

EXECUTIVE SUMMARY

PURPOSE

This Annual Environmental Report is prepared to summarize environmental activities, primarily environmental monitoring, at the Portsmouth Gaseous Diffusion Plant (PORTS) for calendar year 2007. The report fulfills a requirement of the U.S. Department of Energy (DOE) Order 231.1A, *Environment, Safety and Health Reporting*, for preparation of an annual summary of environmental data to characterize environmental management performance.

SITE AND OPERATIONS OVERVIEW

PORTS, which began operation in 1954, is one of three uranium enrichment facilities originally built in the United States; the other two were constructed in Oak Ridge, Tennessee and Paducah, Kentucky, respectively. PORTS is located on 5.9 square miles in Pike County, Ohio. The county has approximately 27,700 residents.

In 1993, the DOE began leasing the uranium enrichment production and operations facilities at PORTS to the United States Enrichment Corporation (USEC). The DOE is responsible for certain environmental restoration and waste management activities, uranium programs, and long-term stewardship of nonleased facilities at PORTS.

LATA/Parallax Portsmouth, LLC (LPP), Theta Pro2Serve Management Company, LLC (TPMC) and Uranium Disposition Services, LLC (UDS) managed DOE PORTS programs throughout 2007. UDS is responsible for construction of the Depleted Uranium Hexafluoride Conversion Facility at PORTS, the surveillance and maintenance of depleted uranium cylinders, and environmental compliance and monitoring activities associated with UDS operations. Depleted uranium hexafluoride, which was 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, which will be shipped off site.

PORTS production facilities that were used for the separation of uranium isotopes by the gaseous diffusion process are currently leased to USEC; however, most activities associated with the gaseous diffusion process of uranium enrichment ceased in 2001. USEC is responsible for cold shutdown operations, removal of uranium deposits from process equipment, and the proposed gas centrifuge uranium enrichment facility. USEC, Inc. (the parent company of USEC) is currently constructing the American Centrifuge Plant at PORTS. The plant is expected to create hundreds of jobs.

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

With the exception of Chapter 2, Compliance Summary; Chapter 4, Environmental Radiological Program Information; and Chapter 5, Environmental Non-Radiological Program Information, this report does not cover USEC operations at PORTS. USEC 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.

ENVIRONMENTAL COMPLIANCE

DOE PORTS or the responsible DOE contractor has been issued a permit for discharge of water to surface streams, several air emission permits, and a permit for the storage of hazardous waste. The DOE is also responsible for preparing a number of reports for compliance with environmental regulations. These reports include an annual groundwater monitoring report, an annual hazardous waste report, an annual polychlorinated biphenyl (PCB) document log, an annual summary of radionuclide air emissions and the associated dose to the public from these emissions, an annual report of specified non-radiological air emissions, a monthly report of National Pollutant Discharge Elimination System (NPDES) monitoring data, a quarterly radiological discharge monitoring report for NPDES outfalls, an annual hazardous chemical inventory, and an annual toxic chemical release inventory.

USEC is responsible for compliance activities directly associated with its operations, including air emission permits for uranium enrichment facilities, water discharge permits for several holding ponds and water treatment facilities, and management of wastes generated by USEC operations.

DOE PORTS did not receive any Notices of Violation for inspections conducted during 2007.

ENVIRONMENTAL PROGRAMS

Environmental Restoration, Waste Management, and Public Awareness Programs are conducted at PORTS to protect and inform the local population, improve the quality of the environment, and comply with federal and state regulations.

Environmental Restoration Program

Environmental restoration is the process of cleaning up waste sites and facilities to demonstrate that risks to human health and the environment are either eliminated or reduced to safe levels. The DOE established the Environmental Restoration Program to find, analyze, and correct site contamination problems.

The 1989 Ohio Consent Decree and the 1989 U.S. EPA Administrative Consent Order (as amended in 1994 and 1997) require investigation and cleanup of PORTS in accordance with the Resource Conservation and Recovery Act (RCRA) Corrective Action Program. The site is divided into quadrants to facilitate the investigation and cleanup. Corrective actions, also called remedial actions, are underway in each quadrant.

In 2007, DOE installed four new groundwater extraction wells in the southern portion of the X-749/X-120 groundwater plume in Quadrant I. The groundwater extraction wells began operating on June 29, 2007, and are intended to control and remediate the groundwater contamination in this area, which had moved a short distance off site. Groundwater data collected in the last half of 2007 indicate that contaminants have decreased in at least one groundwater monitoring well in this area, due in part to operation of the new groundwater extraction wells. In 2007, contamination was not detected beyond the DOE property boundary at concentrations that exceed the EPA drinking water standard.

In December 2003, the Ohio EPA issued the Decision Document for remedial actions required for the X-701B area in Quadrant II. These remedial actions include construction of landfill caps in the western portion of the area and groundwater treatment through injection of a chemical oxidant followed by phytoremediation, if necessary. Phase I field activities for groundwater remediation were completed during 2005 to determine operating parameters for the oxidant injection system. A work plan for

completion of the groundwater remediation at X-701B was approved by Ohio EPA in September 2006. The first phase of oxidant injections was completed in October 2006, with the second and third phases completed in April 2007 and August 2007, respectively. Results of sampling completed after the injections indicate that the oxidant has been effective in removing trichloroethene from groundwater.

As required by the Ohio EPA, remedial actions in Quadrants III and IV were maintained and monitored in 2007.

Waste Management Program

The DOE PORTS Waste Management Program directs the safe storage, treatment, and disposal of waste generated from past plant operations, ongoing plant maintenance, and ongoing environmental restoration projects. In 2007, more than 9 million pounds of waste from PORTS were recycled, treated, or disposed at off-site facilities.

Waste management activities are conducted in compliance with DOE Orders, Ohio EPA regulations, and U.S. EPA regulations. Waste management requirements are varied and often complex because of the variety of wastes generated by DOE PORTS activities. The types of waste managed by DOE PORTS include:

- *Low-level radioactive waste* – radioactive waste not classified as high level or transuranic waste.
- *Hazardous (RCRA) waste* – waste listed under RCRA or that exhibits one or more of the four RCRA hazardous characteristics: ignitability, corrosivity, reactivity, and toxicity.
- *PCB wastes* – waste containing PCBs, a class of synthetic organic chemicals. Disposal of PCB materials is regulated under the Toxic Substances Control Act (TSCA).
- *Solid wastes* – Waste that includes construction and demolition debris, industrial waste, and sanitary waste, as defined by Ohio regulations.

Many of the wastes generated by DOE PORTS are a combination of these first three waste types; for example, some wastes are both RCRA hazardous waste and low-level radioactive waste.

Supplemental policies also have been implemented for waste management including: minimizing waste generation; characterizing and certifying wastes before they are stored, processed, treated, or disposed; pursuing volume reduction (such as blending and bulking); on-site storage in preparation for safe and compliant final treatment and/or disposal; and recycling.

Public Awareness Program

The DOE provides a public Environmental Information Center to allow access to all documents used to make decisions on remedial actions being taken at PORTS. The information center is located just north of PORTS at the Ohio State University Endeavor Center (Room 220), 1862 Shyville Road, Piketon, Ohio 45661. The Information Center is open 9 a.m. to noon Monday and Tuesday, noon to 4 p.m. Wednesday and Thursday, or by appointment (call 740-289-8898 or email eic@falcon1.net). Additional information is provided by the DOE Site Office (740-897-5010) and the LPP Office of Public Affairs (740-897-2336). The latest Annual Environmental Report and other information can also be obtained from the PORTS web site at www.lpports.com.

Public update meetings and public workshops on specific topics are also held to keep the public informed and to receive their comments and questions. Periodically, fact sheets about major projects are written for the public. Additionally, the *Portsmouth Environmental Bulletin* is distributed to more than 4,000 recipients, including those on the community relations mailing list, neighbors within 2 miles of the plant, and plant employees and retirees.

ENVIRONMENTAL MONITORING

Environmental monitoring at PORTS includes air, water, soil, and biota (animals, vegetation, and crops) and includes measurement of both radiological and chemical parameters. Environmental monitoring programs may be required by regulations, permit requirements, and DOE Orders, but also may be developed to address public concerns about plant operations. The DOE *Environmental Monitoring Plan for the Portsmouth Gaseous Diffusion Plant* describes the environmental monitoring programs for DOE PORTS.

In 2007, environmental monitoring information was collected for the following programs:

- Airborne discharges,
- Ambient air,
- Direct radiation,
- Discharges to surface water,
- Local surface water,
- Sediment,
- Soil,
- Vegetation, and
- Biota.

Data collected for these programs in 2007 are consistent with data collected in previous years and indicate that radionuclides and chemicals released by PORTS operations have a minimal effect on human health and the environment. The DOE also collects extensive environmental monitoring information on groundwater at PORTS. Groundwater monitoring is discussed in Chapter 6, Groundwater Programs.

DOSE

Potential impacts on human health from radionuclides released by PORTS operations are calculated based on environmental monitoring data. This impact, commonly called a dose, can be caused by radionuclides released into the air and/or water, or radiation emanating directly from buildings or other objects at PORTS. The U.S. EPA sets a 10 millirem (mrem)/year limit for the dose from radionuclides released to the air, and the DOE sets a 100 mrem/year limit for the dose from radionuclides from all potential pathways (air, water, and direct radiation). A person living in southern Ohio receives a dose of approximately 300 mrem/year from natural sources of radiation (National Council on Radiation Protection 1987). Figure 1 provides a comparison of the doses from various common radiation sources.

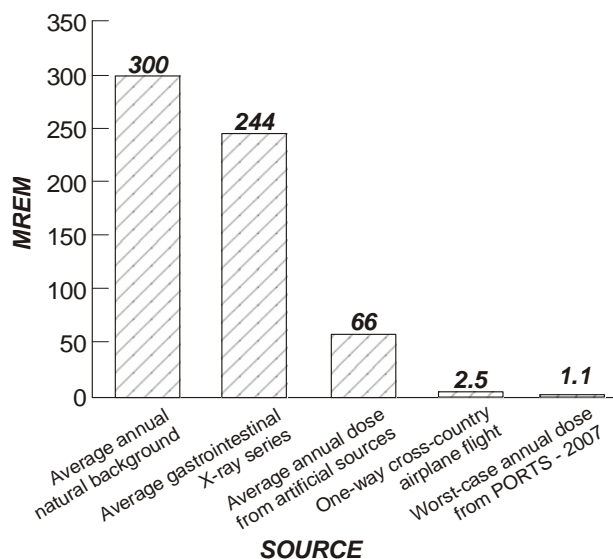


Figure 1. Comparison of dose from various common radiation sources.

This Annual Environmental Report includes radiological dose calculations for the dose to the public from radionuclides released to the environment based on environmental monitoring data collected by both the DOE and USEC. The maximum dose that a member of the public could receive from radiation released by PORTS in 2007 is 1.1 mrem, based on a maximum dose of 0.0051 mrem from airborne radionuclides, 0.022 mrem from radionuclides released to the Scioto River, 0.97 mrem from direct radiation from the PORTS depleted uranium cylinder storage yards, and 0.12 mrem based on exposure to radionuclides detected at off-site monitoring locations in 2007. This dose calculation uses a worst-case approach; that is, the calculation assumes that the same individual is exposed to the most extreme conditions from

each pathway. This dose (1.1 mrem) is significantly less than the 100 mrem/year limit set by DOE for the dose to a member of the public from radionuclides from all potential pathways. The dose to a member of the public from airborne radionuclides released by PORTS (0.0051 mrem) is also significantly less than the 10 mrem/year standard set by U.S. EPA.

GROUNDWATER PROGRAMS

Groundwater monitoring at DOE PORTS is performed at RCRA hazardous waste units, solid waste disposal units, and RCRA Corrective Action Program units. The *Integrated Groundwater Monitoring Plan* describes the groundwater monitoring program for PORTS, which has been reviewed and approved by the Ohio EPA. In general, samples are collected from wells at 11 groundwater monitoring areas and surface water locations that are part of the groundwater monitoring program. Samples are analyzed for metals, volatile organic compounds, and/or radiological constituents. DOE PORTS then evaluates constituents detected in the groundwater to assess the potential for each constituent to affect human health and the environment.

Some groundwater monitoring is conducted in order to meet DOE Order requirements. Exit pathway monitoring assesses the effect of DOE PORTS on regional groundwater quality and quantity.

Five groundwater contamination plumes have been identified on site at PORTS. The primary groundwater contaminant is trichloroethene. Remediation of groundwater is being conducted, in part, under Ohio EPA's RCRA Corrective Action Program. The contaminated groundwater plumes present at PORTS did not change significantly in 2007. Trichloroethene and several other volatile organics continue to be detected at concentrations less than 4 micrograms per liter ($\mu\text{g/L}$ or parts per billion) in an off-site well approximately 45 feet south of the DOE property line that is part of the X-749/X-120 groundwater plume. Trichloroethene and other volatile organics were also detected for the first time in two other off-site monitoring wells at concentrations of 1.2 $\mu\text{g/L}$ or less. In 2007, trichloroethene was not detected in groundwater beyond the DOE property boundary at concentrations that exceed the EPA drinking water standard of 5 $\mu\text{g/L}$.

The groundwater extraction wells installed in the southern portion of the X-749/X-120 groundwater plume in 2007, which began operating on June 29, 2007, are intended to control and remediate the groundwater plume in this area. Concentrations of trichloroethene in at least one on-site groundwater monitoring well had decreased by the end of 2007, due at least in part to operation of the new groundwater extraction wells.

The *Integrated Groundwater Monitoring Plan* also addresses monitoring of residential water supplies near PORTS to verify that site contaminants have not migrated into off-site drinking water wells. Results of this program indicate that PORTS has not affected drinking water wells outside the site boundaries.

QUALITY ASSURANCE AND QUALITY CONTROL

Data reliability is of the utmost importance for monitoring releases and measuring radiation in the environment. To demonstrate that the monitoring and measurement results are accurate, DOE PORTS has implemented a quality assurance and quality control program based on guidelines from the U.S. EPA, the American Society for Testing and Materials, and other federal and state agencies. The DOE PORTS staff administers numerous quality control activities to verify reliability of the data on a day-to-day basis. DOE PORTS also participates actively in quality control programs administered by agencies outside the site such as the U.S. EPA.