INTEROFFICE CORRESPONDENCE

APPLIED STRATIGRAPHY

DATE June 23, 1982

TO P. A. Mundt

CC U. A. Franz
A. J. Miller - FRL
H. H. Mottun - Denver
W. F. Sinclair
M. J. Bender

THERMAL

ESC REQUEST NO. 311B54
MATURATION STUDIES
GULF COLVILLE DELTA
STATE #1, N. SLOPE
ALASKA

Thermal maturation studies (RO, TAI and T-max.) on the fifty three ditch and core samples from 300' to 9200 (T.D.), indicate that transitionally mature rocks (Ro=0.5 to 0.6) first occur between 5950' to 7000'. Poor sample quality due to caved and recycled or oxidized organics prevents exact determination of the depth of the initiation of thermal maturity (Ro=0.5). The broad polymodal Ro histograms, the scattered TAI values and the inconsistent T-max. measurements reflect this poor sample quality.

T-max. measurements suggest a thermal break between thermally immature sediments and transitionaly mature sediments at about 6600'. TAI values indicate a probable thermal shift at 7000'. Vitrinite reflectance studies indicate a thermal shift between 5950' and 6680'.

Caved and recycled or oxidized vitrinite is very common in all the samples. Most of the samples contain less than fifteen percent indigenous vitrinite. Nine samples contain no indigenous vitrinite. I suspect that in an equal number of samples, caved vitrinite has been interpreted as the indigenous vitrinite. The interval from 5950' to 9200' TD was sampled very erratically. Some of the samples are less than fifty feet apart, and have Ro means that vary by as much as 0.06. The close sample intervals and wide range of Ro mean values between 5950' to 6680' allows for two interpretations for the initiation of thermal maturation (see figure 1). An excellent source rock will produce hydrocarbons in the transitionally mature range, while a poor source rock requires a higher thermal maturity.

Included in this report are copies of the Ro histograms, visual Kerogen work sheet, a plot of the mean Ro values, a plot of the TAI measurements, a copy of Brown and Ruth Laboratories Rock Eval Pyrolysis results which includes T-max values, and a a table of maturation values and Kerogen types.

Vitrinite reflectance readings were taken by R. R. Taylor. If you have any questions concerning this report, please contact me.

R. J. Enrico

RJE:mp

Attachments

# ORGANIC RESIDUE (KEROGEN) ANALYSIS

M-005
(Rev. 01-80)

SCALE: T = TRACE (<1%)
1 = 1 – 10%
2 = 11 – 20%
3 = 21 – 30%
4 = 31 – 40%
5 = 41 – 50%
6 = 51 – 60%
7 = 61 – 70%
8 = 71 – 80%
9 = 81 – 90%
10 = 91 – 100%

DATE:

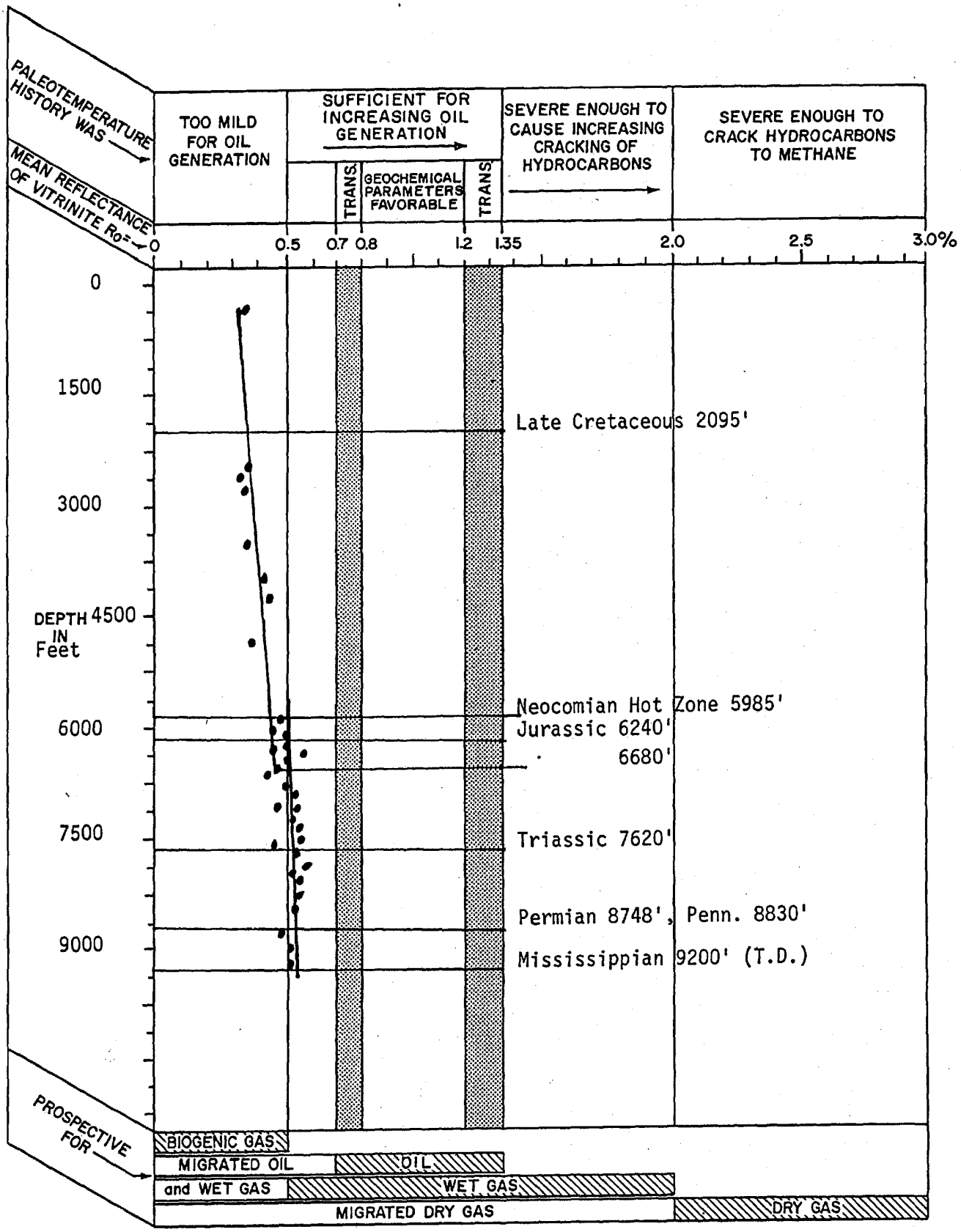
PROJECT:
Gulf Colville #1
Delta State, N. Slope

ESC NO.
ANALYST:
DEPTH OR NO.

| DEPTH OR NO. | TYPE OF ORGANIC MATTER: AMORPHOUS/OIL RICH | CUTICLE | PALYNOMORPHS | OIL TYPE | AMORPHOUS | BARK & WOODY DEBRIS | INERTINITE | GAS TYPE | FUNGAL MATERIAL - CHITIN | % OF RESIDUE FLUORESCING | FLUOR.: STRONG FLUORESCENCE | MODERATE FLUORESCENCE | WEAK FLUORESCENCE | POLLEN COLOR, TAI AND MATURATION: LIGHT YELLOW (1. IMMATURE | MEDIUM YELLOW (1+ / IMMATURE | YELLOW BROWN (2+ / TRANSITIONAL | LIGHT BROWN (2 / SLIGHTLY IMMATURE | MEDIUM BROWN (3- / MOD. MATURE | DARK BROWN (3 / SLIGHTLY MATURE | VERY DARK BROWN (3+ / FULLY MATURE | BLACKISH BROWN (4- / TRANSITIONAL | BLACK (4 to 4+ / OVERMATURE | METAMORPHOSED ROCK (5) | PRESRV: NO PALYNOMORPHS | GOOD | FAIR | POOR | DEPOSITIONAL ENVIRONMENT: MARINE | MARGINAL MARINE | NO MARINE PALYNOMORPHS | UNKNOWN PALYNOMORPHS | REMARKS: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 320' | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | INSUFF. SPL |
| 930 | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | " |
| 1440 | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | " |
| 2130 | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | " |
| 2440 | | | T | 6 | 3 | 1 | | T | | X | | X | | | | | | | | | | | | | | | | | | | | | Pollen |
| 2620 | T | | 1 | 5 | 4 | 1 | | T | | T | T | X | | | | | | | | | | | | | | | | | | | | | " |
| 2770 | | | T | 6 | 3 | 1 | | T | | T | | X | | | | | | | | | | | | | | | | | | | | | |
| 3580 | | | T | 6 | 3 | 1 | | T | | T | | | X | | | | | | | | | | | | | | | | | | | | | Monsulcate |
| 3970 | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | | INSUFF. SPL. |
| 4360 | 1 | | T | 5 | 3 | 1 | | 1 | | 1 | T | X | | | | | | | | | | | | | | | | | | | | | Pollen |
| 5020 | 1 | | T | 4 | 5 | 1 | | 1 | | T | 1 | X | X | | | | | | | | | | | | | | | | | | | | | " |
| 5950 | 1 | | T | 3 | 5 | 1 | | 1 | | T | 1 | | X | | | | | | | | | | | | | | | | X | | | | | " Dino |
| 6030 | 1 | | T | 2 | 6 | 1 | | 1 | | T | 1 | | X | | | | | | | | | | | | | | | | X | | | | | " Dino |
| 6120 | T | | T | 5 | 4 | 1 | | T | | T | | X | X | | | | | | | | | | | | | | | | | | | | | " |
| 6200 | T | | T | 3 | 6 | 1 | | T | | T | | | X | | | | | | | | | | | | | | | | | | | | | " |
| 6280 | T | | T | 6 | 3 | 1 | | T | | T | | | X | | | | | | | | | | | | | | | | | | | | | " |
| 6360 | | | T | 6 | 3 | 1 | | C | | | | | X | X | | | | | | | | | | | | | | | | | | | | Bisaccate |
| 6440 | T | | T | 5 | 4 | 1 | | T | | T | | | X | X | | | | | | | | | | | | | | | | | | | | " ? |
| 6520 | 1 | | T | 5 | 3 | 1 | | 1 | | 1 | T | | X | X | | | | | | | | | | | | | | | | | | | | " ? |
| 6600 | 1 | | T | 4 | 4 | 1 | | 1 | | 1 | T | | X | X | | | | | | | | | | | | | | | | | | | | " |
| 6680 | T | | 1 | 4 | 4 | 1 | | 1 | | 1 | T | | X | X | | | | | | | | | | | | | | | | | | | | | Monsulcate |
| 6760 | 1 | | T | 3 | 6 | 1 | | 1 | | 1 | T | | X | X | | | | | | | | | | | | | | | | | | | | | Bisaccate |
| 6840 | 1 | | T | 3 | 5 | 1 | | 1 | | 1 | T | | X | | | | | | | | | | | | | | | | | | | | | " ? |
| 6920 | 3 | | 1 | 2 | 3 | 1 | | 4 | | 1 | 3 | | X | X | | | | | | | | | | | | | | | X | | | | | Pollen Dino (Gen ?) |
| 7000 | 1 | | 1 | 3 | 4 | 1 | | 2 | | 1 | 1 | | X | X | X | X | | | | | | | | | | | | | | | | | Bisaccate |
| 7080 | 3 | | 1 | 2 | 3 | 1 | | 4 | | 1 | 3 | | X | X | X | | | | | | | | | | | | | | | | | | | " |
| 7160 | 1 | | 1 | 4 | 3 | 1 | | 2 | | 1 | 1 | | | X | X | | | | | | | | | | | | | | X | | | | | Bisacc. to Dino |
| 7240 | 1 | | 1 | 4 | 3 | 1 | | 2 | | 1 | 1 | | X | X | X | | | | | | | | | | | | | | | | | | | " |
| 7300 | 2 | T | 1 | 5 | 3 | 1 | | 3 | | 1 | 2 | | X | | X | | | | | | | | | | | | | | X | | | | | Dino |
| 7350 | 1 | | 1 | 3 | 4 | 1 | | 2 | | 1 | 1 | | X | | X | | | | | | | | | | | | | | | | | | | Bisaccate |
| 7400 | 2 | | 1 | 2 | 4 | 1 | | 3 | | 2 | 1 | | | X | | X | | | | | | | | | | | | | | | | | | Pollen |
| 7450 | 1 | | 1 | 4 | 3 | 1 | | 2 | | 1 | 1 | | X | X | | X | | | | | | | | | | | | | | | | | | Bisaccate |
| 7500 | T | | 1 | 5 | 2 | 1 | | 2 | | 1 | 1 | | X | | X | | | | | | | | | | | | | | | | | | | Bisaccate |
| 7550 | 3 | | 1 | 2 | 3 | 1 | | 4 | | 1 | 3 | X | X | X | | | | | | | | | | | | | | | | | | | | " |
| 7620 | 3 | | 1 | 3 | 2 | 1 | | 4 | | 1 | 3 | | X | | | | | | | | | | | | | | | | X | | | | | Bisaccate Dino |
| 7650 | 4 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | INSUFF. spl. |
| 7710 | 3 | | 1 | 3 | 2 | 1 | | 4 | | 2 | 2 | | X | X | | | | | | | | | | | | | | | | | | | | | Bisaccate |
| 7760 | T | | 1 | 5 | 3 | 1 | | 1 | | 1 | T | | | X | | X | | | | | | | | | | | | | | | | | | | Trilete ? Pollen |
| 7800 | T | | 1 | 5 | 3 | 1 | | 1 | | 1 | T | | | X | | | | | | | | | | | | | | | | | | | | | Monosulcate |
| 7850 | 2 | | 1 | 4 | 2 | 1 | | 3 | | 2 | 1 | | X | | X | | | | | | | | | | | | | | | | | | | | Pollen |
| 7890 | 3 | | 1 | 3 | 2 | 1 | | 4 | | 2 | 2 | | | X | X | | | | | | | | | | | | | | | | | | | | Monosulcate |
| 8016 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | INSSUFF. SPL. |
| 8070 | 3 | | 1 | 3 | 2 | 1 | | 4 | | 1 | 3 | | | | X | | | | | | | | | | | | | | | | | | | | Bisaccate ? |
| 8242 | 3 | | 1 | 3 | 2 | 1 | | 4 | | 1 | 3 | | | X | X | | | | | | | | | | | | | | | | | | | | Pollen |
| 8250 | 3 | | 1 | 3 | 2 | 1 | | 4 | | 2 | 2 | | | X | | | | | | | | | | | | | | | | | | | | | Bisaccate ? |
| 8490 | 2 | | 2 | 3 | 2 | 1 | | 4 | | 2 | 2 | | X | X | X | | | | | | | | | | | | | | | | | | | | " |
| 8610 | | | | | | | | ? | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | INSUFF. SPL |
| 8830 | 2 | | 1 | 4 | 2 | 1 | | 3 | | 1 | 2 | | X | | X | | | | | | | | | | | | | | | | | | | | Pollen |
| 8964 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | INSUFF SPL |
| 8984 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | INSUFF SPL |
| 9100 | 2 | | 1 | 4 | 2 | 1 | | 3 | | 1 | 2 | | X | | X | | | | | | | | | | | | | | | | | | | | Pollen |
| 9200 | 2 | | 2 | 3 | 2 | 1 | | 4 | | 2 | 2 | | X | X | X | | | | | | | | | | | | | | | | | | | | Spore |

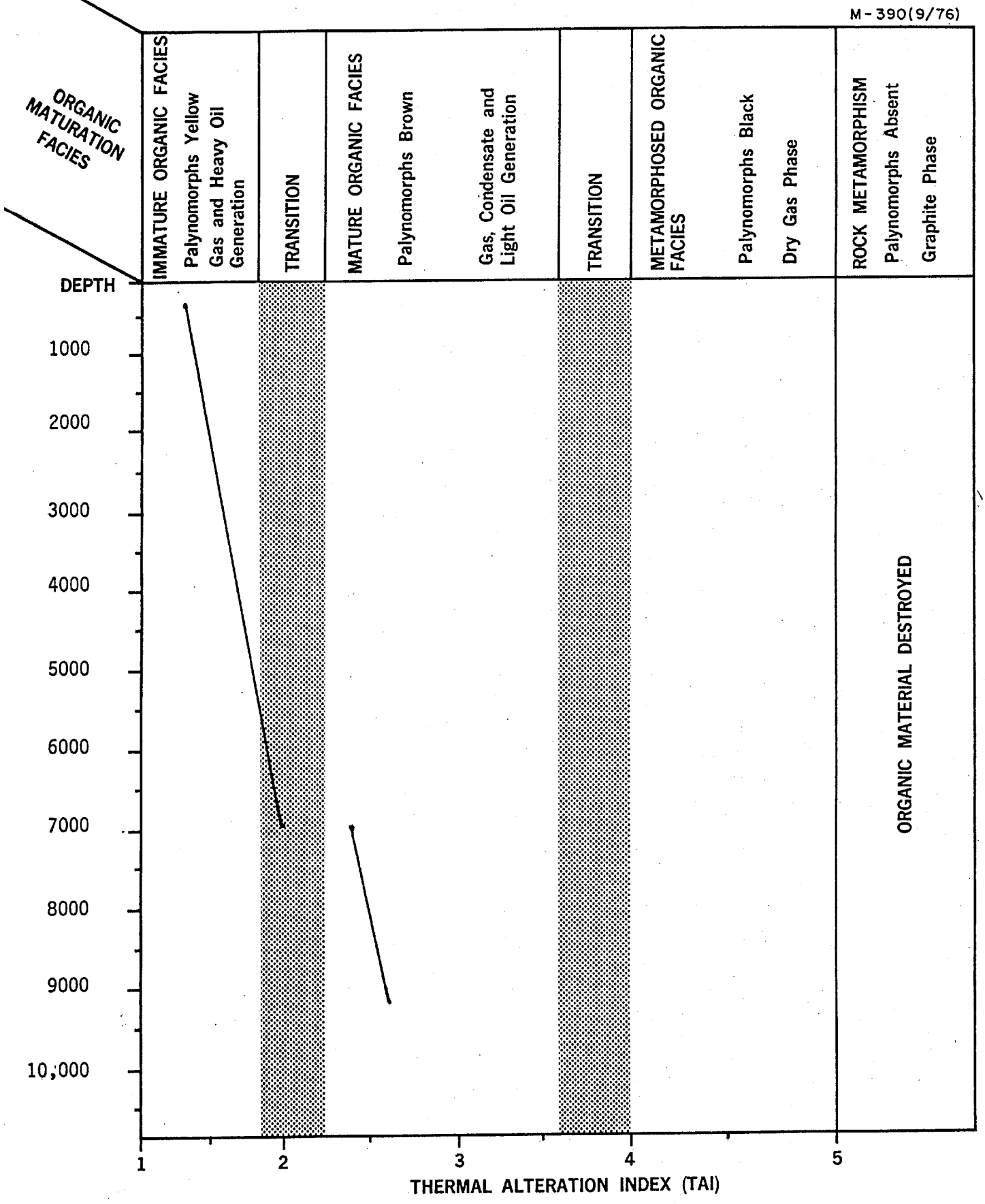
M-047
(5-78)

Mean Ro Value
Gulf Colville Delta State #1
Figure 1



Thermal Alteration Index
Gulf Colville Delta State #1
Figure

M-390(9/76)



BROWN & RUTH LABORATORIES, INC.

# GEOCHEMICAL LOG

OPERATOR: Gulf Oil Corporation
WELL NAME: No. 1 Colville Delta State
LOCATION: North Slope, Alaska
T.D.: 9299'


LITHOLOGICAL LEGEND

- SANDSTONE
- LIMESTONE
- SHALE OR SILTSTONE
- COAL
- DOLOMITE
- CONGLOMERATE

PYROLYSIS TERMS

- S1 FREE HYDROCARBONS PRESENT IN ROCK
- S2 HYDROCARBONS FROM PYROLYSIS OF KEROGEN
- S3 = $CO_2$ FROM KEROGEN PYROLYSIS
- HYDROGEN INDEX S2'T.O.C.

TABLE
Gulf Colville Delta State #1
N. Slope Alaska

| DEPTH OR SPL. NO. | LOW-GRAY Ro MEAN | % POP. | FIRST HIGH-GRAY Ro MEAN | % POP. | TAI | THERMAL MATURITY | KEROGEN TYPE | HYDROCARBON POTENTIAL/REMARKS |
|---|---|---|---|---|---|---|---|---|
| 320' | 0.37 | 30 | 0.79 | 43 | - | Immature | Type IV | No source |
| 930' | - | - | - | - | - | - | Type IV | No source |
| 1440' | - | - | - | - | - | - | - | |
| 2130' | - | - | - | - | - | Immature | Type III | Poor/Gas |
| 2440 | 0.38 | 11 | 0.93 | 77 | 1 | Immature | Type III | Poor/Gas |
| 2620' | 0.35 | 17 | 0.86 | 42 | 1 | Immature | Type III | Poor/Gas |
| 2770' | 0.36 | 5 | 0.97 | 75 | 1 | Immature | Type III | Poor/Gas |
| 3580' | 0.37 | 7 | 0.93 | 83 | 1+ | Immature | Type III | Poor/Gas |
| 3970' | 0.43 | 15 | 0.97 | 76 | - | Immature | Type III | Poor/Gas |
| 4360' | 0.44 | 14 | 0.92 | 68 | 1 | Immature | Type III | Poor/Gas |
| 5020' | 0.39 | 12 | 0.92 | 71 | 1-1+ | Immature | Type III | Poor/Gas |
| 5950' | 0.49 | 14 | 1.20 | 76 | 1+ | Immature | Type III | Poor/Gas |
| 6063' | 0.47 | 21 | 1.14 | 51 | 1+ | Immature | Type III | Poor/Gas |
| 6120' | 0.50 | 26 | 1.17 | 70 | 1-1+ | Immature | Type III | Poor/Gas |
| 6200' | 0.50 | 11 | 1.03 | 71 | 1+ | Immature | Type III | Poor/Gas |
| 6280' | 0.46 | 15 | 0.99 | 79 | 1+ | Immature | Type III | Poor/Gas |

TABLE
Gulf Colville Delta State #1
N. Slope Alaska



| DEPTH OR SPL. NO. | LOW-GRAY Ro MEAN | % POP. | FIRST HIGH-GRAY Ro MEAN | % POP. | TAI | THERMAL MATURITY | KEROGEN TYPE | HYDROCARBON POTENTIAL/REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6360' | 0.54 | 23 | 0.97 | 56 | 1+-2 | Transi-tionally mature | Type IV | No Source |
| 6440' | 0.50 | 18 | 1.03 | 60 | 1+-2 | Transi-tionally mature | Type III | Poor/Gas |
| 6520' | 0.48 | 18 | 1.05 | 67 | 1+-2 | Immature | Type III | Poor/Gas |
| 6600' | 0.45 | 13 | 1.00 | 75 | 1+-2 | Immature | Type III | Poor/Gas |
| 6680' | 0.47 | 11 | 1.00 | 77 | 1+-2 | Immature | Type III | Poor/Gas |
| 6760' | - | - | - | - | 1+-2 | Immature | Type III | Poor/Gas |
| 6840' | 0.50 | 16 | 1.04 | 68 | 1 | Immature | Type II | Gas/Oil |
| 6920' | 0.51 | 8 | 1.11 | 77 | 1+ 2 | Transi-tionally mature | Type II | Gas/Oil |
| 7000' | 0.48 | 20 | 1.00 | 60 | 1+-3⁻ | Transi-tionally mature | Type II | Gas/Oil |
| 7080' | 0.52 | 16 | 1.07 | 64 | 1+-2+ | Transi-tionally mature | Type II | Gas/Oil |
| 7160' | 0.51 | 11 | 1.09 | 82 | 2-2+ | Transi-tionally mature | Type II | Gas/Oil |

TABLE
Gulf Colville Delta State #1
N. Slope Alaska



| DEPTH OR SPL. NO. | LOW-GRAY Ro MEAN | % POP. | FIRST HIGH-GRAY Ro MEAN | % POP. | TAI | THERMAL MATURITY | KEROGEN TYPE | HYDROCARBON POTENTIAL/REMARKS |
|---|---|---|---|---|---|---|---|---|
| 7240' | 0.50 | 20 | 1.09 | 66 | 1+-2+ | Transi-tionally mature | Type II | Gas/Oil |
| 7300' | 0.53 | 13 | 1.01 | 74 | 1+,2+ | Transi-tionally mature | Type II | Gas/Oil |
| 7350' | 0.51 | 8 | 1.12 | 80 | 1+,2+ | Transi-tionally mature | Type II | Gas/Oil |
| 7400' | 0.50 | 14 | 1.22 | 72 | 2,3⁻ | Transi-tionally mature | Type II | Gas/Oil |
| 7450' | 0.50 | 16 | 1.17 | 78 | 2,3⁻ | Transi-tionally mature | Type II | Gas/Oil |
| 7500' | 0.56 | 14 | 1.16 | 73 | 1+,2+ | Transi-tionally mature | Type II | Gas/Oil |
| 7550' | 0.50 | 7 | 1.03 | 66 | 1+-2 | Transi-tionally mature | Type II | Gas/Oil |
| 7620' | - | - | - | - | 1+ | Immature | Type II | Gas/Oil |
| 7650 | - | - | - | - | - | - | - | - |
| 7710' | - | - | - | - | 1+-2 | Transi-tionally mature | Type II | Gas/Oil |

TABLE
Gulf Colville Delta State #1
N. Slope Alaska



| DEPTH OR SPL. NO. | LOW-GRAY Ro MEAN | % POP. | FIRST HIGH-GRAY Ro MEAN | % POP. | TAI | THERMAL MATURITY | KEROGEN TYPE | HYDROCARBON POTENTIAL/REMARKS |
|---|---|---|---|---|---|---|---|---|
| 7760' | - | - | - | - | 2,3⁻ | Transi-tionally mature | Type II | Gas/Oil |
| 7800' | 53 | 10 | 1.07 | 64 | 2 | Transi-tionally mature | Type II | Gas/Oil |
| 7800' | 0.57 | 19 | 1.13 | 60 | 1+,2+ | Transi-tionally mature | Type II | Gas/Oil |
| 7890' | 0.52 | 15 | 1.09 | 55 | 2-2+ | Transi-tionally mature | Type II | Gas/Oil |
| 8016' | - | - | - | - | - | - | - | Gas/Oil |
| 8070' | 0.55 | 17 | 0.93 | 72 | 2+ | Transi-tionally mature | Type II-III | Marginal Gas/Oil |
| 8242' | 0.55 | 7 | 1.10 | 63 | 2-2+ | Transi-tionally mature | Type II-III | Marginal Gas/Oil |
| 8250 | 0.48 | 7 | 1.03 | 68 | 2 | Transi-tionally mature | Type II-III | Marginal Gas/Oil |
| 8990' | 0.53 | 6 | 1.00 | 71 | 1+-2+ | Transi-tionally mature | Type II-III | Marginal Gas/Oil |

TABLE
Gulf Colville Delta State #1
N. Slope Alaska



| DEPTH OR SPL. NO. | LOW-GRAY Ro MEAN | % POP. | FIRST HIGH-GRAY Ro MEAN | % POP. | TAI | THERMAL MATURITY | KEROGEN TYPE | HYDROCARBON POTENTIAL/REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8610' | - | - | - | - | - | - | - | - - - |
| 8830' | 52 | 14 | 1.13 | 56 | 1+,2+ | Transi-tionally mature | Type II-III | Marginal Gas/Oil |
| 8964' | - | - | - | - | - | - | - | |
| 8984' | - | - | - | - | - | - | - | |
| 9100' | 50 | 9 | 1.14 | 81 | 1+,2+ | _ | _ | |
| 9200' (T.D.) | 50 | 7 | 1.23 | 71 | 1+-2+ | - | Type IV | No source |

(Part of Jan. 31, 1982 report)

(original – Do not give out)

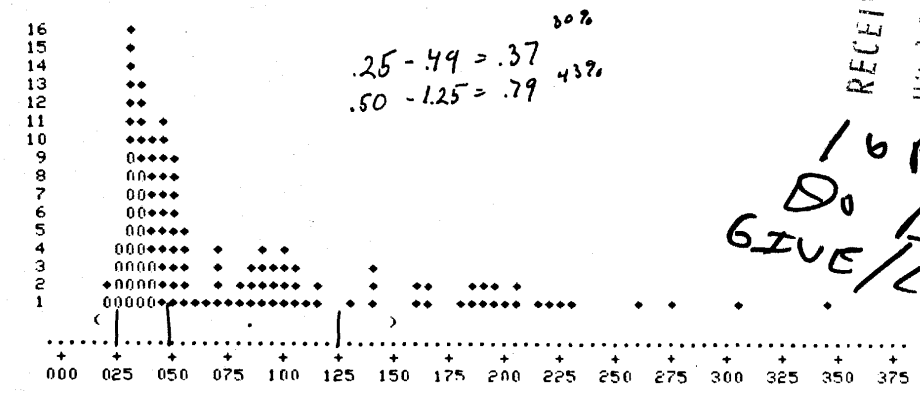
..COMMAND = LO
..FIRST SAMPLE NO. = 20305
..LAST SAMPLE NO. = 20357
..LOAD COMMAND = LP

# MATURATION STUDIES – Gulf #1 Colville Delta State –

## $R_o$ Histograms

06/14/82 20305 50 320' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 86
STD. ERR. = 11
STD. DEV. = 67
PCT. POP. = 100



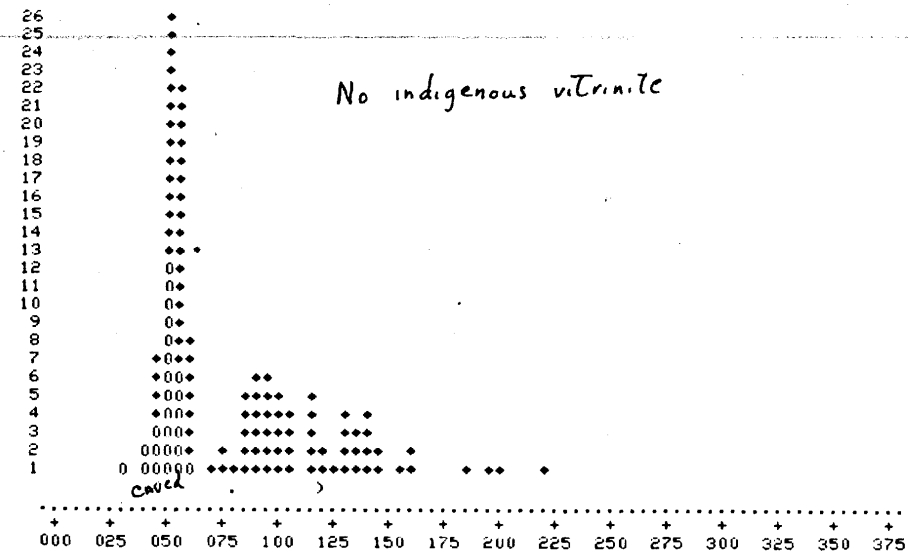



16 P.

DO NOT GIVE/LOAN OUT!

06/14/82 20306 50 930' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

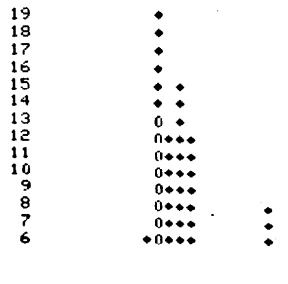
N = 124
MEAN = 84
STD. ERR. = 6
STD. DEV. = 39
PCT. POP. = 99




No indigenous vitrinite

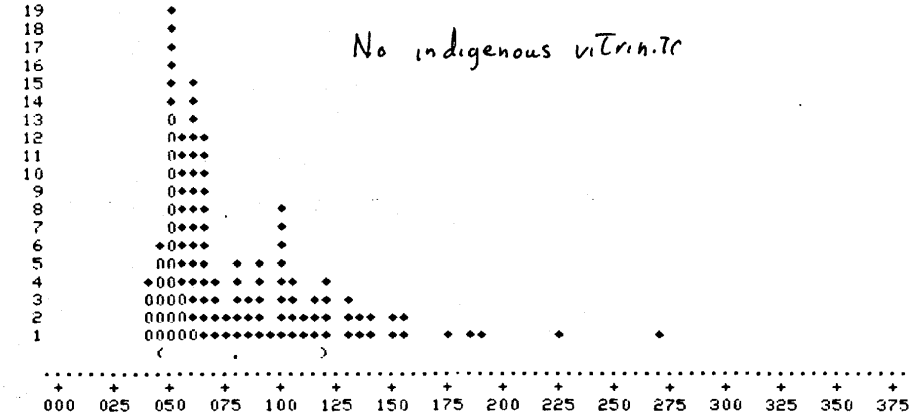
06/14/82 20307 50 1440' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 84
STD. ERR. = 6
STD. DEV. = 39
PCT. POP. = 100



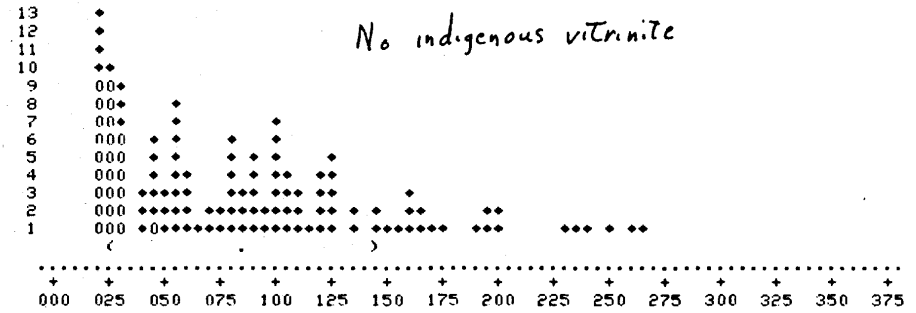
No indigenous vitrinite

STD. DEV. = 39
PCT. POP. = 100



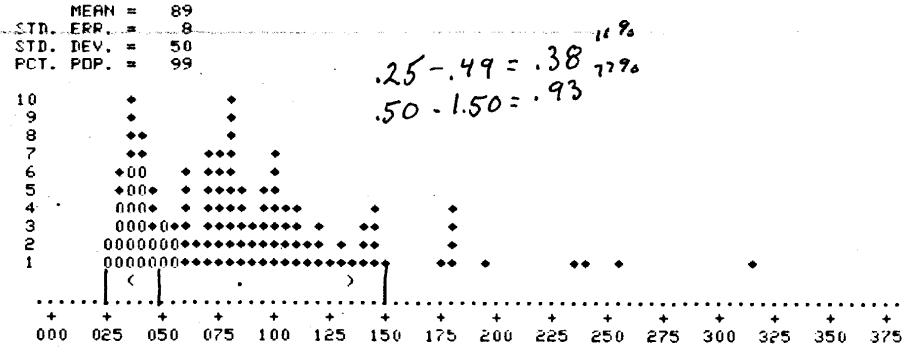

06/14/82 20308 50 2130' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 89
STD. ERR. = 10
STD. DEV. = 60
PCT. POP. = 100



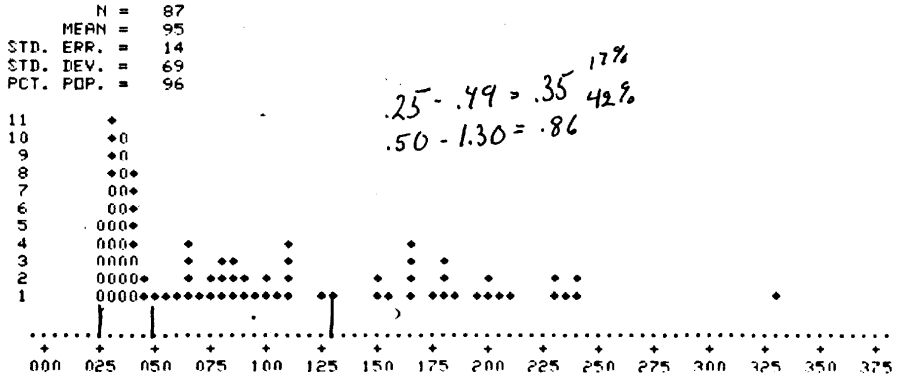

06/14/82 20309 50 2440' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 124
MEAN = 89
STD. ERR. = 8
STD. DEV. = 50
PCT. POP. = 99

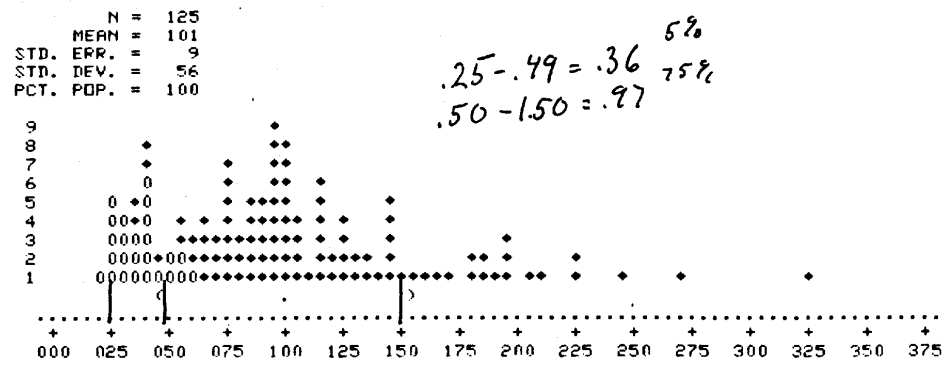



06/14/82 20310 50 2620' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

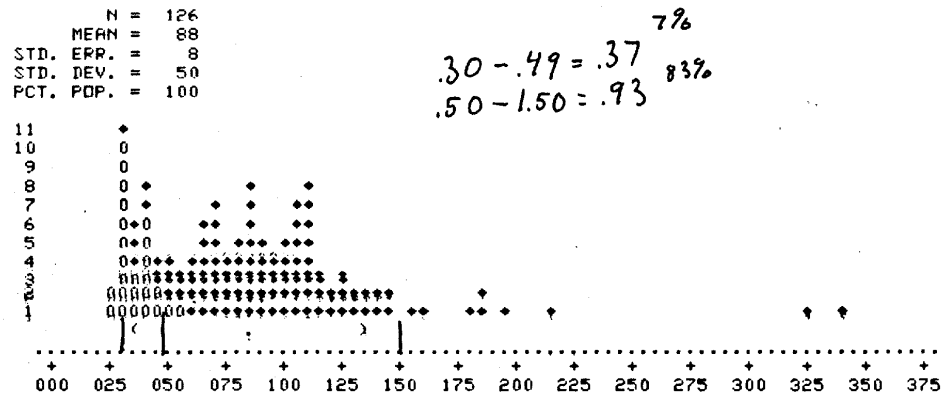
N = 87
MEAN = 95
STD. ERR. = 14
STD. DEV. = 69
PCT. POP. = 96



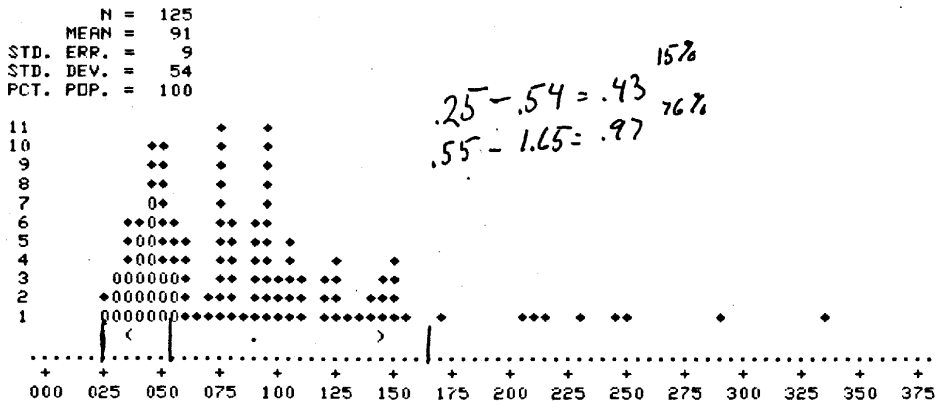
06/14/82 20311 50 2770' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE



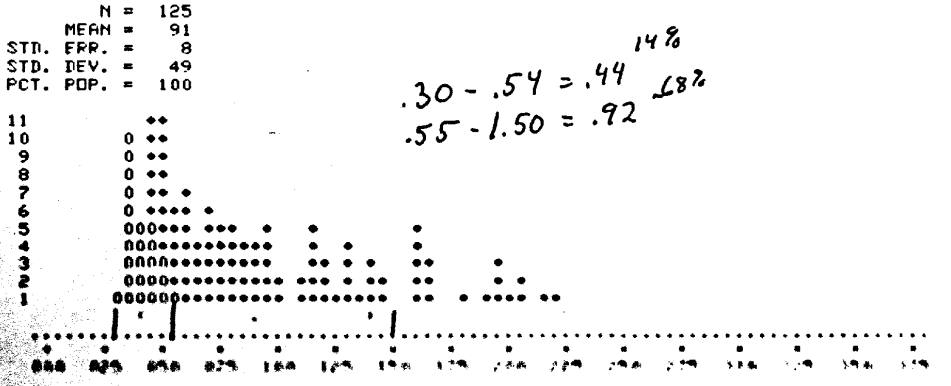

06/14/82 20312 50 3580' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

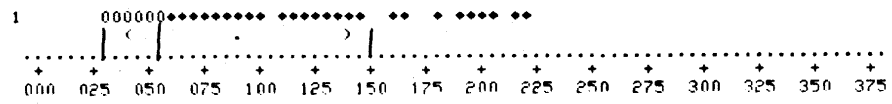



06/14/82 20313 50 3970' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE




06/14/82 20314 50 4360' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

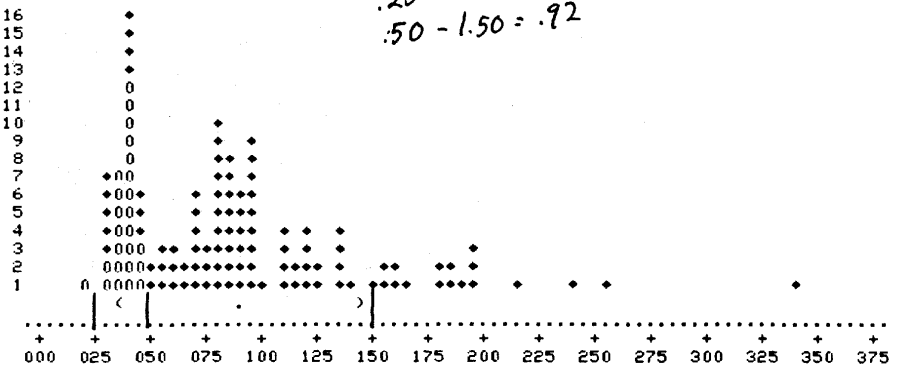




06/14/82 20315 50 5020' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 91
STD. ERR. = 9
STD. DEV. = 54
PCT. POP. = 100

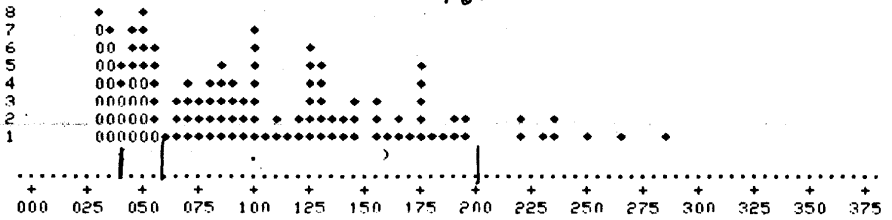
12%
.25 - .49 = .39 27%
.50 - 1.50 = .92



06/14/82 20316 50 5950' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 103
STD. ERR. = 10
STD. DEV. = 59
PCT. POP. = 100

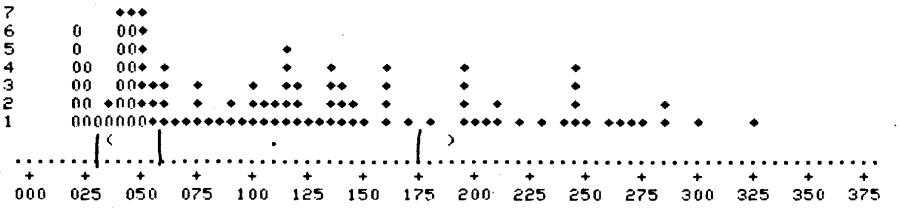
14%
.40 - .59 = .49 76%
.60 - 2.00 = 1.20



06/14/82 20317 50 6030' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 115
MEAN = 114
STD. ERR. = 14
STD. DEV. = 78
PCT. POP. = 100

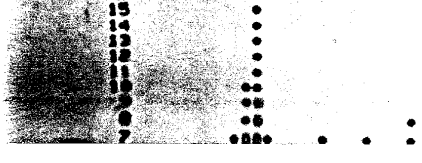
21%
.30 - .59 = .47 51%
.60 - 1.75 = 1.14



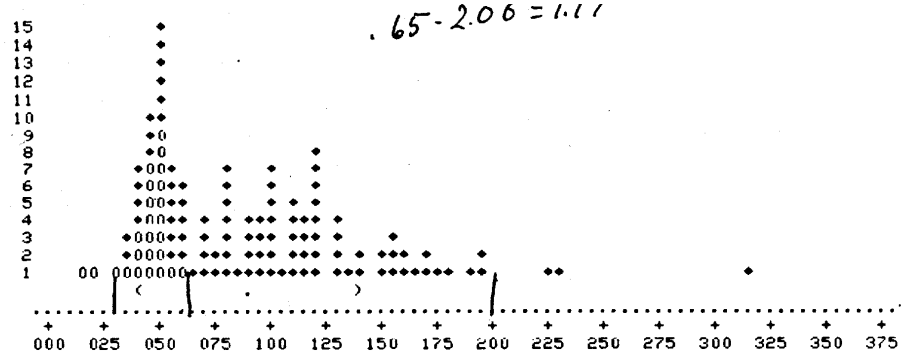
06/14/82 20318 50 6120' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 124
MEAN = 92
STD. ERR. = 8
STD. DEV. = 49
PCT. POP. = 99

26%
.30 - .64 = .50
.65 - 2.06 = 1.17 74%



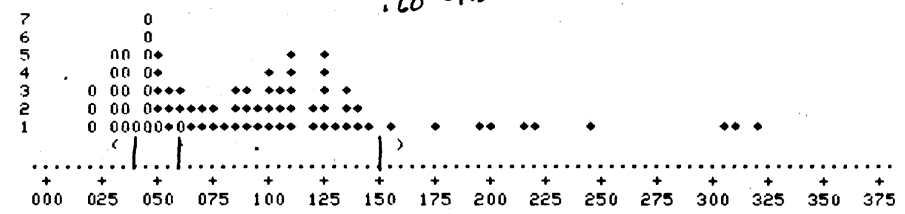
.65 - 2.06 = 1.41



06/14/82 20319 50 6200' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

| | |
|---|---|
| N = | 83 |
| MEAN = | 98 |
| STD. ERR. = | 13 |
| STD. DEV. = | 64 |
| PCT. POP. = | 100 |

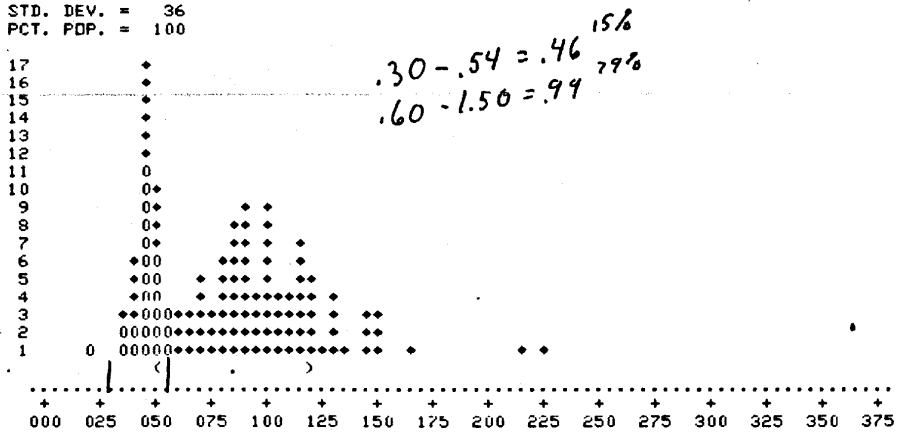
.40 - .59 = .50 11%
.60 - 1.50 = 1.03 71%



06/14/82 20320 50 6280' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

| | |
|---|---|
| N = | 125 |
| MEAN = | 86 |
| STD. ERR. = | 6 |
| STD. DEV. = | 36 |
| PCT. POP. = | 100 |

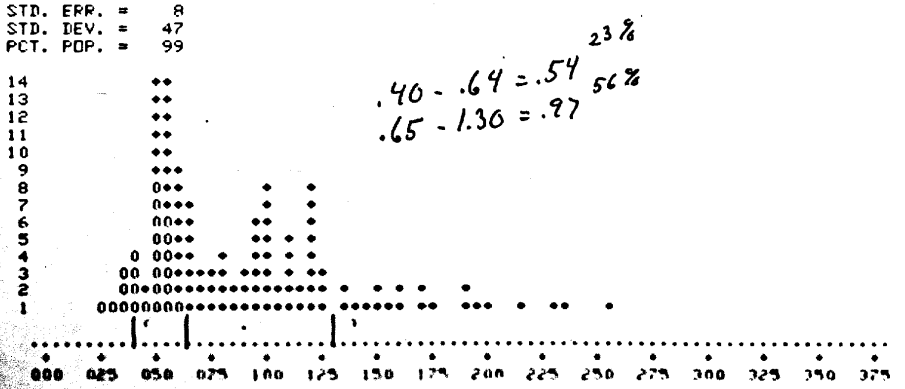
.30 - .54 = .46 15%
.60 - 1.50 = .99 79%

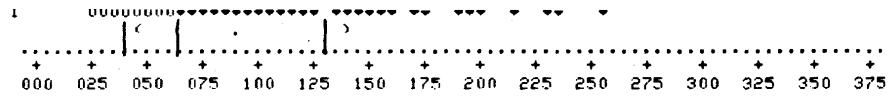


06/14/82 20321 50 6360' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

| | |
|---|---|
| N = | 124 |
| MEAN = | 93 |
| STD. ERR. = | 8 |
| STD. DEV. = | 47 |
| PCT. POP. = | 99 |

.40 - .64 = .54 23%
.65 - 1.30 = .97 56%

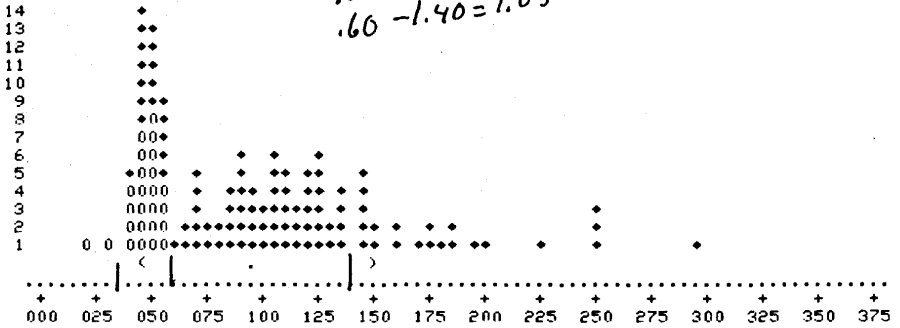





06/14/82 20322 50 6440' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 99
STD. ERR. = 9
STD. DEV. = 52
PCT. POP. = 100

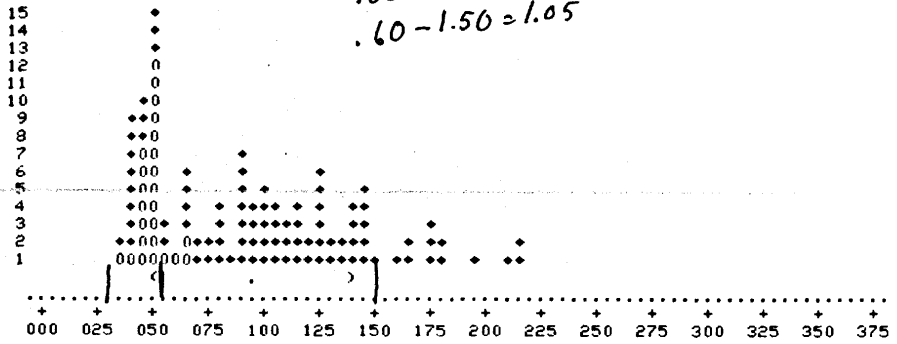
.35 - .59 = .50 18%
.60 - 1.40 = 1.03 60%




06/14/82 20323 50 6520' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 116
MEAN = 95
STD. ERR. = 8
STD. DEV. = 45
PCT. POP. = 100

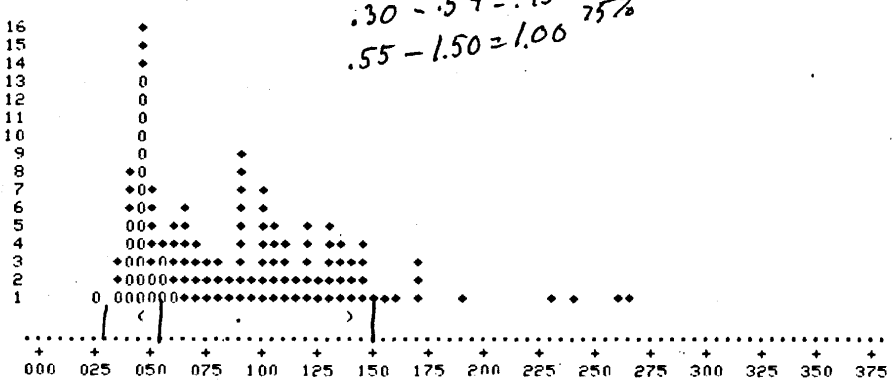
.30 - .59 = .48 18%
.60 - 1.50 = 1.05 67%




06/14/82 20324 50 6600' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 93
STD. ERR. = 8
STD. DEV. = 47
PCT. POP. = 100

.30 - .54 = .45 13%
.55 - 1.50 = 1.00 75%

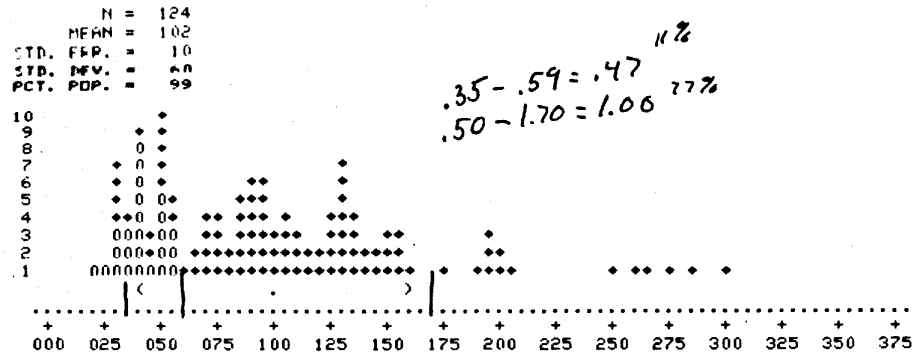



06/14/82 20325 50 6680' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

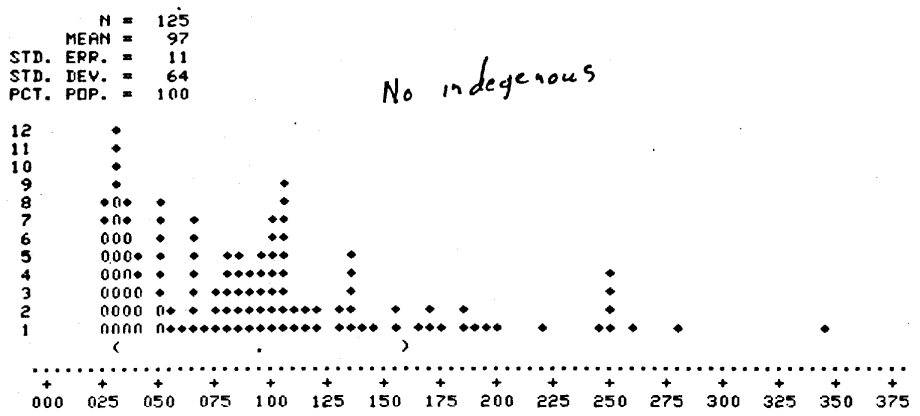
N = 124
MEAN = 102
STD. ERR. = 10

11%

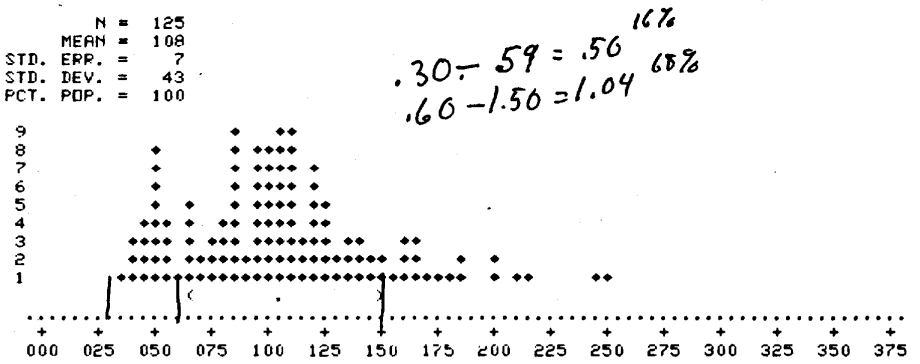
06/14/82 20325 50 6680' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE



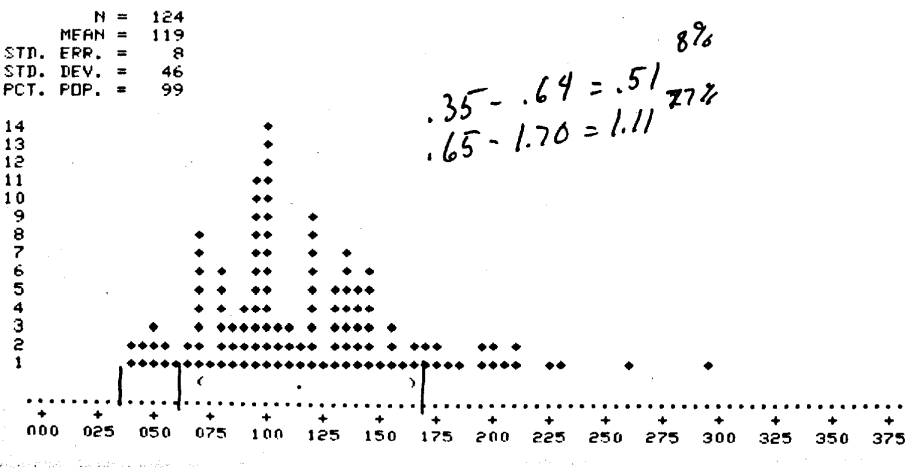

06/14/82 20326 50 6760' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE




06/14/82 20327 50 6840' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

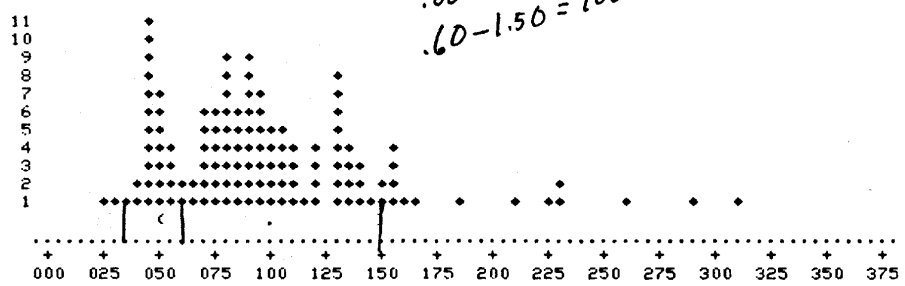



06/14/82 20328 50 6920' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE




06/14/82 20329 50 7000' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

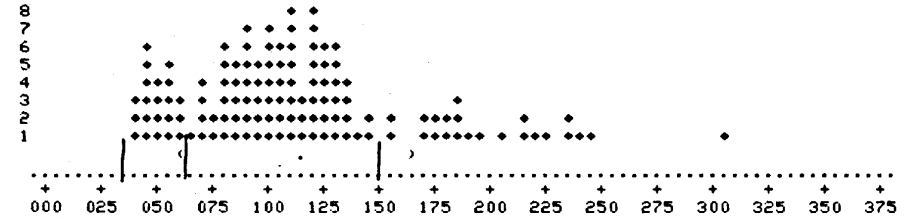
N = 125
MEAN = 101
STD. ERR. = 8
STD. DEV. = 50
PCT. POP. = 100




.35 - .59 = 48 20%
.60 - 1.50 = 100 60%

06/14/82 20330 50 7080' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

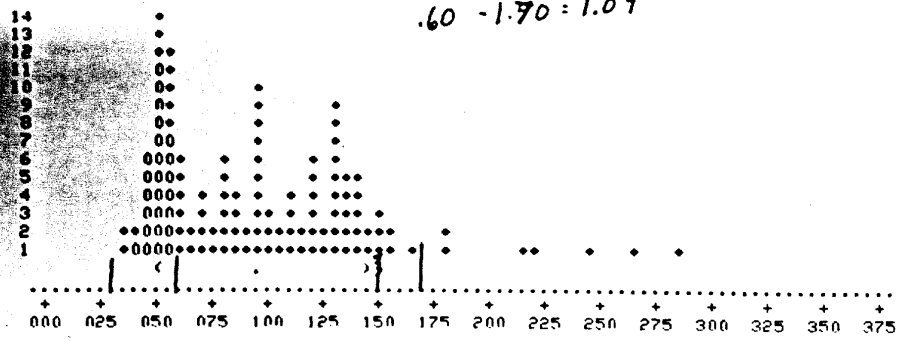
N = 125
MEAN = 115
STD. ERR. = 9
STD. DEV. = 51
PCT. POP. = 100




.35 - .64 = .52 16%
.65 - 1.50 = 1.07 64%

06/14/82 20331 50 7160' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

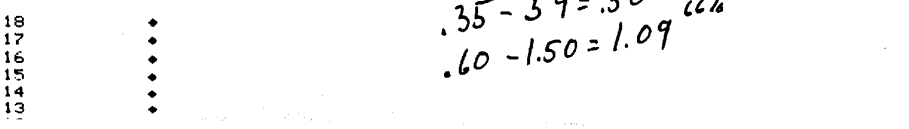
N = 125
MEAN = 99
STD. ERR. = 8
STD. DEV. = 47
PCT. POP. = 100



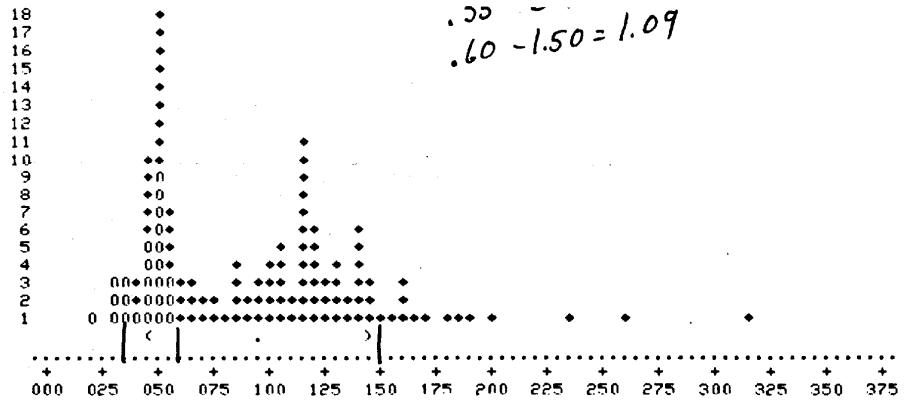

.30 - .59 = .51 44%
.60 - 1.70 = 1.09 92%

06/14/82 20332 50 7240' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 97
STD. ERR. = 8
STD. DEV. = 50
PCT. POP. = 100

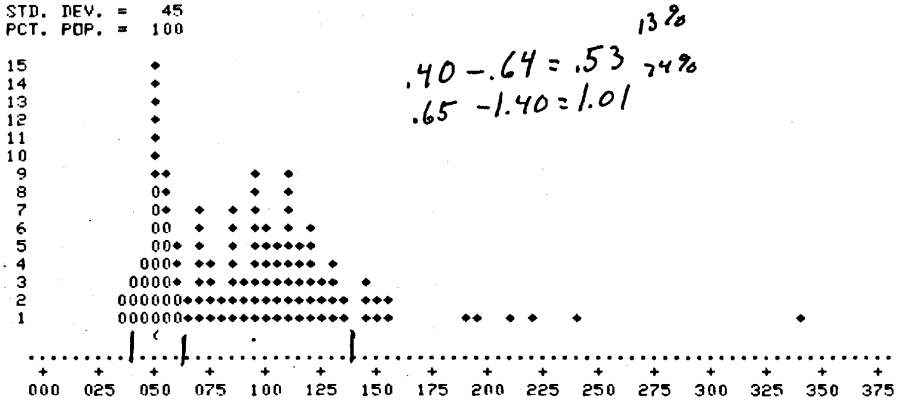



.35 - 59 = .50 20%
.60 - 1.50 = 1.09 66%



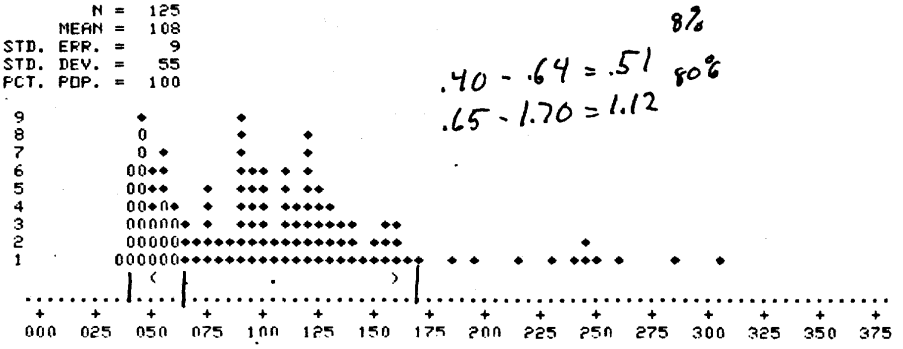

06/14/82 20333 50 7300' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 95
STD. ERR. = 8
STD. DEV. = 45
PCT. POP. = 100



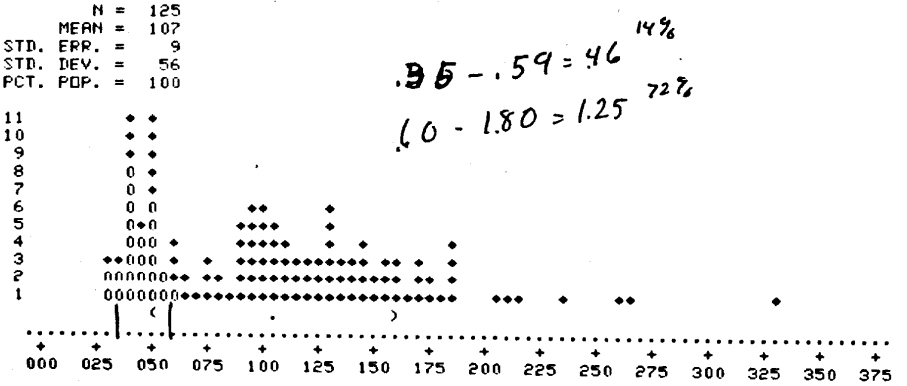

06/14/82 20334 50 7350' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

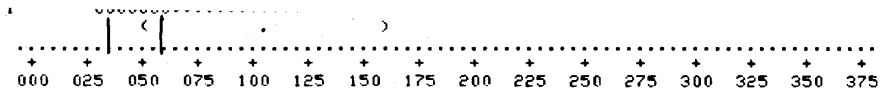
N = 125
MEAN = 108
STD. ERR. = 9
STD. DEV. = 55
PCT. POP. = 100



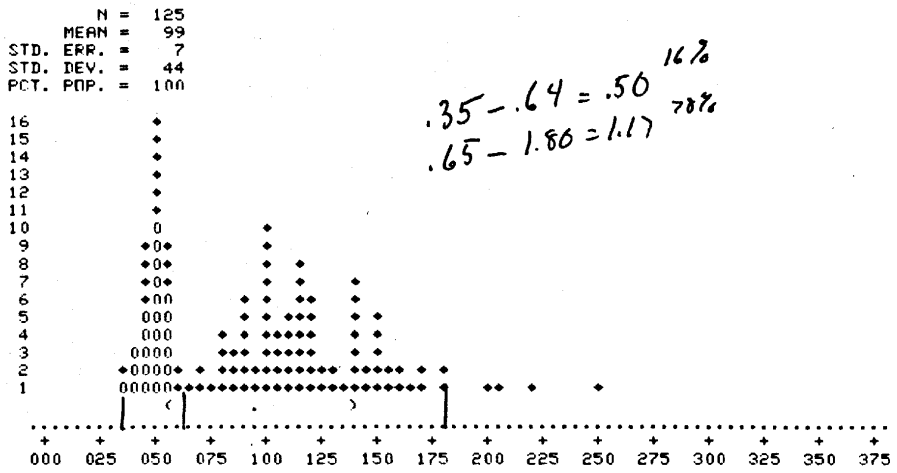

06/14/82 20335 50 7400' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 107
STD. ERR. = 9
STD. DEV. = 56
PCT. POP. = 100



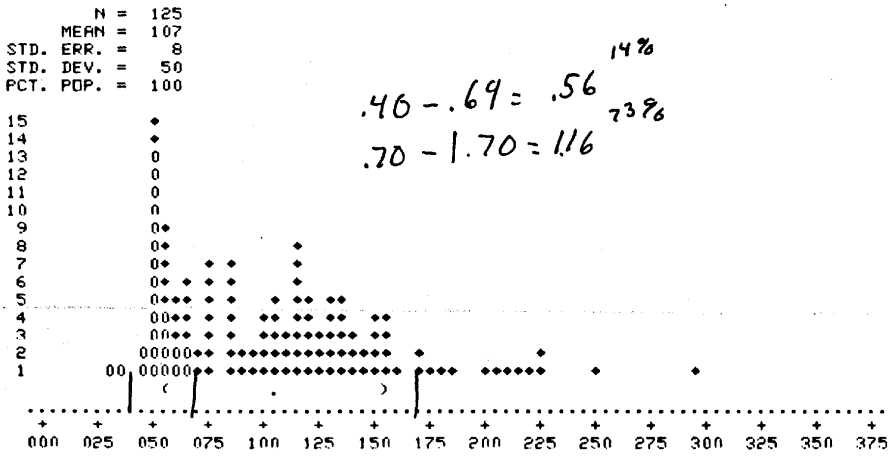



06/14/82 20336 50 7450' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE



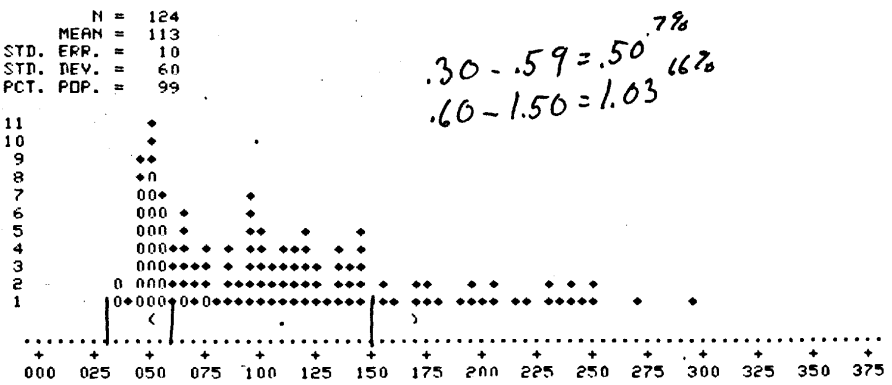

16%
.35 - .64 = .50
78%
.65 - 1.80 = 1.17

06/14/82 20337 50 7500' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE




14%
.46 - .69 = .56
73%
.70 - 1.70 = 1.16

06/14/82 20338 50 7550' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

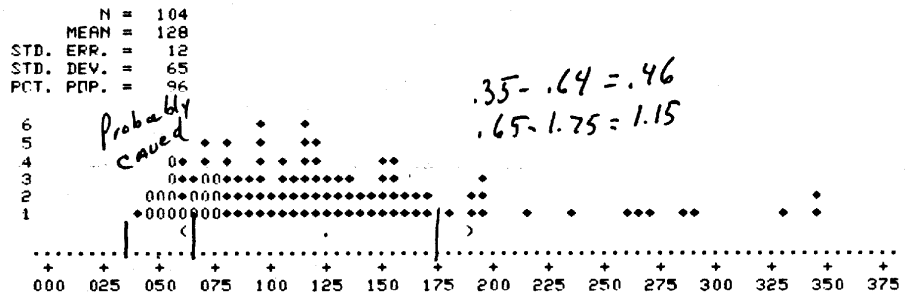



7%
.30 - .59 = .50
16%
.60 - 1.50 = 1.03

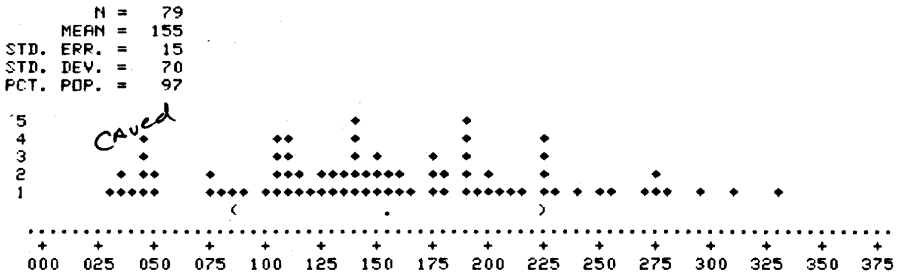
06/14/82 20339 50 7620' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 104
MEAN = 128
STD. ERR. = 12
STD. DEV. = 65
PCT. POP. = 96

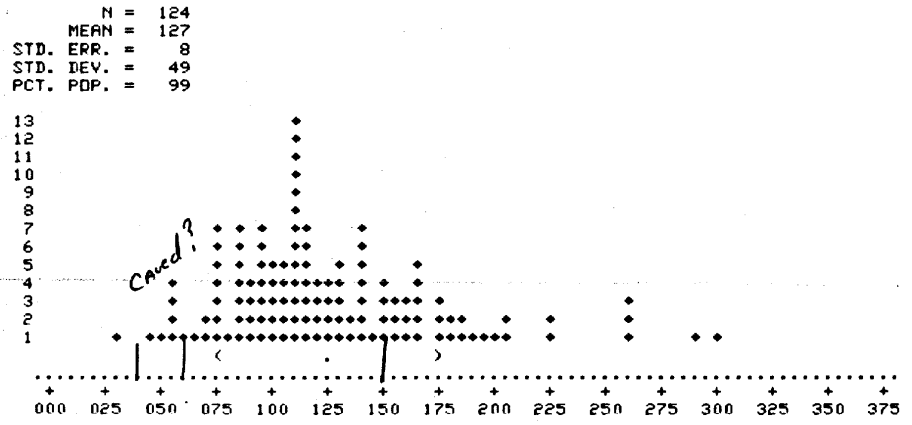
.35 - .64 = .46



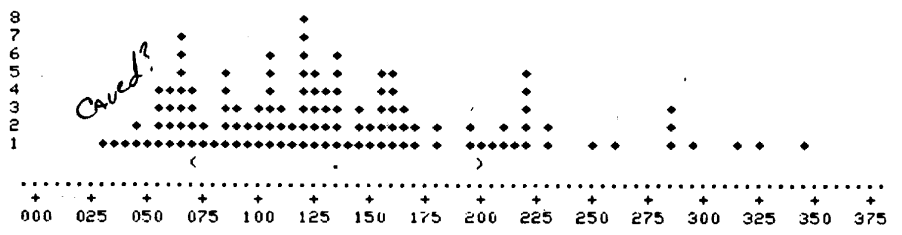

06/14/82 20340 50 7650' 2 GULF #1 COLVILLE DELTA STATE,N.SLOPE



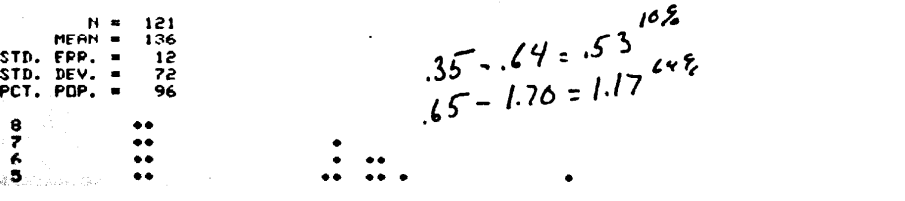

06/14/82 20341 50 7710' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE




06/14/82 20342 50 7760' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

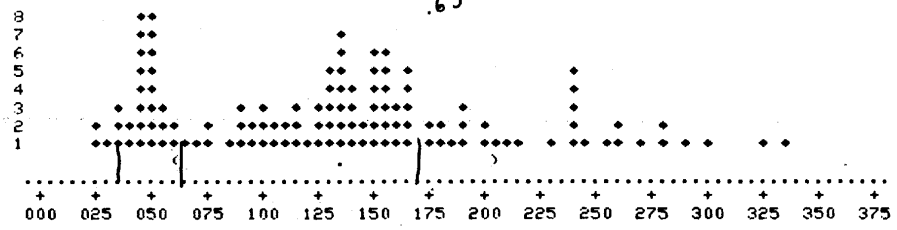



06/14/82 20343 50 7800' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE



STD. DEV. = 72
PCT. POP. = 96

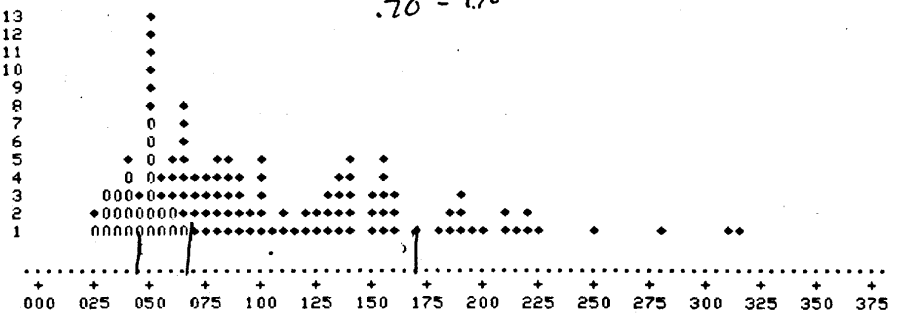
.65 - 1.70 = 1.17




06/14/82 20344 50 •7800' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 106
STD. ERR. = 10
STD. DEV. = 61
PCT. POP. = 100

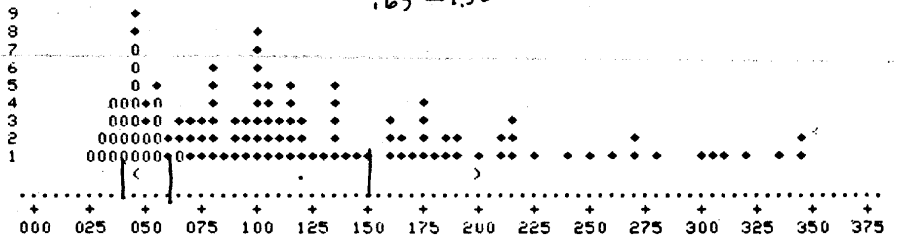
11%
.45 - .69 = .57 60%
.70 - 1.70 = 1.13




06/14/82 20345 50 7850' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 122
MEAN = 124
STD. ERR. = 13
STD. DEV. = 77
PCT. POP. = 97

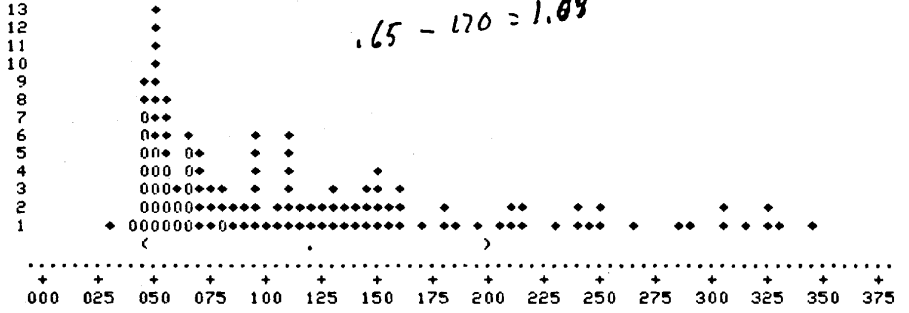
7%
.40 - .64 = .50 55%
.65 - 1.50 = 1.03




06/14/82 20346 50 7890' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 122
MEAN = 123
STD. ERR. = 13
STD. DEV. = 78
PCT. POP. = 97

15%
.40 - .64 = .52 55%
.65 - 1.70 = 1.05

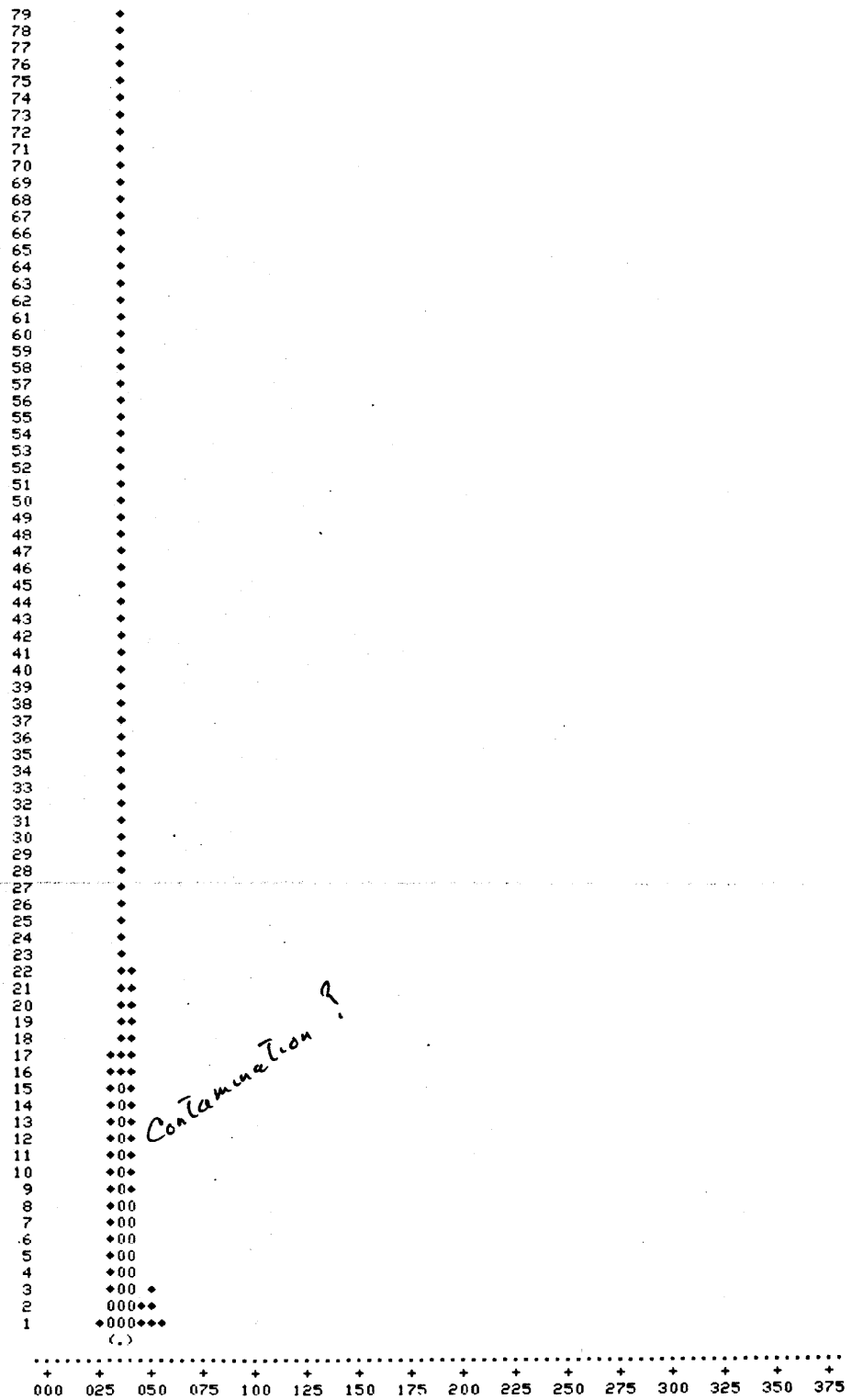



06/14/82 20347 50 8016' 2 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 37

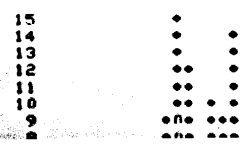
06/14/82 20347 50 8016' 2 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 37
STD. ERR. = 0
STD. DEV. = 4
PCT. POP. = 100

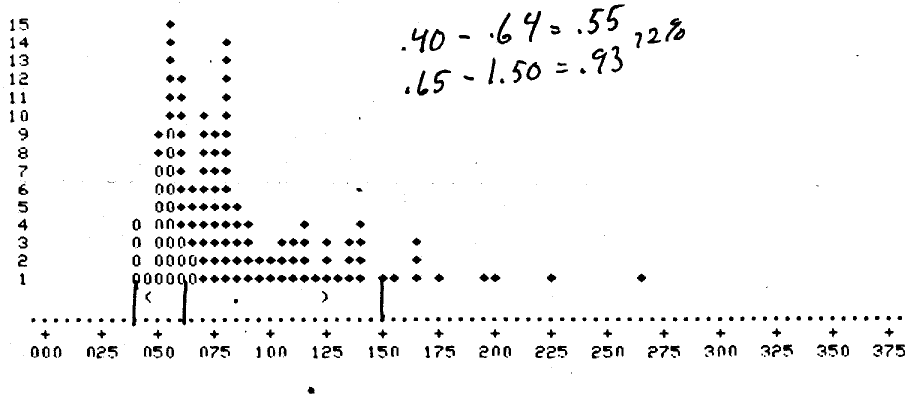



06/14/82 20348 50 8070' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 88
STD. ERR. = 6
STD. DEV. = 39
PCT. POP. = 100



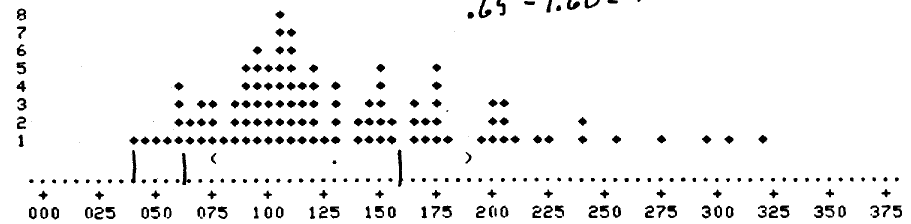
.40 - .64 = .55 (17%)
.65 - 1.50 = .93 (72%)




.40 - .64 = .55 72%
.65 - 1.50 = .93

06/14/82 20349 50 8242' 2 GULF #1 COLVILLE DELTA STATE,N.SLOPE

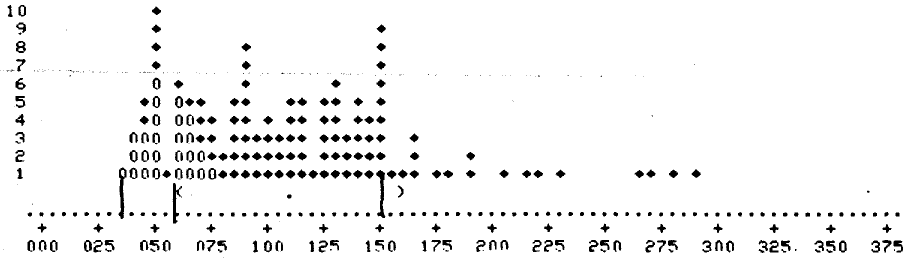
N = 105
MEAN = 133
STD. ERR. = 10
STD. DEV. = 57
PCT. POP. = 97




.40 - .64 = .55 7%
.65 - 1.66 = 1.10 63%

06/14/82 20350 50 8250' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

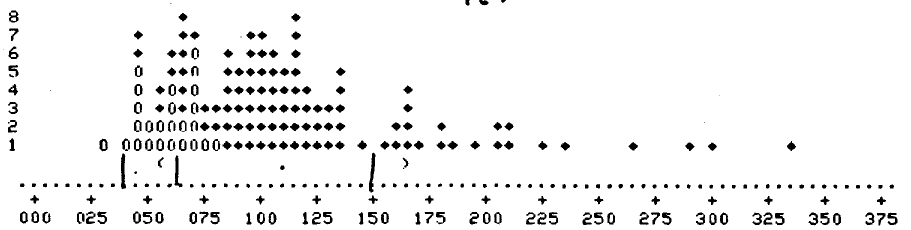
N = 125
MEAN = 112
STD. ERR. = 9
STD. DEV. = 52
PCT. POP. = 100




.35 - .59 = .48 7% 68%
.60 - 1.50 = 1.03

06/14/82 20351 50 8490' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 124
MEAN = 111
STD. ERR. = 9
STD. DEV. = 55
PCT. POP. = 99




.40 - .64 = .53 6%
.65 - 1.56 = 1.06 71%

06/14/82 20352 50 8610' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

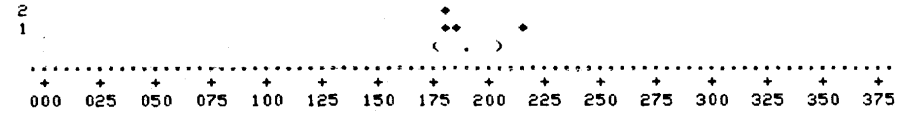
N = 4
MEAN = 193
STD. ERR. = 13
STD. DEV. = 14
PCT. POP. = 100

No indigenous vitrin. to

06/14/82 20352 50 8610' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 4
MEAN = 193
STD. ERR. = 13
STD. DEV. = 14
PCT. POP. = 100

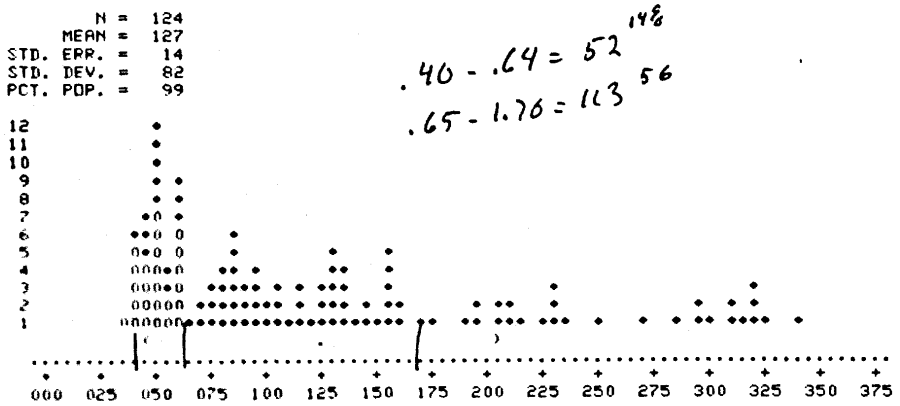
No indegenous vitrin. to




06/14/82 20353 50 8830' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 124
MEAN = 127
STD. ERR. = 14
STD. DEV. = 82
PCT. POP. = 99

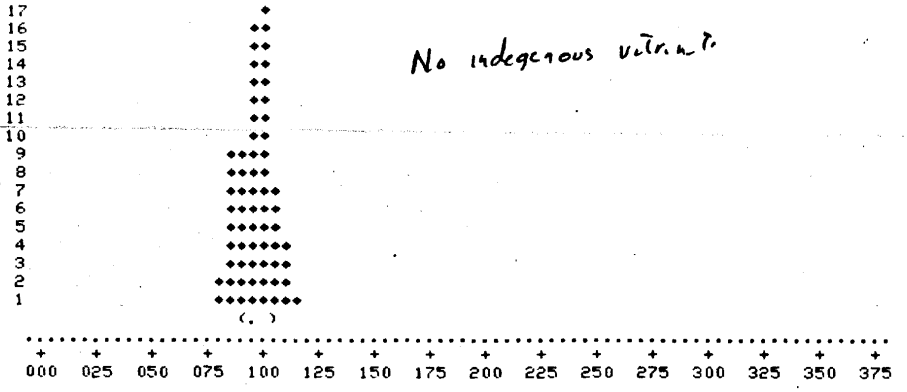
14%
.40 - .64 = 52
56
.65 - 1.76 = 113




06/14/82 20354 50 8964' 2 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 65
MEAN = 98
STD. ERR. = 1
STD. DEV. = 7
PCT. POP. = 100

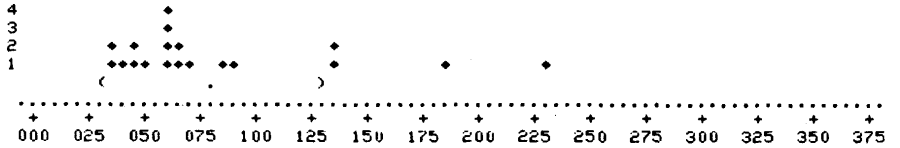
No indegenous vitrin.




06/14/82 20355 50 8984' 2 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 19
MEAN = 83
STD. ERR. = 23
STD. DEV. = 51
PCT. POP. = 100

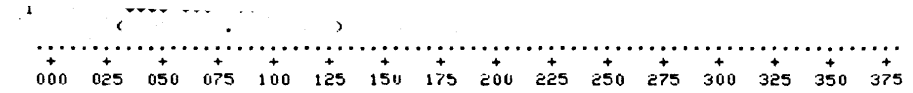
INSUFF. spl.




06/14/82 20356 50 9100' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 113
STD. ERR. = 8
STD. DEV. = 50
PCT. POP. = 100 ?

8%
.64 - .50 = .14
14%

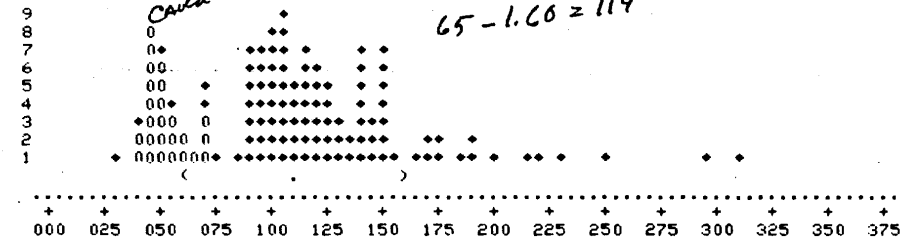



06/14/82 20356 50 9100' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 113
STD. ERR. = 8
STD. DEV. = 50
PCT. POP. = 100

Caved?

.46 - .64 = .50 ±2%
65 - 1.60 = 114 ±1%

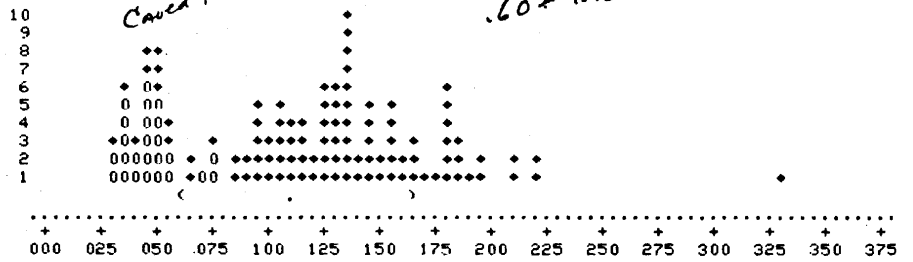



06/14/82 20357 50 9200' 4 GULF #1 COLVILLE DELTA STATE,N.SLOPE

N = 125
MEAN = 114
STD. ERR. = 9
STD. DEV. = 54
PCT. POP. = 100

Caved?

.45 - 64 = .50 ±2%
.60 - 1.70 = 1.23 ±1%




**COMMAND =