Rosebery Down Hole
and Fixed Loop Ground EM Surveys

Logistics Summary

September 2004

for

Zinifex Ltd

<u>Compiled by</u>:

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A.D. Thompson

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FIGURES   **Page**

APPENDIX I

Boco dB/dT Fixed Loop EM Profiles

APPENDIX II

White Spur dB/dT Fixed Loop EM Profiles

APPENDIX III

Boco dB/dT Downhole EM Profile

APPENDIX IV

Chamberlain Downhole EM Profiles

SUMMARY

During September of 2004, Zonge Engineering and Research Organization (Zonge) mobilised a three-person geophysical field crew to the Rosebery Prospect located near the Rosebery Mine in Western Tasmania to conduct down-hole and fixed loop Electromagnetic (EM) surveys for Zinifex Ltd.

The survey consisted of, 24 lines of fixed loop EM at the White Spur and Boco Prospects and three holes of DHEM at the Boco and Chamberlain Prospects.

At White Spur, a total of 56 Fixed Loop EM soundings were recorded at 25 metre intervals over two lines, totalling 1.4 line kilometres. At the Boco Prospect, a total of 256 Fixed Loop EM soundings were collected at 50 metre station intervals over 22 lines, covering a total of 11.475 line kilometres. Down Hole EM data was collected at 25 metre intervals over three holes at the Boco and Chamberlain Prospects resulting in 72 soundings over a combined depth of 1725 metres.

Data quality and repeatability were monitored throughout the course of the survey. Strict acquisition procedures were adhered to, which ensured that good quality data were collected.

1. TEM INSTRUMENTATION

A Zonge multipurpose GDP-32 receiver was used to take all of the data for this project. These receivers are backpack-portable, microprocessor-controlled and capable of simultaneously gathering data on up to sixteen channels (usually configured for eight channels). Each day's data were downloaded every evening from the receiver's solid-state memory to a portable computer. Preliminary processing and plotting were completed in the field. Final processing and plotting were completed in Zonge Engineering's Adelaide office.

Transmitted fields were generated with a Zonge GGT-10 geophysical transmitter powered by a ZMG-7.5 generator system. Signal frequency and synchronisation were controlled directly by an XMT-32 controller.

The receiving antenna for the fixed loop EM was a standard Zonge TEM-3 coil which has an effective area of 10,000 square metres. The receiving antenna for the downhole EM was a sirotem probe, also with an effective area of 10,000 square metres.

2. TEM SURVEY PARAMETERS

Transmitter loops were approximately 400m by 400m wide and were made up of a single turn of standard 2.5mm^2 insulated copper wire. Current for the survey was approximately 15 amperes.

Data were collected at a base frequency of 16 hertz for all areas excepting the surface EM at Boco which was collected at 32 Hz. The transmitter delay (ramp) was measured using an oscilloscope and then set in the receiver at approximately 400 microseconds.

At White Spur, the line separation was 200m, the station separation was 25m and data were collected from a single loop. At the Boco Prospect, data were collected from six separate loops using a 200m line separation and 50m station separation. In both areas only the vertical (Hz) component of the EM field was collected. Loops were located such that all readings were collected outside the loop.

At White Spur, the loop corners were as follows:

Corner	AMG E	AMG N	RL
NW	377360	5359600	540
NE	377650	5359610	490
SW	377300	5359200	540
SE	377650	5359200	485

At the Boco Prospect the loop corners are as follows:

Loop1 – 600N, 1400E to 225S, 2500E

Loop2 – 225S, 2500E to 600N, 3400E

Loop 3 – 175N, 1400E to 225S, 2500E

Loop 4 – 225S, 2500E to 175N, 3400E

Loop 5 – 600N, 1400E to 175N, 2500E

Loop 6 – 600N, 2500E to 175N, 3400E

For the downhole EM a station spacing of 25 metres was used for all holes except where a response was measured at which point the station spacing was closed up to 10m. Again only the axial component of the EM signal was recorded for all holes.

Hole locations for the downhole work are as follows:

Hole_ID	Year	EOH	UTM_East	UTM_North	UTM_RL
CP353	2004	905.5	377163.2	5371336	249.4
CP348	2000	506.2	377203.5	5371315	247
BOC1	2004	551.5	382440	5387705	448.0

Loop Location for BOC1 is:

Loop B1

Corner	AMG E	AMG N	RL
NW	381890	5387720	475
NE	382680	5388140	465
SW	382135	5387285	430
SE	382920	5387705	405

Loop Location for CP353 is:

Loop C1

Corner	AMG E	AMG N	RL
NW	378000	5371850	260
NE	378700	5371850	270
SW	378000	5371050	515
SE	378700	5371050	340

Loop location for CP353 is:

Loop C1

Corner	AMG E	AMG N	RL
NW	378000	5371850	260
NE	378700	5371850	270
SW	378000	5371050	515
SE	378700	5371050	340

3. PROBLEMS AND DATA QUALITY

Data quality was extremely good with repeatability of approximately 0.1 uV/A at late times except for some lines at Boco. At lines 3100E and 3400E from Boco loop 2 late time ringing was evident in the data. This is thought to be due to a cultural effect such as powerlines.

Equipment problems were a big issue and problems were encountered with the transmitter, voltage regulator and downhole probe at various stages throughout the survey. All of the malfunctioning equipment was replaced as required.

4. PRODUCTION SUMMARY

Table 1 gives a short summary of the production of Job 641.

Table 1. Production Summary

Date:	Description:
28th September	Travel from Launceston to Burnie to pick up crew member. Travel to Rosebery.
29th September	Met with client and proceeded to log test hole: logging at 16hz at 25 metre intervals.
30th September	Down day as waiting for equipment to arrive.
1st October	Down day as waiting for equipment to arrive.
2nd October	Down day as waiting for equipment to arrive.
3rd October	Performed transmitter test at drill site and then moved to TEM line 9600N to begin reading. Conducted further testing on receiving coils and probes.
4th October	Truck taken to mechanics for repairs. Travel to White Spur to set up wires.
5th October	Surveyed TEM on White Spur line 9600N from stations 6900E to 7350E.
6th October	Surveyed TEM on White Spur line 9400N from stations 7350E to 7800E.
7th October	Surveyed down-hole TEM on Chamberlain hole from 25 to 900 metres depth.
8th October	Surveyed down-hole TEM on Boco hole from 25 to 550 metres depth.
9th October	Day off.
10th October	Surveyed down-hole TEM on CP349 hole from 25 to 350 metres depth.
11th October	Surveyed surface TEM on White Spur line 9400N from stations 6900E to 7350E.
12th October	Commenced reading fixed loop EM at Boco site. Loop 2: Surveyed lines 3400E and 3100E from stations 650N to 1450N.
13th October	Surveyed Boco fixed loop EM, Loop 2 on lines 2800E and 2500E from stations 650N to 1400N and 1375N respectively.
14th October	Surveyed Boco fixed loop EM, Loop 4 on lines 2500E, 2800E, 3100E, 3400E from stations 200N to 600N.
15th October	No production due to rain, drove crew member to airport.
16th October	Surveyed Boco fixed loop EM, Loop 6 on lines 3400E, 3100E, 2800E and 2500E from stations 225S to 200N.
17th October	Day off as crew chief sick.
18th October	Surveyed Boco fixed loop EM, Loop 1 on lines 1400E and 1600E from stations 650N to 1250N.

19th October	Surveyed Boco fixed loop EM, Loop 1 on Lines 1900E and 2200E from stations 650N to 1350N.
20th October	Some delay due to transmitter problems. Read Boco fixed loop EM, Loop 3 on lines 1400E and 1600E from stations 200N to 600N.
21st October	Surveyed Boco fixed loop EM, Loop 5 on Lines 1400E, 1600E, 1900E and 2200E from stations 225S to 200N. Survey completed, field equipment removed and vehicles packed.

5. DATALIST

Prospect	Survey Type	Line	Loop	Start	Finish	Station spacing	No. of stations
Boco	DHEM	Boco	1	25m	550m	25m	22
Chamberlain	DHEM	CP353	1	25m	900m	25m	36
Chamberlain	DHEM	CP349	1	25m	350m	25m	14
White Spur	Fixed loop	9400N	1	6900E	7800E	25m	37
White Spur	Fixed loop	9600N	1	6900E	7350E	25m	19
Boco	Fixed loop	1400E	1	650N	1250N	50m	13
Boco	Fixed loop	1600E	1	650N	1250N	50m	13
Boco	Fixed loop	1900E	1	650N	1350N	50m	15
Boco	Fixed loop	2200E	1	650N	1350N	50m	15
Boco	Fixed loop	2500E	2	650N	1375N	50m	16
Boco	Fixed loop	2800E	2	650N	1400N	50m	16
Boco	Fixed loop	3100E	2	650N	1450N	50m	17
Boco	Fixed loop	3500E	2	650N	1450N	50m	17
Boco	Fixed loop	1400E	3	200N	600N	50m	9
Boco	Fixed loop	1600E	3	200N	600N	50m	9
Boco	Fixed loop	2500E	4	200N	600N	50m	9
Boco	Fixed loop	2800E	4	200N	600N	50m	9
Boco	Fixed loop	3100E	5	200N	600N	50m	9
Boco	Fixed loop	3500E	5	200N	600N	50m	9
Boco	Fixed loop	1400E	5	225S	200N	50m	10
Boco	Fixed loop	1600E	5	225S	200N	50m	10
Boco	Fixed loop	1900E	5	225S	200N	50m	10
Boco	Fixed loop	2200E	5	225S	200N	50m	10
Boco	Fixed loop	2500E	6	225S	200N	50m	10
Boco	Fixed loop	2800E	6	225S	200N	50m	10
Boco	Fixed loop	3100E	6	225S	200N	50m	10
Boco	Fixed loop	3500E	6	225S	200N	50m	10
Total Number of DHEM Stations / Depth Read						72 / 1.725	
Total Number of Fixed Loop EM Stations / Kilometres Read						311 / 14.15	

No other data were collected during this survey.

6. **<u>EXPLANATION OF FILES</u>**

To uncompress data files use winzip.

<u>EM files</u>

Each grid line of Fixed Loop EM data has been zipped into two separate files under the transmitting loop folder. For example, line 9600n files are titled ZE9600N.ZIP and HP9600N.ZIP. The 'ZE' stands for Zonge Engineering files and 'HP' for Hewlett Packard vector graphics files.

The **ZE*.ZIP** file contains:

*.RAW - the edited raw data downloaded from the GDP-32

*.MDE - files containing processing information

*.AVG - files created by Zonge's CRAVG containing averaged data

*.TEM – files created by Zonge's CRAVG program containing averaged data in AMIRA format.

*.Z - files used for plotting containing amplitudes normalised by the amperage.

The **HP*.zip** file contains HPGL print files that can be copied to a printer.

*.x01 contains log-linear amplitude data in uV/A