

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, and long-term stewardship of the facilities that are not leased to the United States Enrichment Corporation (USEC). Production facilities for the separation and enrichment of uranium isotopes are leased to USEC, but most activities associated with the gaseous diffusion process of uranium enrichment ceased in 2001. In 2009, USEC, Inc. (the parent company of USEC) continued operation of the small-scale demonstration centrifuge for uranium enrichment at PORTS (the Lead Cascade). USEC, Inc. has also begun preparatory activities and initial construction of its commercial scale American Centrifuge Plant at PORTS. In general, USEC activities are not covered by this document, with the exception of some environmental compliance information provided in Chapter 2 and radiological and non-radiological environmental monitoring program information discussed in Chapters 4 and 5, respectively.

1.2 BACKGROUND INFORMATION

PORTS, which began operation in 1954, is owned by the DOE (see Figure 1.1). Effective July 1, 1993, the DOE leased the uranium production facilities at the site to USEC, which was established by the Energy Policy Act of 1992. The DOE is responsible for certain environmental restoration and waste management activities, uranium programs, and long-term stewardship of nonleased facilities at PORTS.



Figure 1.1 The Portsmouth Gaseous Diffusion Plant.

LATA/Parallax Portsmouth, LLC (LPP), Theta Pro2Serve Management Company, LLC (TPMC), and Uranium Disposition Services, LLC (UDS) managed DOE PORTS programs throughout 2009. 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) decontamination and decommissioning of inactive facilities; 5) disposition of highly enriched uranium; and 6) operation of the site's waste storage facilities. TPMC provided infrastructure services including the following: 1) maintenance of facilities, grounds, and roadways; 2) janitorial services; 3) security access for DOE facilities; and 4) information technology/network support for DOE operations.

UDS was responsible for construction of the Depleted Uranium Hexafluoride Conversion Facility at PORTS, surveillance and maintenance of depleted uranium cylinders, and environmental compliance and monitoring activities associated with UDS operations. Depleted uranium hexafluoride, which is a product of the gaseous diffusion process, is stored in cylinders on site. The Depleted Uranium Hexafluoride Conversion Facility will convert depleted uranium hexafluoride into uranium oxide and hydrogen fluoride, which will be shipped off site. The uranium oxide will be disposed as waste, and the hydrogen fluoride will be sold for reuse. Construction of the facility was completed in May 2008. Systems testing and operational readiness reviews were in progress in 2009 with operation of the facility expected to begin in 2010.

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. USEC is transitioning the gaseous diffusion production facilities at PORTS to a cold shutdown mode under a contract with the DOE. 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. USEC is also processing uranium to remove technetium-99. The X-533 Switchyard that supplied power to the former gaseous diffusion process was deactivated in November 2008 and was being prepared for return to DOE in 2009.

In 2002, USEC, Inc. decided to site the Lead Cascade at PORTS, which is a small-scale demonstration centrifuge for uranium enrichment. The Lead Cascade began operating in October 2006 and continued throughout 2009 to generate operational and economic data. In 2004, USEC, Inc. announced that its commercial scale American Centrifuge Plant would be built at PORTS. Preparation for and the initial construction of the American Centrifuge Plant continued until mid-2009, when construction was put on hold pending receipt of additional funding. Consequently, construction of the American Centrifuge Plant was on hold as of the end of 2009. Both of these facilities (the Lead Cascade and the American Centrifuge Plant) are housed in existing buildings at PORTS that were constructed for DOE's Gaseous Centrifuge Enrichment Plant, which was cancelled in 1985.

The gas 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.

In 2009, DOE Headquarters continued the planning process for the decontamination and decommissioning (D&D) of the PORTS gaseous diffusion facilities and associated buildings that was initiated in 2007. D&D includes removing equipment, demolishing buildings, disposing of wastes, and investigating potential contamination beneath the demolished buildings.

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. 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 *2009 Groundwater Monitoring Report* and the *2009 Annual Hazardous Waste Report*, which are available at the DOE PORTS Environmental Information Center.

1.3 DESCRIPTION OF SITE LOCALE

DOE 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.

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

The DOE, through its managing contractors, is responsible for the Environmental Restoration, Waste Management, and Uranium Programs at the plant, as well as other nonleased DOE property. The Environmental Restoration Program performs remedial investigations and



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



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

remedial actions to define the nature and extent of contamination, to evaluate the risk to public health and the environment, and to remediate areas of contamination at PORTS. The goal of the Environmental Restoration Program is to verify that releases from past operations at DOE PORTS are thoroughly investigated and that remedial actions are taken to protect human health and the environment.

The Waste Management Program is responsible for managing wastes generated at the site. Wastes must be identified and stored in accordance with all environmental regulations. The Waste Management Program also arranges 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.

The Uranium Program is responsible for the cost-effective management of PORTS facilities and real property retained by the DOE. Responsibilities include managing contracts between DOE PORTS and other subcontractors for such services as maintenance, utilities, chemical operations, uranium material handling, and laboratory analysis. The Uranium Program also oversees the management and coordination of the PORTS Depleted Uranium Hexafluoride Program and warehousing of uranium materials.