

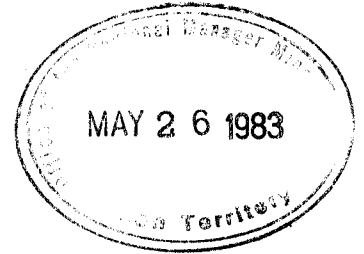
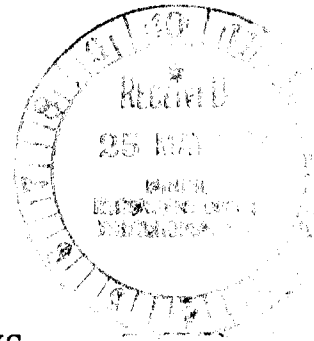
REPORT
ON THE
GROUND GEOPHYSICAL SURVEYS
AT THE
COWARD CREEK - SUE CLAIMS PROSPECT

By

Grant Hendrickson
KIDD CREEK MINES LTD.

N.T.S. 105L-9

August, 1982



091457

This report has been examined by
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report for the amount
of \$ 16,000-

P. Walker

for Regional Director of Geological and
Geological Service for Commissioner
of Yukon Territory.



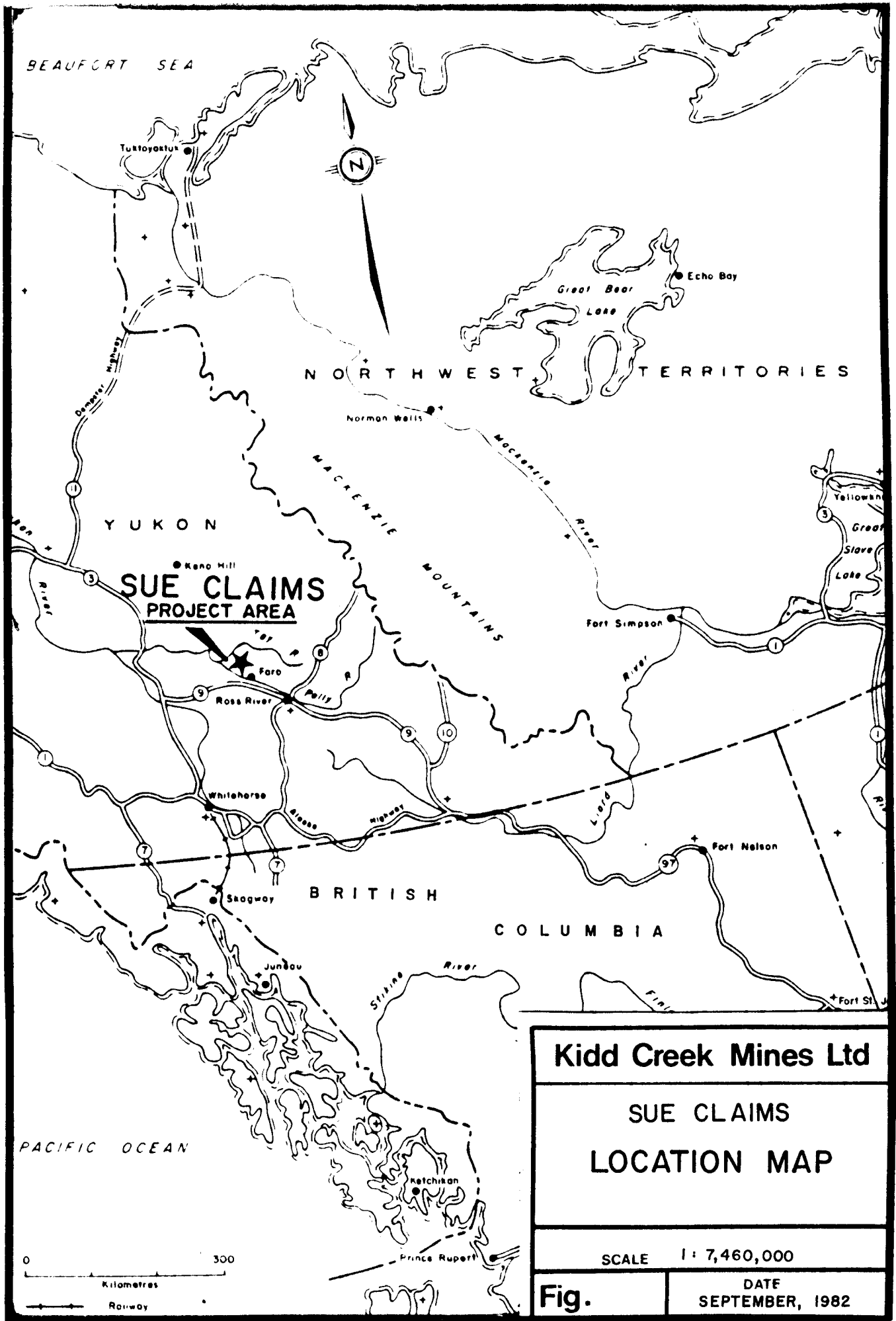
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INTRODUCTION

During the period August 10 to 16th, 1982 Kidd Creek Mines conducted ground geophysical surveys on a grid covering part of the Sue claims. Approximately 25 miles NW of Faro in the Yukon. The target was Anvil type lead zinc mineralization. The area had been covered in 1977 with an Airborne electromagnetic and magnetic survey. Several conductors and magnetic anomalies were known to exist within the grid. The 1982 discovery of a lead zinc showing renewed interest in these conductors.

Ground geophysics utilized the horizontal coplanar loop electromagnetic technique in conjunction with magnetic surveying. The purpose of this work was to evaluate the quality and spatial distribution of conductors and magnetic anomalies. Fifteen kms of linecutting and geophysical surveying were completed on the Sue Claims.



BEAUFORT SEA

Tuktoyaktuk



Echo Bay

Great Bear Lake

NORTHWEST TERRITORIES

Norman Wells

Mackenzie River

YUKON

Keno Hill

SUE CLAIMS PROJECT AREA

Faro

Ross River

Pelly

Fort Simpson

Whitehorse

Highway

Fort Nelson

BRITISH COLUMBIA

COLUMBIA

Skagway

Junbau

Stikine River

PACIFIC OCEAN

0 300

Kilometres

Railway

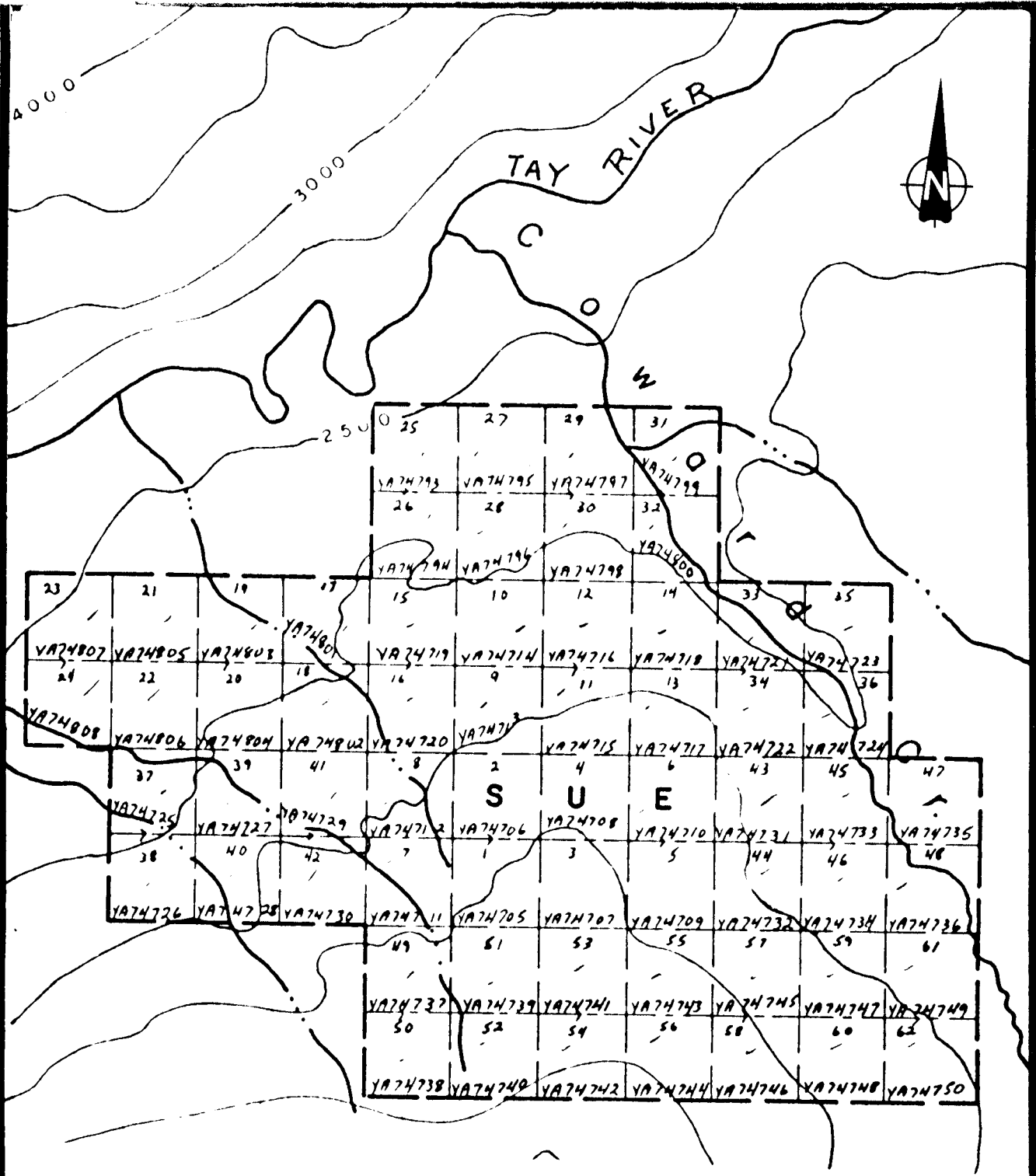
Kidd Creek Mines Ltd

**SUE CLAIMS
LOCATION MAP**

SCALE 1: 7,460,000

Fig.

DATE
SEPTEMBER, 1982



Kidd Creek Mines Ltd

SUE CLAIMS

NTS 105L - 9

SCALE 1" = 1/2 Mile

Fig.

DATE
MAY 1983

PERSONNEL

		<u>Time devoted to project</u>
Scott Boerner	- Student-Helper, Calgary, Alberta	7 days
Darren Frew	- Junior Geologist-Crew Chief Calgary, Alberta	7 days
David Flengke	- Student-Helper, Vancouver, B. C.	7 days
Grant Hendrickson	- Staff Geophysicist, Supervisor, Calgary Alta.	20 days

EQUIPMENT

- 1 - Apex parametrics Maxmin II electromagnetic System
- 1 - Geometrics G-856 Portable Proton Magnetometer
- 1 - Geometrics G-856 Base Station Magnetometer

Additional information and specifications for these instruments can be readily obtained from the manufacturer.

DATA PRESENTATION

The data is presented in both section and plan form at a scale of 1 to 2000. The plan view of the grid shows the data for each line in profile form. The section presentation shows the data profiles overlying the topography for each line. The latter is useful in planning and interpretation of drilling results and trenching. The magnetic data is not contoured due to the complicated nature of the response from line to line.

The E. M. Data is plotted at 1 cm represents 20%. The magnetic data is plotted at 1 cm represents 500 nanotesla.

SURVEY PROCEDURE

The Maxmin II electromagnetic system was chosen for the following reasons:

- a) A small portable transmitter would not excite the host rock as much as large loop turam type systems.
- b) It was hoped that the lower frequencies of the maxmin system would reduce the host rock response without appreciably reducing the response of metallic conductors.
- c) The operational ease of using this equipment.

A coil separation of 80 m was chosen to ensure fairly good horizontal resolution. A limited amount of 160 m coil separation work was also done in an effort to achieve better depth penetration. Frequencies used for the 80 m coil separation work were 1777 HZ and 444 HZ. The 160 m coil separation work was done at 888 HZ and 222 HZ. The frequencies were lower for the large coil separation work to reduce the magnitude of the host rock response. The response of the E.M. system is directly related to frequency and coil separation.

The rough topography of the survey area necessitated well chained and controlled lines to allow for accurate corrections to the in-phase data and to keep the coils coplanar. These corrections arise from coil separation variation. Line separation was 100 m in the center of the grid and 200 m at the edges of the grid. Survey stations were established at 20 m horizontal intervals. Portable inclinometers were used to calculate the correct slope distance for a 20 m horizontal interval.

The magnetic surveying was done at 10 m intervals on all lines. The diurnal change of the magnetic field was monitored with a base station magnetometer. No corrections were necessary to the magnetic data since the maximum diurnal change was 40 nanotesla which was negligible considering the magnitude of the magnetic anomalies. (up to 4000 nanotesla). The magnetic sensor was carried on a staff approximately 4 ft. above the operator's head to ensure against interference from magnetic objects on the operator.

DISCUSSION OF THE RESULTS

After a perusal of the data it is apparent that difficulties exist in trying to interpret quantitatively the E.M. response of conductors within a conductive host rock. The variable shape of the conductive horizons is a complicating factor. Near surface conductors conformable to the topographic surface are a major difficulty in trying to see deep within the metasedimentary package.

On the accompanying sections the apparent shape of the conductors is shown. This interpreted geometry serves as a rough guide of what to expect in any future drilling and trenching. The general structure appears to be a series of small folds which combined with faults repeat the same horizons across the grid. These small structures are probably superimposed on a large antiform. The plan view of the conductor axis may largely represent the crests of small anticlinal structures. Large negative E.M. responses will occur over the top of small anticlinal structures. Flat lying structures can produce either positive or negative E.M. responses depending on their depth relative to the coil separation

used. Shallow flat lying conductors produce negative responses whereas deeper flat lying conductors can produce lower amplitude positive responses. The fact that some of the conductors tend to merge in the center of the grid suggests some of the folds may pinch out due to a gentle east plunge. If one keeps in mind the change in topography when regarding the surface trace of conductors, valuable information on the dip can be deduced. When work resumes the baseline topographic profile should be obtained so relative height of each line can be considered in interpretation. The topographic profile of each line has already been obtained. This information is crucial when dealing with shallow dipping anomalies. Within the grid altitude varies by approx 350 meters.

Conductor width is generally a function of frequency. As the frequency used is reduced the current induced in the conductor diffuses into the conductor thus reducing the apparent width of the conductor.

In certain areas the 80 m coil separation work did not provide sufficient resolution. A limited amount of shorter coil separation work would help solve the local problem of conductor shape and give more precise trench locations. The large coil separation work lacked resolution due to the interaction of adjacent conductors. While not providing resolution the large coil separation work suggests interconnected conductors.

Line to line correlation at 200 meter line separation becomes tenuous thus effort should be made to fill into 100 m separation.

There is fair evidence in the data to suggest a NW trending fault which offsets the north east corner of the grid. Apparent equivalent horizons have been labelled A, B, C etc. to show continuity across this proposed fault.

The center portion of line 16w has little electromagnetic response suggesting a change in geology to a resistive unit (limy phyllite?). Note that line 16w is at the lowest elevation within the grid.

The magnetic results are very complex. The reversals evident in the data are very suggestive of pyrrhotite and magnetite mineralization. Magnetic anomalies without coincident conductors are more probably magnetite. A flat lying sheet has no magnetic expression except at it's edges where a moderate "S" shaped response occurs. The complex nature of the magnetic response is largely due to the varying shape and interaction of mineralized horizons. The data should be viewed profile to profile. Numerous short wave length magnetic anomalies exist which are of no economic importance however do give us local dip information. A few large wavelength anomalies were recorded in the southwest sector of the grid. These anomalies have significant width potential, and are adjacent to strong conductors. The apparent correlation of lead zinc mineralization with magnetite or pyrrhotite may be very useful.

Drill and/or trench locations are best chosen from a study of the enclosed interpretive sections.

CONCLUSIONS

The direct detection of lead zinc mineralization is possible with the methods employed in this survey. The ultimate value of the geophysical work includes the ability to map pyritic, graphitic and magnetic horizons which often are continuous enough to provide valuable information on the structures present. Changes in the electromagnetic background can indicate facies changes (or formation change) within the metasedimentary package.


G. Hendrickson

STATEMENT OF EXPENSE

Coward Creek Project

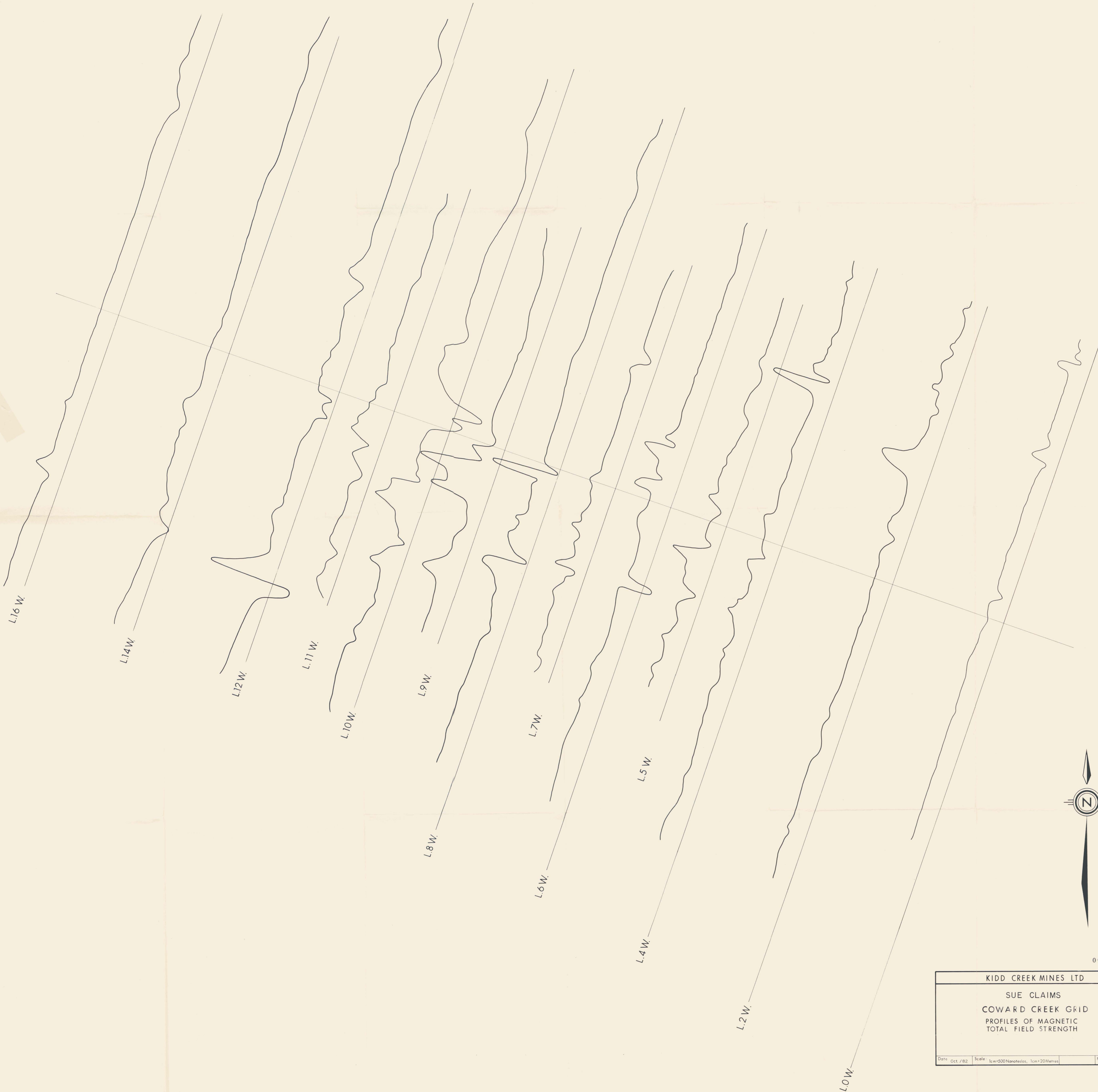
Geophysics - Aug 10-16
Linecutting- July 26-Aug 8

Helicopter time (geophysics and linecutting)	11,487.69
Linecutting	4,530.00
Crew Salaries	2,464.35
Equipment Rental (magnetometer) 5 days @ 71.28	356.40
Accommodation	<u>1,598.20</u>
Total	\$20,436.82



091457

KIDD CREEK MINES LTD	
SUE CLAIMS	
COWARD CREEK GRID	
HORIZONTAL COPLANAR LOOP	
ELECTROMAGNETICS	
COIL SEPARATION 80m.	IN PHASE
FREQUENCY 444 Hz	QUADRATURE
Date: Oct 1982	Scale: 1cm=100m. 1cm=20%
	File No.



091457

KIDD CREEK MINES LTD
SUE CLAIMS
COWARD CREEK GRID
PROFILES OF MAGNETIC
TOTAL FIELD STRENGTH

Date: Oct./82 Scale: 1cm=500Meters, 1cm=20Metres File No:

60,000

59,000

58,000

57,000

60,000

59,000

58,000

57,000

MAGNETICS - TOTAL FIELD

+20%

0

-20%

1777 HZ
80 m. COIL SEPARATION

H. I. E. M.

○ ○ IN-PHASE
x x QUADRATURE

+20%

0

-20%

444 HZ

TOPOGRAPHY

5+00S

4+00S

3+00S

2+00S

1+00S

0+00

1+00N

2+00N

3+00N

4+00N

5+00N

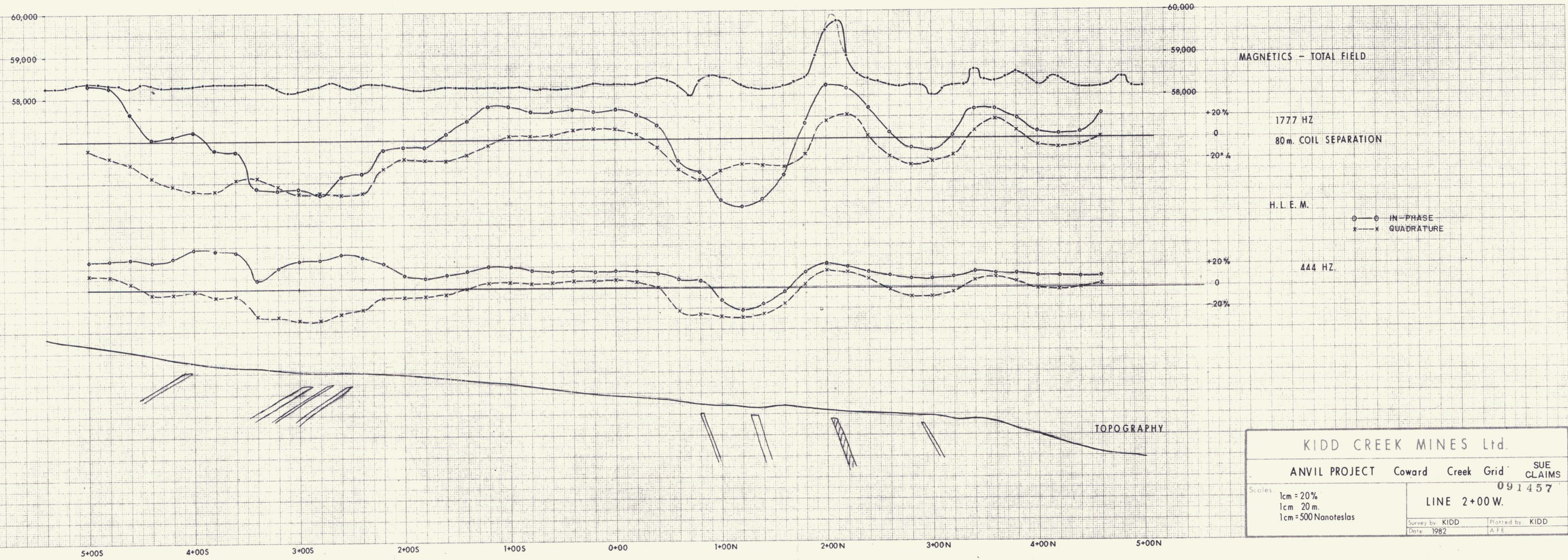
KIDD CREEK MINES Ltd.

ANVIL PROJECT Coward Creek Grid SUE CLAIMS

Scales:
1cm = 20%
1cm = 20m.
1cm = 500 Nanoteslas

LINE 0+00 001457

Survey by KIDD
Date 1982
Plotted by KIDD
A.F.E.



KIDD CREEK MINES Ltd.	
ANVIL PROJECT	Coward Creek Grid
SUE CLAIMS 091457	
LINE 2+00W.	
Scales 1cm = 20% 1cm = 20 m. 1cm = 500 Nanoteslas	Survey by KIDD Date 1982
Plotted by KIDD A.F.E.	

60,000 60,000

59,000 59,000

58,000 58,000

57,000 57,000

MAGNETICS - TOTAL FIELD

+20%
0
-20%

1777 HZ
80m. COIL SEPARATION

H. L. E. M.

○—○ IN-PHASE
x—x QUADRATURE

+20%
0
-20%

444 HZ
80m. COIL SEPARATION

TOPOGRAPHY

5+00S 4+00S 3+00S 2+00S 1+00S 0+00 1+00N 2+00N 3+00N 4+00N 5+00N

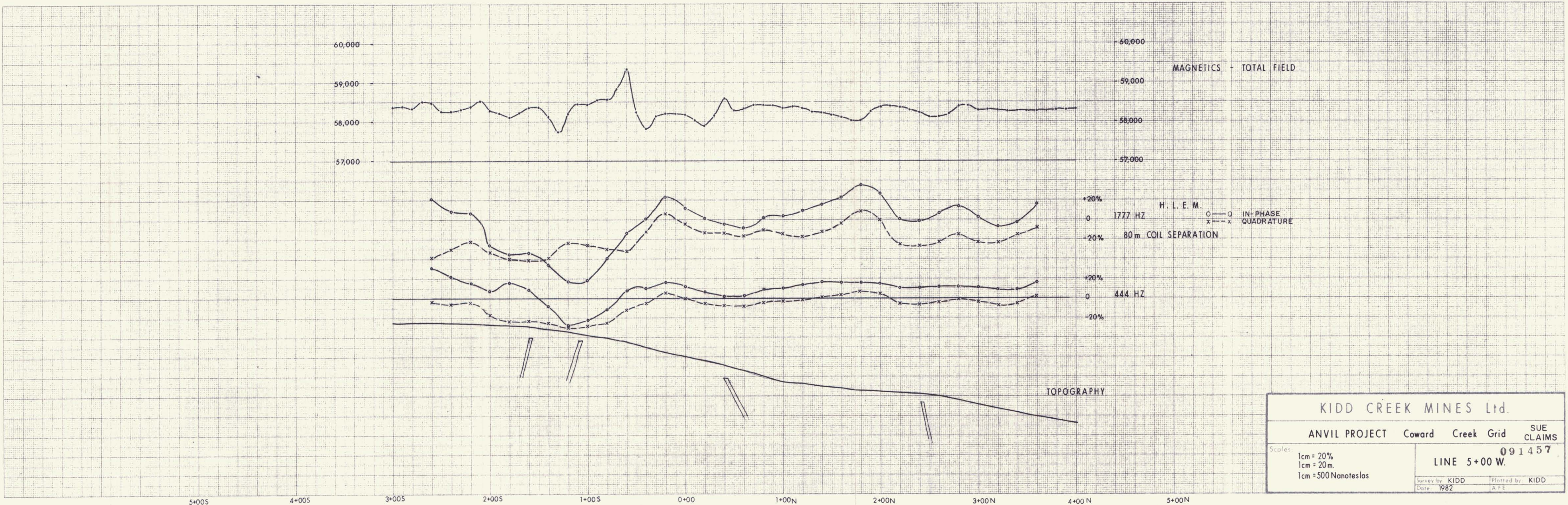
KIDD CREEK MINES Ltd.

ANVIL PROJECT Coward Creek Grid SUE CLAIMS

Scales
1cm = 20%
1cm = 20m
1cm = 500 Nanoteslas

091157
LINE 4+00W.

Survey by KIDD
Date: 1982
Plotted by KIDD
A.F.E.

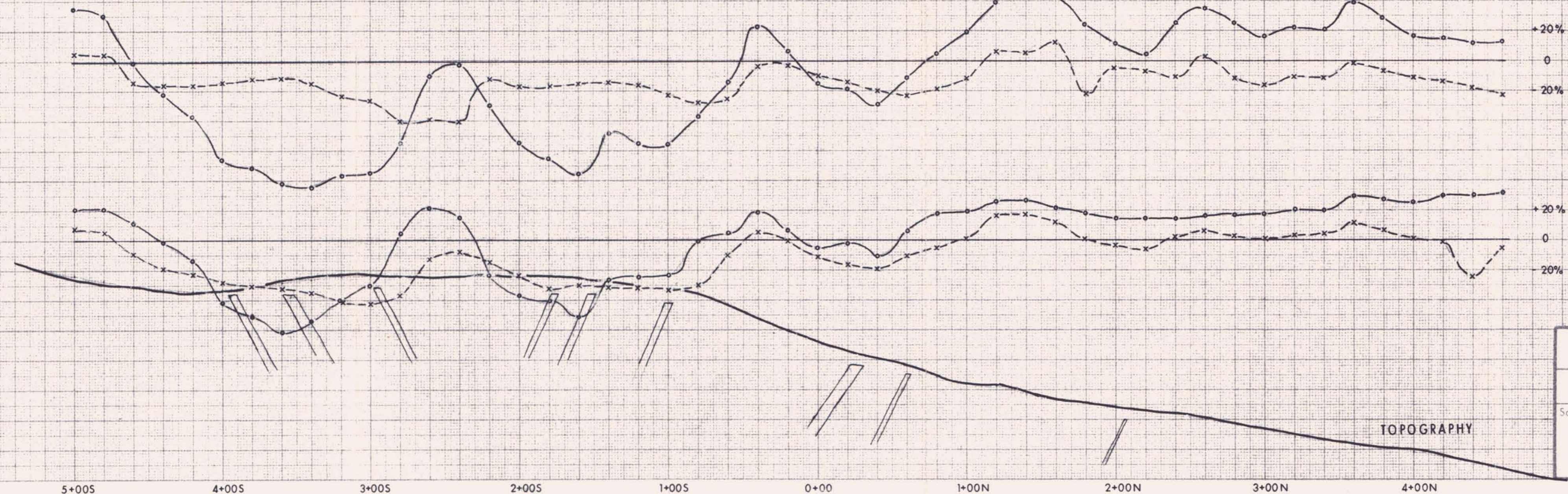


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ANVIL PROJECT	Coward Creek Grid
SUE CLAIMS	091457
LINE 5+00 W.	
Scales: 1cm = 20% 1cm = 20m. 1cm = 500 Nanoteslas	Survey by KIDD Date 1982 Plotted by KIDD AFE

60,000
59,000
58,000
57,000

60,000
59,000
58,000
57,000

MAGNETICS - TOTAL FIELD



1777 HZ
80 m. COIL SEPARATION

H. I. E. M.
O—O IN-PHASE
x—x QUADRATURE

444 HZ

TOPOGRAPHY

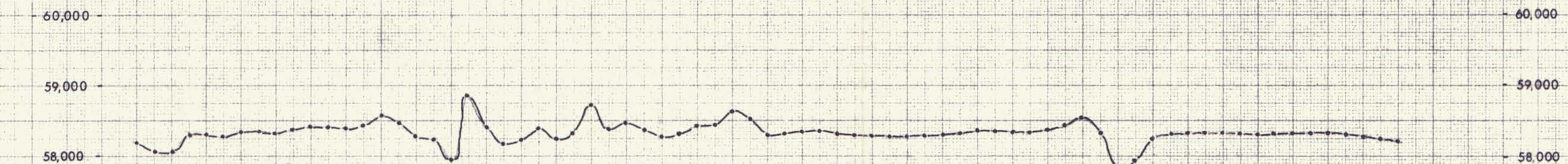
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ANVIL PROJECT Coward Creek Grid SUE CLAIMS

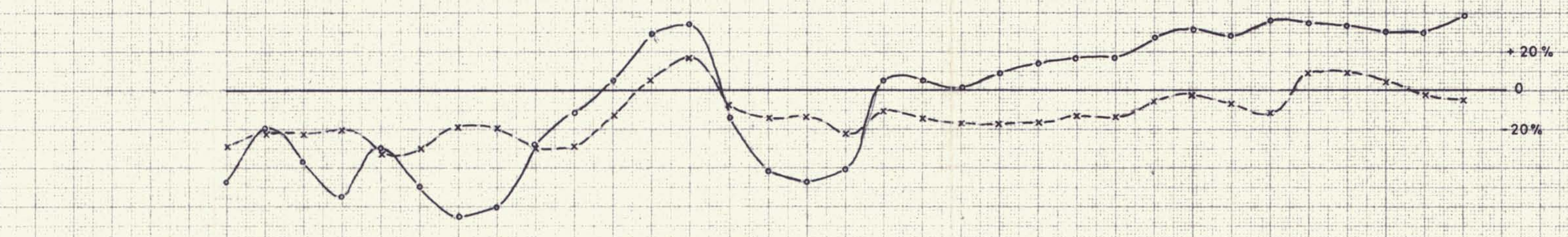
Scales
1cm = 20%
1cm = 20 m.
1cm = 500 Nanoteslas

LINE 6+00W. 091157

Survey by KIDD
Date: 1982
Plotted by KIDD
A.F.E.

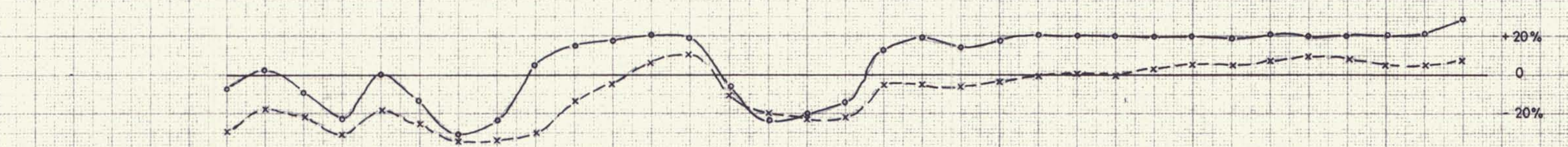


MAGNETICS - TOTAL FIELD

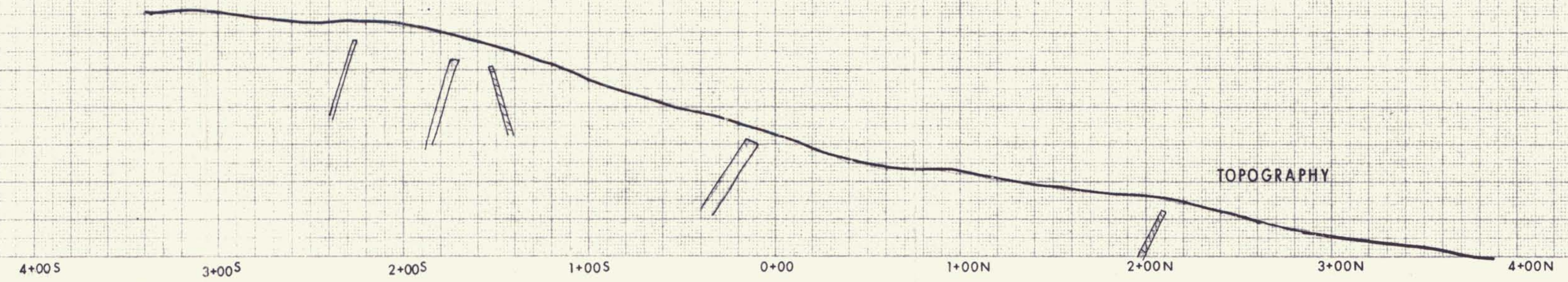


1777 HZ
80m. COIL SEPARATION

H. L. E. M.
 O—O IN-PHASE
 x---x QUADRATURE



444 HZ



TOPOGRAPHY

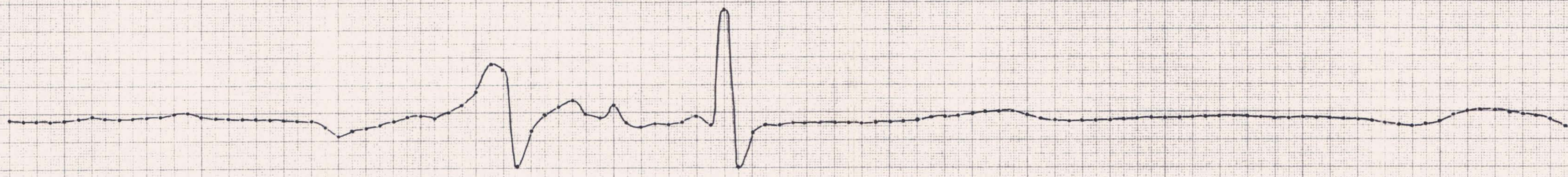
KIDD CREEK MINES Ltd.	
ANVIL PROJECT	Coward Creek Grid
SUE CLAIMS	00147
LINE 7+00 W.	
Survey by: KIDD	Plotted by: KIDD
Date: 1982	A.F.E.

Scales
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 1cm = 20m.
 1cm = 500 Nanoteslas

60,000
59,000
58,000
57,000

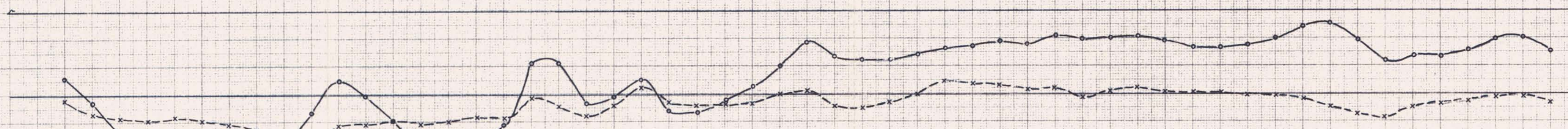
60,000
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57,000

MAGNETICS -
TOTAL FIELD



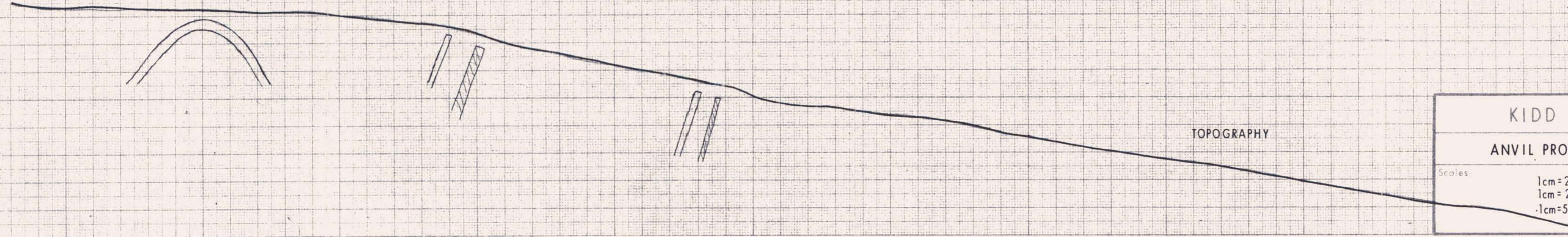
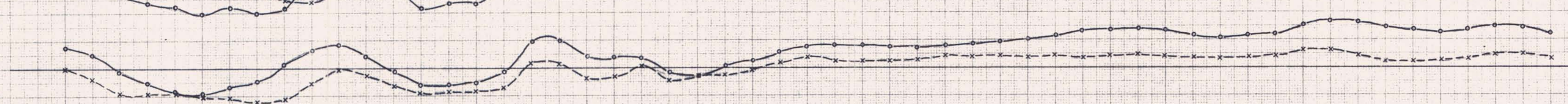
+20%
0
-20%
1777 HZ

80 m COIL SEPARATION



H. L. E. M.

0 - 0 IN-PHASE
x - x QUADRATURE
+20%
0
-20%
444 HZ



5+00S 4+00S 3+00S 2+00S 1+00S 0+00 1+00N 2+00N 3+00N 4+00N 5+00N

KIDD CREEK MINES Ltd.	
ANVIL PROJECT	Coward Creek Grid SUE CLAIMS
Scale: 1cm = 20% 1cm = 20 m. 1cm = 500 Nanoteslas	
Survey by KIDD Date: 1982	Plotted by KIDD A.F.E.
LINE 8+00 W. 091457	

60,000

59,000

58,000

57,000

60,000

59,000

58,000

57,000

MAGNETICS - TOTAL FIELD

1777 HZ
80 m COIL SEPARATION

H. L. E. M.

○ — ○ IN-PHASE
x — x QUADRATURE

444 HZ

TOPOGRAPHY

4+005

3+005

2+005

1+005

0+00

1+00N

2+00N

3+00N

4+00N

KIDD CREEK MINES Ltd.

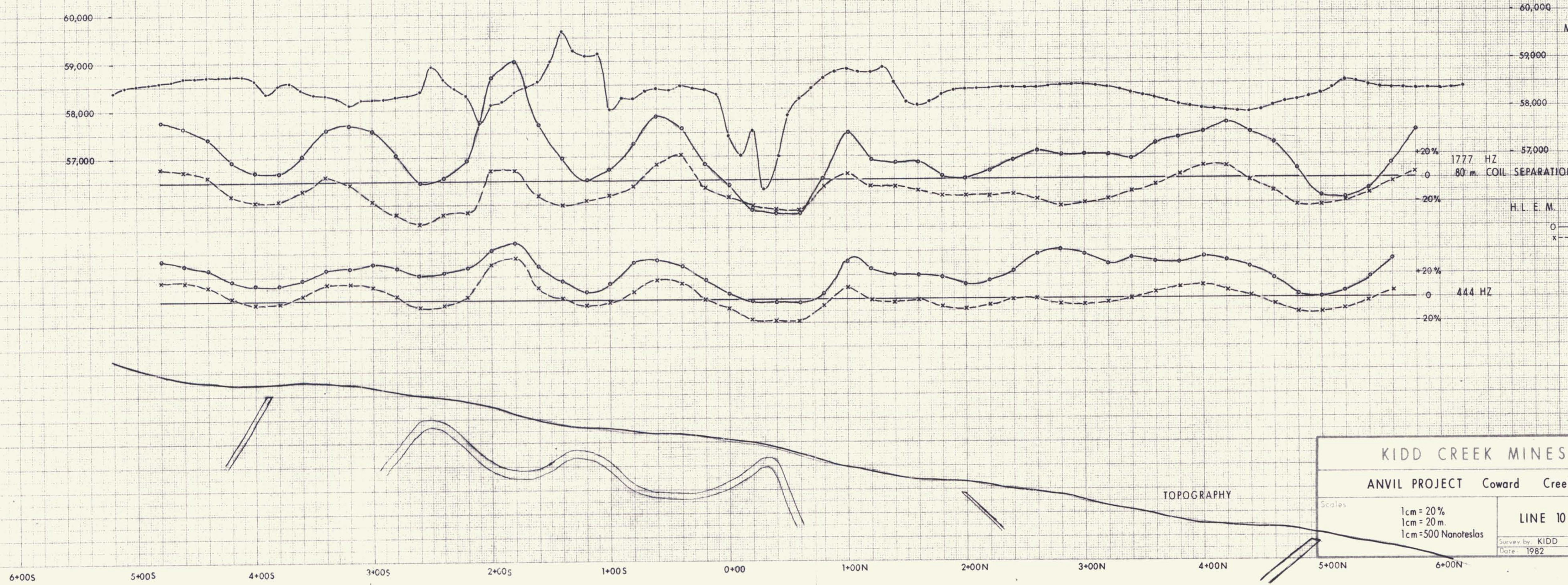
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1cm = 500 Nanoteslas

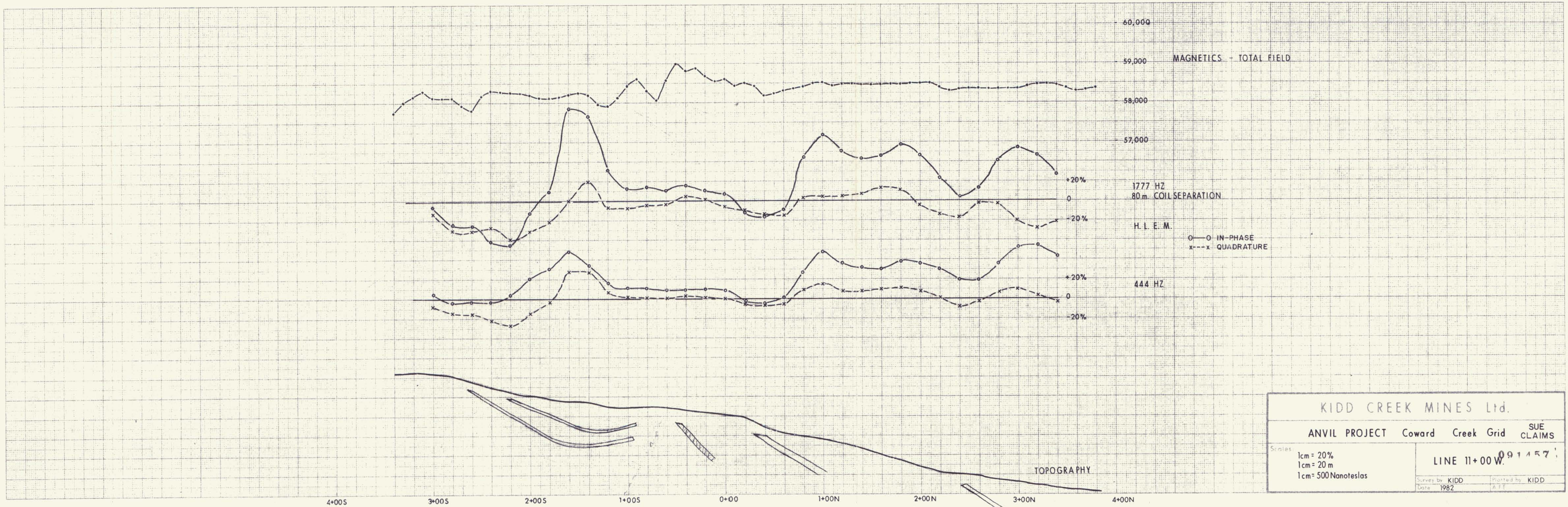
091457
LINE 9+00 W:

Survey by KIDD
Date 1982

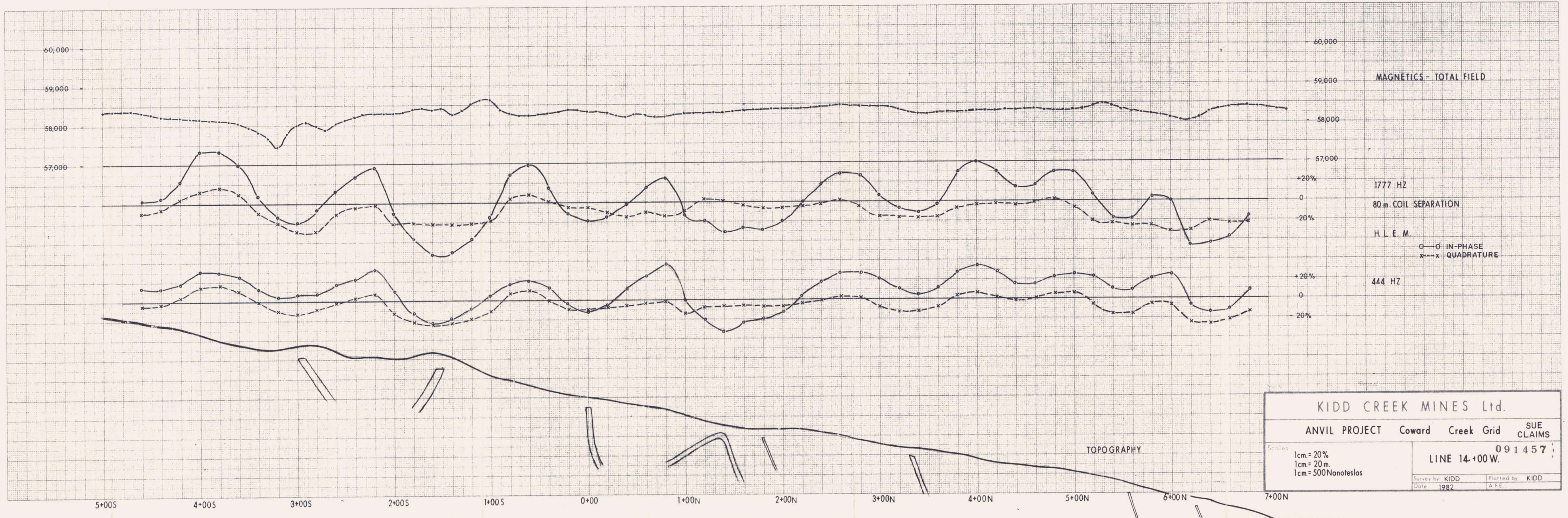
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A.F.E.



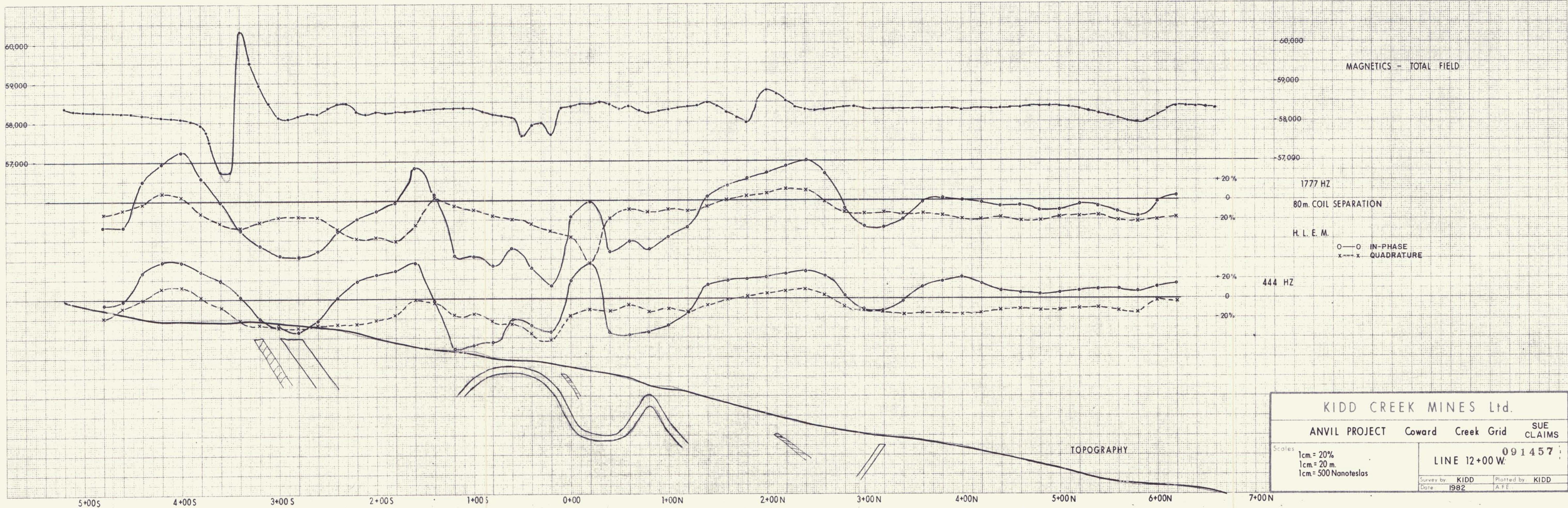
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LINE 10+00 W 091457	
Survey by: KIDD Date: 1982	Plotted by: KIDD A.F.E.



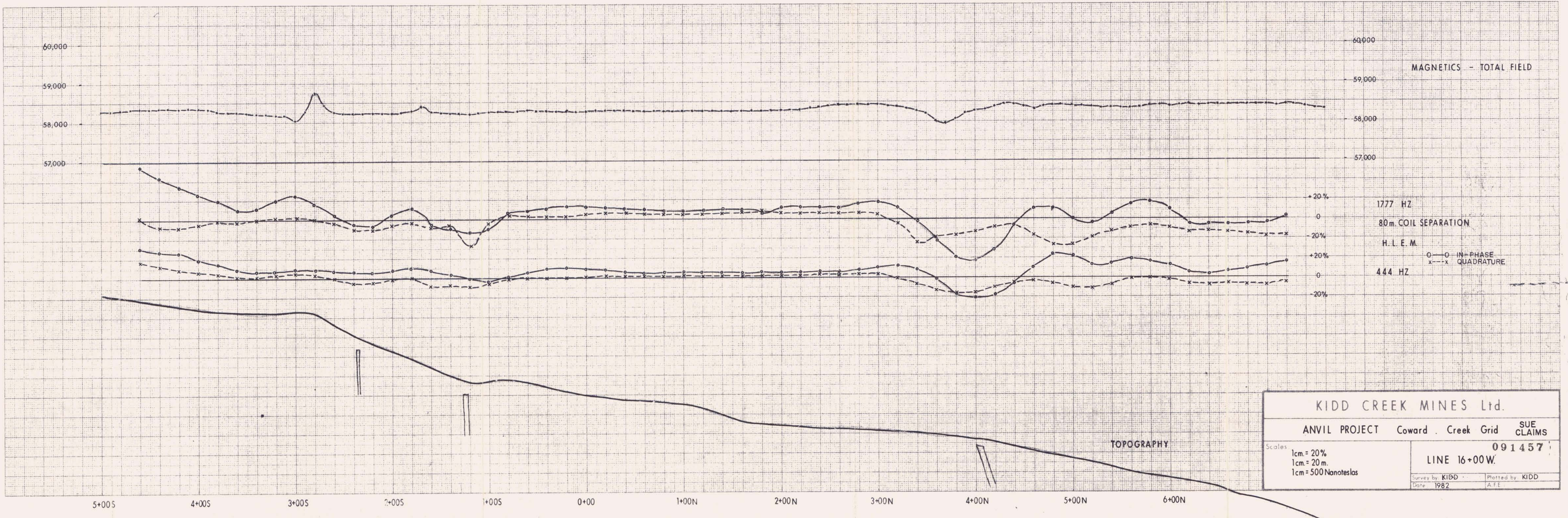
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ANVIL PROJECT	Coward Creek Grid SUE CLAIMS
Scales 1cm = 20% 1cm = 20 m 1cm = 500 Nanoteslas	LINE 11+00W. 091157 Survey by KIDD Date 1982 Plotted by KIDD A.F.E.



KIDD CREEK MINES Ltd.	
ANVIL PROJECT	Coward Creek Grid
SUE CLAIMS	091457
LINE 14+00W.	
Survey by: KIDD	Plotted by: KIDD
Date: 1982	A.F.E.



KIDD CREEK MINES Ltd.			
ANVIL PROJECT	Coward Creek Grid	SUE CLAIMS	
Scales		091457	
1cm. = 20m.	1cm. = 20 m.	LINE 12+00 W.	
1cm. = 500 Nanoteslas		Survey by KIDD	Plotted by KIDD
		Date 1982	A.F.E.



KIDD CREEK MINES Ltd.		
ANVIL PROJECT	Coward Creek Grid	SUE CLAIMS
Scales 1cm. = 20% 1cm. = 20 m. 1cm = 500 Nanoteslas		091457 LINE 16+00W.
Survey by KIDD Date 1982	Plotted by KIDD A.F.E.	