

KHUMSUP PTY LTD

DHEM SURVEY

LOGISTICS SUMMARY REPORT

JOB REF: 306-DHEM-AU

**AVEBURY NICKEL MINE
NICKEL REWARD PROJECT
MELBA FLAT, TASMANIA**

MARCH 2023

1. CLIENT & PROJECT DETAILS

Client	<i>Avebury Nickel Mine</i>
Project Name	<i>Nickel Reward Project</i>
Location	<i>Melba Flat, Tasmania</i>

Agreed Specifications

- Geophysical Technique: *Downhole Transient Electromagnetics*
- Base Frequency (Hz): *2*
- Current (A): *Max*
- Tx Power: *~*
- Stacks: *Minimum 64, depend on data quality*
- Readings: *Minimum three repeatable*
- Turn On (ms): *0.0*
- Turn Off (ms): *Ascertain in the field.*
- Window Timing: *SMARTem Standard*
- Station Spacing (m): *10m, 5m for off hole, 2m for intersection anomalies.*
- Loop Dimensions (m): *Approx. 400 x 400*
- Loop Turns *1*
- GPS Datum/Zone: *GDA94/MGA Zone 55*



Figure 1. Project location.

2. AGREED DELIVERABLES

- Included – Raw and GPS DHEM data.
- Included –Logistics reports.

3. WORK SUMMARY

Logging meters Completed.	MF116 348m to 0m (348m) Total 348m
Production Days	1.5
Standby Days	0
Mobilization Days	3
Breakdown Days	0
Mobilization Start Date	24 TH March 2023
Acquisition Start Date	24 TH March 2023
Acquisition Completed	25 TH March 2023
Mobilization Completed	28 TH March 2023

4. PERSONNEL

Geologist	Emma Haley and Josh Denholm (Avebury Nickel Mine)
Geophysicist	Nick Direen and Kate Hine (Mitre Geophysics)
Operation Supervisor	Muhammad Sulman (Khumsup Geophysics)
Crew Chief	Marwoto (Khumsup Geophysics)
Field Assistant(s)	Rusiate Nakuta

5. SURVEY SPECIFICATIONS

Geophysical Technique	Downhole Transient Electromagnetics
Base Frequency (Hz)	2
Current (A)	80
Tx Voltage (V)	200V
Stacks	60 minimum
Powerline Frequency (Hz)	50
Turn On (ms)	0.0
Turn Off (ms)	0.85
Window Timing	SMARTem Standard
Station Spacing (m)	10, 5m for off hole, 2m for intersection anomalies.
Loop Size (m)	1400
Loop Turns	1
GPS Datum/Zone	GDA94/MGA Zone 55

6. TRANSMITTER LOOPS

Loop	Dimensions (m)	Easting	Northing	RL	Ramp time (m)	Current (A)	Time base (ms)	Channels
Loop A	1400m	366425	5365464	214.8	0.8	80	0.5	3
		366452	5365542	216.5				
		366489	5365642	210.0				

366462	5365666	210.0
366458	5365701	210.0
366349	5365733	210.0
366265	5365769	209.4
366244	5365678	210.0
366243	5365658	210.0
366183	5365603	210.0
366162	5365548	210.6
366181	5365518	210.0
366205	5365495	210.0
366269	5365462	210.0
366290	5365455	210.0
366307	5365457	210.0
366320	5365454	210.0
366344	5365463	210.0
366366	5365474	210.0
366383	5365473	210.0
366406	5365474	210.0
366425	5365465	214.8

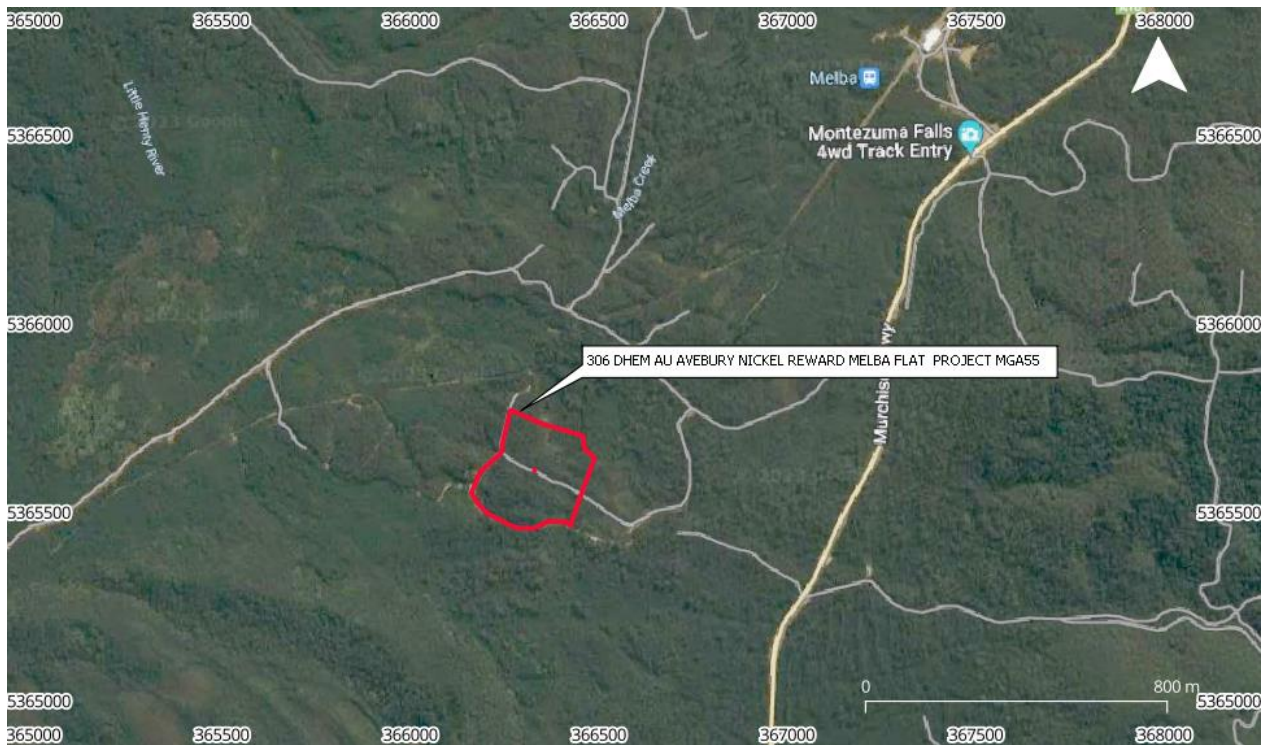


Figure 2. Loop locations.

7. DRILL HOLES

Hole ID	Date(s) logged	Loop	Collar location	Dip	Azimuth	EOH Depth (m)	Depths logged (m)	Components
MF116		Loop	366330 E, 5365610 N	-60	292.5	348.4	248-0m	XYZ (or AUV)

8. EQUIPMENT

DHTEM Transmitter	Maker	Khumsup Pty Ltd
	Model	TDTx
	Serial Number	13G01
DHTEM Receiver	Maker	EMIT
	Model	Digiatlantis
	Serial Number	1770
DHTEM Sensor	Maker	EMIT
	Model	DigiAtlantis
	Serial number	193

9. BRIEF EXPLANATION OF TECHNIQUE

General Principles of DHTEM Operation

- The transmitter introduces a pulsed electric current to the transmitter loop which induces a pulsed primary magnetic field.
- The primary magnetic field couples with conductors in the ground and the changes in magnetic flux induce eddy currents in these conductors.
- The eddy currents induce a secondary magnetic field, which is detected by the down-hole sensor connected to the receiver.
- The sensors can be either magnetometers or induction coils. Magnetometers directly measure the B-field response. Induction coils measure the rate of change of magnetic flux coupling with the coil. The B-field can be calculated from the induction coil response.
- The down-hole sensors can measure a single component (axial component probe), two cross-hole components or all three orthogonal components of the electromagnetic response. Rotational information is provided by tilt sensors and/or the measured primary field.
- The shapes and decay characteristics of anomalies in all three measured EM components can be used to deduce the shape, attitude, position and physical properties of a conductor.
- The DHTEM survey should be designed so that the primary magnetic field couples well with the target conductor, which usually requires a working hypothesis as to the possible position and attitude of the conductor. Optimal coupling occurs when the primary magnetic field is mainly perpendicular to the surface of the target.

References

- Lamontagne, Y., 2007, Deep exploration with EM in boreholes, Paper 24, in "Proceedings of Exploration 07: Fifth Decennial International Conference on Mineral Exploration", B. Milkereit *Ed*, p. 401-415
- McNeill, J.D., 1980, Applications of Transient Electromagnetic Techniques, Technical Note 7, Geonics Ltd., Mississauga, ON

Nabighian, M.N. and J.C. Macnae, 1991, Time domain electromagnetic prospecting methods, Chapter 6 in "Electromagnetic Methods in Applied Geophysics, Volume 2", M.N. Nabighian *Ed.*, Society of Exploration Geophysicists, Tulsa, OK.

10. DATA FILES

Raw Processed Data	Data Format = ASCII text Name Format = <i>ClientName_Project Name_Hole Name_Date.dat</i> Data Contained = processed, windowed TEM survey data, settings relevant to processing, Window Scheme times, acquire parameters, station comments and post acquire processing information
RAW Time Series Data	Data Format = Binary Name Format = <i>ClientName_Project Name_Hole Name_Date_Time_Component_Channel#_Reading#.raw</i> Data Contained = unedited raw time series data output from SmarTEM24 Rx
Stacked Half Period Data	Data Format = Binary Name Format = <i>ClientName_ProjectName_Hole Name_Date_Time_Component_Channel#_Reading#.stk</i> Data Contained = data that represents a half period of stacked data
Locations	Data Format = ASCII text Name Format = <i>JOB# GPS Locations ALL.csv</i> Data Contained = XYZ locations for the project with corresponding local tracks and drill-holes points data
Daily Field Record Sheet	Data Format = PDF image Name Format = <i>JOB# DAILY RECEIVER REPORT YYMMDD.pdf</i> Data Contained = Field record of data collected and operator notes
Daily Production Summary Report	Data Format = PDF image Name Format = <i>JOB# DAILY SUMMARY REPORT YYMMDD .pdf</i> Data Contained = Summary of acquisition work for the day and overall survey progress