

CR 8540

**FINAL REPORT FOR
EXPLORATION LICENCE 9091**

JUMPUP CREEK

**FOR THE PERIOD
29 MAY 1995 TO 7 MARCH 1996**

McARTHUR BASIN, NT

M W RENNISON

MAY 1996

Sheet Reference: Mount Young (SD53-15)

CR916/423.

Tenement EL9091 is held by:

**BHP MINERALS PTY LTD
Level 3
3 Plain Street
EAST PERTH WA 6004**

SUMMARY

This report details the exploration completed by BHP Minerals Pty Ltd (BHP) for sediment-hosted base metal mineralisation on Exploration Licence 9091, JUMPUP CREEK during the period 29 May 1995 to 7 March 1996. The tenement area lies within the Batten Trough in the mid-Proterozoic McArthur Basin.

Two weak TEM anomalies were identified during a re-interpretation of a QUESTEM airborne TEM survey flown previously by BHP.

A single line of moving-loop ground TEM was completed over each anomaly.

Limited geochemical sampling was conducted around each anomaly.

The ground TEM and geochemical sampling failed to provide a target deemed worthy of drill testing and the tenement was surrendered before the first anniversary.

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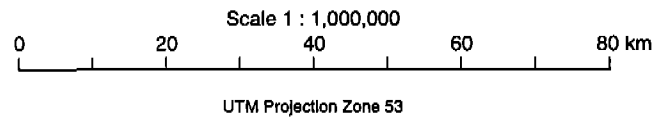
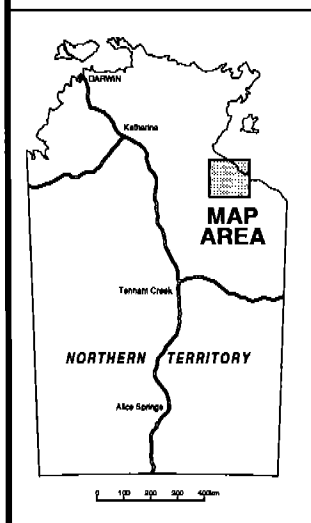
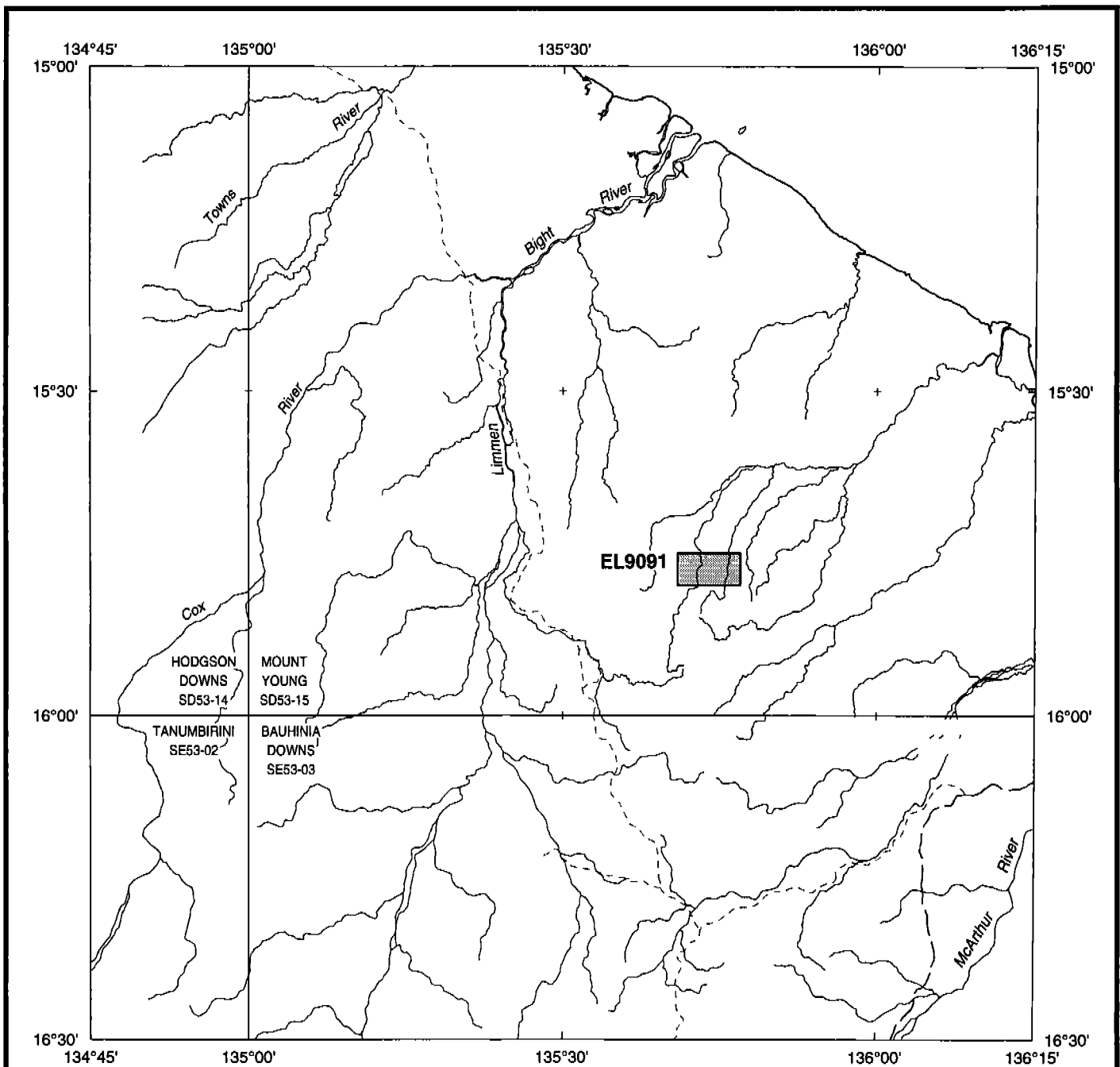
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Prepared : M.Rennison
 Drawn : R.J.Clark
 Date : 9.5.96
 Revised :



Exploration - BHP Minerals
 BHP Minerals Pty. Ltd., A.C.N. 006 694 762

NORTHERN PLATFORMS
BATTEN PROJECT - EL9091 JUMPUP CK., N.T.
LOCATION OF RELINQUISHED TENEMENT

Centre : Perth
 Drg. No. : A4-5923
FIGURE 1

1. INTRODUCTION

This report details work carried out by BHP Minerals Pty Ltd (BHP) for sediment-hosted base metal mineralisation on exploration licence JUMPUP CREEK (EL9091) for the period 29 May 1995 to 7 March 1996. The tenement is located within the Batten Trough in the mid-Proterozoic McArthur Basin, an area considered prospective for sediment-hosted base metal mineralisation.

Base metal exploration consisted of Open File data evaluation, moving-loop ground TEM profiling and geochemical sampling.

1.1 Tenement Status

EL9091 was granted to BHP on 29 May 1995 for a period of six years. The tenement was voluntarily surrendered on to 7 March 1996. Total expenditure for EL9091 was \$21,118. Details of expenditure are presented in Appendix 1.

1.2 Location and Access

EL9091 is located approximately 70 km northwest of Borroloola, Northern Territory (Fig. 1). The tenement falls within the Mount Young (SD 53-15) 1:250,000 map sheet and the Tawallah Range (6066) 1:100,000 map sheet.

Access to EL9091 is extremely poor and all exploration activities were helicopter supported.

1.3 Physiography

EL9091 lies at the northern end of the Tawallah Range. The tenement area is dominated by three large sandstone ridges that reach a maximum elevation of 200 m. The intervening valleys have an elevation of approximately 80 m. Open Eucalypt and

Acacia woodland is the dominant vegetation type. Local thickets of Eucalyptus, Paperbark and Pandanus Palm occur along the more substantial drainage courses.

Little Rosie and Jumpup Creeks are the principal drainages in the area, and run south to north through the tenement. For most of the year, these creeks are dry, occurring as a series of isolated billabongs. Flooding commonly occurs during the summer months.

The climate is monsoonal with hot humid summers and mild dry winters. The average rainfall is 700 mm.

1.4 Previous Work

Ashton Mining explored the area for diamonds in the early 1990s and through a Joint Venture BHP explored the same area for base metals and manganese. Exploration undertaken by BHP included stream sediment, soil and rock chip sampling, a large airborne TEM (QUESTEM) survey, ground TEM and drilling.

A major reinterpretation of BHP's Mount Young QUESTEM survey was undertaken in early 1995. This survey was flown over the Towns and Nathan River areas in mid-1992 in an effort to detect bedrock conductors related to manganese and base metal mineralisation. The first interpretation of the survey was biased towards high conductance anomalies. The reinterpretation was biased towards lower conductance anomalies adjacent to major structures and hosted by McArthur and Nathan Group stratigraphy.

Two anomalies, MY57 and MY58, were selected for ground TEM follow-up on EL9091.

1.5 Rehabilitation

All exploration by BHP was of a nature that caused no ground disturbance and no rehabilitation has been required.

2. GEOLOGY

The tenement lies in the central west part of the north trending Batten Trough, thought to be a syndepositional half graben within the mid-Proterozoic McArthur Basin (Jackson *et al.*, 1987).

The McArthur Basin sequence is divided into four groups, each separated by a regional unconformity: the basal Tawallah Group, which consists mainly of quartz sandstone with subordinate volcanics, carbonates and shales; the McArthur Group, which consists of evaporitic carbonate and interbedded shale with subordinate sandstone and chert; the Nathan Group, which consists of dolostone, sandstone, chert and shale; and the Roper Group, which consists of alternating sandstone and shale (Jackson *et al.*, 1987).

Mid-Proterozoic rocks outcrop in two east-dipping blocks separated by the NNE trending Rosie Fault. The eastern block contains the oldest rocks within EL9091 that belong to the Yiyintyi Sandstone, the lowermost unit of the Tawallah Group. Mafic lava flows of the Seigal Volcanics overlie the Yiyintyi Sandstone and these are in turn overlain by the Sly Creek Sandstone. These units are overlain by the Aquarium Formation and the Wununmantlyala Sandstone. The western block has outcropping Wununmantlyala Sandstone which is unconformably overlain by the Masterton Sandstone and Mallapunyah Formation, both belonging the McArthur Group. Some Cretaceous and Cainozoic sediments have been deposited within the principal drainage valleys.

Structurally, the tenement area is dominated by the NNE-trending Rosie Fault and a series of small NNW-trending branch faults.

3. GEOPHYSICS

A single east-west orientated line 1.2 km long was centred over QUESTEM anomalies MY57 and MY58. Both anomalies were profiled with 200 m moving-loop PROTEM. Survey details are shown in Table 1 and electrical data are presented in Appendix 2

TABLE 1

MOVING LOOP TEM SURVEY LOGISTICS

Contractor.....	Geoterrex Pty Ltd
Instrument.....	PROTEM receiver/TEM 37 transmitter
Loop Size Configuration	200 x 200 metres/moving
Base Frequency	25 Hz
Receiver Spacing.....	50 m
No. of Channels.....	20
Receiver Components.....	2
Coverage.....	MY57 1 line 200 m loop
	MY58 1 line 200 m loop

Ground TEM data over MY57 indicate a flat-lying weak bedrock conductor of approximately 1 Seimen at a depth of 180 m to the top of the conductor. The conductive package is approximately 60 m thick.

Ground TEM data over MY58 indicate an east dipping, weak bedrock conductor that increases in thickness but decreases in conductance to the east.

4. GEOCHEMISTRY

Helicopter supported geological reconnaissance was completed over both QUESTEM anomalies. Ten stream sediment and two rock chip samples were collected. Sample locations are shown in Figure 2. Samples were submitted to Analabs, Townsville for analysis. Analytical methods and results are presented in Appendix 3.

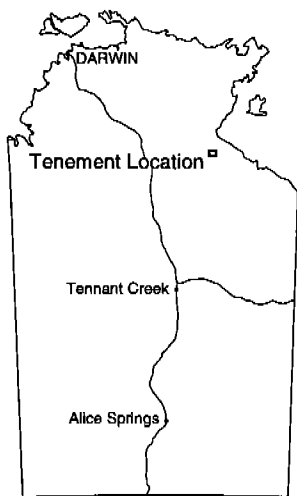
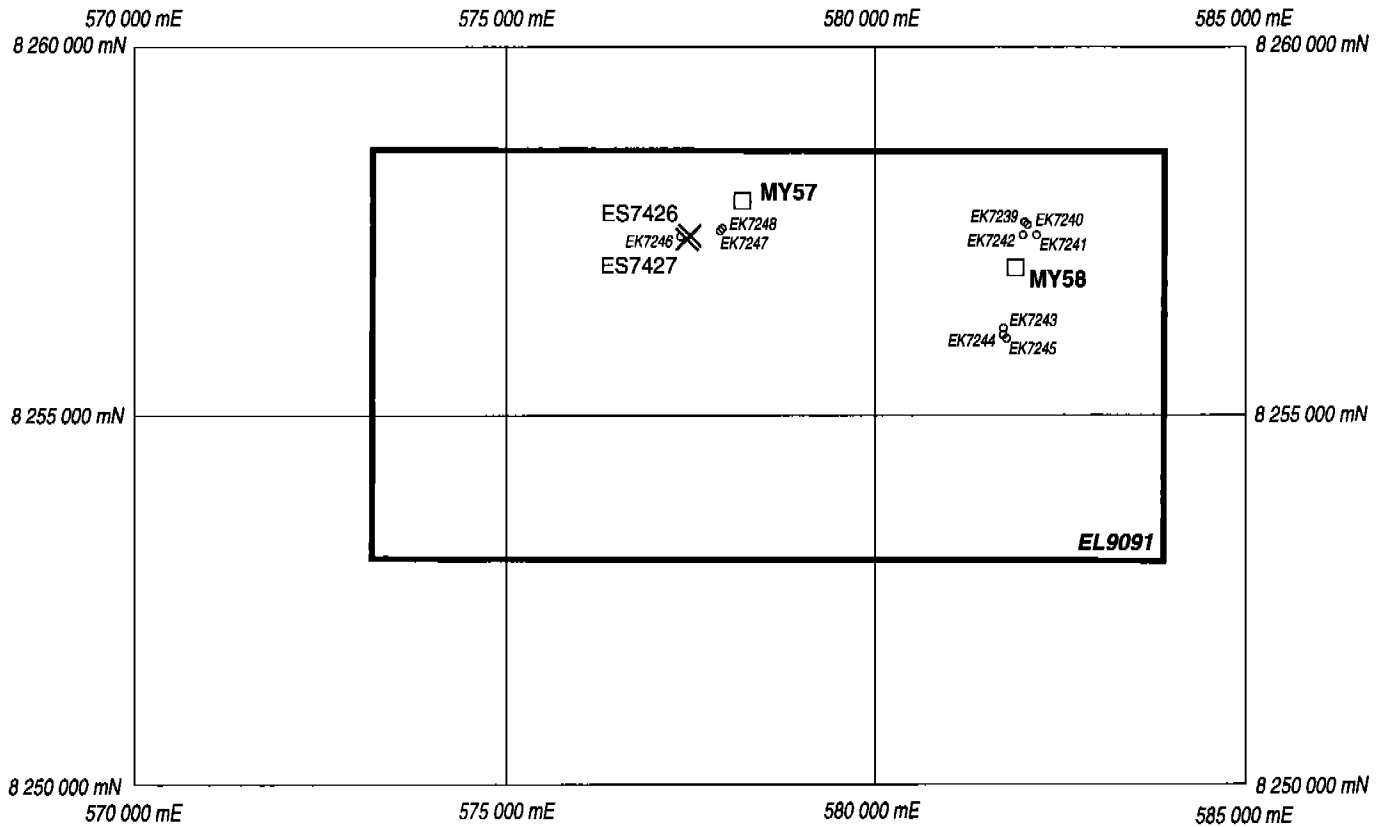
No sample returned significantly elevated base metal values.

5. CONCLUSIONS AND RECOMMENDATIONS

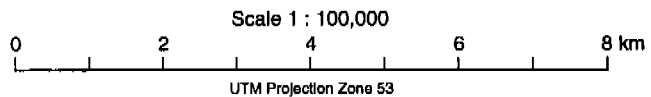
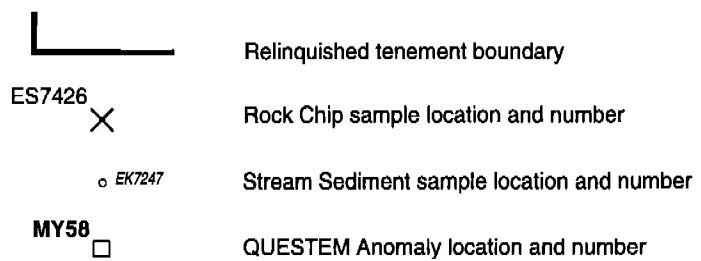
Re-interpretation of a previously flown airborne TEM survey indicated two weak anomalies within EL9091. A moving-loop ground TEM profile over each anomaly TEM and geochemical sampling failed to provide a target deemed worthy of drill testing. No further work is recommended on EL9091.

6. REFERENCES

JACKSON, M.J., MUIR, M.D. and PLUMB, K.A., 1987. Geology of the southern McArthur Basin, Northern Territory. Bureau of Mineral Resources, Bulletin 220.



LOCATION MAP



Mt Young SD53-15 1 : 250 000 Sheet

Prepared : M.Rennison
 Drawn : R.J.Clark
 Date : 9.5.96
 Revised :



Exploration - BHP Minerals
 BHP Minerals Pty. Ltd., A.C.N. 008 694 782
 NORTHERN PLATFORMS PROGRAM
 BATTEN PROJECT - JUMPUP CREEK EL9091

Centre : Perth
 Drg. No. : A4-5924

QUESTEM Anomalies and Geochemical Samples

FIGURE 2

APPENDIX 1
EXPENDITURE

E9091 - JUMPUP CREEK

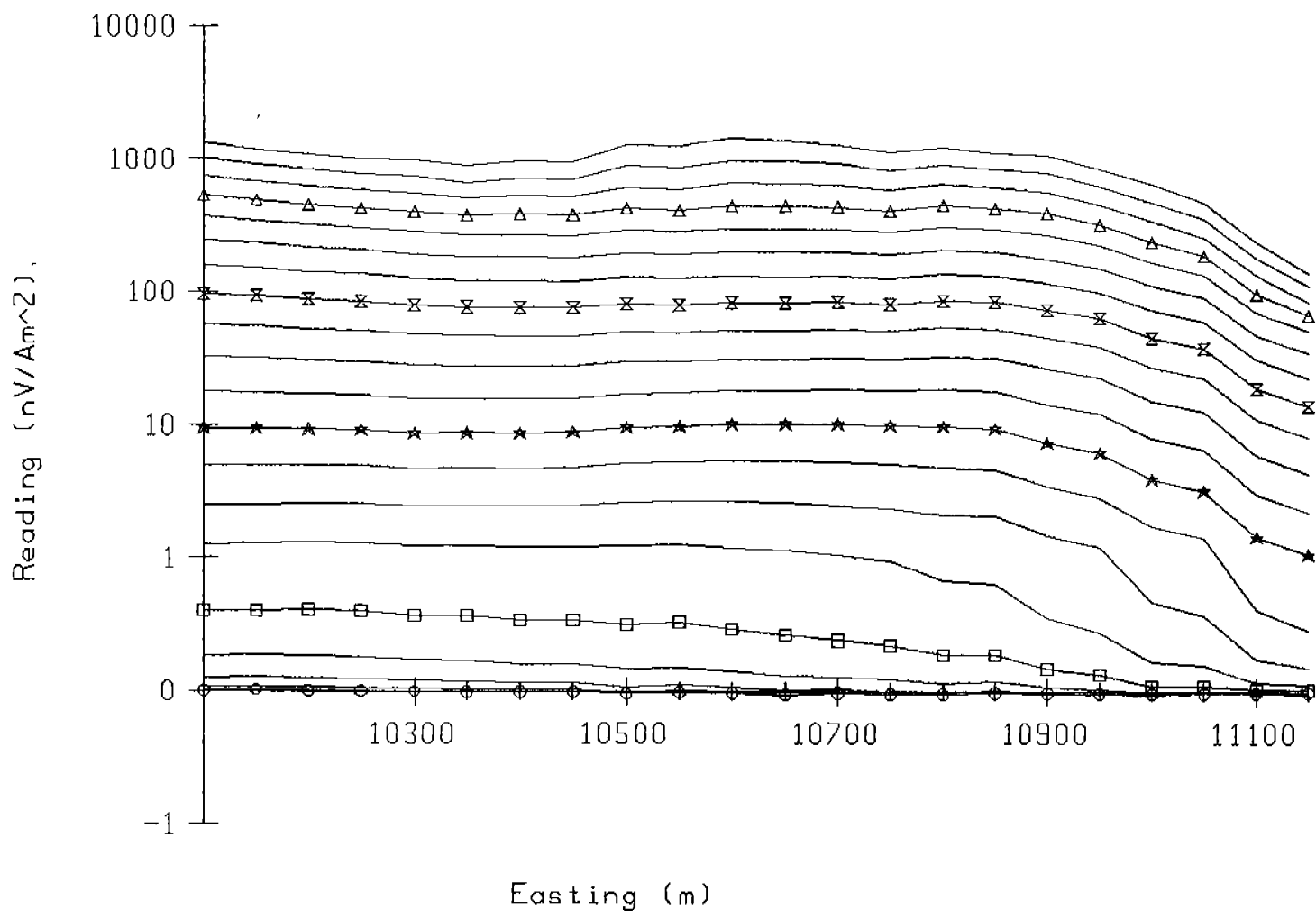
29 May 1995 to 7 March 1996

Wage and Salaries	1,263
Field Support	364
Aircraft Charter	5,977
Geochemistry	117
Geophysics	9,406
Office Expenses	237
Consultants	234
Sub-Total	17,598
20% of Total for Corporate Overheads	3,520
TOTAL	\$21,118

REF: U:\RICHARDS\SEC\GREGS\EXPEND\0028.DOC

APPENDIX 2
GROUND TEM DATA

MY57: Line 10000N: Rx=Z: F=P25 CH= 1-20



SDOUNDING: 10100 : Vers 1
Mt Young MY57 - 10000N 10100E

10100A1

* 153 ohm.m * 106 m.

* 153

106 m.

73.8 ohm.m 69.3 m.

73.8

* 178 m.

352 ohm.m 259 m.

352

434 m.

(1499 ohm.m)

(1499)

STD ERR= 1.5% : S= 2 S

E= 2%

S= 25

Sounding 10100 : Ver 1

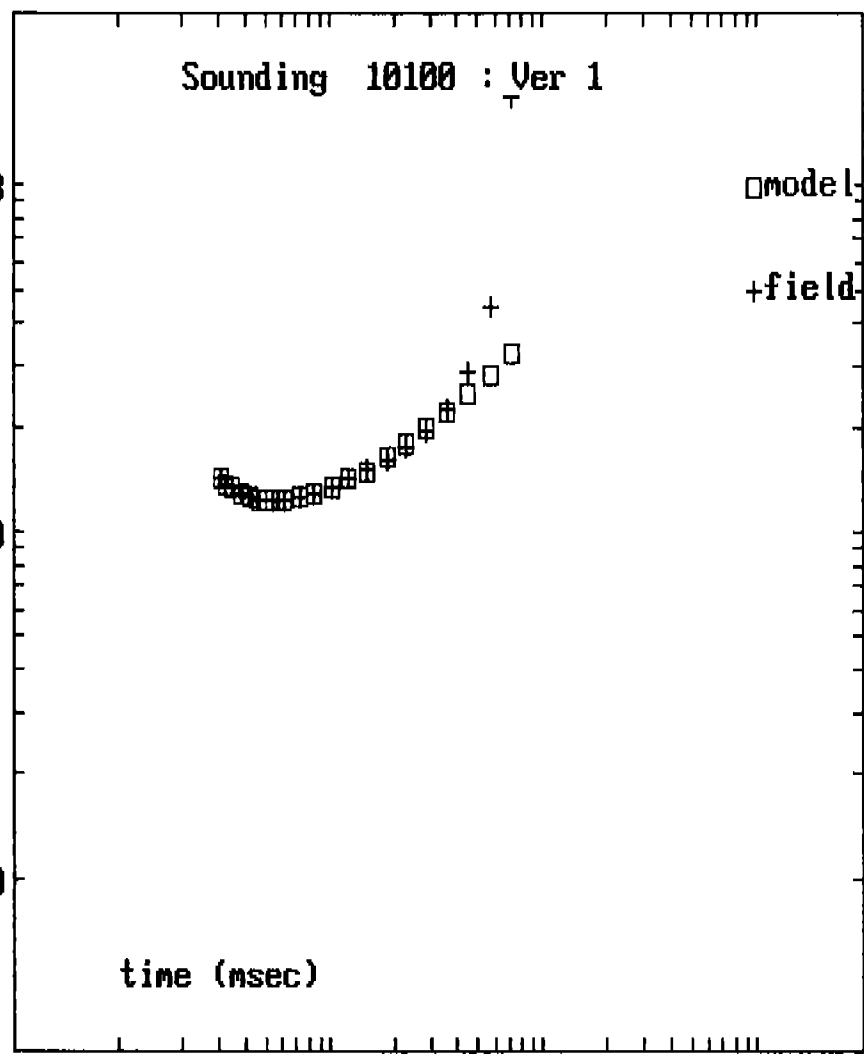
t
r
u
e
a
p
p
r
e
s

1e3
100
10

□ model
+ field

time (msec)

.1 1 10 100



SOUNDING: 10300 : Vers 1
Mt Young MY57 - 10000N 10300E

10300A1

* 203 ohm.m 105 m.

* 203

105 m.

* 83.9 ohm.m (72.9 m.)

* 83.9

178 m.

171 ohm.m * 164 m.

171

* 342 m.

(4025 ohm.m)

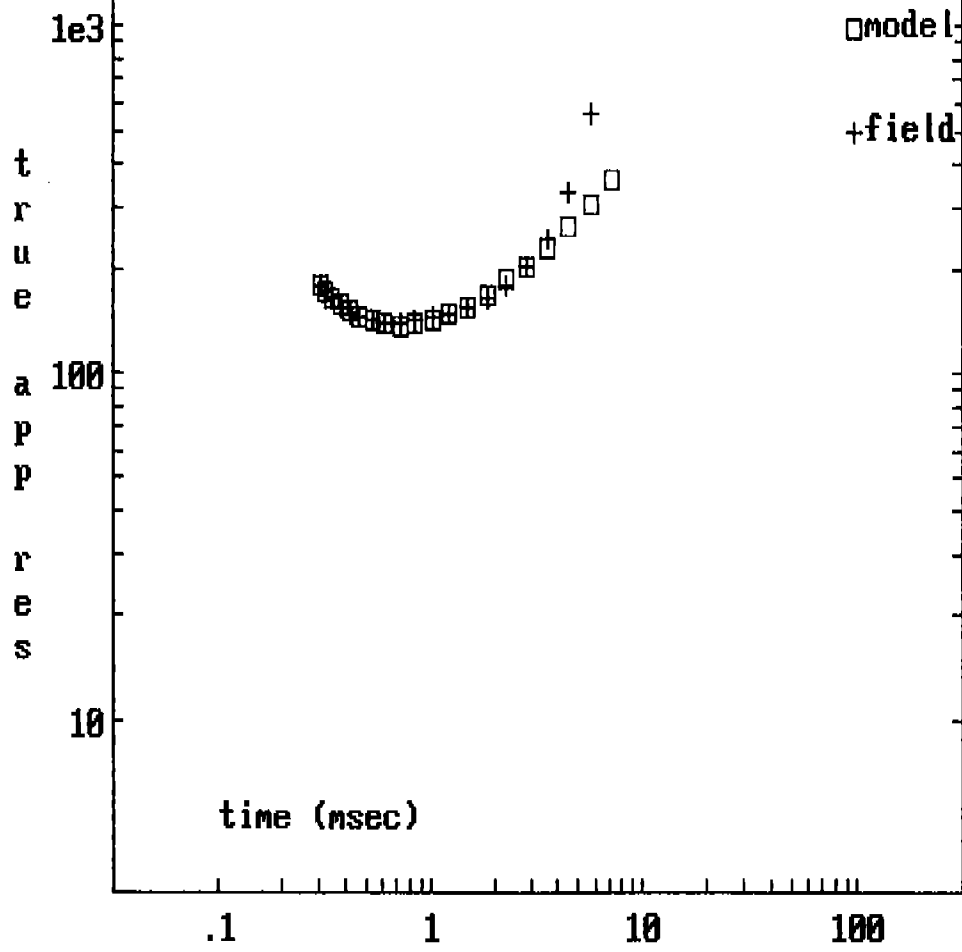
(4025)

STD ERR= 3.4% : S= 2 S

E= 3%

S= 25

Sounding 10300 : Ver 1



SOUNDING: 10500 : Vers 1
Mt Young MY57 - 10000N 10500E

10500A1

77.2 ohm.m 20.4 m. (20.4 m.)

77.2

* 210 ohm.m * 159 m.

* 210

_____ * 179 m.

55.0 ohm.m 66.2 m.

_____ 55.0

_____ * 245 m.

(1480 ohm.m)

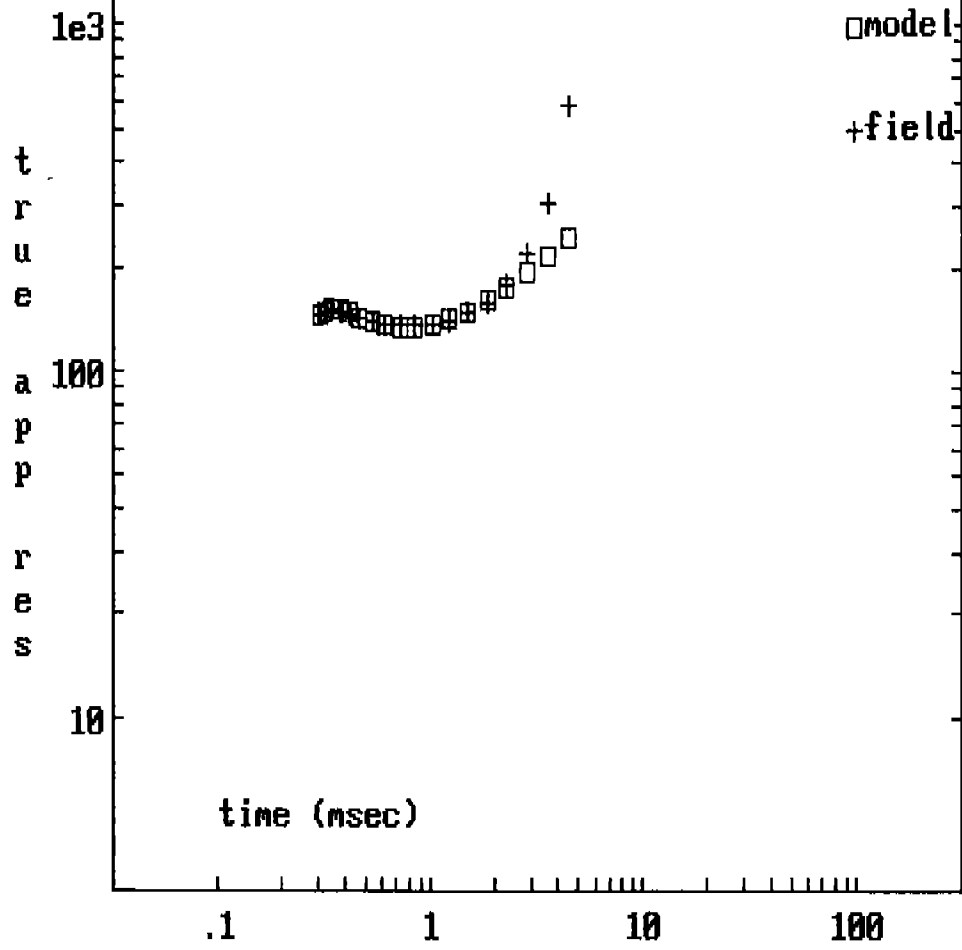
_____ (1480)

STD ERR= 1.6% : S= 2 S

E= 2%

S= 2S

Sounding 10500 : Ver 1



SDOUNDING: 10600 : Vers 1
Mt Young MY57 - 10000N 10600E

10600A1

51.4 ohm.m 17.8 m. 17.8 m.

51.4

288 ohm.m * 147 m.

288

-----* 165 m.

59.4 ohm.m 85.3 m.

59.4

-----* 251 m.

(1302 ohm.m)

(1302)

STD ERR- 1.1% : S- 2 S

Handwritten scribble

E= 1%
S= 2S

Sounding 10600 : Ver 1

1e3

□model

+field

t
r
u
e

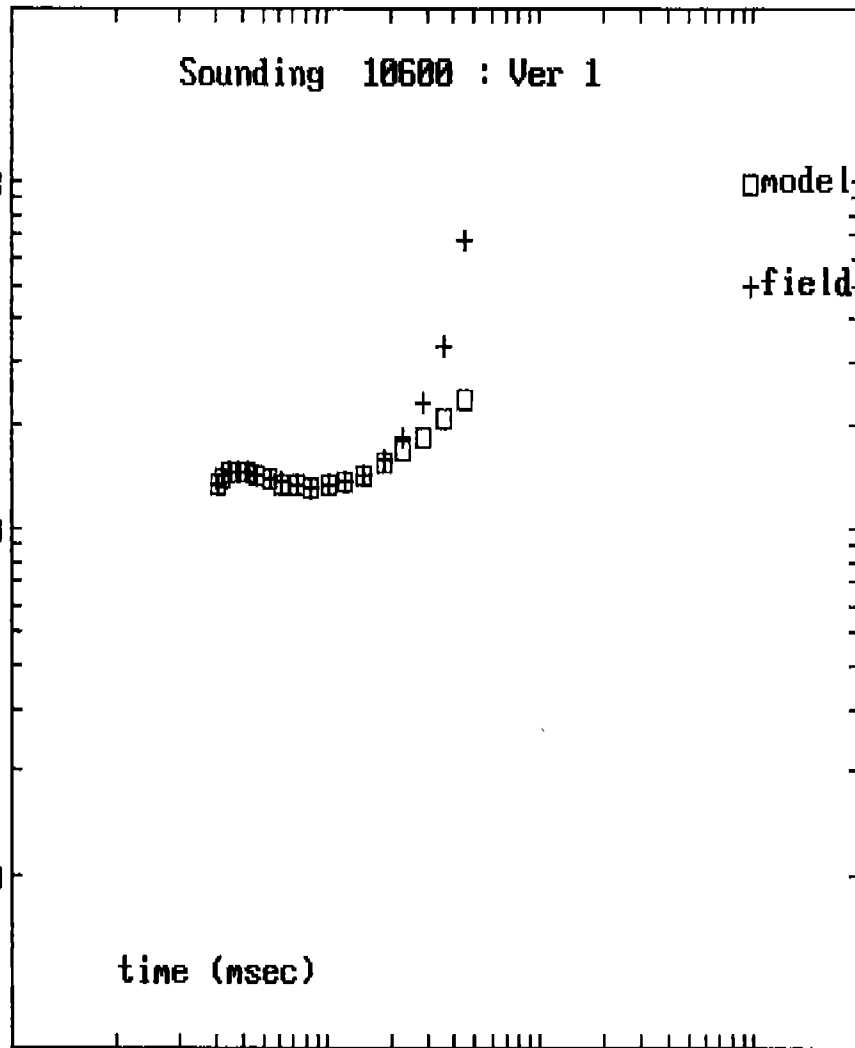
100

a
p
p
r
e
s

10

time (nsec)

.1 1 10 100



SOUNDING: 10700 : Vers 1
Mt Young MY57 - 10000N 10700E

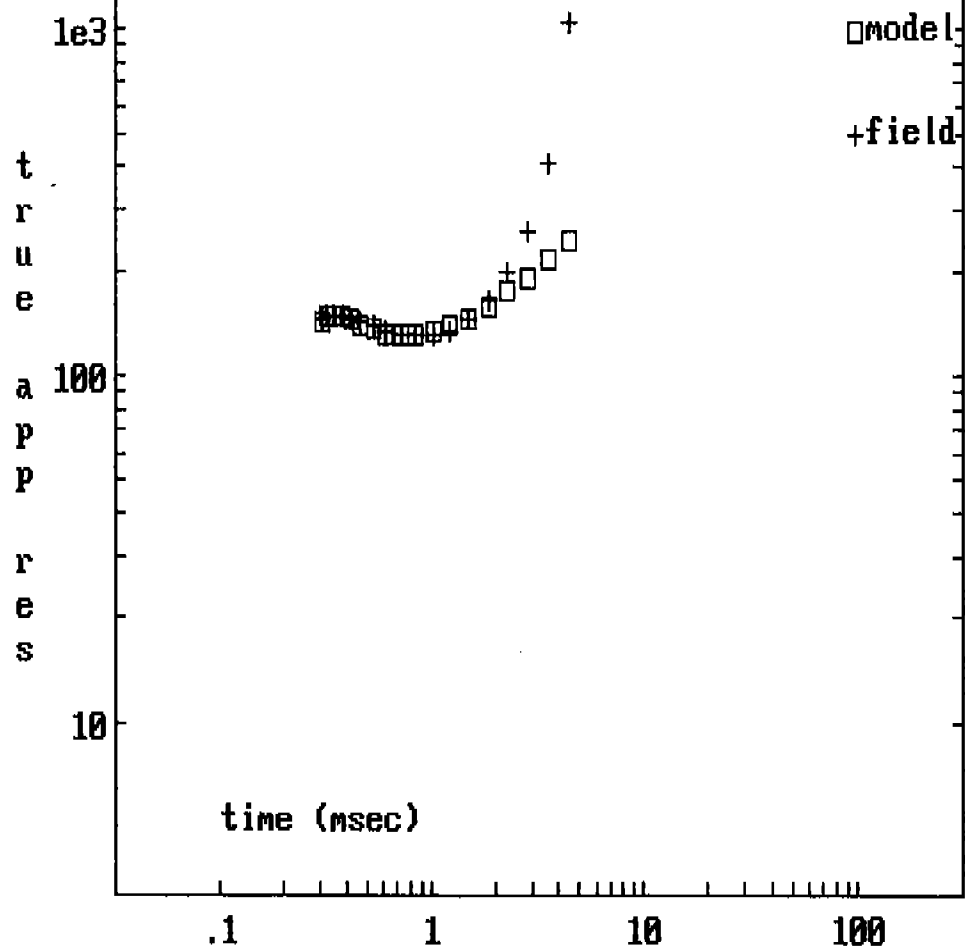
10700A1

53.9 ohm.m	* 17.2	17.2 m.	<u>53.9</u>
209 ohm.m	* 149	m.	209
-----*			-----
48.4 ohm.m	65.6	m.	48.4
-----*			-----
(1294 ohm.m)		226 m.	(1294)

STD ERR= 2.7% : S= 2 S

E= 3%
S= 25

Sounding 10700 : Ver 1



SOUNDING: 10800 : Vers 1
Mt Young MY57 - 10000N 10800E

10800A1

* 150 ohm.m * 180 m.

* 150

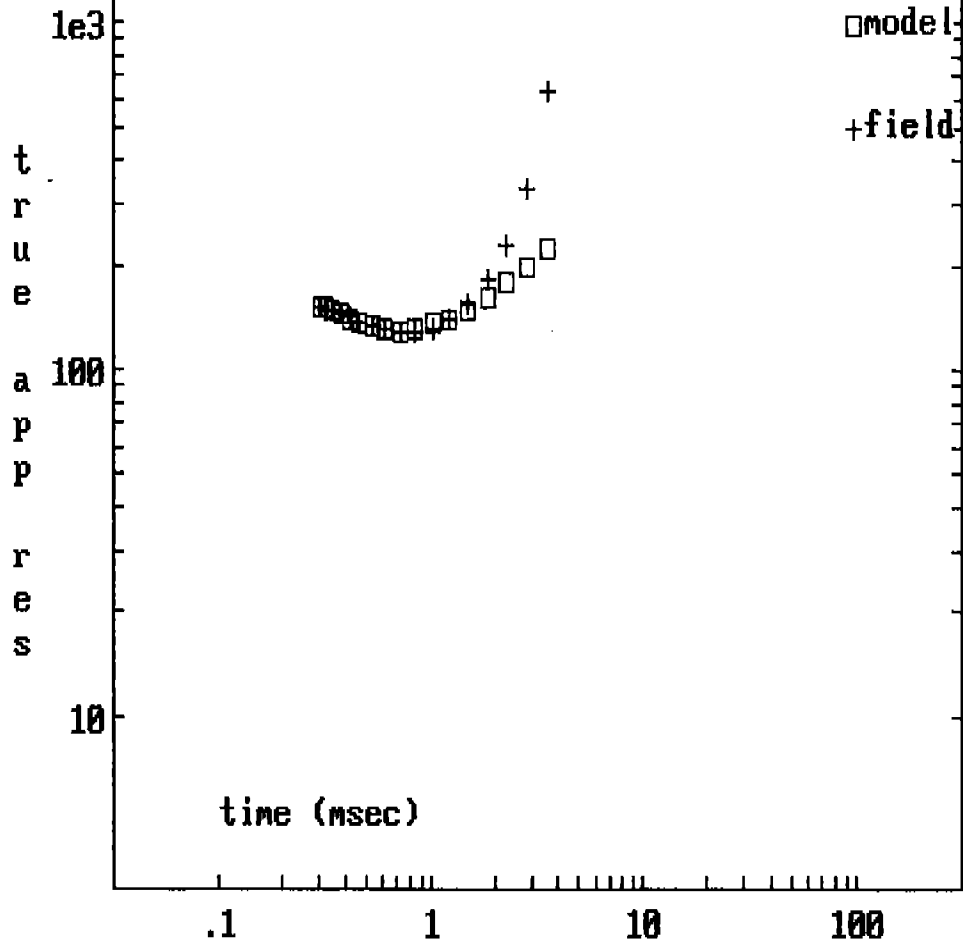
_____ * 180 m.
59.0 ohm.m 57.7 m.

_____ * 238 m.
(1780 ohm.m)

STD ERR= 2.5% ; S= 2 S

E= 3%
S= 25

Sounding 10800 : Ver 1



SOUNDING: 11000 : Vers 1
Mt Young MY57 - 10000N 11000E

11000A1

* 259 ohm.m * 182 m.

* 259

50.9 ohm.m * 182 m.
34.6 m. * 217 m.
(7905 ohm.m)

50.9

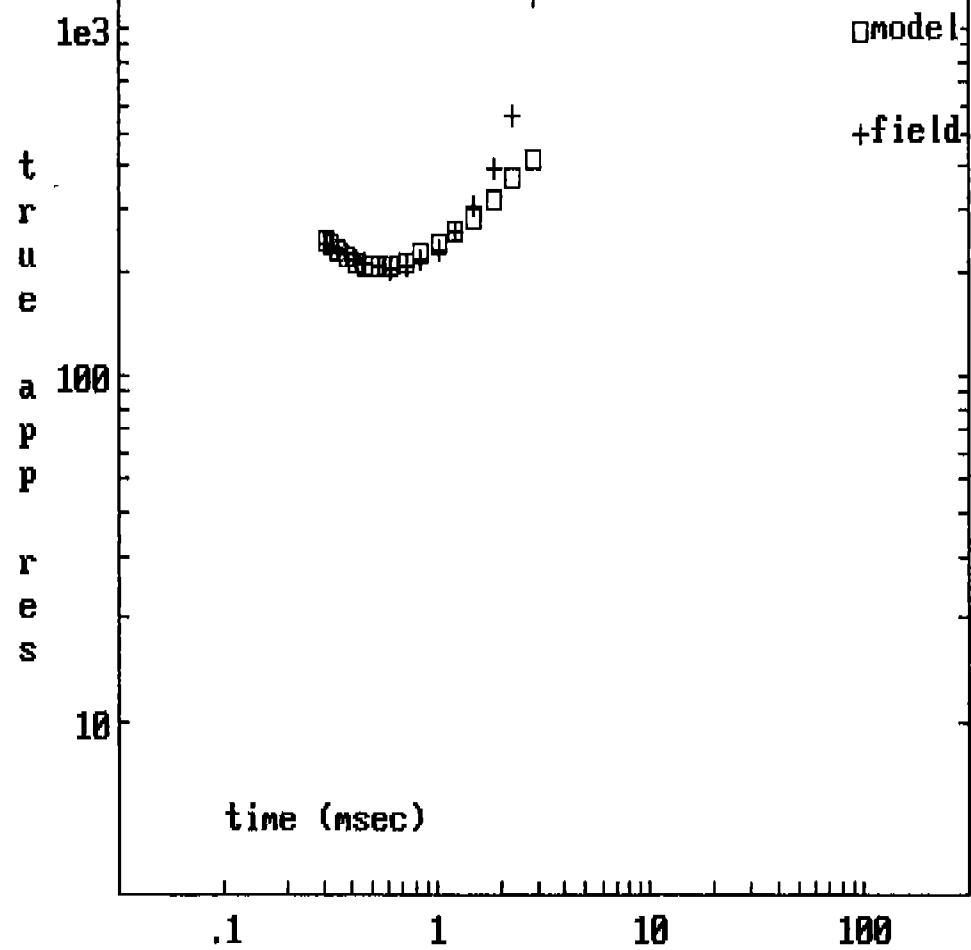
(7905)

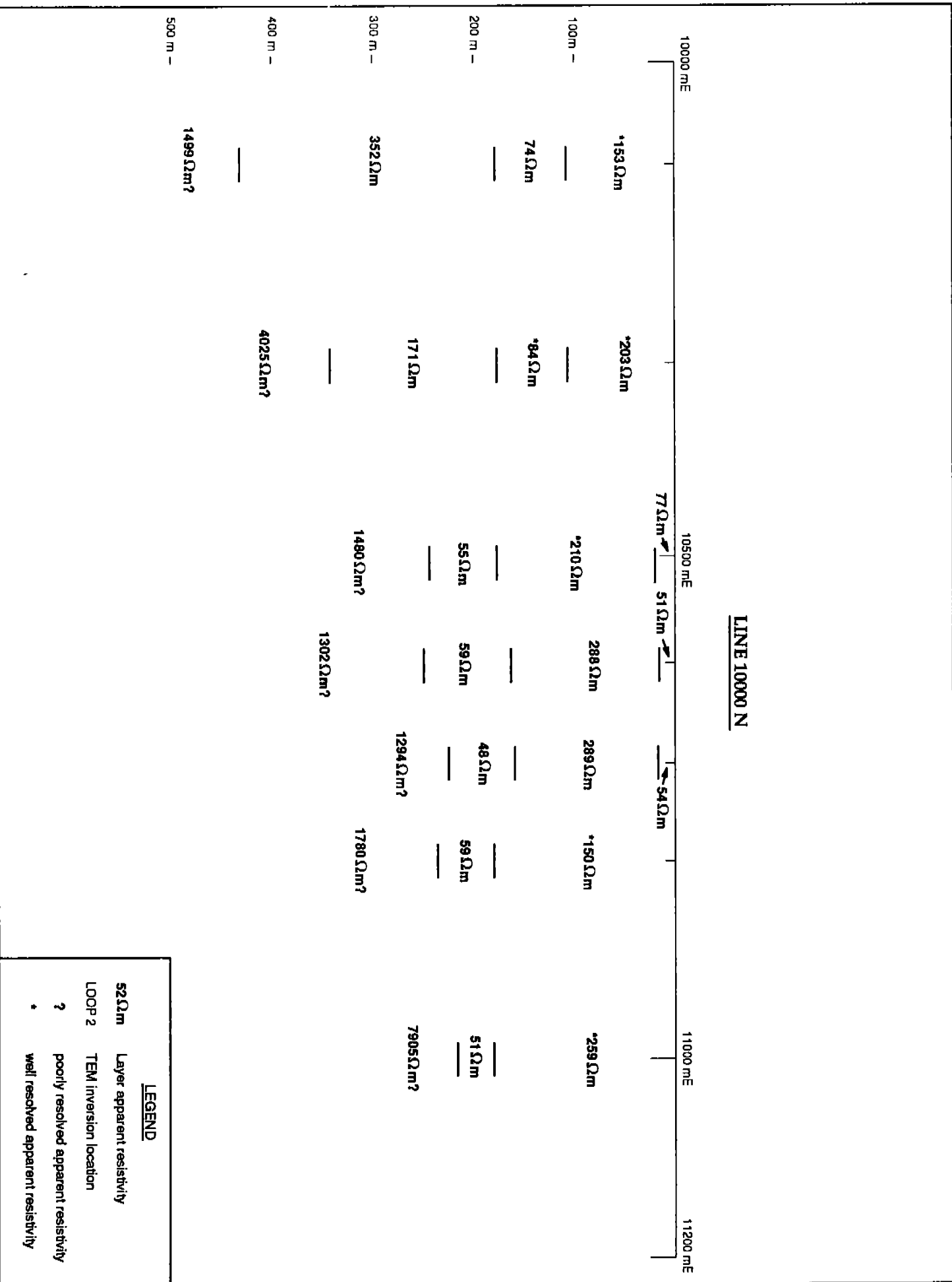
STD ERR= 5.2% : S= 1 S

E= 5%

S= 15


Sounding 11000 : Ver 1





LEGEND	
52 Ωm	Layer apparent resistivity
LOOP 2	TEM Inversion location
?	poorly resolved apparent resistivity
*	well resolved apparent resistivity

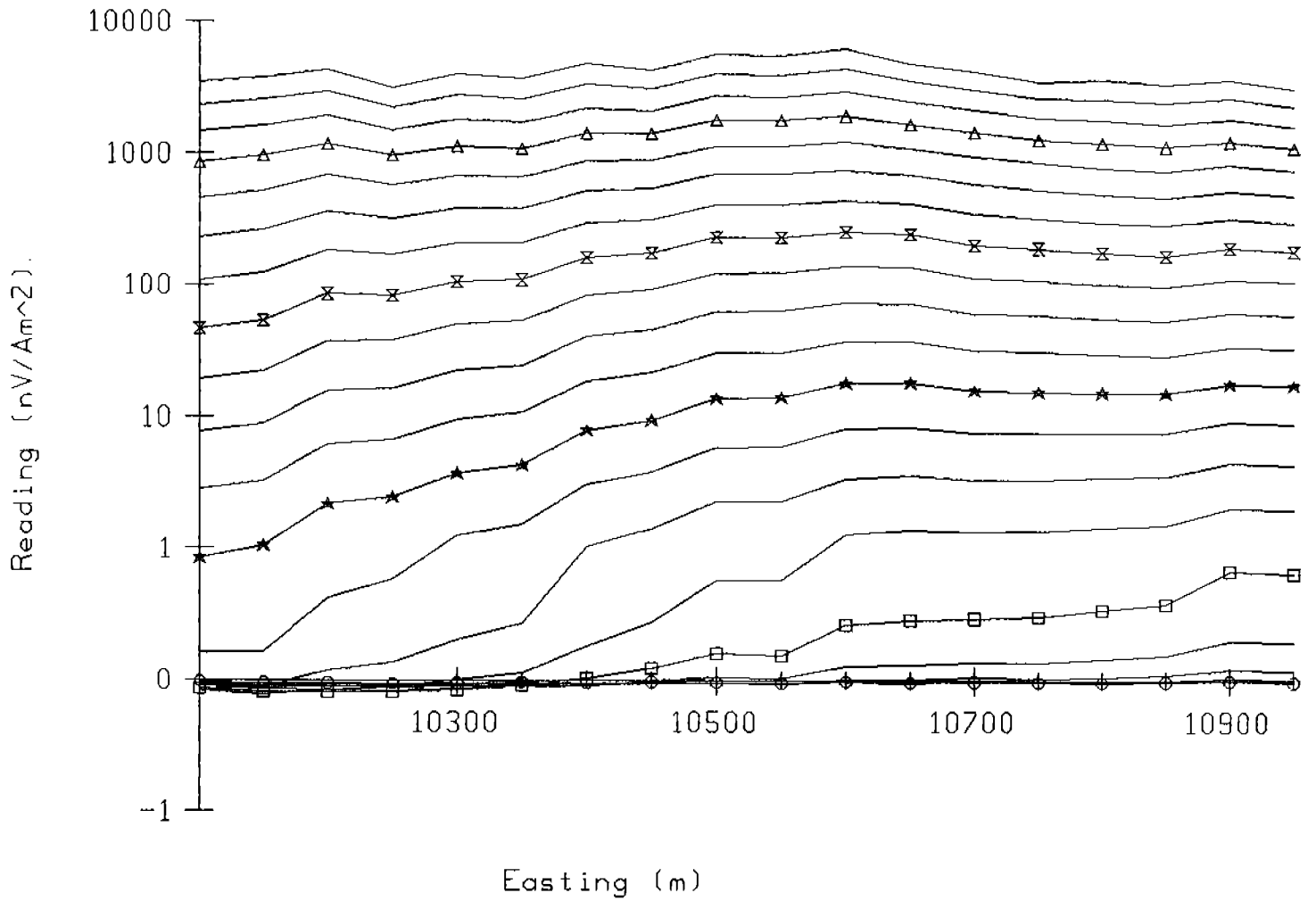
Prepared : R. Brescianini
 Drawn : R.J. Clark
 Date : Sept. 1995
 Revised :


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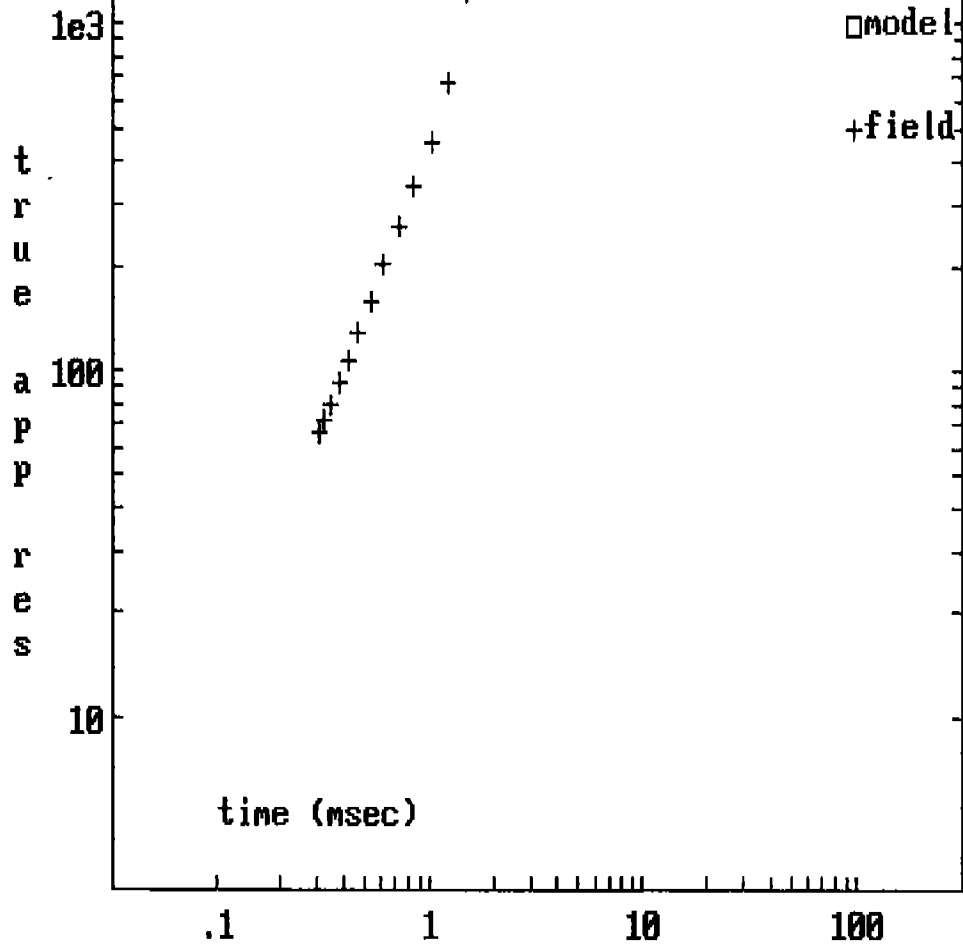
**APPARENT RESISTIVITY - DEPTH SECTION
MY57**

Centre : Perth
 A4-
 FIGURE

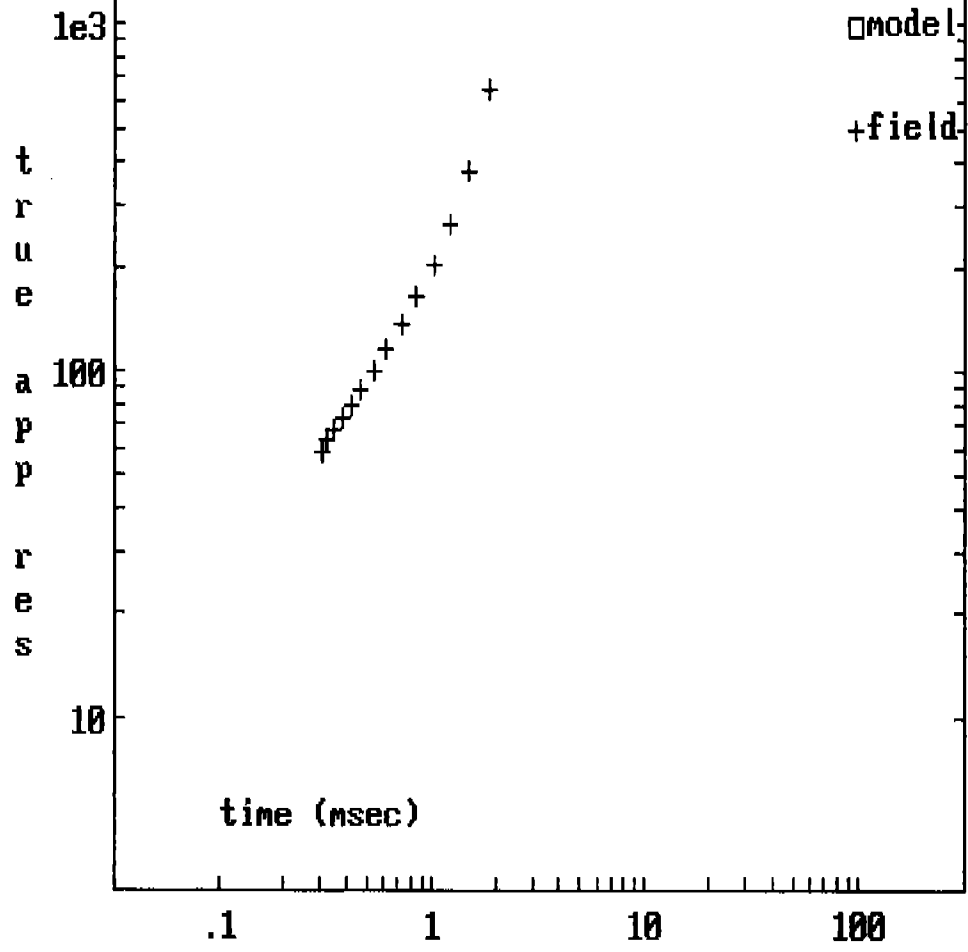
MY58: Line 10000N: Rx=Z: F=P25 CH= 1-20



Sounding 10100 : Ver 1



Sounding 10300 : Ver 1



SOUNDING: 10500 : Vers 1
Mt Young MY58 - 10000N 10500E

10500A1

~~(91.0 ohm.m)~~ ~~(8.2 m.)~~ 3.2 m.

~~(91.0)~~

* 49.3 ohm.m * 78.8 m.

* 49.3

-----* 82.0 m.

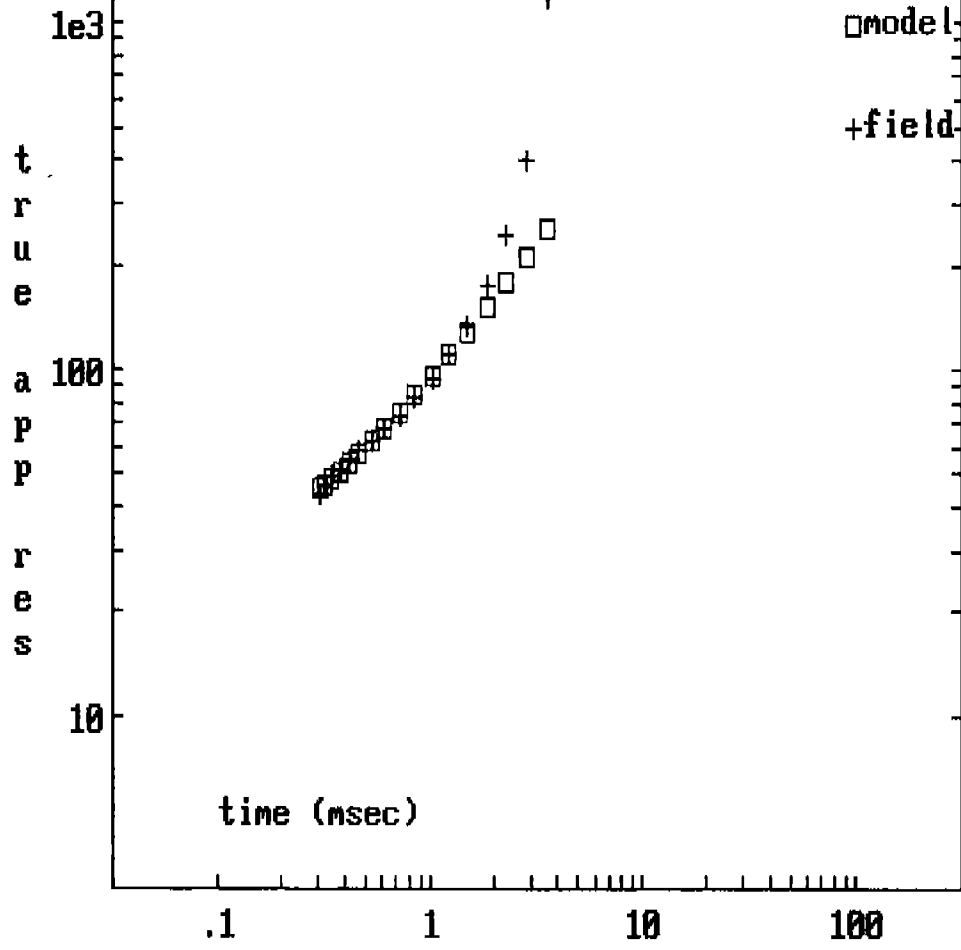
2140 ohm.m

2140

STD ERR= 3.6% : S= 2 S

E= 4%
S= 25

Sounding 10500 : Ver 1



SOUNDING: 10700 : Vers 1
Mt Young MY58 - 10000N 10700E

10700A1

~~21.2 ohm.m~~ ~~5.8 m~~ 5.6 m.

~~21.2~~

* 79.1 ohm.m * 139 m.

* 79.1

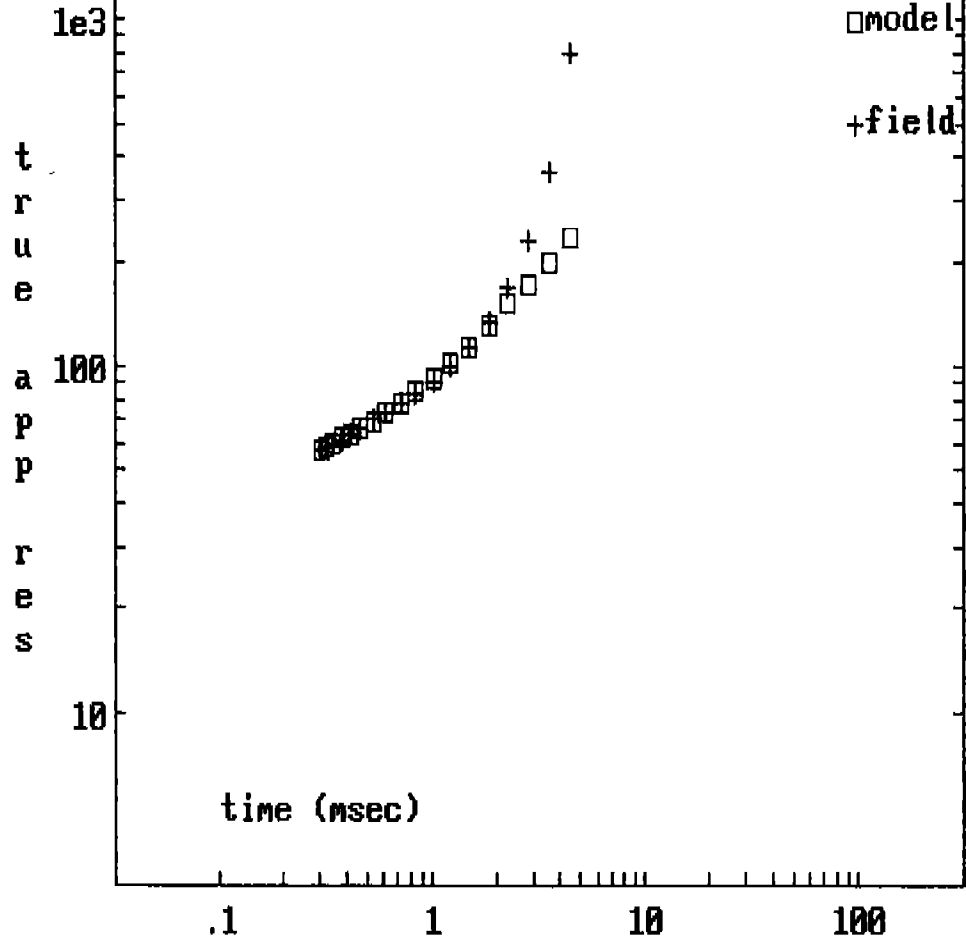
_____ * 144 m.
(1313 ohm.m)

(1313)

STD ERR= 2.0% : S= 2 S

E= 2%
S= 2S

Sounding 10700 : Ver 1



SOUNDING: 10900 : Vers 1
Mt Young MY58 - 10000N 10900E

10900A1

~~22.4 ohm.m~~ ~~5.9 m.~~ 5.9 m.

~~22.4~~

* 88.7 ohm.m * 200 m.

* 88.7

_____ * 208 m.

2435 ohm.m

_____ 2435

STD ERR= 3.7% : S= 2 S

Drill

E= 4%

S= 2S

Sounding 10900 : Ver 1

1e3

□model

+field

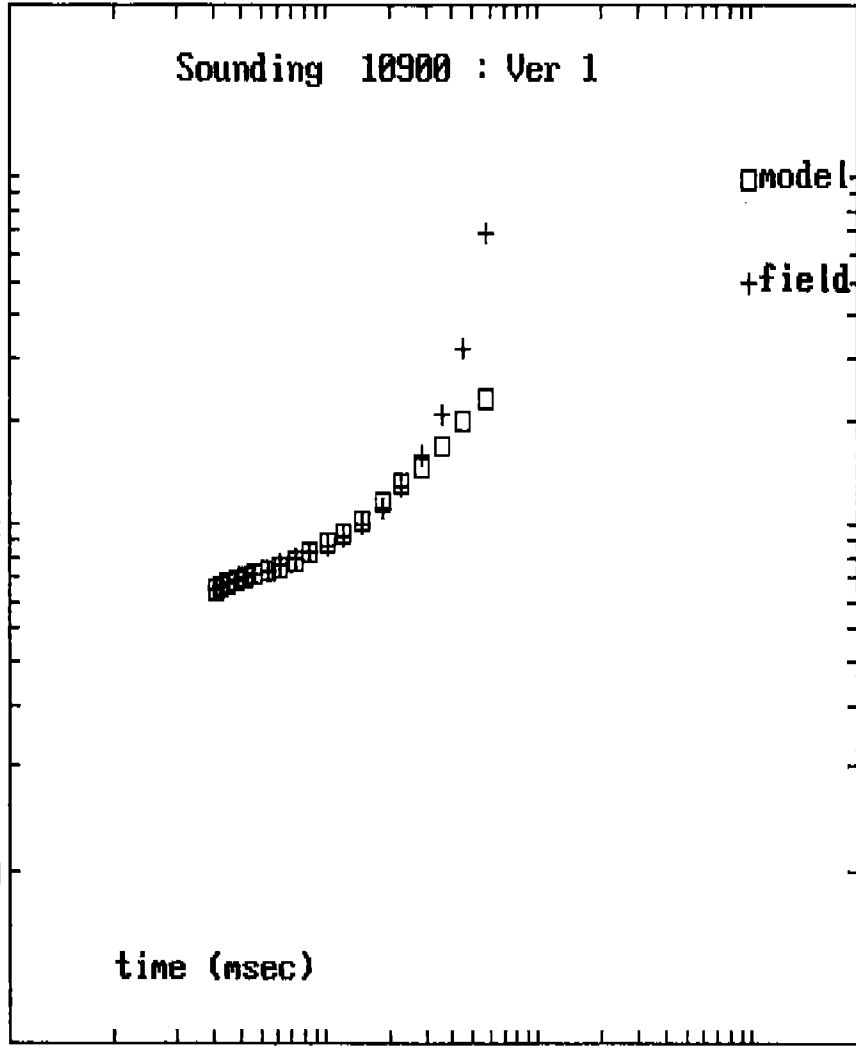
t
r
u
e
a
p
p
r
e
s

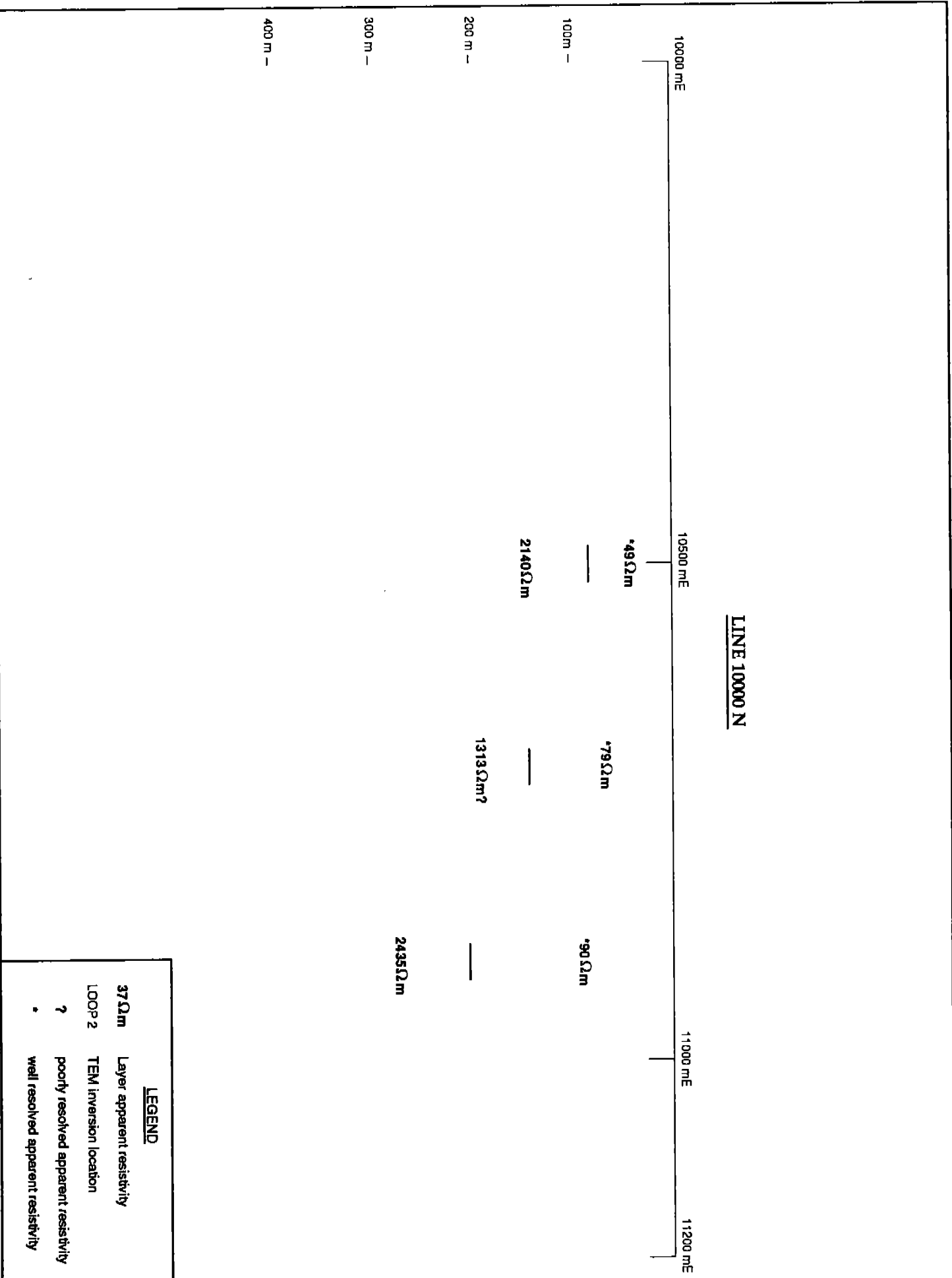
100

10

time (msec)

.1 1 10 100





LINE 10000 N

10000 ME 10500 ME 11000 ME 11200 ME

100m -

200m -

300m -

400m -

LEGEND	
37Ωm	Layer apparent resistivity
LOOP 2	TEM inversion location
?	poorly resolved apparent resistivity
.	well resolved apparent resistivity

Prepared : R.Brescianini
 Drawn : R.J.Clark
 Date : Sept. 1995
 Revised :

BHP Minerals Pty. Ltd.
 A.C.N. 008 694 782

**APPARENT RESISTIVITY - DEPTH SECTION
 MY58**

Centre : Perth
 A4-
 FIGURE

APPENDIX 3

GEOCHEMICAL DATA

SOIL SAMPLE ANALYSIS DESCRIPTION

Scheme Code: GP031

Sample preparation of soil samples; dry, fine pulverise

Scheme Code: D140

Aqua regia/perchloric acid digest (0.3g sample)

Scheme Code: GA140

AAS determination

Cu: Copper

Pb: Lead

Zn: Zinc

Fe: Iron

Mn: Manganese

1995 EL9091 STREAM SAMPLE DETAILS

LAB BATCH	TENEMENT	MESH	SAMPLE	AMG	AMG	Cu	Zn	Pb	Fe	Mn
CODE	NUMBER	SIZE	NUMBER	EASTING	NORTHING	ppm	ppm	ppm	ppm	ppm
TV33182	EL9091	+20#-10#	EK7239	582025	8257615	48	33	4	108000	410
TV33182	EL9091	+20#-10#	EK7240	582065	8257580	61	15	11	64200	885
TV33182	EL9091	+20#-10#	EK7241	582185	8257440	66	11	17	179000	540
TV33182	EL9091	+20#-10#	EK7242	582005	8257400	71	14	11	110000	1070
TV33182	EL9091	+20#-10#	EK7243	581740	8256185	38	8	6	46100	714
TV33182	EL9091	+20#-10#	EK7244	581735	8256090	71	14	16	93300	2030
TV33182	EL9091	+20#-10#	EK7245	581785	8256045	78	10	30	14900	2730
TV33182	EL9091	+20#-10#	EK7246	577360	8257420	22	6	4	48200	229
TV33182	EL9091	+20#-10#	EK7247	577900	8257495	23	6	7	60200	241
TV33182	EL9091	+20#-10#	EK7248	577930	8257530	15	4	4	43800	177

ROCK CHIP ANALYSIS DESCRIPTION

Scheme Code: GP033

Sample preparation of drill core/rock samples; dry, jaw crush, fine pulverise

Scheme Code: D140

Aqua regia/perchloric acid digest (0.3g sample)

Scheme Code: GI140

ICPOES determination

Cu: Copper
Pb: Lead
Zn: Zinc
Fe: Iron
Mn: Manganese
As: Arsenic
Ni: Nickel
Co: Cobalt
Mo: Molybdenum
Cr: Chromium
P: Phosphorus
V: Vanadium
Cd: Cadmium
Ag: Silver

1995 EL9091 ROCK SAMPLE DETAILS

LAB BATCH	TENEMENT	SAMPLE	ROCK	AMG	AMG	Cu	Zn	Pb	Ni	Fe	Mn	Ars	Ag	Mo	Co	Cr	P	Cd	V
CODE	NUMBER	NUMBER	TYPE	EASTING	NORTHING	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
TV33180	EL9091	ES7427	Sf. Algal Dolomite	577450	8257380	18	8	6	6	19600	691	10	-0.2	-2	4	15	50	-0.5	19
TV33180	EL9091	ES7426	Fe sandstone	577490	8257430	7	9	-5	5	179000	181	71	-0.2	3	5	10	200	-0.5	16