105K-6

REPORT ON

INTERPRETATION OF GRAVITY SURVEYS

NORTH ANVIL RANGE

YUKON TERRITORY

015105

for

PETER E. WALCOTT & ASSOC. LTD.

by

PATERSON, GRANT & WATSON LIMITED

TORONTO, CANADA

MARCH 1978

PATERSON GRANT & WATSON LIMITED
CONSULTING GEOPHYSICISTS, TORONTO, CANADA

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1. INTRODUCTION

Gravity surveys were conducted in 1976 by Peter E. Walcott & Assoc. Ltd. on two claim blocks in the north Anvil Range area, Yukon Territory. The approximate locations of these blocks are shown in Figure 1. The program was conducted as part of an exploration project on behalf of Metallgesellschaft Canada Limited and Cyprus Anvil Mines Limited to explore for Pb-Zn mineralization. The program was conducted roughly in accordance with specifications established by Dr. N. R. Paterson, as set out in his letter dated June 8, 1976 and attached as Appendix A to this report.

The critical element in the success of the surveys was the correction for terrain effects caused by extreme topographic variations. The photogrammetry and subsequent terrain corrections occupied the whole of 1977 and it was not until January 1978 that Paterson, Grant & Watson Limited had access to the final data necessary for the interpretation. A program of interpretation was designed and work commenced in mid-February.

The following report describes the steps followed in performing the interpretation, and presents the important elements of the interpretation and conclusion.

2. REGIONAL GEOLOGY

The regional geology is described in Geological Survey of Canada Map 13-1961 "Tay River, Yukon Territory", scale

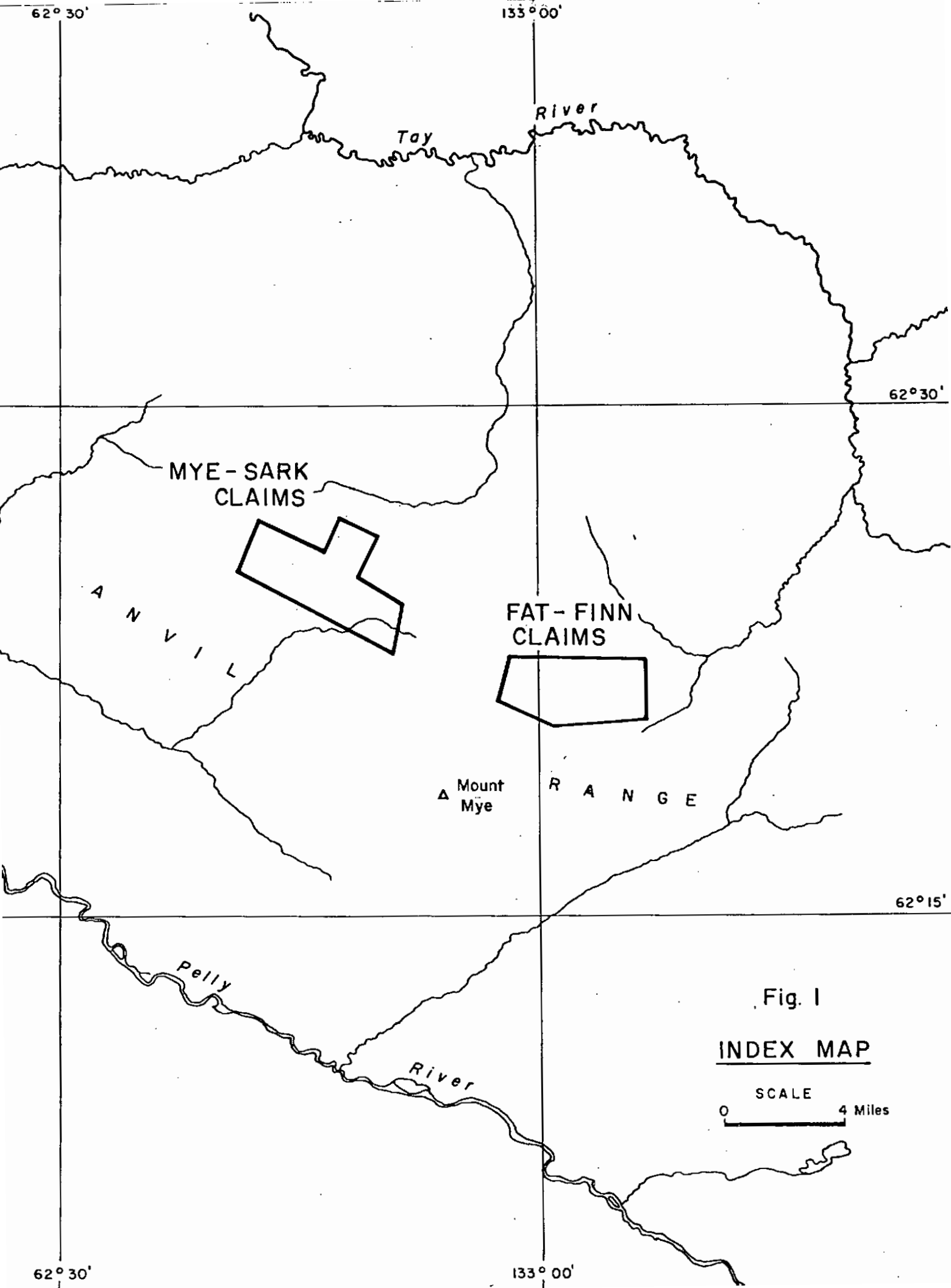


Fig. I

INDEX MAP

1 inch to 4 miles.

The two properties fall on the north flank of the Anvil Range of mountains, the core of which appears to be occupied by Cretaceous quartz monzonite and granodiorite. On both sides the rocks are mainly Paleozoic-Mesozoic sediments, metamorphosed into schist, quartzite, phyllite, marble etc. The principal Pb-Zn deposits are on the south side of the range, and occur mainly in quartz-sericite schist of Mississippian or later age. Control appears to be lithologic rather than structural and a graphitic schist is commonly associated with or lies close to the mineralization.

The Faro deposit, totalling 75 million tons, is now in production; the Vangorda deposit, of 22 million tons, is dormant. Other deposits are undergoing feasibility studies.

The north Anvil Range has not been explored systematically and no mineralization of importance has yet been reported.

3. GRAVITY SURVEY

Gravity surveys were conducted on grids consisting of lines spaced 800 ft. apart with stations at 100-ft. intervals. A total of 44 line miles were surveyed on the Fat-Finn group and 80 line miles on the Mye-Sark group. Terrain corrections were carried out by P.E. Walcott & Assoc. Ltd. using a 100-ft. grid to a distance of 400 ft. from the station, a 200-ft. grid

to a distance of 1600 ft. and a 400-ft. grid to a distance of 9600 ft. A density of 2.7 g/cc was assumed.

Data have been presented by P.E. Walcott & Assoc. in the form of profiles of elevation, Bouguer gravity and terrain-corrected gravity at a horizontal scale of 1 inch to 500 ft.; maps of terrain-corrected gravity at scale 1 inch to 1,000 ft.; and as nine-track, 800 BPI magnetic tapes containing all of the gravity and terrain information.

Gravity values are recorded to the nearest one-hundredth mgal; the probable accuracy of the survey is ±.05 mgal. Terrain corrections of up to 4.8 mgal were required.

4. INTERPRETATION PROCEDURE

4.1 Data Processing

It was obvious on inspecting the data that strong regional gravity gradients were present, probably as a result of granitic intrusions to the south and west of the survey areas. Since the target anomaly (see Appendix A) is only 0.7 mgal and is expected to have a maximum width of 1100 ft., it was clearly necessary to carry out a separation of the regional and residual gravity components.

Firstly, a power spectrum was obtained for each grid. As expected, a continuum of anomaly wavelengths was observed.

Secondly, the spectrum of the Vangorda orebody (Chisholm, 1967, see Appendix A) was calculated. A filter was then designed to remove from the gravity field all effects of anomalies whose wavelengths are significantly greater than those that would be attributable to orebodies of the Vangorda type, using an anomaly width of 2,000 ft. as cut-off. Instrumental and other noise of wavelength less than 150-200 ft. was also removed. The characteristics of the filter are described on the residual gravity maps accompanying this report.

A grid spacing of 100 ft. was adopted for the above processing.

Owing to the steep regional gradients in certain parts of the area, and because the terrain corrections are in some cases quite large, the residual gravity maps in places show effects that are accentuated by the processing. In particular, residual anomalies parallelling the survey lines are sometimes obtained locally where the survey lines parallel the topography.

Despite these problems, the residual gravity maps show anomalies that are not clearly displayed by the Bouguer gravity contours.

Contouring of the residual gravity data was done by mechanical plotter at an interval of .05 mgal.

4.2 Analysis of Residual Gravity Anomalies

The residual gravity maps were inspected and correlated with topography and geology. A strong correlation was immediately evident and it was therefore decided to present the residual gravity contours on a geologic-topographic base.

In particular, it was found that most of the topographic highs coincided with residual gravity lows, surrounded by donut-shaped residual gravity highs. Firstly it was thought that these effects were entirely terrain-induced. Profiles were then constructed across some of the steepest topographic features and terrain corrections were carried out using densities of 2.6, 2.7 and 2.8 g/cc. It was found that the residual features were modified but not removed. It was also noticed that the valleys were occupied by both positive and negative anomalies, flanked by anomalies of the opposite sign. These could not be removed entirely by altering the density used in the terrain corrections.

It was concluded that a combination of lithologic and terrain effects were responsible for the correlation of the residual gravity contours with topography. In

the valleys the effects could be accounted for partly by changing overburden thickness. In the case of the ridges, it was inferred that structure was a controlling feature and that they are in part underlain by low-density rock, probably of acidic composition.

It was further noticeable that few, if any, anomalies of amplitude greater than 0.7 mgal remained after the residual gravity processing.

A number of residual anomalies were picked out on the basis of amplitude, correlation with magnetic and EM anomalies, and geological setting, and were analyzed for geometry and excess mass. Calculations were disappointing in that the maximum tonnage, assuming a massive sulphide concentration of 60% (overall density - 4 g/cc) was just over 10 million tons. Nevertheless, four anomalies were selected, mainly on the grounds of EM correlation, for further analysis.

4.3 EM and Magnetic Correlation

TURAM EM and vertical magnetometer surveys were carried out by Peter E. Walcott & Assoc. Ltd. in conjunction with the gravity surveys. These maps were made available to the writers to assist in the interpretation. Well-defined EM conductors were found to correlate with geologic unit 3E, a graphitic schist, with little departure from the available mapping. Other conductors

were observed over other geologic units, mainly units 3G and 1D.

The magnetic relief was generally small (less than 500 gamma) and no obvious correlation existed between magnetization and lithology.

Few of the residual gravity anomalies showed a significant correlation with either the EM or the magnetics. The two anomalies selected in each area show moderate EM correlation, and in two cases, a magnetic correlation also.

As noted in Appendix A, direct EM and magnetic coincidence is not a necessary feature in this area. However, faced with extremely weak anomalies of the sort obtained on this survey, it was felt that priority should be given where such correlations were evident.

4.4 Detailed Anomaly Analysis

The detailed analysis of the four residual anomalies was carried out on profiles constructed from computer printouts of the digital data. Figures 2 through 5 show the observed Bouguer gravity, the smoothed gravity (assuming a probable error of ±0.05 mgal at each station) and the regional gravity. Tonnage calculations were made on the basis of these profiles and an estimate of strike length from the contour maps.

The smooth gravity anomalies were then digitized and analyzed using a computer model-fitting program called GRAMOD. This program obtains the outlines, locations and densities of bodies that best fit the observed gravity anomalies. The calculated anomalies corresponding to the derived bodies have been plotted in the corresponding figures.

Densities used in the analyses are based on the Vangorda orebody (see Appendix A) and are:

Country rocks	2.8 g/cc
Orebody	4.0 g/cc
Excess density	1.2 g/cc

The orebody density corresponds to a 60% volume concentration of sulphides having an average density of 5.1 g/cc. The relative proportions of the sulphide minerals are: Py-35%, Sph-25%, Gal-15%, Po-10%, Cpy-6%.

A description of each of the four anomalies follows:

4.4.1 MYE-SARK A

The residual anomaly has a maximum amplitude of 0.6 mgal and a width of roughly 600 ft. The main part of the anomaly is 2,000 ft. long, extending from Lines 84W to 108W. An extension to the west at Line 124W could add an additional

1,000 ft. of strike length. The anomaly has lobes on its south side, suggesting possible extensions in this direction.

The excess mass of the body causing the main anomaly is about 0.9 million tons per 1,000 ft. of strike length. This works out to 5.9 million tons of actual mass over a strike length of 2,000 ft., assuming a density of 4 g/cc. The extension to the south could bring the total tonnage to about 8 million tons.

Computer model-fitting (Figure 2) obtains a shallow-dipping tabular body of limited (814 ft.) strike length and an excess density x thickness that is consistent with a body 40 feet thick of excess density 1.2 g/cc.

The mass falls in geological unit 3G, described as "non-calcareous, muscovite-chlorite ± biotite phyllite schist, undifferentiated". It is adjacent to the contact with unit 3E (a graphitic phyllite/schist), which separates unit 3G from unit 3B (a calc-silicate phyllite/schist).

Moderate to strong TURAM EM conductors coincide with or straddle the graphitic zone throughout the area. In the vicinity of the gravity

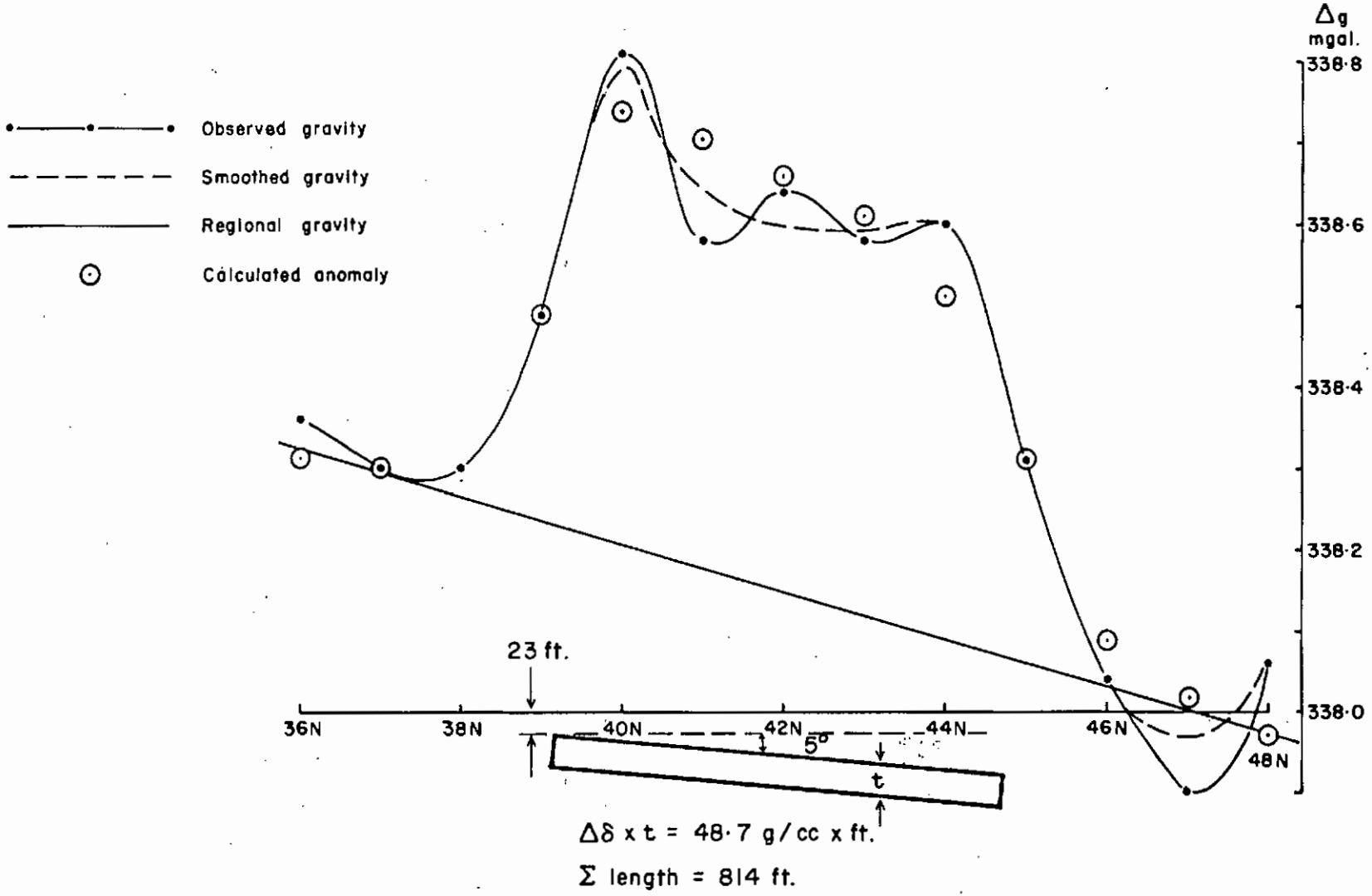


Fig. 2

MYE - SARK A

L-100 W

anomaly the conductors are banded over a width of about 600 ft. and are displaced from the centre of the interpreted mass a distance of approximately 800 ft. The nature of the conductors is consistent with banded graphitic metasediments but local improvements in anomaly strength could be the result of massive sulphides. A magnetic anomaly of approximately 300 gamma flanks the gravity anomaly on its south side, a distance of only 300 ft. from the centre of the interpreted mass.

Faulting is interpreted in a roughly north-south direction, between the two segments of the anomaly.

Topographically the anomaly falls on the south side of a ridge whose axis is marked by a residual gravity low. This low is thought to be partly the result of lithologic changes and partly under-compensation for terrain effect. A portion of the flanking gravity high might also be attributable to these causes.

4.4.2 MYE-SARK B

This anomaly lies in geologic unit 3D, a calc-silicate phyllite/schist, presumably older than unit 3G. It is located some 3,000 ft. south

of the contact with the former unit.

The residual anomaly has a maximum amplitude of 0.5 mgal and a width of approximately 600 ft. Its strike length is approximately 2500 ft.

Excess mass is approximately the same as that of anomaly A, namely 0.9 million tons per 1,000 ft. of strike length. Actual tonnage, based on a strike length of 2500 ft. and a density of 4 g/cc, works out to about 7.5 million tons.

The computer model-fitting (Figure 3) shows a shallow-dipping body of considerable strike length and a density x width consistent with a thickness of 76 ft. at an excess density of 1.2 g/cc.

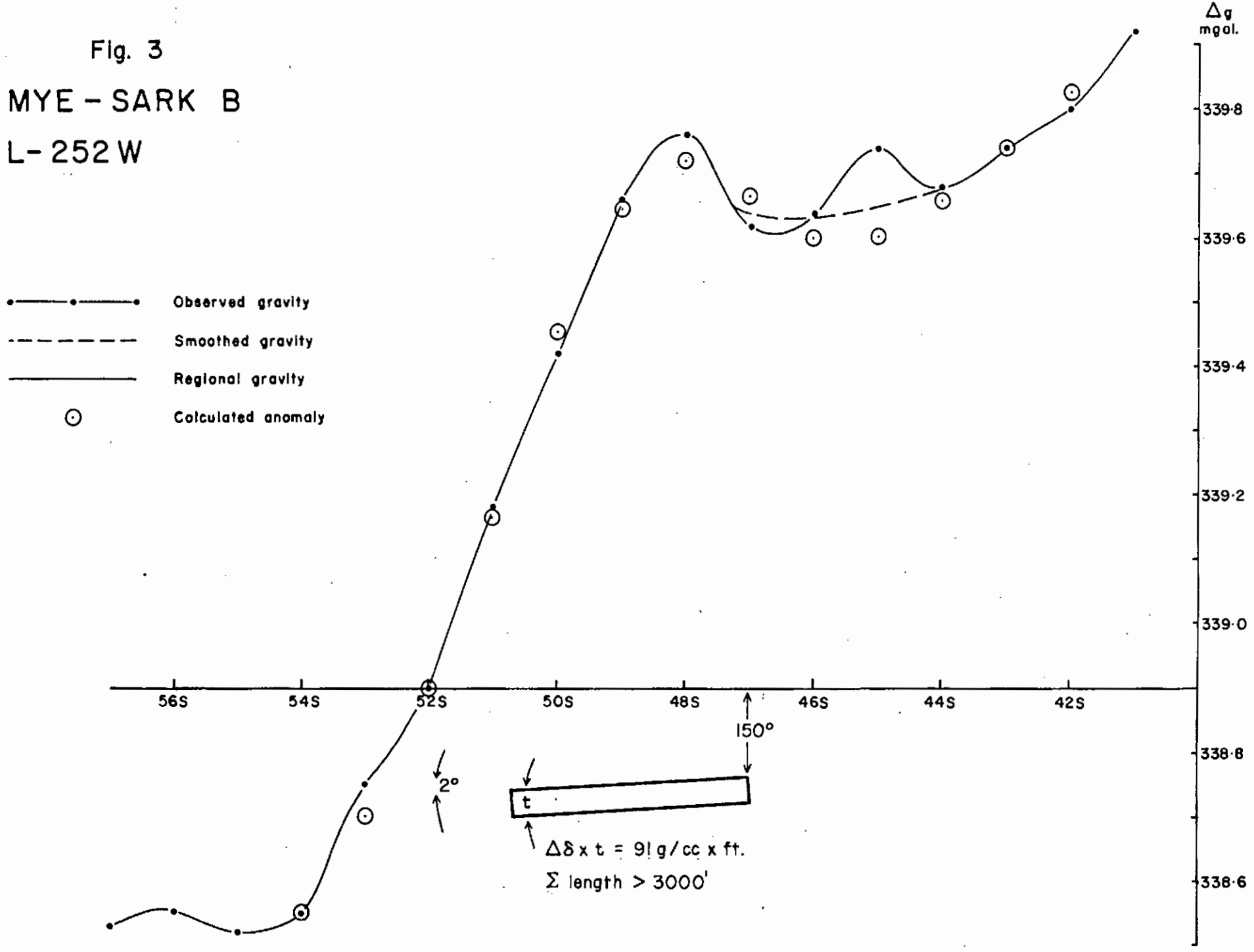
Anomaly B is flanked on its south side at a distance of only 200 ft. by a weak TURAM EM conductor. The length of the conductor corresponds roughly with that of the gravity anomaly.

Vertical magnetic data in the vicinity suggest a double anomaly of less than 100 gamma amplitude, the northern band of which falls very close to the axis of the gravity high.

Fig. 3

MYE - SARK B

L - 252 W



Faulting in a north-south direction is interpreted at both the east and west ends of the anomaly.

Topographically the anomaly falls in a flat area in a saddle between two ridges. There is little likelihood that the anomaly is a result of terrain effects.

4.4.3 FAT-FINN A

This residual anomaly has an amplitude of approximately 0.6 mgal and a width of roughly 400 ft. Its shape is relatively simple and its strike length is 2,000 ft.

The excess mass of the body is calculated to be 1.65 million tons per 1000 ft. of strike length. Assuming a density of 4 g/cc we obtain an actual tonnage of 11 million tons over a strike length of 2000 ft.

The computer model-fitting (Figure 4) shows a shallow-dipping body whose thickness, at an excess density of 1.2 g/cc, would be 71 ft. Strike length is consistent with the plan expression of the anomaly.

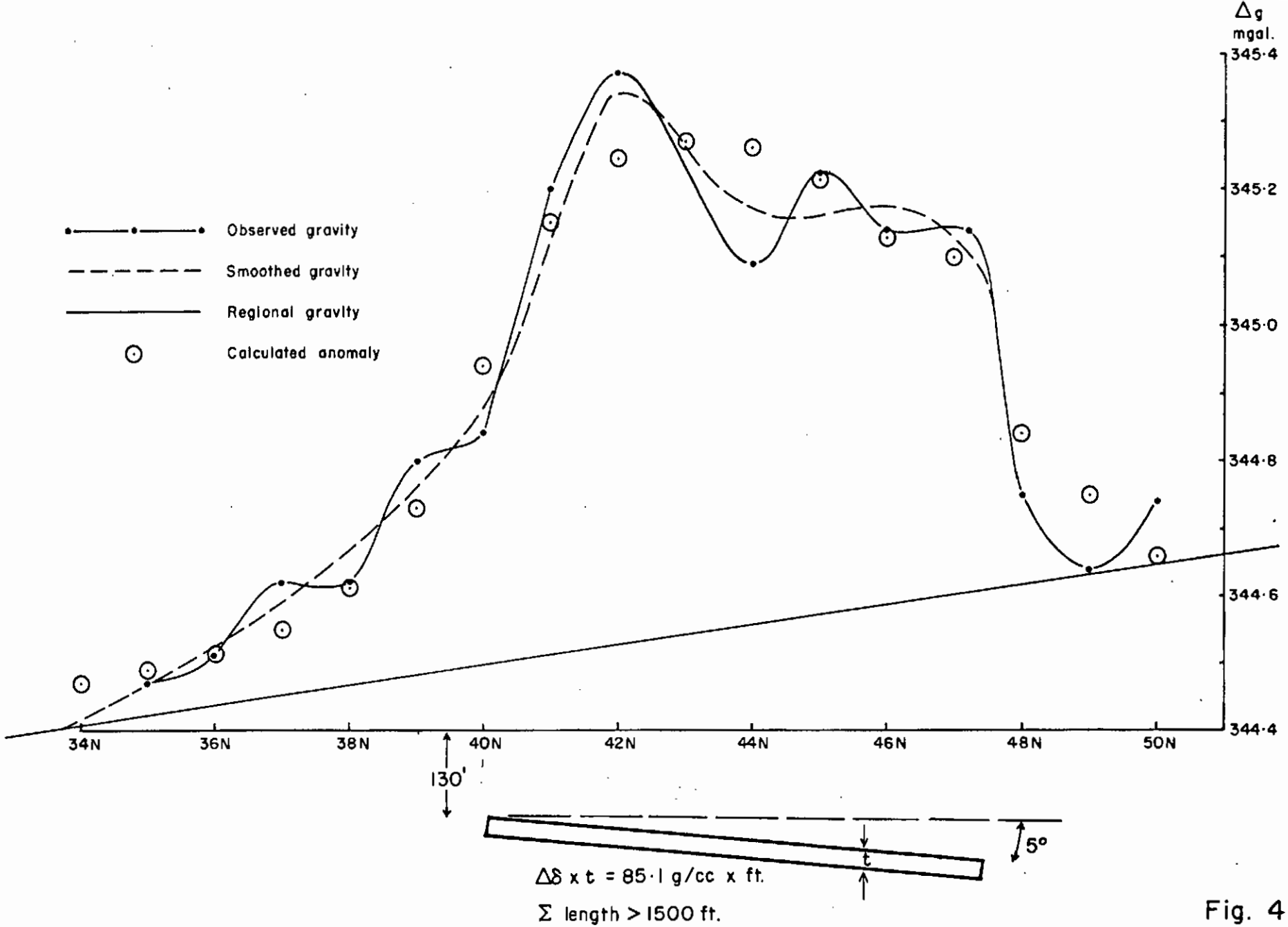


Fig. 4

FAT - FINN A
L - 192 W

The anomaly occurs in unit 3G (as in the case of Mye-Sark A), adjacent to the contact with unit 3E, the graphitic phyllite/schist. The anomaly parallels the major contact with unit 5B which occurs less than 2000 ft. further to the north.

The country rocks contain abundant conductive bands in the vicinity of the anomaly. The strongest of these is centered over unit 3E, but other bands occur within unit 5A, a variably calcareous, graphitic phyllite, and unit 5B. Approximately 1,000 ft. southwest of the anomaly a double conductive band occurs within unit 3G. One of the principal conductor axes, the one associated with unit 3E, falls along the edge of the interpreted mass. The characteristics of the conductor are typical of graphitic meta-sediments, but locally anomalous amplitudes and/or widths may be representative of massive sulphides.

A magnetic anomaly of 400-500 gamma is almost coincident with the gravity anomaly but continues east of the anomaly for several thousand feet. A second magnetic anomaly occurs west of the first and is displaced by what appears to be a cross-fault which also interrupts the EM conductors. The mapping shows a fold in this

vicinity. Another fault is interpreted about 2,000 feet further west at a similar dislocation of magnetic and EM axes.

Topographically the anomaly falls in an easterly trending valley with only moderately sloping sides. It would not appear to be the result of a terrain effect.

4.4.4 FAT-FINN B

The anomaly lies in unit 1C, probably fairly close to a granite contact and about 2500 ft. south of the contact with unit 3G.

The anomaly has a maximum amplitude of 0.6 mgal, a width of about 400 ft. and a strike length of not more than 1,000 ft.

Excess mass of the causative body is calculated to be 1.0 million tons per 1,000 ft. strike length. Actual tonnage, assuming a density of 4 g/cc, is 3.3 million tons over a strike length of 1,000 ft.

The computer model-fitting (Figure 5) shows a shallow-dipping body whose thickness, at an excess density of 1.2 g/cc, would be 43 ft. Calculated strike length is 623 ft., but this figure is unreliable.

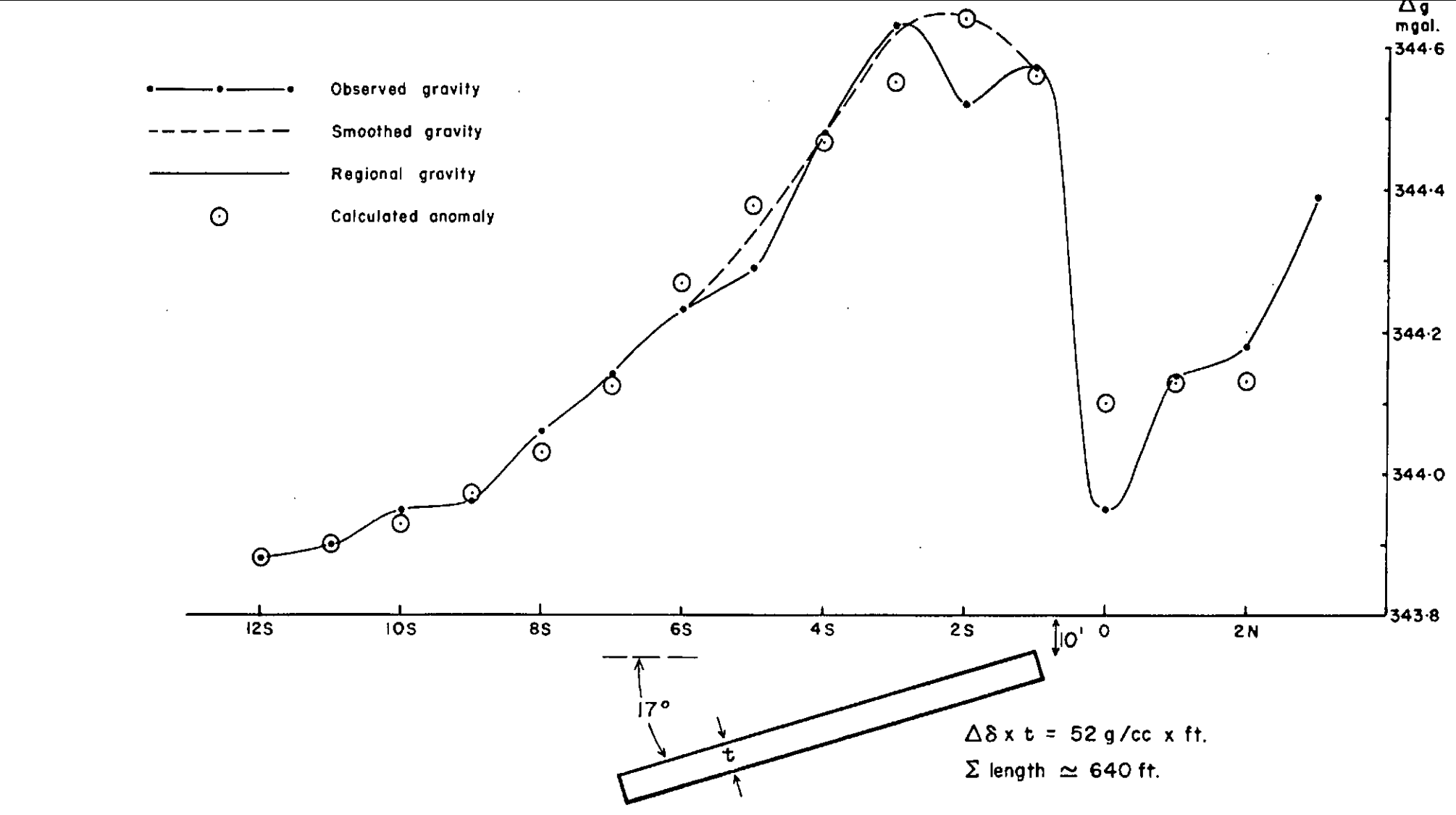


Fig. 5

FAT - FINN B

L - 184 W

A weak TURAM EM anomaly, indicating a poor conductor, coincides with the anomaly over part of its length but continues several thousand feet to the east.

There is no obvious magnetic correlation, but weak (less than 100 gamma) magnetic anomalies occur within a few hundred feet to the north and to the east of the anomaly.

Topographically the anomaly falls on the side of the nose of a northeasterly trending ridge. The ground slope is relatively uniform in its vicinity. The anomaly is flanked by sharp residual lows which may be partly topographically influenced.

The above analyses were carried out using the assumption that the bodies have the shape of dipping plates, i.e. thin in comparison to width and strike length. It is clear that the results obtained justified this assumption as the dimensions and densities derived are consistent with known mineralization in the area.

Other assumptions would have resulted in satisfactory model fits in all cases; however, the causative bodies would not be of simple shape. To demonstrate this a

manual model-fit is shown in Figure 6 for the Mye-Sark A anomaly. The structure is a gabbro sill or volcanic flow of density 3.05 g/cc folded into a syncline with limbs dipping at 48° and 58°. The model is not an optimum one for the local geology but merely serves to illustrate that larger bodies of moderate density could be responsible for the anomalies.

5. SUMMARY AND RECOMMENDATIONS

The residual gravity anomaly map showed no anomalies exhibiting amplitudes that would correspond to sulphide bodies of major economic interest. The majority of the stronger residual anomalies are attributable to a combination of lithologic and terrain effects.

Although the remaining anomalies are below the cut-off amplitude that was used in the design of the geophysical program, four are recognized as being possible sulphide bodies and have been analyzed quantitatively.

The calculated tonnages of these bodies, assuming a density of 4 g/cc (corresponding to about 60% sulphides by volume), are as follows:

Mye-Sark A	8 million tons over 3,000 ft.
Mye-Sark B	7.5 million tons over 2,500 ft.
Fat-Finn A	11 million tons over 2,000 ft.
Fat-Finn B	3.3 million tons over 1,000 ft.

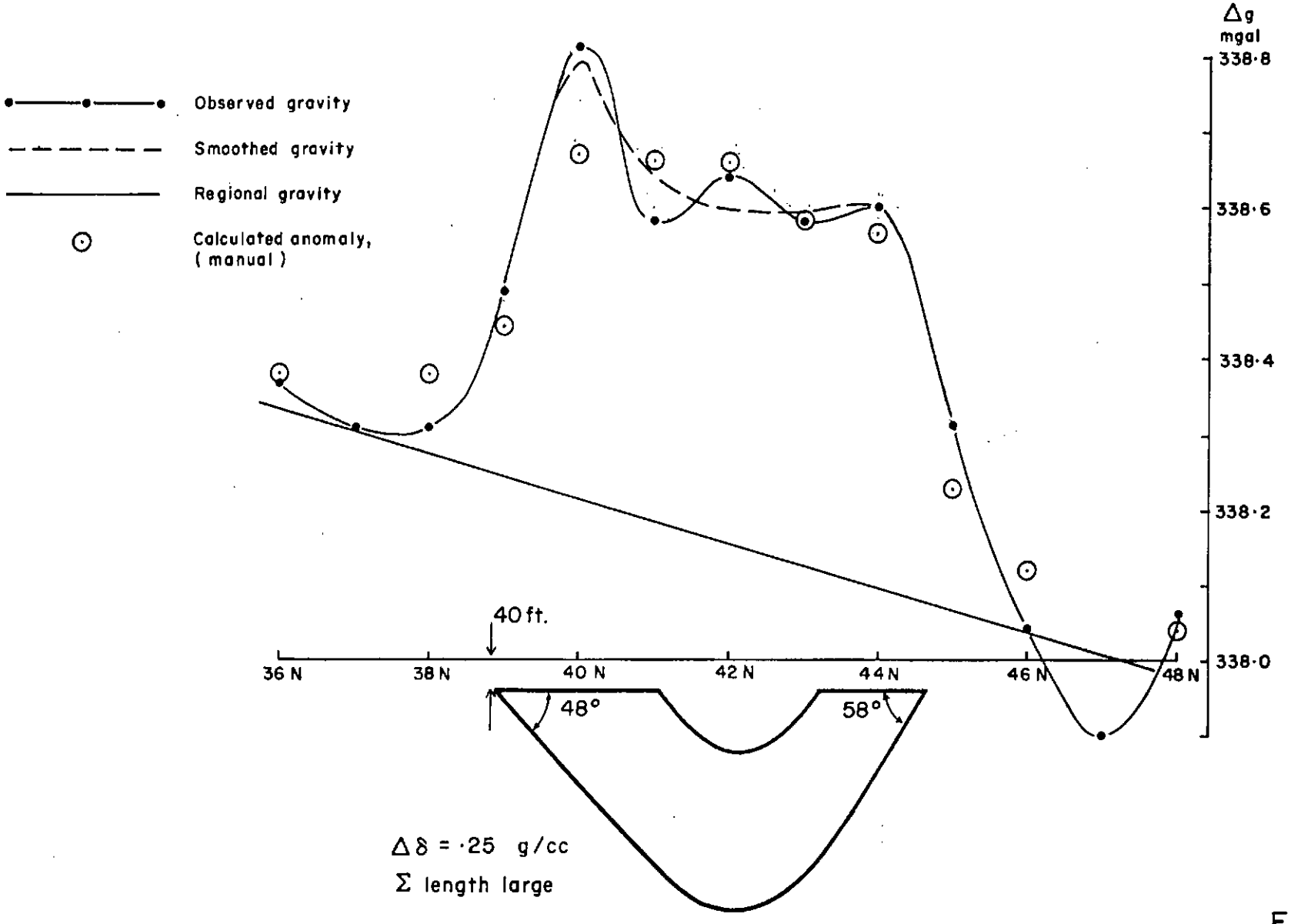


Fig. 6

MYE - SARK A

L - 100 W

In all cases computer model-fitting resulted in thin bodies dipping at shallow angles, with thicknesses (assuming a 4 g/cc density) varying from 40 to 76 ft. If a lower concentration of sulphides is assumed, the thickness becomes proportionately greater. The deepest body is 130 ft. below ground.

Of the four anomalies, Mye-Sark A and Fat-Finn A show the best correlation with EM and magnetic anomalies. Mye-Sark A is partially affected by topography and may have less tonnage than the 8 million shown. Mye-Sark B and Fat-Finn B appear to be less favourably situated in terms of local geology.

Though the computer model-fitting produced very satisfactory results, all four anomalies have been shown to be explainable in terms of lithologic changes, albeit requiring fairly complex structures.

Despite the low tonnages calculated, it is recommended that at least two of the four anomalies should be drilled. On the basis of geophysical characteristics the following order of priority is suggested: (1) Fat-Finn A; (2) Mye-Sark A; (3) Fat-Finn B; (4) Mye-Sark B.

It is the writers' opinion that the two properties have been effectively explored to a depth of at least 300 ft. for Pb-Zn orebodies of the target size.

Respectfully submitted,

PATERSON, GRANT & WATSON LIMITED

Norman R. Paterson, Ph.D., P.Eng.

D. James Misener, Ph.D., P.Eng.

A P P E N D I X A

Letter Dr. N. R. Paterson to

Dr. J. D. Weisser, June 8, 1976

June 8, 1976

Dr. J. D. Weisser
Metallgesellschaft A. G.
Reuterweg 14
Frankfurt, Main, Germany

Re: Gravity Survey, Anvil Area, Yukon

Dear Dr. Weisser,

Dr. Wellmer has asked me to write to you concerning the feasibility of using gravity in his exploration program in the Anvil area, Yukon. I think the question centers around the application of gravity as a primary tool rather than as a means of selectively checking ground EM conductors. The latter application is of course less costly but in our experience has often provided discouraging results, usually because single gravity profiles are extremely difficult to interpret when there are various causes contributing to the gravity effect.

In this letter we examine the application of gravity either as a primary tool or as a systematic follow-up method on two-dimensional grids.

The Target and its Setting

Dr. Wellmer has defined the target as a 20 million ton Pb-Zn orebody of average grade about 10% (combined) and with a specific gravity of approximately 4.0. The body is typically flat-lying and may have dimensions of the order of 100 feet (thickness) x 300 feet (width) x 2000 feet. The host rocks will be mainly schists of approximate density 2.8.

This model follows closely, as you will note from the attached paper by Chisholm, the description of the Vangorda orebody, which is fairly typical of the orebodies in the Anvil area.

.../2

Topography in the area is quite severe, with total relief exceeding 2000 feet and local gradients sometimes reaching 1:1. In the area of your claims, however, gradients are generally less than 1:2, though occasionally reaching 1:1.5.

Intrusive bodies are known to occur in the general area, some of which may be of higher density than the country rocks, and others of lower density. Such bodies are typically several thousand feet in minimum dimension.

The Gravity Anomaly

The profile of the gravity anomaly over the target type of orebody is shown in Figure 1, for depths of burial of 100, 200 and 300 ft. to the upper surface. In this depth range the anomaly decreases from a maximum of 1.33 mgal. to 0.86 mgal. An increase of strike length from 2000 feet to 3000 feet will have the effect of increasing the anomaly only .02 mgal at the shallow depth and .06 mgal at the maximum depth.

In Figure 2 the anomaly has been extrapolated roughly to cover the depth range 50 feet to 500 feet. In this range we might expect the anomaly to vary from 1.9 mgal maximum to 0.7 mgal minimum.

The effect of increasing thickness while decreasing strike length in order to keep the total tonnage constants will result in an increase of anomaly roughly in proportion to the increase in thickness. This will only be true for the shallower bodies; the deeper ones will show a less than proportional increase.

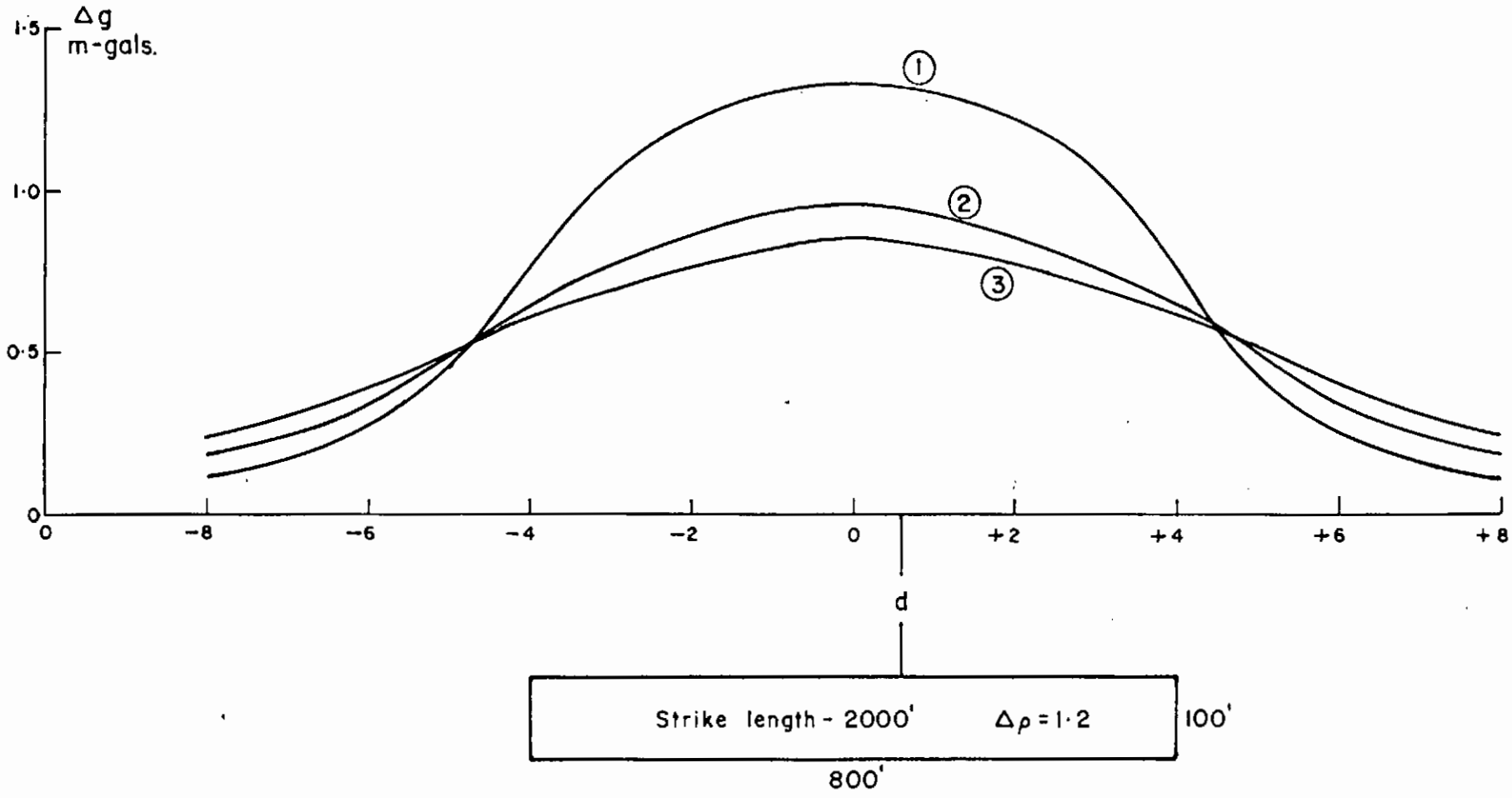
The gravity anomaly over the Vangorda deposit is shown in contour form in the map attached to the paper by Chisholm, and in the profile form in the attached paper by Smellie. The maximum anomaly is approximately 2 mgal, and this occurs at a point where the overburden is about 50 feet thick and where the orebody locally increases in thickness to 250 feet. These results are consistent with the model calculations.

The width of the anomaly is illustrated by both the model results (Figure 1) and the profiles and contours in the published articles. The half-width (width at half anomaly maximum) appears to vary from 800 feet in the case of a very shallow body to about 1100 feet when the body reaches a depth of 300 feet below ground. Where the body becomes thinner the half-width decreases, as for example on Line 16 over the Vangorda deposit where the width is roughly 500 feet and the anomaly half-width reduces to 550 feet.

Anomaly Detectability

Anomalies of the target size are clearly detectable under most conditions where gravity surveys are carried out. The first-order gravity survey, such as the one proposed in this program, is capable of anyaccuracy .05 mgals before elevation and other

...13



	d	Δg	End Effect for Strike 3000'
①	100'	1·33 m-gals.	·02 m-gals.
②	200'	0·96 "	
③	300'	0·86 "	·06 "

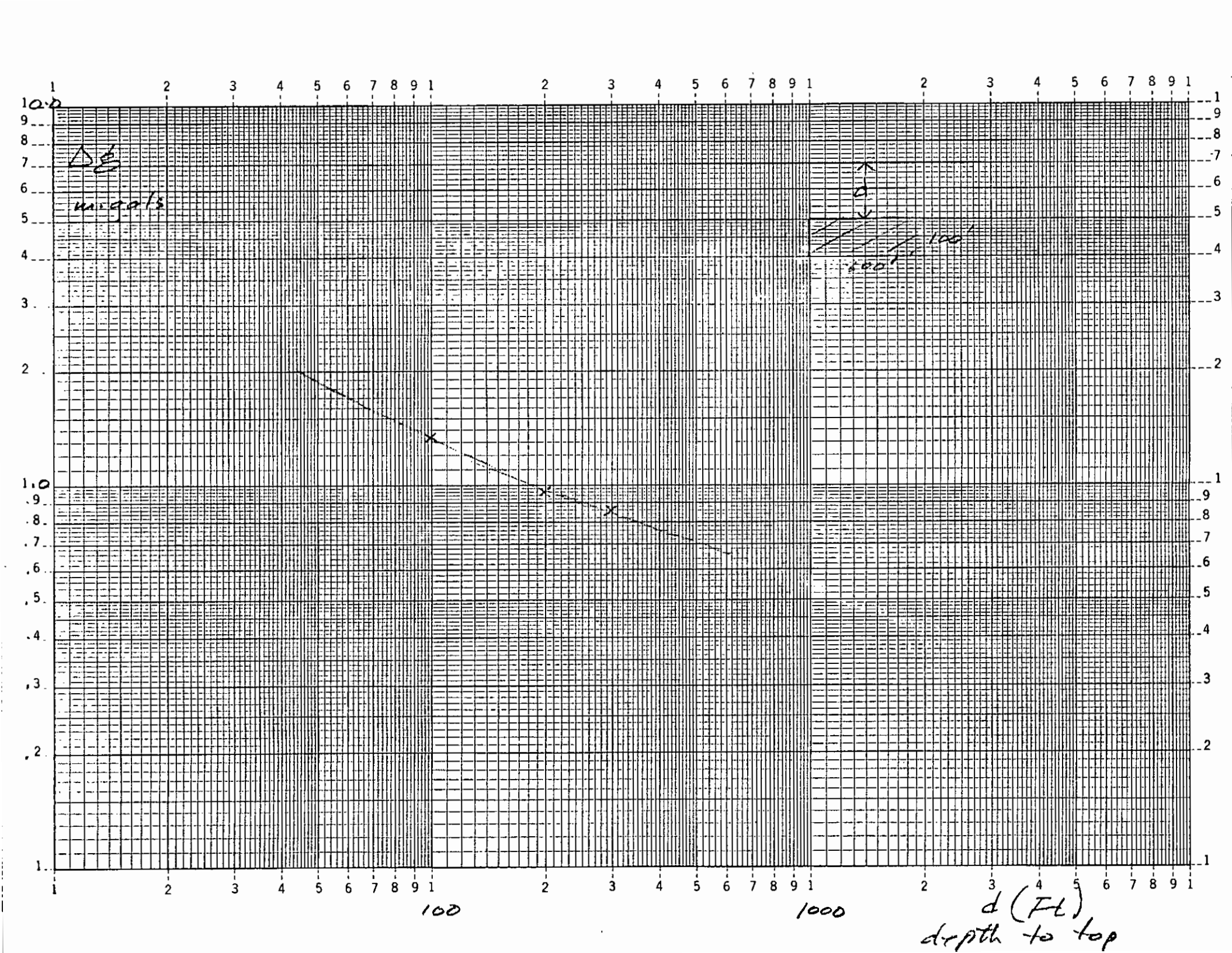
Body 100' x 800' x 2000'

ρ = 4 gm/cc.

V = 24 x 10^7 cu. ft.

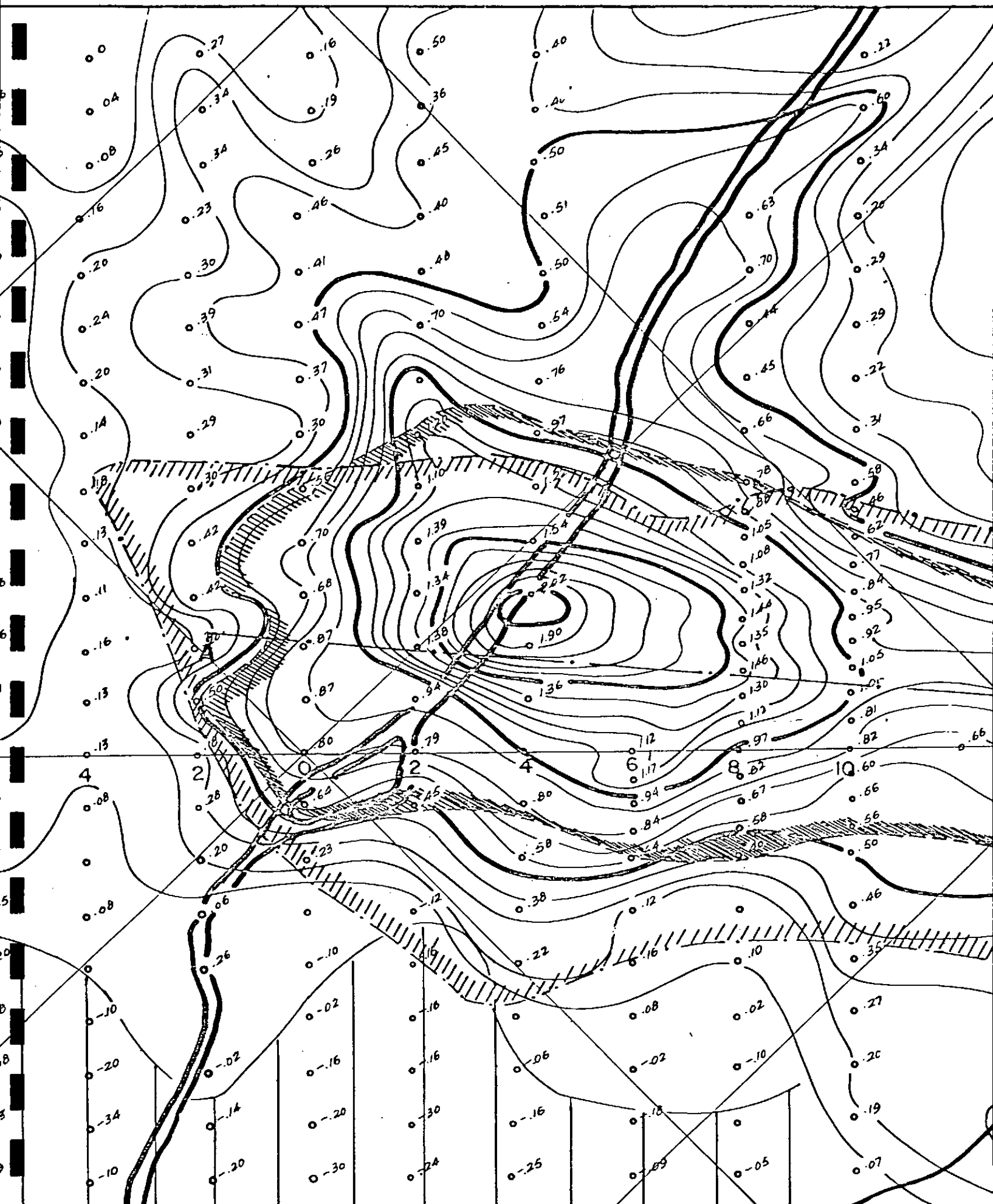
Total mass (tons) = $\frac{\text{Volume (cu. ft.)}}{8\cdot0}$ = 20 x 10^6 tons

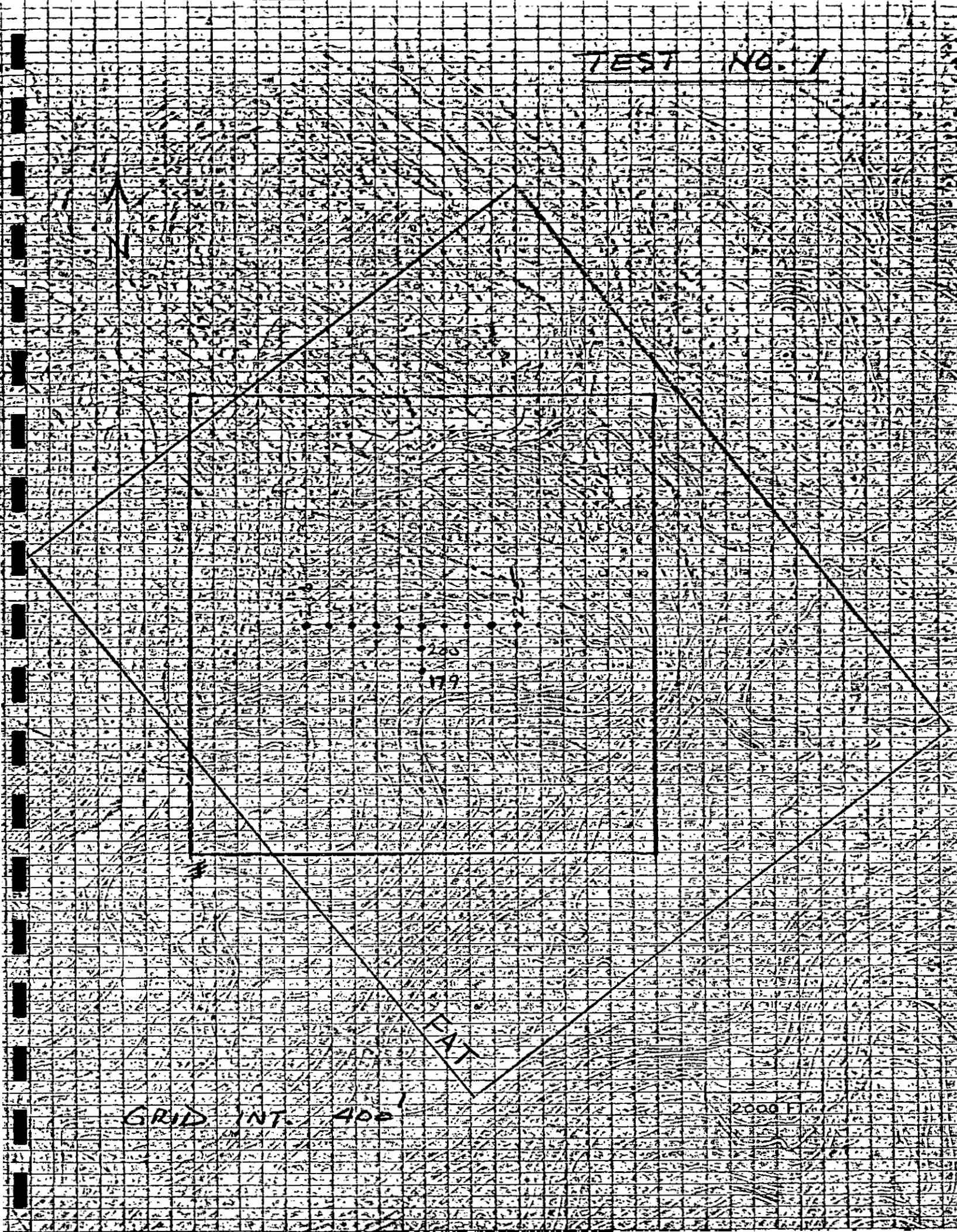
FIGURE 1


Δs
micrograms
d
100'
100'
100
1000
d (Ft)
depth to top

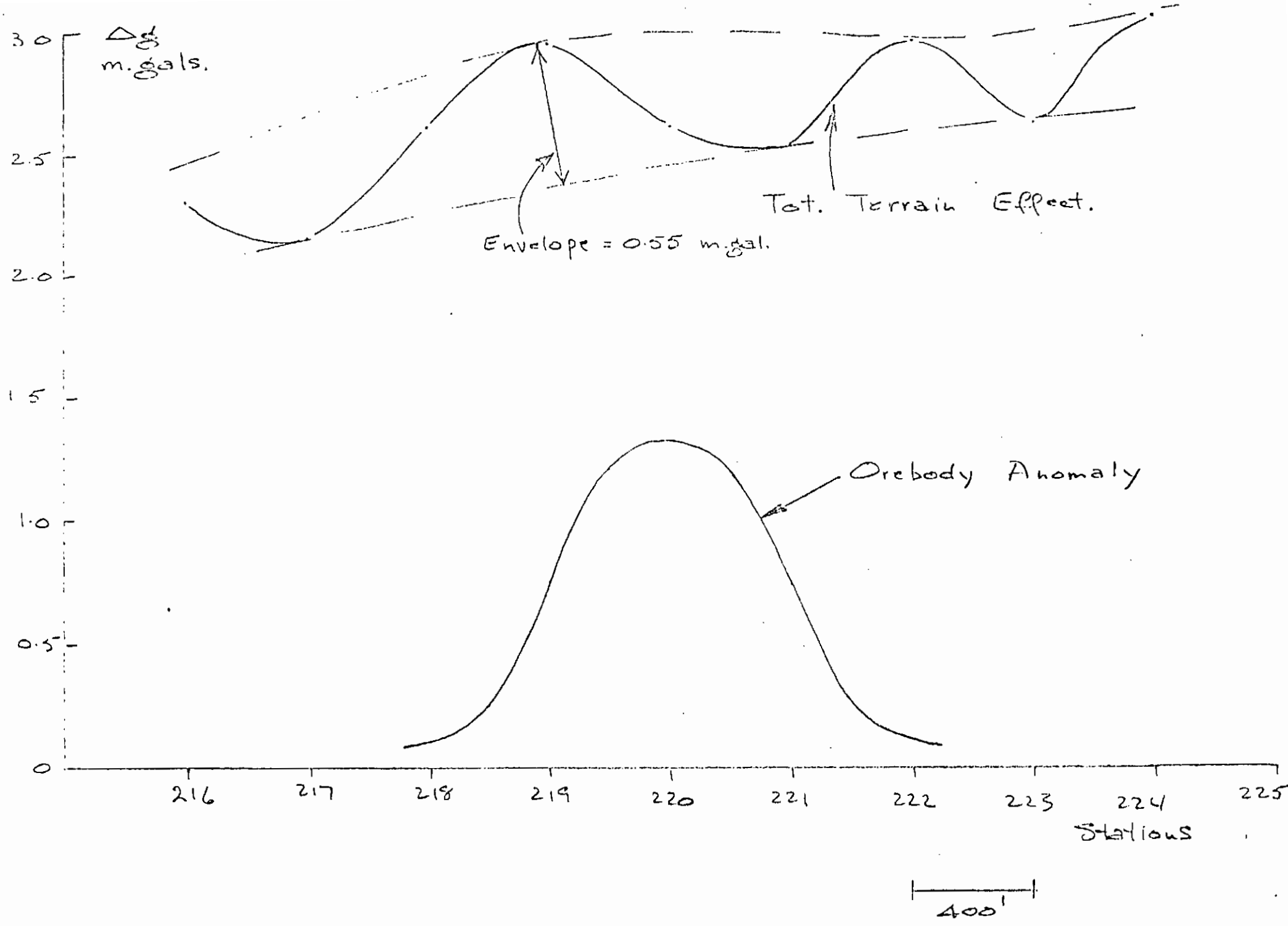
CAL EXPLORATION OF A LEAD-ZINC DEPOSIT IN YUKON TERRITORY

[redacted]. Chisholm *(pp. 269-277)*




TEST NO. 1
N
200
179
EAT
GRID INT. 400'
2000 FT

TEST NO. 2
6000
5000
5500
5000
GRID INT 100'
5500
100 FT.
700 FT.
N



TEST NO. 1.

FIGURE 3

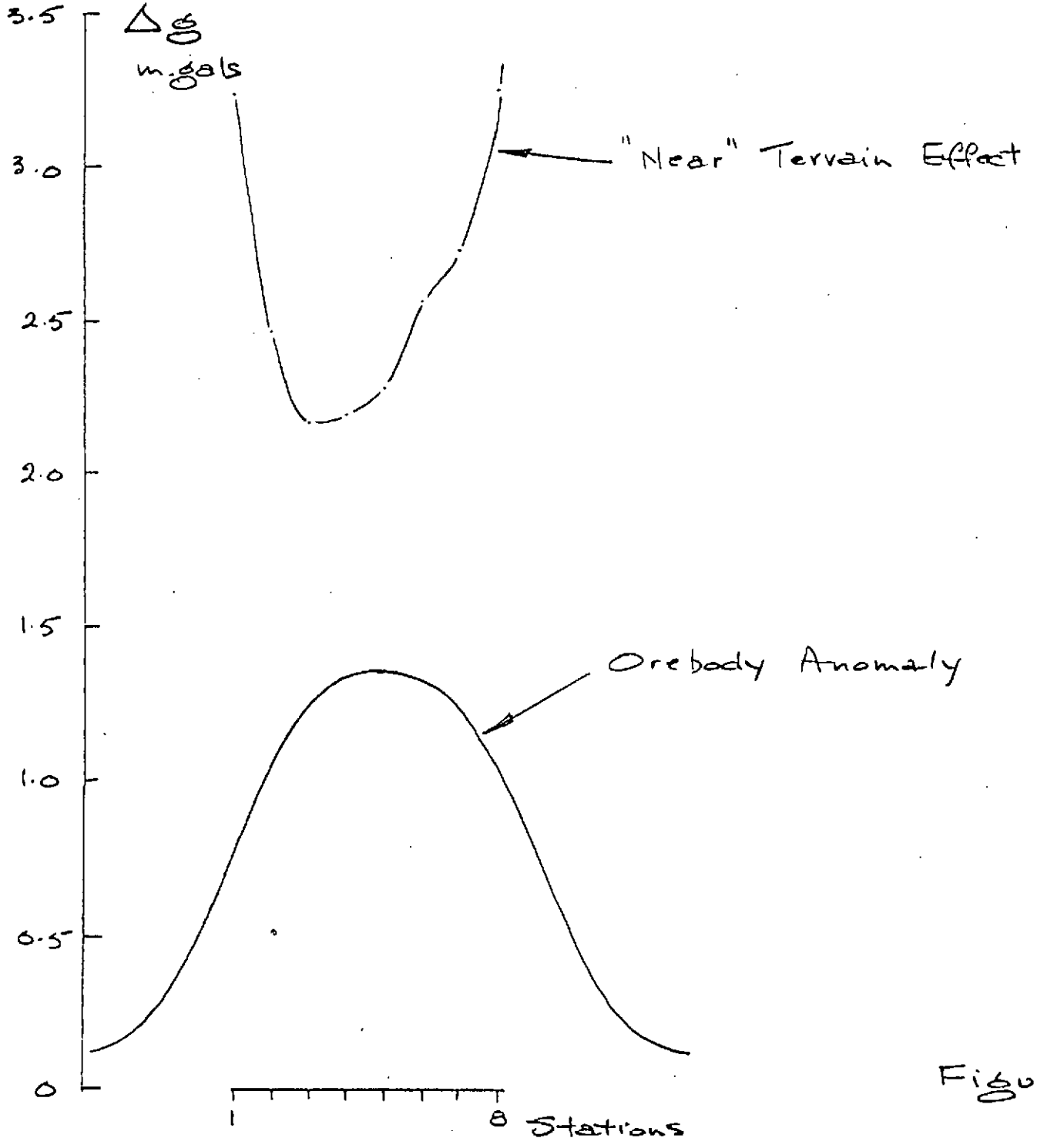


Figure 4

TEST NO. 2

400'

corrections. However, various "noise" sources combine to reduce the anomaly detectability, particularly in this area.

On the proposed survey, the following effects are expected to be the most troublesome:

1. Varying overburden thickness

The density contrast between unconsolidated overburden and bedrock in the Anvil area is expected to be about 0.8 cgs units. This will give rise to negative anomalies over river channels and other features where overburden locally becomes thicker. The anomalous effect will be roughly .01 mgal per foot of overburden thickness variation. The width of the anomalies will be roughly the width of the bedrock depressions.

An example of this effect might be expected in the valley bottoms in the northern part of the FAT group of claims, shown on the attached sketch entitled Test No. 1. It commonly occurs in this area that such valleys are occupied by river deposits to depths of several tens of feet and sometimes greater. If we assume a maximum thickness of 50 feet in this case, we could expect a local gravity low of 0.5 mgal, with a half-width of approximately 200 feet. The anomaly would be correspondingly wider in the broader and shallower valleys.

Gravity lows such as these are not likely to mask the target anomalies, nor are they likely to occur close enough to one another that the "highs" in between would be mistaken for anomalies. On the other hand, they will create background variations that may distort the shapes of anomalies due to dense bodies in the ground.

This type of "noise" is best recognized by a study of the topography and of the surface materials. It will be important to take note of the surficial deposits during the course of any geological mapping that may be conducted in the area. It should be pointed out that overburden effects may be expected to extend over shorter distances than the target anomalies, so that theppossibility exists of suppressing them by selective filtering.

2. Uncompensated terrain effect

This is probably the most serious problem and has been the subject of a brief study in order to quantify its effect in this area.

We have found on past surveys in this area that the effects of the larger terrain variations are usually broad enough that they can be removed satisfactorily with the regional

.../4-

gravity components To determine the magnitude and width of such effects in the proposed survey area we digitized the topography in an area 8000 feet x 8000 feet lying within the FAT claim group, the location of which is shown on the attached sketch entitled Test No. 1. The grid interval used was 400 feet. The integrated terrain effedt was calculated#at 12 points within the test block, using the method of Nagy (1966), as described in the attached paper.

Figure 3 shows the terrain correction profile for a row of eight stations as compared with the theoretical orebody anomaly drawn at the same scale. The average terrain correction is seen to be about 2.5 mgal, holding this mean value fairly steadily for a horizontal distance of more than 3000 feet. This confirms our supposition that the total terrain effect is a relatively slowly varying quantity.

On top of the terrain effect profile, however, we see a short-period variation with an envelope of up to 0.55 mgals, which we assume to be the result of insufficient sampling of the terrain close to the station. This is confirmed by an examination of the computer output which shows the contribution from the terrain within 500 feet of the station to average 43.1% of the total terrain effect. Since the sampling interval used on this test was 400 feet, we can obviously expect such short-period variations.

The topographic map used in Test No. 1 was of insufficient accuracy to permit a closer grid interval. For Test No. 2 we chose a larger scale map in the Anvil area, and digitized a square, 2000 feet x 2000 feet, at a grid interval of 100 feet. Eight stations were chosen in a straight line across a region of very steep topography. The terrain effect was calculated at each station using a square matrix extending 500 feet on each side of the station.

Figure 4 shows the calculated terrain effect as compared with the theoretical orebody anomaly. The terrain effect in this case is seen to be of approximately the same magnitude as in Test No. 1, confirming the importance of the contributions close to the station.

It is important to note that in this test the noise envelope (station to station variation) is very small, confirming that 100 feet is a sufficiently close grid interval to permit accurate near-station corrections.

The accuracy of terrain corrections is affected by the accuracy of the topographic information, by the terrain sampling interval, and by certain basic assumptions-chief of which is the rock density used in the calculation. The first two effects could lead to noise whose "wavelength" would be such

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as to cause interference with the orebody anomaly. It is our opinion, however, that using the available topographic information, carefully digitized at an appropriate interval, the combined short-period noise envelope could be kept within 0.2 mgal (a variation of .1 mgal).

Variations in the bedrock density used in the terrain effect calculation will cause errors of the order of 1 to 3% of the total correction. The errors will tend to be of fairly long wavelength and should not cause serious problems.

Other errors are introduced by effects originating from outside the area digitized, but these are inherently broad and can be filtered out together with the regional gravity component.

In summary, therefore, we believe that while the absolute accuracy of terrain effect calculations will be quite low in areas of this topographic severity, probably being no better than ± 0.5 mgal the relative accuracy - i.e., the station-to-station variation, or "noisiness" - should be much better than this figure (possibly as low as 0.2 mgal) if the analytical work is carefully done.

Systematic terrain calculations have not been applied widely in the Yukon or in British Columbia, probably because of the relatively high cost of obtaining topographic information of sufficient detail. The accurate photogrammetric work available in the Anvil area, together with the availability of economical computer programs for terrain corrections, in our opinion makes the systematic approach not only practical but highly advantageous.

3. Other sources of error

We estimate that the total contributions from other sources of measurement will amount to not more than 0.1 mgals. This assumes an elevation accuracy of 0.5 ft. at the gravity stations and a relative horizontal positioning accuracy of 200 ft. We feel that these are realistic specifications.

These normally show up as short-period effects, and can often be suppressed to some extent by filtering.

In summary, we believe that by the combined application of optimum filtering and judgment based on studies of the topography and geomorphology, gravity anomalies of the target dimensions will be recognizable at amplitudes as low as 0.5 mgal in some cases and as high as 0.75 mgal in others. The target orebody buried at a depth of 100 ft. could be reduced in size to 10 million tons and still be detectable in most of the area. An orebody of 20 million tons buried at a depth of 300 ft. would probably be detectable everywhere; and in fact the mass could be reduced to about 13 million tons

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and it would still be detectable in parts of the area.

4. Proposed Gravity Program

We propose a gravity survey on lines 800 ft. apart and at a station of interval of 100 ft. over the whole of the area of interest. We note that previous ground and airborne geophysical surveys have detected conductors in nearly all parts of the area, so that it would be difficult at this stage to eliminate portions as being of significantly lower priority than others. We also assert that gravity surveys which aim at finding Pb-Zn orebodies in the vicinity of EM conductors caused by graphite schist must extend several thousands of feet on either side of the conductor and must be carried out on a grid in order to be adequately interpretable. Because of the relatively large number of conductors we expect to encounter in this area, in our opinion it would be preferable to cover the entire area with gravity stations rather than to carry out small, follow-up grids after ground EM surveys have taken place. The latter approach would, however, be an acceptable alternative.

The gravity survey should be done to first-order specifications, leading to an accuracy of .05 mgals at any station. Elevations should be determined to an accuracy of 0.5 ft. at any station. Height of instrument should be recorded to 0.1 ft.

Topographic contour maps at scale 1 inch to 1,000 ft. should be obtained on a plain planimetric background for the whole of the survey grid and for a region measuring 2,000 ft. beyond the edges of the grid. Digitizing should be carried out in the area of the survey grid and to a distance of 400 ft. beyond the grid on all sides at an interval of 100 ft. The outer 1600 ft. should be digitized at an interval of 400 ft. Terrain corrections would probably be made along the survey lines with a moving matrix of 11 by 11 grid points at 100 ft. intervals, surrounded by a rectangular ring of 400-ft. spaced points, six deep, bringing the total size of the matrix to 5800 ft. by 5800 ft. An examination of the results of Test No. 1 show that an average of only 6.9% of the total terrain correction originates from a distance greater than 3,000 ft. from the point of calculation. Effects from outside the prescribed matrix would also be of large wavelength and easily removable by filtering.

Interpretation of the corrected Bouguer map would be done by first removing the regional and very short wavelength components, after which quantitative analysis would be done. If sufficient line-to-line correlation is found to exist, filtering could be done by computer in two dimensions and would be based on a spectrum analysis of the corrected gravity data, taking into consideration the expected wavelength of the orebody anomaly. If line-to-line correlation is poor the same processes could be applied in one dimension;

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more probably, however, graphical processes would be adopted.

The final, filtered map would be analysed using quantitative procedures, to obtain the best estimates of physical and geometrical properties of underlying anomalous masses.

Our firm has proprietary computer software for obtaining best fits between the observed data and three-dimensional straight-sided models. At this point in the interpretation care would be taken to correlate all residual anomalies with topography and surface geology, in order to recognize any uncompensated terrain effects or overburden anomalies.

Particular attention would be paid to gravity anomalies lying close to ground EM conductors. These need not necessarily coincide, as in this area the orebodies are not necessarily conductive, but generally lie close (within 2,000 ft.) of conductive graphite beds.

5. Costs

Your Vancouver Office has obtained estimates of costs for the gravity survey itself, including levelling.

The cost of performing the terrain corrections and carrying out interpretation as described above would be in the order of $3.00 to $3.50 per gravity station, which would include the digitizing of the topographic maps.

We hope that this analysis will assist you in deciding on your exploration program in the Anvil area. We hope that, if you do decide topproceed, you will call us to assist you with the processing and interpretation work.

Yours very truly,

PATERSON, GRANT & WATSON LIMITED

Norman R. Paterson, Ph.D., P.Eng.

CC: Dr. F. Wellmer

NRP/yh
Enclosures

GEOPHYSICAL EXPLORATION OF A LEAD-ZINC DEPOSIT IN YUKON TERRITORY

*by Edward O. Chisholm**

Abstract

Self-potential and magnetometer surveys were followed by a gravimetric survey in the northwestern Cordillera to outline successfully a flat-lying lead-zinc sulphide replacement deposit beneath 50 ft. of glacial overburden. This site of the survey is 125 miles northeast of Whitehorse, Yukon Territory, in mountainous terrain. Detailed diamond drilling verified the accuracy of the survey both as to boundaries and estimated tonnage of the deposit. Auxiliary surveys were carried out by aeromagnetic and geochemical methods. Graphitic schists interfered with the self-potential readings, but geochemical and magnetic results were helpful for indicating favourable terrain.

Location, Topography, Etc.

THE lead-zinc sulphide replacement body investigated by geophysical techniques described here is located on the headwaters of Vangorda Creek, a tributary of Pelly River, on the Vangorda Mines property of Prospectors Airways Company Limited. The surrounding country is mountainous but the deposit is in the centre of an intermontane valley approximately 2½ miles wide. Differences of elevation within the area of the survey are less than 100 ft., a feature which facilitated gravity work.

The replacement body lies beneath a glacial sand and boulder ridge varying in thickness from 25 to 80 ft. The ridge is traversed by Vangorda Creek, a small glacial stream, and a smaller tributary. Outcrop is exposed in the area of the survey at one location only on the bank of the stream, and consists of massive sulphides 100 ft. in length, 10 ft. in height. Permafrost, though usual in this latitude, was not encountered. Overlying the glacial material is a persistent layer of volcanic ash approximately 4 inches thick. The climate is sub-arctic and the soil profile is immature with zones of leaching and oxides penetrating less than a foot below surface. This results in a smaller, residual base-metal content of the soil and water than is normal to central latitudes.

The geophysical methods were started in advance of drilling, but were broadened in kind and magnitude as the drilling progressed and as different characteristics of the deposit were revealed. Initially the simplest methods, the self-potential and the magnetometer, were used. When it was apparent that graphitic schist was present, the electrical methods were discarded and magnetometer work was increased. The detail of this method was completed during the second season in time to indicate possible extensions of the deposit.

Further drilling indicated, however, that the magnetometer could not be relied upon solely to indicate sulphides because of the presence of other magnetic zones. At this stage gravimetric work was initiated and was completed over the deposit at the same time as the drill program. The results coincided so well that further drilling to extend the margins of the deposit was considered unnecessary. The excess mass calculation agreed so closely with the tonnage figure arrived at by drilling that it was decided also that further deep holes to explore the possibility of underlying zones were unnecessary.

Geology, Mineralization, Alteration

The deposit comprises an overlapping series of horizontal lenses of sulphides that appear to replace a favourable sedimentary bed; longitudinal section of the body is shown in Figure 1. Seventy-three diamond drill holes indicate a length of 3,200 ft. with an average width of 490 ft., and 9,400,000 tons of sulphide containing 3.16% Pb, 4.96% Zn, 0.27% Cu, 1.76 ozs. Ag, and 0.02 oz. Au; also, an additional 12,600,000 tons of low-grade to barren sulphides. The total mass of sulphides is estimated from diamond drilling to be in the order of 22,000,000 tons. The mineralized body extends from bedrock surface to a depth of 300 ft. Drilling to 1,000 ft. encountered no underlying body.

The host rocks comprise a flat-lying sedimentary assemblage which can be divided into two main zones, namely, one predominantly chloritic sericite schist, and the other predominantly graphitic schist. They are intimately associated with much intercalation at the edges of the graphitic horizon. The graphitic schist is minutely crumpled, breaks easily along cleavage planes, and contains narrow (up to 1 m.m.) quartz stringers

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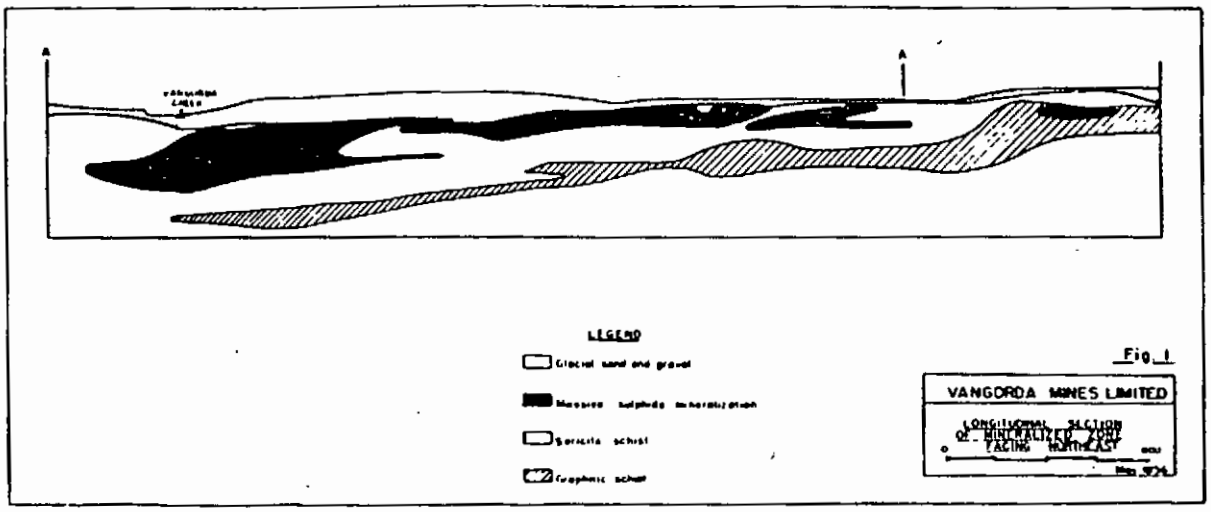


Figure 1.
Longitudinal section of mineralized zone, facing northeast.

which often are mineralized with pyrrhotite, with minor chalcopyrite and pyrite. In thin section, it consists of minutely folded bands of white mica (sericite) and black carbonaceous matter intercalated with bands of anhedral, interlocking quartz grains, and isolated siliceous lenses. Sparse mineralization is confined to the siliceous bands, pyrrhotite apparently replacing quartz. This graphitic schist seems to have been produced by strong metamorphism of impure carbonaceous slate interbedded with thin, sandy layers. Calcite is present in small amounts and may have been introduced with the sulphides.

The sericitic zone consists of light greenish-grey, chlorite schist and appears less deformed than the black schist. It is sparsely mineralized in siliceous bands (mainly pyrrhotite with some galena and chalcopyrite). In thin section, it appears to be a succession of thin bands of sericite, alternating with somewhat wider layers of quartz and chlorite containing minor amounts of orthoclase and sericite. The sericite-chlorite schist appears to have resulted from strong regional metamorphism of a succession of thin sedimentary beds, probably of impure sandstone interbedded with shale. Occasional siliceous lenses containing sulphides may originally have been small pebbles in the sediment.

No intrusive rocks were found within the area, although granite, gabbro, diorite and porphyry are present elsewhere on the claims.

The mineralization is a fine-grained aggregate of sulphides in a siliceous matrix. Sulphide content is variable but might average 60 per cent overall. Minerals present in their order of abundance follow:

Pyrite	35%
Sphalerite	25%
Galena	15%
Pyrrhotite	10%
Chalcopyrite	6%
Arsenopyrite	5%
Magnetite	3%
Marcasite	1%
Tennantite	Small amount

The assemblage indicates a hypothermal replacement deposit.

Alteration is predominantly sericitic and chloritic and is intensified in an envelope surrounding the mineralized deposit.

The control of deposition appears to be lithological rather than structural, but at this stage there is insufficient evidence to decide. There is a suggestion that the northwest extremity of the deposit is terminated by a fault along Vangorda Creek. Brecciation and carbonatization of the ore in drill holes in this section indicate faulting. There is also a suggestion that the long axis of the deposit is controlled by faulting and/or folding. No post-ore displacement of the sulphide mass in a horizontal or a vertical plane was indicated in the drilling and it would seem that any structural elements reflected in the magnetometer and gravity surveys may indicate pre-ore controls. It is reasonable to assume that the presence of feeder faults in the area and the displacement of contours in the magnetic and gravity surveys in the vicinity of Vangorda Creek and its tributary to the east near Line 19E, may be caused by this. However, part of the displacement of the gravity contours along the creeks is due to thinning of the overburden in this locality.

Gravimeter Survey

The outline of the residual gravimeter anomaly and its relation to the mineralized zone is shown in Figure 2 (in pocket).

Readings were taken with a Worden gravimeter with sensitivity of 0.10024 mgs. per scale division, at 100-ft. intervals with varying line separation. Gravity and elevation runs were made in closed loops with all errors being adjusted. Elevation misclosures were kept under 0.5 ft. and gravity misclosures under 0.5 milligals. Drift, elevation, latitude and terrain corrections were applied to the gravity readings.

Density measurements on both surface and core specimens gave the following values:

Specimen	*Depth*	*Type of Material*	*Density*
1	Surface	Granite	2.64 gms./cc.
2	139′	Sericite schist	2.69 "
3	188′	Sericite schist	2.75 "
4	393′	Sericite schist	2.76 "
5	188′	Graphite schist	2.78 "
6	45′	Gabbro	2.85 "
7	50′	Gabbro	2.84 "
8	—	Massive sulphides	4.34 "
9	—	Massive sulphides	4.23 "
10	—	Massive sulphides	4.62 "

The schists are of relatively uniform density, with the granite slightly lighter and gabbro slightly heavier.

• Observations

The mineralized zone was clearly detected by geophysics and its edges are well defined. The results show a remarkable coincidence with the zone as outlined by drilling.

Tonnage calculations from the residual anomaly (total anomaly minus regional anomaly) gave in excess of 6,000,000 long tons. Transferred into actual tonnage, on the assumption that the schist's average density is 2.8 gms./cc. and the mineralization averages 4.0 gms./cc., a total of 20,000,000 tons is indicated. This is remarkably close to the 22,000,000 tons of sulphides indicated by drilling.

The regional gravity, not shown on the accompanying map, slopes gradually southwest and is caused by a series of gabbro intrusions in this direction.

The shape of the anomaly indicates that the mineralization is banded in parallel zones along its length. The portions of greatest thickness near Vangorda Creek, (as shown on the longitudinal section on Figure 1), are reflected in high-gravity values up to a peak of 2.02 milligals. The lensing out of the deposit to the edges is reflected also in lower-gravity values.

Some of the edges of the deposit indicated by the gravity anomaly are noticeably sharp, others are gradual; this may be a reflection of faulting, especially in the northwest end of the deposit.

Approximately 500 ft. southwest of the mineralized deposit, and parallel to it, is a small, broad low; this appears to be a reflection of a graphitic schist zone which outcrops in this area. Its overall density is lower than surrounding schists.

No anomalous regional effects that might be expected in the disturbed zone of intermontane terrain were noticeable in the gravity survey.

• Conclusions

Near-surface deposits of massive sulphides enclosed in light schists that provide a marked density contrast, produced sharp high-gravity anomalies. Values about 0.5 milligals were considered anomalous.

The gravimetric method is a definite tool for outlining sulphide masses in the geological conditions described here.

Self-Potential Survey

The outline of the self-potential survey and its relation to the mineralized zone are shown in Figure 3 (in pocket). Readings were taken at 50-ft. intervals along lines 200 ft. apart.

• Observations

The self-potential survey of the mineralized zone showed several large anomalies seemingly caused by graphitic schist. Readings over the deposit itself generally were flat and appeared to be blanketed by overburden where it exceeded 25 ft. in thickness.

• Conclusions

The self-potential method, although cheap and fast, would be of use under the present geological association only in tracing the block schist zones under overburden less than 25 ft. thick. Where depth of overburden is unknown, interpretation of results would be difficult and the electrical-magnetic method would offer a more effective technique because of its greater penetration.

Aeromagnetic Survey

A series of lines approximately 5,000 ft. apart were flown over the central part of the claims at a

height of 500 ft. to test the effectiveness of this type of instrument for reconnaissance.

- **Observations**

No higher than normal readings were obtained over the mineralized zone, but a generally higher level of readings was noted over the basic intrusive rocks one mile to the southwest of the deposit.

- **Conclusions**

Insufficient lines were run over the zone to test the airborne instrument conclusively; with closely spaced flightlines at a low altitude, results comparative to the ground magnetometer survey might be expected.

Magnetometer Survey

The outline of the magnetometer survey and its relation to the mineralized zone are shown in Figure 4 (in pocket).

Readings were taken by the Askania instrument at 50-ft. intervals on lines 200 ft. apart. Sensitivity was 25.6 gammas per scale division. No magnetic storms or side hill effects from surrounding mountains were noted.

- **Observations**

Six anomalies were found within the area of mineralization, with residual magnetic values ranging from 800 to 2,000 gammas.

Contours are lenticular along the length of the deposit.

The most intense anomalies were obtained where overburden is shallow.

Anomalies of similar magnitude and shape were found outside the mineralized zone.

Certain sections of massive mineralization gave no magnetic anomalies.

Magnetic contours show displacement along Vangorda Creek and its tributary to the east.

Sufficient spot drilling has been done to indicate the cause for most anomalies.

- **Conclusions**

The magnetometer alone would not produce definitive anomalies signifying underlying sulphide mineralization because of the variable magnetite content of the sulphide deposit itself, and because of the presence within the confines of the survey of other factors contributing to a magnetic condition of magnitude similar to that encountered over the mineral deposit. These factors are:

1. Concentration of magnetite in residual gossan material underneath an eroded section of sulphides;

2. Small gabbro intrusive plugs outside the confines of the mineralized zone;

3. Widely disseminated magnetite in certain sections of the graphitic schist zone which, when near surface, produced a mass effect equal in magnitude to the magnetic section of the main mineralized zone.

The magnetometer proved useful in indicating favourable terrain; in determining the strike of mineralized zones; and in pinpointing thick sections of sulphide containing magnetite. It indicated also a possible fault that terminates the deposit abruptly along Vangorda Creek between anomalies 1 and 2; drilling confirmed this fault. A possible pre-ore fault is indicated along the creek at Line 19E.

The magnetometer is best used under the above geological conditions in conjunction with other exploration survey methods.

Geochemical Surveys

The outlines of geochemical heavy-metal surveys in the soil surrounding part of the deposit and in the drainage system cutting through it are shown on Figures 5 and 8 respectively. Geochemical profiles showing the relationship between heavy-metal content in the soil, topography, location of sulphides, gravity and magnetic determinations, are shown in cross-sections 6 and 7.

Soil samples were taken at 100-ft. intervals on lines 200 ft. apart at uniform depth of 2 ft.; this represents the "C" or parent soil zone. It was tested for heavy-metal content by the cold extraction method devised by Bloom*. Surveys were conducted in July after the seasonal run-off had taken place and the water table had reached a state of equilibrium.

The method is a rapid and simple field technique that involves extraction of (Zn, Cu, Pb, Co, Ni) ions from a soil sample with a cold solution of ammonium citrate in the presence of dithizone-xylene solution.

*BLOOM, H. A.: A Field Method for the Determination of Ammonium-Citrate Soluble Heavy Metals in Soils and Alluvium. *Econ. Geol.*, Vol. 50, pp. 533-541.

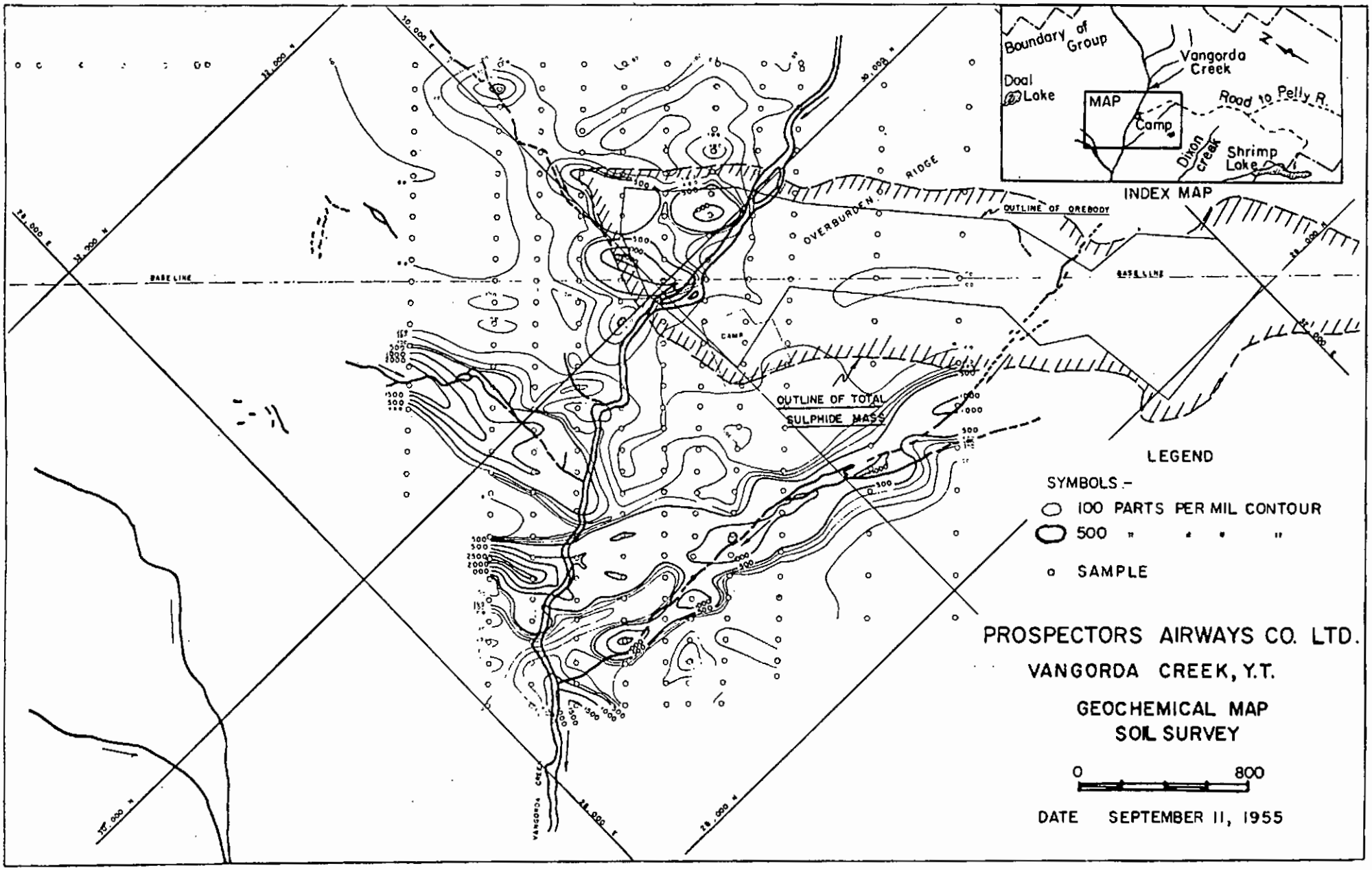


Figure 5. Geological map—soil survey.

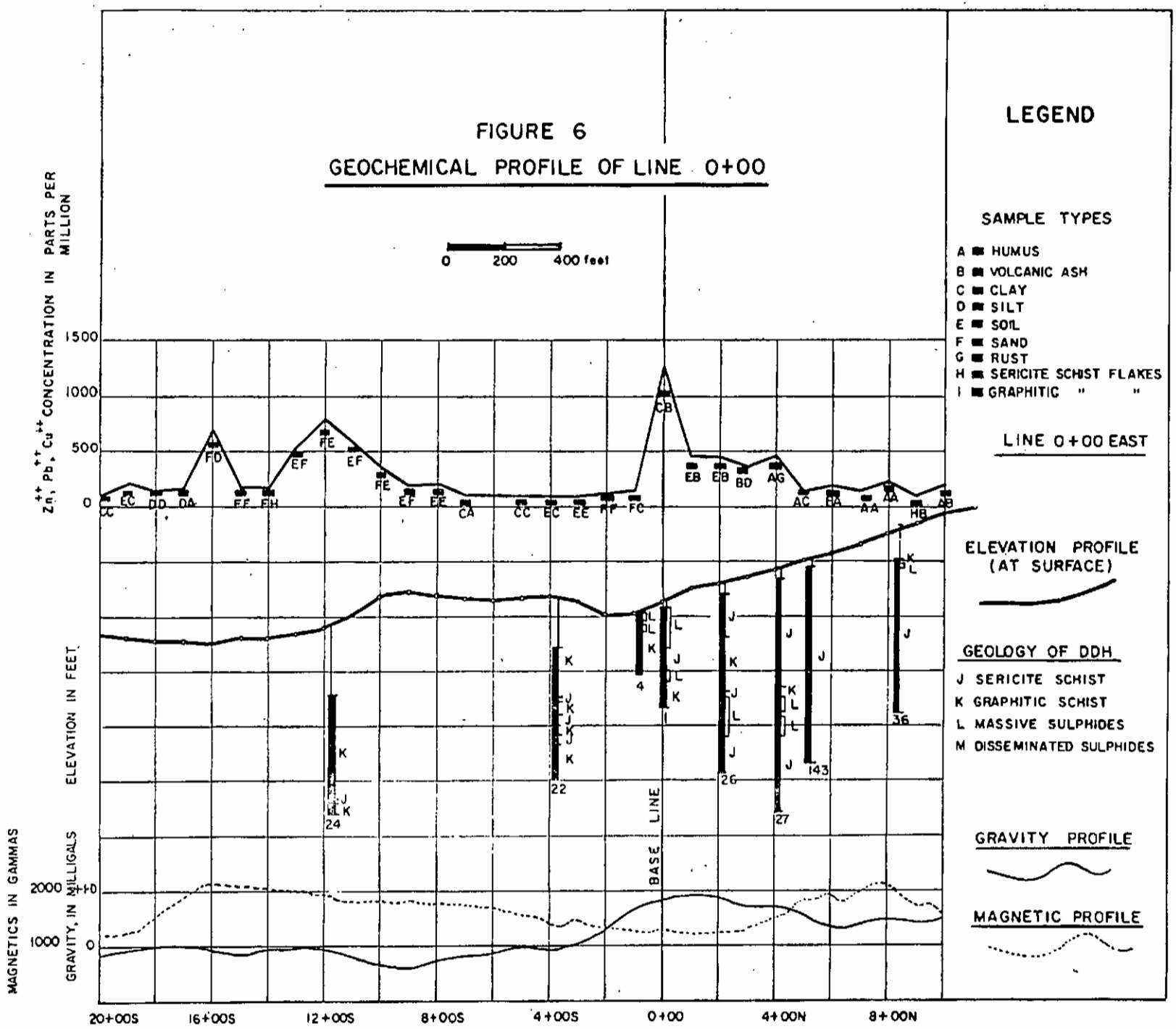


Figure 6. Geochemical profile of line 0+00.

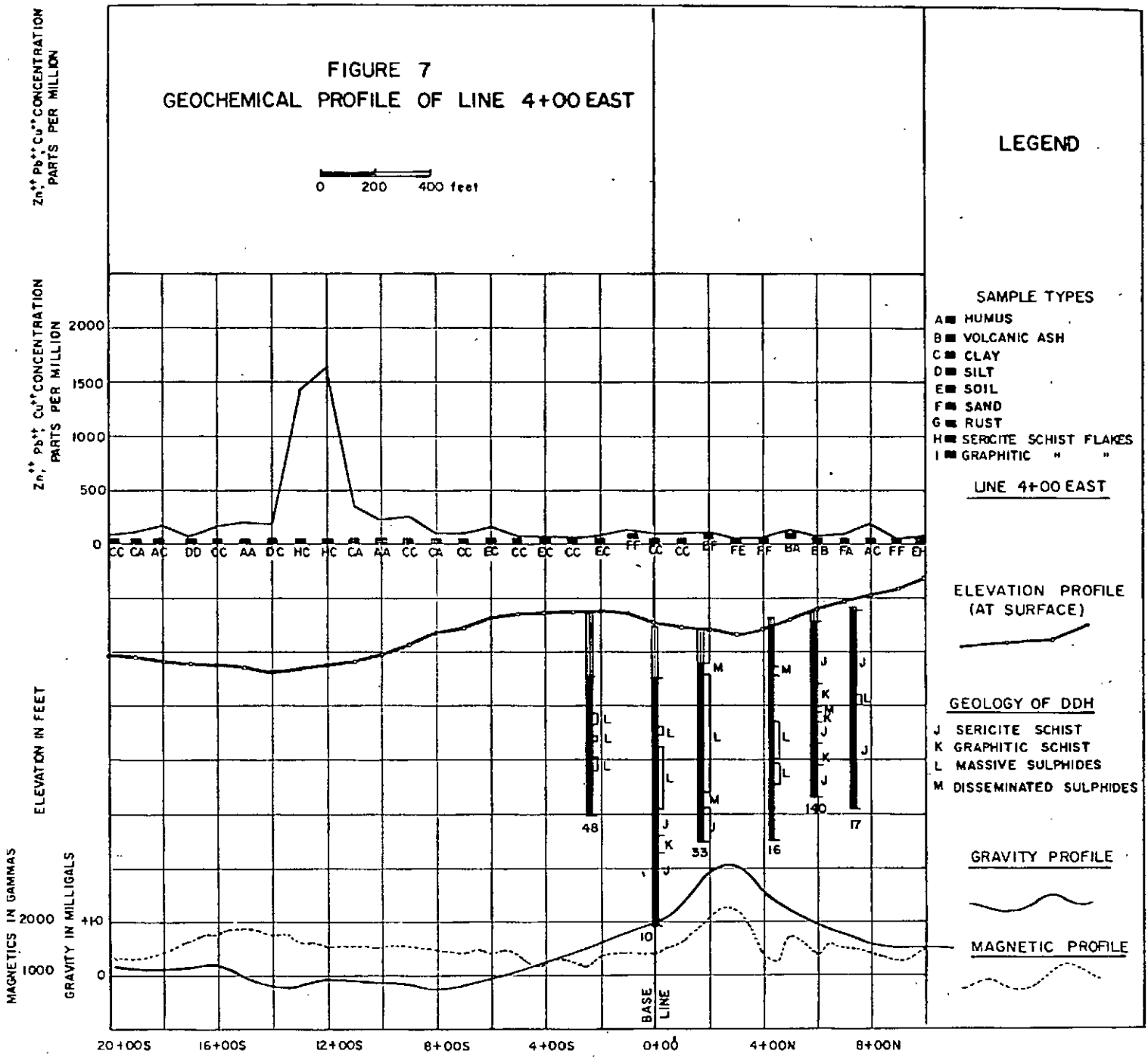


Figure 7. Geochemical profile of line 4 + 00 east.

The method may be used also for water samples taken at regular intervals along streams.

- **Observations**

Figure 5 shows distinct heavy-metal anomalies in the soil near the mineralized zone on the down slope side.

The higher contours generally follow the water channels.

Deep overburden blanketed out anomalies.

Similar results are noted also in Figures 6 and 7 where sharp increases were obtained in the heavy-metal content of the soil on sections 0 plus 00 and 4

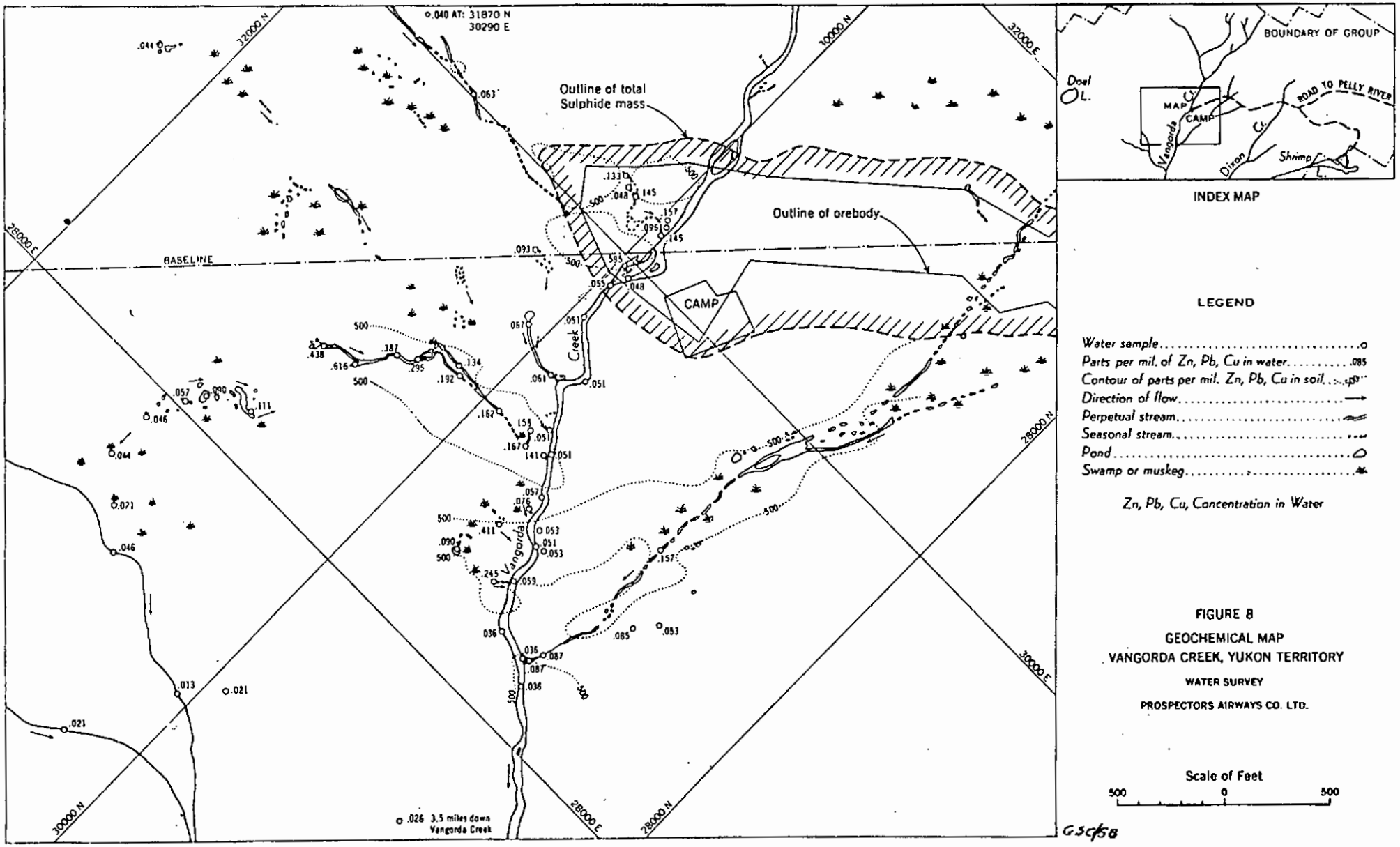


Figure 8. Geochemical map, Vangorda Creek.

plus 00 east at 12 plus 00 south, down-slope from the mineralized zone.

Figure 6 shows a sharp rise in the heavy-metal content of the soil at 0 plus 00 south where the massive sulphides are near surface and where overburden is light. In these conditions a heavy-metal content of over 200 parts per million was considered significant for the soil and over 0.01 part per million for water.

There is a rough correspondence between heavy-metal soil contours and the self-potential contours which trend along water courses. Both may be due in part to the concentration of ions along these channels.

Figure 8 shows a gradual build-up in the heavy-metal content of the water in Vangorda Creek up to the point where it cuts through the mineralized zone. Similar increases in heavy metals were noted in the tributaries of the main creek on proceeding upstream and approaching the mineralized zone.

- **Conclusions**

The geochemical water test is a cheap and useful prospecting method for testing streams and tracing heavy metals to their point of maximum concentration. The soil testing is useful as an auxiliary exploration tool where overburden is light.

The main usefulness of geochemical methods lies in the quick determination of large targets for subsequent exploration by methods other than time-consuming investigation within narrow limits. This is because of the large inherent sampling error in any soil sample.

General Conclusions

The results of geophysical and geochemical surveys over the sulphide deposit at Vangorda Creek indicate that the optimum combination of preliminary exploration techniques elsewhere on the property would consist of a geochemical soil and water reconnaissance followed by electro-magnetic and gravity survey.

The assistance of the following is gratefully acknowledged: Radar Exploration Company (gravity survey); and R. W. Baker, (engineering and diamond drilling data), D. R. S. Doal (magnetometer survey), V. Papezik (geological survey), G. Novak (geochemical survey), and F. A. Campbell (self-potential survey), of Prospectors Airways Company Limited.

GEOCHEMICAL ANOMALIES RELATED TO SOME BRITISH COLUMBIA COPPER MINERALIZATION

by Harry V. Warren, Robert E. Delavault and Christine H. Cross

Abstract

Geochemical techniques were applied to prospecting for copper in three areas in the south part of British Columbia. Soil and vegetation samples were collected along profiles over strong, medium and weak copper mineralization. The analyses were plotted on profiles, and the mineralization, as determined by various methods, is shown. Large geochemical anomalies were obtained over the areas of significant copper mineralization. The ratios of the p.p.m. of copper to the p.p.m. of zinc present in the samples were computed and plotted as aids in interpretation. The techniques were found to be effective for exploration in the section of British Columbia under study.

RECENT interest in low-grade copper deposits has induced a wave of intensive exploration in the vicinity of Kamloops, Ashcroft, Merritt, and Aspen Grove, British Columbia (Figure 1). Much of this section is geologically favourable and heavily drift-covered, making it a natural setting in which to use geochemical techniques.

The examples which follow were not collected originally with the intention of publication, and some data, which would have served to develop a more complete picture, are not available. However, through the kindness of the companies on whose properties the samples were collected, sufficient results have been released to illustrate the type of anomaly which may be looked for over mineralization of different intensities in some sections of south-central British Columbia. Biogeochemistry and pedogeochemistry, particularly the latter, have been shown to be of value in any search for mineralization buried by overburden less than 20 to 30 ft. thick.

A P P E N D I X B

Example computer Print-out of GRAMOD

model-fitting program

1WEIGHTED LEAST SQUARES FIT - RIBBON

1 ANOMALY FAT-FINN A

PARAMETER	KEY	START	LIMITS		FITTED	TOLERANCE	RANGE
DEN*THICK	1	1.000E+00	0.	0.	8.507E-01	5.0E-02	7.3E-02
DIP	2	6.500E+01	0.	0.	5.823E+00	3.0E+00	0.
BASELEVEL	1	4.530E+00	3.0E+00	6.0E+00	4.464E+00	1.0E-01	5.5E+00
BASESLOPE	1	2.000E-02	0.	1.0E+00	6.094E-03	5.0E-03	4.1E-02
POSUTION	1	0.	-4.0E+00	4.0E+00	-1.912E+00	5.0E-02	7.8E-03
WIDTH	1	7.000E+00	0.	0.	7.334E+00	1.5E-01	3.9E-01
DEPTH	1	3.000E+00	0.	0.	1.324E+00	1.5E-01	5.8E-01
LENGTH	2	3.000E+00	1.0E+00	1.5E+01	1.484E+01	1.0E-01	0.
TRAVDIRECT	0	0.	0.	0.	0.	0.	0.
SCALE	0	1.000E+02	0.	0.	1.000E+02	0.	0.

POSITION	WEIGHT	OBS	FITTED
-8.000	.243	4.42	4.47
-7.000	.243	4.47	4.49
-6.000	.243	4.52	4.51
-5.000	.243	4.58	4.55
-4.000	.243	4.66	4.61
-3.000	.243	4.76	4.73
-2.000	.243	4.88	4.94
-1.000	.243	5.16	5.15
0.000	.243	5.34	5.24
1.000	.243	5.26	5.27
2.000	.243	5.17	5.26
3.000	.243	5.16	5.21
4.000	.243	5.15	5.13
5.000	.243	5.13	4.99
6.000	.243	4.75	4.84
7.000	.243	4.64	4.73
8.000	.243	4.74	4.66

NORMALIZED WEIGHTED STANDARD DEVIATION OF FIT .0133

320,000' E 22,710,000' N

22,700,000' N

INTERPRETATION LEGEND

Outline of area of anomalous density

Dipping plate model fitted by computer

Dip direction and magnitude

B — Model identifier

120 — Depth to top of anomalous body in feet

~800 — Strike length in feet

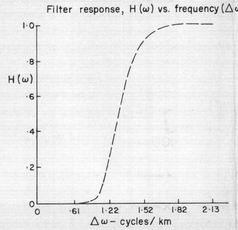
Axis of Turam EM anomaly

Axis of vertical magnetic anomaly

Possible fault and direction of movement

HIGH PASS FILTER

Filter response, H(ω) vs. frequency (Δω)



inches 0 1 2

centimetres 0 1 2 3 4 5

YUKON GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will change if the image is reduced as the image, therefore it can be used as a reference for the original size.

Contours of residual gravity :

05 milligals

25 milligals

Gravity survey by Peter E. Walcott & Associates, 1976

For geological legend see Cyprus Anvil Mining Corporation "Geology", September 1977

PETER E. WALCOTT & ASSOC. LTD.

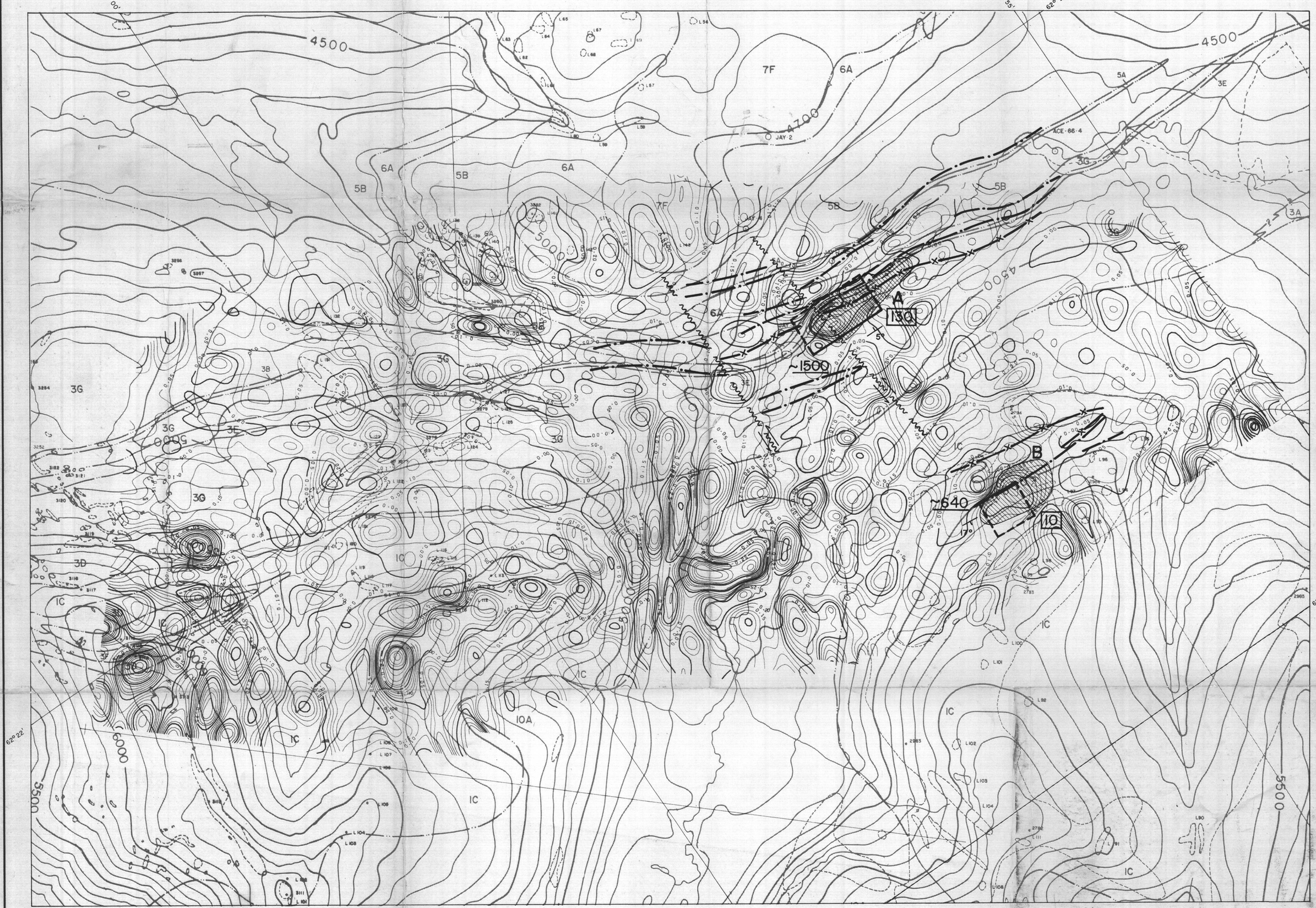
YUKON TERRITORY

MYE - SARK CLAIMS

RESIDUAL BOUGUER GRAVITY AND INTERPRETATION

N.T.S. No: 105-K/6	SCALE: 1" = 1000'
DRAWN BY: A.H.	DRAWING No: P 245
APPROVED:	DATE: March 1978

PATERSON GRANT & WATSON LIMITED
CONSULTING GEOPHYSICISTS, TORONTO, CANADA



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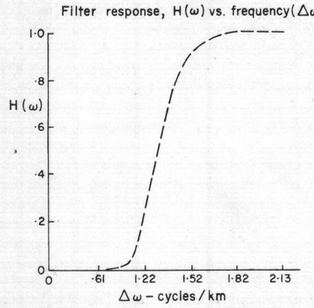

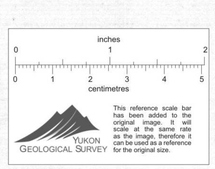

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YUKON TERRITORY

FAT – FINN CLAIMS

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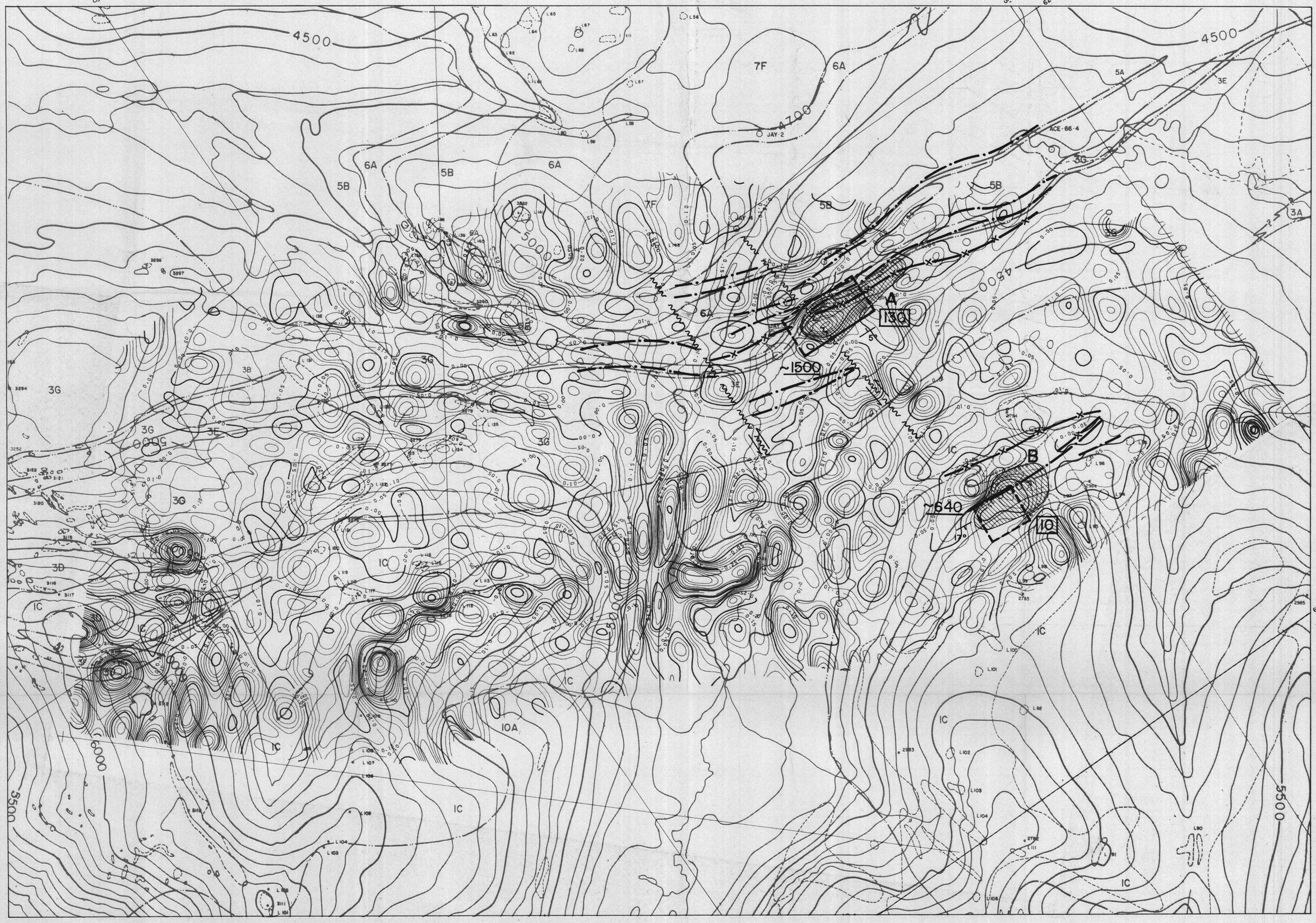

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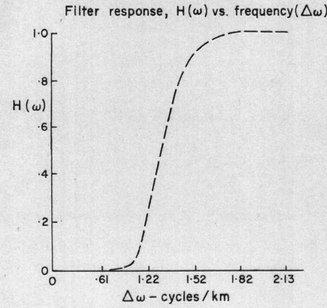

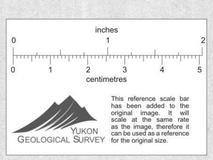

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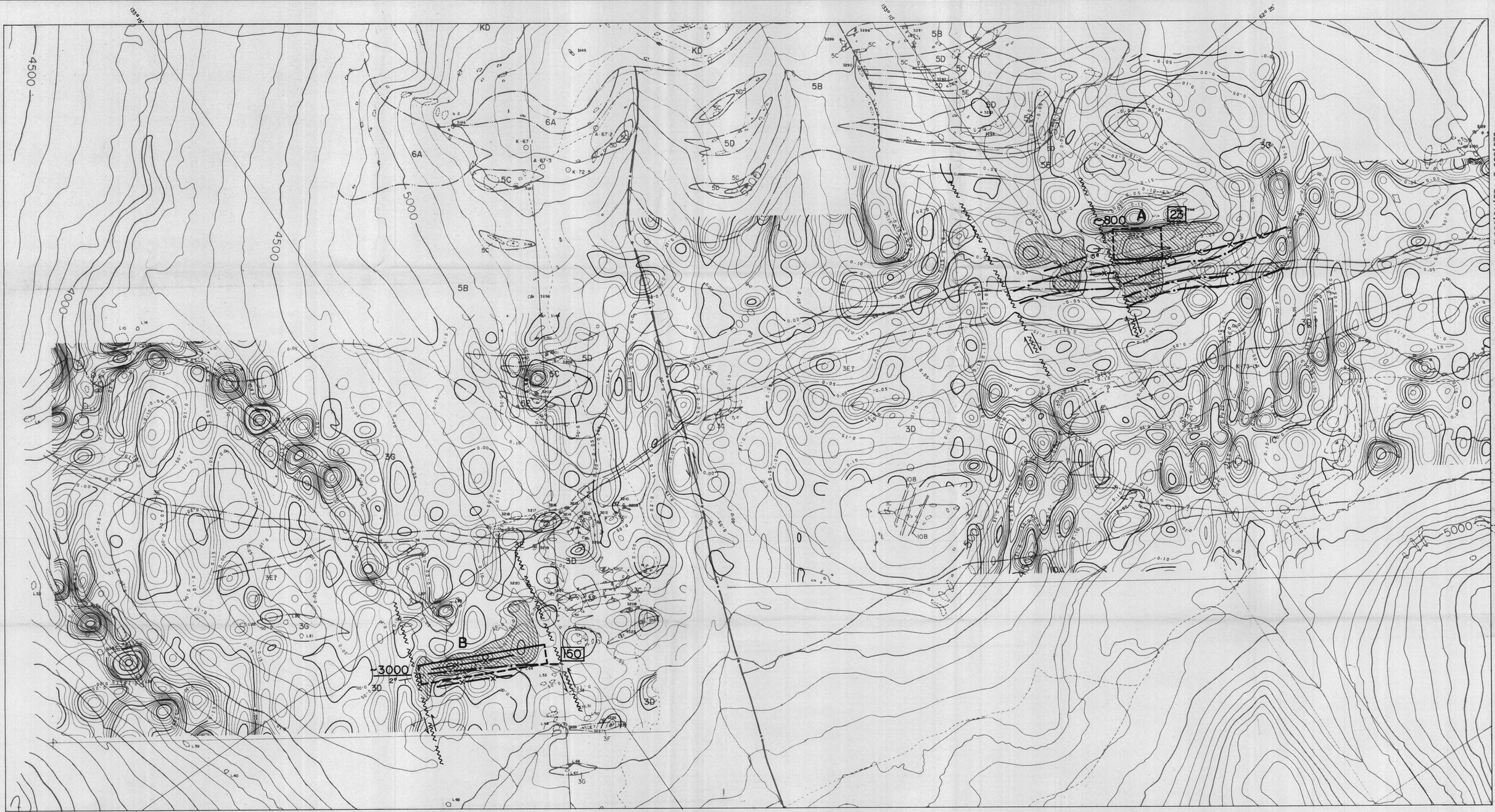

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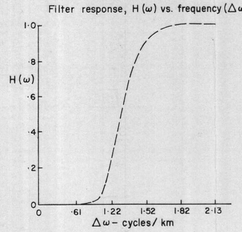

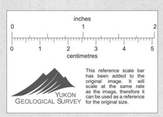

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