



# PIKETON, OHIO

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## **D&D of the Portsmouth Gaseous Diffusion Plant**

U.S. Department of Energy, Portsmouth Paducah Project Office



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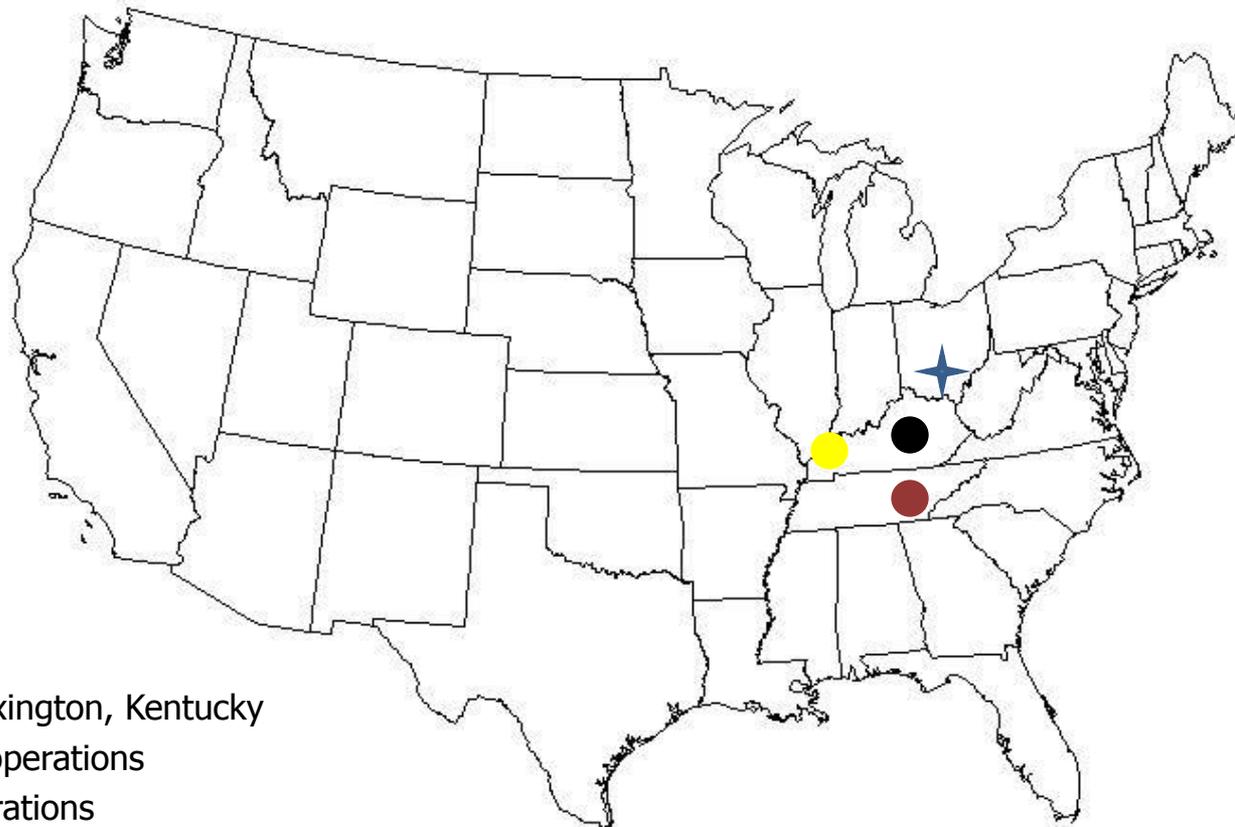
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# PORTSMOUTH



The Portsmouth Gaseous Diffusion Plant is located in south central Ohio, about 75 miles south of Columbus and 22 miles north of the Ohio River.



- PPPO Headquarters, Lexington, Kentucky
- Oak Ridge, Tennessee operations
- Paducah, Kentucky operations



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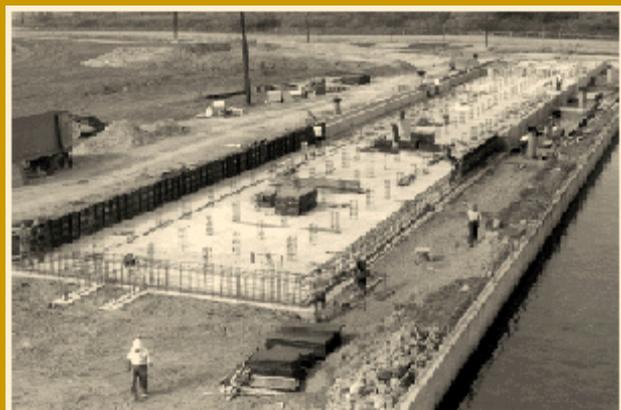
# PORTSMOUTH



## Site History/Purpose

The gaseous diffusion plant (GDP) was built from 1952-1956 as the last of three GDPs constructed to enrich uranium for the nation's nuclear weapons program and later for commercial nuclear reactors.

- First plant was the K-25 plant in Oak Ridge, Tenn., (called ETTP today) which ceased operations in 1985. ETTP is undergoing D&D.
- Second plant, located in Paducah, Ky., is currently enriching uranium and operated by the United States Enrichment Corporation (USEC).
- Portsmouth facility ceased production in May 2001. Currently in Cold Shutdown, prior to D&D.





# PORTSMOUTH



## Recent History

- 1991 – Highly Enriched Uranium (HEU) production ends, Low Enriched Uranium (LEU) production for commercial use continues.
- 2001 – USEC ceases GDP uranium enrichment operations.
- 2001 – DOE establishes Cold Standby Program (site and facilities S&M, capable of restart) on facilities leased to USEC.
- 2005 – Cold Shutdown Program established (site and facilities S&M, process buildings dry pipe fire suppression system installed).
- 2005 – Remediation: Remove legacy waste and excess buildings and continue groundwater treatment options.
- 2007 – Approval to proceed with D&D acquisitions.
- 2009 – Issues Request for Proposals.
- 2009 – Proposals received Nov. 13, 2009.\*

*\* The anticipated contract award date is December 2010.*



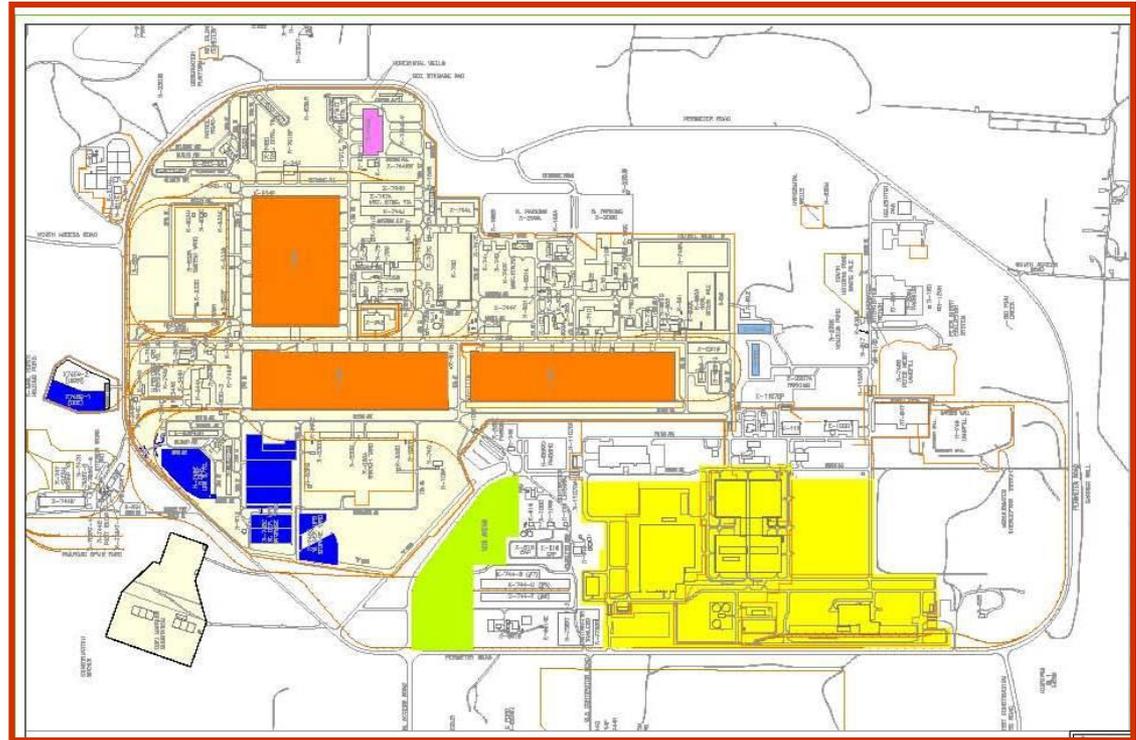


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- USEC was created by the 1992 Energy Policy Act.
- DOE and USEC signed a lease agreement in 1993 for the gaseous diffusion facilities.
- Yellow areas on map denote USEC centrifuge plant site.
- Orange colored facilities are GDP process buildings leased to USEC.
- Blue areas are DOE cylinder yards and green area is location of new DUF<sub>6</sub> conversion plant.
- Purple area is Uranium Management Center.

## Land use at site



***DOE and USEC share industrial land use of the federal reservation.***



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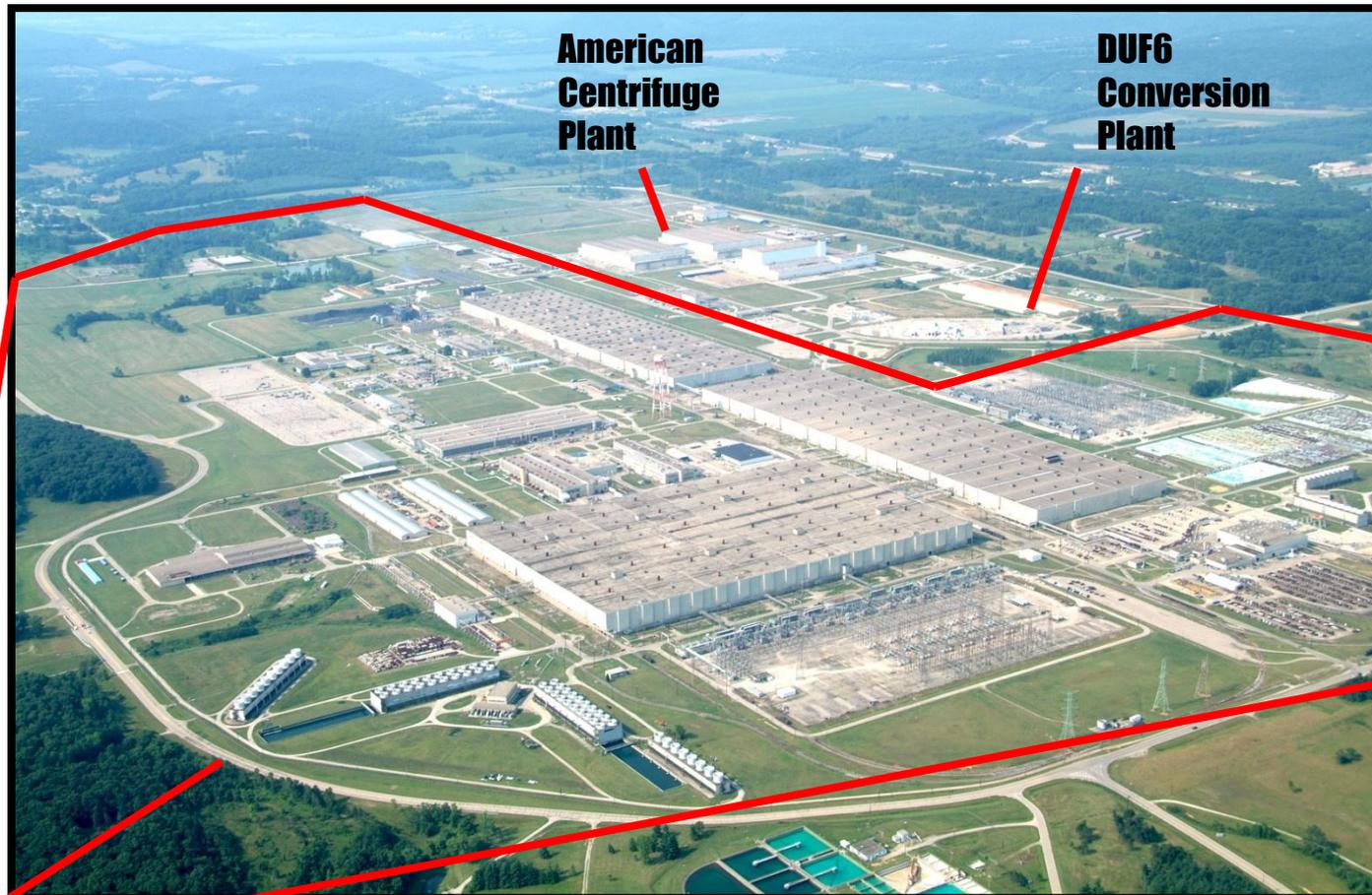
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About 2,700 workers are employed at the PGD plant.



**American Centrifuge Plant**

**DUF6 Conversion Plant**

**Gaseous Diffusion Plant**



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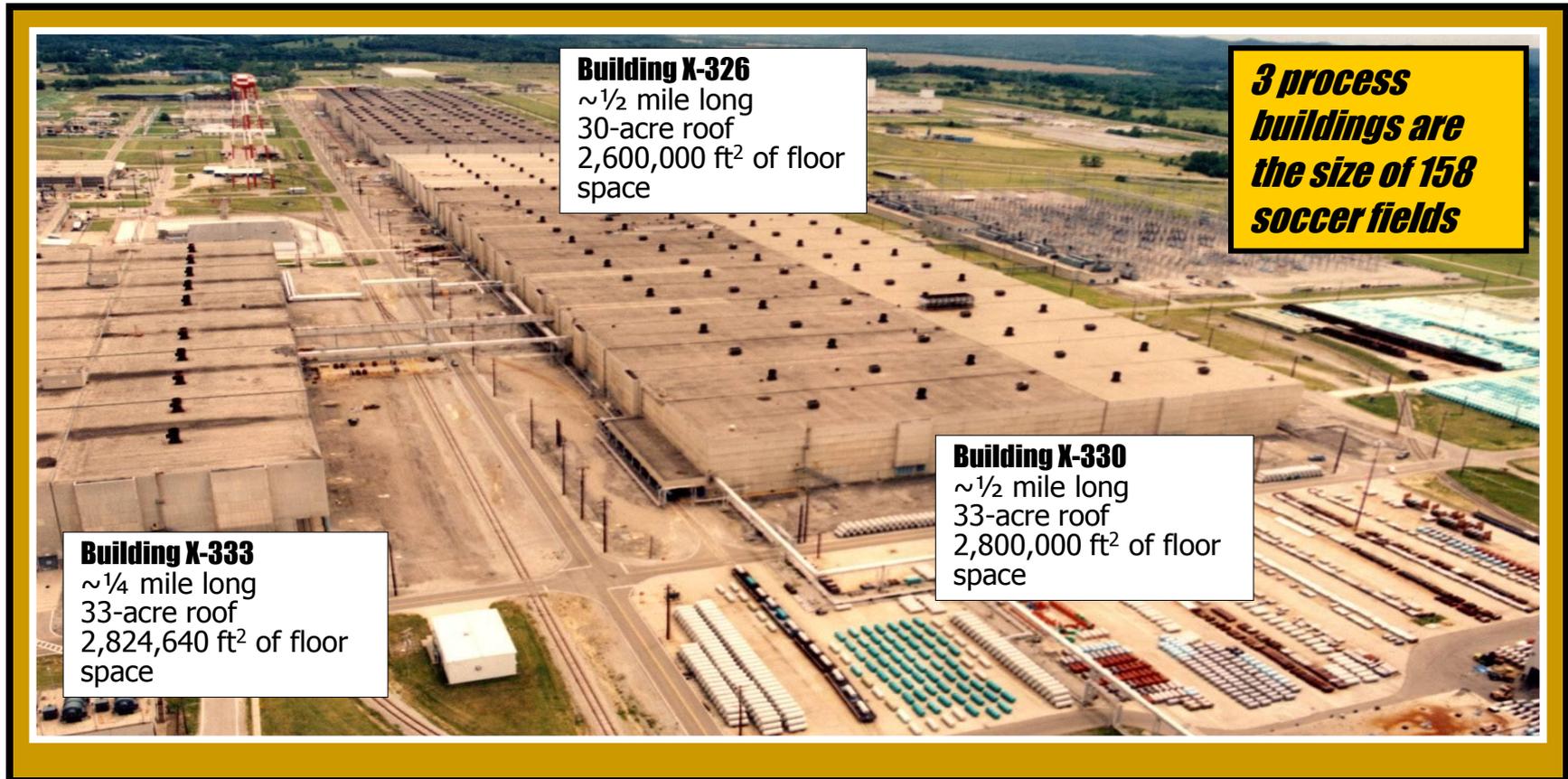
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## Portsmouth GDP Process Buildings



**Building X-326**  
~1/2 mile long  
30-acre roof  
2,600,000 ft<sup>2</sup> of floor space

***3 process buildings are the size of 158 soccer fields***

**Building X-333**  
~1/4 mile long  
33-acre roof  
2,824,640 ft<sup>2</sup> of floor space

**Building X-330**  
~1/2 mile long  
33-acre roof  
2,800,000 ft<sup>2</sup> of floor space



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## D&D Contractors

### ENVIRONMENTAL AND TECHNICAL SERVICES (ETS)

- The ETS contractor provides engineering and environmental technical support to DOE as the Site Integrator. It also supports DOE in the areas of field oversight, administrative services and project management.

### FACILITY SUPPORT SERVICES (FSS)

- The FSS contractor maintains the plant infrastructure, provides training and assists in security.

### DECONTAMINATION AND DECOMMISSIONING (D&D)

- The D&D contractor will coordinate with regulators and stakeholders and perform D&D and site remediation as assigned by DOE.





# PORTSMOUTH



## American Recovery and Reinvestment Act (ARRA)

- Recognized as “ARRA” or “Stimulus Plan,” a program established by U.S. government to aid economic recovery.
- Provides funding for pre-D&D removal actions at some DOE sites.
- Portsmouth site has five “ARRA” projects.
  - X-633 Cooling Tower Complex
  - X-701B Trichloroethene (TCE) Groundwater Contamination Plume
  - X-760 Chemical Engineering Building
  - X-533 Electrical Switchyard Complex
  - Uranium Management Center (UMC)





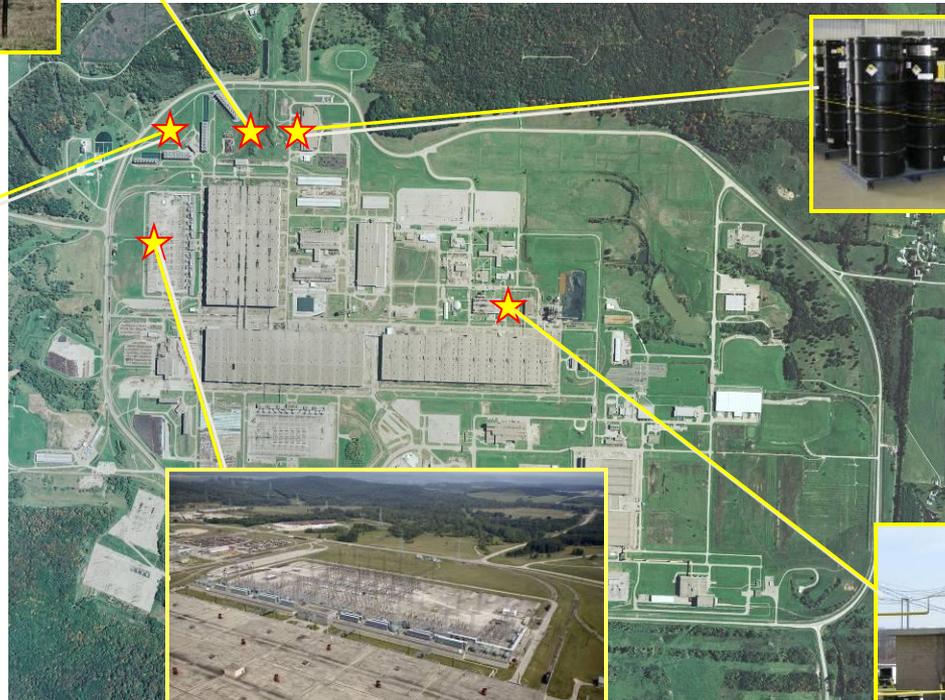
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## ARRA-funded removal actions are accelerating site D&D



**X-701B Groundwater Contamination Plume Source Removal**



**Uranium Management Center (UMC) Repackaging and Disposition of excess uranium materials**



**X-633 Cooling Tower Complex - D&D and Soil Remediation**



**D&D of the X-533 Electrical Switchyard Complex**



**X-760 Chemical Engineering Bldg. D&D and Soil Remediation**



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## X-633 Cooling Tower Complex



**Budgeted cost:** \$13.3 million

**Start date:** May 2009

**Estimated completion date:** January 2011



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# PORTSMOUTH



## X-633 Cooling Tower Complex Operational Summary

- Tasks include removal and disposition of excess material and equipment, characterization of underlying and adjacent soils, removal of contaminated basins and foundations, and disposal/recycling of generated waste/materials.
- Track-mounted excavators fitted with grapples, shears, and universal processors used for demolition and deconstruction.
- Two of the four towers (X-633C and X-633D) have been demolished.
- Cooling Tower Complex project is 48% complete.\*

\* Percentage based on ARRA Earned Value Analysis (EVA) using non-accelerated Integrated Planning, Accountability and Budgeting System (IPABS) data.



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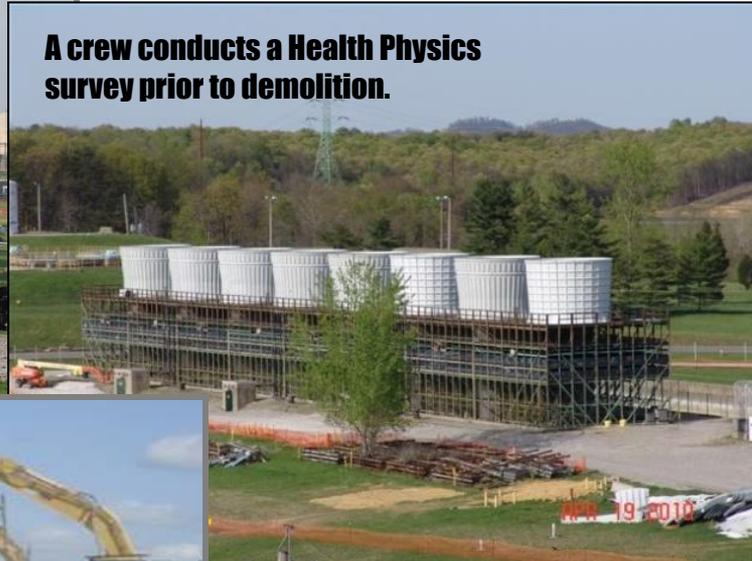


## X-633 Cooling Tower Complex D&D

**Workers demolish Tower C.**



**A crew conducts a Health Physics survey prior to demolition.**



**Workers remove and pack debris into intermodal containers after demolition for shipment.**



**Workers demolish Tower D.**



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## X-701B TCE Groundwater Contamination Plume



**Budgeted cost:** \$34.2 million; **Start date:** May 2009;  
**Estimated completion date:** September 2011



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## X-701B TCE Groundwater Contamination Plume Operational Summary

- Impacted area measures  $\sim 42,000$  ft<sup>2</sup>, of which 15,000 ft<sup>2</sup> has been treated.
- Early remediation included drilling in small area without excavation. Results were limited so efforts now include excavation of the entire plume and treatment of soil with mixture of hydrogen peroxide and sodium persulfate.
- Treatment shows a 99 percent reduction in TCE in six test cells. Concentration averages fell from 54,000 ppb to 425 ppb.
- Treated soils are returned to excavated area.
- TCE Groundwater Contamination Plume remediation is 55% complete.\*

\* Percentage based on ARRA Earned Value Analysis (EVA) using non-accelerated Integrated Planning, Accountability and Budgeting System (IPABS) data.



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## X-701B TCE Groundwater Contamination Plume D&D



**Crews built wooden structures over water storage tanks to prevent freezing before sending water to treatment facility.**

**A worker pulls a corner post from a cell structure. Crews remove cell posts after each cell has been treated and backfilled. They are then moved to the location of the next cell.**



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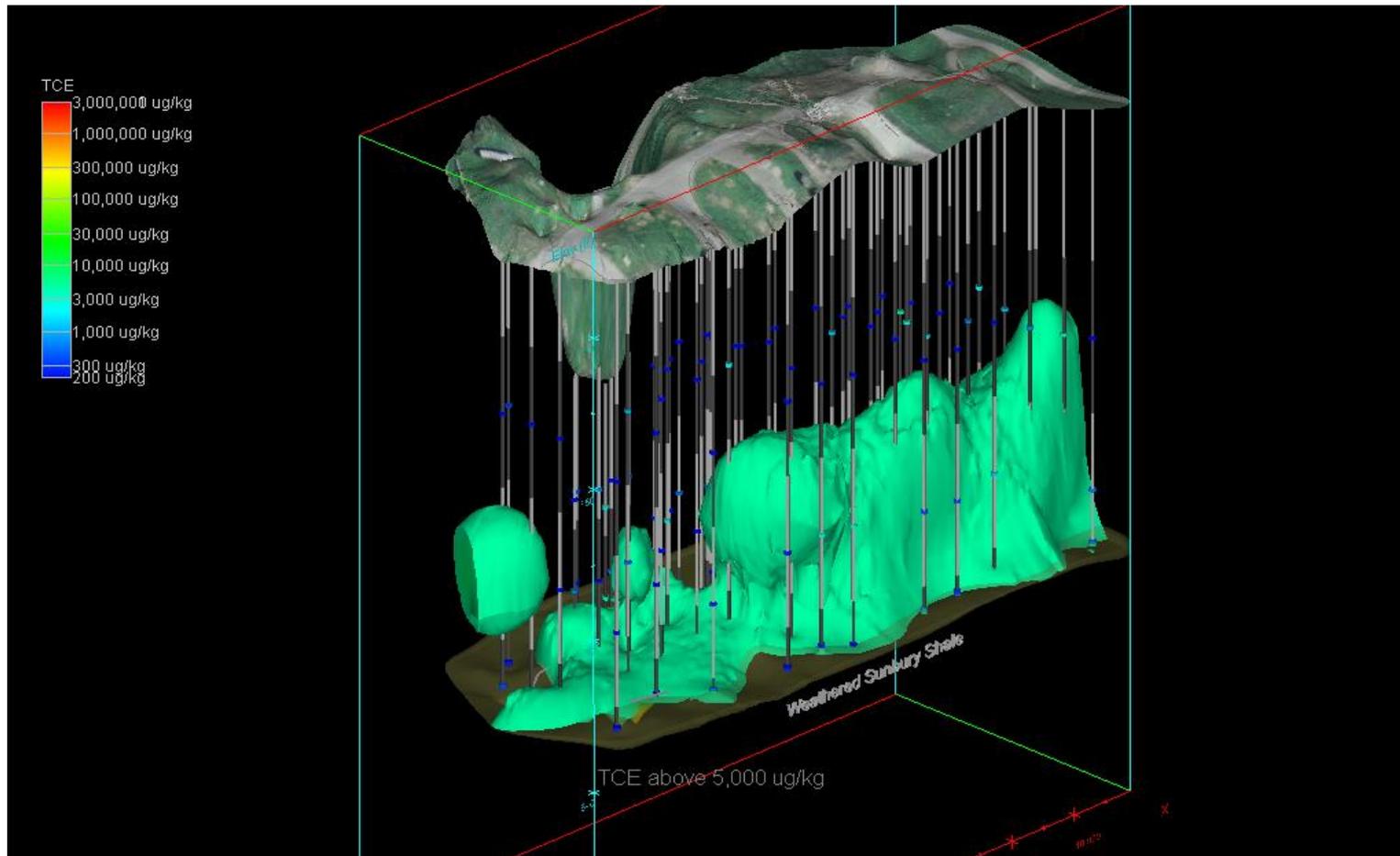
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# PORTSMOUTH



## TCE Plume Concentration – Greater than 5,000 $\mu\text{g}/\text{kg}$

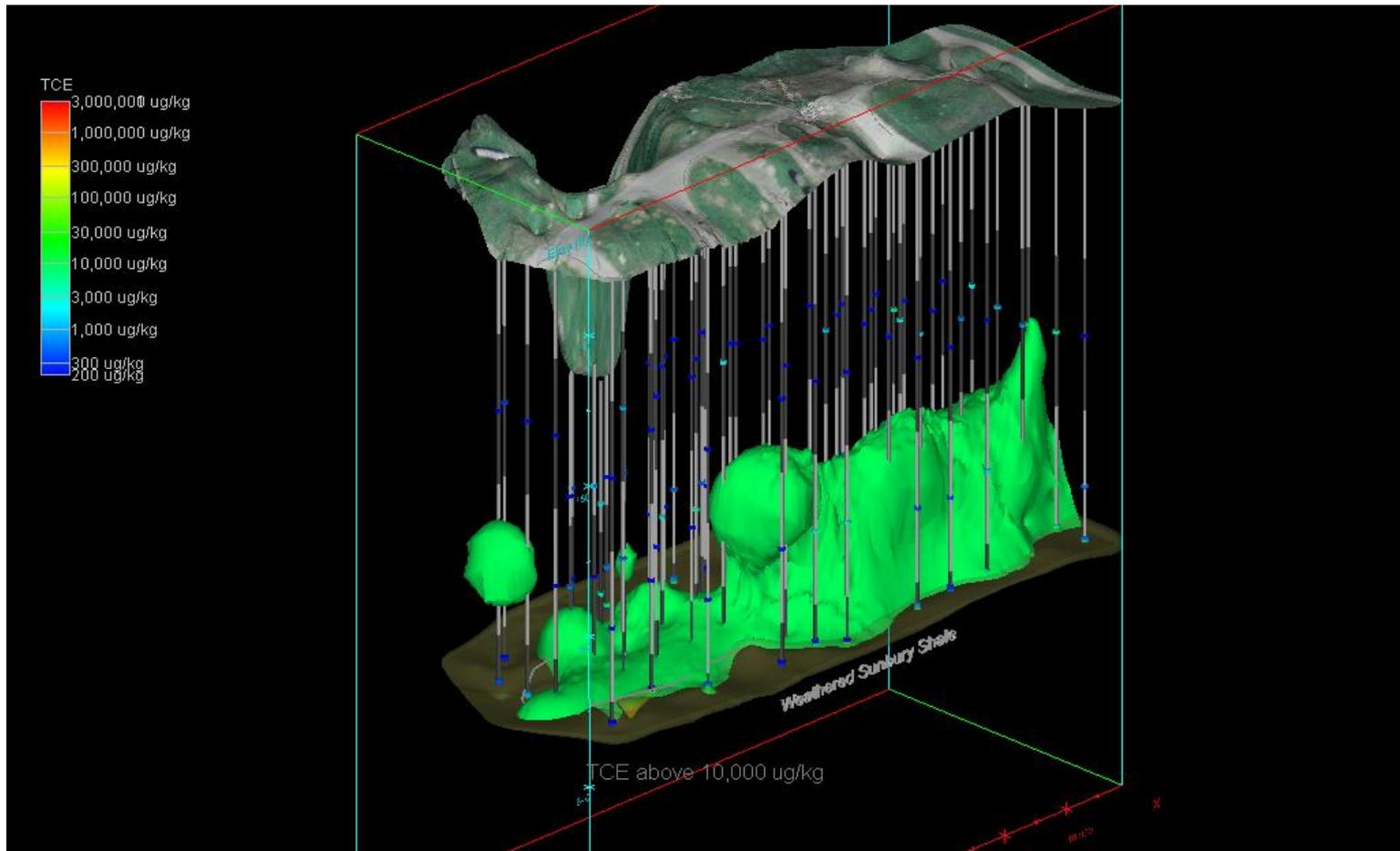




# PORTSMOUTH



## TCE Plume Concentration – Greater than 10,000 $\mu\text{g}/\text{kg}$

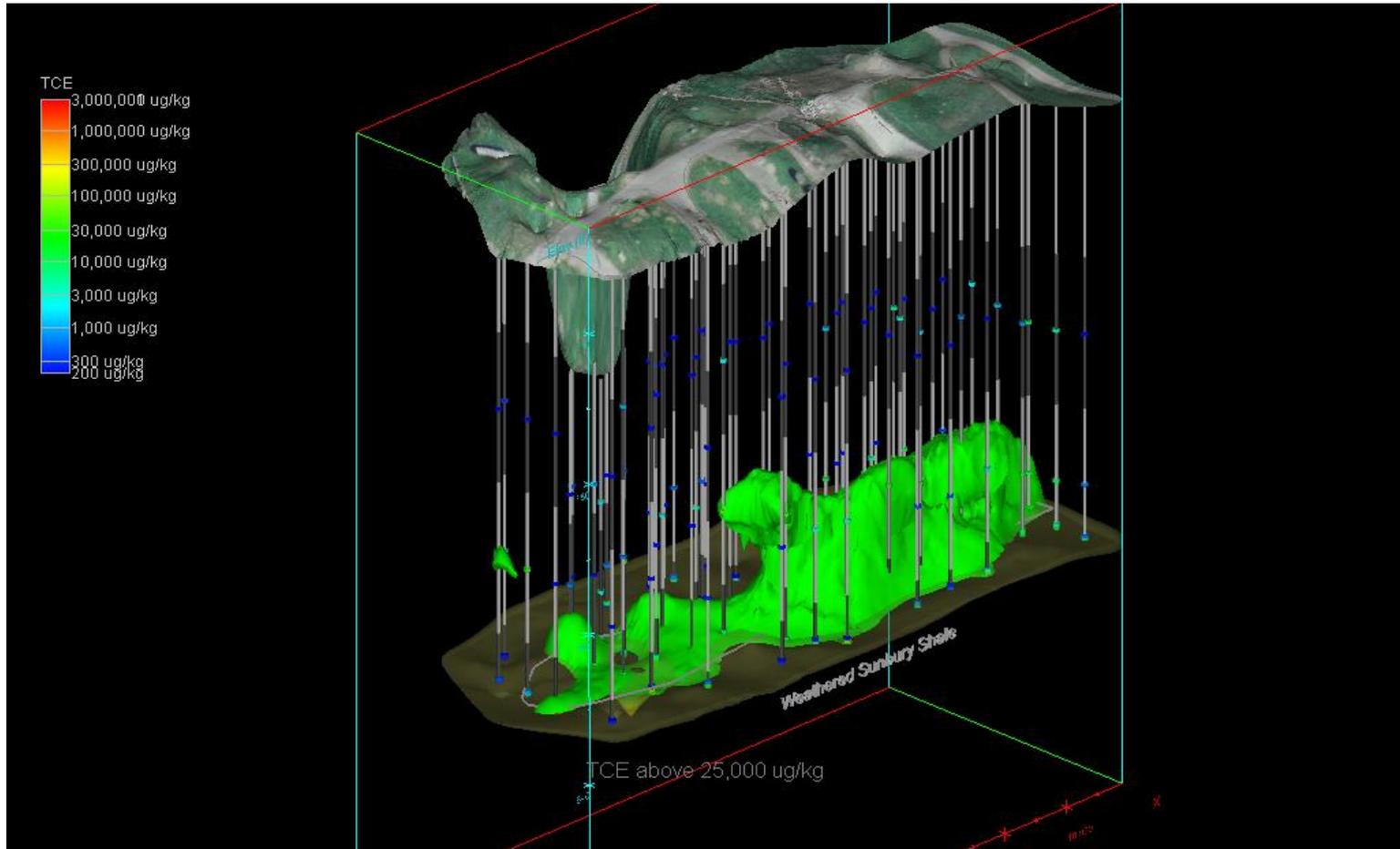




# PORTSMOUTH



## TCE Plume Concentration – Greater than 25,000 $\mu\text{g}/\text{kg}$

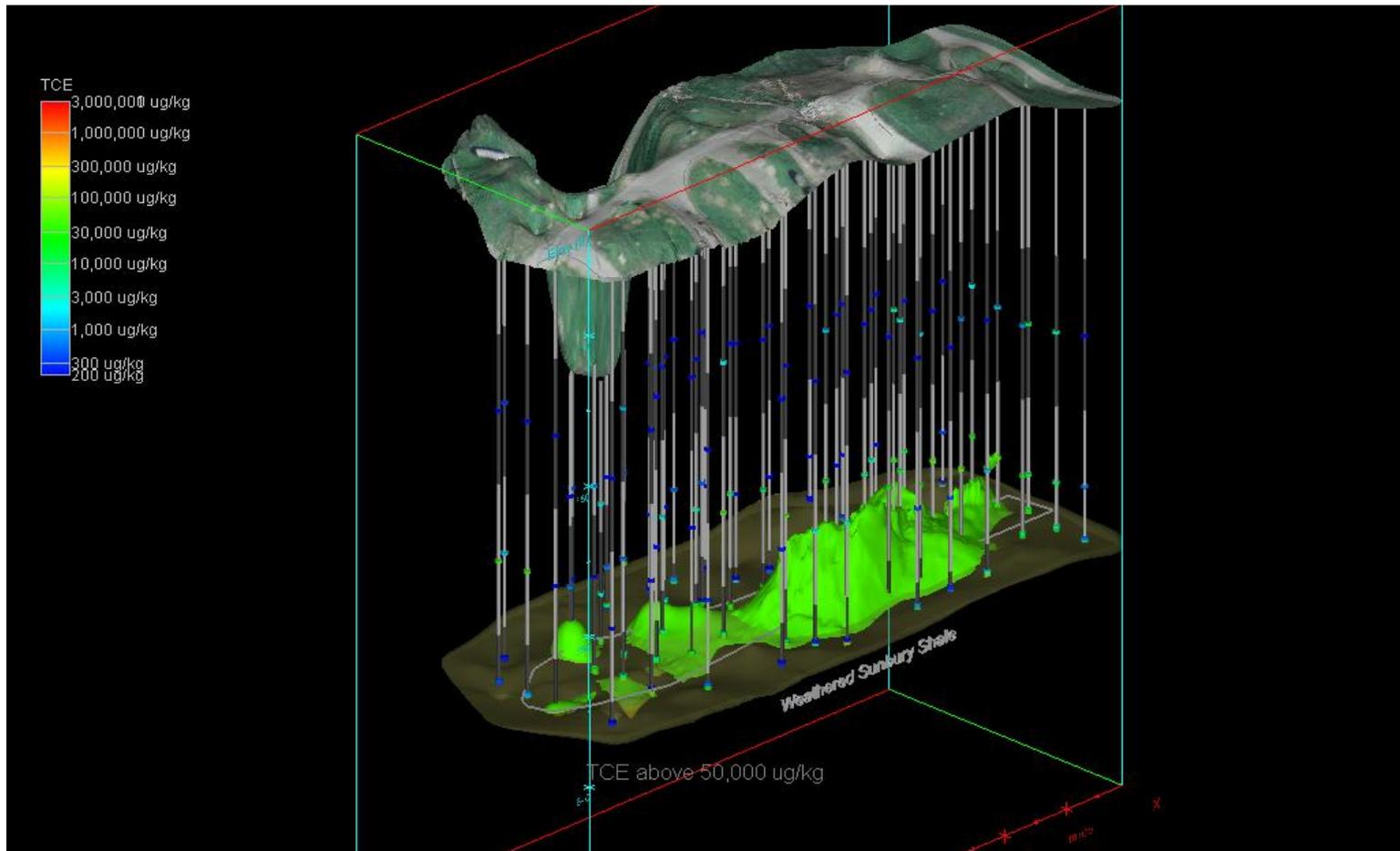




# PORTSMOUTH



## TCE Plume Concentration – Greater than 50,000 $\mu\text{g}/\text{kg}$

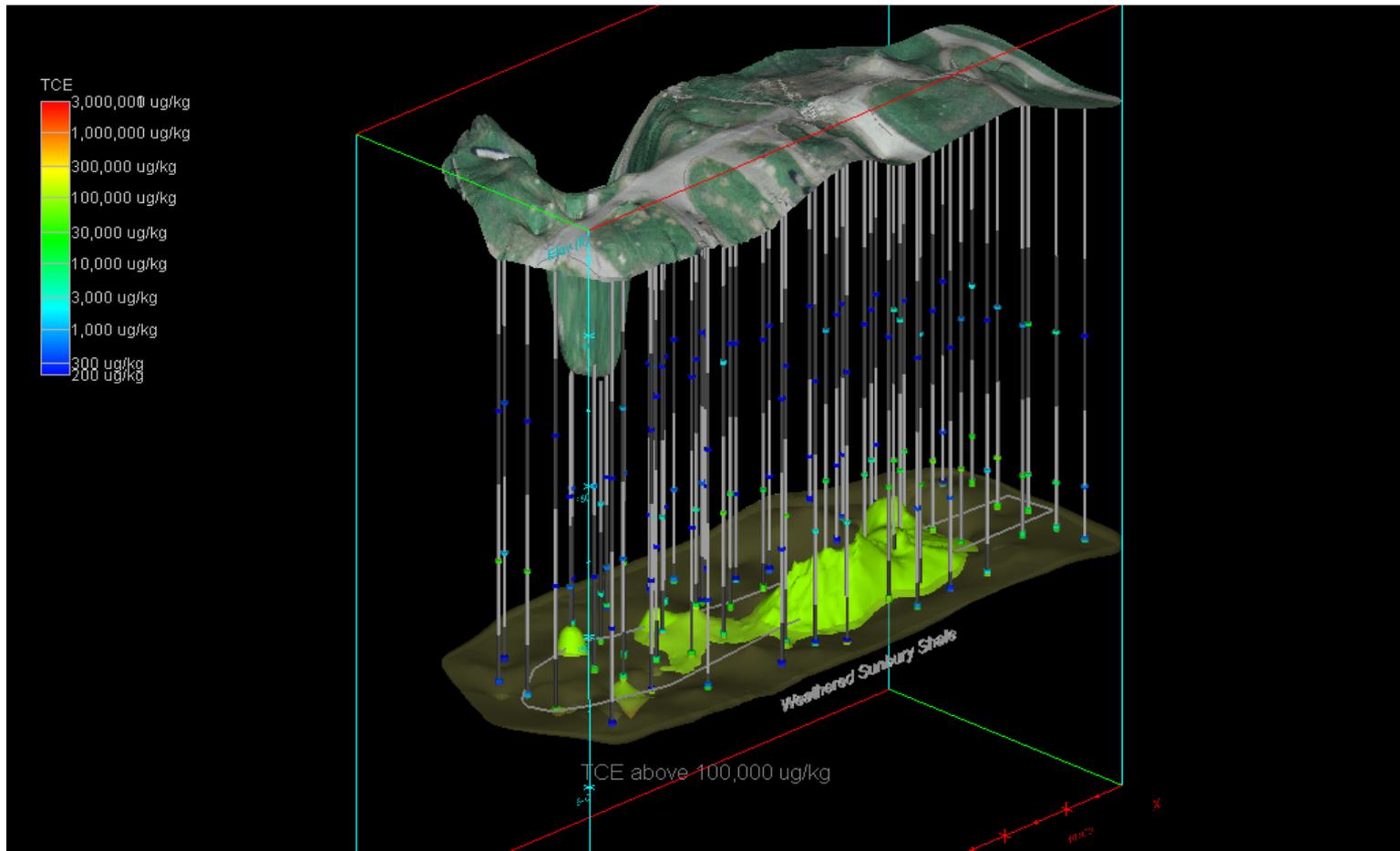




# PORTSMOUTH



## TCE Plume Concentration – Greater than 100,000 $\mu\text{g}/\text{kg}$

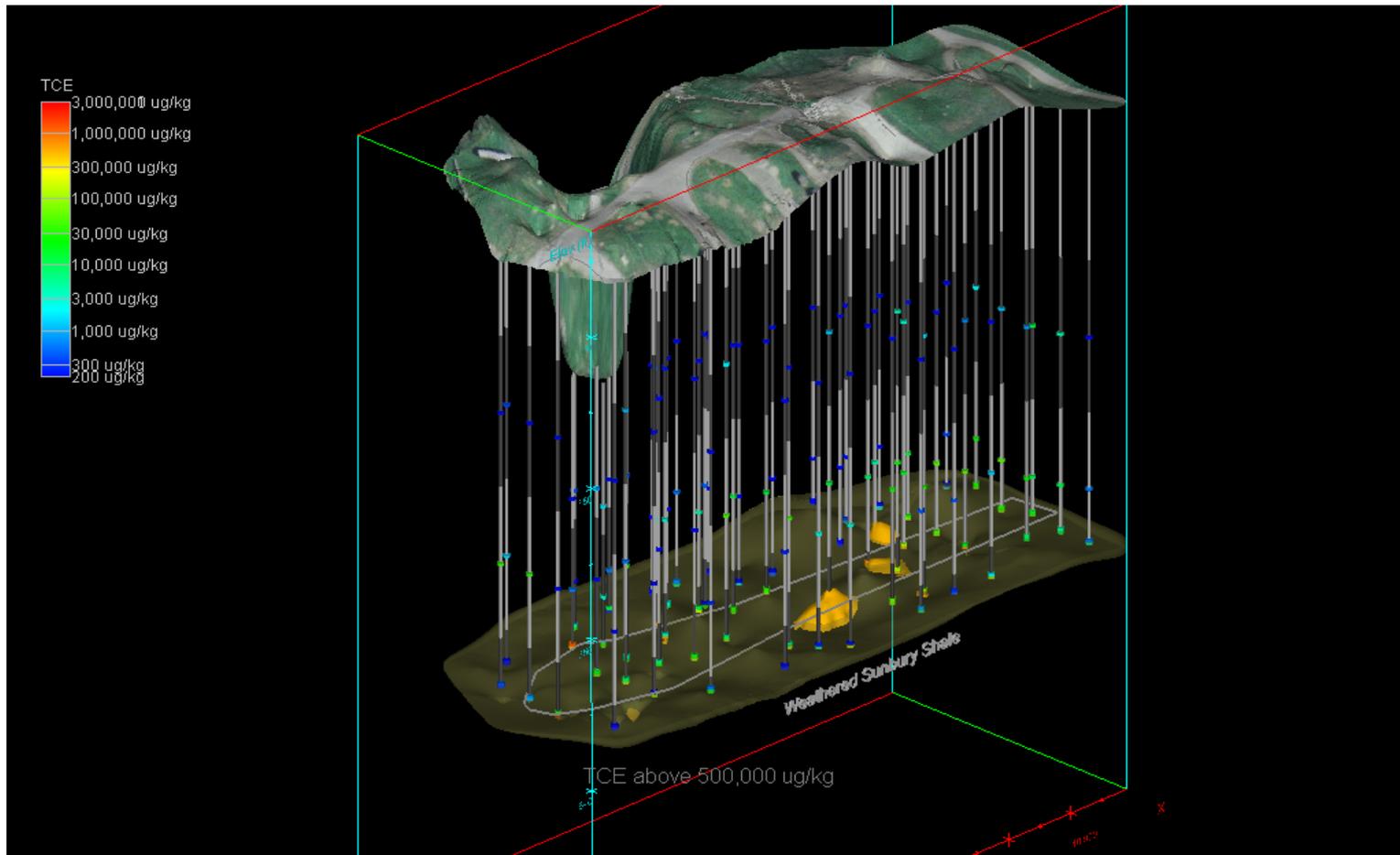




# PORTSMOUTH



## TCE Plume Concentration – Greater than 500,000 $\mu\text{g}/\text{kg}$





# PORTSMOUTH

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## Groundwater Remediation Options

- Chemical In-Situ Treatment (**was used at PORTS**)
- Pump & Treat (**being used at PORTS**)
- Excavate Subsoil - Treat Chemically at Surface (**being used at PORTS**)
- Excavate Subsoil – Install High Permeability / Porosity Zone to Increase Rate of Flow (**being used at PORTS**)
- Install Injection Wells – Inject/Treat/Recover/Re-inject
- Do Nothing – Groundwater Future Use Restrictions



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## X-760 Chemical Engineering Building



**Budgeted cost:** \$11.8 million; **Start date:** May 2009;  
**Estimated completion date:** : December 2010



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# PORTSMOUTH



## X-760 Chemical Engineering Building Operational Summary

- Building is 8,047 ft<sup>2</sup> and tasks include removal of excess material and equipment, demolition of above grade structures, and characterization of underlying soil.
- Treatment and/or disposal of project-generated waste.
- Radiological surveys performed on building structure and equipment for waste characterization.
- Asbestos abatement and Phase I utility isolation completed.
- Chemical Engineering Building remediation is 35% complete.\*

\* Percentage based on ARRA Earned Value Analysis (EVA) using non-accelerated Integrated Planning, Accountability and Budgeting System (IPABS) data.



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## X-760 Chemical Engineering Building D&D



**X-760 Mezzanine**



**Material is loaded into B-25 containers and prepared for shipment.**



**X-760 Maintenance Shop**



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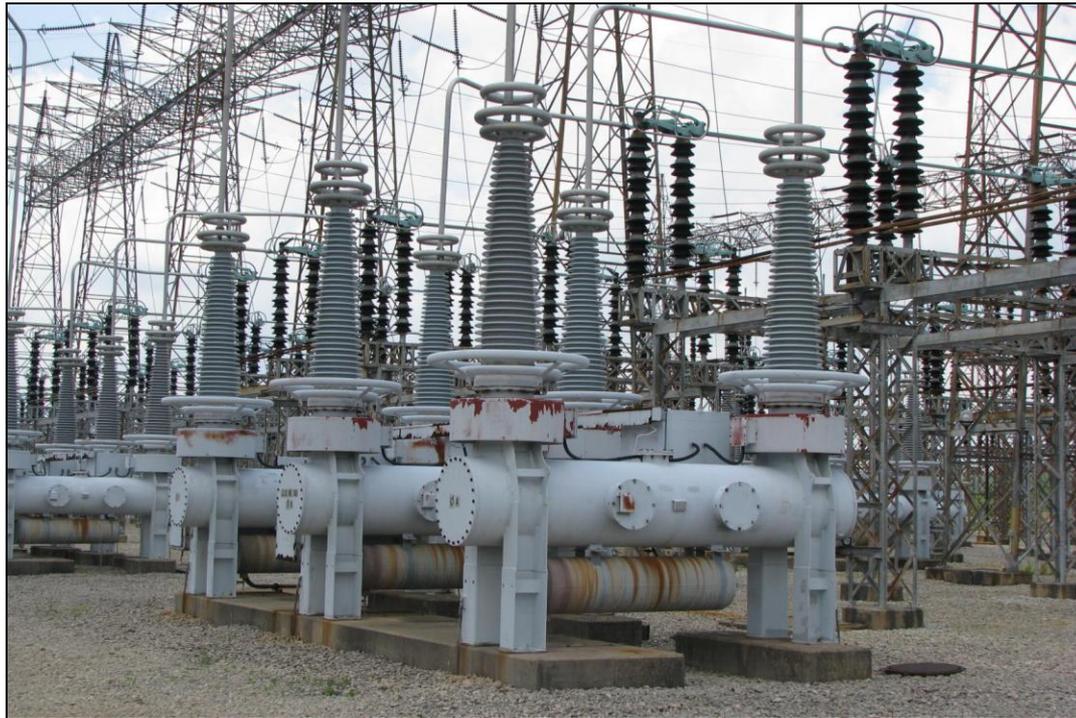
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## X-533 Switchyard



**Budgeted cost:** \$26.2 million; **Start date:** May 2009;  
**Estimated completion date:** October 2010



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## X-533 Switchyard Operational Summary

- Soil characterization within switchyard area ( $\sim 772,000$  ft<sup>2</sup>) and removal of  $\sim 220,000$  ft<sup>3</sup> of identified contaminated soils.
- Demolished maintenance building (X-533C) structure and slab.
- Demolished 79 of 160 towers and removed 245 of 850 tower foundations.
- Asbestos abatement substantially completed.
- X-533 Switchyard project is 35% complete.\*

\* Percentage based on ARRA Earned Value Analysis (EVA) using non-accelerated Integrated Planning, Accountability and Budgeting System (IPABS) data.



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## X-533 Switchyard D&D



**LEFT: Switchyard building shown after panel removal. RIGHT: Electrical towers were erected in open spaces prior to demolition.**



**Demolition of the switchyard storage facilities was part of the X-533 project.**



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## Uranium Management Center (UMC)



**Budgeted cost:** \$32.7 million; **Start date:** May 2009;  
**Estimated completion date:** September 2011



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## Uranium Management Center Operational Summary

- Disposal of 15 lots of surplus uranium materials, including Depleted Uranium (DU) from Fernald, Low-Enriched Uranium from Hanford, and Natural Uranium (NU) from multiple universities.
- Lots include uranium in various forms (LEU oxides, LEU fluorides, uranium metal compounds, uranium metals).
- Project includes readiness assessment, characterization sampling as required, opening/inspection of containers, and preliminary work to attain Waste Profile for disposal at Nevada Test Site (NTS).
- Six lots have been dispositioned and 992 metric tons have been shipped.
- UMC project is 28% complete.\*

\* Percentage based on ARRA Earned Value Analysis (EVA) using non-accelerated Integrated Planning, Accountability and Budgeting System (IPABS) data.



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## Uranium Management Center D&D



Material is moved inside for sampling.



Pre-staging area for boxes before shipment.



Materials secured on truck before shipment.

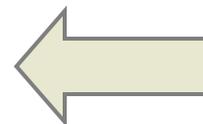


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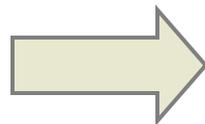


# PORTSMOUTH



September 2009  
(before T-Hoppers  
shipped)

April 26, 2010  
(after T-Hoppers  
shipped)



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## PORTSMOUTH



# Ohio EPA Director's Final Findings and Orders (DFF&O)

- Ohio Environmental Protection Agency (EPA) and DOE reached an agreement in April, 2010, regarding various aspects of D&D activities.
- The agreement addresses hazardous and industrial wastes, existing substances and pollutants, and GDP-related facilities and equipment.



- Ohio EPA will provide oversight of D&D and waste management. It also maintains its authority in regard to previous consent decrees.

- As part of the agreement, DOE will: Develop remedial investigations and feasibility studies (RI/FS) for process buildings and other complex structures at the former GDP; develop engineering evaluations and cost analyses (EE/CA) for non-active GDP facilities; evaluate sitewide waste and demolition debris disposition alternatives; implement a community relations plan to address how DOE will coordinate stakeholder involvement.





# PORTSMOUTH



## Site Specific Advisory Board



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## Site Specific Advisory Board

- The Portsmouth Site Specific Advisory Board was formed in 2008 and provides advice and recommendations to DOE on various plant-related issues.
- The board is made up of up to 20 members, chosen to reflect the diversity of persons living near the site.
- The board members serve on a volunteer basis.
- The SSAB will provide critical input to DOE on decisions that will influence future options for the site.



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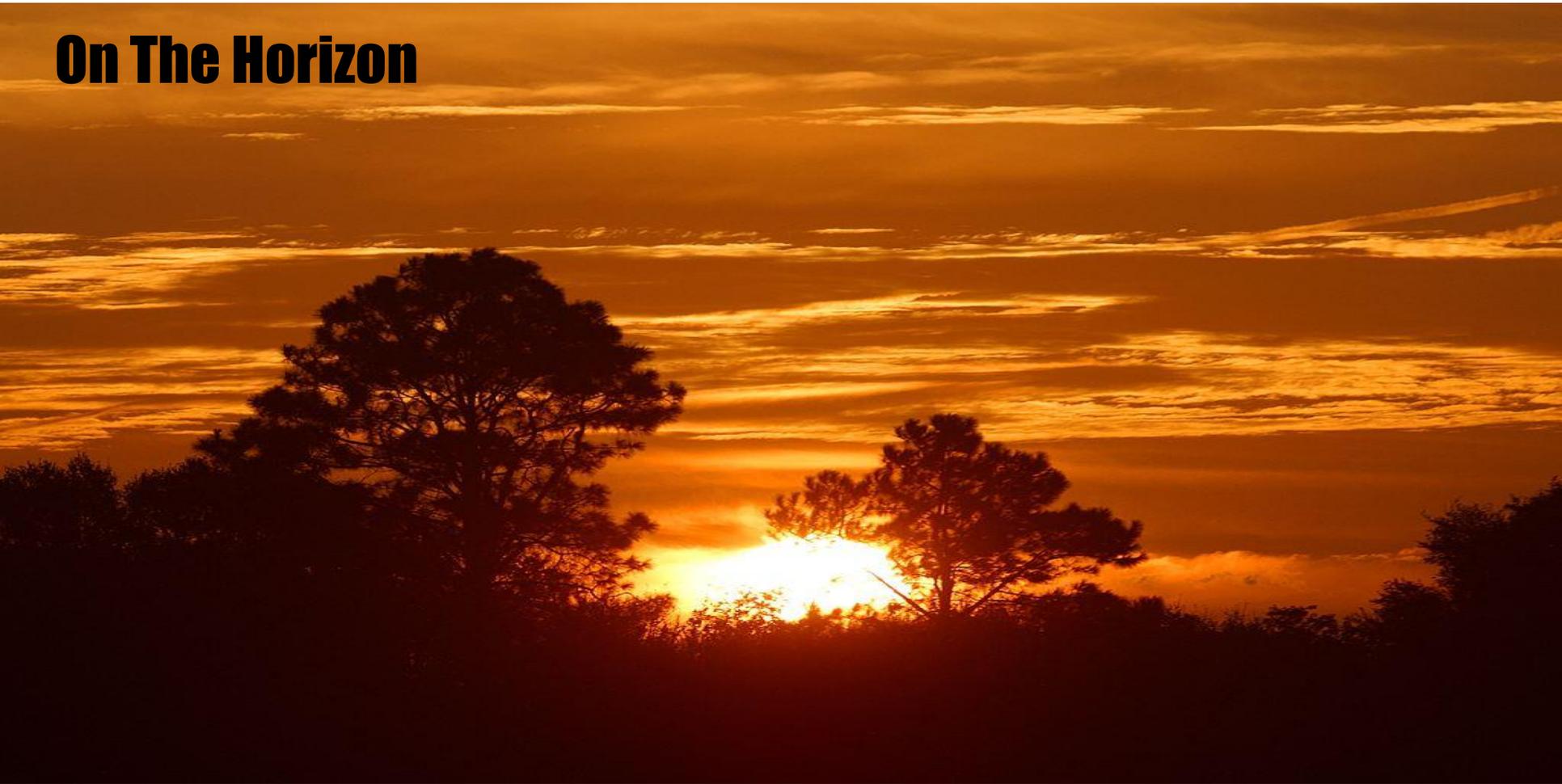
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## On The Horizon



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