

# Alkane Resources tells the hafnium tale

Ian Chalmers, Managing Director of Alkane Resources Ltd. (ASX: ALK | OTCQX: ANLKY) in an interview with InvestorIntel Editor Peter Clausi discuss the Dubbo Project and hafnium. The Dubbo project, northwest of Sydney, Australia, is abundant in rare earth elements – all of which are of interest to Alkane and their investors. However, Alkane's trump card is hafnium. While discussing the relationship between hafnium and Alkane, Ian highlights the major drivers for hafnium demand, as well as new applications.

**Peter Clausi:** I would imagine the past year has been an interesting one for you.

**Ian Chalmers:** That's one way to describe it, yes.

**Peter Clausi:** Tell us a little about that.

**Ian Chalmers:** Trying to advance the Dubbo Project through financing, we've really done everything we can do in terms process development, market development. We're effectively construction ready, just trying to put the financing in place. Started off with a billion dollar project and now working on cutting that into two slices. That's a good step forward.

**Peter Clausi:** Where is the Dubbo Project?

**Ian Chalmers:** It's about 400 kilometers northwest of Sydney in a region they call the Central West, which is a strange name for something that's near the east coast, but that's what they call it. It's a very civilized part of the world to operate in. Lovely countryside, farming countryside, all over infrastructure, everything you need and a good place to live.

**Peter Clausi:** Now at PDAC in Toronto this year was the first

time that I heard about hafnium.

**Ian Chalmers:** Right.

**Peter Clausi:** Good old element 72 on the periodic table. Tell us about what you're doing with hafnium.

**Ian Chalmers:** Well, it's a long story. I'll give you the shortened version. We were approached 4 years ago by a large aerospace group to say, "what are we doing with the hafnium in our deposit?" We said, well, the hafnium reports with the zirconium. Most zirconium products have hafnium. That's the way it lives. They said, "well if you can separate it and get it out we'd be very interested." We embarked on a process to look at hafnium and really then looked at, first of all, the technology of getting it out. It's very complex, but we've got a process. Secondly, I suppose getting into the hafnium space we suddenly realized that here was a metal that had this enormous potential with an enormous amount of R&D taking place that showed lots and lots of opportunities so very interesting product...to access the full interview, [click here](#)

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# **Alkane Resources final planning before full commercial rare earth mine**

✘ The supply of rare-earth metals (REEs) has long been dominated by China, with over 90% of the world's REEs originating from Chinese companies and their associates. Ian

Chalmers, managing director of Alkane Resources Limited (ASX: ALK | OTCQX: ANLKY), promises a change to the current paradigm from the unlikely starting point of Toongi, Australia. 25km south of Dubbo, the site has been in pilot operations for over eight years and has reportedly cleared the final planning hurdle to create a full commercial mine.

The Dubbo Zirconia Project (DZP) is based on one of the world's largest in-ground deposits of zirconium, hafnium, niobium, tantalum, yttrium and other REEs. Particularly promising is the abundance of increasingly desirable metals such as zirconium and niobium, essential for a wide range of everyday and specialised devices such as magnets, phosphors and technical ceramics. While originally seen as a potential strategic and alternative global supplier of critical minerals, recent developments at the DZP highlight just how realistic a prospect it is for Australia to become a world-leading supplier of the so-called "metals of the future".

On 28 October 2016, Alkane released the results of a cost reduction study demonstrating that the use of a modular, two-step plant construction could reduce initial capital needs from almost \$1bn to around \$480m. The separate modules, able to extract 500ktpa each, will be fabricated off-site and transported as needed; not only reducing initial costs but providing increased financial stability to the project as it permits the plant to expand in-line with establishing markets. The announcement closely follows the news that Siemens will be supplying a substantial quantity of equipment and services, whilst also sourcing REEs from the DZP directly. Alkane secured processing services from Vietnam Rare Earth JSC (VTRE) earlier this year to separate ore material into its constituents, and with costs in some areas lower than China, have ensured that future production costs can be truly globally competitive.

The DZP will produce over 16,000tpa of zirconium products

(100% ZrO<sub>2</sub> basis) and includes zirconium dioxide, specialty zirconium chemicals and value added zirconium products. At full capacity, the DZP zirconium revenue is estimated to be US\$100 -120 million, which equates to about 30 – 32% of total project revenue at current spot prices for the project's output. UK-based company Minchem Ltd., a technical ceramics marketing and manufacturing business, have signed an exclusive worldwide marketing, sales and distribution deal for all zirconium materials produced at the DZP.

The zirconium chemicals market consumes about 21% of annual zircon production and is the fastest growing segment of zircon consumption. With a forecast compound annual growth rate of ~5%, the zirconium chemicals market is anticipated to reach 190,000tpa by 2020, and 240,000tpa by 2025, worth in excess of US\$1.5B per annum. With the DZP expected to begin full operations in the next two years, Alkane and their new associates seem perfectly placed to take advantage of present sector growth.

The DZP may focus on the extraction and processing of zirconium products, but its polymetallic model makes for a considerably more robust setup than a single-material mine. The site at Toongi is expected to last for 70-100 years, and there is purportedly another similar resource also owned by Alkane that has yet to be fully investigated. Looking forward, a detailed assessment of concept is due to be completed early in the new year, with full revised financials to be released in the March Quarter of 2017. Given the magnitude of recent developments it seems highly likely that Alkane will emerge successful in its endeavour to put Australian REE mining firmly on the map.

On the 23 November 2015, Alkane Resources Ltd's share price (OTCQX: ANLKY) was trading at \$1.71. The ASX price was at AU\$0.24. At the time of writing, the company's share price was at \$3.43 while the ASX price was at AU\$0.365, which can be

regarded as a testament to the development of the Dubbo project. The market is rewarding Alkane, for what we regard as one of the most viable prospective rare earth companies outside of China which has a real chance of reaching commercial production.

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## **Alkane inks worldwide zirconium deal with Minchem Ltd.**

✘ Australian listed gold producer, **Alkane Resources Ltd. (ASX: ALK | OTCQX: ANLKY)** revealed that it signed a marketing and sales agreement for its Dubbo Zirconia Project (DZP) with ceramics manufacturer, Minchem Ltd. for all its zirconium materials produced by DZP.

Minchem Ltd. was formed following a management buyout of the minerals and chemicals division of Palabora Europe Ltd., a wholly owned subsidiary of Palabora Mining Co. Ltd. As such the company represents the sales and marketing interests of Palabora Mining Company's zirconium ores. As such, the arrangement ensures that Alkane is provided with an experienced partner to market DZP's zirconium products directly to key industry-end users.

Under the arrangement, DZP will initially supply Minchem for five years from the date DZP commences with its zirconium production, with an option to extend for a further five years thereafter by mutual agreement. Currently the company is in the construction phase with the demonstration pilot plant (DPP) trials scheduled to have started in August with the aim of producing zirconium products and hafnium and rare earth

concentrates.

The plan is to produce around 16,000 tpa of zirconium products including zirconium dioxide, speciality zirconium chemicals and value-added zirconium products.

The market reacted positively to the marketing arrangement as Alkane's share price rose from AUD0.2650 to AUD0.3250 (US\$0.204 to US\$0.25) on the back of the announcement on the 16<sup>th</sup> of August. The share price has been maintained at this level.

The majority of zirconium is consumed by the ceramics industry (47%) with the balance being split between chemicals (21%), refractory (17%), foundry (12%) and other uses (3%).

Whilst the milled zircon for use in ceramics has come under pressure due to increased competition from lower cost substitutes such as calcined alumina, feldspar and alumina-silicate mixtures, it is expected that DZP will be focused primarily on zirconium-based chemical products, which Core Consultants is forecasting will rise by roughly 25% CAGR over the next five years. Currently the majority of these chemicals is expected to be produced by China which has invested heavily in chemical facilities over the last decade and currently dominates 80% of zirconium production.

Moreover, 80% of the global zircon chemical capacity, which stands at 525,000 tpa, is comprised of zircon oxychloride ("ZOC") which is forecast to grow. ZOC offers lower levels of radioactivity as uranium and thorium are concentrated in waste streams. Again, China dominates the ZOC market, supplying over 90% of global production and now needs to manage and dispose of these waste streams. This makes Alkane an interesting play, as its zirconium products offer an alternative to Chinese sources and without the issues of radioactivity presented by current producers using zircon.