

1. Introduction

Construction of the Portsmouth Gaseous Diffusion Plant (PORTS) in a rural area of Pike County, Ohio started in 1952. The US Department of Energy (DOE) chose this location for its third gaseous diffusion plant because of its abundant water resources, reliable electric power, and dependable labor force. PORTS began producing enriched uranium to supply the nation's nuclear defense and nuclear energy systems in 1954, and this mission continued until 2001. In 1993 DOE leased the plant to the United States Energy Corporation (USEC), which managed the uranium enrichment program until 2001. The plant remained in safe standby under USEC management for 10 years, capable of restarting if necessary. In 2011 USEC returned the facilities to DOE for decontamination and decommissioning, and this critical mission is ongoing.

This report aims to fulfill the requirements of DOE Order 231.1B, *Environment, Safety, and Health Reporting*, which requires the 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. This Annual Site Environmental Report also demonstrates how DOE complies with the radiation protection requirements of DOE Order 458.1, *Radiation Protection of the Public and the Environment*.

This report is not intended to present all of the monitoring data from PORTS. Data collected for other site purposes such as decontamination and decommissioning, environmental restoration, and waste management are included in other documents that have been prepared according to applicable legal agreements and regulations. These other reports, such as the *2021 Groundwater Monitoring Report* (DOE 2022a) and the *2021 On-Site Waste Disposal Facility Annual Project Status Report* (DOE 2022b) are available at the PORTS Environmental Information Center. These reports and data associated with the reports are also available on the Portsmouth/Paducah Project Office (PPPO) Environmental Geographic Analytical Spatial Information System (PEGASIS) website [here](#).

1.1 Site Location

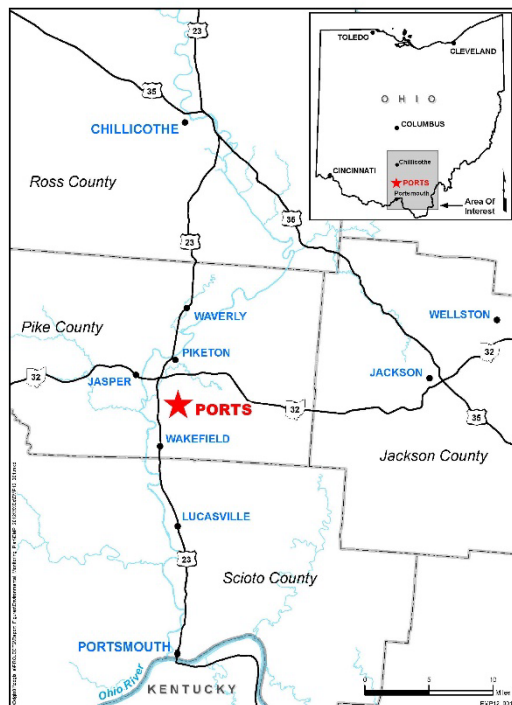


Figure 1.1. Location of PORTS

PORTS is owned by DOE and occupies a 5.8-square-mile site in a rural area of Pike County, Ohio, as shown in Figure 1.1. According to the 2020 US Census (US Census Bureau 2022), Pike County has approximately 27,088 residents. Scattered rural development is typical, but several small villages such as Piketon and Beaver 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 4,165 residents. The nearest residential center is Piketon, which is 1 to 4 miles north of the plant and has a population of about 2,111. A number of residences are adjacent to the plant boundary.

Other cities within 50 miles of the plant are Portsmouth (population 18,252), 22 miles south; Chillicothe (population 22,059), 27 miles north; and Jackson (population 6,252), 18 miles east (US Census Bureau 2022). The total population within 50 miles of the plant is approximately 662,000, which includes people on the outskirts of Cincinnati and Columbus, Ohio; Ashland, Kentucky; and Huntington, West Virginia.

1.2 Environmental Setting

PORTS occupies an upland area of southern Ohio and has an average land surface elevation of 670 feet above mean sea level. The terrain surrounding the plant site consists of marginal farmland and wooded hills. PORTS is approximately one mile west of the Scioto River.

The climate of the PORTS area is humid-continental and is characterized by warm, humid summers and cold, humid winters. Precipitation is distributed relatively evenly throughout the year and averages approximately 40 inches per year. Prevailing winds are from the south-southwest at approximately 5 miles per hour.

In much of the industrialized area of PORTS, the original topography has been modified and graded for construction of buildings and other infrastructure. Much of the native soil and rock removed from higher elevations of the site was placed as fill in existing drainage valleys and depressions.

The topography at PORTS is dominated by ancient and recent streams. The predominant landform is an undulating, broad, sediment-filled ancient river valley. This valley is oriented north to south and is bounded on the east and west by deeply dissected ridges or low-lying hills. The surface of the ancient river valley is modified by recent streams. Little Beaver Creek, which flows northwest across the middle of the site just north and east of the main industrialized area, forms a small valley. Other small valleys formed by streams have cut into the flat-lying unconsolidated deposits on which PORTS is located. One of these valleys includes a westward-flowing stream, the West Drainage Ditch, near the west-central area of the plant site. Two more streams are located in the southern portion of the industrialized area. In the southeast portion of the site, the southerly flowing stream, Big Run Creek, is situated in a relatively broad, gently sloping valley. A stream in the southwest portion of the site (the Southwestern Drainage

Ditch) that flows to the south and west has formed a narrow, steep-walled valley. All of these streams ultimately discharge to the Scioto River.

1.3 Site Operations

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

Today DOE, through its managing contractors, is responsible for decontamination and decommissioning 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 Depleted Uranium Hexafluoride (DUF₆) Conversion Facility.

Decontamination and decommissioning includes the gaseous diffusion process buildings and associated facilities subject to *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*, hereafter referred to as the Decontamination and Decommissioning Director's Final Findings and Orders (Ohio Environmental Protection Agency [Ohio EPA] 2012). Decontamination and decommissioning activities can include deactivating equipment; removing and cleaning process residues from equipment, structures, and piping; and dismantling, demolishing, and removing equipment, structures, piping, and concrete foundations. The Decontamination and Decommissioning Program is also responsible for evaluating alternatives for the disposition of waste generated by decontamination and decommissioning.

The goal of the Environmental Restoration Program is to verify that releases from past operations at PORTS are thoroughly investigated and that, if applicable, remedial actions are taken to protect human health and the environment. 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 potential risk to public health and the environment, remediate areas of environmental contamination, and monitor and evaluate ongoing remedial actions.

Waste management includes managing wastes generated by DOE activities at PORTS, including wastes from decontamination and decommissioning, environmental restoration, the DUF₆ Conversion Facility, and other DOE site activities. Wastes must be identified and stored in accordance with all environmental regulations. The responsible DOE contractor also arranges the transportation and 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 and DOE Orders.

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

DOE contractors Fluor-BXWT Portsmouth, Portsmouth Mission Alliance, and Mid-America Conversion Services managed DOE programs at PORTS in 2021. Fluor-BXWT Portsmouth was responsible for the decontamination and decommissioning of the former gaseous diffusion process buildings and associated facilities; environmental restoration of contaminated areas; environmental monitoring and reporting on environmental compliance; disposition of decontamination and decommissioning waste, legacy

radioactive waste, and hazardous waste; security forces; uranium management; and operation of the site's waste storage facilities.

Portsmouth Mission Alliance managed facility support services including computer and telecommunications services, security, training, records management, fleet management, non-nuclear facility preventive and corrective maintenance, grounds and road maintenance, snow removal, and janitorial services.

Mid-America Conversion Services managed the DUF₆ Conversion Facility, including surveillance and maintenance of DUF₆ cylinders and environmental compliance and monitoring activities associated with operation of the facility. DUF₆, which is a product of the uranium enrichment process, is stored in cylinders on site. The DUF₆ Conversion Facility converts DUF₆ into uranium oxide and aqueous hydrogen fluoride. The uranium oxide is made available for beneficial reuse, storage, or disposal, and the aqueous hydrogen fluoride is sold for reuse.

Centrus is responsible for environmental compliance, environmental monitoring, and management of wastes generated by current activities at the American Centrifuge Plant. Centrus operates independently of DOE and is regulated by the Nuclear Regulatory Commission. The Centrus data and compliance information included in this report are provided for information only.