Advancing Exploration

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A RC rig at Julimar.

The Chalice story

World-first precompetitive research and smart exploration strategy have produced a surprise discovery to rival Nova less than one hour's drive from Perth. By **David Upton**

Chalice Gold Mines stunned the market last month with a high-grade hit of nickel, copper and palladium from the first drill hole at its 100%-owned Julimar project, about 70km northeast of Perth.

The company reported 19 metres @ 2.6% nickel, 1% copper, 8.4 grams per tonne palladium and 1.1 gpt platinum from a depth of just 48 metres, with assays for cobalt and other platinum group elements still pending.

That kind of drill hit is better than many geologists will ever see in their career, however, the discovery is truly remarkable because it has uncovered a province of nickel-copper-PGE rich magmatic sulphides on the western margin of the Yilgarn Craton.

Until Chalice's discovery hole, no-one was even certain the Julimar area had the layered mafic-ultramafic rocks that can host magmatic sulphides.

No-one had drill tested for nickel-copper-PGE magmatic sulphides in the 25-km long intrusive in which Chalice made its astonishing find either.

So why did Chalice decide to drill?

Geoscience Australia's publication in 2016 of a nickel-copper-PGE prospectivity map played a role, according to Chalice Gold Mines managing director Alex Dorsch.

That map was a world first and even noted an unusual new hot spot just to the east of Perth that flew in the face of industry thinking at the time.

"We were aware of the work GA did in 2016, and that confirmed our technical team's view that the margins of the Yilgarn, and where you have deep-tapping structures near that margin, are a very prospective location for magmatic sulphide occurrences," Dorsch said.

He said GA's prospectivity map had also been influential in the selection of areas to target in the company's King Leopold nickel-copper-PGE project in the western Kimberley region and the company's Auralia nickel-copper-PGE project in the Madura province on the WA end of the Nullarbor Plain.

"We had been looking all around WA and actually the rest of the world for new opportunities in nickel sulphide, which are very rare," Dorsch said.

"From that we quickly realised we had to look more conceptually and look at frontier areas. Julimar is the first we have put a drillhole into and tested a concept, and it has been a nice surprise – a spectacular result."

Just as important in Chalice's discovery is smart exploration leadership under Dorsch.

The former petroleum engineer and McKinsey consultant does a number of things of which WMC legend, Roy Woodall, would be proud.

Dorsch drives his geologists to look outside the company for the best thinking and information, backs their ideas and rushes to peg ground whenever they might have found a competitive advantage.

Julimar is a product of that approach.

Dorsch said looking externally for ideas was a key part of the company's approach to targeting and exploration.

"A lot of companies fall in the trap of just looking at their own projects," he said.

"Our geologists are encouraged on a daily basis to look over the fence at what others are doing in the space and to stay active in their industry groups.

"We encourage them to keep their finger on the pulse, know what data is coming out and what others are getting excited by.

"That's how one of our young geos came across Julimar. His interest in the area was triggered by a combination of GA's prospectivity map and the acquisition by Cassini of Yarawindah Brook, about 60km to the northeast.

"A high resolution magnetic survey done years earlier by Alcoa showed a prominent 25km-long magnetic anomaly with many similarities to metal rich intrusive complexes around the world. His research quickly showed the intrusion was under cover and had never been tested for nickel sulphides."

A surprising twist to the story is the intrusion had been drilled just 3km north of Chalice's discovery hole by none other than the Creasy Group, prior to the Nova discovery in 2012. Creasy had drilled for titanium and vanadium, but had not tested for nickel-copper-PGEs.

The other key ingredient to Chalice's success at Julimar is moving quickly on a target and not being shy to drill test, which was a defining characteristic at WMC.

Dorsch said the company staked the ground at Julimar the same day the idea was raised by the young geologist.

"Our attitude is that it's very low cost to put in an application for a bit of ground," he said.

"We don't hesitate. We peg first and then get very specific about what we are trying to find – we set a very high bar in order for a target to be drilled.

"We put a strong commercial objective to every work program, and typically that's about spending the least amount of money to get to the next decision point as quickly as possible."

The first hole at Julimar was drilled two years after the ground was staked.

That is not long for a project that began as a mere concept.

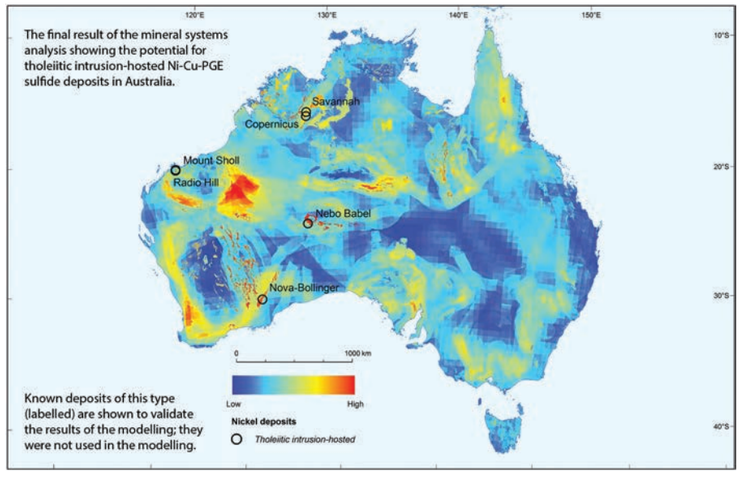
In that short timeframe, Chalice did the technical work, secured land access agreements with private landowners, conducted ground electromagnetic surveys to define a number of conductors and followed up with limited soil sampling – using only portable X-ray fluorescence analysers – at the southern tip of the intrusion.

Unlike the bulk of the intrusion, the southern tip is not under state forest and could be accessed for drilling without spending several months on additional environmental approvals.

Dorsch said the exploration cost up until the first hole was only about $30,000, with another $15,000 to bring in a reverse circulation rig less than an hour away in Perth to drill the discovery hole.

If follow-up drilling confirms the discovery really is as important as it appears, Julimar could rewrite the record books on the costs of finding an orebody.

Follow-up drilling is keenly anticipated as investors work out whether the western margin of the Yilgarn Craton is just as hot as the Fraser Range on the eastern margin.



Geoscience Australia's nickel-copper-PGE prospectivity map, published in 2016, shows a hot spot east of Perth where Chalice last month made its high-grade discovery.

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However, the Julimar discovery has even bigger implications.

It proves the GA's prospectivity mapping works, which is a big deal for exploration in this country.

The nickel-copper-PGE map guides explorers to other hot spots around the country.

Chalice is already on to that with its King Leopold and Auralia projects, however, the map highlights many other locations, including the Paterson region on the southern margin of the Pilbara Craton, the Southern Aileron, Irindina and Northern Warrumpi provinces west of Alice Springs, the Mt Isa region and some other surprising locations.

Beyond that, explorers should take a closer look at all of GA's prospectivity maps, with more than eight published since 2010.

The latest is an iron oxide-copper-gold prospectivity map for the Tennant Creek-Mt Isa region.

The methodology and the work that goes into these maps is remarkable. Data is a key ingredient, of course. In the case of the nickel-copper-PGE map, one of the key data sources was a GA dataset, completed in 2014, that catalogued all the mafic-ultramafic rock occurrences in Australia – the so-called "black rocks map".

The genius of the prospectivity maps lies in knowing what all the available data can tell about the presence, or absence, of each component of a mineral system needed to create an orebody in any given location.

That requires a lot of ingenuity.

There is also an element of subjectivity, which makes GA's world-first prospectivity mapping a really interesting test of their author's skills.

It was already known "blind" results produced a great fit with known deposits.

Chalice's Julimar discovery is compelling evidence of the value of these prospectivity maps, and should have many more explorers sitting up and taking notice. AMM