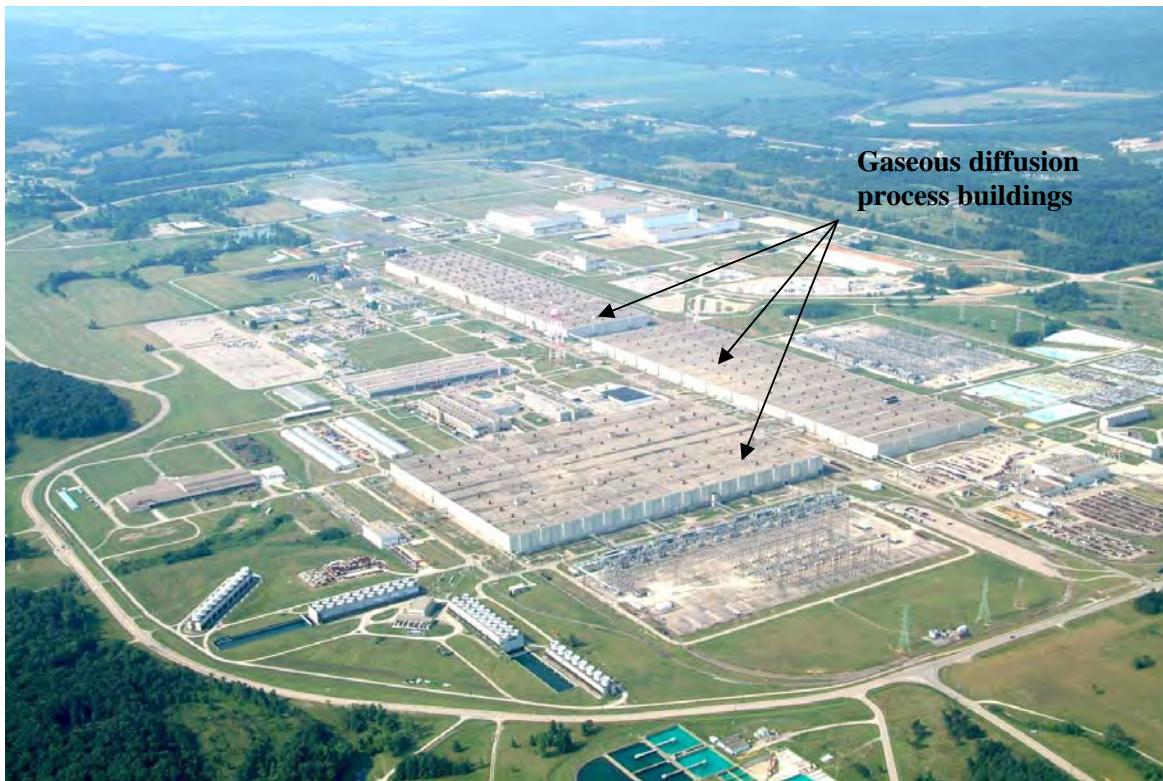


# 1. INTRODUCTION

## 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 decontamination and decommissioning (D&D) of the process buildings and associated facilities formerly used for the gaseous diffusion process of uranium enrichment, environmental restoration, waste management, and uranium operations. On August 17, 2010, DOE announced that Fluor-B&W Portsmouth LLC (FBP) had been awarded a contract for D&D of PORTS, which includes the three gaseous diffusion process buildings and over 100 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. In 2010, USEC Government Services (a subsidiary of USEC) leased the gaseous diffusion production facilities at PORTS under the cold shutdown program. In general, USEC, Inc. and USEC Government Services activities are not covered by this document because their operations are not subject to DOE Orders. However, some USEC, Inc. and USEC Government Services 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. and USEC Government Services 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.**

## 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, uranium operations, and management of facilities that are not leased to USEC, Inc. or USEC Government Services. LATA/Parallax Portsmouth, LLC (LPP), Theta Pro2Serve Management Company, LLC (TPMC), Wastren-EnergX Mission Support, LLC (WEMS), and Uranium Disposition Services, LLC (UDS) managed DOE programs at PORTS in 2010.

LPP was responsible for the following activities: 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.

TPMC or 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. WEMS assumed responsibility for the facility support services contract on March 16, 2010.

UDS was responsible for the initial operation of the Depleted Uranium Hexafluoride (DUF<sub>6</sub>) Conversion Facility at PORTS, surveillance and maintenance of DUF<sub>6</sub> cylinders, and environmental compliance and monitoring activities associated with operation of the DUF<sub>6</sub> Conversion Facility. DUF<sub>6</sub>, which is a product of the uranium enrichment process, is stored in cylinders on site. The DUF<sub>6</sub> Conversion Facility converts DUF<sub>6</sub> into uranium oxide and hydrogen fluoride, which are shipped off site. The uranium oxide is disposed as waste, and the hydrogen fluoride is sold for reuse. Initial hot functional testing of the DUF<sub>6</sub> Conversion Facility was in progress in 2010 with larger-scale operation of the facility anticipated in 2011.

On August 17, 2010, DOE announced that FBP had been awarded a contract for D&D of PORTS. The contract includes D&D of the three gaseous diffusion process buildings and over 100 other associated facilities, as well as environmental remediation, compliance, and other activities that were a part of the LPP contract. FBP assumed responsibility for operations included in the D&D contract in 2011.

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 May 2001, at which time USEC ceased production at PORTS. In 2010, the gaseous diffusion production facilities at PORTS were leased by USEC Government Services (a subsidiary of USEC) under the cold shutdown program. Cold shutdown activities include removing lube oils and oil contaminated with polychlorinated biphenyls (PCBs) from equipment and removing uranium hexafluoride deposits within the gaseous diffusion process equipment to prepare the facilities and equipment for D&D. In 2010, USEC Government Services began the process of returning the gaseous diffusion process buildings and other associated support buildings and areas to DOE. The X-326, X-330 and X-333 Process Buildings, as well as other support buildings and areas, were returned to DOE on September 30, 2010.

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 American Centrifuge Plant (ACP) is under development, but was on hold at the end of 2010 pending receipt of additional funding. 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 231.1A, *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 5400.5, *Radiation Protection of the Public and the Environment*.

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 *2010 Groundwater Monitoring Report* and the *2010 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 (see Figure 1.2). 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 1.3 depicts the plant site and its immediate environs.



Figure 1.2. Location of PORTS within the State of Ohio.

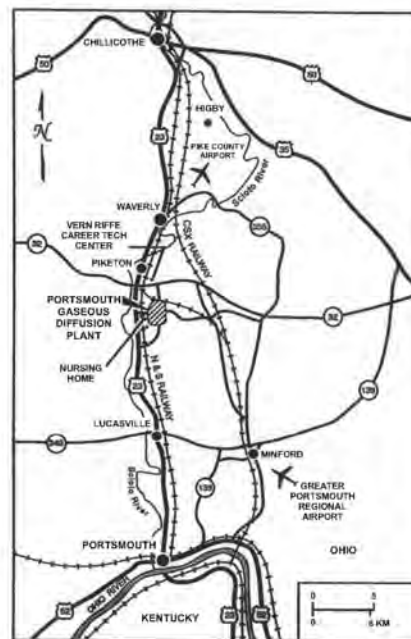


Figure 1.3. Location of PORTS in relation to the geographic region.

Pike County has approximately 27,700 residents. 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. 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 1,900. 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.

Additional cities within 50 miles of the plant are Portsmouth (population 20,909), 22 miles south; Chillicothe (population 21,796), 27 miles north; and Jackson (population 6,184), 18 miles east (U.S. Census 2000). The total population within 50 miles of the plant is approximately 670,000 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 DUF<sub>6</sub> Conversion Facility.

D&D includes the gaseous diffusion process buildings and associated facilities subject to the D&D Orders. D&D activities 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 DUF<sub>6</sub> 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 coordination of the DUF<sub>6</sub> program and warehousing of other uranium materials such as normal uranium hexafluoride, uranium oxides, and uranium metal.