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report # 2200

Vitrinite reflectance (Ro) of dispersed organics from Petro-Canada et al. Southwest Banquereau F-34

Report No. EPGS-DOM.5-89MPA

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November 24, 1989

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G.S.C. Locality No.: D227 **Location:** 44°03'15.62"N, 58°50'21.60"W

R.T. Elevation: 25.3m **Water Depth:** 113.7m **Total Depth:** 6309m

Sample Interval: 630 - 6309m **Interval Studied:** 655 - 6305m

Depth Units: Metres referenced to R.T.

Vitrinite reflectance has been determined on 28 rotary cuttings samples (Table II) from Petro-Canada et al. Southwest Banquereau F-34 which was classified as a wildcat well and is located on the Scotian Shelf approximately 386 km east southeast of Halifax, Nova Scotia. The well was plugged and abandoned.

Data acquisition and manipulation for this report utilized the Zeiss Photo-multiplier III system interfaced with a PC AT microcomputer which provides reliable data acquisition and fast statistical summaries.

Sample preparation followed the procedures listed in Appendix I. The analysis of the well revealed the thermal maturation intervals given in Table I. The specific maturation levels, as set out in this report, were based on those of Dow (1977) with modified terminology (Appendix II).

Table I
Inferred Thermal Maturation Levels*

(Seafloor)-1209m	0.25 - 0.4	% Ro	immature
1209-1791m	0.4 - 0.5	% Ro	immature approaching maturity
1791-2267m	0.5 - 0.6	% Ro	marginally mature
2267m	0.6	% Ro	onset of significant oil generation
3019m	0.8	% Ro	peak of oil generation
3601m	1.0	% Ro	onset of significant wet gas generation
4078m	1.2	% Ro	onset of significant dry gas generation
4385m	1.35	% Ro	oil floor
5412m	2.0	% Ro	wet gas preservation limit
6309m	2.82	% Ro	maturity at total depth
7654m	(3.0)	% Ro	dry gas preservation limit

Note: ( ) indicate Ro extrapolated at 0.166 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 analysis (Figure 1, Table II) was very good over the section penetrated by Southwest Banquereau F-34. The data are 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 0.166 log Ro/km.

Selection of the reflectance population which represented the true maturation of the sediments was aided significantly by the 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 Southwest Banquereau F-34 (between 1791 and 6309m) was suitable for the generation and preservation of hydrocarbons within the drilled section assuming potential source rocks and traps were present.

References

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 #	Depths in metres	Mean Ro (SD) non-rotated	Number of Readings Total	Edited
1	K0746A	655-665	0.28(±.05)	37	37
2	K0746C	950-960	0.33(±.05)	36	35
3	K0747B	1235-1275	0.38(±.06)	29	28
4	K0748A	1595-1635	0.46(±.05)	33	32
5	K0748C	2040-2080	0.56(±.08)	45	35
6	K0749A	2220-2260	0.56(±.07)	53	41
7	K0749B	2400-2440	0.64(±.09)	37	26
8	K0749C	2610-2650	0.69(±.09)	47	29
9	K0750A	2820-2830	0.78(±.12)	41	37
10	K0750B	2995-3005	0.73(±.03)	14	3
11	K0750C	3205-3215	0.90(±.11)	55	33
12	K0751A	3355-3395	0.99(±.04)	70	21
13	K0751B	3575-3585	1.11(±.11)	64	36
14	K0751C	3725-3765	1.22(±.14)	54	38
15	K0752A	3905-3915	1.29(±.08)	13	9
16	K0752B	4055-4095	1.33(±.09)	24	11
17	K0753A	4385-4425	1.55(±.06)	40	16
18	K0753B	4620-4630	1.56(±.11)	42	32
19	K0753C	4770-4810	1.54(±.10)	49	20
20	K0754A	4985-4995	1.68(±.09)	39	24
21	K0754B	5160-5200	1.71(±.08)	38	19
22	K0754C	5370-5410	1.98(±.10)	50	28
23	K0755A	5550-5590	2.05(±.11)	69	53
24	K0755B	5730-5770	2.04(±.07)	27	13
25	K0755C	5940-5980	2.43(±.09)	20	5
26	K0756A	6120-6130	2.04(±.10)	48	34
27	K0756B	6210-6220	2.83(±.03)	7	2
28	K0756C	6295-6305	2.64(±.05)	35	8

Note: All samples are kerogen concentrate type.

Table III

Formation Tops (Wade, pers. comm.)

Formation	Depth
Banquereau	in casing
Wyandot	1773m
Dawson Canyon	1930m
Logan Canyon	2148m
Marmora Mbr	2148m
Sable Mbr	2399m
Cree Mbr	2526m
Naskapi Mbr	3533m
Missisauga	3918m
upper mbr	3918m
"O" Marker	4160-4240m
middle mbr	4240m
Top OP approx.	4600m
Verrill Canyon	4980m
T.D.	6309m

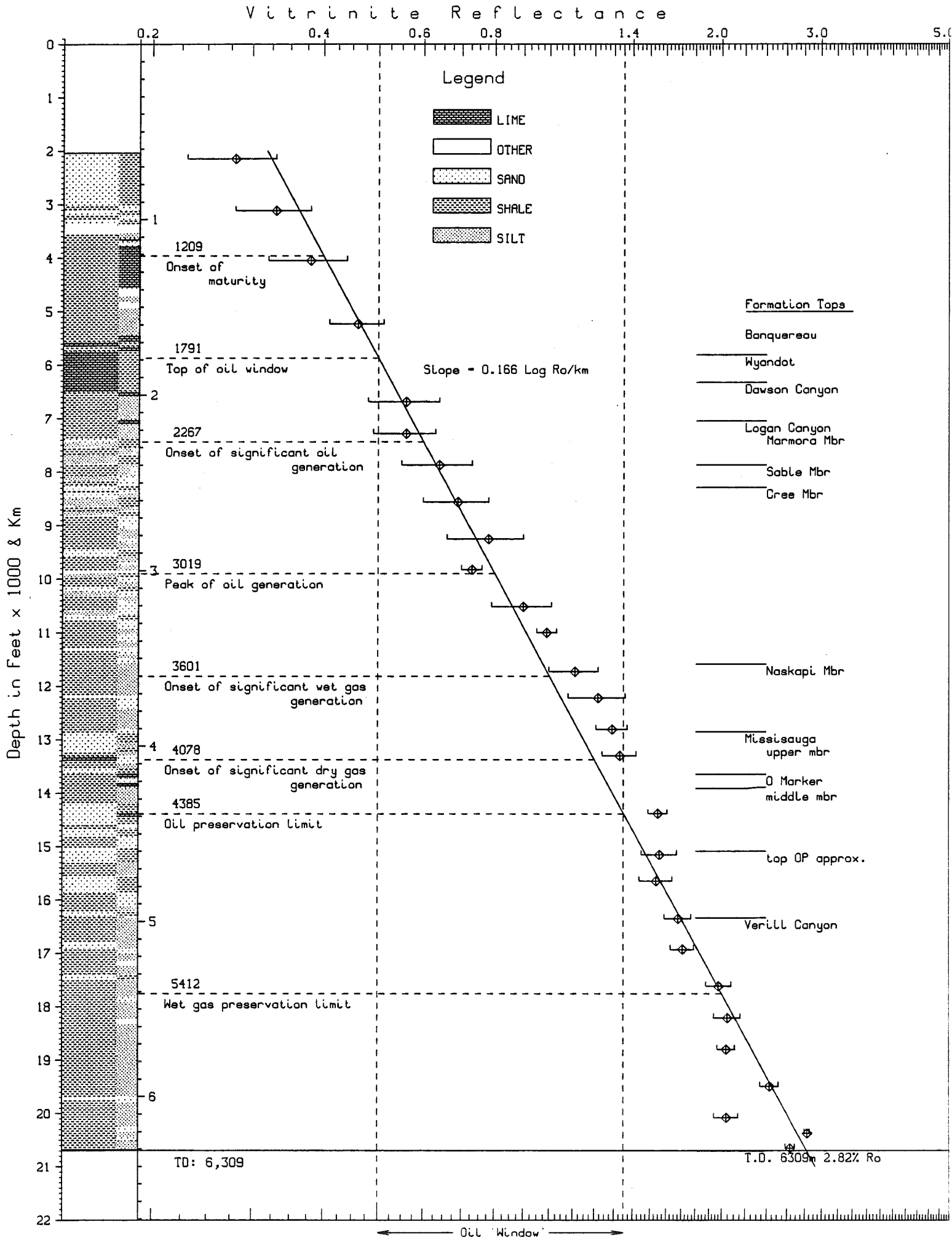


Fig. 1 Southwest Banquereau F-34 Maturation Profile

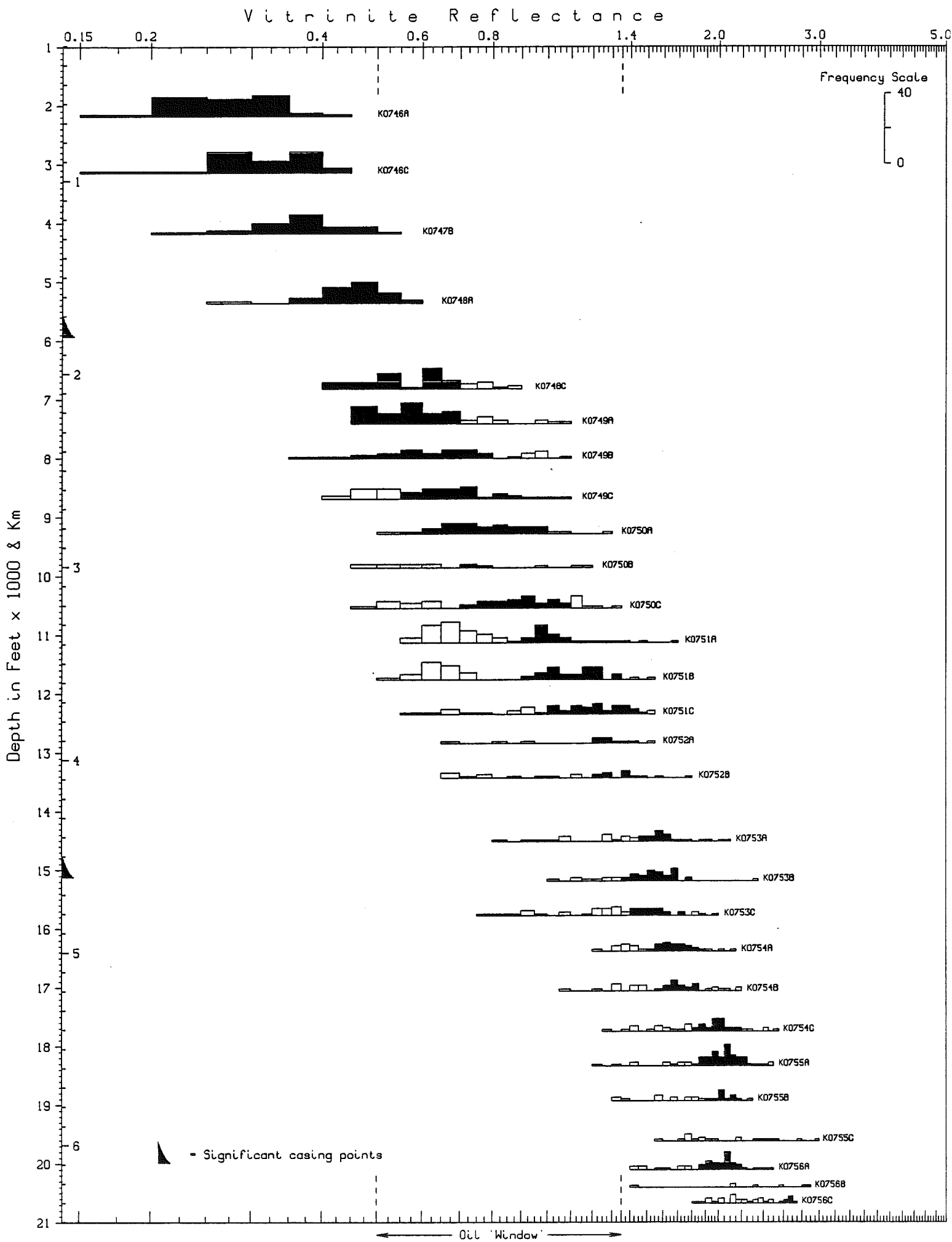


Fig. 2 Southwest Banquereau F-34 < Histograms >

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:

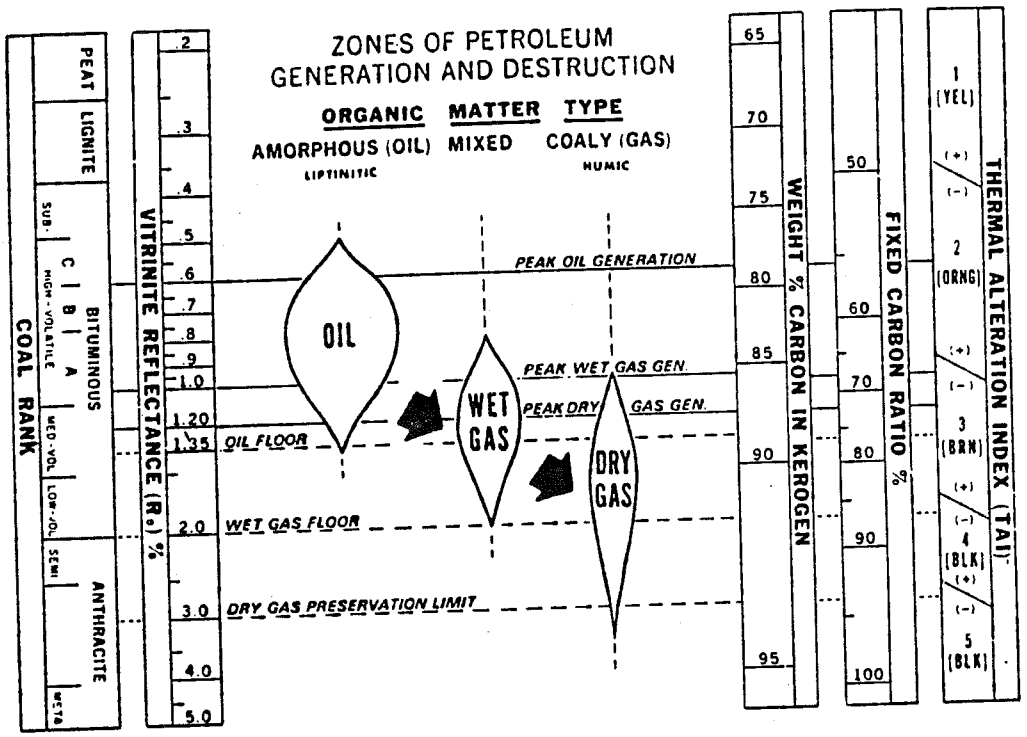
PALYNOLOGY Lab preparation

20-30 grams placed in 250 ml plastic beaker.
Add 10% HC1 till reaction ceases (removes carbonates).
Washed (rinsed) 3 times.
Conc. HF overnight (removes silicates).
Washed (rinsed) 3 times.
Heated (60-65°C) conc. HC1 (remove fluorides caused by HF).
Washed 3 times.
Then put into 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

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: 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' (Table I, Figure 1).

Appendix III

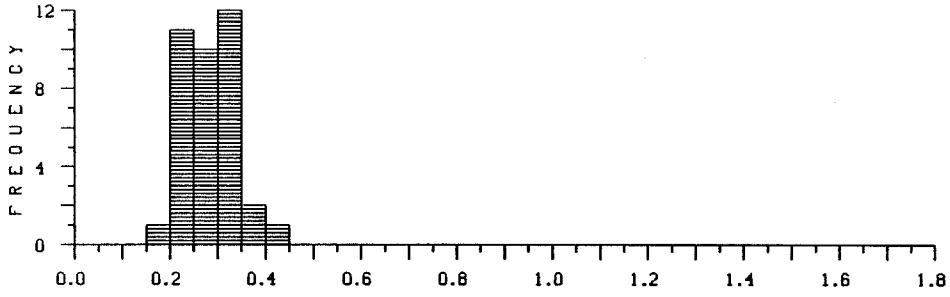
Reflectance Histograms

K0746A,655-665M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.19<	.20<	.20<	.21<	.22<	.23<	.24<	.24<	.24<	.24<
1	.24<	.24<	.25<	.26<	.26<	.26<	.27<	.28<	.29<	.29<
2	.29<	.29<	.30<	.30<	.31<	.31<	.31<	.33<	.33<	.33<
3	.33<	.33<	.34<	.34<	.36<	.37<	.40<			

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.28	.05	37	.19	.40	10.42
EDIT<	.28	.05	37	.19	.40	10.42

REFLECTANCE HISTOGRAM

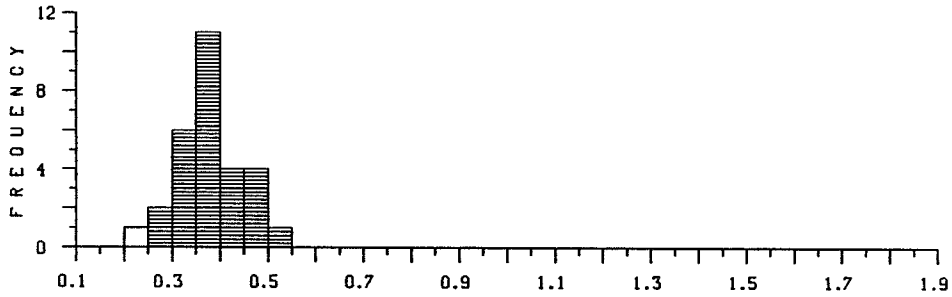


K0747B,1235-1275M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.21	.28<	.29<	.30<	.31<	.33<	.34<	.34<	.34<	.35<
1	.36<	.36<	.36<	.37<	.37<	.37<	.39<	.39<	.39<	.39<
2	.40<	.41<	.41<	.41<	.45<	.46<	.47<	.48<	.51<	

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.37	.06	29	.21	.51	10.84
EDIT<	.38	.06	28	.28	.51	10.63

REFLECTANCE HISTOGRAM

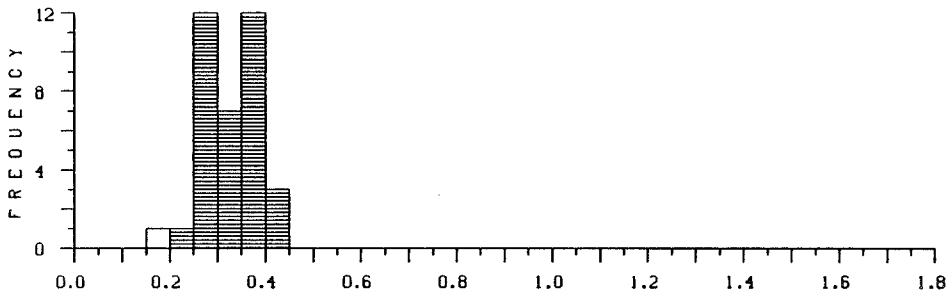


K0746C,950-960M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.18	.24<	.25<	.25<	.25<	.27<	.28<	.28<	.28<	.28<
1	.28<	.29<	.29<	.29<	.30<	.32<	.32<	.32<	.33<	.34<
2	.34<	.35<	.36<	.36<	.36<	.36<	.36<	.37<	.38<	.38<
3	.38<	.39<	.39<	.40<	.40<	.43<				

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.32	.06	36	.18	.43	11.65
EDIT<	.33	.05	35	.24	.43	11.47

REFLECTANCE HISTOGRAM

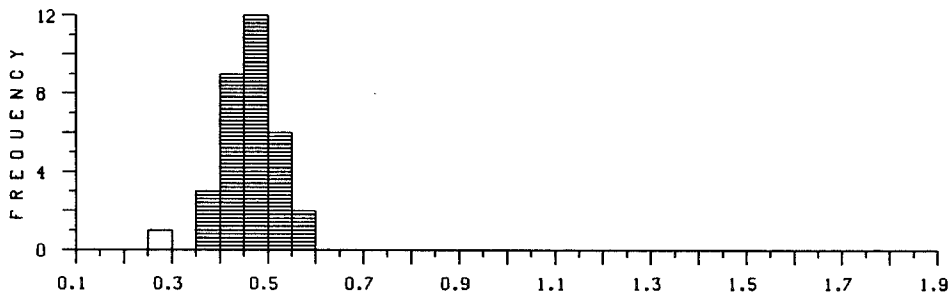


K0748A,1595-1635M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.28	.37<	.39<	.39<	.41<	.41<	.41<	.41<	.42<	.42<
1	.42<	.42<	.44<	.45<	.45<	.46<	.46<	.46<	.46<	.46<
2	.47<	.47<	.48<	.48<	.49<	.50<	.50<	.50<	.50<	.51<
3	.51<	.57<	.57<							

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.45	.06	33	.28	.57	14.94
EDIT<	.46	.05	32	.37	.57	14.66

REFLECTANCE HISTOGRAM

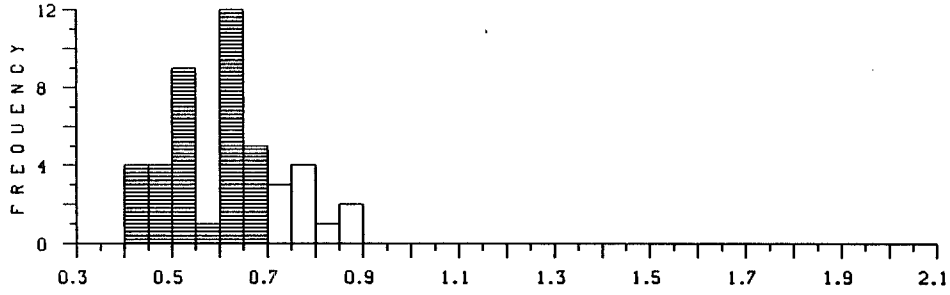


K0748C,2040-2080M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.41<	.41<	.43<	.44<	.45<	.46<	.49<	.49<	.50<	.51<
1	.52<	.52<	.52<	.53<	.53<	.53<	.54<	.57<	.60<	.60<
2	.60<	.61<	.61<	.62<	.62<	.62<	.62<	.63<	.63<	.64<
3	.65<	.66<	.66<	.66<	.66<	.72	.73	.73	.77	.78
4	.78	.79	.83	.88	.89					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.61	.12	45	.41	.89	27.44
EDIT<	.56	.08	35	.41	.66	19.54

REFLECTANCE HISTOGRAM

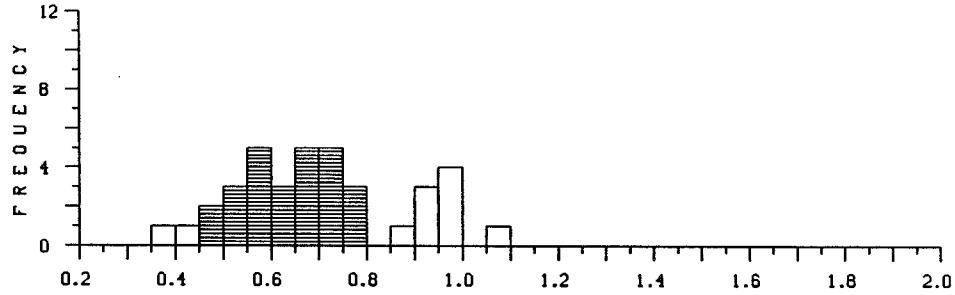


K0749B,2400-2440M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.39	.41	.45<	.49<	.51<	.52<	.53<	.57<	.57<	.58<
1	.59<	.59<	.60<	.61<	.63<	.65<	.67<	.68<	.68<	.69<
2	.71<	.72<	.72<	.73<	.74<	.76<	.79<	.79<	.85	.92
3	.92	.93	.95	.95	.96	.97	1.05			

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.70	.17	37	.39	1.05	25.87
EDIT<	.64	.09	26	.45	.79	16.57

REFLECTANCE HISTOGRAM

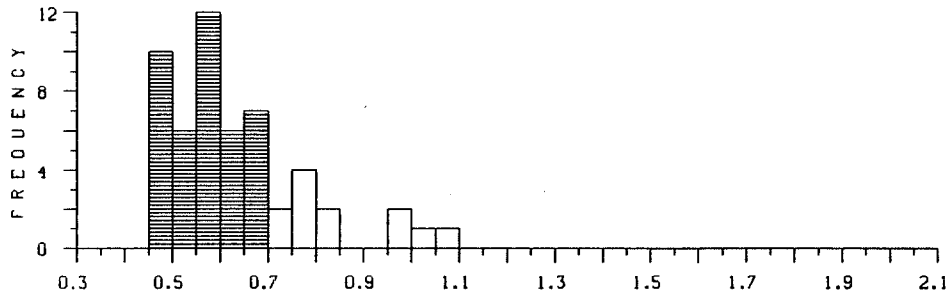


K0749A,2220-2260M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.45<	.45<	.46<	.46<	.46<	.47<	.48<	.48<	.48<	.49<
1	.50<	.51<	.51<	.52<	.52<	.54<	.55<	.55<	.55<	.55<
2	.56<	.56<	.57<	.57<	.58<	.58<	.58<	.59<	.61<	.62<
3	.62<	.64<	.64<	.64<	.66<	.67<	.67<	.68<	.68<	.68<
4	.69<	.71	.74	.76	.79	.79	.79	.81	.84	.96
5	.99	1.00	1.05							

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.63	.15	53	.45	1.05	33.30
EDIT<	.56	.07	41	.45	.69	23.07

REFLECTANCE HISTOGRAM

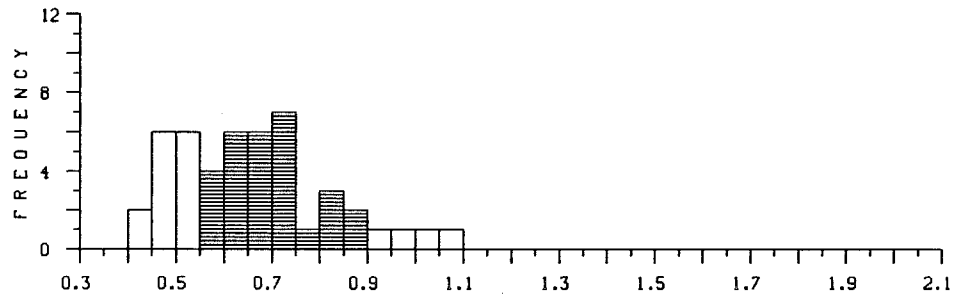


K0749C,2610-2650M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.42	.43	.45	.47	.49	.49	.49	.49	.50	.51
1	.51	.51	.53	.54	.55<	.56<	.57<	.59<	.61<	.62<
2	.62<	.63<	.63<	.64<	.65<	.66<	.66<	.67<	.69<	.69<
3	.71<	.72<	.72<	.72<	.72<	.73<	.74<	.78<	.81<	.82<
4	.83<	.85<	.85<	.93	.99	1.01	1.05			

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.66	.16	47	.42	1.05	30.85
EDIT<	.69	.09	29	.55	.85	20.04

REFLECTANCE HISTOGRAM

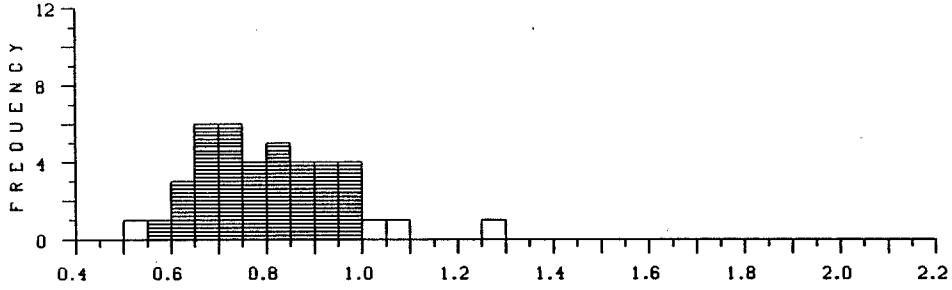


K0750A,2820-2830M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.53	.59<	.60<	.61<	.62<	.65<	.65<	.66<	.66<	.66<
1	.68<	.70<	.70<	.71<	.72<	.73<	.74<	.75<	.77<	.78<
2	.79<	.81<	.81<	.82<	.83<	.84<	.85<	.85<	.86<	.89<
3	.91<	.91<	.92<	.94<	.97<	.98<	.98<	.99<	1.04	1.07
4	1.25									

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.80	.15	41	.53	1.25	32.82
EDIT<	.78	.12	37	.59	.99	28.93

REFLECTANCE HISTOGRAM

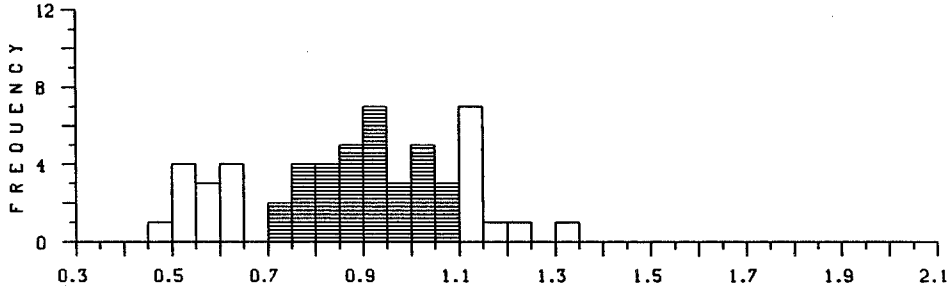


K0750C,3205-3215M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.47	.51	.52	.52	.53	.56	.57	.57	.60	.61
1	.61	.61	.73<	.73<	.75<	.76<	.77<	.77<	.80<	.80<
2	.82<	.83<	.85<	.86<	.86<	.89<	.89<	.90<	.90<	.91<
3	.92<	.92<	.92<	.92<	.96<	.97<	.99<	1.01<	1.02<	1.02<
4	1.03<	1.04<	1.08<	1.09<	1.09<	1.11	1.11	1.11	1.12	1.12
5	1.14	1.14	1.18	1.22	1.31					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.87	.21	55	.47	1.31	48.04
EDIT<	.90	.11	33	.73	1.09	29.80

REFLECTANCE HISTOGRAM

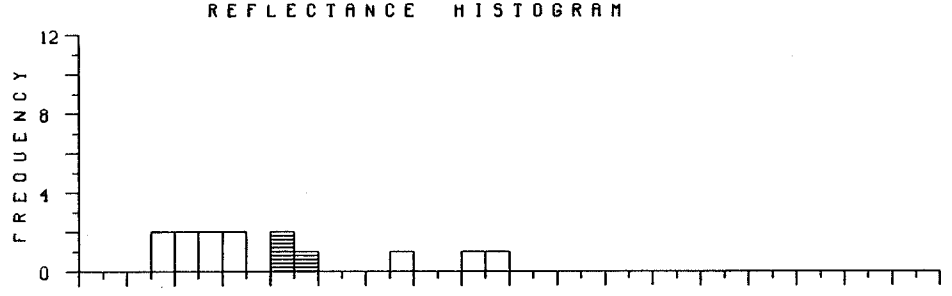


K0750B,2995-3005M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.46	.49	.54	.54	.55	.57	.60	.62	.70<	.74<
1	.76<	.99	1.11	1.19						

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.70	.23	14	.46	1.19	9.86
EDIT<	.73	.03	3	.70	.76	2.20

REFLECTANCE HISTOGRAM

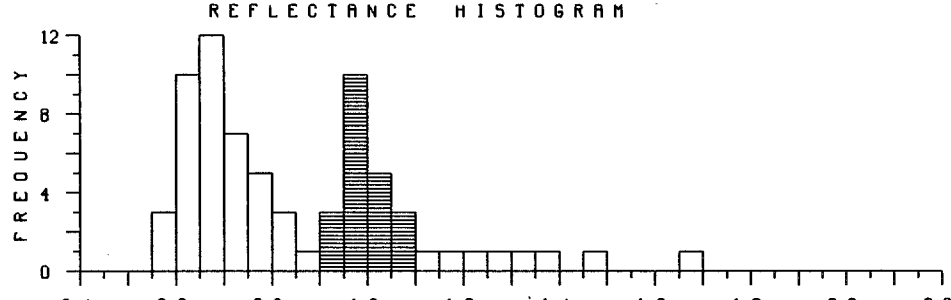


K0751A,3355-3395M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.57	.57	.58	.60	.60	.60	.61	.61	.61	.63
1	.63	.64	.64	.65	.65	.65	.67	.67	.68	.68
2	.69	.69	.69	.69	.69	.70	.70	.71	.72	.73
3	.73	.74	.77	.77	.79	.79	.79	.81	.81	.84
4	.85	.93<	.94<	.94<	.95<	.95<	.96<	.96<	.97<	.97<
5	.98<	.99<	.99<	.99<	1.00<	1.01<	1.02<	1.03<	1.04<	1.05<
6	1.05<	1.06<	1.11	1.18	1.24	1.27	1.31	1.39	1.46	1.66

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.85	.23	70	.57	1.66	59.64
EDIT<	.99	.04	21	.93	1.06	20.78

REFLECTANCE HISTOGRAM

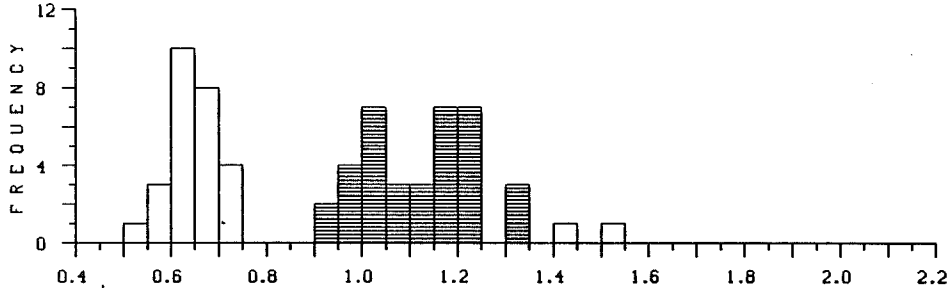


K0751B,3575-3585M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.54	.57	.58	.59	.61	.61	.62	.62	.62	.62
1	.62	.63	.64	.64	.65	.65	.66	.66	.68	.68
2	.68	.69	.70	.70	.71	.73	.90<	.94<	.96<	.97<
3	.97<	.99<	1.01<	1.01<	1.02<	1.02<	1.03<	1.03<	1.04<	1.05<
4	1.07<	1.08<	1.10<	1.11<	1.14<	1.15<	1.15<	1.15<	1.17<	1.18<
5	1.18<	1.19<	1.20<	1.20<	1.21<	1.22<	1.23<	1.23<	1.24<	1.30<
6	1.32<	1.33<	1.40	1.51						

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.93	.26	64	.54	1.51	59.70
EDIT<	1.11	.11	36	.90	1.33	40.09

REFLECTANCE HISTOGRAM

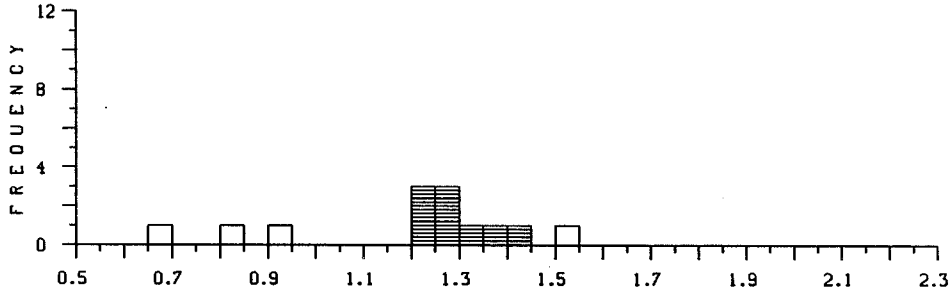


K0752A,3905-3915M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.65	.83	.90	1.22<	1.22<	1.23<	1.26<	1.27<	1.29<	1.32<
1	1.39<	1.44<	1.53							

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.20	.25	13	.65	1.53	15.55
EDIT<	1.29	.08	9	1.22	1.44	11.64

REFLECTANCE HISTOGRAM

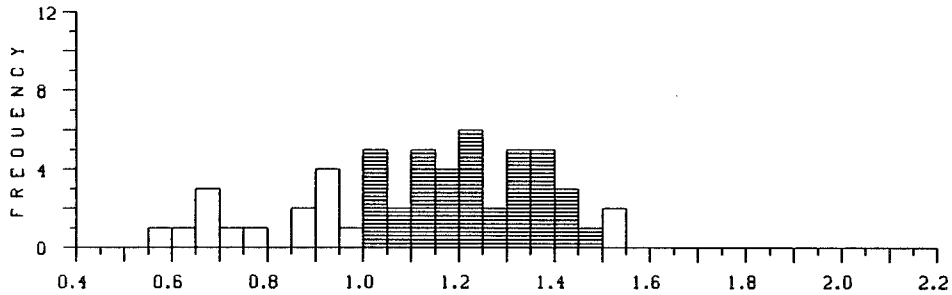


K0751C,3725-3765M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.57	.64	.65	.66	.68	.73	.77	.88	.89	.90
1	.90	.93	.94	.95	1.00<	1.00<	1.00<	1.00<	1.04<	1.05<
2	1.09<	1.10<	1.11<	1.11<	1.12<	1.14<	1.15<	1.15<	1.17<	1.19<
3	1.20<	1.20<	1.21<	1.21<	1.22<	1.22<	1.29<	1.29<	1.31<	1.32<
4	1.32<	1.34<	1.34<	1.35<	1.35<	1.38<	1.38<	1.39<	1.41<	1.43<
5	1.44<	1.45<	1.51	1.52						

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.12	.24	54	.57	1.52	60.59
EDIT<	1.22	.14	38	1.00	1.45	46.47

REFLECTANCE HISTOGRAM

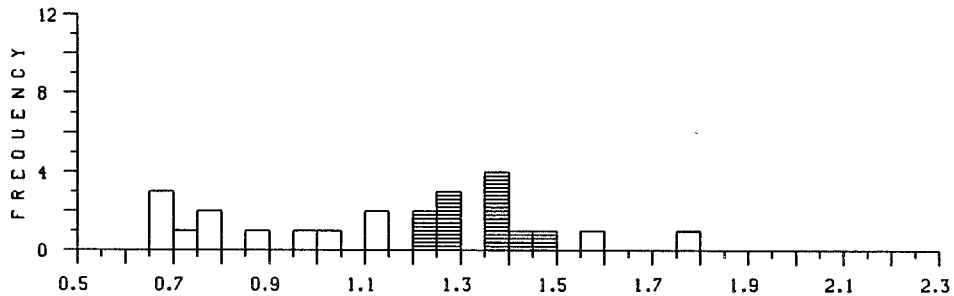


K0752B,4055-4095M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.65	.68	.69	.72	.76	.77	.87	.96	1.03	1.12
1	1.12	1.21<	1.21<	1.26<	1.28<	1.29<	1.37<	1.37<	1.38<	1.38<
2	1.42<	1.49<	1.57	1.77						

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.14	.32	24	.65	1.77	27.37
EDIT<	1.33	.09	11	1.21	1.49	14.66

REFLECTANCE HISTOGRAM

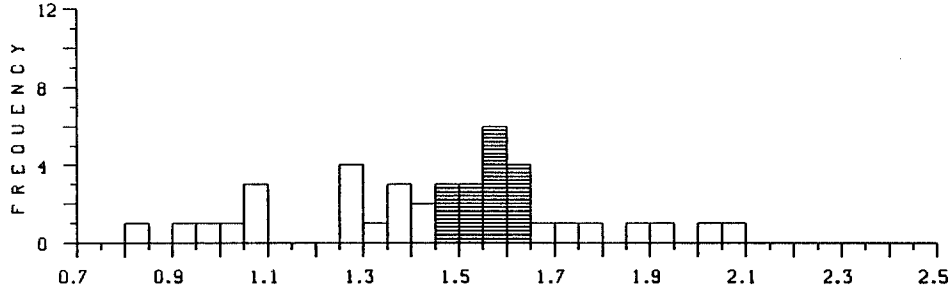


KO753A,4385-4425M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.84	.92	.97	1.00	1.05	1.06	1.09	1.27	1.29	1.29
1	1.29	1.34	1.36	1.38	1.39	1.40	1.40	1.46<	1.47<	1.47<
2	1.50<	1.51<	1.53<	1.55<	1.55<	1.56<	1.57<	1.57<	1.59<	1.61<
3	1.61<	1.61<	1.64<	1.69	1.70	1.79	1.87	1.92	2.00	2.05

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.45	.29	40	.84	2.05	58.16
EDIT<	1.55	.06	16	1.46	1.64	24.80

REFLECTANCE HISTOGRAM

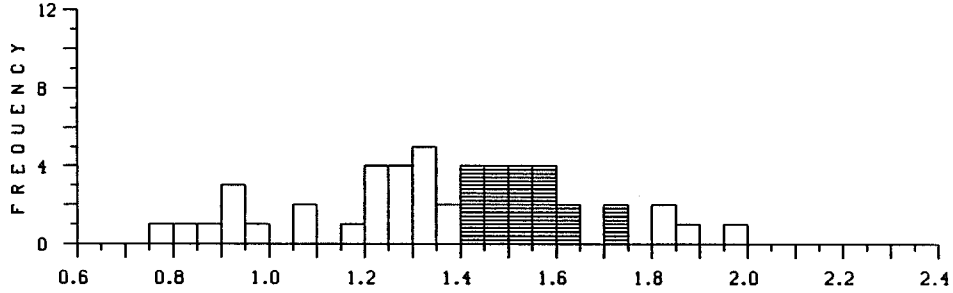


KO753C,4770-4810M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.75	.83	.87	.91	.93	.94	.97	1.08	1.08	1.18
1	1.20	1.21	1.22	1.22	1.27	1.28	1.29	1.29	1.31	1.32
2	1.32	1.33	1.33	1.35	1.35	1.40<	1.41<	1.42<	1.43<	1.47<
3	1.48<	1.49<	1.49<	1.50<	1.53<	1.53<	1.54<	1.55<	1.57<	1.57<
4	1.59<	1.62<	1.64<	1.74<	1.74<	1.81	1.84	1.85	1.99	

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.37	.28	49	.75	1.99	67.03
EDIT<	1.54	.10	20	1.40	1.74	30.71

REFLECTANCE HISTOGRAM

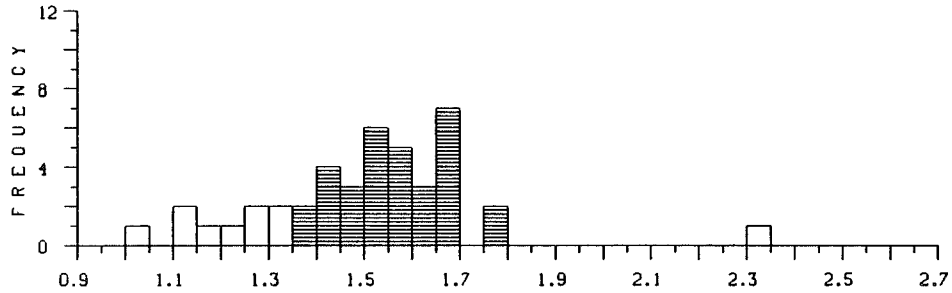


KO753B,4620-4630M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.02	1.11	1.13	1.19	1.24	1.25	1.28	1.31	1.34	1.39<
1	1.39<	1.40<	1.42<	1.43<	1.43<	1.45<	1.47<	1.47<	1.50<	1.51<
2	1.51<	1.54<	1.54<	1.54<	1.56<	1.57<	1.57<	1.57<	1.59<	1.61<
3	1.62<	1.64<	1.66<	1.66<	1.66<	1.67<	1.67<	1.68<	1.69<	1.75<
4	1.79<	2.32								

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.50	.22	42	1.02	2.32	63.14
EDIT<	1.56	.11	32	1.39	1.79	49.95

REFLECTANCE HISTOGRAM

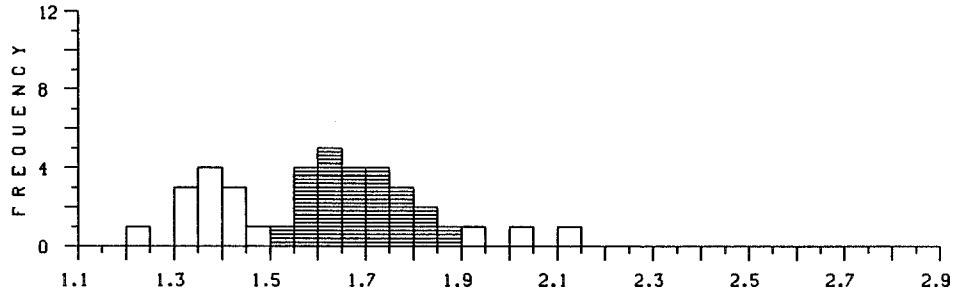


KO754A,4985-4995M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.22	1.31	1.31	1.32	1.35	1.35	1.37	1.38	1.40	1.41
1	1.44	1.45	1.53<	1.55<	1.55<	1.56<	1.58<	1.61<	1.62<	1.63<
2	1.63<	1.63<	1.65<	1.67<	1.68<	1.69<	1.70<	1.71<	1.71<	1.73<
3	1.75<	1.77<	1.79<	1.82<	1.82<	1.85<	1.90	2.00	2.12	

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.60	.20	39	1.22	2.12	62.56
EDIT<	1.68	.09	24	1.53	1.85	40.23

REFLECTANCE HISTOGRAM

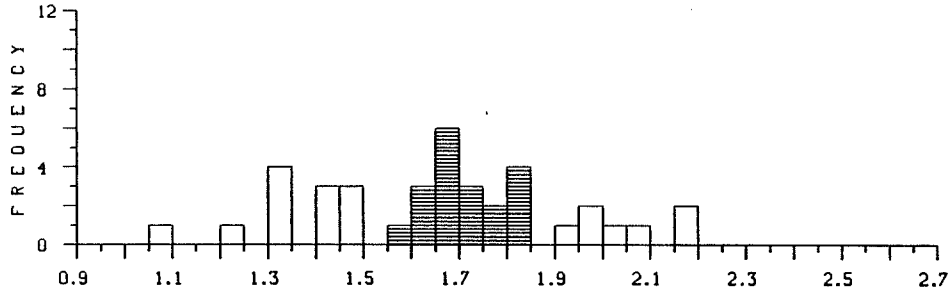


K0754B,5160-5200M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.09	1.21	1.31	1.32	1.33	1.34	1.41	1.41	1.41	1.45
1	1.45	1.49	1.56<	1.61<	1.61<	1.64<	1.66<	1.66<	1.67<	1.68<
2	1.68<	1.69<	1.71<	1.72<	1.72<	1.76<	1.77<	1.81<	1.81<	1.82<
3	1.83<	1.93	1.96	1.97	2.00	2.06	2.16	2.19		

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.66	.26	38	1.09	2.19	62.90
EDIT<	1.71	.08	19	1.56	1.83	32.41

REFLECTANCE HISTOGRAM

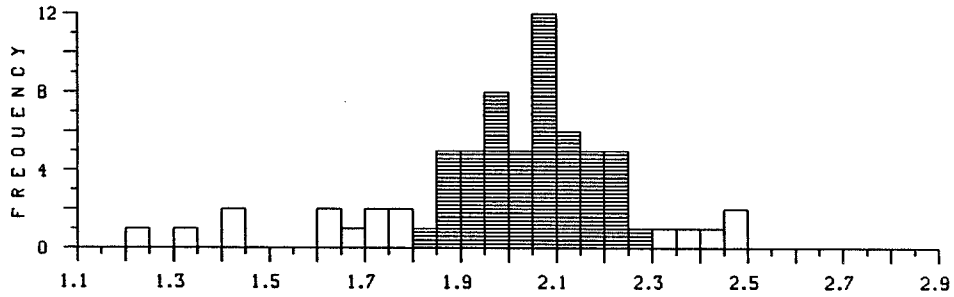


K0755A,5550-5590M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.24	1.34	1.43	1.44	1.60	1.64	1.66	1.72	1.74	1.76
1	1.79	1.80<	1.85<	1.86<	1.86<	1.87<	1.87<	1.91<	1.92<	1.92<
2	1.93<	1.93<	1.95<	1.95<	1.96<	1.96<	1.97<	1.97<	1.98<	1.99<
3	2.00<	2.02<	2.03<	2.03<	2.03<	2.05<	2.06<	2.07<	2.07<	2.08<
4	2.08<	2.08<	2.08<	2.08<	2.08<	2.09<	2.09<	2.10<	2.11<	2.12<
5	2.14<	2.14<	2.14<	2.15<	2.16<	2.19<	2.19<	2.19<	2.21<	2.21<
6	2.22<	2.22<	2.22<	2.25<	2.30	2.38	2.42	2.46	2.47	

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	2.00	.24	69	1.24	2.47	137.82
EDIT<	2.05	.11	53	1.80	2.25	108.43

REFLECTANCE HISTOGRAM

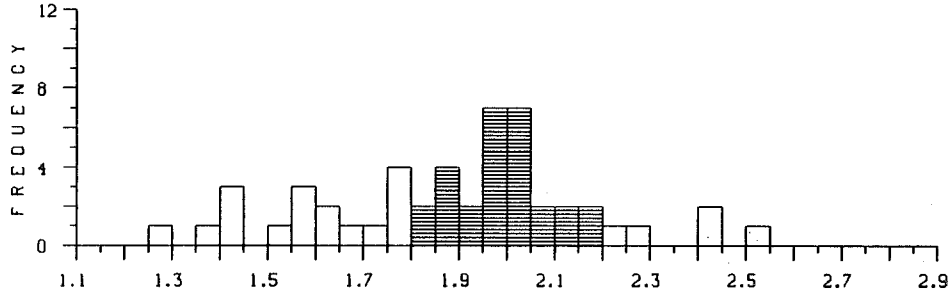


K0754C,5370-5410M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.28	1.39	1.43	1.43	1.43	1.51	1.55	1.56	1.56	1.61
1	1.62	1.65	1.74	1.75	1.75	1.76	1.76	1.80<	1.83<	1.85<
2	1.86<	1.87<	1.88<	1.90<	1.91<	1.95<	1.97<	1.98<	1.98<	1.98<
3	1.99<	1.99<	2.00<	2.00<	2.00<	2.01<	2.02<	2.03<	2.04<	2.07<
4	2.09<	2.12<	2.13<	2.16<	2.17<	2.21	2.28	2.42	2.44	2.52

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.88	.28	50	1.28	2.52	94.23
EDIT<	1.99	.10	28	1.80	2.17	55.58

REFLECTANCE HISTOGRAM

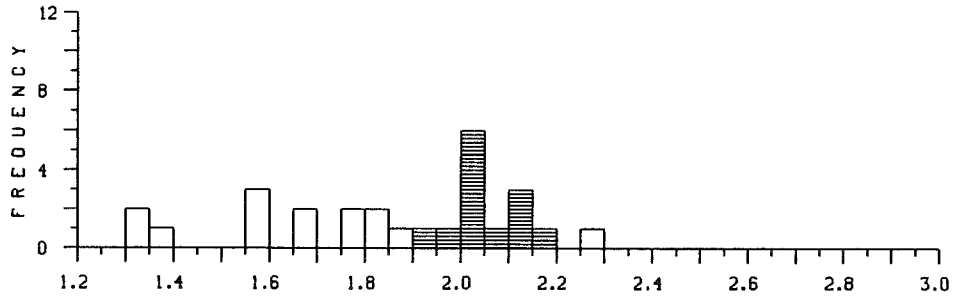


K0755B,5730-5770M;SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.30	1.32	1.35	1.56	1.58	1.58	1.68	1.69	1.76	1.79
1	1.82	1.84	1.87	1.90<	1.95<	2.00<	2.01<	2.02<	2.02<	2.03<
2	2.04<	2.08<	2.10<	2.11<	2.14<	2.15<	2.27			

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.85	.27	27	1.30	2.27	49.96
EDIT<	2.04	.07	13	1.90	2.15	26.55

REFLECTANCE HISTOGRAM

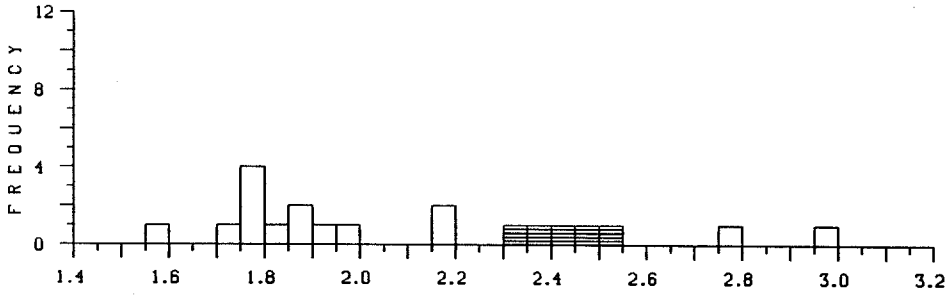


K0755C,5940-5980M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.58	1.73	1.75	1.75	1.76	1.76	1.84	1.85	1.88	1.93
1	1.95	2.16	2.19	2.33<	2.37<	2.40<	2.49<	2.54<	2.75	2.97

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	2.10	.39	20	1.58	2.97	41.98
EDIT<	2.43	.09	5	2.33	2.54	12.13

REFLECTANCE HISTOGRAM

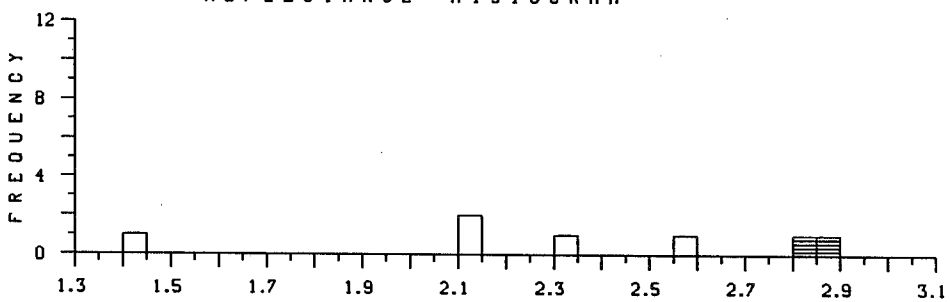


K0756B,6210-6220M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.42	2.10	2.14	2.31	2.57	2.81<	2.85<			

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	2.31	.50	7	1.42	2.85	16.20
EDIT<	2.83	.03	2	2.81	2.85	5.66

REFLECTANCE HISTOGRAM

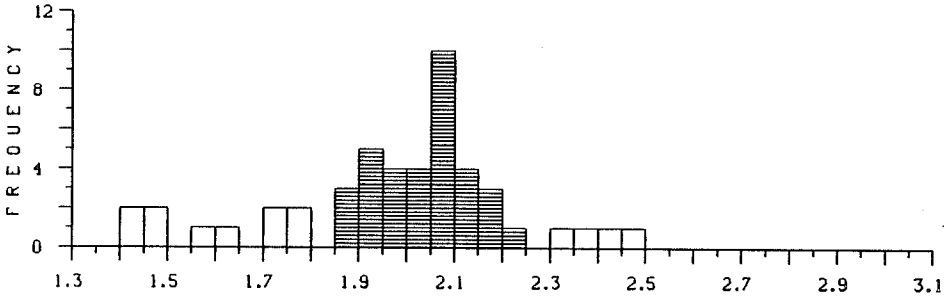


K0756A,6120-6130M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.40	1.40	1.45	1.49	1.55	1.60	1.70	1.74	1.76	1.76
1	1.85<	1.89<	1.89<	1.91<	1.92<	1.92<	1.93<	1.94<	1.95<	1.96<
2	1.99<	1.99<	2.00<	2.02<	2.03<	2.03<	2.05<	2.07<	2.07<	2.07<
3	2.08<	2.08<	2.08<	2.08<	2.08<	2.09<	2.10<	2.13<	2.14<	2.14<
4	2.17<	2.19<	2.19<	2.20<	2.30	2.37	2.44	2.47		

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.97	.25	48	1.40	2.47	94.66
EDIT<	2.04	.10	34	1.85	2.20	69.23

REFLECTANCE HISTOGRAM



K0756C,6295-6305M,SOUTHWEST BANQUEREAU F-34

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.83	1.89	1.92	1.94	1.94	1.96	2.00	2.00	2.01	2.10
1	2.10	2.10	2.11	2.14	2.17	2.19	2.22	2.23	2.28	2.33
2	2.34	2.39	2.39	2.39	2.40	2.47	2.49	2.58<	2.61<	2.61<
3	2.65<	2.65<	2.66<	2.66<	2.74<					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	2.27	.27	35	1.83	2.74	79.49
EDIT<	2.65	.05	8	2.58	2.74	21.16

REFLECTANCE HISTOGRAM