

# MAR 19770017: OLD FORT CHIP

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PRELIMINARY AEROMAGNETIC INTERPRETATION

OLD FORT CHIP PROJECT

ALBERTA

April 14, 1977

W. G. Wahl Limited



19770017

ECONOMIC MINERALS

FILE REPORT No.

U-AF-129(3)

U-AF-130(3)

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April 14, 1977

Mr. A. T. Avison,  
Chief Geologist,  
Exploration Division,  
Denison Mines Limited,  
4 King Street West,  
TORONTO,  
Ontario M5H 1C2.

Dear Mr. Avison,

Submitted herewith is our evaluation of the preliminary aeromagnetic map of the Old Fort Chip area. Depth to top evaluations of various magnetic features on the magnetic residual map indicate two levels of anomalies. One level is about 300m below the flying height, while the other is more variable but in excess of 500m beneath the flying height. These values are thought to reflect the horst and graben structures known to exist within the Athabaska Basin. More detailed magnetic investigation does not rule out the possibility of a carbonatitic feature being the source of 3 lake geochemistry anomalies in the south central portion of the area covered. However, the magnetic data over the feature is incomplete and the resolution does not allow any definite interpretation or conclusion about the feature. It is recommended that additional magnetometer work be carried out over this feature.

## OLD FORT CHIP PROJECT

The regional magnetic trends obtained from GSC aeromagnetic maps 7159G and 7019G, were superimposed on the preliminary aeromagnetic maps of Geotrex. Drawing number 100 shows the regional trends and the resulting residuals for the area under study. The residual was obtained by subtracting the regional trend from the contoured values of the Geotrex aeromag data.

It should be mentioned at this point, that the residuals should be looked at with a "grain of salt". The survey was flown with a technical precision of  $\pm 1$  gamma, but the recorder shows the values in steps of 2 gammas and as such, this represents a "threshold" value. Consequently, values over 4 gammas are considered reliable, while those between 2 and 4 gammas are probable and those between 0-2 gammas may be real or may be noise.

In the south central portion of the residual map a circular feature (Anomaly 1) similar in magnetic expression to a class of known carbonatites (a positive outer rim with a negative core) was observed coincident with 3 lake geochemical anomalies. Both water and sediment samples were anomalous in not only uranium, but also copper, molybdenum and zinc. The subdued magnetic expression of the feature is compatible with that of other known uraniumiferous carbonatites, such as those in L. Nipissing. However, the airborne coverage of this feature was incomplete and it also may have resulted from a contouring bias. As such, the area was further investigated using digital techniques.

The area covering anomaly 1 was digitized from the preliminary map on the equivalent of a 400m square grid. Two residual maps were calculated on a computer using 3 and 4 -ring weighting coefficients. The maps are presented as Drawing numbers 101a and 101b respectively. Examining these maps, two parameters must be kept in mind: 1) the initial airborne coverage is incomplete to the south and 2) there is a distinct paucity of features above the 2 gamma threshold. As such, this indicates that a sought for feature may be obscured by noise. The main feature that is obvious and real is a prominent NW trending positive magnetic ridge with flanking magnetic lows. The trend however, is curved and the central area is negative which tends to support some aspects of the original premise. Also, there appear to be indications of fault traces parallel to the trend of the known horst and graben trends. Two profiles across the residual maps were taken perpendicular to the ridge trend and were analytically continued downwards to find the maximum basement depth. From the profiles (Appendix I) it is quite obvious that below the 2nd step (corresponding to 400m below the airborne data) the profiles are highly oscillatory. As such, this indicates that the maximum basement depth for this feature is below 400m.

Using elementary models such as poles, dipoles, lines of poles and dipoles, vertical cylinders, etc., depth to top estimates were obtained for 10 positive magnetic anomalies shown on drawing number 100.

The values are :

<u>Anomaly</u>	<u>Depth to top</u> (not reduced from flying height)
A	1000 metres
B	300 "
C	200 "
D	315 "
E	260 "
F	500 "
G	750 "
H	300 "
I	860 "
J	300 "

Depending on the particular model chosen there is a considerable variance in the depth interpretation ( $\pm 50$ m for the shallow anomalies and up to  $\pm 100$ m for the deeper ones). The data as shown represents the average corresponding to the best model deemed applicable.

It appears that there are two levels of magnetic anomalies, those around 300m below the data surface and those in excess of 500m below the data surface. It is quite probable this variation in "basement" levels is reflecting the horst and graben structures known to exist underneath the Athabaska basin. Since the vertical throw of some horst and graben structures may exceed 1000' ( 300m) the 350m discrepancies between anomalies G & H

separated by only 1 km appears to be explainable.

RECOMMENDATIONS

More complete magnetic coverage and higher quality data are needed to determine whether Anomaly 1 could be a carbonatite or not. This would entail magnetometer work covering approximately 60 square kilometres. Ground work would be extremely costly, consequently, a high resolution (0.01 gamma) airborne survey is the only other alternative.

Respectfully submitted,

Yours very truly,

W. G. WAHL LIMITED.



Arnis Gubins, B.A.Sc.

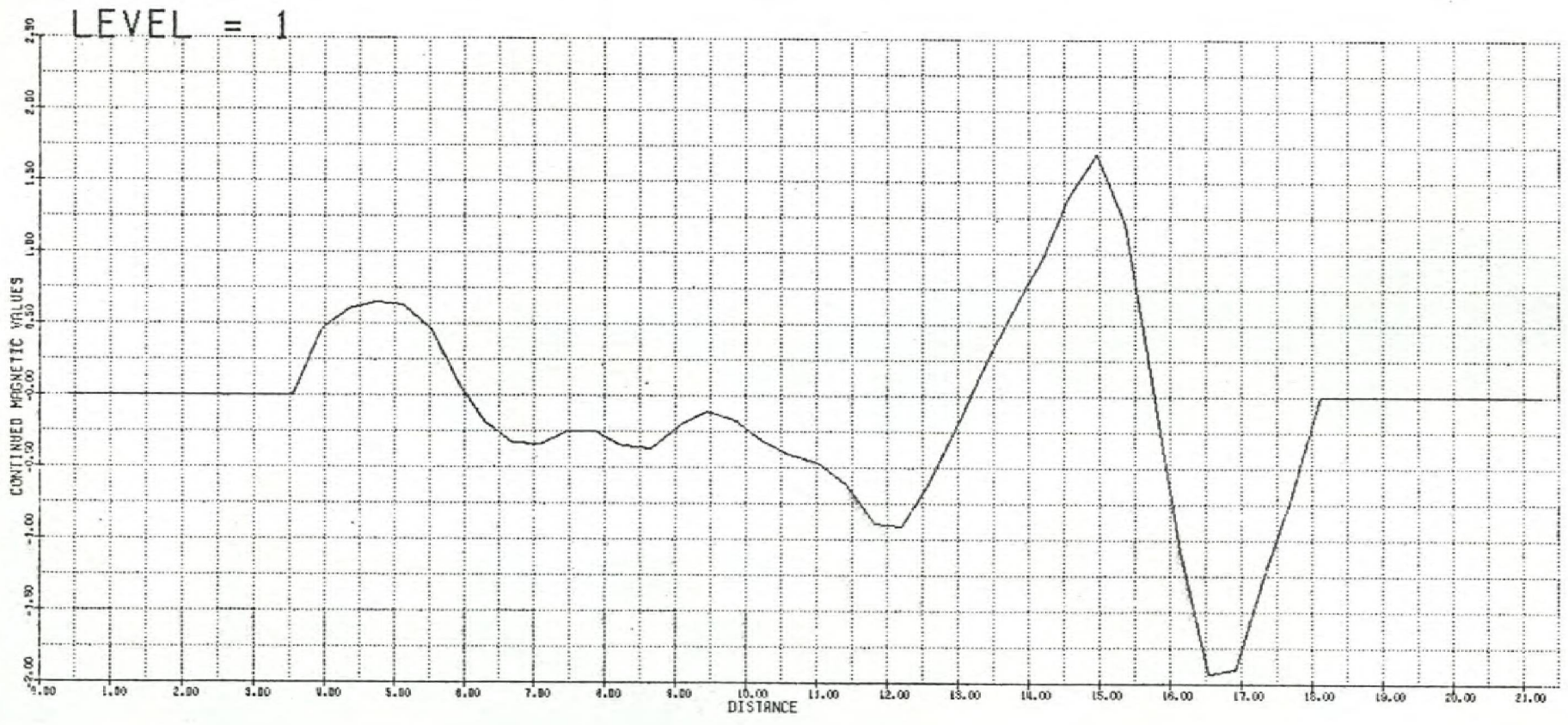
APPENDIX I  
DOWNWARD CONTINUATION



The profiles of lines A-A', B-B' were continued downward using the method of Roy (1966). The data along the profiles was digitized at an interval corresponding to 200m. Each continuation step then also corresponds to 200m below the previous level. The final reproduced profiles are at a smaller scale (1:47,059).

Reference:

Roy, A. (1966): The method of continuation in mining geophysical interpretation; geoexploration, v.4, p.65 - 83.

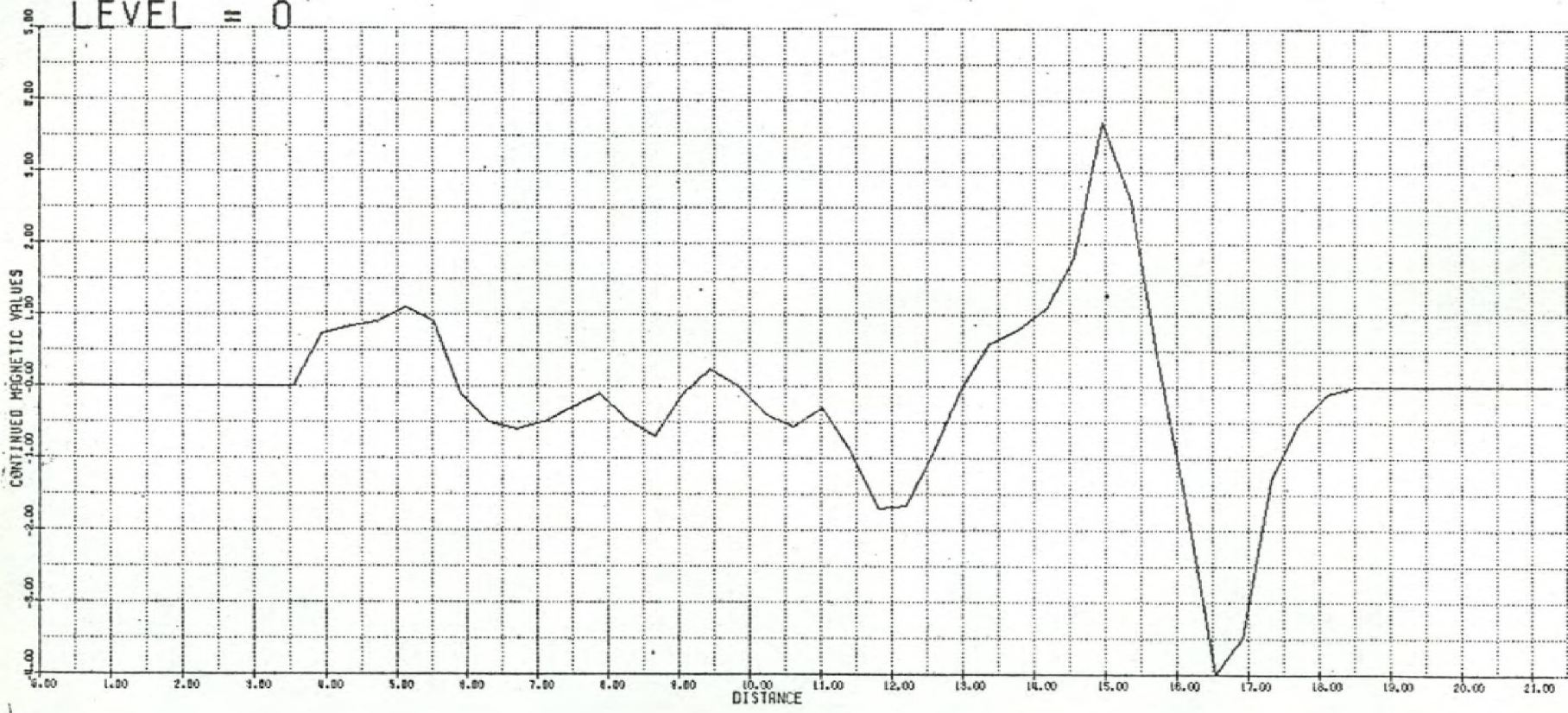


A

A'

Graph #1  
19770017

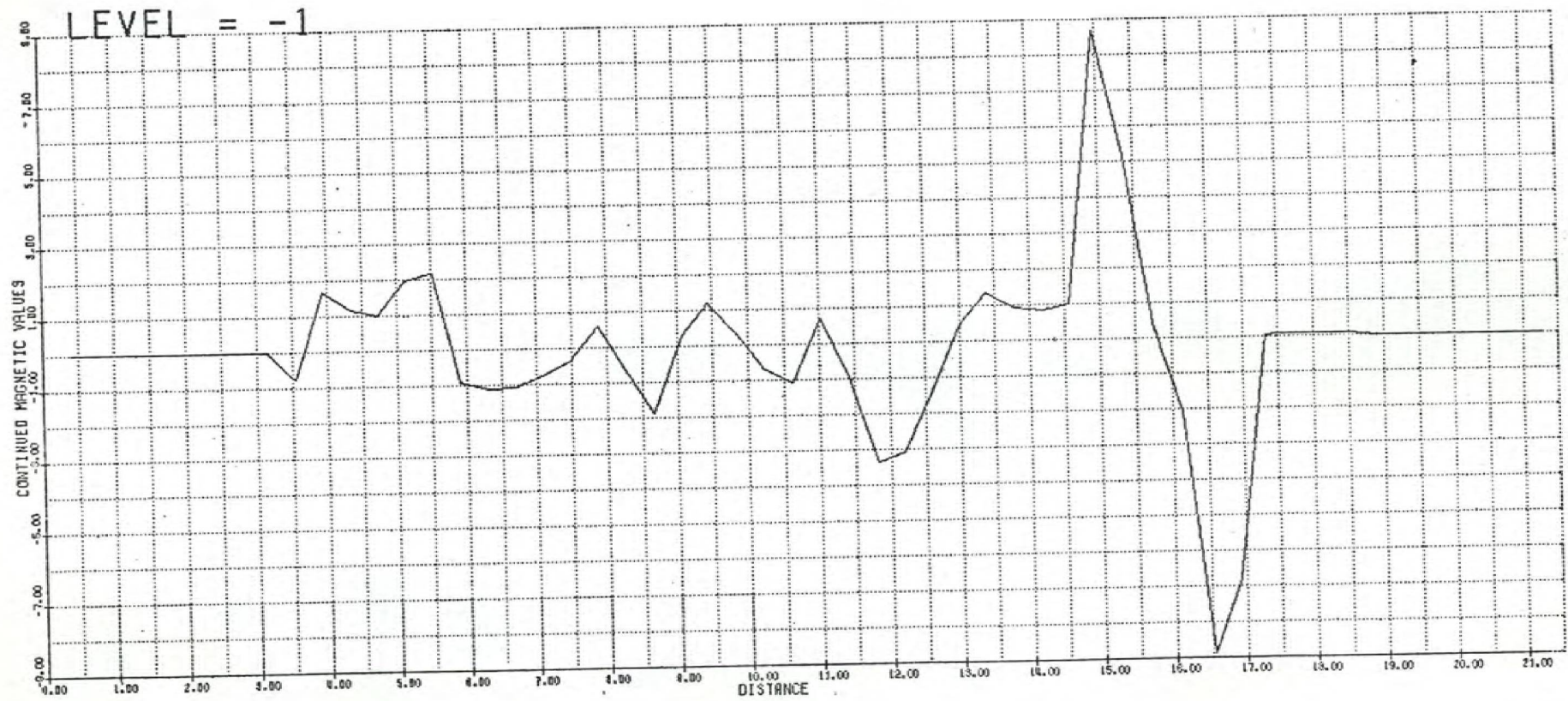
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A

A'

Graph #2  
1977017

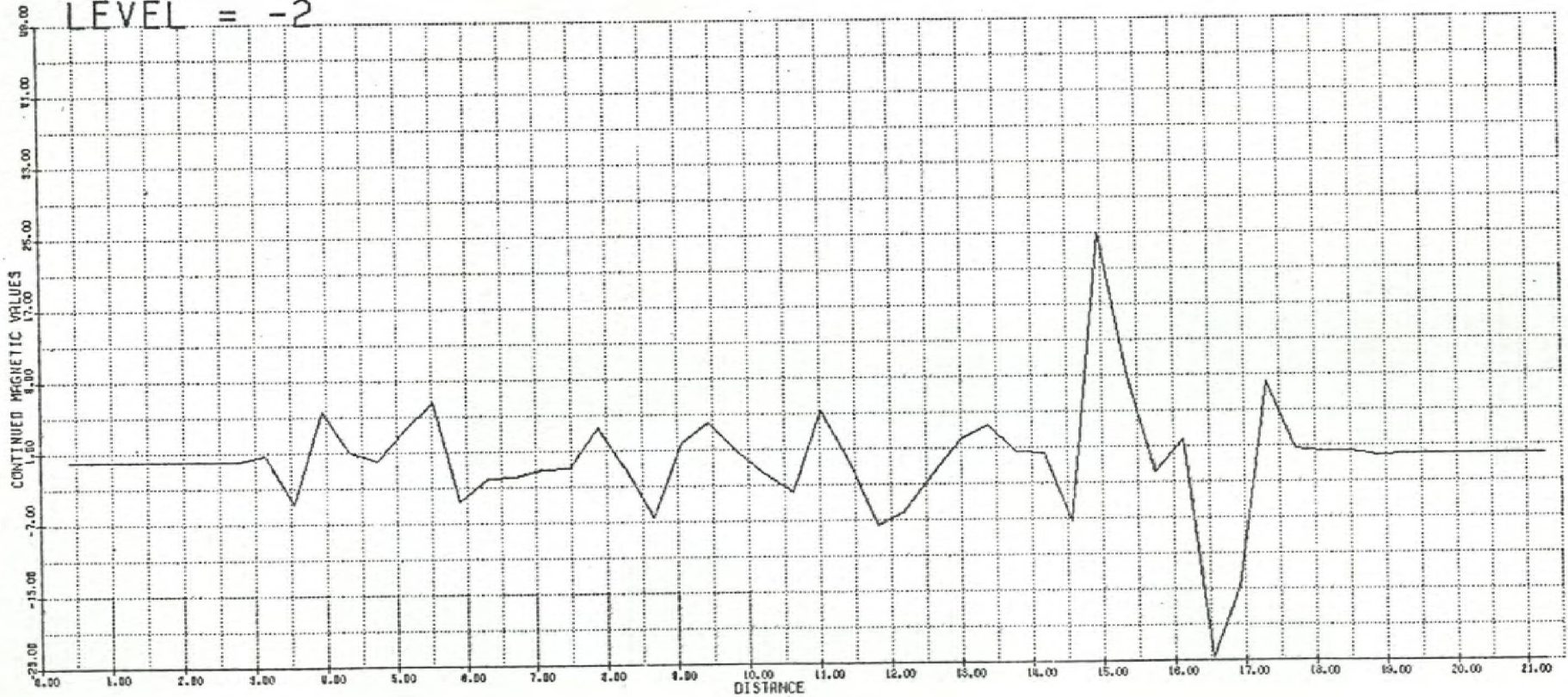


A

A'

Graph #3  
1977017

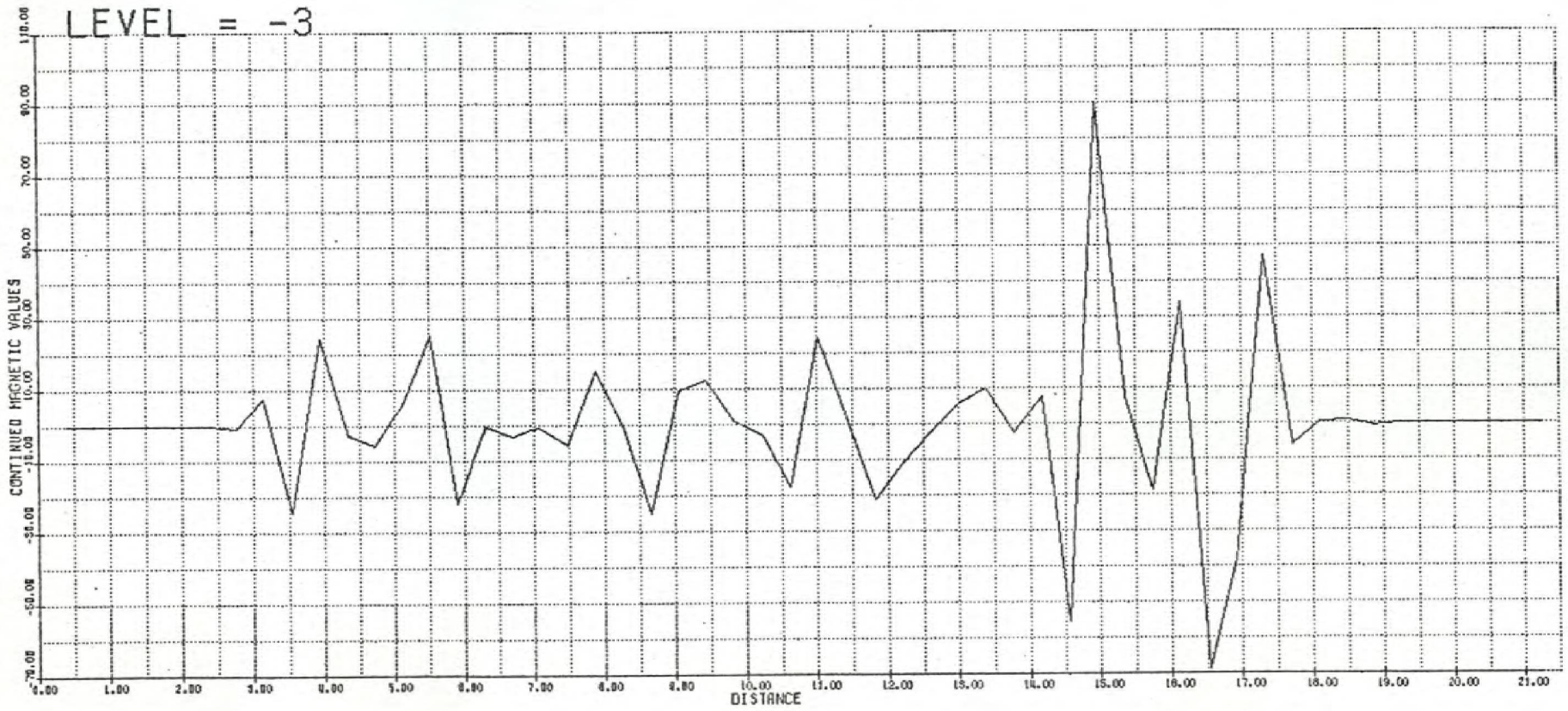
LEVEL = -2



A

A

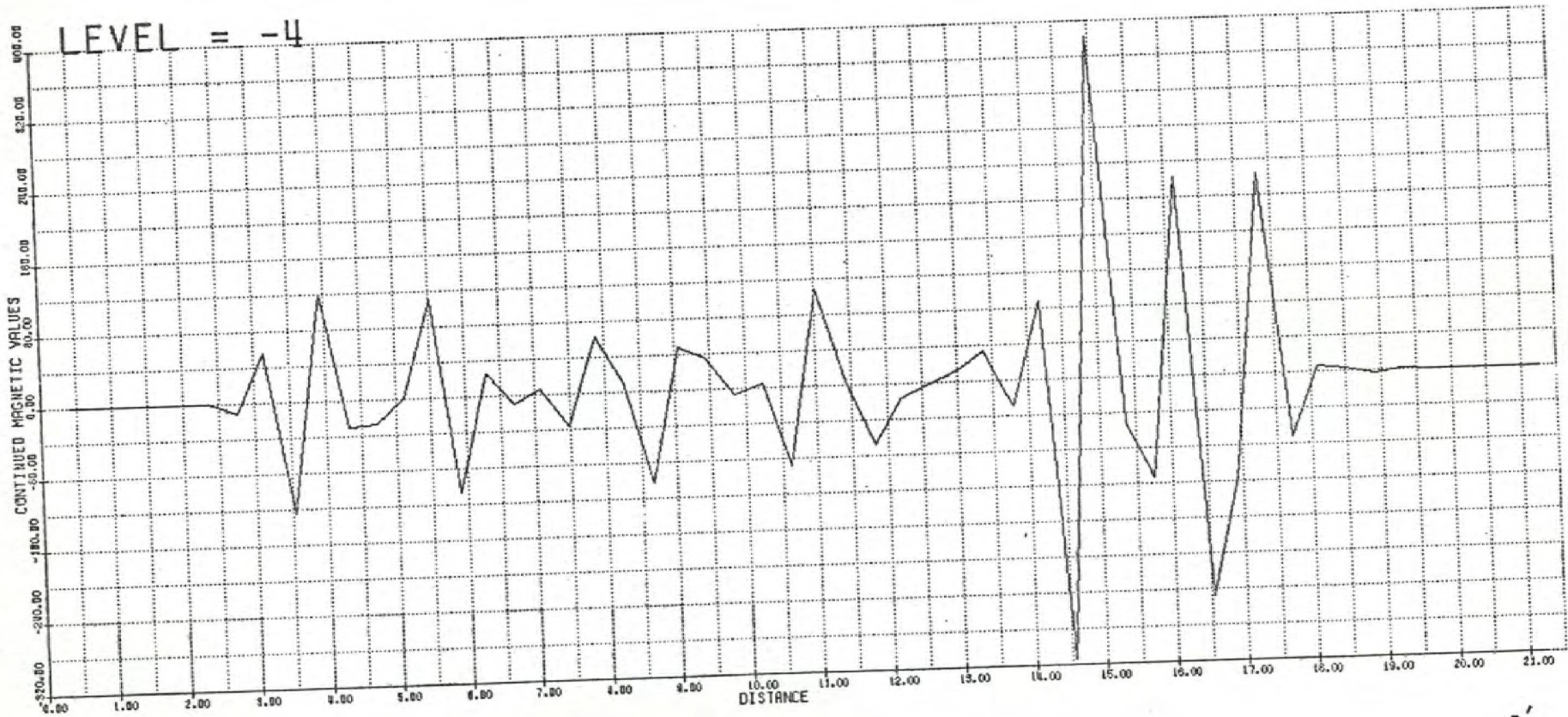
Graph #4  
19770117



A

A'

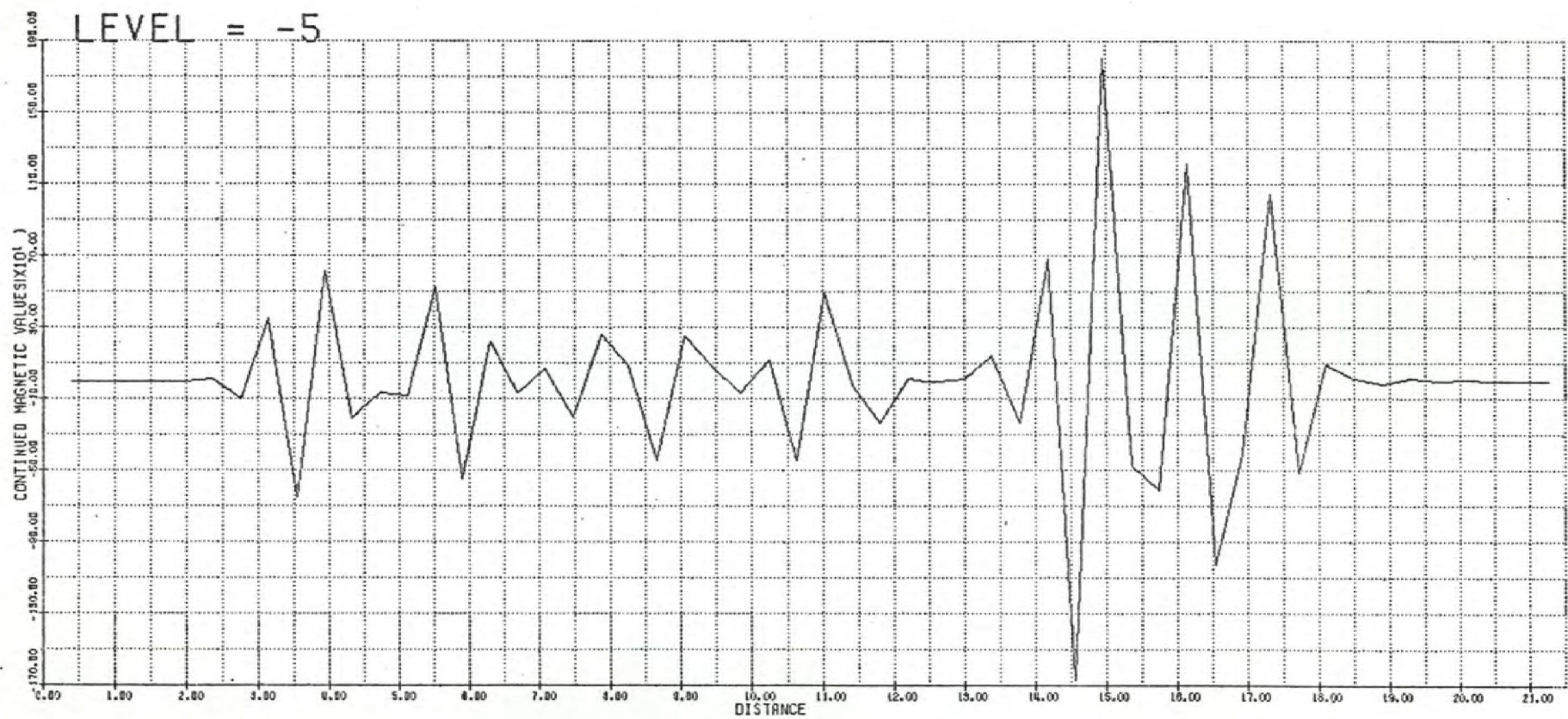
Graph # 5  
19770017



A

A'

Graph # 6  
19770017



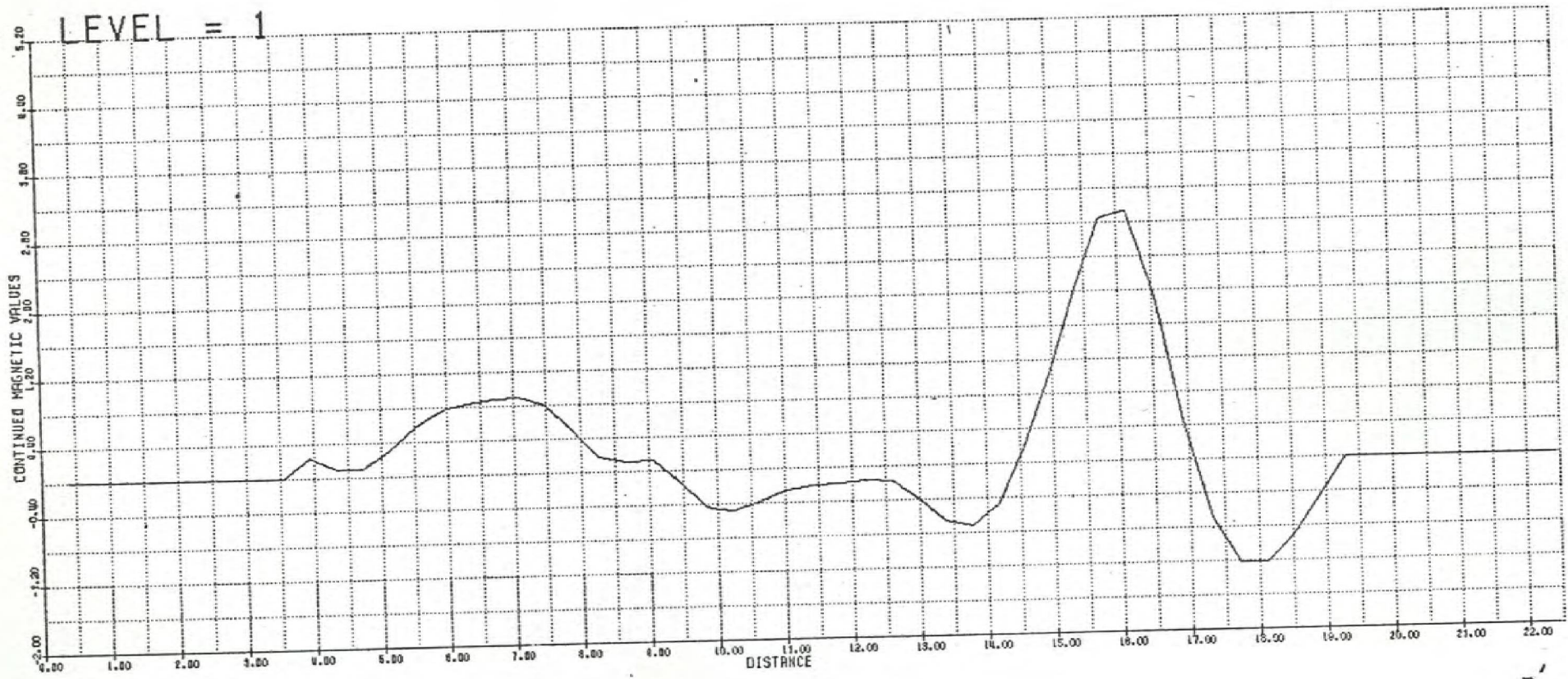
A

A

Graph # 7  
19770017



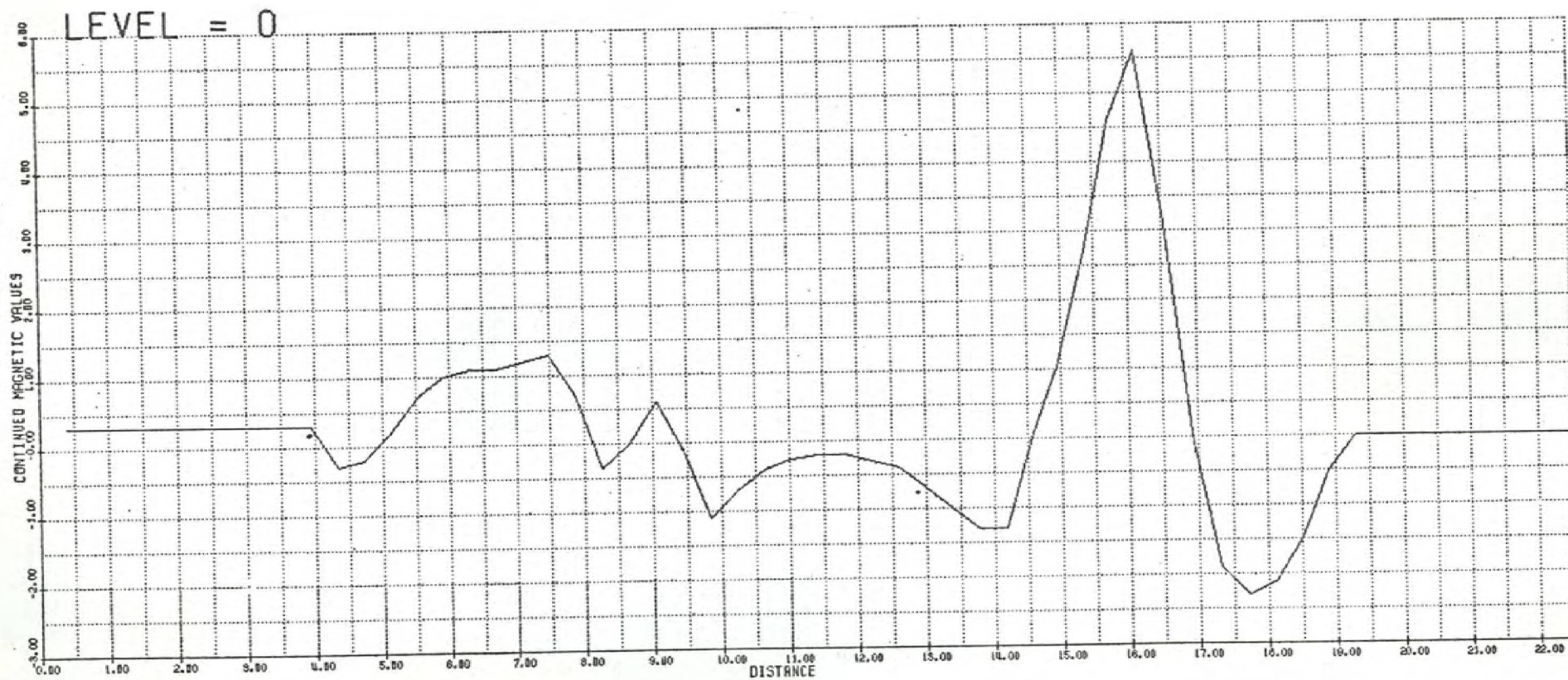
LEVEL = 1



B

B

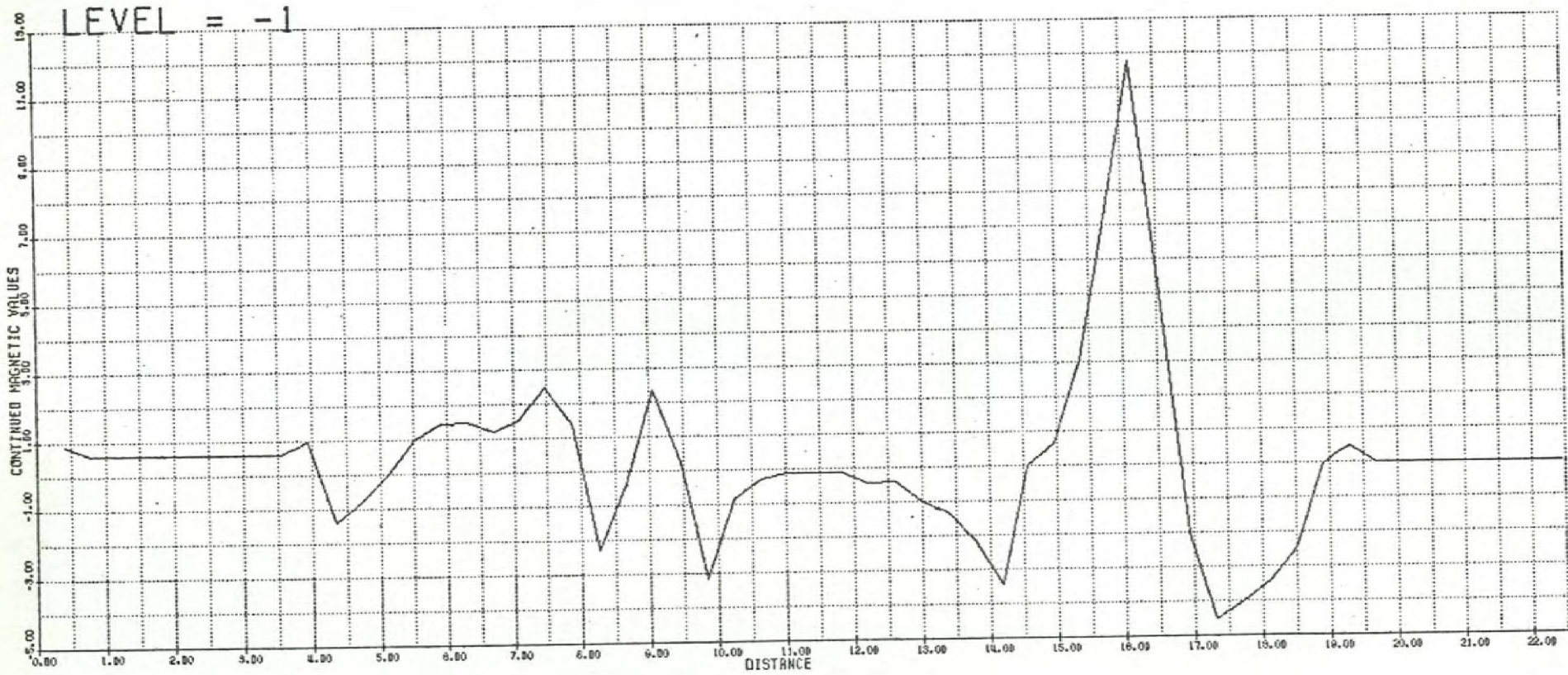
Graph #8  
19770017



Graph #9  
19770217

B

B

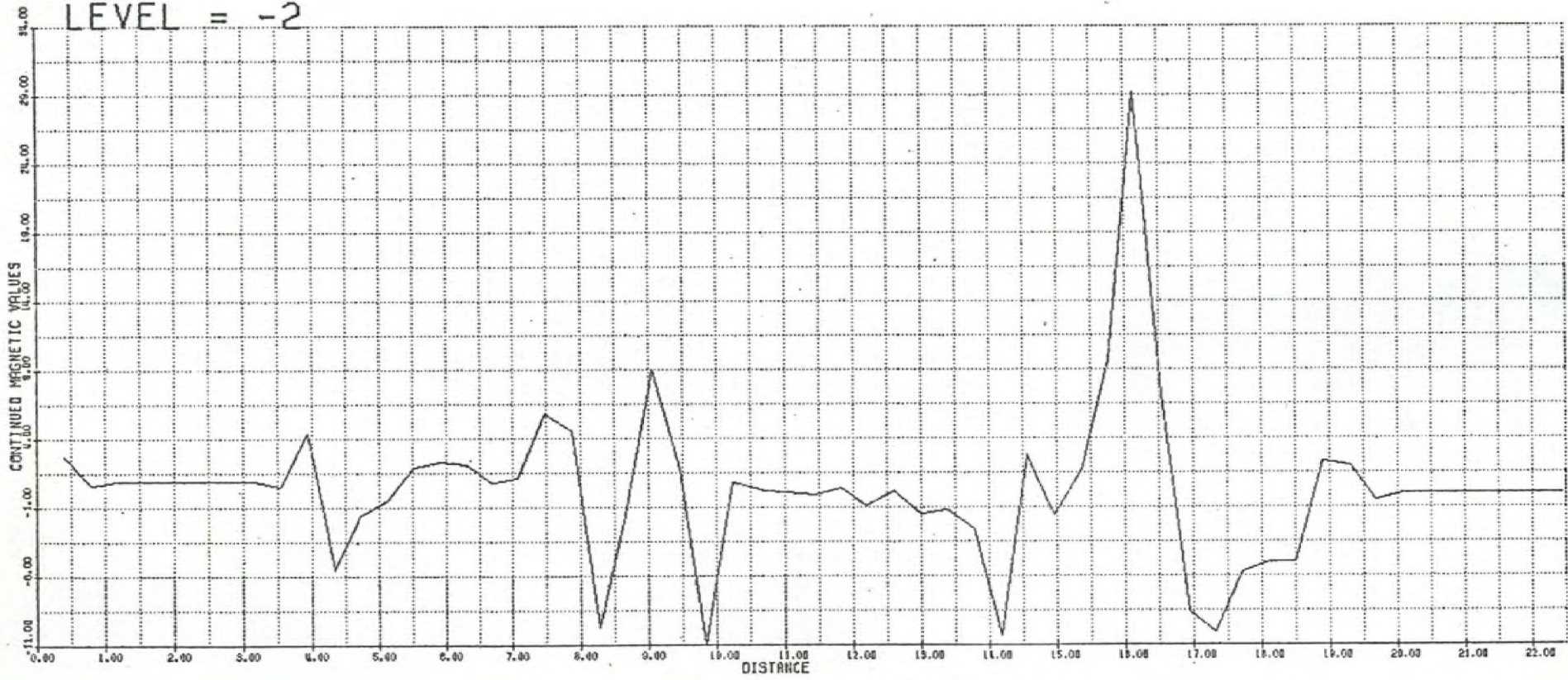


B

B'

Graph #10  
19770017

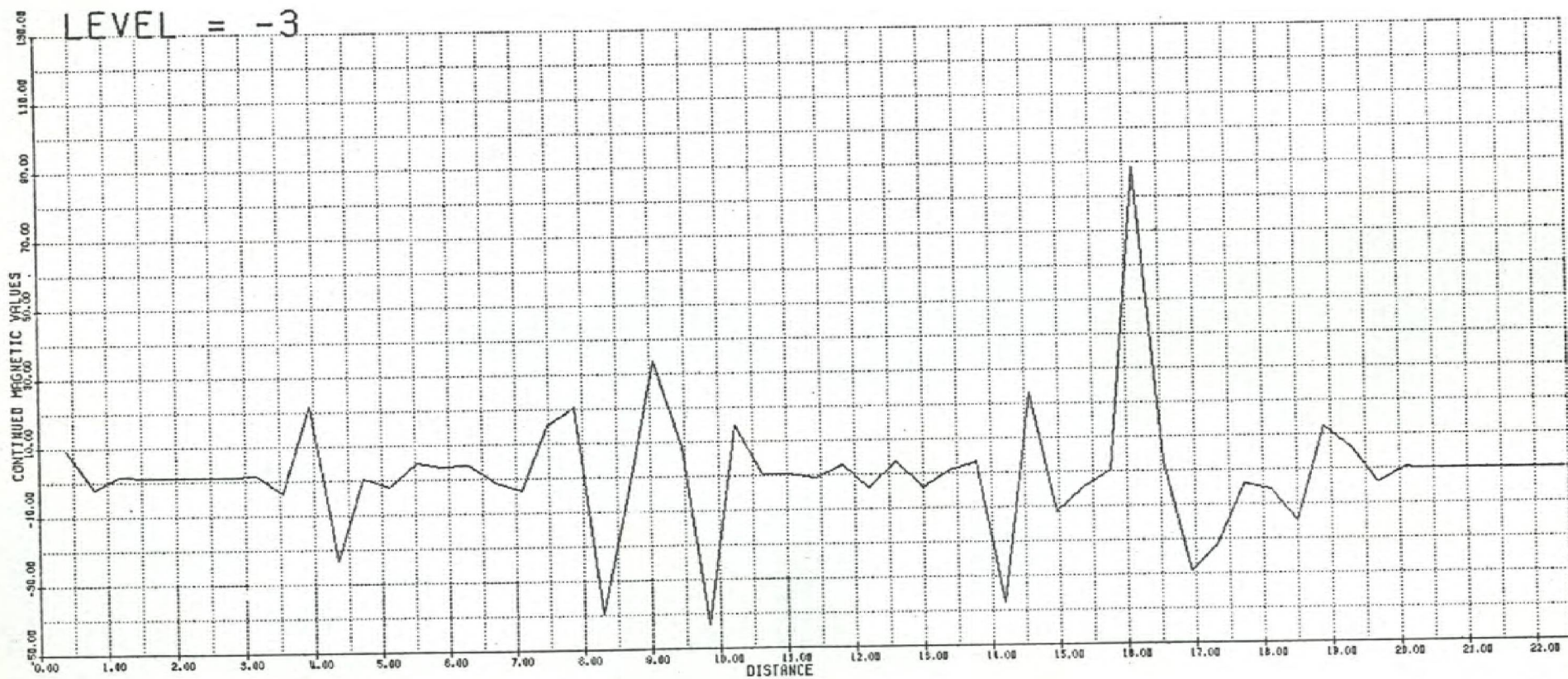
LEVEL = -2



B

B

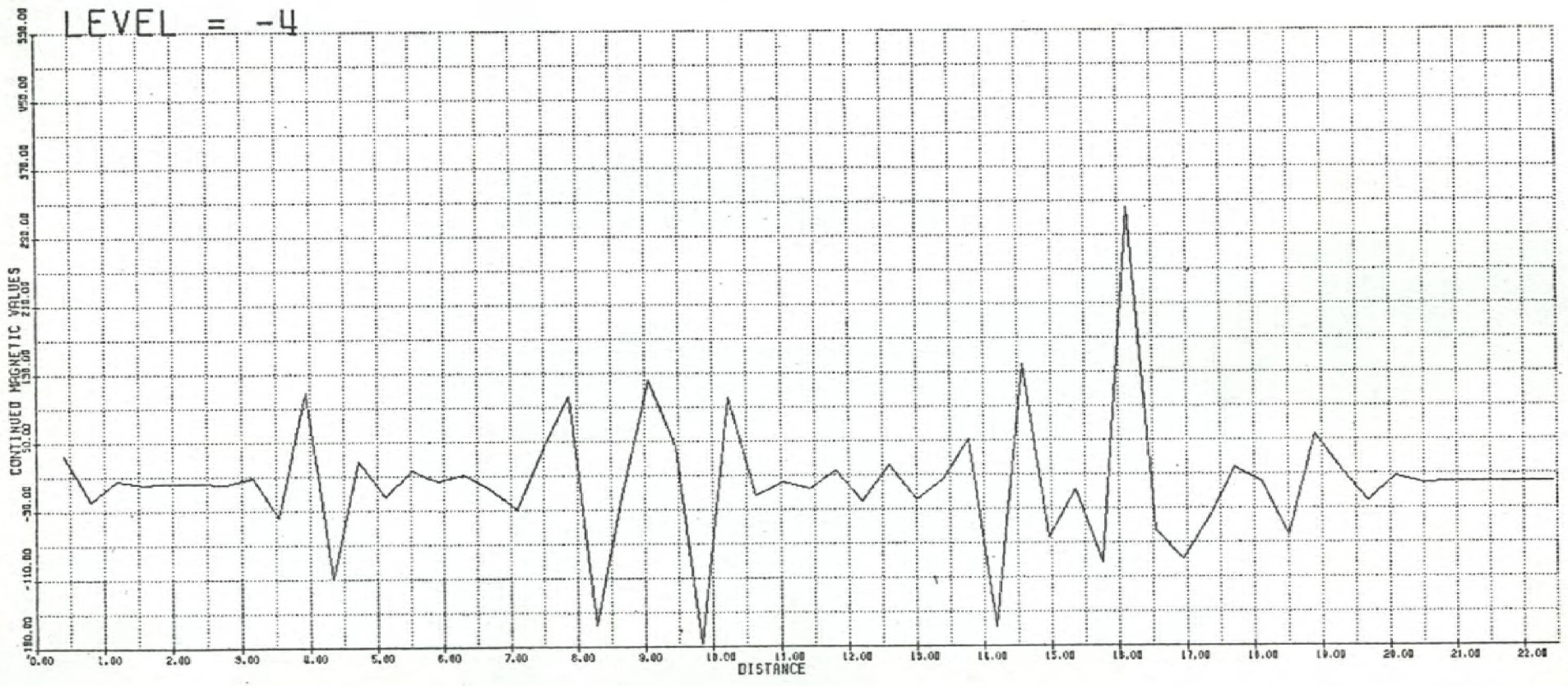
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19770017



B

B

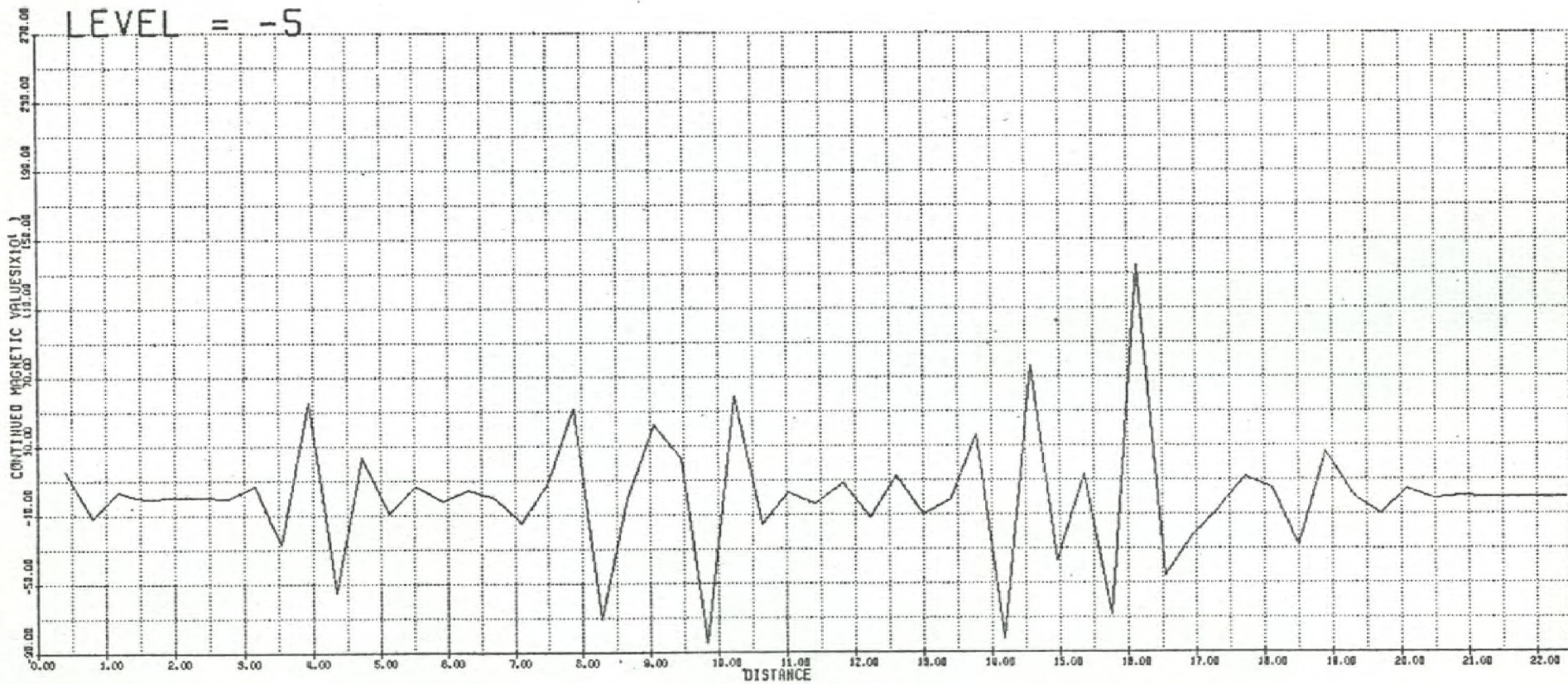
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19770017



B

B'

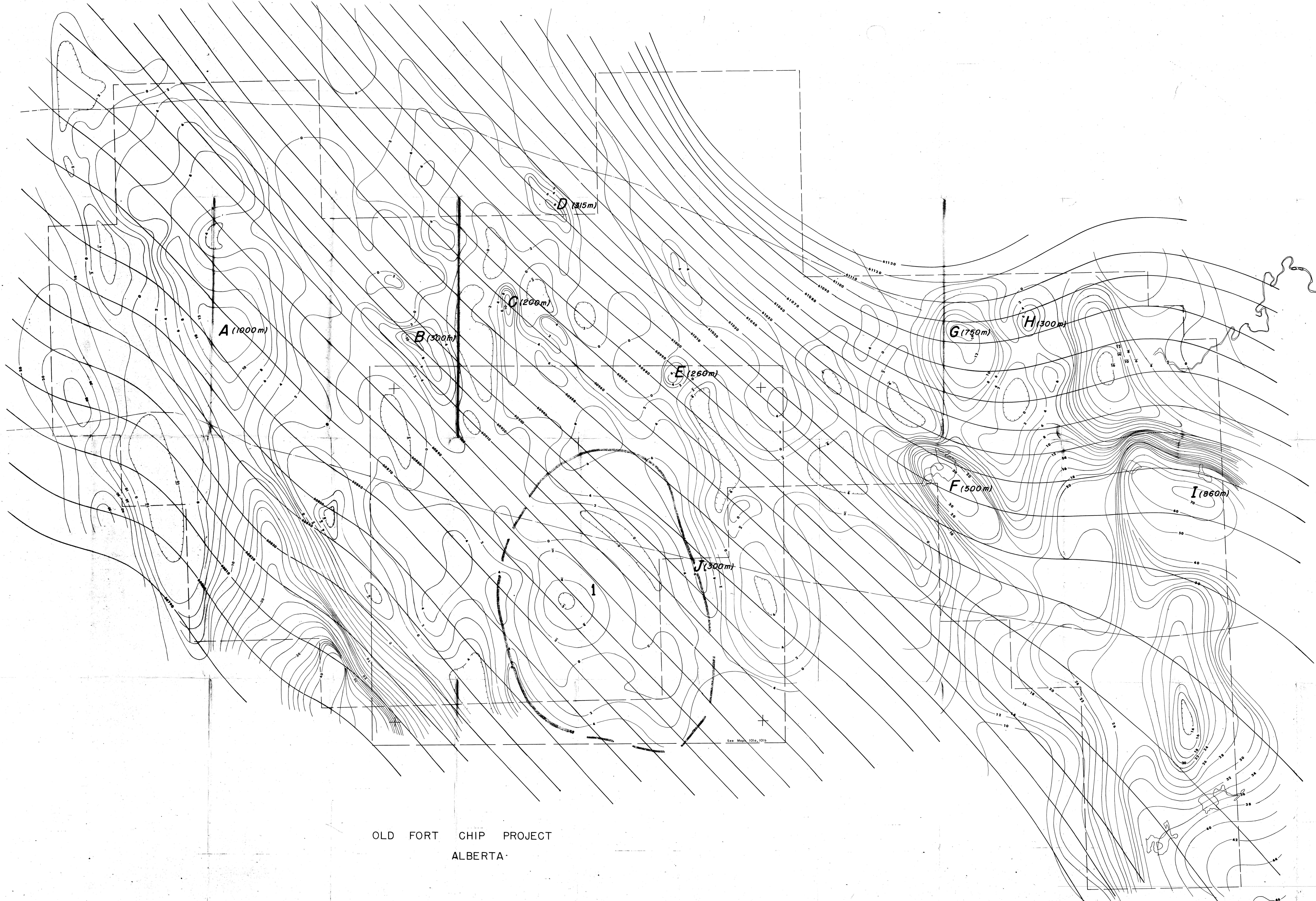
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19970017



B

B

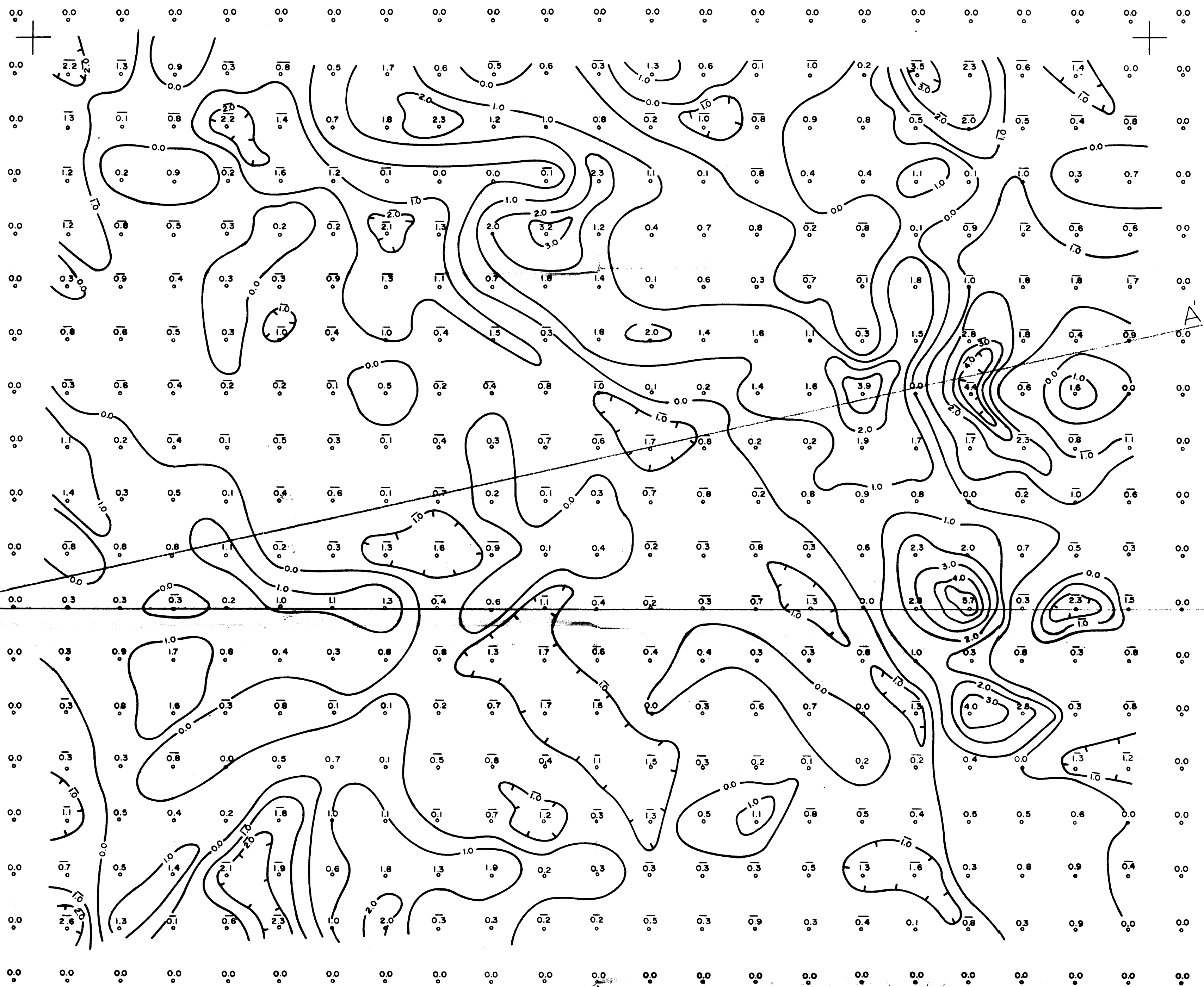
Graph #14  
19770017



OLD FORT CHIP PROJECT  
ALBERTA

	<b>DENISON MINES LIMITED</b> OLD FORT CHIP PROJECT FIRST APPROXIMATION RESIDUAL MAGNETIC INTERPRETATION	PROJECT NO. 100 SHEET NO. 100
	DENISON MINES LIMITED 1100000	FEB 1977 PREPARED BY INTERPRETED BY CHECKED BY SCALE 1:50000
	DENISON MINES LIMITED 1100000	100
	DENISON MINES LIMITED 1100000	100



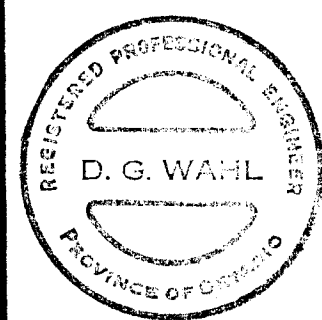


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**OLD FORT CHIP PROJECT**

**3 RING RESIDUAL  
MAGNETIC INTERPRETATION**

DRAWN BY	REV.
TRACED BY	REV.
APPROVED	REV.
N.T.S.	REV.
74 L	



*D. G. Wahl*

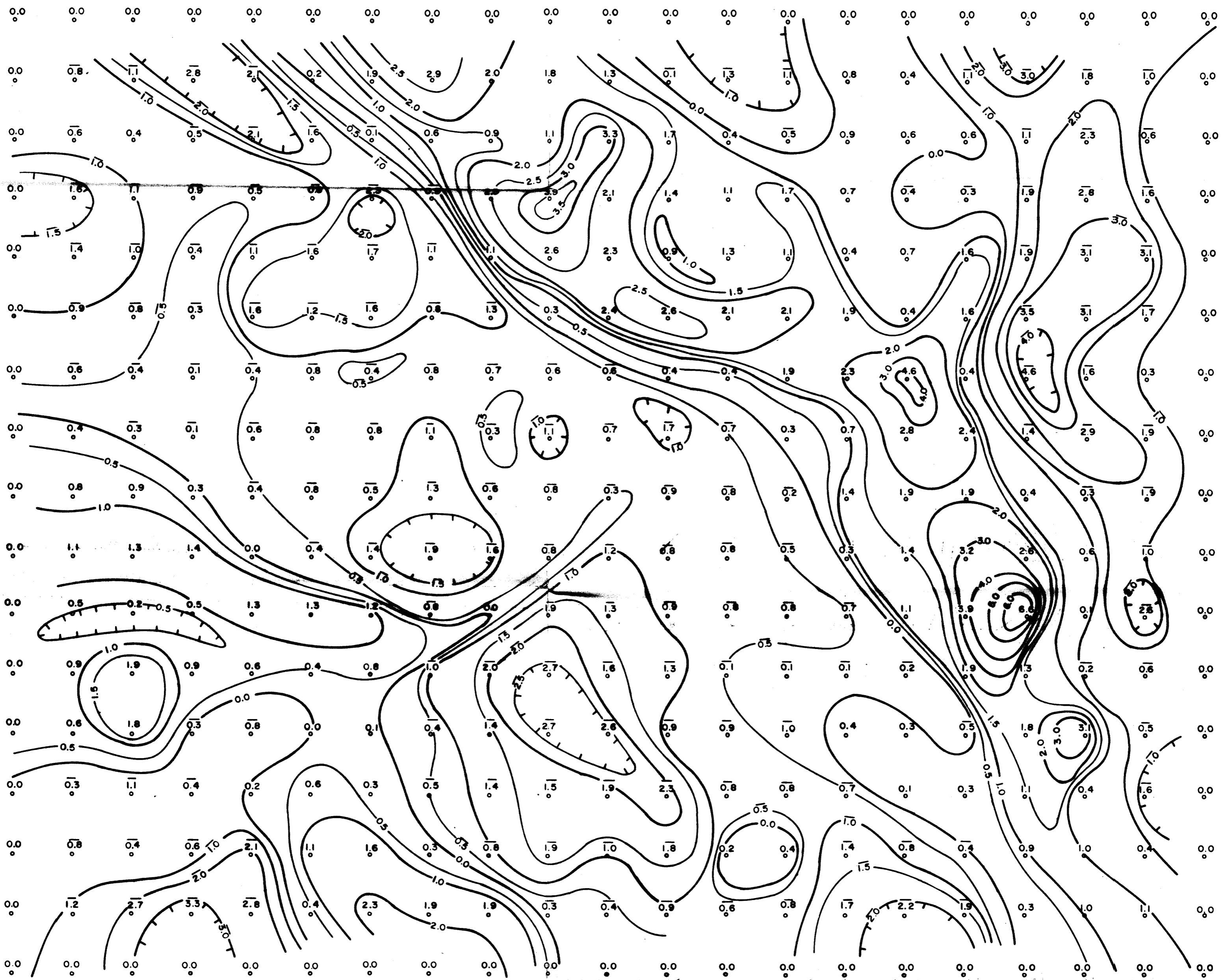
W. G. WAHL LIMITED



1: 20,000

DWG. NO.  
**101a**

19770017



**DENISON MINES LIMITED**

**OLD FORT CHIP PROJECT**

**4 RING RESIDUAL  
MAGNETIC INTERPRETATION**

DRAWN BY	REV.
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APPROVED	REV.
N.T.S. 74 L	REV.



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1: 20,000

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**101b**

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