

RADIOCHEMICAL METHODS AND INTERCOMPARISON PROGRAMS PARTICIPATION BY WIPP LABORATORIES

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The primary mission of the WIPP is the disposal of transuranic waste; the majority of radiochemical spectral analyses which will be required at WIPP are for transuranic. The Radiochemistry Laboratory has developed and implemented a program to perform alpha and gamma spectroscopy. Isotopic measurements for these radionuclides is determined by alpha spectroscopy. This requires a sample to undergo a series of destructive chemical processes to isolate the nuclide of interest and measure the activities of the purified radionuclide using alpha spectrometer.

A sequential separation method for isolating transuranic and fission products from each other has been developed (and published in peer-reviewed journal) at the WIPP Laboratory. A number of advantages to using this method have been identified. Sequential radionuclide analysis of a single sample avoids the cumbersome task of dividing the sample into small volumes for each analysis. The advantage of using a single sample for all required analyses, instead of a number of analysis of sub-samples, is that sample preparation and dissolution and laboratory waste are minimized. The turnaround time is also reduced significantly, because the process of concentration and/or digestion/dissolution is only performed once for the entire analysis. Another advantage to using a larger sample size for each radionuclide analysis, is that lower minimum detectable activity can be achieved. In addition, this method lends itself to the analysis of additional actinides for only a minor increase in time and cost. Finally, the isotopic ratio of radionuclides provides a very powerful means of quality control and data validation.

Examples of the WIPP Radiochemistry Laboratories analytical minimum detectable concentration (MCD) values and results from participation in the DOE and NIST programs are in tables that will be provided at a later time.

Program improvement must be an ongoing process involving the evaluation of personnel, hardware, software and quality assurance. Limitations exist in vendor software and hardware which are not designed specifically for WIPP applications. Additionally, the training of personnel and effective quality assurance practices are essential.