

Samphire Uranium Project - Groundwater



WHO IS ALLIGATOR ENERGY?

Alligator Energy Ltd (Alligator) is an Australian, exploration company focused on uranium and energy related minerals. The Alligator Energy leadership team has significant uranium experience, and the Company's projects include two uranium projects in South Australia (the Samphire Project near Whyalla, and Big Lake in northern SA), the Alligator Rivers uranium project (Northern Territory) and a cobalt-nickel focused project in Piedmont, Italy.



THE SAMPHIRE PROJECT

The Samphire Uranium Project is located approximately 20km south of Whyalla (Mullaquana Road area) in regional South Australia and comprises two historical uranium prospects – the Blackbush and Plumbush deposits.

Alligator is proposing to undertake a short-term (approximately 3 months) small-scale Field Recovery Trial (FRT) at the Blackbush deposit in early 2024. The purpose of the trial is to test the application of the In-Situ Recovery (ISR) mining method on the uranium deposit. ISR is a mining method used in approximately 60% of the world's uranium production and has been used safely and successfully at other uranium mines in north eastern South Australia since 1998.



THE TERTIARY AQUIFER

Alligator Energy understands and respects the importance that local communities place on groundwater, aquifers, and any natural or man-made water sources. Given our operations must work in an area where existing agricultural and other businesses live and work, we must not disturb or damage existing water sources, either above or below ground.

At the Samphire Project, the uranium occurs within compacted sand beds 60m to 80m below the surface deposited in the tertiary period 5.3 - 23 million years ago. The uranium occurs around and in between the sand grains which also houses hypersaline groundwater. This is called the Tertiary Aquifer and is where ISR is proposed to be undertaken to extract the uranium.

The Tertiary aquifer is capped both above and below by impermeable layers of clay (confining layers) meaning the groundwater can move laterally but not up or down. The upper confining layer is 40-50m thick making it much deeper than and separated from the Spencer Gulf ~ 3.6km away.

**To find out more about Alligator
Energy's projects, you can reach us at:**



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To subscribe to digital updates visit:
alligatorenergy.com.au/projects/samphire



GROUNDWATER

Groundwater is water held underground in the pores and crevices of sediments and rocks. Groundwater exists almost everywhere if you dig deep enough. When groundwater can move through the pores (like the tiny spaces between grains of sands) and crevices it is called an aquifer. For example, groundwater can move through sand, so groundwater held in sand deposits is called an aquifer, however, where groundwater is held in clay it cannot freely move and is not considered an aquifer.

Groundwater in the Tertiary aquifer moves particularly slowly even for groundwater, at a rate of 1-2m per year. The groundwater in the Tertiary aquifer is more saline than sea water (greater than 35,000 mg/L Total Dissolved Solids (salts)) and is not able to be used for drinking, even by livestock. The groundwater also contains naturally occurring elevated levels of uranium.



GROUNDWATER AND ISR

The ISR method involves drilling wells into the deposit so that a dilute acid and oxidant can be introduced and circulated through the Tertiary aquifer to convert the uranium from its solid form into a solution. This solution is then pumped via the well network to the surface which is piped to the processing plant and converted back to its solid form.

This circulation process continues until the uranium is removed from the Tertiary aquifer. No water is added or removed as this is a closed loop system, nor are sands disrupted or brought to the surface during the ISR process.

For further information on ISR please refer to ISR Information Sheet.



MONITORING

Under strict regulatory requirements, Alligator Energy is required to monitor the movement of conditioned groundwater within and around the designated FRT area.

For the purposes of the Sapphire Project, modelling demonstrates that to achieve optimal uranium extraction, approximately 4 litres of dilute acid and oxidant is required for every 10,000 litres of groundwater circulated. External independent modelling demonstrates that the oxidant neutralises, and the groundwater returns to its original 'unaltered' hypersaline state within approximately 100m of the FRT well locations.

Alligator Energy must demonstrate that oxidant neutralisation (where conditioned groundwater returns to its original pH level) occurs within pre-determined and approved (by regulators) distances from the injection/recovery wells. This is demonstrated using sampling wells where groundwater samples are extracted at regular intervals. The sample is sent to a laboratory for analysis to determine if the groundwater is altered or 'native' (i.e. not altered). The altered groundwater has higher sulphate concentrations, lower pH and would contain uranium when compared to native, unaltered groundwater.

AGE are required to keep ISR solutions contained within an approved area. This area is surrounded by a monitor well network and the Company must demonstrate no movement of ISR solution outside this monitor network by frequent sampling. Prior to the trial starting, a baseline chemistry of the unaltered groundwater in each monitor is established and approved by the Regulators. Any change from this baseline during and after the operation has ceased would result in an investigation into the reason for the change and immediate rectification measures to be carried out.



COMMUNITY ENGAGEMENT

Alligator Energy strives to build collaborative relationships with all stakeholders who may be impacted by or have an interest in the Company's activities. Environmentally, our ethos is to work closely with stakeholders, to ensure land we work on is returned to a better state than we began with. We maintain a relentless and innovative focus on managing the environment in which we work, along with the health and safety of our employees, contractors and nearby communities.

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