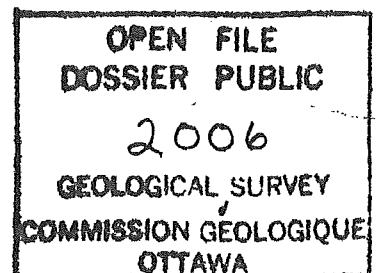


Report No. EPGs-DOM.7-88MPA

Vitrinite reflectance (Ro)
of dispersed organics
from
Mobil et al.
North Dana I-43

Eastern Petroleum Geology Subdivision
Atlantic Geoscience Centre, G.S.C., Dartmouth
October 27, 1988



Vitrinite reflectance (Ro) of dispersed organics from Mobil et al.
North Dana I-43.

G.S.C. Locality No.: D222 Location: 47°12'43.60"N, 47°36'12.62"W
 R.T. Elevation: 27m Water Depth: 221m Total Depth: 5303m
 Sample Interval: 1010 - 5303.3m Interval Studied: 1150 - 5304m
 Depth Units: Meters referenced to R.T.

Vitrinite reflectance has been determined on 20 rotary cuttings samples (Table II) from Mobil et al. North Dana I-43 which was classified as a wildcat well and is located on the Grand Banks approximately 386 km east of St. John's, Newfoundland. It was completed as an abandoned gas discovery.

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

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)-1978m	0.16 - 0.4	% Ro	immature
1689-2467m	0.4 - 0.5	% Ro	immature approaching maturity
2467-2867m	0.5 - 0.6	% Ro	marginally mature
2867m	0.6	% Ro	onset of significant oil generation
3498m	0.8	% Ro	peak of oil generation
3987m	1.0	% Ro	onset of significant wet gas generation
4386m	1.2	% Ro	onset of significant dry gas generation
4645m	1.35	% Ro	oil floor
5303m T.D.	1.82	% Ro	beyond oil preservation limit
(5506m)	2.0	% Ro	wet gas preservation limit
(6395m)	3.0	% Ro	dry gas preservation limit

Note: () indicate depth extrapolated at 0.198 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 good over most of the section penetrated by North Dana I-43 although the number of VR readings obtainable per sample was consistently low below 4500m (Table II, Figure 2). Samples from this lower section which yielded few measurable vitrinite particles were mostly derived from non-shale lithologies. The data were plotted on a log Ro vs. linear depth scale and a linear regression line was 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 be deceptively small for samples with very few readings. The slope of the maturation line is 0.198 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 North Dana I-43 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

October 27, 1988



M.P. Avery
Eastern Petroleum Geology
MPA

c.c. K.D. McAlpine, EPGS, Dartmouth	J.S. Bell, ISPG, Calgary
A.E. Jackson, EPGS, Dartmouth	L.R. Snowdon, ISPG, Calgary
EPGS Files, Dartmouth	D. Skibo, ISPG, Calgary
G.R. Campbell, COGLA, Ottawa	C. Beaumont, Dalhousie Univ., Halifax
Central Technical Files, Ottawa	Exploration Manager, CNOPB, St. John's

Table II

Summary of kerogen - based vitrinite reflectance

Seq. #	Sample #	Depths in meters	Mean Ro (SD) non-rotated	Number of Readings	
				Total	Edited
1	K0697A	1150-1190	0.29(±.05)	38	26
2	K0697B	1360-1400	0.27(±.05)	6	5
3	K0697C	1540-1580	0.42(±.05)	15	13
4	K0698A	1720-1760	0.36(±.03)	23	19
5	K0698B	1840-1880	0.40(±.06)	37	35
6	K0698C	1995-2030	0.42(±.03)	16	12
7	K0699A	2135-2170	0.43(±.05)	22	17
8	K0699B	2280-2320	0.49(±.05)	47	30
9	K0699C	2430-2470	0.48(±.05)	34	20
10	K0700A	2615-2655	0.56(±.06)	38	29
11	K0700C	2885-2925	0.64(±.09)	7	6
12	K0701A	3545-3585	0.69(±.08)	37	23
13	K0701B	3695-3735	0.67(±.04)	7	4
14	K0701C	3845-3885	0.85(±.05)	39	13
15	K0703A	4565-4575	1.31(±.13)	17	13
16	K0703B	4775-4785	1.52(±.08)	11	6
17	K0703C	4925-4935	1.55(±.09)	13	7
18	K0704A	5015-5025	1.72(±.07)	28	6
19	K0704B	5135-5145	1.98(±.19)	14	9
20	K0704C	5285-5303	1.91(±.17)	16	12

Note: All samples are kerogen concentrate type.

Table III

Formation Tops (McAlpine, pers. comm.)*

Formation	Depth
Banquereau	in casing
South Mara unit	3350m
Wyandot	3367m
Dawson Canyon	3433
Petrel Mbr	3490-3528m
Jeanne d'Arc	3572m
Rankin	3774m
Egret Mbr	3883-4000m
Voyager	4647m
T.D.	5303m

* Preliminary stratigraphic picks.

Vitrinite Reflectance

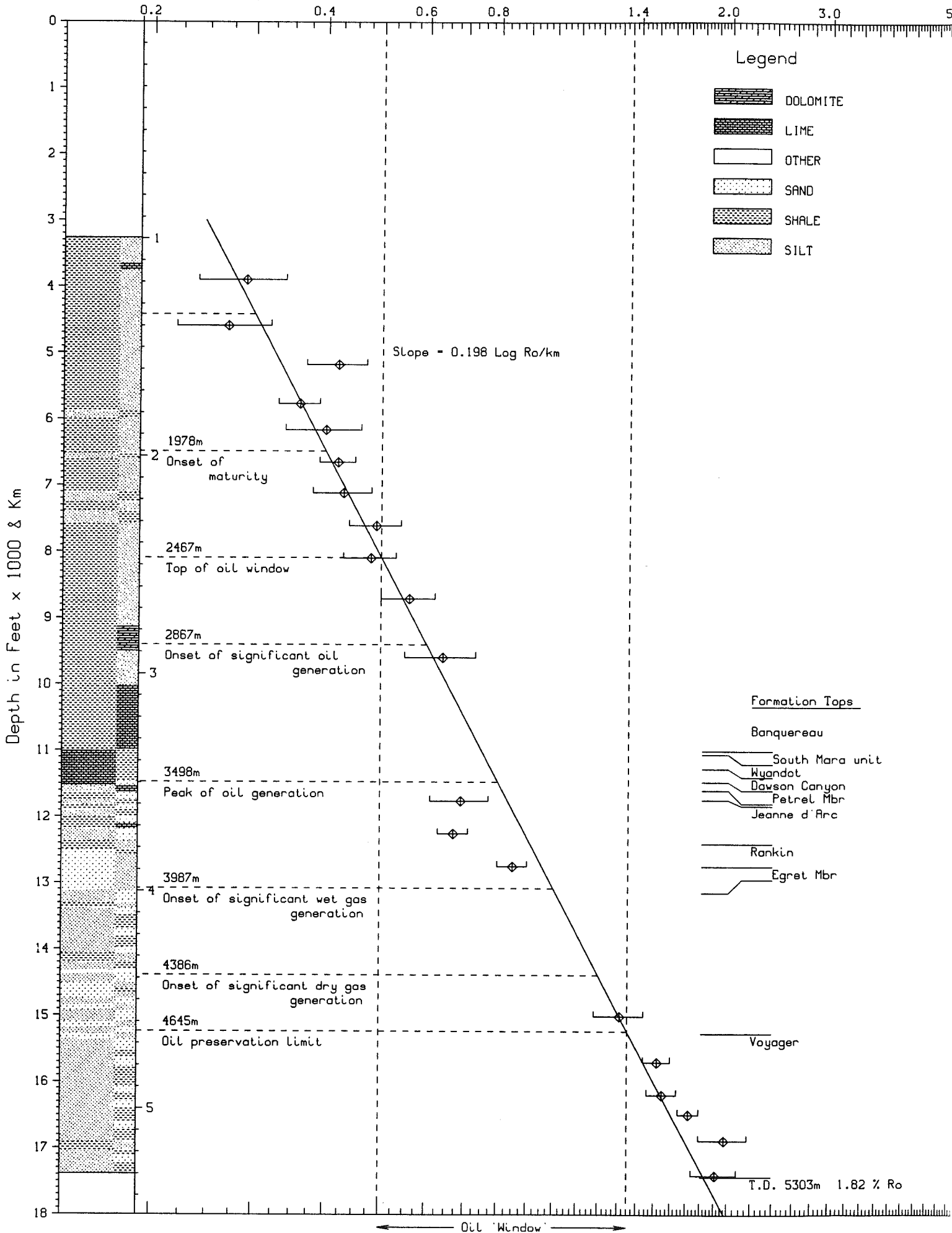


Fig. 1 North Dana I-43

< Maturation Profile >

Vitrinite Reflectance

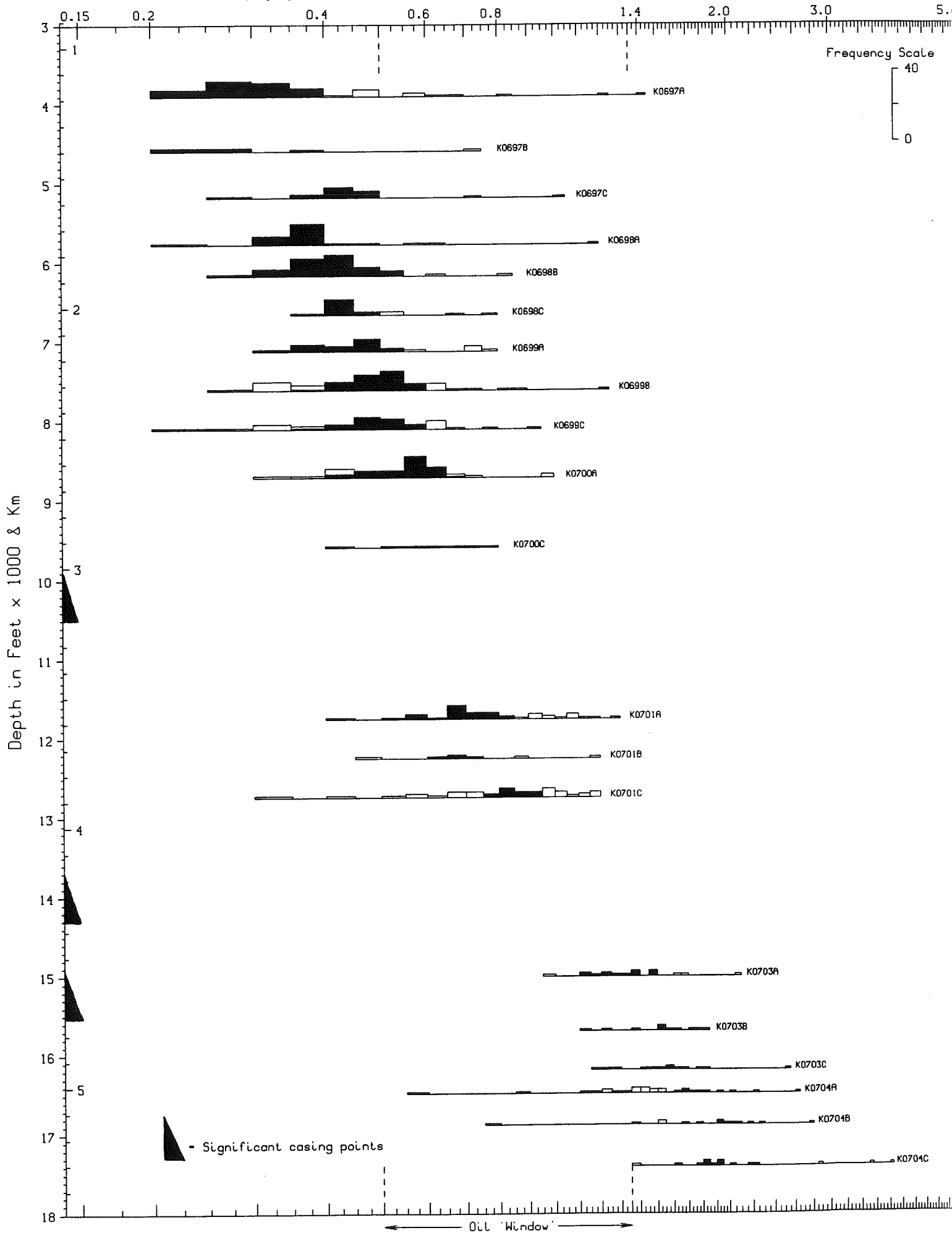


Fig. 2 North Dana I-43 < Histograms >

APPENDIX I

Sample Preparation Method

COGLA Lab preparation

Preliminary Wash

Samples dried in oven

Split: a. all of coarse to Petrology Lab
b. $\frac{1}{2}$ 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% 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 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.

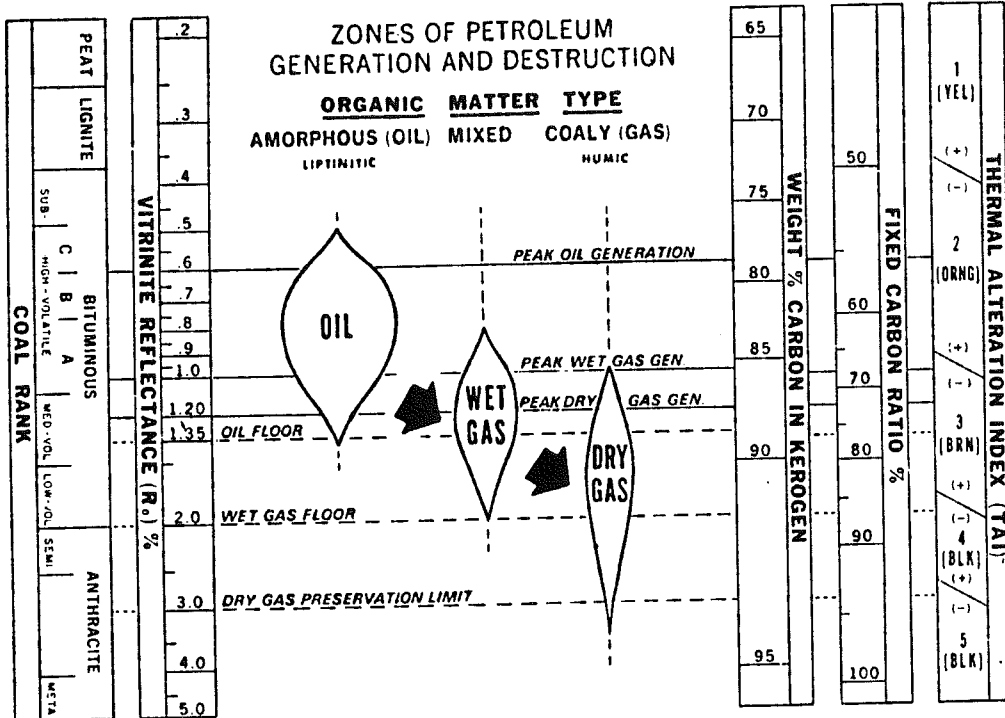
Freeze dried.

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).

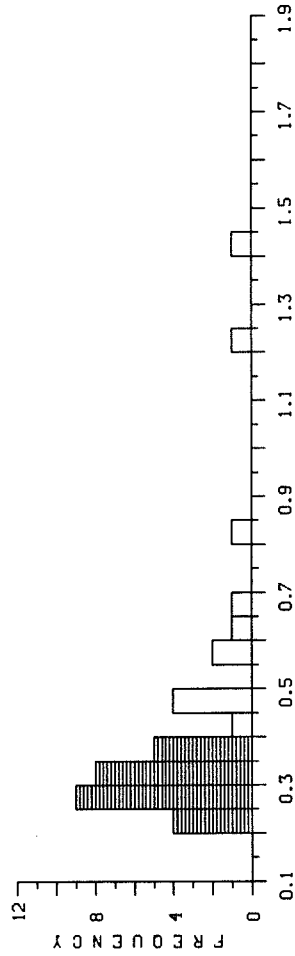
Appendix III
Sample Reports

K0697A, 1150-1190M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.21<	.21<	.21<	.24<	.25<	.25<	.26<	.26<	.28<	.28<
1	.28<	.29<	.29<	.30<	.30<	.30<	.30<	.31<	.32<	.33<
2	.34<	.35<	.36<	.36<	.36<	.36<	.40	.45	.47	.49
3	.49	.56	.57	.63	.65	.84	1.23	1.44		

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.42	.26	38	.21	1.44	15.82
EDIT<	.29	.05	26	.21	.36	7.60

REFLECTANCE HISTOGRAM

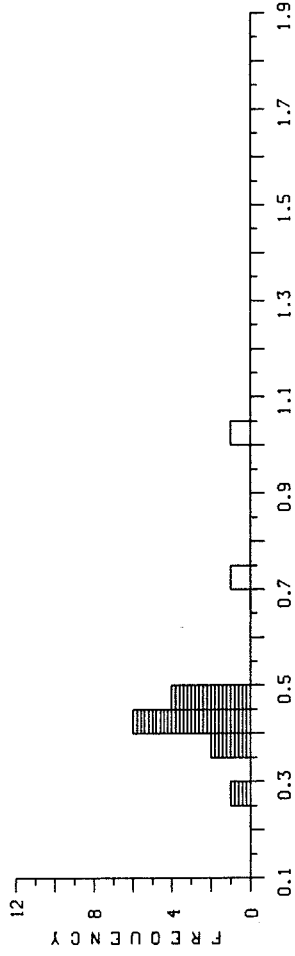


K0697C, 1540-1580M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.29<	.39<	.39<	.42<	.42<	.43<	.44<	.44<	.44<	.45<
1	.46<	.47<	.48<	.70	1.00					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.48	.17	15	.29	1.00	7.22
EDIT<	.42	.05	13	.29	.48	5.52

REFLECTANCE HISTOGRAM

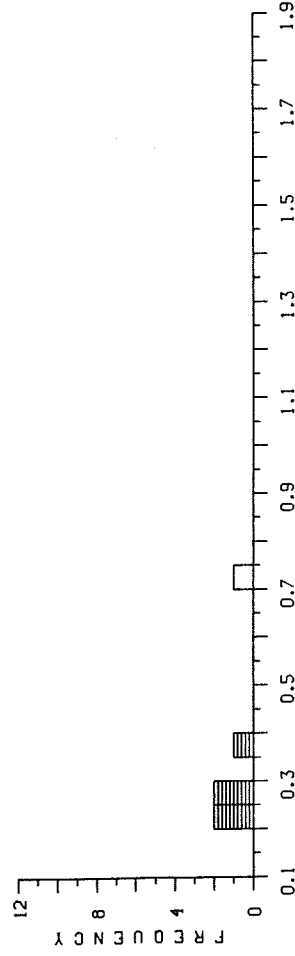


K0697B, 1360-1400M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.24<	.24<	.25<	.25<	.36<	.74				

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.35	.20	6	.24	.74	2.08
EDIT<	.27	.05	5	.24	.36	1.34

REFLECTANCE HISTOGRAM

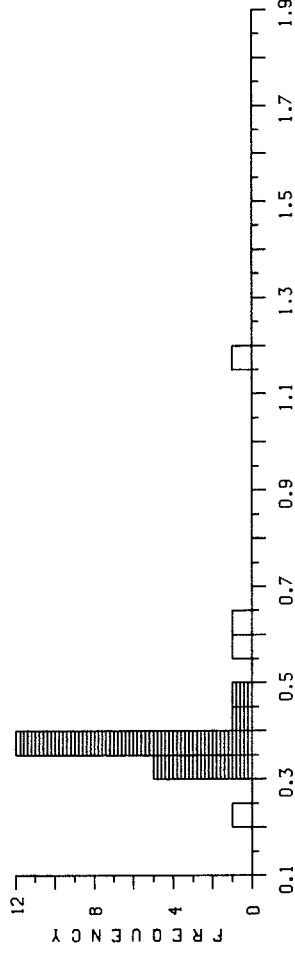


K0698A, 1720-1760M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.23	.30<	.33<	.34<	.34<	.34<	.35<	.35<	.36<	.36<
1	.36<	.36<	.36<	.36<	.37<	.37<	.37<	.39<	.39<	.43<
2	.55	.60	1.17							

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.41	.18	23	.23	1.17	9.43
EDIT<	.36	.03	19	.30	.45	6.88

REFLECTANCE HISTOGRAM

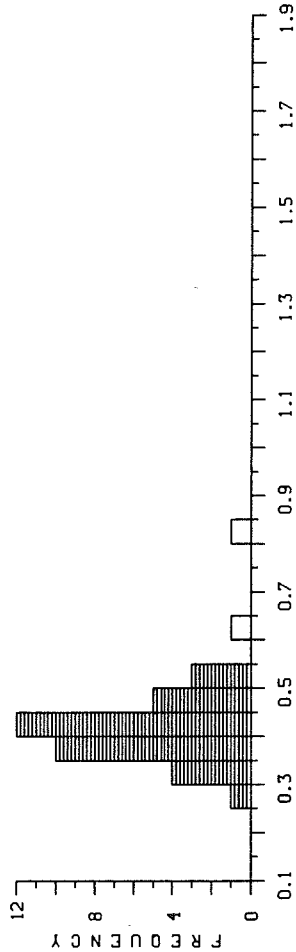


K06986, 1840-1880M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.27<	.30<	.32<	.33<	.34<	.36<	.36<	.37<	.37<	.38<
1	.38<	.38<	.38<	.39<	.39<	.40<	.40<	.40<	.41<	.41<
2	.41<	.41<	.42<	.42<	.43<	.44<	.44<	.45<	.45<	.46<
3	.46<	.47<	.51<	.52<	.53<	.61	.84			

MEAN	STAND DEV	PTS	MIN	MAX	SUM
.42	.10	37	.27	.84	15.61
TOTAL EDIT<	.40	35	.27	.53	14.16

REFLECTANCE HISTOGRAM

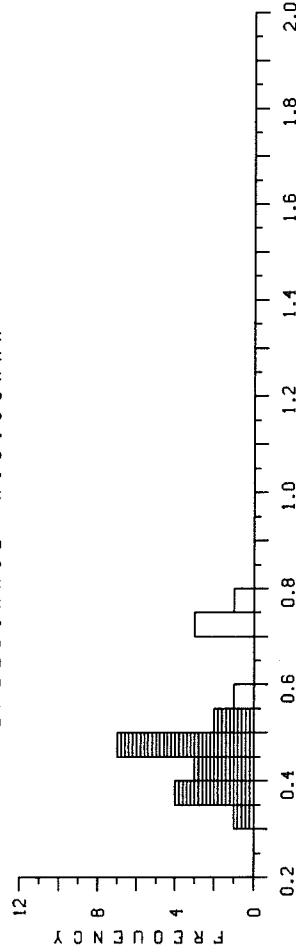


K0699A, 2135-2170M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.34<	.35<	.37<	.37<	.39<	.41<	.42<	.43<	.45<	.45<
1	.46<	.46<	.46<	.47<	.48<	.51<	.52<	.58	.70	.73
2	.74	.78								

MEAN	STAND DEV	PTS	MIN	MAX	SUM
.49	.13	22	.34	.78	10.87
TOTAL EDIT<	.43	17	.34	.52	7.34

REFLECTANCE HISTOGRAM

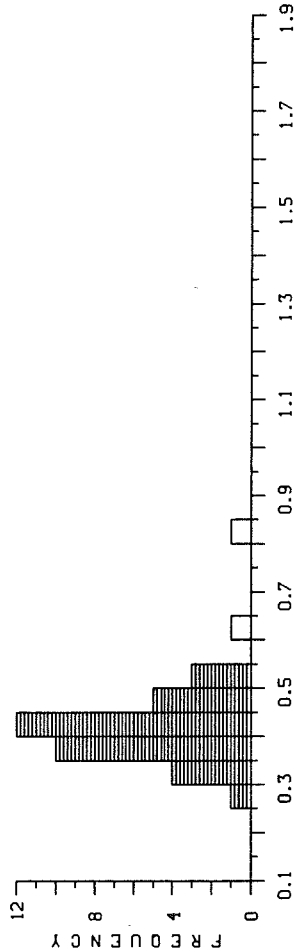


K06986, 1995-2030M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.38<	.40<	.40<	.40<	.40<	.41<	.42<	.42<	.43<	.44<
1	.47<	.48<	.53	.53	.65	.78	.84			

MEAN	STAND DEV	PTS	MIN	MAX	SUM
.47	.11	16	.38	.78	7.54
TOTAL EDIT<	.42	12	.38	.48	5.05

REFLECTANCE HISTOGRAM

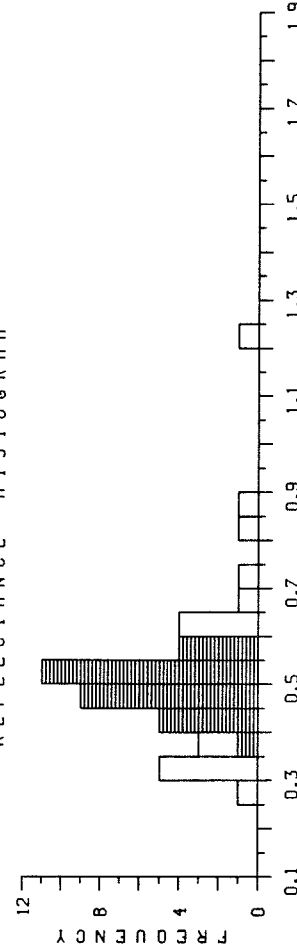


K0699B, 2280-2320M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.26	.30	.31	.33	.34	.34	.35	.35	.39<	.40<
1	.42<	.42<	.44<	.44<	.45<	.45<	.47<	.47<	.47<	.48<
2	.48<	.49<	.49<	.50<	.50<	.50<	.50<	.51<	.52<	.52<
3	.53<	.54<	.54<	.54<	.55<	.55<	.55<	.57<	.60	.61
4	.62	.63	.68	.74	.80	.86	1.20			

MEAN	STAND DEV	PTS	MIN	MAX	SUM
.51	.16	47	.26	1.20	24.00
TOTAL EDIT<	.49	30	.39	.57	14.68

REFLECTANCE HISTOGRAM

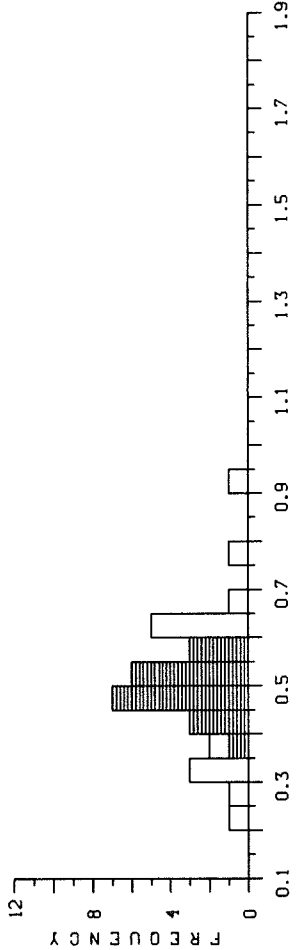


K0699C,2430-2470M,NORTH DRNA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.24	.28	.32	.32	.34	.35	.39	.40	.40	.44
1	.45	.45	.45	.45	.48	.48	.48	.50	.50	.50
2	.50	.53	.54	.55	.55	.56	.60	.60	.60	.63
3	.63	.67	.76	.92						

MEAN	STAND DEV	PTS	MIN	MAX	SUM
.50	.14	34	.24	.92	16.86
.48	.05	20	.39	.56	9.60

REFLECTANCE HISTOGRAM

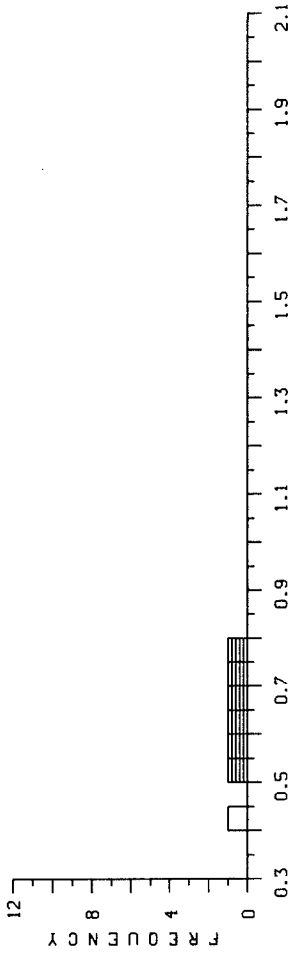


K0700C,2865-2925M,NORTH DRNA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.42	.53	.55	.61	.66	.71	.76			

MEAN	STAND DEV	PTS	MIN	MAX	SUM
.61	.12	7	.42	.76	4.24
.64	.09	6	.53	.76	3.82

REFLECTANCE HISTOGRAM

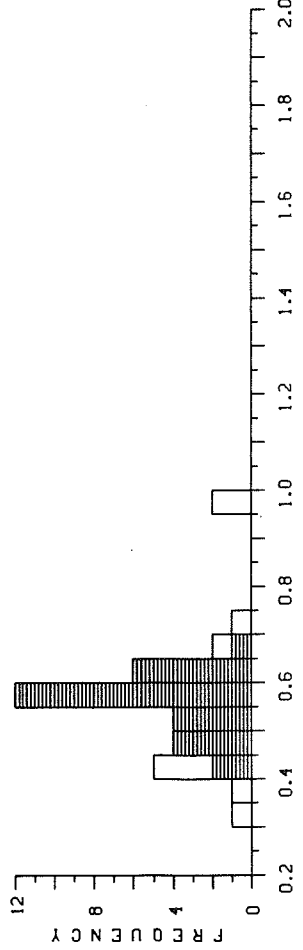


K0700R,2615-2655M,NORTH DRNA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.32	.37	.40	.41	.41	.44	.44	.45	.47	.47
1	.48	.50	.54	.54	.54	.55	.55	.56	.57	.57
2	.57	.58	.59	.59	.59	.59	.59	.60	.61	.62
3	.63	.63	.63	.65	.68	.73	.96	.98		

MEAN	STAND DEV	PTS	MIN	MAX	SUM
.56	.13	38	.32	.98	21.40
.56	.06	29	.44	.65	16.14

REFLECTANCE HISTOGRAM

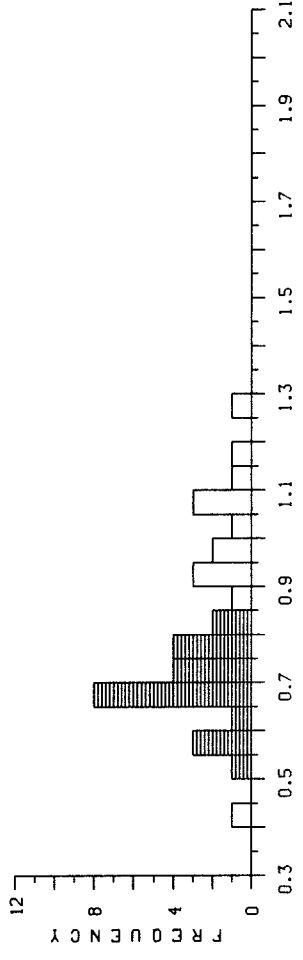


K0701R,3545-3585M,NORTH DRNA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.43	.53	.55	.55	.59	.63	.65	.66	.67	.67
1	.67	.67	.67	.67	.70	.70	.71	.74	.76	.77
2	.79	.79	.81	.81	.89	.92	.93	.94	.98	.98
3	1.02	1.06	1.06	1.07	1.14	1.18	1.28			

MEAN	STAND DEV	PTS	MIN	MAX	SUM
.80	.20	37	.43	1.28	29.64
.69	.08	23	.53	.81	15.76

REFLECTANCE HISTOGRAM

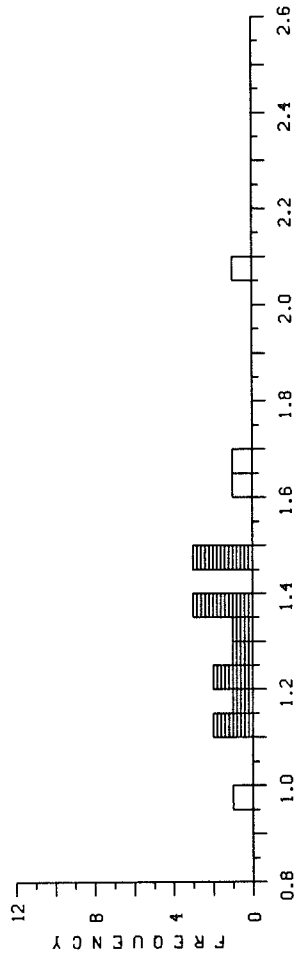


K0703A,4565-4575M,NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.98	1.11<	1.14<	1.19<	1.20<	1.22<	1.25<	1.32<	1.37<	1.38<
1	1.39<	1.45<	1.49<	1.49<	1.64	1.65	2.06			

MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.37	.25	17	.98	23.33
EDIT<	1.31	.13	13	1.11	17.00

REFLECTANCE HISTOGRAM

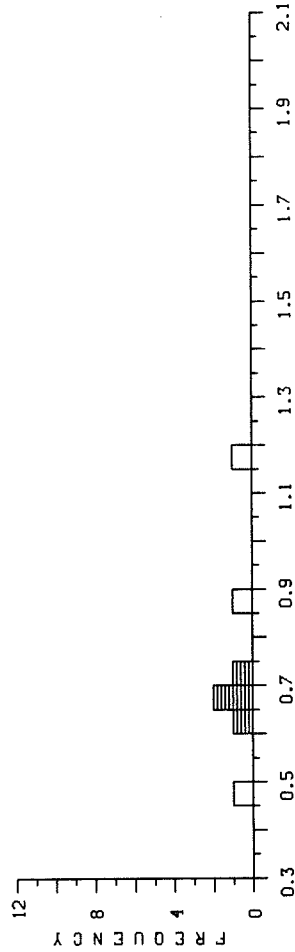


K0701B,3695-3735M,NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.46	.64<	.65<	.66<	.72<	.86	1.19			

MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.74	.23	7	.46	5.18
EDIT<	.67	.04	4	.64	2.67

REFLECTANCE HISTOGRAM

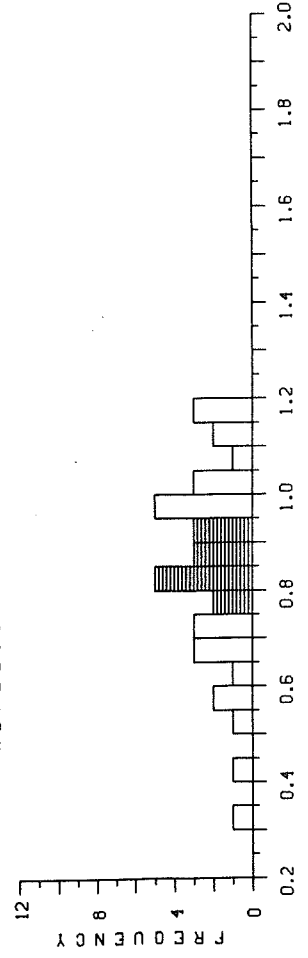


K0701C,3845-3885M,NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.52	.42	.50	.56	.59	.63	.67	.67	.68	.70
1	.70	.71	.76<	.79<	.80<	.81<	.83<	.83<	.84<	.87<
2	.88<	.88<	.90<	.92<	.92<	.95	.97	.98	.99	.99
3	1.01	1.01	1.04	1.06	1.11	1.12	1.18	1.19	1.19	

MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.85	.21	39	.32	32.97
EDIT<	.85	.05	13	.76	11.03

REFLECTANCE HISTOGRAM

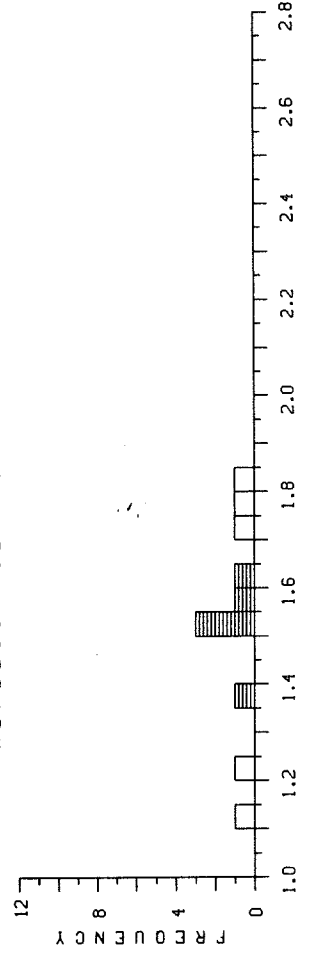


K0703B,4775-4785M,NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.12	1.22	1.38<	1.51<	1.53<	1.54<	1.55<	1.63<	1.73	1.77
1	1.83									

MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.53	.22	11	1.12	16.81
EDIT<	1.52	.08	6	1.38	9.14

REFLECTANCE HISTOGRAM

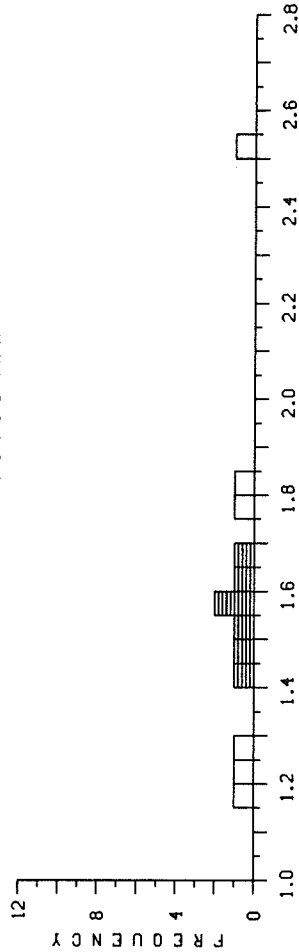


K0703C, 4925-4935M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.18	1.23	1.28	1.43	1.45	1.54	1.55	1.58	1.64	1.65
1	1.75	1.84	2.52							

MEAN	STAND DEV	PTS	MIN	MAX	SUM
1.59	.34	13	1.18	2.52	20.64
1.55	.09	7	1.43	1.65	10.84

REFLECTANCE HISTOGRAM

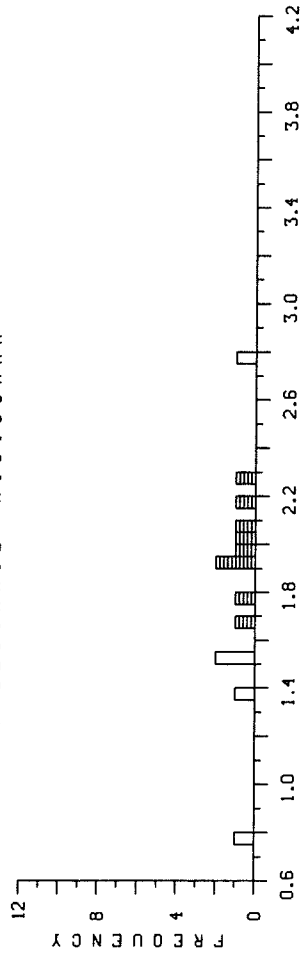


K0704B, 5135-5145M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.77	1.37	1.50	1.52	1.68	1.75	1.91	1.91	1.97	2.03
1	2.07	2.17	2.29	2.79						

MEAN	STAND DEV	PTS	MIN	MAX	SUM
1.84	.48	14	.77	2.79	25.73
1.96	.19	9	1.68	2.29	17.78

REFLECTANCE HISTOGRAM

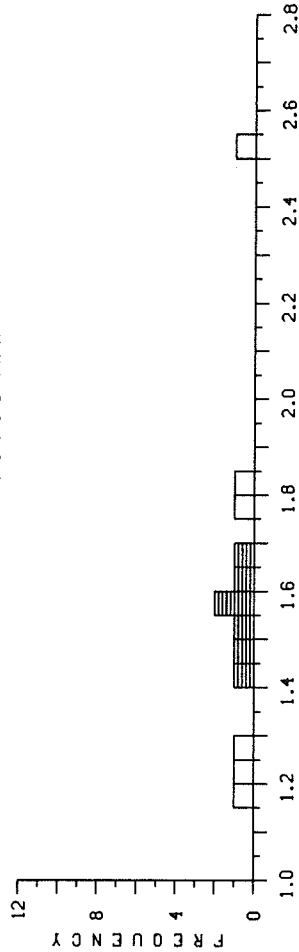


K0704A, 5015-5025M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.58	.85	1.12	1.17	1.21	1.22	1.29	1.34	1.36	1.36
1	1.39	1.41	1.41	1.43	1.48	1.48	1.53	1.54	1.64	1.68
2	1.68	1.74	1.79	1.80	1.90	2.04	2.23	2.64		

MEAN	STAND DEV	PTS	MIN	MAX	SUM
1.51	.40	28	.58	2.64	42.31
1.72	.07	6	1.64	1.80	10.33

REFLECTANCE HISTOGRAM



K0704C, 5285-5305M, NORTH DRAMA I-43

COL >	1	2	3	4	5	6	7	8	9	0
ROW	1.35	1.60	1.79	1.81	1.81	1.84	1.88	1.91	1.91	1.93
1	2.01	2.17	2.21	2.86	3.50	3.80				

MEAN	STAND DEV	PTS	MIN	MAX	SUM
2.15	.67	16	1.35	3.80	34.38
1.91	.17	12	1.60	2.21	22.87

REFLECTANCE HISTOGRAM

