

# U.S. DEPARTMENT OF ENERGY

## Richland Operations Office Briefing to **The Nuclear Cleanup Caucus**

*March 7, 2012*

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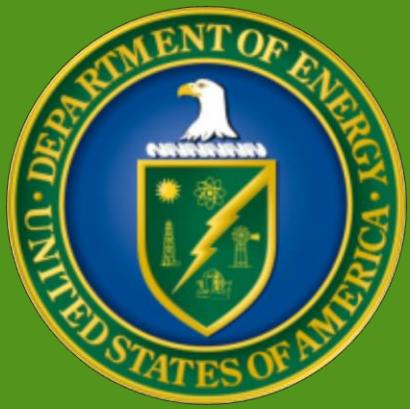
**Frank Armijo**  
President and General Manager,  
Mission Support Alliance

**E<sub>M</sub> Environmental Management**

safety ♦ performance ♦ cleanup ♦ closure

[www.hanford.gov](http://www.hanford.gov)

[www.em.doe.gov](http://www.em.doe.gov)



# U.S. DEPARTMENT OF ENERGY

## Hanford Cleanup Progress Richland Operations Office

March 7, 2012

Presented by  
**Matt McCormick**  
**Manager**



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[www.em.doe.gov](http://www.em.doe.gov)

# Safety



*Placing grout  
to prepare  
U Canyon for  
demolition*



*"Surveying out" near K Reactors*



*Removing waste  
from plutonium  
conveyors inside  
Plutonium  
Finishing Plant*



*Loading  
transuranic  
waste  
containers*



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# Richland Cleanup Overview

- Richland Operations Office 2012 budget is approx. \$1 billion
- Three prime contractors reported \$726 million of subcontracting in fiscal year 2011
- 5,318 total DOE Richland Federal and contractor employees
- Cleanup mission continues to approximately 2050 - 2062



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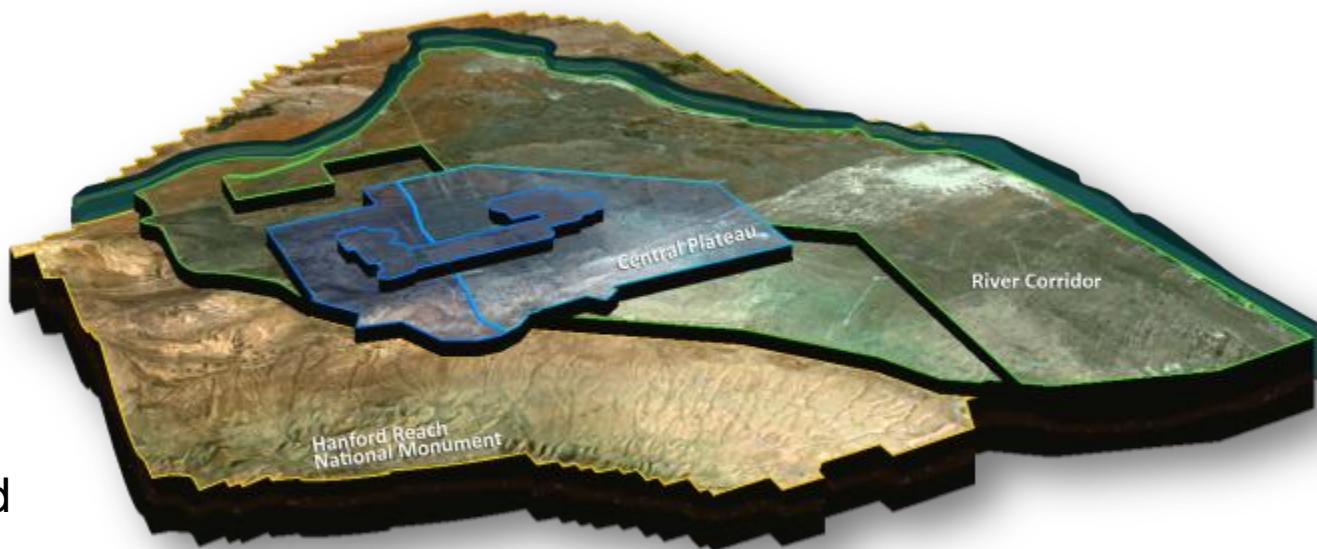
# Richland Cleanup Overview

## Two Components

- River Corridor
- Central Plateau

## Cleanup Work

- Treat contaminated groundwater
- Demolish facilities
- Move buried waste, contaminated soil away from Columbia River
- Isolate contamination from environment on Central Plateau



100N Area



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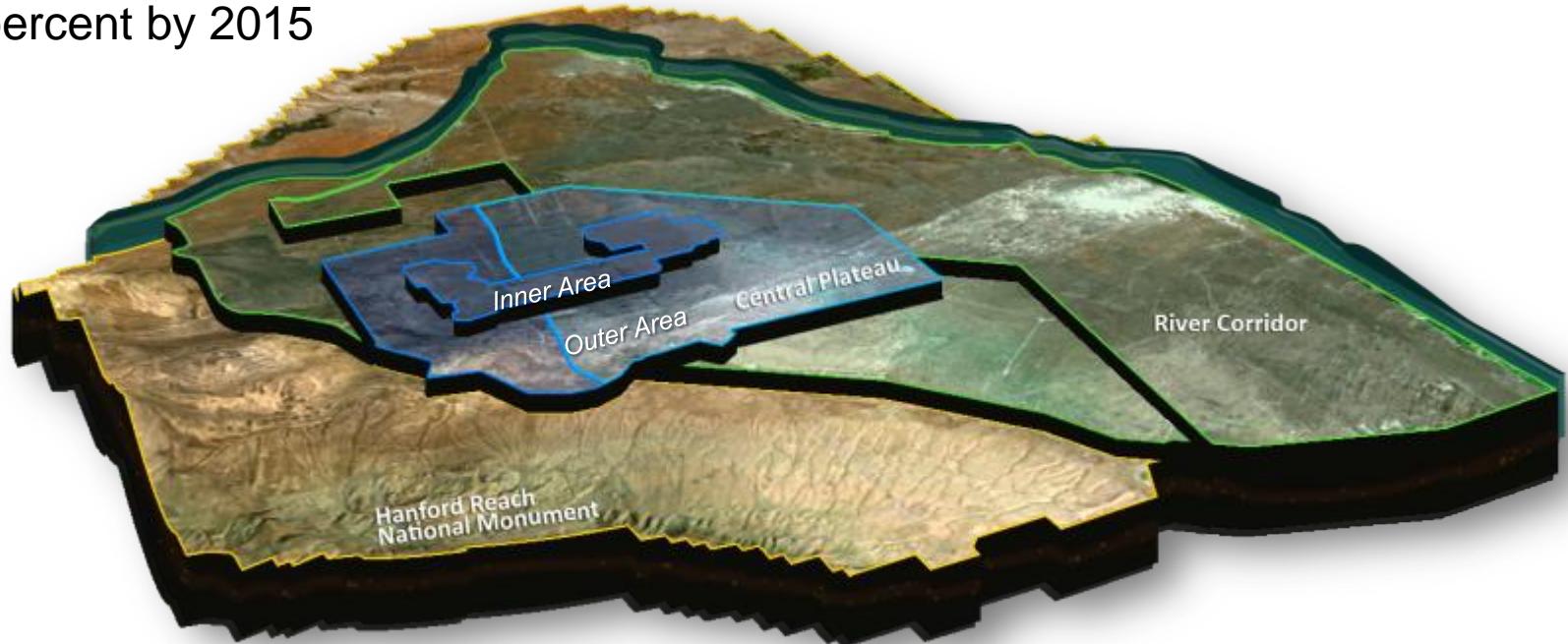
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# Shrinking the Cleanup Footprint

## Footprint reduction goals:

- 49 percent in 2011
  - **66 percent complete to date**
- 70 percent in 2012
- 90 percent by 2015

*Shrink, to the extent practical,  
from 586 square miles to  
about 75 square miles by 2015*



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# Progress Last Year



*Two new groundwater facilities built next to Columbia River – One near H Reactor*



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# Progress Last Year



***Two new groundwater facilities built near Columbia River – Another near D Reactors***



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# Progress Last Year



*Demolished 68 facilities, remediated 48 waste sites in River Corridor –  
N Reactor “cocooning” nearly complete*



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# Progress Last Year



***Demolished 10 facilities, remediated 17 waste sites in Central Plateau –  
Demolishing plutonium vaults***



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# Progress Last Year



*New groundwater treatment facility built near center of site – 200 West Area*



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# Progress Last Year



*Developed the Wireless Wind and Solar Powered Platform (WWASP) to provide information at the point of performance*



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# Recovery Act Progress

- \$1.635 billion received
- 2 prime contractors awarded more than 3,400 subcontracts valued at approx. \$1 billion
- Reduced 586-square-mile footprint of Hanford Site cleanup by 66 percent
- Demolished 76 facilities
- Remediated 73 waste sites
- Built 2 groundwater treatment facilities



*100K East Reactor*



*Plutonium Finishing Plant*

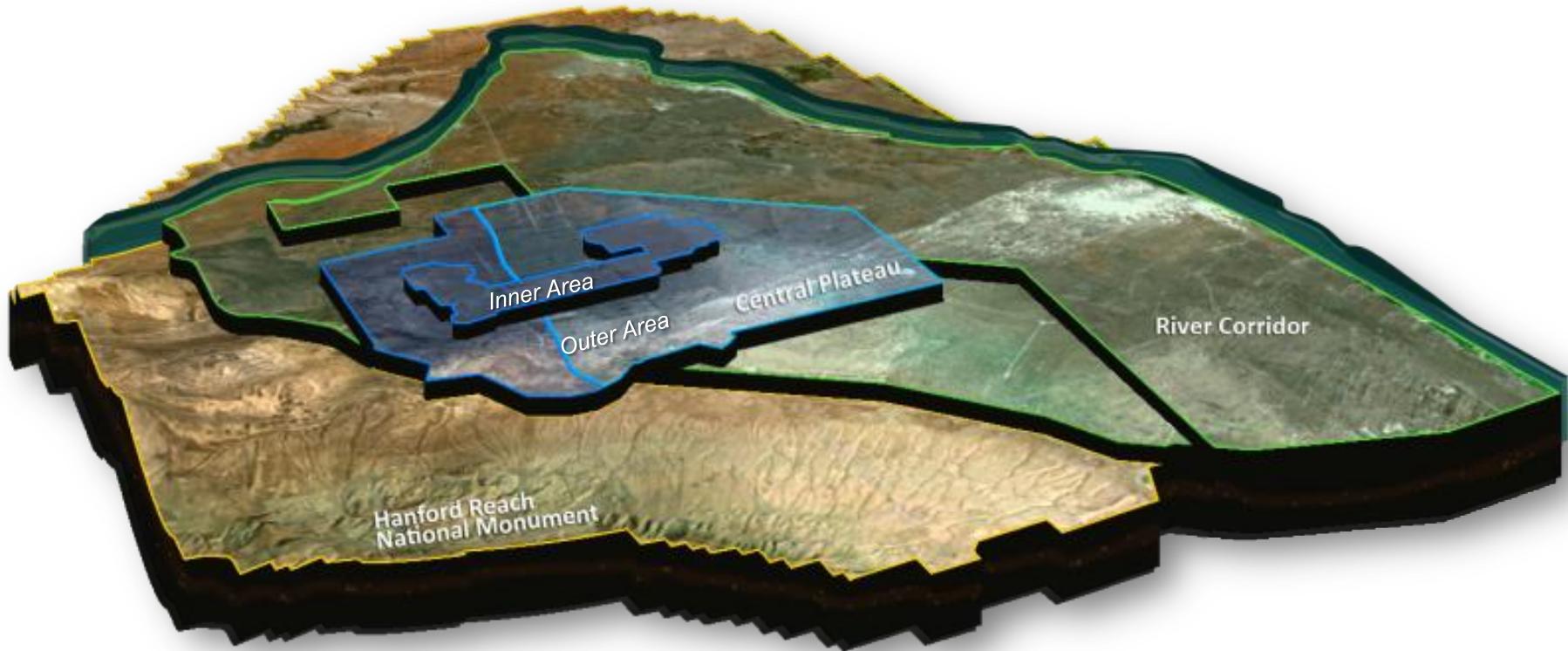


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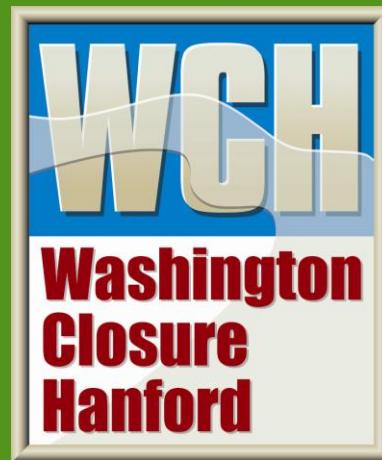
# Hanford is a Sound Investment



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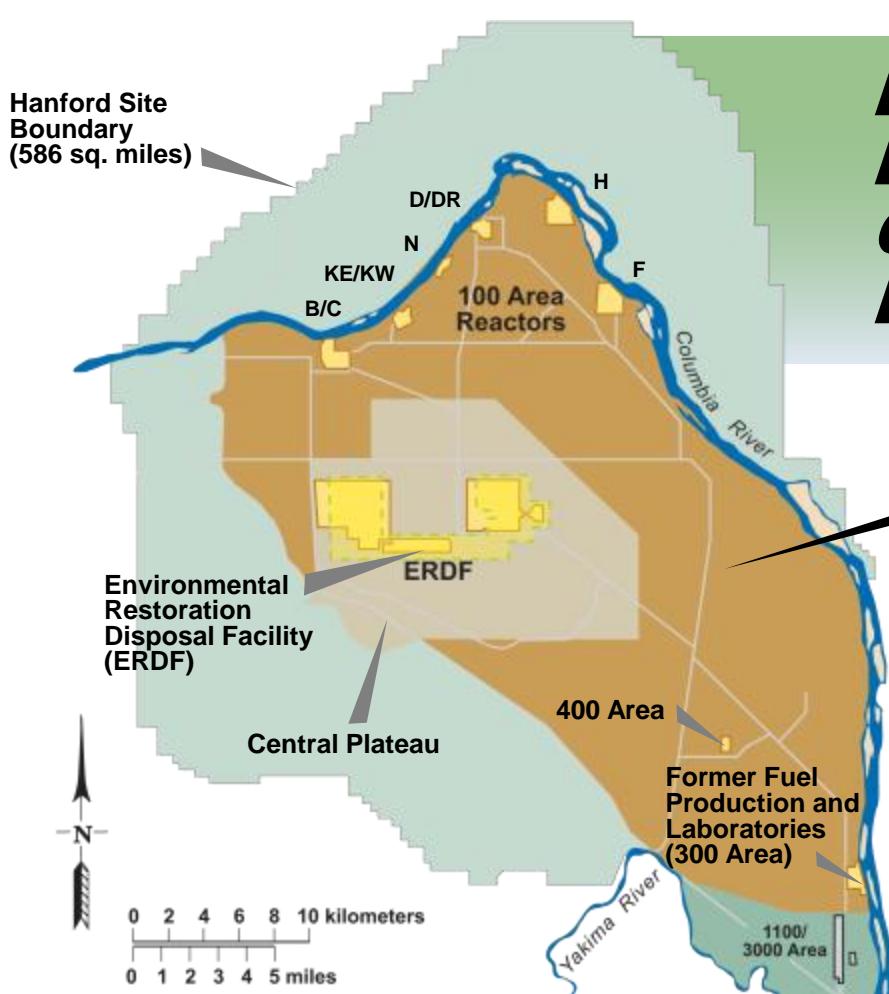
# **Hanford Cleanup Progress**

## Washington Closure Hanford

**March 7, 2012**

Presented by  
**Carol Johnson**  
**President and Project Manager**

# Our Work Scope



***DOE's Largest Environmental Cleanup Closure Project***

**River Corridor**  
(220 square miles and 46 linear miles along the Hanford portion of the Columbia River)

# Our Work Scope

**Hanford's River Corridor  
is home to Cold War  
legacy wastes from  
nuclear reactors and  
support facilities dating  
back to the early 1940s.**

- 10-year contract ends 2015
- Cost-plus incentive fee contract incentivizes:
  - Safe and regulatory-sound cleanup
  - Cost and schedule savings
- Parent companies:
  - URS, Bechtel, CH2M Hill



**Deactivate, decontaminate,  
decommission and demolish  
329 facilities**



**Clean up and close 565  
burial grounds and  
waste sites**



**Treat, transport and dispose  
of 10 million tons of waste  
debris to disposal facility**

# Risks and Hazards Facing Our Workers

- High-risk working conditions
- Chemical and contamination hazards include chromium, asbestos, beryllium, mercury and tritium
- Industrial and construction hazards
- Un-inventoried waste sites
- High-dose fuel elements and other highly contaminated components, such as reactor parts



*A gantry crane system was used to remove hot cells from the 327 Building*



*Pump removal at N Reactor river structures*



*Workers take samples at the 618-10 Burial Ground*

# Our Safety-Conscious Work Environment



*Reactor D&D*

- Achieved record safety performance in 2011
- Engaged workforce
- Striving for continuous improvement, taking safety to the next level
- Recognized in the 2012 National Voluntary Protection Program Participants' Association Best Practices Directory

# Applying Technologies to Improve Worker Safety While Increasing Efficiency

- Over 6 years, deployed 45 technologies that:
  - Increased worker efficiency
  - Reduced risks to workers
  - Reduced overall costs



*An auger system will be used to crush and grind the vertical pipe units and surrounding soil during burial ground remediation*

*A multi-step filtration system allowed sediment in river structures to be filtered for possible heavy metal contamination*

# Our Project Remains Ahead of Schedule and Under Budget



*Remediating waste sites*

- 10-year project is past the half-way mark and contract is 85 percent complete
- Reinvested \$233 million gained in efficiencies and work improvements back into the project
- To date completed 30 of 30 regulatory agreement milestones on or ahead of schedule
- Transition to closure process underway

# Our Cleanup Momentum Continues

- Decontaminated, demolished and loaded out 201 buildings (out of 329 total in contract)
- Remediated 268 waste sites (out of 565 total in contract)
- Transported and disposed of 6.9 million tons of waste at the Environmental Restoration Disposal Facility



*A non-intrusive sampling probe is inserted below hot cells that leaked highly-radioactive materials below the 324 Building*



*Pump removal at a river water intake structure near N Reactor*



*The containment structure of a test reactor is removed at Hanford's 300 Area*

# American Recovery and Reinvestment Act of 2009 (ARRA) Produced Results

## ARRA Performance

- 931,243 ARRA hours without a recordable injury
- Total spent: \$223M
- 186 jobs

*The addition of super cells 9 and 10 increased ERDF's capacity by 5.6 million tons to a total of 16.4 million tons*



## Environmental Restoration Disposal Facility (ERDF)

**(ERDF)** – Completed a \$100 million dollar expansion of the facility. Upgrades helped increase disposal rates for accelerated Hanford cleanup.

**618-10 Burial Ground** – Began remediation of the burial ground's waste trenches. The burial ground is one of the most hazardous sites at Hanford.

**618-11 Burial Ground** – Completed non-intrusive characterization of the burial ground's 50 vertical pipe units.

**100-F Area** – Completed cleanup of 18 of 19 waste sites. The site will be Hanford's first reactor area to be cleaned up.

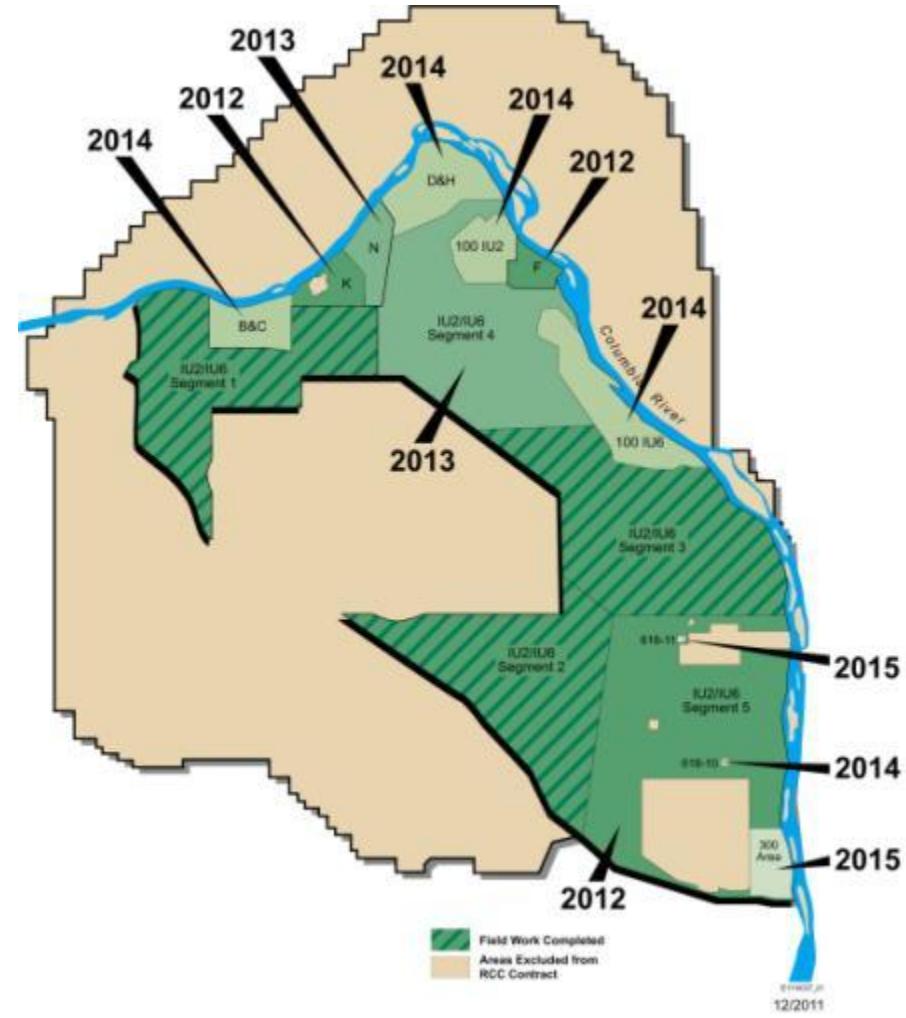
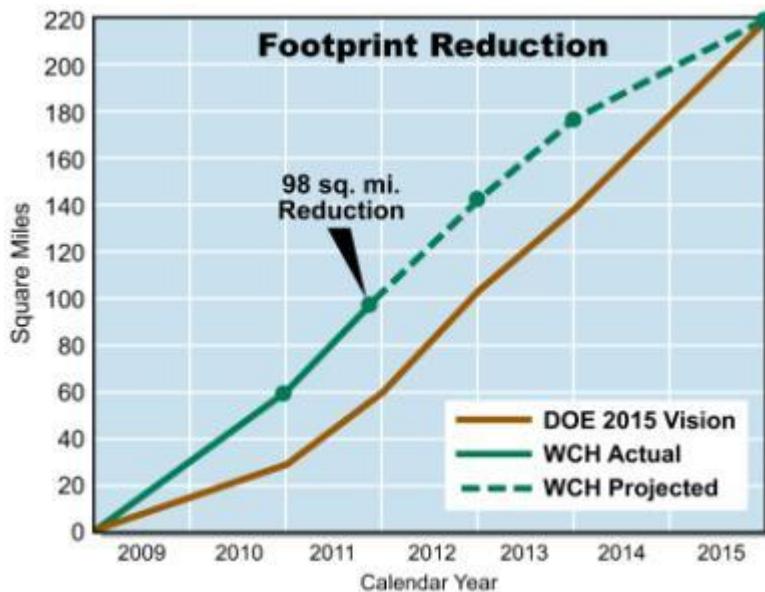


*Trench excavation at 618-10 Burial Ground*



*Waste site cleanup along the Columbia River at 100-F*

# On Track to Meet DOE's 2015 Vision



## Project Status

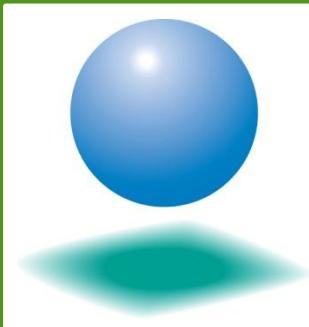
- Transition of land Segment 1 complete (30 sq. miles)
- Transition of land Segments 2 and 3 in progress (68 sq. miles)

# Our Mission

- Protect our workers and the community
- Protect the Columbia River
- Complete the River Corridor cleanup by 2015 and reduce the Hanford Site cleanup footprint



*Cleanup along Columbia River*



**CH2MHILL**

# **Hanford Cleanup Progress**

## **CH2M HILL Plateau Remediation Company**

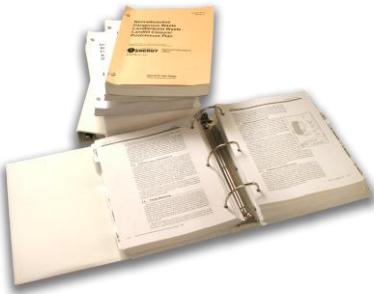
**March 7, 2012**

**Presented by  
John Lehew**

**President and Chief Executive Officer**

# Work Scope

- 100K Area remediation
- Plutonium Finishing Plant closure
- Groundwater/deep-soil remediation project
- Facility, waste site, and canyon remediation
- Managing legacy waste and fuels
- Coordinating decision documents for Hanford, including the River Corridor
- Shrinking the active cleanup footprint (Hanford Reach National Monument)



*Supporting sitewide decision documents*



*Groundwater treatment construction*



*Waste site remediation*



*Applying contamination fixative in U Canyon*

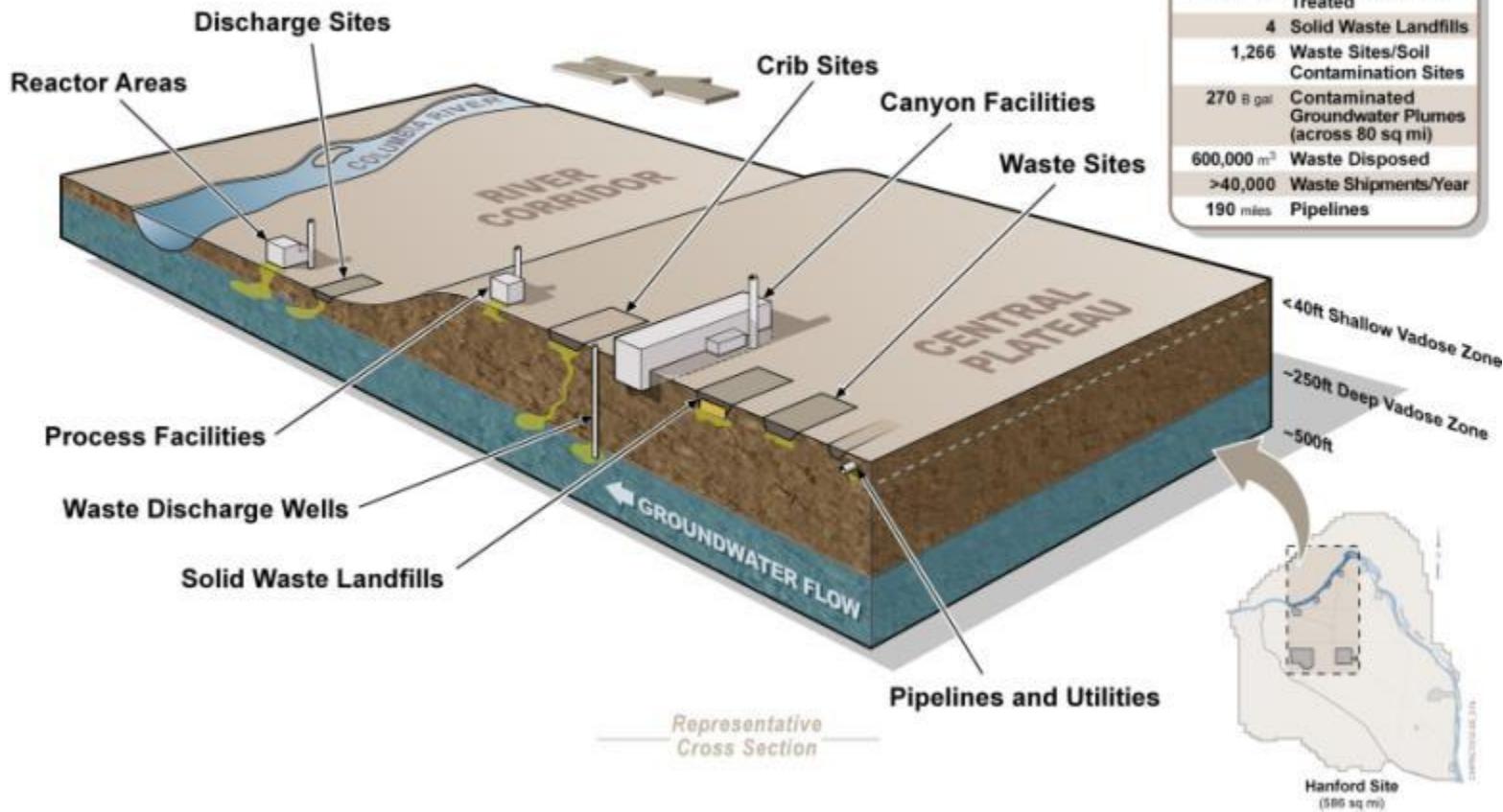


*Demolition at 100K Area*

# Work Scope

CH2M HILL Plateau Remediation Company

## Pre-Cleanup Legacy Environmental Conditions



# CH2M HILL Safety Culture



- **Worker Involvement:**
  - Identifying hazards
  - Planning work
  - Post-job reviews/lessons learned
  - Employee safety committees
- **We encourage:**
  - Inquiring minds
  - Stopping when unsure

*Ensuring safe, compliant operations  
through worker involvement and  
hazard identification in all work  
planning*

# Accomplishments

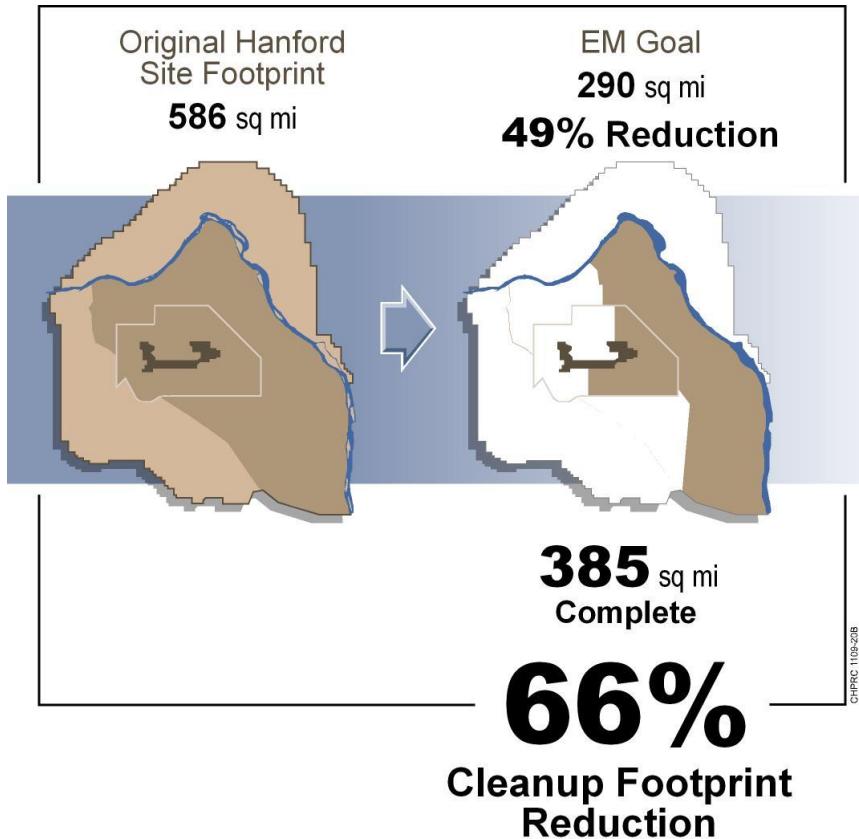
***Working Safely, On Schedule, Below Cost***

- On schedule and below cost during first 3 years of contract
- Exceeded small business goals (49 percent awarded to small businesses – 70 percent locally)
- Met all 89 Tri-Party Agreement (TPA) milestones on or ahead of schedule
- Safely executing work – over 4.2 million hours worked without an injury requiring days away from work

*Central Plateau and River Corridor cleanup*



# Shrink the Cleanup Footprint 90 Percent by 2015



- **Fiscal Year 2011 goal was 290 square miles – CHPRC cleaned up 330 square miles of the total cleanup footprint reduction of 385 square miles at Hanford**
- **Achieved the first cleanup footprint reduction at Hanford**



*Our efforts, along with River Corridor cleanup, helped DOE achieve a 66 percent reduction in Hanford's active cleanup footprint*

*Cleanup is complete on the Hanford Reach National Monument to the north, west and south of Hanford*

# Protect the Columbia River

*DOE Goal: Remove contaminated soil and solid waste adjacent to the river and stop key contaminants so they don't enter the river*

- **Significant progress removing K-West Basin sludge away from the Columbia River**
  - Teams are working together in a full-scale mockup facility to design and test tools before using on the highly-radioactive sludge
  - Completed the pretreatment of material from “knock-out pot” configurations
  - Completed fuel-free floor, pits and bin activities
  - Preparing for first Multi-Canister Overpack shipment in 2012
  - Designing the 105 K West Fuel Transfer Annex Building to facilitate sludge transport to T Plant

*Pre-treating sludge from canisters in K-West Basin*



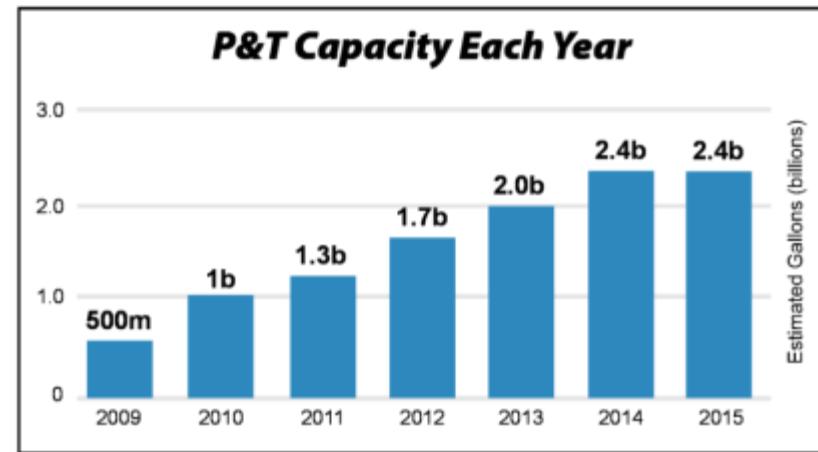
*Loading sludge samples into shipping containers in K-West Basin*



# Protect the Columbia River

**DOE Goal:** Remove contaminated soil and solid waste adjacent to the river and stop key contaminants so they don't enter the river

- **Implementing DOE's goal to stop hexavalent chromium from entering the Columbia River by the end of 2012**
- **Completed design and construction of three groundwater treatment systems – increased treatment capability by 160 percent since 2008**
- **100-DX Groundwater Treatment Facility processed more than 2 billion gallons of water to drinking water standards since January 2011**
- **All facilities treating a combined 100 million gallons per month, enough to fill 150 Olympic-size swimming pools**



*From 2009 to 2010, CH2M HILL's water optimization processes doubled pump-and-treat capacity. Since then, three new pump-and-treat systems have drastically expanded capacity to treat groundwater.*

# Protect the Columbia River

**DOE Goal:** Remove contaminated soil and solid waste adjacent to the river and stop key contaminants so they don't enter the river

- Reducing the cleanup footprint around the K East and K West reactors
- Demolished 57 buildings along the River Corridor
- Completed interim safe storage conceptual design for K East Reactor
- Removed over 84,000 tons of soil from River Corridor waste sites



*Before (left) and after (right) photos of K East Reactor—now ready for Interim Safe Storage*

# Clean Out and Demolish the Plutonium Finishing Plant

*DOE Goal: Deactivate and demolish more than 80 facilities/structures*

- **Completing Plutonium Finishing Plant demolition to support 2015 Vision**

- Will save \$50M in surveillance and maintenance costs per year after the plant has been demolished
- Demolished 29 buildings including the Vault Complex
- Removed 168 of 232 glove boxes
- Completed initial cleaning of Plutonium Reclamation Facility Canyon floor
- Removed 40 of 196 pencil tanks
- Removed 1,800+ feet of highly contaminated process vacuum system piping/transfer line



*Plutonium Finishing Plant employees work in confined spaces to safely remove glove boxes*

# Contain Key Contaminants on the Central Plateau

**DOE Goal:** *Install critical groundwater treatment systems by 2012 and operate them to contain key contaminants in the Central Plateau, so they don't impact the Columbia River in the future*

- **Designed, constructed, and will operate the 200 West Groundwater Treatment Facility**
  - Largest pump-and-treat system at Hanford
  - Designed to achieve Leadership Energy and Environmental Design (LEED) certification
  - Construction completed ahead of the 2011 TPA milestone
  - On track to complete testing and startup by TPA milestones
- **Evaluating and conducting treatability tests on promising remediation technologies (e.g., soil desiccation, uranium sequestration), and removing highly-contaminated perched water from the Deep Vadose Zone to prevent further degradation of the aquifer**



**The 200 West Groundwater Treatment Facility will have the highest treatment capacity at Hanford – 2,500 gallons per minute**

# Reduce Hanford Site Infrastructure Costs

**DOE Goal:** Complete River Corridor cleanup and shrink the active cleanup footprint to reduce the need for infrastructure and services

- Ready for first-of-a-kind demolition of massive U Canyon—filled the canyon with 25,578 cubic yards of grout to contain contaminants



*U Canyon, at 810 feet long, is longer than Seattle's Space Needle is high*



- Demolished 150 buildings, removed over 1.5 million square feet of facilities
- Removed over 900,000 tons of soil from waste sites

# ARRA Summary



*Power House D&D team  
and facility demolition*



- Completed \$1.3 billion ARRA scope
- Doubled workforce and scope in first contract year
- Met or exceeded all ARRA goals except for one (D&D at the Plutonium Finishing Plant)
- Conducted workforce restructuring (1,200 layoffs)
- Exceeded subcontractor goals (51 percent of subcontracts awarded to small businesses)

# Innovations & Efficiencies

- Optimization techniques increased groundwater treatment capability by 300 million gallons per year without adding new facilities
- Apatite (calcium-citrate and phosphate) was injected into wells to expand a groundwater barrier in soil
- Used telemetry to allow wireless communications with wells, eliminating cables across highly-sensitive or historic areas
- New treatment resin at pump-and-treat facilities, surpassing performance expectations to reduce long-term operating costs by \$20 million; testing for use at additional treatment facilities
- Deployed standard larger waste containers to more safely and efficiently package equipment removed from buildings for disposal at WIPP
- Implementing Point of Waste Generation Strategy to reduce waste handling and improve worker safety



*Optimizing water treatment*



*New water treatment tests*



*Using larger waste boxes*

# Project Delivery

- Working safely and efficiently
- Accelerating accomplishment of DOE's 2015 vision on time and under budget
- Reducing lifecycle mortgage costs
- Finding innovations and efficiencies to increase worker safety and reduce cost and schedule



*Plutonium Finishing Plant employees use supplied air to safely prepare one of the most contaminated facilities in the nation for demolition by 2015*



# **Hanford Cleanup Progress**

## **Mission Support Alliance (MSA)**

**March 7, 2012**

**Presented by**  
**Frank Armijo**  
**President and General Manager**

# Scope of Work

***MSA provides integrated infrastructure services and portfolio management for the Richland Operations Office and Office of River Protection field offices***



## **LOGISTICS & TRANSPORTATION**

2,700,000 managed facility sq.ft.  
25 construction cranes  
2,960 fleet and heavy duty vehicles



## **EMERGENCY SERVICES & TRAINING**

4 fire stations  
1,500 emergency response calls  
65,000 “person-days” training



## **SITE INFRASTRUCTURE & UTILITIES**

465,000,000 gallons of water per year  
200,000 megawatt hours of power  
500 miles of roadway



## **INFORMATION MANAGEMENT**

10,000 computer systems  
359 square miles Wi-Fi coverage  
2,500,000 managed electronic records



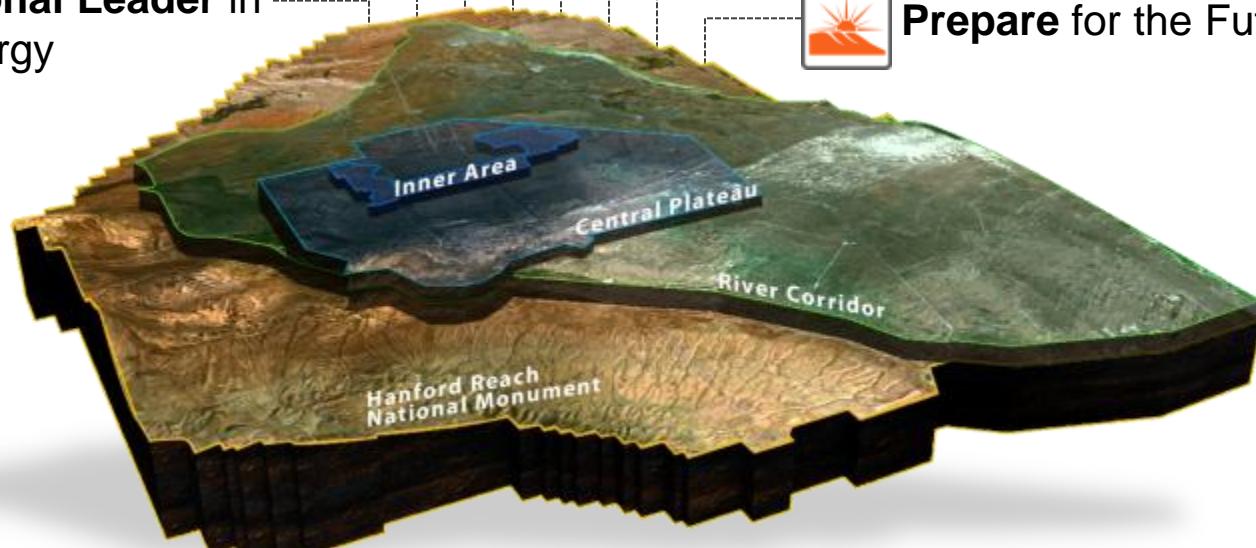
## **ENERGY & ENVIRONMENTAL SERVICES**

70,000 chemical analyses  
50 percent reduction in data center energy usage  
44 percent reduction in CO<sub>2</sub> emissions



# Infrastructure & Integration Focus

-  **Implement Commercial Service Delivery Model**
-  **Right-Size the Infrastructure**
-  **Lead Site-Wide Integration**
-  **Be a National Leader in Clean Energy**
-  **Drive Innovations and Cost Savings**
-  **Support WTP and Waste Complex Operations**
-  **Excel in the Safe and Secure Performance of Work**
-  **Prepare for the Future**



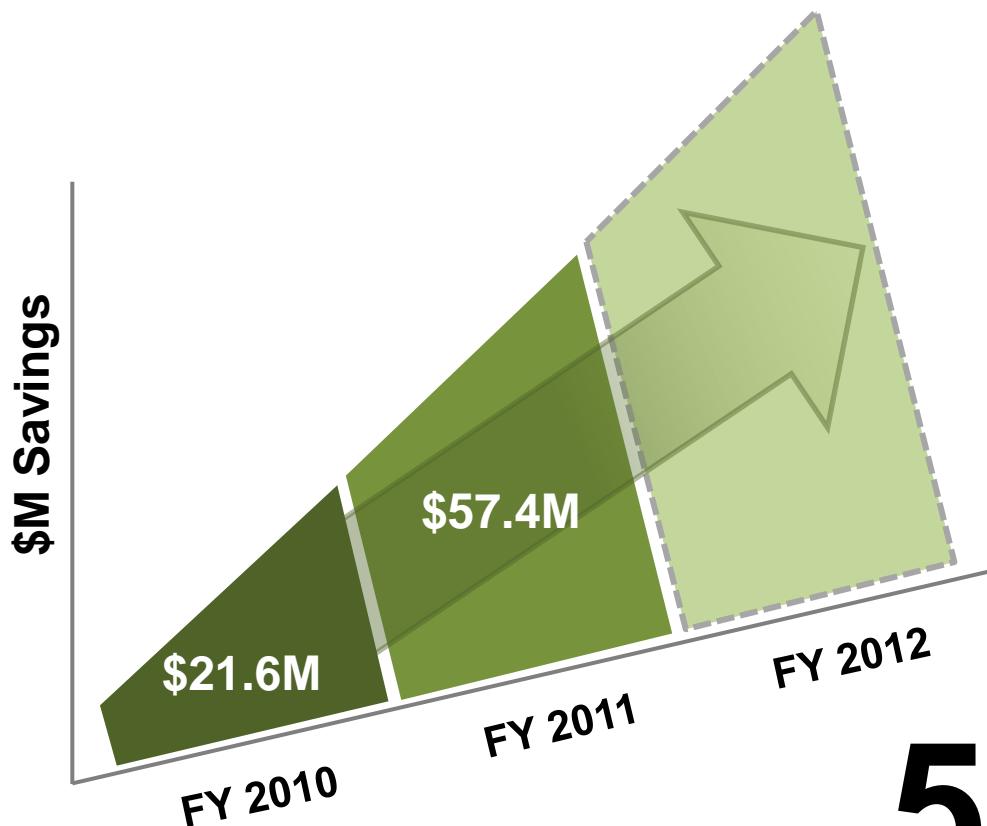
# Focus on Safety

- **Key Safety Programs**
  - Voluntary Protection Program Star Status
  - Integrated Safety Management System
  - Environmental Management System
  - ISO 14001 Certified
- **Site-wide Integration Support**
  - Specialized training
  - Integrated sitewide safety standards
    - 15 of 16 standards complete with 11 standards “field implemented”
  - Emergency services and protective forces
  - Lead and advance Beryllium awareness and corrective actions



*Training campus and Voluntary Protection Program “Star Site” flag*

# Cost Savings



**35** Six Sigma Events

**95%** Crane and Rigging Crew Availability

**53%** Increase Warehouse Operations

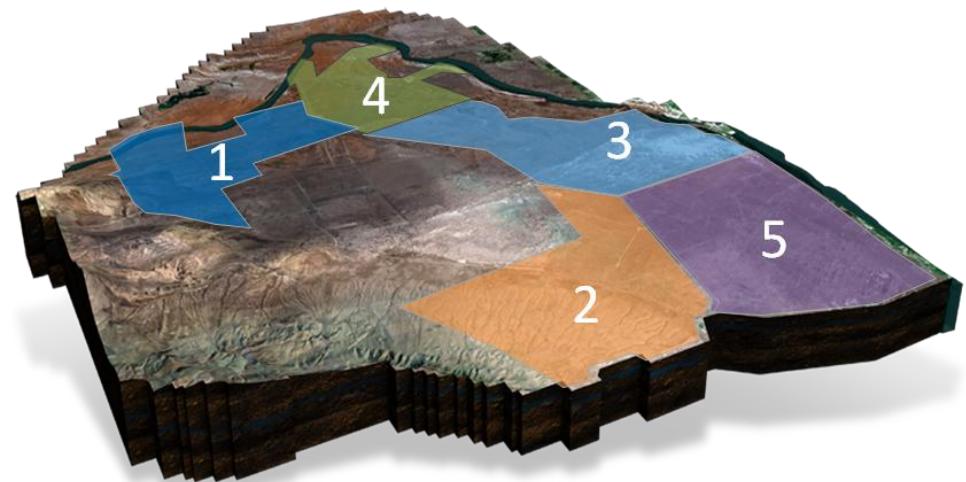
**55%** Increase Fleet Service Cycle Time

***Exceeded FY11 \$25M goal with \$35.6M in documented savings***



# Accomplishments

- Over \$300M in small business subcontracts to over 200 small businesses
- Exceeding small business contracting dollars by 70%
- Met 100% of all Service Level Agreements
- Received 100% satisfaction on critical contractor project support
- Realized 20% improvement in forecasted services
- Assumed surveillance of the first land segment from WCH



# Innovations & Efficiencies

- **Infrastructure is leading the delivery of innovation, cost savings and productivity**
  - **Public works consolidation**
    - Municipal-style planning and zoning
    - Water, sewer, power and roads



# Innovations & Efficiencies

- Providing renewable energy solutions in support of Presidential Executive Order 13514
  - Natural gas services
  - Electric and natural gas fill stations
- Received “Best in Class” E-Star Awards
  - Data Center Consolidation
    - Consolidated 9 data centers to 2
    - Reduced energy usage by 50 percent
- Achieved fleet vehicle reductions
  - Achieved a reduction of 13.6 percent
  - Reduced CO<sub>2</sub> emissions by 44 percent



# Innovations & Efficiencies

- **Hanford Federal Cloud Computing**
  - Leading the EM complex, providing a secure multi-tenant network
  - Maximizing past and current investments
  - Will save 60 percent per year in federal network costs
  - Significantly reduces energy consumption
  - Total savings estimated at \$12 million in next 4 years
- **Deployed Voice over Internet Protocol (VoIP)**
  - Largest VoIP deployment in the DOE complex
  - Completed on time and under budget
  - MSA invested \$2 million to initiate project
  - \$8 million cost avoidance in retiring end-of-life technologies
  - \$1.5 million in annual savings in add/moves/changes
  - Over 600 buildings and over 10,000 telephone circuits and associated phones
  - Reduced need for dedicated telephone facilities (7 to 0)



# Summary

- **Accomplishing DOE's Mission support strategy**
  - Achieving the 2015 vision while modernizing Hanford's infrastructure for the next phase
  - Allowing cleanup contractors to focus on their core mission
  - Reducing site-wide operating costs
  - Ensuring a reliable infrastructure over the next 50 years
    - Regardless of which contractor is managing cleanup work scope

