

Report No. EPGs-DOM.1-85MPA

Vitrinite reflectance (Ro) on the
dispersed organics in the Amoco
Imperial Skelly Tern A-68

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GSC O.F. 1167

Vitrinite reflectance (Ro) on the dispersed organics in the Amoco Imperial Skelly Tern A-68

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G.S.C. Locality No: D102

Location: 44°27'13.41"N, 53°09'00.84"W

R.T. Elevation: 98'

Sample Interval: 1100-13743'

Total Depth: 13743'

Water Depth: 376'

Release Date: April 16, 1975

Interval Studied: 1640-13740'

Vitrinite reflectance has been determined on 28 samples (Table II) from the Amoco Imperial Skelly Tern A-68, which was classified as a wildcat well and is located on the southern Grand Banks, approximately 352km south of St. John's, Newfoundland.

Data acquisition and manipulation for this report utilized the Zeiss Photo-multiplier 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 values 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 6510'	0.22 - 0.4	% Ro	immature
6510-8989'	0.4 - 0.5	% Ro	immature approaching maturity
8989-11015'	0.5 - 0.6	% Ro	marginally mature
11015'	0.6	% Ro	peak of oil generation
13743' T.D.	0.77	% Ro	within oil window

Projected

16691'	1.0	% Ro	peak of wet gas generation
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Remarks

The sample coverage of vitrinite reflectance data (Figure 1) was very adequate for establishing the rank/depth line in this well. A small gap in data to support this line (calculated by RMS method) exists between 8660' and 11160'. This significant increase in the determined rank from approximately 0.5 to 1.0 % Ro correlates with a significant change in lithology over this interval. Unconformities at 8953' and at 10130' (Wade, 1980) almost bracket these anomalous data. In fact, the samples between 10130' and 11160' have a smaller population of lower Ro values which lie closer to the overall thermal maturation line as shown in Figure 1.

All the samples within this anomalous interval had some evidence of more 'normal' Ro values but these have been masked to varying degrees by a predominance of a high reflectance population. These high end populations were due to the presence of reworked vitrinite or relatively low reflecting semifusinite (vitrinite-like coal maceral). The possibility of a nearby source of older roughly Carboniferous age sediments (Wade, pers. comm.) suggests that reworked material is the most likely explanation.

Kerogen typing studies for this well (Bujak, 1978) report a hiatus in the relative amount of 'Hylogen' present in samples over the anomalous interval. This was accompanied by a small increase in TAI values from (2-) to (2- to 2).

This maturation data provides evidence indicating that the thermal regime at Tern A-68 was suitable for the generation of oil 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.
- Bujak, J.P., 1978. Organic Type and Thermal Alteration Index of Amoco-Imp-Skelly Tern A-68, Grand Banks. Report No. EPGs-DOM.11-78JPB, 2 p., 2 appendices.
- Dow, W.G., 1977. Kerogen studies and geological interpretations. Journal of Geochemical Exploration, no. 7, p. 79-99.

Wade, J.A., 1977. Stratigraphic picks Amoco IOC Tern A-68. Report No. EPGS-STRAT.3-77JAW, 1 p. (revised in 1980).

February 4, 1984



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Eastern Petroleum Geology

MPA/nk

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Table II

Summary of kerogen-based vitrinite reflectance

Seq. #	Sample #	Depth in feet	Ro (S.D.)	Number of readings	
				Total	Edited
1	K0348A	1640-1670	.28 (.06)	56	30
2	K0348B	3800-3830	.32 (.07)	66	31
3	K0348C	4160-4190	.23 (.03)	7	4
4	K0349A	4520-4550	.34 (.07)	71	39
5	K0349B	4880-4910	.35 (.06)	25	13
6	K0349C	5330-5360	.34 (.06)	58	46
7	K0350A	5690-5720	.37 (.06)	57	35
8	K0350B	6050-6080	.38 (.03)	49	29
9	K0350C	6410-6440	.4 (.07)	42	33
10	K0351A	6770-6800	.41 (.05)	43	34
11	K0351B	7040-7070	.4 (.05)	41	23
12	K0351C	7400-7430	.4 (.06)	45	32
13	K0352A	7760-7790	.44 (.06)	46	33
14	K0352B	8040-8070	.46 (.08)	54	40
15	K0352C	8330-8360	.48 (.08)	50	46
16	K0353A	8630-8660	.51 (.08)	41	25
17	K0353B	9030-9160	.99 (.1)	99	74
18	K0353C	9330-9360	.99 (.08)	99	50
19	K0354A	9630-9660	1.14 (.12)	99	85
20	K0354B	9930-9960	1.11 (.1)	99	88
21	K0354C	10530-10560	.54 (.07)	99	15
22	K0355A	10830-10860	.53 (.07)	99	30
23	K0355B	11130-11160	.6 (.06)	68	35
24	K0355C	11430-11460	.63 (.07)	62	55
25	K0356A	11730-11760	.61 (.1)	99	84
26	K0356B	12130-12160	.65 (.1)	95	64
27	K0356C	12750-12780	.74 (.13)	17	13
28	K0357A	13710-13740	.82 (.06)	99	8

Table III

Geologic tops (Wade '77)

Depth	Top or Interval
in casing	Banquereau
8808'	E. Eocene Chalk
8953'	Unconformity
8953'	Dawson Canyon
9620-9678'	Petrel Member
9875'	Logan Canyon
9875'	Eider Member
10056'	Naskapi Member?
10130'	Avalon Unconformity
10130'	Missisauga
11062'	Verrill Caynon
13043'	Caprock?
13376'	Argo
13743'	T.D.

Ro/per cent/--Log Scale--

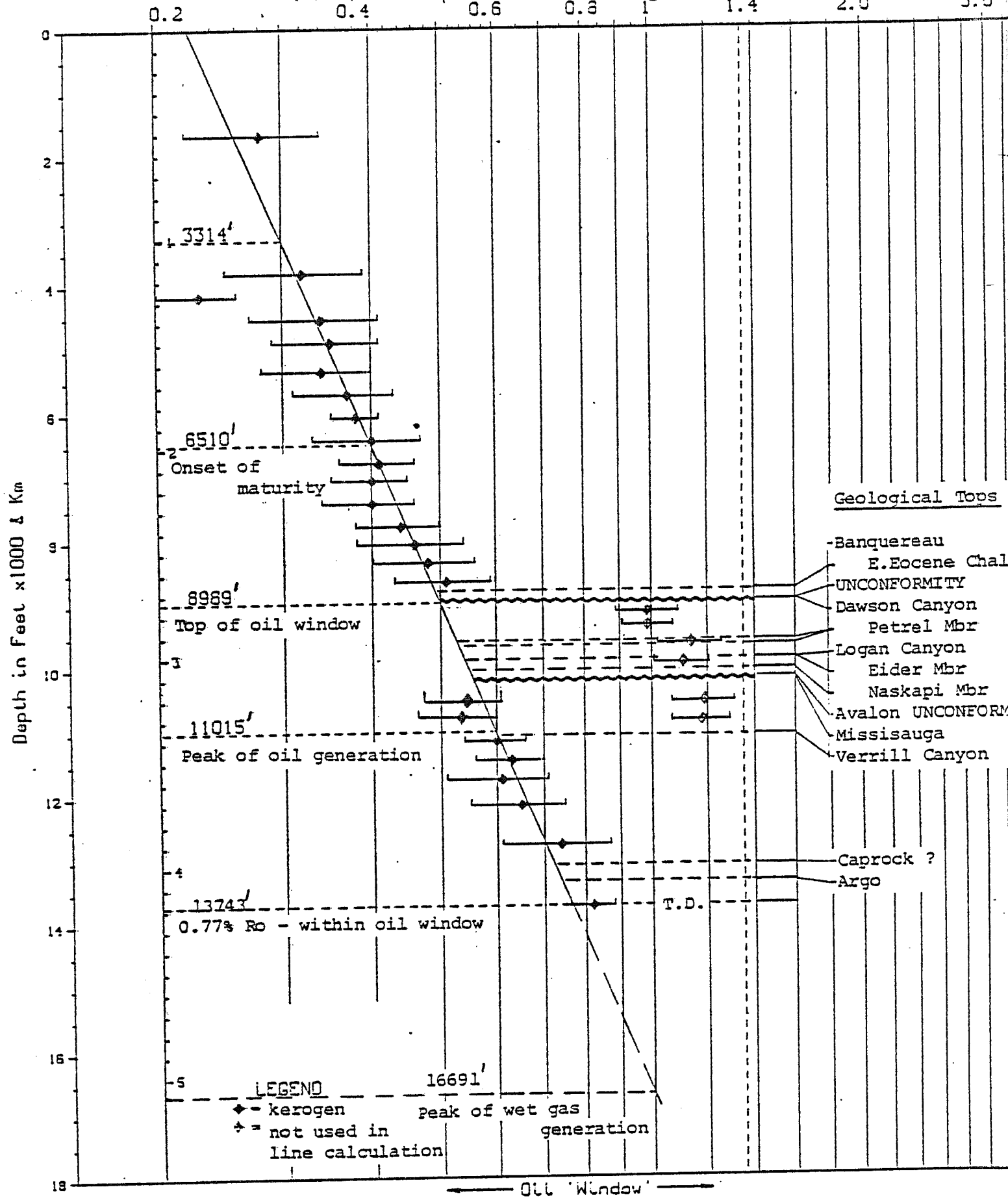


Fig. 1 Tern A-68

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 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-TEX 301) in predrilled plastic stubs.

Polished using modified coal petrology polishing methods.

Examined under oil lens at approximately 800x mag'n.

Vitrinite Reflectance Histograms

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 DEPTH 1640-1670', TERN A-58, MIKE AVERY, NOV-29-84

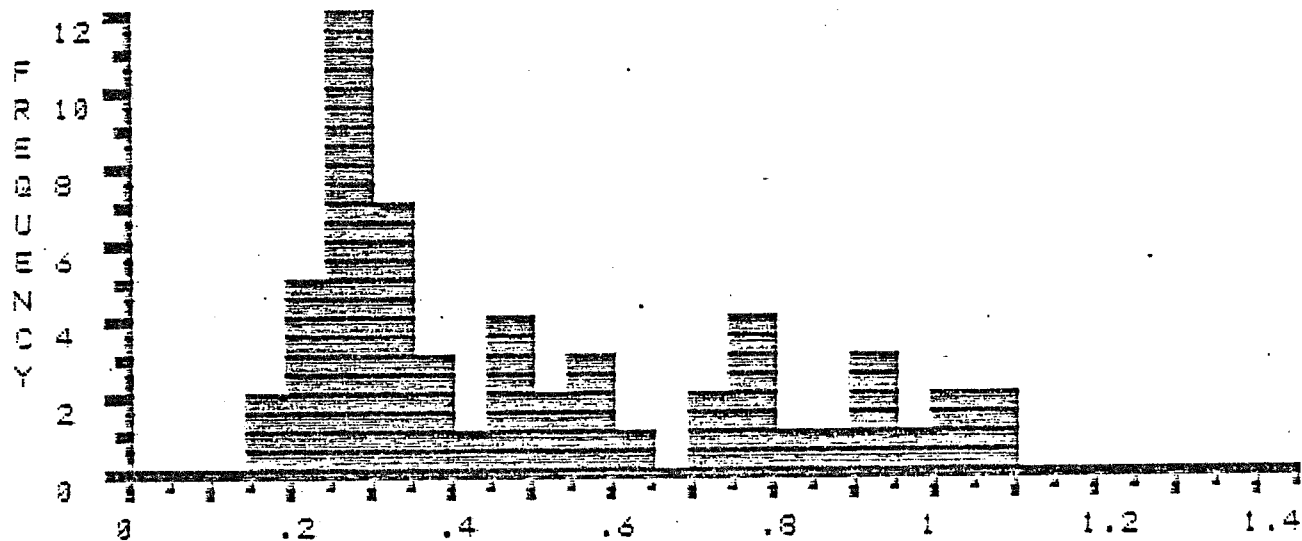
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2	*.3	*.3	*.3	*.31	*.32	*.33	*.33	*.33	*.35	*.39
3	*.4	.45	.45	.46	.49	.52	.54	.57	.59	.59
4	.64	.71	.71	.75	.76	.77	.78	.81	.89	.9
5	.92	.94	.96	1	1.04	1.05	1.09			

SUM : 27.79 NUMBER : 56 MIN : .17 MAX : 1.09 MEAN : .5 STAN.DEV.: .27

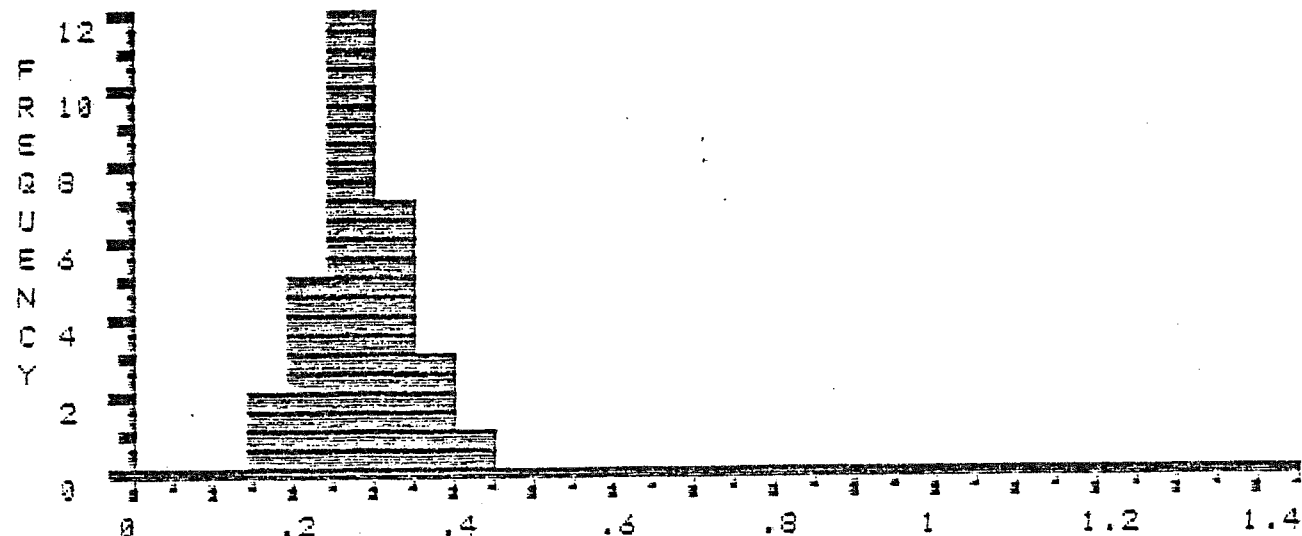
EDITED STATISTICS * * * * *

SUM : 8.42 NUMBER : 30 MIN : .17 MAX : .4 MEAN : .28 STAN.DEV.: .06

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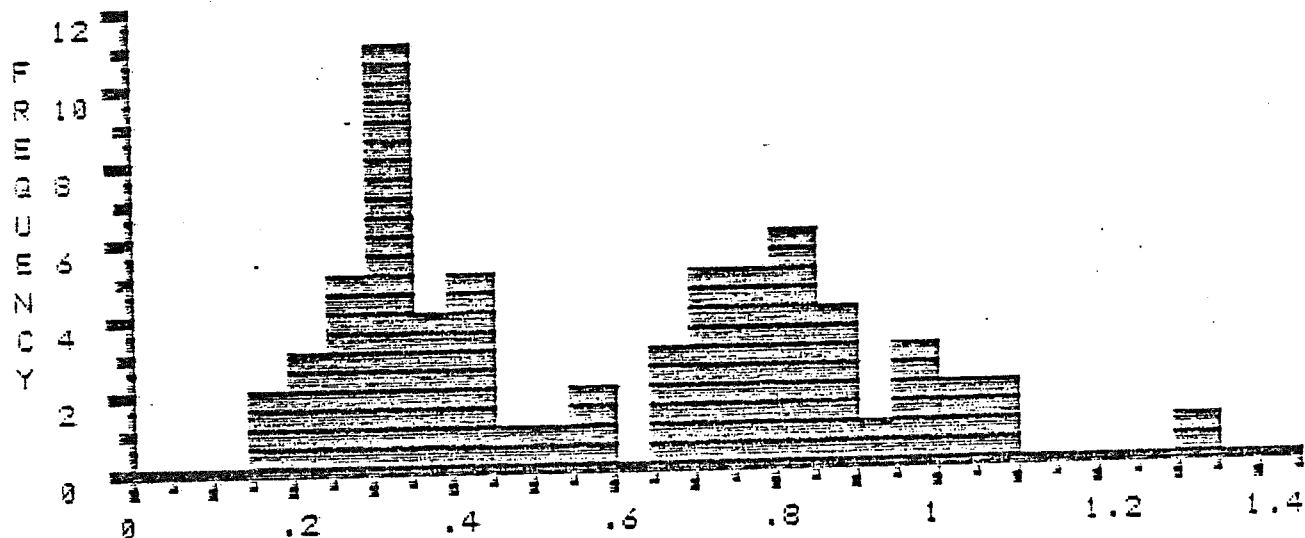
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2	*.34	*.34	*.35	*.36	*.37	*.38	*.41	*.42	*.42	*.43
3	*.43	*.43	.53	.53	.59	.65	.68	.69	.7	.7
4	.72	.72	.74	.75	.78	.79	.79	.79	.8	.8
5	.82	.83	.83	.84	.86	.87	.88	.89	.93	.97
6	.97	.99	1	1.02	1.07	1.08	1.32			

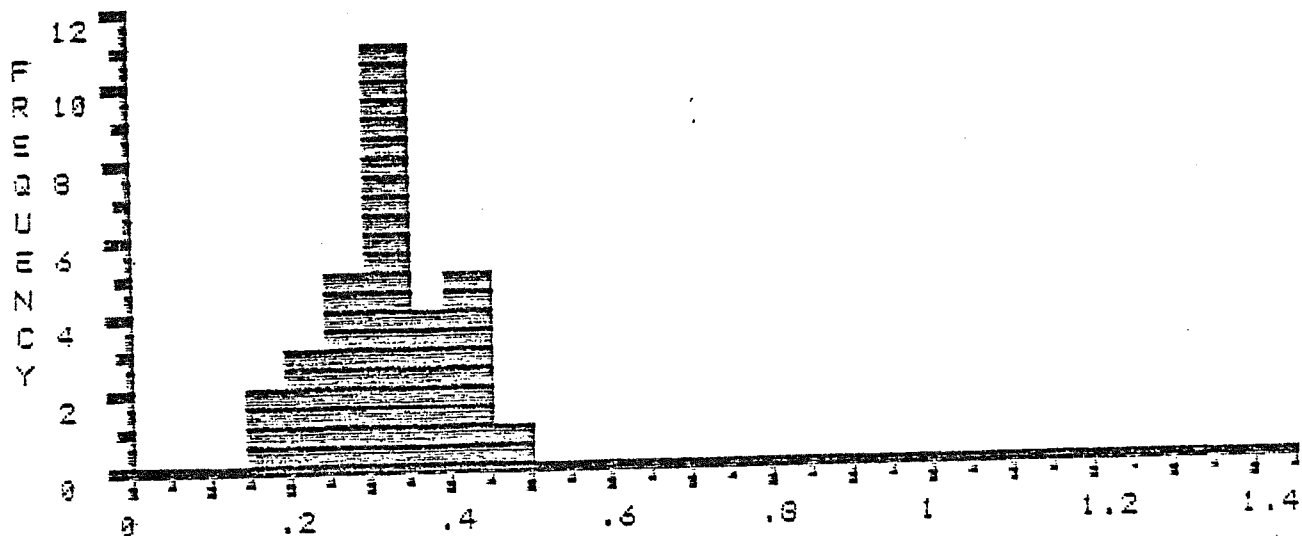
SUM : 38.99 NUMBER : 66 MIN : .19 MAX : 1.32 MEAN : .59 STAN.DEV.: .28

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 SUM : 10.92 NUMBER : 31 MIN : .19 MAX : .46 MEAN : .32 STAN.DEV.: .07

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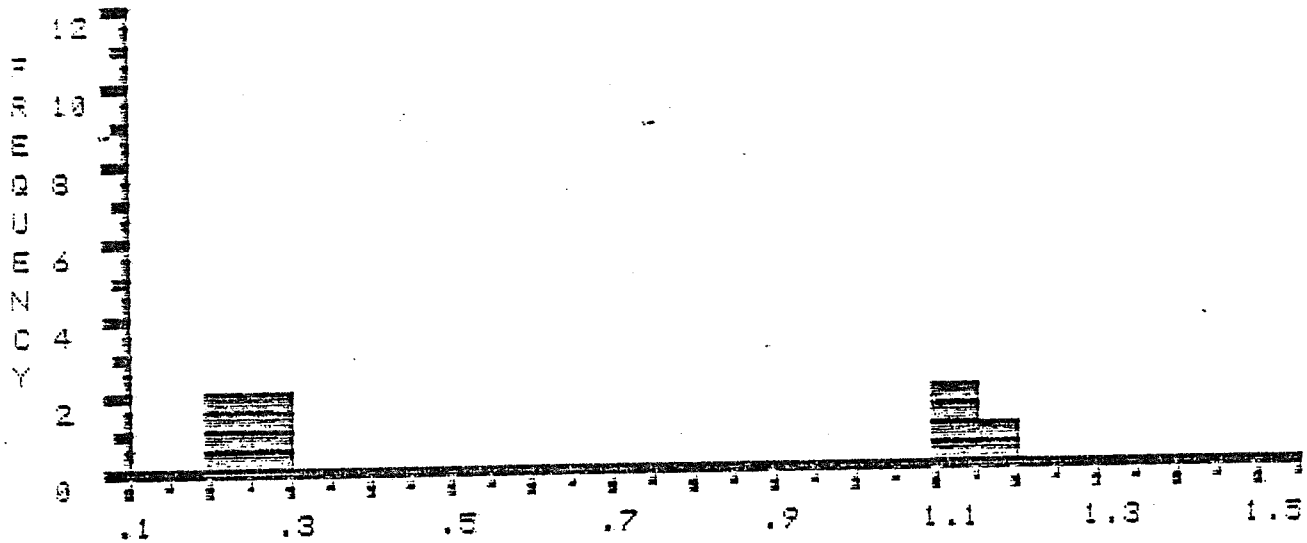


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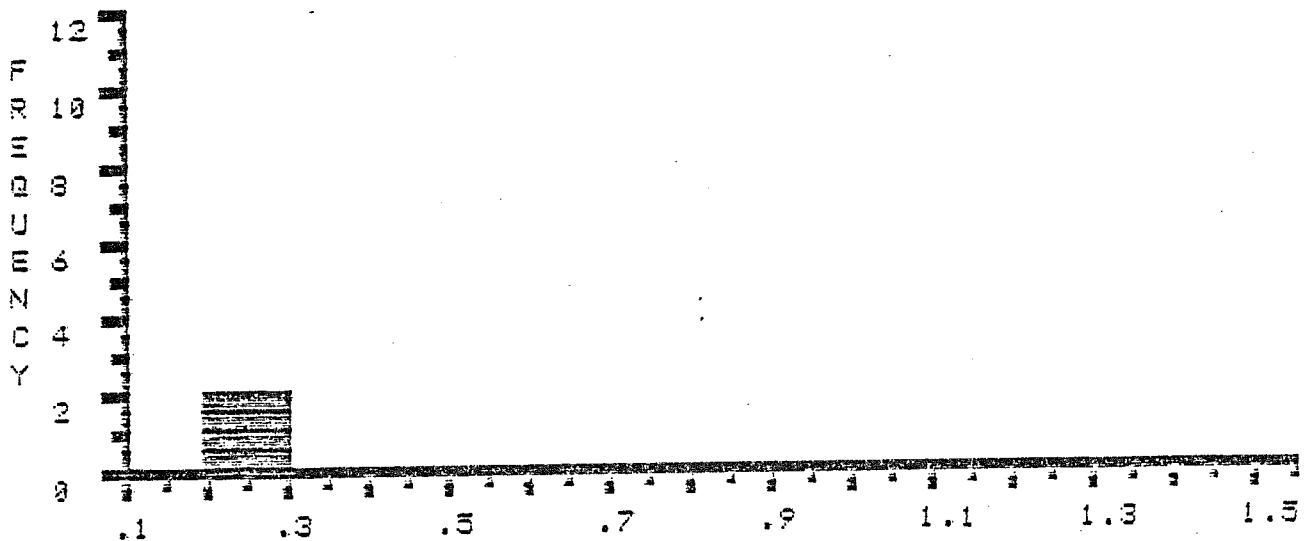
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SUM	4.34	NUMBER : 7	MIN : .2	MAX : 1.16	MEAN : .62	STAN.DEV.: .48				

EDITED STATISTICS * * * * *
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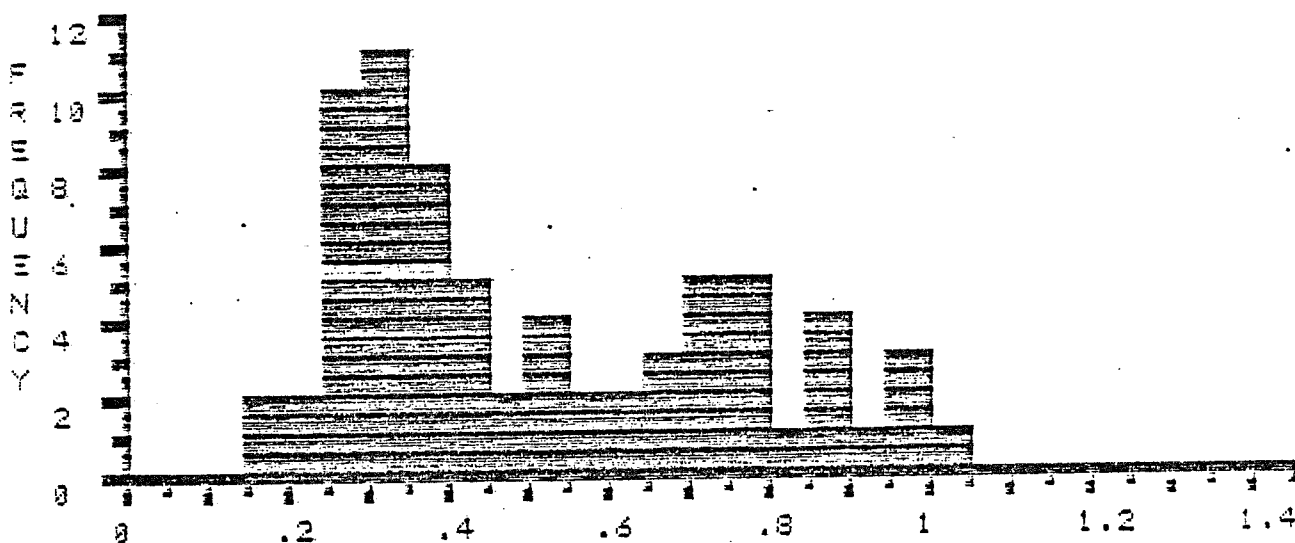
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2	*.32	*.32	*.32	*.33	*.34	*.34	*.35	*.35	*.35	*.35
3	*.37	*.38	*.38	*.39	*.4	*.41	*.41	*.41	*.43	*.45
4	*.49	*.5	.5	.51	.52	.56	.58	.61	.63	.65
5	.67	.69	.71	.73	.73	.73	.74	.75	.77	.77
6	.78	.79	.82	.85	.86	.86	.87	.91	.96	.97
7	.99	1								

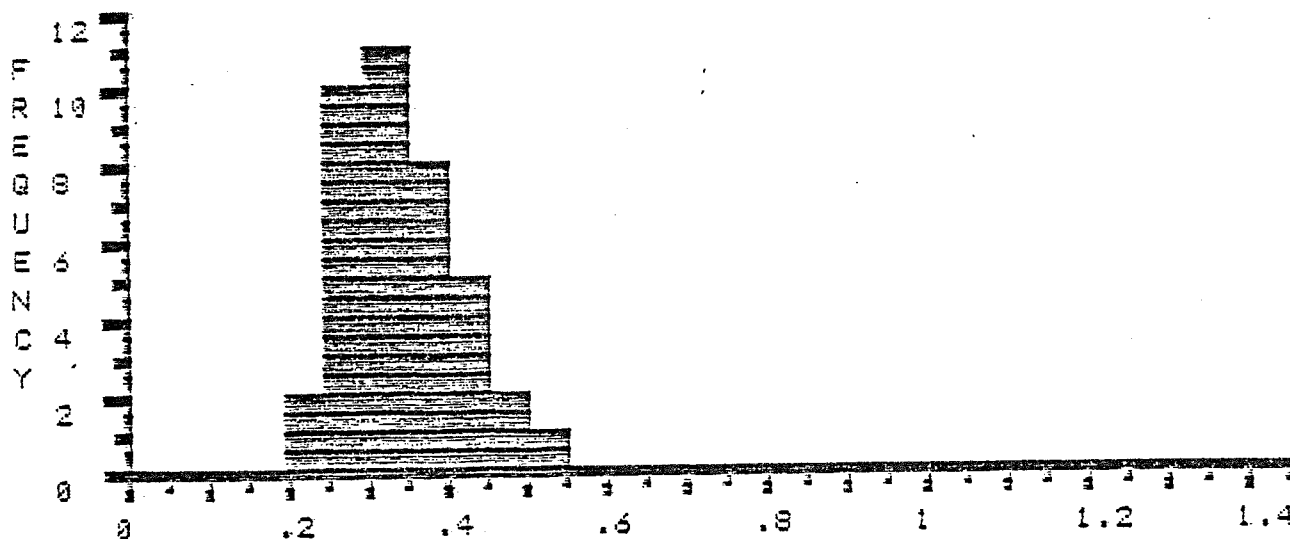
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 SUM : 13.13 NUMBER : 39 MIN : .22 MAX : .5 MEAN : .34 STAN.DEV. : .07

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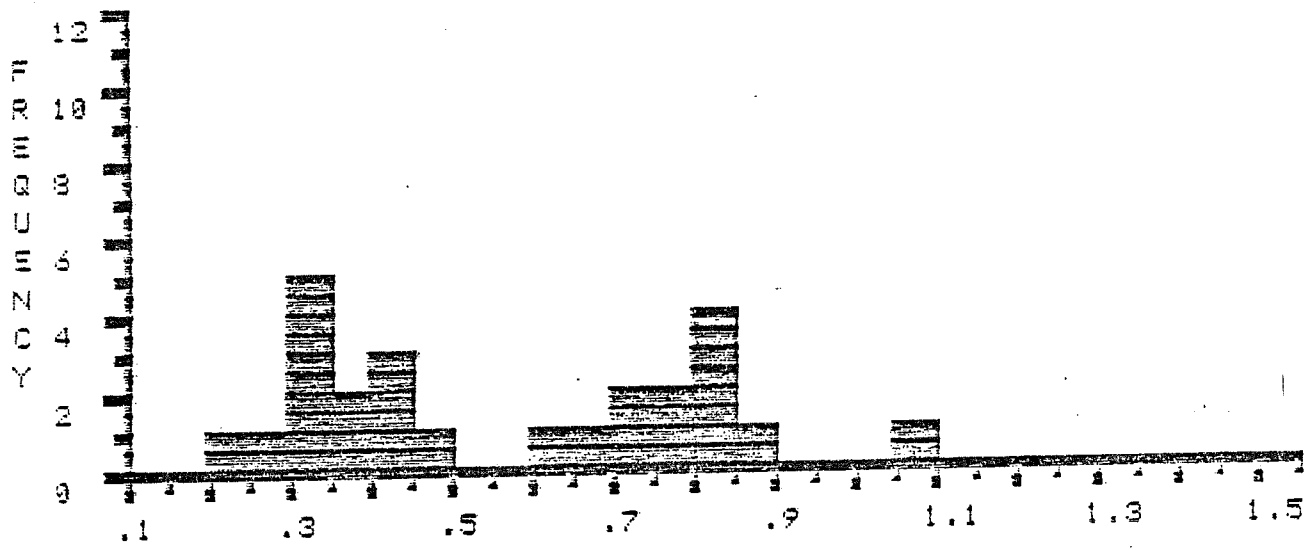
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ROW		*.24	*.29	*.3	*.31	*.32	*.32	*.33	*.35	*.35
1	*.4	*.43	*.43	*.45	.5	.66	.72	.73	.75	.75
2	.8	.83	.84	.84	.85	1.05				

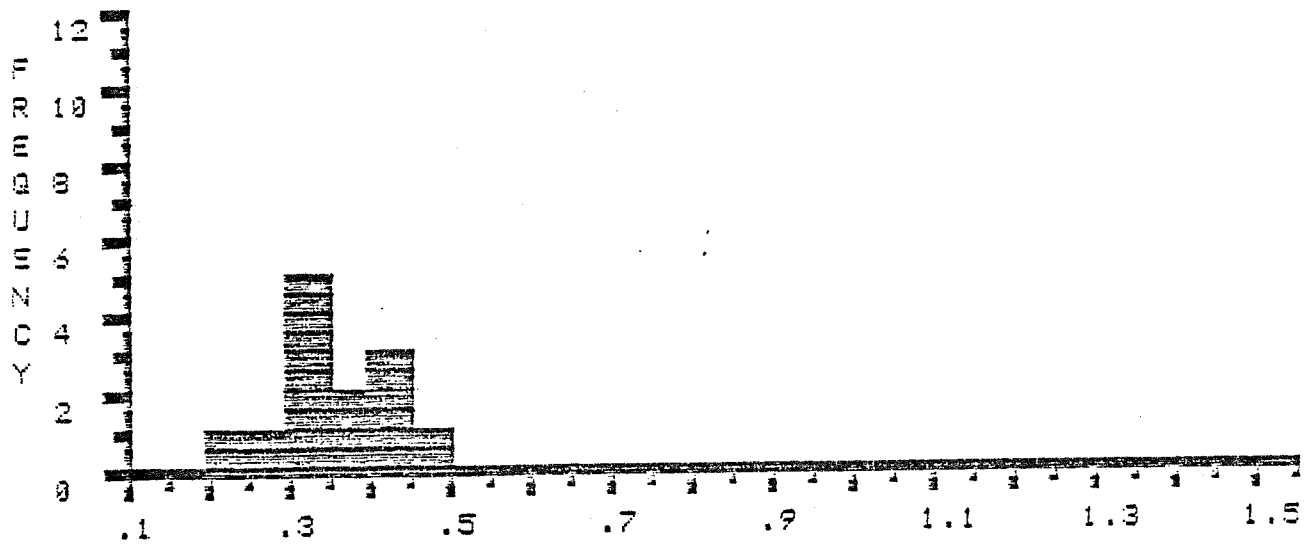
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FILE >> K88490 DESCRIPTION FOLLOWS :
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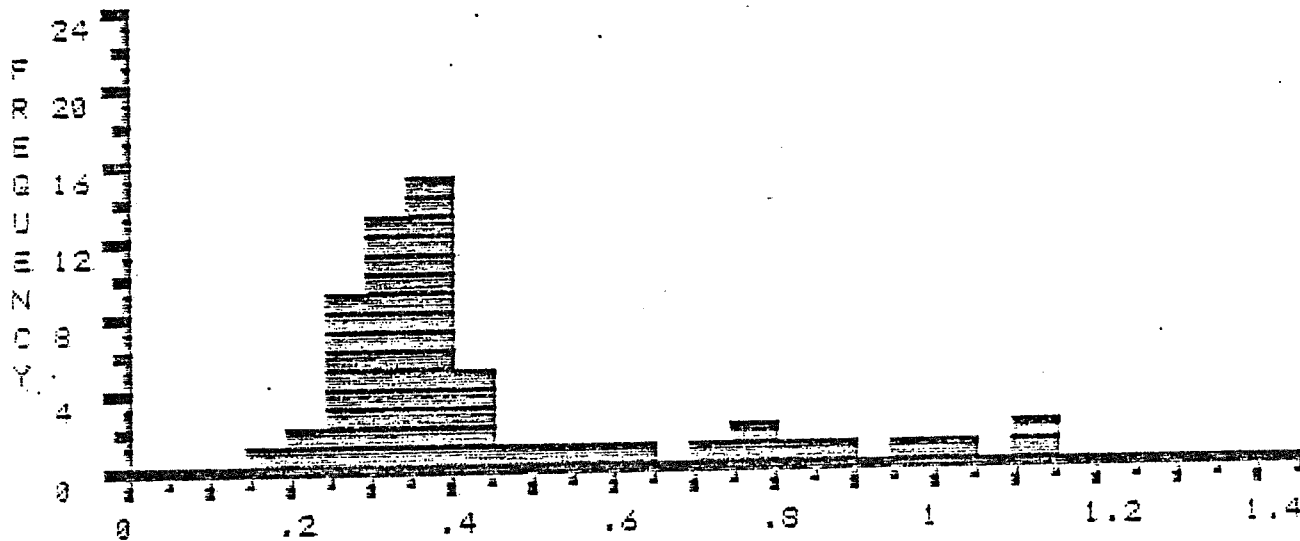
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1	*.28	*.28	*.29	*.3	*.3	*.3	*.31	*.31	*.32	*.33
2	*.32	*.32	*.33	*.33	*.34	*.34	*.35	*.35	*.35	*.36
3	*.36	*.36	*.36	*.36	*.37	*.37	*.38	*.38	*.38	*.38
4	*.39	*.4	*.4	*.4	*.41	*.41	*.47	*.5	.56	.6
5	.73	.75	.79	.8	.89	.95	1	1.11	1.11	

SUM : 24.93 NUMBER : 58 MIN : .16 MAX : 1.11 MEAN : .43 STAN.DEV.: .22

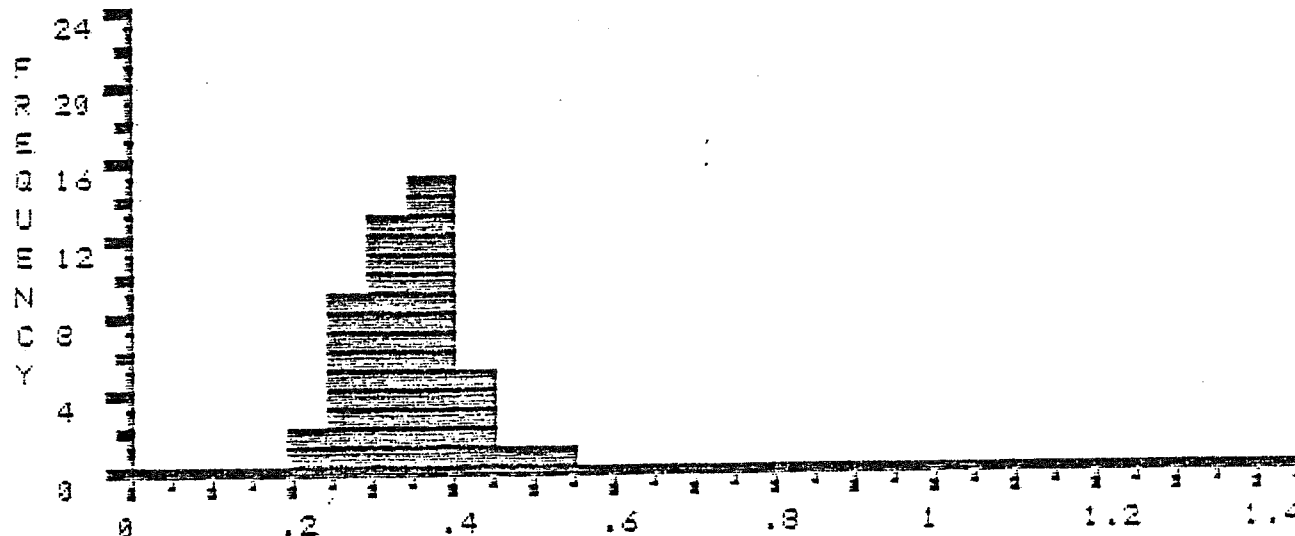
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SUM : 15.48 NUMBER : 46 MIN : .2 MAX : .5 MEAN : .34 STAN.DEV.: .06

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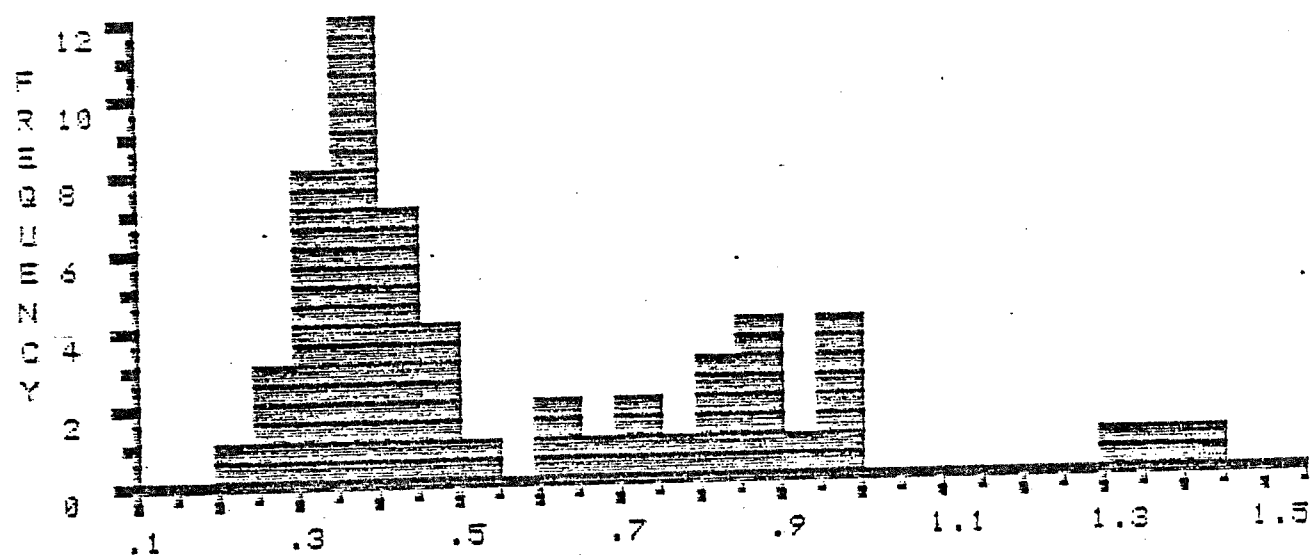
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2	*.38	*.38	*.38	*.38	*.39	*.4	*.41	*.41	*.41	*.42
3	*.42	*.43	*.43	*.46	*.46	*.47	*.5	.6	.61	.63
4	.73	.74	.76	.8	.81	.83	.85	.86	.88	.89
5	.93	.95	.95	.96	.99	1.31	1.39	1.43		

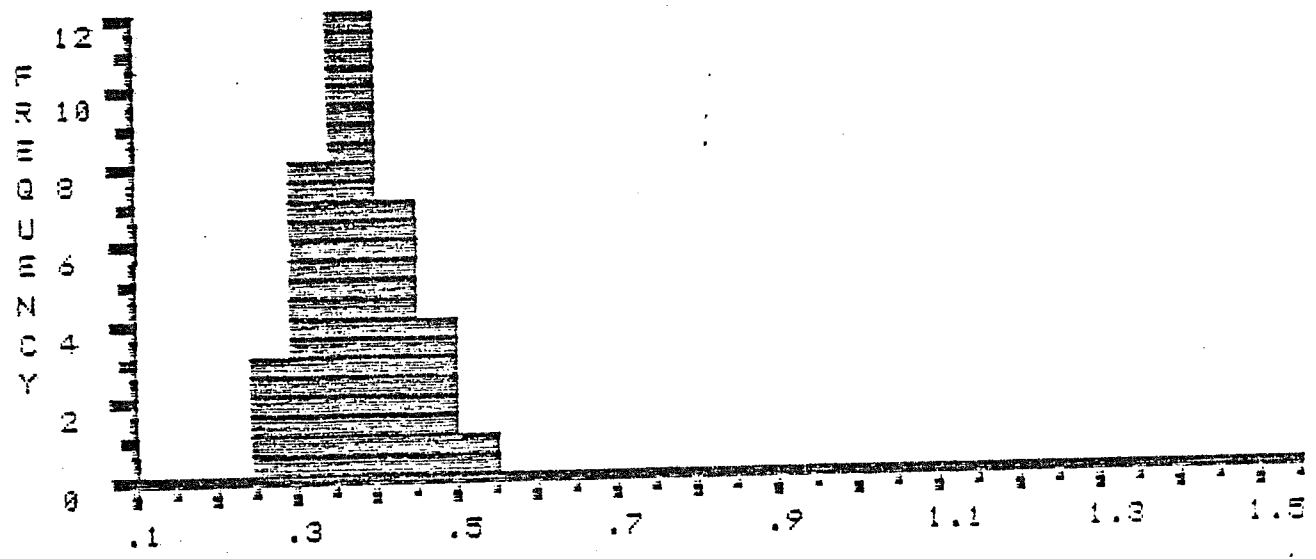
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% REFLECTANCE



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FILE >> K03506 DESCRIPTION FOLLOWS :
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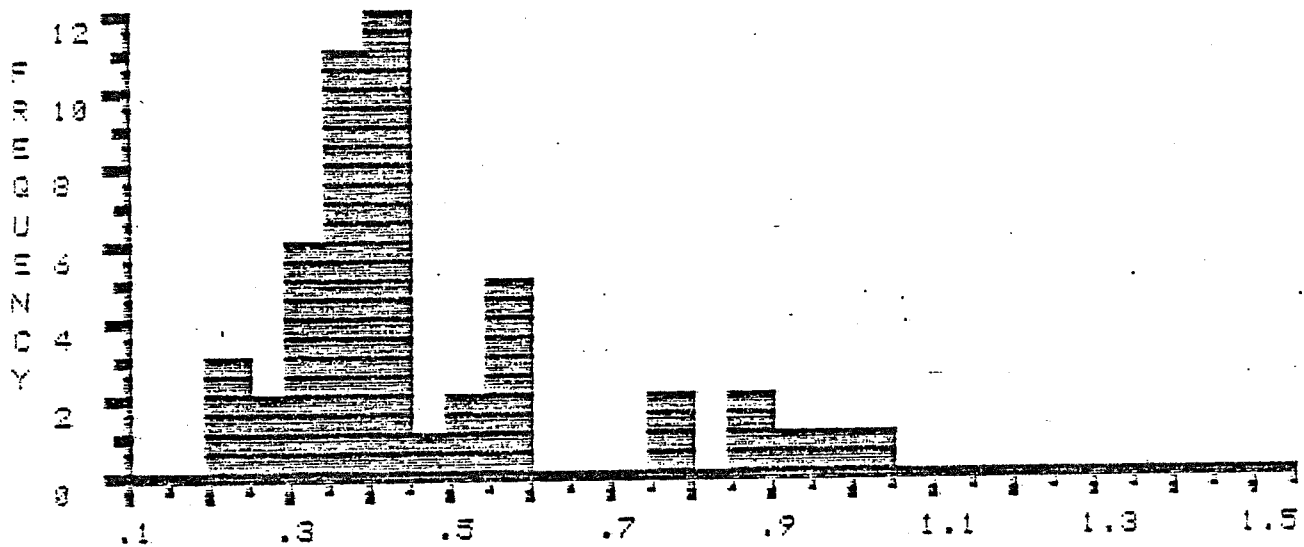
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2	*.39	*.39	*.39	*.4	*.4	*.4	*.41	*.41	*.41	*.42
3	*.42	*.42	*.43	*.43	*.44	.49	.51	.53	.55	.57
4	.57	.58	.59	.77	.79	.85	.88	.94	.99	1.01

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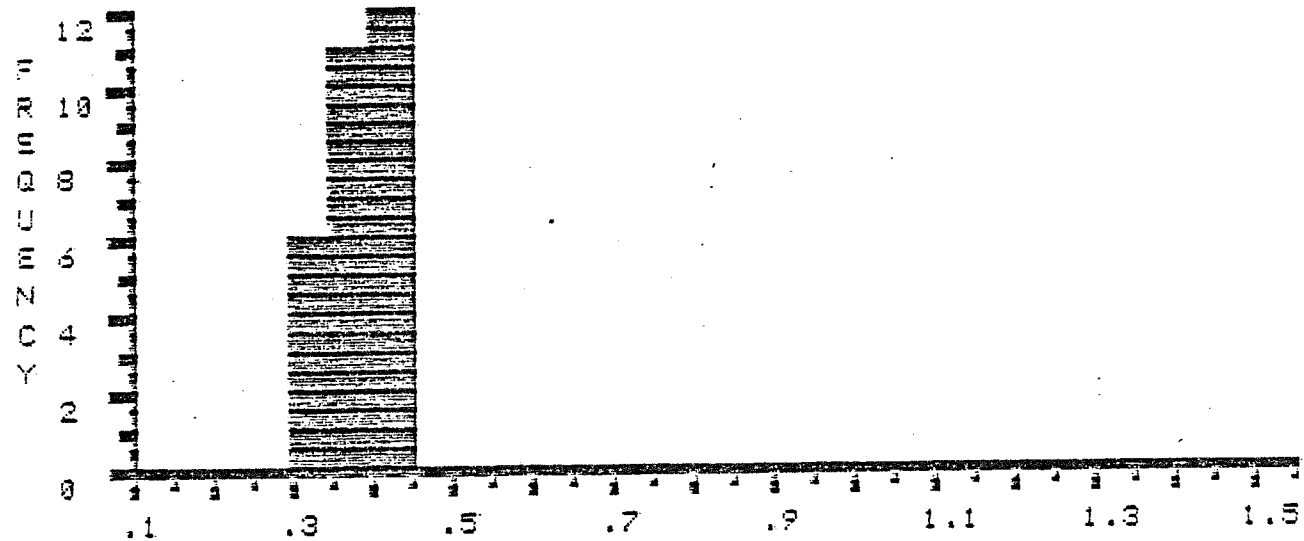
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SUM : 11.14 NUMBER : 29 MIN : .32 MAX : .44 MEAN : .38 STAN.DEV.: .02

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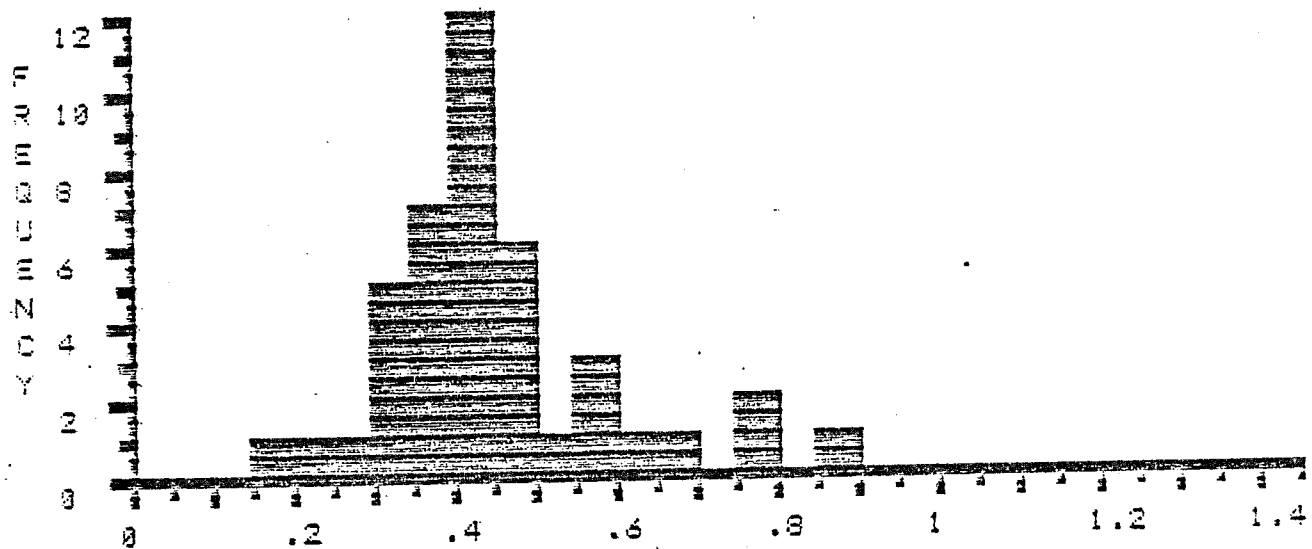
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1	*.36	*.37	*.37	*.38	*.38	*.39	*.4	*.4	*.4	*.4
2	*.41	*.41	*.41	*.41	*.42	*.42	*.43	*.44	*.47	*.47
3	*.43	*.43	*.43	*.43	*.52	*.55	.58	.59	.64	.65
4	.75	.77	.85							

SUM : 18.54 NUMBER : 42 MIN : .18 MAX : .85 MEAN : .44 STAN.DEV.: .14

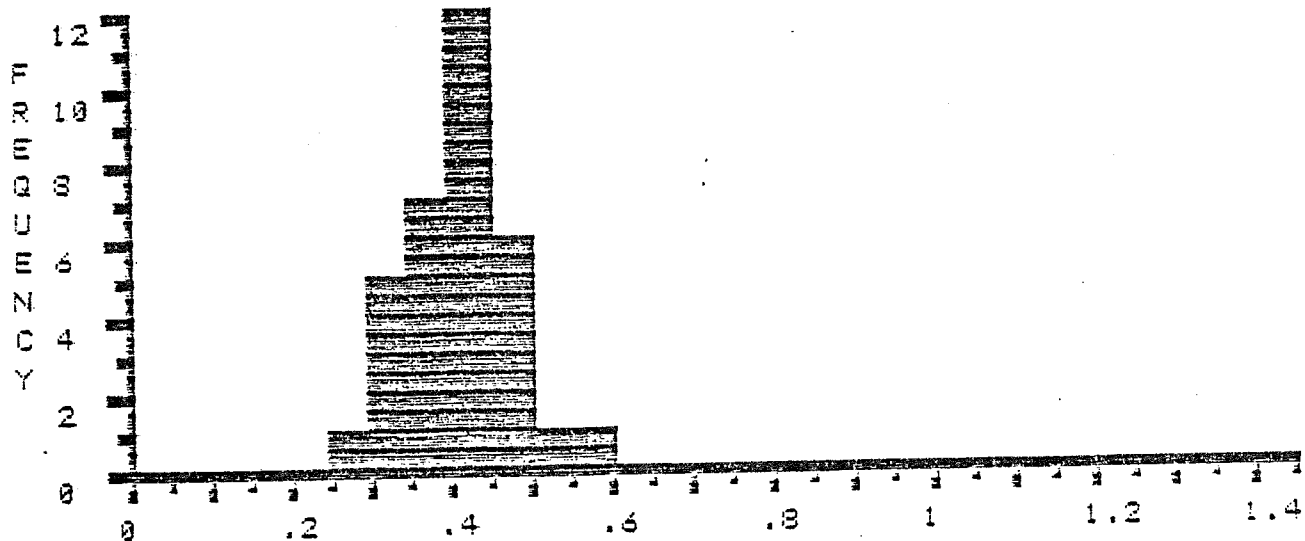
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SUM : 13.33 NUMBER : 33 MIN : .25 MAX : .55 MEAN : .4 STAN.DEV.: .07

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



% R E F L E C T A N C E * * E D I T E D * *



FILE >> K0351A DESCRIPTION FOLLOWS :
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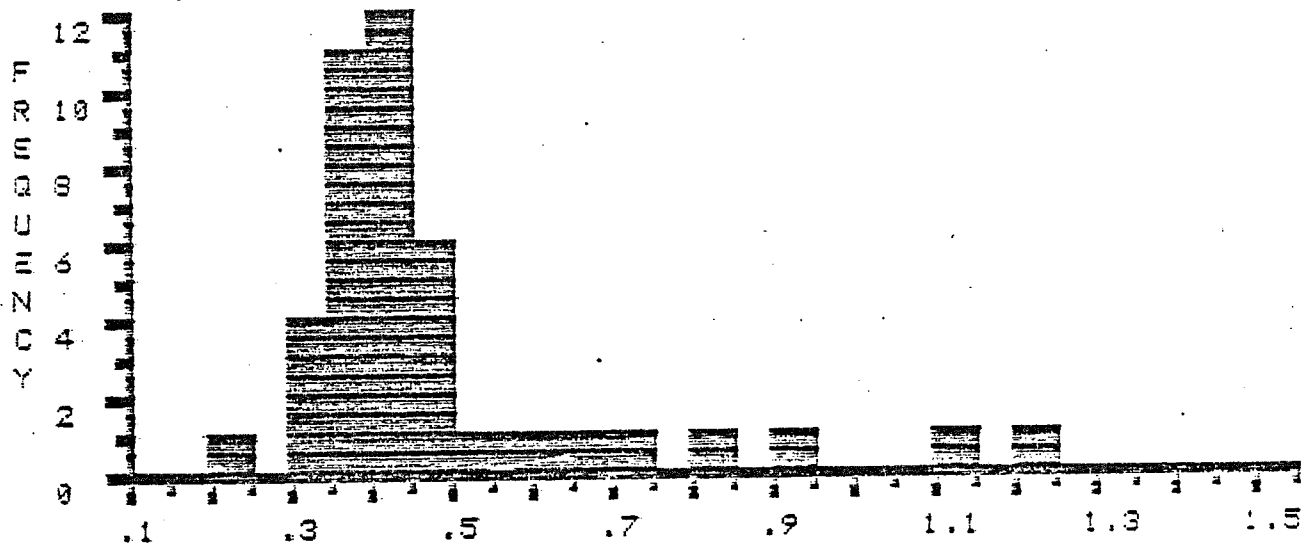
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1	*.37	*.37	*.38	*.38	*.39	*.39	*.39	*.4	*.4	*.41
2	*.41	*.41	*.41	*.41	*.42	*.42	*.42	*.44	*.44	*.45
3	*.47	*.47	*.47	*.49	*.49	*.54	.56	.62	.69	.71
4	.83	.92	1.14	1.22						

SUM : 20.7 NUMBER : 43 MIN : .21 MAX : 1.22 MEAN : .48 STAN.DEV.: .21

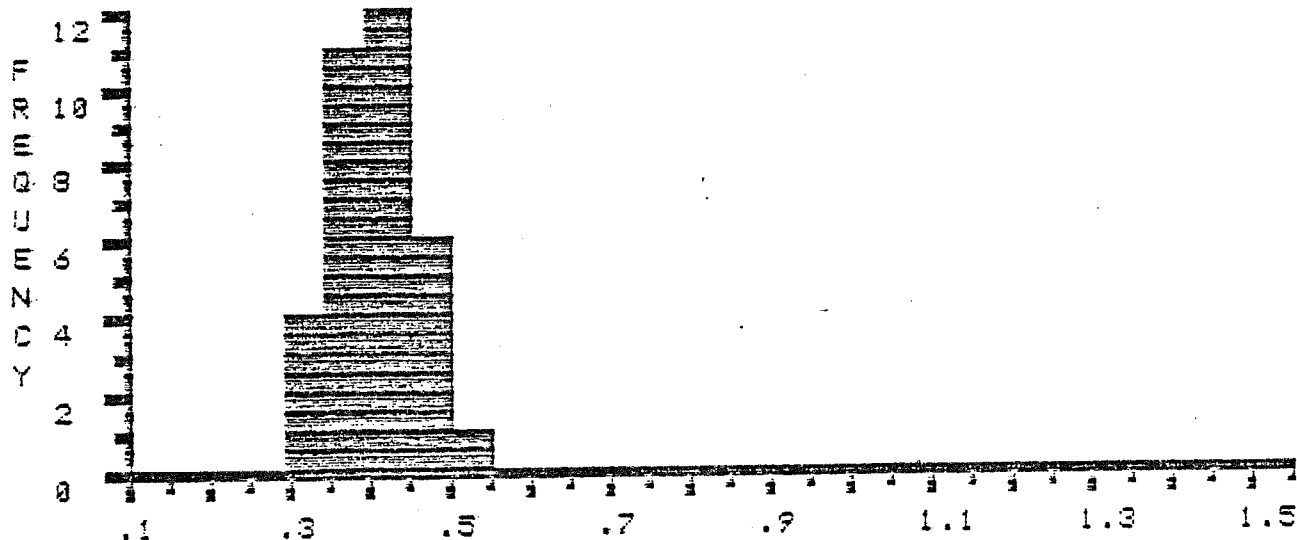
EDITED STATISTICS * * * * *

SUM : 13.8 NUMBER : 34 MIN : .32 MAX : .54 MEAN : .41 STAN.DEV.: .05

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FILE >> K03513 DESCRIPTION FOLLOWS :
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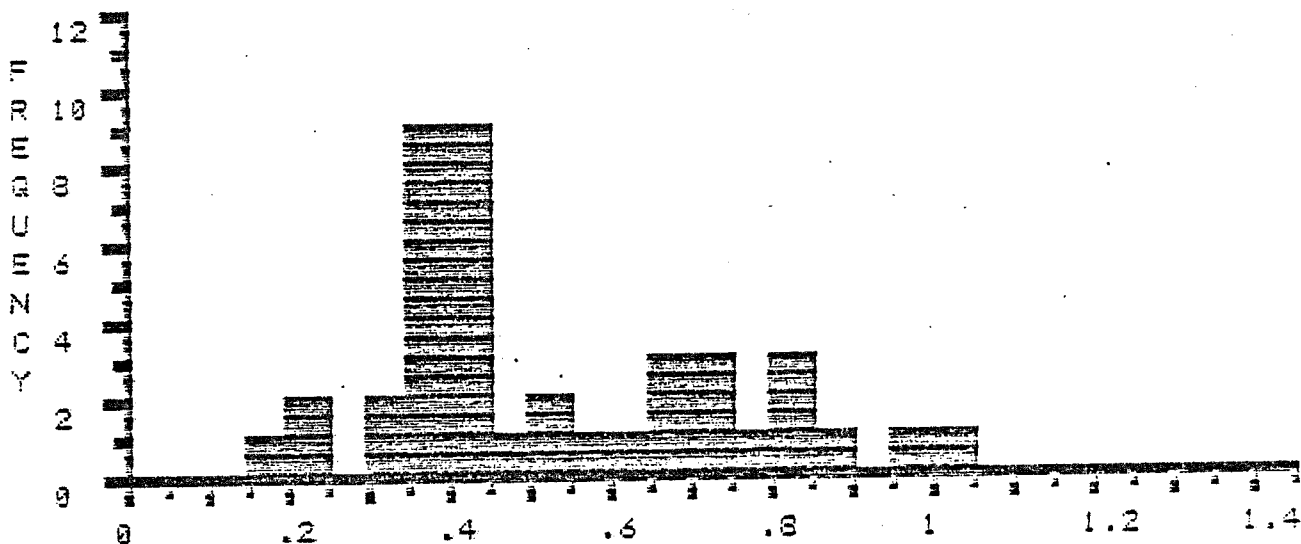
COL>	0	1	2	3	4	5	6	7	8	9
ROW		.10	.2	.23	*.34	*.34	*.35	*.36	*.36	*.37
1	*.37	*.37	*.37	*.38	*.39	*.4	*.4	*.4	*.41	*.41
2	*.42	*.42	*.43	*.44	*.48	*.5	*.51	.57	.61	.65
3	.65	.68	.72	.72	.73	.78	.8	.83	.84	.89
4	.95	1								

SUM : 21.25 NUMBER : 41 MIN : .18 MAX : 1 MEAN : .32 STAN.DEV.: .21

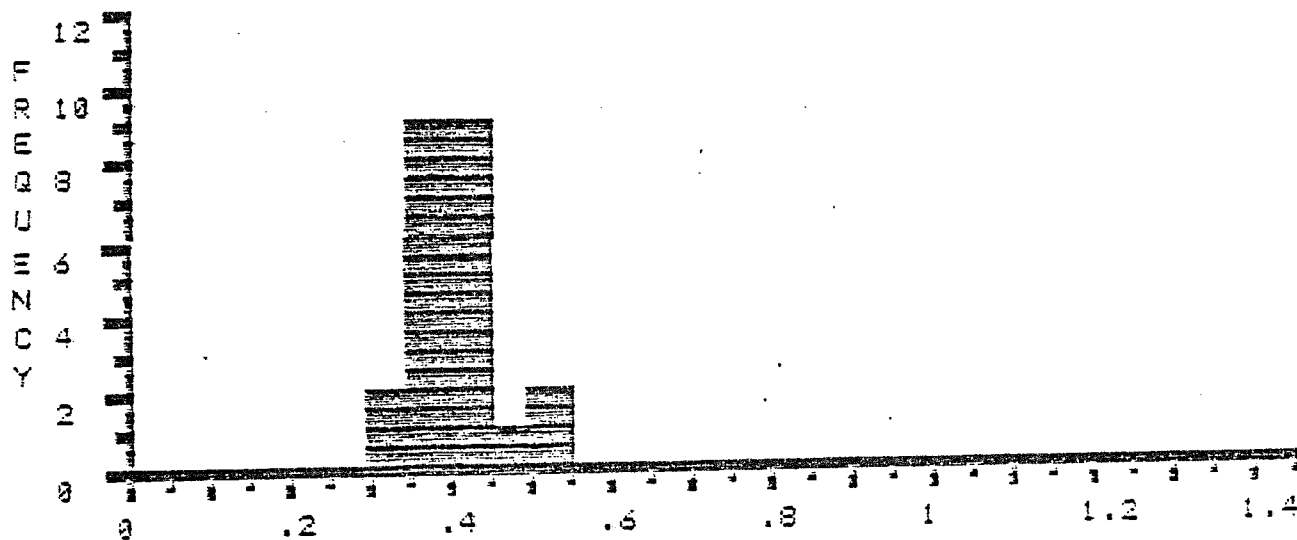
EDITED STATISTICS * * * * *

SUM : 9.22 NUMBER : 23 MIN : .34 MAX : .51 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 * *



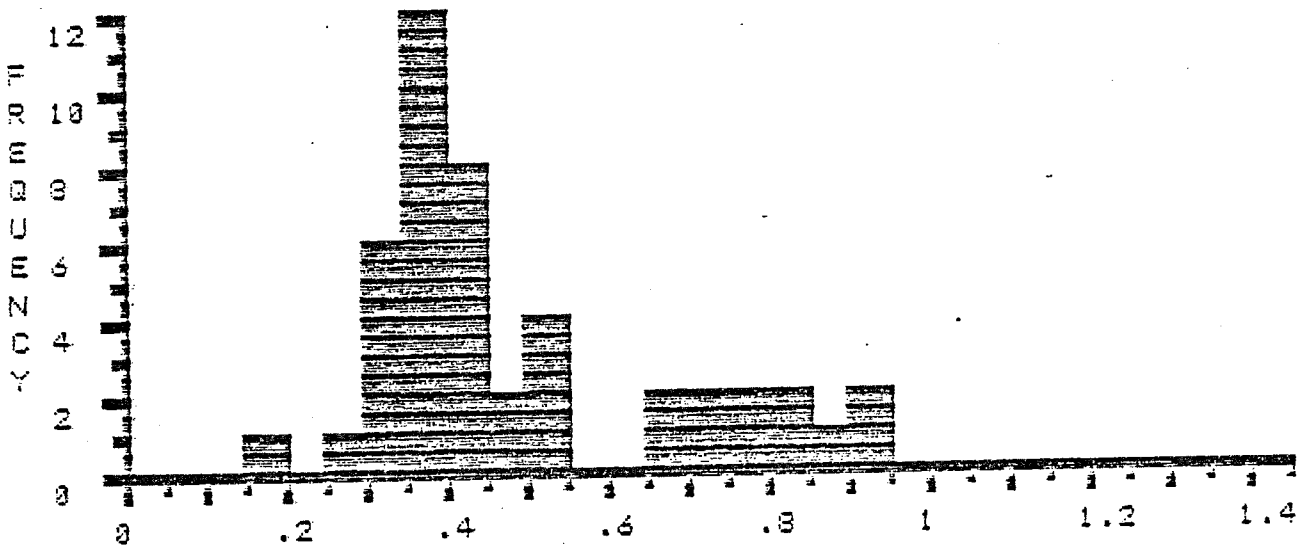
FILE >> K0851C DESCRIPTION FOLLOWS :
 DEPTH 7400-7430', TERN A-68, MIKE AVERY, DEC-13-84

COL>	0	1	2	3	4	5	6	7	8	9
ROW		.19	.26	*.3	*.3	*.31	*.33	*.34	*.34	*.35
1	*.36	*.36	*.36	*.37	*.37	*.38	*.38	*.39	*.39	*.39
2	*.39	*.4	*.4	*.4	*.4	*.4	*.41	*.43	*.44	*.46
3	*.47	*.5	*.52	*.52	*.52	.66	.68	.7	.73	.75
4	.79	.81	.81	.87	.91	.93				

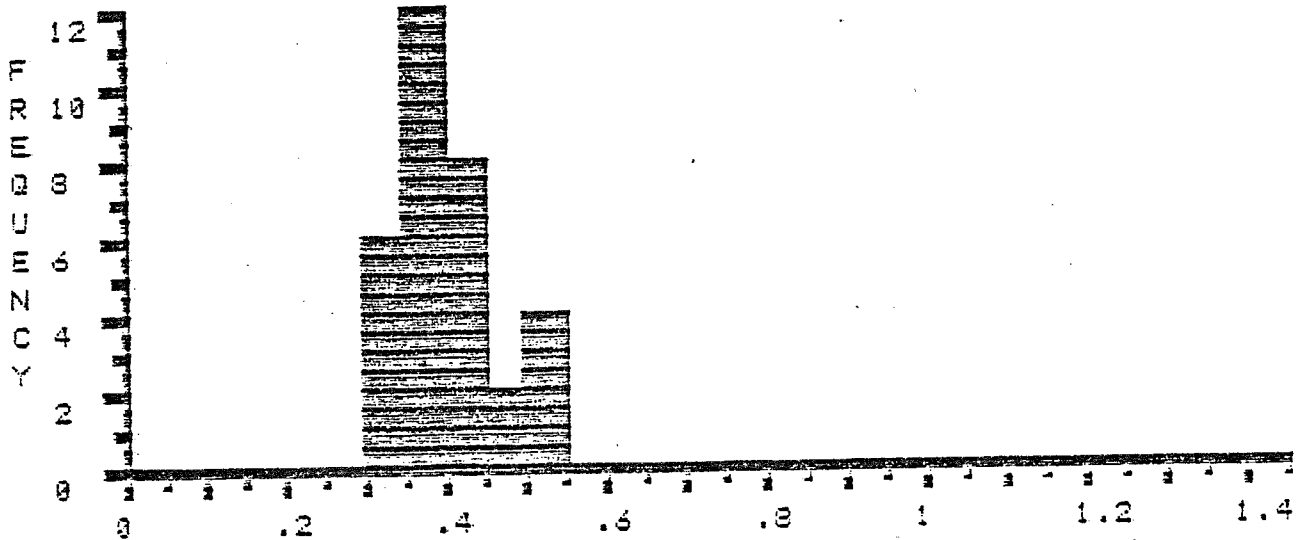
SUM : 21.77 NUMBER : 45 MIN : .19 MAX : .93 MEAN : .48 STAN.DEV.: .19

EDITED STATISTICS * * * * *
 SUM : 12.68 NUMBER : 32 MIN : .3 MAX : .82 MEAN : .4 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 * *



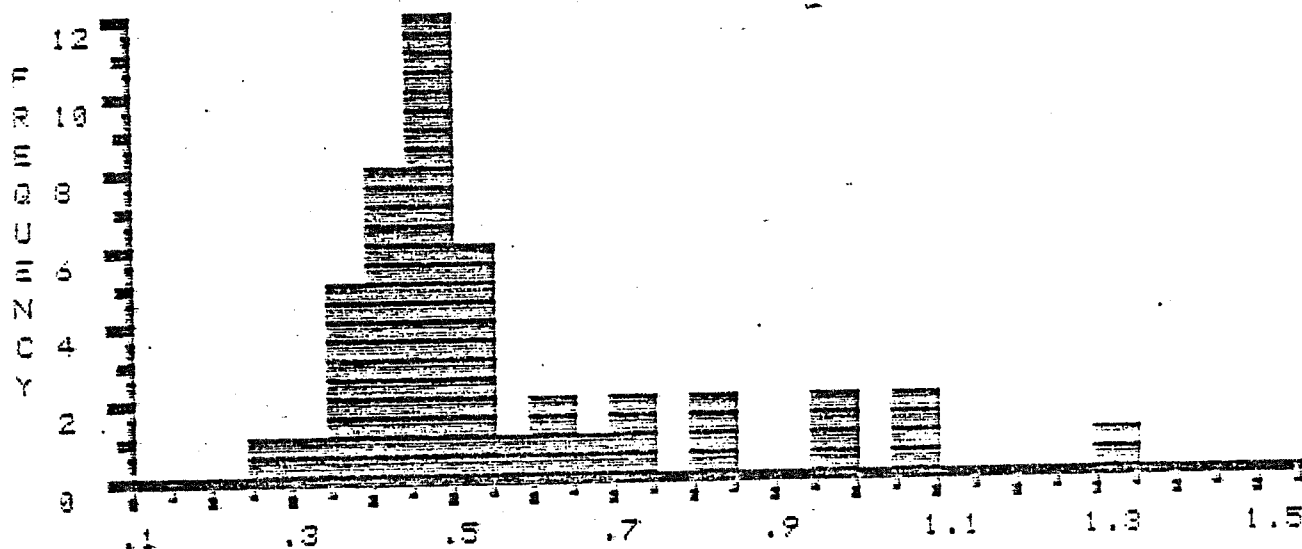
FILE >> K8852A DESCRIPTION FOLLOWS :
 DEPTH 7760-7790', TERN A-68, MIKE AVERY, DEC-13-64

COL	0	1	2	3	4	5	6	7	8	9
ROW		*.29	*.32	*.35	*.36	*.37	*.39	*.39	*.4	*.42
1	*.42	*.42	*.42	*.42	*.43	*.44	*.46	*.46	*.46	*.46
2	*.46	*.47	*.47	*.47	*.47	*.47	*.47	*.49	*.5	*.5
3	*.52	*.53	*.53	*.53	.55	.6	.64	.68	.7	.7
4	.8	.81	.95	.98	1.05	1.06	1.3			

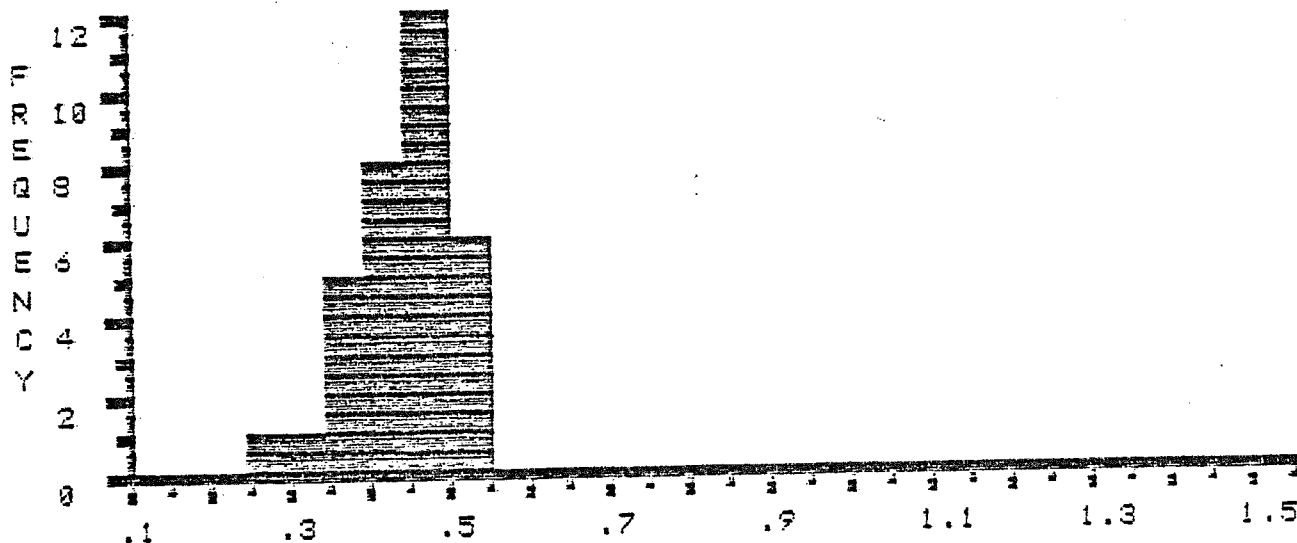
SUM : 25.38 NUMBER : 46 MIN : .29 MAX : 1.3 MEAN : .55 STAN.DEV.: .22

EDITED STATISTICS * * * * *
 SUM : 14.56 NUMBER : 33 MIN : .29 MAX : .53 MEAN : .44 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 >> K0002E DESCRIPTION FOLLOWS :
 DEPTH 9940-9970', TERN A-68, MIKE AVERY, DEC-13-84

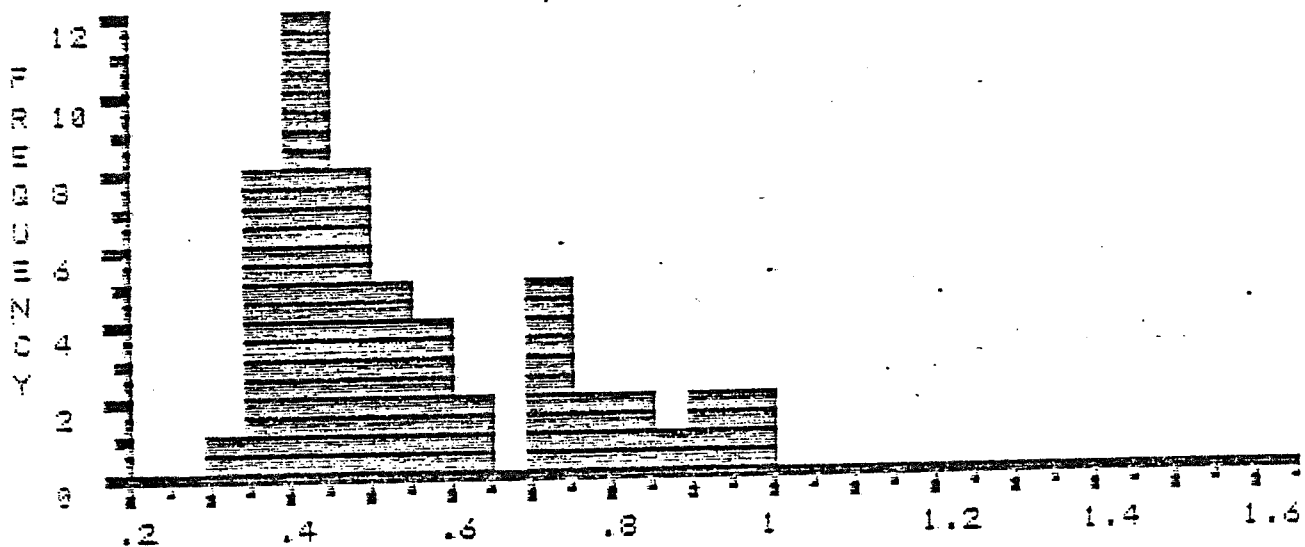
COL)	0	1	2	3	4	5	6	7	8	9
ROW		*.33	*.36	*.37	*.38	*.38	*.38	*.38	*.38	*.38
1	*.4	*.4	*.41	*.41	*.41	*.42	*.42	*.42	*.42	*.44
2	*.44	*.44	*.45	*.45	*.46	*.46	*.47	*.47	*.48	*.49
3	*.5	*.51	*.52	*.52	*.54	*.56	*.57	*.58	*.59	*.61
4	*.64	.7	.73	.74	.74	.74	.79	.79	.8	.83
5	.89	.91	.94	.96	.97					

SUM : 29.78 NUMBER : 54 MIN : .33 MAX : .97 MEAN : .55 STAN.DEV.: .18

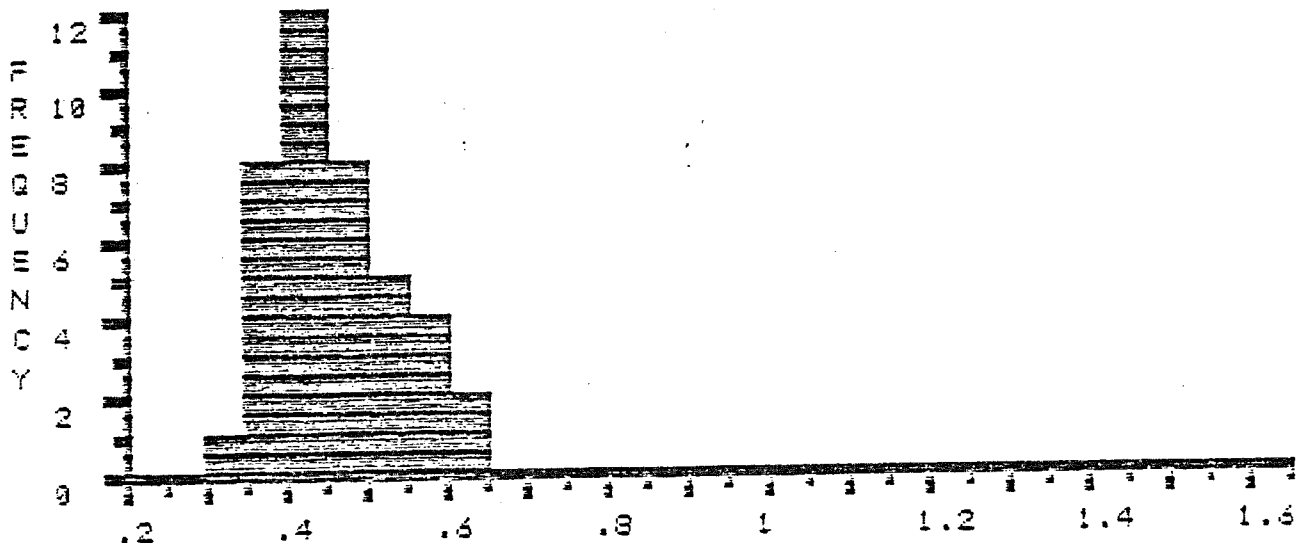
EDITED STATISTICS * * * * *

SUM : 18.25 NUMBER : 40 MIN : .33 MAX : .64 MEAN : .46 STAN.DEV.: .08

% REFLECTANCE



% REFLECTANCE * * EDITED * *



FILE >> K03520 DESCRIPTION FOLLOWS :
 DEPTH 8330-8360', TERN A-68, MIKE AVERY, DEC-14-84

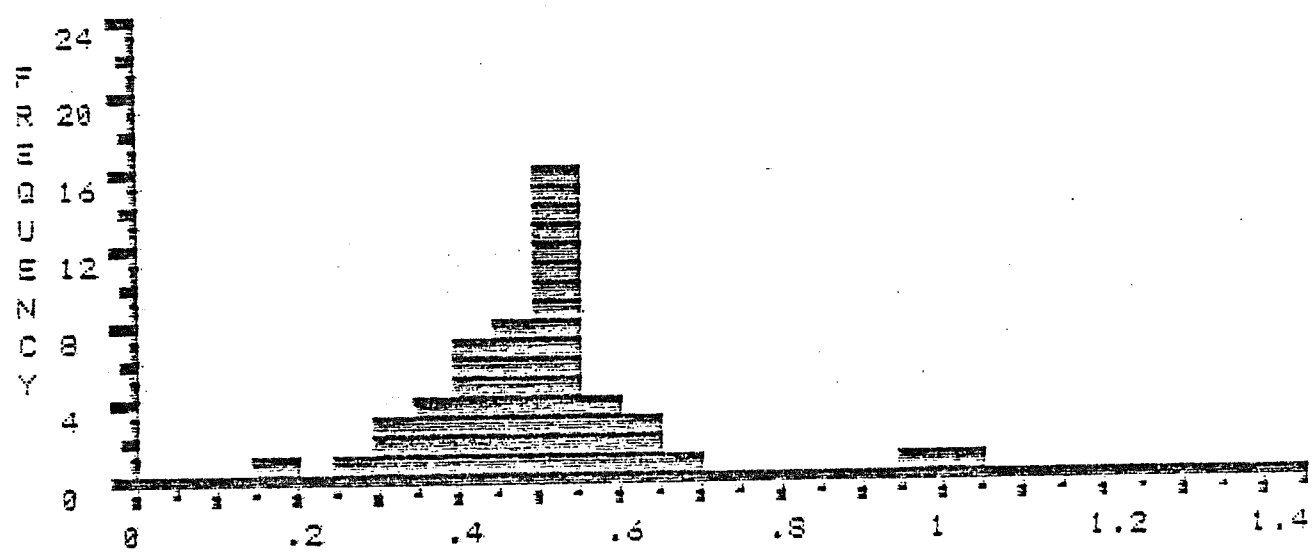
COL	0	1	2	3	4	5	6	7	8	9
ROW		.19	.25	*.31	*.33	*.33	*.36	*.37	*.38	*.39
1	*.41	*.41	*.42	*.42	*.42	*.43	*.43	*.43	*.43	*.43
2	*.46	*.47	*.47	*.47	*.49	*.5	*.5	*.51	*.51	*.51
3	*.51	*.51	*.51	*.51	*.52	*.53	*.53	*.54	*.54	*.54
4	*.54	*.57	*.58	*.59	*.59	*.6	*.62	*.63	*.63	.98
5	1.02									

SUM : 24.7 NUMBER : 50 MIN : .19 MAX : 1.02 MEAN : .49 STAN.DEV. : .14

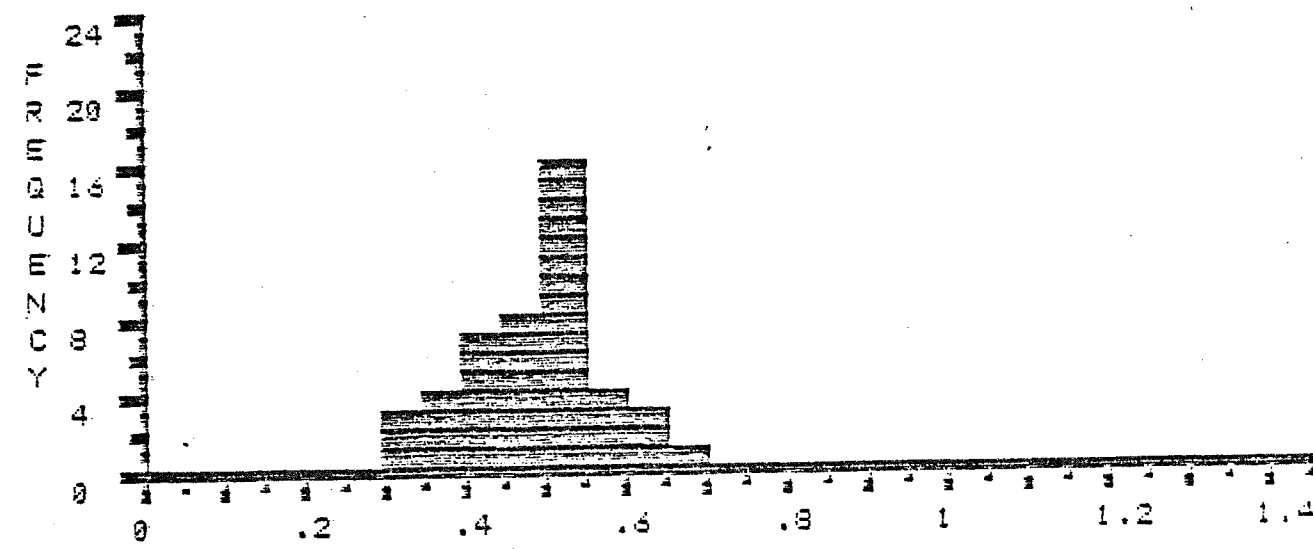
EDITED STATISTICS * * * * *

SUM : 22.26 NUMBER : 46 MIN : .31 MAX : .65 MEAN : .48 STAN.DEV. : .08

% REFLECTANCE



% REFLECTANCE * * EDITED * *



FILE >> K0353A DESCRIPTION FOLLOWS :
 DEPTH 8630-8639', TERN A-68. MIKE AVERY, DEC-14-84

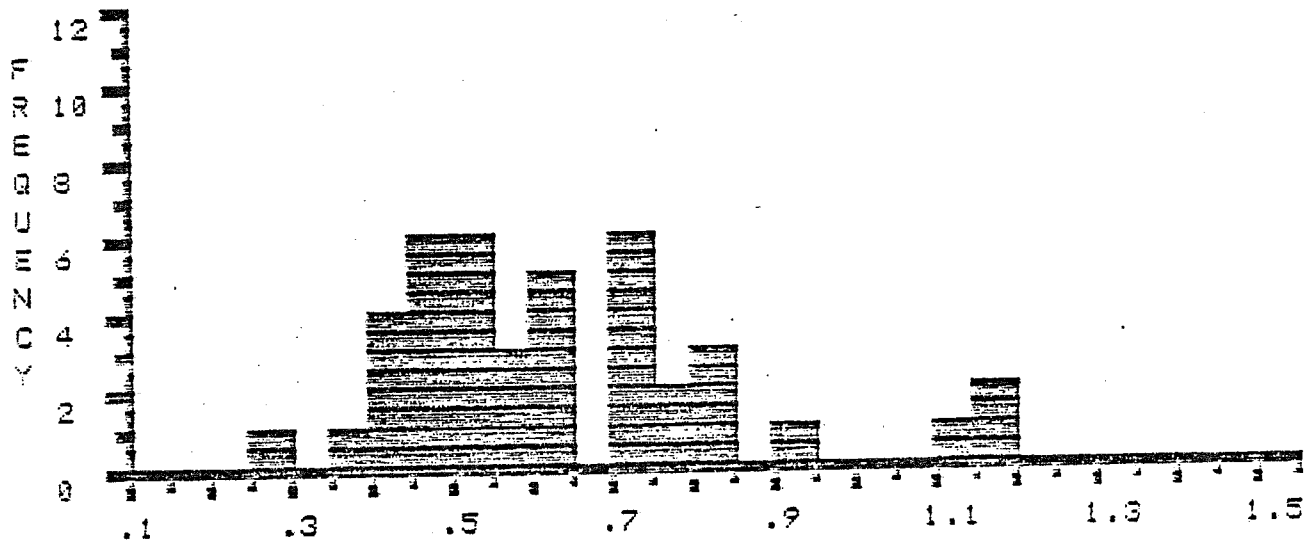
COL>	0	1	2	3	4	5	6	7	8	9
ROW		.25	*.39	*.4	*.41	*.42	*.43	*.45	*.45	*.47
1	*.47	*.48	*.48	*.5	*.51	*.51	*.52	*.53	*.53	*.57
2	*.57	*.58	*.61	*.61	*.62	*.64	*.64	.7	.7	.7
3	.71	.72	.73	.76	.78	.8	.8	.84	.9	1.13
4	1.15	1.18								

SUM : 23.64 NUMBER : 41 MIN : .25 MAX : 1.18 MEAN : .63 STAN.DEV.: .21

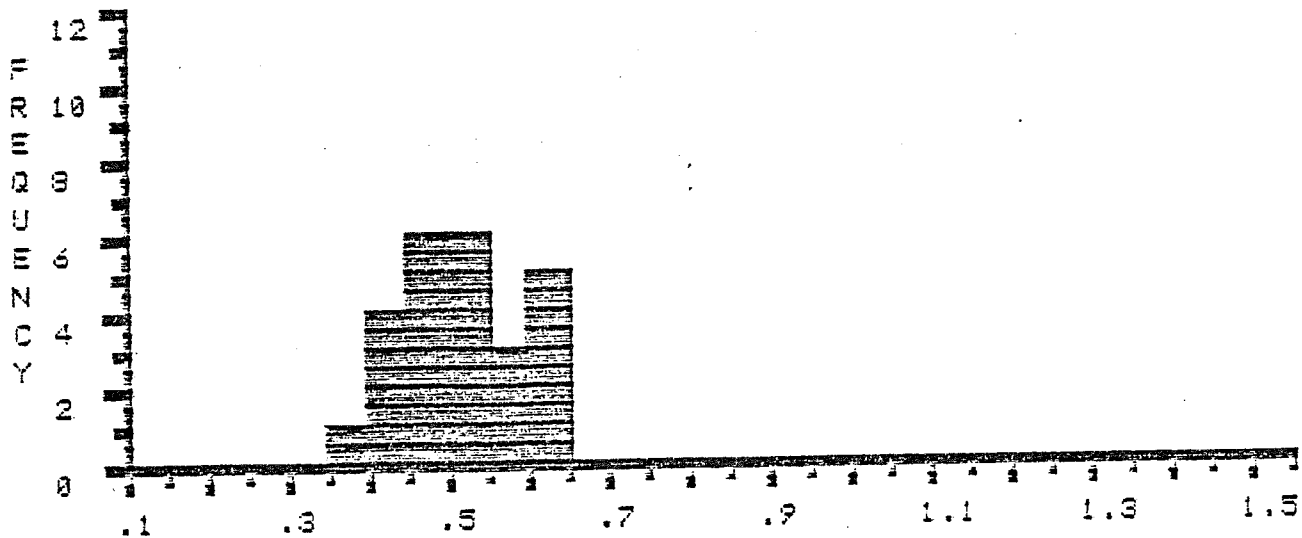
EDITED STATISTICS * * * * *

SUM : 12.79 NUMBER : 25 MIN : .39 MAX : .64 MEAN : .51 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 >> K03568 DESCRIPTION FOLLOWS :
 DEPTH 9000-9100', TERN A-68, MIKE AVERY, DEC-14-84

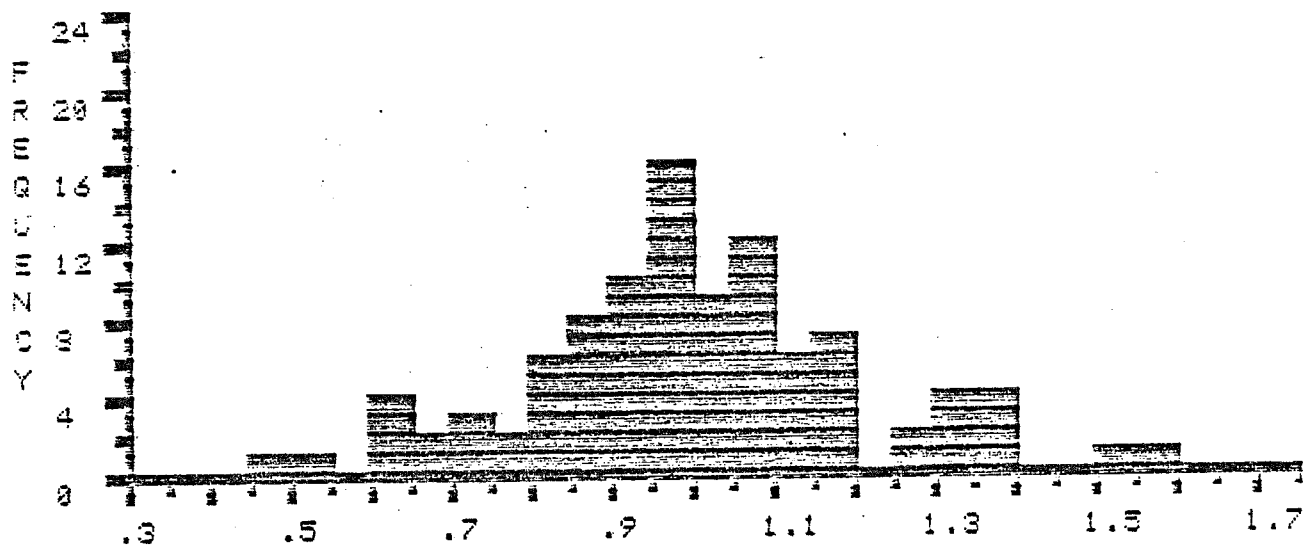
COL	0	1	2	3	4	5	6	7	8	9
ROW		.45	.50	.6	.68	.68	.64	.66	.65	.71
1	.71	.71	.76	.76	*.8	*.8	*.81	*.82	*.82	*.84
2	*.85	*.86	*.86	*.87	*.88	*.88	*.89	*.89	*.9	*.91
3	*.92	*.92	*.93	*.93	*.93	*.94	*.94	*.94	*.95	*.95
4	*.95	*.95	*.95	*.96	*.97	*.97	*.97	*.97	*.97	*.97
5	*.98	*.99	*.99	*.99	*1	*1	*1.01	*1.01	*1.02	*1.02
6	*1.02	*1.03	*1.03	*1.03	*1.05	*1.05	*1.06	*1.07	*1.07	*1.07
7	*1.07	*1.08	*1.08	*1.09	*1.09	*1.1	*1.11	*1.11	*1.12	*1.14
8	*1.14	*1.15	*1.16	*1.16	*1.17	*1.17	*1.19	*1.19	1.27	1.28
9	1.32	1.33	1.34	1.34	1.35	1.37	1.39	1.39	1.53	1.55

SUM : 78.43 NUMBER : 99 MIN : .45 MAX : 1.55 MEAN : .99 STAN.DEV.: .21

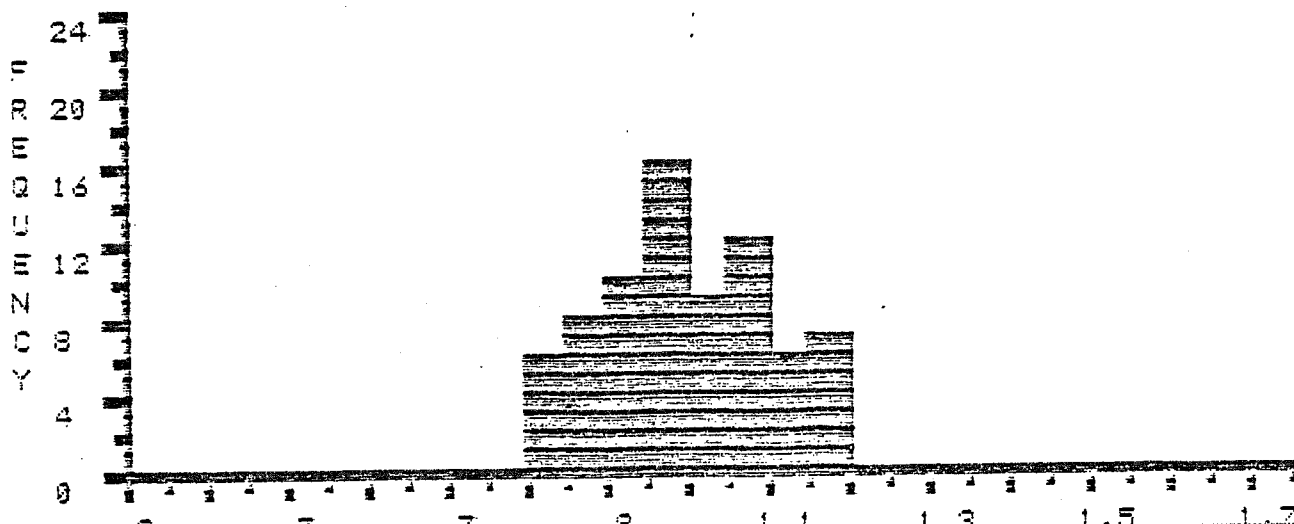
EDITED STATISTICS * * * * *

SUM : 73.49 NUMBER : 74 MIN : .8 MAX : 1.19 MEAN : .99 STAN.DEV.: .1

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



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



FILE >> K8858C DESCRIPTION FOLLOWS :
 DEPTH 9330-9360', TERN A-62, MIKE AVERY, DEC-14-84

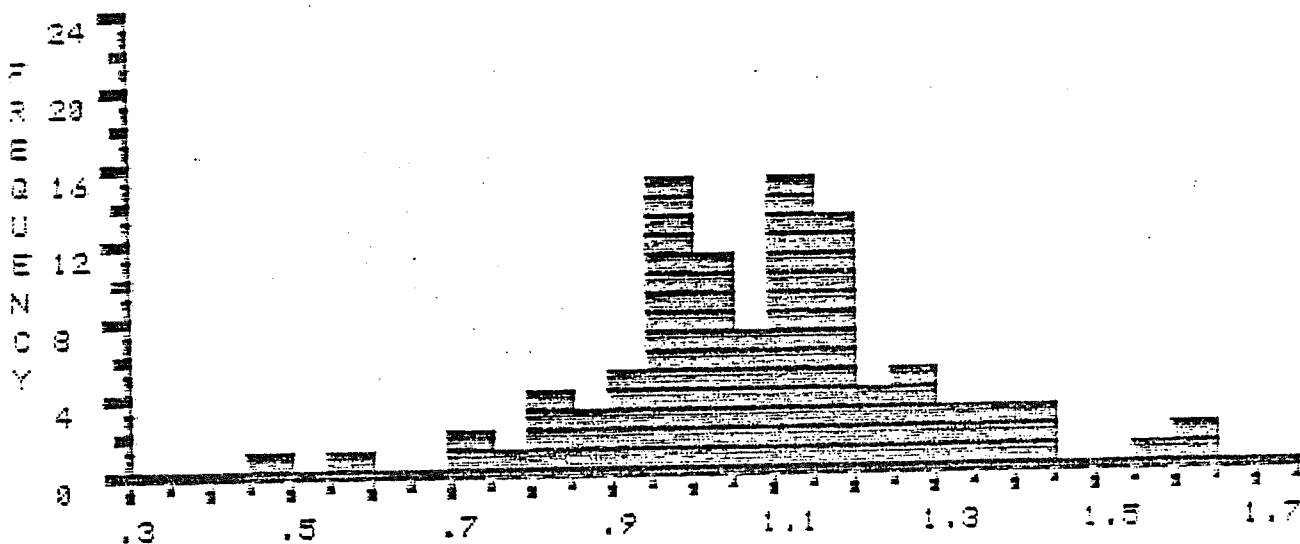
COL>	0	1	2	3	4	5	6	7	8	9
ROW		.47	.58	.74	.74	.78	*.88	*.84	*.84	*.84
1	*.86	*.88	*.89	*.91	*.91	*.92	*.93	*.94	*.95	*.95
2	*.95	*.96	*.96	*.96	*.96	*.96	*.96	*.97	*.97	*.98
3	*.99	*.99	*.99	*1	*1.01	*1.01	*1.02	*1.02	*1.03	*1.03
4	*1.03	*1.03	*1.04	*1.04	*1.05	*1.05	*1.05	*1.06	*1.06	*1.06
5	*1.07	*1.1	*1.1	*1.1	*1.11	*1.11	1.12	1.12	1.12	1.13
6	1.13	1.13	1.13	1.13	1.14	1.14	1.15	1.15	1.15	1.16
7	1.16	1.17	1.17	1.18	1.18	1.18	1.19	1.19	1.19	1.2
8	1.22	1.23	1.24	1.25	1.27	1.27	1.28	1.28	1.3	1.3
9	1.31	1.36	1.36	1.39	1.41	1.42	1.44	1.53	1.6	1.62

SUM : 107.42 NUMBER : 99 MIN : .47 MAX : 1.62 MEAN : 1.09 STAN.DEV.: .19

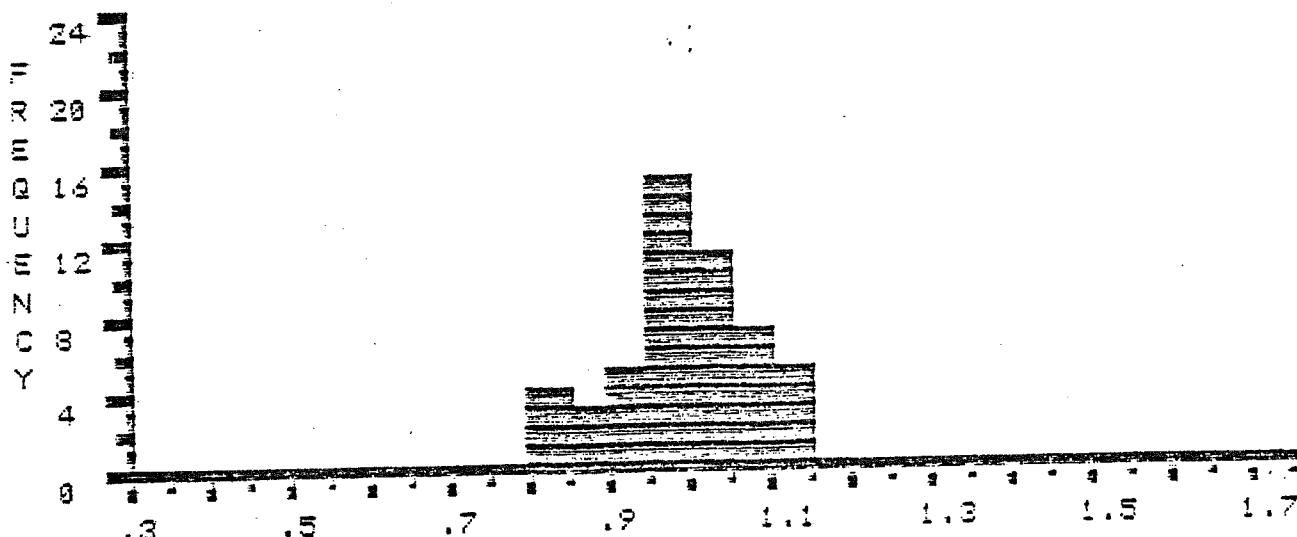
EDITED STATISTICS * * * * *

SUM : 49.27 NUMBER : 50 MIN : .93 MAX : 1.11 MEAN : .99 STAN.DEV.: .08

% REFLECTANCE



% REFLECTANCE * * EDITED * *



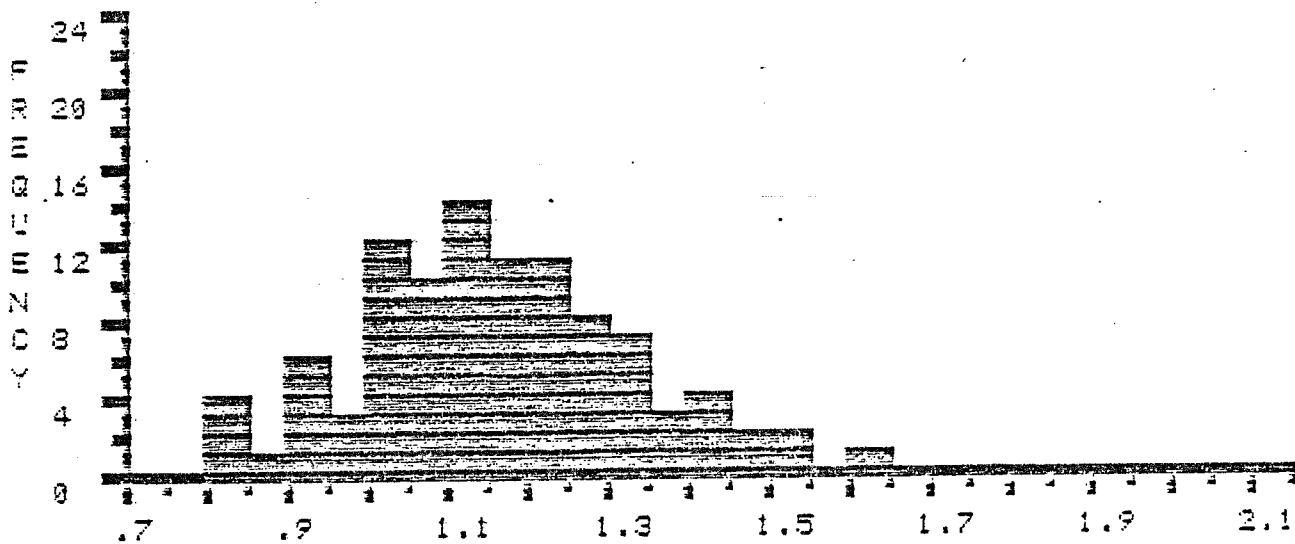
FILE >> K08844 DESCRIPTION FOLLOWS :
 DEPTH 9690-9699', TERN A-68, MIKE AVERY, 050-18-84

COL>	0	1	2	3	4	5	6	7	8	9
ROW		.81	.82	.88	.88	.87	*.9	*.9	*.91	*.92
1	*.93	*.94	*.97	*.97	*.99	*1	*1.01	*1.01	*1.01	*1.02
2	*1.02	*1.03	*1.03	*1.03	*1.03	*1.04	*1.04	*1.05	*1.05	*1.06
3	*1.07	*1.07	*1.07	*1.07	*1.08	*1.08	*1.08	*1.1	*1.1	*1.11
4	*1.11	*1.11	*1.12	*1.12	*1.13	*1.13	*1.13	*1.14	*1.14	*1.14
5	*1.14	*1.15	*1.15	*1.16	*1.16	*1.17	*1.17	*1.17	*1.18	*1.18
6	*1.18	*1.19	*1.2	*1.2	*1.21	*1.21	*1.21	*1.21	*1.22	*1.22
7	*1.22	*1.22	*1.24	*1.26	*1.26	*1.27	*1.27	*1.28	*1.29	*1.29
8	*1.29	*1.3	*1.31	*1.32	*1.32	*1.33	*1.34	*1.34	*1.35	*1.35
9	*1.37	1.4	1.41	1.41	1.43	1.49	1.49	1.52	1.53	1.62

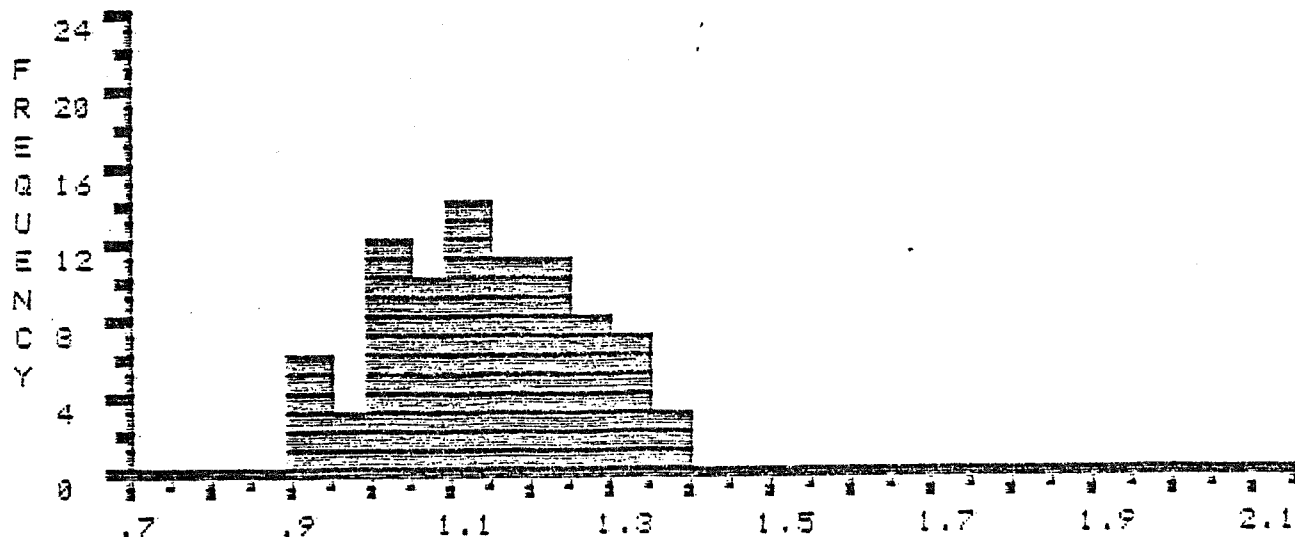
SLM : 114.34 NUMBER : 99 MIN : .81 MAX : 1.62 MEAN : 1.15 STAN.DEV.: .17

EDITED STATISTICS * * * * *
 SUM : 96.88 NUMBER : 85 MIN : .9 MAX : 1.37 MEAN : 1.14 STAN.DEV.: .12

% REFLECTANCE



% REFLECTANCE * * EDITED * *



FILE >> K03542 DESCRIPTION FOLLOWS :
 DEPTH 9930-9960', TERN A-68, MIKE AVERY, DEC-18-84

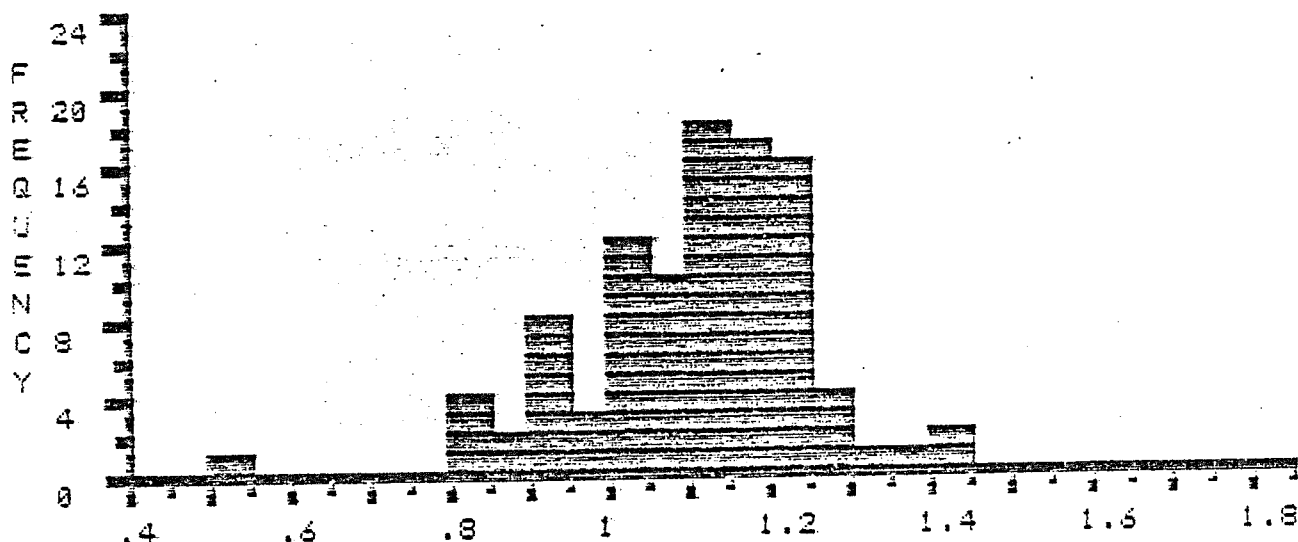
COL	0	1	2	3	4	5	6	7	8	9
ROW		.54	.81	.82	.83	.83	.87	.87	*.9	*.9
1	*.91	*.92	*.93	*.93	*.93	*.94	*.97	*.97	*.99	*1
2	*1.01	*1.01	*1.01	*1.02	*1.02	*1.03	*1.03	*1.03	*1.03	*1.04
3	*1.04	*1.05	*1.06	*1.06	*1.07	*1.07	*1.07	*1.07	*1.08	*1.08
4	*1.08	*1.1	*1.1	*1.11	*1.11	*1.11	*1.11	*1.12	*1.12	*1.12
5	*1.13	*1.13	*1.13	*1.14	*1.14	*1.14	*1.14	*1.14	*1.14	*1.15
6	*1.15	*1.15	*1.15	*1.16	*1.16	*1.16	*1.16	*1.17	*1.17	*1.17
7	*1.18	*1.18	*1.18	*1.18	*1.18	*1.19	*1.2	*1.2	*1.21	*1.21
8	*1.21	*1.21	*1.21	*1.22	*1.22	*1.22	*1.23	*1.23	*1.23	*1.23
9	*1.23	*1.24	*1.26	*1.26	*1.27	*1.27	1.3	1.36	1.43	1.43

SUM : 112.95 NUMBER : 99 MIN : .54 MAX : 1.43 MEAN : 1.14 STAN.DEV.: .18

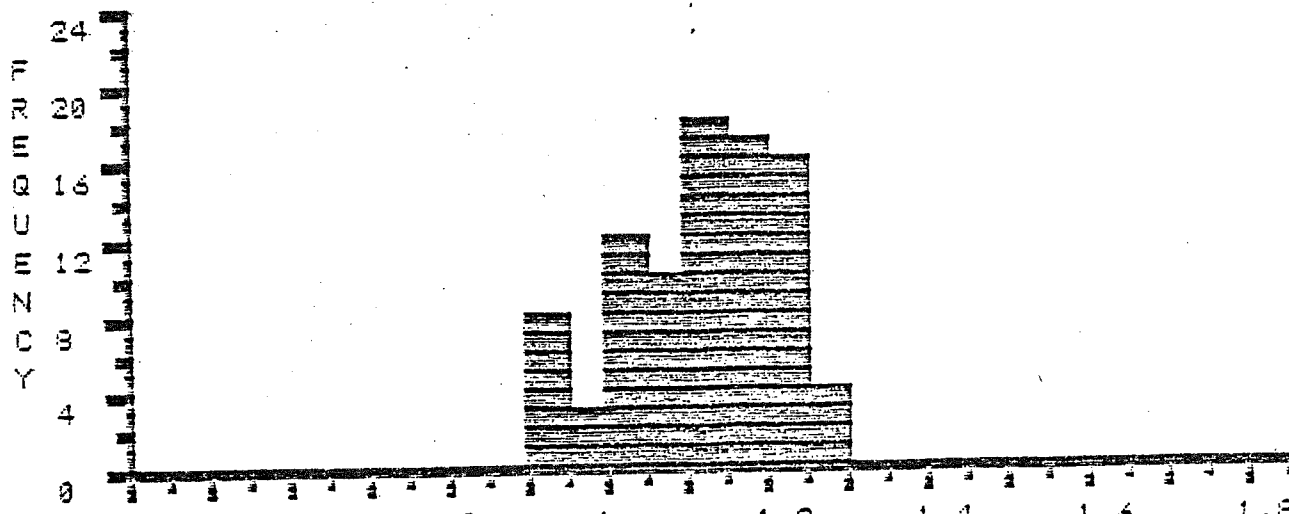
EDITED STATISTICS * * * * *

SUM : 97.89 NUMBER : 88 MIN : .9 MAX : 1.27 MEAN : 1.11 STAN.DEV.: .1

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



% R E F L E C T A N C E * * E D I T E D * *



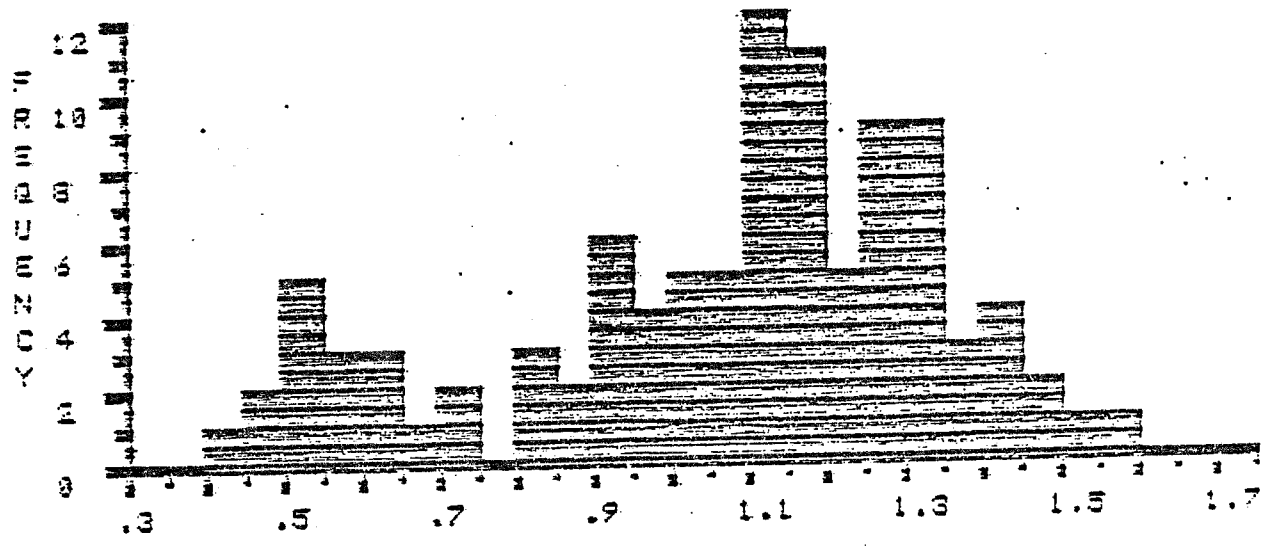
FILE >> X03390 OBSERVATION FOLLOWS :
 DATE 1968-1968, TURN 2-68, MIKE BERRY, 080-19-86

COL	1	2	3	4	5	6	7	8	9
1	1.007	1.009	1.014	1.011	1.013	1.013	1.014	1.014	1.015
2	1.006	1.009	1.010	1.010	1.010	1.010	1.011	1.011	1.011
3	1.007	1.009	1.010	1.010	1.010	1.010	1.011	1.011	1.011
4	1.007	1.009	1.010	1.010	1.010	1.010	1.011	1.011	1.011
5	1.007	1.009	1.010	1.010	1.010	1.010	1.011	1.011	1.011
6	1.007	1.009	1.010	1.010	1.010	1.010	1.011	1.011	1.011
7	1.007	1.009	1.010	1.010	1.010	1.010	1.011	1.011	1.011
8	1.007	1.009	1.010	1.010	1.010	1.010	1.011	1.011	1.011
9	1.007	1.009	1.010	1.010	1.010	1.010	1.011	1.011	1.011

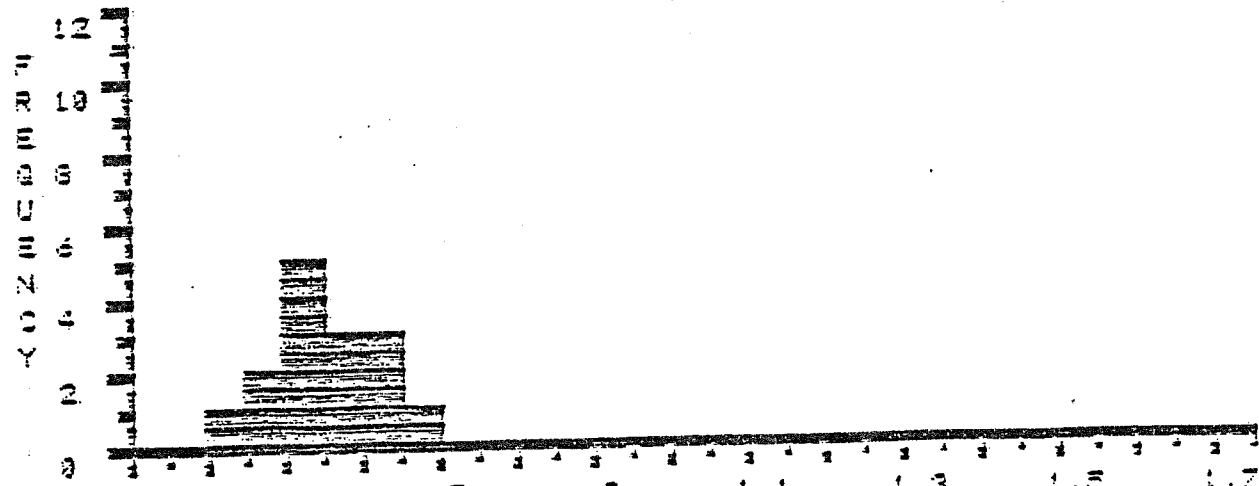
SUM : 105.32 NUMBER : 99 MIN : .41 MAX : 1.67 MEAN : 1.06 STAN.DEV. : .26

EDITED STATISTICS * * * * *
 SUM : 8.12 NUMBER : 15 MIN : .41 MAX : .66 MEAN : .54 STAN.DEV. : .07

% REFLECTANCE



% REFLECTANCE * * EDITED * *



FILE >> K0354C DESCRIPTION FOLLOWS :
 DEPTH 10530-10560', TERN A-66, MIKE AVERY, DEC-19-84

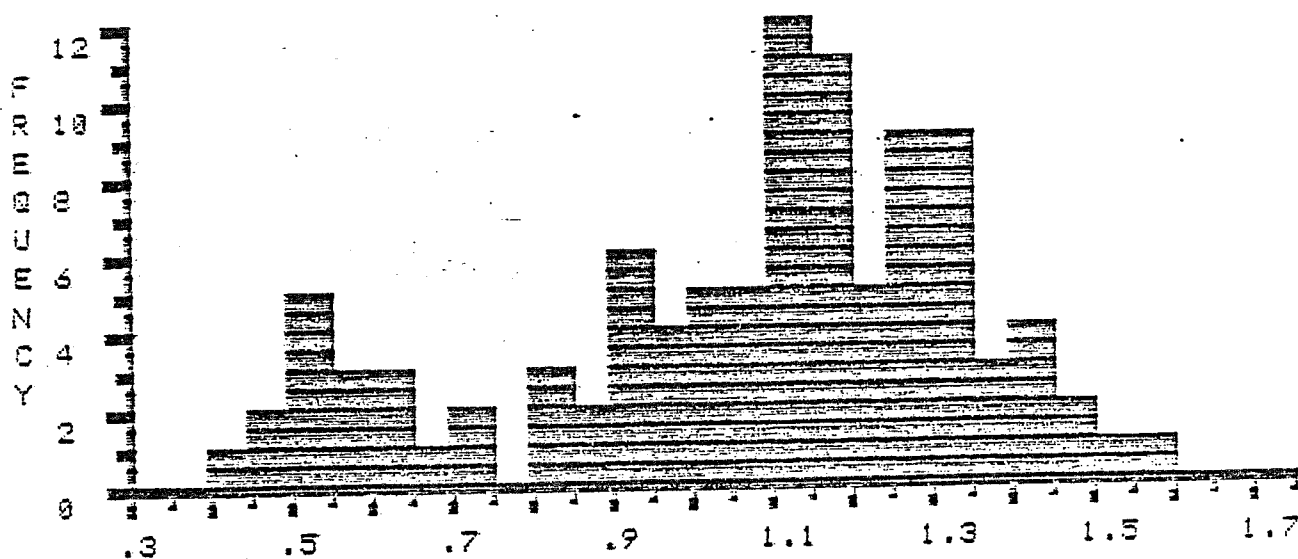
COL>	0	1	2	3	4	5	6	7	8	9
ROW		.41	.47	.47	.5	.51	.51	.51	.52	.56
1	.57	.59	.61	.61	.62	.66	.72	.73	.83	.83
2	.84	.87	.88	.91	.92	.92	.93	.93	.93	.97
3	*.98	*.98	*.98	*1.02	*1.03	*1.03	*1.04	*1.04	*1.07	*1.08
4	*1.09	*1.09	*1.09	*1.1	*1.1	*1.1	*1.11	*1.11	*1.11	*1.11
5	*1.12	*1.13	*1.13	*1.14	*1.14	*1.15	*1.16	*1.16	*1.17	*1.17
6	*1.17	*1.18	*1.18	*1.18	*1.18	*1.19	*1.2	*1.2	*1.23	*1.24
7	*1.24	*1.25	*1.25	*1.26	*1.26	*1.26	*1.26	*1.28	*1.29	*1.29
8	*1.3	*1.3	*1.3	*1.31	*1.31	*1.32	*1.33	*1.34	*1.34	*1.35
9	*1.37	*1.38	*1.4	*1.41	*1.41	*1.42	1.48	1.49	1.54	1.57

SUM : 105.32 NUMBER : 99 MIN : .41 MAX : 1.57 MEAN : 1.06 STAN.DEV.: .28

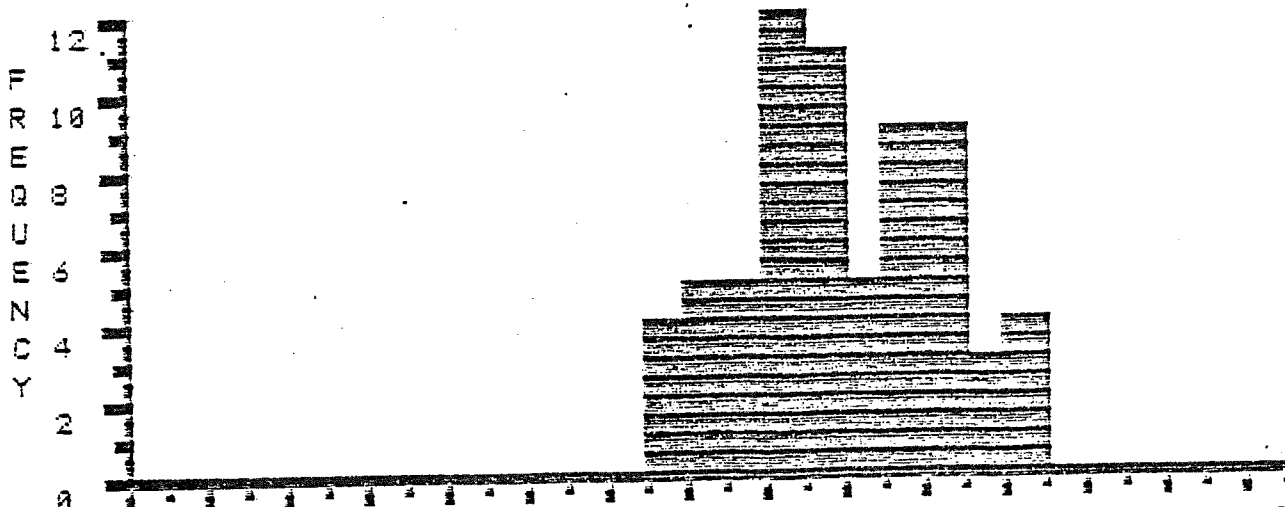
EDITED STATISTICS * * * * *

SUM : 79.88 NUMBER : 67 MIN : .97 MAX : 1.42 MEAN : 1.19 STAN.DEV.: .12

% REFLECTANCE



% REFLECTANCE * * EDITED * *



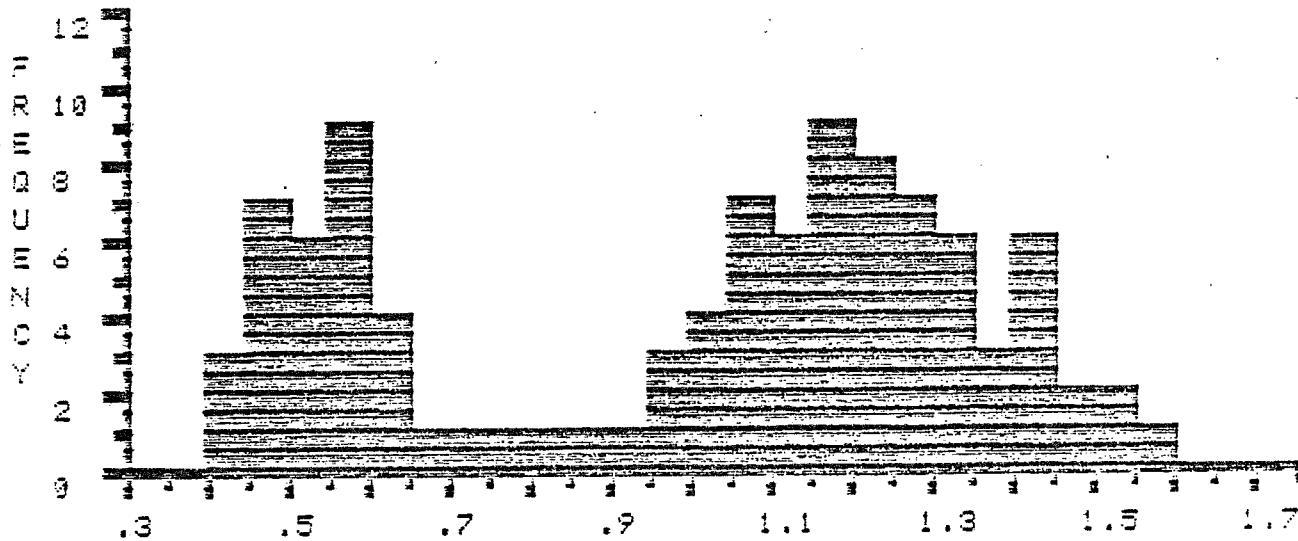
FILE >> K00554 DESCRIPTION FOLLOWS :
 DEPTH 10030-10049', TERN A-68, MIKE AVERY, DEC-19-64

COL	0	1	2	3	4	5	6	7	8	9
ROW		*.43	*.44	*.44	*.45	*.46	*.47	*.47	*.48	*.48
1	*.49	*.5	*.5	*.5	*.51	*.51	*.53	*.53	*.53	*.54
2	*.57	*.58	*.58	*.59	*.59	*.59	*.62	*.62	*.63	*.64
3	*.66	.70	.70	.81	.85	.9	.96	.96	.98	1
4	1.02	1.03	1.04	1.06	1.06	1.07	1.08	1.08	1.08	1.09
5	1.1	1.11	1.12	1.14	1.14	1.14	1.15	1.15	1.15	1.15
6	1.16	1.16	1.19	1.19	1.19	1.21	1.22	1.22	1.22	1.23
7	1.23	1.23	1.24	1.25	1.27	1.27	1.28	1.28	1.28	1.29
8	1.31	1.31	1.32	1.32	1.34	1.34	1.36	1.36	1.37	1.41
9	1.41	1.42	1.44	1.44	1.44	1.48	1.49	1.5	1.51	1.51

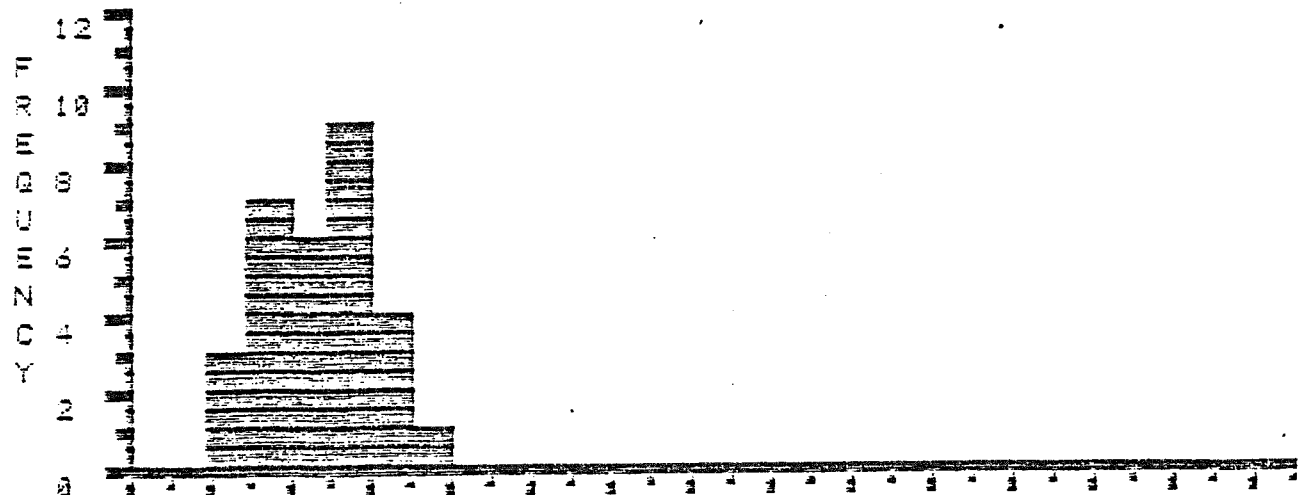
SUM : 98.66 NUMBER : 99 MIN : .43 MAX : 1.57 MEAN : 1 STAN.DEV.: .64

EDITED STATISTICS * * * * *
 SUM : 15.98 NUMBER : 30 MIN : .43 MAX : .66 MEAN : .53 STAN.DEV.: .07

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



% R E F L E C T A N C E * * E D I T E D * *



FILE >> K9355A DESCRIPTION FOLLOWS :
 DEPTH 19839-19869', TERN A-68, MIKE AVERY, DEC-19-84

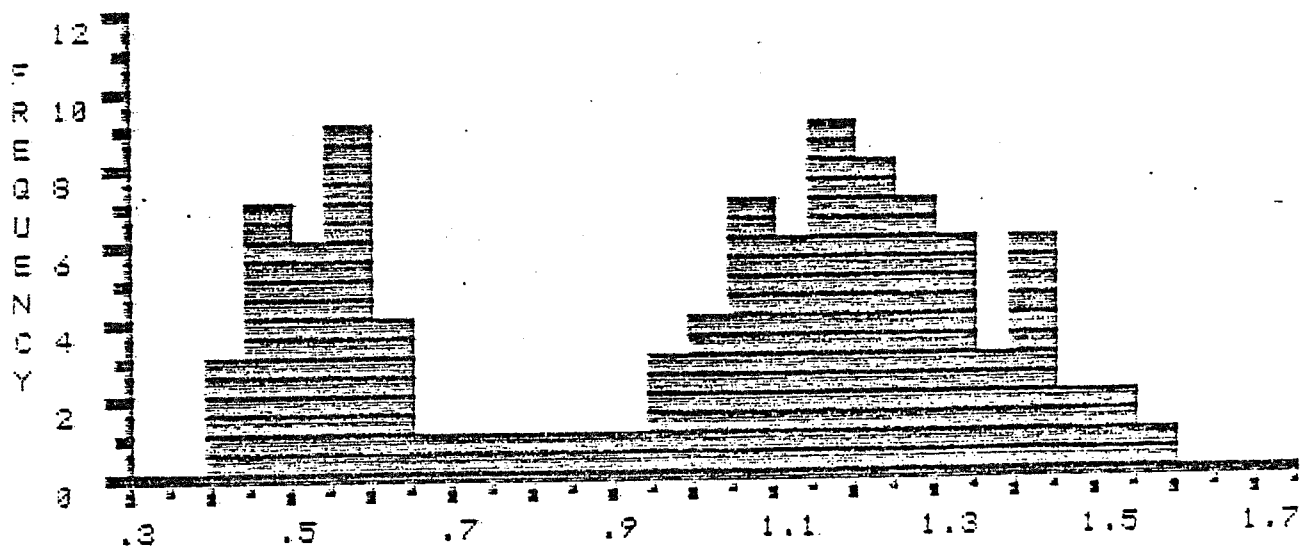
COL	0	1	2	3	4	5	6	7	8	9
ROW		.43	.44	.44	.45	.46	.47	.47	.48	.48
1	.49	.5	.5	.5	.51	.51	.53	.53	.55	.55
2	.57	.58	.58	.59	.59	.59	.62	.62	.63	.64
3	.66	.73	.76	.81	.85	.9	*.96	*.96	*.98	*1
4	*1.02	*1.03	*1.04	*1.06	*1.06	*1.07	*1.08	*1.08	*1.08	*1.09
5	*1.1	*1.11	*1.12	*1.14	*1.14	*1.14	*1.15	*1.15	*1.15	*1.15
6	*1.16	*1.16	*1.19	*1.19	*1.19	*1.21	*1.22	*1.22	*1.22	*1.23
7	*1.23	*1.23	*1.24	*1.25	*1.27	*1.27	*1.28	*1.28	*1.28	*1.29
8	*1.31	*1.31	*1.32	*1.32	*1.34	*1.34	*1.36	*1.36	*1.37	1.41
9	1.41	1.42	1.44	1.44	1.44	1.48	1.49	1.5	1.51	1.57

SUM : 98.66 NUMBER : 99 MIN : .43 MAX : 1.57 MEAN : 1 STAN.DEV.: .34

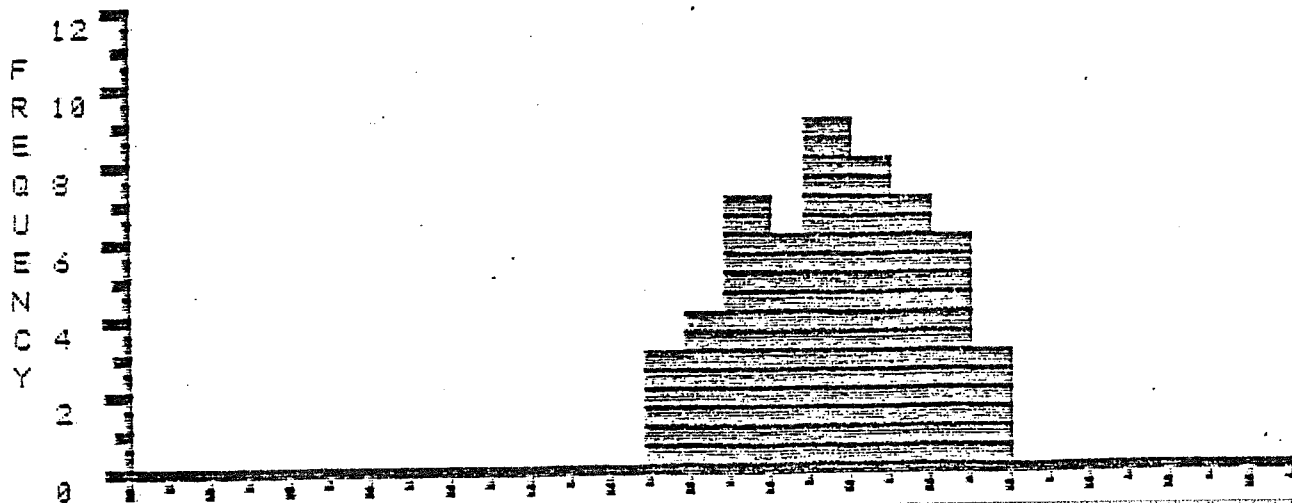
EDITED STATISTICS * * * * *

SUM : 62.5 NUMBER : 53 MIN : .96 MAX : 1.37 MEAN : 1.18 STAN.DEV.: .11

% REFLECTANCE



% REFLECTANCE * * EDITED * *



FILE >> K03558 DESCRIPTION FOLLOWS :
 DEPTH 11130-11130', TERN A-68, MIKE AVERY, DEC-19-84

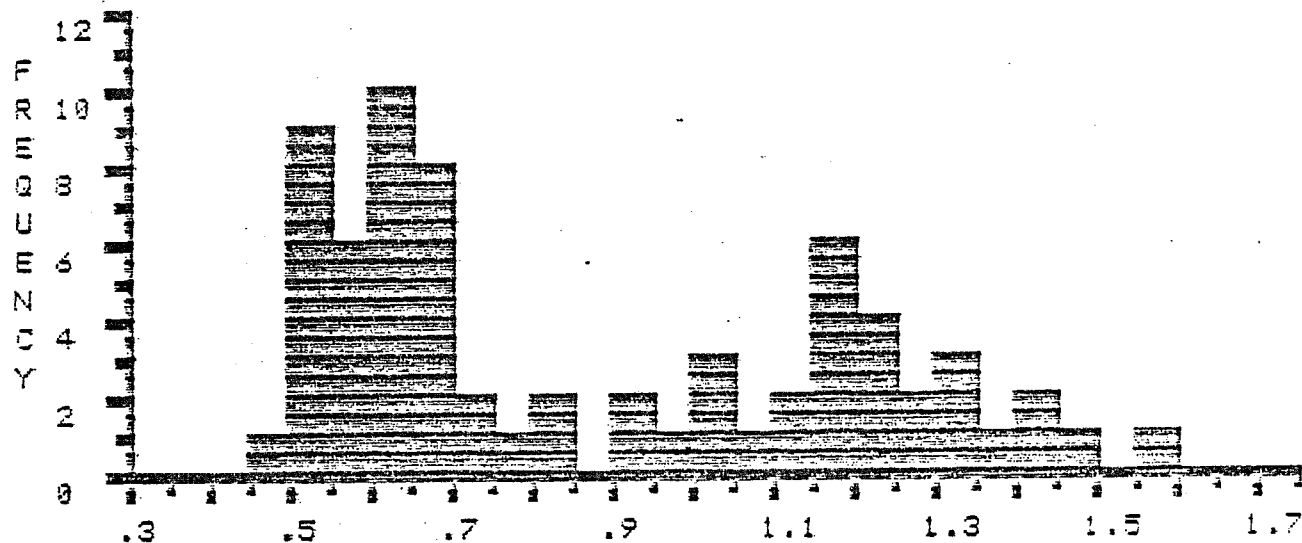
COL>	0	1	2	3	4	5	6	7	8	9
ROW		.47	*.52	*.52	*.53	*.53	*.53	*.54	*.54	*.54
1	*.54	*.55	*.56	*.57	*.58	*.59	*.59	*.6	*.61	*.61
2	*.62	*.62	*.62	*.63	*.63	*.63	*.64	*.65	*.65	*.65
3	*.67	*.67	*.67	*.68	*.68	*.7	*.71	.79	.82	.83
4	.9	.93	.97	1	1.03	1.04	1.09	1.11	1.13	1.15
5	1.15	1.15	1.17	1.19	1.19	1.2	1.23	1.23	1.24	1.25
6	1.28	1.3	1.34	1.34	1.35	1.4	1.42	1.48	1.53	

SUM : 58.92 NUMBER : 68 MIN : .47 MAX : 1.53 MEAN : .87 STAN.DEV.: .32

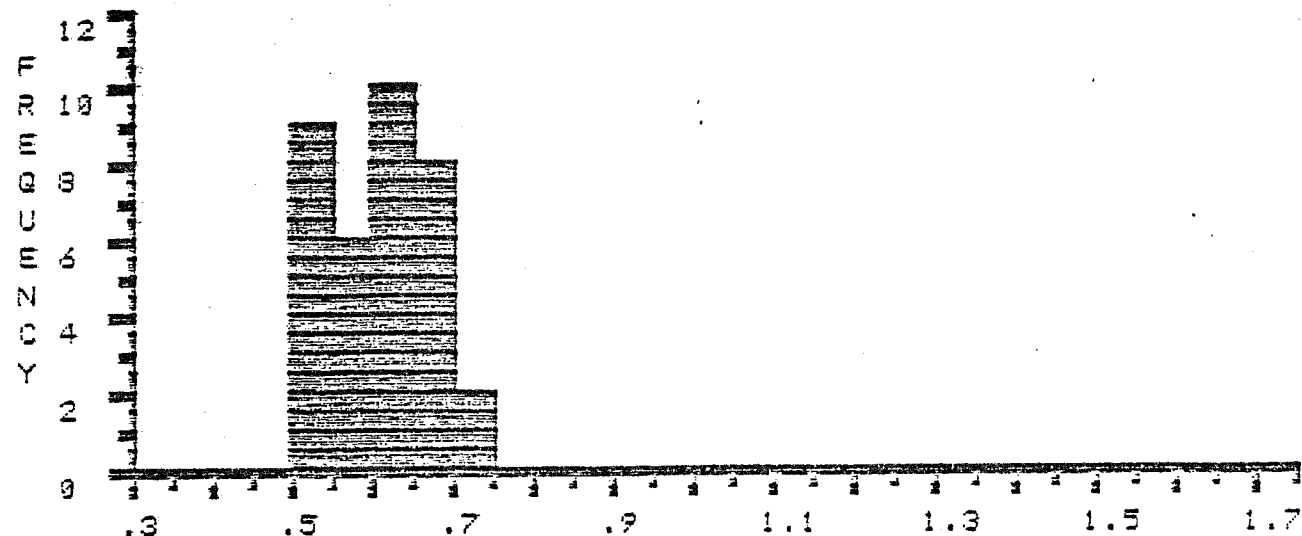
EDITED STATISTICS * * * * *

SUM : 21.17 NUMBER : 35 MIN : .52 MAX : .71 MEAN : .6 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 * * E D I T E D * *



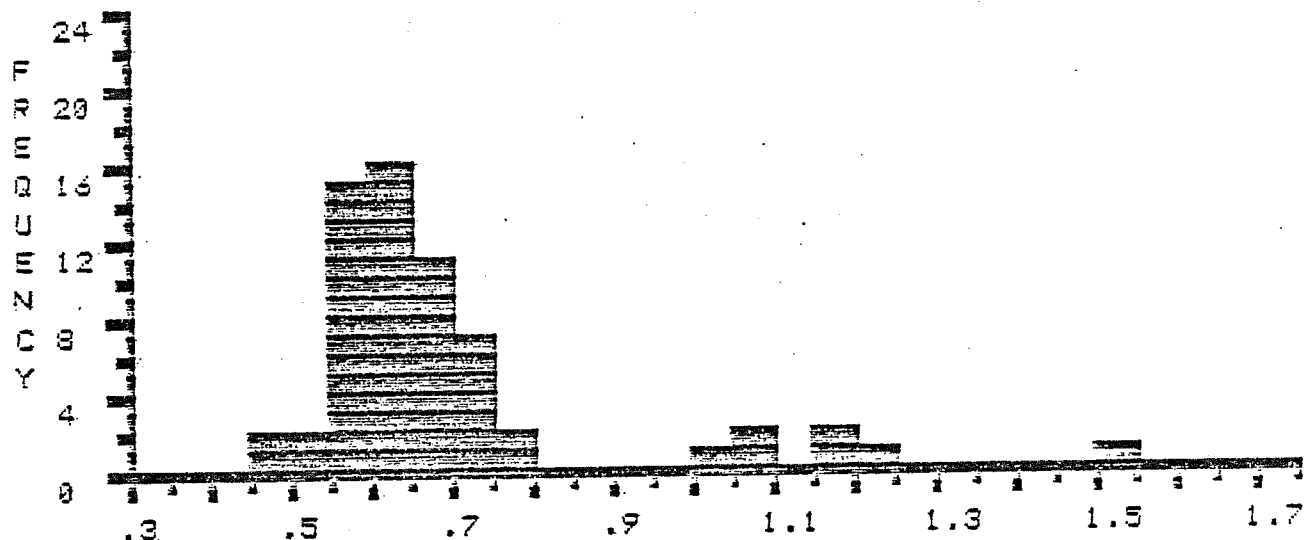
FILE >> K0355D DESCRIPTION FOLLOWS :
 DEPTH 11430-11460', TERN A-68, MIKE AVERY, DEC-19-84

COL>	0	1	2	3	4	5	6	7	8	9
ROW		*.48	*.49	*.53	*.54	*.55	*.55	*.55	*.55	*.56
1	*.56	*.56	*.56	*.58	*.58	*.58	*.58	*.58	*.59	*.59
2	*.6	*.6	*.62	*.62	*.62	*.62	*.62	*.62	*.63	*.63
3	*.63	*.64	*.64	*.64	*.64	*.64	*.65	*.65	*.65	*.66
4	*.66	*.66	*.66	*.67	*.67	*.68	*.69	*.7	*.7	*.7
5	*.71	*.73	*.73	*.73	*.79	*.79	1.01	1.05	1.06	1.19
6	1.19	1.23	1.53							

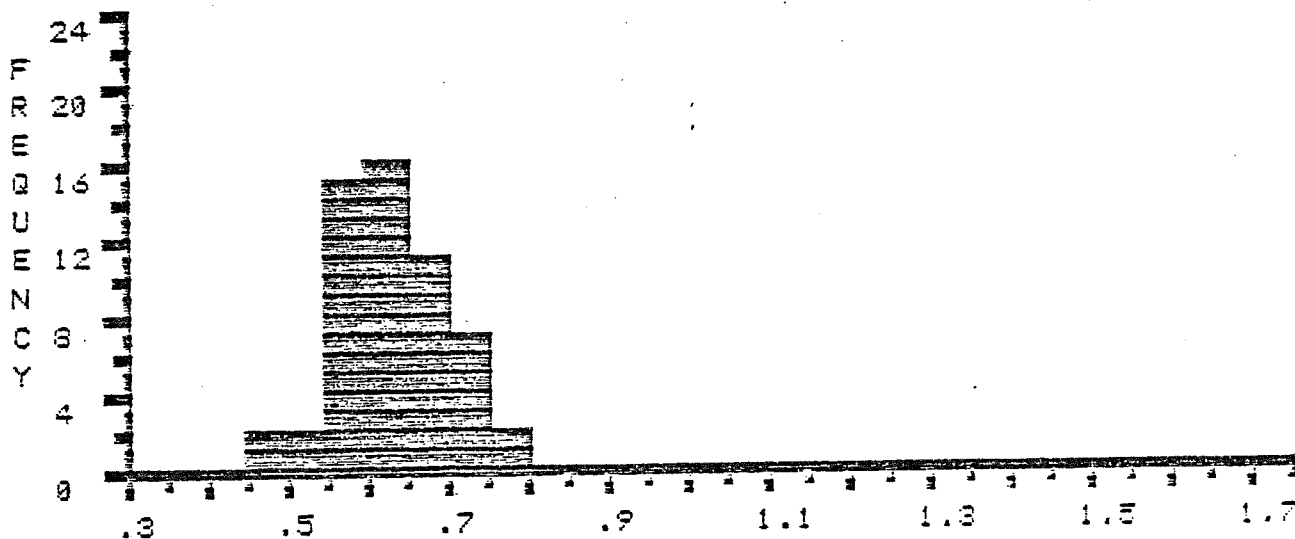
SUM : 42.71 NUMBER : 62 MIN : .48 MAX : 1.53 MEAN : .69 STAN.DEV.: .12

EDITED STATISTICS * * * * *
 SUM : 34.45 NUMBER : 55 MIN : .48 MAX : .79 MEAN : .63 STAN.DEV.: .07

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



% R E F L E C T A N C E * * E D I T E D * *



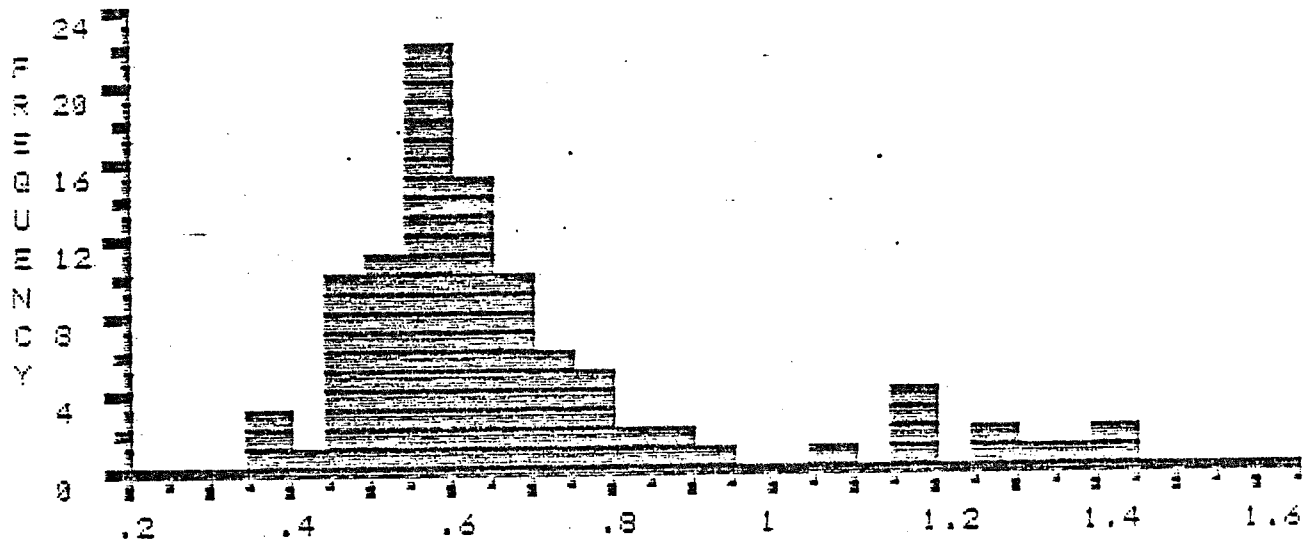
FILE >> K9356A DESCRIPTION FOLLOWS :
 DEPTH 11730-11760', TERN A-66, MIKE AVERY, DEC-19-84

COL	0	1	2	3	4	5	6	7	8	9
ROW		.86	.97	.89	*.42	*.45	*.46	*.46	*.46	*.47
1	*.47	*.48	*.48	*.49	*.49	*.5	*.5	*.5	*.5	*.51
2	*.51	*.52	*.53	*.54	*.54	*.54	*.55	*.55	*.55	*.56
3	*.56	*.57	*.57	*.57	*.57	*.57	*.57	*.57	*.57	*.57
4	*.58	*.58	*.59	*.59	*.59	*.59	*.59	*.59	*.6	*.6
5	*.6	*.6	*.6	*.6	*.61	*.61	*.61	*.61	*.62	*.62
6	*.63	*.64	*.64	*.65	*.65	*.66	*.66	*.67	*.67	*.67
7	*.69	*.69	*.69	*.7	*.7	*.7	*.71	*.72	*.74	*.75
8	*.76	*.79	*.79	*.79	*.8	*.81	*.86	*.89	.94	1.27
9	1.15	1.15	1.16	1.16	1.27	1.27	1.3	1.35	1.4	1.41

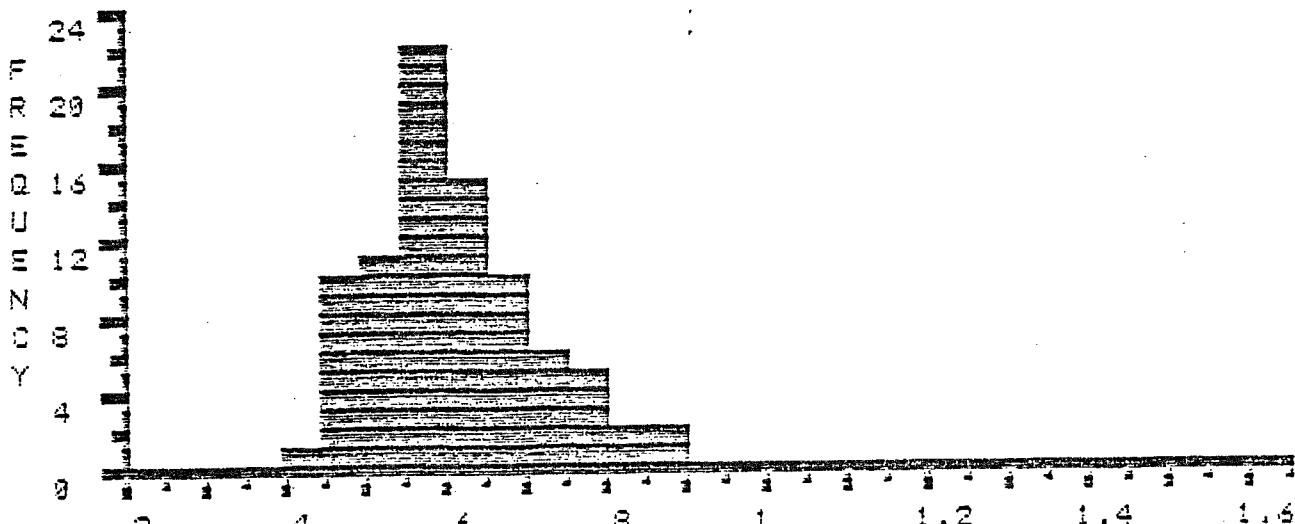
SUM : 66.61 NUMBER : 99 MIN : .36 MAX : 1.41 MEAN : .67 STAN.DEV.: .23

EDITED STATISTICS * * * * *
 SUM : 50.86 NUMBER : 84 MIN : .43 MAX : .89 MEAN : .61 STAN.DEV.: .1

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



% R E F L E C T A N C E * * E D I T E D * *



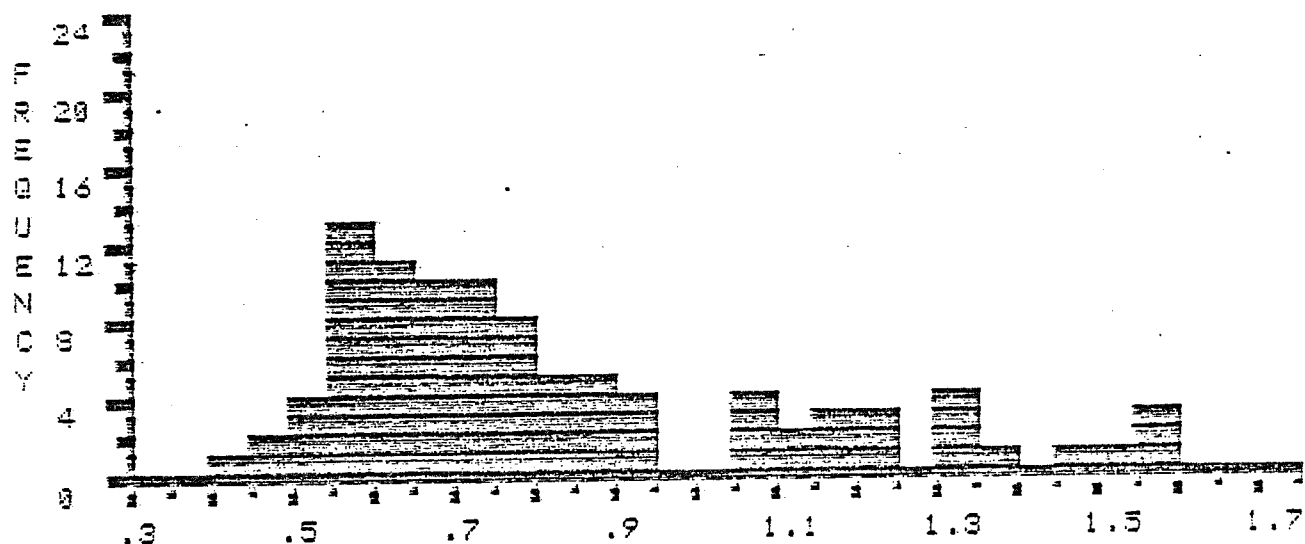
FILE >> K00569 DESCRIPTION FOLLOWS :
 DEPTH 12100-12100', TERN A-68, MIKE AVERY, DEC-19-84

COL)	0	1	2	3	4	5	6	7	8	9
ROW		*.44	*.45	*.49	*.5	*.51	*.52	*.54	*.55	*.56
1	*.56	*.56	*.57	*.57	*.57	*.57	*.57	*.57	*.58	*.58
2	*.59	*.6	*.6	*.61	*.63	*.63	*.63	*.64	*.64	*.64
3	*.64	*.64	*.65	*.65	*.65	*.65	*.66	*.66	*.66	*.67
4	*.67	*.68	*.7	*.7	*.71	*.71	*.72	*.73	*.73	*.73
5	*.74	*.74	*.76	*.76	*.76	*.77	*.77	*.78	*.78	*.79
6	*.81	*.81	*.81	*.82	*.82	.86	.86	.87	.88	.89
7	.9	.92	.93	.93	1.07	1.09	1.09	1.09	1.1	1.12
8	1.16	1.17	1.19	1.22	1.23	1.24	1.3	1.31	1.32	1.34
9	1.39	1.48	1.51	1.56	1.56	1.58				

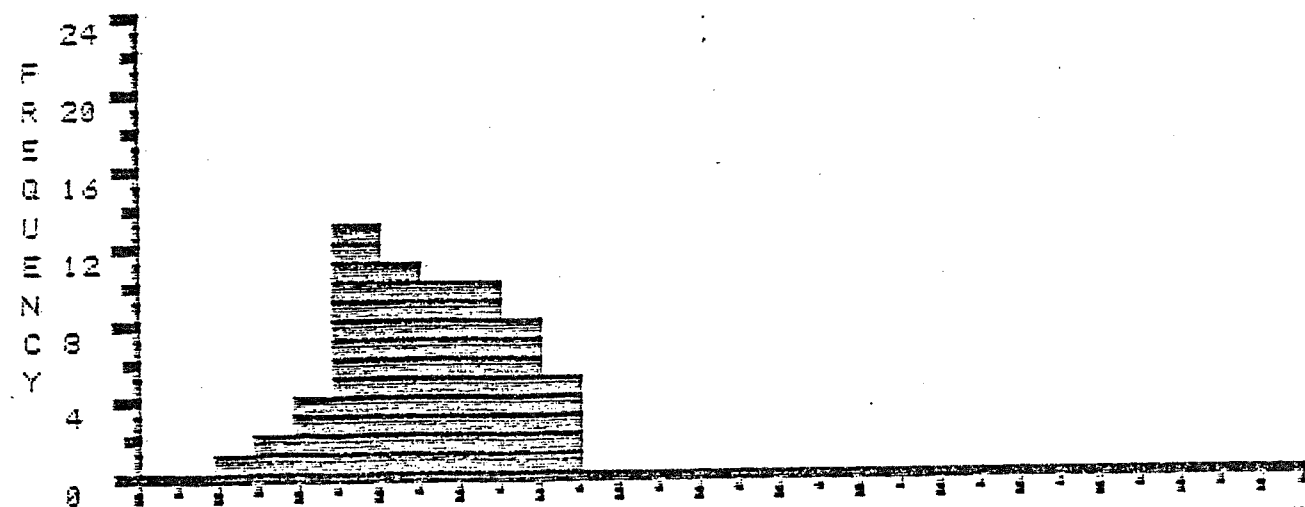
SUM : 77.96 NUMBER : 95 MIN : .44 MAX : 1.58 MEAN : .82 STAN.DEV.: .29

EDITED STATISTICS * * * * *
 SUM : 41.8 NUMBER : 64 MIN : .44 MAX : .82 MEAN : .65 STAN.DEV.: .1

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



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



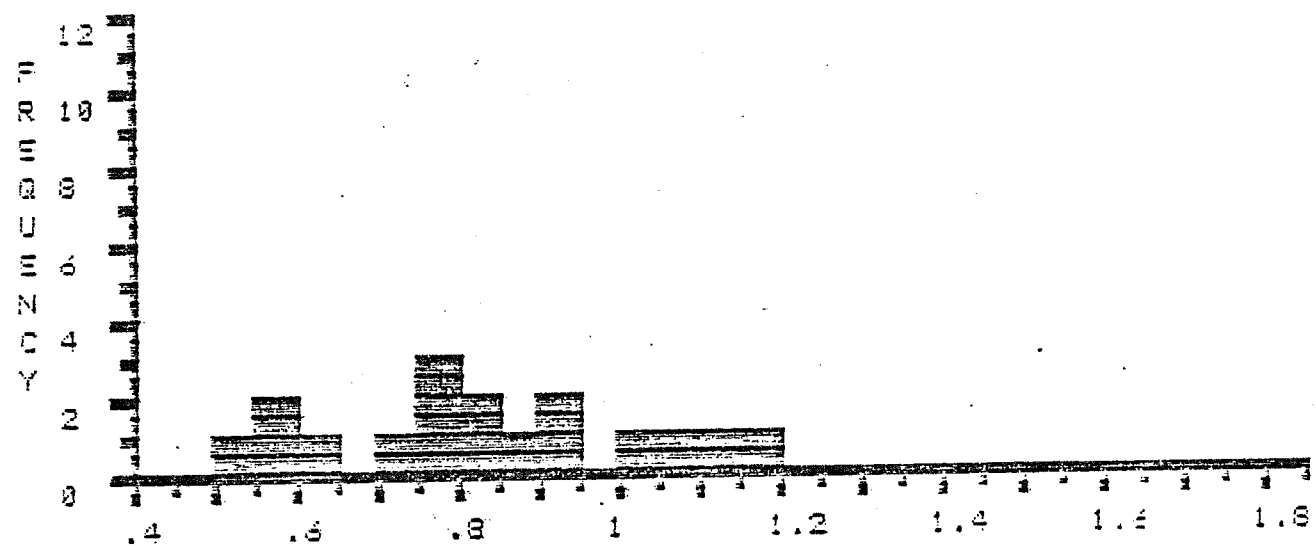
FILE >> K08560 DESCRIPTION FOLLOWS :
 DEPTH 12750-12790', TERN A-68, MIKE AVERY, DEC-20-84

COL>	0	1	2	3	4	5	6	7	8	9
ROW		*.52	*.58	*.58	*.64	*.73	*.75	*.75	*.77	*.81
1	*.82	*.85	*.93	*.94	1.03	1.06	1.1	1.17		

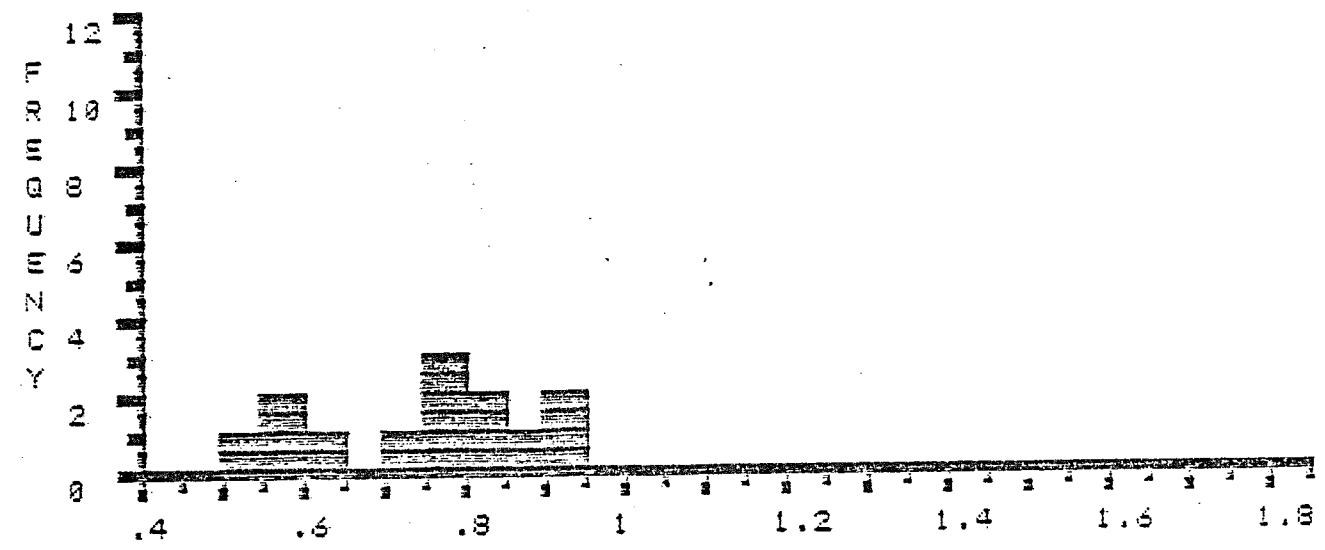
SUM : 14.93 NUMBER : 17 MIN : .52 MAX : 1.17 MEAN : .83 STAN.DEV.: .19

EDITED STATISTICS * * * * *
 SUM : 9.67 NUMBER : 13 MIN : .52 MAX : .94 MEAN : .74 STAN.DEV.: .13

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



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



FILE >> K0357A DESCRIPTION FOLLOWS :
 DEPTH 13719-13749', TERN A-68, MIKE AVERY, 090-23-84

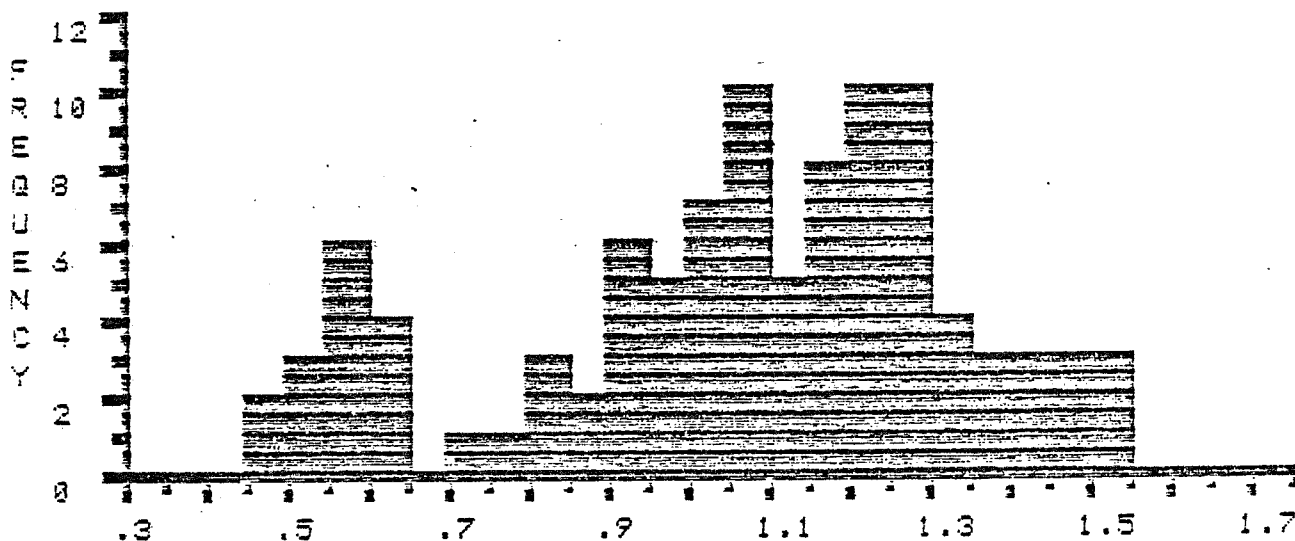
COL	0	1	2	3	4	5	6	7	8	9
ROW		.47	.49	.5	.51	.53	.55	.56	.56	.58
1	.58	.59	.6	.61	.61	.62	*.71	*.77	*.8	*.81
2	*.81	*.87	*.88	*.91	.92	.92	.92	.93	.93	.93
3	.93	.99	.99	.99	1.01	1.02	1.02	1.02	1.02	1.03
4	1.04	1.05	1.06	1.06	1.06	1.08	1.09	1.09	1.09	1.09
5	1.09	1.1	1.11	1.13	1.13	1.14	1.15	1.16	1.16	1.16
6	1.17	1.18	1.19	1.19	1.2	1.2	1.21	1.21	1.22	1.22
7	1.22	1.23	1.23	1.24	1.25	1.26	1.26	1.27	1.28	1.28
8	1.28	1.28	1.29	1.29	1.3	1.3	1.31	1.32	1.33	1.37
9	1.39	1.4	1.43	1.43	1.45	1.47	1.47	1.5	1.51	1.51

SUM : 104.61 NUMBER : 99 MIN : .47 MAX : 1.51 MEAN : 1.06 STAN.DEV.: .27

EDITED STATISTICS * * * * *

SUM : 6.56 NUMBER : 8 MIN : .71 MAX : .91 MEAN : .82 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 * *

