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Vitrinite reflectance (Ro) of dispersed organics from Shell **Demascota G-32**

Report No. EPGS-DOM.2-92MPA

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G.S.C. Locality No.: D125 **Location:** 43°41'27.2"N, 60°49'54.0"W

R.T. Elevation: 98' **Water Depth:** 178' **Total Depth:** 15329'

Sampled Interval: 1000 - 15329' **Interval Studied:** 3160 - 15190'

Depth Units: Feet referenced to R.T. **Rig Release Date:** May 20, 1974

Vitrinite reflectance has been determined on 19 rotary cuttings samples (Table II) from Shell Demoscota G-32 which was classified as a new field wildcat well and is located on the Scotian Shelf approximately 245 km east southeast of Halifax, Nova Scotia. Well status is plugged and abandoned.

Sample preparation followed the procedures listed in Appendix I. Data acquisition and manipulation for this report utilized the Zeiss Photometer III system with a custom interface to a microcomputer which provides reliable data acquisition and immediate statistical summaries.

The analysis of the well revealed the thermal maturation intervals given in Table I. The 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*

178' (sea floor)	0.22	% Ro	immature
5745'	0.4	% Ro	immature approaching maturity
7944'	0.5	% Ro	marginally mature
9742'	0.6	% Ro	onset of significant oil generation
12578'	0.8	% Ro	peak of oil generation
14777'	1.0	% Ro	onset of significant wet gas generation
16575'	(1.2)	% Ro	onset of significant dry gas generation
17736'	(1.35)	% Ro	oil floor
18000' (approx. basement)			
15329' (T.D.)	1.06	% Ro	maturity at total depth

Note: ( )'s indicate Ro has been extrapolated at 0.145 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 for vitrinite reflectance analysis (Figure 1, Table II) was very good over the section penetrated by Demascota G-32. These provided good control in determining the maturation trend since the significant problem of contamination from cavings is eliminated in these samples. The data were plotted on a log Ro vs. linear depth scale and a linear regression line was calculated by the least squares method (Figure 1). The 'error bars' plotted on the maturation profile indicate one standard deviation on either side of the mean and may be deceivingly small for samples with very few readings. The slope of the maturation line is 0.145 log Ro/km.

Samples could not be obtained from conventional cores because all the cores were from limestone and dolomite sections with very little shale. VR determinations on samples taken from conventional core are generally more reliable because they eliminate the possibility of cavings.

Selection of the reflectance population which represents the maturation of the sediments was aided by the histogram display plot (Figure 2). Plotting the histograms on a log reflectance scale helps reveal linear trends in the Ro data. It also demonstrates the effects of cavings, geology, casing points and other factors on the vitrinite reflectance populations.

The results from the VR data in this report was compared to a much earlier report (Avery '78). In that report VR was determined on two coaly samples and these points were plotted on Figure 1 to demonstrate the comparison. These older data points certainly support the maturation profile produced from the data in this report.

These vitrinite reflectance data provide evidence that the thermal regime at Demoscota G-32, between 7944 and 15329' (T.D.), is suitable for the generation and preservation of hydrocarbons within the drilled section assuming potential source rocks and traps are present.

References

Avery, M.P., 1978. Vitrinite reflectance of Shell Demascota G-32. Internal report no. EPGS-DOM7-78MPA

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

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Table II

Summary of kerogen - based vitrinite reflectance

Seq. #	Sample Labels	Depths in feet	Mean Ro (SD) non-rotated	Number of Readings Total	Edited
1	K0114A	3160-3370	0.34(±.09)	20	12
2	K0114B	4550-4580	0.39(±.06)	39	32
3	K0114C	5650-5780	0.39(±.05)	19	19
4	K0115A	6350-6380	0.38(±.04)	23	23
5	K0115B	6850-6880	0.44(±.04)	25	25
6	K0116A	7050-7080	0.45(±.05)	24	24
7	K0116C	7350-7380	0.46(±.05)	35	35
8	K0117C	7950-8180	0.50(±.04)	30	30
9	K0118B	8550-8680	0.53(±.06)	25	22
10	K0119A	9150-9280	0.55(±.06)	40	39
11	K0119C	9850-9980	0.64(±.08)	51	51
12	K0121A	10450-10480	0.68(±.07)	28	28
13	K0122B	10950-10980	0.73(±.08)	39	39
14	K0123B	11350-11370	0.73(±.08)	56	56
15	K0744B	11960-11990	0.79(±.07)	55	55
16	K0744C	12760-12790	0.74(±.07)	31	31
17	K0745A	13660-13690	0.75(±.06)	35	33
18	K0745B	14160-14190	0.85(±.06)	29	27
19	K0745C	15160-15190	1.35(±.08)	35	11

Note: All samples are kerogen preparations.

Table III

Formation Tops (Wade, pers. comm.)

Formation	Depth
Banquereau	in casing
Wyandot	3250′
Dawson Canyon	3672′
Petrel Member	4160-4167′
Logan Canyon	4488′
Marmora Member	4488′
Sable Member	5220′
Cree Member	5550′
Naskapi Member	7272′
Missisauga	7866′
upper member	7866′
"O" Marker	8550-8600′
middle member	8600′
Verrill Canyon	10220′
Artimon Member	11157′
Abenaki	11532′
Baccaro Member	11532′
Misaine Member	14840′
?Scatarie Member	15156′
Total Depth	15329′

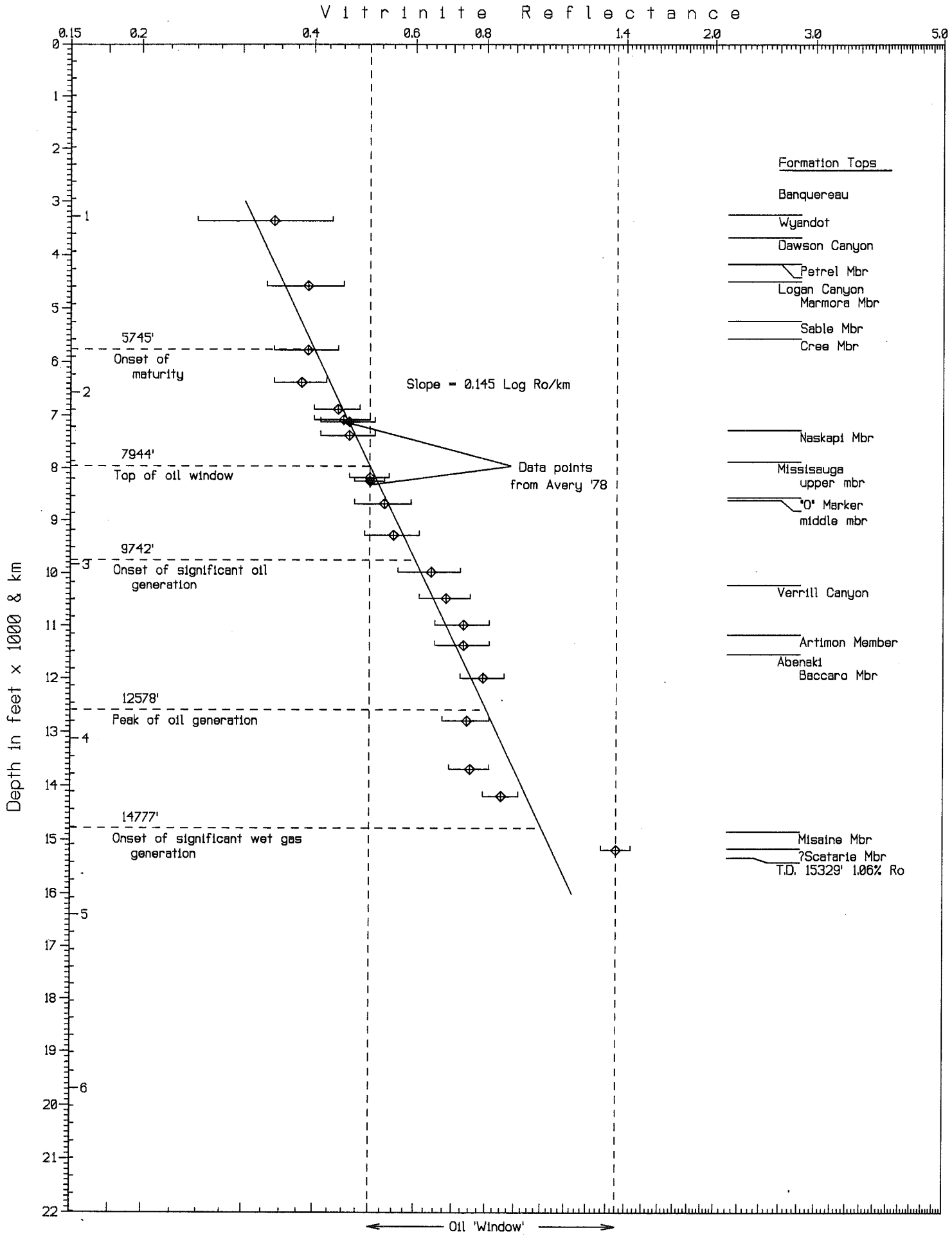


Fig. 1 Demascota G-32

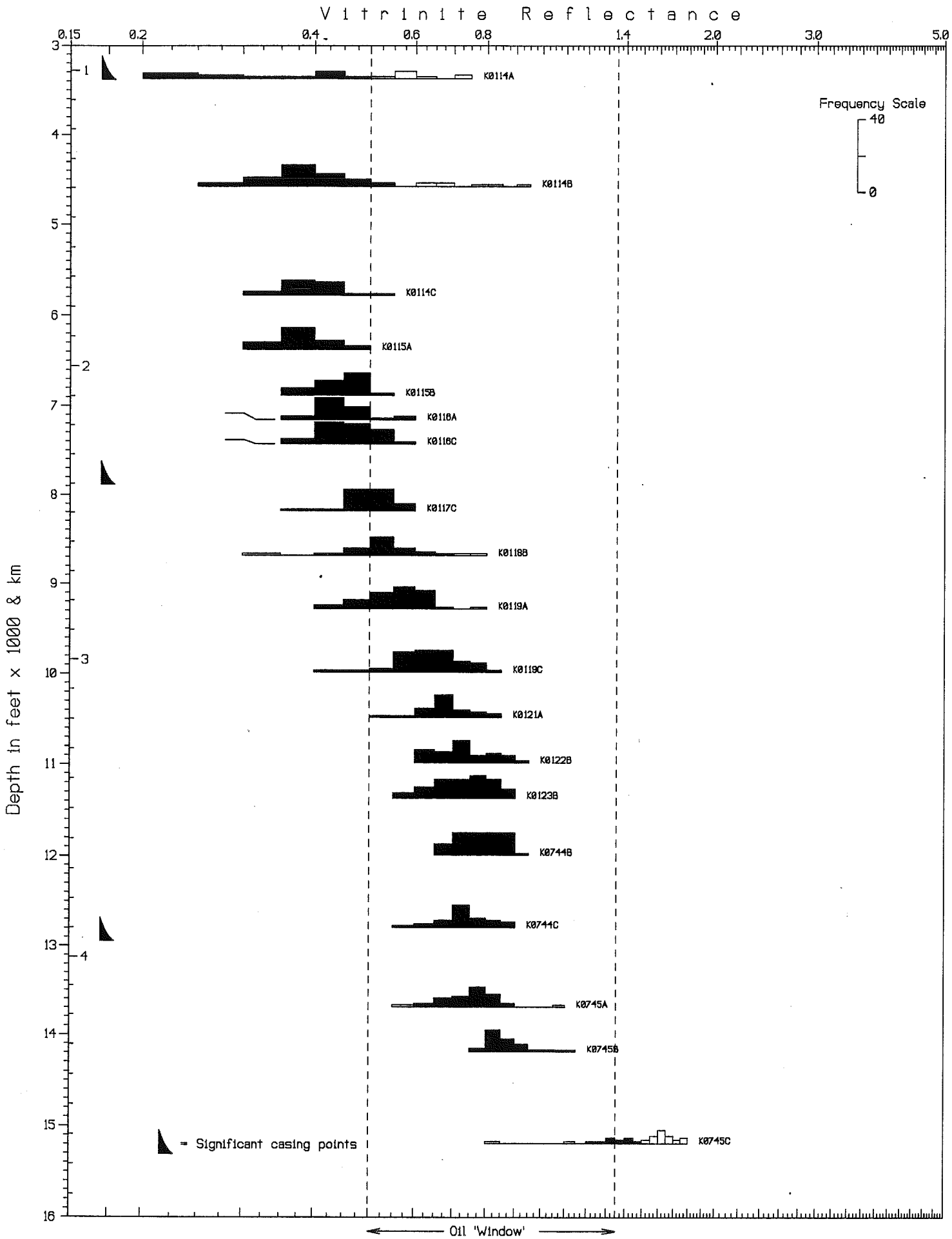


Fig. 2 Demascota G-32 <Histograms>

APPENDIX I

Sample Preparation Method

Kerogen Concentrate

COGLA Lab preparation

Preliminary wash
Dry samples 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:

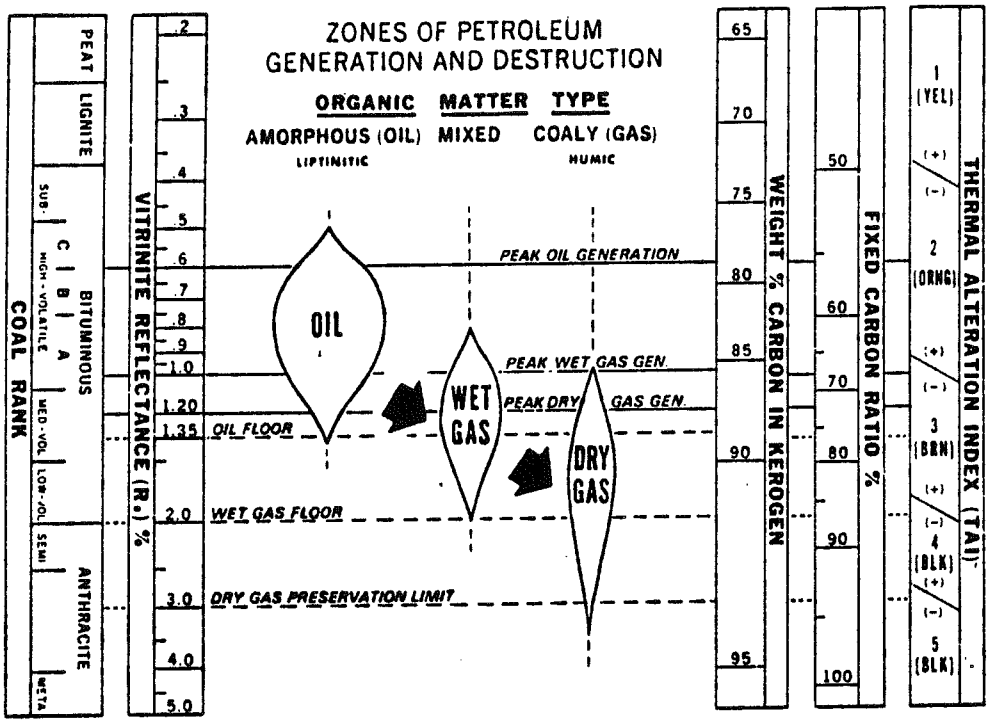
PALYNOLOGY Lab preparation

Place 20-30 grams 250 ml plastic beaker.
Add 10% HC1 till reaction ceases (removes carbonates).
Wash (rinsed) 3 times.
Conc. HF overnight (removes silicates).
Wash (rinsed) 3 times.
Heat (60-65°C) conc. HC1 (remove fluorides caused by HF).
Wash 3 times.
Trannsfer to 15 ml test tube with 4-5 ml 4% Alconox.
Differential centrifuge at 1500 rpm for 90 sec.
Decant.
Wash 3 times with centrifuging.
Float off organic fraction using 2.0 S.G. Znbr solution.
Centrifuge 1000 rpm, 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

Pipette off excess water and place in plastic stubs (made to fit polisher).
Freeze dry and fix material for polishing with epoxy resin (Struer's EPOFIX).
Polish with diamond based suspension to obtain low relief, scratch free surface.
Examine under oil lens, incident light at approximately 1000x mag'n.

Appendix II (Dow, 1977)



Note: In this report, 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 here used as the 'peak of oil generation'

Appendix III

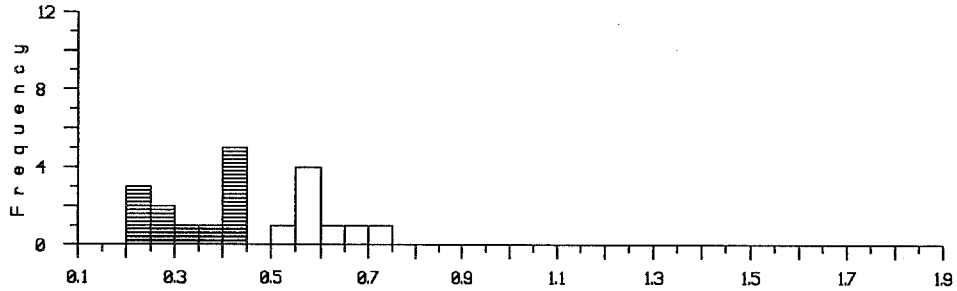
Reflectance Histograms

K0114A,3160-3370',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.21<	0.23<	0.23<	0.28<	0.29<	0.34<	0.39<	0.40<	0.40<	0.41<
1	0.44<	0.45<	0.50	0.55	0.58	0.59	0.59	0.62	0.70	0.74
2										

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.45	0.16	20	0.21	0.74	8.94
Edit<	0.34	0.09	12	0.21	0.45	4.07

Reflectance Histogram

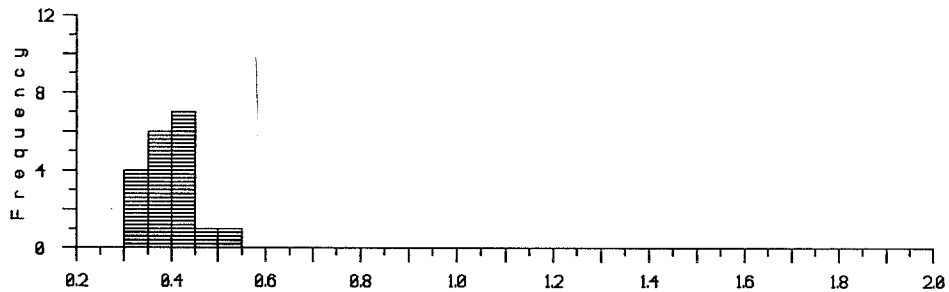


K0114C,5650-5780',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.32<	0.33<	0.35<	0.35<	0.36<	0.36<	0.36<	0.37<	0.37<	0.39<
1	0.40<	0.40<	0.41<	0.42<	0.42<	0.44<	0.44<	0.48<	0.52<	

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.39	0.05	19	0.32	0.52	7.49
Edit<	0.39	0.05	19	0.32	0.52	7.49

Reflectance Histogram

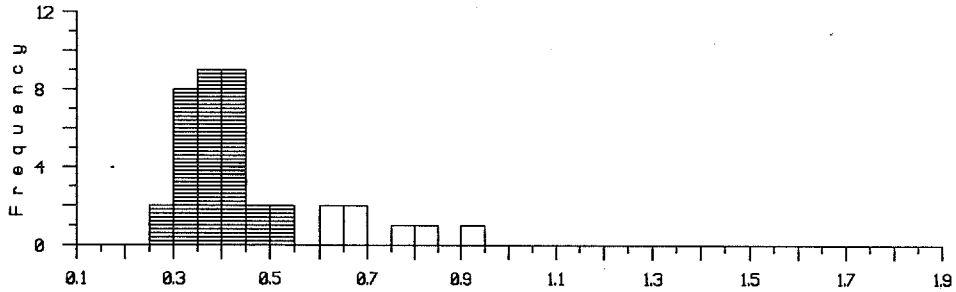


K0114B,4550-4580',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.25<	0.25<	0.31<	0.33<	0.33<	0.33<	0.34<	0.35<	0.35<	0.35<
1	0.36<	0.36<	0.37<	0.38<	0.38<	0.39<	0.39<	0.39<	0.39<	0.41<
2	0.42<	0.43<	0.43<	0.43<	0.44<	0.44<	0.45<	0.45<	0.47<	0.47<
3	0.51<	0.52<	0.61	0.63	0.67	0.69	0.76	0.80	0.92	

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.45	0.15	39	0.25	0.92	17.55
Edit<	0.39	0.06	32	0.25	0.52	12.47

Reflectance Histogram

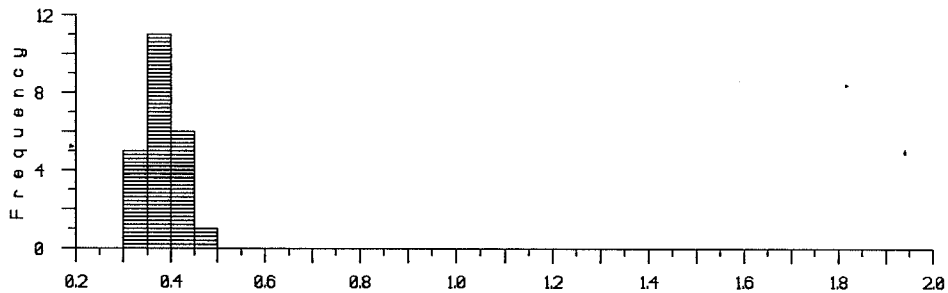


K0115A,6350-6380',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.30<	0.31<	0.33<	0.34<	0.35<	0.36<	0.36<	0.36<	0.37<	0.37<
1	0.38<	0.38<	0.38<	0.39<	0.39<	0.39<	0.40<	0.41<	0.42<	0.42<
2	0.43<	0.45<	0.46<							

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.38	0.04	23	0.30	0.46	8.75
Edit<	0.38	0.04	23	0.30	0.46	8.75

Reflectance Histogram

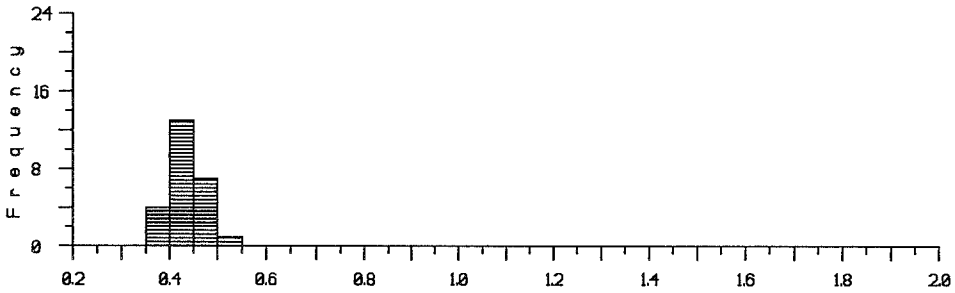


K0115B,6850-6880',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.37<	0.39<	0.39<	0.39<	0.40<	0.40<	0.41<	0.41<	0.42<	0.42<
1	0.43<	0.44<	0.45<	0.45<	0.45<	0.45<	0.45<	0.46<	0.47<	0.47<
2	0.47<	0.47<	0.48<	0.49<	0.51<					

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.44	0.04	25	0.37	0.51	10.94
Edit<	0.44	0.04	25	0.37	0.51	10.94

Reflectance Histogram

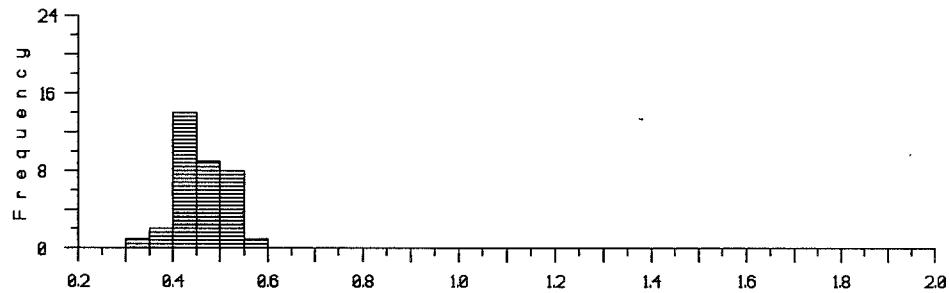


K0116C,7350-7380',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.35<	0.38<	0.39<	0.40<	0.40<	0.41<	0.41<	0.42<	0.42<	0.42<
1	0.43<	0.43<	0.43<	0.44<	0.44<	0.45<	0.45<	0.46<	0.46<	0.46<
2	0.47<	0.48<	0.48<	0.48<	0.49<	0.49<	0.50<	0.50<	0.50<	0.50<
3	0.51<	0.51<	0.51<	0.52<	0.56<					

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.46	0.05	35	0.35	0.56	15.95
Edit<	0.46	0.05	35	0.35	0.56	15.95

Reflectance Histogram

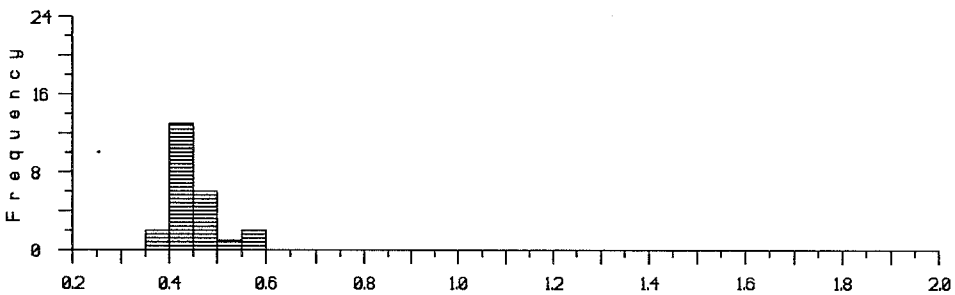


K0116A,7050-7080',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.39<	0.39<	0.40<	0.40<	0.41<	0.42<	0.42<	0.42<	0.43<	0.43<
1	0.43<	0.44<	0.44<	0.44<	0.45<	0.46<	0.46<	0.48<	0.49<	0.49<
2	0.49<	0.51<	0.57<	0.58<						

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.45	0.05	24	0.39	0.58	10.84
Edit<	0.45	0.05	24	0.39	0.58	10.84

Reflectance Histogram

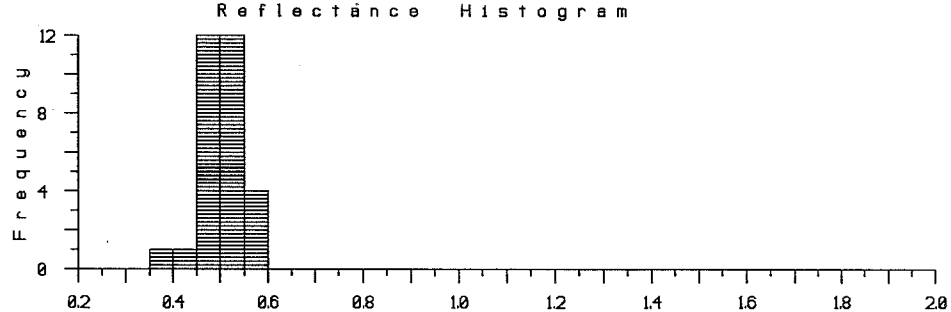


K0117C,7950-8180',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.38<	0.42<	0.46<	0.46<	0.47<	0.47<	0.48<	0.48<	0.48<	0.49<
1	0.49<	0.49<	0.49<	0.49<	0.51<	0.51<	0.51<	0.52<	0.52<	0.52<
2	0.53<	0.53<	0.53<	0.54<	0.54<	0.54<	0.55<	0.55<	0.57<	0.59<
3										

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.50	0.04	30	0.38	0.59	15.11
Edit<	0.50	0.04	30	0.38	0.59	15.11

Reflectance Histogram

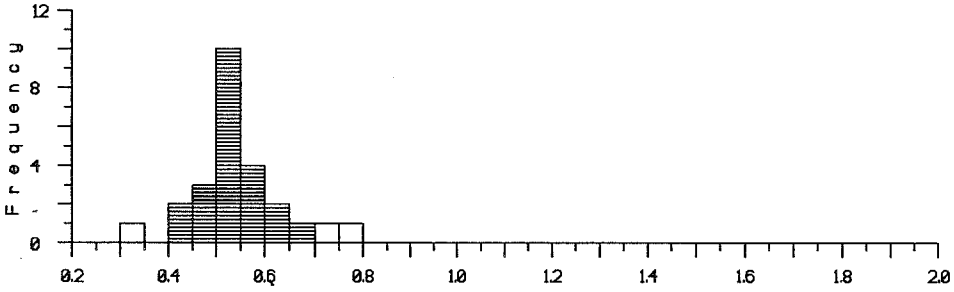


K0118B,8550-8680',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.33	0.41<	0.45<	0.46<	0.47<	0.47<	0.50<	0.50<	0.50<	0.51<
1	0.51<	0.52<	0.52<	0.53<	0.53<	0.54<	0.55<	0.56<	0.56<	0.58<
2	0.60<	0.64<	0.67<	0.73	0.77					

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.54	0.09	25	0.33	0.77	13.41
Edit<	0.53	0.06	22	0.41	0.67	11.58

Reflectance Histogram

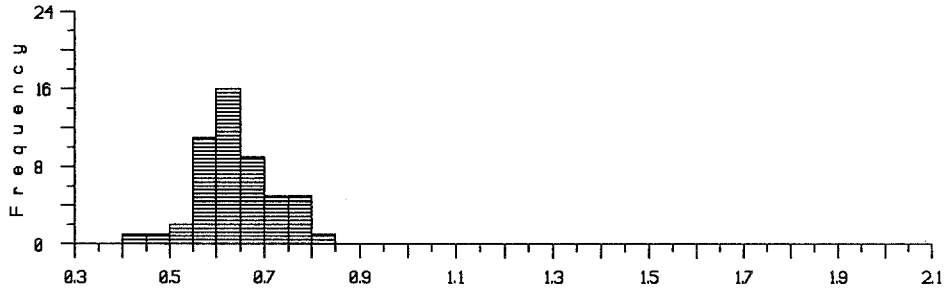


K0119C,9850-9980',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.44<	0.48<	0.53<	0.54<	0.55<	0.56<	0.56<	0.57<	0.57<	0.58<
1	0.58<	0.58<	0.59<	0.59<	0.59<	0.60<	0.60<	0.61<	0.61<	0.62<
2	0.62<	0.62<	0.62<	0.63<	0.64<	0.64<	0.64<	0.65<	0.65<	0.65<
3	0.65<	0.66<	0.66<	0.66<	0.67<	0.68<	0.68<	0.69<	0.69<	0.70<
4	0.71<	0.72<	0.72<	0.73<	0.73<	0.76<	0.76<	0.76<	0.77<	0.78<
5	0.84<									

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.64	0.08	51	0.44	0.84	32.73
Edit<	0.64	0.08	51	0.44	0.84	32.73

Reflectance Histogram

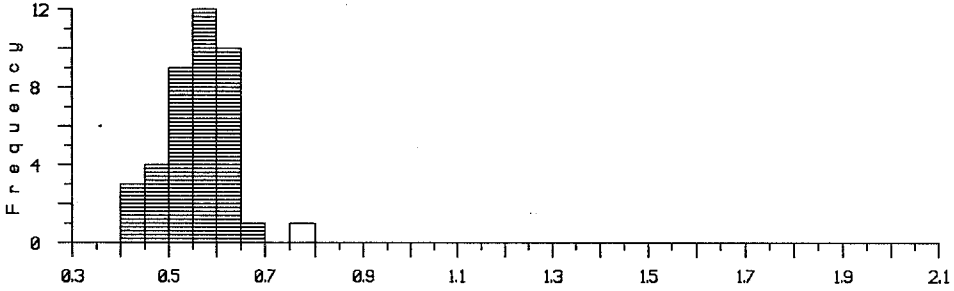


K0119A,9150-9280',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.43<	0.44<	0.45<	0.47<	0.48<	0.49<	0.49<	0.50<	0.50<	0.51<
1	0.53<	0.53<	0.53<	0.53<	0.53<	0.54<	0.55<	0.55<	0.56<	0.56<
2	0.57<	0.57<	0.57<	0.58<	0.58<	0.58<	0.59<	0.59<	0.60<	0.60<
3	0.61<	0.61<	0.61<	0.62<	0.62<	0.62<	0.63<	0.63<	0.69<	0.78
4										

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.56	0.07	40	0.43	0.78	22.42
Edit<	0.55	0.06	39	0.43	0.69	21.64

Reflectance Histogram

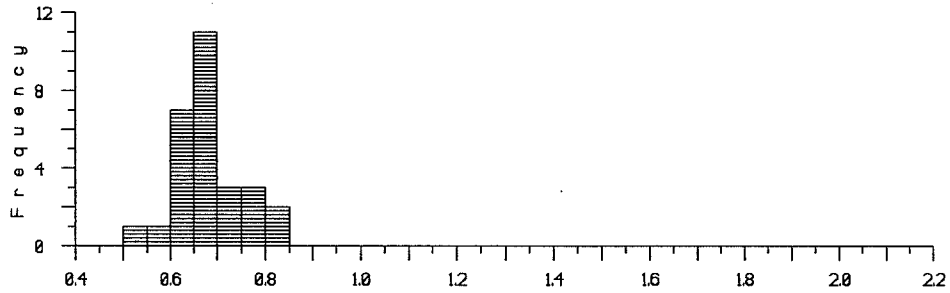


K0121A,10450-10480',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.51<	0.59<	0.60<	0.61<	0.62<	0.62<	0.64<	0.65<	0.65<	0.66<
1	0.68<	0.68<	0.68<	0.69<	0.69<	0.69<	0.69<	0.69<	0.69<	0.70<
2	0.71<	0.72<	0.73<	0.75<	0.76<	0.78<	0.81<	0.81<		

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.68	0.07	28	0.51	0.81	19.10
Edit<	0.68	0.07	28	0.51	0.81	19.10

Reflectance Histogram

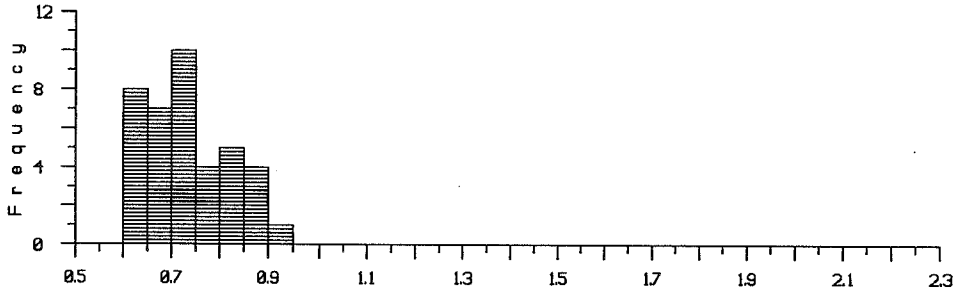


K0122B,10950-10980',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.61<	0.62<	0.62<	0.63<	0.64<	0.64<	0.64<	0.65<	0.66<	0.66<
1	0.68<	0.68<	0.69<	0.70<	0.70<	0.71<	0.71<	0.71<	0.72<	0.73<
2	0.73<	0.73<	0.74<	0.74<	0.74<	0.76<	0.77<	0.78<	0.79<	0.80<
3	0.80<	0.80<	0.84<	0.84<	0.85<	0.85<	0.86<	0.86<	0.93<	

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.73	0.08	39	0.61	0.93	28.61
Edit<	0.73	0.08	39	0.61	0.93	28.61

Reflectance Histogram

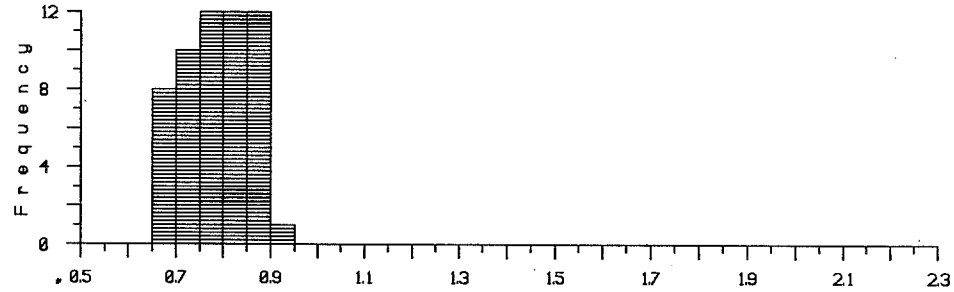


K0744B,11960-11990',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.66<	0.67<	0.68<	0.69<	0.69<	0.69<	0.70<	0.70<	0.71<	0.71<
1	0.72<	0.72<	0.72<	0.73<	0.74<	0.74<	0.74<	0.74<	0.75<	0.75<
2	0.76<	0.76<	0.76<	0.76<	0.77<	0.78<	0.78<	0.78<	0.79<	0.79<
3	0.81<	0.81<	0.81<	0.81<	0.82<	0.82<	0.83<	0.83<	0.84<	0.84<
4	0.84<	0.84<	0.85<	0.85<	0.85<	0.85<	0.86<	0.86<	0.88<	0.88<
5	0.88<	0.89<	0.89<	0.89<	0.92<					

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.79	0.07	55	0.66	0.92	43.23
Edit<	0.79	0.07	55	0.66	0.92	43.23

Reflectance Histogram

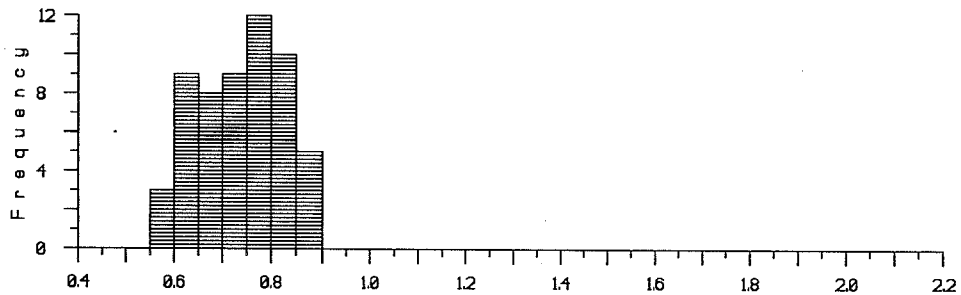


K0123B,11350-11370',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.55<	0.56<	0.58<	0.62<	0.62<	0.63<	0.63<	0.64<	0.64<	0.65<
1	0.65<	0.65<	0.66<	0.67<	0.68<	0.68<	0.69<	0.69<	0.69<	0.70<
2	0.71<	0.71<	0.72<	0.72<	0.73<	0.73<	0.73<	0.74<	0.74<	0.75<
3	0.75<	0.76<	0.76<	0.76<	0.76<	0.77<	0.77<	0.78<	0.78<	0.78<
4	0.78<	0.80<	0.80<	0.80<	0.81<	0.81<	0.81<	0.81<	0.83<	0.84<
5	0.84<	0.85<	0.86<	0.86<	0.87<	0.87<				

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.73	0.08	56	0.55	0.87	41.07
Edit<	0.73	0.08	56	0.55	0.87	41.07

Reflectance Histogram

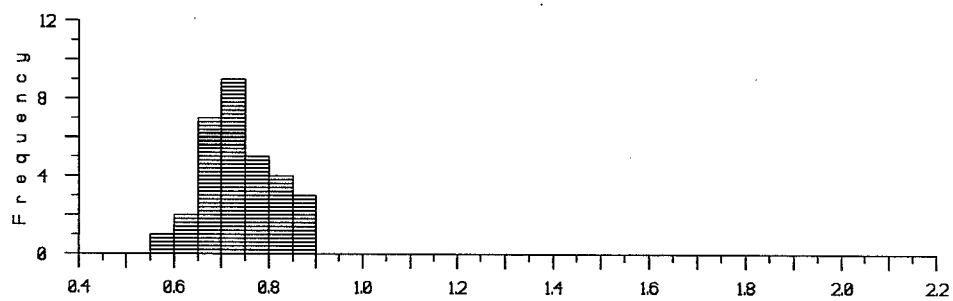


K0744C,12760-12790',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.57<	0.64<	0.64<	0.66<	0.66<	0.68<	0.68<	0.70<	0.70<	0.70<
1	0.71<	0.71<	0.72<	0.72<	0.72<	0.72<	0.72<	0.72<	0.73<	0.75<
2	0.76<	0.78<	0.78<	0.79<	0.80<	0.80<	0.81<	0.84<	0.85<	0.86<
3	0.88<									

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.74	0.07	31	0.57	0.88	22.80
Edit<	0.74	0.07	31	0.57	0.88	22.80

Reflectance Histogram

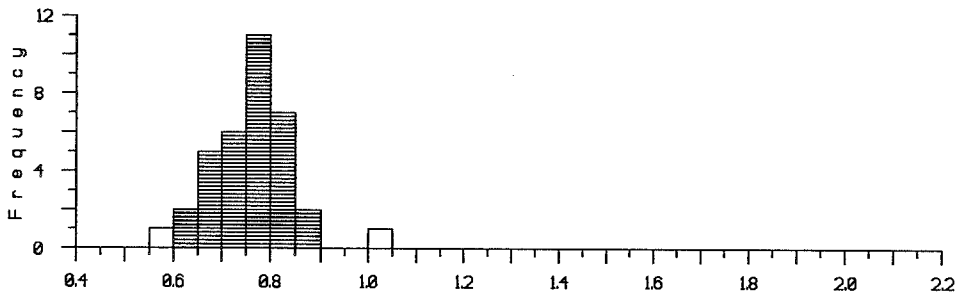


K0745A,13660-13690',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.57	0.63<	0.63<	0.66<	0.66<	0.68<	0.69<	0.69<	0.71<	0.72<
1	0.72<	0.73<	0.73<	0.74<	0.75<	0.75<	0.75<	0.75<	0.76<	0.77<
2	0.78<	0.78<	0.79<	0.79<	0.79<	0.80<	0.80<	0.80<	0.81<	0.82<
3	0.84<	0.84<	0.86<	0.88<	1.05					

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.76	0.09	35	0.57	1.05	26.52
Edit<	0.75	0.06	33	0.63	0.88	24.90

Reflectance Histogram

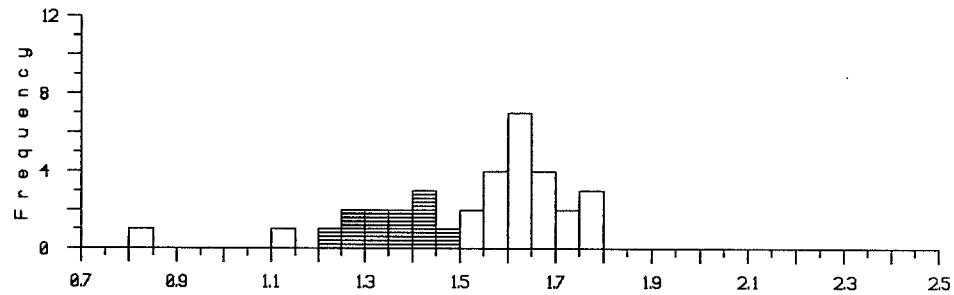


K0745C,15160-15190',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.82	1.13	1.23<	1.26<	1.30<	1.31<	1.32<	1.37<	1.37<	1.41<
1	1.43<	1.43<	1.46<	1.53	1.54	1.56	1.57	1.57	1.59	1.60
2	1.61	1.62	1.63	1.64	1.64	1.64	1.66	1.66	1.69	1.69
3	1.70	1.71	1.75	1.76	1.79					

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	1.51	0.21	35	0.82	1.79	52.99
Edit<	1.35	0.08	11	1.23	1.46	14.89

Reflectance Histogram



K0745B,14160-14190',DEMASCOTA G-32

Col >	1	2	3	4	5	6	7	8	9	0
Row	0.75<	0.78<	0.80<	0.80<	0.80<	0.81<	0.81<	0.81<	0.82<	0.83<
1	0.83<	0.84<	0.84<	0.84<	0.85<	0.85<	0.85<	0.85<	0.87<	0.88<
2	0.89<	0.90<	0.90<	0.93<	0.94<	0.95<	1.00<	1.07	1.12	

	Mean	Stand Dev	Pts	Min	Max	Sum
Total	0.87	0.08	29	0.75	1.12	25.21
Edit<	0.85	0.06	27	0.75	1.00	23.02

Reflectance Histogram