

Annual SCDHEC Technology Briefing

April 17, 2013

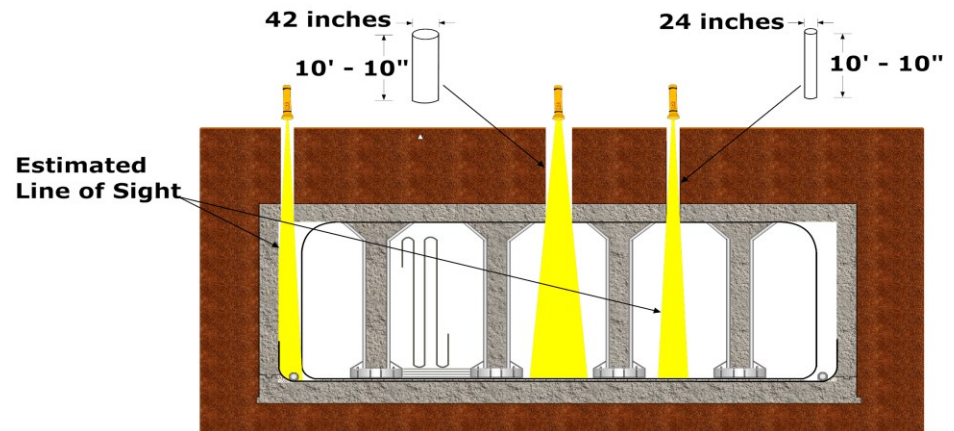
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Waste Removal & Tank Closure

SRR-LWE-2013-00077

- Annual briefing on technology investigated and lessons learned for Waste Removal and Tank Closure
- Covering new information since April 2012



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- Waste Management Symposia
- Hanford Site Visits
- Sellafield Exchanges
- Other Technology Sources and Lessons Learned



Hanford Tank Farms

- WMSym is an annual meeting of suppliers, vendors, DOE contractors, DOE and Regulators
- Several hundred presentations are made on the state of the art in the management of HLW
- SRR sent approx 30 representatives in 2012
 - Attended over 100 presentations and visited over 175 vendor booths



- Attended or reviewed approx 35 different presentations related to waste removal / tank closure
 - Areas of interest included
 - Mixing experience
 - Transport/transfer of slurry mixtures
 - Tank Integrity programs

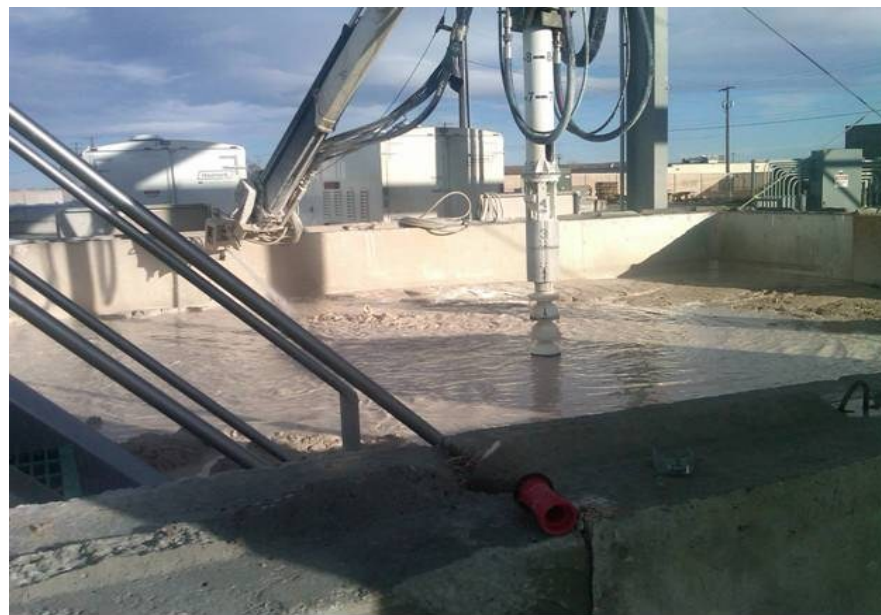


- Continued to follow the progress of tank mixing efforts, arm-based tank cleaning systems, and environmental modeling
- No new technologies ready to deploy in SRS closures at this time
- Conversely, several SRS-developed technologies are of interest to the other sites
- SRS continues to be ahead of the other sites and a supplier of technology rather than a beneficiary



- SRR Interfaced with Hanford site during MARS deployment

- MARS deployment
- Water sluicing devices
- Waste transfer pumps
- Modular waste transfer systems
 - Diversion boxes
 - Ventilation system skids
- MARS vacuum development
 - Technical Review of system performance

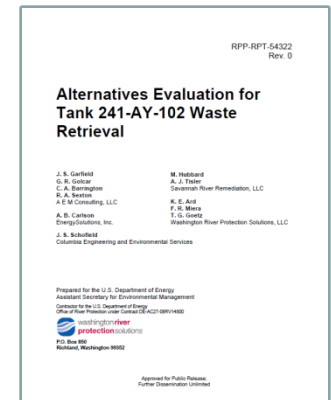


MARS at Hanford Test Facility

- MARS is a hydraulic arm mounted in a riser in the tank top that can position a water sluicer or vacuum device throughout the tank
 - MARS could only be used in SRS Type IV tanks
 - 4 of 47 remaining tanks
 - Device has the reach and capacity to remove bulk waste and possibly the heel from these tanks
 - MARS Sluicer continues to be 1st generation tool
 - MARS Vacuum readying for deployment
 - Mobile arm retrieval will be considered in future strategy for Tanks 21-24 at SRS

Hanford Interfaces

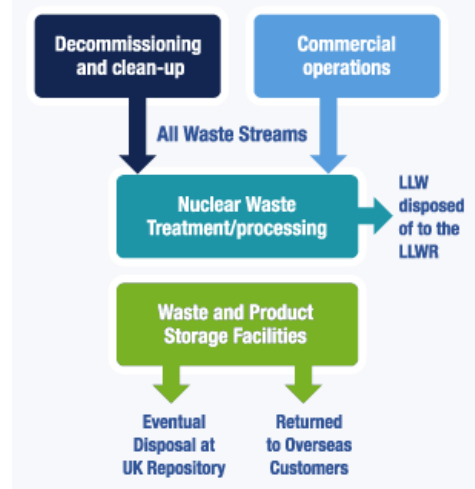
- AY-102 Retrieval technology alternative analysis
 - Double shell tank AY-102 at Hanford leaking
 - Desire is to remove sludge expeditiously
 - Participated on Alternative Analysis team
 - Similar to SRS System Engineering Evaluation
 - Over 18 alternatives reviewed
 - Mixing and sluicing technologies analyzed further



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Sellafield, UK (overview)

- The Sellafield site in the UK reprocesses nuclear fuel
- Established to create nuclear weapons materials Seven nuclear reactors (none operating) and several fuel reprocessing facilities
- Waste Management Facilities include:
 - HLW tanks and evaporators
 - Containerized grouting of waste items
 - Three vitrification process lines
- Sellafield faces many of the same challenges as SRS



Other Technology Sources con't

- SRS personnel continue exchanges with Sellafield personnel
 - Both at SRS and Sellafield
- General findings:
 - Sellafield uses Pulse Jet Mixers to mix waste
 - Prefer no moving parts in contact with the waste
 - Deployed in “Black Cells”
 - Sludge storage very different than SRS
- Showing interest in cleaning technology used at SRS

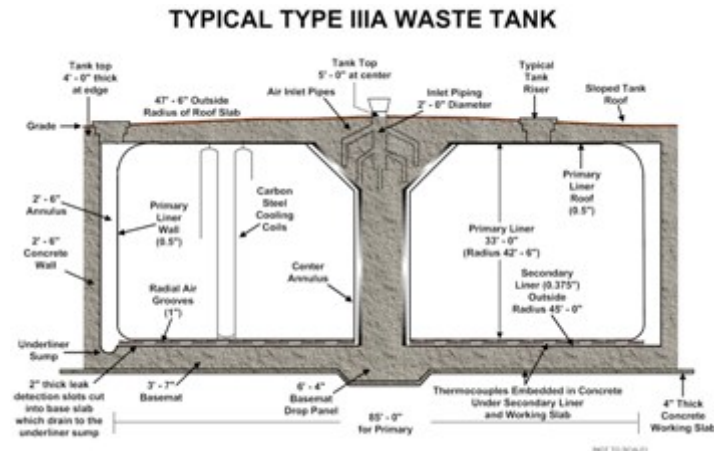
- Monitoring new technology that could enhance the execution of the baseline methods, but would not necessarily increase the effectiveness of the baseline:
 - Laser technology for final mapping
 - Miniaturized high definition sonar to help look beneath the waste level for interferences
 - Remote drilling methods - to provide more access points into tanks



- Commercial mapping laser planned for demonstration
 - Utilize on a tank with completed volume determination
 - Comparison with current mapping techniques

*Note - Request for Proposal for Mapping Services drew limited response

- Modeling tools have not accurately predicted slurry behavior
- Developing predictive tool to provide better mixing/transport information for future Bulk Waste Removal and Heel Removal
 - Demonstrate ability to predict mixing in SRS tanks with low volume



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- Continue to develop alternative mixers
 - Desire is to have one mixer pump for all phases of waste removal and tank closure
 - More economic pump without sacrificing performance
- Sampling devices/crawlers
 - Continue to develop sampling crawlers and techniques for sampling minimal residuals
- Optimization of the chemical cleaning flowsheet
 - Tailored to each tank vs generic
 - Caustic cleaning and acid cleaning as primary tools

