

**Vitrinite reflectance (Ro) of dispersed organics from Amoco-Imperial  
Heron H-73.**

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G.S.C. Locality No.: D82

Location: 44°02'26.65"N, 52°25'40.58"W

R.T. Elevation: 85'

Water Depth: 346'

Total Depth: 12000'

Sample Interval: 1000 - 12000'

Interval Studied: 2350 - 11360'

Depth Units: Feet referenced to R.T.

Vitrinite reflectance has been determined on 16 rotary cuttings samples (Table II) from the Amoco-Imperial Heron H-73 wildcat well located in the South Whale Subbasin on the southern edge of the Grand Banks approximately 389 km south of St. John's, Newfoundland. The well was abandoned with oil shows.

Data acquisition and manipulation for this report utilized the Zeiss Photomultiplier III Zonax system interfaced with a IBM-PC AT clone microcomputer to provide improved speed and reliability of data acquisition.

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)-4575'	0.18 - 0.4	% Ro	immature
4575-5874'	0.4 - 0.5	% Ro	immature approaching maturity
5874-6936'	0.5 - 0.6	% Ro	marginally mature
6936'	0.6	% Ro	onset of significant oil generation
8612'	0.8	% Ro	peak of oil generation
9911'	1.0	% Ro	onset of significant wet gas generation
10973'	1.2	% Ro	onset of significant dry gas generation
11659'	1.35	% Ro	oil preservation limit
12000' T.D.	1.43	% Ro	below oil preservation limit
(13948')	2.0	% Ro	wet gas preservation limit
(16309')	3.0	% Ro	dry gas preservation limit

Note: ( ) indicate depth extrapolated at 0.245 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 Heron H-73 except for the interval from 8000 to 10000 ft. The data are 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 0.245 log/km.

Selection of the reflectance population that 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 Heron H-73 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
- Amoco-Imperial, 1974. Well history report Amoco-Imperial Heron H-73. Open File report, Department of Energy, Mines and Resources, Ottawa.

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Table II

**Summary of kerogen - based vitrinite reflectance**

Seq. #	Sample #	Depths in feet	Mean Ro (SD) non-rotated	Number of Readings	
				Total	Edited
1	K0401A	2350-2380	0.27( $\pm .05$ )	43	25
2	K0401B	2710-2740	0.32( $\pm .06$ )	32	32
3	K0401C	2980-3100	0.32( $\pm .06$ )	40	37
4	K0402A	4330-4450	0.40( $\pm .04$ )	25	24
5	K0402B	4870-4900	0.40( $\pm .03$ )	18	14
6	K0402C	5320-5350	0.43( $\pm .03$ )	25	23
7	K0403A	5770-5800	0.47( $\pm .04$ )	36	28
8	K0403B	6160-6190	0.49( $\pm .03$ )	47	11
9	K0403C	6610-6640	0.54( $\pm .10$ )	68	13
10	K0404A	6980-7010	0.64( $\pm .10$ )	39	8
11	K0404B	7570-7600	0.74( $\pm .08$ )	15	6
12	K0404C	10160-10190	0.99( $\pm .06$ )	86	32
13	K0405A	10460-10490	1.15( $\pm .11$ )	100	64
14	K0405B	10730-10760	1.24( $\pm .08$ )	99	44
15	K0405C	11030-11060	1.23( $\pm .07$ )	100	35
16	K0406A	11330-11360	1.23( $\pm .10$ )	23	11

Note: All samples are kerogen concentrate type.

Table III

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

Formation	Depth
Banquereau	in casing
E. Eocene Chalk	5710'
UNCONFORMITY	5792'
Dawson Canyon	5792'
Petrel Mbr	7230-7780'
Logan Canyon	7780'
Eider Mbr	7780'
Avalon UNCONFORMITY	8036'
Abenaki	8036'
Mid Jur-SS/Sh	9792'
Limestone	10176'
Iroquois	11056'
Argo	11475'
T.D.	12000'

\* Preliminary stratigraphic picks.

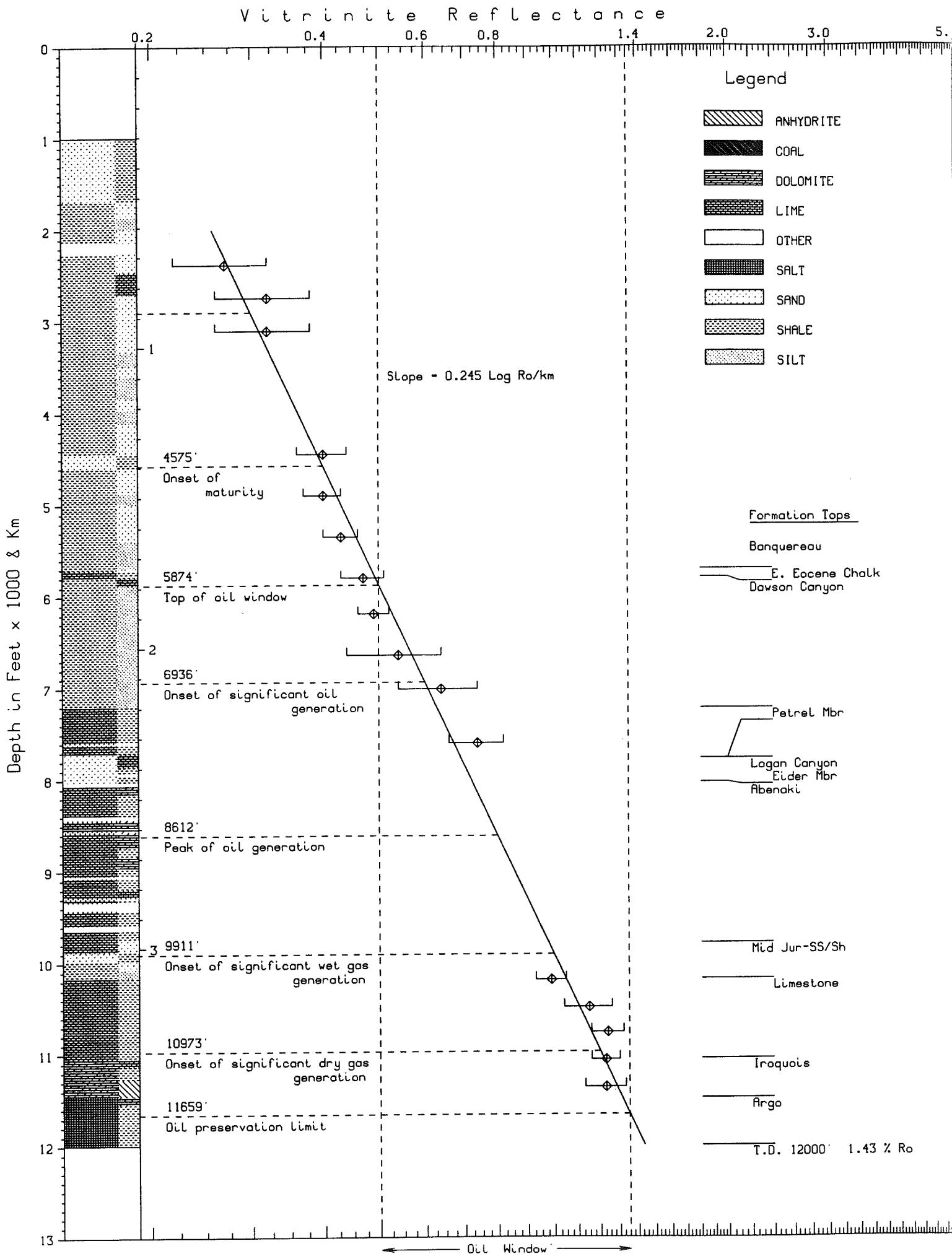
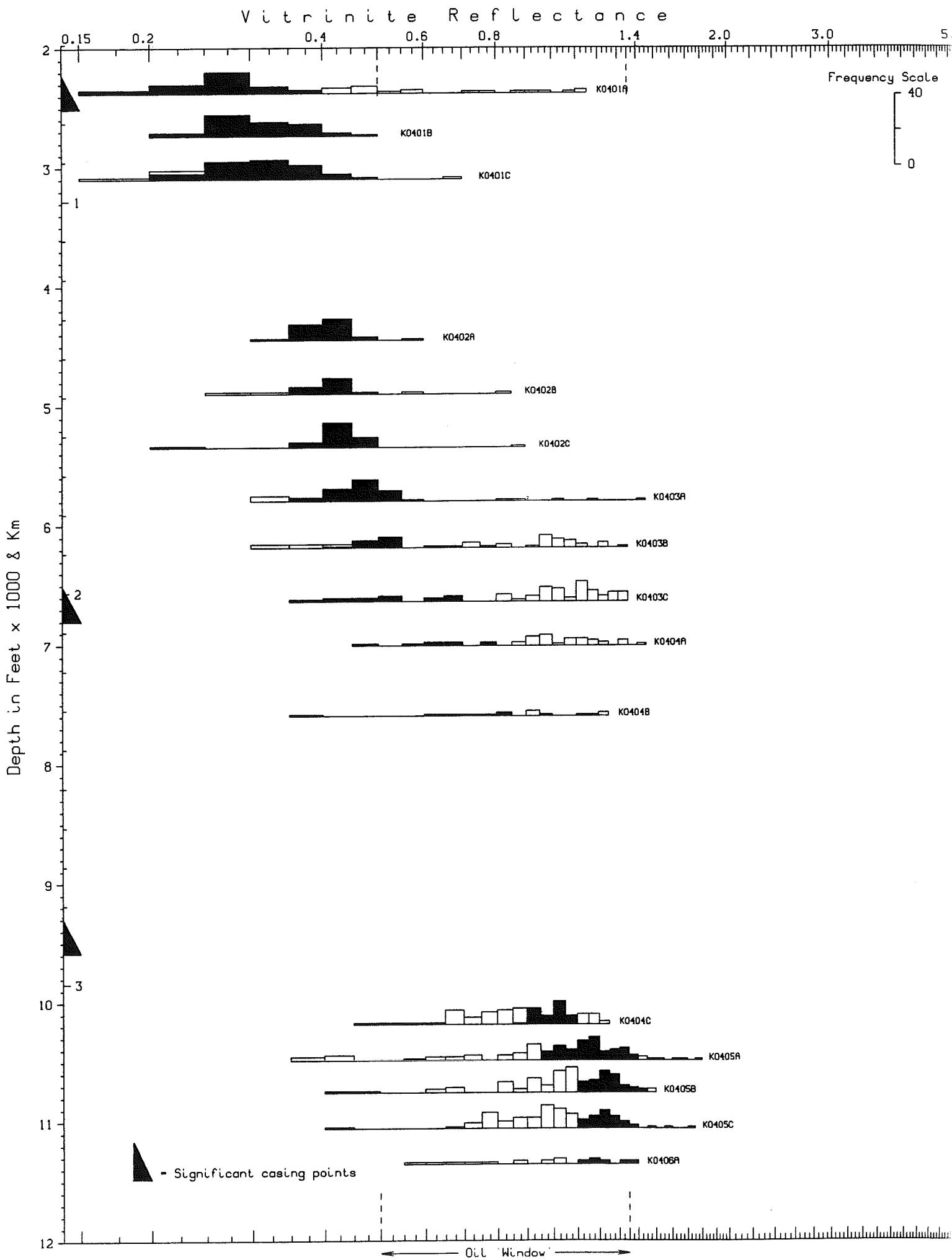


Fig. 1 Heron H-73 < Maturation Profile >



## 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% 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.

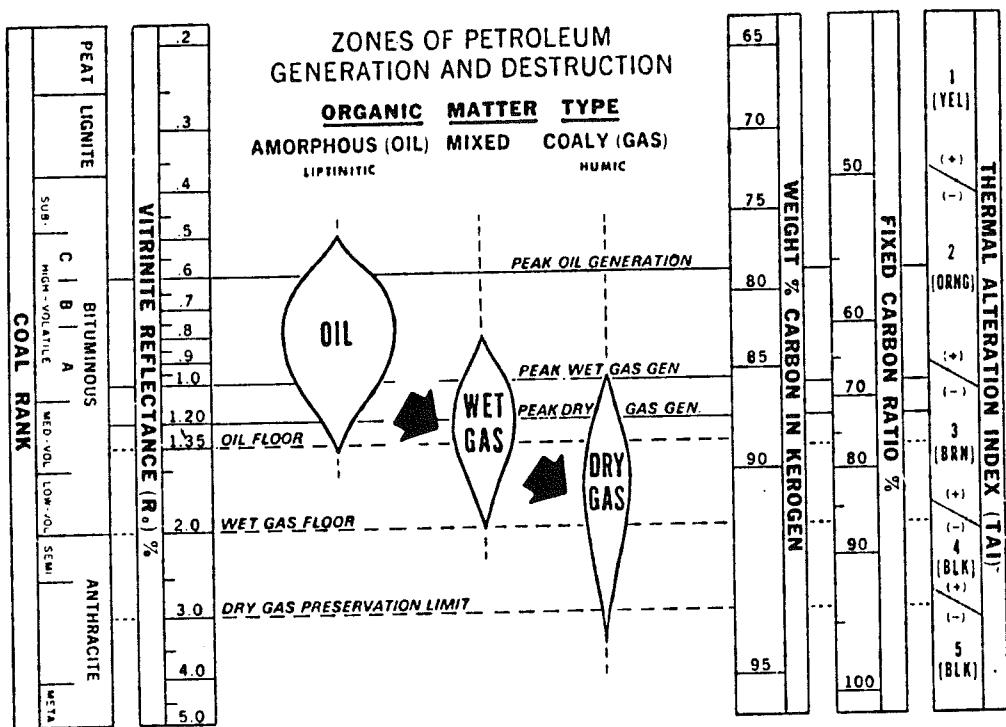
Freeze dried.

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.

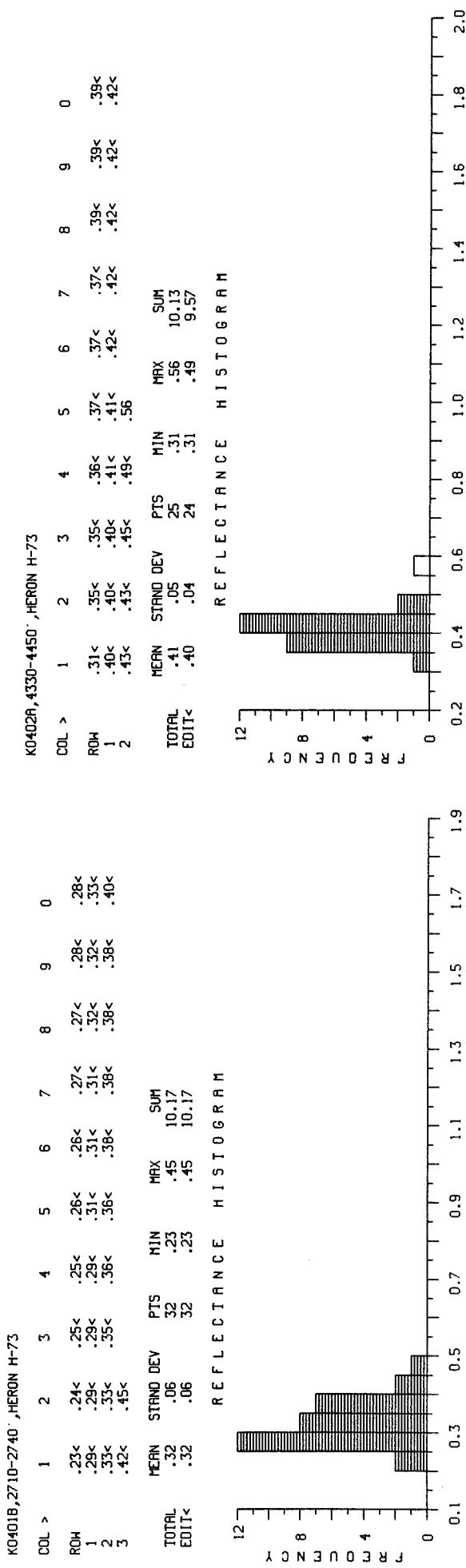
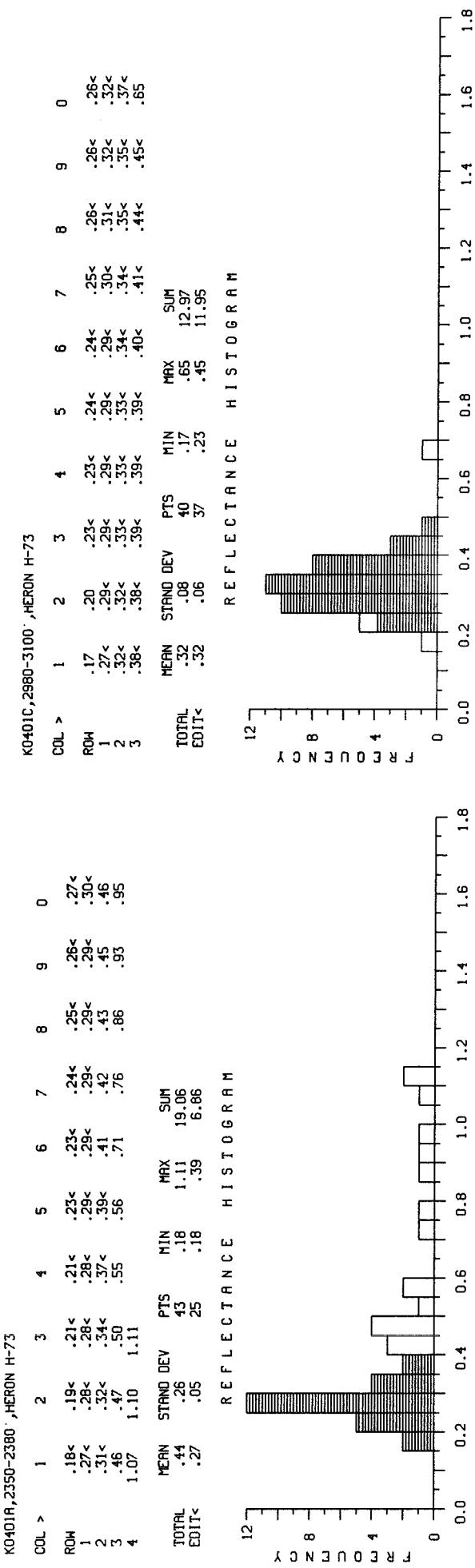
Appendix II (Dow, 1977)

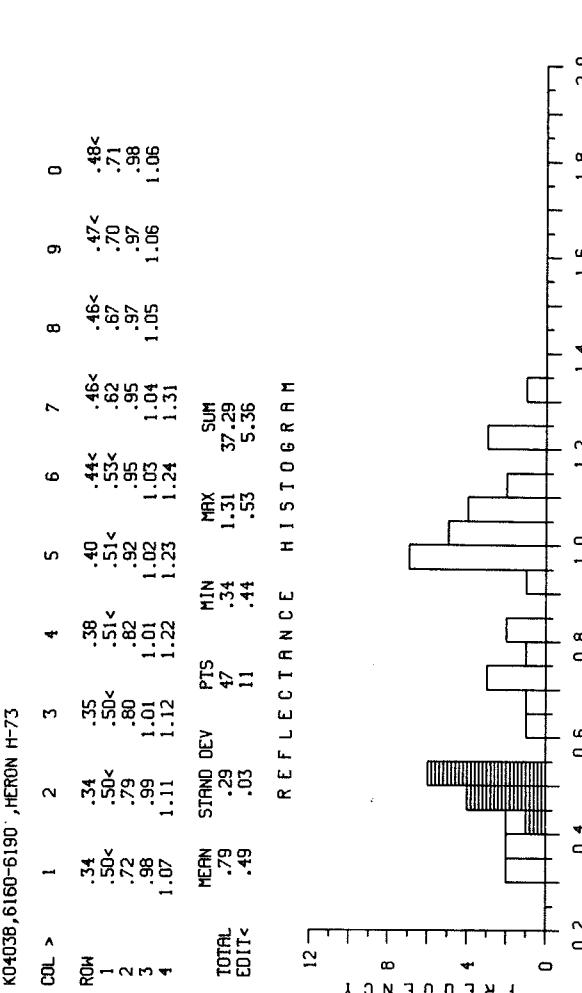
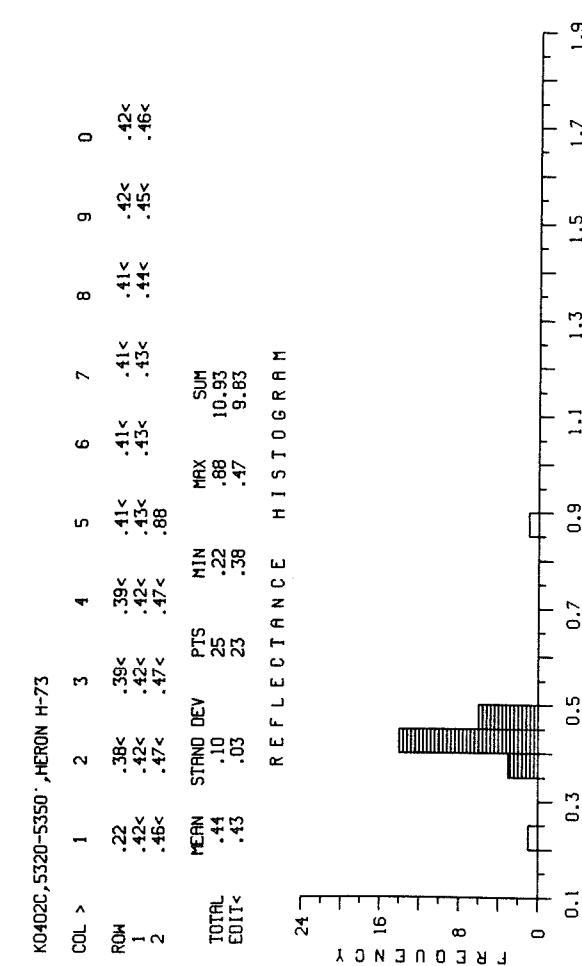
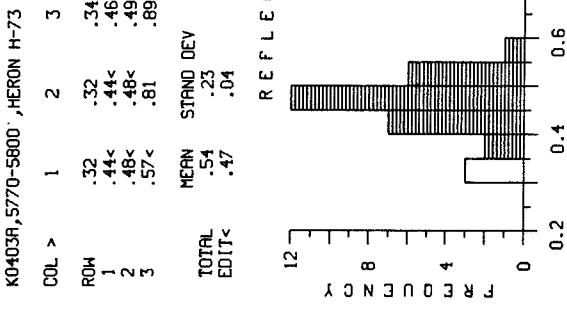
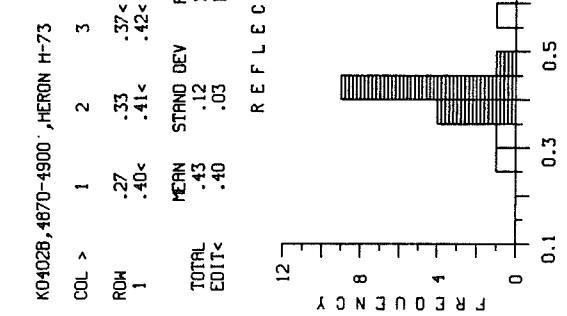


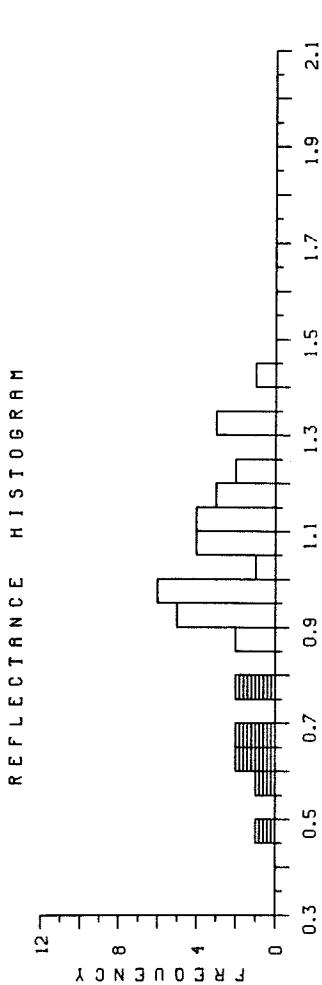
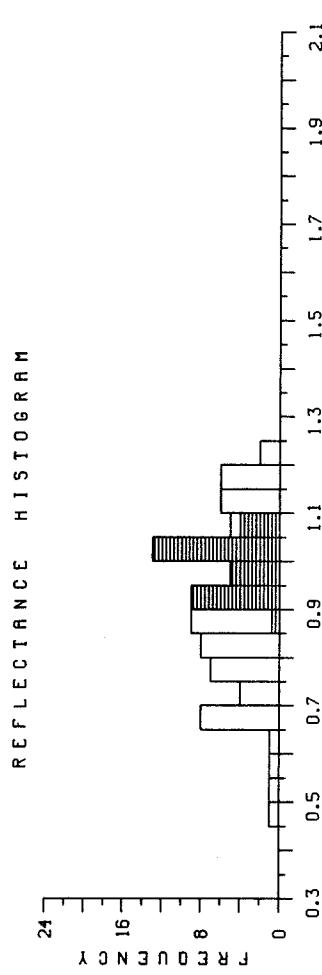
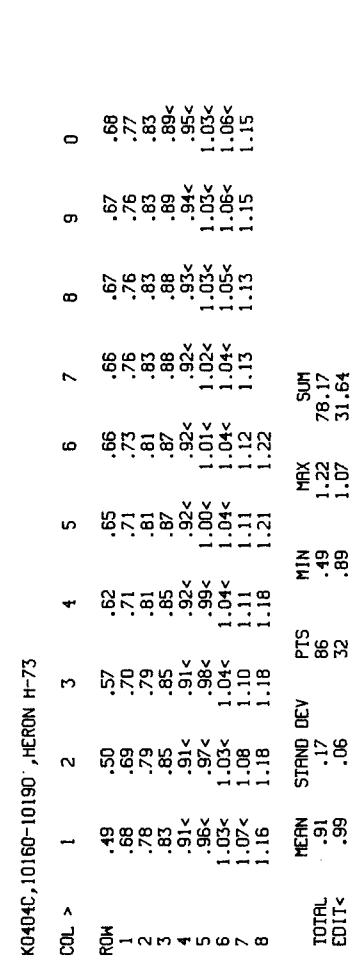
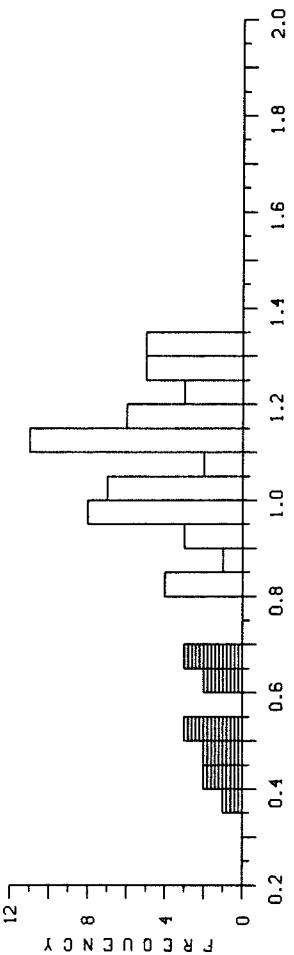
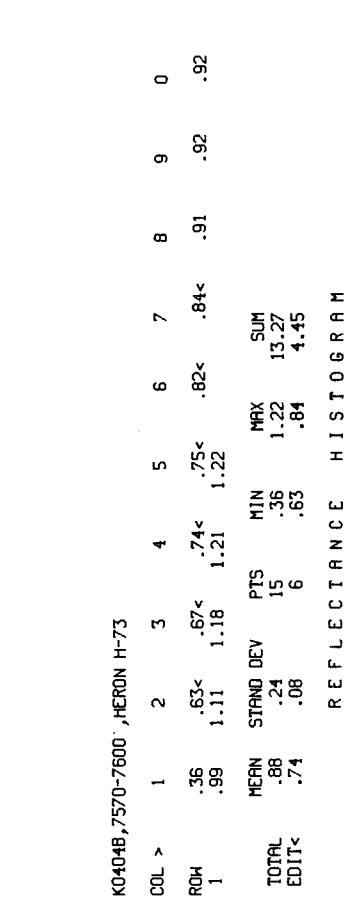
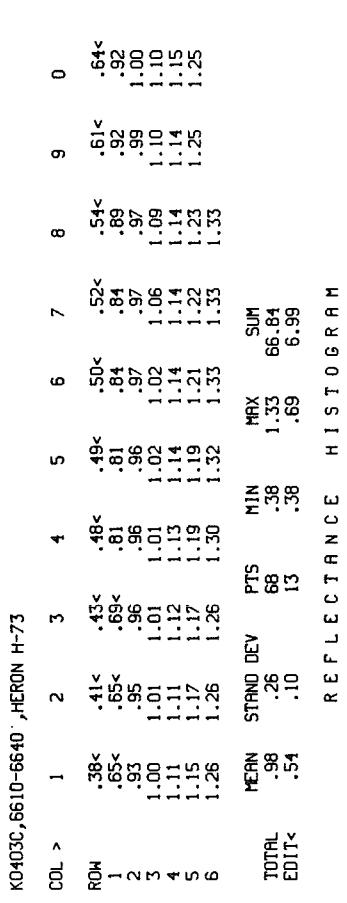
Note: In this report, the terminology used to describe the various maturation levels has been modified. The 'peak' designation, as used in this figure, has been changed to 'onset of significant' and 0.8 Ro is here used as the 'peak of oil generation' (Table I, Figure 1).

### **Appendix III**

#### **Sample Reports**



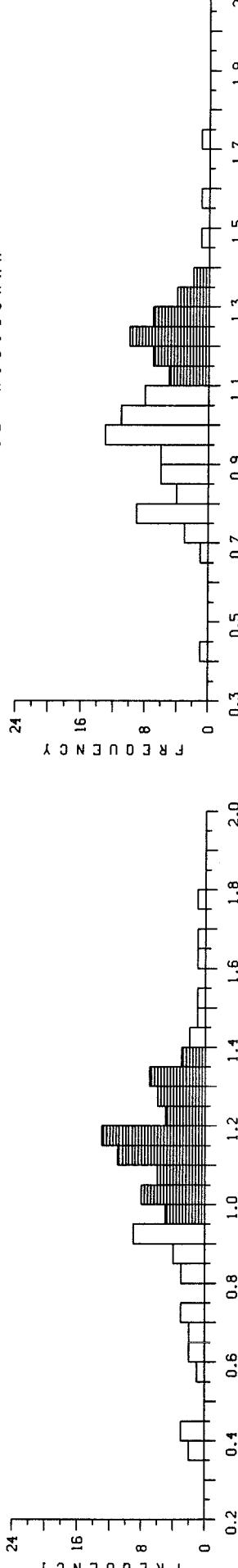




K0405A,10460-10490',HERON H-73

	COL >	1	2	3	4	5	6	7	8	9	0
ROW	.37	.39	.41	.44	.44	.59	.60	.62	.67	.69	.69
1	.70	.71	.73	.80	.82	.84	.85	.87	.87	.89	.89
2	.90	.90	.92	.92	.92	.93	.93	.94	.94	.95<	.95<
3	.96<	.97<	.97<	.99<	.99<	1.00<	1.00<	1.01<	1.01<	1.02<	1.02<
4	1.04<	1.04<	1.05<	1.06<	1.06<	1.08<	1.08<	1.09<	1.09<	1.10<	1.10<
5	1.11<	1.11<	1.11<	1.12<	1.12<	1.13<	1.13<	1.14<	1.14<	1.15<	1.15<
6	1.15<	1.15<	1.16<	1.16<	1.16<	1.16<	1.16<	1.17<	1.17<	1.17<	1.17<
7	1.19<	1.19<	1.19<	1.20<	1.20<	1.22<	1.22<	1.22<	1.22<	1.25<	1.25<
8	1.28<	1.28<	1.29<	1.30<	1.31<	1.31<	1.31<	1.33<	1.33<	1.33<	1.33<
9	1.35<	1.35<	1.37<	1.40	1.42	1.46	1.53	1.63	1.66	1.79	1.79
TOTAL	1.06	.27	100	.37	1.79	106.38	SUM				
EDIT<	1.15	.11	64	.95	1.37	73.88					

REFLECTION HISTOGRAM  
K0405B,10730-10760',HERON H-73



K0405C,11030-11060',HERON H-73

	COL >	1	2	3	4	5	6	7	8	9	0
ROW	.42	.46	.63	.64	.65	.67	.69	.81	.81	.82	.82
1	.84	.84	.84	.85	.85	.90	.90	.91	.93	.93	.93
2	.94	.94	.94	.95	.95	.96	.96	.99	.99	1.00	1.02
3	1.02	1.02	1.03	1.03	1.03	1.03	1.04	1.04	1.04	1.04	1.05
4	1.05	1.05	1.05	1.06	1.06	1.06	1.06	1.07	1.07	1.07	1.08
5	1.08	1.08	1.08	1.09	1.09	1.10<	1.11<	1.12<	1.12<	1.13<	1.14<
6	1.17<	1.17<	1.18<	1.18<	1.19<	1.19<	1.19<	1.19<	1.20<	1.22<	1.22<
7	1.22<	1.22<	1.23<	1.23<	1.24<	1.24<	1.24<	1.24<	1.24<	1.25<	1.25<
8	1.25<	1.25<	1.26<	1.26<	1.28<	1.28<	1.28<	1.29<	1.29<	1.30<	1.30<
9	1.33<	1.33<	1.33<	1.36<	1.37<	1.38<	1.43<	1.43<	1.48	1.48	1.48
TOTAL	1.08	.21	99	.42	1.49	107.03	SUM				
EDIT<	1.24	.08	44	1.10	1.43	54.65					

REFLECTION HISTOGRAM  
K0405C,11030-11060',HERON H-73

