

Role of Standard Reference Materials in the United States Transuranium and Uranium Registries

Royston H. Filby^{1,2} and Samuel E. Glover¹

¹USTUR, ²Department of Chemistry, Washington State University

The United States Transuranium and Uranium Registries (USTUR) is a research program to study the distribution, biokinetics and health effects of the internal deposition of actinides, principally Pu, Am, U and Th, in nuclear facility workers who have been occupationally exposed to these elements. The current program operates under a grant from the U.S. Department of Energy. Tissue samples (or whole body) are taken from volunteer workers at autopsy for radiochemical analysis for one or more of the actinide elements. Radiochemical procedures involve acid digestion of whole organs or tissues, separation of Pu, Am, U and Th by combined anion exchange and solvent extraction, electrodeposition of the individual actinides followed by alpha spectrometry. Recently, new radiochemical separations based on extraction chromatography (Actinide®, TRU®, TEVA® resins, Eichrom Industries) have been developed and are currently being validated. Method validation and routine QA/QC procedures require the use of Standard Reference Materials (SRMs), which ideally should be of similar matrix to the human tissues analyzed. Currently only two human-tissue matrix SRMs are available from NIST, Human Lung, SRM 4351 and Human Liver, SRM 4352. The USTUR program is currently participating in the NIST certification of a Human Bone SRM for Pu, A, U and Th. Analytical results from these SRMs are presented and discussed. The needs for low level tissue-matrix standards for other actinide elements for the USTUR program (e.g. Np, Cm, and Cf) are evaluated. Analytical developments to extend the capabilities of the USTUR, including FTA, RNAA and INAA are also discussed.

USTUR-0074-97