The Application of AEM as a Regional Mapping and Targeting Tool: A Mineral Explorer’s Perspective

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SUMMARY

Much of the highly prospective Paterson Province of Western Australia lies under sand cover, which has previously inhibited mineral exploration in much of the region. The Yeneena Project, held by WA-based company Encounter Resources, lies in this region and is actively being explored using geophysics to identify undercover targets. AEM has proved a particularly effective geophysical technique in mapping unexposed regional structures and geological units. Surveys generated by both Geoscience Australia and Encounter has directly led to the identification of new targets and significant investment in detailed ground geophysics and drilling. Crucially, these activities have led to the discovery of copper sulphides and prospective mineral systems within the Yeneena Project, demonstrating the significant impact that regional geophysical datasets can have on the exploration potential of an area.

Key words: AEM, Exploration, Western Australia

INTRODUCTION

Encounter Resources is an ASX listed, greenfields exploration company run by former Western Mining Corporation (WMC) employees. Encounter currently holds a number of highly prospective exploration projects in Western Australia. The company’s main focus is on the Yeneena Project, located 60km south-west of the giant Telfer gold/copper deposit in the Proterozoic Paterson Province (refer to Figure 1).

Prior exploration in the area has been minimal due to extensive sand cover and the scarcity of outcropping prospective geological terrains. Indeed, it is worth noting that the major mineral discoveries of the region, including Telfer (Au-Cu), Nifty (Cu) and Woodie Woodie (Mn), were found in no small part due to the presence of outcrop that accompanied these deposits. This, coupled with the ineffectiveness of magnetics as a regional mapping and targeting tool (Figure 2), has resulted in the need for Encounter to develop an exploration strategy that can effectively identify undercover targets in the Paterson Province.

AEM MAPPING TOOL IN EXPLORATION TARGETING

In 2008, Geoscience Australia (GA) conducted a TEMPEST Airborne Electromagnetic (AEM) survey in the Paterson Province as part of the Onshore Energy Initiative. Flight lines ranged from 1 – 2km in spacing, with the survey providing an effective baseline for exploration in the region, including ground held by Encounter (Figure 3).

In what was a bold decision for the company at the time, Encounter committed to infill the GA regional survey to 500m line spacing’s across tenements totalling 1400km².

The acquisition and application of this new data set proved to be a seminal moment in the Yeneena exploration project. The use of AEM has proved highly effective in mapping structure as well as geological units under sand cover and, in conjunction with regional aircore (AC) drilling, has significantly improved the exploration potential of the highly prospective Paterson mineral province.

Furthermore, the successful identification of structural targets in the initial TEMPEST survey resulted in Encounter undertaking additional detailed helicopter – based VTEM surveys to better characterise specific areas of interest within its ground (Figure 4).

Crucially, the use of the regional AEM data has led to a significant investment in ground geophysics (IP) and drilling (AC, RC and diamond), which have led to the discovery of copper sulphides in three separate locations at the Yeneena Project. This includes the BM1 – BM7 copper mineral system which is now over 11km long and still growing. Early intersections of 10m @ 6.8% Cu, 20m @ 2% Cu and 73m @ 0.4% Cu have demonstrated the prospectively and scale of this exciting new copper discovery in WA.

CONCLUSIONS

AEM has proved to be an effective undercover geophysical exploration mapping technique in the Paterson Province, with surveys able to generate accurate structural and geological targets in areas otherwise obscured by sand cover. Importantly, the application of AEM datasets has led to not only further investment by Encounter in ground geophysics and drilling, but also discoveries of highly prospective mineral systems.