

## Spectacular drill result from Lucapa's Brooking diamond discovery in WA

### *Stunning drill result from Lucapa, at Brooking (80%)*

A couple of months ago I mentioned the drilling campaign underway and the possibility that Brooking could lead the charge in a new diamond exploration boom in WA. Well, Lucapa has delivered exactly what the good doctor ordered with its second drill hole, reported last Tuesday.

Drill hole LSC/DH002 has returned 18 macro-diamonds (>0.5mm) and 1,082 micro-diamonds from a 178 kg sample. Given the scarce distribution of diamonds in any deposit, it is amazing that this number of diamonds could be recovered from a 4 inch diameter drill core. It is believed to be the best ever drill result from diamond exploration in Australia, by a factor of three. It is 10x better than the first drill hole at Brooking, which returned 119 micro and macro diamonds. LSC/DH002 was drilled 30m north of this first hole.

Another seven holes have been drilled with all of them intersecting lamproitic material. Hopefully these will confirm the results seen in the first two holes, when they are assayed. The next program will involve trenching and bulk sampling. Eleven new lamproite targets have been identified, including a 7 ha anomaly identified as Katie's Bore, where 20 diamonds have been recovered from previous stream sampling. Work is being undertaken to enable these to be drill tested.

A few people recognised the significance of this result with the share trading up 23% to peak at 29¢ on the day, but sellers took it back down to close at 25.5¢, on ASX turnover of about 3.5 mill. shares. Thus the good news was treated as an exit opportunity. Nonetheless, there is much more upside from these levels. This might be a modest size pipe but the grade is likely to make up for it. The proximity of 11 other targets nearby could result in multiple mining opportunities.

*Disclosure: Interests associated with the author own shares/options in Lucapa Diamond Company, and capital raising fees have been received. .*

### *Commentary on batteries and supercapacitors*

We have previously commented on the BEST Battery™, a next generation energy storage device being developed by First Graphene and the Swinburne University of Technology (SUT), using graphene oxide and laser technology. Research has proved the science that can lead to a several times increase in the energy density of supercapacitors. The current work program is concentrating on manufacturing techniques to demonstrate that there can be a scalable production process suitable for industry. The ultimate goal would be the production of a supercapacitor that can be an alternative to lithium-ion batteries, but that

will take further work. As Elon Musk has himself said, the biggest breakthrough in energy storage will come with the next generation of supercapacitors. See his comments in this link: <https://www.youtube.com/watch?v=60EG6fmAsNM>

Putting that ultimate objective aside, what about the easier goal of product that can more readily fit industry today, being the supercapacitor market. How big is it and what openings are available to a new product?

### *Difference between batteries and supercapacitors*

Supercapacitors store energy in an electric field whereas batteries store energy in a chemical reaction. Supercapacitors have traditionally been used where there is a need for higher bursts of energy, having high power density that enables much faster charging and discharging rates. Development of significantly better energy density is being achieved with graphene, and advanced electric circuitry is allowing slower, more controlled energy discharge rates, making them more competitive with chemical batteries.

### *Market growing at 15.5% p.a.*

The global supercapacitor market is expected to be worth US\$3.1bn by 2026 (*Source: Research and Markets*), growing at 15.5% p.a. from 2017 to 2026. The major drivers of growth for this market are increasing demand for hybrid electrical vehicles and portable electronics products and their superior properties, such as high energy density, long lifecycles, and power stabilisation as compared conventional batteries.

### *Where to use supercapacitors*

Supercapacitors are often used to control power quality of grid and off-grid energy storage to give a fast response to ensure uninterrupted power supply and improving high power performance in data centres, engine starting, winches and cranes, wind turbine pitch control and satellites. Very low maintenance is an important benefit.

Supercapacitors can work very well with chemical batteries in electric vehicles (EVs). The supercapacitor provides the power needed for acceleration, while a battery provides range and recharges the supercapacitor between surges.

With kinetic energy recovery systems (KERS) in heavy truck transportation, whereby supercapacitors store kinetic energy on braking, there could be 25% savings in fuel consumption with obvious environmental benefits. Better than 40% energy savings may be achieved for port cranes using the same principles.

### *Skeleton Technologies is a leader in supercapacitors*

Skeleton Technologies, based in Estonia, is one of the leading companies in the supercapacitor field, and it is actually using graphene. Referring to them as

ultracapacitors it quotes benefits such as lifetimes of more than one million cycles, operating temperatures from -40° to 70°, 30% more efficient than batteries, up to 60x the power density of batteries (relates to the speed of charging) and no harmful chemical or toxic metal.

Skeleton uses “curved” graphene as one of the key factors in achieving superior energy density, with a very low ESR (equivalent series resistance) that means high efficiency by reducing the amount of energy lost as heat.

Curved graphene has been developed to overcome the tendency of single graphene sheets to re-stack, which limits the accessibility of the pores to the electrolyte. Skelton says that this delivers twice as much energy storage and 5x the power performance compared to other supercapacitors. The process is proprietary, so there is very little information on how it makes curved graphene, though a paper from 2015, described how to make it using graphene oxide from a modified Hummers Method.

### *Where does the BEST Battery fit in?*

SUT is using different technology to gain the benefits of graphene in supercapacitors. While it also uses graphene oxide (GO) as a raw material, it creates precise nanopores using laser technology whilst reconfiguring the design of the device. From what we can tell it is achieving better energy density improvements than Skeleton. Power density results are probably similar. There is every reason to believe that the SUT/FGR product will be an improvement on Skeleton's, but we need to gather the information to support this view and it could take another 12 months of research to gain a better view.

On a separate point, graphene oxide is very expensive and not easy to make without the use of hazardous chemicals. First Graphene is working with Flinders University to develop a new, much lower cost and better method of making graphene oxide. So far there has been very good progress but it will take a number of months to get a definitive result. If successful, it could be a world changing event in the manufacturing of GO.

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### *HIPO Entering the Battery Space*

While on the battery space it is interesting to see that HIPO Resources (HIP) has done a deal to earn into an improved design lithium-ion battery called the Next-Battery. At first glance it looks like it is strongly incremental rather than revolutionary, but it is nonetheless significant if it works commercially.

The “newness” relates to the nano-structuring of a cathode lattice to increase the active surface area of the cathode thereby enabling faster lithium transport and electron movement in a more energy dense structure. The scientists are aiming to achieve a 100% increase in specific energy,

or gravimetric energy density, being the battery capacity in weight.

Looking at the Next-Battery website [www.next-battery.com](http://www.next-battery.com), it claims that it will be able to double the range of electric cars from 515 km to 1,020 km on a single charge. If this can actually be achieved it will be a major breakthrough. It claims to have twice the specific energy of the Tesla 2170 battery.

The founder of Next-Battery is Benton Wilcoxon, based in the Ukraine. Interestingly, the company declines to name its scientific team “*due to today's rampant technology theft and potential distractions*”.

HIP can earn up to 35% of Next-Battery. The first 25% can be earned by spending US\$500,000, with an option to go to 35% for another US\$1m. Up to 10 mill. shares will also be issued on achievement of 50% and 100% increases in specific energy. The deal is due to be finalised by 7 September. If its technology is as good as they say, needing only another 12 months to achieve targets, then it looks like a good deal. Though, having a 35% potential equity means it is an investment rather than IP ownership.

There are many groups working to improve the performance of anodes, cathodes, electrolytes and design features of the lithium-ion battery. It is too difficult to know who is the best, but it is unlikely to be a field in which the winner-takes-all. We have added HIP to our chart coverage.

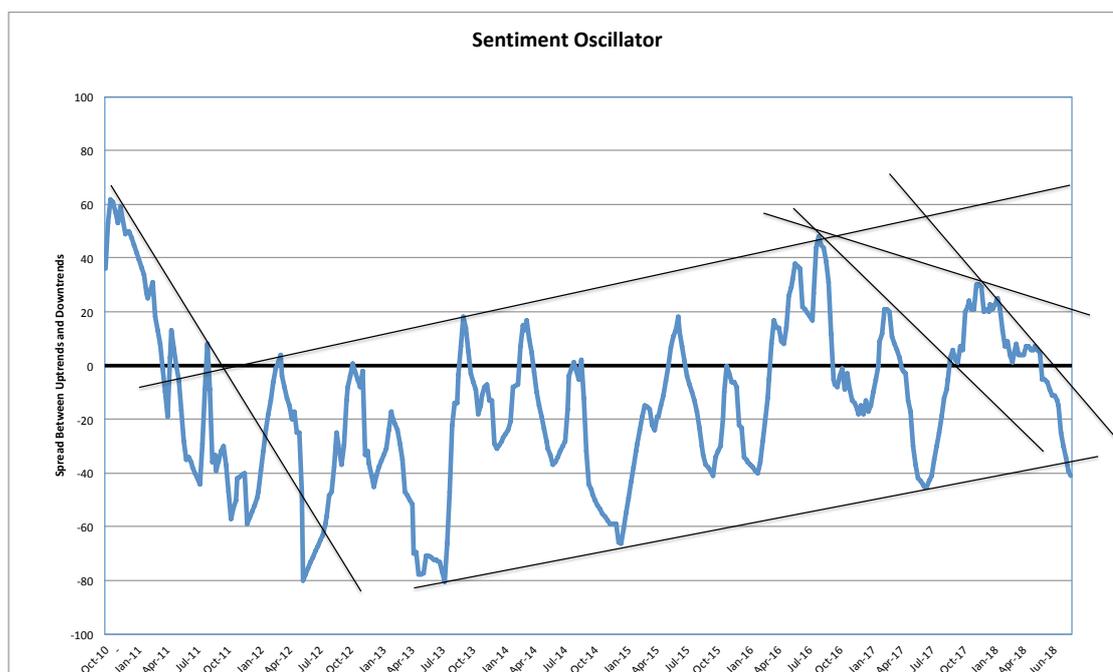
### *Video on Andean Mining*

Last week I mentioned Andean Mining, a private company that is earning in to a property that has a target of 4 Mt at 30.5% Cu and 4.5 gpt. The following link to a short three minute video is worth clicking on for a better understanding. [Learn more](#) by watching this short 3 minute video for Andean Mining. Andean will be launching its \$1.5m capital raising next week.

### *When a drill intercept is “too good to be true”*

At first glance Artemis's intercept from Carlow Castle near Karatha is an amazing hole with the headline intercept being 132m at 4.89 gpt gold, 0.35% cobalt and 1.11% copper, from a downhole depth of 98m. However, you need to look at Figure 3 in the ASX release to get a true picture. Hole ARC0139 was drilled down the guts of the orebody (down dip is the technical term) rather than perpendicular. That means the width of the orebody has been grossly overstated in the intercept. Going through other holes reported by the Company it seems to have done this repeatedly without offering any redeeming explanation. Sure, there are good grades, but it not as big as the latest drill holes might suggest.

The market seems to have been fooled by this result, as on Wednesday there were 5.3 million shares traded (\$996,0968) with the shares up 14.7% on the day. Don't be one of the bunnies.



**Sentiment Indicator:** The Oscillator is breaching the support line, so it is difficult to say how much further the market will fall, though fall it probably will. So now, 17% (18%) of the charts were in uptrend and 58% (55%) in downtrend on Friday's close.

### Detailed Chart Comments

*NB. Only the bold comments have been updated. Comments in grey type are from previous weeks and will be less relevant. Please note that this list is a cross section of the market. It IS NOT a list of recommendations.*

Indices	Code	Trend Comment	
All Ordinaries	XAO	in a rising wedge	
Metals and Mining	XMM	first signs of a breakout	
Energy	XEJ	correction from highs	
Stocks	Code	Trend Comment (updated comments in bold)	Main Interest
Adriatic Resources	ADT	down now	zinc
Aeon Metals	AML	breached support line	copper + cobalt
Alacer Gold	AQG	heavy fall	gold – production
Alkane Resources	ALK	breached long term support line	gold, zirconia
Acacia Resources	AJC	Sideways at the bottom	coal
Alchemy Resources	ALY	base forming	nickel, cobalt
Alicanto Minerals	AQI	down	gold exploration
Allegiance Coal	AHQ	holding LT uptrend	coal
Alliance Resources	AGS	continuing down	gold exploration
Altech Chemicals	ATC	sideways	industrial minerals - synthetic sapphire
Anova Metals	AWV	new low on poor production report	gold
Apollo Consolidated	AOP	rallying	gold exploration
Archer Exploration	AXE	breach of support	magnesite, graphite
Argent Minerals	ARD	down	silver
Aurelia Metals	AMI	new high	gold + base metals

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AusTin	ANW		new low	tin, cobalt
Australian Bauxite	ABX		surged through downtrend	bauxite
Australian Potash	APC		testing downtrend	potash
Australian Mines	AUZ		down	cobalt/nickel
Australian Vanadium	AVL		new high	vanadium
Bounty Coal	B2Y		down	coal
BHP	BHP		short term down, but approaching support	diversified
Base Resources	BSE		sideways, but softer last week	mineral sands
Bathurst Resources	BRL		slump	coal
Battery Minerals	BAT		collapse to new low	graphite
BBX Minerals	BBX		down	gold
Beach Energy	BPT		near highs	oil and gas
Beadell Resources	BDR		another new low	gold
Bellevue Gold	BGL		testing downtrend	gold
Berkeley Energia	BKY		breached downtrend, but pullback	uranium
Berkut Minerals	BMT		new low	cobalt
Blackstone Minerals	BSX		new low	gold, cobalt
Broken Hill Prospect.	BPL		down	minerals sands, cobalt
Buru Energy	BRU		slump	oil
Cardinal Resources	CDV		testing uptrend, down	gold exploration
Cassini Resources	CZI		sideways	nickel/Cu expl.
Celsius Resources	CLA		back in downtrend	copper/cobalt
Chalice Gold	CHN		testing downtrend	gold
Cobalt Blue	COB		free fall on study results	cobalt
Comet Resources	CRL		new low	graphite
Crusader Resources	CAS		spike out of downtrend then pullback	gold
Dacian Gold	DCN		down heavily	gold
Danakali	DNK		less steep uptrend	potash
Doray Minerals	DRM		trying to hold uptrend	gold
Eden Innovations	EDE		down	carbon nanotubes in concrete
Egan Street Resources	EGA		new low	gold
Emerald Resource	EMR		short term higher	gold
Evolution Mining	EVN		down	gold
Excelsior Gold	EXG		down	gold
FAR	FAR		sideways break through uptrend	oil/gas
First Cobalt	FCC		surge higher	cobalt
First Graphene	FGR		holding uptrend	graphene
Frontier Diamonds	FDX		new low	diamonds
Fortescue Metals	FMG		rallied out of steepest, but still in LT downtrend	iron ore
Galaxy Resources	GXY		longer term downtrend confirmed	lithium
Galilee Energy	GLL		retaining uptrend	oil and gas, CBM
Gascoyne Resources	GCY		down	gold
Global Geoscience	GSC		testing downtrend	lithium
Gold Road	GOR		breached uptrend	gold exploration

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Golden Rim	GMR		new low	gold exploration
Graphex Mining	GPX		new low	graphite
Heron Resources	HRR		downtrend persisting	zinc
Highfield Resources	HFR		down again	potash
Highlands Pacific	HIG		still in uptrend	nickel, cobalt
Hillgrove Resources	HGO		sideways	copper
Hipo Resources	HIP		down	battery metals
Iluka Resources	ILU		crunched down	mineral sands
Image Resources	IMA		resumed LT uptrend	mineral sands
Independence Group	IGO		breached support line	gold, nickel
Jervois Mining	JVR		strong bounce	nickel/cobalt
Karoon Gas	KAR		new low	gas
Kasbah Resources	KAS		still in downtrend	tin
Kibaran Resources	KNL		sideways	graphite
Kin Mining	KIN		trying to form a base	gold
Legend Mining	LEG		strongly higher	exploration
Lepidico	LPD		continuing down	lithium
Lithium Australia	LIT		testing downtrend	lithium
Lucapa Diamond	LOM		breached downtrend	diamonds
Macphersons Res.	MRP		rallying	gold/silver
Mako Gold	MKG		down	gold
Marmota	MEU		sideways	gold exploration
MetalsX	MLX		down again	tin, nickel
Metro Mining	MMI		fallen back to support	bauxite
Mincor Resources	MCR		breached uptrend	gold
Myanmar Minerals	MYL		testing uptrend	zinc
MZI Resources	MZI		bounced off low	mineral sands
Neometals	NMT		down	lithium
Northern Cobalt	N27		down again	cobalt
Northern Minerals	NTU		sideways	REE
Northern Star Res.	NST		still strong	gold
NTM Gold	NTM		continuing downtrend	gold
Oceana Gold	OGC		rising again	gold
Oklo Resources	OKU		down	gold expl.
OreCorp	ORR		breached downtrend	gold development
Orinoco Gold	OGX		down	gold development
Orocobre	ORE		secondary downtrend	lithium
Oz Minerals	OZL		struggling with uptrend	copper
Pacific American Coal	PAK		still in uptrend	coal
Pantoro	PNR		on support line	gold
Panoramic Res	PAN		down	gold , nickel
Peel Mining	PEX		downtrend confirmed	copper
Peninsula Energy	PEN		risen to resistance line	uranium
Perseus Mining	PRU		breaching uptrend	gold

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Pilbara Minerals	PLS		down	lithium/tantalum
PNX Metals	PNX		lower	gold, silver, zinc
Polarex	PXX		still down	polymetallic
Prodigy Gold	PRX		down	gold exploration
Red5	RED		struggling	gold
Red River Resources	RVR		down	zinc
Regis Resources	RRL		down	gold
Resolute Mining	RSG		testing downtrend	gold
RIO	RIO		down	diversified
Salt Lake Potash	SO4		re-entering downtrend	potash
Saracen Minerals	SAR		down	gold
St Barbara	SBM		breached uptrend	gold
Sandfire Resources	SFR		down	copper
Santana Minerals	SMI		new low	silver
Santos	STO		back to highs	oil/gas
Sheffield Resources	SFX		rising again	mineral sands
Sino Gas & Energy	SEH		confirming uptrend	gas
Sipa Resources	SRI		sideways	general exploration - Ni,Cu, Co, Au
Stanmore Coal	SMR		new high	coal
Sundance Energy	SEA		testing uptrend	oil/gas
Syrah Resources	SYR		new low	graphite
Talga Resources	TLG		down	graphite
Tanami Gold	TAM		slump	gold
Technology Metals	TMT		short term down	vanadium
Tiger Realm	TIG		down	coal
Triton Minerals	TON		down	graphite
Troy Resources	TRY		down	gold
Tyranna Resources	TYX		Sideways at the bottom	gold exploration
Vango Mining	VAN		correcting	gold
Vector Resources	VEC		back to lows	gold
Vimy Resources	VMY		testing downtrend	uranium
Volt Resources	VRC		down	graphite
West African Resources	WAF		breached downtrend, but then a slump	gold
Westwits	WWI		down	gold
Western Areas	WSA		down	nickel
Whitehaven Coal	WHC		softer	coal
Totals	17%	24	Uptrend	
	58%	80	Downtrend	
		138	Total	

### Guides to Chart Interpretations

- Charts usually go pass from one trend (up or down) into the other via a period of indecision and uncertainty during which the trend can either recover or change. This period is signified by the orange colour. The orange represent both the greatest risk and greatest reward possibilities.
- Once a chart is in confirmed up or downtrends it is not uncommon for 10-20% of that trend to have already transpired.

- There are trends within trends. The focus of this chart review is the immediate trend that affects the sentiment i.e. it can be a downtrend within a long-term uptrend.
- Not every chart warrants a new comment every week. The new comments are in bold type. Grey type comments may be dated.
- Individual charts provide a single view. It is valuable to look at charts of other companies in similar commodities, and the overall sentiment is also very valuable. Not many stocks can swim against the tide.
- We periodically add or delete charts, some times for obscure reasons. If a chart consistent gives poor signals or is very erratic, we may delete it. Sometimes we add a chart because we want to see what all the fuss is about. We do have a preference for charting stocks that we cover in our research as well.
- Errors and omissions may occur from time to time, especially in fast moving markets.

Amber Lights in Tables: Just a reminder if when the amber light is used in the table – it is when the charts are ambiguous or when there is a change of trend taking place. If a chart is breaching a downtrend it can either be a positive sign or a trap. Only once it has done more work can it be confirmed as a new uptrend. Maybe it is a new uptrend (or conversely a new downtrend); the risk takers can decide to jump on board early (or sell). They will maximise their profits (or minimise their losses if indeed it is the start of the new uptrend (downtrend). More risk-averse investors should wait a little longer, being prepared to give up some of the gains in return for greater certainty.

Weightings of Sectors Represented in the Company Charts			
Sector	No. of Companies	Weighting	
Gold	39	28.3%	
Gold Exploration	12	8.7%	
Graphite	9	6.5%	
Coal	8	5.8%	
Oil/Gas	8	5.8%	
Cobalt	7	5.1%	
Lithium	7	5.1%	
Copper	6	4.3%	
Mineral Sands	6	4.3%	
Nickel	6	4.3%	
Zinc	4	2.9%	
Potash/Phosphate	4	2.9%	
Silver	3	2.2%	
Tin	3	2.2%	
Uranium	3	2.2%	
Bauxite	2	1.4%	
Diamonds	2	1.4%	
Iron Ore	1	0.7%	
Other	8		
Total	138		

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