

**A Comparison of Alpha Spectroscopy Procedures  
for Measuring Actinide Contaminates and  
Total Uranium Concentration on Smears and Filters**

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At Los Alamos National Laboratory (LANL), an electrolytic decontamination process for removing actinide contamination from uranium surface has been demonstrated. This process requires a quantitative analytical technique for measuring removable total actinide to levels below 20 dpm (disintegrations per minute) per 100 cm<sup>2</sup> surface. Usually the total uranium concentrations are larger than 90 % of total alpha activities. The activities of these swipes range from several hundreds dpm to hundred thousands dpm.

In this work, several sample processing procedures and alpha spectroscopy techniques are evaluated. These include (1) performing alpha spectroscopy on the smears directly, (2) processing smears using chemical treatments such as ashing, dissolution, and uranium separation, and (3) taking smears using standard health physics swipes or ashless filter papers. Along with differences in methodology, a comparison of these techniques reveals differences in time, cost, and waste generation and handling.