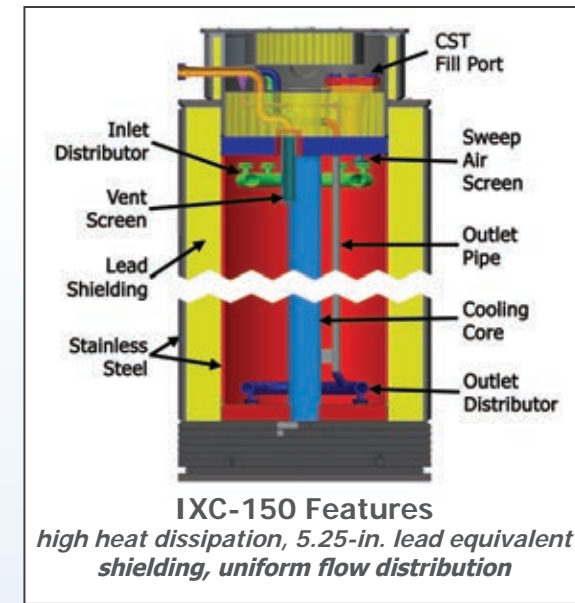
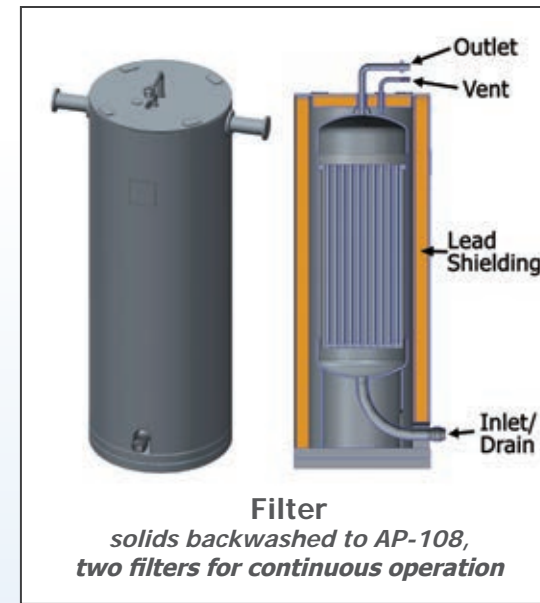
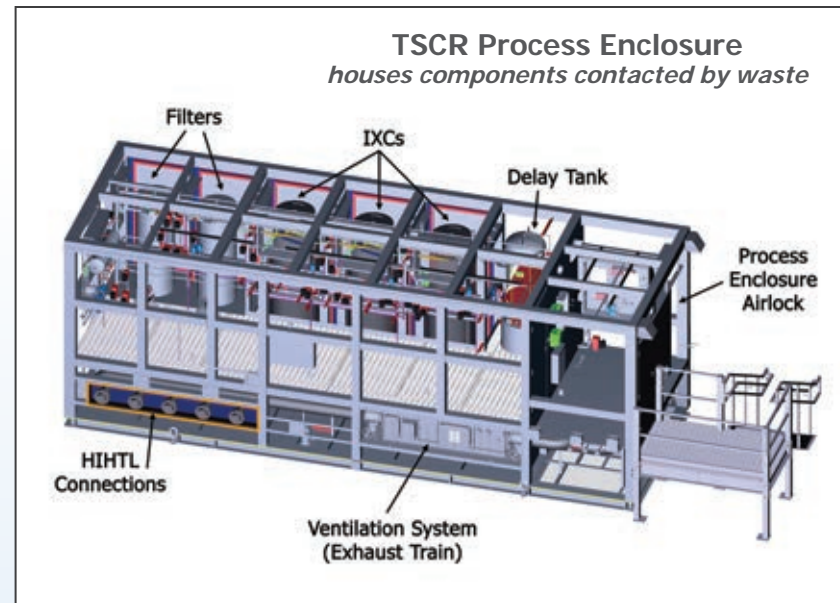


Tank Side Cesium Removal (TSCR) System – DOE Hanford Site

The TSCR System was designed and fabricated by AVANTech for Washington River Protection Solutions (WRPS) to treat liquid waste in the DOE Hanford 200-East Tank Farm. Liquid waste is transferred from tank AP-107 to TSCR for treatment in a safe, economical, and environmentally protective manner. Treatment includes removal of solids and adsorption of Cs-137 on crystalline silicotitanate (CST) media. The TSCR system is housed in three transportable enclosures with all process components in the Process Enclosure. The TSCR System is controlled remotely from a nearby Control Enclosure. Treatment consists of filtration and ion exchange – where ion exchange takes place in three model IXC-150 shielded ion exchange columns (IXCs). The three columns operate in a lead-lag-polish carousel arrangement that aids in achieving high effluent quality while minimizing secondary solid waste generation. Treated waste passes through a delay tank (to facilitate ¹³⁷m-Ba decay) and in-line gamma monitors before exiting TSCR en route to tank AP-106. Periodically, the process is shutdown for the replacement of cesium-loaded IXC-150 columns, which are subsequently placed on a nearby interim storage pad.



The IXC-150 Column is the latest generation of AVANTech shielded ion exchange modules derived from the system AVANTech designed and fabricated for the Fukushima Daiichi Nuclear Power Station in Japan. The IXC-150 incorporates innovative design features such as an inner cooling core that promotes effective decay heat dissipation, keeping internal liquid temperatures well below 100°C when fully loaded with Cs-137. In addition, the integral shielding reduces exterior radiation dose rates to approximately 5 mrem/hr, thus allowing contact handling with a forklift. TSCR is a modular, quickly-deployable, and passively safe system for efficiently removing solids and cesium from alkaline liquid waste. It will facilitate early production of Direct-Feed Low-Activity Waste (DFLAW) that can be sent directly to the WTP LAW Vitrification Facility, thus progressing the DOE Hanford clean-up mission.

