

2002



ANNUAL REPORT TO THE PUBLIC

on the **FERNALD**

Closure Project

Prepared by:



Ohio Environmental Protection Agency
OFFICE OF FEDERAL
FACILITIES OVERSIGHT



State of Ohio

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ACRONYMS

A1PIII	Area 1 Phase III
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	Department of Energy
ECOS	Environmental Council of the States
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 Pit Remedial Action Project



November 2002 photo courtesy of DOE Fernald Site Photography #7897-1.

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 2002.

As the Fernald closure contract was renegotiated and Fluor Fernald underwent management changes, work at the silos and waste pits was stepped up to ensure site cleanup by DOE's 2006 closure goal. The last of the nuclear materials left Fernald, while two new on-site disposal cells were open for low level waste placement. This report highlights remediation, restoration and public outreach in 2002.

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 the dedication of staff and resources to the project.

Ohio EPA is the State’s lead agency for implementation of the grant. Ohio Department of Health (ODH) and Ohio Emergency Management Agency (Ohio EMA) provide support in the 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 with grant funds. An important goal of Ohio’s federal facilities program has been enhancing public involvement in decision making at Fernald.

The following graph represents a profile of the funding provided to the State of Ohio by DOE for oversight at Fernald.

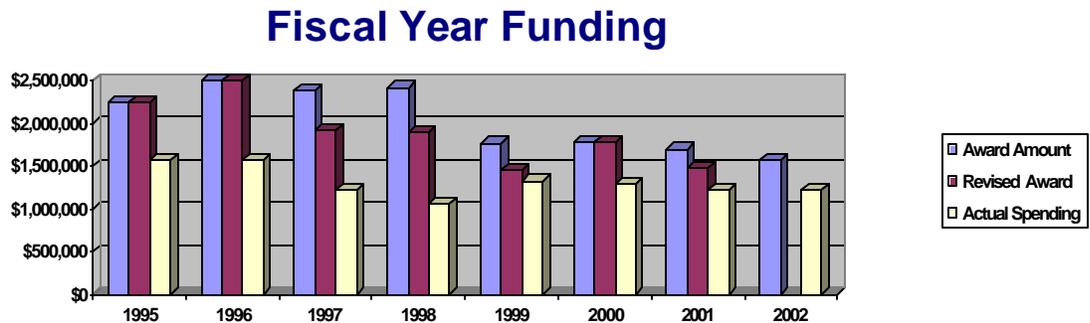


Figure 1 Funding awards and spending since the inception of OFFO.

INTRODUCTION

The distribution of expenditures for fiscal year 2002 is provided in the figure below. Personnel expenditures include salaries, benefits, 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

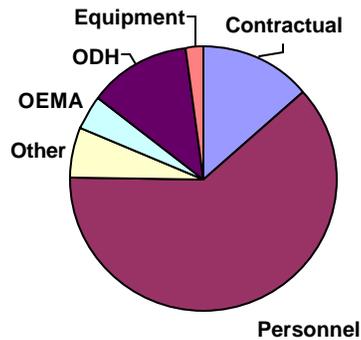


Figure 2 Money is distributed across various program areas.

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 of the less contaminated, high volume materials on-site.

In 2002, DOE developed a new site closure plan to accelerate cleanup to meet their 2006 goal.

Two new on-site

disposal facility (OSDF) cells (4 and 5) were opened for waste placement.

Demolition of 23 more buildings brings the total to 119 of more than 200 structures to be demolished. Start-up of the Radon Control System in support of silo 1 and 2 cleanup was accomplished. The disposition of 31 million pounds of nuclear material was completed. 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 for 2002 are further explained in the following sections.



Early in 2002, several probes were installed around the cell 1 cap. Various probes measure water content, matric potential, temperature and osmotic pressure.

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2.1 REMEDIATION OVERSIGHT

The site first 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. Settlement of the State's natural resource damages claims is 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, 178 technical documents were reviewed and commented on and/or approved in 2002. 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 141 site inspections. The inspections focused on OSDF cell liner construction and waste placement, storm water management, fugitive dust control, waste pit operations, and other on-site activities.

Large-scale remediation continued in 2002. The liners for cells 4 and 5 were completed, and waste placement continued in the OSDF. At the waste pits, excavation of pits 4 and 5 began, while waste loading operations and shipping continued throughout the year. Excavation and certification of the Southern Waste Units (SWU) was completed in December.

Waste Pits Remedial Action Project (formerly OU1): The six waste pits contain over 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

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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. Some materials require drying prior to shipment.

Waste pit excavations were initiated in pits 4 and 5 in 2002. Excavation continued in pits 1, 2 and 3. By the end of 2002, 74 unit trains were sent to Envirocare in Utah for disposal. A total of 467,000 of an estimated 790,000 tons of waste have been



Left, looking northeast at the waste pits in 1977. Above, excavations in waste pit 3 reveal the brightly colored orange oxide, a by-product of the production years. In 2002, this uranium oxide sludge was excavated, dried and shipped by rail to Envirocare for disposal.

shipped. A 24/7 work schedule was initiated and 35 additional railcars were leased to meet the demands of the accelerated waste processing and shipping schedule. The OU1 Final Explanation of Significant Differences was signed, detailing changes in the ROD for treating certain non-OU1 waste streams.

On-Site Disposal Facility Project (formerly OU2, OU3, OU5): Contaminated material including soil and debris are 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.

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Cell 1 cap was completed early in 2002, while cell 2 was filled and will be capped in 2003. Cell 3 continued to receive waste and was more than 50 percent full by the end of the year. The liners for cells 4 and 5 were completed and winter cover placed in preparation of full-scale waste placement in 2003.

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.

By the end of the year, 22 structures were demolished. Among those



A shearer shreds metal left from the demolition of Plant 6.

demolished were the Health and Safety Building, Plant 6, the 60-foot Nitric Acid Recovery Towers, and the Thorium Warehouse. Work continued in Plant 2/3, Plant 8, and the Pilot Plant. A total of 119 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.

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Construction of components for silos 1 and 2 remediation and advanced waste retrieval continued in 2002. After several contractors were released from their obligations in 2002, Fluor Fernald took over the advanced waste retrieval project along with the remediation of all silo contents.

During 2002 progress was made toward remediation of silo materials. The advanced waste retrieval (AWR) project was 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 safer configuration as well as to make sure the material is in a more homogenous state. The premixing of the silo material will aid in its eventual treatment.

During 2002, the transfer tank portion of the AWR was installed. The tanks were fabricated, tested and enclosed in cement walls to aid in shielding from gamma ray emissions.

In addition, progress was made toward the completion of the new radon control system (RCS). This RCS is being built to replace the previous RCS, which was smaller and less efficient.

This new RCS will have the capacity to

reduce the amount of radon currently emanating from the silos, as well as support the remediation facility being built to treat the silos contents.



The blue stack to the left is the emissions tower for the RCS, to the right. The concrete RCS building contains carbon beds to treat radon from the silos.

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This December photo shows the unused silo 4 with reinforcing frame needed to practice cutting an entry wall into the silo. Contents of silo 3 will be emptied, cutting into the side of the silo and retrieving the material.

Silo 3 is being treated separately from the other two silos. Project staff investigated several methods for removal of the dry, powdery contents of the silos. Silo 4 is being used for mock-up work to test the removal of silo 3 materials. A supporting foundation is being constructed along side of empty silo 4 to

practice the actual material removal. This supporting structure will allow the side of the silo to be cut away in stages without compromising the strength of the silo.

During 2002, DOE and Fluor Fernald kept stakeholders informed by presenting information during monthly progress briefings as well as smaller roundtable discussions.

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

Contaminated soils are being excavated with disposal of those soils meeting the waste acceptance criteria in the OSDF. In 2002, the soils project included excavation, certification and restoration. Full-scale excavation operations in area 3A/4A (part of the former production plant) began, and four natural resources restoration projects were completed.

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

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completed in the SWU and 97 acres were certified. More than half 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 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.

In 2002, more than 950 net pounds of uranium were removed from the Great Miami aquifer. Four extraction, one injection, and 26 monitoring wells were installed.

Resource Conservation and Recovery Act (RCRA): Ohio EPA’s Division of Hazardous Waste Management maintains oversight of hazardous waste and mixed waste stored on-site, as well as the ultimate disposition of these wastes as documented in the facility’s Site Treatment Plan. During 2002, the facility continued to ship legacy hazardous and mixed wastes off-site for treatment and disposal. By the end of 2002, only two of the facility’s active container storage units still had containerized waste in storage: elements of the Plant 1 Pad and Building 79. Most, if not all, of these containers will be shipped off-site in during 2003.

In 2002, approximately 126,700 pounds of waste were treated on-site through the Advanced Waste Water Treatment Plant, while 524,767 pounds were shipped off-site for treatment and disposal. Fernald generated 51,021 pounds of waste this year, primarily lead debris from D&D activities, nuclear material declared to be waste during 2002, and excess chemicals and laboratory wastes.

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Ohio EPA inspectors conduct a facility hazardous waste Compliance Evaluation Inspection on an annual basis. The purpose of this inspection is to assess the facility's level of compliance with State and Federal regulations governing the management of hazardous wastes. The facility was inspected for hazardous waste management compliance in December 2002. The inspection indicated the facility was in substantial compliance with hazardous waste requirements, and no violations were cited as a result of the inspection.

2.2 RESTORATION OVERSIGHT

Ohio EPA is the designated Fernald Natural Resource Trustee for the State of Ohio. Other Trustees for Fernald include DOE and the Department of Interior represented by the U.S.

Fish & Wildlife Service. The 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 of the trustees is to

The gray tree frog is one of the amphibian species captured during Ohio EPA's 2002 sampling.

have the restoration activities lead to settlement of the State of Ohio's Natural Resource Damages (NRD) claim against DOE. Over 800 acres of the site will undergo natural resource restoration to include native grasslands, riparian buffers, forests and wetlands.

In 2002, negotiations stalled on resolution of NRD claims and settlement of the State of Ohio's lawsuit. DOE began to re-evaluate its position on the NRD settlement and involve new site and headquarters staff in the negotiations. No progress regarding settlement was achieved. However, actual restoration work continued to progress including the initiation of two new large-scale restoration areas, the Southern Waste Units and the Northern Pine Plantation.

Restoration Projects

Ecological restoration projects during 2002 included initiation of restoration in the SWU and the Northern Pine Plantation. Maintenance and replacement activities

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occurred in the A1PI wetland, A8PII restoration area, Carolina area and A1PIII. The site of the former radium hotspot was planted with live cuttings of several species to provide a nursery for future live cutting needs. See the Restoration Areas Map in Appendix A for locations of all restoration projects.

The Southern Waste Units is a former disposal area where contaminated debris,



flyash and soils were dumped over a cliff face into the flood plain of Paddys Run. Over 400,000 cubic yards of waste and soil were removed during remediation of the area. Waste excavations extended into the sands and gravels making up the Great Miami Aquifer. Significant ground water

Looking west at restoration in the SWU. The channel is lined with coir matting and coir logs were used at check dams.

contamination existed in the area. Large reductions in ground water contamination were realized following excavation of the waste and the infiltration of clean surface water.

Restoration of the SWU includes the creation of a flood plain wetland surrounded by upland forests and xeric-sand prairies. The flood plain portion of the project and former storm water control ponds will be converted into a series of basins and sloughs for holding storm water and expanding the floodplain of Paddys Run. The area is designed to be flooded during a 2-year, 24-hour storm event. Some portions of the SWU are excavated into the unsaturated portions of the Great Miami Aquifer allowing for some of the ponds to act as recharge sources to the aquifer. Some upland areas are primarily made up of aquifer

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substrates of sand and gravel. These areas were seeded in a xeric-sand prairie seed mix.

The second major project was the Northern Pine Plantation. About half the pines in the plantation were removed due to their deteriorating condition and the desire to return the area to predominantly native vegetation. The area contains a number of seeps and sources of surface water flow.

Seven basins were installed within the project area. Some of the basins flow in series and a few were

intended as vernal pools. Planting is

primarily upland forest with areas of grassland adjacent to the OSDF to aid in reducing tree growth on the cell cap.



A vernal pool constructed adjacent to the remaining portion of the Northern Pine Plantation. Woody debris was added after grading and the surrounding area was seeded.

Deer damage is a significant concern on this project. The first deer exclusion fence was installed as a trial in the project area. During 2002, grading and seeding were completed. Planting of upland trees and wetland plugs will continue into 2003.

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 based on data from baseline, reference and restored areas. Monitoring in 2002

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focused on baseline sites that document the pre-restoration condition and initial project areas. Surveys were continued to monitor vegetation.

Ohio EPA continued its amphibian and macroinvertebrate monitoring program



Monitoring of the endangered Indiana Bat in 2002 documented their presence at Fernald for the first time.

within baseline, reference and restored areas. Sampling was conducted using a technique developed by Ohio EPA, which uses 10 funnel traps to collect samples. In 2001, the baseline site only had two amphibian species, fowler's toad and spring peeper. On-site restored areas

sampled in 2001 and 2002 had up to five species in a sample site and a total of seven different species, including bullfrog, green frog, cricket 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 11 different species. In addition to those species found on-site, reference sites had the following species: marbled salamander, spotted salamander, smallmouth salamander, two-lined salamander and chorus frogs. Most restored areas had more species of amphibians during 2002 than during 2001.

Ohio EPA continued monitoring a permanent butterfly/skipper transect in the A1PI 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

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were down dramatically in 2002 due to the cold, wet spring and very dry summer.

One research project Ohio EPA is conducting 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.



Ohio EPA collects research data from the former SP3 on vegetative cover for future OSDF capping projects.

Monitoring started in

late 2000 and continued through 2002 with the addition of locations within the former active flyash pile footprint. Monitoring in 2002 included the OSDF cell 1 cap that was seeded in late 2001. Because of construction delays, various methods of seeding and erosion mat installation were tried on the cell 1 cap. These methods were studied and subsequent vegetation response was monitored to ensure the most efficient seeding and installation methods are used for future OSDF cells. Monitoring of OSDF cell 1 and SP3 footprint will continue in 2003.

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2.3 PUBLIC OUTREACH

In 2002, 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.

For the fourth consecutive year, Ohio EPA hosted outreach events teaching school children about using native plants for the restoration effort at Fernald. In



In March, students planted various native seeds and tended to them during the spring (left). In May, students planted the seedlings in Fernald's wetland (below).



March, staff went to Ross and Crosby Middle Schools and Eastmont Elementary to teach students about the wetland restoration effort at Fernald and help the children plant their own seeds. The students tended the seedlings throughout the spring. In May, Ohio EPA staff helped the children from Fernald area schools plant the seedlings at Fernald. The

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children from Ohio EPA's Adopt-A-School, Eastmont Elementary, planted the seedlings at their school in an effort to revitalize an unused courtyard and prairie behind the school. More than 500 plants of almost 15 different species of grasses and flowers were planted with the help of kids in 2002.

In 2002, the Fernald Public Environmental Information Center moved to an on-site trailer. OFFO participated in several site tours with representatives from

Ohio's attorney general's and governor's offices, the Environmental Council of the States (ECOS), and DOE Headquarters. Tours and meetings were held for Energy Secretary, Spencer



Fernald's Cold War Garden provides a gathering place before the annual tour.

Abraham, and Assistant Secretary, Jessie Roberson, to promote DOE's new accelerated cleanup plan and funding. Long-term stewardship (LTS) continued to be the focus of many public meetings. The following pages highlight public involvement at Fernald in 2002.

Meetings

In July, OFFO participated in a 'meeting about meetings' at the request of local citizens to discuss communication issues and maintenance of good relationships at Fernald. OFFO representatives fully participate in DOE and community-sponsored public meetings and workshops, and give presentations as

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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 State and Tribal Government Working Group, National Governor's Association Federal Facilities Task Force, Environmental Council of the States, the Association of State and Territorial Solid Waste Management Officials, the Environmental Management Advisory Board, and the Ohio Society for Ecological Restoration.

In 2002, Ohio EPA staff continued to regularly participate in all Fernald Citizens Advisory Board (FCAB) stewardship committee and full board activities, in ex-



The FCAB toured Weldon Springs, MO and discussed LTS initiatives at other DOE sites.

officio capacities. The group spent time in 2002 on accelerated cleanup, OU4, funding, future use and long-term stewardship. Information management at post-closure Fernald was the topic of the FCAB's Future of Fernald workshop in March. The FCAB hosted a Site Specific Advisory Board chairs meeting in April to discuss DOE's Top to Bottom review, 2003 budget, and long-term stewardship. A design charret was held in May to discuss architectural ideas for a potential education center at Fernald. In September, members of the FCAB visited Weldon Springs in

Missouri to observe long-term stewardship initiatives at another DOE site. The FCAB issued their report, *Telling the Story of Fernald: Community Based Stewardship and Public Access to Information*, in October, 2002.

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Ohio EPA continued to participate in quarterly meetings and promotional efforts 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. University of Cincinnati, working with the living history group, continued efforts to implement the \$50,000 grant received in 1999 from the Ohio Environmental Education Fund. The Linking Community with Environment teacher enrichment workshop was held in June at the Fernald site. Teachers at the two day workshop, increased their awareness of environmental history of Fernald and discussed lesson plans for classroom application. OFFO staff presented an environmental history of Fernald to workshop attendees. In 2002, OFFO continued to maintain an e-mail list and Web pages for the Living History Project.

The Fernald Community Reuse Organization will be phasing out activities by the end of 2003. Many community members feel the area is not totally supportive of economic development at this time. The Community Reuse Organization will go into an inactive status and could reconvene in the future should a need arise.

Publications

- *Donor Soils Jumpstart Revegetation of Created Wetlands*, technical paper co-authored by Tom Schneider and Joe Bartoszek published in Ecological Restoration, March
- *2001 Annual Report to the Public on the Fernald Environmental Management Project*, June
- *Determining Cleanup Goals at Radioactively Contaminated Sites: Case Studies*, a document co-authored by Tom Schneider for ITRC in Washington DC, June

Fact Sheets

- Quarterly environmental monitoring results fact sheets
- Fernald Chronology

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Presentations

- *Fernald Stewardship Technologies and ITRC Activities*, presented to the National LTS S&T Roadmap Needs Assessment Working Group, Dallas
- *Getting to Stewardship: The Fernald Journey*, presented at the Environmental Stewardship: Promising Solutions to Uncertainty conference in New Orleans, February
- *Ground Water Issues at Fernald*, presented at Site Specific Advisory Board Workshop, Augusta, February
- *Graphing Techniques*, presented to Eastmont Adopt-a-School, February
- *Native Plants and Wetland Habitats*, presented to Ross, Crosby and Eastmont students, March
- *Clean Water Act – 30 Years Later*, presented at the SW Ohio Water Field Day, April
- *Determining Cleanup Goals at Radioactively Contaminated Sites: Case Studies*, presented to the Federal Remediation Technologies roundtable in Washington DC, June
- *Fernald's Environmental History*, presented to K-12 teachers at University of Cincinnati's "Linking Community With Environment" summer workshop, June
- *How OFFO Uses GIS*, presented at the Ohio EPA Hazardous Waste retreat, SEDO, September
- *Careers in Environmental Science*, presented to University of Dayton biology students, October
- *State Regulator Perspectives on LTS: Results of an ITRC State Regulators Survey*, presented at the ITRC fall conference in Washington DC, November
- Fernald presentations to graduate students at Miami University, April, June and November
- 20 South Pole presentations, January through December

On the Internet

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

In 2002 OFFO staff participated in Ohio EPA's web consistency workgroup to develop a unified look for all Agency web pages. OFFO's web site will change in 2003 to be consistent with the rest of the Agency's pages. The Web server continues to host multiple Web sites, including the community-based Fernald Living History

The Agency's web consistency team began efforts in 2002 to develop a consistent look for all Ohio EPA web pages.

Project site, the southwest district site and the Hamilton County Environmental Action Commission site. The OFFO Web site can be accessed at <http://offo2.epa.state.oh.us> for more information about Fernald.

ACTIVITIES AND ACCOMPLISHMENTS

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. Ohio EMA continues to enter updated DOE facility information into the state resource directory, the duty officer's handbook and a database.



Ohio EMA Mobile Emergency Communications van deployed for the Multi-Agency Communications drill.

Ohio EMA continues to prepare for site emergencies by improving preparedness posture through training and upgrading the emergency operations center. In April, the Mobile Emergency Communications Van participated in a multi-agency drill.

Under the DOE grant provisions, Ohio EMA provided pass-through funds to Hamilton and Butler County emergency management agencies to be used for Fernald-specific issues. The funds were used to prepare hazards assessments, participate in emergency response organizations, conduct exercises and drills, digitize site-specific information, participate in periodic communications checks, and upgrade facilities.

Ohio EMA continues to work with Fernald to track shipment information. This information is processed and disseminated to the county emergency management agencies. Ohio EMA continues to attend the Cooperative Planning and Training meetings for Fernald.

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 appraise the success of ongoing cleanup activities. During 2002, 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 2002. The reviews included a 2001 fourth quarter status report, the first IEMP data quarterly summary of 2002, Attachment B of the 2001 IEMP Annual Report, the 2001 Site Environmental Report, the draft IEMP Revision 3 covering all monitoring activities, the 2002 IEMP Mid-Year Data Summary, and an 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 2002. 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.

ENVIRONMENTAL MONITORING

3.1 PRIVATE WELLS

Ohio EPA continued to monitor three private wells in 2002 for total uranium. OFFO split sampled the wells with DOE/Fluor Fernald. The 2002 private well sampling locations are shown on the off-site sampling map in Appendix A. Private wells BOK14, BKM13, and NKM12 are located down gradient of Fernald. These residents are all on public water and the wells are used for monitoring purposes only.

Private well water is analyzed for total uranium, which is the primary contaminant of concern at Fernald. The USEPA 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 2002 was 144 µg/l, found in well NKM12. Well BOK14 was consistently less than background in 2002. Appendix B contains the private well sampling data.

In an effort to reduce costs, DOE made the decision in 2002 to monitor the three private wells twice a year.

Subsequently, Ohio EPA adjusted their private well split sampling from a quarterly to a biannual basis.

In 2002, private well split sampling frequency was reduced from four to two times per year.

OFFO has been split sampling the three wells with Fernald since 1994. These wells have historically shown some fluctuation in their total uranium concentrations. Increased concentrations have been noted in well NKM12 since re-injection began in 1998. With Fernald's re-injection and extraction system, treated water is reinjected, pushing the contaminated ground water past the private well and toward the extraction wells.

3.2 SURFACE WATER

Thirty eight surface water samples were taken in 2002, compared with 52 taken in 2001 and 37 taken in 2000. In addition to 35 routine monitoring samples taken in 2002, samples were taken in September at the Pilot Plant Drainage Ditch (PPDD0.5), and November at the Southern Waste Units constructed ponds in the northwest corner (SWU-WW, SWU-GF). Routine samples were analyzed for total uranium, radium-226 and radium-228.

The maps in Appendix A shows all 2002 surface water 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 (NPDES) outfall from Fernald in the Great Miami River. Location GM21.4 is approximately three miles downstream of the effluent at the bridge in New Baltimore.



Ohio EPA and Flour Fernald staff in the Advanced Waste Water Treatment facility during the annual NPDES inspection in July.

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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 µg/l, 38 pCi/l, and 47 pCi/l, respectively. No sample results exceeded the FRLs.

Paddys Run at the property line (PR1.8) was generally dry. The three routine samples taken at this location continued to demonstrate low levels of total uranium (2.1, 3.5 and 4.9 µg/l).

PR1.8 Total Uranium

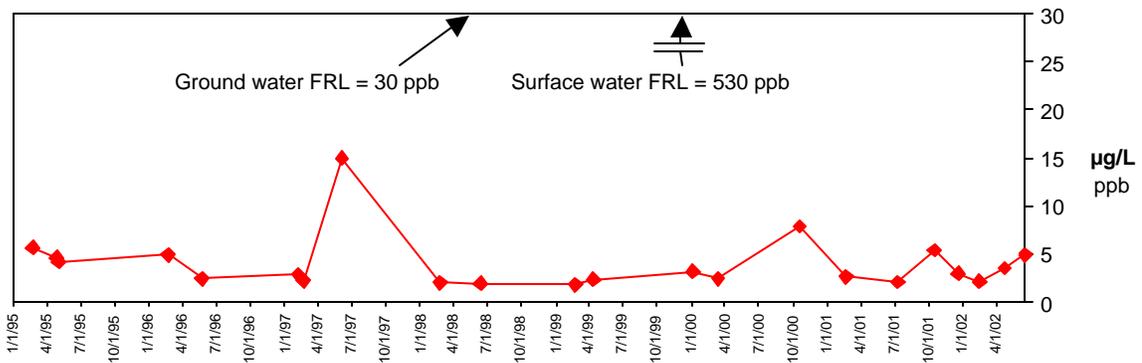


Figure 3 Paddys Run at the property line was sampled three times in 2002.

3.3 SEDIMENT

Sediment samples were taken at six locations in 2002. This compares to seven sediment samples taken in 2001, and six in 2000. Samples were analyzed for total uranium, radium-226, and isotopic thorium.

The maps in Appendix A show all 2002 sediment sampling locations. Most samples were co-located with surface water. Location PR7.2 has a gravel and cobble substrate, and did 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.

Final remediation levels for sediment at Fernald have been established for the following analytes per the OU5 Record of Decision (December 15, 1995): total uranium (210 µg/g); radium-226 (2.9 pCi/g); thorium-228 (3.2 pCi/g), -230 (18,000 pCi/g), and -232 (1.6 pCi/g). No sediment sample had any analyte above the final remediation level. Results are summarized in Appendix D.

Total Uranium in Sediment

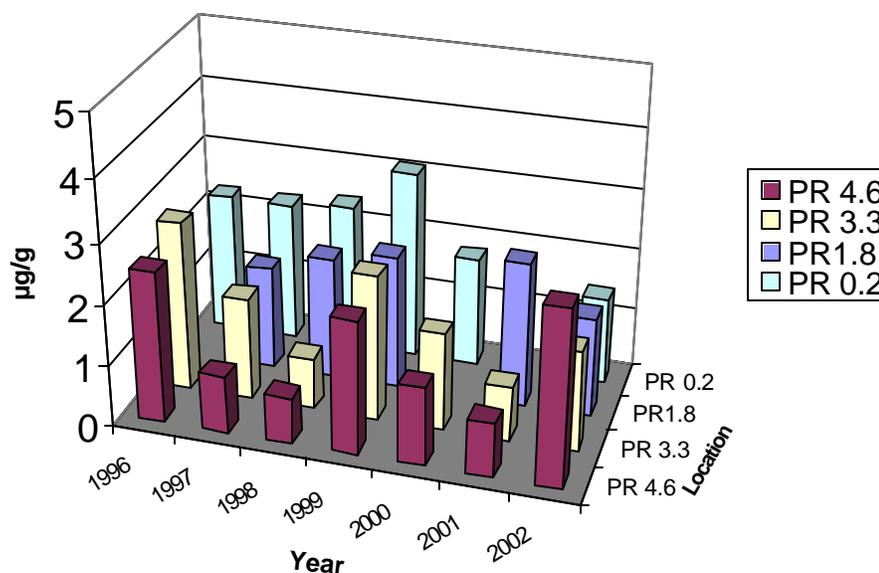


Figure 4 Total uranium levels in Paddys Run sediment have remained far below the FRL of 210 µg/g.

3.4 AIR

Ohio EPA conducts air monitoring and surveillance at Fernald. Ohio EPA operated six high volume air samplers for the collection of particulate samples and three radon monitors for the continuous monitoring of 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. 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. Off-site samplers are located in Crosby and Ross townships. The 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). Significant differences have been observed in 2002 between these and the background sampler, located in Crosby Township. These locations indicate elevated

concentrations of total uranium and thorium-230. Fernald installed a pugmill ventilation system in 2002 to reduce air emissions from waste pit activities. All of the measured concentrations were less than NESHAP standards.

The 2002 average total uranium concentration measured at both waste pit locations were essentially the same as those measured in 2001. 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 ($2.78 \times 10^{-2} \mu\text{g}/\text{m}^3$). This marks the first year that the concentrations have not increased since WPRAP operations began, despite increased activities in the area. The pugmill ventilation system appears to be controlling emissions. 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.

**Total Uranium in Air, 2002
WPRAP Operations**

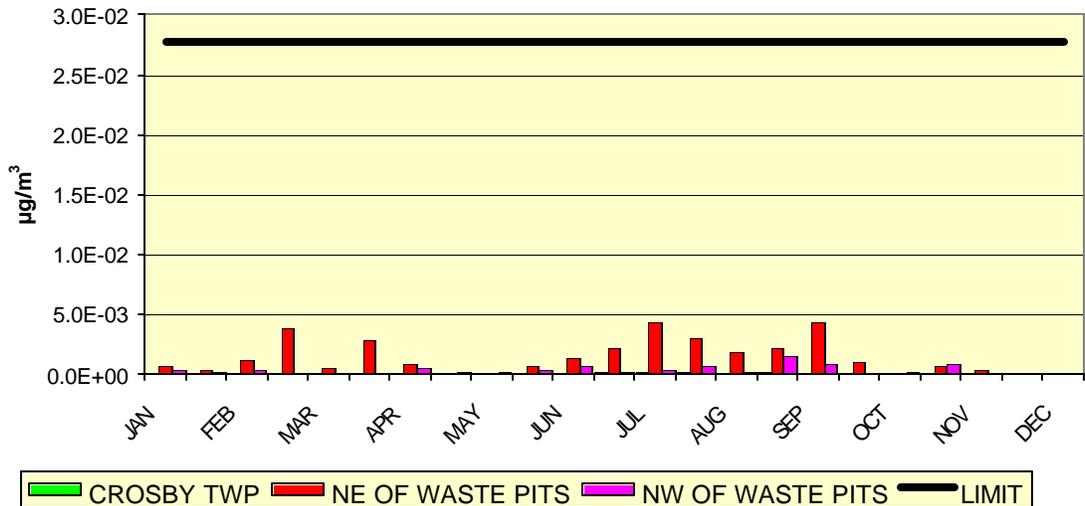


Figure 5 Total Uranium at Ohio EPA monitoring locations.

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Thorium isotopes (thorium-232, thorium-230, and thorium-228) were also analyzed at the waste pit locations. Thorium-230 concentrations were elevated at both WPRAP locations compared to the concentrations measured at the background location. The thorium-230 concentrations were nearly the same as those measured in 2001. All of the thorium concentrations measured in 2002 were less than the NESHAP concentrations. As mentioned earlier, Fernald is taking steps to decrease emissions from the WPRAP. The thorium-230 results are shown in Figure 6.

Thorium-230 in Air, 2002 WPRAP Operations

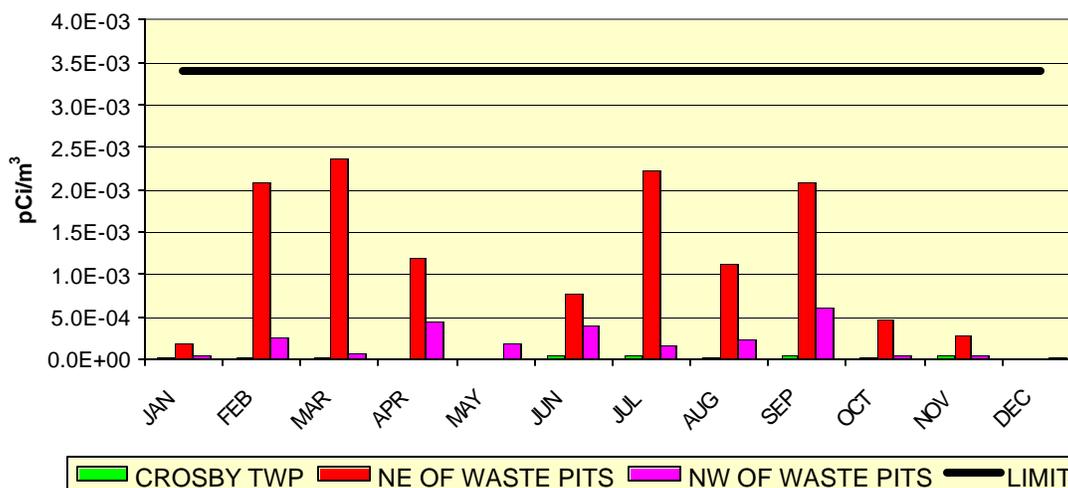


Figure 6 Thorium-230 was elevated at the waste pits again in 2002.

Radium-226 concentrations in air were also measured at the waste pit monitors in 2002. The results were similar to the results measured during 2001 and were similar to the concentrations measured at the background location.

The 2002 average TSP concentration at both locations was nearly the same as 2001 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 2 additional monitors on-site, FNAPS02 (northeast fenceline) and FNAPS03A (met tower) as well as an additional off-site location in Ross Township (Ross). Total uranium and TSP samples are collected from this location semi-monthly. A monthly composite sample for thorium isotopes is also performed.

The 2002 total uranium concentrations are approximately the same as the concentrations measured in 2001 and significantly greater than the concentrations measured off-site. FNAPS02 has the greatest concentrations of these locations which can be attributed to waste placement in the OSDF. The other locations, with the exception of Ross, continue to have elevated concentrations. These concentrations are to be expected as remediation activities continue on site. The measured concentrations remain well below the NESHAP standard. The total uranium results for the other sampling locations are shown in Figure 7.

Total Uranium in Air, 2002 Other Locations

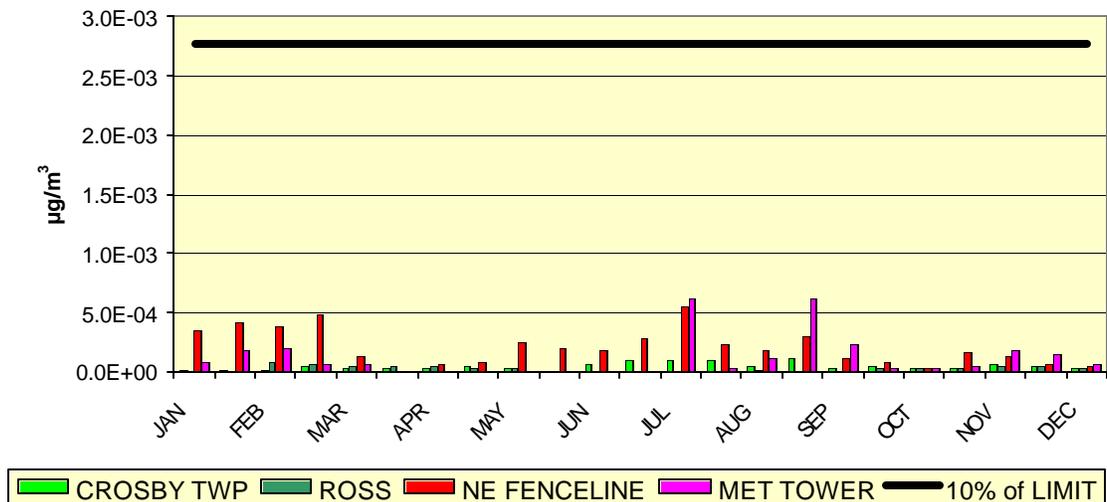


Figure 7 Total Uranium at and around Fernald remained within limits.

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The 2002 TSP concentrations for these locations remain essentially the same as 2001, and were similar to off-site concentrations. The thorium concentrations measured at these locations were slightly elevated compared to the off-site locations, but all were significantly less than the NESHAPs standard.

Annual Composites: All of the samples from each of the six sampling locations are composited into a single sample for an annual composite sample. 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.

Qualitatively, the results are consistent with the semi-monthly and monthly results. The 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.

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, and;
- FNRDN03, located approximately 2 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 locations of these 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 the waste pits and silo 3. 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 E. The data indicates that average monthly radon concentrations from the monitors located east of the silos (FNRDN02A) and the Paddys Run Road location (FNRDN01) range from 0.2 to 1.2 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. Average monthly radon concentrations are shown in the figure below.

Radon-222 in Air

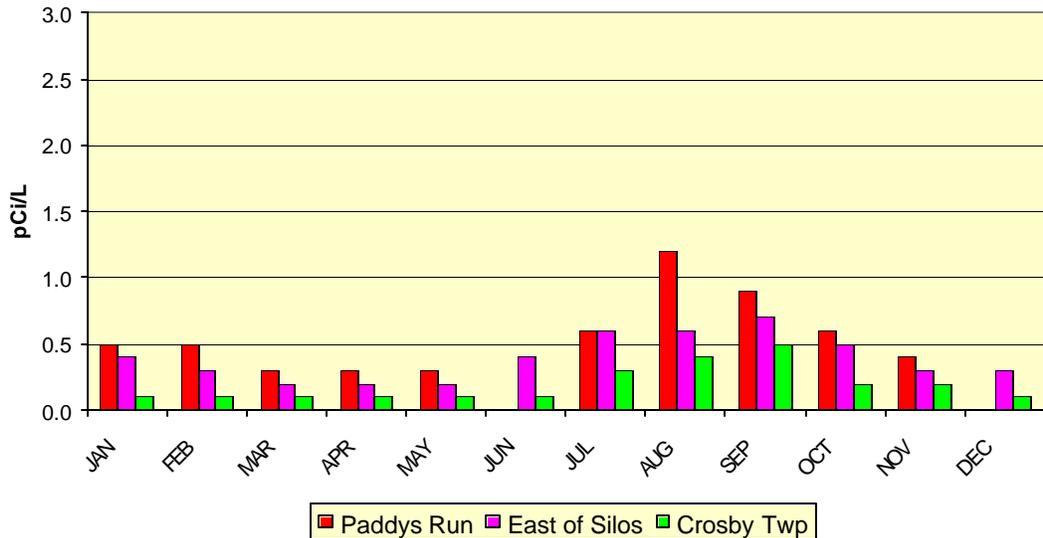


Figure 8 Monthly radon averages stayed below the DOE limit of 3.0 pCi/l.

The Paddys Run Road location (FNRDN01) and the east of the silos (FNRDN02A) location each had a slightly higher average concentration than that

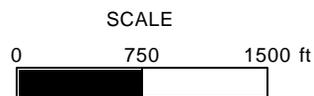
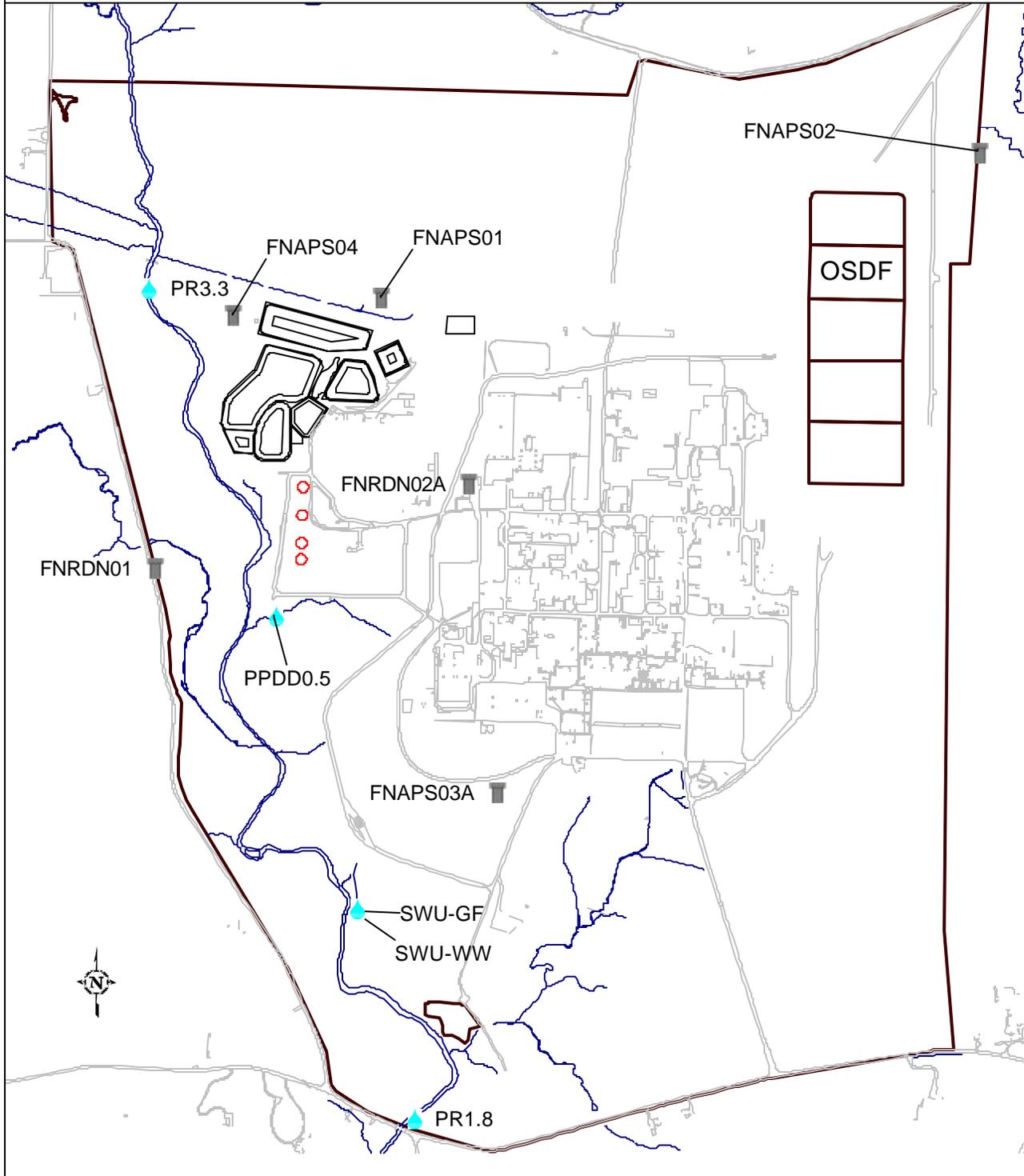
ENVIRONMENTAL MONITORING

measured at Crosby Township (FNRDN03) in 2002. The annual average concentration measured at Paddys Run Road was 0.6 pCi/L as compared to 0.2 pCi/L measured at Crosby.

The average radon concentrations were all less than the 3.0 pCi/L limit in DOE Order 5400.5 and less than 0.5 pCi/L greater than background, the limit proposed in Draft 10 CFR 834.

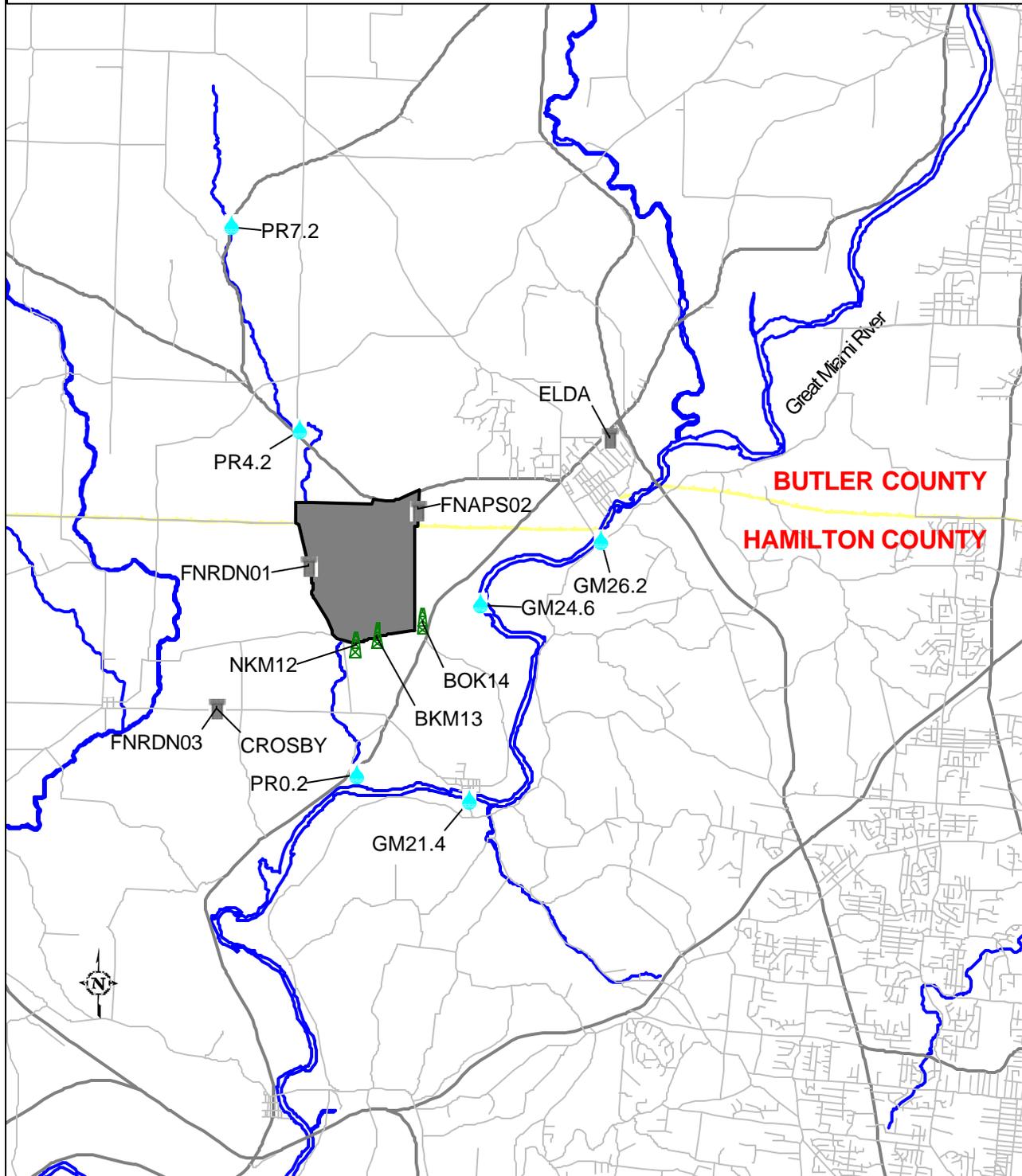
APPENDICES

2002 OHIO EPA ON-SITE SAMPLING LOCATIONS



LEGEND	
	AIR LOCATION
	SURFACE WATER/SEDIMENT LOCATION

2002 OHIO EPA OFF-SITE SAMPLING LOCATIONS



F:\GEOWORKSPACES\lanrep03_OffSite.gws

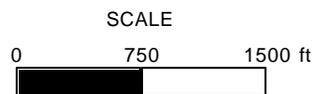
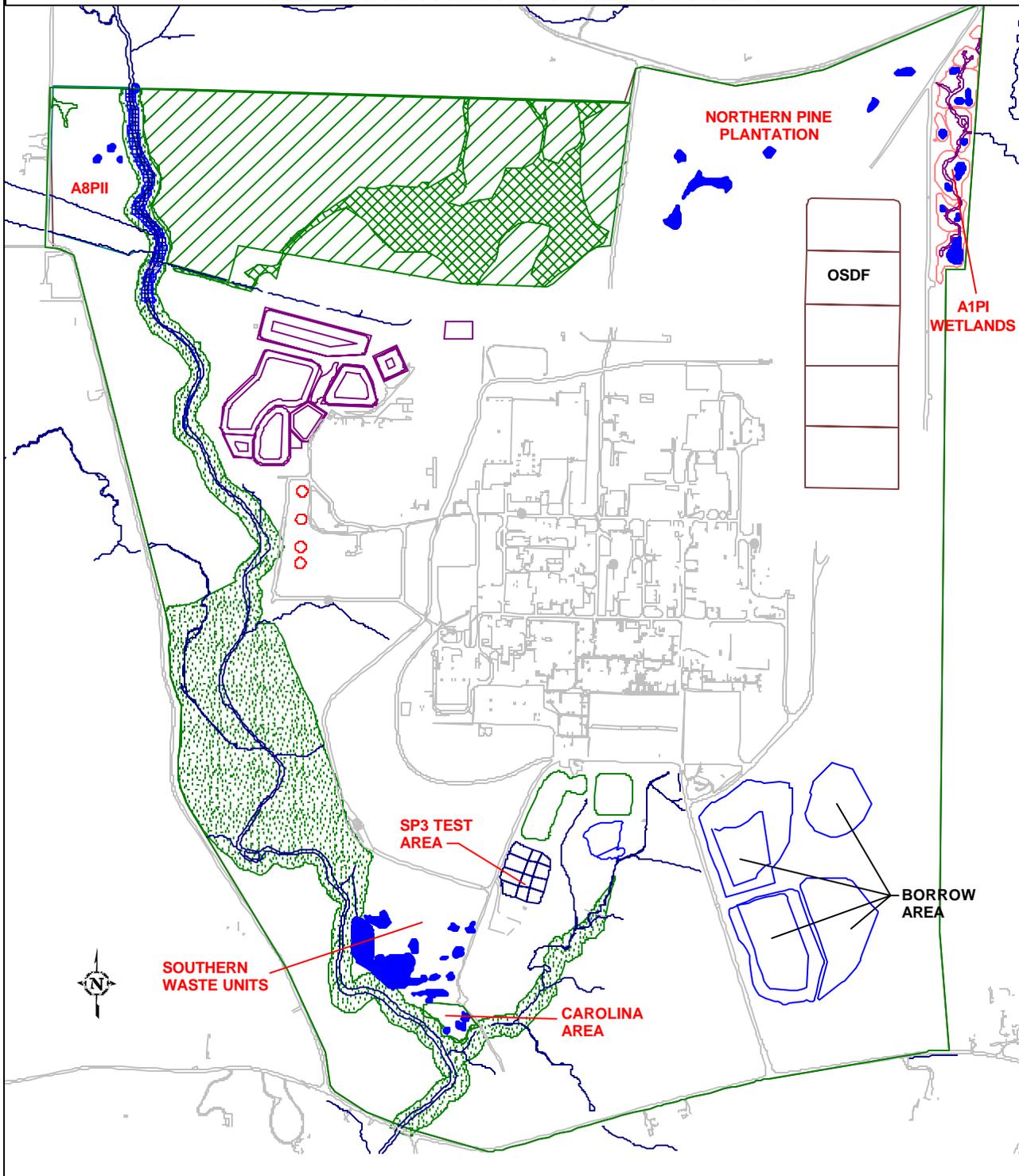
SCALE
0.0 0.5 1.0 1.5 mi



LEGEND

-  AIR LOCATION
-  SURFACE WATER/SEDIMENT LOCATION
-  PRIVATE WELL

RESTORATION PROJECT AREAS



LEGEND	
	WETLANDS
	NORTHERN WOODLOT
	RIPARIAN CORRIDOR

PRIVATE WELLS			
LOCATION CODE	COLLECT DATE	OEPA TOTAL U µg/L	DOE TOTAL U µg/L
NKM12	1/30/2002	74.3	85.7
NKM12	4/25/2002	70.9	69.6
NKM12	7/31/2002	74.5	81.2
NKM12	10/29/2002	144	89.8
BKM13	1/30/2002	13.4	12.8
BKM13	4/25/2002	20.2	19.1
BKM13	7/31/2002	19.6	17.9
BKM13	10/29/2002	20.3	12.5
BOK14	1/30/2002	2.33	2.38
BOK14	4/25/2002	2.94	2.77
BOK14	7/31/2002	2.54	2.51
BOK14	10/29/2002	2.38	1.93

Note:

µg/l = micrograms per liter

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

APPENDIX C

SURFACE WATER							
LOCATION CODE	COLLECT DATE	TOTAL U $\mu\text{g/L}$	TOTAL U +/- error	Ra-226 pCi/g	Ra-226 +/- error	Ra-228 pCi/g	Ra-228 +/- error
PPDD0.5	9/30/2002	56.2	0.619	NS		NS	
PR0.2	2/15/2002	0.685	0.069	<0.46	0.24	0.958	0.6
PR0.2	4/24/2002	3.45	0.0417	<0.273	0.154	<1.24	0.483
PR0.2	6/18/2002	3.85	0.0455	<0.226	0.146	<0.971	0.457
PR0.2	12/4/2002	2.76	0.035	<0.223	0.132	<0.855	0.386
PR1.8	2/15/2002	2.09	0.21	<0.35	0.18	1.05	0.65
PR1.8	4/24/2002	3.51	0.0449	<0.45	0.254	<1.38	0.532
PR1.8	6/18/2002	4.87	0.0576	<0.234	0.14	<1.23	0.506
PR3.3	2/15/2002	1.83	0.18	<0.3	0.2	0.948	0.57
PR3.3	4/24/2002	1.63	0.0199	<0.316	0.16	<1.31	0.542
PR3.3	6/18/2002	1.26	0.0169	<0.332	0.216	<0.959	0.444
PR3.3	10/22/2002	15.1	0.188	<0.234	0.139	<0.96	0.394
PR3.3	12/4/2002	1.44	0.018	<0.263	0.165	<0.716	0.347
PR7.2	2/15/2002	1.36	0.14	<0.51	0.29	1.01	0.58
PR7.2	4/24/2002	1.08	0.0137	<0.301	0.187	<1.33	0.614
PR7.2	6/18/2002	0.997	0.0121	<0.297	0.16	<1.17	0.551
PR7.2	10/22/2002	0.956	0.012	0.306	0.168	<0.919	0.362
PR7.2	12/4/2002	1.17	0.015	<0.235	0.149	<0.809	0.39
GMR21.4	2/15/2002	2.2	0.22	<0.39	0.24	<0.92	0.59
GMR21.4	4/24/2002	1.59	0.019	0.362	0.193	<1.05	0.499
GMR21.4	6/18/2002	1.72	0.0206	0.367	0.159	<1.11	0.451
GMR21.4	8/27/2002	1.89	0.0208	0.296	0.178	<1.14	0.494
GMR21.4	10/22/2002	1.63	0.0201	<0.381	0.24	<1.27	0.56
GMR21.4	12/4/2002	1.95	0.025	<0.194	0.118	<0.858	0.39
GMR24.6	2/15/2002	2.32	0.23	<0.38	0.21	1.06	0.61
GMR24.6	4/24/2002	1.74	0.021	<0.363	0.209	<1.01	0.46
GMR24.6	6/18/2002	2.05	0.0244	0.282	0.181	<1.05	0.433
GMR24.6	8/27/2002	2.17	0.0244	<0.309	0.199	<1.43	0.586
GMR24.6	10/22/2002	2.02	0.0243	<0.272	0.179	<0.922	0.413
GMR24.6	12/4/2002	2.05	0.026	0.518	0.176	<0.718	0.345
GMR26.2	2/15/2002	2.17	0.22	<0.45	0.23	0.964	0.59
GMR26.2	4/24/2002	1.61	0.0195	0.351	0.227	<0.973	0.455
GMR26.2	6/18/2002	1.71	0.0215	<0.266	0.174	<1.06	0.465
GMR26.2	8/27/2002	1.5	0.0167	0.265	0.165	<1.28	0.522
GMR26.2	10/22/2002	1.52	0.0185	<0.27	0.165	<1.06	0.452
GMR26.2	12/4/2002	1.68	0.021	<0.286	0.173	<0.887	0.405
SWU GF	11/26/2002	8.69	0.0947	NS		NS	
SWU WW	11/26/2002	20.4	0.221	NS		NS	

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

APPENDIX D

SEDIMENT					
LOCATION CODE	COLLECT DATE	TOTAL U µg/L	TOTAL U +/- error	Ra-226 pCi/g	Ra-226 +/- error
PR0.2	6/18/2002	1.43	0.0183	0.576	0.122
PR1.8	6/18/2002	1.65	0.0205	0.64	0.168
PR3.3	6/18/2002	1.67	0.0213	0.968	0.235
PR4.6	6/18/2002	2.88	0.0434	1.15	0.178
GMR21.4	6/18/2002	2.08	0.0259	1.06	0.158
GMR26.2	6/18/2002	2.02	0.0255	1.09	0.189

LOCATION CODE	COLLECT DATE	Th-228 pCi/g	Th-228 +/- error	Th-230 pCi/g	Th-230 +/- error	Th-232 pCi/g	Th-232 +/- error
PR0.2	6/18/2002	0.292	0.0464	0.594	0.0608	0.24	0.0387
PR1.8	6/18/2002	0.366	0.0527	0.75	0.0694	0.323	0.0456
PR3.3	6/18/2002	0.464	0.0567	0.718	0.0659	0.429	0.0507
PR4.6	6/18/2002	0.523	0.0627	0.834	0.0747	0.511	0.0585
GMR21.4	6/18/2002	0.886	0.0857	1.18	0.0932	0.884	0.0809
GMR26.2	6/18/2002	0.836	0.0759	1.13	0.0831	0.715	0.066

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

APPENDIX E

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 $\mu\text{g}/\text{m}^3$	ELDA ROSS TWP $\mu\text{g}/\text{m}^3$
01/07/02	01/25/02	19.32	20.02	18.82	17.31	21.93	ND
01/25/02	02/07/02	15.66	19.92	21.65	13.74	16.30	ND
02/07/02	02/25/02	18.12	22.30	20.84	15.95	16.81	21.4
02/25/02	03/13/02	26.09	26.66	19.40 c	10.00	22.83	29.44
03/13/02	04/01/02	19.70	ND	19.40 c	10.00	20.32	25.17
04/01/02	04/24/02	28.66	17.46	ND	21.56	22.25	26.89
04/24/02	05/01/02	35.25	24.38	ND	24.82	27.80	35.43
05/01/02	05/15/02	ND	22.50	ND	21.56	51.82	34.60
05/15/02	05/29/02	ND	26.09	ND	18.50	27.95	18.88
05/29/02	06/18/02	40.94	51.44	ND	24.05	ND	ND
06/18/02	07/02/02	68.76	50.66	ND	41.79	47.54	ND
07/02/02	07/16/02	50.02	41.96	ND	40.64	45.92	ND
07/16/02	07/31/02	49.07	37.10	43.05	33.01	48.16	ND
07/31/02	08/15/02	63.21	43.16	3.41	40.07	52.18	3.32
08/15/02	09/03/02	44.12	26.46	35.62	30.46	36.28	5.12
09/03/02	09/16/02	53.82	50.13	48.86	40.52	57.16	ND
09/16/02	09/30/02	48.88	27.95	53.97	26.83	30.88	ND
09/30/02	10/20/02	35.21	26.07	46.50 c	10.74	34.67	30.91 c
10/22/02	10/31/02	24.73	18.86	46.50 c	39.64	25.23	30.91 c
10/31/02	11/14/02	20.71	19.05	20.86	16.09	21.65	22.14
11/14/02	12/04/02	ND	17.69	25.74	ND	33.41	25.62
12/06/02	12/23/02	ND	17.79	28.33	18.78	23.15	26.19
12/23/02	01/07/03	ND	14.77	16.96	15.41	16.59	19.47

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 $\mu\text{g}/\text{m}^3$	ELDA ROSS TWP $\mu\text{g}/\text{m}^3$
01/07/02	01/25/02	6.61E-04	3.49E-04	8.24E-05	2.57E-04	1.81E-05	ND
01/25/02	02/07/02	3.12E-04	4.25E-04	1.92E-04	1.16E-04	1.94E-05	ND
02/07/02	02/25/02	1.20E-03	3.79E-04	1.96E-04	2.67E-04	1.39E-05	7.84E-05
02/25/02	03/13/02	3.85E-03	4.87E-04	5.82E-05	7.90E-05 c	4.27E-05	6.57E-05
03/13/02	04/01/02	4.56E-04	1.28E-04	5.82E-05	7.90E-05 c	3.41E-05	4.96E-05
04/01/02	04/24/02	2.75E-03	ND	ND	1.78E-05	3.46E-05	5.62E-05
04/24/02	05/01/02	8.84E-04	6.07E-05	ND	5.96E-04	2.89E-05	5.66E-05
05/01/02	05/15/02	ND	8.20E-05	ND	2.07E-04	4.31E-05	3.47E-05
05/15/02	05/29/02	ND	2.49E-04	ND	2.12E-04	3.02E-05	3.47E-05
05/29/02	06/18/02	6.76E-04	2.03E-04	ND	2.70E-04	ND	ND
06/18/02	07/02/02	1.40E-03	1.90E-04	ND	7.45E-04	6.05E-05	ND
07/02/02	07/16/02	2.12E-03	2.92E-04	ND	2.31E-04	1.03E-04	ND
07/16/02	07/31/02	4.26E-03	5.52E-04	6.15E-04	3.61E-04	1.02E-04	ND
07/31/02	08/15/02	3.08E-03	2.35E-04	2.67E-05	6.61E-04	9.52E-05	4.80E-06
08/15/02	09/03/02	1.79E-03	1.90E-04	1.08E-04	2.48E-04	5.09E-05	1.81E-05
09/03/02	09/16/02	2.16E-03	2.93E-04	6.19E-04	1.51E-03	1.25E-04	ND
09/16/02	09/30/02	4.32E-03	1.21E-04	2.31E-04	8.84E-04	3.62E-05	ND
09/30/02	10/20/02	9.82E-04	7.72E-05	2.36E-05	3.89E-05	5.19E-05	2.71E-05
10/20/02	10/31/02	6.87E-05	2.47E-05	2.36E-05	1.02E-04	2.86E-05	2.71E-05
10/31/02	11/14/02	6.38E-04	1.71E-04	5.01E-05	9.09E-04	3.18E-05	3.71E-05
11/14/02	12/04/02	4.33E-04	1.28E-04	1.91E-04	5.35E-05	5.99E-05	4.68E-05
12/06/02	12/23/02	ND	6.06E-05	1.52E-04	9.04E-05	4.52E-05	4.44E-05
12/23/02	01/07/03	ND	3.93E-05	6.75E-05	4.16E-05	2.65E-05	2.82E-05

Notes:

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

c = Indicates one sample composited over entire month.

Thorium - 228 IN AIR						
MONTH 2001	FNAPS01 NE OF WASTE PITS pCi/m3	FNAPS02 NE FENCELINE pCi/m3	FNAPS03A MET TOWER pCi/m3	FNAPS04 NW OF WASTE PITS pCi/m3	AMS-11 CROSBY TWP pCi/m3	AMS-13 ROSS pCi/m3
JAN	1.01E-05	8.49E-06	4.83E-06	<3.15E-06	5.05E-06	ND
FEB	3.38E-05	1.35E-05	1.24E-05	7.46E-06	3.40E-06	7.08E-06
MAR	4.72E-05	1.37E-05	<1.13E-05	<6.94E-06	6.18E-06	1.11E-05
APR	3.00E-05	1.60E-05	ND	6.41E-06	5.28E-06	8.37E-06
MAY	ND	2.00E-05	ND	9.92E-06	1.23E-05	1.58E-05
JUN	2.55E-05	1.39E-05	ND	1.98E-05	2.54E-05	2.10E-05
JUL	5.98E-05	1.24E-05	<1.66E-05	1.16E-05	1.08E-05	ND
AUG	2.67E-05	1.83E-05	5.03E-06	1.35E-05	1.04E-05	<2.26E-06
SEP	3.46E-05	8.04E-06	2.46E-05	1.59E-05	1.46E-05	ND
OCT	9.51E-06	<2.71E-06	3.18E-05	<5.77E-06	5.12E-06	<9.91E-06
NOV	9.49E-06	5.11E-06	1.01E-05	2.04E-06	9.02E-06	6.45E-06
DEC	ND	<1.12E-06	3.47E-06	1.58E-06	1.77E-06	3.65E-06

Thorium - 230 IN AIR						
MONTH 2001	FNAPS01 NE OF WASTE PITS pCi/m3	FNAPS02 NE FENCELINE pCi/m3	FNAPS03A MET TOWER pCi/m3	FNAPS04 NW OF WASTE PITS pCi/m3	AMS-11 CROSBY TWP pCi/m3	AMS-13 ROSS pCi/m3
JAN	1.92E-04	7.51E-05	4.55E-05	5.57E-05	1.02E-05	ND
FEB	2.09E-03	1.15E-04	1.20E-04	2.55E-04	1.38E-05	2.36E-05
MAR	2.36E-03	1.39E-04	2.62E-05	7.03E-05	2.29E-05	3.87E-05
APR	1.19E-03	1.09E-05	ND	4.48E-04	4.98E-06	5.31E-05
MAY	ND	1.45E-05	ND	1.81E-04	5.87E-06	1.09E-05
JUN	7.69E-04	6.98E-05	ND	4.01E-04	4.80E-05	3.87E-05
JUL	2.23E-03	9.34E-05	5.17E-05	1.56E-04	3.43E-05	ND
AUG	1.13E-03	7.58E-05	2.78E-05	2.28E-04	2.74E-05	8.85E-06
SEP	2.08E-03	4.17E-05	3.11E-04	6.02E-04	4.55E-05	ND
OCT	4.78E-04	2.31E-05	9.95E-05	4.95E-05	1.76E-05	3.31E-05
NOV	2.89E-04	4.95E-05	6.49E-05	4.54E-05	3.29E-05	3.03E-05
DEC	ND	1.29E-05	4.57E-05	2.51E-05	6.88E-06	1.23E-05

Thorium - 232 IN AIR						
MONTH 2001	FNAPS01 NE OF WASTE PITS pCi/m3	FNAPS02 NE FENCELINE pCi/m3	FNAPS03A MET TOWER pCi/m3	FNAPS04 NW OF WASTE PITS pCi/m3	AMS-11 CROSBY TWP pCi/m3	AMS-13 ROSS pCi/m3
JAN	8.67E-06	1.41E-05	9.51E-06	6.28E-06	6.84E-06	ND
FEB	3.05E-05	7.23E-06	4.71E-06	8.56E-06	5.92E-06	1.04E-05
MAR	3.53E-05	9.37E-06	5.45E-06	2.62E-06	9.95E-06	8.81E-06
APR	2.77E-05	2.04E-05	ND	1.38E-05	5.80E-06	9.70E-06
MAY	ND	6.10E-06	ND	3.62E-06	1.27E-05	8.93E-06
JUN	3.36E-05	1.47E-05	ND	2.72E-05	2.61E-05	8.91E-06
JUL	6.57E-05	1.55E-05	<1.07E-05	1.95E-05	1.37E-05	ND
AUG	3.52E-05	1.16E-05	3.11E-06	1.61E-05	1.30E-05	1.86E-06
SEP	2.95E-05	7.51E-06	1.82E-05	1.66E-05	1.43E-05	ND
OCT	1.14E-05	5.61E-06	1.83E-05	7.47E-06	6.72E-06	1.24E-05
NOV	1.18E-05	8.16E-06	1.55E-05	2.68E-06	1.00E-05	8.00E-06
DEC	ND	1.94E-06	3.54E-06	2.78E-06	1.84E-06	2.81E-06

Notes:

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

c = Indicates one sample composited over entire month.

APPENDIX E

AIR - Radium - 226						
MONTH 2001	FNAPS01 NE OF WASTE PITS pCi/m3	FNAPS02 NE FENCELINE pCi/m3	FNAPS03A MET TOWER pCi/m3	FNAPS04 NW OF WASTE PITS pCi/m3	CROSBY CROSBY TWP pCi/m3	ELDA ROSS TWP pCi/m3
JAN	<2.06E-05	NS	NS	<2.20E-05	<1.59E-05	NS
FEB	7.88E-05	NS	NS	<5.58E-05	<3.87E-05	NS
MAR	1.04E-04	NS	NS	<3.81E-05	<1.94E-05	NS
APR	1.07E-04	NS	NS	1.42E-05	<1.93E-05	NS
MAY	ND	NS	NS	3.68E-05	4.28E-05	NS
JUN	6.10E-05	NS	NS	7.68E-05	<2.58E-05	NS
JUL	1.28E-04	NS	NS	5.99E-05	6.46E-05	NS
AUG	7.09E-05	NS	NS	2.55E-05	2.25E-05	NS
SEP	1.54E-04	NS	NS	8.67E-05	6.49E-05	NS
OCT	4.38E-05	NS	NS	1.94E-05	4.86E-05	NS
NOV	3.16E-05	NS	NS	6.86E-06	2.01E-05	NS
DEC	ND	NS	NS	5.46E-06	1.36E-05	NS

AIR - Annual Composites								
LOCATION	Total U µg/m ³	U-238 pCi/m3	U-235 pCi/m3	U-234 pCi/m3	Th-232 pCi/m3	Th-230 pCi/m3	Th-228 pCi/m3	Ra-226 pCi/m3
FNAPS01	1.54E-03	5.19E-04	1.03E-05	2.79E-04	3.75E-05	1.07E-03	6.35E-05	5.86E-05
FNAPS02	1.74E-04	7.21E-05	2.85E-06	6.23E-05	7.44E-06	3.71E-05	8.36E-06	1.74E-05
FNAPS03A	1.44E-04	5.00E-05	1.63E-06	4.31E-05	7.91E-06	5.69E-05	1.04E-05	1.74E-05
FNAPS04	2.89E-04	1.21E-04	4.48E-06	7.02E-05	8.90E-06	1.66E-04	1.06E-05	1.55E-05
ELDA	3.12E-05	1.48E-05	<7.39E-07	1.47E-05	9.23E-06	2.77E-05	8.37E-06	9.96E-06
CROSBY	6.32E-05	1.77E-05	5.43E-07	1.52E-05	9.26E-06	1.98E-05	1.16E-05	1.74E-05

AIR - Radon						
MONTH 2001	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	0.5	2.3	0.4	4.7	0.1	0.7
FEB	0.5	1.9	0.3	2.3	0.1	0.9
MAR	0.3	1.4	0.2	2.0	0.1	0.8
APR	0.3	5.4	0.2	1.6	0.1	0.5
MAY	0.3	0.7	0.2	1.3	0.1	0.5
JUN	ND	ND	0.4	1.8	0.1	0.5
JUL	0.6	2.6	0.6	2.1	0.3	1.1
AUG	1.2	2.4	0.6	2.4	0.4	1.4
SEP	0.9	3.4	0.7	3.1	0.5	1.9
OCT	0.6	2.4	0.5	2.0	0.2	1.0
NOV	0.4	1.4	0.3	2.0	0.2	0.7
DEC	ND	ND	0.3	1.7	0.1	0.6

Notes:

NS = Indicates "Not Sampled".

c = Indicates one sample composited over entire month.

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

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 38
Ross, OH 45061
(513) 648-4168
contact: Randy Welker

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
P.O. Box 129
Ross, OH 45061-0129
(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

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Ohio Emergency Management Agency(614) 889-7178



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