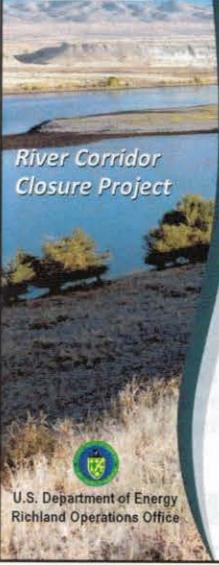


DOE's Largest Environmental Cleanup Closure Project

River Corridor
Closure Project



U.S. Department of Energy
Richland Operations Office

Washington Closure Hanford: Cleanup Progress Along the River Corridor

Scott Sax

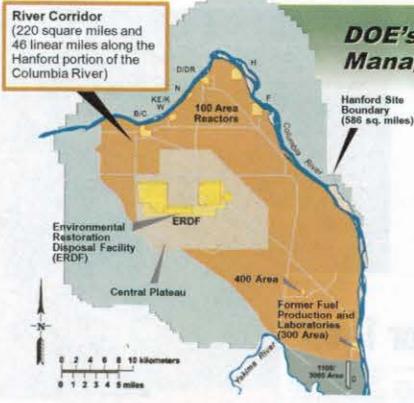
October 2016

Protecting the Columbia River

RIVER CORRIDOR CLOSURE PROJECT DOE's Largest Environmental Cleanup Closure Project

River Corridor Closure Project

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



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

Client:  **U.S. DEPARTMENT OF ENERGY**

Scope:

- 1) Remove hundreds of excess nuclear facilities
- 2) Place deactivated plutonium production reactors in interim safe storage
- 3) Clean up waste sites and burial grounds
- 4) Manage Hanford site waste disposal facility

- \$2.9B contract
- Cost-plus incentive fee contract
- Making great progress
 - 324 buildings remediated
 - 575 waste sites cleaned up
 - Strong safety performance

Partners:   

One Team for Safe, Visible Cleanup of the River Corridor

Washington Closure Hanford: Cleanup Progress Along the River Corridor, September 2016 E1600019_a_2 of 19

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.



Deactivate, decontaminate, decommission, and demolish 324 facilities



Clean up and close 578 burial grounds, waste sites



Treat, transport, and dispose 11.9 million tons of waste debris to disposal facility

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Recognized for Safe, Cost-Effective Progress

- Contract extended through 9/30/2016
- Received Project of the Year award from local chapter of the Project Management Institute; one of three finalists for international award



WASHINGTON CLOSURE HANFORD Cleanup contract extended for 1 year

Additional time will be needed to complete the cleanup of the Hanford River Corridor, according to a report released by the U.S. Department of Energy on Wednesday. The report says that the cleanup of the Hanford River Corridor will require an additional \$2.9 billion and 18 months of work.

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Risks and hazards facing our workers

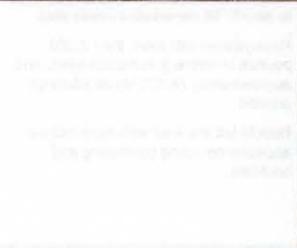
- High-risk working conditions
- Radiological, chemical, and contamination hazards include chromium, asbestos, beryllium, mercury, and tritium
- Industrial and construction hazards
- Discovery of unexpected waste sites
- High-dose fuel elements and other reactor parts
- Unexploded ordnance
- Pyrophoric uranium oxide (UOX) drums



One Team for Safe, Visible Cleanup of the River Corridor

Success in Project Performance

300 Area



300 Area Cleanup

- Located 1.5 miles north of the city of Richland, close to the Columbia River
- Center of Hanford's radiological research and fuel fabrication during the Manhattan Project and Cold War
- 173 facilities demolished
- 109 waste sites cleaned up

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Success in Project Performance

100-B/C Reactor Area



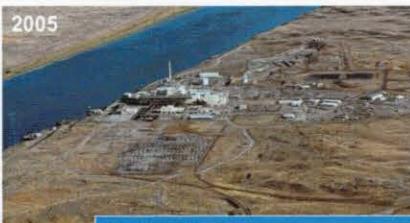
100-C-7 Waste Site Cleanup

- More than 120 acres cleaned up; 2.5 million tons of waste material removed
- Revegetated with native bunchgrasses and roughly 52,000 tubelings of three different native plant species
- Using contouring and boulders, backfilling left the area with a more natural appearance

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Success in Project Performance

100-N Reactor Area



100-N Cleanup

- 726,000 tons of clean material was used to backfill 98 remediated waste sites
- Revegetated with more than 3,000 pounds of native bunchgrass seed, and approximately 78,000 shrub tubelings planted
- Backfill left the area with more natural appearance, using contouring and boulders

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Success in Project Performance

100-D Reactor Area



During Operations

100-D Area Cleanup

- Have removed what is believed to be Hanford's primary source of chromium contamination to the Columbia River
- Two major chromium sites completed
- More than 60,000 tons of chromium-contaminated soil was sent to the Environmental Restoration Disposal Facility (ERDF) and treated



Waste Site Cleanup



May 2016

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Success in Project Performance

100-H Reactor Area



During Operations

100-H Area Cleanup

- 55 waste sites cleaned up
- One of two reactors WCH finalized for "cocooning"
- Cleaned up and shipped 742,646 tons of contaminated material to Hanford's disposal facility



March 2016

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Success in Project Performance

100-F Reactor Area



- 100-F Area Cleanup**
- F Reactor was the first of Hanford's reactor sites to be fully remediated
 - 650,000 tons of contaminated material from 55 waste sites were transported away from the Columbia River
 - F Reactor is the third of Hanford's nine plutonium production reactors constructed to support WWII and the Cold War
 - The reactor operated from 1945 to 1965 and was cocooned in 2004



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The Environmental Restoration Disposal Facility (ERDF) is the "Hub" of the Site's Waste Disposal

- ~ 12M tons disposed since 2005
- \$100M ARRA expansion project completed without injury



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Revegetation and Wetlands Restoration

- Since 2012, more than 1,100 acres along the Columbia River have been restored, including 30 acres of wetland restoration
- More than 575,000 shrubs and 28,000 pounds of seed have been planted
- More than 2,200 tons of native grass straw has been spread over revegetated areas



Above: Wetlands restoration at a "borrow pit" near B/C Reactor Areas.

Left: Mulched grass straw covers revegetated areas near N Reactor.

A significant portion of the 100-D Reactor Area has been revegetated and cleaned up sites were filled and contoured.

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618-10 Burial Ground



Above: 618-10 Burial Ground, May 2016. The seven-acre waste site is one of the most hazardous at Hanford.

Right: Workers remove a decontamination cell that was once used in a former Hanford research facility.

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618-10 Burial Ground



Above: Waste is excavated, processed as appropriate, and shipped to a disposal facility.

Right: Steel over-casings have been installed at 80 vertical pipe units at the 618-10 Burial Ground. Augering completed on all 80 ahead of schedule and 33 retrieved.



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324 Building and 300-296 Waste Site

Overview of 324 Chemical Engineering Laboratory

- Contaminated soil beneath B-cell discovered just prior to demolition in 2010
 - Soil highly radioactive (more than 12,000 R/hr)
 - Soil contamination confined below hot cell footprint
 - Not currently impacting groundwater – monitoring wells in place
 - Design and mock-up training facility is complete for future cleanup of 300-296 waste site



Workers collected contaminated soil samples from beneath 324 Building B-cell for analysis.



Grout removed from the B-cell trench and sump uncovered a breach in the liner in 2009

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Progress Toward Placement



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Challenges

1. Changing the culture from a bias for acceptance to one with a bias for action
2. Improve safety culture
3. Improve trust between workforce, customer and regulators
4. Implement and streamline regulatory closure process
5. Stabilize and secure consistent project funding
6. Streamline the development of solutions to technical issues and the discovery of unknown site issues
7. Develop and retain qualified Closure staffing
8. Learn to celebrate success in a negative environment

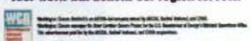
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Washington Closure Hanford's Cleanup of the Columbia River Corridor

	578 waste sites remediated
12 million tons of waste removed	
	324 facilities demolished
	7.4 million consecutive safe work hours achieved*

"a Hanford success" — Tri-City Herald

AECOM, Bechtel, and CH2M congratulate and thank the Washington Closure Hanford and Department of Energy team for all it accomplished during the past 11 years.
Your work will benefit our region forever.



One Team for Safe, Visible Cleanup of the River Corridor

Challenges

1. Changing the culture from a risk-averse mindset to one with a bias for action
2. Improving communication between workforces
3. Streamlining regulatory processes and regulatory requirements
4. Improving and streamlining regulatory processes
5. Building trust and consistent project funding
6. Streamlining the development of solutions to technical issues and the discovery of unknown site issues
7. Developing a "right to be right" culture
8. Learning to celebrate success in a regulatory environment