Tank Side Cesium Removal System (TSCR)

Issue Managers: Bob Suyama,
Advice/Lines of Inquiry/Concerns/Issues/Questions

Background

The Tank Side Cesium Removal System (TSCR) system is initially planned to be deployed as a demonstration project in the AP Tank Farm. The objective of the TSCR system is to demonstrate a potentially low-cost, efficient tank-side treatment technology to filter solids and remove cesium from supernatant tank waste using non-elutable cesium ion-exchange media. The resulting treated tank waste will provide a low-activity waste (LAW) feed to the Waste Treatment and Immobilization Plant (WTP) in support of Direct Feed Low Activity Waste (DFLAW) system's hot commissioning and operation.

The TSCR system will receive tank supernatant waste from Double Shell Tank (DST) AP-107, filter out undissolved solids, and treat the tank supernatant waste by removing radioactive cesium using an ion-exchange subsystem. The liquid and gaseous effluents from the TSCR system will be returned to DST AP-108. Treated waste will be sent to DST AP-106. The treated waste compliant with WTP waste acceptance criteria will be fed to the WTP LAW Facility.

The TSCR system consists of pre-filtration and cesium ion-exchange units located inside of a process enclosure. Waste feed is delivered from DST AP-107 to the process enclosure interface via a transfer pump and hose-in-hose transfer line (HIHTL). The pre-filtration subsystem consists of multiple filter units, so that a clean filter is always on-line. The solids remain in the offline filter until flushed out with a side stream of filtrate from the online filter. Filter flush is sent to DST AP-108.

The treated LAW product is sent to DST AP-107 via a HIHTL. When an ion-exchange column is fully loaded, it will be taken out of service and the next ion-exchange column will begin loading. When all ion-exchange columns within the process enclosure are loaded, the spent ion-exchange columns will be replaced.

Each spent ion-exchange column will be displaced with caustic followed by a water rinse. The caustic and water flush will be sent to DST AP-108. Each spent ion-exchange column will then be air-dried. The drying process is expected to consist of draining an ion-exchange column, and then flowing dry air through each ion-exchange column in up-flow for approximately one week. Air and liquids will be sent to DST AP-108 during the drying process. The spent ion-exchange columns will be moved by others to an interim storage pad. The newly installed ion-exchange

columns will be flushed with caustic solution and water for fines removal and pre-conditioning prior to use. The caustic pre-conditioning solution will be sent to DST AP-108.

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- Spent TSCR Resin Cannisters
  - Potential orphaned waste (744 to 1800 cannisters) stockpiled on storage pad(s).
  - No defined disposal path for the spent TSCRs.
  - Current cannister design does not facilitate the ease of removal of spent resins for potential future disposal of the cesium ion-exchange media as HLW.
  - No identified disposal path for disposal of emptied cannisters.

- What is the back-up or contingency plan for cesium removal if TSCR Demonstration System fails to meet DFLAW requirements?

- Need a Process Flowsheet that shows expected operational DST feed through-put, volumes of treated LAW waste generated, volume of secondary waste generated, anticipated need for TSCR cannisters, TSCR cannister and HIHTL replacement timing and LAW facility operational feed requirements, etc.

- DST waste storage is currently nearing full capacity. Dedicating at least three (3) million-gallon AP Tank Farms tanks (AP-106, 107, 108) to support TSCR operations will remove their equivalent capacity from the DST inventory. At the same time, TSCR operation will generate additional secondary waste, the Evaporator is currently not operational, and plans are to place to generate more waste to be stored in the DST's from the recovery of SST waste operations in the A & AX Tank Farms. We have not seen an Integrated System Plan that demonstrates how the DST waste from these concurrent operations will be managed.

- The planned TSCR Demonstration System has a planned 5-year operational life. Hose-in-hose transfer lines serving the TSCR has a 3-year design life. What is the process to change out HIHTL? What will be the impacts on TSCR operation?

- How does TSCR operations impact the planning, design and construction of the Pre-Treatment Facility?

- What is the planned process and opportunities for obtaining public Input?