

ARP Startup and Operations Summary



Seth Campbell
ARP/MCU Process Engineer
Washington Savannah River Co.

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Waste Management Technical Exchange

Agenda

- **Mission**
- **Process Overview**
- **Equipment Testing**
- **Startup**
- **Processing Results**
- **Issues & Resolution Examples**
- **Enhancement**
- **Summary**

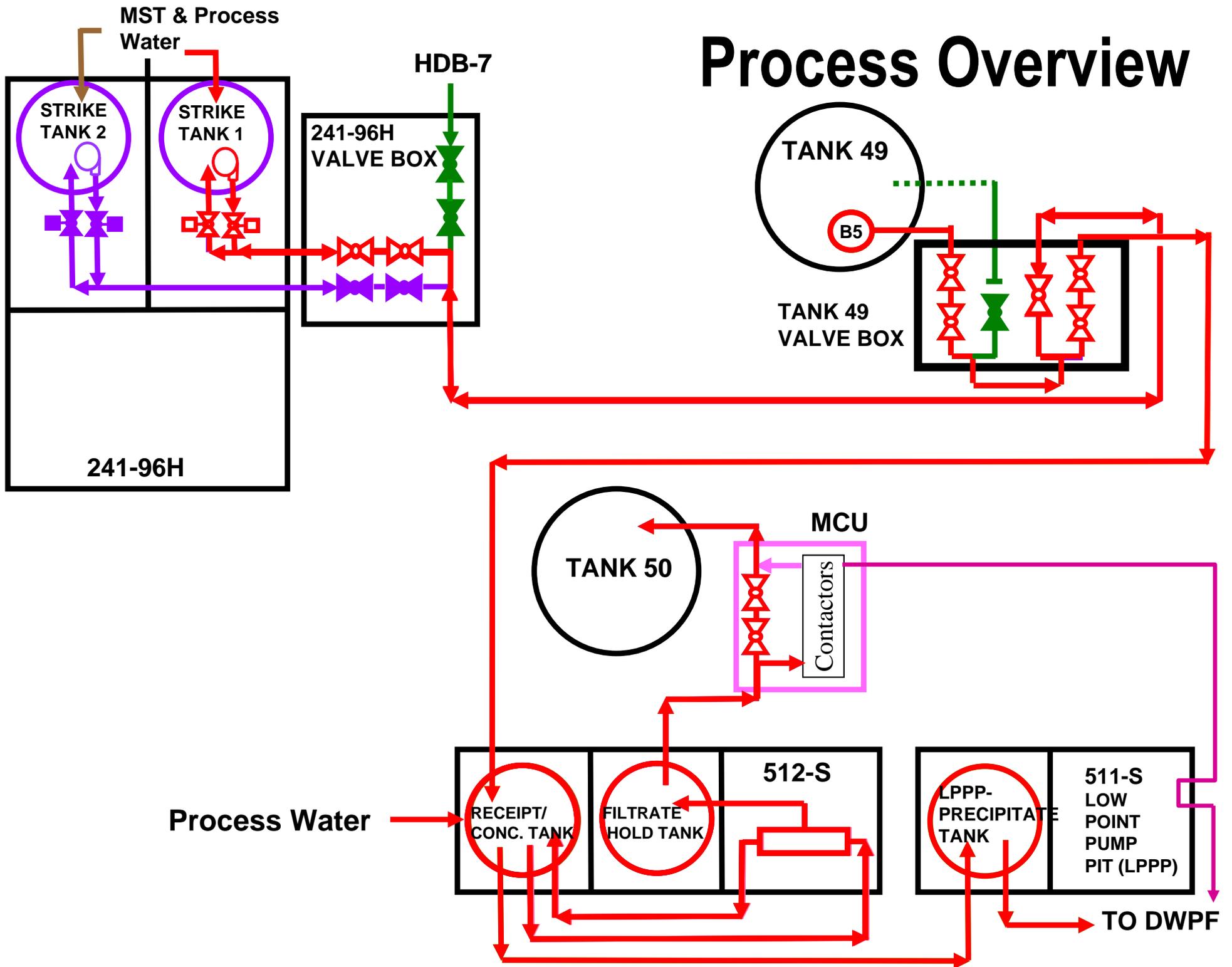
ARP Mission

- **Process dissolved salt solution for disposal**
 - Receive salt solution from SRS Tanks (≤ 1.1 Ci/gal)
 - Remove soluble Sr and Pu via Monosodium Titanate
 - Filter to remove sludge & MST solids
- **Provide operational experience for SWPF**
 - Equipment reliability
 - Process chemistry
 - Lessons learned

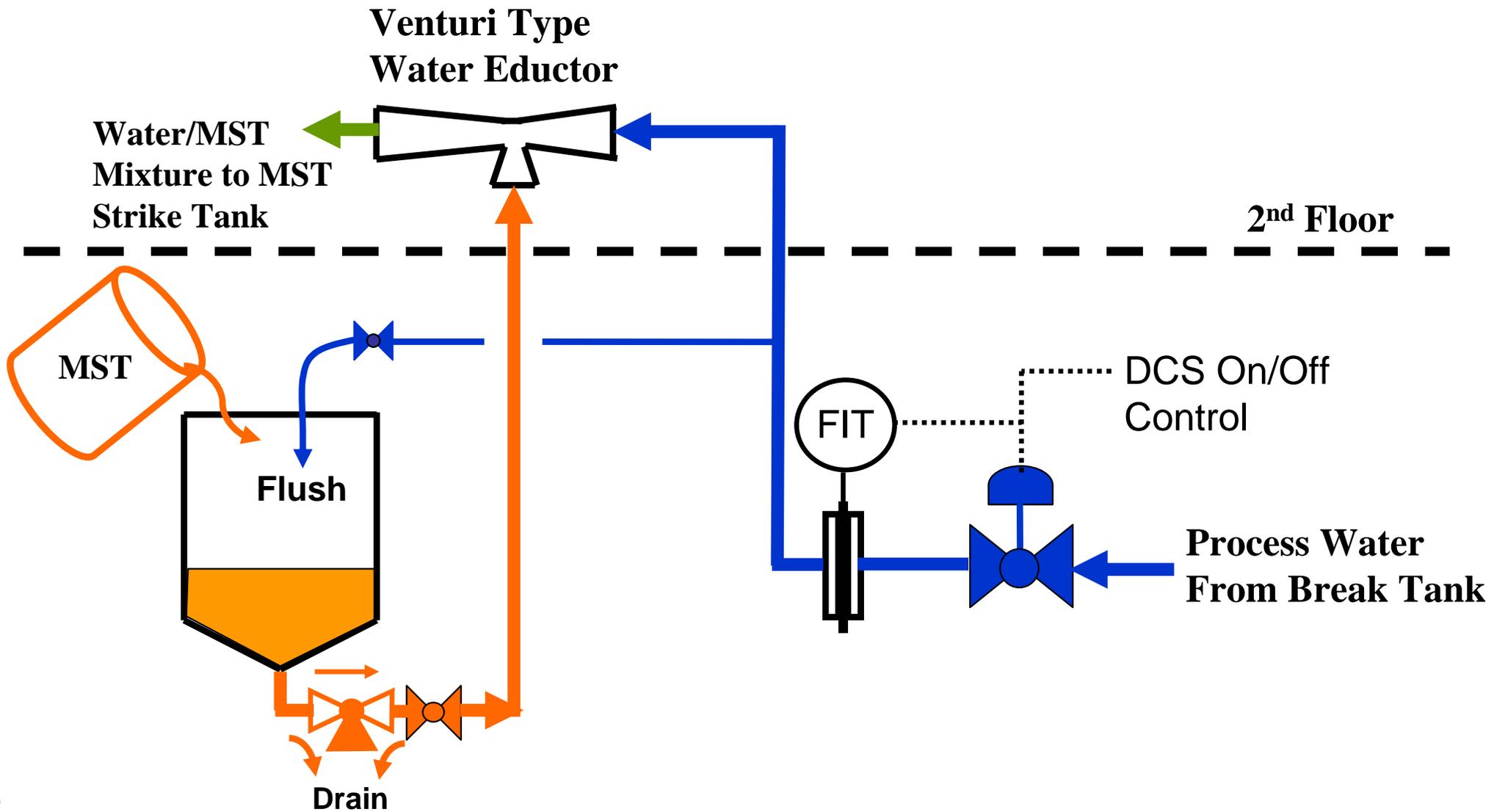
Process Overview

- **Receive waste from underground storage tank**
- **Adsorb Sr & Pu**
 - Add MST
 - Maintain Temperature at $25 \pm 5^{\circ}\text{C}$
 - Agitate for predetermined time (baseline = 24 hrs)
- **Remove Solids (Filter)**
 - Filtrate goes to MCU for Cs removal
- **Concentrate Solids (multiple batches)**
- **Wash and Transfer Solids for Vitrification**

Process Overview

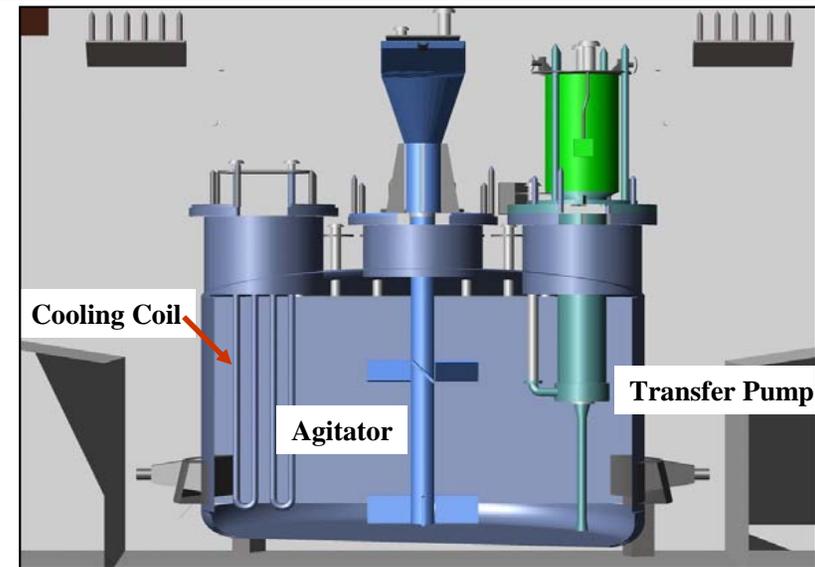


Process Water and MST Addition



96H Equipment Testing

- Tank Mapping
 - Bubbler corroborated via radar
- Agitator Run-in
- MST Addition System
- Chiller
 - Maintain @ $25 \pm 5^{\circ}\text{C}$
 - Cool from 34°C to 30°C in <3 hr
- PVV
 - $-1''\text{wc}$ Tank to Cell Δ w/150 gpm feed
 - 10°C Δ across HEPA



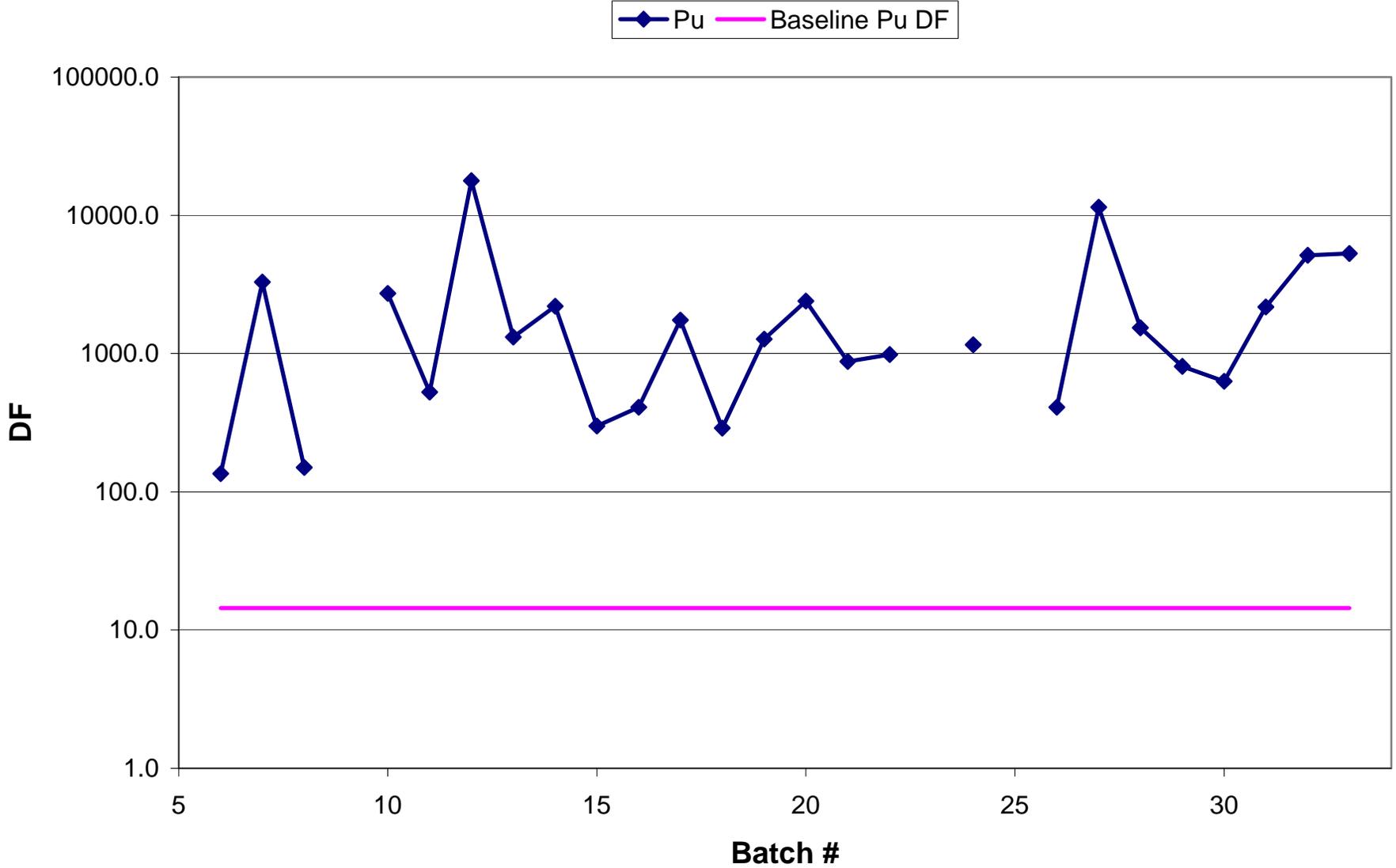
512-S Equipment Testing

- **Crossflow filter / Filter feed pump**
 - Filter flux
 - Solids removal
- **Secondary filter performance**
- **Chemical Cleaning**
- **Chiller**
 - Maintain @ $25 \pm 5^{\circ}\text{C}$
- **Agitators**
- **Backpulse system**

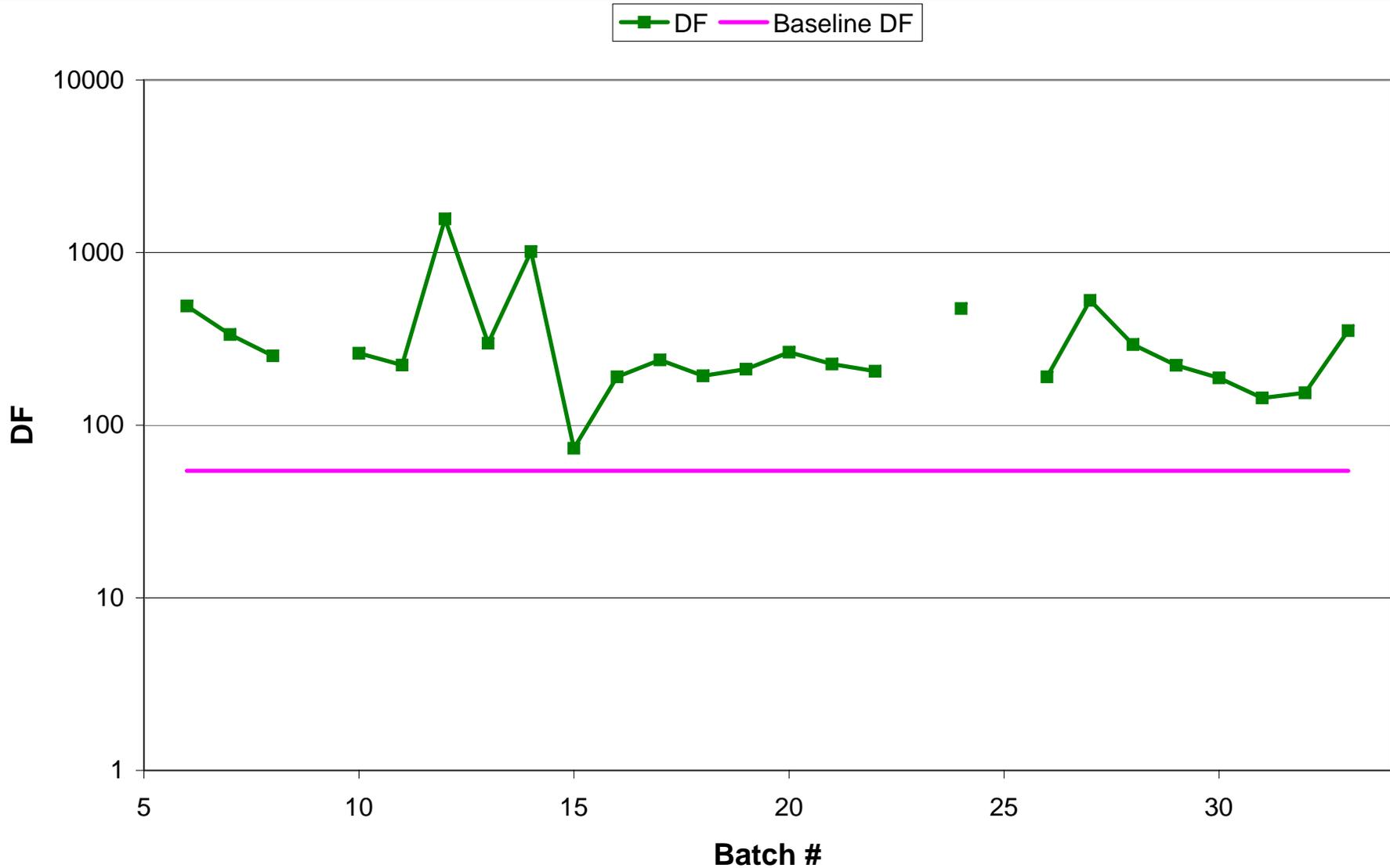
Startup

- **Successfully completed an FSA, MSA, & Contractor ORR.**
- **Completed a DOE ORR with independent SME oversight with only 1 pre-start finding (Not ARP related).**
- **Safely operated the process through hundreds of hours of operation**
 - **Meeting or Exceeding Decontamination Factor (DF) and Solvent Carryover Requirements.**
 - **Processed >260 kgal Salt Waste**

Pu DF (Salt Batch 1)



Sr DF (Salt Batch 1)



96H Issues & Resolutions

- **Vacuum variability during testing**
 - Ventilation calc assumed overflow line submerged
 - Reduced gap around rotor shaft
- **Radiological dose trends in PVV header**
 - Salt solution inlet lines have down comers w/ siphon breaks
 - Weep hole directed toward PVV nozzle
 - Increased PVV header dia & installed demisters
- **MOV operability failure**
 - Solids found on ball and beneath seats
 - Polishing internals restored performance
 - Water addition to ST for dose reduction initiated precipitation

512-S Issues & Resolutions

- **Reduced filtration rate**
 - Secondary filter exhibited high differential pressure
 - Add NaOH to prevent Al precipitation
 - Replaced secondary filter with increased surface area design
 - Drain crossflow filter shell between batches
- **PVV pre-heater condensate**
 - Steam pre-heater condensate diluting batches
 - Replaced with electric heater
- **MOVs experienced intermittent failure**
 - Inspection found metal fines contaminating sealing surfaces
 - Appeared to be residual from initial construction

Previous Secondary Filter Design



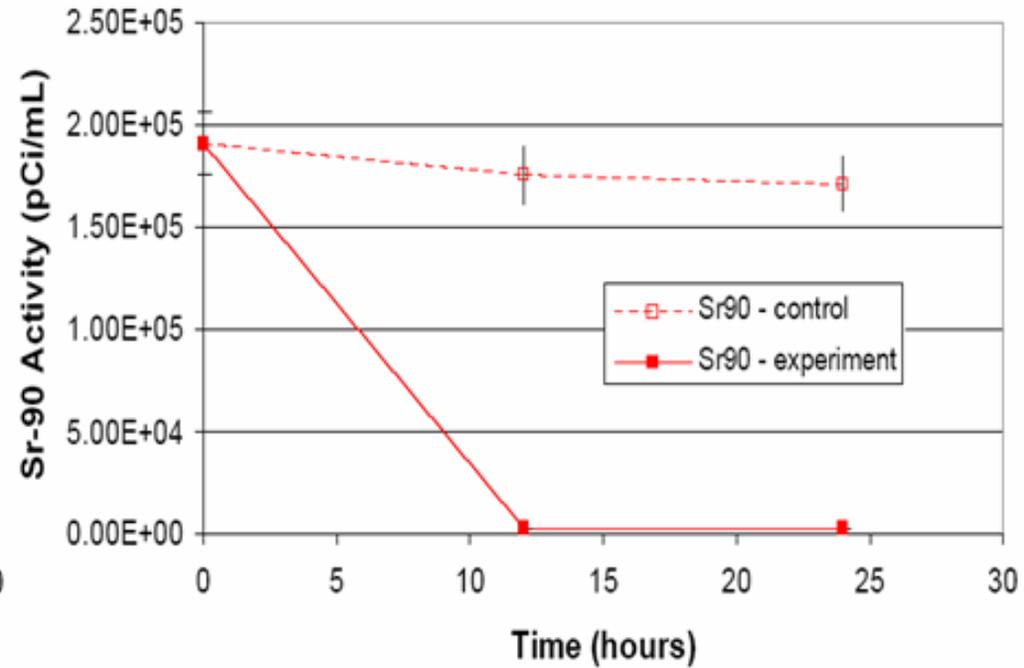
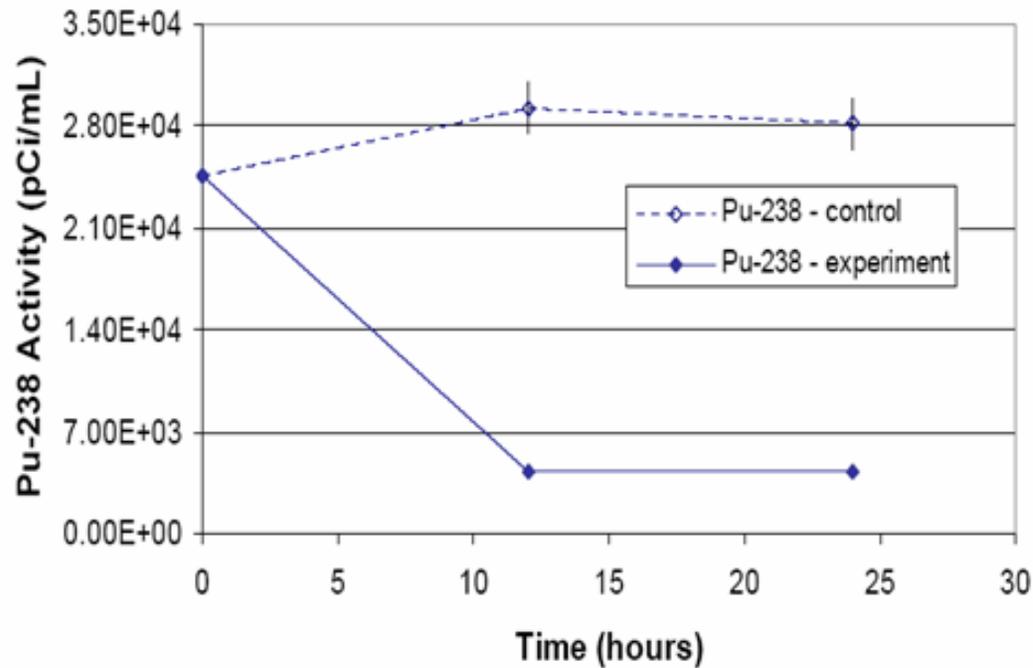
New Filter Design



Enhancement

■ Reduce Strike Time

- From 24 hrs to 12 hrs
- Currently performing a process demonstration
- Engineering evaluation to follow



Summary

- **Process is exceeding design basis**
 - Pu & Sr DF
 - Filtration rate
- **Reuse of equipment provides challenges**
- **Production continues to improve as challenges are overcome.**
- **Operating experience proven valuable for SWPF**
- **Further production rate increase with 12-hr MST strike**

Questions



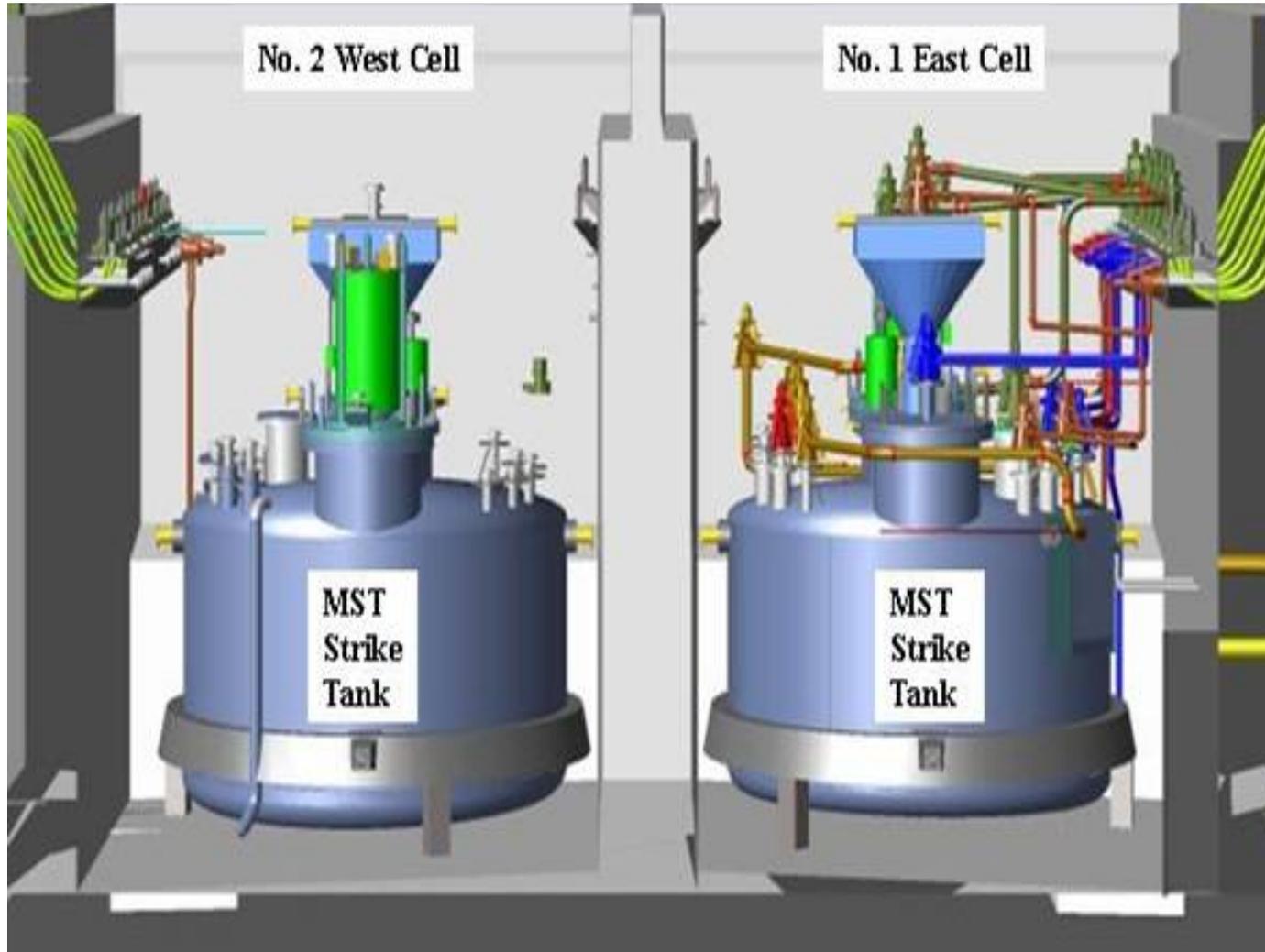
Contact:

Seth Campbell

(803) 208-3704

SRS, Aiken SC 29808

96H Coffiguration



ARP Strike Tanks (96H)



ARP Startup and Operations Summary

MST Pail Shaker



ARP Startup and Operations Summary

MST Addition System



96H Valve Box



512-S Cross-Flow Filter

