difficult. Ro=0.47 is a good interpretation

H I S T O G R A M 17.4.1985

Channel Symbol # Meas. Mean St.Ddev. Coeff. of Var.

R3 34/7-4,2490.0m,SWC ##### 49 .728 .233 .3204

Class Counts Perc. '#####'=1%

Class	Counts	Perc.	'#####'=1%
Below	0	0.00	
.20	1	2.04	#####
.25	0	0.00	
.30	2	4.08	#####
.35	0	0.00	
.40	2	4.08	#####
.45	2	4.08	#####
.50	2	4.08	#####
.55	5	10.20	#####
.60	3	6.12	#####
.65	4	8.16	#####
.70	3	6.12	#####
.75	6	12.24	#####
.80	7	14.29	#####
.85	4	8.16	#####
.90	3	6.12	#####
.95	1	2.04	#####
1.00	2	4.08	#####
1.05	0	0.00	
1.10	0	0.00	
1.15	1	2.04	#####
1.20	0	0.00	
1.25	0	0.00	
1.30	0	0.00	
1.35	0	0.00	
1.40	0	0.00	
1.45	0	0.00	
1.50	0	0.00	
1.55	1	2.04	#####
Above	0	0.00	

L I S T 17.4.1985

Channel: R3 34/7-4, 2490.0m, SWC

No. of Measurements: 49
Mean: .728
Standard Deviation: .233
Coeff. of Variation: .3204

# Meas.	Value
1	.563
2	.655
3	.224
4	.913
5	.692
6	.836
7	.342
8	.449 ●
9	.504 ●
10	.457 ●
11	.840
12	.851
13	.666
14	.847
15	1.598
16	.851
17	.751
18	.622
19	.600
20	.593
21	.843
22	.792
23	.773
24	.589
25	.302
26	.814
27	.906
28	.917
29	.560
30	.608
31	1.042
32	.596
33	1.171
34	.847
35	1.009
36	.508 ●
37	.420 ●
38	.759
39	.666
40	.486 ●
41	.718
42	.854
43	.869
44	.847
45	.983
46	.759
47	.751
48	.740
49	.707

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 104 2518.0 swc clst - HF

Comments:

Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 105	2518.0	swc	clst	0.53 (4)	HF
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Comments:

Claystone, totally dominated by inertinitic material of good particle quality. Contains a few particles of good vitrinite Ro=0.53.

L I S T 24.4.1985

Channel: R5 34/7-4, 2518.0m, SWC

No. of Measurements: 50
Mean: .894
Standard Deviation: .319
Coeff. of Variation: .3569

# Meas.	Value
1	.626
2	1.080
3	.569 ●
4	.869
5	1.076
6	.440
7	1.222
8	1.108
9	1.269
10	1.119
11	1.194
12	.855
13	1.201
14	.983
15	.330
16	.801
17	.855
18	1.294
19	1.240
20	1.080
21	.962
22	1.144
23	.287
24	.905
25	.990
26	1.076
27	.958
28	.987
29	1.251
30	.722
31	.308
32	.244
33	.801
34	.905
35	.962
36	.497 ●
37	.840
38	1.358
39	1.080
40	1.369
41	.855
42	.812
43	1.494
44	.426
45	.372
46	.819
47	1.269
48	.537 ●
49	.533 ●
50	.722

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 90	2538.5	core	clst	-	HF
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Comments:
Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 88	2540.0	core	clst	-	HF
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Comments:

Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 84 2541.0 core clst - HF

Comments:
Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 103	2542.0	swc	clst	0.99 (50)-	HF
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Comments:

Claystone contains only inertinitic material.

H I S T O G R A M 24.4.1985

Channel	Symbol	# Meas.	Mean	St.Dev.	Coeff. of Var.
R3 34/7-4,2542.0a,SWC	####	50	.994	.153	.1544

Class	Counts	Perc.	'*' = 1%
Below	0	0.00	
.65	1	2.00	##
.70	1	2.00	##
.75	2	4.00	####
.80	4	8.00	#####
.85	3	6.00	#####
.90	5	10.00	#####
.95	12	24.00	#####
1.00	9	18.00	#####
1.05	7	14.00	#####
1.10	1	2.00	##
1.15	1	2.00	##
1.20	2	4.00	####
1.25	0	0.00	
1.30	0	0.00	
1.35	0	0.00	
1.40	1	2.00	##
1.45	0	0.00	
1.50	0	0.00	
1.55	1	2.00	##
Above	0	0.00	

L I S T 24.4.1985

Channel: R3 34/7-4, 2542.0m, SWC

No. of Measurements: 50
Mean: .994
Standard Deviation: .153
Coeff. of Variation: .1544

# Meas.	Value
1	.913
2	1.567
3	.967
4	1.080
5	1.098
6	.945
7	.996
8	.982
9	.778
10	.822
11	.956
12	1.153
13	.840
14	.855
15	.993
16	.956
17	1.062
18	.985
19	1.004
20	1.243
21	.862
22	1.018
23	1.033
24	1.211
25	.927
26	.964
27	.749
28	.815
29	.847
30	1.029
31	1.084
32	1.040
33	1.109
34	.949
35	.771
36	1.011
37	.669
38	.982
39	.924
40	.996
41	.989
42	.956
43	1.073
44	.855
45	1.080
46	1.015
47	1.047
48	1.073
49	1.007
50	1.403

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 92 2545.0 core clst 0.55 (7) HF

Comments:

Claystone, relatively poor in organic matter but contains some vitrinite of acceptable quality.

H I S T O G R A M 22.4.1985

Channel	Symbol	# Meas.	Mean	St.Dev.	Coeff. of Var.
R5 34/7-4,2545.0a,CDRE	oooo	20	1.025	.403	.3934

Class	Counts	Perc.	'oooo'=1%
Below	0	0.00	
.45	2	10.00	oo
.50	1	5.00	oooooooooooooooooooooooooooo
.55	3	15.00	oo
.60	1	5.00	oooooooooooooooooooooooooooo
.65	0	0.00	
.70	0	0.00	
.75	0	0.00	
.80	0	0.00	
.85	0	0.00	
.90	0	0.00	
.95	1	5.00	oooooooooooooooooooooooooooo
1.00	0	0.00	
1.05	1	5.00	oooooooooooooooooooooooooooo
1.10	3	15.00	oo
1.15	1	5.00	oooooooooooooooooooooooooooo
1.20	0	0.00	
1.25	1	5.00	oooooooooooooooooooooooooooo
1.30	2	10.00	oo
1.35	0	0.00	
1.40	3	15.00	oo
1.45	0	0.00	
1.50	0	0.00	
1.55	0	0.00	
1.60	0	0.00	
1.65	0	0.00	
1.70	0	0.00	
1.75	0	0.00	
1.80	0	0.00	
1.85	1	5.00	oooooooooooooooooooooooooooo
Above	0	0.00	

L I S T 22.4.1985

Channel: R5 34/7-4, 2545.0m, CORE

No. of Measurements: 20
Mean: 1.025
Standard Deviation: .403
Coeff. of Variation: .3934

# Meas.	Value
1	1.870
2	1.108
3	1.314
4	1.050
5	1.173
6	.480 ●
7	1.140
8	.577 ●
9	.595 ●
10	.639 ●
11	.599 ●
12	1.447
13	1.404
14	.505 ●
15	1.278
16	1.440
17	.971
18	.465 ●
19	1.310
20	1.144

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 93	2545.0	core	clst	0.50 (24)	HF
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Comments:

Claystone, relatively poor in organic matter but contains some vitrinite of acceptable quality.

H I S T O G R A M 22.4.1985

Channel	Symbol	# Meas.	Mean	St.Dev.	Coeff. of Var.
R4 34/7-4,2545.0m,CORE	xxxxx	42	.765	.397	.5188

Class Counts Perc. 'xxxxx'=1%

Below	0	0.00	
.25	1	2.38	xxxxxxxxxxxx
.30	1	2.38	xxxxxxxxxxxx
.35	2	4.76	xxxxxxxxxxxxxxxxxxxxxxxx
.40	4	9.52	xx
.45	5	11.90	xx
.50	6	14.29	xx
.55	3	7.14	xx
.60	3	7.14	xx
.65	0	0.00	
.70	1	2.38	xxxxxxxxxxxx
.75	2	4.76	xxxxxxxxxxxxxxxxxxxxxxxx
.80	0	0.00	
.85	2	4.76	xxxxxxxxxxxxxxxxxxxxxxxx
.90	0	0.00	
.95	1	2.38	xxxxxxxxxxxx
1.00	1	2.38	xxxxxxxxxxxx
1.05	0	0.00	
1.10	0	0.00	
1.15	1	2.38	xxxxxxxxxxxx
1.20	1	2.38	xxxxxxxxxxxx
1.25	4	9.52	xx
1.30	0	0.00	
1.35	1	2.38	xxxxxxxxxxxx
1.40	0	0.00	
1.45	0	0.00	
1.50	0	0.00	
1.55	1	2.38	xxxxxxxxxxxx
1.60	0	0.00	
1.65	0	0.00	
1.70	2	4.76	xxxxxxxxxxxxxxxxxxxxxxxx
Above	0	0.00	

L I S T 22.4.1985

Channel: R4 34/7-4, 2545.0m, CORE

No. of Measurements: 42
 Means: .765
Standard Deviation: .397
Coeff. of Variation: .5188

# Meas.	Value	
1	1.043	
2	1.270	
3	.361	●
4	.433	●
5	1.704	
6	.527	●
7	.509	●
8	1.588	
9	.736	
10	.758	
11	.350	●
12	.790	
13	.888	
14	.548	●
15	.545	●
16	.462	●
17	1.375	
18	.451	●
19	.419	●
20	1.711	
21	.494	●
22	1.267	
23	.873	
24	.296	
25	.476	●
26	.530	●
27	.426	●
28	1.299	
29	.960	
30	.642	●
31	.574	●
32	.426	●
33	.610	●
34	.588	●
35	.606	●
36	1.151	
37	.382	●
38	1.252	
39	.538	●
40	.567	●
41	.476	●
42	1.242	

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 89 2548.5 core c1st 0.30 (50) HF

Comments:

Claystone contains low reflecting coaly material. Impossible to distinguish from lignite mud additive

HISTOGRAM 17.4.1985

Channel	Symbol # Meas.	Mean	St.Dev.	Coeff. of Var.
R2 34/7-4,2548.5m,CORE	+++++	50	.298	.173 .5818

Class	Counts	Perc.	'+'=1%
Below	0	0.00	
.15	3	6.00	+++++
.20	15	30.00	+++++
.25	23	46.00	+++++
.30	6	12.00	+++++
.35	0	0.00	
.40	0	0.00	
.45	0	0.00	
.50	0	0.00	
.55	0	0.00	
.60	0	0.00	
.65	0	0.00	
.70	0	0.00	
.75	1	2.00	++
.80	0	0.00	
.85	1	2.00	++
.90	0	0.00	
.95	0	0.00	
1.00	0	0.00	
1.05	0	0.00	
1.10	0	0.00	
1.15	1	2.00	++
Above	0	0.00	

L I S T 17.4.1985

Channel: R2 34/7-4, 2548.5m, CORE

No. of Measurements: 50
 Mean: .298
 Standard Deviation: .173
 Coeff. of Variation: .5818

# Meas.	Value
1	.151
2	.180
3	1.175
4	.269
5	.243
6	.261
7	.221
8	.224
9	.236
10	.298
11	.331
12	.339
13	.294
14	.236
15	.254
16	.247
17	.335
18	.221
19	.206
20	.335
21	.224
22	.210
23	.280
24	.884
25	.265
26	.265
27	.298
28	.276
29	.261
30	.261
31	.258
32	.261
33	.294
34	.265
35	.261
36	.258
37	.283
38	.239
39	.302
40	.324
41	.755
42	.177
43	.232
44	.254
45	.250
46	.265
47	.228
48	.239
49	.250
50	.232

WELL 3477-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 91	2551.5	core	clst	0.53 (4)	HF
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Comments:

Claystone, nearly barren, contains some vitrinitic material of acceptable quality.

H I S T O G R A M 17.4.1985

Channel	Symbol	# Meas.	Mean	St.Ddev.	Coeff. of Var.
R2 34/7-4,2551.5m,CORE	+++++	7	.613	.209	.3402

Class	Counts	Perc.	'+'=1%
Below	0	0.00	
.35	1	14.29	+++++
.40	0	0.00	
.45	0	0.00	
.50	4	57.14	+++++
.55	0	0.00	
.60	0	0.00	
.65	0	0.00	
.70	0	0.00	
.75	0	0.00	
.80	0	0.00	
.85	1	14.29	+++++
.90	1	14.29	+++++
Above	0	0.00	

L I S T 17.4.1985

Channel: R2 34/7-4,2551.5m,CORE

No. of Measurements: 7
 Mean: .613
 Standard Deviation: .209
 Coeff. of Variation: .3402

# Meas.	Value
1	.379
2	.545 ●
3	.530 ●
4	.887
5	.515 ●
6	.508 ●
7	.928

WELL 3477-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 86	2552.5	core	clst	0.43 (8)	HF
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Comments:

Claystone, nearly barren, contains some vitrinitic material of acceptable quality.

L I S T 17.4.1985

Channel: R4 34/7-4, 2552.5m, CORE

No. of Measurements: 50
Mean: 1.039
Standard Deviation: .332
Coeff. of Variation: .3198

# Meas.	Value
1	1.057
2	1.042
3	1.337
4	.460 ●
5	.423 ●
6	.361 ●
7	.416 ●
8	.445 ●
9	.917
10	1.094
11	.442 ●
12	.445 ●
13	.409 ●
14	1.444
15	.917
16	1.160
17	1.123
18	1.079
19	1.248
20	1.602
21	1.296
22	1.256
23	.957
24	1.219
25	1.366
26	1.517
27	.854
28	1.318
29	.902
30	1.407
31	.898
32	1.525
33	1.407
34	.943
35	1.145
36	1.340
37	1.245
38	.939
39	1.326
40	1.145
41	1.149
42	.943
43	.674
44	1.245
45	1.200
46	1.175
47	.902
48	.965
49	.994
50	1.252

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 85	2555.5	core	clst	-	HF
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Comments:

Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 87 2557.0 core clst - HF

Comments:

Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 102	2562.0	swc	clst	0.60 (8)	HF
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Comments:

Claystone, totally dominated by inertinitic material of poor quality, difficult identification. The value indicated can be poor quality inertinite

HISTOGRAM 24.4.1985

Channel	Symbol	# Meas.	Mean	St.Ddev.	Coeff. of Var.
R4 34/7-4,2562.0m,SWC	xxxxx	28	.810	.289	.3567

Class Counts Perc. 'xxxxx'=1%

Class	Counts	Perc.	'xxxxx'=1%
Below	0	0.00	
.30	1	3.57	xxxxxxxxxxxxxxxxxxxx
.35	1	3.57	xxxxxxxxxxxxxxxxxxxx
.40	1	3.57	xxxxxxxxxxxxxxxxxxxx
.45	0	0.00	
.50	1	3.57	xxxxxxxxxxxxxxxxxxxx
.55	2	7.14	xxxxxxxxxxxxxxxxxxxx
.60	5	17.86	xxxxxxxxxxxxxxxxxxxx
.65	1	3.57	xxxxxxxxxxxxxxxxxxxx
.70	3	10.71	xxxxxxxxxxxxxxxxxxxx
.75	0	0.00	
.80	1	3.57	xxxxxxxxxxxxxxxxxxxx
.85	0	0.00	
.90	2	7.14	xxxxxxxxxxxxxxxxxxxx
.95	2	7.14	xxxxxxxxxxxxxxxxxxxx
1.00	3	10.71	xxxxxxxxxxxxxxxxxxxx
1.05	0	0.00	
1.10	3	10.71	xxxxxxxxxxxxxxxxxxxx
1.15	1	3.57	xxxxxxxxxxxxxxxxxxxx
1.20	0	0.00	
1.25	0	0.00	
1.30	0	0.00	
1.35	0	0.00	
1.40	0	0.00	
1.45	0	0.00	
1.50	0	0.00	
1.55	1	3.57	xxxxxxxxxxxxxxxxxxxx
Above	0	0.00	

L I S T 24.4.1985

Channel: R4 34/7-4, 2562.0m, SWC
No. of Measurements: 28
Mean: .810
Standard Deviation: .289
Coeff. of Variation: .3567

# Meas.	Value
1	1.138
2	.324
3	.604 ●
4	.604 ●
5	1.025
6	.938
7	.956
8	.738
9	.444
10	1.131
11	1.040
12	.608 ●
13	.604 ●
14	.807
15	.644 ●
16	.938
17	1.193
18	1.134
19	.717
20	.673
21	.978
22	1.025
23	.728
24	.386
25	1.592
26	.579 ●
27	.597 ●
28	.546 ●

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 101	2567.0	swc	clst	-	HF
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Comments:

Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
----------------	-------------------------	----------------	-----------	------------------------------------	-------------

SA 100 2573.0 swc clst - HF

Comments:
Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 99	2621.0	swc	clst	-	HF
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Comments:

Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 98	2651.0	swc	clst	-	HF
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Comments:
Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 97	2660.0	swc	clst	-	HF
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Comments:

Claystone, barren

WELL 3477-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 96 2673.0 swc clst - HF

Comments:
Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
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SA 95 2689.0 swc clst - HF

Comments:
Claystone, barren

WELL 34/7-4

VITRINITE REFLECTANCE RAW DATA

Sample code	Sample depth mRKB	Sample type	Lithology	Vitrinite reflectance Ro (N)	Preparation
SA 94	2708.0	swc	clst	-	HF

Comments:

Claystone, barren