

# International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Exploration, Mining, Production, Supply and Demand, Economics and Environmental Issues (URAM-2018)



Contribution ID: 143

Type: ORAL

## Coagulation of Colloidal Silica from Uranium Leach Solutions for Improved Solvent Extraction

*Wednesday, 27 June 2018 11:40 (20 minutes)*

Colloidal silica generated in the leaching process by contacting clays and concrete with sulphuric acid has caused operational problems in solvent extraction (SX) at Cameco's Key Lake uranium mill throughout its history. This colloidal silica stabilizes aqueous continuous emulsions in SX, resulting in increased solvent losses and operational downtime. Silica coagulation was investigated in 2014 with POLYSIL RM1250, a polyethylene glycol coagulant. Lab results showed excellent clarification of the process solution, but subsequent mill trials were unsuccessful. In 2015 the problem shifted from optimizing solution clarity to measuring the changes in phase separation performance under both organic and aqueous continuous mixing with varying POLYSIL doses. This analysis showed aqueous continuous separation performance was equivalent to organic continuous separation performance at doses approaching 300 ppm, significantly higher than anything previously tested. A follow-up pilot study confirmed the lab results, but also discovered an inverse relationship between acid concentration and separation time, suggesting less acid would be required in the mill process. A mill trial with POLYSIL RM1250 was performed in 2017 with doses ranging from 170-300 ppm. The mill trial was successful in reducing SX solvent consumption by 85% and overall acid and lime consumption by 7%.

### Country or International Organization

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**Session Classification:** Underground and Open Pit Uranium Mining and Milling

**Track Classification:** Track 6. Underground and open pit uranium mining and milling