

Wednesday 21<sup>st</sup> December 2011

Australian Securities Exchange  
Company Announcements Platform  
ASX Code: USA

## RELEASE

# CONSIDERATION OF MINING METHODS FOR THE SAMPHIRE URANIUM PROJECT

## Key Points

1. UraniumSA Limited has commenced an assessment of the mining methods which may be available to maximise recovery of uranium from the total of 42 Mlb U<sub>3</sub>O<sub>8</sub> in Inferred Resources in the Blackbush and Plumbush deposits which it has identified in its 100% owned Samphire project, south of Whyalla on the Eyre Peninsula in South Australia.
2. The alternative mining methods now being examined are:
  - Open-pit mining. The top of mineralisation is at ~50m which makes it potentially accessible to a conventional mining operation. Such an operation would process all mineralised material mined and possibly recover up to 80% of the contained uranium.
  - In-situ recovery. On the basis of existing operations an ISR operation could be expected to recover 40 – 60% of the contained uranium. Not all of the mineralisation in the resource is contained in rocks amenable to ISR extraction, and recovery of accessible mineralisation is typically ~70%.
3. Exploration of mineralisation in bedrock below the Blackbush deposit (28 Mlb U<sub>3</sub>O<sub>8</sub> Inferred Resource in sediments above basement) has the potential to significantly add to the amount of mineralisation which could be recovered in an open cut operation. Such mineralisation would not be recovered by an ISR operation.
4. Exploration for mineralisation in bedrock elsewhere in the Samphire project has the potential to deliver new discoveries of uranium mineralisation and transform the asset base and development opportunities for the project.
5. The evaluation of ISR as a method for the development of the Blackbush deposit is well advanced and the Company has made application for a Retention Lease to enable it to conduct a field trial. This work will continue but at a reduced rate while bedrock exploration and evaluation of mining methods is underway.

As the above work is completed new indicative evaluation and development schedules towards production will be provided. The postponement of potential ISR production is more than balanced out by the prospect that the Company could be considering a project of a significantly larger scale and value.

More information is provided in the following pages.

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## FORWARD STRATEGY

UraniumSA has commenced a program of work to determine the optimal mining process for its 42M lb U<sub>3</sub>O<sub>8</sub> Inferred Resources of mineralisation in the Samphire project, south of Whyalla on the Eyre Peninsula in South Australia.

The discovery of uranium mineralisation in granite basement at Blackbush – within the Samphire project - will add substantially to the inventory of uranium mineralisation in the deposit and has the potential to completely change the scope and economic significance of the project and the Company. To optimise the actual and potential value of these developments the Company is completely reviewing the development and exploration options for the Blackbush deposit. Elsewhere across the Samphire project there are numerous good quality exploration targets emerging which the Company is confident will likely deliver exciting discoveries.

The Blackbush deposit, the most advanced prospect in the Samphire project with a 28M lb U<sub>3</sub>O<sub>8</sub> Inferred Resources of sediment-hosted mineralisation, has always been fast-tracked for production using the in-situ recovery (ISR) extraction method. However, the uranium in basement below the sediment-hosted resource of mineralisation would not be extractable by ISR. To ensure that the project proceeds with a mining plan that will optimise the recovery of the entire uranium resource – both sediment hosted and in basement - the Company has halted its focussed progression to ISR production while it reviews all of its mining and processing options.

### **Over the next two quarters the Company will:**

1. Focus on determining the size, grade and metallurgical characteristics of the granite-bedrock hosted mineralisation underlying the Blackbush deposit. This material will be evaluated as a potential addition to the existing sediment-hosted resource.
2. Start exploration across the Samphire project for repetitions of the uranium in basement granite identified at Blackbush. We expect more discoveries of this type of mineralisation.
3. Commence a systematic evaluation of the known Blackbush deposit sediment-hosted resource of mineralisation as a potential open pit operation. This will involve modelling and evaluation of the distribution, grade and metallurgical characteristics of the rock units within the deposit.
4. Continue the evaluation of the ISR mining option at the Blackbush deposit, but at a reduced rate. The planned field trial of the ISR method and ongoing geological evaluation of the deposit will continue.

A discussion of these intentions and schedule is provided below.

## Bedrock mineralisation

### Program and schedule

Exploration for granite hosted mineralisation will comprise:

1. An aeromagnetic survey to map the detail of magnetic-destructive alteration associated with mineralisation. This is being contracted for delivery during January 2012 with data to be available February 2012.
2. Pattern drilling in the area of the known mineralisation below the Blackbush deposit to determine the geometry, thickness and grade of these occurrences. Negotiations are in progress for drilling to commence February 2012.
3. Interpretation of the aeromagnetic data to identify new targets across the Samphire project. This will commence as data becomes available at the end of January and initial reconnaissance drilling will start late February to early March 2012.

### Background

Early in 2011 the Company announced the discovery of uranium in granite bedrock below the resource of sediment hosted mineralisation at the Blackbush deposit (ASX 25<sup>th</sup> May 2011). The granite mineralisation occurs immediately below and in contact with the sediment hosted mineralisation that comprises the existing Blackbush deposit Inferred Resources of ~28M lb U<sub>3</sub>O<sub>8</sub>. Geochemical and petrographic work (ASX 2<sup>nd</sup> December 2011) confirmed that the mineralisation/alteration is part of the granite complex, and that similar material occurs over a significant area below the sediment hosted resource.

### Exploration Model

The granite host rocks to this mineralisation at Blackbush are “A” type granites, a particular type of granite which is specifically associated with the Cu-Au+/-U mineralisation styles. The best known examples of the style would probably be the Roxby Downs, Prominent Hill and Carrapateena deposits in South Australia, and the Earnest Henry deposit in Queensland. The presence of these granites is an indicator of potential for mineralisation.

The mineralised granite drill core is an assemblage of quartz-clay-sericite alteration materials and the uranium mineralisation appears to be a primary phase. The alteration is a magnetic destructive style of alteration which is consistent with the association of the mineralised envelopes with broad magnetic-negative trends in the available aeromagnetic images.

The mineralisation is unusual and to date no unambiguous analogues with known deposits or styles have been established. One of the better exploration model fits is the association of magnetic destructive alteration with uranium mineralisation, as a variation of the “albitite-hosted” deposit style. A potentially analogous prospect is the Kurupung Batholith in Guyana, South America, which is described as having broadly similar geology, alteration and mineralisation, and which contains a number of discrete prospects with a global exploration objective of 30-35 Mlb U<sub>3</sub>O<sub>8</sub> at grades around 0.1%. The Canadian company U3O8CORP is actively exploring in the Kurupung district.

### Blackbush deposit – granite mineralisation

In the Samphire project drill holes targeting sediment-hosted mineralisation have previously been stopped as soon as basement granite is reached – this means that there are very few useable granite intersections. However, re-logging and re-interpretation has identified an

alteration/mineralisation footprint extending ~ 2.7 km along magnetic strike and ~1.7 km across strike. The dimensions of the footprint indicate there is significant size potential for the bedrock mineralised system.

There are four drill holes which have recorded partial intersections from the Eocene unconformity (base of sediment) through granite hosted mineralisation and into background granite. In each case the top portion of the zone is assumed to be incomplete because of erosion during Eocene deposition, but the intersections provide an indication of the minimum thickness and possible grade variation of the materials which may be present.

**Table 1:** available information of thickness/grade of granite hosted mineralisation underlying the Blackbush deposit.

Hole ID	east	north	from	Length (m)	Average eU <sub>3</sub> O <sub>8</sub> ppm	Peak eU <sub>3</sub> O <sub>8</sub> ppm
MRM599	722700	6324901	61	8	640	5,709
MRM614	722697	6324297	72	9	603	1,908
MRM647	722697	6323898	83	9	438	835
MRC006	722747	6324350	74	6	602	1,775
				<b>8</b>	<b>571</b>	<b>2,557</b>

**NOTE.** Intercepts have been visually picked using a cut-off of >100 eU<sub>3</sub>O<sub>8</sub>ppm and assume no other parameters. They are indicative only of the geological occurrences and should not be used for any other purpose.

### Samphire project – granite exploration

The granite underlying the Blackbush deposit are part of a much larger intrusive system which has been given the informal name of the Samphire Batholith. The Samphire Batholith has an area of ~700km<sup>2</sup>.

The known mineralisation at Blackbush is primarily uranium in structural zones within the granite body. There is no significant known copper association, and gold which is a common associate in similar settings has not been assayed.

An aeromagnetic survey is being commissioned to cover the extent of the Samphire Batholith. The existing data is predominantly from 400m line separation surveys and does not provide sufficient definition of structure and alteration. The majority of the survey will be flown at 100m separations, with 50m and 25m data collected in areas where mineralisation has already been identified.

## Mining Options – evaluation of sediment hosted mineralisation

### Program and schedule

Work on the evaluation of alternative mining options for the sediment hosted uranium mineralisation contained within the Inferred Resource of the Blackbush deposit (~28M lb U<sub>3</sub>O<sub>8</sub>) has commenced. The intention is to determine what options are available to obtain the optimum economic return from the existing known resource of mineralisation at Blackbush.

The work involved is outlined below and an initial appraisal is scheduled to be available early in the second quarter of 2012.

### **Volumes of material**

The first phase of this work has been to examine the gross ratio of the volume of mineralised Eocene sediments section to the sum total of overlying Miocene and Pliocene sediments. This has used the numbers generated for the simple polygonal estimate of mineralisation used in the existing resource estimations.

An initial estimation of potential contained tonnes and grade within a conceptual pit shell will be available shortly. There will be no associated indicative information on the alternative mining methods and processing options for some time. The existing Inferred Resource estimate which makes no assumptions concerning mining or processing methods or costs remains valid.

### **Metallurgy**

The metallurgical data generated from bottle roll and other initial test work is being evaluated to obtain initial indications of possible performance of the materials in conventional process circuits. Preliminary appraisal indicates that much of the metallurgical work we have already done will be directly applicable to this evaluation.

### **Hydrogeology**

The hydrogeological data acquired for the investigation of in-situ recovery extraction is all applicable to the consideration of an open pit option.

## **ISR project – continuation of work**

### **Program and schedule**

The Retention Lease for a field trial of the in-situ recovery method is anticipated to be granted early in 2011. The Regulator has provided a final series of questions and requests for clarification in relation to the application for a Retention Lease, and the Company is preparing responses. Once the lease is granted the next round of documentation for the conduct of the work will be developed and submitted. It is presently anticipated that commencement of work on the ground will be possible mid-2012.

### **Background**

The in-situ recovery method (ISR) for extracting uranium from porous sand host rocks by circulating acid solutions through the ground and precipitating yellowcake at surface is a well-established method in Australia and internationally. In the right settings ISR provides a way of extracting uranium with a minimal surface footprint, and it can have good capital and operating cost characteristics. The sediment hosted mineralisation at the Blackbush deposit appears largely suited to the method and it has been the focus of investigations to date. The downside of ISR is that it extracts only a portion of the mineralisation in the ground which is not a sustainably optimal use of the resource. In particular, it does not extract mineralisation from fine grained sediments and lignite, nor will it be able to extract any mineralisation from the granite basement.

It is considered unlikely that it would be practicable to run an ISR operation and to then subsequently mine through the same area to access basement mineralisation. However, until such time as there is sufficient information available to determine an optimal mining method for the entire deposit, the investigation of ISR as a potential method will continue, but at a significantly

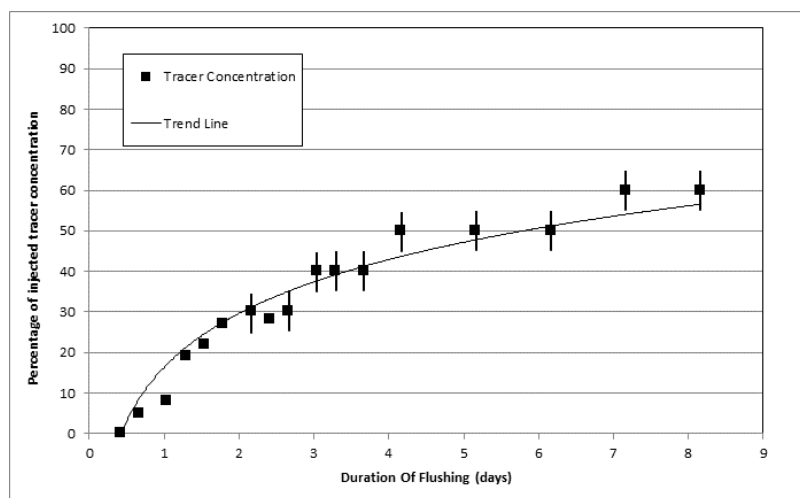
reduced scale. There are other prospects in the Samphire project which are potential targets for ISR operations, and which do not have associated bedrock mineralisation.

### Circulation Trial

The circulation trial within the Blackbush deposit has been completed. The field work ran as planned and results obtained were in line with expectations. Significant outcomes from the trial were:

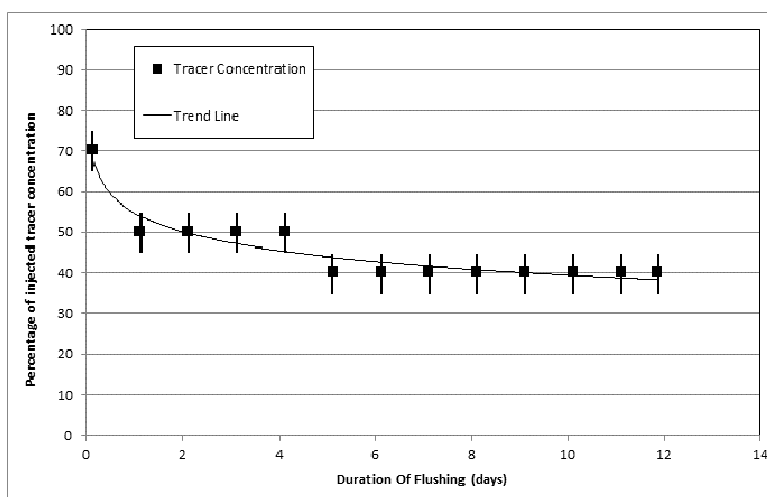
1. A moderately stable plume of injected water was established over the 14 days of the trial (8 days flushing, 5 days circulation).
2. The tracers injected into the formation were contained and recovered at acceptable levels and rates: A 60% concentration of the bromide tracer used was recovered after ~8 days of flushing (Figure 1).
3. During the circulation phase, the injected water plume was diluted by up to 40% by formation waters (Figure 2).

The results are in line with expectations and provide a sound basis of information on the hydrogeology of the target mineralised formation. The trial results provide crucial information to design and operate lixiviant management systems for the field trial for in-situ recovery.



**Figure 1:** Concentration of injected tracer recovered at the production well during flushing phase. Error bars show analytical precision.

**Figure 2:** Concentration of injected tracer recovered at the production well during circulation phase. Error bars show analytical precision.



### **Metallurgy - Column Leach trials**

ANSTO (Australian Nuclear Science and Technology Organisation) have completed the second column leach test involving a bulk sample of mineralised drill core from the Blackbush deposit and sea water based sulphuric acid lixiviant. The column was initially operated for calcium flushing with the pH progressively lowered and the column discharge rejected. When the targeted feed of pH 1.5 was achieved the column was operated in a closed circuit to simulate in-situ recovery field operations. The initial results indicate:

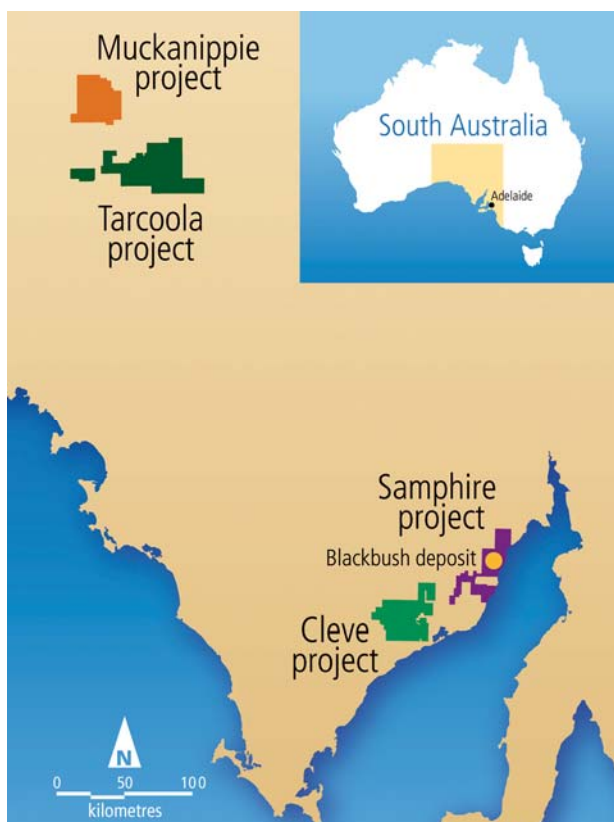
1. ~ 85 % of the calcium in the ore was preferentially leached before uranium leaching commenced.
2. 82 % uranium extraction after 12.5 days leaching at pH 1.5.
3. Low levels of impurities in leach liquor after 36 days of recirculation (< 3 ppm of Th, Zr, Mo, P, and V).
4. No evidence of reduced permeability at ~1.0 gpl calcium in circulating leach liquor, indicating increased calcium solubility in a sea water chloride environment.

The results obtained are consistent with those from the first column leach results reported to ASX on Monday 29th August 2011.

### **Metallurgy - Resin Testing**

ANSTO have completed uranium loading test work on nine candidate resins. Following evaluation of these results four resins have been selected for further test work involving loading, elution and precipitation of uranium. The four resin selected cover a range of chemical functionality, elution and precipitation methods. Two of these resins were used for the precipitation test work reported to ASX on 12th August. This stage of resin testing is expected to take ~4 months.

## About UraniumSA Limited



UraniumSA is an Adelaide based uranium only explorer specialising in sediment hosted styles of uranium mineralisation within a substantial portfolio of properties in South Australia's Gawler Craton.

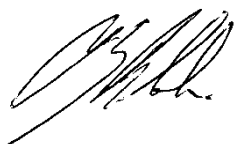
The Company has discovered sediment hosted uranium mineralisation within Exploration Licence 3652, Samphire, which is located 20km south of the industrial city of Whyalla on the eastern Eyre Peninsula in South Australia. The exploration Licence is owned and operated by Samphire Uranium Pty Ltd, a wholly owned subsidiary of UraniumSA Limited.

The inventory of sediment-hosted uranium mineralisation in the Blackbush and Plumbush deposits within the Samphire project (previously the Mullaquana project) is some 19,000 tonnes of  $U_3O_8$  (equivalent to approximately 42 million pounds).

The recent discovery of uranium in granite basement below the known sediment hosted uranium has provided significant new exploration/development opportunity.

An evaluation of mining methods to optimise the recovery of uranium from the identified resources of mineralisation has commenced. This will include consideration of open cut options for the sediment-hosted and granite basement hosted uranium mineralisation in addition to an ongoing evaluation of in-situ recovery operations. Application has been made for a Retention Lease for an in-situ recovery field trial at the Blackbush deposit.

Through its own tenure and by Joint Venture the Company has exploration control over what it considers the most prospective portions of the Pirie Basin.



Russel Bluck

Managing Director  
UraniumSA Limited

*The exploration results and mineral resources reported herein, insofar as they relate to mineralisation, are based on information compiled by Mr Russel Bluck, Managing Director, UraniumSA Limited who is a Member of the Australian Institute of Geoscientists and has sufficient experience relevant to the style of mineralisation and type of deposits being considered, and to the activity which is reported to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code, 2004 Edition). Mr. Bluck consents to the inclusion in the report of matters based on his information in the form and context in which it appears. It should be noted that the abovementioned exploration results are preliminary.*