



Minerals geophysics



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If it seems too good to be true...

Once upon a time, in a country far, far away, a magician (geophysicist) appeared at court with an amazing offer.

Provide me with a helicopter and a piece of the ore you seek, and I will criss-cross the country and find your mineral deposits.

The military vetoed the helicopter on security grounds, but our geo-wizard was not to be put off.

No problems. I will hold the lump of ore in my hand, pass it over a geological map, and pin-point drill-sites that way.

The offer was never followed up.

A fairy-tale, right? It could never happen in this day and age, right? Well, wrong. Fantastic schemes are still peddled in our industry, as the following story illustrates. It would be improper to identify the personnel or organisations involved, but I trust the geophysicist who told me the story. This really did happen.

As with many of these schemes it began with a cold call, in this case to someone high up the company hierarchy. Recently

declassified foreign power satellite imagery, the cold caller said, had been carefully analysed using sophisticated proprietary techniques, and this analysis had detected a base metal orebody on company ground. A joint venture was proposed, whereby another proprietary technique would be employed to properly locate and map out the orebody. Technical details for this method were sketchy, but it was based on atomic physics. The method would provide very detailed soundings of metal grade (virtual drill-holes), reducing the need for conventional drill-testing.

Management asked geoscientists within the company to assess the technique, and, using the limited information provided, they dismissed it as probable scientific nonsense. None-the-less, senior management was interested in pursuing emerging innovations and called for the contractors to carry out a program of field tests to verify the technique against information from existing drill-holes, along with combined helicopter and ground exploration to properly locate and detail the potential orebody.

This program was duly organised and carried out by the contractors under company supervision. The field verification tests were disappointing. The contractors had been reluctant to undertake some of the work, and the results they provided were often preliminary in nature. When compared with existing drill-hole information some results were clearly wrong; nevertheless there were some possible correlations. The exploration component, however, was a resounding success! The contractors' base metal orebody was located by the helicopter work and mapped in detail on the ground. Copper content was assessed at 2%–4% over a vertical extent of 600 m from 150 m sub-surface. Based on their survey results and interpretation, the contractors sited two vertical drill-holes to confirm their findings.

Drilling found nothing, unless one speck of malachite in the weathered zone could be taken as significant; in particular, the geological environment was spectacularly

un-promising. The contractors were not dismayed; they knew the orebody was down there somewhere. They produced a new interpretation showing the mineralisation, now sub-vertical, fitting neatly between the two close-spaced drill-holes; these, they now insisted, should have been drilled on the incline. However, management had had enough. The technique was considered discredited, and the project terminated.

The thought processes associated with this tale are interesting. Initially, the scientific groundings of the method were stressed, but without going into too much detail on exactly how these were applied. When this was challenged, the possibility that the technique might work because the science couldn't entirely be dismissed was played upon. Once the verification field test results were available, the possible correlations were emphasised, rather than the obvious discrepancies – a true believer will naturally look for supporting evidence. Finally, when the definitive drill-test was done and the results were negative, there was an alternate interpretation to explain the lack of success, and reasons given why more testing should be done.

Are there any positives to be taken out of this? Well, yes, I believe there are. Credit is due to management who backed their idea to have the method tested, and much credit is due to the exploration team, who, despite their communicated misgivings, designed and supervised the test program. And, of course, their initial doubts regarding the scientific validity of the method were vindicated.

Now, if I've still got your attention, I've got my own science-based scheme in mind. It involves passing small electric currents (solar powered, with battery back-up, naturally) through public swimming pools and collecting the precious metals leached from swimmers' jewellery; as a bonus, gemstones dropping from corroded and weakened jewellery settings could also be harvested from the bottom of the pool at regular intervals. All expressions of interest and any offers of seed money are welcome!