



ABN 63 111 306 533

## QUARTERLY REPORT TO SHAREHOLDERS

for the three months ended  
30 September 2018

### ASX Code - EME

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This report and further  
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Energy Metals' website at:

[www.energymetals.net](http://www.energymetals.net)



## HIGHLIGHTS

### Bigirlyi JV Project (NT)

Study of vanadium mineralisation at Bigirlyi commences.

Uranium series disequilibrium study at Bigirlyi Anomaly-2 deposit (oxidised carnotite zone) indicates significant but variable disequilibrium.

### Ngalia Regional Project (NT)

Enhanced processing of aerial electromagnetic (AEM) survey imagery reveals details of uranium-prospective, buried palaeochannels in the eastern Ngalia Basin.

High resolution ground penetrating radar survey over AEM conductivity anomalies identifies palaeochannel targets at depths of 40m to 90m.

## FINANCIAL

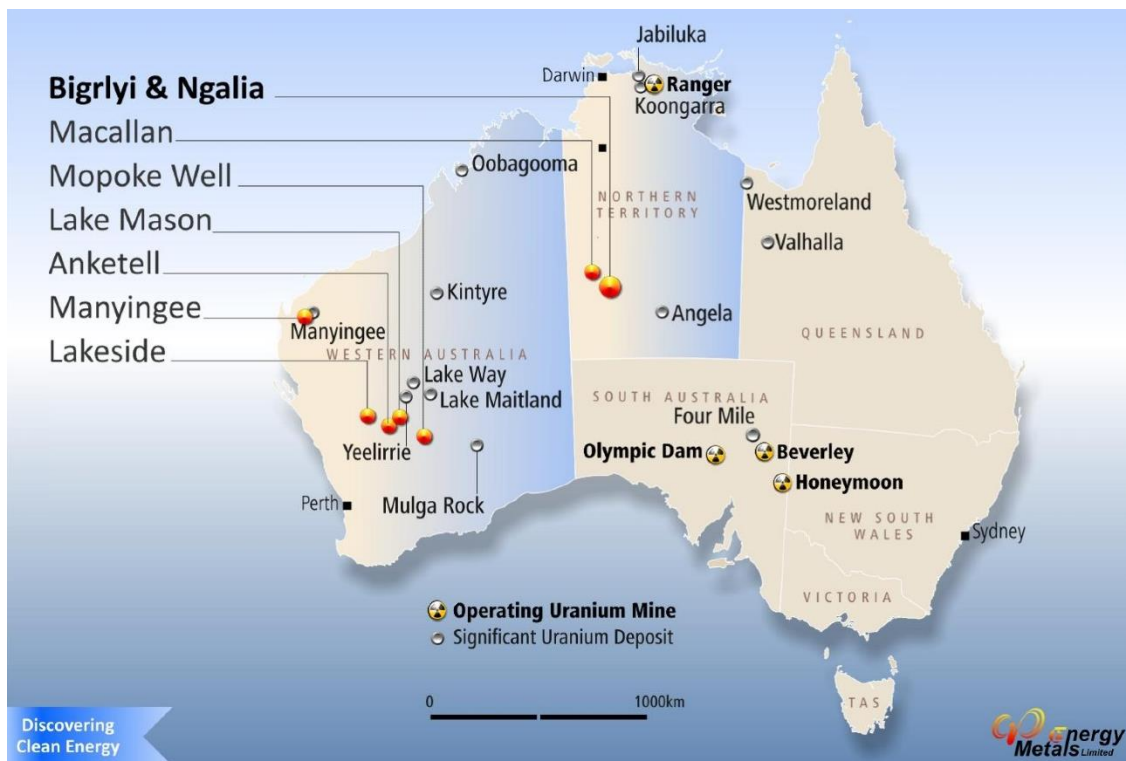
Energy Metals had approximately \$18.3M in cash and 209.7M shares on issue at 30 September 2018.

A handwritten signature in black ink, appearing to read '肖树青' (Xiao Shuqing).

Shuqing Xiao  
Managing Director  
29 October 2018

## **INTRODUCTION**

Energy Metals (EME) is a dedicated uranium company with eight exploration projects located in the Northern Territory (NT) and Western Australia covering over 3,200 km<sup>2</sup> (Figure 1). Most of the projects contain uranium mineralisation discovered by major companies in the 1970's, including the advanced Bigrlyi Project (NT).



**Figure 1 – Location of Energy Metals Projects**

Energy Metals is well placed to take advantage of the favourable outlook for Uranium as nuclear power continues to play an increasing role in reducing global carbon emissions.

Importantly Energy Metals is one of only five companies that currently hold all the required permits and authorities to export Uranium Oxide Concentrates (UOC) from Australia. The Company has completed its first shipment of UOC and is negotiating with Australian uranium producers to enable further shipments from Australia for resale, primarily to major Chinese utility China General Nuclear Power Group (CGN), ultimately Energy Metals' largest shareholder.

China Uranium Development Company Limited, Energy Metals' largest shareholder (with 66.45% of issued capital), is a wholly owned subsidiary of CGN. As of 30 September 2018, CGN had 21 operating nuclear power units with a generation capacity of 22,550MWe and 9,180MWe of capacity under construction in seven other nuclear power units across various locations in China. Additionally, CGN is one of only two companies authorised by the Chinese government to import and export uranium.

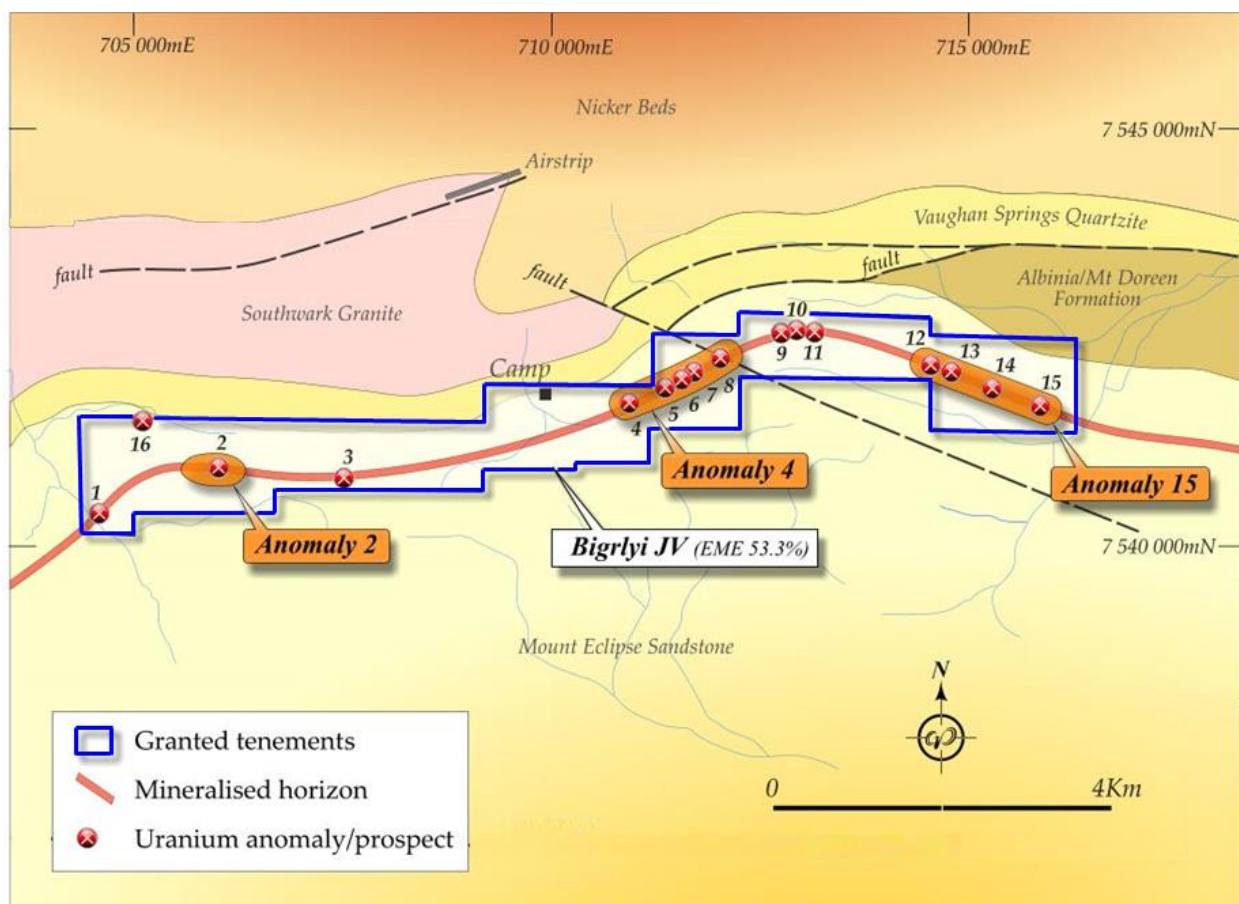
This unique relationship with CGN gives Energy Metals direct market exposure as well as access to significant capital and places the Company in a very strong position going forward.

## **NORTHERN TERRITORY**

### **Bigrlyi Joint Venture (EME 53.3%)**

The Bigrlyi Joint Venture comprises 11 granted exploration licences in retention (ELRs), one granted EL, and several applications within the Ngalia Basin, located approximately 350km northwest of Alice Springs. EME operates the Joint Venture in partnership with Northern Territory Uranium Pty Ltd and Southern Cross Exploration NL. The Bigrlyi Joint Venture tenements have been subject to significant exploration activity since discovery in 1973, including over 1,040 drill holes, metallurgical testwork and mining studies, with most work undertaken at the Bigrlyi project (Figure 2).

The Bigrlyi project is characterised by relatively high uranium grades, vanadium credits and excellent metallurgical recoveries. Historical base case acid leach tests recorded extraction rates of 98% uranium. For further information on metallurgical testwork, resource estimates and economic studies please refer to ASX announcements or the Company's website [www.energymetals.net](http://www.energymetals.net).

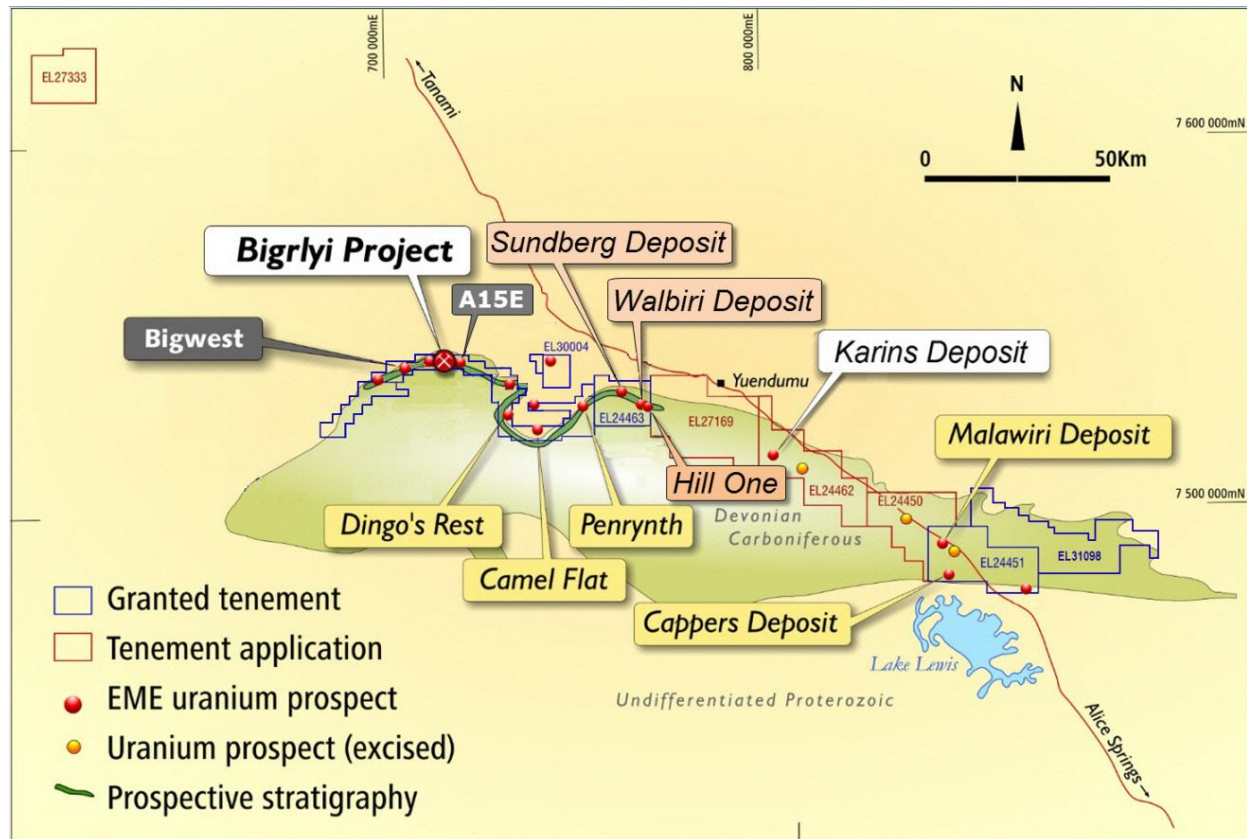


**Figure 2 – Bigrlyi Joint Venture Project area showing simplified geology**

The historic Karins deposit, located approximately 260km northwest of Alice Springs (Figure 3), is located on tenement applications MLN1952 and MCS318-328, which are part of the Bigrlyi Joint Venture. Karins is a tabular uranium-vanadium style of deposit similar to Bigrlyi although with an oxidised zone (carnotite zone) of variable thickness. EME acquired CPM's interest in the

project in 2005, including all the historical exploration records. A maiden JORC-compliant resource estimate for the Karins Deposit was released to the ASX in July 2015.

In October 2015, a maiden JORC (2012) resource estimate was announced for the historic Sundberg deposit, a satellite of the larger Walbiri deposit (Figure 3).



**Figure 3 - Uranium deposits, occurrences and exploration target areas in the Ngalia Basin**

### **Walbiri Joint Venture (EME 41.9%)**

ELR45, granted in August 2014, covers part of the historical Walbiri deposit and part of the Hill One satellite deposit (Figure 3). The project is a joint venture with Northern Territory Uranium Pty Ltd (58.1%), with EME as the operator. In October 2015 an initial JORC (2012) mineral resource estimate was announced for the Walbiri deposit, confirming Walbiri as the third largest sandstone-hosted uranium deposit in Central Australia after Angela and Bigrlyi.

### **Malawiri Joint Venture (EME 52.1%)**

ELR41, granted in August 2014, covers the historical Malawiri deposit. The project is a joint venture with Northern Territory Uranium Pty Ltd (47.9%) with Energy Metals as the operator. A program of digitisation and reprocessing of historical gamma logs, core re-logging, and historical data compilation and verification was completed in mid-2015 and a small drilling program was completed in September 2016. In late 2017 EME advanced the Malawiri project to JORC-compliant resource status with announcement of a maiden inferred-category mineral resource estimate of 542 tonnes  $U_3O_8$  (for further details see ASX announcements of 27 September 2016 & 14 December 2017).



## JV Activities (September 2018 Quarter)

Energy Metals' exploration strategy is to progressively advance its projects toward economic development within current market constraints. For its advanced JV projects, Energy Metals' aim is to ensure that they meet the high standards necessary for any future development to proceed in a timely manner once market conditions improve.

**Vanadium Study.** Recent increased commodity market interest in vanadium, partly due to its importance in energy storage technologies, has resulted in improved pricing - over \$27 per lb  $V_2O_5$ , currently near parity with the spot price of  $U_3O_8$  (also \$27 per lb). Recovery of vanadium is likely to enhance the economics of a uranium mining development at Bigirlyi where vanadium is a significant accessory commodity. The Bigirlyi deposit shows many geological similarities with sandstone-hosted uranium-vanadium deposits of the Colorado Plateau, USA, where vanadium and uranium were historically co-mined for many years in the 1950s to 1970s. Just as in the Colorado Plateau deposits, some parts of Bigirlyi are known to be rich in vanadium and relatively poor in uranium. However, the factors that control vanadium distribution at Bigirlyi relative to uranium and its mineralogy and hence its prospects for metallurgical extraction are not well understood. This quarter Energy Metals commenced a program to further investigate vanadium mineralogy and metallurgy at Bigirlyi, including studies on the controls and distribution of vanadium mineralisation in cooperation with CSIRO researchers and external consultants.

**Uranium-Series Disequilibrium Study at Anomaly-2.** During the quarter, results were received ex ANSTO laboratories, Sydney, from an investigation of uranium-series disequilibrium in mineralised samples from the Anomaly-2 sub-deposit at Bigirlyi. This deposit differs from other Bigirlyi mineralised zones in that it is deeply weathered to a depth of 100m or more (carnotite zone) and therefore likely to be susceptible to radiochemical disequilibrium. Previous results confirmed that within error, unweathered Bigirlyi uranium mineralisation (uraninite zone) is in radiochemical equilibrium (refer to March 2018 Quarterly Report).

Radiochemical disequilibrium occurs in the uranium decay chain when geologically recent chemical processes disrupt the concentrations of one or more of the radioactive daughter isotopes. Disequilibrium is common in young, surficial, calcrete-style uranium deposits but is less common in older deposits such as Bigirlyi. A common form of disequilibrium, often occurring as a result of weathering or ground-water leaching, is caused by the migration of the radioactive isotope *Radium-226* away from mineralised host rock into its surroundings. This leads to formation of a radium halo around the uranium orebody. Separation of uranium from its radium daughter isotope has implications for the determination of equivalent uranium grades ( $eU_3O_8$ ) by the downhole gamma probe method. This arises because probe measurements are dominated by contributions from gamma emitters in the *Radium-226* decay chain. Where radium has migrated away from the orebody the gamma probe will under-report uranium grade, and where radium accumulates, the gamma probe will over-report grade. A correction factor known as the 'radioactive equilibrium factor' or  $REF = U_3O_8/eU_3O_8 = {}^{238}U\text{-activity}/{}^{226}Ra\text{-activity}$  must be applied to equivalent uranium grades where disequilibrium is proved. For the Bigirlyi deposit a REF value of 1 has previously been assumed and radiochemical equilibrium has recently been confirmed for the uraninite zone by modern measurements (refer to March 2018 Quarterly Report).

Direct measurements of radiochemical equilibrium are undertaken by the so called 'closed-can' method where a uranium ore sample is sealed in a container or 'can' to prevent escape of radon

gas and the activity of daughter isotopes are measured by gamma spectrometry after elapse of a sufficient period (weeks) to allow for ingrowth of radon progeny.

Six mineralised samples from previous drilling at Bigrlyi Anomaly-2 were selected for closed-can gamma spectrometric determination of uranium-series equilibrium at ANSTO's laboratories in Sydney. All samples are from the oxidised carnotite zone at a range of depths. The results are presented in Table 1 and indicate that the carnotite-dominant mineralisation shows a variable state of uranium series equilibrium; half the samples being in-equilibrium and half significantly out of equilibrium by 20 to 50% (low radium) with no depth control. This result likely reflects the variable nature of modern weathering processes and its effect on radium mobility.

**Table 1.** Determination of Radiochemical Equilibrium\*

Drill Hole**	Sample Depth (m)	Ore Mineral Zone	U <sub>3</sub> O <sub>8</sub> assay (%)	Activity U-238 (Bq/g)	Activity Ra-226 (Bq/g)	Activity Th-232 (Bq/g)	Activity K-40 (Bq/g)	REF (U/Ra)	Results
BRC11108	89	Carnotite	0.665	69.7	69	0.07	0.72	1.0	Equilibrium
BRC11109	36	Carnotite	0.22	23.1	23	0.09	0.71	1.0	Equilibrium
BRC11111	91	Carnotite	0.34	35.6	38	0.1	0.58	0.9	Equilibrium
BRC11112	65	Carnotite	0.211	22.1	15	0.09	0.69	1.5	Disequilibrium
BRC11114	91	Carnotite	1.158	121.2	98	0.06	0.61	1.2	Disequilibrium
BRC11114	122	Carnotite	0.246	25.7	22	0.05	0.81	1.2	Disequilibrium

\* A REF value in the range 0.9 to 1.1 is indicative of equilibrium within error (i.e. +/- 10%).

\*\* Refer to ASX release of 23 December 2011 for further information regarding these drill holes.

The results indicate that downhole gamma probe measurement will not accurately reflect uranium grade in parts of Bigrlyi Anomaly-2 – in fact gamma probe grades could be understating uranium grades by up to 50% in places. The variable nature of the disequilibrium, and the absence of any obvious controls, indicates that grade information for mineral resource estimate purposes at Bigrlyi Anomaly-2 should be chemical assay based.

### **Ngalia Regional Project (EME 100%)**

The Ngalia Regional project comprises twelve 100% owned exploration licences (total area approximately 3,100 km<sup>2</sup>) located in the Ngalia Basin, between 180km and 350km northwest of Alice Springs in the Northern Territory (Figure 3). The tenements are contiguous and enclose the Bigrlyi project as well as containing a number of uranium occurrences, including part of the historic Walbiri deposit and the Cappers deposit.

Nine of the twelve Ngalia Regional exploration licences have been granted; the three remaining applications (ELs 24450, 24462 and 27169) are located on Aboriginal Freehold (ALRA) land and Energy Metals is negotiating access agreements with the Traditional Owners through the Central Land Council (CLC) (Figure 3).

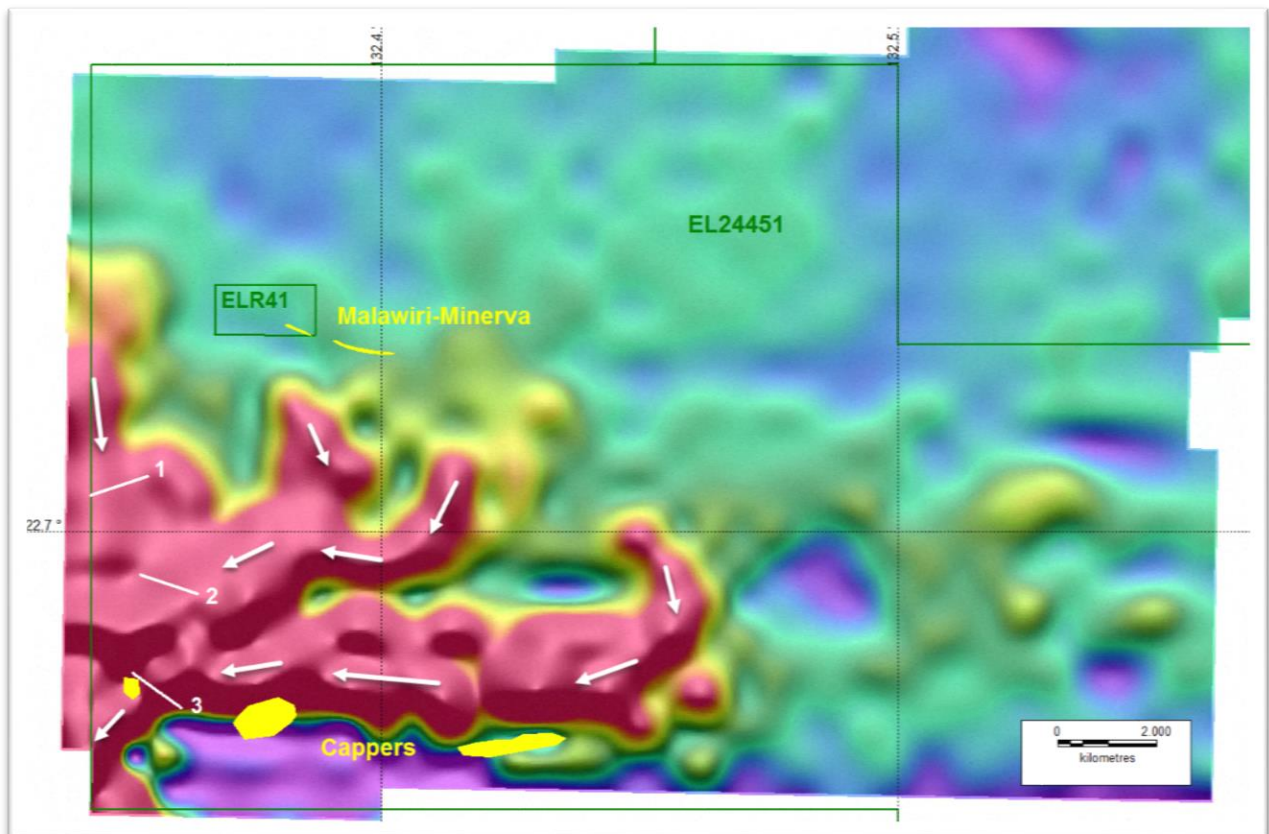
A number of high priority targets have been identified on the 100% owned tenements and Energy Metals is undertaking a program of systematic evaluation of these prospects, some of which were originally discovered in the 1970s. In February 2014, EME announced maiden resource estimates for the Bigwest, Anomaly-15 East and Camel Flat satellite deposits and in October 2015 EME announced inferred JORC resources for the historical Walbiri, Sundberg and Hill One deposits (Figure 3).

### Activities (September 2018 Quarter)

Field work was completed this quarter with a focus on enhancing Energy Metals' understanding of the various Ngalia Basin uranium-vanadium deposits and how they form, to improve targeting and future discoveries. Representative sampling of historic drill cores was undertaken as part of the vanadium study program (see above). Results from two geophysical survey programs were received this quarter.

**Eastern Ngalia Electromagnetic Survey.** In mid-2017 an aerial electromagnetic (AEM) survey was flown over parts of EL24451 and EL31098 in the eastern Ngalia Basin in conjunction with Geoscience Australia's *Exploring for the Future Program*. Final data products from the survey were received in June and interpretation and targeting work by Energy Metals' staff and external geophysical consultants was completed this quarter.

Enhanced processed AEM conductivity imagery over the eastern Ngalia Basin was received this quarter and an example is shown in Figure 4 below. The image is a conductivity slice at 30-40m depth and shows numerous buried, highly conductive, palaeochannel-like features, presumably containing saline groundwaters, which are located beneath and to the north of Energy Metals' Cappers deposit (a surficial calcrete-style uranium deposit). The Cappers deposit was only ever drill tested to a depth of 10m; the underlying older channel system is a new and deeper target within inferred palaeochannels of several kilometres length.



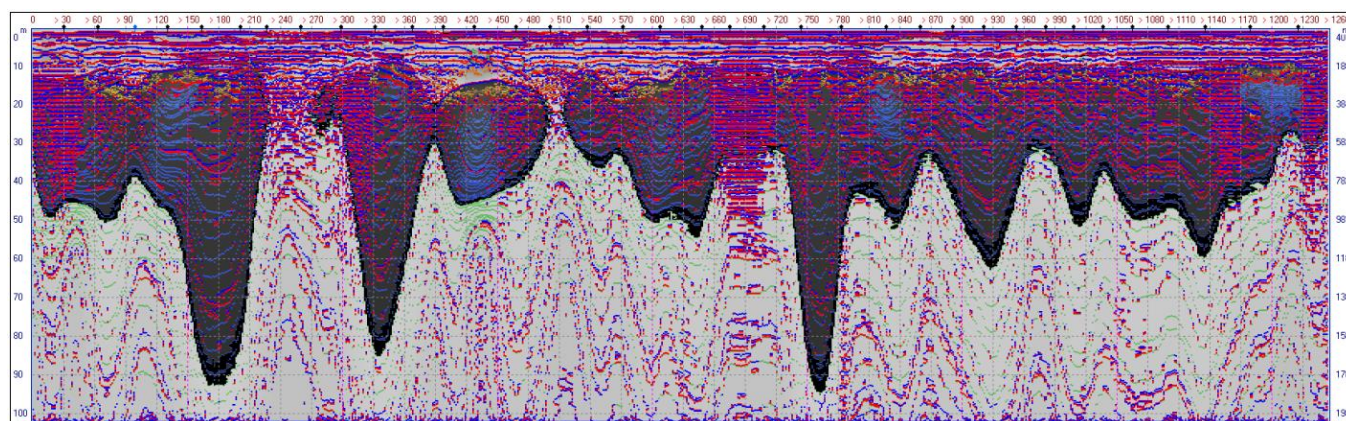
**Figure 4 – Enhanced AEM conductivity imagery for a 30-40m depth slice over southwest part of EL24451 (red = highly conductive, blue/purple = low conductivity) showing conductive palaeochannel-like features of several kilometres length inferred to drain from the north and east (arrows). Yellow outlines show Cappers calcrete uranium mineralisation (surficial) and Malawiri-Minerva sandstone-hosted uranium mineralisation (buried). The location of DS-GPR lines 1 to 3 shown.**



**EL24451 Deep-Sensing GPR Survey.** In order to refine targeting, three lines of approx. 1.2 km length each across the inferred palaeochannels (Figure 4) were selected for high-resolution, deep-sensing ground penetrating radar (DS-GPR) surveys by Lozar Radar Australia (Figure 5). The technique is able to detect the sub-surface architecture of buried channel-systems based on their contrasting radar signal response. Results are shown in Figure 6. Several deeper palaeochannels incised into inferred basement sandstone have been identified – all are considered future priority uranium drilling targets.

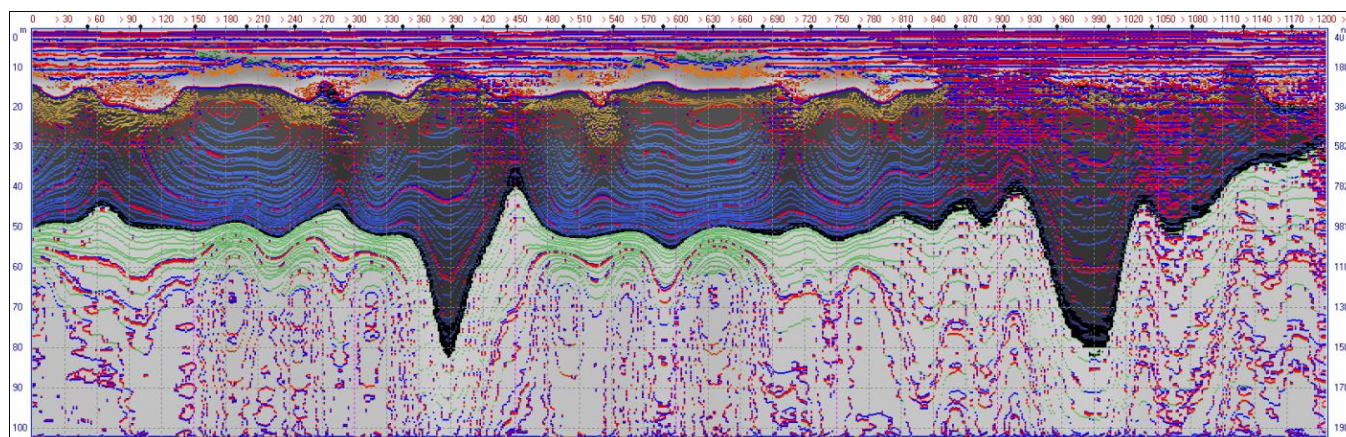


**Figure 5 – Manually towed GPR sensor & transmitter array on location, southwest EL24451, July 2018.**

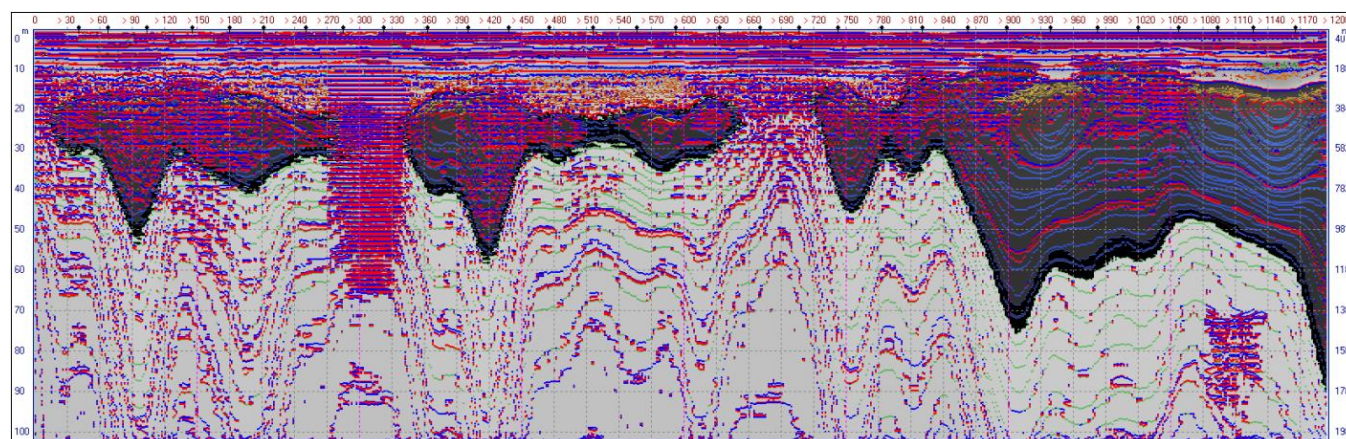


**GPR Line 1 – Three 80-90m deep channels incised into rugged sub-surface topography of approx. 30-50m depth**





**GPR Line 2 – Two 75m deep channels incised into smooth sub-surface of 40-50m depth shallowing in the east**



**GPR Line 3 – Deep channel system in the east, smaller incised channels on approx. 30m deep surface to the west**

**Figure 6 – Generated GPR profiles for lines 1, 2 and 3 to a depth of 100m showing three distinct units with different radar penetration/reflection properties: a surficial unit of 10-15m depth (bedded clay-rich lake sediments), a sub-surface channel-facies of variable thickness (sand & gravel - dark blue colours) and more consolidated basement (inferred sandstone - grey) into which channels have been incised. The conductivity anomalies seen in Figure 4 occur largely within the channel-facies.**

## **Macallan (EME 100%)**

The Macallan project comprises a single exploration licence application (ELA27333), located 460 km NW of Alice Springs and 140 km from Bigblyi. The tenement covers a strong 3km-wide bullseye radiometric anomaly. The Macallan anomaly lies within the Wildcat Palaeovalley, an ancient valley system that drains into Lake Mackay to the southwest. The Macallan anomaly most likely represents a surficial accumulation of uranium minerals associated with the Wildcat palaeodrainage system, although other explanations are possible.

ELA27333 lies on land under Aboriginal Freehold title and access is subject to negotiation with the Traditional Owners and the CLC. The negotiation period has been extended until October 2019.

## **WESTERN AUSTRALIA**

### **Manyingee (EME 100%)**

The Manyingee project comprises retention licence application R08/3, underlying tenement E08/1480 and exploration licence application E08/2856, which are located 85 km south of Onslow. The project is located adjacent to mining leases containing Paladin Energy's Manyingee resource, a stacked series of buried, palaeochannel-hosted, roll-front uranium deposits. In November 2016 EME announced an initial JORC (2012) Mineral Resource Estimate for the Manyingee East uranium deposit, which is located up-channel of Paladin's Manyingee deposit.

Law firm Gilbert+Tobin were appointed during the quarter to assist EME with landholder objections to grant of the Manyingee title applications. The objections are expected to proceed to Warden's Court hearings over the next few months.

### **Mopoke Well (EME 100%)**

The Mopoke Well project is located 55km west of Leonora on retention licence R29/1. The project contains two historic uranium prospects (Peninsula and Stakeyard Well) hosted by calcretised sediments associated with the Lake Raeside drainage system. A JORC (2004) mineral resource estimate was released to the ASX in March 2013.

There was no activity during the period.

### **Lakeside (EME 100%)**

The Lakeside project is located in the Murchison district 20km west of Cue on retention licence R21/1. This project was acquired to follow up previously discovered surficial uranium mineralisation at Lake Austin associated with calcrete and saline drainages. Aircore drilling campaigns were undertaken by EME in 2007, 2008, 2010 and 2012. A JORC (2012) mineral resource estimate was release to the ASX in June 2014.

There was no activity during the period.

### **Anketell (EME 100%)**

The Anketell project is located 50km west of Sandstone on retention licence R58/2 and comprises surficial calcrete-style mineralisation discovered by Western Mining (WMC) in 1972. Following completion of aircore drilling programs, an initial JORC (2004) mineral resource estimate was released to the ASX in July 2009.

There was no activity during the period.

### **Lake Mason (EME 100%)**

The Lake Mason project is located 25km north of Sandstone on retention licence R57/2 and comprises shallow carnotite mineralisation hosted in calcrete and calcareous sediments associated with the Lake Mason drainage system. A JORC (2004) mineral resource estimate was released to the ASX in December 2010.

There was no activity during the period.

## **CORPORATE**

In August 2018 Energy Metals announced that Dr Weidong Xiang had resigned as Managing Director and that Mr Shuqing Xiao had been appointed a non-executive director. Mr Xiao was subsequently appointed as Managing Director of the Company on 23 October 2018.

Energy Metals remains in a strong financial position with approximately \$18.3 million in cash and bank deposits at the end of the quarter, forming a solid resource for ongoing exploration and project development.



**Table 2: Tenement Information as required by listing rule 5.3.3**

TENEMENT*	PROJECT	LOCATION	INTEREST	CHANGE IN QUARTER
<b>Northern Territory</b>				
EL24451	Ngalia Regional	Napperby	100%	-
EL24463	Ngalia Regional	Mt Doreen	100%	-
EL31098	Ngalia Regional	Napperby	100%	-
EL31820	Ngalia Regional	Mt Doreen	100%	-
EL31821	Ngalia Regional	Mt Doreen	100%	-
ELR31754	Ngalia Regional	Mt Doreen	100%	-
ELR31755	Ngalia Regional	Mt Doreen	100%	-
ELR31756	Ngalia Regional	Mt Doreen	100%	-
ELR46	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR47	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR48	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR49	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR50	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR51	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR52	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR53	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR54	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR55	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR41	Malawiri Joint Venture	Napperby	52.1%	-
ELR45	Walbiri Joint Venture	Mt Doreen	41.9%	-
EL30004	Ngalia Regional	Mt Doreen	100%	-
ELA27169	Ngalia Regional	Yuendumu	100%	-
EL30144	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELR31319	Bigirlyi Joint Venture	Mt Doreen	53.3%	-
ELA24462	Ngalia Regional	Yuendumu	100%	-
ELA24450	Ngalia Regional	Yuendumu	100%	-
ELA27333	Macallan	Tanami	100%	-
MCSA318-328	Bigirlyi Joint Venture	Yuendumu	53.3%	-
MLNA1952	Bigirlyi Joint Venture	Yuendumu	53.3%	-
<b>Western Australia</b>				
E08/1480	Manyingee	Yanrey	100%	-
E08/2856	Manyingee	Yanrey	100%	-
R08/3	Manyingee	Yanrey	100%	-
R21/1	Lakeside	Cue	100%	-
R29/1	Mopoke Well	Leonora	100%	-
R57/2	Lake Mason	Sandstone	100%	-
R58/2	Anketell	Sandstone	100%	-

\* EL = Exploration Licence (NT); ELA = Exploration Licence Application (NT); ELR = Exploration Licence in Retention (NT); ELRA = Exploration Licence in Retention Application (NT); MCSA = Mineral Claim (Southern) Application (NT); MLNA = Mineral Lease (Northern) Application (NT); E = Exploration Licence (WA); R = Retention Licence (WA).

### **Competent Persons Statement**

*Information in this report relating to exploration results, data and cut-off grades is based on information compiled by Dr Wayne Taylor and Mr Lindsay Dudfield. Mr Dudfield is a member of the AusIMM and the AIG. Dr Taylor is a member of the AIG and is a full time employee of Energy Metals; Mr Dudfield is a consultant to Energy Metals. They both have sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are undertaking to qualify as a Competent Person as defined in the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves – The JORC Code (2012)". Dr Taylor and Mr Dudfield both consent to the inclusion of the information in the report in the form and context in which it appears.*

*This report references mineral resource estimates and/or related information that was prepared and first disclosed under the JORC Code 2004. It has not been updated since to comply with the JORC Code 2012 on the basis that the information has not materially changed since it was last reported.*