ASX Announcement

9 December 2022

Highly Successful uranium leach and extraction tests for Samphire Uranium Project

Alligator Energy Limited **ASX: AGE** (**Alligator** or the **Company**) is pleased to advise that the extensive series of bench scale uranium leach and extraction tests of Samphire Uranium Project core samples, undertaken by the Australian Nuclear Science and Technology Organisation (ANSTO), has been very successful. The following are key highlights and descriptions of results.

Highlights

- Testwork covered leaching of uranium through diagnostic, bottle roll and column leach tests, and ion exchange (IX) uranium extraction using latest Strong Base Ion salt tolerant resins.
- The highly saline groundwater at Samphire does not impact uranium leaching into solution, with diagnostic leach results of ≥ 98.6% extraction in all tests, showing a high level of leachable uranium present.
- Bottle roll tests to create leach liquor for subsequent column leach testwork further confirmed uranium extractions between 86.1% and 93.3% with low reagent consumption.
- **The leaching performance of the uranium ore in an In Situ Recovery (ISR) scenario was simulated in two horizontal column leaching tests over 33 days, using Samphire ground water from the mineralised zone adjusted to a pH of 1.5. High uranium extraction into solution was again confirmed with extractions between 92.9% and 96.3%.**
- Acid consumption was very low in the above long duration test, and a relatively low iron addition was required for effective uranium leaching.
- IX testwork undertaken at various salinity (chloride) levels showed that uranium resin loading occurred in all scenarios, but as anticipated loading efficiency of uranium is negatively impacted by higher ground water salinity. AGE is proposing that wellfield ground water pre-conditioning be utilised to lower chloride (Cl) levels from ~30g/L Cl to ~10 g/L Cl using reverse osmosis (RO) treatment of groundwater prior to ISR extraction and will be tested in the 2023 field recovery trial. This pre-conditioning is a similar technique which is permitted at the Honeymoon mine to reduce calcium in groundwater prior to ISR mining.
- Core samples from the previous Blackbush deposit sonic core drilling program were used for these tests, and these results have been very consistent with our expectations and compare favourably with other ISR operations in Australia and the US.
- As mentioned at our recent AGM, the Scoping Study for Samphire is well underway, with economic models currently being populated with these latest test results. An updated resource estimate for the Blackbush deposit from latest drilling results is underway. With the time required for completion of these activities, the Scoping Study results are now anticipated to be released during January 2023.

Alligator's CEO Greg Hall stated: *"The ANSTO testwork outcomes have been highly successful from Alligator's perspective, confirming anticipated results. The high level of uranium extraction during the various leaching tests using existing groundwater conditions have shown that nearly all the uranium present is leachable. In particular, the column leach tests over 33 days emulate the potential ISR in-ground conditions and indicate an excellent result of leaching characteristics and potential performance. The loading results of uranium onto salt tolerant resins within the saline ground water was also anticipated, and even during our early December 2020 desktop study we had assumed a certain level of ground water pre-conditioning would be needed.*

Our primary consultants WGA are currently uploading these results into our Scoping Study, with work on this over the coming weeks. We now anticipate announcing these results during January 2023."

Leach Testwork

Ore samples from AGE's sonic core drilling program conducted late 2021/early 2022 were used for the ANSTO testwork (Appendix 1). Mineralogical analysis (QEMSCAN) of samples used in the leaching testwork show uranium is present primarily as coffinite, with minor amounts of uraninite and uranophane. The only other minerals present in significant quantities were quartz, comprising 96.3% and pyrite (1.1%).

Diagnostic Leach and Bottle Roll Tests

Three diagnostic leaches were carried out on composite ore samples and showed that uranium extractions were very high in each test, between 98.6% and 99.5%. The results show that uranium is readily leachable from the ore and aggressive leaching conditions, or high iron (Fe^{3+}) concentrations were not required for effective extraction. The results obtained were very similar to previous work undertaken by UraniumSA Ltd (USA) in 20xx, with uranium extractions slightly higher (Table 1).

Table 1: Summary of Diagnostic Leach Results

Test No.	pH	ORP[1] (mV)	Temperature (°C)	Fe Addition (g/L)	Feed U_3O_8 (ppm)	Residue U_3O_8 (ppm)	U Extraction (%)
AGE-1	2.0	500	25	0.5		40	98.6
AGE-2	1.5	500	25	0.5	2,877	23	99.2
AGE-3	1.2	600	25	2.0		15	99.5
USA-1A	1.6	550	25	0.5		45	96.3
USA-1B	1.2	550	40	2.0	1,440	21	98.3
USA-3A	1.8	500	25	0.5		55	95.5

Five bottle roll leaches were undertaken in parallel at pH 1.4, ORP[1] 450 mV and Fe addition 0.5 g/L for 72 hours, to generate the feed liquor for subsequent column leach testwork. The data obtained also confirmed the target leaching conditions yielded uranium extractions between 86.1% and 93.3% (Figure 1). Reagent consumption in these tests were also low, averaging 1.6 kg/t H_2SO_4 and 0.69 kg/t H_2O_2.

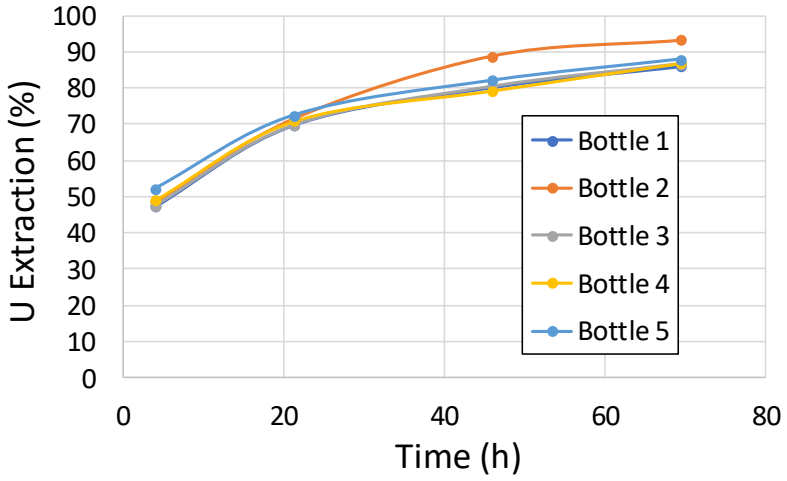

Figure 1: Uranium Extractions in Bulk Bottle Roll Leach Tests

[1] ORPs quoted in this report are relative to an Ag/AgCl reference electrode filled with 3 M KCl.

Column Leach Tests

The leaching performance of the ore in an ISR scenario was simulated in two horizontal column leach tests. Each of the column feed liquors were made up with Samphire formation water (mining aquifer ground water) adjusted to pH 1.5 and ORP 550 mV, with one column feed containing 0.5 g/L Fe and the other 1.5 g/L Fe. The columns were run for a total of 33 days with a flow rate of 2 m/day through the ore bed. The final uranium extractions were 92.9 and 96.3% for 0.5 and 1.5 g/L Fe tests, respectively, with the rate of leaching consistently faster at the higher Fe concentration due to more pyrite oxidation at the elevated Fe concentration (Figure 2).

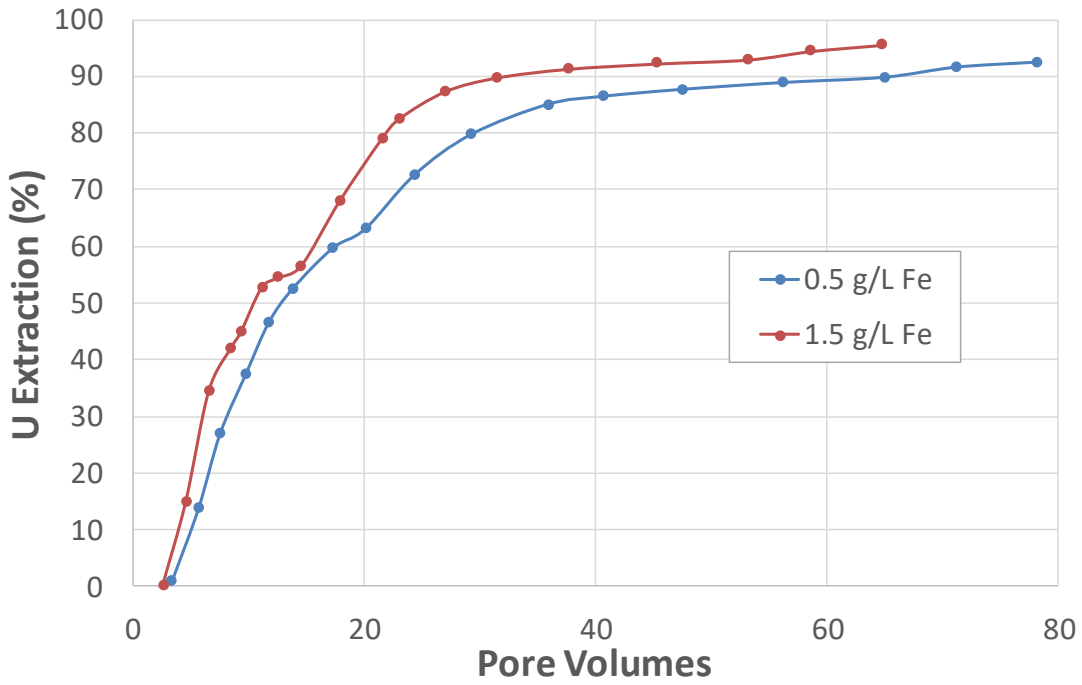

Figure 2: Uranium Extractions in Column Leach Tests

The high uranium extraction, and the fact that extraction was still progressing at the conclusion of the 0.5 Fe g/L test means that it is likely that a relatively low Fe^{3+} concentration is required for effective uranium leaching. This means a lower target Fe^{3+} concentration/ORP would be optimal in full-scale operations to minimise pyrite oxidation whilst maintaining a sufficiently high uranium extraction. Acid consumption by other minerals (gangue) was very low in both columns, with sulphide oxidation resulting in a net acid generation for the 1.5 g/L Fe column and a similar result in the later part of the 0.5 g/L Fe test.

In summary, the column leach tests confirmed that the uranium minerals in the Samphire ore are readily leachable. In addition, the operation of the column suggests that the orebody is sufficiently permeable to allow exposure of the leach solution to the ore and the reagent consumptions are relatively low.

Ion Exchange (IX) Testwork

The feed solution for the ion exchange test was the combined liquor from the column leaching tests which totalled 18 g/L Cl. To simulate the effects of groundwater salinities typical of Samphire on IX performance, two other feed streams were created by doping to 24 and 29 g/L Cl using NaCl.

Previous IX studies undertaken by USA focussed on the use of either Weak Base Anion Exchange (WBA) or chelating resins. Since the USA study, ANSTO has demonstrated that the Strong Base Anion (SBA) resin can achieve high loadings (~30-50 g/L U_3O_8) from a saline uranium leach liquor. For this reason, the resin used in this IX study was an SBA resin (Lewatit TP 107).

Three loading curves were obtained at 18, 24 and 29 g/L Cl and results show (Figure 3) that uranium loading was negatively affected as chloride levels increased, particularly 24 and 29 g/L Cl typical of Samphire groundwaters. This means the concentration of chloride present in the mining solution coming out of future Samphire wellfields (pregnant liquor solution (PLS)) into an IX plant will need to be pre-treated in some way to decrease the salinity. AGE propose wellfield ground water pre-conditioning be utilised to lower chloride (Cl) levels from ~30g/L Cl to ~10 g/L Cl using reverse osmosis (RO) treatment of groundwater prior to adding reagents for ISR operations. This will be the assumed baseline in the Scoping Study and tested in the forthcoming 2023 field recovery trial. This use of RO is proposed to be used in a similar way to the Honeymoon Mine to lower groundwater calcium levels prior to mining.

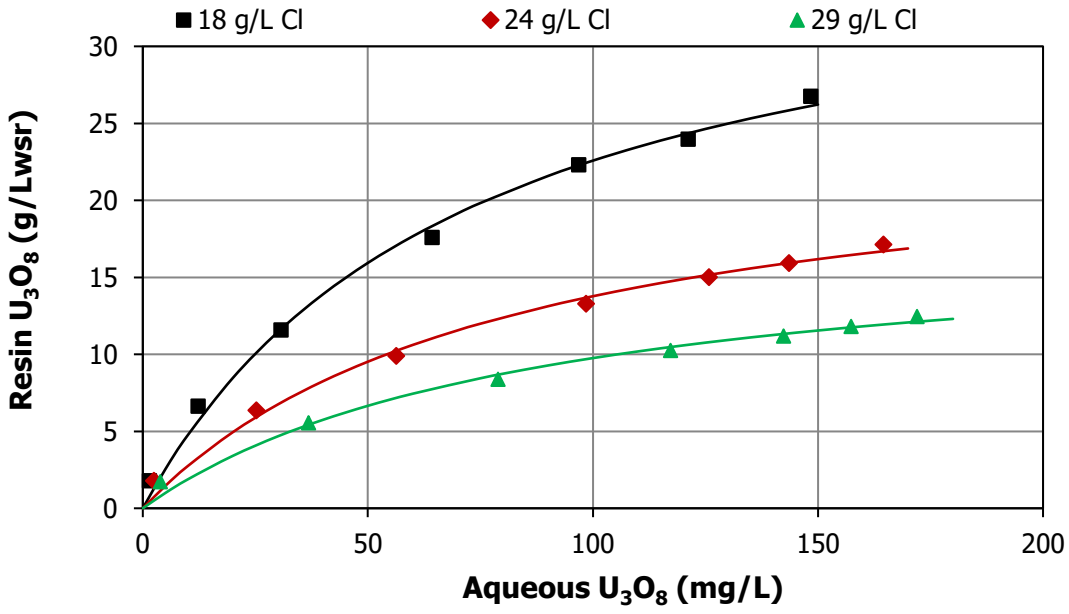

Figure 3: Uranium Loading Curves for TP107 resin (pH 1.5, 25^{O}C)

Next Steps

AGE's Scoping Study for Samphire is well underway, with models currently being populated with these latest test results. Concurrently AGE have commissioned AMC Consultants to undertake an update of the Indicated and Inferred resource estimate for the Blackbush deposit incorporating the results from the latest drilling. With the time required for completion of these activities, the Scoping Study results are now likely to be released during January 2023.

Drilling and associated downhole geophysical logging crews have already been secured for an early February 2023 start of further infill and extensional drilling at the Blackbush deposit.

JORC Table 1: Section 2: Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	The Blackbush deposit references historical drilling and geophysics covering the SUP which are now located on Exploration Licence EL5926 originally granted 20th November 2016 for a term expiring 2018. A renewal has been lodged with DEM and is pending but is not under threat of not being renewed (pers comm SA Department of Energy and Minerals). AGE is currently drafting the relevant documents for an application for a Retention Lease over the area that contains the Blackbush deposit to progress with a Field Recovery Trial at Blackbush. EL5926 is 100% held by S Uranium Pty Ltd a wholly owned subsidiary of Alligator Energy Ltd. The land covering the licence area is Crown Lease; consisting of several leases over 2 pastoral stations.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	Samphire Uranium Limited (SUL), previously UraniumSA (ASX: USA) historically conducted almost all previous exploration within EL5926 defining the Plumbush (JORC2004) and Blackbush (JORC2012) resources and all relevant drilling, geophysics except ground magnetics conducted by AGE in 2021. UraniumSA conducted preliminary In-Situ Recovery (ISR) hydrogeological and metallurgical testwork on the Blackbush deposit with pump testing and hydrogeological modelling.
Geology	• *Deposit type, geological setting and style of mineralisation.*	Mineralisation is dominantly sediment hosted roll-front uranium style within the Eocene Kanaka Beds (sands). Minor amounts of mineralisation are present in the overlying Miocene Melton sands (informal name) and underlying Samphire granite (informal name).

Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*
	  ○ *easting and northing of the drill hole collar*
	  ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar*
	  ○ *dip and azimuth of the hole*
	  ○ *down hole length and interception depth*
	  ○ *hole length.*
	• *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*
		The topography in the region of the Samphire Uranium Project is predominantly flat. All holes were drilled vertically with an average hole depth of approximately 80 m.
		
		Additional images, tables and relevant cross-sections have been included in the body and appendices of this report.

Criteria	JORC Code explanation	Commentary
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	Mineralized intervals were chosen based upon a nominal 250 ppm U_3O_8 cut-off, minimum 0.5 m interval thickness, and no fixed internal dilution. Consideration was given to mineralisation defined by a combination of PFN-derived (pU_3O_8) data, natural gamma (eU_3O_8) data, and chemical assay (cU_3O_8) data for uranium grades.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	Mineralised widths are considered true widths or close to true widths due to the generally flat lying orientation of the mineralisation and use of perpendicular vertical drilling.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	Results are reported in appropriate diagrams and tables within this release.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	This is for reporting of a Mineral Resource and not new Exploration Results. Appendix B lists the drillhole collar locations used in the Mineral Resource estimate. Otherwise, recent drilling has been reported as part of AGE public announcements or presentations. All other historic drilling data used in the Mineral Resource estimate have previously been released to market and have not been included in this report.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	Ground gravity data has been reprocessed by AGE over the Samphire Uranium Project including Blackbush area to provide guidance on the profile of the paleochannel. However, these surveys have not been used directly in the 2022 update (as drilling density is sufficient to override resolution of information provided by the gravity data deemed irrelevant for the purpose of this report.
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	Program for 2022 includes: Continued detailed geological interpretation/well log correlations of all rotary mud and cored holes. Follow-up infill drilling program on the inferred resource at Blackbush subject of this report. Extraction (leaching and recovery)

Criteria	JORC Code explanation	Commentary
		testwork on sonic core samples. Infill high-resolution ground geophysical surveys and follow-up exploration drilling to test for extensions to the Blackbush deposit.

APPENDIX 1

Sonic core hole intervals used for the ANSTO testwork

Holeid	Easting (GDA94, Z53)	Northing (GDA94, Z53)	RL	Azimuth	Dip	Sample From (m)	Sample To (m)	Thickness (m)
BBS21-002	722823	6323855	20	000	-90.00	69.00	70.00	1.00
BBS21-003	722697	6323904	20	000	-90.00	74.00	76.00	2.00
BBS21-004	722902	6323901	20	000	-90.00	63.00	64.00	1.00
BBS21-004	722902	6323901	20	000	-90.00	67.00	68.00	1.00
BBS21-005	722924	6323924	20	000	-90.00	61.00	62.00	1.00
BBS21-006	722905	6324547	20	000	-90.00	61.00	62.00	1.00
BBS21-009	722748	6324546	20	000	-90.00	72.00	73.00	1.00
BBS21-010	722800	6324449	20	000	-90.00	73.00	74.00	1.00
BBS21-011	722749	6324448	20	000	-90.00	74.00	75.00	1.00
BBS21-013	722647	6324304	20	000	-90.00	72.00	73.00	1.00
BBS21-014	722849	6324371	20	000	-90.00	67.00	68.00	1.00
BBS21-014	722849	6324371	20	000	-90.00	67.00	68.00	1.00
BBS21-014	722849	6324371	20	000	-90.00	71.00	72.00	1.00

This announcement has been authorised for release by the Alligator Energy CEO.

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Forward Looking Statement

This announcement contains projections and forward-looking information that involve various risks and uncertainties regarding future events. Such forward-looking information can include without limitation statements based on current expectations involving a number of risks and uncertainties and are not guarantees of future performance of the Company. These risks and uncertainties could cause actual results and the Company's plans and objectives to differ materially from those expressed in the forward-looking information. Actual results and future events could differ materially from anticipated in such information. These and all subsequent written and oral forward-looking information are based on estimates and opinions of management on the dates they are made and expressly qualified in their entirety by this notice. The Company assumes no obligation to update forward-looking information should circumstances or management's estimates or opinions change

Competent Person's Statement

Information in this report is based on current and historic Exploration and Resource Drilling Results compiled by Dr Andrea Marsland-Smith who is a Member of the AusIMM. Dr Marsland-Smith is employed on a full-time basis with Alligator Energy as Chief Operating Officer, and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration (including 20 years in ISR uranium mining operations and technical work) and to the activity she is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Dr Marsland-Smith consents to the inclusion in this release of the matters based on her information in the form and context in which it appears.

About Alligator Energy

Alligator Energy Ltd is an Australian, ASX-listed, exploration company focused on uranium and energy related minerals, principally cobalt-nickel. Alligator's Directors have significant experience in the exploration, development and operations of both uranium and nickel projects (both laterites and sulphides).

Projects