



Contribution ID: 201

Type: oral

Development of Spectrophotometric Process Monitors for Aqueous Reprocessing Facilities

Wednesday, 22 October 2014 14:10 (20 minutes)

The safeguards envelope of an aqueous reprocessing plant can be extended beyond traditional measures to include surveillance of the process chemistry itself. By observing the concentration of accountable species in solution directly, a measure of real time accountancy can be applied. Of equal importance, select information on the process chemistry can be determined that will allow the operator and inspectors to verify that the process is operating as intended. One of the process monitors that can be incorporated is molecular spectroscopy, such as UV-Visible absorption spectroscopy.

Argonne National Laboratory has developed a process monitoring system that can be tailored to meet the specific chemistry requirements of a variety of processes. The Argonne Spectroscopic Process monitoring system (ASP) is composed of commercial-off-the-shelf (COTS) spectroscopic hardware, custom manufactured sample handling components (to meet end user requirements) and the custom Plutonium and Uranium Measurement and Acquisition System (PUMAS) software.

Two versions of the system have been deployed at the Savannah River Site's H-Canyon facility, tailored for high and low concentration streams. The design, development and potential application of these systems will be discussed.

Country or International Organization

United States of America

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Session Classification: Technology Foresight and Emerging Technologies I