Researchers testing filters to contain radioactive materials

October 30 2014, by Allison Matthews

Charles Waggoner, right, deputy director of ICET and Mississippi State research professor, hosts a tour of visitors including Department of Energy officials and nuclear energy industry leaders from across the country who came recently to observe testing technology which assesses nuclear grade high-efficiency particulate air (HEPA) filtration systems. Credit: Megan Bean

If released in significant quantities, radioactive materials pose a potential threat to people and the environment. Now, new research at Mississippi State University is helping the nuclear industry ensure that radioactive

materials continue to be safely contained and that standards of safety are continuously improved.

MSU's Institute for Clean Energy Technology (ICET) is leading the nation in research to ensure that confinement systems for processing radioactive waste are robust and effective with minimal risk of accidental exposure for workers at specialized waste treatment facilities, as well as area neighbors.

The university research center recently hosted visitors from the U.S. Department of Energy, Washington State's Department of Health, Bechtel National, Inc., Defense Nuclear Facilities Safety Board, and nuclear energy industry leaders from across the country to observe testing technology which assesses nuclear grade high-efficiency particulate air (HEPA) filtration systems.

ICET is an entity of the university's Energy Institute and is currently engaged in major projects funded by the DOE Office of Environmental Management, the DOE Nuclear Safety Research and Development program, and by Bechtel National, Inc., to test HEPA filtration systems with the goal of developing more robust HEPA filters for the nuclear industry. The filters are used at energy facilities across the country, such as the DOE Hanford site in Washington State, the Savannah River site in South Carolina, and the Idaho site. The opportunity to host prestigious visitors gave MSU a chance to showcase the ICET facility to those who are responsible for designing and constructing the Waste Treatment and Immobilization Plant at Hanford and those who regulate its operation.

Charles Waggoner, deputy director of ICET and MSU research professor, said the highly technical processes and testing infrastructure are vitally important for assessing HEPA filtration systems' abilities to withstand unexpected harsh conditions, such as a fire or high humidity event like a steam line failure.

"The testing we're doing is very significant," Waggoner said, "and we are the only place in the world with infrastructure and personnel capable of doing this work."

The HEPA filters are the last line of defense to be sure that radioactive contamination is contained. These specialized filters are 99.97 percent efficient, and they are tested to ensure that they will maintain that efficiency, even under the stress of an unexpected event, such as if damage to a facility is caused by an earthquake.

Of particular interest to the high-profile visitors, MSU researchers discovered a problem with one variation of "separatorless" HEPA filters. DOE now has expanded funding at ICET to further study the issue, and results from this testing will be used to determine a path forward.

DOE HEPA filter technical specialist in the Office of Environment, Health, Safety & Security Subir Sen said his office prepares the directives and standards for DOE in regards to HEPA filter procurement and a separate quality control testing program.

"We also manage the additional testing that the filters used in nuclear facilities for DOE undergo through an independent filter test facility," he said, explaining that each individual filter used in a DOE nuclear facility is tested before use.

"When test results were published by Dr. Waggoner which showed that separatorless filters may not perform under certain conditions, we became interested. [DOE's Office of Environmental Management is] following through with this test to find out how they perform and if any recommendations need to be made within our standards," he said.

Sen noted that the testing process at MSU is unique in that it combines different types of stressors to see how the filters perform during a

combination of harsh conditions. While current national consensus standards also require testing for harsh conditions, the MSU testing at ICET is the only one that combines the conditions to occur simultaneously.

Scott MacMurray, a project engineer with Savannah River National Laboratory in Aiken, South Carolina, said the testing at MSU will impact which design of filters his company will purchase in the future. As a member of the Energy Facility Contractors Operating Group, MacMurray said contractors who run the various DOE sites around the U.S. will be sharing information about the latest test findings at ICET.

"Lots of different groups have sent a representative because it's such an important program," MacMurray said of the MSU visit. "All the different parties are interested in the results of the testing."

Provided by Mississippi State University

Citation: Researchers testing filters to contain radioactive materials (2014, October 30) retrieved 3 May 2024 from https://phys.org/news/2014-10-filters-radioactive-materials.html