M.I.M. EXPLORATION PTY. LTD.

TECHNICAL REPORT

No. 1928

TITLE	**EXPLORATION LICENCE 7525 'JUMPUP' NORTHERN TERRITORY FIRST ANNUAL REPORT: YEAR ENDED 11th SEPTEMBER 1992**
ISSUING DEPARTMENT	**EXPLORATION**
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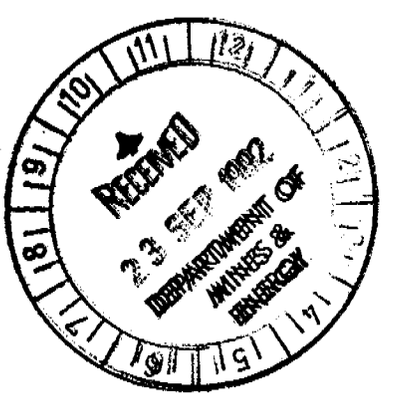
SUBMITTED BY	**P. G. SIMPSON**
DATE	**SEPTEMBER 1992**



CONTENTS

EXPLORATION LICENCE No. 7525 'JUMPUP'

NORTHERN TERRITORY

FIRST ANNUAL REPORT : YEAR ENDED 11th SEPTEMBER 1992

1. INTRODUCTION AND SUMMARY

Exploration Licence No. 7525 'Jumpup' is located approximately 985km by road SE of Darwin and about 65km NW of Borroloola. The Licence covers approximately 81km^2. The EL is one of several currently held by Mount Isa Mines Limited in the McArthur Basin. 'Jumpup' was granted for six years on 11th September 1991.

The tenement covers the Middle Proterozoic Tawallah Group. A northerly trending splay from the Emu Fault to the east is thought to pass through the centre of the Licence area. This geological situation suggests 'Jumpup' has potential for stratiform or other base metal deposits. The area has been explored in the past for base metals, phosphate and uranium with little result.

M.I.M Exploration Pty. Ltd. carried out a airborne QUESTEM survey over the Licence, which defined a broad anomaly in the northeast of the area. The Tawallah Range 1:100 000 aeromagnetics shows three belts of moderate magnetic anomalism, most probably related to the basic volcanic rocks of the Tawallah Range Formation found in the vicinity. The QUESTEM anomaly appears to be the result of conductive overburden.

There is limited correlation between the QUESTEM and magnetic results.

Ground geophysical follow up work of the QUESTEM anomaly will commence in the second year along with the completion of geological mapping and air photo structural interpretation. If warranted, targets generated by this will be diamond drilled.

2. LOCATION AND ACCESS

The Licence area lies on the Tawallah Range (6066) 1:100 000 scale topographic map, approximately 65km NW of Borroloola or 620km, in a straight line, SE of Darwin, Northern Territory. The EL is enclosed within latitudes 15°40'S and 15°45'S and longitudes 135°47'E and 135° 52'E (Fig. 1).

Access to EL7525 is by the Stuart Highway from Darwin to Daly Waters, the Carpentaria Highway to Borroloola and along the Bing Bong road for approximately 72.5km to the Licence area turn-off.

Within the area, access is limited to a few dirt tracks which follow BHP's old surveyed grid lines. Cross-country traverses are difficult due to the low and thick nature of the scrub. The terrain is sandy with minor black soil and paperback swamps. Topographically the majority of the area is flat lying, cut by deep creek gullies. High (up to 180m ASL) dissected hills and ridges occur in the west of the EL.

3. TENURE

Exploration Licence No. 7525 'Jumpup' was applied for on the 24th June 1991 and granted to Mount Isa Mines Limited on the 11th September 1991 for a term of six years. The area covered is 25 one-minute graticular blocks, which equals 81km^2 . The N.T.D.M.E. expenditure commitment for the first year was $15 000. There are no unusual conditions or requirements attached to the Licence.

4. REGIONAL GEOLOGY

EL7525 'Jumpup' is located on the Mt Young 1:250 000 Geological Sheet area (SD53-15). The sequence of interest is the McArthur Group - a stratigraphic equivalent of the ore-bearing sequences in the Mount Isa District. Important base metal deposits within the North Australian Craton are all hosted by this Group or its equivalents. This coupled with the projected extension through the centre of the area of a northerly trending fault splay from the Emu Fault to the east makes EL7525 potentially prospective for base metal mineralisation.

The McArthur Basin consists of a thick platform cover sequence overlying the eastern edge of the Northern Australian Craton, which consists of Lower to Middle Proterozoic basement rocks (Jackson et al, 1987). It has a stratigraphic succession similar to the Lawn Hill Platform and Mount Isa Orogen. The basin is divided into four rock groups: Roper (youngest), Nathan, McArthur and Tawallah (oldest). Only the Tawallah and McArthur Groups will be discussed as they bear direct significance to the EL7525 area.

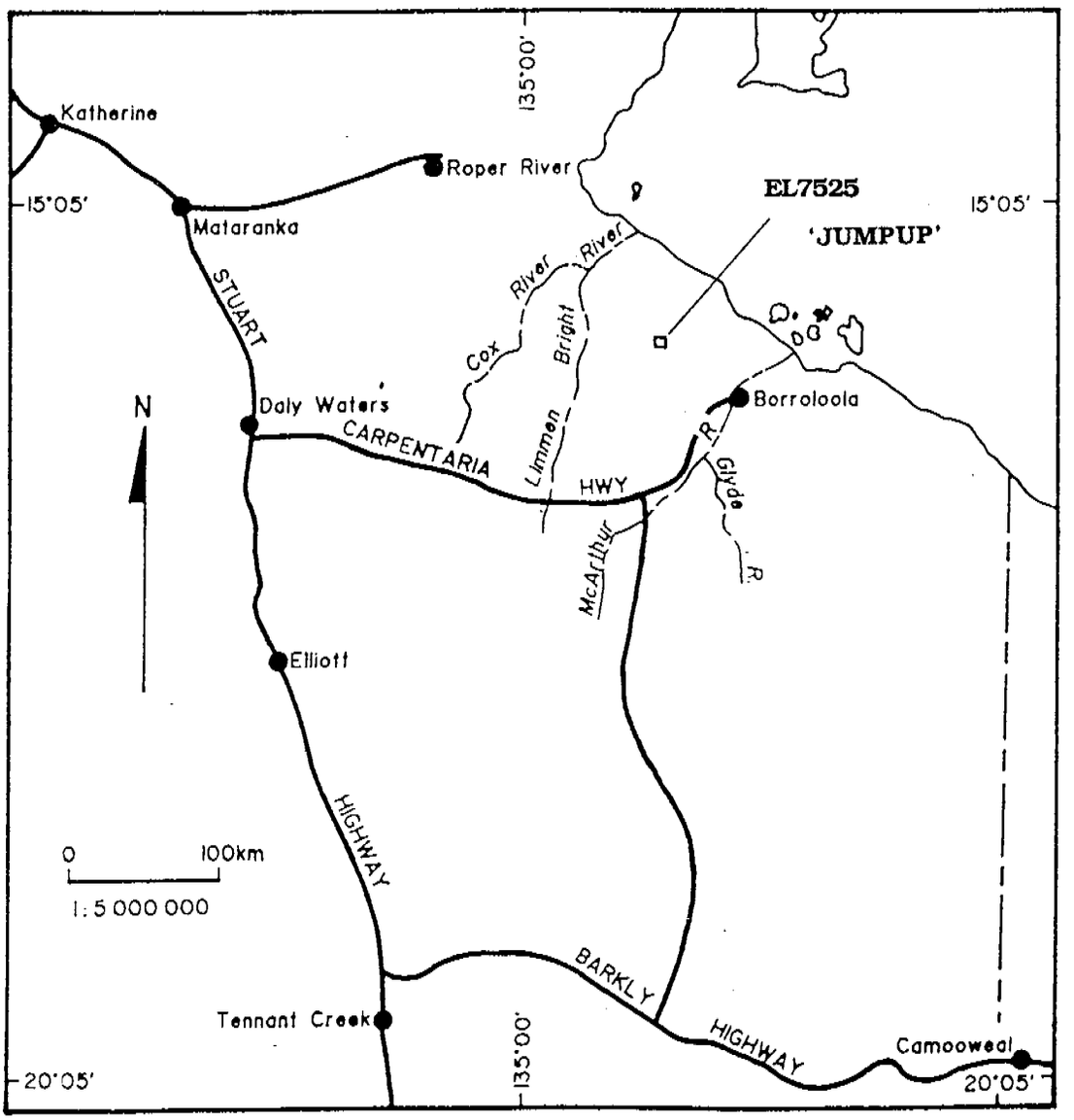


Fig. 1.

LOCATION MAP

4.1. Tawallah Group

The Tawallah Group is the oldest group in the McArthur Basin consisting mainly of thick sequences of ridge-forming sandstones alternating with units of recessive volcanics and fine grained clastics (Pietsch et al, 1991). It has an unconformable lower contact with the Scrutton Volcanics in the pre-McArthur basement and has a maximum thickness from 4500 - 5200 metres.

4.2. McArthur Group

The McArthur Group unconformably overlies the Tawallah Group and consists of a sequence of interbedded carbonates and lutites with subordinate sandstones up to approximately 4200 metres thick (Jackson et al, 1987). The Group is sub-divided into the Umbolooga Sub-group (older) and Batten Sub-group (younger). These Sub-groups are thought to be separated by a regional palaoregolith. This conformable contact is only disrupted by major fault zones. The Umbolooga Sub-group is host to the McArthur River lead-zinc-silver deposit.

4.3. Structure

The McArthur River Basin is dominated structurally by the Batten Fault Zone, a north-trending zone 50 - 70km wide and flanked by the Wearyan Shelf to the east and the Bauhinia shelf to the west. This zone is thought to represent the site of a former syndepositional half graben. Deformation of the basin has mainly been in response to block-faulting along the Batten and Urapunga Fault Zones causing the reversal of the graben structure into a horst or anticlinorium. This has lead to the exposure of the Scrutton Volcanics in the middle of the Batten Fault Zone (Jackson et al, 1987).

The Faults have considerable strike-dip displacement as well as strike-slip with tension gashes in the Emu Fault Zone indicating right-lateral displacement of unknown magnitude. Within the Batten Fault Zone, fault movement of major blocks has caused broad folds and warping, and, at a more local scale, dragfolds, steep tilting, shearing, brecciation, veining and solution alteration effects.

5. PREVIOUS EXPLORATION

In the late 1950's Mount Isa Mines Limited (AP510 and AP1748) and Geopeko Ltd. (AP1438) held various portions of EL7525 'Jumpup' (Table 1). Stratiform base metals were their primary target with phosphate and uranium being of secondary concern. Both companies considered the base metal potential of the 'Jumpup' area as unprospective and so no work was conducted after initial reconnaissance.

TABLE 1

OPEN FILE COMPANY REPORTS COVERING EL7525 "JUMPUP"

TENEMENT No.	COMPANY	CR NUMBER
AP 510	Mount Isa Mines Ltd.	CR57/006 CR57/007 CR57/008 CR57/009
AP 1438	Geopeko Ltd. CR67/006	
AP 1748	Mount Isa Mines Ltd.	CR56/003
AP 2357	Aust. Ore & Minerals Ltd.	CR69/005
AP 2554	RABAC Exploration N.L.	CR71/044A-B
AP 3069	Metals Invest. Holdings N.L.	CR71/079
EL 1424	Aust. & New Zealand Expl. Co.	CR78/011
EL 1710	Western Mining Corp. Ltd.	CR79/108 CR81/161A-B CR82/216
EL 2072	A.O. (Aust.) Pty. Ltd.	CR80/171 CR82/284 CR83/123
EL 4083	CRA Exploration Pty. Ltd.	CR84/024
EL 4745	BHP Minerals Ltd.	CR86/216

In 1968 Australian Ore and Minerals Ltd. covered the northeastern corner part of the present tenement area under AP2357. Layton and Associates were contracted to undertake the exploration for phosphate or uranium mineralisation. After extensive literature search and ground follow up of airphoto anomalies proved disappointing the area was relinquished in 1969.

The central southwestern portion of EL7525 was held by RABAC Exploration Concession in 1970. AP2554 was the subject of intensive Side Looking Airborne Radar (SLAR) survey looking for a base metal or uranium deposit. The technique delineated two major fault zones in the present tenement area. Both these fault zones trend northeast - southwest. In addition to these a host of fracture patterns were defined in a number of directions. Limited ground follow up was conducted over the next two years with little success. In 1972 the area was relinquished.

Metals Investment Holdings Ltd. held the northeastern corner of 'Jumpup' under AP3069 from 1970-71. A stratified base metal or uranium deposit was sought. Geological and structural mapping lead to sedimentological facies analysis of the most favourable lithologies. No mineralisation was delineated so the tenement was relinquished in 1971.

Australian and New Zealand Exploration Company in 1977 held the southern portion of 'Jumpup' for manganese exploration. Interpretation of landsat images and airphotos inconjunction with geological mapping indicated that economic manganese potential in the area was low. The AP was relinquished in 1978.

In 1978 the majority of EL7525 'Jumpup' was held under EL1710 by Western Mining Pty. Ltd. The target was a stratiform Cu-Pb-Zn deposit. Based on detail aerial photo interpretation and geological mapping forty-nine soil traverses (traverses 9-11 are in the present tenement area) and orientation airborne INPUT-EM survey was flown. Nineteen INPUT-EM anomalies were defined and they indicated the best host for base metal mineralisation was the Wollogorang Formation of the Tawallah Group. In follow up exploration IP and TEM geophysical techniques were used to define the presence of the Wollogorang Formation. Only two of these anomalous zones are contained in 'Jumpup' - R1-2 and R1-11. Five percussion drill holes were sunk into R1-11 to test weak IP and TEM anomalies. Drilling defined a black carbonate unit and porphyritic trachyte. Weak pyrite and chalcopyrite were also reported. The anomalies were defined as a response to the deep weathering profile (up to 30m). In 1981-82 three lines of ironstone and rock chip sampling and a limited IP surveys were conducted to the south of R1-11 and west of R1-2. Although ironstone, rock chip and drill chip samples assayed up to 800ppm copper it was felt that high background copper values were indicative of the Wollogorang Formation and consequently the area was relinquished in 1983.

In the middle to late 1980's small portions of EL7525 were held by A. O. (Aust) Pty. Ltd. (EL2072 - stratiform base metals), CRA Exploration Pty. Ltd. (EL4083 - diamonds) and BHP Minerals Ltd. (EL4745 - stratiform base metals). Very limited work was conducted by all three in the present tenement area and no anomalies were defined. The licences were surrendered in 1981, 1985 and 1986 respectively.

The Tawallah Range 1:100 000 Sheet has been covered by airborne magnetics. The map, prepared by the NTGS, includes data from two sources:

(a) NTGS survey with the following specifications:

Contractor	:	Aerodata Holdings Ltd.
Line Directions	:	90° and 270°
Line Spacings	:	500m
Mean Terrain Clearance	:	100m
Date	:	1990

(b) BHP survey with the following specifications:

Contractor	:	Geoterrex Pty. Ltd.
Line Directions	:	0° to 180° & 90° to 270°
Line Spacings	:	300m
Mean Terrain Clearance	:	80m
Date	:	1988

Both surveys used caesium vapour magnetometers with 0.04nT resolution and 0.2 sec cycle rate.

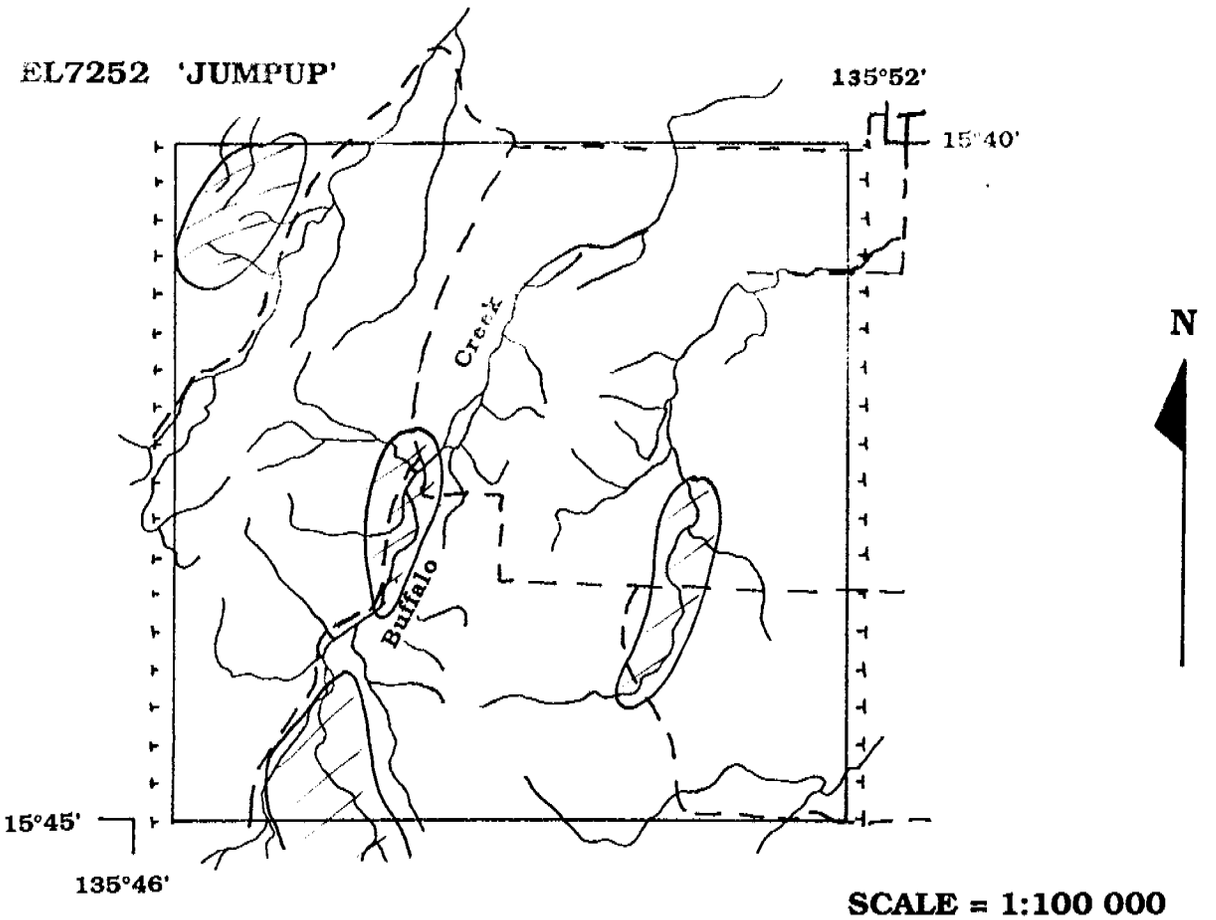
6. EXPLORATION CONDUCTED BY M.I.M. EXPLORATION PTY. LTD.

Figure 2 outlines areas explored and methods utilised by M.I.M. Exploration Pty. Ltd. in 1991.

6.1 Geophysics

Due to the extensive quartz sand and sandstone ground cover a detail airborne EM survey was conducted by Aerodata in 1991. The method used was QUESTEM, which is a time domain EM system, the details of which are outlined in Appendix 1.

All geophysical interpretation and compiling was conducted by M.J. Shalley, M.I.M. Consultant Geophysicist.



LEGEND

QUESTEM LINES

AREAS OF VOLCANIC ROCK

TRACKS

Fig. 2:

EXPLORATION CONDUCTED BY M.I.M. EXPLORATION, 1991.

6.1.1 Survey Specifications

The survey specifications are as follows:

Flight Line Directions	:	90° and 270°
Flight Line Spacings	:	500m
Nominal Mean Terrain Clearance	:	120m (aircraft)
	:	45m (receiver)
Navigation and Flight Path Recovery	:	satellite GPS
QUESTEM Operating Frequency	:	75 Hz

Data Collected (as outlined in Appendix 1) included:

QUESTEM	:	15 channels
Magnetometer	:	High sensitivity Cs vapour
Aircraft Ground Clearance	:	Radar altimeter

6.1.2 Data Presentation and Quality

Data is presented in Appendix 2 as multiplot profiles which include:

Fifteen channels of QUESTEM
Two channels of magnetometer (high and low sensitivity)
Aircraft ground clearance
QUESTEM anomaly time constant

The last of these, the time constant is of dubious value because it is not clear how accurately it reflects the quality of an anomalous conductor.

QUESTEM Channel 10 data is presented in the form of a contour map (Drw. No. 33605) showing the location of anomalous zones. Apart from anomaly amplitude, it contains little information on the quality of the anomalies. A flight path map (Drw. No. 33606) shows the location and direction of traverses. Maps and profiles are at the scale 1:25 000.

Because of the moderately rugged terrain in parts of the area, the nominal mean terrain clearance of the aircraft was often exceeded. Actual clearance, as read from the radar altimeter record, varied between 115 and 300m. The western third of the area showed the more extreme variations but clearance was usually less than 250m.

Where the terrain clearance exceeds 150m, the ability of the system to detect small or deep conductive bodies, particularly if they are steeply dipping, will be moderately to severely impaired. In the case of large, shallow-dipping or flat lying mineralised

bodies, similar to the HYC system at McArthur River, the impairment would be weak or negligible. In any case, more careful interpretation procedures will need to be applied in assessment of this data.

6.1.3 Preliminary Appraisal of Data

The Channel 10 contour map (Drw. No. 33605) shows that the area is generally fairly resistive, that is the anomalies are weak. Greatest activity occurs in the northeast of the area, where anomalous values reach 550 ppm. Both the contour map and the profiles show that this anomalous zone is broad and therefore probably caused by conductive overburden. There are some weak anomalies more or less coincident with magnetic anomalies (see 6.1.5).

A more detailed interpretation, including computer modelling, will be supplied with the next report.

The published magnetics discussed in Section 5 show three belts of moderate magnetic activity lie within, or partly within the EL. Comparison with geological mapping indicates that the most likely source is basic volcanics. However, there is not much outcrop available to confirm this. Drawing Number 33607 shows the extent of these magnetic anomalies within the present tenement.

There is a very limited positive correlation between the magnetics and QUESTEM Channel 10 data. The best of this coincidence of weak QUESTEM and moderate magnetic activity near the eastern edge of the area at about 592500E, 8262500N. A similar situation exits along the central meridional zone of magnetic activity, where a string of weak QUESTEM highs shows approximate coincidence. However, towards the south of the zone the QUESTEM anomalies shift a little to the west of the magnetic activity.

The general association of weak QUESTEM anomalies with obviously shallow sourced magnetic activity is consistent with a basic volcanic source. Weathering of the volcanics promotes surface conductivity which produces the QUESTEM anomalies.

6.2 Geological Mapping

Due to the difficulty of access the Licence area has had only limited geological reconnaissance performed to date by M.I.M. Exploration. The remained of the mapping will be completed next year.

7. CONCLUSIONS

The airborne geophysics has defined a broad QUESTEM anomaly in the northeastern corner of the EL.

The three bands of moderately anomalous magnetic zones which may be related to basic volcanics in these areas.

Limited reconnaissance has delineated a number of scattered volcanic outcrops.

8. FUTURE WORK

1. Ground EM-37 follow up of the limited QUESTEM anomaly in the northeastern corner of the EL.

2. Completion of the geological mapping.

3. Completion of the air photo lineament study.

4. Diamond drilling of targets generated by the above work.

D. C. Kettlewell

Derrick C. Kettlewell

9. REFERENCES

Jackson, M. J., Muir, M. D., and Plumb, K. A. 1987: Geology of the Southern McArthur Basin, Northern Territory, Bureau of Mineral Resources, Australia, Bulletin 220.

Pietsch, B. A., Wyche, S., Rawlings, D. J., Creaser, P. M., and Findhammer, T. L. R., 1991: McArthur River Region 6065-6165, 1:100 000 Geological Explanatory Notes, Department of Mines and Energy, Darwin, Australia.

Plumb, K. A., and Paine, A. G. L., 1964: 1:250 000 Geological Series - Mt Young, Northern Territory (SD/53-15) Explanatory Notes, Bureau of Mineral Resources, Australia.

DRAWINGS

135° 46'

135° 50'

135° 52'

15° 39'

15° 40'

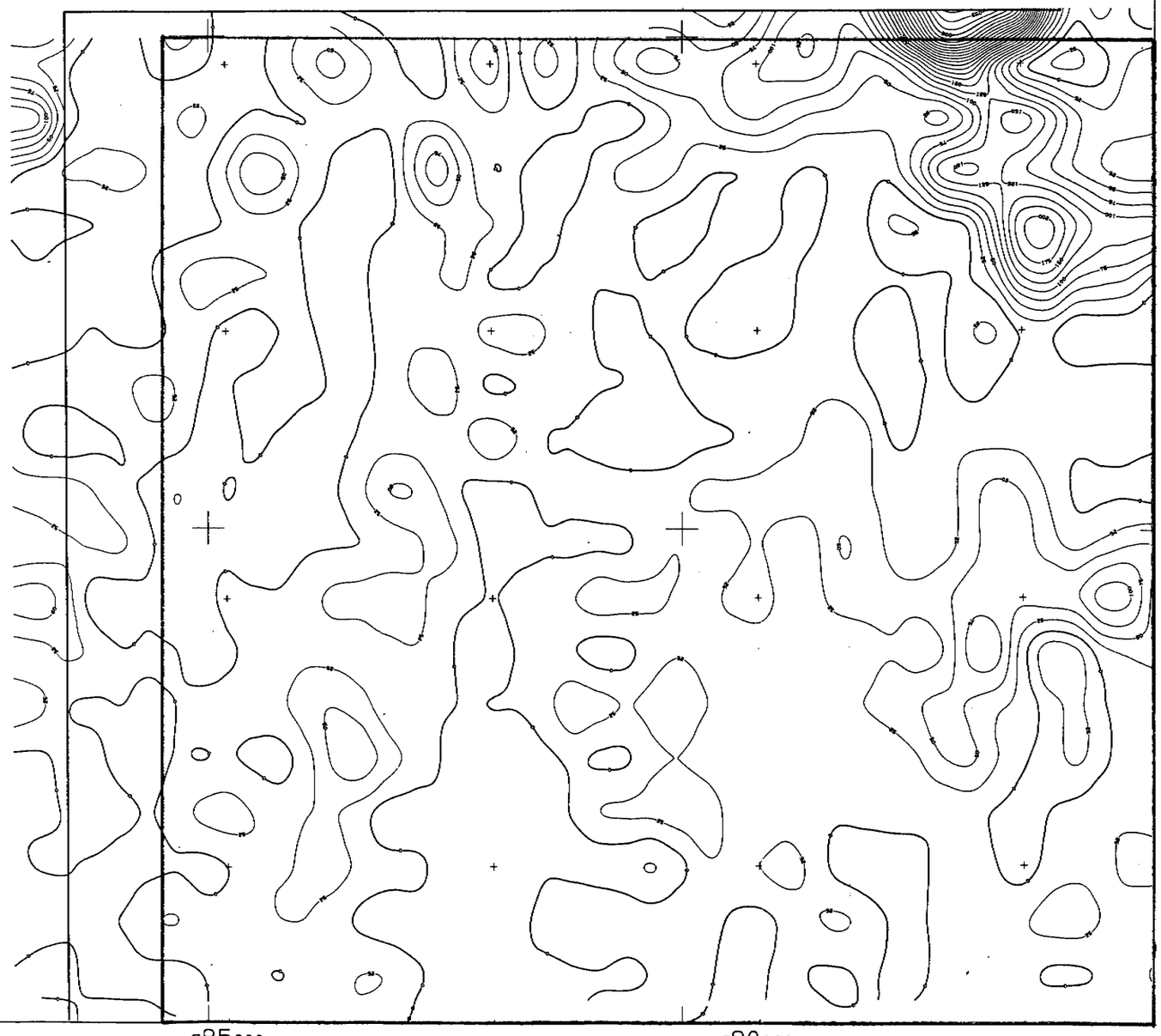
15° 45'

8265000

8260000

585000

590000



SCALE

1: 50000

0 500 1000 1500 2000 2500 3000

m m

MIM EXPLORATION PTY LTD

EL 7525 JUMP UP

QUESTEM AIRBORNE EM SURVEY

CHANNEL 10 (1.861 ms DELAY)

DATA VALUES - ppm

Compiled by:	Date: 5 Jun 1992
Drawn by:	Drawing No.: 33605

135° 46'

135° 50'

135° 52'

15° 39'

15° 40'

15° 45'

8265000

8260000

585000

590000

110100

110200

110300

110400

110500

110600

110700

110800

110900

111000

111100

111200

111300

111400

111500

111600

111700

111800

111900

SCALE

1: 50000

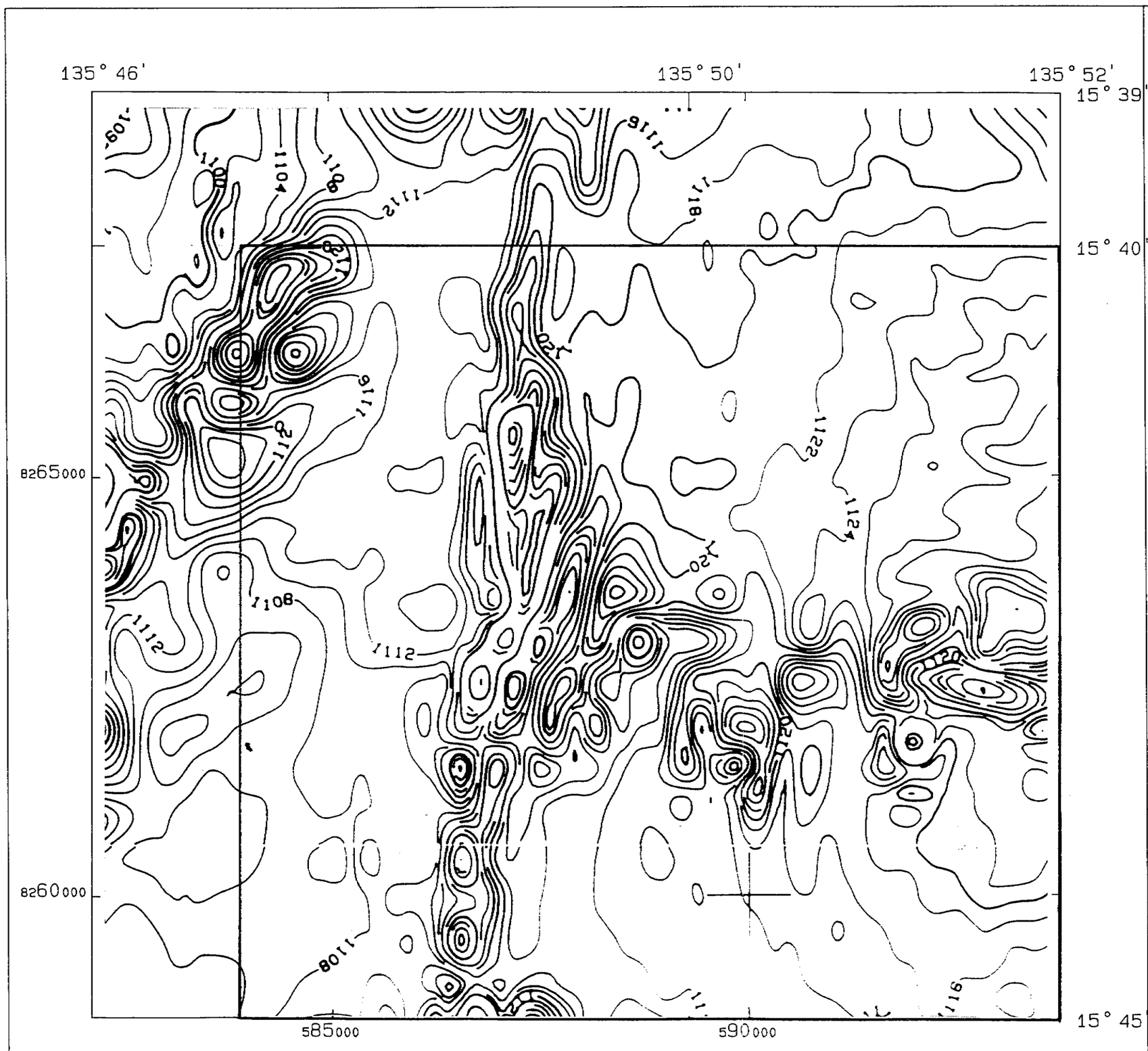
0 500 1000 1500 2000 2500 3000 m

MIM EXPLORATION PTY LTD

EL 7525 JUMP UP

QESTEM AIRBORNE SURVEY
FLIGHT LINE MAP

Compiled by: KJS	Date: 5 Jun 1992
Drawn by: KJS	Drawing No.: 33606



SCALE

1: 50000

0 500 1000 1500 2000 2500 3000

m m

MIM EXPLORATION PTY LTD

EL 7525 JUMP UP
TOTAL MAGNETIC FIELD

After NTGS Compilation

Compiled by:	Date: 5 Jun 1992
Drawn by:	Drawing No.: 33607

APPENDIX 1

QUESTEM AIRBORNE EM SYSTEM

Aerodata
AIRBORNE GEOPHYSICAL SURVEYS

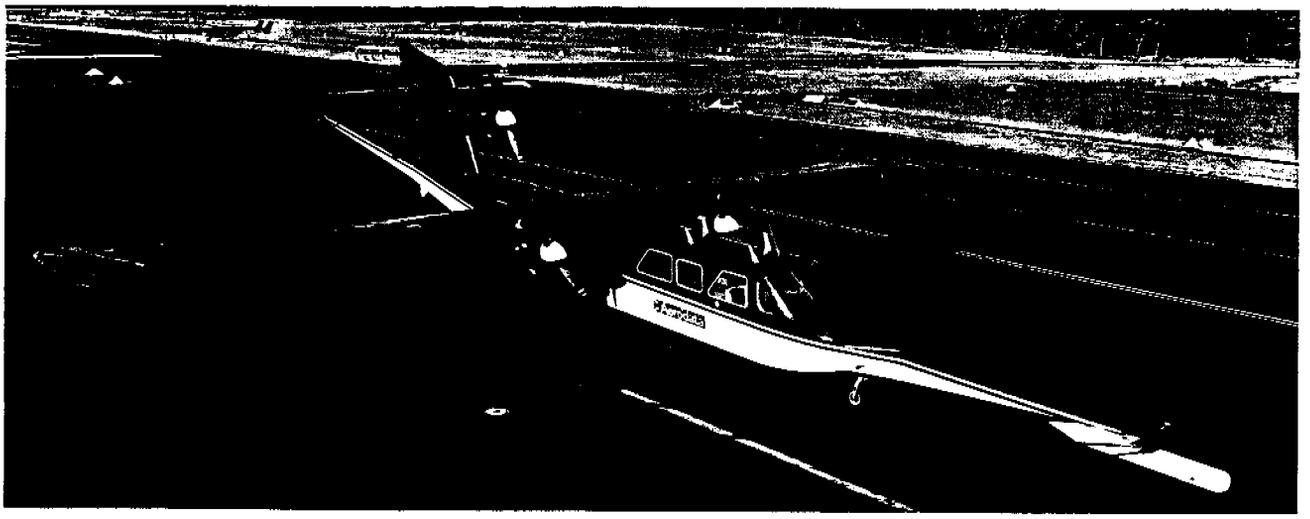
17 Emerald Terrace.
West Perth. 6005
Western Australia

Telephone (09) 322 1799
International (619) 322 1799
Facsimile (09) 481 0709
International (619) 481 0709
Telex 'AERODA' AA 96146

QUESTEM

Digital Time-Domain Airborne Electromagnetics

Recent advances in equipment sensitivity and quantitative data processing techniques have extended the range of applications of Aerodata's **QUESTEM** airborne EM system from being purely an anomaly detector to one which can map ground conductivities, both areally and in depth. This is a major advance for mineral exploration and has applications in the related fields of detailed geological mapping, groundwater exploration, salinity monitoring and general environmental studies.



The **QUESTEM** system comprises:

- Choice of 75 or 37.5 Hz operation
- Recording of unwindowed data - select required windows post-flight
- Increased depth penetration with real time digital signal processing
- Large transmitter moment
- Broad transmitter and receiver bandwidth
- Intelligent spheric monitoring and rejection
- Software stacking to increase signal-to-noise ratio and to reject power line interference
- High sensitivity Cs vapour magnetometer (0.5 second sampling)
- Installation in a cost efficient Trislander aircraft.

Data processing and interpretation services offered include:

- Automatic anomaly selection, classification and plotting
- Conductivity inversion for layered earth and discrete conductors
- Apparent conductivity and decay constant maps
- Full layered earth inversion for **QUESTEM** transients
- Colour image processing of EM and magnetic data
- Integration of EM, magnetic and other geophysical or satellite remote sensing data sets
- Comprehensive geophysical and geological interpretation by experienced earth science consultants.

THE QUESTEM RECEIVER

QUESTEM is built around an IBM - compatible PC. All signal processing and calculations are carried out with software-controlled digital hardware on a programmable array processor (see attached diagram). Four transients are recorded per second. This translates to one sample approximately every 13 m.

Windows can be positioned anywhere on the transient waveform (including during the pulse). The position of windows can be simply altered to suit the requirements of a particular survey. In addition, several auxiliary parameters are calculated. These include monitors of power-line interference, spheric activity and primary field. All parameters are displayed in real-time on a computer screen, in hard-copy and stored on disk.

The Questem system can be operated at a fundamental frequency of 75 Hz or 37.5 Hz. The lower frequency allows recording out to a delay time of 11.33 msec after the transmitter pulse. This allows a drastic increase in depth penetration in conductive areas.

The contribution of secondary eddy currents in the aircraft to the total signal is removed in real-time. This is possible because of calibration, carried out at high altitude at the commencement of flight, during which the aircraft's response is identified accurately and stored digitally.

Atmospheric or 'spheric' noise is detected and rejected before it can be integrated into stacked data. This is particularly important because the limited time available for stacking does not allow the spherics to be 'stacked out'. Noise induced by motion of the coil sensor in the Earth's magnetic field is easily separated from desired signal because of its much lower frequency.

As a result of ongoing research, the performance of Questem is continually being upgraded. Recent developments mean that the separation of primary and secondary fields is far more accurate than in pre-existing systems and conductivities derived from Questem data are accurately calibrated.

QUESTEM DATA PROCESSING

Aerodata, in conjunction with its Canadian sister company Questor, offers the latest developments in the processing of airborne EM and magnetic data. Colour imaging workstations are used to prepare final map products of the highest quality.

Any parameter derived from the data set may be colour contoured or imaged. These parameters include: time constant, conductivity, raw channels etc. Recently-developed software allows the integration of the complementary EM and magnetic data sets into a single presentation.

Computer routines have been developed for the automatic selection and plotting of EM anomalies. Plotted anomalies may be annotated with conductivity-thickness products and/or any other body parameters.

Aerodata has developed its own layered earth QUESTEM modelling software which carries out rapid forward modelling and inversion of QUESTEM responses. This software has led to the implementation of a conductivity-depth mapping scheme allowing the plotting of cross sections of conductivity distributions with depth along flight lines.

QUESTEM AIRBORNE TIME-DOMAIN EM SYSTEM

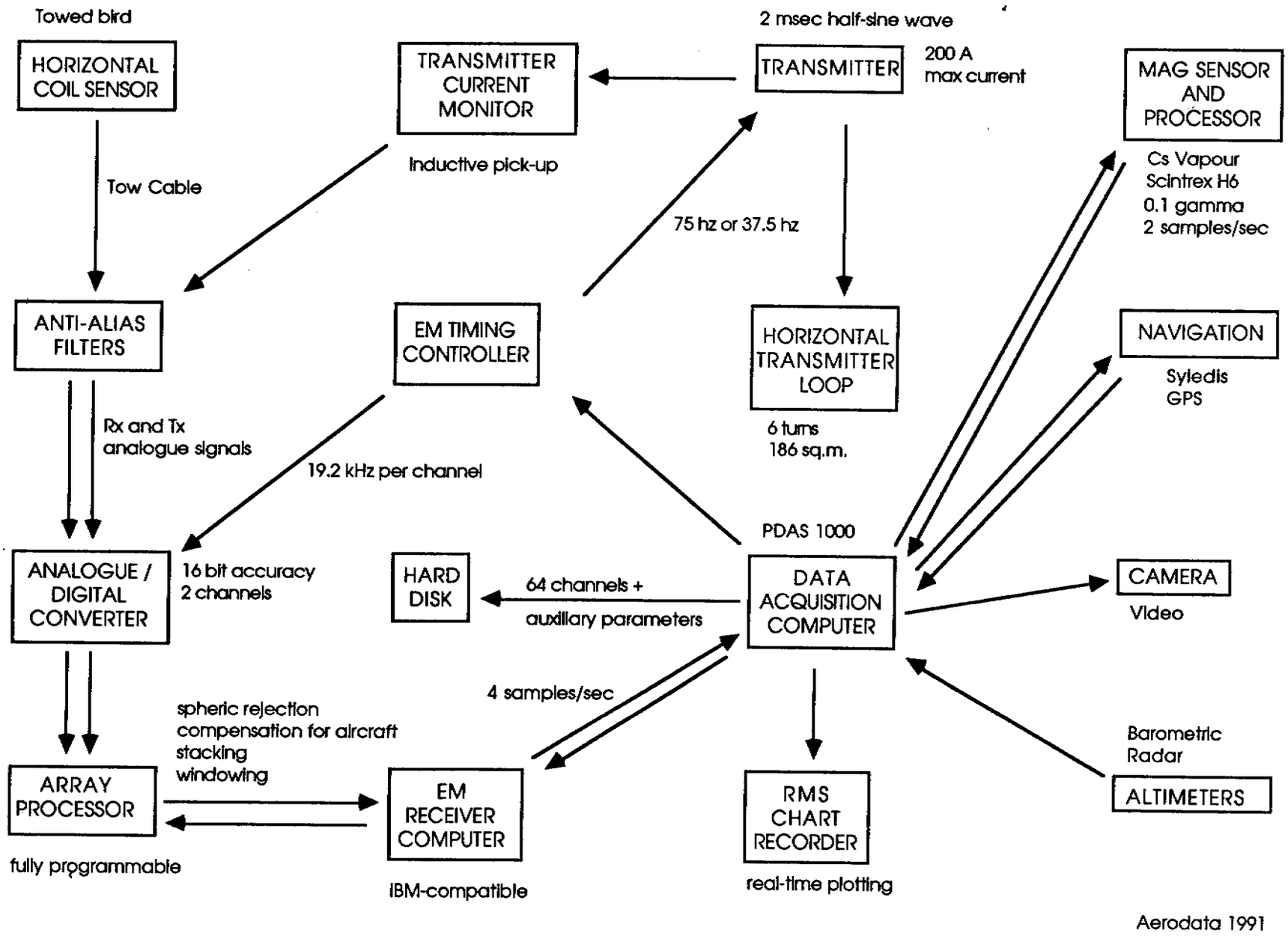
Aircraft: Britten-Norman Trislander VH-NKW

Flying height:	120 m
Bird height:	45 m
Frequency of transmitter operation:	75 Hz or 37.5 Hz
Transmitter waveform:	half-sine wave pulse
Transmitter on-time:	2.0 msec
Transmitter off-time:	4.67 msec/75 Hz or 11.33 msec/37.5 Hz
Peak transmitter loop current:	200A
Transmitter loop turns:	6
Area per loop turn:	186 m^2
Transmitter loop moment:	223,000 ATm^2
Number digital samples per waveform :	128/75 Hz or 256/37.5 Hz
Sample size:	52.08 microsec
Sensor:	horizontal coil in towed bird
EM reading duration:	200 msec
EM readings per second:	4
Mag sensor:	Cs vapour
Mag reading duration:	100 msec
Mag readings per second:	2
Mag resolution:	0.1 nanoTesla

SUGGESTED QUESTEM WINDOW SPECIFICATIONS

	75 Hz SYSTEM			37.5 Hz SYSTEM	
WINDOW	START (µsecs)	END (µsecs)	WINDOW	START (µsecs)	END (µsecs)
1	168	325	1	168	324
2	273	429	2	376	533
3	377	533	3	585	949
4	481	637	4	1001	1366
5	584	845	5	1418	1783
6	793	1054	6	1835	2408
7	1001	1262	7	2460	3033
8	1210	1574	8	3085	3658
9	1418	1782	9	3710	4491
10	1626	2095	10	4543	5324
11	1939	2408	11	5377	6158
12	2355	2929	12	6210	7199
13	2876	3450	13	7252	8450
14	3398	3971	14	8502	9908
15	3918	4490	15	9544	11158

QUESTEM SYSTEM SCHEMATIC



Aerodata 1991

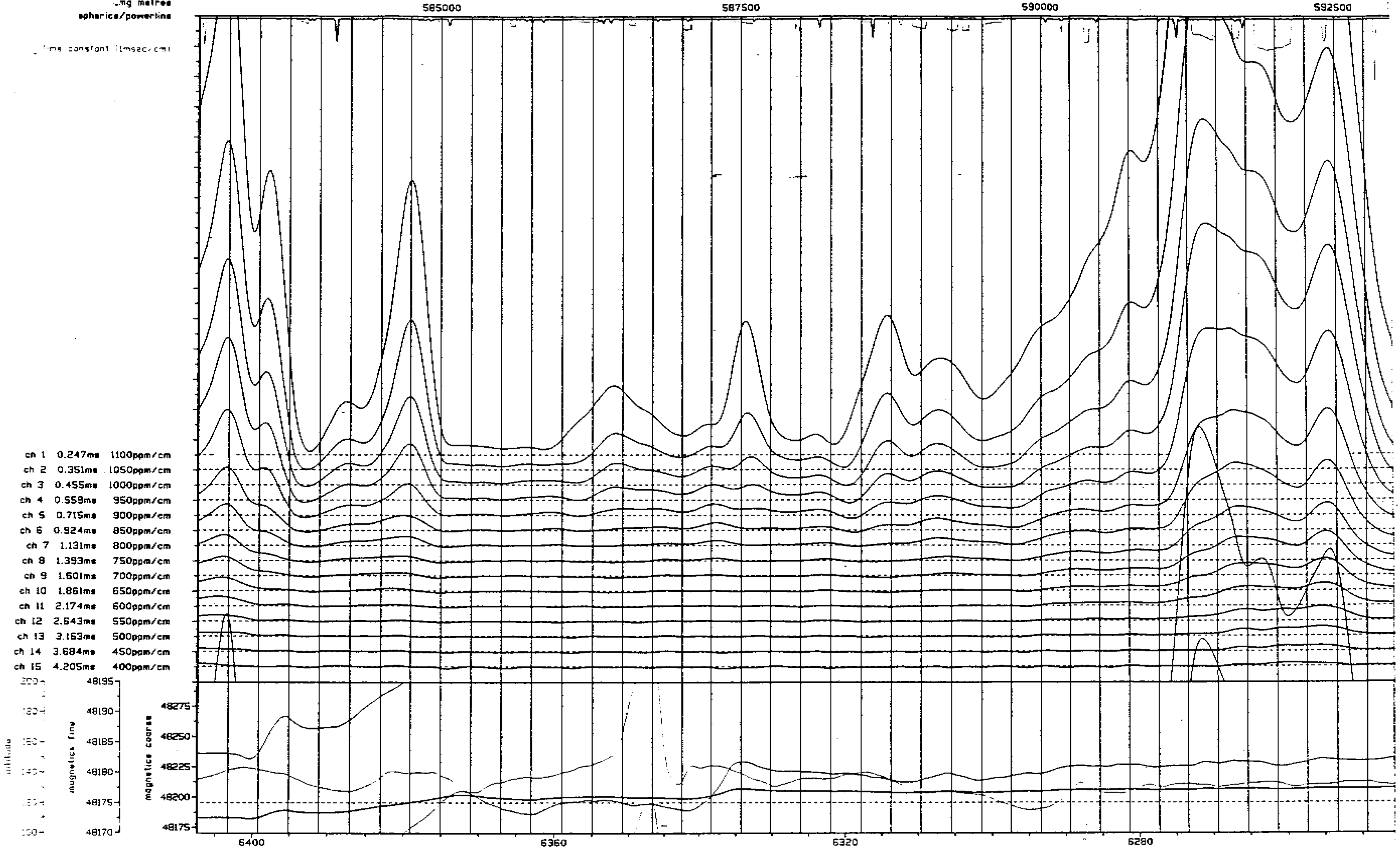
APPENDIX 2

QUESTEM MULTIPLOT PROFILES

LINES 110100 to 112000

AERODATA QUESTEM SYSTEM
Base frequency 75.0 Hz.

line no.	110100	
flight no.	14	
direction	270	
date flown	10oct91	
time flown	08:49:55.50	08:54:08.25
fiducial no.	6154	6407
line location	8268014	8267994
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	

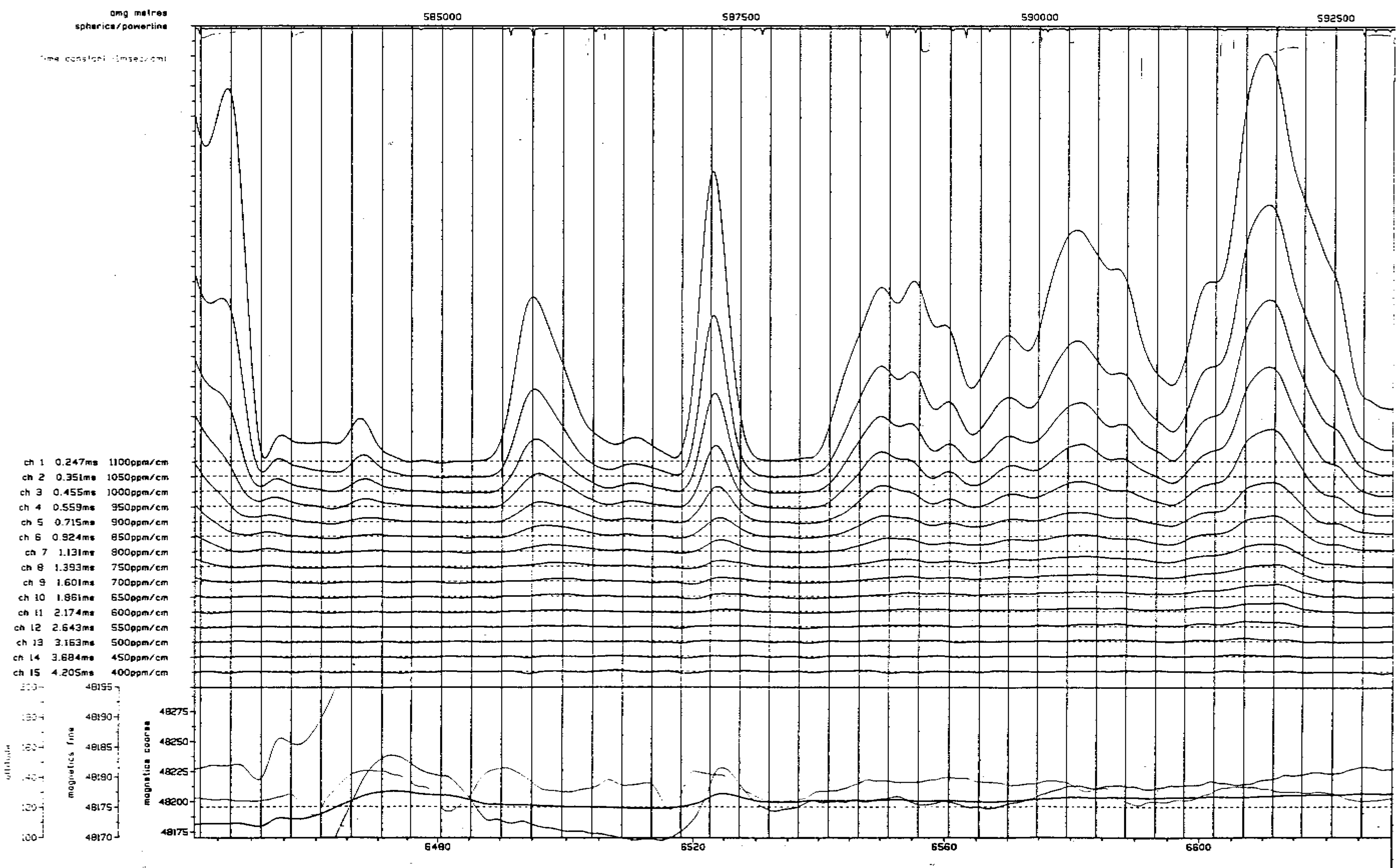


amg metres
spherics/powerline
585000
587500
590000
592500
time constant (msec/cm)
ch 1 0.247ms 1100ppm/cm
ch 2 0.351ms 1050ppm/cm
ch 3 0.455ms 1000ppm/cm
ch 4 0.559ms 950ppm/cm
ch 5 0.715ms 900ppm/cm
ch 6 0.924ms 850ppm/cm
ch 7 1.131ms 800ppm/cm
ch 8 1.393ms 750ppm/cm
ch 9 1.601ms 700ppm/cm
ch 10 1.861ms 650ppm/cm
ch 11 2.174ms 600ppm/cm
ch 12 2.643ms 550ppm/cm
ch 13 3.163ms 500ppm/cm
ch 14 3.684ms 450ppm/cm
ch 15 4.205ms 400ppm/cm
altitude
magnetics fine
magnetics coarse
48195
48190
48185
48180
48175
48170
48275
48250
48225
48200
48175
6400
6360
6320
6280

page 1 of 2

AERODATA QUESTEM SYSTEM
Base frequency 75.0 Hz.

line no.	110200	
flight no.	14	
direction	90	
date flown	10oct91	
time flown	08:55:51.50	09:00:45.25
fiducial no.	6442	6735
line location	8267500	8267488
client	M.I.M. EXPLORATION PTY. LTD	
job	2114-9	
area	JUMP UP	
scale	1:25000	



amg metres
spherics/powerline
585000
587500
590000
592500
time constant (msec/cm)
ch 1 0.247ms 1100ppm/cm
ch 2 0.351ms 1050ppm/cm
ch 3 0.455ms 1000ppm/cm
ch 4 0.559ms 950ppm/cm
ch 5 0.715ms 900ppm/cm
ch 6 0.924ms 850ppm/cm
ch 7 1.131ms 800ppm/cm
ch 8 1.393ms 750ppm/cm
ch 9 1.601ms 700ppm/cm
ch 10 1.861ms 650ppm/cm
ch 11 2.174ms 600ppm/cm
ch 12 2.643ms 550ppm/cm
ch 13 3.163ms 500ppm/cm
ch 14 3.684ms 450ppm/cm
ch 15 4.205ms 400ppm/cm
altitude
magnetics fine
magnetics coarse
48195
48190
48185
48180
48175
48170
48275
48250
48225
48200
48175
6480
6520
6560
6600

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AERODATA QUESTEM SYSTEM
Base frequency 75.0 Hz

line no. 110300
flight no. 14
direction 270
date flown 10oct91
time flown 09:01:50.50 09:05:59.25
fiducial no. 6742 6991
line location 8267006 8266965
client M.I.M. EXPLORATION PTY. LTD.
job 2114-9
area JUMP UP
scale 1:25000

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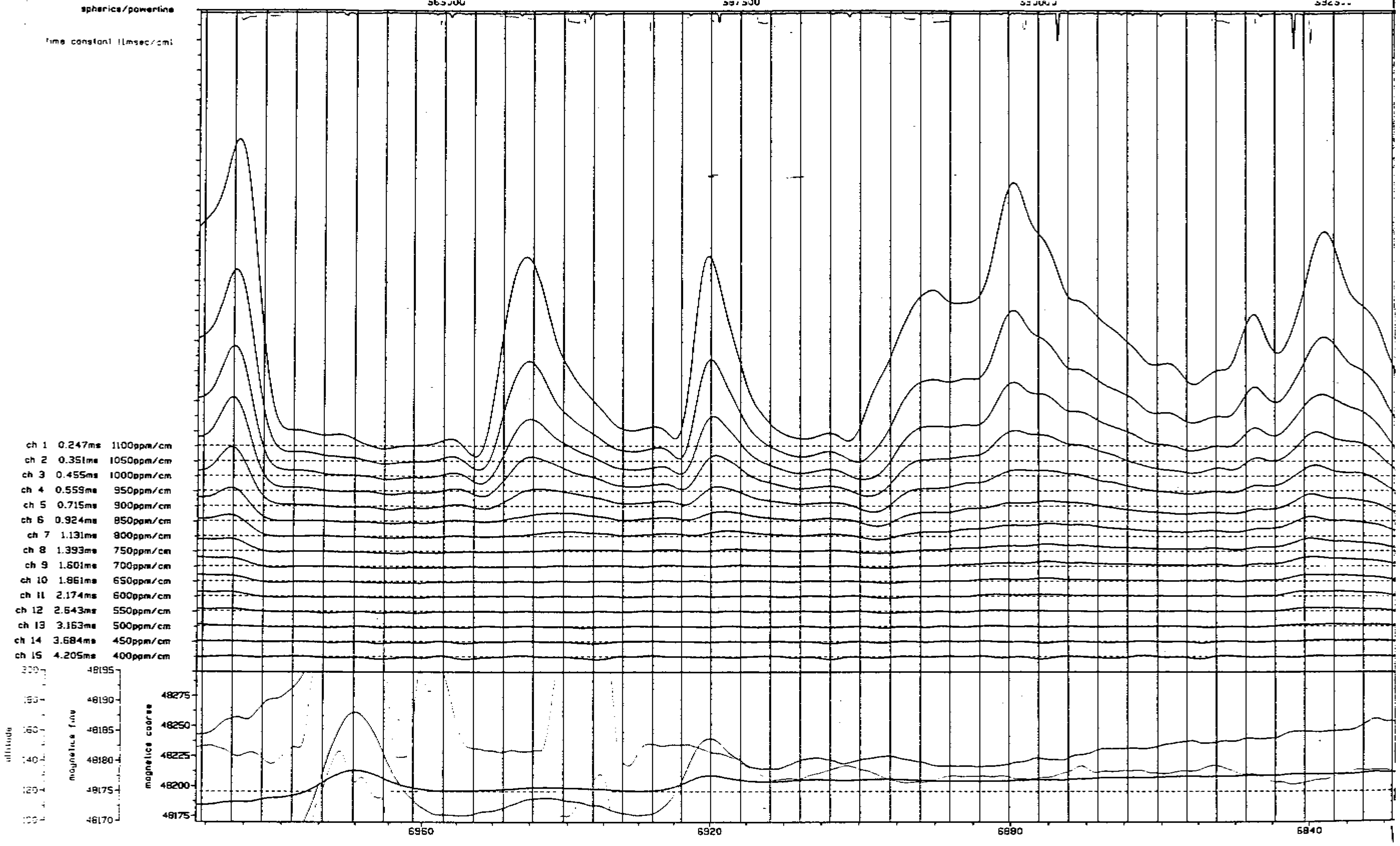

spherics/powerline
time constant (msec/cm)
ch 1 0.247ms 1100ppm/cm
ch 2 0.351ms 1050ppm/cm
ch 3 0.455ms 1000ppm/cm
ch 4 0.559ms 950ppm/cm
ch 5 0.715ms 900ppm/cm
ch 6 0.924ms 850ppm/cm
ch 7 1.131ms 800ppm/cm
ch 8 1.393ms 750ppm/cm
ch 9 1.601ms 700ppm/cm
ch 10 1.861ms 650ppm/cm
ch 11 2.174ms 600ppm/cm
ch 12 2.643ms 550ppm/cm
ch 13 3.163ms 500ppm/cm
ch 14 3.684ms 450ppm/cm
ch 15 4.205ms 400ppm/cm
altitude
magnetics fine
magnetics coarse
48275
48250
48225
48200
48175
48195
48190
48185
48180
48175
48170
6960
6920
6880
6840

AERODATA QUESTEM SYSTEM
Base frequency 75.0 Hz

line no. 110400
flight no. 14
direction 90
date flown 10oct91
time flown 09:07:34.50 09:12:27.25
fiducial no. 7022 7315
line location 8266501 8266501
client M.I.M. EXPLORATION PTY. LTD.
job 2114-9
area JUMP UP
scale 1:25000

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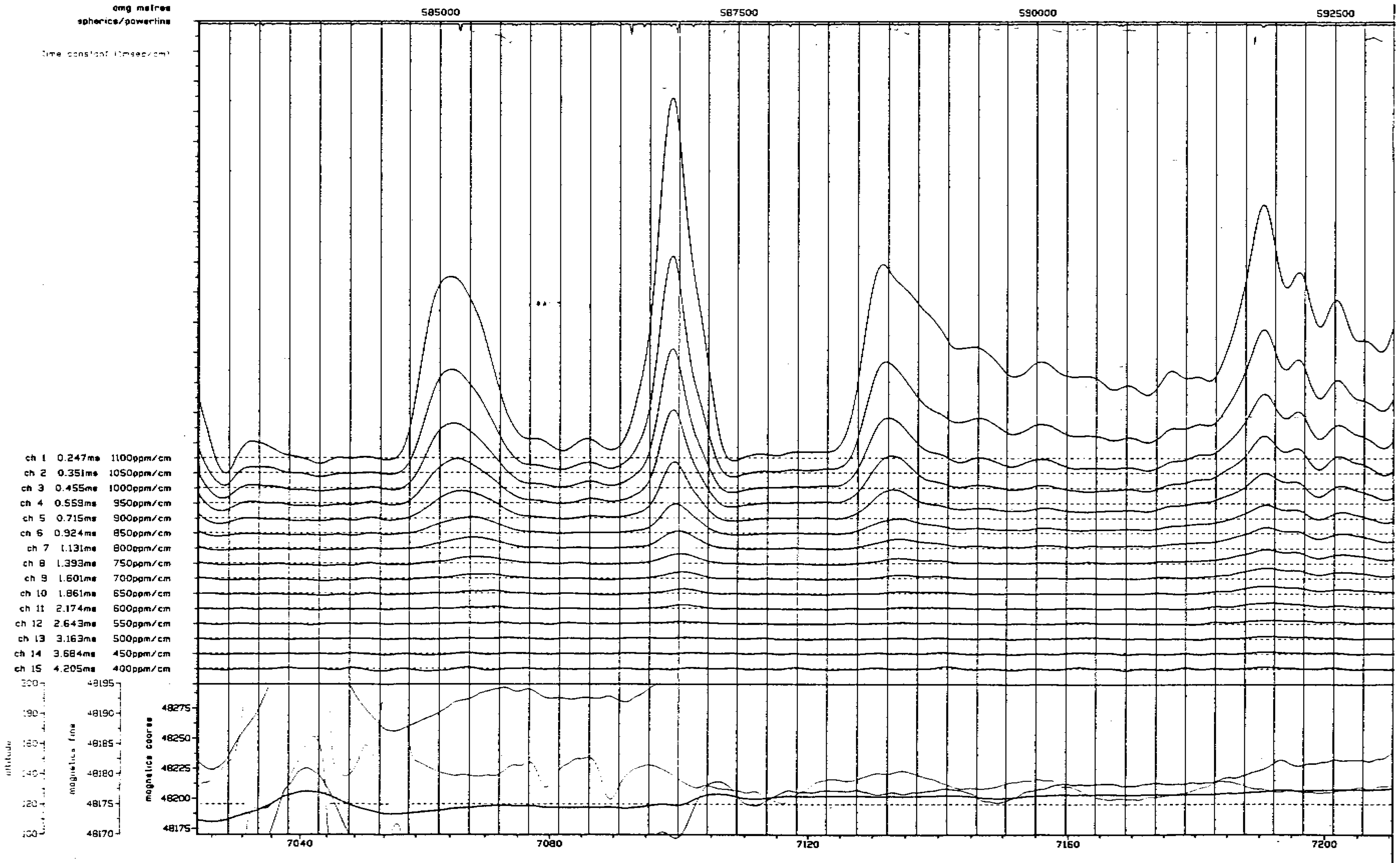
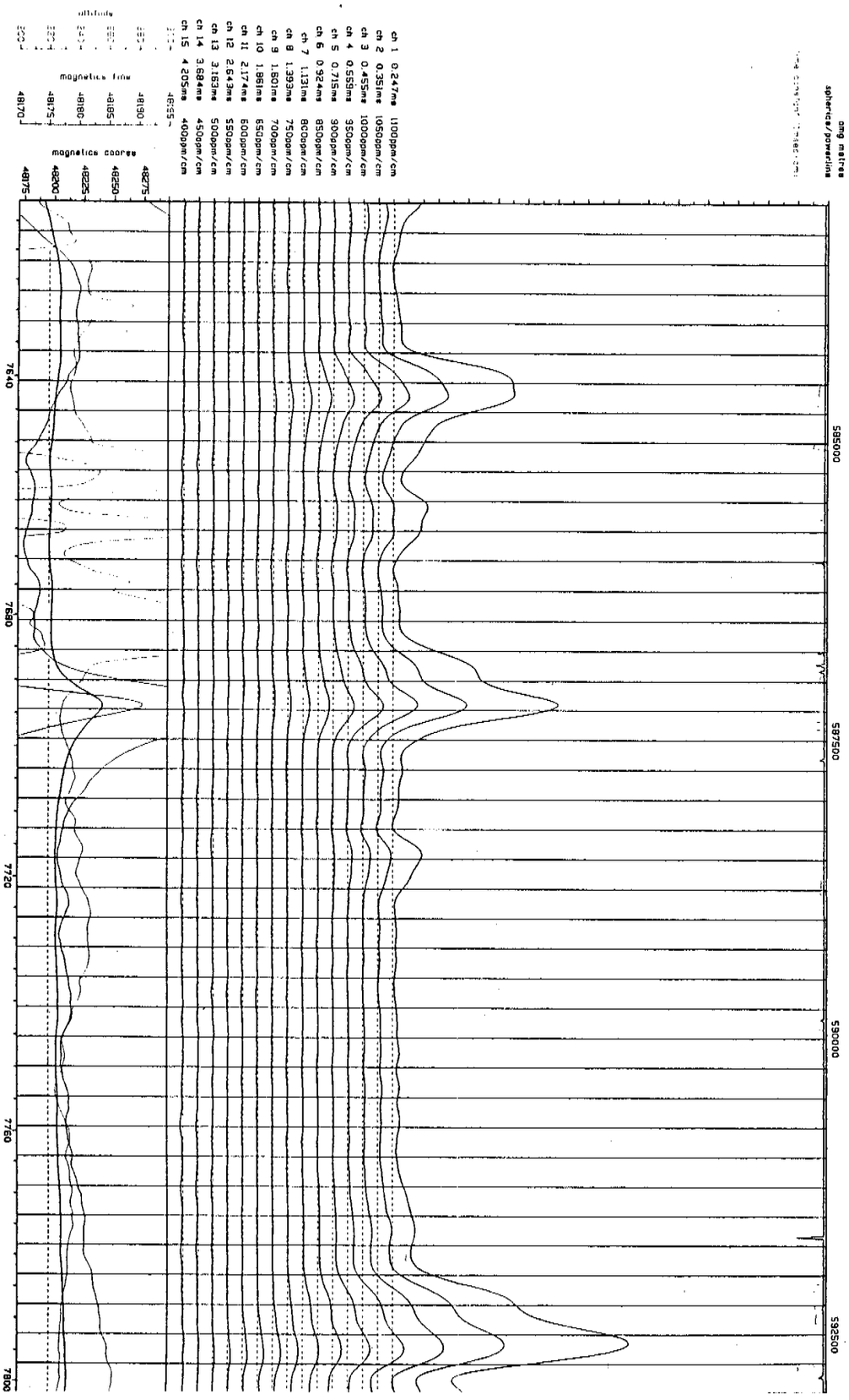


amg metres
spherics/powerline
585000
587500
590000
592500
time constant (msec/cm)
ch 1 0.247ms 1100ppm/cm
ch 2 0.351ms 1050ppm/cm
ch 3 0.455ms 1000ppm/cm
ch 4 0.559ms 950ppm/cm
ch 5 0.715ms 900ppm/cm
ch 6 0.924ms 850ppm/cm
ch 7 1.131ms 800ppm/cm
ch 8 1.393ms 750ppm/cm
ch 9 1.601ms 700ppm/cm
ch 10 1.861ms 650ppm/cm
ch 11 2.174ms 600ppm/cm
ch 12 2.643ms 550ppm/cm
ch 13 3.163ms 500ppm/cm
ch 14 3.684ms 450ppm/cm
ch 15 4.205ms 400ppm/cm
altitude
magnetics fine
magnetics coarse
48275
48250
48225
48200
48175
48195
48190
48185
48180
48175
48170
7040
7080
7120
7160
7200

AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	110600	
flight no.	14	
direction	90	
date flown	10oct91	
time flown	09:19:22.50	09:24:16.25
fiducial no.	7612	7905
line location	8265499	8265492
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	



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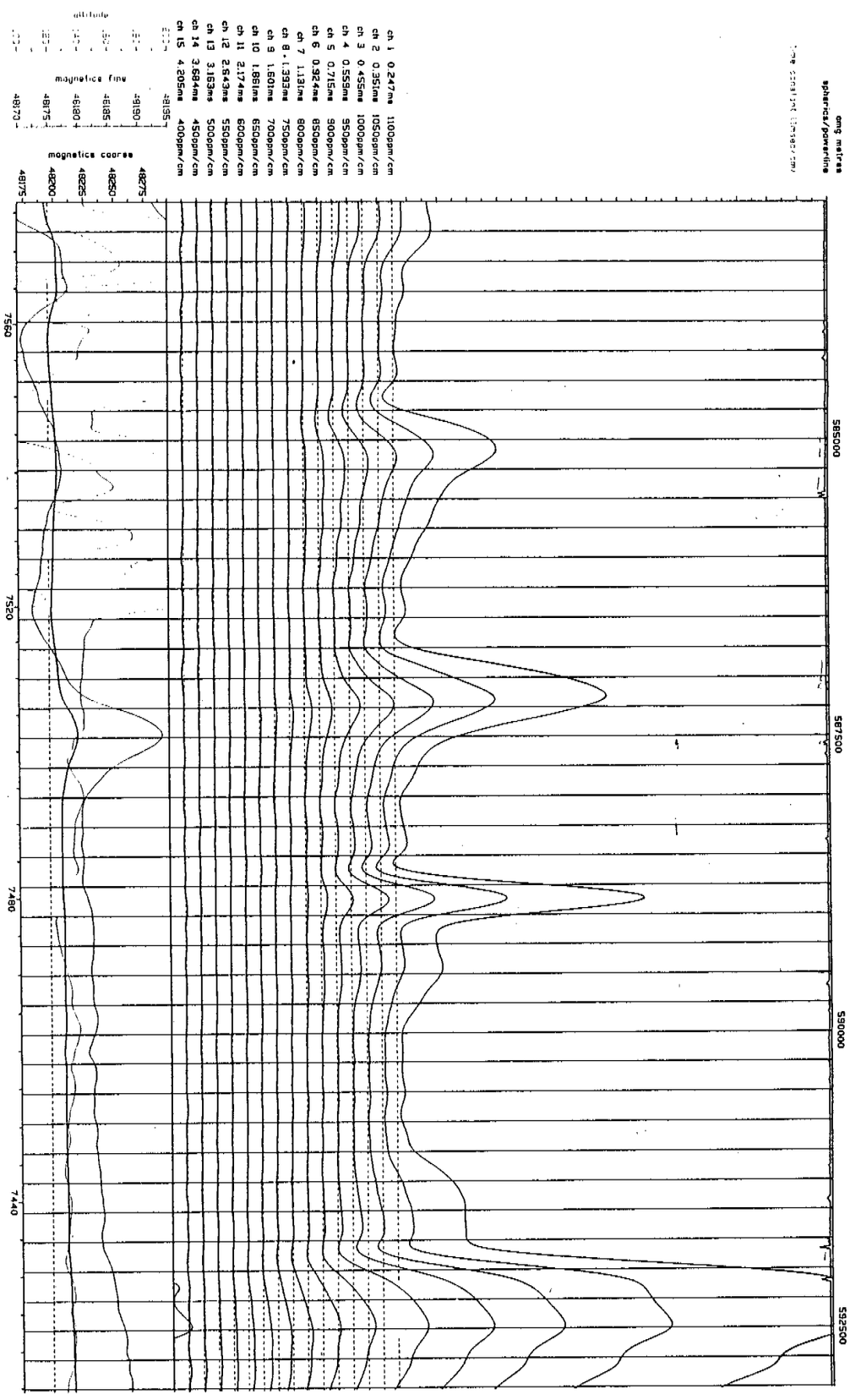
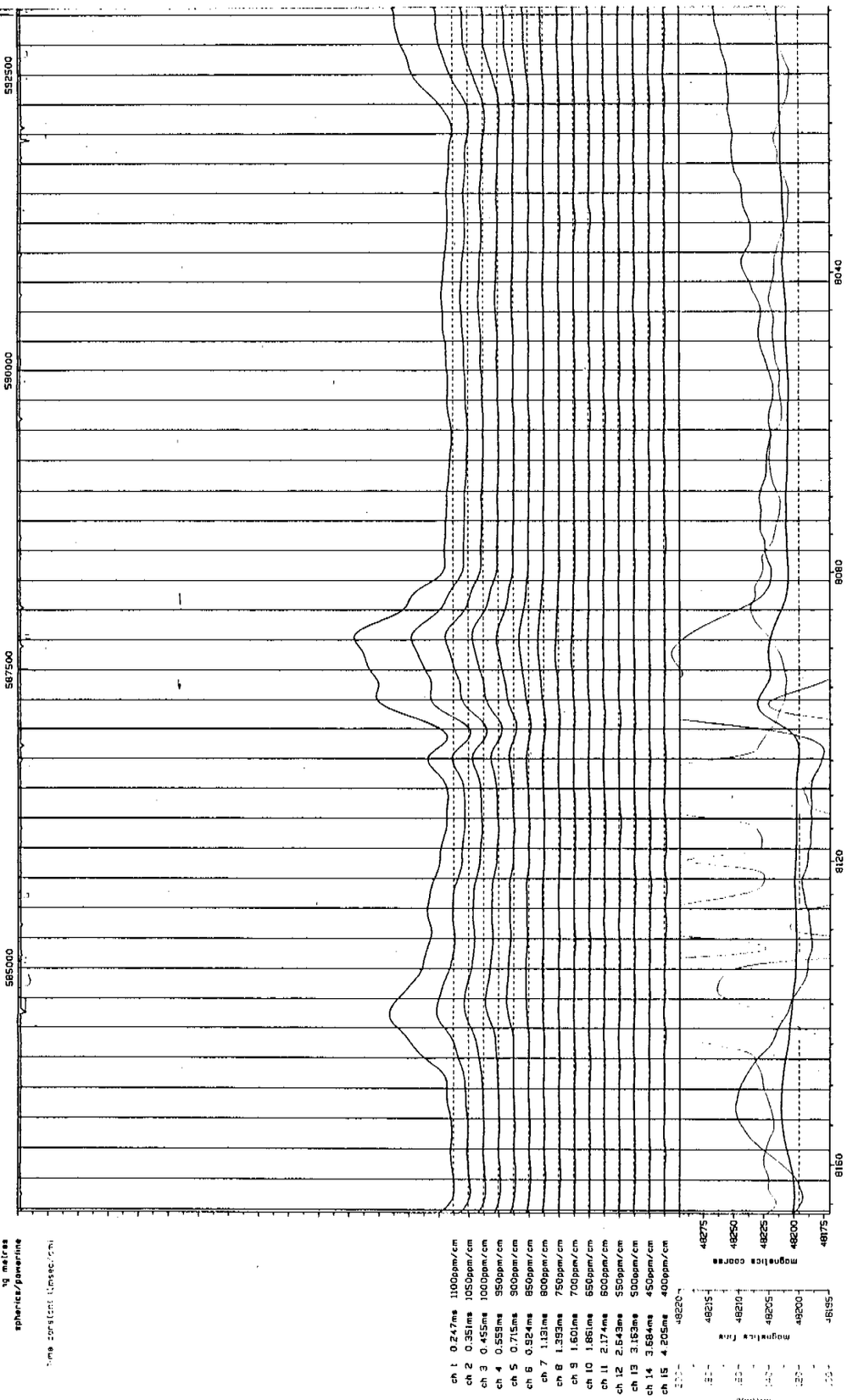
AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	110500	
flight no.	14	
direction	270	
date flown	10oct91	
time flown	09:13:33.50	09:17:41.25
fiducial no.	7328	7576
line location	8266035	8266003
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	



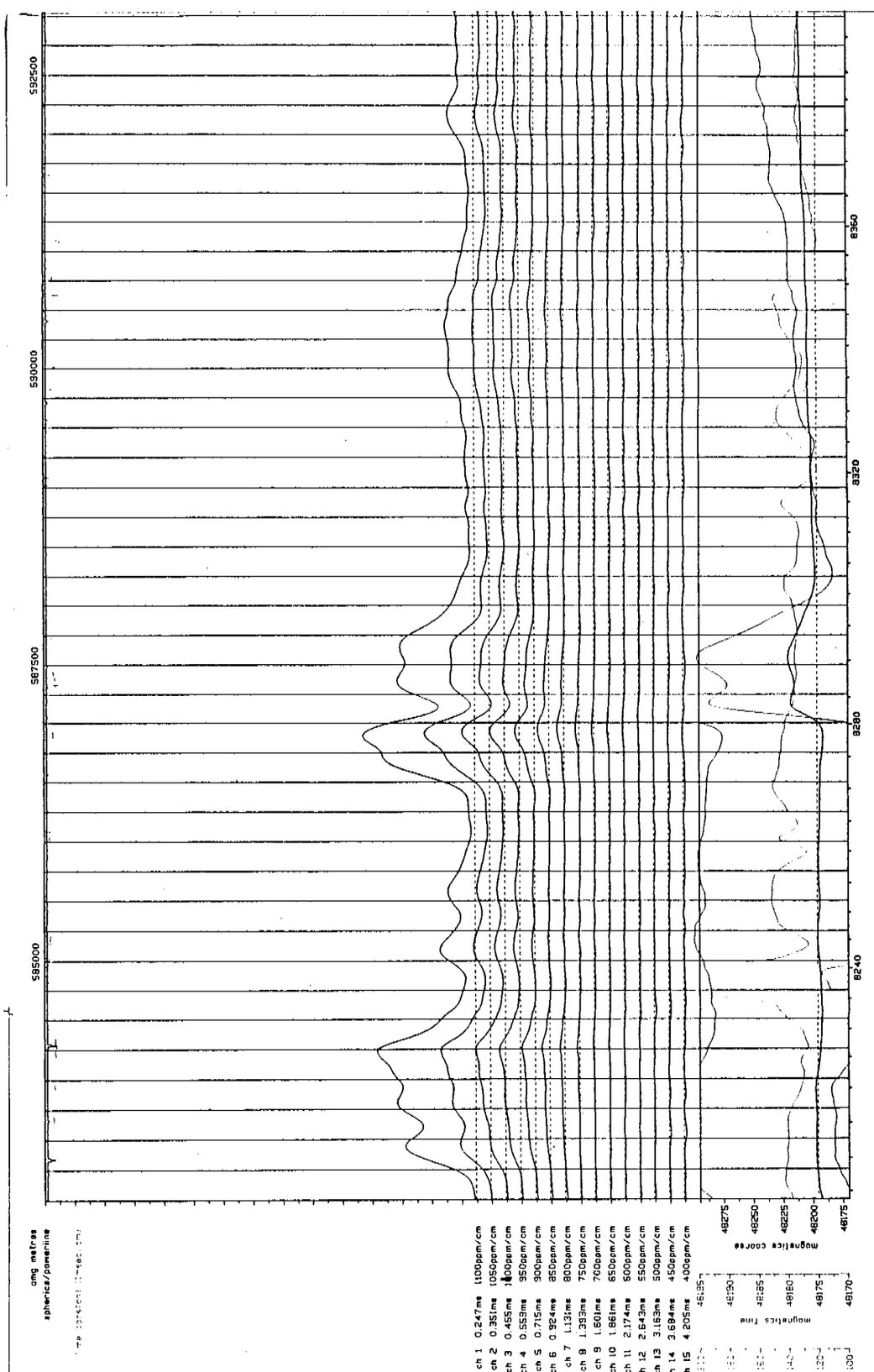


AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	110700
flight no.	14
direction	270
date flown	10oct91
time flown	09:25:14.50 09:29:24.25
fiducial no.	7916 8166
line location	8265027 8264996
client	M.I.M. EXPLORATION Pty. LTD.
job	2114-9
area	JUMP UP
scale	1:25000

ch 1	0.247ms	1100ppm/cm	ch 9	1.601ms	700ppm/cm
ch 2	0.351ms	1050ppm/cm	ch 10	1.861ms	650ppm/cm
ch 3	0.455ms	1000ppm/cm	ch 11	2.174ms	600ppm/cm
ch 4	0.559ms	950ppm/cm	ch 12	2.643ms	550ppm/cm
ch 5	0.715ms	900ppm/cm	ch 13	3.163ms	500ppm/cm
ch 6	0.924ms	850ppm/cm	ch 14	3.684ms	450ppm/cm
ch 7	1.131ms	800ppm/cm	ch 15	4.205ms	400ppm/cm
ch 8	1.393ms	750ppm/cm			



AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

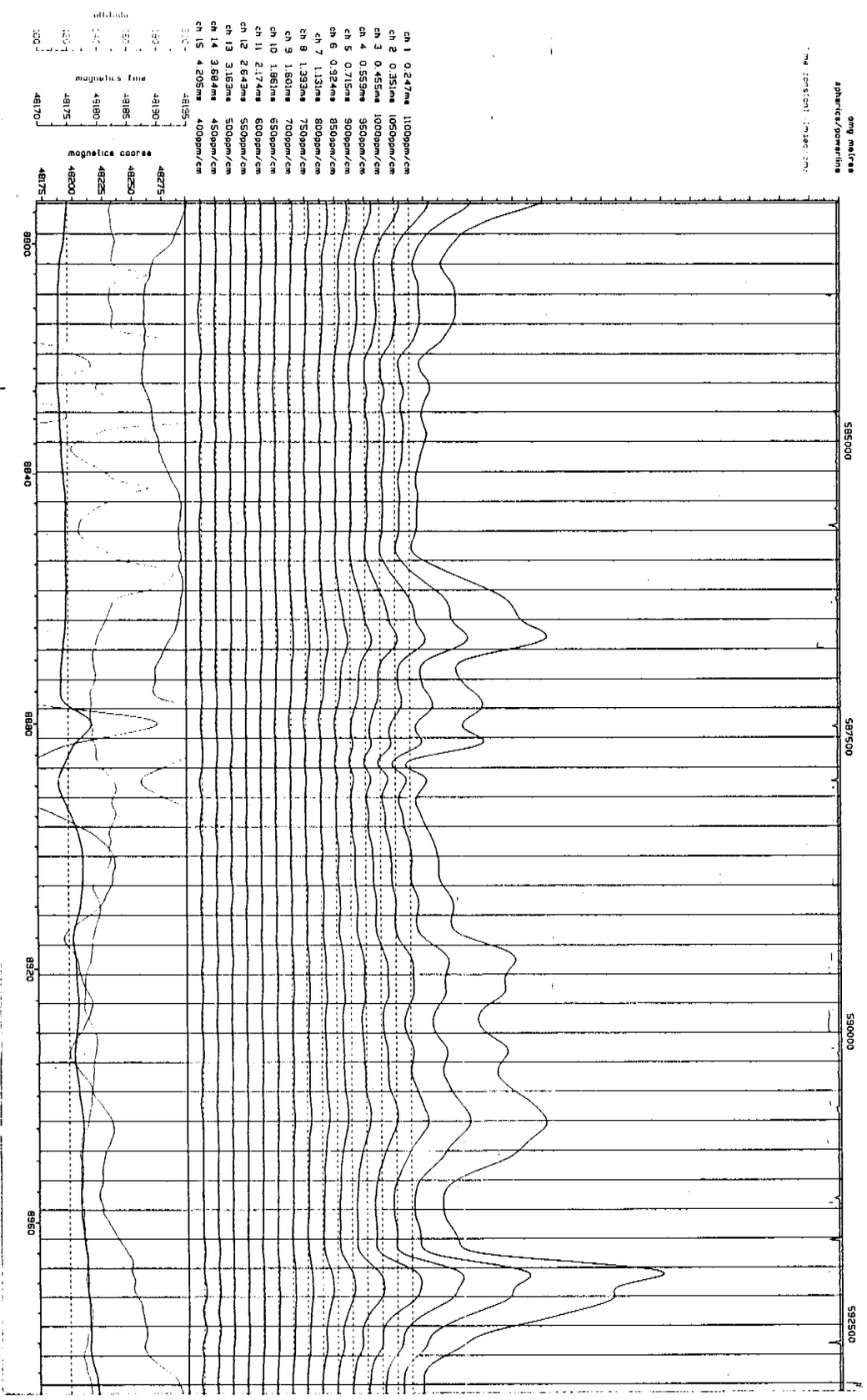
line no.	110800
flight no.	14
direction	90
date flown	10oct91
time flown	09:31:05.50 09:36:00.25
fiducial no.	8203 8499
line location	8264475 8264518
client	M.I.M. EXPLORATION Pty. LTD.
job	2114-9
area	JUMP UP
scale	1:25000

ch 1	0.247ms	1100ppm/cm	ch 9	1.601ms	700ppm/cm
ch 2	0.351ms	1050ppm/cm	ch 10	1.861ms	650ppm/cm
ch 3	0.455ms	1000ppm/cm	ch 11	2.174ms	600ppm/cm
ch 4	0.559ms	950ppm/cm	ch 12	2.643ms	550ppm/cm
ch 5	0.715ms	900ppm/cm	ch 13	3.163ms	500ppm/cm
ch 6	0.924ms	850ppm/cm	ch 14	3.684ms	450ppm/cm
ch 7	1.131ms	800ppm/cm	ch 15	4.205ms	400ppm/cm
ch 8	1.393ms	750ppm/cm			

AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	111000	
flight no.	14	
direction	90	
date flown	10oct91	
time flown	09:43:11.25	09:48:08.25
fiducial no.	8793	9090
line location	8263543	8263480
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	



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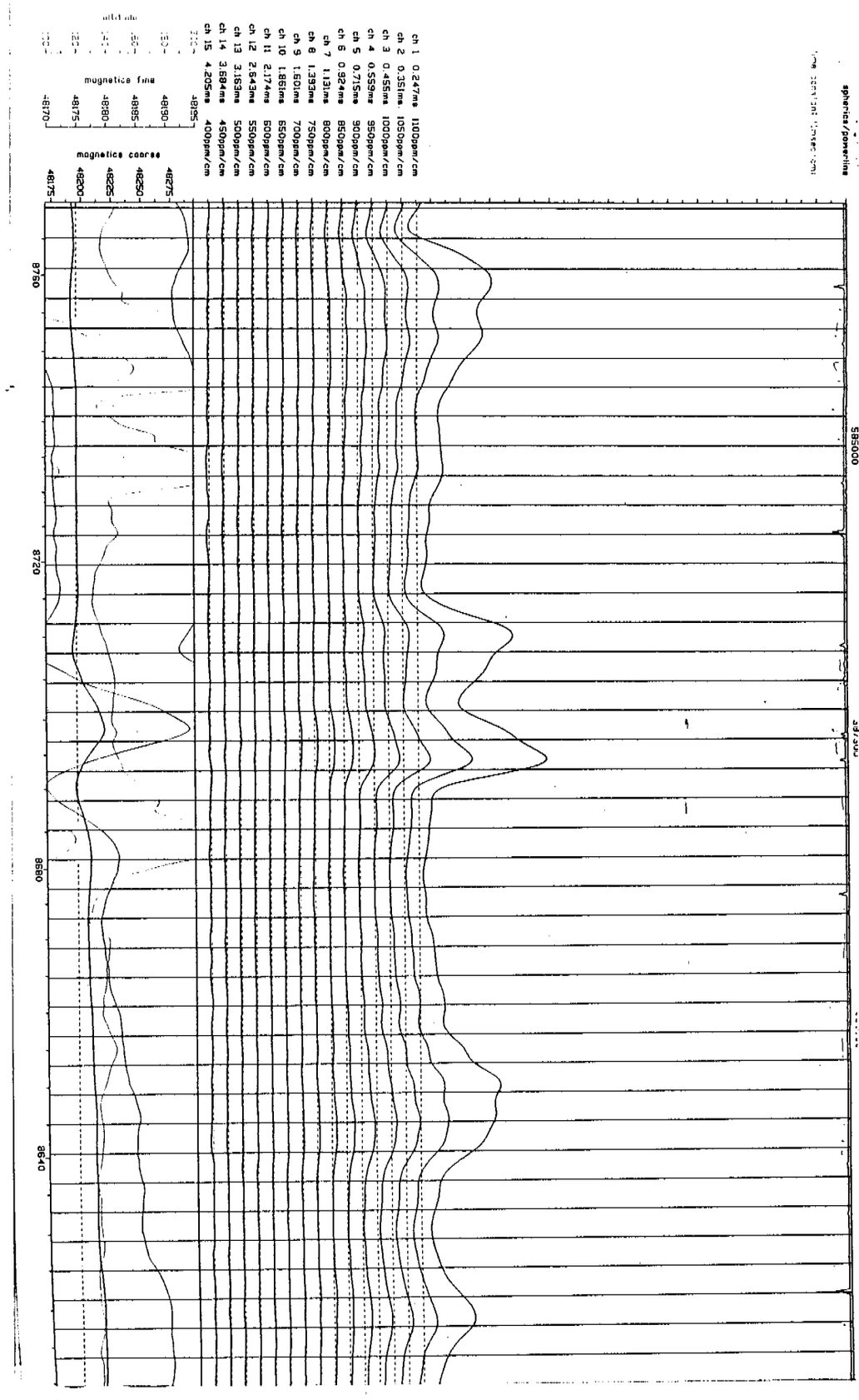
AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

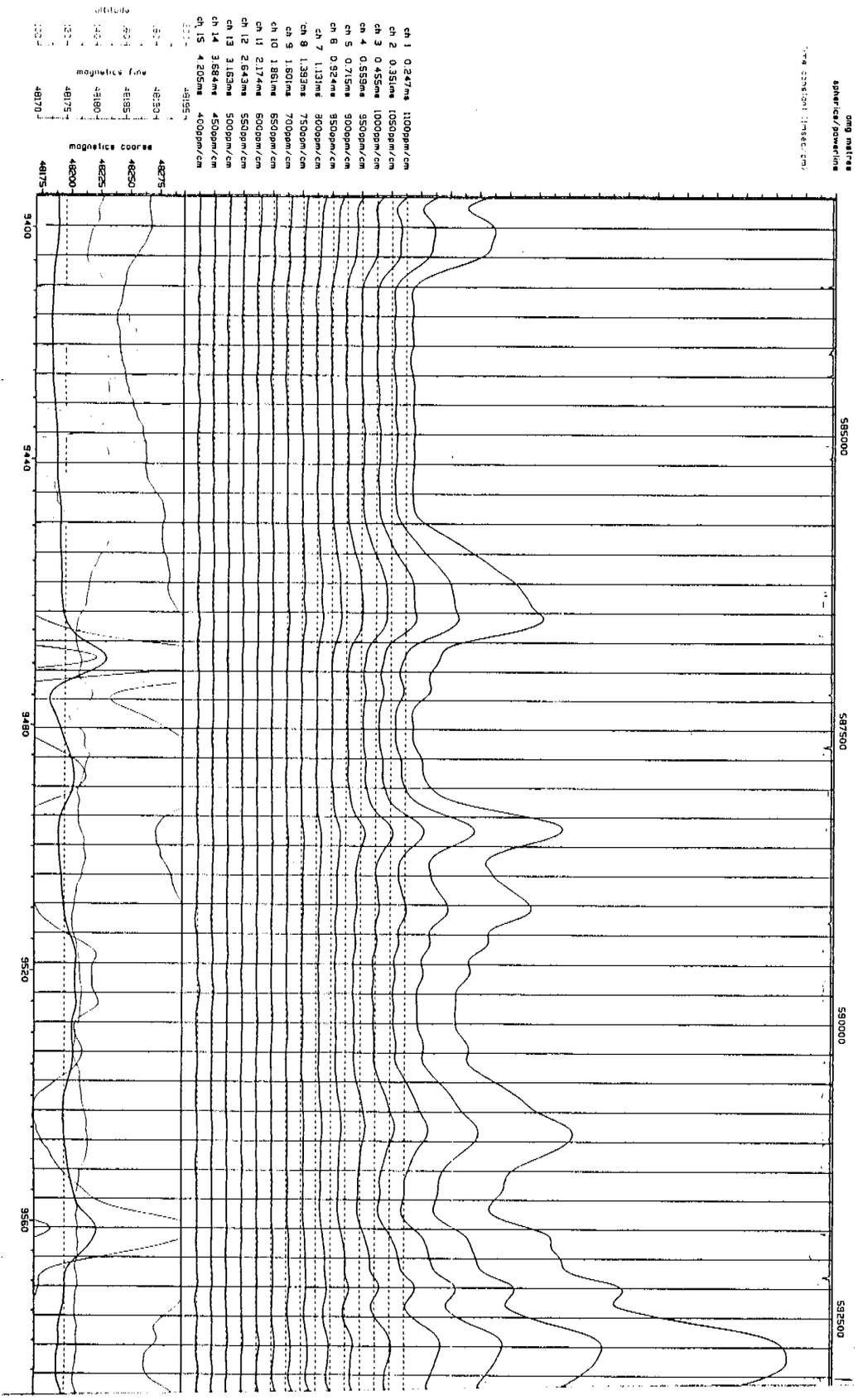
line no.	110900	
flight no.	14	
direction	270	
date flown	10oct91	
time flown	09:37:26.50	09:41:31.25
fiducial no.	8525	8769
line location	8264002	8263996
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	



AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	111200	
flight no.	14	
direction	90	
date flown	10oct91	
time flown	09:55:23.25	10:00:18.00
fiducial no.	9395	9690
line location	8262510	8262516
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	



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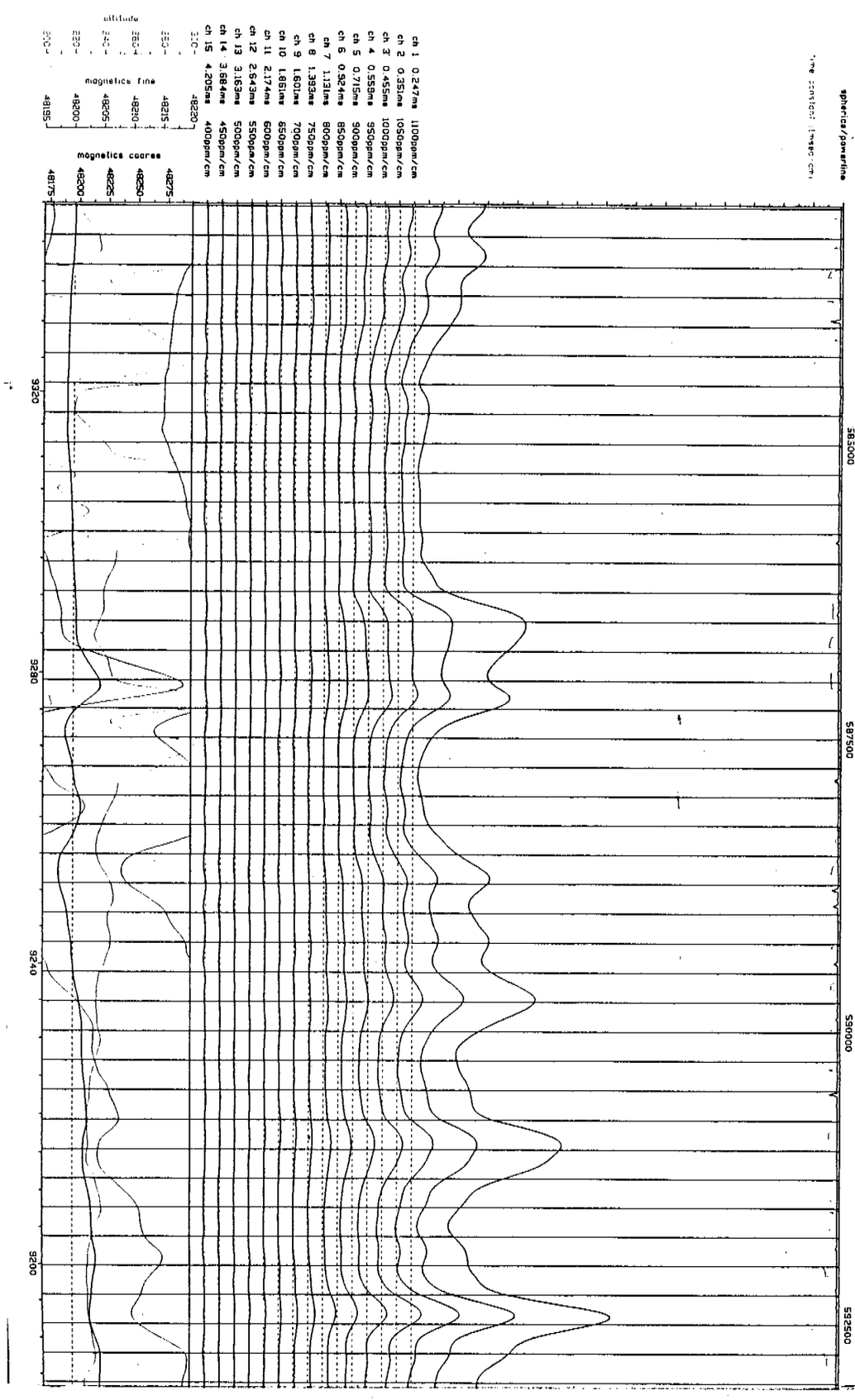
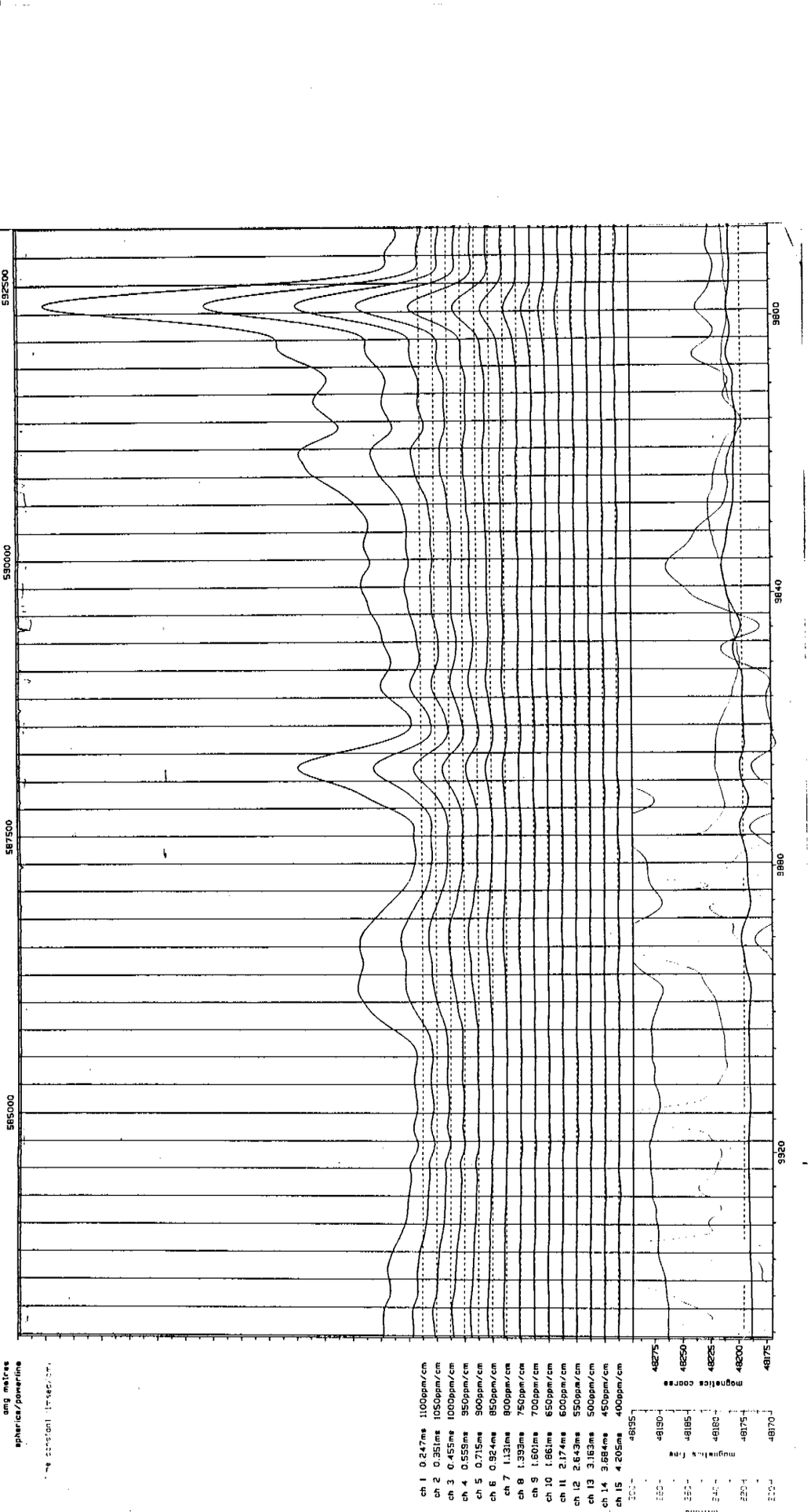
AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	111100	
flight no.	14	
direction	270	
date flown	10oct91	
time flown	09:49:19.25	09:53:21.00
fiducial no.	9103	9345
line location	8263013	8262968
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	





AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	111300	
flight no.	14	
direction	270	
date flown	100191	
time flown	10:01:30.25	10:05:34.00
fiducial no.	9702	9946
line location	8262057	8261976
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	

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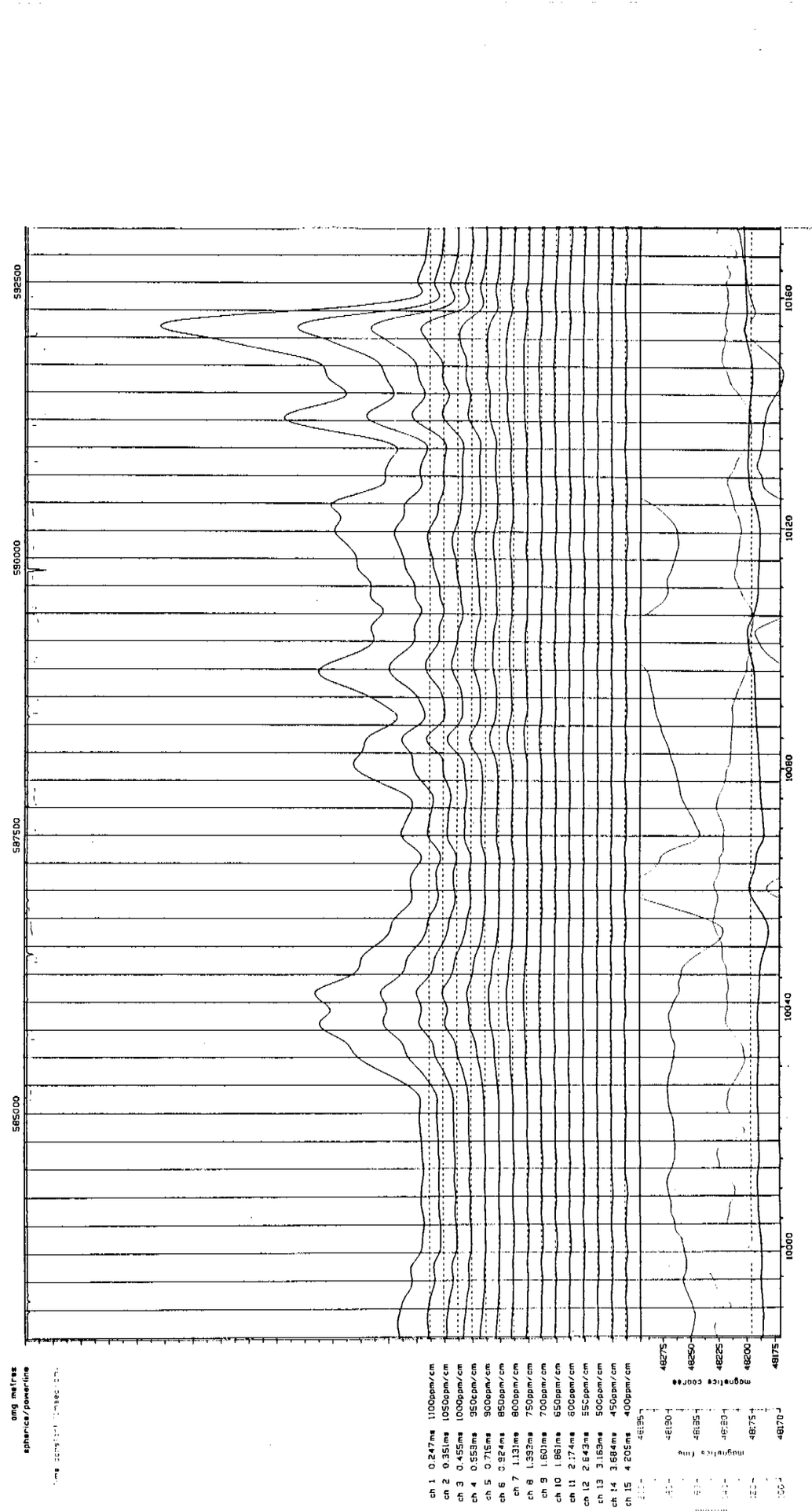

AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz

line no.	111400	
flight no.	14	
direction	90	
date flown	100191	
time flown	10:07:42.25	10:12:35.00
fiducial no.	9985	10278
line location	8261512	8261488
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	

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AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	111600	
flight no.	14	
direction	90	
date flown	10oct91	
time flown	10:20:22.25	10:25:15.00
fiducial no.	10574	10867
line location	8260508	8260483
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	

ch 1 0.247ms 1100ppm/cm
ch 2 0.351ms 1050ppm/cm
ch 3 0.455ms 1000ppm/cm
ch 4 0.559ms 950ppm/cm
ch 5 0.715ms 900ppm/cm
ch 6 0.924ms 850ppm/cm
ch 7 1.131ms 800ppm/cm
ch 8 1.393ms 750ppm/cm
ch 9 1.601ms 700ppm/cm
ch 10 1.861ms 650ppm/cm
ch 11 2.174ms 600ppm/cm
ch 12 2.643ms 550ppm/cm
ch 13 3.163ms 500ppm/cm
ch 14 3.684ms 450ppm/cm
ch 15 4.205ms 400ppm/cm

altitude
magnetics fine
magnetics coarse
dmg metres
spherics/powerline

AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	111500	
flight no.	14	
direction	270	
date flown	10oct91	
time flown	10:13:45.25	10:17:49.00
fiducial no.	10295	10539
line location	8260993	8261013
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	

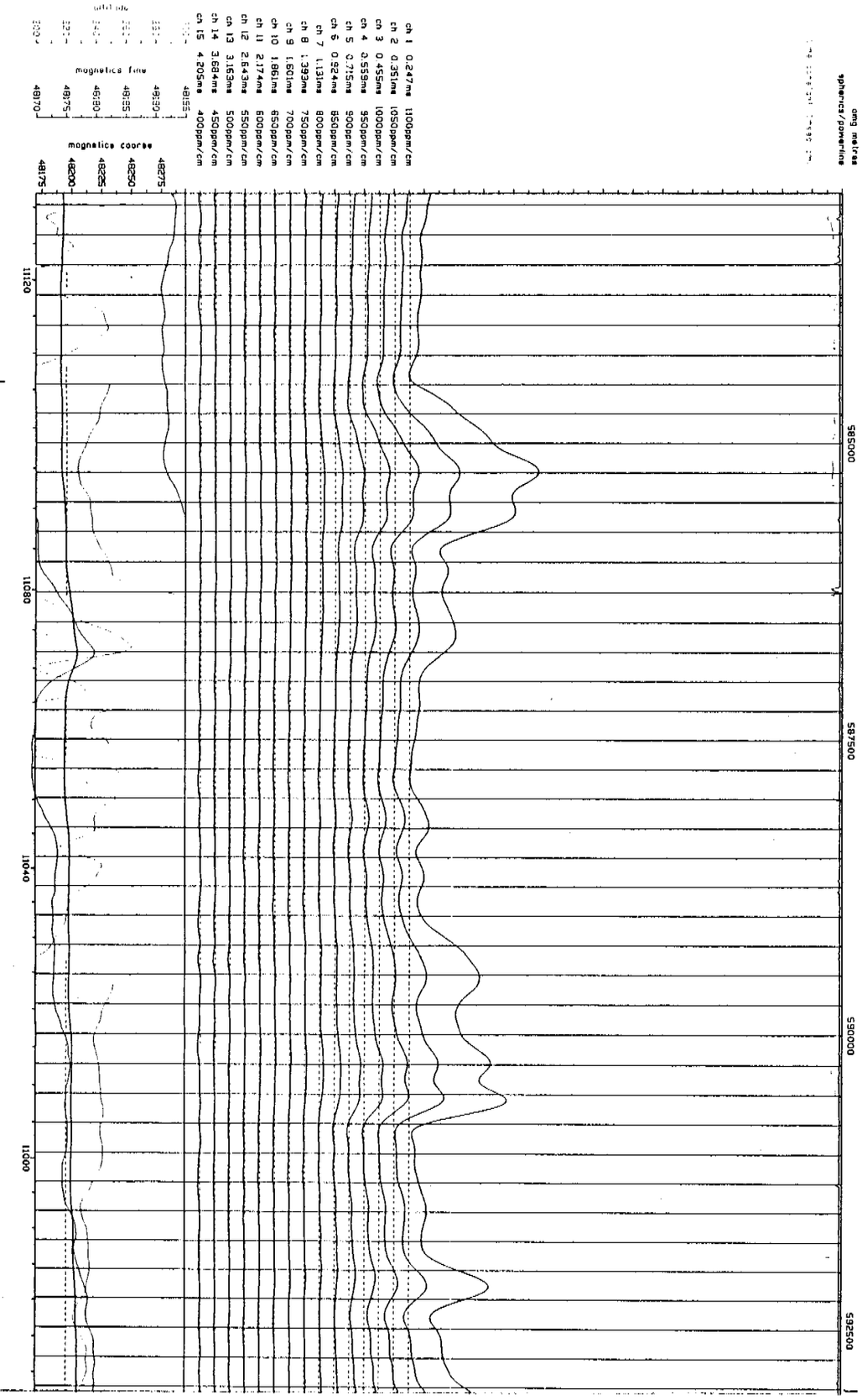
ch 1 0.247ms 1100ppm/cm
ch 2 0.351ms 1050ppm/cm
ch 3 0.455ms 1000ppm/cm
ch 4 0.559ms 950ppm/cm
ch 5 0.715ms 900ppm/cm
ch 6 0.924ms 850ppm/cm
ch 7 1.131ms 800ppm/cm
ch 8 1.393ms 750ppm/cm
ch 9 1.601ms 700ppm/cm
ch 10 1.861ms 650ppm/cm
ch 11 2.174ms 600ppm/cm
ch 12 2.643ms 550ppm/cm
ch 13 3.163ms 500ppm/cm
ch 14 3.684ms 450ppm/cm
ch 15 4.205ms 400ppm/cm

altitude
magnetics fine
magnetics coarse
dmg metres
spherics/powerline

AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no	111700
flight no.	14
direction	270
date flown	10oct91
time flown	10:26:30.25 10:30:42.00
fiducial no.	10880 11132
line location	8259990 8259995
client	M.I.M. EXPLORATION PTY. LTD
job	2114-9
area	JUMP UP
scale	1:25000



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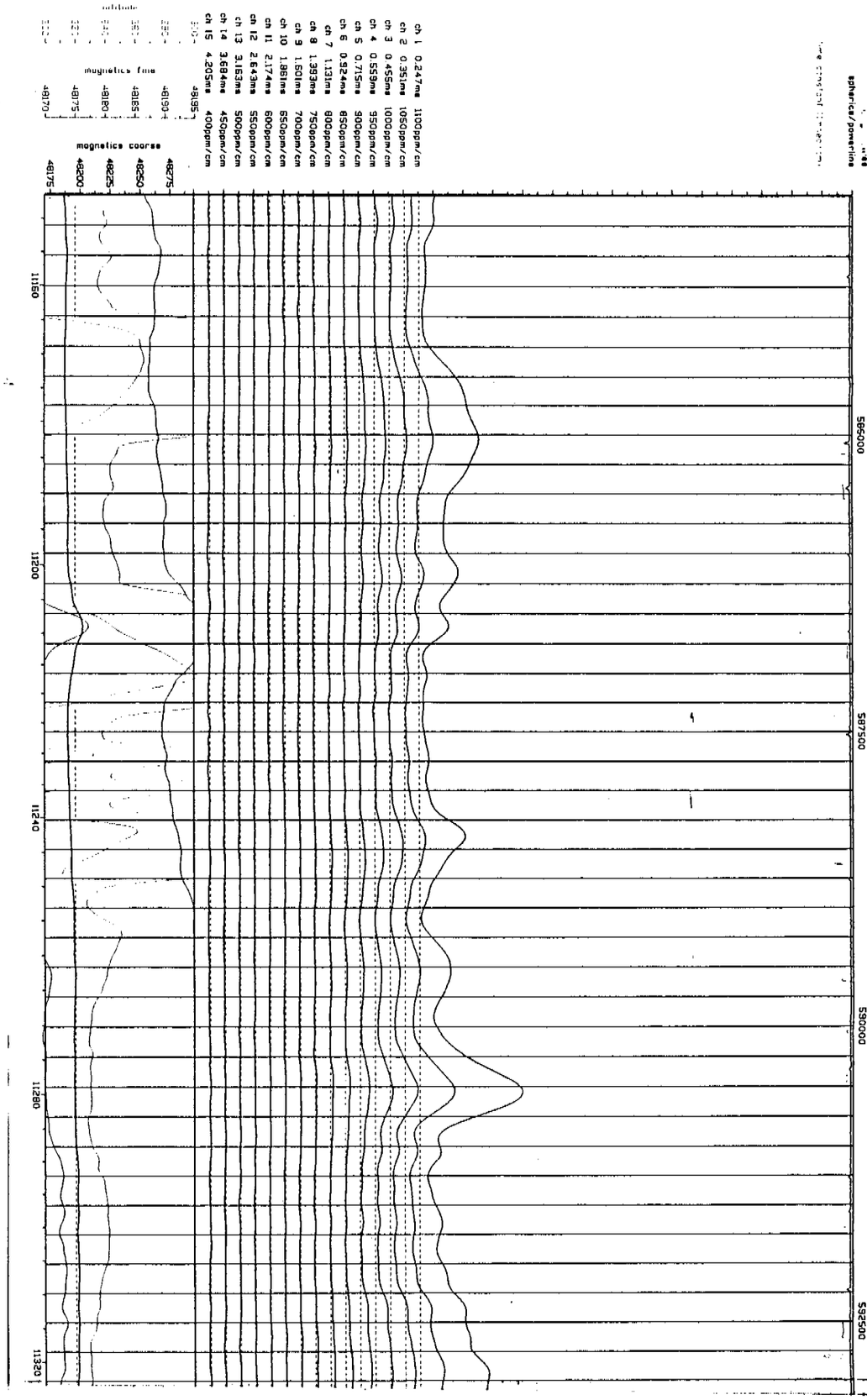
AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

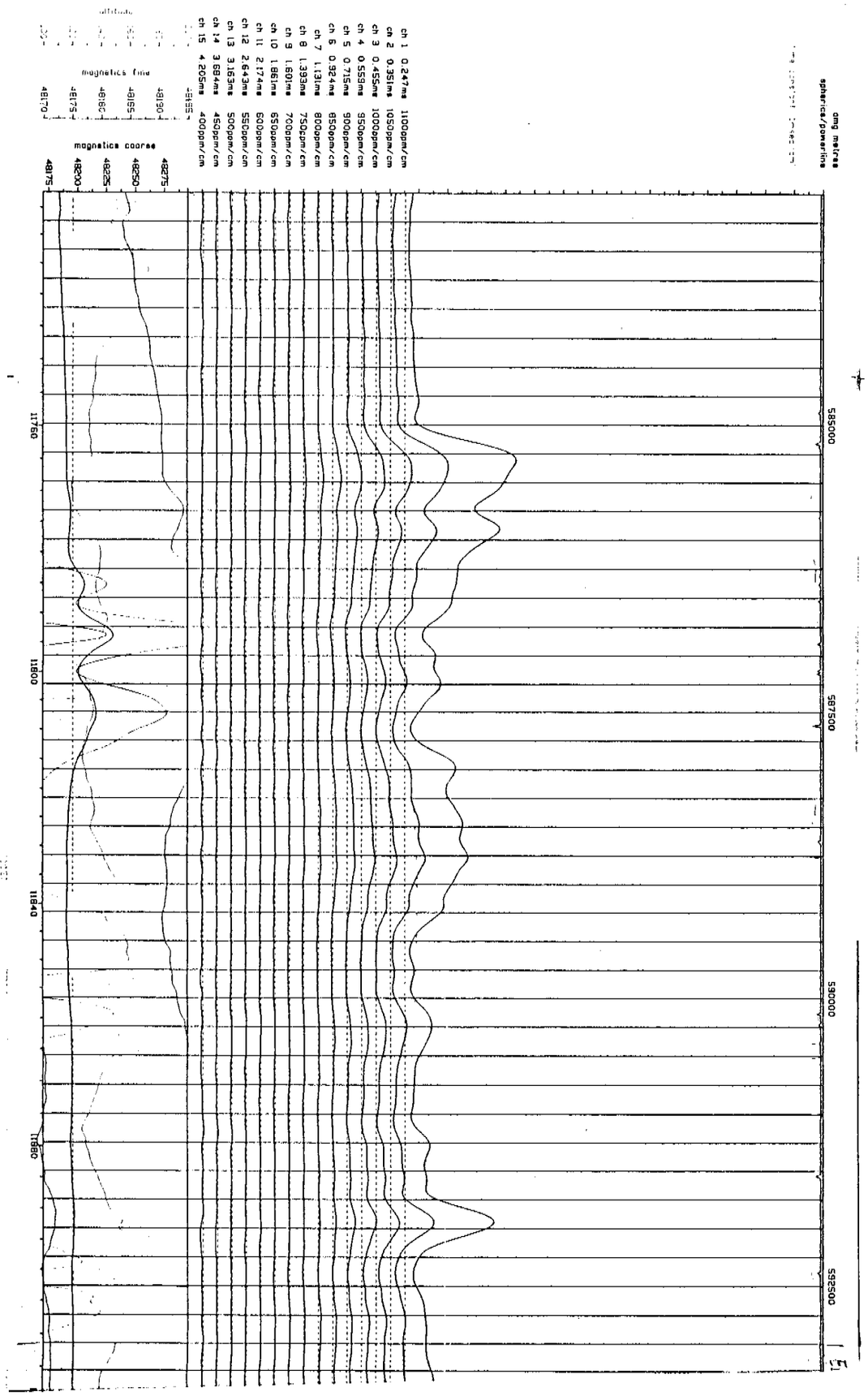
line no.	111800
flight no.	14
direction	90
date flown	10oct91
time flown	10:31:59.25 10:36:38.00
fiducial no.	11146 11425
line location	8259597 8259506
client	M.I.M. EXPLORATION PTY. LTD.
job	2114-9
area	JUMP UP
scale	1:25000



AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	112000	
flight no.	14	
direction	90	
date flown	10oct91	
time flown	10:43:39.25	10:48:26.00
fiducial no.	11722	12009
line location	8258517	8258488
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000	



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AERODATA QUESTEM SYSTEM

Base frequency 75.0 Hz.

line no.	111900	
flight no.	14	
direction	270	
date flown	10oct91	
time flown	10:38:11.25	10:42:23.00
fiducial no.	11451	11703
line location	8259007	8258956
client	M.I.M. EXPLORATION PTY. LTD.	
job	2114-9	
area	JUMP UP	
scale	1:25000