

**CASE STUDY:
CONCENTRATION OF URANIUM ELUATE USING NANOFILTRATION
ON AN ISR PLANT IN KAZAKHSTAN**

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ABSTRACT

The low uranium market position and decrease in in-situ leach recovery production concentration over the life of the mine, drives continuous optimization and process improvements in order to maintain operational profit margins. The application of nanofiltration membranes were evaluated on two process streams, namely (1) pregnant leach solution and (2) eluate post IX. Membrane systems were also investigated at various positions in the operating circuit in order to target concentration of uranium and simultaneously reduce the volume of eluate to be transported by road for further processing. Nanofiltration membranes produce two value streams by not only concentrating uranium but also recovering and recycling reagents, as permeate, back to the leach section.

The application of new technology in the mining industry follows rigorous technical and commercial evaluation to prove viability prior to major capital investment. This paper follows this process from the initial baseline feasibility calculations, modelling plant data and performance, through to synthetic and process solution laboratory studies and eventual pilot plant deployment and integration into the process plant.

The membrane systems performance parameters that were critical in the development of the feasibility models were as follows:

- System recovery affects permeate production and volumetric concentration factor
- Uranium rejection affects permeate quality
- Acid passage affects ammonia water consumption
- Operating pressure which is a limiting factor on feed concentration changes from site

The membrane performance data from all the previous studies are compared with pilot plant results and resulting effect on the payback period as initially calculated.

Keywords: Uranium, nanofiltration, membranes, acid recovery