

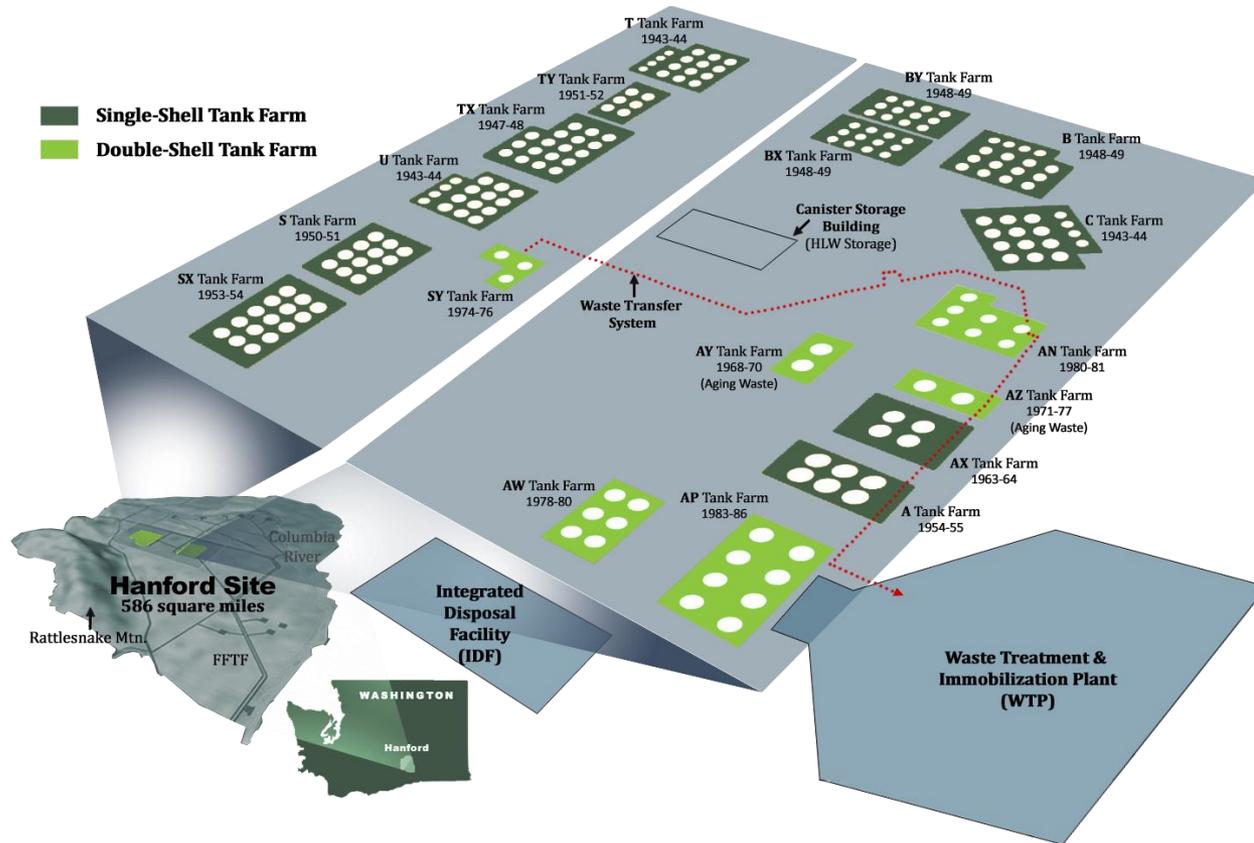


THE HANFORD SITE

Grout Progress

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Mission: Safely, efficiently and effectively treat tank waste and close Hanford tanks.



- This briefing is to share information on the U.S. Department of Energy (DOE) efforts to develop waste processing options for the following:
 - Stabilization of secondary waste from vitrification and evaporators
 - Development of additional waste processing options to accelerate the Hanford cleanup mission
- All opportunities are being considered within the existing legal and regulatory framework and will require support from regulators, stakeholders, and community

Different types of grout with different characteristics, acceptance criteria, and processes for approval of use are:

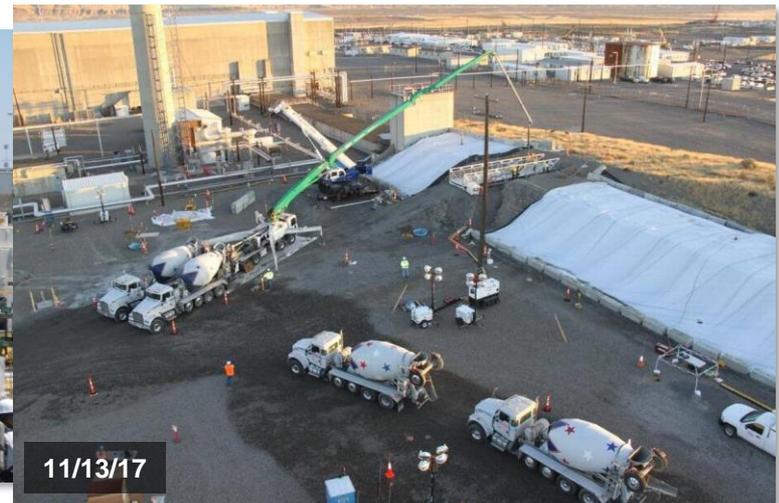
- Secondary waste from current operations grouted to ensure safe cleanup and transport for disposal (e.g., pumps pulled from tanks)
- Stabilization efforts (e.g., PUREX tunnels) and closure efforts (e.g., empty C Tank Farm tanks)
- Stabilization of secondary waste from vitrification and evaporators in the current Hanford planning (e.g., HEPA filters, large volumes of liquid secondary waste)



C-110 Empty Tank



C-111 Pump Install

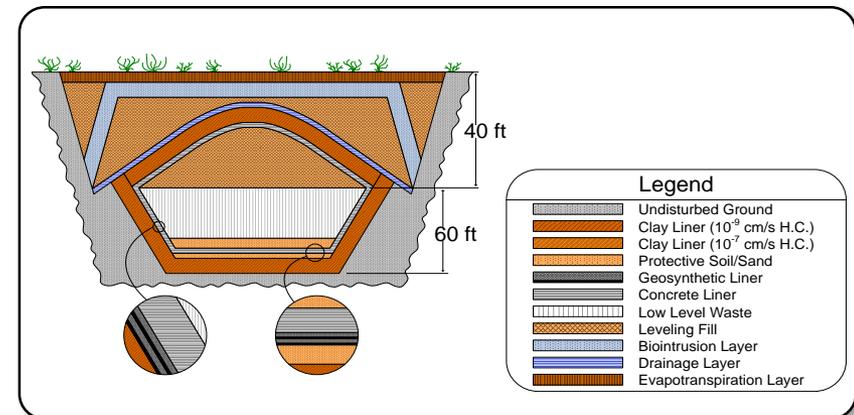


PUREX Tunnel Filled with Grout

- Vitrification generates substantial secondary liquid waste that requires stabilization for disposal
- Having multiple treatment technologies provides opportunities for mission needs
- Grout development could improve waste performance for onsite disposal



- Waste Control Specialists permit (August 2014) allows high levels of technetium-99 and iodine-129 at their Federal Waste Facility in Andrews, Texas
- Federal Waste Facility
 - Regulated by Texas Commission on Environmental Quality under Nuclear Regulatory Commission authority
 - Over 100 feet deep, 7-foot liner system
 - Capacity of 26 million cubic feet and 5.6 million curies
 - Multi-layered liners and barrier systems
 - The geographical makeup of the area makes it a favorable disposal site
 - Technetium-99 and iodine-129 limits exceed Hanford's needs
 - Exceeds 10,000-year period of compliance



What is Supplemental Low-Activity Waste (SLAW)?

- SLAW is the portion of low-level waste to be stabilized beyond the capacity of the Low-Activity Waste (LAW) Facility at the Waste Treatment and Immobilization Plant.
- The current capacity of the LAW Facility is estimated at 50 percent of Hanford's LAW
- The 2013 *Final Tank Closure and Waste Management Environmental Impact Statement Record of Decision* identified benefits in additional studies prior to a future decision on a supplemental technology
- This topic is reserved for future discussion in the Tri-Party Agreement



Congress mandated a review in 2017 by the National Academies of Science, Engineering, and Medicine pursuant to *National Defense Authorization Act* Section 3134 to include the following:

- Analysis of approaches for supplemental treatment of low-activity waste at the Hanford Nuclear Reservation
- Analyze treatment approaches for the treatment of SLAW:
 - Further pretreatment of waste to remove long-lived constituents (i.e., technetium-99 and iodine-129)
 - Vitrification, grouting, steam reforming, and other identified alternatives
- Approaches are to be Analyzed for:
 - Risks related to treatment and disposition
 - Benefits and costs
 - Anticipated schedules
 - Regulatory compliance
 - Any obstacles that would inhibit pursuit

Draft Federally Funded Research & Development Centers Results (May 2019)

- Vitrification
 - Most complex, most expensive
- Grouting
 - Least complex, least expensive
- Steam Reforming
 - Least mature, relative to LAW



Grout Use Internationally and Around the DOE Complex

- Sellafeld Site, United Kingdom:
 - Intermediate level waste (contains constituents similar to LAW) has been treated with grout for the last 20 years
 - Chose grout because it is effective, less costly, and suitable for a wide-range of radioactive wastes
- West Valley Demonstration Project:
 - Generated 660,000 gallons of liquid high-level waste (HLW) stored in two underground tanks
 - DOE separated out LAW to reduce the amount that needed to be vitrified, mixed LAW with grout, and shipped offsite for disposal
- Savannah River Site (SRS):
 - DOE has treated approximately 4 million of the 36 million gallons of LAW at SRS (42 million gallons total: 6 million HLW and 36 million LAW)
 - By getting started, DOE learned more about the performance of grout at SRS



Waste Control Specialists disposal of treated mixed low-level waste in Andrews, Texas

Risk, lifecycle, and cost reduction is possible



- Direct-feed LAW remains DOE's priority
- Opportunities for significant risk, schedule, and cost reduction exist
- Grout technology has advanced in support of secondary waste form development for direct-feed LAW
- All opportunities are being considered within the existing legal and regulatory framework and will require support from our regulators, stakeholders, and community