



U.S. DEPARTMENT OF **ENERGY**

Paducah Gaseous Diffusion Plant (PGDP) *Industry Workshop*

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Office of Environmental Management
Portsmouth/Paducah Project Office
U.S. Department of Energy



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PGDP Industry Workshop

The purpose of this Industry Interest Workshop is to communicate with prospective businesses that may be interested in either the operation of the PGDP as a uranium enrichment facility or have an interest in reindustrialization of various plant facilities.

- ✓ PGDP facilities are currently owned by DOE and leased to the United States Enrichment Corporation (USEC).
- ✓ In preparation for future site use, DOE is evaluating if opportunities exist for private industry to operate the facility for commercial uranium enrichment or individual facilities, as they become available, in the event that USEC returns the facilities to DOE.
- ✓ The PGDP is a large industrial site that may have radiological or chemical contamination within or around the perimeter of the facilities. Facility contamination will need to be considered in planning for future site use.
- ✓ DOE is responsible for implementing the environmental cleanup program under the Federal Facilities Agreement between DOE, Kentucky, and the U.S. Environmental Protection Agency.



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PGDP Industry Workshop

- ✓ This workshop is not a pre-solicitation
- ✓ This workshop is not related to any current procurements
- ✓ This workshop does not support potential decontamination and decommissioning (D&D) of the PGDP and there will be no questions or discussions related to D&D
- ✓ Information discussed at this workshop may be used in future re-use planning for the site.
- ✓ Below are links to additional information.
 - www.paducaheic.com
 - www.pppo.energy.gov
 - www.pgdpcab.org
 - www.energy.gov
 - www.oakridge.doe.gov
 - www.emcbc.doe.gov





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Paducah Gaseous Diffusion Plant Overview

3,556 acre reservation -- about 750 acres in industrial area
Borders West Kentucky Wildlife Management Area
3 miles south of the Ohio River and 12 miles west of Paducah



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Site History

- In 1950, the Atomic Energy Commission selected the former Kentucky Ordnance Works site for the second of three planned uranium enrichment plants.
- Construction began in 1951. The first product was shipped in 1952.
- Construction 1951-54
- Enrichment began 1952
- Met national defense demands until mid 1960s
- Enriching for commercial nuclear power since 1963



(Photo of a floodwall mural by Robert Dafford marking the plant's 50th anniversary.)



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Paducah Site Economic Impact

- ✓ The United States Enrichment Corporation (USEC) has ~1,200 employees and is western Kentucky's largest industrial employer.
- ✓ The U.S. Department of Energy (DOE) and its contractors employ ~800.
- ✓ The enrichment plant buys about \$500 million in power per year, almost all from the Tennessee Valley Authority (TVA).
- ✓ In its nearly 60 years of operation, the plant has pumped more than \$5 billion into the regional economy.



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Paducah Site DOE Missions

DOE and its predecessor agencies operated the plant until 1993. Today, USEC runs as a private entity the enrichment facilities. DOE's role includes:

- ✓ Owner/landlord
- ✓ Environmental cleanup
- ✓ Disposal of legacy waste
- ✓ Decontamination and Decommissioning (D&D) of surplus facilities
- ✓ Storage and conversion of depleted uranium hexafluoride (DUF₆)



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Paducah Site DOE Missions

Depleted Uranium Hexafluoride Plant



Environmental Cleanup



Firing Range Removal Action

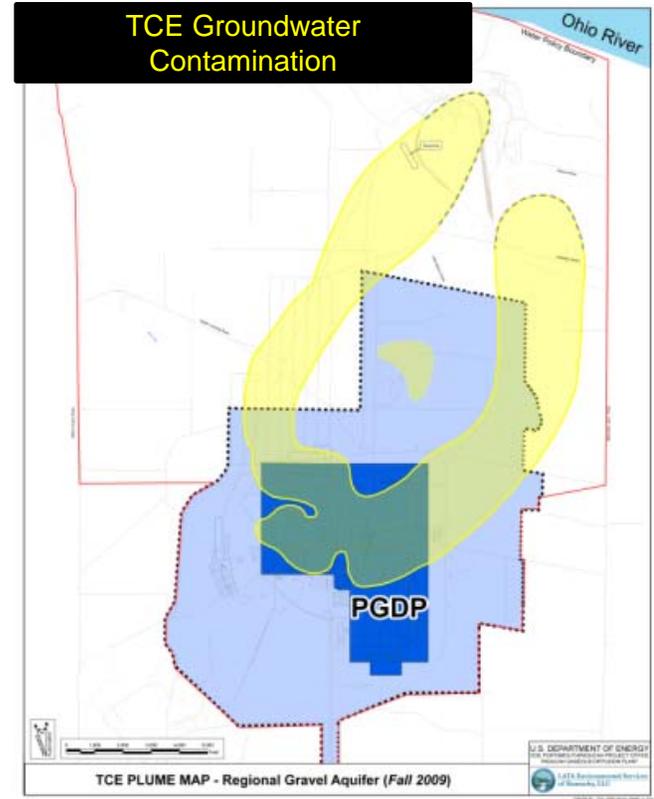


D&D of an Inactive Facility



Offsite Waste Shipment

TCE Groundwater Contamination

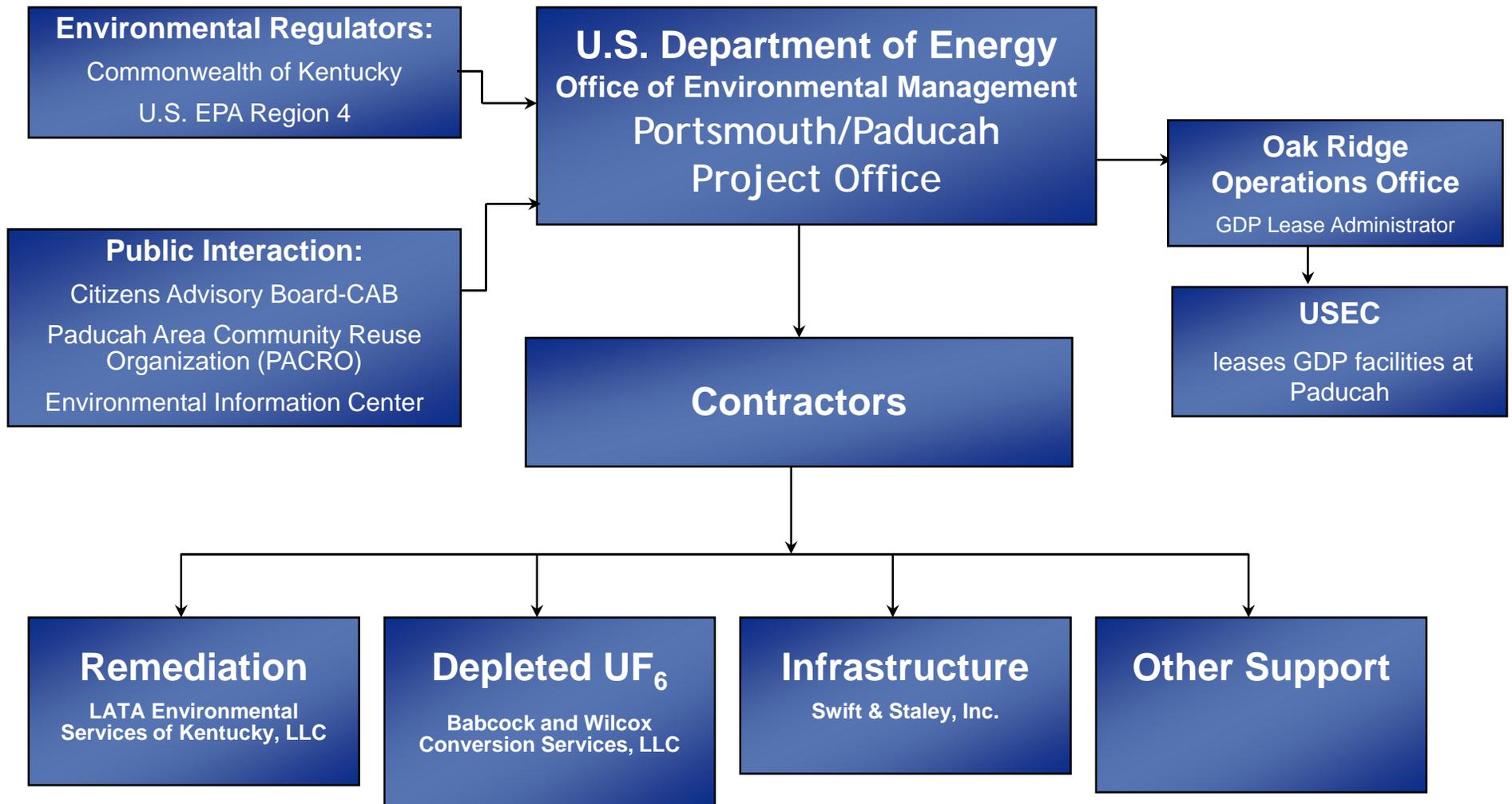


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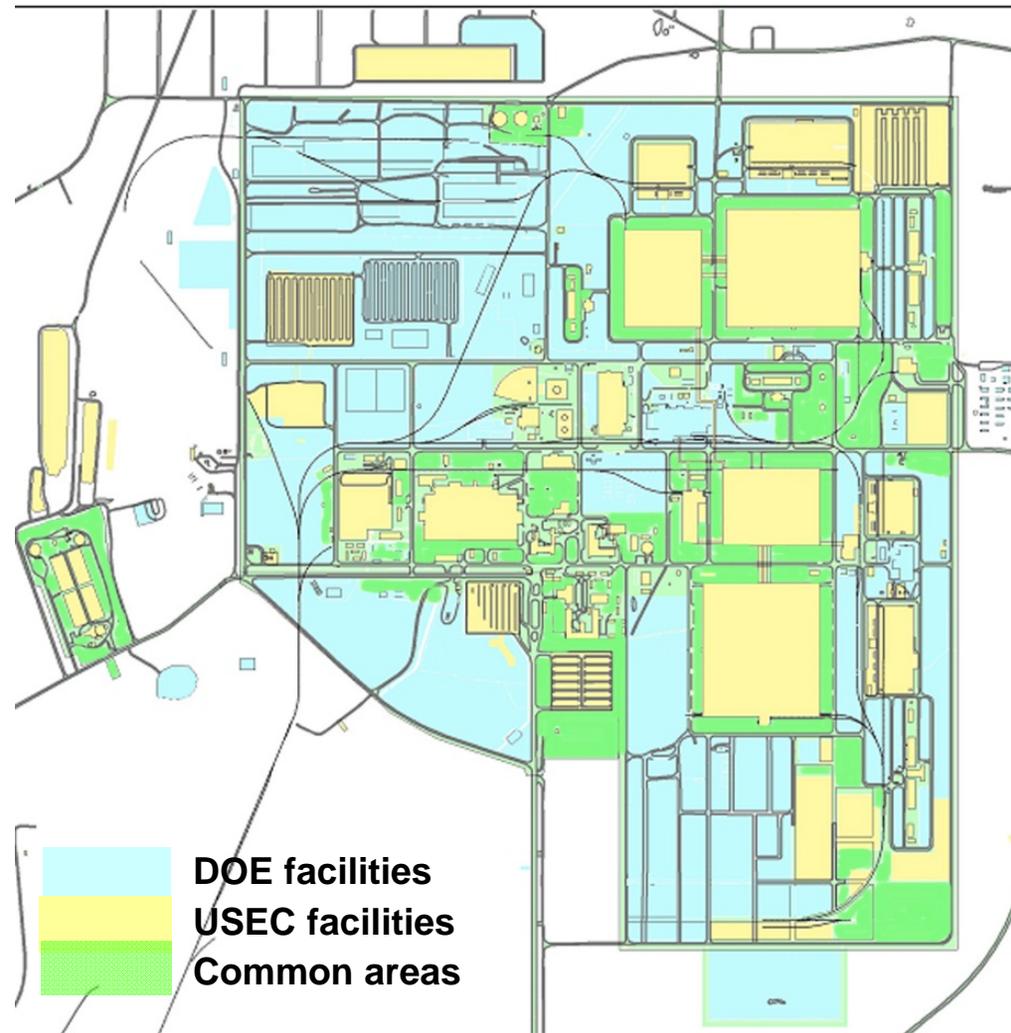
Paducah Site At A Glance



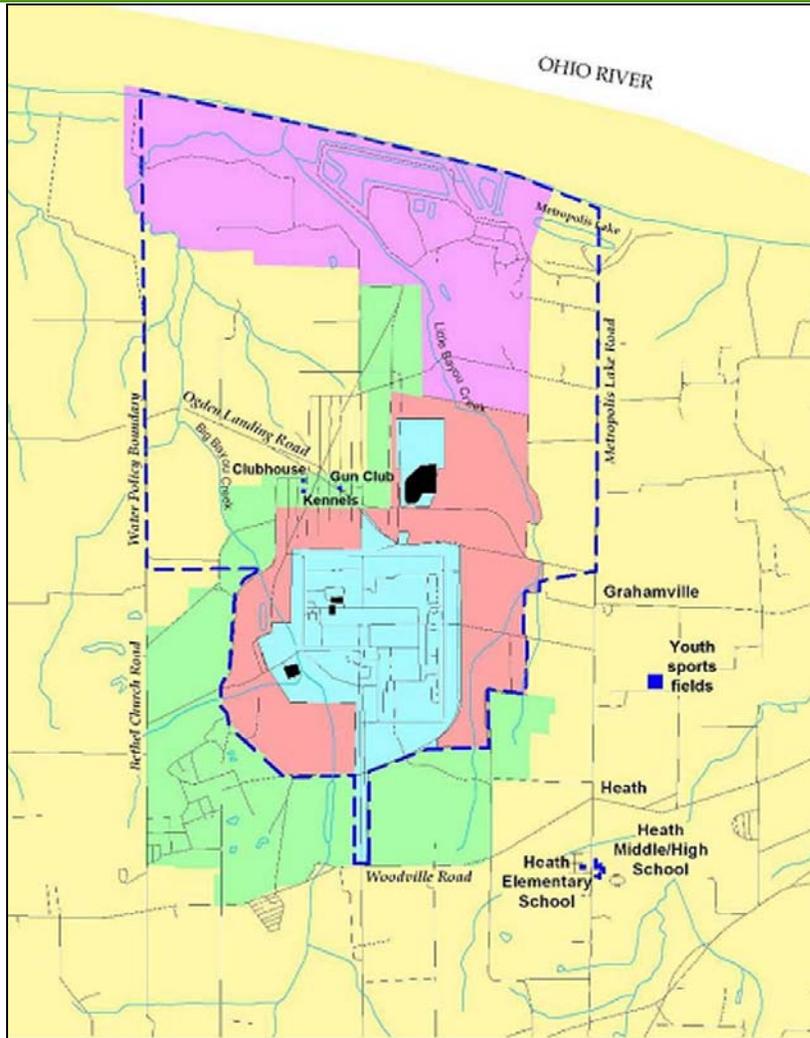
A Shared Site

DOE and USEC use the enrichment plant and many of its facilities.

- DOE activities are conducted under DOE Authority governed by DOE Orders.
- USEC leases key facilities, such as the Administration Building, the Guard and Fire Headquarters, the Equipment Cleaning Building, Technical Services Building, Maintenance and Stores Building, and all process-related buildings.
- USEC uranium enrichment activities are conducted under license issued by the Nuclear Regulatory Commission.
- Authority for activities conducted in common areas are dependent on the agency performing the work.



Land Use



Pink – TVA Shawnee Fossil Plant
Peach – DOE Land Licensed to WKWMA
Green – WKWMA Owned Land
Blue – DOE Owned Property

Most of the DOE-owned land is licensed to the Commonwealth of Kentucky as part of the West Kentucky Wildlife Management Area (WKWMA).

- Blue area includes DOE facilities, operating enrichment plant facilities, and the depleted uranium conversion facility
- TVA owns a large tract of land north of the enrichment plant where they built power plant



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Summary of Gaseous Diffusion



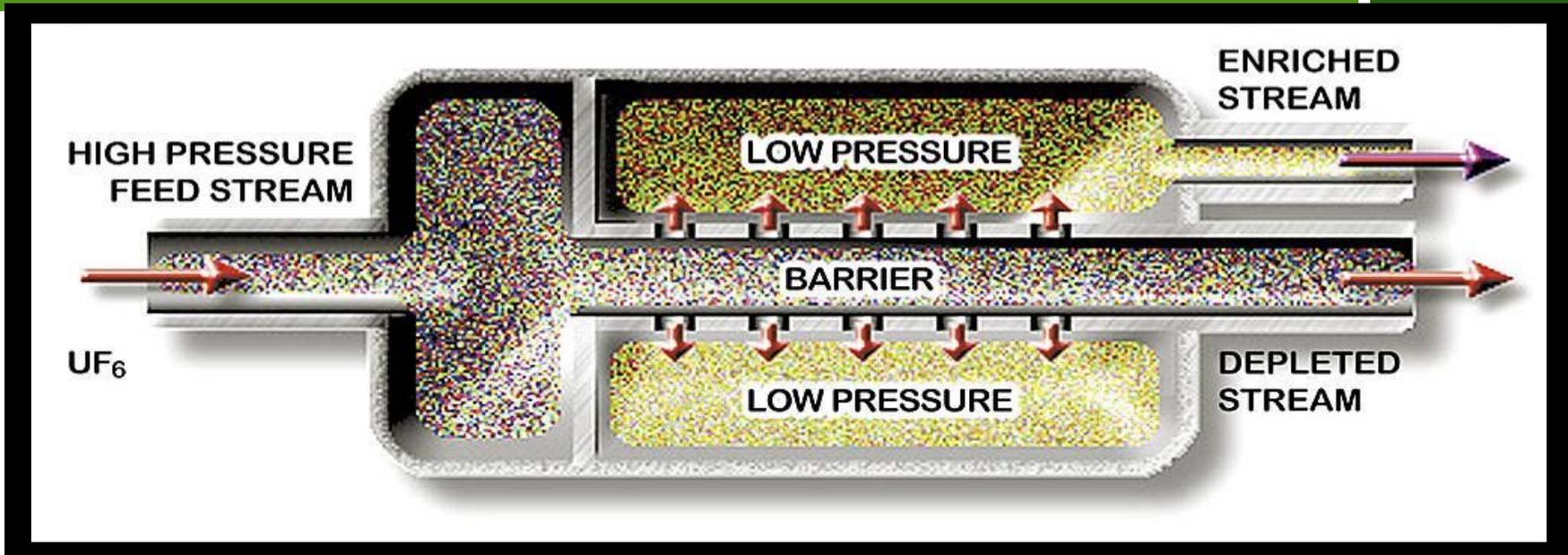
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Gaseous Diffusion Process



- Enrichment process separates lighter uranium-235 isotopes from heavier uranium-238. Gas is forced through a series of porous membranes (barriers) with microscopic openings. Uranium-235 moves through the membranes more easily, increasing the concentration of uranium-235 as it moves through the process.
- A set of enrichment equipment, known as a “stage,” includes an electric motor powering a compressor that forces the gas through the barriers located in the converter.
- There are four process buildings with 74 acres under roof.



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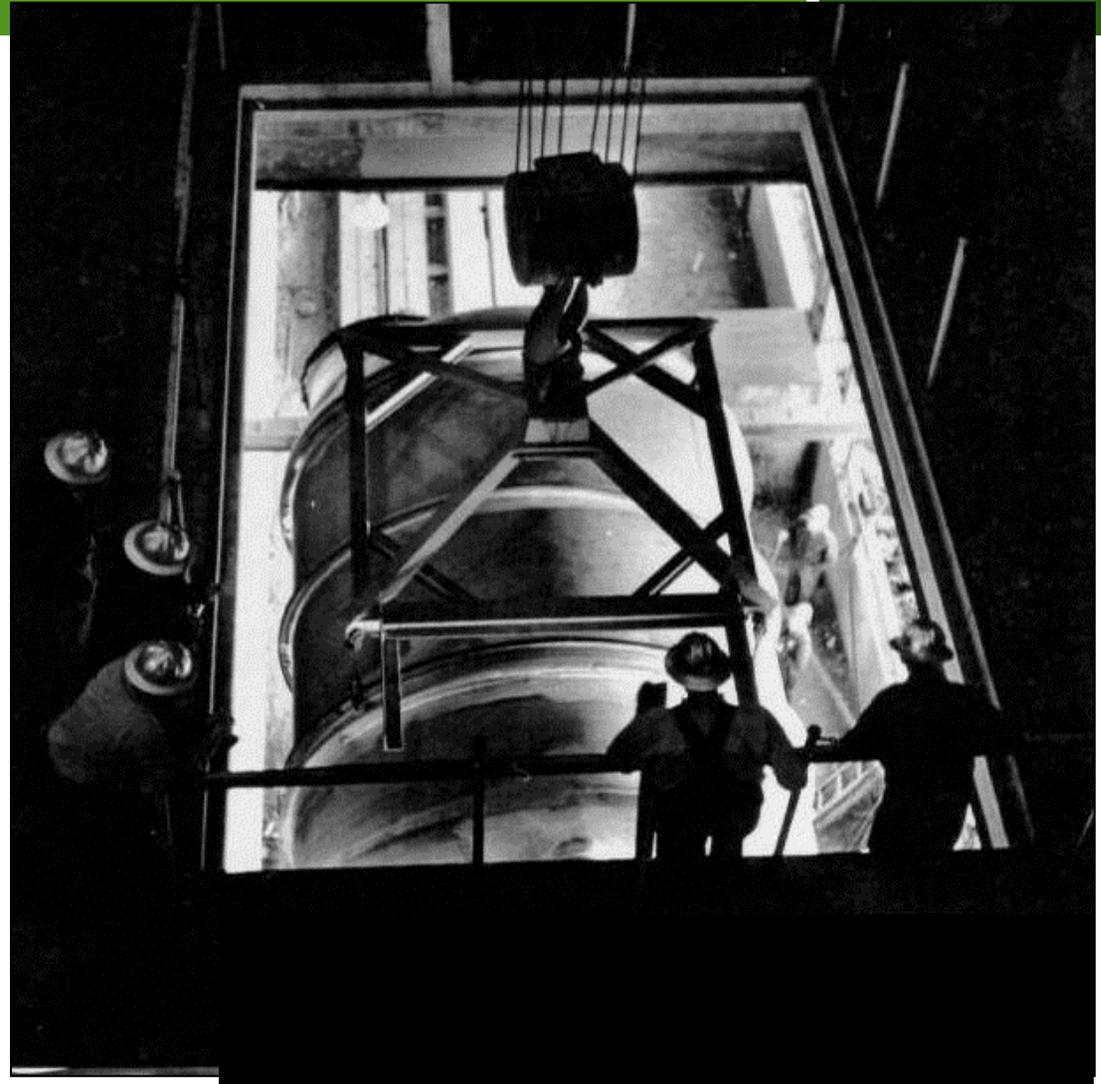
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Gaseous Diffusion Process

- ✓ There are 1,760 stages in the four process buildings and 60 stages in the purge and product facility and about 400 miles of process piping. Stages are arranged in groups called cells.
- ✓ A converter from the original construction is shown at right.



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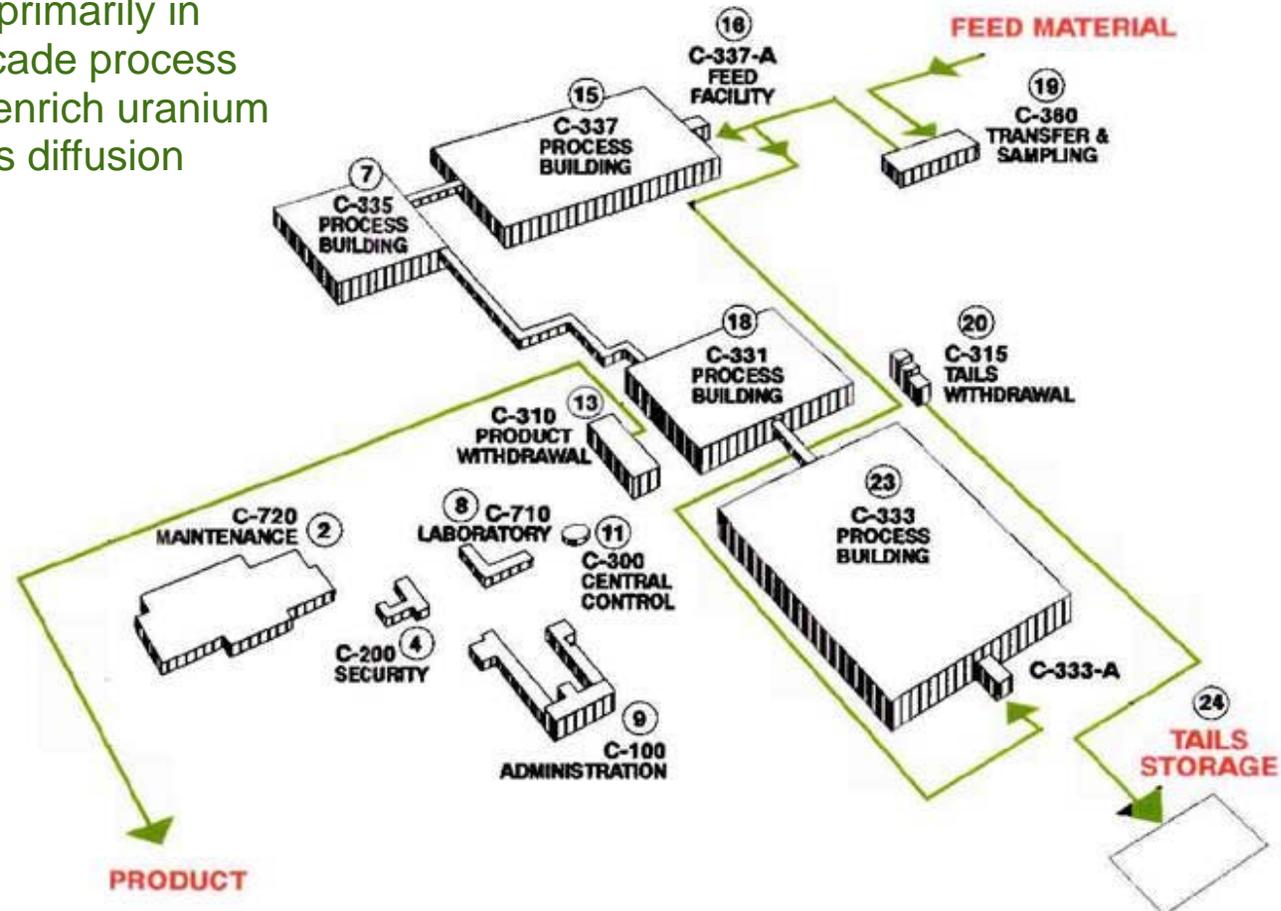
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Gaseous Diffusion Process

- ✓ The enrichment process at PGDP occurs primarily in four large cascade process buildings that enrich uranium by the gaseous diffusion process.



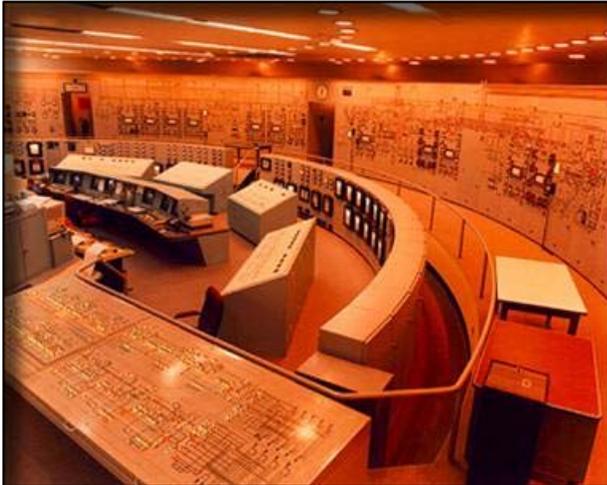
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C-300 Central Control



- ✓ The Central Control Facility monitors, coordinates, and/or controls critical plant processes, power distribution, utilities, communications, plant alarm systems, and emergency operations.
- ✓ More than 10,000 miles of cable supply electronic information about the plant's process systems to this building.
- ✓ The Central Control Facility houses four main functions: the plant shift superintendent, the cascade coordinator, the power supervisor, and the emergency operations center.



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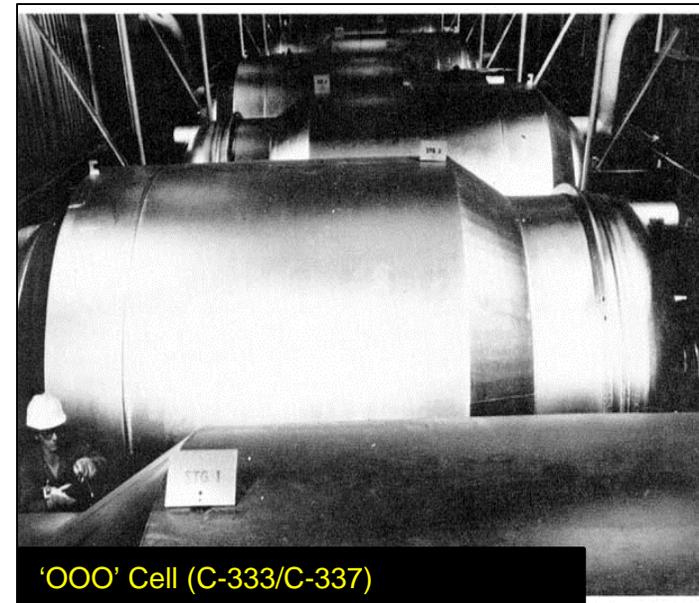
Cascade

- ✓ Paducah Plant operates in a parallel configuration allowing the number of stages in series to shift as needed for production efficiency.
- ✓ The “lower” cascade is made up of C-331 and C-333 and the “upper” cascade is made up of C-335 and C-337.
- ✓ Product withdrawal occurs in C-310 and tails withdrawal occurs in C-315.
- ✓ UF₆ is fed into the cascade from C-333-A and C-337A utilizing steam heat and containment autoclaves.



Cascade

- ✓ Through different valving configurations, the plant is able to enrich uranium at higher assays up to 5.5 wt. % ^{235}U .
- ✓ The larger process buildings are approximately 1100 feet long by 970 feet wide, and 83 feet high. Each large process building contains approximately 26 acres under roof.
- ✓ The smaller process buildings are approximately 804 feet long by 640 feet wide, and 68 feet high. Each smaller process building contains approximately 13 acres under roof.
- ✓ Each process building has a dedicated switchyard and set of cooling towers.



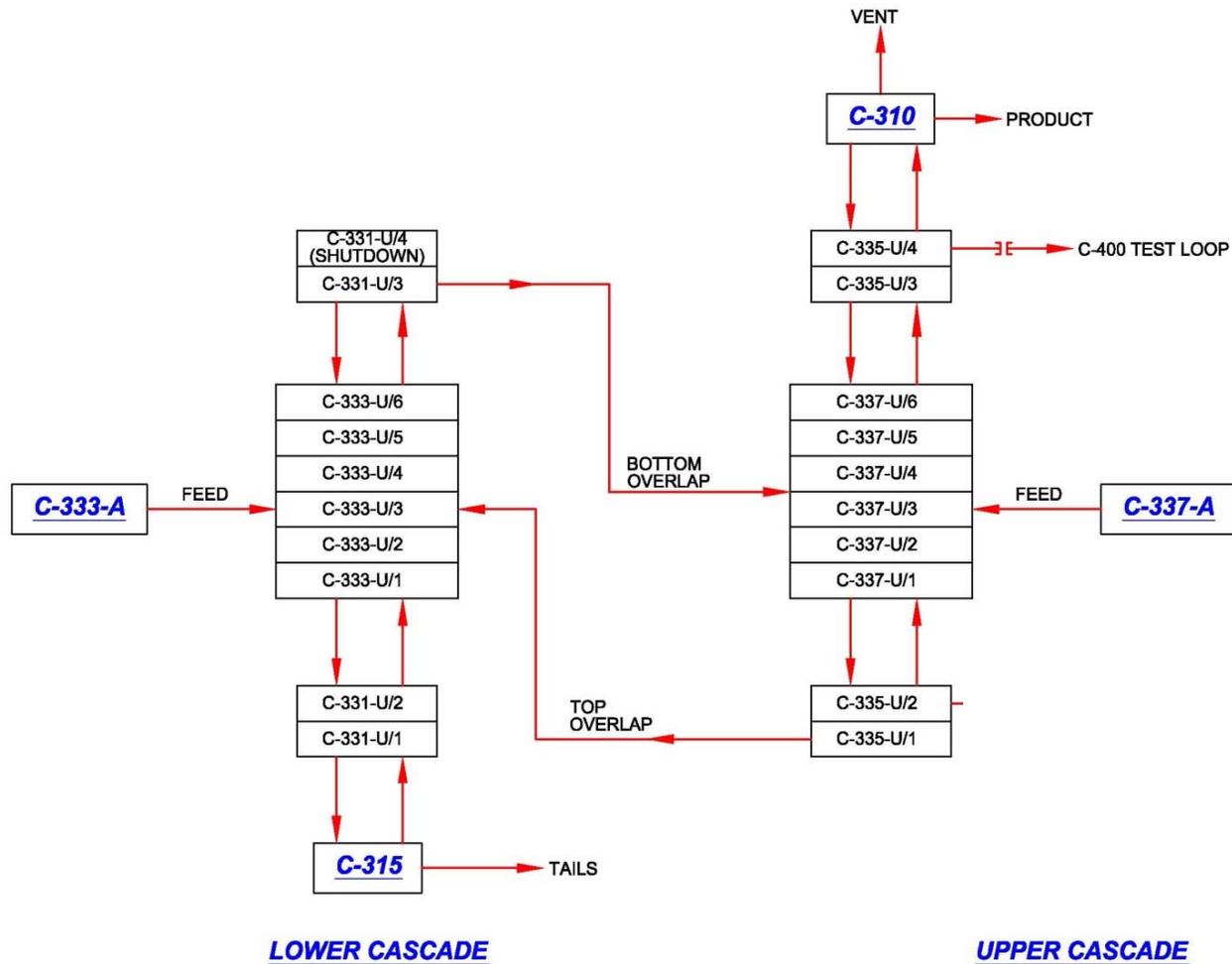
Cascade C-333



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PADUCAH CASCADE GENERALIZATION OF UF₆ FLOW



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C-310 Product Withdrawal

- ✓ Enriched uranium is withdrawn from the cascade at the Product Withdrawal Facility. This building is equipped with withdrawal positions to accommodate either 2.5-ton (30B) or 10-ton (48X) product cylinders.
- ✓ The large tower next to the west side of the building is a 200-foot stack used to vent gases from the enrichment process.



C-315 Tails Withdrawal

- ✓ At the Depleted Uranium (Tails) Withdrawal Facility, the uranium that is depleted of most of its U-235 atoms is pulled from the cascade process and drained into 14-ton cylinders for storage.
- ✓ This facility may fill between one to four cylinders per day. Once filled, the cylinders are moved with cylinder haulers to storage yards.



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C-360 Toll Transfer and Sampling

- ✓ The C-360 Toll Transfer and Sampling Facility provides systems for receiving, sampling, transferring and shipping cylinders containing UF_6 .
- ✓ This facility provides all operations necessary for fulfilling enrichment service contracts for private industry. Feed material, as well as the plant's enriched product, is weighed and tested at this facility to ensure it meets industry standards.
- ✓ Four autoclaves, similar to the ones housed in the vaporizer facilities, are used to sample and/or transfer UF_6 .
- ✓ A new annex facility is used to prepare customer orders for shipment.



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Process Facilities

Facility number	Function	Floor area (square feet)	Construction date
Process buildings			
C-300	Central Control Building	16,022	1953
C-310	Purge and Product Building	112,240	1952
C-310-331-A	Enclosed Bridge	200 linear feet	1952
C-310-331-B	Tie Lines	200 linear feet	1952
C-310-410	Tie Lines	520 linear feet	1952
C-310-A	Product Withdrawal Building	3,276	1952
C-315	Surge and Tails Building	16,040	1952
C-315-331	Tie Lines	10,240; 5,800	1952
C-331	Process Building	1,029,120	1952
C-331-333-A	Enclosed Bridge	300 linear feet	1952
C-331-333-B	Tie Line (East)	300 linear feet	1952
C-331-333-C	Tie Line (West)	300 linear feet	1952
C-331-335	Tie Line	1,350 linear feet	1952
C-331-410	Tie Line	629 linear feet	1952
C-333	Process Building	2,130,120	1952
C-333-A	Feed Vaporization Facility	8,305	1952
C-335	Process Building	1,029,120	1954
C-335-337-A	Enclosed Bridge	200 linear feet	1954
C-335-337-B	Tie Line (North)	200 linear feet	1954
C-335-337-C	Tie Line (South)	200 linear feet	1954
C-337	Process Building	2,130,120	1954
C-337-A	Feed Vaporization Facility	8,556	1960
C-340	Powder Building/Decontamination and Decommissioning	67,428	1955
C-410	Feed Plant Complex	128,869	1953-57
C-620	Air Compressor Room	10,000	1953
C-342	Ammonia Dissociator Building	1,242	1958
C-342-A	Ammonia Dissociator Addition	1,224	1956
C-342-B	Ammonia Dissociator Tank Shelter	Tank Area 2304	1978
C-350	Drying Agent Storage Building	1,570	1973
C-360 and C-360-A	Toll Transfer and Sampling Building	17,800	1982



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Major Plant Systems

- ✓ R114 (freon) – Removes the heat of compression from UF6 gas stream to maintain target cell operating temperatures.
- ✓ High Pressure Fire Water System – Provides water to 100,000 sprinkler heads installed in the plant that cover approximately 8.5 million square feet of buildings and equipment.
- ✓ Recirculating Cooling Water (RCW) – Removes heat of compression generated by the process.
- ✓ Ventilation Systems – Removes heat generated by the process and heat resulting from electrical losses.
- ✓ Auxiliary Power – Required to operate lube oil pumps, lighting, ventilation systems, seal exhaust pumps, motor operated valves, etc.
- ✓ Cell Trip – Shuts down the cascade motors as a safety function.
- ✓ Gas Leak Detection – Detects and alerts personnel of a UF6 release.





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Site Infrastructure

Switchyards

Electrical switchyards and switch houses				
Facility number	Function	Floor area (square feet)	Construction date	
C-531-1	Switch House	31,400	1952	
C-531-2	Switchyard	135,160	1952	
C-531-3A	Fire Valve House No. 1	144	1952	
C-531-3B	Fire Valve House No. 2	144	1952	
C-532	Relay House	7,784	1952	
C-533-1	Switch House	37,360	1953	
C-533-2	Switchyard	218,860	1953	
C-533-3A	Fire Valve House No. 1	144	1953	
C-533-3B	Fire Valve House No. 2	144	1953	
C-533-3C	Fire Valve House No. 3	144	1953	
C-533-3D	Fire Valve House No. 4	144	1953	
C-535-1	Switch House	28,000	1954	
C-535-2	Switchyard	165,680	1954	
C-535-3A	Fire Valve House No. 1	144	1954	
C-535-3B	Fire Valve House No. 2	144	1954	
C-535-4	Test Shop	480	1954	
C-536	Relay House	7,784	1954	
C-537-1	Switch House	42,140	1954	
C-537-2	Switchyard	284,200	1954	
C-537-3A	Fire Valve House No. 1	144	1954	
C-537-4	Test Shop	480	1954	
C-540-A	Oil Pump House	312	1952	
C-541-A	Oil Pump House	312	1952	



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Site Infrastructure

Switchyards



- ✓ C-531, C-533, C-535, and C-537 switchyards contain the 161 kilovolt (kV) electrical system components necessary for operation of the PGDP.
- ✓ The plant typically uses between 900 megawatts and 2000 megawatts of electrical power per hour, depending on the plant's production targets and availability of reasonably priced power.
- ✓ The plant was built with the capacity to use up to 3000 megawatts.
- ✓ Electrical power comes into the plant at 161,000 volts through the overhead transmission lines from TVA's Shawnee Steam Plant and Electric Energy, Inc. (EEI) at Joppa, Illinois.
- ✓ The power flows through more than 80 circuit breakers to large transformers (35) located throughout the plant.



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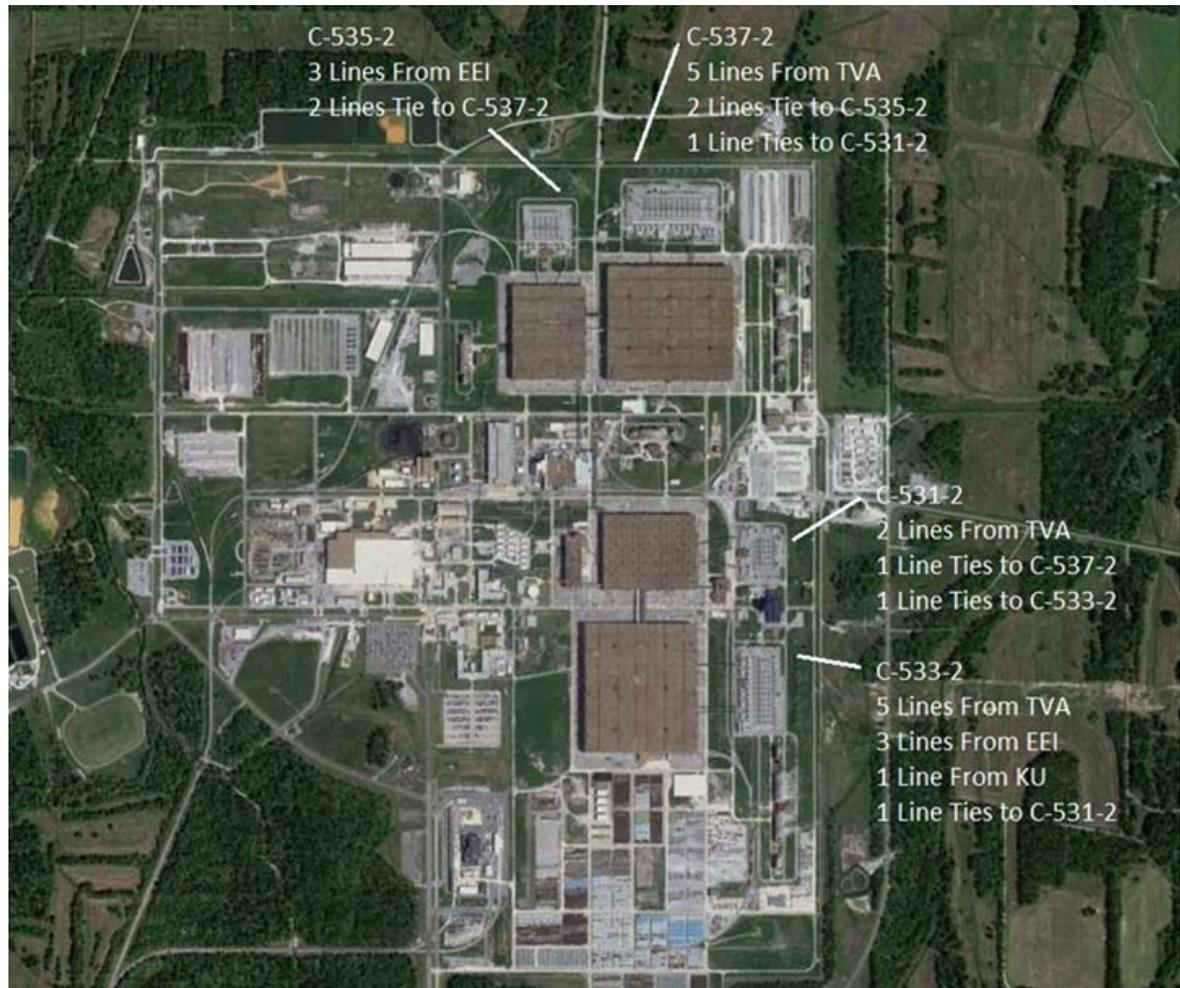
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Site Infrastructure

Switchyards

- ✓ Of the eighteen transmission lines entering the PGDP, twelve are owned by the Tennessee Valley Authority (TVA) and six are owned by EEI.
- ✓ Kentucky Utilities owns one line that comes to the plant and goes out but does not provide feed to the plant.
- ✓ In addition the four PGDP switchyards are connected by five 161kV tie lines owned by DOE and leased by USEC.



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Site Infrastructure

Cooling Towers and Pump Houses

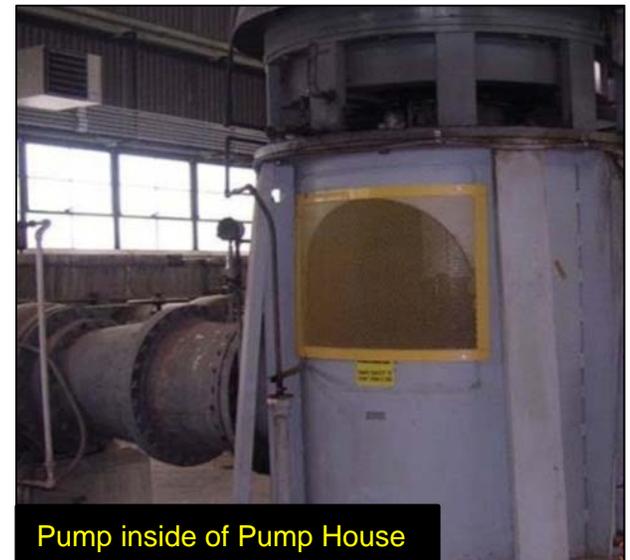
Cooling towers and pump houses			
Facility number	Function	Floor area (square feet)	Construction date
C-631-1	Pump House	9,700	1952
C-631-2	Cooling Tower	15,248	1953
C-631-3	Pump House (Firewater)	1,196	1959
C-631-4	Blending Pump House	1,540	1982
C-631-5	Blending Cooling Tower (West)	3,024	1953
C-631-6	Blending Cooling Tower (East)	3,024	1953
C-633-1	Pump House	10,245	1953
C-633-2A	Cooling Tower (South)	16,085	1953
C-633-2B	Cooling Tower (North)	16,085	1953
C-633-3	Blending Pump House	1,984	1953
C-633-4	Blending Cooling Tower (North)	4,536	1953
C-633-5	Blending Cooling Tower (South)	4,536	1953
C-633-6	Sand Filter Building	260	1983
C-635-1	Pump House and Piping	8,505	1954
C-635-2	Cooling Tower	15,428	1954
C-635-3	Blending Pump House	1,984	1982
C-635-4	Blending Cooling Tower (North)	2,520	1954
C-635-5	Blending Cooling Tower (South)	3,024	1954
C-635-6	Process Waste Heat Utilization Pump House	2,566	1983
C-637-1	Pump House	10,245	1954
C-637-2A	Cooling Tower (South)	22,100	1954
C-637-2B	Cooling Tower (North)	22,011	1954
C-637-3	Blending Pump House	2,048	1982
C-637-4	Blending Cooling Tower (North)	3,528	1954
C-637-5	Blending Cooling Tower (South)	3,528	1954
C-637-6	Sand Filter Building	260	1982



Site Infrastructure

Cooling Towers and Pump Houses

- ✓ The cooling towers and pump houses serve to remove the heat produced in the gaseous diffusion process and to pump cooled water back into the process buildings to cool the diffusion machinery.
- ✓ There are four sets of cooling towers used to remove heat from the enrichment process—one set of cooling towers dedicated to each process building.
- ✓ These towers include C-631, which supports Building C-331; C-633, which supports Building C-333; C-635, which supports Building C-335, and C-637, which supports Building C-337. Each complex contains a pump house, cooling tower, blending cooling towers, and other support buildings.
- ✓ About 500 million gallons of water are recirculated in the plant every 24 hours. Nearly 12-25 million gallons of water evaporate each day depending on the plant load or power level. Currently at 900 megawatts, approximately 12 million gallons per day are replaced with water from the Ohio River.



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Site Infrastructure

C-635-6 Waste Heat Pumps

- ✓ More than 90% of the power consumed is rejected as the waste heat of compression.
- ✓ PGDP facilities have taken advantage of the large amount of waste heat by using that heat to maintain process building temperatures.
- ✓ Systems were designed and built to pump heated recirculating cooling water (RCW) from the process buildings to the buildings requiring space heating.
- ✓ The pumped water is known as recirculating heating water (RHW). Currently there are nine buildings at PGDP heated with RHW.
- ✓ Shutdown of the gaseous diffusion process will result in loss of waste heat source, RCW and RHW, and the internal radiant heat from the process within each building.
- ✓ Steps must be taken to provide alternate sources of heat or to winterize the buildings if the uranium enrichment process is shutdown.



The buildings heated with RHW are:

C-100 Administration
C-101 Cafeteria
C-102 Medical
C-200 Guard and Fire Headquarters
C-400 Cleaning Facility
C-710 Laboratory
C-720 Maintenance Shops
C-750 Garage
C-360 Toll Transfer and Sampling



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Site Infrastructure

Administrative Buildings

Administrative buildings			
Facility number	Function	Floor area (square feet)	Construction date
C-100	Administration Building	67,516	1953
C-101	Cafeteria	18,326	1953
C-102	Hospital	11,666	1953
C-212	Office Building	3,471	1952
C-302	Operations Division Data Center	7,366	1981
C-303	Supervisory Control and Data Acquisition Systems Building	2,109	1984
C-304	Training and Cascade Office Building	8,000	1991
C-320	Communication Building	1,116	1952
C-709	Plant Laboratory Annex	13,500	1998
C-710	Technical Service Building	84,333	1953
C-743	Office Building	9,973	1971



Site Infrastructure

C-100 Administrative Complex

- ✓ The C-100/101/102 Administrative Complex consists of numerous offices and conference rooms, two fireproof vaults, cafeteria facilities and medical facilities.
- ✓ The Administration Building contains the plant's cafeteria with seating capacity for approximately 250 people, and also the plant's Credit Union and Medical Facility.



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Site Infrastructure

C-710 Laboratory

- ✓ The C-709 Plant Laboratory Annex and the C-710 Technical Services Building house laboratories with an array of modern analyzers and test equipment, offices, a conference room, and vault for records retention and storage.
- ✓ The laboratory facilities analyze over 100,000 various types of analytical tests per year, such as analyzing for metals, radiological, organics, inorganics, volatiles, and semivolatiles.
- ✓ Media types such as groundwater, concrete, soil, air, waste waters are processed through the laboratory, also supporting the environmental cleanup programs.



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Site Infrastructure

Security Facilities

Security facilities			
Facility number	Function	Floor area (square feet)	Construction date
C-200/201/202/203/204	Guard and Fire Headquarters	19,490	1953–1986
C-205	Respirator Issue Facility	3,600	1998
C-207	Fire Training Facility	900	1993
C-212-U	Utility Operations Office	1,715	1953
C-215	Portals 18 and 19	1,045	1957
C-216	Post 37	500	1983



Site Infrastructure

C-200 Guard and Fire Headquarters

- ✓ The C-200 Guard and Fire Headquarters currently houses the sites security forces and fire services personnel.
- ✓ Emergency response equipment includes a 100-foot snorkel truck, two ambulances, an emergency truck, and a pump truck with foam-making capability.
- ✓ DOE also has mutual-aid agreements with surrounding communities so we can help one another if needed during an emergency.
- ✓ C-200 is constructed of reinforced concrete with 19,490 square feet of floor space. It contains offices, two conference rooms, a firing range and bays for emergency response vehicles.



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Site Infrastructure

Water Treatment Facilities

Water treatment facilities

Facility number	Function	Floor area (square feet)	Construction date
C-611	Water Treatment Plant	15 acres	1942
C-611-O	Sanitary Water Storage Tank	250,000 gal	1953
C-611-R	Water Tank	300,000 gal	1953
C-615	Sewage Disposal Plant	806	1952
C-616-A	Chemical Feed Building	2000	1978
C-616-B	Clarifier-East	1,350,000 gal	1977
	Clarifier-West		
C-616-K	Service Building	420	1979



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Site Infrastructure

C-611 Water Treatment Plant

- ✓ The C-611 Water Treatment System provides the water supply to the Paducah Site.
- ✓ An average 26 million gallons per day (mgd) is required at the present with a peak of 30 to 32 mgd usage.
- ✓ The water treatment process is based on conventional water treatment techniques which include softening, coagulation, flocculation, sedimentation, and chlorination. Raw water is obtained from the Ohio River through an intake station and pumped through water-softening units at the facility.



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Site Infrastructure

C-615 Sewage Treatment Plant



- ✓ The C-615 Sewage Disposal Plant provides the sewage handling and treatment for the Paducah Site.
- ✓ Sewage is handled by four 400 gallons per minutes (gpm) basin pumps and 75 gpm sludge pumps which provide a basic plant capacity of 350 gpm. Normal flow is between 200 and 300 gpm.
- ✓ The sewage collection system services all the occupied plant buildings with the exception of some remote facilities.
- ✓ The plant consists of chemical, mechanical, and biological treatment prior to discharge.
- ✓ The plant provides secondary treatment. It consists of a comminutor, primary and secondary settling basins, trickling filter, sludge digester and settling beds, chlorinator, and contact chamber.



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Site Infrastructure

C-616 Liquid Pollution Abatement

- ✓ The PGDP Recirculating Cooling Water (RCW) systems are treated for corrosion control with a phosphate-based inhibitor for steel, a copper corrosion inhibitor, and a dispersant.
- ✓ Because a large quantity of RCW is lost through evaporation in the cooling towers, the concentration of soluble salts and nondissolved impurities will increase unless some means is used to control it.
- ✓ To control this at PGDP, a blowdown is used. The corrosion inhibitors and other contaminants in the blowdown prohibit direct discharge of this water to the receiving stream.
- ✓ The purpose of the C-616 waste water treatment plant is to treat this waste water to lower the contaminant concentrations below the discharge limits.
- ✓ Blowdown from the four cascade cooling tower systems is pumped into a collection system that routes the blowdown to C-616.
- ✓ Ferrous sulfate, calcium oxide, and a cationic polymer are used to precipitate contaminants in the blowdown water for removal.
- ✓ Clarifiers provide for the flash mixing of the chemicals with the incoming blowdown water and recirculating sludge, coagulation, and clarification within a single tank.



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Site Infrastructure

Storage Tanks

Storage tanks			
Facility number	Function	Floor area (square feet)	Construction date
C-406	Trichloroethylene Storage Tank	6,015 gal	1953
C-407	Nitric Acid Storage Tank	11,000 gal	1953
C-540-B	Oil Storage Tank (Northwest)	15,000 gal	1953
C-540-C	Oil Storage Tank (Southwest)	15,000 gal	1953
C-540-D	Oil Storage Tank (Northeast)	7,500 gal	1953
C-540-E	Oil Storage Tank (Southeast)	15,000 gal	1953
C-541-B	Oil Storage Tank (Northwest)	7,500 gal	1953
C-541-C	Oil Storage Tank (Southwest)	15,000 gal	1953
C-541-D	Oil Storage Tank (Northeast)	7,500 gal	1953
C-541-E	Oil Storage Tank (Southeast)	15,000 gal	1953
C-601-A	Steam Plant Fuel-Storage Tank (Center)	420,000 gal	1953
C-601-B	Steam Plant Fuel-Storage Tank (South)	420,000 gal	1953
C-601-D	Fuel Oil Storage Tank (North)	1,000,000 gal	1974
C-603-E	Nitrogen Storage Tank (East)	11,000 gal	1974
C-603-F	Nitrogen Storage Tank (Center)	11,000 gal	1975
C-603-G	Nitrogen Storage Tank (West)	11,000 gal	1975



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Site Infrastructure

Storage Tanks



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Site Infrastructure

Chemical Operations

Chemical Operations			
Facility number	Function	Floor area (square feet)	Construction date
C-400	Cleaning Building	116,140	1954
C-408	50-Ton Truck Scale	130	1963
C-409	Stabilization Building	26,797	1976



Site Infrastructure

C-400 Cleaning Facility



- ✓ The C-400 Chemical Operations Facility, provides cleaning and decontamination services for the plant.
- ✓ Equipment removed from the process buildings for repair is cleaned here prior to being moved to the maintenance facility.
- ✓ Cylinders are also cleaned and tested at this facility.
- ✓ The Chemical Operations Facility also houses the plant's laundry which cleans and mends more than 3,000 pairs of coveralls each week.
- ✓ The floor drains in the C-400 building that are near fissile operations without secondary containment have been sealed or have engineered controls in place.



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Site Infrastructure

Steam Plant and Utilities

Steam Plant and Utilities

Facility number	Function	Floor area (square feet)	Construction date
C-600	Steam Plant	47,424	1952
C-601	Nitrogen Generator Building Addition	1,128	1952
C-601-C	Steam Plant Fuel Oil Pump House	148	1952
C-604	Utilities Maintenance Building	2,400	1979
C-605	Substation Building	1,200	1979
C-606	Coal Crusher Building	1,470	1980
C-607	Emergency Air Compressor Generator Building	2,000	1984



Site Infrastructure

C-600 Steam Plant



- ✓ The plant produces steam used to heat, vaporize UF_6 , obtain UF_6 samples, maintain process temperatures, clean equipment, and provide heat for other miscellaneous buildings and process operations.
- ✓ It consists of three water wall tube boilers (two coal-fired and one oil-and gas-fired) each capable of producing 100,000 pounds of steam per hour at 250 pounds per square inch plus associated equipment.
- ✓ Some of the site facilities such as C-100, C-300, and C-710 currently utilize the chilled water system for building air conditioning and the steam for heating.
- ✓ The use of electrostatic precipitators and low-sulphur coal helps the plant keep atmospheric emissions below environmental limits. The steam plant uses approximately 35,000 tons of coal per year.



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Site Infrastructure

Warehouses, Storage and Support Buildings

Warehouses, storage, and support buildings			
Facility number	Function	Floor area (square feet)	Construction date
C-710-A	Gas Cylinder Storage Building	400	1953
C-711	Gas Manifold	962	1953
C-720	Maintenance and Stores Building	299,944	1952
C-720-G	90-Day Storage Recycling/Stores Storage	10,800	1976
C-720-H	Warehouse	2,400	1978
C-721	Gas Manifold Storage	962	1952
C-724-A	Carpenter Shop Annex	3,900	1954
C-724-B	Carpenter Shop	10,215	1954
C-724-C	Paint Shop	1,600	1954
C-724-D	Lumber Storage Building	2,880	1954
C-726	Sandblast Building	2,019	1973
C-727	90-Day Mixed Waste Accumulation	4,428	1954
C-728	Motor Cleaning Facility	1,597	1958
C-729	Acetylene Building	430	1956
C-730	Maintenance Service	1,057	1955
C-731	Railroad Repair Equipment Storage Building	1,280	1981
C-732	Maintenance Materials Storage Building	1,680	1981
C-733	Waste Oil and Chemical Storage Facility	1,680	1985
C-740-B	Oil Drum Storage Shelter	2,800	1975
C-741	Mobile Equipment Building	5,360	1952
C-742	Cylinder Storage Building	5,360	1952
C-744	Material Handling	6,400	1952
C-746-A	North Warehouse	72,000	1954
C-746-B	South Warehouse	72,000	1959
C-746-G	Electrical Equipment Storage	2,400	1974
C-746-L	Tractor Storage	364	1985
C-746-M	Waste Uranium Chip Storage Facility	432	1976
C-746-Q	Hazardous and LLW Storage	33,165	1965
C-746-Q1	High-Assay Waste Storage Facility	16,335	1965
C-750	Garage	11,866	1952
C-751	Fuel Dispensing Facility	50	1991



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Site Infrastructure

C-720 Maintenance Shops



- ✓ C-720 Maintenance and Stores Building is primarily a maintenance area containing both high bay and low bay areas.
- ✓ Contains numerous offices, conference rooms, large storage areas, maintenance shops and loading docks.
- ✓ 336,498 square feet of floor space.
- ✓ The crafts housed in this building have the capability to fabricate, repair, maintain, and calibrate almost every piece of equipment essential to the operation of the plant.

The high bay portion of the facility contains:

- ✓ metal fabrication and machining equipment
- ✓ overhead crane bays
- ✓ electrical motor facilities which include support equipment necessary to completely rebuild and test electrical motors
- ✓ climate controlled shop areas for precision work
- ✓ electronic repair facilities
- ✓ paint spraying facilities



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Site Infrastructure

C-720 Maintenance Shops

- ✓ There are 72 milling machines, both horizontal and vertical ranging in size from a Bridgeport with a 9 inch by 36 inch table to a Gray 20 foot table with a 72 inch vertical head travel.
- ✓ Various equipment is available for all types of grinding, shaping, forming and welding.
- ✓ This facility could support anything from heavy equipment fabrication and assembly to intricate parts manufacturing.



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Site Infrastructure

C-750 Garage



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Site Security

- ✓ USEC currently provides the Protective Force.
- ✓ Approximately 644 acres lie within the Limited Area (LA) perimeter fence (blue).
- ✓ Most facilities necessary for PGDP operation are contained within this LA.
- ✓ Property Protection Areas (yellow) totaling approximately 194 acres are outside of the LA, including the water treatment plant, some lagoons, landfills, and various smaller facilities, but are within the DOE reservation.



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Environmental Agreements/Permits

DOE Facility/Operations Agreements/Permits

Permits/Agreements	Issuing Agency
Kentucky Pollutant Discharge Elimination System	Kentucky Division of Water
Solid Waste – Residential Landfill (Closed)	Kentucky Division of Waste Management
Solid Waste – Inert Landfill (Closed)	Kentucky Division of Waste Management
Solid Waste Contained Landfill (Construction and Operation)	Kentucky Division of Waste Management
Hazardous Waste Facility Permit	Kentucky Division of Waste Management
Clean Air Act Permit	Kentucky Division for Air Quality
Federal Facilities Agreement	Kentucky Department for Environmental Protection, U.S. Environmental Protection Agency, and DOE
Toxic Substances Control Act Federal Facility Compliance Agreement and Modifications	U.S. Environmental Protection Agency and DOE
Site Treatment Plan Agreed Order	Natural Resources and Environmental Protection Cabinet and DOE
DUF ₆ Agreed Order	Natural Resources and Environmental Protection Cabinet and DOE
DMSA, Water, Landfill Agreed Order	Natural Resources and Environmental Protection Cabinet and DOE



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Environmental Agreements/Permits

Gaseous Diffusion Facility/Operations Permits

Permits/Agreements	Issuing Agency
Utah Generator Site Access	Utah Department of Environmental Quality
Hazardous Waste	Kentucky Division of Waste Management
Tennessee Radioactive-Waste-License-for-Delivery	Tennessee Department of Environment and Conservation
Kentucky Pollutant Discharge Elimination System	Kentucky Division of Water
Ohio River Water Withdrawal Permit	Kentucky Division of Water
Water Treatment Registration (Public Water System)	Kentucky Division of Water
Clean Air Act Title V Permit	Kentucky Division for Air Quality
Underground Storage Tank Registration (2 fuel tanks)	Kentucky Division of Waste Management
Toxic Release Inventories	US Environmental Protection Agency



Site Landfills

- ✓ The C-746-U Solid Waste Contained Landfill is the only operating disposal site at the Paducah plant.
- ✓ It opened in 1997 and has helped DOE reduce disposal costs by accepting certain types of waste: sanitary waste, soil and debris and industrial waste.
- ✓ No hazardous is accepted; however, waste with small amounts of radioactivity within the landfill's Authorized Limits is acceptable.
- ✓ No radioactive waste above the Authorized Limits is accepted.



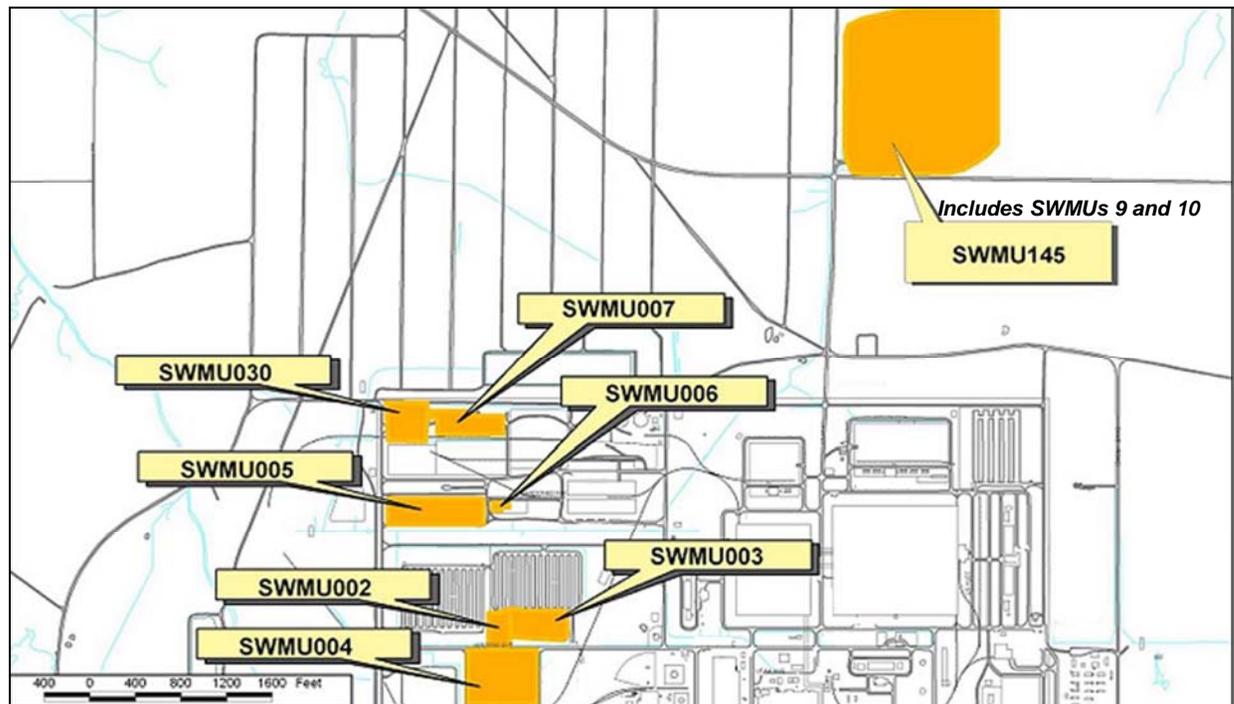
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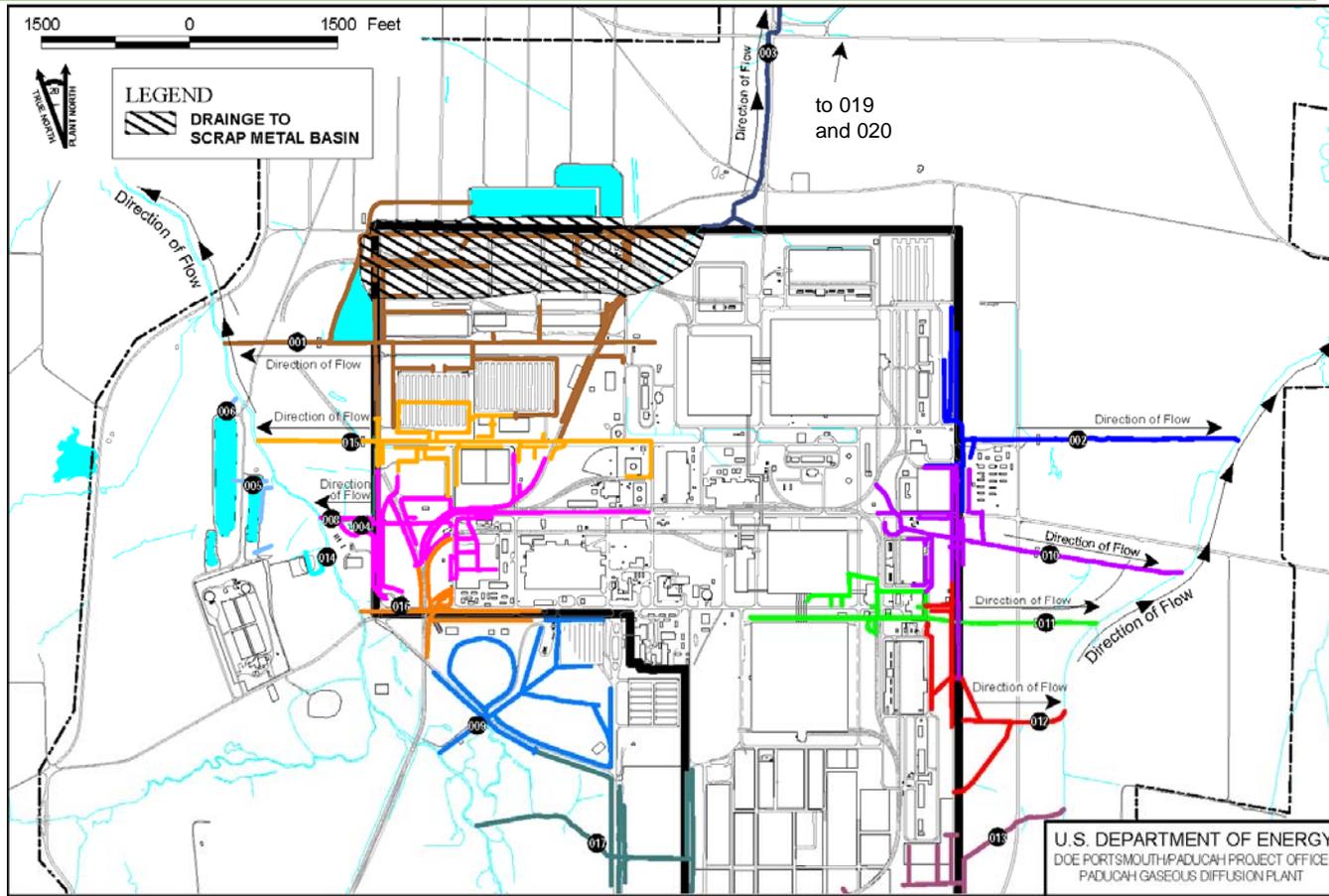
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Site Landfills

- ✓ In the plant's early years of operation, material and equipment removed from the facility were buried in a series of on-site disposal areas.
- ✓ These burial grounds include both classified and non-classified material. The Burial Grounds Operable Unit (ten Solid Waste Management Units) was established to conduct the remediation activities for these areas.
- ✓ Alternatives are being evaluated through the CERCLA process.



Outfalls



- ✓ DOE Outfalls are 001, 015, 017, 019, and 020
- ✓ USEC Outfalls are 002, 004, 006, 008, 009, 010, 011, 012, 013, and 016
- ✓ Eliminated Outfalls are 003, 005, and 014



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