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ABMINCO N. L.

Progress Report

EXPLORATION LICENCE 1/63,

CLEVELAND

for six month period ending

August 11, 1977

77-1232

D.M. Ransom
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September, 1977

INTRODUCTION

Preliminary results from a statistical study of soil geochemical data from EL 1/63 were presented in the report for the six month period to February 11, 1977 (Ransom, 1977). The remainder of this study has been completed in the six month period to August 11, 1977 and the results are included in this report.

As described in Ransom (1977), the programme of review of soil geochemical data in EL 1/63 comprises two parts. These are based on the calculation of basic statistics, multiple regression analysis and plotting of histograms of:

1. particular geographic areas in EL 1/63;
2. a series of designated rock types.

The results of the geographic subdivisions were presented in the report to February 11, 1977.

During the ensuing six months the rock type analysis was completed.

The calculations are carried out with a Hewlett-Packard 9830A computer calculator.

RESULTS

For the purposes of the rock type subdivision, geochemical samples were divided into ten general classes, based on detailed mapping of sample lines and the regional interpretation presented in Ransom (1976), as follows:

Rock 1: Mt. Cleveland Sequence: a sequence predominantly of coarse mica sandstone, with minor mafic volcanic, variegated mudstones, and chert.

Rock 2: Cleveland Mine/Falls Creek Sequence: a sequence extending to the south of the Cleveland mine composed mainly of variegated mudstones, cherts, mafic volcanic arenites and mica sandstone.

Rock 3: Halls Formation: a sequence of grey mudstone and chert, direct extensions of the Cleveland Mine sequence.

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Rock 4: Mt. Bischoff Sequence: a sequence of black, commonly contact metamorphosed arenites and argillites bordering the Meredith Granite.

Rock 5: Greenstone Sequences: mainly coarse dolerites and maroon coloured mafic flows with minor red argillites and chert, probable ophiolites.

Rock 6: Meredith Granite.

Rock 7: Tertiary Basalt.

Rock 8: Cleveland Mine Area: not a particular rock type but inclusive of samples taken as part of an orientation survey over the known Cleveland orebodies.

Rock 9: Deep Creek Basic Volcanics: a sequence of fine to medium grained altered basalt flows and tuffs, immediately overlying Cleveland mine sequence.

Rock 10: Washington Hey Mafic Sequence: a sequence of medium to coarse mafic tuffs and ?flows.

Each of these rock types was sorted and processed by computer in three ways as described by Ransom (1977) as follows:

- a) calculation of logarithmic and arithmetic means, variances and standard deviations.
- b) calculation of a correlation matrix and standardized, log transformed partial regression coefficients.
- c) plotting of a histogram of log transformed values for each rock type and calculation of cumulative frequency for individual classes.

The calculations are presented in Table 1 and the histograms and multiple regression results in Figures 1 to 50.

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DISCUSSION AND INTERPRETATION

Superficial examination of Table 1 in Ransom (1977) and Table 1, this report, shows clearly that the Cleveland mine area is unique in EL 1/63 in its soil geochemical character. No other area or rock type directly resembles the mine area in any of the statistical parameters calculated. The low tin background elsewhere suggests strongly that there is no other outcropping tin deposit in the Licence area. However, by comparing each parameter from the mine area with those of each of the other rock types it is apparent that the Mine/Falls Creek Sequence is the most prospective rock unit in the Licence area. This conclusion supports the correlation and continuity of these rocks with the mine area established in the regional mapping programme of 1972.

This conclusion does suggest, that this area, which has been neglected since 1972 should be reassessed in further detail, and a proposal to further explore the area immediately north of the mine is currently under consideration.

FINANCE

Expended in the six months to August 11, 1977: \$1,875

REFERENCES

- Ransom, D.M. (1976) "Progress report on EL 1/63 for six months ending August 11, 1976". CEPL report to Tas. Mines Department (unpublished).
- Ransom, D.M. (1977) "Progress report EL 1/63 for six month period ending February 11, 1977". Abminco N.L. report to Tas Mines Department (unpublished).

ATTACHMENTS

- Figures 1 to 50 Histograms, correlation matrices and basic statistics for ten rock units.

Submitted *D.M. Ransom*
D.M. Ransom
Senior Geologist

	ROCK 1 MT CLEVELAND SEQUENCE	ROCK 2 MINE/FALLS CREEK SEQUENCE	ROCK 3 HALLS FORMATION	ROCK 4 MT BISCHOFF SEQUENCE	ROCK 5 GREENSTONE SEQUENCE	ROCK 6 MEREDITH GRANITE	ROCK 7 TERTIARY BASALT	ROCK 8 CLEVELAND MINE AREA	ROCK 9 DEEP CREEK BASIC VOLCANICS	ROCK 10 WASHINGTON HEY MAFIC SEQUENCE
<u>LEAD</u>										
No. of samples	255	356	118	537	404	323	14	125	98	111
Arithmetic Mean	46	22	17	83	27	136	18	30	18	110
Arithmetic Variance	4.04 x 10 ⁶	2.03 x 10 ⁵	84100	1.37 x 10 ⁷	1.35 x 10 ⁶	1.88 x 10 ⁷	12845	4.37 x 10 ⁵	1.33 x 10 ⁵	1.0 x 10 ⁸
Arithmetic Standard Deviation	2010	451	290	3696	1163	4334	113	661	365	10004
% Samples Below Detection Limit	0	0	92	0	<1	8	0	0	0	0
Log Mean (Log units)	2.79	2.95	2.53	3.39	2.55	4.29	2.07	2.79	2.13	2.61
Log Mean (ppm)	16	19	13	30	13	73	8	16	8	14
Log Variance	0.66	1.29	0.34	2.42	1.32	1.31	1.68	0.80	1.44	1.41
Log Standard Deviation (log units)	0.81	1.14	0.58	1.56	1.15	1.14	1.30	0.89	1.20	1.19
Log Standard Deviation (ppm)	5	6	5	6	5	8	4	5	4	5
Correlation Coefficients	Zn 0.514 Sn 0.296 Cu 0.250	Zn 0.062 Sn 0.302 Cu 0.114	Zn 0.223 Sn -0.055 Cu 0.206	Zn 0.112 Sn 0.397 Cu 0.277	Zn 0.260 Sn 0.181 Cu 0.233	Zn 0.091 Sn 0.393 Cu 0.280	Zn 0.306 Sn 0.327 Cu 0.294	Zn 0.296 Sn -0.122 Cu 0.191	Zn 0.054 Sn 0.328 Cu 0.177	Zn 0.452 Sn 0.362 Cu 0.174
<u>TIN</u>										
No. of samples	402	360	1358	629	453	331	32	275	366	99
Arithmetic Mean	36	50	28	21	17	47	41	508	26	35
Arithmetic Variance	2.3 x 10 ⁶	3.7 x 10 ⁷	3.95 x 10 ⁷	1.20 x 10 ⁶	5.23 x 10 ⁵	3.92 x 10 ⁶	1.01 x 10 ⁶	3.42 x 10 ⁸	5.74 x 10 ⁶	4.12 x 10 ⁶
Arithmetic Standard Deviation	1509	6081	6286	1094	724	1979	1005	18488	2396	2030
% Samples Below Detection Limit	11	0	10	0	0	0	0	0	6	0
Log Mean (log units)	2.49	2.20	2.26	2.41	2.17	2.62	1.90	5.48	2.09	2.31
Log Mean (ppm)	12	9	10	11	9	14	7	240	8	10
Log Variance	1.49	1.16	1.12	1.33	1.25	2.10	1.72	1.59	1.33	0.98
Log Standard Deviation (log units)	1.22	1.08	1.06	1.15	1.12	1.45	1.31	1.26	1.15	0.99
Log Standard Deviation (ppm)	5	4	5	5	4	5	4	10	4	5
Correlation Coefficients	Zn 0.363 Cu 0.314 Pb 0.296	Zn 0.252 Cu 0.359 Pb 0.302	Zn 0.163 Cu 0.074 Pb -0.055	Zn -0.026 Cu 0.198 Pb 0.397	Zn 0.184 Cu 0.178 Pb 0.181	Zn 0.006 Cu 0.029 Pb 0.393	Zn 0.101 Cu 0.193 Pb 0.327	Zn -0.095 Cu 0.221 Pb -0.122	Zn 0.016 Cu 0.040 Pb 0.328	Zn 0.280 Cu -0.020 Pb 0.362

	ROCK 1 MT CLEVELAND SEQUENCE	ROCK 2 MINE/FALLS CREEK SEQUENCE	ROCK 3 HALLS FORMATION	ROCK 4 MT BISCHOFF SEQUENCE	ROCK 5 GREENSTONE SEQUENCE	ROCK 6 MEREDITH GRANITE	ROCK 7 TERTIARY BASALT	ROCK 8 CLEVELAND MINE AREA	ROCK 9 DEEP CREEK BASIC VOLCANICS	ROCK 10 WASHINGTON HEY MAFIC SEQUENCE
COPPER										
No. of samples	402	402	1216	714	534	359	33	275	389	126
Arithmetic Mean	32	38	36	51	38	23	18	165	92	39
Arithmetic Variance	7.6×10^5	2.97×10^6	7.02×10^6	4.94×10^6	2.41×10^6	6.4×10^5	15836	2.53×10^7	5.79×10^6	3.3×10^5
Arithmetic Standard Deviation	871	1724	2649	2222	1554	800	126	5034	2406	577
% Samples Below Detection Limit	0	0	25	0	0	0	0	0	2	0
Log Mean (log units)	3.19	3.16	3.05	3.43	3.17	2.54	2.61	4.42	4.14	3.43
Log Mean (ppm)	24	24	21	31	24	13	13	83	63	31
Log Variance	0.73	0.61	0.86	1.01	0.85	1.01	0.59	1.31	0.91	0.39
Log Standard Deviation (log units)	0.85	0.78	0.93	1.01	0.92	1.00	0.77	1.14	0.95	0.62
Log Standard Deviation (ppm)	6	6	6	6	6	5	5	8	8	6
Correlation Coefficients	Zn 0.531 Sn 0.314 Pb 0.250	Zn 0.579 Sn 0.359 Pb 0.114	Zn 0.816 Sn 0.074 Pb 0.206	Zn 0.440 Sn 0.198 Pb 0.277	Zn 0.402 Sn 0.178 Pb 0.233	Zn 0.228 Sn 0.029 Pb 0.280	Zn 0.712 Sn 0.193 Pb 0.294	Zn 0.684 Sn 0.221 Pb 0.191	Zn 0.671 Sn -0.040 Pb 0.177	Zn 0.515 Sn -0.020 Pb 0.174
ZINC										
No. of samples	356	402	1217	714	534	359	33	275	389	126
Arithmetic Mean	43	35	39	109	37	74	83	175	74	50
Arithmetic Variance	4.07×10^6	1.24×10^6	5.28×10^6	1.89×10^7	3.09×10^6	4.77×10^6	6.07×10^5	2.19×10^7	4.74×10^6	4.25×10^6
Arithmetic Standard Deviation	2017	1116	2297	4342	1759	2184	779	4682	2177	2061
% Samples Below Detection Limit	4	0	25	0	0	0	0	0	2	0
Log Mean (log units)	3.20	3.07	3.25	4.04	3.00	3.70	3.66	4.54	3.90	3.37
Log Mean (ppm)	25	22	26	57	20	41	39	94	49	29
Log Variance	0.61	0.73	0.72	1.53	0.84	1.11	1.34	1.41	0.80	0.52
Log Standard Deviation (log units)	0.78	0.85	0.85	1.24	0.92	1.05	1.16	1.19	0.89	0.72
Log Standard Deviation (ppm)	6	6	6	7	6	7	7	8	7	6
Correlation Coefficients	Cu 0.531 Pb 0.514 Sn 0.363	Cu 0.579 Pb 0.062 Sn 0.252	Cu 0.816 Pb 0.223 Sn 0.163	Cu 0.440 Pb 0.112 Sn -0.026	Cu 0.402 Pb 0.260 Sn 0.184	Cu 0.228 Pb 0.091 Sn 0.006	Cu 0.712 Pb 0.306 Sn 0.101	Cu 0.684 Pb 0.296 Sn -0.095	Cu 0.671 Pb 0.054 Sn 0.016	Cu 0.515 Pb 0.452 Sn 0.280

CLEVELAND SOIL GEOCHEMISTRY OF CLEVELAND SEQUENCE

X ARRY: X1=NO. OF SAMPLES; X2=SUMS OF SQUARES
 X4=MEAN; X5=STANDARD DEVIATION; X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS; X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA; X26=SUMS STAND. DATA; X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	402.0	353.0	402.0	349.0
2	1270.3	1048.6	1234.2	791.0
3	4259.3	3547.2	4082.0	2156.4
4	3.2	3.0	3.1	2.3
5	0.8	1.1	0.9	1.0
6	402.0	353.0	402.0	349.0
7	353.0	353.0	353.0	323.0
8	402.0	353.0	402.0	349.0
9	349.0	323.0	349.0	349.0
16	401.0	352.0	401.0	348.0
17	93.9	352.0	193.1	103.5
18	212.8	193.1	401.0	135.4
19	117.2	103.5	135.4	348.0
26	-0.0	0.0	0.0	-0.0
27	401.0	352.0	401.0	348.0

CORRELATION MATRIX:- FILES 1 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.250	0.531	0.314
Pb	0.250	1.000	0.514	0.296
Zn	0.531	0.514	1.000	0.363
Sn	0.314	0.296	0.363	1.000

PARTIAL REGRESSION COEFFICIENTS

B 0=	1.598	
B 1=	-0.037	Pb
B 2=	0.462	Zn
B 3=	0.112	Sn

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LEVELAND SOIL GEOCHEMISTRY - MINE/FALLS CREEK SEQUENCE

X ARRAY:- X1=NO. OF SAMPLES, X2=SUMS, X3=SUMS OF SQUARES
 X4=MEAN, X5=STANDARD DEVIATION, X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS, X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA, X26=SUMS STAND. DATA, X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	487.0	255.0	487.0	415.0
2	1554.6	711.4	1559.1	1047.1
3	5316.9	2152.7	5287.6	3238.0
4	3.2	2.8	3.2	2.5
5	0.9	0.8	0.8	1.2
6	487.0	255.0	487.0	397.0
7	255.0	255.0	255.0	228.0
8	487.0	255.0	487.0	397.0
9	397.0	228.0	397.0	415.0
16	486.0	36.7	305.9	174.6
17	36.7	254.0	30.4	87.7
18	305.9	30.4	486.0	134.0
19	174.6	87.7	134.0	414.0
26	0.0	-0.0	0.0	-0.0
27	486.0	254.0	486.0	414.0

CORRELATION MATRIX:- FILES 1 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.105	0.629	0.389
Pb	0.105	1.000	0.087	0.271
Zn	0.629	0.087	1.000	0.299
Sn	0.389	0.271	0.299	1.000

PARTIAL REGRESSION COEFFICIENTS

B 0#	0.833	
B 1#	-0.004	Pb
B 2#	0.616	Zn
B 3#	0.158	Sn

CLEVELAND SOIL GEOCHEMISTRY - HALL'S FORMATION

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COPPER

NUMBER OF SAMPLES= 1216
 MAXIMUM VALUE= 1225
 MINIMUM VALUE= 2
 ARITHMETIC MEAN= 36
 VARIANCE= 7.02E+06
 STANDARD DEVIATION= 2649.17
 NUMBER OF SAMPLES BELOW DETECTION LIMIT= 302
 PERCENTAGE SAMPLES BELOW DETECTION LIMIT= 25
 NUMBER OF SAMPLES NOT COUNTED= 0
 NUMBER OF SAMPLES ABOVE POP'N LIMIT= 0
 LOGARITHMIC INTERVAL= 0.32

CLASS INTERVAL	FREQ	FREQ%	CU. FREQ	CU. FREQ%
FROM TO (PPM)				
2.0- 2.7	2	0.16	2	0.16
2.7- 3.7	5	0.41	7	0.58
3.7- 5.2	36	2.96	43	3.54
5.2- 7.1	82	6.74	125	10.28
7.1- 9.8	91	7.48	216	17.76
9.8- 13.5	229	18.83	445	36.60
13.5- 18.7	178	14.64	623	51.23
18.7- 25.8	146	12.01	769	63.24
25.8- 35.6	129	10.61	898	73.85
35.6- 49.1	96	7.89	994	81.74
49.1- 67.8	68	5.59	1062	87.34
67.8- 93.6	69	5.67	1131	93.01
93.6- 129.1	32	2.63	1163	95.64
129.1- 178.2	28	2.30	1191	97.94
178.2- 245.9	13	1.07	1204	99.01
245.9- 339.4	4	0.33	1208	99.34
339.4- 468.4	3	0.25	1211	99.59
468.4- 646.5	1	0.08	1212	99.67
646.5- 892.2	3	0.25	1215	99.92
892.2- 1231.3	1	0.08	1216	100.00

HISTOGRAM
FROM TO
(PPM)

2.0- 2.7	
2.7- 3.7	X
3.7- 5.2	XXXXXXXXXX
5.2- 7.1	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
7.1- 9.8	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
9.8- 13.5	XX
13.5- 18.7	XX
18.7- 25.8	XX
25.8- 35.6	XX
35.6- 49.1	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
49.1- 67.8	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
67.8- 93.6	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
93.6- 129.1	XXXXXXXXXX
129.1- 178.2	XXXXXXX
178.2- 245.9	XXX
245.9- 339.4	X
339.4- 468.4	
468.4- 646.5	
646.5- 892.2	
892.2- 1231.3	

293021

CLEVELAND SOIL GEOCHEMISTRY - BRUJ'S FORMATION

ARRAY:- X1=NO. OF SAMPLES, X2=SUMS OF SQUARES
 X4=MEAN, X5=STANDARD DEVIATION, X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS, X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA, X26=SUMS STAND. DATA, X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	1216.0	118.0	1216.0	1339.0
2	3712.7	298.2	3954.4	3065.2
3	12381.6	793.5	13721.2	8433.0
4	3.1	2.5	3.3	2.3
5	0.9	0.6	0.8	1.0
6	1234.0	136.0	1234.0	1079.0
7	136.0	136.0	136.0	126.0
8	1234.0	136.0	1234.0	1079.0
9	1079.0	126.0	1079.0	135.0
16	1026.9	100.2	1026.9	96.4
17	100.2	178.8	107.4	-28.3
18	1026.9	107.4	1252.9	211.6
19	96.4	-28.3	211.6	1347.8
26	14.6	14.6	24.0	-10.4
27	1265.0	178.8	1252.9	1347.8

CORRELATION MATRIX:- FILES 1 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.206	0.816	0.074
Pb	0.206	1.001	0.223	-0.055
Zn	0.816	0.223	1.000	0.163
Sn	0.074	-0.055	0.163	1.000

NOTE:- VARIABLE 1(B 0) IS THE DEPENDENT VARIABLE, 2 THROUGH N ARE INDEPENDENT.

PARTIAL REGRESSION COEFFICIENTS

B 0=	0.154	
B 1=	0.031	Cu
B 2=	0.905	Pb
B 3=	-0.053	Zn

293026

CLEVELAND SOIL GEOCHEMISTRY - NT BISCHOFF SEQUENCE

HEADING:- X1=NO. OF SAMPLES, X2=SUMS, X3=SUMS OF SQUARES
 X4=MEAN, X5=STANDARD DEVIATION, X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS, X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA, X26=SUMS STAND. DATA, X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	714.0	524.0	714.0	600.0
2	2448.2	1818.8	2881.2	1513.4
3	9117.2	7460.4	12722.2	4478.8
4	3.4	3.5	4.0	2.5
5	1.0	1.5	1.2	1.1
6	756.0	566.0	756.0	641.0
7	566.0	566.0	566.0	520.0
8	756.0	566.0	756.0	641.0
9	640.0	519.0	640.0	640.0
16	749.9	182.4	352.1	162.5
17	182.4	554.5	105.4	245.9
18	352.1	105.4	726.5	43.6
19	163.5	244.8	43.1	629.6
26	-11.2	-26.2	-1.1	-21.1
27	749.9	554.5	726.5	629.3

CORRELATION MATRIX:- FILES 18 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.282	0.477	0.238
Pb	0.282	1.000	0.166	0.413
Zn	0.477	0.166	1.000	0.064
Sn	0.238	0.413	0.064	0.999

PARTIAL REGRESSION COEFFICIENTS

B 0=	1.270	
B 1=	0.100	Cu
B 2=	0.360	Pb
B 3=	0.142	Zn

CLEVELAND SOIL GEOCHEMISTRY - GREEN-TONE SEQUENCES

X ARRAY: X1=NO. OF SAMPLES; X2=SUMS; X3=SUMS OF SQUARES
 X4=MEAN; X5=STANDARD DEVIATION; X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS; X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA; X26=SUMS STAND.DATA; X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	534.0	398.0	534.0	425.0
2	1693.0	1031.5	1604.0	981.1
3	5820.1	3168.1	5267.0	2691.7
4	3.2	2.6	3.0	2.3
5	0.9	1.1	0.9	1.0
6	534.0	398.0	534.0	425.0
7	398.0	398.0	398.0	362.0
8	534.0	398.0	534.0	425.0
9	425.0	362.0	425.0	425.0
16	533.0	107.0	214.0	84.6
17	107.0	397.0	119.8	74.4
18	214.0	119.8	533.0	87.2
19	94.0	74.4	87.2	424.0
26	0.0	-0.0	0.0	-0.0
27	533.0	397.0	533.0	424.0

CORRELATION MATRIX:- FILES 1 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.233	0.402	0.178
Pb	0.233	1.000	0.260	0.181
Zn	0.402	0.260	1.000	0.194
Sn	0.178	0.181	0.194	1.000

NOTE: VARIABLE 1(CB 0) IS THE DEPENDENT VARIABLE, 2 THROUGH N ARE INDEPENDENT.

PARTIAL REGRESSION COEFFICIENTS

B 0=	1.049	
B 1=	0.103	Cu
B 2=	0.354	Pb
B 3=	0.083	Zn

293033

CLEVELAND SOIL GEOCHEMISTRY - MEREDITH GRANITE

LEAD
 NUMBER OF SAMPLES= 323
 MAXIMUM VALUE= 2000
 MINIMUM VALUE= 3
 ARITHMETIC MEAN= 136
 VARIANCE= 1.88E+07
 STANDARD DEVIATION= 4333.56
 NUMBER OF SAMPLES BELOW DETECTION LIMIT= 15
 PERCENTAGE SAMPLES BELOW DETECTION LIMIT= 5
 NUMBER OF SAMPLES NOT COUNTED= 11
 NUMBER OF SAMPLES ABOVE POP'N LIMIT= 0
 LOGARITHMIC INTERVAL= 0.33

CLASS INTERVAL	FREQ	FREQ%	CU.FREQ	CU.FREQ%
FROM TO (PPM)				
2.9- 4.1	6	1.86	6	1.86
4.1- 5.6	0	0.00	6	1.86
5.6- 7.8	0	0.00	6	1.86
7.8- 10.8	23	7.12	29	8.98
10.8- 15.0	0	0.00	29	8.98
15.0- 20.8	11	3.41	40	12.38
20.8- 28.8	0	0.00	40	12.38
28.8- 39.9	49	15.17	89	27.55
39.9- 55.3	67	20.74	156	48.30
55.3- 76.6	0	0.00	156	48.30
76.6- 106.1	84	26.01	240	74.30
106.1- 146.9	0	0.00	240	74.30
146.9- 203.5	29	8.98	269	83.28
203.5- 282.0	0	0.00	269	83.28
282.0- 390.6	37	11.46	306	94.74
390.6- 541.2	9	2.79	315	97.52
541.2- 749.7	0	0.00	315	97.52
749.7- 1038.6	7	2.17	322	99.69
1038.6- 1438.8	0	0.00	322	99.69
1438.8- 1993.3	0	0.00	322	99.69

HISTOGRAM

FROM TO (PPM)	HISTOGRAM
2.9- 4.1	XXXX
4.1- 5.6	
5.6- 7.8	
7.8- 10.8	XXXXXXXXXXXXXXXXXXXX
10.8- 15.0	
15.0- 20.8	XXXXXXX
20.8- 28.8	
28.8- 39.9	XX
39.9- 55.3	XX
55.3- 76.6	
76.6- 106.1	XX
106.1- 146.9	
146.9- 203.5	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
203.5- 282.0	
282.0- 390.6	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
390.6- 541.2	XXXXXXX
541.2- 749.7	
749.7- 1038.6	XXXXXX
1038.6- 1438.8	
1438.8- 1993.3	

293036

SOIL GEOCHEMISTRY - MEREDITH GRANITE

ARRAY:- X1=NO. OF SAMPLES, X2=SUMS, X3=SUMS OF SQUARES
 X4=MEAN, X5=STANDARD DEVIATION, X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS, X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA, X26=SUMS STAND. DATA, X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	358.0	323.0	359.0	318.0
2	910.8	1384.7	1330.0	867.1
3	2672.6	6358.7	5326.0	2965.0
4	2.5	4.3	3.7	2.7
5	1.0	1.1	1.1	1.4
6	358.0	322.0	358.0	317.0
7	322.0	323.0	323.0	287.0
8	358.0	323.0	359.0	318.0
9	317.0	287.0	318.0	318.0
16	357.0	94.9	81.6	9.7
17	94.9	322.0	30.8	125.7
18	81.6	30.8	358.0	2.2
19	9.7	125.7	2.2	317.0
26	-0.0	-0.0	-0.0	-0.0
27	357.0	322.0	358.0	317.0

CORRELATION MATRIX:- FILES 1 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.280	0.228	0.029
Pb	0.280	1.000	0.091	0.393
Zn	0.228	0.091	1.000	0.006
Sn	0.029	0.393	0.006	1.000

NOTE:- VARIABLE (NO 6) IS THE DEPENDENT VARIABLE, 2
 THROUGH N ARE INDEPENDENT.

PARTIAL REGRESSION COEFFICIENTS

B 0=	0.906	
B 1=	0.258	Cu
B 2=	0.191	Pb
B 3=	-0.065	Zn

293041

CLEVELAND: GEOCHEMISTRY-TERTIARY BASALT

* ARRAY:- X1=NO. OF SAMPLES, X2=SUMS, X3=SUMS OF SQUARES
 X4=MEAN, X5=STANDARD DEVIATION, X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS, X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA, X26=SUMS STAND. DATA, X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	33.0	12.0	33.0	29.0
2	86.2	28.9	120.9	60.7
3	244.6	83.3	487.2	170.2
4	2.6	2.4	3.7	2.1
5	0.8	1.1	1.2	1.2
6	33.0	12.0	33.0	29.0
7	12.0	12.0	12.0	10.0
8	33.0	12.0	33.0	29.0
9	29.0	10.0	29.0	29.0
16	32.0	5.5	22.8	5.8
17	5.5	11.0	5.7	5.7
18	22.8	5.7	32.0	3.0
19	5.8	5.7	3.0	28.0
26	-0.0	0.0	-0.0	-0.0
27	32.0	11.0	32.0	28.0

CORRELATION MATRIX:- FILES 1 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.294	0.712	0.193
Pb	0.294	1.000	0.306	0.327
Zn	0.712	0.306	1.000	0.101
Sn	0.193	0.327	0.101	1.000

NOTE:- VARIABLE 1(B 0) IS THE DEPENDENT VARIABLE, 2
 THROUGH N ARE INDEPENDENT.

PARTIAL REGRESSION COEFFICIENTS

B 0=	0.724	
B 1=	0.034	Cu
B 2=	0.454	Pb
B 3=	0.068	Zn

CLEVELAND SOIL GEOCHEMISTRY - MINE AREA

COPPER

NUMBER OF SAMPLES= 275
 MAXIMUM VALUE= 1625
 MINIMUM VALUE= 7
 ARITHMETIC MEAN= 165
 VARIANCE= 2.53E+07
 STANDARD DEVIATION= 5034.45
 NUMBER OF SAMPLES BELOW DETECTION LIMIT= 0
 PERCENTAGE SAMPLES BELOW DETECTION LIMIT= 0
 NUMBER OF SAMPLES NOT COUNTED= 0
 NUMBER OF SAMPLES ABOVE POP'N LIMIT= 0
 LOGARITHMIC INTERVAL= 0.27

CLASS	INTERVAL	FREQ	FREQ%	CU.FREQ	CU.FREQ%
FROM	TO				
(PPM)					
6.9-	9.0	6	2.18	6	2.18
9.0-	11.8	8	2.91	14	5.09
11.8-	15.5	3	1.09	17	6.18
15.5-	20.4	12	4.36	29	10.55
20.4-	26.8	16	5.82	45	16.36
26.8-	35.2	20	7.27	65	23.64
35.2-	46.3	15	5.45	80	29.09
46.3-	60.8	28	10.18	108	39.27
60.8-	79.9	38	13.82	146	53.09
79.9-	104.9	31	11.27	177	64.36
104.9-	137.8	4	1.45	181	65.82
137.8-	181.0	25	9.09	206	74.91
181.0-	237.7	18	6.55	224	81.45
237.7-	312.3	18	6.55	242	88.00
312.3-	410.2	11	4.00	253	92.00
410.2-	538.8	5	1.82	258	93.82
538.8-	707.7	3	1.09	261	94.91
707.7-	929.6	4	1.45	265	96.36
929.6-	1221.1	6	2.18	271	98.55
1221.1-	1604.0	3	1.09	274	99.64

HISTOGRAM

FROM	TO	
(PPM)		
6.9-	9.0	XXXXXXXXXX
9.0-	11.8	XXXXXXXXXXXXXX
11.8-	15.5	XXXX
15.5-	20.4	XXXXXXXXXXXXXXXXXXXXXX
20.4-	26.8	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
26.8-	35.2	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
35.2-	46.3	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
46.3-	60.8	XX
60.8-	79.9	XX
79.9-	104.9	XX
104.9-	137.8	XXXXXXX
137.8-	181.0	XX
181.0-	237.7	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
237.7-	312.3	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
312.3-	410.2	XXXXXXXXXXXXXXXXXXXXXX
410.2-	538.8	XXXXXXX
538.8-	707.7	XXXX
707.7-	929.6	XXXXXX
929.6-	1221.1	XXXXXXXXXX
1221.1-	1604.0	XXXX

CLEVELAND SOIL GEOCHEMISTRY - MINE AREA

043

ZINC

293044

NUMBER OF SAMPLES= 275
 MAXIMUM VALUE= 1575
 MINIMUM VALUE= 5
 ARITHMETIC MEAN= 175
 VARIANCE= 2.19E+07
 STANDARD DEVIATION= 4681.67
 NUMBER OF SAMPLES BELOW DETECTION LIMIT= 0
 PERCENTAGE SAMPLES BELOW DETECTION LIMIT= 0
 NUMBER OF SAMPLES NOT COUNTED= 0
 NUMBER OF SAMPLES ABOVE POP'N LIMIT= 0
 LOGARITHMIC INTERVAL= 0.29

CLASS INTERVAL	FREQ	FREQ%	CU. FREQ	CU. FREQ%
FROM TO (PPM)				
4.9- 6.5	3	1.09	3	1.09
6.5- 8.7	6	2.18	9	3.27
8.7- 11.6	10	3.64	19	6.91
11.6- 15.5	5	1.82	24	8.73
15.5- 20.7	9	3.27	33	12.00
20.7- 27.6	10	3.64	43	15.64
27.6- 36.8	12	4.36	55	20.00
36.8- 49.1	22	8.00	77	28.00
49.1- 65.5	29	10.55	106	38.55
65.5- 87.4	25	9.09	131	47.64
87.4- 116.6	15	5.45	146	53.09
116.6- 155.5	28	10.18	174	63.27
155.5- 207.5	27	9.82	201	73.09
207.5- 276.7	22	8.00	223	81.09
276.7- 369.2	21	7.64	244	88.73
369.2- 492.4	16	5.82	260	94.55
492.4- 656.9	5	1.82	265	96.36
656.9- 876.2	4	1.45	269	97.82
876.2- 1168.8	3	1.09	272	98.91
1168.8- 1559.1	2	0.73	274	99.64

HISTOGRAM

FROM TO (PPM)	HISTOGRAM
4.9- 6.5	XXXXXX
6.5- 8.7	XXXXXXXXXXXXXXXX
8.7- 11.6	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
11.6- 15.5	XXXXXXXXXX
15.5- 20.7	XXXXXXXXXXXXXXXXXXXXXXXX
20.7- 27.6	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
27.6- 36.8	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
36.8- 49.1	XX
49.1- 65.5	XX
65.5- 87.4	XX
87.4- 116.6	XX
116.6- 155.5	XX
155.5- 207.5	XX
207.5- 276.7	XX
276.7- 369.2	XX
369.2- 492.4	XX
492.4- 656.9	XXXXXXXXXXXX
656.9- 876.2	XXXXXXXXXX
876.2- 1168.8	XXXXXX
1168.8- 1559.1	XXXX

CLEVELAND SOIL GEOCHEMISTRY - MINE AREA
TIN

NUMBER OF SAMPLES= 275
 MAXIMUM VALUE= 11000
 MINIMUM VALUE= 3
 ARITHMETIC MEAN= 508
 VARIANCE= 3.42E+08
 STANDARD DEVIATION= 18488.30
 NUMBER OF SAMPLES BELOW DETECTION LIMIT= 0
 PERCENTAGE SAMPLES BELOW DETECTION LIMIT= 0
 NUMBER OF SAMPLES NOT COUNTED= 0
 NUMBER OF SAMPLES ABOVE POP'N LIMIT= 0
 LOGARITHMIC INTERVAL= 0.41

CLASS INTERVAL FROM TO (PPM)	* *	FREQ *	* *	FREQ% *	* *	CU.FREQ *	* *	CU.FREQ% *
2.9- 4.4	*	1	*	0.36	*	1	*	0.36
4.4- 6.7	*	1	*	0.36	*	2	*	0.73
6.7- 10.1	*	3	*	1.09	*	5	*	1.82
10.1- 15.2	*	1	*	0.36	*	6	*	2.18
15.2- 23.0	*	5	*	1.82	*	11	*	4.00
23.0- 34.7	*	13	*	4.73	*	24	*	8.73
34.7- 52.3	*	15	*	5.45	*	39	*	14.18
52.3- 78.9	*	5	*	1.82	*	44	*	16.00
78.9- 119.0	*	37	*	13.45	*	81	*	29.45
119.0- 179.5	*	10	*	3.64	*	91	*	33.09
179.5- 270.8	*	42	*	15.27	*	133	*	48.36
270.8- 408.6	*	59	*	21.45	*	192	*	69.82
408.6- 616.4	*	28	*	10.18	*	220	*	80.00
616.4- 929.9	*	7	*	2.55	*	227	*	82.55
929.9- 1402.9	*	32	*	11.64	*	259	*	94.18
1402.9- 2116.4	*	11	*	4.00	*	270	*	98.18
2116.4- 3192.9	*	3	*	1.09	*	273	*	99.27
3192.9- 4816.8	*	0	*	0.00	*	273	*	99.27
4816.8- 7266.8	*	0	*	0.00	*	273	*	99.27
7266.8- 10962.8	*	1	*	0.36	*	274	*	99.64

HISTOGRAM

FROM TO (PPM)	X
2.9- 4.4	X
4.4- 6.7	X
6.7- 10.1	XXX
10.1- 15.2	X
15.2- 23.0	XXXXX
23.0- 34.7	XXXXXXXXXXXXXXXXX
34.7- 52.3	XXXXXXXXXXXXXXXXX
52.3- 78.9	XXXXXX
78.9- 119.0	XX
119.0- 179.5	XXXXXXXXXXXX
179.5- 270.8	XX
270.8- 408.6	XX
408.6- 616.4	XX
616.4- 929.9	XXXXXXXXXX
929.9- 1402.9	XX
1402.9- 2116.4	XXXXXXXXXXXX
2116.4- 3192.9	XXX
3192.9- 4816.8	
4816.8- 7266.8	
7266.8- 10962.8	X

293046

CLEVELAND SOIL GEOCHEMISTRY-MINE AREA

ARRAY:- X1=NO. OF SAMPLES, X2=SUMS, X3=SUMS OF SQUARES
 X4=MEAN, X5=STANDARD DEVIATION, X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS, X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA, X26=SUMS STAND. DATA, X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	275.0	125.0	275.0	275.0
2	1214.2	348.6	1248.3	1507.7
3	5720.7	1072.3	6052.6	8703.2
4	4.4	2.0	4.5	5.5
5	1.1	0.9	1.2	1.3
6	275.0	125.0	275.0	275.0
7	125.0	125.0	125.0	125.0
8	275.0	125.0	275.0	275.0
9	275.0	125.0	275.0	275.0
10	274.0	35.2	187.4	60.6
17	35.2	124.0	54.5	-22.6
18	187.4	54.5	274.0	-25.9
19	60.6	-22.6	-25.9	274.0
26	0.0	-0.0	0.0	-0.0
27	274.0	124.0	274.0	274.0

CORRELATION MATRIX:- FILES 1 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.191	0.684	0.221
Pb	0.191	1.000	0.296	-0.122
Zn	0.684	0.296	1.000	-0.095
Sn	0.221	-0.122	-0.095	1.000

NOTE:- VARIABLE 1(CU) IS THE DEPENDENT VARIABLE, 2
 THROUGH 4 ARE INDEPENDENT.

PARTIAL REGRESSION COEFFICIENTS

B ₁	-0.183	
B ₂	0.022	Pb
B ₃	0.681	Zn
B ₄	0.263	Sn

LEVELAND SOIL GEOCHEMISTRY-DRRP CREEK BASIN VOLCANICS

ARRAY:- X1=NO. OF SAMPLES, X2=SUMS, X3=SUMS OF SQUARES
 X4=MEAN, X5=STANDARD DEVIATION, X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS, X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA, X26=SUMS STAND. DATA, X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	389.0	93.0	389.0	352.0
2	1609.3	209.1	1516.1	763.8
3	7010.4	587.2	6220.2	2080.6
4	4.1	2.2	3.9	2.2
5	1.0	1.1	0.9	1.1
6	389.0	93.0	389.0	344.0
7	93.0	93.0	93.0	89.0
8	389.0	93.0	389.0	344.0
9	344.0	89.0	344.0	352.0
16	388.0	33.4	260.3	-14.7
17	33.4	92.0	10.3	58.9
18	260.3	10.3	388.0	5.9
19	-14.7	58.9	5.9	351.0
26	0.0	-0.0	-0.0	0.0
27	388.0	92.0	388.0	351.0

CORRELATION MATRIX:- FILES 1 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.177	0.671	-0.040
Pb	0.177	1.000	0.054	0.328
Zn	0.671	0.054	1.000	0.016
Sn	0.040	0.328	0.016	1.000

NOTE:- VARIABLE 1(CU) IS THE DEPENDENT VARIABLE, 2 THROUGH 4 ARE INDEPENDENT.

PARTIAL REGRESSION COEFFICIENTS

H=	1.257
B ₁ =	0.149
P ₁ =	0.705
I ₁ =	-0.094

CLEVELAND SOIL GEOCHEMISTRY-WASHINGTON HEY MAFIC SEQUENCE

293056

X ARRAYS: X1=NO. OF SAMPLES, X2=SUMS, X3=SUMS OF SQUARES
 X4=MEAN, X5=STANDARD DEVIATION, X6 TO X15 ARE
 THE TOTALS FOR X-PRODUCTS, X16 TO X25 =X-PRODUCTS
 STANDARDISED DATA, X26=SUMS STAND. DATA, X27=SUMS OF
 SQUARES OF STANDARDISED DATA.

1	126.0	110.0	126.0	98.0
2	432.3	289.9	425.0	228.9
3	1532.0	913.4	1498.9	626.6
4	3.4	2.6	3.4	2.3
5	0.6	1.2	0.7	1.0
6	126.0	110.0	126.0	98.0
7	110.0	110.0	110.0	91.0
8	126.0	110.0	126.0	98.0
9	98.0	91.0	98.0	98.0
16	125.0	20.4	64.4	-2.2
17	20.4	109.0	52.7	37.2
18	64.4	52.7	125.0	30.8
19	-2.2	37.2	30.8	97.0
26	-0.0	-0.0	-0.0	-0.0
27	125.0	109.0	125.0	97.0

CORRELATION MATRIX:- FILES 1 TO 24)

	Cu	Pb	Zn	Sn
Cu	1.000	0.174	0.515	-0.020
Pb	0.174	1.000	0.452	0.362
Zn	0.515	0.452	1.000	0.280
Sn	-0.020	0.362	0.280	1.000

NOTE: VARIABLE 1(B 0) IS THE DEPENDENT VARIABLE, 2
 THROUGH N ARE INDEPENDENT.

PARTIAL REGRESSION COEFFICIENTS

B 0=	2.046	
B 1=	-0.012	Pb
B 2=	0.496	Zn
B 3=	-0.111	Sn