Hanford Tank Waste Retrieval, Treatment, and Disposition Framework

Hanford Advisory Board
December 11, 2013

Ben Harp, Manager
WTP Start-Up and Commissioning Integration
Secretary Moniz Visits Hanford

- June 19, 2013
  - Secretary Moniz toured Tank Farms and Waste Treatment and Immobilization Plant (WTP)
- Two Briefings with State of Washington
- Announced Framework for New Path Forward Through Phased Approach
  - Begin immobilization of tank waste as soon as practicable for direct-feed to Low-Activity Waste (LAW) Facility
  - Process transuranic tank waste for disposal at the Waste Isolation Pilot Plant (WIPP) in New Mexico
  - Resolve technical issues for Pretreatment (PT) and High-Level Waste (HLW) Facilities
Hanford Tank Waste Retrieval, Treatment, and Disposition Framework

- The Framework document is not a proposal, but rather a framework for discussion with the State of Washington to seek to resolve concerns regarding completion of the waste treatment mission.
- Framework describes an approach that would allow for immobilization of tank waste to begin as early as practicable.
- Moves forward without waiting for completion of work to resolve the technical issues associated with PT and HLW Facilities.
- Framework identifies potential waste treatment options, based on a combination of:
  - Previous alternatives analyses
  - External reviews
  - Testing
  - Ongoing analyses
Hanford’s Three Waste Streams

The 56-million gallons of tank waste can be binned into three major categories for treatment:

1. LAW
2. Potential Contact-Handled Transuranic Waste (CH-TRU)
3. HLW
   - Easier to process
   - Harder to process
Phased Construction and Startup of the Waste Treatment and Immobilization Plant

- Completion of the WTP in a phased sequenced manner
  - U.S. Department of Energy, Office of River Protection will apply resources to address the most mobile tank waste, supernate
  - Resolve the remaining technical issues associated with PT and HLW Facilities

- As technical issues are resolved, construction resources will move to the HLW Facility followed by the PT Facility

- Allows WTP vitrification operations to begin as soon as practicable
Phased Construction and Startup of the WTP

**Phase 1 Key Activities Include:**

- **Current activities**
  - Completion, commissioning, and startup of Balance of Facilities and the Analytical Laboratory
  - Completion of the ongoing C-Farm retrievals

- **Direct Feed Low-Activity Waste Activities (DFLAW)**
  - Completion of the tank farm infrastructure and an interim pretreatment capability (for removal of cesium and miscellaneous solids) needed to directly feed the LAW Facility
  - Completion, commissioning, and startup of the LAW Facility
  - Final permitting of the onsite Integrated Disposal Facility for LAW

- **CH-TRU Activities**
  - Retrieval and shipment of any CH-TRU waste from the single-shell tanks to the WIPP, pending the proper and legal classification of the waste as transuranic and obtaining the necessary permits

- **Direct Feed High-Level Waste Activities (DFHLW)**
  - Initiation of a tank waste characterization and staging (TWCS) capability in the tank farms to support HLW

- **Technical Issue Resolution**
  - Completion of full-scale vessel testing and resolution of technical issues in the PT and HLW Facilities
Phase Startup – Phase 1 Flow Diagram

- **SSTs**
- **Potential CH-TRU**
- **DST System**
  - **Tank Farm**
  - **242-A Evaporator**
  - **AP-Farm**
- **Direct Feed LAW Pretreatment**
- **WTP**
  - **Pretreatment**
  - **HLW Facility**
  - **LAW Facility**
- **ETF**
- **IDF**
  - Canisters from LAW immobilization

Facilities in the tank farm baseline to be constructed
Facilities/Capabilities proposed in framework
Existing facilities that require modifications

- CH-TRU – contact handled transuranic
- DST – double-shell tanks
- ETF – Effluent Treatment Facility
- HLW – high-level waste
- IDF – Integrated Disposal Facility
- LAW – low-activity waste
- SSTs -- single-shell tanks
- WTP – Waste Treatment and Immobilization Plant
Phased Construction and Startup of the WTP

Phased 2 Key Activities Include:

- **DFHLW Activities**
  - Completion of HLW
  - Completion of a TWCS capability
  - Completion and commissioning of the Interim Hanford Storage Facility

- **PT Facility**
  - Continue construction of the PT Facility
Phase Startup – Phase 2 Flow Diagram

- **SSTs**
- **DST System**
  - **Tank Farm**
  - **242-A Evaporator**
  - **AP-Farm**
- **Potential CH-TRU**
- **ETF**
- **WTP**
  - **Pretreatment**
  - **HLW Facility**
  - **LAW Facility**
- **IHSF**
  - Canisters from HLW immobilization
- **IDF**
  - Canisters from LAW immobilization

Facilities in the tank farm baseline to be constructed
Facilities/Capabilities proposed in framework
Existing facilities that require modifications

- **Cs** – cesium
- **CH-TRU** – contact handled transuranic
- **DST** – double-shell tanks
- **ETF** – Effluent Treatment Facility
- **HLW** – high-level waste
- **IDF** – Integrated Disposal Facility
- **IHSF** – Interim Hanford Storage Facility
- **LAW** – low-activity waste
- **SSTs** – Single-Shell Tanks
- **WTP** – Waste Treatment and Immobilization Plant
Phased Construction and Startup of the WTP

**Phased 3 Key Activities Include:**

- Full WTP Completion
  - PT Facility commissioning
  - Initiating integrated WTP operations
  - Possible additional preconditioning capability for the harder to process waste
Phase Startup – Phase 3 Flow Diagram

- SSTs
- DST System
- Tank Farm
- 242-A Evaporator
- AP-Farm
- Potential CH-TRU
- Pretreatment Staging
- Harder to process Waste
- Tank Farm Waste Characterization and Staging
- Direct Feed LAW Staging
- Direct Feed LAW Pretreatment
- WTP
- Pretreatment
- HLW Facility
- LAW Facility
- ETF
- IHSF
- Canisters from HLW immobilization
- IDF
- Canisters from LAW immobilization
- Supplemental Immobilization
- Cs Eluant
- Cs – cesium
- CH-TRU – contact handled transuranic
- DST – double-shell tanks
- ETF – Effluent Treatment Facility
- HLW – high-level waste
- IDF – Integrated Disposal Facility
- IHSF – Interim Hanford Storage Facility
- LAW – low-activity waste
- SSTs – single-shell tanks
- WTP – Waste Treatment and Immobilization Plant

Facilities in the tank farm baseline to be constructed
Facilities/Capabilities proposed in framework
Existing facilities that require modifications
Current Actions To Date

- Preparing contract direction to Tank Operating Contractor and WTP for DFLAW
- Submitted justification of mission needs for TWCS capability
- Waste designation for potential CH-TRU in process
- Class 3 Permit Modification in New Mexico for WIPP
- Technical issues resolution underway
Conclusion

- Multipronged, phased approach to the startup and completion of the tank waste mission is intended to facilitate the start of tank waste immobilization
- Continue to resolve the remaining technical issues in PT and HLW Facilities
- Framework recommends two Phase 1 waste treatment options
  - DFLAW
  - CH-TRU
- Discussed a third option of DFHLW
- While preferred alternatives are identified based on current analyses, the alternatives analysis process continues