PASMINCO EXPLORATION

INTERPRETATION
OF DOWN-HOLE ELECTROMAGNETIC
DATA ACQUIRED ON CP348
JUNE 2000

DUNDAS EL21/96

Author: Chris Dauth

Date: July 2000

Submitted To: A McNeill

Copies To: Pasminco Exploration, Melbourne
Pasminco Exploration, Rosebery

Submitted By:

Accepted By:

Melbourne Report No: VC 342

CONTENTS

FIGURES

1 SUMMARY

During June 2000 down-hole electromagnetic data (DHEM) were acquired on diamond drill-hole CP348. CP348 was drilled within the Dundas EL 21/96 situated in Western Tasmania. Outer-Rim Exploration Services were commissioned to complete the DHEM survey for Pasminco Exploration who are currently exploring the ground for Rosebery or Hellyer style Zn-Pb-Ag-Au mineralisation.

The DHEM survey was conducted to follow-up a drill-hole targeted at a surface EM anomaly. The drill-hole failed to intersect a source for the surface EM anomaly. The aim of the DHEM survey was to determine whether an off-hole EM anomaly could be detected that would explain the observed surface EM anomaly.

DHEM data were acquired in the time-domain using an impulse response (square-wave signal) CRONE PEM system. Three component data were acquired on 21 separate channels (including the "Primary Field" or PP measurement) on a 20 msec timebase. Data were acquired to a depth of 505 m at 10 m station interval. Two separate rectangular transmitter loops were used to log the hole. The survey took 3 days to complete at a contractor cost of approximately $5000 (including an allocation for mobilisation).

The DHEM data show three main responses. The first is a very weak early-time in-hole response at 300 m coincident with a sulphide intersection. The data do not indicate that this sulphide intersection is part of a larger system and follow-up is not recommended.

The second observed response in a mid-time anomaly interpreted to be the result of current channelling down the Rosebery Fault situated to the east and parallel to the CP348 collar. This is no recommended for follow-up.

The third response is observed as a very broad EM anomaly suggesting a source approximately 200 m off-hole. Modelling indicates the source to be situated below the drill trace. The plate has dimensions of at least 600 m x 600 m with a conductance of 50-100 siemens. The modelled geometry is very poorly constrained due to the fact that the wavelength of the response is not covered by the length of the drill-hole. Indications are of a plate that dips at 50-70° to the west (consistent with known geology). Decay curve analysis (once again poorly constrained due to difficulties encountered trying to determine true background response) suggests a time constant in the order of 4 msec. There is a high probability that the source of the EM anomaly is pyritic black shales within the lower White Spur Formation. It is conceptual that the anomaly is caused by a large base metal deposit. A deep 800-1000m drill-hole below CP348 has been recommended that would intersect the modelled source.

2 INTRODUCTION

The Dundas exploration licence (EL21/96) south of the town of Rosebery in Western Tasmania (Figure 1) is currently being explored by Pasminco Exploration. The EL overlaps the Rosebery Mine Lease and the ground is considered to have potential to host Rosebery or Hellyer style Zn-Pb-Ag-Au mineralisation within Cambrian sediments, volcanics and volcaniclastic sediments of the Central Mt Read Volcanic Belt.

This report presents results of a down-hole electromagnetic (DHEM) survey conducted by Outer Rim Exploration Services for Pasminco Exploration during June 2000. The survey was conducted on drill-hole CP348 which was originally drilled at the Chamberlain Prospect to test a surface EM anomaly. The aim of the DHEM survey was to determine whether an off-hole response could be identified that would explain the surface EM anomaly. The three component DHEM data would then be used to determine the optimum position for a follow-up drill-hole to intersect the conductor.

3 LOCAL GEOLOGY AND PREVIOUS WORK

The Dundas EL comprises lithologies of the Cambrian Mt Read Volcanic Belt. Geology generally strikes N-S and dips moderately to the west. Topography is steep to undulating and vegetation is typically dense. The immediate survey area has undergone many years of historical fossicking and is covered with cultural features such as cableways, road access, and powerlines.

The Chamberlain Prospect is situated on the western side of the east dipping Rosebery Fault. The Rosebery Fault is a reverse fault with a displacement of 100's of metres up to several km's (?) having younger volcaniclastic sediments and sediments of the Dundas Group on the western side and predominantly felsic volcanics and volcaniclastics of the stratigraphically underlying Central Volcanic Sequence on the east. The eastern felsic volcanics are essentially highly resistive. The western Dundas Group sediments contain black shale horizons that have been observed elsewhere in Western Tasmania to be highly pyritic and graphitic and consequently are relatively conductive.

The region has undergone several phases of historical exploration. In May 1999 a ground fixed loop electromagnetic survey was conducted following up a historical UTEM geophysical anomaly. The CRONE EM data were interpreted to indicate a large and deep sub-surface conductor at the Chamberlain Prospect. These data are reported by Silic 2000.

In May-June 2000 a single diamond drill-hole, CP348, was drilled to a depth of 505 m to test the surface EM anomaly. This drill-hole intersected minor sulphide mineralisation (<0.5 m) including pyrrhotite at 300 m depth however did not intersect anything that could suitably explain the observed surface EM anomaly. Relatively monotonous siltstone was intersected for the length of the drill-hole and no black shales were intersected.

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 2000
Contractor:	Outer Rim Exploration Services
Survey Type:	DHEM
System:	CRONE PEM
Drill-hole:	CP348
Station Spacing:	10 m
Components:	Axial (A) and cross-components (U and V)
Transmittter Loops:	C2 and C3
Time Base:	20 msec
Channels:	21 including the PP field
Ramp Time:	500 µsec
Synchronisation:	Crystal clock
Transmitter Size:	400m x 400m (C2) and 360m x 460m (C3)
Current:	12 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.

The drill-hole CP348 is collared at 377201E, 5371318N, 256 RL drilled on an azimuth of 108° AMG and with a dip of -72°. The hole was drilled to a depth of 505m. The drill-hole intersected minor pyrrhotite mineralisation at 300m depth which visual inspection suggests would produce a small in-hole DHEM response.

Down-hole survey details are listed below:

Hole_ID	Depth	Dip	UTM_Az	Mag_Az
CP348	0	-72	108	96
CP348	26	-71.25	110	98
CP348	59	-72	109	97
CP348	91	-69.5	103	91
CP348	128	-67.5	102	90
CP348	155	-66	101	89
CP348	188	-64.5	101	89
CP348	218	-63	100	88
CP348	248	-62	99	87
CP348	281	-60	98	86
CP348	323	-56.5	98	86
CP348	341	-54.5	99.5	87.5
CP348	371	-52	101	89
CP348	401	-50	101	89
CP348	431	-48	102	90
CP348	461	-46	101	89
CP348	491	-44	101	89
CP348	506	-43.5	101	89

Transmitter loop corner coordinates are listed below:

Loop	Prospect	Corner	East	North	RL
C2	Chamberlain	NW	377590	5371400	280
C2	Chamberlain	NE	378000	5371400	370
C2	Chamberlain	SW	378000	5371020	520
C2	Chamberlain	SE	377590	5371020	350
C3	Chamberlain	NW	376730	5371400	240
C3	Chamberlain	NE	377090	5371400	235
C3	Chamberlain	SW	377050	5370930	320
C3	Chamberlain	SE	376730	5370880	300

The location of drill trace and the transmitter loops is presented in Figure 2.

The survey took three days to complete with the survey crew based out of the town of Rosebery. Total contractor costs (including mobilisation and lodging) were approximately $5000.

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

CHANNEL	DELAY	WIDTH
1	0.05625	0.01349
2	0.07425	0.02251
3	0.09900	0.02700
4	0.13280	0.04060
5	0.17790	0.04960
6	0.23635	0.06730
7	0.31500	0.09000
8	0.42075	0.12150

9	0.56020	0.15740
10	0.74470	0.21160
11	0.98975	0.27850
12	1.31350	0.36900
13	1.74550	0.49500
14	2.31950	0.65300
15	3.08000	0.86800
16	4.09000	1.15200
17	5.42900	1.52600
18	7.20650	2.02900
19	9.56550	2.68900
20	12.70000	3.58000

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.

6 DISCUSSION AND RESULTS

Stacked profiles of the DHEM responses are presented in Figure 3 to Figure 8. Results are discussed below.

The data were modelled using the Leroi modelling algorithm. A problem encountered during modelling was the inability to reproduce the background response using a homogenous half-space or layered earth model. It is considered that the background geology of resistive felsic volcanics to the east of the Rosebery Fault; less resistive siltstones to the west of the Rosebery Fault; the Rosebery Fault itself; and the conceptual conductive White Spur siltstones at depth have combined to provide an electromagnetic signature that is unable to be reproduced using currently available modelling products.

Three anomalous responses are observed in the data.

The first is an early-time sharp in-hole response at 300m own-hole. This is coincident with an in-hole vein intersection of carbonate-pyrrhotite-chalcopyrite-arsenopyrite. The sharp wavelength of the response indicates a small source and it is not a viable exploration target.

The second response is observed as a mid-time (1- 3 msec) positive axial component (loop 3) rise towards the end of the drill-hole. The loop C2 data show a negative axial component rise at equivalent times. This response is interpreted to be due to current channelling along the Rosebery Fault at a position below 300m vertical depth. The response is not recommended for follow-up.

The third response is most likely to be the source for the targeted surface EM anomaly. This is a late-time (5-12 msec) response. Loop C2 data show a broad (+200m wavelength) positive rise in the axial and X (U) component data. The loop C3 data exhibit a late-time negative axial component rise and positive X (U) response. The wavelength of the response is not covered by the full length of the drill-hole which makes modelling very difficult and unreliable (particularly the dips). Modelling of the source geometry is also complicated by the difficulty encountered in trying to model a background response.

The modelled target plate using the C2 transmitter loop data has the following parameters:

Centre of the top edge of the plate east: 377300mE

Centre of the top edge of the plate north: 5371260mN

Vertical depth to the top edge of the plate: 540m

Conductance: 80 Sm

Strike length: 600m

Strike azimuth: 25° from AMG N

Depth extent: 600m

Dip: 70° to the west

The modelled target plate using the C3 transmitter loop data has the following parameters:

Centre of the top edge of the plate east: 377340mE

Centre of the top edge of the plate north: 5371240mN

Vertical depth to the top edge of the plate: 570m

Conductance: 200 Sm

Strike length: 600m

Strike azimuth: 25° from AMG N

Depth extent: 600m

Dip: 50°

Residual decay curve analysis using the C3 axial data suggest a time constant in the order of 4 msec. This could be characteristic of a significant massive sulphide system. Unfortunately the time-constant is a function of the size of a conductor and hence a very thick pyritic shale package can also yield a significant time-constant. The only way to determine the actual nature of the geophysical response is going to be to drill a hole that intersects the modelled source. Such a hole should be targeted at least 100m down-dip of the modelled top of the target to allow for drill-hole lifting and modelling errors.

7 RECOMMENDATIONS

A large conductive source has been identified below the drill trace of CP348. It is not possible to determine whether the source is a thick package of pyritic shales or a large massive sulphide base-metals system. Drill testing is recommended as the most viable means of identifying the source. A drill-hole of approximately 800-1000m depth drilled from the west to intersect the modelled plate at a vertical depth of approximately 650m or deeper would be required to suitably test the response.

8 KEYWORDS AND LOCALITY

Keywords

black shale, Chamberlain, conductivity, DHEM, electromagnetics, orebody, sulphides

Locality

1:100K Sophia 8014

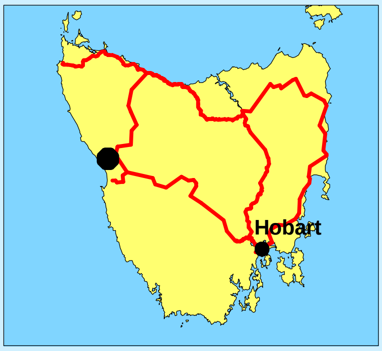
1:250K SK\55-SW Sheet

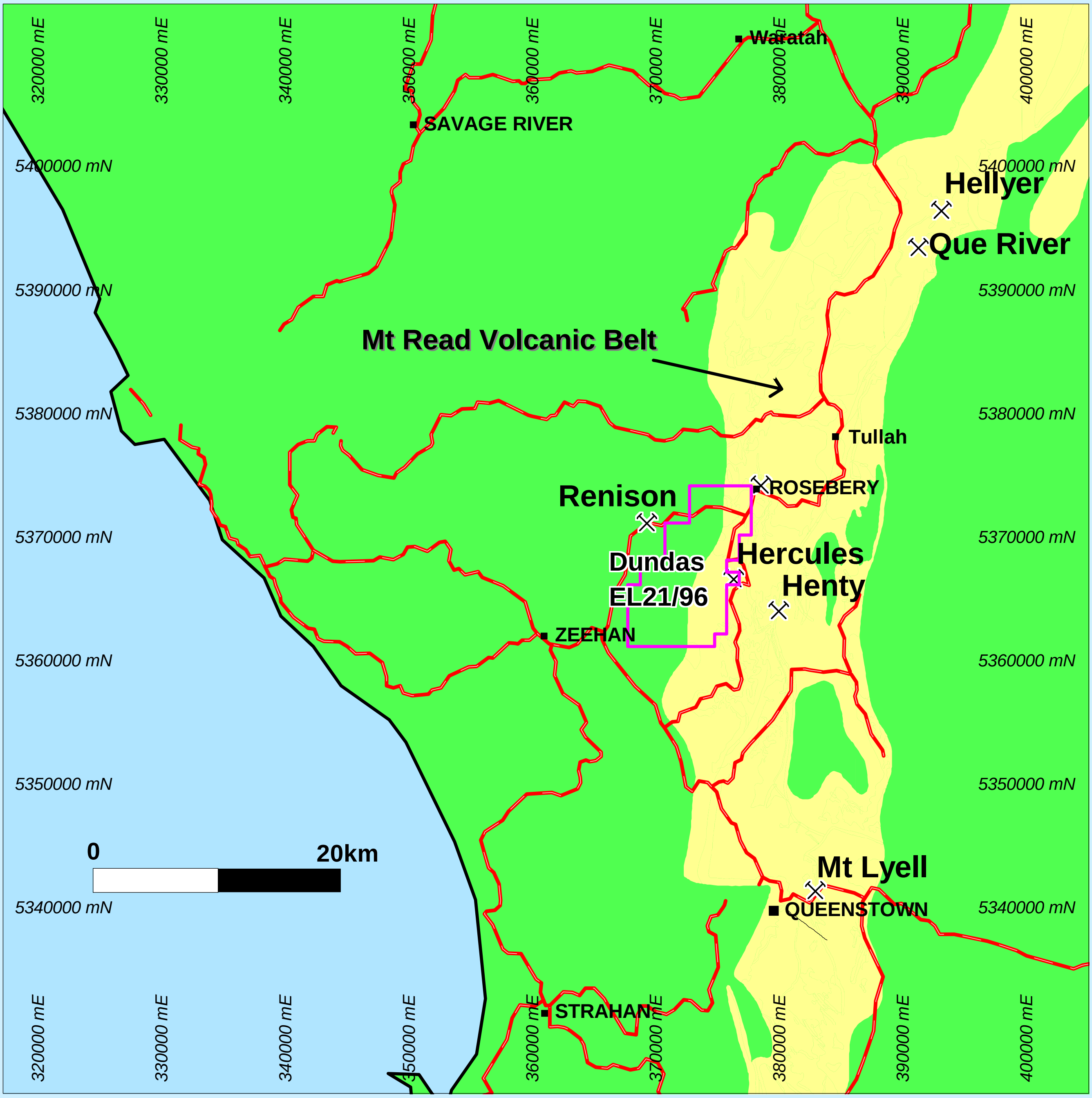
9 REFERENCES

Silic, J., 2000, Interpretation Report TDEM Survey at Chamberlain and Jupitor Prospect for Pasminco Limited Rosebery Mine, Pasminco Exploration Rosebery Report No. RML152

PASMINCO
EXPLORATION

Figure 1.
Dundas EL 21/96
Location Diagram



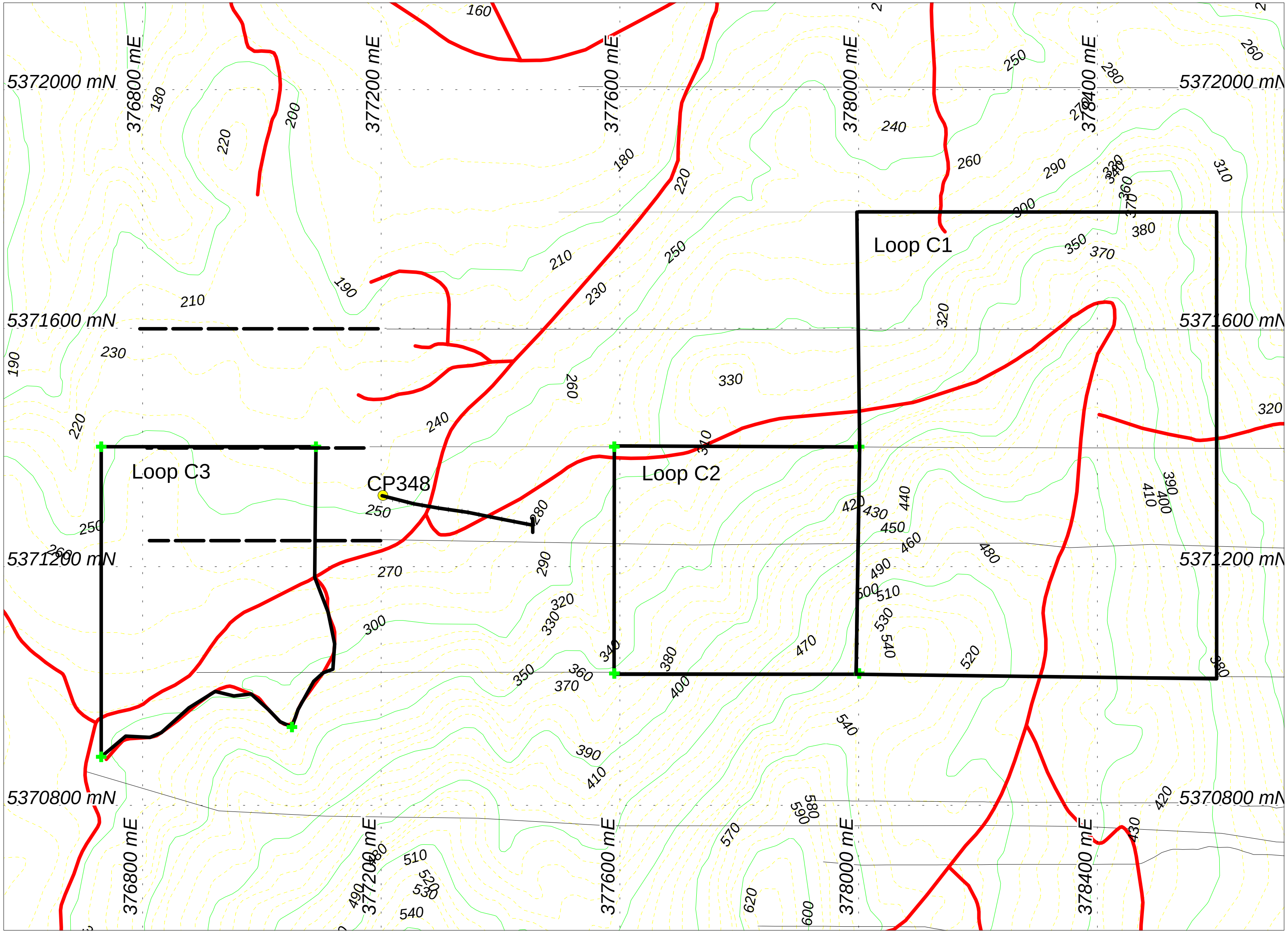


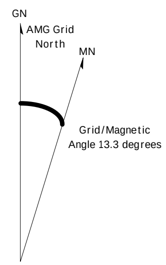
Scale 1:500,000

Compiled by C Dauth July 2000

PASMINCO EXPLORATION

Figure 2
Chamberlain Prospect
DHEM Design
Location Plan





Legend

- Drill-hole Collar
- Existing grid line (South Rosebery Grid)
- DHEM transmitter loop

Scale 1: 10,000

0 100 200 500 1000m

Distances in metres

Projection: UTM

Datum: AGD84

Zone: 55

By C Dauth *July 2000*

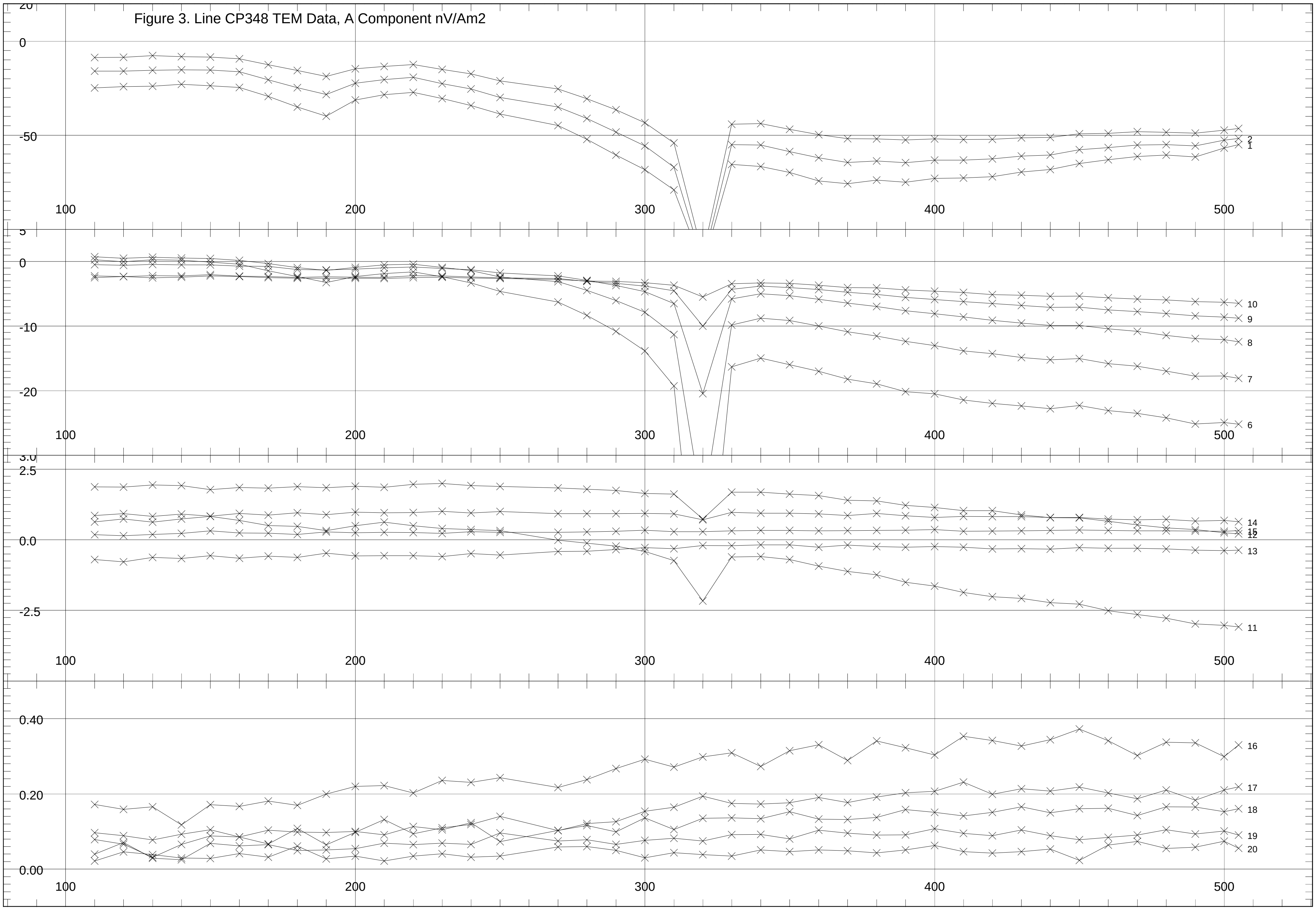


Figure 3. Line CP348 TEM Data, A Component nV/Am2
20
0
-50
100
200
300
400
500
2
1
5
0
-10
-20
10
9
8
7
6
3.0
2.5
0.0
-2.5
14
15
12
13
11
0.40
0.20
0.00
16
17
18
19
20

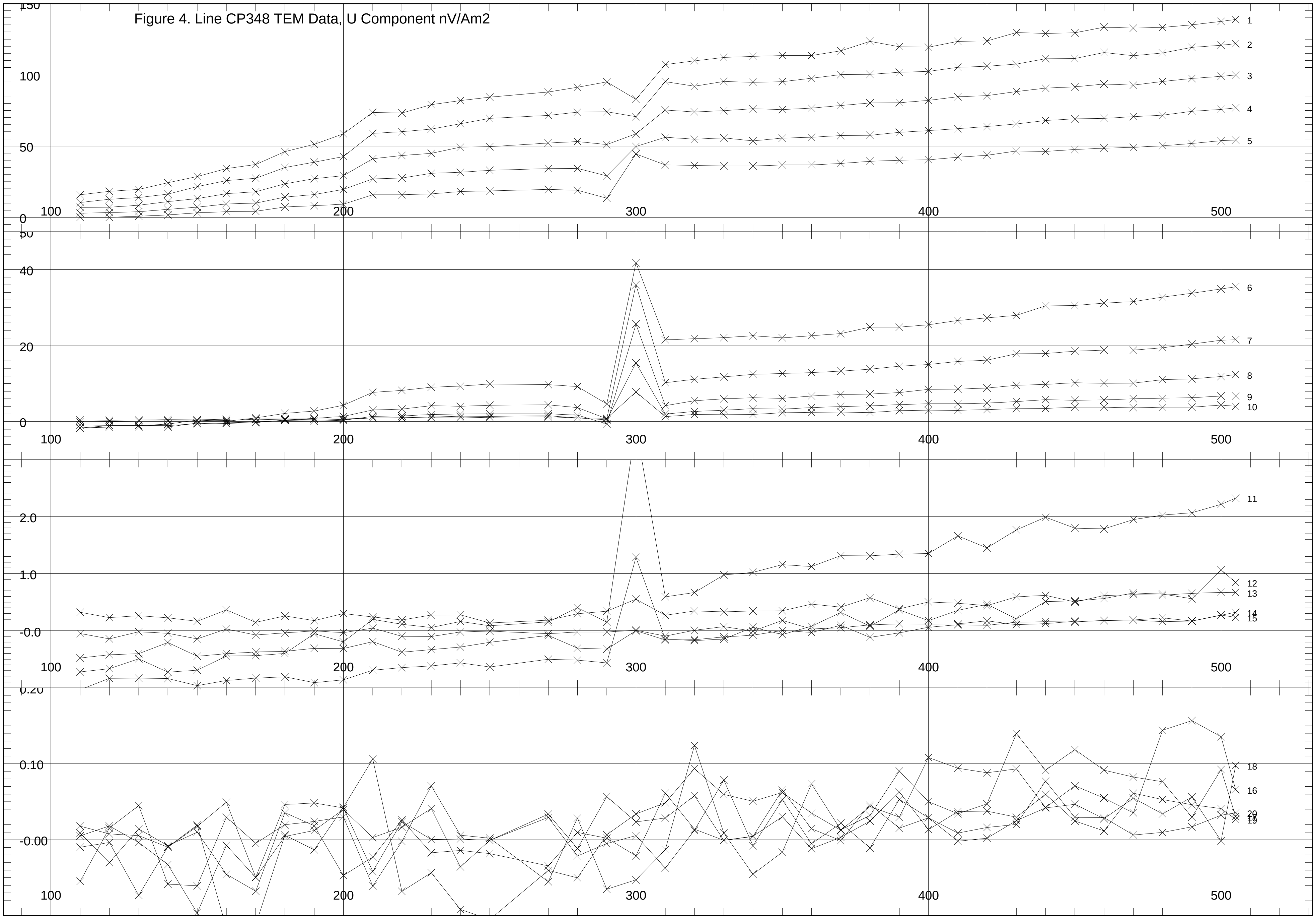


Figure 4. Line CP348 TEM Data, U Component nV/Am2
150
100
50
0
100
200
300
400
500
1
2
3
4
5
50
40
20
0
6
7
8
9
10
2.0
1.0
-0.0
11
12
13
14
15
0.20
0.10
-0.00
18
16
20
19

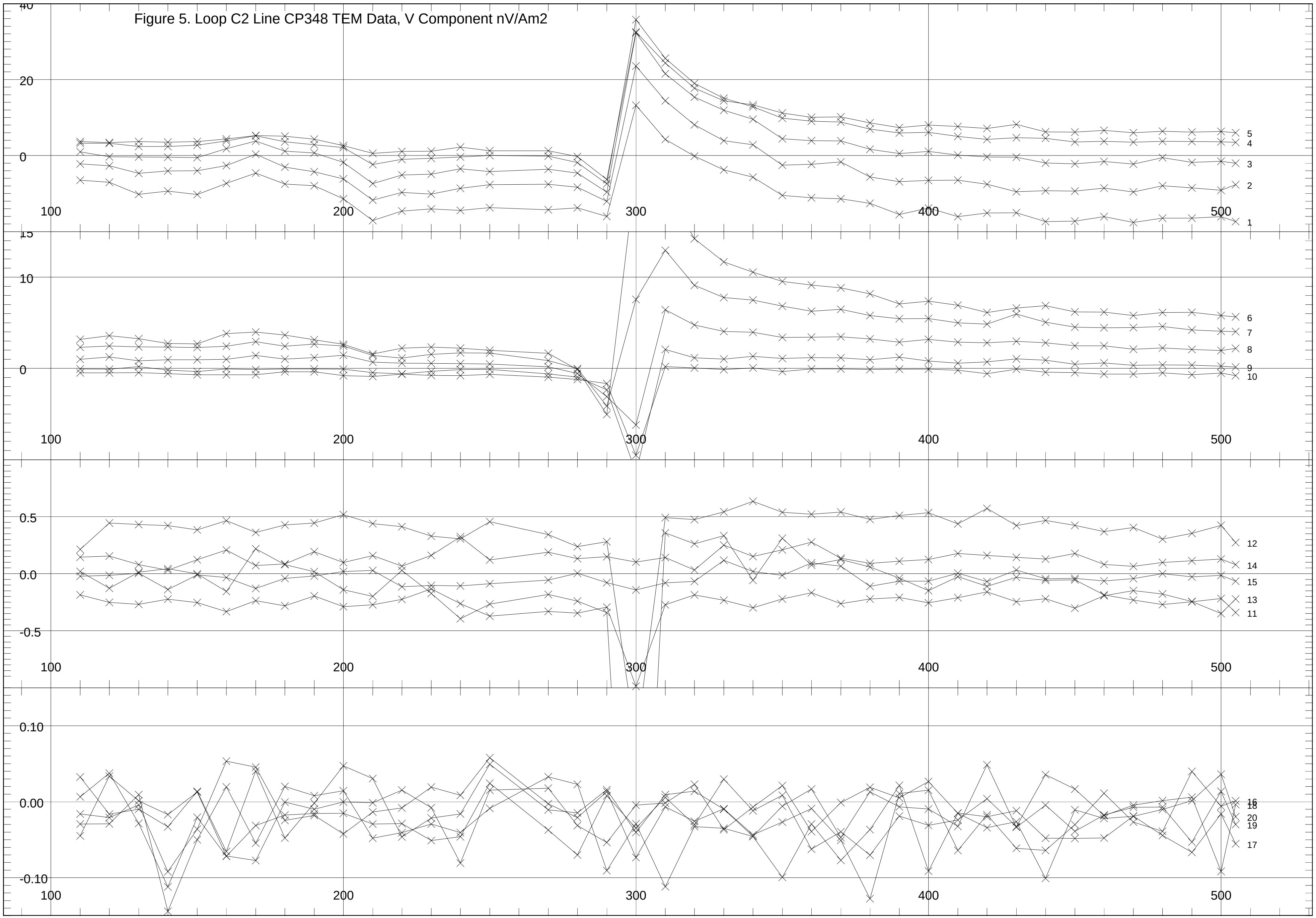


Figure 5. Loop C2 Line CP348 TEM Data, V Component nV/Am2
40
20
0
100
200
300
400
500
1
2
3
4
5
15
10
0
6
7
8
9
10
0.5
0.0
-0.5
11
12
13
14
15
0.10
0.00
-0.10
16
17
18
19
20

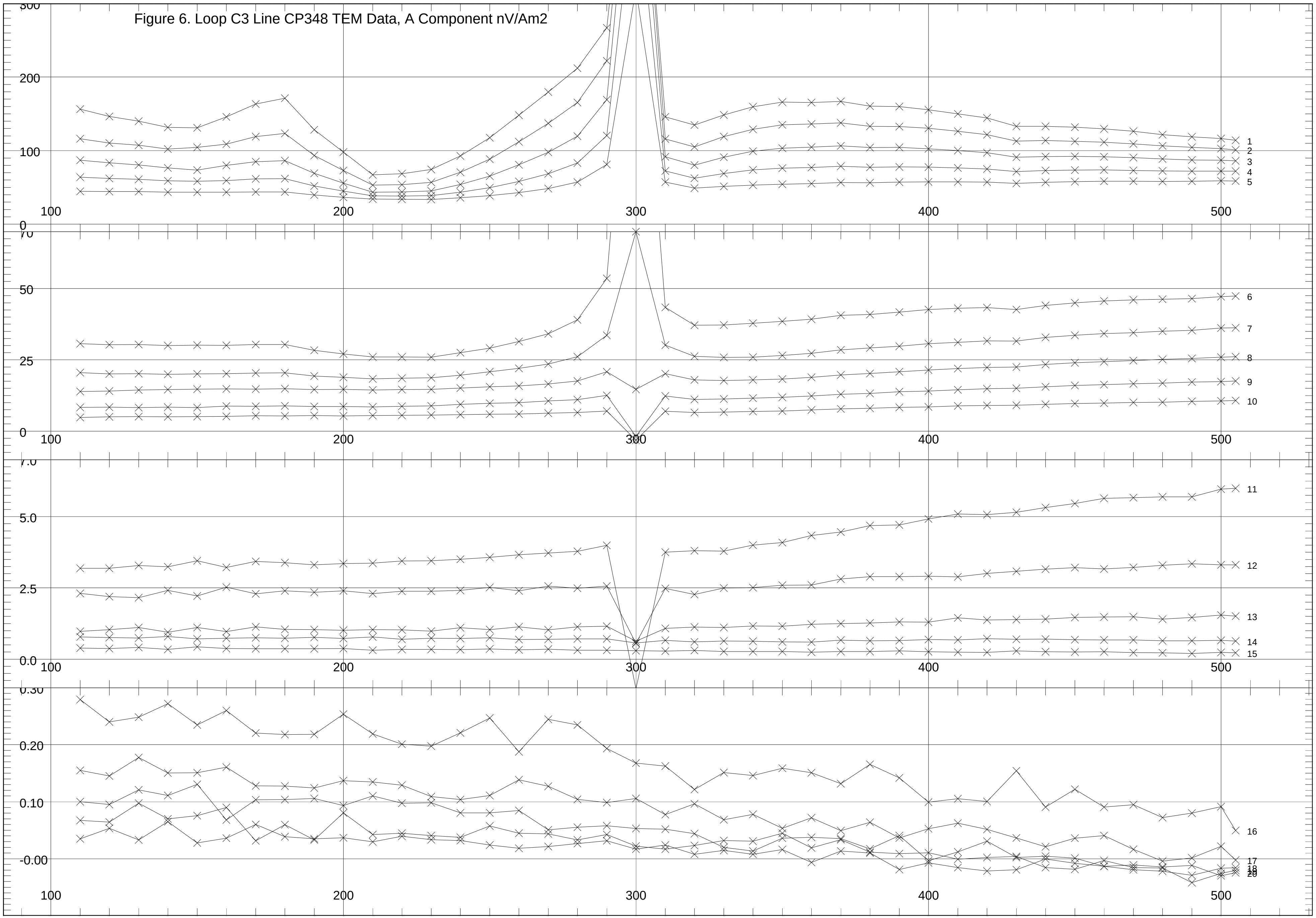


Figure 6. Loop C3 Line CP348 TEM Data, A Component nV/Am2

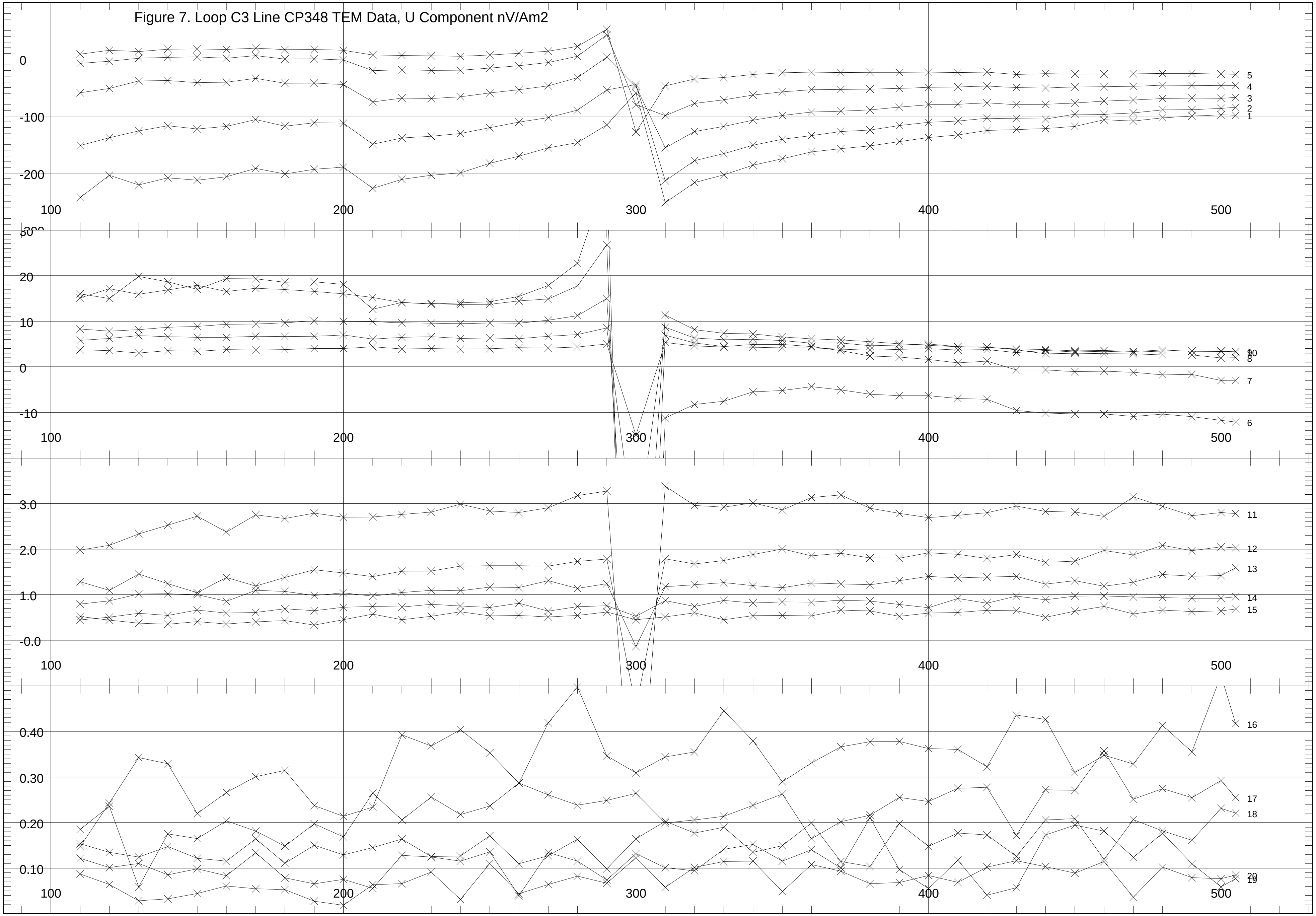


Figure 7. Loop C3 Line CP348 TEM Data, U Component nV/Am2

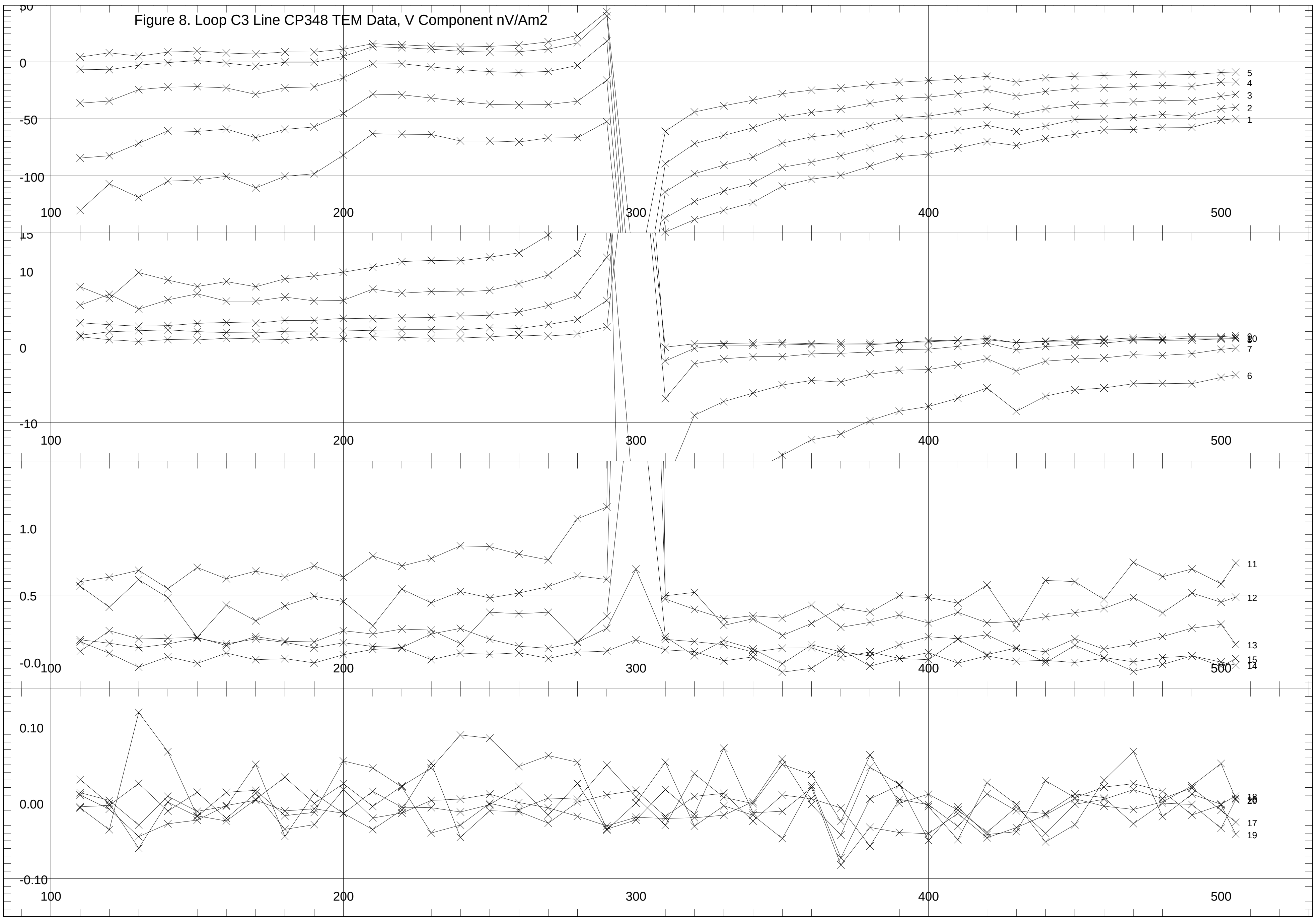


Figure 8. Loop C3 Line CP348 TEM Data, V Component nV/Am2
50
0
-50
-100
100
200
300
400
500
5
4
3
2
1
15
10
0
-10
8
10
7
6
1.0
0.5
-0.0
11
12
13
15
14
0.10
0.00
-0.10
18
20
17
19