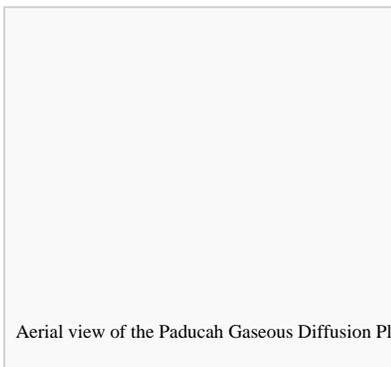


Coordinates: 37°06′50″N 88°48′37″W﻿ / ﻿37.11667°N 88.81028°W﻿ / 37.11667; -88.81028

Paducah Gaseous Diffusion Plant

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Aerial view of the Paducah Gaseous Diffusion Plant.



The **Paducah Gaseous Diffusion Plant** is a facility located in McCracken County, Kentucky, near Paducah, Kentucky that produced enriched uranium 1952-2013. The plant is now operated by United States Enrichment Corporation, a subsidiary of USEC Incorporated, a publicly traded corporation (NYSE: USU). It was the only operating uranium enrichment facility in the United States in the period 2001-2010. The Paducah plant produced low-enriched uranium, originally as feedstock for military reactors and weapons refining and later for nuclear power fuel.

The gaseous diffusion plant covers 750 acres (300 ha) of a 3,425 acres (1,386 ha) site. The four process buildings cover 74 acres (30 ha), and consume a peak electrical demand of 3,040 megawatts.^[1]

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History

The former Kentucky Ordnance Works site was chosen from a candidate list of eight sites in 1950. The construction contractor was F.H. McGraw of Hartford, Connecticut and the operating company was Union Carbide. The plant was opened in 1952 as a government-owned, contractor-operated facility producing enriched uranium to fuel military reactors and for use in nuclear weapons. The mode of enrichment was the gaseous diffusion of uranium hexafluoride to separate the lighter fissile isotope U-235 from the heavier non-fissile isotope U-238. The Paducah plant originally produced low-enriched uranium which was further refined at Portsmouth and the K-25 plant at Oak Ridge, Tennessee. From the 1960s the Portsmouth and Paducah plants were dedicated to uranium enrichment for nuclear power plants. In 1984 the operating contract was assumed by Martin Marietta Energy Systems.

Lockheed Martin has operated the plant since the merger of Martin Marietta with Lockheed in 1995. From 2001, all USEC production has been consolidated at Paducah.^{[2][3]}

The Paducah plant had a capacity of 11.3 million separative work units per year (SWU/year) in 1984. 1812 stages were located in five buildings: C-310 with 60 stages, C-331 with 400 stages, C-333 with 480 stages, C-335 with

400 stages and C-337 with 472 stages.^[4]

Before its downsizing and final cessation of uranium enrichment on May 31, 2013, the Paducah facility consumed about 3,000 megawatts of electricity at peak operation.^[5] Power for the Paducah gaseous diffusion plant came from the Tennessee Valley Authority (TVA). In 2012 the majority of the TVA grid was generated by coal fired plants, with three nuclear power plants counting for about 30 percent of TVA's energy.^[6]

Geoffrey Sea of “Neighbors for an Ohio Valley Alternative” wrote a series of articles on USEC in the ecowatch news site.^{[7][8][9][10][11][5][12][13][14]} Although in 1996 the National Academy of Sciences estimated that total costs of gaseous diffusion cleanup ranged from \$8 billion to \$46 billion,^[15] it was reported that USEC plant's decontamination and decommissioning (D&D) fund was diverted and the surcharge was waived.^[8] The reporter further asserted that USEC had threatened the Department of Energy with "a sudden shutoff of power at Paducah at the end of May (2013)" despite its charter "to return the facility to DOE 'in safe condition.'"^[16]

In May 2013, Paducah mayor Gayle Kaler said “Our priority as a community is first and foremost demanding cleanup dollars. We cannot accept a dirty shut down.”^[11] When USEC ceased enrichment operations at its Portsmouth gaseous diffusion plant in Piketon, Ohio in May 2001, it reportedly did not purge the diffusion cells although it had nine years time and had received the funding.^[12] In late May 2013 the reporter predicted a dirty power down at Paducah.^[10] As of late June 2013, it was reported that USEC had shut down about 60 percent of the cascade, with the remainder to be shut down over the summer.^[13]

On November 17, 2013 a tornado damaged the Paducah gaseous diffusion plant.^[17] A spokesman for the plant operator, USEC Inc., reported that damage was limited to the exterior of one of the four enrichment production buildings, adjacent cooling towers and an electrical switch yard. The spokesman stated that there was no release of hazardous or radioactive materials.^[18] In the previous year, on March 2, 2012 the "Camp Creek tornado" reportedly stopped a few miles short of the Piketon, Ohio plant.^[7]

Geoffrey Sea wrote in September 2013, USEC's demise will be either by creditors (by October 2014 loan repayment deadline), "regulators who find their spines", or by "repeal of the USEC Privatization Act by Congress."^[14]

Employment and Economic Impact

USEC employed around 1100 to operate the plant. The Department of Energy employs around 600 through contractors to maintain the grounds, portions of the infrastructure, and to remediate environmental contamination at the site. The facility has had a positive economic impact on the local economy and continues to be an economic driver for the community. Elected officials work to ensure that the plant continues to operate though other methods of enriching uranium such as centrifuge are more efficient.^[1]

Contamination

Plant operations have contaminated the site over time. The primary contamination of concern is trichloroethylene (TCE), which was a commonly used degreaser at the site. TCE leaked and contaminated groundwater on and off the site. The groundwater is also contaminated with trace amounts of technetium-99, a radioactive fission product; Other contaminants include polychlorinated biphenyl (PCBs). Through normal operations, portions of the plant are contaminated with uranium.

In 1988 TCE and trace amounts of technetium-99 was found in the drinking water wells of residences located near the plant site in McCracken County, Kentucky. To protect human health the Department of Energy provided city water at no cost to the affected residents, and continues to do so.

On April 30, 2013 a contamination event occurred following a pressure spike during unloading of UF₆ cylinder causes in the C-337A Feed Facility at the Paducah enrichment plant.^{[19][20]}

Cleanup status

The Department of Energy is using electrical resistance heating, ET-DSP (trademarked) to vaporize the TCE from the groundwater. This cleanup action began in mid-2010. Much of the contamination of the actual plant will not be cleaned up until the plant ceases operations.

See also

- K-25
- Portsmouth Gaseous Diffusion Plant
- United States Enrichment Corporation

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External links

- Paducah Gaseous Diffusion Plant at USEC

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Categories:

- Buildings and structures in Paducah, Kentucky
- Isotope separation facilities in the United States
- Superfund sites in Kentucky

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