

Liquid Nuclear Waste Tank Farms

The radioactive waste from the Savannah River Site (SRS) chemical separations process is present in the tank farms in both solid and liquid forms. Over 150 million gallons of nuclear waste have been generated and concentrated by evaporation to a present volume of about 38 million gallons.

The wastes are stored in 49 permitted waste tanks in the Savannah River Site's F and H Areas, two of the tanks have been operationally closed, and two more are slated for operational closure by 2012.



In storage tanks, the insoluble solids constituents in the waste settle and accumulate on the bottom of the tanks. This accumulation is referred to as sludge. Liquid above the sludge, referred to as supernate, is concentrated by evaporation to reduce its volume. As the concentrated supernate cools, a portion crystallizes forming a solid salt cake. This concentration process not only reduces the volume, but also makes the waste less mobile. There are three operating evaporator systems at SRS, which were placed in service in 1980, 1982 and 2000. Two older evaporator systems have been removed from service. Corrosion and pitting of the tanks are controlled through a special waste-chemistry program. Under this program, the waste is sampled and chemicals added, if necessary, to maintain corrosion inhibitors within prescribed limits.

Since 1954, SRS waste tanks have provided safe and environmentally sound storage for nuclear waste. These tanks include four designs.

- Types I and II, the oldest tanks, have 5-foot high steel secondary containment pans within a concrete vault and forced cooling systems. Type I tanks are 75 feet in diameter with a maximum storage capacity of approximately 750,000 gallons. Type II tanks are 85 feet in diameter and have a maximum capacity of approximately 1 million gallons. Some of these tanks previously developed small hairline cracks that allowed leakage of small volumes of salt solution into secondary collection pans below the tanks. The cracks were induced by high nitrate concentration in the waste solutions and residual stresses near weld sites. Waste levels within those tanks have been lowered below all known leak sites. There are no active leak sites.



Tank 16, a Type II tank, is the only tank to have had a release of waste from the secondary pan. The leak, which occurred in 1960, was from the primary tank into the secondary pan. Overflow of the secondary pan into the surrounding concrete vault resulted in a few tens of gallons of waste escaping to the soil through a concrete vault joint. The tank was removed from service and emptied. Groundwater monitoring surrounding the Tank Farm has confirmed that this isolated area of contaminated soil is not creating any human health concerns.

- The type III design has a maximum storage capacity of approximately 1.3 million gallons and is 33 feet high and 85 feet in diameter. Type III tanks have full-height secondary containment, i.e. they are constructed as a tank within a tank. The Type III tanks also have forced cooling systems. These tanks, built in the mid-1960s, have been successfully stress-relieved to prevent stress cracking. No cracks or leaks have occurred in any of the Type III tanks.
- Type IV tanks have a single wall and do not have a forced cooling water system. Type IV tanks are designed for waste storage that does not require auxiliary cooling and for waste materials with relatively low levels of radioactive contamination. This tank type basically is a pre-stressed concrete tank with a steel liner and a domed roof. Each tank has a maximum capacity of approximately 1.3 million gallons and is 85 feet in diameter and 34 feet high.

Wastes from all of the tanks will be removed with first priority given to the Type I, II and IV tanks. Two of these tanks are targeted for closure by 2012 and four are planned for closure by 2015.

SRS is owned by the U.S. Department of Energy. The SRS Liquid Waste contract is managed by SRR, a team of companies led by URS Corp. with partners Bechtel National, CH2M Hill and Babcock & Wilcox. Critical subcontractors for the contract are AREVA, Energy Solutions and URS Safety Management Solutions.

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