Report No. EPGS-DOM.8-88MPA

# Vitrinite reflectance (Ro) of dispersed organics from Home et al. Louisbourg J-47

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**Vitrinite reflectance (Ro) of dispersed organics from Home et al.**
**Louisbourg J-47**

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**G.S.C. Locality No.:** D240 **Location:** 44°26'43.08"N, 58°21'26.02"W

**R.T. Elevation:** 38m **Water Depth:** 63m **Total Depth:** 6043m

**Sample Interval:** 900 - 6044m **Interval Studied:** 1050 - 5910m

**Depth Units:** Meters referenced to R.T.

Vitrinite reflectance has been determined on 16 rotary cuttings samples (Table II) from Home et al. Louisbourg J-47 which was classified as a wildcat well and is located on the Scotian Shelf approximately 420 km east of Halifax, Nova Scotia. The well was plugged and abandoned as a gas show.

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 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)-2311m | 0.17 - 0.4 | % Ro | immature |
| 2311-2907m | 0.4 - 0.5 | % Ro | immature approaching maturity |
| 2907-3394m | 0.5 - 0.6 | % Ro | marginally mature |
| 3394m | 0.6 | % Ro | onset of significant oil generation |
| 4163m | 0.8 | % Ro | peak of oil generation |
| 4760m | 1.0 | % Ro | onset of significant wet gas generation |
| 5247m | 1.2 | % Ro | onset of significant dry gas generation |
| 5562m | 1.35 | % Ro | oil floor |
| 6043m T.D. | 1.61 | % Ro | beyond oil preservation limit |
| 5399m | (2.0) | % Ro | wet gas preservation limit |
| 6468m | (3.0) | % Ro | dry gas preservation limit |

Note: ( ) indicate Ro extrapolated at 0.168 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 good over the section penetrated by Louisbourg J-47. 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 0.168 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 Louisbourg J-47 (between 2907 and 5562m) 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 meters | Mean Ro (SD) non-rotated | Number of Readings Total | Edited |
|---|---|---|---|---|---|
| 1 | K0631A | 1050-1060 | 0.27(±.03) | 21 | 15 |
| 2 | K0631B | 1200-1210 | 0.29(±.04) | 25 | 22 |
| 3 | K0631C | 1350-1360 | 0.31(±.04) | 7 | 6 |
| 4 | K0632A | 1475-1575 | 0.25(±.02) | 10 | 3 |
| 5 | K0632B | 1925-1935 | 0.36(±.06) | 11 | 7 |
| 6 | K0632C | 2345-2355 | 0.40(±.04) | 37 | 28 |
| 7 | K0633B | 2765-2775 | 0.53(±.05) | 32 | 26 |
| 8 | K0633C | 3065-3075 | 0.51(±.05) | 29 | 28 |
| 9 | K0634A | 3335-3345 | 0.56(±.04) | 37 | 33 |
| 10 | K0634B | 3635-3645 | 0.66(±.05) | 28 | 22 |
| 11 | K0634C | 3935-3945 | 0.64(±.06) | 32 | 26 |
| 12 | K0635A | 4225-4385 | 0.79(±.10) | 41 | 38 |
| 13 | K0635B | 4520-4710 | 0.83(±.07) | 41 | 25 |
| 14 | K0635C | 5180-5340 | 1.22(±.16) | 16 | 11 |
| 15 | K0636A | 5660-5670 | 1.81(±.15) | 12 | 10 |
| 16 | K0636B | 5780-5910 | 1.64(±.15) | 21 | 17 |

Note: All samples are kerogen concentrate type.

Table III

**Formation Tops (Wade, pers. comm.)**

| Formation | Depth |
|---|---|
| Banquereau | in casing |
| Wyandot | 1363.2m |
| Dawson Canyon | 1546.2m |
| Petrel Mbr | 1630.0-33.7m |
| Logan Canyon | 1726.0m |
| Marmora Mbr | 1726.0m |
| Sable Mbr | 1872.0m |
| Cree Mbr | 2034.0m |
| Naskapi Mbr | 2474.0m |
| Missisauga | 2993.0m |
| upper mbr | 2993.0m |
| "O" Marker | 3198-3276m |
| middle mbr | 3276.0m |
| Mic Mac | 4290.5m * |
| Top OP approx | 4520.0m |
| T.D. | 6043m |

* Preliminary stratigraphic pick.

Well profile plot borrowed by

John Wade

for [illegible]

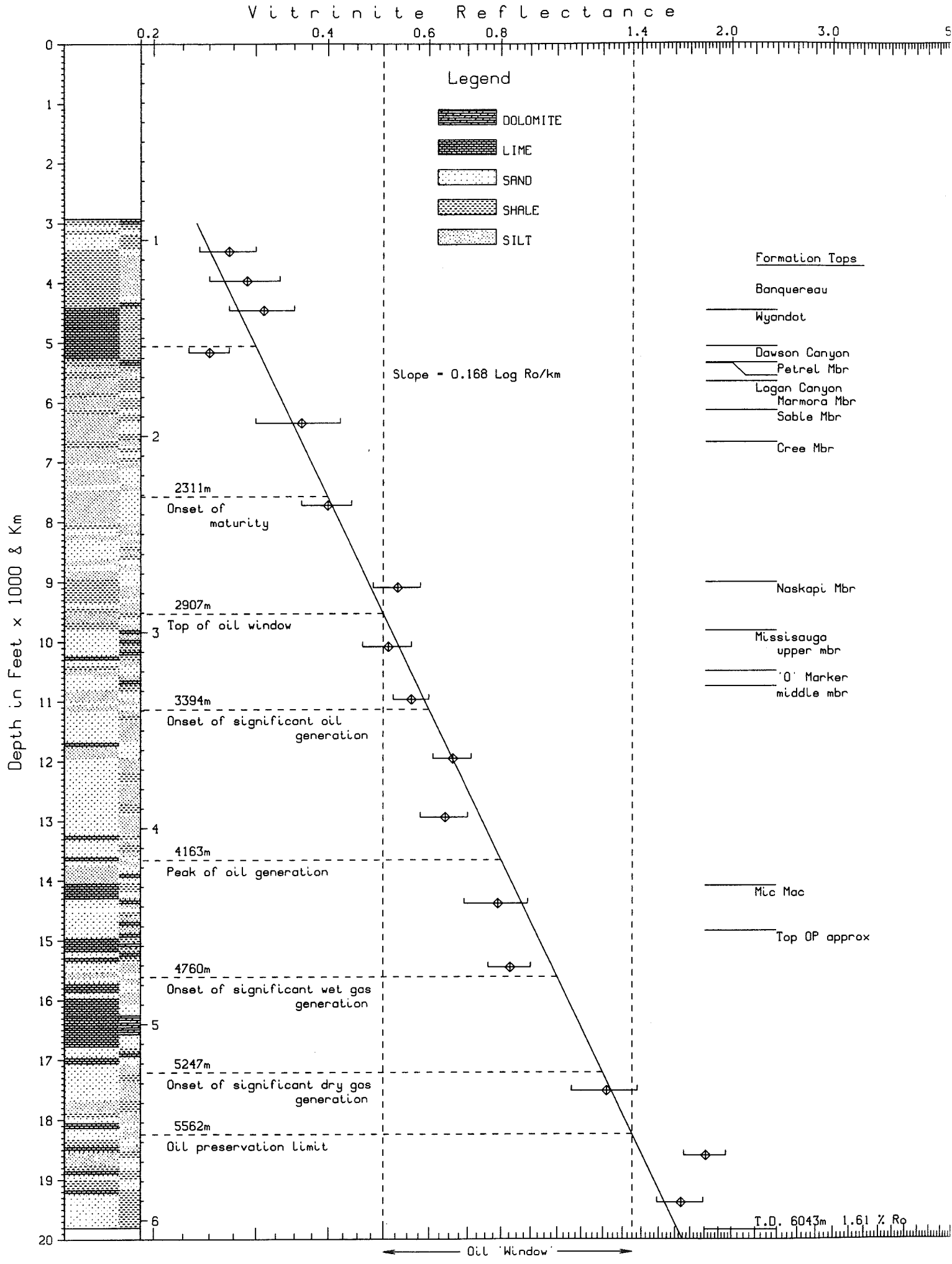



Fig. 1 Louisbourg J-47 < Maturation Profile >

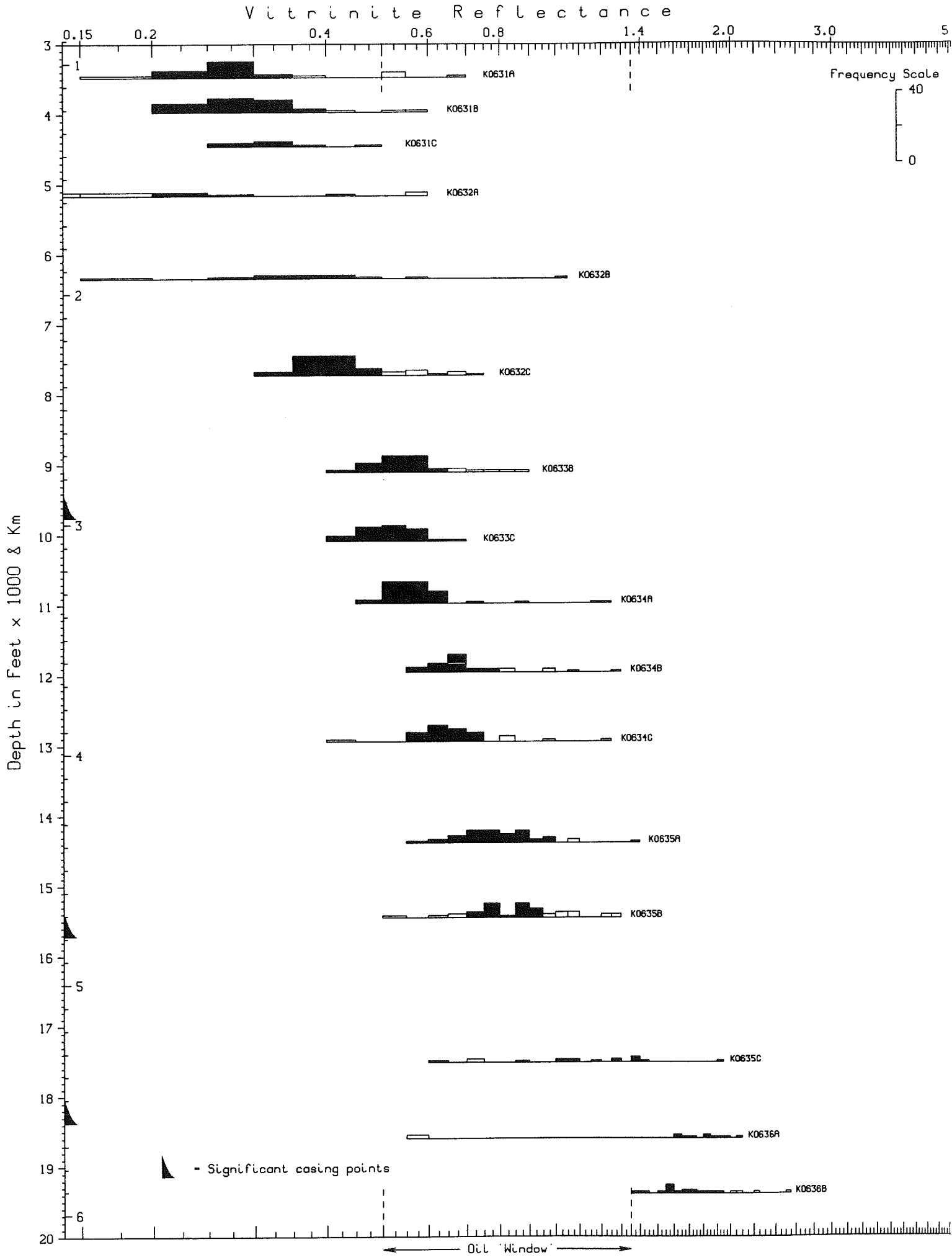



Fig. 2 Louisbourg J-47 < Histograms >

# 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:

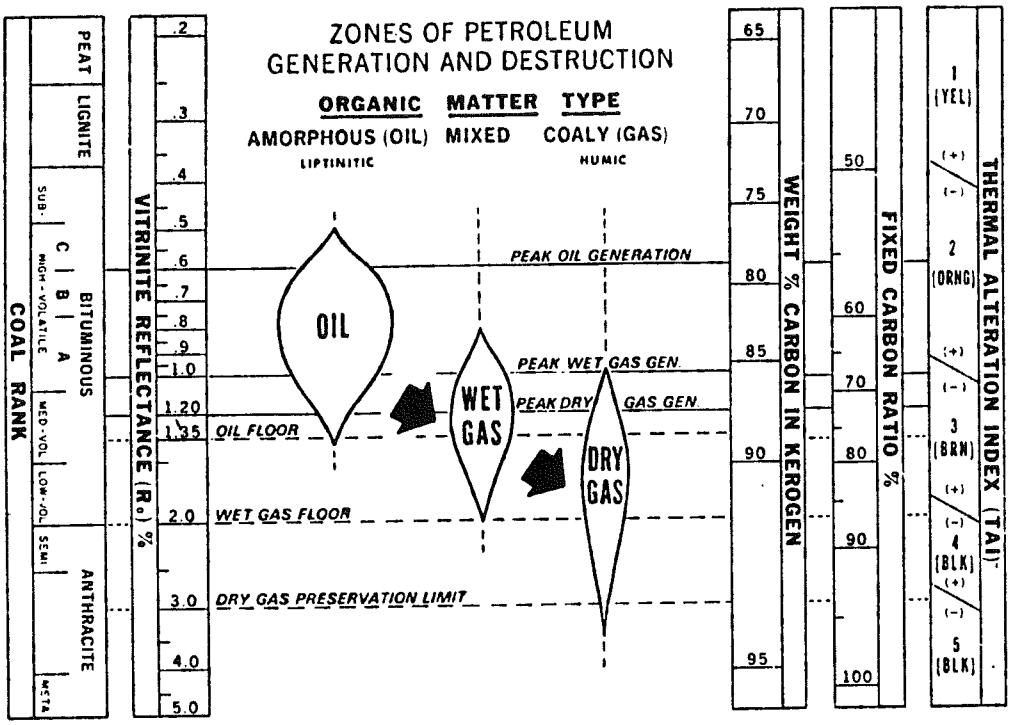
### PALYNOLOGY Lab preparation

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

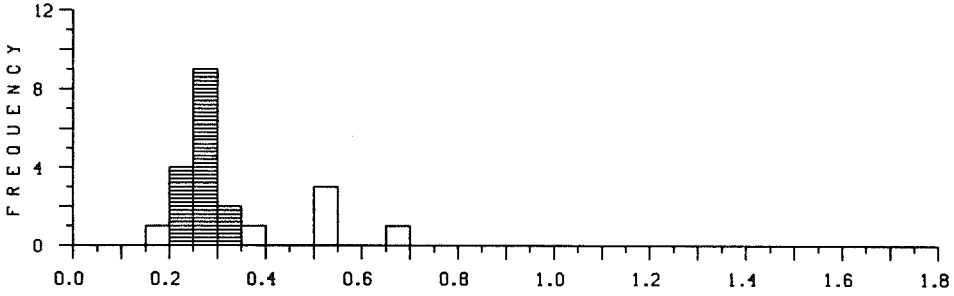
## Sample Reports

K0631A,1050-1060M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .17 | .23< | .24< | .24< | .24< | .25< | .25< | .25< | .26< | .26< |
| 1 | .26< | .28< | .28< | .28< | .33< | .34< | .37 | .52 | .52 | .54 |
| 2 | .68 | | | | | | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .32 | .13 | 21 | .17 | .68 | 6.79 |
| EDIT< | .27 | .03 | 15 | .23 | .34 | 3.99 |

REFLECTANCE HISTOGRAM

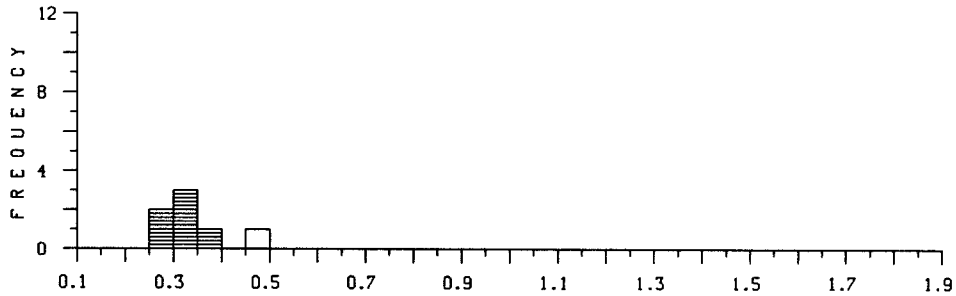



K0631C,1350-1360M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .25< | .28< | .31< | .31< | .33< | .36< | .49 | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .33 | .08 | 7 | .25 | .49 | 2.33 |
| EDIT< | .31 | .04 | 6 | .25 | .36 | 1.84 |

REFLECTANCE HISTOGRAM

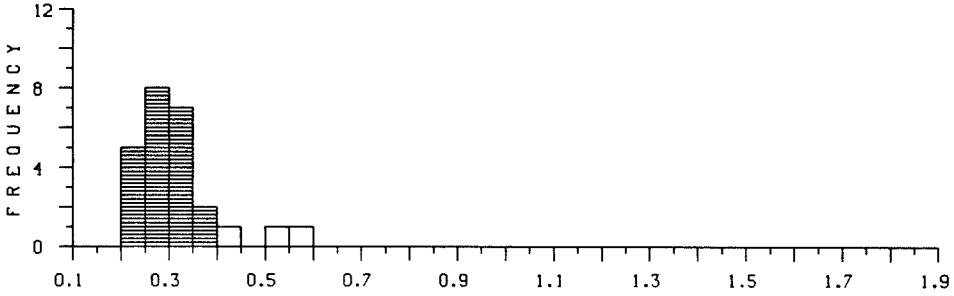



K0631B,1200-1210M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .20< | .23< | .23< | .23< | .23< | .26< | .26< | .27< | .27< | .27< |
| 1 | .28< | .29< | .29< | .30< | .31< | .32< | .33< | .33< | .33< | .34< |
| 2 | .35< | .36< | .41 | .51 | .56 | | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .31 | .08 | 25 | .20 | .56 | 7.76 |
| EDIT< | .29 | .04 | 22 | .20 | .36 | 6.28 |

REFLECTANCE HISTOGRAM

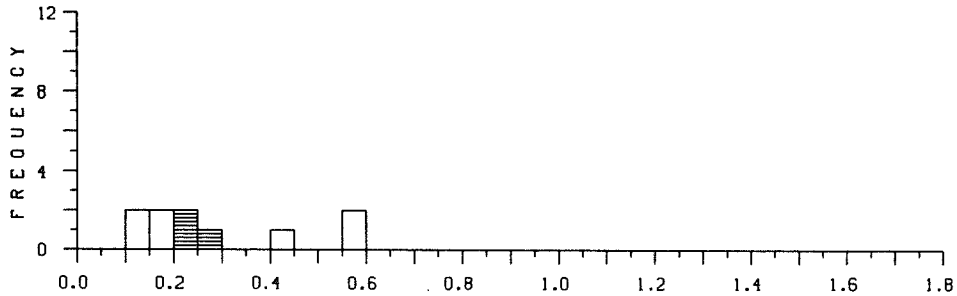



K0632A,1475-1575M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .13 | .13 | .17 | .19 | .23< | .24< | .27< | .40 | .56 | .56 |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .29 | .16 | 10 | .13 | .56 | 2.88 |
| EDIT< | .25 | .02 | 3 | .23 | .27 | .74 |

REFLECTANCE HISTOGRAM

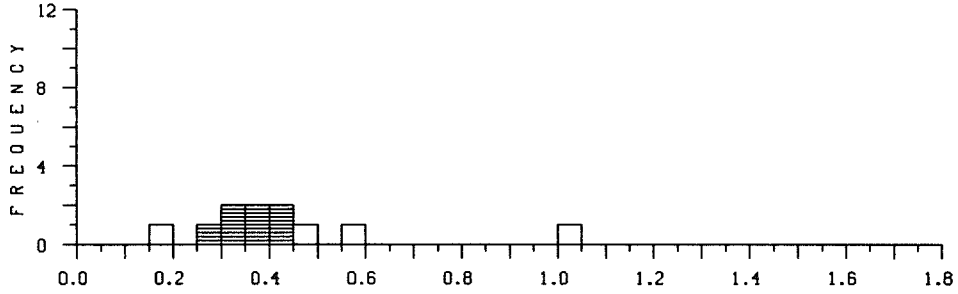


K0632B,1925-1935M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .15 | .29< | .31< | .31< | .36< | .39< | .42< | .44< | .49 | .58 |
| 1 | 1.00 | | | | | | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .43 | .22 | 11 | .15 | 1.00 | 4.74 |
| EDIT< | .36 | .06 | 7 | .29 | .44 | 2.52 |

REFLECTANCE HISTOGRAM

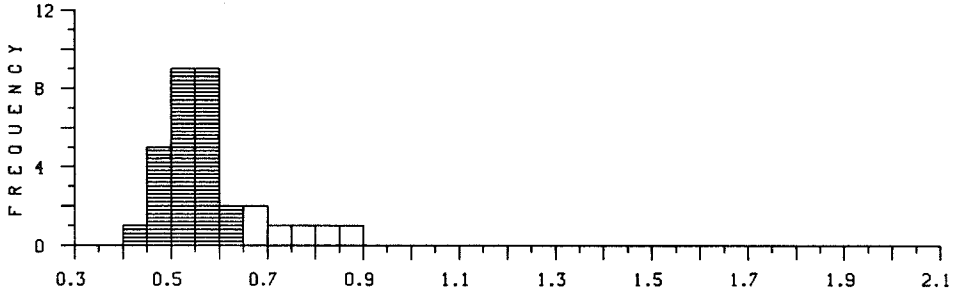



K0633B,2765-2775M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .41< | .45< | .46< | .48< | .48< | .49< | .50< | .51< | .51< | .51< |
| 1 | .52< | .52< | .52< | .53< | .53< | .56< | .57< | .57< | .57< | .57< |
| 2 | .58< | .58< | .58< | .59< | .61< | .62< | .67 | .69 | .72 | .76 |
| 3 | .84 | .87 | | | | | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .57 | .11 | 32 | .41 | .87 | 18.37 |
| EDIT< | .53 | .05 | 26 | .41 | .62 | 13.82 |

REFLECTANCE HISTOGRAM

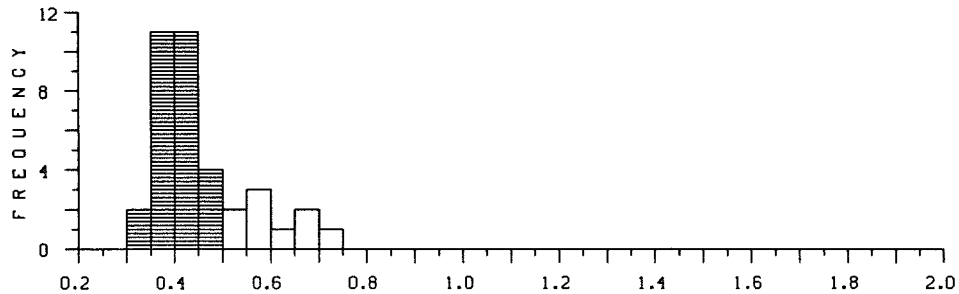



K0632C,2345-2355M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .31< | .34< | .36< | .36< | .37< | .37< | .38< | .38< | .39< | .39< |
| 1 | .39< | .39< | .39< | .40< | .40< | .41< | .41< | .41< | .42< | .42< |
| 2 | .43< | .43< | .43< | .44< | .45< | .47< | .47< | .47< | .52 | .53 |
| 3 | .57 | .59 | .59 | .63 | .65 | .67 | .72 | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .45 | .10 | 37 | .31 | .72 | 16.75 |
| EDIT< | .40 | .04 | 28 | .31 | .47 | 11.28 |

REFLECTANCE HISTOGRAM

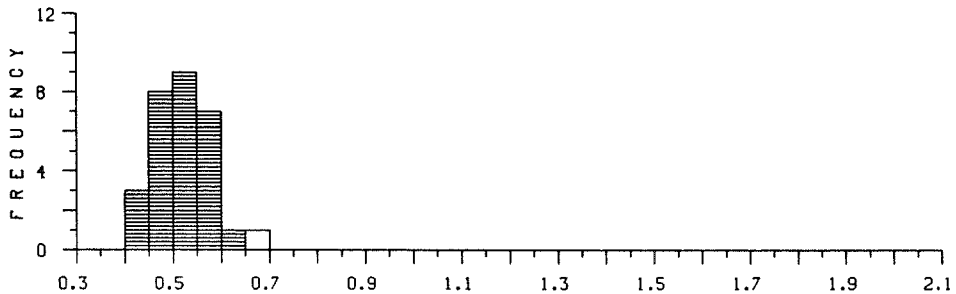



K0633C,3065-3075M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .43< | .43< | .44< | .45< | .46< | .47< | .47< | .48< | .49< | .49< |
| 1 | .49< | .51< | .51< | .52< | .52< | .52< | .53< | .54< | .54< | .54< |
| 2 | .55< | .55< | .56< | .57< | .57< | .57< | .58< | .61< | .68 | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .52 | .06 | 29 | .43 | .68 | 15.07 |
| EDIT< | .51 | .05 | 28 | .43 | .61 | 14.39 |

REFLECTANCE HISTOGRAM

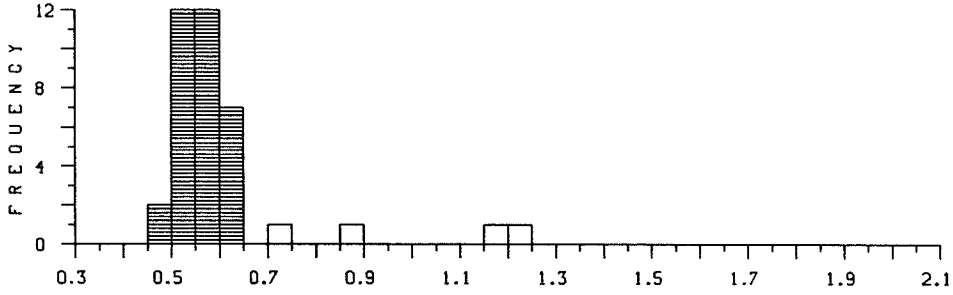


K0634A,3335-3345M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .48< | .49< | .50< | .51< | .51< | .51< | .52< | .52< | .53< | .54< |
| 1 | .54< | .54< | .54< | .54< | .55< | .55< | .56< | .56< | .56< | .56< |
| 2 | .56< | .56< | .57< | .58< | .59< | .59< | .60< | .60< | .61< | .62< |
| 3 | .63< | .64< | .64< | .72 | .86 | 1.18 | 1.20 | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .60 | .16 | 37 | .48 | 1.20 | 22.36 |
| EDIT< | .56 | .04 | 33 | .48 | .64 | 18.40 |

REFLECTANCE HISTOGRAM

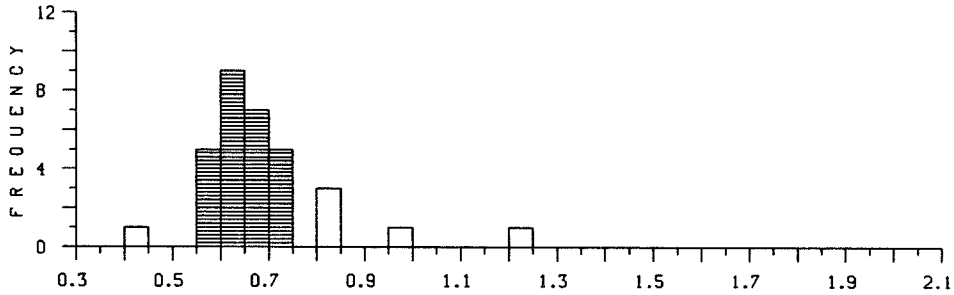



K0634C,3935-3945M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .44 | .55< | .55< | .56< | .56< | .58< | .60< | .60< | .60< | .61< |
| 1 | .61< | .61< | .62< | .63< | .64< | .66< | .66< | .67< | .68< | .68< |
| 2 | .69< | .69< | .71< | .71< | .71< | .74< | .74< | .80 | .82 | .84 |
| 3 | .99 | 1.22 | | | | | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .68 | .14 | 32 | .44 | 1.22 | 21.77 |
| EDIT< | .64 | .06 | 26 | .55 | .74 | 16.66 |

REFLECTANCE HISTOGRAM

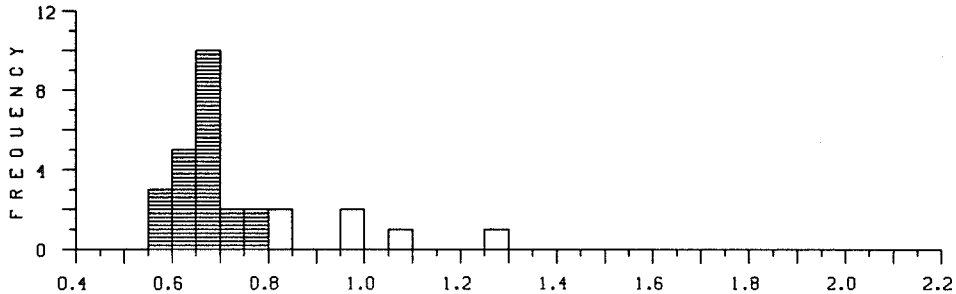



K0634B,3635-3645M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .56< | .58< | .59< | .60< | .61< | .62< | .63< | .63< | .66< | .66< |
| 1 | .66< | .67< | .68< | .68< | .68< | .68< | .68< | .69< | .70< | .72< |
| 2 | .75< | .77< | .81 | .84 | .95 | .99 | 1.05 | 1.27 | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .73 | .16 | 28 | .56 | 1.27 | 20.41 |
| EDIT< | .66 | .05 | 22 | .56 | .77 | 14.50 |

REFLECTANCE HISTOGRAM

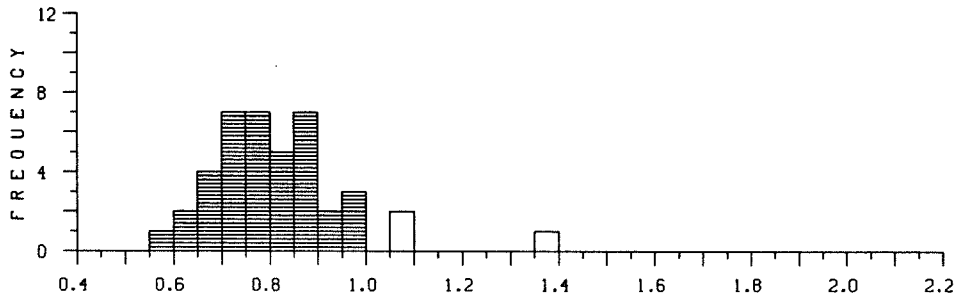



K0635A,4225-4385M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .59< | .61< | .64< | .65< | .65< | .69< | .69< | .71< | .71< | .72< |
| 1 | .73< | .73< | .74< | .74< | .75< | .76< | .76< | .77< | .77< | .78< |
| 2 | .78< | .80< | .81< | .82< | .82< | .83< | .86< | .86< | .87< | .87< |
| 3 | .88< | .89< | .89< | .92< | .94< | .96< | .98< | .99< | 1.06 | 1.08 |
| 4 | 1.35 | | | | | | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .82 | .14 | 41 | .59 | 1.35 | 33.45 |
| EDIT< | .79 | .10 | 38 | .59 | .99 | 29.96 |

REFLECTANCE HISTOGRAM

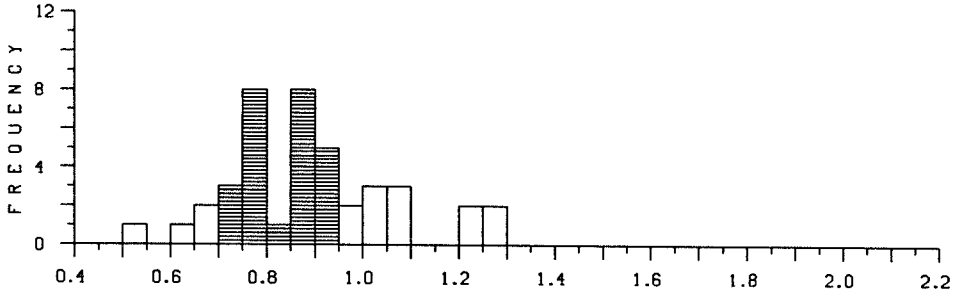


K0635B,4520-4710M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .50 | .64 | .67 | .68 | .71< | .74< | .74< | .75< | .77< | .77< |
| 1 | .78< | .78< | .79< | .79< | .79< | .83< | .85< | .86< | .86< | .87< |
| 2 | .87< | .87< | .88< | .88< | .91< | .92< | .93< | .93< | .94< | .99 |
| 3 | .99 | 1.00 | 1.00 | 1.02 | 1.05 | 1.06 | 1.09 | 1.21 | 1.22 | 1.26 |
| 4 | 1.29 | | | | | | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | .89 | .17 | 41 | .50 | 1.29 | 36.48 |
| EDIT< | .83 | .07 | 25 | .71 | .94 | 20.81 |

REFLECTANCE HISTOGRAM

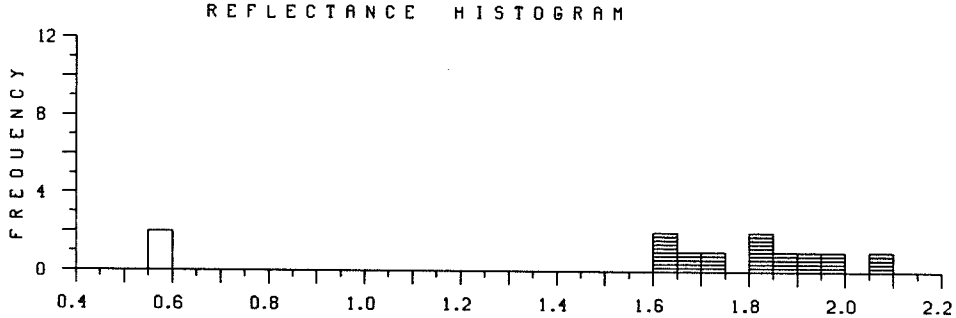



K0636A,5660-5670M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .56 | .57 | 1.61< | 1.63< | 1.68< | 1.74< | 1.83< | 1.83< | 1.86< | 1.93< |
| 1 | 1.95< | 2.07< | | | | | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | 1.61 | .50 | 12 | .56 | 2.07 | 19.26 |
| EDIT< | 1.81 | .15 | 10 | 1.61 | 2.07 | 18.13 |

REFLECTANCE HISTOGRAM

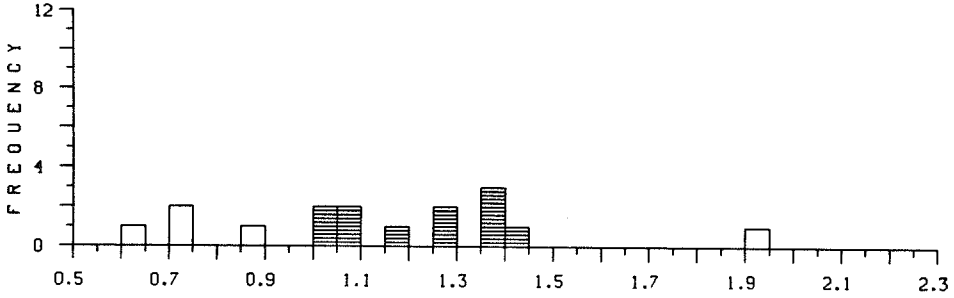



K0635C,5180-5340M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | .60 | .73 | .74 | .89 | 1.00< | 1.03< | 1.05< | 1.09< | 1.17< | 1.26< |
| 1 | 1.26< | 1.35< | 1.36< | 1.39< | 1.44< | 1.94 | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | 1.14 | .33 | 16 | .60 | 1.94 | 18.30 |
| EDIT< | 1.22 | .16 | 11 | 1.00 | 1.44 | 13.40 |

REFLECTANCE HISTOGRAM




K0636B,5780-5910M,LOUISBOURG J-47

| COL > | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| ROW | 1.35< | 1.42< | 1.50< | 1.55< | 1.57< | 1.57< | 1.57< | 1.58< | 1.62< | 1.65< |
| 1 | 1.65< | 1.72< | 1.74< | 1.75< | 1.83< | 1.87< | 1.93< | 2.00 | 2.08 | 2.20 |
| 2 | 2.54 | | | | | | | | | |

| | MEAN | STAND DEV | PTS | MIN | MAX | SUM |
|---|---|---|---|---|---|---|
| TOTAL | 1.75 | .28 | 21 | 1.35 | 2.54 | 36.69 |
| EDIT< | 1.64 | .15 | 17 | 1.35 | 1.93 | 27.87 |

REFLECTANCE HISTOGRAM