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Journey to Excellence Goal 1 and 2 Tank Waste and Lifecycle Costs

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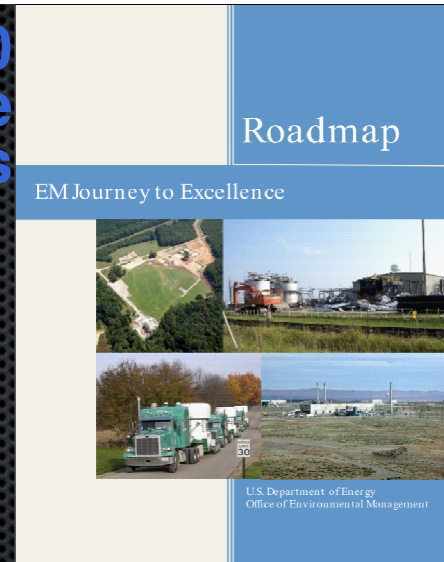
Agenda

- › Journey to Excellence – Goal 1: Status Three Major Tank Waste Projects
- › Journey to Excellence – Goal 2: Enhanced Tank Waste Strategy
- › Key 2011 Activities
- › Support from EMAB

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Expanding the 2020 vision into measurable outcomes



2019
Complete the three major tank waste projects

2020
Reduce Life-cycle costs and accelerate cleanup

2015
Complete disposition of 90% of legacy TRU by 2015

2015
Reduce EM legacy footprint by 40% by the end of 2011 and 90% by 2015

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What We Do Program Goals

Goal 1
Complete the three major
tank waste projects

Complete the three major tank
waste projects within the
approved baselines

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Complete the three major tank waste construction projects

- › Use best scientific resources
- › Provide necessary tools
- › Establish an integrated design/engineering testing and commissioning framework
- › Use Construction Project Reviews (CPRs)
- › Align contract fee with completion of each capital asset
- › Develop a Code of Record, only accept significant changes

Key Strategies

- › <10% variance for project cost and schedule performance indices
- › 90% of CPRs are performed as scheduled with successively fewer recommendations
- › 90% of associated Corrective Actions finished within six months
- › Interim success parameters

Key Success Indicators



Journey to Excellence – Goal 1

Status of 3 Major Construction Projects

- ▶ Sodium Bearing Waste Facility
 - ▶ Construction 92% complete, commissioning systems
 - ▶ 2011 completion tracking with performance baseline
- ▶ Salt Waste Processing Facility
 - ▶ Construction 53% complete, fabricating large ASME vessels
 - ▶ 2013 completion projected as planned
- ▶ Waste Treatment Plant
 - ▶ Construction 57% complete, large scale integrated mixing testing for the pulse jet mixing

Project Status

- ▶ Sodium Bearing Waste Facility
 - ▶ Project completion (CD-4) in December 2011
 - ▶ Complete Hot Nitrogen Testing, Conduct Operational Readiness Reviews, and begin Hot Operations
- ▶ Salt Waste Processing Facility
 - ▶ Reassess critical path (schedule) due to ASME vessel slippage
 - ▶ Complete major vessel procurements and installation
 - ▶ Complete structural construction to the 139-foot elevation
- ▶ Waste Treatment Plant
 - ▶ Identify cost reduction and early completion opportunities

Key Activities in 2011

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Idaho National
Laboratory



Gallons SBW
0.9 Million

Complete the three major tank waste
construction projects

0.5 Million
Curies

Total Tanks
15

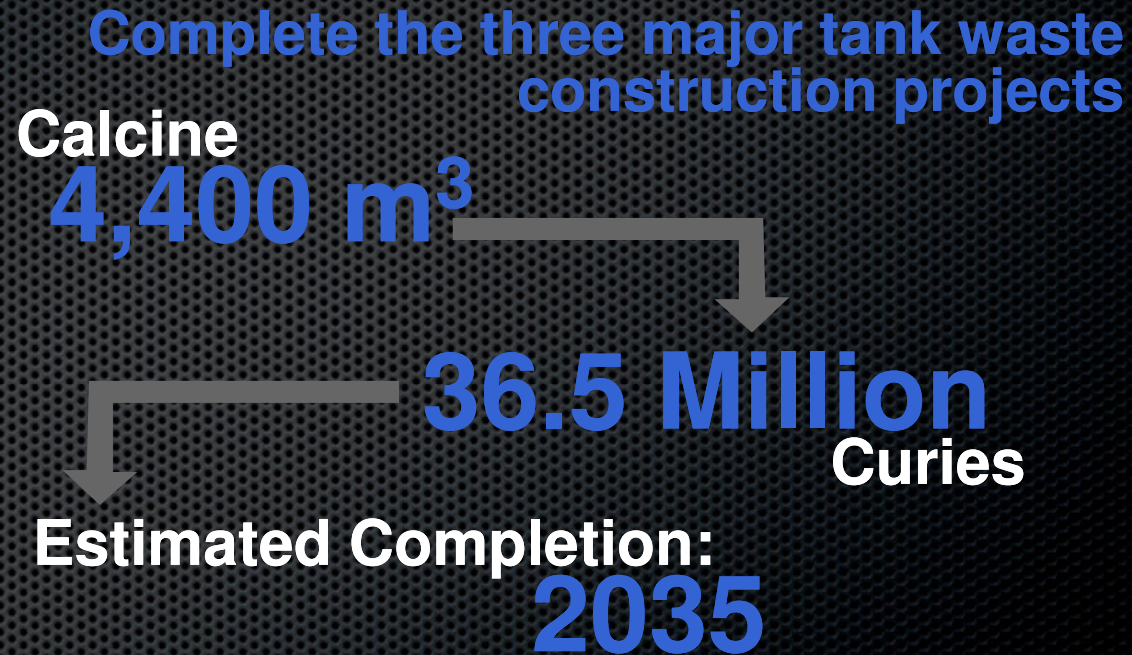
11 Tanks
Cleaned

Estimated Completion:
2012

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Idaho National
Laboratory



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Complete the three major tank waste construction projects

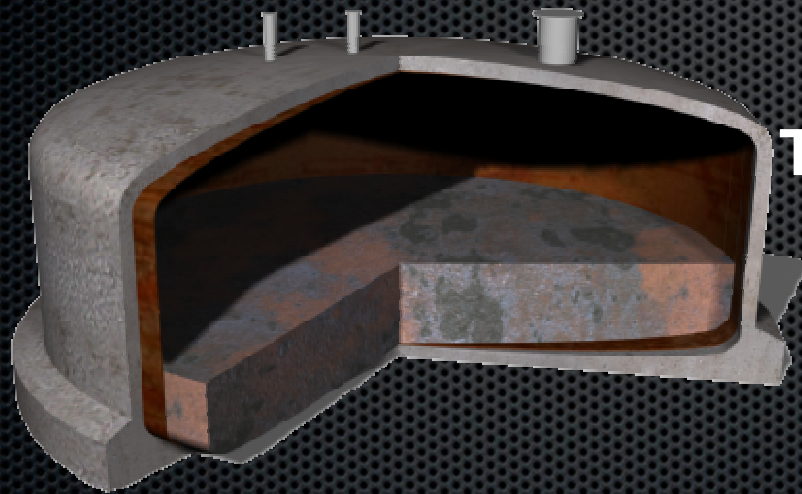
Sodium Bearing Waste Treatment Facility
Idaho



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Savannah River



Complete the three major tank waste construction projects

Gallons

37 Million

379 Million

Curies

Total Tanks

51

4 Tanks

Cleaned

Estimated Completion:

2032

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Complete the three major tank waste construction projects

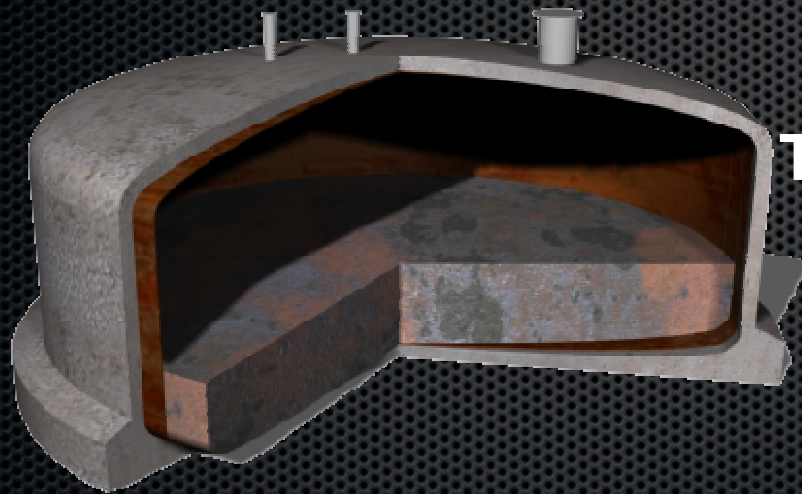
Salt Waste
Processing Facility
Savannah River



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Hanford



Complete the three major tank waste construction projects

Gallons

53 Million

176 Million

Curies

Total Tanks

177

7 Tanks

Cleaned

Estimated Completion:

2047

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Complete the three major tank waste construction projects

Waste Treatment Plant Hanford

- › 257,000 cubic yards concrete
- › 34,600 tons structural steel
- › 980,000 feet piping
- › 2,055 tons ductwork
- › 946,000 feet electrical raceway
- › 4.2 million feet electrical cable



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What We Do Program Goals

Reduce the life-cycle costs
and accelerate the cleanup
of the Cold War legacy

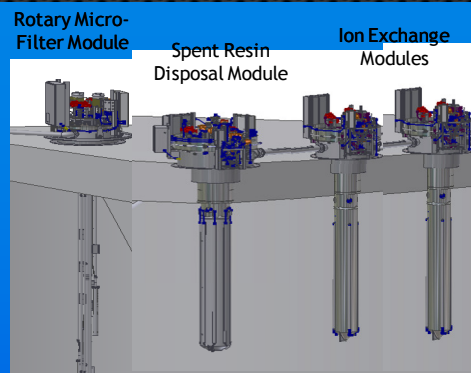
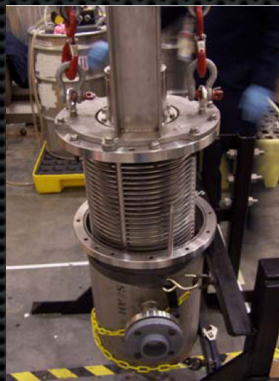
Goal 2
Reduce Life-cycle costs
and accelerate cleanup

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Reduce the lifecycle costs by investing in transformational technologies

- **\$7B** lifecycle cost savings and avoidance via ARRA
- **\$19B** tank waste savings by accelerating tank waste schedule 6 years at SRS and 7 years at Hanford; thereby reducing EM's environmental liability and lifecycle cost by \$3B at SRS and \$16B at Hanford
- **\$10B** groundwater remediation



Fluidized Bed Steam Reformer



Pilot-Scale WFE, Vapor Discharge End





Journey to Excellence - Goal 2
Enhanced Tank Waste
Key Strategies and
Technology Needs

- ▶ **At-Tank/In-Tank treatment solutions** for supplemental treatment capacity - Small Column Ion Exchange (**SCIX**) and Rotary Microfilter (**RMF**)
- ▶ Fluidized Bed Steam Reformer (**FBSR**) vs upgrading Effluent Treatment Facility
- ▶ FBSR as supplemental treatment vs 2nd LAW Facility
- ▶ HLW improved vitrification capacity (1.5 – 2 X) starting in 2025 - **Next generation melters** and enhanced glass formulations
 - Advanced Joule-heated melters
 - Cold Crucible Induction Melter (CCIM)
 - Iron Phosphate glass
- ▶ Single Shell Tank (SST) Consolidation - **SST Integrity non-destructive examination**
- ▶ Hard Heel Retrieval Technology - **Chemical cleaning techniques**
- ▶ Redundant and flexible evaporation capability - Wipe Film Evaporator (**WFE**)
- ▶ Contact handled waste (11 tanks) dried, packaged, stored onsite pending offsite disposition

Key Strategies and
Technology Needs



Journey to Excellence - Goal 2
**Enhanced Tank Waste
Strategy Progress**

- ▶ Five samples part of the Bench Scale Steam Reforming (BSR) testing; three samples of actual Hanford tank waste
- ▶ BSR product – granular and monolith forms – undergoing waste form durability analysis at SRNL and PNNL – expect results by Spring 2011
- ▶ Continued development of in-tank Rotary Micro-Filter and Small Column Cs Ion Exchange technologies for SRS and Hanford applications
- ▶ Continued development of Wiped Film Evaporators – modular design to augment the 242-A Evaporator and better stage waste for treatment
- ▶ Planned testing in 2011 of engineering-scale melter with off-gas recycle loop to better understand Tc-99 retention in LAW glass
- ▶ Next generation melters development and enhanced glass formulations

Key Activities in 2011

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EMAB Support

- ▶ Task 1 – Review Modeling for Life-Cycle Analysis
- ▶ Task 2 – Assess Candidate LAW Forms
- ▶ Task 3 – Assess At-Tank/In-Tank Technologies
- ▶ Task 4 – Evaluate Various Melter Technologies
- ▶ Task 5 – Evaluate Reliability of Waste Delivery Plans
- ▶ Task 6 – Identify Other Tank Waste Vulnerabilities

EMAB Tasks

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Summary

- All Three Construction Projects on schedule and within cost
- *Sodium Bearing Waste Facility operations by 2011*
- Tank Waste Mission drives the EM LCC
- ETWS, if successful, offers significant opportunity to reduce EM's LCC
- Significant activities in 2011
- Engage Regulators, Tribes, and Stakeholders
- HLW Corporate Board, EM-TEG, and EMAB to assist EM Leadership in this Journey to Excellence