Report No. EPGS-DOM.2-85MPA

Vitrinite reflectance (Ro) on the
dispersed organics in Mobil Tetco
Petro-Canada Migrant N-20

Vitrinite reflectance (Ro) on the dispersed organics in the Mobil Tetco Petro-Canada Migrant N-20

G.S.C. Locality No: D170

Location: 43°59'56.13"N, 60°17'18.25"W

R.T. Elevation: 85'   Sample Interval: 980-14660'

Total Depth: 14661'   Water Depth: 45'

Release Date: January 20, 1980   Interval Studied: 1670-14360'

Units: All depths are in feet and referenced to R.T.

Vitrinite reflectance has been determined on 26 samples (Table II) from the Mobil Tetco Petro-Canada Migrant N-20 well, which was classified as a wildcat well and is located on the Scotian Shelf, approximately 180 miles (290km) east of Halifax, Nova Scotia and 9 miles (14km) northwest of Sable Island.

Data acquisition and manipulation for this report utilized the Zeiss Photomultiplier III Zonax microcomputer system. Improvements in the Zonax software provided the microscope operator with a cumulative histogram which was constantly displayed and updated on the computer monitor as readings were acquired as well as with an essentially instant sorting of the valves on a completed sample. Sample preparation was as given in Appendix I. The analysis of the well revealed the thermal maturation intervals given in Table I. Specific maturation levels as set out were based on those by Dow (1977) (see also Report No. EPGS-DOM.9-83MPA).

Table I
Inferred Thermal Maturation Levels

Determined

Above 5325'	0.25 - 0.4	% Ro	immature
5325-7824'	0.4 - 0.5	% Ro	immature approaching maturity
7825-9866'	0.5 - 0.6	% Ro	marginally mature
9866'	0.6	% Ro	peak of oil generation
14661' T.D.	0.92	% Ro	within oil window

Projected

15587'	1.0	% Ro	peak of wet gas generation

Remarks

The sample coverage of vitrinite reflectance data for this well (Figure 1) was very adequate for establishing the rank/depth line. The line plotted through the points has been calculated by the 'least squares' best fit method.

Drill stem tests were carried out at 3 levels (Table III). Of the 8 tests run only DST #2 flowed hydrocarbons. The flow of gas at this interval was 10 MMcf/d (283,165 m^3/d).

The top of the oil window, as established here, approximately coincides with the top of the Missisauga Formation. Initial maturity of sediments for wet gas generation (0.80%) occurred in the Mic Mac Formation.

This maturation data provides evidence indicating that the thermal regime at Migrant N-20 was suitable for the generation of oil and gas within the drilled section.

References

Avery, M.P., 1983. Vitrinite reflectance (Ro) on the dispersed organics in Mobil-Texaco-Pex Venture B-43. Report No. EPGS-DOM.9-83MPA, 2 p., 3 figures.

Dow, W.G., 1977. Kerogen studies and geological interpretations. Journal of Geochemical Exploration, no. 7, p. 79-99.

Wade, J.A., 1979. Stratigraphic picks (Mobil Tetco Pex Migrant N-20). Report No. EPGS-STRAT.45-79JAW, 1 p. (revised copy).

February 6, 1984

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Table II

Data summary

Seq. #	Sample #	Depth in feet	Mean Ro (SD)	Number of readings Total	Edited
1	KO232A	1670–1790	.27 (.04)	21	18
2	KO232B	2030–2150	.28 (.07)	16	15
3	KO232C	2570–2690	.29 (.04)	25	8
4	KO233A	2930–2960	.35 (.09)	20	5
5	KO233B	3290–3410	.4 (.08)	54	21
6	KO233C	4010–4040	.37 (.06)	63	29
7	KO234A	4670–4700	.37 (.03)	83	70
8	KO234B	5480–5600	.4 (.05)	97	50
9	KO234C	6120–6150	.42 (.05)	99	62
10	KO235A	6490–6520	.43 (.02)	92	18
11	KO235B	6970–7000	.45 (.04)	73	49
12	KO235C	7520–7550	.49 (.05)	99	66
13	KO236A	8150–8180	.5 (.06)	99	73
14	KO236B	8520–8550	.56 (.08)	98	76
15	KO236C	9260–9290	.58 (.06)	79	39
16	K2373A	9640–9670	.66 (.06)	79	49
17	KO237B	10190–10220	.63 (.08)	99	94
18	KO237C	10850–10880	.64 (.06)	99	90
19	KO238A	11240–11270	.63 (.06)	99	89
20	KO238B	11600–11630	.66 (.06)	99	94
21	KO238C	12050–12080	.79 (.08)	99	88
22	KO239A	12440–12560	.77 (.08)	99	86
23	KO239B	12980–13010	.79 (.06)	99	87
24	KO239C	13610–13640	.8 (.09)	99	83
25	KO240A	14060–14090	.86 (.07)	99	87
26	KO240B	14330–14360	.93 (.1)	34	25

Note: All samples are Kerogen Type.

Table III

Drill stem test results (schedule of wells)

DST #	Interval	Comments
1	14,216 - 14,310'	No recovery
2	14,216 - 14,310'	Flowed gas at 10 MMcf/d (283,165 m^3/d)
3	14,010 - 14,020'	Misrun
4	14,010 - 14,020'	Misrun
5	14,010 - 14,020'	No recovery
6	13,796 - 13,822'	No recovery
7	13,796 - 13,822'	Misrun
8	13,796 - 13,822'	No recovery

Table IV

Geology tops (Wade '79)

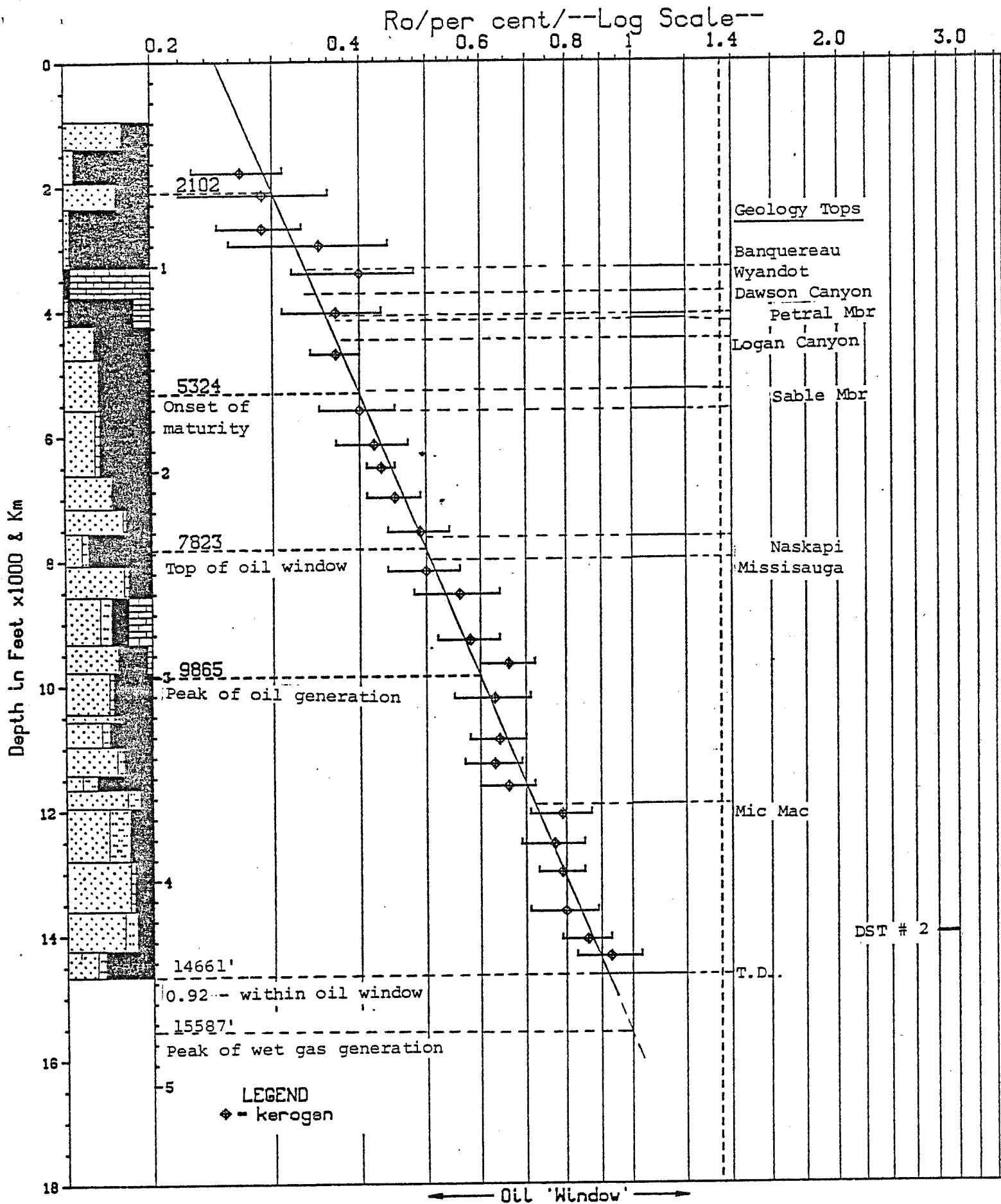| Depth	Top or Interval
in casing	Banquereau
3330'	Wyandot
3764'	Dawson Canyon
4123-4153'	Petral Member
4499'	Logan Canyon
5316-5636'	Sable Member
7645'	Naskapi Member
8030'	Missisauga
11,967'	Mic Mac
14,661'	T.D.

Fig. 1   Migrant N-20

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 250ml 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 15ml test tube with 4-5ml 4% Alconox.
Differential centrifuge at 1500rpm for 90 sec.
Decant.
Wash 3 times with centrifuging.
Float off organic fraction using 2.0 S.G. Znbr solution.
Centrifuge 1000rpm, 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.

Vitrinite Reflectance Histograms

FILE >> K0232A   DESCRIPTION FOLLOWS :
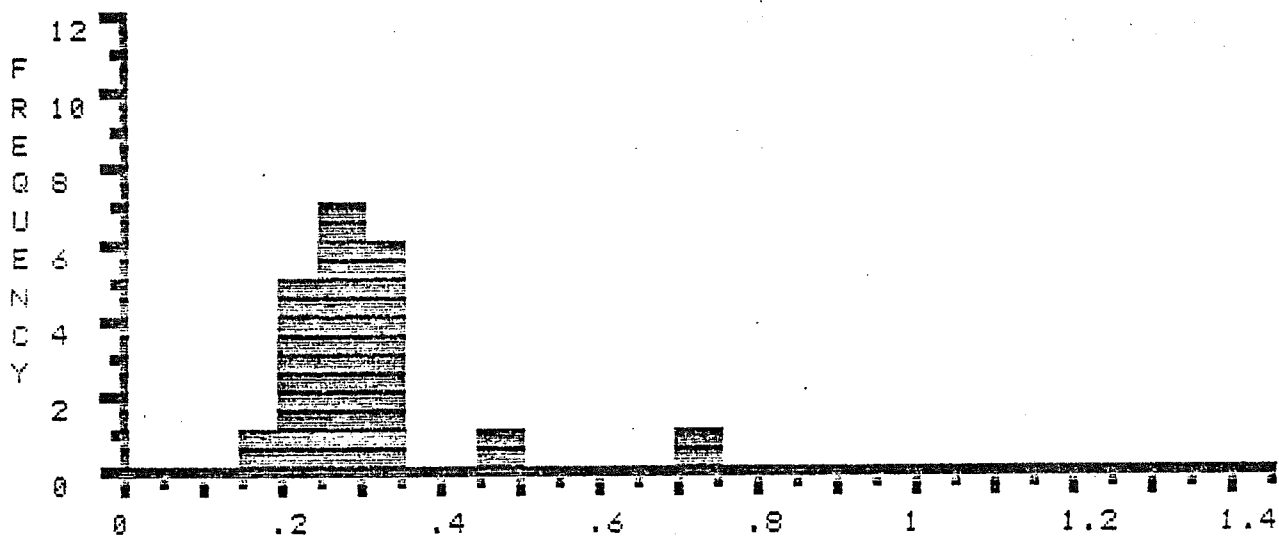DEPTH 1670-1790', MIGRANT N-20, MIKE AVERY, OCT-20-84

COL>   1   2   3   4   5   6   7   8   9   0

ROW   .15   *.21   *.21   *.22   *.23   *.24   *.25   *.25   *.25 .*.29
 1   *.29   *.29   *.29   *.3   *.3   *.3   *.3   *.32   *.34   .45
 2   .72

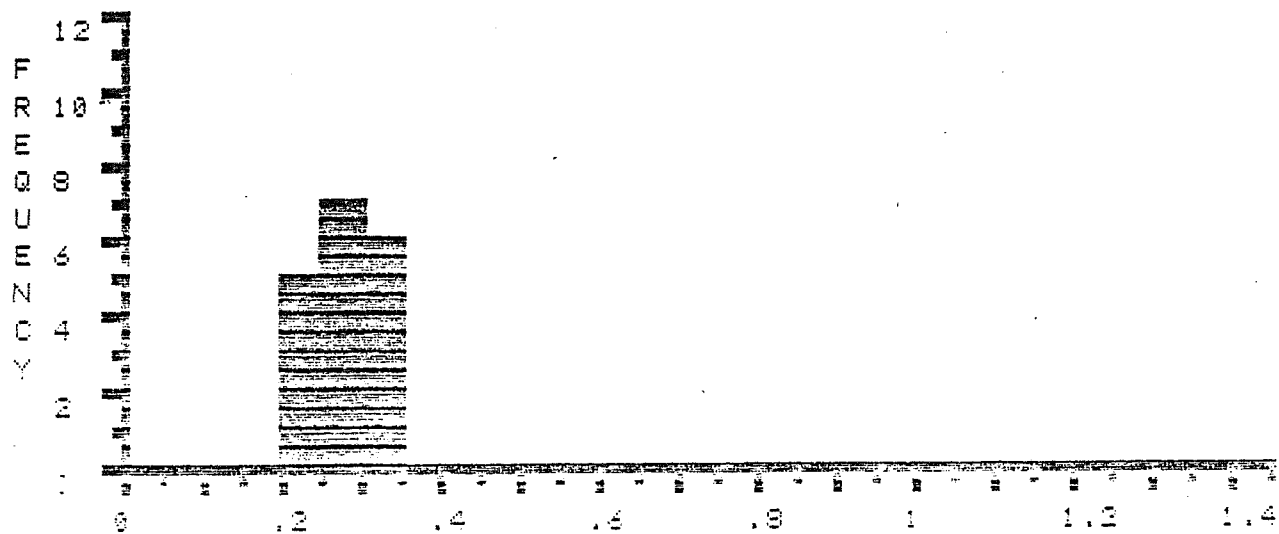SUM : 6.19   NUMBER : 21   MIN : .15   MAX : .72   MEAN : .29   STAN.DEV.: .11

EDITED STATISTICS * * * * *
SUM : 4.87   NUMBER : 18   MIN : .21   MAX : .34   MEAN : .27   STAN.DEV.: .04

% REFLECTANCE

% REFLECTANCE * * EDITED * *

FILE >> K0232B   DESCRIPTION FOLLOWS :
DEPTH 2030-2150', MIGRANT N-28, MIKE AVERY, OCT-20-84

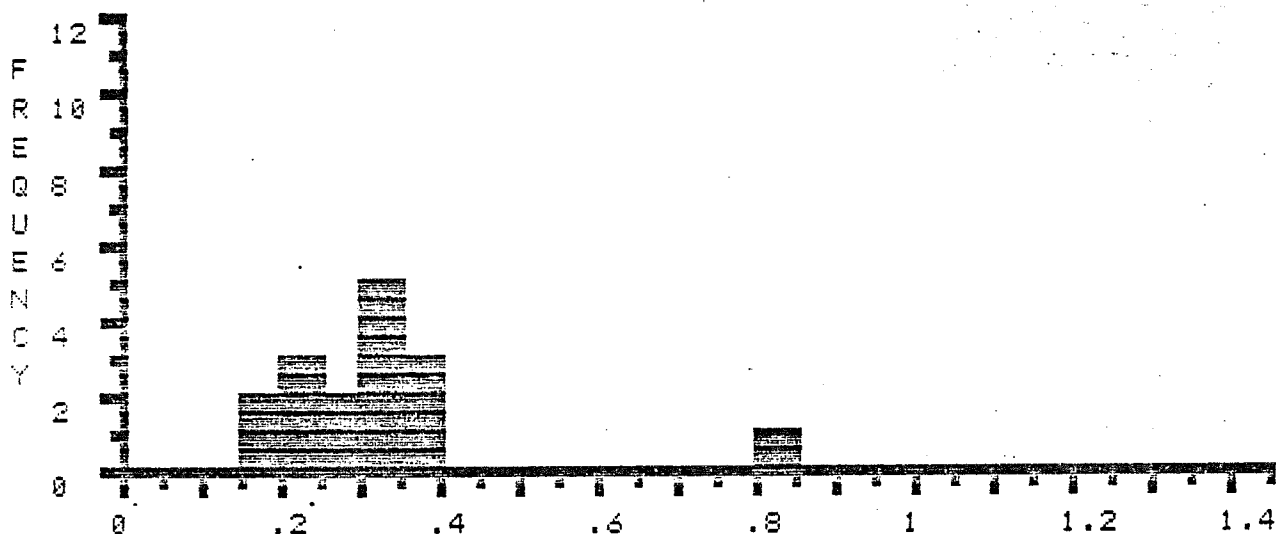COL>   1   2   3   4   5   6   7   8   9   0

ROW   *.18   *.18   *.2   *.22   *.24   *.27   *.28   *.32   *.32   *.33
1-   *.33   *.33   *.35   *.36   *.36   .84

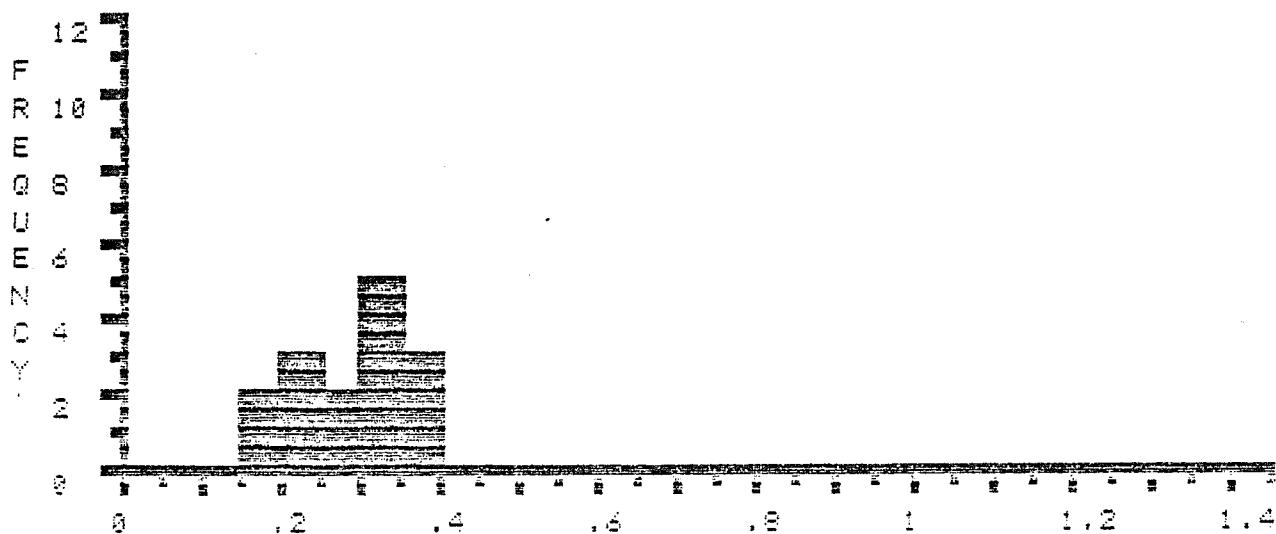SUM : 5.11   NUMBER : 16   MIN : .18   MAX : .84   MEAN : .32   STAN.DEV.: .15

EDITED STATISTICS * * * * *
SUM : 4.27   NUMBER : 15   MIN : .18 MAX : .36   MEAN : .28   STAN.DEV.: .07

% REFLECTANCE

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FILE >> K0232C   DESCRIPTION FOLLOWS :
DEPTH 2578-2690', MIGRANT N-20, MIKE AVERY, OCT-20-84

COL>	1	2	3	4	5	6	7	8	9	. 0
ROW	*.23	*.25	*.28	*.28	*.28	*.31	*.33	*.34	.46	.47
1	.6	.74	.76	.79	.8	.81	.89	.92	.93	.95
2	1.04	1.05	1.12	1.14	1.33					

SUM : 17.1 NUMBER : 25 MIN : .23 MAX : 1.33 MEAN : .68 STAN.DEV.: .34

EDITED STATISTICS * * * *
SUM : 2.3 NUMBER : 8 MIN : .23 MAX : .34 MEAN : .29 STAN.DEV.: .04

% R E F L E C T A N C E

% R E F L E C T A N C E * * EDITED * *

FILE >> K0233A   DESCRIPTION FOLLOWS :
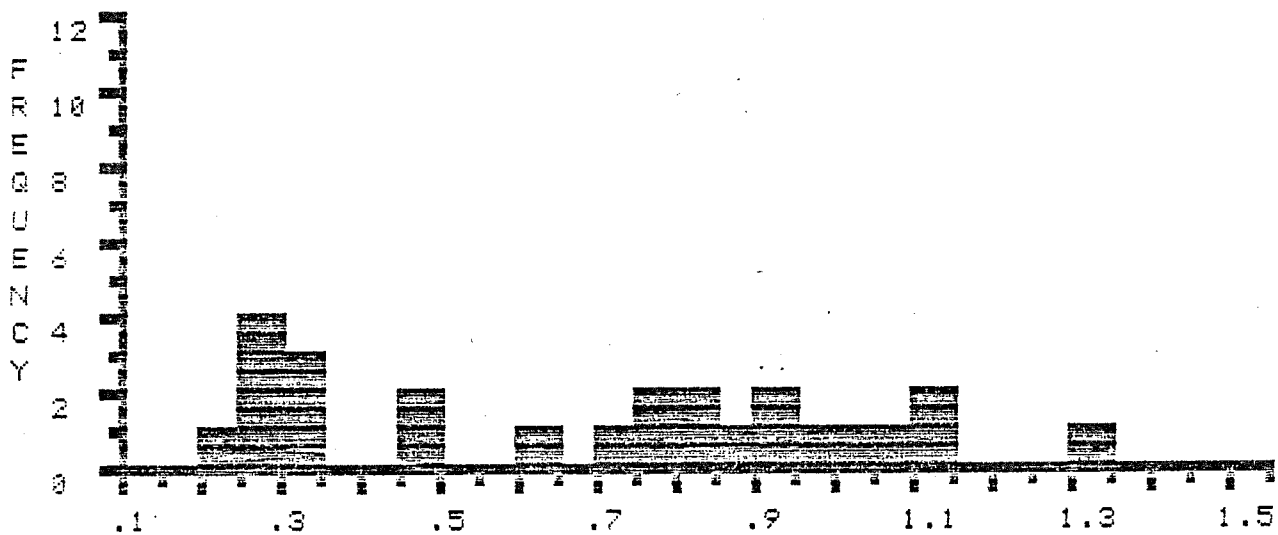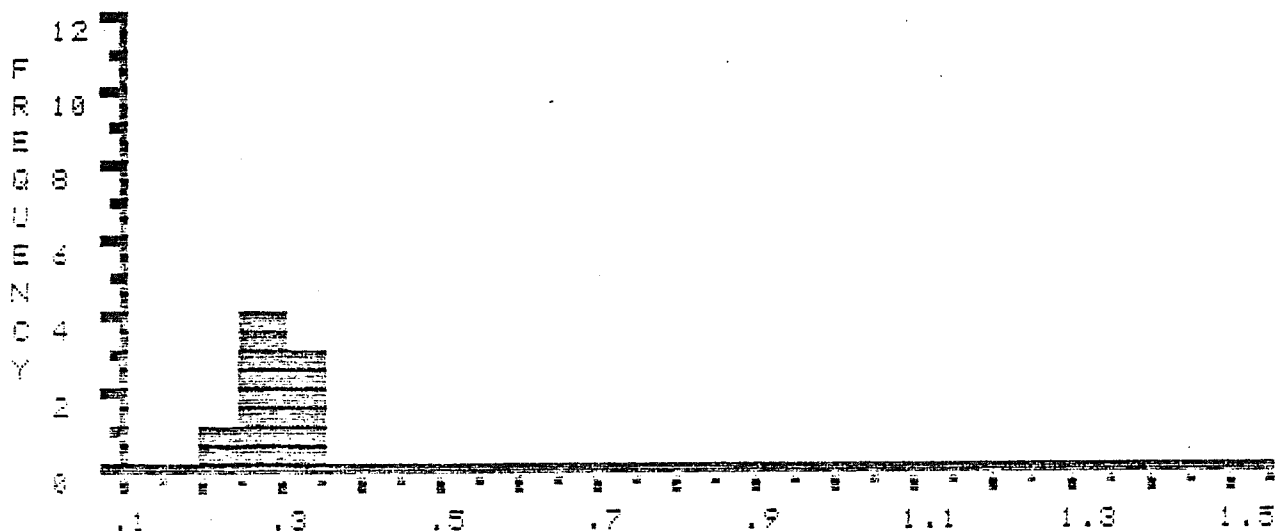DEPTH 2930-2960', MIGRANT N-20, MIKE AVERY, OCT-20-84

COL>   1   2   3   4   5   6   7   8   9   0
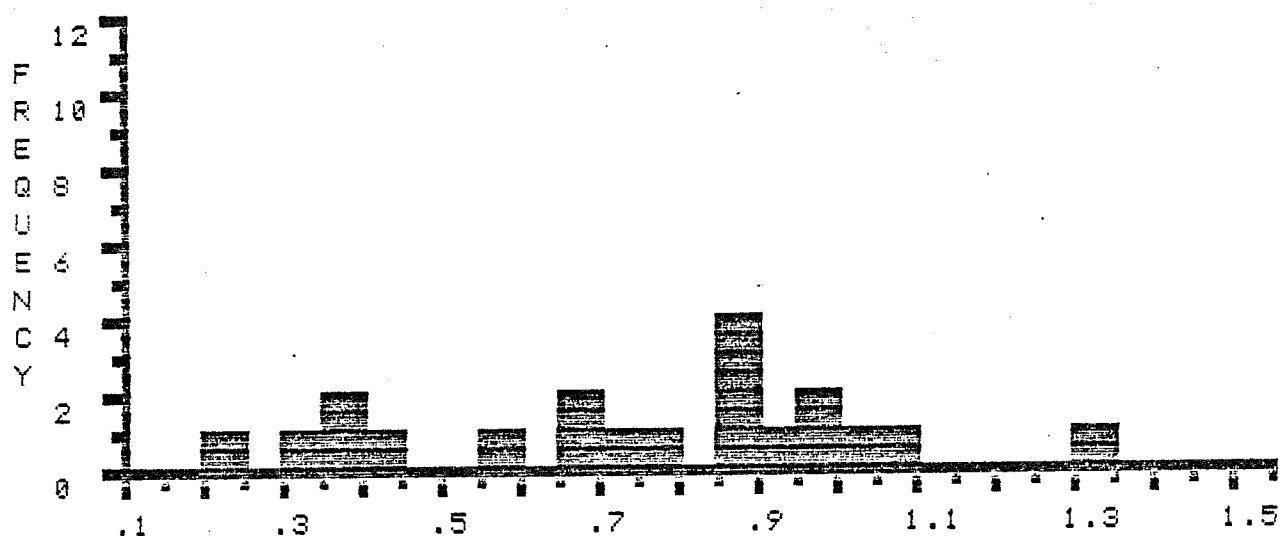
ROW   *.21   *.33   *.37   *.39   *.44   .59   .65   .68   .72   .77
 1   .87   .88   .88   .89   .9   .95   .95   1.02   1.09   1.31

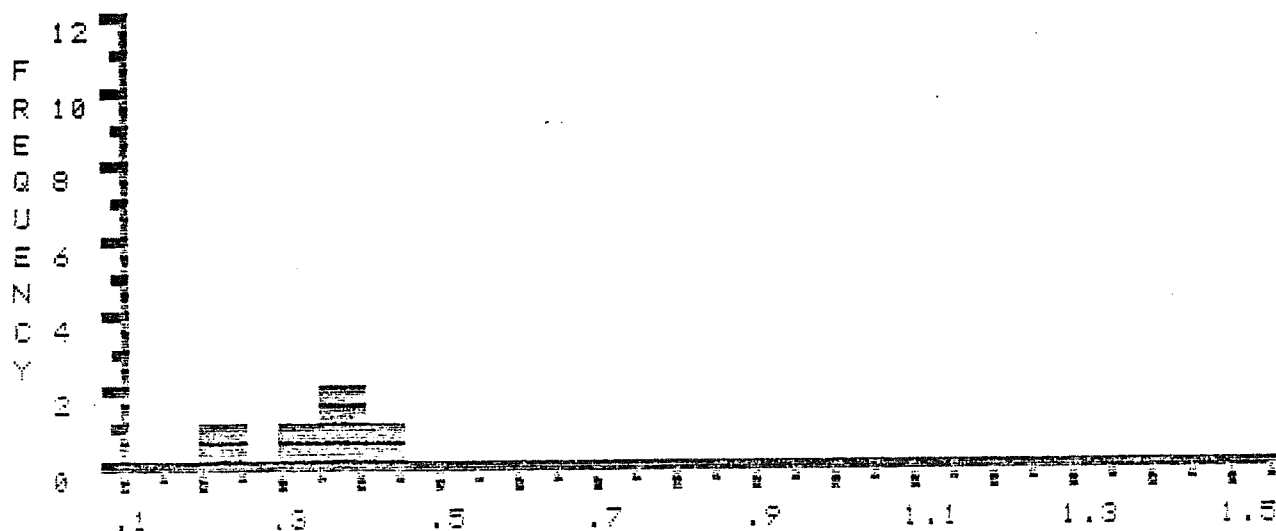SUM : 14.88 NUMBER : 20 MIN : .21   MAX : 1.31   MEAN : .74   STAN.DEV.: .29

EDITED STATISTICS * * * * *
SUM : 1.74 NUMBER : 5 MIN : .21 MAX : .44   MEAN : .35   STAN.DEV.: .09

% REFLECTANCE

% REFLECTANCE * * EDITED * *

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FILE >> K02339      DESCRIPTION FOLLOWS :
DEPTH 3290-3410', MIGRANT N-20, MIKE AVERY, OCT-20-84

COL>     1       2       3       4       5       6       7       8       9       0

ROW    *.27    *.28    *.29    *.29    *.31    *.33    *.34    *.36    *.37    *.4
 1     *.4     *.41    *.44    *.44    *.44    *.47    *.48    *.49    *.5     *.51
 2     *.52    .62     .63     .65     .68     .7      .71     .75     .76     .76
 3     .76     .77     .82     .84     .86     .88     .89     .89     .89     .92
 4     .93     .94     .96     .97     .97     .99     1       1.01    1.03    1.03
 5     1.05    1.06    1.14    1.19

SUM : 37.39  NUMBER : 54  MIN : .27  MAX : 1.19  MEAN : .69  STAN.DEV.: .27

EDITED STATISTICS * * * * *
SUM : 8.34  NUMBER : 21  MIN : .27 MAX :  .52  MEAN : .4  STAN.DEV.: .08
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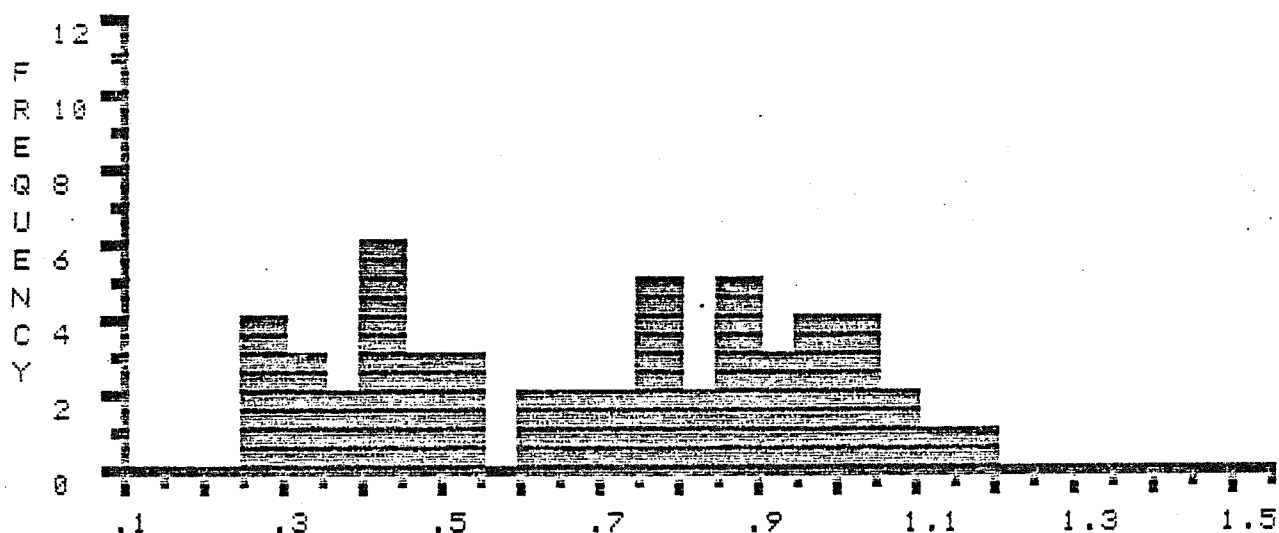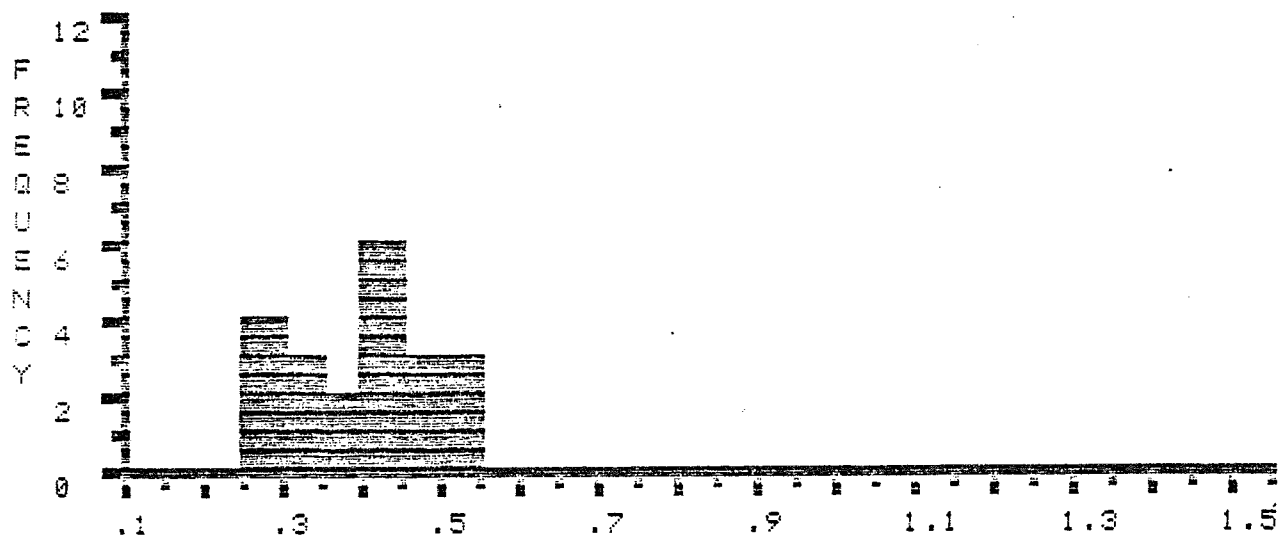
% R E F L E C T A N C E

% R E F L E C T A N C E * * EDITED * *

FILE >> K0233C   DESCRIPTION FOLLOWS :
DEPTH 4010-4040', MIGRANT N-20, MIKE AVERY, OCT-20-84

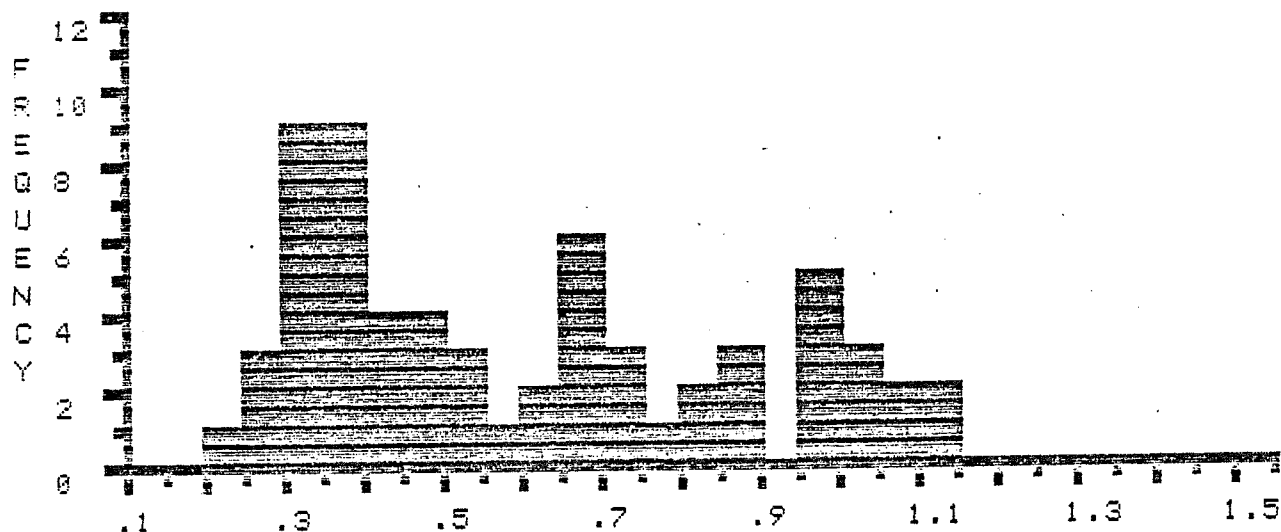COL>   1   2   3   4   5   6   7   8   9   0

ROW   .24   *.28   *.29   *.29   *.31   *.31   *.31   *.31   *.32   *.33
 1   *.34   *.34   *.34   *.35   *.35   *.35   *.35   *.36   *.36   *.36
 2   *.39   *.39   *.41   *.43   *.44   *.44   *.45   *.46   *.48   *.49
 3   .53   .53   .54   .55   .62   .64   .65   .66   .67   .68
 4   .69   .69   .7   .72   .74   .77   .8   .8   .86   .86
 5   .88   .95   .96   .97   .98   .98   1   1.01   1.04   1.06
 6   1.07   1.1   1.14

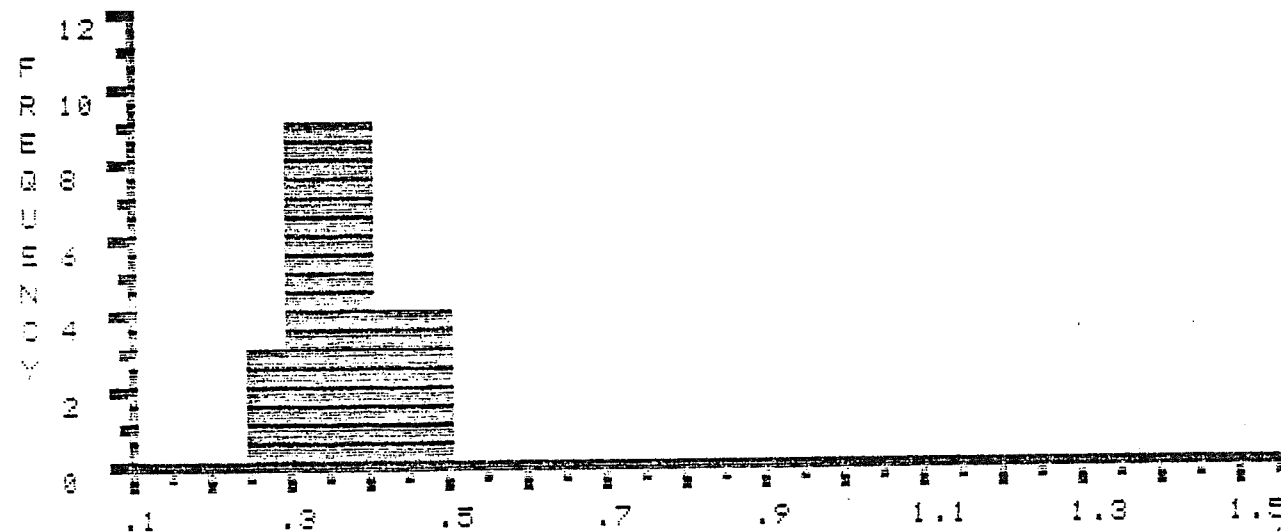SUM : 37.71   NUMBER : 63   MIN : .24   MAX : 1.14   MEAN : .6   STAN.DEV.: .27

EDITED STATISTICS * * * * *
SUM : 10.63   NUMBER : 29   MIN : .28 MAX :   .49   MEAN : .37   STAN.DEV.: .06

% REFLECTANCE

% REFLECTANCE * * EDITED * *

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FILE >> K0234A      DESCRIPTION FOLLOWS :
DEPTH 4670-4780', MIGRANT N-20, MIKE AVERY, OCT-20-84

COL>     1      2      3      4      5      6      7      8      9      0

ROW    *.3    *.3    *.31   *.32   *.32   *.34   *.34   *.34   *.34   *.34
 1     *.34   *.34   *.35   *.35   *.35   *.35   *.35   *.35   *.35   *.35
 2     *.36   *.36   *.36   *.36   *.36   *.36   *.36   *.36   *.36   *.36
 3     *.36   *.36   *.37   *.37   *.37   *.37   *.37   *.37   *.37   *.37
 4     *.38   *.38   *.38   *.38   *.38   *.38   *.38   *.39   *.39   *.39
 5     *.39   *.39   *.39   *.39   *.39   *.39   *.39   *.4    *.4    *.4
 6     *.4    *.41   *.41   *.41   *.42   *.42   *.43   *.44   *.45   *.46
 7      .52    .55    .56    .57    .59    .65    .66    .7     .71    .72
 8      .85   1.07   1.23

SUM : 35.4  NUMBER : 83  MIN : .3  MAX : 1.23  MEAN : .43  STAN.DEV.: .15

EDITED STATISTICS * * * *
SUM : 26.02  NUMBER : 70  MIN : .3 MAX :  .46  MEAN : .37  STAN.DEV.: .03
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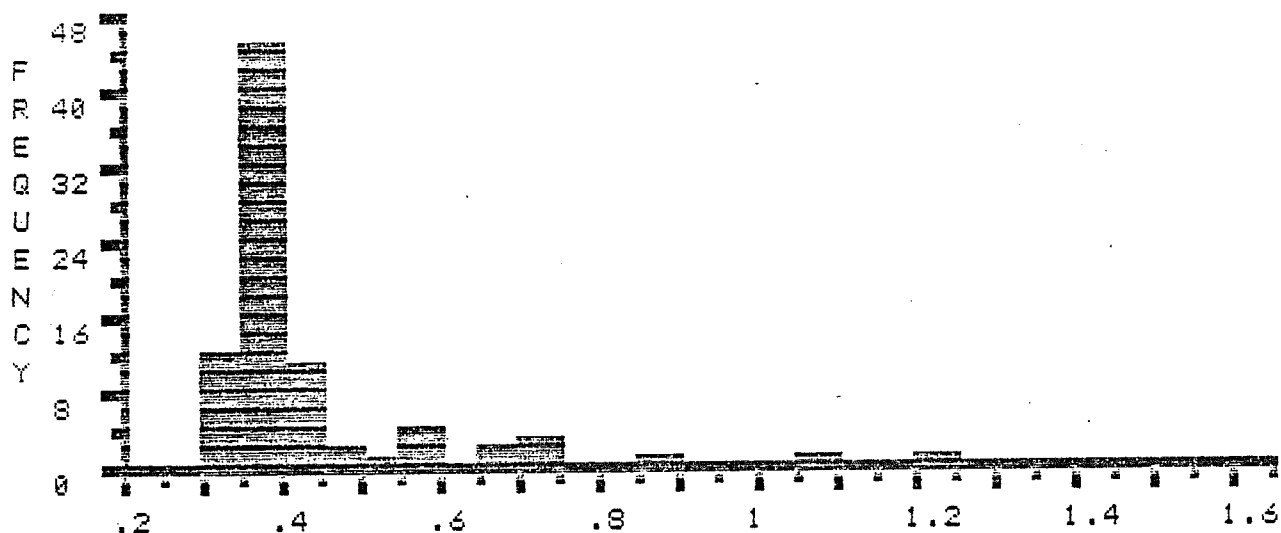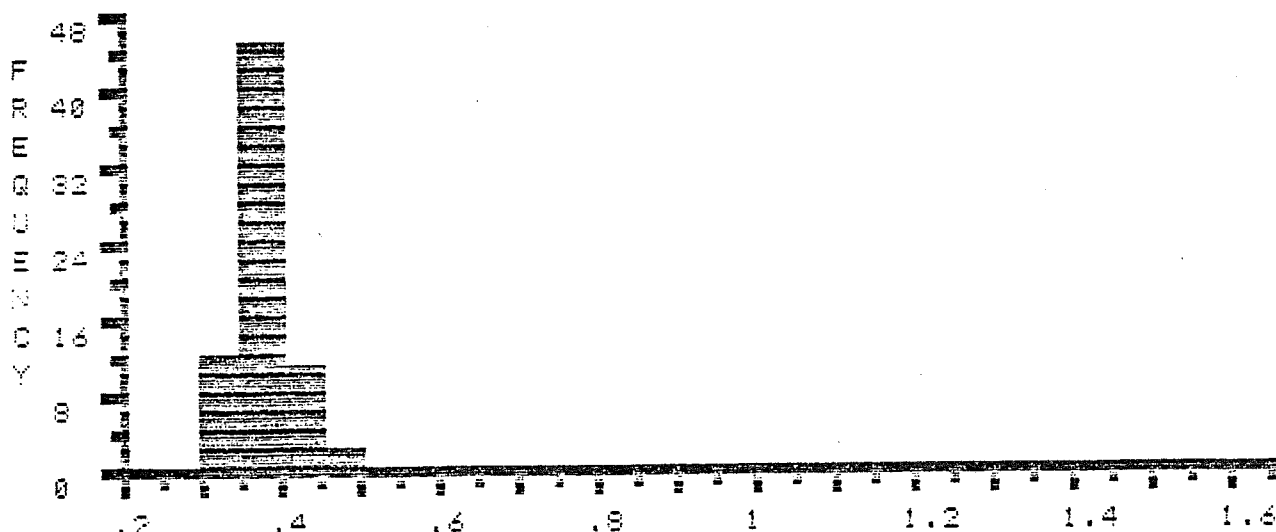
% REFLECTANCE

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FILE >> K02349   DESCRIPTION FOLLOWS :
DEPTH 5480-5600', MIGRANT N-20, MIKE AVERY, OCT-21-84

COL>	1	2	3	4	5	6	7	8	9	0
ROW	.27	*.33	*.33	*.34	*.34	*.34	*.34	*.34	*.35	*.35
1	*.35	*.36	*.36	*.36	*.36	*.36	*.36	*.37	*.37	*.37
2	*.37	*.38	*.38	*.38	*.38	*.38	*.39	*.39	*.4	*.4
3	*.4	*.4	*.41	*.41	*.41	*.42	*.42	*.43	*.43	*.45
4	*.45	*.45	*.45	*.46	*.46	*.47	*.47	*.48	*.48	*.49
5	*.5	.51	.51	.51	.52	.56	.56	.56	.57	.57
6	.59	.62	.62	.63	.64	.65	.65	.65	.65	.67
7	.68	.68	.68	.68	.69	.71	.71	.73	.74	.74
8	.75	.76	.77	.77	.8	.82	.82	.86	.95	.99
9	1.07	1.08	1.11	1.12	1.2	1.3	1.33			

SUM : 54.92   NUMBER : 97   MIN : .27   MAX : 1.33   MEAN : .57   STAN.DEV.: .23

EDITED STATISTICS * * * * *
SUM : 19.87   NUMBER : 50   MIN : .33   MAX :   .5   MEAN : .4   STAN.DEV.: .05

% R E F L E C T A N C E

% R E F L E C T A N C E * * EDITED * *
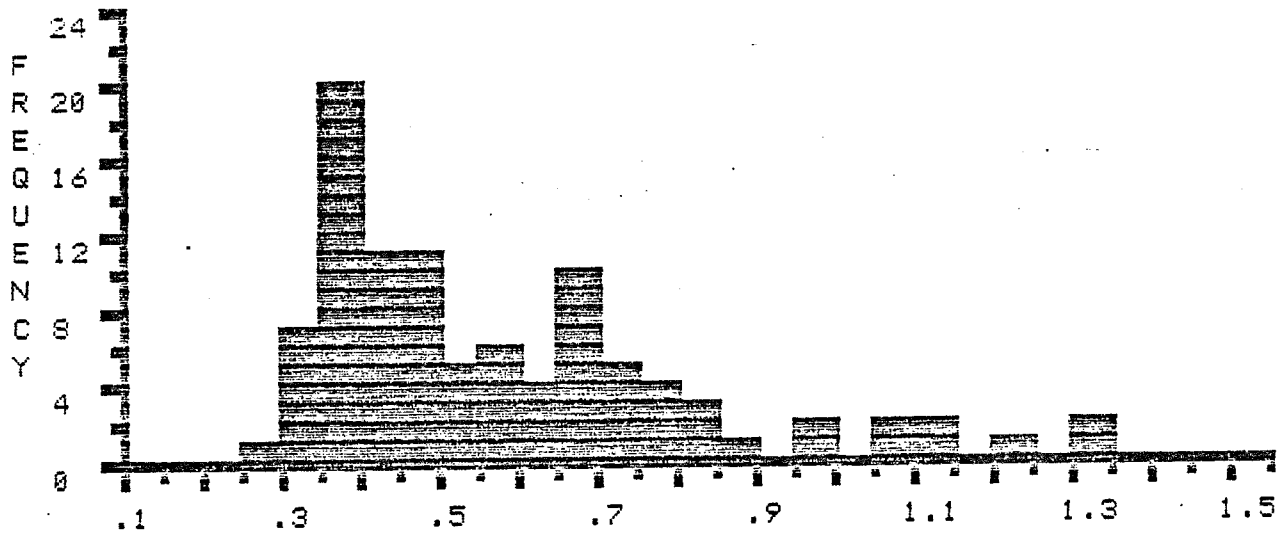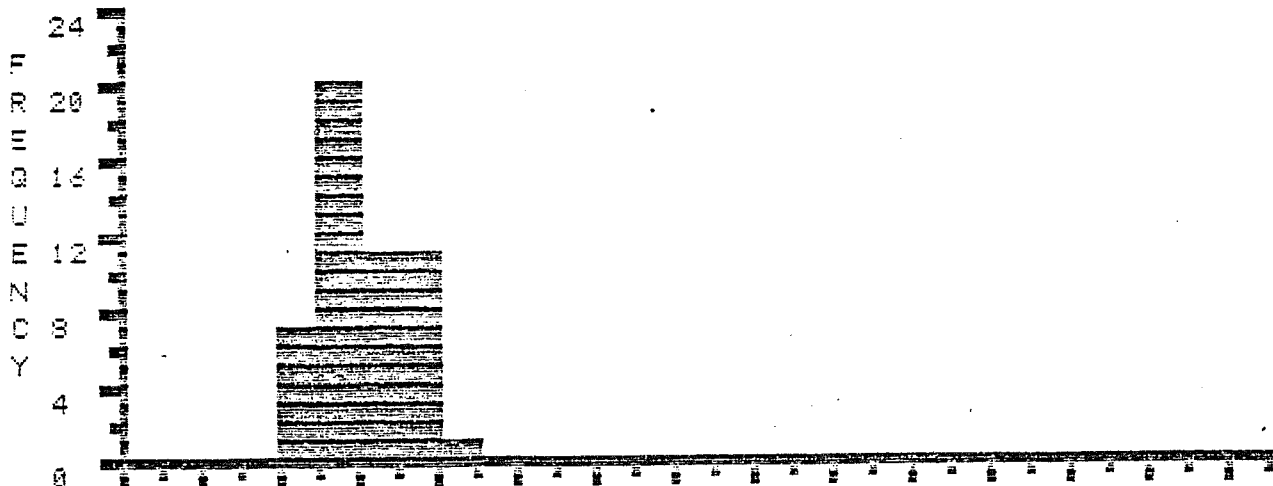
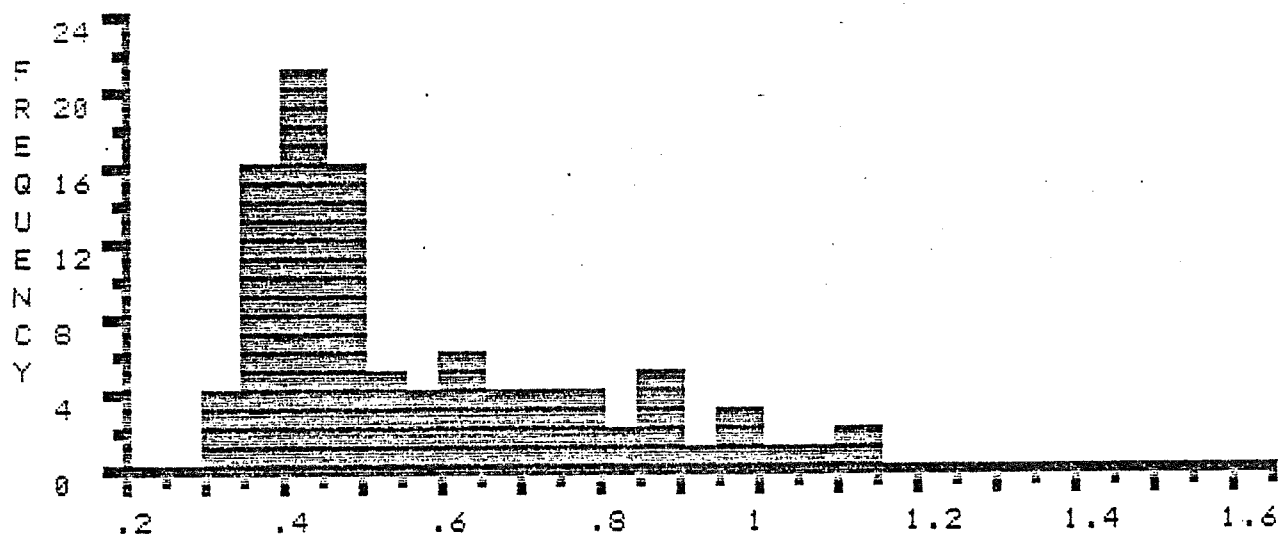FILE >> K0234C   DESCRIPTION FOLLOWS :
DEPTH 6120-6150', MIGRANT N-20, MIKE AVERY, OCT-21-84

COL>   1   2   3   4   5   6   7   8   9   0

ROW   *.32   *.33   *.33   *.33   *.35   *.35   *.36   *.36   *.37   *.37
1   *.38   *.38   *.38   *.38   *.38   *.38   *.39   *.39   *.39   *.39
2   *.4   *.4   *.4   *.4   *.4   *.4   *.4   *.41   *.41   *.41
3   *.41   *.42   *.42   *.42   *.42   *.43   *.43   *.43   *.44   *.44
4   *.44   *.45   *.45   *.45   *.46   *.46   *.46   *.46   *.46   *.46
5   *.46   *.47   *.47   *.48   *.48   *.49   *.49   *.5   *.53   *.53
6   *.53   *.54   .56   .56   .59   .59   .6   .6   .6   .61
7   .63   .64   .66   .67   .67   .68   .71   .72   .72   .74
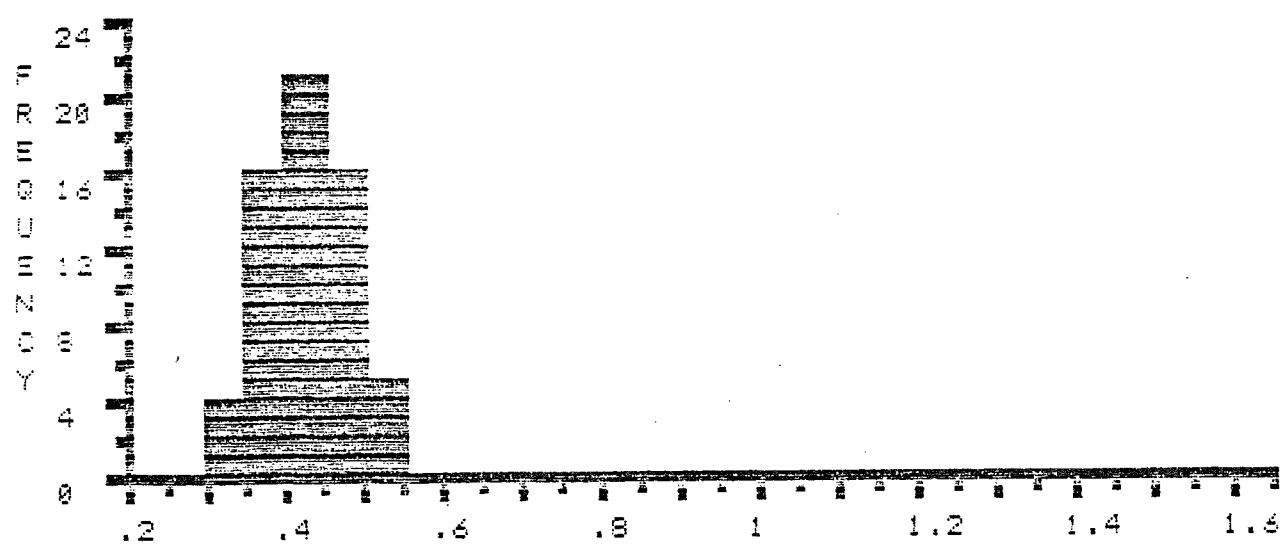8   .75   .75   .76   .78   .82   .83   .87   .87   .87   .88
9   .88   .94   .95   .97   .98   1.01   1.07   1.1   1.12

SUM : 54.87   NUMBER : 99   MIN : .32   MAX : 1.12   MEAN : .55   STAN.DEV.: .2

EDITED STATISTICS * * * *
SUM : 26.12   NUMBER : 62   MIN : .32 MAX : .54   MEAN : .42   STAN.DEV.: .05

% REFLECTANCE

% REFLECTANCE * * EDITED * *

FILE >> K0235A   DESCRIPTION FOLLOWS :
DEPTH 6490-6520', MIGRANT N-20, MIKE AVERY, OCT-21-84

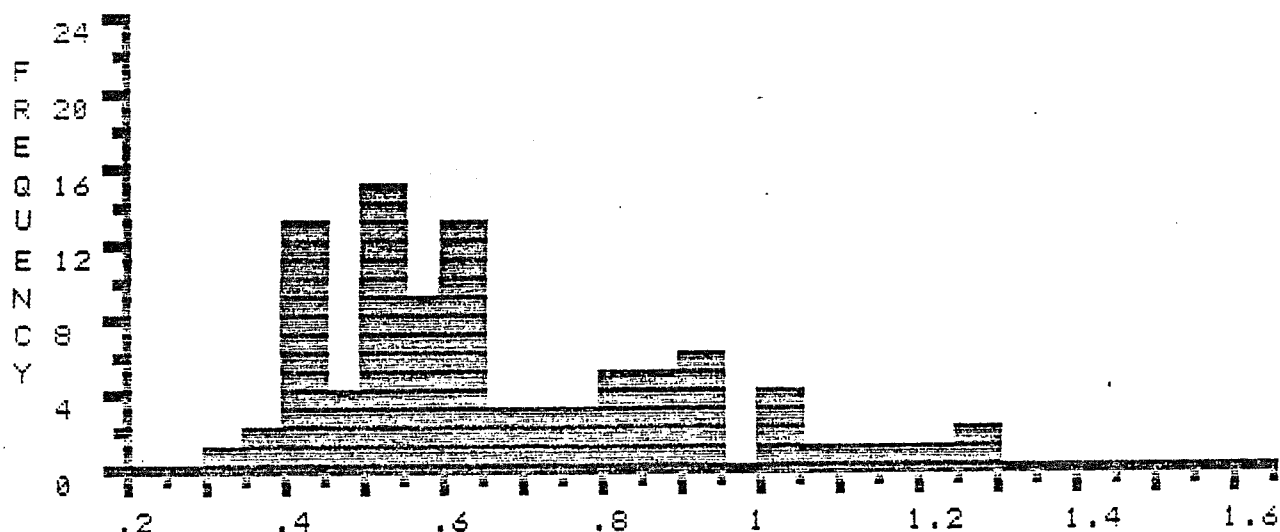| COL>	1	2	3	4	5	6	7	8	9	0
ROW	.33	*.39	*.39	*.4	*.41	*.41	*.41	*.41	*.42	*.42
1	*.43	*.43	*.43	*.43	*.44	*.44	*.46	*.47	*.47	.49
2	.5	.5	.5	.51	.51	.51	.51	.52	.53	.53
3	.54	.54	.54	.54	.54	.56	.56	.57	.58	.58
4	.59	.59	.59	.59	.6	.6	.6	.61	.61	.61
5	.61	.62	.62	.62	.62	.63	.64	.66	.66	.69
6	.7	.7	.74	.77	.78	.78	.8	.81	.82	.82
7	.82	.85	.86	.86	.86	.88	.91	.92	.92	.92
8	.93	.93	1	1.04	1.04	1.04	1.07	1.11	1.17	1.23
9	1.27	1.27								

SUM : 61.13 NUMBER : 92 MIN : .33 MAX : 1.27 MEAN : .66 STAN.DEV.: .22
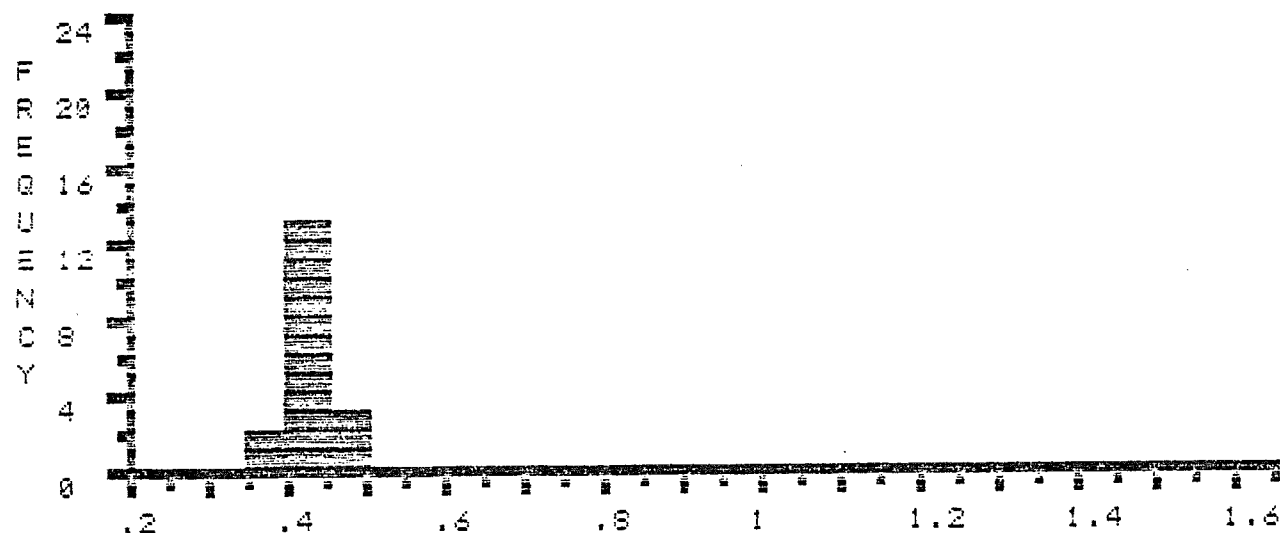
EDITED STATISTICS * * * * *
SUM : 7.66 NUMBER : 18 MIN : .39 MAX : .47 MEAN : .43 STAN.DEV.: .02

% REFLECTANCE

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FILE >> K0235B    DESCRIPTION FOLLOWS :
DEPTH 6970-7000', MIGRANT N-20, MIKE AVERY, OCT-21-84

COL)    1      2      3      4      5      6      7      8      9      0

ROW    *.37   *.38   *.38   *.39   *.39   *.39   *.4    *.4    *.4    *.4
 1     *.4    *.41   *.41   *.42   *.43   *.43   *.43   *.43   *.44   *.44
 2     *.44   *.44   *.44   *.44   *.45   *.46   *.46   *.46   *.46   *.46
 3     *.47   *.47   *.47   *.47   *.47   *.47   *.48   *.48   *.48   *.49
 4     *.49   *.49   *.5    *.5    *.51   *.52   *.52   *.52   *.54    .58
 5      .58    .64    .66    .66    .68    .69    .7     .71    .72    .73
 6      .74    .76    .77    .78    .81    .85    .85    .86    .88    .89
 7      .91    .94    .97
```
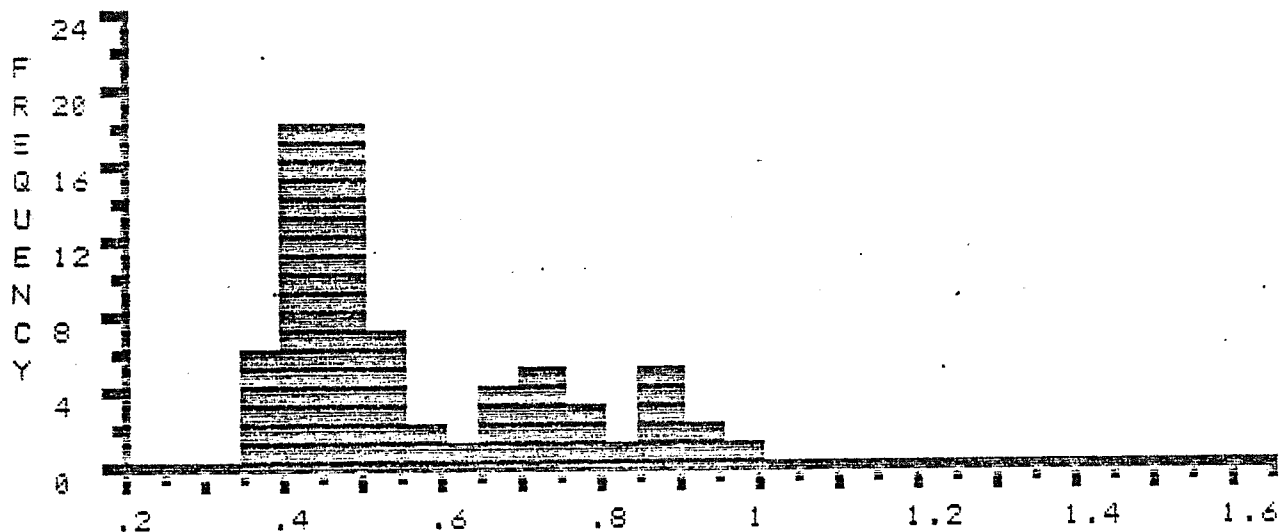
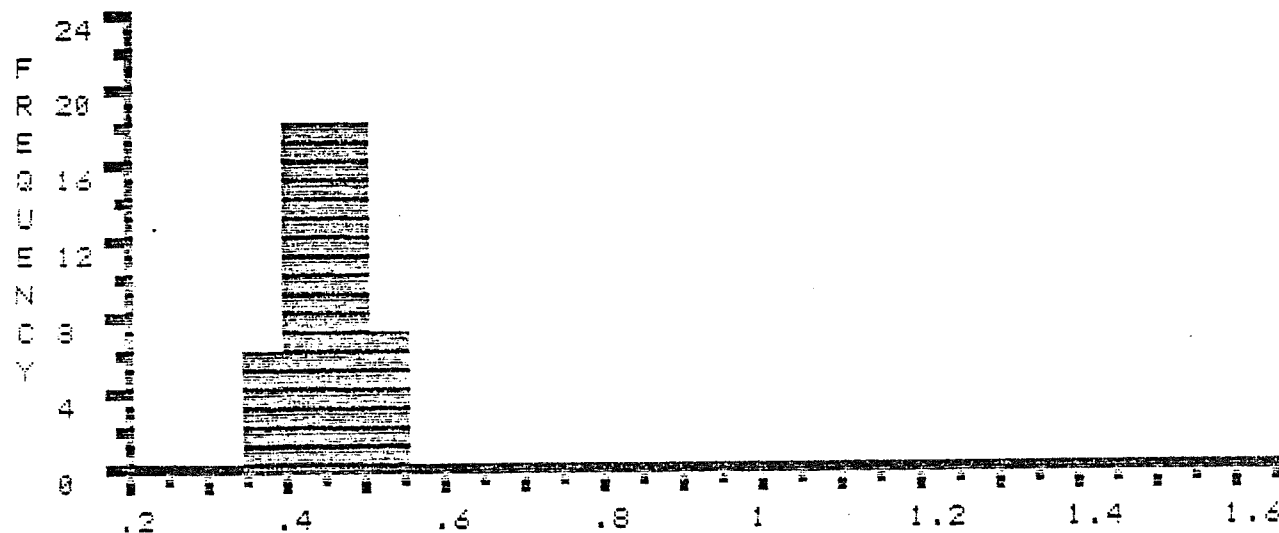SUM : 40.35   NUMBER : 73   MIN : .37   MAX : .97   MEAN : .55   STAN.DEV.: .17

EDITED STATISTICS * * * * *
SUM : 21.99   NUMBER : 49   MIN : .37 MAX :   .54   MEAN : .45   STAN.DEV.: .04

% R E F L E C T A N C E

% R E F L E C T A N C E * * EDITED * *
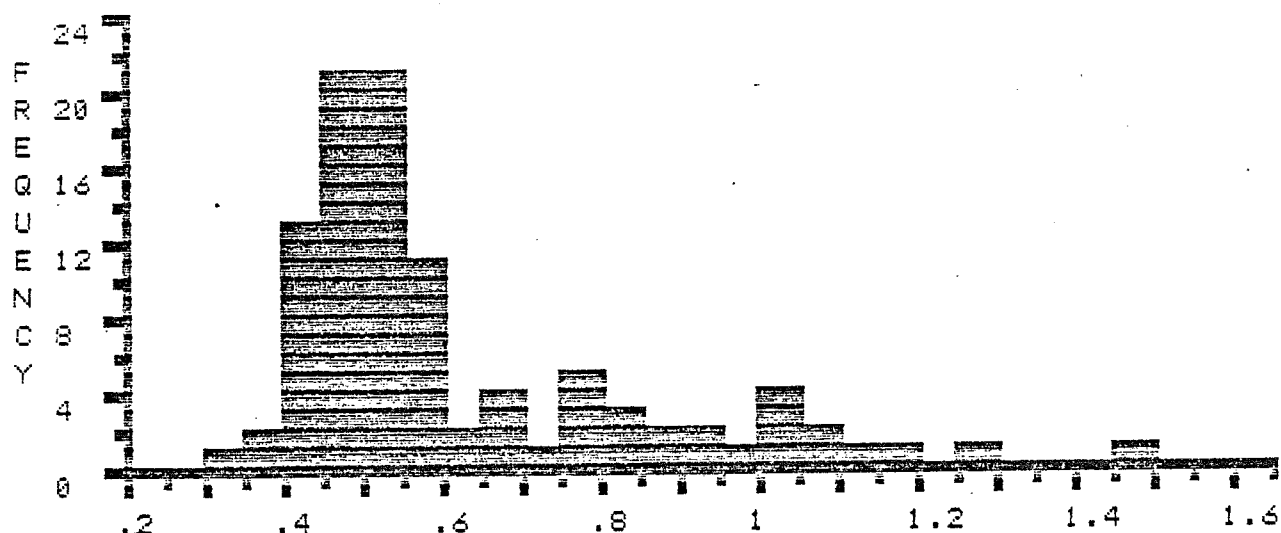
FILE >> K0235C   DESCRIPTION FOLLOWS :
DEPTH 7520-7550', MIGRANT N-20, MIKE AVERY, OCT-24-84

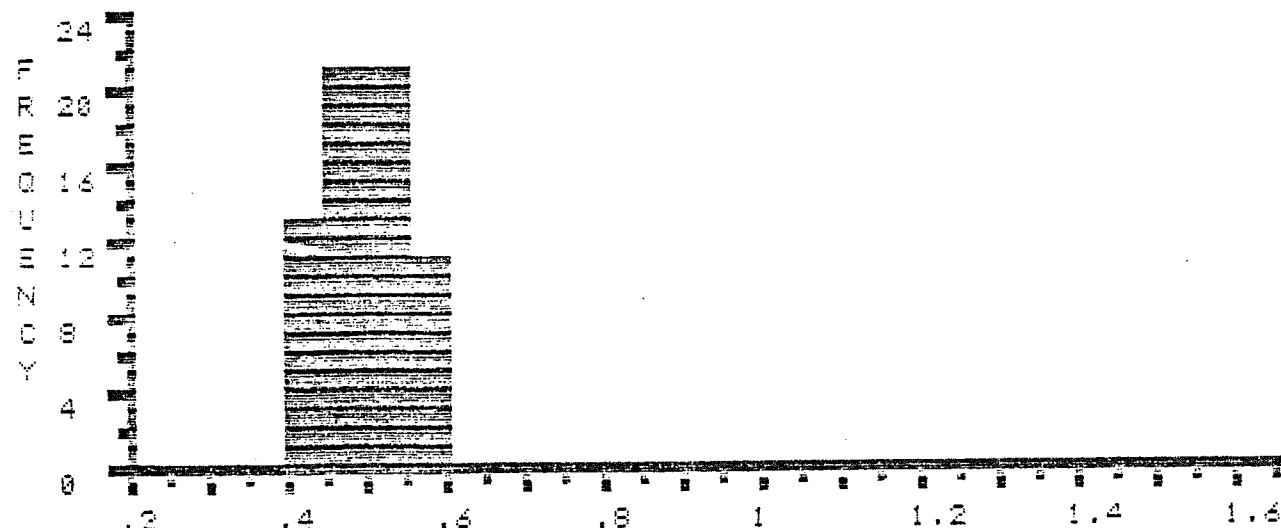| COL>	1	2	3	4	5	6	7	8	9	0
ROW	.3	.35	.35	*.4	*.41	*.42	*.42	*.42	*.42	*.42
1	*.42	*.43	*.44	*.44	*.44	*.44	*.45	*.45	*.45	*.45
2	*.45	*.45	*.46	*.46	*.46	*.46	*.47	*.47	*.48	*.48
3	*.48	*.48	*.48	*.49	*.49	*.49	*.49	*.5	*.5	*.5
4	*.5	*.51	*.51	*.52	*.52	*.52	*.52	*.52	*.53	*.53
5	*.53	*.53	*.53	*.54	*.54	*.54	*.54	*.54	*.55	*.55
6	*.55	*.55	*.56	*.57	*.57	*.58	*.58	*.58	*.59	.62
7	.64	.65	.65	.68	.68	.71	.75	.77	.78	.78
8	.79	.8	.82	.84	.85	.87	.93	.94	.98	1
9	1	1.04	1.04	1.07	1.09	1.14	1.19	1.25	1.47	

SUM : 60.38   NUMBER : 99   MIN : .3   MAX : 1.47   MEAN : .61   STAN.DEV.: .22

EDITED STATISTICS * * * *
SUM : 32.56   NUMBER : 66   MIN : .4   MAX : .59   MEAN : .49   STAN.DEV.: .05

% REFLECTANCE

% REFLECTANCE * * EDITED * *

```
FILE >> K0236A      DESCRIPTION FOLLOWS :
DEPTH 8150-8180', MIGRANT N-20, MIKE AVERY, OCT-24-84

COL>     1      2      3      4      5      6      7      8      9      0

ROW   *.37   *.38   *.39   *.39   *.4    *.4    *.42   *.42   *.42   *.43
 1    *.43   *.44   *.44   *.44   *.44   *.45   *.45   *.45   *.45   *.45
 2    *.46   *.46   *.47   *.47   *.47   *.47   *.47   *.47   *.48   *.48
 3    *.49   *.49   *.49   *.49   *.49   *.49   *.5    *.5    *.5    *.5
 4    *.5    *.51   *.52   *.52   *.52   *.52   *.52   *.52   *.53   *.53
 5    *.53   *.53   *.54   *.54   *.54   *.55   *.55   *.55   *.56   *.56
 6    *.56   *.56   *.57   *.57   *.57   *.58   *.58   *.59   *.59   *.59
 7    *.6    *.62   *.63    .65    .66    .67    .68    .71    .71    .73
 8     .73    .73    .79    .8     .81    .83    .85    .88    .92    .92
 9     .93    .93    .95    .97    .99   1.12   1.13   1.18   1.21

SUM : 58.83  NUMBER : 99  MIN : .37  MAX : 1.21  MEAN : .59  STAN.DEV.: .19

EDITED STATISTICS * * * *
SUM : 36.35  NUMBER : 73  MIN : .37 MAX :   .63  MEAN : .5  STAN.DEV.: .06
```
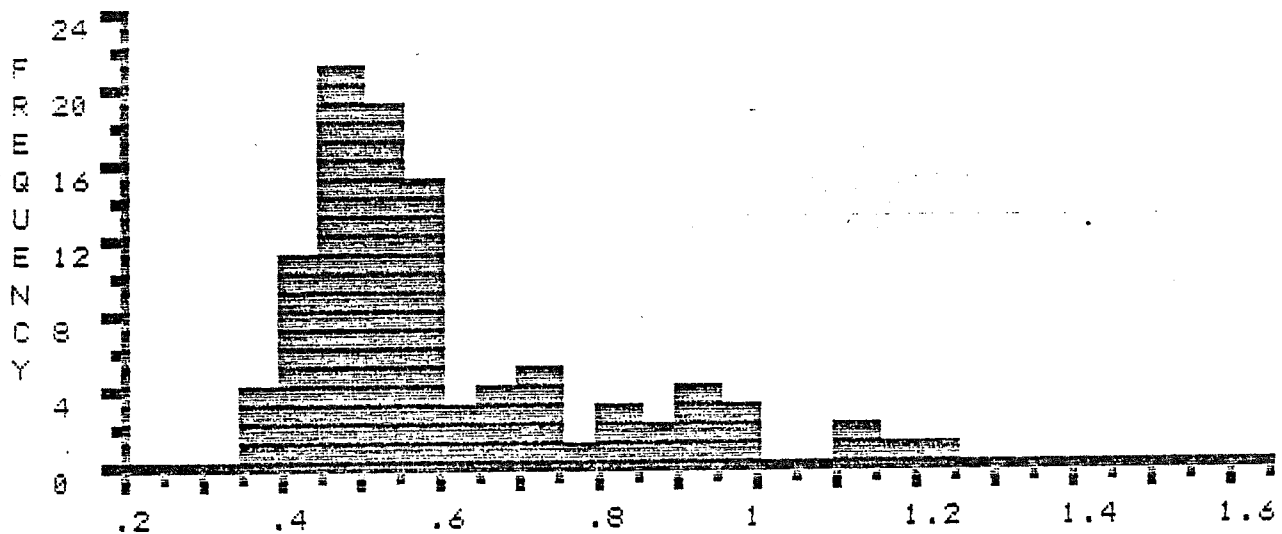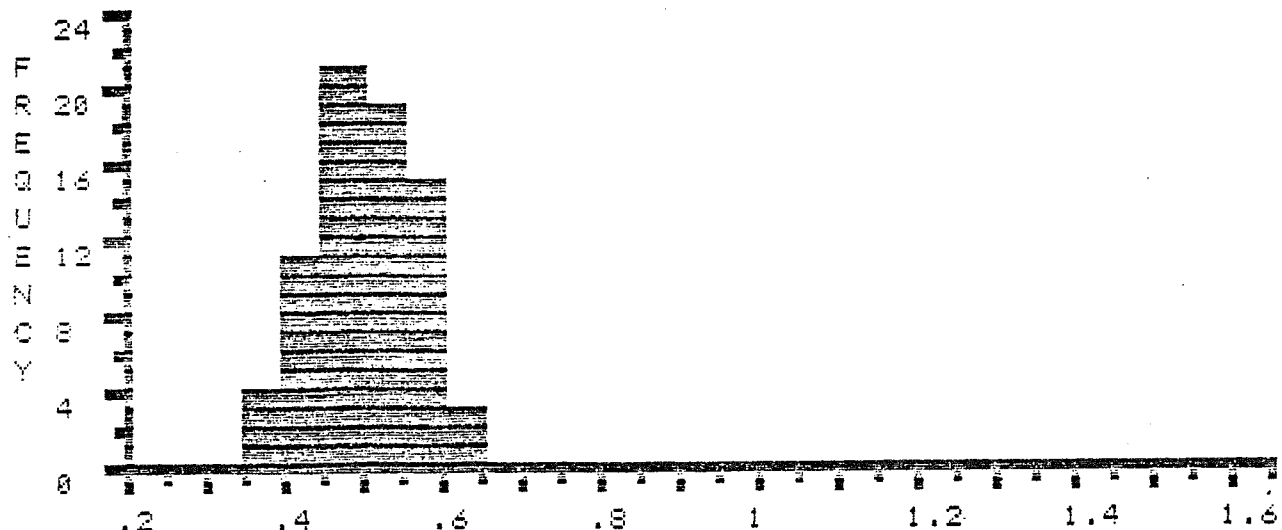
% REFLECTANCE

% REFLECTANCE * * EDITED * *

DEPTH 8520-8550', MIGRANT N-20, MIKE AVERY, OCT-24-84

COL>	1	2	3	4	5	6	7	8	9	0
ROW	.34	.36	*.41	*.41	*.42	*.42	*.43	*.43	*.44	*.45
1	*.45	*.45	*.48	*.48	*.48	*.48	*.49	*.49	*.49	*.5
2	*.5	*.5	*.5	*.5	*.5	*.51	*.52	*.53	*.53	*.53
3	*.53	*.54	*.55	*.55	*.55	*.55	*.55	*.56	*.56	*.56
4	*.56	*.56	*.56	*.57	*.57	*.57	*.58	*.58	*.58	*.59
5	*.59	*.59	*.59	*.6	*.6	*.61	*.61	*.61	*.62	*.63
6	*.64	*.64	*.64	*.64	*.65	*.65	*.66	*.66	*.66	*.66
7	*.67	*.68	*.69	*.69	*.7	*.7	*.72	*.73	.76	.76
8	.78	.79	.79	.8	.8	.9	.9	.91	.92	.93
9	1.03	1.07	1.09	1.11	1.13	1.19	1.23	1.33		

SUM : 62.58   NUMBER : 98   MIN : .34   MAX : 1.33   MEAN : .64   STAN.DEV.: .2

EDITED STATISTICS * * * * *
SUM : 42.66   NUMBER : 76   MIN : .41   MAX : .73   MEAN : .56   STAN.DEV.: .08

% R E F L E C T A N C E

% R E F L E C T A N C E * * EDITED * *

FILE >> K0236C   DESCRIPTION FOLLOWS :
DEPTH 9260-9290', MIGRANT N-20, MIKE AVERY, OCT-25-84
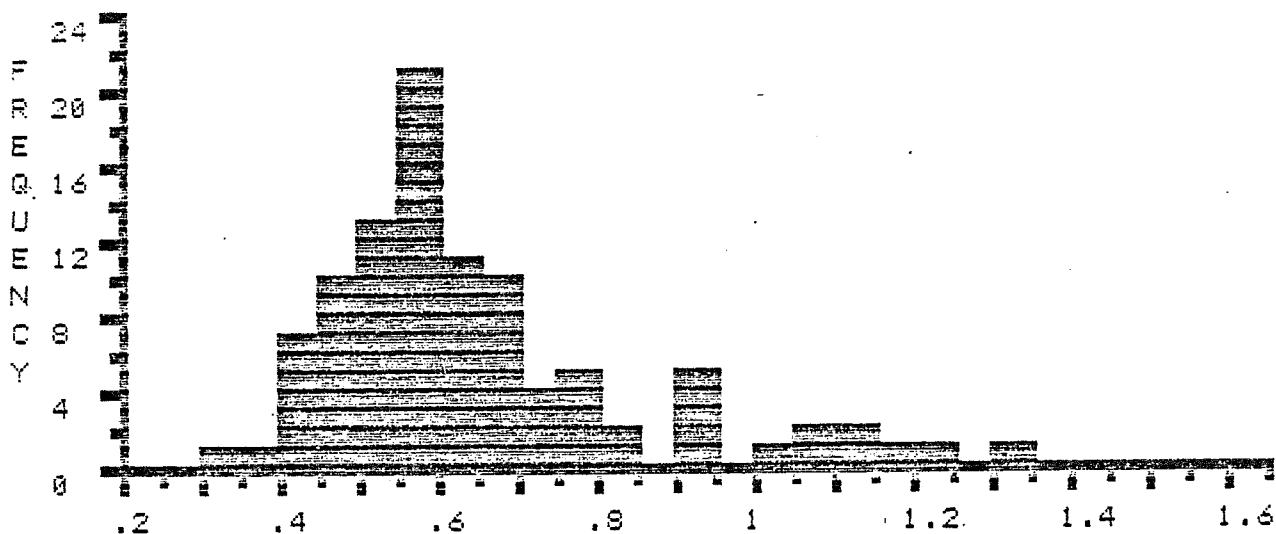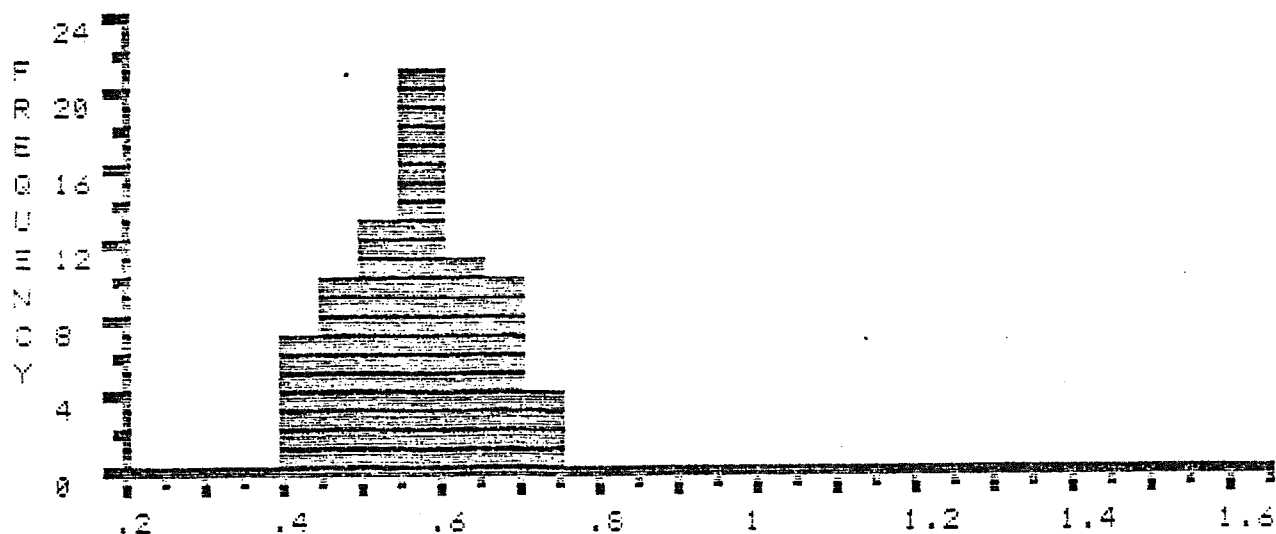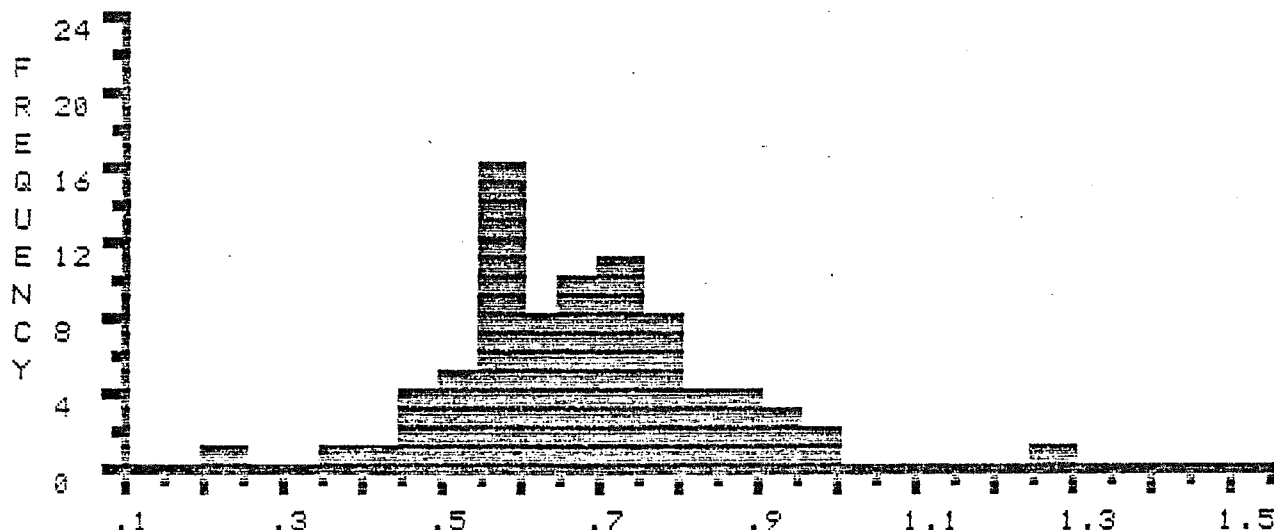
COL>	1	2	3	4	5	6	7	8	9	0
ROW	.24	.35	.4	*.45	*.46	*.47	*.49	*.52	*.53	*.53
1	*.54	*.54	*.55	*.55	*.55	*.55	*.56	*.56	*.56	*.56
2	*.56	*.56	*.58	*.58	*.58	*.58	*.58	*.59	*.6	*.6
3	*.61	*.63	*.63	*.63	*.64	*.64	*.66	*.66	*.67	*.67
4	*.68	*.68	.69	.69	.69	.69	.7	.7	.7	.7
5	.71	.72	.72	.72	.72	.72	.73	.75	.75	.76
6	.77	.78	.78	.78	.79	.8	.81	.82	.84	.85
7	.86	.88	.89	.9	.9	.93	.99	.99	1.25	

SUM : 53.04   NUMBER : 79   MIN : .24   MAX : 1.25   MEAN : .67   STAN.DEV.: .16

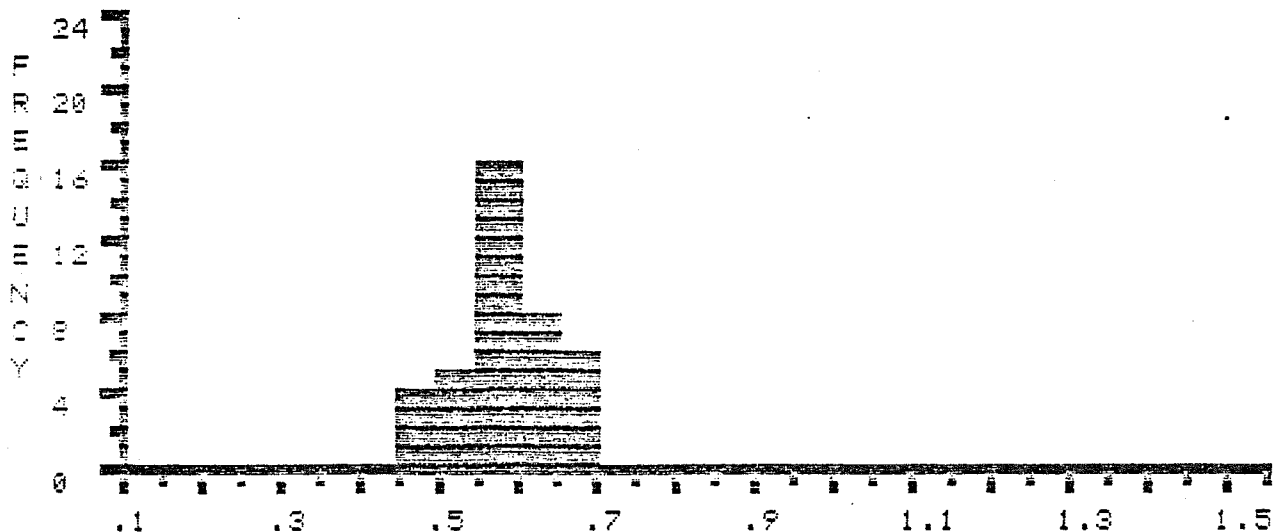EDITED STATISTICS * * * *
SUM : 22.58   NUMBER : 39   MIN : .45 MAX :   .68   MEAN : .58   STAN.DEV.: .06

% R E F L E C T A N C E

% R E F L E C T A N C E * * EDITED * *

FILE >> K0237A   DESCRIPTION FOLLOWS :
DEPTH 9640-9670', MIGRANT N-20, MIKE AVERY, OCT-25-84

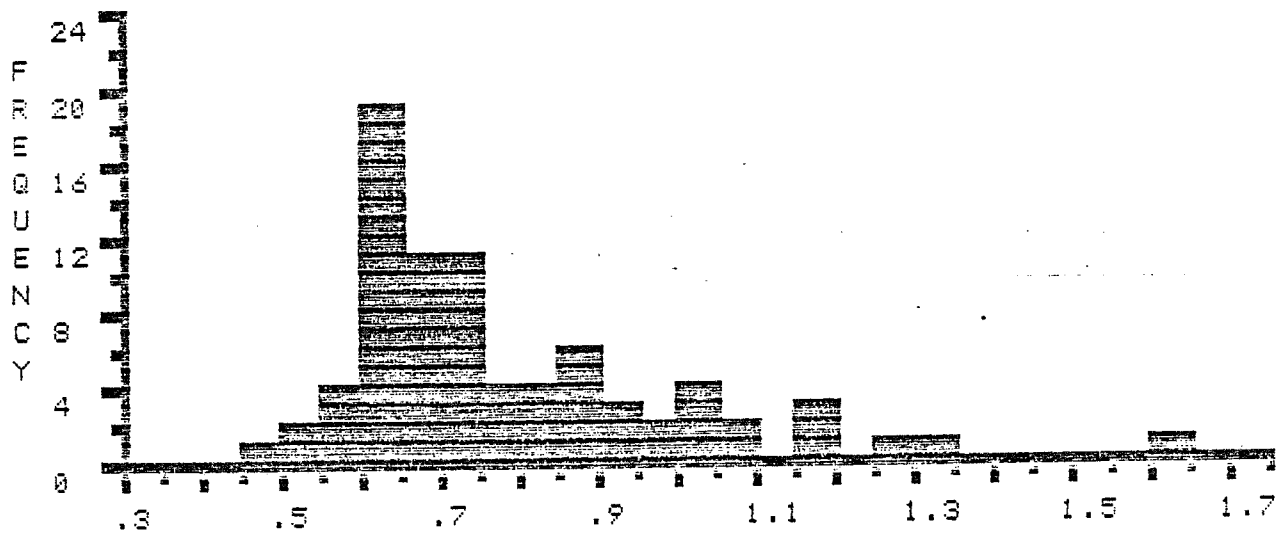COL>   1   2   3   4   5   6   7   8   9   0

ROW   .47   .51   .52   *.56   *.58   *.58   *.59   *.6   *.6   *.6
  1   *.61   *.61   *.61   *.62   *.62   *.62   *.62   *.62   *.62   *.63
  2   *.63   *.63   *.63   *.63   *.64   *.64   *.65   *.65   *.65   *.66
  3   *.67   *.67   *.67   *.68   *.69   *.69   *.69   *.7   *.7   *.7
  4   *.72   *.73   *.73   *.73   *.73   *.74   *.74   *.74   *.75   *.77
  5   *.77   *.78   .81   .82   .83   .84   .85   .86   .86   .87
  6   .88   .89   .9   .91   .93   .98   .99   1.02   1.02   1.03
  7   1.03   1.06   1.09   1.16   1.17   1.19   1.25   1.3   1.64

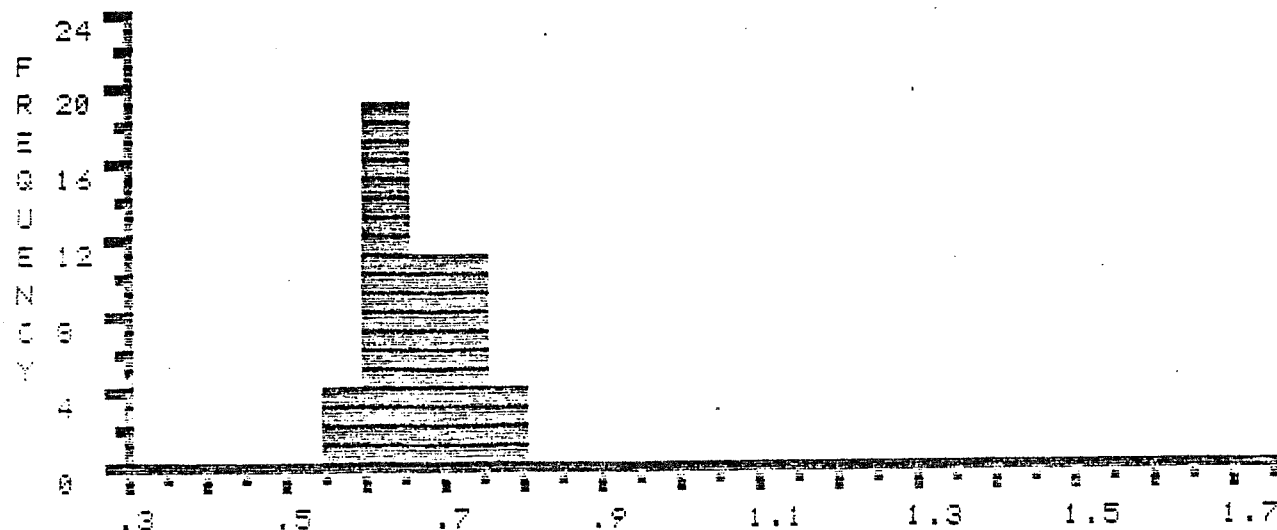SUM : 61.17   NUMBER : 79   MIN : .47   MAX : 1.64   MEAN : .77   STAN.DEV.: .21

EDITED STATISTICS * * * * *
SUM : 32.49   NUMBER : 49   MIN : .56 MAX :   .78   MEAN : .66   STAN.DEV.: .06

% REFLECTANCE

% REFLECTANCE * * EDITED * *

```
FILE >> K0237B      DESCRIPTION FOLLOWS :
DEPTH 10190-10220', MIGRANT N-20, MIKE AVERY, OCT-25-84

COL>     1      2      3      4      5      6      7      8      9      0

ROW     .36    .44   *.47   *.48   *.49   *.49   *.49   *.5    *.5    *.5
 1     *.52   *.53   *.53   *.54   *.54   *.55   *.56   *.56   *.56   *.56
 2     *.57   *.57   *.57   *.57   *.57   *.58   *.58   *.58   *.58   *.59
 3     *.59   *.59   *.59   *.59   *.6    *.6    *.6    *.6    *.6    *.6
 4     *.61   *.61   *.61   *.61   *.61   *.62   *.62   *.62   *.62   *.63
 5     *.63   *.63   *.63   *.63   *.63   *.64   *.64   *.65   *.65   *.65
 6     *.65   *.66   *.66   *.66   *.66   *.66   *.67   *.67   *.67   *.67
 7     *.67   *.67   *.67   *.68   *.69   *.69   *.69   *.69   *.69   *.7
 8     *.71   *.71   *.71   *.71   *.72   *.72   *.73   *.73   *.74   *.74
 9     *.75   *.77   *.77   *.78   *.78   *.79    .89    .99   1.29

SUM : 62.93  NUMBER : 99  MIN : .36  MAX : 1.29  MEAN : .64  STAN.DEV.: .11

EDITED STATISTICS * * * * *
SUM : 58.96  NUMBER : 94  MIN : .47 MAX :  .79  MEAN : .63  STAN.DEV.: .08
```
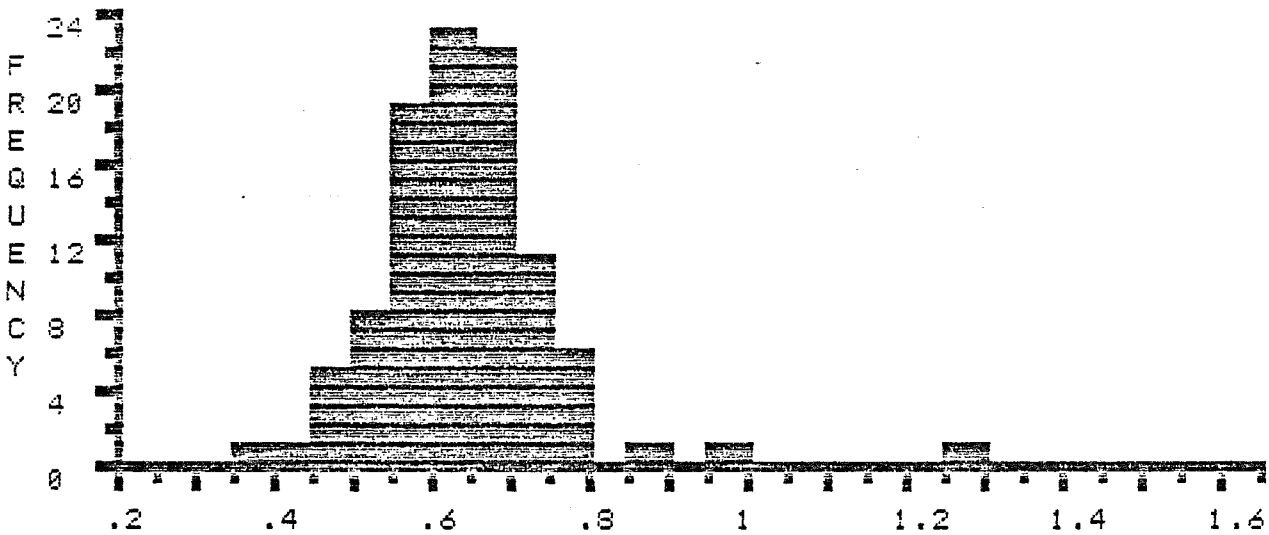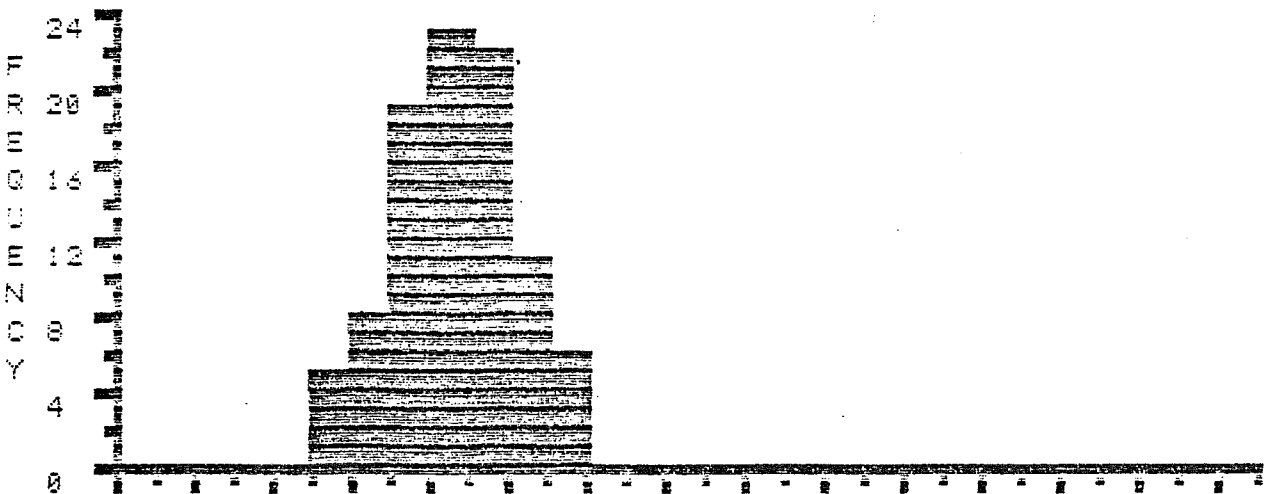
% REFLECTANCE

% REFLECTANCE * * EDITED * *

```
FILE >> K0237C     DESCRIPTION FOLLOWS :
DEPTH 10850-10880', MIGRANT N-20, MIKE AVERY, OCT-25-84

COL>    1      2      3      4      5      6      7      8      9      0

ROW    *.5    *.53   *.54   *.55   *.55   *.55   *.56   *.56   *.56   *.56
 1     *.57   *.57   *.57   *.57   *.57   *.58   *.58   *.58   *.58   *.59
 2     *.59   *.59   *.59   *.59   *.59   *.59   *.6    *.6    *.6    *.61
 3     *.61   *.62   *.62   *.62   *.62   *.62   *.62   *.62   *.62   *.63
 4     *.63   *.64   *.64   *.64   *.64   *.64   *.64   *.64   *.65   *.65
 5     *.65   *.65   *.65   *.65   *.66   *.66   *.66   *.66   *.66   *.66
 6     *.66   *.66   *.66   *.66   *.67   *.67   *.67   *.67   *.67   *.67
 7     *.67   *.67   *.68   *.68   *.68   *.68   *.69   *.69   *.7    *.7
 8     *.71   *.72   *.72   *.73   *.74   *.74   *.75   *.76   *.78   *.79
 9      .92    .93   1.12   1.15   1.16   1.21   1.22   1.25   1.59

SUM : 67.83  NUMBER : 99  MIN : .5   MAX : 1.59   MEAN : .69   STAN.DEV.: .17

EDITED STATISTICS * * * * *
SUM : 57.29  NUMBER : 90  MIN : .5 MAX :  .79   MEAN : .64   STAN.DEV.: .06
```
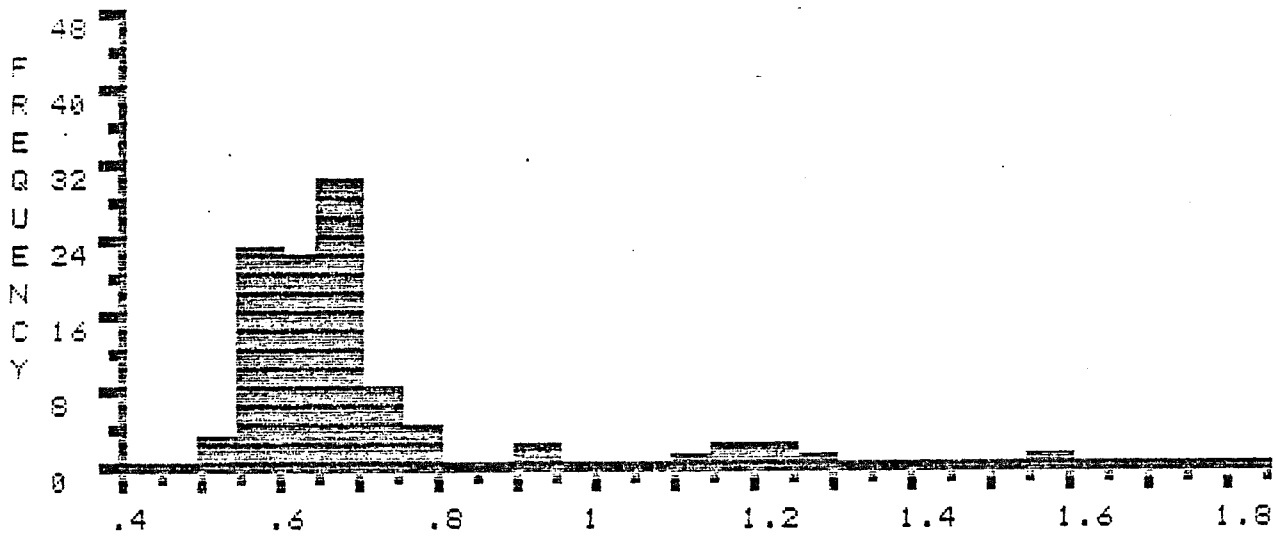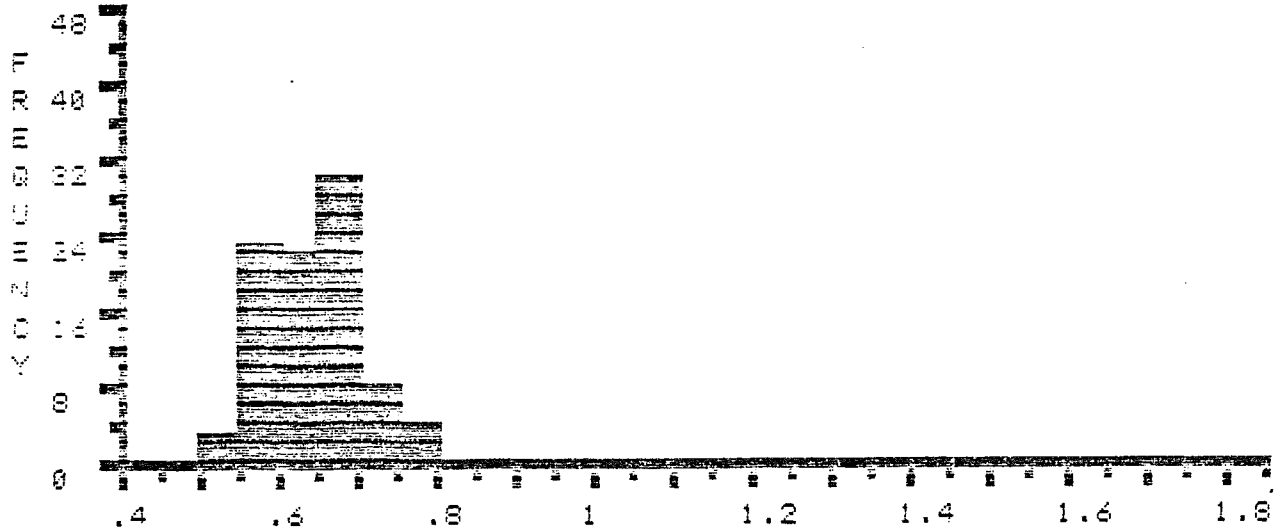
% REFLECTANCE

% REFLECTANCE * * EDITED * *

FILE >> K0238A   DESCRIPTION FOLLOWS :
DEPTH 11240-11270', MIGRANT N-20, MIKE AVERY, OCT-26-84

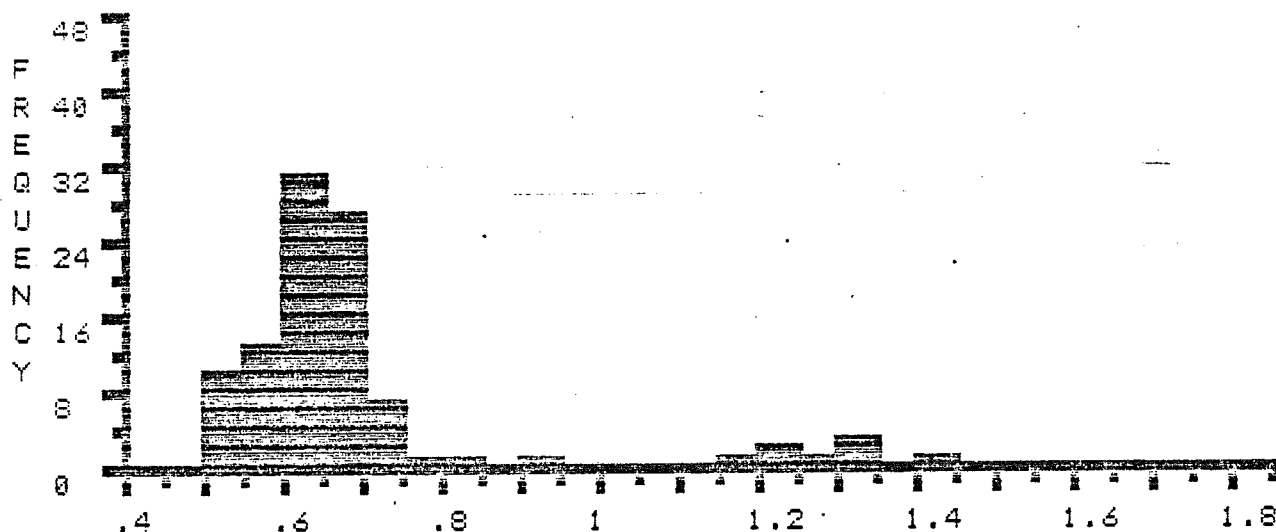| COL>	1	2	3	4	5	6	7	8	9	0
ROW	*.51	*.51	*.51	*.53	*.53	*.54	*.54	*.54	*.54	*.54
1	*.55	*.55	*.55	*.55	*.55	*.55	*.56	*.57	*.57	*.57
2	*.58	*.58	*.59	*.6	*.6	*.6	*.6	*.61	*.61	*.61
3	*.61	*.61	*.62	*.62	*.62	*.62	*.62	*.63	*.63	*.63
4	*.63	*.63	*.63	*.63	*.63	*.63	*.64	*.64	*.64	*.64
5	*.64	*.64	*.64	*.64	*.65	*.65	*.65	*.65	*.65	*.65
6	*.66	*.66	*.66	*.66	*.66	*.67	*.67	*.67	*.67	*.67
7	*.67	*.68	*.68	*.68	*.68	*.68	*.68	*.68	*.69	*.69
8	*.69	*.7	*.7	*.7	*.7	*.71	*.71	*.74	*.75	.81
9	.93	1.17	1.2	1.2	1.29	1.3	1.31	1.33	1.43	

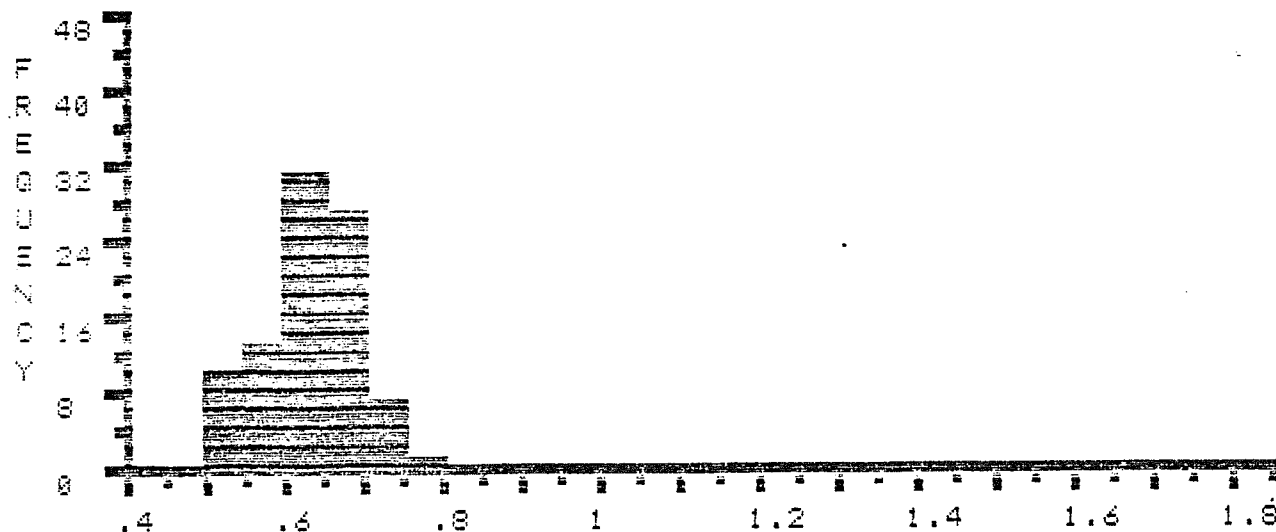SUM : 67.68   NUMBER : 99   MIN : .51   MAX : 1.43   MEAN : .68   STAN.DEV.: .19

EDITED STATISTICS * * * * *
SUM : 55.71   NUMBER : 89   MIN : .51   MAX : .75   MEAN : .63   STAN.DEV.: .06

% REFLECTANCE

% REFLECTANCE * * EDITED * *

FILE >> K0238B   DESCRIPTION FOLLOWS :
DEPTH 11600-11630', MIGRANT N-20, MIKE AVERY, OCT-26-84

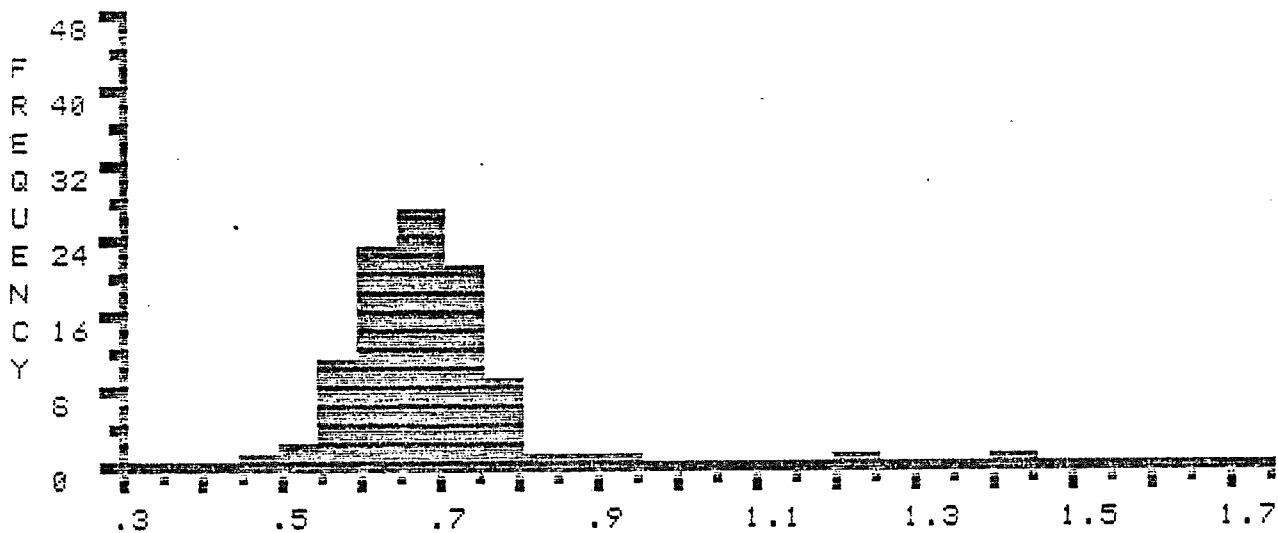COL>   1   2   3   4   5   6   7   8   9   0

ROW   .47   *.53   *.54   *.55   *.56   *.56   *.57   *.57   *.58   *.58
 1   *.59   *.59   *.59   *.59   *.6   *.6   *.6   *.61   *.61   *.61
 2   *.61   *.61   *.62   *.62   *.62   *.62   *.62   *.62   *.63   *.63
 3   *.63   *.63   *.64   *.64   *.64   *.64   *.64   *.65   *.65   *.65
 4   *.65   *.66   *.66   *.66   *.66   *.66   *.66   *.66   *.66   *.66
 5   *.67   *.67   *.67   *.67   *.67   *.67   *.68   *.68   *.68   *.68
 6   *.69   *.69   *.69   *.69   *.7   *.7   *.7   *.7   *.7   *.71
 7   *.71   *.71   *.71   *.71   *.71   *.71   *.71   *.72   *.72   *.72
 8   *.72   *.72   *.73   *.74   *.74   *.75   *.75   *.75   *.76   *.77
 9   *.77   *.77   *.77   *.78   *.8   .87   .94   1.22   1.4

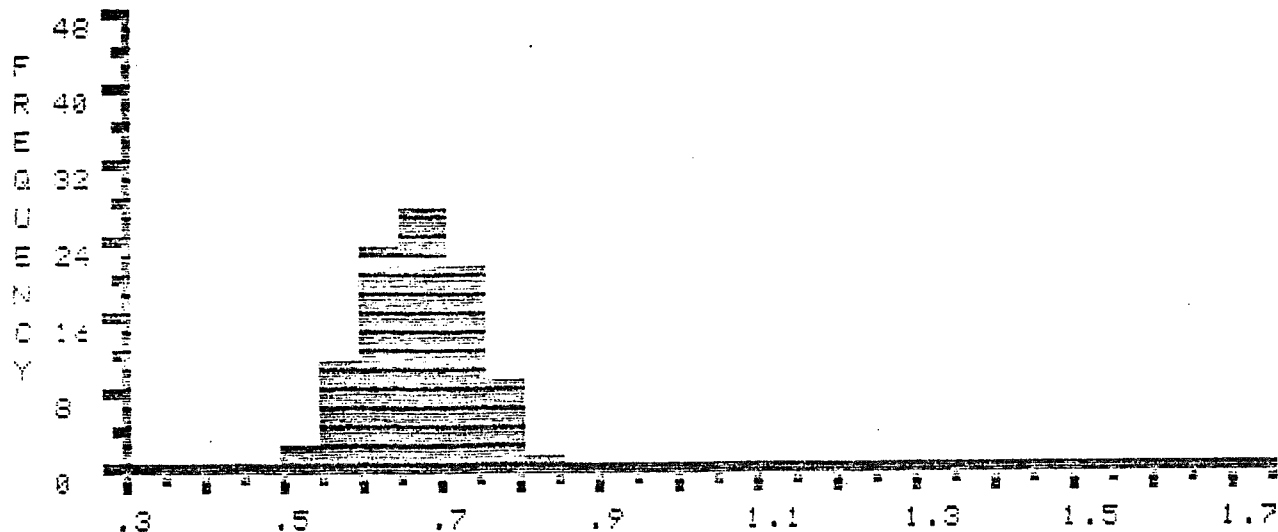SUM : 67.29   NUMBER : 99   MIN : .47   MAX : 1.4   MEAN : .68   STAN.DEV.: .12

EDITED STATISTICS * * * *
SUM : 62.39   NUMBER : 94   MIN : .53   MAX : .8   MEAN : .66   STAN.DEV.: .06

% REFLECTANCE

% REFLECTANCE * * EDITED * *

COL>	1	2	3	4	5	6	7	8	9	0
ROW	.43	.52	.54	.6	*.63	*.65	*.66	*.66	*.66	*.66
1	*.68	*.69	*.69	*.7	*.7	*.7	*.7	*.7	*.71	*.71
2	*.71	*.71	*.72	*.72	*.73	*.73	*.73	*.73	*.73	*.73
3	*.74	*.74	*.74	*.75	*.75	*.75	*.76	*.76	*.76	*.76
4	*.77	*.77	*.77	*.77	*.77	*.77	*.78	*.78	*.78	*.79
5	*.8	*.8	*.8	*.81	*.81	*.81	*.81	*.81	*.82	*.82
6	*.82	*.83	*.83	*.83	*.84	*.84	*.84	*.85	*.85	*.85
7	*.85	*.85	*.86	*.86	*.86	*.87	*.87	*.88	*.88	*.88
8	*.88	*.89	*.89	*.89	*.9	*.92	*.92	*.93	*.93	*.93
9	*.95	*.95	.99	1.02	1.08	1.2	1.28	1.39	1.49	

SUM : 80.05 NUMBER : 99 MIN : .43 MAX : 1.49 MEAN : .81 STAN.DEV.: .15

EDITED STATISTICS * * * * *
SUM : 69.51 NUMBER : 88 MIN : .63 MAX : .95 MEAN : .79 STAN.DEV.: .08

% REFLECTANCE

% REFLECTANCE * * EDITED * *

```
FILE >> K0239A      DESCRIPTION FOLLOWS :
DEPTH 12440-12560', MIGRANT N-20, MIKE AVERY, OCT-26-84

COL>     1       2       3       4       5       6       7       8       9       0

ROW     .55    *.59    *.6    *.6    *.61    *.63    *.65    *.66    *.67    *.67
 1     *.67    *.67    *.68    *.68    *.68    *.68    *.68    *.69    *.7    *.71
 2     *.71    *.71    *.71    *.71    *.71    *.71    *.72    *.72    *.73    *.73
 3     *.73    *.73    *.74    *.74    *.74    *.74    *.75    *.75    *.76    *.76
 4     *.76    *.76    *.77    *.77    *.77    *.77    *.78    *.78    *.79    *.79
 5     *.79    *.8    *.8    *.8    *.81    *.81    *.81    *.81    *.82    *.82
 6     *.82    *.82    *.82    *.83    *.83    *.83    *.83    *.84    *.84    *.84
 7     *.85    *.85    *.86    *.86    *.86    *.87    *.87    *.88    *.88    *.89
 8     *.89    *.89    *.9    *.91    *.91    *.93    *.94    .99    1    1.08
 9     1.14   1.15   1.17   1.19   1.2    1.21   1.43   1.55   1.57

SUM : 81.5  NUMBER : 99  MIN : .55  MAX : 1.57  MEAN : .82  STAN.DEV.: .18

EDITED STATISTICS * * * *
SUM : 66.27  NUMBER : 86  MIN : .59 MAX :   .94  MEAN : .77  STAN.DEV.: .08
```
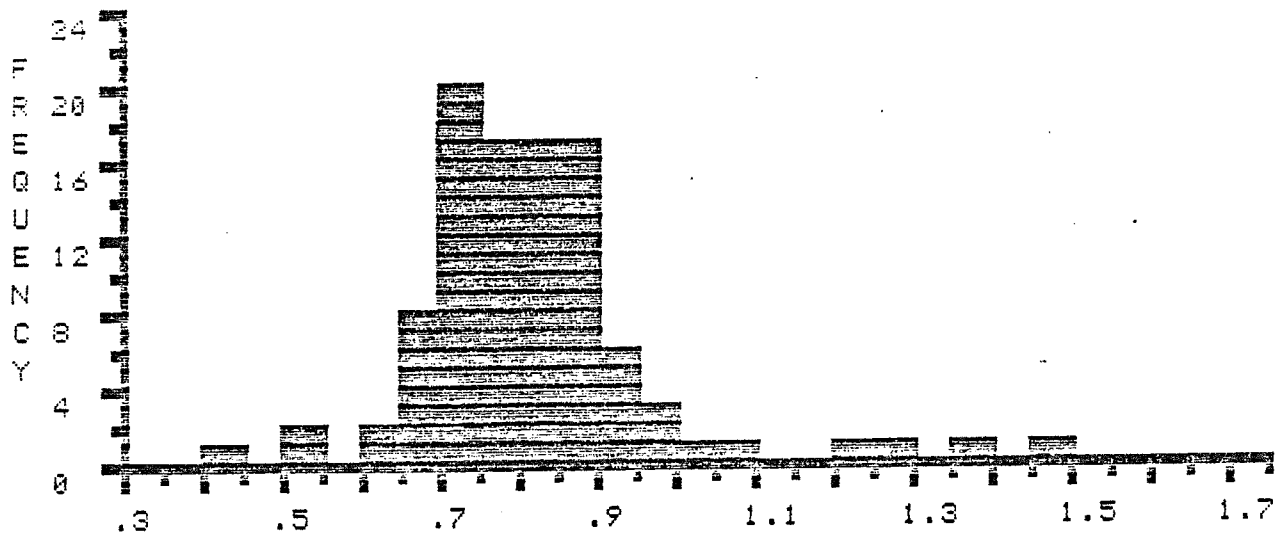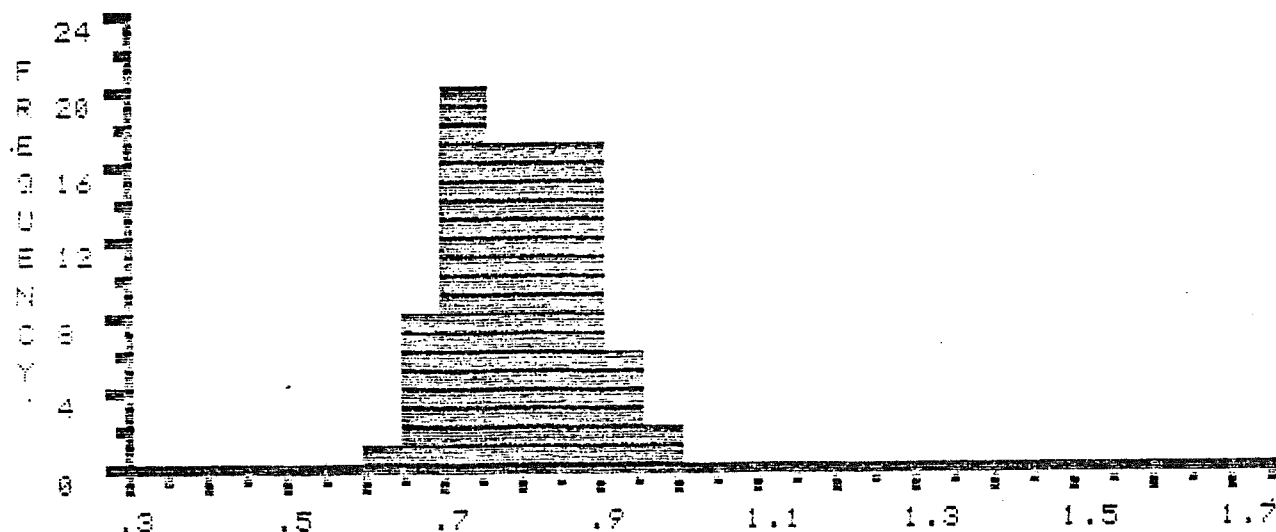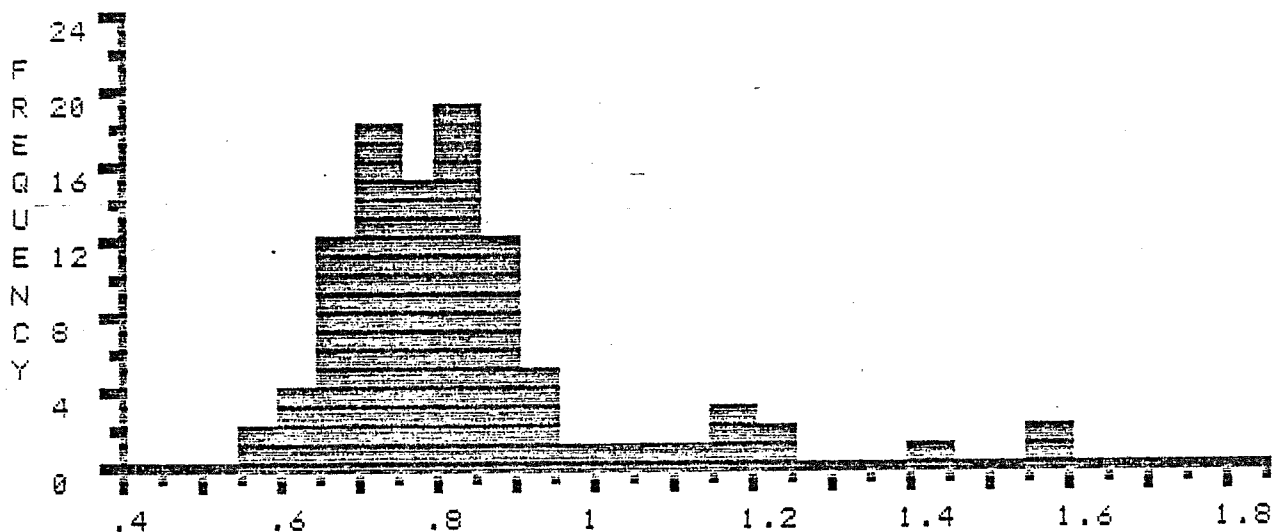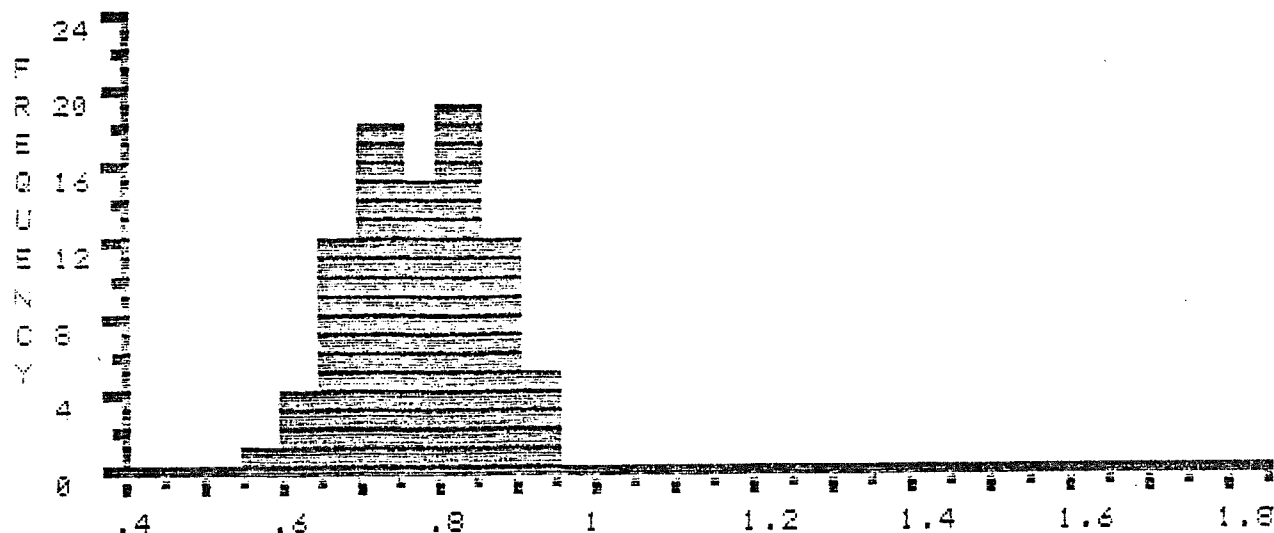
% REFLECTANCE

% REFLECTANCE * * EDITED * *

```
FILE >> K0239B      DESCRIPTION FOLLOWS :
DEPTH 12980-13010', MIGRANT N-20, MIKE AVERY, OCT-28-84

COL>      1      2      3      4      5      6      7      8      9      0

ROW      .48    .54    .59    .61    .61    .64    .66   *.68   *.68   *.68
 1      *.68   *.69   *.69   *.69   *.7    *.7    *.7    *.7    *.7    *.71
 2      *.71   *.72   *.72   *.73   *.73   *.73   *.73   *.73   *.74   *.74
 3      *.74   *.75   *.75   *.75   *.75   *.75   *.75   *.76   *.76   *.76
 4      *.76   *.77   *.77   *.77   *.77   *.77   *.77   *.77   *.78   *.78
 5      *.78   *.79   *.79   *.79   *.79   *.79   *.79   *.8    *.8    *.8
 6      *.81   *.81   *.81   *.81   *.81   *.81   *.82   *.82   *.82   *.83
 7      *.83   *.83   *.83   *.83   *.83   *.84   *.84   *.84   *.84   *.84
 8      *.85   *.85   *.86   *.86   *.87   *.88   *.88   *.88   *.89   *.91
 9      *.91   *.92   *.93   *.94    1     1.05   1.06   1.08   1.5

SUM : 78.18  NUMBER : 99  MIN : .48  MAX : 1.5  MEAN : .79  STAN.DEV.: .12

EDITED STATISTICS * * * * *
SUM : 68.36  NUMBER : 87  MIN : .68 MAX :  .94  MEAN : .79  STAN.DEV.: .06
```
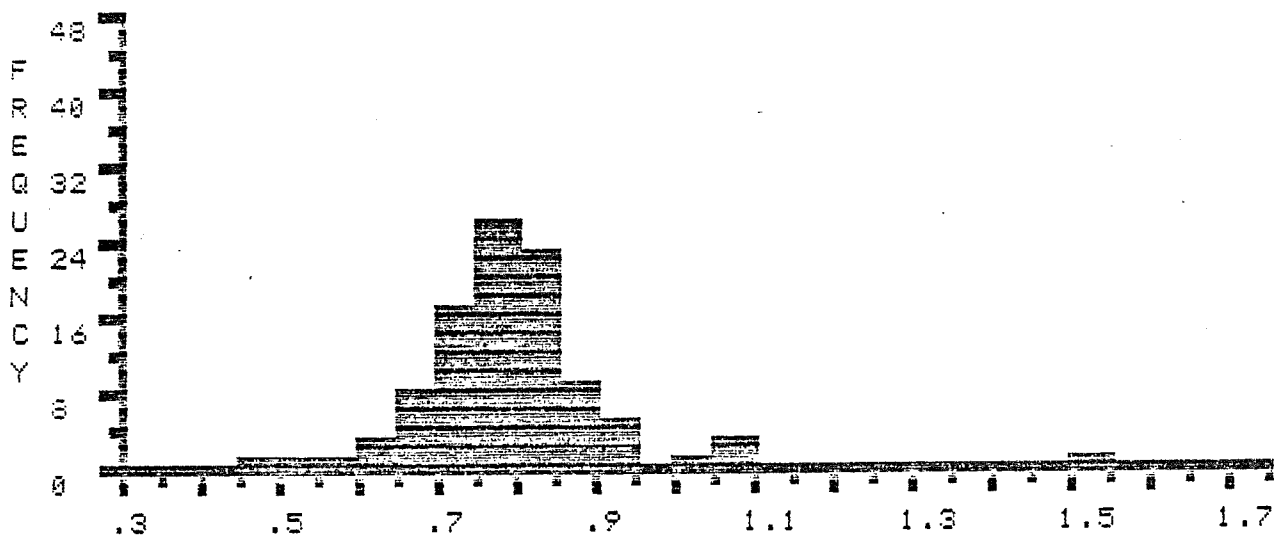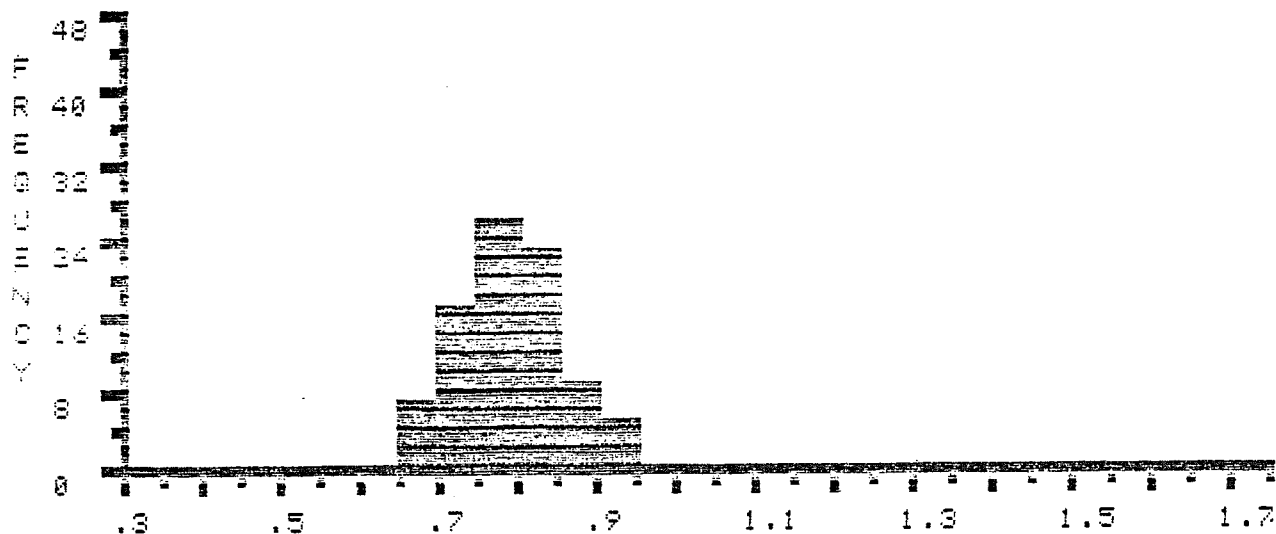
% R E F L E C T A N C E

% R E F L E C T A N C E * * EDITED * *
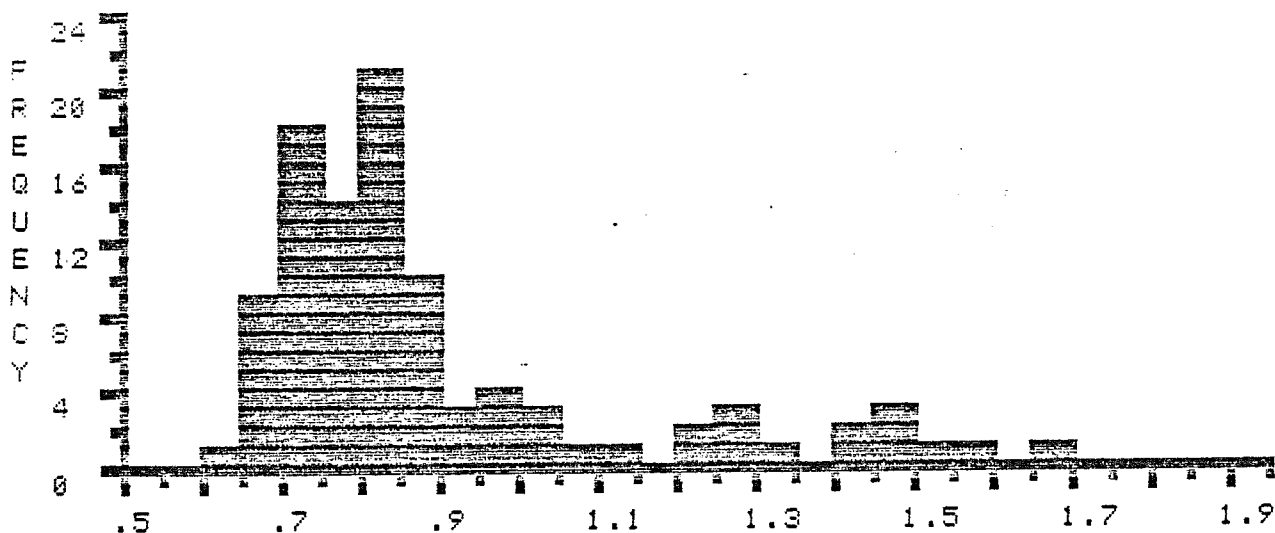
FILE >> K0239C   DESCRIPTION FOLLOWS :
DEPTH 13610-13640', MIGRANT N-20, MIKE AVERY, OCT-28-84

COL>   1   2   3   4   5   6   7   8   9   0

ROW   *.64   *.65   *.65   *.67   *.67   *.67   *.68   *.69   *.69   *.69
 1   *.7   *.7   *.71   *.71   *.71   *.72   *.72   *.72   *.72   *.72
 2   *.72   *.73   *.73   *.73   *.74   *.74   *.74   *.74   *.75   *.75
 3   *.76   *.76   *.76   *.77   *.77   *.77   *.77   *.77   *.77   *.78
 4   *.79   *.79   *.8   *.8   *.8   *.8   *.8   *.8   *.8   *.8
 5   *.8   *.81   *.81   *.82   *.82   *.82   *.83   *.83   *.83   *.83
 6   *.83   *.83   *.84   *.86   *.86   *.86   *.87   *.87   *.88   *.88
 7   *.88   *.89   *.89   *.93   *.93   *.94   *.95   *.97   *.97   *.99
 8   *1   *1.01 *1.02 1.05   1.12   1.23   1.23   1.27   1.29   1.29
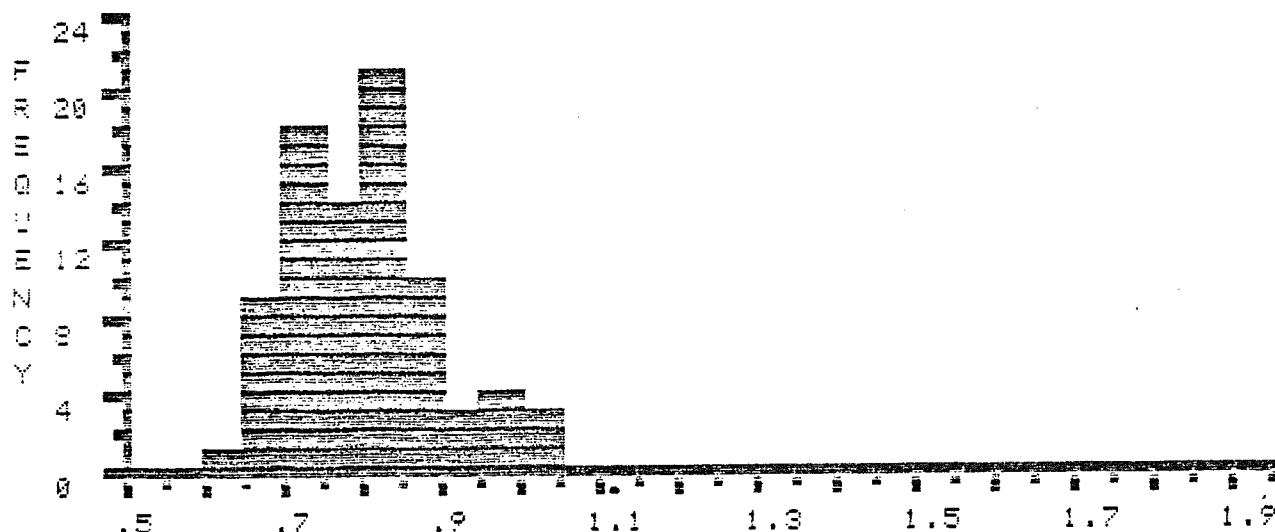 9   1.34   1.4   1.4   1.47   1.48   1.49   1.54   1.56   1.66

SUM : 87.83 NUMBER : 99 MIN : .64   MAX : 1.66   MEAN : .89   STAN.DEV.: .24

EDITED STATISTICS * * * *
SUM : 66.01 NUMBER : 83 MIN : .64 MAX : 1.02   MEAN : .8   STAN.DEV.: .09

% REFLECTANCE

% REFLECTANCE * * EDITED * *

FILE >> K0240A   DESCRIPTION FOLLOWS :
DEPTH 14060-14090', MIGRANT N-20, MIKE AVERY, OCT-28-84

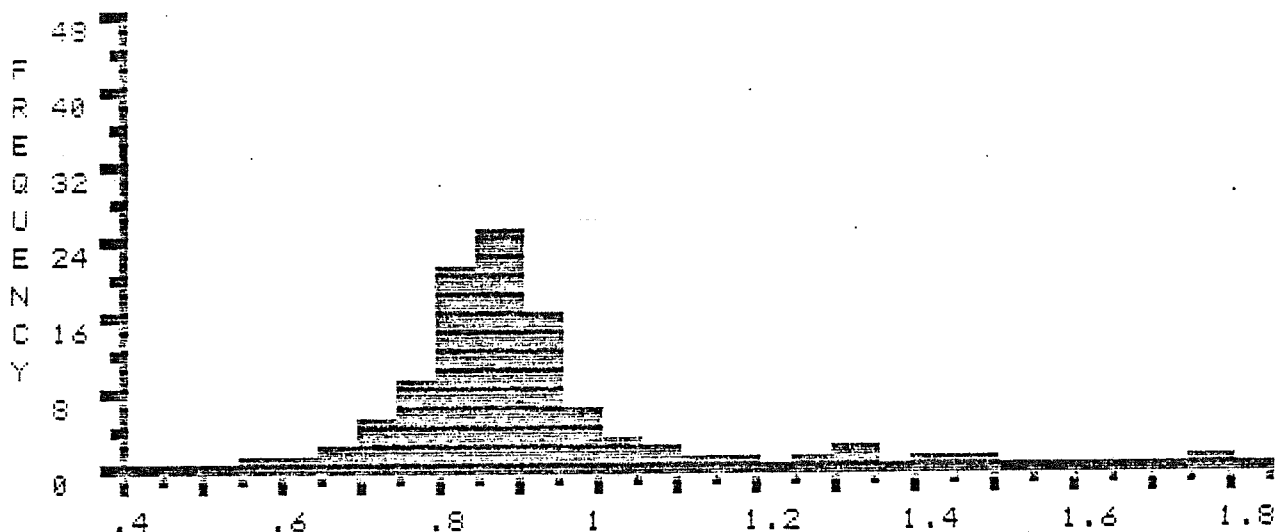| COL>	1	2	3	4	5	6	7	8	9	0
ROW	.58	.64	*.67	*.68	*.7	*.71	*.74	*.74	*.74	*.75
1	*.77	*.77	*.78	*.78	*.79	*.79	*.79	*.79	*.8	*.8
2	*.8	*.8	*.8	*.81	*.81	*.81	*.82	*.82	*.82	*.83
3	*.83	*.83	*.83	*.83	*.83	*.84	*.84	*.84	*.84	*.85
4	*.85	*.85	*.85	*.85	*.86	*.86	*.86	*.86	*.87	*.87
5	*.87	*.87	*.87	*.87	*.88	*.88	*.88	*.88	*.88	*.88
6	*.89	*.89	*.89	*.89	*.9	*.9	*.9	*.91	*.93	*.93
7	*.93	*.93	*.93	*.94	*.94	*.94	*.94	*.94	*.94	*.94
8	*.95	*.95	*.95	*.97	*.98	*.99	*1	*1	*1.02	1.07
9	1.07	1.11	1.18	1.26	1.32	1.33	1.4	1.45	1.75	

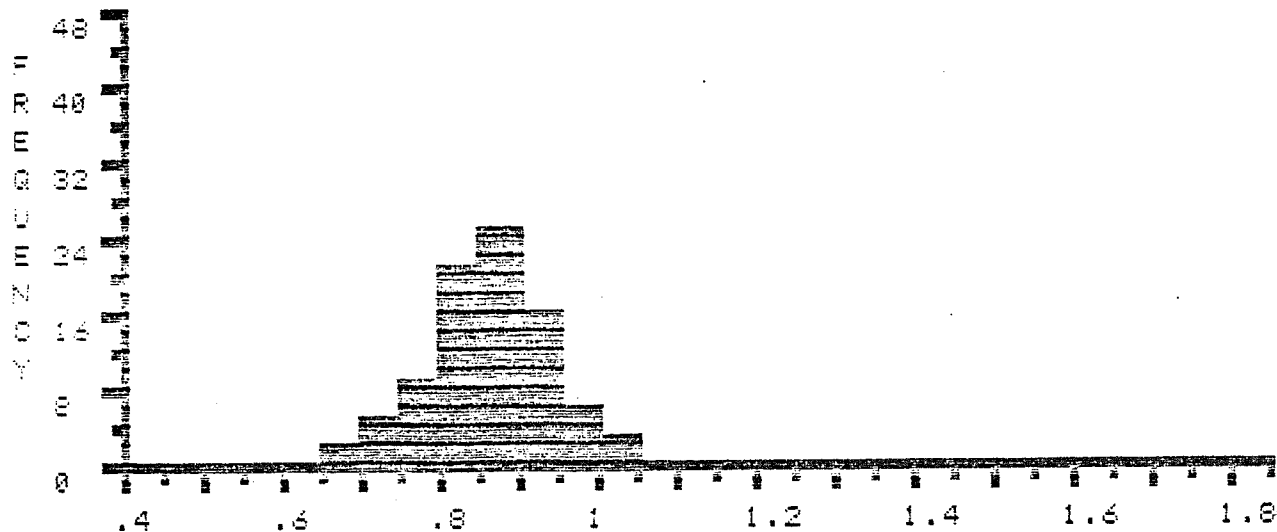SUM : 88.78   NUMBER : 99   MIN : .58   MAX : 1.75   MEAN : .9   STAN.DEV.: .17

EDITED STATISTICS * * * *
SUM : 74.62   NUMBER : 87   MIN : .67   MAX : 1.02   MEAN : .86   STAN.DEV.: .07

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% R E F L E C T A N C E * * EDITED * *

FILE >> K0240B   DESCRIPTION FOLLOWS :
DEPTH 14330-14360', MIGRANT N-20, MIKE AVERY, OCT-28-84

COL>   1   2   3   4   5   6   7   8   9   0
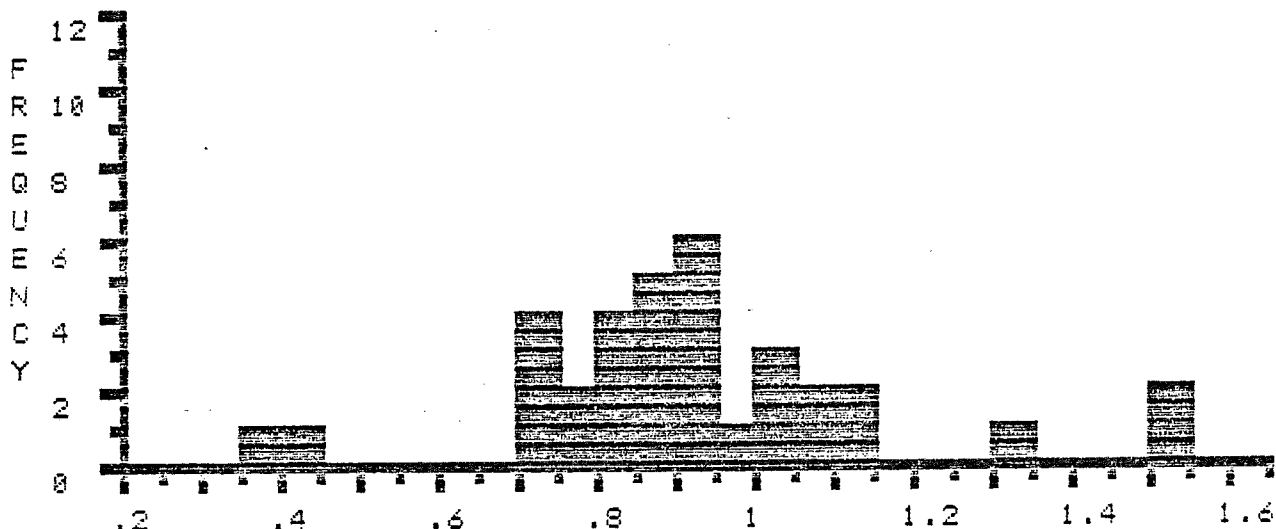
ROW   .37   .43   .7   .72   .73   .74   *.77   *.77   *.82   *.83
 1   *.84   *.84   *.85   *.87   *.88   *.89   *.89   *.91   *.91   *.91
 2   *.91   *.92   *.93   *.99   *1   *1.01 *1.03 *1.05 *1.09 *1.13
 3   *1.14 1.33   1.5   1.51

SUM : 31.21 NUMBER : 34 MIN : .37 MAX : 1.51 MEAN : .92 STAN.DEV.: .23

EDITED STATISTICS * * * *
SUM : 23.18 NUMBER : 25 MIN : .77 MAX : 1.14 MEAN : .93 STAN.DEV.: .1

% REFLECTANCE

% REFLECTANCE * * EDITED * *