TUMMEL BASIN GEOCHEMICAL SURVEY

014669

WHITEHORSE MINING DISTRICT

YUKON TERRITORY

N.T.S. 105-L-9, 10 AND 15

LATITUDE: 62° 45' N

LONGITUDE: 134° 30' W

PREPARED FOR

CYPRUS ANVIL MINING CORPORATION

BY:

R. W. ROLLINGS, C.E.T.

MARCH 28, 1979.

Cyprus Anvil Mining Corporation

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Dear Dr. Simpson:

The accompanying report entitled "Tummel Basin Geochemical Survey" is submitted as a requirement for a B.C.I.T., Business Report Writing, Course number 31.912.

The purpose of the report is to compare the Tummel Basin geochemical results and aeromagnetic surveys with the same data covering the Anvil Range sulphide deposits.

The results of the investigation are that six geochemical surveys warrant further work and that surveys performed by other mining companies over the area should be obtained and re-evaluated in view of preparing detailed exploration programs.

I would appreciate the opportunity to follow-up in these investigations.

Yours truly,

R. W. Rollings, C.E.T.
Senior Engineering Technician

RWR/ew
Encl.

CYPRUS ANVIL

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TUMMEL BASIN GEOCHEMICAL SURVEY

SUMMARY

A northwest extension of the Anvil Range host units underlies part of the Tummel Basin.

The similarities of data associations between the Anvil Range sulphide deposits and the Tummel Basin geochemical anomalies suggests that the Tummel Basin is prime exploration ground for the discovery of an Anvil Range-Type sulphide deposit.

Geochemical anomalies not covered by claims should be staked. Detailed exploration programs for the staked areas should be initiated.

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INTRODUCTION

The Tummel Basin geochemical survey was done to test a northeast extension of the Anvil Range host units. Seven out of eight Anvil Range sulphide deposits show a surface geochemical response, and of these seven, six are related to aeromagnetic highs.

Cyprus Anvil's geochemical results and Federal aeromagnetic maps are the data used in comparing the two areas.

LOCATION AND ACCESS

The Tummel Basin area is located 30 kilometers northwest of the town of Faro in the Whitehorse Mining District, Yukon Territory at approximately 62° 45' N x 134° 30' W (Figure 1).

HISTORY OF THE AREA

Exploration in the survey area began in 1935. Gold and silver were the primary metals of interest.

Since the discovery of the Faro Deposit in 1965, a number of mining companies have explored the Tummel Basin for lead and zinc, because the area is underlain by rocks similar to the host units in the Anvil Range.

Appendix A lists the companies that have done work in the Tummel Basin.

TUMMEL BASIN GEOCHEMISTRY

A total of 1776 soil samples were taken over the Tummel Basin. Soil sampling was carried out over the area on flagged lines at 1,000 meter spacings. Samples were taken along the lines at 500 meter intervals. This is the same line spacing and sample interval used to detect geochemical anomalies associated with the Anvil Range sulphide deposits.

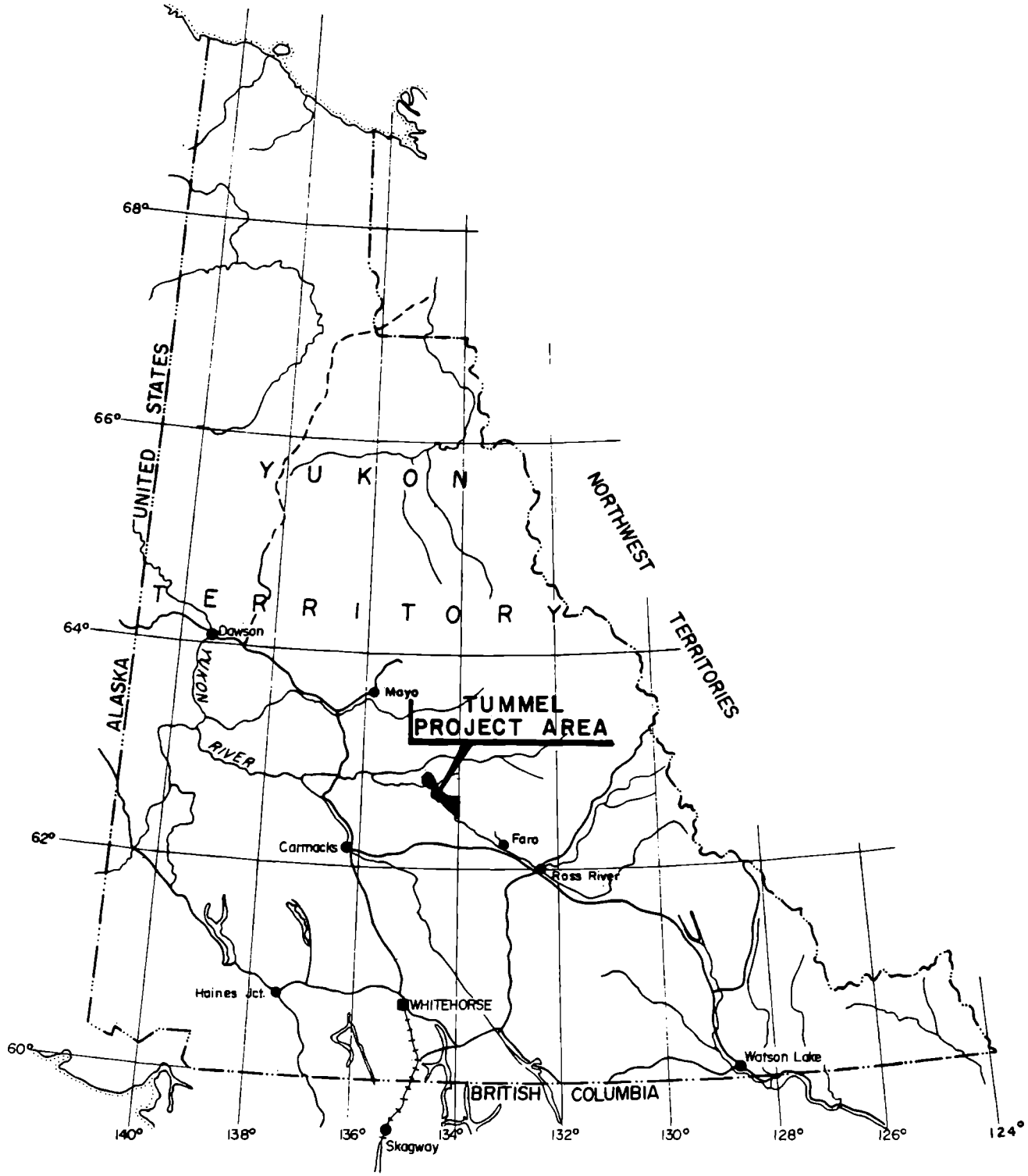

FIGURE 1

CYPRUS ANVIL MINING CORPORATION

LOCATION MAP

TUMMEL BASIN GEOCHEMICAL SURVEY

YUKON

SCALE 1" = 100 MILES

552 sediment samples were taken at 400 meter intervals along the streams in the survey area.

Samples were sent to Barringer Research for analysis. The quantities of copper, lead, and zinc contained in the samples were determined using the atomic absorption method.

STATISTICAL ANALYSIS

Stream analytical data and soil analytical data were separated, and placed on computer tape for geostatistical analysis. Two statistical studies were performed on both sets of data, Appendix B.

The first study gave unrealistic results for the standard deviation values. It included erratic high analysis for the various elements, which under standard practice are omitted from geostatistical analysis.

The second study utilized 95% of the data, and omitted the erratic high values. The results are summarized in Table I and were used to contour the geochemical values, Maps 1-1, 1-2, 1-3, and 1-4.

DISCUSSION OF GEOCHEMICAL ANOMALIES

Anomaly 1 (Map 1-1) is a strong coincident copper-lead anomaly that covers an area of approximately three square kilometers. Zinc has been transported down-slope extending the anomaly to the south. This anomaly covers rocks of the Vangorda Formation.

Anomaly 2 (Map 1-1) is a coincident copper-lead anomaly covering an area of one square kilometer. Zinc is not associated with this anomaly. A stream draining to the north carries anomalous values for copper, lead, and zinc. The area between anomaly 2 and the stream requires more sampling. The anomaly covers rocks of the Vangorda Formation.

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TABLE I - TUMMEL BASIN STATISTICAL RESULTS

	Mean ($\bar{x}$)	Standard Deviation (s)	Background ($\bar{x}$+s)	Anomalous ($\bar{x}$+2s)
A. SOIL SAMPLES				
Copper (ppm)	24	10	34	44
Lead (ppm)	20	6	26	32
Zinc (ppm)	71	26	97	125
B. SILT SAMPLES				
Copper (ppm)	32	12	44	56
Lead (ppm)	17	6	23	29
Zinc (ppm)	110	52	162	214

Note: Parts per million values (ppm) are rounded off.

Anomalies 3 and 4 (Map 1-2) are coincident copper-lead anomalies covering an area of 25 square kilometers. A zinc anomaly occurs down-slope south of the copper-lead area. The anomalies cover rocks of the Vangorda Formation.

Anomaly 5 (Map 1-2) is a coincident copper-lead anomaly covering an area of 10 square kilometers. Anomalous lead values are scattered throughout the area, and are associated with high copper values. Few anomalous zinc values occur in this area. The anomaly covers rocks of the Vangorda Formation.

Anomaly 6 (Map 1-3) is an area of about 12 square kilometers containing scattered soil copper-lead-zinc highs. Streams draining the area to the northwest and southeast carry interesting values in copper, lead, and zinc. The anomaly covers rocks of the Mt. Mye Formation.

Figure 2 compares the Tummel soil anomaly peaks with geochemical peaks from anomalies covering the Anvil Range sulphide deposits.

Anomaly 7 (Map 1-4) is a strong stream sediment anomaly. High values for copper, lead, and zinc extend along Anvil Creek for a distance of 5 kilometers. The area was covered by the MARY and MARK Claims, subsequently restaked as the TAY Claims. No high metal concentration is indicated in the soil line crossing Anvil Creek, the stream anomaly is considered to be transported.

Anomaly 8 (Map 1-1) is a strong stream anomaly located 1.5 kilometers north of soil anomaly 2. The stream sediment carries above background values for copper, lead, and zinc.

Anomaly 9 (Map 1-1) is a stream anomaly located 6 kilometers north of soil anomaly 1 on Horsefall Creek. Above background values for copper and zinc, and interesting lead values occur in the stream sediments.

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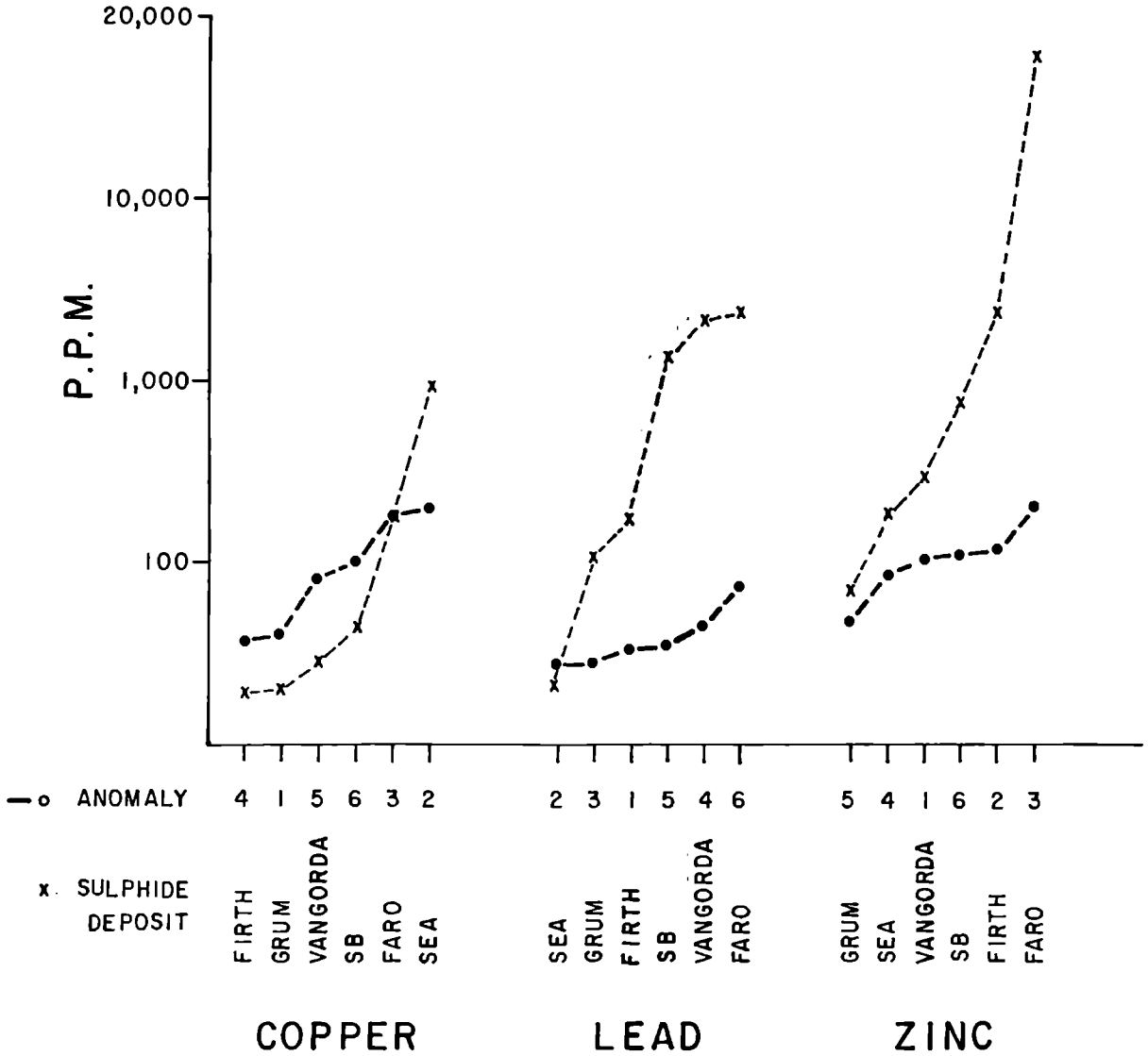

FIGURE 2
COMPARISON OF ANOMALY PEAKS

MARCH 26,1979 rwr.

AEROMAGNETICS

Government aeromagnetic surveys covering the Tummel Basin and Anvil Range were used to compare the geophysical response over the two areas. Map sheets 105-L-9, 10, and 15 cover the Tummel Basin area and map sheets 105-K-2, 3, and 6 cover the Anvil Range area.

Aeromagnetic response over the Anvil Range rocks is relatively flat. Gamma values range from 58,260 in the northeast to 58,520 in the southeast for a total variance of 260 gammas.

Sulphide deposits of the Anvil Range contain the magnetic mineral pyrrhotite which is responsible for the surface aeromagnetic response over the deposits.

The strength of an aeromagnetic response over a sulphide deposit depends on:

1) The magnetic characteristics of the minerals contained in the sulphide deposit;
2) The depth at which the sulphide deposit lies below the surface;
3) The thickness of overburden covering the sulphide deposit;

The Grum, Vangorda, Swim, SB and Sea Deposits are associated with strong aeromagnetic highs. The Faro Deposit lies on the flank of a weak aeromagnetic response, Map 3.

Aeromagnetic response over the Tummel Basin rock is also relatively flat. Gamma values range from 3,090 in the northeast to 3,480 in the southeast for a total variance of 390 gammas, Map 4.

Anomaly 1 lies in a magnetic low.

Anomalies 2, 3, and 4 lie on a weak linear aeromagnetic response. Gamma values range between 3,120 at the northwest end and 3,180 at the southeast end.

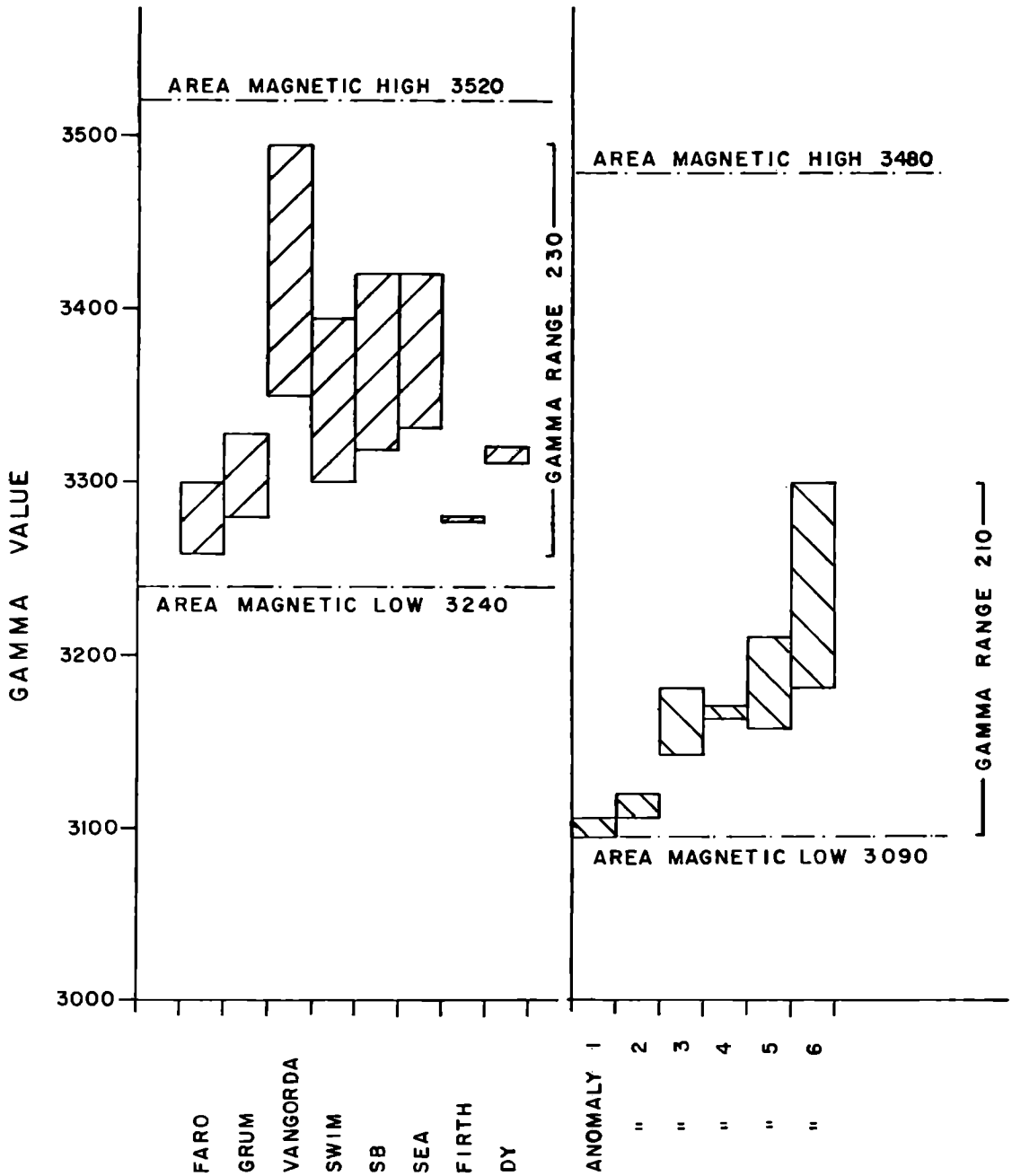

FIGURE 3

COMPARISON OF AEROMAGNETIC RESPONSES

March 26, 1979 rwr

Anomaly 5 is associated with a 3,200 gamma high.

Anomaly 6 is associated with a 3,300 gamma high.

Figure 3 compares the aeromagnetic responses related to the Anvil Range sulphide deposits with the responses associated with the Tummel Basin geochemical anomalies. The aeromagnetic contour interval of the Anvil Range survey was adjusted to conform with the contour interval of the Tummel Basin survey. By subtracting 55,000 gammas from the Anvil Range contour interval, a comparison of data was obtained.

AGE OF SULPHIDE DEPOSITS

The known stratabound sulphide deposits in the Anvil Range are located near the base of the Vangorda Formation or below it, Figure 4. The Vangorda Formation is Upper Cambrian in age and all the sulphide deposits in the Anvil Range are therefore, Upper Cambrian or older.

Tummel Basin is underlain by comparable lithologies similar in age to the Anvil Range host units.

CONCLUSIONS

1) Anvil Range sulphide deposits and Tummel Basin geochemical anomalies occur in rock units of the Vangorda and Mt. Mye Formations.
2) Anvil Range geochemical anomalies are stronger than the Tummel Basin anomalies, except for copper were the reverse is true. This suggests:
    (i) there may be more overburden cover in the Tummel Basin;
    (ii) that the sulphide section does not frequently sub-outcrop within the Tummel Basin;
    (iii) that the Tummel Basin anomalies relate to stratigraphic units, not to orebodies.

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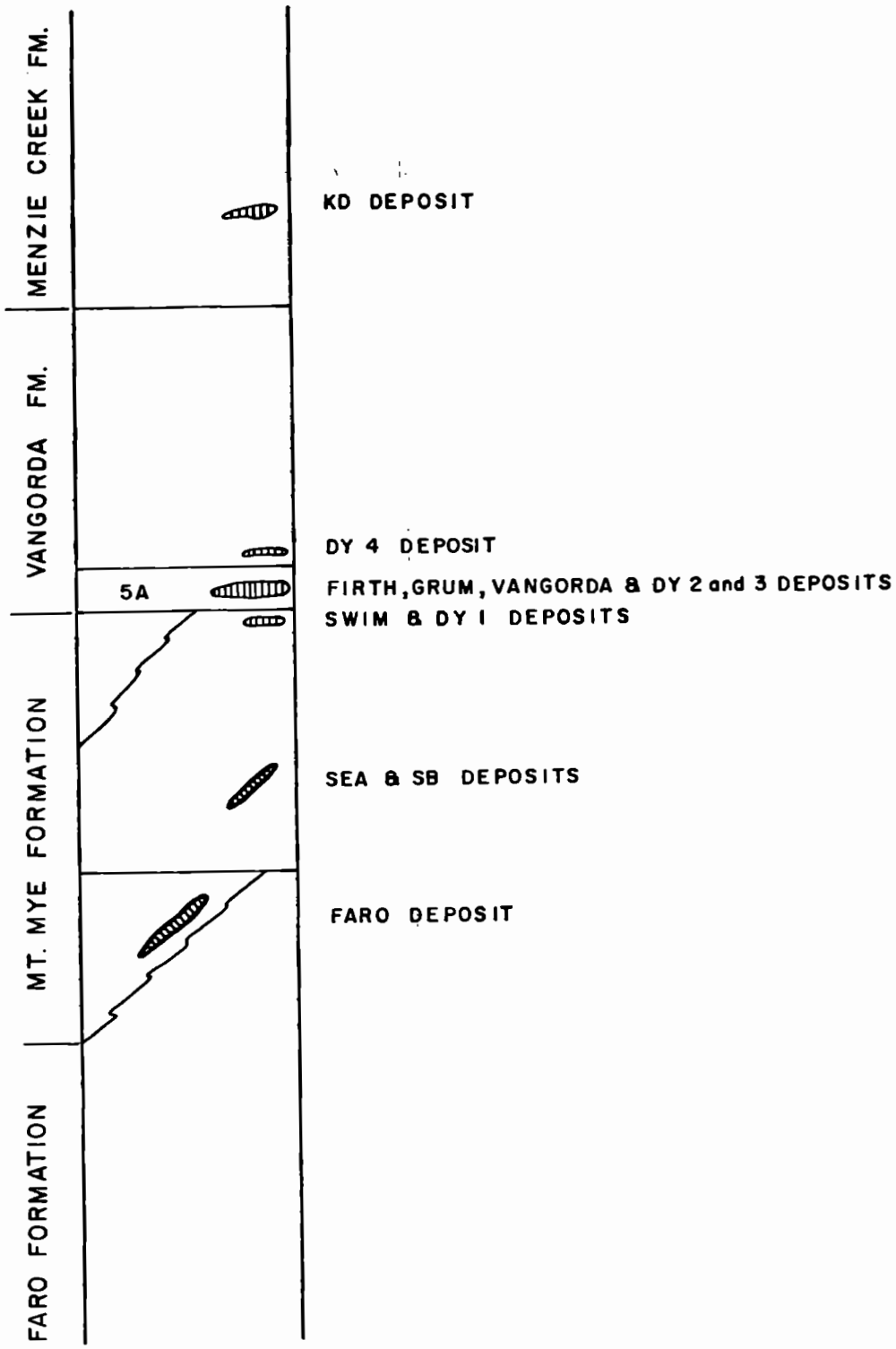

FIGURE 4

SIMPLIFIED STRATIGRAPHIC SECTION
OF THE HOST FORMATIONS

After Dr. D.S. Jennings MARCH 18, 1979 rwr

3) the comparison of the aeromagnetic data for the two areas show that the Anvil Range sulphide deposits and Tummel geochemical anomalies are associated with aeromagnetic responses of similar intensities, 260 gammas verses 210 gammas.

4) although the Tummel Basin geochemical anomalies are weaker than the Anvil Range anomalies, because of their relationship to Anvil Range lithologies and similar aeromagnetic responses, further work should be done in the anomaly areas.

RECOMMENDATIONS

1) Additional stream sediment sampling should be done on anomalies 7, 8, and 9 to test for upstream anomaly extensions.

2) Assessment reports for the following lapsed mineral claims should be obtained: LYN, OZ, ROG, END, LOBO, MARY and MARK Claim groups.

3) Because of the low intensity of the geochemical anomalies, any buried sulphide deposits would be located at depth. Anomalies 1 to 6 inclusive should be tested with Spectral I. P. when the instrument is ready for operation.

Respectfully submitted,

R. W. Rollings
Senior Engineering Technician.

March 28, 1979.

ACKNOWLEDGEMENTS

I would like to express my appreciation to the following:-

Dr. D. S. Jennings for his technical guidance;

Dr. J. G. Simpson for allowing me to use the Tummel Basin results as a submittal for a B.C.I.T. course requirement;

and to

Mrs. E. Woolverton for typing of the manuscript.

LIST OF REFERENCES

1) Cyprus Anvil Geology Maps 105-L-9, 10, & 15, and 105-K-2, 3, & 6.
   Scale 1:50,000.

2) Federal Government Aeromagnetic Maps 105-L-9, 10, & 15, and 105-K-2, 3, & 6.
   Scale 1" = 1 mile.

3) Yukon Territory Claim Maps 105-L-9, 10, & 15.
   Scale 1" = ½ mile.

4) Archer Cathro Northern Cordillera Mineral Inventory.

LIST OF EXPLORATION COMPANIES THAT HAVE DONE WORK IN THE TUMMEL BASIN AREA

APPENDIX A

List of Exploration Companies that have done work in the Tummel Basin Area.

EXPLORATION COMPANY	CLAIM GROUP	OCCURRENCE NO.
1. Anvil Syndicate	Mark	16
2. Spartan Explorations	Arrow & Lobo	17 & 18
3. Golden Gate Explorations	Stone	19
4. Conwest Explorations	Tum	20
5. Bow River Resources	End	23
6. Jarma Resources	Rog	24
7. Essex Minerals	Sue	33
8. Canadian Natural Resources	A & B	39

REVISED 1976
Property Name: Common JAR Other

Location: Lat. 62°27' Long. 134°03' NTS 105L/8

Metals: Major Minor

Type of Mineral Deposit:

History and Previous Work:

Staked as Mark cl (Y53906) in July/70 by the Anvil Synd(Can. Reserve O & GL, Aquitaine C of Can. L, Can. Southern Pet. L, Occidental Mls L, and Husky OL)
* which carried out mapping, gravity and geochem surveys in 1971 and 1972.

Description:

Claims mostly cover an overburden-filled valley but nearby outcrops consist of volcanics and metasediments (unit 15), with a slightly complicated
** aeromagnetic pattern. Gravity anomalies were associated with background geochemical assays and were interpreted as bedrock highs.

References:

* MIR, 1971-72, pp 98-99

REVISED 1976 Occurrence No. 17

Property Name: Common HODDER Other

Location: Lat. 62°35' Long. 134°15' NTS 105L/9

Metals: Major Minor

Type of Mineral Deposit:

History and Previous Work:

Staked as Arrow cl (Y59039) in Sept/70 by the Anvil Synd. (Can Reserve O & GL, Aquitaine C of Can. L, Can. Southern Pet. L, Occidental Mls L, and Husky OL)
** which conducted mapping, geochem and gravity surveys and drilled three holes in 1971, and more mapping and geochem sampling plus an IP survey in 1972.

Description:

Claims are underlain by volcanics and metasediments (unit 15), near a
* 100 gamma aeromagnetic anomaly. No mineralization was found.

References:

* MIR, 1971-72, p.89

REVISED 1976

Occurrence No. 18

Property Name: Common SPAR Other

Location: Lat. 62°36' Long. 134°10' NTS 105L/9

Metals: Major Minor

Type of Mineral Deposit:

History and Previous Work:

Staked as Spar cl (Y13299) in May/67 by Spartan EL, which conducted a small
** magnetometer survey later in the year. Lobell ML staked the Lobo cl (Y98446) about 1.5 miles north in May/75.

Description:

Claims cover a gossan developed in quartz-feldspar-biotite gneiss (unit 15) in contact with biotite granodiorite. Fragments of bull quartz and vuggy coarse grained tourmaline are found in the gossan area. No sulfides are present on surface & geochemical response is flat. A small magnetic anomaly was obtained over the gossan, which is probably derived from a pyrite-pyrrhotite lens within the gneiss.

References:

ER, May/68 by C.L. Smith for Spartan - FFAC

Property Name: Common STONE Other

Location: Lat. 62°37' Long. 134°02' NTS 105L/9

Metals: Major Minor

Type of Mineral Deposit:

History and Previous Work:

Staked as Stone cl (95209) in Dec/65 by Golden Gate EL and Kay cl (98192) in Jan/66 by A. Van Bibber, etc. Golden Gate conducted an aeromag survey later in the year.

Description:

Claims are underlain by metasediments (unit 15) with a flat aeromag response.

References:

CORRECTED - APRIL/73

Property Name: Common MENZIE Other

Location: Lat. 62°39' Long. 134°27' NTS 105L/9

Metals: Major Minor

Type of Mineral Deposit:

History and Previous Work:

Staked as Tum cl (Y9418) in July/66 by Conwest following an airborne mag and EM survey. Prospecting and limited geochemical sampling was conducted later in the year.

Description:

Claims underlain by Unit 15 Mississippian or later volcanics and limy sediments.

References:

Property Name: Common MUIR Other JH

Location: Lat. 62°39' Long. 134°35' NTS 105L/10

Metals: Major Copper Minor Silver, Gold

Type of Mineral Deposit: Vein

History and Previous Work:

* The main showing was found prior to 1935 although no staking records or
* work history have been located. Staked as Farmu cl (73127) in Aug/57 by Gavin Muir and restaked as JH cl (Y10954) in Nov/66 following an airborne mag and EM survey by Glenlyon ML, which conducted soil sampling and ground EM surveys in 1967 and optioned the property in early 1968 to McIntyre Porcupine ML, which drilled one hole (550 ft) later in the year. Restaked as End cl (Y91534) in Nov/74 by Bow River Res L & Envoy Res L, which conducted geochemical and geophysical surveys in 1975.

Description:

The Farmu claims were reportedly staked on an ultrabasic although none has
* been mapped in this location. The main showing is exposed on a small bluff and
* consists of pyrite and chalcopyrite in a quartz stockwork cutting phyllite
* and sericite-chlorite schist. Glenlyon found similar mineralization in
* silicified, ferruginous dolomite and collected two representative chip samples 1500 ft apart, across widths of 10 to 25 ft that averaged about 0.18% Cu, 0.2 oz/ton Ag and trace Au. The drill hole tested the main showing and it intersected numerous zones of chalcopyrite associated with quartz veining. The most continuous mineralization was from 8-24 ft which averaged 0.15% Cu and 0.45 oz/ton Ag while the best grade was 1.41% Cu, 0.7 oz/ton Ag and 0.01
** oz/ton Au from 315 to 319 ft. Envoy discovered mineralized float near the main showing from which two representative samples of 50 fragments each assayed 0.75% and 0.57% Cu. Soil sampling failed to outline extensions of the known showings.

References:

M 200, p.18
ER, Oct/66 by P.H. Sevensma in Glenlyon ML Prospectus
GCNL, 15 Mar/67
P69-55, pp.28-29
MIR, 1975, p.128
** ER, Feb/75 by R.G. Hilker for Bow River & Envoy - FFAC
ER, Oct/75 by J.W. MacLeod for Bow River & Envoy - FFAC

REVISED 1976 Occurrence No. 24

Property Name: Common HUB Other

Location: Lat. 62°41' Long. 134°40' NTS 105L/10

* Metals: Major Copper Minor Silver , Gold

Type of Mineral Deposit: ?

History and Previous Work:

Staked as Sherpa cl (Y1309) in March/66 by J.B. O'Neill, and as Hub cl (Y5468) in May/66 by Glenlyon ML. When the Sherpa cl expired in 1967, the ground was restaked as Hub cl (Y12240). Glenlyon ML flew airborne mag and EM surveys and conducted a soil sampling and mapping program in 1966, completed a ground EM survey, bulldozer trenching and more soil sampling in 1967, and optioned the property in early 1968 to McIntyre Porcupine ML,
** which drilled one hole (684 feet) in a geochemical and EM anomaly later in the year. Restaked as Rog cls(Y66601) in May/72 by R.G. Hilker and C. Shandalla and transferred in 1975 to Jalna Res L, which trenched later in the year.

Description:

The G.S.C. reported pyrite and chalcopyrite in quartz veinlets in this vicinity in 1935 and Glenlyon ML found minor occurrences on these claims. Host rocks are sericite-chlorite schists (unit 15). Glenlyon reported that a grab sample from surface assayed 3.9% Cu. 0.06 oz/ton Ag and trace Au.
** Traces of chalcopyrite associated with pyritic quartz veins were cut throughout the hole. Core assays ranged from 0.02 to 0.3% Cu, 0.1 to 0.2 oz/ton Ag and trace to 0.01 oz/ton Au.

References:

ER, Oct/66 by P.H. Sevensma in Glenlyon ML Prospectus
M 200, p.18
P69-55, pp 28-29
GCNL, 28 June/68, 24 Sept/68

REVISED 1978 Occurrence No. 33

Property Name: Common NELS Other

Location: Lat. 62°53' Long. 135°09' NTS 105L/14

Metals: Major Minor

Type of Mineral Deposit:

History and Previous Work:

Staked as Nels cl (Y6628) in April/67 following an airborne mag and EM survey by Conwest, which carried out prospecting and limited geocehmical sampling later in the year. Restaked as part of a block of 1070 Sue cl
* (Y80651) in Sept/74 by Conwest and Teck Corp. Essex Mls L(U.S. Steel) acquired the Teck interest in early 1974 and formed the Macmillan JV, which conducted
* linecutting (bulldozer), EM, mag and gravity surveys in 1975, 1976 and 1977.

Description:

The claims cover an area with extensive overburden cover and flat aeromagnetic response. They are probably underlain by metasediments of the Anvil Range Group (unit 15).

References:

* MIR, 1975, p.129; 1976, p.164

Property Name: Common ALPHABET Other

Location: Lat. 62°32' Long. 134°07' NTS 105L/9

Metals: Major Minor

Type of Mineral Deposit:

History and Previous Work:

Staked as A & B cl (Y98930) in June-Nov/75 by Swim Lake ML, which conducted a gravity survey later in 1975 and mapping and geochem surveys
** in 1976 before optioning the property to Can Natural Res L. which drilled 2 holes (748 ft) on A2 and B2 claims in 1977. Amax tied on 176 AM cl (YA4830) in Aug/76, cut 52 miles of line and added BM cl in Sept/77. Swim Lake changed its name to Karma Ventures Inc. in 1977.

Description:

The claims are underlain by graphitic and limy phyllite that has been correlated with Cambro-Ord unit 3 in the Anvil District. The gravity survey
** outlined one strong and five weak anomalies. The drilling tested a coincident gravity-geochem anomaly and failed to encounter any significant mineralization.

References:

** MIR, 1975, p.127; 1976, pp.163-164
GCNL: 13 June, 21 Sept/77

APPENDIX B

COMPUTER ANALYSIS OF THE TUMMEL BASIN GEOCHEMICAL RESULTS

FREQUENCY ANALYSIS OF THE TUMMEL AREA SOIL SAMPLES

VARIABLE: 3 -- ZINC

ANALYSIS 2 OF 2 -- REANALYSIS OF THAT DATA WHICH ACCOUNTS FOR AT LEAST 95% OF THE DATA USES IN ANALYSIS 1
THE VALUE CUTOFF ADJUSTED TO: 149.999

NUMBER OF SAMPLES READ --- 1776
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 109
NUMBER USED IN ANALYSIS -- 1667

RANGE: 3.000 TO 149.000

MEAN: 71.477
ST. DEV.: 26.238

INTERVAL			NUMBER	%	CULM.%
0.	TO	4.999	4	.24	.24
5.000	TO	9.999	15	.90	1.14
10.000	TO	14.999	17	1.02	2.16
15.000	TO	19.999	12	.72	2.88
20.000	TO	24.999	19	1.14	4.02
25.000	TO	29.999	15	.90	4.92
30.000	TO	34.999	17	1.02	5.94
35.000	TO	39.999	48	2.88	8.82
40.000	TO	44.999	51	3.06	11.88
45.000	TO	49.999	88	5.28	17.16
50.000	TO	54.999	111	6.66	23.82
55.000	TO	59.999	125	7.50	31.31
60.000	TO	64.999	150	9.00	40.31
65.000	TO	69.999	128	7.68	47.99
70.000	TO	74.999	174	10.44	58.43
75.000	TO	79.999	159	9.54	67.97
80.000	TO	84.999	115	6.90	74.87
85.000	TO	89.999	80	4.80	79.66
90.000	TO	94.999	94	5.64	85.30
95.000	TO	99.999	38	2.28	87.58
100.000	TO	104.999	16	.96	88.54
105.000	TO	109.999	25	1.50	90.04
110.000	TO	114.999	29	1.74	91.78
115.000	TO	119.999	26	1.56	93.34
120.000	TO	124.999	43	2.58	95.92
125.000	TO	129.999	13	.78	96.70
130.000	TO	134.999	12	.72	97.42
135.000	TO	139.999	10	.60	98.02
140.000	TO	144.999	19	1.14	99.16
145.000	TO	149.999	14	.84	100.00

A Z-VALUE = 119.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

98
26
122

FREQUENCY ANALYSIS OF THE TUMMEL AREA SOIL SAMPLES

VARIABLE: 3 -- ZINC

ANALYSIS 1 OF 2 -- ALL DATA WITHIN THE RANGE: 0. - 1000000.000

NUMBER OF SAMPLES READ --- 1776
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 0
NUMBER USED IN ANALYSIS -- 1776

RANGE: 3.000 TO 628.000

MEAN: 79.510
ST. DEV.: 43.583

INTERVAL			NUMBER	%	CULM.%
0.	TO	49.999	286	16.10	16.10
50.000	TO	99.999	1174	66.10	82.21
100.000	TO	149.999	207	11.66	93.86
150.000	TO	199.999	71	4.00	97.86
200.000	TO	249.999	23	1.30	99.16
250.000	TO	299.999	6	.34	99.49
300.000	TO	349.999	6	.34	99.83
350.000	TO	399.999	0	0.	99.83
400.000	TO	449.999	2	.11	99.94
450.000	TO	499.999	0	0.	99.94
500.000	TO	549.999	0	0.	99.94
550.000	TO	599.999	0	0.	99.94
600.000	TO	649.999	1	.06	100.00

A Z-VALUE = 149.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

FREQUENCY ANALYSIS OF THE TUMMEL AREA SOIL SAMPLES

VARIABLE: 2 -- LEAD

ANALYSIS 2 OF 2 -- REANALYSIS OF THAT DATA WHICH ACCOUNTS FOR
AT LEAST 95% OF THE DATA USES IN ANALYSIS 1
THE VALUE CUTOFF ADJUSTED TO: 34.999

NUMBER OF SAMPLES READ --- 1776
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 101
NUMBER USED IN ANALYSIS -- 1675

RANGE: 1.000 TO 34.000

MEAN: 20.431
ST. DEV.: 5.808

INTERVAL			NUMBER	%	CULM.%
0.	TO	1.999	1	.06	.06
2.000	TO	3.999	2	.12	.18
4.000	TO	5.999	16	.96	1.13
6.000	TO	7.999	13	.78	1.91
8.000	TO	9.999	27	1.61	3.52
10.000	TO	11.999	47	2.81	6.33
12.000	TO	13.999	82	4.90	11.22
14.000	TO	15.999	136	8.12	19.34
16.000	TO	17.999	152	9.07	28.42
18.000	TO	19.999	260	15.52	43.94
20.000	TO	21.999	247	14.75	58.69
22.000	TO	23.999	196	11.70	70.39
24.000	TO	25.999	159	9.49	79.88
26.000	TO	27.999	149	8.90	88.78
28.000	TO	29.999	81	4.84	93.61
30.000	TO	31.999	63	3.76	97.37
32.000	TO	33.999	29	1.73	99.10
34.000	TO	35.999	15	.90	100.00

A Z-VALUE = 29.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

FREQUENCY ANALYSIS OF THE TUMMEL AREA SOIL SAMPLES

VARIABLE: 2 -- LEAD

ANALYSIS 1 OF 2 -- ALL DATA WITHIN THE RANGE: 0. - 1000000.000

NUMBER OF SAMPLES READ --- 1776
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 0
NUMBER USED IN ANALYSIS -- 1776

RANGE: 1.000 TO 93.000

MEAN: 21.812
ST. DEV.: 8.442

INTERVAL			NUMBER	%	CULM.%
0.	TO	4.999	6	.34	.34
5.000	TO	9.999	53	2.98	3.32
10.000	TO	14.999	181	10.19	13.51
15.000	TO	19.999	496	27.93	41.44
20.000	TO	24.999	533	30.01	71.45
25.000	TO	29.999	299	16.84	88.29
30.000	TO	34.999	107	6.02	94.31
35.000	TO	39.999	46	2.59	96.90
40.000	TO	44.999	17	.96	97.86
45.000	TO	49.999	15	.84	98.70
50.000	TO	54.999	6	.34	99.04
55.000	TO	59.999	8	.45	99.49
60.000	TO	64.999	2	.11	99.61
65.000	TO	69.999	2	.11	99.72
70.000	TO	74.999	2	.11	99.83
75.000	TO	79.999	0	0.	99.83
80.000	TO	84.999	0	0.	99.83
85.000	TO	89.999	1	.06	99.89
90.000	TO	94.999	2	.11	100.00

A Z-VALUE = 34.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

FREQUENCY ANALYSIS OF THE TUMMEL AREA SOIL SAMPLES

VARIABLE: 1 -- COPPER

ANALYSIS 2 OF 2 -- REANALYSIS OF THAT DATA WHICH ACCOUNTS FOR
AT LEAST 95% OF THE DATA USES IN ANALYSIS 1
THE VALUE CUTOFF ADJUSTED TO: 49,999

NUMBER OF SAMPLES READ --- 1776
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 132
NUMBER USED IN ANALYSIS -- 1644

RANGE: 2.000 TO 49,000

MEAN: 23.592
ST. DEV.: 10,199

INTERVAL		NUMBER	%	CULM.%
2.000 TO	3.999	1	.06	.06
4.000 TO	5.999	13	.79	.85
6.000 TO	7.999	6	.36	1.22
8.000 TO	9.999	34	2.07	3.28
10.000 TO	11.999	105	6.39	9.67
12.000 TO	13.999	121	7.36	17.03
14.000 TO	15.999	145	8.82	25.85
16.000 TO	17.999	125	7.60	33.45
18.000 TO	19.999	143	8.70	42.15
20.000 TO	21.999	130	7.91	50.06
22.000 TO	23.999	88	5.35	55.41
24.000 TO	25.999	96	5.84	61.25
26.000 TO	27.999	78	4.74	66.00
28.000 TO	29.999	74	4.50	70.50
30.000 TO	31.999	81	4.93	75.43
32.000 TO	33.999	90	5.47	80.90
34.000 TO	35.999	77	4.68	85.58
36.000 TO	37.999	54	3.28	88.87
38.000 TO	39.999	47	2.86	91.73
40.000 TO	41.999	37	2.25	93.98
42.000 TO	43.999	28	1.70	95.68
44.000 TO	45.999	25	1.52	97.20
46.000 TO	47.999	24	1.46	98.66
48.000 TO	49.999	22	1.34	100.00

A Z-VALUE = 41.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

FREQUENCY ANALYSIS OF THE TUMMEL AREA SOIL SAMPLES

VARIABLE: 1 -- COPPER

ANALYSIS 1 OF 2 -- ALL DATA WITHIN THE RANGE: 0. - 1000000.000

NUMBER OF SAMPLES READ --- 1776
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 0
NUMBER USED IN ANALYSIS -- 1776

RANGE: 2.000 TO 300.000

MEAN: 27.450
ST. DEV.: 20.662

INTERVAL			NUMBER	%	CULM.%
0.	TO	9.999	54	3.04	3.04
10.000	TO	19.999	639	35.98	39.02
20.000	TO	29.999	466	26.24	65.26
30.000	TO	39.999	349	19.65	84.91
40.000	TO	49.999	136	7.66	92.57
50.000	TO	59.999	60	3.38	95.95
60.000	TO	69.999	27	1.52	97.47
70.000	TO	79.999	15	.84	98.31
80.000	TO	89.999	6	.34	98.65
90.000	TO	99.999	5	.28	98.93
100.000	TO	109.999	7	.39	99.32
110.000	TO	119.999	5	.28	99.61
120.000	TO	129.999	0	0.	99.61
130.000	TO	139.999	0	0.	99.61
140.000	TO	149.999	2	.11	99.72
150.000	TO	159.999	0	0.	99.72
160.000	TO	169.999	1	.06	99.77
170.000	TO	179.999	0	0.	99.77
180.000	TO	189.999	0	0.	99.77
190.000	TO	199.999	0	0.	99.77
200.000	TO	209.999	0	0.	99.77
210.000	TO	219.999	0	0.	99.77
220.000	TO	229.999	0	0.	99.77
230.000	TO	239.999	0	0.	99.77
240.000	TO	249.999	0	0.	99.77
250.000	TO	259.999	0	0.	99.77
260.000	TO	269.999	0	0.	99.77
270.000	TO	279.999	0	0.	99.77
280.000	TO	289.999	0	0.	99.77
290.000	TO	299.999	4	.23	100.00

A Z-VALUE = 49.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

ANALYSIS OF TUMMEL AREA SILT SAMPLES

VARIABLE: 1 -- COPPER

ANALYSIS 1 OF 2 -- ALL DATA WITHIN THE RANGE: 0. - 1000000.000

NUMBER OF SAMPLES READ --- 552
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 0
NUMBER USED IN ANALYSIS -- 552

RANGE: 2.000 TO 328.000

MEAN: 36.391
ST. DEV.: 25.558

INTERVAL			NUMBER	%	CULM.%
0.	TO	19.999	62	11.23	11.23
20.000	TO	39.999	342	61.96	73.19
40.000	TO	59.999	99	17.93	91.12
60.000	TO	79.999	19	3.44	94.57
80.000	TO	99.999	11	1.99	96.56
100.000	TO	119.999	10	1.81	98.37
120.000	TO	139.999	3	.54	98.91
140.000	TO	159.999	1	.18	99.09
160.000	TO	179.999	4	.72	99.82
180.000	TO	199.999	0	0.	99.82
200.000	TO	219.999	0	0.	99.82
220.000	TO	239.999	0	0.	99.82
240.000	TO	259.999	0	0.	99.82
260.000	TO	279.999	0	0.	99.82
280.000	TO	299.999	0	0.	99.82
300.000	TO	319.999	0	0.	99.82
320.000	TO	339.999	1	.18	100.00

A Z-VALUE = 79.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

ANALYSIS OF TUMMEL AREA SILT SAMPLES

VARIABLE: 1 -- COPPER

ANALYSIS 2 OF 2 -- REANALYSIS OF THAT DATA WHICH ACCOUNTS FOR AT LEAST 95% OF THE DATA USES IN ANALYSIS 1
THE VALUE CUTOFF ADJUSTED TO: 79.999

NUMBER OF SAMPLES READ --- 552
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 30
NUMBER USED IN ANALYSIS -- 522

RANGE: 2.000 TO 79.000

MEAN: 31.682
ST. DEV.: 12.490

INTERVAL			NUMBER	%	CULM.%
0.	TO	4.999	2	.38	.38
5.000	TO	9.999	0	0.	.38
10.000	TO	14.999	10	1.92	2.30
15.000	TO	19.999	50	9.58	11.88
20.000	TO	24.999	104	19.92	31.80
25.000	TO	29.999	94	18.01	49.81
30.000	TO	34.999	86	16.48	66.28
35.000	TO	39.999	58	11.11	77.39
40.000	TO	44.999	48	9.20	86.59
45.000	TO	49.999	25	4.79	91.38
50.000	TO	54.999	15	2.87	94.25
55.000	TO	59.999	11	2.11	96.36
60.000	TO	64.999	6	1.15	97.51
65.000	TO	69.999	5	.96	98.47
70.000	TO	74.999	2	.38	98.85
75.000	TO	79.999	6	1.15	100.00

A Z-VALUE = 54.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

ANALYSIS OF TUMMEL AREA SILT SAMPLES

VARIABLE: 2 -- LEAD

ANALYSIS 1 OF 2 -- ALL DATA WITHIN THE RANGE: 0. - 1000000.000

NUMBER OF SAMPLES READ --- 552
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 0
NUMBER USED IN ANALYSIS -- 552

RANGE: 4.000 TO 1000.000

MEAN: 35.460
ST. DEV.: 98.336

INTERVAL			NUMBER	%	CULM.%
0.	TO	49.999	524	94.93	94.93
50.000	TO	99.999	7	1.27	96.20
100.000	TO	149.999	3	.54	96.74
150.000	TO	199.999	1	.18	96.92
200.000	TO	249.999	0	0.	96.92
250.000	TO	299.999	0	0.	96.92
300.000	TO	349.999	0	0.	96.92
350.000	TO	399.999	2	.36	97.28
400.000	TO	449.999	4	.72	98.01
450.000	TO	499.999	1	.18	98.19
500.000	TO	549.999	5	.91	99.09
550.000	TO	599.999	0	0.	99.09
600.000	TO	649.999	0	0.	99.09
650.000	TO	699.999	2	.36	99.46
700.000	TO	749.999	0	0.	99.46
750.000	TO	799.999	1	.18	99.64
800.000	TO	849.999	1	.18	99.82
850.000	TO	899.999	0	0.	99.82
900.000	TO	949.999	0	0.	99.82
950.000	TO	999.999	0	0.	99.82
1000.000	TO	1049.999	1	.18	100.00

A Z-VALUE = 49.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

ANALYSIS OF TUMMEL AREA SILT SAMPLES

VARIABLE: 2 -- LEAD

ANALYSIS 2 OF 2 -- REANALYSIS OF THAT DATA WHICH ACCOUNTS FOR
AT LEAST 95% OF THE DATA USES IN ANALYSIS 1
THE VALUE CUTOFF ADJUSTED TO: 49,999

NUMBER OF SAMPLES READ --- 552
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 28
NUMBER USED IN ANALYSIS -- 524

RANGE: 4.000 TO 43.000

MEAN: 17.489
ST. DEV.: 5.729

INTERVAL		NUMBER	%	CULM.%
4.000 TO	5.999	2	.38	.38
6.000 TO	7.999	3	.57	.95
8.000 TO	9.999	20	3.82	4.77
10.000 TO	11.999	60	11.45	16.22
12.000 TO	13.999	41	7.82	24.05
14.000 TO	15.999	79	15.08	39.12
16.000 TO	17.999	75	14.31	53.44
18.000 TO	19.999	73	13.93	67.37
20.000 TO	21.999	64	12.21	79.58
22.000 TO	23.999	42	8.02	87.60
24.000 TO	25.999	24	4.58	92.18
26.000 TO	27.999	12	2.29	94.47
28.000 TO	29.999	10	1.91	96.37
30.000 TO	31.999	7	1.34	97.71
32.000 TO	33.999	4	.76	98.47
34.000 TO	35.999	2	.38	98.85
36.000 TO	37.999	4	.76	99.62
38.000 TO	39.999	1	.19	99.81
40.000 TO	41.999	0	0.	99.81
42.000 TO	43.999	1	.19	100.00

A Z-VALUE = 27.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

ANALYSIS OF TUMMEL AREA SILT SAMPLES

VARIABLE: 3 -- ZINC

ANALYSIS 1 OF 2 -- ALL DATA WITHIN THE RANGE: 0. - 1000000.000

NUMBER OF SAMPLES READ --- 552
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 0
NUMBER USED IN ANALYSIS -- 552

RANGE: 14.000 TO 1178.000

MEAN: 140.654
ST. DEV.: 152.401

INTERVAL			NUMBER	%	CULM.%
0.	TO	49.999	29	5.25	5.25
50.000	TO	99.999	238	43.12	48.37
100.000	TO	149.999	168	30.43	78.80
150.000	TO	199.999	43	7.79	86.59
200.000	TO	249.999	30	5.43	92.03
250.000	TO	299.999	13	2.36	94.38
300.000	TO	349.999	9	1.63	96.01
350.000	TO	399.999	3	.54	96.56
400.000	TO	449.999	2	.36	96.92
450.000	TO	499.999	0	0.	96.92
500.000	TO	549.999	1	.18	97.10
550.000	TO	599.999	0	0.	97.10
600.000	TO	649.999	2	.36	97.46
650.000	TO	699.999	1	.18	97.64
700.000	TO	749.999	0	0.	97.64
750.000	TO	799.999	0	0.	97.64
800.000	TO	849.999	3	.54	98.19
850.000	TO	899.999	0	0.	98.19
900.000	TO	949.999	3	.54	98.73
950.000	TO	999.999	3	.54	99.28
1000.000	TO	1049.999	0	0.	99.28
1050.000	TO	1099.999	0	0.	99.28
1100.000	TO	1149.999	1	.18	99.46
1150.000	TO	1199.999	3	.54	100.00

A Z-VALUE = 299.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA

ANALYSIS OF TUMMEL AREA SILT SAMPLES

VARIABLE: 3 -- ZINC

ANALYSIS 2 OF 2 -- REANALYSIS OF THAT DATA WHICH ACCOUNTS FOR AT LEAST 95% OF THE DATA USES IN ANALYSIS 1
THE VALUE CUTOFF ADJUSTED TO: 299.999

NUMBER OF SAMPLES READ --- 552
MISSING DATA --------- 0
VALUES ABOVE CUTOFF -- 31
NUMBER USED IN ANALYSIS -- 521

RANGE: 14.000 TO 295.000

MEAN: 110.528
ST. DEV.: 52.116

INTERVAL		NUMBER	%	CULM.%
10.000 TO	19.999	4	.77	.77
20.000 TO	29.999	4	.77	1.54
30.000 TO	39.999	10	1.92	3.45
40.000 TO	49.999	11	2.11	5.57
50.000 TO	59.999	23	4.41	9.98
60.000 TO	69.999	35	6.72	16.70
70.000 TO	79.999	54	10.36	27.06
80.000 TO	89.999	65	12.48	39.54
90.000 TO	99.999	61	11.71	51.25
100.000 TO	109.999	52	9.98	61.23
110.000 TO	119.999	42	8.06	69.29
120.000 TO	129.999	30	5.76	75.05
130.000 TO	139.999	21	4.03	79.08
140.000 TO	149.999	23	4.41	83.49
150.000 TO	159.999	16	3.07	86.56
160.000 TO	169.999	4	.77	87.33
170.000 TO	179.999	5	.96	88.29
180.000 TO	189.999	9	1.73	90.02
190.000 TO	199.999	9	1.73	91.75
200.000 TO	209.999	8	1.54	93.28
210.000 TO	219.999	6	1.15	94.43
220.000 TO	229.999	5	.96	95.39
230.000 TO	239.999	5	.96	96.35
240.000 TO	249.999	6	1.15	97.50
250.000 TO	259.999	1	.19	97.70
260.000 TO	269.999	1	.19	97.89
270.000 TO	279.999	3	.58	98.46
280.000 TO	289.999	3	.58	99.04
290.000 TO	299.999	5	.96	100.00

A Z-VALUE = 219.999 ACCOUNTS FOR AT LEAST 95% OF THE DATA