2.0 Remediation Status and Compliance Summary

This chapter provides a summary of CERCLA remediation activities in 2005 for each project, and summarizes compliance activities with other applicable environmental laws, regulations, and legal agreements. CERCLA, the "Superfund Act," is the primary driver for environmental remediation of the Fernald site.

The EPA and OEPA enforce the environmental laws, regulations, and legal agreements governing work at the Fernald site. The EPA develops, promulgates, and enforces environmental protection regulations and technology-based standards. EPA regional offices and state agencies enforce these regulations and standards by review of data collected at the Fernald site. Region V of the EPA has regulatory oversight of the CERCLA process at the Fernald site, with active participation from OEPA.

For some programs, such as those under the Resource Conservation and Recovery Act (RCRA) as amended, the Clean Air Act as amended (excluding NESHAP compliance), and the Clean Water Act as amended; EPA has authorized the State of Ohio to act as the primary enforcement authority. For these programs, Ohio promulgates state regulations that must be at least as stringent as federal requirements. Several legal agreements between DOE, EPA Region V, and OEPA identify site-specific requirements for compliance with the regulations. As part of complying with these regulations, DOE Headquarters issues directives to its field and area offices and conducts audits to ensure compliance with all regulations.

2.1 CERCLA Remediation Status

The process for remediating sites under CERCLA consists of three phases: site characterization, remedy selection, and implementation. The FCP has completed the first two phases, as the regulatory agencies have approved remedy selection documents (i.e., records of decision) for all operable units, as well as several amendments to these documents.

During 2005, the FCP was involved in the implementation phase of CERCLA remediation, which includes remedial design, remedial action (construction and implementation of the remedy), certification of soil to verify that the remedy was effective, and ultimately site closure. Remediation activities, documents, and schedules have been specifically identified in each operable unit's remedial design and remedial action work plan.

Each phase of the CERCLA remediation process requires documentation. The documents produced reflect the input of stakeholders who have helped form the remediation strategy at the Fernald site. Many documents that describe specific remediation activities were issued or approved in 2005. All cleanup-related CERCLA documentation, including a copy of the Administrative Record, is available to the public at the Public Environmental Information Center, which is located at 10995 Hamilton-Cleves Highway in Cincinnati, Ohio and is open Monday through Thursday, 9:00 a.m. to 4:00 p.m. A copy of the Administrative Record is also located at EPA's Region V office in Chicago, Illinois. The progress made by each remedial project toward CERCLA cleanup is summarized later in this chapter.

CERCLA also requires a five-year review process of remedial actions implemented under the signed Record of Decision for each operable unit. The purpose of a five-year review is to determine, through evaluation of performance of the selected remedy, whether the remedy at a site remains protective of human health and the environment. The first five-year review report for the Fernald site (DOE 2001b) was approved by the EPA in September 2001. The second five-year report was submitted April 2006 (DOE 2006b).

Cleanup levels at the Fernald site for surface water, sediment, and groundwater were established in the Record of Decision for Remedial Actions at Operable Unit 5 (DOE 1996). These FRLs were established for constituents of concern or those constituents at the Fernald site determined, through risk assessment, to present potential risk to human health or the environment. Table 2-1 lists FRLs identified for constituents in groundwater, surface water, and sediment. FRLs represent the maximum allowable residual levels (the maximum concentrations which may remain in the environment following remediation), and these levels drive excavation and cleanup.

Note that on November 30, 2001, the EPA approved an Explanation of Significant Differences document to the Operable Unit 5 Record of Decision. This document formally adopts the EPA's Safe Drinking Water Act Maximum Contaminant Level for uranium of 30 µg/L as both the FRL for groundwater remediation and the monthly average uranium effluent discharge limit to the Great Miami River.

2.1.1 Waste Pits Project

The Waste Pits Project (Operable Unit 1) is responsible for the excavation, drying (as required), loading, and rail transport of the contents of Waste Pits 1 through 6, the burn pit, and the clearwell to an off-site disposal facility. Sampling and analysis of the waste pit material, and the off-site disposal of contaminated soil and debris from other remedial projects that exceed the waste acceptance criteria (physical, chemical, and radiological standards) for the on-site disposal facility, are part of this scope of work. The project is also responsible for collecting wastewater and storm water associated with Waste Pits Project activities and, as needed, pre-treating and discharging this remediation water to the converted advanced wastewater treatment facility. In addition, the project is responsible for implementing dust control measures and for implementing point source emission controls for dryer operations.

TABLE 2-1
FINAL REMEDIATION LEVELS FOR GROUNDWATER, SURFACE WATER, AND SEDIMENT

	FRL[a]		
Constituent	**Groundwater**	**Surface Water**	**Sediment**
General Chemistry	**(mg/L)**	**(mg/L)**	**(mg/kg)**
Cyanide	NA[b]	0.012	NA
Fluoride	4[c]	2.0	NA
Nitrate[d]	11	2,400	NA
Inorganics	**(mg/L)**	**(mg/L)**	**(mg/kg)**
Antimony	0.0060	0.19	NA
Arsenic	0.050	0.049	94
Barium	2	100	NA
Beryllium	0.0040	0.0012	33
Boron	0.33	NA	NA
Cadmium	0.014	0.0098	71
Chromium VI[d]	0.022	0.010	3,000
Cobalt	0.17	NA	36,000
Copper	1.3	0.012	NA
Lead	0.015[c]	0.010	NA
Manganese	0.900	1.5	410
Mercury	0.0020	0.00020	NA
Molybdenum	0.10	1.5	NA
Nickel	0.10	0.17	NA
Selenium	0.050	0.0050	NA
Silver	0.050	0.0050	NA
Thallium	NA	NA	88
Vanadium	0.038	3.1	NA
Zinc	0.021	0.11	NA
Radionuclides	**(pCi/L)**	**(pCi/L)**	**(pCi/g)**
Cesium-137	NA	10	7.0
Neptunium-237	1.0	210	32
Lead-210	NA	11	390
Plutonium-238	NA	210	1,200
Plutonium-239/240	NA	200	1,100
Radium-226	20	38	2.9
Radium-228	20	47	4.8
Strontium-90	8.0	41	7,100
Technetium-99	94	150	200,000
Thorium-228	4.0	830	3.2
Thorium-230	15	3500	18,000
Thorium-232	1.2	270	1.6
	(µg/L)	**(µg/L)**	**(mg/kg)**
Total Uranium[e]	30[f]	530	210

TABLE 2-1
(Continued)

Constituent	FRL[a] Groundwater	Surface Water	Sediment
Organics	(µg/L)	(µg/L)	(µg/kg)
Alpha-chlordane	2.0	0.31	NA
Aroclor-1254	0.20	0.20	670
Aroclor-1260	NA	0.20	670
Benzene	5.0	280	NA
Benzo(a)anthracene	NA	1.0	190,000
Benzo(a)pyrene	NA	1.0	19,000
Benzo(b)fluoranthene	NA	NA	190,000
Benzo(k)fluoranthene	NA	NA	1,900,000
Bis(2-chloroisopropyl)ether	5.0	280	NA
Bis(2-ethylhexyl)phthalate	6.0	8.4	5,000,000
Bromodichloromethane	100	240	NA
Bromoform	NA	NA	160,000
Bromomethane	2.1	1300	NA
Carbazole	11	NA	63,000
Carbon disulfide	5.5	NA	NA
Chloroethane	1.0	NA	NA
Chloroform	100	79	NA
Chrysene	NA	NA	19,000,000
Dibenzo(a,h)anthracene	NA	1.0	NA
3,3'-Dichlorobenzidene	NA	7.7	NA
1,1-Dichloroethane	280	NA	NA
1,1-Dichloroethene	7.0	15	NA
1,2-Dichloroethane	5.0	NA	NA
Dieldrin	NA	0.020	NA
Di-n-butylphthalate	NA	6,000	NA
Di-n-octylphthalate	NA	5.0	NA
Methylene chloride	5.0	430	NA
4-Methylphenol	29	2,200	NA
4-Methyl-2-pentanone	NA	NA	2,100,000
4-Nitrophenol	320	7,400,000	NA
N-nitrosodiphenylamine	NA	NA	260,000
Octachlorodibenzo-p-dioxin	0.0001	NA	NA
Phenanthrene	NA	NA	3
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.010	NA	NA
Tetrachloroethene	NA	45	NA
1,1,1-Trichloroethane	NA	1.0	NA
1,1,2-Trichloroethane	NA	230	NA
Trichloroethene	5.0	NA	NA
Vinyl Chloride	2.0	NA	NA

[a]From Record of Decision for Remedial Actions at Operable Unit 5, Tables 9-4 through 9-6, January 1996.
[b]NA = not applicable. No FRL was required for this constituent in this particular environmental media.
[c]The groundwater FRLs for fluoride and lead were changed from 0.89 milligrams per liter (mg/L) and 0.002 mg/L, respectively, to be consistent with the FRL selection process outlined in the Feasibility Study Report for Operable Unit 5 (DOE 1995a). The changes were documented in the Operable Unit 5 Record of Decision by change pages.
[d]Because of holding time considerations, nitrate/nitrite is analyzed for nitrate and total chromium is analyzed for hexavalent chromium. Total chromium and nitrate/nitrite provide a more conservative result.
[e]Uranium consists of several isotopes (uranium-234, 235, 236 and 238). This report interchangeably uses the terms uranium and total uranium, both defined as the sum of the various isotopic components.
[f]The total uranium groundwater FRL was changed to 30 µg/L in 2001 to reflect the EPA's adopted Safe Drinking Water Act Final Maximum Contamination Level for uranium.

The Waste Pits Project involves the pre-treatment (e.g., crushing, sorting, and shredding) of waste pit materials, drying (as required), and the loadout of railcars with pit material for shipment to Envirocare of Utah, Inc. During 2005, 34 unit trains left the Fernald site carrying approximately 218,120 tons (197,880 metric tons) of material. From April 1999, when the first rail shipment left the Fernald site, through December 2005, 167 unit trains carrying approximately 1,067,380 tons (968,327 metric tons) of material were shipped to Envirocare of Utah, Inc. for disposal. By the end of June 2005, the project was complete; specifically, all of the waste and contaminated liners had been removed from all the waste pits and shipped to Envirocare of Utah, Inc. Beginning in June 2005, the only project activity was continued rail shipping of soil and other material from other site projects that exceeded the on-site disposal facility waste acceptance criteria. This material was placed into Soil Pile 7 and loaded from that same location. In total, almost 14 of the 34 unit trains that left the Fernald site in 2005 contained material loaded from Soil Pile 7 (approximately 88,350 tons [80,150 metric tons]). At the end of 2005, the shipment of Soil Pile 7 material was approximately 70 percent completed.

Waste Pits after waste removal, with subsoil excavation ongoing.

2.1.2 Environmental Closure, Soil, and Disposal Facility Project

The Environmental Closure, Soil and Disposal Facility Project, which includes components of both Operable Units 2 and 5, is responsible for characterizing the extent of contamination in the soil, soil sampling, treatment of soil if necessary, certifying that the soil meets the FRLs established in the Operable Units 2 and 5 Records of Decision, natural resource restoration, the design and certification activities associated with the on-site disposal facility, and waste acceptance operations associated with the placement of materials into the facility. The project is also responsible for construction activities associated with excavation of soil and debris, placement of soil and debris in the on-site disposal facility, and the construction of the on-site disposal facility liners and caps. The on-site disposal facility's leachate and leak detection monitoring, as well as operation, maintenance, and monitoring of the leachate transmission system are part of the Environmental Closure scope, but are addressed under the Aquifer Restoration/Wastewater Project.

The Fernald site has been divided into nine separate soil remediation areas based on land use history and known contamination levels (refer to Figure 2-1). Area 9 includes off-site soil that was remediated and/or certified. In addition, portions of the site's stream corridors (including Paddys Run), along with other potentially contaminated corridors, will require remediation and are considered unique areas. Other utility corridors and access roads are not included with the remediation areas; these will be addressed following completion of aquifer restoration.

Prior to soil remediation, real-time scanning and soil sampling are performed to gather information related to the extent of surface and subsurface contamination and to identify the impacted materials that meet or exceed the waste acceptance criteria for the on-site disposal facility. Materials that cannot be placed in the on-site disposal facility are stockpiled and/or containerized, monitored, and tracked for off-site disposal. Engineering personnel use the analytical data on extent of contamination to design soil and debris excavations.

Volume Descriptions: Bank and In-Place

Soil/debris can be described as "bank" (in the ground before excavation) or "in-place" (placed and compacted in the on-site disposal facility). When soil is designed and estimated for excavation, the soil volume is calculated by length, width, and height. When the soil is placed in the on-site disposal facility, considerable compaction is achieved, which reduces the volume that is actually in-place at the on-site disposal facility.

In 2005, the project removed over 1,000,000 bank yd^3 (764,600 bank m^3) of contaminated soil and debris, and placed it in the on-site disposal facility. By the year's end, soil remediation activities at the Fernald site were about 94 percent complete, with over 2.75 million in-place yd^3 (2.10 million m^3) of soil and debris (including above-grade decontamination and demolition debris) excavated and placed in the on-site disposal facility. The following soil remedial excavation activities took place in 2005:

- Area 2 (Phase II). Small-scale remedial excavations continued on the western portion of the Storm Water Retention Basin.
- Area 3B/4B/5. Large-scale remedial excavations continued in the former production area, the areas south of the former production area, and in the east parking lot.
- Main drainage corridors between Areas 3A, 3B, 4A, and 4B. Excavation was completed.
- Area 6. Remedial excavations continued in the waste pit area and the former on-site disposal facility material transfer area.
- Area 7. Excavation began in the footprint of Silos 1 and 2, in the former advanced wastewater treatment facility footprint, and the Storm Water Retention Basin footprint.

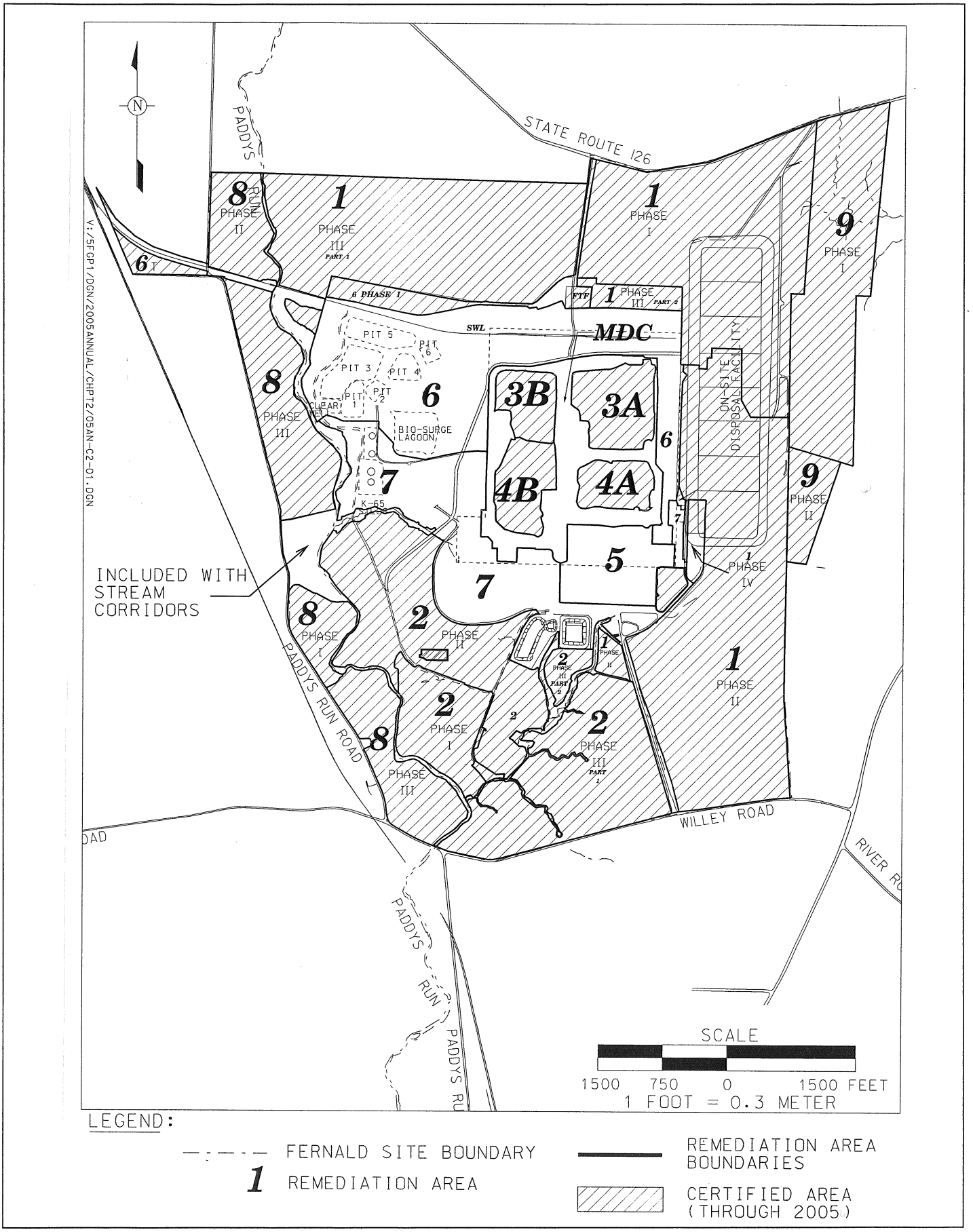


Figure 2-1. Sitewide Soil Remediation and Certified Areas

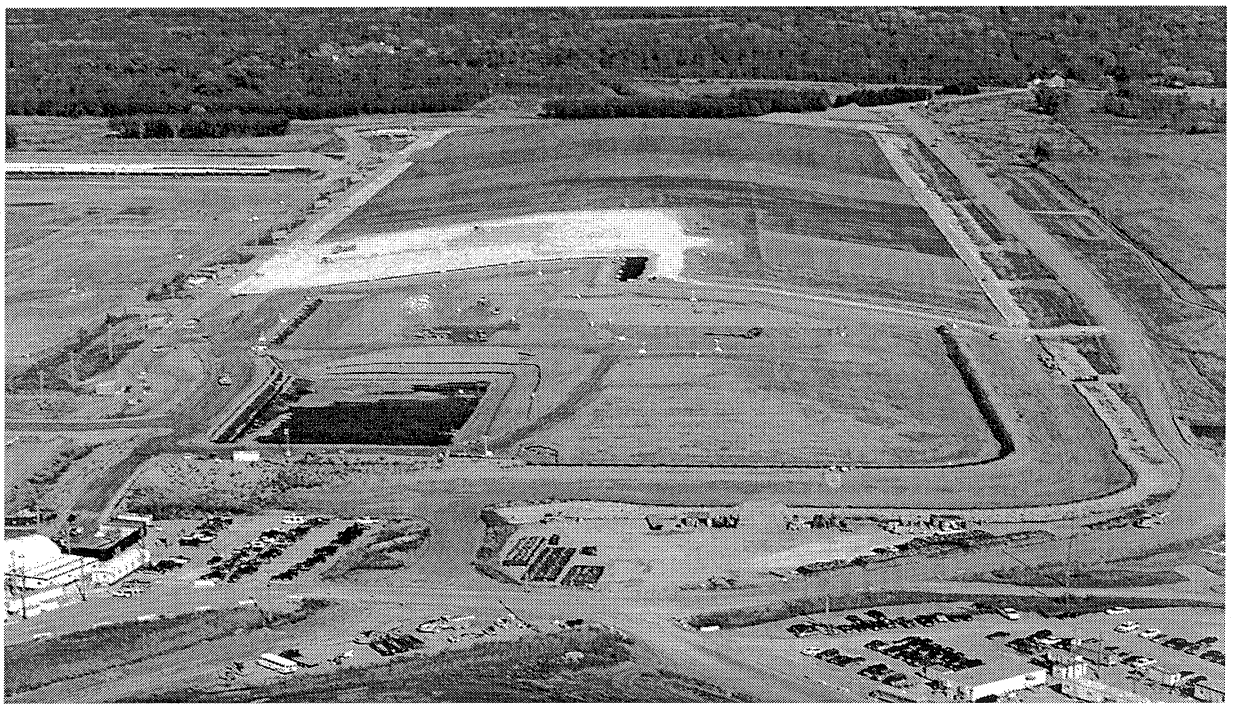
When contaminated soil and debris have been excavated from each area, pre-certification real-time scanning and certification sampling are performed to demonstrate that the residual levels of the constituents of concern for that area are below the Fernald site's soil FRLs. After statistical analyses for an area are reviewed and indicate that concentrations meet certification requirements, a certification report is submitted to EPA and OEPA for review. Upon receipt of EPA and OEPA approval of the certification report, the area is certified as meeting the soil remediation goals.

Figure 2-1 identifies all remediation areas that have been certified as of December 31, 2005. As of December 31, 2005, approximately 86 percent of the Fernald site had been certified. The following areas of the Fernald site were certified or were in the process of certification during 2005:

- Area Stream Corridors, storm sewer outfall ditch; certification approved by OEPA in November and by EPA in December
- Area 2 (Phase II), Subarea 3, impacted material haul road; certification approved by OEPA in July and by EPA in August
- Area 2 (Phase II), Subarea 3, equipment wash facility / subcontractor area / trailer complex area / Aquifer Restoration/Wastewater Project laydown area; certification approved by EPA in December and by OEPA in January 2006
- Area 3A and Area 3B; certification approved by EPA in January and by OEPA in March
- Area 4A, southeast corner of former production area; certification approved by EPA in August and by OEPA in October
- Area 4B, southwest corner of former production area; certification approved by EPA in December and by OEPA in January 2006
- Area 6, waste pits; certification in progress
- Area 9 (Phase III), abandoned outfall line; certification approved by EPA in June and by OEPA in July.

After an area of the site is certified, natural resource restoration activities can begin. Chapter 7 discusses the specific natural resource restoration activities that took place in 2005.

During 2005, approximately 905,000 in-place yd^3 (692,000 m^3) of waste (including some excavated material, debris, etc.) were placed in Cells 5, 6, 7, and 8 of the on-site disposal facility. Cells 5 and 6 were capped in September and October, respectively. Cell 7 is nearly filled to its capacity (94 percent) and the final cover system construction was in progress at the end of the year. Cell 8 has reached approximately 63 percent of its capacity. A discussion of the ongoing performance monitoring of the on-site disposal facility is provided in Chapter 3.



On-site Disposal Facility: Cells 1–5 capped, Cell 6 being seeded, and Cells 7 & 8 impacted material being placed.

2.1.3 Decontamination and Demolition Project

The Decontamination and Demolition Project (Operable Unit 3) is responsible for decontaminating and dismantling the above-grade structures and facilities associated with production operations and remedial actions. This includes decontamination of facilities; isolation of utilities; demolition of buildings, equipment, and other facilities; removal of uranium and other material from former processing equipment; and shipment of material and equipment off-site. The scope includes the collection and proper management of associated decontamination wastewater.

During 2005, decontamination and demolition activities were completed at the following facilities:

- 12E Maintenance Laborer Storage Building
- 12F Maintenance Laborer Storage Building
- 16A Main Electrical Switchyard
- 16C Electrical Panels and Transformer
- 16D Main Electrical Switch House
- 16E Main Electrical Transformers
- 16H 10-Plexes North Substation
- 16J 10-Plexes South Substation
- 18J Sludge Mix Tank
- 18U 50K-Gallon Holding Tank
- 20E Well House #1
- 20F Well House #2
- 24C Locomotive Maintenance Building
- 25C Sewage Lift Station Building
- 25J 10-Plexes Sanitary Lift Station
- 25K New Sewage Treatment Plant Complex
- 26C Main Electrical Substation Riser House
- 28K Security Checkpoint (East Parking Lot)
- 31B Old Truck Scale Foundation and Out Building
- 34A K-65 Storage Tank (Silo 2)
- 34B K-65 Storage Tank (Silo 1)
- 46 Heavy Equipment Building
- 50 Maintenance Storage Building
- 51B Slurry Dewatering Facility
- 51C Advanced Wastewater Treatment Facility Laboratory Expansion Building
- 52A Radiation Tracking Building
- 52B Accelerated Site Technology Deployment Soils Characterization and Excavation Project Building
- 82A Receiving/Incoming Materials Inspection
- 91A Gas Cleaning System/Water Treatment Building
- 91B Material Handling Building
- 91C Railcar Loadout Building
- 91D Railcar Prep and Liner Building
- 91E Maintenance Building
- 91F Warehouse
- 91H GeoSyntec Consultants Lab
- 93A Southwest Boiler House
- 94Y Silos Maintenance Building
- TSS-014 Tension Support Structure #14

Demolition of these 38 structures brings the total number of structures demolished at the Fernald site to 250 out of a total of 323 structures. Additionally, 55 Fernald site trailers were dismantled and either shipped off-site or demolished in 2005.

Structural demolition of the Locomotive Maintenance Building (Component 24C).

2.1.4 Silos Projects

The Silos Project (Operable Unit 4) includes Silos 1 and 2 (also known as the K-65 Silos), Silos 3 and 4, and several nearby structures. Silos 1 and 2 contained radium-bearing residues from the processing of uranium ore and ore concentrates during the 1950s and were demolished in 2005 after completing retrieval of the residues. Silo 3 contains cold metal oxides generated from uranium recovery operations. Silo 4 was never used and was demolished in 2004. The Silos Project remediation activities include the retrieval, processing, and off-site disposal of the residues stored in the silos, as well as decontamination and dismantling of the silo structures and associated facilities.

In 1997, DOE, EPA, and OEPA reached the decision to separate the remediation of Silo 3 material from the remediation of Silos 1 and 2 material and re-evaluate the treatment remedies for both materials. In addition, the Silos 1 and 2 Accelerated Waste Retrieval Project was initiated to provide control of radon in Silos 1 and 2 headspaces and treatment facilities, and safe storage of the Silos 1 and 2 material during the interim period until treatment and disposal can be implemented. Following is a summary of each project's major activities during the year.

2.1.4.1 Silos 1 and 2 Remediation

The Silos 1 and 2 Project initiated the Accelerated Waste Retrieval Project in 1998. The purpose of this project is to address the increasing radon concentrations in the Silos 1 and 2 headspace, as well as issues regarding silo integrity and heterogeneity of the material for the final treatment facility. The project scope includes design, construction, testing, and operation of interim storage facilities to hold the Silos 1 and 2 material until treatment is implemented. The project also includes design, construction, and startup of the Radon Control System to provide control of radon emissions during the construction and operation phases of the Accelerated Waste Retrieval Project, as well as during interim storage and operation of the Silos 1 and 2 full-scale treatment facility. Operation of the Radon Control System to reduce radon concentrations in the Silos 1 and 2 headspaces and waste retrieval equipment continued through the end of the year. The equipment required for transfer of the Silos 1 and 2 material from the silos to the Transfer Tank Area consists of four 750,000-gallon tanks to be used to receive and store the material from Silos 1 and 2, pending transfer to the remediation facility. Transfer of material from Silos 1 and 2 to the Transfer Tank Area was initiated September 22, 2004 and was completed March 1, 2005.

An Explanation of Significant Differences document was approved by EPA on January 18, 2005, following formal public and state review in late 2004. The Explanation of Significant Differences document modified the remedies for Silos 1, 2, and 3 materials to allow for temporary off-site storage at an appropriately licensed facility prior to permanent off-site disposal. The remedies for Silos 1, 2, and 3 material still require on-site processing and packaging of the material in accordance with the previous remedies, followed by off-site disposal at the Nevada Test Site or a permitted commercial facility. Start-up testing of the necessary equipment and facilities for implementation of the revised remedy for Silos 1 and 2 was completed in early 2005, and operation of the facility was initiated May 27, 2005. By the end of 2005, Silos 1 and 2 material was treated, packaged in 2,531 containers, and shipped to an off-site facility for storage, pending permanent disposal. An estimated total of approximately 3,500 containers will be necessary to treat and package Silos 1 and 2 material; completion of treatment and packaging is expected during the first quarter of 2006.

2.1.4.2 Silo 3 Project

In 2001, re-evaluation of alternatives for implementation of Silo 3 remediation was initiated with input from DOE, regulators, and stakeholders to identify the optimal path forward for remediation of the Silo 3 material. This process resulted in a Record of Decision Amendment for Silo 3, which was approved by the EPA on September 24, 2003, documenting the revised remedy, which consists of retrieval, conditioning to the extent practical to reduce dispersability and mobility, and off-site disposal. Construction and start-up testing of facilities for retrieval, conditioning, and packaging of the Silo 3 material were completed during 2004. Due to uncertainty in the availability of off-site disposal capacity, the facilities were maintained in a state of readiness to allow prompt startup, when required, through the end of 2004. In early 2005, a contract was placed with Envirocare of Utah, Inc. for disposal of the Silo 3 material. Operation of the Silo 3 remediation facility was initiated March 23, 2005. By the end of 2005, Silo 3 material was packaged in 1,543 containers and shipped to Envirocare of Utah, Inc. for disposal. An estimated total of approximately 2,300 containers will be required for packaging of Silo 3 material; this packaging is expected to be completed during the first quarter of 2006.

Silos Project remediation facilities.

2.1.5 Aquifer Restoration/Wastewater Project

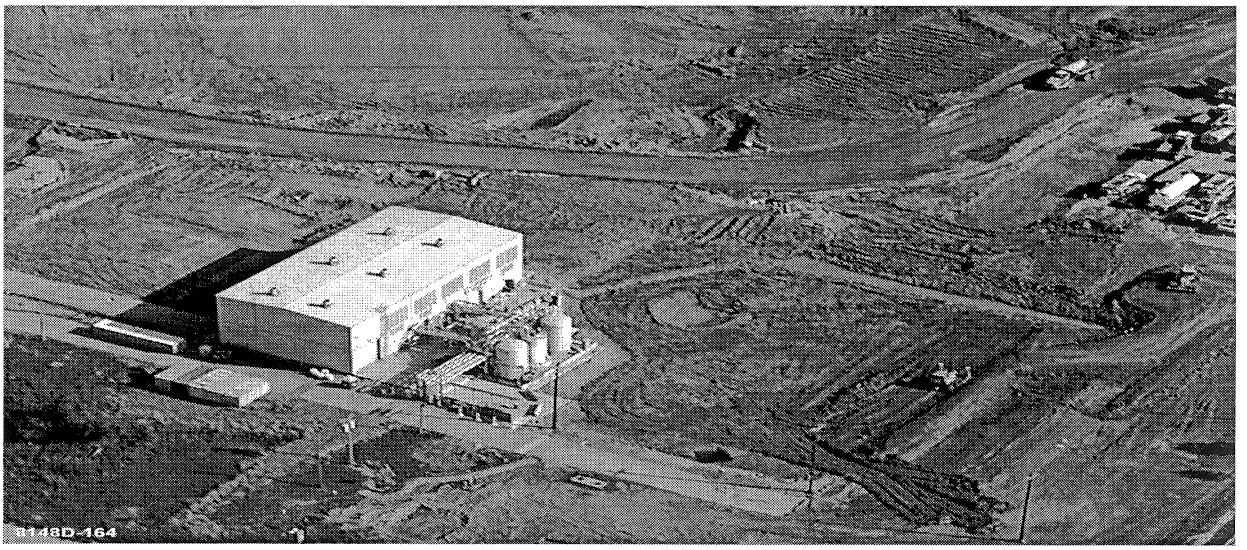
The Aquifer Restoration/Wastewater Project (Operable Unit 5) is responsible for the restoration of water quality in the affected portions of the Great Miami Aquifer and for addressing the Fernald site's water treatment needs. This includes the design, construction, operation, monitoring, and reporting regarding the groundwater restoration and wastewater treatment systems at the Fernald site. This project is also responsible for managing the on-site disposal facility's leak detection monitoring program, as well as operation, maintenance, and monitoring of the leachate transmission system.

In 2005, a total of 1,656 million gallons (6,268 million liters) of groundwater were extracted from the Great Miami Aquifer, and 602 pounds (273 kg) of uranium were removed from the aquifer. Chapter 3 discusses groundwater monitoring.

In May of 2004, EPA and OEPA approved the decision to reduce the size of the advanced wastewater treatment facility in order to address the remaining storm water and long-term groundwater treatment needs at the Fernald site. The converted advanced wastewater treatment facility project received a

DOE Pollution Prevention Award of "Best in Class" for Life Cycle Assessment Decision Making for Post-Closure Wastewater Treatment Facility by reducing disposal, transportation, and infrastructure risks; significantly minimizing waste generation; and achieving cost savings in excess of $17 million. Conversion of the advanced wastewater treatment facility to the converted advanced wastewater treatment facility began in September 2004. Construction work was divided into two stages. During Stage I, the expansion system was reconfigured to meet the scope of continuing treatment needs. During Stage II, infrastructure no longer required to meet treatment needs was removed and a new modular laboratory, control room, and backwash basin were installed. Stage I construction was completed in February 2005. Full-scale operation of the converted advanced wastewater treatment facility began in March and continued through the remainder of the year with occasional shutdowns to accommodate Stage II construction, decontamination, and dismantlement of the out-of-service portions of the advanced wastewater treatment facility, and soil remediation in the vicinity of the converted advanced wastewater treatment facility. Stage II construction began in May 2005. The laboratory and control room portions of Stage II construction were completed in June. Construction of the backwash basin began late in the year, and was scheduled for completion in January 2006. Well field operations were reduced at various times in 2005 to facilitate the completion of modifications to the water treatment system.

Former Advanced Wastewater Treatment facility.



Current converted Advanced Wastewater Treatment facility.

2.2 Summary of Compliance with Other Requirements

CERCLA requires compliance with other laws and regulations as part of remediation of the Fernald site. These other requirements are referred to as applicable or relevant and appropriate requirements (ARARs). ARARs that are pertinent to remediation of the Fernald site are specified in the record of decision for each operable unit. This section highlights some of the major requirements related to environmental monitoring and waste management, and how the FCP complied with these requirements in 2005.

The regulations discussed in this section have been identified as ARARs within the records of decision. The FCP must comply with these regulations while site remediation under CERCLA is underway; compliance is enforced by EPA and OEPA. Some of these requirements include permits for controlled releases, which are also discussed in this section.

2.2.1 Resource Conservation and Recovery Act (RCRA)

RCRA as amended, regulates the treatment, storage, and disposal of hazardous waste and the hazardous part of mixed waste (mixed waste contains both radioactive and hazardous waste components). Hazardous and mixed waste now generated at the Fernald site results from such activities as CERCLA remedial actions and maintenance activities. These wastes are regulated under RCRA and Ohio hazardous waste management regulations; therefore, the Fernald site must comply with legal requirements for managing hazardous and mixed wastes. OEPA has been authorized by EPA to enforce its hazardous waste management regulations in lieu of the federal RCRA program. In addition, hazardous waste management is subject to the 1988 Consent Decree and the 1993 Stipulated Amendment between the State of Ohio and DOE, as well as a series of Director's Final Findings and Orders issued by OEPA.

The FCP completed several administrative activities related to mixed waste storage and treatment during 2005, including:

- Submittal of the 2004 RCRA Annual Report (DOE 2005h), which describes hazardous waste activities for 2004.
- Submittal of the Fiscal Year 2005 Annual Update to the Site Treatment Plan (DOE 2005c) as required in the 1992 Federal Facility Compliance Act and the implementing Director's Findings and Orders issued by OEPA in October 1995.
- Submittal of a revised RCRA Part B Permit Application.

Additional details on projects involving treatment of mixed wastes are provided in subsection 2.2.1.4, Mixed Waste Treatment.

In 2005, the FCP received two Notices of Violation from OEPA. In March, the FCP was cited as being in violation of Ohio Administrative Code (OAC) 3745-52-41 requirements for submitting incorrect information in the 2004 RCRA Annual Report. According to the letter, the FCP had incorrectly reported the EPA Identification Number for two hazardous waste transporters. The information was corrected by OEPA upon entering the information into their database, so no further action was required. In June, the FCP contacted OEPA after two containers of hazardous waste were discovered during decontamination and dismantlement activities at the advanced wastewater treatment facility. The containers had been transported to the advanced wastewater treatment facility for treatment but had not been treated. The FCP was cited for improper storage of the containers, not conducting inspections of the containers while they were in storage, improper labeling of the containers, and missing the June 30, 2004 date for completing treatment of these wastes. The FCP returned to compliance in July when treatment of these wastes was completed.

2.2.1.1 RCRA Property Boundary Groundwater Monitoring

The Director's Findings and Orders, which were signed September 10, 1993, described an alternate monitoring system for RCRA groundwater monitoring. A revision of this document was approved on September 7, 2000 to align with the groundwater monitoring strategy identified in the IEMP. The Property Boundary Groundwater Monitoring program is discussed in Chapter 3.

2.2.1.2 RCRA Closures

The 1993 Stipulated Amendment to Consent Decree required that DOE identify all hazardous waste management units at the Fernald site. As a result, burners, incinerators, furnaces, stills, process equipment, tank units, dust collectors, and other potential waste containment units were evaluated in the early 1990s to determine if they were hazardous waste management units or solid waste management units. This evaluation was completed in 1994. In 1996, OEPA issued Director's Findings and Orders to integrate RCRA closure requirements with CERCLA response actions for the Fernald site hazardous waste management units. In 2005, the FCP completed the remediation of two units: the Plant 1 Pad and the Plant 6 Warehouse (Building 79).

2.2.1.3 Thorium Management

A thorium management strategy to improve the storage of thorium materials at the Fernald site and a schedule to complete RCRA determinations of thorium materials were developed as part of the Stipulated Amendment to the Consent Decree signed in 1991. This strategy is based on three primary objectives:

- To maintain environmentally stable interim storage of the thorium inventory while minimizing personnel radiation exposure.
- To implement actions required in order to complete RCRA evaluations of the thorium materials.
- To implement long-term storage and disposal alternatives.

The Thorium Overpacking Project was completed in 1997. Under this project, the FCP shipped 80,480 cubic feet (ft^3) (2,279 m^3) of thorium material to the Nevada Test Site for disposal. The characterization documentation and formal RCRA waste determinations for the remaining estimated 8,500 containers of thorium legacy waste resumed in 1999.

In 2005, the FCP shipped 1,051 pounds (477 kg) of mixed thorium-contaminated oil to Envirocare of Utah, Inc. for treatment and disposal. At the end of 2005, there were only three containers of thorium-contaminated mixed waste remaining on-site. These containers are planned for shipment to Envirocare of Utah, Inc. in early 2006.

2.2.1.4 Mixed Waste Treatment

The Fernald site stores mixed wastes that are subject to RCRA land disposal restrictions. These restrictions currently prohibit the storage of certain hazardous waste streams for longer than one year unless OEPA approves an extension.

The 1992 amendment to RCRA, the Federal Facilities Compliance Agreement, provided DOE with an exemption from enforcement under the land disposal restrictions storage prohibition as long as DOE sites complied with the plans and schedules for mixed waste treatment. This is identified in the Site Treatment Plan and the implementing Director's Findings and Orders issued by OEPA on October 4, 1995. The FCP submitted the first Site Treatment Plan Annual Update to OEPA in December 1996. These updates are due by December 31 of each year. The annual update describes the status of mixed waste treatment projects developed under the Site Treatment Plan. It also adds newly generated and newly identified mixed waste streams, and certifies that the FCP met all regulatory milestone dates for the treatment of mixed wastes identified in the plan and in the implementing Director's Findings and Orders.

In 2005, 52,248 pounds (23,721 kg) of mixed waste were shipped off-site for treatment and/or disposal, or treated on-site. These include the following waste streams:

- 1,090 pounds (495 kg) of acid were shipped to Perma-Fix in Gainesville, Florida for treatment.
- 2,478 pounds (1,125 kg) of treatability study residues were shipped to Waste Control Specialists in Andres, Texas for treatment.
- 48,680 pounds (22,101 kg) of sludge, debris, and other wastes were shipped to Envirocare of Utah, Inc. for treatment and disposal.
- 519 pounds (236 kg) of uranyl nitrate hexahydrate were neutralized on-site.
- 583 pounds (265 kg) of liquid aqueous mixed wastes meeting National Pollutant Discharge Elimination System (NPDES) Permit requirements, were treated at the advanced wastewater treatment facility and the converted advanced wastewater treatment facility.

2.2.2 Clean Water Act

Under the Clean Water Act as amended, the Fernald site is governed by NPDES regulations that require the control of discharges of non-radiological pollutants to waters of the State of Ohio. The NPDES Permit, issued by the State of Ohio, specifies discharge and sample locations, sampling and reporting schedules, and discharge limitations. The FCP submits monthly reports on NPDES activities to OEPA. The Fernald site's current NPDES Permit, Permit No. 1IO00004*GD, became effective on July 1, 2003. Chapter 4 discusses the surface water and treated effluent information in detail.

2.2.3 Clean Air Act

NESHAP Subpart H imposes a limit of 10 millirem (mrem) per year on the effective dose equivalent to the maximally exposed individual as a result of all air emissions (with the exception of radon) from the facility in a single year. For 2005, the Fernald site was in compliance with the NESHAP dose limit as determined by ambient air monitoring at the Fernald site's boundary.

EPA regulates the Fernald site's radionuclide emission sources through NESHAP; OEPA has authority to enforce the State of Ohio's air standards including particulate, chemical, and toxic emission sources. In 2005, the FCP complied with all emissions standards, as discussed in Chapter 5. The NESHAP Annual Report for 2005 is included as Appendix D of this report.

Several remediation activities, including waste pits remediation, decontamination and dismantling, soil excavation, and on-site disposal facility construction and waste placement, may result in the generation of fugitive dust, which is also regulated by OEPA. Compliance is accomplished by implementing the Fugitive Dust Control Policy negotiated between DOE and OEPA in 1997. This policy is implemented in the Best Available Technology Determination for Remedial Construction Activities on the Fernald Environmental Management Project (DOE 1997b), the requirements of which are incorporated into each operable unit's remedial design and remedial action deliverables. The policy allows for visual observation of fugitive dust and implementation of dust control measures to determine compliance during remediation activities.

2.2.4 Superfund Amendments and Reauthorization Act of 1986

The Superfund Amendments and Reauthorization Act of 1986 (SARA) amended CERCLA and was enacted, in part, to clarify and expand CERCLA Superfund requirements. SARA Title III is also known as the Emergency Planning and Community Right-to-Know Act.

The SARA Title III, Section 312, Emergency and Hazardous Chemical Inventory Report for 2005 was submitted to OEPA, to the Local Emergency Planning Committees of Hamilton and Butler Counties, and to the Crosby Township Fire Department prior to the March 1, 2006 deadline. This report lists the amounts and locations of hazardous chemicals and substances stored or used in amounts greater than the minimum reporting threshold (generally 10,000 pounds [4,540 kg] for "hazardous chemicals," and 500 pounds (107 kg) for "extremely hazardous substances") at any time during the previous year. For 2005, demolition of buildings and facilities and downsizing of the advanced wastewater treatment facility led to further reduction of the types and quantities of chemicals utilized and stored on-site. Several chemicals which had been reported in previous years, no longer exceeded reportable thresholds due to their use or disposition through transfers to other DOE sites, sales, or shipment off-site for treatment and disposal. The major chemicals which exceeded reportable thresholds were those associated with the site-wide excavation and demolition activities (such as diesel fuel) and those used in the Silos 1 and 2 waste treatment project and the Silo 3 waste stabilization project. No new chemicals were above reportable thresholds.

Another SARA Title III report, the Section 313 Toxic Chemical Release Inventory Report (Form R), is required if the Fernald site exceeds an applicable threshold for any SARA 313 chemical. If required, the Toxic Chemical Release Inventory Report lists routine and accidental releases, as well as information about the activities, uses, and waste for each reported toxic chemical. No chemicals have exceeded the threshold for several years. An evaluation to determine if any chemicals used at the FCP during 2005 exceeded reporting thresholds will be completed and will be reported, if required, to EPA and OEPA prior to the July 1, 2005 compliance date. It is anticipated again this year that no chemical will exceed a reporting threshold.

Also under SARA Title III, any off-site release meeting or exceeding a reportable quantity as defined by SARA Title III, Section 304, requires that immediate notifications be made to local emergency planning committees and the state emergency response commission. Notifications are also made to the National Response Center and other appropriate federal, state, and local regulatory entities. All releases occurring at the Fernald site are evaluated and documented to ensure that proper notifications are made in accordance with SARA, and under CERCLA Section 103, RCRA, the Toxic Substances Control Act, the Clean Air Act, the Clean Water Act, and Ohio environmental laws and regulations. Note that in 2005, there were no releases at the Fernald site that met the reporting criteria under CERCLA.

2.2.5 Other Environmental Regulations

The FCP is also required to comply with other environmental laws and regulations in addition to those described above. Table 2-2 summarizes compliance with each of these requirements for 2005.

2.2.6 Other Permits

Permits are the means by which certain environmental laws are implemented. The FCP has permits for controlled releases to surface water. The FCP's permit for discharging water under NPDES regulations is discussed in subsection 2.2.2, Clean Water Act. The only remaining facilities for which Permits to Install were obtained include the Storm Water Retention Basin and Bio-Surge Lagoon. Permits to Install govern the installation (and to a lesser degree, the operation) of specific wastewater treatment and control devices.

Note that both the Bio-Surge Lagoon and Storm Water Retention Basin are expected to be eliminated by early 2006 as a result of continuing remediation progress; and therefore, no Permits to Install will be required at the Fernald site. In 2005, the Bio-Surge Lagoon was removed from operation in March and the west basin of the Storm Water Retention Basin was removed from service in October. The east basin of the Storm Water Retention Basin is expected to be removed from service in early 2006.

All air sources previously covered by air Permits to Operate or Install have either been eliminated or are being addressed through the CERCLA remediation process. Due to this, the FCP has withdrawn all active air Permits to Operate. Therefore, the Fernald site no longer has any air permits associated with its operations.

TABLE 2-2
COMPLIANCE WITH OTHER ENVIRONMENTAL REGULATIONS

Regulation and Purpose	Background Compliance Issues	2005 Compliance Activities
Toxic Substances Control Act (TSCA)		
Regulates the manufacturing, use, storage, and disposal of toxic materials, including polychlorinated biphenyl (PCB) and PCB items.	The last routine TSCA inspection of the FCP's program was conducted by EPA Region V on September 21, 1994. No violations of PCB regulations were identified during the inspection.	Non-radiologically contaminated PCBs and PCB items are shipped to TSCA-approved commercial disposal facilities for incineration on an as-needed basis. Radiologically contaminated PCB liquids were shipped to the TSCA-permitted DOE incinerator in Oak Ridge, Tennessee.
Ohio Solid Waste Act		
Regulates infectious waste.	The Fernald site was registered with OEPA as a generator of infectious waste (generating more than 50 pounds [23 kg] per month) until December 6, 1999, when OEPA concurred with the Fernald site's qualification as a small quantity generator.	All infectious wastes generated in the medical department were transported to a licensed treatment facility for incineration.
Federal Insecticide, Fungicide, and Rodenticide Act		
Regulates the registration, storage, labeling, and use of pesticides (such as insecticides, herbicides, and rodenticides).	The last inspection of the Federal Insecticide, Fungicide, and Rodenticide Act program conducted by EPA Region V on September 21, 1994 found the Fernald site to be in full compliance with the requirements mandated by Federal Insecticide, Fungicide, and Rodenticide Act.	Pesticide applications at the Fernald site were conducted according to federal and state regulatory requirements.
National Environmental Policy Act		
Requires the evaluation of environmental, socio-economic, and cultural impacts before any action, such as a construction or cleanup project, is initiated by a federal agency.	An environmental assessment for proposed final land use was issued for public review in 1998. It was prepared under DOE's guidelines for implementation of **National Environmental Policy Act**, 10 CFR 1021. The assessment requires consulting the public before any decisions on land use are made; it includes previous DOE commitments.	No **National Environmental Policy Act** activities were required in 2005.
Endangered Species Act		
Requires the protection of any threatened or endangered species found at the site as well as any critical habitat that is essential for the species' existence.	Ecological surveys conducted by Miami University and DOE, in consultation with the Ohio Department of Natural Resources, and the U.S. Fish and Wildlife Service, have established the following list of threatened and endangered species and their habitats existing on site: Cave salamander, state-listed endangered — marginal habitat, none found; Sloan's crayfish, state-listed threatened — found on northern sections of Paddys Run; Indiana brown bat, federally listed endangered — found in riparian areas along Paddys Run.	No endangered species surveys were conducted in 2005.

TABLE 2-2
(Continued)

Regulation and Purpose	Background Compliance Issues	2005 Compliance Activities
Floodplains/Wetlands Review Requirements		
DOE regulations require a floodplain/wetland assessment for DOE construction and improvement projects.	A wetlands delineation of the Fernald site, completed in 1992 and approved by the U.S. Army Corps of Engineers in August 1993, identified 36 acres (15 hectares) of freshwater wetland on the Fernald site property. Updated delineations are conducted approximately every five years.	No assessments were performed in 2005.
National Historic Preservation Act		
Establishes a program for the protection, maintenance, and stewardship of federal prehistoric and historic properties.	The Fernald site is located in an area of sensitive historic and prehistoric cultural resources that are eligible for or on the National Register of Historic Places. These cultural resources include historic structures, buildings, and bridges, plus Native American villages and campsites.	No cultural resource surveys were necessary in 2005. Monitoring for unexpected discoveries was conducted during site-wide field activities.
Native American Graves Protection and Repatriation Act		
Establishes a means for Native American Indians to request the return or "repatriation" of human remains and other cultural items. Federal agencies must return human remains, associated funerary objects, sacred objects, and objects of cultural patrimony to the Indian Nations or Tribes with cultural affiliation to the remains or material.	Native American Indian remains have been discovered during remediation activities at the Fernald site. Native American Indian remains and artifacts have been removed or left in place, with consultation from Native American Indian Nations, Tribes, and Groups.	No Native American remains were discovered or repatriated to Native American Indian Nations, Tribes, or Groups in 2005. As stated above, monitoring for unexpected discoveries was conducted during site-wide field activities.
Natural Resource Requirements Under CERCLA and Executive Order 12580		
Requires DOE to act as a Trustee (i.e., guardian) for natural resources at its federal facilities.	DOE and the other Trustees, which include the U.S. Department of the Interior, the U.S. Fish and Wildlife Service, OEPA, the Ohio Attorney General's Office, and EPA, meet regularly to discuss potential impact to natural resources and to coordinate Trustee activities. The Trustees also interact with the Fernald Citizens Advisory Board and Community Reuse Organization.	In 2005, the Trustees and DOE continued to pursue settlement of the 1986 Natural Resource injury claim at Fernald. While the components of restoration have been established through a 2001 Memorandum of Understanding (DOE 2001c) and restoration of the site continues, the Trustees and DOE continue to negotiate issues such as maintenance and monitoring at the Fernald site.

2.2.7 Pollution Prevention and Source Reduction

The FCP is actively involved in an effort to reduce solid, hazardous, radioactive, and mixed-waste generation, and eliminate or minimize pollutant releases to all environmental media during remediation. As part of the Annual Waste Reduction Report under DOE Order 5400.1 (DOE 1990), the FCP submitted the Fernald site's summary of waste generated and pollution prevention progress (DOE 2005a), which is available from the DOE's pollution prevention website (http://www.eh.doe.gov/p2). This report includes 2005 data on waste quantities generated and avoided, as well as narrative text describing pollution prevention and waste minimization efforts and their effectiveness.

Various waste streams were recycled during 2005, including toner cartridges (approximately 0.17 tons [0.15 metric tons]), scrap tires (approximately 8.4 tons [7.6 metric tons]), and scrap metal (approximately 93 tons [84 metric tons]). The following approximate amounts of wastes were shipped to approved recycle centers or treatment facilities in 2005:

- 52,851 pounds (23,994 kg) of lead acid batteries for recycle
- 432 pounds (196 kg) of nickel-cadmium batteries for recycle
- 197,093 pounds (89,480 kg) of used oil for recycle
- 3,150 pounds (1,430 kg) of electrical waste (fluorescent light tubes) for recycle.

The FCP's affirmative procurement program involves source reduction and the use of EPA-designated materials to increase the market for recovered materials. In accordance with Executive Order 13101, Greening of the Government Through Waste Prevention, Recycling and Federal Acquisition, the FCP generates an annual report demonstrating compliance with this order.

2.2.8 Site-Specific Regulatory Agreements

2.2.8.1 Federal Facility Compliance Agreement

In July 1986, DOE entered into a Federal Facility Compliance Agreement with EPA, which requires the Fernald site to:

- Maintain a continuous sample collection program for radiological constituents at the treated effluent discharge points and report the results to EPA, OEPA, and the Ohio Department of Health. The sampling program to address this requirement has been modified over the years and is currently governed by an agreement reached with EPA and OEPA that became effective May 1, 1996. These data are reported through IEMP reports (refer to Appendix B of this report).

- Maintain a sampling program for daily flow and total uranium at the South Plume extraction wells and report the results to the EPA, OEPA, and Ohio Department of Health. The sampling program conducted to address this requirement has also been modified over the years and is currently governed by the agreement reached with EPA and OEPA on May 1, 1996. These data are reported through IEMP reports (refer to Appendix A of this report).

2.2.8.2 Federal Facility Agreement, Control, and Abatement of Radon-222 Emissions

The Federal Facility Agreement between DOE and EPA, signed in November of 1991, ensures that DOE takes all necessary actions to control and abate radon-222 emissions at the Fernald site, under the authority of 40 CFR 61, Subpart Q. This agreement acknowledges that Silos 1 and 2 exceed the radon flux rate of 20 picoCuries per square meter per second (pCi/m^2/sec). But it allowed the FCP to address this exceedance by implementing a removal action (installation of a bentonite cap in 1991) to bring radon emissions from the silos to a level as low as reasonably achievable (ALARA), and to attain the NESHAP Subpart Q standard upon completion of final remediation. The Federal Facility Agreement also requires demonstration of compliance with the Subpart Q standard upon completion of remedial actions for the waste pits, clearwell, and any other sources found to contain radium-226 in sufficient concentrations to emit radon in excess of 20 pCi/m^2/sec. Chapter 5 further discusses the results of the Radon Monitoring program for 2005.

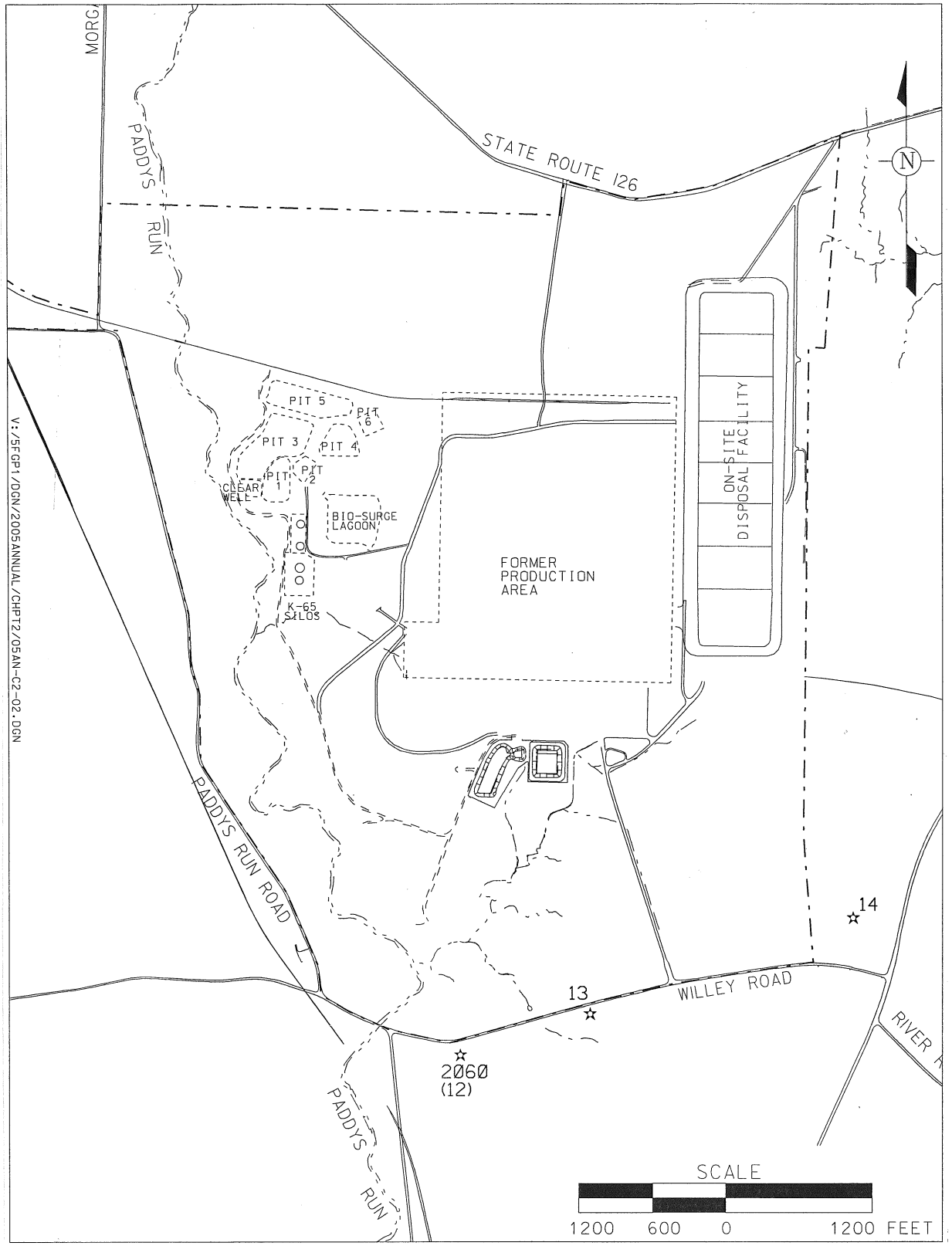
2.2.9 Environmental Management Systems Requirement

DOE has required that sites develop and implement Environmental Management Systems as a means of systematically planning, implementing, evaluating, and improving processes and actions undertaken to achieve environmental goals. This requirement is specified in DOE Order 450.1, Environmental Protection Program, which directs that sites implement an Environmental Management Systems by December 2005. As a CERCLA remediation site, the Fernald site has progressed through, or is in the process of implementing, similar steps of investigation, risk evaluation, remedy selection, planning, execution, and evaluation. During 2004, the Fernald site conducted a cross-reference comparison of the elements of the Environmental Management Systems approach versus the systematic method of addressing environmental issues identified under the CERCLA-driven approach. The comparison demonstrated that the substantive elements of an Environmental Management Systems are satisfied through implementation of the CERCLA program at the Fernald site. In addition, the Fernald site's Integrated Safety Management System integrates environmental management into the overarching safety program in place at the Fernald site. The FCP's Safety Management System Description (DOE 2005e) defines "safety" as including all aspects of environmental, safety, and health including pollution prevention and waste minimization. Recognizing the remediation of the Fernald site through existing programs and processes as defined in the closure contract and CERCLA remediation documentation, the DOE Ohio Field Office has acknowledged that the Fernald site meets the intent of DOE Order 450.1 and no modification of the contract was required to incorporate the Order after its issuance.

2.3 Split Sampling Program

Since 1987, DOE has participated in the split sampling program with the state. Split samples are obtained when technicians alternately add portions of a sample to two individual sample containers. This collection method helps ensure that both samples are as identical as possible. The split samples are then submitted to two different analytical laboratories; this allows for an independent comparison of data to ascertain laboratory analysis and field quality assurance. In addition to split sampling, OEPA performs some independent sampling. Results are provided in OEPA's Annual Report to the Public on the FCP.

In 2005, DOE and OEPA cooperated in the split sampling program. Samples of groundwater were split; refer to split sample locations in Figure 2-2. The results are provided in Table 2-3. The data from the split sampling program show reasonable agreement between DOE and OEPA results for groundwater.



LEGEND:

— · — · — FERNALD SITE BOUNDARY

☆ SAMPLE LOCATION

Figure 2-2. 2005 DOE and OEPA Groundwater Split Sample Locations

TABLE 2-3
2005 DOE/OEPA SPLIT SAMPLING COMPARISON

Media	Sample Location	Sample Date	Constituent	DOE Result	OEPA Result	FRL
Groundwater[a]				(µg/L)	(µg/L)	(µg/L)
	2060 (12)	April	Total Uranium	53	47.7	30
	2060 (12)	October	Total Uranium	87.3	100	30
	13	April	Total Uranium	15.1	No result	30
	13	October	Total Uranium	10.9	11.2	30
	14	April	Total Uranium	4.7	3.70	30
	14	October	Total Uranium	3.28	3.46	30

[a]Refer to Figure 2-2 for groundwater split sample locations.