

Minotaur Exploration Ltd: Breaks Through With New Model For Copper Under Cover

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Sydney, Australia - David Upton is one of Australia's leading writers on mineral exploration. He has BSc in Geology and is the author of The Olympic Dam Story.

As a geology undergraduate in the 1980s, I had the opportunity to make a field trip to the Curnamona province in South Australia. The objective was to teach a bunch of city kids the basics of field mapping, although our weary lecturers had a hard time imparting much knowledge. For me, the experience of being immersed for two weeks in the beautiful landscape of the Olary domain encouraged too much daydreaming and not enough study.

However, I never forgot being told by senior lecturer, Alex Grady: "There are pegmatites and there are pegmatites." It seemed to me as impossible as a bolt of lightning from the bright blue sky under which we all stood. But Dr Grady was simply saying there is more than one type of coarse-grained rock that went by the name of pegmatite, and we needed to look closer at what was actually before us. His words came back to me when asked for my perspective on Minotaur Exploration (ASX:MEP). For, while there are some 750 junior resource companies on the ASX, there are mineral explorers and there are mineral explorers.

Minotaur is among a group of some 30 companies that I term the "high exploration" sector, defined by their high ambition, commitment to high science and high-concept exploration strategy. The group includes an even more elite subset of explorers who have made major discoveries, including Minotaur following the Prominent Hill discovery at the end of 2001.

The division between this group and the rest of the market became clear to me after spending the best part of 18 months researching and writing the history of the Olympic Dam discovery by Western Mining. Many of today's high-exploration juniors are doing all the right things that could make them the next Western Mining.

Unfortunately, most investors don't see positive differences between a high-exploration company and a junior drilling out a tired old gold deposit. In fact, the latter typically gets the price premium because investors see some prospect of cashflow in the short term and no value in exploring for Tier 1 greenfield deposits.

In some ways, that point of view is understandable. Companies such as Minotaur that are looking for the next generation of discoveries are forced to explore under cover - a barren blanket of soils, sands and sediments that covers 75% of our continent. This has proved extremely challenging. Discoveries have been too few to teach investors that high-exploration companies, when they make a discovery, can create wealth faster (and much more sustainably) than a bitcoin bubble.

As a nation, we are probably still five to 10 years away from being able to make meaningful difference to our success at exploring for multiple deposit styles under cover. However, it's a very different story at Minotaur, which this year has achieved remarkable success with an innovative new exploration model for blind copper deposits in the Mt Isa region.

The ISCG model

Minotaur has quietly achieved a breakthrough based on a new deposit style known as Iron-Sulphide-Copper-Gold or ISCG. This new style is a relative of the Iron Oxide Copper Gold (IOCG) deposit type that shot to prominence in the 1970s with the discovery of Olympic Dam.

An ISCG deposit is created when the metal-rich fluids that give rise to an IOCG find their way into a low-oxygen or reducing environment. The legendary Douglas Haynes - whose model for copper-depleted basalts led to the discovery of Olympic Dam - seems to be first person to suggest the idea of ISCGs back in 2000.

The classic IOCG deposit is oxygen rich, leading to abundant oxides of iron — hematite and magnetite. By contrast, an ISCG is formed in an oxygen-poor environment, where valuable metals become associated with sulphides of iron, such as pyrite and pyrrhotite.

The most exciting aspect of Minotaur's new thinking is the sulphides in ISCGs are highly conductive. This

opens up the possibility of detection by electromagnetic surveys, in much the same way EM is an indispensable tool in the hunt for nickel-copper sulphides (eg Kambalda, Nebo and Nova-Bollinger) and volcanogenic massive sulphides (eg De Grussa).

The development of the ISCG deposit model and the EM techniques to penetrate the notoriously difficult cover of the Cloncurry region have taken Minotaur the best part of a decade. It began in 2010 at the Cormorant prospect, within an area known as Naraku, 30 km north of the Ernest Henry mine. Minotaur had struck a joint venture with Japan's JOGMEC, which was keen to trial a proprietary Squid EM system known as SquiTEM on the highly conductive style of mineralisation that Minotaur had come across.

Trials of SquiTEM proved successful at penetrating Cloncurry's cover, but the system was cumbersome and not suited for the hot and dusty exploration landscape. Minotaur's geophysicists had soon assembled something similar with off-the-shelf Squid and B-Field technology and fine-tuned it at Naraku.

Based on that, the company decided to look more broadly for ISCG style mineralisation. The best place to start was judged to be around the Eloise copper deposit, which was an oddity in the region, being neither an IOCG nor a basin-hosted (Mt Isa)-style deposit. However, Minotaur could see a great fit with its new ISCG style and now had the exploration toolkit to search for similar deposits nearby. (Eloise is a significant deposit in its own right, with +10 million tonnes at 2.2% copper and 0.9 g/t gold having been extracted. It is mined by an underground operation, owned by FMR Investments, formerly Barminto, from 1300m below surface).

Results came quickly with the discovery of Artemis in July 2014, just nine months after Minotaur secured the ground through an agreed, all-scrip takeover of Breakaway Resources.

The discovery hole intersected 22 metres at 3.02% copper, including 9 metres (from a downhole depth of 167 metres) at 5.2% copper, along with gold, zinc, lead and silver.

Artemis was not only an emphatic proof of concept, it had the potential to be Minotaur's first ever production asset. However, OZ Minerals was eager to joint venture the ground on the condition that the search was refocused on even bigger deposits with the potential to move the dial for a company with a \$3 billion market capitalisation.

OZ entered the Eloise JV in December 2015, agreeing to spend at least \$1.5m in 2016, then a further \$3.5m over next two years to earn 51%. It could then invest a further \$5m over the next three years to earn up to 70%.

The decision to back Minotaur was bold for a number of reasons, despite the Artemis discovery. OZ was signing up to an exploration effort aimed at a deposit style that was unproven as far as the rest of the exploration community was concerned. And it was backing an exploration strategy for copper under cover that would be led by EM rather than magnetics and gravity. EM targets would be drilled even if there was no magnetic anomaly, which had been unthinkable until now. OZ also agreed that Minotaur would operate the JV. OZ might be 100 times bigger than Minotaur in terms of market cap, but it clearly respects its junior partner's exploration expertise.

The financial backing of OZ allowed new freedom in the hunt for ISCGs. Previously, Minotaur had confined its search west of Eloise, where the cover thickness is only tens of metres. This allowed Minotaur to use heli-borne EM to screen a large area for targets, and cost-effectively follow up with deep penetrating ground EM. But with OZ's backing, Minotaur could now afford to refocus the search on the more deeply buried Levuka Shear Zone (LSZ), which runs north-south through Eloise and is known to be a regional-scale conduit for metal-rich fluids. Heli-borne EM would not be effective because of the thicker cover, but would be replaced by a series of transects along the 50km-strike length of the LSZ.

EM transects and ground gravity surveys along the LSZ north of Eloise began in March 2016. By October, drilling at the new Iris prospect was underway and immediately struck ISCG mineralisation, with a best intercept of 38m @ 0.47% Cu and 0.08 g/t gold from a depth of 166m at Iris South. While that's not quite an economic grade, it was a remarkable result. Remember, this is mineralisation under cover, which is essentially blind to magnetics and gravity, hit with the very first drill hole at depths considered beyond the limits of EM just a few years earlier.

Further drilling north of Eloise continued to produce highly encouraging results from Iris and a new prospect known as Electra, but nothing that appeared to have the size and grade to satisfy OZ's ambitions. The joint venture partners decide to switch the focus of the search to the south of Eloise. By August 2017, EM had identified several promising new targets, including Jericho (just 3km south of Eloise), which is actually three adjacent conductors, including the 3km-long J1 conductor.

Drilling began at Jericho in October 2017, and immediately delivered outstanding results from J1 and J2. The

best result of the maiden two-hole drill program was 27m at 2.42% copper and 0.71 g/t gold from 435m, including 6m at 4.23% Cu and 0.42 g/t gold from 440m and 9m at 3.83% copper and 1.73 g/t gold from 453m. It's important to note these are downhole depths from holes that have been inclined to intercept both conductors. Thickness of cover is 70 - 80m and shallow drilling to test upward extent of mineralisation is yet to be undertaken.

Since then, a further 26 holes and a total of 12,840m have been drilled. Copper-gold mineralisation has been intercepted in every drillhole along 3.3km strike of the J1 conductor and 1.2km strike of the J2 conductor. This is an incredible success rate at this stage of exploration. Furthermore, most of the intercepts are not mere hints of copper-gold, but full-blooded drill hits of economic grades.

The very large size of the system means much more drilling needs to be done to define a JORC resource, although that's a terrific problem to have. In the meantime, you can get a sense of how big Jericho might be by comparing it with Eloise, where the main lodes are just 200m in length. The comparison with Eloise suggests Jericho has the potential to be the most significant copper discovery in Queensland for decades. Remarkably, it has been sitting there undiscovered on the doorstep of the Eloise deposit for almost 30 years. No-one had drilled in the area immediately south of Eloise because there was no hint of a magnetic anomaly. Previous explorers had fixated on the magnetic signatures, but Minotaur has smashed that thinking with the success of its ISCG exploration model and the Jericho discovery.

OZ is clearly excited about the Jericho discovery. Its enthusiastic spending under the joint venture means OZ is on track to spend \$10 million and reach its maximum 70% earn-in threshold by early 2019, three years earlier than allowed under the agreement.

The most recent batch of assays, released on 25 October, highlighted strong copper grades at shallow depths along a 1km of strike of J1. This is highly encouraging and is being followed up immediately with shallow drilling north of hole EL18D15. This area is known to be mineralised but access issues prevented drilling until now.

After that, the impending wet season will force a break in drilling activity until April, but in the meantime the Eloise JV partners will conduct sophisticated analysis of drill core, including geochemistry. This could yield important insights about the nature of the mineralisation and help direct the next phase of drilling to the highest grade areas. The 2019 field season is also likely to include scout drilling of promising new targets within 30km of Jericho, recently revealed by a new series of ground EM surveys.

While Jericho is the headline act at the moment, Minotaur is moving quickly to unlock the potential of other project areas with its breakthrough ISCG exploration model. In July, the company acquired 100% of the Highlands project - nine tenements covering 667km² of ground, centred 50km northeast of Mt Isa. The project surrounds CopperChem's Barbara deposit (4.75Mt @ 1.6% copper, 0.15 g/t gold and 309 g/t cobalt) and is highly prospective for ISCGs. A five-hole program of reconnaissance RC drilling started mid-October.

It will be fascinating to watch the results from Highlands, as well as an even more recent project known as Windsor, 200km southwest of Townsville. Windsor is prospective for volcanogenic massive sulphide (VMS)-style deposits. The area is a proven location for high-grade polymetallic deposits, such as Thalanga and Highway-Reward, but has received scant exploration since the early 1990s because of the highly conductive cover. Minotaur's EM skills create a big competitive advantage for the company and could lead to a new wave of discoveries.

There's even more to Minotaur than the projects covered in this review, including the Osborne joint venture with Japan's JOGMEC, another big partner with a lot of respect of Minotaur's exploration skills.

But the most important assets for Minotaur (and why I rank it among an elite group of the high-exploration juniors) are a board of directors and a geoscience team that understand it takes persistence, excellence and innovation to make a discovery. Minotaur's founder, Derek Carter (now retired) and the company's long-standing geoscience leader, Tony Belperio, showed those attributes to discover Prominent Hill in 2001, after 11 years of doggedly pursuing their goal. Persistence, excellence and innovation are still hallmarks of Minotaur under the leadership of Andrew Woskett and are key to the brilliant ISCG story that is rapidly unfolding.

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About Minotaur Exploration Ltd:

[Minotaur Exploration Ltd.](#) (ASX:MEP) is a public company listed on the Australian Securities Exchange

(ASX) under the market code MEP. MEP commenced trading on ASX on 25 February 2005. Minotaur has extensive minerals exploration tenements in South Australia, New South Wales, Victoria, Queensland and Western Australia.

The Company is governed by a Board of Directors according to Australian Corporate law and the Listing Rules of the ASX. Minotaur specialises in application of innovative geophysical techniques to locate virgin mineralisation deep below the surface. Often, economic mineral deposits are contained within basement rocks, buried below several hundred metres of transported cover (overburden) and cannot be located through conventional surface exploration methods such as soil sampling, geochemical assays and drilling. Minotaur's remote sensing and interpretative approach has proven very successful, time and time again.

The directors and management of Minotaur each have over 30 years of exploration, mining and mineral resource experience and are eminently qualified in their respective fields of expertise. Under their direction, Minotaur has earned a strong reputation for technical excellence and a high profile within the Australian resources sector. Minotaur's share register comprises 3500 shareholders.

Minotaur is actively exploring IOCG style targets in Australia, where geophysics have identified numerous sub-surface anomalies prospective for copper-gold mineralisation and other targets prospective for base metals such as zinc, lead, copper.

Source:

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