

INNOVATION AND PROCESS INTEGRATION IN URANIUM ION EXCHANGE

By

¹James Quinn, ¹Karin Soldenhoff, ²Bryn Jones and ²Keith Bowes

¹Australian Nuclear Science and Technology Organisation (ANSTO), Australia

²Boss Energy, Australia

Presenter and Corresponding Author

James Quinn

ABSTRACT

The application of Ion Exchange (IX) for the recovery of uranium from leach liquors has been practiced industrially for well over six decades, with few significant changes or improvements to the process in that time. It is particularly suited to lower grade projects, where upgrading the uranium concentration and rejecting key impurities is critical for an economically produced and high-quality product.

Uranium IX is therefore a mature and well-characterised technology. Unfortunately, the conventional process is not well suited to elevated salinity in process liquors, as the loading of uranium is severely depressed by elevated chloride concentrations. ANSTO has been at the forefront of several innovations in this area, including the investigation of chloride tolerant solvent extraction, the use of alternative resin functionalities, nanofiltration to upgrade eluate tenors and recover reagent, and most recently through the development of a novel elution strategy for a particular class of chloride tolerant resins.

Boss Energy's Honeymoon mine, in South Australia, is an in-situ recovery (ISR) process, that operated from 2011 to 2013. Prior to being placed on care and maintenance the process plant used solvent extraction to recover uranium from saline PLS. Boss acquired the project in 2015, and since 2016 ANSTO has been tasked with exploring IX options for the plant as part of the company's restart and expansion plans. Boss has now adopted a chloride tolerant IX process combined with the ANSTO patented elution technology as its preferred option.

In this work we discuss the challenges, constraints, and benefits of integration of a chloride tolerant IX process with uranium product recovery.

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