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Use of Analytical Application for Remediation Results in Technology Transfer

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ABSTRACT

Radioanalytical laboratories typically require up to 21 days to complete sample analysis. By using the potassium-fluoride fusion method for sample preparation, soil samples are ready to count by alpha spectrometry within hours. The shortened turnaround time (TAT) provides for expedient action by the FUSRAP team for remediation and cleanup activities. In this fusion process the soil samples are dissolved completely. Separation chemistry is required to concentrate and isolate alpha radiological components of interest because of their overlapping energies. Selective precipitation of components is utilized as the separation technique prior to sample counting. This method was developed at Idaho National Engineering Laboratory by Claude Sill and is utilized by the FUSRAP program through a technology transfer.

Quicker turnaround time for sample data is only one of the attributes of this application. The recovery of radioactivity, such as Thorium from soil samples, was lower using conventional techniques. With this new technique, total recoveries have more than tripled. Higher recoveries, approximately 80 percent, can enable counting times to be reduced dramatically while still maintaining environmental minimum detectable activities.

The resolution of the alpha spectra from these methods are precise, thus enhancing the quality of the sample data. The spectrum for Radium-226 is a good example of improved resolution and precise spectra for identification and quantification.

The new method is utilized in FUSRAP laboratories, including the mobile remediation laboratory. The analytical time is similar to that of rapid screening methods utilized in the laboratory, but provides more detailed information. FUSRAP employs the best technology available to serve DOE in order to save costs, reduce sample data turnaround times, and improve data quality.