Flying Doctor Case History

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The Flying Doctor Deposit, located approximately 8 km east of Broken Hill in western NSW, has long been used as a test site for geophysical techniques and was part of the coverage of the first potential field surveys carried out there in the late 1940s.

From the 1960s through to the present, most geophysical techniques were tried over the deposit. The first test survey was actually the ‘discovery’ survey: Flying Doctor showed up as a very strong frequency domain response in the 1960 McPhar IP survey. This was followed by various incarnations of ground electromagnetics (EM), ground IP, gravity, magnetics, downhole EM, magneto-metric resistivity (MMR), downhole MMR, sub-audio magnetics (SAM), fixed-wing EM, and most recently helicopter EM (SkyTEM) in August 2009.

The Flying Doctor deposit is blind (depth to top >50m below surface), size <1.5Mt at 15% Pb+zn, and is composed of several elongate, steeply northwest dipping plates. The mining lease owner, Perilya, has recently recommenced the drilling campaign with a view to mining and the long standing test site is now at risk of disappearing.

This paper summarises the results of the Flying Doctor geophysical surveys, compares the data from old versus new geophysical technique, and presents an outline of the evolution of geophysics in Australia from the unique perspective of this one prospect.

The results highlight the improvement in electrical and particularly electromagnetic techniques and show the much better ability of the most recent methods to penetrate deeper and discriminate ore from cultural noise and unwanted background responses.