

**PASMINCO EXPLORATION**

**INTERPRETATION  
OF SURFACE ELECTROMAGNETIC  
DATA ACQUIRED AT THE  
HEREFORDS PROSPECT  
JUNE 2000**

**EL 3/98**

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**Date:** July 2000

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**Melbourne Report No:** VC 309

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## 1. SUMMARY

During June 2000 surface fixed loop electromagnetic data (FLEM) were acquired on four lines at the Herefords Prospect. The Herefords Prospect is situated in Western Tasmania within EL 3/98 approximately 5 kilometres south-west of the town of Sheffield. Outer-Rim Exploration Services were commissioned to complete the FLEM survey for Pasmaenco Exploration who are currently exploring the ground for Rosebery or Hellyer style Zn-Pb-Ag-Au mineralisation.

The FLEM survey was conducted to follow-up a surface geochemical anomaly with the aim of delineating anomalous EM response that could be attributed to massive sulphide mineralisation. It is estimated that the FLEM technique would effectively explore to within 400 metres depth below the surface position of the geochemical anomaly. The Herefords Prospect does not contain conductive host lithologies (ie black shales) hence the EM technique is considered well suited for exploration.

FLEM data were acquired in the time-domain using an impulse response (square-wave signal) CRONE PEM system. Data were acquired on 32 separate channels (including the "Primary Field" or PP measurement) on a 20 msec timebase. Z and X component data were collected on four lines at 25 m intervals for a total of 4.325 line km's. One 400 m x 600 m rectangular transmitter loop was used. The survey took 4.5 days to complete at a contractor cost of approximately \$8900.

The FLEM data do not indicate the presence of a strong EM conductor coincident with the geochemical anomaly at the Herefords Prospect. A very weak and shallow (sourced within the top 100m) early time response is detected on all four lines directly to the north of the geochemical anomaly coincident with the Tertiary basalt contact. This response is consistent with what would be observed over a stringer mineralisation or weakly mineralised shear/fault zone. The response is not consistent with what would be observed over a 5MT+ massive sulphide orebody containing conductive sulphides (pyrrhotite, chalcopyrite, galena, pyrite). The usual "electrical geophysical disclaimer" when applying EM for base metals exploration must be pointed out:

"If a sphalerite rich system (ratio Zn:Pb of +8) existed on the prospect (eg Hercules) then it is unlikely that the EM survey would have detected it".

Hence the survey is not a sterilisation method.

No drill targets were recommended. No follow-up geophysics has been recommended.

## **2. INTRODUCTION**

The Herefords Prospect is situated within EL 3/98 approximately 5 km's south-west of the town of Sheffield in North-Western Tasmania (Figure 1). The ground is currently being explored by Pasminco Exploration for its potential to host Rosebery or Hellyer style Zn-Pb-Ag-Au mineralisation within Palaeozoic volcanics and volcanoclastic sediments of the Central Mt Read Volcanic Belt.

This report presents results of a surface fixed loop electromagnetic (FLEM) survey conducted by Outer Rim Exploration Services for Pasminco Exploration during June 2000. The aim of the FLEM survey was to determine whether a surface geochemical anomaly had a coincident anomalous conductivity response. Anomalous EM response in the vicinity of a geochemical anomaly would provide a high priority target for exploratory drilling. No previous geophysical work had been conducted at the prospect.

## **3. LOCAL GEOLOGY AND PREVIOUS WORK**

The survey region comprises Palaeozoic volcanics and volcanoclastic sediments of the Central Mt Read Volcanic Belt. These rocks have been unconformably overlain by Tertiary basalts in the survey region. Topography is steep to undulating and vegetation varies from sparse rural to dense forest.

The main exploration focus is upon an east-west striking contact between andesite and quartz phyric volcanoclastic sediments. In March-April 2000 a large east-west striking coherent multi-element geochemical anomaly (Zn, Pb, Cd, Ag) was delineated within a steep valley and named the Herefords Prospect. The Zn anomaly is 600m long and 400m wide situated within an andesitic volcanic package interpreted as the hanging wall to the underlying felsic volcanoclastics (taken from the Pasminco Mining Districts April 2000 Monthly Report).

The region is considered most suitable for electrical geophysical exploration. There are no conductive host lithologies (eg black shales) and the rocks are essentially unweathered at the surface with no significant overlying glacial sediments. As a consequence any EM anomalism should be worthy of investigation.

#### 4. SURVEY SPECIFICATIONS

The survey was conducted by Outer Rim Exploration Services using the CRONE PEM system.

The survey specifications are tabulated below:

Date of Survey:	June 24 – 28 2000
Contractor:	Outer Rim Exploration Services
Survey Type:	FLEM
System:	CRONE PEM
No. of lines:	4
Line Spacing:	200 m
Components:	Z (up positive) and along line X (N-S direction north positive)
Station Spacing:	25 m
Time Base:	20 msec
Channels:	32 including the PP field
Ramp Time:	500 µsec
Synchronisation:	Crystal clock
Transmitter Size:	600m x 400m
Current:	8A Amps

The method of data noise and repeatability control was as follows:

- One to three readings were taken at every station. Up to 4096 stacks were recorded particularly on the southern end of each survey line where powerline noise interference was extreme. A high tension and voltage powerline passes within 400m of the southern end of the survey lines.

One transmitter loop position was utilised. The corner coordinates are listed below:

NW 428840mE, 5410250mN  
NE 429440mE, 5410250mN  
SE 429440mE, 5409850mN  
SW 428840mE, 5409850mN

The following grid lines were surveyed with the EM receiver:

Line 428800E, 5408975mN to 5409775mN  
Line 42900E, 5409100mN to 5410000mN  
Line 429200E, 5408600mN to 5410000mN  
Line 429400E, 5408600mN to 5409825mN

The location of survey lines and the transmitter loop is presented in Figure 2.

The survey took five days to complete with the survey crew based out of the town of Sheffield. Total contractor costs (including mobilisation and lodging) should be approximately \$8900. A total of 4.325 line km's were surveyed transcribing to \$2060 per line kilometre.

Time gates utilised by the CRONE PEM system are tabulated below (msec after ramp cessation):

CHANNEL	DELAY	WIDTH
1	0.05400	0.00900
2	0.06525	0.01350
3	0.07875	0.01350
4	0.09450	0.01800
5	0.11480	0.02260
6	0.13960	0.02700
7	0.16890	0.03160
8	0.20495	0.04050
9	0.24760	0.04480
10	0.29920	0.05840
11	0.36220	0.06760
12	0.43875	0.08550
13	0.53095	0.09890
14	0.64115	0.12150
15	0.77620	0.14860
16	0.93825	0.17550
17	1.13400	0.21600
18	1.37000	0.25600
19	1.65550	0.31500
20	2.00000	0.37400
21	2.41650	0.45900
22	2.92050	0.54900
23	3.52800	0.66600
24	4.26350	0.80500
25	5.15000	0.96800
26	6.22100	1.17400
27	7.51450	1.41300
28	9.07850	1.71500
29	10.96800	2.06400
30	13.24500	2.49000
31	16.00000	3.02000

## 5. MODELLING PARAMETERS

Data were modelled using the Leroi modeling algorithm invoked through the EMVISION EM modelling and visualisation package. The Leroi algorithm allows for modelling a thin plate within a background response. EM modelling does not allow for changing the background response laterally, nor does it allow for topographic effects or varied conductivity within a conductive plate. Modelling results are not presented within this report since the results were only used to confirm background response and to determine the effective depth of exploration to be 400 m.

## 6. DISCUSSION AND RESULTS

Stacked profiles of the FLEM responses are presented in Figure 3 to Figure 10. Results are discussed below:

### **Line 8800E**

Data are presented in Figure 3 and Figure 4. The line features a narrow late time Z component negative centred at 5409700mN. This is coincident with the northern edge of the geochemical anomaly and the contact between andesite and Tertiary basalt. The wavelength of the response (<150m) indicates a very shallow source limited in depth extent. It therefore is not recommended as a drill target. The source is postulated as being current channelling along the basalt andesite contact. The main part of the geochemical anomaly (centred at 5409500mN) is not anomalous.

### **Line 9000E**

Data are presented in Figure 5 and 6. A very early time response (channels 1-5) is centred at 5409725mN (once again coincident with the basalt andesite contact). The sharp cross-over suggests a source at or near the surface.

### **Line 9200E**

Data are presented in Figure 7 and 8. A shallow early time response at 5409625mN is observed in the Z and X component coincident with the basalt andesite contact. An additional weak early time EM response is observed at 5408925mN from channel 1 to 14. This response is unable to be explained by the known geology although is too small in wavelength (hence any source is of very limited depth extent) to be considered a viable target.

## **Line 9400E**

Data are presented in Figure 9 and 10. A weak current channelling response is observed at 5409150mN and at 5409625mN. Both are coincident with Tertiary basalt contacts.

## **7. CONCLUSIONS & RECOMMENDATIONS**

No drill targets have been recommended as a result of interpretation of the Herefords Prospect FLEM data. All responses are considered to be too small or related to the basalt contact.

The survey data are relatively noisy and it is recommended that future surveys utilise less channels (20 channels rather than 31) and higher transmitter current to overcome the powerline noise.

## **8. KEYWORDS AND LOCALITY**

### Keywords

conductivity, electromagnetics, orebody, sulphides

### Locality

1:100K Forth 8115

1:250K SK\55-NW Sheet

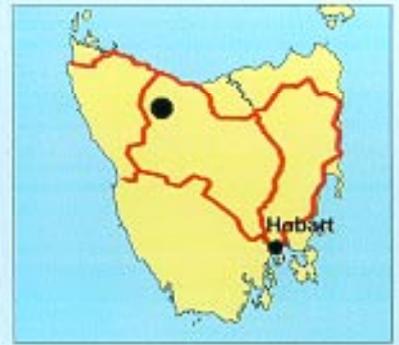
## **9. REFERENCES**

Pasminco Exploration, 2000, April 2000 Mining Districts Monthly Report, Pasminco Technical Library, Internal Report



PASMINCO  
EXPLORATION

**Figure 1.  
Herefords Prospect  
Location Diagram**



Scale 1:1,000,000

Compiled by C Dauth June 2000

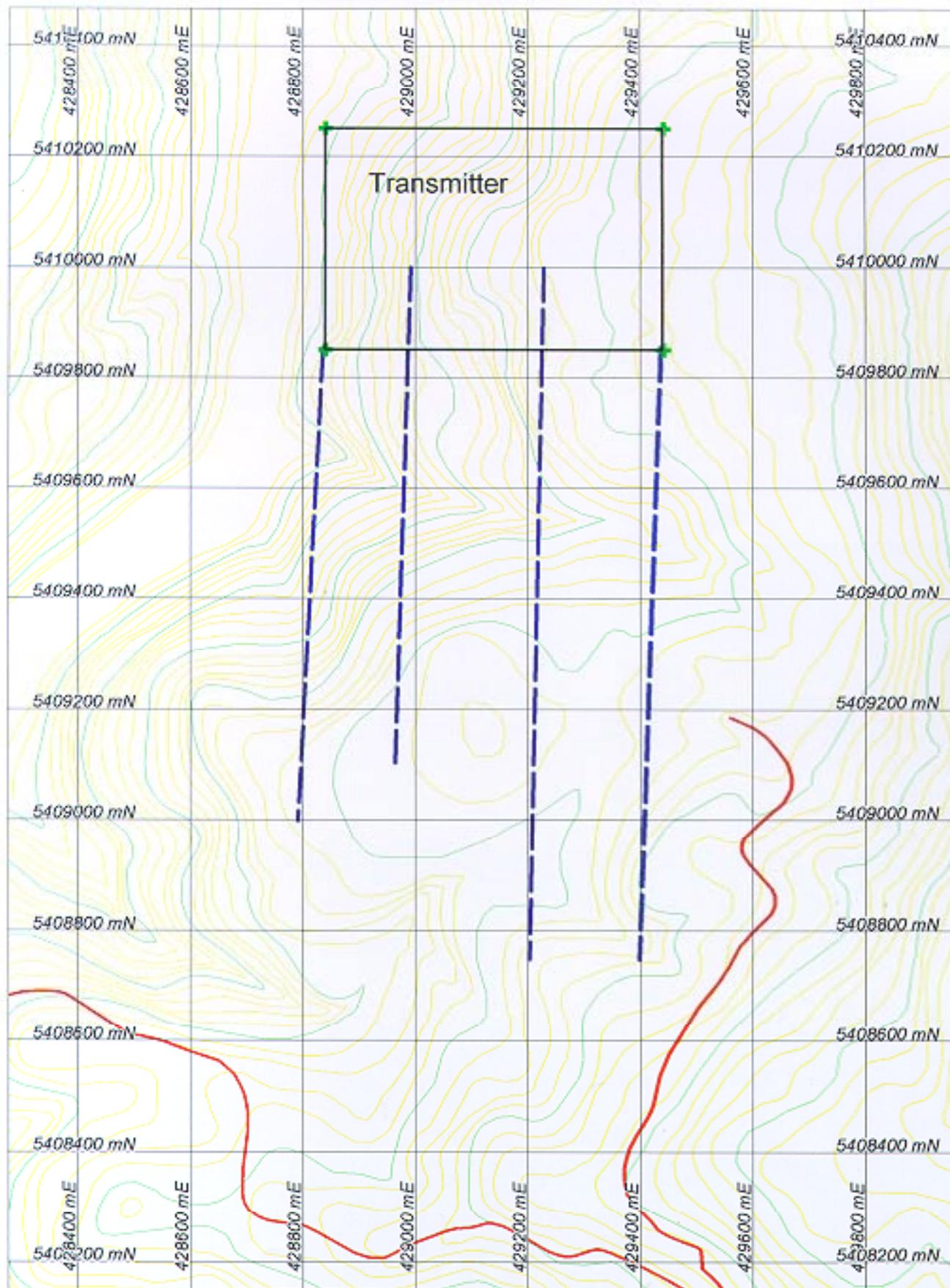
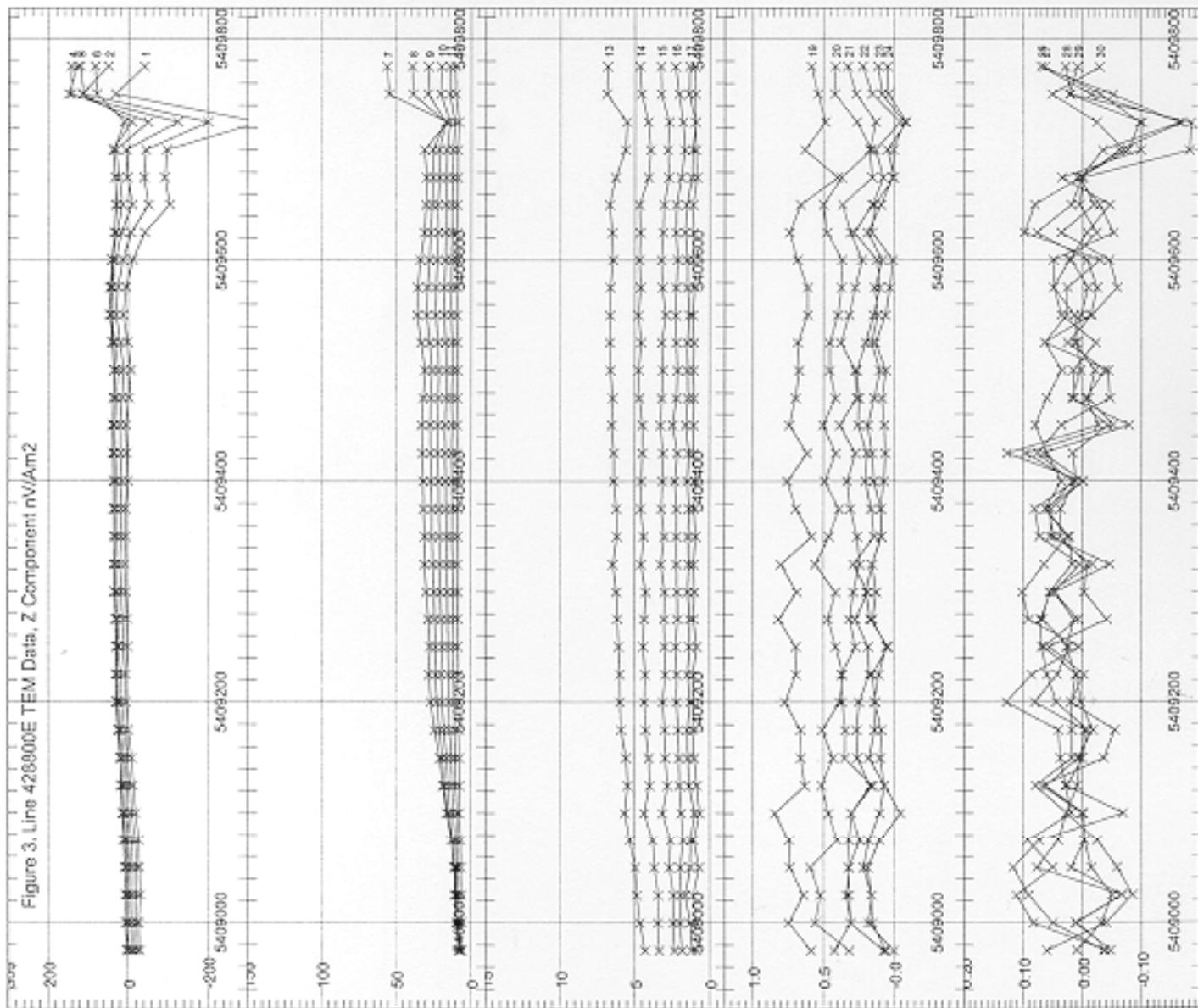


Figure 2  
 Herefords Prospect EM Survey  
 Survey Layout Diagram



Projection: UTM  
 Zone: 55  
 Datum: AGD84

Figure 3. Line 428800E TEM Data, Z Component nV/Am<sup>2</sup>





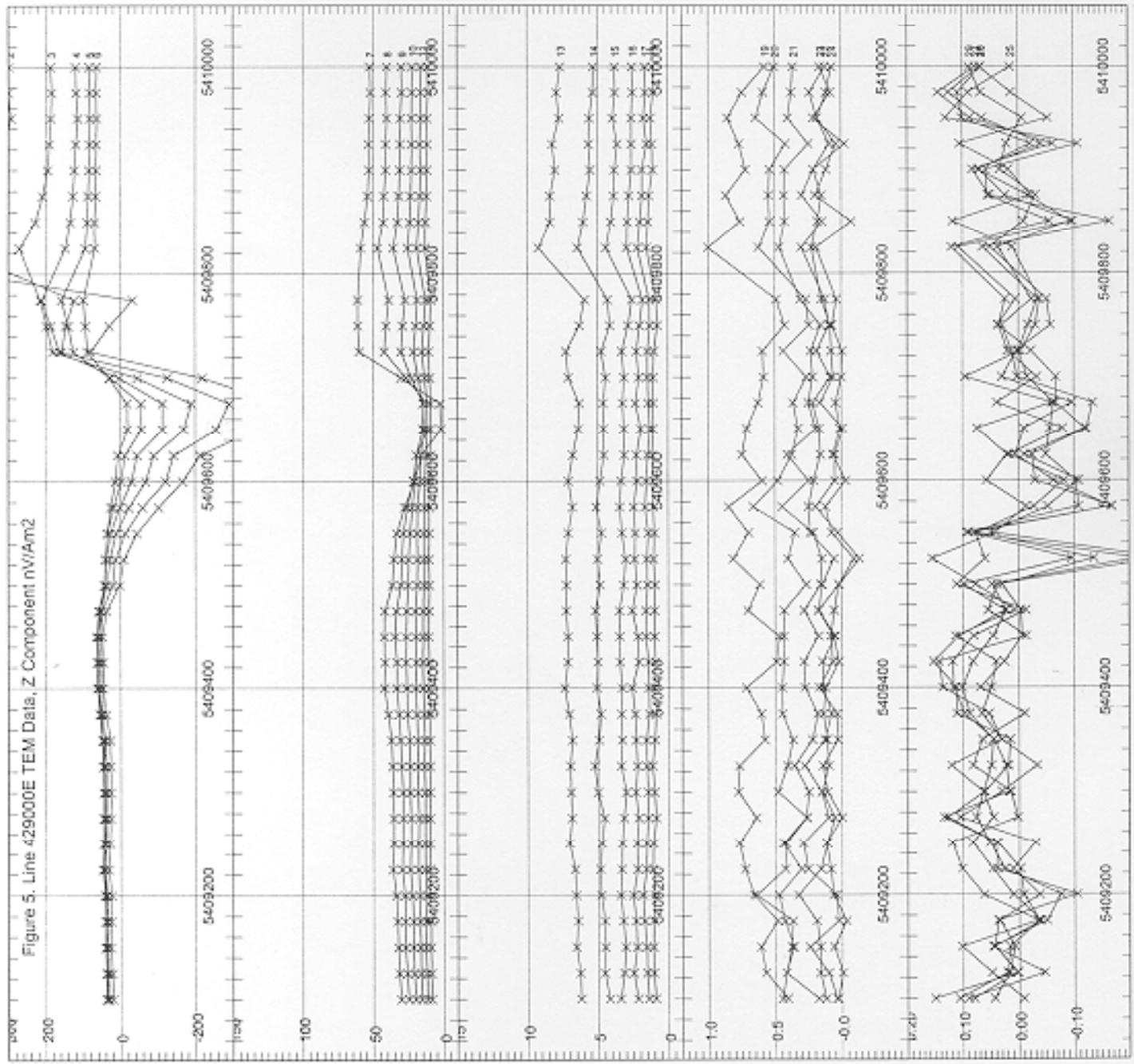


Figure 6. Line 428000E TEM Data, X Component nV/Am<sup>2</sup>

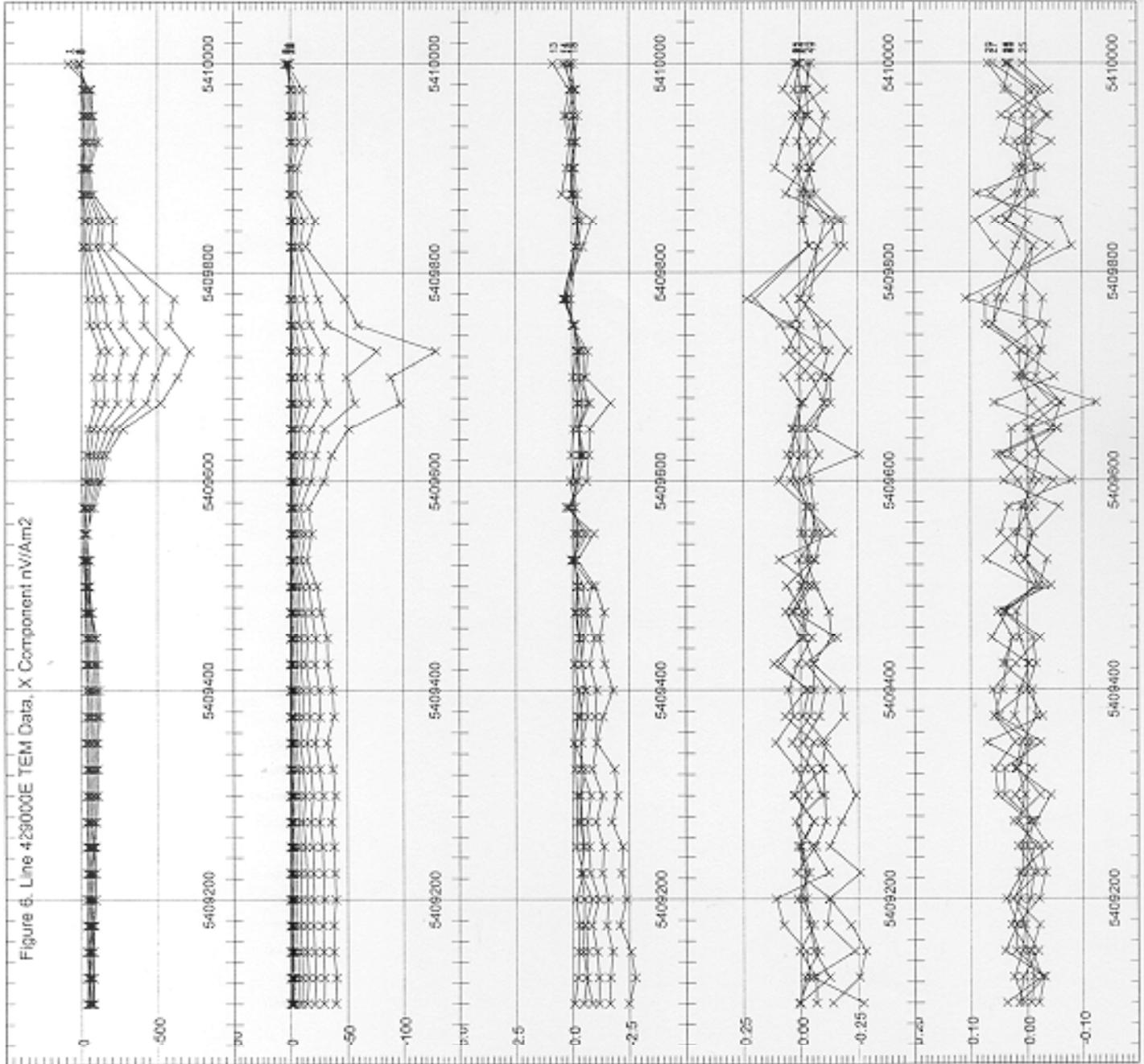


Figure 7. Line 429200E TEM Data, Z Component nV/Am<sup>2</sup>

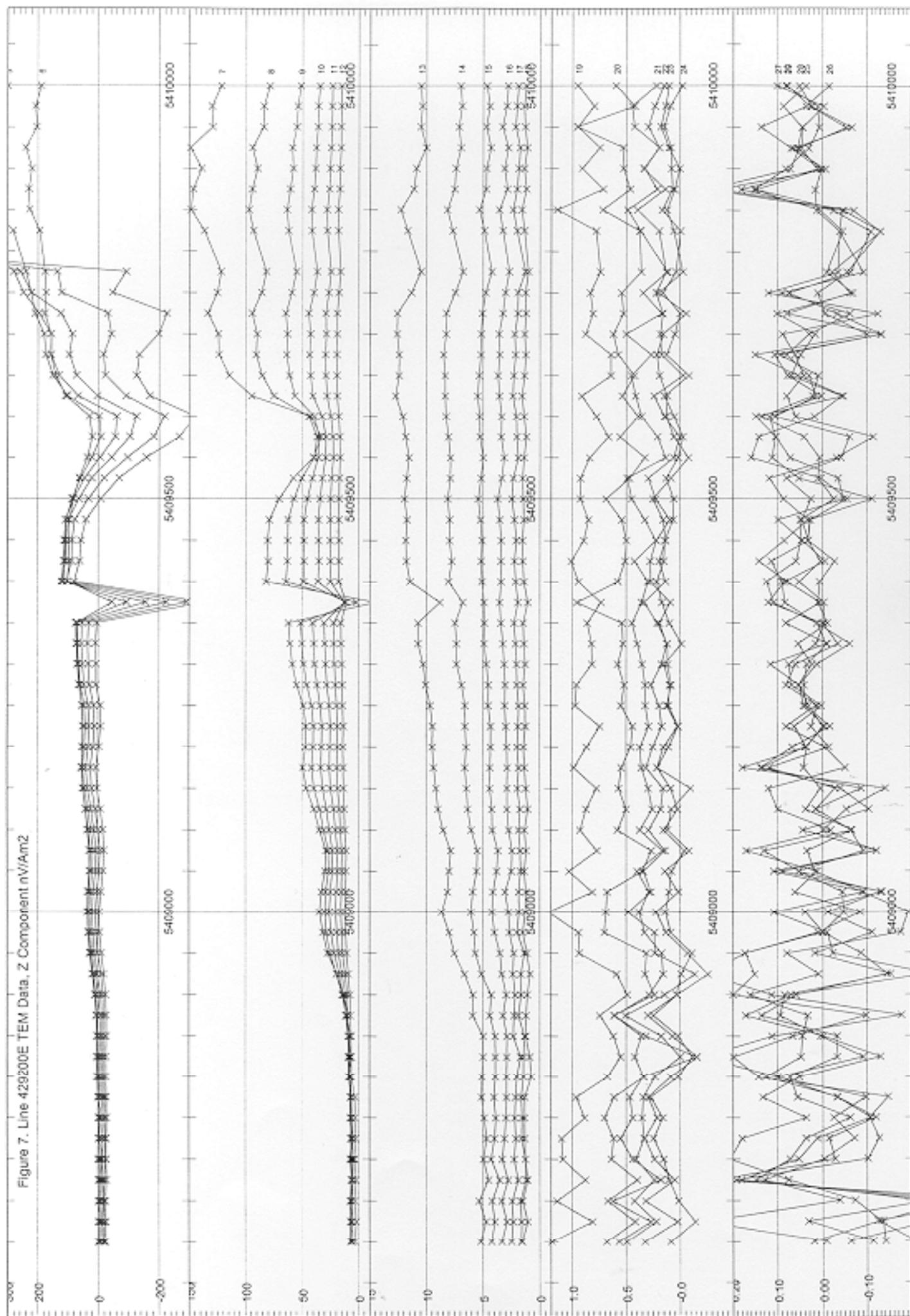


Figure 8. Line 429200E TEM Data, X Component nV/Am<sup>2</sup>

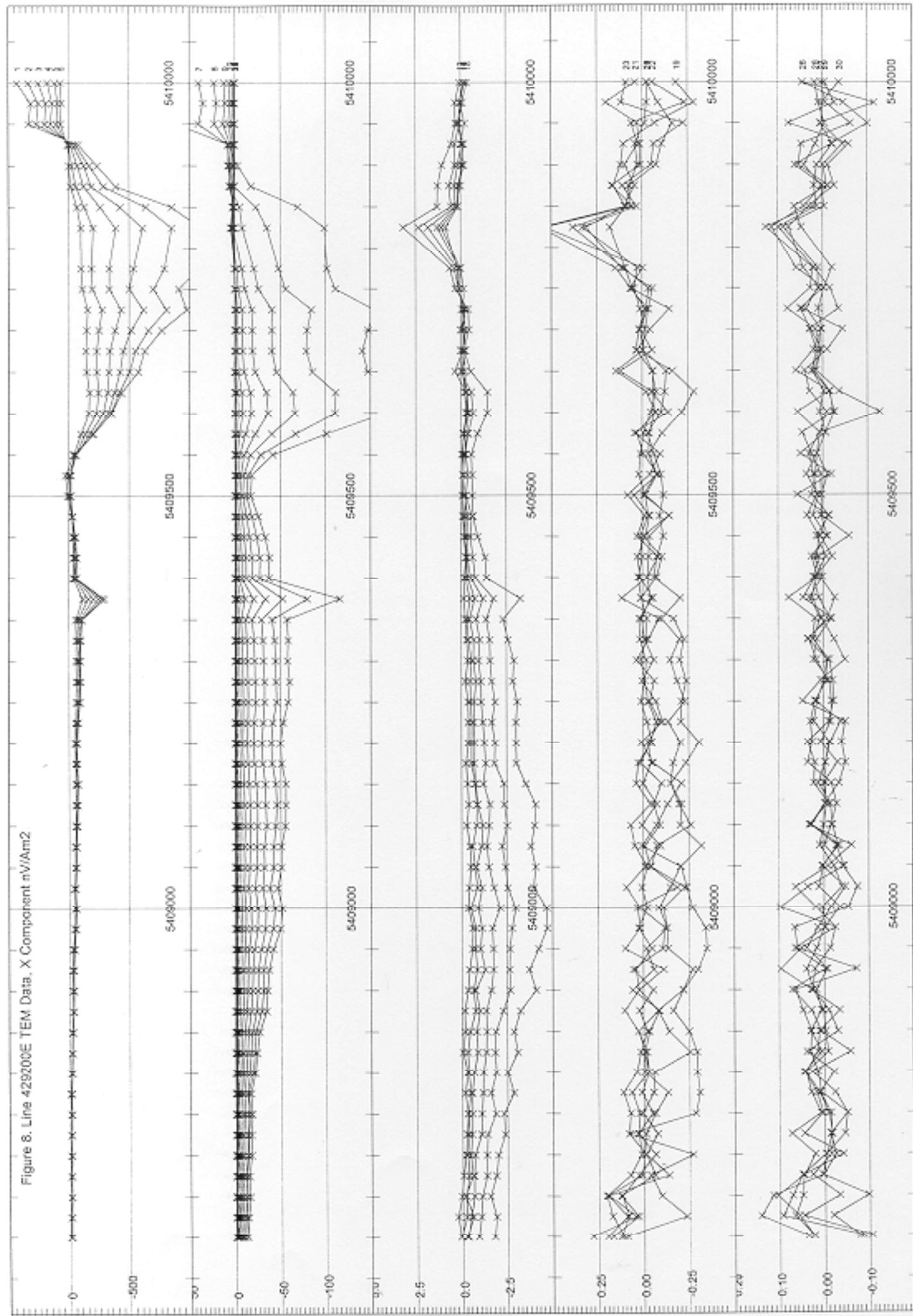


Figure 9. Line 429400E TEM Data, Z Component nV/Am<sup>2</sup>

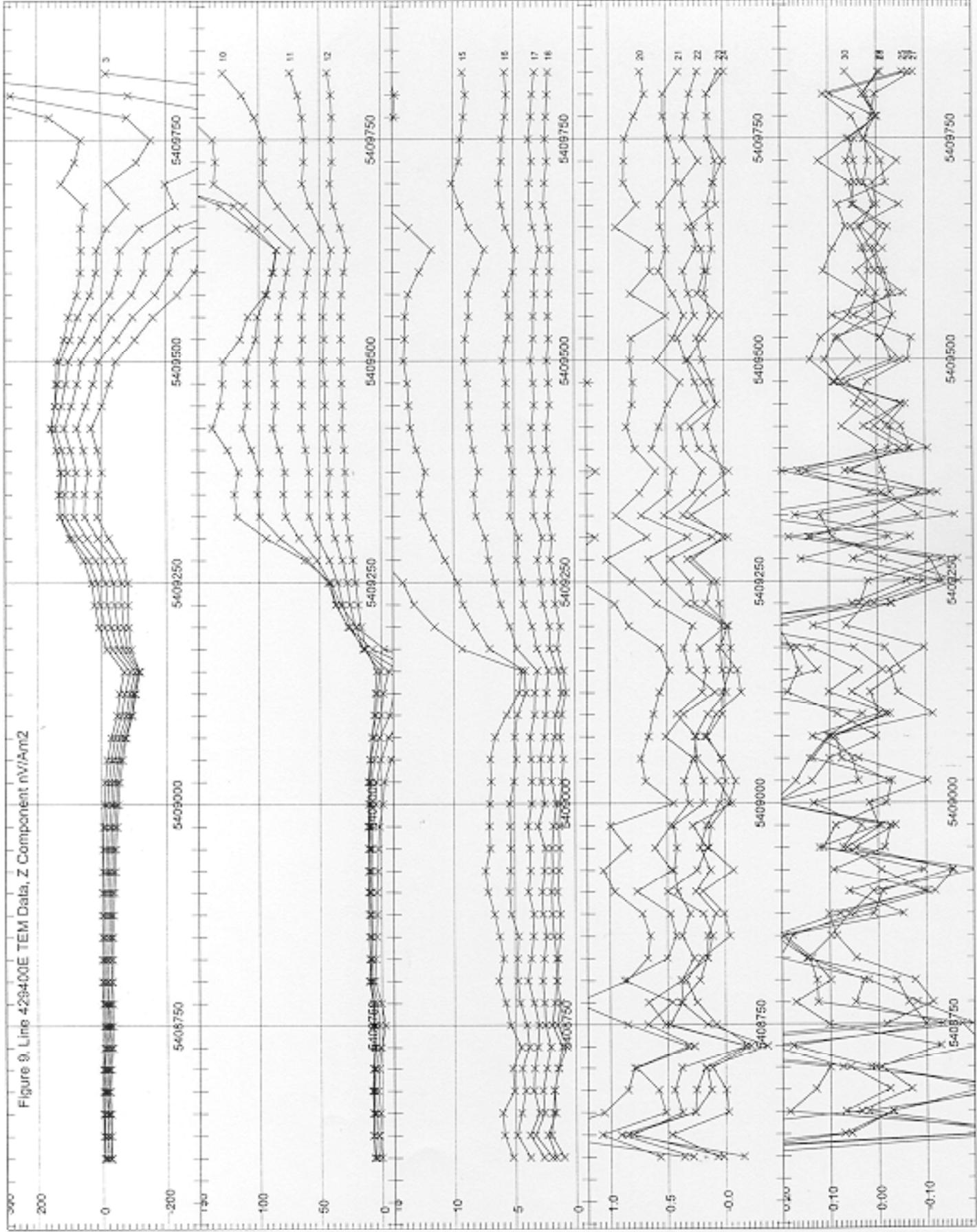


Figure 10. Line 429400E TEM Data, X Component nV/Am<sup>2</sup>

