



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

Portsmouth/Paducah Project Office

Robert E. Edwards III, Manager



Waste Management Symposia

Phoenix, Arizona

Thursday, March 9, 2017



- Portsmouth GDP Cleanup
- Paducah GDP Cleanup
- DUF6 Conversion

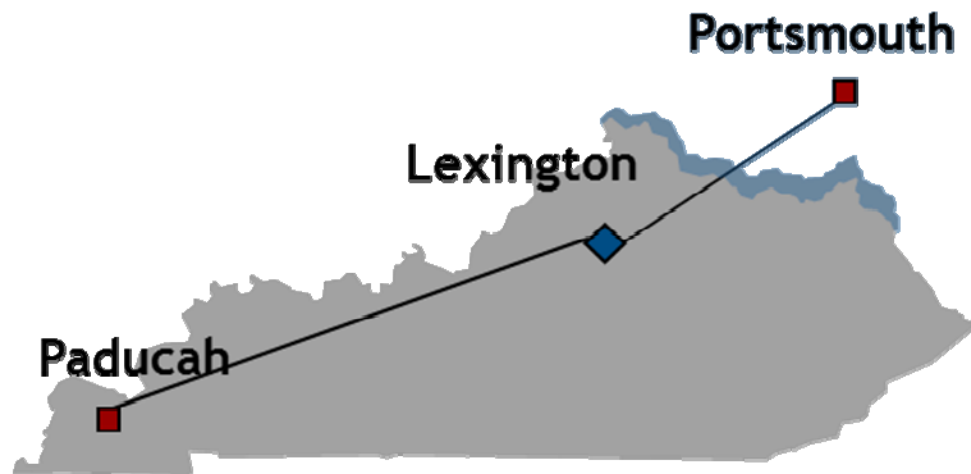
PPPO provides consolidated management in support of cleanup efforts at two gaseous diffusion plant sites formerly operated by the Department of Energy.

Technical Support:

- Project Management
- Environmental Health & Safety
- Security
- Risk Management
- Quality Assurance

Business Support:

- Human Resources
- Financial Management
- Public Affairs
- Legal Services
- Contract Management



- Continue to improve health and safety performance
- Continue to gain efficiencies using a centralized management approach
- Continue to share and incorporate lessons learned at both sites





Paducah, KY

- Environmental cleanup began in 1988
- USEPA/State have joint regulatory role under Tri-Party agreement
- Deactivation began in 2014
- Transitioning from enrichment operations to cleanup/S&M/D&D



Jennifer Woodard

DOE-PPPO
Paducah Site Lead



Bob Smith

Program Manager
Fluor Paducah Deactivation Project
(Deactivation/Remediation)



Tammy Courtney

Swift & Staley, Inc.
Paducah Infrastructure
Support Services



- The former Gaseous Diffusion Plant is located on a 3,556-acre federal site.
- Uranium Enrichment Operations: 1952-2013.
- DOE Cleanup began in 1988.
- Placed on the National Priorities List (NPL) in 1994.
- Deactivation project began in 2014 to prepare for D&D.



Paducah selected for second of three enrichment plants for defense



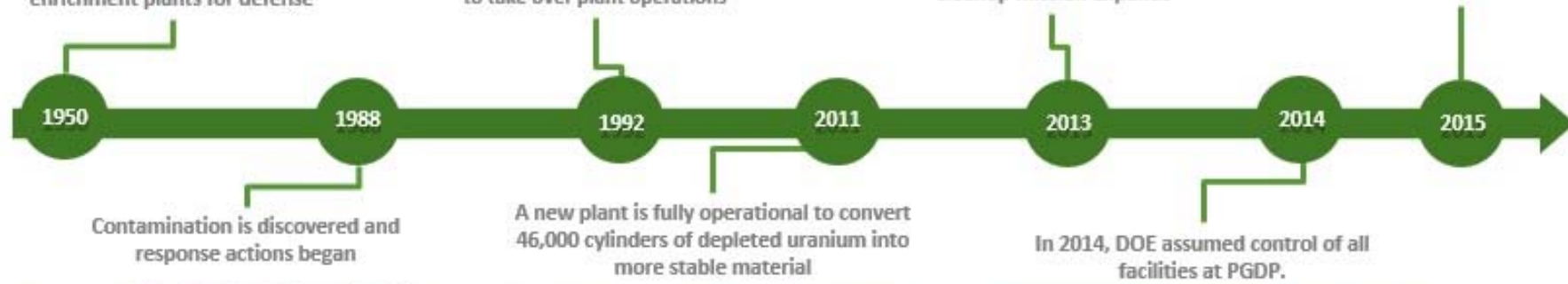
Energy Policy Act of 1992 establishes USEC to take over plant operations

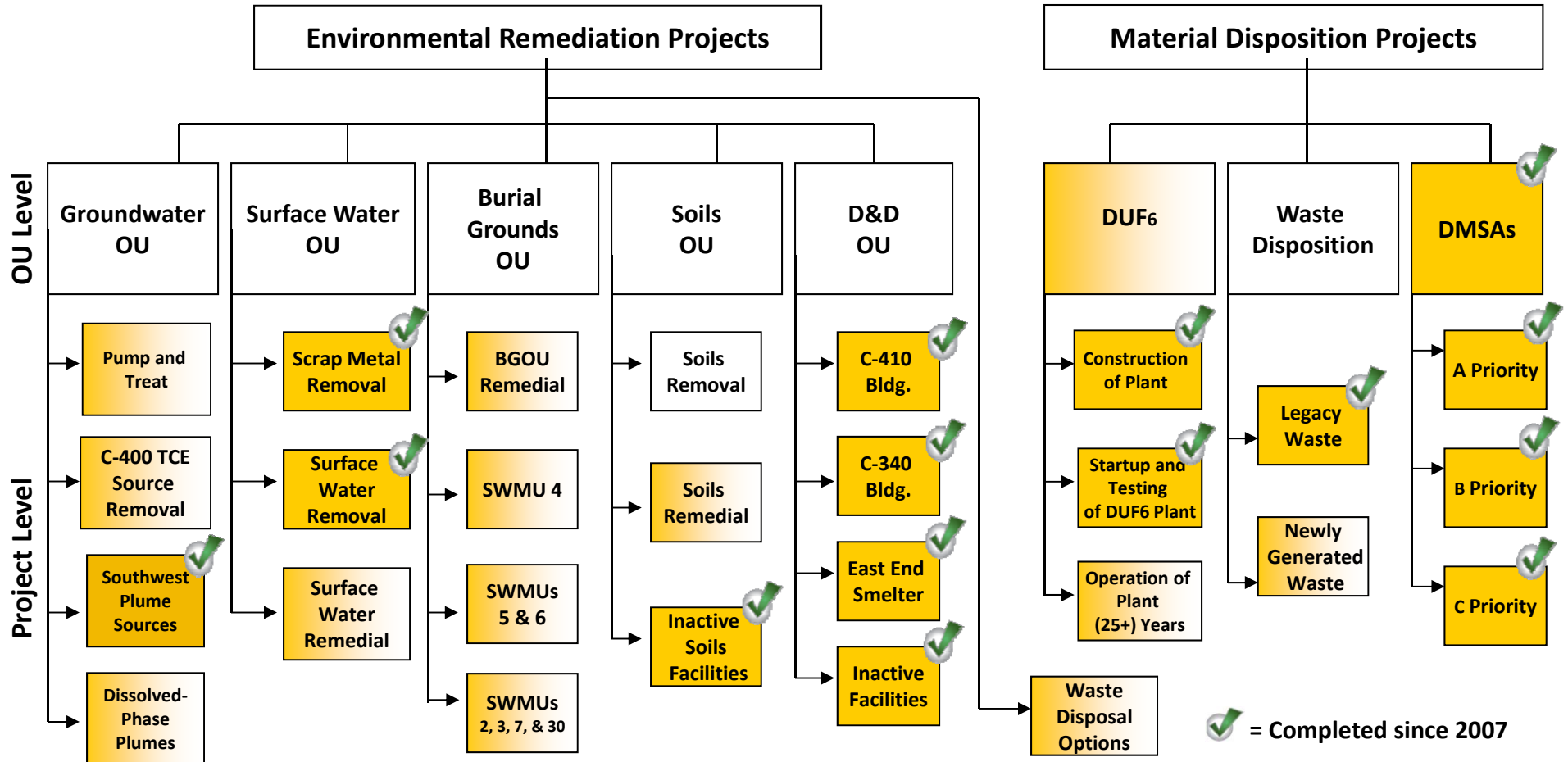


Enrichment ends and DOE cleanup mission expands



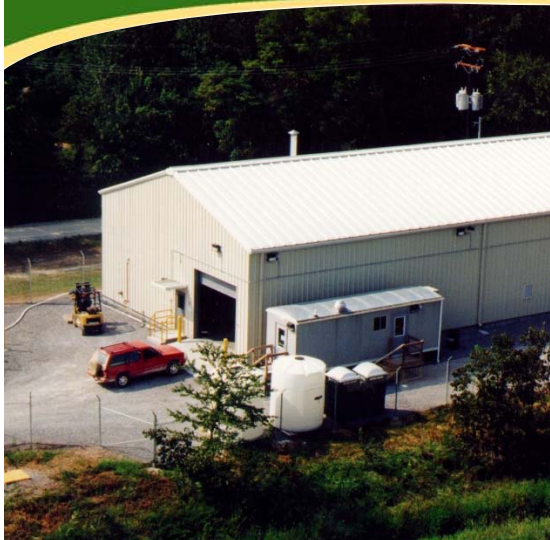
DOE mission focuses on stabilization, deactivation, optimization, and remediation





Pre-Shutdown Scope

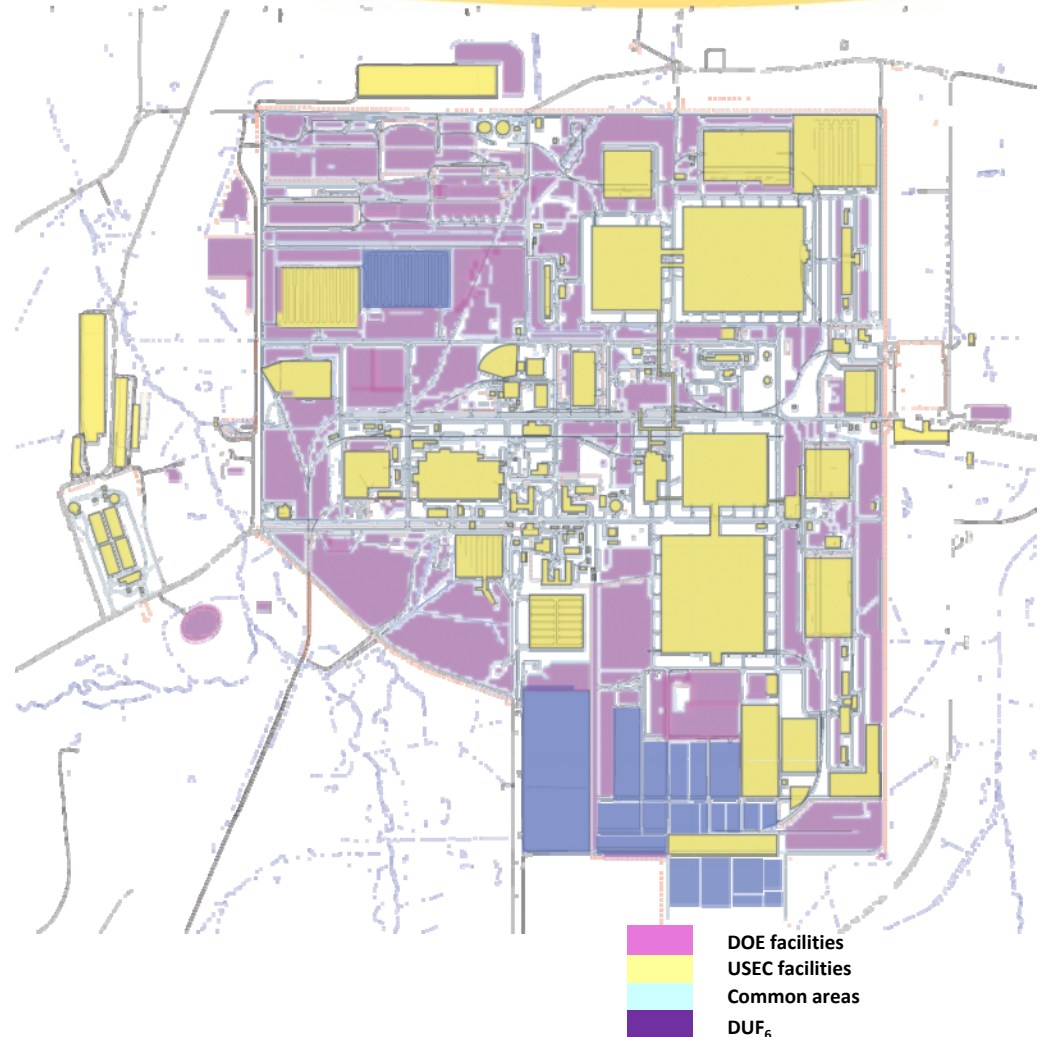
NOTE: Each environmental project is expected to have a corresponding CERCLA decision document (i.e., ROD, AM)



- Mitigated exposure to residents by providing municipal drinking water.
- Reduced migration of off-site groundwater contamination using pump-and-treat systems.
- Treated more than 3.6 billion gallons of contaminated water; removed more than 8,100 gallons of solvent from groundwater and source areas.
- Removed more than 1 million cubic feet of contaminated soils/sediment from on-site plant ditches.
- Removed ~73,000 cubic feet of contaminated soils from historical site operations and investigated more than 180 potential areas totaling more than 200 acres.
- Removed 43 contaminated, inactive facilities totaling nearly a half-million square feet.
- Repackaged and removed 420,000 ft³ of legacy waste stored onsite in drums.
- Removed 33,000 tons of contaminated scrap metal.

- The leased systems and facilities at Paducah were returned to the Department of Energy (DOE) in October 2014.
 - More than 370 facilities returned to DOE
 - The four process buildings alone amount to >3M ft² of roofing and >6M ft² of floor space

- DOE's mission at the site is now focused on the following key areas and challenges:
 - Environmental Remediation
 - Facility Stabilization
 - Facility Deactivation
 - Infrastructure Optimization
 - Facility Long-Term Maintenance





- Continuing to make progress for ongoing environmental commitments
- Assessing facilities and infrastructure that was returned
- Identifying opportunities to right size utilities
- Evaluating the necessity for specific facilities
- Lifecycle baseline planning and development



Fluor Federal Services

- Project management
- Facility modification
- Infrastructure optimization
- Decontamination/demolition
- Absorbed Environmental Services scope in July 2015
- 3-year contract, from July 2014 to July 2017
- Contract value ~\$399 M (Cost + Award Fee)
- ~950 employees



Swift & Staley Inc.

- Infrastructure (facility and road operations, maintenance)
- Security (classification)
- Records management
- Property and fleet management
- Information technology
- Base 3-year contract from October 2015 to November 2018
- Contract value (base plus two 1-year extensions) ~\$185 M
- ~120 employees



Mid-America Conversion Services

- DUF₆ plant construction
- DUF₆ plant operation
- Cylinder management
- 5-year contract, from February 2017 to February 2021
- Contract value ~\$320.5 M
- ~500 employees (3 locations)



Pro2Serve

- Oversight support to site office
- Environmental technical services
- Project/program management support
- 5-year contract from February 2013 to January 2018
- Contract value ~\$45 M
- ~40 employees

Long-term facilities removal

- >300 building structures with ~200 acres of floor space to be demolished
- Underlying soils to be investigated, cleaned up as needed

Deactivation

- Infrastructure optimization, e.g., switchyard consolidation
- Facility modifications incl. repairs for ~3mil. s.f. of roofs
- Deactivation activities incl. oils and refrigerant removal from process buildings
- Uranium deposit removal from process buildings

Surface Water

- Remediation of ~6 miles of contaminated creeks, ditches, etc.

Depleted uranium

- About 53,300 cylinders

Burial grounds

- 10 burial grounds, ~100 acres
- Some contain radioactive, pyrophoric and RCRA waste

Major TCE source

- Primary source of off-site contamination
- Heavy concentrations present; >500,000 ppb of TCE in groundwater

Inactive facilities

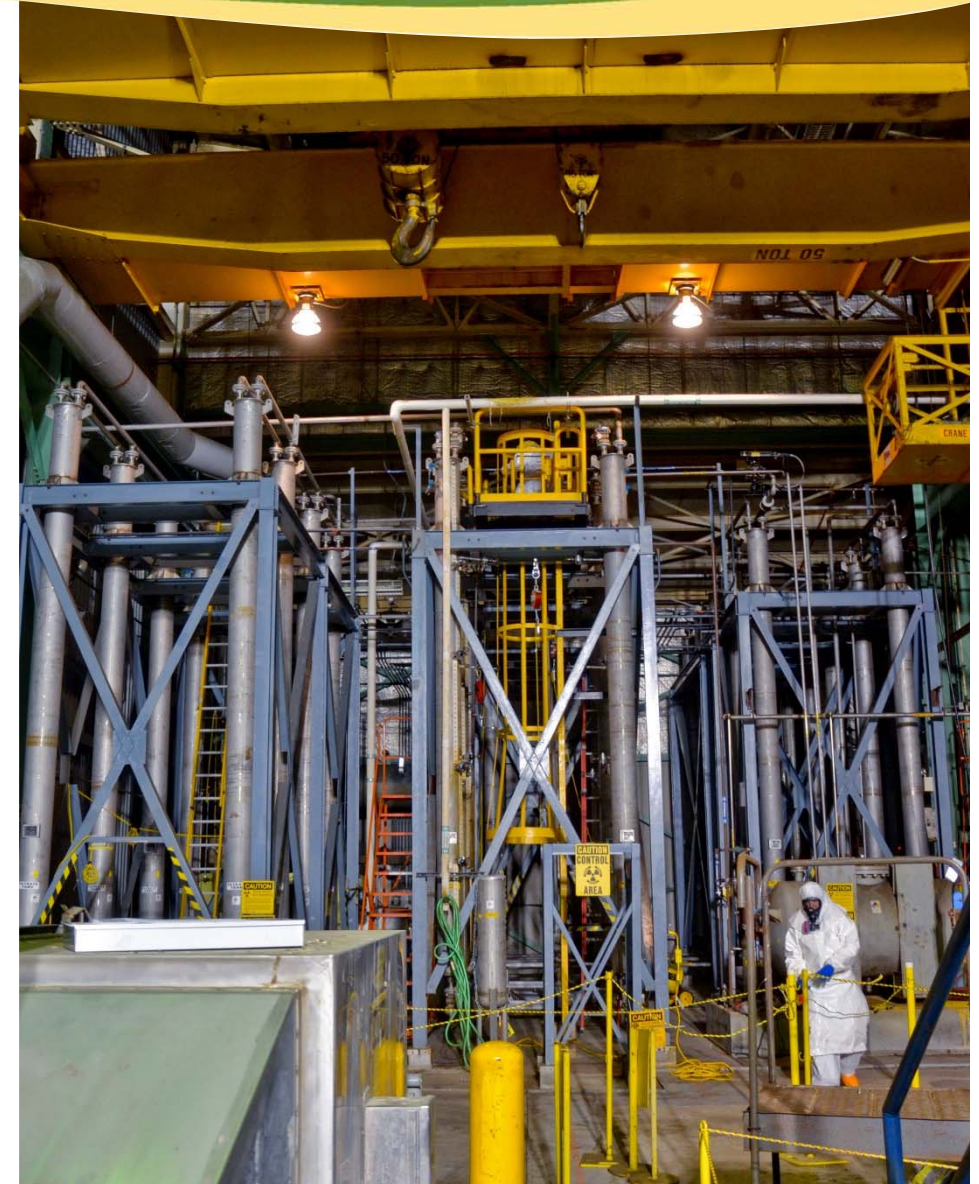
- Demolished 32 buildings prior to transition. 11 additional facilities completed in 2016.

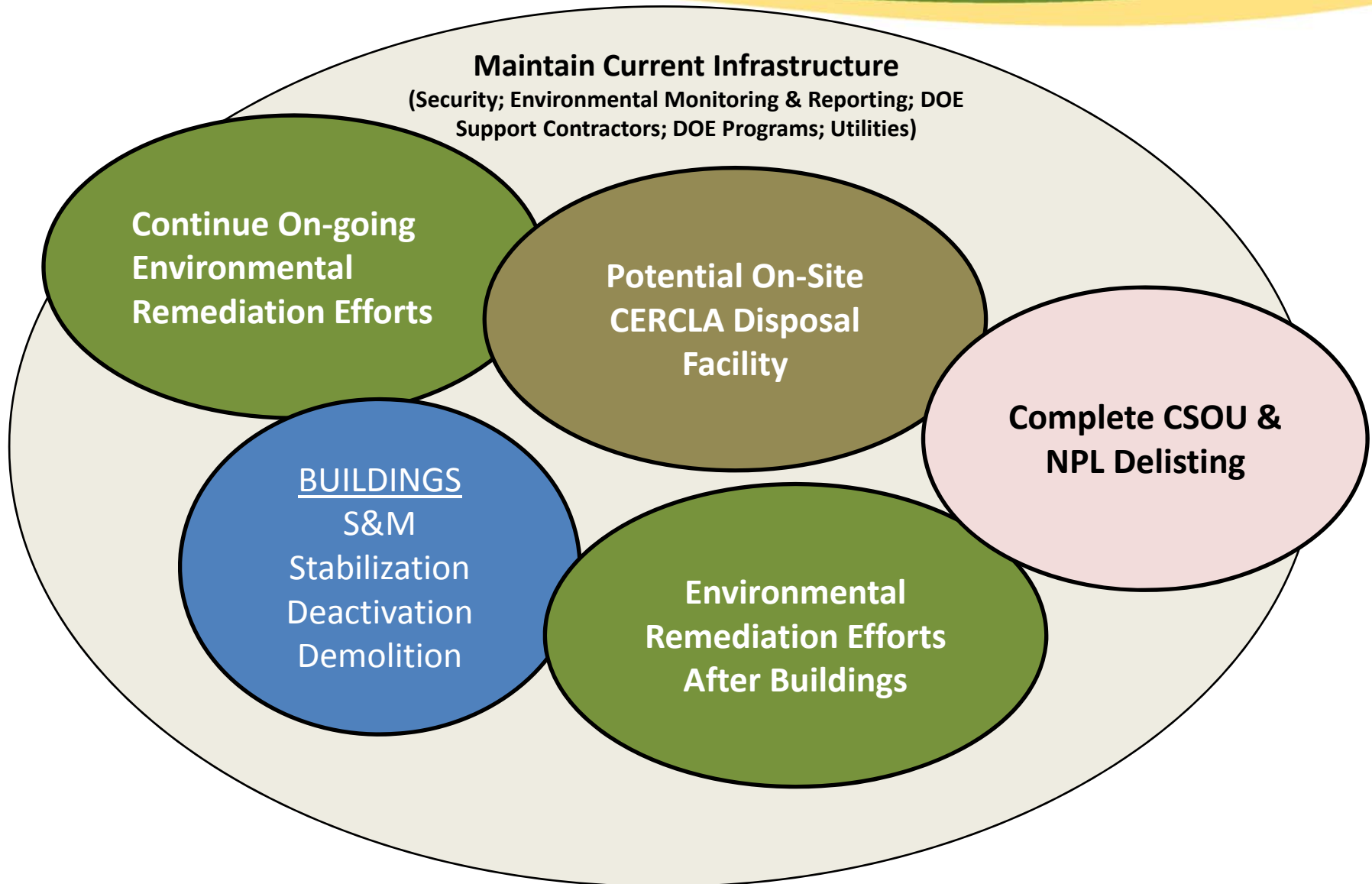
Tc-99 plume

- Radionuclide releases have migrated off-site, but not above Drinking Water Standards.

Contaminated soils

- PCBs and uranium
- 66 areas totaling ~ 115 acres







- Plant facilities were returned to DOE with significant maintenance/repair backlogs.
- Addressing deferred maintenance to ensure safety to workforce and environment.

Roof Resurfacing

Leaking roofs created the potential for the spread of contamination and additional hazards to the workforce in those buildings.

- Improves worker safety
- Reduces potential for equipment failure
- Prepares facilities for demolition
- Drives down overhead costs

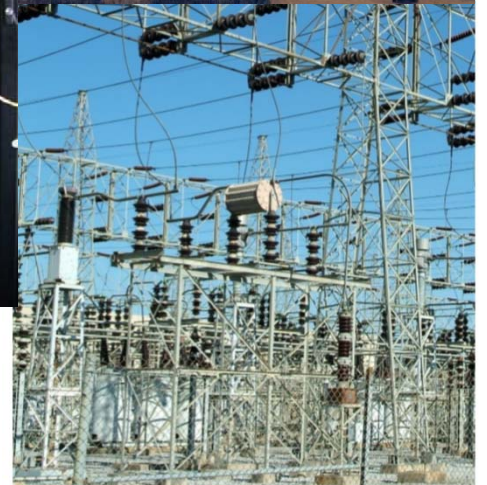
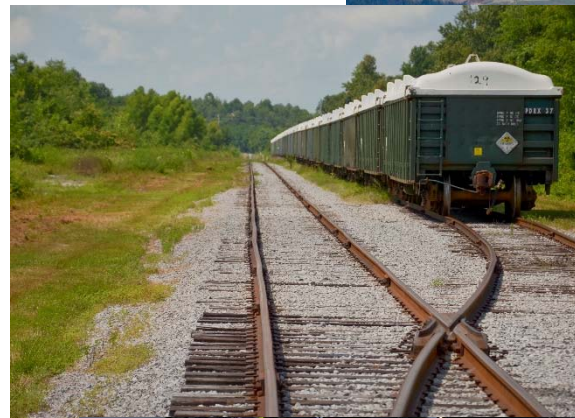


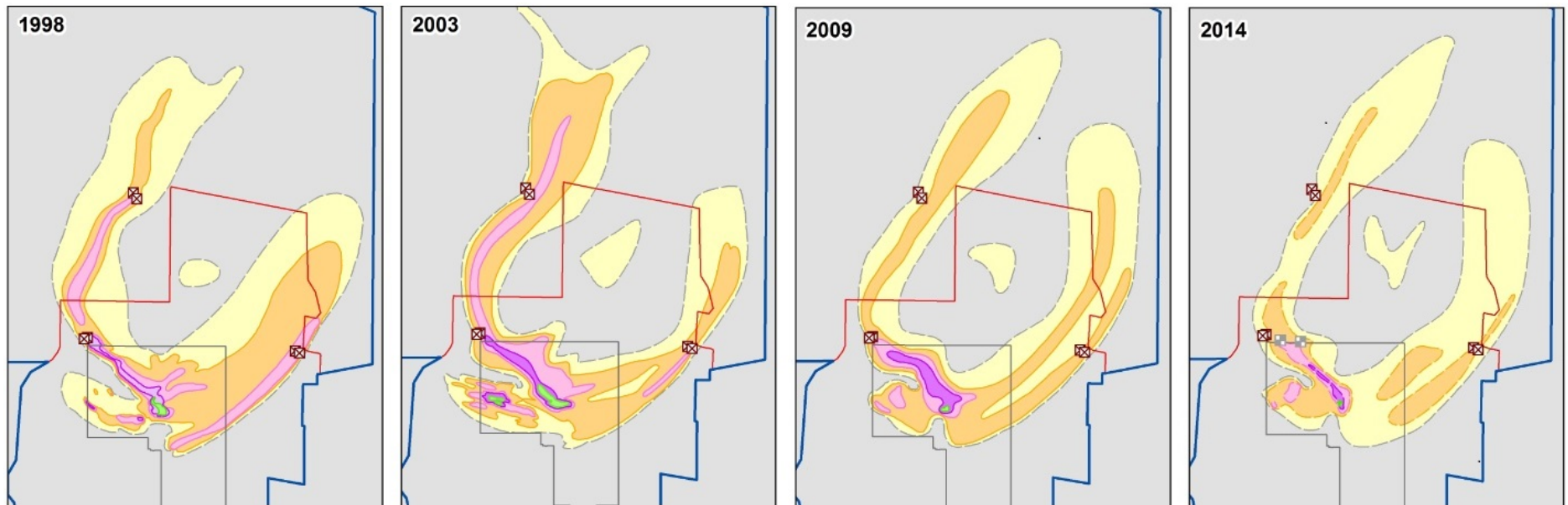
BEFORE

AFTER



- Roofs
- On-site rail line
- Roads
- Sewer, water, air, steam, nitrogen, etc. lines
- Facility structural shell
- HVAC systems
- Communication systems
- Information technology systems
- Security systems
- Environmental compliance and monitoring systems





Paducah Groundwater Program – evolution and strategy

Current Plan

- RGA action only
- TCE only
- Southeast corner of the C-400 building

Proposed Strategy

- All areas and media (soils, building slabs, structures, UCRS, RGA)
- All COCs
- Entire City Block
- Series of multiple field start for different media and areas

Deactivation at the Paducah Site

Bob Smith

Program Manager

Fluor Paducah Deactivation Project



FLUOR®

LSRS | A
LATA
Company



- Facility Stabilization
- Infrastructure Optimization

- Facility Deactivation
- Environmental Remediation

- Achieved 4 million safe work hours without a lost time injury
- Removed ~100,000 gallons of PCB oil and ~371,000 gallons of lubrication oil from the process buildings.
- Resurfaced 75 acres, or 4.5 million ft², of roofs that had been leaking with new material to protect personnel and equipment.
- Consolidated four switchyards into one to reduce future operations and maintenance costs.



Accomplishments



- Completed demolition of 11 inactive facilities totaling more than 100,000 ft².
- Completed removal of fissile spare parts from on-site maintenance facility totaling 10 tons of waste.
- Accelerated deactivation of C-400 Cleaning Building, the site's primary source of groundwater contamination



Safety

- Protect workers, the public, and the environment.
- Comply with regulations and requirements, including administrative requirements.

Risk Reduction

- Facilitate ultimate decommissioning work.
- Establish a low-risk facility status.
- Fulfill commitments to stakeholders.

Reduce S&M Costs

- Facilitate low-cost S&M after the facility is deactivated.
- Plan cost reduction dollars into D&D.



Facility Stabilization and Maintenance

- Preparation and/or removal of hazardous materials and contaminants from facilities.
- Stabilization activities are performed during early stages of facility deactivation.
- Long term maintenance of aging facilities and systems.

Facility Deactivation

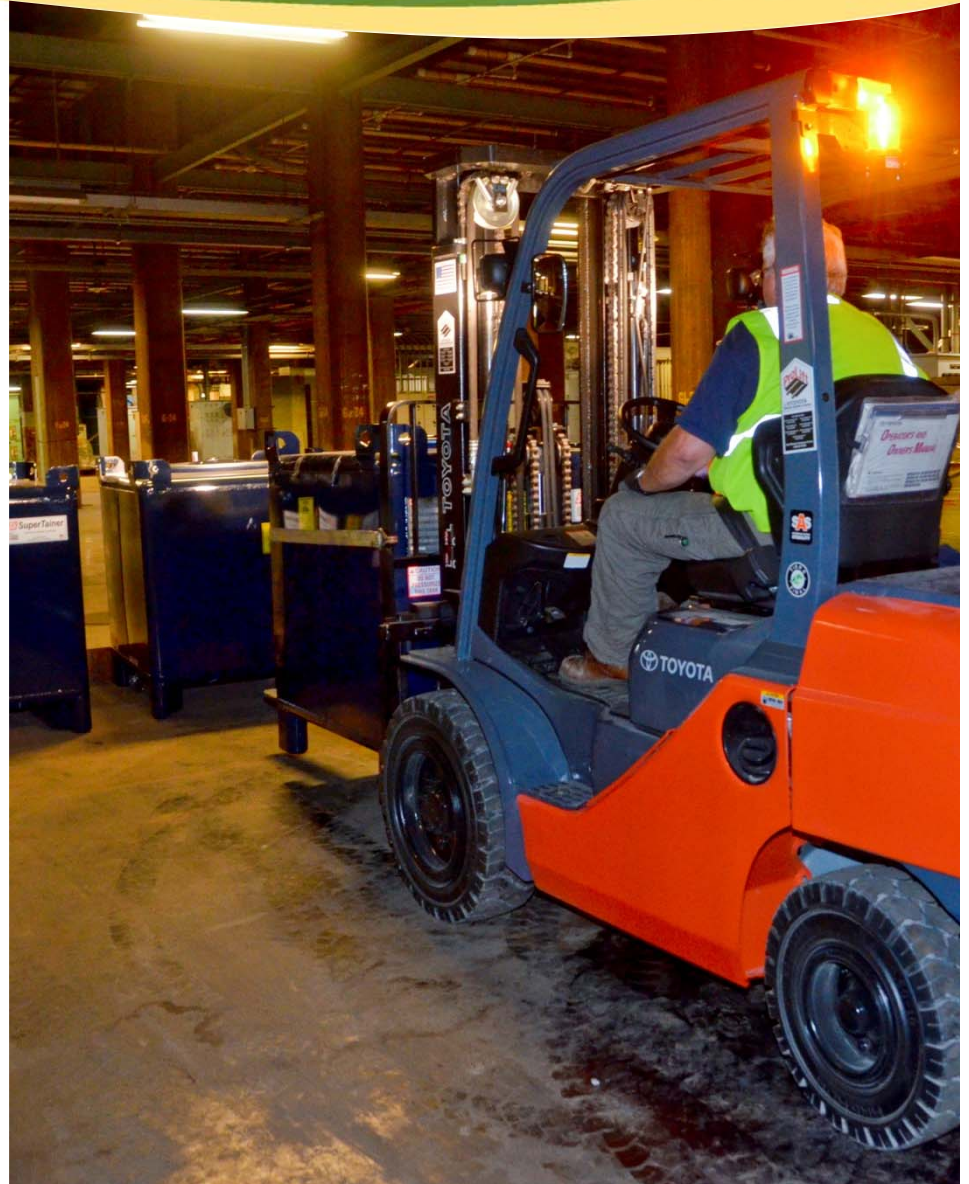
- Removal of radioactive and hazardous materials.
- Shutdown of facility systems
- De-energizing equipment in preparation for long-term maintenance and cleanup.

Infrastructure Optimization

- Scale down and optimization of utilities including water, sewage treatment, and steam to meet the needs of the project.

Stabilization activities:

- Shutting facility systems down and securing them in a safe configuration (e.g., leak detection system)
- Addressing uranium deposits
- Removing R-114 refrigerant
- Draining PCB transformers in the process buildings
- Removing lube oils





75 acres (4.5 million sq ft) of roofs were resurfaced





- The site infrastructures was designed to support enrichment operations.
- Utilities in process of being “right-sized” from operations to current mission

Electricity: Designed for 3,000 MW, usage ~10 MW.

Water: Designed for 30 Million Gals./day, usage ~3 Million Gals./day.

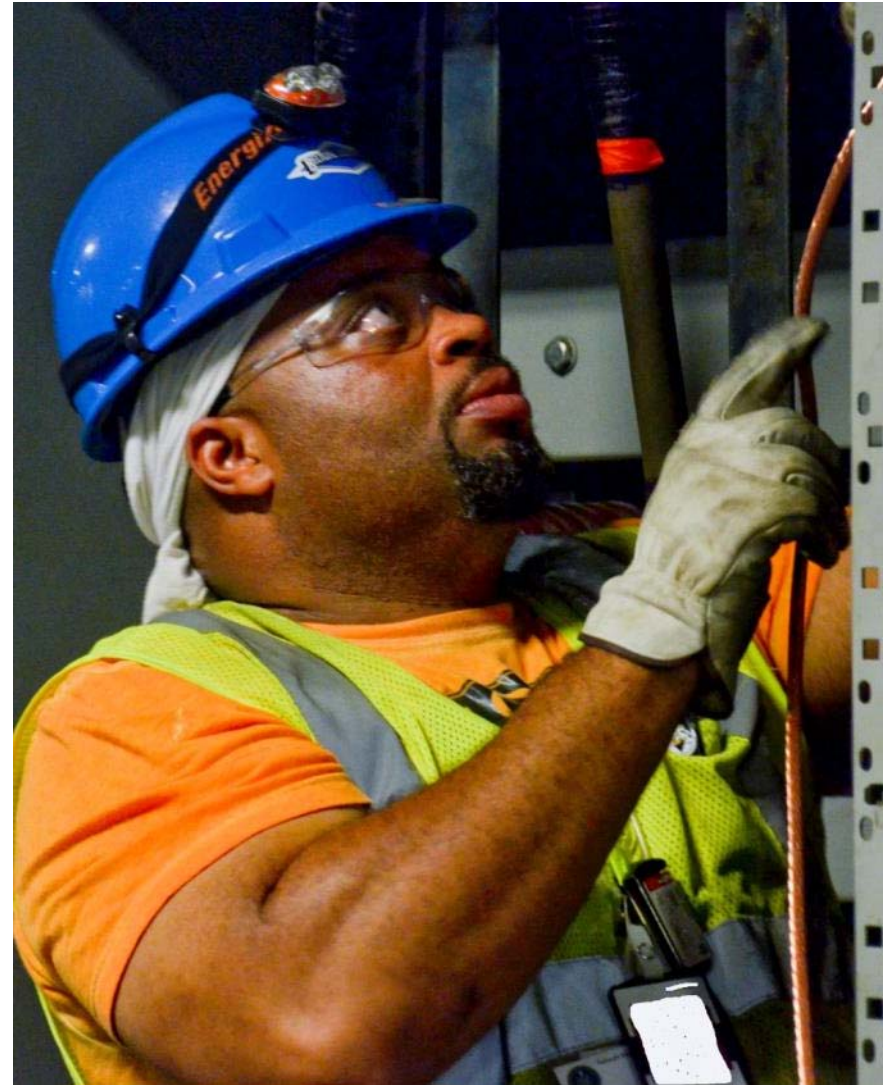
Steam: Designed for 300,000 lbs./hr. steam, now only need ~5,000 lbs./hr.

Plant Air: Designed for 25,000 scfm, now only need ~8,000 scfm.

- Optimization will minimize utility infrastructure costs



Finished switchyard consolidation ahead of schedule and under budget.





Installed five energy efficient natural gas package boilers and shut down the coal-fired steam plant that no longer met EPA air regulations.





Deactivation activities:

- Asbestos removal
- Hazardous and radioactive materials removal
- Liquids removal
- Reduction of fire loading (i.e., combustible loadings)
- Loose materials removal
- Equipment removal
- Air gap all utilities to the facility



TSCA required transformers to be rinsed. Lube Oil was used as a rinsing agent, saving ~\$500,000.



69 Transformers; 100,000 gals of PCB Oil removed



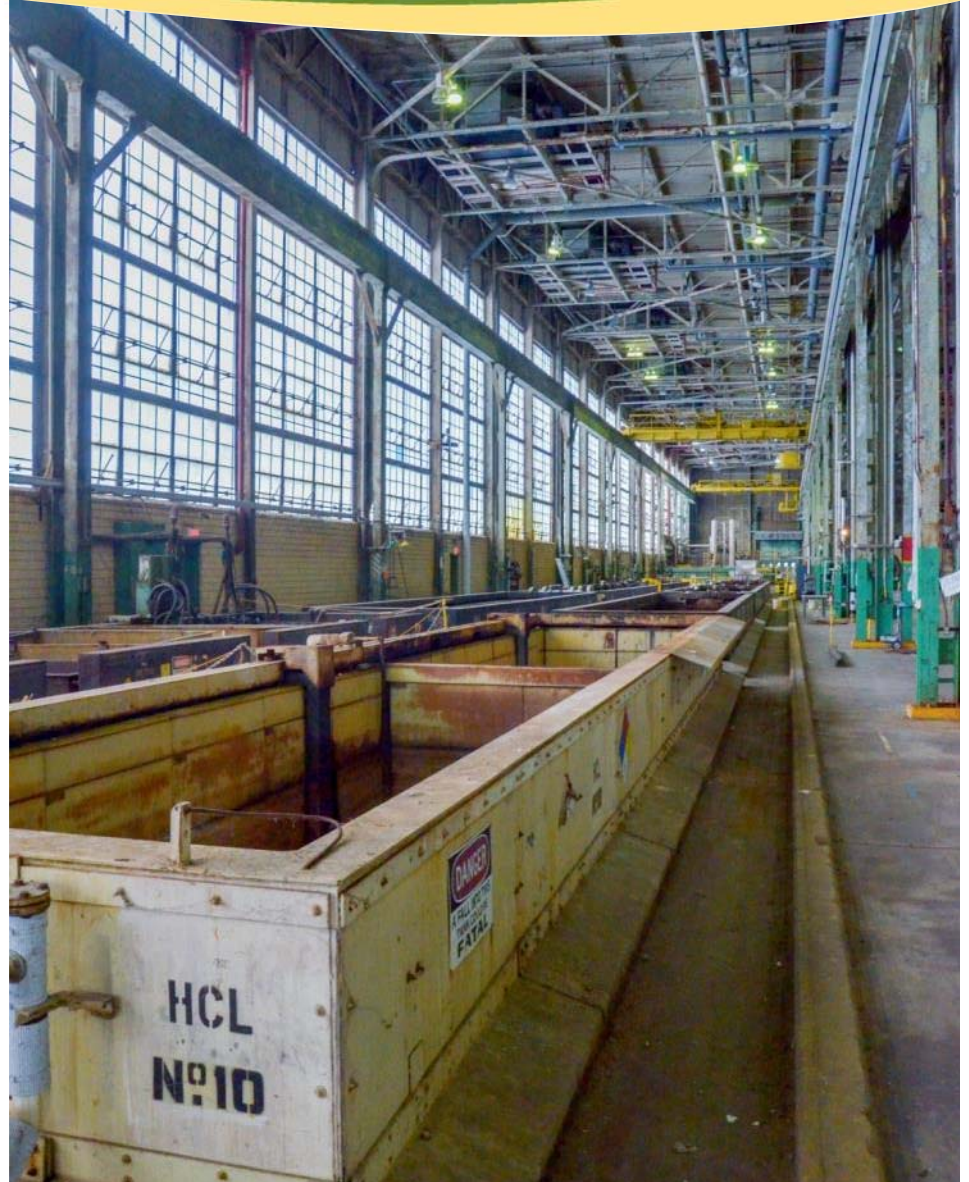


~600,000 lbs. of R-114 refrigerant have been removed from the process buildings.



ISO containers and railcars have been purchased to support bulk storage until a pathway for the R-114 is finalized.

- The C-400 Cleaning Building is the location of the primary source of groundwater contamination.
- Highly visible project for stakeholders, including DOE, EPA, Commonwealth of Kentucky, and Citizens Advisory Board.
- Groundwater remediation efforts are being managed in concurrence with deactivation.
- Current deactivation will allow for a future groundwater final remedy.

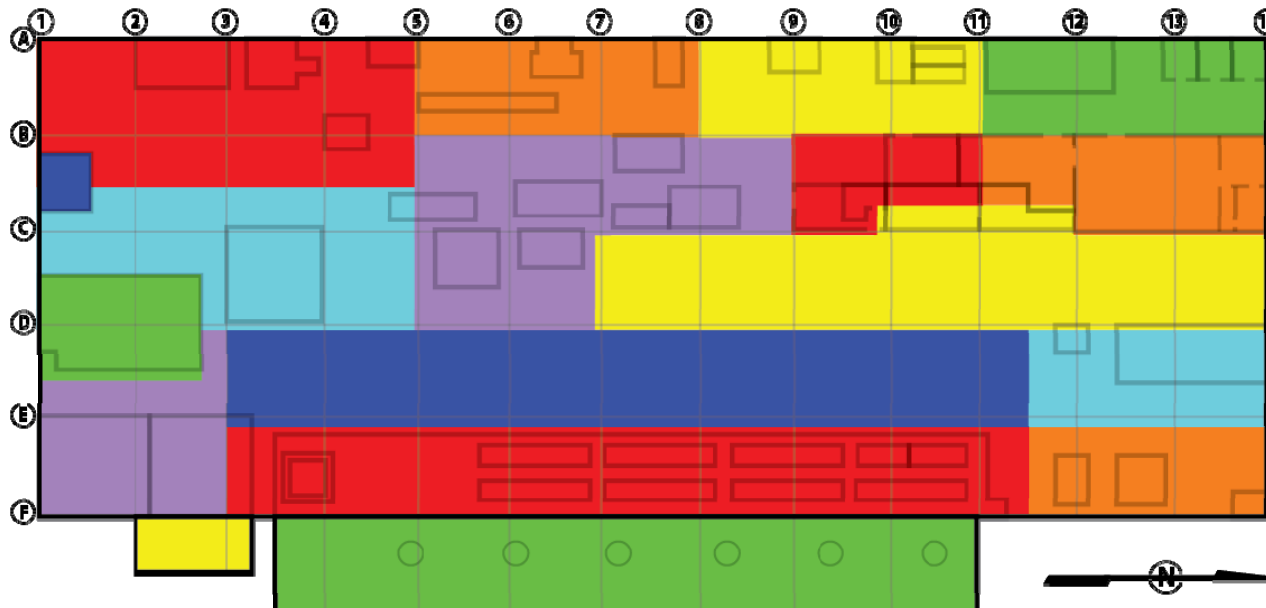




- Over 81,000 ft² will be cleared representing about 82% of floor space
- Clearing floor space will allow for sampling under the building.
- Asbestos abatement 80% complete, with exception of transite siding, dip tank bricks and inaccessible areas.

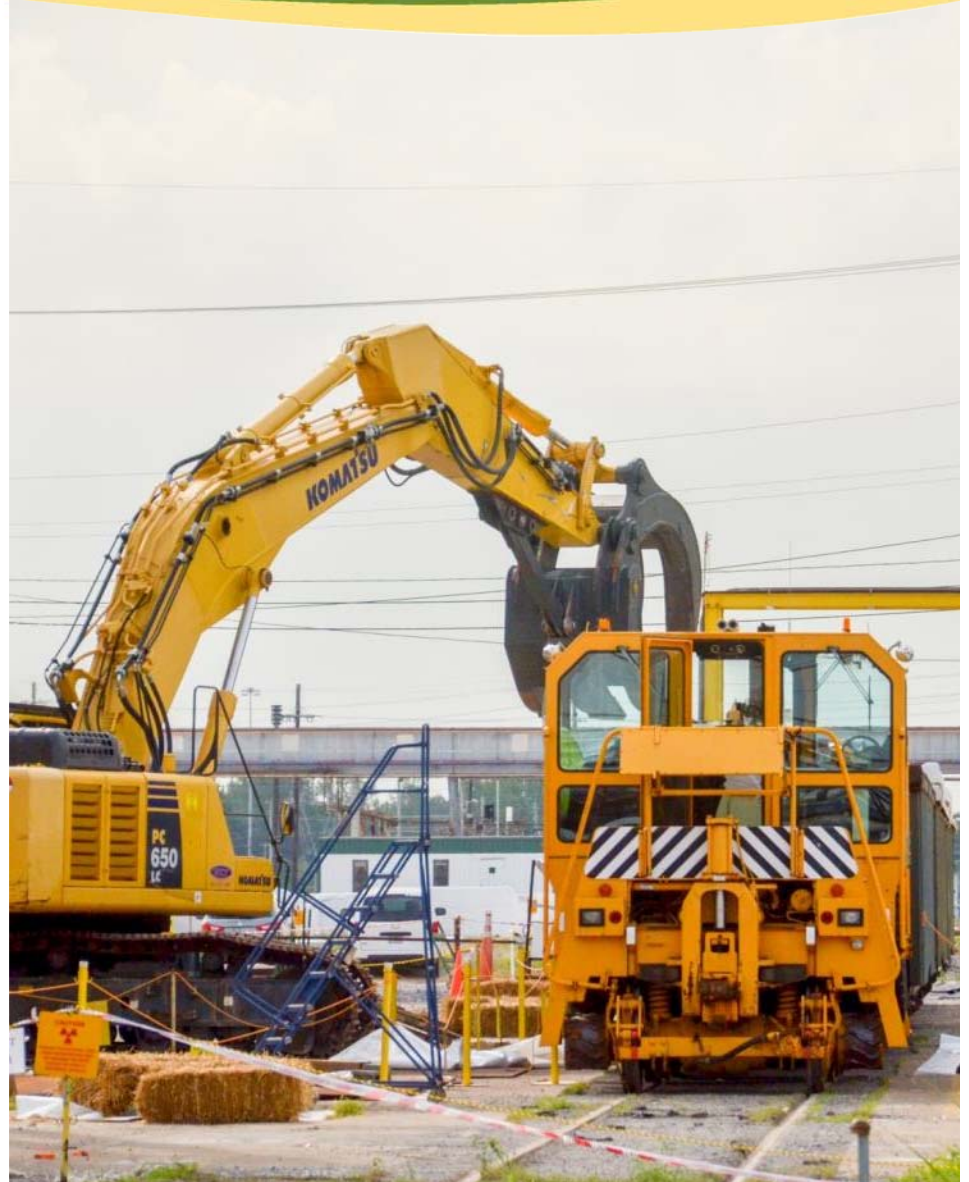


- Test Loop - this zone contains the structure that tested components used in the enrichment of uranium before they were installed in the Gaseous Diffusion Plant.
- Pulverizer - this zone contains the equipment that crushed and screened UF₄.
- Basement and Tanks - this zone contains the asbestos-lined dip tanks and the associated piping as well as other basement components.



- Divided the building into physical zones, making it easier to sequence work.
 - Enabled funding to be maximized as it became available.
 - Ensured the project remained compliant with waste regulations.
 - Allowed time for strategy development for complexities.

- Avoided costs on waste shipments by identifying equipment for reuse, downsizing waste, and diverting some waste to the onsite landfill avoiding the need for additional railcars.
- Researched documents and interviewed former employees to help characterize waste, reducing sampling and disposal costs.
- Waste is shipped by rail to a variety of disposal facilities.



Paducah Infrastructure Contract

Tammy Courtney
Project Manager, Swift & Staley Inc.

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- A nighttime photograph of a large, multi-story industrial building at the Paducah site. The building is illuminated from within, and the sky is dark blue. The foreground shows a paved area and some construction equipment.
- Swift & Staley (SST) supports DOE priority work at the Paducah site for the:
 - Deactivation Contractor – Fluor Federal Services-Paducah Deactivation Project (FPDP), and
 - Depleted Uranium Hexafluoride Conversion Contractor – Mid-America Conversion Services (MCS)
 - In addition to contract services, Swift & Staley supports our customers
 - Site Council – senior management leadership team representing DOE, FPDP, MCS, and SST
 - Shared Site Committee – collaborative team of technical representatives from DOE, FPDP, MCS, and SST
 - Safety Team of Paducah (STOP) Committee – safety representatives from DOE, DOE prime contractors, union worker representatives, and subcontractors
 - Full-time Customer Service Representative – working to resolve issues as early as possible



1998 – Subcontractor to
DOE Prime

2004 – 1st DOE Prime
Small Bus. – Paducah

2010 – Won
Infrastructure Re-
compete

2015 – 3rd Consecutive
Award

1st Fixed Price
Contract at
Paducah



We are NOT just...

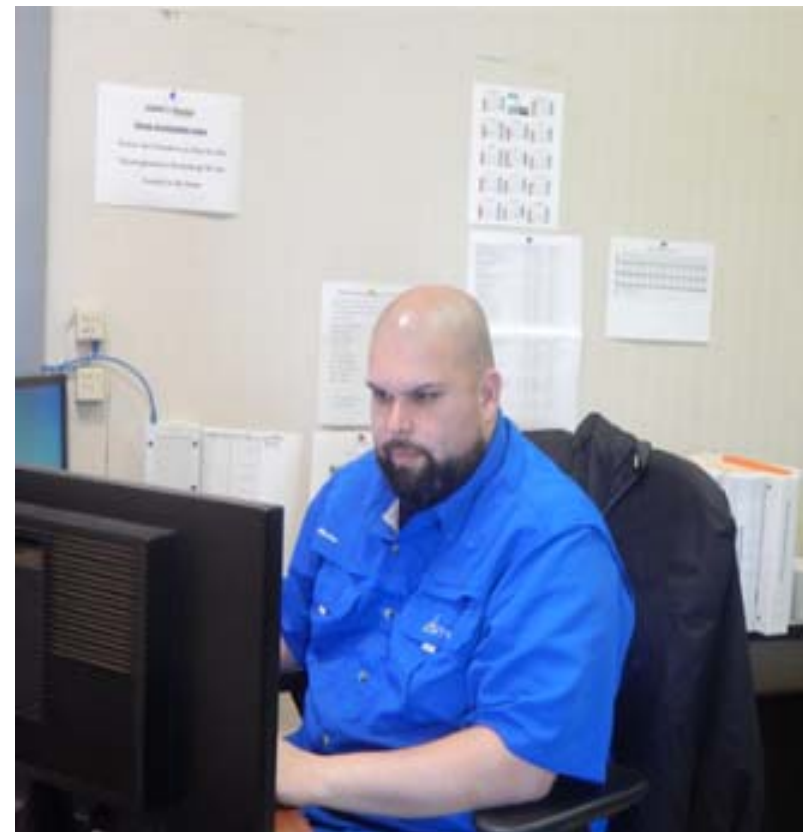


... and



In 2016

- Performed classification reviews on >8.6 million pages of records
- Issued >1,000 badges
- Processed more than 400 clearances
- Issued ~1,000 Controlled Article Passes



In 2016

- Snow/ice removal on 32 miles of paved roadways/parking lots
- Mowed >800 acres
- Diverted 2.8M lbs. of construction debris (rock and gravel)



In 2016

- Janitorial services for ~114 facilities
- Recycled more than 98,000 lbs. of paper, cardboard, plastic



In 2016

- Monthly inspections on ~3,000 fire extinguishers
- Performed preventative maintenance on vehicles
 - 89 vehicles
 - 31 pieces of heavy equipment
 - 134 pieces of ancillary equipment
- Replaced more than 1,800 light bulbs
- Completed ~1,200 Work Requests



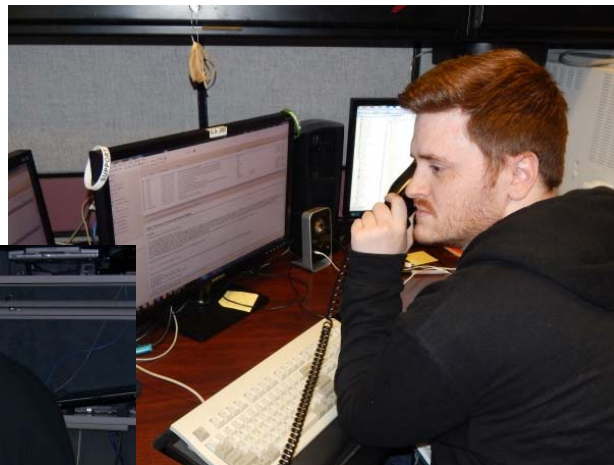


In 2016

- Provided General Employee Training for more than 1,000 site personnel
- Provided Consolidated Annual Training for more than 1,700 personnel
- Maintained records for training for SST, Deactivation Contractor, and DOE in the Learning Management System database

In 2016

- Maintained the network for more than 2,000 site users
- Closed more than 9,000 IT Help Desk Tickets
- Web filter processed ~18 million emails through exchange server
- Managed 1 Petabyte of data



In 2016

- Maintained ~54,000 feet (10 miles) of railroads
- Managed 439 facilities in the Facility Information Management System (FIMS)
- Managed >1,300 personal property items



In 2016

- Processed >10,000 electronic records into the electronic records management system
- Processed >3,600 cubic feet of hardcopy legacy records



In 2016

- Calibrations and repairs on >700 radiological instruments
- Provided quarterly dosimetry and bioassay sampling to >1,000 site personnel



Sounds simple enough...



But...







- Roads Replacement and Repairs
- Railroads Maintenance and Repairs
- Water and Sewer Systems Optimizations
- Replacement of Outdated Equipment
 - HVACs (60+ years old)
 - Telephone Systems (15+ years old)
 - Fiber Optics Upgrades
- Emergency Operations Center and Public Warning System Upgrades



Infrastructure Support:

- Numerous and Complex tasks and responsibilities
- Outdated facilities
- An integral part of day to day operations
- Close coordination among DOE and ISS, D&R and DUF6 contractors is essential





Joel Bradburne

DOE-PPPO
Portsmouth Site Lead



Jeff Stevens

Deputy Site Project Director
Fluor-BWXT
Portsmouth

Portsmouth (Piketon), OH

- Environmental Remediation began in 1989
- USEC cold standby/cold shutdown, 2001-2010
- Active D&D began in 2010
- State has primary regulatory role under Ohio EPA Director's Final Findings & Orders (DFF&O)



- The Portsmouth Gaseous Diffusion Plant site is located in South Central Ohio.
 - Plant occupies approximately 1,200 acres of a 3,777-acre federal site.
 - Uranium Enrichment Operations began in 1952 and ceased in 2001.
 - DOE cleanup mission began in 1989.

Portsmouth's Evolving Mission



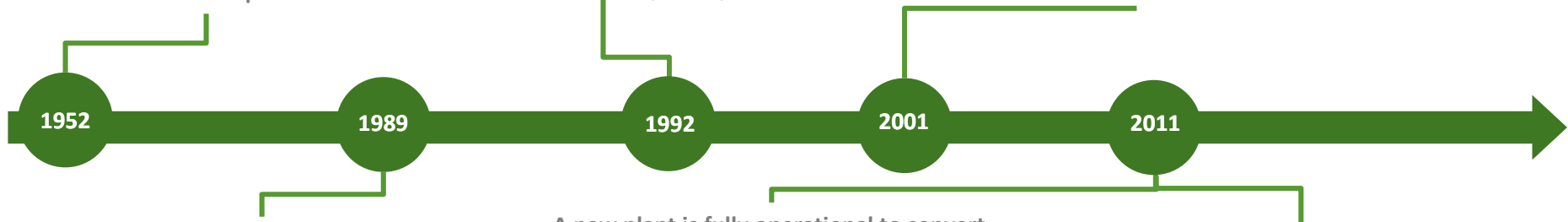
Portsmouth selected as the last of three U.S. uranium enrichment plants for defense



Energy Policy Act of 1992 establishes USEC to take over plant operations



Enrichment ends; plant placed in shutdown



1952

1989

1992

2001

2011

DOE Cleanup Program begins

A new plant is fully operational to convert 46,000 cylinders of depleted uranium into more stable material

Plant returned to DOE; active D&D cleanup project begins





- Treated more than 680 million gallons of groundwater; removed more than 35,000 pounds of Trichloroethylene (TCE).
- 125 Solid Waste Management Units have attained No Further Action (NFA) determinations under the RCRA Corrective Action Program.
- Obtained Records of Decision for On-site Waste Disposal Facility and D&D of Process Buildings (2015).
- 40 facilities removed, including more than 700,000 square feet of buildings.
- Recycled 25 million pounds of material, including approximately 14 million pounds of steel, aluminum, and copper from the demolition of a former electrical switchyard.



Fluor-BWXT Portsmouth

- Project management
- Facility modification
- Infrastructure optimization
- Decontamination/demolition
- Environmental remediation
- 7.5-year contract; exp. October 2018
- ~1,950 employees (incl. subcontractors)



Portsmouth Mission Alliance, LLC

- Infrastructure (facility and road operations, maintenance)
- Security (classification)
- Records management
- Property & fleet management
- Information technology
- 3-year, firm-fixed-price contract; exp. December 2019
- ~175 employees



Mid-America Conversion Services

- DUF₆ plant construction
- DUF₆ plant operation
- Cylinder management
- 5-year contract, from February 2017 to February 2021
- ~500 employees (3 locations)



Restoration Services, Inc.

- DOE support and oversight
- Project management
- Project control
- Regulatory support
- Technical support
- Strategy and planning
- 5-year contract; exp. January 2018
- ~50 employees

- Built from 1952-1956 by the U.S. Atomic Energy Commission
Now the U.S. Department of Energy
- Enriched Uranium by Gaseous Diffusion process from 1954-2001

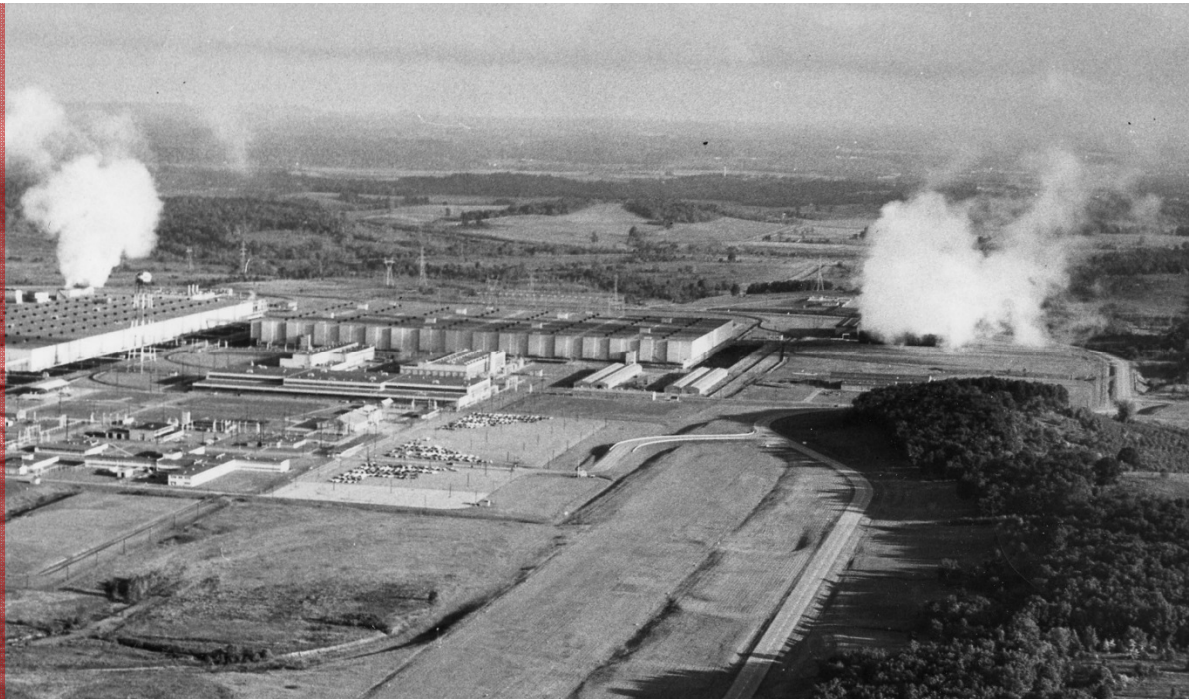


- Built from 1952-1956 by the U.S. Atomic Energy Commission
Now the U.S. Department of Energy
- Enriched Uranium by Gaseous Diffusion process from 1954-2001

COLD WAR

1954-1989

Nuclear Defense



- Built from 1952-1956 by the U.S. Atomic Energy Commission
Now the U.S. Department of Energy
- Enriched Uranium by Gaseous Diffusion process from 1954-2001

COLD WAR

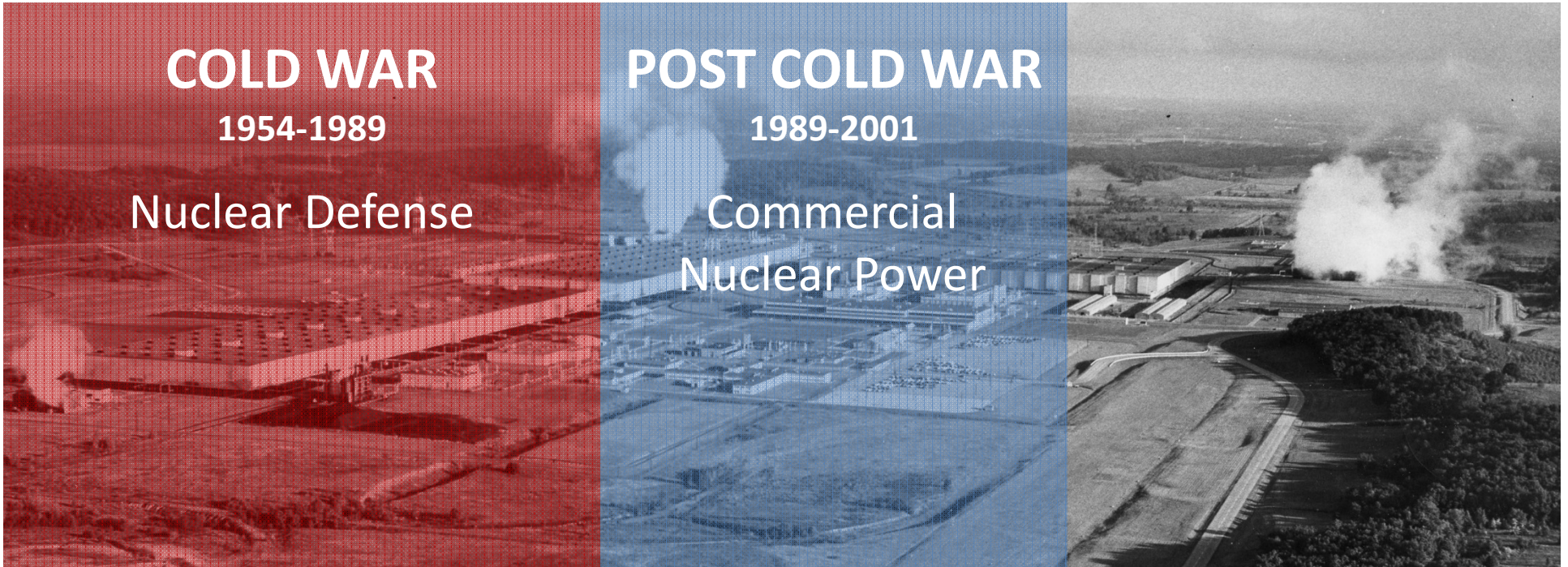
1954-1989

Nuclear Defense

POST COLD WAR

1989-2001

Commercial
Nuclear Power



- Built from 1952-1956 by the U.S. Atomic Energy Commission

Now the U.S. Department of Energy

- Enriched Uranium by Gaseous Diffusion process from 1954-2001

COLD WAR

1954-1989

Nuclear Defense

POST COLD WAR

1989-2001

Commercial
Nuclear Power

CLEANUP

2001-Current

- Environmental Cleanup
- Decontamination & Decommissioning
- Reuse



➤ Groundwater Cleanup

- 681 million gallons treated
- 35,000 pounds of TCE removed

➤ Landfills and Lagoons Closed

- Five landfills containing construction debris, low-level contaminated scrap metal, hazardous materials, sanitary wastes
- Sludge lagoons, impoundments and oil biodegradation plots

➤ Waste Removed

- More than 2.8 million cubic feet of waste removed and disposed off-site

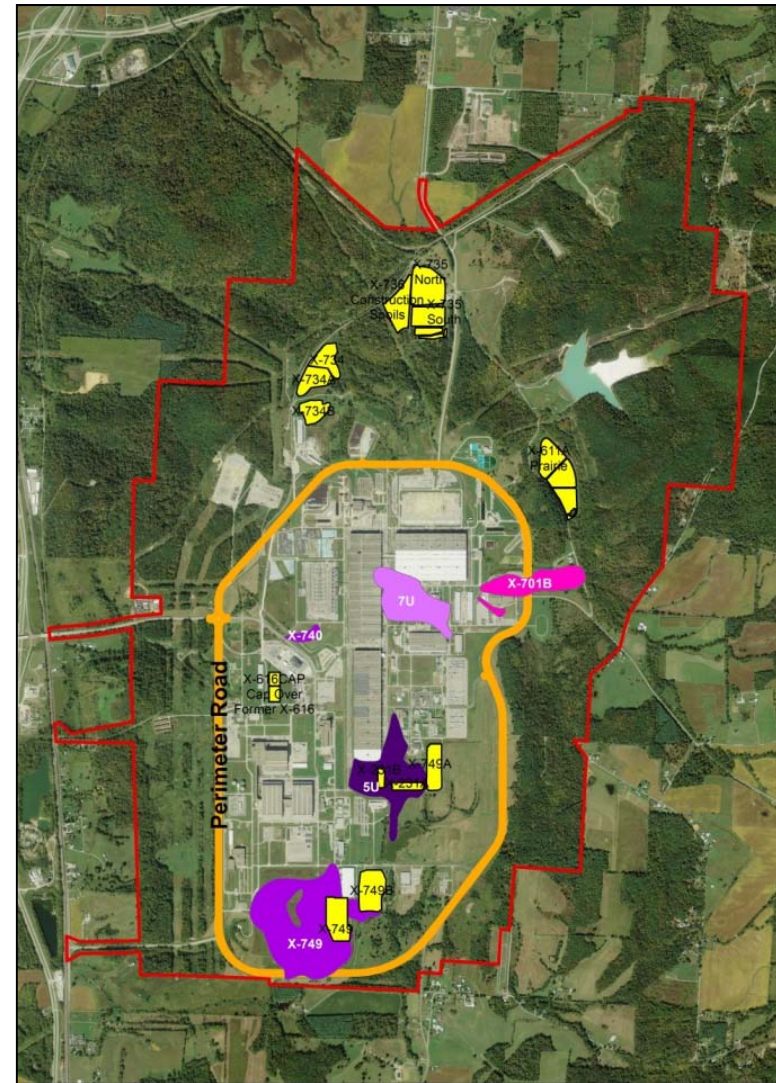
➤ Demolition and Removal of Facilities

- 40 buildings and facilities removed

➤ Strategy Summary

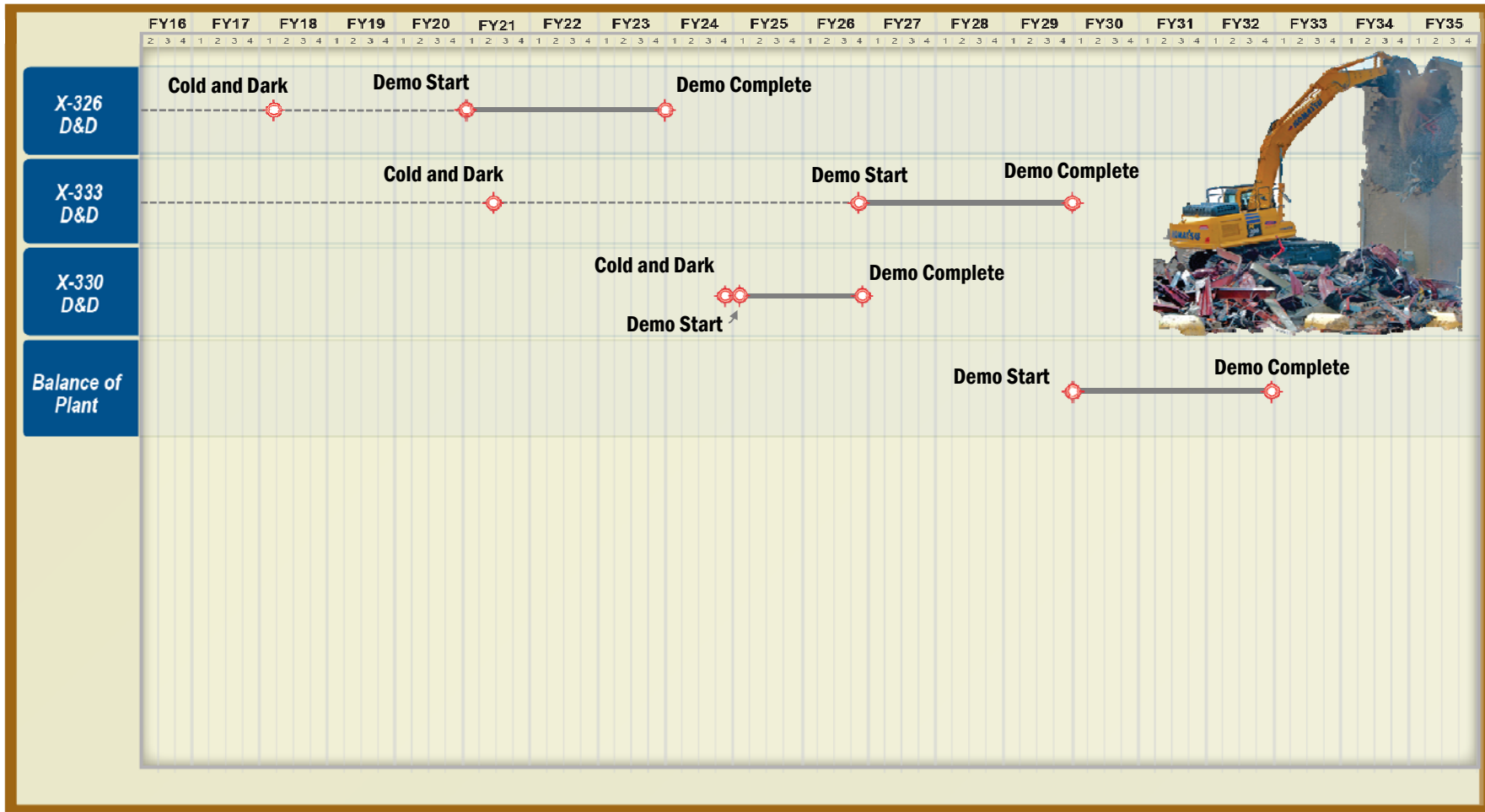
- Deactivation
- Consolidation of landfills and plumes
- On-Site Waste Disposal Facility
- Preserving infrastructure
- Property Transfer

**OSWDF
Sediment
Pond**





- Strategy Summary
 - Deactivation and Demolition





- Strategy Summary
 - Landfill and Plume Excavation

