U.S. DEPARTMENT OF ENERGY

Office of River Protection Update
Hanford Site

2009 Congressional Nuclear Cleanup Caucus

May 14, 2009

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Office of River Protection (ORP)

Bill Johnson, President and Project Manager
Washington River Protection Solutions (WRPS)

Ted Feigenbaum, Project Director
Bechtel National, Inc. (BNI)

Office of River Protection
Mission

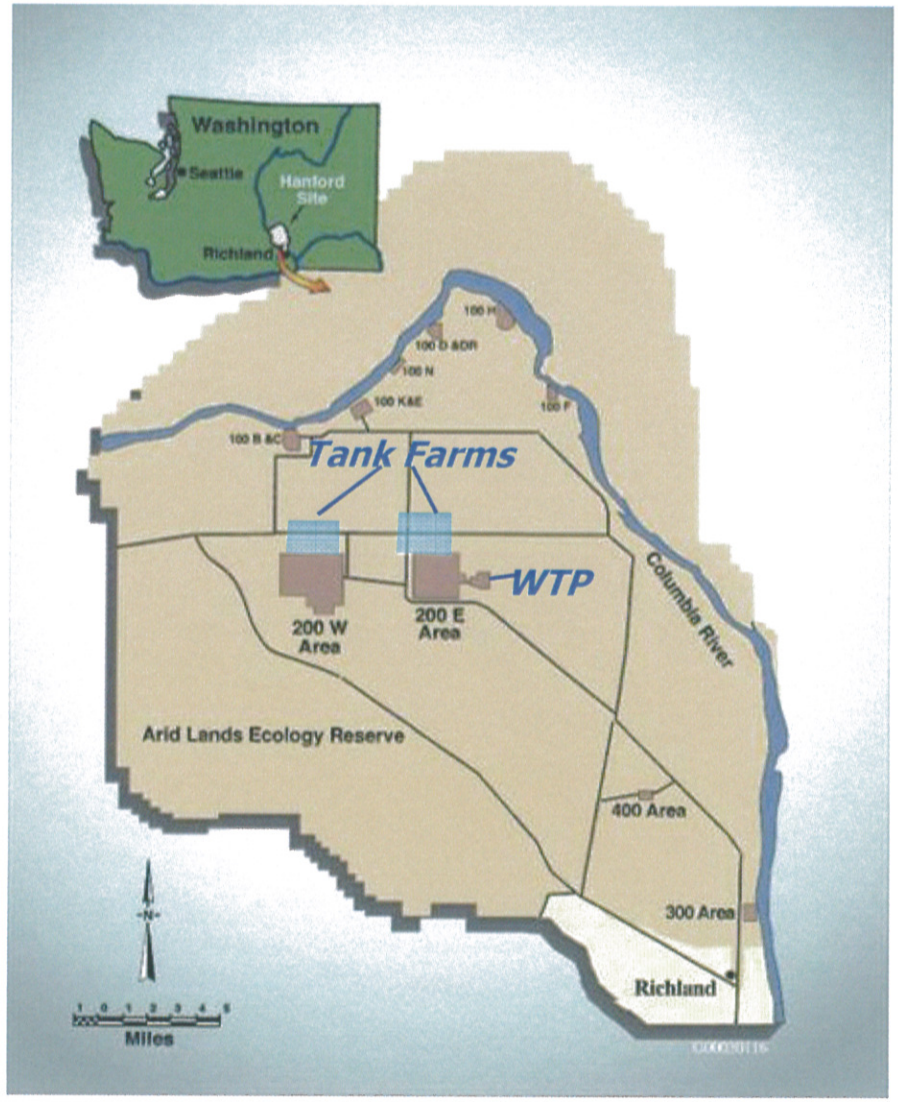
Retrieve, immobilize and dispose of radioactive and chemical tank waste and close Hanford's Tank Farms

Tank Farms

- 177 underground storage tanks
  - –149 Single Shell Tanks (SST)
  - –28 Double Shell Tanks (DST)
- 53 million gallons radioactive and chemical waste
- 194 million curies radioactivity
- 151,000 tons complex chemicals

Waste Treatment Plant (WTP)

- Design/build
- Operational 2019
- Treat and immobilize in glass radioactive and chemical tank waste



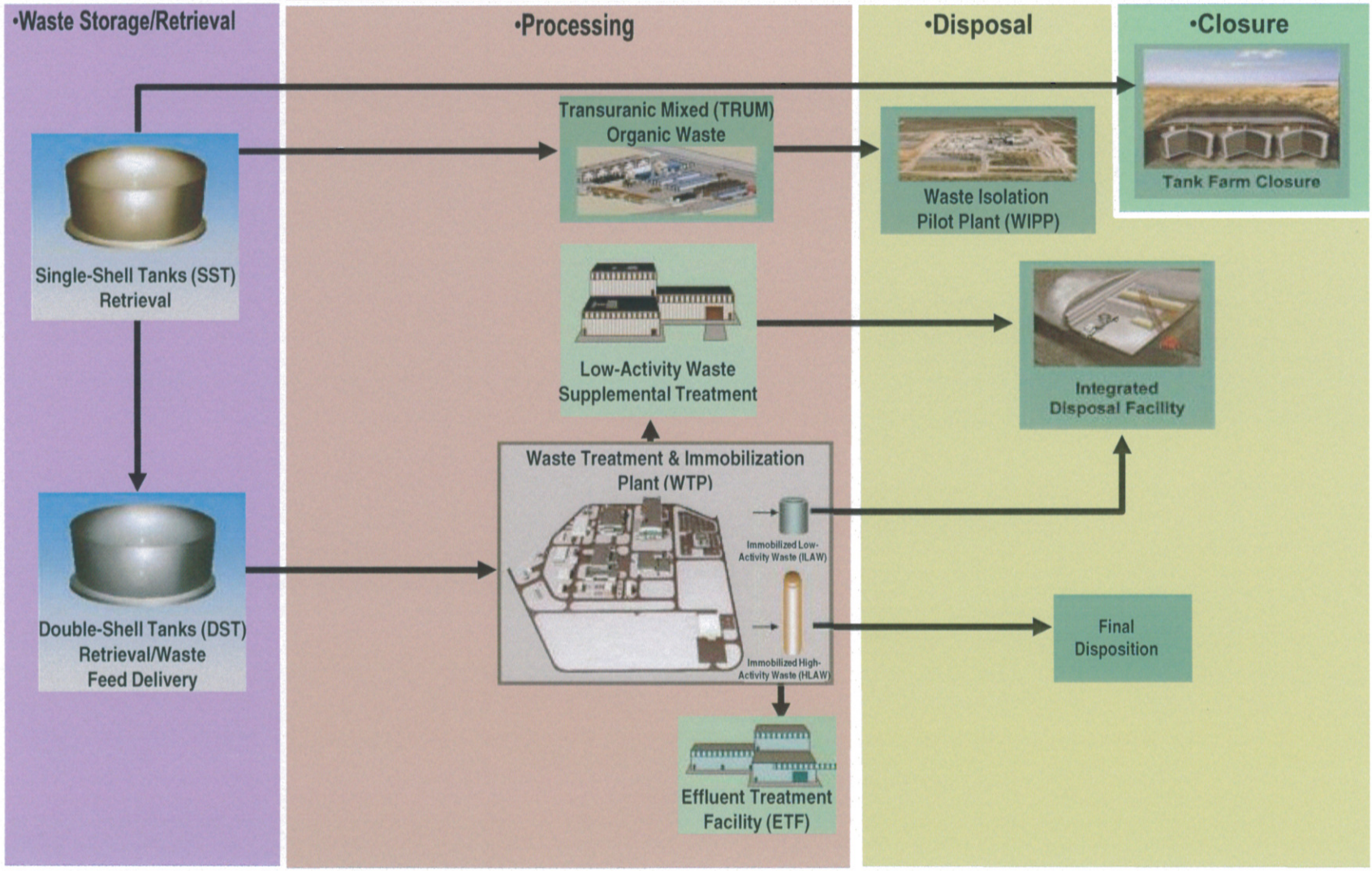
Office of River Protection
Funding Profile Fiscal Year (FY) 2009 – 2010

	FY2009 ($M)	FY2010 ($M)
Appropriation	1009.9	TBD
President's Budget Request	978.4	1098.0

American Recovery and Reinvestment Act	326.0*

*To ensure adequate controls only 80% of ARRA funds are being allotted to the sites for obligation against contracts. The remaining 20% is being held at Headquarters and will be released after the projects are demonstrating adequate performance. Additionally, only 24% of ARRA funds can be used until all contractor baseline plans have been submitted, reviewed, validated and approved.

Office of River Protection
A Large, Technically Complex Mission



Office of River Protection
Building on Success @ Tank Farms

- New contractor experienced in tank waste management, treatment, vitrification and closure – leveraging national/international experience
- Contract motivates long-term view, life-cycle/systems approach/integration with WTP contractor
- Protecting workers from radiological and chemical hazards
- Developing/deploying retrieval technologies

Office of River Protection
Building on Success @ WTP

- Increasing project performance and accountability
- Resolving last few technical design issues
- Completing design engineering for key WTP facilities
- Acquiring critical plant equipment and components
- Preparing for waste treatment in 2019 by ensuring Tank Farm and WTP projects are fully integrated

Office of River Protection
Near Term Focus @ Tank Farms

- Continuing tank retrievals to prepare WTP feed and identify technical needs
- Expanding retrieval technology toolbox for hard heel/leakers
- Reducing overall lifecycle cost/project risks
- Preparing predictable/consistent waste feed delivery system
- Executing Tank Farm ARRA - work infrastructure/facility upgrades

Left: Workers retrieve cameras used in tank C-108 retrieval

Right: Workers deploy the off-riser sampler system in single-shell tank C-103

Office of River Protection
Near Term Focus @ WTP

- Continuing to drive project performance and accountability
- Advancing overall project completion from 50% to 58%
- Finalizing/Freezing design from 75% to 82%
  - Shift from engineering to construction focus
- Substantially complete 12 of 18 Balance of Facilities
- Continuing safety vigilance and focus
- Acquiring next generation of workers

Left: A rebar wall is constructed at the High Level Waste Facility

Right: Iron beams are lifted into place at the Pretreatment Facility

Office of River Protection
American Recovery and Reinvestment Act (ARRA)

PROJECT	WORKSCOPE	$
ORP-1000	Tank Farm Infrastructure Upgrades to Support Waste Feed to the Waste Treatment Plant (WTP)	$326M

Tank Farm Infrastructure
- AP/SY Ventilation
- Waste Transfer Infrastructure
- Level Rise Modifications
- Control Systems
- AP Valve Pits

Other Infrastructure
- Wiped Film Evaporator
- Cross Site Transfer Line Upgrade
- Core Sampling Truck

Waste Feed Infrastructure
- Control Systems (AN, AP, AW, AY/AZ, SY)
- Exhausters
- Characterization

Facility Upgrades
- 242-A Upgrades
- 222-S Upgrades
- Secondary Waste Treatment

Includes major subprojects only

Bill Johnson, President and Project Manager

Washington River Protection Solutions

washington river protection solutions

New Contractor Team

washington river protection solutions

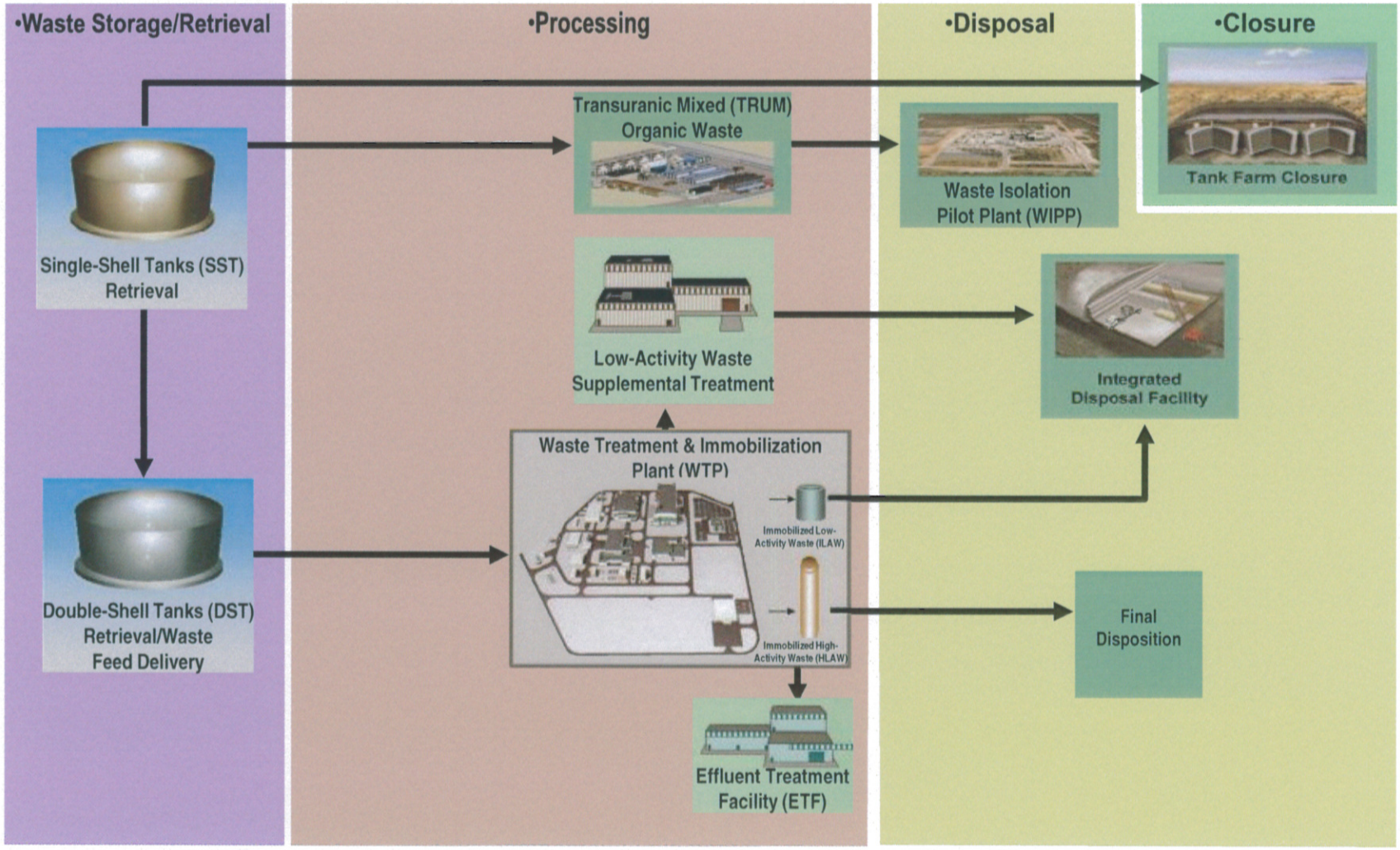
- Tank operations contractor since 10/1/2008
- International high-level waste experience
  - First two HLW tank closures in DOE; managing ~37 million gallons in 49 tanks—Savannah River
  - Cleaned and grouted 11 tanks—Idaho Cleanup Project
  - Operation of vitrification facilities in the U.S., United Kingdom and France
- $7.1 billion, 10-years
  - (5-year base period with options to extend up to another five years)

URS Washington Division

ENERGYSOLUTIONS

AREVA
Integrated Sub-Contractor

Office of River Protection
A Large, Technically Complex Mission



Project Goals

- Do work safely
- Significantly reduce risks to the Columbia River and the public through retrievals and waste management
- Create sustained waste feed inventory for the Waste Treatment Plant
- Invest in employees
- Reduce lifecycle costs

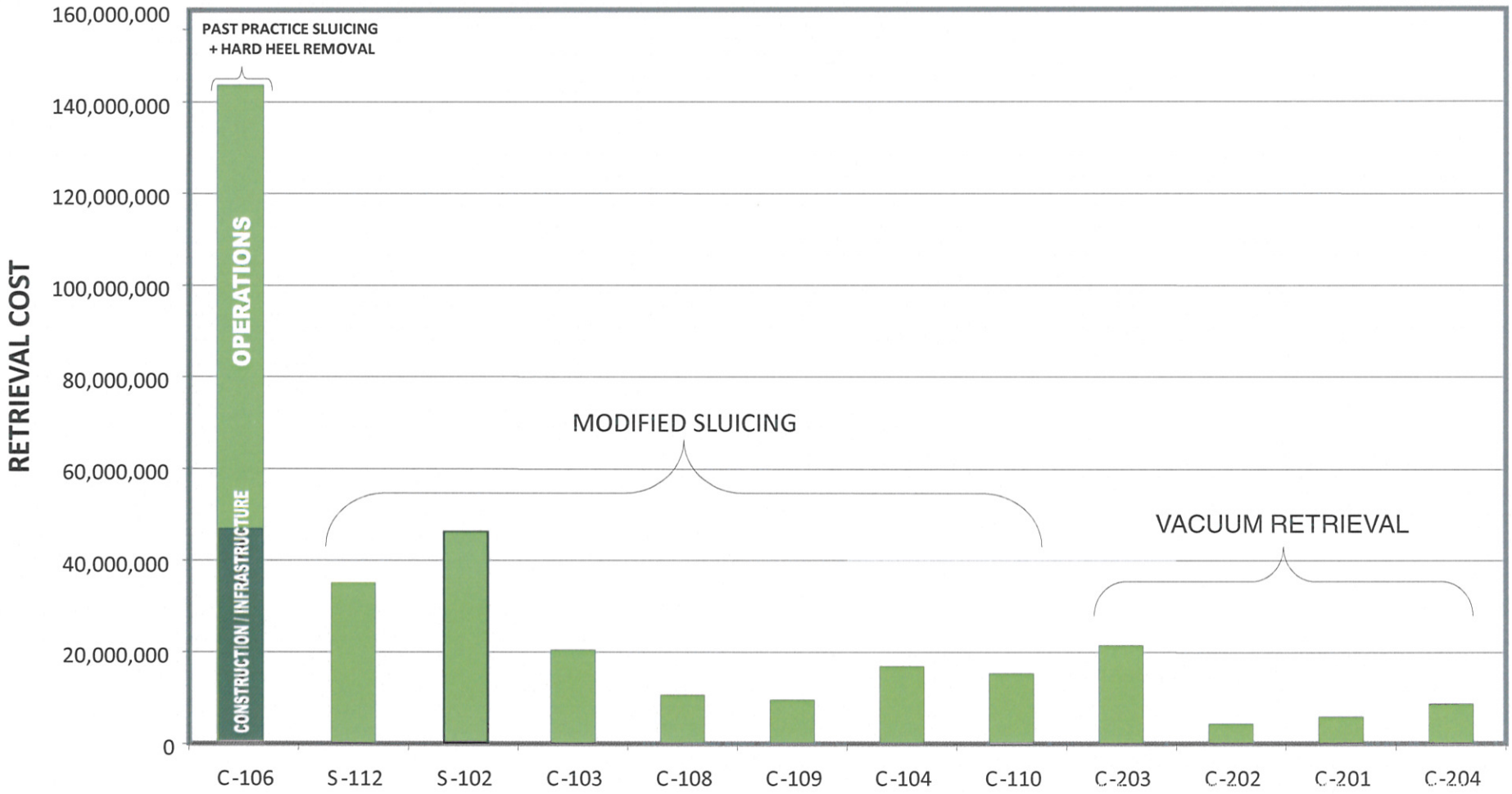
Safety – Our Way of Life

- Integrated Safety Management System verification
- Working toward VPP Star status for the entire organization in FY 2010
- Total Recordable Case Rate more than 25% lower than FY-08
- Improved program for worker protection from tank vapors

Hanford Tank Cleanup Status

•RETRIEVED	•LIMITS OF TECHNOLOGY	•IN PROGRESS	•NEXT IN LINE
S-112	C-109	C-104	C-111
C-202	C-108		TBD tank for Mobile Arm Retrieval System (MARS)
C-204	S-102		
C-203	C-110		
C-103			
C-106			
C-201			

Retrieval Cost by Tank



SST Retrieval Capabilities Established

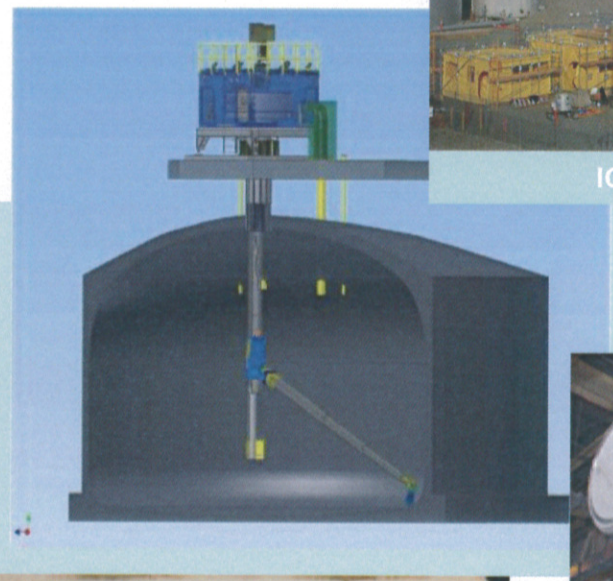
- Knowledge of tanks and tank contents
- Set of effective technologies in place
- Preparing final tools for deployment

		Tanks Remaining / Planned Retrieval Method (138 tanks)			
Type of Tank	Retrieved (11)	Modified Sluicing + heel removal	Vacuum Retrieval	Vacuum + Vehicle (in development)	Mobile Arm Retrieval System (in development)
Sound Sludge Tank	1 (Modified Sluicing)	4 +9 small			
Sound Sludge Tank w/ Hard Heel	3 (Past Practice Sluicing; Acid Modified Sluicing; Foldtrack)	21			
Assumed Leaker Sludge Tank	1 (Modified Sluicing) +4 small (Vacuum Retrieval)	2	3 small	12	18
Sound Saltcake Tank		12			
Sound Saltcake Tank w/ Hard Heel	2 (Modified Sluicing; Salt Mantis; Rotary Viper)	30			
Assumed Leaker Saltcake Tank		2			25
Total #	11 Tanks Retrieved	80 Tanks	3 Tanks	12 Tanks	43 Tanks

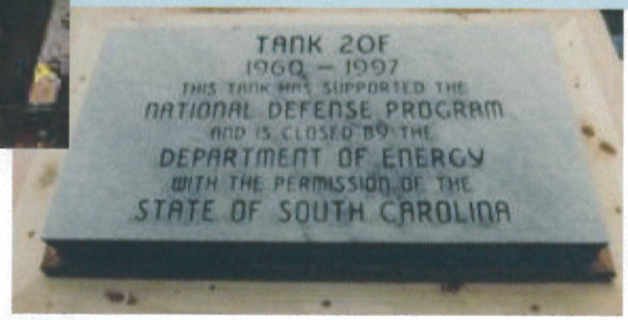
Integrating Best Technology from Commercial Application and Across the DOE Complex

- Applying a suite of proven technologies
  - Mobile Arm Retrieval System (MARS)
  - Tank waste treatment systems
  - Tank closure experience
  - Integration with HLW vitrification facilities

ICP Tank Grouting



Sellafield Waste Treatment Facilities



DWPF Canisters

SST Retrieval and Closure

- Resumed C-110 retrieval (86% complete;~150,000 gallons); at limits of technology
- Initiated construction work for C-104 retrieval (60% complete)
- Began design and procurement of robotic arm (MARS)

Other 2009 Work

- Begin C-104 retrieval
- Continue vadose zone work for barrier sites development in TY, S/SX, and C Farms
- Remove 11 hose-in-hose transfer lines
- Complete sampling of C-108 in readiness for closure

Waste Management

- First evaporator campaign started
- Major facility decontamination/upgrades completed

Other 2009 Work

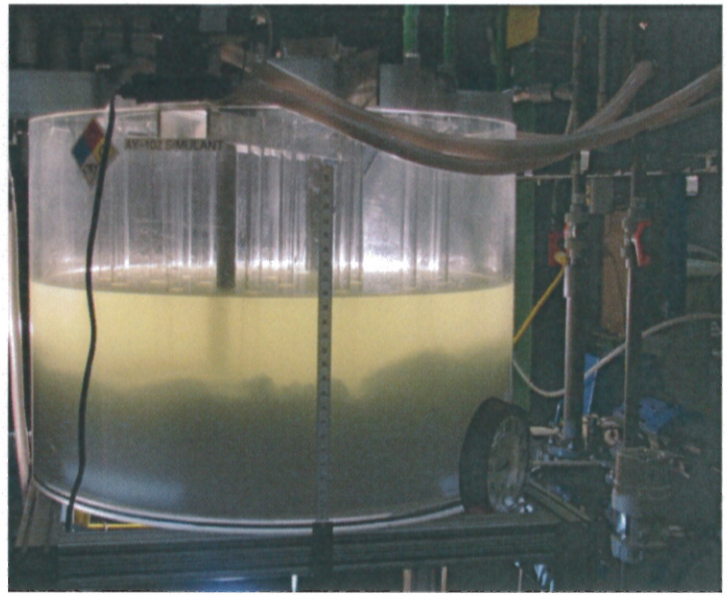
- Double-shell tank (DST) space management
  - Three evaporator campaigns; ~900,000 gallons of space created
  - Series of waste transfers
- Single shell (SST) & double shell (DST) tank integrity
  - Expert panel
- Facility/farms upgrades
  - 222-S, 242-A

Waste Treatment Plant Support

- Updated River Protection Project System Plan

Other 2009 Work

- Perform waste feed delivery mixing and sampling demonstrations
- Develop Integrated Waste Feed Delivery Plan



Ted Feigenbaum, Project Director

Bechtel National, Inc. (BNI)

BECHTEL

Washington Group International

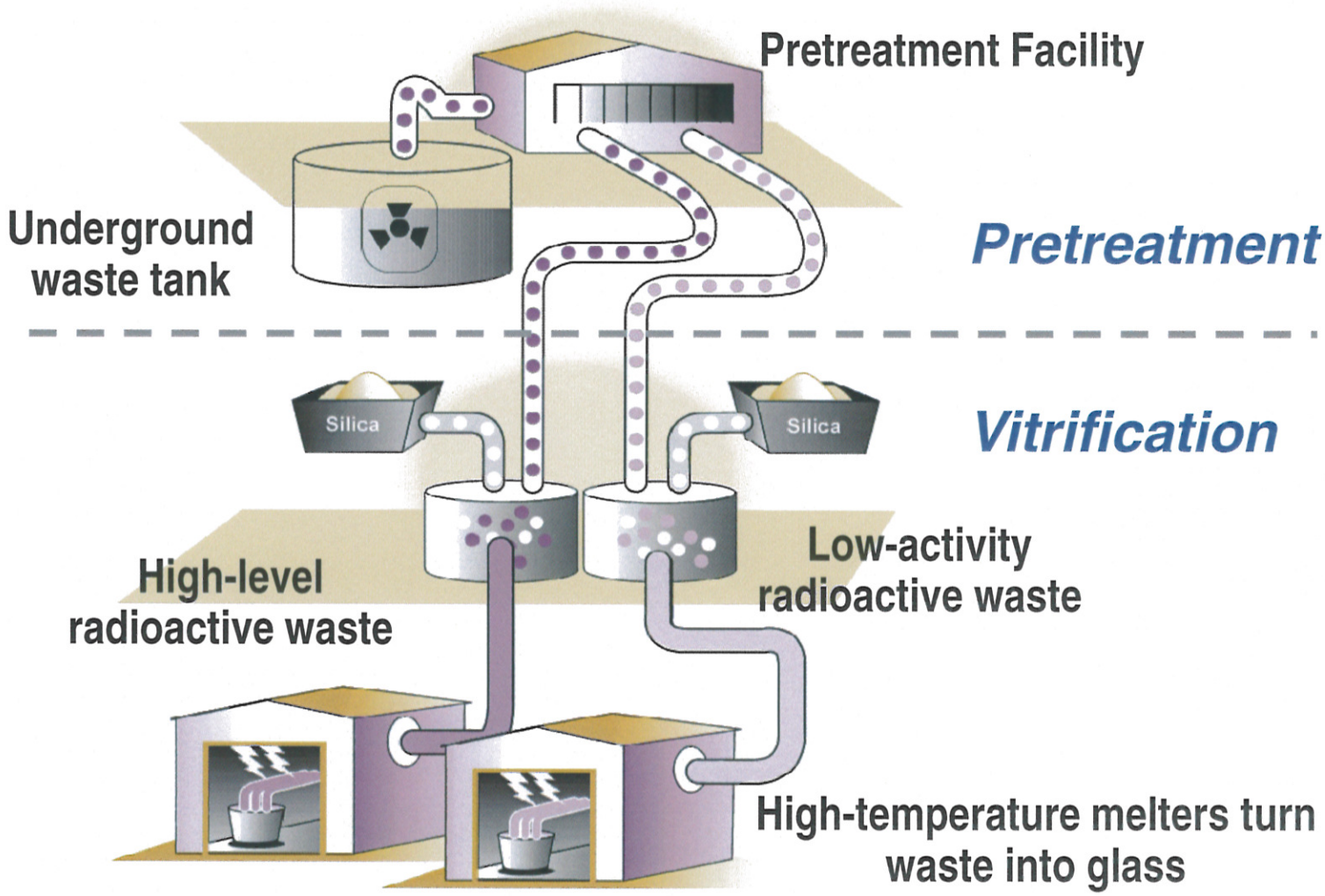
A subsidiary of the Washington Division of URS Corporation

URS

Progress at Waste Treatment Plant

- Significant progress made in 2008 and 2009, nearing the 50% complete milestone
- Closing technical issues and completing Research and Technology activities
- Moving from an engineering-driven phase to a construction-focused phase
- Preparing for start-up, commissioning, and operations

Waste Treatment Plant Vitrification Process



2001: Vit Plant Construction Began

April 2009: Vit Plant is 47% complete

- $12.2 Billion
- First-of-a kind
- ~3,000 workforce
  - Union craft
  - Engineering and other professionals
- Complete in 2019

Achieving VPP Merit Status

Pretreatment Facility

World's largest radioactive chemical separations facility: 42% complete

Current progress

- 72% design complete
- 28% construction complete

2009 Planned Accomplishments

- Complete design of all PT structural steel
- Complete walls to elevation +56 ft
- Erect 1,500 tons steel
- Place 43,000 CY concrete

High-Level Waste Vitrification Facility

Turns high-level waste into glass: 44% complete

Current progress

- 78% design complete
- 23% construction complete

2009 Planned Accomplishments

- Complete design of all HLW structural steel
- Complete all concrete floors from -21 ft to ground elevation
- Erect structural steel and decking to elevation +14 ft
- Place 6,000 CY concrete

Low-Activity Waste Vitrification Facility

Turns low-activity waste into glass: 65% complete

Current progress

- 88% design complete
- 59% construction complete

2009 Planned Accomplishments

- Erect switchgear building
- Start fabrication of thermal catalytic oxidizers
- Deliver offgas mercury adsorber
- Install cooling water pumps, and melter pour cave insulated liner plate

Analytical Laboratory

Ensures glass meets regulatory requirements: 43% complete

Current progress

- 75% design complete
- 54% construction complete

2009 Planned Accomplishments

- Deliver hot cell and waste transfer system equipment, high integrity fans
- Complete majority of liner plate installation and facility fire protection

Balance of Facilities

Vast infrastructure to support operations: 51% complete

Current progress

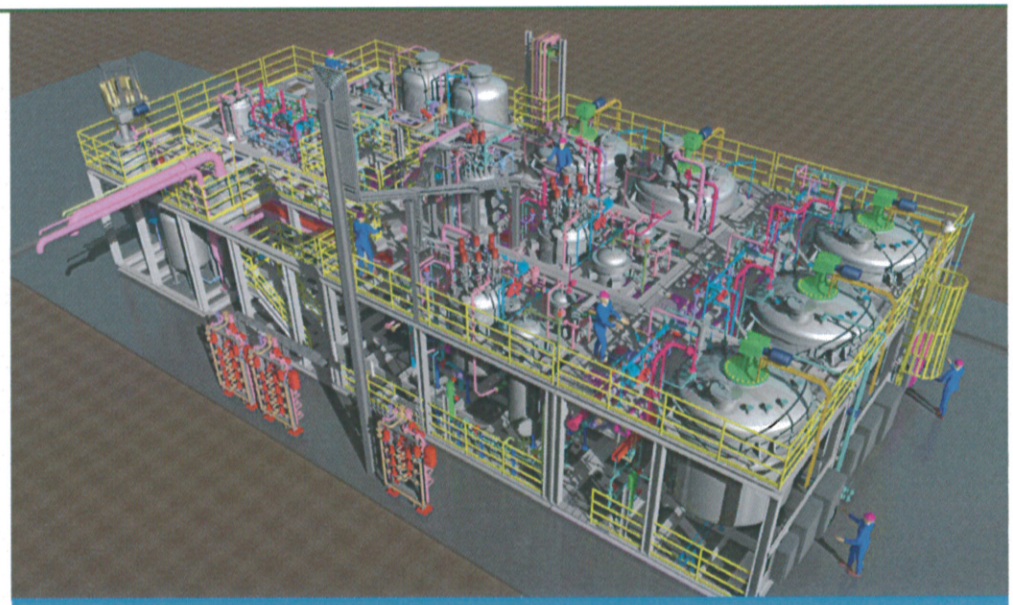
- 72% design complete
- 62% construction complete

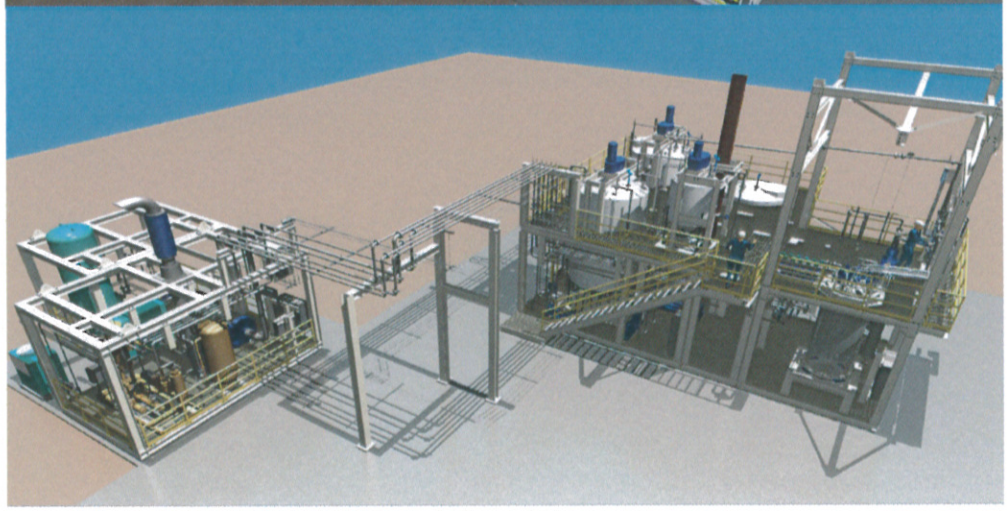
2009 Planned Accomplishments

- Complete turnover of third support system for start-up activities
- Install all 13 glass former silos

Driving Technical Issues to Closure

- Resolving technical issues in 2009
  - External Flowsheet Review Team
    - Pulse jet mixing in vessels
    - Autosampling system
  - Hydrogen control including hydrogen in piping and ancillary vessels
  - Fire protection for facility filters
- Proving the effectiveness of key processes
- Identifying and mitigating risks now benefits start-up, commissioning and operations





Closely Integrating with Tank Operations Contractor

- Defining technical interfaces such as tank waste material delivery specifications
- Using Tank Farm data as basis for WTP safety design to reduce complexity and benefit operations
- Ensuring fully compatible work control systems
- Developing aligned engineering, maintenance and training programs to facilitate turnover
- Sharing technical talent and discussing retention of experienced people