Report No. EPGS-DOM.5-87MPA

Vitrinite reflectance (Ro) of dispersed organics from Eastcan et al **Cartier D-70**

Eastern Petroleum Geology Subdivision
Atlantic Geoscience Centre, G.S.C., Dartmouth
August 13, 1987

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G.S.C. Locality No.: D157 **Location:** 54°39'02.39"N, 55°40'29.90"W

R.T. Elevation: 41' **Water Depth:** 1017' **Total Depth:** 6322'

Sample Interval: 1950 - 6316' **Interval Studied:** 3460 - 5880'

Depth Units: Feet referenced to R.T.

Vitrinite reflectance has been determined on 8 rotary cuttings samples (Table II) from Eastcan et al Cartier D-70 which was classified as a wildcat well and is located on the Labrador Shelf approximately 106 km off the Labrador coast.

Data acquisition and manipulation for this report utilized the Zeiss Photomultiplier III Zonax microcomputer system with improvements in software to provide a dynamic histogram display as readings are acquired. Sample preparation followed the procedures listed in Appendix I. The analysis of the well revealed the thermal maturation intervals given in Table I.

Specific maturation levels, as set out in this report, are based on those of Dow (1977) with modified terminology (Appendix II).

Table I
Inferred Thermal Maturation Levels*

Seafloor-4676'	0.18 - 0.4	% Ro	immature
4676-5988'	0.4 - 0.5	% Ro	immature approaching maturity
5988-6322' T.D.	0.5 - 0.53	% Ro	marginally mature
(7060')	0.6	% Ro	onset of significant oil generation
(8751')	0.8	% Ro	peak of oil generation
(10063')	1.0	% Ro	onset of significant wet gas generation
(11135')	1.2	% Ro	onset of significant dry gas generation
(11828')	1.35	% Ro	oil floor

Note: ( ) indicate depth extrapolated at 0.242 log Ro/km.

* Maturation levels are provided for all types of organic matter. Actual hydrocarbon products depend on type of organic matter present.

Remarks

Sample coverage of vitrinite reflectance data (Figure I, Table II) over the lower part of the section (3460-5880') penetrated by Cartier D-70. The data are plotted on a log Ro vs. linear depth scale and linear regression lines were calculated by the least squares method. The 'error bars' plotted on the maturation profile (Figure 1) indicate one standard deviation on either side of the mean and may appear deceivingly small for samples with very few readings. The slope of the maturation line is 0.242 log/km.

Selection of the reflectance populations which represented the true maturation of the sediments was significantly aided by our recently developed histogram display plot (Figure 2). This interpretation tool helps to reveal linear trends (populations) in the Ro data. It also demonstrates the effects of cavings, geology, casing points and other factors on the vitrinite reflectance populations.

The lithology strip plot (Figure 1) was produced directly from the E.P.G. LITHFILE database which extracts data from digitized CANSTRAT logs.

The vitrinite reflectance data provides evidence that the thermal regime at Cartier D-70 was suitable for the generation and preservation of hydrocarbons within the drilled section assuming potential source rocks and traps were present.

References

Canada Oil and Gas Lands Administration, 1987. Offshore schedule of wells. Department of Energy, Mines and Resources, Ottawa.

Dow, W.G., 1977. Kerogen studies and geological interpretations. Journal of Geochemical Exploration, no. 7, p. 77-99

Eastcan et al., 1976. Well history report Eastcan et al. Cartier D-70. Open File report, Department of Energy, Mines and Resources, Ottawa.

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Table II

Summary of kerogen - based vitrinite reflectance

Seq. #	Sample #	Depth in feet	Mean Ro (SD) non-rotated	Number of Readings Total	Edited
1	K0250A	3460-3490	.34(±.04)	31	26
2	K0250B	3870-3900	.33(±.03)	39	12
3	K0250C	4270-4300	.40(±.06)	34	24
4	K0251A	4750-4780	.39(±.06)	36	29
5	K0251B	5060-5090	.42(±.03)	24	15
6	K0251C	5350-5380	.44(±.04)	15	14
7	K0252A	5670-5700	.48(±.07)	80	64
8	K0252B	5850-5880	.51(±.07)	14	7

Note: All samples are kerogen type

Table III

Formation Tops (Moir, pers. comm.)

Formation	Depth
Saglek	1315'
Mokami	
upper mbr	1550'
lower mbr	2572'
Kenamu	4183'
Leif mbr	4198-4461'
Gudrid upper unit	5619'
Cartwright	5783'
Gudrid lower unit	5888'
Markland	6088'
rubble zone	6232-6263'
Precambrian granite (1332 ± 45 ma)	6263'
T.D.	6322'

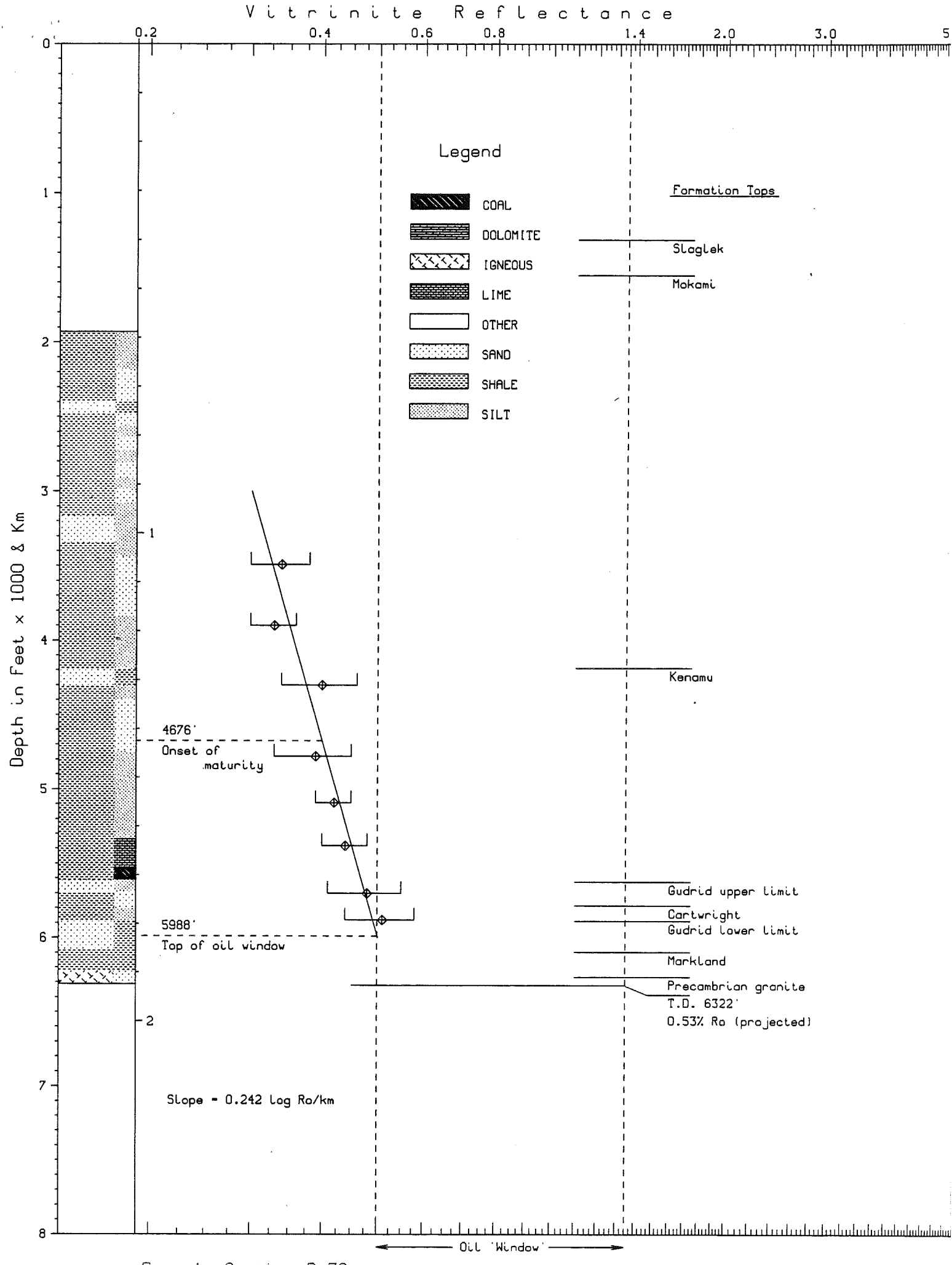


Fig. 1 Cartier D-70

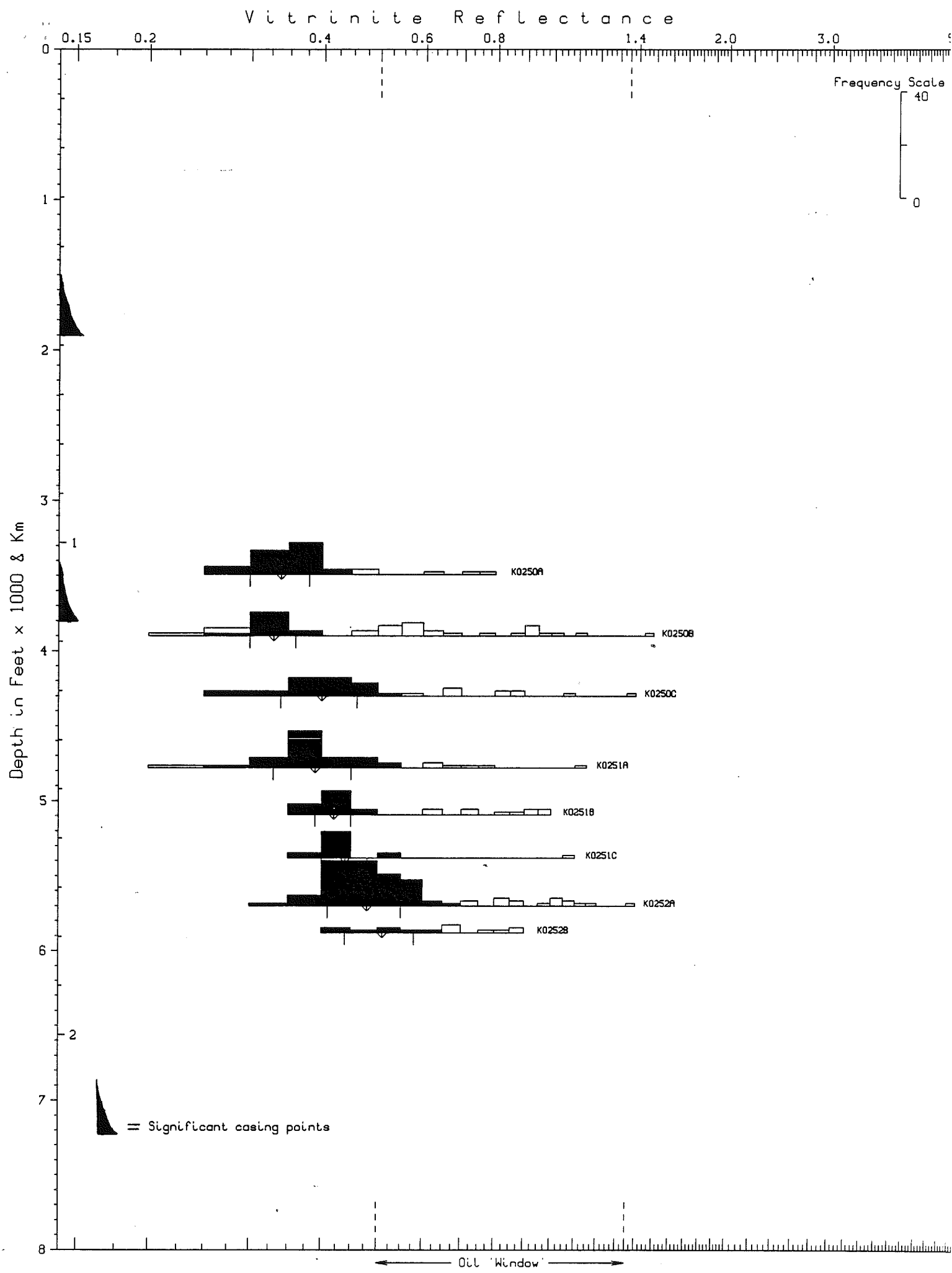


Fig. 2 Cartier D-70 <histograms>

APPENDIX I

Sample Preparation Method

COGLA Lab preparation

Preliminary Wash
Samples dried in oven
Split: a. all of coarse to Petrology Lab
b. ½ medium to Palynology Lab
c. rest of medium and all of fine combined for Micropaleo Lab
Split "b" is delivered to Palynology Lab and treated as follows:

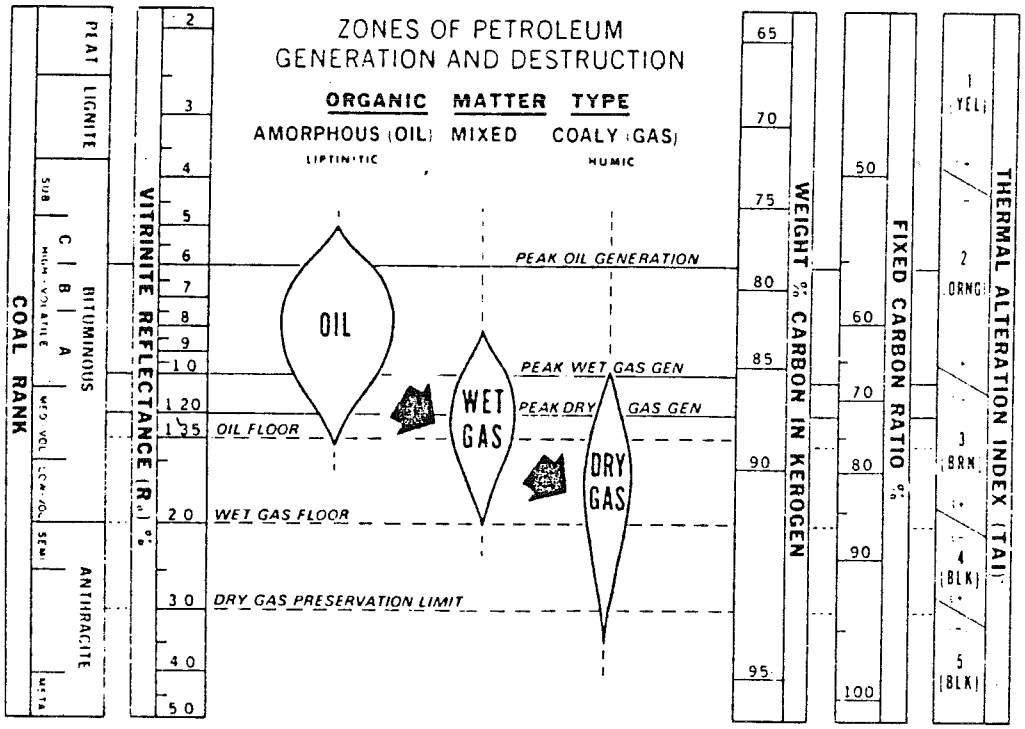
PALYNOLOGY Lab preparation

20-30 grams placed in 250ml plastic beaker.
Add 10% HCl till reaction ceases (removes carbonates).
Washed (rinsed) 3 times.
Conc. HF overnight (removes silicates).
Washed (rinsed) 3 times.
Heated (60-65°C) conc. HCl (remove fluorides caused by HF).
Washed 3 times.
Then put into 15ml test tube with 4-5ml 4% Alconox.
Differential centrifuge at 1500rpm for 90 sec.
Decant.
Wash 3 times with centrifuging.
Float off organic fraction using 2.0 S.G. Znbr solution.
Centrifuge 1000rpm, 8 min.
Float fraction into second test tube.
Wash 3 times with centrifuging.
Kerogen smear slide made.
Remaining kerogen material delivered to Vitrinite Reflectance Lab.

VITRINITE REFLECTANCE Lab preparation

Excess water pipetted off.
Freeze dried.
Mounted using epoxy resin (EPO-TEK 301) in predrilled plastic stubs.
Polished using modified coal petrology polishing methods.
Examined under oil lens at approximately 800x mag'n.

Appendix II (Dow,1977)



Note: For these reports, the terminology used to describe the various maturation levels has been modified. The 'peak' designation, as used in this figure, has been changed to 'onset of significant' and 0.8 Ro is now used as the 'peak of oil generation' (Table I, Figure 1).

Appendix III

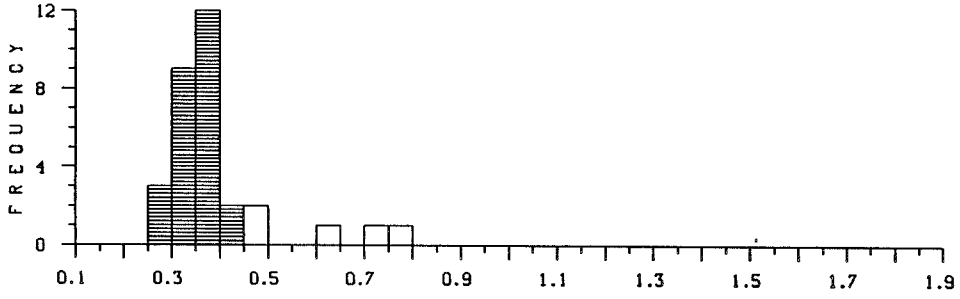
Sample Reports

K0250A,DEPTH 3460-3490', CARTIER D-70

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.27<	.27<	.29<	.30<	.30<	.30<	.31<	.32<	.33<	.33<
1	.33<	.34<	.35<	.36<	.36<	.36<	.36<	.36<	.36<	.36<
2	.37<	.37<	.39<	.39<	.41<	.42<	.45	.46	.64	.72
3	.79									

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.39	.12	31	.27	.79	11.97
EDIT<	.34	.04	26	.27	.42	8.91

REFLECTANCE HISTOGRAM

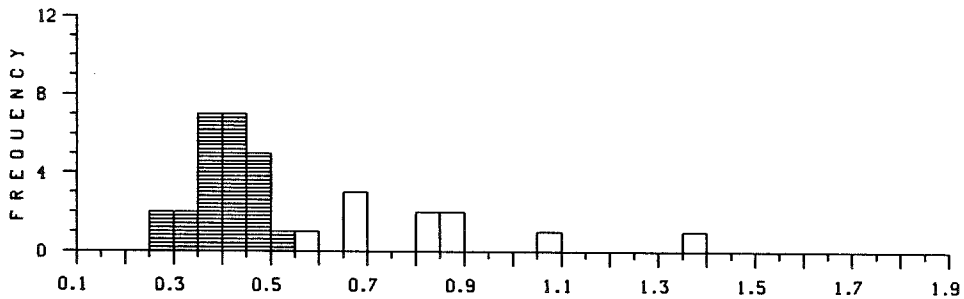


K0250C,DEPTH 4270-4300', CARTIER D-70

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.29<	.29<	.31<	.34<	.35<	.36<	.36<	.37<	.37<	.39<
1	.39<	.40<	.41<	.42<	.42<	.43<	.44<	.44<	.45<	.45<
2	.47<	.47<	.47<	.51<	.59	.67	.67	.69	.80	.84
3	.86	.87	1.07	1.38						

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.53	.24	34	.29	1.38	18.04
EDIT<	.40	.06	24	.29	.51	9.60

REFLECTANCE HISTOGRAM

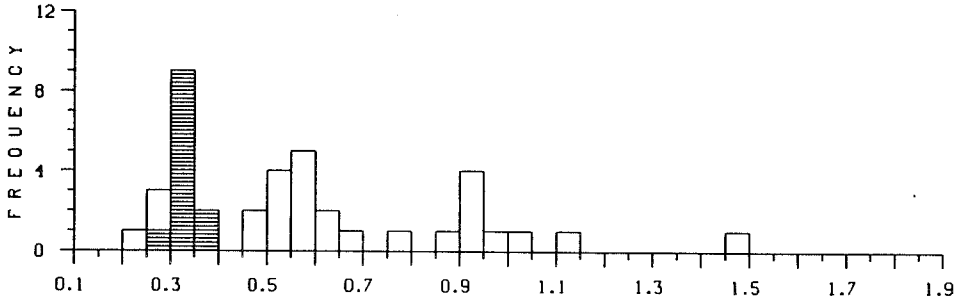


K0250B,DEPTH 3870-3900', CARTIER D-70

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.23	.25	.26	.29<	.31<	.31<	.32<	.33<	.33<	.34<
1	.34<	.34<	.34<	.38<	.38<	.46	.46	.50	.51	.51
2	.52	.55	.56	.57	.57	.58	.61	.64	.66	.76
3	.86	.91	.91	.92	.94	.98	1.02	1.13	1.49	

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.57	.29	39	.23	1.49	22.37
EDIT<	.33	.03	12	.29	.38	4.01

REFLECTANCE HISTOGRAM

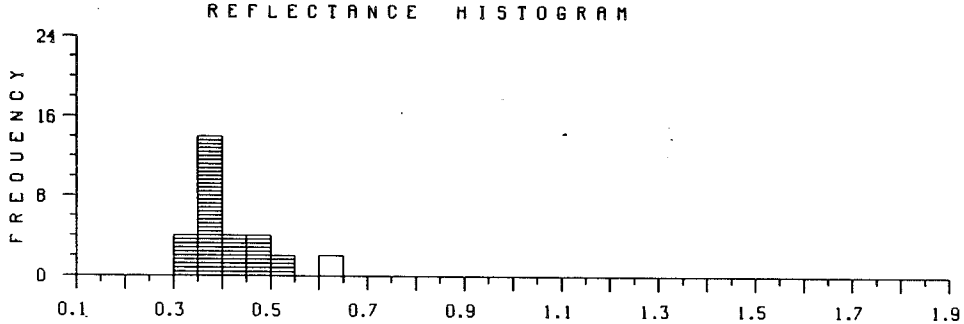


K0251A,DEPTH 4750-4780', CARTIER D-70

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.22	.29<	.31<	.32<	.33<	.33<	.35<	.35<	.35<	.35<
1	.36<	.37<	.37<	.38<	.38<	.38<	.39<	.39<	.39<	.39<
2	.41<	.42<	.43<	.44<	.46<	.46<	.48<	.48<	.50<	.53<
3	.60	.61	.66	.74	.78	1.10				

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.45	.17	36	.22	1.10	16.10
EDIT<	.39	.06	29	.29	.53	11.39

REFLECTANCE HISTOGRAM

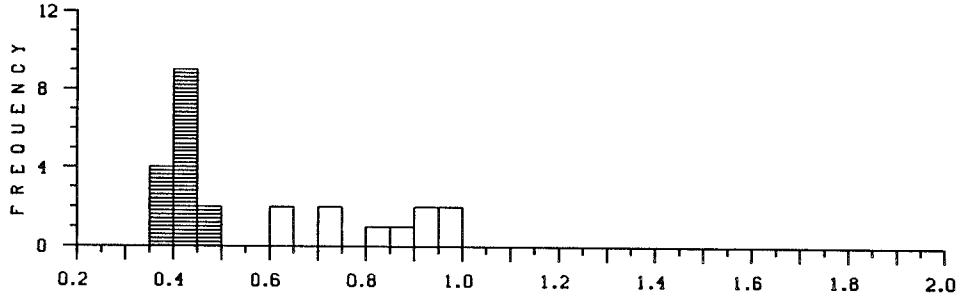


K0251B,DEPTH 5060-5090', CARTIER D-70

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.37<	.38<	.38<	.39<	.40<	.41<	.41<	.41<	.42<	.42<
1	.42<	.44<	.44<	.46<	.48<	.63	.64	.72	.72	.83
2	.89	.90	.91	.95	.96					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.58	.22	25	.37	.96	14.38
EDIT<	.42	.03	15	.37	.48	6.23

REFLECTANCE HISTOGRAM

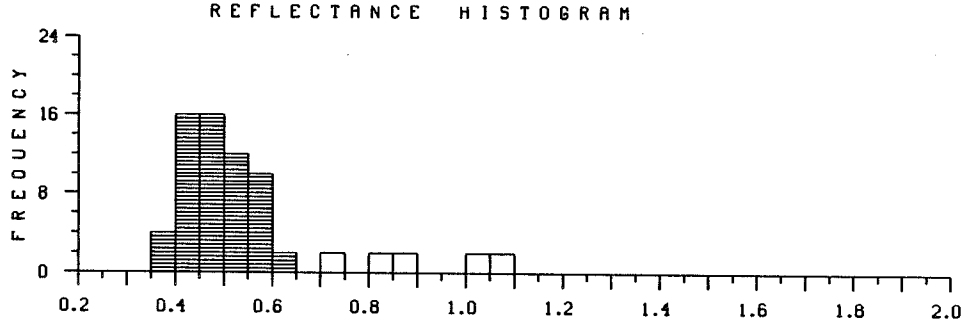


K0252A,DEPTH 5670-5700', CARTIER D-70

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.33<	.36<	.37<	.39<	.39<	.40<	.40<	.40<	.42<	.42<
1	.42<	.42<	.42<	.42<	.43<	.43<	.43<	.43<	.43<	.43<
2	.44<	.44<	.45<	.45<	.46<	.46<	.46<	.46<	.46<	.46<
3	.47<	.47<	.47<	.48<	.48<	.48<	.48<	.49<	.49<	.50<
4	.50<	.50<	.50<	.51<	.51<	.52<	.53<	.53<	.53<	.53<
5	.54<	.55<	.55<	.56<	.57<	.57<	.59<	.59<	.59<	.59<
6	.59<	.60<	.60<	.66<	.74	.74	.81	.81	.84	.85
7	.86	.96	1.02	1.03	1.03	1.05	1.06	1.12	1.15	1.35

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.58	.22	80	.33	1.35	46.22
EDIT<	.48	.07	64	.33	.66	30.80

REFLECTANCE HISTOGRAM

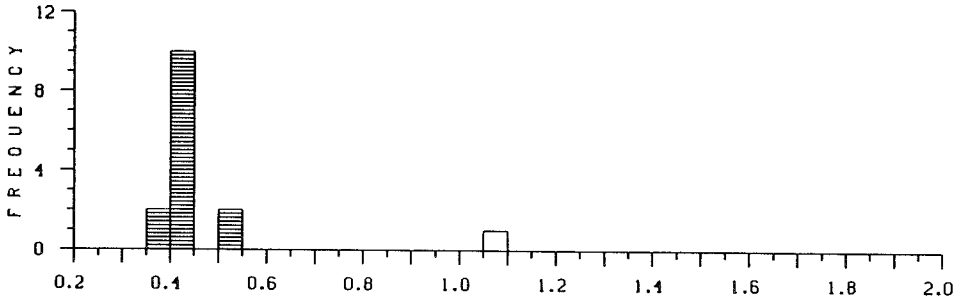


K0251C,DEPTH 5350-5380', CARTIER D-70

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.37<	.39<	.40<	.41<	.43<	.43<	.43<	.44<	.44<	.44<
1	.44<	.44<	.52<	.53<	1.07					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.48	.17	15	.37	1.07	7.18
EDIT<	.44	.04	14	.37	.53	6.11

REFLECTANCE HISTOGRAM



K0252B,DEPTH 5850-5880', CARTIER D-70

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.43<	.44<	.46<	.51<	.51<	.58<	.62<	.65	.67	.69
1	.76	.82	.86	.86						

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.63	.15	14	.43	.86	8.86
EDIT<	.51	.07	7	.43	.62	3.55

REFLECTANCE HISTOGRAM