Attachment B

Post-Closure Care and Inspection Plan

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Acronyms and Abbreviations

ARARs	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
LM	U.S. Department of Energy Office of Legacy Management
EPA	U.S. Environmental Protection Agency
FFCA	Federal Facility Compliance Agreement
ft	feet
GWLMP	Groundwater/Leak Detection and Leachate Monitoring Plan
HWMU	Hazardous Waste Management Unit
IC Plan	Institutional Controls Plan
IEMP	Integrated Environmental Monitoring Plan
LCS	leachate collection system
LDS	leak detection system
LMICP	*Comprehensive Legacy Management and Institutional Controls Plan*
mg/kg	milligram per kilogram
OAC	*Ohio Administrative Code*
ODNR	Ohio Department of Natural Resources
OSDF	on-site disposal facility
OU	operable unit
PCCIP	Post-Closure Care and Inspection Plan
pCi/g	picocuries per gram
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
ROD	record of decision
WAC	waste acceptance criteria

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1.0 Introduction

This Post-Closure Care and Inspection Plan (PCCIP) covers the long-term care of the Fernald Preserve's on-site disposal facility (OSDF) and its associated buffer area. This plan has been developed to address reasonably expected circumstances that may arise during the post-closure care period, or legacy management, of the Fernald Preserve. Other relevant key concepts addressed by this PCCIP are ownership, access controls and restrictions, deed and use restrictions, environmental monitoring, inspections (scheduled, unscheduled, and contingency), custodial maintenance, contingency repair, corrective actions, emergency notification and reporting, and public involvement.

The PCCIP has undergone several revisions and became part of the *Comprehensive Legacy Management and Institutional Controls Plan* (LMICP) in January 2006.

1.1 Plan Scope and Duration

This PCCIP establishes the inspection, monitoring, and maintenance activities necessary to ensure the continued proper performance of the OSDF. The facilities and structures covered by this PCCIP include the following:

- Security system (e.g., fences, gates, warning signs).
- Permanently surveyed benchmarks, corner monuments, and cap survey anchors.
- OSDF run-on/runoff controls.
- OSDF final cover (referred to as the "cap").

As specified in the Records of Decision (RODs) and in accordance with appropriate regulations, the initially established duration of the post-closure care period is 30 years, subject to potential future modification. The applicable regulations are the Ohio solid waste rule (*Ohio Administrative Code* [OAC] 3745-27-14[A]) in lieu of federal solid waste regulation (Title 40 *Code of Federal Regulations* [CFR] §258.61[a]), and Ohio hazardous waste rules OAC 3745-66-17 and 3745-68-10 in lieu of federal hazardous waste regulations 40 CFR §§265.117(a)(1) and 264.117(a)(1), respectively. Care and maintenance of the OSDF will continue in perpetuity.

1.2 Plan Organization

The remainder of this plan is organized as follows:

- The remainder of Section 1.0 presents a description of the parties responsible for this plan and the support plans that are to be used in conjunction with this plan.
- Section 2.0 addresses the requirements pertinent to this plan.
- Section 3.0 addresses final site conditions at closure of the OSDF.
- Section 4.0 addresses institutional controls and points of contact.
- Section 5.0 addresses environmental monitoring.
- Section 6.0 addresses routine scheduled inspections.

- Section 7.0 addresses unscheduled inspections.
- Section 8.0 addresses custodial maintenance and contingency repair.
- Section 9.0 addresses corrective actions.
- Section 10.0 addresses emergency notification and reporting.
- Section 11.0 addresses public involvement.
- Section 12.0 presents references.

1.3 Responsible Parties

The governing document for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions at the Fernald Preserve is the Amended Consent Agreement between the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) Region V, signed in September 1991. Responsibility for implementation of the PCCIP lies with DOE as the lead agency responsible for CERCLA activities at the Fernald Preserve and with EPA as the oversight agency. The DOE Office of Legacy Management (LM) has the ultimate authority for ensuring that the post-closure care of the OSDF meets all the goals, standards, specifications, and requirements of this PCCIP.

1.4 Related Plans

Several other support plans have been prepared for the OSDF remedial action project and should be used in conjunction with this plan, or referred to for information on how contaminated materials were placed into the OSDF. The other plans containing information relevant to this plan are listed below with a brief statement of the relationship to this plan. These plans are accessible either electronically or in hard copy.

- *Permitting Plan and Substantive Requirements for the On-Site Disposal Facility* (DOE 1998): Identifies the administrative and substantive requirements for the National Pollutant Discharge Elimination System permit, and the substantive requirements for all of the operable units' (OUs') on-site disposal needs for the Wetlands Nationwide Permit, the Ohio Solid Waste Permit to Install, and the Resource Conservation and Recovery Act (RCRA) permit; additionally, discusses how the requirements relate to the OSDF, presents the plan for compliance with the requirements, and discusses additional applicable or relevant and appropriate requirements (ARARs) that are not related to the issuance of a specific permit.
- *Construction Quality Assurance Plan; On-Site Disposal Facility* (GeoSyntec 2001a): Contains procedures used to evaluate soils and other features of the OSDF liner and final cover system.
- *Final Design Criteria Package; On-Site Disposal Facility* (GeoSyntec 1997): Provides the design of the OSDF and includes the *Final Remedial Design Work Plan*, which presents the design approach for the OSDF.
- *Impacted Materials Placement Plan; On-Site Disposal Facility* (GeoSyntec 2005): Outlines waste acceptance criteria (WAC) for the OSDF and contains procedures used to place the contaminated materials into the OSDF.

- *Surface Water Management and Erosion Control Plan; On-Site Disposal Facility* (GeoSyntec 2001b): Provides details of permanent erosion and sediment controls and surface water controls for the OSDF, including maintenance requirements for channels and sediment controls.
- Groundwater/Leak Detection and Leachate Monitoring Plan (Attachment C to the LMICP): Provides details on the leak detection monitoring program for the OSDF, addresses monitoring within the OSDF in the leachate collection system (LCS) and leak detection system (LDS), and the underlying groundwater in the till immediately underneath the OSDF and the groundwater in the Great Miami Aquifer.
- *Systems Plan, Collection and Management of Leachate for the On-Site Disposal Facility* (DOE 2001): Describes the inspection, monitoring, and maintenance activities that will be undertaken at the Fernald Preserve to collect and manage leachate collected from the OSDF.
- Integrated Environmental Monitoring Plan (IEMP) (Attachment D to the LMICP): Defines the environmental monitoring and reporting requirements, including post-closure requirements.
- *Work Plan for Removal and In-Place Abandonment of the OSDF Cell 1 Final Cover Monitoring System* (GeoSyntec 2006): Explains the process used to remove and abandon in place the Cell 1 final cover monitoring system.

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2.0 Pertinent Requirements

2.1 Overview

Regulatory and other requirements pertinent to this plan primarily take the form of ARARs and to-be-considered criteria as determined by the ROD for each of the various Fernald Preserve OUs, functional requirements, and general design criteria. These are addressed in the following subsections.

2.2 Pertinent Requirements

ARARs and to-be-considered criteria that should be addressed by this plan are provided in Table 2–1 as obtained from the *Final Record of Decision for Remedial Actions at Operable Unit 2* (DOE 1995a), the *Final Record of Decision for Remedial Actions at Operable Unit 5* (DOE 1996a), and the *Operable Unit 3 Record of Decision for Final Remedial Action* (DOE 1996b), as identified by an *X* in the appropriate column. Additional regulatory requirements that are appropriate guidance for development or maintenance of this plan have been identified and are indicated by an *X* in the *Permitting Plan and Substantive Requirements for the On-Site Disposal Facility* (DOE 1998) column but no *X* in the previous columns.

2.3 Functional Requirements

The Final Design Criteria Package (GeoSyntec 1997) contains a variety of functional requirements that have been established for the OSDF. The functional requirements pertinent to this plan are to:

- Protect the OSDF from damage caused by precipitation and storm water run-on and runoff.
- Route run-on and runoff to designated diversion channel locations for appropriate management.
- Discharge surface water to existing watercourses in accordance with applicable regulatory and DOE requirements.

The surface water management system should be maintained such that it will continue to perform in a manner that meets the project requirements for long-term conditions (i.e., after site physical completion). The system should prevent storm water run-on to the OSDF and uncontrolled storm water runoff from the OSDF. Features of the long-term surface water management system were constructed to require minimal monitoring and maintenance. The system was integrated, to the extent possible, with existing topography, features, and facilities.

2.4 General Design Criteria

The OSDF Design Criteria Package also identifies a number of general design criteria for the OSDF. The general design criteria pertinent to this plan are:

- Long-term erosion and sediment control features for the OSDF were designed for the 2,000-year, 24-hour storm event (design criterion for assumption of a DOE Performance Category 2 facility).
- Long-term run-on/runoff control structures for the OSDF were designed to limit interruption and damage (i.e., washout) of the OSDF in the 2,000-year, 24-hour storm event (design

criterion for assumption of a DOE Performance Category 2 facility); run-on should be controlled and diverted away from and around the OSDF using swales, channels, or diversion berms.

Table 2–1. ARARs and To-Be-Considered Criteria

#	Title	Requirements	OU2 ROD	OU3 ROD	OU5 ROD	OSDF Permitting Plan
		PLANS				
1	Ohio Municipal Solid Waste Rules—Sanitary Landfill Facility Permit to Install Application OAC 3745-27-06(C)(7)	• Prepare a post-closure plan as detailed in OAC 374-27-11(B).	X	X	X	X
		• Prepare a leachate monitoring plan to ensure compliance with OAC 3745-27-19(M)(4).	X	X	X	X
		• Prepare a leachate contingency plan as required by OAC 3745-27-19(K)(6).	X	X	X	X
		• Prepare a groundwater detection monitoring plan as required by OAC 3745-27-10 and, if applicable, a groundwater quality assessment plan and/or corrective measures plan required by OAC 3745-27-10.	X	X	X	X
2	Ohio Municipal Solid Waste Rules—Final Closure of Sanitary Landfill Facility OAC 3745-27-11(B)	The owner shall prepare a post-closure plan which shall contain: • The name and location of the facility and unit(s) included in the plan. • A description of the post-closure activities. • The name, address, and telephone number of the person or office to contact regarding the unit(s) of the facility during the post-closure care period. The Ohio Environmental Protection Agency (Ohio EPA) shall be notified of any changes.			X	X
3	Ohio Hazardous Waste Interim Standards Rules—Post-Closure Plan: Amendment of Plan OAC 3745-66-18(A) and (C)	The owner of a hazardous waste disposal unit shall have a written post-closure plan, which shall identify the activities that will be carried on after closure of each unit and the frequency of those activities, and include at least: • A description of the planned monitoring activities and frequencies at which they will be performed. • A description of the planned maintenance activities and frequencies at which they will be performed, to ensure (a) the integrity of the cap and final cover or other containment systems, and (b) the function of the monitoring equipment. • The name, address, and telephone number of the person or office to contact about the hazardous waste disposal unit or facility during the post-closure period.				X

Table 2–1 (continued). ARARs and To-Be-Considered Criteria

#	Title	Requirements	OU2 ROD	OU3 ROD	OU5 ROD	OSDF Permitting Plan
CLOSURE AND POST-CLOSURE OBJECTIVES						
4	Ohio Municipal Solid Waste Rules—Final Closure of a Sanitary Landfill Facility OAC 3745-27-11(H)	At final closure of a landfill facility: • All land surfaces shall be graded to prevent ponding of water where solid waste has been placed. Drainage facilities shall be provided to direct surface water from the landfill facility. • A groundwater monitoring system shall be designed and installed in accordance with OAC 3745-27-10, if a system is not already in place.	X	X		X
5	Ohio Municipal Solid Waste Rules—Final Closure of a Sanitary Landfill Facility OAC 3745-66-11(O)	Closure of the sanitary landfill facility must be completed in a manner that minimizes post-closure formation and release of leachate to surface water to the extent necessary to protect human health and the environment.	X	X		X
6	Ohio Hazardous Waste Interim Standards Rules—Closure Performance Standard OAC 3745-66-11	The owner shall close his facility in a manner that: • Minimizes the need for further maintenance. • Controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the groundwater, or surface waters, or to the atmosphere. • Complies with closure requirements.		X	X	X
7	Ohio Hazardous Waste Landfill Rules—Closure and Post-closure OAC 3745-68-10(A) (in lieu of 40 CFR § 265.310[a])	At final closure of the landfill, the owner or operator must cover the landfill with a final cover designed and constructed to: • Provide long-term minimization of migration of liquids through the closed landfill. • Function with minimum maintenance. • Promote drainage and minimize erosion or abrasion of the cover. • Accommodate settling and subsidence so that the cover's integrity is maintained. • Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoil present.		X	X	X

Table 2–1 (continued). ARARs and To-Be-Considered Criteria

#	Title	Requirements	OU2 ROD	OU3 ROD	OU5 ROD	OSDF Permitting Plan
8	Ohio Municipal Solid Waste Rules—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19-(J)(1) and (4)	Surface water shall be diverted from areas where solid waste has been deposited. The facility shall be designed, constructed, maintained, and provided with surface water control structures, as necessary, to control run-on and runoff of surface water to ensure minimal infiltration of water through the cover material and cap system, and minimal erosion of the cover material and cap system. If ponding or erosion occurs on areas of the landfill facility where solid waste had been deposited, action will be taken to correct the conditions causing the ponding or erosion.	X	X	X	X
9	Ohio Municipal solid Waste Rules—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19(E)(26)	The integrity of the engineered components of the landfill facility shall be maintained and any damage to, or failure of, the components shall be repaired.	X	X	X	X
DURATION OF POST-CLOSURE CARE PERIOD						
10	Ohio Municipal Solid Waste Rules— Post-Closure Care of Sanitary Landfill Facilities OAC 3745-27-14(A) (in lieu of RCRA Subtitle D)	Following completion of final closure activities in accordance with OAC 3745-27-11, post-closure care activities shall be conducted at the sanitary landfill facility for a minimum of 30 years.	X	X	X	X
11	Ohio Hazardous Waste Interim Standards Rules— Post-Closure Care and Use of Property OAC 3745-66-17(A) (in lieu of 40 CFR §265.117[a][1])	Post-closure care must begin after completion of the unit and continue for 30 years after that date, unless shortened or extended by the Ohio Director of Environmental Protection in accordance with OAC 3745-66-18(G) (40 CFR §265.117[a][2]). Note: Identified in OU5 ROD as applicable only to existing Hazardous Waste Management Units (HWMUs).			X	
12	Ohio Municipal Solid Waste Rules— Post-Closure Care of Sanitary Landfill Facilities OAC 3745-27-14(A)(1) and (2) (in lieu of RCRA Subtitle D)	Post-closure care activities for all sanitary landfill facilities shall include, but are not limited to: • Continuing operation and maintenance of the leachate management system, surface water management system, and the groundwater monitoring system. • Maintaining the integrity and effectiveness of the cap system, including making repairs to the cap system as necessary to correct the effects of erosion and preventing run-on and runoff from eroding or otherwise damaging the cap system.	X	X	X	X

Table 2–1 (continued). ARARs and To-Be-Considered Criteria

#	Title	Requirements	OU2 ROD	OU3 ROD	OU5 ROD	OSDF Permitting Plan
13	Ohio Hazardous Waste Interim Standards Rules—Post-Closure Care and Use of Property OAC 3745-66-17(A)(1) (in lieu of 40 CFR §265.117[a][1])	Post-closure care must consist of at least the following: • Monitoring and reporting. • Maintenance and monitoring of waste containment systems. Note: Identified in OU5 ROD as applicable only to existing HWMUs.			X	
14	Ohio Hazardous Waste Landfill Rules—Closure and Post-Closure OAC 3745-68-10(B) (in lieu of 40 CFR §265.310[b])	After final closure, the owner or operator must comply with post-closure requirements, including maintenance and monitoring throughout the post-closure care period. The owner or operator must: • Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events. • Continue to operate the leachate collection and removal system until leachate is no longer detected. • Maintain and monitor the LDS. • Maintain and monitor the groundwater monitoring system. • Prevent run-on and runoff from eroding or otherwise damaging the final cover. • Protect and maintain surveyed benchmarks.		X	X	X
15	Ohio Hazardous Waste Landfill Rules—Closure and Post-Closure OAC 3745-68-10(D) (in lieu of 40 CFR§ 265.310[b])	During the post-closure period, the owner of a hazardous waste landfill must: • Maintain the function and integrity (integrity and effectives) of the final cover. • Maintain and monitor the leachate collection, removal, and treatment system to prevent excess accumulation of leachate in the system. • Protect and maintain surveyed benchmarks.		X	X	X
MODIFICATIONS TO POST-CLOSURE CARE PLAN OR PERIOD						
16	Ohio Hazardous Waste Interim Standards Rules—Post-Closure Plan; Amendment of Plan OAC 3745-66-18(D)	The owner may amend the post-closure plan any time during the active life of the facility or during the post-closure period.				X
17	Ohio Hazardous Waste Interim Standards Rules—Post-Closure Plan; Amendment of Plan OAC 3745-66-18(G) (continued on next page)	The post-closure plan and length of the post-closure care period may be modified any time prior to the end of the post-closure care period. A modification of the post-closure plan may include, where appropriate, the temporary suspension rather than permanent deletion of one or more post-closure care requirements. At the end of specified period of suspension, the Ohio Director of Environmental Protection would then				X

Table 2–1 (continued). ARARs and To-Be-Considered Criteria

#	Title	Requirements	OU2 ROD	OU3 ROD	OU5 ROD	OSDF Permitting Plan
		determine whether the requirements should be permanently discontinued or reinstated to prevent threats to human health and the environment.				
PROPERTY USE RESTRICTIONS						
18	Ohio Hazardous Waste Interim Standards Rules—Post-Closure Care and Use of Property OAC 3745-66-17(C) (in lieu of 40 CFR §265.117[c])	Post-closure use of property on or in which hazardous wastes remain after partial or final closure must never be allowed to disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the facility's monitoring systems, unless the Ohio Director of Environmental Protection approves otherwise. Note: Identified in OU5 ROD as applicable only to existing HWMUs. Note: If clean closure is performed, then post-closure care is not required.			X	
19	Ohio Hazardous Waste Landfill Rules—Closure and Post-Closure OAC 3745-68-10(D)(5)	During the post-closure period, the owner of a hazardous waste landfill must restrict access to the landfill as appropriate for its post-closure use.		X	X	X
20	Ohio Municipal Solid Waste Rules—Final Closure of a Sanitary Landfill Facility OAC 3745-27-11-(H)(5)(a)	The owner shall file—with the board of health having jurisdiction, with the county recorder of the county in which the facility is located, and with the Ohio Director of Environmental Protection—a plat of the unit(s) of the sanitary landfill facility and information describing the acreage, exact location, depth, volume, and nature of the solid waste deposited in the unit(s) of the sanitary landfill facility.		X		X
21	Ohio Hazardous Waste Interim Standards Rules—Survey Plat OAC 3745-66-16	The owner shall submit—to the local zoning authority, or the authority with jurisdiction over local land use, and to the Ohio Director of Environmental Protection—a survey plat, prepared and certified by a professional land surveyor, indicating the location and dimensions of landfill cells or other hazardous waste disposal units with respect to permanently surveyed benchmarks. The plat must contain a note, prominently displayed, which states the owner's obligation to restrict disturbance of the hazardous waste disposal unit in accordance with OAC 3745-66-17(C).		X		X
22	Ohio Hazardous Waste Interim Standards Rules—Post-Closure Notices OAC 3745-66-19(A)	The owner shall submit—to the local zoning authority, or the authority with jurisdiction over local land use, and to the Ohio Director of Environmental Protection—a record of the type, location, and quantity of hazardous wastes disposed of within each cell or disposal unit of the facility.				X

Table 2–1 (continued). ARARs and To-Be-Considered Criteria

#	Title	Requirements	OU2 ROD	OU3 ROD	OU5 ROD	OSDF Permitting Plan
		DEED NOTATION				
23	Ohio Municipal Solid Waste Rules—Final Closure of a Sanitary Landfill Facility OAC 3745-27-11(H)(5)(b)	The owner shall record a notation on the deed to the sanitary landfill facility property, or on some other instrument which is normally examined during title search, that will notify in perpetuity any potential purchaser of the property that: • The land has been used as a sanitary landfill facility. • Includes information describing acreage, exact location, depth, volume, and nature of solid waste deposited in the sanitary landfill facility.	X	X		X
24	Ohio Hazardous Waste Interim Standards Rules—Post-Closure Notices OAC 3745-66-19(B)	The owner shall record, in accordance with state law, a notation or the deed of the facility property, or on some other instrument which is normally examined during title search, that will notify in perpetuity the potential purchasers of the property that: • The land has been used to manage hazardous wastes. • Its use is restricted under the Ohio Administrative Code closure and post-closure rules. • The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each cell or hazardous waste unit of the facility as required by OAC 3745-66-16 and 3745-66-19(A) have been filed with the local zoning authority or the authority with jurisdiction over local land use and with the Ohio Director of Environmental Protection.				X
25	Ohio Hazardous Waste Interim Standards Rules—Post-Closure Notices OAC 3745-66-19(C)	If the owner or any subsequent owner of the land upon which a hazardous waste disposal unit was located wishes to remove hazardous wastes and hazardous waste residues in satisfaction of the criteria in OAC 3745-66-17(C), the owner may request that the Ohio Director of Environmental Protection approve either or the following: • The removal of the notation on the deed to the facility property or other instrument normally examined during title search. • The addition of a notation to the deed or instrument indicating the removal of the hazardous waste.				X

Table 2–1 (continued). ARARs and To-Be-Considered Criteria

#	Title	Requirements	OU2 ROD	OU3 ROD	OU5 ROD	OSDF Permitting Plan
OTHER DOE CRITERIA						
26	Disposal Site Closure/Post-Closure DOE Order 5820.2A, Chapter III (3)(j)—This order has been replaced with DOE Order 435.1 Chg 1.	• During post-closure, residual radioactivity levels for surface soil shall comply with existing DOE decommissioning guidelines. • Inactive disposal facilities, disposal sites, and disposal units shall be managed in conformance with RCRA, CERCLA, and the Superfund Amendments and Reauthorization Act of 1986, as amended. • Corrective measures shall be applied to new disposal sites or individual disposal units if conditions occur or are forecasted that could jeopardize attainment of the performance objectives [of the unit]. • Termination of monitoring and maintenance activity at closed facilities or sites shall be based on an analysis of site performance at the end of the institutional control period.	X	X	X	
27	Environmental Monitoring DOE Order 5820.2A, Chapter III(3)(k)—this order has been replaced with DOE Order 435.1 Chg 1.	I.1.E.(7) Environmental Monitoring. Radioactive waste management facilities, operations, and activities shall meet the environmental monitoring requirements of DOE Order 5400.1, *General Environmental Protection Program*; and DOE Order 5400.5, *Radiation Protection of the Public and the Environment*. IV.R.(3)(a) The site-specific performance assessment and composite analysis shall be used to determine the media, locations, radionuclides, and other substances to be monitored. IV.R.(3) Disposal Facilities. • (C) The environmental monitoring programs shall be capable of detecting changing trends in performance to allow application of any necessary corrective action prior to exceeding the performance objectives in this chapter.	X	X	X	

2.5 Other Requirements

In addition to the requirements contained in the OSDF Design Criteria Package, the following requirements have been incorporated into this plan:

- Disturbed areas should be stabilized (i.e., vegetated) after the area has been reconstructed to final grade.
- General practices for inspection and maintenance of erosion and sediment control features should be as recommended by the Ohio Department of Natural Resources Division of Soil and Water Conservation document *Rainwater and Land Development: Ohio's Standards for Storm Water Management, Land Development, and Urban Stream Protection* (ODNR 2006 or its most current revision).

Other criteria relevant to this plan consist of those industry standard practices that have proven effective at other waste disposal facilities. Inspection and monitoring requirements from the manufacturers and suppliers of material and equipment installed at the OSDF are also criteria relevant to this plan.

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3.0 Final Site Conditions

3.1 Site History

In July 1986, DOE and EPA signed a Federal Facilities Compliance Agreement (FFCA), addressing impacts to the environment associated with the federally operated site known as the Fernald Environmental Management Project. DOE agreed to conduct the FFCA investigation as a remedial investigation/feasibility study in accordance with guidelines of CERCLA. In November 1989, the Fernald Site was included on the EPA National Priorities List. The FFCA was later amended by the June 1990 Consent Agreement between DOE and EPA, which was further modified by amendment in September 1991.

In accordance with the September 1991 Amended Consent Agreement, EPA approved and signed the OU2 ROD on June 8, 1995; the OU5 ROD on January 31, 1996; and similarly, the OU3 ROD for Final Remedial Action on September 24, 1996. The design of the OSDF, as currently developed, is presented in the *Final Design Criteria Package; On-Site Disposal Facility* (GeoSyntec 1997). The Final Design Criteria Package includes the *Final Remedial Design Work Plan for Remedial Actions at OU2* (DOE 1995b), which presents the design approach for the OSDF and which was submitted to EPA in August 1995 and subsequently approved in November 1995. The Ohio Environmental Protection Agency (Ohio EPA), which actively participated throughout the CERCLA response process, also concurred with the documentation and decisions to date.

The OSDF was constructed to permanently contain impacted materials derived from the remediation of the OUs at the Fernald Site. All material placed in the OSDF was required to meet OSDF WAC. The OU2 ROD established radiological WAC of 346 picocuries per gram (pCi/g) of uranium-238 or 1,030 milligrams per kilogram (mg/kg) total uranium for all soil and soil-like impacted material destined for the OSDF. Similarly, the OU5 ROD established additional radiological and chemical WAC for OU5 soils destined for the OSDF. The OU3 ROD established radiological WAC for debris materials destined for the OSDF of 105 grams technetium-99. These radiological/chemical WAC have been compiled and presented in Table 3–1. The impacted materials sent to the OSDF from OU3 may also have included small material contributions from OUs 1 and 4. Any material from OUs 1 and 4 destined for the OSDF met the OU3 WAC. In addition to the radiological/chemical WAC discussed above, the *Impacted Materials Placement Plan* (GeoSyntec 2005) presents physical WAC for the OSDF.

The volume of the impacted material that was destined for disposal in the OSDF was originally estimated at 2.9 million cubic yards (2.2 million cubic meters) bank/unbulked. Approximately 80 percent of this volume was expected to consist of impacted soil, and the remainder would be building demolition rubble, fly ash, lime sludge, municipal solid waste, and small quantities of miscellaneous other materials. After soil and soil-like material, debris from demolition of buildings in the former production area was expected to constitute the largest volume of impacted material for OSDF disposal. The OU3 ROD indicates that impacted debris could be assigned to one of ten material categories. Only material from seven of these categories was disposed of in the OSDF. The seven material categories of impacted debris allowed for disposal in the OSDF are presented in Table 3–2, which also gives descriptions of the materials making up the categories.

Table 3–1. On-Site Disposal Facility Waste Acceptance Criteria

#	Constituent of Concern	Soil[a]		Debris[b]
		OU2	OU5[d]	OU3
	Radionuclides:			
1	Neptunium-237		3.12×10^{9} pCi/g	105 g
2	Strontium-90		5.67×10^{10} pCi/g	
3	Technetium-99		29.1 pCi/g	
4	Uranium-238	346 pCi/g		
	Total Uranium	1,030 mg/kg	1,030 mg/kg	
	Inorganics:			
5	Boron		1.04×10^{3} mg/kg	
6	Mercury[c]		5.66×10^{4} mg/kg	
	Organics:			
7	Bromodichloromethane		9.03×10^{-1} mg/kg	
8	Carbazole		7.27×10^{4} mg/kg	
9	Alpha-chlordane		2.89 mg/kg	
10	Bis (2-chlorisopropyl) ether		2.44×10^{-2} mg/kg	
11	Chloroethane		3.92×10^{5} mg/kg	
12	1,1-Dichloroethene[c]		11.4 mg/kg	
13	1,2-Dichloroethene[c]		11.4 mg/kg	
14	4-Nitroaniline		4.42×10^{-2} mg/kg	
15	Tetrachloroethene[c]		128 mg/kg	
16	Toxaphene[c]		1.06×10^{5} mg/kg	
17	Trichloroethene[c]		128 mg/kg	
18	Vinyl chloride[c]		1.51 mg/kg	

[a] maximum concentration
[b] maximum total mass
[c] RCRA-based constituent of concern
[d] Constituents that have established maximums that serve as WACs; other compounds that will not exceed designated Great Miami Aquifer action levels within 1,000-year performance period, regardless of starting concentration in the OSDF, are not listed.
Sources:
OU2 ROD (DOE 1995a)
OU3 ROD (DOE 1996b)
OU5 ROD (DOE 1996a)

Table 3–2. OU3 Material Categories and Descriptions

Category A **Accessible Metals**	**Category B** **Inaccessible Metals**	**Category D** **Painted Light Gauge Metals**	**Category E** **Concrete**	**Category G** **Non-regulated Asbestos-Containing Material**	**Category H** **Regulated Asbestos-Containing Material**	**Category I** **Miscellaneous Materials**
Structural and miscellaneous steel	• Doors • Conduit/wire/ cable tray • Electrical wiring and fixtures • Electrical transformers • Miscellaneous electrical items • HVAC equipment • Material handling equipment • Process equipment • Miscellaneous equipment • Piping	• Ductwork • Lead flashing • Louvers • Metal wall and roof panels	• Asphalt • Slabs • Columns • Beams • Foundations • Walls • Masonry • Clay piping	• Ceiling demolition • Feeder cable • Fire brick • Floor tile • Transite wall and roof panels	• Ductwork insulation • Piping insulation • Personal protective equipment • Copper scrap metal pile	• Polyvinyl chloride (PVC) conduit • Basin liners • Fabric • Drywall • Building insulation • Miscellaneous debris • Personal protective equipment • PVC piping • Roofing build-up • Process trailers • Non-process trailers • Windows • Wood

Source: Table 4–2, OU3 Material Categories/Description, OU3 ROD (DOE 1996b).
Note: Only those seven material categories allowed for on-site disposal according to the OU3 ROD are presented.

3.2 Location and Description of the OSDF Area

A pre-design investigation was performed to define the most suitable location for the OSDF within an identified area at the Fernald Site, based on the OU2 and OU5 Remedial Investigation/Feasibility Study. The results of that investigation are presented in the *Pre-design Investigation and Site Selection Report for the On-site Disposal Facility* (DOE 1995c). The report, its objectives, and its results are summarized below.

The identified best area is located on the east side of the Fernald Site property and measures approximately 2,000 feet (ft) east to west by 5,300 ft north to south. This location was considered the best location for an OSDF because it has the greatest thickness of gray clay, which provides a protective layer over the underlying Great Miami Aquifer. Fate and transport modeling and risk assessments in the OU2 and OU5 feasibility studies have shown that a disposal facility in this area, based on a feasible facility design and a 12-ft-thick gray clay layer, would be protective of human health and the environment. The identified best area is bounded on the north, east, and south using the Ohio EPA siting requirements (buffer from property line and water supply wells). The western boundary incorporates areas with greater than 12 ft of gray clay, with the exception of the northern portion of the west boundary line, which was determined based on identification of sand lenses within the gray clay.

Planning meetings between DOE, EPA, and Ohio EPA resulted in a pre-design investigation that had three objectives (identified in Table 3–3). Results of the pre-design investigation served as the basis for selecting the location within the identified best area for siting the OSDF. The selected location, measuring 800 ft east to west by 4,300 ft north to south, provided suitable space for the estimated 2.5 million cubic yards of impacted materials and met applicable Ohio EPA siting requirements. The gray clay thickness is greater than the minimum 12-ft thickness established in the OU2 ROD (DOE 1995a) for protection of the Great Miami Aquifer; the gray clay is actually greater than 15 ft thick within the selected location, and approximately 75 percent of the selected location has a 20- to 50-ft thickness of gray clay. The investigation identified minimal amounts of interbedded granular material, none of which would offer a rapid migration pathway through the gray clay.

3.3 OSDF As-Built

The design approach for the OSDF is presented in the *Final Remedial Design Work Plan for Remedial Actions at Operable Unit 2* (DOE 1995b). The design approach of the OSDF, as currently developed, is presented in the *Final Design Criteria Package; On-Site Disposal Facility* (GeoSyntec 1997). The design of the OSDF includes a liner system, impacted material placement, final cover system, leachate management system, surface water management system, and other ancillary features.

As-built conditions of the completed OSDF are documented with a set of as-built record drawings and photographs. These drawings were developed by DOE or its contractor, and were used to prepare the topographic map discussed in this section. This information illustrates baseline conditions for comparison to future conditions during the post-closure period. These drawings will be used to document changes in the physical site conditions of the OSDF over time and to develop a corrective action plan, if required. The drawings are accessible at the site, either electronically or in hard copy.

Table 3–3. Pre-Design Investigation Objectives and Field Components

#	Objective	Field Components
1	Identify the most suitable hydrogeology within the identified best area	Verification of the gray clay thickness Identification of interbedded granular material
2	Verify protection of human health and the environment	Verification of existing vertical and horizontal uranium contamination Actual uranium solubility Uranium retardation Lateral and vertical gradients Background concentrations of uranium in water in the vadose zone
3	Develop field information for the design of the OSDF	Location and extent of interbedded granular material Obtain geotechnical information in the footprint of the OSDF

The final OSDF site map was compiled from a final topographic map of the Fernald Site. The final topographical survey was conducted in accordance with the standards of the *Manual of Photogrammetry* (ASPRS 1980). The following specifications were used in developing the map, in accordance with the appropriate regulations (Ohio solid waste rules OAC 3745-27-06[B][2] and 3745-27-11[H][5][a], and Ohio hazardous waste general new facility rule OAC 3745-54-18 and hazardous waste interim status facility rule OAC 3745-66-16):

- A scale of 1 inch = 200 ft (1 mm = 2.4 m).
- A contour interval of 5 ft (1.5 m).
- A coverage area of the OSDF site and a distance of 1,000 ft.
- North arrow displayed.

In addition to existing topography, the maps will define the following:

- Property lines of the land owned by DOE.
- Limits of impacted material placement.
- Outline of the toe and crest of the OSDF.
- The individual phases/cells of the OSDF.
- OSDF site property boundaries, fences, gates, and access roads.
- Location and extent of permanent storm water run-on and runoff control features.
- Vegetation, streams, lakes, springs, and other surface waters.
- Survey control stations/benchmarks.

- Permanent site surveillance features (e.g., monuments, markers, signs).
- Wetlands (if any) within the limits of impacted material placement and within 200 ft of the limits of impacted material placement.
- Limits of a regulatory floodplain (i.e., 100-year floodplain as depicted on a federal insurance administration flood map, according to OAC 3745-27-01 and 3745-54-18[B]).
- Site coordinate system.
- Existing residences, land uses, zoning classifications, property ownership, political subdivisions, and communities.
- Underground utilities (sewers, water lines, electric cables), field tiles, French drains, pipelines.
- Location (if any) within 200 ft of the limits of impacted material placement of any fault which has had displacement in Holocene time (OAC 3745-54-18[A]).
- All public and private water supply wells within 2,000 ft of the limits of impacted material placement (using a scale insert if necessary), and the current status of each, including depth, use, and where applicable, abandonment date, based on publicly available information.

  Note: DOE plans to update information on water supply wells only during the CERCLA 5-year reviews.

These as-built drawings were submitted to EPA and Ohio EPA. The map will be revised as part of the CERCLA 5-year review, if necessary. When the OSDF map is updated, the revised map will include the year of revision, the revision number, and the type of the activity or event that triggered the need for the revision. No revision was identified during the 2011 CERCLA 5-year review.

All drawings, disposal facility site maps, and photographs will be archived. DOE is responsible for maintaining and archiving these maps, drawings, and photographs as part of the OSDF permanent record.

3.4 OSDF Baseline Photographs

A photographic record of the final conditions after closure of the final cell of the OSDF is included and maintained in the OSDF permanent site file. This record consists of a series of aerial and ground photographs that provide a baseline visual record of final site construction and final site conditions to complement the as-built drawings. In particular, this set of aerial photographs provides a permanent record of site conditions, enabling future inspectors to monitor changes in site conditions (e.g., erosion patterns, vegetation changes, land use) over time. The need for new aerial photographs will be evaluated at the CERCLA 5-year reviews. Table 3–4 summarizes the anticipated specifications for the aerial photographs.

Table 3–4. Aerial Photography Specifications

Area to be photographed	Final disposal site plus a minimum of 0.25 mile (0.4 kilometer) beyond its boundaries unless site conditions require otherwise.
Products to be delivered	One set of vertical color, infrared stereo contact prints; glossy, double-weight, not trimmed; 9 inch × 9 inch (230 millimeters [mm] × 230 mm): Scale: 1 inch = 200 ft (1 mm = 2.4 meters) (1:2,400) Index map showing flight lines and frame numbers: Scale: 1 inch = 1,000 ft (1:12,000) One set of natural color, low oblique photographs taken from a minimum of two different angles with 90-degree rotation. If 35mm or 70mm film is used, glossy double-weight 8-inch × 10-inch enlargements; if 9-inch × 9-inch format is used, glossy double-weight contact prints.
Flight date	To be determined; mid to late summer, at peak of photosynthetic response of vegetation, unless the flight is to be used exclusively for topographic mapping.
Camera	Vertical photos: Precision, 9-inch × 9-inch (230 mm × 230 mm) format. Oblique photos: A 35-millimeter (single lens reflex) or larger format camera is acceptable.
Film	Vertical photos: Eastman-Kodak Aerochrome Infrared 2443 or its equivalent. Oblique photos: Eastman-Kodak Aerocolor Negative Film 2445 or its equivalent.
Filter	Infrared (vertical) photos: Wratten No. 12 or No. 15. Color (oblique) photos: Skylight.
Flight line coverage	60 percent end overlap; 30 percent average side overlap.
Ground control	Control stations will be second order, Class 1, for horizontal control, and third order for vertical control (standard U.S. Geological Survey map accuracy specifications).

3.5 OSDF Site Inspection Photographs

Photographs are taken annually and during the quarterly site inspections to document conditions at the OSDF and its surrounding permanent features. These photographs provide a continuous record for monitoring changing conditions over time. The photographs can be compared with the baseline photographs to monitor site integrity.

Each photograph is recorded individually in a site-inspection photo log. An appropriate description of the feature photographed will be entered into the log. If possible, a photograph will include a reference point such as a survey monument, boundary monument, site marker, or monitoring well.

For specific areas where a photograph is used to monitor change over time, the photo location and the azimuth should be recorded, and all subsequent photographs should be taken from the same orientation to provide an accurate picture of changing conditions.

Copies of quarterly site-inspection photographs will be included in inspection reports. Annual inspection photographs are posted on Geospatial Environmental Mapping System (GEMS), a Web-based application used to manage and provide agencies and the public with Internet access to electronic data (http://www.lm.doe.gov/Fernald/Sites.aspx). All site-inspection photographs taken, as well as all corresponding photo log forms, will be maintained in the permanent OSDF file.

Quarterly inspection photographs typically include cell cap side slopes and associated drainages. Photographs used for inspection follow-up are taken as needed. Additional OSDF features are documented with annual photographs. Table 3−5 summarizes the type and frequency of photo-documentation.

Table 3–5. Site Features, Photo Frequency, and Reporting Mechanisms

Features	Frequency	Reporting Mechanism
Permanent site surveillance features	Annually	GEMS
Inner and outer drainages	Quarterly	Reports
Fences, gates, warning signs, access roads, perimeter roads, paths, toe, and drainages	Annually	GEMS
The OSDF (top, sides, buffer area, and surrounding area). Panoramic sequences of photographs from selected vantage points may be used for this purpose.	Annually	GEMS
Any evidence of erosion (e.g., gullies, rivulets, rills) that the inspector considers significant and documents in the inspection notes	As needed	Reports
Any evidence of burrowing animals	As needed	Reports
Any off-OSDF features that may affect the OSDF in the future and that the inspector considers significant and documents in the inspection notes	As needed	Reports
General vegetation (OSDF side slope), presence of woody vegetation and invasive plant species	Quarterly	Reports
General vegetation (OSDF top slope and buffer area), presence of woody vegetation and invasive plant species	Annually	GEMS
Any evidence of ponded water	As needed	Reports
Erosion protection material (riprap)	As needed	Reports
Evidence of leachate seeps	As needed	Reports
Survey control points for local coordinate system	Annually	GEMS
Damaged monitoring wells	As needed	Reports

Features that are designated with an “As needed” frequency will usually be photographed only if specific follow-up inspection is required. In addition to the above, any new or potential problem areas identified during an inspection will be documented with photographs. Photographs can also be taken to record developing trends and to allow inspectors to make reasonable decisions concerning additional inspections, custodial maintenance or repairs, or corrective action.

4.0 Institutional Controls and Points of Contact

4.1 Introduction

This section discusses the institutional controls that will be in place for the OSDF and its buffer area during the post-closure care period (legacy management). The IC Plan (Volume II of the LMICP) is the enforceable governing document for institutional controls for the Fernald Preserve, and this PCCIP provides supporting details for the OSDF. Table 4–1 presents a compilation of the institutional controls for the OSDF and its buffer area, as identified in the OU2 and OU5 RODs. Environmental monitoring (item 5), inclusive of groundwater monitoring (item 4), is discussed in Section 5.0 of this PCCIP. This PCCIP, in general, addresses the maintenance program (item 6). The remainder of Section 4.0 discusses the remaining items (1, 2, and 3).

Table 4–1. Institutional Controls as Key Components in the RODs

#	Component	OU2 ROD	OU5 ROD
Institutional Controls			
1	Ownership	The selected remedy will include the following as institutional controls: "continued federal ownership of the [OSDF] site" [2a]	"Institutional controls, such as . . ."[5a] "property ownership will be maintained by the federal government of the area comprising the [on-site] disposal facility and associated buffer areas"[5b]
2	Access Controls/ Restrictions	"access restrictions (fencing)"[2a]	"access controls"[5a]
3	Deed Notations/ Use Restrictions	"restrictions on the use of property will be noted on the property deed before the property could be sold or transferred to another party" [2c]	"deed restrictions"[5a] ; "if portions of the Fernald property [outside the disposal facility area] are transferred or sold at any future time, restrictions will be provided in the deed, and proper notifications will be provided as required"[5b]
4	Groundwater Monitoring Program	"groundwater monitoring"[2a] . . . "following closure of the on-site disposal facility"[2b]	See entry 5 below, but not identified as an institutional control
Other Key Components of the Selected Remedy			
5	Environmental Monitoring program	See entry 4 above.	"long-term environmental monitoring program"[5a]
6	Maintenance Program	"maintenance of the on-site disposal facility"[2b]	"maintenance program to ensure the continued protectiveness of the remedy"[5a]

[2a]Declaration, Description of the Selected Remedy, p. D-2, OU2 ROD (DOE 1995a).
[2b]Decision Summary, Section 9.1 Key Components, p. 9-2, OU2 ROD (DOE 1995a).
[2c]Responsiveness Summary, Section 3.0 Summary of Issues and Responses, Issue 7 C Future Use/Ownership, p. RS-3-33, OU2 ROD (DOE 1995a).
[5a]Declaration Statement, Description of the Selected Remedy, p. D-ii, OU5 ROD (DOE 1996a).
[5b]Decision Summary, Section 9.1 Key Components, p. 9-18, OU5 ROD (DOE 1996a).

4.2 Points of Contact

Points of contact by either the name or position title, address, and telephone number of the person or office to contact about the OSDF during the post-closure care period are provided in Table 4–2, in accordance with appropriate regulations (Ohio solid waste rule OAC 3745-27-11[B][3] in lieu of federal solid waste regulation 40 CFR §258.61[c][2], and Ohio hazardous waste rules OAC 3745-66-18[C][3] and 3745-68-10 in lieu of federal hazardous waste regulations 40 CFR §§265.118[c][3] and 264.118[b][3], respectively). Table 4–2 presents the on-site points of contact and an emergency contact number that is accessible 24 hours a day. These points of contact will serve to ensure that access to the facility will be possible for appropriate authorized personnel after closure and in the case of an emergency. An updated copy of this plan will be maintained at each of the locations identified in Table 4–2.

Table 4–2. Points of Contact

	Title of Contact	Telephone	Mailing Address
1	LM	513-648-3148	10995 Hamilton-Cleves Highway Harrison, Ohio 45030-9728
2	S.M. Stoller	513-648-3894	10995 Hamilton-Cleves Highway Harrison, Ohio 45030-9728
3	DOE Grand Junction 24-hour number	877-695-5322	N/A

Due to the duration of the post-closure period, DOE anticipates that the points of contact are likely to change over time. DOE will notify the regulatory agencies of any changes to the points of contact via modification to this PCCIP.

4.3 Ownership

As presented in item 1 of Table 4–1, property ownership of the area comprising the OSDF and its associated buffer areas will be maintained by the federal government (e.g., DOE or a successor federal agency).

4.4 Access Controls/Restrictions and Security Measures

As long as the federal government maintains property ownership, access to the OSDF will be restricted by means of fences, gates, and warning signs. Access to those areas within the fencing will be controlled by DOE authorization and will be limited to personnel for inspection, custodial maintenance, corrective actions, or other DOE-authorized activity. The fences, gates, and warning signs are covered by the inspection and custodial maintenance components of the post-closure care program implemented under this PCCIP (refer to Sections 7.0 and 9.0) and the IC Plan (Volume II of the LMICP).

To provide additional security, a warning sign with the following information will be placed on the access gates to the OSDF:

- The name of the site.
- The international symbol indicating the presence of radioactive material.

- A notice that trespassing is forbidden on this U.S. Government-owned site.
- A local DOE telephone number and a 24-hour DOE emergency telephone number; this same 24-hour telephone number will be recorded in agreements with local agencies to notify DOE in the event of an emergency or breach of site security or integrity.
- In addition to the entrance signs, weather-resistant signs are mounted on the chain-link fence surrounding the OSDF at approximately equal spacing. The signs have the international symbol indicating the presence of radioactive material and state the following:

CAUTION
Underground Radioactive Material,
Contact Site Manager Prior to Entry
513-910-6107

The effectiveness of site security measures (e.g., fence condition, locked gate) will be monitored through routine scheduled site inspections (refer to Section 6.0).

4.5 Deed Notations and Use Restrictions

If management of the OSDF is transferred from DOE to another federal entity, real estate restrictions will be included in the deed, and proper notifications will be provided as required by the appropriate rules and regulations. Specific details and the exact language appropriate to the specific parcels of property will need to be developed and inserted at the time the deed notice is recorded.

In such an event, signed certification that the notation in the deed has been recorded will be submitted to the EPA regional administrator and the Ohio Director of Environmental Protection in accordance with appropriate regulations (Ohio solid waste rule OAC 3745-27-11[H][5] in lieu of federal solid waste regulation 40 CFR §258.60[I], and Ohio hazardous waste rules OAC 3745-66-19[A] and [B], and 3745-68-10[B] in lieu of federal hazardous waste regulations 40 CFR §§265.119[b][1] and 264.119[b][1]), accompanied by a copy of the document in which the notation has been placed.

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5.0 Environmental Monitoring

5.1 Introduction

The primary element of environmental monitoring associated with the OSDF post-closure care period is groundwater monitoring. This section describes the focus and scope of the plans for the groundwater monitoring that is continuing for the OSDF.

5.2 Groundwater Monitoring

Groundwater monitoring for the OSDF is currently presented in the OSDF Groundwater/Leak Detection and Leachate Monitoring Plan (GWLMP) (Attachment C to the LMICP). The focus of that plan is the leak detection monitoring program for the OSDF, addressing monitoring both within the OSDF (in the LCS and LDS) and the underlying groundwater (in the till layer immediately underneath the OSDF and the groundwater in the Great Miami Aquifer). Although the temporal coverage of that plan began in part prior to the placement of impacted material/remediation waste into the OSDF, its coverage continues during the legacy management of the site. The GWLMP will be revised over time to address monitoring needs; DOE will complete any revisions in consultation with EPA and Ohio EPA.

If a leak is detected from the OSDF, DOE will consult with EPA and Ohio EPA in accordance with the requirements established in the GWLMP for notifications and response actions.

5.3 Monitoring of Other Media

All environmental monitoring is covered by both the GWLMP and the IEMP. Monitoring under the IEMP indicates the additional media to be monitored (e.g., surface water, sediment) and includes sampling frequencies and constituents to be analyzed.

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6.0 Routine Scheduled Inspections

6.1 Introduction

This section establishes inspection techniques and frequency as required by the appropriate regulations (Ohio hazardous waste rules OAC 3745-66-18[A] and [C] in lieu of federal hazardous waste regulations 40 CFR §§264.118[b][2] and 265.118[c][2]). Components covered by these inspections are:

- Security system (e.g., fences, gates, locks, warning signs).
- Final cover system.
- Run-on and runoff control systems.
- Surveyed benchmarks—at least three third-order benchmarks on separate sides of the OSDF within easy access to the limits of waste/impacted materials placement (Ohio solid waste rule OAC 3745-27-08[C][7][a]–[c], and Ohio hazardous waste rule OAC 3745-68-10[D][4] in lieu of federal hazardous waste regulation 40 CFR §265.310[b][6]).

6.2 Routine Facility Inspections

Discussed in this section are those background details and preliminary considerations necessary to conduct routine scheduled site inspections, including the inspection team, frequency and timing of inspections, and inspection aids. Also discussed are the procedures for routine scheduled site inspections.

6.2.1 Preliminary Considerations

6.2.1.1 Frequency and Timing of Inspections

Routine scheduled inspections were conducted quarterly at the OSDF until the closure of the Fernald Closure Project. The objective of these inspections was to establish and record physical modifications to the OSDF through many seasonal cycles and to provide a basis for decisions regarding future inspections. Inspections consist of a cap “walkover” as well as an evaluation of fencing, drainages, roads, etc. Walkover inspections were conducted quarterly for 2 years following completion of cells 7 and 8. After the 2-year period, the frequency was to be reevaluated. Since October 2008, 2 years after completion of the OSDF, the OSDF cap inspections were conducted semiannually, in spring and fall. During the winter months, safely accessing the OSDF and scheduling of the inspection is difficult due to frequent inclement weather. During the summer months, vegetation on the majority of the cap is so dense that walking on the cap is difficult, and visibility of the ground surface is greatly reduced, limiting the quality of the actual inspection. These conditions have become more prevalent during the spring walkdown. Therefore, complete cap walkover are now conducted annually in the fall, after mowing and baling is completed. If mowing of the cap is delayed until spring, then the annual walkover will take place within one month following the spring mow. Inspection of the institutional controls related to the OSDF (fencing, signs, locks, etc.) continues to occur quarterly as part of the point-specific institutional control inspections. Areas of recent revegetation and repair activities will continue to be inspected quarterly. The frequency may also be re-evaluated

through the CERCLA 5-year review process. No significant changes to the inspection frequency were identified during the 2011 CERCLA 5-year review.

Should the inspectors find that weather conditions at the site are not conducive to making a complete and thorough inspection, they will use the opportunity to observe and record changes to the cover, diversion channels, and other site features. The remainder of the inspection tasks will then be rescheduled to a more favorable day.

6.2.1.2 Inspection Team

The inspection team for routine scheduled inspections will consist of a chief inspector and one or more assistants. The minimum number on a team is two; more can be assigned depending on the conditions expected at the site at the time of inspection. If only two inspectors are assigned, one will be a geotechnical or civil engineer, and the second will be an ecologist. Prior to each inspection, DOE or its contractor will determine the size of the inspection team. EPA and Ohio EPA will be notified of the scheduled dates and times of these routine inspections so they may send representatives to accompany the inspection team.

Quarterly OSDF inspections shall be led by site personnel that are familiar with inspection requirements, maintenance, and management of the cap. For annual cap walkovers, the chief inspector will have a degree in civil engineering or soil mechanics, and at least 5 years of experience (or an equivalent amount of experience and education) in projects involving the planning and implementation of earthen structure designs. Where possible, the chief inspector will have made at least one site inspection as an assistant inspector. Assistant inspectors will have degrees and experience complementing the chief inspector, as appropriate, for the expected site conditions. Assistants will have a minimum of 3 year's experience (or an equivalent amount of experience and education) in their field. Prior to each inspection, DOE or its contractor will designate the chief inspector and assistants.

6.2.1.3 Familiarization with Site Characteristics

The site inspection team will become familiar with the OSDF site by reviewing this PCCIP, and the most recent inspection report.

6.2.1.4 Preparations for Conducting Site Inspections

After site familiarization, the inspection team must make preparations to conduct the field inspection. This requires the inspection team to:

- Obtain approval to enter adjacent property (if required).
- Assemble the equipment needed to conduct the inspection. Equipment may include such items as cameras, binoculars, tape measure, GPS unit, optical ranging devices, Brunton compass or equivalent, photo scale stick, erasable board, additional signs, and wire flags.

6.2.2 Conduct of OSDF Inspection

The primary objective of the routine scheduled OSDF inspection is to identify potential problems at an early stage prior to the need for significant maintenance or repairs. The inspection team will be guided by a knowledge and understanding of the processes that could adversely change the

disposal facility. A fundamental part of the inspection will be the detection of change, and particularly the progressive change, over a number of years due to slow processes. The inspection will include the following:

- Security of fences, gates, and locks, as well as the condition of applicable warning signs.
- General health and density of the vegetation cover.
- Presence of any deep-rooted, woody species.
- Evidence of burrowing by animals on the cover.
- Presence, depth, and extent of erosion or surface cracking, indicating possible cap deterioration.
- Visibly noticeable subsidence, either localized or over a large area, especially that will allow for the ponding of water.
- Presence and extent of any leachate seeps.
- Integrity of run-on and runoff control features.
- Integrity of benchmarks.
- Integrity of monitoring wells.

Any findings observed during the inspections will be recorded on the Fernald Preserve OSDF Walkdown Inspection Form (Appendix D in Volume II). Section 6.2.3 below describes the details of the OSDF field inspection process.

6.2.3 OSDF Inspection Field Procedures

6.2.3.1 Adjacent Off-Site Features

A reconnaissance of the adjacent area within approximately 0.25 mile of the Fernald Preserve property line will be conducted as part of the OSDF inspection. Any evidence of a change in land use will be described. In general, any increase of human activity in the vicinity increases the probability of either inadvertent or purposeful intrusion into the site.

Evaluation will be made of whether the drainage courses in the immediate vicinity of the OSDF pose any threat to the continued integrity of the OSDF. An observation from a prominent topographic feature will be made first, looking for indications of high water levels, areas of active erosion and sedimentation, and potential changes in channel position.

Reaches of adjacent drainage courses will then be walked for approximately 1,000 ft, and notes will be made of unusual or changed sediment deposits, large debris accumulations, manmade or natural constrictions, and recent or potential channel changes. Any such features will be documented with photographs, which will include recognizable landmarks and known objects for scale.

Similarly, any gullies, or locations that appear to be favorable to the development of gullies, will be examined. The portion of the head of the gully will be the most important observation, but the shape of the cross section will give an indication of the degree of the activity, and any interruption in the longitudinal profile may suggest rejuvenation or the presence of a local base level.

6.2.3.2 Monuments

Each survey monument and cell boundary marker will be examined for evidence of disturbance. If any have been disturbed, a recommendation for their re-establishment and possible protective action will be made.

A walking traverse of the fence will be made to inspect the condition of fencing, gates, locks, and signs. Evidence of deterioration, damage, or vandalism will be noted. Any breaks in the OSDF perimeter fence, or conditions which might lead to a break, will be described. Signs will be evaluated for legibility, proper location, and information. If human intrusion is indicated, an effort will be made to determine whether it was inadvertent or purposeful, and whether it poses any threat to the integrity of the OSDF. Missing, badly damaged, or defaced signs will be replaced in a timely manner.

6.2.3.3 Crest and Slopes

The crest of the OSDF is an obvious vantage point from which to examine the site and surrounding area. Observations, with the aid of binoculars, will be made in all directions from the crest of any features which are anomalous or unexpected, and which may require further inspection. These will be recorded on the inspection form. Examples of such features that might be observed include changes in soil color, distressed vegetation patterns, trails, and patterns of erosion.

When conducting a walkover of a cell cap, the following process is used. Transects, at approximately 50-yard intervals, will be walked along the crest and side slopes. A search will be made for evidence of differential settling, subsidence, and cracks, if any. The patterns of cracks and evidence of subsidence will be described in an overlay and photographed. The depth and width of the cracks will be measured; notes will be made of any points at which the cracks extend below the outer erosion barrier.

Erosion of the crest is not expected to be a problem because of the low slopes. However, differential settling or sliding along the slopes may cause flow concentrations that may disturb that protection, and thus irregularities will be examined for early evidence of erosion. Evidence of wind erosion, including the presence of ripple marks, partially exhumed vegetation, the presence of pedestal rocks, or obvious lag gravels, will be noted. The OSDF will be vegetated as part of the closure activities; therefore, careful examination will be made to determine areas of distressed or sparse vegetation, or the presence of deep-rooted, woody species.

Changes to the OSDF are most likely to occur in the lower portions of the slopes. Therefore, an examination at the toe of the slope will be a key part of the inspection. A traverse at the toe of the slope will be made during each inspection.

Settlement or sliding, although highly unlikely, will be apparent by the presence of bulges and depressions, cracks, and scarps. If any such features are observed, the extent of the area affected, whether the area is stable or likely to continue moving, and the nature of the movement that is occurring (settlement, planar, or rotational sliding) will be determined. Evidence of related

erosion will be noted. Photographs showing detail and area perspective will be taken of any such features observed.

General health of grass cover and signs of stressed or dead grass will be noted. Grass density and coverage will be inspected. Any areas with sparse vegetation or no vegetation will be mapped and described. The presence of any woody vegetation or noxious/invasive plants will be noted.

During these inspections, the slopes will be examined for evidence of animal intrusion, burrowing, changes in vegetation, and human activity. Regularly used trails (human or animal) can concentrate runoff and encourage erosion; any such trails observed will be mapped and described. Any signs of small animal trails or burrows will be noted, and an effort will be made to tentatively identify the species. If animal burrows have been observed during previous inspections, the burrow sites will be examined for indications of current activity.

Erosion of vegetated slopes will first be apparent by the development of rills and rivulets, which extend only part way up the slope. If they are present, their spacing, length, depth, and width will be measured and noted. Particular attention will be placed on evidence of integration of the drainage and development of a master channel. Such a development can, in a short time, evolve into a gully.

Evidence of removal of the cover, extensive vandalism to signs and monuments, or the presence of well-established trails will be described in detail.

6.2.3.4 Periphery

The area adjacent to the OSDF will be examined during the traverse at the toe of the slope. Features to be looked for and described, if present, include erosion channels, accumulations of sediment, evidence of seepage, and signs of animal or human intrusion.

6.2.3.5 Diversion Channels

Each diversion channel will be walked its entire on-property length to determine whether the channels have been functioning, and can be expected to continue as designed. The channels and side slopes will be examined for evidence of erosion or sedimentation, slides or incipient erosion channels, debris, or growing vegetation. The side slopes of the diversion channels also will be examined for evidence of piping or burrowing by animals, which could lead to sloughing of material into the channel.

For portions of the channel that have riprap (or a concrete spillway), the soil or rock material adjacent to the structure will be examined carefully for evidence of unstable conditions such as piping or destructive currents. The riprap (or concrete) will be examined for evidence of deterioration caused by weathering or erosion. At those portions of the channel slopes that are rock, plant colonization will be slow to develop but will gradually occur. The inspection procedure is expected to record this gradual colonization by noting the extent of vegetation, its location, and its cover density.

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7.0 Unscheduled Inspections

7.1 Introduction

An unscheduled inspection may be triggered by reports or information that the OSDF site integrity has been or may be compromised. The two types of unscheduled inspections anticipated (follow-up inspections and contingency inspections) are discussed in the following subsections.

7.2 Follow-up Inspections

Follow-up inspections investigate and quantify specific problems encountered during a routine scheduled inspection, special study, or other DOE or other regulatory agency activity. They determine whether processes currently active at or near the site threaten site security or stability, and they evaluate the need for custodial maintenance, repairs, or corrective action. They will also be conducted to evaluate the effectiveness of corrective measures and contingency repairs that have been implemented. Some of the situations that may require a follow-up inspection include:

- Unforeseen subsidence of the OSDF slopes or its foundation.
- Gullying that has cut through or is threatening to cut through the outer cover.
- Slides on the slopes of the OSDF.
- Seepage.
- Change in the position of an adjacent stream channel.
- Indications of rapid headward cutting of a nearby gully.
- Cracks that extend deeply (greater than 6 inches) into the slopes.
- Presence of animal burrows on the OSDF or in its diversion channels.
- Invasion of trees or shrubs onto the vegetation cover of the OSDF.
- Removal of some of the material from the OSDF cover.
- Corrective measures or contingency repair has been implemented.

Follow-up inspections will be made by technical specialists in a discipline appropriate to the problem that has been recognized. That is, if erosion is a problem, the inspectors will be individuals knowledgeable in evaluating erosion, such as a soils scientist or geomorphologist; if settlement or sliding is the problem, a geotechnical engineer; if changes in an adjacent stream, a hydrologist; if plant invasion, a botanist; and the like.

The follow-up inspection begins with an on-site visit to determine the need for definitive tests or studies. Additional visits may be scheduled if more data are needed to draw conclusions and recommend corrective action. If repair or corrective action is warranted, DOE will notify EPA, Ohio EPA, appropriate local officials, and other appropriate local stakeholders.

7.2.1 Objectives and Procedures

These investigations include all additional investigations or studies necessary to evaluate the continued effectiveness of the OSDF for containment of the encapsulated materials. The procedures used will be those required in the judgment of DOE and will depend upon the nature and severity of the problem. Representative and appropriate responses for several possible problems are listed in Table 7–1.

Table 7–1. Possible Problem Situations and Responses

Situation	Representative Response
Gullying on slopes	Measurement or mapping not done as part of routine scheduled inspection will be done. The primary objective is to determine the factors that led to the initiation of the gully. This might involve evaluation of the erosion barrier design parameters or site drainage, and the role of sheet erosion, rill formation, slides, or burrows. The product will be a recommendation for maintenance and preventive measures, if required.
Headward gully erosion	Procedures to determine the rate of headcutting will be established and implemented. A line of reference stakes (capped rebar) upstream from the gully head is a simple and effective method of measuring change in the position of the gully; comparison of periodic aerial photographs might also be useful. An understanding of why dissection is occurring and any limiting conditions will be sought. The product will be a recommendation for maintenance and preventive measures, if required.
Invasive vegetation	Species identification and abundance will be determined if large trees or shrubs invade the vegetation cover of the OSDF. Large trees and shrubs are not permitted on the OSDF and will be removed if present.
Creep	The occurrence of creep can be determined by setting rows of stakes parallel to contours on the side slopes, which will gradually tilt downslope if creep is occurring. The rate of creep can best be determined by marking a number of rock fragments on the slopes, and accurately determining their location in relation to additionally emplaced survey monuments over a number of years.
Landslides	Upon evidence of a slide or debris flow, an additional investigation will be made. The area and volume affected, the type of movement, and causal factors will be determined. Drilling, hand augering, or excavation might be necessary. The product will be a recommendation for what remedial and preventive maintenance are required.

7.2.2 Schedule and Reporting

Once a routine scheduled inspection has identified a concern, DOE will notify EPA and Ohio EPA and begin a follow-up inspection by submitting a preliminary assessment of the concern and a plan for follow-up inspection. Upon review by EPA and Ohio EPA, DOE will implement the inspection plan. Once the follow-up inspection is completed, DOE will recommend maintenance or other appropriate action to be performed, as needed.

7.3 Contingency Inspections

Contingency inspections are unscheduled situation-unique inspections ordered by DOE when it receives information indicating that site integrity has been or may be threatened. Events that could trigger contingency inspections include severe vandalism, intrusion by humans or livestock, severe rainstorms, or unusual events of nature such as tornadoes or earthquakes. Events that have caused severe damage to the OSDF or that pose an immediate threat to human health and the environment will be immediately reported to EPA and Ohio EPA.

A preliminary inspection/assessment report of each contingency inspection triggered by such an unusual event will be submitted to EPA and Ohio EPA within 60 days of the initial report that damage or disruption has occurred at the OSDF site. At a minimum, this report will include:

- Problem/event description.
- Preliminary assessment of the custodial maintenance or repair or corrective action required.
- Conclusions and recommendations.
- Assessment data, including field and inspection data and photographs.
- Names and qualifications of the field inspectors.

A copy of the report and all other data and documentation from such a contingency inspection will be maintained in the permanent site file and will be submitted to EPA and Ohio EPA.

After EPA and Ohio EPA have reviewed the preliminary inspection/assessment report, DOE will submit a corrective action plan (for those events requiring corrective action) for EPA review and approval in accordance with a schedule to be determined on a case-by-case basis by consultation between DOE, EPA, and Ohio EPA. Based on the findings of these reports, DOE will implement the corrective action.

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8.0 Custodial Maintenance and Contingency Repair

8.1 Introduction

This section explains the procedures to be used by DOE to determine when maintenance or contingency repairs are needed at the OSDF. In general, the decision to conduct maintenance or contingency repair will be based on the results of follow-up site inspections or contingency site inspections (refer to Section 7.0 for both), which assess problems at the site.

This section will establish maintenance activities and their frequency, fulfilling the requirements to do so established in the appropriate regulations (Ohio hazardous waste rules OAC 3745-66-18[A] and [C] in lieu of federal hazardous waste regulations 40 CFR §§265.118[c][2] and 264.118[b][2]). The following subsections address custodial maintenance of the security system (e.g., fencing, gates, signage) and the impacted materials containment system.

8.1.1 Security System

Custodial maintenance of the security system may require the repair and replacement of sections of fences, gates, locks, and signs due to normal wear, severe weather conditions, or vandalism.

8.1.2 Impacted Materials Containment System

Custodial maintenance of the impacted materials containment system will require:

- Maintaining the integrity and effectiveness of the final cover, including making repairs to the cap/cover as necessary to correct the effects of settling, dead vegetation, subsidence, erosion, leachate outbreaks, or other events (Ohio solid waste rule OAC 3745-27-14[A], and Ohio hazardous waste landfill rule OAC 3745-68-10 in lieu of federal hazardous waste regulation 40 CFR §265.310).
- Mowing.
- Seeding and mulching repaired areas or areas that are lacking required vegetation cover.
- Maintaining surface water run-on and runoff drainage features to prevent erosion of, or other damage to, the final cover (Ohio solid waste rule OAC 3745-27-14[A], and Ohio hazardous waste landfill rule OAC 3745-68-10 in lieu of federal hazardous waste regulation 40 CFR 265.310).
- Controlling burrowing animals.

8.2 Conditions Requiring Maintenance or Repair Actions

Inspection reports and monitoring results will be reviewed, and site conditions will be compared from inspection to inspection so that trends of changing conditions can be determined. Identifiable trends will provide a means for predicting when maintenance or repairs will be needed. DOE, in conjunction with EPA and Ohio EPA, will decide whether to initiate custodial maintenance or contingency repair. After the decision to initiate maintenance or a contingency repair, a statement of work will be prepared for the work to be performed. The maintenance or repair action required to correct a site problem will depend on the nature of the problem. Although the details of maintenance or repair actions that may be needed throughout the post-closure care period cannot be reliably predicted in advance, examples of conditions that

may require custodial maintenance or that may trigger contingency repairs are outlined in Table 8–1, along with the appropriate actions.

When compared with contingency repairs, custodial maintenance is expected to be generally less costly, smaller in scale, and more frequent in occurrence. In contrast, contingency repairs are very unlikely to be needed; however, repair costs may be more substantial due to the size of the workforce and the technical skills required for repairs.

Table 8–1. Examples of Conditions That May Require Custodial Maintenance or Contingency Repair

Condition	Appropriate Actions
Custodial Maintenance	
1. Damage due to normal wear, severe weather conditions, or vandalism to survey control monuments.	• Reestablish survey control monuments.
2. Growth of woody species such as deep-rooted shrubs or trees on the cover.	• Apply herbicide and/or remove deep-rooted shrubs or trees from the cover. • Backfill root hole with soil, compact to reestablish grade, and reestablish the regular vegetative cover via seeding.
3. Development of animal burrows on the cover or in the diversion channels.	• Control or eradication of burrowing animals. • Backfill burrow hole with soil, compact to reestablish grade, and reestablish the regular vegetative cover via seeding. • If the problem becomes extensive, the services of a professional exterminator will be retained.
Contingency Repair	
4. Development of rills or gullies deeper than 6 inches with near-vertical walls and no vegetative cover.	• Fill in gullies or rills with soil, compact to reestablish grade, and reestablish the regular vegetative cover via seeding and mulching[1, 2].
5. Surface rupture where the dimensions of the cracks are larger than 1 inch wide by 10 ft long by 1 ft deep, which would indicate severe shrinkage of cover materials or differential settlement.	• Reconstruction of slope segments where slumping, mass wasting, liquefaction, or other severe events have occurred. • Root cause analysis, evaluate corrective actions and preventive measures, implement recommended actions[1, 2].
6. Instability of the slopes to the point where mass wasting or liquefaction has occurred due to earthquakes, differential settlement, or other causes.	• Reconstruction of slope segments where slumping, mass wasting, liquefaction, or other severe events have occurred. • Root cause analysis, evaluate corrective actions and preventive measures, implement recommended actions[1, 2].
7. Encroachment of stream channels or gullies into the disposal facility or its buffer area.	• Reconstruction of cover or other features[1]. • Root cause analysis, evaluate corrective actions and preventive measures, implement recommended actions[1, 2].
8. Flood damage to the site in the form of new channels, or debris deposits.	• Reconstruction of cover or other features[1]. • Root cause analysis, evaluate corrective and preventive measures/actions, implement recommended actions[1, 2].
9. Human intrusion has resulted in removal of cover materials.	• Reconstruction of cover or other features[1]. • Root cause analysis, evaluate corrective actions and preventive measures, implement recommended actions[1, 2].

[1]This might involve general regrading in the area to modify drainage and/or the use of temporary drainage structures and controls to reduce runoff velocities until vegetation has been reestablished.
[2]Severe or repetitive occurrences might best be addressed via a corrective action (refer to Section 9.0).

8.3 Maintenance and Repair

The following subsections discuss custodial maintenance for the security system, the cap and final cover, and the run-on and runoff drainage features.

8.3.1 Security System

The security system established for the OSDF includes fencing, gates, locks, and warning signs. The routine custodial maintenance and repairing of the security systems include conducting visual inspections and repairing or replacing affected components. Possible problems include deterioration, erosion, or frost heave of fence post anchors resulting in fence damage. Normal wear, deterioration, and vandalism are also possible on fencing, gates, locks, and signs. Table 8–2 presents the inspection and maintenance activities for these features.

Table 8–2. Site Security System Inspection and Maintenance Activities

Component	Inspection Frequency	Condition	Remedy	Maintenance
Fence	Quarterly	• Damaged fence fabric or posts • Under-fence erosion	• Repair or replace as necessary • Repair erosion or extend fence as necessary	• Repair or replace as necessary • Provide erosion and sedimentation control
Gates	Quarterly	• Tampering or damage to locks	• Repair or replace as necessary	• Install proper locks
Warning signs	Quarterly	• Damaged or missing warning signs	• Repair or replace as necessary	• Install or re-attach warning signs to fence or gates
Notes: 1. Site security system shall be inspected after the occurrence of major earthquakes (refer to Section 10.3).				

8.3.2 Cap and Final Cover System

The routine custodial and preventive maintenance of the cap and final cover includes the visual inspection of benchmark integrity, the upkeep of the vegetation cover, general mowing, the clearing of debris, the removal of woody weeds and seedlings, and reseeding. These activities will be performed as needed as identified during the routine inspections (refer to Section 6.0). presents the custodial maintenance schedule for these features. When excessive localized depression is indicated by persistent water ponding, repairs will be performed.

Table 8–3. Drainage Channel System Inspection and Maintenance Activities

Component	Inspection Frequency	Condition	Remedy	Maintenance
Drainage channels	Quarterly	• Free-flowing • Clogging by sediment or debris • Scouring, other evidence or erosion, or other damage	• None—desired condition • Remove accumulated debris or sediment • Repair damage	• None—desired condition • Remove accumulated debris or sediment • Maintain as-built or undertake corrective action
Grade control structures	Quarterly	• Free-flowing • Clogging by sediment or debris • Scouring, undermining, other evidence of erosion, or other damage	• None—desired condition • Remove accumulated debris or sediment • Repair damage	• None—desired condition • Remove accumulated debris or sediment • Remove emergent vegetation • Maintain as-built or undertake corrective action
Culverts	Quarterly	• Free-flowing • Clogging by sediment or debris • Other damage	• None—desired condition • Remove accumulated debris or sediment • Repair damage	• None—desired condition • Remove accumulated debris or sediment • Maintain as-built or undertake corrective action

Notes:
1. Drainage system shall be inspected after the occurrence of major earthquakes (refer to Section 10.3).

The native seed mixes used on the OSDF cover benefit from periodic mowing, baling, and prescribed burning. Mowing will normally occur in the fall at a time when the final cover system is reasonably dry. Mowing will not occur on a cap if it is determined that the mowing will have an adverse effect on the vegetation or grassland nesting birds. Mowing equipment shall not cause the rutting or disturbance of topsoil. If the cell cap cannot be mowed in the fall, then the mowing will be postponed until the following spring. The cell caps will be mowed and baled on a 3-year rotation (cell caps 1, 2, and 3 the first year; cells 4, 5, and 6 the second; then cells 7 and 8 the third). Additional mowing may take place as a means of weed control or as a method to promote native grass establishment. As described in Section 3.2.1 of Volume II, prescribed burning would be a preferred management alternative to mowing and baling.

Woody reproduction that develops on the OSDF final cover systems shall be eliminated by hand, mechanically, chemically, or by fire. Many woody species maintain their root systems when cut and will rapidly resprout. The root system continues to grow through repeated cuttings and can become extensive. For this reason, chemical herbicides (spraying of individual trees and shrubs) or fire shall be preferred for woody species control, as eradication of the whole plant including the root system is a primary goal. A combination of mechanical and chemical treatment where cut stumps are treated with herbicide to prevent resprouting may also be considered. DOE will evaluate the most effective method for managing woody species vegetation on the OSDF based on available equipment, expertise, and cost.

Inspection/investigation, corrective maintenance, or contingency repair of the cover may be required for one of the following reasons:

- Formation of localized depressions caused by subsidence of the emplaced impacted materials.
- Progressive deterioration of the cover caused by erosion.
- Destruction of a portion of the cover by some gross physical event.

Settlement is not expected to be a significant problem, as the OSDF contains little putrescible waste. In the case of localized depressions, it will likely be necessary to strip existing topsoil in the affected area and stockpile it in an adjacent area. General soil would then be used to fill the settled area to restore uniform grades in order to promote proper drainage. Topsoil would then be replaced. Where this phenomenon occurs in the upper cover, simple regrading and filling of the depression with compacted fill will likely be satisfactory. All affected areas will be reseeded and mulched immediately upon completion of repairs.

The following are typical steps to repair excessive settlement:

[1] When maintenance is required, the amount of soil needed should be estimated, and arrangements for stockpiling or delivery should be made in advance to minimize the amount of time the repair area is disturbed.

[2] Install temporary silt control and surface water controls.

[3] Remove and stockpile topsoil and vegetative soil layers. Segregate as necessary.

[4] Vegetative soil material can be added to the existing vegetative soil layer portion of the cover, or the existing vegetative soil material can be excavated, and appropriate fill placed to bring the area to acceptable grades.

[5] Document vegetative soil layer placement and compaction in accordance with the original construction quality assurance program (GeoSyntec 2001a).

[6] Replace vegetative and topsoil layers, and revegetate. Care should be taken during final grading to ensure that the area is tracked perpendicular to the slope to minimize channeling by surface water.

Progressive deterioration of the cover caused by erosion will likely be addressed by reconstruction of the cover in that area and by improvement of the erosion problem. This may involve some general regrading in the area to modify drainage and the use of temporary drainage structures and controls to reduce runoff velocities until vegetation has been reestablished.

8.3.3 Run-on and Runoff Drainage Features

Diversion and drainage channels surrounding the OSDF collect runoff and divert run-on. The channels may require mowing and, from time to time, reshaping to control the runoff. Vegetation growth in and around diversion channels will be maintained by periodic mowing and clearing. Mowing of the vegetation on the same schedule as the OSDF final cover system (refer to Section 8.3.2) will ensure proper maintenance of the channels. Any large plants or seedlings will

be removed to prevent sediment buildup and damage caused by roots. Reseeding and mulching will be performed as needed in bare areas to prevent excessive erosion.

During the routine inspections (refer to Section 6.0), the drainage channels will be examined for erosion. Any problems identified by inspections will be repaired to conform as closely as possible to the original construction specifications and drawings. To the extent possible, appropriate measures will be taken to prevent problems from reoccurring.

Maintenance of the diversion channel system might be needed in areas of excessive sediment buildup, sloughing of banks, or plugging of culverts due to sediment and vegetation buildup. The grade control structures—rocks placed at an inlet, outlet, or along the length of a drainage channel—might also require maintenance for sediment and vegetation buildup. Appropriate actions will be taken to address these situations, including cleaning out and re-contouring channels, repairing banks, and unplugging culverts. Table 8–3 presents the inspection and custodial maintenance schedule for these features.

9.0 Post-Closure Corrective Actions

9.1 Introduction

Previous sections of this plan address maintenance or repair activities for the OSDF, which are directed at routine or custodial problems. This section discusses at the conceptual level the steps necessary to evaluate and correct situations of more significant concern. Those steps include:

- Preliminary assessment of the situation.
- Development of a technical approach and work plan.
- Identification of alternatives.
- Evaluations of alternatives.
- Identification of the preferred alternative.
- Public involvement.
- Selection of the corrective action/response action alternative.
- Implementation of the selected alternative.

9.2 Future Corrective Actions and Response Actions

The following points are important to keep in mind, based upon legislation and regulations in effect at the time of formulation of this plan:

- The Fernald Preserve has been listed on the National Priorities List.
- Response actions under CERCLA have been and are being conducted at the Fernald Preserve to remediate the threats (or potential threats) to human health and the environment from past releases and potential releases at the site.
- Regardless of whether the Fernald Preserve is deleted from the National Priorities List in the future, any future corrective actions/response actions would be conducted as a response action under CERCLA, either as a removal action or a remedial action as appropriate to the situation.

The inspection and maintenance activities identified throughout this plan will be the mechanism to identify, and address as appropriate, situations needing maintenance or repair activities of a custodial or routine nature. DOE will consult with EPA and Ohio EPA whenever it identifies a situation believed worthy of more significant attention.

When there is a situation that requires significant attention, the first focus will be identification of the perceived problem (“problem statement”). This should include, as possible based upon existing information, a preliminary assessment of the nature of the problem and its threats to human health and the environment. This step is intended to be a remedial or removal site evaluation, as those terms are currently used in the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300). The intended outcome of this first step is an assessment of the seriousness of the situation and a determination of the time-criticalness of response action. From this, the appropriate course of CERCLA response action (removal action or remedial action) will be decided.

Regardless of removal or remedial course of action, the next step would be development of a technical approach, including identification of objectives, activities to fulfill those objectives, and associated time frames. The embodying document would vary depending on the course of CERCLA response action identified as appropriate:

[1] If a time-critical removal action is necessary, then a removal action work plan will be required.

[2] If a non-time-critical removal action is necessary, then an engineering evaluation/cost analysis will be required.

[3] If a remedial action is necessary, then a work plan for a focused feasibility study will be required.

For numbers 2 and 3, above, the process will include the following:

- Identification of alternatives.
- Evaluation of alternatives.
- Identification of the preferred alternative.
- Public involvement.
- Selection of the corrective action/response action alternative.
- Implementation of the selected alternative.

10.0 Emergency Notification and Reporting

10.1 Introduction

The OSDF was designed to comply with EPA and Ohio EPA standards with minimum maintenance and oversight during the post-closure care period. However, unforeseen events could create problems that could affect the disposal facility's ability to remain in compliance with these standards. Therefore, DOE has requested notification from local, state, and federal agencies of discoveries or reports of any purposeful intrusion or damage at the site, as well as the occurrence of earthquakes, tornadoes, or floods in the area of the OSDF. Such notification would trigger a contingency inspection, as discussed in Section 7.3.

10.2 Agency Agreements

LM issued letters to the Hamilton County sheriff's department, the Butler County sheriff's department, and the Ross, Crosby, and Morgan Township police and fire officials, requesting that they notify LM if they observe any unauthorized human intrusion or unusual natural event.

LM issued a letter to the Ohio Earthquake Information Center, located at Alum Creek State Park in Delaware County, Ohio, requesting that they notify LM in the event of an earthquake in the vicinity of the Fernald Preserve.

LM will monitor emergency weather notification system announcements and has requested notification from the National Weather Service (either Wilmington or Cincinnati) of severe weather alerts.

To notify LM of site concerns, the public may use the 24-hour security telephone numbers monitored at the DOE facility in Grand Junction, Colorado. The 24-hour security telephone numbers will be posed at site access points and other key locations on the site.

THE 24-HOUR EMERGENCY NUMBER
877-695-5322

10.3 Unusual Occurrences and Earthquakes

As the major portion of the OSDF is within Hamilton County, DOE has requested that the Hamilton County sheriff's department notify DOE of any unusual occurrences in the area of the OSDF that may affect surface or subsurface stability, as well as any reports of vandalism or unauthorized entry. DOE has also requested the same from the Butler County sheriff's department.

Because the Fernald Preserve and the OSDF are not in an active seismic zone and are not situated on or constructed of lithified earth materials, the probability of occurrence of seismic events that could damage the OSDF is slim. If they do occur, seismic events that could potentially damage the OSDF would manifest themselves in numerous ways in the area, the most apparent of which are:

- Rupture of potable water supply lines.
- Rupture of natural gas supply lines.
- Rupture of natural gas transmission lines.

LM has issued a letter to the Ohio Earthquake Information Center requesting notification in the event of an earthquake in the vicinity of the site.

LM issued letters to and requested acknowledgement from the Hamilton County sheriff's department, the Butler County sheriff's department, and both Ross and Crosby Township police and fire officials to notify LM in the event of unauthorized human intrusion or unusual natural events. All of the above-mentioned agencies have been asked to contact LM should an event occur that might affect the control of known contaminants or the condition of the OSDF. LM will also monitor emergency weather notification system announcements.

10.4 Meteorological Events

DOE has also requested that the National Weather Service (either the Wilmington, Ohio, or Cincinnati, Ohio, office) notify DOE whenever a flash-flood or tornado warning in Hamilton or Butler Counties has been issued.

11.0 Community Relations

The public played an important role in the remediation process at the Fernald Preserve, and the stakeholders remain involved in legacy management. DOE holds regularly scheduled meetings with various groups and the general public to share information on the current site status and progress. The public and other key stakeholders will remain fully involved in the legacy management of the site, and DOE will continue to conduct public meetings as long as the public continues to show an active interest. Additional information on the history of the public's involvement is included in Section 5.2 of the IC Plan (Volume II of the LMICP) and in the Community Involvement Plan (Attachment E to the LMICP).

Another process involving the public is the CERCLA 5-year review. The CERCLA 5-year reviews will focus on the protectiveness of the remedies associated with each of the five OUs. Following the review, a report will be submitted to EPA. The public will also be able to review these reports and provide feedback. In addition, the data and documentation used for the report will be accessible, either electronically or in hard copy.

Reporting to the public and stakeholders will occur on a regular basis. These requirements are further defined in Section 4.4 of the Legacy Management Plan (Volume I of the LMICP), in Section 5.1.3 of the IC Plan (Volume II of the LMICP), and in the Community Involvement Plan (Attachment E to the LMICP).

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12.0 References

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