



Advancing Exploration

✉ editorial@miningmonthly.com

Going undercover

Recently listed junior explorer Woomera Mining has secured backing from OZ Minerals in an intriguing joint venture that could rewrite the books on how to explore for base metals under cover. By **David Upton**

OZ Minerals announced in January it had struck a deal worth up to \$7.5 million to earn a maximum 75% stake in Woomera's Alcurra nickel-copper-cobalt-platinum group elements project at the eastern end of the Musgrave Ranges, immediately south of the South Australia-Northern Territory border.

The deal has flown under the radar, partly because Woomera was not listed at the time. The company back-door listed in March via Ausroc Metals after raising \$4.1 million at 20c a share.

Woomera is the brainchild of one of Australia's most seasoned exploration geophysicists, Don Triggs, who spent a significant part of his consulting career with CRA.

He was closely involved with a lot of good work by CRA in SA that was shelved when CRA was absorbed by Rio Tinto in 1995.

In 2011, he pegged ground over a number of ex-CRA projects and other prematurely discarded projects that became available when the Department of Defence relaxed restrictions on exploring in the Woomera Prohibited Area.

For the past seven years, he has been diligently reworking the geophysics and combining the results with pre-competitive data to develop some exciting exploration targets in the Gawler Craton and the eastern Musgrave Ranges.

The quality of the work enticed veteran geologist Gerard Anderson out of retirement to take on the role of managing director.

Anderson's career includes senior roles at BHP, Boddington and KCGM. He was managing director of Centrex Metals and then Archer Exploration before he retired in 2016.

The lack of profile for the Woomera-OZ Minerals joint venture is a shame because it is effectively a test of the pioneering use of vector residual magnetic intensity in base metal exploration.

VRMI is an alternative way of interpreting data from magnetic surveys that strips out the effect of magnetic remanence in the target host rocks.

Adelaide-based Dr John Paine is a leader in VRMI and developed the software used by Woomera.

The technique is widely and successfully used in exploration for iron ore, where the target rocks can act as powerful magnets. While there have been some attempts to use VRMI by gold explorers, Woomera Mining is the first to put serious effort behind the technique for base metal exploration.

Basic principles say VRMI should have an important role to play in exploring for many kinds of base metals.

efforts to measure magnetic susceptibility, which – along with gravity – has been one of the great workhorses for exploration under cover for decades.

If Triggs is right, we have been looking wrongly at magnetics all this time, and the implications for base metal exploration could be huge.

"Normally when you are modelling magnetics you just look at the perturbations in the Earth's normal magnetic field caused by susceptible rocks," Triggs said.

"A susceptible rock doesn't have to have its own magnetic field and it's better if it doesn't, but when it does it can throw the magnetics off. It's like having a bar magnet under the ground. It means you can have a body of high susceptibility, but because the magnet is pointing in the other direction, you don't see it, or even worse it could look as if it's negative, which you would tend to walk away from as an exploration target."

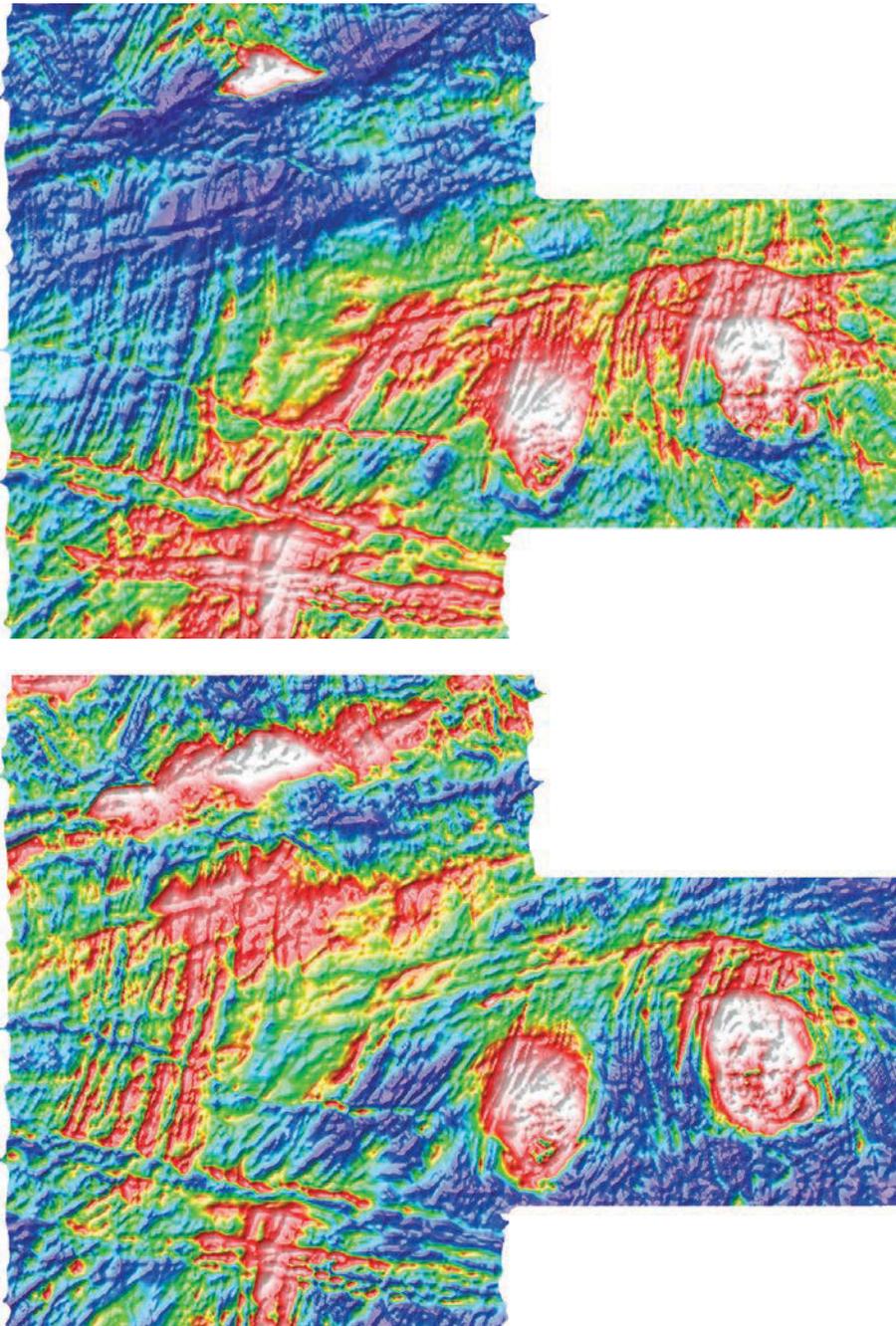
"In the Musgraves, Don has spent a number of years working up targets based on additional EM data as well as some very good geochemistry and petrology from government drilling back in the early 2000s. We have been able to take that data and highlight areas of substantial anomaly."

– Gerard Anderson

For example, magmatic nickel-copper sulphides, such as those targeted at Alcurra, typically contain significant amounts of iron as sulphides and/or oxides, which become magnetised by the Earth's magnetic field in their final stages before cooling from a liquid to a solid.

The rocks take on their own magnetic field, which is known as the magnetic remanence. This can completely confuse

The pair of maps shows the vast difference between a VRMI image and a traditional total magnetic intensity image over an area of ground in the Alcurra joint venture with OZ Minerals. Not surprisingly, the 3D inversion models of the source of the magnetic anomaly, which are crucial inputs in the decision about where to drill, are also dramatically different.



The pair of maps show the vast difference between a VRMI image (bottom) and a traditional total magnetic intensity image over an area of ground in the Alcurra joint venture with OZ Minerals.

Anderson said OZ Mineral’s interest was a strong endorsement for the application of VRMI in base metals but pointed out the company was not putting all its eggs in the one basket.

“A number of the targets have multiple vectors working for them,” he said.

“In the Musgraves, Don has spent a number of years working up targets based on additional EM data as well as some very good geochemistry and petrology from government drilling back in the early 2000s. We have been able to take that data and highlight areas of substantial anomaly.”

Triggs added that government reports at the time basically declared the existence within the Alcurra joint venture area of the Giles Complex – the ultramafic host rock of the Nebo-Babel deposits at the western end of the Musgraves.

“That’s given us confidence, and there’s also dating that shows we are targeting rocks of the same age as the Giles Complex with apparently the same chemistry,” he said.

A test of the VRMI technique using publicly available TMI data over Nebo-Babel clearly highlighted the deposits, in stark contrast with the original TMI images.

The real test begins soon with a maiden drilling program at Alcurra of shallow, high priority targets for a total of about 4000m.

Ground EM surveys are scheduled from mid-August at six target areas to refine drill collar locations. Drilling is expected to get underway in September-October.

Alcurra is first cab off the rank for Woomera because the company has made rapid progress in negotiating access with the Tjajuwara-Unmuru people, who are the traditional landowners of ground immediately east of the APY Lands.

However, in terms of sheer excitement value, Alcurra ranks alongside two other Woomera projects on the Gawler Craton – the Labyrinth copper-gold-rare earths project near the southern boundary of the Woomera Prohibited Area, and the Carulinia IOCG target about 30kms west of Oodnadatta.

Triggs has used VRMI in both locations to show that previous limited drilling – by CRA at Labyrinth in the 1990s and by Inco and Barrick at Carulinia in the 2000s – missed the most prospective part of coincident magnetic and gravity anomalies.

Carulinia has all the geophysical hallmarks of Olympic Dam, Carrapateena and Prominent Hill and, according to Triggs, is the second only to Olympic Dam in terms of the size of its gravity anomaly. It is a deep target at about 650m and will need a joint venture partner to fund the kind of exploration effort it deserves.

Anderson is well aware of the pitfalls of banging in just one or two holes at deep geophysical anomalies on the Gawler Craton, and points out that five of the first nine holes at Olympic Dam were barren.

At Labyrinth, previous drilling showed the target depth to be shallow, and Woomera is confident it can go it alone on this one.

Woomera also holds a large group of tenements in the newly defined Nawa Domain on the western Gawler Craton. It is about as greenfield as you can get, but SA’s Geological Survey and Geoscience Australia are nearing the end of a huge pre-competitive data acquisition program.

This includes the world’s largest aeromagnetic survey.

Just imagine what secrets Woomera might be able to unlock if the imminent drill program in the eastern Musgrave proves the value of VRMI in exploring for base metals under cover.

If that is not enough blue sky for investors, Woomera has also put together an impressive portfolio of lithium projects – both hard rock and brines – in Western Australia.

As you might expect from Woomera, these are based on some impressive science and research, not the nearology relied upon by most lithium hopefuls.

There are certainly exciting days ahead. **AMM**