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1995



**ANNUAL REPORT
TO THE PUBLIC**
on the
FERNALD
Environmental Management Project

Prepared by:



Ohio Environmental Protection Agency
OFFICE OF FEDERAL
FACILITIES OVERSIGHT

Combined Report

Agreement In Principle (# DE-FG05-940R22206)
& Cost Recovery Grant (# DE-FG05-940R22167)



State of Ohio

Ohio Environmental Protection Agency

Ohio Department of Health

Ohio Emergency Management Agency

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ACRONYMS

AIP	Agreement In Principle
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERE	Consortium for Environmental Risk Evaluation
CRG	Cost Recovery Grant
DOE	Department of Energy
EMAB	Environmental Management Advisory Board
EMP	Environmental Monitoring Program
FCTF	Fernald Citizens Task Force
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
FFCAct	Federal Facilities Compliance Act
FRESH	Fernald Residents for Environmental Safety & Health
FSP	Field Sampling Plan
GIS	Geographic Information System
GPS	Global Positioning System
GMR	Great Miami River
IRTEP	Integrated Remedial Technologies Evaluation Program
ITRD	Innovative Treatment Remediation Demonstration
NGA	National Governor's Association
NPDES	National Pollutant Discharge Elimination System
NRDA	Natural Resources Damage Assessment
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
ROD	Record of Decision
RCRA	Resource Conservation and Recovery Act
STGWWG	State and Tribal Governments Working Group
USEPA	United States Environmental Protection Agency
UNH	Uranyl Nitrate Hexahydrate

INTRODUCTION



The Fernald Environmental Management Project is located 18 miles northwest of Cincinnati near the rural village of Fernald.

1.0 INTRODUCTION

This is the State of Ohio's first annual report to document oversight activities at the United States Department of Energy's (DOE) Fernald Environmental Management Project (FEMP). The report is written to provide interested parties a single source of information regarding Ohio's Fernald-related regulatory, environmental monitoring, public outreach, and planning activities during calendar year 1995. In addition, this report completes one of Ohio's commitments under the Agreement In Principle (AIP) between Ohio and DOE.

INTRODUCTION

1.1 AGREEMENT IN PRINCIPLE

The AIP outlines goals and commitments to be carried out by the State of Ohio and DOE during Fernald's cleanup and provides funding to Ohio. Ohio's objectives in this agreement are to: 1) extend agency non-regulatory oversight and review to Fernald's Environmental Monitoring Program (EMP); 2) assist in emergency preparedness planning; and 3) enhance public involvement and education. The AIP was signed in October of 1993. Implementation of the AIP began in 1994.

Ohio Environmental Protection Agency (Ohio EPA) is the lead agency for Ohio's implementation of the AIP. Ohio Department of Health (ODH) and Ohio Emergency Management Agency (Ohio EMA) provide support in health physics and emergency preparedness planning, respectively. The Office of Federal Facilities Oversight (OFFO) coordinates Ohio EPA's Fernald activities. Under the AIP, in 1995 Ohio conducted environmental monitoring, reviewed DOE's EMP, drafted a Field Sampling Plan (FSP), solicited public involvement, provided monitoring data to the public, participated in national dialogues on DOE issues, and conducted emergency planning activities with local planning agencies.

1.2 COST RECOVERY GRANT

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

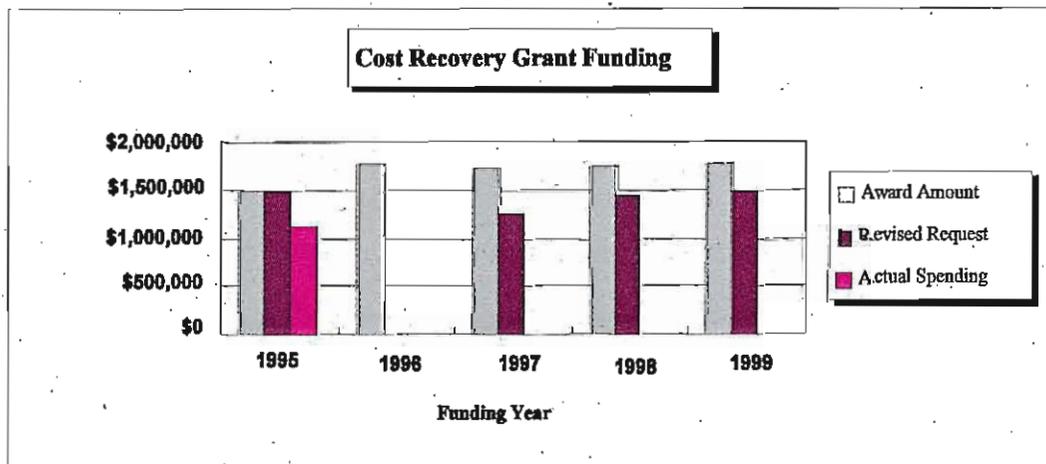
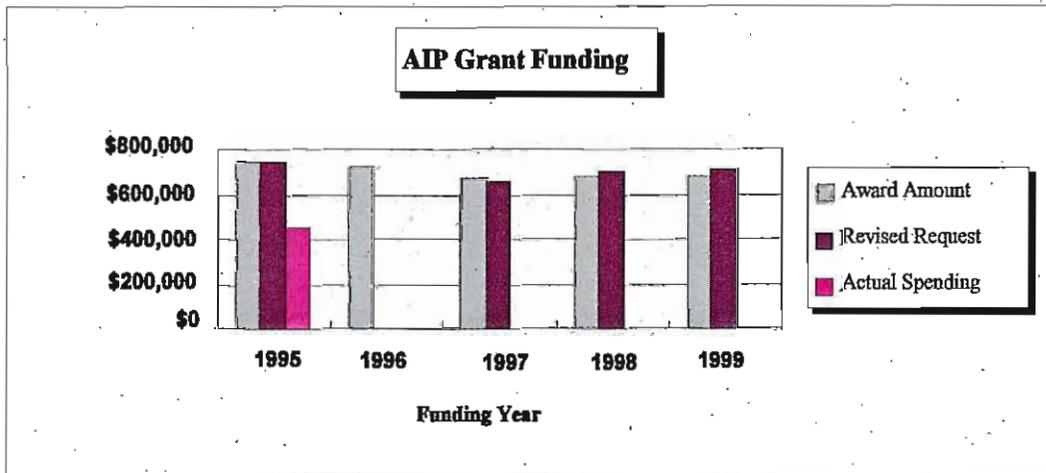
Ohio EPA is Ohio's lead agency for implementation of the CRG. ODH provides health physics support and data validation. Ohio EPA conducts regulatory oversight for implementation of the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and other environmental laws and regulations. In addition to regulatory activities, Ohio EPA conducts public outreach and environmental sampling under the CRG. Enhancing public involvement in decision making has been an important goal of Ohio's CRG program.

Ohio's actions under the CRG are focused on oversight of the investigation and remediation of environmental contamination resulting from the facility's former production activities. OFFO's role includes the review of DOE plans and reports for characterizing site contamination and selecting alternatives for cleanup. The review helps ensure that the selected remedies are protective of human health and the environment, comply with regulations, and are cost-effective. Ohio reviews the design and implementation of the selected remedial actions. Environmental samples are collected to ensure remedial action is conducted in a manner that limits impacts on the environment.

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1.3 FUNDING

The graphs below represent profiles of the funding provided to the State of Ohio by DOE under the AIP and CRG for oversight at the Fernald site. Significantly less money was spent during the first year than was provided in the original grants. The dollars saved are the result of efforts by Ohio to streamline costs and increase efficiency. Examples of this include elimination of the proposed T1 line and decreases in requested staffing. Money saved by Ohio can then be applied to cleanup at Ohio DOE sites.

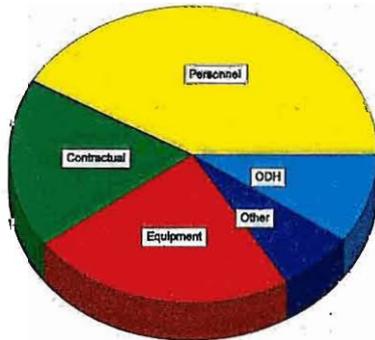


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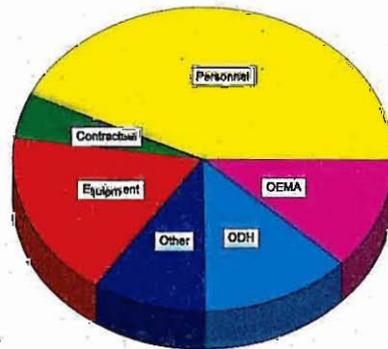
Ohio's revised funding requests for State Fiscal Year 1997 (\$656,214 AIP, \$1,259,853 CRG) represent 3% and 27% reductions from the original AIP and CRG funding requests, respectively.

The distribution of expenditures for the first year is provided in the figures below.

Ohio EPA CRG Spending



Ohio EPA AIP Spending

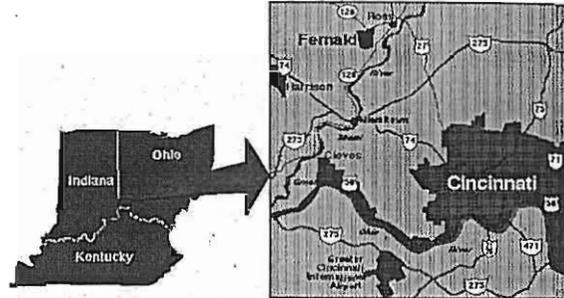


Ohio spent \$1,117,985 from the Cost Recovery Grant first year funding. This expenditure is a 25% savings of the funds available under the original award. For AIP activities Ohio spent \$456,498 of first year funds, representing a 39% savings over the original award amount. Ohio will continue to look for opportunities to improve the efficiency and effectiveness in our programs.

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1.4 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. Production began in 1953 with National Lead of Ohio as the facility operator.



Uranium metal for national defense programs was produced at Fernald, including slightly enriched and depleted, as well as normal uranium. Small amounts of thorium metal were also produced. Production stopped in July 1989 to focus resources on environmental restoration. In December 1989, the site was added to the United States Environmental Protection Agency's (USEPA) National Priorities List. DOE officially announced the end of the production mission in 1991 and the site was renamed the Fernald Environmental Management Project, or FEMP. In 1992, the Fernald Environmental Restoration Management Corporation (FERMCO) assumed responsibility for cleanup from Westinghouse.

Environmental Threats

Groundwater: The Fernald site is located over the Great Miami Aquifer, which is designated a sole source aquifer and is also a valued natural resource. The Southwest Ohio Water Company operates a production wellfield approximately one mile east of Fernald's production area. Groundwater is contaminated across the site with above background concentrations of uranium approximately one mile south of the site in what is referred to as the "south plume."

Aquifer: any underground water-bearing unit from which usable quantities of water can be drawn.

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Waste Pits: The six waste pits, used during production, contain approximately 475,000 tons of waste, including uranium, thorium, and other radioactive and chemical contaminants. The pits range in size from a football field to a baseball diamond, and vary in depth from 13 to 30 feet. Two pits have water covers, one has a synthetic cap, and the others have soil covers. The waste pits are either in close proximity to, or in contact with, the Great Miami Aquifer and are contributing to contamination of the groundwater.

Silos: Four concrete silos were constructed at Fernald to store radioactive materials. Two of them, the K-65 silos, contain high radium-bearing residues, one contains lower-level dried uranium-bearing residue, and one has not been used. To reinforce the K-65 silos, a soil berm was added in the 1960s and enlarged in the 1980s. In 1991, bentonite clay was injected into the tops of the K-65 silos to cap the high radium residues, reduce the silos' radon emissions, and provide protection in the event of silo dome failure.

Past Releases*: During production at the FEMP an estimated 680,000 pounds of uranium were released to the air, while about 220,000 pounds were released to the Great Miami River and Paddys Run, according to an independent dose reconstruction study. The study also estimates 170,000 curies of radon-222 and 130,000 curies of radon decay products were released. Numerous other radioactive and hazardous substances have contaminated soil and groundwater at the Fernald site.

* These estimates are reconstructions of past releases and are based on incomplete data. This review of historic data was conducted by Radiological Assessments Corporation under a contract with the Centers for Disease Control and Prevention.

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2.1 REGULATORY OVERSIGHT

The site first began remedial investigation activities as part of a 1986 Federal Facility Compliance Agreement between USEPA and DOE. In 1988 a Consent Decree between the State of Ohio and DOE was signed, which also required completion of the CERCLA cleanup. Following a listing on the 1989 National Priorities List, or NPL, a CERCLA Consent Agreement was signed by USEPA and DOE in 1990. Although two separate agreements requiring cleanup exist, Ohio EPA and USEPA work together on all aspects of the project.

Ohio reviewed numerous documents in 1995 in order to fulfill its regulatory functions. These included remedial investigation and feasibility studies, proposed plans, records of decision (ROD), removal action reports, work plans, investigation reports, design documents, and procedural reports. In all, approximately 70 documents were reviewed and commented on and/or approved by Ohio EPA staff. In addition to these oversight activities, Ohio EPA conducted RCRA and Safe Drinking Water Act inspections of the Fernald site.

In 1995 substantial progress was made in meeting regulatory milestones. Fernald is one of the first major facilities in the DOE complex to have finalized RODs for every operable unit (OU). With this accomplishment, the Fernald site is poised to move from the study phase into actual cleanup activities.

The site is divided into five OUs, each one having its own preferred cleanup remedy. The operable unit concept was developed to more effectively manage the complex issues and large volume of work necessary to clean up the Fernald site. The five operable units and their ROD description include:

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OU1: *Waste storage area, including six waste pits, a clearwell and a burn pit.* The ROD signed in March, 1995 calls for excavation of the waste pit contents, thermal drying, and shipment by rail to a commercial disposal facility. The Remedial Design Work Plan was approved in May of 1995.

OU2: *Other waste units, including flyash piles, south field disposal area, lime sludge ponds, and solid waste landfill.* The ROD signed in June 1995 calls for excavation of the materials and disposal in an on-site engineered disposal cell, with off-site disposal for the waste that exceeds the waste acceptance criteria. The ROD ensures that no off-site waste will be allowed in the disposal cell.

OU3: *Former production area, including all buildings, equipment, and inventoried hazardous material.* An interim ROD was signed in July 1994 which calls for decontamination and dismantling of buildings. Waste disposal decisions will be made in the final ROD during 1996.

OU4: *Silos 1-4, including the K-65 silos, their contents, and associated piping and soils.* The ROD was signed in December 1994 and calls for vitrification of silo contents and off-site disposal at the Nevada Test Site.

OU5: *Environmental media, including groundwater, surface water, and soil and vegetation not included in the other OUs.* The ROD, approved at the end of 1995, calls for excavation of contaminated soils, disposal of those soils meeting the waste acceptance criteria in the on-site disposal facility, and extraction and treatment of contaminated groundwater from the Great Miami Aquifer.

The overall strategy for managing these five OUs has been a balanced approach which

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includes removing the most contaminated materials for off-site disposal, while disposing of the lesser contaminated materials on-site.

DOE, FERMCO, USEPA, and Ohio EPA worked in partnership to develop and promote a plan for accelerated cleanup at Fernald. The plan encompasses completion of all remediation, except groundwater, within 10 years and at a cost savings of more than \$2 billion for taxpayers compared to the previous 25 year cleanup schedule. This effort was supported by actions of the Fernald Citizens Task Force as well as local stakeholders. The plan also received DOE headquarters and Congressional support.

Federal Facility Compliance Act (FFCA): The FFCA of 1992 mandates that treatment plans be developed for mixed waste at DOE sites. Mixed wastes contain both hazardous and radioactive components. Uranyl nitrate hexahydrate (UNH) is an example of a mixed waste that was treated at Fernald under the FFCA. In late 1994, Ohio EPA issued Director's Findings and Orders to DOE and FERMCO requiring them to neutralize and process approximately 200,000 gallons of UNH. Much of early 1995 was spent ensuring this project was initiated and completed in a timely manner. In addition to neutralizing UNH, DOE and FERMCO expedited processing of thorium nitrate and nitric acid waste streams, both of which were completed in 1995.

The Director's Findings and Orders defined compliance with the FFCA requirements for mixed waste were finalized in October 1995. They were signed ahead of the FFCA required deadline making Fernald one of the first DOE sites to comply with this part of the FFCA. Treatment of mixed waste under the findings and orders began in 1995.

RCRA/CERCLA Integration: Over the course of 1995, Ohio EPA worked with DOE and FERMCO to develop Director's Findings and Orders addressing RCRA/CERCLA

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integration at Fernald. The Orders will eliminate duplication of effort under two programs and result in a cleanup that is streamlined, comprehensive, and compliant with both laws.

Natural Resource Damage Assessment (NRDA): Ohio EPA is the authorized agency to act as natural resource trustee for the State of Ohio. The trustees' role is to act as guardians for public natural resources near Fernald. Other trustees for Fernald include DOE and the Department of Interior. The focus of 1995 discussions was aimed at integrating natural resource restoration activities into the CERCLA remediation efforts. The goal is to get the best restoration while saving effort and money through coordination of natural resource management with the cleanup process. Another goal of the trustees efforts is to have the restoration activities result in settlement of the State of Ohio's NRDA claim against DOE. Included in Ohio's activities as natural resource trustee is review and oversight of threatened and endangered species surveys, protection of the state threatened Sloan's crayfish populations in Paddys Run, and wetland mitigation oversight.

National Pollutant Discharge Elimination System (NPDES): Under the umbrella of the NPDES permit, several issues were addressed and documents reviewed. Through significant cooperation and open communication with DOE and FERMCO, the NPDES permit was renewed in 1995. As part of this renewal, a stormwater permit application was incorporated into elements of the industrial permit issued in 1995. There are four stormwater outfalls permitted in the NPDES at Fernald that will require biannual sampling. Stormwater control issues were reviewed for the mitigation activities at the waste pits and the on site disposal cells as part of the 30% design review. Changes in the Advanced Waste Water Treatment Plant to accommodate the RA#9 liquid mixed wastes were reviewed. The pilot plant drainage ditch mitigation work plan was also reviewed.

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2.2 PUBLIC OUTREACH

Ohio EPA's public outreach program is designed to supplement monitoring and oversight activities by involving the public in important environmental decisions. Since every decision at Fernald ultimately affects the public, their inclusion and understanding of the cleanup process is essential. Ohio EPA conducts its own public meetings, prepares fact sheets and press releases, and coordinates numerous other activities to ensure the public is included in decision making. These activities are in addition to full participation in DOE/FERMCO sponsored events, Fernald Citizens Task Force (FCTF) activities, and other public outreach activities. OFFO's Fernald team is committed to encouraging early and meaningful public participation in cleanup decisions. Public availability and working partnerships with all stakeholders continue to be priorities for Ohio.

Meetings

The following list includes Fernald meetings in which Ohio participated. Some of these were initiated and conducted by Ohio EPA. Those meetings which were conducted in support of the AIP are listed separately from those meetings



Tom Schneider, Ohio EPA Fernald Project Manager, addresses the public at a DOE Quarterly Community meeting.

conducted under the CRG. Meetings which aren't readily categorized are listed in the Other Meetings column below.

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AIP Meetings:

- meetings with FRESH, FCTF, and public to discuss Evaluation of Fernald's EMP and the direction of Ohio's monitoring program*

CRG Meetings:

- DOE Quarterly Community Meetings (Ohio EPA presentations)
- on-site disposal meetings and workgroups with township trustees and FCTF*
- OU2 meeting with FRESH*
- OU5 ROD Availability Session*

Other Meetings:

- FRESH monthly meetings
- FCTF ex officio member
- participated in the Consortium for Environmental Risk Evaluation (CERE) regulators focus group for the public concerns inventory
- meetings and conference calls with reporters
- meeting with Oak Ridge National Laboratory public participation staff
- FFCAct public meeting coordination*
- presentation on Fernald public participation at the State and Tribal Forum on Risk-Based Decision Making

*These public meetings were sponsored by OFFO

Ohio EPA has an open door policy when it comes to public inquiries or requests for information. OFFO attempts to pro-actively address public concerns by sponsoring organized meetings with local residents to work through complex issues. Availability sessions are a tool OFFO uses to bring together Ohio EPA technical staff and local citizens. The purpose of the meetings is to provide open and candid availability of Ohio EPA staff. These sessions are held to clarify difficult issues, to further explain programs and policies within the agency, and to assist with public review of technical documents (such as the OU5 ROD).

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OFFO representatives also participate in all DOE sponsored public meetings and workshops, and give presentations where requested or appropriate. This includes participating in regular meetings of the FCTF as an ex officio member. The Task Force is a group of concerned citizens representing different facets of the community. The group first convened more than two years ago to make cleanup recommendations. In July 1995, the FCTF issued a report to DOE titled, "Recommendations on Remediation Levels, Waste Disposition, Priorities, and Future Use." In December 1995, the FCTF changed their structure and formed four subcommittees to look at waste disposition, environmental monitoring, natural resources, and transportation issues. At least one OFFO staff member participates in each FCTF subcommittee.

What's in Print?

The following is a list of Ohio EPA generated resources relating to Fernald:

Publications:

- *Case Study - Red Hot Public Participation Panel Could Save Government \$2.5 Billion*, published in the Public Relations Society of America -- Environmental Section newsletter, written by Laura Hafer, September 1995
- *Status Report: Fernald Site Remediation*, presented at the Waste Management '95 conference, written by Tom Schneider, J. Craig, J. Saric, M. Yates; February 1995

On the Internet:

The first comprehensive and current Fernald internet page was created by OFFO in June. Internet users can quickly view information about the Fernald cleanup and contact OFFO staff with further questions. The sharing of Fernald successes and problems worldwide may assist other cleanup sites conducting similar activities. More information about the Fernald cleanup and other Ohio federal facilities activities is at internet address:

<http://offo2.epa.ohio.gov/offo.htm>

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Fact Sheets:

- quarterly environmental monitoring results
- Federal Facilities Compliance Act revised fact sheet
- Fernald Environmental Management Project revised fact sheet
- Radium Issues at Fernald

Media Relations:

- OU1 ROD approval joint press release
- OU2 ROD approval joint press release
- OU5 ROD approval joint press release
- UNH project delays press release
- Director's Letter to the Editor on radium issues

Miscellaneous

OFFO responded to numerous public information requests and discussed Fernald issues with several reporters. These requests were received as mail and phone inquiries, as well as from the internet via the Fernald home page. OFFO staff also prepared a Governor's letter of recognition for the accomplishments of the Fernald Citizen's Task Force, and the Director's acknowledgement of receipt of their recommendations. Additionally, staff members were active in several other community outreach programs, such as the Adopt-a-School program.

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2.3 GIS & GPS

Geographic Information System

The Geographic Information System (GIS) is a computer based mapping system capable of storing, manipulating, and analyzing geographical information. OFFO uses GIS as a tool to aid in oversight of complex remediation tasks. This system helps OFFO provide more efficient and cost-effective oversight for the DOE cleanup of the Fernald site.

OFFO is developing and using a GIS for two important reasons: first, the system provides analytical capabilities previously unavailable; second, the system completes existing tasks more efficiently.

Not all relationships between data at the Fernald site are obvious. Due to the complex nature of contaminant transport at Fernald, relationships may exist between items which would not be realized without the sophisticated analytical capabilities of the GIS. The system allows technical staff to associate all existing data on waste materials and contamination with site information such as topography, stratigraphy, surface drainage features, and geology. These associations can then be analyzed and presented on maps that reveal visual correlations. These comparisons cannot be made easily without the GIS's capacity to manipulate and integrate various types of data. GIS provides the tools necessary to effectively use the tremendous volume of data which has been collected at Fernald.

GIS will help Ohio EPA understand the complex relationships between different types of data. For instance, how are topography and soil contamination affecting groundwater? What is the best location at Fernald for a disposal cell? Answering these types of questions will help ensure a better and more efficient cleanup of Fernald.

GIS Projects: The following are examples of GIS projects OFFO completed or is

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currently pursuing. These projects show how OFFO uses GIS to enhance regulatory and environmental monitoring oversight.

AIP Activities: OFFO has developed an environmental monitoring database which includes sample locations and sample results for Ohio EPA, FERMCO and ODH. This data is stored in the OFFO GIS database where it can be retrieved and manipulated to create maps, graphs, database reports, and models of the contamination at and in the vicinity of Fernald. These outputs can then be analyzed and used to help make responsible monitoring decisions. OFFO also used GIS to help determine the sampling locations included in OFFO's Field Sampling Plan. These sampling locations were picked after analyzing current sampling locations and drawing conclusions from the corresponding data.

CRG Activities: Ohio EPA uses the GIS extensively in an effort to help technical staff analyze data. The GIS gives OFFO the ability to analyze and review data in different ways than what is presented in the technical documents by FERMCO and DOE. Rather than just reviewing the data and maps produced by FERMCO, OFFO manipulates and analyzes the data in an interactive mode. This interaction improves the review process for OFFO. For Fernald CRG work, OFFO has developed GIS projects for OU2, OU3, and OU5.

The OU2 GIS project involved determining the best available on-site location for an engineered disposal cell through three dimensional (3D) solid block modeling. This involved reviewing 3D models of the subsurface geology and interpreting soil boring information in the area to create cross sections and validate the thickness of the clay layers and sand lenses.

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GIS map of the OU3 production area.

Ohio EPA developed a mapping project for Fernald's buildings and structures in OU3. When the user clicks on a building, all sample results are retrieved for that particular building. This project provides OFFO with a tool to better monitor waste stored in these buildings and to better track the building decontamination and demolition.

Ohio EPA used the OU5 GIS⁹ database to create maps and reports to aid in the review of characteristic waste (such as technetium-99), to verify the placement of monitoring wells, and determine the effectiveness of the current south plume recovery well system. This effort helped determine that the south plume is moving east/west rather than north/south.

sample_data_ou3 Table

Column Name	Column Value
sample_date	19931124
lab_rpt_name	URGUR081
top_depth	-99.000000
bottom_depth	0.000000
sample_type	STEEL COATINGS
ra_type	HERSHEL
component_id	7A
component_name	Metals Production Plant
process_area	1
process_name	Reduction

Query Operations: Execute Query, Build Query..., Query Set...

Row: 25 of 79

Related Tables: [Dropdown]

Record Operations: Modify Row, Delete Row, Insert Row

Graphic Operations: Refresh, Link Data, Locate, Unlink Data, Locate All

General: Clear Values, Table Info..., Options...

OK

GIS database for the OU3 project.

GIS and mapping technologies have become invaluable for monitoring, evaluating, and managing environmental projects. This project demonstrates that GIS offers essential tools for analyzing geographic data for development and decision-making purposes. GIS has proven a very effective tool for environmental resource management. GIS is being used for data management, mapping, spatial analysis, and 3D modeling, all of which are aimed at improving management of hazardous waste sites such as Fernald. It will also

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provide a tool for demonstrating and educating the public and other stakeholders about the methods of cleanup and the progress toward full remediation at Fernald.

Global Positioning System

OFFO uses a global positioning system (GPS) to enhance oversight activities, in particular, the environmental monitoring program. GPS uses a series of satellites and a base station to reliably pinpoint geographic locations to within a few inches. The system accurately maps locations using a GPS receiver. OFFO purchased optional software to improve the accuracy of the GPS locations.

In 1995, OFFO successfully used the GPS to determine surface water sampling locations collected under the CRG and private well locations under the AIP. The geographic data from OFFO's environmental monitoring program are entered into our local database for GIS analysis and interpretation. OFFO plans to



The LGT 1000 GPS receiver.

use the GPS to aid in determining former locations of buildings when demolition has taken place. It will be an important part of the certification sampling program once areas are fully remediated. OFFO continues to use GPS equipment to determine sampling locations and efforts are underway to identify additional uses for the equipment. Typical applications for GPS equipment include mapping previously unrecorded areas or features, verifying maps digitized from older sources, and position recording those features identified in photos. The GPS can also be used to record positional information for roads, trails, bridges, culverts, dwellings, land use, vegetation and wetland areas, creeks, rivers,

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addresses, test wells, and soil samples.

Effective integration of the GPS and GIS has enhanced Ohio EPA's oversight of Fernald, and improved the efficiency of project review. In addition to providing oversight and monitoring for DOE, Ohio EPA will be able to assist DOE in implementing a more thorough and efficient clean-up.

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2.4 PROGRAMMATIC AND NATIONAL ISSUES

The advent of the Office of Federal Facilities Oversight brought about increased efforts by the State to be proactive in tracking regulatory, legislative, and DOE programmatic issues with potential implications for the cleanup activities at Fernald. Through OFFO, the State of Ohio has also increased participation in national initiatives relating to the DOE complex.

Increased participation in the budget process and project prioritization is one of the many activities funded under the AIP and CRG at Fernald. To this end, OFFO staff have participated in several prioritization meetings and supported the development of what has become the Ten Year Plan for Fernald remediation. Increased cooperation and early agreement on priorities limits delays and helps speed cleanup. Involvement in national efforts such as the development of the Baseline Environmental Management Report, Waste Management Programmatic Environmental Impact Statement, and other projects are also a part of Ohio's enhanced oversight.

Through 1995, OFFO continued to participate in the Ohio Federal Facilities Forum. The forum was established to bring large and small federal facilities from around the State, and their regulators, together to share information, concerns, and work on better ways of managing environmental matters. Through sharing lessons learned and raising issues that cut across the facilities, efforts are underway to enhance environmental quality at federal facilities in a cost effective manner. Fernald group staff are participating in both the budget/funding subcommittee, which is working to improve budgetary decision making in times of rapidly decreasing funding levels, and the forum report group, which is attempting to better define and report on environmental success stories at Ohio federal facilities including cost effectiveness and regulatory streamlining.

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Tracking legislative and regulatory issues with potential ramifications on the cleanup has been a component of Ohio's efforts to ensure effectiveness of Fernald's environmental program. This includes quickly obtaining and assessing implications of new regulations and legislative actions such as the Uranium Mill Tailings Remedial Action Program rules and their relationship to the OU2 disposal cell, Ohio's SB19 siting requirements for low level radioactive waste disposal, and many other ongoing issues. OFFO has also been involved in assessing and commenting on several pending legislative actions, such as Superfund reform, to ensure appropriate consideration of State goals for federal facility cleanups. Interaction with other States individually and through national organizations such as the Association of State and Tribal Waste Management Officers, the National Governors Association (NGA), and the State and Tribal Governments Working Group (STGWG) is also ongoing.

In response to Congressional concerns, DOE entered an agreement with the Consortium for Environmental Risk Evaluation (CERE) to do a quick and independent assessment of risks and public perceptions at six of the major DOE facilities. Fernald was included in this assessment. The information was to be provided to DOE for use as feeder material into the Congressionally mandated risk report. OFFO staff from the Fernald group were asked to participate in the CERE project. Staff attended several meetings and commented numerous times during the development of this report in an attempt to ensure that information pertaining to Fernald was accurate, consistently evaluated compared to other sites, and adequately reflected the State's position on cleanup at Fernald.

Though most participation in the Environmental Management Advisory Board (EMAB) and its Risk subcommittee is not funded through the CRG or AIP, EMAB represents an important part of the national dialogue on DOE environmental management that Ohio participates in. In 1995, EMAB advised DOE on preparation of the Risk Report to

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Congress and appropriate tools for budget development, assessed results of such external reviews as CERE, and recommended long term planning and technology development goals. EMAB is a fully chartered federal advisory committee.

Due to Ohio's participation on the Risk subcommittee of the Environmental Management Advisory Board, OFFO was asked to provide a participant to serve on the steering committee for what became the first State and Tribal Forum On Risk Based Decision Making. The forum was held in Saint Louis on November 12-15 and drew attendance from numerous state, tribal, and federal organizations. The intent of the forum was to gather risk managers and decision makers from around the country to discuss new and innovative means of applying different notions of risk to practical decision making in environmental matters. OFFO also provided a speaker to the forum to present and discuss Ohio's perspective on the success at Fernald in building consensus on risk management decisions through the Fernald Citizens Task Force and an extensive dialogue with stakeholders.

OFFO was invited to participate in the DOE Office of Science & Technology's Community Leaders Network (CLN) since 1993. CLN is a network of individuals associated with sites across the DOE complex. Members include representatives from chambers of commerce, organized labor, local citizen groups, elected local officials, Native American tribes, and regulatory agencies. CLN provides a source of stakeholder input to DOE on its technology development efforts. CLN members participate in budget reviews, priority setting, technology demonstrations, and technology conferences. OFFO representatives have participated in Mixed-Waste Focus Area, Plumes Focus Area, Landfill Stabilization Focus Area, and Planning Committee activities. CLN provides OFFO the opportunity comment on DOE's technology development activities as well as to bring back information on new technologies to Ohio EPA as well as the local DOE

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sites.

Another important national organization that OFFO staff have participated in is the DOE sponsored State and Tribal Government Working Group. STGWG provides State and Tribal government representatives the opportunity to address the larger national issues affecting the DOE Environmental Management program. A major initiative in 1995 was development of a partnering framework designed to allow DOE to more efficiently work with contractors, State and Tribal governments, and other stakeholders across the country. The partnering framework was presented to DOE in December 1995. The partnering process should lead to significant cost savings through the building of more effective working relationships.

During 1995, OFFO participation in National Governors Association FFCAct Mixed Waste Task Force increased significantly. A major activity that OFFO staff were involved with included the 'train wreck' dialogue that NGA initiated with DOE. This important and ongoing dialogue addresses the approach that will be taken by DOE to manage environmental responsibilities in times of increasing obligations and decreasing funds. The train wreck discussions began outside of the mixed waste group but were incorporated into the mixed waste dialogue. Other discussion areas include DOE waste management and disposal policy and equity issues.

Fernald group staff also participated in two projects designed to investigate and prove innovative cleanup technologies. The Integrated Remedial Technologies Evaluation Program (IRTEP), is a cooperative effort of the USEPA Office of Research and Development, Ohio EPA, Wright Patterson Air Force Base, and the major DOE facilities in Ohio. IRTEP is intended to accelerate the cleanup of contaminated federal installations by increasing the direct involvement of several sites with similar problems

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and encouraging private sector participation in innovative technology demonstrations. IRTEP's pilot programs involving innovative uses of soil washing are an effort to provide a cooperative atmosphere and reduce red tape and costs to evaluate new cleanup methods and speed up site restoration. The Innovative Treatment Remediation Demonstration (ITRD) Program is funded by the DOE Office of Environmental Restoration in cooperation with USEPA. The overall purpose of the Program is for DOE, USEPA, industry, and federal and state regulatory agencies to cooperatively establish remediation demonstrations at DOE sites in order to generate full-scale and real-world operating, *treatment and cost data on new technologies*. This data will be used to accelerate the nation-wide implementation of new technologies. OFFO's contribution to these two programs consists of screening the new technologies and the locations where they can be applied and providing regulatory input and serving as liaisons to the other Ohio departments and programs.

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2.5 EMERGENCY MANAGEMENT PLANNING

The overall goal of Ohio EMA in the AIP program is to develop an emergency management system that consists of independently developed plans and hazards assessments. Ohio EMA also acts to improve coordination between local, state and site emergency management and response organizations by conducting joint training, drills, and exercises. In addition to establishing independent planning and hazard assessment efforts, all involved emergency management systems would be enhanced and improved by sharing plans and assessments.

Ohio EMA has held numerous discussions with all three DOE sites concerning procedures for state personnel responding to on-site events that have the potential for off-site consequences. As a result of these discussions, the state developed procedures that would ensure personnel will have timely access to the Incident Command Post during

Incident Command Post:

The location from which the response to an incident is controlled and coordinated. It may be collocated with the incident base or other incident facilities.

incidents. A "Facility Questionnaire" was developed for use by the sites in assisting Ohio EMA develop an independent hazards assessment for each site. Ohio EMA developed preliminary and basic hazards assessments for each site based on

the returned questionnaires. Ohio EMA produced and distributed revisions 5 and 6 to the State Hazmat Plan/DOE Annex. Ohio EMA personnel attended the national AIP conference in Knoxville, TN, and national Computer Aided Management of Emergency Operations (CAMEO) training in Louisville, KY.

In an effort to enhance emergency planning and training related to Fernald, Ohio EMA continued its participation in the Fernald Community Planning & Training Committee. This committee is an organization that examines and addresses all emergency planning

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and training issues relative to Fernald. The committee consists primarily of emergency management and emergency response personnel from Fernald, Butler and Hamilton Counties, and the State of Ohio. Many local representatives also participate on the committee. The committee provides guidance to the site, counties, and state on matters such as public warning systems, responder communications and training, and conducting exercises.

Through this committee's promotion of candid community and member input, emergency management and emergency response training has been focused on the needs of the site and its neighboring communities. This focusing has resulted in a comprehensive emergency management system that is able to address the complex issues at Fernald.

At Fernald, Ohio EMA helped to design and participated in the full scale emergency management exercise called Joint Response '95. Ohio EMA personnel also participated in a transportation and a communications tabletop exercise. Ohio EMA personnel assisted in the design of the Joint Response '96 exercise. Personnel from Ohio EMA conducted a Introduction to CAMEO course for FERMCO, DOE and county personnel. Ohio EMA reviewed the site's draft hazards assessment, and developed an independent basic hazards analysis for Fernald.

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2.6 ENVIRONMENTAL MONITORING PROGRAM REVIEW

Under the AIP, part of Ohio EPA's responsibility is to evaluate DOE's Environmental Monitoring Program (EMP). During the latter part of 1994 and early 1995, Ohio conducted an initial evaluation of DOE's EMP activities. The draft evaluation was submitted to DOE, FERMCO, and the public for their review in January of 1995. In February, a public meeting was held to receive public comments on both Ohio's evaluation of DOE's EMP and Ohio's (split) sampling program. The final evaluation,

Split Sample:
a sample collected from one location and divided in half between two parties. The samples are sent to two different labs for analyses. This process checks laboratory quality control.

"Initial Review of the Fernald Environmental Monitoring Program," was completed on April 21, 1995. Results of the ongoing review are to be periodically reported to DOE, FERMCO, and the public.

The goal of the review was to improve the EMP at Fernald by helping DOE better focus their resources and point out areas where the EMP should be modified. The review was conducted by evaluating the DOE's EMP as explained in the *Fernald Environmental Monitoring Plan* (PL-1002, 31 May 94) and numerous supporting documents.

Ohio's general assessment was that the Fernald Environmental Monitoring Program is successful and accomplishes its primary objectives. Through the EMP, Fernald has identified contaminant pathways, established good monitoring protocols, and improved communication with the public through a program that is responsive to the needs of the community. There were, however, a few areas in which efforts should be made by DOE and FERMCO to improve their program. Documentation is not always consistent and justifications and criteria used for many activities have not been written into the monitoring plan. Environmental monitoring activities should be more centralized to

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enhance FERMCO's ability to provide the community a holistic and reliable assessment of annual releases from the site. FERMCO's laboratory does not adequately ensure that all uranium in their Kinetic Phosphorescence Analysis, or KPA, is represented in the sample results. Lastly, FERMCO should monitor surface water runoff during major storm events. This sampling will greatly improve the current understanding of how much uranium annually leaves the site through this pathway and in tracking changes in off-site releases during remediation efforts.

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2.7 FIELD SAMPLING PLAN DEVELOPMENT

The State of Ohio has conducted environmental monitoring activities at Fernald since 1985. In 1995, Ohio EPA's Office of Federal Facilities Oversight expanded the State's previous sampling efforts under the AIP. The intent was to monitor the contamination at Fernald which is primarily due to the former production activities. Additional contamination may occur from demolition, disposal, and waste handling. On and off-site contamination is monitored by regularly sampling environmental media (i.e., groundwater, surface water, soil, sediment, fish, air, grass, and produce). Environmental monitoring is performed to evaluate potential impacts that may affect the public and the surrounding environment. Monitoring also brings attention to increases in concentrations that may occur, so mitigation of contamination can be started.

Environmental monitoring is a part of the ongoing cleanup activities conducted since 1992 by FERMCO. FERMCO follows DOE Orders 5400.5, *Radiation Protection of the Public and the Environment* and 5400.1, *General Environmental Protection Program* which address environmental releases of radionuclides. To provide better direction to AIP sampling activities, Ohio drafted a Field Sampling Plan (FSP) for environmental monitoring. The FSP differs from 1995 AIP activities in that it includes independent sampling and supplemental media such as local produce and soil and air monitoring. The FSP is a hands on document that defines program objectives, sampling locations, parameters, analytical methods, standard operating procedures, and data validation process.

OFFO staff developed program and data use objectives to help guide the FSP. The main objectives are monitoring impacts of past and ongoing releases at Fernald, validating DOE's EMP, and informing the public of environmental impacts. An additional goal of this program is to reduce the impacts of remedial actions on the environment and

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compare Ohio's results to DOE's monitoring data.

The draft FSP was submitted to DOE, FERMCO, and the public for their review on January 30, 1996. A public meeting was held in February to receive comments. The FSP will be finalized following incorporation of comments and after DOE's finalization of a new monitoring plan.

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2.8 SAMPLING

The Ohio EPA's Office of Federal Facilities Oversight is responsible for sampling activities at Fernald. These activities are funded under two grants, AIP and Cost Recovery. The AIP grant is non-regulatory and covers with environmental monitoring activities. The Cost Recovery grant provides funds for cleanup-related oversight operations. The following section summarizes the sampling events the Office of Federal Facilities Oversight has completed during 1995.



Fish sampling in Paddys Run.

AIP Sampling

The AIP specifies that the State of Ohio is to carry out split sampling with DOE, evaluate DOE's EMP and prepare site specific plans for oversight of DOE's EMP. Following these requirements, Ohio EPA began environmental monitoring, through split sampling efforts with FERMCO, starting in July 1994. The purpose of split sampling enables Ohio EPA to fulfill a requirement of the AIP and generates data which assists in evaluating DOE's EMP. In addition, split sampling provides mechanisms for quality control through sample analyses and data comparisons by using the same analytical method at different laboratories. As split sampling efforts expanded in 1995, Ohio EPA collected samples with FERMCO from most environmental media at Fernald. FERMCO and Ohio EPA collected split samples from private well water, surface water, sediment, soil and grass, and fish from the Great Miami River (GMR). The collection of local produce and air monitoring was not conducted by Ohio EPA during 1995, but will begin in 1996.

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CRG Sampling

The CRG has provided the available support the State of Ohio requires for regulatory oversight, compliance, and remediation project oversight at Fernald. Out of these available resources, Ohio EPA's Division of Surface Water and OFFO were able to conduct several types of sampling events that included collection of surface water, sediment, fish, macroinvertebrates, and grass and soil samples during 1995. All of these CRG sampling events, except for grass and soil, were part of an extensive survey conducted on the GMR. The results of the analyses will be used to determine the status of the water quality of the Great Miami River and selected tributaries. Results will also be used to assess Fernald's impacts of on area water quality. The GMR survey incorporates surface water samples taken at eight different locations in the months of June through October (inclusive) in the vicinity of Fernald. The surface water samples were analyzed for up to 35 different parameters whereas, sediment was sampled at six sites and analyzed for 31 different parameters. In addition, fish were sampled at four different sites along Paddy's Run. The results of this survey will be published in a Technical Support Document from Ohio EPA's Division of Surface Water. This report will be distributed to the public in December of 1996.

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3.1 PRIVATE WELLS

Private well monitoring comprised a large portion of the AIP split sampling done by Ohio EPA and FERMCO in 1995. FERMCO has routinely sampled over 30 private wells in the Fernald area every month for the EMP since 1992. As part of the AIP sampling, OFFO and FERMCO split samples on approximately 10% of the private wells in the EMP on a monthly basis in 1995. Each well is established at a local residence or business near Fernald. The monthly split samples were collected from four wells and one additional well randomly chosen each month from the list of EMP private wells. The exceptions to the routine occurred with one frozen well in January and one additional well sample collected in October, as a request from a citizen. In 1995, 60 private wells were sampled.

Private well sampling locations surround the Fernald site, with most of the sampling locations south of the site. Two locations, BOK14 and RE19, are located on the leading edge of the uranium contamination plume. One well, DS15, is located in the plume. North of the site, NN04 served as a background location. Map 3-1 shows the location of all private wells sampled.

Total uranium is the primary contaminant of concern at Fernald, and is the parameter analyzed in private well water. The highest concentration of total uranium detected in a private well during 1995 was 179 ppb. This value is above the proposed drinking water standard of 20 ppb for total uranium and local background level of approximately 2 ppb. The lowest concentration detected in private well water for total uranium was <0.01 ppb. The Appendix summarizes the sampling results for 1995. Data from the four regularly sampled wells show results consistent with FERMCO's data. It should be noted that the private wells that are affected by Fernald contamination are not used as drinking water sources. In addition, residents with contaminated well water will be connected to a public

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water supply line scheduled to be operational in 1996.

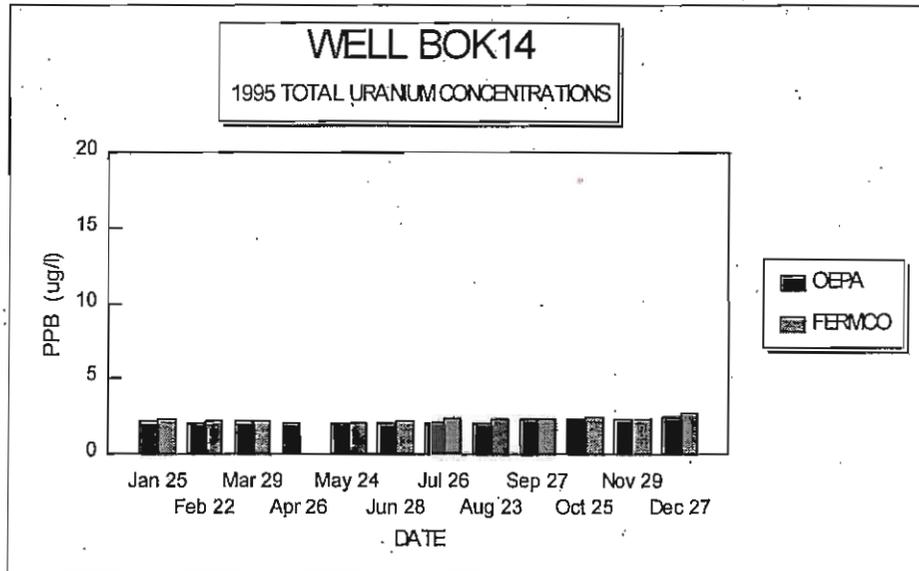


Figure 3-1

A database was prepared to keep track of the results of samples collected by OFFO, as well as by FERMCO. Database records show strong agreement between results in samples split between OFFO and FERMCO. This indicates good quality control in OFFO and FERMCO's sampling technique and both laboratories analyses. Figure 3-1 is representative of the comparison of sampling results for residential wells. The consistency of these data were used in determining the frequency of sampling for 1996.

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3.2 SURFACE WATER

During 1995, surface water samples were split monthly with FERMCO under the AIP. FERMCO monitors surface water at 12 locations every month. In early 1995, Ohio EPA split samples with FERMCO at all 12 locations (see Map 3-2). Ohio reviewed the surface water split sampling schedule in March 1995. Since there was general agreement between Ohio EPA and FERMCO's sample results (see Figure 3-2), a limited number of sites were selected for continued split sampling (PRB09, PDD10, PMS10, PSF11, and BBW03). At times when the stream was dry or frozen, no sample was taken. A total of 62 surface water samples were split with FERMCO during 1995. Additional surface water samples were collected as a part of the Great Miami River survey and those will be reported in a Technical Support Document from Ohio EPA's surface water division, to be published in December 1996. Copies of this report will be available to the public.

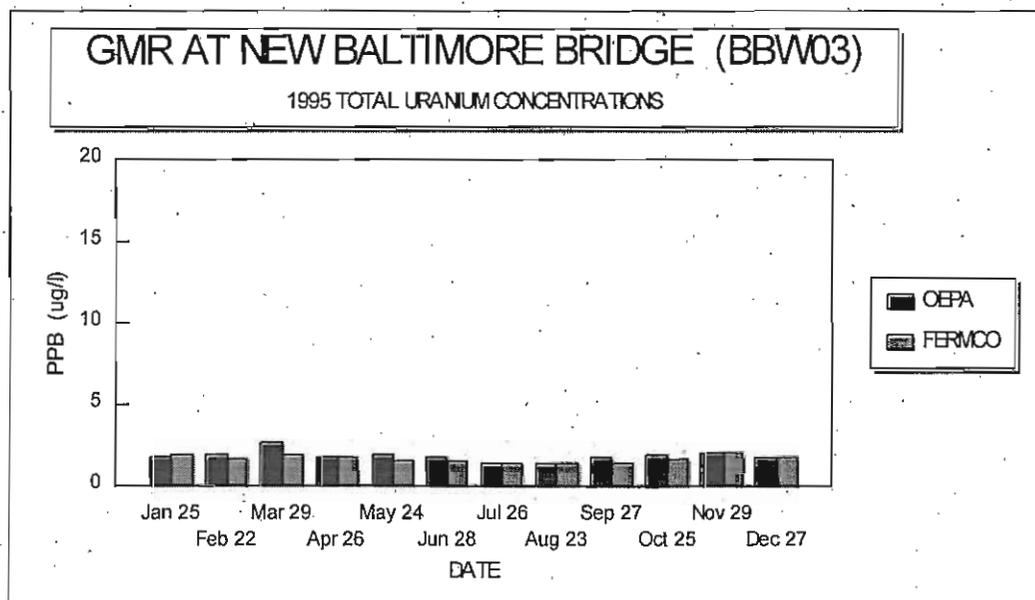


Figure 3-2

Surface water samples were analyzed for total uranium, radium 226, and radium 228. Levels of radium 226 and 228 were comparable to upstream (background) samples. The highest levels of uranium were found in the pilot plant drainage ditch (PDD10). The pilot

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plant drainage ditch was split sampled eleven times during 1995 and averaged 720 ppb with the highest reading of 1280 ppb during the June 28 sampling event. Levels of uranium downstream of the confluence of the pilot plant drainage ditch and Paddy's Run dropped to below 20 ppb before going off site (see Appendix). A portion of the contaminated water going to the pilot plant drainage ditch will be collected for treatment beginning in 1996.

Levels of total uranium in the Great Miami River, both upstream and downstream of Fernald, were at or near background and well below the proposed drinking water standard of 20 ppb. The Appendix summarizes the sampling results for 1995. Note that locations PMR05 and VBW01 are the upstream locations for Paddy's Run and the Great Miami River, respectively.

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3.3 SEDIMENT

Split sediment sampling under the AIP took place during the June 7, 1995 FERMCO sediment sampling event. Four sites along Paddys Run and three sites along the Great Miami River were split sampled with FERMCO. The split samples included background



Sediment sampling in Paddys Run.

samples upstream of Fernald on both Paddys Run and the Great Miami River and downstream samples, below Fernald's effluent on the Great Miami River and south of the Fernald property on Paddys Run (see Map 3-3).

Additional sediment sampling was conducted during the survey of the Great Miami River and will be reported in

Ohio EPA's Division of Surface Water Technical Support Document that will be published in December 1996. Copies of this report will be available to the public.

The samples were analyzed for total uranium, radium 226, cesium 137 (gamma spec), and isotopic thorium. The highest concentration of uranium (13.6 $\mu\text{g/g}$) was found in a sample taken from the pilot plant drainage ditch. This drainage ditch empties into Paddys Run on site. The pilot plant drainage ditch has also consistently shown elevated levels of uranium in the surface water samples as discussed in the previous section. All other sites had levels of radionuclides at or near background. Note that locations GMR25 and P3BKG are background locations for the Great Miami River and Paddys Run, respectively. The Appendix summarizes the split sampling results for 1995. Trends were reflected in both Ohio EPA and FERMCO samples although agreement was not as consistent as in other media. We are examining possible reasons for this.

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3.4 FISH TISSUE

FERMCO samples fish at three sites along the Great Miami River once each year. Sampling is done in the autumn after a growing season for the fish. This maximizes the potential uptake of any contaminants to which the fish may be exposed. A background station is upstream of the site (separated from Fernald by two dams), one station is at the effluent line, and the third station is at the confluence of Paddys Run and the Great Miami River. Ohio EPA split sampled at the location on Map 3-4.

Prior to 1995, the fish collecting permit used for EMP sampling didn't allow for the collection of sportfish such as bass. This prevented analysis of fish like bass for uranium uptake, leaving open the question of whether uranium may be concentrating as it goes up the food chain (i.e. bass have more uranium in them than the fish they eat). Ohio EPA's collecting permit provides for the collection of sportfish so in 1995 FERMCO and Ohio were able to examine bass from the Great Miami River. Ohio EPA split sampled bass and carp at the downstream location.

Fillets were analyzed for total uranium. The bass had lower levels of uranium than the carp indicating that bioaccumulation of uranium in sport fish near Fernald is not occurring. Ohio results compared favorably with FERMCO's results and are summarized in the Appendix. The levels of uranium in fish were at or near the levels of the fish from the background location at river mile 38.

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3.5 SOIL AND GRASS

For the 1995 AIP sampling OFFO split soil and grass samples with FERMCO at seven different locations. FERMCO collects soil and grass once in the summer for DOE's EMP and analyzes these media for total uranium. Soil and grass sampling is another method of monitoring impacts of remedial actions and site operations via airborne emissions to the surrounding environment. Out of the seven soil and grass sampling locations chosen, three were on-site and situated at or near air monitoring stations (see Map 3-5). The map shows these locations signified by AMS (soil) or AMG (grass) and an associated number, i.e., AMG02. Soil and grass samples are collected near air monitoring because the stations provide a network of locations established in a pattern that reflects local wind direction.

Off-site soil and grass locations help determine potential airborne contamination leaving the site. Of the seven sampling locations chosen, four were off-site of the facility. These sampling points were difficult to select because the land around Fernald is either used for agriculture or is mowed regularly during the spring and summer. It is important that each soil and grass sampling location have plenty of grass for a sample and the grass must be green, not dry. In addition, each location should be undisturbed, the area must be open and unprotected from the wind with no hanging trees or bushes over the sampling site. The map shows off-site sampling locations by either SOL or GRS and includes a number i.e., SOL33 and GRS33. OFFO split a total of eight soil and eight grass samples in 1995 including duplicate and background samples for both media. The background location for soil is BSO18 and the background location for grass is GRS18.

Results from soil and grass sampling can help determine whether airborne contaminants are leaving the site, how far contaminants are traveling, and their concentrations. Fernald has a final remediation level for soil of 80 $\mu\text{g/g}$ and an ALARA (as low as reasonably

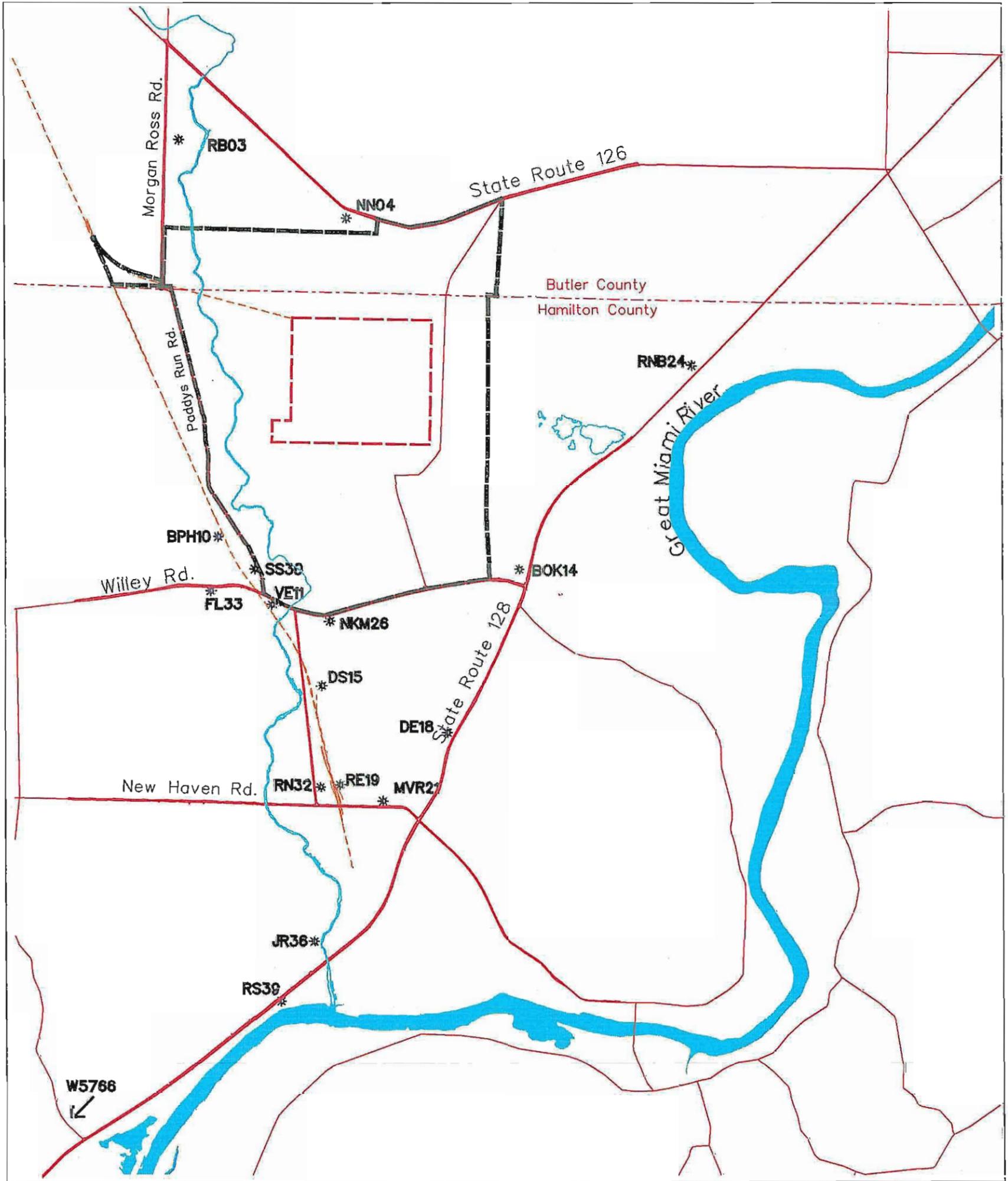
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achievable) level of 50 $\mu\text{g/g}$. Background soil concentrations of total uranium in the Fernald area are up to 5 $\mu\text{g/g}$. For grass, the results are compared against background samples collected during the 1995 sampling event and any other historic data. Out of the total number of samples for both media, the samples collected at or near the air monitoring stations showed the highest total uranium concentrations. The off-site samples showed considerably lower levels. The Appendix summarizes the results.

All soil results showed higher total uranium concentrations than the grass results. The grass results are above the background level that was collected during this sampling event. Four soil samples detected concentrations of total uranium higher than background, one of which had a total uranium concentration of 86.9 $\mu\text{g/g}$.

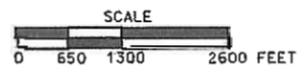
Database records show good agreement between results in soil samples split between OFFO and FERMCO. This is a good indication of quality control in sampling technique and both laboratory analyses. Unfortunately, the database shows disagreement between OFFO grass results and FERMCO's. The data show variation that is due to differences in the application of analytical methods. FERMCO's analysis of the grass samples was done with dried grass and Ohio's was done with wet grass. Because of this difference, the grass results are not comparable. In the future, analysis will be done on dried grass.





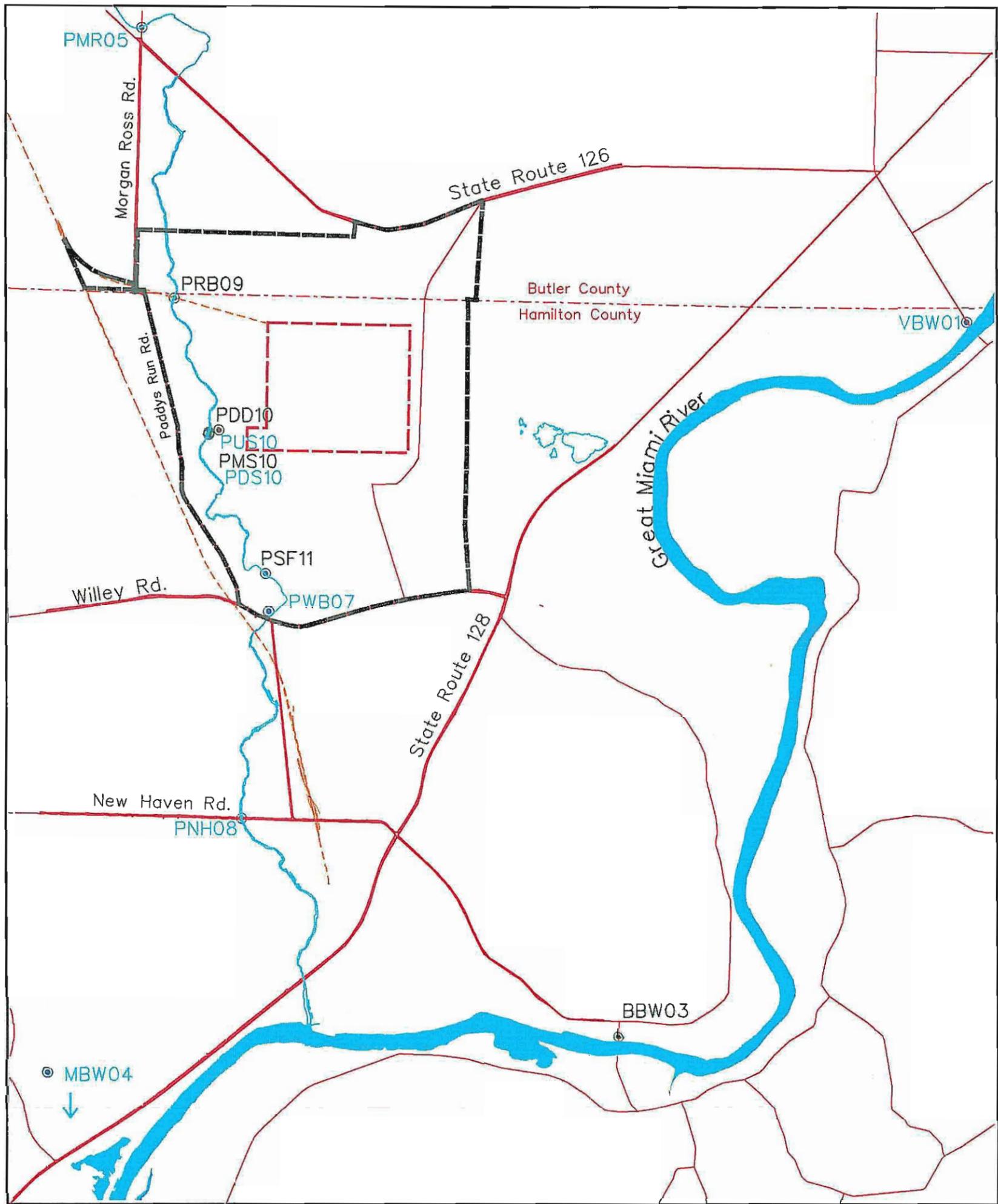
Legend

* Monthly Locations	--- FEMP Production Area
* Random Locations	— FEMP Boundary
■ Surface Water	— Roads
	- - - Rail Lines



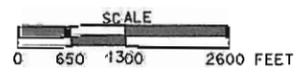
Projection: Ohio State Plane South
 Units: Feet
 Datum: 1927 North American
 Produced By: Ohio EPA - OFFO

Map 3-1 Private Well Sampling Locations



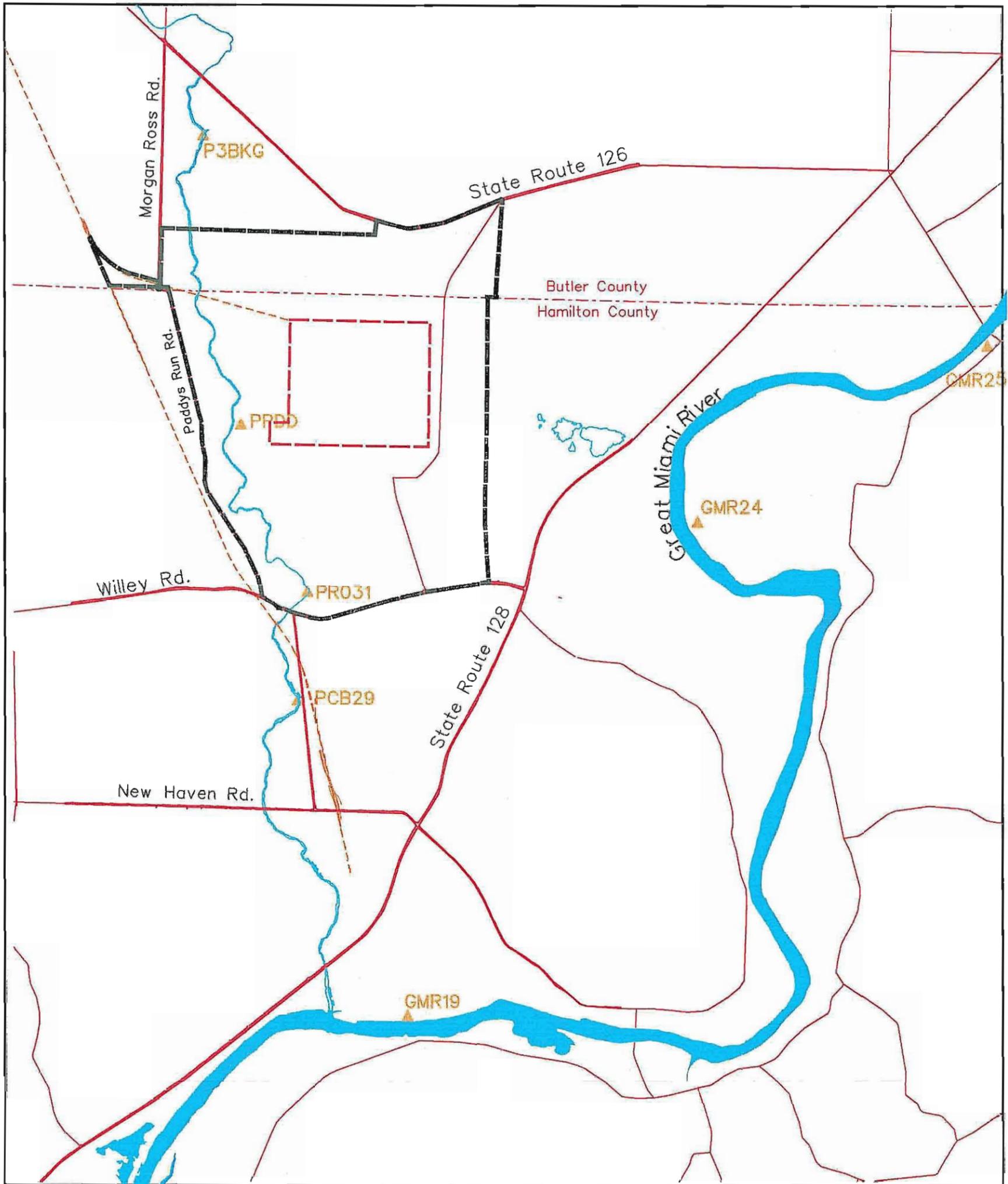
Legend

⊙	Sampled Jan.-Mar.	---	FEMP Production Area
⊙	Sampled Jan.-Dec.	- - -	Rail Lines
---	FEMP Boundary	—	Roads
■	Surface Water		



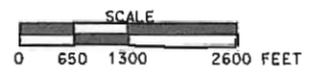
Projection: Ohio State Plane South
 Units: Feet
 Datum: 1927 North American
 Produced By: Ohio EPA - OFFO

Map 3-2 Surface Water Sampling Locations



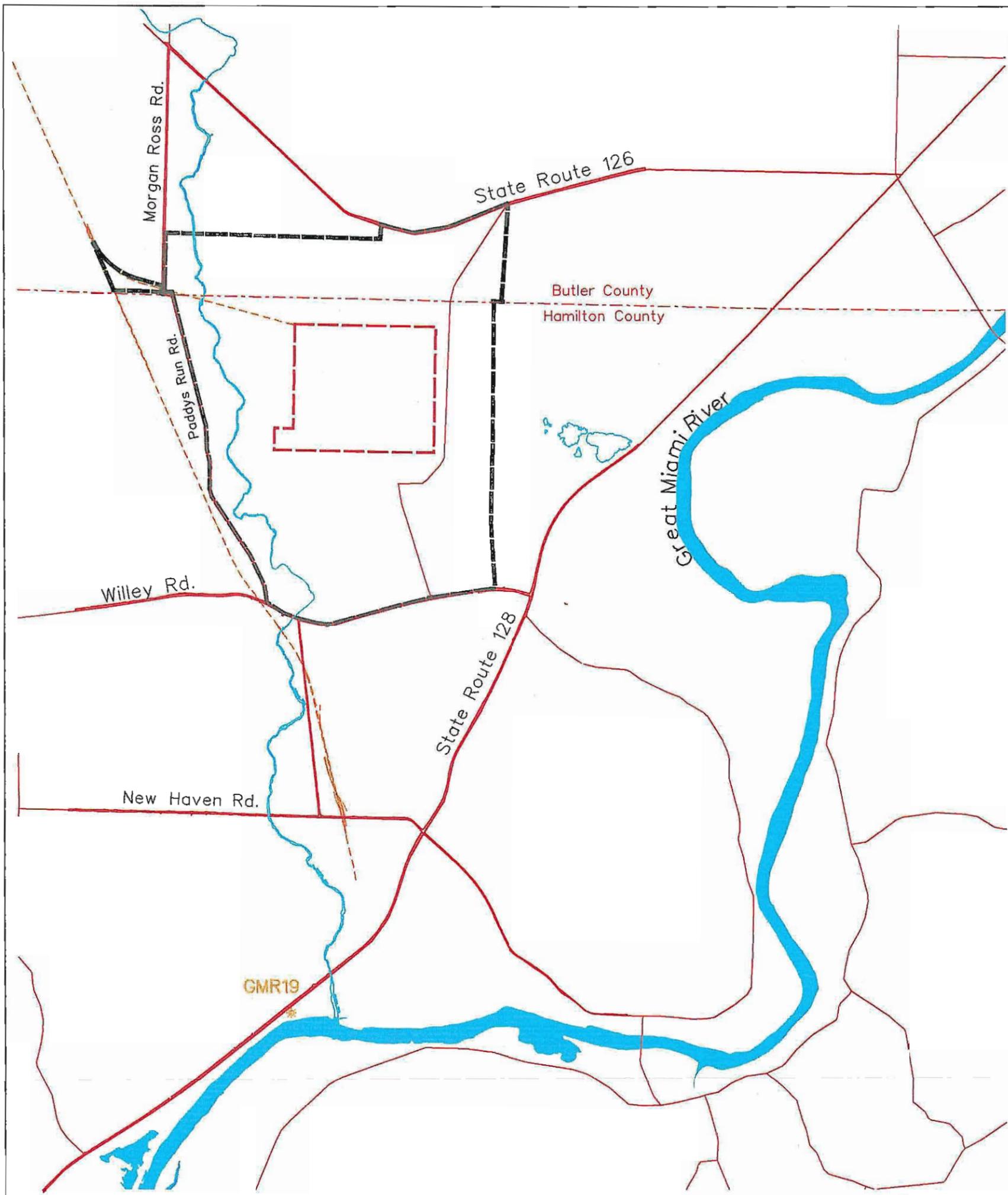
Legend

	Sediment Location		FEMP Production Area
	FEMP Boundary		Rail Lines
	Surface Water		Roads



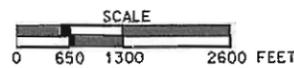
Projection: Ohio State Plane South
 Units: Feet
 Datum: 1927 North American
 Produced By: Ohio EPA - OFFO

Map 3-3 Sediment Sampling Locations



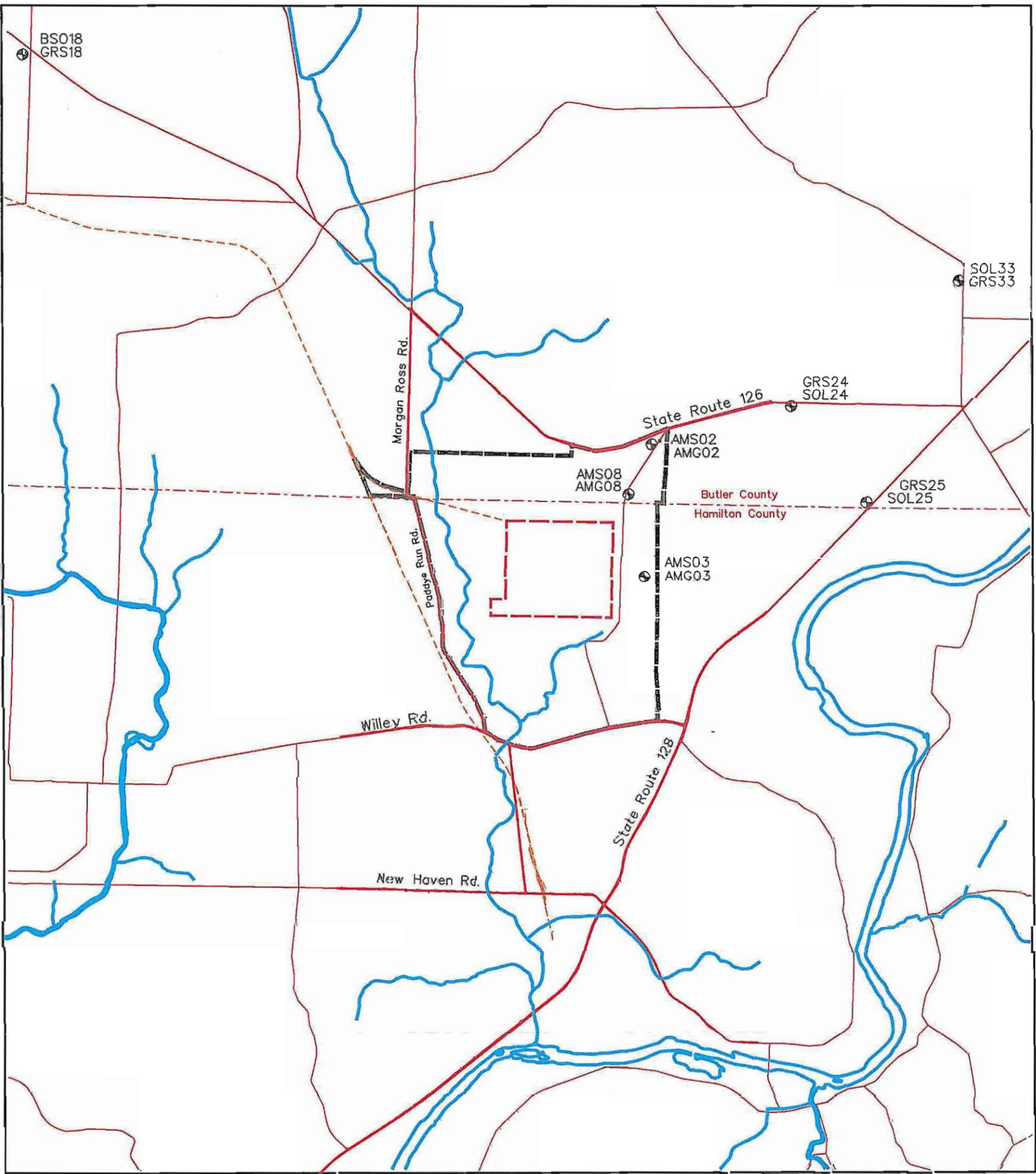
Legend

	Fish Sampling Location		FEMP Production Area
	FEMP Boundary		Rail Lines
	Surface Water		Roads



Projection: Ohio State Plane South
 Units: Feet
 Datum: 1927 North American
 Produced By: Ohio EPA - OFFO

Map 3-4 Fish Sampling Location



Legend

	Soil and Grass Location		FEMP Production Area
	FEMP Boundary		Rail Lines
	Surface Water		Roads

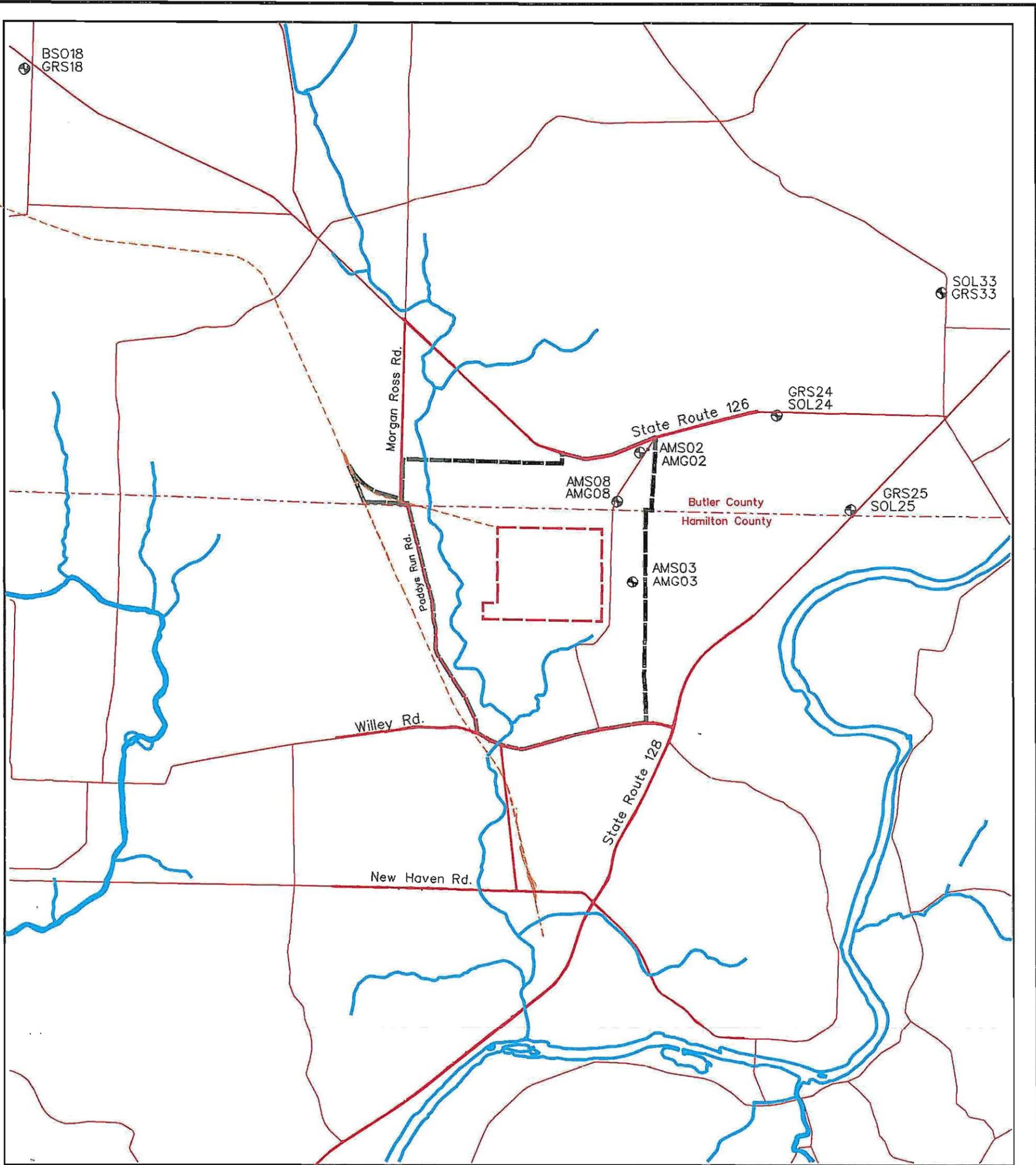


Projection: Ohio State Plane South
 Units: Feet
 Datum: 1927 North American
 Produced By: Ohio EPA - OFFO



Map 3-5 Soil and Grass Sampling Locations





Legend

	Soil and Grass Location		FEMP Production Area
	FEMP Boundary		Rail Lines
	Surface Water		Roads



Projection: Ohio State Plane South
 Units: Feet
 Datum: 1927 North American
 Produced By: Ohio EPA - OFFO



Map 3-5 Soil and Grass Sampling Locations

TABLE A-1

PRIVATE WELLS				
LOCATION CODE	DATE 1995	OEPA TOTAL URANIUM RESULTS PPB µg/l	FERMCO TOTAL URANIUM RESULTS PPB µg/l	OEPA AIP/CRG
BOK14	Jan 25	2.2	2.3	AIP
BOK14	Feb 22	2.1	2.2	AIP
BOK14	Mar 29	2.2	2.2	AIP
BOK14	Apr 26	2.1	NS	AIP
BOK14	May 24	2	2	AIP
BOK14	Jun 28	2.1	2.2	AIP
BOK14	Jul 26	2.08	2.3	AIP
BOK14	Aug 23	2.1	2.3	AIP
BOK14	Sep 27	2.4	2.3	AIP
BOK14	Oct 25	2.4	2.5	AIP
BOK14	Nov 29	2.3	2.4	AIP
BOK14	Dec 27	2.5	2.7	AIP
DS15	Jan 25	170	160	AIP
DS15	Feb 22	161	160	AIP
DS15	Mar 29	163	160	AIP
DS15	Apr 26	155	170	AIP
DS15	May 24	176	170	AIP
DS15	Jun 28	162	160	AIP
DS15	Jul 26	155.6	160	AIP
DS15	Aug 23	155.96	180	AIP
DS15	Sep 27	170	170	AIP
DS15	Oct 25	170	170	AIP
DS15	Nov 29	160	170	AIP
DS15	Dec 27	160	170	AIP
NN04	Jan 25	2.2	2.5	AIP
NN04	Feb 22	2	1.9	AIP
NN04	Mar 29	1.7	1.6	AIP
NN04	Apr 26	1.6	1.8	AIP
NN04	May 24	2.3	2.2	AIP
NN04	Jun 28	1.7	1.6	AIP
NN04	Jul 26	1.47	1.6	AIP
NN04	Aug 23	1.69	1.7	AIP
NN04	Sep 27	1.4	1.3	AIP
NN04	Oct 25	1.5	1.5	AIP
NN04	Nov 29	1.6	1.6	AIP
NN04	Dec 27	1.9	2	AIP
RE19	Jan 25	FROZEN	FROZEN	AIP
RE19	Feb 22	0.016	<0.1	AIP
RE19	Mar 29	0.02	<0.1	AIP
RE19	Apr 26	0.008	<0.1	AIP
RE19	May 24	0.007	<0.1	AIP
RE19	Jun 28	0.009	<0.1	AIP
RE19	Jul 26	0.005	<0.1	AIP
RE19	Aug 23	0.01	<0.1	AIP
RE19	Sep 27	0.007	<0.1	AIP
RE19	Oct 25	<0.030	<0.1	AIP
RE19	Nov 29	<0.030	0.1	AIP
BPH10	Aug 23	0.43	0.5	AIP
DE18	Mar 29	0.4	0.5	AIP
FL33	Apr 26	0.5	0.5	AIP
JR36	May 24	1.1	1.2	AIP
MVR21	Jun 28	0.35	0.4	AIP
NKM26	Dec 27	0.039	0.2	AIP
RB03	Oct 25	<0.030	<0.1	AIP
RN32	Sep 27	0.034	<0.1	AIP
RNB24	Jan 25	0.5	0.5	AIP
RS39	Feb 22	5.3	5.3	AIP
SS30	Jul 26	0.7	0.8	AIP
VE11	Nov 29	1.5	1.7	AIP
W5766	Oct 25	0.48	NS	AIP

NS = NO SAMPLE COLLECTED

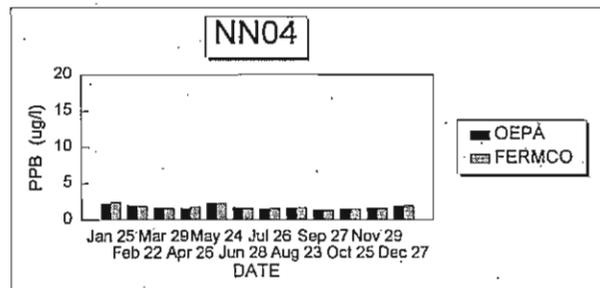
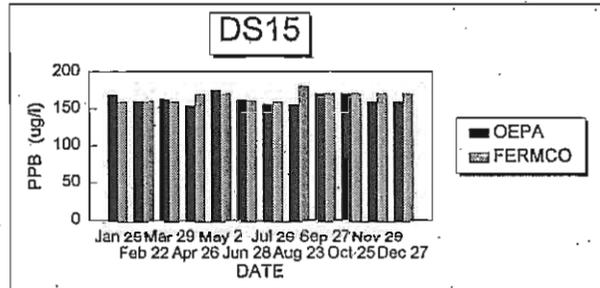
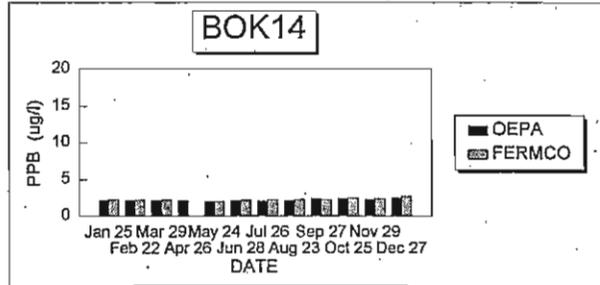


TABLE A-2

SURFACE WATER

LOCATION CODE	LOCATION DESCRIPTION	DATE 1995	OEPA TOTAL URANIUM RESULTS PPB µg/l	FEMP TOTAL URANIUM RESULTS PPB µg/l	OEPA Ra 226 RESULTS pCi/l	OEPA Ra 226 +/-	OEPA Ra 228 RESULTS pCi/l	OEPA Ra 226 +/-	OEPA AIP/CRG
BBW03	New Baltimore Bridge	Jan 25	1.78	1.8	<1.0	NA	<1.0	NA	AIP
BBW03	New Baltimore Bridge	Feb 22	1.8	1.6	0.21	0.06	1.3	0.73	AIP
BBW03	New Baltimore Bridge	Mar 29	2.66	1.9	<1.0	NA	<1.0	NA	AIP
BBW03	New Baltimore Bridge	Apr 26	1.7	1.7	<1.0	NA	<1.0	NA	AIP
BBW03	New Baltimore Bridge	May 24	1.8	1.5	<1.0	NA	<1.0	NA	AIP
BBW03	New Baltimore Bridge	Jun 28	1.7	1.5	0.49	0.15	1.39	1.16	AIP
BBW03	New Baltimore Bridge	Jul 26	1.38	1.4	0.22	0.06	3.68	1.32	AIP
BBW03	New Baltimore Bridge	Aug 23	1.41	1.4	0.3	0.07	<1.02	1.12	AIP
BBW03	New Baltimore Bridge	Sep 27	1.7	1.4	0.13	0.043	<0.6	0.93	AIP
BBW03	New Baltimore Bridge	Oct 25	1.9	1.6	0.24	0.046	1.1	1.7	AIP
BBW03	New Baltimore Bridge	Nov 29	2	2	0.26	0.048	0.85	0.61	AIP
BBW03	New Baltimore Bridge	Dec 27	1.7	1.7	0.18	0.043	-0.41	0.66	AIP
MBW04	Miamitown Bridge	Jan 25	1.86	1.8	<1.0	NA	1.6	1	AIP
MBW04	Miamitown Bridge	Feb 22	1.7	1.6	0.181	0.088	0.61	0.66	AIP
MBW04	Miamitown Bridge	Mar 29	2.1	1.9	<1.0	NA	<1.0	NA	AIP
PDD10	Drainage Ditch	Jan 25	531	550	0.13	0.9	3.7	2.1	AIP
PDD10	Drainage Ditch	Feb 22	341	510	<1.0	NA	<1.0	NA	AIP
PDD10	Drainage Ditch	Mar 29	600.24	710	<1.0	NA	<1.0	NA	AIP
PDD10	Drainage Ditch	Apr 26	337	360	<1.0	NA	<1.0	NA	AIP
PDD10	Drainage Ditch	May 24	524	520	NS	NA	NS	NA	AIP
PDD10	Drainage Ditch	Jun 28	1280	1300	NS	NA	NS	NA	AIP
PDD10	Drainage Ditch	Jul 26	758.32	810	NS	NA	NS	NA	AIP
PDD10	Drainage Ditch	Aug 23	1150	1200	NS	NA	NS	NA	AIP
PDD10	Drainage Ditch	Oct 25	920	930	NS	NA	NS	NA	AIP
PDD10	Drainage Ditch	Nov 29	910	950	NS	NA	NS	NA	AIP
PDD10	Drainage Ditch	Dec 27	570	630	NS	NA	NS	NA	AIP
PDS10	Down Stream	Jan 25	20.5	21	0.1	0.08	1.9	1.7	AIP
PDS10	Down Stream	Feb 22	33.4	36	<1.0	NA	<1.0	NA	AIP
PDS10	Down Stream	Mar 29	50.47	54	<1.0	NA	1.4	0.9	AIP
PDS10	Down Stream	Apr 26	9	9.1	<1.0	NA	<1.0	NA	AIP
PDS10	Down Stream	May 24	8	6.8	<1.0	NA	<1.0	NA	AIP
PDS10	Down Stream	Dec 27	16	17	0.19	0.046	-0.017	0.66	AIP
PMR05	Morgan Ross Bridge	Feb 22	1.04	0.7	<1.0	NA	<1.0	NA	AIP
PMR05	Morgan Ross Bridge	Mar 29	<0.735	1.2	<1.0	NA	<1.0	NA	AIP
PMS10	Mid Stream	Feb 22	1.93	2.2	<1.0	NA	<1.0	NA	AIP
PMS10	Mid Stream	Mar 29	3.59	2.4	<1.0	NA	1.4	0.9	AIP
PNH08	New Haven Bridge	Feb 22	5.75	6	<1.0	NA	<1.0	NA	AIP
PNH08	New Haven Bridge	Mar 29	5.16	3.4	<1.0	NA	<1.0	NA	AIP
PRB09	Railroad Bridge	Mar 29	3.35	2.6	<0.05	NA	<0.05	NA	AIP
PRB09	Railroad Bridge	Apr 26	2	2.3	NS	NA	NS	NA	AIP
PRB09	Railroad Bridge	May 24	1.8	1.8	NS	NA	NS	NA	AIP
PRB09	Railroad Bridge	Jun 28	1.1	1	NS	NA	NS	NA	AIP
PRB09	Railroad Bridge	Jul 26	1.26	1.3	NS	NA	NS	NA	AIP
PRB09	Railroad Bridge	Aug 23	1.16	1.3	NS	NA	NS	NA	AIP
PRB09	Railroad Bridge	Sep 27	1.3	1	NS	NA	NS	NA	AIP
PRB09	Railroad Bridge	Oct 25	1.4	1.4	NS	NA	NS	NA	AIP
PRB09	Railroad Bridge	Nov 29	3.2	3.6	NS	NA	NS	NA	AIP
PSF11	South Field	Feb 22	4.8	6.4	<1.0	NA	<1.0	NA	AIP
PSF11	South Field	Mar 29	13.59	14	<1.0	NA	<1.0	NA	AIP
PSF11	South Field	Apr 26	4.9	5.5	NS	NA	NS	NA	AIP
PSF11	South Field	May 24	4.1	4.2	NS	NA	NS	NA	AIP
PSF11	South Field	Dec 27	7	7.5	NS	NA	NS	NA	AIP
PUS10	Up Stream	Feb 22	1.52	3.1	<1.0	NA	<1.0	NA	AIP
PUS10	Up Stream	Mar 29	3.28	2.5	<1.0	NA	<1.0	NA	AIP
PWB07	Willey Road Bridge	Feb 22	5.63	6.4	<1.0	NA	2.48	1.2	AIP
PWB07	Willey Road Bridge	Mar 29	3.35	NA	<1.0	NA	<1.0	NA	AIP
PWB07	Willey Road Bridge	Apr 26	4.6	5.3	<1.0	NA	1.19	NA	AIP
PWB07	Willey Road Bridge	May 24	4.2	4.1	<1.0	NA	<1.0	NA	AIP
VBW01	Venice Bridge	Jan 25	1.8	2.1	0.27	0.14	3.5	2	AIP
VBW01	Venice Bridge	Feb 22	1.8	1.4	0.202	0.081	0.39	0.65	AIP
VBW01	Venice Bridge	Mar 29	2.04	1.9	<1.0	NA	<1.0	NA	AIP

NA = NOT AVAILABLE/NOT REPORTED BY LAB

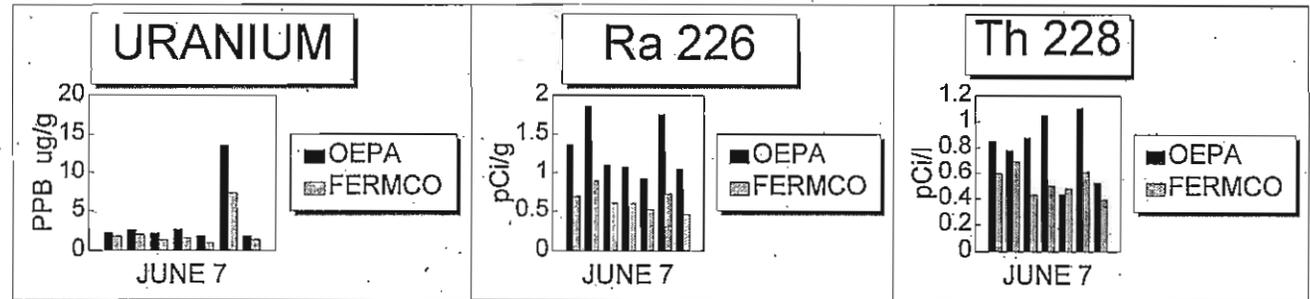
NS = NO SAMPLE COLLECTED

+/- (PLUS/MINUS) VALUES ARE THE UNCERTAINTY IN THE ANALYTICAL RESULTS AT THE 95% CONFIDENCE LEVEL.

TABLE A-3

SEDIMENT

LOCATION CODE	LOCATION DESCRIPTION	DATE 1995	OEPA URANIUM $\mu\text{g/g}$	FERMCO URANIUM $\mu\text{g/g}$	OEPA Ra 226 pCi/g	OEPA +/-	FERMCO Ra 226 pCi/g	OEPA Th 228 pCi/g	OEPA +/-	FERMCO Th 228 pCi/g
GMR19	GMR RM 19.5	Jun 7	2.29	1.8	1.37	0.21	0.69	0.846	0.122	0.6
GMR24	GMR RM 24.1	Jun 7	2.65	2.1	1.86	0.29	0.89	0.776	0.122	0.69
GMR25	GMR RM 25.6-background	Jun 7	2.2	1.4	1.1	0.17	0.61	0.874	0.148	0.43
PCB29	Clayton Burton	Jun 7	2.66	1.6	1.078	0.17	0.6	1.046	0.145	0.5
PR031	Paddys Run	Jun 7	1.82	1	0.92	0.14	0.52	0.434	0.084	0.48
PPDD	Pilot Plant Drainage Ditch	Jun 7	13.61	7.3	1.75	0.27	0.72	1.103	0.154	0.61
P3BKG	background location	Jun 7	1.85	1.4	1.05	0.17	0.46	0.522	0.097	0.39



NA = NOT AVAILABLE/NOT REPORTED BY LAB

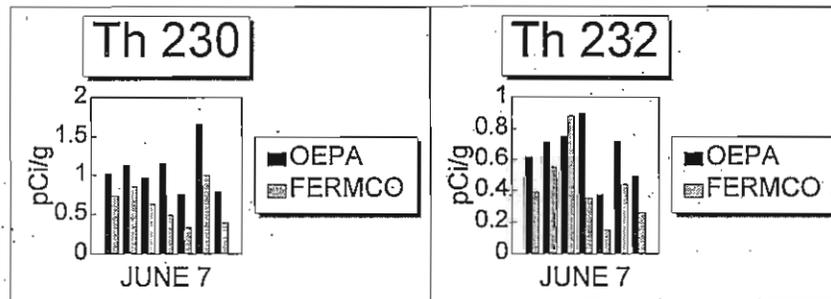
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TABLE A-3

SEDIMENT

LOCATION CODE	LOCATION DESCRIPTION	OEPA Th 230 pCi/g	OEPA +/-	FERMCO Th 230 pCi/g	OEPA Th 232 pCi/g	OEPA +/-	FERMCO Th 232 pCi/g	OEPA Th 234 pCi/g	OEPA +/-	FERMCO Th 234 pCi/g
GMR19	GMR RM 19.5	1.022	0.136	0.73	0.617	0.093	0.39	NA	NA	0.38
GMR24	GMR RM 24.1	1.128	0.155	0.85	0.713	0.11	0.55	NA	NA	0.54
GMR25	GMR RM 25.6	0.965	0.151	0.63	0.75	0.126	0.88	NA	NA	0.88
PCB29	Clayton Burton	1.147	0.149	0.49	0.894	0.123	0.35	NA	NA	0.41
PR031	Paddys Run	0.75	0.111	0.33	0.372	0.07	0.15	NA	NA	0.42
PPDD	Pilot Plant Drainage Ditch	1.656	0.203	1	0.717	0.106	0.44	1.74	0.6	3
P3BKG	background location	0.789	0.12	0.39	0.492	0.087	0.26	NA	NA	0.77



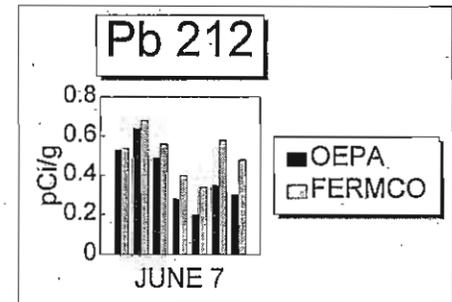
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TABLE A-3

SEDIMENT											
LOCATION CODE	LOCATION DESCRIPTION	OEPA K 40 pCi/g	OEPA +/-	FERMCO K 40 pCi/g	OEPA Cs 137 pCi/g	OEPA +/-	FERMCO Cs 137 pCi/g	OEPA Pb 212 pCi/g	OEPA +/-	FERMCO Pb 212 pCi/g	
GMR19	GMR RM 19.5	9.11	1.28	NS	<0.11	NA	0.046	0.53	0.12	0.54	
GMR24	GMR RM 24.1	8.61	1.17	NS	<0.076	NA	0.072	0.64	0.93	0.68	
GMR25	GMR RM 25.6	9.21	1.16	NS	<0.056	NA	0.045	0.49	0.12	0.56	
PCB29	Clayton Burton	6.31	0.9	NS	<0.045	NA	-0.0085	0.28	0.074	0.4	
PR031	Paddys Run	5.44	0.79	NS	<0.030	NA	-0.0039	0.2	0.055	0.34	
PPDD	Pilot Plant Drainage Ditch	5.69	0.92	NS	0.1	0.047	0.042	0.35	0.07	0.58	
P3BKG	background location	6.59	0.98	NS	<0.049	NA	0.012	0.3	0.1	0.48	



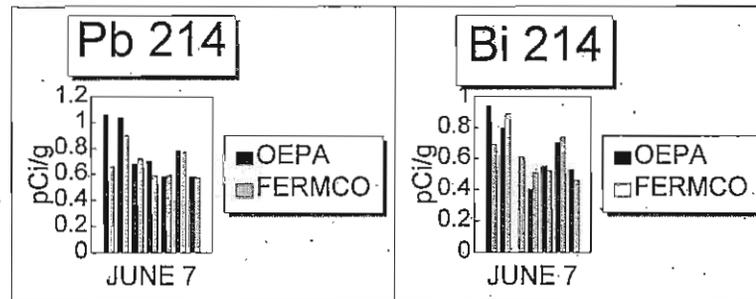
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+/- = (PLUS/MINUS) VALUES ARE THE UNCERTAINTY IN THE ANALYTICAL RESULTS AT THE 95% CONFIDENCE LEVEL.

TABLE A-3

SEDIMENT												
LOCATION CODE	LOCATION DESCRIPTION	OEPA Pb 214 pCi/g	OEPA +/-	FERMCO Pb 214 pCi/g	OEPA Bi 214 pCi/g	OEPA +/-	FERMCO Bi 214 pCi/g	OEPA Ti 208 pCi/g	OEPA +/-	FERMCO Ti 208 pCi/g	OEPA AIP/CRG	
GMR19	GMR RM 19.5	1.06	0.16	0.66	0.94	0.16	0.69	NA	NA	0.18	AIP	
GMR24	GMR RM 24.1	1.04	0.14	0.9	0.8	0.14	0.89	0.64	0.18	0.23	AIP	
GMR25	GMR RM 25.6	0.68	0.13	0.72	NA	NA	0.61	NA	NA	0.2	AIP	
PCB29	Clayton Burton	0.7	0.14	0.59	0.4	12	0.51	NA	NA	0.12	CRG	
PR031	Paddys Run	0.58	0.1	0.59	0.55	0.11	0.52	NA	NA	0.1	CRG	
PPDD	Pilot Plant Drainage Ditch	0.78	0.11	0.77	0.7	0.11	0.74	NA	NA	0.1	CRG	
P3BKG	background location	0.58	0.15	0.57	0.53	0.12	0.46	NA	NA	0.12	AIP	



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NS = NO SAMPLE COLLECTED

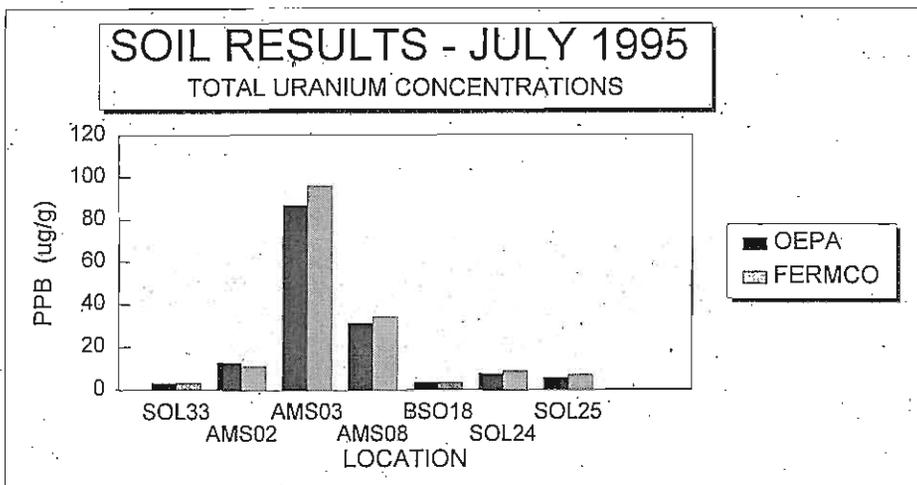
+/- = (PLUS/MINUS) VALUES ARE THE UNCERTAINTY IN THE ANALYTICAL RESULTS AT THE 95% CONFIDENCE LEVEL.

TABLE A-4

FISH						
SAMPLE ID	LOCATION DESCRIPTION	DATE 1995	MATRIX	OEPA TOTAL URANIUM µg/g	FERMCO TOTAL URANIUM µg/g	OEPA AIP/CRG
1995090802	GMR RIVER MILE 19	Sept-8-95	FISH - BASS	0.001	0.00335	AIP
1995090801	GMR RIVER MILE 19	Sept-8-95	FISH - CARP	0.002	0.00422	AIP

TABLE A-5

GRASS AND SOIL								
GRASS LOCATION CODE	SOIL LOCATION CODE	LOCATION DESCRIPTION	DATE 1995	OEPA GRASS TOTAL URANIUM $\mu\text{g/g}$ (a)	FERMCO GRASS TOTAL URANIUM $\mu\text{g/g}$ (b)	OEPA SOIL TOTAL URANIUM $\mu\text{g/g}$	FERMCO SOIL TOTAL URANIUM $\mu\text{g/g}$	OEPA AIP or CRG
GRS33	SOL33	Layhigh Road	Jul-7-95	0.0021	0.11	3.2	3.2	AIP
AMG02	AMS02	Air Monitor Station 02	Jul-7-95	0.089	0.14	12.5	11	AIP
AMG03	AMS03	Air Monitor Station 03	Jul-7-95	0.013	0.038	86.9	96	AIP
AMG08	AMS08	Air Monitor Station 08	Jul-7-95	0.085	0.89	31	34	AIP
GRS18	BSO18	Chapel Rd. S. of Rt. 126	Jul-12-95	0.002	0.0036	3.3	3.4	AIP
GRS24	SOL24	Rt. 126 & Brown Farm Rd.	Jul-12-95	0.009	0.031	7.5	8.8	AIP
GRS25	SOL25	Rt. 128 at county line	Jul-12-95	0.063	0.15	5.6	6.9	AIP



(a) WET WEIGHT

(b) DRY WEIGHT

NS = NO SAMPLE COLLECTED

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