



ERDC wastewater treatment system slashes costs of removing 'forever chemicals' from environment



U.S. Army Engineer Research and Development Center, Environmental Laboratory

A portable wastewater treatment system developed by the U.S. Army Corps of Engineers (USACE) makes it 90 times less expensive to keep “forever chemicals” out of the environment, where they have become a serious health issue.

Per- and poly-fluoroalkyl substances (PFAS) are manmade compounds that are extremely resistant to environmental degradation. This property has made PFAS useful for creating products like Teflon, Scotchgard, and the foam used to control jet fuel fires at Department of Defense (DoD) bases. However, the same property also makes PFAS persistent environmental pollutants—sometimes called “forever chemicals”—that are being implicated in various health disorders.

Commercially available solutions to remove PFAS from wastewater rely on costly permanent site-built facilities, which are too expensive for small accumulations of 250 million gallons or less. To address this problem, researchers at the USACE Engineer Research and Development Center – Environmental Laboratory (ERDC-EL) invented the PFAS Effluent Treatment System (PETS) and the related PFAS Water Treatment Research Reactor (PWTRR) to remove PFAS from contaminated waters.

PETS is a stand-alone, trailer-mounted water treatment system specifically designed to treat PFAS. Providing its own power via a generator, PETS features an ion exchange system that separates the contaminants from water and a granular activated carbon media bed to collect the contaminants. Treated water is either discharged or reused, and residual waste is incinerated.

A second form of the same basic technology, PWTRR, is built inside a shipping container. PWTRR is designed to be left in one location to provide continuous treatment; however, it can be easily moved with a medium-sized forklift.

The National Defense Center for Energy & Environment provided funding to design and build the PETS system. Under a technology transition



Above: The PETS System **Below:** The PFAS Water Treatment Research Reactor (PWTRR)



agreement, the PETS and PWTRR have been successfully deployed at multiple DoD installations—including two located in Japan. These efforts required extensive collaboration and coordination, made even more difficult due to the global COVID-19 pandemic.

In these deployments, PETS dramatically reduced the volume of material requiring disposal by an 8,000-fold decrease. Calculations show that PETS or PWTRR can be 90 times less expensive (over a five-year period) than traditional cleanup efforts.

The technology has wide-ranging applications beyond its current implementation, which could include disaster response scenarios and water treatment for soldiers in the field. DoD partnership intermediary TechLink is actively soliciting and vetting commercial licensing prospects for the technology. Patent applications have been filed for both PETS and PWTRR.☺