Zonge Engineering and Research Organization (Australia) Limited.

# Rosebery Fixed Loop and Down-Hole EM Survey

# Logistics Summary

**March 2005**

**for**

**Zinifex Ltd**


Compiled by:

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**FIGURES**

## SUMMARY

During March of 2005, Zonge Engineering and Research Organization (Zonge) mobilised a three-person geophysical field crew to Rosebery, western Tasmania to conduct down hole and fixed loop EM surveys for Zinifex Ltd.

During the course of the survey, data was read within the Boco, Chamberlain, Henty and White Spur prospects. The survey consisted of 28 lines of fixed loop EM and 6 holes of DHEM.

A total of 462 fixed loop EM soundings, producing 21.625 line kilometres of data were taken within the Henty and White Spur prospects.

A total of 136 down hole EM readings covering a total depth of 3.346 kilometres were taken within the Boco, Chamberlain, Henty and White Spur prospects

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-30 geophysical transmitter powered by a ZMG-30 generator system. Signal frequency and synchronisation were controlled directly by an XMT-32 controller.

## 2. TEM SURVEY PARAMETERS:

Transmitter loops for the surface EM were approximately 600m by 800m wide and were made up of a singe turn of standard 2.5mm$^2$ insulated copper wire. Figures 4 to 11 below show the transmitter loop configurations used in this survey. Transmitting current varied throughout the survey due different loop configurations and ranged between 12 and 19 Amperes. The receiving antenna was a standard Zonge TEM-3 coil, which has an effective area of 10,000 square metres. Surface EM data were collected at a base frequency of 32 hertz with down-hole EM data taken at 8Hz to 32Hz depending on the resistivity of surrounding rock. The transmitter delay (ramp) was measured using an oscilloscope and then set in the receiver, this delay time varied with transmitter set-up and ranged from 120 to 200 microseconds.

## 3. PROBLEMS:

## 4. PRODUCTION SUMMARY

Table 1 gives a short summary of the production of job 656.

**Table 1.** Production Summary

| *Date:* | *Description:* |
|---|---|
| 8th March | Travel from Adelaide to Devonport. |
| 9th March | Travel from Devonport to Burnie to Rosebery. Met with client, un-packed equipment and bought supplies. |
| 10th March | Commenced reading on White Spur line 9400N from 7400E to 7800E. Drive to Loop 1 to test |
| 11th April | Drive to Henty Gorge and commenced reading on Loop 1: line 6800N from 6025E to 6575E. |
| 12th March | Read Henty Gorge loop 1: line 6400N from 6225E to 6525E and line 6600N from 6025N to 6775E. |
| 13th March | Read Henty Gorge loop 2: line 6400N from 6525E to 7100E, line 6200N from 5525E to 7000E and line 6000N from 7000E to 6525E. |
| 14th March | Read Henty Gorge loop 2: line 5600N from 6525E to 7100E, line 5800N from 5525N to 7000E. Move survey to Henty Gorge loop3. |
| 15th March | Read Henty Gorge loop 3: line 6200N from 7050E to 7300E line 6000N from 7025E to 7475E. |
| 16th March | Read Henty Gorge loop 3: line 5800N from 7025E to 7475E and line 5600N from 7400E to 6225E. |
| 17th March | Travel with client to Mt Reid to find access to White Spur Loops. |
| 18th March | Read Henty Gorge loop 3: line 5600N from 6475E to 6025E, line 6000N from 6450E to 6000E and line 6200N from 6025E to 6475E. |
| 19th March | Commenced reading on White Spur loop 4: line 3400N from 6125E to 4825E and line 3800N from 5200E to 5700E. |
| 20th March | Read White Spur loop 4: line 3800N from 5700E to 6100E. |
| 21st March | Read White Spur loop 4: line 3600N from 4800E to 6150E. Pack up site and move wires to next loop. |
| 22nd March | Read White Spur loop 3: line 3600N from 4800E to 6150E. |
| 23rd March | Refuel stop. Read White Spur loop 3: line 3400N from 6175E to 4825E. |
| 24th March | Read White Spur loop 3: line 3800N from 6075-5200E. Encountered equipment problems. |
| 25th March | Move White Spur loop 3 to loop 2 and read line 3400N from 4900E to 5675E. |
| 26th March | Re-Fuel stop. Read White Spur loop 2: line 3200N from 5725E to 6225E and line 3000N from 6325E to 5325E. |
| 27th March | Day off. |
| 28th March | Commenced reading on White Spur loop 1: line 3000N from 5323E to 5125E line 2800N from 6350E to 5050E. |
| 29th March | Move loop 1 to loop 2 and read line 3200N from 6200E to 5500E. |
| 30th March | Read White Spur loop 2: Line 3200N from 5550E to 4900E and line 3000N from 5100E to 6300E. |

| | |
|---|---|
| 31st March | Read White Spur loop 2: line 2800N from 5000E to 6350E. |
| 1st April | Pick up loop 2 wires at White Spur and drive to Henty Mine. Read down-hole EM on YSG1 from 50m to 284m. |
| 2nd April | Layout loop for Chamberlain hole 353 and read down-hole EM from 100m to 750m depth at 16Hz. |
| 3rd April | Read down-hole EM on Chamberlain hole 353 from 880m up to 200m at 8hz. |
| 4th April | Read down-hole EM on Chamberlain hole 348 from 100m to 350m and White Spur hole 13 from 50m to 540m. |
| 5th April | Read down-hole EM on White Spur hole 12 from 25m to 314m |
| 6th April | Pick up Loop wire on White Spur hole 12 and drove to Boco. Read down-hole EM on BOC2 from 50m to 650m. |
| 7th April | Pack-up equipment and depart. |

## 5. DATALIST

**Table 2.** Data summary of down-hole EM data.

| Prospect | Survey Type | Hole | Start | Finish | Frequency | Reading interval | No of stations |
|---|---|---|---|---|---|---|---|
| Boco | Down-hole EM | Boc2 | 100m | 650m | 32Hz | 25m | 21 |
| Chamberlain | Down-hole EM | 348 | 100m | 380m | 8Hz | 25m | 13 |
| Chamberlain | Down-hole EM | 353 | 200m | 880m | 8Hz | 25m | 20 |
| Chamberlain | Down-hole EM | 353 | 50m | 880m | 16Hz | 25m | 34 |
| Henty | Down-hole EM | YSG1 | 50m | 284m | 16Hz | 25m | 13 |
| White Spur | Down-hole EM | WSP12 | 25m | 314m | 32Hz | 25m | 13 |
| White Spur | Down-hole EM | WSP13 | 50m | 533m | 32Hz | 25m | 22 |
| **Total number of down-hole EM readings** | | | | | | | **136** |

**Table 3. Data summary of fixed loop EM data.**

| Prospect | Survey Type | Loop | Line | Start | Finish | Frequency | Station Spacing | No of stations |
|---|---|---|---|---|---|---|---|---|
| Henty | Fixed loop EM | 1 | 5356400N | 376025E | 376525E | 32Hz | 50m | 11 |
| Henty | Fixed loop EM | 1 | 5356600N | 376025E | 376725E | 32Hz | 50m | 15 |
| Henty | Fixed loop EM | 1 | 5356800N | 376025E | 376525E | 32Hz | 50m | 12 |
| Henty | Fixed loop EM | 2 | 5355600N | 376525E | 376975E | 32Hz | 50m | 10 |
| Henty | Fixed loop EM | 2 | 5355800N | 376575E | 376975E | 32Hz | 50m | 9 |
| Henty | Fixed loop EM | 2 | 5356000N | 376525E | 376975E | 32Hz | 50m | 10 |
| Henty | Fixed loop EM | 2 | 5356200N | 376525E | 376975E | 32Hz | 50m | 10 |
| Henty | Fixed loop EM | 2 | 5356400N | 376525E | 377075E | 32Hz | 50m | 12 |
| Henty | Fixed loop EM | 3 | 5355600N | 377050E | 377400E | 32Hz | 50m | 8 |
| Henty | Fixed loop EM | 3 | 5355800N | 377025E | 377475E | 32Hz | 50m | 10 |
| Henty | Fixed loop EM | 3 | 5356000N | 377025E | 377475E | 32Hz | 50m | 10 |
| Henty | Fixed loop EM | 3 | 5356200N | 377000E | 377300E | 32Hz | 50m | 7 |
| Henty | Fixed loop EM | 3 | 5355600N-a | 376025E | 376475E | 32Hz | 50m | 10 |
| Henty | Fixed loop EM | 3 | 5355800N-a | 376225E | 376525E | 32Hz | 50m | 7 |
| Henty | Fixed loop EM | 3 | 5356000N-a | 376000E | 376450E | 32Hz | 50m | 10 |
| Henty | Fixed loop EM | 3 | 5356200N-a | 376025E | 376475E | 32Hz | 50m | 10 |
| White Spur | Fixed loop EM | 1 | 5362800N | 375050E | 376350E | 32Hz | 50m | 27 |
| White Spur | Fixed loop EM | 1 | 5363000N | 375125E | 376325E | 32Hz | 50m | 25 |
| White Spur | Fixed loop EM | 1 | 5363200N | 374800E | 376125E | 32Hz | 50m | 28 |
| White Spur | Fixed loop EM | 2 | 5362800N | 375050E | 376350E | 32Hz | 50m | 27 |
| White Spur | Fixed loop EM | 2 | 5363000N | 375100E | 376300E | 32Hz | 50m | 25 |
| White Spur | Fixed loop EM | 2 | 5363200N | 374900E | 376200E | 32Hz | 50m | 27 |
| White Spur | Fixed loop EM | 3 | 5363400N | 374825E | 376175E | 32Hz | 50m | 28 |
| White Spur | Fixed loop EM | 3 | 5363600N | 374700E | 376125E | 32Hz | 50m | 30 |
| White Spur | Fixed loop EM | 3 | 5363800N | 375225E | 376075E | 32Hz | 50m | 18 |
| White Spur | Fixed loop EM | 4 | 5363400N | 374825E | 376125E | 32Hz | 50m | 27 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| White Spur | Fixed loop EM | 4 | 5363600N | 374700E | 376075E | 32Hz | 50m | 28 |
| White Spur | Fixed loop EM | 4 | 5363800N | 375200E | 375700E | 32Hz | 50m | 11 |
| **Total number of fixed loop EM stations** | | | | | | | | **462** |

**No other data were collected during this survey.**

**Figure 4.** Map of Henty surface EM transmitter loop 2.

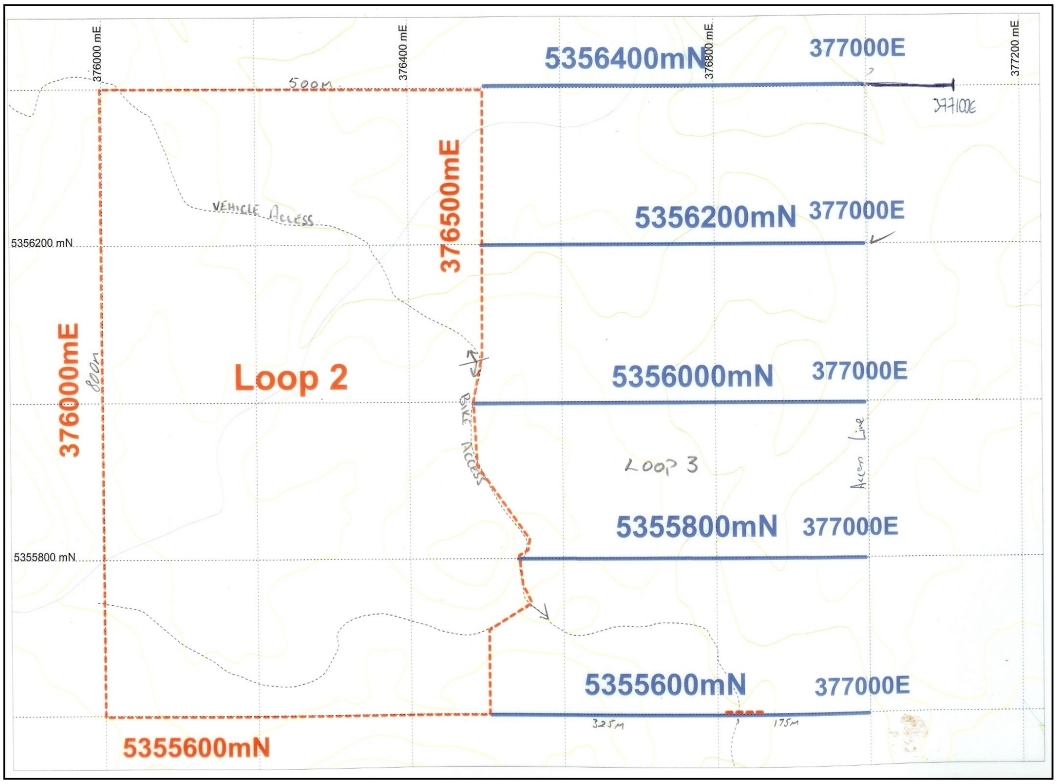



**Figure 5.** Map of Henty surface EM transmitter loop 3.

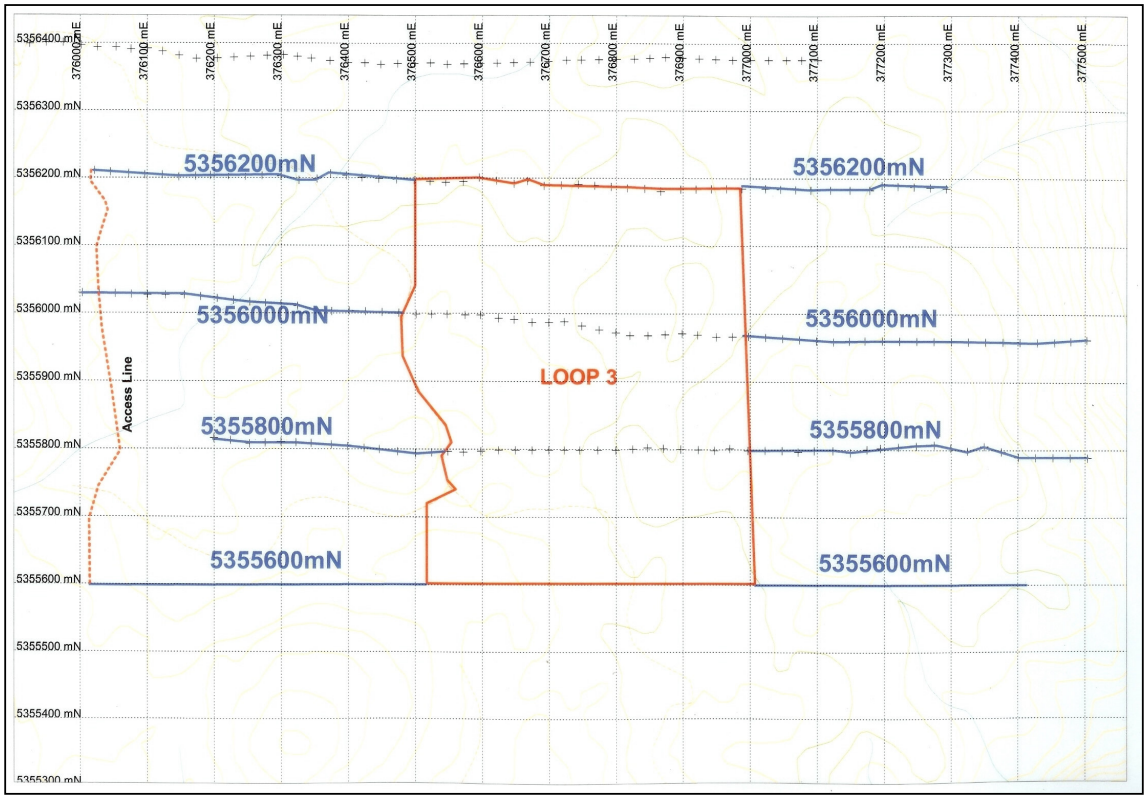


**Figure 6.** Map of White Spur surface EM transmitter loop 1.

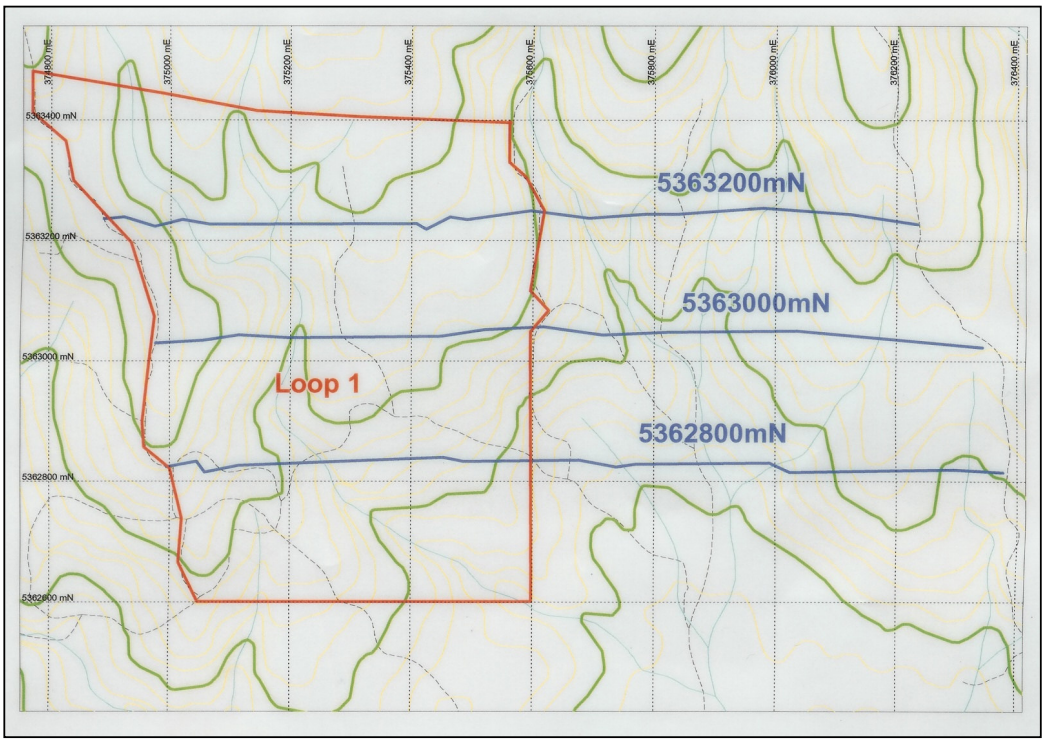



**Figure 7.** Map of White Spur surface EM transmitter loop 2.

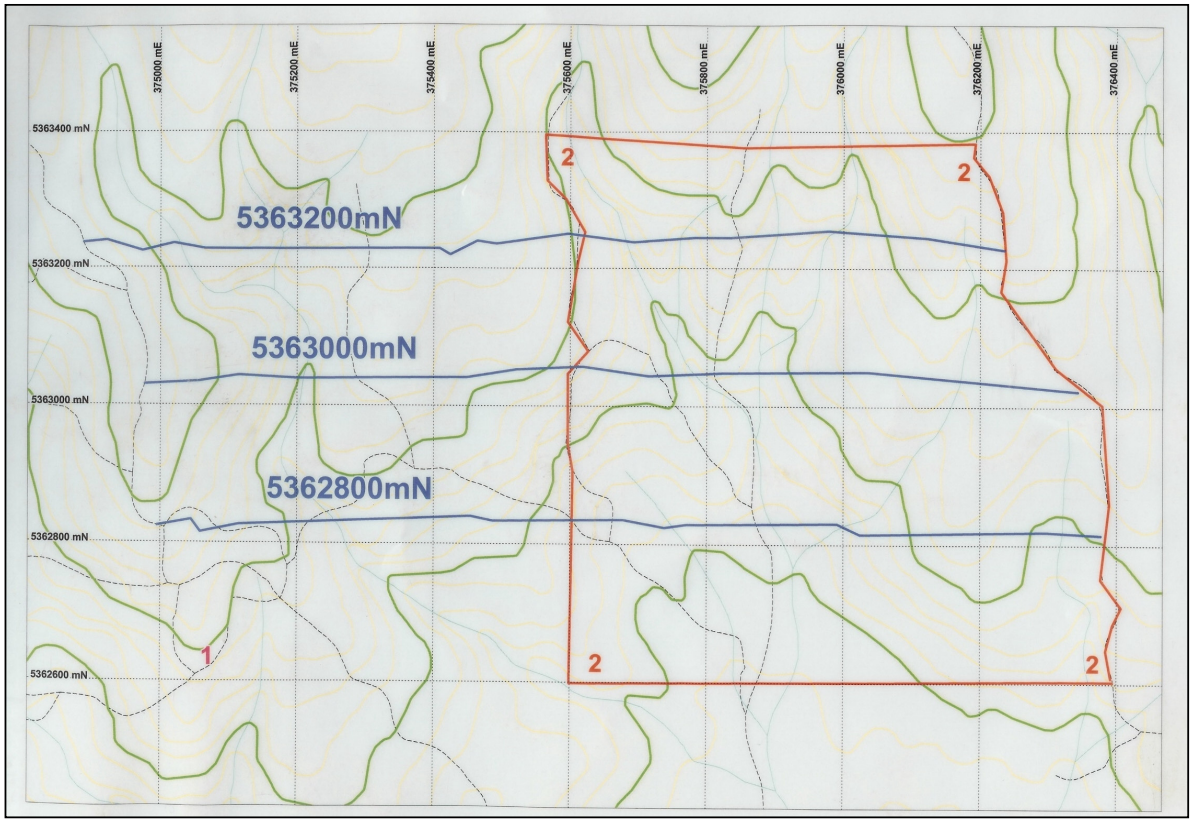


**Figure 8.** Map of White Spur surface EM transmitter loop 3.

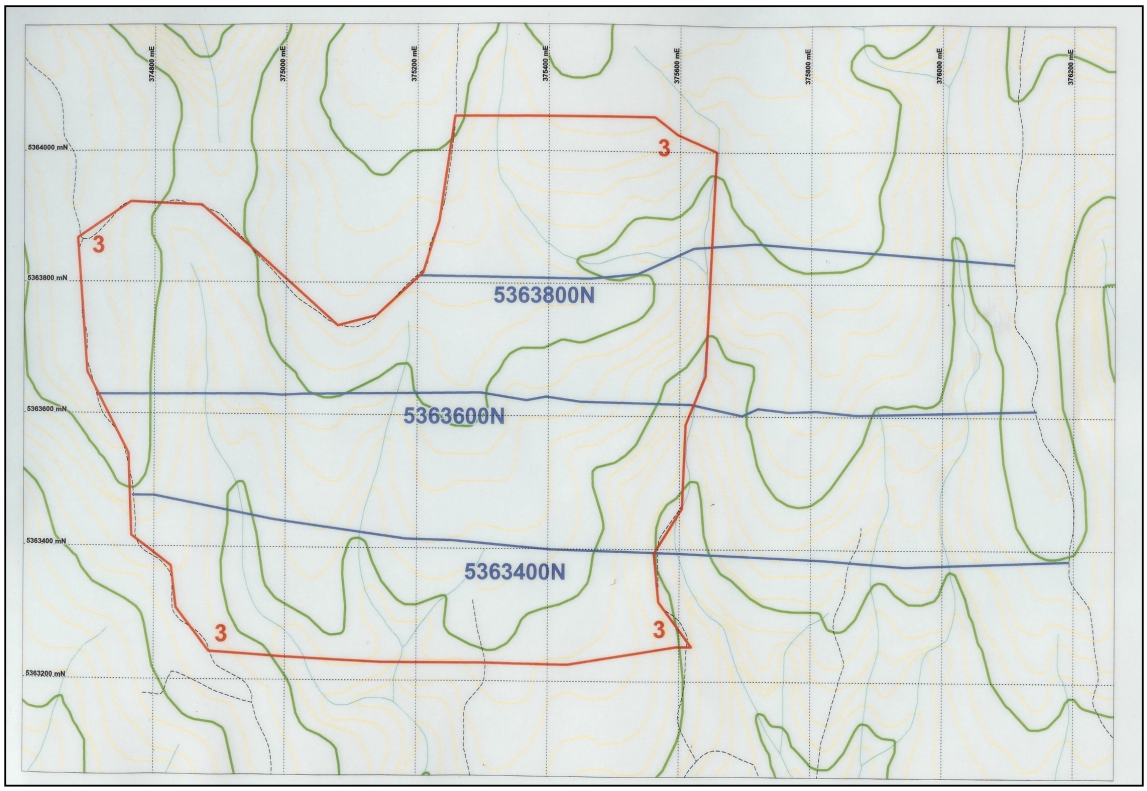



**Figure 9.** Map of White Spur surface EM transmitter loop 4.

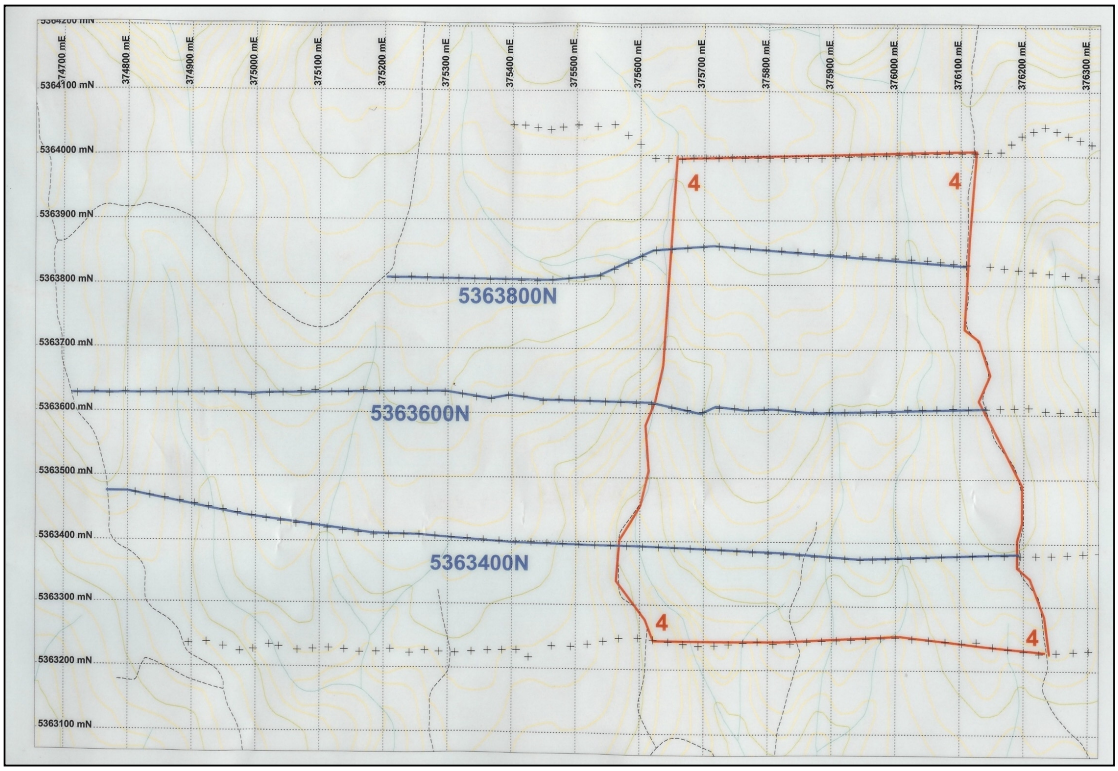


**Figure 10.** Map of Boco DHEM transmitter loop.

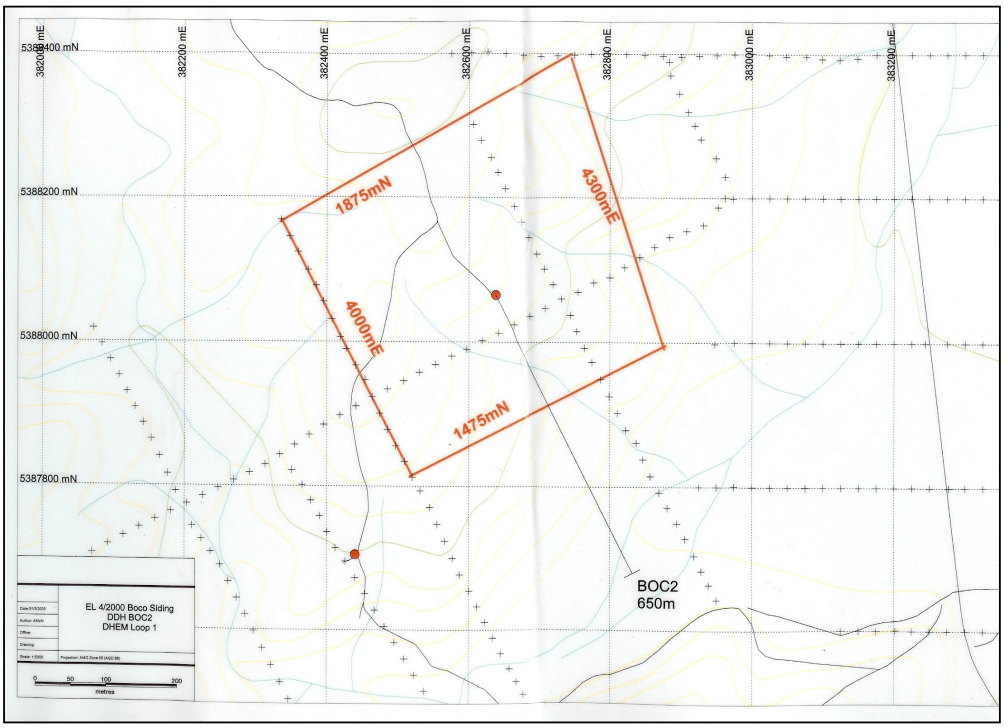
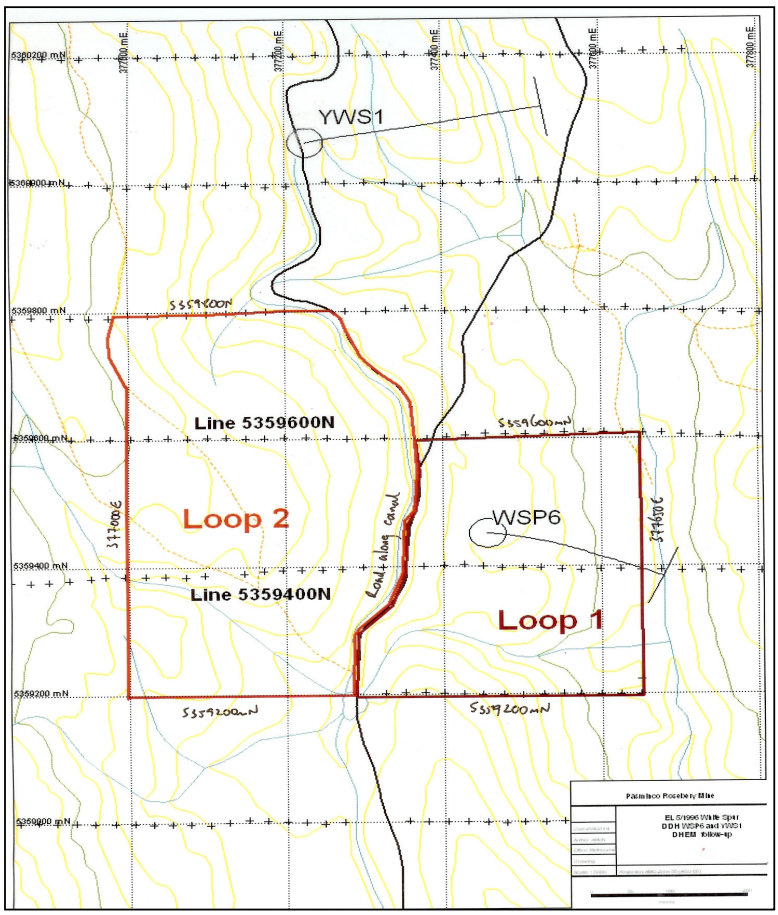



**Figure 11.** Map of White Spur DHEM transmitter loops.



## 6. EXPLANATION OF FILES

## EXPLANATION OF FILES

To uncompress data files use winzip.

### EM files

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

# Appendix 1

Henty and White Spur Fixed Loop EM dB/dT Profiles.