# MEASUREMENT AND UNCERTAINTY CHALLENGES IN BRINGING USTUR’S DECADES-OLD RADIOCHEMISTRY PROGRAM INTO THE 21ST CENTURY – Part 1

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The United States Transuranium and Uranium Registries (USTUR; [ustur.wsu.edu](file:///D%3A%5CDocs_2020%5CUSTUR%5CDQO%5Custur.wsu.edu)) is a U.S. Department of Energy funded research program at the Washington State University that studies deposition, biokinetics, dosimetry, and possible biological effects of actinides such as Pu, Am, and U. Other radionuclides of interest for analysis at the USTUR include Ra, Th, Np, and Cm. The USTUR radiochemical laboratory analyzes human tissues from deceased Registrants who have donated part or all their bodies for post-mortem study. This presentation focuses on radiochemical measurements at very low levels by alpha spectrometry.

Plutonium measurements from as early as the 1940s appear in USTUR records. Radiochemical measurements have evolved and improved repeatedly since then, with new measurement technologies and new consensus standards. Understanding and expression of uncertainty have also evolved and improved. This presentation highlights the latest changes to align the USTUR Quality Assurance Program Plan with MARLAP concepts and processes, and also with ANSI ANS N41.5-2012. This talk presents those aspects of USTUR radiochemistry operation that are innovative or unique to the Registries, including implementation of MARLAP’s *N*+1 counting statistics, measurement quality objectives for tissue analysis, radiochemical measurement process, uncertainty propagation and management, and the unimportance of critical values when the analyte is known to be present.