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DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS

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HIERARCHICAL ANALYSIS OF VARIANCE OF STREAM-SEDIMENT SAMPLES FOR GEOCHEMICAL RECONNAISSANCE, ESTER DOME, FAIRBANKS MINING DISTRICT, ALASKA

By
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ABSTRACT

Problems addressed by this study include a) what are the relative sizes of the components of variance associated with geochemical stream-sediment sampling on Ester Dome, Alaska, and b) what concentration differences are statistically significant for copper, lead, zinc, and arsenic in stream sediments sampled at a density of one sample per 1/4 mi.

A sampling design using two creeks, three localities per creek, three sample types per locality, and three samples per type and locality was followed. Duplicates of each sample were collected, and 108 samples were analyzed. The analysis of variance (ANOVA) of the completely nested and randomized design for the total variance of copper, lead, zinc, and arsenic, respectively, showed: a) between-creek variance of 30 percent, 0 percent, 6 percent, and 37 percent; b) among-localities variance of 25 percent, 4 percent, 35 percent, and 4 percent; c) among-sample variance of 12 percent, 2 percent, 8 percent, and 7 percent; and d) replicate variance of 6 percent, 22 percent, 12 percent, and 2 percent. Only the underlined values were statistically significant at the 95-percent confidence level. The means and standard deviations for all samples are: a) copper - 17.8 ppm, 3.56; b) lead - 8.84 ppm, 1.54; c) zinc - 51.4 ppm, 6.73; and d) arsenic - 43.2 ppm, 27.3.

The following consequential differences were detected for eight pairs of samples (two streams, each 2-mi long with one sample per 1/4 mi) at $\alpha=\beta=0.05$: copper - 5 ppm; lead - 2 ppm; zinc - 9 ppm; and arsenic - 38 ppm.

Because of the small number of samples collected, this study provides only a first look at the variance structure of stream-sediment sampling on Ester Dome. A larger study using more samples and other areas within the Fairbanks mining district is needed to obtain results generally applicable to the entire district.

INTRODUCTION

The purpose of this study was to investigate sources of variability among stream-sediment samples taken in geochemical exploration for metallic deposits on Ester Dome. For a given element, the sources of variability studied were: a) analytical variability between replicate samples ('sampling error'); b) variability among the same type of sample at different sublocalities within a given sample locality on a stream ('sample variance'); c) variability among different types of samples at various localities ('type variance'); d) variability among different localities on a stream ('locality variance'); and e) variability between samples from two different creeks ('creek variance').

Estimates of the different components of variance for copper, lead, zinc, and arsenic for mineralized Nugget Creek and unmineralized Baldry Creek (located on the north flank of Ester Dome, fig. 1), of the number of samples required to distinguish mineralized and unmineralized creeks, and of significant concentration differences between creeks for the standard DGGS sampling density are reported.

SAMPLING

This study used the balanced, randomized, nested design shown schematically in figure 2. This design is amenable to ANOVA whose mathematical model is discussed in a later section of this report.

Stream-sediment samples consisting of grab samples of wet sandy sediment, wet organic sediment, and dry sandy sediment from three localities on Nugget and Baldry Creeks (fig. 1) were collected during June 1981. To estimate 'sample variance,' a sample of the same type was taken from each of three locations (sublocalities) along a 30 to 50 ft length of the creek, for a total of three samples of the same type per locality. Thus, for each locality (section of creek samples) nine samples were taken, three of each type; a total of 54 samples was collected. The samples were dried and sieved in the DGGS laboratory, and the fraction passing 80-mesh was retained for analysis. Each sample was split, and the splits were randomized, renumbered, and submitted for analysis. The values for copper, lead, and zinc were determined by the DGGS Mineral Laboratory and arsenic was determined by Bondar-Clegg and Company, Ltd., of Vancouver, B.C. The results of the chemical analyses, arranged according to sample type, locality, and stream, are shown in appendix I.

STATISTICAL ANALYSIS

Descriptive Statistics

Summary statistics for each element with respect to stream and sample type are shown in appendix I. Data used for the summary statistics are listed and summarized graphically in histograms and normal probability plots in appendix II. A summary of these data are presented in table 1. Calculations were computed using an HP-9845 computer.

Analysis of Variance

The ANOVA for data in appendix I was computed using the HP-9845 'Nested ANOVA Program'; results are shown in table 2. Variance-ratio or 'F' tests of the mean squares are shown in table 3.

DISCUSSION

The mathematical model used for the sampling design is

$$Y_{ijkl} = u + C_i + L_{(i)j} + T_{(ij)k} + S_{(ijk)l} + e_{ijkl} \qquad (1)$$

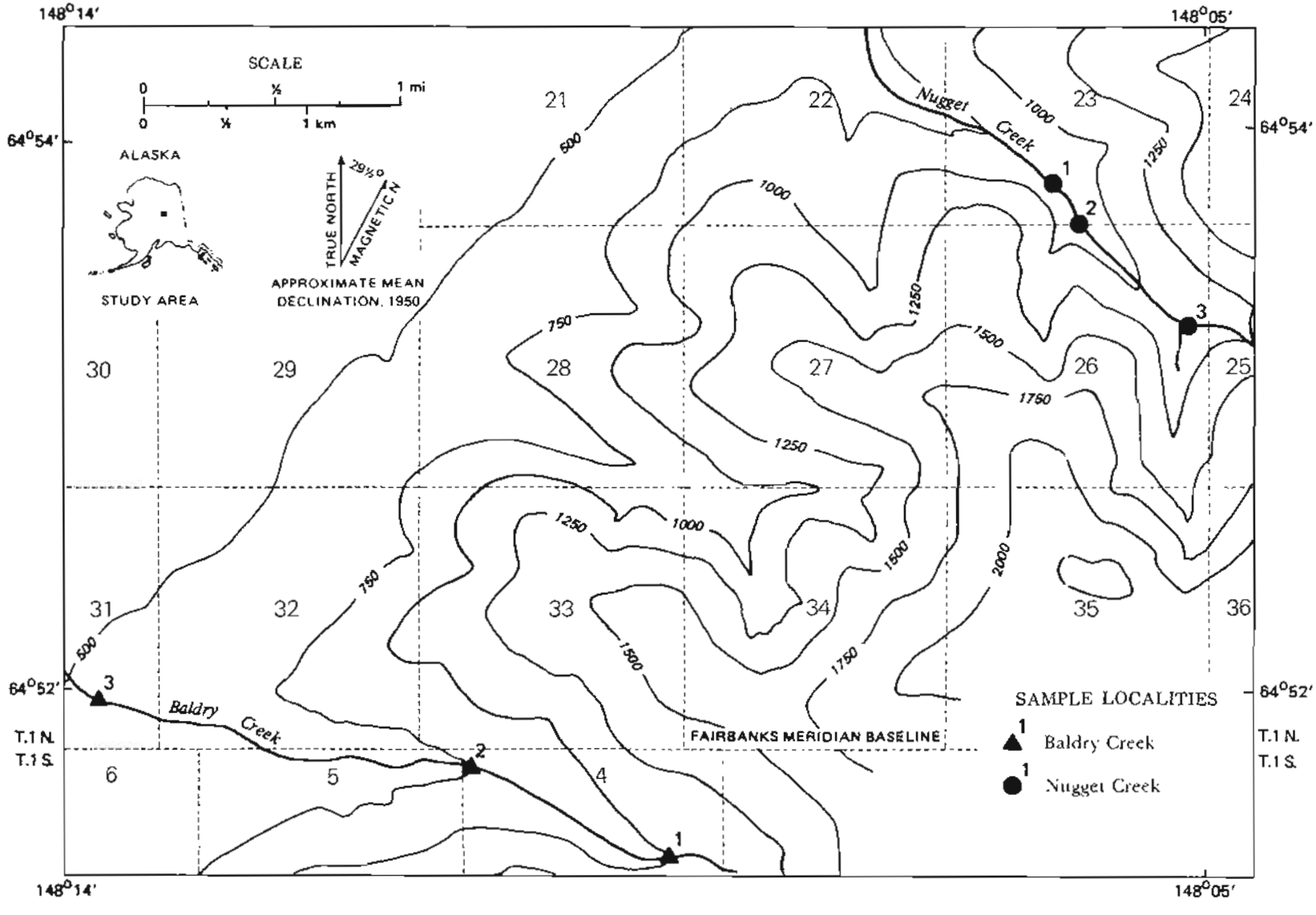

Figure 1. Map of study area on northwest flank of Ester Dome, Fairbanks mining district, Alaska.

Table 1. Summary statistics for copper, lead, zinc, and arsenic.

Creek	Sample type	Mean (ppm)	Standard deviation (ppm)	N
		Copper		
Both	All	17.8	3.56	108
Baldry	All	16.0	1.76	54
Nugget	All	19.6	3.96	54
Both	Wet	18.0	3.24	36
Both	Dry	16.7	2.14	36
Both	Organic	18.7	4.64	36
		Lead		
Both	All	8.84	1.54	108
Baldry	All	8.72	1.84	54
Nugget	All	8.96	1.18	54
Both	Wet	9.11	1.49	36
Both	Dry	8.58	1.32	36
Both	Organic	8.83	1.78	36
		Zinc		
Both	All	51.4	6.73	108
Baldry	All	48.9	6.09	54
Nugget	All	53.8	6.51	54
Both	Wet	52.9	6.65	36
Both	Dry	47.9	4.77	36
Both	Organic	53.3	7.25	36
		Arsenic		
Both	All	43.2	27.3	108
Baldry	All	26.2	11.4	54
Nugget	All	60.2	28.0	54
Both	Wet	47.1	27.5	36
Both	Dry	36.8	23.8	36
Both	Organic	45.6	29.8	36

(Hicks, 1973). Y_{ijkl} represents the measured variable, u is the population mean (a common effect in all observations), C_i is the variability between creeks, i = 1,2; $L_{(i)j}$ is the variability among locations, j = 1,3; $T_{(ij)k}$ is the variability among different sample types, k = 1,3; $S_{(ijk)l}$ is the variability among samples of the same type from different locations in a given locality, l = 1,3; and $e_{(ijkl)}$ is the random error in sampling estimated by

Table 2. Nested analysis of variance for copper, lead, zinc, and arsenic.

Copper

Source (name)	df	Sums of squares	Mean square
Total	107	1354.102	12.655
A Creek	1	359.343	359.343
B(A)	4	425.481	106.370
C(B(A))	12	342.778	28.565
D(C(B(A)))	36	176.000	4.889
Sampling error	54	50.500	0.935

Lead

Total	107	254.324	2.377
A Creek	1	1.565	1.565
B(A)	4	167.370	41.843
C(B(A))	12	19.222	1.602
D(C(B(A)))	36	29.667	0.824
Sampling error	54	36.500	0.676

Zinc

Total	107	4876.324	45.573
A Creek	1	640.454	640.454
B(A)	4	1931.704	482.926
C(B(A))	12	1463.333	121.944
D(C(B(A)))	36	505.333	14.037
Sampling error	54	335.500	6.213

Arsenic

Total	107	81082.912	757.784
a Creek	1	30509.142	30509.142
B(A)	4	39100.725	9775.181
C(B(A))	12	4877.548	406.462
D(C(B(A)))	36	5592.385	155.344
Sampling error	54	1003.112	18.576

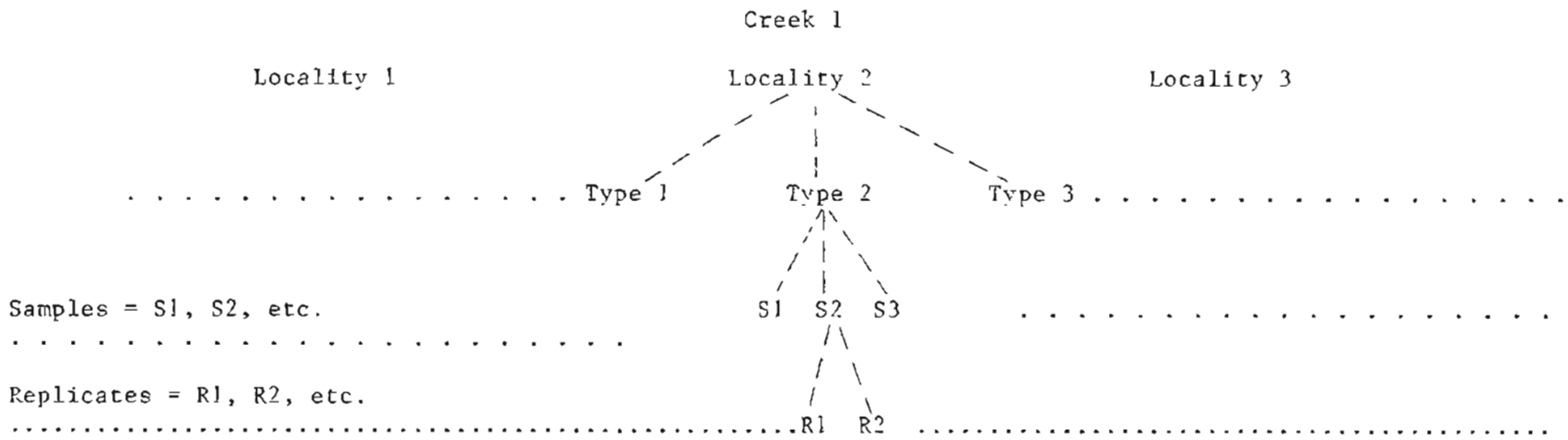

Figure 2. Part of the sampling design, showing how localities are nested in the creeks, types nested in the localities, sample sublocalities nested in the types, and replicates nested in the samples.

replications of various samples. Equation (1) can be rewritten in terms of the respective means to yield

$$Y_{ijkl} = u + (u_{i.} - u) + (u_{ij} - u_{i.}) + (u_{ijk} - u_{ij.}) + (u_{ijkl} - u_{ijk.}) + (Y_{ijkl} - u_{ijk.}) \quad (2)$$

In this equation, $u_{i.}$ is the mean value of the variable for a particular creek; thus the term $(u_{i.} - u)$ is the difference between the mean value of the variable for a given creek and the grand mean for the variable, and so forth. According to Hicks (1973, p. 26-42), this model can be used to calculate expected mean-square values (EMS). The EMS can be used in conjunction with the observed mean squares (ANOVA, table 2) to estimate the different components of variance. The general layout of the ANOVA table (Box and others, 1978) for the separation of the variance components associated with creeks, localities, sample types, samples, and replications is shown in table 4. Using the calculated mean squares (table 2) and the EMS (table 4), the variance components shown in table 5 were calculated.

Table 3. Tabulation of 'F' tests of mean squares in table 2.

Source	df	Cu	Pb	Zn	As	F*.05	F*.01
Creek	1	3.38	0.374	1.33	3.12	7.71	21.2
Locality	4	3.72	26.1	3.96	24.0	3.26	5.41
Type	12	5.84	1.94	8.69	2.62	2.02	2.70
Samples	36	5.23	1.22	2.26	8.36	1.59	2.00
Sampling	54						

* Critical 'F' ratios from table A-5, pt-6 to T-9 (Natrella, 1963).
Values significant at the 95-percent confidence level.
Values significant at the 99-percent confidence level.

For copper, 30 percent of the total variance is due to differences between creeks, 27 percent to differences among localities, 25 percent to differences among the three sample sites, 12 percent to variations among samples from the different sublocalities, and 6 percent to sampling (replicate) error. Although differences between creeks may account for as much as 37 percent of the total variance, the results of the 'F' tests (table 3) show that this variance component is not statistically significant and that the two creeks cannot be distinguished on the basis of the mean copper, lead, zinc, or arsenic values of these samples.

Significant (95-percent CL) to highly significant (99-percent CL) differences exist among the localities on the two creeks for all four elements. Copper, zinc, and arsenic also show significant differences among the sample types and among the samples. The among-localities variance ranges from 27 percent to 72 percent of the total variance for an element. Variability due to sample type comprises 25 to 35 percent of the total variance for copper and zinc. Sample variance is relatively small (about 10 percent) for all four elements. With the exception of lead, the sampling (replicate) error is also small, about 6 percent on the average.

Lead behaves anomalously throughout the ANOVA because the levels of lead in the samples are low and relatively uniform, apparently reflecting a lack of lead mineralization on either stream. If there were significant variations in the lead concentration at different localities or between streams, they would contribute the major variance, and the sampling error would become relatively small.

'Best' Element for Geochemical Exploration.

Arsenic is the most suitable of the four elements for use in stream-sediment geochemical exploration on Ester Dome. Major variance components for arsenic are between creeks and especially among localities. In fact, much of the variance of arsenic is due to the high values observed at locality 3 on Nugget Creek. These two sources of variance account for 87 percent of the variance of arsenic in the samples. Even though the variance contributed by sample type and samples is statistically significant, these are relatively small components of the total variance. The effect of sample type is small. Wet, dry, or organic samples can probably all be used interchangeably without introducing much error. Also, the error due to variability among sublocalities is small, and thus, a single (noncomposite) sample can be taken at a given site without markedly affecting the overall variance. Finally, because the sampling variance is small, only one analysis per sample is required.

Copper and zinc may be useful in geochemical exploration on Ester Dome because they show significant variability with respect to sample type. This variance stems from differences between values for dry samples and for wet sand or wet organic samples. As shown in table 1, the dry samples yield values lower than those for the wet sand or wet organic samples. For copper and zinc, sampling should be restricted to wet samples, either sand or organic; dry samples should be avoided. (However, it is better to take a dry sample than no sample at all.)

Sampling Density

Results of this analysis can be used to estimate the number of samples needed to detect a specified concentration difference between groups of samples. First, consider the two types of errors (Types I and II) that arise in testing a statistical hypothesis. The origin of the errors is shown schematically, where H_o is the null hypothesis, for example, the hypothesis that the mean copper concentration of Nugget Creek equals that of Baldry Creek.

Conditions	Our response: Accept H_o	Reject H_o
H_o True	Correct	Type I Error
H_o False	Type II Error	Correct

Table 4. General ANOVA layout.

Source of variation	Sum of squares	Degrees of freedom	Mean squares	Expected mean squares
Average	$CLTSR\bar{y}^{-2}$	1		
Creeks	$LTSR \sum_{c} (\bar{y}_c - \bar{y})^2$	C - 1	M_c	$LTSR\sigma_c^2 + TSR\sigma_l^2 + SR\sigma_t^2 + R\sigma_s^2 + \sigma_r^2$
Localities	$TSR \sum_{c} \sum_{l} (\bar{y}_{cl} - \bar{y}_c)^2$	C(L-1)	M_l	$TSR\sigma_l^2 + SR\sigma_t^2 + R\sigma_s^2 + \sigma_r^2$
Types	$SR \sum_{c} \sum_{l} \sum_{t} (\bar{y}_{tlc} - \bar{y}_{cl})^2$	CL(T-1)	M_t	$SR\sigma_t^2 + R\sigma_s^2 + \sigma_r^2$
Samples	$R \sum_{c} \sum_{l} \sum_{t} \sum_{s} (\bar{y}_{stlc} - \bar{y}_{tlc})^2$	CLT(S-1)	M_s	$R\sigma_s^2 + \sigma_r^2$
Replicates	$\sum_{c} \sum_{l} \sum_{t} \sum_{s} \sum_{r} (\bar{y}_{rstlc} - \bar{y}_{stlc})^2$	SCLT(R-1)	M_r	σ_r^2
Total	$\sum_{c} \sum_{l} \sum_{t} \sum_{s} \sum_{r} y^2_{rstlc}$	RSCLT		

Table 5. Variance components

Source	Copper Component	Copper %	Lead Component	Lead %	Zinc Component	Zinc %	Arsenic Component	Arsenic %
Creek	4.68	30	0	0	2.92	6	384.	37
Localities	4.32	27	2.24	72	20.2	39	520.	50
Type	3.95	25	0.13	4	18.0	35	41.9	4
Samples	1.97	12	0.07	2	3.92	8	68.4	7
Replicates	.094	6	0.68	22	6.21	12	18.6	2
Totals	15.01	100	3.12	100	51.25	100	1033.	100

If we accept the hypothesis that the mean copper concentrations of Nugget and Baldry Creeks are statistically the same when in fact they are different, we have made a Type II error, the probability of which is designated by β. If we reject the null hypothesis, and decide the mean copper concentrations of the two creeks are different when in fact they are the same, we have made a Type I error, the probability of which is designated by α. We are always able to estimate α from our data, but we must have a specific alternate hypothesis if we are to estimate β. In other words, we must specify some value for the mean copper content of a mineralized creek relative to a nonmineralized creek before we can estimate β. I stress that this is a geologic decision and not a statistical question, and it rests on the actions a geologist will take if certain values are encountered.

In this example, we commit a Type II error if we call a creek 'background' when it isn't; we commit a Type I error if we call the creek 'anomalous' when it isn't. Clearly there are costs associated with making both kinds of errors, and the errors are complimentary. If we decrease the risk of making a Type I error, we automatically increase the risk of making a Type II error. Balancing the two errors depends on the context of the problem. For example, a Type I error may be very costly relative to a Type II error; therefore we would attempt to reduce the risk of a Type I error while increasing the probability of a Type II error. Again, I stress that balancing the two errors is a geologic, not statistical decision.

In the following example, I am attempting to reduce the two errors to a small, approximately equal value by the method of 'consequential differences,' which is summarized in the operating characteristics of a statistical test. Suppose we take as the difference to be detected (consequential difference) the difference between the mean copper values for Nugget Creek and Baldry Creek. This difference is 3.65 ppm. The standard deviation of copper is 3.56 ppm (table 1). Suppose that at $\alpha = 0.05$, we wish to be 95 percent certain (i.e., $1 - \beta = 0.95$) of detecting this difference of 3.65 ppm when s = 3.56 ppm. How many samples must we take? We first calculate 'd,' the standard difference, where

$$d = \delta / s = 3.65/3.56 = 1.03$$

Table 6. Sample sizes required to detect prescribed differences between averages when the sign of the difference is not important (Natrella, 1963).

The table entry is the sample size (n) required to detect, with probability $1-\beta$, that the average m of a new product differs from the standard m_0 (or that two product averages m_A and m_B differ). The standardized difference is d, where

$d = \frac{|m - m_0|}{\sigma}$ (or $d = \frac{|m_A - m_B|}{\sqrt{\sigma_A^2 + \sigma_B^2}}$ if we are comparing two products).

The standard deviations are assumed to be known, and n is determined by the formula:

$$n = \frac{(z_{1-\alpha/2} + z_{1-\beta})^2}{d^2}$$

$\alpha = .01$

d \ $1-\beta$	.50	.60	.70	.80	.90	.95	.99
.1	664	801	962	1168	1488	1782	2404
.2	166	201	241	292	372	446	601
.4	42	51	61	73	93	112	151
.6	19	23	27	33	42	50	67
.8	11	13	16	19	24	28	38
1.0	7	9	10	12	15	18	25
1.2	5	6	7	9	11	13	17
1.4	4	5	5	6	8	10	13
1.6	3	4	4	5	6	7	10
1.8	3	3	3	4	5	6	8
2.0	2	3	3	3	4	5	7
3.0	1	1	2	2	2	2	3

If we must estimate σ from our sample and use Student's t, then we should add 4 to the tabulated values to obtain the approximate required sample size. (If we are comparing two product averages, add 2 to the tabulated values, to obtain the required size of each sample. For this case, we must have $\sigma_A = \sigma_B$).

$\alpha = .05$

d \ $1-\beta$	.50	.60	.70	.80	.90	.95	.99
.1	385	490	618	785	1051	1300	1838
.2	97	123	155	197	263	325	460
.4	25	31	39	50	66	82	115
.6	11	14	18	22	30	37	52
.8	7	8	10	13	17	21	29
1.0	4	5	7	8	11	13	19
1.2	3	4	5	6	8	10	13
1.4	2	3	4	5	6	7	10
1.6	2	2	3	4	5	6	8
1.8	2	2	2	3	4	5	6
2.0	1	2	2	2	3	4	5
3.0	1	1	1	1	2	2	3

If we must estimate σ from our sample and use Student's t, then we should add 2 to the tabulated values to obtain the approximate required sample size. (If we are comparing two product averages, add 1 to the tabulated values to obtain the required size of each sample. For this case, we must have $\sigma_A = \sigma_B$).

From table 6 (from Natrella, 1963), we find that for the selected levels of α and β, about 17 samples are needed. Detailed calculation shows that these two errors are balanced at 15 samples. For the observed differences in the mean values of lead, zinc, and arsenic between the two creeks, corresponding values are: lead - 900 samples, zinc - 30 samples, and arsenic - 14 samples. Notice that we must specify 'a priori,' the consequential difference, but that we obtain 's' from our data. Notice also that the greater the consequential difference for a fixed 's,' the fewer the samples required to detect this difference. Thus, if d = 3 (a consequential difference equal to 3s), only two samples are required to detect this difference.

Table 6 and the standard deviations of the variance estimates derived in this study can be used to estimate the contrast or consequential difference based on the standard DGGS sampling density of one sample per 1/4 mi of stream. For two streams (each 2 mi long) or a total of eight pairs of samples and for the standard deviations estimated here, consequential differences of 38 ppm arsenic, 9 ppm zinc, 2.2 ppm lead, and 5 ppm copper could be detected at $\alpha = \beta = 0.05$.

CONCLUSIONS

The results of this study are applicable only to the elements and the two creeks studied. The number of samples studied here was very small, and the relative magnitude of the variance components could change greatly with inclusion of just one or two more localities. This study has provided a first look at the variance structure of geochemical stream-sediment sampling on Ester Dome. The work is a necessary preliminary of other larger studies that should be done if the variance components for geochemical exploration of different areas within the Fairbanks mining district are to be known.

ACKNOWLEDGMENTS

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Appendix I. Summary statistics for elements with respect to stream and sample type.

Nugget Creek

Locality 1

Sample Type:	Wet						Dry						Organic					
	Replicate pairs (ppm)						Replicate pairs (ppm)						Replicate pairs (ppm)					
Cu	20	19	18	19	19	18	17	18	17	18	17	17	18	18	17	18	15	18
Pb	10	9	8	10	9	9	10	9	9	9	7	8	8	9	9	8	7	9
Zn	63	59	58	55	63	58	52	59	59	52	48	46	59	59	55	59	47	57
As	45	43	43	42	50	45	45	37	52	52	45	53	43	35	43	45	48	43

Locality 2

Sample Type:	Wet						Dry						Organic					
	Replicate pairs (ppm)						Replicate pairs (ppm)						Replicate pairs (ppm)					
Cu	17	15	15	15	15	17	19	19	20	20	18	18	17	16	20	22	20	16
Pb	8	8	7	9	8	8	9	10	8	7	8	8	9	8	9	9	9	6
Zn	50	46	47	45	46	49	57	57	48	45	47	45	51	48	55	48	54	49
As	47	47	42	48	43	43	55	70	13	13	21	21	50	45	52	62	38	18

Locality 3

Sample Type:	Wet						Dry						Organic					
	Replicate pairs (ppm)						Replicate pairs (ppm)						Replicate pairs (ppm)					
Cu	23	26	21	23	26	26	16	16	19	18	21	19	30	33	26	27	24	25
Pb	11	11	9	9	10	10	9	8	9	9	10	10	10	11	11	10	12	10
Zn	59	62	59	60	58	60	50	46	49	44	45	43	65	65	63	63	58	60
As	105	110	105	105	95	95	70	65	82	80	80	90	105	100	105	100	110	110

Appendix I (cont.)

Baldry Creek

Locality 1

Sample Type:	Wet Replicate pairs (ppm)						Dry Replicate pairs (ppm)						Organic Replicate pairs (ppm)					
Cu	17	17	17	17	17	18	13	14	16	16	18	18	16	19	18	18	17	16
Pb	11	12	12	10	10	10	10	10	11	11	10	10	10	12	11	9	10	10
Zn	58	51	51	54	54	53	45	44	45	44	48	48	51	58	54	53	51	51
As	43	38	43	36	33	36	16	23	23	20	32	28	33	35	28	25	35	35

Locality 2

Sample Type:	Wet Replicate pairs (ppm)						Dry Replicate pairs (ppm)						Organic Replicate pairs (ppm)					
Cu	16	17	15	17	17	18	17	18	14	15	15	16	18	19	18	17	17	16
Pb	8	11	8	10	10	10	8	8	9	9	8	8	10	10	8	9	9	10
Zn	53	56	51	56	55	59	52	54	47	48	49	51	56	59	58	56	55	57
As	37	45	33	33	41	43	30	28	25	23	27	33	35	32	40	43	37	40

Locality 3

Sample Type:	Wet Replicate pairs (ppm)						Dry Replicate pairs (ppm)						Organic Replicate pairs (ppm)					
Cu	17	17	16	16	14	13	14	14	15	15	13	13	14	15	14	15	12	13
Pb	7	8	7	8	6	7	7	7	7	6	7	6	6	6	5	7	6	6
Zn	44	45	42	44	42	39	43	42	44	44	43	41	43	43	40	41	38	40
As	15	17	14	13	12	12	12	12	13	12	10	14	12	13	12	13	10	10

Appendix II. Summary statistics, histograms, and normal probability plots of data in appendix I.

ARSENIC: NUGGET AND BALDRY CREEKS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	45.00000	43.00000	43.00000	42.00000	50.00000
6	45.00000	45.00000	37.00000	52.00000	52.00000
11	45.00000	53.00000	43.00000	35.00000	43.00000
16	45.00000	48.00000	43.00000	47.00000	47.00000
21	42.00000	48.00000	43.00000	43.00000	55.00000
26	70.00000	13.00000	13.00000	21.00000	21.00000
31	50.00000	45.00000	52.00000	62.00000	38.00000
36	18.00000	105.00000	110.00000	105.00000	105.00000
41	95.00000	95.00000	70.00000	65.00000	82.00000
46	80.00000	80.00000	90.00000	105.00000	100.00000
51	105.00000	100.00000	110.00000	110.00000	43.00000
56	38.00000	43.00000	36.00000	33.00000	36.00000
61	16.00000	23.00000	23.00000	20.00000	32.00000
66	28.00000	33.00000	35.00000	38.00000	25.00000
71	35.00000	35.00000	37.00000	45.00000	33.00000
76	33.00000	41.00000	43.00000	30.00000	28.00000
81	25.00000	23.00000	27.00000	33.00000	35.00000
86	32.00000	40.00000	43.00000	37.00000	40.00000
91	15.00000	17.00000	14.00000	13.00000	12.00000
96	12.00000	12.00000	12.00000	13.00000	12.00000
101	10.00000	14.00000	12.00000	13.00000	12.00000
106	13.00000	10.00000	10.00000		

SUMMARY STATISTICS
ON DATA SET:
ARSENIC: NUGGET AND BALDRY CREEKS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ARSENIC	108	0	4662.00000	43.16667

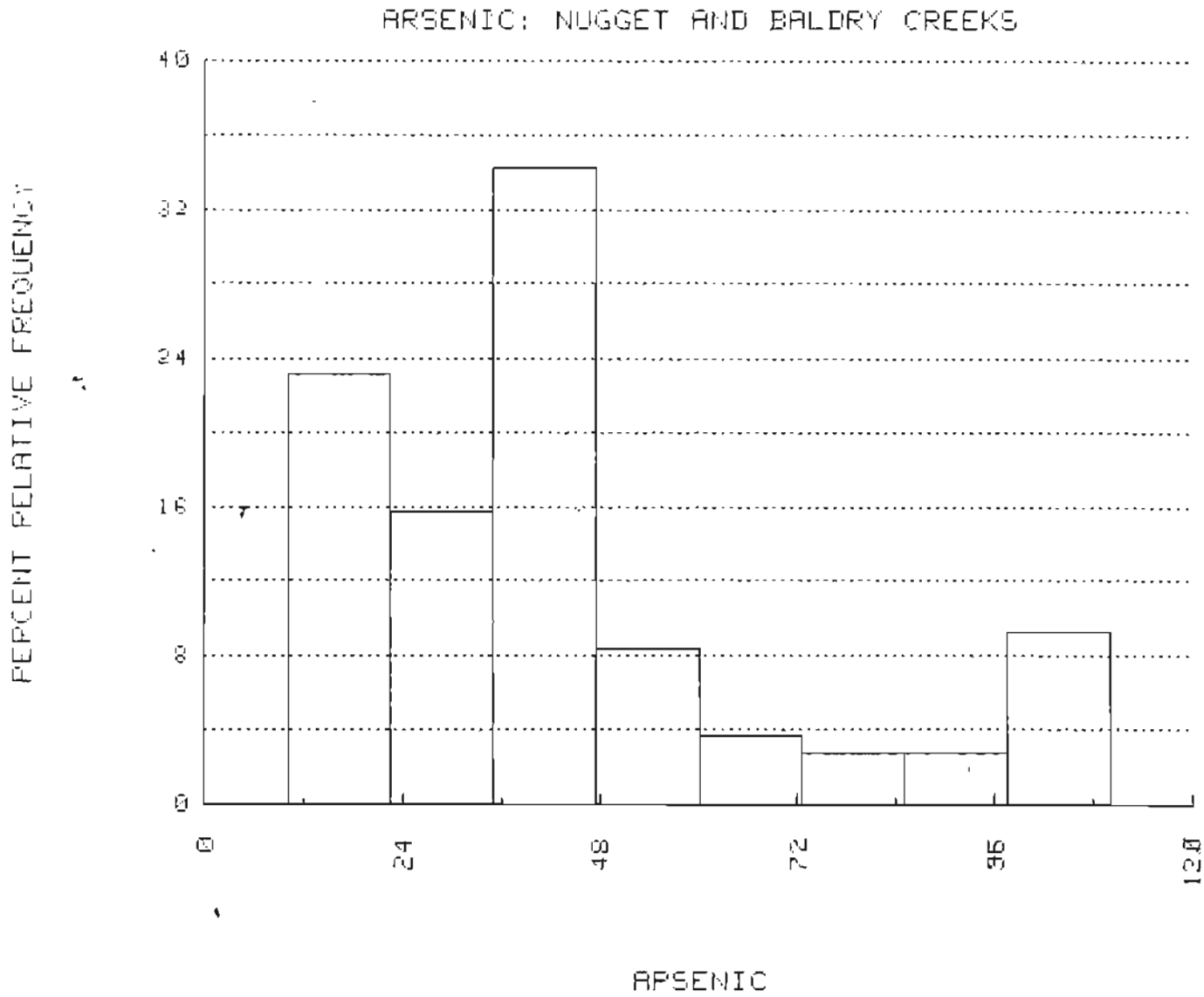
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ARSENIC	745.16822	27.29777	1.07718	.41483

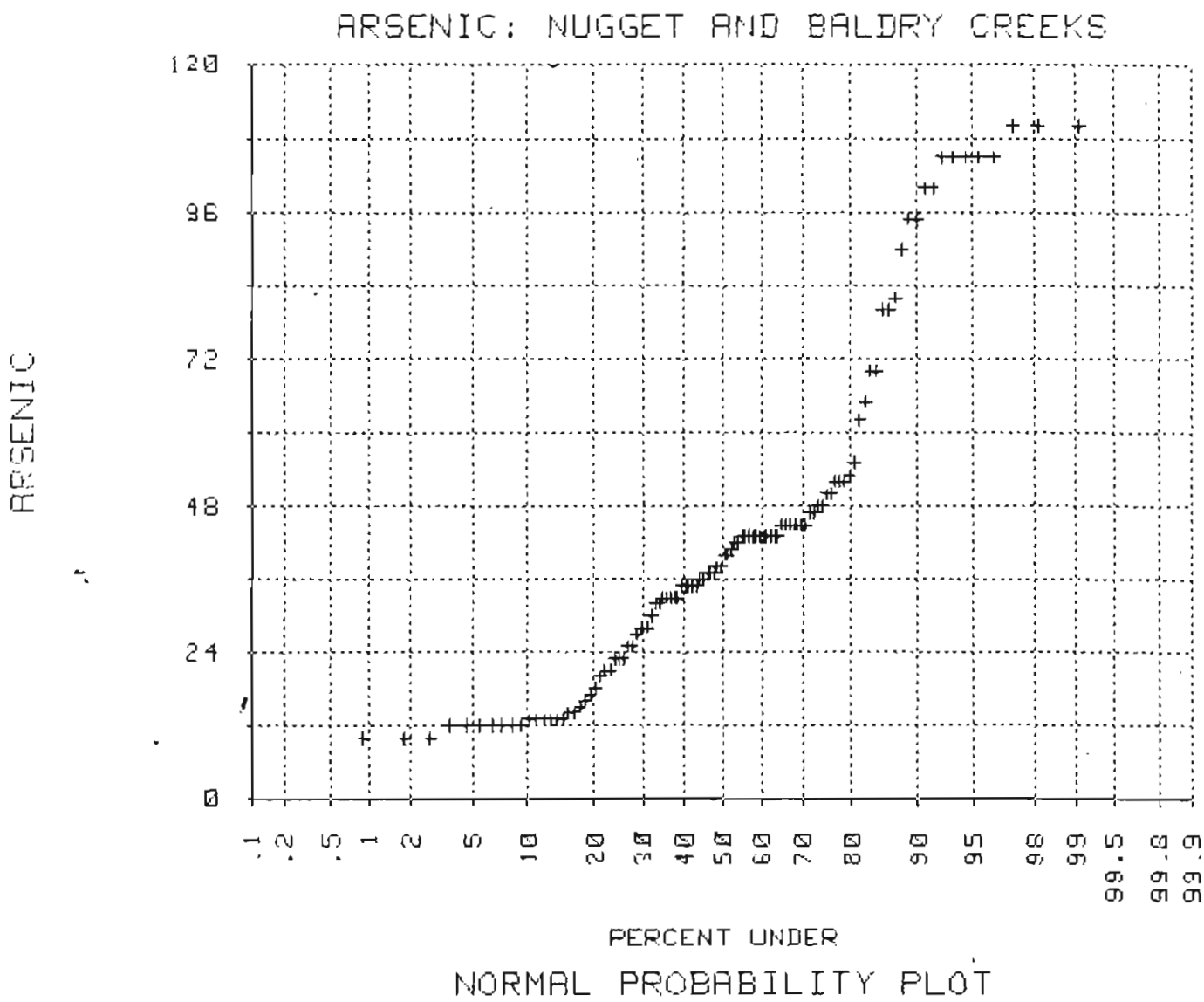
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ARSENIC	63.23808	2.62673	37.95832	48.37502

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ARSENIC	110.00000	10.00000	100.00000	60.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	10.000	22.500	25
2	22.500	35.000	17
3	35.000	47.500	37
4	47.500	60.000	9
5	60.000	72.500	4
6	72.500	85.000	3
7	85.000	97.500	3
8	97.500	110.000	10




ARSENIC: NUGGET AND BALDRY CREEKS
ARSENIC
120
96
72
48
24
0
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

ARSENIC: BALDRY CREEK

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	43.00000	38.00000	43.00000	36.00000	33.00000
6	36.00000	16.00000	23.00000	23.00000	20.00000
11	32.00000	28.00000	33.00000	35.00000	28.00000
16	25.00000	35.00000	35.00000	37.00000	45.00000
21	33.00000	33.00000	41.00000	43.00000	30.00000
26	28.00000	25.00000	23.00000	27.00000	33.00000
31	35.00000	32.00000	40.00000	43.00000	37.00000
36	40.00000	15.00000	17.00000	14.00000	13.00000
41	12.00000	12.00000	12.00000	12.00000	13.00000
46	12.00000	10.00000	14.00000	12.00000	13.00000
51	12.00000	13.00000	10.00000	10.00000	

SUMMARY STATISTICS
ON DATA SET:
ARSENIC: BALDRY CREEK

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ARSENIC	54	0	1413.00000	26.16667

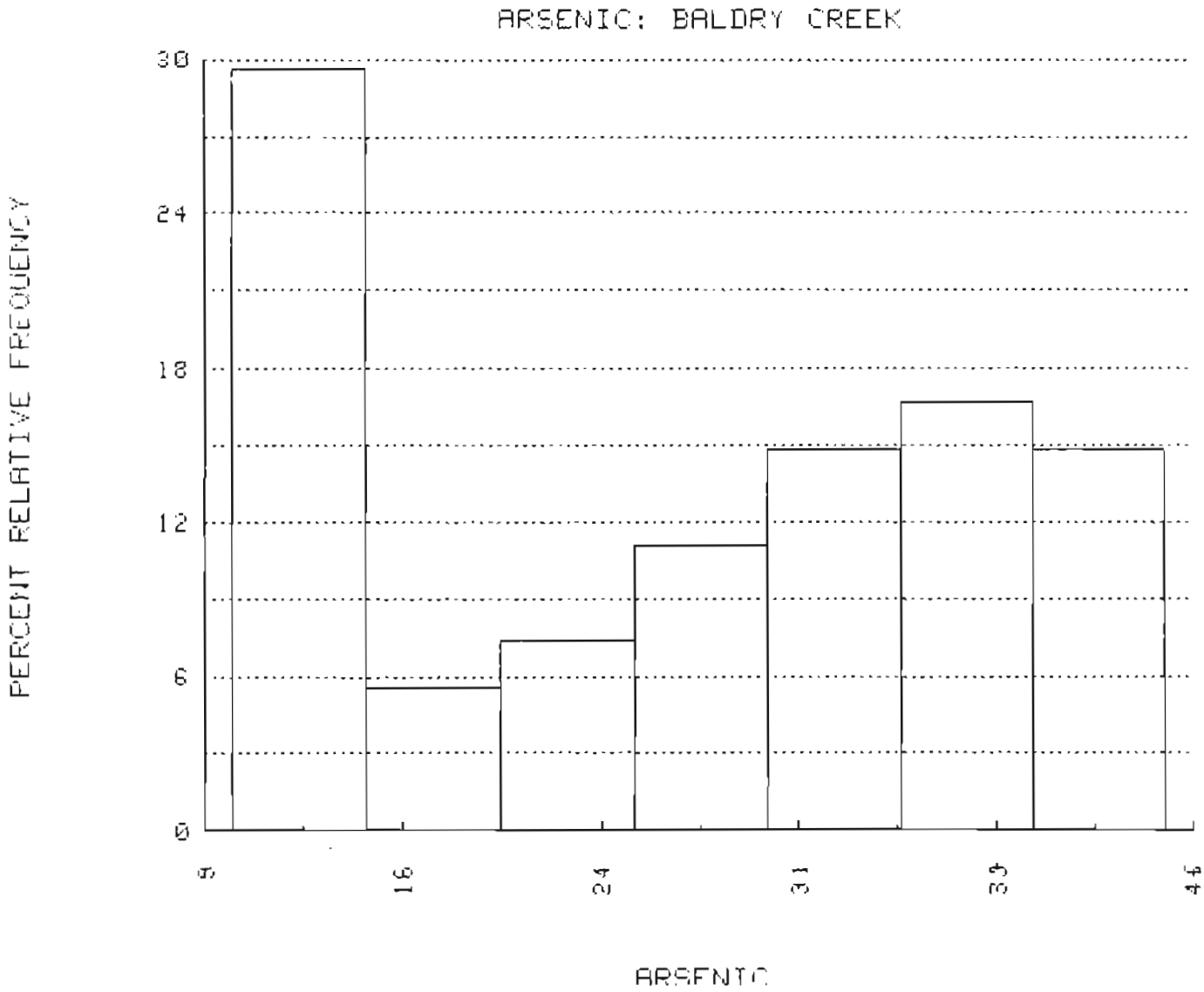
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ARSENIC	129.42453	11.37649	-.04673	-1.44118

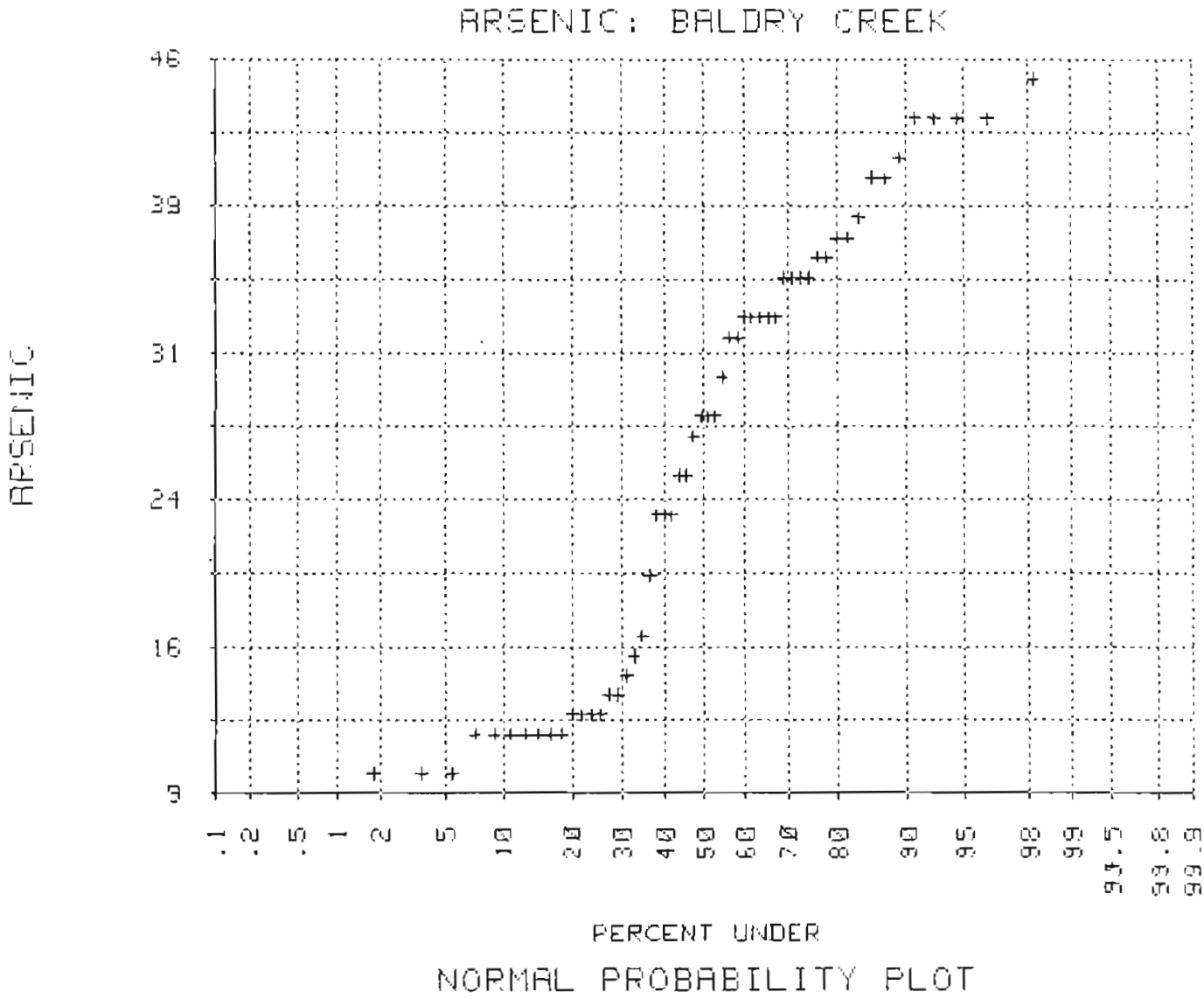
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ARSENIC	43.47703	1.54814	23.06077	29.27256

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ARSENIC	45.00000	10.00000	35.00000	27.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	10.000	15.000	16
2	15.000	20.000	3
3	20.000	25.000	4
4	25.000	30.000	6
5	30.000	35.000	8
6	35.000	40.000	9
7	40.000	45.000	8




ARSENIC: BALDRY CREEK
ARSENIC
46
38
31
24
16
9
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

ARSENIC: NUGGET CREEK

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	45.00000	43.00000	43.00000	42.00000	50.00000
6	45.00000	45.00000	37.00000	52.00000	52.00000
11	45.00000	53.00000	43.00000	35.00000	43.00000
16	45.00000	48.00000	43.00000	47.00000	47.00000
21	42.00000	48.00000	43.00000	43.00000	55.00000
26	70.00000	13.00000	13.00000	21.00000	21.00000
31	50.00000	45.00000	52.00000	62.00000	38.00000
36	18.00000	105.00000	110.00000	105.00000	105.00000
41	95.00000	95.00000	70.00000	65.00000	82.00000
46	80.00000	80.00000	90.00000	105.00000	100.00000
51	105.00000	100.00000	110.00000	110.00000	

****

SUMMARY STATISTICS

ON DATA SET:

ARSENIC: NUGGET CREEK

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BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ARSENIC	54	0	3249.00000	60.16667

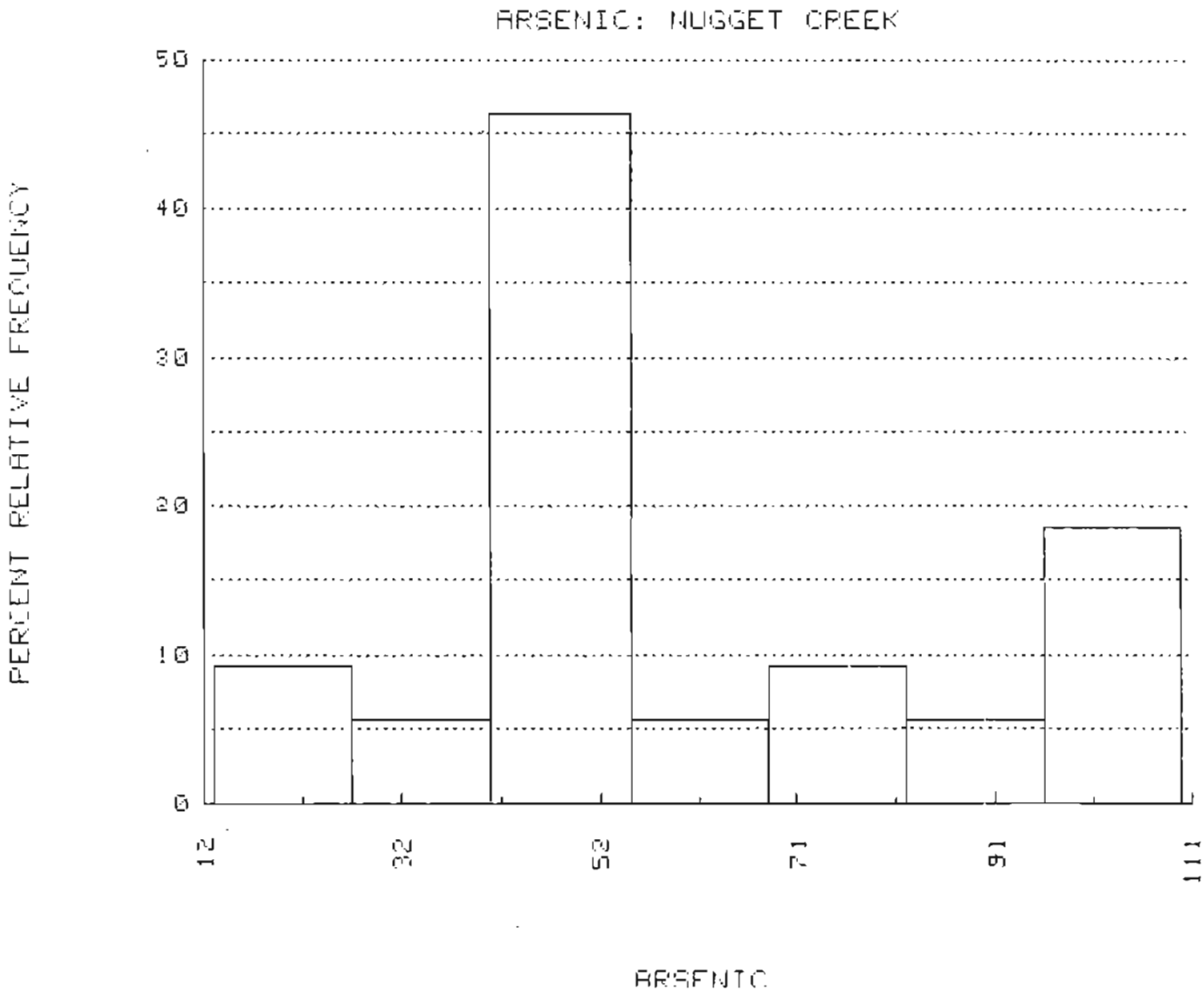
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ARSENIC	786.06604	28.03687	.48596	-.88402

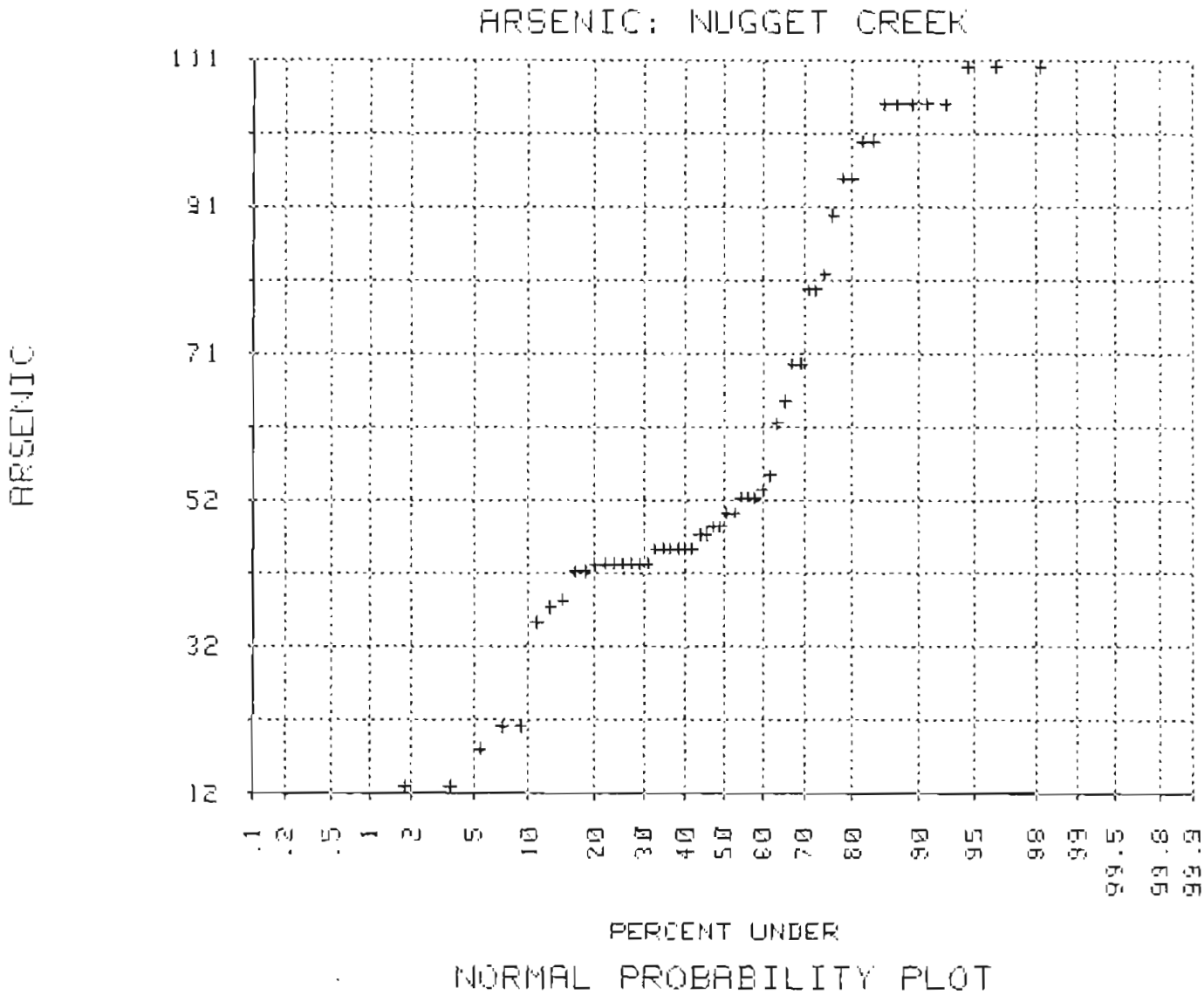
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ARSENIC	46.59867	3.81533	52.51233	67.82100

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ARSENIC	110.00000	13.00000	97.00000	61.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	13.000	26.857	5
2	26.857	40.714	3
3	40.714	54.571	25
4	54.571	68.429	3
5	68.429	82.286	5
6	82.286	96.143	3
7	96.143	110.000	10





NORMAL PROBABILITY PLOT

ARSENIC: WET SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	45.00000	43.00000	43.00000	42.00000	50.00000
6	45.00000	47.00000	47.00000	42.00000	48.00000
11	43.00000	43.00000	105.00000	110.00000	105.00000
16	105.00000	95.00000	95.00000	43.00000	38.00000
21	43.00000	36.00000	33.00000	36.00000	37.00000
26	45.00000	33.00000	33.00000	41.00000	43.00000
31	15.00000	17.00000	14.00000	13.00000	12.00000
36	12.00000				

SUMMARY STATISTICS
ON DATA SET:
ARSENIC: WET SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ARSENIC	36	0	1697.00000	47.13889

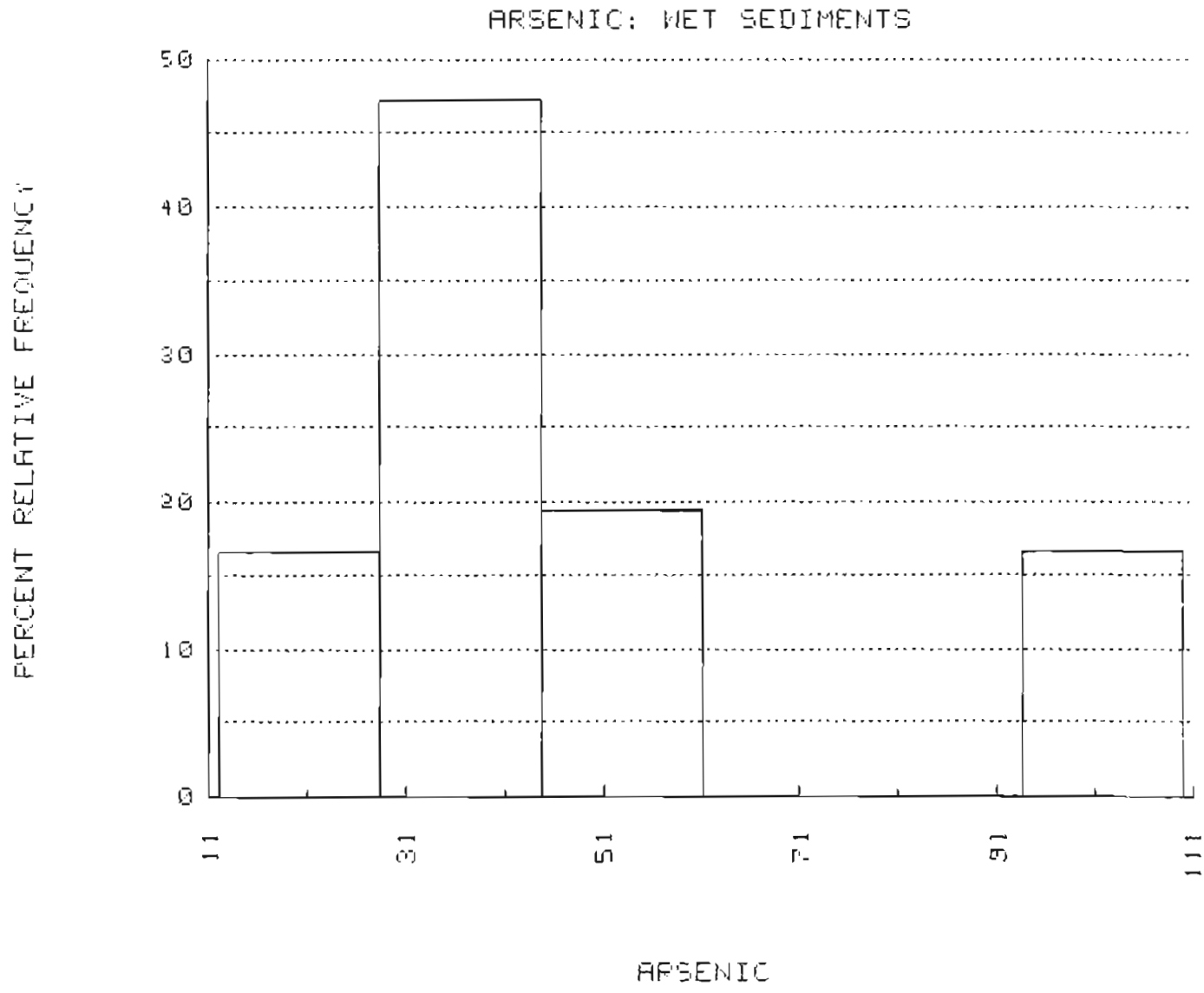
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ARSENIC	757.66587	27.52573	1.12713	.45109

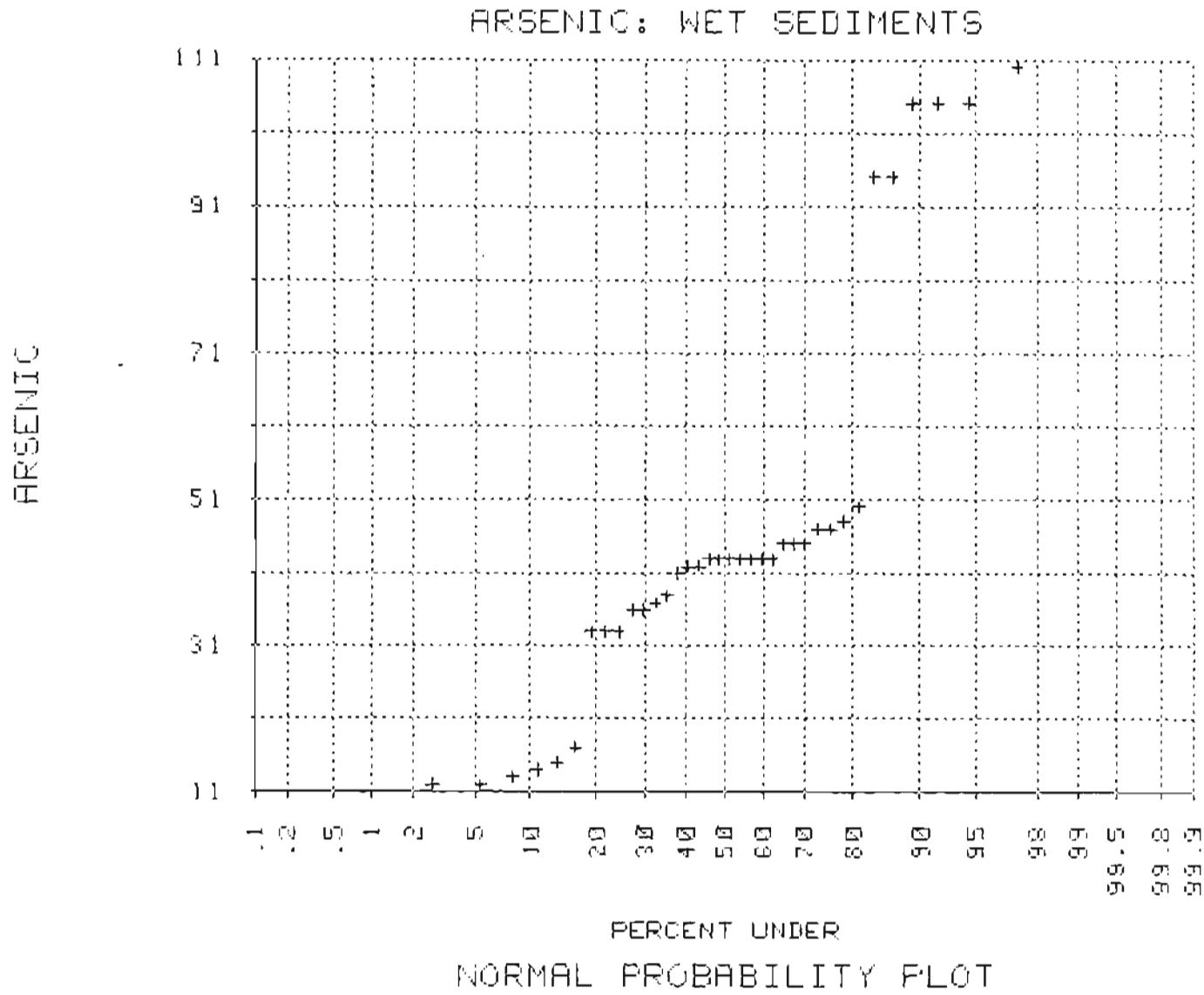
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ARSENIC	58.39283	4.58762	37.82336	56.45442

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ARSENIC	110.00000	12.00000	98.00000	61.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	12.000	28.333	6
2	28.333	44.667	17
3	44.667	61.000	7
4	61.000	77.333	0
5	77.333	93.667	0
6	93.667	110.000	6




ARSENIC: WET SEDIMENTS
ARSENIC
111
91
71
51
31
11
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

ARSENIC: DRY SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	16.00000	23.00000	23.00000	20.00000	32.00000
6	28.00000	30.00000	28.00000	25.00000	23.00000
11	27.00000	33.00000	12.00000	12.00000	13.00000
16	12.00000	10.00000	14.00000	45.00000	37.00000
21	52.00000	52.00000	45.00000	53.00000	55.00000
26	70.00000	13.00000	13.00000	21.00000	21.00000
31	70.00000	65.00000	82.00000	80.00000	80.00000
36	90.00000				

SUMMARY STATISTICS
ON DATA SET:
ARSENIC: DRY SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ARSENIC	36	0	1325.00000	36.80556

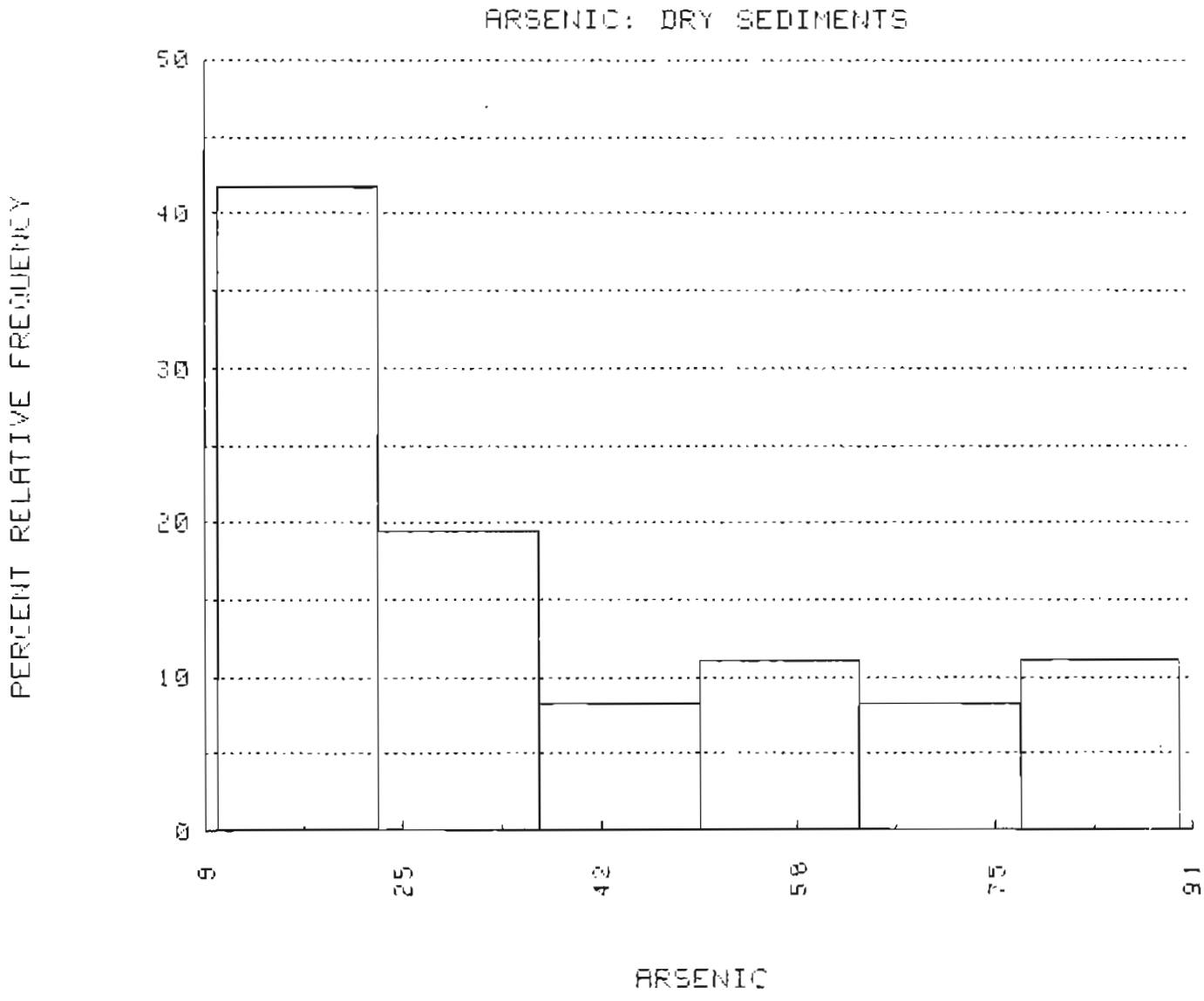
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ARSENIC	566.78968	23.80735	.78725	-.62833

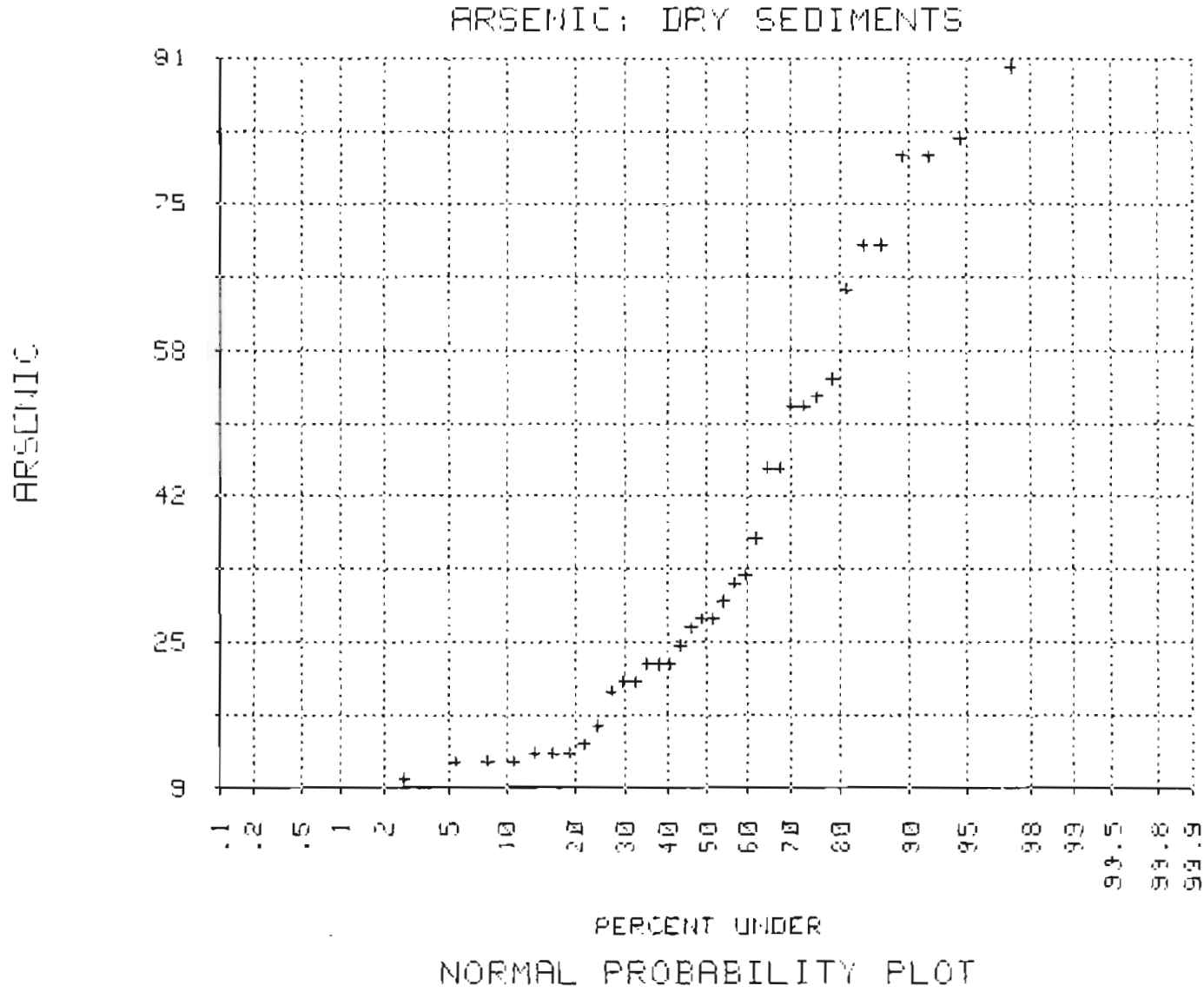
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ARSENIC	64.68411	3.96789	28.74844	44.86267

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ARSENIC	90.00000	10.00000	80.00000	50.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	10.000	23.333	15
2	23.333	36.667	7
3	36.667	50.000	3
4	50.000	63.333	4
5	63.333	76.667	3
6	76.667	90.000	4





NORMAL PROBABILITY PLOT

ARSENIC: ORGANIC SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	43.00000	35.00000	43.00000	45.00000	48.00000
6	43.00000	50.00000	45.00000	52.00000	62.00000
11	38.00000	18.00000	105.00000	100.00000	105.00000
16	100.00000	110.00000	110.00000	33.00000	35.00000
21	28.00000	25.00000	35.00000	35.00000	35.00000
26	32.00000	40.00000	43.00000	37.00000	40.00000
31	12.00000	13.00000	12.00000	13.00000	10.00000
36	10.00000				

SUMMARY STATISTICS
ON DATA SET:
ARSENIC: ORGANIC SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ARSENIC	36	0	1640.00000	45.55556

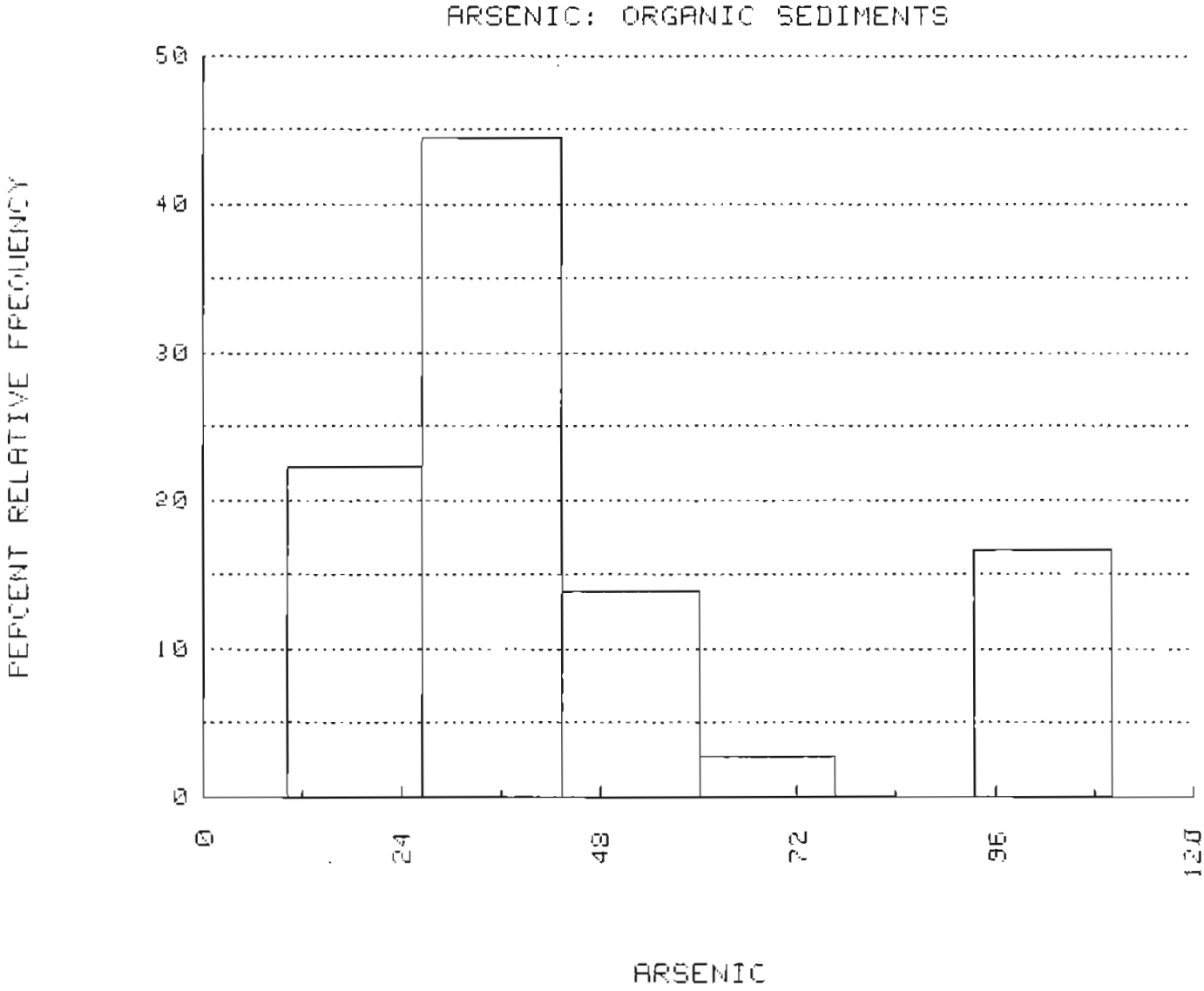
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ARSENIC	889.91111	29.83138	1.09334	.19422

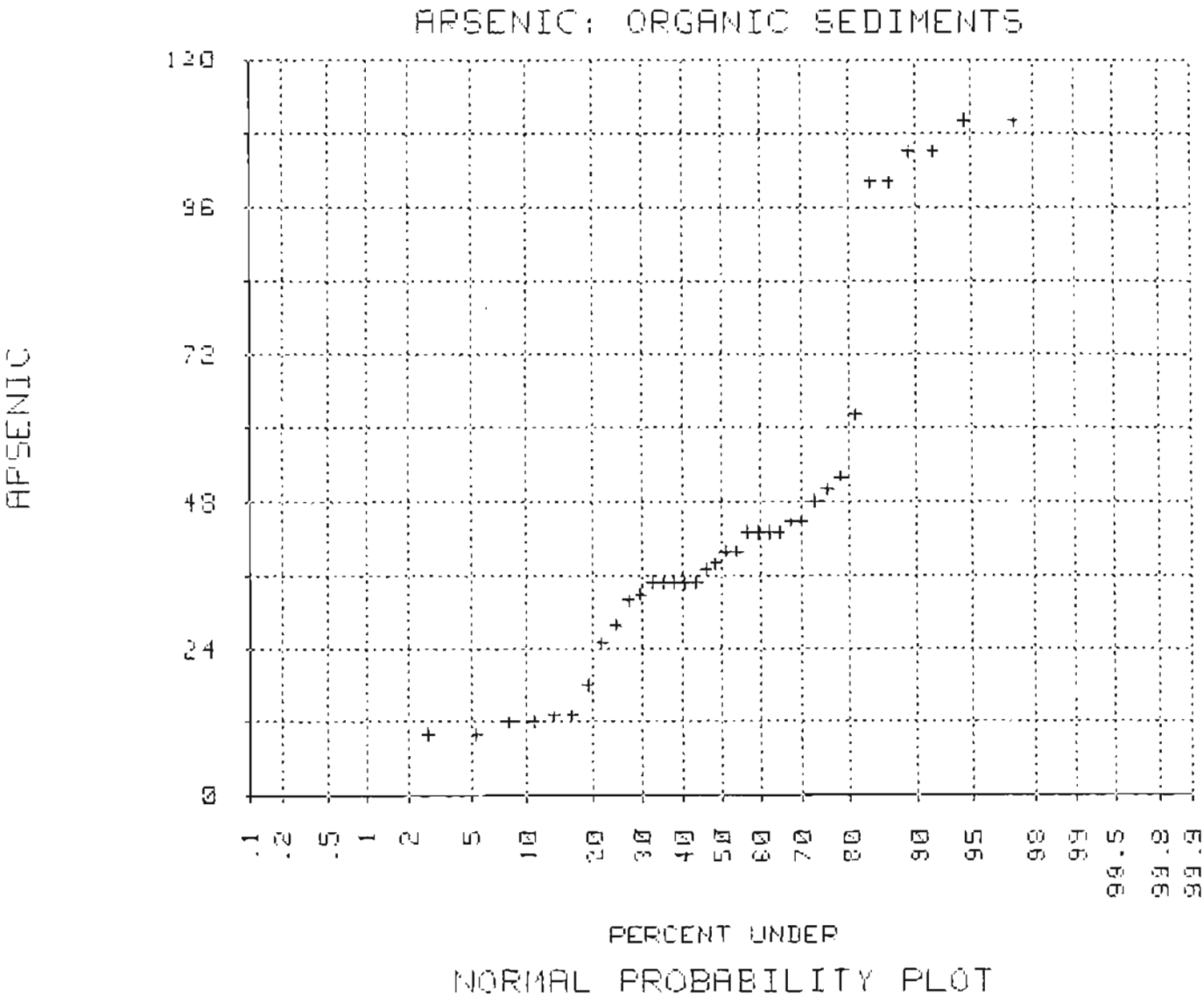
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ARSENIC	65.48351	4.97190	35.45972	55.65139

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ARSENIC	110.00000	10.00000	100.00000	60.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	10.000	26.667	8
2	26.667	43.333	16
3	43.333	60.000	5
4	60.000	76.667	1
5	76.667	93.333	0
6	93.333	110.000	6




ARSENIC: ORGANIC SEDIMENTS
ARSENIC
120
96
72
48
24
0
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS I+-
1	20.00000	19.00000	18.00000	19.00000	19.0...
5	18.00000	17.00000	18.00000	17.00000	19.00.00
11	17.00000	17.00000	18.00000	18.00000	17.00.00
16	18.00000	15.00000	18.00000	17.00000	15.00.00
21	15.00000	15.00000	15.00000	17.00000	19.00000
26	19.00000	20.00000	20.00000	18.00000	19.00000
31	17.00000	16.00000	20.00000	22.00000	20.00000
36	16.00000	23.00000	26.00000	21.00000	23.00000
41	26.00000	26.00000	16.00000	16.00000	19.00000
46	18.00000	21.00000	19.00000	30.00000	33.00000
51	26.00000	27.00000	24.00000	25.00000	17.00.00
56	17.00000	17.00000	17.00000	17.00000	18.00000
61	13.00000	14.00000	16.00000	16.00000	18.00000
66	18.00000	16.00000	19.00000	18.00000	16.00000
71	17.00000	16.00000	16.00000	17.00000	15.00000
76	17.00000	17.00000	18.00000	17.00000	18.00000
81	14.00000	15.00000	15.00000	16.00000	18.00000
86	19.00000	18.00000	17.00000	17.00000	16.00000
91	17.00000	17.00000	16.00000	16.00000	14.00000
96	13.00000	14.00000	14.00000	15.00000	15.00000
101	13.00000	13.00000	14.00000	15.00000	14.00000
106	15.00000	12.00000	13.00000		

SUMMARY STATISTICS
ON DATA SET:
COPPER: NUGGET AND BALDY CREEKS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
COPPER	108	0	1921.00000	17.78704

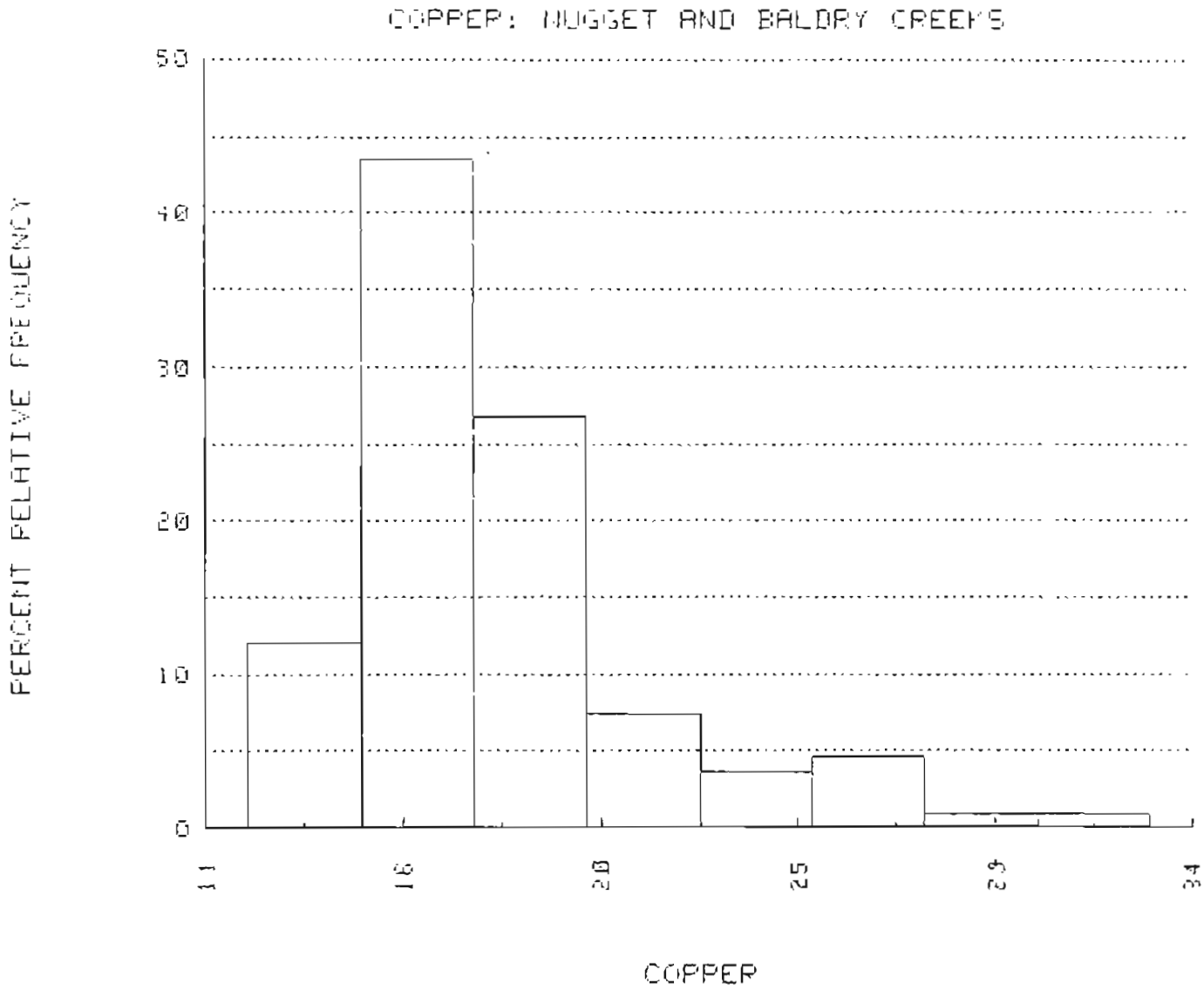
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
COPPER	12.65516	3.55741	1.66498	3.69153

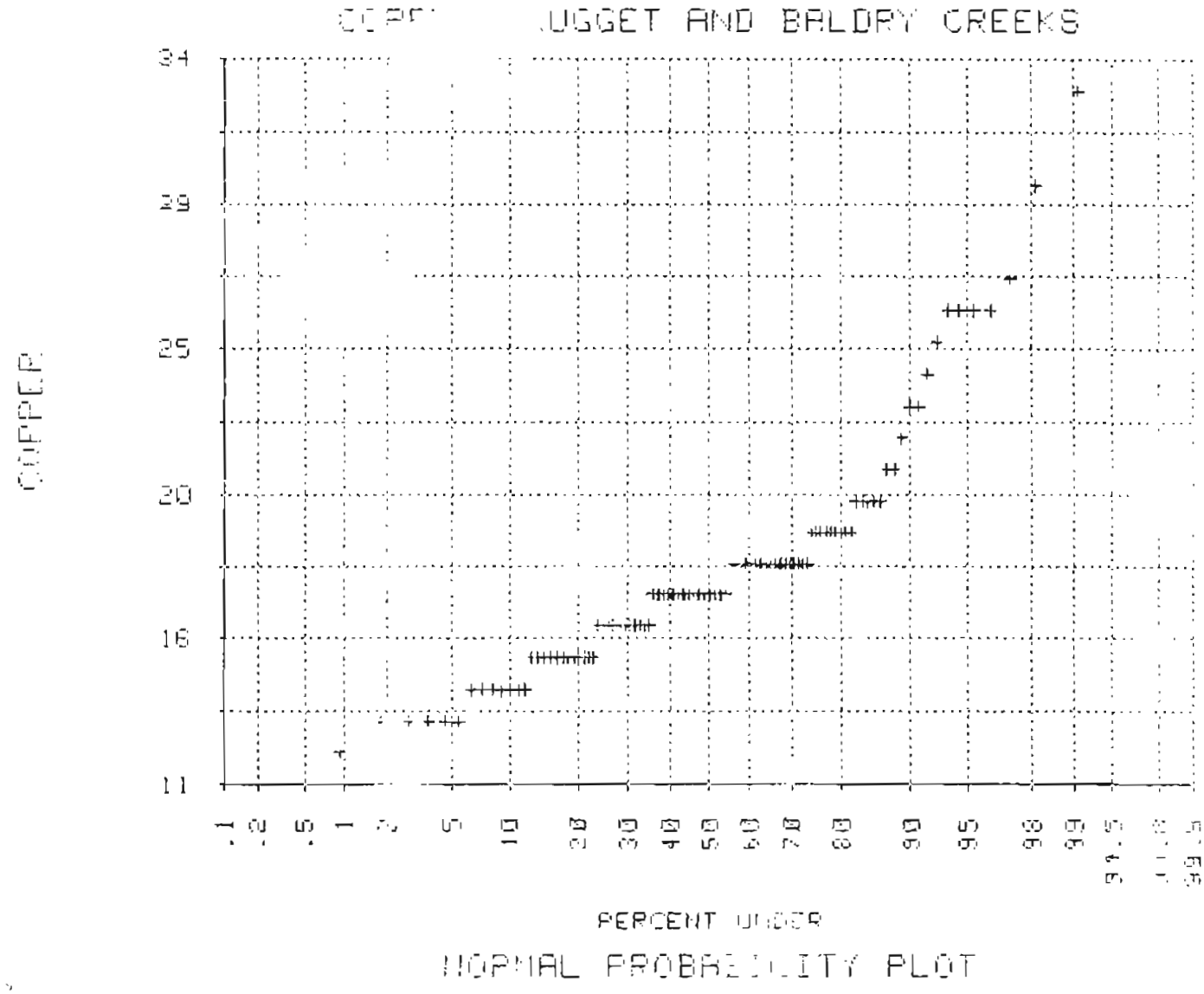
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
COPPER	20.02001	.34231	17.10829	18.46578

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
COPPER	33.00000	12.00000	21.00000	22.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	13.000	14.625	13
2	14.625	17.250	47
3	17.250	19.875	29
4	19.875	22.500	8
5	22.500	25.125	4
6	25.125	27.750	5
7	27.750	30.375	1
8	30.375	33.000	1





COPPER JUGGET AND BALDRY CREEKS

NORMAL PROBABILITY PLOT

COPPER: BALDRY CREEK

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	17.00000	17.00000	17.00000	17.00000	17.00000
6	18.00000	13.00000	14.00000	16.00000	16.00000
11	18.00000	18.00000	16.00000	19.00000	18.00000
16	18.00000	17.00000	16.00000	16.00000	17.00000
21	15.00000	17.00000	17.00000	18.00000	17.00000
26	18.00000	14.00000	15.00000	15.00000	16.00000
31	18.00000	19.00000	18.00000	17.00000	17.00000
36	16.00000	17.00000	17.00000	16.00000	16.00000
41	14.00000	13.00000	14.00000	14.00000	15.00000
46	15.00000	13.00000	13.00000	14.00000	15.00000
51	14.00000	15.00000	12.00000	13.00000	

SUMMARY STATISTICS
ON DATA SET:
COPPER: BALDRY CREEK

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
COPPER	54	0	862.00000	15.96296

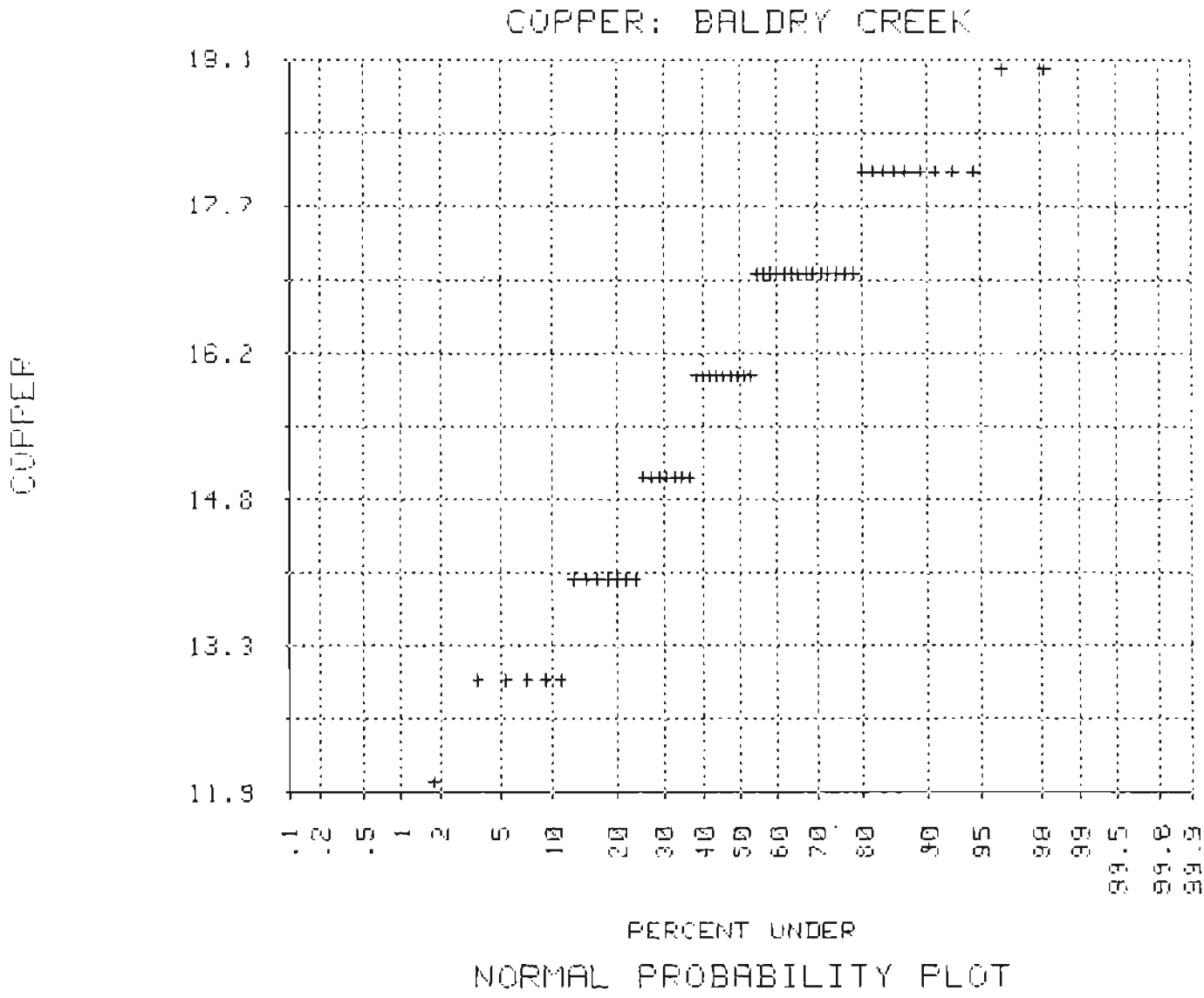
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
COPPER	3.09294	1.75868	-.36337	-.82311

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
COPPER	11.01723	.23933	15.48283	16.44310

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
COPPER	19.00000	12.00000	7.00000	15.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	12.000	13.000	1
2	13.000	14.000	5
3	14.000	15.000	7
4	15.000	16.000	7
5	16.000	17.000	9
6	17.000	18.000	14
7	18.000	19.000	11


COPPER: BALDRY CREEK
COPPER
18.1
17.7
16.2
14.8
13.3
11.9
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

COPPER: NUGGET CREEK

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	20.00000	19.00000	18.00000	19.00000	19.00000
6	18.00000	17.00000	18.00000	17.00000	18.00000
11	17.00000	17.00000	18.00000	18.00000	17.00000
16	18.00000	15.00000	18.00000	17.00000	15.00000
21	15.00000	15.00000	15.00000	17.00000	19.00000
26	19.00000	20.00000	20.00000	18.00000	18.00000
31	17.00000	16.00000	20.00000	22.00000	20.00000
36	16.00000	23.00000	26.00000	21.00000	23.00000
41	26.00000	26.00000	16.00000	16.00000	19.00000
46	18.00000	21.00000	19.00000	30.00000	33.00000
51	26.00000	27.00000	24.00000	25.00000	

****
SUMMARY STATISTICS
ON DATA SET:
COPPER: NUGGET CREEK
****

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
COPPER	54	0	1059.00000	19.61111

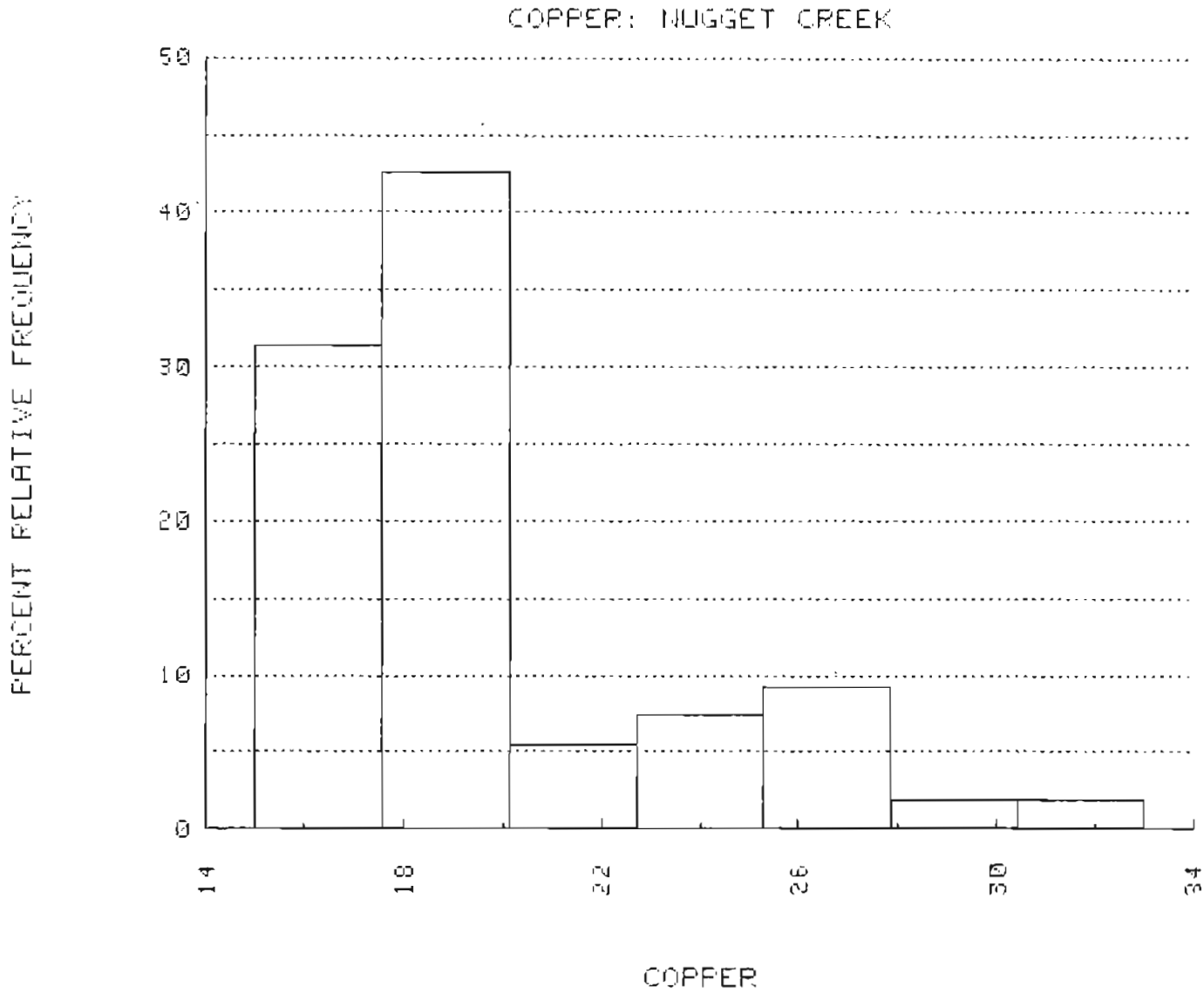
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
COPPER	15.67610	3.95931	1.36164	1.56344

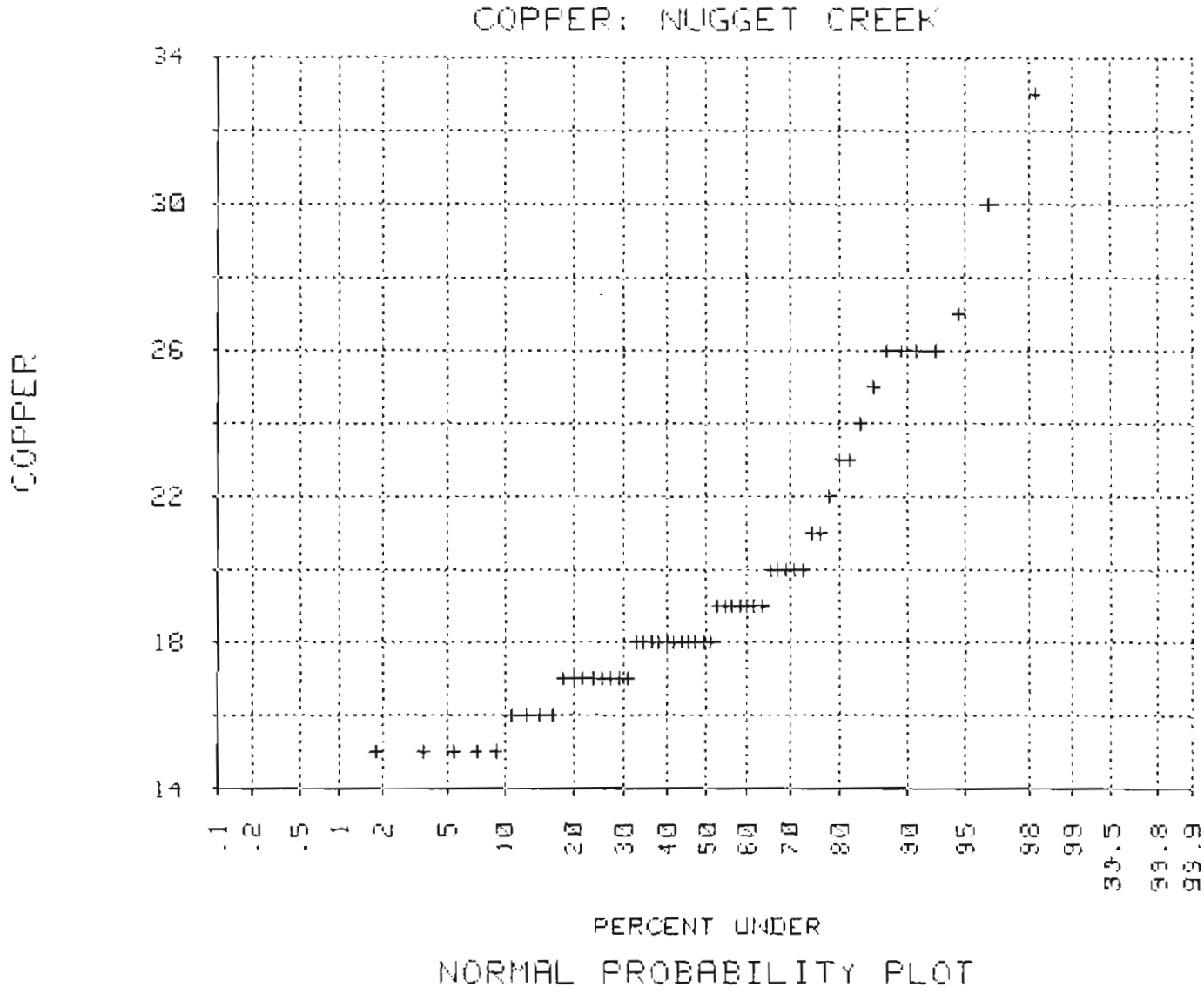
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
COPPER	20.18909	.53879	18.53018	20.69204

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
COPPER	33.00000	15.00000	18.00000	24.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	15.000	17.571	17
2	17.571	20.143	23
3	20.143	22.714	3
4	22.714	25.286	4
5	25.286	27.857	5
6	27.857	30.429	1
7	30.429	33.000	1




COPPER: NUGGET CREEK
COPPER
34
30
26
22
18
14
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

COPPER: WET SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	17.00000	17.00000	17.00000	17.00000	17.00000
6	18.00000	16.00000	17.00000	15.00000	17.00000
11	17.00000	16.00000	17.00000	17.00000	16.00000
16	16.00000	14.00000	13.00000	20.00000	19.00000
21	18.00000	19.00000	19.00000	18.00000	17.00000
26	15.00000	15.00000	15.00000	15.00000	17.00000
31	23.00000	26.00000	21.00000	23.00000	26.00000
36	26.00000				

SUMMARY STATISTICS
ON DATA SET:
COPPER: WET SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
COPPER	36	0	648.00000	18.00000

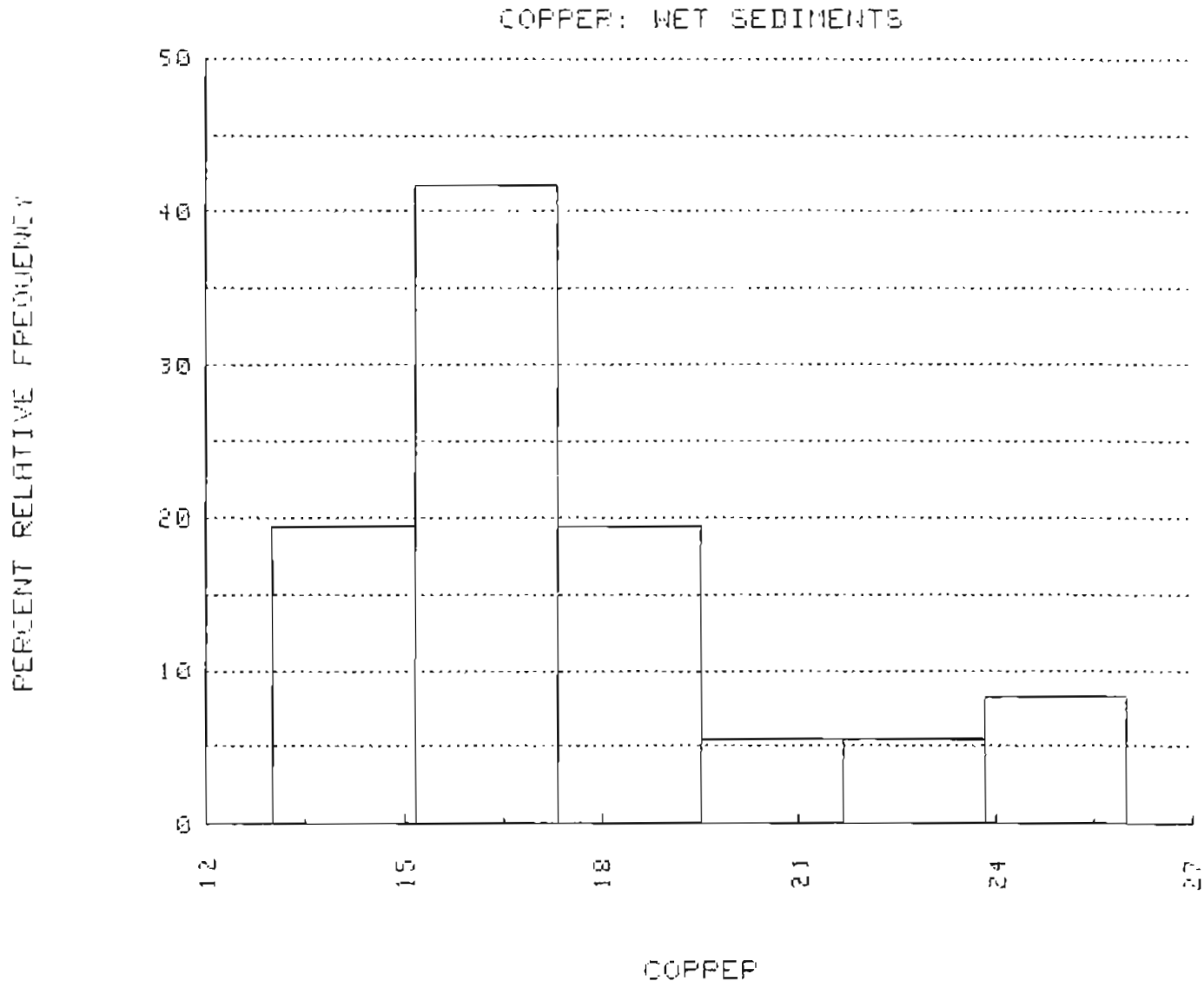
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
COPPER	10.51429	3.24257	1.24429	.98322

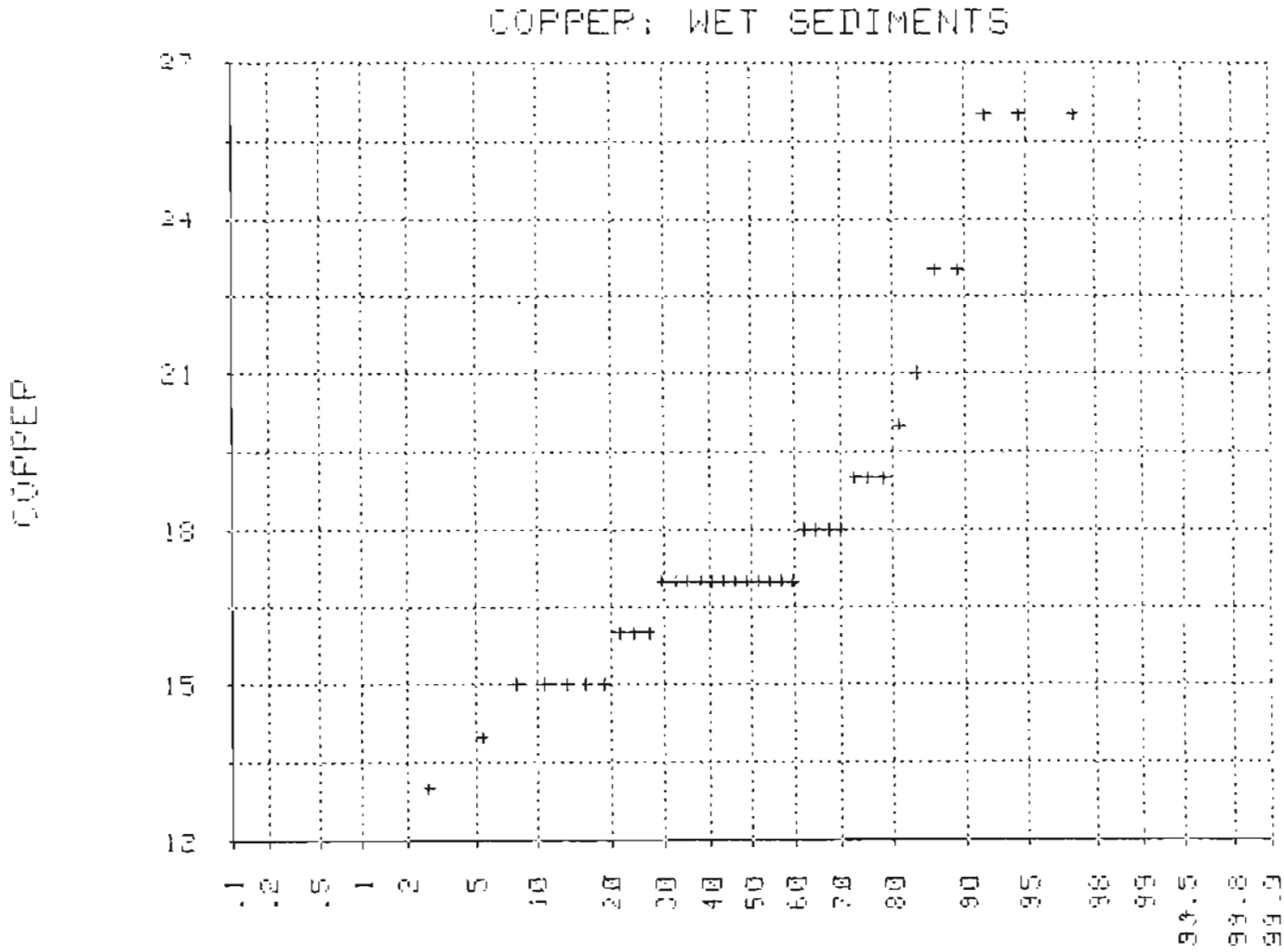
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
COPPER	18.01430	.54043	16.90262	19.09738

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
COPPER	26.00000	13.00000	13.00000	19.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	13.000	15.167	7
2	15.167	17.333	15
3	17.333	19.500	7
4	19.500	21.667	2
5	21.667	23.833	2
6	23.833	26.000	2




COPPER: WET SEDIMENTS
COPPER
24
21
18
15
12
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

COPPER: DRY SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	17.00000	18.00000	17.00000	18.00000	17.00000
6	17.00000	19.00000	19.00000	20.00000	20.00000
11	18.00000	18.00000	16.00000	15.00000	19.00000
16	18.00000	21.00000	19.00000	13.00000	14.00000
21	16.00000	16.00000	18.00000	18.00000	17.00000
26	18.00000	14.00000	15.00000	15.00000	16.00000
31	14.00000	14.00000	15.00000	15.00000	13.00000
36	13.00000				

SUMMARY STATISTICS
ON DATA SET:
COPPER: DRY SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
COPPER	36	0	601.00000	16.69444

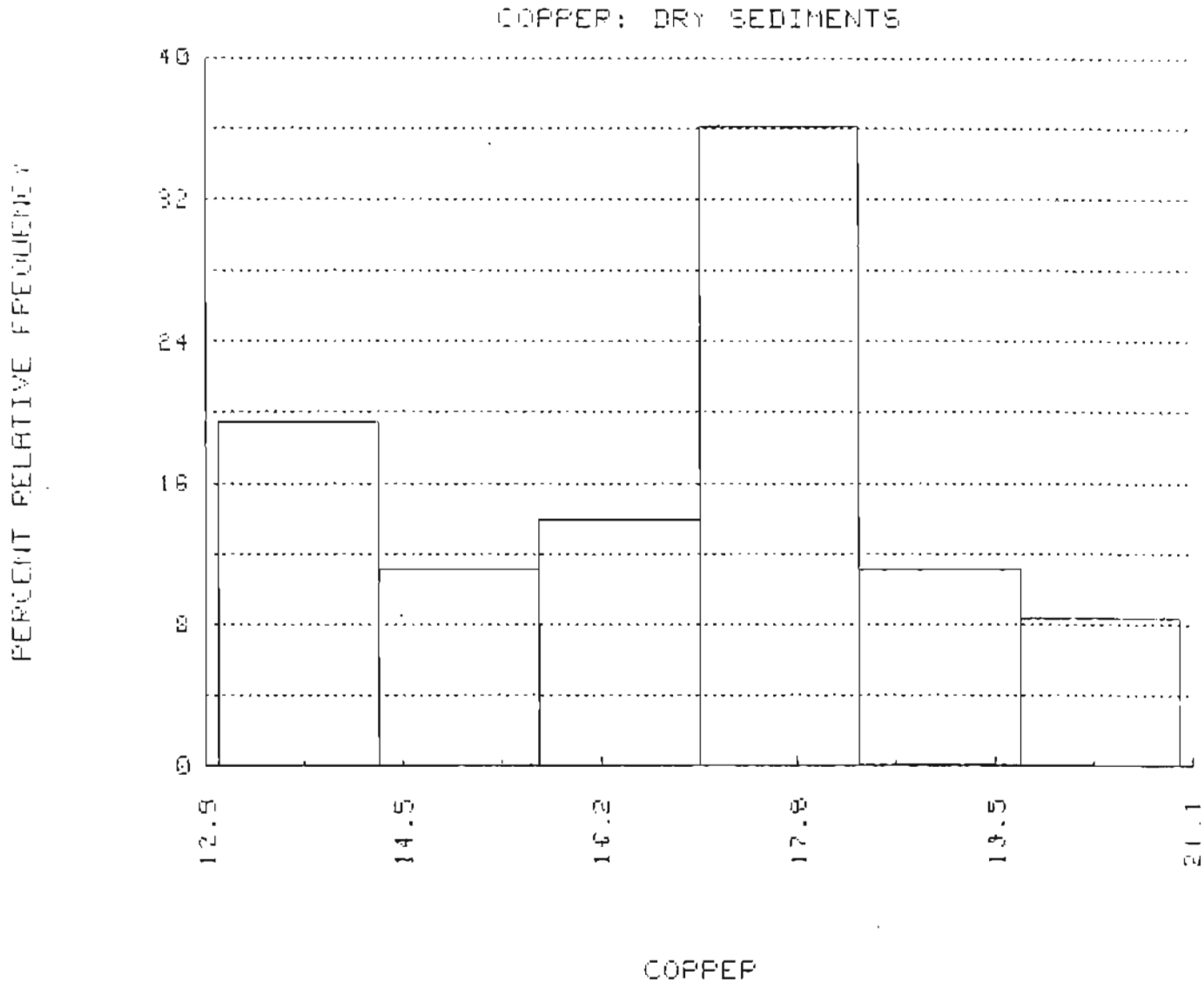
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
COPPER	4.56111	2.13568	-.09411	-.84916

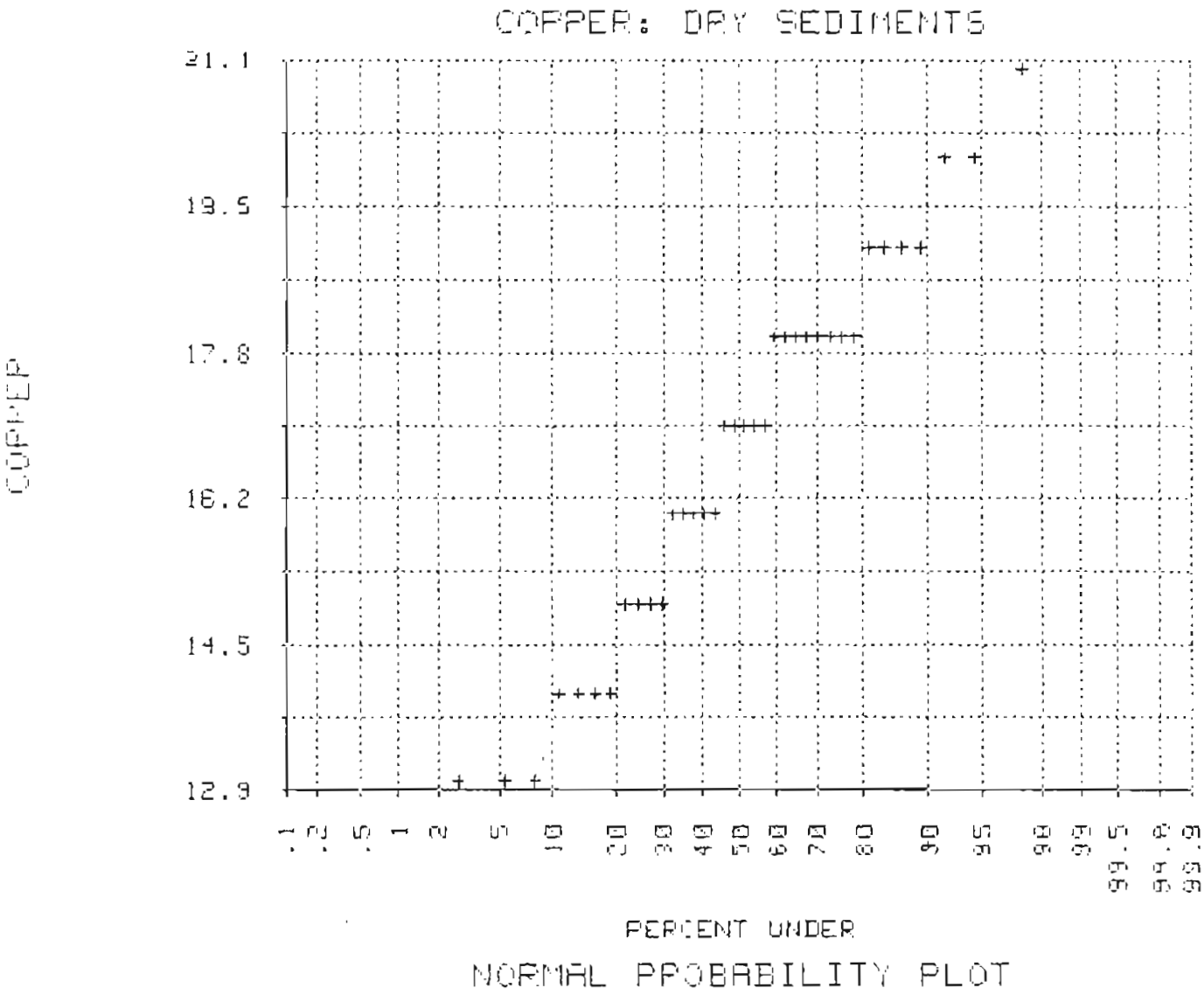
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
COPPER	12.79273	.35595	15.97167	17.41722

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
COPPER	21.00000	13.00000	8.00000	17.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	13.000	14.333	7
2	14.333	15.667	4
3	15.667	17.000	5
4	17.000	18.333	13
5	18.333	19.667	4
6	19.667	21.000	3




COPPER: DRY SEDIMENTS
21.1
18.5
17.8
16.2
14.5
12.9
COPPEP
.1 .2 .5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.5 99.8 99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

COPPER: ORGANIC SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	18.00000	18.00000	17.00000	18.00000	15.00000
6	18.00000	17.00000	16.00000	20.00000	22.00000
11	20.00000	16.00000	30.00000	33.00000	26.00000
16	27.00000	24.00000	25.00000	16.00000	19.00000
21	18.00000	18.00000	17.00000	16.00000	18.00000
26	19.00000	18.00000	17.00000	17.00000	16.00000
31	14.00000	15.00000	14.00000	15.00000	12.00000
36	13.00000				

SUMMARY STATISTICS
ON DATA SET:
COPPER: ORGANIC SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
COPPER	36	0	672.00000	18.66667

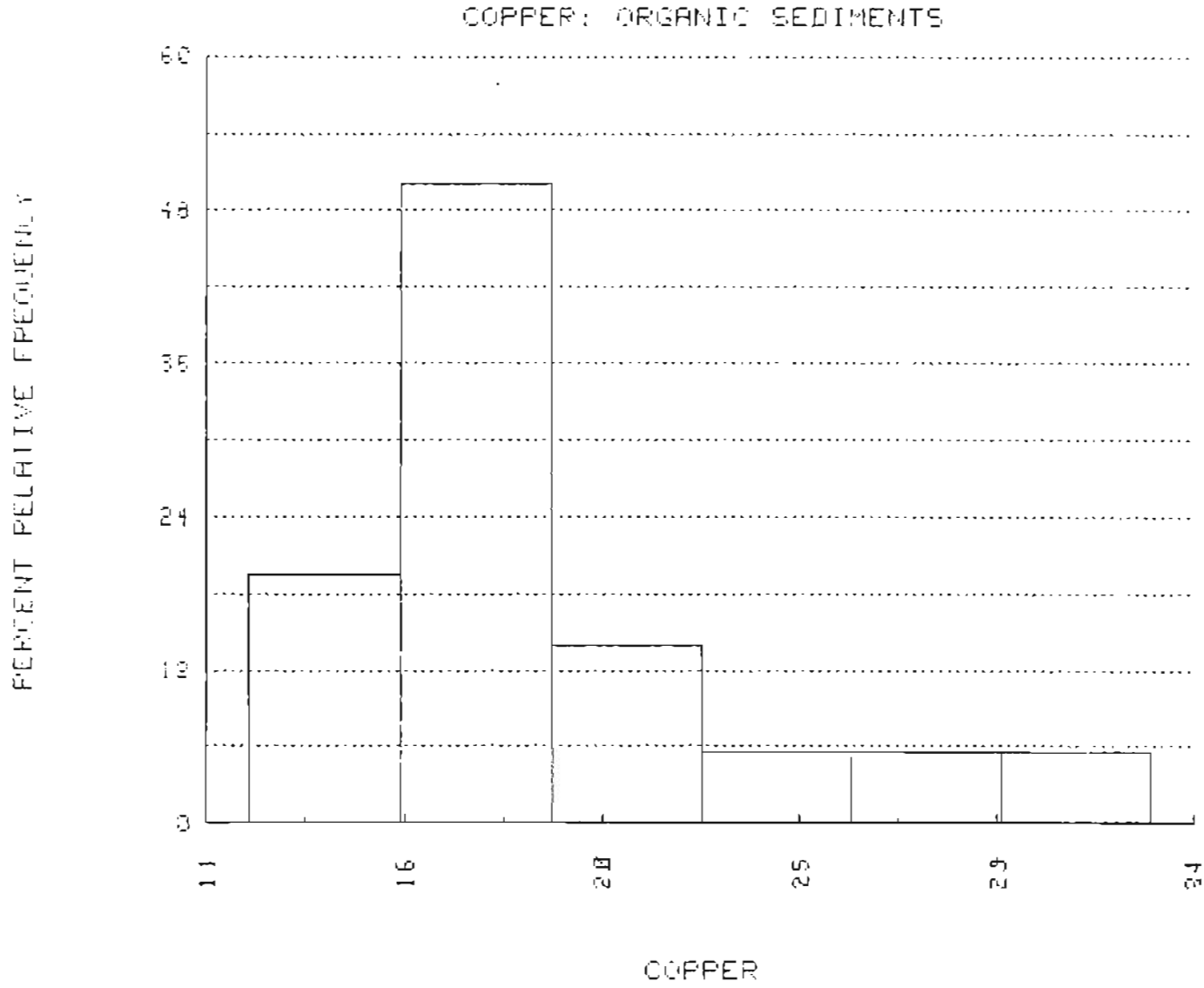
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
COPPER	21.54286	4.64143	1.41170	1.67056

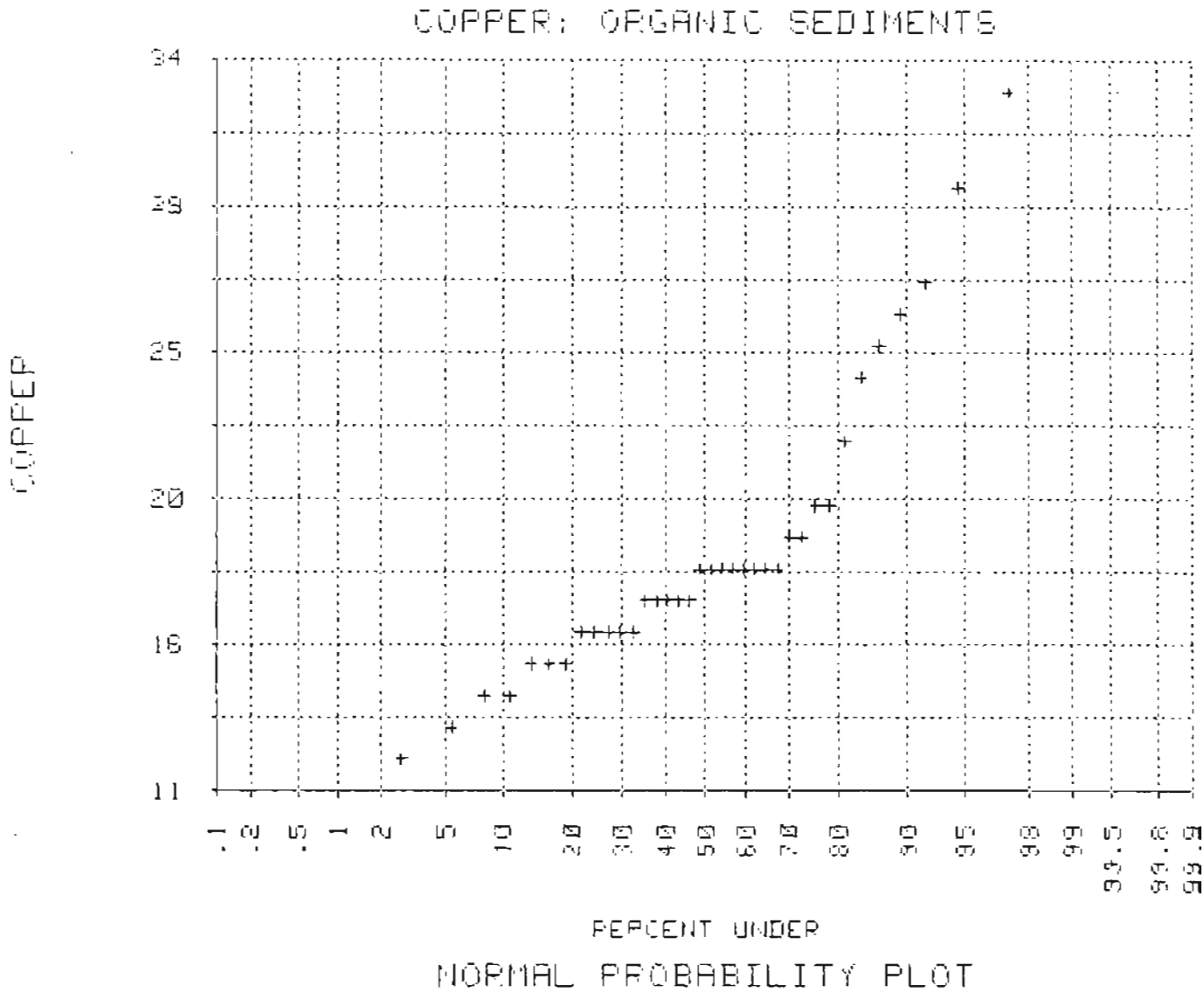
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
COPPER	24.86479	.77357	17.09587	20.23746

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
COPPER	33.00000	12.00000	21.00000	22.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	12.000	15.500	7
2	15.500	19.000	18
3	19.000	22.500	5
4	22.500	26.000	2
5	26.000	29.500	2
6	29.500	33.000	2




COPPER: ORGANIC SEDIMENTS
COPPER
34
29
25
20
16
11
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	10.00000	9.00000	8.00000	10.00000	9.00000
6	9.00000	10.00000	9.00000	9.00000	9.00000
11	7.00000	8.00000	8.00000	9.00000	9.00000
16	8.00000	7.00000	9.00000	8.00000	8.00000
21	7.00000	9.00000	8.00000	8.00000	9.00000
26	10.00000	8.00000	7.00000	8.00000	8.00000
31	9.00000	8.00000	9.00000	9.00000	9.00000
36	8.00000	11.00000	11.00000	9.00000	9.00000
41	10.00000	10.00000	9.00000	9.00000	9.00000
46	9.00000	10.00000	10.00000	10.00000	11.00000
51	11.00000	10.00000	12.00000	10.00000	11.00000
56	12.00000	12.00000	10.00000	10.00000	10.00000
61	10.00000	10.00000	11.00000	11.00000	10.00000
66	10.00000	10.00000	12.00000	11.00000	9.00000
71	10.00000	10.00000	8.00000	11.00000	8.00000
76	10.00000	10.00000	10.00000	8.00000	8.00000
81	9.00000	9.00000	8.00000	8.00000	10.00000
86	10.00000	8.00000	9.00000	9.00000	10.00000
91	7.00000	8.00000	7.00000	6.00000	6.00000
96	7.00000	7.00000	7.00000	7.00000	6.00000
101	7.00000	6.00000	6.00000	6.00000	5.00000
106	7.00000	6.00000	6.00000		

SUMMARY STATISTICS
ON DATA SET:
LEAD

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
LEAD	103	0	955.00000	8.84259

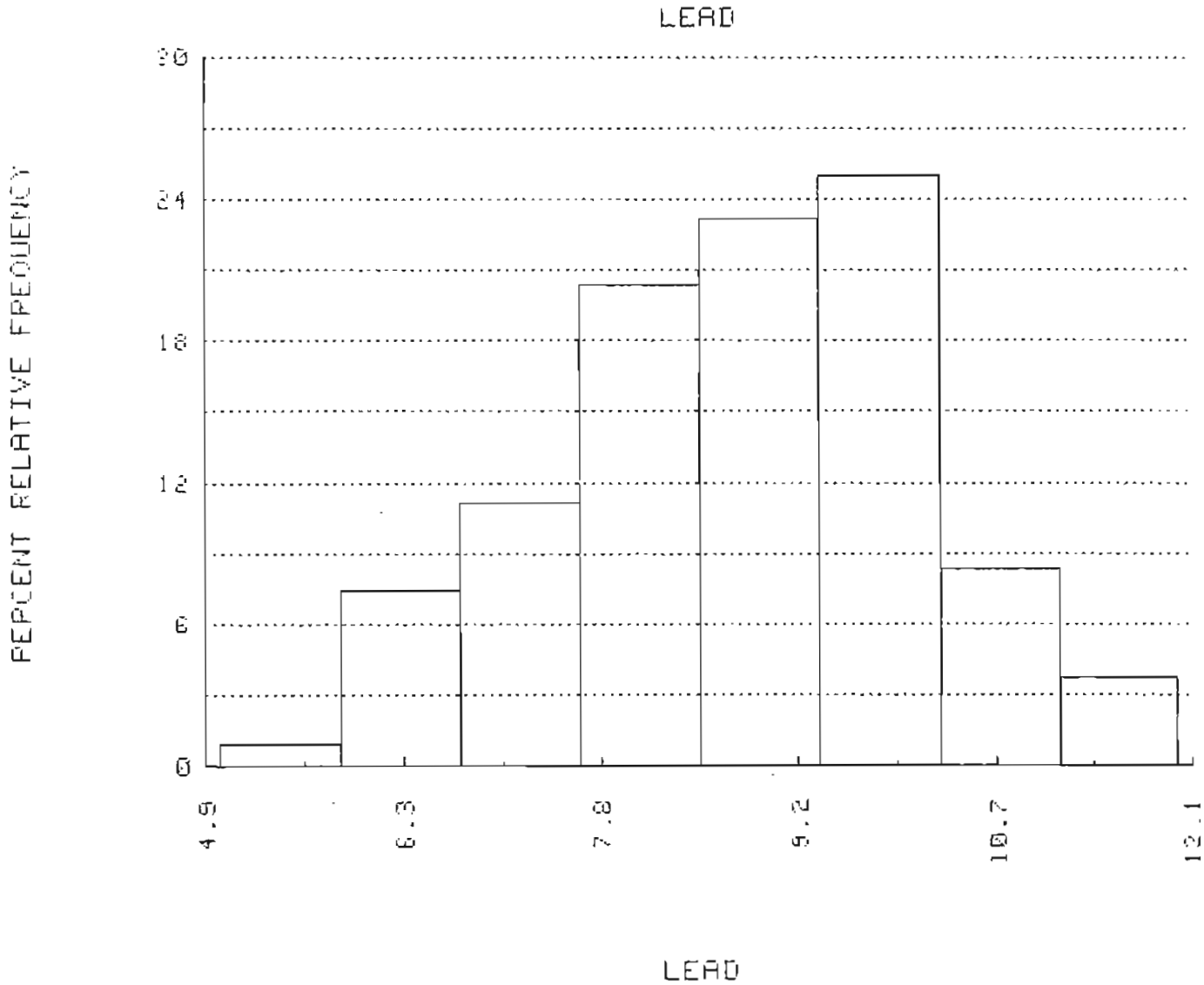
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
LEAD	2.37686	1.54171	-.18859	-.44405

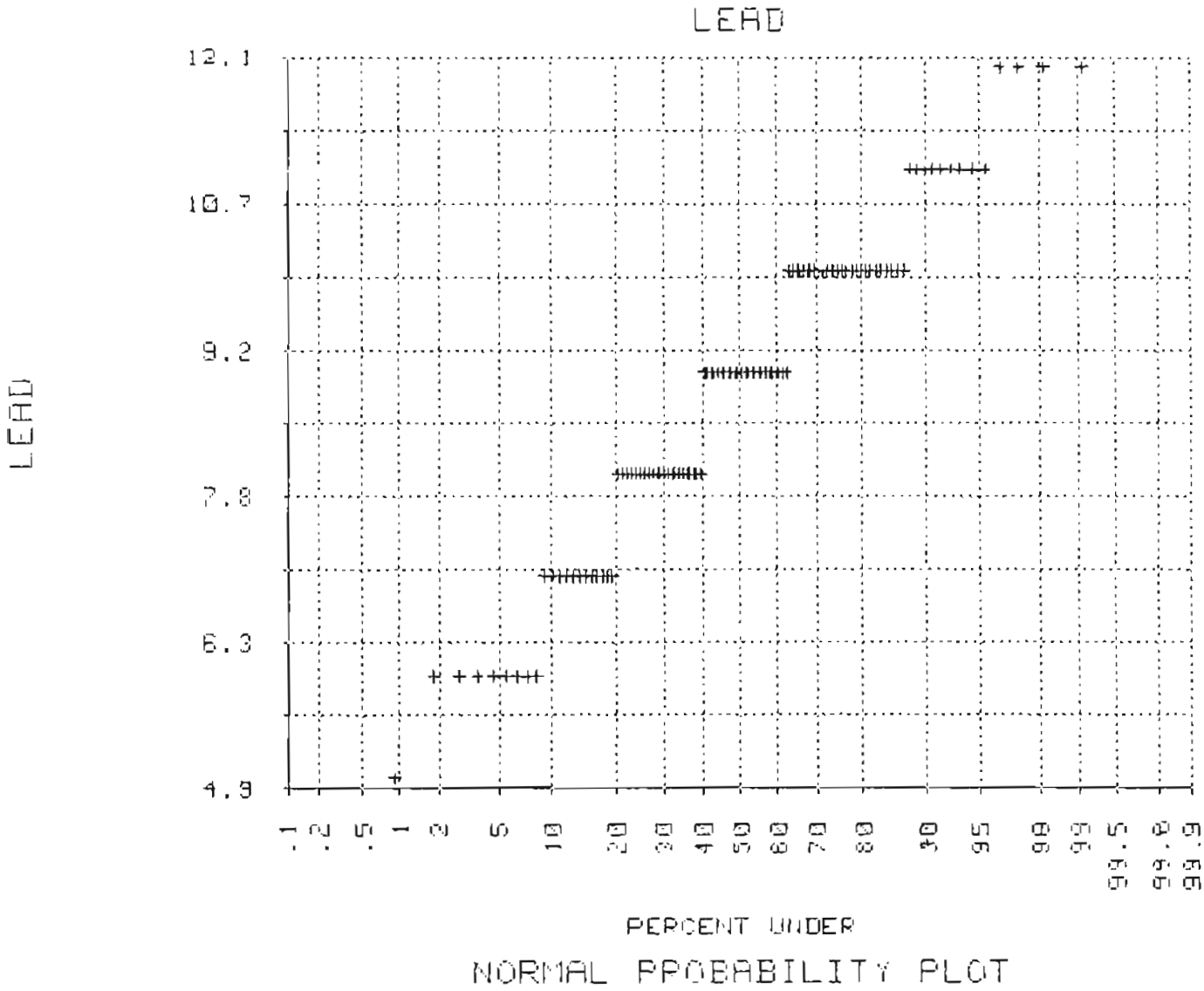
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
LEAD	17.43501	.14835	8.54844	9.13675

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
LEAD	12.00000	5.00000	7.00000	8.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	5.000	5.875	1
2	5.875	6.750	8
3	6.750	7.625	12
4	7.625	8.500	22
5	8.500	9.375	25
6	9.375	10.250	27
7	10.250	11.125	9
8	11.125	12.000	4




LEAD
12.1
10.7
9.2
7.8
6.3
4.9
LEAD
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

LEAD: BALDRY CREEK

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	11.00000	12.00000	12.00000	10.00000	10.00000
6	10.00000	10.00000	10.00000	11.00000	11.00000
11	10.00000	10.00000	10.00000	12.00000	11.00000
16	9.00000	10.00000	10.00000	8.00000	11.00000
21	8.00000	10.00000	10.00000	10.00000	9.00000
26	8.00000	9.00000	9.00000	8.00000	8.00000
31	10.00000	10.00000	8.00000	9.00000	9.00000
36	10.00000	7.00000	8.00000	7.00000	8.00000
41	6.00000	7.00000	7.00000	7.00000	7.00000
46	6.00000	7.00000	6.00000	6.00000	6.00000
51	5.00000	7.00000	6.00000	6.00000	

SUMMARY STATISTICS
ON DATA SET:
LEAD: BALDRY CREEK

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
LEAD	54	0	471.00000	8.72222

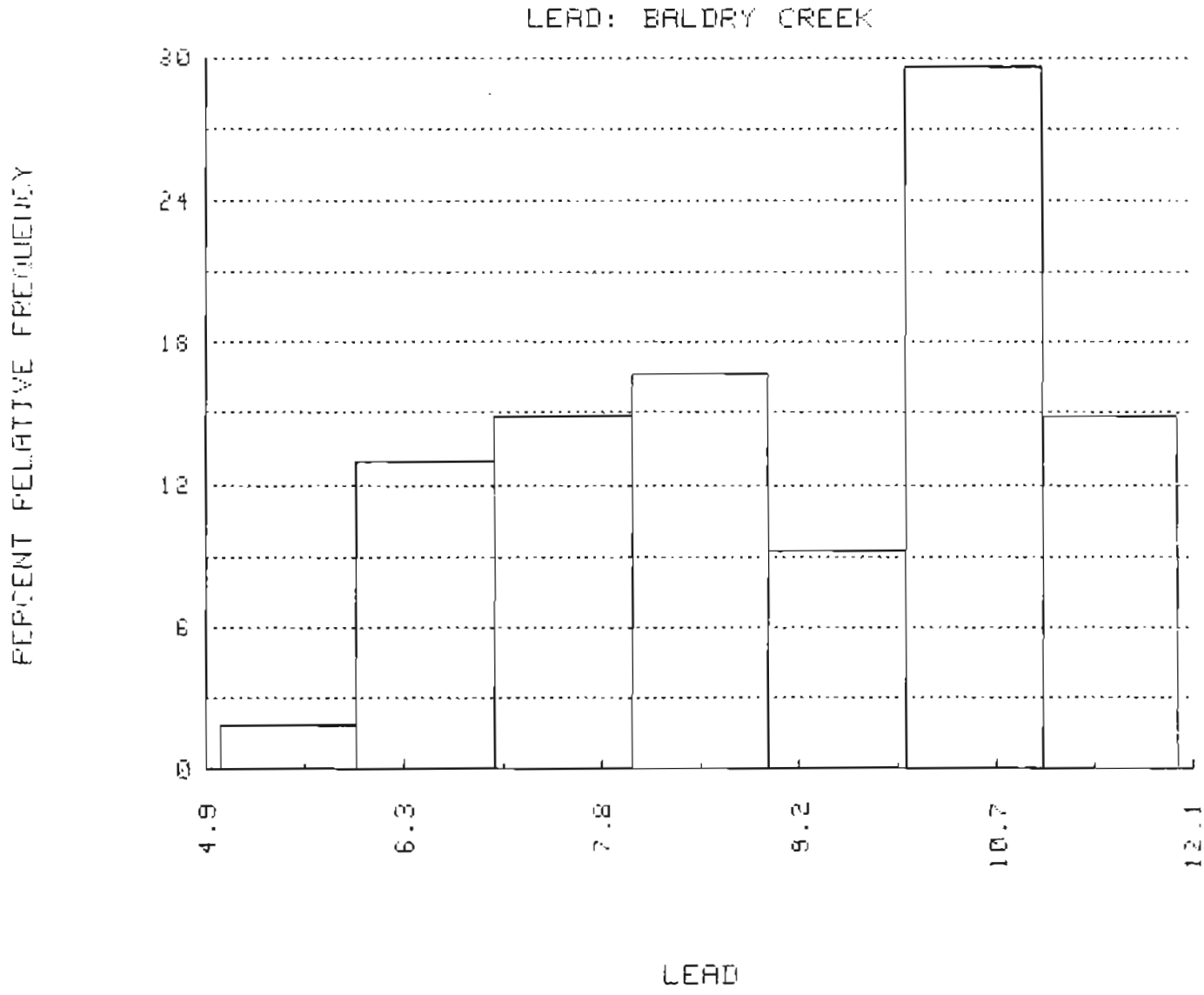
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
LEAD	3.37421	1.83690	-.11927	-1.01982

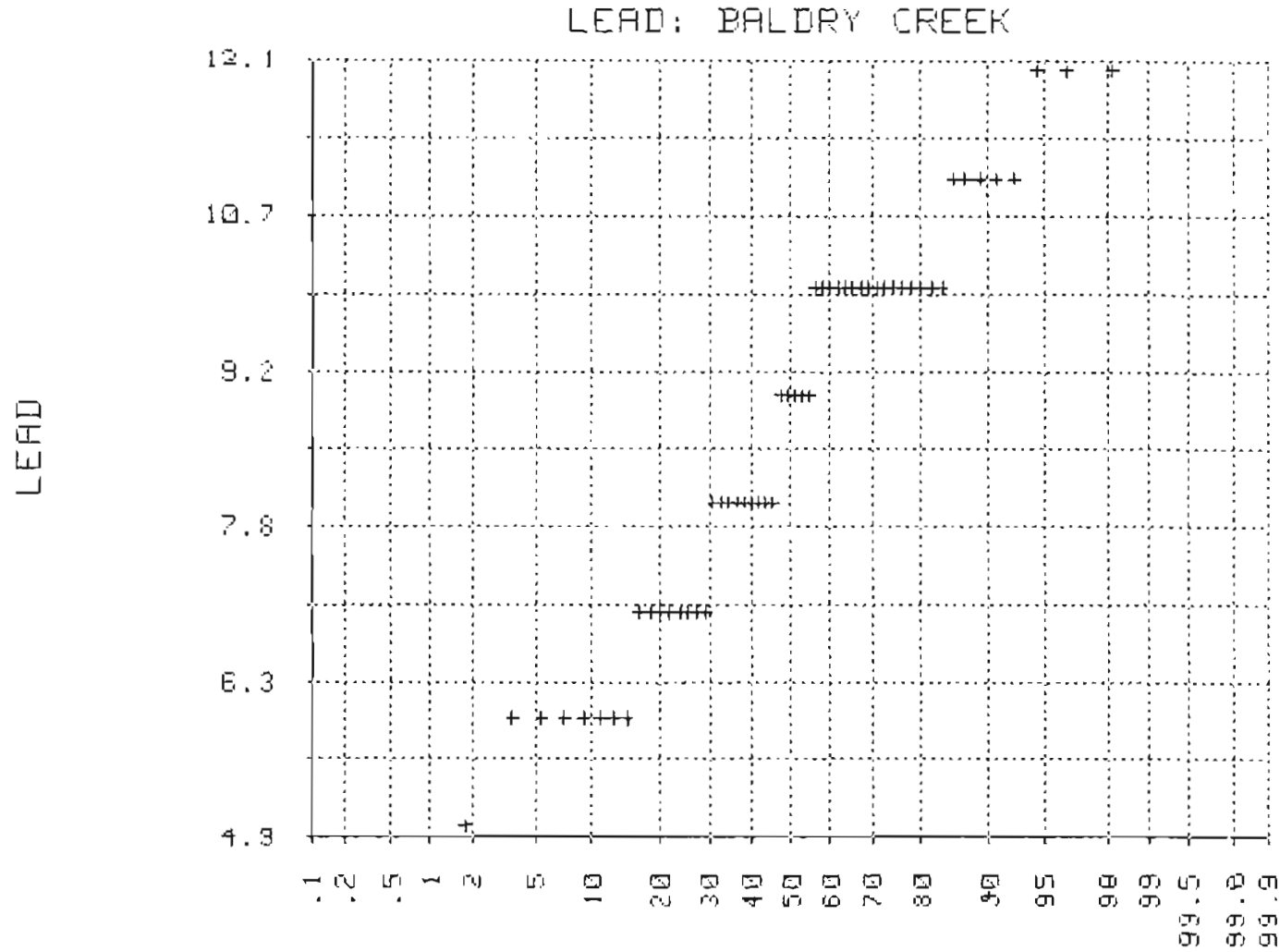
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
LEAD	21.06004	.24997	8.22073	9.22371

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
LEAD	12.00000	5.00000	7.00000	8.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	5.000	6.000	1
2	6.000	7.000	7
3	7.000	8.000	8
4	8.000	9.000	9
5	9.000	10.000	5
6	10.000	11.000	16
7	11.000	12.000	8




LEAD: BALDRY CREEK
LEAD
12.1
10.7
9.2
7.8
6.3
4.8
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

LEAD: NUGGET CREEK

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	10.00000	9.00000	8.00000	10.00000	9.00000
6	9.00000	10.00000	9.00000	9.00000	9.00000
11	7.00000	8.00000	8.00000	9.00000	9.00000
16	8.00000	7.00000	9.00000	8.00000	8.00000
21	7.00000	9.00000	8.00000	8.00000	9.00000
26	10.00000	8.00000	7.00000	8.00000	8.00000
31	9.00000	8.00000	9.00000	9.00000	9.00000
36	6.00000	11.00000	11.00000	9.00000	9.00000
41	10.00000	10.00000	9.00000	8.00000	9.00000
46	9.00000	10.00000	10.00000	10.00000	11.00000
51	11.00000	10.00000	12.00000	10.00000	

SUMMARY STATISTICS
ON DATA SET:
LEAD: NUGGET CREEK

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
LEAD	54	0	484.00000	8.96296

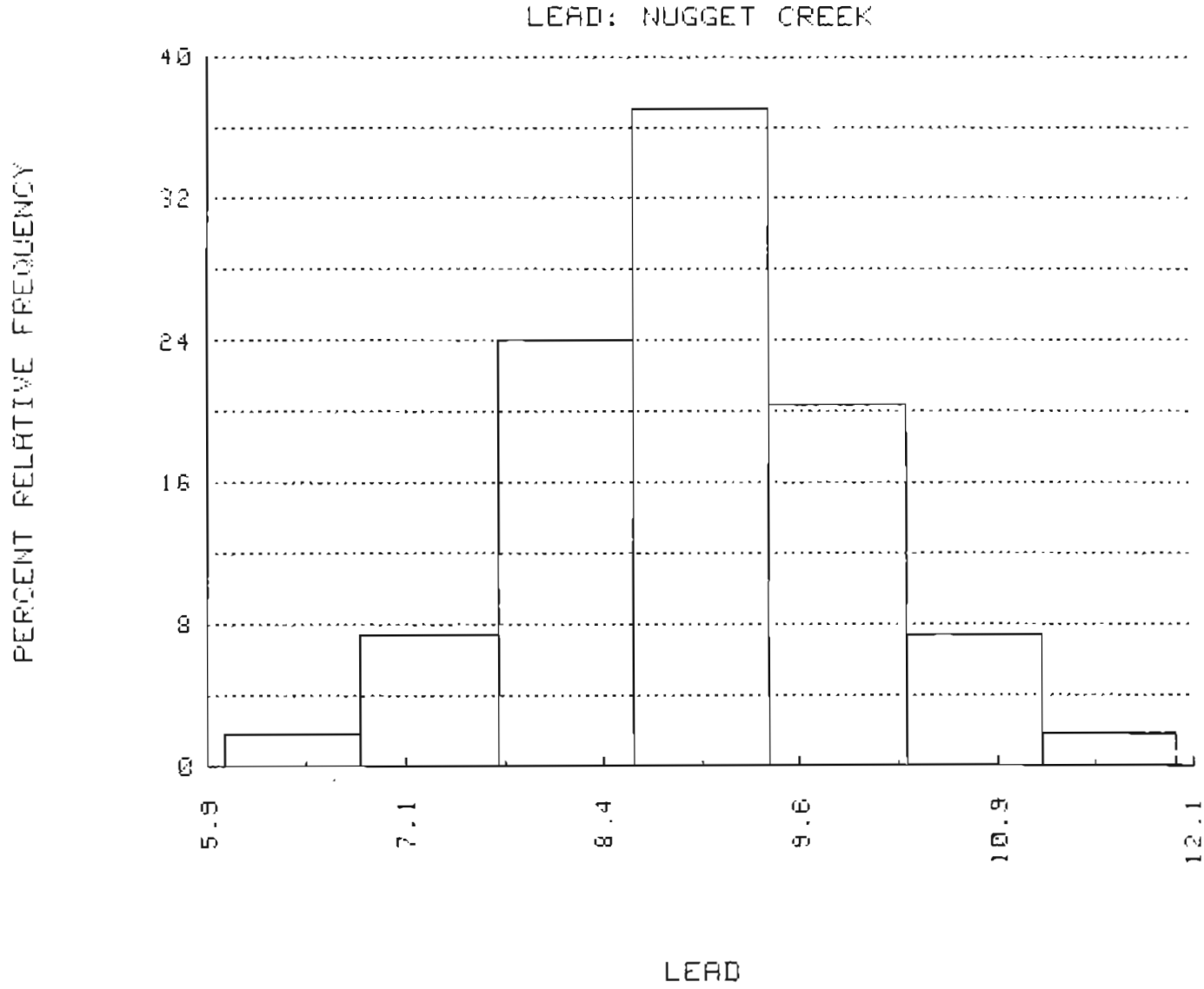
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
LEAD	1.39483	1.18103	.07187	.10572

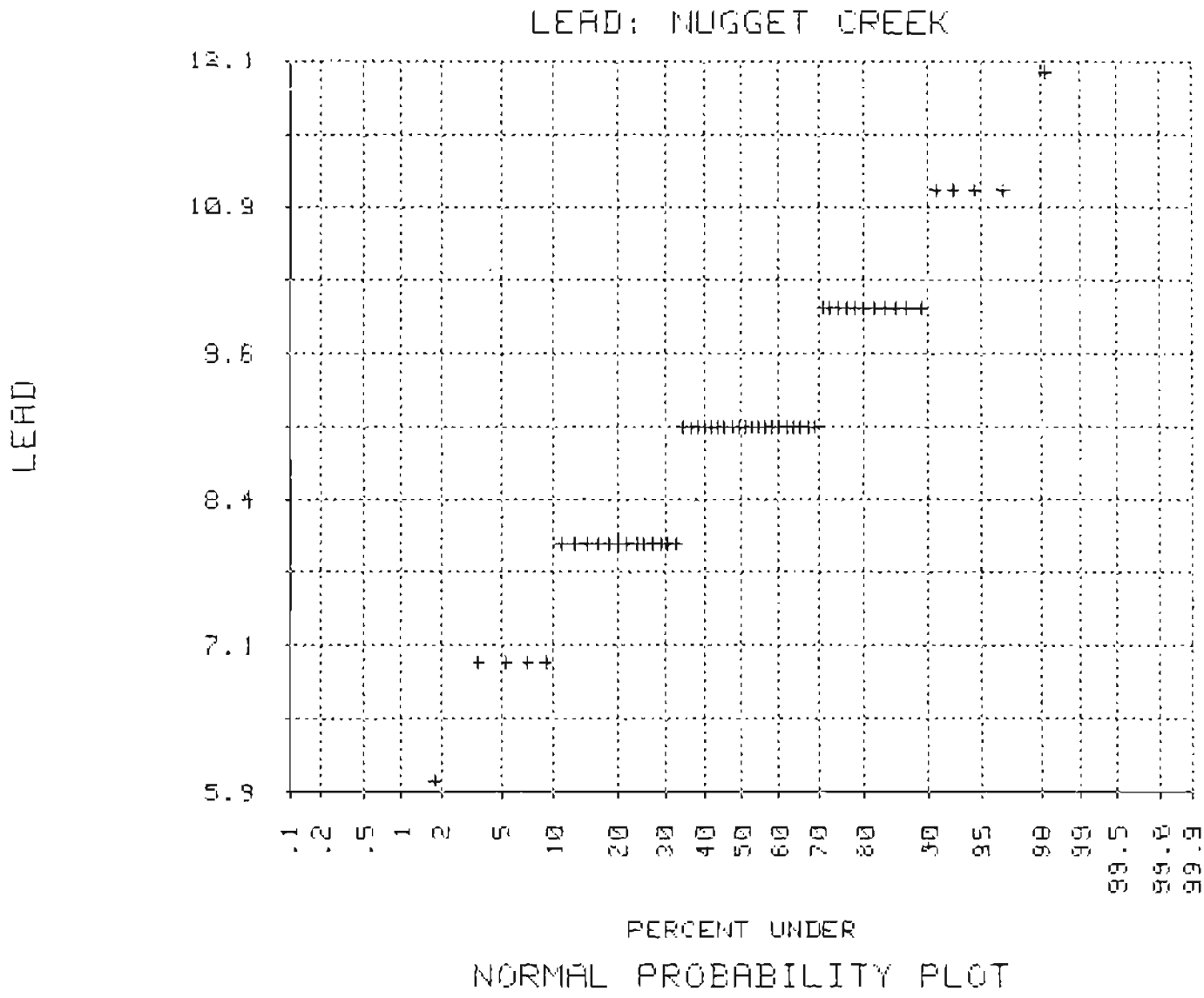
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
LEAD	13.17677	.16072	8.64053	9.28540

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
LEAD	12.00000	6.00000	6.00000	9.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	6.000	6.857	1
2	6.857	7.714	4
3	7.714	8.571	13
4	8.571	9.429	20
5	9.429	10.286	11
6	10.286	11.143	4
7	11.143	12.000	1




LEAD: NUGGET CREEK
LEAD
12.1
10.9
9.6
8.4
7.1
5.9
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

LEAD: WET SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	10.00000	9.00000	8.00000	10.00000	9.00000
6	9.00000	8.00000	8.00000	7.00000	9.00000
11	8.00000	8.00000	11.00000	11.00000	9.00000
16	9.00000	10.00000	10.00000	11.00000	12.00000
21	12.00000	10.00000	10.00000	10.00000	8.00000
26	11.00000	8.00000	10.00000	10.00000	10.00000
31	7.00000	8.00000	7.00000	8.00000	6.00000
36	7.00000				

SUMMARY STATISTICS
ON DATA SET:
LEAD: WET SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
LEAD	36	0	328.00000	9.11111

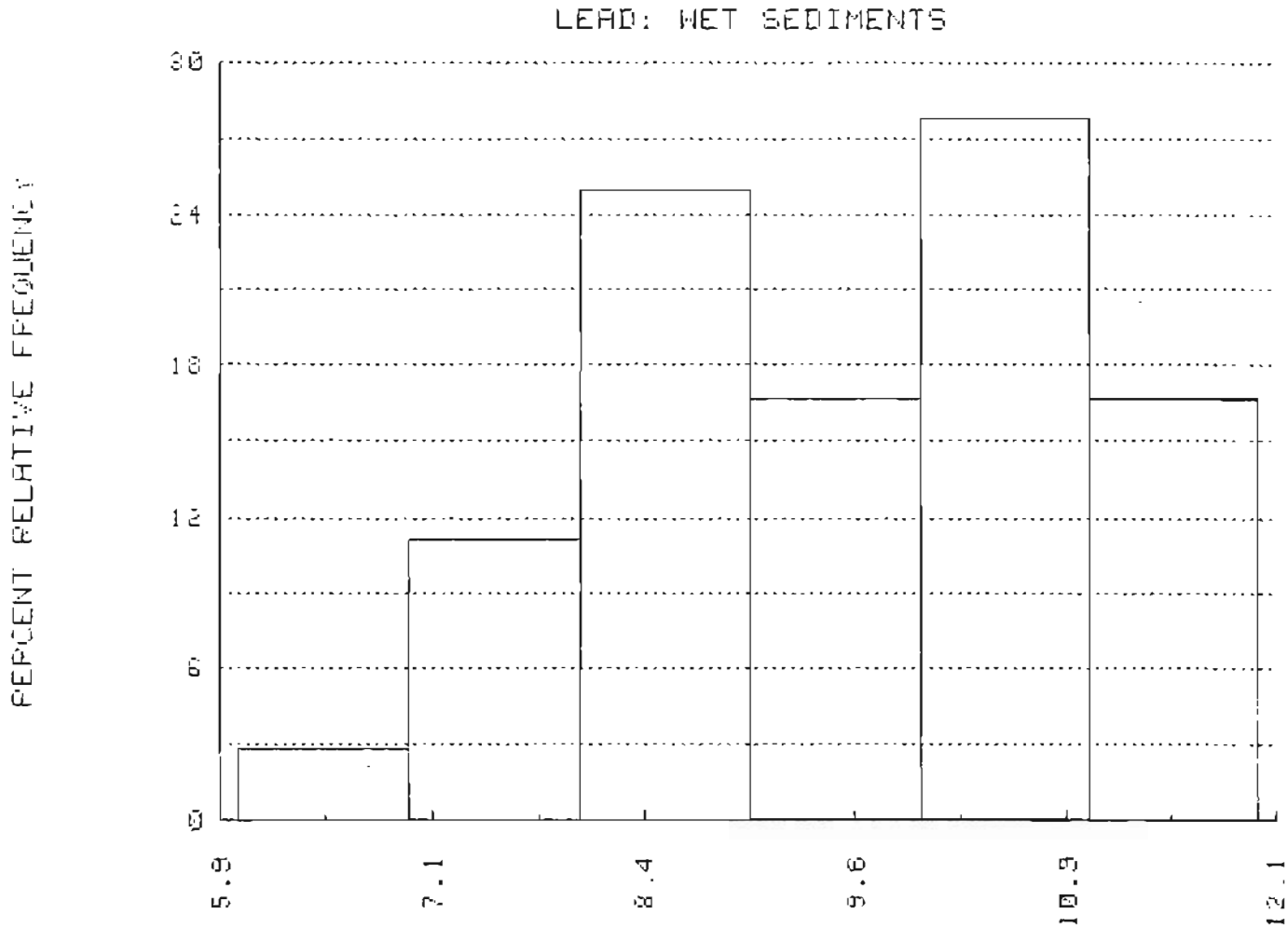
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
LEAD	2.21587	1.48858	.01844	-.70578

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
LEAD	16.33808	.24810	8.60733	9.61489

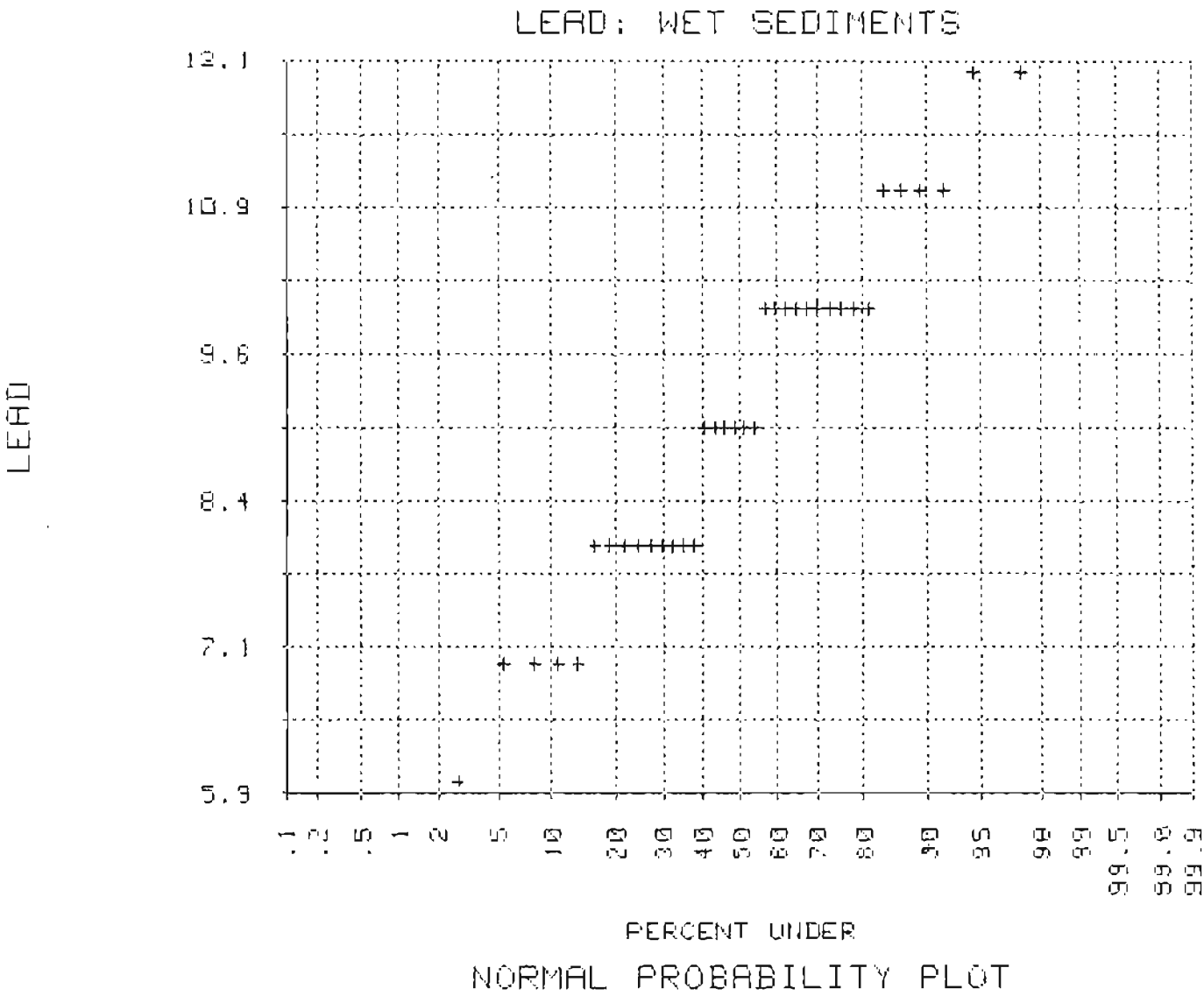
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
LEAD	12.00000	6.00000	6.00000	9.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	6.000	7.000	1
2	7.000	8.000	4
3	8.000	9.000	9
4	9.000	10.000	6
5	10.000	11.000	10
6	11.000	12.000	6



LEAD


LEAD: WET SEDIMENTS
12.1
10.9
9.6
8.4
7.1
5.9
LEAD
.1 .2 .5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.5 99.8 99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

LEAD: DRY SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	10.00000	9.00000	9.00000	9.00000	7.00000
6	8.00000	9.00000	10.00000	8.00000	7.00000
11	8.00000	8.00000	9.00000	8.00000	9.00000
16	9.00000	10.00000	10.00000	10.00000	10.00000
21	11.00000	11.00000	10.00000	10.00000	8.00000
26	8.00000	9.00000	9.00000	8.00000	8.00000
31	7.00000	7.00000	7.00000	6.00000	7.00000
36	6.00000				

SUMMARY STATISTICS
ON DATA SET:
LEAD: DRY SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
LEAD	36	0	309.00000	8.58333

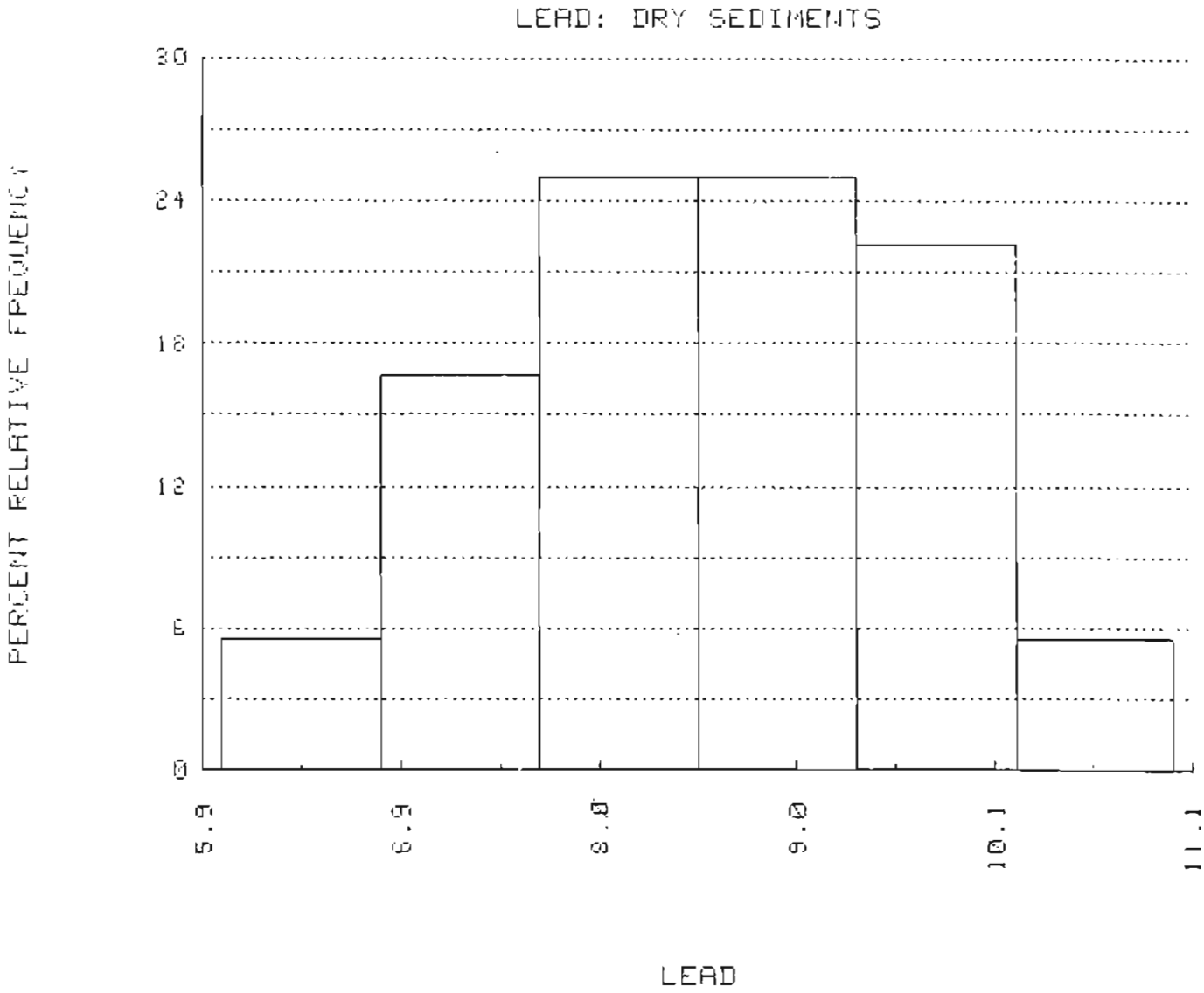
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
LEAD	1.73571	1.31747	-.10718	-.77072

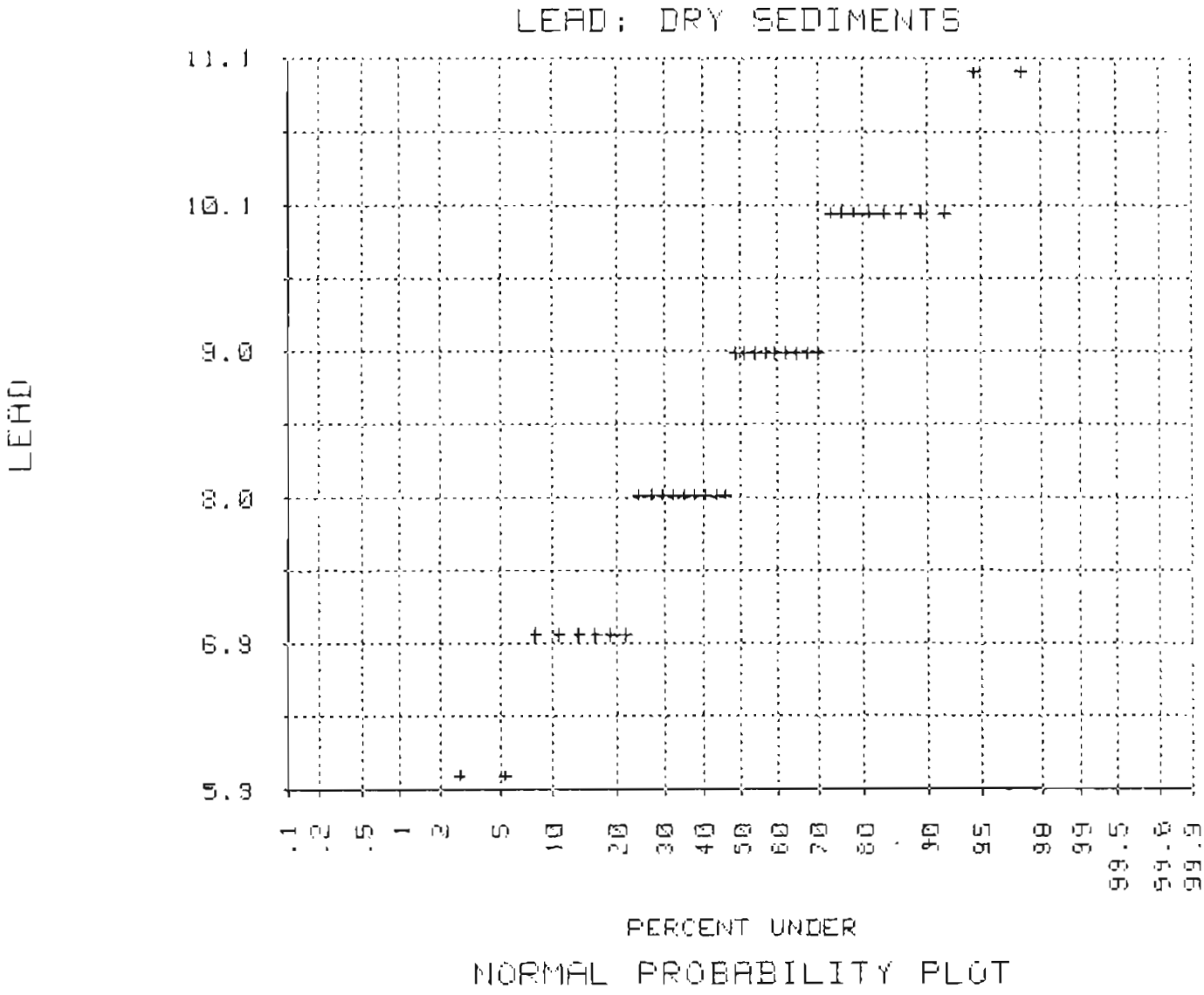
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
LEAD	15.34911	.21958	8.13746	9.02920

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
LEAD	11.00000	6.00000	5.00000	8.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	6.000	6.833	2
2	6.833	7.667	6
3	7.667	8.500	9
4	8.500	9.333	9
5	9.333	10.167	8
6	10.167	11.000	2




LEAD: DRY SEDIMENTS
LEAD
11.1
10.1
9.0
8.0
6.9
5.9
.1 .2 .5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.5 99.8 99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

LEAD: ORGANIC SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	10.00000	12.00000	11.00000	9.00000	10.00000
6	10.00000	10.00000	10.00000	8.00000	9.00000
11	9.00000	10.00000	6.00000	6.00000	5.00000
16	7.00000	6.00000	6.00000	8.00000	9.00000
21	9.00000	8.00000	7.00000	9.00000	9.00000
26	8.00000	9.00000	9.00000	9.00000	6.00000
31	10.00000	11.00000	11.00000	10.00000	12.00000
36	10.00000				

SUMMARY STATISTICS
ON DATA SET:
LEAD: ORGANIC SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
LEAD	36	0	318.00000	8.83333

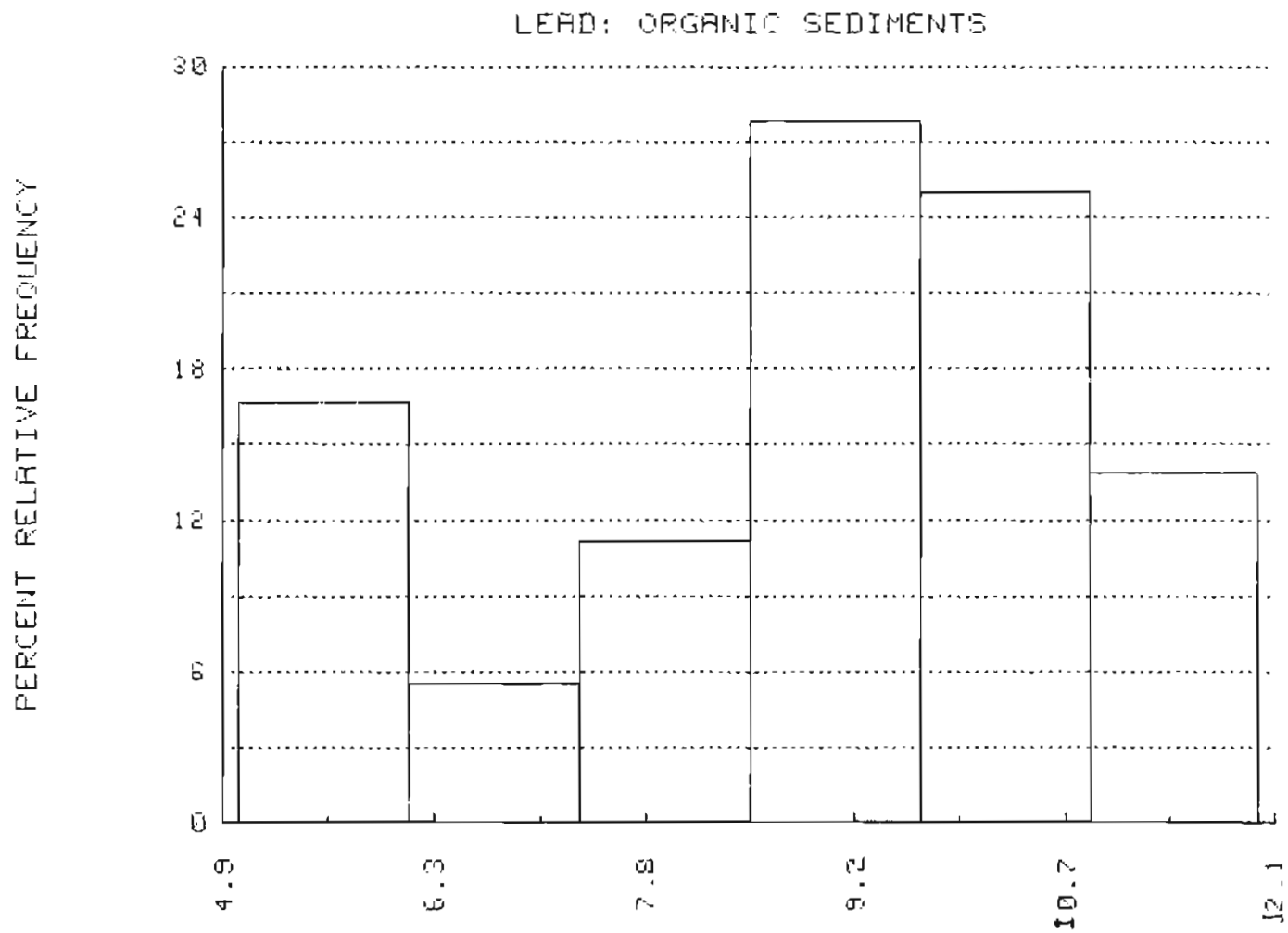
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
LEAD	3.17143	1.78085	-.39163	-.52642

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
LEAD	20.16057	.29681	8.23064	9.43603

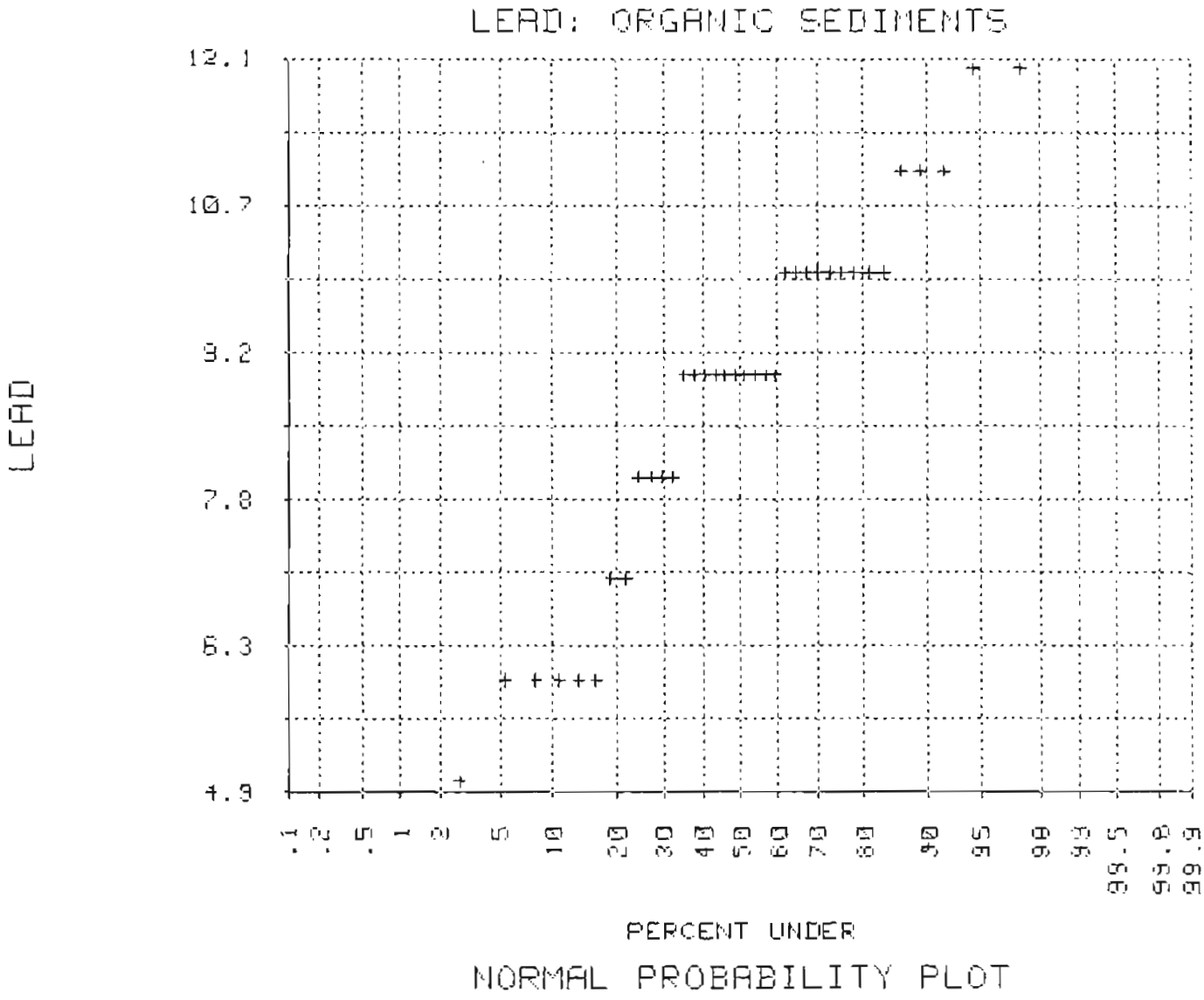
ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
LEAD	12.00000	5.00000	7.00000	8.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	5.000	6.167	6
2	6.167	7.333	2
3	7.333	8.500	4
4	8.500	9.667	10
5	9.667	10.833	9
6	10.833	12.000	5



LEAD


LEAD: ORGANIC SEDIMENTS
LEAD
12.1
10.7
9.2
7.8
6.3
4.9
.1 .2 .5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.5 99.8 99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

ZINC: NUGGET AND BALDRY CREEKS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	63.00000	59.00000	58.00000	55.00000	63.00000
6	58.00000	52.00000	59.00000	59.00000	52.00000
11	48.00000	46.00000	59.00000	59.00000	55.00000
16	59.00000	47.00000	57.00000	50.00000	46.00000
21	47.00000	45.00000	46.00000	49.00000	57.00000
26	57.00000	48.00000	45.00000	47.00000	45.00000
31	51.00000	48.00000	55.00000	48.00000	54.00000
36	49.00000	59.00000	62.00000	59.00000	60.00000
41	58.00000	60.00000	50.00000	46.00000	49.00000
46	44.00000	45.00000	43.00000	65.00000	65.00000
51	63.00000	63.00000	58.00000	60.00000	58.00000
56	51.00000	51.00000	54.00000	54.00000	53.00000
61	45.00000	44.00000	45.00000	44.00000	48.00000
66	48.00000	51.00000	58.00000	54.00000	53.00000
71	51.00000	51.00000	53.00000	56.00000	51.00000
76	56.00000	55.00000	58.00000	52.00000	54.00000
81	47.00000	48.00000	49.00000	51.00000	56.00000
86	59.00000	58.00000	56.00000	55.00000	57.00000
91	44.00000	45.00000	42.00000	44.00000	42.00000
96	39.00000	43.00000	42.00000	44.00000	44.00000
101	43.00000	41.00000	43.00000	43.00000	40.00000
106	41.00000	38.00000	40.00000		

SUMMARY STATISTICS
ON DATA SET:
ZINC: NUGGET AND BALDRY CREEKS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ZINC	108	0	5547.00000	51.36111

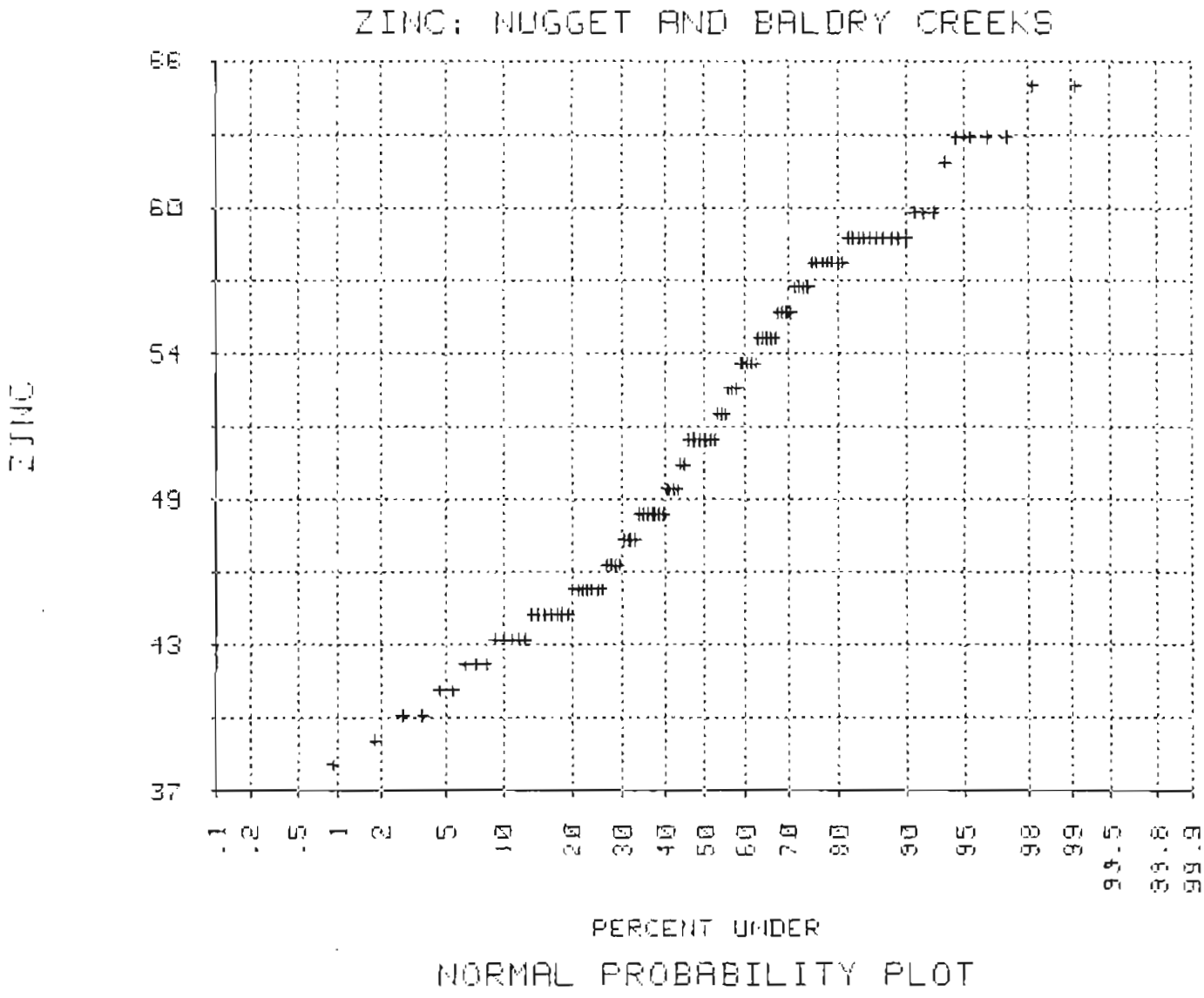
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ZINC	45.26090	6.72762	.05573	-1.04912

VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ZINC	13.09867	.64737	50.07750	52.64473

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ZINC	65.00000	38.00000	27.00000	51.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	38.000	41.375	6
2	41.375	44.750	15
3	44.750	48.125	22
4	48.125	51.500	14
5	51.500	54.875	11
6	54.875	58.250	20
7	58.250	61.625	13
8	61.625	65.000	7


ZINC: NUGGET AND BALDRY CREEKS
ZINC
66
60
54
49
43
37
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

ZINC: BALDRY CREEK

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	58.00000	51.00000	51.00000	54.00000	54.00000
6	53.00000	45.00000	44.00000	45.00000	44.00000
11	48.00000	48.00000	51.00000	58.00000	54.00000
16	53.00000	51.00000	51.00000	53.00000	56.00000
21	51.00000	56.00000	55.00000	59.00000	52.00000
26	54.00000	47.00000	48.00000	49.00000	51.00000
31	56.00000	59.00000	58.00000	56.00000	55.00000
36	57.00000	44.00000	45.00000	42.00000	44.00000
41	42.00000	39.00000	43.00000	42.00000	44.00000
46	44.00000	43.00000	41.00000	43.00000	43.00000
51	40.00000	41.00000	38.00000	40.00000	

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SUMMARY STATISTICS

ON DATA SET:

ZINC: BALDRY CREEK

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BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ZINC	54	0	2643.00000	48.94444

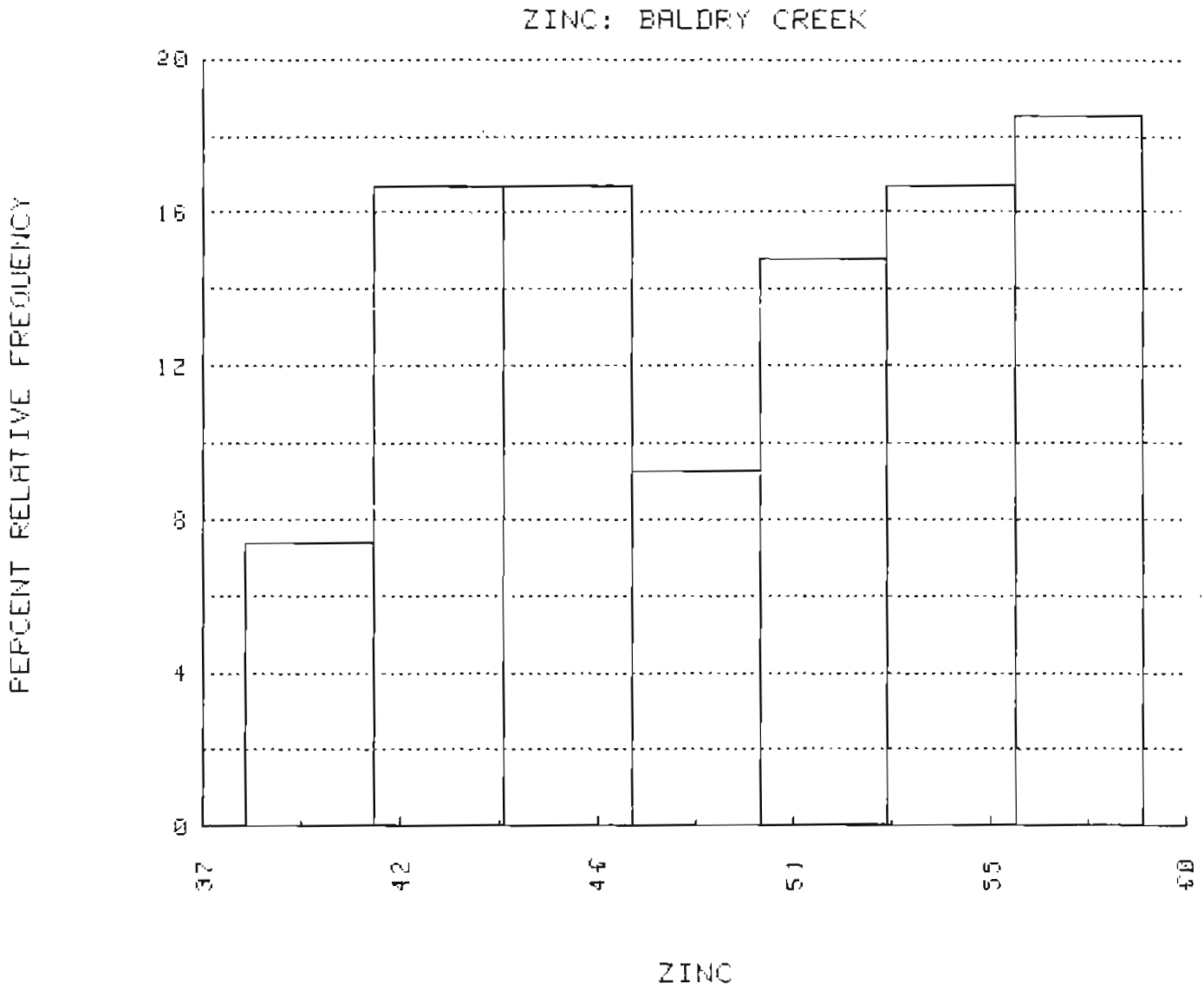
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ZINC	37.11006	6.09180	-.00448	-1.29336

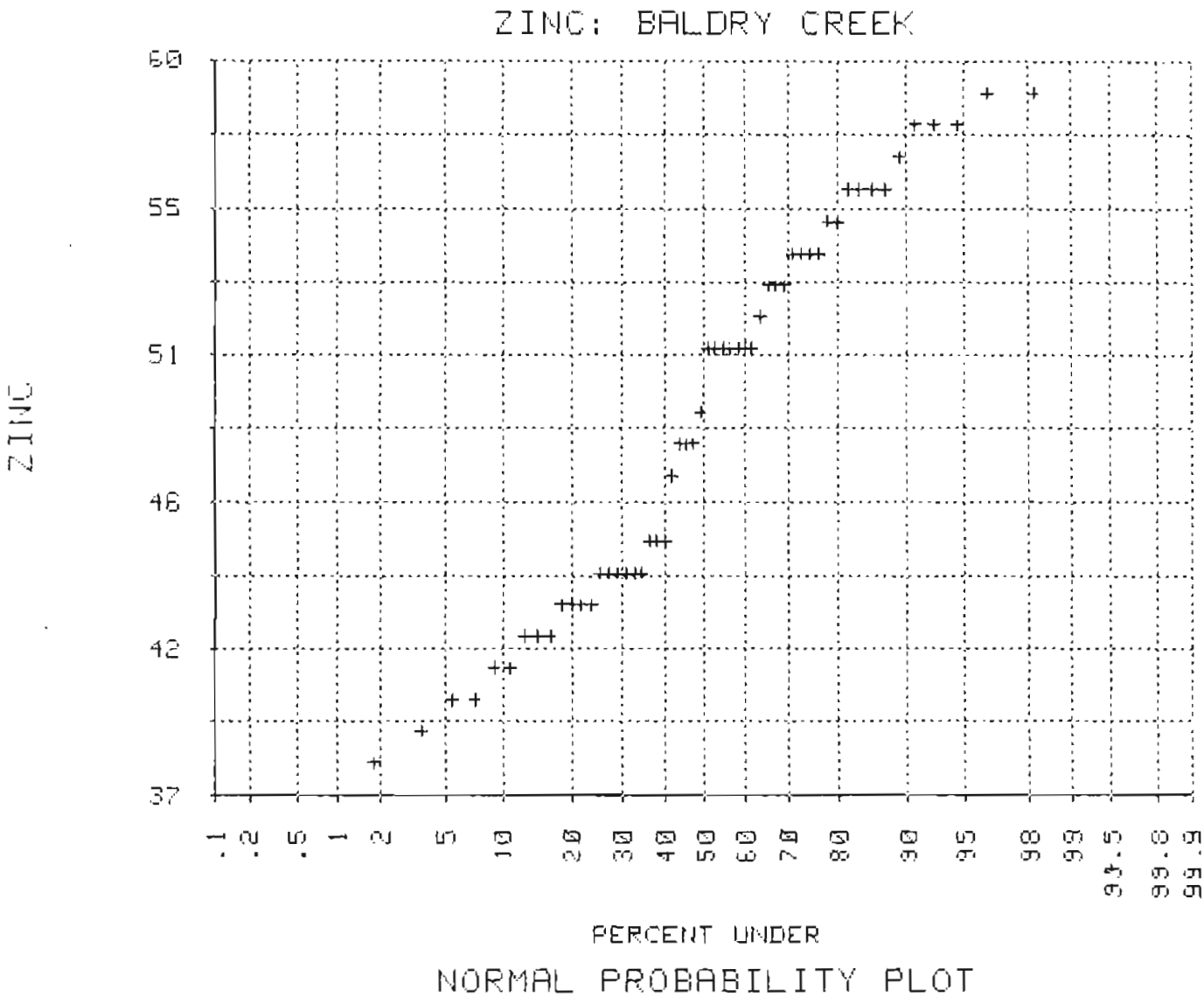
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ZINC	12.44636	.82899	47.28132	50.60757

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ZINC	59.00000	38.00000	21.00000	48.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	38.000	41.000	4
2	41.000	44.000	9
3	44.000	47.000	9
4	47.000	50.000	5
5	50.000	53.000	8
6	53.000	56.000	9
7	56.000	59.000	10




ZINC: BALDRY CREEK
ZINC
60
55
51
46
42
37
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

ZINC: NUGGET CREEK

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	63.00000	59.00000	58.00000	55.00000	63.00000
6	58.00000	52.00000	59.00000	59.00000	52.00000
11	48.00000	46.00000	59.00000	59.00000	55.00000
16	59.00000	47.00000	57.00000	50.00000	46.00000
21	47.00000	45.00000	46.00000	49.00000	57.00000
26	57.00000	48.00000	45.00000	47.00000	45.00000
31	51.00000	48.00000	55.00000	48.00000	54.00000
36	49.00000	59.00000	62.00000	59.00000	60.00000
41	58.00000	60.00000	50.00000	46.00000	48.00000
46	44.00000	45.00000	43.00000	65.00000	65.00000
51	63.00000	63.00000	58.00000	60.00000	

SUMMARY STATISTICS
ON DATA SET:
ZINC: NUGGET CREEK

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ZINC	54	0	2904.00000	53.77778

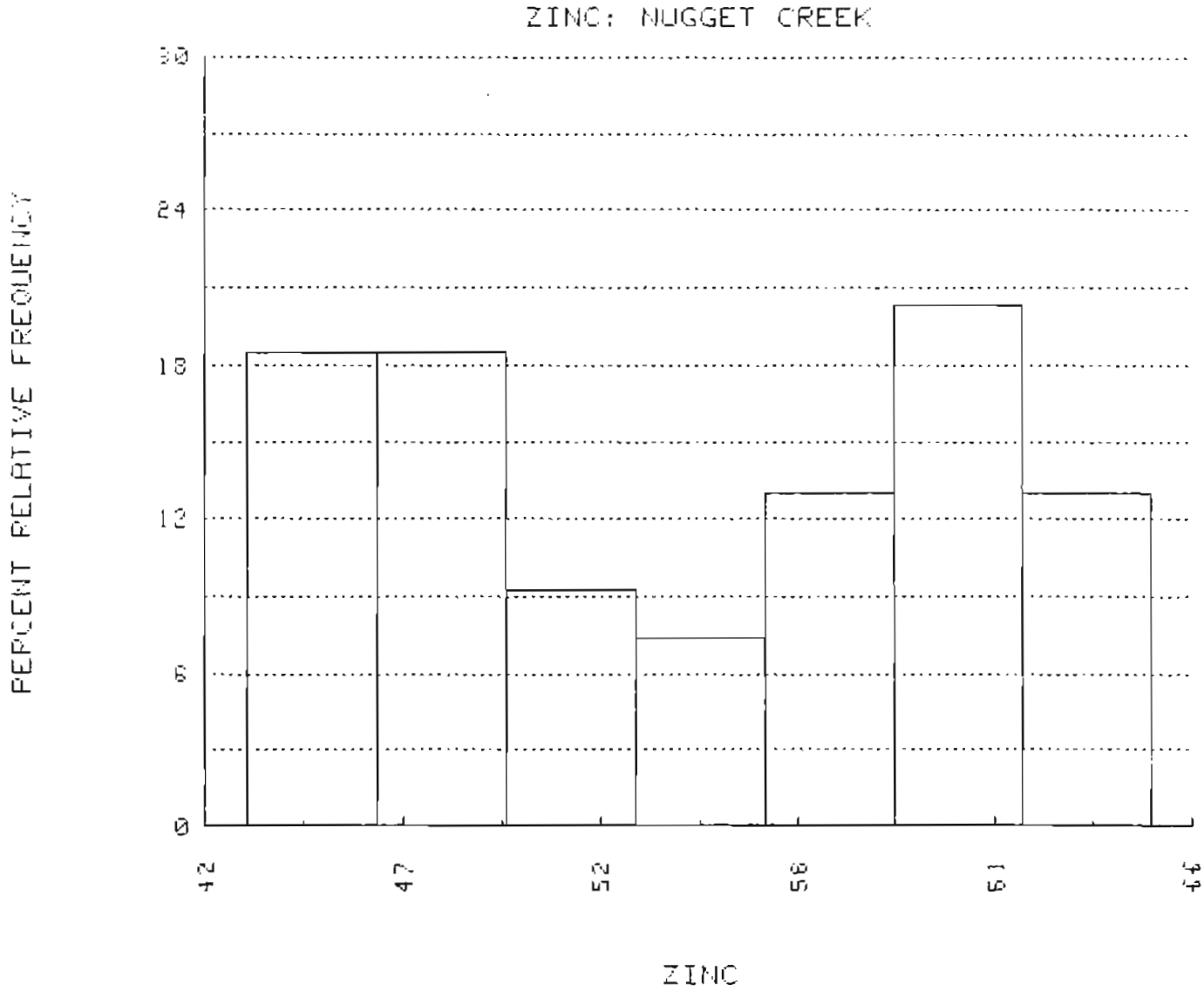
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ZINC	42.36478	6.50883	-.01095	-1.38124

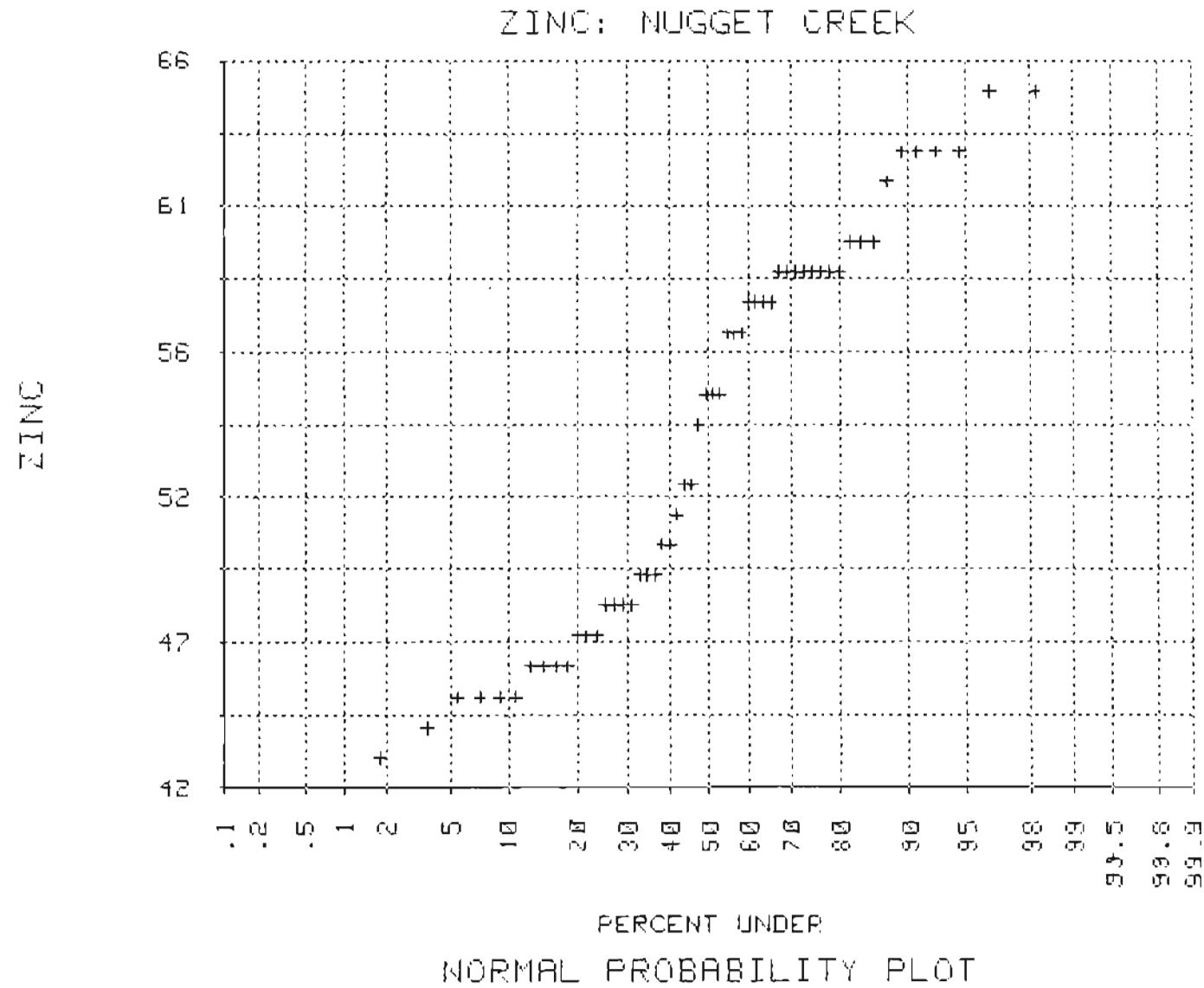
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ZINC	12.10318	.88574	52.00081	55.55475

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ZINC	65.00000	43.00000	22.00000	54.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	43.000	46.143	10
2	46.143	49.286	10
3	49.286	52.429	5
4	52.429	55.571	4
5	55.571	58.714	7
6	58.714	61.857	11
7	61.857	65.000	7




ZINC: NUGGET CREEK
ZINC
66
61
56
52
47
42
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

ZINC: WET SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	58.00000	51.00000	51.00000	54.00000	54.00000
6	53.00000	53.00000	56.00000	51.00000	56.00000
11	55.00000	59.00000	44.00000	45.00000	42.00000
16	44.00000	42.00000	39.00000	63.00000	59.00000
21	58.00000	55.00000	63.00000	58.00000	50.00000
26	46.00000	47.00000	45.00000	46.00000	49.00000
31	59.00000	62.00000	59.00000	60.00000	58.00000
36	60.00000				

SUMMARY STATISTICS
ON DATA SET:
ZINC: WET SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ZINC	36	0	1904.00000	52.88889

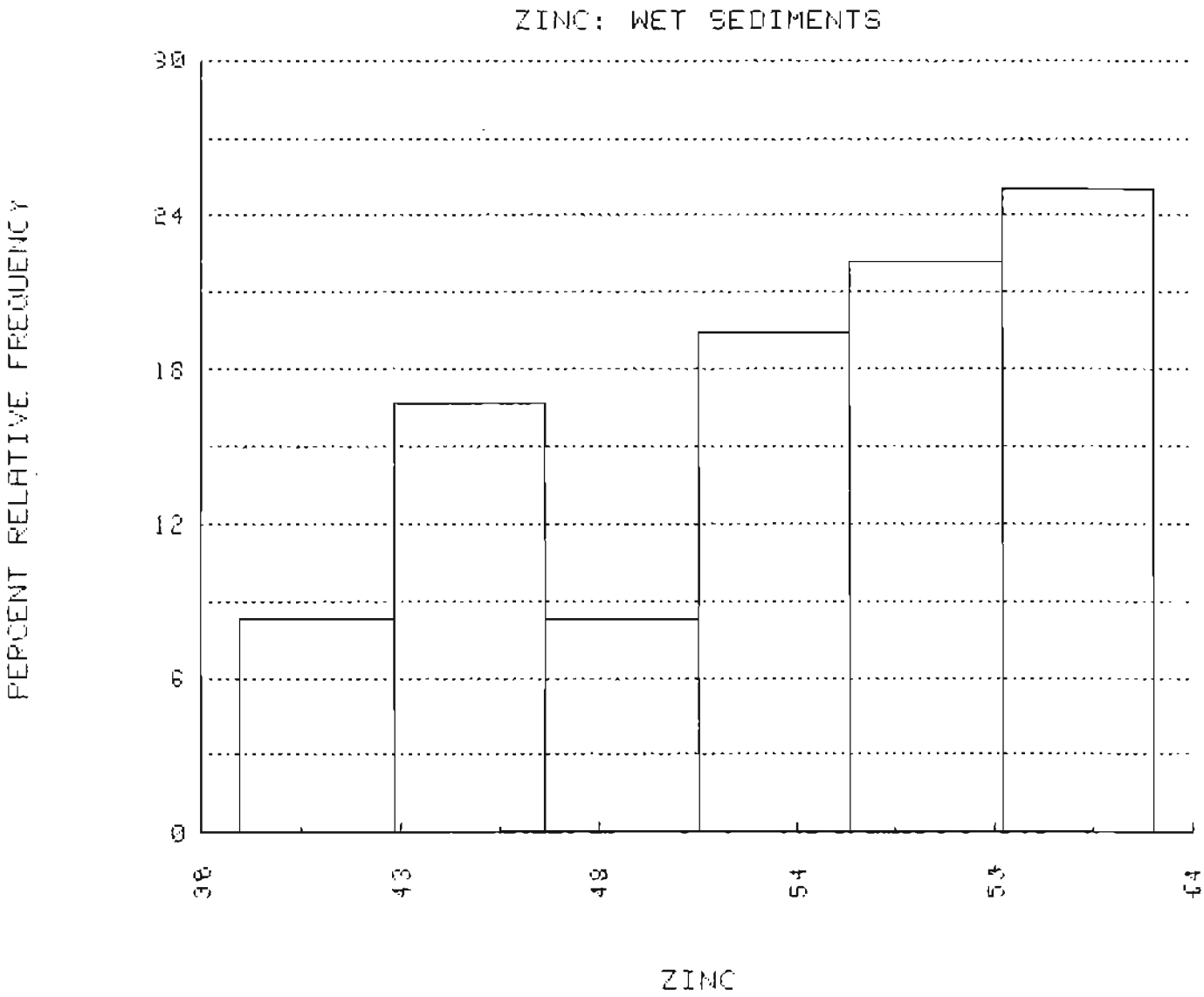
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ZINC	44.27302	6.65380	-.34796	-1.00517

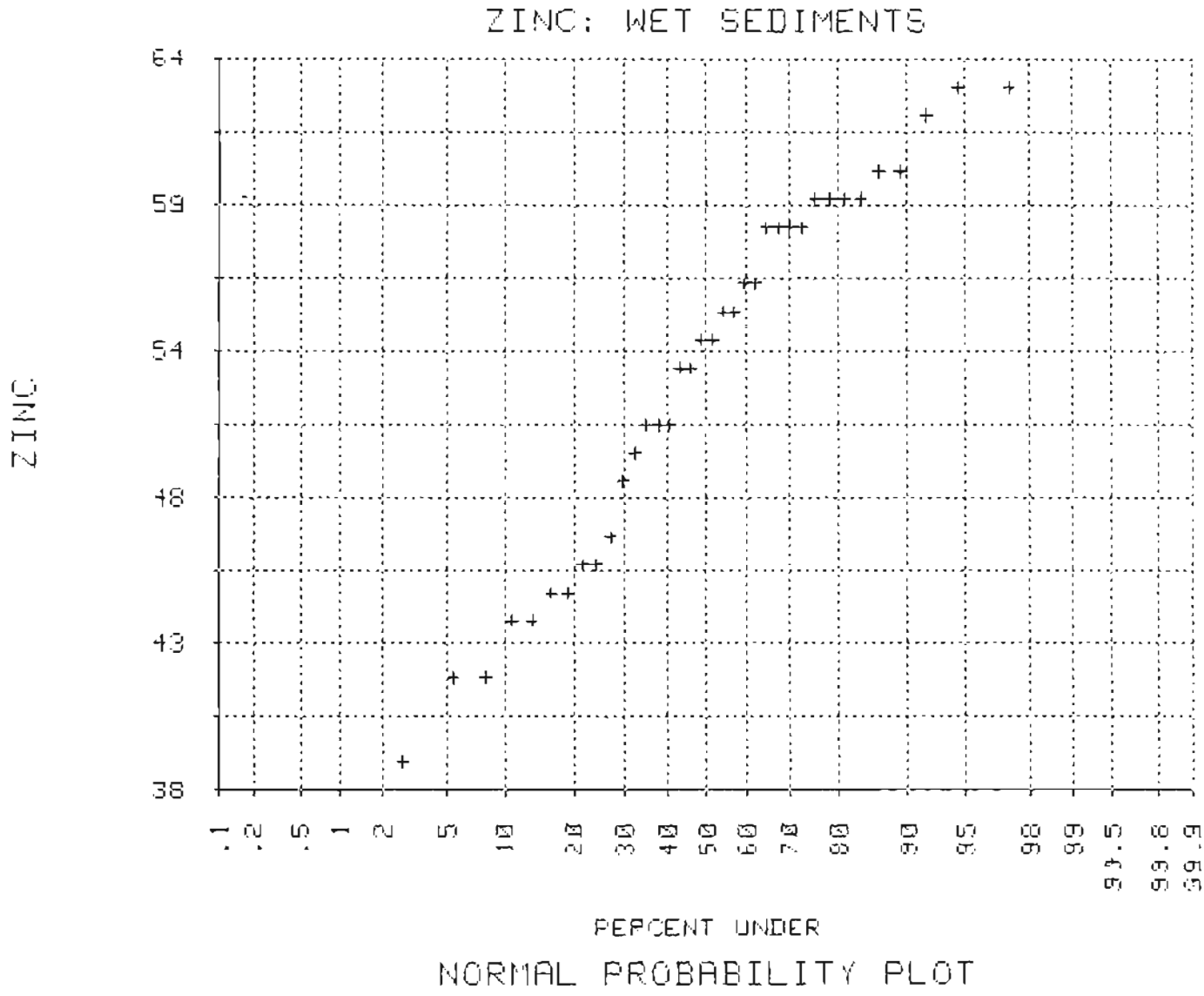
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ZINC	12.58071	1.10897	50.63704	55.14073

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ZINC	63.00000	39.00000	24.00000	51.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	39.000	43.000	3
2	43.000	47.000	6
3	47.000	51.000	3
4	51.000	55.000	7
5	55.000	59.000	8
6	59.000	63.000	9




ZINC: WET SEDIMENTS
ZINC
64
59
54
48
43
38
.1
.2
.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.5
99.8
99.9
PERCENT UNDER
NORMAL PROBABILITY PLOT

ZINC: DRY SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	45.00000	44.00000	45.00000	44.00000	48.00000
6	48.00000	52.00000	54.00000	47.00000	48.00000
11	49.00000	51.00000	43.00000	42.00000	44.00000
16	44.00000	43.00000	41.00000	52.00000	59.00000
21	59.00000	52.00000	48.00000	46.00000	57.00000
26	57.00000	48.00000	45.00000	47.00000	45.00000
31	50.00000	46.00000	49.00000	44.00000	45.00000
36	43.00000				

SUMMARY STATISTICS
ON DATA SET:
ZINC: DRY SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ZINC	36	0	1724.00000	47.88889

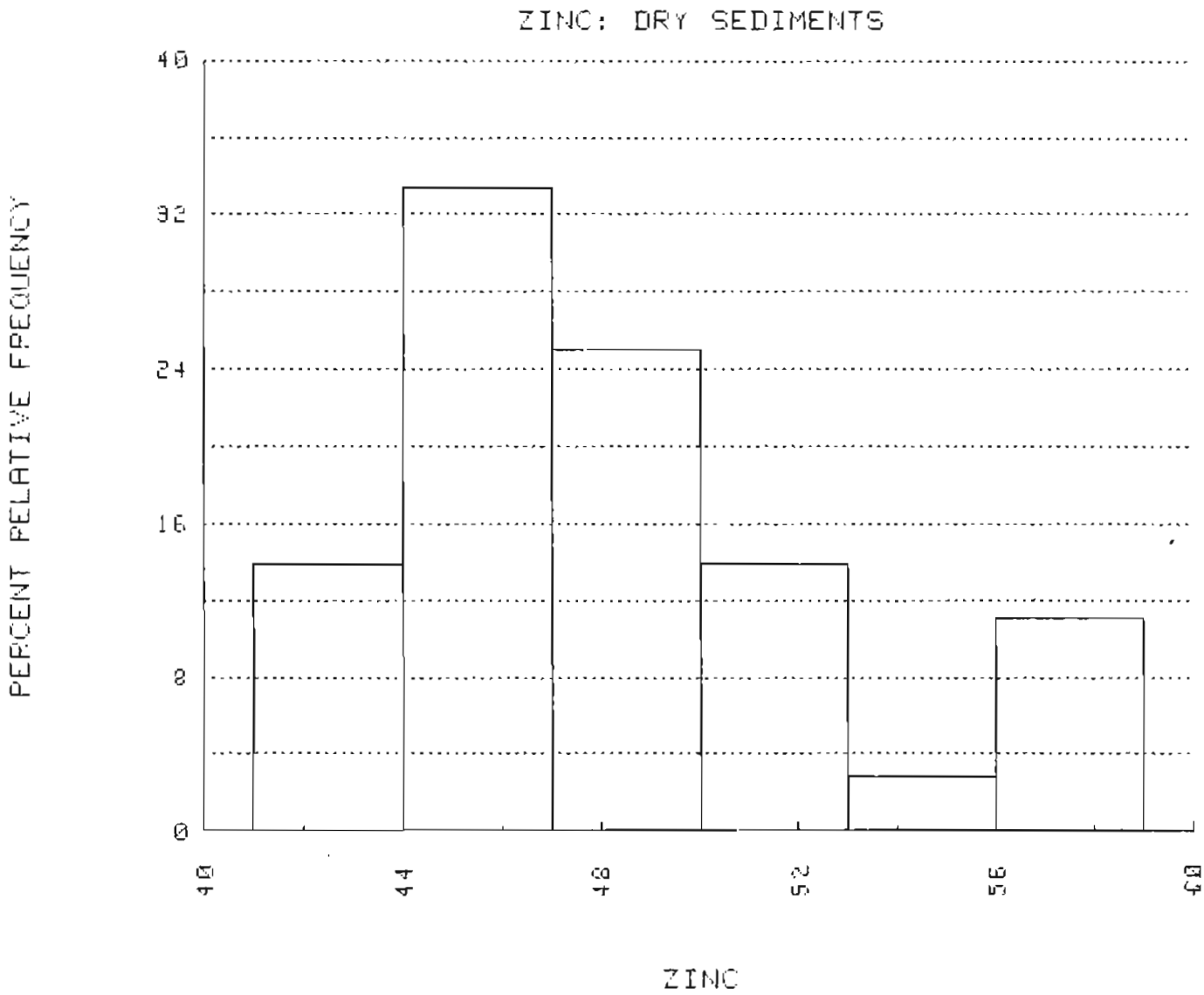
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ZINC	22.78730	4.77360	.91208	.01770

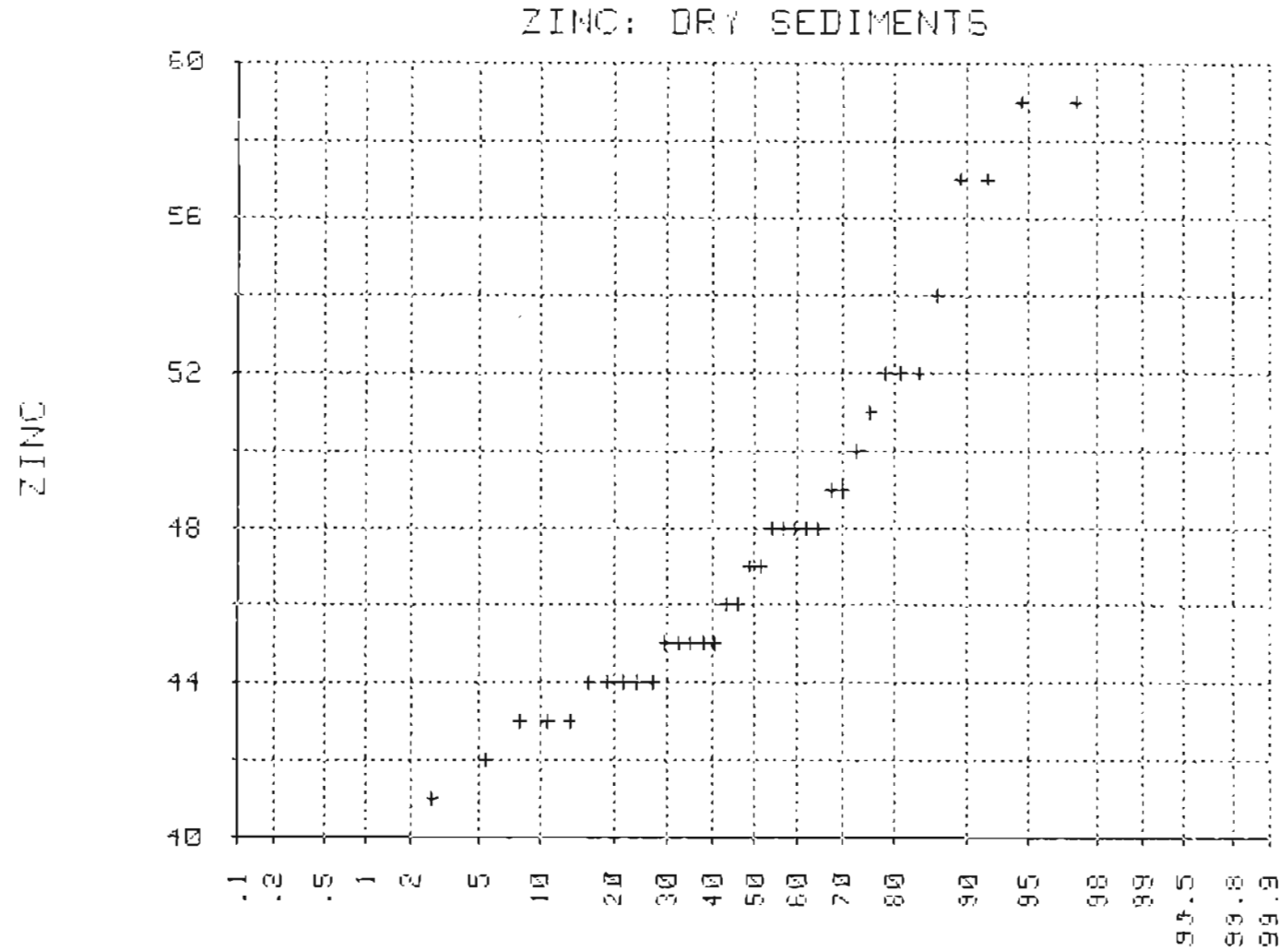
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ZINC	9.96808	.79560	46.27336	49.50442

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ZINC	59.00000	41.00000	18.00000	50.00000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	41.000	44.000	5
2	44.000	47.000	12
3	47.000	50.000	9
4	50.000	53.000	5
5	53.000	56.000	1
6	56.000	59.000	4





NORMAL PROBABILITY PLOT

ZINC: ORGANIC SEDIMENTS

VARIABLE # 1

I	OBS(I)	OBS(I+1)	OBS(I+2)	OBS(I+3)	OBS(I+4)
1	59.00000	59.00000	55.00000	59.00000	47.00000
6	57.00000	51.00000	48.00000	55.00000	48.00000
11	54.00000	49.00000	65.00000	65.00000	63.00000
16	63.00000	58.00000	60.00000	51.00000	58.00000
21	54.00000	53.00000	51.00000	51.00000	56.00000
26	59.00000	58.00000	56.00000	55.00000	57.00000
31	43.00000	43.00000	40.00000	41.00000	38.00000
36	40.00000				

SUMMARY STATISTICS
ON DATA SET:
ZINC: ORGANIC SEDIMENTS

BASIC STATISTICS

VARIABLE	# OBSERVATIONS	# MISS. VALUES	SUM	MEAN
ZINC	36	0	1919.00000	53.30556

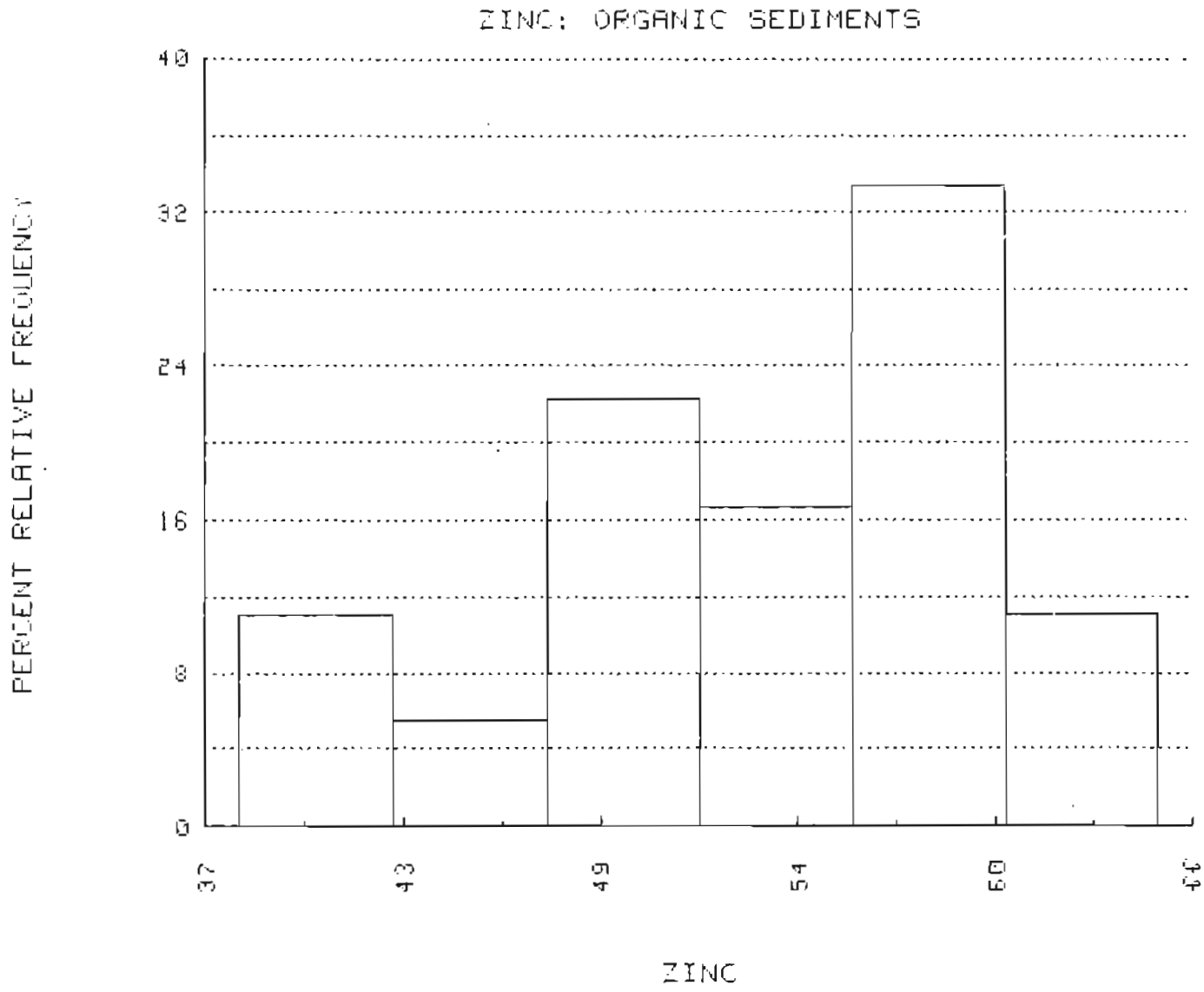
VARIABLE	VARIANCE	STANDARD DEV.	COEF OF SKEWNESS	COEF OF KURTOSIS
ZINC	52.61825	7.25384	-.49363	-.55955

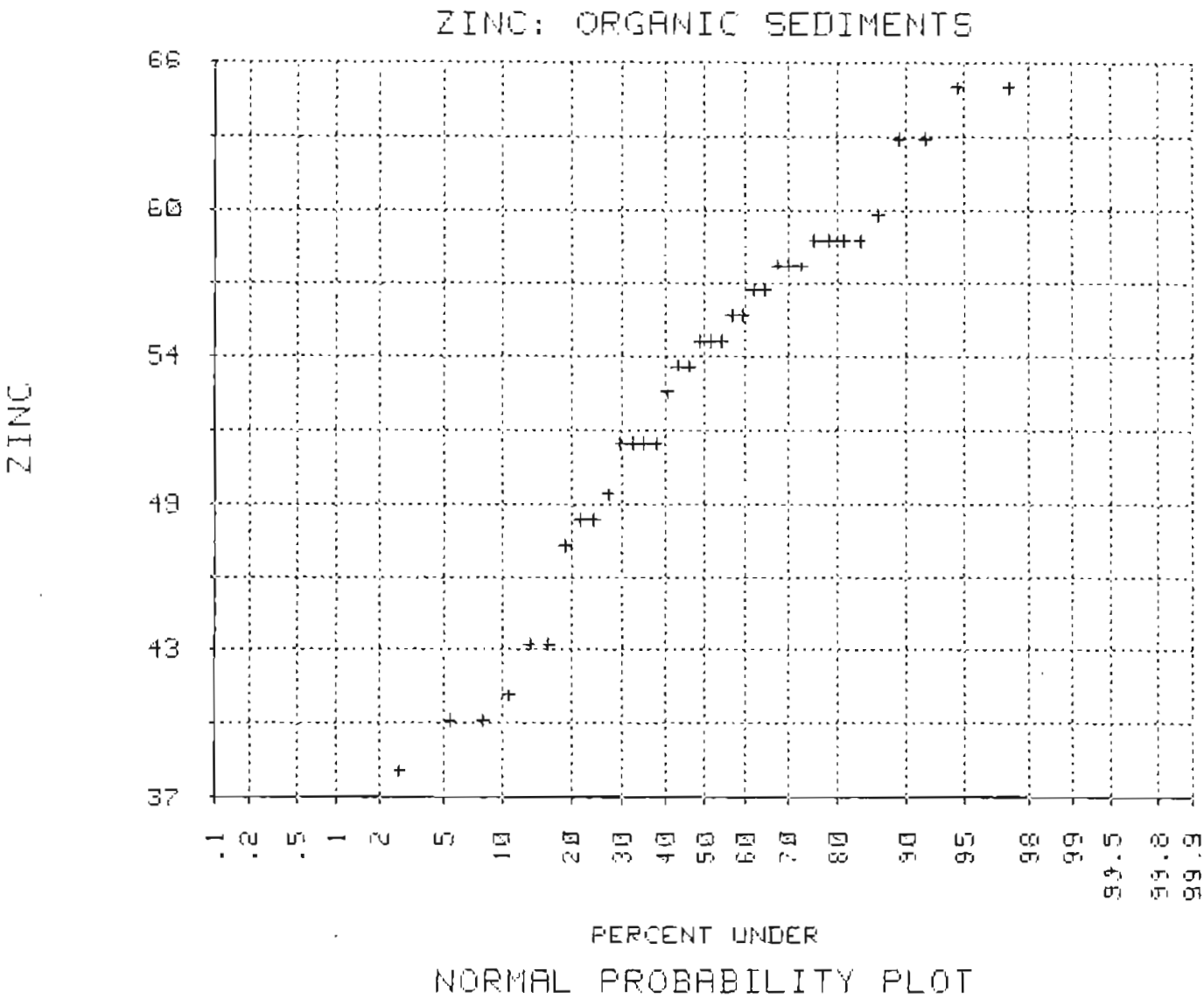
VARIABLE	COEF VARIATION	STANDARD ERROR OF THE MEAN	95 % CONFIDENCE INTERVAL ON MEAN LOWER LIMIT	UPPER LIMIT
ZINC	13.60805	1.20897	50.85064	55.76047

ORDER STATISTICS

VARIABLE	MAXIMUM	MINIMUM	RANGE	MIDRANGE
ZINC	65.00000	38.00000	27.00000	51.50000

CELL	MINIMUM	MAXIMUM	OBSERVED FREQUENCY
1	38.000	42.500	4
2	42.500	47.000	2
3	47.000	51.500	8
4	51.500	56.000	6
5	56.000	60.500	12
6	60.500	65.000	4





NORMAL PROBABILITY PLOT