



U.S. DEPARTMENT OF
ENERGY

Portsmouth/Paducah Project Office

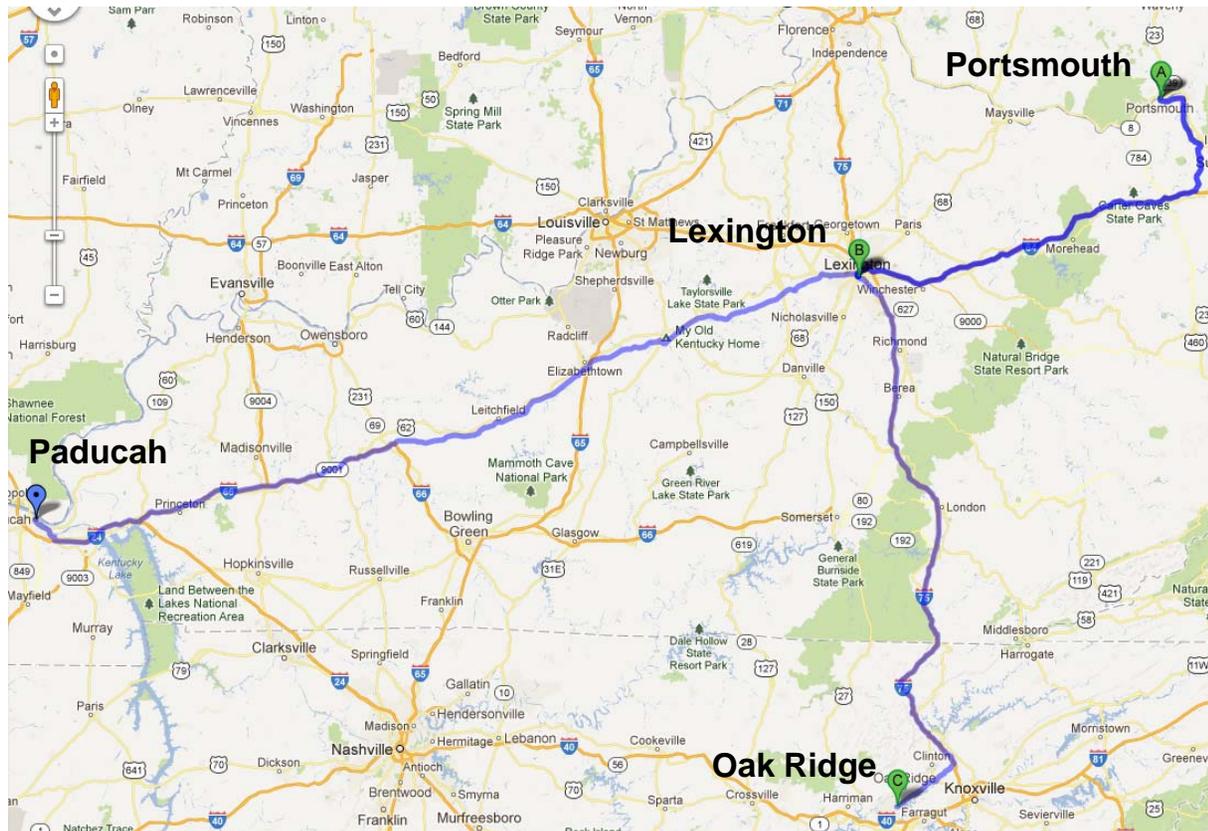
**Presented by
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William E. Murphie
Manager

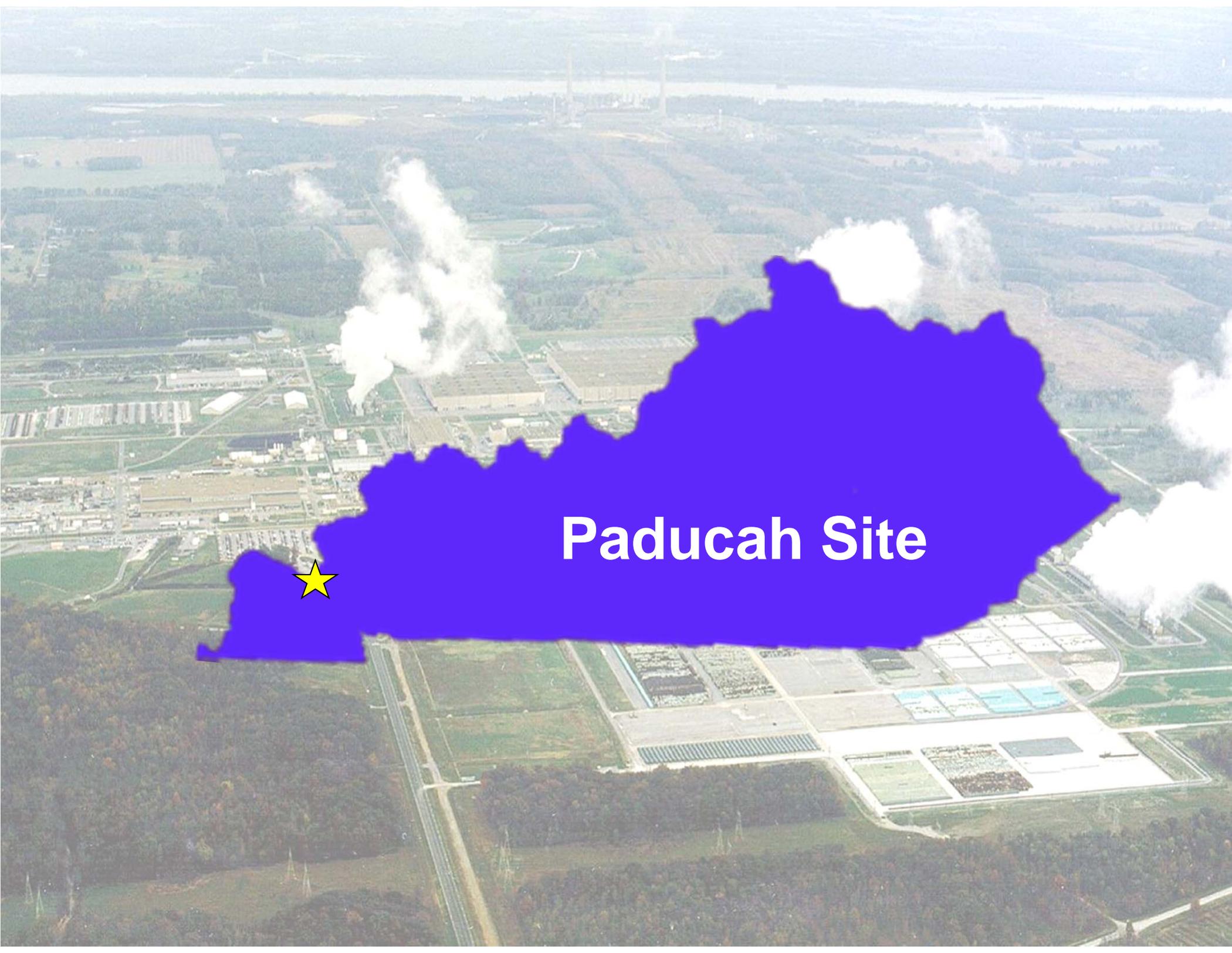


The Portsmouth/Paducah Project Office

In May 2003 the Department of Energy decided to create the Portsmouth/Paducah Project Office (PPPO); in July 2003 the final pieces fell into place, and PPPO was established. The impetus for the creation was the need for support of accelerated cleanup at the Portsmouth and Paducah sites.



“The mission of the PPPO is to effectively implement the Office of Environmental Management responsibilities, obligations and activities at the Department's Portsmouth, Ohio, and Paducah, Kentucky sites in compliance with Departmental policy.”



Paducah Site





Paducah Quick Facts

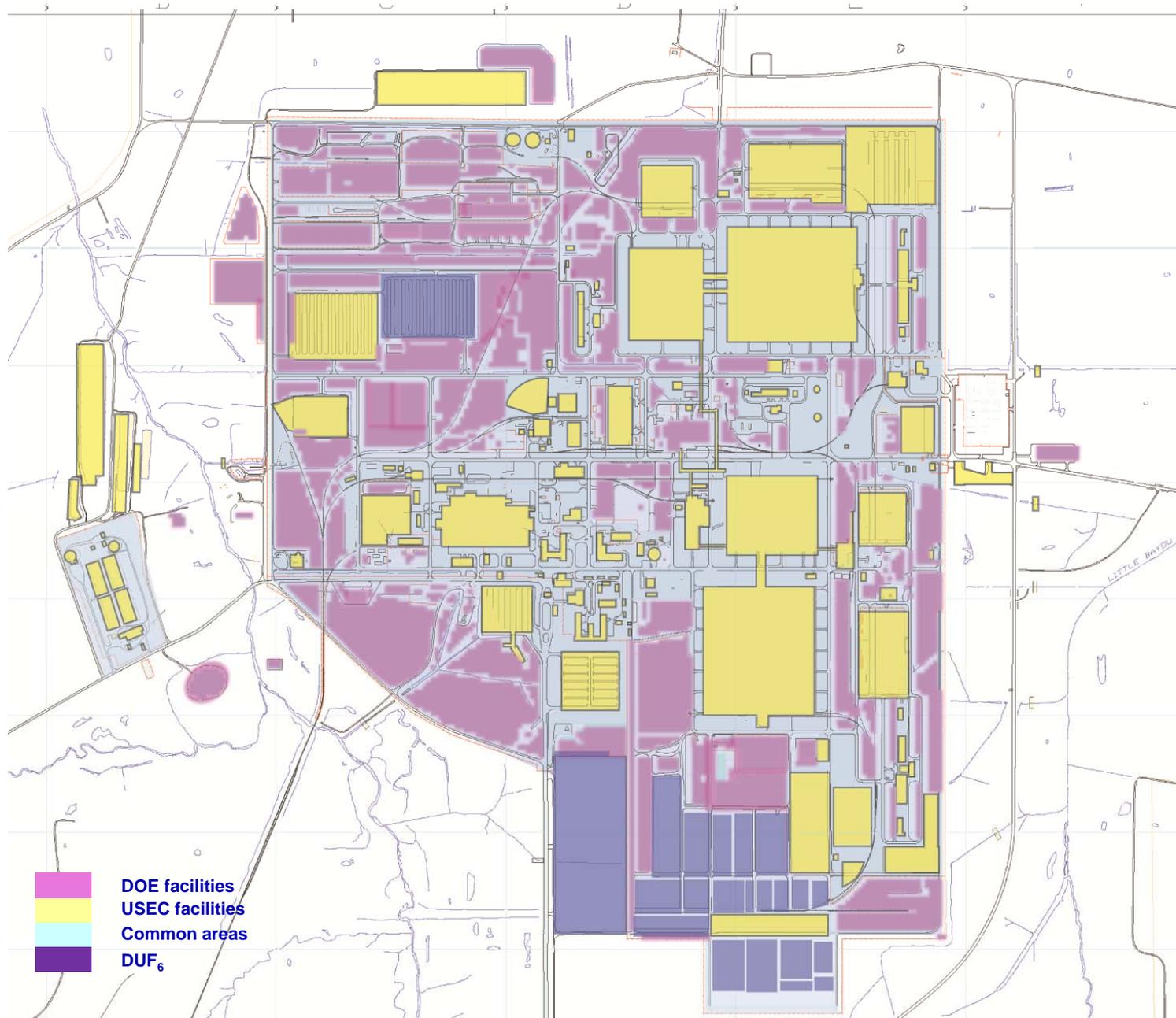


- 3,500+ acre federal site
- Shared site with an operating gaseous diffusion plant and a DUF₆ conversion facility
- As of May 15, 2013 there are 681 employees working for either the Federal Government or the contractors at the site*

* This does not include the USEC employee numbers.



Lease Map





The History of the Paducah Gaseous Diffusion Plant





Plant History

The Paducah Gaseous Diffusion Plant, operated by the United States Enrichment Corporation (USEC), a subsidiary of USEC Inc., is one of only two operating uranium enrichment facility in the United States.

Uranium enrichment began in the early 1940s as a United States defense initiative to produce fissionable material for the atomic bomb. The enrichment program was eventually transferred to the Atomic Energy Commission (AEC), and the nation's first gaseous diffusion plant, K-25, at Oak Ridge, Tennessee, went on line in 1945.

In December 1950, the Paducah site (the location of the former Kentucky Ordnance Works) was chosen from a short list of eight locations for construction of a new gaseous diffusion plant. It was speculated that Vice President Alben Barkley, a former Kentuckian, may have helped tip the scales toward the selection of the Paducah site.

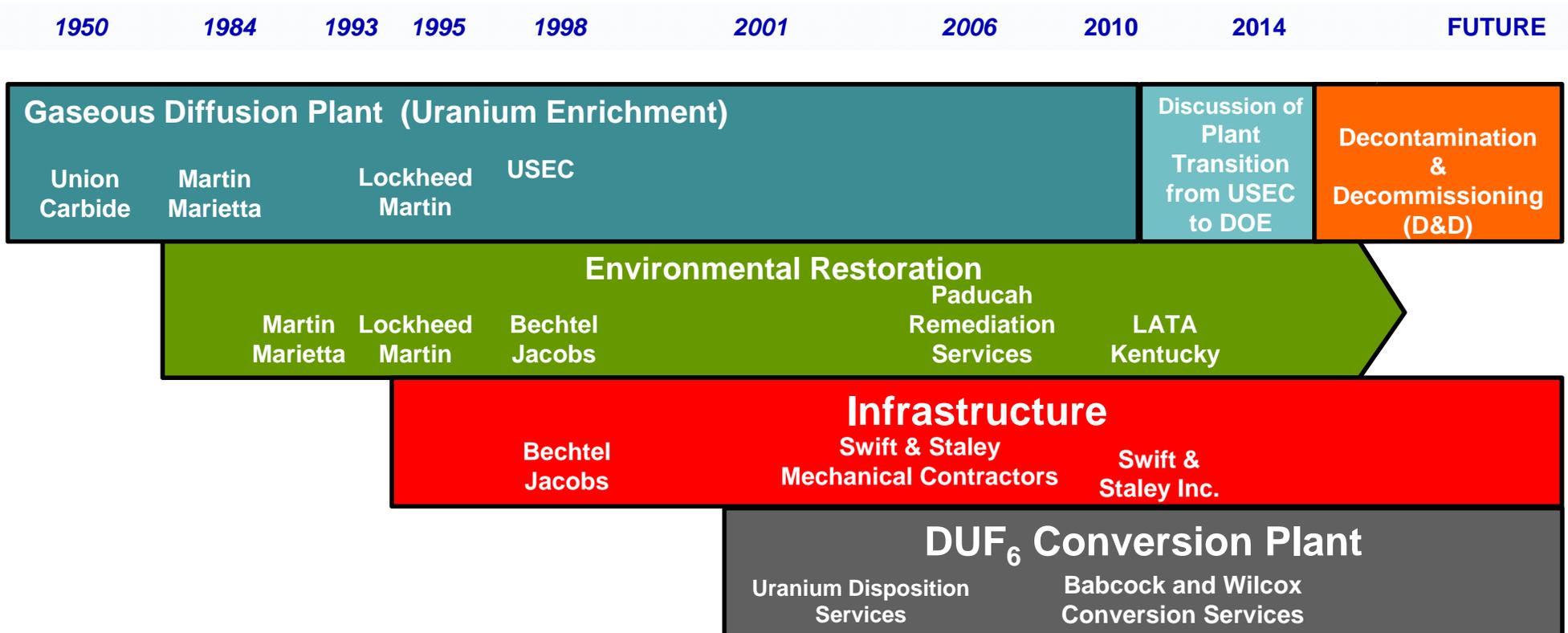
F.H. McGraw and Co. of Hartford, Connecticut, was awarded the construction contract while Carbide and Carbon Chemicals Co. was named operating contractor for the more than \$800 million project.

The original plant design was completed and in operation two months ahead of schedule, with the first production cells going on line in September 1952. The first enriched uranium product withdrawals were made in November 1952 and the first 2.5-ton product cylinders with partially enriched uranium were shipped to Oak Ridge.

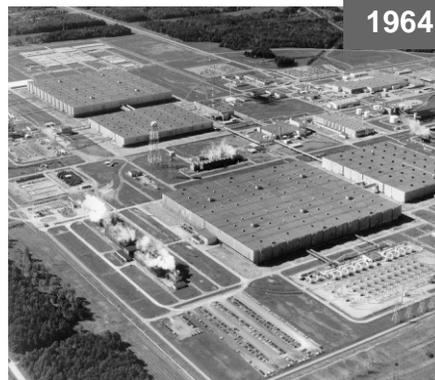
In the 1960s, the Paducah plant's mission changed from enriching uranium for nuclear weapons to one focused on producing fuel for commercial nuclear power plants. Until recently, Paducah and its sister plant located near Portsmouth, Ohio, worked together to enrich uranium for use in nuclear power plants. In May 2001, USEC consolidated its enrichment operations at Paducah. The following year, transfer and shipping operations were also consolidated at Paducah.



Paducah Gaseous Diffusion Plant History



1952



1964



2009



2013



1950-1954

Paducah Gaseous Diffusion Plant (PGDP) Construction



- AEC picks old Kentucky Ordnance Works site as the location for the second of three planned uranium enrichment plants and names Carbide and Carbon Chemicals Co. (now Union Carbide) to operate the plant.
- Construction begins in 1951 on the Paducah Gaseous Diffusion Plant and is completed in 1954.
- In 1952 plant operations begin, requiring various support facilities such as electrical switchyards, a chemical cleaning/decontamination building (C-400), waste water treatment facilities, etc.
- In fall 1952 the first production cells go “on stream” and in late 1952 the first product is withdrawn and sent to Oak Ridge.



1957-1962

- Work for Others program, begins in 1958 and runs for 30 years; contaminants associated with the program are: beryllium, tritium, uranium oxide, lead and beryllium-copper compound
- U.S. military warheads were sent to Paducah for dismantling; resulted in beryllium, tritium and/or cobalt-60 contamination



C-340

- UF_4 produced in C-340 was stored in the cascade buildings; some of the material was converted to uranium metal or processed at C-400 and transferred to the Department of Defense.
- Emptied UF_4 drums were deposited in the northwest corner of the plant, leading to the creation of Drum Mountain

- For two separate time periods (1952-1962 and 1968 to 1973) the C-340 Complex converted Depleted Uranium Hexafluoride (DUF_6) to Hydrogen Fluoride (HF) and Uranium Tetrafluoride (UF_4); and UF_4 to uranium metal



Drum Mountain



1962-1970

- The Paducah plant shifts from producing highly enriched uranium to low enriched uranium to be used as fuel for electric utilities operating nuclear power plants.
- In 1965 the C-746-A Warehouse is converted to install East and West End Smelters as part of the Work for Others program; smelts both reusable and contaminated metals into ingots, including gold and aluminum
- Smelter later plays a role in plant cascade upgrade by smelting nickel recovered from the cascades in Paducah, Portsmouth, and Oak Ridge into nearly 10,000 tons of volumetrically contaminated ingots (equal to the entire weight of the Eiffel Tower)



C-746-A



Nickel ingots



Aluminum ingots



1971-1980

- Upgrade of plant cascades results in thousands of tons of equipment being removed to the northwest corner of the plant; this results in creation of D-Yard, where classified converter components were stored
- In January 1975 the Nuclear Regulatory Commission (NRC) and the Energy Research and Development Agency (ERDA) assume AEC functions. NRC takes over regulatory oversight of nuclear power plants and ERDA assumes responsibility for uranium enrichment.
- In October of 1977 the federal government transfers ERDA functions to the newly-created Department of Energy (DOE)
- From 1975-1979 contamination was created at the site through land farm testing for viability of biodegradation, the shutdown of a contaminated facility and testing with trichloroethene (TCE) and dry ice for structural integrity.



Oil Land Farm



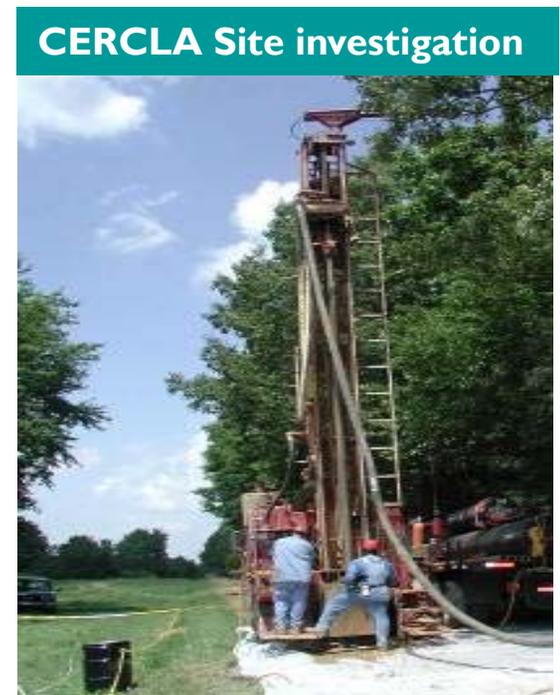
D-Yard



1981-1990

- In 1986 RCRA-hazardous (Resource Conservation and Recovery Act) waste was discovered resulting in the closure/capping of the primary disposal area for Low-Level Waste (LLW). In addition, TCE-contaminated soils at C-400 were discovered during sewer excavation; TCE was later determined to be the primary groundwater contaminant.
- From 1986-1988, during upgrades to the UF₆ contaminant system, high PCB concentrations were discovered in excavated trenches in facilities that had been in operation since 1952.

- In 1988 contamination was found in residential wells; environmental remediation program begins. Well sampling begins at this time, with DOE establishing a Water Policy and entering into the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Consent Order with EPA. City water lines extensions are started.
- Phase I of CERCLA site investigation begins in 1989 to determine nature and extent of off-site contamination





1991-1995

- LLW inventories further grow through the 1990s as a result of DOE's 1991 national moratorium for off-site disposal and funding constraints
- In October 1992 the Energy Policy Act creates USEC to take over the government's uranium enrichment enterprise.
- In July 1993 USEC assumed responsibility for Paducah uranium enrichment plant.
- In 1993 source removal and groundwater treatments begin





1996-2000

- In March of 1997 regulatory oversight of the Gaseous Diffusion Plant (GDP) officially transfers from DOE to NRC.
- In 1998 USEC becomes a privatized company.
- In May of 1999 USEC takes over direct operation of the GDP. Remediation, infrastructure and DUF_6 remains with DOE
- In 1999 plant workers file lawsuits alleging exposure to radioactive elements during plant operations. Secretary Bill Richardson visits PGDP and deploys a DOE-Environment, Safety and Health team to investigate worker claims.
- In June 2000 USEC announces plan to consolidate enrichment activity at Paducah by bringing Portsmouth operations to the PGDP by June 2001
- In 2000 beryllium exposure identified by former workers as a major health concern





2001-2005

- In June of 2002 USEC completed consolidation of transfer and shipping operations at Paducah.
- In 2003 Jesse Hill Roberson, then Assistant Secretary of DOE, and Governor Patton sign a Letter of Intent which leads to an Agreed Order for DOE Material Storage Areas/listed waste and accelerated Federal Facilities Agreement (FFA) cleanup.





2006-Present

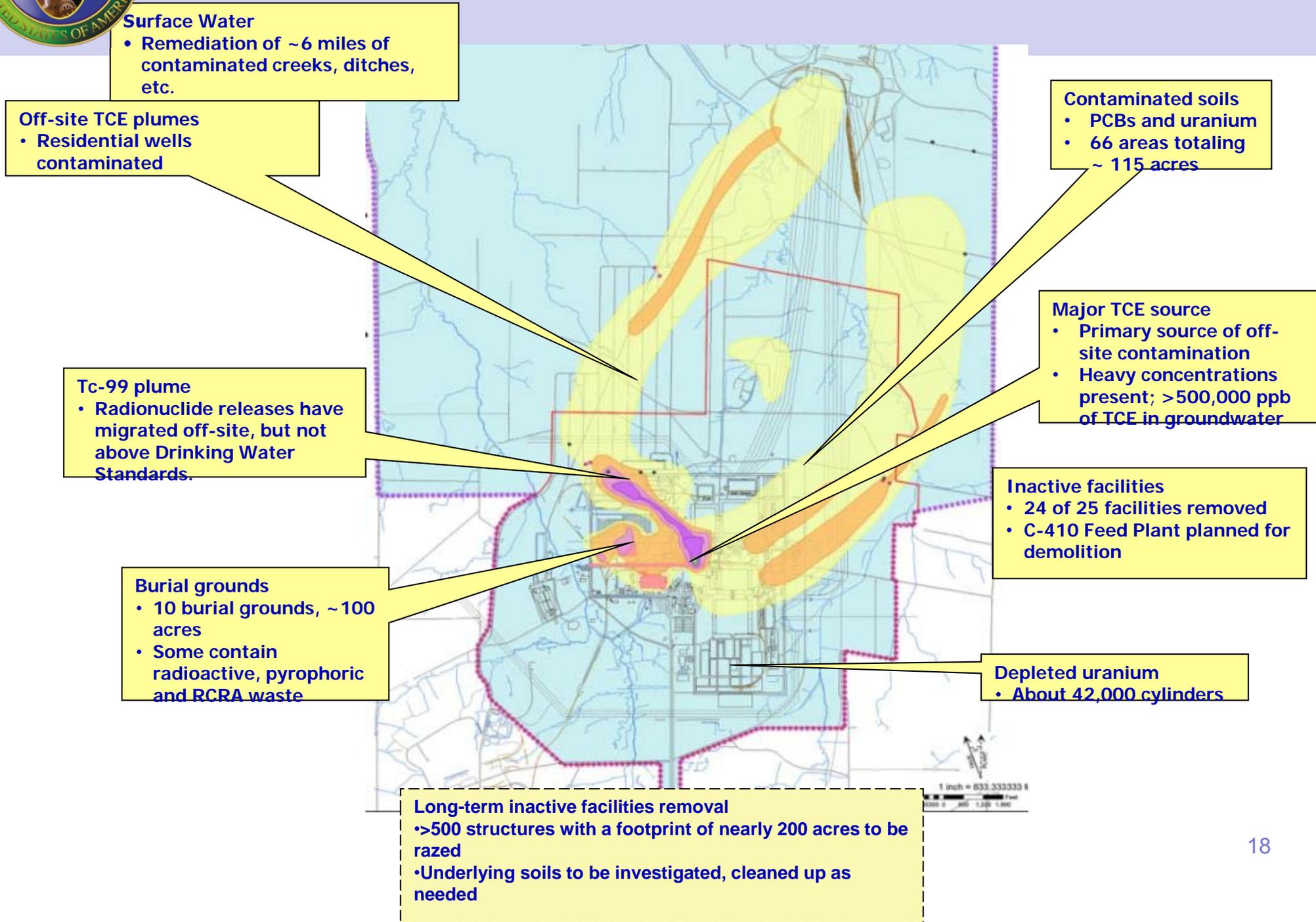
- In 2006 areas of soil and rubble potentially contaminated with elevated levels of radiation and PCBs were discovered outside the security perimeter fence.
- In 2008 Field work begins on C-400 TCE Source Reduction Action
- In 2013-2014 it is anticipated that USEC will shut down its facilities at the site and return them to DOE; at present, transition discussion is being accomplished



- In 2010, completed construction on DUF₆ facility



Major EM Projects





Paducah Contractors



U.S. DEPARTMENT OF
ENERGY

 LATA Kentucky

Swift  Staley

B & W Conversion Services



Paducah Contractors

There are three contractors at the Paducah site responsive to the EEOICPA program.



LATA Environmental Services
of Kentucky, LLC

- LATA Kentucky performs environmental remediation, compliance reporting and monitoring, and legacy waste disposition.



- Swift & Staley Inc. performs infrastructure maintenance, training, security and other services.



- BWCS operates the DUF_6 conversion plant, which converts depleted uranium hexafluoride for reuse or disposal.



Records Maintained by Paducah Contractors

LATA Kentucky:

- Access to employment and medical records for current employees only.
- The Industrial Hygiene database contains data from 2006 to present only.
- Individual radiation exposure data is maintained for active employees only in the Oak Ridge National Lab dosimetry databases.
- Has incident/accident reports on individuals from 1983 to present.
- Has access to training records on individuals from 1990 to present.
- Does not hold legacy records
- Records are in Kentucky

SST:

- Environmental restoration and waste management records from 1988 to present.
- Personnel, medical and employment records.
- Bargaining unit records.
- Radiation exposure records – Former DOE and contractor (infrastructure and remediation) employees and current DOE and SST employees.
- Current and previous contractor training records.
- Legacy records are held by SST in Kentucky and the Oak Ridge Office in Tennessee.

BWCS:

- Access to employment and medical records for former contractor and current employees.



All Paper Records at Paducah

There are over 303.7 square yards of paper records. This volume is equivalent to just over two Leaning Tower of Pisa's!





Records Maintained by LATA Kentucky

A very small percentage of LATA Kentucky records that support EEOICPA are maintained in paper. The majority of records are maintained in electronic systems.



The screenshot shows the Eclipse IDE interface for configuring a Java module. The Package Explorer on the left displays a project structure with folders like 'src', 'Artifacts', 'JAR Definitions', etc. The main editor shows the 'General' tab for the module configuration, including fields for Name, Type, Description, Author, and Implementation JARs.

Description	Resource	Path	Location

Documentum



Records Maintained by Swift & Staley

The hardcopies of all unclassified records were transferred to a Federal Records Center or the National Archives Records Administration (NARA) by May 31, 2013.





Location of the SST Records Vault

- Records received prior to May 1999 are maintained as hardcopy.
- Most records received after May 1999 are scanned to a PDF and also maintained as hardcopy.
- Records received after November 2011 are maintained electronically, with few exceptions.



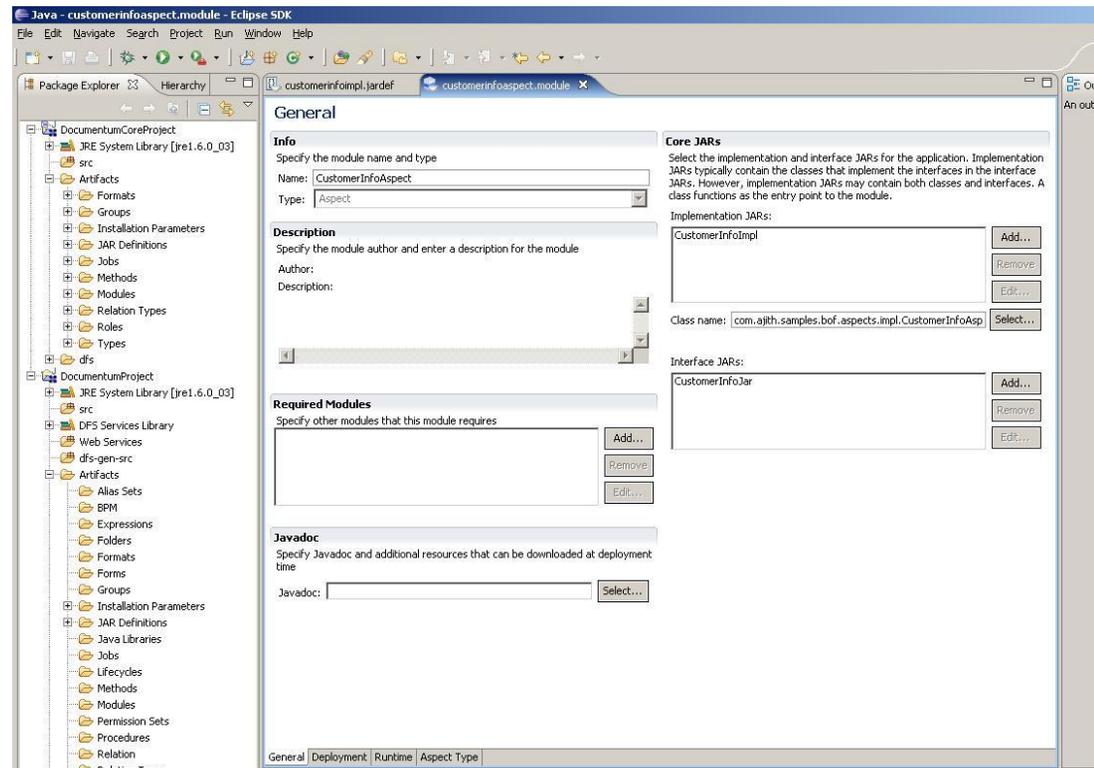


Records Maintained by BWCS Paducah



...rather, their files are stored in a program called Documentum.

BWCS does not maintain many physical files....





Portsmouth Site





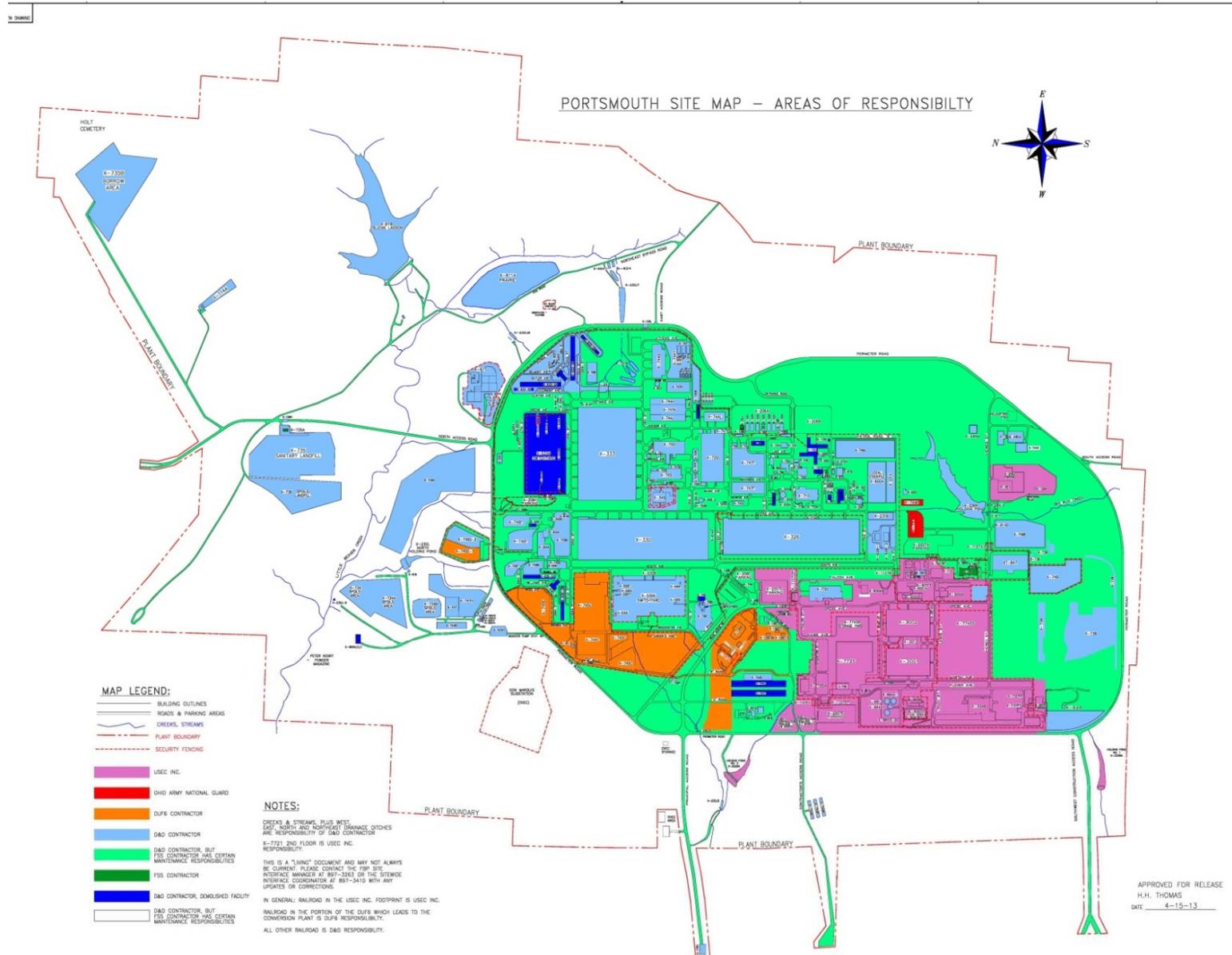
Portsmouth Quick Facts



- 3,700+ acre federal site
- Shared site with American Centrifuge Plant and operating DUF_6 conversion facility
- As of May 15, 2013 there are 2,441 employees working for either the Federal Government or the contractors at the site



Facility Status Map





The History of the Portsmouth Gaseous Diffusion Plant





Plant History

Uranium enrichment began in the early 1940s as a United States defense initiative to produce fissionable material for the atomic bomb. The enrichment program was eventually transferred to the AEC, and the nation's first gaseous diffusion plant, K-25 at Oak Ridge, Tennessee, went on line in 1945.

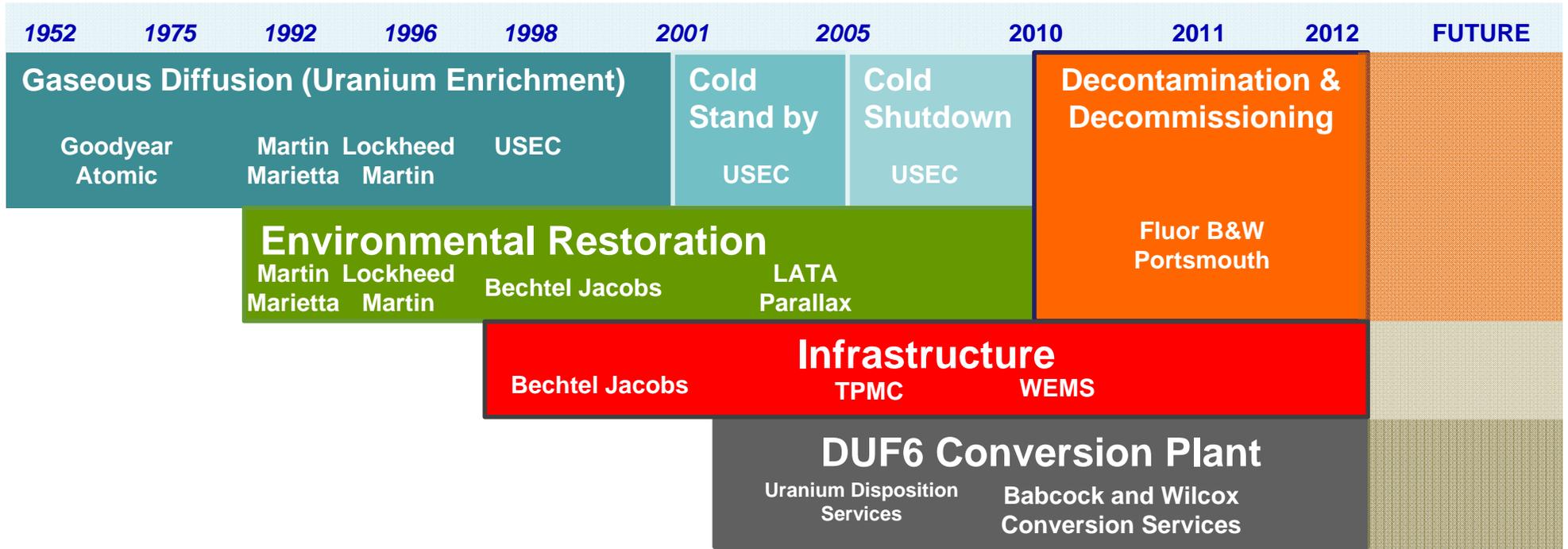
The Portsmouth Gaseous Diffusion Plant was constructed by Peter Kiewit Sons' Co of Nebraska starting in 1952 and finishing in early 1956, six months ahead of schedule; the first enrichment cells went online in 1954. The site was chosen because of the large amount of flat land, the availability of large amounts of electrical power, a dependable source of water, local labor and suitable transportation routes. Construction required 69 million man-hours, more than 68,000 drawings (enough to cover 2-1/2 acres) and as many as 22,500 construction workers at its peak in the summer of 1954. More than 1,200 acres were cleared.

Goodyear Atomic Corporation was announced as the operating contractor in September 1952. Goodyear held this role until 1986, when the contract was taken over by Martin Marietta Energy Systems. USEC took overall responsibility for the plant in 1993, keeping the operating contract with Martin Marietta. In 1995 that became Lockheed Martin due to the merger of Martin Marietta with Lockheed.

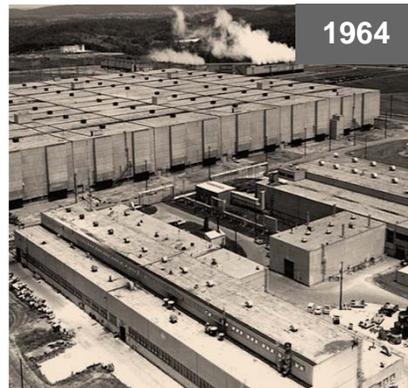
In May 2001, the Portsmouth plant (located in Piketon, Ohio) ceased operations and was placed in cold standby, a function that would allow the plant to be restarted within a short period of time if it needed to be. In 2006, the site work shifted into cold shutdown transition in preparation for future D & D.



Portsmouth Gaseous Diffusion Plant History



1954



1964



2006



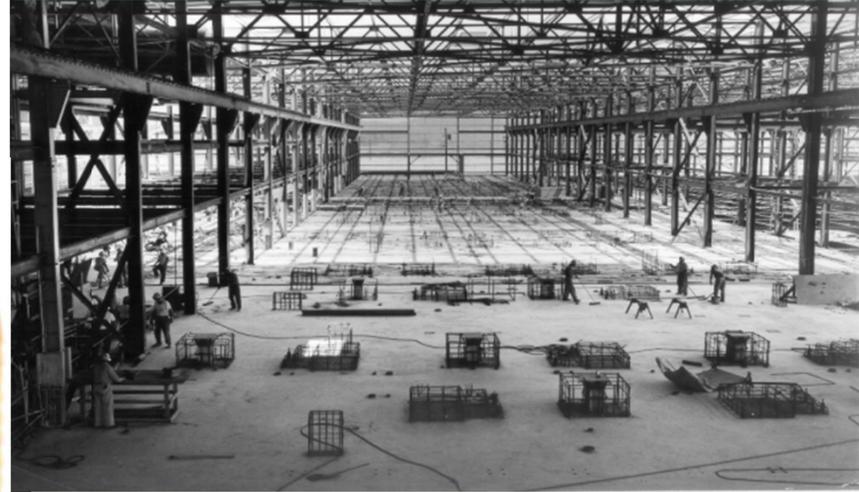
2011



1952-1956

- In 1952 the AEC selected the Ohio River Valley for the last of three uranium enrichment plants in the country
- The plant was built between 1952 and 1956 to enrich uranium by using gaseous diffusion technology. In 1954 enrichment operations began.

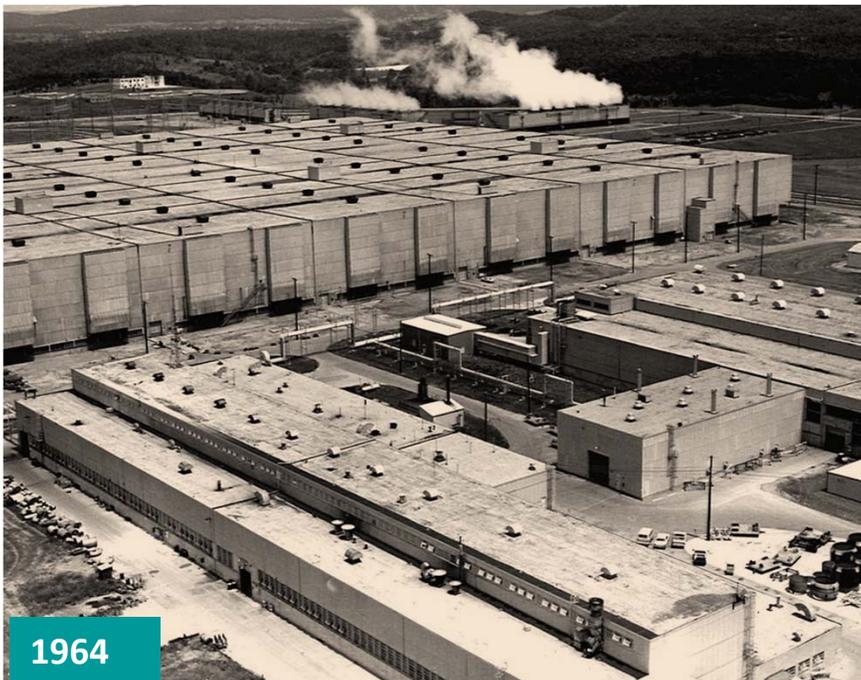
Portsmouth Gaseous Diffusion Plant Construction





1960's-1970's

- Weapons grade material was produced from 1954 to 1964
- Operations resulted in groundwater and soil contamination from several hazardous chemicals, but primarily from extensive use of the industrial degreaser TCE;
- Enrichment plant upgrades result in 7,000 tons of scrap metal (almost as much metal as is in the Eiffel Tower) and old process converter shell equipment.





1978-1989

- In 1978 a 14-ton UF₆ cylinder rupture results in implementation of a public warning system.
- In 1979 DOE begins construction on a \$3 billion Gas Centrifuge Enrichment Plant onsite. The project was canceled in 1985 before becoming operational.



Gas Centrifuge Enrichment Plant



UF₆ Cylinder



Gas Centrifuge enrichment machines

- Cleanup Program begins at the Portsmouth plant
 - In 1989 the Office of Environmental Management was established to address the Cold War environmental legacy across the country



1990-1995

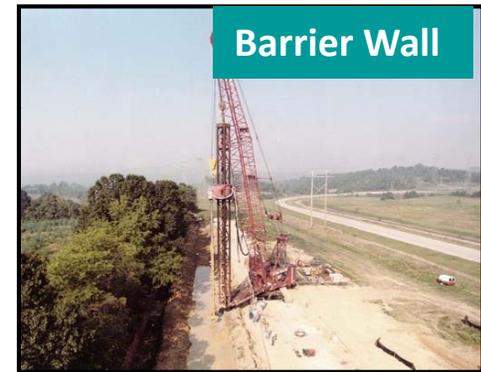
- In 1991 Portsmouth stopped producing highly enriched uranium
- The Energy Policy Act created USEC to run the GDP, as well as the D&D fund to clean up the gaseous diffusion plants
- In 1993 USEC assumes uranium enrichment enterprise under a lease agreement with DOE.



- A trench system and groundwater treatment facility was built to prevent migration of contaminated groundwater into Little Beaver Creek



- In 1993 in-situ soil mixing technology was demonstrated.



- In 1994 a subsurface clay mortar barrier wall was installed as an interim action at the southern boundary to mitigate contaminated groundwater migration.



1995-2000

- Completed remediation of lagoons and surface impoundments
 - Cleanup itself generates large volumes of wastes – drums/containers of soils, sludge, personal protective equipment, rags, oils, etc.
- Closed and capped the last three on-site landfills
 - 1998: X-735 Sanitary Landfill and X-749B Peter Kiewit Landfill
 - 2000: X-734 Construction Spoils Landfill
- In 1996 the first D&D project was completed
- In 1997 an 18-acre lime sludge lagoon was converted to a prairie



- In 2000 a project begins to size-reduce, containerize and remove over 8,000 tons of contaminated scrap metal



2000-2006

- In 2003 3,000 hybrid poplar trees were planted as part of an approved remedy for groundwater cleanup on the southern end of the plant



Poplar Grove

- Shipped deteriorating containers of legacy waste off-site for disposal, approximately 8,400 tons, more metal than in the Eiffel Tower



- USEC stopped all enrichment production in 2001. The plant was put into “Cold Standby”.
- In 2006 shifted to “Cold Shutdown”.
- Cleaned out more than 1,300 old centrifuge casings and equipment from centrifuge facilities.



Removal of the last centrifuge casing



2006-Present

- Working with Ohio EPA, DOE continues extensive cleanup actions at the site
- Demolished and removed at least 16 inactive surplus facilities
- Completed construction on DUF₆ facility



2006



2011





Site Ownership/DOE Responsibilities

Today, DOE's role includes:

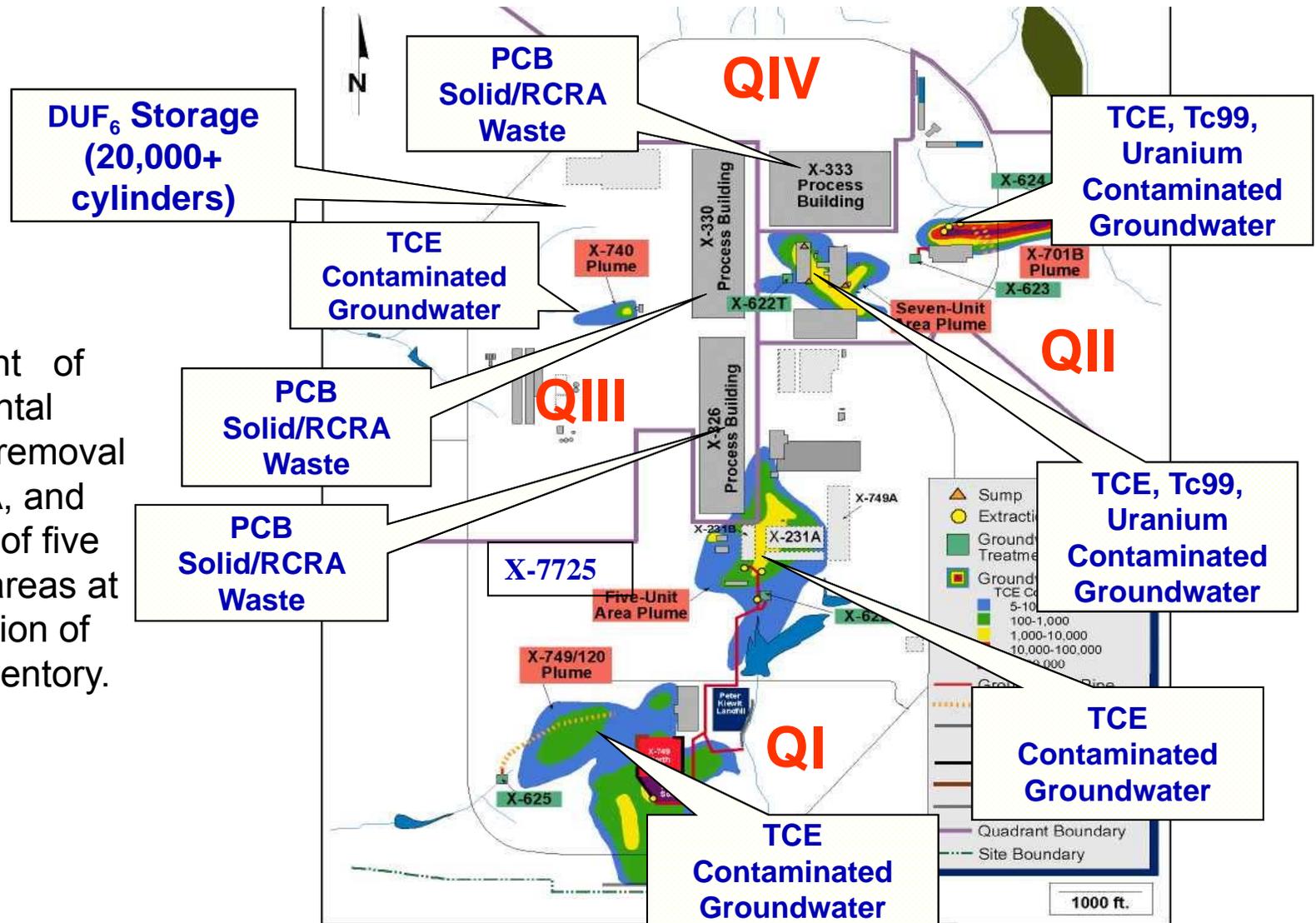
- Owner/landlord
- Environmental cleanup
- Disposal of remaining legacy waste
- Removal of inactive facilities
- Storage and conversion of depleted uranium hexafluoride (DUF_6)
- Interim storage/disposition of surplus uranium materials
- Planning for D&D of gaseous diffusion plant





Portsmouth Site Cleanup Challenges

Today the Department of Energy's environmental challenges focus on removal of radioactive, RCRA, and PCB waste; cleanup of five groundwater plume areas at the site; and conversion of the DUF₆ cylinder inventory.





Portsmouth Contractors



U.S. DEPARTMENT OF
ENERGY



B & W Conversion Services



Portsmouth Contractors

There are three contractors at the Portsmouth site responsive to the EEOICPA program.



- FBP is the Portsmouth Decontamination and Decommissioning contractor.
- WEMS is the Facility Support Services contractor responsible for infrastructure maintenance, training, security and other services.
- BWCS operates the DUF_6 plant, which takes depleted uranium hexafluoride and converts it for reuse or disposal.



Records Maintained by Portsmouth Contractors

WEMS:

- Access to current employment, medical and training records.
- Access to past USEC employee medical and employment records; are in contact with former contractors' for employment dates
- DOE Contractor legacy records which include: WEMS and previous contractor project, engineering, vendor manuals, operations, ESH&Q, medical, employee and training records.
- DOE Contractor microfiche, project photos and audiovisual records.
- Manages Administrative Records at Environmental Information Center located at Endeavor Center.

FBP

- Maintains records for current employees; maintains Industrial Hygiene database for current employees and past contractors.
- Maintains past contractor employee training records
- Manages and maintains current FBP facility records and documents
- DOE Contractor records which include: FBP contractor project file and contractor submittals, engineering, vendor manuals, operations, ESH&Q, medical, employee and training records as well as project photos and audiovisual records
- Maintains controlled documents, controlled distributions, and forms control
- Provide records for the Administrative Records

BWCS

- Access to employment and medical records for current and former contractor employees



All Paper Records at Portsmouth

There are over 370.37 square yards of paper records. This volume is equivalent to about two and a half Leaning Tower of Pisa's!





WEMS Records Vault for DOE Contractor legacy records

- Records received prior to July 1998 are in hard copy.
- Records received after July 1998 are in hard copy and electronic format.
- Approximately 10,000 cubic feet of records received from USEC are in a mixed format.





FBP Records Vault



These are the records currently held by FBP

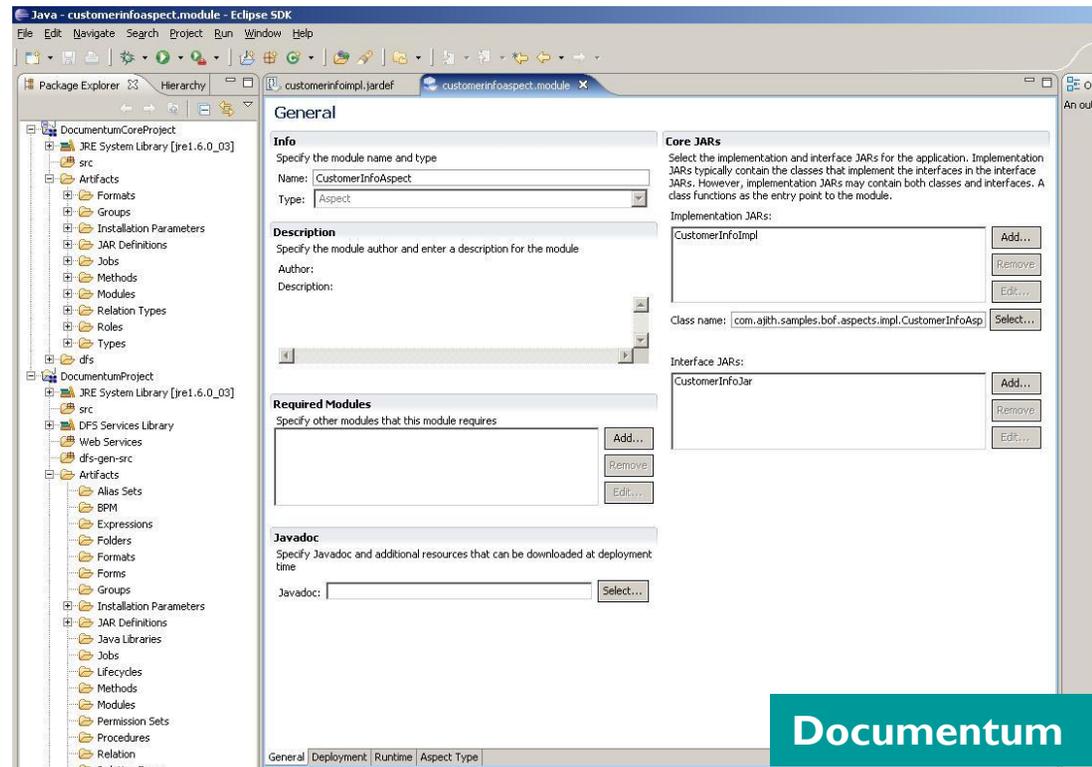


Records Maintained by BWCS Portsmouth



BWCS does not maintain many physical files....

...rather, their files are stored in a program called Documentum.





All Possible Records are Searched at Portsmouth and Paducah

Records used to Verify Employment and Site Presence

Worker Records	Facility Records
<p>Personnel Files Payroll Records Security Clearance Timecards Pension/Benefit Plan Medical Records Industrial Hygiene Radiation Exposure Accident/Incident</p>	<p>Badge and Pass Logs Training Attendance Employee Rosters Site Phone Books Databases Payment in Lieu of Taxes Contract Files Other</p>



Concerns We Have Noticed

PPPO is receiving forms with errors that may impact the claims process.

- Forms are coming in with the certification already filled in
- Claims that do not belong to PPPO are being sent to us
- Claims are coming in filled out incorrectly (i.e. a claim sent to both Paducah and Oak Ridge that is only showing employment at Oak Ridge on the request form, even though the employment history shows Paducah as well as Oak Ridge)

Claims are being sent again after submission of the response; these claims are not Supplemental's.



DOL Questions

1. Paducah Remediation. What do the remediation activities involve (radiation, hazardous waste, scrap). Also, the site listing identifies the major contractors associated with the remediation contracts. Is there a list anywhere of the subcontractors that worked for these major contractors?

- **The Paducah remediation involves D & D of inactive facilities as well as remediation of soils, groundwater and surface water. The various media such as demolition waste, soils and groundwater contain radiological and chemical contamination.**

- **The following are subcontractors working for the major contractors**

- | | |
|--|--|
| ✓ Stoller | ✓ Wastren |
| ✓ GEO | ✓ Service Contracts |
| ✓ B&W | ✓ Diversified Management |
| ✓ NYSIS | ✓ E2 Consulting |
| ✓ Focus Management | ✓ Corporate Reachback (B&W) |
| ✓ DeNuke | ✓ Bartlett Services |
| ✓ SAIC | ✓ Abell Rail Service & |
| ✓ ITS | Excavating |
| ✓ Geosyntec | ✓ Harold Coffey Construction |
| ✓ Seminole | Co |
| ✓ LSRS | ✓ Alert Alarm |
| ✓ LATA | ✓ Occunet |
| ✓ DMC | ✓ Waste Path |
| ✓ URS Professional Solutions, LLC | ✓ Terminix |



DOL Questions

2. What records do we have and what records do we not have? (see slide 49)
 - ✓ **Personnel Files**
 - ✓ **Payroll Records**
 - ✓ **Security Clearance**
 - ✓ **Timecards**
 - ✓ **Pension/Benefit Plan**
 - ✓ **Medical Records**
 - ✓ **Industrial Hygiene**
 - ✓ **Radiation Exposure**
 - ✓ **Accident/Incident**
 - ✓ **Badge and Pass Logs**
 - ✓ **Training Attendance**
 - ✓ **Employee Rosters**
 - ✓ **Site Phone Books**
 - ✓ **Databases**
 - ✓ **Payment in Lieu of Taxes**
 - ✓ **Contract Files**

3. What can be verified with subcontractors?
 - ✓ **Portsmouth: Security clearances, training records, RAD records, medical charts (if they went to the on-site hospital), HR departments (some Personnel, mostly dates of employment)**
 - ✓ **Paducah: RAD information, contractor required training, security clearances, and some RAD worker permits**