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HALLGARTEN & COMPANY

Initiating Coverage

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Alkane Resources (ASX: ALK, OTCQX:ANLKY)
Strategy: LONG

Key Metrics			
Price (AUD)	$ 0.220		
Price (USD)	$ 1.640		
12-Month Target Price (AUD)	$ 0.85		
Upside to Target	286%		
High-low (12 mth)	$0.18 - $0.29		
Market Cap (AUD mn)	$ 109.3		
Shares Outstanding (millions)	496.80		
	2015	**2016e**	**2017e**
Consensus EPS		($0.01)	($0.01)
Hallgarten EPS		$0.02	$0.032
Actual EPS	($0.01)		
P/E	n/a	10.00	6.89

Alkane Resources

The "Great Survivor" of the Specialty Metals Space

- + The Dubbo Zirconia Project (DZP) is akin to having several horses running in the same race. It has Rare Earths, Zirconium, Niobium and Hafnium in its mix, all of these being metals that have registered high demand and prices at varying times over the last decade
- + Rare Earths prices and sentiments look likelier to move higher rather than lower at this stage
- + Cash position at end of June totaled AUD$29.8mn (of which AUD$5.3mn was bullion on hand),making this one of the most cashed up REE plays
- + The Tomingley gold mine essentially foots the bill for all of Alkane's pre-build, testing and operational expenses at the DZP, thus lightening the load on shareholders and insulating Alkane to some degree from the vagaries of the financing market.
- + Guidance for Tomingley FY17 production of 65,000-72,000 ounces of gold
- ✖ Despite its multi metal nature the DZP would accelerate with Rare Earths prices moving to a better place than they have been in the last five years
- ✖ Financing environment remains challenging

DZP- Redefining "Polymetallic"

The term "polymetallic" is common in the mining arena and usually refers to base metal with base metal or base metal with precious metal(s) and occasionally refers to specialty metal with base metal or specialty metal with specialty metal (a good example being tin/tantalum). The Dubbo Zirconia Project (the DZP) of Alkane though is a whole different level of polymetallic with a very unique mix of rare and specialty metals (Zirconium, the Rare Earths, Niobium and Hafnium) which makes it a potential trove of high value and high-demand metals all with applications in new and evolving technologies.

Alkane was a Rare Earth developer back in the days when the universe was only this company, Great Western and Avalon. Indeed Alkane first identified the REE potential at DZP in 1999. Of that group it is the only one still advancing a REE project and indeed it has outlived the vast horde of lesser challengers that appeared and fizzled.

In a canny move that separated it from the rest of the Rare Earth pack, Alkane dusted off a gold project in its immediate vicinity during 2014 and gained itself not only an insurance policy against the notoriously fickle REE space, but cash flow and producer status as well.

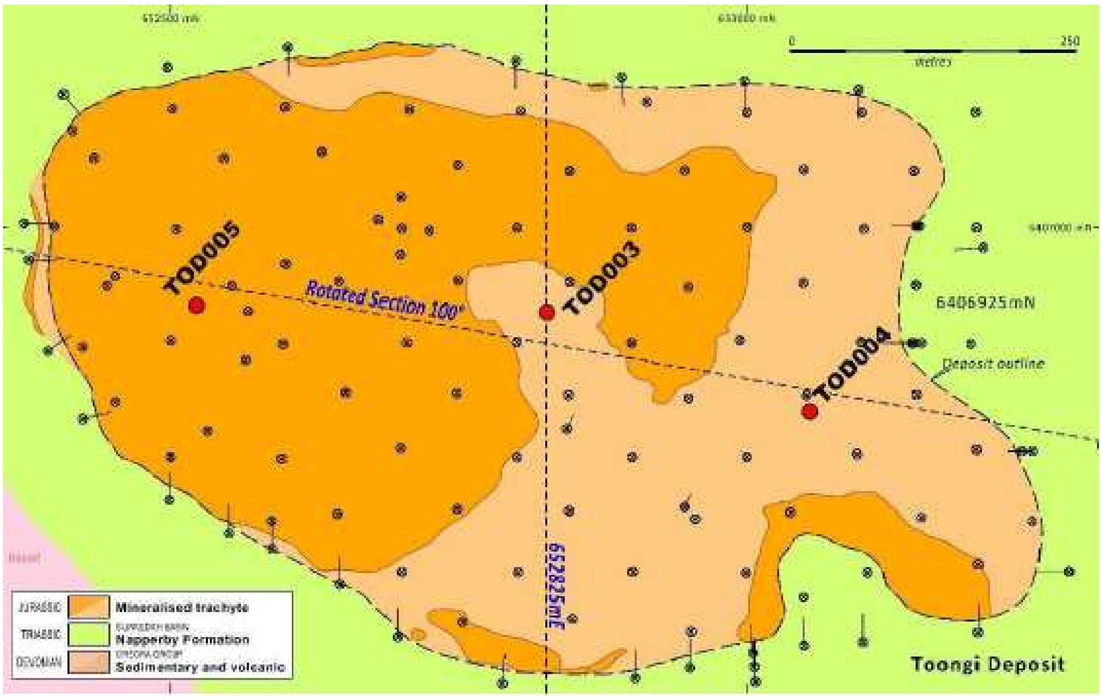
In this review we shall look at the main game, the DZP, and also examine the Tomingley Gold mining operation which is essentially the enabler of everything else that Alkane is doing. In having this source of revenues to carry work forward on a Rare Earth project, Alkane has separated itself out from the rest of the REE pack who have been unable to self-fund development in a tough market.

The DZP

Alkane's main project is located in central west New South wales, some 400km northwest of Sydney within a region that has substantial infrastructure – roads, rail, power, gas, light engineering, substantially populated (with 100,000 people in relative proximity). The zone is an important agricultural and mining area.

The DZP consists of a very large polymetallic resource of the metals Zirconium, Hafnium, Niobium, Tantalum, Yttrium and Rare Earths (of which 25% of Rare Earth output is in the Heavy Rare Earth category). The Tantalum potential is very sizeable by global standards and not often highlighted as a viable recovery process is yet to be determined.

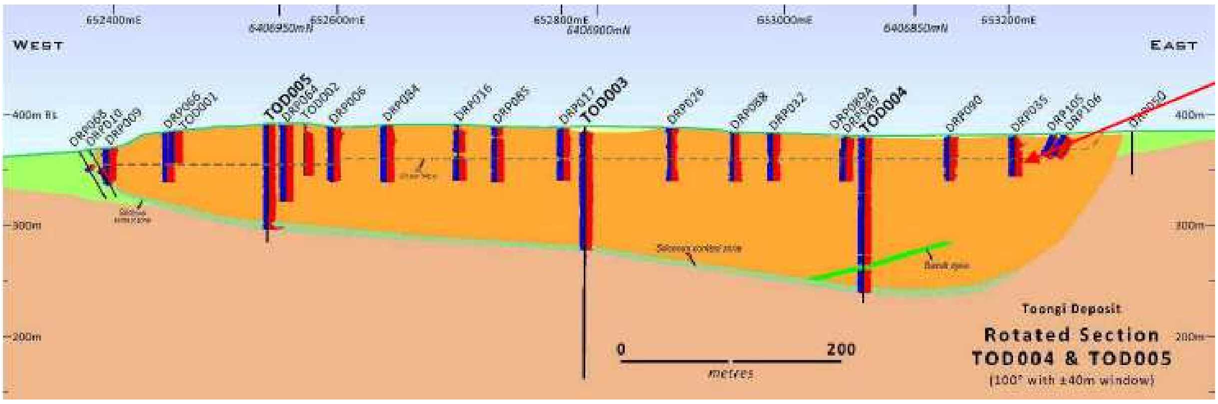
Alkane has been working up this project for the best part of a decade and now has a demonstrated flow sheet with a pilot plant turning out products for market evaluation at ANSTO. It also has a financial feasibility study completed in April 2013. All environmental approvals, both state and federal are in place for the project to proceed to construction. In August 2015, it published a Front End Engineering Design (FEED) study that significantly revised and improved previous versions of the flowsheet and demonstrated a financially viable project, even at current spot prices for the metals.



The Geology at DZP

While the project name is the DZP, the geological name for Alkane's mineralization is the Toongi intrusive. This is a Jurassic aged trachyte lava flow with approximate dimensions of 900 metres east-west and 600 metres north-south and a lozenge shape with maximum of 200 metres depth. The body exhibits uniformly elevated grades for Zirconium, Hafnium, Niobium, Tantalum, Yttrium and Rare Earth elements laterally and vertically.

Mineralogical studies indicate that ore minerals are very fine grained being less than 100µm in size (most less than 20µm) and generally of extremely rare compositions. Calcium- and REE-rich zirconosilicates (similar to eudialyite or armstrongite) are the dominant ore minerals of Zirconium, Hafnium and Yttrium/HREE while natroniobite ($NaNbO_3$) and calcian bastnasite are the major source of Niobium, Tantalum and LREE's respectively. All these minerals are soluble in sulphuric acid and only minor amounts of refractory Zircon and a refractory Niobium mineral (possibly columbite) have been detected.



The orebody also contains low level uranium and thorium values but is not classified as a radioactive ore.

The Resource and Reserve

Below can be seen the current Resource and Reserve estimates for the DZP.

DZP Resource

	Tonnage	ZrO2	HfO2	Nb2O5	Y2O3	REO
	Mn Tonnes	%	%	%	%	%
Measured	35.7	1.96	0.04	0.46	0.14	0.75
Indicated	37.5	1.96	0.04	0.46	0.14	0.75
Total	73.2	1.96	0.04	0.46	0.14	0.75

The Reserve supports a 35-year mine life at one million tonne ore processing per annum with the defined resource potentially supporting a significantly longer operation.

DZP Reserve

	Tonnage Mn Tonnes	ZrO2 %	HfO2 %	Nb2O5 %	Y2O3 %	REO %
Proven	8.07	1.91	0.04	0.46	0.14	0.75
Probable	27.86	1.93	0.04	0.46	0.14	0.74
Total	35.93	1.93	0.04	0.46	0.14	0.74

Rare Earths – What Goes Around Comes Around

The Rare Earths sub-sector has almost become a poster boy for what is wrong about the Vancouver promotional space. What might go wrong did go wrong with a massive influx of players creating a glut of projects while a few key projects hoovered up the available financing leaving many worthy projects to die of financial starvation. Then the industry leaders proceeded to implode under the weight of their own gargantuan capex projections with indifferent investors standing on the sidelines watching the calamity unfold.

Despite this Alkane was one of the forerunners of the Rare Earth development process (with Great Western and Avalon) and after the dust has settled it remains as clearly a survivor after literally hundreds of wannabes have been swept off the decks and Avalon has refocused on Lithium and Great Western has gone to its demise. There are still other REE plays out there and some with good prospects but Alkane is the "Great Survivor" in the space.

Looking in the Chinese Mirror from a Different Angle

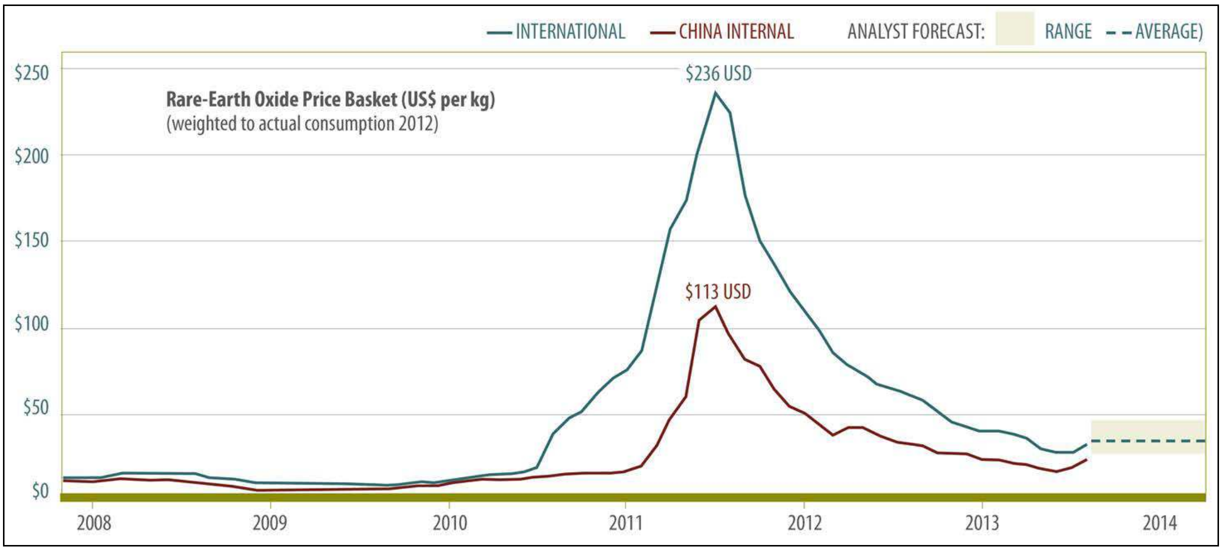
Conventional theory goes that over-production of Rare Earths resulted in the catastrophic fall in prices between 2011 and the current time. However, as there has been little to no reduction in REE consumption, as China remains the dominant player by a massive margin and that little new production has been added to the mix (and this might not even replace those mines closed in China for environmental reasons) then we are inclined to think that the Rare Earth bubble was first a burgeoning of prices brought about by official Chinese policy and then that the bust was similarly engineered.

The price surge was encouraged to finally reward Chinese producers for the nation's dominance of REE production after decades of selling at breakeven (or loss) levels. Two years later the Chinese saw that their dominance was imminently under threat if even 10% of the myriad REE projects outside China came to some sort of fruition. Then the Chinese engineered a resetting of the REE price lower which killed or put in the deep freeze almost all the REE proposals and their promoting companies. In the process it managed to also fatally torpedo Molycorp below the waterline and that company eventually also slipped beneath the waves.

The myth that Western demand pushed the prices of the whole of the REE suite higher is just not supported by fact. Likewise in a market essentially dominated by a Chinese cartel the prices are set by Chinese companies (in cahoots with the relevant ministry) and therefore were set dramatically higher in 2008-9 and then plunged to market-clearing (literally) levels in 2011-12 by the internal "price-setters".

What was made to go up could just as easily be made to come down.

The price surge and then plunge is even better documented by the chart below:



Source: Metal Pages/IMCOA

Therefore, our view of Rare Earth prices is that the levels are not some sort of random walk but in fact are put where the Chinese "powers that be" want them to be. The last few years of suppressing prices to clean out the REE space of potential competitors has largely been successful with Molycorp effectively eliminated and the number of junior challengers with any serious potential being now a mere handful. Can the Chinese afford to undercut themselves in REE pricing for any longer (because they are essentially loss-leading and providing a gift of a scarce and declining resource to the end users in the space) with the sole object of beggaring the few remaining wannabes?

Our thesis is that the loss-leading is near an end and that prices will start to be moved higher in all REE metals, excepting Lanthanum and Cerium. Such a strategy will keep Molycorp's Mountain Pass out of contention (and deep in administration) and leave Lynas underperforming its potential. Despite this we do think the outlook for Lynas will be enhanced in its higher value metals. The Chinese are also cognizant that there are several REE players with the potential to flick the "On" switch should prices uptick in a sustained manner. The question is whether the threat of these projects such as Alkane's DZP (and for example those of Peak Resources and Mkango) is great enough to keep Chinese pricing in defensive mode. We would posit that it is not a dramatic threat and thus that the Chinese will raise prices gradually in a way that keeps the reins of pricing firmly in their hands.

Current spot prices in the Rare Earth space are almost all trading at below the long-term average price though admittedly the long term price was skewed upwards by the 20009-2011 spike.

Most commentators feel that the price deck is more likely to trend higher rather than lower in coming years. Most are also of the persuasion, as are we, that Lanthanum and Cerium remain in an extremely well-supplied state and that this is not likely to be mitigated short of a new application(s) appearing to clear away the glut. Alkane is not alone in the up and coming REE producers in resolving to stockpile these minerals rather than try to market them. This is then reflected in the poor pricing outlook for those two specifically.

Both our 2020 estimates, and those of Alkane, are shown in the table on the following page. Most of the envisaged price uplifts are not very ambitious and all represent discounts to the peak years of the REE phenomenon. In erring on the side of caution, we probably underestimate potential revenues from REEs and the share that they will have of the DZP's total revenues.

Product	Units	Current Price Range	Estimate 2020	
			Alkane	Hallgarten
		US$/kg*	US$/kg	US$/kg
Lanthanum Oxide	La_2O_3	2.00 – 2.50	4	3
Cerium Oxide	CeO_2	2.00 – 2.50	3	2.50
Praseodymium Oxide	Pr_6O_{11}	62.00 – 75.00	90	90
Neodymium Oxide	Nd_2O_3	45.00 – 50.00	80	92
Samarium Oxide	Sm_2O_3	2.50 – 3.50	6	8
Europium Oxide	Eu_2O_3	235.00 – 325.00	265	410
Gadolinium Oxide	Gd_2O_3	15.00 – 20.00	30	30
Terbium Oxide	Tb_4O_7	550.00 – 650.00	600	630
Dysprosium Oxide	Dy_2O_3	260.00 – 310.00	350	393
Holmium Oxide	Ho_2O_3	39.00 – 40.00	40	n/a
Erbium Oxide	Er_2O_3	39.00 – 42.00	40	n/a
Ytterbium Oxide	Yb_2O_3	29.00 – 31.00	30	n/a
Lutetium Oxide	Lu_2O_3	980.00 – 990.00	990	n/a
Yttrium Oxide	Y_2O_3	6.00 – 8.00	13	13

Source: Argus Metals/Hallgarten/Alkane

Meanwhile at DZP

Alkane's Dubbo Zirconia Project (DZP) continues to bubble along. It has been around since before the REE boom erupted and is still here after the tide has gone out. Part of its longevity is that it is multi-metal in nature with zirconium (hafnium), niobium (tantalum), yttrium and rare earth elements. It also helps that it is one of the world's largest in-ground resources of rare metals and rare earths. Due to the size of the resource, the mine is expected to process 1,000,000 tonnes of ore throughput per year over a period of 70 years or more.

A demonstration pilot plant at ANSTO (the research complex on the outskirts of Sydney) has been running since 2008, allowing Alkane to prove up the DZP's technical and financial viability. The pilot plant aided in the development of a working flowsheet and verified resource extraction and processing methods for the complex mineralogy.

FEED

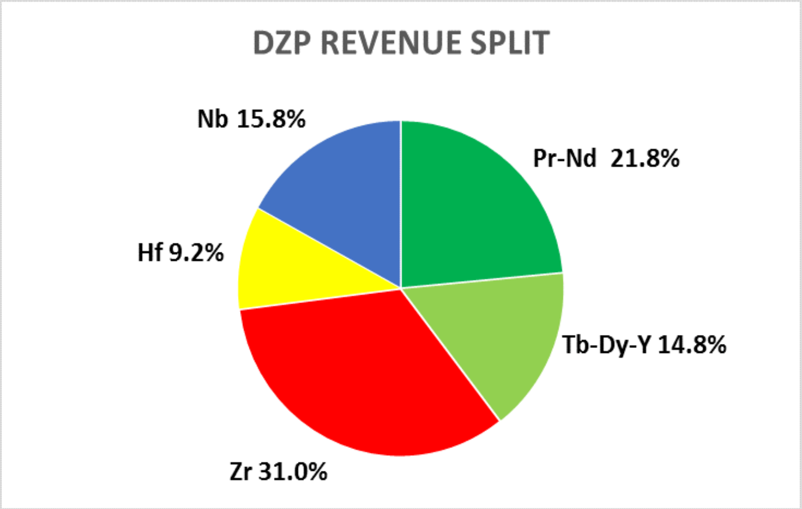
In a new twist on Feasibility Studies, Alkane published in August 2015 its Front End Engineering Design (FEED) and process enhancements which essentially contained much of the material one has become used to seeing in Feasibility and Scoping Studies. The most salient information was that it reaffirmed the economics of the DZP with anticipated product revenue of around US$17/kg and with costs of approximately US$8/kg. The study estimated annual revenue to be approximately AUD$580mn with operating costs of AUD$260mn delivering a AUD$320mn EBITDA. The NPV over a 20-year mine life was AUD$1.22bn and IRR of 17.5%.

The FEED came in with a capital estimate for the DZP of US$0.97bn, which included a contingency of AUD$103mn.

Some of the changes to the FEED can be attributed to the work being done at ANSTO as substantial improvements and optimisation of the flow sheet delivered significant reduction in annual water consumption by 50% to 2 gigalitres, and reduction of the site footprint by 50% to 500 hectares. Overall Rare Earth recoveries were improved by 11.5% for a total 6,664tpa (with Neodymium up by 7% to 960 tonnes per annum and Dysprosium by 27% to 128 tonnes per annum, pre-refining). While the flow sheet naturally separates "light" rare earths (La, Ce, Pr, Nd and Sm) from the "heavy" rare earths (Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu and Y) the revised processing plan combines these two streams for initial on-site separation to produce a Lanthanum-Cerium concentrate for storage (or future processing), Yttrium Oxide ($Y2O_3$) for direct sale and a Pr-Lu (95% REO) chemical concentrate for third party toll treatment. This reinforces the trend of recent times for upcoming REE producers to sideline the La-Ce component as long as prices remain uneconomic in these preponderant minerals in the REE mix.

In other co-products, a commercial zirconium basic carbonate production circuit was demonstrated, with potential for higher value zirconium products. Meanwhile, the development of a Hafnium recovery circuit has also delivered higher purity zirconium products with greater value potential.

The FEED envisaged the DZP revenue split from the various metals in the DZP mix. The split is of course a moving feast as prices are constantly moving.



The Japanese Connection

The Japanese have had a tough road to hoe on Rare Earths in recent years. While at the mercy of the Chinese choking off supplies upon a whim, they have also faced the challenge of the Chinese effectively trying to centralize the bulk of value-added onto the Chinese mainland while appropriating technology from its developers. Brief hopes appeared that the REE boom at the turn of the decade would provide alternatives but the vast bulk of Canadian pretenders proved to be exactly that, with only Lynas making it across the production line while other Australian players such as Alkane and Peak Resources maintained serious intentions to get to production.

It was Alkane's consistency of approach that drew the attention of Shin-Etsu, the massive Japanese chemicals combine that ranks 9th in the world in that space, as the strategic partner in the development of DZP. Shin-Etsu is the operator of Japan's only large scale separation and refining plant for rare earths. Australian Zirconia Limited (AZL), a wholly owned subsidiary of Alkane, inked a non-binding MOU with Shin-Etsu in June 2012. The plan was that AZL would produce a suite of separated heavy and light rare earths using the rare earth concentrates from the DZP.

A toll processing agreement would use Shin-Etsu Chemical's technology to process 100% of DZP heavy and light rare earth concentrates in Japan (or other agreed location) to produce high purity separated rare earth oxides.

Under the terms of the agreement, Shin-Etsu would have priority to purchase at commercial prices a quantity of the Rare Earths that they would toll process via an initial five-year offtake agreement. The remaining available quantity of separated rare earths could be sold to other companies.

On 1 June 2015 Alkane reported to the ASX that the MoU with Shin-Etsu expired on 31 December 2014 but a draft rare earth toll-treatment and off-take agreement had been provided to Shin-Etsu in the second half of 2014 as a basis for commercial discussions to continue.

At the end of last year they still had not done so, their reasoning seemingly being that the WTO winning its REE case against China, and low prices, had taken the pressure off proceeding with an offtake agreement.

The Vietnam Angle

Intriguingly the dialogue on offtakers has now morphed into one about Vietnam. This country is rapidly positioning itself as the competitor to China in a number of industries and it is playing an even more important role in the global Rare Earth supply chain in recent years. The first signs of this were when Toyota established a recycling plant in Vietnam to be fed with material from scrapped hybrid vehicles. Then the country came to prominence as a supposed conduit for smuggled Chinese REE's which were making their way around the convoluted import/export taxes and rules that the Chinese has imposed (which were subject to WTO challenges).

Now, unsurprisingly, a REE processing industry is evolving in Vietnam. At the height of Lynas's travails in Malaysia we had suggested that that company would have been better to have positioned itself in Vietnam rather than its more southerly neighbor. Vietnam has shown itself to be aggressive in courting industries (another example being Tungsten) where it cannot offer raw material but can offer conversion of metals and minerals at competitive prices at a centrally located position in proximity to the end users and not at too great a distance from the sources of raw materials.

Alkane's connection into this evolving complex is via a Letter of Intent it has signed on the Vietnam Rare Earth JSC (VTRE). VTRE has two facilities with the plant at Phu Ly being a 4,000 tpa REO separation plant producing La, Ce, Nd, Pr, Dy and Tb that is already selling certified products into Asia. The plant at Hai Phong (the port city of Hanoi) is a 1,200 tpa Rare Earth metal /alloy plant. This is engaged in selling certified REE metals into Asian permanent magnet manufacturers.

The world of Vietnamese Rare Earth conversion is, to put it tactfully, somewhat opaque. A recent announcement advised Shenghe Resources, one of the leading rare earth producer in Sichuan, China, through its wholly-owned subsidiary, Shenghe Singapore Co., Ltd. , is in the process of acquiring 90% of Vietnam Rare Earth Limited Company (VREX) from Chuo Denki Kogyo Co., Ltd. There is also another rare earth recycling plant owned by the powerful Japanese group Showa Denko but it has apparently closed due to low prices. These operations are quite separate from VTRE, Alkane's partner.

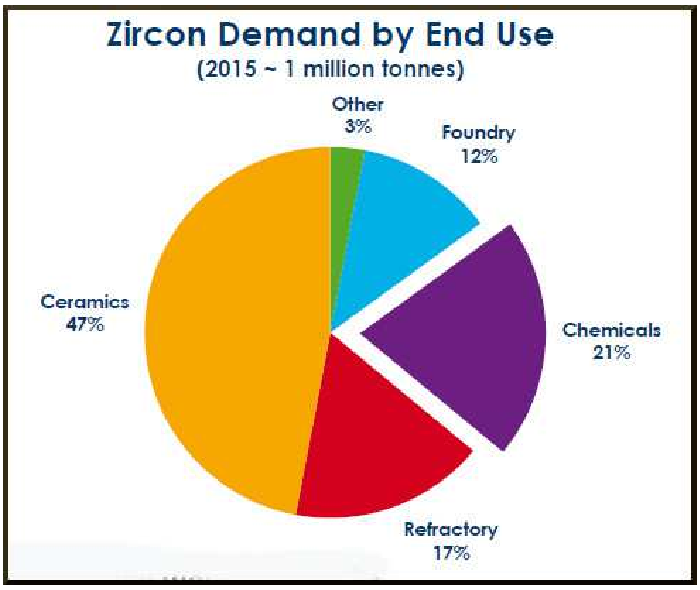
The LOI that Alkane has signed is directed towards toll processing of the DZP's REE concentrate feed to produce separated rare earth products to certified standard. Under the agreement the partners will establish a joint marketing company to expand the VTRE's market base into Europe and North America using VTRE existing feed. It shall replace existing feed progressively as DZP comes on stream. The VTRE feed is coming from various sources, some of which may be of Chinese origin. The replacement with Alkane product flow would effectively liberate the Vietnam venture from the fickle flow of Chinese REE material which as we know from the past can be somewhat brutally switched off on occasion if the political or commercial winds change direction.

Interestingly, Alkane claims that the costs of VTRE production are currently equal to, or less than, those quoted for Chinese Rare Earth industry. While VTRE does not have the Shin-Etsu "name" the deal that Alkane has now is better financially and has enabled Alkane to promote other off-take in Europe and US without the limitations that the Shin-Etsu deal imposed.

Zirconium

The DZP has its origins in the hunt for new sources of Zirconium. This chemical element has the symbol Zr and atomic number 40. The name of zirconium is taken from the name of the mineral Zircon ($ZrSiO_4$), a silicate mineral which is the principal commercial source of zirconium, with 97% of all zirconium chemicals/fused zirconia being derived from zircon. Zirconium also occurs in more than 140 other minerals, including the commercially useful ores baddeleyite and kosnarite.

Zirconium is a lustrous, grey-white, strong transition metal . Zirconium is mainly used as a refractory and opacifier, although small amounts are used as an alloying agent for its strong resistance to corrosion.



Processing of zircon takes two general routes. The first using an electric arc furnace produces fused zirconia with the principal end being in ceramic pigments.

Chemical leaching is the second process which generates a variety of products (including "chemical" zirconias) which are used in many applications ranging from drying agents, fire retardants, advanced ceramics, electronics and catalysts. These zirconias are also a key component of Solid Oxide Fuel Cells, a developing and important source of "clean" electricity.

Most zirconia is used directly in commercial applications, but a small percentage is converted to the metal. Most Zr metal is produced by the reduction of the zirconium(IV) chloride with magnesium metal in the Kroll process. The resulting metal is sintered until sufficiently ductile for metalworking.

Sources

Zirconium is found primarily in Australia, Brazil, India, Russia, South Africa and the United States, as well as in smaller deposits around the world.

USGS figures for 2015 show the ranking of primary producers from mines as being Australia, producing 500,000 tpa, South Africa 380,000tpa and China, in a distant third place, with 140,000 tpa. Therefore around two-thirds of zircon mining occurs in Australia and South Africa.

Zirconium resources are estimated by the USGS to be around 78mn tonnes worldwide of which they credit Australia with 51mn tonnes and China with a mere 500,000 tonnes.

Zircon is processed in a number of countries but China currently dominates supply of processed zirconium products.

It is useful to note that Zircon currently is overwhelmingly a by-product of the mining and processing of the titanium minerals ilmenite and rutile, as well as tin mining. Collected from beaches and the near offshore (particularly in Western Australia), zircon-bearing sand is purified by spiral concentrators to remove lighter materials, which are then returned to the water because they are natural components of beach sand. Using magnetic separation, the titanium ores ilmenite and rutile are removed.

However, in contrast, the DZP sources its ore from hard rock.

Trends

Zircon consumption bottomed out in 2014 at its lowest point for a decade. Consumption had dropped by over 30% to 1mn tonnes from its 2011 peak. The use of zircon in some key markets, including traditional ceramics and foundries, had been affected by substitution from competing minerals or its outright elimination from product formulations. According to Zircomet, a leading Western converter, the fall in consumption occurred in spite of continued growth in the traditional ceramics market, the largest application for zircon, as consumers sought to reduce their reliance on the opacifier mineral owing to high raw material costs.

Lower consumption of zircon has been achieved by manufacturers through substitution, changing fashions and manufacturing innovations. In ceramics, zircon substitution has been particularly pronounced in the traditional Western European hubs of Spain and Italy. Ceramic producers have achieved similar quality levels by partially or completely substituting zircon with aluminosilicate minerals such as calcined alumina and feldspar in some applications. However it should be noted that some European ceramic producers sustain that the substitutes do not possess the same opacifier quality of zircon or zircon chemicals. Therefore substitution is mainly being driven by price considerations alone. This is somewhat like the situation we have encountered in the Antimony space.

While some substitution has also been seen in Asian ceramics, mainly those produced for the export market, producers in the much larger domestic markets in the region have sacrificed quality in favour of lower production costs. In many cases consumers have entirely removed zircon from their formulations.

Zircon use in chemicals and refractories also showed a decline between 2011 and 2013, but this was linked to lower output of these end-products rather than raw material substitution.

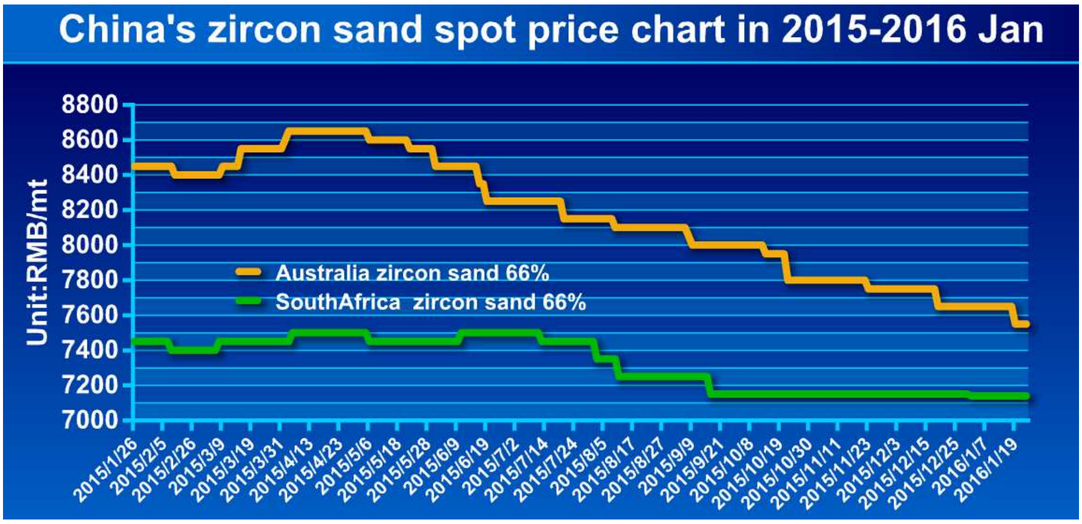
Pricing

Pricing of zircon has been a wild ride in the first decade and a half of this century. From 2003 to 2007, while prices for the mineral zircon steadily increased from $360 to $840 per tonne, the price for unwrought zirconium metal decreased from $39,900 to $22,700 per ton. Zirconium metal is much higher priced than zircon because the reduction processes are expensive.

Zircon prices were volatile between 2010 and 2012, more than doubling in the space of 18 months to reach $2,500/t in mid-2012. This was the result of supply shortages, as end markets recovered from the financial downturn more rapidly than anticipated. In many cases, zircon consumers were unable to pass on increased costs, particularly in the traditional ceramics market.

Zircomet reported that, as a result of lower zircon demand, supply significantly exceeded consumption which led to the creation of large stockpiles. During this period, prices stabilised and then fell sharply. Australian zircon export prices fell to an average of $1,650/t in late 2012, and continued to fall throughout 2013 and into 2014. By mid-2014, they had reached an average of $1,000/t.

Prices for zircon sand have been weak over the last year as the chart below showing prices in Renminbi from the two major producers makes evident.



Source: Mining Bulletin

The Chinese & Zirconium

Global zirconium chemical capacity is estimated to be 523,000 tonnes per annum in 2014, with zirconium oxychloride (ZOC) comprising 80% of this. The Chinese ZOC market is currently in a state of acute overcapacity with few profits available to suppliers.

China is a leading producer of Zirconium chemicals and zirconia but far from being the major player in zirconium metal. It is however very important as a processor/converter of zircon.

The Chinese zirconium industry is following the lead of the Rare Earth sector's reorganisation driven by *diktats* from above. This has manifested itself in:

- consolidation of Chinese fused and zirconium chemical industry
- production is about 75% of total world market
- import of over 95% of the zircon required

The "champion" in this rationalization would appear to be Guangdong Orient Zirconic (the largest SOE operating in this metal) which is headquartered in Shantou in Guangdong Province. OZC is the largest zircon processing and zirconium product manufacturer. It employs over 1,700 people and is listed on the Shenzhen Stock Exchange with a market capitalisation of approximately AUD$1bn.

OZC is leading the consolidation process as it bought Zirconium Valley (Shenghua), operating in ZOC and Zirconia, and then bought Wengsheng, a processor of zircon concentrates. It was also the owner of Murray Zircon until recently when it folded its mothballed Mindarie mine in South Australia into Image Resources. It also has a JV with Australian Zircon, which holds the advanced WIM150 project in far western Victoria. This project is aiming to recover heavy mineral sands to produce a variety of products, including Zircon Flour, Rare Earth Concentrates and Titanium Mineral Concentrates (ilmenite, leucoxene and rutile).

The consolidation is being driven by environmental (water, air and land) and OH&S cost pressures. The Chinese processors are also grappling with the treatment of high Uranium and Thorium residues from zirconium chemicals.

Alkane's Zirconium Strategy

The DZP is aiming to meet the demand for premium zirconium chemicals and zirconia that can compete with Chinese production of zirconium chemicals and fused zirconia. A major advantage of the DZP is the quality of its zirconium product output which is derived directly from the ore and not a zircon source.

The specs of zircon produced are very important to end-users as global zircon production is becoming increasingly "dirty". This impacts on the ability of the processors to achieve on-spec Zr products.

The company is aiming to produce 16,374 tpa of 99% ZrO_2, which is about 8% of current world demand for chemicals.

Tantalum – a Possible Addition to the Mix

It's worth mentioning the Tantalum aspect of Alkane's mix despite it not currently being part of the envisioned production mix.

Australia's Economic Demonstrated Resources (EDR) are estimated to be 60 kilotonnes (kt) of tantalum in 2012. Of these 85% are in WA and 15% in NSW. Alkane's DZP accounts for the totality of the NSW component of the tantalum EDR. The deposit contains a Measured Resource of 35.7mn tonnes grading 0.03% Ta_2O_5, and an Inferred Resource of 37.5mn tonnes grading 0.03% Ta_2O_5.

Alkane have reported the presence of mineralisation at the neighbouring Railway prospect some four kilometres northwest of the Toongi orebody, where reverse circulation drilling in the trachyte body intersected a zone containing grades ranging from 0.013% to 0.15% Ta_2O_5. The report noted that there has been insufficient exploration of the Railway trachyte to define a mineral resource and it is uncertain that further exploration will result in the determination of a mineral resource.

According to the company, a 30% tantalum recovery would produce 100 tonnes a year of Ta_2O_5.

Hafnium – Alkane to Dominate

The metal, Hafnium (symbol - Hf), of which Alkane will become the major producer, is obscure in comparison to even the Rare Earths space. There are no primary mines and its uses are either in super-alloys or nuclear plants, although there a number of potential new applications, including as microprocessors for computing applications. Internationally it is classified a strategic material which limits public information and it has no public pricing mechanism, and the USGS does not even dare to venture which countries the production comes from and how much that production might be. In the words of the USGS: “World primary hafnium production data are not available. Although Hafnium occurs with zirconium in the minerals zircon and baddeleyite, quantitative estimates of hafnium reserves are not available”. However applying the 50:1 ratio to Zirconium reserves gives some idea of the potential global supply of Hafnium.

This puts Hafnium in the “more obscure than Scandium” category, which is a dark place indeed.

While Hafnium makes up but a small part of Alkane’s volumes from the DZP it makes up about 10% of the revenues. In the absence of any other apparent producers of size, that makes Alkane the heavyweight in the Hafnium space going forward.

What is Hafnium?

Hafnium is a chemical element with symbol Hf and atomic number 72. In appearance it is a lustrous, silvery gray, metal. Hafnium is estimated to make up about 5.8 ppm of the Earth's upper crust by mass. It chemically resembles zirconium and is found in zirconium minerals, hence the presence at DZP. The notable physical difference between these metals is their density, with zirconium having about one-half the density of hafnium.

Hafnium reacts in air to form a protective film that inhibits further corrosion. The metal is not readily attacked by acids but can be oxidized with halogens or it can be burnt in air.

Hafnium Uses

As mentioned the highest profile usage currently is in super alloys, such as nickel-cobalt for turbine blades in jet and industrial gas engines, where small additions can increase the operating temperatures up to $2{,}000^{0}$c. This improves fuel efficiency, energy output and emissions minimization.

It also has important applications in the nuclear industry in control rods in nuclear power plants. The most notable nuclear properties of hafnium are its high thermal neutron-capture cross-section and that the nuclei of several different hafnium isotopes readily absorb two or more neutrons apiece. In contrast with this, zirconium is practically transparent to thermal neutrons, and it is commonly used for the metal components of nuclear reactors – especially the claddings of their nuclear fuel rods.

Hafnium is also used in filaments and electrodes. Some superalloys used for special applications contain hafnium in combination with niobium, titanium, or tungsten. It is also used in alloys with iron, titanium, niobium, tantalum, and other metals. Small additions of hafnium increase the adherence of protective oxide scales on nickel-based alloys and improve the corrosion resistance. An alloy used for liquid rocket thruster nozzles, for example the main engine of the Apollo Lunar Modules in the 1960s was composed of 89% niobium, 10% hafnium and 1% titanium.

Hafnium Production

The major current source of Hafnium is heavy mineral sands ore deposits, pegmatites and carbonatite intrusions. The most likely new source of hafnium is trachyte volcanics containing the zircon-hafnium silicates eudialyte or armstrongite, at the DZP.

Hafnium reserves have been infamously estimated to last under 10 years by one source if the world population increases and demand grows. In reality, since Hafnium occurs with Zirconium, Hafnium can always be a byproduct of Zirconium extraction to the extent that the low demand requires.

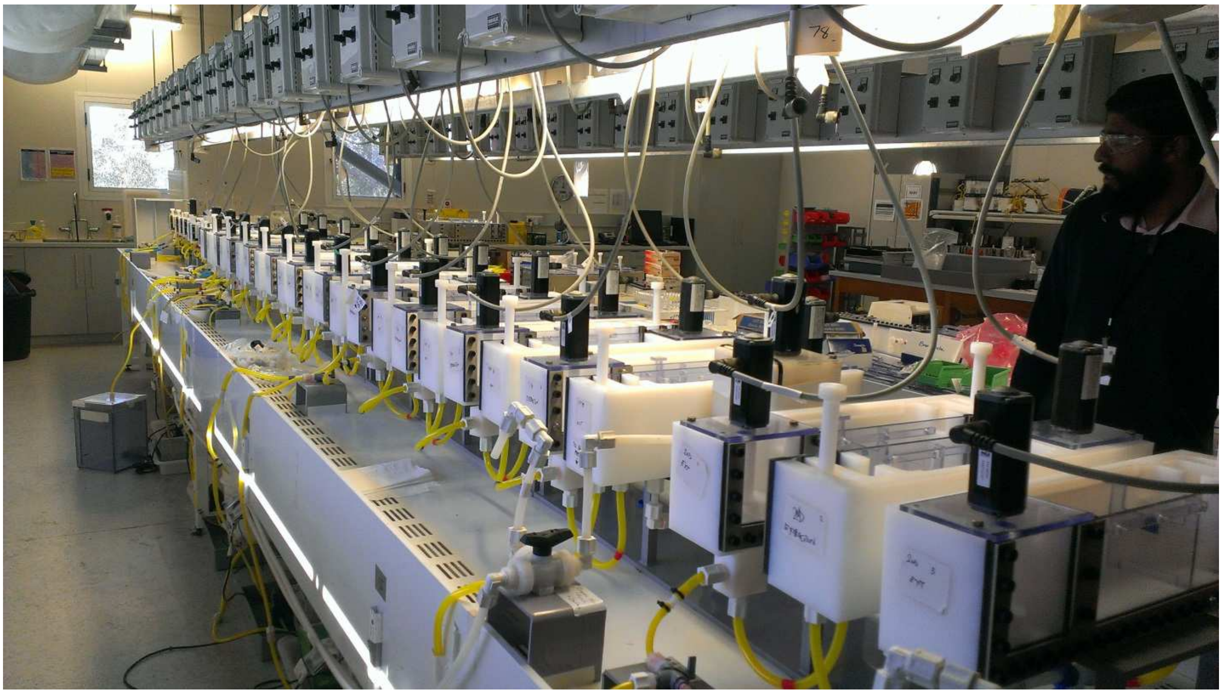
As the heavy mineral sands ore deposits of the titanium ores ilmenite and rutile yield most of the mined zirconium, and therefore also most of the hafnium, the quantities produced are to some degree dictated by Titanium demand.

Typically, Zirconium and Hafnium are contained in zircon at a ratio of about 50 to 1. Commercial Zirconium metal typically contains 1–2.5% of Hafnium. The chemical properties of hafnium and zirconium are nearly identical, which makes the two difficult to separate. Because of hafnium's neutron-absorbing properties, Hafnium impurities in zirconium would cause it to be far less useful for nuclear-reactor applications. Thus, a nearly complete separation of Zirconium and Hafnium is necessary for their use in nuclear power.

After Zirconium was chosen as material for nuclear reactor programs in the 1940s, a separation method was developed. These liquid-liquid extraction processes with a wide variety of solvents are still used for the production of Hafnium. Virtually all Hafnium metal manufactured is produced as a by-product of zirconium refining with the end product of the separation being Hafnium(IV) Chloride.

Hafnium at the DZP

The most recent process improvement in the DZP flow chart consisted of the addition of a scrub circuit into the zirconium solvent extraction process, to remove the Hafnium for subsequent refining to produce a saleable hafnium product. This addition was made by the Alkane team outside of the FEED scope after further research with ANSTO.



Currently the thinking is that, with an assumed recovery of 50% and 200 tpa of 95% grade HfO_2 production (with prices for the metal being around US$1,000 to $1,500 per kg - but using $800 for 2020 in the model) and sales of 50 tpa, then revenues should be of the order of US$40mn per annum by 2020 from Hafnium alone. This would amount to around 9% of expected revenues, so a not insignificant co-product contribution.

In the opinion of Alkane the preliminary capital and operating estimates of the inclusion of the Hafnium circuit into the final plant design suggest its incorporation will add significant value to the project.

In Hafnium we have a metal that is truly off the radar but be that as it may with prices in a range that reaches as high as US$2,000 per kilo, it is definitely something obscure that is worth producing. Rightly Alkane have used a much lower price in their models than the market price because when they begin production they will be effectively cracking open the shell of this mysteriously traded mineral and exposing it to the glare of daylight which usually results in pricing being less smoke and mirrors.

Even so, the Hafnium component of the DZP mix is going to be a significant one and one that most pundits had not figured into their calculations. Hafnium may be "niche" but it's a niche that Alkane seems destined to dominate.

Ferro-Niobium

The least gripping of Alkane's product range is its potential output of Ferro-Niobium and that is largely due to its close association with the steel complex which is massively oversupplied globally due to Chinese over-expansion. Alkane's goal is to produce Ferro-Niobium with a 65% Niobium content and the

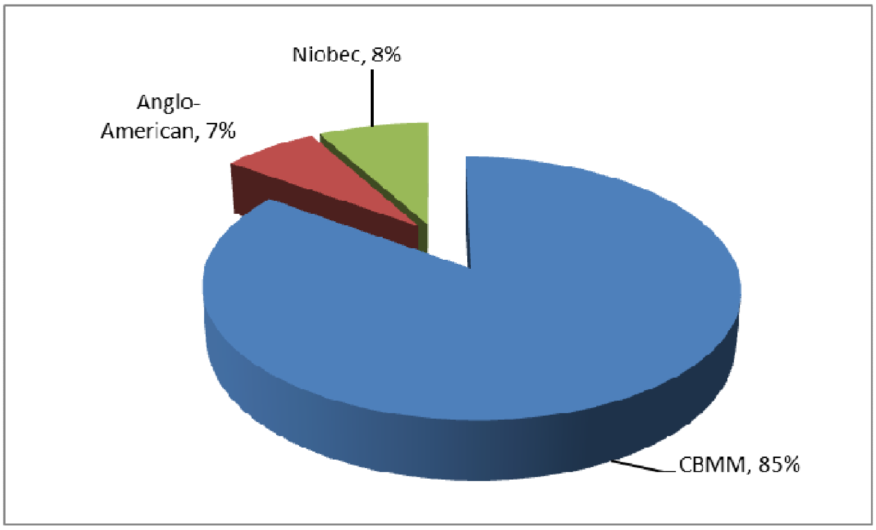
Niobium component will be equivalent to 1,967 tpa. On the scale of things this will not be an amount to majorly upset the global Niobium market but will represent Australia's entry into what is hitherto a very small club of producers.

In 2013, Alkane announced that it had signed a joint venture with the Austrian metal alloy producer, Treibacher Industrie AG (TIAG) to produce FeNb on site at the DZP and use TIAG's existing customer base to sell 100% of the 3,000 tpa production.

Niobium is an alloying agent which, when added to steel, creates a material with substantial benefits in the production of high grade steel. Steel containing niobium has many properties making it stronger, lighter in weight and highly resistant to corrosion. Adding niobium to steel also creates steel with a higher melting point. Ferro-Niobium (66% Niobium, 34% Iron) represents over 90% of world niobium production. Molybdenum and vanadium can be substituted for niobium in some applications, but a performance or cost penalty may outweigh substitution. For many applications, such as some super alloys and oil and gas pipelines, there are no substitutes for niobium as the niobium allows for withstanding extreme pressures. Understandably, Niobium has not been as healthy pricewise as it was several years ago due to the travails of the global steel industry. Nevertheless, the Niobium space has all the look of a cartelized market with good price and production discipline.

The real player is Brazil, the world's largest producer of niobium (92%), followed by Canada.

Brazil has two of the largest niobium deposits in the world, the Araxá and the Catalão deposits. The Araxá mine is operated by CBMM, where decreasing grades are increasing operating costs at the mine. CBMM is owned by the Moreira Salles family, one of Brazil's wealthiest groups. Their fortune has largely derived from a punt on Niobium back in the 1960s and interests in the banking sector.



Interestingly Molycorp (in its days as a diversified metals company owned by an oil major) was a substantial shareholder in CBMM at its inception and Mark Smith, the former CEO of Molycorp (who now runs Niocorp) was the MCP representative on CBMM's board.

Several years ago, according to Bloomberg, CBMM was generating more than $600 million in annual profit. They calculated it was worth at least $13 billion, based on the family's sale of a 30% stake to a group of Asian steelmakers for $3.9 billion in 2011. The brothers are estimated to hold an equal share of the remaining 70% stake. Another mine value reference was provided when Magris, the private equity vehicle of Aaron Regent acquired Niobec from Iamgold for $500mn. It is worth noting that the DZP's Nb grade is slightly higher than that of Niobec.

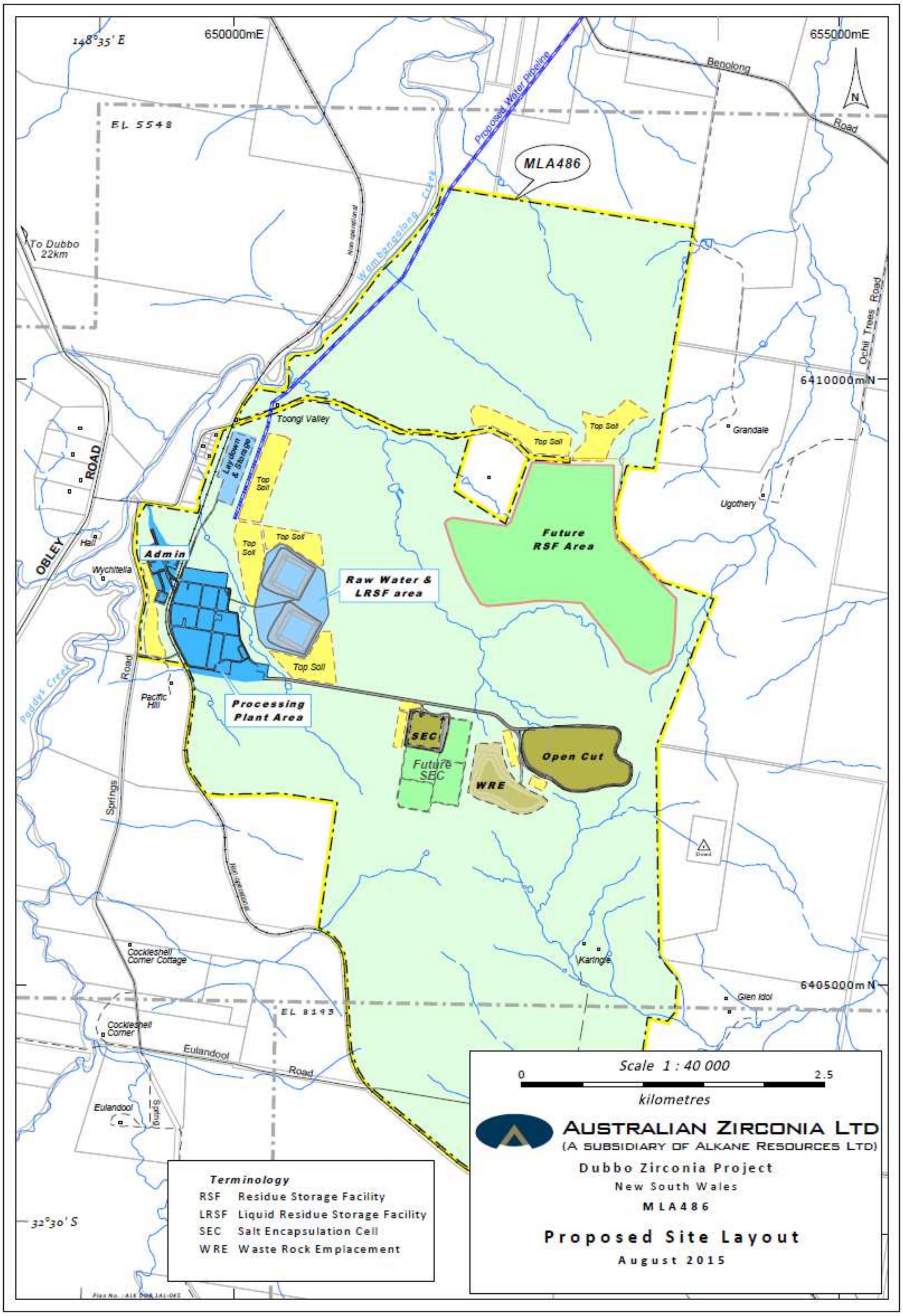
Company & Deposit		Reserve	Grade of Nb	Existing Production	Expanded Production
CBMM - Araxa	Brazil	800-900 MT M&I	2.50%		150,000
IAMgold - Niobec	Quebec	450 MT M&I	0.42%	4,500	13,500
Anglo-American - Catalao	Brazil	33 MT M&I	1.24%	4,000	6,500

The Catalão mine in the state of Goias is owned by Anglo American Brazil. It has the smallest reserves of the three Niobium "majors". There has been speculation that the mine may run out of ore if the deposit size cannot be increased.

In the results of the FEED, it was revealed that commercial grade ferro-niobium had been successfully developed with technical input from the joint venture partner, TIAG. With prices around US$35-40 per kg for Ferro-Niobium at the current time, Alkane is positing revenues from this by-product of around US$69mn per annum. The Austrian company had also completed a market strategy to ensure sale of all the FeNb output of the DZP.

Mining & Processing

It is important to note that FEED provided around 30% detail design and that the Project Engineering design is now at the construction stage awaiting finance. The construction timeline includes remaining detail design and project infrastructure such as access road, power line and water supply.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650000mE
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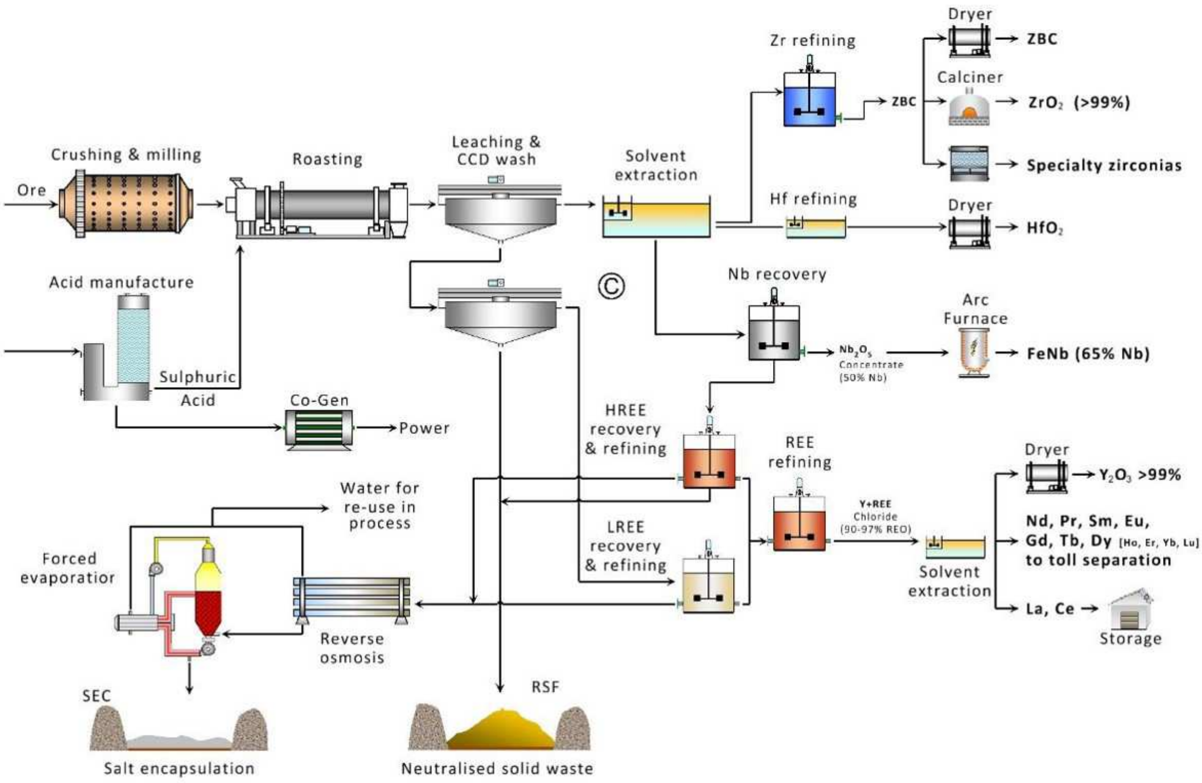
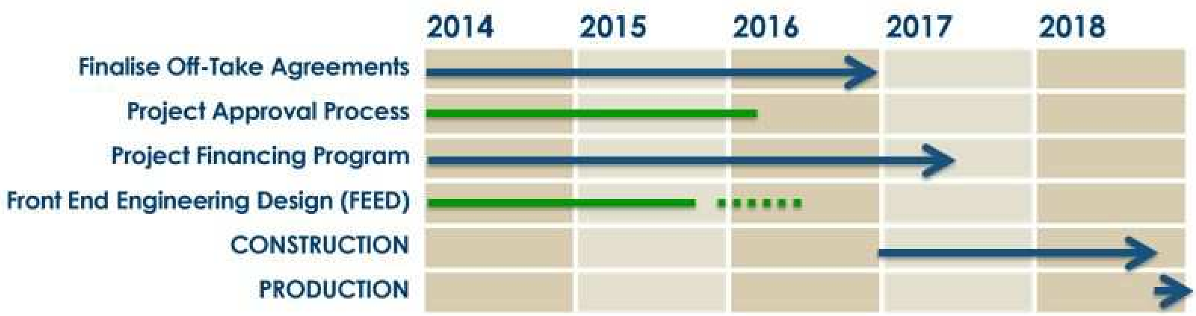
EL 5548
MLA486
Proposed Water Pipeline
Benolong
Road
To Dubbo 22km
Ochil Trees Road
6410000mN
Toongi Valley
Top Soil
Grandale
Laydown & Storage
Ugothery
OBLEY ROAD
Hall
Admin
Future RSF Area
Wychitella
Raw Water & LRSF area
Processing Plant Area
Pacific Hill
Paddys Creek
SEC
Future SEC
WRE
Open Cut
Springs Road
Cockleshell Corner Cottage
Karingle
6405000mN
Glen Idol
EL 8193
Cockleshell Corner
Eulandool Road
Eulandool
Scale 1 : 40 000
0
2.5
kilometres
AUSTRALIAN ZIRCONIA LTD
(A SUBSIDIARY OF ALKANE RESOURCES LTD)
Dubbo Zirconia Project
New South Wales
MLA486
Proposed Site Layout
August 2015
Terminology
RSF Residue Storage Facility
LRSF Liquid Residue Storage Facility
SEC Salt Encapsulation Cell
WRE Waste Rock Emplacement
32°30' S

The process envisioned has morphed over time as the planned product mix has evolved. Most recently this has included a Hafnium circuit to extract this element as it became clear that this could be an important addition to the revenue mix and a positive to the overall financials as a by-product credit.



DZP's Timetable to Production

As the main trigger to moving into construction is securing sufficient offtake commitments this is now the prime priority of management. The goal is to achieve this by the end of 2016.



The Gold Division – a long-time focus

Alkane’s gold focus in recent decades has been in the Tomingley area, which is situated within the northern Macquarie Arc, part of the Lachlan Fold Belt, in central western NSW. The company firstly operated the Peak Hill Mine for many years and now its focus is on the Tomingley set of deposits from which production began in the first half of 2014.

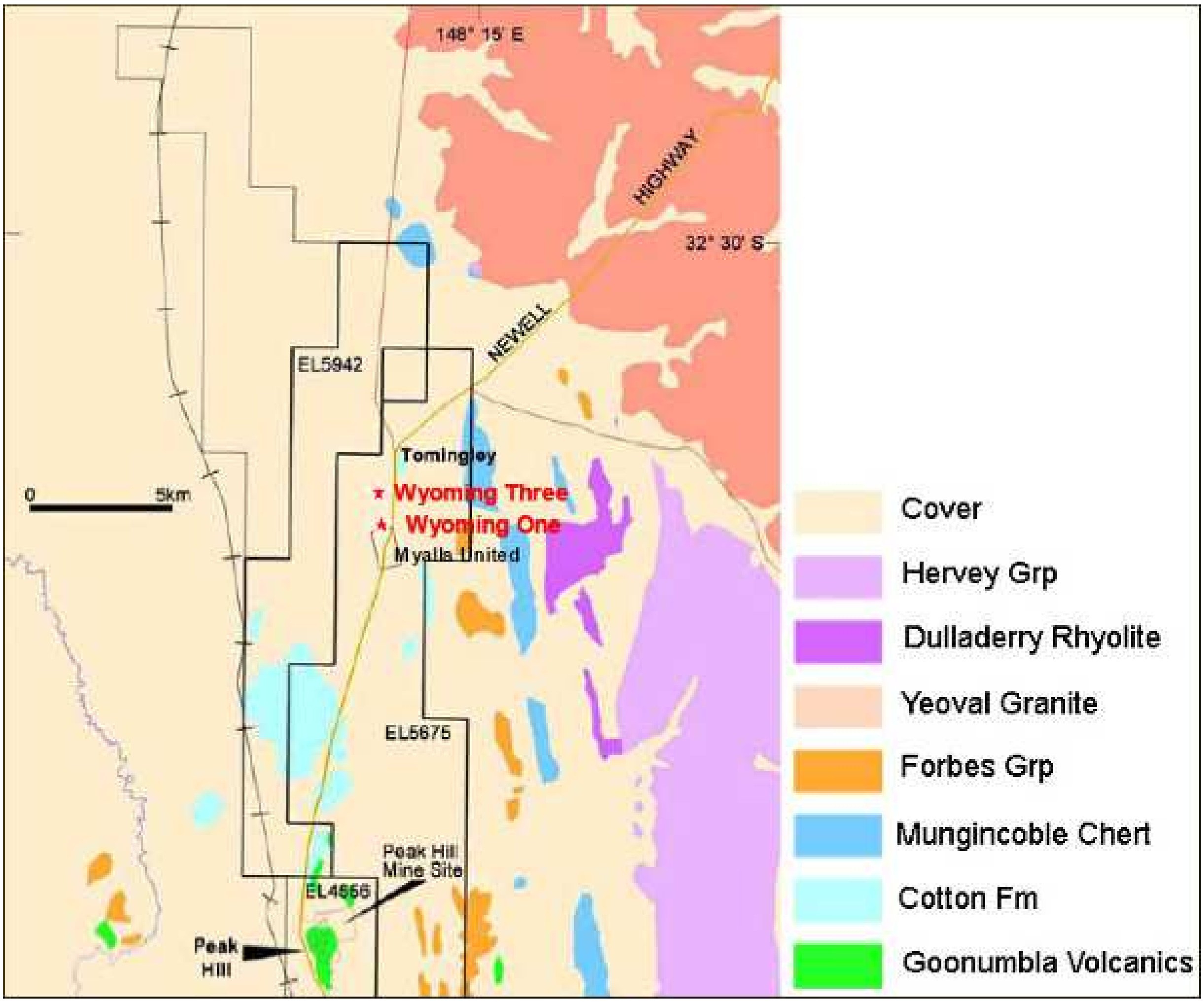
Alkane has concentrated its gold efforts in this area as the Ordovician volcanic rocks of the Macquarie Arc host some of Australia's largest gold and copper-gold deposits including the > 1.3 mn oz Northparkes deposit (formerly RTZ and now China Moly/Sumitomo), the > 3 mn oz Cowal deposit (formerly Barrick Gold, now Evolution Mining) and the > 30 mn oz Cadia-Ridgeway deposits (Newcrest).

The Peak Hill mine pictured below was operated by Alkane from 1996 to 2006.

At Tomingley (about 15kms north of Peak Hill), Alkane commissioned Feasibility Studies, which were completed in 2010, that identified the potential for three open pit mines, Wyoming One, Wyoming Three and Caloma, and a longer term underground development at Wyoming One.

The History

The Tomingley region has been the subject of mineral exploration activities since before 1889. Gold was discovered at Tomingley in 1879 sparking a gold rush and the Tomingley Gold Field was proclaimed on the 19th June, 1882. Production was focused on a narrow belt of Ordovician volcanics between Forbes and Tomingley. Oxide zone and hard rock sulphide zone workings in the region prior to 1981 yielded an estimated 70,270 oz from the Tomingley area, the bulk of which came from the Myalls United mine which operated from the 1890s, about 500 m south of the Wyoming deposits. An estimated 86,900 oz was also mined from around Peak Hill pre-1981, mostly as alluvial gold. Further gold extraction by Alkane, using cyanide heap-leach, from the oxide zone at Peak Hill yielded 153,000 oz. This operation ceased in 2005. Alkane estimates that around 467,000 oz remain at Peak Hill, below the weathering front, as sulphide ore.



The Tomingley Project

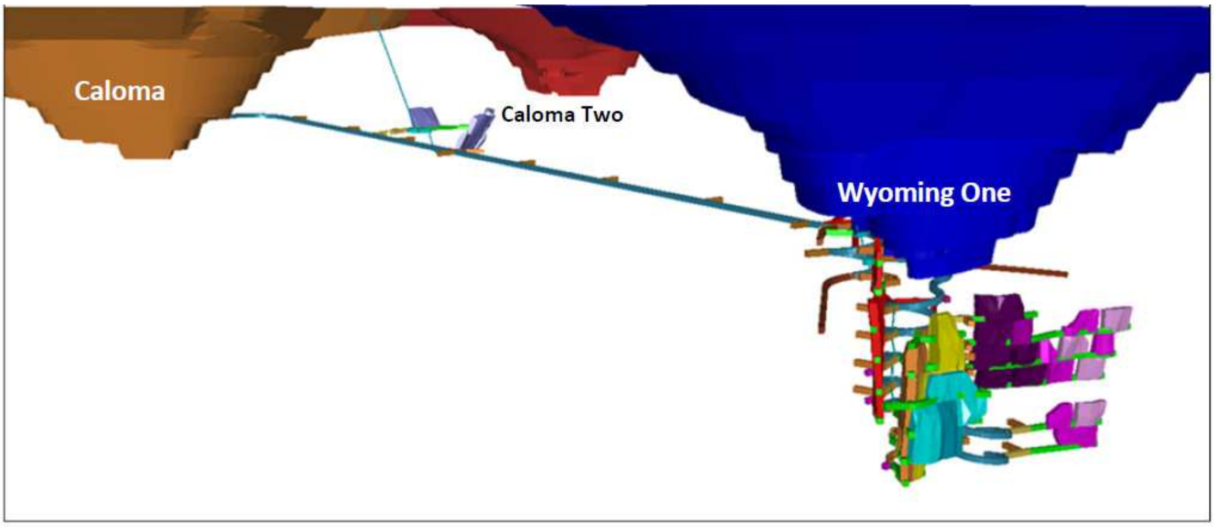
Tomingley is a medium-sized gold project with approximately 921,000 ounces of gold in the 2014 startup defined resource. The project is composed of a large north-south oriented tenement package covering Ordo-Silurian volcanics and sedimentary rocks with minor intrusives. Significant mineralisation in and about the project area includes the Wyoming Gold Deposits, the Peak Hill Gold Mine and the historic Myall United Gold Mine.

The discovery of Tomingley occurred back in as 2001, with Alkane then launching a resource definition campaign consisting of 1,602 drill holes (RAB, RC, Diamond drilling) amount to 160,784 metres. This drilling plus the cost of the feasibility studies resulted in an expenditure of around AUD$13 million.

The project at Tomingley was developed with the aim of producing 50,000 – 60,000 ounces of gold per year, based on an annual ore throughput of around one million tonnes. Mining operations commenced at Tomingley in January 2014 with the commissioning, with the first ore feed to the mill, in January 2014. The company poured its first gold bar in mid-February 2014. Tomingley has an expected mine life of 7.5 years though the resource has a target life of 10-12 years.

Going Underground

The next expansion move for Tomingley is to head underground to access a number of known reserves, the main one of which is under the Wyoming One pit. The company considered six alternative means of doing this and the option chosen accesses ore within the Wyoming One and Caloma Two deposits from a portal in the Caloma open pit. This can be seen in the schematic below.



The geological controls to mineralisation at Tomingley are well understood and it is anticipated that further drilling from underground developments will continue to expand the potential resource base. The study highlights the potential of the Tomingley gold deposits to sustain a long term underground mining operation.

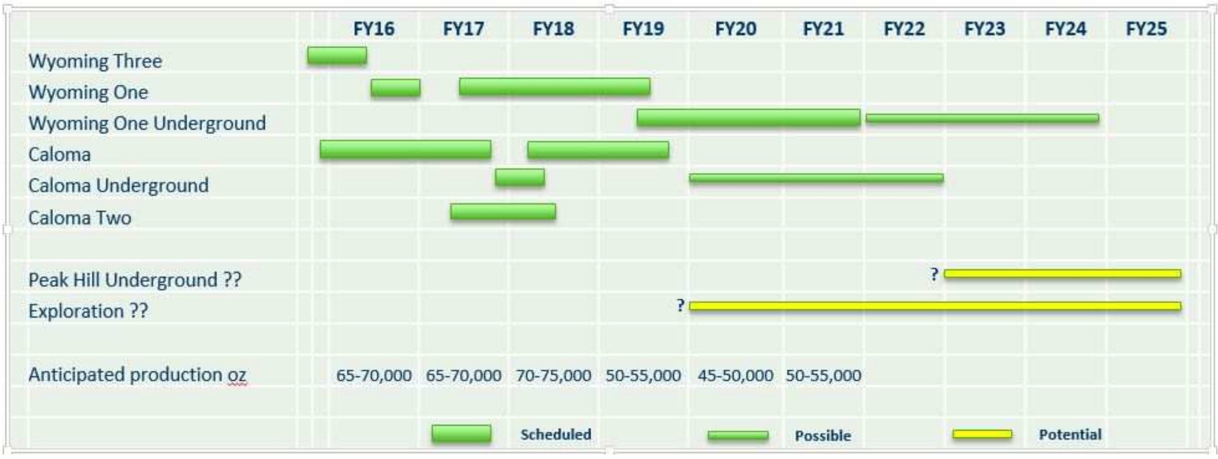
The company also released an initial ore reserve estimate for the underground portion. There is scope to expand this reserve considerably.

Tomingley Underground			
Ore Reserve Summary			
	Tonnes Ore	**Au g/t**	**Au Ozs**
Proven	223,900	4.03	29,000
Probable	300,500	3.38	32,600
Total	524,400	3.66	61,600

Possible Outcomes

Originally many investors and analysts thought that Tomingley was just a stop-gap operation with a shortish Life of Mine that would fade away as the DZP ramped up. Now we are starting to "think bigger". There might be two outcomes and neither is extinction of the gold activities. Firstly we wonder whether the whole division might be spun out. Looking at the current market cap of Alkane there seems to be no credit for Tomingley. Indeed the gold division as a standalone company could possibly have a market cap of several hundreds of millions of dollars. This might imply that, perversely, there is a discount applied to Alkane for the DZP potential.

The other option is that the gold division stays within Alkane and remains an internal funding source for the Dubbo project build. The following timetable shows the company's estimation as to when various stages of the deposit kink-in. It should be noted that this does NOT include the potential for a Peak Hill underground mine nor any further exploration outcomes.



The projections of the company with relation to this timeline peak at 70-75,000 ozs per annum in FY18 and then decline to around 50,000 ozs per annum in the next few years.

However, with gold perking up and the AUD staying so low the profits flowing down to the bottom line at Tomingley are rather unappreciated by the market as they get sidetracked to fund Dubbo and thus never see light of day (i.e. the bottom line). However, if the gold division was to be IPOed it could provide Alkane with a cash windfall that far exceeded whatever cashflow comes from it currently. It all depends on how sentiment evolves towards gold in coming months and where the Australian dollar goes.

The Miracle of Cashflow

Due to this gold operation Alkane, unlike most in the Rare Earth space, can point to having a sizeable cashflow. Despite the sloppy gold price in the first year after production commenced, the company had revenues of AUD$56.9mn in the six months to the end of December 2014. Then in calendar year 2015 the gold price perked up, oil prices plunged and the AUD moved favorably for Antipodean gold producers so Alkane has been made highly cashflow positive from its Tomingley “sideline”.

The company also began a policy of keeping some of its gold on the balance sheet rather than selling all production. The company also maintains a gold hedge which at 30th June 2016 stood at 63,900 ounces at average forward price of AUD$1,690 per ounce. This represented nearly a year’s worth of production.

Financials

It is not surprising that with most of the promotional focus being on Rare Earths and specialty metals that many mistakenly think Alkane has little or no production. As we know the gold operation belies this as Alkane registered AUD$109.1mn in revenues in FY16, generating site net operating cash flow of A$27.6M2016. The vast bulk of this came from Tomingley, which while not the company’s main focus, it is still “bringing home the bacon” and enabling the company to continue advancing when many other specialty metals companies have had to pull their heads back into their shell.

The financials in recent years (and our revenue projections) are shown in the table on the following page. The number for the fiscal year ended June 2016 include actuals (and estimates – coloured in yellow) as the full results have not been announced.

Our financial model for Alkane goes out to the end of FY17 (i.e. June 2017). During this period the income source will continue to be almost entirely the gold mining operation at Tomingley, thus revenues shall be driven by the gold price, the positioning of the Australian dollar and the company’s success in maintaining cash costs.

Our assumptions are that gold ounce production will be around 70,000 ozs per annum in the current FY and the next and that the gold price will remain between US$1,200 and $1,300 per ounce and that the Australian dollar will most likely firm up to between US75cts to 80cts while the company will be able to keep cash costs around the current levels. Stripping costs should decline after having a negative impact in FY16.

Alkane Resources - Earnings Statement

AUD mns (FY ending June)	FY17e	FY16e	1H16	FY15	2H15	1H15	FY14
Gold revenues	122.192	109.100	55.441	102.467	45.518	56.949	25.264
Other Revenues	0.000	0.796	0.796	0.000	0.571	-0.571	0.000
Total	122.192	109.896	56.237	102.467	46.089	56.378	25.264
Cost of Production	91.200	86.000	42.721	101.366	52.184	49.182	25.426
Gross Profit	30.992	23.896	13.516	1.101	-6.095	7.196	-0.162
Other Income (expense)				-0.654			10.21
Other Expenses	9.700	8.900	4.391	8.211	3.804	4.407	7.187
Impairment charges	0.000	0.000	0.000	0.000	0.000	0.000	3.769
Finance charges	0.280	0.420	0.196	0.373	0.184	0.189	0.369
Pre-Tax Revenues	21.012	14.576	8.909	-8.137	-11.879	3.742	-1.277
Tax	5.043	3.644	2.572	-4.051	-4.456	0.405	4.893
Post-tax Results	15.969	10.932	6.337	-4.086	-7.423	3.337	-6.17
Shares On Issue	500.00	496.80	414.00	414.00	413.00	413.00	412.00
EPS	0.032	0.022	0.015	-0.010	-0.018	0.008	-0.015
Gold Ozs produced	71,000	67,812	35,136	69,612	28,075	41,537	20,711

This produces a scenario of a sound result for FY16 and an excellent net result for FY17, with the chief difference being the sharply improved margins from the gold price having moved to a higher place in recent months. This in turn puts the company in a stronger financial position as it moves towards implementation of the timetable for DZP construction.

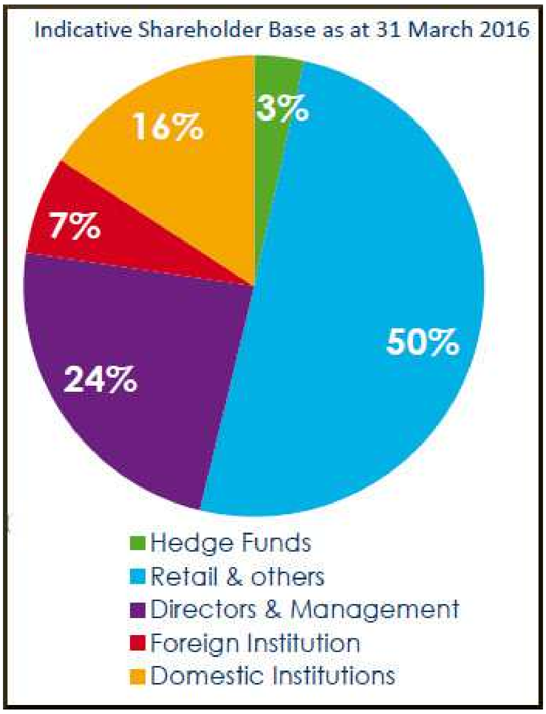
Financing

The most recent funding undertaken by Alkane was a rights issue. This was staged to take advantage of the positive sentiments in the gold market and the rapidly recuperating mining shares market in Australia.

The deal was a 1 for 5 pro-rata traditional non-renounceable entitlement offer priced at 20 cts per share. The subscription period closed on the 23rd May 2016 and applications were received for a total of 61.9mn new shares and additional new shares raising approximately AUD$12.4mn. The shortfall under the offer was 20.71mn shares. The $12.4mn was received by the 30th of June and the remainder in early July.

The proceeds from the $16.5 million capital raising will be used for the following:

- Perform DZP pilot plant runs to confirm work to date and produce product samples for potential off-take customers
- Development of strategic partnerships to provide value enhancement to published project financials
- Other DZP related expenditures
- General working capital requirements (including fees associated with the offer)



Prior to the issue the share register looked as displayed in this pie chart. Of the institutional investors, Fidelity accounted for around 10%.

Following the allotment of shares in the issue, Alkane's largest shareholder, Abbotsleigh Pty Ltd, holds around 22% of the shares in issue. Abbotsleigh is an investment vehicle of Alkane director Ian Gandel.

At the end of June, Alkane's cash position totalled AUD$29.8mn with AUD$24.5mn cash, in addition to bullion on hand valued at AUD$5.3mn. This was an increase in liquids of AUD$8.8mn from the previous quarter.

Subsequent to the June quarter end an AUD$14mn working capital facility was executed with Macquarie Bank Ltd.

Other Prospects

As they would say in the racing industry Alkane "has form" when it comes to gold projects, and we are not just talking of Tomingley. In 2010 the McPhillamys gold project, which had been a JV between Alkane and Newmont, was sold to Regis Resources for $150mn, of which Alkane's share was $73.5mn. This deposit had been discovered by Alkane in 2005 and a 3mn oz gold resource was identified in 2010. In the hope of repeating this win the company has a number of other gold/base metals prospects on the boil. Most are in the general vicinity of the DZP in central New South Wales.

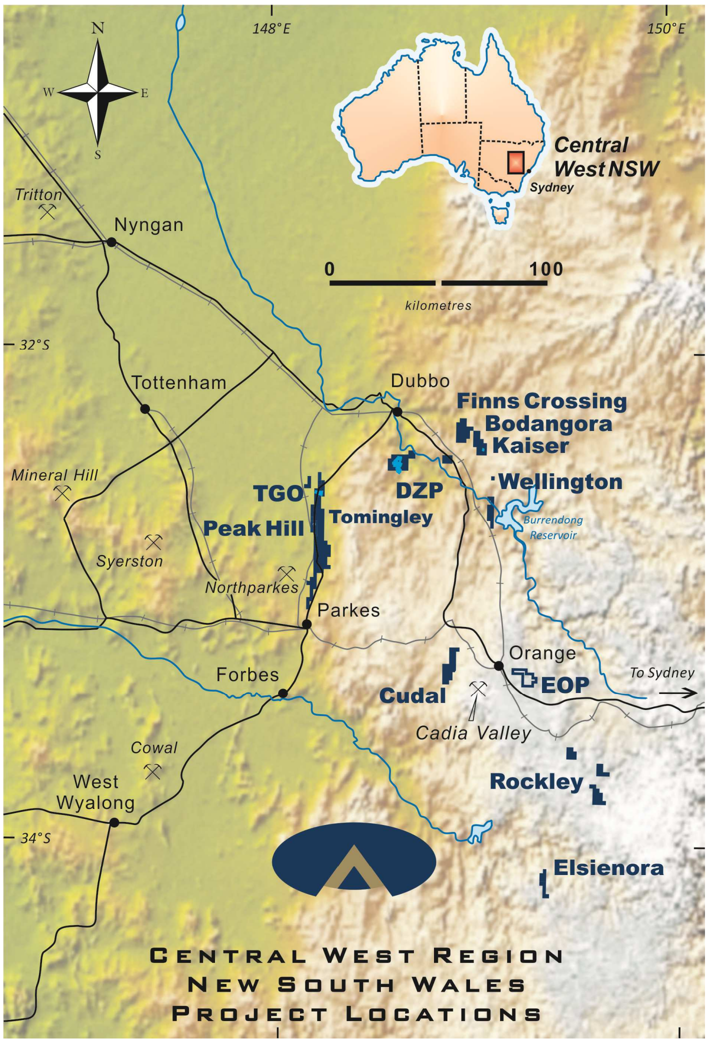
Those of note are:

Bodangora gold-copper prospect

In recent times a limited RC drilling program of seven holes totalling 1761 metres was completed within the Kaiser and Bodangora properties. The Bodangora and Kaiser tenements form part of the larger project area in the northern Molong Volcanic Belt located approximately 20-25 km north of Wellington in the central west of NSW. It is a large monzonite intrusive complex with gold-copper mineralisation.

The Molong Volcanic Belt is host to a number of mineral deposits exemplified by the alkalic porphyry deposits within the Cadia Valley Operations of Newcrest Mining.

- Most recent drill results at hole KSRC013 showed 111 metres grading 0.61g/t gold and 0.08% copper from 42 metres, including 4 metres grading 9.69g/t gold and 0.06% copper from 110 metres
- Previous drill intercepts at new target (Kaiser) included:



- 41m @ 1.15g/t gold and 1.24% copper
- 8m @ 0.34g/t gold and 1.06% copper

Elsienora gold prospect

The most recent work was in May 2016 when drilling successfully delineated a zone of strong sericite-pyrite alteration and quartz veining hosted predominantly in intermediate to mafic volcaniclastic sediments along a strike length of approximately 700 metres (using a >0.5 g/t gold cut-off).

The better intercepts are:

- ELRC018 8m grading 2.78g/t Au from surface – up dip from ELRC00, and
- ELRC024 2m grading 2.60g/t Au from 44m – 200m along strike to the south from ELRC018
- ELRC021 2m grading 2.40g/t Au from 10m appears to be a new zone of mineralisation, hanging wall to the main Cuddyong zone

Work results released back in 2015 had reported drill intercepts includingd 29m @ 1.53g/t Au, including 4m @5.86g/t Au and 8m @ 3.14g/t Au.

Cudal gold-zinc prospect

- The best drill intercept was 17m @ 1.2 g/t gold and 2.8% zinc that was announced in 2011
- Interesting targets, both porphyry style copper-gold and possibly sedimentary replacement (Carlin model)

Board & Management

John Dunlop is the non-executive Chairman. He is a consultant mining engineer with over 45 years surface and underground mining experience in both Australia and overseas. He is a former director of the Australasian Institute of Mining and Metallurgy (2001 - 2006) and is currently the chairman of MICA (Mineral Industry Consultants Association). He has been the non-executive chairman of Alliance Resources since November 1994. Recently, he served as a non-executive director of Copper Strike Limited from 2009 to 2014 and a director of Gippsland Limited from 2005 to 2012. He is a certified arbitrator and mineral asset valuer, consulting internationally.

(David) Ian Chalmers was appointed as a director as long ago as 1986 and has been the Managing Director (CEO) since 2006. He is a geologist and graduate of the Western Australia Institute of Technology (Curtin University) and has a Master of Science degree from the University of Leicester in the United Kingdom. He has worked in the mining and exploration industry for over 40 years, during which time he has had experience in all facets of exploration and mining through feasibility and development to the production phase. He was Technical Director up until 2006, overseeing the group's minerals exploration efforts across New South Wales, Western Australia, Indonesia and New Zealand and the development and operations of the Peak Hill Gold Mine (NSW).

Ian Gandel is a non-executive director of Alkane and is a major figure in the Melbourne business scene with interests in retail management and retail property. He has been a director of the Gandel Retail Trust and has had an involvement in the construction and leasing of Gandel shopping centres. He has previously been involved in the Priceline retail chain and the CEO chain of serviced offices. Through his private investment vehicles, he has been an investor in the mining industry since 1994. He is currently a substantial holder in a number of publicly listed Australian companies and, through his private investment vehicles, now holds and explores tenements in his own right in Victoria, Western Australia and New South Wales. He is also a non-executive chairman of Alliance Resources Ltd.

Anthony Dean Lethlean is the other non-executive Director. He is a geologist with over 10 years' mining experience, including four years underground on the Golden Mile in Kalgoorlie. In later years, he has worked as a resources analyst with various stockbrokers and investment banks including CIBC World Markets. He was a founding director of Helmsec Global Capital which seeded, listed and funded a number of companies in a range of commodities. He remained with that group until 2014. He has been a non-executive director of Alliance Resources Ltd since October 2003.

Risks

It is important to highlight some of the risks in any such venture. At least with its location in the well-known and long established mining jurisdiction of NSW, it is unlikely that any problems should present themselves on that front. However, one should consider:

- Financing difficulties
- Price fluctuations in what are relatively opaque markets for the various metals Alkane will eventually produce (excepting gold)
- Failure of demand to match rising production (i.e. build it and no-one comes) in Hafnium
- Excessive number of competing projects could crowd the scene and hog capital in the event that REE prices turn up
- An extended period of weakness in Zircon prices

The chief advantage that Alkane has is that its reputation has not been sullied since the REE boom rose and fell. The Japanese clearly regarded the company highly which is in stark contrast to their history with Canadian players. Obtaining offtake agreements will be key to moving the financing of the DZP ahead.

Conclusion

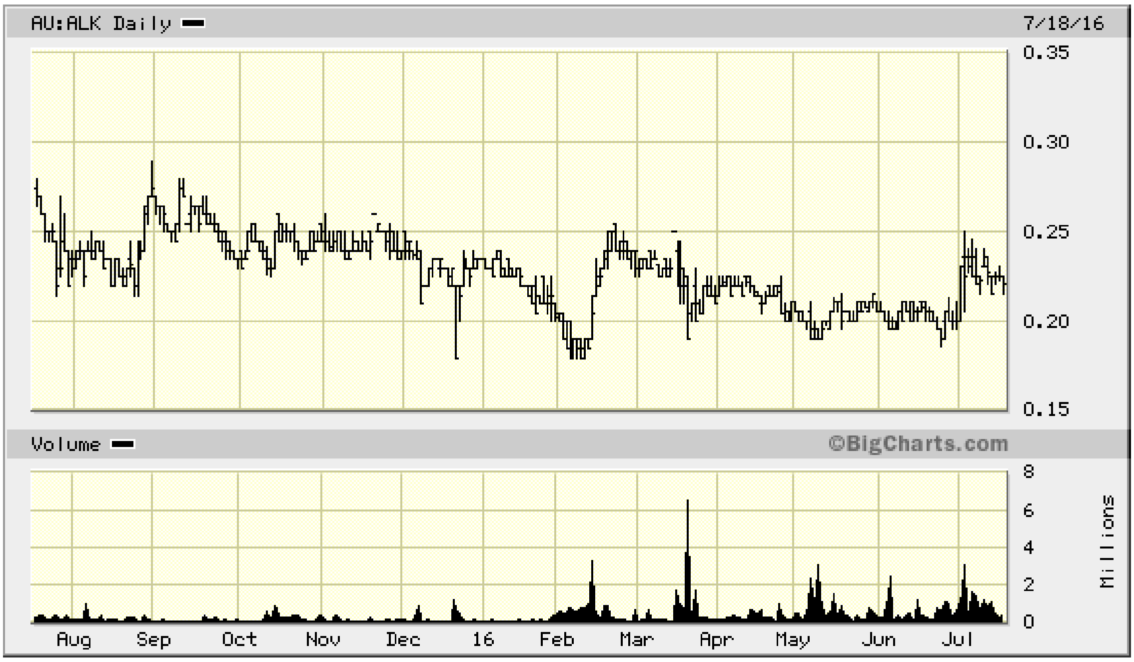
In Australian literature there is a character known as the Magic Pudding. This strange creature is quite literally a rather ornery pudding which never runs out and can be whatever flavour the diner wants it to be as this accommodating character morphs from steak & kidney pudding to plum pudding and whatever else the consumer desires. While we would not claim that Alkane's DZP will last forever or is as inexhaustible as the Magic Pudding, the likeness is in the fact that Alkane offers so many products, potentially, to so many diverse user groups. Essentially there is something to please everyone, even the gold enthusiast, at Alkane.

In this day and age when financing requires one to have a fairly firm source of income there can be little better than having several sources of income where each will in turn, or hopefully concurrently, fire up and provide a flow of revenues that will beat the swings and roundabouts of the mining markets.

While the sound and fury of the REE boom is but a distant memory Alkane is still with us (and a mere handful of other REE names). It is as it should be. Indeed Alkane has probably stood the test of time better than most (and has the largest cash balance) exactly because it did not make itself solely dependent upon the suite of REE metals and most particularly its gold "sideline" has been its strongest feature. This has provided a handy (and growing) income stream to minimize funding needs in the darkest hours for specialty metals.

The issue now is whether the gold division might be even more gainfully employed as a big hit capital generator by being spun out. Such an action would give existing shareholders a payday, raise capital for Alkane and make the separated gold entity self-funding for its own exploration efforts. We feel that gold will be kept as a cashflow generator at least until the DZP is fully funded for development.

Our belief is that it will ultimately be a recovery in REE prices that will drive sentiment in a positive direction and lift Alkane into a higher price range and shift the focus firmly onto the DZP as the most likely next cab off the rank in the REE production space. Therefore we rate Alkane as a **Long** position at this time with a 12-month target price of AUD85cts.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©BigCharts.com
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