Mullaquana Uranium
exploration case history
sediment hosted uranium mineralisation

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This presentation was developed and delivered using the animation features of PowerPoint and was accompanied by a dialogue relating to the material on the slide.

This static version of the presentation does not have the benefit of the animation features and many of the slides are therefore very information dense.
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The results reported herein, insofar as they relate to mineralisation, are based on information compiled by Russel Bluck who is a Member of the Australian Institute of Geoscience and an employee of UraniumSA Limited with sufficient experience relevant to the style of mineralisation and type of deposits being considered and to the activity which is being reported to qualify as a Competent Person as defined by the 2004 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code, 2004 Edition). He consents to the inclusion in the report of matters based on his information in the form and context in which it appears.
Corporate Overview

- 146m shares
- ~$7.6m cash at bank
- Top 20 shareholders ~42%
- Largest shareholder ~ 6%

- Only uranium
- Only in South Australia

- Inferred Mineral Resource 67.2 Mt @ 284 ppm
- 19,000 tonnes U₃O₈ (42M lb)
- Progression towards field trials leading to production
- Scheduling to commence field trials 1st Qtr 2012
The criteria UraniumSA applies in its exploration business are to:

- work where there are effective regulatory and administrative regimes
  South Australia has a history of discovery and development of uranium mines

- focus where there is a known uranium endowment
  the Gawler Craton in South Australia is self-selecting under this criterion

- apply a system approach to exploration and evaluation of results
Exploration Approach – sediment hosted uranium

For sediment-hosted uranium exploration we use a source → transport system → depositional site model

The uranium endowment of Miocene-Eocene in the Frome Embayment in South Australia was our starting point.

From this, the Mullaquana exploration project developed from:

- **source** an inferred proximal Hiltaba suite granite
- **transport** fluvial and transgressive facies in the Pirie Basin
- **deposition** sand/lignite assemblages in the Kanaka Beds
Exploration Rollout - sediment hosted uranium

- **discovery**
  
  1981 BHP drill hole PP15 the log in PIRSA files has a pencil annotation “redox” on its face. Person unknown

  2007 UraniumSA drill hole MRM 001 intersected uranium mineralisation with “redox” alteration

- **architecture**

  2007 – 2009 basin architecture from 49 drill holes and AEM survey for stratigraphy and mineralisation

- **resources**

  5th May 2009, Blackbush maiden resource estimate

  8th April 2011, total resource estimate 42 Mlb U₃O₈
South Australia – best uranium jurisdiction in Australia

Pirie Basin  Eocene Kanaka Beds
Adelaide  400km scheduled air service

Whyalla  established mining community
         established skilled workforce
         established power, water, roads
Exploration – source of uranium in sediments

The area is underlain by a magnetically concentrically zoned body interpreted as a Hiltaba suite granite.

The granite is uranium anomalous yellow dots granite basement at eoh >100ppm eU$_3$O$_8$.

And is overlain by mineralisation.

Blackbush 28 Mlb U$_3$O$_8$

Plumbush 14 Mlb U$_3$O$_8$
The Pirie Basin extends across the area of the inferred granite

In the Mullaquana area the Pirie Basin sequence has a characteristic gamma profile

- **Cover**: soil, sand, calcrete, gypcrete, alluvium.
- **Plastic Clay**: blue-grey massive to thick bedded plastic clay: ~12m
- **Limestone**: fawn, cream and white bioclastic limestone, calcareous marl and sand, predominantly thin bedded: ~18m
- **Pollymict Sand**: oxidised fine grained to granular sand, well rounded lithics, ~12m
- **Monomict Sand**: grey to black, fine grained to granular sand, intercalated carbonaceous clay and lignite: 8m to 30m
- **Basement**: variously weathered granite, granite gneiss and metamorphic.
Exploration – location of mineralisation in sediments

596 holes have been drilled for regional exploration, resource estimation, mineral characterisation and hydrogeology.

basement incised fluvial systems dominate in the north and west

merge into lacustrine and marginal marine assemblages east and south

basin sequence to the south is not well known

potential ore grade mineralisation in fluvial channels and along the edge of marginal marine settings

Eocene isopach from drilling

Blackbush deposit ~28M lb U₃O₈

Plumbush deposit ~14M lb U₃O₈

Samphire prospects

View north, scene is ~18km wide
Exploration to Development – ISR resources

Blackbush deposit

45.5M tonnes

12,700t contained U₃O₈
(28 million lbs)

weighted average
grade 280ppm eU₃O₈
thickness 11.71m

Resource envelope remains open in several directions

Higher grade/thickness “starter zones” present

view north, 1 km graticules
View north, scene is ~23km east-west
Blackbush deposit

Development – tons/grade for ISR

There is capacity to vary grade to adapt to changing circumstances.
Development – roll front mapping for ISR

Blackbush deposit

multiple vertically stacked roll-front traces separated by horizontal aquatards

*three fronts mapped and a further 3-4 to be delineated*

Zone 1  55.0m to 57.0m
Zone 2  57.1m to 58.5m
Zone 3  59.0 to 60.20m

*fronts have been mapped, volumes and grades not yet estimated*

7-spot pattern for circulation trials (15m separation)

view north, scene 400m by 400m
Development – mineralogy in sediments

Mineralisation is predominantly uraninite/coffinite localised on grain boundaries and fractures which has contributed to favourable results in bottle rolls

Simon Hall, UraniumSA Metallurgical Manager, is presenting on this topic later in the conference
Development – trajectory to ISR production

**Blackbush deposit**
our emphasis is on staged sequential de-risking to advance the project

- **1\textsuperscript{st} Qtr 2012** – schedule commencement of field trial
- **1\textsuperscript{st} to 2\textsuperscript{nd} Qtr 2012** – field trial for resource upgrade and mine design
- **2\textsuperscript{nd} Qtr to 3\textsuperscript{rd} Qtr 2012** – submission of mining proposal
- **3\textsuperscript{rd} Qtr to 4\textsuperscript{th} Qtr 2012** – commencement of site works
- **4\textsuperscript{th} Qtr 2012 to 1\textsuperscript{st} Qtr 2013** – first 100tpa production module
- **2\textsuperscript{nd} Qtr to 3\textsuperscript{rd} Qtr 2013** – production ramp up to 400tpa
Exploration – next. granite hosted mineralisation

The Mullaquana granite is an exploration target in its own right.

Uranium anomalism in granite mirrors the magnetic zonation

Background uranium content in granite varies vertically suggesting a compositional layering

A recent core hole returned 5.4m @ 434ppm pU₃O₈ (peak grade 2,485ppm pU₃O₈) in sulphide bearing clay altered granite

yellow dots - granite basement
eoh >100ppm eU₃O₈

View north, scene is ~13km east-west

Granite:
background 20-30 ppm eU₃O₈
increasing to 50-70 ppm eU₃O₈
full scale is 500 ppm eU₃O₈
the challenge

is to move as quickly and as cost-effectively as possible from positive results
to drums of ISR product
to new discoveries