01 MAY, 2022

Australia's platinum future

Australian Resources & Investment, Melbourne

Drilling in the Julimar State Forest, WA.

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Platinum group elements are largely produced by Russia and South Africa. But as several exploration companies advance PGE projects, momentum is increasing on the local scene.

In December 2020, Chalice Gold Mines changed its name to Chalice Mining.

Gold had brought Chalice plenty of success over the years; however, the winds were changing and priorities shifting.

In March 2020, a side hustle took pole position when Chalice made a world-class discovery of platinum group elements (PGE), nickel, copper, cobalt and gold at its Julimar project 70km north-east of Perth.

The Gonneville deposit is estimated to contain 10 million ounces of palladium, platinum and gold – collectively called 3E (three elements) – plus more than 900,000 tonnes of base metals.

Most significant was the platinum and palladium finding, which single-handedly inaugurated a new critical minerals industry.

Palladium is estimated to be 15 times rarer than platinum and 30 times rarer than gold. Russia makes up about 40 per cent of the world's palladium supply, producing 2.6 million troy ounces of the metal in 2021.

South Africa is the world's largest platinum supplier, with the country's Bushveld complex comprising the world's largest open-pit platinum mine, Mogalakwena.

Combined, palladium and platinum are critical to autocatalysts – a device used in the automotive industry to convert harmful pollutants from internal combustion engine vehicles into less-harmful properties such as carbon dioxide and water.

Demand for palladium and platinum also comes from the jewellery industry, where the metals' rarity is especially appealing.

Platinum is also becoming increasingly important in the world's pursuit of decarbonisation. The metal is currently used in electrolysers to produce green hydrogen, and in hydrogen fuel cells to power fuel cell electric vehicles. Chalice claims palladium can also be used for this purpose.

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While there was fortune to Gonneville, Chalice was and is a well-oiled machine, boasting one of the best technical teams in the business. Managing director and chief executive officer Alex Dorsch said the company had been putting in the hard yards leading up to Gonneville.

"Even before the Julimar discovery, Chalice always punched well above its weight and operated at a more 'sophisticated' level than the typical junior," he told *Australian Resources & Investment*.

"I think the track record of value creation and rewarding shareholders by returning cash has been a big part of the recipe.

"Keeping active on the ground, setting a high bar for what success looks like and turning over projects when they don't make the cut has built loyalty and a strong following.

"I had the privilege of coming into the company after it had already built that solid track record and ownership mindset. Plus it had a strong balance sheet to show for it, so it's really been building on that ever since."

Dorsch became Chalice managing director in November 2018 after being appointed CEO in March 2018.

He said Julimar isn't just confined to its sizeable 3E and base metals resource. The project has unique mineralogical characteristics that will give Chalice greater versatility in the market.

"The sulphide mineralogy at Julimar is such that we can use flotation to produce two separate metal concentrates – a copper-PGE-gold concentrate and a nickel-cobalt-PGE concentrate," he said.

"This allows us to essentially sell to existing copper and nickel concentrate customers, not dissimilar to other base metal miners in WA.

"We are also investigating additional processing techniques, particularly on lower-grade mineralisation at Julimar, as we see significant potential to produce battery precursor products from the project."

Having established Gonneville's foundations, there's still plenty of work to be done before first production.

"We are certainly moving Gonneville, the first discovery, forward through studies as quickly as possible," Dorsch said. "The next major milestone is the scoping study for the initial development of Gonneville, which is expected to be completed in mid-2022.

"Meanwhile, we are continuing to expand the resource at Gonneville, with a focus on extending high-grade zones at depth."

Chalice managing director and chief executive officer Alex Dorsch.

In early March 2022, Chalice announced it had intersected high-grade sulphides up to 400m below its current Gonneville resource, with promising palladium and platinum hits reported.

Most significantly, the JD232 drill hole hit 3.7m at 7.3 grams per tonne (g/t) palladium, 1.2g/t platinum, 0.7g/t gold, 0.6 per cent nickel, one per cent copper (or 4.5 per cent nickel equivalent) from 429.3m.

Chalice is also focusing its efforts on Julimar's fancied Hartog prospect, which had received stronger responses in prior airborne electromagnetic (AEM) surveys than Gonneville.

"We are also drilling exploration holes over 10km of Julimar complex strike length immediately north of Gonneville, at the Hartog and Dampier targets, as well as at the Jansz and Torres targets approximately 15–20km to the north-east," Dorsch said.

"It is certainly an exciting time for the company, as some of Julimar's most exciting drill targets are tested over the coming months."

Australia has never been a prominent player in the PGE space, and with current PGE supply confined to a handful of countries, the nation has a big opportunity to become part of the conversation.

"For the last 50-plus years, the world has been totally reliant on Russia and South Africa, and to a lesser degree North America, for the supply of the incredible valuable and scarce platinum group metals," Dorsch said. "Australia has had very few standalone PGE discoveries and those have typically been too small to be economic or have had metallurgical challenges. PGEs are currently produced as by-products from certain nickel sulphide mines in WA ... in very small quantities.

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Core sample from the Gonneville deposit in WA.

"So our discovery, with approximately 10 million ounces of contained precious metals, about 910,000 tonnes of contained base metals – and growing – and with the right sulphide mineralogy, allowing us to sell to a range of customers, is a major development in Australian history."

Caspin Resources has been developing its Yarawindah Brook nickel-copper-PGE project just 40km from Julimar.

In early February, the company announced a significant discovery at its XC-22 prospect within Yarawindah Brook, unearthing a 68m zone of nickel, copper and PGE mineralisation from its YARC0022 drill hole.

Given this was XC-22's first drill hole, Caspin chief executive officer Greg Miles said it was a critical milestone for the company.

"It was important to us for a couple of reasons," he said.

"Firstly, it's probably our best result in terms of economic grade. I wouldn't consider it to be a high-grade result at the moment, but the width of PGE mineralisation at almost a gram combined platinum, palladium and gold at such a shallow depth is certainly a step in the right direction.

"There was also a significant nickel and copper hit in the drill hole, which is also exciting.

"But the main potential is probably the PGE mineralisation, and from our understanding the geology would suggest the PGE mineralisation is possibly over at least a kilometre along strike and certainly open down-dip or down-plunge."

Caspin's 2022 field program will see the company complete approximately 7000m of drilling at various targets within Yarawindah Brook. XC-22 will be a priority, with Caspin looking to evaluate potential for nickel-copper massive sulphide and low-sulphide PGE mineralisation.

The drill program will also focus on other targets, including the Northwest PGE-nickel-copper anomaly and Brassica prospect. A lot will be learnt about Yarawindah Brook's potential in 2022 fieldwork.

"I think a lot of people are going to be interested in this next phase of exploration," Miles said. "We've got an RC (reverse circulation) and a diamond rig and that's going to be an exciting phase.

"The XC-22 prospect has certainly elevated the potential of the project. And we're not in a stage where it's make or break. The number of opportunities we have is growing at the moment, not closing.

"Some people tend to think that the more you drill, with every drill hole, the likelihood of finding something decreases. Well, we're not at that stage at all, it's completely the opposite. Every hole we're drilling is opening up new opportunities.

"I think the short-term future of Caspin is pretty exciting. I think the long-term future of the West Yilgarn province is even more exciting.

"Ourselves and Chalice and all the other companies operating in the region, we're looking forward to a really interesting couple of years."

Located in the eastern section of the Yilgarn Craton, Western Mines Group's Mulga Tank nickel-copper-PGE project is tapping into the largely unexplored Minigwal greenstone belt. The next few months will see Western Mines complete an initial 10–12-hole drill program at Mulga Tank.

"Our discovery, with approximately 10 million ounces of contained precious metals, about 910,000 tonnes of contained base metals and with the right sulphide mineralogy, allowing us to sell to a range of customers, is a major development in Australian history."

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Western Mines managing director Caedmon Marriott said the untapped nature of its target area had the company particularly enthusiastic.

"This is what makes it exciting for us," he said.

"The fact a little company like us can pick up a bunch of giant projects that from historic work is highly prospective but no one's really given it a good crack.

"It's ultramafic intrusion, it covers a large area, and I think the historical work shows there's a working geochemical system here.

"If you've been researching PGEs, you'll know the geochemistry of these rocks – these ultramafic and mafic rocks – is critical to generate sulphides, to generating PGEs, nickel and copper."

The West Yilgarn province where Julimar is located had been largely neglected up until Chalice made its record discovery. Chalice's belief in the resource never wavered, something Marriott said can inspire any emerging operation.

"It's incredibly awesome for the industry that Chalice have been successful because they've gone to what was potentially a province written off or nobody gave credibility and they've been able to find a massive deposit," he said.

"It shows that these areas that have maybe been looked at a little bit or are more frontier in a way or untested, which certainly our project is ... it just gives us the confidence that it is possible."

Looking at the present situation, one could reasonably consider Chalice Caspin and Western Mines competitors, but more discovery creates more momentum and collective success will go a long way to solidifying Australia's first PGE industry. ARⅈ

Palladium is estimated to be 15 times rarer than platinum.

Drill rigs at Chalice's Gonneville deposit.