

MAP NO.: PLACER ASSESSMENT REPORT X
115 J 14 PROSPECTUS
CONFIDENTIAL X
OPEN FILE

DOCUMENT NO: 120130
MINING DISTRICT: Dawson
TYPE OF WORK: Magnetometer survey

REPORT FILED UNDER: Crew Natural Resources Ltd.

DATE PERFORMED: September 1990

DATE FILED: September 1990

LOCATION: LAT.: 62° 55'N

AREA: Ballarat Creek

LONG.: 132° 00'W

VALUE \$: 11 400.00

CLAIM NAME & NO.: P 27684 TO P 27700

WORK DONE BY: Yukon Engineering Services Ltd.

WORK DONE FOR: Crew Natural Resources Ltd.

DATE TO GOOD STANDING:

REMARKS: A magnetometer survey was conducted on placer claims on Ballarat Creek in 1990. The baseline was 2280 metres long with stations every 20 or 40 metres and offsets every 5 metres. Several anomalies possibly corresponding to placer accumulations were detected at various locations offset from the present stream channel.

*indexed
24/10/90*



MAGNETOMETER GEOPHYSICAL SURVEY
BALLARAT CREEK, YUKON
NTS 115 J 14: Lat. 62° 55' Long. 132° 00'

CREW NATURAL RESOURCES LTD.

Assessment Report By:
R.L. McIntyre, C.E.T.

120130

Yukon Engineering Services
September, 1990



This report has been examined by
the Geological Evaluation Unit under
Section 41 Yukon Placer Mining Act
and is recommended as allowable
representation work in the amount
of \$ 11,400.00 .

W. LeBayer

for **Chief Geologist, Exploration and
Geological Services Division, Northern
Affairs Program for Commissioner of
Yukon Territory.**

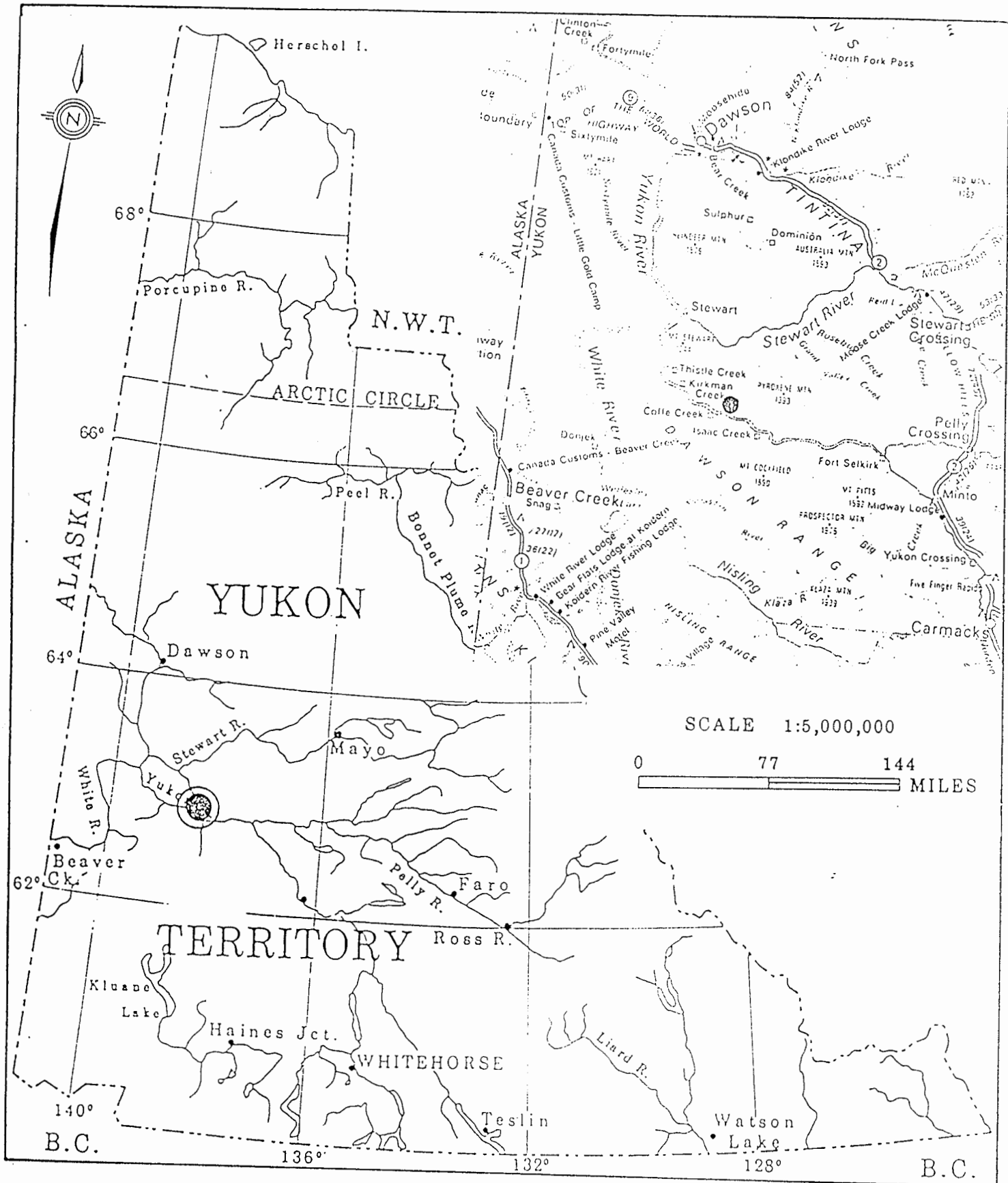
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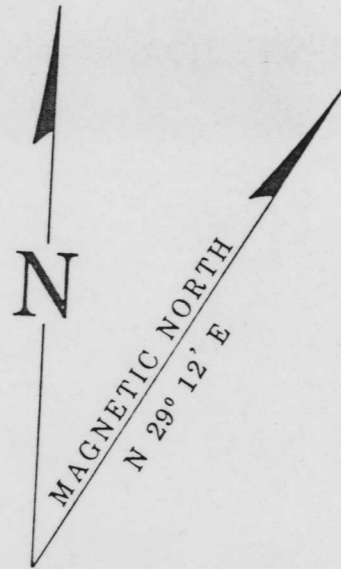
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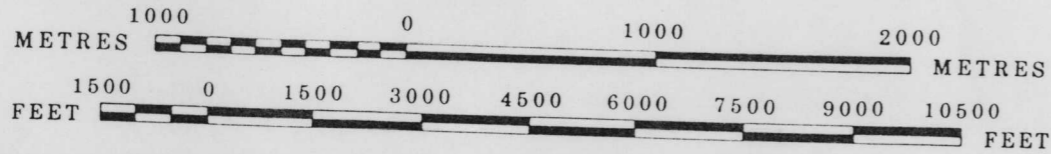
Magnetic Total Field Contour Map.....A
Cross Sections.....B

Figure 1. Location Map





SCALE 1:30,000



MAGNETOMETER GEOPHYSICAL SURVEY

BALLARAT CREEK, YUKON TERRITORY

115 J 14, 15

1. SUMMARY

This report presents the methods, results and exploration implications of a total field magnetometer ground geophysical survey conducted on mid - Ballarat Creek, Dawson Range area, Yukon Territory. The survey was conducted by R.L. McIntyre, C.E.T. of Yukon Engineering Services on a grid established by Lokey Mining Services Ltd.

The purpose of the survey was to locate alluvial paleochannels downstream from past mining activity by the client. The alluvial channels are located by interpretation of the magnetic response of their associated magnetic minerals concentrations. Indications from the client's past mining on Ballarat Creek are that the economic concentration of placer gold are indeed associated with magnetic heavy minerals (chiefly magnetite, some ilmenite).

Magnetic anomalies, that can be interpreted as local concentrations of unconsolidated magnetite in the stream gravels, were detected by this survey. Exploration implications are discussed on page 4 of this report.

2. PLACER MAGNETOMETER SURVEYS: CONSIDERATIONS FOR INTERPRETATION

It is important to note that the magnetometer method, when used in surficial deposit excavations, gives broadly interpreted qualitative information for magnetic minerals located in the stream bed gravels. These concentrations of magnetics may or may not bear a direct relationship to concentrations of gold.

The writer bases exploration and mining recommendations on a relationship governed by the following assumptions:

1. - Regionally and locally, (within the area influenced by this creek drainage) the host rocks for gold mineralization, and/or the associated rock types, also bear magnetic mineralization;
2. - The stream sedimentation processes that controlled alluvial gold deposition also controlled deposition of other heavy minerals to roughly the same degree;
3. - Old stream channels, presently buried by alluvium, exist in the valley at varying displacements from the present stream channel.

In the case of Ballarat Creek, past mining production adjacent to the grid gives evidence that the above assumptions are true.

However, very little research has been done that can be used to perform detailed modelling of placer deposits based on their magnetic response. Schwarz and Wright (1988)⁷ present discussions on the modelling problem, and conclude that the surface trace (2-D length and width) can be reliably interpreted.

Using a theoretical model of a relatively thin, narrow, elongated plate, and performing power spectra computations on the magnetic total field profile, one can arrive at 3-dimensional estimates for the "ore body". In that this research by the Geological Survey of Canada is ongoing (and presently conducted only on Eastern Canadian and B.C. placers of different surficial geological characteristics than Yukon placers), the writer has not made depth and thickness estimates for Ballarat Creek Placers.

In summary, it is accepted (Adler & Adler, 1985¹; Schwartz and Wright, 1988)⁷ that when conducted with the proper instrumentation and with due regard to local geophysical and geological conditions, that the magnetometer method will be successful in placer investigations.

3. PROPERTY LOCATION AND ACCESS

The Ballarat Creek property of Crew Natural Resources Ltd. is located on the north side (right limit) of the Yukon River approximately 120 miles upstream from Dawson City, at 62 55' N, 132 00' W, on NTS map sheet numbers 115 J 14 and 115 J 15.

Access is by air (fixed wing to the gravel strip at the mouth or rotary aircraft from Dawson City or Carmacks) or Yukon River travel.

The survey was carried out on Creek Placer claims Tara 38(P27684) to Tara 53 (P27700), held by Crew Natural Resources Ltd. See location map, Figure (ii).

4. Equipment and Survey Procedures

The survey was conducted using an EDA Instruments (now Scintrex) OMNI IV proton precession magnetometer, operated in the Total Field mode, with an EDA OMNI IV Base Station Magnetometer for correction of the diurnal drift. The Base Station was programmed to take total field readings at thirty second intervals to ensure accurate corrections for the rapidly collected field survey data.

The instrument is sensitive to 0.1 nano-Teslas (1 nT=1 gamma), necessitating diurnal drift and micropulsation correction to survey data to discern true anomalies. The Base Station collected data on thirty second intervals.

The grid parameters and direction of travel are programmed into the OMNI IV by the operator and are automatically updated at each position increment. The position information, sensor decay rate and sensitivity, total magnetic field and statistical error are displayed to the operator, who then stores the information in the 48k memory of the magnetometer. This system enables the operator to assess measurement quality,; and take repeat readings if necessary. Readings were taken at 5 metre intervals along lines perpendicular to valley direction,; extending from valley rim to valley rim.

The daily survey information is manipulated with the following procedure:

- a) - field mag unit connected to base station;
data transferred and corrected;
- b) - base station unit connected to laptop computer;
corrected field data, as well as base station
readings, dumped to GWBasic software;
- c) - both data files transferred to EMXS software for
review and preliminary data manipulation.

The final review, interpretation and presentation of results is performed in the Whitehorse office of Yukon Engineering Services. This involves the computer generation of a three dimensional digital terrain model, and extraction of cross sections of each grid line. The corrected total field magnetic values are presented in this report as both cross sections and a planimetric contour map.

The data is interpreted and geophysical anomalies are discussed later in this report.

5. GEOPHYSICAL GRID PARAMETERS

The grid was established on the upstream portion of the Tara Claim Group, in two portions. The North Grid is directly downstream of the early 1980's mining cut. This area, offers the best chance for correlating pay channel as discovered through actual mining methods with magnetic anomalies on unmined areas. A baseline was cut out from the North to the South Grid, some 1500 metres downvalley, in order to maintain an accurate topographical tie. All crosslines were cut out by hand to afford rapid data collection and accurate location control. The grid has the following dimensions:*

BASELINE : 2,280 metres; station 0+000 IS 25 metres.
 downstream from mining cut, 77m @ 250 Az
 from Post No 1, P27699.

HORIZONTAL ALIGNMENT	: Pot 1	N 22880	E 1000	Sta	0+000
	Pot 2	Azim	140	Dist	1000
	Pot 3	Azim	135	Dist	500
	Pot 4	Azim	130	Dist	500
	Pot 5	Azim	126	Dist	280

STATIONS : At twenty or 40 metre intervals

OFFSETS : At five metre intervals

LINE LENGTH (MAX. OFFSET) : 120 m East, 110 m West (varies with
 valley width)

TOTAL GRID : 11.78 Line Kilometres

TOTAL READINGS : 1,497 (not including base station
 readings)

* NOTE: Conventional mining exploration terminology dictates the
 use of "line" for increments along the baseline, and
 "station" for increments along the "lines". EMXS software
 employs standard engineering terminology, ie. "station"
 for increments along a horizontal alignment (baseline),
 and "offset" for increments right or left of each station.
 Engineering notation will be used throughout this report.

6. REGIONAL/PROPERTY GEOLOGY AND GEOPHYSICS: MAGNETIC IMPLICATIONS

The 1:63,360 scale aeromagnetic maps (GSC Pad. 4305 Coffee Creek
 and GSC pad 4319 Britania Creek) in the immediate area of the grid
 shows low magnetic relief (less than 20 gammas), with no perceptable
 grain. This relatively flat regional geomagnetic signature is
 conducive to discerning the subtle magnetic response from the
 Ballarat Creek Quarternary alluvium.

The property exhibits the typical Dawson Range geomorphology and
 geography of low rounded drainage divides with very sparse outcrop
 exposure. Mapping by Templeman-Kluit (1973)^a and a reconnaissance
 traverse by McIntyre (1988)⁵ indicates that the area is underlain
 by the Proterozoic Age Pelly Gneiss unit. Local facies variations
 within that unit are quite marked, ranging principally from thinly
 bedded gneissic biotite granodiorite, through foliated muscovite
 granodiorite, to foliated weakly granetiferous amphibolite, with
 quartz veining throughout conformable to jointing planes. These
 felsic to mafic facies changes are sufficiently varied to produce an
 anomalous magnetic response across their contacts. This fact has
 been considered in the discussion on data interpretation.

7. RESULTS AND RECOMMENDATIONS:

1. General

The survey was successful in detecting some anomalies that warrant physical investigation. Because of the largely empirical methods used to interpret placer magnetic anomalies (as discussed on page 1 and 2 of this report), there is little use in assigning detailed analyses to each specific anomaly. The complex surficial geology of the stream bed gives rise to complicated anomaly trends, although each section presents the appearance of a clean, interpretable signature. Inspection of the 20 gamma contour planimetric presentation (DWG No.9019OR06) yields perhaps the most useful information. To be blunt, this survey was not intended to be used for location and accurate placement of 6" drill holes; rather it was intended to indicate the continuity of the "pay streak". For the practical purposes of placer mining, small site specific magnetic anomalies will not be mined, leaving other areas virgin. At this stage in Ballarat Creeks' history, the economics from past mining are known. The 1990 magnetometer survey indicates that there is a good potential for those conditions to prevail in the locations discussed below.

2. North Grid

In the North Grid, the relatively flat response of the first four lines gives way to a significant response commencing at Station 80. This 100 to 200 gamma spike covers an area approximately 50 metres wide by 100 metres long. Given the historical information already mentioned, it is likely that this represents the continuance of the main Ballarat Creek pay channel. It is centred 5 - 10 metres east of the baseline, which can readily be located in the field. The anomalous responses on the rest of the grid are all centered well east of the baseline, indicating that the pay channel in this part of the valley does continue downstream from past mining activity, and favors the left limit (between the baseline and the road).

The strong anomalies found on this grid are believed to arise from substantial concentrations of magnetite in the gravels ("black sand"), Stations 0+080 to 0+220 and 0+340 and 0+380 present the most significant anomalies. The area between these locations may either represent lesser concentrations of black sand, or deeper gravels. It is most likely that the two large anomalous areas contain physical structures more amenable to heavy mineral deposition, with abrasion and degradation occurring in some areas between.

3. South Grid

The South Grid gives generally more complex and subtle magnetic anomalies than the North Grid. There are, however, anomalies of sufficient width and amplitude to suggest that magnetite-rich gravels have been deposited in certain areas. The general trend of the anomalous areas favors the left limit again, with the strongest anomalies occurring at Station 2+220 to 2+260, centered 40 metres east of the baseline. Anomaly features such as that on Station 2+220

present three distinct peaks of increasing magnitude eastward. This can represent a braided channel, with an inequality of either magnetite content or depth. This signature degrades up and downstream to a single peak anomaly, indicating a convergence of channels.

The area between the North and South grid has been surveyed by total field magnetometer in 1985 by MPH Consultants Ltd. Their interpretation of results indicates paleo channels in four main anomalous zones of a generally sinuous linear nature. The combination of past mining activity and indications from these three surveys gives strong evidence for the persistence and stability of the Ballarat Creek pay channel.

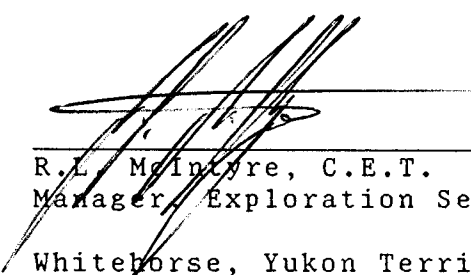
7. REFERENCES:

1. Adler, K.P. and Adler, J.E., 1985 Placer Magnetism for the Small Operator.
2. Breiner, S., 1973 Applications Manual for Portable Magnetometers, GeoMetrics, Sunnyvale, California.
3. Geological Survey of Canada, Geophysics Paper 4319 Britannia Creek and 4305 Coffee Creek: Aeromagnetic Series, 1967.
4. Hood, P.J., 1977 "Geophysics and Geochemistry in the Search for Metallic Ores", G.S.C. Economic Geology Report 31.
5. McIntyre, R.L., 1988 Magnetometer Geophysical Surveys: Bellarat Creek Project (Unpublished Assessment Report).
6. Schwarz, E.J. and Wright, N., 1987 Buried Placers in Chaudiere River Sediments Indicated by Ground Magnetometer Survey, Eastern Townships, Quebec; in Current Research Part A, G.S.C., Paper 87-1A, pp 423-428, 1987.
7. Schwarz, E.J. and Wright, N., 1988 The Detection of Buried Placer Deposits by Ground Magnetic Survey. (Geophysical Prospecting 36, 919-932).
8. Templeman-Kluit, D.J., 1973, G.S.C. Paper 73-41, 1:250,000 Geology map, Snag, Y.T..

CERTIFICATE

I, Robert L. McIntyre, C.E.T., of Whitehorse, Yukon Territory, do hereby certify that;

1. I hold a Geological Technician Diploma from Sir Sanford Fleming College, Lindsay, Ontario, and I have been practising continuously since graduation in 1979;
2. I am a Certified Engineering Technologist (Geology) for Alberta and Yukon, by the Alberta Society of Engineering Technologists.
3. The geophysical field work and report preparation was performed by me personally.
4. I have based conclusions and recommendations contained in this report on my knowledge of geophysics, my previous experience, and on the results of field work conducted on the property.
5. I hold no interest, directly or indirectly, in this property other than professional fees, nor do I expect any interest in the property, or any other of Crew Natural Resources Ltd.s' holdings.

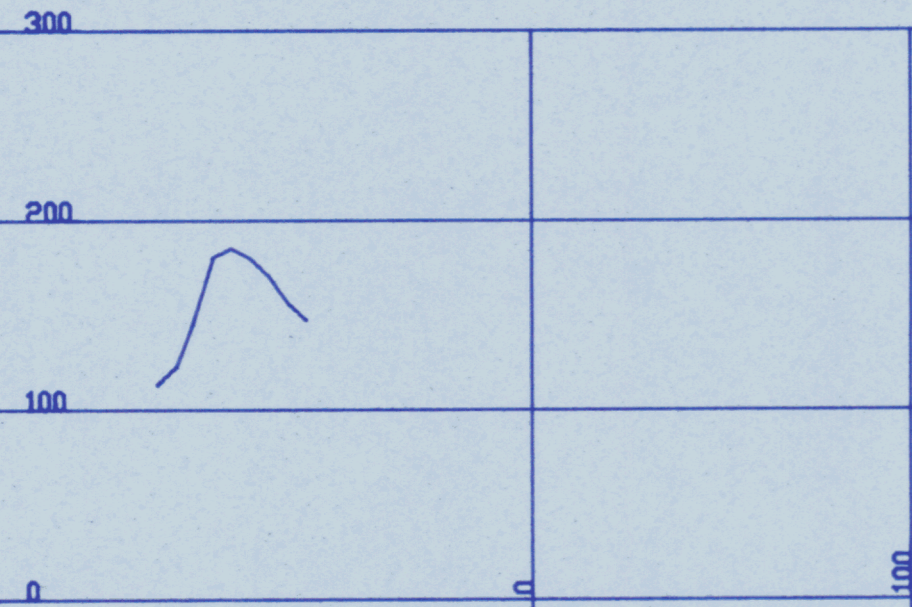


R.L. McIntyre, C.E.T.
Manager, Exploration Services

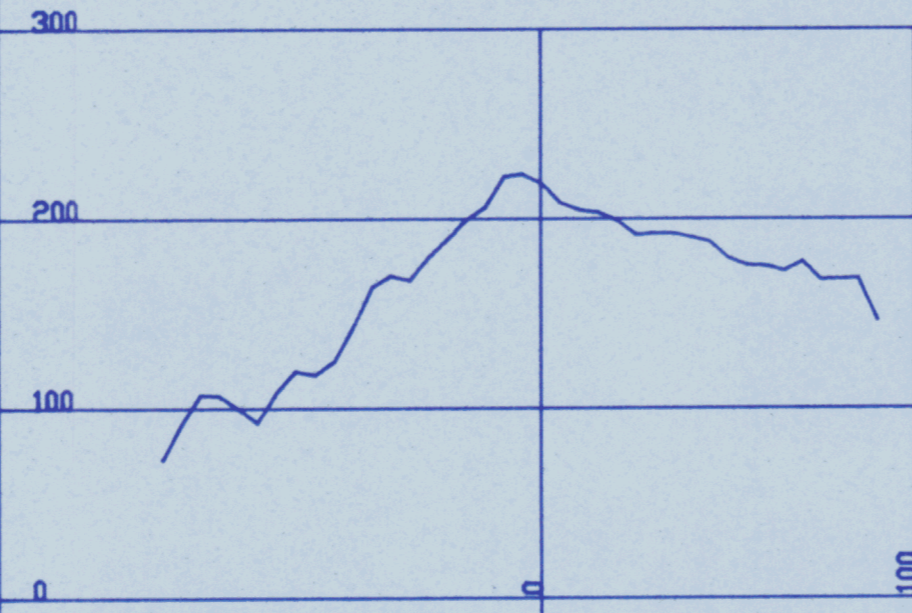
Whitehorse, Yukon Territory
September, 1990

APPENDICES

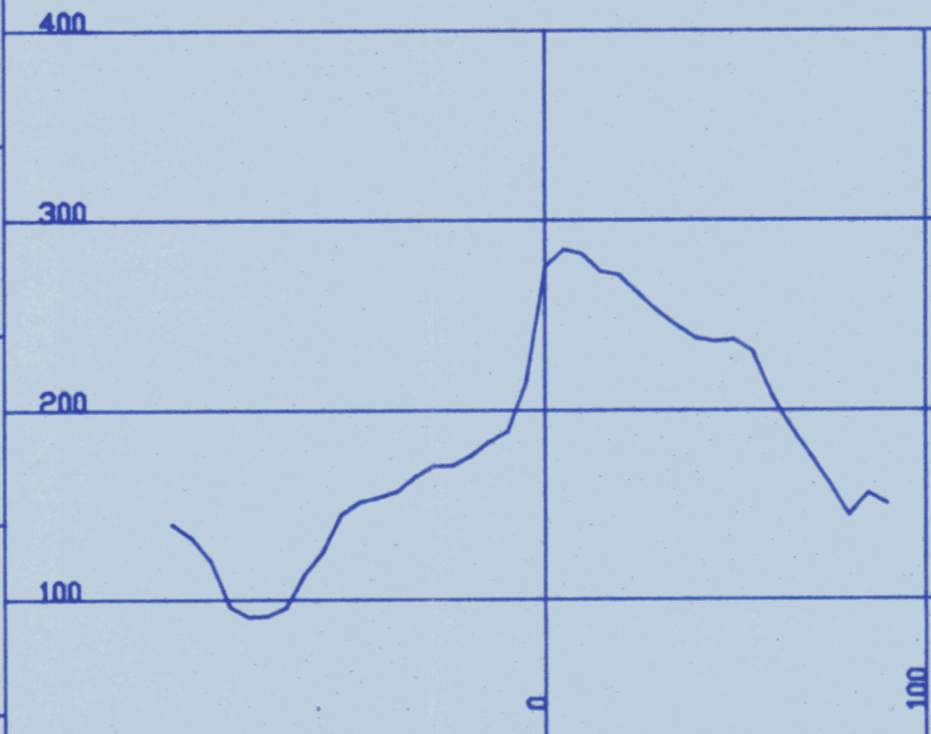
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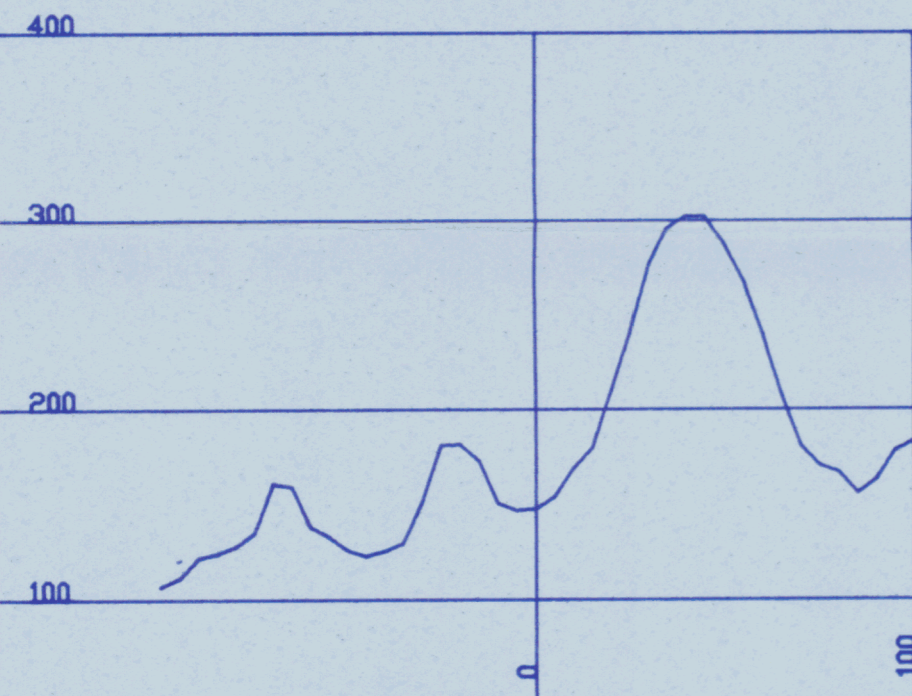
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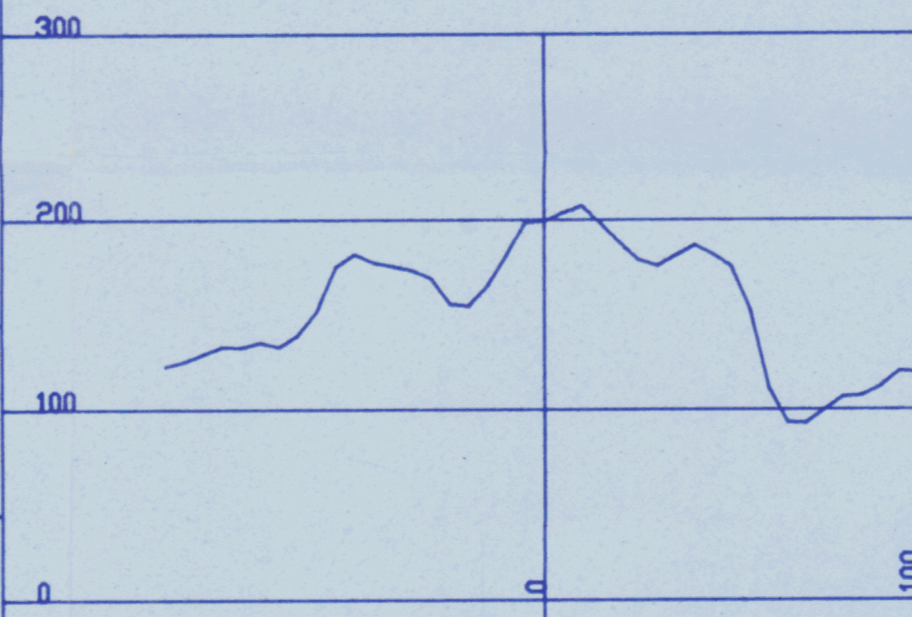
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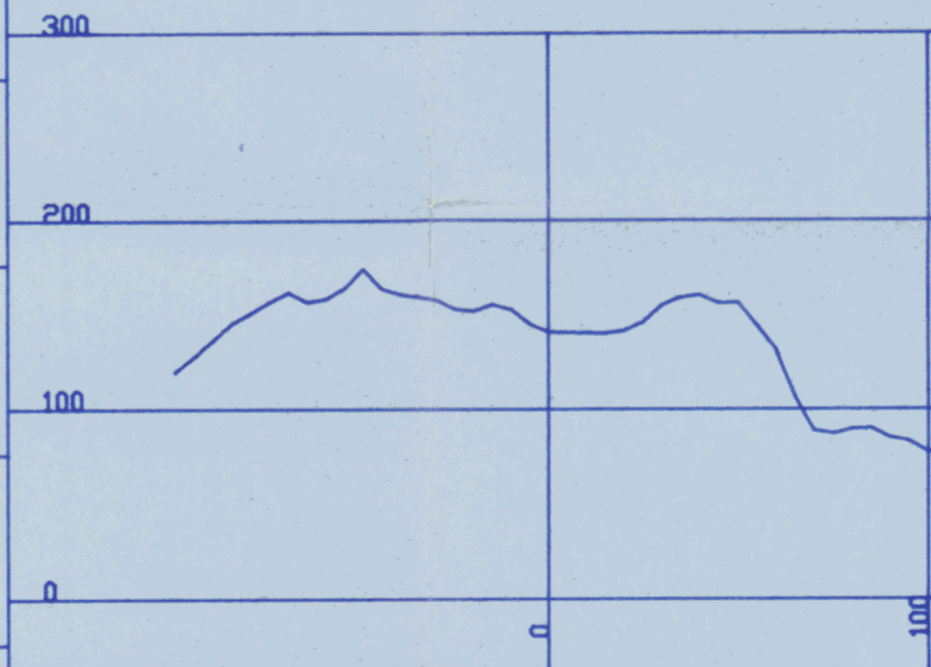
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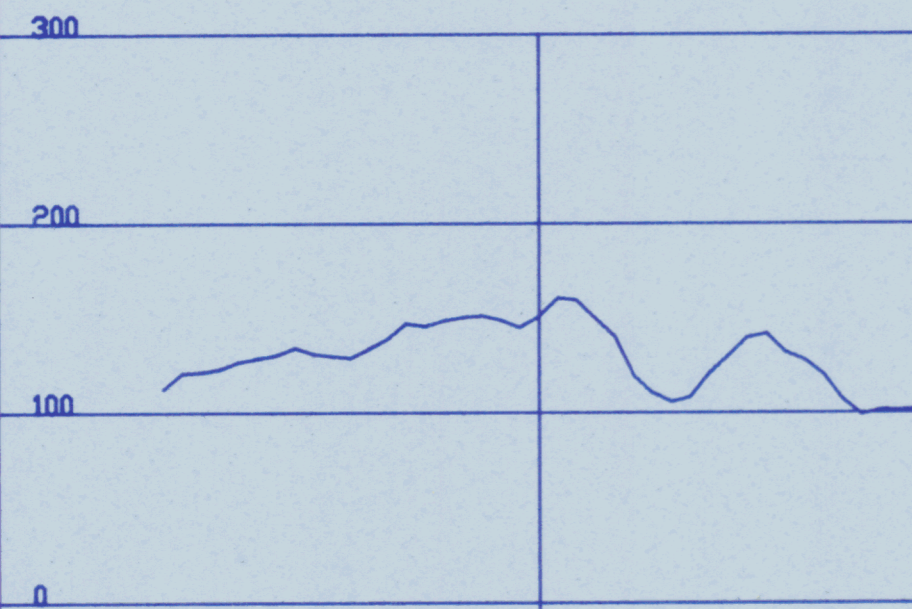
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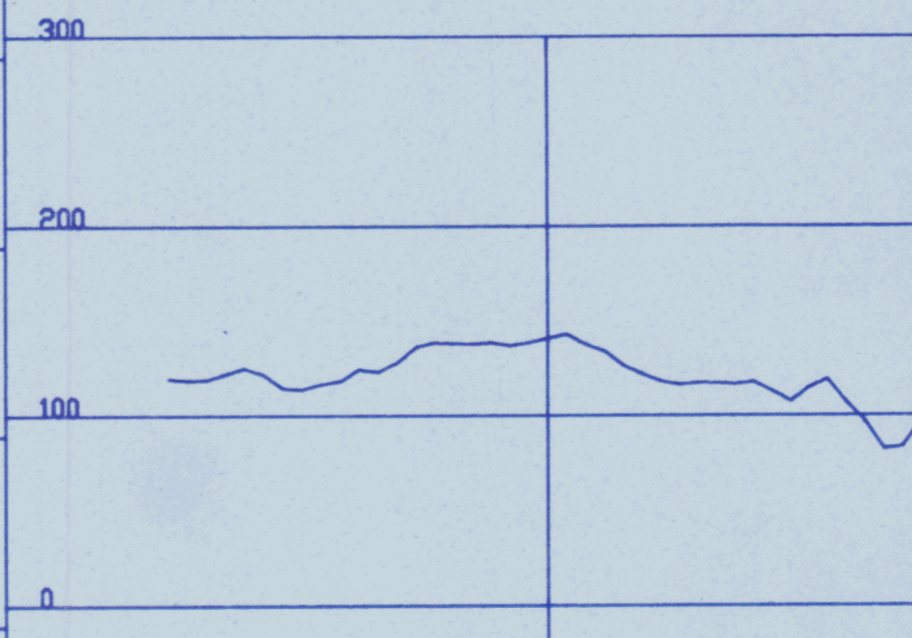
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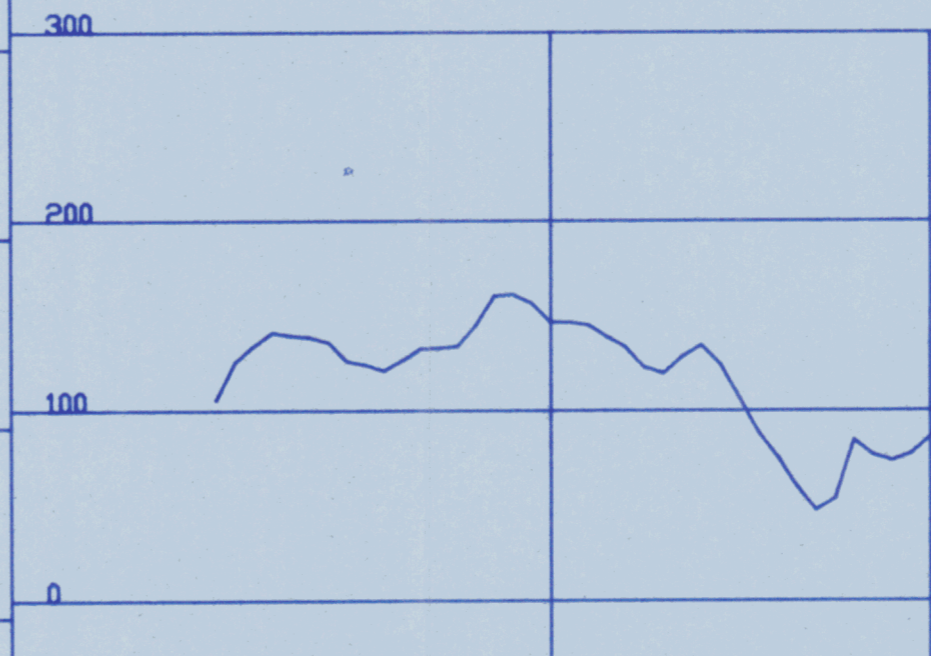
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REVISIONS:

REV. NO.	DATE	BY
ORIGINAL	90.08.31	RLM

NOTES:

- SECTIONS LOOKING NORTH
- X AXIS GAMMAS, Y AXIS METRES
- 60,000 GAMMAS SUBTRACTED FROM X AXIS

LEGEND:

PROJECT:

BALLARAT CREEK
PLACER PROPERTY

Dwg 9019 DR 01

TOTAL FIELD
MAGNETOMETER
SURVEY

BASE STATION CORRECTED

CREW NATURAL
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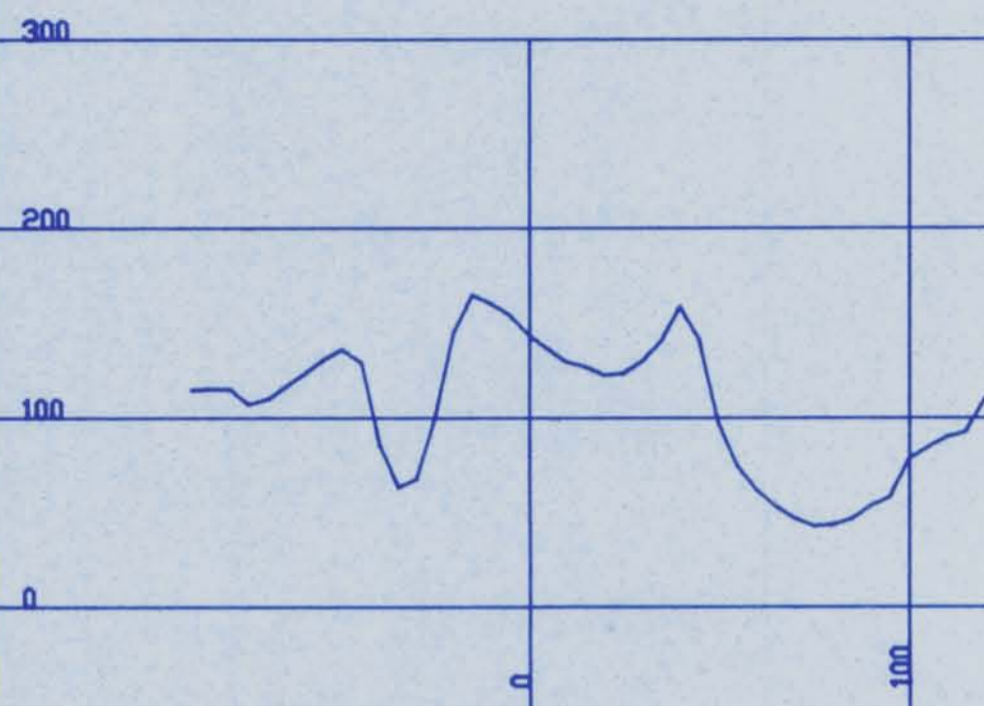
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120130

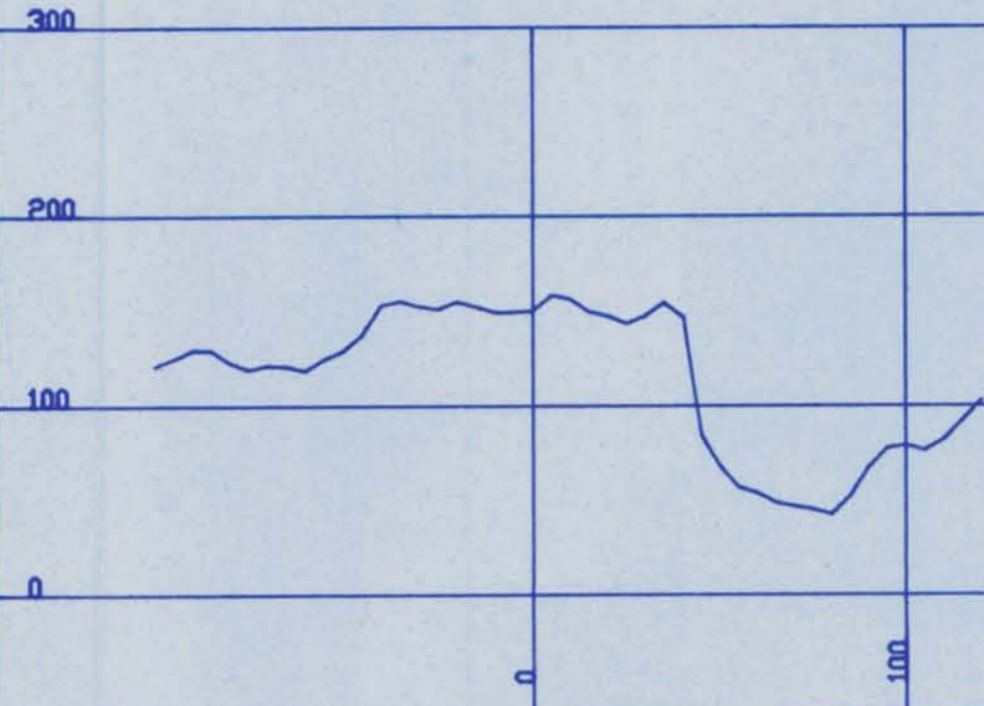
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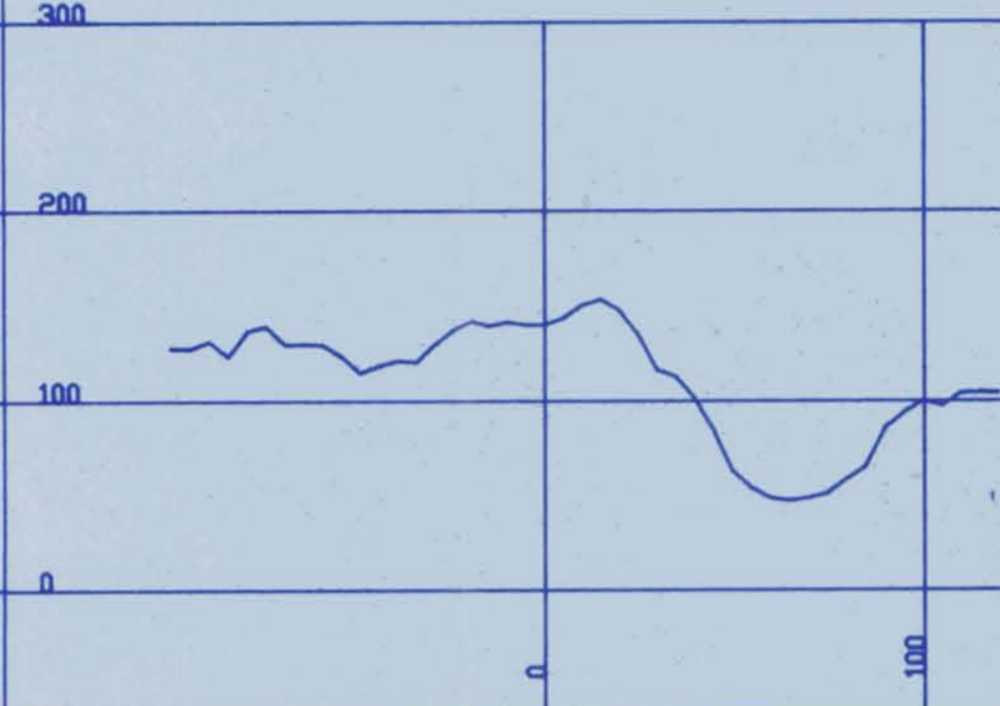
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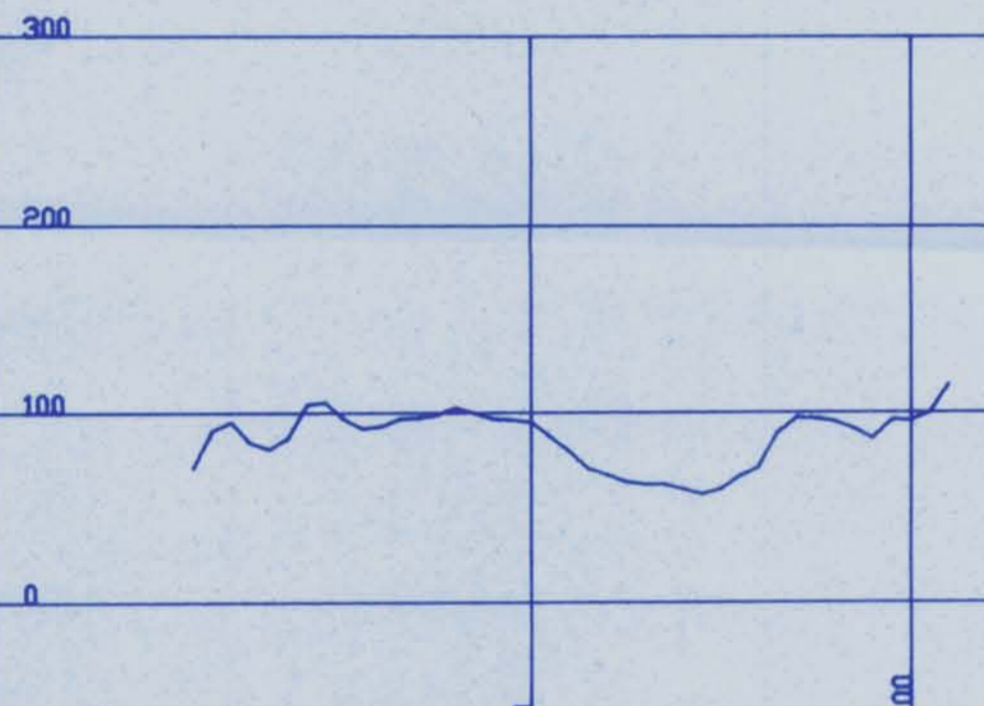
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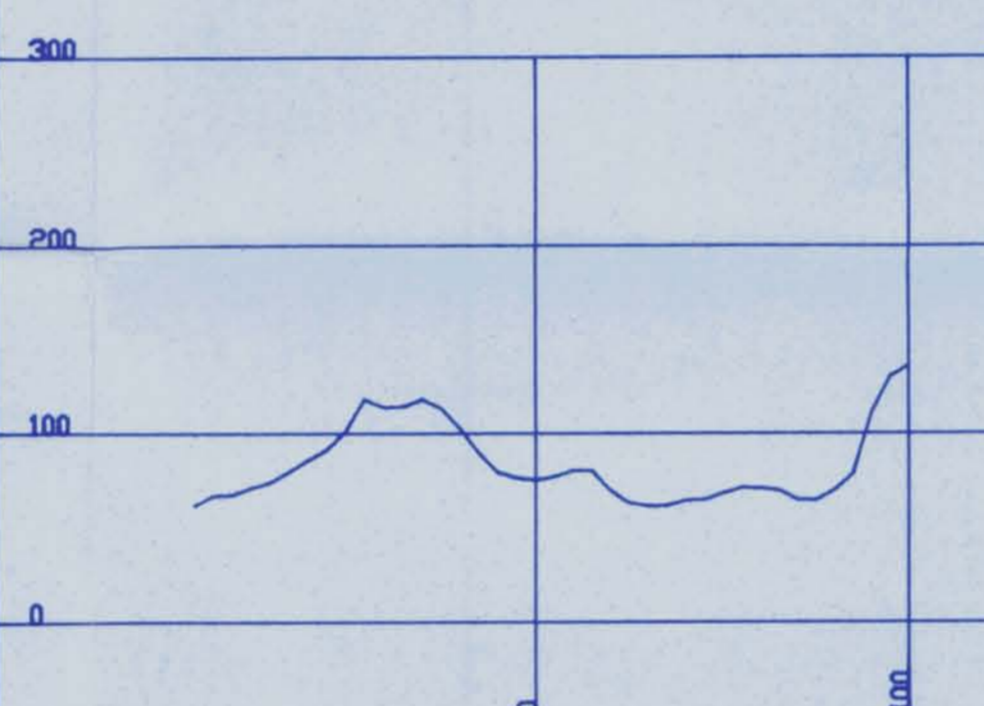
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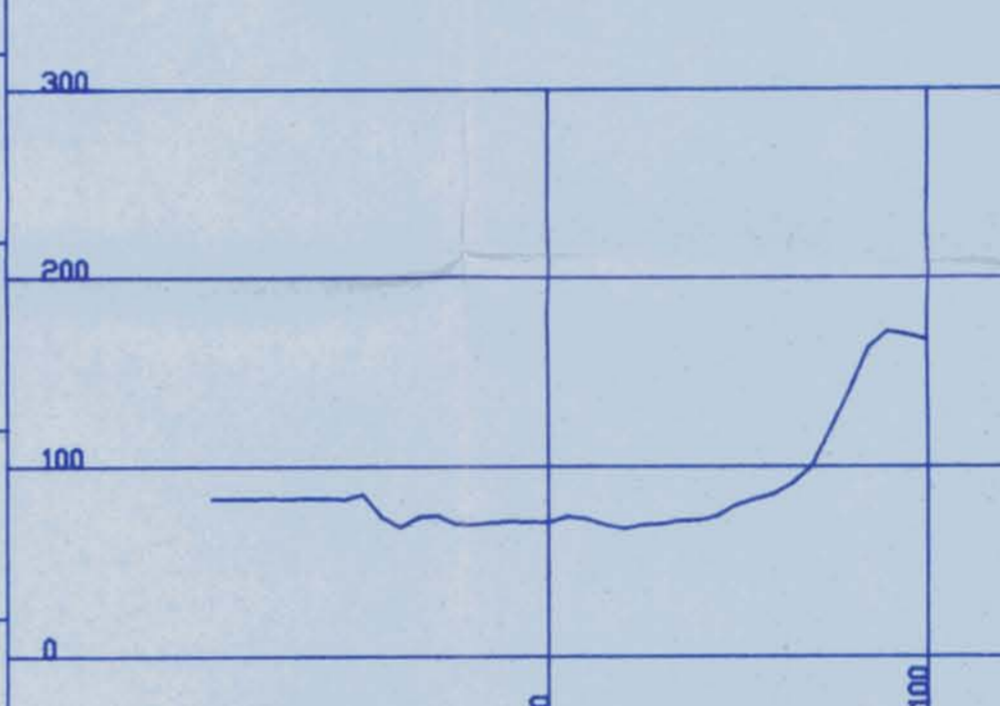
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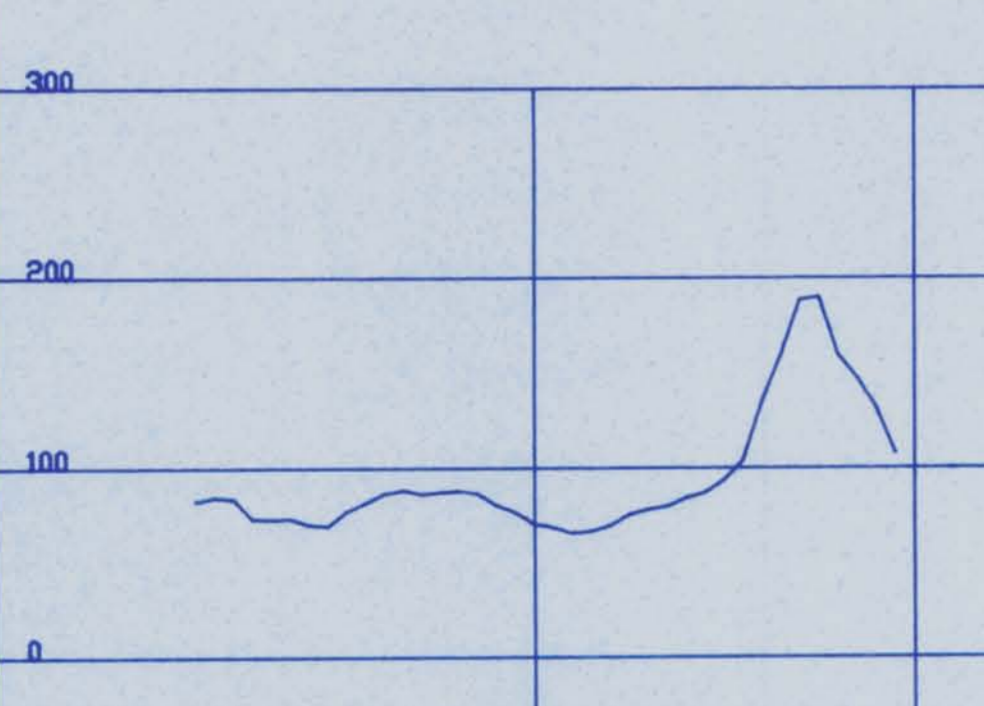
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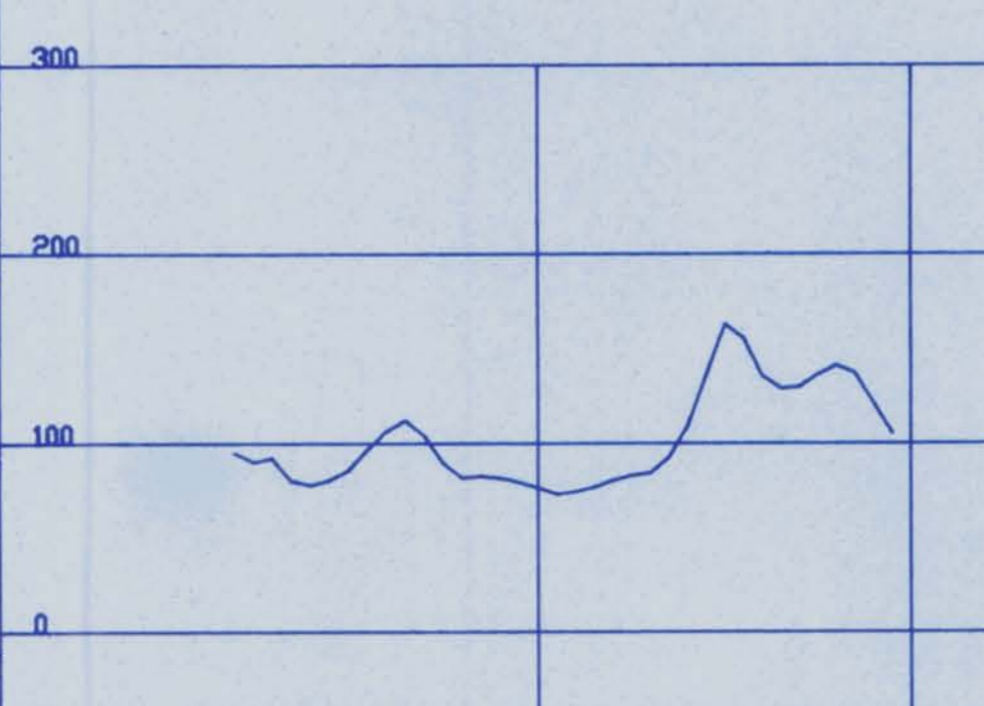
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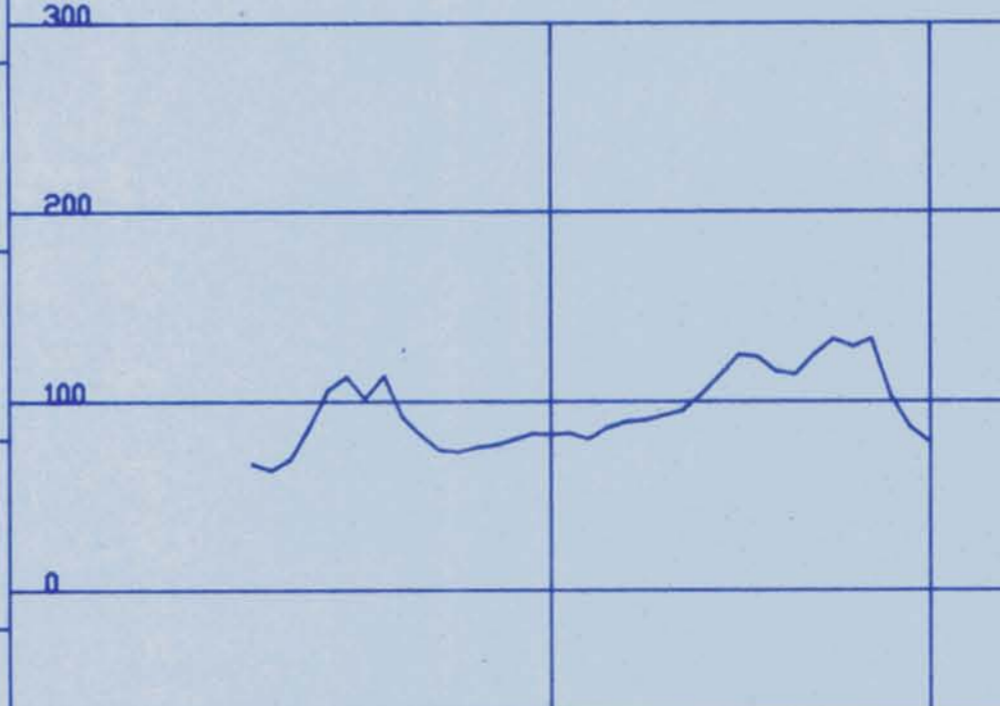
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- X AXIS GAMMAS, Y AXIS METRES
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LEGEND:

PROJECT:

BALLARAT CREEK PLACER PROPERTY

Dwg 9019 DR 02

TOTAL FIELD MAGNETOMETER SURVEY

BASE STATION CORRECTED

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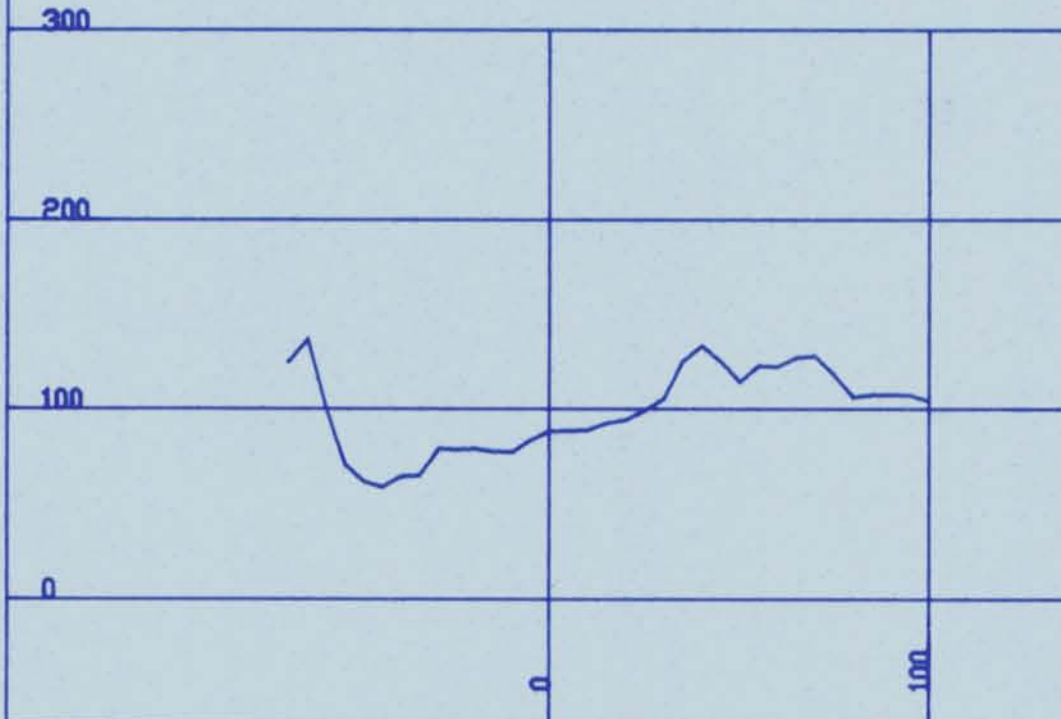
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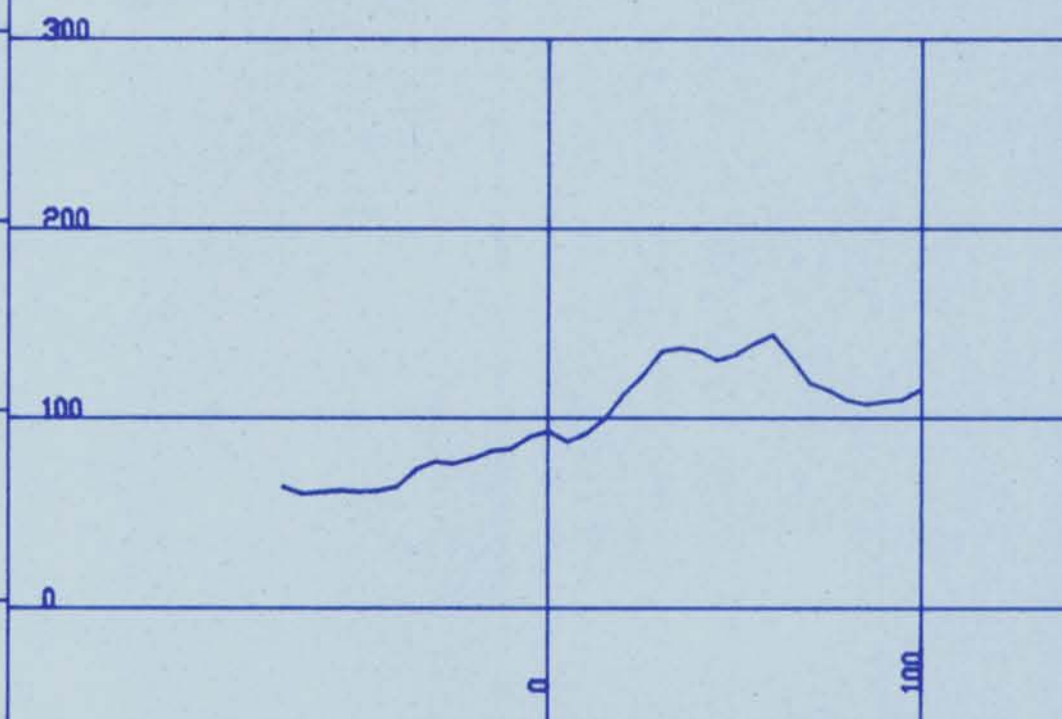
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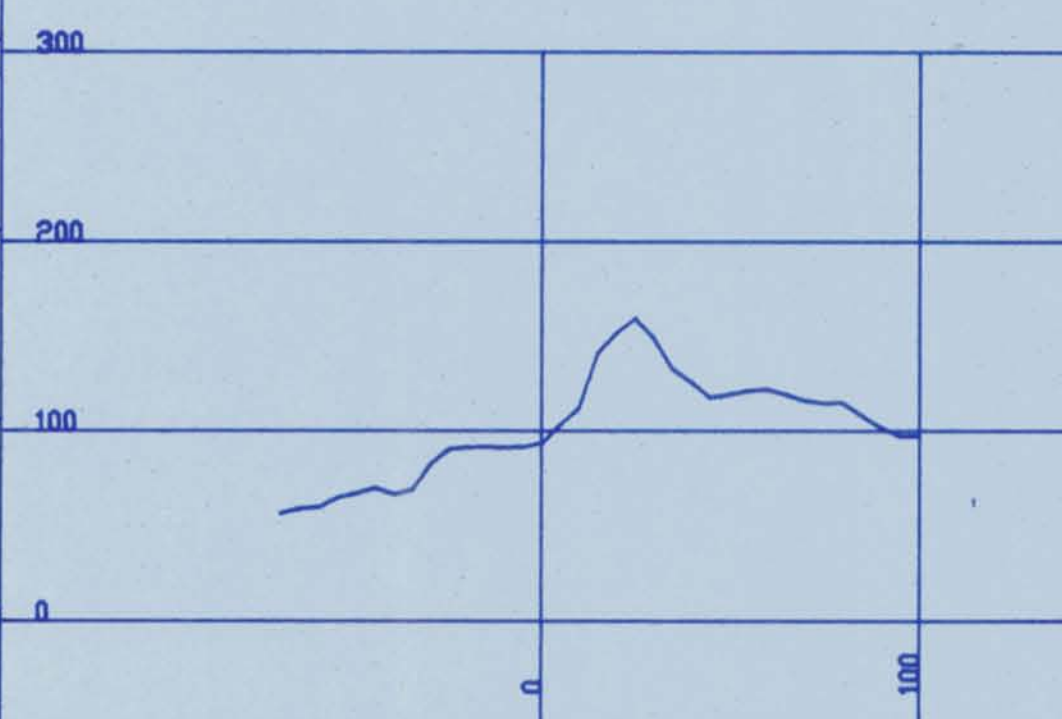
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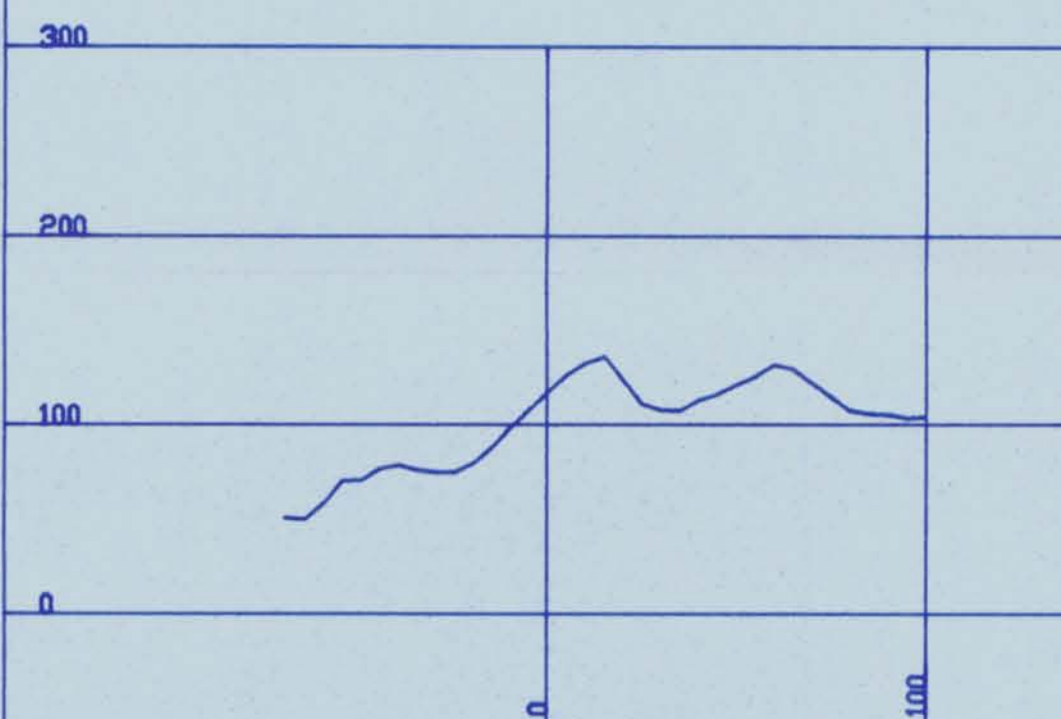
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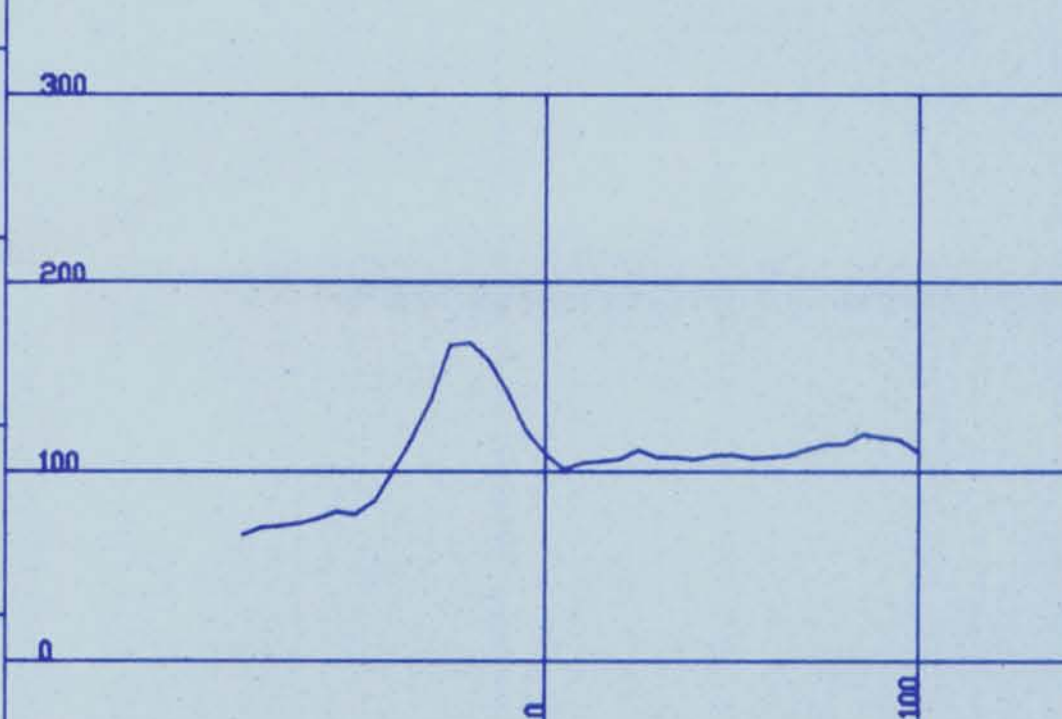
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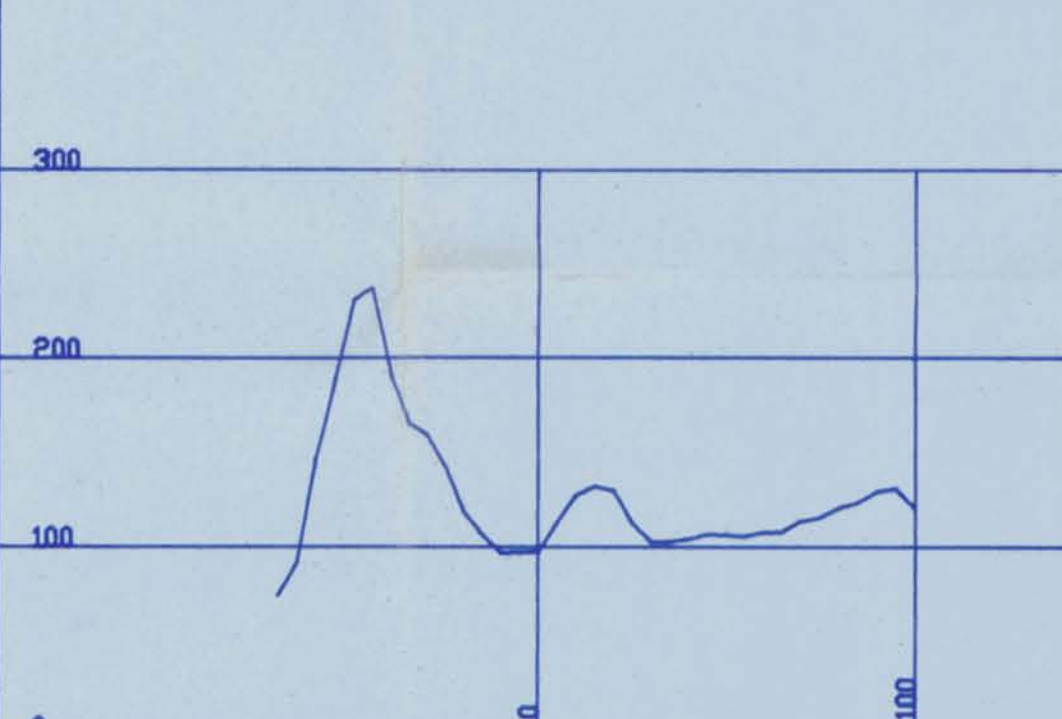
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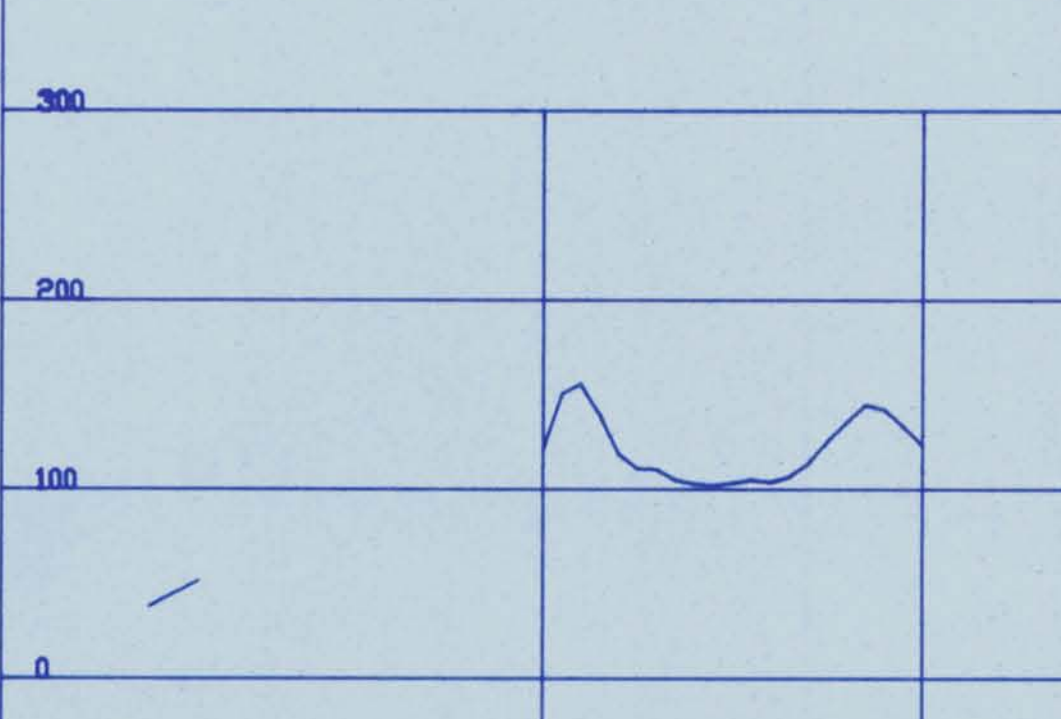
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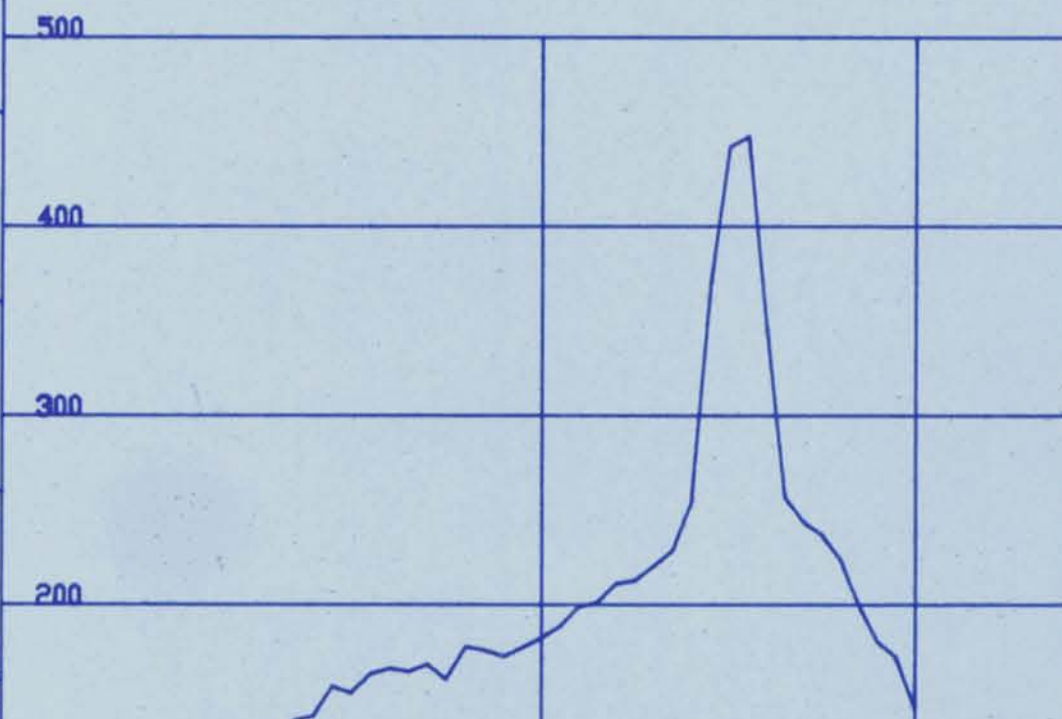
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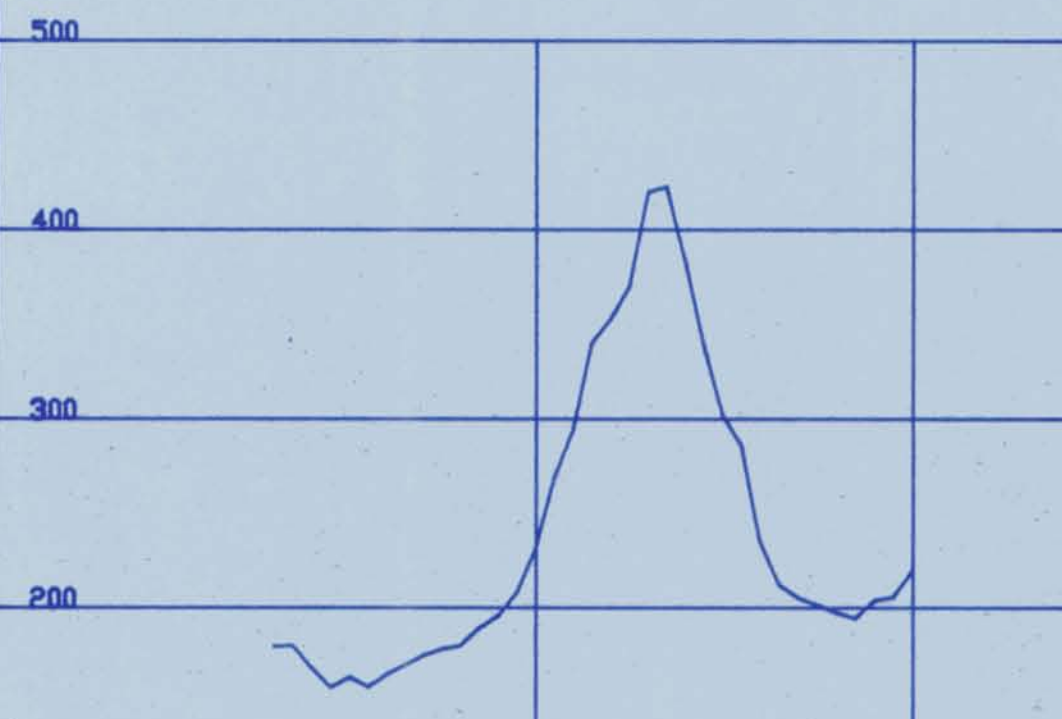
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- 60,000 GAMMAS SUBTRACTED FROM X AXIS

LEGEND:

PROJECT:

BALLARAT CREEK
PLACER PROPERTY

Dwg 9019 DR 03

TOTAL FIELD
MAGNETOMETER
SURVEY

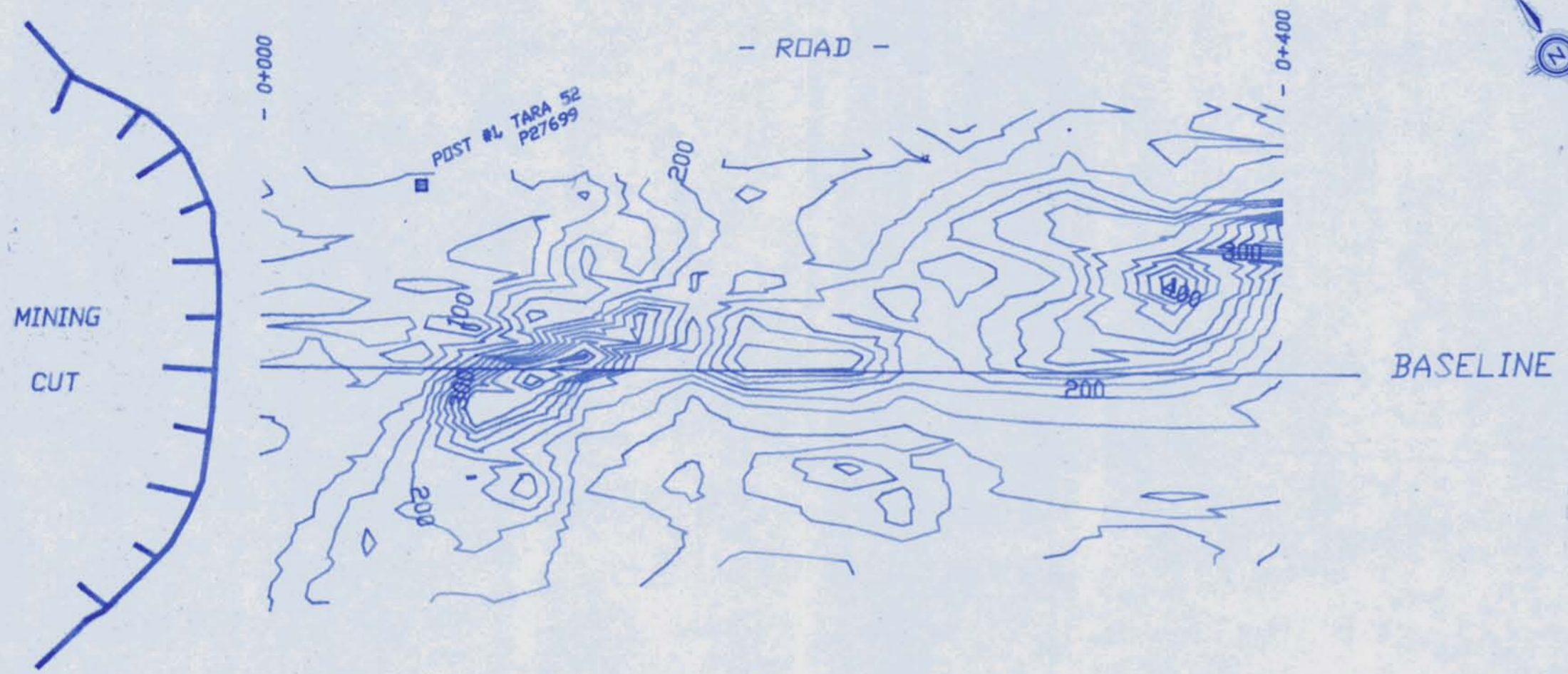
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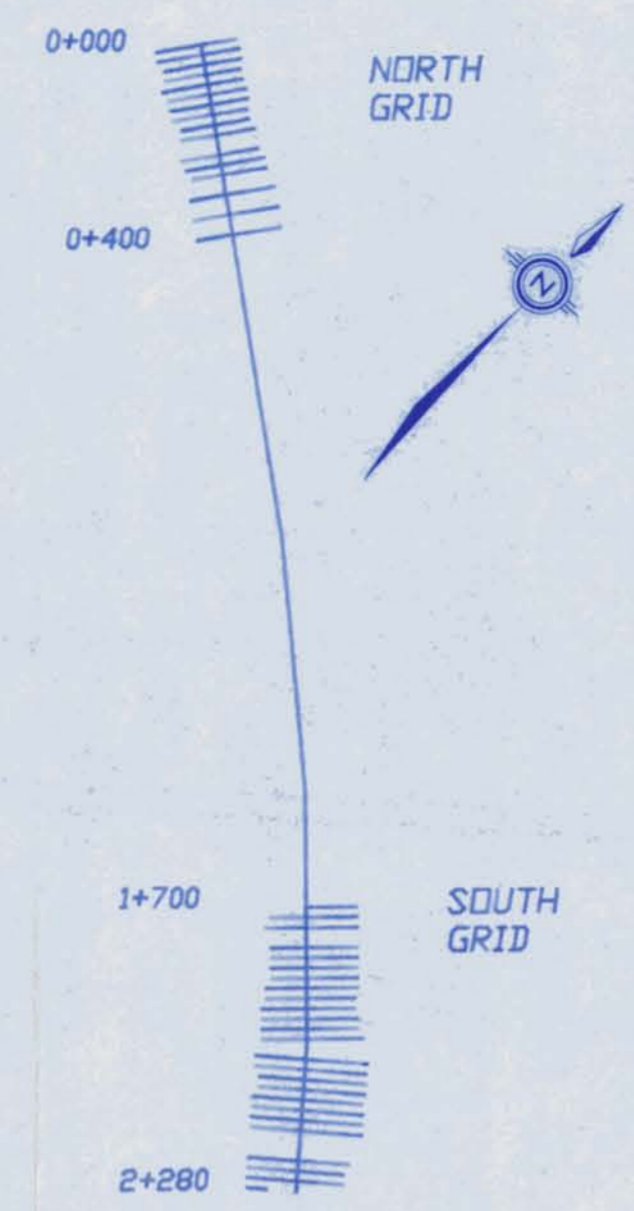
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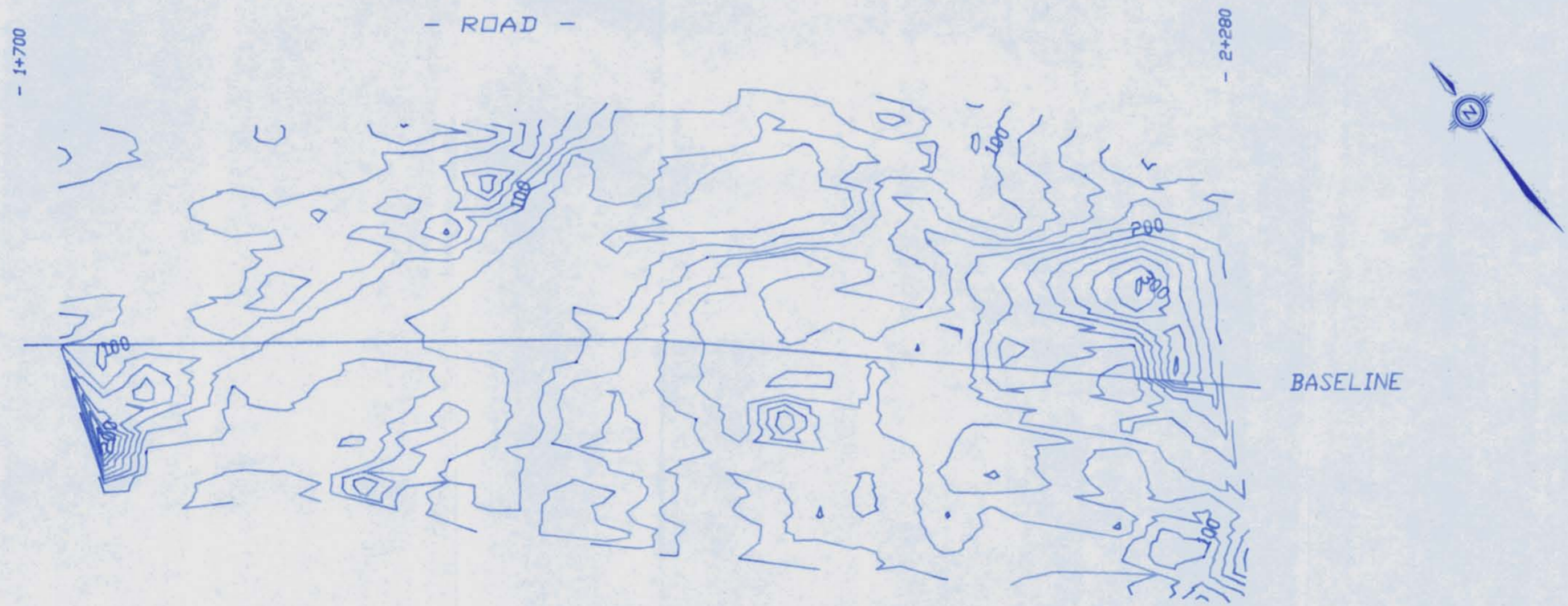
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NORTH GRID : SCALE 1:2,000



GRID LOCATION SCHEMATIC
SCALE 1:20,000



SOUTH GRID : SCALE 1:2,000

REVISIONS:

REV. NO.	DATE	BY
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NOTES:

20 GAMMA CONTOURS

LEGEND:

PROJECT:

BALLARAT CREEK
PLACER PROPERTY

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TOTAL FIELD
MAGNETOMETER
SURVEY

BASE STATION CORRECTED

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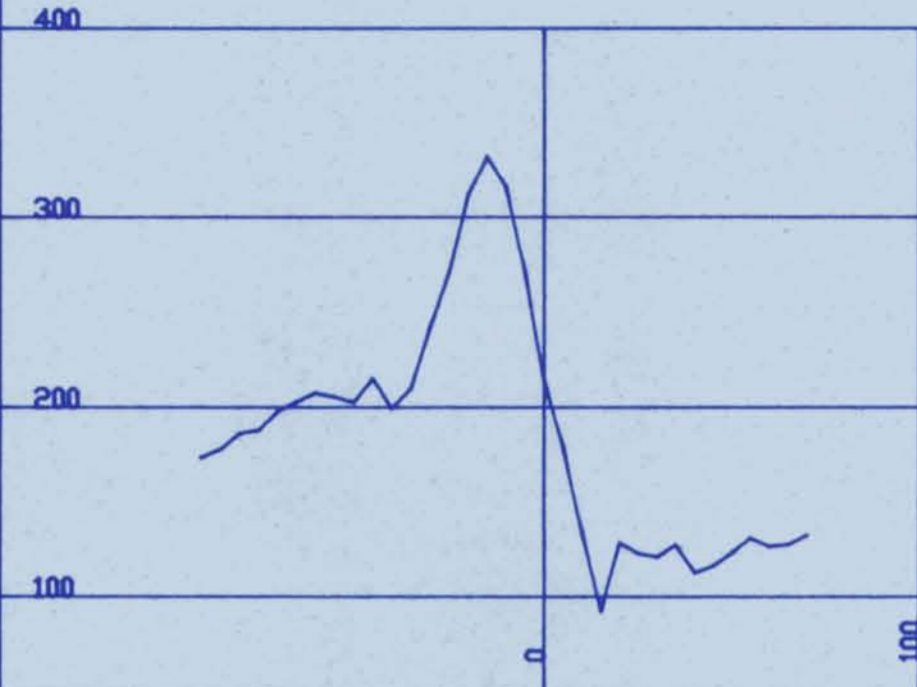
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E ngineering
S ervices

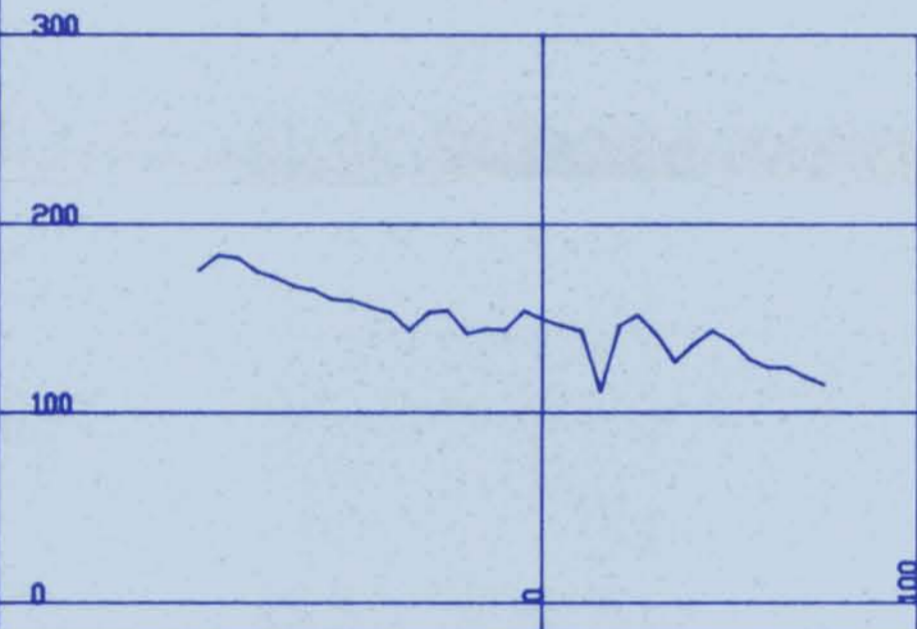
MAP# 115-J-14 (30)

120130

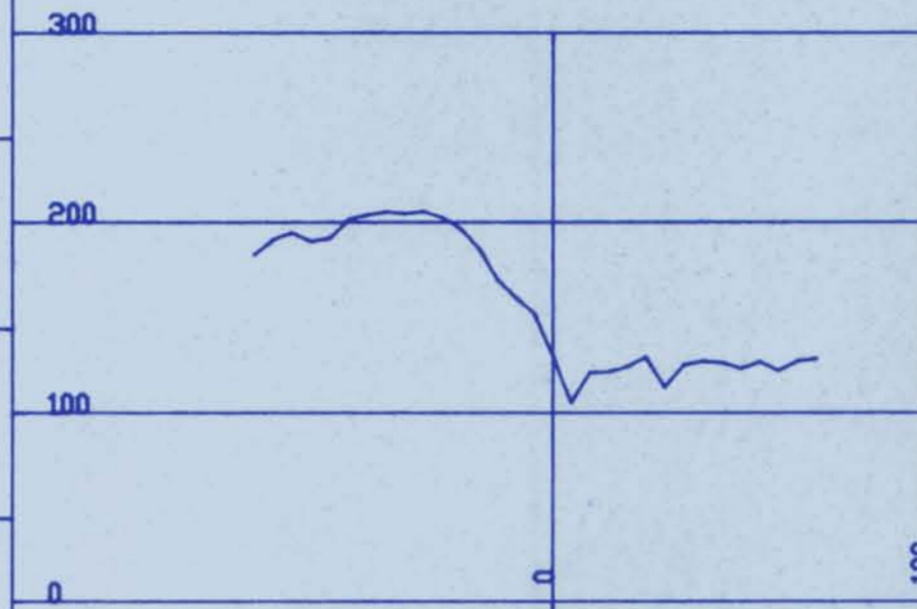
Station -80
H= 1:2000 V= 1:4000



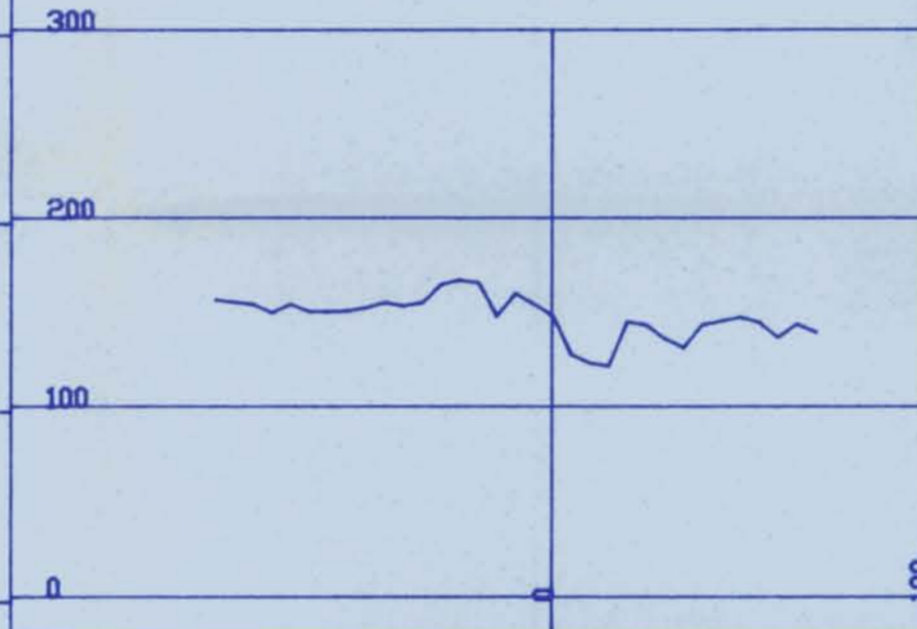
Station -20
H= 1:2000 V= 1:4000



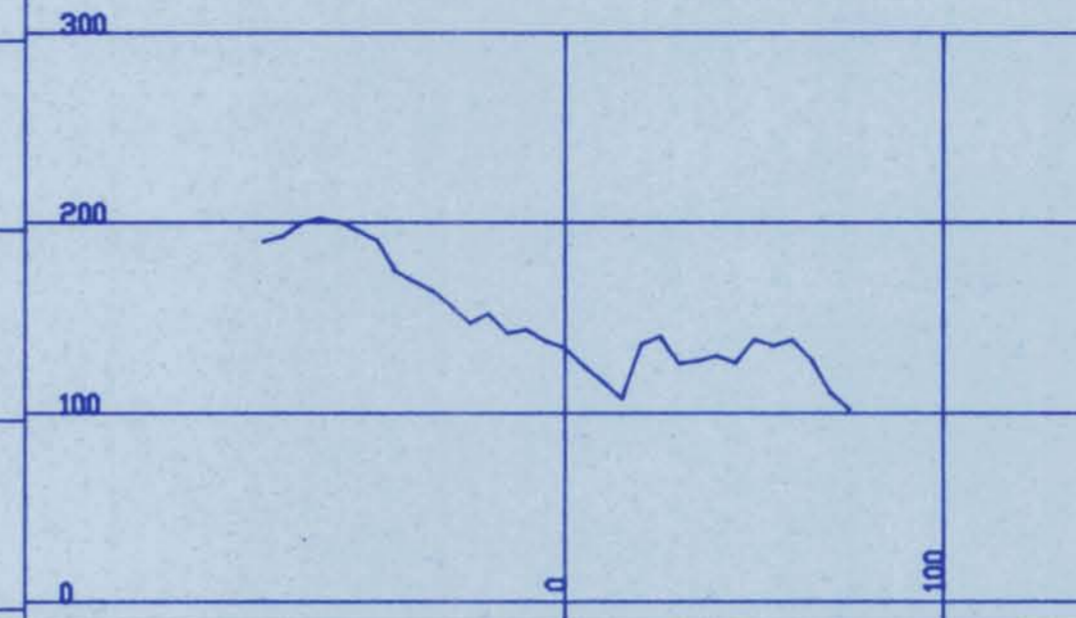
Station -60
H= 1:2000 V= 1:4000



Station 0
H= 1:2000 V= 1:4000



Station -40
H= 1:2000 V= 1:4000



REVISIONS:

REV. NO.	DATE	BY
ORIGINAL	90.08.31	RLM

NOTES:

- SECTIONS LOOKING NORTH
- X AXIS GAMMAS, Y AXIS METRES
- 60,000 GAMMAS SUBTRACTED FROM X AXIS

LEGEND:

PROJECT:

BALLARAT CREEK
PLACER PROPERTY

Dwg 9019 OR 05

TOTAL FIELD
MAGNETOMETER
SURVEY

BASE STATION CORRECTED

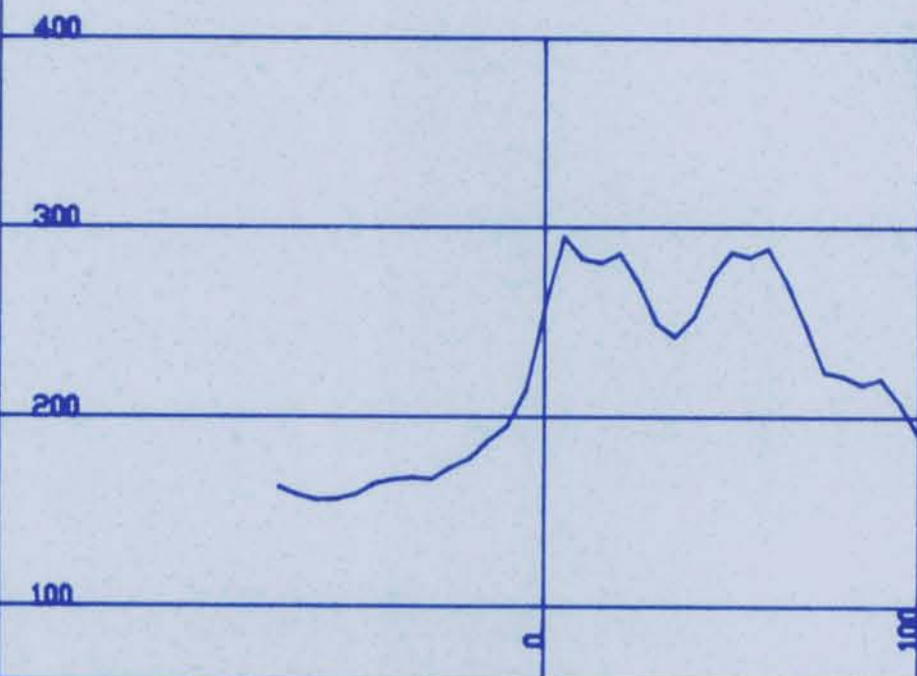
120130
CREW NATURAL
RESOURCES LTD.

VANCOUVER, B.C.

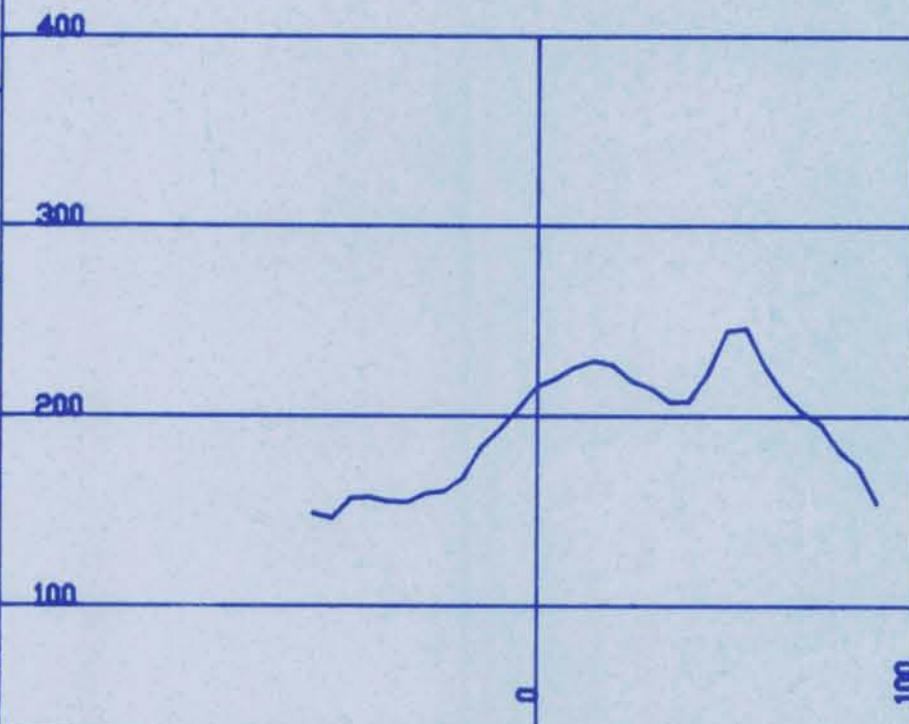
Y ukon
E ngineering
S ervices

MAP# 115-J-14(31)

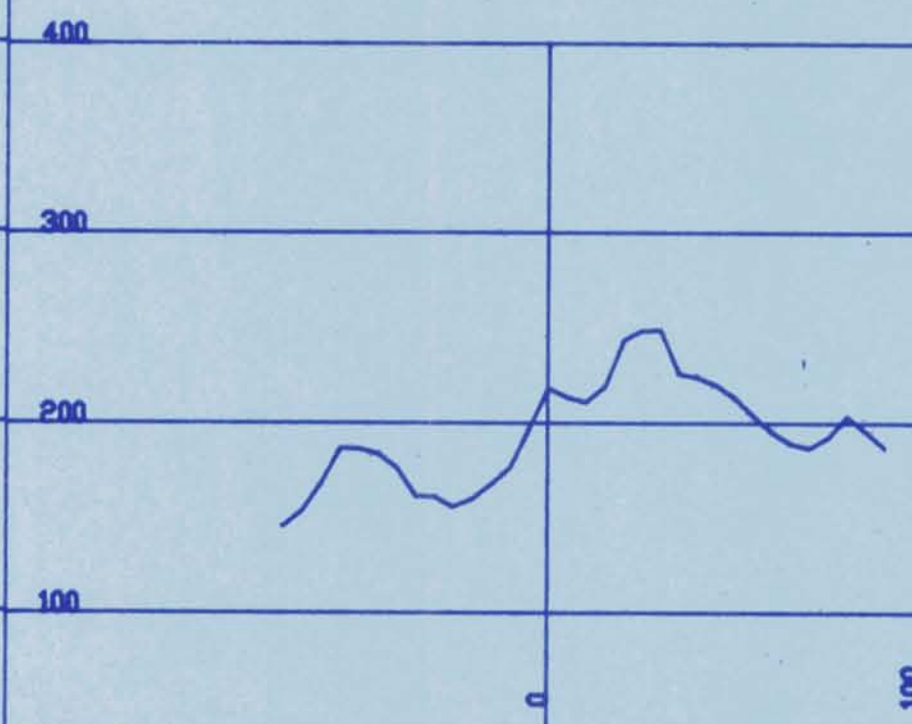
Station -300
H= 1:2000 V= 1:4000



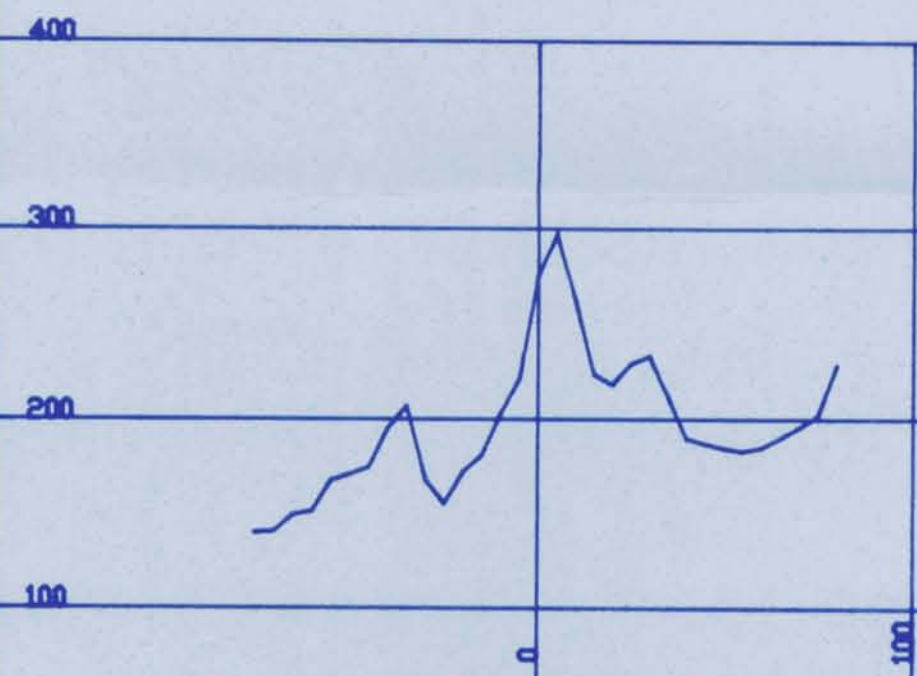
Station -260
H= 1:2000 V= 1:4000



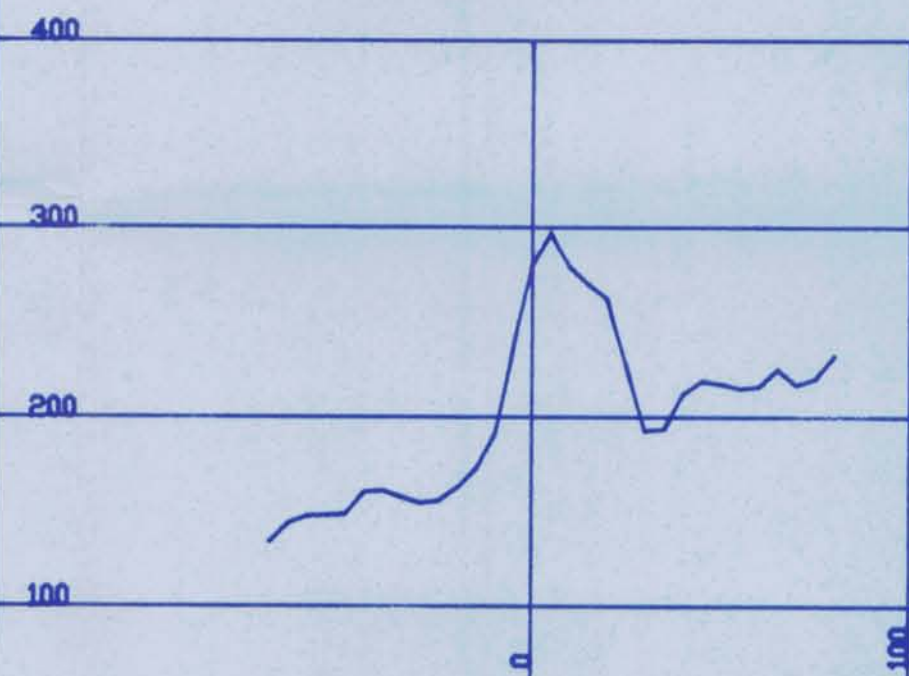
Station -240
H= 1:2000 V= 1:4000



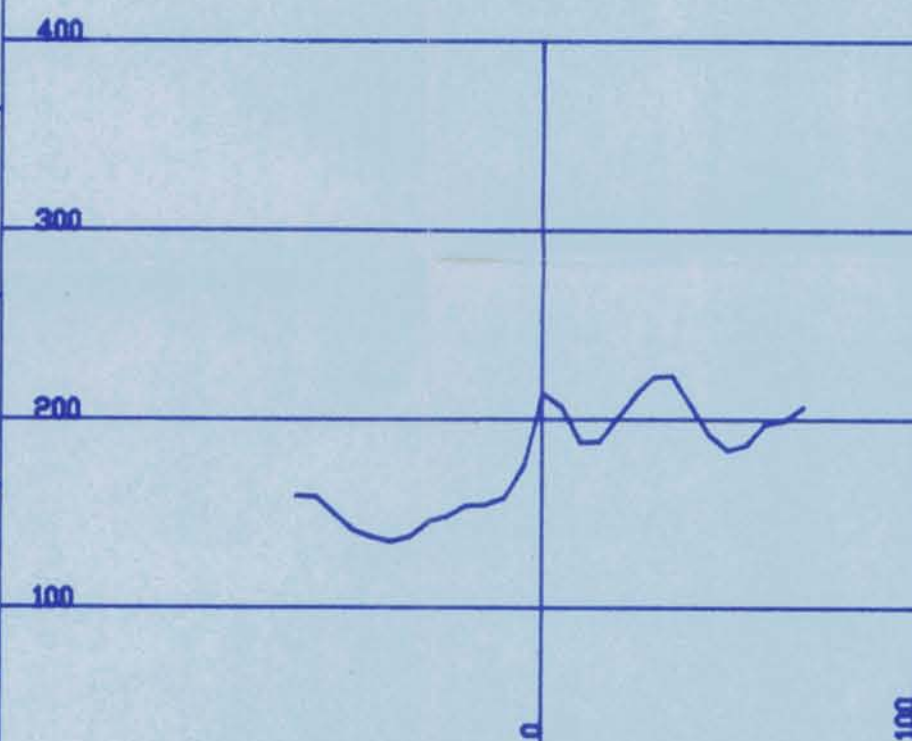
Station -220
H= 1:2000 V= 1:4000



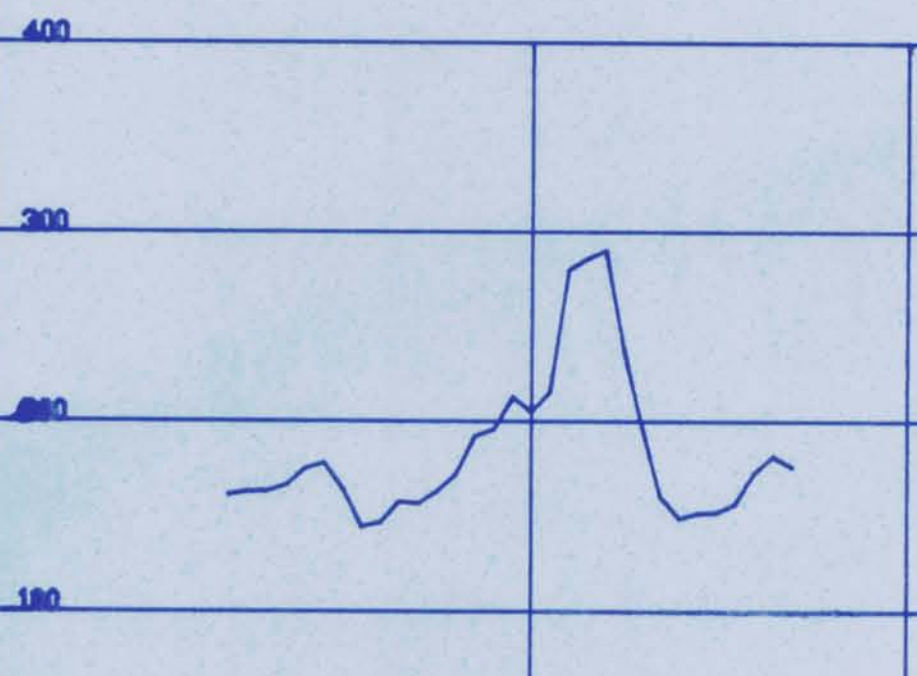
Station -180
H= 1:2000 V= 1:4000



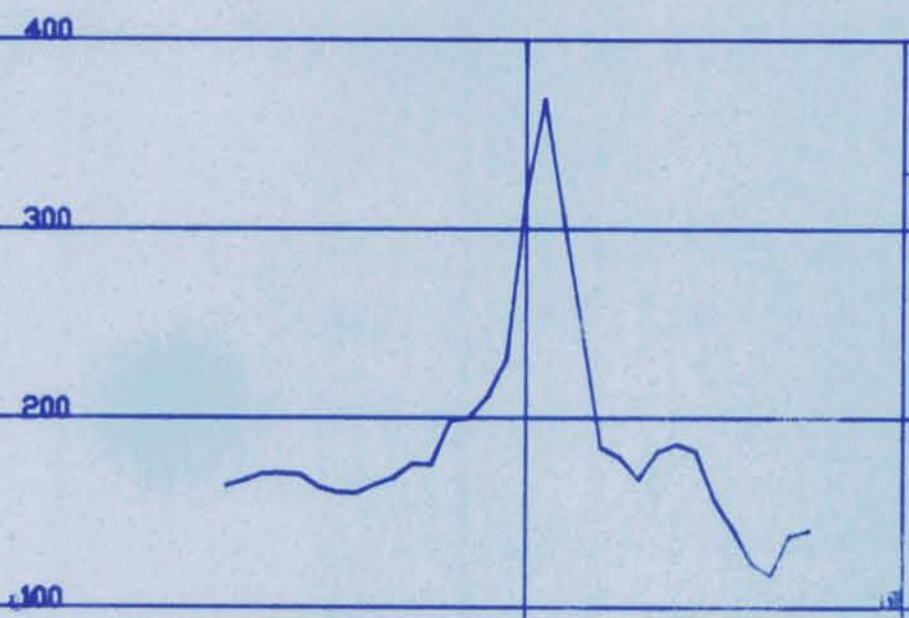
Station -160
H= 1:2000 V= 1:4000



Station -140
H= 1:2000 V= 1:4000



Station -120
H= 1:2000 V= 1:4000



Station -100
H= 1:2000 V= 1:4000



REVISIONS:

REV. NO.	DATE	BY
ORIGINAL	90.08.31	RLM

- NOTES:
- SECTIONS LOOKING NORTH
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 - 60,000 GAMMAS SUBTRACTED FROM X AXIS

LEGEND:

PROJECT:

BALLARAT CREEK
PLACER PROPERTY

Dwg 9019 DR 04

TOTAL FIELD
MAGNETOMETER
SURVEY

120130

BASE STATION CORRECTED

CREW NATURAL
RESOURCES LTD.

VANCOUVER, B.C.

Y ukon
E ngineering
S ervices

MAP# 115-J-14 (32)