

Waste Treatment Plant Project validating process, design

The Waste Treatment Plant Project's Research and Technology department has successfully completed testing actual radioactive waste from Hanford Tank AZ-101. Battelle staff members performed the testing at the Radiochemical Processing Laboratory in Richland. Waste from tank AZ-101 will be one of the first high-level waste feeds processed by the Waste Treatment Plant.

These bench-scale tests, defined and coordinated by the WTP Research and Technology department, are an essential step toward validating the project's process flowsheet. Using similar processes on a reduced scale, the process flow is tested using actual waste samples.

"This bench-scale testing is an important step in validating our process equipment and systems design," says Garth Duncan, engineering manager for Mechanical and Process Engineering and a major customer of the Research and Technology group.

The testing is done on core samples, approximately 2 liters in volume, taken from the underground tanks. These radioactive core samples are processed remotely in hot cells — similar to the way the waste will be processed at the WTP. The test waste was characterized and processed through evaporation, cross-flow filtration, ion exchange, the addition of high-level- and low-activity-waste glass former, and finally, vitrification using bench-scale equipment. Relevant process information and actual waste data were collected for each of the unit operations.

Rheological and physical characterization was also performed at each process step to determine the flow properties. The test results are being compared to results of tests on non-radioactive simulants to determine whether the simulant behaves like real waste. This simulant validation is an important step in allowing most of the testing to be performed with the non-radioactive substitute.

Data from the tests are being used for a variety of purposes by several project organizations. Engineering uses the data to conduct design calculations and validate the design basis, Environmental and Nuclear Safety to support petitions related to de-listing and land-disposal restrictions, Process Operations to develop flowsheet models, and Research and Technology to complete Waste Form Qualification activities.

Testing of the samples of low-activity and high-level tank waste is being conducted at Pacific Northwest National Laboratory and the Savannah River Technology Center. ■



Relevant process information and actual waste data were collected during a recent bench-scale test performed with actual waste samples from Hanford's tank AZ-101. The test data are being used to validate the project's processing equipment and system designs.