28 September 2011

Alkane Resources

Year End	Revenue (A$m)	PBT* (A$m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/09	**4.7	2.4	1.0	0.0	106.0	N/A
12/10	**10.1	7.9	3.2	0.0	33.1	N/A
12/11e	0.1	(2.1)	(0.8)	0.0	N/A	N/A
12/12e	33.0	(17.6)	(6.5)	0.0	N/A	N/A

Note: *PBT and EPS are normalised, excluding intangible amortisation and exceptional items. **2009/10 revenues include A$4.1m and A$9.6m gain on sale of investments respectively.

Investment summary: Dubbo DFS

Based on Alkane's definitive feasibility study for the Dubbo Zirconium Project (DZP), we value the project at A$2.91 per share. This valuation is based on a throughput of 400ktpa expanded to a 1Mtpa operation (considered likely in light of recent significant demand and price increases for the DZP basket of products), with first production in H114, and the Tomingley Gold Project (TGP) coming online in 2012. The revised valuation takes into account higher capex (US$708m vs our original US$400m estimate) as well as Alkane's view of sustainable long-term prices for the DZP basket of goods. To this should be added A$0.42 per share for its stake in the McPhillamys gold project held in joint venture with Newmont. This results in a valuation for the company of A$3.33, putting the current price at a 68% discount.

Continuing price increases – DZP highly cash generative

Widespread media coverage of the rare earths market and China's dominance are well known, and current price levels for this group of elements are at record highs. Though less known, zircon-based products have also seen remarkable price increases over the past year, with no substitution available. Based on 'conservative' prices provided by Alkane, we forecast that the DZP should be able to generate c A$504m per annum (after ramp up in 2015) over its 20-year life of mine.

Further upside potential via 1Mtpa DFS

Though the announced DFS provides appropriate detail for a 400kt per annum operation, Alkane will be required to re-address certain elements of the project design for the likely 1Mtpa throughput. There is scope for costs (eg labour not being a 'scalable' factor) and capex (eg residue storage reducing in size once the water recycling study is completed) to come down. We await further clarification on such cost estimates to assess the impact on our valuation.

Valuation: Shares at a 68% discount

Our total valuation for Alkane is A$3.33 per share. This includes both the DZP and TGP projects and A$0.42 for its eventual 25% share of the McPhillamys deposit. We will look to the upcoming feasibility study for the DZP based on a 1Mtpa rate as the next key catalyst to a revision of our valuation.

Price	A$1.06
Market Cap	A$285m

Share price graph

Share details

Code	ALK
Listing	ASX
Sector	Metals and Mining
Shares in issue	269m

Price

52 week	High	Low
	A$2.6	A$0.70

Balance Sheet as at 30 June 2011

Debt/Equity (%)	N/A
NAV per share (c)	16.0
Net cash (A$m)	18.3

Business

Alkane Resources is a multi-commodity explorer, with projects located in the central west region of New South Wales in Australia. Alkane owns the Tomingley Gold (100%) and Dubbo rare metal and rare earths (100%) projects and has a 49% (moving to 25%) stake in the McPhillamys Gold project with JV partner Newmont Australia.

Valuation

	2010	2011e	2012e
P/E relative	282%	N/A	N/A
P/CF	N/A	N/A	N/A
EV/Sales	25.6	N/A	N/A
ROE	17%	N/A	N/A

Geography based on revenues

UK	Europe	US	Other
0%	0%	0%	100%

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Alkane Resources is a research client of Edison Investment Research Limited

Million tonne per annum operation more likely

While the definitive feasibility study (DFS) for the Dubbo Zirconium Project (DZP) outlines a detailed approach to mining at a rate of 400,000 tonnes of ore a year, it is now likely, due to the significant increases in the prices of DZP products, that the operation will run at an expanded rate of 1,000,000 tonnes of ore per annum. The current DFS contains much of the detailed analysis required to operate at this increased level, however Alkane will still need to address a number of factors (such parts of the process plant) that are not directly scalable to an increase in production rates. These further works to complete a feasibility study for the expanded 1Mtpa rate are already commencing and will run concurrently with environmental and financing programmes. Alkane states that the original timeline to production remains unchanged (we forecast first production during H114 ramping up to full production by 2016).

Resource to reserve conversion – minimal loss, if any

The DZP's very large shallow resource base is more than sufficient to allow for an increase to a 1Mtpa throughput. As exploration and development stage mining companies move to the production stage they are required to convert mineral resources to mineable reserves. The geometry and situation of an ore body usually has some impact over this conversion and can, such as in the case of narrow veined steeply dipping ore bodies, cause a loss of resource (sometimes in the region of 30%). However, the DZP resource can be considered as a sub-vertical trachyte pipe, cropping out at surface, with areal extents of c 900m by 600m, drilled to 55m for the measured resource and 100m for the additional inferred category. The mineralisation has been identified to be consistent throughout. The 100m vertical extent drilled to date (for delineation of the inferred resource) has not closed the ore body off at depth, providing further upside if required. The following exhibit details the current mineral resource for the DZP.

Exhibit 1: Dubbo Zirconia Project resource

Toongi Prospect Resource category	Tonnage (Mt)	Compound (%)	ZrO_2	HfO_2	Nb_2O_5	Ta_2O_5	Y_2O_3	REO	U_3O_8
Measured	35.7		1.96	0.04	0.46	0.03	0.14	0.75	0.014
Inferred	37.5		1.96	0.04	0.46	0.03	0.14	0.75	0.014
Total	**73.2**		1.96	0.04	0.46	0.03	0.14	0.75	0.014

Source: Alkane Resources

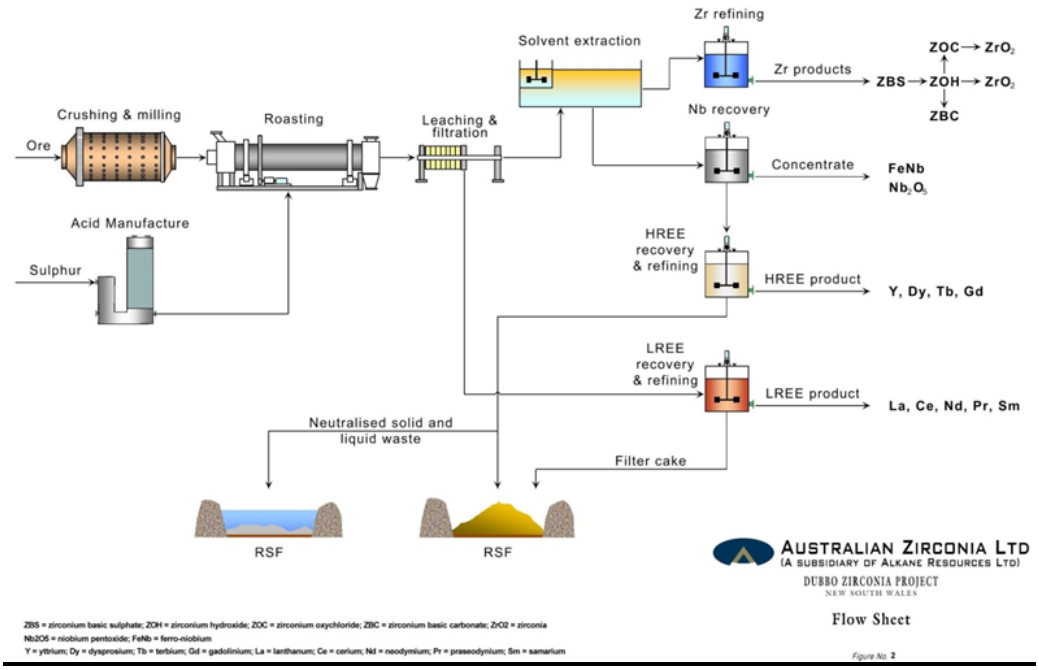
In conclusion, we consider that the company's statement that the resource above will readily convert into mineable reserves is justified, and we expect little loss, if any, during the estimation of mineable reserves. The 400kt per annum scenario details an open pit covering 28 hectares (529m x 529m) within the extents of the ore body such that ore would be left in the pit walls, essentially sterilising it until a cut back is undertaken. In fact, a benefit of increasing throughput to 1Mtpa would be that sterilisation of ore is reduced with management expecting that the eventual pit design would mine out the ore body entirely to a depth of 100m.

Proprietary processing technology

As to be expected from any multi-commodity mining project, especially one seeking to extract the rare earth group of elements, processing technology needs to be tailored to the specific characteristics of the individual (DZP) ore body. An important consideration is that Alkane is only

producing concentrates of its products, seeing this as the most viable cost-effective way in which to fast track the DZP to production and minimise process complexity. The process design (completed by Alkane's wholly owned subsidiary Australian Zirconia Limited) naturally separates the light and heavy rare earths. Also, the low levels of uranium and thorium in the deposit (note the DZP is not classified as a radioactive deposit) will not be concentrated (as with some rare earth process flows sheets designed by other companies) and will remain at concentrations similar to that which are recorded in-situ. The overall process design at the 400kt production rate is given in Exhibit 2 below. At the expanded 1Mtpa rate, additional roasters will be required (currently two at 400ktpa and five at 1Mtpa) and obviously capacity for residue and reagent storage will also change.

Exhibit 2: Dubbo Zirconia Project process flow sheet



Source: Alkane Resources

Memorandums of understanding and off-take agreements

Critical to the profitability of the DZP are the securing of off-take agreements with third parties. The DZP will produce tailored concentrates to the buyers' very specific requirements. This is still an ongoing part of Alkane's project development timeline, in no way due to the lack of potential buyers (management states it could sell many times the amount of rare earth concentrates at the expanded 1Mtpa rate), but instead due to the complex structure of these agreements. Three memorandums of understanding have already been finalised securing the entire 15,700 tonnes of zirconium output, and by extension, c A$195.8m of the A$508m of potential annual revenue at the 1Mtpa production rate. Agreements are still pending concerning the niobium (expected shortly), light and yttrium-heavy rare earth concentrates. The rare earth off-take agreements are still being discussed due to the potential for these to be developed via joint venture, whereby individual rare earths are separated, certain elements are sold on, and potentially unwanted elements handed back by the JV partner to Alkane, to sell on its own terms.

DZP forecast product prices used in base case valuation

Exhibit 3 gives the current prices used in our valuation based on Alkane and its consultants' views on sustainable market prices for each of its products. Due to the significant rises in each product prices (see our March 2011 note *Further price increases*), Alkane has taken a conservative view with its estimates, especially concerning the light rare earth concentrate. Light rare earth prices may well come off their current highs as Lynas Corp continues to ramp up production from Mount Weld and Molycorp continues to modernise Mountain Pass – both light rare earth only projects.

Exhibit 3: Revised long-term Dubbo Zirconia Project concentrate prices (as of September 2011)

Note: A$0.85/US$. Annual tonnage and revenue figures are at steady state 1Mtpa production rates.

Concentrate	Concentrate price (US$/kg)	Concentrate price (A$/t)	Tonnes produced at 1Mtpa rate	Annual revenue (A$m)
ZOC	10.6	12,471	15,700	195,788
FeNb (cont. 70% Nb)	45.0	52,941	3,005	111,362
LREE	30.0	35,294	3,050	107,647
Y-HREE	68.0	80,000	1,120	89,600
Total	**153.6**	**180,706**	**22,875**	**504,397**

Source: Alkane Resources

The expected annual concentrate production rates and prices used in our valuation have changed from those used in our May 2011 update, *First agreement signed*. The main reason for these changes is a greater understanding of potential concentrate tonnages and recoveries achievable at the expanded 1Mt per annum production rate (resulting from the ongoing works at Alkane's pilot plant facility in Sydney). Ongoing works at Alkane's pilot plant will however focus further on recoveries, especially for the heavy rare earths. Tonnages now expected from the DZP versus concentrate tonnages used in our May valuation are given in Exhibit 4 below. Notable is that tonnages for the light and heavy rare earth concentrates have markedly decreased; these have a considerable impact on cashflow generation due their high value and are a contributing factor (along with higher capex – see Exhibit 5) to our revised, lower valuation of the company.

Exhibit 4: Comparison of concentrate tonnages used in Edison valuation of the DZP

Concentrate	Tonnages used for current valuation	Tonnages used in our May 2011 valuation	% change in current tonnages vs those used in our May 2011 valuation
ZOC	15,700	15,000	5%
FeNb (cont. 70% Nb)	3,005	3,500	-14%
LREE	3,050	4,949	-38%
Y-HREE	1,120	1,500	-25%
Total	**22,875**	**24,949**	**-8%**

Source: Alkane Resources

Valuation based on the DZP definitive feasibility study

The following valuation is based on Alkane's released definitive feasibility study announcement for the DZP. While this study is at an appropriate level of detail for the 400ktpa production scenario, a number of factors require further analysis to bring the study up to scratch for the 1Mtpa scenario. However, we consider the company's continuing press statements that the 1Mtpa scenario is "more likely" and therefore provide our base case valuation using figures expanded for this production rate as contained with the company's 19 September 2011 announcement.

Based on this announcement we have the DZP entering its production phase from H114, with ore extraction starting at an rate of 0.50Mtpa, increasing to 0.75Mtpa during 2015 and reaching a steady state 1.0Mtpa from 2016 until the current end of mine in 2033 (selected only for financial modelling and not due to a lack of ore) for a total of 20.25Mt of ore produced. This equates to a total life of mine (LOM) of 21 years, which, under our assumptions, considers 2014 as the commissioning year for the DZP and is therefore treated as an additional year to the company's official 20-year LOM projection. A low strip ratio is expected at the 1.0Mtpa production rate but has yet to be released, and so for the purposes of this valuation with have used the 400kt per annum scenario waste to ore ratio of 0.14. Unit costs for mining, processing, personnel, general and administrative costs are based on the 400ktpa production scenario (see Exhibit 4 for values).

However, these figures are likely to change and may well decrease due to economies of scale arising at the higher production rate and lower labour costs to operate at this level. Specifically the residue storage facilities currently constitute A$120m of the A$165m infrastructure cost, though this element of the plant design may drastically reduce in scale once Alkane completes a water recycling study as part of completing the feasibility study for the 1Mtpa production scenario.

Our valuation of the Tomingley Gold Project (TGP) remains unchanged from our December 2010 update *Positive re-rating*. The annual concentrate tonnages and prices used to calculate revenues for the DZP are as stated in Exhibit 3. The main parameters used in our valuation are given in Exhibit 5.

Exhibit 5: Main valuation parameters used

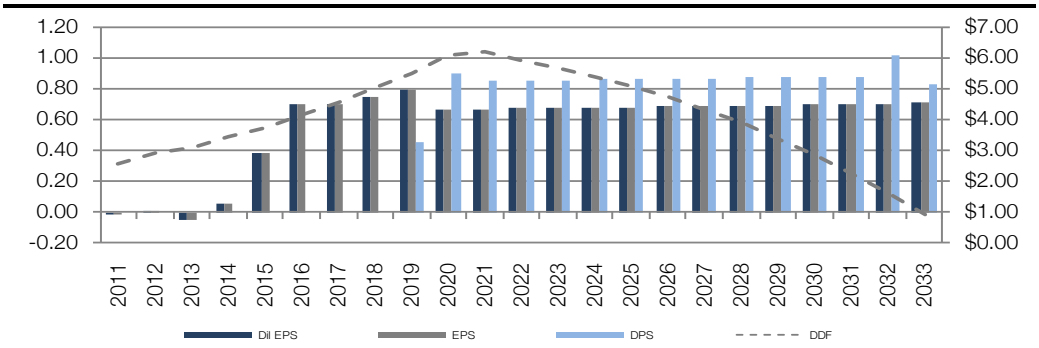
DZP Tonnes mined (after ramp up)		Mt	1.14
Strip ratio DZP (waste:ore)		t	0.14:1
DZP Tonnes processed (after ramp up)		Mt	1.0
DZP grades	ZrO_2	%	1.96
	REO	%	0.75
	Nb/Ta	%	0.48
	Y_2O_3	%	0.14
DZP concentrates produced per annum	ZOC	t	15.700
(at steady state prodcution from 2015)	Nb	t	3,005
	LREE	t	3,050
	YHREE	t	1,120
DZP mining cost		A$/t	5.5
DZP processing cost		A$/t	146.75
G&A		A$/t	27.25
Personnel		A$/t	60.25
Total annual operating costs		A$m	194
DZP capex (including EPCM & contingency)		A$m	728
DZP Infrastructure + owners costs		A$m	165
Total capital outlay over two-year development period		A$m	893

Source: Alkane Resources

If Alkane executes its TGP and DZP projects by conventional debt funding routes and pays out all its spare cash in the form of dividends, we estimate that a hypothetical dividend stream to investors from 2013 to 2033 will be worth A$2.91 in current money terms (using a 10% discount rate to reflect general equity risk). This then rises to A$6.04 in 2019 in the year the maiden dividend is paid, as depicted in Exhibit 6.

Exhibit 6: Dubbo Zirconia Project resource

Note: DDF = discounted dividend flow.



Source: Edison Investment Research

McPhillamys

Alkane released in July 2010 an initial resource estimate for McPhillamys of 2.96Moz at 1g/t Au with gold recoveries between 86% and 91%. Alkane currently has a 49% interest in this project, which is majority held by JV partner Newmont Australia Ltd (51%), which, on completion of a BFS, will earn a further 24% stake. With only this initial resource estimate to use in valuing McPhillamys we have applied derived values for measured, indicated and inferred resource ounces of US$339.9, US$158.55 and US$33.65 respectively as per our sector report *Gold: Valuation benchmarks are obsolete*, published in January 2010. This results in the total current resource being worth US$334.8m. Assuming Alkane retains a 25% interest in the project, its share is therefore worth US$86.2m or A$0.42 per share.

Total valuation

We therefore value all Alkane's assets at A$3.33 per share. This puts the current share price at a 63% discount to the current share price (A$1.22 as at 28 September 2011).

Capital requirements for the DZP and TGP

The capital expenditure requirements for the DZP have increased markedly from the A$400m estimate used in our May 2011 valuation to a possible total capital outlay of A$893m. Of this, a core A$543m is allocated to development of the DZP mine site (cf A$400m in our May valuation). The higher A$893m figure includes amounts for contingency (A$142m), EPCM (A$43m) and infrastructure (A$165m), which the lower A$400m capex estimate did not include. From our modelling of the DZP and TGP we forecast that Alkane has a A$489m capital requirement in 2012 as part of its plans to start developing the DZP (A$446.5m) and bring the TGP (A$49.9m) into production. The remaining A$449m will be required in 2013 to complete construction at both projects.

Financing the DZP

While we use traditional debt funding in our valuation of the DZP, this is very unlikely to be the case. The financing options currently available to Alkane are equity sale of minor interest (<10%) in Australian Zirconia Limited to strategic stakeholders, loan facilities through off-take partners, financial assistance through government agencies, normal equity and credit routes. Alkane states it

has held numerous discussions with interested financial institutions, but that it considers that a combination of the aforementioned may well become the reality.

Exhibit 7: Financials

A$'000s	2009	2010	2011e	2012e
Year end 31 December	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS				
Revenue (includes FY09 & FY10 gain on sale of investments)	**4,714**	**10,116**	**68**	**33,004**
Cost of Sales	0	0	0	(25,891)
Gross Profit	4,714	10,116	68	7,113
EBITDA	**2,249**	**7,642**	**(2,003)**	**4,886**
Operating Profit (before GW and except.)	**2,200**	**7,593**	**(2,132)**	**(17,809)**
Intangible Amortisation	0	0	0	0
Exceptionals/discontinued	(130)	(130)	0	0
Other	0	0	0	0
Operating Profit	**2,071**	**7,463**	**(2,132)**	**(17,809)**
Net Interest	227	326	68	224
Profit Before Tax (norm)	**2,427**	**7,919**	**(2,063)**	**(17,585)**
Profit Before Tax (FRS 3)	**2,298**	**7,789**	**(2,063)**	**(17,585)**
Tax	0	0	0	0
Profit After Tax (norm)	**2,427**	**7,919**	**(2,063)**	**(17,585)**
Profit After Tax (FRS 3)	**2,298**	**7,789**	**(2,063)**	**(17,585)**
Average Number of Shares Outstanding (m)	245.8	249.0	259.0	269.0
EPS - normalised (c)	0.99	3.18	(0.80)	(6.54)
EPS - FRS 3 (c)	0.49	1.59	(0.40)	(3.27)
Dividend per share (c)	0.0	0.0	0.0	0.0
Gross Margin (%)	100.0	100.0	100.0	21.6
EBITDA Margin (%)	47.7	75.5	N/A	14.8
Operating Margin (before GW and except.) (%)	46.7	75.1	N/A	-54.0
BALANCE SHEET				
Fixed Assets	**33,574**	**41,849**	**48,804**	**527,798**
Intangible Assets	31,994	39,266	44,506	49,746
Tangible Assets	1,084	2,071	3,786	477,540
Investments	496	512	512	512
Current Assets	**10,980**	**4,995**	**14,930**	**5,034**
Stocks	0	0	0	2,732
Debtors	221	438	0	2,300
Cash	4,832	4,555	14,927	0
Other available for sale financial assets	5,928	3	3	3
Current Liabilities	**(710)**	**(1,090)**	**(94)**	**2,034**
Creditors	(638)	(997)	0	2,128
Short term borrowings	(72)	(94)	(94)	0
Long Term Liabilities	**(146)**	**(186)**	**(186)**	**(488,996)**
Long term borrowings	0	0	0	(488,811)
Other long term liabilities	(146)	(186)	(186)	(186)
Net Assets	**43,699**	**45,568**	**63,455**	**45,870**
CASH FLOW				
Operating Cash Flow	**(552)**	**(1,525)**	**(1,802)**	**(1,513)**
Net Interest	227	326	68	224
Tax	0	0	0	0
Capex	(8,903)	(8,831)	(7,844)	(502,449)
Acquisitions/disposals	4,071	9,587	0	0
Financing	1,665	166	19,950	0
Dividends	0	0	0	0
Net Cash Flow	(3,492)	(277)	10,373	(503,738)
Opening net debt/(cash)	**(8,324)**	**(4,832)**	**(4,555)**	**(14,927)**
HP finance leases initiated	0	0	0	0
Other	0	0	0	0
Closing net debt/(cash)	**(4,832)**	**(4,555)**	**(14,927)**	**488,811**

Source: Edison Investment Research, company accounts