Nuclear Waste Technical Review Board
Engineered Barrier System Panel Meeting

The Hanford Site
Tank Waste Remediation System's (TWRS) Waste Disposal Program

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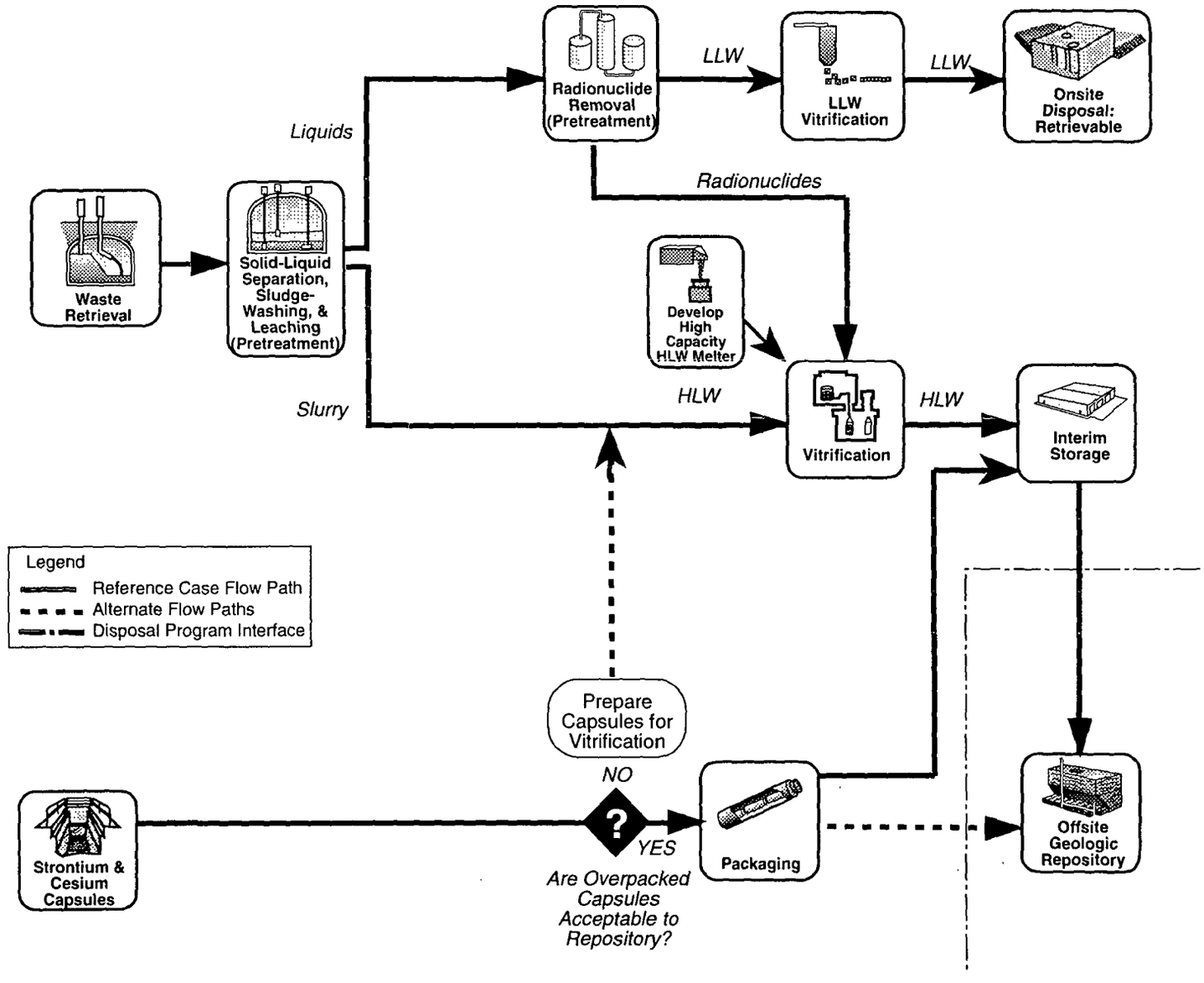
Wastes Requiring Disposal

- Single-shell tank waste
- Double-shell tank waste
- Cesium and strontium capsules

TWRS Disposal Program



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TWRS Tri-Party Agreement Disposal-Related Milestones

• Characterization	
– Complete Tank Characterization	09/1999
• New Double-Shell Tanks	
– Install Six New Tanks	12/1998
• Low-Level Waste	
– Pretreatment (Cesium Removal) Startup	12/2004
– Vitrification Plant Startup	06/2005
• High-Level Waste	
– Pretreatment (Caustic Sludge Washing) Startup	06/2008
– Vitrification Startup	12/2009
• Tank Waste Treatment	
– Complete Treatment of Tank Waste	12/2028

Pretreatment

- Caustic sludge washing primary means to minimize high-level waste volume
- Technology development of sludge dissolution and advanced radionuclide removal processes will continue as contingency
- Organic destruction process development will continue
- Pretreatment facilities operational
  - Low-level waste: 2004
  - High-level waste: 2008

High-Level Waste Immobilization

- Vitrified waste form in canisters
- Vitrified waste stored onsite until shipped to geologic repository for disposal
- High-level waste canister design optimized to reduce cost; may be as large as multipurpose canister (MPC) per discussions with RW/YMSCO
- Vitrification facility
  - Capacity: ~15 metric tons of waste glass per day
  - Start construction: 2002
  - Hot operation: 2009
  - Complete vitrification: 2028

Standard Design Basis Waste Form and Canister

- 2 ft dia x 10 ft long stainless canister (0.6 m^3)
- Glass monolith
- Borosilicate glass
- Thermal output 1500 watts (maximum) per canister

Projected Characteristics of Hanford Site's High-Level Waste Product

- Range of HLW glass volume:
  - 10,000 - 28,000 m^3
- Range of number of canisters (0.6 m^3):
  - 16,700 - 46,700
- Total kW (thermal): ~930 (includes Cs/Sr and is indexed to 2021)
- Total eMTHM: ~2,600

Waste Form and Canister Options Under Consideration at Hanford

- Larger canisters/casks
  - Elongated wide mouth (West Valley) canister, 2 ft dia x 15 ft (1.4 m^3)
  - Large canister or cask (~10 m^3)
- Non-monolithic glass, e.g., glass cullet, marbles
- Non-borosilicate glasses
  - Aluminosilicates
  - Others
- Cesium/strontium capsules
  - Overpack in canisters
  - Blend with high-level waste feed to vitrification plant

Technical Rationale for Options Considered

- Larger canister/cask
  - Fewer units to handle and transport
  - Takes advantage of repository packaging and shipping cask concepts for spent nuclear fuel
- Non-monolithic glass (glass cullet likely to be unacceptable to repository as waste form)
  - Easier to accommodate recycle of out-of-specification product
  - Facilitates use of large diameter canisters
- Non-borosilicate glasses
  - Potentially higher waste loadings per unit volume resulting in fewer canisters
- Cesium and strontium capsules
  - Overpack requires fewer processing steps
  - Blending yields fewer canisters

Cost Incentives for Options Considered

- Larger canister/cask
  - RW's cost model shows that larger canister options reduce disposal fee
- Non-monolithic glass
  - Reduced cost if recycling necessary
  - May be necessary if 10 m^3 canister is used
- Non-borosilicate glasses
  - Reduced operating, storage, transportation, and disposal costs
- Overpack of cesium and strontium capsules
  - Less capital investment in facility to process cesium and strontium capsules
  - Lower operating costs
- Blending of cesium and strontium capsules
  - Potentially reduces number of canisters requiring repository disposal

Major EM/RW Program Interface Actions

- Based on recently signed MOA between EM and RW, continue dialogue on waste form and canister options
- Establish points-of-contact between RW/YMSCO and EM/RL
- Provide technical and economic evaluations of options under consideration
- Agree on process for formal transmittal of requests and responses between RL and YMSCO