

## Nuclear Buzz

### Is Mulga Rock A Risk Worth Taking?

By Andrea Jenetta, Publisher

So the Mulga Rock DFS.

First, let me say that the executive summary is a very cool document. It's readable. It's colorful and color-coordinated. It has graphics. It is very easy to get bottom line technical and financial information.

Mulga Rock is solid and simple. But it isn't dazzling in the same way that Salamanca appears to dazzle.

The life-of-mine, all-in-sustaining cost is \$34 per pound. It needs a term price of \$44.58 just to break even. The analysis assumes \$60 per pound, a number that as of Feb. 2, 2018, seems beyond unrealistic, particularly when you take a snapshot of the supply/demand picture.

But if you know Mike Young, Julian Tapp and the rest of the Vimy team, you also know that they are credible, capable and take the Mulga Rock project very seriously.

If they have to make it happen through sheer force of will, then that's what they will do—if for know other reason than to show a middle figure to the haters and naysayers the day the first pound of Mulga Rock U3O8 is drummed.

[Aside: Fuel Cycle Week will proudly publish any and all documented

### Mulga Rock Could Enter Production In 2020 with Contracts at \$60/lb

By Andrea Jenetta, Publisher

Mulga Rock in Western Australia could be producing uranium in as little as 36 months if owner Vimy Resources inks off take contracts at long term prices \$30 above current levels to secure financing and justify a final investment decision planned before the end of 2018.

The project's definitive feasibility study released this week by Vimy is predicated on a \$60 per pound U3O8 term price. The all-in capital breakeven price for the project is \$44.58 per pound using a discount rate of 8% (see key metrics chart, p. 8).

The document's executive summary devotes a chapter to making the case for why Mulga Rock could be the right project at the right time, despite the protracted negative outlook for the uranium sector as the result of too much supply, too little demand and prices too low to sustain primary production.

The premise of the argument centers on decisions by Cameco, Kazatomprom and Orano (AREVA) in late 2017 to cut production, actions that could remove as much as 30 million pounds from the market in 2018 (although it now is unclear how much production KAP will actually cut).

Vima said the moves "confirmed a widely-held view that current low uranium prices cannot sustain primary uranium production."

The firm expects what it called a "supply side strike" to drive prices higher over the short to medium term, with production from impacted operations expected to remain idle until prices warrant a resumption in mining.

At the same time, Vimy projects that nuclear generation will grow some 38% over the next 10 years, particularly in countries that aren't members of the Organization for Economic Cooperation and Development.

Speaking by phone from Perth on Feb. 2, CEO and managing director Mike Young told Fuel Cycle Week that Vimy has not signed any contracts. see [Mulga Rock DFS on page 7](#)

More Inside

Husab Produced 2.2Mlbs in 2017. What About 2018?

See article on p. 3

evidence of that middle finger. In fact, we'd devote an entire issue. **End Aside]**

Young told me this week that Vimy has not signed any offtake contracts. But according to the DFS, the plan calls for a final investment decision by the end of 2018 and the onset of construction in 2019. The document projects confidence about that schedule.

At \$60 and AUD:USD exchange rate of 0.70, the project's NVP is a solid A\$530 million, the IRR is 25% and the payback is 3.1 yrs. The DFS includes a valuation discussion on sensitivities to AUD and uranium prices (see Table 14.1, p. 7).

The bottom line is that each \$5 change in price, or each 0.07 change in the exchange rate, results in a change in NPV of A\$170 million, IRR 5%, and payback 5 months.

That brings us to the Vimy board and its appetite for risk. If it can accept an IRR of 20%, the minimum contract price would be \$55. It seems reasonable to assume that half of Mulga Rock's output of 3.5 million pounds per year would need to be contracted. That seems a little more realistic. Of course, much depends on what happens with supply between now and 2020.


This brings me to a key section of the DFS, one that devotes several pages attempting to explain the inexplicable to non-citizens of Uraniumland™.

Let me say here that I disagree with Vimy's assertion that nuclear generating capacity is expected to increase 38% in the next decade. That's simply not credible, for 10,000 different reasons.

But as the firm notes in the DFS, over the next few years, many of the long-term contracts signed back in the day will come to an end, "and so the industry is entering a period of readjustment as the disconnect between utilities and the uranium miners begins to play out."

True. It is also true that Cameco's decision to suspend operations at McArthur River will remove 18 million pounds of supply from the market starting this year.

It is further true that no one knows what the fuck Kazakhstan is

		<b>Uranium Prices</b> <b>Term: March 2017</b> <b>cob February 1, 2018</b>	
		BID	OFFER
U3O8 (physical)		\$21.75	\$22.50
U3O8 (financial)		\$21.75	\$22.50
UF6 (physical)		\$63.50	\$64.50

Source: Evolution Markets Inc. +1 914.323.0252  
[www.evomarkets.com](http://www.evomarkets.com) [Disclaimer](#)

doing, including Kazakhstan, although I think it's safe to assume Kazatomprom will hold production at 23,000t per year through 2020.

I further believe it's reasonable to expect more cuts by Orano in Niger.

Here's the thing: I predict that Cameco will either outright announce or lay the groundwork for a longer suspension during the Feb. 9 call with analysts to discuss 2017 financial results.

We'll also hear louder noise that Saskatoon is going to the spot market to buy up material to place into its term contracts.

On paper, inventories are high and secondary supply abounds. But the amount of AVAILABLE SPOT MATERIAL IS THIN.

Still, there is plenty of uncertainty. Husab is a huge wild card. So is Olympic Dam and it behooves Uraniumland™ to pay attention to the copper market for clues.

We know that Ranger has an expiration date and you have to think that Rossing's days are numbered. As for Langer Heinrich, if production is still only sold at spot, its chances of survival are slim, especially if you believe as I do that Paladin's financials will stay shaky even after the planned resurrection.

Nevertheless, it's entirely possible, that the timing for Mulga Rock is right on and that Vimy will be able to thread the needle between despair and upside. It just depends on how fuel buyers view the future. ●

## CGN Offers Mixed Signals on 2018 Output Plan for Husab

By Roger Murray, Global Correspondent

The large, open-pit Husab uranium mine in Namibia's central Erongo region produced just over 1,000 tonnes U3O8 in 2017, majority owner CGN has disclosed. This equates to 2.2 million pounds U3O8, or just under one-sixth (15%) of Husab's 15 million pounds per year design capacity.

Given the huge size of the mine site and what industry sources say are problems with ore grade variability, this has to be rated as an achievement by the Chinese company, although clearly there is a still along way to go before Husab attains nameplate production.

CGN owns a 54% equity interest in the locally-registered mine owner Swakop Uranium and China-Africa Development Fund (CADFund) 36% via Hong Kong-based Taurus Mineral. State-owned Epangelo Mining Co. owns the remaining balance 10% via a free-carried equity shareholding.

The Husab production number was reported by China Daily on Jan. 24, which stated the mine "will continue to be optimized" during 2019. However, the newspaper was a little fuzzy in describing how fast the mine would reach design capacity.

First it quoted CGN spokesman Huang Xiaofei as stating that the company will ramp up throughput "to ensure the mine reaches its design capacity by this year." But then it said the mine will produce 6,500 tonnes of uranium oxide "within a few years," which is not quite the same thing.

Namibia's latest official medium-term growth projection is predicated on Husab moving to full output by the end of 2019.

China Daily added that Husab's optimization is part of CGN's efforts to expand its uranium supply chain for domestic and worldwide civil projects; it has put together agreements in most of the world's uranium-producing countries, including Namibia, Kazakhstan, Australia and Canada.

### Slower Ramp Up Cuts GDP Growth

Husab's slower than anticipated ramp up is one of the factors in a recent downgrade by the Bank of Namibia of its economic growth projections for this year and next.

That followed Namibia's weaker than expected economic performance in 2017, when real GDP growth contracted for each of the first three quarters, representing average negative growth of -1.6%.

This was despite the mining sector averaging 19% output growth during the first nine months, reflecting higher rough diamond recoveries, increased production by the Rössing uranium mine and Husab's initial production.

The Bank of Namibia stated that Husab had begun "commercial" production during 2017.

But higher mining output was more than offset by a continued sharp contraction in the construction sector for the second year running due to the completion of major mining projects (including Husab) in 2015, and reduced government building work due to budgetary constraints.

The wholesale and retail trade sector also contracted by a substantial margin, due to reduced domestic demand and lower consumer confidence.

While a further expansion in Namibia's diamond and uranium output probably enabled a resumption of positive growth in the final quarter of last year, this is unlikely to have been sufficient to have avoided negative growth for calendar year 2017 as a whole.

### GDP Grows 3.3% If Husab Delivers

Accordingly, real GDP growth is projected at 2.1% for 2018 and 3.3% for 2019 in the Bank of Namibia's December economic outlook. This is well down from the July 2017 outlook's growth forecasts of 3.8% and 3.5%, respectively.

The latest forecast states that "medium-term growth is expected to be sustained by improved growth in uranium mining as the Husab mine ramps up production to reach its maximum production capacity."

On that basis, the bank projects that uranium mining output is expected to grow "robustly" by 16% in 2018 and 40% in 2019. However, it noted that this mining sub-sector's growth performance "is clouded by uncertainty" around a recovery in the uranium price.

The central bank stressed that its growth forecast "assumes a modest increase in the international price of uranium." It cautioned that "the persistently low uranium price remains a major risk" to Namibia's medium-term growth prospects. ●

## Rampaphosa Cleans House at Eskom, Halts New Build Plan

By Roger Murray, Global Correspondent

South Africa's political and economic prospects have begun to look distinctly better since the former trade union leader turned businessman Cyril Rampaphosa became the new leader of the ruling African National Congress Party (ANC) in December.

South Africa's business community has warmly welcomed his narrow victory over Nkosazana Dlamini-Zuma, the wife of President Jacob Zuma, as the rand has surged to its highest level against the U.S. dollar in just over three years at twelve to the greenback.

However, South Africa's controversial and hugely-costly nuclear new build program is being put on hold. In the view of Ramaphosa and a new team at the financially-strapped state energy company Eskom, allocated the lead role in commissioning a new generation of nuclear reactors, it is currently unaffordable.

Under the country's integrated resource plan (IRP), South Africa would build eight nuclear reactors to generate 9.6 GWe. The price tag is estimated to be around \$83 billion, equivalent to 28% of the country's 2016 GDP of \$295 billion.

Last October, the Department of Environmental Affairs authorized Eskom's final environmental impact report (EIA) for a first new plant at Dufnefontein, next to the existing Koeberg station.

Ramaphosa, currently the country's deputy president, is now effectively South Africa's president-in-waiting, as head of state Jacob Zuma will stand down before the next National Assembly elections in 2019 as he has already served the permitted maximum of two five-year terms.

London-based fortnightly newsletter Africa Confidential says he has moved with a mix of "determination and pragmatism" to initiate sweeping changes in the ANC and to prepare the ground for his government.

A key priority is to roll-back the tide of corruption and so-called state capture activities that engulfed Zuma and made South Africa an unattractive environment for foreign investors.

Instead, Ramaphosa has promised to build an "open and diverse" economy providing opportunities for all, especially young people and women, rather than just a few "privileged individuals and their families," a clear reference to Zuma and his links with the Gupta business group.

In his first policy statement at an East London public rally on Jan. 8, Ramaphosa said he aimed to resuscitate the country's moribund economy and welcome investment.

"We must not have an economy that discourages and chases away investors from investing in South Africa."

### Eskom Being Recalibrated

As a first step, the government has dismissed at Ramaphosa's behest senior Eskom executives implicated in fraud and appointed a new board.

Eskom has the key role in delivering new build nuclear; its two-unit Koeberg plant in Western Cape has a 1.8 GWe capacity, generating around 5% of South Africa's electricity.

State-owned Telkom chair Jabu Mabuza is Eskom's new head, with Absa Bank executive and former Land Bank CEO Phakamane Hadebe named as new acting group CEO with immediate effect.

The measures are intended to stabilize management at the utility and have been widely welcomed by the business sector.

Business Leadership SA (BLSA) CEO Bonang Mohale commented: "This is a clear display of commitment by government to the transformation of our state-owned corporations." Mohale added that Mabuza brought with him "unimpeachable integrity."

Business Unity SA (BUSU) CEO Tanya Cohen said the announcement was a significant step by government to "finally" rid Eskom of escalating maladministration and corruption.

For his part, Mabuza issued a statement identifying the need to establish transparent and effective governance as the initial priority.

Mabuza added: "With the right governance structures, the priority would be to restore the credibility and integrity of the utility with financial markets."

Former acting CEO Matshela Koko and suspended CFO Anoj

Singh, both implicated in state capture, have been summarily dismissed. The government has also recommended the board appoint a new permanent CEO and CFO within the next three months.

The Eskom board changes are just the start of the stable cleaning.

Deputy Public Enterprises Minister Ben Martins was due to appear before the resumed parliamentary inquiry into the utility this week.

Last year, Martins had vehemently denied allegations by Eskom's former head of legal Suzanne Daniels that he was present at a meeting with a member of the Gupta family at the center of allegations of state capture at the utility and Zuma's son Duduzane.

Daniels told the inquiry's previous session that Ajay Gupta signaled at the meeting that he would manipulate the timing of a court case into the illegal pension payout to disgraced former Eskom CEO Brian Molefe to suit the ANC faction loyal to Zuma.

In testimony last week, both Koko and Singh denied illicit dealings with the Guptas, who are alleged to have raked in billions from contracts facilitated by top officials at South African state-owned enterprises.

## **Nuclear Program Delayed**

The first indication that the new build nuclear program would be put on hold came at the recently-ended World Economic Forum annual meeting in Davos, Switzerland.

Asked at a Jan. 25 press conference if South Africa still intended to proceed with it, Ramaphosa responded, "We have got to look at where our economy is."

He added: "We have excess power and we have no money for major nuclear plant building....If, in our discussions as we proceed, we find that it doesn't in the end really make sense because we don't (have the) money, that is the type of discussion we will have."

The new build pause was confirmed by acting CFO Calib Cassim on Jan. 30, who said Eskom cannot afford to expand its nuclear power capacity. He was speaking to the local media during the release of Eskom's 2018 first half financial results.

"If [we] don't have a sustainable balance sheet now [we] can't commit to nuclear if I have limited funds," Cassim said. "Now the focus is on maintaining the current assets and then whether we can sustain nuclear in the future."

The six month figures confirmed Eskom's financial difficulties. Interim profits dropped by 34% to \$500 million due to declining sales and higher financing costs.

It also reported a \$1 billion cash shortfall. Cassim said an \$800 million cash injection was needed by Feb. 1 and a further \$800 million by the end of that month.

Eskom's current debt is \$31 billion, some of which acting CEO Phakamani Hadebe said may be converted into equity to reduce gearing.

He said the utility has secured 54% of funding for the 2017/18 financial year. But Hadebe stressed Eskom needed further engagement with investors and funders.

"We need to build credibility [which is] something that is earned."

That won't be helped by rating agency Moody's having downgraded Eskom's credit rating to junk status last weekend. ●

## May Government Plows on With Measures to Replicate Euratom Functions in U.K.

By Roger Murray, Global Correspondent

Prime Minister Theresa May's administration is plowing on with measures to replicate the nuclear agreements and safeguards currently assured by Britain's membership in Euratom.

However, as previously reported by FCW, May's government is committed to the U.K. leaving Euratom in conformity with its decision to exit the European Union, terms for which are currently being exhaustively (and exhaustingly) negotiated with the European Commission.

This might be only a matter of importance to the U.K. but for Britain's strategic position as an attractive market to overseas investors and nuclear reactor manufacturers/vendors for new build nuclear developments.

On this theme, May appears to have achieved a rare success during a three-day visit to China this week.

She agreed a joint trade and investment review with China as the first step towards an "ambitious" post-Brexit deal, the BBC reported.

According to the official text, the prime minister said: "We will be free to strike our own trade deals" after leaving the EU, following talks with China's President Xi Jinping.

He promised China's markets would be further opened to the U.K., including beef, dairy and other food products. May said £9 billion (\$13 billion) in business deals would be signed on her three-day trip.

There was no specific discussion of a particular model for a trade deal between the two countries after Brexit during the two leaders' 80 minute meeting.

But the point of the review was to look at what model could work best, a U.K. spokesman said.

### Draft Nuclear Regulations

The administration published on Jan. 19 initial pre-consultation versions of nuclear safeguards regulations to enable early

engagement with parliament, industry and other stakeholders.

The regulations, drafted by the Department for Business, Energy and Industrial Strategy (BEIS), set out the post-Brexit nuclear safeguards regime and the department's powers to make regulations under the Nuclear Safeguards Bill.

In explanatory notes to the documents, BEIS stated: "Although good progress has been made with the two sets of regulations, they are still being developed with the Office for Nuclear Regulation (ONR); some elements are dependent on external issues, and some require further policy development."

Formal public consultation on the proposed rules is currently planned for spring 2018, after which they will be tabled in parliament before the end of the year.

There are presently two safeguards agreements with the International Atomic Energy Agency (IAEA), a voluntary offer agreement and an additional protocol. They comprise trilateral agreements between the IAEA, the U.K and Euratom, and are primarily fulfilled through Britain's Euratom membership.

As a result of Britain's intended withdrawal, the current trilateral agreements will become ineffective.

Consequently, the country will need to conclude new bilateral safeguards agreements with the IAEA, in connection with the Treaty on the Non-proliferation of Nuclear Weapons.

BEIS anticipates that Britain will sign new bilateral nuclear co-operation agreements with other states, including nuclear safeguards obligations, for example, with Australia, Canada, Japan and the U.S.

These agreements may impose additional safeguards obligations on Britain, relating to the supply of qualifying nuclear material.

As a result, ONR may need to share certain information it receives from operators with the IAEA and with other countries.

The regulatory agency said it will engage with stakeholders to discuss the operation of the future domestic safeguards regime in the coming months.

### Energy Security Post-Brexit

A report by a House of Lords energy and environment subcommittee published Jan. 29 report concluded that Brexit will put Britain's current "frictionless" trade in energy with the EU at risk.



In the document, the six-member, cross-party, subcommittee called on the government to detail how it will work with its European Union counterparts to anticipate and manage supply shortages, and to assess what impact leaving the internal energy market would have on the price paid by consumers for their energy.

The panel heard evidence that the U.K.'s ability to build future on nuclear generation sites, including Hinkley Point C, would be in doubt if access to specialist EU workers is curtailed.

Failure to replace Euratom Treaty provisions by the time Brexit occurs could result in the U.K. being unable to import nuclear materials.

The report concluded that Britain might become more vulnerable to energy shortages in the event of extreme weather or unplanned

generation outages.

Committee chair Lord Teverson commented: "Individuals and businesses across the U.K. depend on a reliable and affordable supply of energy. In recent years, the U.K. has achieved such a supply in partnership with the EU, working with other member states to make cross-border trade in energy easier and cheaper.

Teverson added: "Over the course of the inquiry the committee heard benefits of the U.K.'s current energy relationship with the EU"

But it remained unclear how this could be achieved, he said, without the U.K. remaining in the EU single market and the other bodies that develop and implement the EU's energy policy. ●

*continued from Mulga Rock DFS on page 1*

But the firm is being advised by Société Générale on the level of pricing and volume necessary to get a green light on final investment and construction decisions.

"Using our financial model, the bank will provide us with the minimum contract terms on price, offtake percentage, contract terms and counterparties that we need to achieve for debt funding," Young said.

"We are therefore seeking cornerstone partners with low counterparty risk, and this of course includes the U.S.A.," he added.

Under the DFS, Mulga Rock will produce 3.5 million pounds per year, taking total production over a projected 15-year mine life to 47.1 million pounds, with an all-in-sustaining cost of \$34 per pound.

Cash operating costs for the initial five years of the project are forecast at \$25.11, while life of mine cash costs come in at \$27.95. Those numbers result in annual free cash flow (EBITDA) of A\$134 million (\$108 million) after royalties.

At \$60 per pound, pre-tax NPV (8%) is estimated at A\$530 million (\$426 million), with an IRR of 25% and a project payback period of 3.1 years after the start of production.

Mulga Rock's capital cost stands at almost half a billion Australian dollars (\$397 million), including \$41.7 million (\$34 million) in contingencies

Vimy noted that price has the greatest impact on project economics, as every \$5 per pound increase in contract prices results in NPV increasing by A\$172 million (\$138 million) (see table, below).

Table 14.1: Financial return at different uranium prices

Item	Unit	Uranium Price (US\$/lb U <sub>3</sub> O <sub>8</sub> )				
		US\$44.58/lb	US\$55/lb	US\$60/lb	US\$65/lb	US\$70/lb
NPV <sub>8</sub> (inc. royalties, pre-tax)	A\$M	0	358	<b>530</b>	702	874
IRR	%	8.0	20.4	<b>25.3</b>	29.8	34.1
Payback	Years	5.6	3.7	<b>3.1</b>	2.6	2.2

### Jump in Reserves Improves Economics

The substantial jump in mineral resources to 90.1 million pounds grading 570ppm U3O8 announced last year will likewise boost Mulga Rock's financials (see Table 5.1, p. 9).

This represents an increase of 20% in contained U3O8 metal for the global resource compared to the 2015 prefeasibility study, including a 10% increase in uranium grade and 9% increase in tonnage.

More importantly, the Mulga Rock East area made up of the Ambassador and Princess deposits has increased by 34% in contained metal comprising a 17% increase in grade and a 13% increase in tonnage when compared to the PFS.

The project's total ore reserves of 42.3 million pounds grading 845ppm U3O8 are based on the optimized pit designs for Ambassador, Princess and Shogun, which contain 85% of proved and probable ore reserves (see Table 5.2, p. 9).

Over 90% of the first 10 years of production is supported by reserves at the three deposits. There was a 98% conversion of measured resources into proved ore reserves, and 91% conversion of indicated material into probable ore reserves.

Vimy said the operation will use a "simple, open pit operation" at a maximum depth of only 74 meters, while the process plant will adopt "a simple method of extraction" involving atmospheric acid leaching and resin-in-pulp processes.

The firm plans to mine three major high-grade pit shells at Ambassador, Princess and Shogun that will be the focus of initial mining activities during the 3.1 year payback period.

### DFS vs PFS

The most significant difference between the 2015 PFS and this week's DFS, besides the upward revision in resources, is NPV which improved by nearly 40% to A\$530 million (\$426 million), using the same \$60 price and exchange rate (A\$1.00:US\$0.70).

Vimy said the improvement is the result of a higher mineral resource uranium grade; lower uranium price pit shells; inclusion of a sulfuric acid plant in the processing facility; higher uranium production during the initial ramp-up period due to higher grade ore being sourced; and a 500,000 pound increase in annual nameplate production.

Total cash operating costs fell by \$3.40 per pound, 12%, despite higher costs for some inputs. Process plant maintenance

### Mulga Rock DFS Key Metrics

Resource (ppm U3O8)	
Life of mine (yrs)	15
Plant ore throughput (Mtpa)	2.4
Grade, yrs 1-5	1,010
Run of mine grade (LOM)	770
Average strip ratio (BCM/t ore)	12.1
Production (Mlbs U3O8)	
Metallurgical recovery (%)	87.3
Annual production	3.5
LOM	47.1
Capital (A\$M)	
Pre-production	36.3
Mining	107.8
Process plant and infrastructure	211.4
Indirects, owner's costs, contingencies	137.5
Total	493
Operations (\$/lb U3O8)	
Exchange rate (AUD:USD)	0.7
Cash opex (yrs 1-5)	25.11
Cash opex (LOM)	27.95
All-in-sustaining cost (yrs 1-5)	30.16
AISC opex (LOM)	34
Royalties	
Western Australia (%)	5
Resource Capital Fund VI (%)	1.15
Project Financials	
Price assumption (\$/lb U3O8)	60
NPV (A\$M)	530
IRR (%)	25.3
Payback (yrs)	3.1

Source: Mulga Rock Definitive Feasibility Study

increased \$1.19 per pound due to corrosive process conditions. But reagent expenses fell by \$4.70 per pound after sulfuric acid use was incorporated.

According to the DFS, it will take 122 weeks to design, construction and commission Mulga Rock.

The project is scheduled to be implemented in two stages, the first involving all site activities except the beneficiation plant, and the second installation and commissioning of the beneficiation plant.



Buying, installing and turning on the SAG mill is the project's critical path and the equipment must be ordered 18 months ahead of commissioning. Regarding the beneficiation plant, the schedule for delivery and installation is expected to take 70 weeks, with construction starting at the end of year 1,

in preparation for the cessation of high-grading at the mine in year 2, month 8. Another 18 weeks will be scheduled for commissioning. The process plant will take 24 months to fully ramp-up, with the plant operating at 83% of design throughput within twelve months. ●

Table 5.1: Mulga Rock Project Mineral Resource, July 2017

Deposit / Resource	Classification	Cut-off Grade (ppm U <sub>3</sub> O <sub>8</sub> )	Tonnes (Mt) <sup>1</sup>	U <sub>3</sub> O <sub>8</sub> (ppm) <sup>2</sup>	U <sub>3</sub> O <sub>8</sub> (Mlbs)
<b>Mulga Rock East</b>					
Ambassador	Measured	150	5.2	1,100	12.6
Ambassador	Indicated	150	14.8	800	26.0
Ambassador	Inferred	150	14.2	420	13.1
Princess	Indicated	150	2.0	820	3.6
Princess	Inferred	150	1.3	420	1.2
<b>Sub-Total</b>			<b>37.4</b>	<b>680</b>	<b>56.4</b>
<b>Mulga Rock West</b>					
Shogun	Indicated	150	2.2	680	3.2
Shogun	Inferred	150	0.9	290	0.6
Emperor	Inferred	150	30.8	440	29.8
<b>Sub-Total</b>			<b>33.8</b>	<b>450</b>	<b>33.6</b>
<b>Total Resource</b>			<b>71.2</b>	<b>570</b>	<b>90.1</b>

1. t = metric dry tonnes; Appropriate rounding has been applied, and rounding errors may occur.
2. Using cut combined U<sub>3</sub>O<sub>8</sub> composites (combined chemical and radiometric grades).

The information in the table above is extracted from ASX announcement entitled 'Significant Resource Update – Mulga Rock Cracks 90Mlbs' released on 12 July 2017 and available to download from [www.asx.com.au](http://www.asx.com.au) ASX:VMY. The Company is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

Table 5.2: Mulga Rock Project Ore Reserves, August 2017

Deposit / Resource	Classification	Cut-off Grade (ppm U <sub>3</sub> O <sub>8</sub> )	Tonnes (Mt) <sup>1,2</sup>	U <sub>3</sub> O <sub>8</sub> (ppm) <sup>3</sup>	U <sub>3</sub> O <sub>8</sub> (Mlbs) <sup>4</sup>
<b>Mulga Rock East</b>					
Ambassador	Proved	150	5.3	1,055	12.3
Ambassador	Probable	150	14.1	775	24.0
Princess	Probable	150	1.7	870	3.3
<b>Sub-Total</b>			<b>21.1</b>	<b>850</b>	<b>39.6</b>
<b>Mulga Rock West</b>					
Shogun	Probable	150	1.6	760	2.7
<b>Sub-Total</b>			<b>1.6</b>	<b>760</b>	<b>2.7</b>
<b>Total Reserves</b>			<b>22.7</b>	<b>845</b>	<b>42.3</b>

1. Tonnages and grades are reported including mining dilution.
2. t = metric dry tonnes; appropriate rounding has been applied and rounding errors may occur.
3. Using cut combined U<sub>3</sub>O<sub>8</sub> composites (combined chemical and radiometric grades).
4. Metallurgical plant recovery factors are not applied to Total Metal content.

The information in the table above is extracted from ASX announcement entitled 'Major Ore Reserve Update – Moving to the go line' released on 4 September 2017 and available to download from [www.asx.com.au](http://www.asx.com.au) ASX:VMY. The Company is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

**Peninsula Energy** (ASX:PEN) has signed binding agreements to sell a portion of its interests in existing long-term uranium sale and purchase agreements to a third party for \$19 million.

These relate to two existing sale and purchase agreements and 935,000 pounds (425 tonnes) U3O8 of delivery obligations scheduled between 2018 and 2021.

The firm has also sold its entire interest in an agreement to purchase 900,000 pounds (408 tonnes) U3O8 between 2018 and 2020, which would have provided the bulk of the material for those delivery commitments.

Peninsula operates the **Lance** project in Wyoming and has up to 6.6 million pounds (2,994 tonnes) U3O8 remaining under contract for delivery between 2018 and 2030. Proceeds from the contract sales were received in full on Jan. 31.

Managing Director/CEO Wayne Heili commented: “One of Peninsula’s defining strengths is our sales contract portfolio. Today we have greatly enhanced our current financial position by accelerating some of the income potential contained in that portfolio.”

He added: “This non-dilutive cash infusion should allow the company to comfortably advance our production improvement initiatives at the Lance projects.”

The 2018 winter drill program at the **Rook I** property in Saskatchewan’s Athabasca Basin is underway.

Owner **NexGen Energy** (TSX:NXE, NYSE MKT:NXE) said Jan. 29 that the program will consist of approximately 25,000m using eight drill rigs and focus on a number of key objectives.

At the **Arrow** deposit, drilling will focus on further A3 high grade zone definition, targeting the large untested areas surrounding the A1-A5 shears, potential extensions of the shears particularly to the north east and definition of newly discovered high grade mineralization northwest of the A1 shear (*FCW #733, Jan. 19*).

At **South Arrow**, drilling will continue to focus on defining the extent of mineralization in all directions. Highly ranked geophysical targets on the Arrow, South Arrow and **Mirror** conductors will be targeted due to the results of geophysical surveys conducted predominantly in 2016 and 2017.

NexGen said geotechnical, hydrogeological and metallurgical work continues to support the maiden pre-feasibility study scheduled for Q3. It has roughly C\$155 million (\$126 million) cash on hand.



A trial has commenced to test the effectiveness of electrical resistivity to detect channels at the base of the gravel layer at the **Laguna Salada** property in Argentina, owner **U3O8 Corp.** (TSX:UWE) said Jan. 30.

Exploration elsewhere at the deposit has shown that channels contain higher-grade uranium-vanadium mineralization that could further improve the positive economics of the deposit.

The NI 43-101 resource at Laguna Salada was based principally on a 1m thick layer of uranium-vanadium bearing gravel that extends from surface to a maximum depth of only 3m.

Exploration that was completed following the resource estimate revealed a second layer that contains generally higher uranium-vanadium grades that may result in the estimated cash cost of production being even lower than for the near-surface material on which the preliminary economic assessment was based.

Current resources at Laguna Salada total 10.1 million pounds U3O8, of which 6.3 million pounds are measured. The project’s estimated capital cost is \$136 million, with cash costs of \$22 per pound, net of by-product vanadium.

The test work is expected to be completed in mid-February, and if successful, a more extensive geophysical program will be considered to provide specific targets for exploration by pitting with an excavator.

The winter 2018 exploration program at **Christie Lake** is underway, with the goal of expanding resources on the **Yalowega** uranium trend.

Operator **UEX Corp.** (TSX:UEX), which holds a 45% interest in the project, said Jan. 29 that the C\$1.5 million (\$1.2 million) program consists of approximately 4,500m of drilling in 9 holes, focusing on testing targets located along strike and northeast of the **Örora** deposit discovered in 2017.

Highlights of the discovery included hole CB-109, which intersected 22.81% U<sub>3</sub>O<sub>8</sub> over 8.6m from 475.1 to 483.7m, and hole CB-116A, which returned 20.00% U<sub>3</sub>O<sub>8</sub> over 8.5m from 471.0 to 479.5m.

UEX said the winter program will be “a major step” towards earning a 60% interest in Christie Lake. The company continues to work with a consulting firm to complete the maiden NI 43-101-compliant resource estimate for the project.

The second phase of beneficiation development test work at **Wiluna** has confirmed potential substantial capital and operating cost reductions.

**Toro Energy** (ASX:TOE), owner of the Western Australia project, said this week the results validate at scoping level that the re-design of the process flow sheet significantly reduces the capital and operational costs of the proposed hydrometallurgical plant. Key changes in the re-design and processing flowsheet included:

- the introduction of a beneficiation circuit that used simple screening and de-sliming to concentrate uranium;
- a filtration and washing step which removes saline water and produces a drier leach feed, thereby reducing reagent consumption;
- a unique wash water recirculation to increase reagent

utilization and reduce reagent losses; and

- the introduction of ion exchange which removes the need for evaporation ponds.

The test work confirmed de-sliming to be robust on all ore types, providing a beneficiated ore feed amenable to all other proposed downstream processing techniques in the redesigned plant

Clay80 ore, one of Wiluna’s dominant ore types, continued to perform above expectations in terms of producing a low mass, high grade concentrate after screening and de-sliming.

Vacuum filtration of Clay80 ore after beneficiation successfully removed saline water from the de-slimed concentrate at filtration rates equal to or greater than those achieved in the preliminary test work.

This, Toro said, confirms the potential for a significant reduction in reagent use and the potential to replace direct precipitation with ion exchange in the processing circuit

Heavy liquid separation testing has indicated that a gravity separation process will be an efficient method of rejecting two major consumers of reagents in the leach, gypsum and celestine, from the coarse component of the two main ore types

Gravity separation presented itself as a potentially effective method of further beneficiating the low grade coarse component of already beneficiated ore. ●

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*Fuel Cycle Week* is published every Friday, 44 times a year.

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