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# **Innovative Rotary Crossflow System for Volume Reduction of Mixed Hazardous and Rad Waste**

William A. Greene ([wgreene@spintekfiltration.com](mailto:wgreene@spintekfiltration.com): 714-848-3060)

SpinTek Filtration  
16421 Gothard Street  
Huntington Beach, CA 92647

## **Abstract**

DOE operations generating liquid waste that is subsequently discharged from the facility will normally have a clarifier as part of the waste treatment process. Chemicals are added to the waste stream prior to the clarifier that will flocculate and settle radioactive and hazardous components of the waste stream. The settled solids form a sludge that must be dewatered for long-term storage or disposal.

The standard method of sludge dewatering at DOE facilities is the use of precoat filters that use diatomaceous earth or a similar filter aid. The filter aids add significantly to the amount of radioactive or hazardous material that must be stored or further processed. As an example, at one DOE facility studied it was determined that 90% of the clarifier sludge consisted of filter aids and only 10% actual radioactive/hazardous components.

The objective of the SpinTek project is to eliminate the need for precoat material, obtain higher solids removal efficiency, and concentrate the recovered solids to a thick paste for subsequent treatment or storage.

SpinTek has developed the ST-II rotary microfiltration system that meets all of the project objectives. The system consists of ten (10) 11" diameter disks that are coated with a ceramic membrane on each side. The disks are rotated at 1,200 rpm close to turbulent promoters that generate high shear at the surface of the membrane. The high shear minimizes fouling that can occur on the membrane surface and allows the system to operate for weeks before cleaning is required.

In phase I of the PRDA we successfully scaled the ST-II rotary microfilter from a single disk to ten disk system. The ST-II was operated on a wide range of surrogate materials and operational parameters of rotor speed, feed pressure and temperature were optimized. The ten disk ST-II unit is now at Los Alamos being installed for the on-site demonstration to begin.

Subsequent work with the ST-II at DOE will focus on other difficult liquid/liquid and liquid/solid separations. Of particular interest is the development of a ST-II based system for the treatment and recovery of cooling water blowdown.