

Alternative Enhanced Chemical Cleaning of Waste Tanks

Project #: 08.1.2.2.3
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Background

- after completion of mechanical sludge removal from SRS tanks scheduled for closure, chemical cleaning needed to remove remaining materials
 - nominally 5000 gallon heels
 - chemical cleaning involves at least partial heel dissolution, material transfer to compliant tank, sludge reprecipitation
- oxalic acid (OA) based technologies currently being utilized and considered for chemical cleaning in SRS F Area tanks
 - baseline Chemical Cleaning method - 8 wt. % OA in multiple batch contacts recently deployed for SRS Tanks 5 and 6
 - Enhanced Chemical Cleaning (ECC) project utilizing nominally 1 wt. % OA and an oxalate destruction technology currently being studied and developed through site funding for Tank 8
- SRS Tank Farm Inventory saturated with oxalate
 - OA causes downstream problems in both SWPF and DWPF
 - SWPF will add more OA from filter chemical cleaning
 - alternative to baseline sludge heel removal technology must be identified



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Technology Needs

- technologies meeting new expectations
 - longer processing window
 - minimal downstream impacts
 - minimal added waste volume in tank farm
 - less restrictive corrosion limits for tanks slated for closure
- non-OA based technologies or OA-based technologies including oxalate destruction
- comparison/downselection of available technologies considering current performance requirements to ensure best method being implemented
- more thorough studies and better understanding of most promising technologies
- technologies applicable to sludges and tanks other than F tank farm

Program Goals

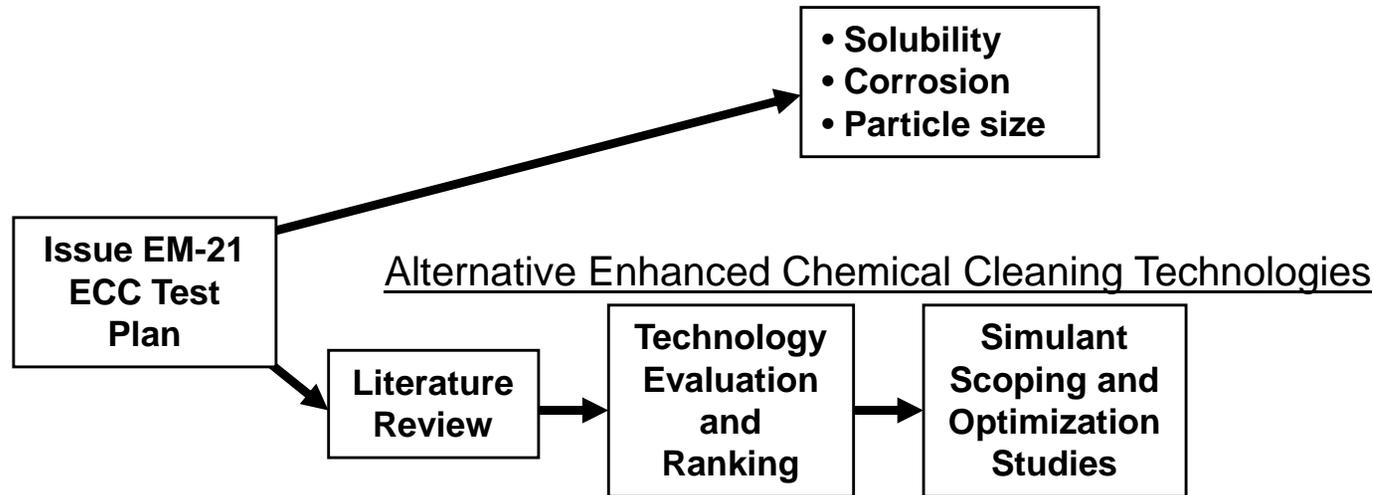
- identify, evaluate, and develop alternatives to baseline 8 wt. % OA chemical cleaning (Alternative Enhanced Chemical Cleaning - AECC)
- advance development and basic understanding of OA-based technologies



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Technical Strategy/Approach

Basic Studies for Oxalic Acid Based Technologies



- Basic Studies for OA-Based Technologies
 - solubilities of selected species vs. OA concentration, time, and temperature
 - OLI modeling
 - corrosion evaluations
- AECC Technologies
 - literature review
 - scoping/optimization studies of selected technologies
 - includes OA and non-OA based technologies and oxalate destruction
 - non-OA technologies include other acids, acid combinations, and caustic

Technical Status and Results

- TTQAP issued
- equipment ordered
- Technical Brainstorming Meetings conducted with SRNL and SRS Liquid Waste representatives on potential alternative technologies
- literature review conducted, summary document under review
- preliminary OLI modeling conducted
- preliminary hazards analysis underway for solubility testing (oxalic acid based technologies)



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Resource Conflicts with Site EM Customer

- resource issues have continued
- program lead (King) spent majority of time working on site funded ECC program
- issue addressed by using four different researchers on part-time basis
- expected that two researchers will be able to work on project at $\geq 50\%$ during late summer and early fall with additional support from others (as many as 5 total)

significant progress expected on both program parts (AECC and basic studies of OA-based technologies) by October



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Potential Project Impact

- identification/development of technology with no net OA addition to SRS Tank Farm allowing for sludge heel removal and tank closure
- accelerated tank closure or reduced maximum practical levels of radionuclides in tanks may result through:
 - identification of technologies with enhanced dissolution properties
 - development of cleaning agent destruction technologies
- increased basic understanding and broader knowledge of available methods to assist in development of ECC technologies for SRS H area and Hanford tanks