

1. INTRODUCTION

1.1 SUMMARY

The Portsmouth Gaseous Diffusion Plant (PORTS) is located on a 5.9-square-mile site in a rural area of Pike County, Ohio. U.S. Department of Energy (DOE) activities at PORTS include environmental restoration, waste management, uranium operations, and decontamination and decommissioning (D&D) of the process buildings and associated facilities formerly used for the gaseous diffusion process of uranium enrichment. Fluor-B&W Portsmouth LLC (FBP) is the DOE contractor responsible for D&D of PORTS, which includes the three gaseous diffusion process buildings and other associated facilities.

The United States Enrichment Corporation (USEC) operated the gaseous diffusion uranium enrichment facilities at PORTS until 2001. USEC, Inc. (the parent company of USEC) leases facilities at PORTS for the development and planned operation of its gaseous centrifuge uranium enrichment facility – the American Centrifuge Plant (ACP). USEC Government Services, a subsidiary of USEC that leased the gaseous diffusion production facilities at PORTS from DOE, began the process of returning the facilities to DOE in 2010. This process was completed on September 30, 2011. USEC Government Services is no longer responsible for any activities at PORTS. Environmental monitoring data collected by USEC Government Services prior to September 30, 2011, are reported by FBP (the DOE contractor that became responsible for this monitoring).

In general, activities conducted by USEC, Inc. are not covered by this document because their operations are not subject to DOE Orders. However, some USEC, Inc. environmental compliance information is provided in Chapter 2 and radiological and non-radiological environmental monitoring program information is discussed in Chapters 4 and 5, respectively. USEC, Inc. data are included in these chapters to provide a more complete picture of the programs in place at PORTS to detect and assess potential impacts to human health and the environment resulting from PORTS activities.



Figure 1.1 The Portsmouth Gaseous Diffusion Plant – 2011.

1.2 BACKGROUND INFORMATION

PORTS, which produced enriched uranium via the gaseous diffusion process from 1954 through 2001, is owned by DOE (see Figure 1.1). In 1993, DOE leased the uranium production facilities at the site to USEC, which was established by the Energy Policy Act of 1992.

DOE is responsible for D&D of the gaseous diffusion process buildings and associated facilities, environmental restoration, waste management, and uranium operations. DOE contractors LATA/Parallax Portsmouth, LLC (LPP), FBP, Wastren-EnergX Mission Support, LLC (WEMS), B&W Conversion Services, LLC (BWCS), and Uranium Disposition Services, LLC (UDS) managed DOE programs at PORTS in 2011.

LPP was responsible for the following activities from January 1, 2011 until March 29, 2011: 1) environmental restoration of contaminated areas; 2) monitoring and reporting on environmental compliance; 3) disposition of legacy radioactive waste; 4) D&D of inactive facilities; 5) disposition of highly enriched uranium; and 6) operation of the site's waste storage facilities. On March 29, 2011, FBP assumed responsibility for these activities, as well as D&D of PORTS.

WEMS provided facility support services including the following: 1) maintenance of facilities, grounds, and roadways; 2) janitorial services; 3) security access for DOE facilities; 4) training; 5) records and fleet management; and 6) information technology/network support for DOE operations.

UDS was responsible for operations associated with the Depleted Uranium Hexafluoride (DUF_6) Conversion Facility at PORTS until March 29, 2011. BWCS assumed responsibility for the DUF_6 Conversion Facility on March 29, 2011, including surveillance and maintenance of DUF_6 cylinders, and environmental compliance and monitoring activities associated with operation of the facility. DUF_6 , which is a product of the uranium enrichment process, is stored in cylinders on site. The DUF_6 Conversion Facility converts DUF_6 into uranium oxide and hydrogen fluoride. The uranium oxide is made available for beneficial reuse, storage, or disposal, and the hydrogen fluoride is sold for reuse.

USEC, which became a publicly-held company in 1998, enriched uranium at PORTS via the gaseous diffusion process for use in commercial nuclear power reactors until 2001, at which time USEC ceased production at PORTS. USEC Government Services, a subsidiary of USEC that leased the gaseous diffusion production facilities at PORTS from DOE, began the process of returning the facilities to DOE in 2010. This process was completed on September 30, 2011.

USEC, Inc. (the parent company of USEC) is developing a gaseous centrifuge uranium enrichment plant at PORTS. The gaseous centrifuge uranium enrichment process requires much less electricity than the gaseous diffusion process. Gas centrifuge uranium enrichment uses a rotor that spins at a high speed within a casing to separate uranium-235 from uranium-238 (resulting in enriched uranium). Gaseous diffusion uranium enrichment uses a porous barrier to separate uranium-235 molecules from uranium-238 molecules.

The USEC, Inc. Lead Cascade, which is a small-scale demonstration centrifuge for uranium enrichment, has been operating since 2006. The commercial scale ACP is under development. Both of these facilities (the Lead Cascade and the ACP) are housed in existing buildings at PORTS that were constructed for DOE's Gaseous Centrifuge Enrichment Plant, which was cancelled in 1985.

This report is intended to fulfill the requirements of DOE Order 231.1B, *Environment, Safety and Health Reporting*. This DOE Order requires development of an annual site environmental report that includes information on regulatory compliance, environmental programs, radiological and non-radiological monitoring programs, groundwater programs, and quality assurance. The Annual Site Environmental

Report also provides the means by which DOE demonstrates compliance with the radiation protection requirements of DOE Order 458.1 *Radiation Protection of the Public and the Environment*, which replaced DOE Order 5400.5 during 2011.

This report is not intended to present all of the monitoring data at PORTS. Additional data collected for other site purposes, such as environmental restoration and waste management, are presented in other documents that have been prepared in accordance with applicable laws and regulations. These data are presented in other reports, such as the *2011 Groundwater Monitoring Report* and the *2011 Annual Hazardous Waste Report*, which are available at the PORTS Environmental Information Center.

1.3 DESCRIPTION OF SITE LOCALE

PORTS is located in a rural area of Pike County, Ohio, on a 5.9-square-mile site. The site is 2 miles east of the Scioto River in a small valley running parallel to and approximately 120 feet above the Scioto River floodplain. Figure 1.2 depicts the plant site within the State of Ohio and its immediate environs.

Pike County has approximately 28,700 residents (U.S. Census 2010). Scattered rural development is typical; however, the county contains a number of small villages such as Piketon and Beaver that lie within a few miles of the plant. The county's largest community, Waverly, is about 10 miles north of the plant and has a population of about 4,400 residents (U.S. Census 2010). The nearest residential center in this area is Piketon, which is about 5 miles north of the plant on U.S. Route 23 with a population of about 2,200 (U.S. Census 2010). Several residences are adjacent to the southern half of the eastern boundary and along Wakefield Mound Road (old U.S. 23), directly west of the plant.

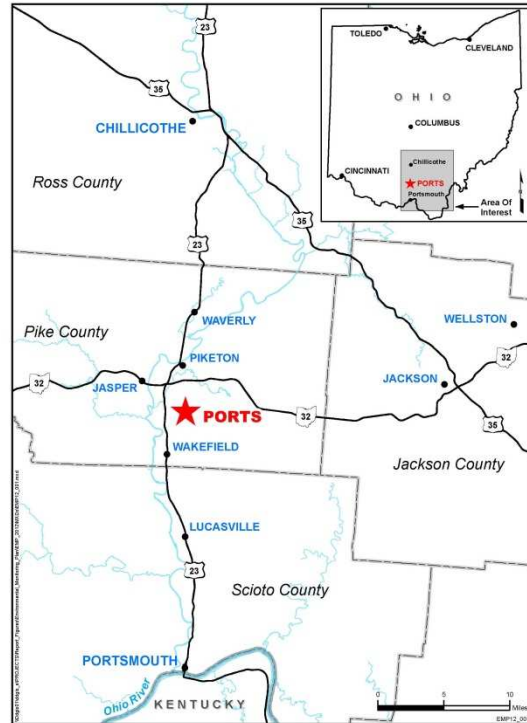


Figure 1.2. Location of PORTS.

Additional cities within 50 miles of the plant are Portsmouth (population 20,226), 22 miles south; Chillicothe (population 21,901), 27 miles north; and Jackson (population 6,397), 18 miles east (U.S. Census 2010). The total population within 50 miles of the plant is approximately 677,000 persons.

1.4 DESCRIPTION OF SITE OPERATIONS

DOE, through its managing contractors, is responsible for D&D of the gaseous diffusion uranium enrichment buildings and associated facilities, environmental restoration, and waste management associated with DOE activities. DOE is also responsible for uranium management, which includes the DUF₆ Conversion Facility.

D&D includes the gaseous diffusion process buildings and associated facilities subject to the DFF&O. D&D activities can consist of deactivation of equipment; removal and cleaning of process residues from equipment, structures, and piping; and dismantlement, demolition, and removal of equipment, structures, piping, and concrete foundations. The D&D Program is also responsible for conducting an evaluation of alternatives for disposition of waste generated by D&D.

Environmental restoration is the investigation and remediation of environmental contamination associated with the past operation of the gaseous diffusion uranium enrichment facilities. Remedial investigations and remedial actions define the nature and extent of environmental contamination, evaluate the risk to public health and the environment, remediate areas of environmental contamination, and monitor/evaluate ongoing remedial actions. The goal of the Environmental Restoration Program is to verify that releases from past operations at PORTS are thoroughly investigated and that remedial actions are taken to protect human health and the environment.

Waste management includes managing wastes generated by DOE activities at PORTS, including wastes generated by D&D, environmental restoration, the DUF₆ Conversion Facility, and other DOE site operations. Wastes must be identified and stored in accordance with all environmental regulations. The responsible DOE contractor also arranges the transportation and off-site disposal of wastes. The goal of the Waste Management Program is to manage waste from the time it is generated to its ultimate treatment, recycling, or disposal in accordance with all applicable regulations.

DOE is also responsible for uranium management, which includes management of uranium product, coordination of the DUF₆ program, and warehousing of other uranium materials such as normal uranium hexafluoride, uranium oxides, and uranium metal.