

Engineering Development Laboratory



Pilot-scale testing of Hanford's waste pretreatment system

Overview

This fully-equipped, climate-controlled, 10,000 sq. ft. laboratory contains 3 high bays, 3 overhead cranes, a large fabrication shop, ample electrical support systems, several data acquisition systems, and over 3,000 pieces of measuring and test instrumentation. Innovative equipment tests and demonstrations are performed in the laboratory, as well as tests on existing and proposed designs.

Areas of Technological Leadership

- Heat and mass transfer
- Fluid flow (1 and 2 phase)
- Mechanical design
- Chemical processes
- All aspects of experimentation
- Test performance
- Data analysis
- Documentation
- Field support and troubleshooting
- Design of unique instruments and process systems



Large-scale pilot test, using nonradioactive simulants, of Fractional Crystallization (FC) – a process similar to that used to purify table salt – for separating radioactive waste into High Level and Low Activity streams.

FASTfacts

- The SRNL Engineering Development Laboratory can design and build custom experimental facilities to meet customer needs.

Key Applied Technologies

- Solid/liquid and HEPA filtration
- Mixing
- Phase separation
- Chemical reaction
- Stabilization/solidification
- Ion exchange
- Remediation
- Sluicing
- Experiment instrumentation
- Data acquisition
- Measuring and testing equipment
- Pump testing
- Valve performance
- Hydro cyclones
- Thermal properties analysis
- Environmental remediation systems
- Hydrogen storage
- Ultra-low-level, high-sensitivity nuclear measurements

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Ceramic HEPA Filter

Selected Applications

Alternative HEPA Filters

The old generation of HEPA filters was no longer meeting our customer needs. In conjunction with private industry, two new filter technologies were successfully developed and demonstrated in the laboratory. Design and fabrication of full-scale, deployable prototypes are in progress to support a planned field demonstration.

The anticipated benefits of these new technologies include the ability to clean the filter in situ and then reuse it. This method dramatically decreases filter changeout and disposal costs, significantly reduces filter failure and material release risks, and eliminates personnel exposure from spent filter handling.

River Protection Program (RPP) Pilot-Scale Cross-Flow Filtration

The Hanford RPP project required a pilot-scale cross-flow filter facility in order to investigate filtration of simulated high-level and low-activity wastes. As a cost savings measure, the needed experimental setup employed an existing cross-flow filtration facility. Tests were designed and conducted using the Hanford waste products. Significant savings in both costs and time were realized by using existing equipment and instrumentation. Several modifications to the filtration system and various operating schemes were investigated to optimize facility design and operation. This type of process testing will minimize startup testing problems and system redesign/rework at the planned full-scale treatment plant.



Cross-Flow Filter

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