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BILLITON AUSTRALIA

THE METALS DIVISION OF
THE SHELL COMPANY OF AUSTRALIA LTD.

E.L. 103/87 - LAKE SELINA
VOLUME 2

Progress Report on Exploration for the Period Ending
21st April, 1989

MINES	
File Ref.	EL 103/87
22 MAR 1989	
Doc. Ref.	
Action Officer	Initials
LETTER	
20. 3. '89	
REFERS	
89-2929	
Submit to	Date
N. Hungerford	

RECORDED

Authors : C.J. Creagh
N. Hungerford

Report No : 08.4247

Date : 17th March 1989

Copy No :

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1. Department of Mines, Tasmania
 2. Billiton Australia, Melbourne
 3. Billiton Australia, Tasmania

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SUMMARY

Exploration carried out during the initial 12 month tenure on the Lake Selina portion of EL 103/87 has consisted of gridding, ground magnetic survey, CSAMT survey, field mapping and interpretation and compilation of previous exploration activity.

One significant bedrock conductor has been located by the CSAMT survey with further TEM testing to be carried out.

The known mineralization within the licence appears to be of Cambrian origin, remobilised along zones of structural weakness to its present location during the Devonian.

Mapping has revealed a favourable setting for VMS style mineralization.

1.0 INTRODUCTION

This report details exploration completed and results achieved by Billiton Australia within the Lake Selina portion of EL 103/87 during the 12 month period to 21st April 1989. This is the first year of tenure of the licence and thus this report represents the initial report by the company. The licence was acquired by a successful tender to the Mines Department.

Exploration philosophy for the Lake Selina area has been to locate massive base metal sulphide mineralization at depths probably greater than 200m.

2.0 LAND TENURE

EL 103/87 was granted to the Shell Company of Australia until the 21st April 1989. The licence consists of 26 sq km, which is divided into two separate areas known as Lake Selina (10 sq km), and Basin Lake (16 sq km) (Fig. 1). This report deals with the Lake Selina area only; the Basin Lake report is in Volume 1.

The Lake Selina area is totally within the Southwest Conservation Area. Part of the licence is due to be flooded in 1994 as a result of dam construction by the HEC.

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3.0 LOCATION & ACCESS

The Lake Selina EL is located on the west coast of Tasmania approximately 13km southeast of Rosebery (Fig. 1). Access to the licence is via the Anthony Road, which passes along the western boundary. Access within the licence is via 4WD tracks which join the Anthony Road at the HEC Newton Camp.

A significant topographical feature within the licence is Mt. Selina (780m), which occupies the northern portion of the licence., Steep rugged terrain persists throughout this area. Vegetation over Mt. Selina consists of thick rainforest and ti-tree scrub whereas the remainder of the licence is flat to gently undulating hills covered in button grass and light ti-tree scrub.

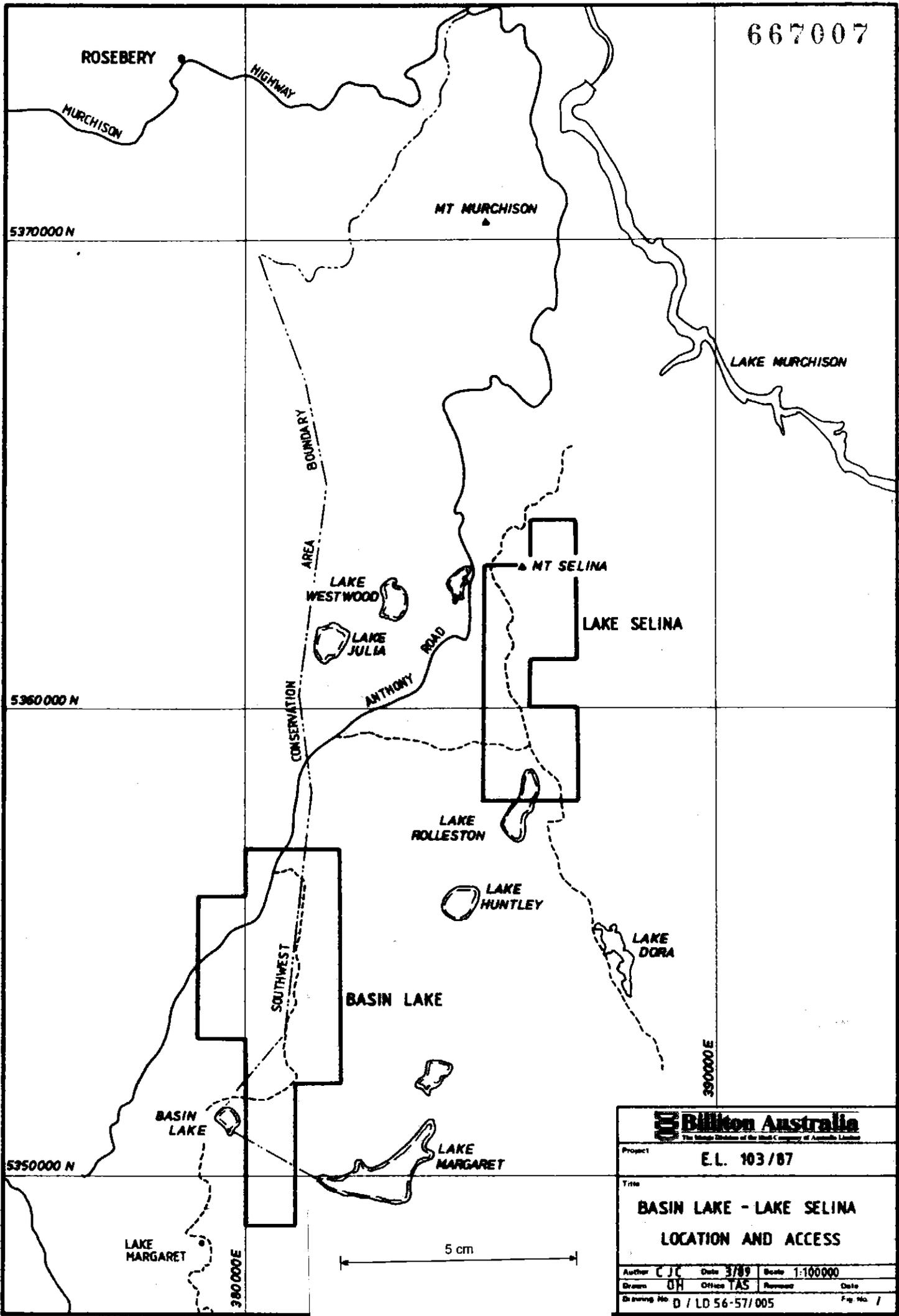
4.0 GEOLOGICAL SETTING

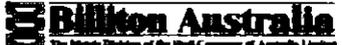
The Lake Selina licence area is located along the eastern margin of the Cambrian Mt. Read Volcanics, a northerly trending predominantly felsic volcanic arc on the west coast of Tasmania (Fig. 2).

The EL contains lithologies from the youngest sequence of the Mt. Read Volcanics, the Tyndall Group. The Tyndall Group consists of mainly quartz-feldspar phyric volcanics and sediments. The eastern boundary of the Tyndall Group is marked by a disconformable contact with the PreCambrian Tyennan Nucleus

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 <small>The Maps Division of the Staff Company of Australia Limited</small>			
Project		E.L. 103/87	
Title			
BASIN LAKE - LAKE SELINA LOCATION AND ACCESS			
Author	CJC	Date	3/89
Scale	1:100000		
Drawn	OH	Office	TAS
Drawing No.	D / LD 56-57/005		Page No. 1

07
quartzites and metasediments. To the west the Tyndall Group is fault bound by a down thrown block of Ordovician Owen Conglomerate.

5.0 PREVIOUS EXPLORATION

Copper mineralization was discovered within the licence by prospectors at the turn of the century, with several adits and trenches being excavated between 360000N and 362000N ('Lake Selina Workings'). From 1903 to 1939 Mt. Lyell and the Mines Department carried out test work on these small copper deposits with discouraging results. RTAE carried out an aeromagnetic survey in 1957 but failed to carry out any ground surveys.

Systematic exploration commenced in 1969-70 when Mt. Lyell (GoldFields Exploration Pty. Ltd.), gridded, mapped, soil sampled (where not moraine covered) and surveyed with magnetic, Pole-dipole IP and SP the area south of 361200N. This work defined the southern end of the Western Pyrite Zone (WPZ), as a marked IP anomaly with coincident magnetic and geochemical anomalies. The zone between 360000N and 361200N was drilled in 1970 by holes LS 1-3, which intersected pyritic altered rhyolitic volcanics with minor basemetals.

Mapping over the remaining northern portion of the licence was completed after LS 1-3 were drilled. Pole-dipole IP and magnetic surveys were carried out north of 361200N but only

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covered the Western Pyrite Zone region. Grid based soil sampling was carried out during the summer of 1970-71 from 361200N to 362800N. These surveys showed that the WPZ was best expressed between 362000N and 363200N. Drill holes LS 4-6 and LS 7 were drilled in this area in 1971 and 1972 respectively. All four holes intersected extensive zones of strong pyrite-magnetite mineralization but base metal values were low.

Other than a small, partially successful Turair EM survey in 1973 over the area drilled by LS 4-7, and an inconclusive study of cobalt levels in pyrite of the WPZ, interest in the licence area lapsed at this stage.

In 1975 a comprehensive review of all results concluded that the style and degree of mineralization in the WPZ around 362400N to 362800N was similar to that at Mt. Lyell.

Exploration was renewed in 1979-80, and a Dighem survey of the area north of 361600N. A similar magnetic signature to that of the WPZ was observed several hundred metres to the east of the WPZ, being later confirmed as the Eastern Pyrite Zone (EPZ), in 1980-81 by mapping and gradient array IP surveys. The EPZ was drilled by LS 8 to the north of the present licence area in 1981. The hole showed a zone of strong banded and disseminated magnetite-pyrite mineralization but with insignificant base metal values.

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An alteration study of the Mt. Read Volcanics by Eastoe in 1981 concluded that the Selina mineralization was 'deep footwall type' related to the Cambrian Murchison Granite, and unsuitable for the formation of massive sulphides.

During 1984 two holes were drilled in the WPZ, LS 9 and LS 12 (outside current licence). No significant assay results were obtained from these holes, with LS 12 ending within the Murchison Granite. Two holes were also drilled to test the EPZ, LS 10 and LS 11 (outside current licence). LS 10 contained maximum values of 1.06% Zn, 0.72% Cu, 5g/t Ag and 0.21g/t Au (non-coincident 1m intervals). The hole ceased drilling within altered, cherty-chalcedonic tuffaceous sediments averaging 15% disseminated pyrite.

During 1985 a UTEM survey was carried out over a significant geochemically anomalous region immediately to the south of the EPZ, with no major anomalies being noted. This zone was drilled by LS 13 in 1986, intersecting weak sulphide mineralization, including thin galena-sphalerite veinlets over a 60m interval within moderately altered volcanoclastics.

Down-hole Sirotem on LS 10 and LS 13 in 1986 failed to detect any anomalies.

6.0 EXPLORATION COMPLETED

The original exploration philosophy of searching for massive sulphide targets at depths greater than 200m has been adhered to during the current reporting period.

Approximately 24 line kms of grid were constructed over the entire licence. A ground magnetic survey has been conducted over the grid. A partial CSAMT survey has also been carried out. Interpretation of the data are completed. A TEM survey over anomalous CSAMT areas and untested zones was unsuccessful due to equipment failure.

Grid based mapping has been carried out in the northern portion of the licence and the geology and mineralization reinterpreted.

7.0 EXPLORATION RESULTS

7.1 Geology

A new grid consisting of approximately 24 kms of grid lines with 400m spacing, and 10 km of access lines were constructed over the entire licence. The grid was completed under contract in May 1988 (Fig. 3).

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Mapping of the grid was only carried out in the northern portion from 361600N to 364000N. Outcrop within this part of the licence is generally poor with interpretations loosely based on inferred positions of lithologies from predominantly float samples. Outcrop to the west of 385600E is almost non-existent, being mostly covered by a flat buttongrass plain.

The geology within the EL consists of a thin segment of the predominantly quartz-feldspar phyric volcanics and sediments of the Late Cambrian Tyndall Group, fault bound to the west by the Ordovician Owen Conglomerate and overlying the PreCambrian Tyennan Nucleus to the east. The geology of the Tyndal Group within the licence in the past has been interpreted as consisting of a central dome-like mass of dacitic lavas and intrusives centred on Mt. Selina lying conformably upon the Sticht Range Beds. This central lava complex is flanked to the east and west by volcanoclastics and sediments steeply dipping generally to the east with east and west facings away from the central lava mass.

The results from recent mapping have been interpreted as a sequence of rhyolitic to dacitic volcanics, epiclastics and lesser sedimentary rocks of the Tyndall Group shallowly dipping (30°) to the east of west (Fig. 3). Contacts observed within drill core suggest steeper dips. The Tyndall Group is then overlain by the Dora Conglomerate

in the north and extreme south of the licence, possibly forming a syncline or small fault bounded basin structure. Clasts within the Dora Conglomerate are derived from the Tyndall Group and PreCambrian Tyennan Nucleus. The Sticht Range Beds appear to be either syndepositional to, or overlie the Dora Conglomerate in the northeastern part of the licence. The Sticht Range Beds sequence of laminated quartz-mica sandstones overlain by coarse quartzite conglomerate within this part of the licence strongly resembles the basal Newton Creek Sandstone Member of the Denison Group.

Two very extensive and strong linear, conformable zones of pyrite \pm base metals mineralization - the Eastern Pyrite Zone (EPZ) and Western Pyrite Zone (WPZ), occur within the Tyndall Group sequence. The EPZ and WPZ both occur within zones of intense shearing which can be traced over considerable distance north-south. Clasts within the Dora Conglomerate adjacent to the EPZ display considerable flattening and lineation. The intense shearing appears to be parallel to a regional foliation attributed to the Middle Devonian Tabberabberan Orogeny. A thin section study was made of these two zones at the University of Tasmania, in an attempt to determine the nature of the mineralization. Thin sections were cut from drill core, DDH LS 6 representing the WPZ and DDH LS 10 representing the EPZ. Examination of the thin sections has shown the base metal sulphides (galena,

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sphalerite and chalcopyrite), to have been emplaced syntectonic to, or post-tectonic to the Tabberabberan Orogeny. In LS 6 base metal sulphides have deposited within pressure shadows of deformed pyrite grains suggesting syntectonic deposition. In LS 10 quartz-carbonate veins containing pyrite, chalcopyrite, galena and sphalerite cross cut the regional foliation suggesting post-tectonic emplacement.

A lead isotope investigation by Gulson & Porritt, (1983), upon the Lake Selina prospect indicates similar $^{206}\text{Pb}/^{204}\text{Pb}$ as that found from Cambrian massive sulphide deposits elsewhere within the Mt. Read Volcanics eg Rosebery, Que River, Hercules. These results suggest the remobilization of sulphides during the Devonian along preferentially weak structural zones from an original Cambrian sulphide system. This mineralization may be due to the intrusion of the Murchison Granite equivalent, which outcrops on 361600N, however recent lead isotope studies carried out by Billiton suggest that the Murchison Granite is not the source of the sulphides.

7.2 Geophysics

Geophysical surveys comprised a major part of the exploration work carried out during the reporting period.

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Surveys carried out include:

Ground Magnetics: Line 358000N to 364000N
(Billiton) 10.6 line kms, 10m station spacing
400 metre line spacing

CSAMT: Lines 358000-359200, 361200-362000mN
13.1 line kms (80m stns)
400m line spacing, 80m E-dipoles
9 frequencies

TEM: Line 359600N was surveyed using Zonge's
GDP-12 receiver. Data quality was so
poor that results are not included in
this report.

TEM: EM-37 survey in progress at time of
report. Results to be reported in
1989-1990 report.

7.2.1 Ground Magnetics

The stacked profiles are presented on Figs 4 and 5.

These profiles detail the aeromagnetic anomalies evident from the Mines Dept. aeromagnetic survey. This latter survey indicates a strongly magnetic source beneath Mt. Selina, possibly due to a magnetic Cambrian granite. A similar lower intensity feature occurs in the centre-west of the EL and may also indicate a deep Cambrian granite.

The ground profiles do not fully cover the strong anomaly under Mt. Selina but its presence is obvious on lines 364000N and 363600N, where subsidiary shallow sources are evident, generally coincident with the EPZ. This zone has been drilled by LS 10 and LS 8. The

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latter is about 250m north of the EL boundary and intersected strong chlorite-magnetite-pyrite alteration, clearly explaining the near-surface magnetic anomaly (which may be genetically related to the underlying granite).

Along the western edge of the grid a trend of shallow magnetic anomalies are coincident with the WPZ over about 3kms. This has been drill tested also, intersecting magnetite-pyrite alteration near the Ordovician/Cambrian contact (Anthony Fault). The magnetic source appears to dip east, indicating the contact probably does also.

Other than the Eastern and Western Pyrite Zones, there is only one other zone of interest. This is in the eastern central part of the grid and may be an untested southern extension to the EPZ (it is coincident with an anomalous chargeability trend).

The Mines Department gravity data (Fig. 6), indicate interesting correlations with the aeromagnetic data. The magnetic Cambrian granite has an associated (weak) gravity low, whereas the Cambrian volcanics have a clear positive anomaly associated with them. The Anthony Fault is indicated by a 2-3 mgal E-W gradient at the southern end of the EL, indicating a considerable throw on the fault.

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7.2.2 CSAMT

The CSAMT survey did not cover the EPZ, and only covered the WPZ (where it has been drill tested) on line 362000N. At this location, 385600E, there is no clear conductor, indicating the disseminated nature of the sulphide mineralization along this zone. The CSAMT conductors and contacts are shown on Fig. 7 with the profiles on Figs. 8 - 25.

The lines surveyed show some similar features:

a) A major lithological contact along the western side of the EL approximately along 385300mE. This contact appears to occur about 300m west of the mapped Ordovician/Cambrian contact (Anthony Fault). Since there is extensive glacial coverage here, the source of this CSAMT conductor, which extends over at least 3kms, is unknown. Since the glacials are not usually conductive the source is unlikely to be related to them, and must occur either in the underlying Ordovician conglomerate or beneath that in the Cambrian volcanics. On most lines the conductor is not fully covered - this will be done during the forthcoming TEM detailing survey, which should clarify conductor position, depth and conductivity.

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b) A strong transition zone is evident between 'far-field' (high frequency) and 'near-field' (low frequency) data between 1024 and 2048HZ on most lines. This zone is characterized by low cagniard Resistivities and Phase Difference anomalies. In the Selina data the transition zone is more marked than usual. This can be due to enhancement from a shallow conductive layer over a highly resistive layer. Since in this area no conductive layer exists (ie no weathering or conductive overburden), the explanation may instead be due to 'source overprint' which occurs when the transmitter is placed over a resistive basement which underlies more conductive rocks. The E-W transmitter dipole in this survey was placed at about 537200m/(AMG), predominantly over Cambrian volcanics overlying the Murchison Granite.

This transition-zone resistivity 'notch' can obscure true bedrock conductors unfortunately, although the Phase Difference can assist in indicating the presence of a real conductor. An example of a possible bedrock conductor is at 6000E on 358800mN, although the Phase Difference does not support this conjecture.

The only occurrence on the grid of an apparently genuine isolated bedrock conductor is on line 358000mN at 5600E. This feature may however be an extension of the major strike-extensive conductive zone noted above, but will be detailed with TEM.

There does not appear to be a conductor associated with the magnetic anomaly in the central-eastern part of the grid. That does not preclude the possibility of this anomaly being an extension of the EPZ however, although any sulphides must be well disseminated.

8.0 CONCLUSIONS

The ground magnetic survey was successful in defining the strong chlorite-magnetite-pyrite alteration associated with the linear north-south EPZ and WPZ. A possible extension to the EPZ has been defined along the southeast boundary of the licence. This coincides with an earlier IP anomaly detected by GoldFields Exploration.

Only one significant conductor has been located by the limited CSAMT survey on 358000N at 385600E. It remains to be seen if this is a massive conductor or a strike extension to the WPZ. Further EM 37 testing will hope to define the anomaly.

The EPZ and WPZ appear to be structurally controlled epigenetic disseminated Cambrian sulphide systems, remobilised during or after the Middle Devonian Tabberabberan Orogeny.

Field mapping has revealed a highly prospective sequence of lavas, volcanoclastics, epiclastics and sediments in a submarine environment, within which VMS style mineralization could have occurred.

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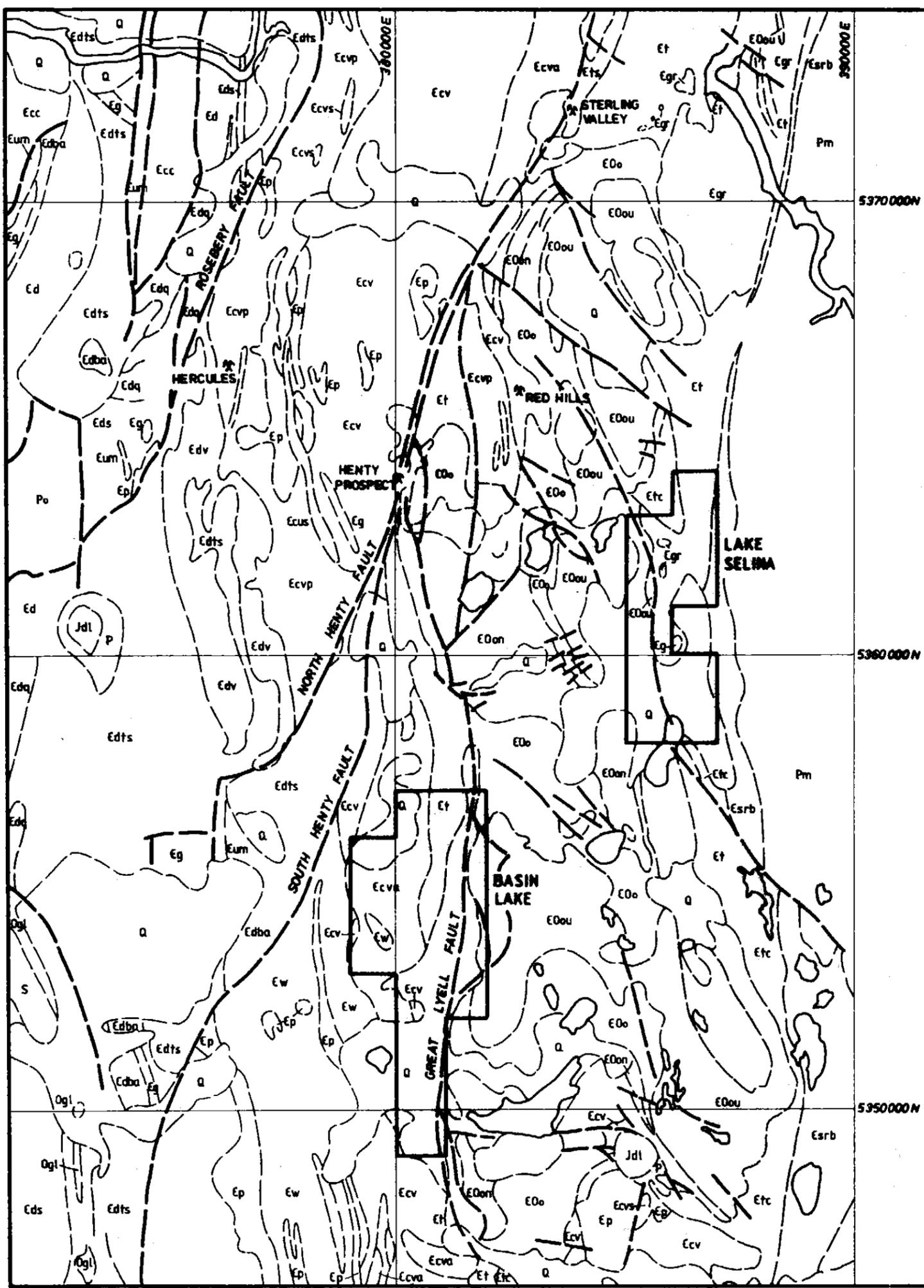
9.0 RECOMMENDATIONS

Further geophysical surveys should be carried out over those parts of the licence that as yet have not been tested for massive sulphide targets at depth. Detailing of the CSAMT anomalies by EM 37 survey should clarify conductor position, depth and conductivity. Drill testing of favourable anomalies should follow EM detailing.

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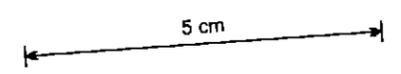
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Project 78/P98A.



LEGEND

- Q Quaternary
- Jdl Jurassic
- P Permian
- S Silurian
- Ogl Ordovician
- EOou } Cambrian Denison Group
- EOon }
- Edo }
- Et } Cambrian Tyndall Group
- Ets }
- Etc }
- Esrb }
- Cd } Cambrian Dundas Group
- Eds }
- Edts }
- Cdq }
- Cdv }
- Cdba }
- Ecv } Cambrian Central Volcanic Complex
- Ccvp }
- Ecvs }
- Ecva }
- Cw } Cambrian Western Sequence
- Ecc } Cambrian Crimson Creek Formation
- Po } Pre Cambrian
- Pm }
- Cgr } Cambrian Intrusives
- Cp }
- Cg }
- Cum }



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89-2929

Bilston Australia <small>The Minerals Division of the BHP Company of Australia Limited</small>			
Project		E. L. 103 / 87	
Title			
BASIN LAKE - LAKE SELINA GEOLOGICAL SETTING			
Compiled from Corbett & McNeill 1988			
Author	CJC	Date	3/88
Scale	1:100 000		
Drawn	OH	Office	TAS
Revised		Date	
Drawing No.	D/LD 56-57/006		Fig. No. 2

667023

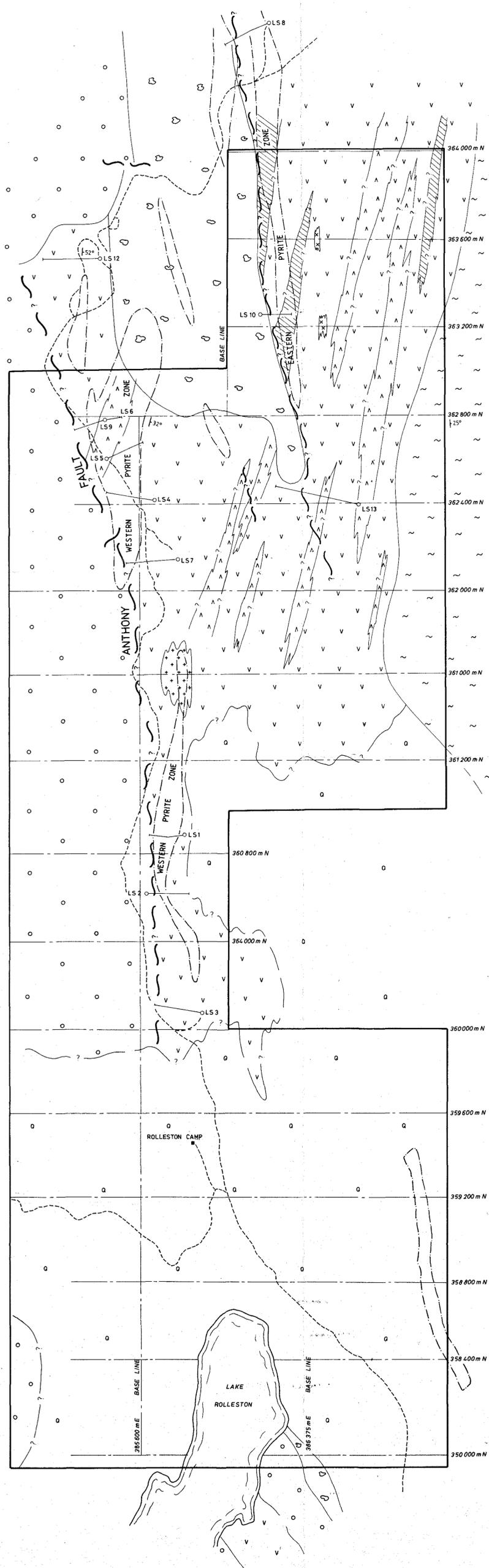
89-2929

Billion Australia
The National Division of the State Geology of Australia Limited

Project: E. L. 103/87

Title: LAKE SELINA
GEOLOGY & GRID PLAN

Author	C.J.C.	Dept.	T.A.S.	Scale	1:10,000
Drawn	OH	Date	3/89	Revised	Date
Checked	Date	Stamped	Date	Sheet No.	7/5
Sheet No.	FIG No.	7/5	Drawing No.	07/LD 86/007	



LEGEND

- QUATERNARY
 - Q Fluvio-glacial sediment
- ORDOVICIAN
 - O Owen Conglomerate
- CAMBRIAN
 - V Sticht Range Beds
 - D Dora Conglomerate
 - V Medium to coarse grained rhyolitic to dacitic quartz-feldspar phryic volcanics and epiclastics
 - A Fine to very fine grained rhyolitic to dacitic quartz-feldspar phryic volcanics and epiclastics
 - V Very fine grained sericitic volcanoclastics
- CAMBRIAN INTRUSIVES
 - X Quartz-feldspar-hornblende porphyry
 - Murchison Granite equivalent
- Bedding (1:25)
- Diamond drill hole
- Access tracks
- IP Anomalous zones
- Geological boundary inferred
- Inferred fault position
- Grid lines

5 cm



SHELL COMPANY OF AUSTRALIA

METALS DIVISION

R.O.C.S. - PROTEM

LAKE SELINA
GROUND MAG
BASE LEV. 62200nT
500nT/cm

SCALE 1 : 10000

FIG No : 4

DATE : SEPT. 1988

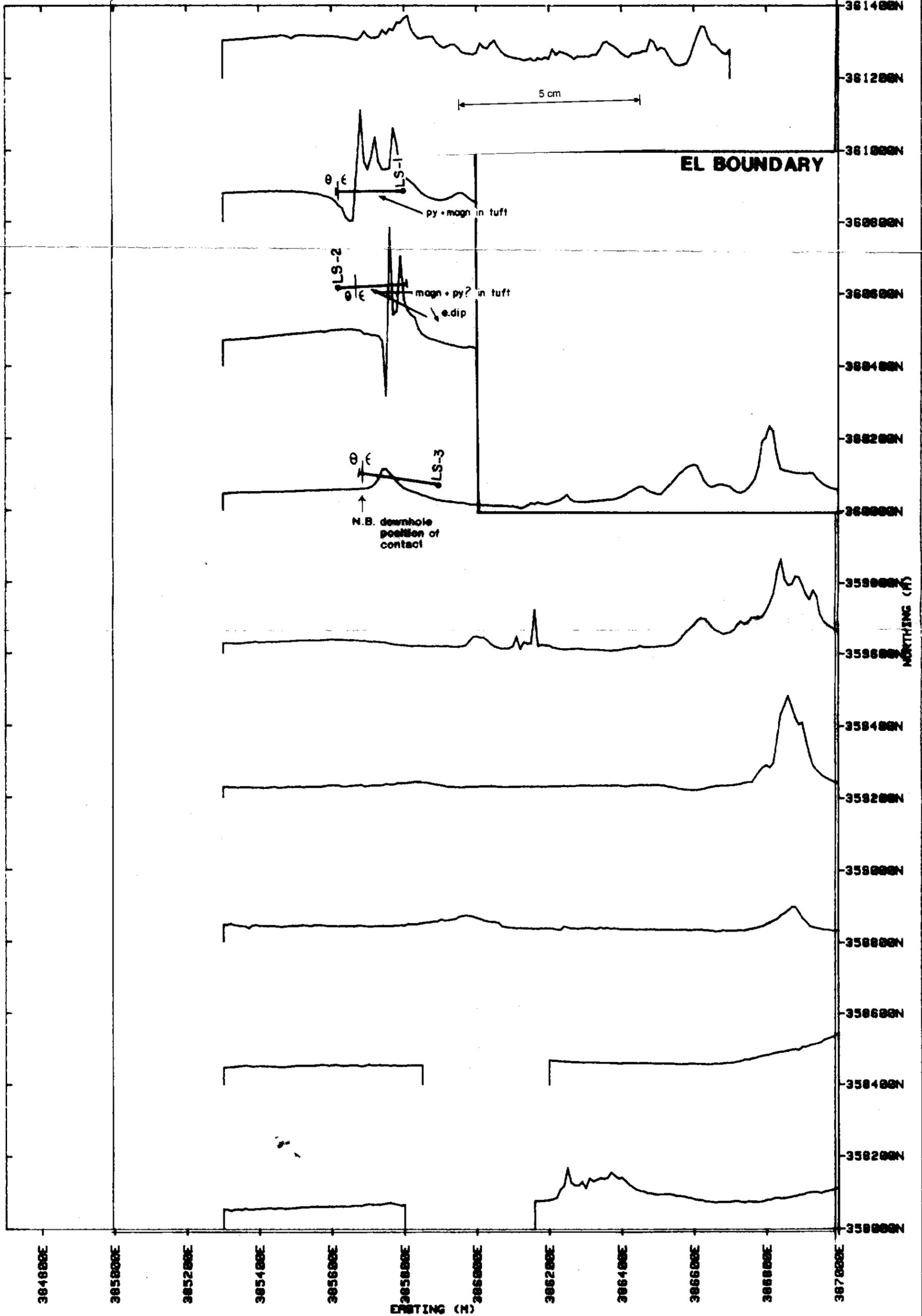
AUTHOR : N. Haggerford

OFFICE : MELB.

Drwg No : LD56/1019

LEGEND

2X G858



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89-2929

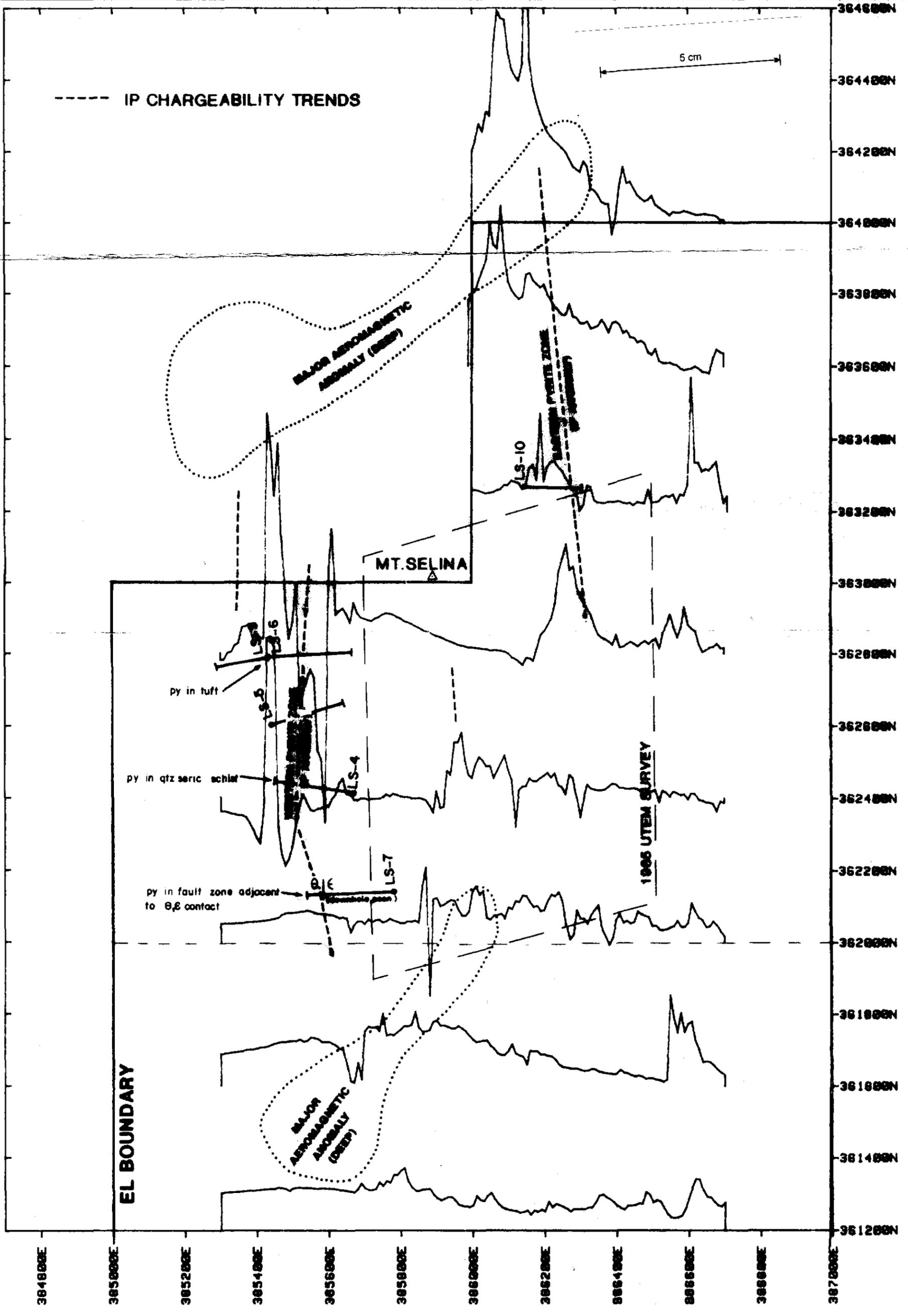


SHELL COMPANY OF AUSTRALIA
 METALS DIVISION
 R.O.C.S. - PROTEM

LAKE SELINA
 GROUND MAG
 BASE LEV. 62200nT
 500nT/cm
 SCALE 1 : 10000

FIG No : 5
 DATE : SEPT. 1966
 AUTHOR : N. Hungerford
 OFFICE : MELB.
 Drawg. No : LD56/1020

LEGEND
 2X G856



667025

89-2929



5355000N
381000E

388000E

From: Department of Mines, Tasmania.



667026
N.W. TASMANIA
RESIDUAL BOUGUER GRAVITY
LAKE SELINA

Contour Interval= 1mgal

89-2929

Author N.HUNGERFORD	Date SEPT.1988	Encl.
Report No	Drawing LD56/1021	

5 364 000m N

5 366 000m N

387 000 E

387 000 E

362 000

361 600

361 200

360 000

359 800

359 200

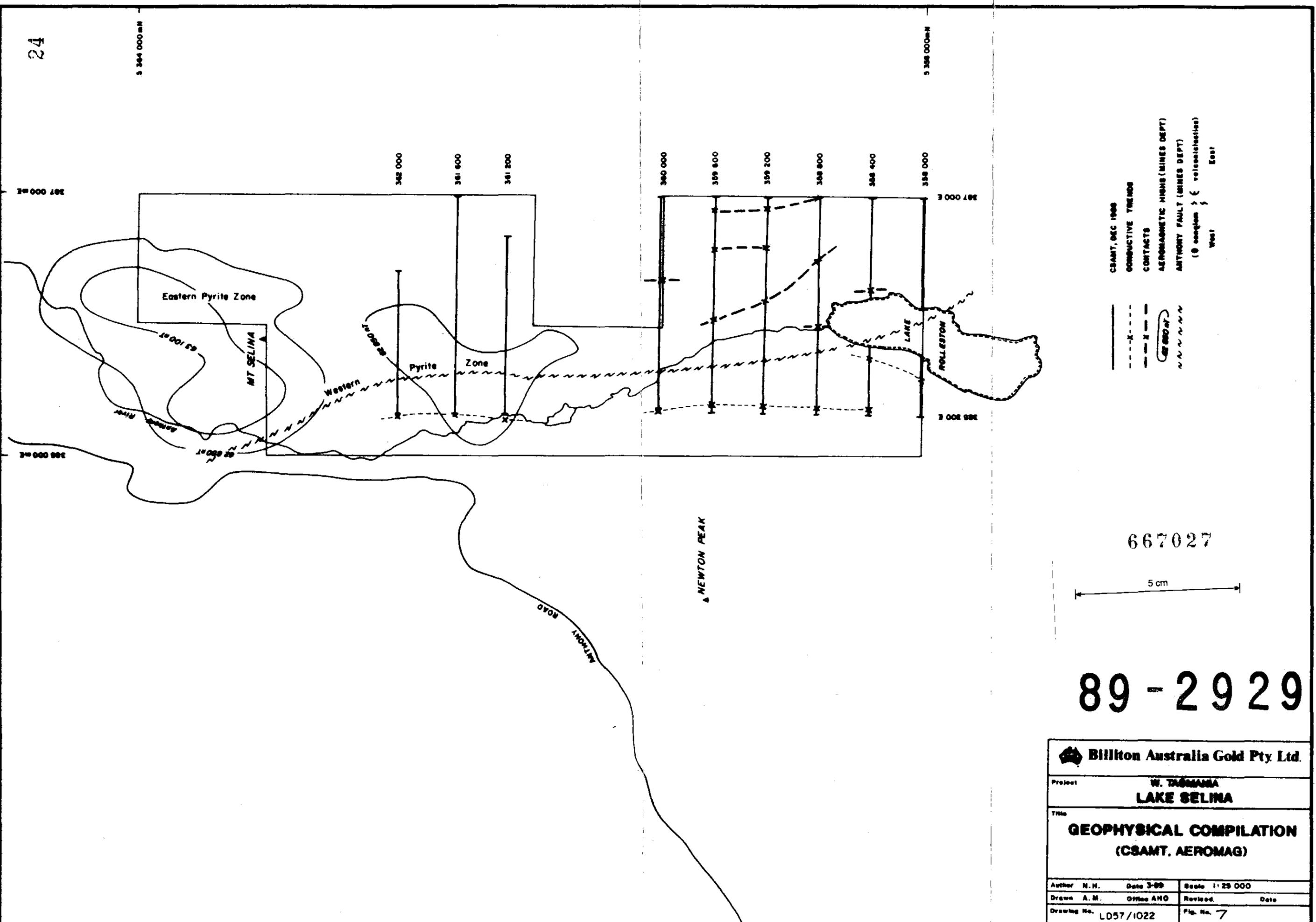
358 800

358 400

358 000

386 000 E

386 000 E



CSAMT, DEC 1988
 CONDUCTIVE TRENDS
 CONTACTS
 AEROMAGNETIC HIGHS (MINES DEPT)
 ANTHONY FAULT (MINES DEPT)
 (0 section } (relocated)
 West East

 - - -
 - - -
 (0 section)
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667027

5 cm

89-2929

|                                                       |            |                |
|-------------------------------------------------------|------------|----------------|
| <b>Bililton Australia Gold Pty Ltd.</b>               |            |                |
| Project <b>W. THOMAS LAKE SELINA</b>                  |            |                |
| Title <b>GEOPHYSICAL COMPILATION (CSAMT, AEROMAG)</b> |            |                |
| Author N.H.                                           | Date 3-89  | Scale 1:25 000 |
| Drawn A.M.                                            | Office ANO | Revised Date   |
| Drawing No. LD57/1022                                 | Fig. No. 7 |                |

Fig 8  
 Line 362000  
 MT SELINA  
 for  
 BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
 CAGNIARD RESISTIVITY  
 values in ohm-meters  
 <RHO-C

[Plot limits] and LOGARITHMIC CONTOURS  
 ( Interval: 0:20 )

|        |        |         |
|--------|--------|---------|
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| 6.31M  | 63.1K  | 631     |
| 3.98M  | 39.8K  | 398     |
| 2.51M  | 25.1K  | 251     |
| 1.59M  | 15.9K  | 159     |
| 1.00M  | 10.0K  | 100     |
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| 159. K | 1595   |         |

25

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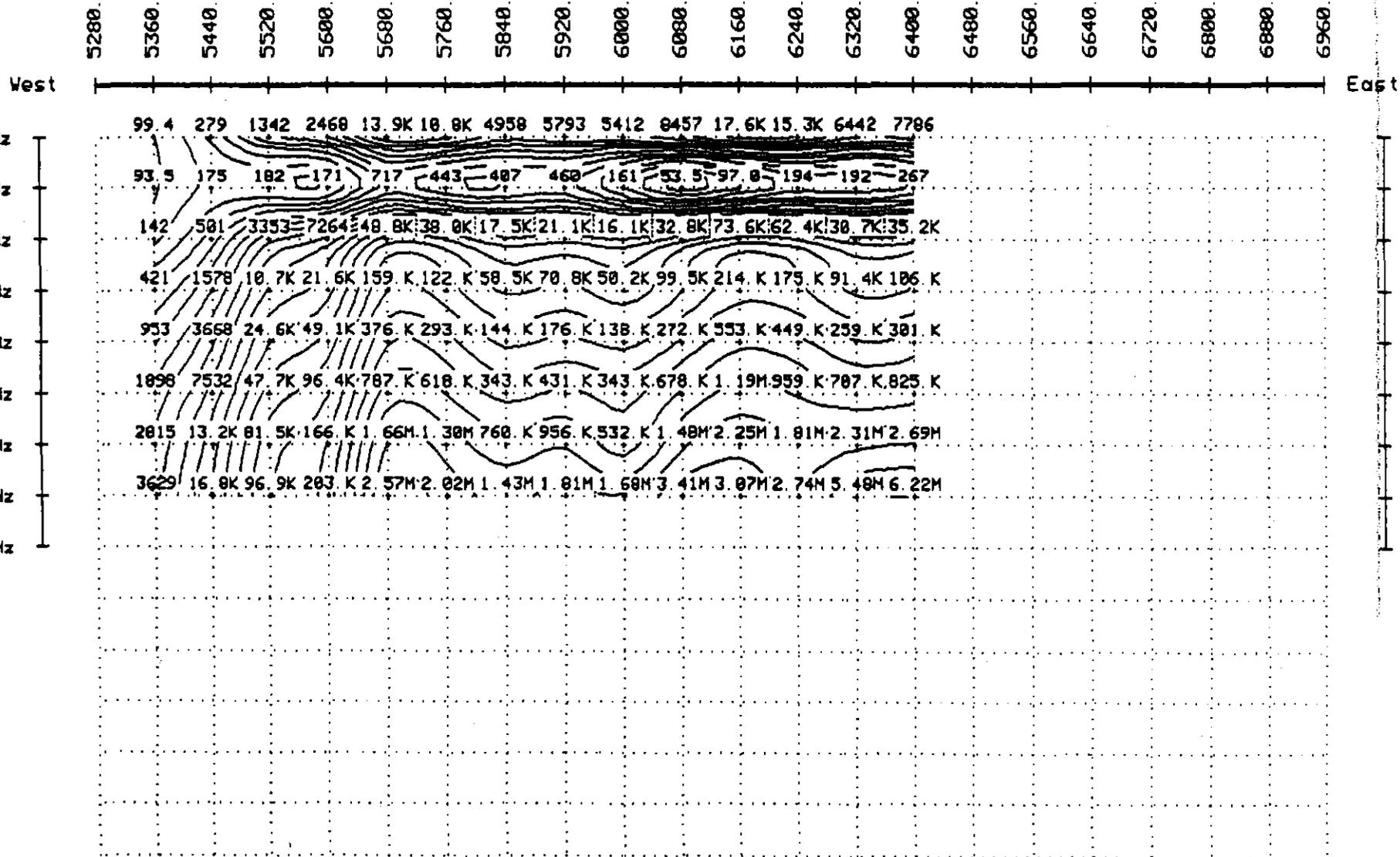
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 Spacing = 80.m Dipole = East

Surveyed = DEC 88

TRANSMITTER DATA

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 Orient. = East  
 Distance = 7KM  
 Rx to Tx = North

ZONGE Job 864  
 PLOT BY CPlot 5.48  
 PLOTTED 13 Jan 89



667028

Fig 9

Line 362000  
MT SELINA  
for  
BILLITON AUSTRALIA

SCALE 1:8000

ZONCE Job 864  
PLOT BY CPLOT 3.48  
PLOTTED 13 Jan 89

CSAMT SURVEY DATA  
PHASE DIFFERENCE ( E - H )

values in milli-radians  
<PDIFF

RECEIVER DATA

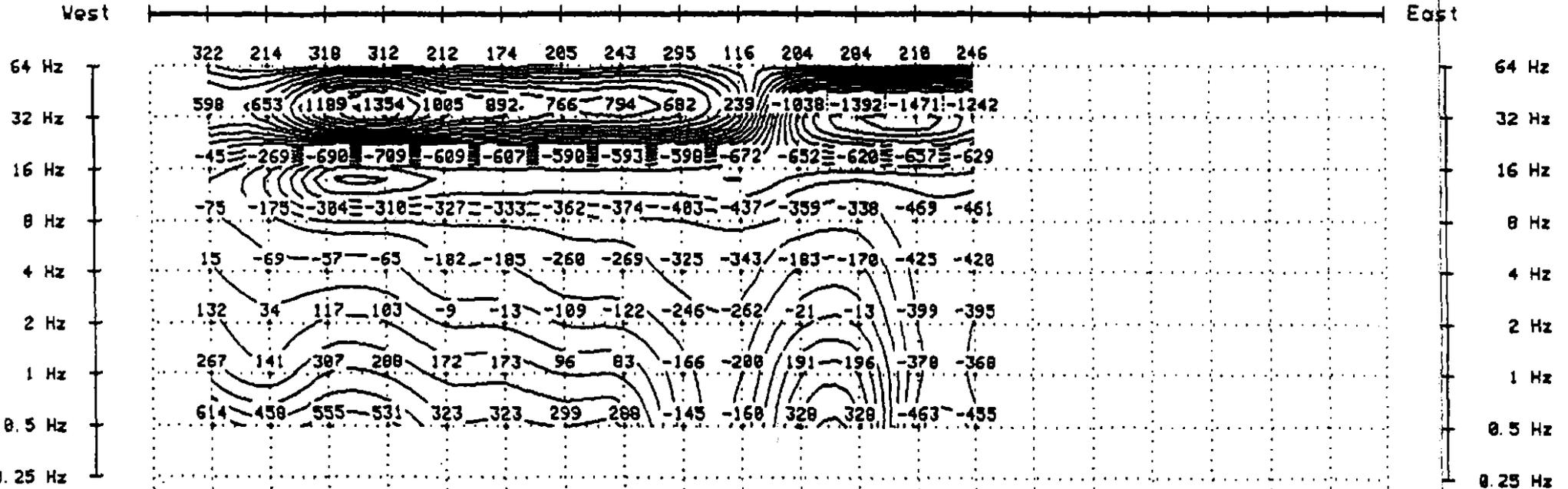
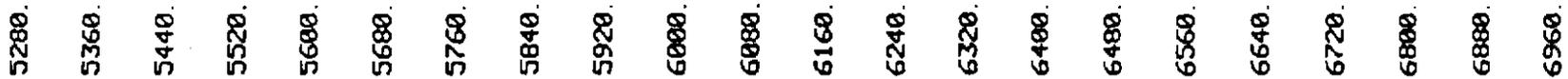
Length = 88.m Line = East  
SPacing = 88.m Dipole = East

Surveyed = DEC 88

TRANSMITTER DATA

Length = 1500M  
Orient. = East  
Distance = 7KM  
Rx to Tx = North

| [Plot limits] and    |      | ARITHMETIC CONTOURS |         |
|----------------------|------|---------------------|---------|
| ( Interval: 100.00 ) |      |                     |         |
| [1435]               | 500  | -500                | [-1473] |
|                      | 1400 | 400                 | -600    |
|                      | 1300 | 300                 | -700    |
|                      | 1200 | 200                 | -800    |
|                      | 1100 | 100                 | -900    |
|                      | 1000 | 0.00                | -1000   |
|                      | 900  | -100                | -1100   |
|                      | 800  | -200                | -1200   |
|                      | 700  | -300                | -1300   |
|                      | 600  | -400                | -1400   |



620299

Fig 10  
Line 361600  
MT SELINA  
for  
BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
CAGNIARD RESISTIVITY

values in ohm-meters  
<RHO-C

RECEIVER DATA

Length = 80.m Line = East  
Spacing = 80.m DiPole = East

Surveyed = DEC 88

TRANSMITTER DATA

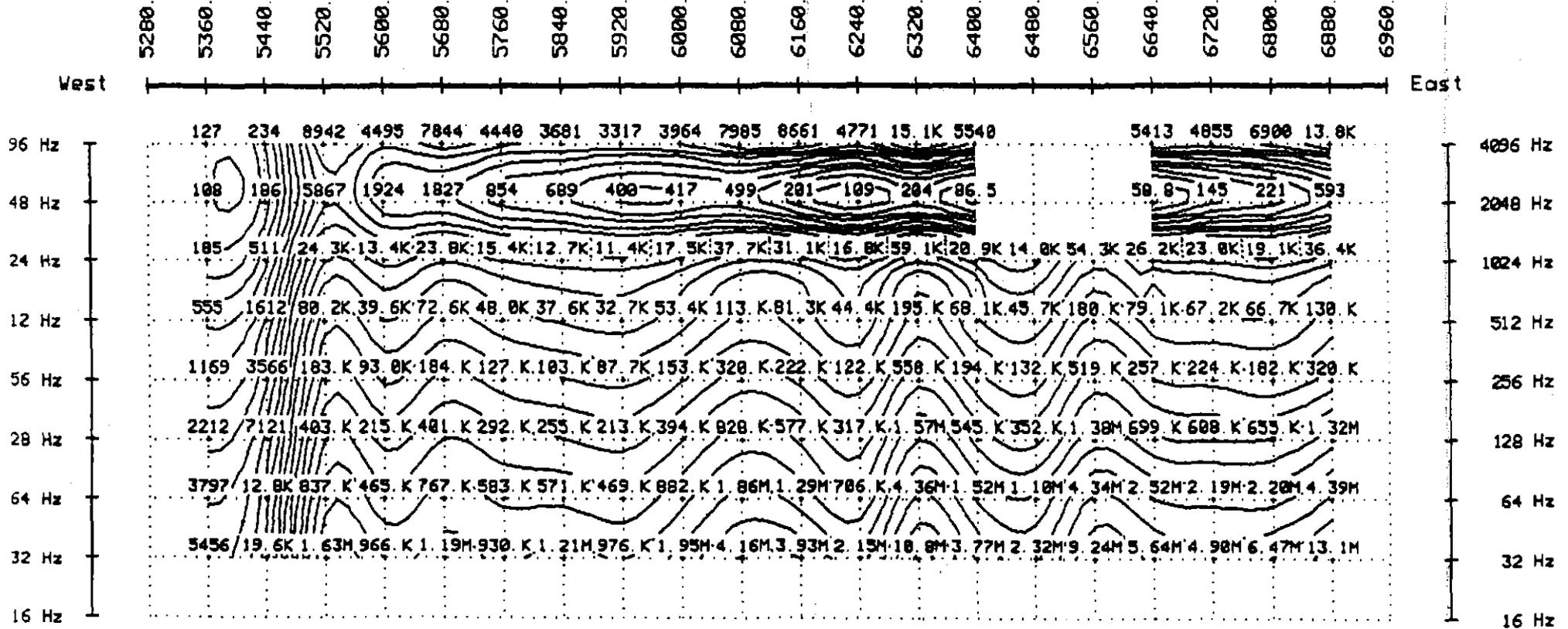
Length = 1500M  
Orient. = East  
Distance = 7KM  
Rx to Tx = North

[Plot limits] and LOGARITHMIC CONTOURS  
( Interval: 0.20 )

|         |       |        |
|---------|-------|--------|
| [13.1M] | 158.K | 1585   |
| 10.0M   | 180.K | 1000   |
| 6.31M   | 63.1K | 631    |
| 3.98M   | 39.8K | 398    |
| 2.51M   | 25.1K | 251    |
| 1.58M   | 15.8K | 158    |
| 1.00M   | 10.0K | 100    |
| 631.K   | 6310  | 63.1   |
| 398.K   | 3981  | [58.7] |
| 251.K   | 2512  |        |

27

NGE Job B64  
JT BY CPlot 5.48  
PLOTTED 12 Jan 89



667030

Fig 11  
Line 361600  
MT SELINA  
for  
BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
PHASE DIFFERENCE ( E - H )  
values in milli-radians  
<PDIFF

[Plot limits] and ARITHMETIC CONTOURS  
(Interval: 100.00)

|        |      |      |       |
|--------|------|------|-------|
| (2146) | 1200 | 200  | -800  |
| 2100   | 1100 | 100  | -900  |
| 2000   | 1000 | 0.00 | -1000 |
| 1900   | 900  | -100 | -1100 |
| 1800   | 800  | -200 | -1200 |
| 1700   | 700  | -300 | -1285 |
| 1600   | 600  | -400 |       |
| 1500   | 500  | -500 |       |
| 1400   | 400  | -600 |       |
| 1300   | 300  | -700 |       |

RECEIVER DATA

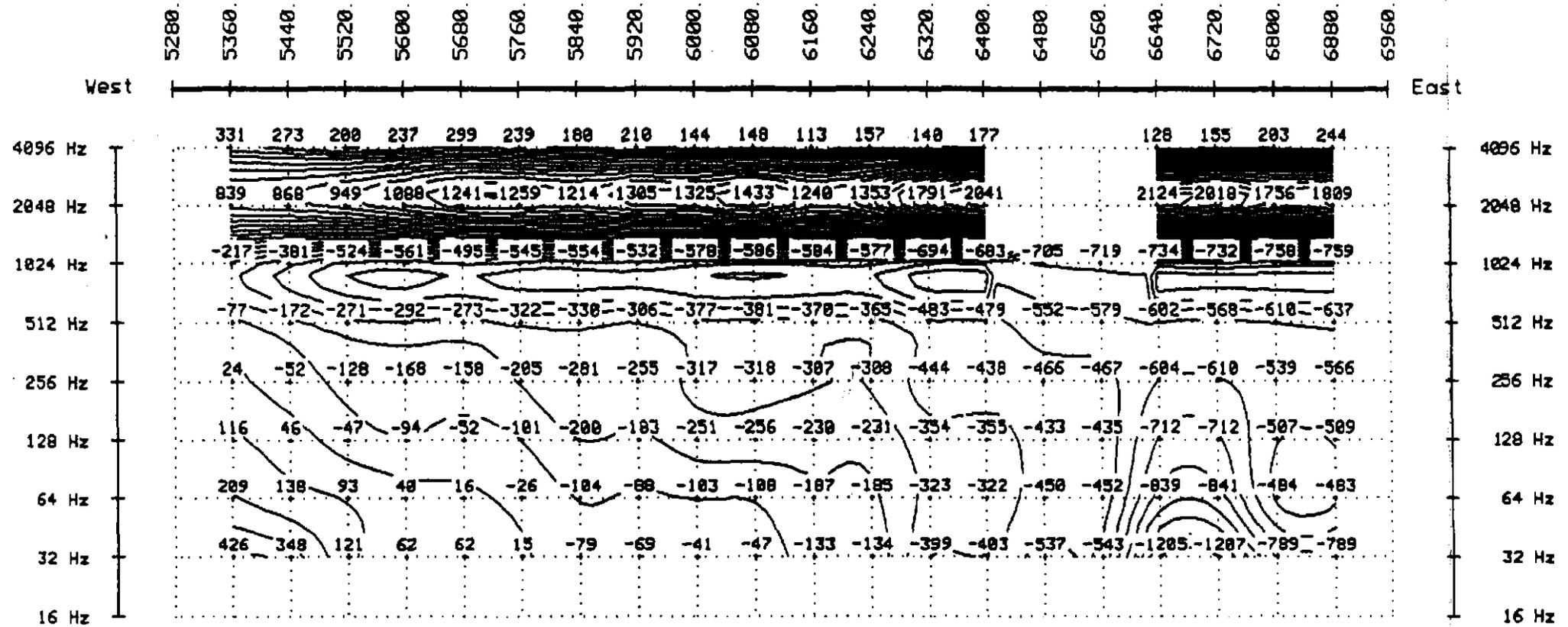
Length = 80 m Line = East  
SPacing = 80 m DiPole = East

Surveyed = DEC 88

TRANSMITTER DATA

Length = 1500M  
Orient. = East  
Distance = 7KM  
Rx to Tx = North

ZONGE Job 864  
PLOT BY C PLOT 3.48  
PLOTTED 12 Jan 89



667031

Fig 12  
 Line 361200  
 MT SELINA  
 for  
 BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
 CAGNIARD RESISTIVITY

values in ohm-meters  
 <RHO-C

RECEIVER DATA

Length = 80.m Line = East  
 Spacing = 80.m Dipole = East

Surveyed = DEC 88

TRANSMITTER DATA

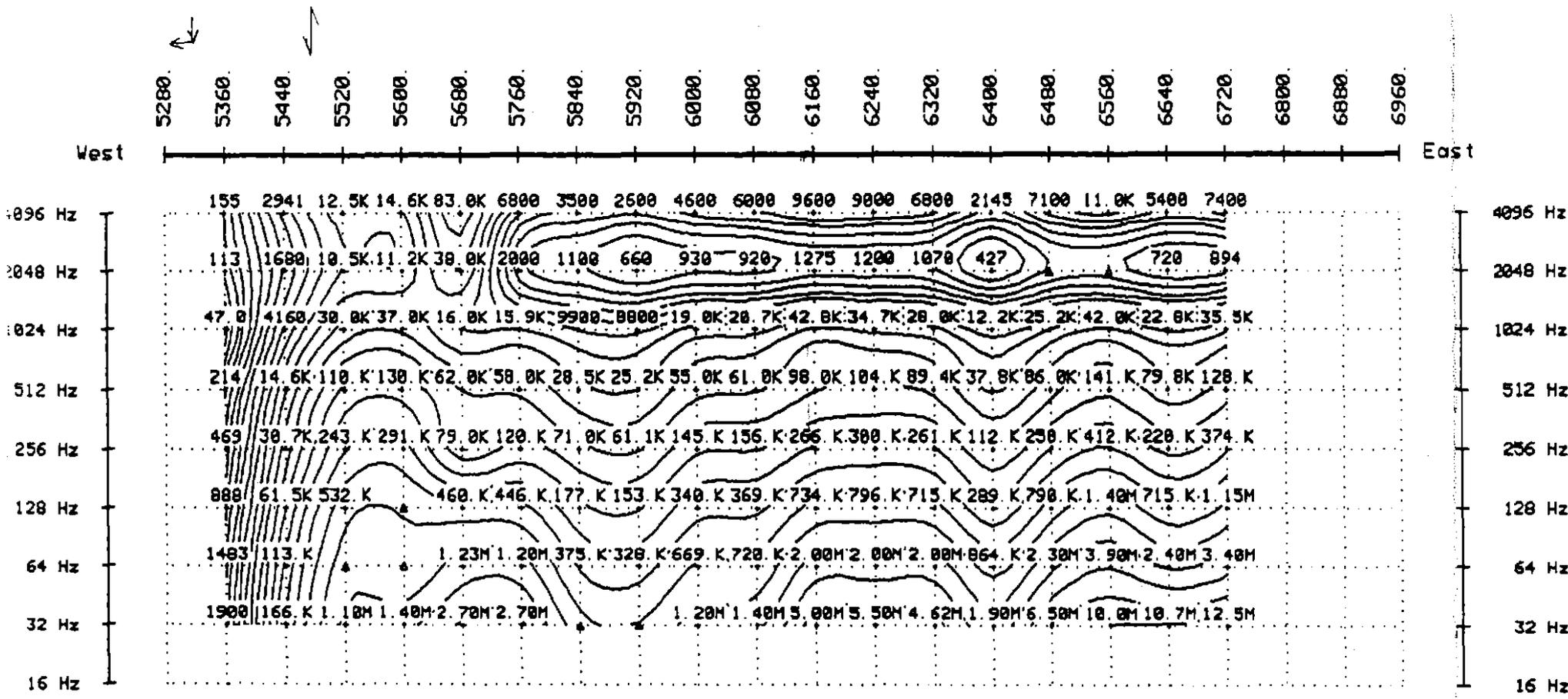
Length = 1500M  
 Orient. = East  
 Distance = 7KM  
 Rx to Tx = North

[Plot limits] and LOGARITHMIC CONTOURS  
 ( Interval: 0.20 )

|       |       |        |
|-------|-------|--------|
| 12.5M | 150.K | 1585   |
| 10.0M | 100.K | 1000   |
| 6.31M | 63.1K | 631    |
| 3.98M | 39.8K | 398    |
| 2.51M | 25.1K | 251    |
| 1.58M | 15.8K | 158    |
| 1.00M | 10.0K | 100    |
| 631.K | 6310  | 63.1   |
| 398.K | 3981  | [47.0] |
| 251.K | 2512  |        |

29

ONGE Job 864  
 PLOT BY CPLOT 3.40  
 PLOTTED 13 Jan 89



6670329

Fig 13  
 Line 361200  
 MT SELINA  
 for  
 BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
 PHASE DIFFERENCE ( E - H )

values in milli-radians  
 <PDIFF

RECEIVER DATA

Length = 80. m Line = East  
 Spacing = 80. m Dipole = East

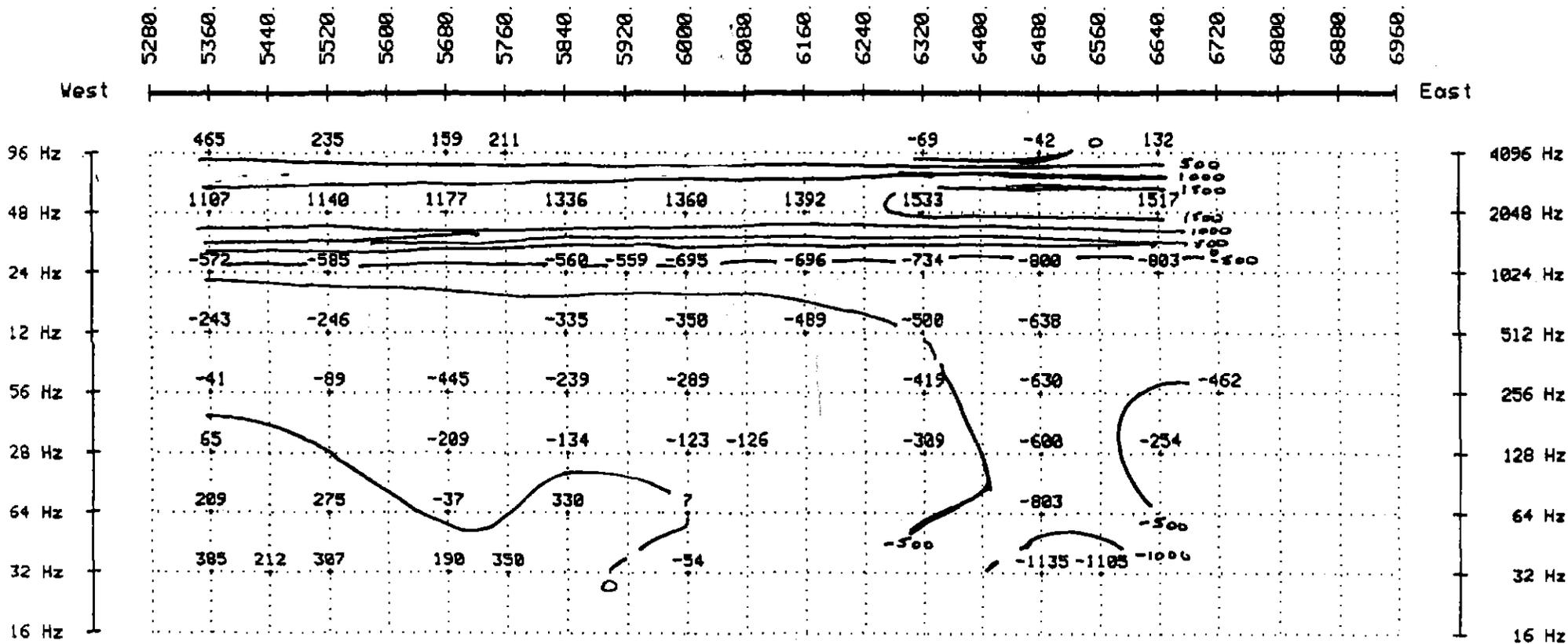
Surveyed = DEC 88

TRANSMITTER DATA

Length = 1500M  
 Orient. = East  
 Distance = 7KM  
 Rx to Tx = North

30

NCE Job 864  
 OT BY C/PLOT 5.40  
 OTTED 13 Jan 89



667033

Fig 14

Line 360000  
MT SELINA  
for  
ILLITON AUSTRALIA  
SCALE 1:8000

CSAMT SURVEY DATA  
CAGNIARD RESISTIVITY

CAGNIARD RESISTIVITY  
values in ohm-meters  
<RHO-C

[Plot limits] and LOGARITHMIC CONTOUR  
(Interval 0 20)

|         |       |
|---------|-------|
| [14 IM] | 15.8K |
| 10.0M   | 10.0K |
| 6.31M   | 6310  |
| 3.98M   | 3981  |
| 2.51M   | 2512  |
| 1.58M   | 1585  |
| 1.00M   | 1000  |
| 631 K   | 631   |
| 398 K   | 398   |
| 251 K   | [285] |
| 158 K   |       |
| 100 K   |       |
| 63.1K   |       |
| 39.8K   |       |
| 25.1K   |       |

RECEIVER DATA

Dipole Length= 80 m  
Stn Spacing = 80 m

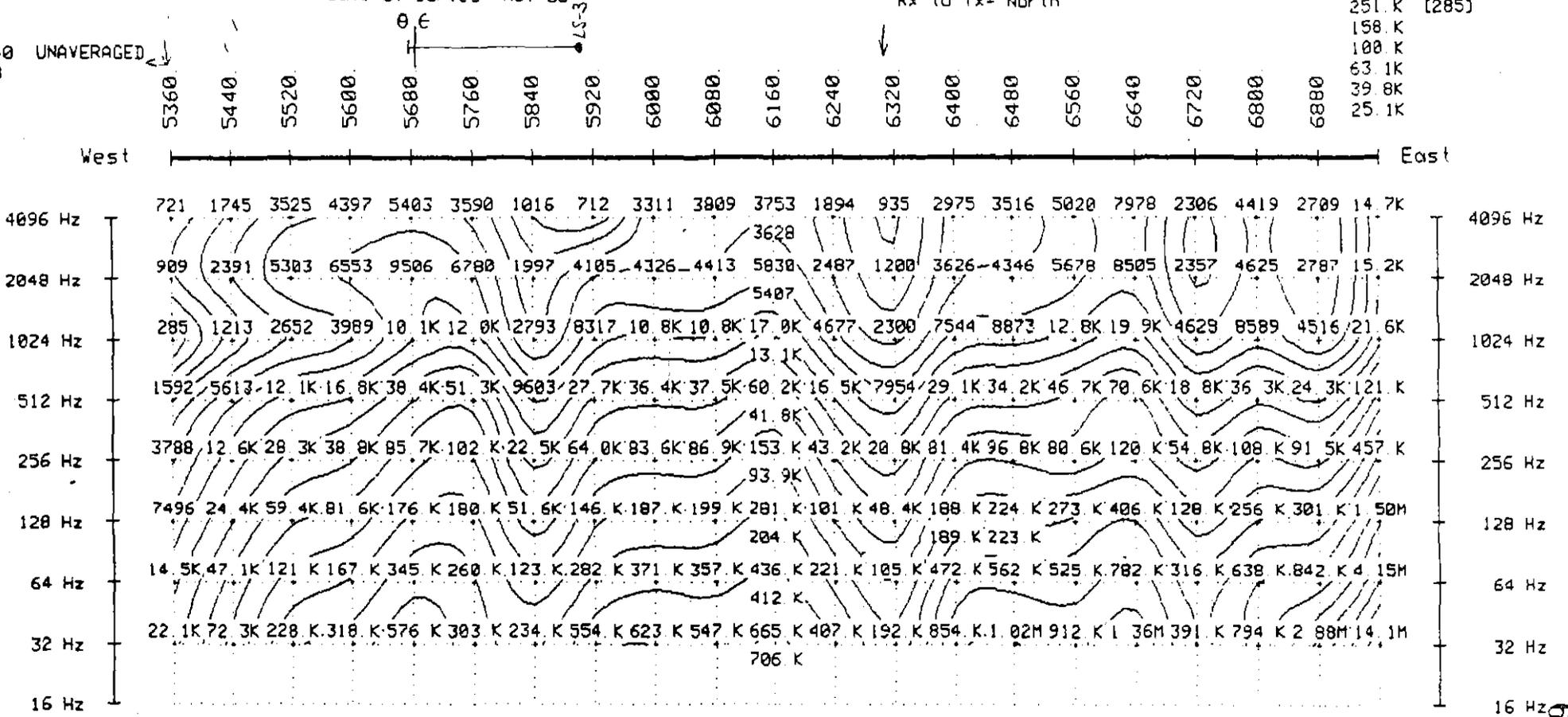
Line Orient= East  
Dipole Orient= East

TRANSMITTER DATA

Length = 1500M  
Orient. = East  
Distance= 7KM  
Rx to Tx= North

Date of survey= NOV 88

GE Job 864  
T BY CPlot 5.40 UNAVERAGED  
TTED 31 Dec 88



667034

Fig 15  
Line 360000  
MT SELINA  
for

CSAMT SURVEY DATA  
PHASE DIFFERENCE ( E - H )

(Plot limits) and ARITHMETIC CONTOUR  
( Interval 100.00 )

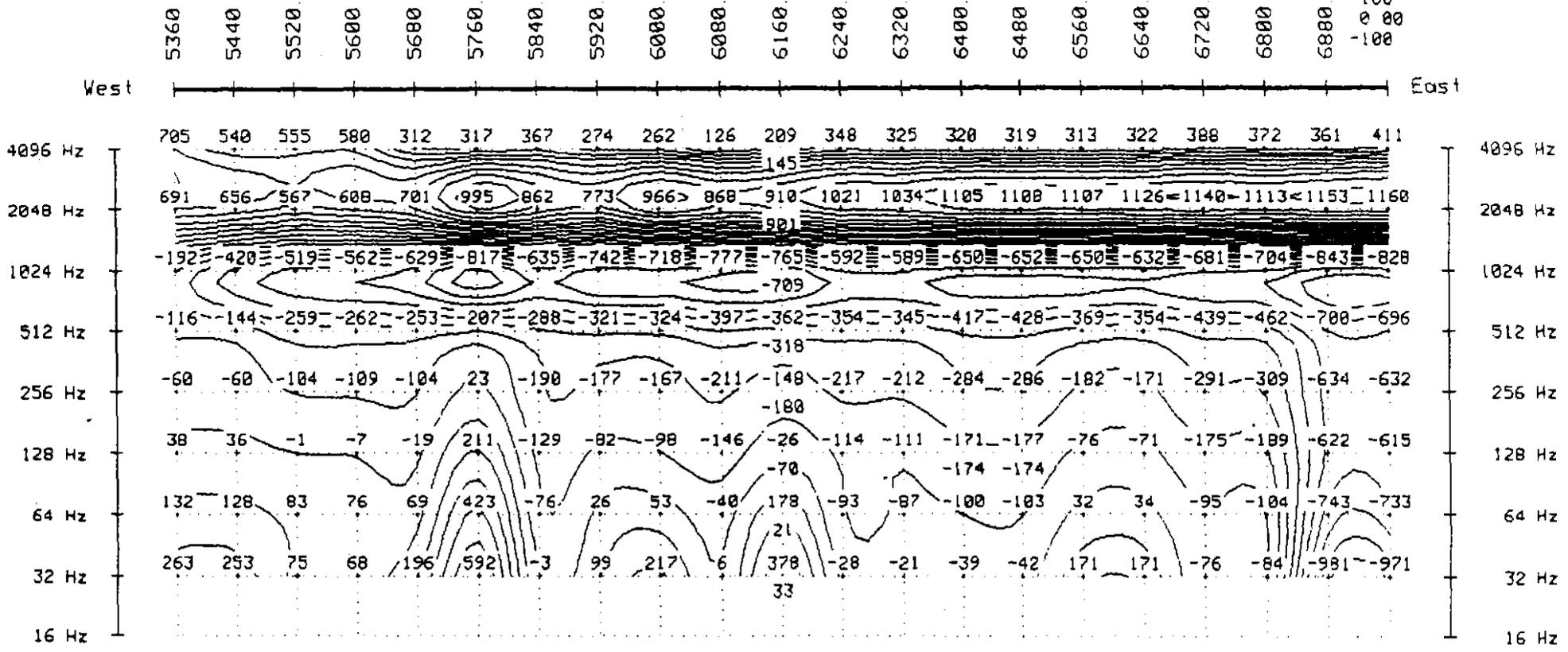
|      |         |
|------|---------|
| 1253 | -200    |
| 1200 | -300    |
| 1100 | -400    |
| 1000 | -500    |
| 900  | -600    |
| 800  | -700    |
| 700  | -800    |
| 600  | -900    |
| 500  | -1000   |
| 400  | [-1000] |
| 300  |         |
| 200  |         |
| 100  |         |
| 0.00 |         |
| -100 |         |

ILLITON AUSTRALIA  
SCALE 1:8000

RECEIVER DATA  
 DiPole Length= 80 m    Line Orient= East  
 Stn. Spacing = 80 m    DiPole Orient= East  
 Date of survey= NOV 88

TRANSMITTER DATA  
 Length = 1500M  
 Orient. = East  
 Distance= 7KM  
 Rx to Tx= North

GE Job 864  
T BY CPL0T 5.40 UNAVERAGED  
TTED 31 Dec 88



66703E

Fig 16

Line 359600

MT SELINA

for

BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
CAGNIARD RESISTIVITY

CAGNIARD RESISTIVITY  
values in ohm-meters  
<RHO-C

[Plot limits] and LOGARITHMIC CONTO  
( Interval: 0 20 )

RECEIVER DATA

DiPole Length= 80 m  
Stn. Spacing = 80 m

Line Orient= East  
DiPole Orient= East

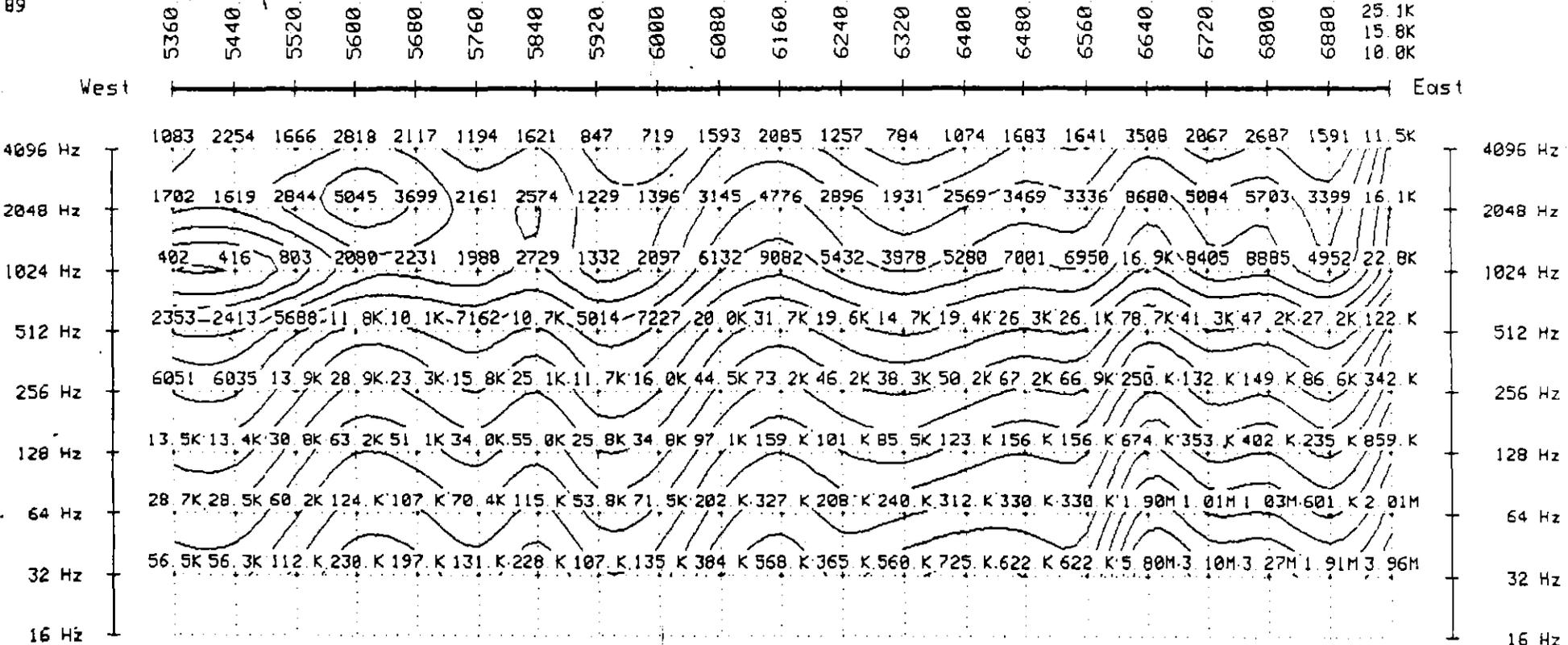
Date of survey= DEC 88

TRANSMITTER DATA

Length = 1500M  
Orient. = East  
Distance= 7KM  
Rx to Tx= North

- [6 12M] 6310
- 3 98M 3981
- 2 51M 2512
- 1 58M 1585
- 1 00M 1000
- 631 K 631
- 398 K 398
- 251 K [382]
- 158 K
- 100 K
- 63 1K
- 39 8K
- 25 1K
- 15 8K
- 10 8K

ZONGE Job 864  
PLOT BY CPLOT 5.40  
PLOTTED 05 Jan 89



980799

Fig 17  
Line 359600  
MT SELINA  
for

CSAMT SURVEY DATA  
PHASE DIFFERENCE ( E - H )

[Plot limits] and ARITHMETIC CONT.  
( Interval 100.00 )

|       |         |
|-------|---------|
| [888] | -600    |
| 600   | -700    |
| 700   | -800    |
| 600   | -900    |
| 500   | -1000   |
| 400   | -1100   |
| 300   | [-1111] |
| 200   |         |
| 100   |         |
| 0.00  |         |
| -100  |         |
| -200  |         |
| -300  |         |
| -400  |         |
| -500  |         |

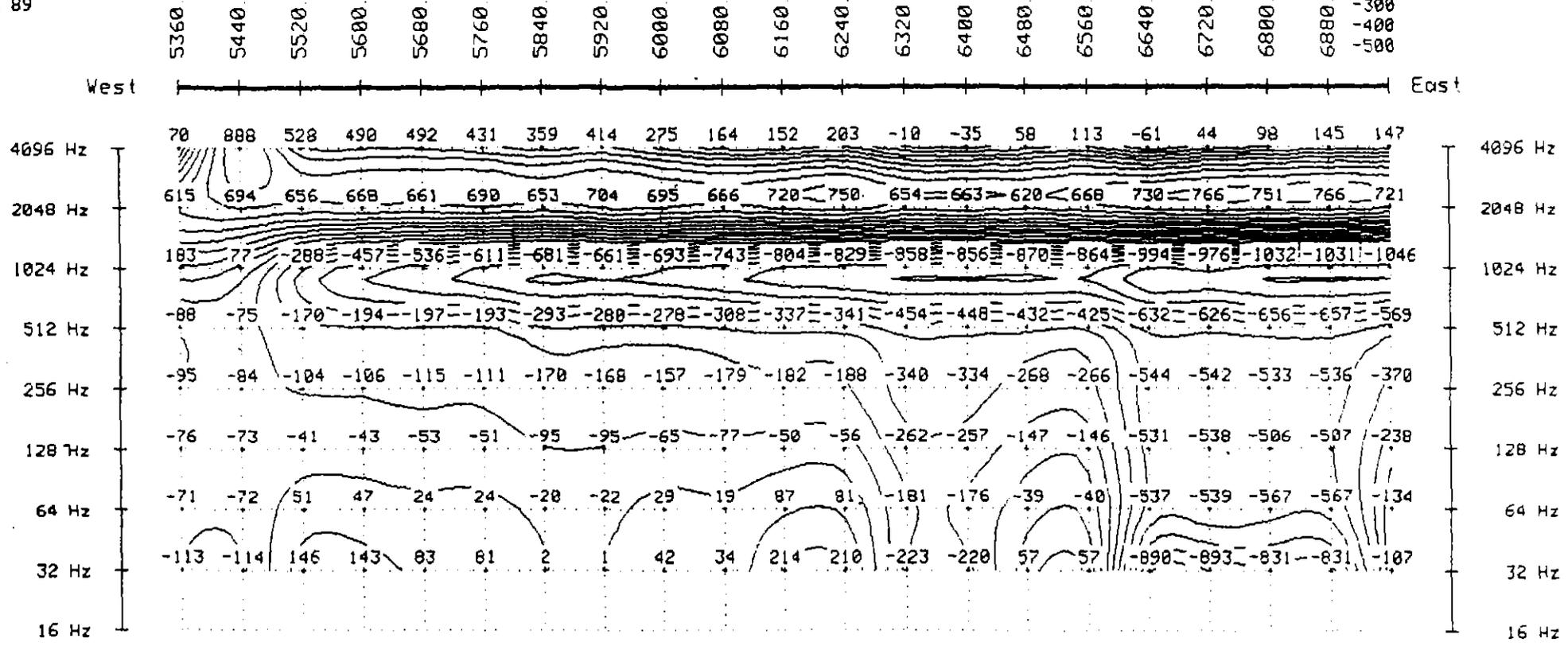
PHASE DIFFERENCE ( E - H )  
values in milli-radians  
<PDIFF

BILLITON AUSTRALIA  
SCALE 1:8000

RECEIVER DATA  
DiPole Length= 80 m Line Orient= East  
Stn. Spacing = 80 m DiPole Orient= East  
Date of survey= DEC 88

TRANSMITTER DATA  
Length = 1500M  
Orient = East  
Distance= 7KM  
Rx to Tx= North

ZONGE Job 864  
PLOT BY C/PLOT 5.40  
PLOTTED 05 Jan 89



667037

Fig 18.

Line 359200  
MT SELINA  
for  
BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
CAGNIARD RESISTIVITY

values in ohm-meters  
<RHO-C

[Plot limits] and LOGARITHMIC CONTOURS  
( Interval: 0.20 )

|         |       |       |
|---------|-------|-------|
| [1.24M] | 15.8K | 158   |
| 1.00M   | 10.0K | [130] |
| 631.K   | 6310  |       |
| 398.K   | 3981  |       |
| 251.K   | 2512  |       |
| 158.K   | 1585  |       |
| 100.K   | 1000  |       |
| 63.1K   | 631   |       |
| 39.8K   | 398   |       |
| 25.1K   | 251   |       |

RECEIVER DATA

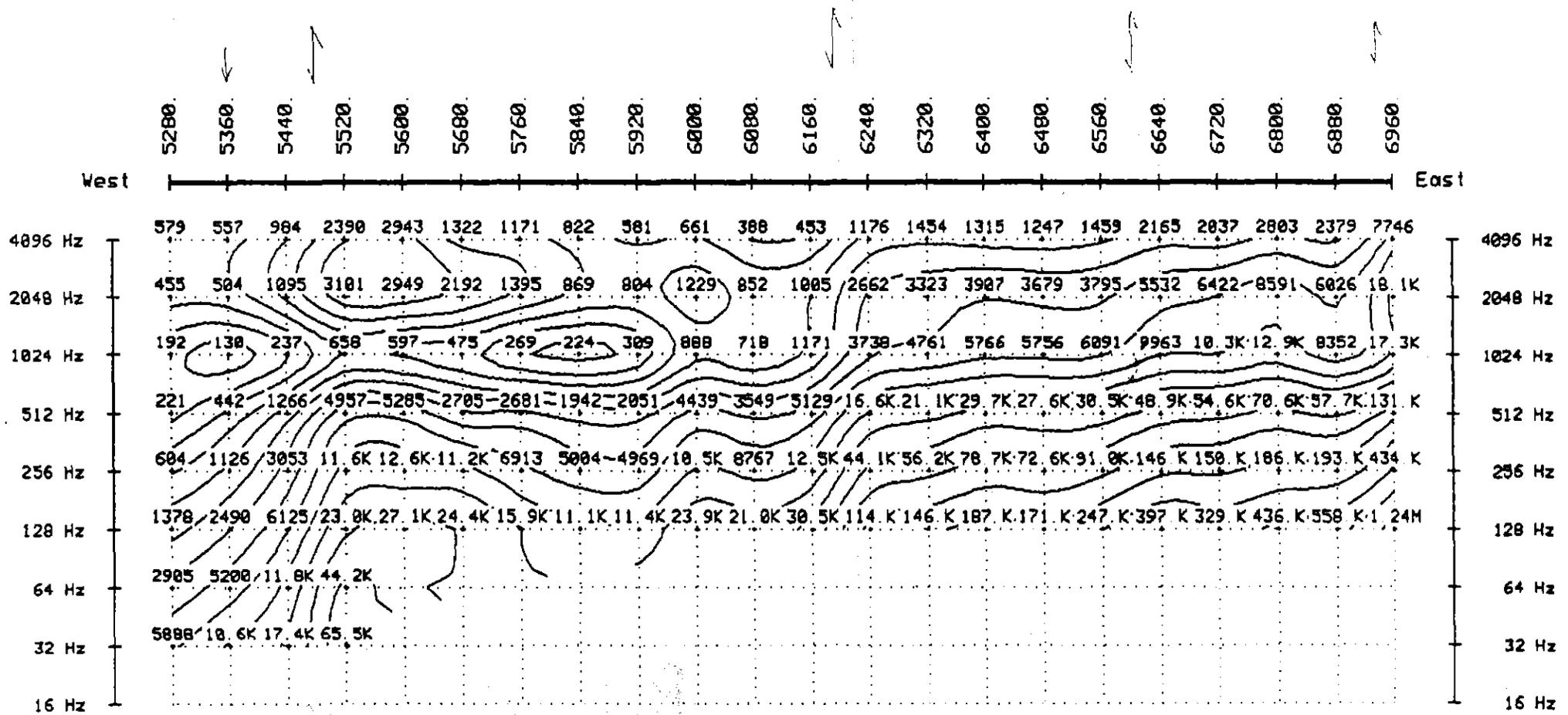
Length = 88.m Line = East  
Spacing = 88.m DiPole = East

Surveyed = DEC 88

TRANSMITTER DATA

Length = 1500M  
Orient. = East  
Distance = 7KM  
Rx to Tx = North

ZONGE Job 864  
PLOT BY C/PLOT 3.48  
PLOTTED 23 Jan : 0



667038

Fig 19

Line 359200  
 MT SELINA  
 for  
 BILLITON AUSTRALIA  
 SCALE 1:8000

CSAMT SURVEY DATA  
 PHASE DIFFERENCE ( E - H )

values in milli-radians  
 <PDIFF

[Plot limits] and ARITHMETIC CONTOURS  
 ( Interval 100 00 )

|        |      |         |
|--------|------|---------|
| (1200) | 300  | -700    |
| 1200   | 200  | -800    |
| 1100   | 100  | -900    |
| 1000   | 0 00 | -1000   |
| 900    | -100 | -1100   |
| 800    | -200 | -1200   |
| 700    | -300 | -1300   |
| 600    | -400 | (-1337) |
| 500    | -500 |         |
| 400    | -600 |         |

RECEIVER DATA

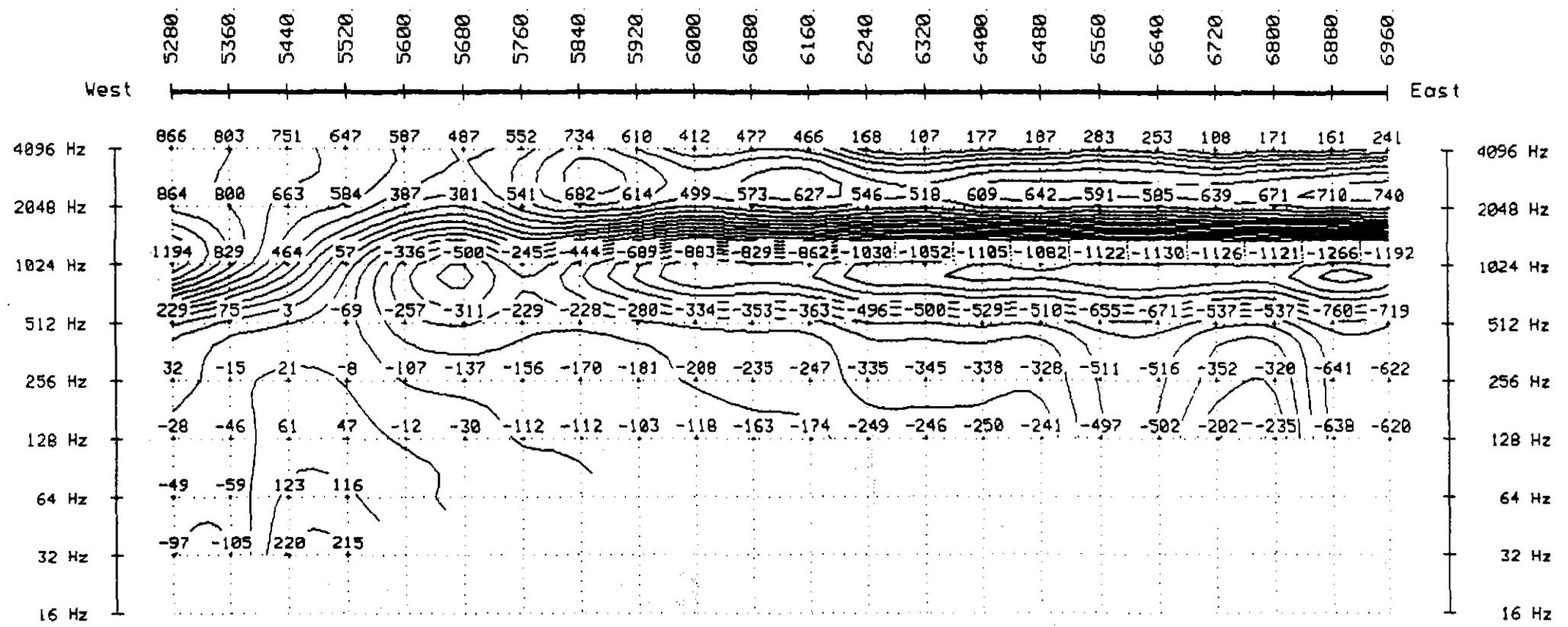
Length = 80 m Line = East  
 Spacing = 80 m DiPole = East

Surveyed = DEC 88

TRANSMITTER DATA

Length = 1500M  
 Orient = East  
 Distance = 7KM  
 Rx to Tx = North

ZONGE Job 864  
 PLOT BY CPLOT 5.40  
 PLOTTED 11 Jan 89



680499

Fig 20.

Line 358800  
MT SELINA  
for  
BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
CAGNIARD RESISTIVITY  
values in ohm-meters  
(RHO-C)

(Plot limits) and LOGARITHMIC CONTOURS  
(Interval: 0 20)

|         |       |        |
|---------|-------|--------|
| (11.1M) | 158 K | 1585   |
| 10.0M   | 100 K | 1000   |
| 6.31M   | 63.1K | 631    |
| 3.98M   | 39.8K | 398    |
| 2.51M   | 25.1K | 251    |
| 1.58M   | 15.8K | 158    |
| 1.00M   | 10.0K | 100    |
| 631 K   | 6310  | 63.1   |
| 398 K   | 3981  | 39.8   |
| 251 K   | 2512  | (35.5) |

RECEIVER DATA

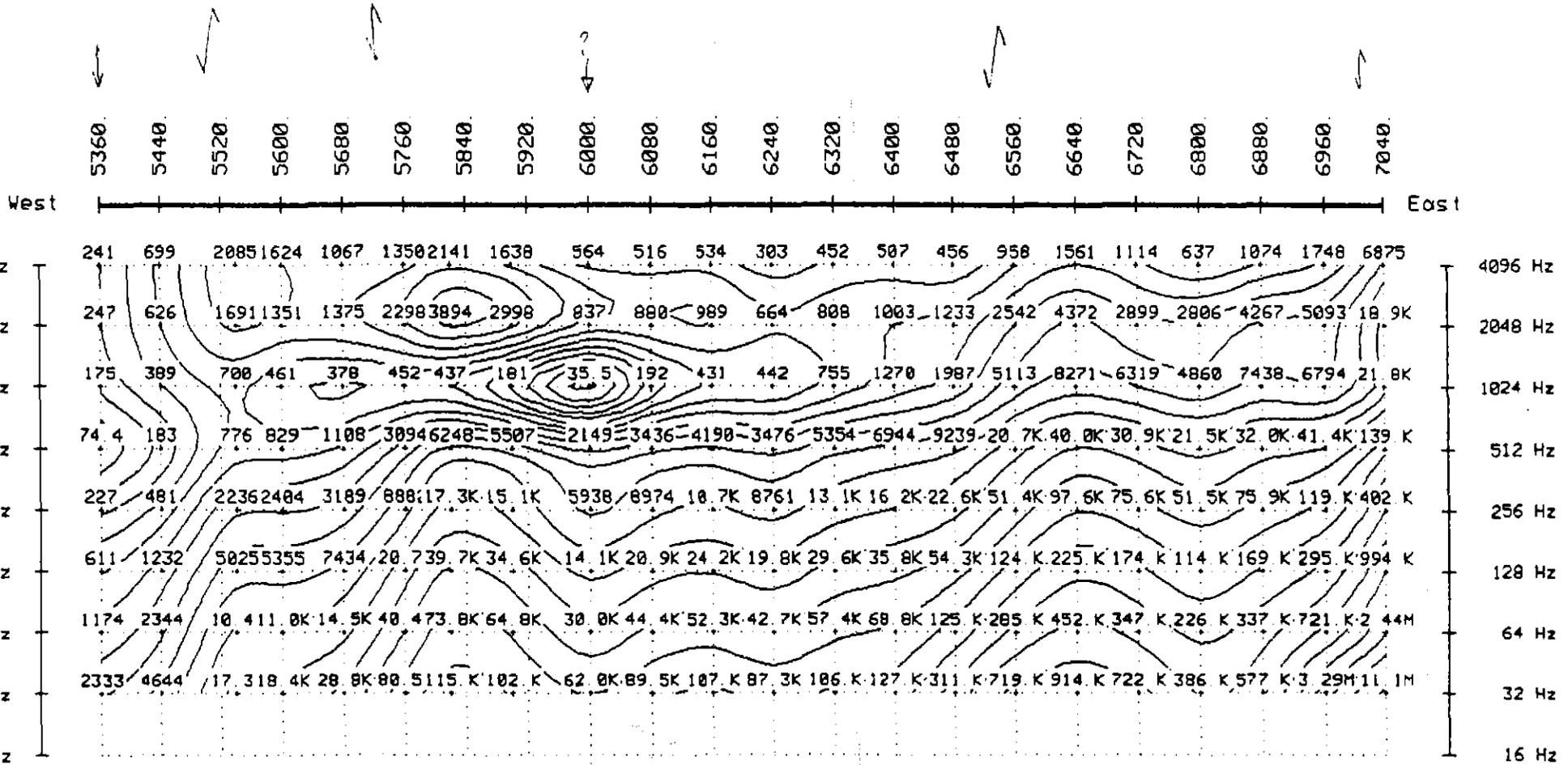
Length = 80 m Line = East  
Spacing = 80 m DiPole = East

Surveyed = DEC 88

TRANSMITTER DATA

Length = 1500M  
Orient = East  
Distance = 7KM  
Rx to Tx = North

ZONGE Job 864  
PLOT BY CPlot 5.40  
PLOTTED 11 Jan 89



667040

Fig 2i

Line 358800  
 MT SELINA  
 for  
 BILLITON AUSTRALIA  
 SCALE 1:8000

CSAMT SURVEY DATA  
 PHASE DIFFERENCE ( E - H )  
 values in milli-radians  
 <PDIFF

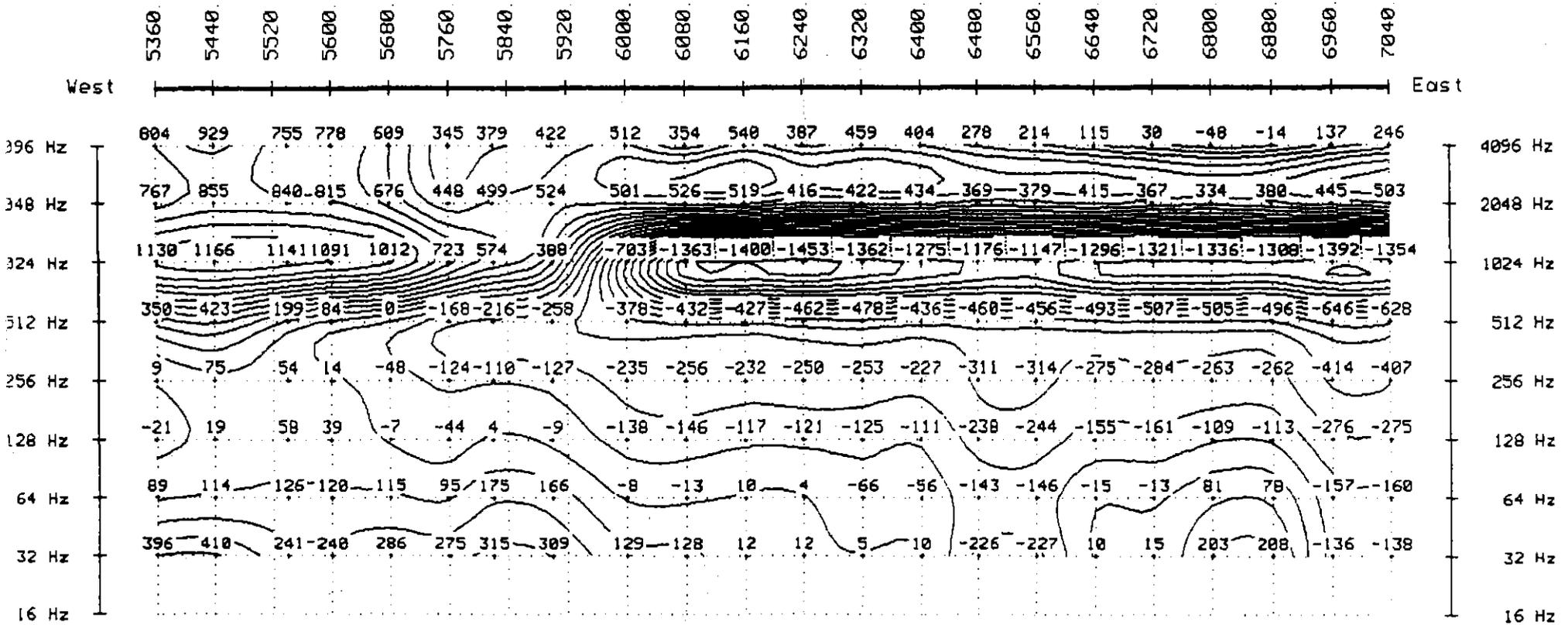
[Plot limits] and ARITHMETIC CONTOURS  
 ( Interval 100 00 )

|        |      |         |
|--------|------|---------|
| (1168) | 200  | -800    |
| 1100   | 100  | -900    |
| 1000   | 0 00 | -1000   |
| 900    | -100 | -1100   |
| 800    | -200 | -1200   |
| 700    | -300 | -1300   |
| 600    | -400 | -1400   |
| 500    | -500 | [-1453] |
| 400    | -600 |         |
| 300    | -700 |         |

RECEIVER DATA  
 Length = 80 m Line = East  
 Spacing = 80 m DiPole = East  
 Surveyed = DEC 88

TRANSMITTER DATA  
 Length = 1500M  
 Orient = East  
 Distance = 7KM  
 Rx to Tx = North

INGE Job 864  
 PLOT BY CPlot 5.40  
 PLOTTED 11 Jan 89



667041

Fig 22

Line 358400  
MT SELINA  
for  
BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
CAGNIARD RESISTIVITY

values in ohm-meters  
<RHO-C>

[Plot limits] and LOGARITHMIC CONTOURS  
( Interval: 0.20 )

|         |       |       |
|---------|-------|-------|
| [1.16M] | 15.8K | [192] |
| 1.00M   | 10.0K |       |
| 631 K   | 6310  |       |
| 398 K   | 3981  |       |
| 251 K   | 2512  |       |
| 158 K   | 1585  |       |
| 100 K   | 1000  |       |
| 63.1K   | 631   |       |
| 39.8K   | 398   |       |
| 25.1K   | 251   |       |

RECEIVER DATA

Length = 80 m Line = East  
Spacing = 80 m DiPole = East

Surveyed = DEC 88

TRANSMITTER DATA

Length = 1500M  
Orient = East  
Distance = 7KM  
Rx to Tx = North

DNGE Job 864  
LOT BY CPL0T 5.40  
PLOTED 11 Jan 89

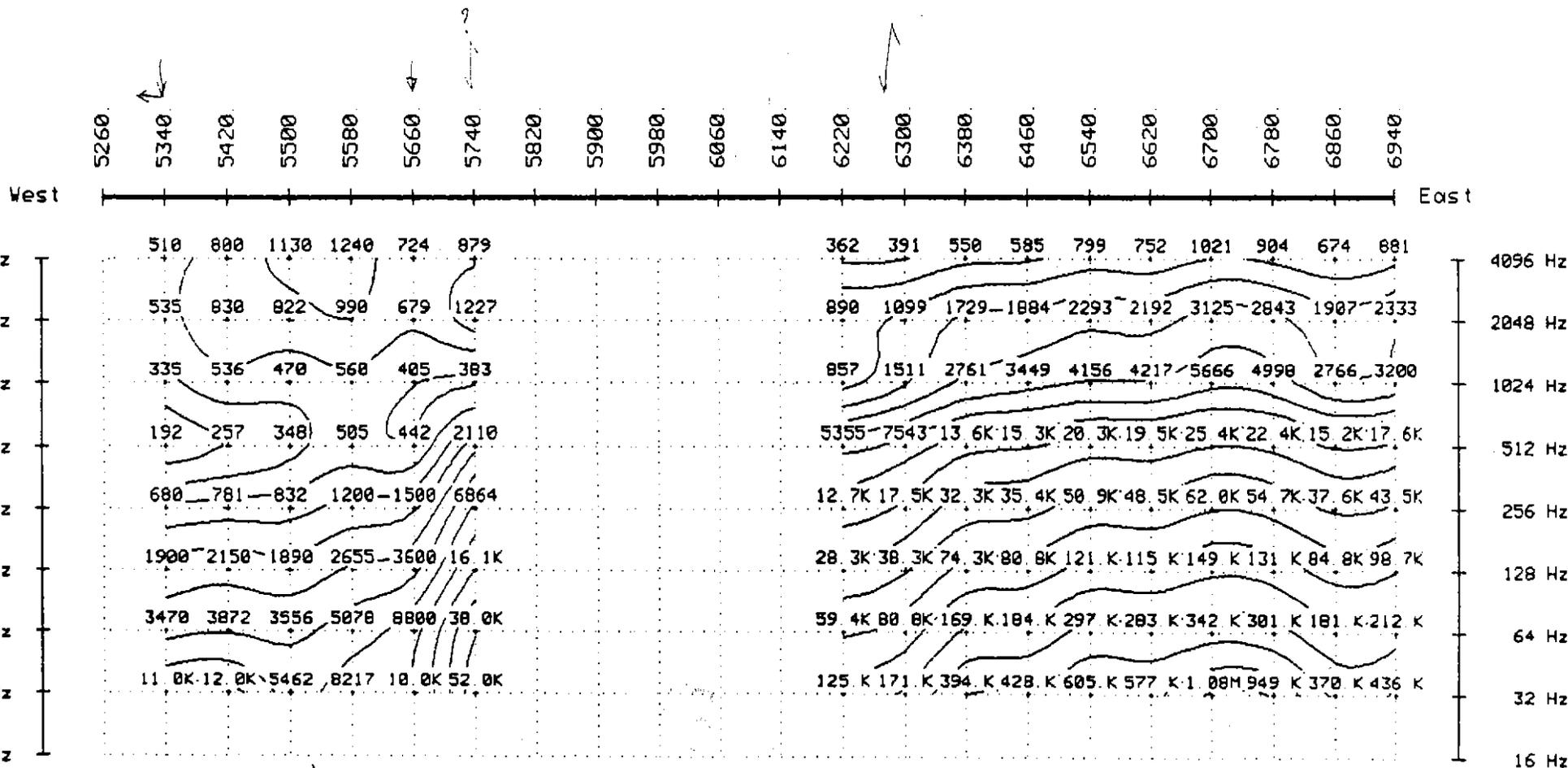


Fig 23

Line 358400  
MT SELINA  
for  
BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
PHASE DIFFERENCE ( E - H )

values in milli-radians  
<PDIFF

RECEIVER DATA

Length = 80 m Line = East  
SPacing = 80 m DiPole = East

Surveyed = DEC 88

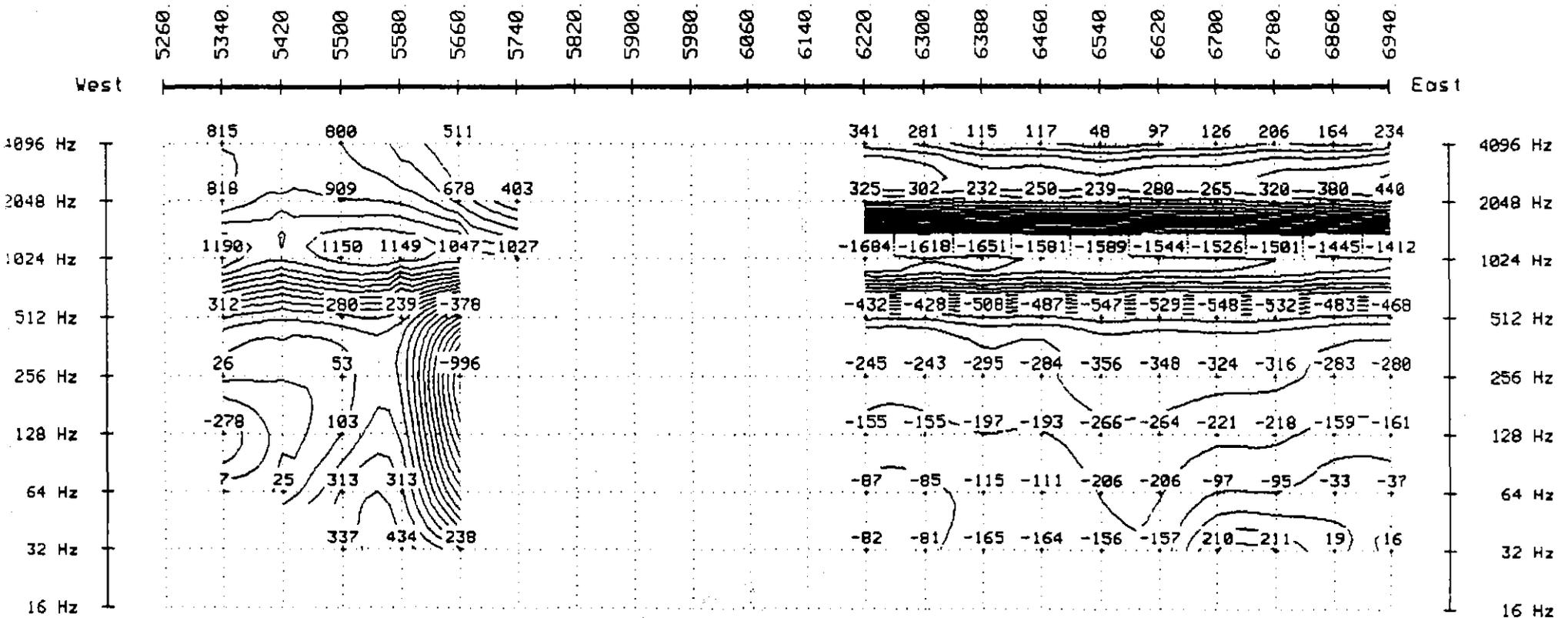
TRANSMITTER DATA

Length = 1500M  
Orient. = East  
Distance = 7KM  
Rx to Tx = North

[Plot limits] and ARITHMETIC CONTOURS  
( Interval: 100 00 )

|        |      |         |
|--------|------|---------|
| (1191) | 200  | -800    |
| 1100   | 100  | -900    |
| 1000   | 0 00 | -1000   |
| 900    | -100 | -1100   |
| 800    | -200 | -1200   |
| 700    | -300 | -1300   |
| 600    | -400 | -1400   |
| 500    | -500 | -1500   |
| 400    | -600 | -1600   |
| 300    | -700 | [-1692] |

LONGE Job B64  
PLOT BY C/LOT 5.40  
P/LOT 11 Jan 89



667043



Fig 25  
 Line 358000  
 MT SELINA  
 for  
 BILLITON AUSTRALIA

SCALE 1:8000

CSAMT SURVEY DATA  
 PHASE DIFFERENCE ( E - H )

values in milli-radians  
 <PDIFF

[Plot limits] and ARITHMETIC CONTOURS  
 ( Interval: 100.00 )

|        |      |       |       |         |
|--------|------|-------|-------|---------|
| [1570] | 600  | -400  | -1400 | -2400   |
| 1500   | 500  | -500  | -1500 | -2500   |
| 1400   | 400  | -600  | -1600 | [-2525] |
| 1300   | 300  | -700  | -1700 |         |
| 1200   | 200  | -800  | -1800 |         |
| 1100   | 100  | -900  | -1900 |         |
| 1000   | 0.00 | -1000 | -2000 |         |
| 900    | -100 | -1100 | -2100 |         |
| 800    | -200 | -1200 | -2200 |         |
| 700    | -300 | -1300 | -2300 |         |

RECEIVER DATA

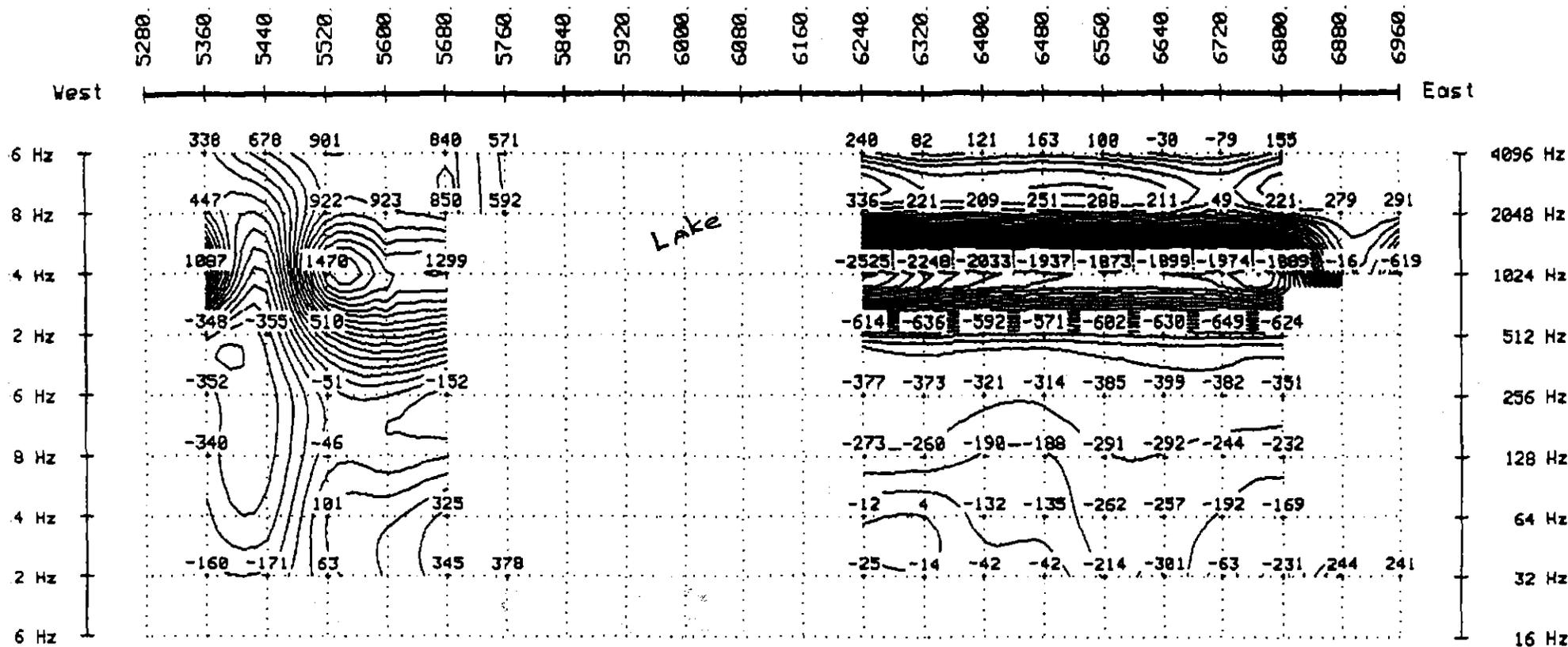
Length = 80. m Line = East  
 Spacing = 80 m DiPole = East

Surveyed = DEC 88

TRANSMITTER DATA

Length = 1500M  
 Orient. = East  
 Distance = 7KM  
 Rx to Tx = North

GE Job 864  
 T BY CPLOT 5.40  
 TTED 18 Jan 89



667045