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REPORT ON MAGNETIC DATA
COMPILATION, ANALYSIS AND INTERPRETATION
BEST CHANCE GRID, YUKON

For

Hudson Bay Mining and Smelting Co. Ltd.

By

ALLAN SPECTOR AND ASSOCIATES LIMITED
TORONTO
CANADA

November, 1984

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November 2, 1984
J326

Mr. William Jobin-Bevans
Hudson Bay Mining and Smelting Co. Ltd.
P.O. Box 28
Toronto Dominion Centre
Toronto, Ont.
M5K 1B8

Dear Bill,

RE: Best Chance Grid

1. INTRODUCTION

This report serves to describe the results of our compilation, analysis and interpretation of ground magnetometer data. The data was surveyed in the period September 9 to October 17, 1984. Major objective of the survey was to locate buried intrusive rocks which are associated with sulfide mineralization observed southeast of the project area.

According to the geological map of the area, in the survey area there is little outcrop. That which is exposed is described as metamorphosed upper Triassic sedimentary rocks; limestone and/or dolomite and a quartzite - greywacke - argillite series. Granitic rocks are observed in an exposure north of Bork Lake.

To illustrate the results of our work a number of maps accompany this report;

Plate	Title
1	Location Map
2	Total Magnetic Intensity Map
3	Filtered and Downward Continued Magnetic Intensity
4	Magnetic Interpretation

Plate 1 shows the location of the project area as southwest of the city of Whitehorse.

2. COMPILATION OF MAGNETIC SURVEY DATA

A compilation of magnetic field data measured at 1394 stations was carried out. A Geometrics proton precession magnetometer, which has a resolution capability of ± 1 gamma, was used in the survey. Measurements were taken at 100 foot interval on lines 400 feet apart. At selected intervals, spacing was decreased to 50 feet. Surveying was done on 34 lines; 32S, 36S, ...164S. Line azimuth is N60°E.

Input data consisted of original field notes which include station number, time and magnetic reading in gammas. Stations occupied on a NW-SE baseline were looped in order to establish a magnetic control station network. The following is a list of corrected control station values (above a datum of 57,000 gammas);

Station	Value	Station	Value
32S	1054 gammas	100S	836 gammas
36	1122	104	928
40	1130	108	921
44	932	112	953
48	916	116	820
52	936	120	858
56 + 50	877	124	875
60	789	128	1000
64	797	132	909
68	1076	136	830
72	1142	140	1028
76	914	144	877
80	876	148	954
84	871	152	830
88	858	156	722
92	867	160	677
96	793	164	646

Repeat measurements showed that these values are accurate to ± 5 gammas.

Survey measurements in the course of each traverse were then corrected for diurnal variation using this network of control station values. The corrected values are posted in Plate 2 together with contours at 100 gammas.

3. OBSERVED MAGNETIC ANOMALIES

A 1400 gamma anomaly dominates the north half of the magnetic intensity map. It appears to reflect an ESE trending magnetic zone that is about 250 ± 50 feet below ground.

A broad, 300 to 500 gamma anomaly is discernable in the central part of the survey, trending southeasterly. It however is progressively more obscured to the south by high amplitude near-surface anomalies originating within 50 feet of ground level. These shallow ± 20 gamma anomalies are probably due to skarning within Triassic sedimentary rocks. It is presumed that the broader features are due to a buried Mesozoic intrusive.

4. COMPUTER ANALYSIS OF THE MAGNETIC DATA

Greatest interest for exploration is attracted to the magnetic expression of intrusive rocks at depth as opposed to the shallower features. To improve the resolution of the deeper origin features, a computer process of matched filtering and downward continuation was applied to the magnetic survey data. The process consisted of the following steps.

(a) digitization of data on a 100 foot grid,

(b) computation of power spectrums of the digitized data,

(c) analysis of power spectrums to design a filter operator to suppress magnetic anomalies of shallow origin,

(d) simultaneous filtering and downward continuation of data. Downward continuation depth was selected as 100 feet.

The final result of these operations is Plate 3; Filtered and Downward Continued Magnetic Intensity Map. To relate the map to survey coverage and to the original measurements, posted survey values (unfiltered) are also included in this map.

The deep-origin anomaly trending southeasterly through the central and southern parts of the survey area is now clearly discernable.

5. ANALYSIS AND INTERPRETATION

Magnetic data analysis was done principally using the survey data computer plotted in profile form. In the profiles, near-surface and deep-seated magnetic anomalies were distinquished with the help of the filtered downward continuation results. The profile analysis yielded the following information;

- anomaly resolution,
- depth to magnetic zone,
- location of magnetic contacts.

Profile analysis was done on the basis of comparison of observed anomalies with model curves which were computed for the project area (field inclination 76^{o}, declination 30^{o}E and intensity 58,000 gammas.

Plate 4 shows the geological results of the interpretation.

Principal outcome of the work is the delineation of a southwest-trending, magnetic zone. It is presumed that the 1200 to 2000 foot wide magnetic zone corresponds to intrusive rocks. The anomaly varies in amplitude from 1300 to less than 300 gammas.

This amplitude variation (or attenuation) can be explained by changes in the depth to the intrusive rocks, i.e. from less than 200 to about 500 feet below ground. Changes in depth and also noticeable dislocutions of the magnetic zone are attributed to a series of NE/SW-trending and also WNW-trending cross-faults.

An embayment on the upper surface of the intrusive rocks appears to be associated with a V-shaped graben-like structure bounded by two or three cross-faults; between lines 72S and 88S. This can be taken to be part of a broader area of depression in the interval between 72S and 110S.

6. SUMMARY AND RECOMMENDATIONS

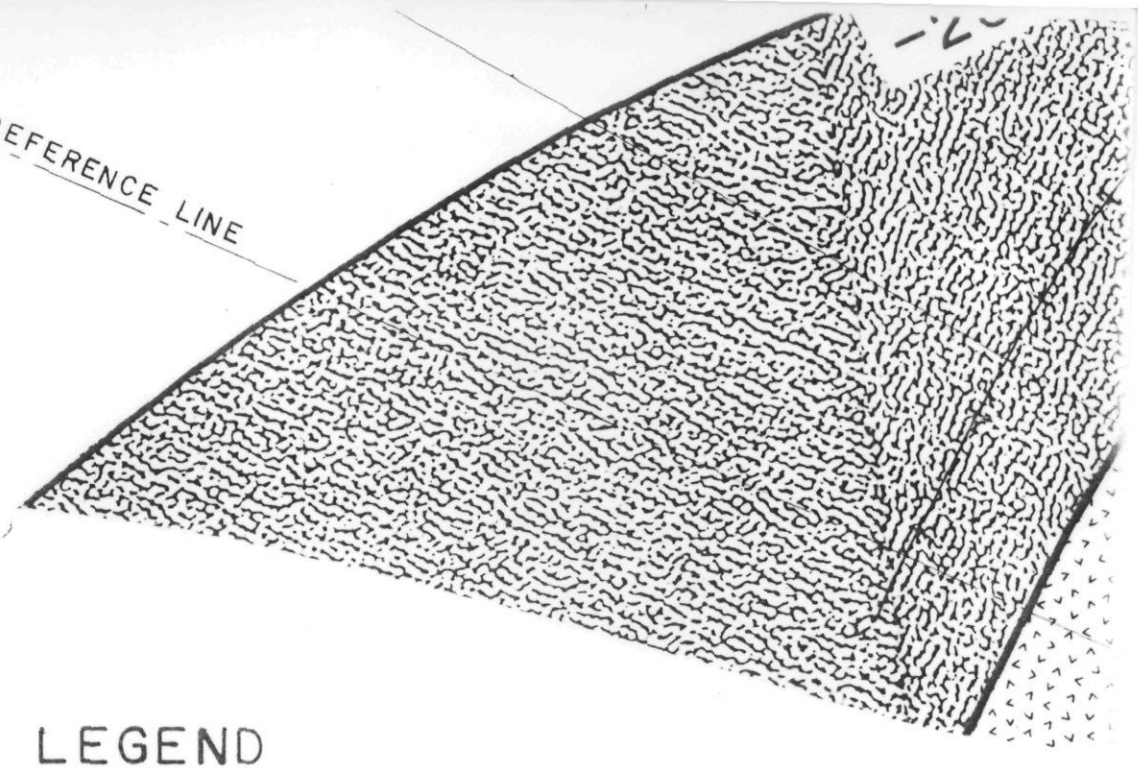
The magnetic survey has revealed the presence of magnetized intrusive rocks at depth. Computer processing intended to enhance the expression of these anomalies appearing to give satisfactory results.

The data considered in this study covers only a portion of the Best Chance Grid. In 1975 a magnetic survey covered much of the remaining part of the Grid. A comparison of the 1975 data with the 1984 data shows that the two data sets are of comparable quality. It is recommended therefore that where warranted, further processing of the 1975 survey data be considered.

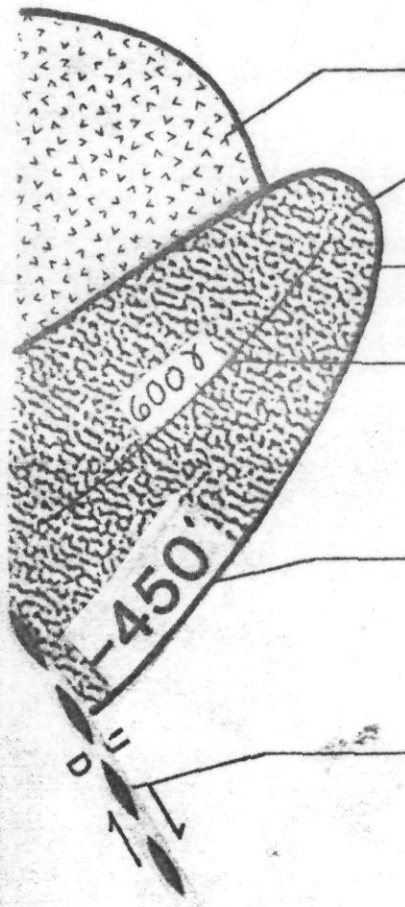
Yours sincerely,

ALLAN SPECTOR AND ASSOCIATES LTD.

Allan Spector, Ph.D., P. Eng.



LEGEND



zone of moderate magnetization

zone of high magnetization

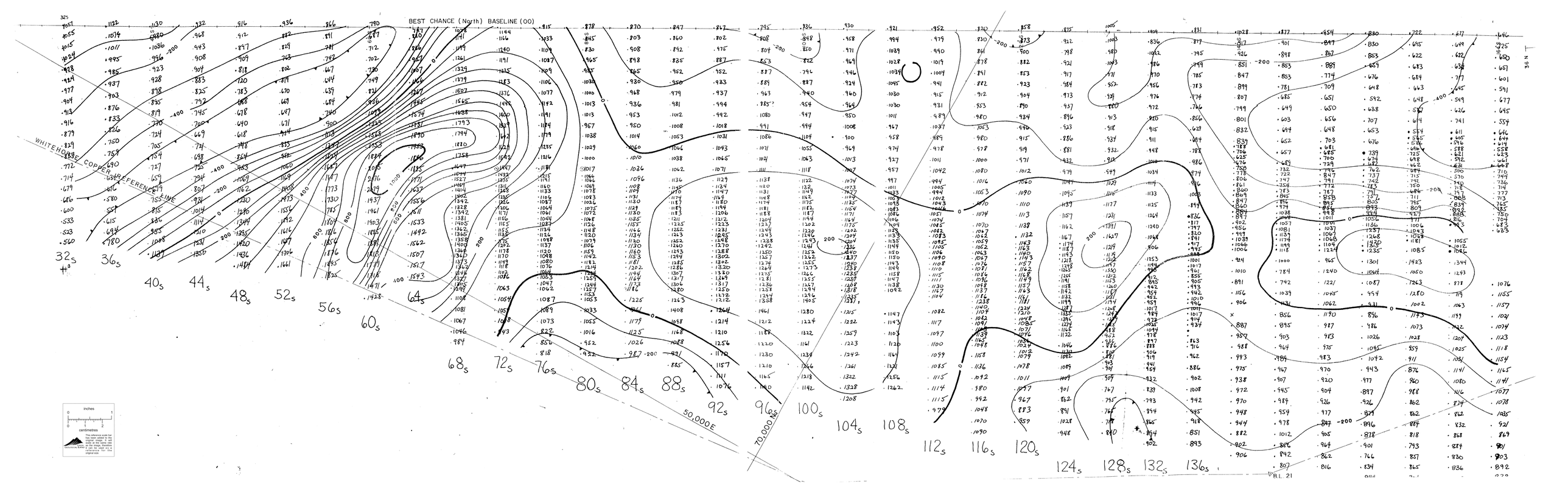
magnetic contact

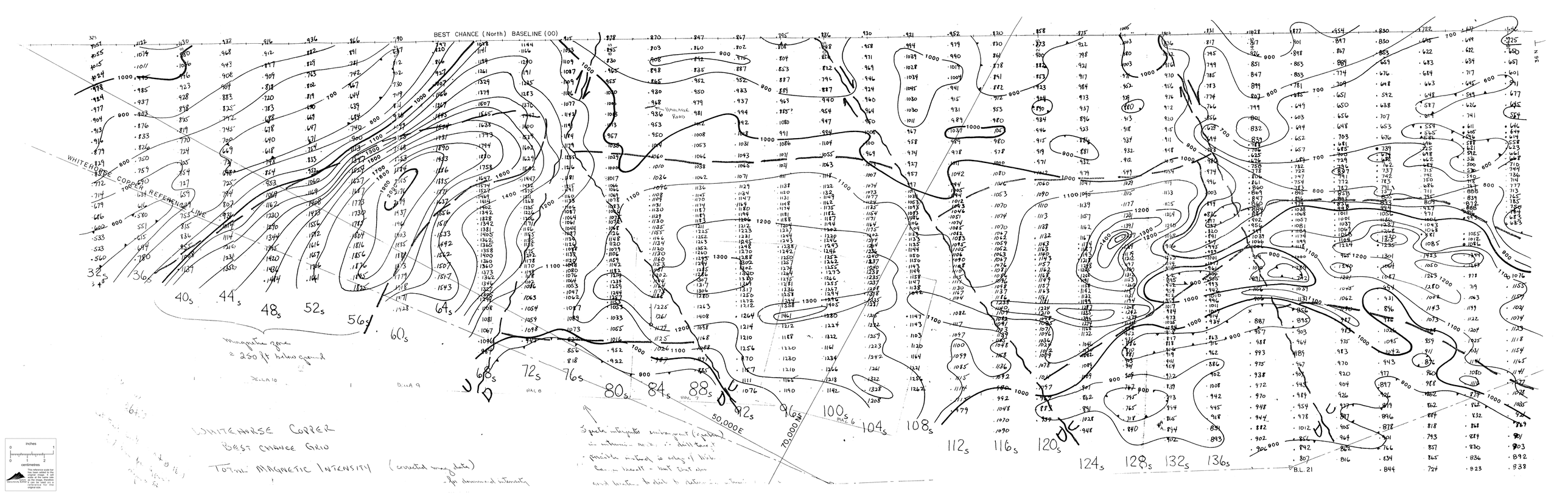
magnetic anomaly axis

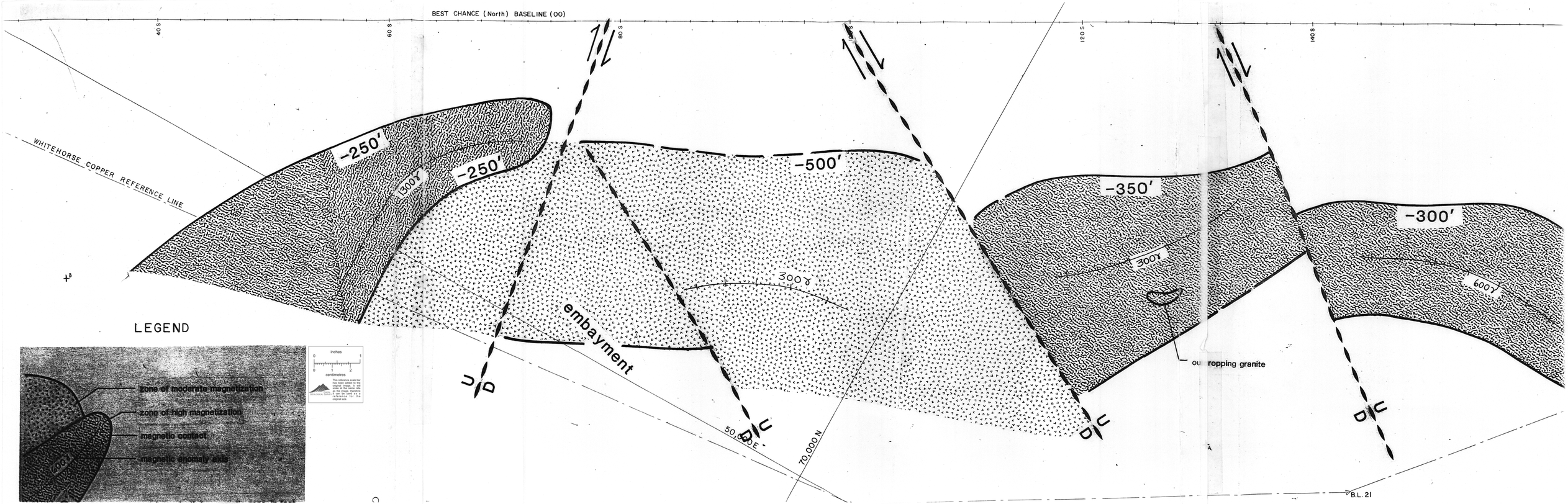
maximum depth to magnetic zone, in feet

interpreted fault, horizontal & vertical displacements indicated

PLATE 4


BEST CHANCE (North) BASELINE (00)
WHITEHORSE COPPER REFERENCE LINE
32s
36s
40s
44s
48s
52s
56s
60s
64s
68s
72s
76s
80s
84s
88s
92s
96s
100s
104s
108s
112s
116s
120s
124s
128s
132s
136s
50,000E
70,000E
36 N
inches
centimetres


BEST CHANCE (North) BASELINE (00)
WHITEHORSE COPPER REFERENCE LINE
40S
44S
48S
52S
56S
60S
64S
68S
72S
76S
80S
84S
88S
92S
96S
100S
104S
108S
112S
116S
120S
124S
128S
132S
136S
50,000 E
70,000 N
WHITEHORSE COPPER
BEST CHANCE GRID
TOTAL MAGNETIC INTENSITY (corrected survey data)
B.L. 21


BEST CHANCE (North) BASELINE (00)
40 S
60 S
80 S
100 S
120 S
140 S
WHITEHORSE COPPER REFERENCE LINE
-250'
300'
-250'
-500'
300'
embayment
-350'
300'
-300'
600'
outcropping granite
50,000 E
70,000 N
B.L. 21
LEGEND
zone of moderate magnetization
zone of high magnetization
magnetic contact
magnetic anomaly axis
-300'
inches
centimetres