Performance Assessment of Laboratories Performing Uranium Analyses on Gulf War Veterans

Abstract

This presentation will discuss the results of an intercomparison of six laboratories performing urinalysis measurements of uranium by various analytical techniques. This one round evaluation was conducted using a mixture of depleted and natural uranium materials covering the range of concentrations in urine representing background excretion rates up to concentrations similar to those found in Gulf War veterans with embedded depleted uranium fragments. Eleven samples, including two blanks, were distributed to each participating laboratory. Results were evaluated in a manner similar to ANSI N13.30, Performance Criteria for Radiobioassay. In general, laboratories using ICP-MS (Inductively Coupled Plasma Mass Spectrometry) performed the best for determination of total uranium, ^{238}U, ^{235}U, and $^{235/238}$U. Kinetic phosphorimetric analysis (KPA) was found to provide reliable total uranium values based on this study. Alpha spectrometry was used by three laboratories and its performance was generally inferior to these methods except for the determination of ^{234}U. The results of five additional laboratories on a similar set of samples (but at lower levels) using high resolution mass spectrometric methods will also be presented if all results have been obtained from the participating laboratories.

Samuel E. Glover, glover@wsu.edu, Department of Chemistry, Washington State University, Pullman, WA 99164-1300