



SA graphite expandable in so many ways

In a graphite market teeming with new and evolving products and applications, it is difficult to accurately assess where an individual project's prospects stand, but some clarity is emerging.

Archer Exploration Ltd managing director Gerard Anderson is convinced Australian and other Western producers must offer an enhanced product if they are to survive in the ever-expanding marketplace.

"Australia and other western world producers face a greater challenge in regards capital and operating costs

versus China and those companies operating in Africa," Anderson told **Paydirt**. "Companies in developed jurisdictions must value-add to their products or they are stuffed."

Archer's home state of South Australia is evidence of the need for Western juniors to innovate. Archer is one of half a dozen companies aiming to exploit the State's well known but long neglected graphite endowment.

Valence Industries Ltd was the first of the SA graphite companies to reach production through the reopening of the Uley graphite mine at the beginning of 2015. In doing so, Valence was seemingly ushering in a new generation of graphite production on the Eyre Peninsula.

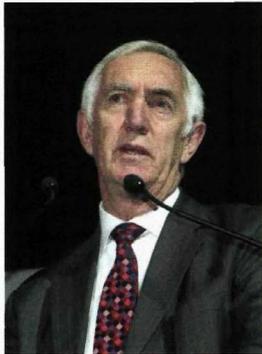
However, with prices for graphite concentrates largely refusing to meet the levels forecast a few years ago, all the hopefuls are considering ways they can glean more value from their products.

"Four years ago prices were on the up and forecasts were bullish but it hasn't happened quite how it was predicted," Anderson said. "A paradigm has developed which sees the middle men cornering the market with the miners largely forced to be price-takers."

This has led would-be miners to investigate value-add opportunities for their projects with the valuable and growing lithium-ion battery market an obvious target.

Lincoln Minerals Ltd chairman John Parker told **Paydirt** his company had identified the production of spherical graphite – the product which is a key ingredient in batteries – as a potential pathway to profitability as Western end-users pursue new sources of a product currently dominated by China.

"Some 90% of spherical graphite is currently coming out of China but a lot of it is either low quality or expensive," Parker said. "If we can produce spherical graphite we would only have to take half of the Chinese market to be


John Parker

a very major player; that would be huge for a company the size of Lincoln."

Building a spherical graphite plant would require a leap from traditional mining and processing capabilities to a more manufacturing-based focus; a major task for a single junior.

"What you would probably see would be collaboration between various South Australian graphite companies with a view to producing spherical graphite here," Parker said.

Anderson agreed, saying a number of SA companies would likely welcome the opportunity to value-add to their product.

"If everyone pursued beneficiation in South Australia we could end up sharing the same facilities," he said. "If you simply produce run-of-mine graphite, you are asking for trouble."

He also believes junior miners will have to adapt to a different business mindset if they are to be successful graphite producers.

"You have got to do your homework on products and marketing and then do it right," he said. "You have to understand what you can produce and where your competitive capabilities lay. Higher grade and purity material are more sought after but are also more difficult to get certified by customers. As a graphite producer you are really a manufacturer and it is a very unforgiving industry. You need exhaustive metallurgy to give customers confidence you can deliver the same product specifications every week."

Archer's Campoona project on the Eyre Peninsula has already proven to host high-purity graphite, suitable for use in lithium-ion batteries.

"We have undertaken exhaustive testing of the material and it showed the performance of the Campoona graphite in terms of charge capacity was equivalent or better than commercially available synthetic graphite," Anderson said.

However, Archer is keen to expand its options further and test the outer and ever-expanding limits of graphite's applications with interest growing over its Sugarloaf project.

Graphite has developed a reputation as a 21st Century material, not only for its key role in the rapidly expanding electric vehicle and battery storage sectors but also for the evol-

ving use of its derivative product; graphene.

Graphene is being touted as important to this century as steel was to the 19th Century or plastic was to the 20th Century with new potential applications in an array of industries.

Metallurgical test work has already shown the Sugarloaf graphite is amenable to simple graphene production but while European innovators are testing graphene's use in tertiary industrial applications, Archer believes it has found a primary industrial scenario for its use.

"We tested it but didn't get fantastic grades," Anderson said. "But when we analysed it again we realised it was not a typical crystalline graphite but a carbon which could be readily processed to produce graphene and actually had 11 of the 13 elements which are critical to plant nutrition."

Test work at the University of Adelaide followed and found potential for the Sugarloaf product to be used as a soil-conditioner and/or fertiliser.

"The research tested extracting the graphene and then applying a graphene coating to superphosphate to try to slow the release rate of nutrients but it would likely be too costly."

Further research looked at applying the Sugarloaf carbon directly to soils.

"The initial plant trials have been very encouraging. Over 21 days, the addition of the Sugarloaf carbon to control samples increased root length by more than 45%, increased shoot length by more than 30% and led to noticeably thicker stems."

Further extensive test work is needed but Anderson envisages a low capex opportunity for Sugarloaf.

"Our product wouldn't displace superphosphate but could aid it and, with no beneficiation necessary, it would just be mining and crushing. Being on the Eyre Peninsula also means we could mine it, crush it and sell it at the mine gate where local farmers could buy it."

Anderson said Sugarloaf would be developed in line with Archer's traditional approach.

"The company has always had a business strategy of finding it, adding value and then finding the logical owner for it. We may be looking at seven years of trials for this but is there a fertiliser company out there who could come in as a JV partner? We will see."

– Dominic Piper


Gerard Anderson