



U.S. DEPARTMENT OF
ENERGY

*Update on the
Office of Environmental Management*



**2009 Congressional Nuclear Cleanup Caucus
May 7, 2009**

**William E. Murphie
Office Manager
Portsmouth/Paducah Project Office**



**Paul Kreitz
President**



**Bill Franz
Project Manager**



**Dan McDonald
Site Manager**



**Toni Brooks
Director**



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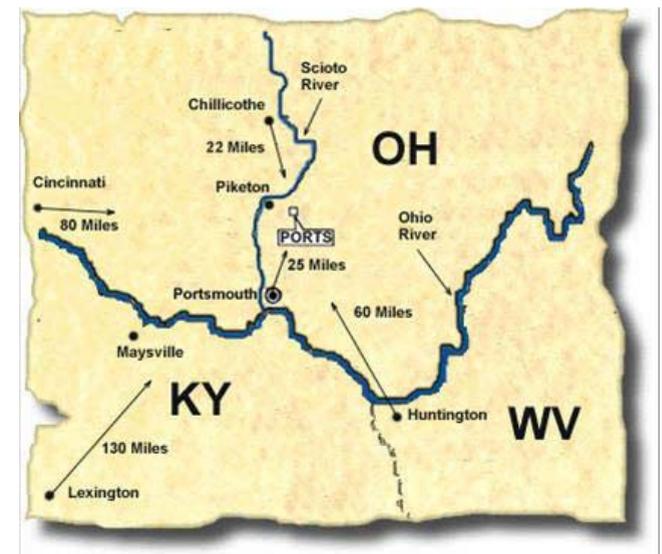
Portsmouth Site Facts

- **Portsmouth Major Components**

- Department of Energy (DOE): Environmental Management [including future decontamination and decommissioning (D&D) of the gaseous diffusion plant (GDP) now in Cold Shutdown]
- DOE: Depleted Uranium Hexafluoride (DUF6) Conversion Plant
- United States Enrichment Corporation Inc.: Commercial American Centrifuge Plant

- **Portsmouth Demographics**

- 3,777 acres
- 1,900 workers; Largest employer in rural southern Ohio



From the early 1950s until production ended in 2001, the Portsmouth plant enriched uranium for defense purposes and commercial nuclear power plants.



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Portsmouth Site Aerial Tour: Projects



**ARRA Project:
D&D of the X-633
Cooling Water Tower
Complex**



**ARRA Project:
D&D of the X-533
Switchyard Complex**



**ARRA Project:
Disposition of 2,300 Large
Low Enriched Uranium
(LEU) Cylinders**



**Depleted Uranium Hexafluoride (DUF₆)
Conversion Plant**



**ARRA Project:
Repackaging &
Disposition of Excess
Uranium Materials**



**X-746 Shipping &
Receiving Facility
Removal**



**ARRA Project:
D&D of the X-760
Chemical Engineering
Building**



ARRA D&D subject to Request For Proposal (RFP)

**ARRA = American Recovery and Reinvestment Act of 2009
D&D = Decontamination and Decommission**

Portsmouth Site Aerial Tour : Environmental

**7-Unit Groundwater Plume Area
Phytoremediation and
Oxidant Treatment**



**ARRA Project: X-701B Groundwater
Plume Source Removal**



**X-770 Soil
Characterization /
Pad Removal**



**Additional Extraction
Well Project in 5-Unit
Plume Area**



**X-344C Deferred Unit
Soil Remediation**



**X-740 Groundwater Plume
Area; Phytoremediation and
extraction wells in place**

**X-749/X-120 Groundwater Plume
Optimization Area;
Phytoremediation and extraction
wells in place**



Project Acceleration Through The American Recovery and Reinvestment Act of 2009

Projects totaling \$118 million funding, creating/saving jobs

- **Removal of 3 major surplus facilities**
 - Decontamination and Decommissioning (D&D) of the X-633 Recirculating Cooling Water Tower Complex
 - D&D of the X-760 Chemical Engineering Building
 - D&D of the X-533 Electrical Switchyard Complex
- **Disposition surplus Cylinders (with heel quantities)**
 - Project will disposition 2,300 surplus UF₆ cylinders. Inventory includes low to empty 30-inch and 48-inch near empty cylinders with LEU residual.
- **Repackaging and Disposition of Excess Uranium Materials**
 - Project will dispose of about 1,000 metric tons of excess materials in inventory.
- **Groundwater Plume Source Removal**
 - Excavate, treat and dispose of highest trichloroethylene (TCE) contaminated source area

(Disposition means several options are possible - reuse, recycle, dispose as waste, etc.)



X-633 Recirculating Cooling Water Towers
Estimated waste removed at completion: 900,000 ft³



X-760 Chemical Engineering Building
Estimated waste removed at completion: 200,000 ft³



X-533 Electrical Switchyard Complex
Estimated waste removed at completion: 703,000 ft³



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Portsmouth Priorities

- **D&D**
 - Cost estimates between \$5 billion to \$12 billion in draft RFP
 - DOE seeking to complete project in approximately 15 years as compared to previously reported 35-year schedule
 - Draft Request For Proposals - 1/2009; incorporating comments
- **Groundwater Treatment**
 - Completed site-wide investigative studies and implemented treatment at all 5 groundwater plumes.
 - Operating 4 groundwater treatment facilities, 26M gallons/year.
 - Installed additional extraction wells to “pull” TCE contaminated groundwater back to DOE property at southern plant boundary.
- **Waste Disposition**
 - Waste now removed as it is generated
 - FY 2008 totals were 7,829 cubic meters
- **Environmental Remediation**
 - On-going sampling activities
 - Continuous communication with regulatory agencies
- **Involvement with Community**
 - Formation of Site Specific Advisory Board in 2008
 - 4 committees (Environmental Remediation, Waste Disposition, Future Land Use, Decontamination and Decommissioning)
 - DOE and contractors meet with committees and full board on a monthly basis



Depleted metal is prepared for shipment to the Nevada Test Site.



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Paducah Site Facts

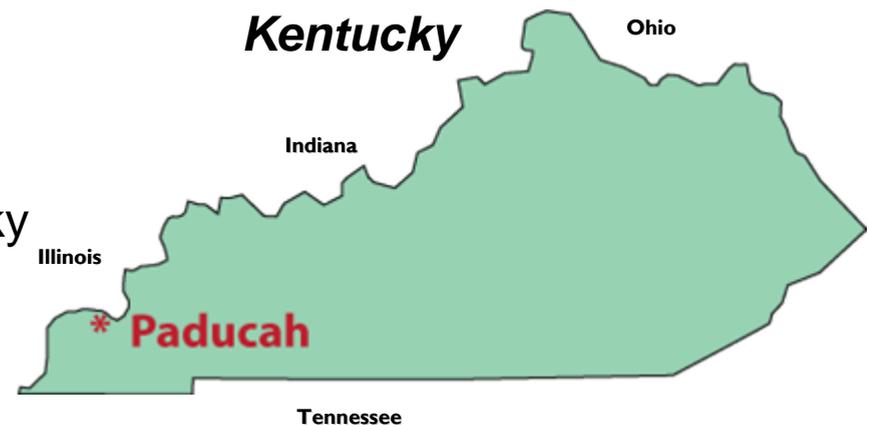
Major Paducah Components

- U.S. Department of Energy: environmental management, including future D&D of the currently operating enrichment plant
- DOE/Uranium Disposition Services: Depleted Uranium Hexafluoride Conversion Facility
- United States Enrichment Corporation: Ongoing operation of nation's only enrichment plant



Paducah Demographics

- 3,556-acre federal site
 - ~750 acres in industrial area
 - Most of the land is licensed to Kentucky for use in the West Kentucky Wildlife Management Area
- Site employs nearly 2,000 people



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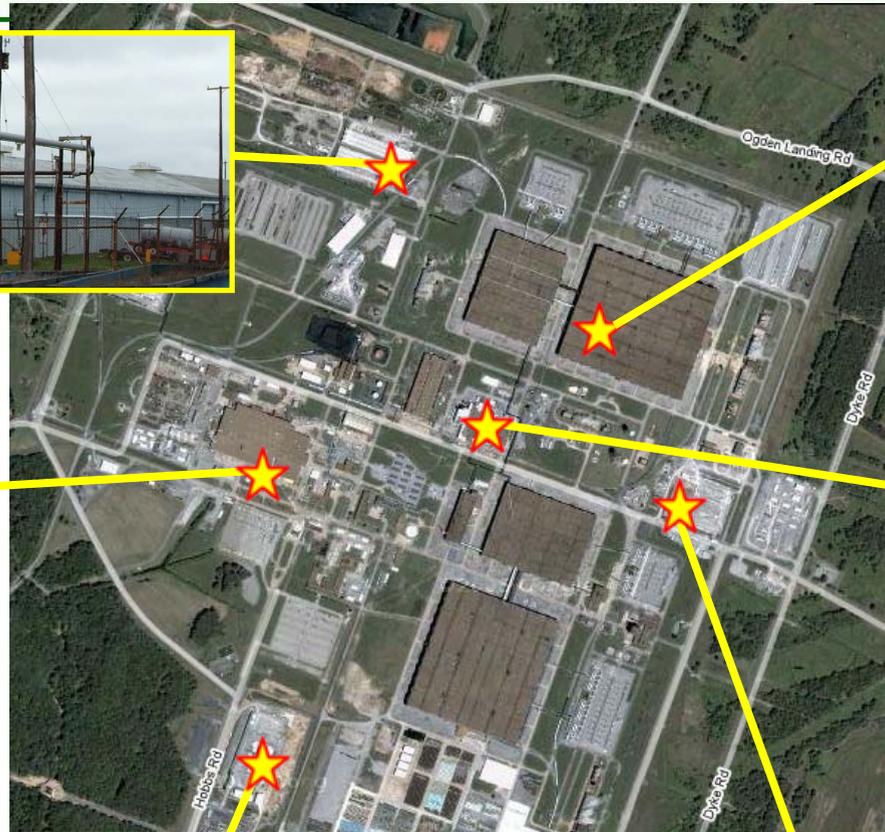
Paducah Site Aerial Tour



ARRA Project: East End Smelter



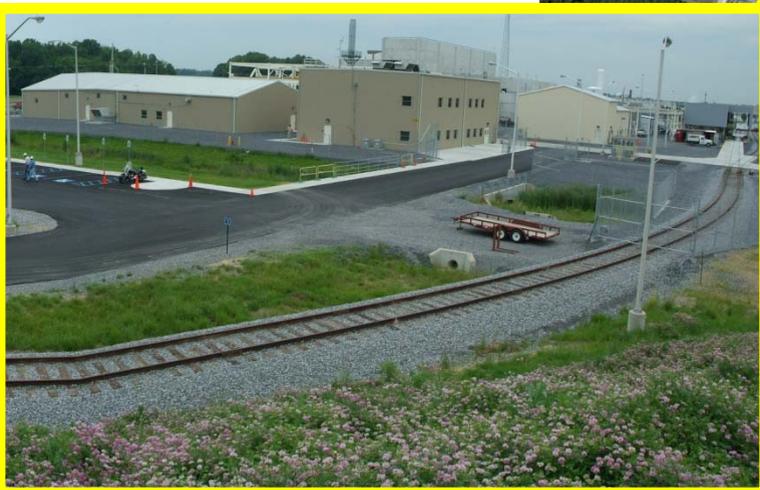
Legacy Waste Disposition



DOE Material Storage Areas



ARRA Project: Feed Plant



DUF₆ Conversion Facility



ARRA Project: Metals Plant

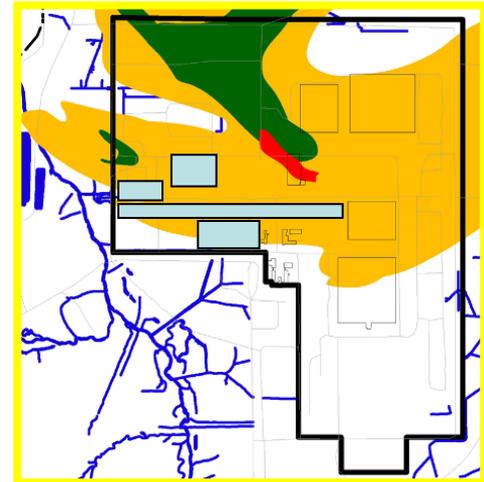
Paducah Site Aerial Tour: Environmental



Removal of contaminated soils



Burial Grounds



Southwest Plume Sources



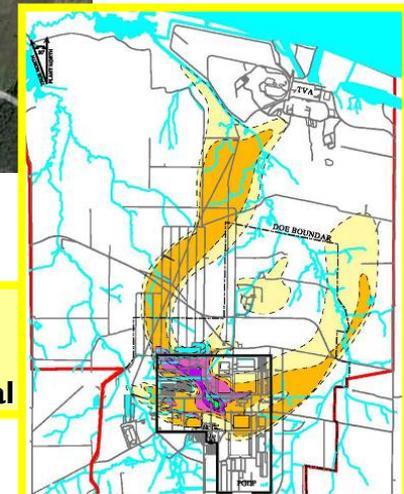
Removal of contaminated soils



Removal of contaminated soil piles



TCE Source Removal



Project Acceleration Through ARRA

- **Three facilities to be removed**
 - C-746-A East End Smelter
 - 22-year acceleration
 - Scope: Demolish and remove debris
 - C-340 Metals Plant
 - 5-year acceleration
 - Scope: Demolish to slab
 - C-410 Feed Plant (ongoing)
 - Acceleration of one year
 - Scope: Demolish to slab
- **Additional funding of \$79 million**
- **Will create new jobs and save current jobs**

All three removals will reduce risks, DOE's "footprint" in Paducah, and surveillance/maintenance costs.



From the top, the C-746-A East End Smelter, the C-340 Metals Plant, and the C-410 Feed Plant. D&D work is ongoing in the Feed Plant and will be accelerated under the ARRA program.



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Paducah Priorities

• Waste Disposition

- Meet regulatory requirement to complete characterization of materials by September 30, 2009
- Complete removal of legacy waste materials by September 30, 2009

• Environmental Remediation

- Begin operations in June of treatment system to reduce main groundwater contamination source
- Gain regulatory approval of key decision documents
 - Soils, 2009
 - Surface Water, 2009
 - Groundwater (Southwest Plume), 2010
 - Long-term waste disposal, 2011
 - Burial Grounds, 2012

• Facility Disposition

- Complete D&D of 3 inactive facilities not included in ARRA package
- Complete ARRA projects ahead of September 30, 2011 deadline



• Community Involvement

- Continue to work with Citizens Advisory Board and community to gain input on key pending decisions
 - Long-term waste disposal
 - Future use of the site
 - Other environmental projects



Portsmouth & Paducah Funding Profile FY2009

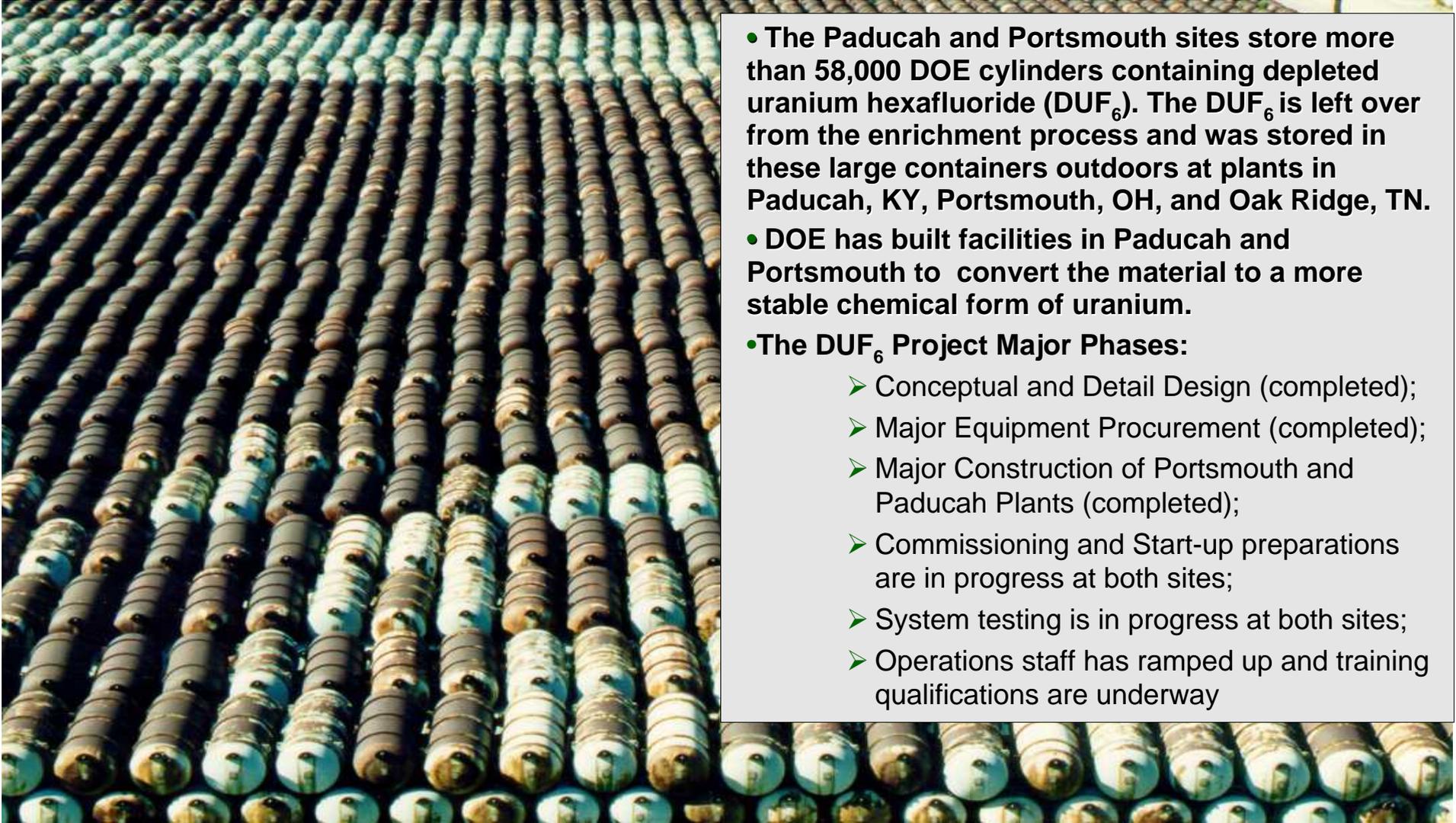
	FY2009 (\$M)	
Appropriation	Portsmouth 240.7	Paducah 169.9
President's Budget Request	Portsmouth 242.6	Paducah 143.0

	Portsmouth	Paducah
American Recovery and Reinvestment Act	118*	79*

*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.



Depleted Uranium Hexafluoride DUF_6 Conversion Project - Paul Kreitz



- The Paducah and Portsmouth sites store more than 58,000 DOE cylinders containing depleted uranium hexafluoride (DUF_6). The DUF_6 is left over from the enrichment process and was stored in these large containers outdoors at plants in Paducah, KY, Portsmouth, OH, and Oak Ridge, TN.
- DOE has built facilities in Paducah and Portsmouth to convert the material to a more stable chemical form of uranium.
- The DUF_6 Project Major Phases:
 - Conceptual and Detail Design (completed);
 - Major Equipment Procurement (completed);
 - Major Construction of Portsmouth and Paducah Plants (completed);
 - Commissioning and Start-up preparations are in progress at both sites;
 - System testing is in progress at both sites;
 - Operations staff has ramped up and training qualifications are underway



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DUF₆ Accomplishments

Portsmouth



After



Paducah



After



The Portsmouth Plant will convert 250,000 metric tons of depleted UF₆ which will take 18 years to complete. The Paducah Plant will convert 400,000 metric tons which will take 25 years to complete. Each plant will employ 160 personnel.



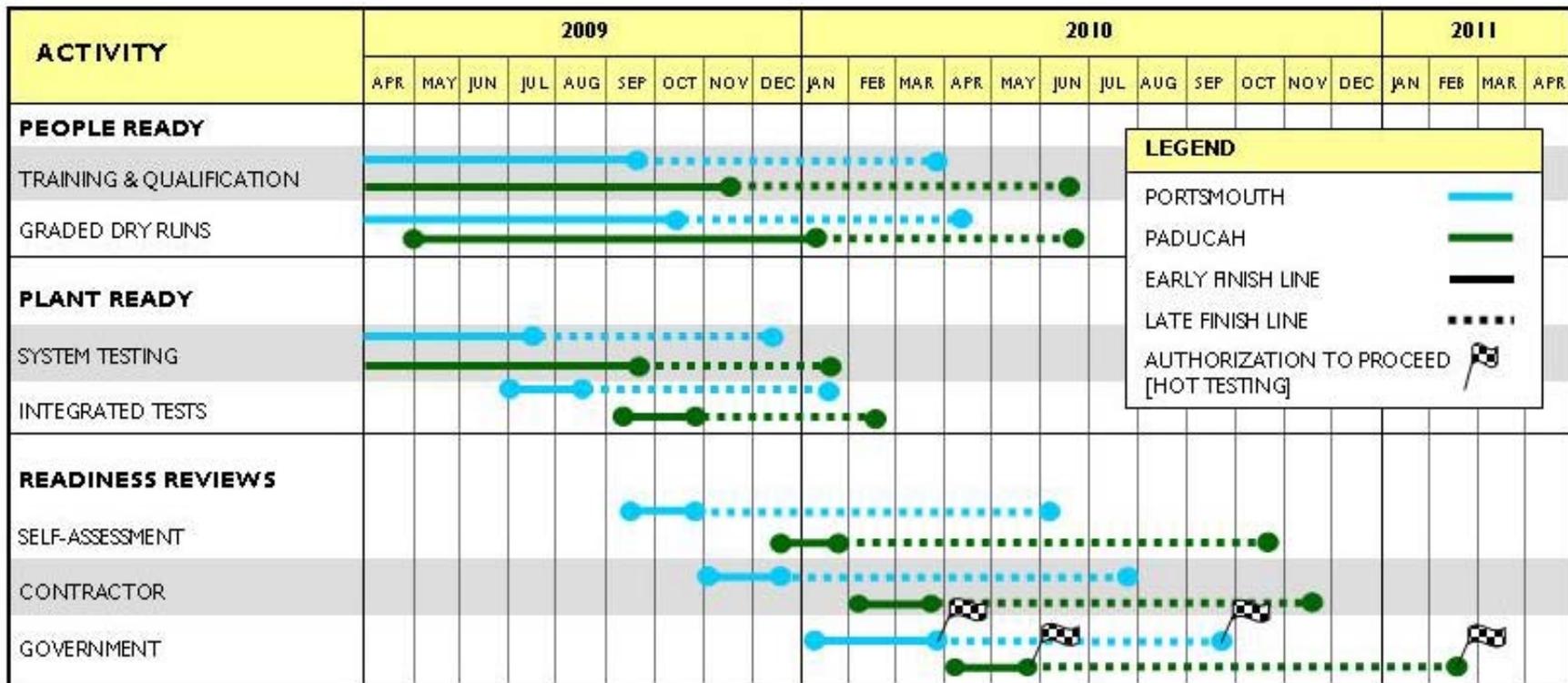
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DUF₆ Commissioning Roadmap

Accelerated Path to Hot Operations



Success Factors

- ✓ Safety performance
- ✓ Cost and schedule discipline
- ✓ Best-athlete management team
- ✓ Strong customer relationships
- ✓ Effective application of lessons learned
 - Successful DOE start-ups
 - Effective performance testing programs
 - Plant-to-plant communication tools

LATA/Parallax Portsmouth, LLC

Bill Franz, Project Manager

- **Scope of Work**
 - Restoration of contaminated areas
 - Monitoring and reporting compliance
 - Disposition of legacy radioactive waste
 - D&D of inactive facilities
 - Disposition of highly enriched uranium
 - Operation of site waste storage facilities
- **Occupational Risks**
 - Potential exposure to hazardous elements
 - Working environments include heavy machinery and equipment
 - Elevated work areas
- **Safety Measures**
 - On-going training for employees
 - Integrated Safety Management System (ISMS)
 - Emergency Management / Preparedness
 - Personal Protective Equipment (PPE)
- **Performance**
 - Program in place to reward employee attention to safety
 - Aggressive I Care/We Care Program that has substantially increased worker involvement.



Mechanical/piping tie-in work was completed in March 2009 for a new groundwater extraction well near the X-326 Process Building.



Another shipment is carefully prepared for departure from the Uranium Management Center during operations in late 2008.



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Portsmouth: Cleanup Program Accomplishments

- Disposed of more than 10,000 tons of radioactively contaminated scrap metal
- Closed and capped all 5 on-site landfills
- Demolished 21 total inactive facilities, dispositioning more than 200,000 ft³ of debris.
- Completed project to clean 15,000 metric tons of out-of-specification uranium contaminated with technetium for re-use in nuclear industry
- Emptied waste storage facility of 49,000 legacy waste containers for re-use by American Centrifuge Plant
- Treatments in place at all 5 identified groundwater plume areas
- All major cleanup actions implemented except 40 solid waste management units agreed by DOE and Ohio Environmental Protection Agency (OEPA) to be deferred for further investigation until plant D&D.



Increasing Performance

- **Small Cylinder Disposition Project (Phase II)**
 - Project will disposition approximately 420 cylinders; scheduled for completion by end of September 2009
- **Removal of X-746 Shipping & Receiving Facility**
 - Scope entails building demolition including slab, foundation and adjacent parking areas, plus waste disposition
 - First building D&D at the site under CERCLA process
- **X-345 Lab Stripout**
 - Project will dismantle and dispose of High Activity Sampling and Analysis (HASA) Laboratory and supporting equipment, and High Assay Isotopic Standards Preparation (HAISP) Laboratory from inside building
- **Cleanout of DOE Material Storage Areas (DMSA)**
 - Project will dispose of 324 items of equipment in 2 DMSA areas
- **Excess Materials Disposition**
 - Project will facilitate overall cleanup at the site through removal of excess material in several different areas



Processing and waste removal of more than 1,200 small cylinders was completed in July 2008. The project was completed ahead of schedule and \$500,000 under budget.



Cost and Schedule Achievements

- **Cost Savings**

- 2008: Completed Phase I of a Small UF₆ Cylinder disposition project 3 months ahead of schedule and approximately \$500,000 under budget
- 2008: Use of local companies for recycling non-contaminated metals and debris from demolition of two warehouses resulted in a cost savings of approximately \$300,000.

- **Schedule**

- December 2007: Waste removal is completed on schedule and for the first time in 15 years, waste is removed from the site as it is generated.
- 2008: Safely completed the processing and removal of 438 old process equipment converter shells on schedule. Shells measuring 7 ft. high by 11 ft. wide and weighing 20-30 tons each had been stored outside for 30 years.



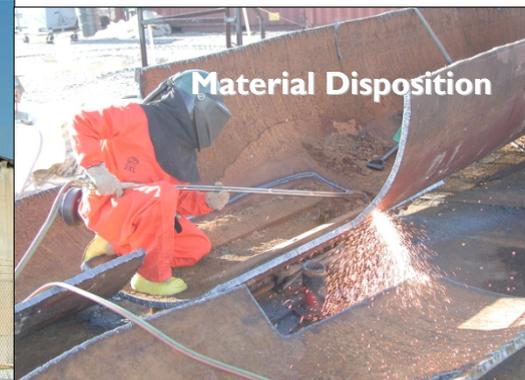
More than 49,000 containers of hazardous and mixed waste was removed from the site's X-7725 facility, providing availability for industrial reuse by USEC Inc.'s commercial centrifuge program.



Paducah Remediation Services, LLC

Dan McDonald, Site Manager

- **Scope of Work**
 - Environmental Remediation
 - Soils, Surface Water, Groundwater
 - Material Disposition
 - Legacy wastes, Newly generated wastes
 - Facility Disposition
 - Unusable facilities, Future site D&D
- **Reducing Occupational Risks**
 - Front-line workers actively involved in hazard assessment and control
 - Hazards include radioactivity, chemicals, confined spaces, working at heights, and working around heavy equipment
 - Use of cutting torches
- **Enhancing Safety**
 - On-going training for employees
 - Integrated Safety Management System/Environmental Management System (ISMS/EMS)
 - Emergency Planning & Preparedness
- **Performance**
 - Program rewards workers for attention to safety
 - FY2008 lost-time incidents 40 percent below DOE goal; OSHA reportable cases 20 percent below DOE goal



Paducah workers work at number of hazards including working at heights, in contaminated facilities, and placing rigging operations



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Paducah: Cleanup Program Accomplishments

- Disposed of more than 30,500 tons of radioactively contaminated scrap metal
- Demolished 16 of 22 inactive facilities covering more than 5 acres
- Removed ~95 percent of legacy wastes stored on the site for decades
- Restored more than 2 billion gallons of groundwater to drinkable conditions
- Excavated and restored a half-mile long contaminated on-site ditch



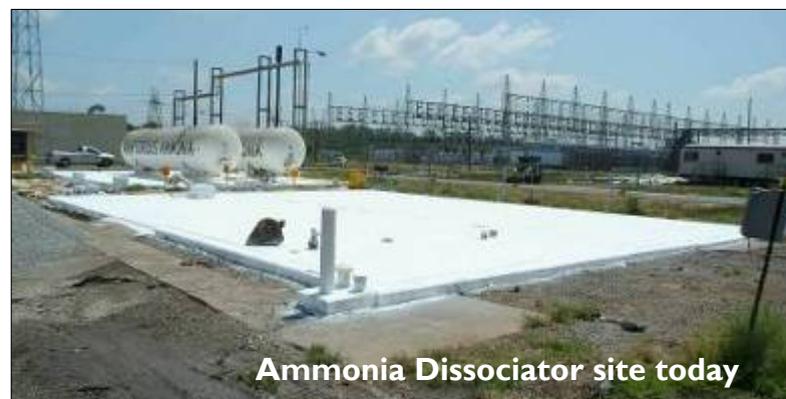
Incinerator Building before D&D



Incinerator site today



Ammonia Dissociator before D&D



Ammonia Dissociator site today



Increasing Performance Through Technology

- **Electrical Resistance Heating Background**
 - The degreaser TCE is the largest contributor to off-site groundwater contamination at Paducah
 - Subsurface soils around the C-400 Building are the largest single source of this contamination
 - In 2005, DOE signed a Record of Decision to use electrical resistance heating to remove TCE
- **Electrical Resistance Heating Project Details**
 - Modification of the technology developed for Paducah to be used
 - Construction underway; 100+ electrodes are being installed to heat the subsurface to TCE's boiling point
 - Vacuum pumps will extract TCE vapors for treatment
 - Construction to be completed in June and Operation this summer
- **Remote Waste Scanning**
 - The Paducah Site recently installed a remote scanning system to assist in waste characterization
 - Reduces worker radiation exposure
 - Used in combination with Nondestructive Assay to speed characterization and disposal, reduce costs, and reduce generation of secondary waste
- **Enhanced Recycle and Reuse**
 - DOE to increase reuse/recycle of materials to reduce waste
 - Paducah is evaluating technologies that could assist by removing surface contamination – hydro laser and liquid nitrogen sandblasting



Electrical resistance heating, as shown in the technology test above, will be used to remove TCE up to 100 feet below the surface.



Operators use scanning system to Speed characterization of wastes prior to disposition.



Recent Paducah Project Achievements

- **Waste Disposition**

- 4-5 months ahead of Agreed Order deadline to complete characterization of 160 DOE Material Storage Areas (DMSAs) (9/30/09)
- 3-4 months ahead of contract deadline to complete disposition of DMSAs (9/30/09)
- On schedule to meet contract deadline for other legacy wastes
- \$3 million cost savings to date

- **Facility Disposition**

- 1 year ahead of schedule on C-410 project
- \$1 million cost savings to date

- **Environmental Remediation**

- 4 years ahead of schedule on C-746 Soils removal project
- \$12 million in projected savings



The B-I Pad, shown before and after stored waste materials were removed.



Recent Paducah Project Achievements

In February 2009, DOE demolished two 66-year-old concrete water towers built for a WWII era munitions plant.



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Tc-99 Removal

Toni Brooks, Director of Infrastructure Services

- Project completed September 2008 for the original inventory
- More than 15,000 metric tons uranium cleaned from 2002-2008
- Value of cleaned uranium material exceeded \$2.1 Billion dollars (based on market price per KgU of normal UF6 on 09/30/08)
 - Cleaned material owned by both DOE and USEC
 - DOE: 7,610 MTU
 - USEC: 7,433 MTU



A remotely-controlled overhead crane is used to move a cylinder containing technetium-contaminated uranium hexafluoride into an autoclave where it will be heated. The material inside turns from a solid into a liquid and is fed through a trapping system that removes contaminants.



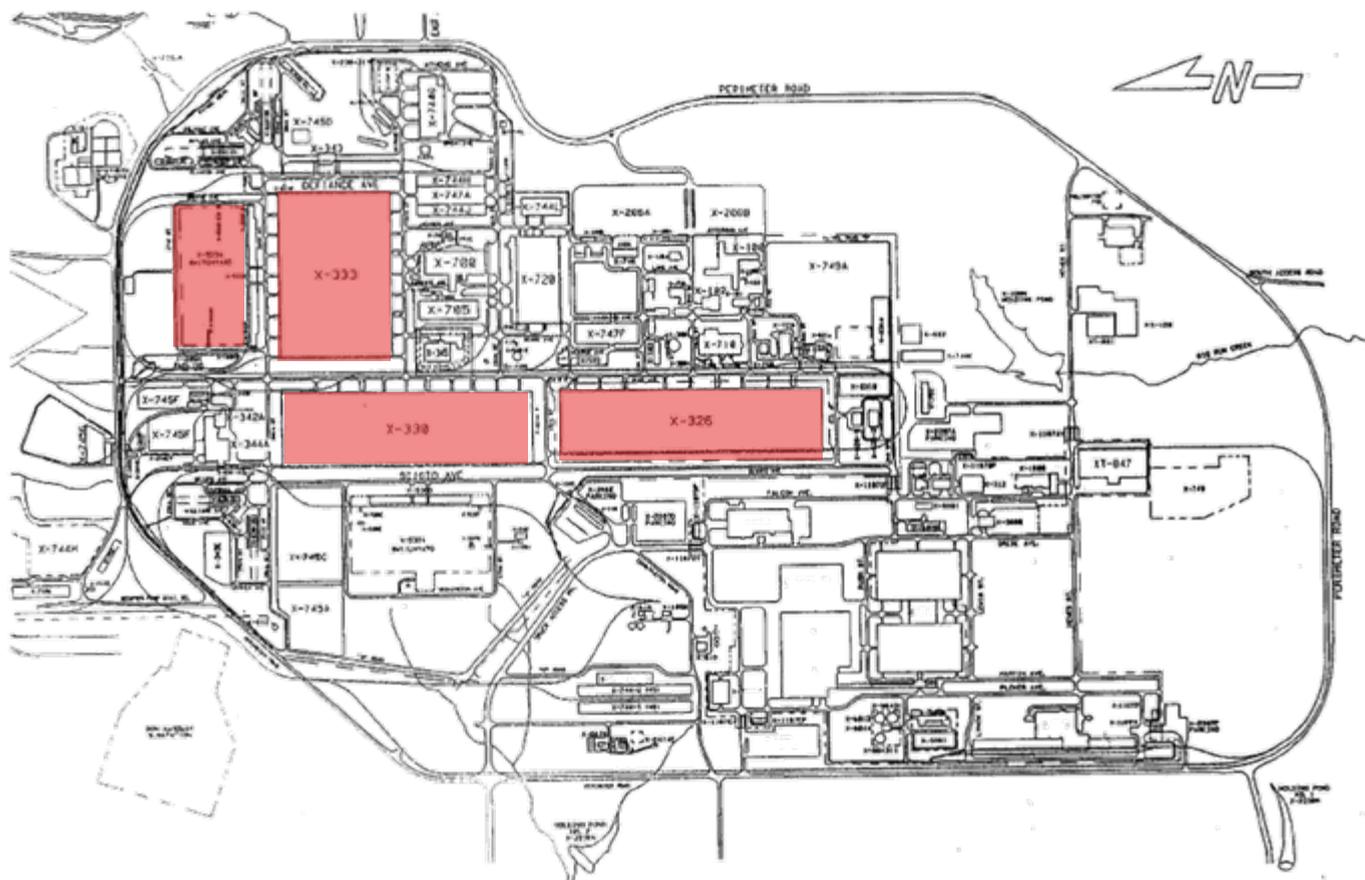
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Cold Shutdown

- Maintenance of Gaseous Diffusion Process buildings, equipment and support facilities as well as preparation of such facilities for eventual decontamination and decommissioning.



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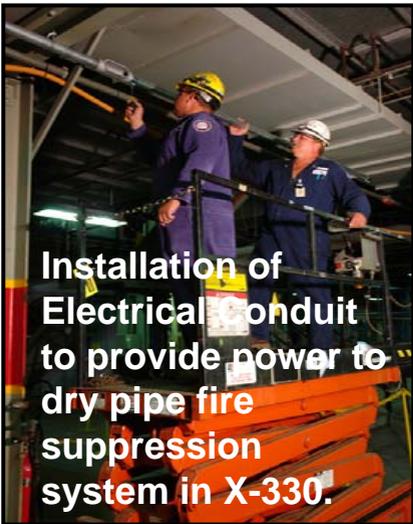
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Cold Shutdown



A 12-inch cylinder is lowered into a cold trap, where it will be filled with uranium hexafluoride (UF₆) recovered from the X-326 Highly Enriched Uranium deposit removal project.



Installation of Electrical Conduit to provide power to dry pipe fire suppression system in X-330.

Deposit Removal

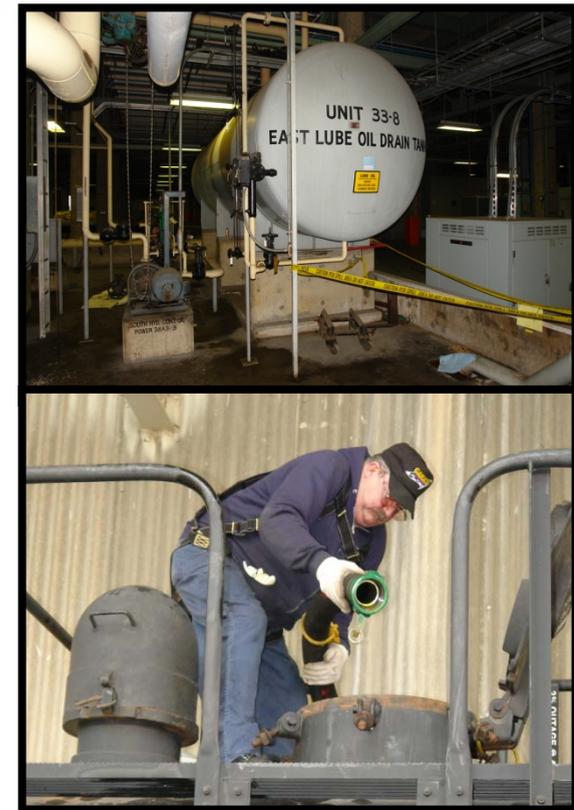
- Chemical removal of uranium deposits residing in the shut down gaseous diffusion process equipment.

Safety System Installation

- Dry pipe fire suppression systems were installed in two of the three process buildings in 2008. New system eliminates freezing hazard of original sprinkler systems

Oils Removal

- *In preparation for D&D, USEC is removing TSCA regulated oils and lubricating oils from the three gaseous diffusion process buildings.*
- *A contract is in place with clean Harbors, Texas, to incinerate lube oils from Portsmouth. (1st rail shipment in April 2009)*



	Shipments / Planned Shipments	
	Pyranol X-330/X-333	Lube X-330/X-333/X-326
2006	224,460	379,593
2007	159,216	239,440
2008	79,608	276,670
2009	2,010,472	1,063,314
	Amounts in pounds	



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Facility De-Lease

- USEC currently holds a lease on many of the buildings and facilities that DOE has identified for future D&D.
- A USEC team has been formed to expedite de-lease schedule to support DOE's D&D closure plans.
- Intent to provide DOE a listing of facilities with a commitment to support D&D schedule.

