

Alkane Resources

Getting back on track at the TGO

After a testing H117 at the Tomingley Gold Operation (TGO) due to high levels of rainfall that affected gold production, Alkane's third quarter results show a return to profitable operations, with net cash flow from operations of A\$6.5m reducing after delayed December 2016 payments to a net A\$2.0m at quarter's end. As weather conditions improved in NSW, Q317 gold production recorded a q-o-q increase of 59%, with 18,721ozs Au produced at AISC costs of A\$1,201/oz. Sales of 16,303ozs Au at an average realised gold price of A\$1,694/oz resulted.

Year end	Revenue (A\$m)	PBT* (A\$m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
06/15	101.8	0.1	1.0	0.0	26.0	N/A
06/16	109.6	11.0	2.2	0.0	11.8	N/A
06/17e	98.0	(17.7)	(1.5)	0.0	N/A	N/A
06/18e	104.3	(16.2)	(1.2)	0.0	N/A	N/A

Note: *PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments.

TGO exploration eyes further UG resources

Following a review of the underground (UG) resource and proposed mine plan for the TGO, Alkane has stated that it will revise its overall plan for the transition to UG mining. Previously, we assumed c 84koz would be recovered from an UG operation at Wyoming One from FY18 to FY24, supplementing ounces derived from ongoing surface mining. For now, we keep this Wyoming One UG mining schedule intact until official guidance is announced, but advise that the amount and, more importantly, the schedule for ore extraction, is likely to change as exploratory drilling completes and, so far, very favourable assay results are incorporated into a new resource and mine plan. Concerning Alkane's broader exploration focus, drilling completed over a number of non-TGO exploration targets has so far revealed promising stratigraphic and lithological signals which, in some instances, are the same as some of the largest gold mines in the region.

DP – product prices stable or rising

Our DP valuation uses pricing forecasts for 2020 as detailed in its definitive feasibility study (DFS). We have reviewed current pricing trends across the Dubbo Project's (DP) product suite and see these forecasts as intact, see page 6 onwards.

Valuation: Fluctuates heavily on share price level

We have incorporated TGO FY17 production guidance of 53-58koz (we assume 57koz, see page 5), rolled forward our valuation to FY18 and have moved our DP funding assumptions from FY17 to FY18 to allow for DP financing negotiations to complete. Applying a lower share price for notional future funding has the automatic effect of reducing our valuation to A\$0.61/share for the TGO and DP combined (previously A\$0.78). However, with all other pricing, project development and mine schedule assumptions unchanged, we see considerable scope for upside as DP catalysts emerge in the form of commercial offtake and financing, see pages 9 and 10 for details.

Re-initiation of coverage

Metals & mining

15 May 2017

Price **A\$0.26**

Market cap **A\$130m**

A\$/US\$0.75

Net cash (A\$m) at 31 March 2017 20.8

Shares in issue 505.2m

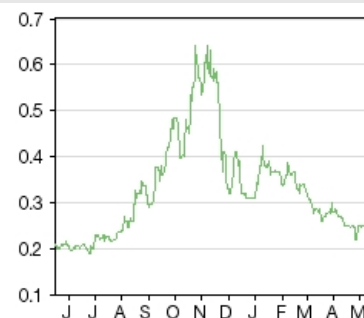
Free float 51%

Code ALK

Primary exchange ASX

Secondary exchange OTCQX

Share price performance



% 1m 3m 12m

Abs (3.8) (29.2) 27.5

Rel (local) (2.2) (30.4) 17.8

52-week high/low A\$0.6 A\$0.2

Business description

Alkane Resources is a multi-commodity explorer and developer, with projects in the central west region of New South Wales in Australia. It owns the Tomingley Gold Operation (TGO) and the Dubbo Project (DP) rare metal, zirconium chemicals and rare earths projects (both 100%). TGO entered production in January 2014 and DP is planned for first production during 2019.

Next events

Q417 quarterly cash flow July 2017

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research client of Edison
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Investment summary

Company description: Rising DP prices could release financing

The longstanding investment case for Alkane Resources is tied to the development of the Dubbo Project (DP), a strategic project in that it carries a multitude of key speciality metals outside of the dominant supplier, China. These metals feed not only into a wide range of green technologies and electric vehicles, but also into defence technologies that do not wish to be subjected to Chinese export controls, in whatever form they take. Alongside the DP, the ongoing mining of gold at the TGO has seen a rebound in gold production after an H117 affected by rain.

Valuation: Share price reaction to DP catalysts key

We have valued Alkane's shares on the basis of its revised DP project scope (see our December note [Staged DZP plan de-risks financing and off-take](#)), as well as our interpretation for mining the TGO until FY24. The TGO valuation uses our in-house gold price deck, and the DP uses prices as per its Front End Engineering Design (FEED) study announced in August 2015. The latter, in general, reflect current REE pricing levels, with zirconium product pricing rebounding from multi-year lows. Hafnium prices could rise as supply disruption results from Toshiba's Westinghouse bankruptcy and ferro-niobium prices remain stable, as ever, due to the oligopoly present over supply. Our base case valuation, fully diluted for our DP financing assumptions, is A\$0.84/share using a 10% discount rate.

Exhibit 1: Base case, TGO-only and DP scenario valuations

	Previously	FY18
TGO only, without any dilution, financing, costs or revenues associated with the DP.	0.37	0.26
Base case - TGO and DP fully developed	0.78	0.61
The following valuation scenarios include TGO production		
Post stage one capex with stage two developed	0.93	0.66
Post stage one without stage two developed	0.43	0.35
Post stage two capex	1.31	0.86

Source: Edison Investment Research

Financials

Alkane had A\$20.8m cash at end March 2017 and we now estimate net cash of A\$9.4m at end FY17, which factors in an earlier repayment of its debt, than under our previous assumptions. To this could be added A\$8.2m for the company's gold held as bullion on hand.

Sensitivities: DP shovel-ready, TGO operationally sound

We consider that Alkane's share price over the course of 2016, and ytd, reflects both newsflow concerning the DP, as well as the market's assessment of the TGO's profitability and performance. Sensitivities to Alkane's valuation therefore range from operational performance at a working gold mine to the pre-development catalysts involved with developing the multi-commodity speciality metal DP project into a working mine. The performance of the TGO was only affected in H117 due to heavy rainfall of roughly four times the average for the time of year. Third-quarter gold production, which came in at 18.7koz, or c75koz on an annualised basis, indicates that Alkane is more than able to generate the gold ounces required to meet its annual production targets. The main sensitivity to the DP is that of finalising offtake agreements to secure revenue, a finalisation of bankable studies on the phased two-stage development plan and DP financing.

Moving on all fronts

As Alkane continues to progress its flagship DP, with financing to follow a finalisation of bankable studies into the project's revised modular design (by its consultant Outotec, due later in 2017), exploration has become a focus for the TGO. This is not only to replenish depleted reserves, but also to gain greater confidence in planning for building out a UG mining phase at Wyoming and possibly also either at Caloma or Caloma Two. Caloma Two is situated only c 0.5km laterally from Wyoming One, making lateral UG development from one to the other very possible. The following overview of exploration activities continues to demonstrate the highly prospective (for gold and copper, in particular) land packages Alkane maintains in New South Wales, Australia. We also provide a brief summary of the current level of DP product prices. These include the rare earth group of elements, chemical zirconia and zirconium basic carbonate, as well as hafnium and ferro-niobium. All but a few of the rare earths are being sold, and there have been material price increases in rare earths used in magnets.

Exploration activities – both at TGO and its environs

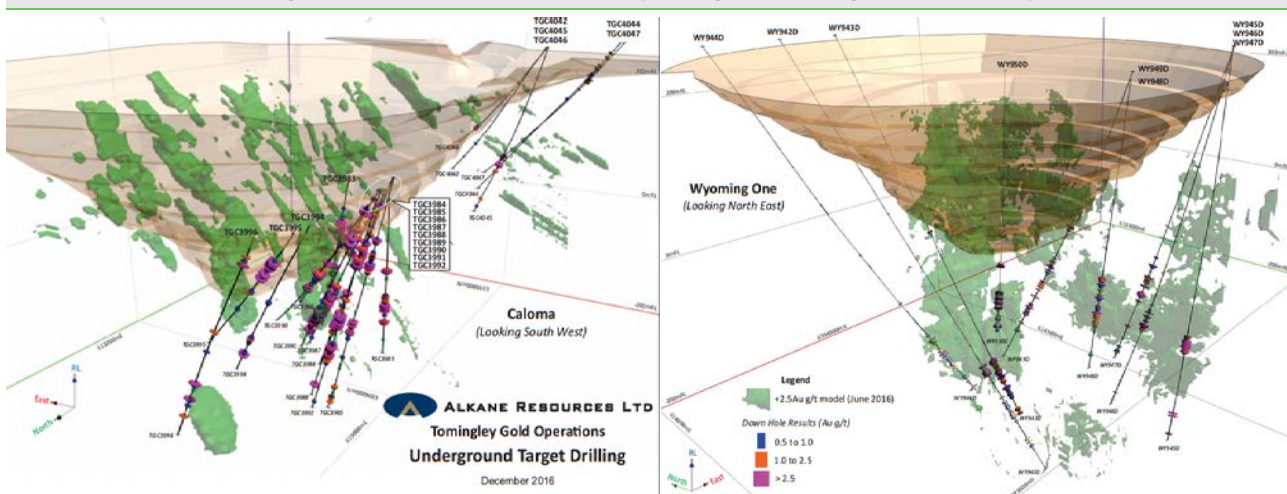
Exploration activities during Q317 have focused on areas surrounding the existing TGO mining operation, in particular the area underneath the Wyoming One and Caloma open pits. This focus will allow Alkane to form stringent underground mining plans for these orebodies. We already value an UG mining phase at the TGO, and have done so since the company first suggested it had plans for an UG phase at Tomingley when the surface operations and mine schedules were being devised as part of the DFS back in 2013. Whereas Alkane has guided that its underground mining inventory may reduce on removal by its engineers of an ore-grade crown pillar at the base of the Wyoming One pit accounting for c 20koz, we understand from management that this will in fact be extracted, but likely towards the end of the mine's life. This could occur when deeper-level workings cease and a retreat through the upper levels allows for the removal of certain ore-grade rock left in place for structural support.

Coupled with exploration at the TGO, the company continues to explore the areas surrounding the mine. The geology of the TGO, as well as that of the surrounding area, is that of a 60km-long trend of complexly folded and faulted Ordovician-aged volcanics, intrusives and sediments. Alkane states that much of the belt is covered by younger, transported sand and clay sediments, which mask basement geology and mineralisation – the term for such hidden mineralisation is 'blind'.

TGO – similar to early Wyoming exploration signatures

Drilling undertaken during H117 adjacent to or below the Wyoming One and Caloma open pits was designed to prove greater continuity between known ore-grade drill intercepts. For a very good and thorough overview of these results, the company's 20 January 2017 announcement is well worth reading. The following two views of drill hole traces below the Wyoming One pit are taken from this announcement and clearly indicate the typical vein hosted at the TGO (as shown by the pale green areas in Exhibit 2 below).

Exhibit 2: View of drilling beneath Caloma (LHS) and Wyoming One, pale green is orebody, brown is pit outline

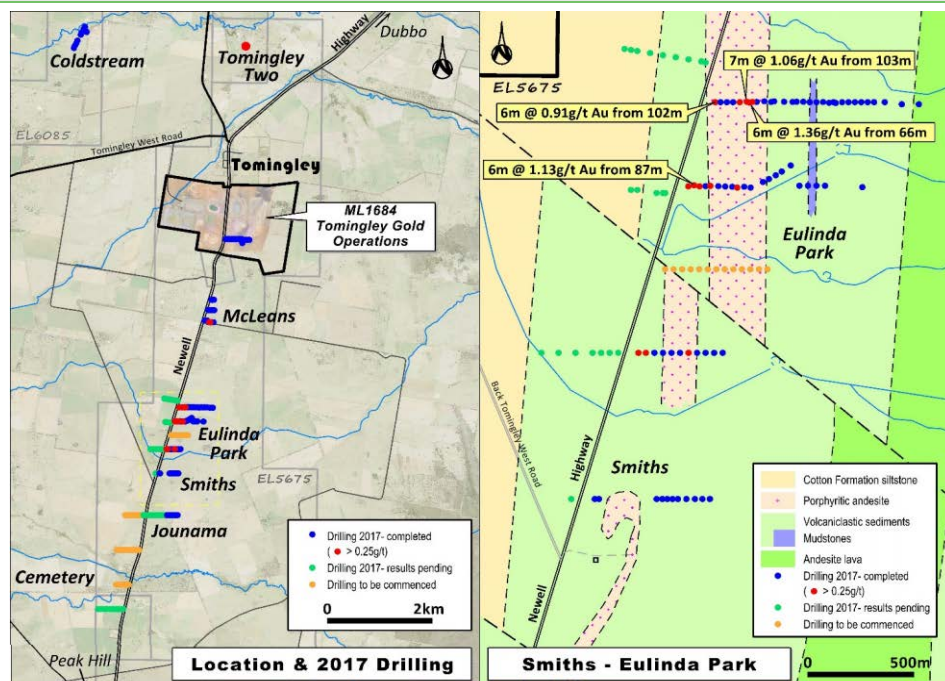


Source: Alkane Resources

Regional exploration

The exploration targets drilled by Alkane in the surrounding areas to the TGO have so far returned gold and copper grades that encourage further investigation. 16,277m of air core drilling to the top of fresh rock have been completed so far, broadly spaced and testing an area just south of the TGO to the Cemetery exploration target located just north of Alkane's past-producing gold heap leach operation, approximately 12km away. Air core drilling is used as a cheaper, early-stage drilling method, and is commonly used to screen exploration targets devised either from field reconnaissance works or desk top studies using remote sensing data. It is usually not included in resource estimation calculations due to the lack of sample support it provides. Side-wall contamination of the returned air core cuttings can take place which can arterially extend or reduce the area of influence of a particular assay data point.

Exhibit 3: Drilling locations and selected assay data for early-stage indications of a Wyoming One-type deposit



Source: Alkane Resources

Operational TGO data – subtle seasonality appears

The following chart displays all grade and tonnage data, by quarter, for the TGO mine from start of mining in Q214 to the current quarter. While H117 was adversely affected in terms of ore tonnes milled and grade mined (due to the above average heavy rainfall across the period), the third and fourth quarters tend to experience relatively high levels of waste tonnes mined, along with a commensurate decrease of ore tonnes moved due to finite haulage capacity. This pattern now appears to be roughly consistent should be noted in terms of earnings potential from the mine.

Exhibit 4: TGO grade and tonnage performance by quarter, Q214-Q417e



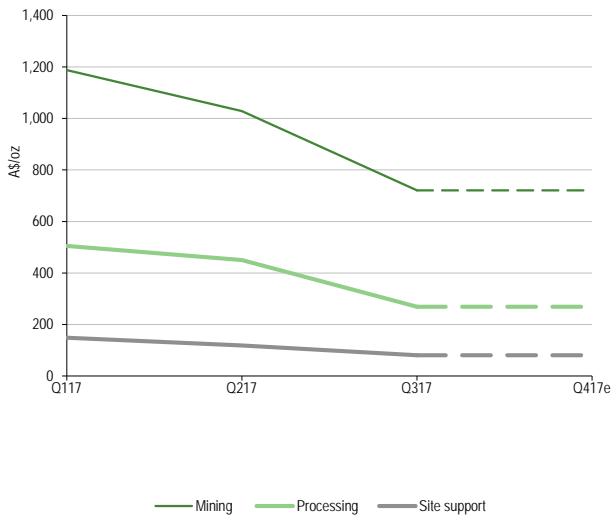
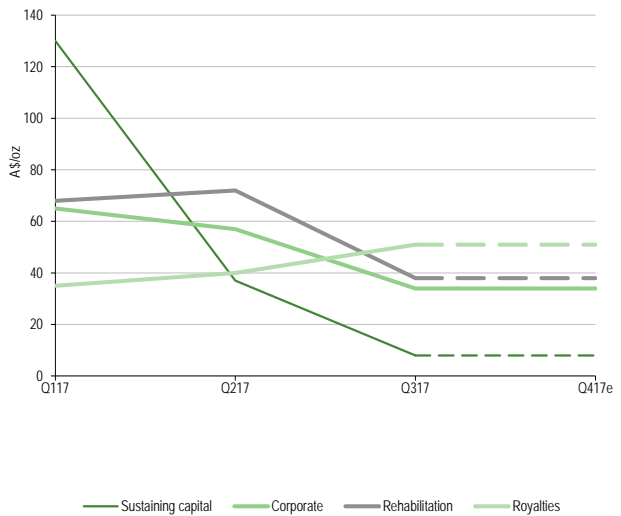
Source: Alkane Resources and Edison Investment Research

This seasonality in TGO's operational data suggests that as the Australian autumn sets in, so it also favours a return of more stable mining conditions during the latter half of the financial year, followed by a final quarter of production that is guided by the company's requirement to meet its stated production target. Such management can include the processing of existing lower-grade stockpiles, blended with higher-grade ore (if appropriate) or the amount of gold held as bullion on hand.

Unit cost breakdown – main mining costs were steadily falling

In terms of unit costs over the course of FY17, the following trends are seen, as represented by Exhibits 5 and 6. Despite the unseasonal weather experienced through H117, in fact on a unit cost basis the main costs incurred from mining were all steadily decreasing through FY17.

Following discussions with management, we are now more positive on the company's cost performance and expect costs to stay at the same level as Q3 to support a FY17 AISC cost level below A\$1,500/oz. Actual gold production was obviously affected, but the strength of Q3 gold production as the TGO mine recovered shows that, importantly, the actual operational performance of mining and processing equipment was relatively unaffected by the adverse weather conditions in H117.

Exhibit 5: C1 cash cost breakdown over FY17

Exhibit 6: AISC cost breakdown by quarter over FY17


Source: Edison Investment Research

Source: Edison Investment Research

Exhibit 7: FY17 TGO quarterly operational and selected financial data

Production		Q117	Q217	Q317	Q417e	FY17e
Waste mined	BCM	1,533,279	-1,533,279	2,165,717	1,550,000	3,715,717
Implied strip ratio	Tonnes	18.3	15.4	23.0	12.4	6.4
Ore mined	g/t	221,139	-221,139	249,109	330,000	579,109
Ore grade	Tonnes	1.51	1.39	2.42	2.00	9.42
Ore milled	g/t	231,797	279,338	281,654	330,000	1,122,789
Head grade	%	1.50	1.48	2.36	2.00	1.78
Recovery	Ounces	90.1%	90.4%	91.1%	91.0%	90.7%
Gold recovered	A\$/oz	10,435	11,756	18,721	19,310	60,222
Gold sold	A\$/oz	10,000	12,519	16,303	19,310	58,132
Gold revenue	A\$/m	16.3	21.2	27.6	32.2	97.5
Implied realised gold price/ actual	A\$/oz	1,627	1,694	1,694	1,668	1,681
Cost of sales	A\$/m	19.2	21.2	22.5	23.2	86.1
AISC operating cost	A\$/oz	2,139	1,803	1,201	1,201	1,469
Gross Margin	%	-11.6%	6.1%	58.3%	55.9%	29.7%
		3,150	3,150	4,986	4,986	4,986
Stockpiles and bullion on hand						
Ore for immediate milling	Tonnes	3,150	3,150	4,986	4,986	4,986
Bullion on hand	Ounces	5.12	5.34	8.20	8.32	8.32
Value of bullion on hand (based on implied gold price above)	A\$/m	661,645	709,148	620,271	620,271	620,271
Stockpile grade	g/t Au	0.80	0.79	0.75	0.75	0.75
Contained gold in stockpiles	oz	17,201	18,195	15,126	15,126	15,126
Value of stockpiled gold ounces at quarter's average price	A\$/m	28.0	30.8	25.6	25.6	25.6
Detailed cost summary						
Mining	A\$/oz	1,188	1,029	721	721	855
Processing	A\$/oz	505	450	269	269	343
Site support	A\$/oz	148	118	80	80	98
C1 site cash costs	A\$/oz	1,841	1,597	1,070	1,070	1,296
Royalties	A\$/oz	35	40	51	51	46
Sustaining capital	A\$/oz	130	37	8	8	35
Rehabilitation	A\$/oz	68	72	38	38	49
Corporate	A\$/oz	65	57	34	34	44
AISC	A\$/oz	2,139	1,803	1,201	1,201	1,469

Source: Alkane Resources and Edison Investment Research

Alkane's Dubbo Project – prices on the rise

Alkane's longstanding flagship project is now called the Dubbo Project (DP). Previously, it was known as the Dubbo Zirconium Project (DZP). The new simplified name omits zirconium which, although forming a major component of future DP revenue streams, does not describe the multi-commodity nature of the project. The DP will extract and sell 12 of the 15 lanthanide group elements. Lanthanum and cerium will not be sold due to current oversupply/low prices, and will, instead be stockpiled. Also, thulium will not be sold. The DP will also produce a highly pure form of chemical zirconia (free of the element hafnium, which itself will form a distinct revenue stream to service the growth in demand seen particularly in the aerospace sector) and zirconium basic carbonate, as it is the preferred feedstock material for use in a range of downstream industrial applications. The DP will also produce ferro-niobium, with this output already subject to a binding offtake agreement with German company, Treibacher Industrie.

Alkane's initial scope for the DP has changed materially over the course of our coverage of the company (which dates back to 2010). Putting the recent material change of project scope to one side (see our December 2016 note [Staged DP plan de-risks financing and off-take](#), which should be read in conjunction with this note and carries a complete review of our DP + TGO valuation), the company's R&D into DP products has been assessing and meeting potential end-user requirements since 2008. Indeed, Alkane's continued use of its pilot plant facility at ANSTO, just outside central Sydney, NSW, has provided the company with a crucial tool to tailor the DP's products to meet the ever changing landscape of specialist metal applications alongside the development of the DP's front-end design. The use of the ANSTO pilot plant facility has allowed Alkane to develop its product suite at minimal cost. Alkane spent A\$2.5m on building the plant in 2007 and has spent c A\$30m operating it. This compares very favourably to works being undertaken elsewhere in the sector. For example, Northern Minerals' recent announcement (8 April 2017) states that it intends to build a A\$56m plant to recover only 148 tonnes of neodymium over a three-year period, and from this work to prove a working flow sheet design. Note that Alkane has been refining its proven flow sheet design for over seven years to recover 15 speciality metals, including 12 of 15 lanthanide metals. In addition, its long use of the ANSTO facility is not due to any abnormal difficulties in processing DP ore material. Rare earth development is notoriously difficult and to develop a working process flow sheet is a long-winded process.

The DP's enrichment in magnet metals used for electric cars

The level of attention paid to the lithium space over the course of 2016, intimately linked to the electric vehicle space, brought about a considerable increase in the value of this market over 2016. However, the metals used in the production of electric vehicles and the myriad of other green technologies go far beyond just that of lithium and graphite. Of the various metals used in electric vehicles, the following are the key technology metals required in the manufacturing processes behind renewable energy storage and generation in particular:

- Rare earth metals praseodymium, neodymium and holmium for use in magnets and various electronic components.
- Lithium in either carbonate or hydroxide form, for use in battery anodes
- The upgraded form of graphite called coated spherical purified graphite (CSPG) for use in battery cathodes.
- Cobalt metal used as cobalt-oxide in the anode material of lithium-cobalt-oxide batteries.

Based on DP Phase 1 product output tonnages at 500ktpa ore throughput, and applying our assumption of product prices in 2020 (as guided by Alkane and its consultants due to the opaque nature of these product markets), we generate 2020 revenue estimates as shown in the following exhibit. Note that the DP is enriched with the aforementioned 'magnet' metals, with all of the main

three (Nd+Pr+Dy) accounting for 73% of DP REE revenues (excluding Hf), and 22% of total DP revenues (including hafnium, zirconium basic carbonate, chemical zirconia and ferro-niobium).

Exhibit 8: DP pricing assumptions and Phase 1 tonnages produced (ie based on 0.5Mtpa throughput)

		Product	Units	Anticipated 2020 product price (US\$/kg)	Refined output (tonnes pa)	Anticipated 2020 revenue (US\$m)	Comments
	Atomic number						
LREE	57	Lanthanum oxide	La ₂ O ₃	2.25	685	1.5	Not sold due to oversupply
	58	Cerium oxide	CeO ₂	2.25	1,125	2.5	Not sold due to oversupply
	59	Praseodymium oxide	Pr ₆ O ₁₁	68.5	119	8.1	
	60	Neodymium oxide	Nd ₂ O ₃	47.5	461	21.9	
	61	Samarium oxide	Sm ₂ O ₃	3.0	56	0.2	
	62	Europium oxide	Eu ₂ O ₃	280.0	2	0.4	
	63	Gadolinium oxide	Gd ₂ O ₃	17.5	54	0.9	
HREE	64	Terbium oxide	Tb ₄ O ₇	600.0	7	4.2	
	65	Dysprosium oxide	Dy ₂ O ₃	285.0	61	17.4	
	66	Holmium oxide	Ho ₂ O ₃	39.5	11	0.4	
	67	Erbium oxide	Er ₂ O ₃	40.5	38	1.5	
	68	Thulium oxide	Tm ₂ O ₃	0	3	0.0	Not sold
	69	Ytterbium oxide	Yb ₂ O ₃	30	31	0.9	
	70	Lutetium oxide	Lu ₂ O ₃	985	2	1.5	
	71	Yttrium oxide	Y ₂ O ₃	7.0	516	3.6	
						0.0	
		ZBC (zirconium basic carbonate)	100% ZrO ₂	5.5	2,000	11.0	
		Chemical zirconia	99.5% ZrO ₂	12.5	6,178	77.2	
						0.0	
		Hafnium oxide (95% HfO ₂)	Hf Metal	1,100	25	27.5	
						0.0	
		Ferro-niobium (65% Nb)	Nb Metal	37.5	984	36.9	
		Grand total (US\$m)				218	
		Grand total (A\$m)				287	

Source: Alkane Resources and Edison Investment Research

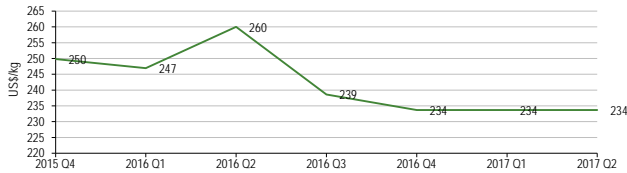
Rising DP basket prices

Alkane stated in its Q317 quarterly report that the rare earths that go into making magnets are undergoing material price increases, of 5-7% since the start of 2017. Indeed, this is supported by our view of SteelHome prices recorded over the same period (source: SteelHome/Bloomberg), as shown in the following six exhibits. These indicate only neodymium, in particular, experiencing a meaningful price increase of 11% ytd. This rare earth element is the most important in terms of volumes mined (Nd represents 34% of traded DP rare earth element tonnes produced, and 10% of Phase 1 DP revenues based on a US\$47.5/kg price assumption). Phase 1 dysprosium production is 87% lower than the tonnes of neodymium produced. Based on the 2020 assumption for dysprosium given in Exhibit 8, of US\$285/g, it accounts for 8% of estimated 2020 DP revenues. The current SteelHome dysprosium price is US\$234/kg, 18% below the 2020 forecast price we use to value the DP. Due to the bilateral nature of trading REEs, SteelHome prices may not truly reflect the prices fetched in the overall global REE market.

When comparing these six REE prices to our DP pricing assumptions given in Exhibit 8 above (estimated levels expected in 2020, the year of first steady-state production for Phase 1 at the DP under our assumptions), the majority are at the price level used in the DP's August 2015 FEED study.

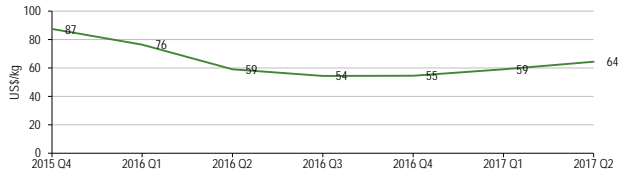
We include three other rare earth price charts for europium, terbium and ytterbium for reference and note that these six prices are the only available for the lanthanide group of elements on the Bloomberg platform.

Exhibit 9: Dysprosium metal prices (US\$/kg)



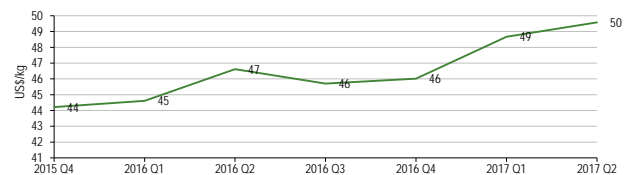
Source: Bloomberg

Exhibit 10: Europium metal prices (US\$/kg)



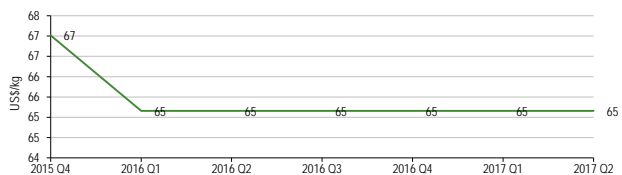
Source: Bloomberg

Exhibit 11: Neodymium prices (US\$/kg)



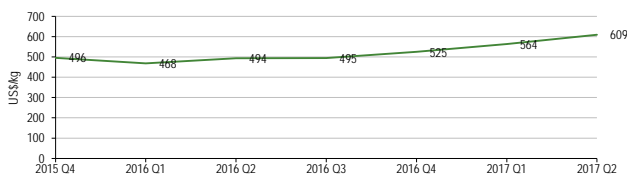
Source: Bloomberg

Exhibit 12: Praseodymium metal prices (US\$/kg)



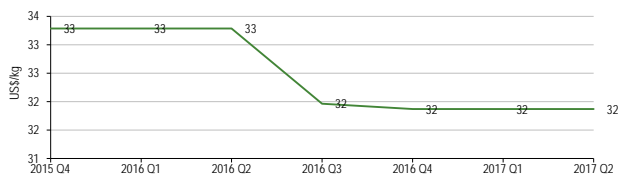
Source: Bloomberg

Exhibit 13: Terbium prices (US\$/kg)



Source: Bloomberg

Exhibit 14: Ytterbium prices (US\$/kg)



Source: Bloomberg

Zircon

A surge in demand for zircon based products in 2011 resulted from concerns about supply shortfalls, creating an almost bubble-like demand situation that carried through into 2012. The result of this intense period of buying led to the creation of vast stockpiles which, when coupled with decreasing Chinese demand through the downturn years of 2012-16, depressed zirconium prices to multi-year lows (one major market driver was the construction industry as zircon is used in the manufacture of tiles, which are a major type of floor surfacing and wall finishing in Asia). As these stockpiles have now dissipated into the marketplace and along with increased Chinese demand experienced over 2016 and ytd, the commodity is now experiencing price increases across its various product types (ie ZOC, ZBS and the Dubbo Project's own ZBC), which Alkane states are similar to the 5-7% increases seen in the REE group.

Letters of intent signed over 60% of Phase 1 DP output

The marketing of the DP's zirconia-based output has been plagued in recent years by the aforementioned depressed nature of the zircon market, which now appears to be recovering. Potentially as a result of this recovery, Alkane's marketing agent, Minchem, has secured six non-binding letters of intent (LOIs) covering 60% of planned Phase 1 output from the DP (ie 8,150tpa, or 8,178tpa under our assumptions, with the difference due to rounding during the calculation of

finished product tonnages from raw ore at the grades and recovery numbers given in the DP's DFS).

Westinghouse bankruptcy to stifle hafnium & hafnium-free zirconia supply

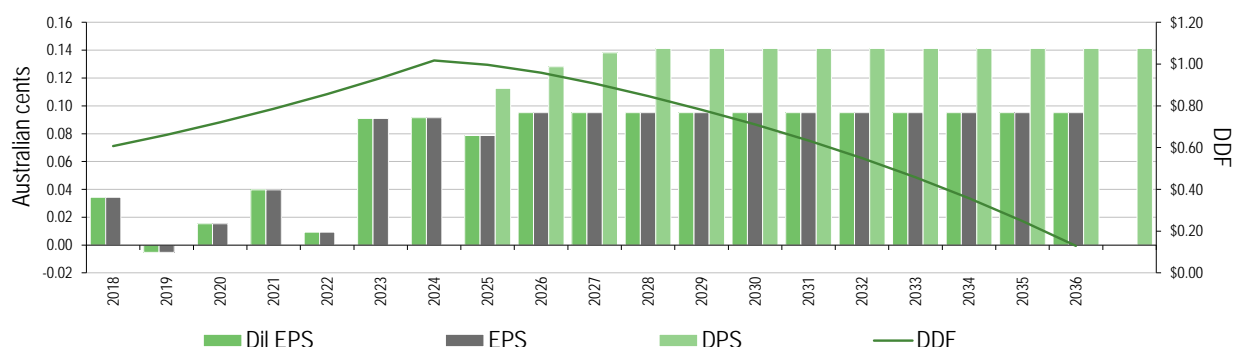
Hafnium is an important, although relatively recent addition to the DP's product suite. Hafnium is constrained by supply; and its ability to enhance the physical properties of alloys has led to increased R&D and demand in the high-growth civil aerospace industry. One important recent development that may affect the supply of this metal is the bankruptcy of Toshiba's Westinghouse atomic unit. The closure of this business, due in large part to cost overruns in reactor construction and increased health and safety regulation post-Fukushima, may well constrain upstream supply of speciality metals produced by Westinghouse used in the nuclear industry, of which hafnium and hafnium-free zirconia are two such materials.

Industry feedback has been especially positive for DP hafnium output as it is not tied to the vagaries of the nuclear industry. This is because growth in the extremely small (c 50tpa) hafnium market is to be largely linked to high-tech material usage, such as alloys used in the aerospace and industrial gas turbine industries. Current hafnium production is linked to production of neutron transparent zirconium metals used in nuclear fuel rod casings (hafnium absorbs c 600x the amount of neutrons that zircon absorbs and therefore needs to be refined out of zirconium metal – a process Alkane has successfully completed). As such, the depressed levels of activity in the nuclear industry currently, coupled with the Westinghouse bankruptcy, and uncertainty persisting from the Fukushima disaster of 2011, plus the increasing growth in the renewable energy economy, mean that stable hafnium output from nuclear industry sources cannot be depended on. Further, hafnium production volumes from the nuclear industry are unlikely to meet demand from other industrial sectors.

Valuation: More dilution due to Alkane share price fall

The following exhibit is based on the two-stage development concept for the DP. It also includes our value for the TGO, although we highlight that the potential future revenues and profits occurring from the DP (starting in FY18 under our assumptions) dwarf the relatively small cash generation levels that result from gold mining.

Exhibit 15: Edison's estimate of theoretical EPS, diluted EPS, DPS and dividend discount flow (DDF)



Source: Edison Investment Research

As can be seen above, earnings are depressed through to FY22 as production from the DP ramps up and the project's capital expenditure dominates. Even though maximum gold production of 68koz from the TGO occurs (as per our assumptions) in FY19e, earnings are depressed as a result of the A\$7m in capex required to develop an underground mining phase at Wyoming, with an additional A\$13m in TGO UG capex capitalised as the reserve base is expected to grow as mining

commences. A slight rise in earnings is seen over FY20 and FY21 as first DP profits materialise, but reduces again as stage 2 capex is spent over FY22. The following year (FY23) sees the first full year of mining at the maximum 1Mtpa ore throughput rate.

Note that our current UG mining assumptions for the TGO may change as the company finalises new resource estimates and these are subsequently used to potentially revise the mine schedule.

Breakdowns of discounted earning valuations for the following periods of our valuation horizon are given in Exhibit 16 below.

Exhibit 16: Base case, TGO-only and DP scenario valuations		
	Previously	FY18
TGO only, without any dilution, financing, costs or revenues associated with the DZP.	0.37	0.26
Base case - TGO and DZP fully developed	0.78	0.61
The following valuation scenarios include TGO production		
Post stage one capex with stage 2 developed	0.93	0.66
Post stage one without stage 2 developed	0.43	0.35
Post stage 2 capex	1.31	0.86
Source: Edison Investment Research		

Sensitivity to share price

Other than commodity prices, the most notable effect on our valuation stems from our assumption for the price at which Alkane raises capital. Following Edison's practice we apply the current share price to future potential equity issuance. However, we note that likely positive upcoming DP catalysts will alter this calculation as good news feeds into the share price. Exhibit 17 provides our total valuation (TGO+DP) given a range of share prices at which an equity portion of the DP's financing might be raised:

Exhibit 17: Sensitivity to price at which DP financing raised						
Equity raise price	0.20	0.26	0.30	0.40	0.50	0.60
NPV10 (TGO + DP) A\$/share	0.50	0.61	0.68	0.82	0.96	1.067
Source: Edison Investment Research						

Illustrative premium rating valuation – A\$2.20 possible

Mining companies, once they are firmly into profitable stable production, are usually awarded valuations at a multiple to their NPV. Simply put, once the DP reaches steady-state stable production and its products are sold into a stable price environment, if we assume that Alkane pays out all its free cash in the form of dividends, we can impute a share price valuation. If we assume a 5% dividend yield (a relatively conservative assumption of long-term mining stock yield levels), Alkane's maiden theoretical dividend of A\$0.11 in FY24 (the first year we estimate that the dividend could be paid) could imply a potential A\$2.20/share Alkane valuation.

Financials

Alkane had A\$20.8m cash at end March 2017 and we estimate that Alkane will finish with net cash of A\$9.4m at end FY17. To this should be added A\$8.2m for the company's gold held in inventory as bullion on hand.

Our end FY17 net cash figure is after a cash outflow of A\$46.1m relating largely to TGO expenditures, and net financing inflows of 3.6m. From our discussions with management we do not expect bullion-on-hand to increase further from its end H117 amount. Our estimate includes an earlier repayment of the company's bank debt. Previously we had repayment of Alkane's working capital loan facility equally over four years, from FY18 through to FY22. From Alkane's Q3 cash

flow report, debt repayments ytd total A\$6.7m. We now assume that all debt is repaid by end FY17, amounting to a small debt repayment of A\$0.9m in Q417.

Note: Alkane has a hedge book with Macquarie bank. At the beginning of FY17 this book had a starting balance of 63,900oz Au. We have factored these sales and revenues into our cash flow forecasts for the TGO. The remaining 31,000/oz are to be paid in full by end FY18, unless the book is replenished by agreement with Macquarie bank.

Our financing assumptions for the DZP

Alkane's financing team (led by Sumitomo Mitsui Banking Corporation) is pursuing the US\$0.5bn initial capex required to bring the DP into Phase 1 production. Alkane's plan is to sell a small stake in its wholly owned subsidiary containing the DP. Alkane is also pursuing Export Credit Agency (ECA) funding, which may provide hundreds of millions of Australian dollars in the form of loans at very low interest rates. These two financing routes would be joined with more conventional debt and equity financing to satisfy the requirement.

The exact financing structure of the DP has not been finalised. However, we understand from discussions with management that the financing structure for the total US\$0.84bn (A\$1.1bn) required to develop the DP could be secured by:

- selling stakes in both Phase 1 and 2 equivalent to 10% of Phase 1 capex (ie A\$68m) and Phase 2 capex (ie A\$47m); and
- raising 35% of Phase 1 capex (US\$480m, A\$632m) as equity. For Phase 1 this amounts to the notional issue in FY18 of 891m new shares priced at A\$0.26 each to raise gross A\$231m (US\$176m). For Phase 2 this results in raising US\$126m (A\$166m) via the issue of 639m new shares in FY21.

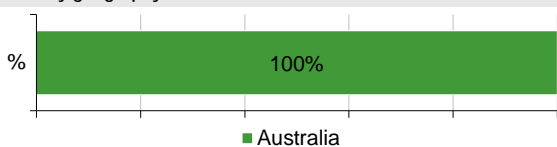
In the above scenario, we calculate that this would leave Alkane with a maximum required net debt position in FY18 of A\$327m to fund Phase 1, which equates to a gearing (debt/equity) ratio of 78% and a leverage (debt/debt+equity) ratio of 44%. Alkane is looking to cover this requirement using ECA loans incurring very favourable interest rates, as well as conventional project financing routes, potentially incurring higher interest rates.

Phase 2 development depends on the success of Phase 1 and prevailing commodity prices. However, if the same funding scenario is applied to raising 35% of Phase 2 capex; 639m new shares would be issued in FY21, giving rise to a net debt position in this year of A\$78m, equating to gearing and leverage ratios of 11% and 13% respectively.

Exhibit 18: Financial summary

	A\$'000s	2014	2015	2016	2017e	2018e
Year end 30 June		IFRS	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS						
Revenue		35,474	101,813	109,624	98,011	104,290
Cost of Sales		(25,692)	(74,809)	(76,236)	(78,048)	(50,695)
Gross Profit		9,782	27,004	33,388	19,962	53,595
EBITDA		3,890	26,478	40,913	14,817	48,800
Operating Profit (before GW and except.)		3,890	(79)	10,984	(18,183)	(16,349)
Intangible Amortisation		0	0	0	0	0
Exceptionals/discontinued		(4,798)	(8,211)	(4,375)	(20,475)	63,244
Other		0	0	0	0	0
Operating Profit		(908)	(8,290)	6,609	(38,658)	46,894
Net Interest		(471)	153	54	490	140
Profit Before Tax (norm)		3,419	74	11,038	(17,693)	(16,210)
Profit Before Tax (FRS 3)		(1,379)	(8,137)	6,663	(38,168)	47,034
Tax		(4,893)	4,051	(1,968)	3,064	0
Profit After Tax (norm)		(1,372)	4,125	9,070	(14,629)	(16,210)
Profit After Tax (FRS 3)		(6,272)	(4,086)	4,695	(35,104)	47,034
Average Number of Shares Outstanding (m)		373.7	413.4	420.8	964.5	1,407.2
EPS - normalised (c)		(0.4)	1.0	2.2	(1.5)	(1.2)
EPS - FRS 3 (c)		(1.7)	(1.0)	1.1	(3.6)	3.3
Dividend per share (c)		0.0	0.0	0.0	0.0	0.0
Gross Margin (%)		27.6	26.5	30.5	20.4	51.4
EBITDA Margin (%)		N/A	N/A	N/A	N/A	N/A
Operating Margin (before GW and except.) (%)		N/A	N/A	N/A	N/A	N/A
BALANCE SHEET						
Fixed Assets		160,174	162,624	182,691	175,315	757,150
Intangible Assets		53,406	65,251	72,553	55,078	59,078
Tangible Assets		100,032	89,787	102,941	113,040	690,875
Investments		6,736	7,586	7,197	7,197	7,197
Current Assets		40,811	28,342	38,569	21,881	13,284
Stocks		15,391	11,505	12,394	10,836	11,572
Debtors		4,906	1,988	1,720	1,603	1,712
Cash		15,569	14,849	24,455	9,442	0
Other available for sale financial assets		4,945	0	0	0	0
Current Liabilities		(14,726)	(11,251)	(10,448)	(17,099)	(333,018)
Creditors		(13,755)	(9,726)	(8,745)	(15,396)	(4,167)
Short term borrowings		0	0	0	0	(327,149)
Other		(971)	(1,525)	(1,703)	(1,703)	(1,703)
Long Term Liabilities		(12,039)	(9,265)	(20,502)	(20,502)	(20,502)
Long term borrowings		0	0	0	0	0
Other long term liabilities		(12,039)	(9,265)	(20,502)	(20,502)	(20,502)
Net Assets		174,220	170,450	190,310	159,595	416,914
CASH FLOW						
Operating Cash Flow		(3,508)	28,454	37,432	23,947	36,725
Net Interest		(369)	153	54	490	140
Tax		0	0	0	3,064	0
Capex		(95,281)	(32,588)	(40,423)	(46,099)	(646,985)
Acquisitions/disposals		40,534	3,151	416	0	63,244
Financing		9,800	162	12,127	3,585	210,285
Dividends		0	0	0	0	0
Net Cash Flow		(48,824)	(668)	9,606	(15,013)	(336,591)
Opening net debt/(cash)		(64,294)	(15,569)	(14,849)	(24,455)	(9,442)
HP finance leases initiated		0	0	0	0	0
Other		99	(52)	0	0	0
Closing net debt/(cash)		(15,569)	(14,849)	(24,455)	(9,442)	327,149

Source: Note: We forecast DZP financing capex starting in FY17 including the planned sale of 10% of the DZP for A\$64m recorded on the P&L. Assumes notional capital raise as described on page 12.

Contact details	Revenue by geography
89 Burswood Rd Victoria Park WA 6100 Australia +61 8 9227 5677 www.alkane.com.au	 <p>■ Australia</p>
Management team	
MD: David Ian Chalmers Mr Chalmers is a geologist and graduate of the Western Australian Institute of Technology (Curtin University). He has worked in the mining and exploration industry for over 40 years.	Chairman: John Stuart Ferguson Dunlop Mr Dunlop is a consultant mining engineer with close to 40 years' surface and underground mining experience, both in Australia and overseas.
Non-exec director: Ian Gandel Through Ian Gandel's private investment vehicles, Gandel Metals Pty is currently a substantial holder in a number of publicly listed Australian companies.	Non-executive director: Anthony Dean Lethlean Mr Lethlean is a geologist with 10 years' mining experience. He has worked as a resources analyst with various stockbrokers and also consults to Helmsec Global Capital.
Principal shareholders	(%)
Abbotsleigh Pty Ltd	21.8%
Gandel, I J	21.8%
Fidelity Ltd	5.9%
Fidelity – other, multiple portfolios, equity funds	7.1%
Coupland Cardiff Asset Management	3.3%
Choice Investments Dubbo Pty Ltd.	1.3%
Pattinson W H Soul	1.1%
Funding Securities Pty Ltd	0.7%
Companies named in this report	
Northern Minerals	

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