

## Fernald Cleanup Fact Sheet

[printable .pdf](#)

This fact page describes the U.S. Department of Energy's (DOE) Fernald site and associated cleanup activities. The site has gone by many names over the years, including Feed Materials Production Center, Fernald Environmental Management Project, Fernald Closure Project, and in 2007 became the Fernald Preserve. The Ohio Environmental Protection Agency (Ohio EPA) and the United States Environmental Protection Agency mandated and regulated the cleanup activities at the site. For a detailed timeline of the Fernald history, see [Fernald Chronology](#).

### Background

The site, formerly known as the Feed Materials Production Center, is a 1050-acre facility located in a rural, residential area 18 miles northwest of Cincinnati. The facility was constructed in the early 1950s and production began in 1952 with National Lead of Ohio (NLO) as the operator.

Uranium metal products for the nation's defense programs were produced at Fernald, including slightly enriched and depleted uranium. Smaller amounts of thorium metal also were produced. Production stopped in July 1989 to focus resources on environmental cleanup. In December 1989 the site was added to the U.S. EPA National Priorities List. In 1991 DOE officially ended production and the site was renamed the Fernald Environmental Management Project, or FEMP. In 1992 Fluor Daniel Fernald (formerly FERMCO) assumed responsibility for cleanup of the Fernald site from Westinghouse.

### Environmental Threats

**Ground Water:** The Fernald site is located over the Great Miami Aquifer, which is designated a sole source aquifer and considered a valued natural resource. The Southwest Ohio Water Company operates a production wellfield approximately one mile east of Fernald's former production area.

Ground water is contaminated with above background concentrations of uranium approximately one mile south of the site in what is referred to as the south plume. DOE provided bottled water for residents in the south plume area until 1996 when a public drinking water system became operational.

**Waste Pits:** The six waste pits used during past operations contained approximately 475,000 tons of waste, including uranium, thorium and other radioactive and chemical contaminants. The pits ranged in size from a football field to a baseball diamond, with varying depth from 13 to 30 feet. Two of the pits had a water cover, one had a synthetic cap and the others had a soil cover. The waste pits were in close proximity to, and sometimes in contact with, the Great Miami Aquifer and contributed to contamination of the ground water.

**Silos:** Four concrete silos were constructed at Fernald to store radioactive materials. Two of them, referred to as the K-65 silos, contained high radium-bearing residues, one contained lower-level dried uranium residues, and one was never used. To reinforce the K-65 silos, a soil berm was added in the 1960s and enlarged in the early 1980s. In 1991, bentonite clay was injected into the tops of the two K-65 silos to cap the high radium residues and reduce radon emissions from the silos.

**Past Releases:** According to an independent [dose reconstruction study](#)<sup>\*</sup>, an estimated 340 tons of uranium were released during production at Fernald. The study also estimates 170,000 curies of radon were released from the K-65 silos. A different study released in 1998 estimated the number of lung cancer deaths occurring between 1951 and 2088 may be increased by 1% to 12% from Fernald related radiation exposures. The study focused on lung cancer because exposure to radon contributed 70% to 90% of the lung dose to the Fernald community.

<sup>\*</sup> These estimates are reconstructions of past releases and are based on incomplete data. This review of historic data was conducted by Radiological Assessments Corporation (*The Fernald Dosimetry Reconstruction Project*, August 1996).

<sup>\*\*</sup> *Draft Risk Assessment*, Centers For Disease Control and Prevention, March 1998.

## **Operable Units/Projects**

In 1997 the site work was reorganized around projects that incorporated operable units (OU) derived through the CERCLA process. The following explain the projects:

**Waste Pits Remedial Action Project** (includes OU1— Waste storage area, including six waste pits, clearwell and burn pit) The waste pit contents were excavated, thermally dried and shipped by rail to Energy Solutions (formerly Envirocare) disposal facility in Utah.

**On-Site Disposal Facility** (includes OU2, OU3, and OU5) Contaminated soil and debris was excavated and disposed in the on-site engineered disposal cell. Any waste exceeding the waste acceptance criteria was disposed off-site. No off-site waste was allowed in the disposal cell. The first of eight cells opened for waste placement in 1997. The final cap of cell 8 was installed in 2006.

**Facilities Closure and Demolition Project** (includes OU3 — Former production area, including all buildings, equipment, inventoried hazardous material and scrap metal piles, and remediation facilities) All on-site buildings were decontaminated and dismantled. Debris within the waste acceptance criteria went in the on-site disposal facility, with higher level materials going off-site.

**Silos Project** (includes OU4 — Silos 1-4, including the K-65 silos, their contents and associated piping and soils) Silo 1 & 2 waste was removed by slurry, solidified and placed in casks. The casks were shipped to a facility in Texas to await disposal there. Waste from Silo 3 was removed via vacuum, conditioned for shipment, packaged in bags and sea-land containers and shipped to a disposal facility in Utah.

**Soils Characterization and Excavation Project** (included OU2 and OU5) Contaminated soils were excavated and those meeting the waste acceptance criteria (WAC) disposed in the on-site disposal facility. Soil and debris exceeding the WAC were shipped off-site for disposal in Utah. A thorough certification process using real-time radiation detection equipment and standard physical sampling along with rigorous statistical analyses was used to determine cleanup had been completed.

**Aquifer Restoration and Waste Water Project** (included OU5) The Great Miami Aquifer will be remediated by a combination of treatment, extraction and injection of the ground water. An Advanced Waste Water Treatment Facility was completed in 1994 with additional capacity added in 1998. The South Plume extraction system removal action began pumping in August 1993. The South Field extraction system became operational in 1998.

## **Regulatory Arena**

Numerous federal and state laws guided environmental remediation at Fernald. The primary driver in Fernald's cleanup is CERCLA. Also known as Superfund, CERCLA mandates the study and implementation of cleanup initiatives.

Other important regulations that affect the cleanup process include the Resource Conservation and Recovery Act (RCRA—for hazardous waste), the National Pollutant Discharge Elimination System (NPDES—for wastewater discharges), the National Environmental Policy Act (NEPA), and numerous other state and federal laws that protect air, water and land resources.

Ohio EPA worked with DOE to improve efficiency in the regulations that affect Fernald. For example, Ohio EPA worked with DOE to integrate RCRA and CERCLA ground water monitoring programs. Additional streamlining occurred with the integration of RCRA closures and CERCLA cleanups.

Ohio EPA works closely with U.S. EPA under judicial consent decrees and enforceable inter-agency agreements to oversee the cleanup effort at Fernald. The 1991 Consent Agreement was signed by DOE and U.S. EPA which sets schedules for CERCLA documentation and implementation, and clarifies

methods for assessing risk. Using state and federal legislation along with negotiated agreements, both EPAs are able to ensure an effective cleanup at Fernald.

In 1994, Ohio EPA created the Office of Federal Facilities Oversight to coordinate and manage regulatory activities at several federal facilities. OFFO was created to provide a consistent and comprehensive approach to oversight activities. As Fernald closure concluded at the end of 2006, many OFFO staff transitioned to other jobs, while some remained with Ohio EPA's Federal Facilities Section to monitor DOE's Legacy Management activities at Fernald. Ohio EPA's activities at Fernald are funded through a DOE Cost Recovery Grant. From 1995 To 2003 Ohio EPA produced annual reports to the public detailing oversight activities. Electronic copies of these can be obtained [HERE](#).

### **Environmental Monitoring**

Environmental monitoring was conducted on a regular basis to meet certain objectives at Fernald. The overall objective of sampling at Fernald is to ensure the protection of human and environmental health.

Since June 1994, Ohio EPA has taken independent and split samples with the Fernald monitoring team. Ohio EPA has sampled ground water, surface water, sediment, soil, produce and air.

The State of Ohio was tasked to evaluate the adequacy of Fernald's sampling program. In March 1995, Ohio EPA and the Ohio Department of Health completed the *Initial Review of the Fernald Environmental Monitoring Program*. In May 1998, OFFO completed the Field Sampling Plan and Standard Operating Procedures, a guidance document for sampling and reporting data at Fernald.

In 1996, OFFO participated in the development of Fernald's new program to integrate and streamline all aspects of environmental monitoring. Fernald's Integrated Environmental Monitoring Program (IEMP) combined DOE's project specific monitoring with compliance monitoring and ground water remedy performance monitoring. Fernald's IEMP monitored for environmental releases and doses to the public as part of DOE Orders. It is governed by CERCLA, RCRA, FFCA, NPDES, ARARs, NESHAPs, and Ohio Fugitive Dust Regulations.

### **Public Water Supply System**

In response to elevated concentrations of uranium in the ground water around Fernald, a public water supply system was installed in the area. DOE contributed approximately \$5.4 million to this project. Residents living within a certain area were eligible to have the initial installation of the water service paid by DOE. The public water supply system became operational in 1996.

### **Community Involvement**

Public availability and working partnerships with all stakeholders helped Ohio EPA's Fernald team to enhance their cleanup oversight at Fernald. The team encouraged early and active public participation in Fernald cleanup decisions. Through technical availability sessions, environmental monitoring fact sheets, web site, and frequent contact with the public, Ohio EPA's Fernald team helped to enhance the remediation at Fernald.

There is a very vocal and active community involved with the cleanup of Fernald. From local residents to elected officials, the public played an active role in Fernald's remediation.

In 1984, after a resident learned she had been drinking contaminated well water, she joined with several area residents to express outrage at the environmental threats to their community. From 1984 - 2006 FRESH, Inc. (Fernald Residents for Environmental Safety and Health) played an active role in the cleanup process at Fernald by influencing key decision-makers, educating the larger community, and participating in the national debate on nuclear waste issues.

The [Fernald Citizens Advisory Board](#), formerly the Fernald Citizens Task Force, a DOE Site Specific Advisory Board, first convened in the summer of 1993 with various representatives from the community.

The Advisory Board issued reports and recommendations on future use, waste disposal, cleanup levels, and priorities. They have also influenced major budget and policy initiatives like the 10 Year Plan.

Other groups that have contributed to the Fernald community include the Fernald Citizens for Health and Environment Committee (FCHEC), Fernald Community Reuse Organization (FCRO) and Fernald Living History Project (FLHP).

During site closure in 2006 many of these groups disbanded as their missions were complete. With long-term stewardship issues still on the horizon, the [Fernald Community Alliance \(FCA\)](#) emerged as a single voice for the Fernald community.

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*Written by Ohio EPA*

<http://offo2.epa.state.oh.us/FernaldNew/FernaldCleanup/SiteInfo/fact.htm>