

2003



ANNUAL REPORT TO THE PUBLIC

on the **FERNALD**

Closure Project

Prepared by:



Ohio Environmental Protection Agency
OFFICE OF FEDERAL
FACILITIES OVERSIGHT



State of Ohio

Ohio Environmental Protection Agency

Ohio Department of Health

Ohio Emergency Management Agency

Prepared and Published by:

Ohio Environmental Protection Agency

Office of Federal Facilities Oversight

Fernald Team

401 East Fifth Street

Dayton, Ohio 45402-2911

937-285-6357

<http://offo2.epa.state.oh.us>



This document is printed on recycled paper (30% post-consumer)
and can be recycled. Please remove plastic binding.

TABLE OF CONTENTS

Acronyms List

1.0	Introduction	1
1.1	Site Background	2
1.2	Funding	3
2.0	Activities and Accomplishments	5
2.1	Remediation Oversight	6
2.2	Restoration Oversight	12
2.3	Public Outreach	16
2.4	Emergency Management Planning	21
3.0	Environmental Monitoring	22
3.1	Private Wells	23
3.2	Surface Water	24
3.3	Sediment	26
3.4	Produce	27
3.5	Air	28

APPENDICES

Appendix A - Maps

Appendix B - Private Well Data Table

Appendix C - Surface Water Data Table

Appendix D - Sediment Data Table

Appendix E - Produce Data Tables

Appendix F - Air Data Tables

ACRONYMS

A1P3	Area 1 Phase 3
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	Department of Energy
ECOS	Environmental Council of the States
EOC	Emergency Operations Center
FCAB	Fernald Citizens Advisory Board
FRL	Final Remediation Level
IEMP	Integrated Environmental Monitoring Plan
ITRC	Interstate Technology & Regulatory Cooperation Workgroup
LTS	Long-Term Stewardship
NESHAP	National Emission Standard for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NRD	Natural Resource Damages
ODH	Ohio Department of Health
Ohio EMA	Ohio Emergency Management Agency
Ohio EPA	Ohio Environmental Protection Agency
OFFO	Office of Federal Facilities Oversight
OU	Operable Unit
OSDF	On-Site Disposal Facility
RCRA	Resource Conservation and Recovery Act
SP3	Soil Pile 3
SWU	Southern Waste Units
TSP	Total Suspended Particulates
U.S. EPA	United States Environmental Protection Agency
WAC	Waste Acceptance Criteria
WPRAP	Waste Pits Remedial Action Project



Looking east at Fernald, November 2003. Photo courtesy of DOE Fernald Site Photography #D0073.

1.0 INTRODUCTION

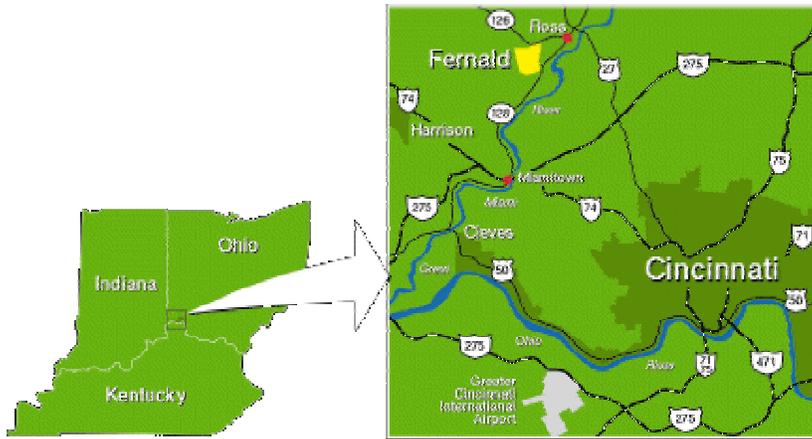
This report documents the State of Ohio's oversight activities at the United States Department of Energy's (DOE) Fernald Closure Project. The report is written by the Ohio Environmental Protection Agency (Ohio EPA) to provide interested parties a single source of information regarding Ohio's regulatory, environmental monitoring, public outreach and planning activities at Fernald during calendar year 2003.

In 2003, more buildings were dismantled, waste shipped, contamination removed and water treated than in any previous year. DOE welcomed Bill Taylor as the new site director. The highly visible 269-foot water tower was imploded. Once home to more than 100,000 drums, the Plant 1 Pad was emptied and demolished. Risk-Based End State discussions and a safety shutdown slowed cleanup at the end of the year. This report highlights remediation, restoration and public outreach in 2003.

INTRODUCTION

1.1 SITE 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.



Graphic courtesy of DOE Fernald site.

The facility was constructed in the early 1950s and production began in 1952 with National Lead of Ohio as the operator.

Uranium metal products for the nation's defense programs, including slightly enriched and depleted uranium, were made at Fernald. Smaller amounts of thorium metal were also made. Production stopped in July 1989 to focus resources on environmental cleanup. In December 1989, the site was added to the United States Environmental Protection Agency's (U.S. EPA) National Priorities List. In 1991, DOE officially ended production and the site was renamed the Fernald Environmental Management Project. Fluor Fernald assumed responsibility for cleanup from Westinghouse in 1992. Today the site is called the Fernald Closure Project to reflect the current mission.

During production, numerous contaminants were released and disposed of which affected surrounding soil, ground water and surface water. According to an independent dose reconstruction study, 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 risk assessment published in 1998 estimated the number of lung cancer deaths occurring between 1951 and 2088 might be increased by 1% to 12% from Fernald radiation exposures**.

*The Fernald Dosimetry Reconstruction Project, August 1996; Radiological Assessments Corporation. (These estimates are reconstructions of past releases and are based on incomplete data.)

**Estimation of the Impact of the Former Feed Material Production Center (FMPC) on Lung Cancer Mortality in the Surrounding Community, Centers for Disease Control and Prevention, December 1998.

1.2 FUNDING

Ohio EPA has a long-standing regulatory role at Fernald. The 1988 Consent Decree between DOE and the State of Ohio provided the mechanism for recovery of costs associated with regulatory oversight. In 1993, the Cost Recovery Grant was finalized to provide these costs in a financial assistance award, eliminating the need for annual reimbursement. This arrangement allows Ohio to provide more active oversight through dedicating staff and resources to the project.

Ohio EPA is the State’s lead agency for implementing the grant. Ohio Department of Health (ODH) and Ohio Emergency Management Agency (Ohio EMA) provide support in health physics and emergency preparedness planning, respectively. Ohio EPA conducts regulatory oversight for implementation of the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and other environmental laws and regulations. In addition to regulatory activities, Ohio EPA conducts public outreach and environmental sampling under the Cost Recovery Grant. An important goal of Ohio’s federal facilities program is to enhance public involvement in decision-making at Fernald.

FISCAL YEAR FUNDING

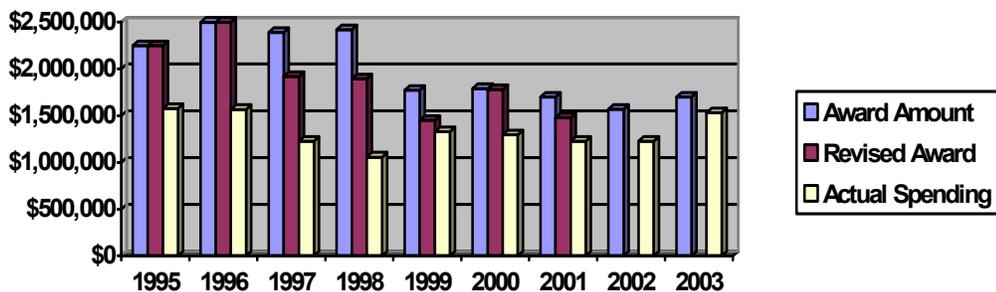


Figure 1 Funding awards and spending since the inception of OFFO.

INTRODUCTION

The graph in Figure 1 represents a profile of the funding provided to the State of Ohio by DOE for oversight at Fernald. The 2003 spending referenced in Figure 1 shows an increase based on a 14 month a funding period.

The distribution of expenditures for fiscal year 2003 is provided in the figure below. Personnel expenditures include salaries, fringes and indirect costs. Contractual expenditures include medical monitoring, laboratory and remedial oversight contractor costs. Operating costs, supplies, training and travel make up the “other” expenditures.

OHIO SPENDING CATEGORIES

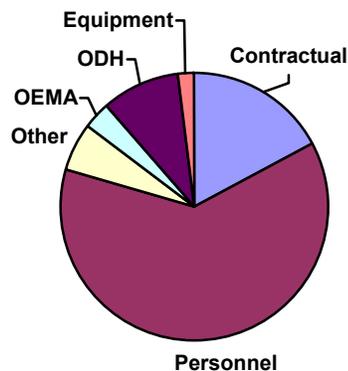


Figure 2 Money is distributed across various program areas.

2.0 ACTIVITIES AND ACCOMPLISHMENTS

The overall strategy for remediation of the Fernald site continues to be a balanced approach, which includes removing the most contaminated materials for off-site disposal, while disposing high volume materials on-site. Large-scale remediation continued in 2003.



Ohio EPA staff conduct an inspection of the former Plant 1 Pad in August, 2003.

Cell 2 was capped, and the liner for cell 6 was completed. In

November, the one-hundredth train of low-level waste pits material left the site for disposal. Remediation work began on the west side of the production area, and the Plant 1 Pad was removed for disposal in the on-site disposal facility (OSDF). Staff from Ohio EPA's Office of Federal Facilities Oversight (OFFO) observed these and other accomplishments during numerous field visits. Restoration efforts were advanced at Fernald, in part through our efforts to involve school children in native plantings. OFFO staff participated in public meetings that kept the community informed of progress at Fernald. Ohio continued to work with DOE on several national level issues and to maintain emergency planning operations. Ohio's activities and accomplishments at Fernald for 2003 are further explained in the following pages.

ACTIVITIES AND ACCOMPLISHMENTS

2.1 REMEDIATION OVERSIGHT

The site began remedial investigation activities as part of a 1986 Federal Facility Compliance Agreement between U.S. EPA and DOE. In 1986, the State of Ohio sued DOE under various environmental statutes. As partial settlement of the lawsuit, a Consent Decree between the State of Ohio and DOE was signed in 1988. The State's natural resource damages claim remains outstanding. Following a 1989 listing on the National Priorities List, a CERCLA Consent Agreement was signed by U.S. EPA and DOE in 1990. Although separate agreements requiring cleanup exist, Ohio EPA and U.S. EPA work together on all aspects of the project.

As part of Ohio's oversight role at Fernald, 154 technical documents were reviewed and commented on and/or approved in 2003. Most of these documents related directly to the on-going remediation of the facility including design packages, implementation plans, certification reports, and work plans. In addition to these regulatory reviews, Ohio EPA focused significant effort on field oversight of remediation projects. During the year, Ohio EPA conducted 96 site inspections. The inspections focused on OSDF cell liner construction and waste placement, storm water management, fugitive dust control, waste pit operations, former production area excavations and other on-site activities.

Waste Pits Remedial Action Project (formerly OU1): The six waste pits contained more than one million tons of soil and waste, including uranium, thorium and other radioactive and chemical contaminants. The pits range in size from one to five acres, and vary in depth from 10 to 40 feet. Two of the pits have water covers, one has a synthetic cap, and the other pits have soil covers. The waste pits are either in close proximity to, or in contact with, the Great Miami Aquifer and are contributing to ground water contamination. Waste pits material and residual soil is excavated and shipped by gondola railcars to Envirocare, in Utah, for disposal. Some materials require drying prior to shipment.

ACTIVITIES AND ACCOMPLISHMENTS



Aerial of the waste pits in November 2003. Photo courtesy of DOE Fernald Site Photography #D0074.

Excavation continued in pits 1, 2, 3 and 5. Pit 4 excavation is almost completed. By the end of 2003, 105 unit trains were sent to Envirocare for disposal. A total of 683,287 of an estimated 790,000 tons of waste have been shipped. With the addition of 25 railcars, the total fleet is 250. This allows Fernald to run four unit trains.

On-Site Disposal Facility Project (formerly OU2, OU3, OU5): Contaminated material, including soil and debris, is being disposed in the OSDF. Any waste that exceeds the OSDF waste acceptance criteria (WAC) is treated to meet the criteria or disposed off-site. No off-site waste is allowed in the OSDF.

Cell 2 was capped in 2003. Cell 3 is 98 percent filled, and will be capped in 2004. Waste placement continued in cells 4 and 5. Cell 6 was constructed and received some waste. Liner construction for cell 7 began. In 2003, 412,000 in-place cubic yards of soil and debris were placed in the OSDF, the highest amount since the project began, bringing the total amount of materials placed into the OSDF to 1.35 million cubic yards.



Looking southwest at the OSDF in November 2003. Photo courtesy of DOE Fernald Site Photography #D0042.

ACTIVITIES AND ACCOMPLISHMENTS

Facilities Closure and Demolition Project (formerly OU3): All on-site buildings are being decontaminated and dismantled. All waste, except that which exceeds the WAC, will be disposed in the OSDF.



In March, repairs were made to the OSDF leachate conveyance system.

By the end of the year, 26 structures were demolished. Work on dismantling the Analytical Laboratory and Plant 8 continued. The project was shut down for safety reasons at the end of the year. The rest of the former production buildings are scheduled to be demolished in 2004; 145 of a projected 223 site structures have been demolished.

Silos Project (formerly OU4): There are four concrete silos at Fernald that were constructed to store radioactive materials. Two of them, referred to as the K-65 silos, contain high radium-bearing residues, one contains lower-level dried uranium residues, and one has never been 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. In 1999 the domes of silos 1 and 2 were resealed to reduce radon emissions.

Construction of the new radon control system for silos 1 and 2 was completed and operations began in 2003. This system was built to replace the previous radon system, which was smaller and less efficient. The new radon control system has the capacity to reduce the amount of radon currently emanating from the silos, as well as support the remediation facilities that are under construction.

ACTIVITIES AND ACCOMPLISHMENTS

During 2003, progress continued toward the remediation of silo material. The advanced waste retrieval project neared completion. This project is designed to remove materials from silos 1 and 2 and place them in a series of four newly constructed tanks. The purpose of this removal is to place the silo contents in a tanked configuration for supply to the treatment facility, as well as to make sure the material is in a more homogenous state. The treatment facility construction was ongoing during 2003.

Silo 3 is being treated separately from the other silos. A separate remediation facility is scheduled for operation in 2004 to remove the silo contents, spray a dust-reducing substance and transfer the material into soft-sided containers for shipment by sealand container to the Nevada Test Site or a permitted commercial disposal facility. During 2003, the



Silo 3 is being enclosed as part of remediation. Photo courtesy of DOE Fernald Site Photography #8027D-173.

empty silo 4 was used to test the removal of silo 3 materials. It is scheduled for demolition during early 2004, before operation of the silo 3 remediation facility. OU4 contractor issues continued during 2003. As a result, Fluor decided to release these contractors and self perform the entire silo remediation project.

Soils Characterization and Excavation Project (formerly OU2 and OU5):

Contaminated soils were excavated with disposal of those soils meeting the waste acceptance criteria in the OSDF. In 2003, the soils project included characterization, excavation, certification and restoration. Full-scale excavation operations continued in area 3A/4A (eastern part of the former production plant), while excavation began in area 3B/4B (western part of the former production area).

ACTIVITIES AND ACCOMPLISHMENTS

Certification of areas attaining the final remediation levels (FRL) was started in 1998. Sampling, analysis, and statistical testing occurred for both remediated areas as well as several areas not requiring remediation. Excavation was completed in the southern waste units (SWU) and 97 acres were certified; 57 percent of the site is certified as meeting final cleanup levels for soils.

Aquifer Restoration and Waste Water Project (formerly OU5): The Fernald site is located over the Great Miami aquifer, which is designated a sole source aquifer and considered a valued natural resource. Ground water is contaminated

The year end total discharge to the Great Miami River was 562.45 pounds of uranium in compliance with the annual 600 pound discharge to the river limit.

with 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 plume area from

1991 until 1996 when a public drinking water system became operational. In 1993, the south plume removal action was started to slow off-site migration of the uranium plume. A total of 5,740 pounds of uranium have been removed from the aquifer since 1993, with 9.6 billion gallons of water treated.

Resource Conservation and Recovery Act (RCRA): Ohio EPA's Division of Hazardous Waste Management continues regulatory oversight of the facility's hazardous waste and mixed waste management program.

In 2003, the facility continued to ship hazardous waste off-site for treatment and disposal. At the end of calendar year 2003, the total quantity of RCRA containerized waste still in storage was 328,421 pounds according to the facility's 2003 RCRA Annual Report to Ohio EPA. This quantity of waste is representative of 909 containers and two mobile tanks. The majority of this waste will be shipped off-site for treatment and disposal during 2004.

ACTIVITIES AND ACCOMPLISHMENTS

Ohio EPA inspectors conduct an annual evaluation of the facility to assess the level of compliance with hazardous waste management requirements. The 2003 inspection indicated the facility was in substantial compliance with hazardous waste requirements and no violations were found.

ACTIVITIES AND ACCOMPLISHMENTS

2.2 RESTORATION OVERSIGHT

Ohio EPA is the designated Fernald Natural Resource Trustee for the State of Ohio. Other Trustees for the Fernald site include DOE and the Department of Interior, represented by the U.S. Fish & Wildlife Service. Trustees act as guardians for public natural resources impacted by the Fernald site. One goal is to integrate natural resource restoration into the ongoing CERCLA remediation at the site. Another goal is for restoration activities to lead to settlement of the State of Ohio's Natural Resource Damages (NRD) claim against DOE. More than 800 acres of the site will undergo natural resource restoration to include native grasslands, riparian buffers, forests and wetlands.

In 2003, negotiations remained stalled on resolution of NRD claims and



Restoration of the Northern Pine Plantation was completed in 2003.

settlement of the State of Ohio's lawsuit. DOE began to re-evaluate its position on NRD settlement and involved new site and headquarters staff in the negotiations. No progress regarding settlement was achieved. However, actual restoration work continued to progress, including the completion of two new, large-scale restoration areas, the southern waste units and the Northern Pine Plantation (NPP), and initiation of work in A8P3 south and the phase 2 wetland mitigation.

Restoration Projects

Ecological restoration projects during 2003 included initiation of work in A8P3 south, the northern woodlot and the phase 2 wetland mitigation. Restoration work was completed in the SWU and the NPP. Maintenance and replacement

ACTIVITIES AND ACCOMPLISHMENTS

activities occurred in the A1P1 wetland, A8P2 restoration area, Carolina area and A1P3. See the Restoration Areas Map in Appendix A for all restoration project locations.

The phase 2 wetland mitigation project and the northern woodlot project are adjacent and complementary efforts covering approximately 63 acres. The wetland mitigation work is part of the necessary wetland mitigation acreage required under the Clean Water Act for destruction of wetlands on-site. The project includes a three-basin, tiered wetland system that is surface water fed. Primarily emergent and forested wetland plantings will occur. Some open water habitat will be included. The wetland project covers eight acres of the total project area. Work in 2003 focused on site preparation and initial grading. Planting plugs and trees, and seeding is planned for 2004 following final grading.

The northern woodlot restoration work is aimed at conversion of former pasture to prairie and removal of severe invasive species infestation. Efforts in 2003 focused on the removal of invasives by cutting and using herbicides. Seeding with native woodland and prairie grasses and flowers follows removal of invasives.

The second major project area was the A8P3 south project. This restoration focuses on a 43-acre area on the southern boundary of the site bordered by Paddys Run to the east. Restoration is intended to establish prairie in the former pasture, to expand the riparian corridor along Paddys Run and to improve existing woodland areas. Work in 2003 included site preparation, invasive species removal, tree and shrub planting, and grading a small basin/temporary pool area.

Restoration Research and Monitoring

In 2001, the trustees initiated a functional monitoring program. The functional monitoring program is aimed at habitat types and their relative success trajectory

ACTIVITIES AND ACCOMPLISHMENTS

based on data from baseline, restored and reference areas. Monitoring in 2003 focused on reference sites that document the ideal condition. Surveys were conducted to monitor vegetation.

Ohio EPA continued its amphibian and macroinvertebrate monitoring program in



Eight species of frogs and toads have been identified at Fernald restoration areas.

reference and restored areas. Sampling was conducted using a trapping technique developed by Ohio EPA. The baseline site (2001) only had two species of amphibian (fowler's toad and spring peeper), while on-site restored areas (2001 - 2003) had up to six species in a sample site, with an average of five per site, and a total of eight species (bullfrog, green frog, cricket frog, chorus frog, leopard frog, American toad, gray treefrog and spring peeper). The reference sites had up to six species of amphibians in a sample site, and a total of 14 species. In addition to those species found on-site, reference sites had marbled salamander, spotted salamander, smallmouth salamander, two-lined salamander, tiger salamander and Jefferson salamander.

Ohio EPA continued monitoring a permanent butterfly/skipper transect in A1P1 wetland. The transect data in the wetland supports observations of more native vegetation, including forbs, as the overall number of butterflies observed in 2001 increased 100 percent over the 2000 observations. Butterfly numbers and species variation were down in both 2002 and 2003, likely due to the decrease in weedy annual plants and an increase in permanent wetland vegetation.

ACTIVITIES AND ACCOMPLISHMENTS

One Ohio EPA research project is aimed at optimizing the vegetation used on the OSDF cap. The research plots were installed on the footprint of the former soil pile 3 (SP3). Plots were measured for vegetative percent cover and seeding success. Monitoring started in late 2000 and continued through 2003 with the addition of locations within the former active flyash pile footprint. Monitoring in 2003 included the OSDF cell 1 cap that was seeded in late 2001. Due to delays in construction and weather, various methods of seeding and erosion mat installation were used on the cell 1 cap. These installation problems lead to the ability to study various methods and the subsequent vegetation response. Monitoring OSDF cell 1, cell 2 and the former SP3 will continue in 2004.



An overall increase in flora and fauna has been observed in the restored areas of Fernald.

ACTIVITIES AND ACCOMPLISHMENTS

2.3 PUBLIC OUTREACH

In 2003, OFFO's public outreach program continued to enhance site remediation efforts. Open, ongoing, formal and informal communication enhanced relations with stakeholders, site personnel and other regulators. Steady and interactive communication enables all parties to better understand all views on an issue. Person-to-person contact, along with quick, open responses from technical staff to public inquiries, ensure the public is included in Ohio EPA's decision-making. This type of public outreach results in a diverse collection of opinions and enables better cleanup decisions. OFFO's public outreach program supplements our monitoring and oversight activities by fostering early public involvement in important environmental decisions.



Sixth graders from Ross Middle School's environmental program helped to grow native wildflowers that were planted in Fernald restoration areas in May, 2003.

For the fifth consecutive year, Ohio EPA hosted outreach events that taught school children about using native plants for the restoration effort at Fernald. In February and March, staff went to Crosby and Ross Schools to teach sixth-grade students about the wetland mitigation effort at Fernald and to help the children

plant their own seeds. The students tended the seedlings throughout the spring. In May, Ohio EPA staff helped the children plant the seedlings in the constructed wetland area of Fernald's Northern Pine Plantation. Positive news coverage of this outreach event was in Cincinnati area media outlets.

In May 2003, numerous media outlets covered Ohio EPA's joint effort with Ohio Department of Transportation to survey and relocate the threatened Sloan's Crayfish in Paddys Run north of Fernald. OFFO staff instructed fifth- and sixth-

ACTIVITIES AND ACCOMPLISHMENTS

grade students at adopt-a-school Eastmont Elementary on the scientific method and how to create a science fair experiment. In February, OFFO staff helped judge science fairs at Eastmont and other local schools. In June, OFFO staff participated in and assisted as tour guides for the last official public tour of the site. Public access to some cleanup areas will be impossible as work is completed at a rapid pace.



Tom Schneider, OFFO Team Leader, acted as tour guide on the last public bus tour of Fernald in June.

More than 550 neighbors, retired workers and other stakeholders participated for this record turnout. OFFO participated in several site tours with representatives from Ohio's congressional staff, governor's office and other interested parties. In October and November, Fernald staff initiated a public dialogue for two documents that proposed major changes to cleanup decisions, *The Groundwater Strategy Report* and *Risk-Based End States*. The regulatory, public and media reaction to the proposed cleanup changes and associated public participation was negative. Ohio's strong stand against remedy changes at this stage in the cleanup received national attention. The following pages highlight public involvement at Fernald in 2003.

Meetings

OFFO representatives fully participate in DOE and community-sponsored public meetings and workshops, and give presentations as appropriate. In addition to Fernald-specific groups, such as FRESH, Ohio EPA staff also participated in numerous national groups including the Interstate Technology & Regulatory Cooperation (ITRC), the Ohio Society for Ecological Restoration (SER), the State and Tribal Government Working Group, National Governor's Association Federal Facilities Task Force, Environmental Council of the States, the Association of

ACTIVITIES AND ACCOMPLISHMENTS

State and Territorial Solid Waste Management Officials and the Environmental Management Advisory Board.

Ohio EPA staff attended the tenth anniversary dinner for the Fernald Citizens Advisory Board (FCAB). OFFO staff participated in the monthly meetings of the stewardship committee and full board activities, in ex-officio capacities. In 2003, the group spent time in 2003 on accelerated cleanup, OU4, funding, future use and long-term ground water remediation infrastructure as proposed in the *Risk-Based End States* document. Long-term stewardship, including the NRDA settlement and negotiations, continued at the forefront of stewardship committee's discussions. The FCAB sent a letter to Judge Spiegel regarding the State's outstanding NRD claim.

Ohio EPA continued to participate in quarterly meetings and promotional efforts



Graham Mitchell, OFFO chief, presents "Fernald's Environmental History" at the quarterly Fernald Living History meeting.

of the Fernald Living History Project. This project involves community members and site workers in an effort to record and preserve the various perspectives that are a part of their environmental history. Guest speakers were featured at quarterly meetings, including Graham Mitchell, OFFO Chief, who presented "Fernald's Environmental History" at the

March meeting. In 2003, OFFO continued to maintain an e-mail list and Web pages for the Living History Project.

Publications

- *2002 Annual Report to the Public on the Fernald Environmental Management Project*, August

Fact Sheets

- Quarterly environmental monitoring results fact sheets
- Fernald Chronology

Presentations

- *The Scientific Method*, presented to adopt-a-school, Eastmont Elementary fifth and sixth graders, January
- *Native Plants and Wetland Habitats*, presented to Crosby and Ross students, February and March
- *Fernald's Environmental History*, presented to Fernald Living History Project, March
- *Vernal Pools*, presented to Beavercreek fourth and fifth grade students, March
- *Weapons to Wetlands: Remediating and Restoring US DOE Fernald*, presented to University of Dayton students and faculty, October
- *Amphibian IBI for Evaluating Constructed Wetlands*, presented to the International SER Conference, November (also poster presentation)
- *Careers in Environmental Science*, presented at Sinclair Community College, October
- Fernald presentations to graduate students at Miami University, April, June and November
- 8 South Pole presentations, January through December

ACTIVITIES AND ACCOMPLISHMENTS

On the Internet

OFFO's Fernald Web site continues to be a valuable resource for providing information to both internal and external users. Users can quickly view information about the Fernald cleanup and contact Ohio EPA staff with further questions. Sharing Fernald successes and challenges worldwide may assist other cleanup sites conducting similar activities.

In 2003, OFFO staff continued participation in Ohio EPA's web consistency workgroup to develop a unified look for all Agency web pages. Changes in OFFO's web site were implemented throughout the year to be consistent with the new Agency standard. Positive feedback was received about the new look. A web page was created to provide support to the Agency's adopt-a-school, Eastmont Elementary, with its science fair projects. The web server continues to host multiple web sites, including the community-based Fernald Living History Project site, the Ohio EPA's southwest district site and the Hamilton County Environmental Action Commission site. For more information about Fernald, the OFFO Web site can be accessed at <http://offo2.epa.state.oh.us>.

2.4 EMERGENCY PLANNING

Ohio EMA continues to work with other state agencies to implement the State's Incident Command System. Revisions to the State of Ohio Hazardous Materials Plan and the DOE Annex have been completed. Under Ohio Revised Code, the DOE Annex has been identified as a Secure Document with limited distribution. Ohio EMA



An Ohio EMA technician calibrates radiation detection equipment.

continues to enter updated DOE facility information into the state resource directory, the duty officer's handbook, and a database. Ohio EMA continues to prepare for site emergencies through training and upgrading the emergency operations center (EOC). Ohio EMA has revised its standard operating procedures for the State EOC and is implementing new software to more effectively process information. Ohio EMA personnel attended hazardous materials courses and emergency planning seminars. In 2003, Ohio EMA taught two introductory CAMEO courses in Columbus, and one each in Butler and Hamilton Counties.

Under DOE grant provisions, Ohio EMA provided funds to Hamilton and Butler County emergency management agencies to be used for Fernald. Funds were used to prepare hazard assessments, participate in emergency response organizations, conduct drills, digitize information, participate in communications checks and upgrade their EOCs.

Ohio EMA continues to work with Fernald to gather information on shipments from the site. This information was processed and disseminated to the county emergency management agencies.

3.0 ENVIRONMENTAL MONITORING

The State of Ohio has conducted environmental monitoring at Fernald since 1985. Monitoring is performed to evaluate potential impacts from remedial actions and to appraise the success of ongoing cleanup activities. During 2003, on- and off-site releases were monitored through the sampling of ground water, surface water, sediment, biota and air.

Ohio EPA reviewed and commented on DOE's Integrated Environmental Monitoring Plan (IEMP) in 2003. The reviews included the 2002 Site Environmental Report, the 2003 Annual Review of the IEMP, the IEMP Mid-Year Data Summary Report for 2003, the 2002 Mid-Year IEMP Data Summary Report and the on-line extranet data site. The IEMP integrates monitoring associated with various regulatory oversight programs, such as RCRA and CERCLA, with the current monitoring program required by DOE Orders. As a result of DOE's revised IEMP, Ohio EPA conducts most of the off-property environmental monitoring at Fernald.

Ohio EPA continued its independent and split sampling programs in 2003. Independent sampling allows Ohio EPA to evaluate suspected impacts from remedial activities, evaluate additional sampling locations and analytical parameters not currently monitored by DOE, respond to specific citizen requests, and independently monitor DOE's compliance with the waste acceptance criteria. Split sampling provides a comparison of data between Ohio EPA and Fernald.

A discussion of sampling activities and results for each media is provided in Sections 3.1 through 3.6. Summary data from Ohio EPA's sampling program are included in the appendices. Complete data packages may be viewed by contacting Ohio EPA.

3.1 PRIVATE WELLS

Ohio EPA continued to monitor three private wells in 2003 for total uranium. OFFO split sampled the wells with DOE/Fluor Fernald. The 2003 private well sampling locations are shown on the off-site sampling map in Appendix A. Private wells BOK14, BKM13 and NKM12 are located south of Fernald. The well owners are all on public water and the wells are used for monitoring only.

Private well water is analyzed for total uranium, which is the primary contaminant of concern at Fernald. The U.S. EPA drinking water standard for total uranium was finalized in 2001 at 30 µg/L, a change from the long proposed limit of 20 µg/L, and Fernald’s ground water FRL was changed accordingly. Local background for total uranium in ground water, as determined in the OU5 Remedial Investigation (October, 1994), ranges up to 3.1 µg/L. The highest total uranium concentration detected from the three monitoring wells during 2003 was 78.1 µg/L, found in well NKM12. Well BOK14 was consistently near background in 2003. Appendix B contains the private well sampling data.

OFFO began split sampling the three private wells with Fernald in 1994. With Fernald’s re-injection and extraction system starting in 1998, treated water is re-injected, pushing the contaminated ground water past the private well and toward the extraction wells. After an initial increase in concentrations observed at well NKM12, the total uranium levels have been slowly decreasing.

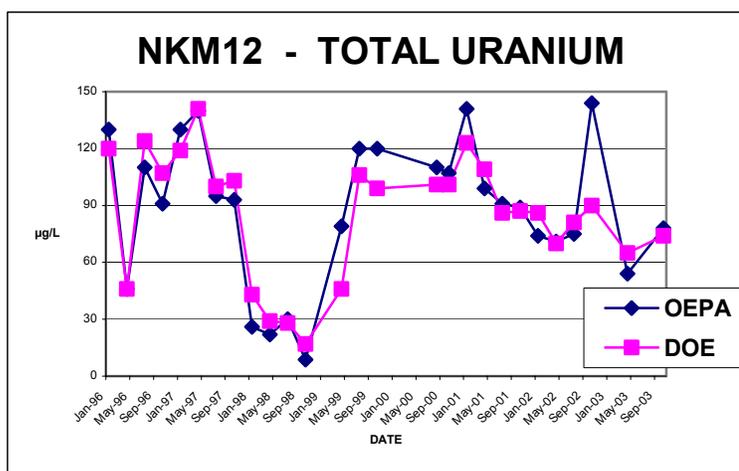
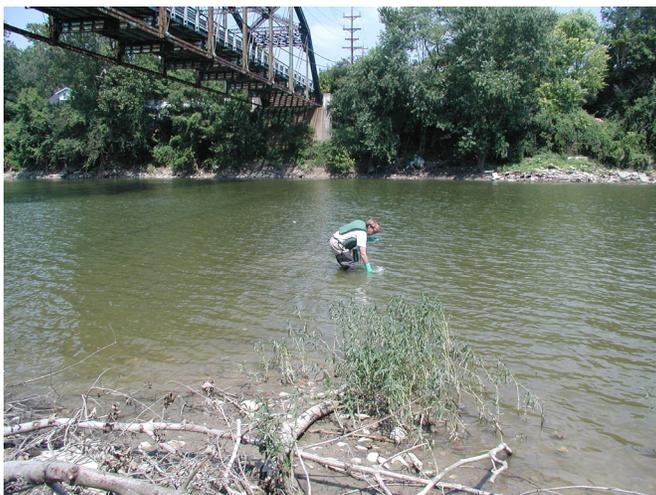


Figure 3 Increased concentrations that were noted in well NKM12 after re-injection began in 1998, have been slowly decreasing again.

3.2 SURFACE WATER



Joe Bartoszek, from Ohio EPA's Surface Water Division, taking a surface water sample at GMR21.4

Forty-seven surface water samples were taken in 2003, compared with 42 taken in 2002 and 52 taken in 2001. In addition to the 38 routine monitoring samples taken in 2003, samples were taken in February at the Pilot Plant Drainage Ditch (PPDD0.5), and February, April, June and August at the southern waste units

constructed ponds (SWU WW, SWU GF). Routine samples were analyzed for total uranium, radium-226 and radium-228.

Appendix A shows the 2003 sampling locations. Location codes reflect the river mile of the routine sampling locations. GM26.2 and PR7.2 are background locations on the Great Miami River and Paddys Run, respectively. PR3.3 is located on Paddys Run below the confluence of the drainage ditch that drains the site north of the production area. This location is where the state threatened Sloan's Crayfish is found. Location PR1.8 is at the Willey Road Bridge on Paddys Run. This location is at the southern boundary of the site. PR0.2 is located at the Route 128 bridge and is fed primarily by ground water. Location GM24.6 is directly downstream of the National Pollutant Discharge Elimination System outfall from Fernald in the Great Miami River. Location GM21.4 is three miles downstream of the effluent at the bridge in New Baltimore.

The final remediation levels for total uranium, radium-226 and radium-228 in surface water in Paddys Run and the Great Miami River are 530 $\mu\text{g/L}$, 38 pCi/L, and 47 pCi/L, respectively. No sample results exceeded the FRLs.

Paddys Run location PR1.8 is at the property line (PR1.8) where Paddys Run leaves the site.

PR1.8 TOTAL URANIUM

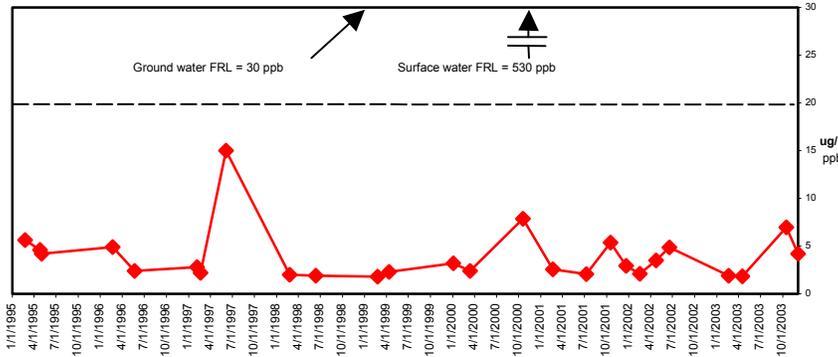


Figure 4 Paddys Run was sampled quarterly at the property line in 2003.

The four routine samples taken at this location continued to demonstrate low levels of total uranium as illustrated in Figure 4 (1.84 to 6.97 µg/L).

Total uranium samples were taken at the SWU ponds because the pond nearest the wheel wash facility (SWU WW) continued to have water when the others had very low water. For comparison, samples were taken at the pond nearest the wheel wash facility and at one pond not influenced by surface water input (SWU GF) in the vicinity of the wheel wash. Figure 5 shows results from the ponds.

Although all sample results were far below the surface water FRL of 530 ppb, the first two samples taken were higher in the pond of interest than the comparison pond. There is no evident cause for this difference. The next three sample results were much closer to each other. Monitoring will continue for these ponds.

TOTAL URANIUM AT SWU PONDS

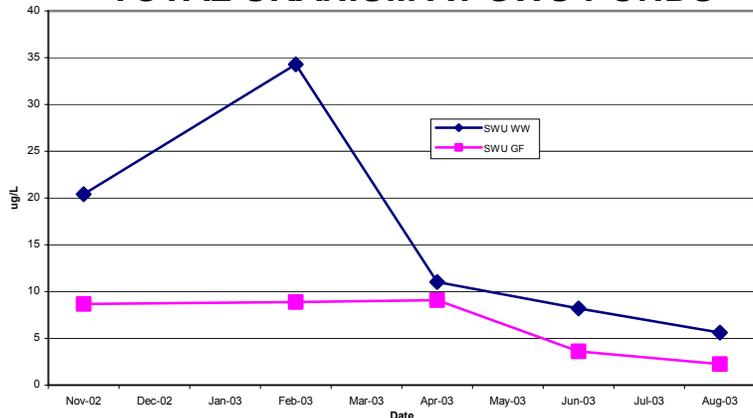


Figure 5 Ohio EPA monitored two ponds in the restored SWU in addition to quarterly monitoring.

3.3 SEDIMENT

Sediment samples were taken at five locations in 2003. A total of six sediment samples were analyzed in 2002, and seven in 2001. Samples were analyzed for total uranium, radium-226 and isotopic thorium.

The map in Appendix A shows all 2003 sediment sampling locations. Most samples were co-located with surface water. Location PR7.2 has a gravel and cobble substrate, and does not have sufficient sediment. PR4.6 at the Morgan Ross Road bridge, the DOE/Fluor Fernald background station for Paddys Run surface water and sediment, was sampled for sediment in place of PR7.2. PR0.2 was not sampled in 2003 due to construction of the Route 126 bridge at the sampling site. Due to frequent rain, sediment sampling took place later than usual and GMR24.6 could not be sampled due to high flow and scouring.

Final remediation levels for sediment at Fernald have been established for the following analytes (OU5 Record Of Decision, December 15, 1995): total uranium (210 µg/g); radium-226 (2.9 pCi/g); and thorium-228 (3.2 pCi/g), -230 (18000 pCi/g), and -232 (1.6 pCi/g). No sediment sample had any analyte above the FRL. Results are summarized in Appendix D.

3.4 PRODUCE

Ohio EPA and DOE collected produce samples in August and September 2003. Splitting samples with DOE provided another opportunity for Ohio EPA to monitor impacts of airborne emissions from remedial activities and site operations at Fernald.

The produce was collected off-site in the Fernald area. The map in Appendix A shows the three sampling locations.

***Corn, cucumbers, soybeans
and tomatoes from local fields
were sampled.***

Two of the locations are upwind or northeast of Fernald, and the third is southeast of the site.

Produce was picked from farm fields and a private residence. Tomatoes and cucumbers were collected at location 43. Both vegetables came from single plants, which were split into two samples. The produce from location 20 was selected from two adjacent fields. These vegetables, corn and soybeans, were collected in a similar manner. Tomatoes were picked at location 5 and also divided into two samples.

The primary parameters analyzed in produce were total uranium and thorium-230. OFFO last sampled Fernald area produce in 1996 and 1997 but discontinued monitoring due to IEMP changes and historical data revealing little to no total uranium uptake (concentrations ranged between 0.000666 pCi/g and 0.0169 pCi/g). When results were compared to historical data and trends, the 2003 total uranium concentrations show consistency with previous data. Produce data tables can be found in Appendix E.

ENVIRONMENTAL MONITORING

3.5 AIR

Ohio EPA conducts air monitoring and surveillance at Fernald. Ohio EPA operated six high volume air samplers to collect particulate samples and three radon monitors to continuously monitor radon-222 gas. The objectives of Ohio EPA air sampling are to verify the effectiveness of the DOE environmental air monitoring network and to measure environmental impacts from remediation.

High Volume Air Sampling

Ohio EPA conducts high volume air sampling to determine concentrations of selected particulate contaminants present in the air from Fernald activities. These samplers are strategically located to measure total uranium, total suspended particulates (TSP) and other target radionuclides present in the air. Four air samplers are located on-site, and two are located in nearby communities. These locations were chosen based on the potential impacts from specific activities, prevailing wind direction, availability of utilities, locations of public interest and points where maximum concentrations may be measured. Projects specifically targeted include the Waste Pit Remedial Action Project (WPRAP) and the on-site disposal facility. Our off-site samplers are located in Crosby and Ross townships. Locations are shown on the maps in Appendix A.

Ohio EPA compares on-site concentrations with off-site location concentrations and the concentrations listed in the National Emission Standard for Hazardous Air Pollutants (NESHAP) for radionuclides.

Waste Pit Remedial Action Project: Ohio EPA monitors total uranium, TSP, thorium isotopes and radium-226 concentrations in air at two sampling locations adjacent to the waste pits. These air samplers are located northeast and northwest of the waste pits, (FNAPS01 and FNAPS04, respectively). In 2003, significant differences were observed between these samplers and our background sampler, located in Crosby Township. These locations indicate elevated concentrations of total uranium and all thorium isotopes. All of the

measured concentrations were less than NESHAP standards.

The 2003 average total uranium concentrations measured at both waste pit locations were increased from those measured in 2002. Both locations had total uranium concentrations significantly greater than the concentrations measured off-site. The concentrations were still less than a calculated, NESHAP-based, concentration for natural uranium in air ($2.78 \times 10^{-2} \mu\text{g}/\text{m}^3$). The increased average concentrations measured at these locations are likely due to increased operations in the WPRAP area, as well as increased demolition activities on former production area buildings. Elevated concentrations will likely continue throughout the remediation of this area. Ohio EPA will continue to monitor these locations to ensure that control measures are in place to keep emissions as low as reasonably achievable. The 2003 total uranium results for WPRAP samplers are depicted in the following figure.

TOTAL URANIUM IN AIR WPRAP Operations

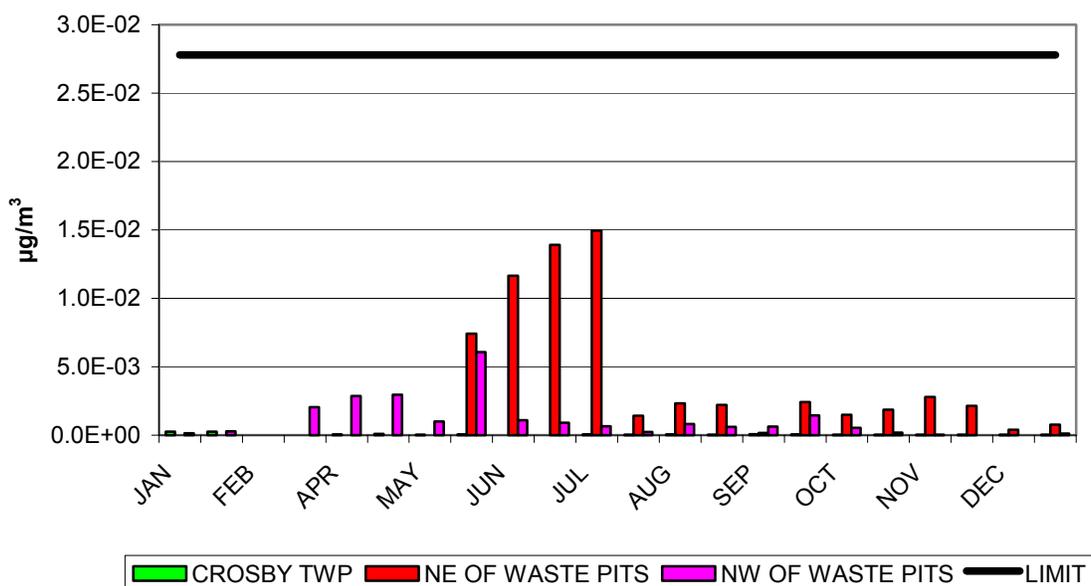


Figure 6 Elevated total uranium concentrations near WPRAP operations are likely due to increased operations in the area during 2003.

ENVIRONMENTAL MONITORING

Isotopes of thorium (thorium-228, thorium-230, and thorium-232) were also analyzed at the waste pit locations. All three thorium isotope concentrations were elevated at both WPRAP locations compared to the concentrations measured at the background location. Thorium-230 concentrations were nearly the same, or slightly less than those measured in 2002. All of the thorium concentrations measured in 2003 were less than the NESHAP concentrations. The thorium-230 results are shown in Figure 7.

THORIUM-230 IN AIR WPRAP Operations

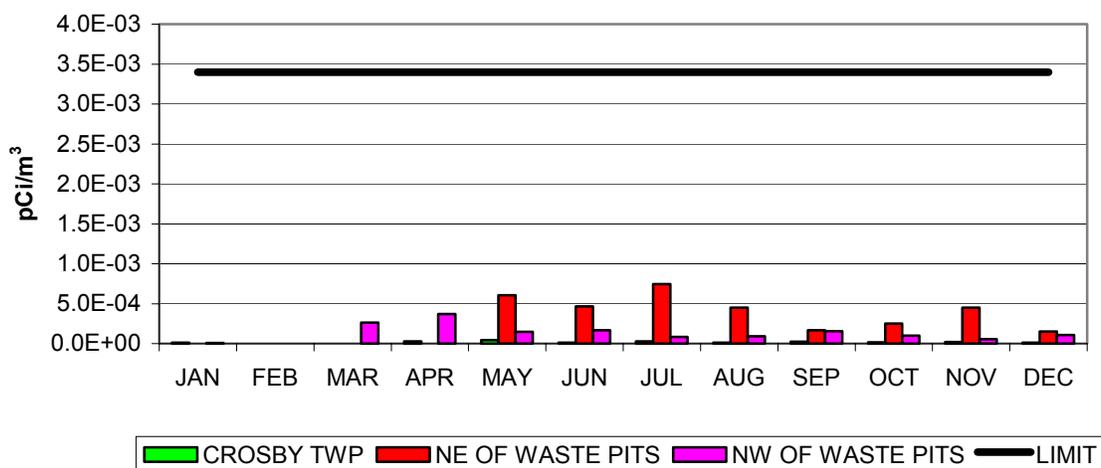


Figure 7 Thorium-230 was slightly lower at the waste pits in 2003 than during 2002.

Radium-226 concentrations in air were also measured at the waste pit monitors in 2003. The results were similar to the results measured during 2002, and were similar to the concentrations measured at the background location.

The 2003 average TSP concentration at both locations was nearly the same as 2002, and was similar to background. These concentrations may be attributed to the aggressive program in place at Fernald to minimize fugitive emissions.

Other Monitoring Locations: Ohio EPA operates two additional monitors on-site, FNAPS02 (northeast fence line) and FNAPS03A (met tower), as well as an

additional off-site location in Ross Township (Ross). Total uranium and TSP samples are collected from these locations semi-monthly. A monthly composite sample for isotopes of thorium is also performed.

All of the 2003 total uranium concentrations are similar to the concentrations measured in 2002. While the concentrations measured at FNAPS02 and FNAPS03A are significantly greater than the concentrations measured off-site, their average concentrations remained approximately the same as the 2002 average concentrations. Elevated concentrations are to be expected as remediation activities continue. The measured concentrations remain well below the NESHAP standard. The total uranium results for the other sampling locations are shown in Figure 8.

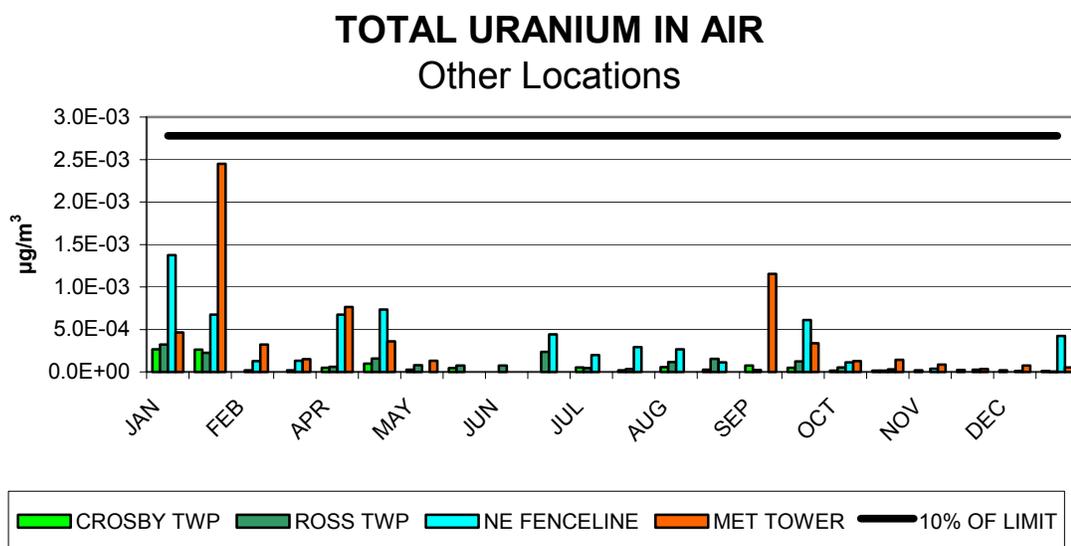


Figure 8 Ohio EPA measures total uranium concentrations at several on- and off-site locations.

The 2003 TSP concentrations for these locations remain essentially the same as 2002, and were similar to the concentrations measured off-site.

The thorium concentrations measured at these locations were slightly elevated compared to the off-site locations, but all were less than the NESHAP standard.

ENVIRONMENTAL MONITORING

Annual Composites: Yearly composite samples are taken from each of the six sampling locations. This method of analysis allows for detection of isotopes that may not have been detectable on a semi-monthly basis. The annual composites are analyzed for total uranium, isotopic uranium, isotopic thorium and radium-226. A gamma spectroscopy analysis is also performed to detect gamma-emitting isotopes that are not part of the routine analytical suite.

The results for analytes of concern that were detectable are shown in Figure 9. Qualitatively, the results are consistent with the semi-monthly and monthly results. Uranium-235 concentrations were indistinguishable from background. The sampler northeast of the waste pits had the highest concentrations for all isotopes. All of the on-site samplers had higher concentrations than the off-site samplers, but all concentrations were less than the NESHAP standards.

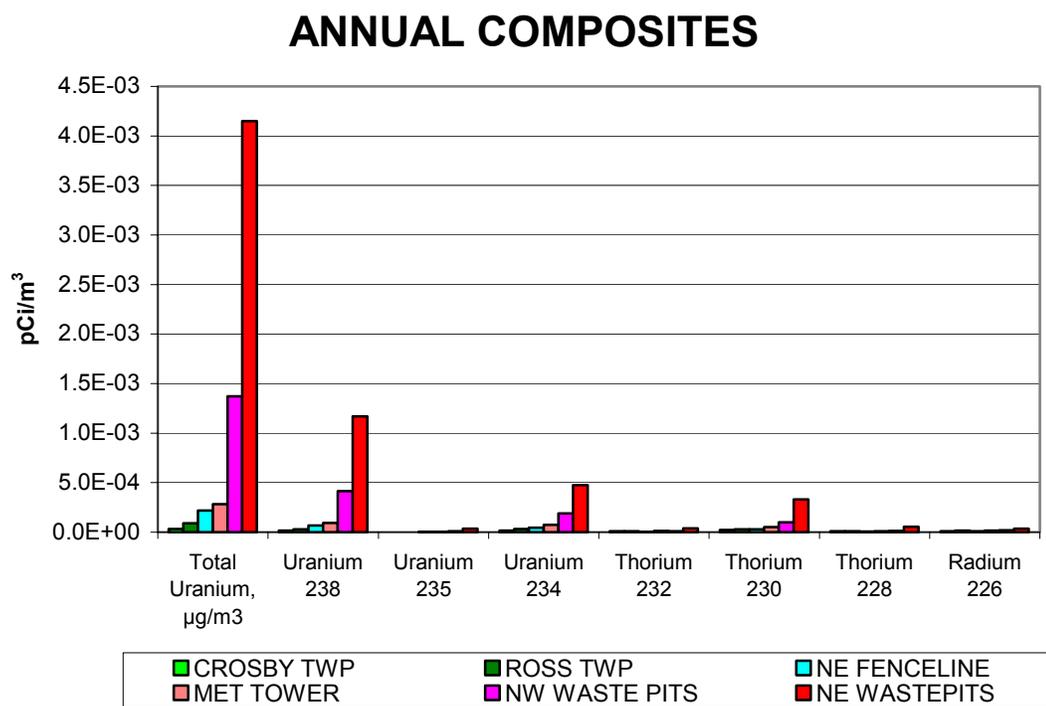


Figure 9 Ohio EPA measured annual composite samples for several contaminants.

Radon Sampling

Ohio EPA collects continuous, or “real-time,” hourly measurements of radon-222 concentrations in ambient air. The locations are:

- FNRDN01, located west of the silos along Paddys Run Road
- FNRDN02A, located east of the silos along the border of OU4 and the former production area
- FNRDN03, located approximately two miles west-southwest of Fernald in Crosby Township and serves as our background location

The most recent hourly data is posted “real-time” on the OFFO web site at http://offo2.epa.state.oh.us/Fernald/EnvMon/real_radon.asp. The location of the monitoring stations are illustrated on the maps in Appendix A.

The primary source of radon at Fernald is the K-65 silos. These silos contain high concentrations of radium bearing wastes from former production activities. The radium in the silos decays to radon-222, which is continuously released into the air. There are also less significant sources of radon at Fernald, including silo 3 and the waste pits. Ohio EPA uses continuous radon monitors to measure the concentrations of radon-222 present in ambient air. The locations were chosen primarily for their proximity to the K-65 silos, and to provide a method for verifying the effectiveness of DOE’s radon monitoring network.

The results for all radon monitoring locations are shown in Appendix F. The data indicates that average monthly radon concentrations from all three monitors range from 0.1 to 0.7 pCi/L. This range of concentrations is well below the DOE Order 5400.5 limit of 3.0 pCi/L annual average at the facility fence line and less than 0.5 pCi/L greater than background, the limit proposed in Draft 10 CFR 834. The average monthly radon concentrations are illustrated in the following figure.

RADON-222 IN AIR

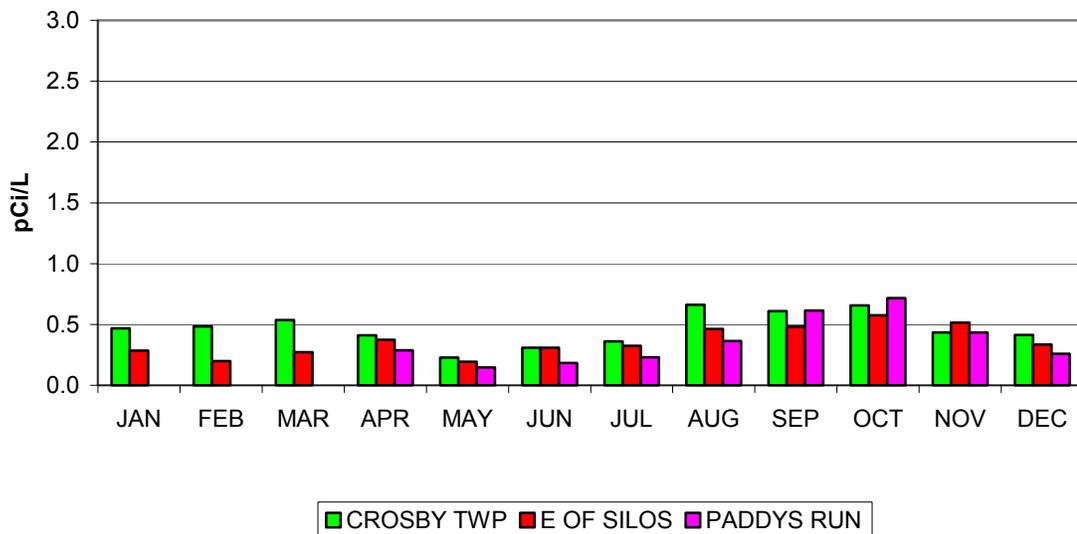
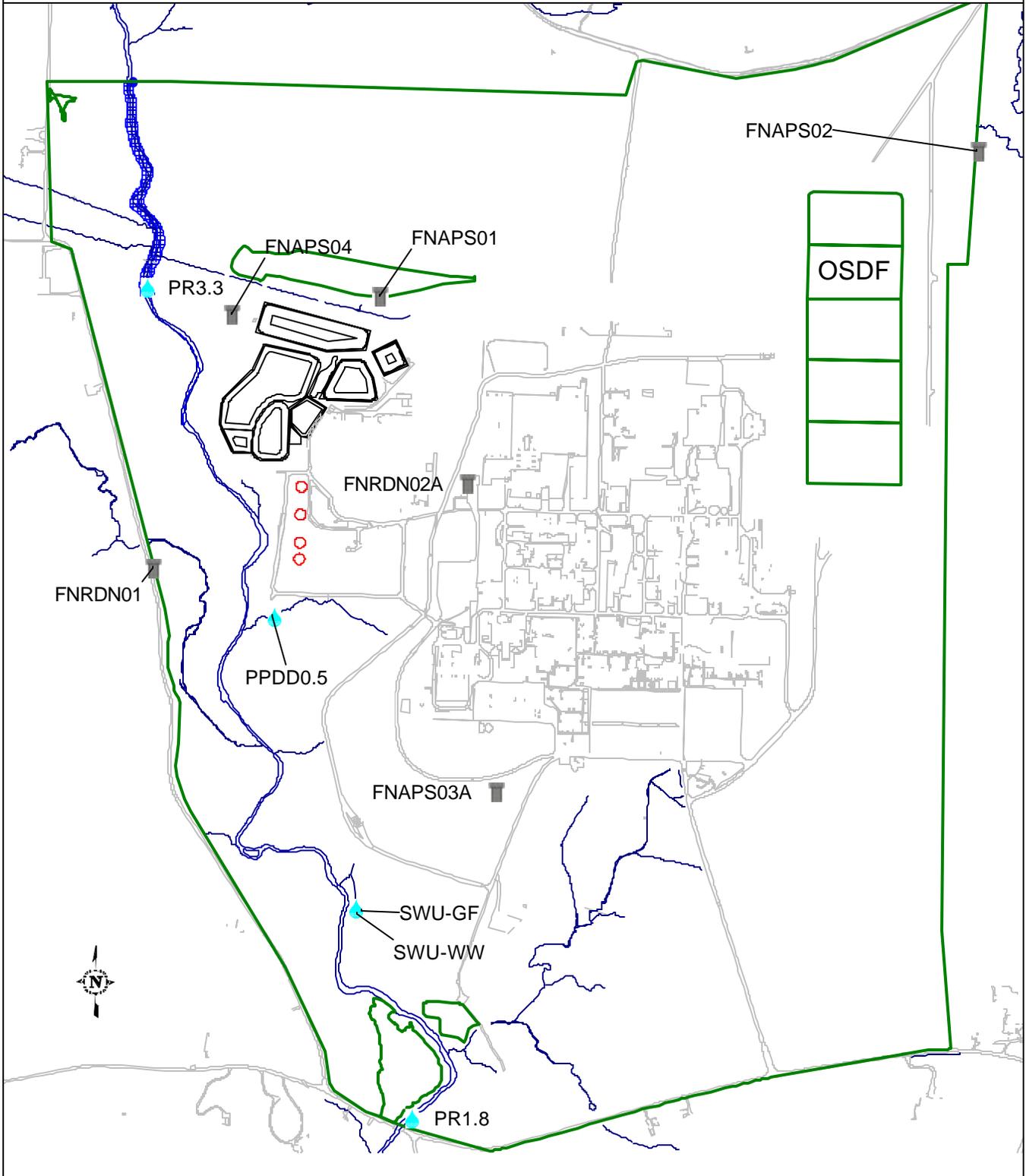


Figure 10 Monthly radon averages stayed below the DOE limit of 3.0 pCi/L during 2003.

The Paddy's Run Road location (FNRDN01) and the location east of the silos (FNRDN02A) had concentrations that were indistinguishable from the background location in Crosby Township (FNRDN03) in 2003. Previous years' monitoring had shown slightly higher concentrations at FNRDN01 and FNRDN02A. The start-up of the Silos Project radon control system in April 2003 is the likely reason for the reductions in average concentrations at these monitors.

APPENDICES

2003 OHIO EPA ON-SITE SAMPLING LOCATIONS



OFFICE OF FEDERAL FACILITIES OVERSIGHT

F:\GEOWORKSPACES\anrep03_OnSite.gws

SCALE



LEGEND

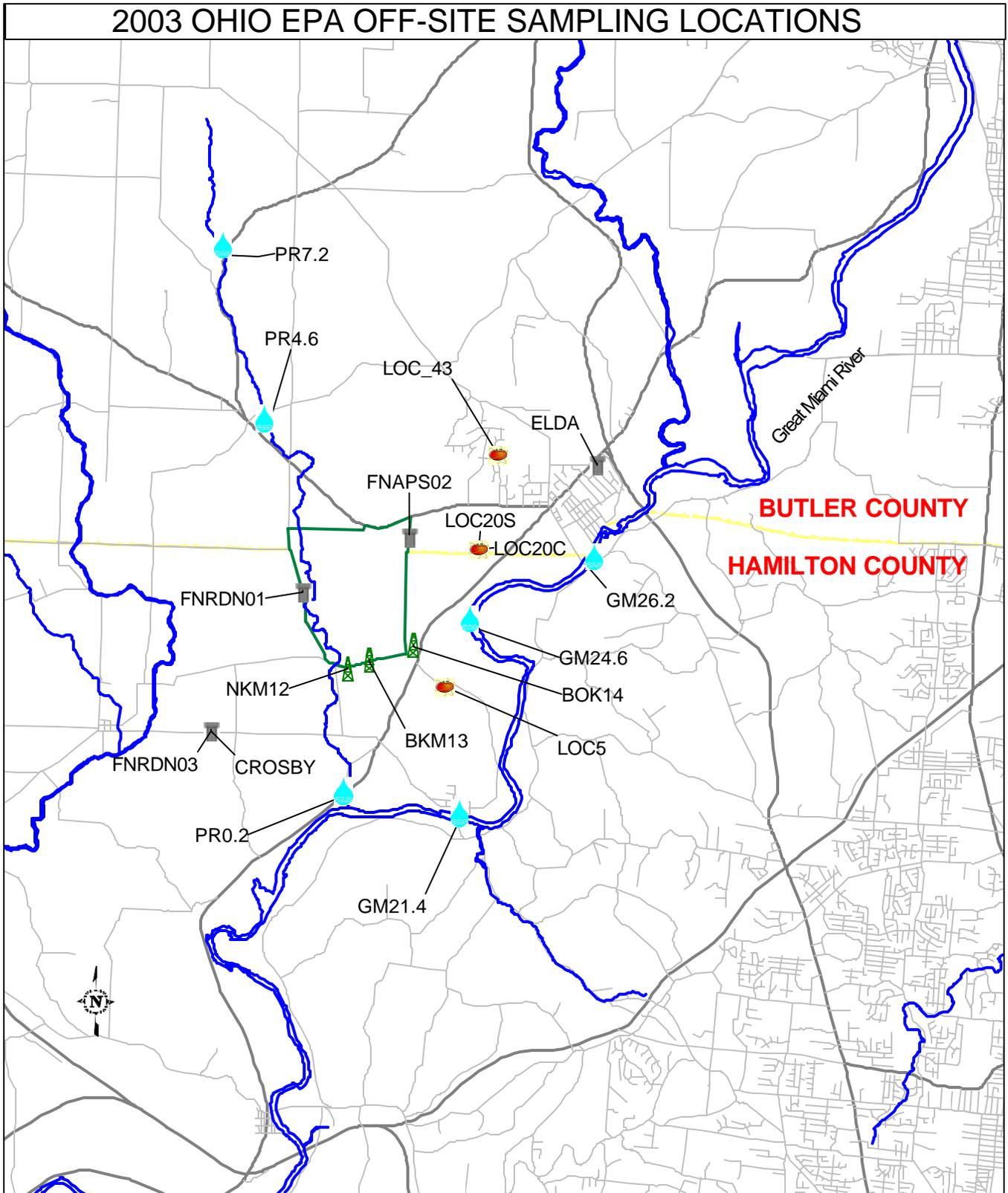


AIR MONITOR



SURFACE WATER/SEDIMENT

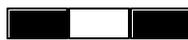
2003 OHIO EPA OFF-SITE SAMPLING LOCATIONS



OFFICE OF FEDERAL FACILITIES OVERSIGHT

F:\GEOWORKSPACES\anrep03_OffSite.gws

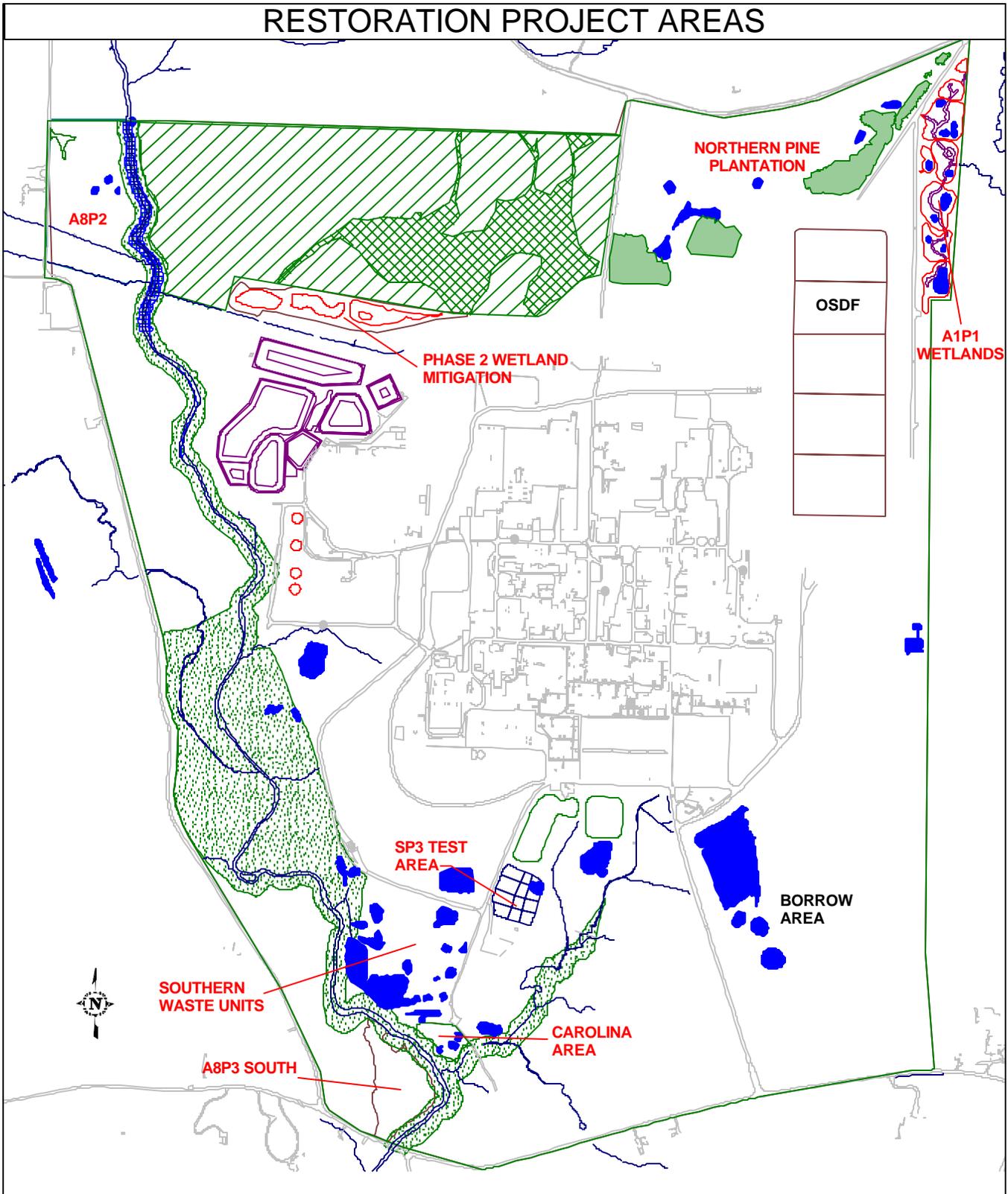
SCALE
0.0 0.5 1.0 1.5 mi



LEGEND

-  AIR MONITOR
-  SURFACE WATER/SEDIMENT
-  PRIVATE WELL
-  PRODUCE

RESTORATION PROJECT AREAS



OFFICE OF FEDERAL FACILITIES OVERSIGHT

SCALE



LEGEND

-  WETLANDS
-  NORTHERN WOODLOT
-  RIPARIAN CORRIDOR

PRIVATE WELLS			
LOCATION CODE	COLLECT DATE	OEPA TOTAL U µg/L	DOE TOTAL U µg/L
NKM12	4/9/03	54.35	64.9
NKM12	10/29/03	78.1	74.2
BKM13	4/9/03	14.33	20
BKM13	10/29/03	8.70	13.1
BOK14	4/9/03	2.55	1.78
BOK14	10/29/03	3.32	2.62

Note:

µg/L = micrograms per liter

Total uranium Final Remediation Level = 30 µg/L for ground water

For complete data packages contact Ohio EPA.

APPENDIX C

SURFACE WATER				
LOCATION CODE	COLLECT DATE	TOTAL U $\mu\text{g/L}$	Ra-226 pCi/L	Ra-228 pCi/L
SWU WW	2/19/03	34.281	NS	NS
SWU WW	4/24/03	11.037	NS	NS
SWU WW	6/30/03	8.189	NS	NS
SWU WW	8/19/03	5.602	NS	NS
SWU GF	2/19/03	8.891	NS	NS
SWU GF	4/24/03	9.086	NS	NS
SWU GF	6/30/03	3.608	NS	NS
SWU GF	8/19/03	2.238	NS	NS
PPDD0.05	2/19/03	31.336	0.649	1.454
PR0.2	10/15/03	2.153	0.594	<1.632
PR0.2	12/3/03	3.687	<0.207	<1.485
PR1.8	2/19/03	1.896	<0.153	1.156
PR1.8	4/16/03	1.844	0.065	<1.284
PR1.8	10/15/03	6.971	0.241	2.56
PR1.8	12/3/03	4.202	0.208	<1.622
PR3.3	2/19/03	2.16	0.166	<1.003
PR3.3	4/16/03	1.585	<0.201	<1.001
PR3.3	6/30/03	1.001	<0.256	<1.077
PR3.3	8/19/03	0.896	<0.315	<1.339
PR3.3	10/15/03	1.932	<0.18	<1.111
PR3.3	12/3/03	1.35	<0.145	1.402
PR7.2	2/19/03	1.403	0.217	<0.871
PR7.2	4/16/03	1.138	<0.176	<1.231
PR7.2	6/30/03	0.539	<0.216	<1.103
PR7.2	8/19/03	0.732	0.239	<1.513
PR7.2	10/15/03	0.657	0.283	<1.208
PR7.2	12/3/03	1.103	0.217	<1.474
GM21.4	2/19/03	2.393	<0.148	<1.277
GM21.4	4/16/03	1.978	0.25	<1.073
GM21.4	6/30/03	1.306	<0.188	<0.932
GM21.4	8/19/03	1.376	0.198	<1.643
GM21.4	9/3/03	0.663	NS	NS
GM21.4	10/15/03	1.341	0.205	<1.402
GM21.4	12/3/03	1.623	0.347	<1.674
GM24.6	2/19/03	2.475	0.225	0.987
GM24.6	4/16/03	2.202	0.283	<1.093
GM24.6	6/30/03	1.434	0.291	<0.939
GM24.6	8/19/03	1.529	0.361	<1.564
GM24.6	9/3/03	1.301	0.355	<1.505
GM24.6	10/15/03	1.431	0.526	<0.985
GM24.6	12/3/03	1.914	0.312	<1.802
GM26.2	2/19/03	1.897	<0.162	<0.868
GM26.2	4/16/03	1.791	<0.282	<1.065
GM26.2	8/19/03	1.249	0.339	<1.138
GM26.2	9/3/03	0.651	0.227	<1.327
GM26.2	10/15/03	1.259	0.479	<1.747
GM26.2	12/3/03	1.576	0.295	<1.417

Notes:

$\mu\text{g/L}$ = micrograms per liter

pCi/L = picocuries per liter

NS = no sample or sample not analyzed for parameter

Total uranium Final Remediation Level = 530 $\mu\text{g/L}$ for surface water

Radium-226 Final Remediation Level = 38 pCi/L for surface water

Radium-228 Final Remediation Level = 47 pCi/L for surface water

For complete data packages contact Ohio EPA.

APPENDIX D

SEDIMENT						
LOCATION CODE	COLLECT DATE	TOTAL U µg/g	Ra-226 pCi/g	Th-228 pCi/g	Th-230 pCi/g	Th-232 pCi/g
PR1.8	8/20/03	0.788	0.534	0.288	0.525	0.324
PR3.3	8/20/03	1.644	0.866	0.71	0.871	0.619
PR4.6	8/20/03	0.835	0.428	0.441	0.732	0.351
GM21.4	8/20/03	1.698	1.06	0.707	1.027	0.631
GM26.2	8/20/03	1.858	1.064	0.726	1.186	0.742

Notes:

µg/g = micrograms per gram

pCi/g = picoCuries per gram

Total uranium Final Remediation Level = 210 µg/g for sediment

Radium-226 Final Remediation Level = 2.9 pCi/g for sediment

Thorium-228 Final Remediation Level = 3.2 pCi/g for sediment

Thorium-230 Final Remediation Level = 18,000 pCi/g for sediment

Thorium-232 Final Remediation Level = 1.6 pCi/g for sediment

For complete data packages contact Ohio EPA.

APPENDIX E

PRODUCE						
LOCATION	MATRIX	COLLECT DATE	OEPA Th-230 pCi/g	DOE Th-230 pCi/g	OEPA Total U µg/g	DOE Total U µg/g
Location 5	tomato	9/17/03	0.00549	0.451	<0.00483	0.135
Location 43	tomato	9/17/03	0.0169	0.0826	0.0122	<0.0579
Location 43	cucumber	9/17/03	0.00185	0.179	<0.00596	<0.0947
Location 20	corn	9/17/03	0.000666	0.395	<0.00156	<0.0854
Location 20	soybeans	9/17/03	<0.00109	0.268	0.00206	0.16

Note:

pCi/g = picoCuries per gram - dry weight

µg/g = micrograms per gram - dry weight

< = less than the minimum detectable level

NS = no sample or sample not analyzed for analyte

For complete data packages contact Ohio EPA.

AIR - TOTAL SUSPENDED PARTICULATES							
START	STOP	FNAPS01 NE OF WASTE PITS $\mu\text{g}/\text{m}^3$	FNAPS02 NE FENCELINE $\mu\text{g}/\text{m}^3$	FNAPS03A MET TOWER $\mu\text{g}/\text{m}^3$	FNAPS04 NW OF WASTE PITS $\mu\text{g}/\text{m}^3$	CROSBY CROSBY TWP $\mu\text{g}/\text{m}^3$	ROSS ROSS TWP $\mu\text{g}/\text{m}^3$
1/7/03	1/22/03	ND	19.90	18.54	15.44	18.74	31.39
1/22/03	2/7/03	ND	20.56	28.23	7.90	18.91	32.59
2/7/03	3/14/03	ND	20.55	58.88	ND	ND	24.88
3/14/03	3/31/03	ND	24.94	41.56	24.83	ND	35.97
3/31/03	4/15/03	ND	32.76	50.29	23.89	29.92	36.02
4/15/03	4/30/03	ND	44.53	53.67	37.08	43.21	60.41
4/30/03	5/13/03	ND	ND	39.07	31.40	38.16	38.44
5/13/03	6/2/03	28.73	ND	ND	26.30	31.40	34.65
6/2/03	6/18/03	30.21	ND	ND	27.01	24.84	31.65
6/18/03	7/1/03	51.49	59.59	ND	36.17	39.07	51.28
7/1/03	7/16/03	35.94	33.07	ND	27.68	37.91	43.02
7/16/03	7/29/03	34.47	29.78	ND	24.43	26.89	28.38
7/29/03	8/15/03	35.76	31.56	ND	28.30	31.97	39.79
8/15/03	9/3/03	59.11	44.69	ND	34.87	41.33	49.34
9/3/03	9/15/03	38.52	ND	43.64	33.58	36.87	50.87
9/15/03	9/30/03	26.35	31.09	26.72	20.83	22.78	32.93
9/30/03	10/20/03	36.91	24.05	28.61	21.24	27.42	37.84
10/20/03	11/3/03	28.67	6.30	30.60	21.37	23.36	14.32
11/3/03	11/21/03	33.84	11.30	32.50	5.82	18.65	ND
11/21/03	12/2/03	28.56	9.32	24.38	ND	16.46	ND
12/2/03	12/18/03	25.05	9.55	24.33	ND	17.40	ND
12/18/03	1/8/04	14.44	11.17	15.35	12.67	15.00	2.12

AIR - TOTAL URANIUM							
START	STOP	FNAPS01 NE OF WASTE PITS $\mu\text{g}/\text{m}^3$	FNAPS02 NE FENCELINE $\mu\text{g}/\text{m}^3$	FNAPS03A MET TOWER $\mu\text{g}/\text{m}^3$	FNAPS04 NW OF WASTE PITS $\mu\text{g}/\text{m}^3$	CROSBY CROSBY TWP $\mu\text{g}/\text{m}^3$	ROSS ROSS TWP $\mu\text{g}/\text{m}^3$
1/7/03	1/22/03	ND	1.37E-03	4.65E-04	1.43E-04	2.67E-04	3.21E-04
1/22/03	2/7/03	ND	6.75E-04	2.45E-03	2.80E-04	2.62E-04	2.25E-04
2/7/03	3/14/03	ND	1.28E-04	3.20E-04	ND	ND	1.98E-05
3/14/03	3/31/03	ND	1.31E-04	1.51E-04	2.05E-03	ND	1.73E-05
3/31/03	4/15/03	ND	6.75E-04	7.65E-04	2.87E-03	4.89E-05	6.04E-05
4/15/03	4/30/03	ND	7.33E-04	3.60E-04	2.94E-03	9.90E-05	1.57E-04
4/30/03	5/13/03	ND	ND	1.31E-04	1.01E-03	2.56E-05	7.80E-05
5/13/03	6/2/03	7.42E-03	ND	ND	6.07E-03	4.68E-05	7.65E-05
6/2/03	6/18/03	1.17E-02	ND	ND	1.09E-03	ND	7.34E-05
6/18/03	7/1/03	1.39E-02	4.44E-04	ND	9.14E-04	ND	2.37E-04
7/1/03	7/16/03	1.50E-02	1.97E-04	ND	6.51E-04	5.21E-05	4.54E-05
7/16/03	7/29/03	1.43E-03	2.93E-04	ND	2.28E-04	1.99E-05	3.54E-05
7/29/03	8/15/03	2.33E-03	2.67E-04	ND	8.11E-04	5.66E-05	1.17E-04
8/15/03	9/3/03	2.21E-03	1.13E-04	ND	5.93E-04	2.46E-05	1.54E-04
9/3/03	9/15/03	1.68E-04	ND	1.15E-03	6.25E-04	7.64E-05	2.27E-05
9/15/03	9/30/03	2.42E-03	6.10E-04	3.35E-04	1.45E-03	4.70E-05	1.24E-04
9/30/03	10/20/03	1.50E-03	1.11E-04	1.28E-04	5.27E-04	1.54E-05	5.31E-05
10/20/03	11/3/03	1.85E-03	2.86E-05	1.44E-04	1.89E-04	1.60E-05	1.62E-05
11/3/03	11/21/03	2.79E-03	3.61E-05	8.73E-05	2.31E-05	1.79E-05	ND
11/21/03	12/2/03	2.15E-03	2.43E-05	3.35E-05	ND	2.06E-05	ND
12/2/03	12/18/03	4.00E-04	1.17E-05	7.34E-05	ND	2.04E-05	ND
12/18/03	1/8/04	7.78E-04	4.24E-04	5.06E-05	1.27E-04	1.18E-05	3.89E-06

Notes:

ND: Indicates sparse or no data collected for this time period from equipment failure or due to extreme weather conditions.

For complete data packages contact Ohio EPA.

APPENDIX F

AIR - THORIUM - 228						
MONTH	FNAPS01	FNAPS02	FNAPS03A	FNAPS04	CROSBY	ROSS
2003	NE OF WASTE PITS	NE FENCELINE	MET TOWER	NW OF WASTE PITS	CROSBY TWP	ROSS
	pCi/m³	pCi/m³	pCi/m³	pCi/m³	pCi/m³	pCi/m³
JAN	ND	4.72E-06	9.91E-06	<3.41E-06	5.95E-06	4.38E-06
FEB	ND	5.23E-06	<1.45E-09	ND	ND	5.42E-06
MAR	ND	<2.41E-06	1.32E-05	1.21E-05	ND	1.06E-05
APR	ND	1.36E-05	2.48E-05	1.12E-05	1.30E-05	1.47E-05
MAY	9.11E-05	ND	1.39E-05	1.75E-05	8.52E-06	1.18E-05
JUN	4.28E-05	<9.47E-06	ND	1.68E-05	4.10E-06	5.24E-06
JUL	4.34E-05	7.29E-06	ND	9.71E-06	1.08E-05	6.65E-06
AUG	9.89E-05	1.60E-05	ND	2.51E-05	6.96E-06	8.27E-06
SEP	1.84E-05	<7.31E-06	1.79E-05	1.49E-05	6.82E-06	1.20E-05
OCT	3.17E-05	3.65E-06	1.35E-05	1.28E-05	7.54E-06	5.27E-06
NOV	6.57E-05	2.30E-06	4.69E-06	<3.62E-06	<4.61E-06	ND
DEC	1.20E-05	2.41E-06	3.99E-06	1.32E-05	<9.05E-07	<3.70E-06

AIR - THORIUM - 230						
MONTH	FNAPS01	FNAPS02	FNAPS03A	FNAPS04	CROSBY	ROSS
2003	NE OF WASTE PITS	NE FENCELINE	MET TOWER	NW OF WASTE PITS	CROSBY TWP	ROSS
	pCi/m³	pCi/m³	pCi/m³	pCi/m³	pCi/m³	pCi/m³
JAN	ND	6.29E-05	8.22E-05	7.18E-06	1.31E-05	3.11E-05
FEB	ND	3.83E-05	2.61E-04	ND	ND	1.73E-05
MAR	ND	7.27E-05	6.38E-05	2.63E-04	ND	3.03E-05
APR	ND	6.15E-05	1.36E-04	3.69E-04	2.87E-05	4.31E-05
MAY	6.04E-04	ND	3.81E-05	1.49E-04	4.54E-05	2.46E-05
JUN	4.65E-04	9.67E-05	ND	1.66E-04	1.17E-05	2.96E-05
JUL	7.47E-04	5.03E-05	ND	8.33E-05	2.82E-05	3.47E-05
AUG	4.51E-04	4.93E-05	ND	9.34E-05	1.28E-05	4.67E-05
SEP	1.67E-04	6.92E-05	7.88E-05	1.54E-04	2.41E-05	3.11E-05
OCT	2.51E-04	1.51E-05	4.54E-05	9.94E-05	1.56E-05	3.25E-05
NOV	4.51E-04	1.33E-05	2.07E-05	5.65E-05	2.19E-05	ND
DEC	1.52E-04	3.14E-05	5.30E-05	1.09E-04	1.31E-05	<2.93E-06

AIR - THORIUM - 232						
MONTH	FNAPS01	FNAPS02	FNAPS03A	FNAPS04	CROSBY	ROSS
2003	NE OF WASTE PITS	NE FENCELINE	MET TOWER	NW OF WASTE PITS	CROSBY TWP	ROSS
	pCi/m³	pCi/m³	pCi/m³	pCi/m³	pCi/m³	pCi/m³
JAN	ND	5.47E-06	9.88E-06	<7.81E-07	5.50E-06	5.13E-06
FEB	ND	7.13E-06	6.53E-05	ND	ND	5.05E-06
MAR	ND	3.97E-06	1.61E-05	9.45E-06	ND	1.54E-05
APR	ND	2.12E-05	2.41E-05	1.38E-05	8.59E-06	1.65E-05
MAY	1.01E-04	ND	1.68E-05	1.54E-05	7.93E-06	9.33E-06
JUN	4.95E-05	1.99E-05	ND	1.91E-05	8.01E-06	4.37E-06
JUL	4.04E-05	1.35E-05	ND	5.96E-06	1.10E-05	9.16E-06
AUG	9.33E-05	1.16E-05	ND	3.38E-05	6.33E-06	1.31E-05
SEP	2.80E-05	9.97E-06	2.59E-05	1.49E-05	9.70E-06	7.67E-06
OCT	3.58E-05	5.59E-06	1.40E-05	1.35E-05	9.94E-06	7.18E-06
NOV	5.25E-05	3.52E-06	1.44E-05	<1.74E-06	4.23E-06	ND
DEC	1.74E-05	3.63E-06	6.28E-06	5.17E-06	2.89E-06	<1.68E-06

Notes:

ND: Indicates sparse or no data collected for this time period from equipment failure or due to extreme weather conditions.

For complete data packages contact Ohio EPA.

APPENDIX F

AIR - RADIUM - 226			
MONTH 2003	FNAPS01	FNAPS04	CROSBY
	NE OF WASTE PITS pCi/m ³	NW OF WASTE PITS pCi/m ³	CROSBY TWP pCi/m ³
JAN	ND	2.36E-05	3.53E-05
FEB	ND	ND	ND
MAR	ND	6.17E-05	ND
APR	ND	4.86E-05	3.94E-05
MAY	7.35E-05	2.35E-05	3.26E-05
JUN	4.91E-05	3.46E-05	2.27E-05
JUL	6.34E-05	2.18E-05	<1.32E-05
AUG	4.24E-05	3.16E-05	2.47E-05
SEP	4.53E-05	4.28E-05	<9.83E-06
OCT	1.49E-05	4.44E-05	<1.19E-05
NOV	8.87E-05	6.20E-05	2.62E-05
DEC	2.24E-05	<1.90E-05	<9.66E-06

AIR - ANNUAL COMPOSITES								
LOCATION	Total U µg/m ³	U-238 pCi/m ³	U-235 pCi/m ³	U-234 pCi/m ³	Th-232 pCi/m ³	Th-230 pCi/m ³	Th-228 pCi/m ³	Ra-226 pCi/m ³
FNAPS01	4.15E-03	1.17E-03	3.43E-05	4.75E-04	3.92E-05	3.30E-04	5.61E-05	3.66E-05
FNAPS02	2.20E-04	6.73E-05	2.67E-06	4.62E-05	4.04E-06	2.95E-05	6.46E-06	8.29E-06
FNAPS03A	2.83E-04	9.40E-05	3.65E-06	7.48E-05	1.14E-05	5.01E-05	1.05E-05	1.65E-05
FNAPS04	1.37E-03	4.13E-04	1.09E-05	1.90E-04	1.12E-05	1.01E-04	1.22E-05	2.06E-05
ELDA	9.10E-05	3.01E-05	4.57E-07	3.22E-05	1.11E-05	2.82E-05	9.20E-06	1.68E-05
CROSBY	3.15E-05	1.72E-05	6.76E-07	1.48E-05	8.99E-06	2.10E-05	8.11E-06	9.94E-06

AIR - RADON						
MONTH 2003	FNRDN01 W OF SILOS		FNRDN02A E OF SILOS		FNRDN03 CROSBY TOWNSHIP	
	MONTHLY AVG	HOURLY MAX	MONTHLY AVG	HOURLY MAX	MONTHLY AVG	HOURLY MAX
	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L
JAN	ND	ND	0.3	2.2	0.5	1.9
FEB	ND	ND	0.2	1.1	0.5	0.9
MAR	ND	ND	0.3	2.2	0.5	1.5
APR	0.3	1.3	0.4	2.1	0.4	1.9
MAY	0.1	0.6	0.2	1.0	0.2	0.8
JUN	0.2	0.6	0.3	1.5	0.3	1.5
JUL	0.2	1.0	0.3	1.5	0.4	1.7
AUG	0.4	1.4	0.5	2.3	0.7	3.5
SEP	0.6	2.9	0.5	2.0	0.6	2.8
OCT	0.7	2.8	0.6	2.5	0.7	2.4
NOV	0.4	3.6	0.5	2.7	0.4	5.5
DEC	0.3	1.9	0.3	1.5	0.4	1.3

Notes:

ND = Indicates sparse or no data collected for this time period from equipment failure or due to extreme weather conditions.

For complete data packages contact Ohio EPA.

OTHER RESOURCES

DOE Public Environmental
Information Center (PEIC)
7400 Willey Road (MS78)
Harrison, OH 45030
(513) 648-5051
diana.rayer@fernald.gov

Fernald Citizens Advisory Board
P.O. Box 538704
Cincinnati, OH 45253-8704
(513) 648-6478
contact: Jim Bierer, Chair
info@fernaldcab.org

DOE-FN Public Information
P.O. Box 538705
Cincinnati, OH 45253
(513) 648-3153
contact: Gary Stegner, Director

Community Reuse Organization
P.O. Box 538705
Cincinnati, OH 45253
(513) 648-3153
contact: Todd Trammel

Fluor Daniel Fernald Public Affairs
P.O. Box 538704
Cincinnati, OH 45253
(513) 648-4898
contact: Jeff Wagner, Director

Fernald Residents for
Environmental Safety and Health
10206 Crosby Road
Harrison, OH 45030
(513) 738-8055 (phone and fax)
contact: Lisa Crawford, President

U.S. EPA -- Region V
77 West Jackson Blvd.
Chicago, IL 60604
(312) 886-0992
contact: Jim Saric, Remedial
Project Manager

Fernald Living History Project
c/o Steve Depoe
5360 Desertgold Drive
Cincinnati, OH 45247
(513) 556-4459
contact: Steve Depoe, President

Fernald Team Contacts

Main Number: 1-800-686-8930

FAX: (937) 285-6404

<http://offo2.epa.state.oh.us>

Graham Mitchell OFFO Chief..... 285-6018	Kelly Kaletsky Env. Monitoring/GPS 285-6075
Tom Schneider Fernald Project Manager 285-6466	Bill Lohner Air Monitoring 285-6051
Donna Bohannon Environmental Monitoring 285-6453	Tom Ontko CERCLA Oversight..... 285-6073
Rex Brown Data Manager.. 285-6057	Michelle Waller CERCLA Oversight..... 285-6454
Jim Coon IT Administrator..... 285-6074	Joe Bartoszek Surface Water..... 285-6464
Laura Hafer Public Outreach 285-6455	Mike Proffitt Ground Water 285-6603
Ruth Vandegrift and Jim Colleli Ohio Department of Health (614) 644-2727	
Lloyd Bokman Ohio Emergency Management Agency (614) 889-7178	



This document is printed on recycled paper (30% post consumer waste) and can be recycled. Please remove plastic binding.