



Mobile Arm Retrieval System

Presented at Waste Management 2010

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WRPS: We are URS, EnergySolutions and AREVA

Mission: Reduce the risk from 53M gallons of radioactive and chemical waste stored in 177 underground tanks

Major Focus: Moving waste out of aging single-shell tanks into safer double-shell tanks to be staged for treatment and disposal

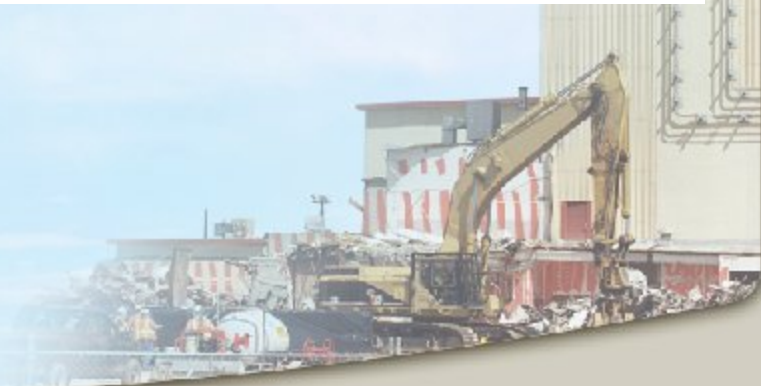
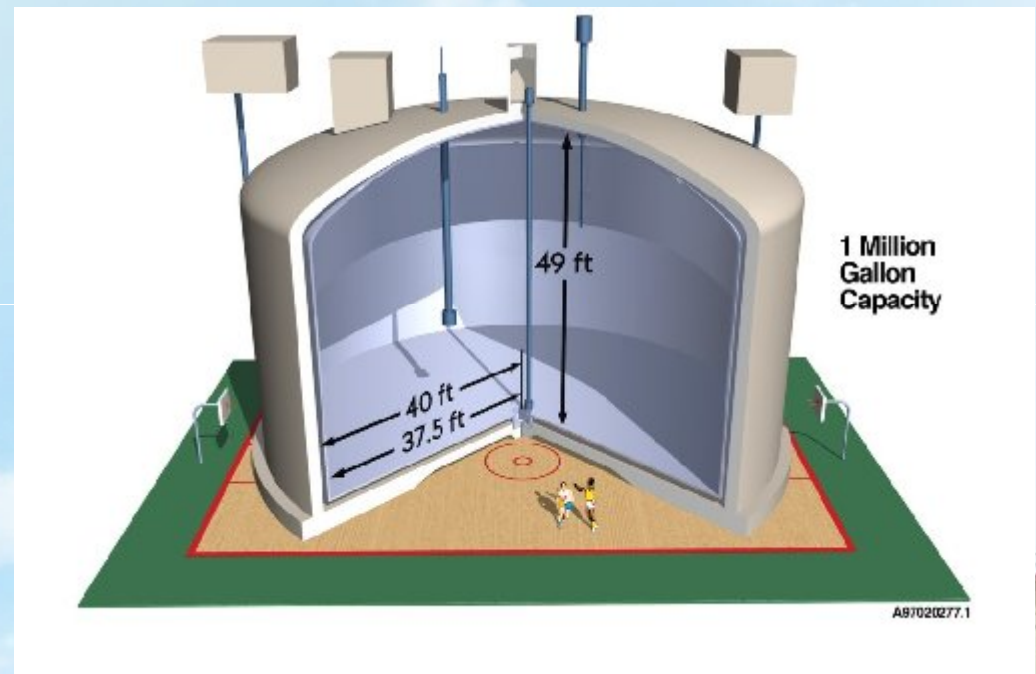
Problem: Waste Retrieval is the most complex cleanup challenge in the DOE complex requiring revolutionary changes to meet obligations under the Hanford Tri-Party Agreement





Retrieval Objectives

- Tri-Party Agreement
 - Complete ten remaining tank retrievals in C-Farm by 2014
 - Complete nine additional tank retrievals 2022
- C-Farm tanks built in the late '40s and have limited 12" dia access from the top





The Challenge

Retrieval Challenges:

- Past practice has been to sluice with water or liquid waste using a water nozzle from the top of the tank and then pumping the material to a nearby double-shell tank
- When limits of sluicing technology are reached, typically after ~90% of material is retrieved, equipment is removed and a another technology must be deployed to retrieve the remaining material
- This approach is slow, expensive, and inefficient





Mobile Arm Retrieval System Objective

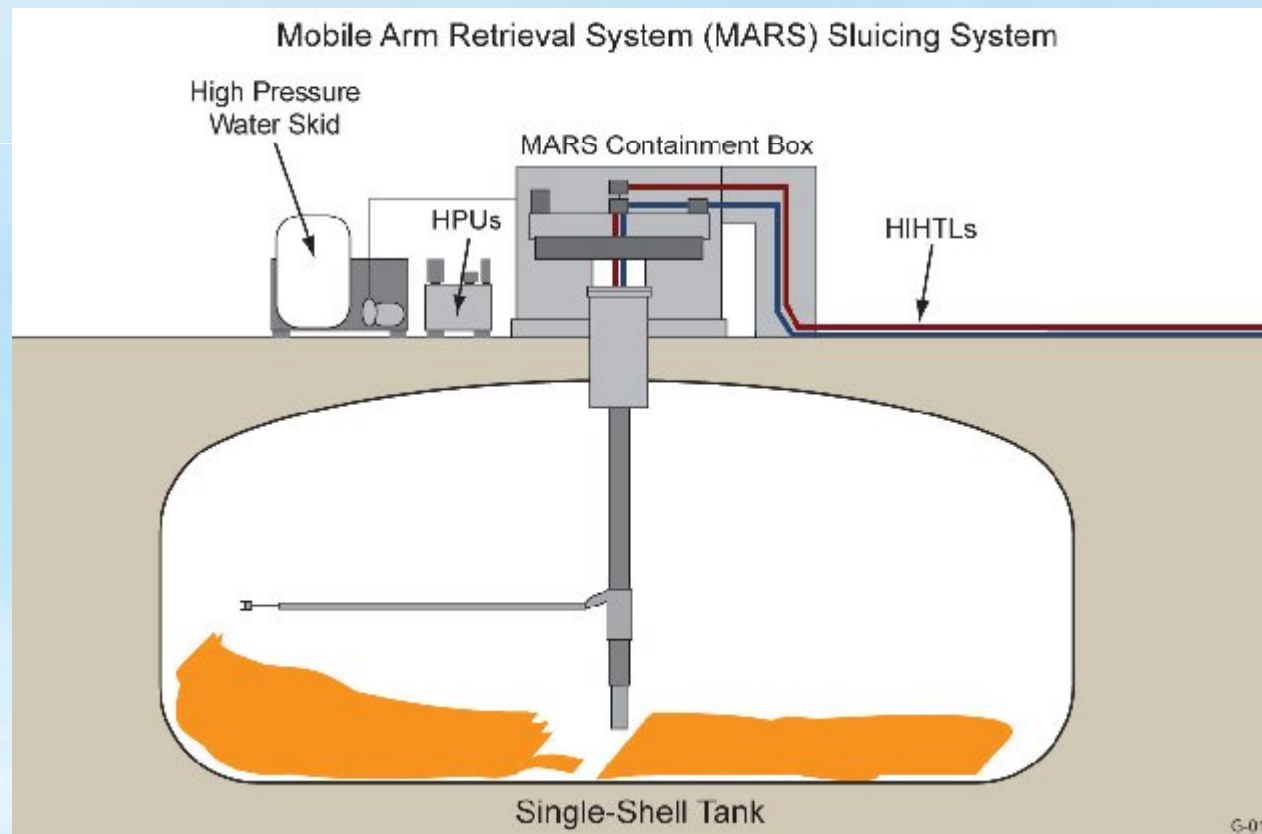
- Deploy a single tool that eliminates multiple tank entries for various stages of retrieval in a given tank (i.e., bulk sludge, salt, hard heel)
- Meet or exceed the retrieval goals of the Tri-Party Agreement
- Ready the single-shell tanks for eventual closure



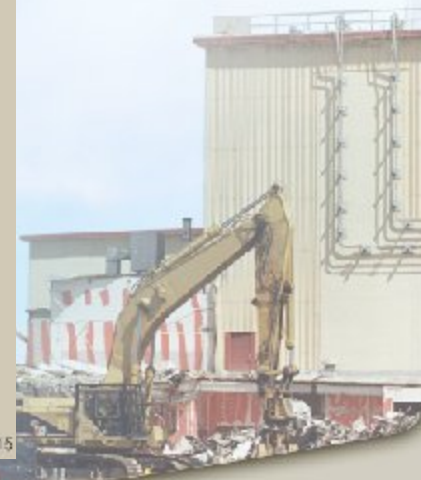


Mobile Arm Retrieval System - Description

- Telescoping, robotic arm combined with a pump on a central mast
- Deployed in a 42" central tank riser opening



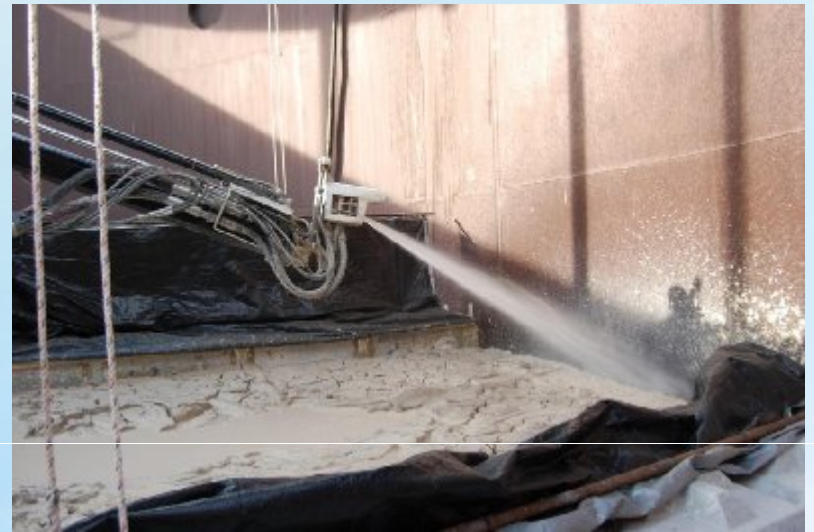
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Mobile Arm Retrieval System - Description

- Arm reaches all areas of the 75' diameter tank
- Uses a system of high pressure water nozzles to hydraulically "rake" the waste to the pump suction
- Uses off-the-shelf technology as much as possible to save time and reduce costs





Mobile Arm Retrieval System - Description

- Backstop integrated with pump and mast to direct material to pump suction
- Controlled by an operator using joy sticks, switches, and controls to operate the arm and control the flow of the sluicing liquids
- Designed to be mobile for re-use in another tank
- Designed by Columbia Energy and Environmental Services in Richland and fabricated by Highline Engineering Company in Richland





Mobile Arm Retrieval System – Performance Testing

- Retrieves all waste types including damp sludges, hard concrete-like layer, and even dense simulants resembling gravel
- Reaches and rapidly cleans the tank floor and walls
- Unique capabilities allow reach around obstacles
- Hydraulic slurry pump integration identified enhancement opportunities





Mobile Arm Retrieval System – Path Forward

- Slurry pump selection and procurement underway
- The first tank to be cleaned out using MARS will be tank C-107
- Factory acceptance testing in mid-2010
- Installation begins in late 2010
- Waste retrieval begins in March 2011
- Vacuum retrieval system to be developed and tested using the MARS platform in 2011





Mobile Arm Retrieval System - Video

– Imbed video here

