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SUBMITTAL OF POST-CLOSURE CARE AND INSPECTION PLAN FOR THE  
ON-SITE DISPOSAL FACILITY

09/18/96

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REPORT

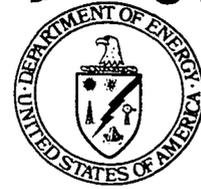
EPAS



**Department of Energy**

**Ohio Field Office  
Fernald Area Office**

P. O. Box 538705  
Cincinnati, Ohio 45253-8705  
(513) 648-3155



SEP 18 1996  
DOE-1373-96

**Mr. James A. Saric, Remedial Project Director  
U.S. Environmental Protection Agency  
Region V - SRF-5J  
77 West Jackson Boulevard  
Chicago, Illinois 60604-3590**

**Mr. Tom Schneider, Project Manager  
Ohio Environmental Protection Agency  
401 East 5th Street  
Dayton, Ohio 45402-2911**

Dear Mr. Saric and Mr. Schneider:

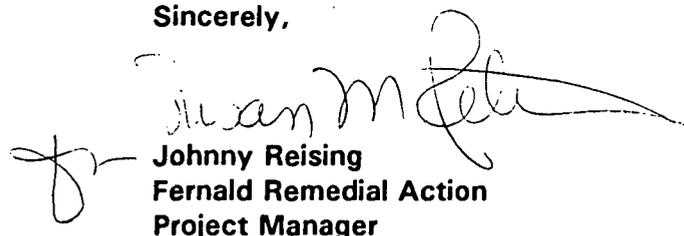
**SUBMITTAL OF POST-CLOSURE CARE AND INSPECTION PLAN FOR THE ON-SITE  
DISPOSAL FACILITY**

This letter submits the Post-Closure Care and Inspection Plan for the On-Site Disposal Facility (OSDF) for your review. This plan has been revised to address comments from the U.S. Environmental Protection Agency (U.S. EPA) and the Ohio Environmental Protection Agency (OEPA). In accordance with the schedule appearing in Table 5-1 of the OSDF Remedial Action Work Plan (June 1996 version), submittal of this plan to the U.S. EPA is required by September 18, 1996.

This submittal is occurring in advance of the submittal of responses to comments received from the U.S. EPA and OEPA. At the U.S. EPA's request, the plan has been revised to address those comments. In light of this, to facilitate review, substantive revisions to the plan are summarized in the enclosed table and are displayed in the plan via redline and strike through.

If there are any questions, please contact Rod Warner at (513) 648-3156.

Sincerely,

  
**Johnny Reising  
Fernald Remedial Action  
Project Manager**

FEMP:Warner

**Enclosure: As Stated**

**cc w/enc:**

**S. Fauver, EM-425/GTN  
R. L. Nace, EM-425/GTN  
G. Jablonowski, USEPA-V, 5HRE-8J  
R. Beaumier, TPSS/DERR, OEPA-Columbus  
T. Schneider, OEPA-Dayton (3 copies of encs. total)  
F. Bell, ATSDR  
D. S. Ward, GeoTrans  
R. Vandegrift, ODOH  
S. McLellan, PRC  
T. Hagen, FERMC0/65-2  
J. Harmon, FERMC0/90  
AR Coordinator/78**

**cc w/o enc:**

**J. Patterson, DOE-HQ  
J. Jalovec, DOE-FEMP  
S. Peterman, DOE-FEMP  
J. Reising, DOE-FEMP  
S. Garland, FDF/52-2  
M. Hickey, FDF/52-2  
U. Kumthekar, FDF/52-2  
C. Little, FDF/2  
M. Strimbu, FDF/52-2  
T. Walsh, FDF/65-2  
EDC, FDF/52-7**

PCCIP Section	Substantive Revision
1.3 Related Plans	Bullets have been added to describe the OSDF Ground Water Monitoring Plan and the Integrated Environmental Monitoring Plan.
Table 3-1	Typographical errors in the WAC value exponents displayed in this table were discovered during final proofreading, and have been corrected. Due to the small size of the exponents' text, redline/strike through was not used. Constituents affected are: bis(2-chlorisopropyl), 4-nitroaniline, chloroethane, 1,1-dichloroethene, and 1,2-dichloroethene. The presentation sequence has also been revised to be radionuclides, inorganics, organics, and alphabetic within each category. NOTE: As this table also appears in the Impacted Materials Placement Plan and the OSDF Remedial Action Work Plan, those same corrections will carry through to those plans.
Table 3-2	This table has been revised to correspond to the source table found in the OU3 ROD, rather than the OU3 FS. NOTE: As this table also appears in the Impacted Materials Placement Plan, those same corrections will carry through to that plan.
Table 4-3, p. 4-7	Per OEPA comment, the Director of the Ohio Department of Health has been added to the listing of recipients receiving filing of survey plat.
5.3 Groundwater Monitoring	This "to be developed" section has been developed.
6.0 Leachate Management System	Previously included subsections 6.8 through 6.10 on leachate flow monitoring (6.8), and notification and response actions for leachate (6.10 and associated Table 6-3), have been removed from this plan and are being transferred to the OSDF Ground Water Monitoring Plan, in response to agency comments. The subsequent subsection has been renumbered accordingly; redline/strike through has not been used.
8.3 Contingency Inspections	Text on reporting frequencies and time frames, previously identified as "to be determined later", has been developed.
10.0 Post-Closure Corrective Actions	This section, previously identified as "to be developed", has been developed. As most of the text is new, redline/strike through has not been used throughout the text.
11.3 Unusual Occurrences and Earthquakes	The previous version had two separate subsections to address these topics. Text on earthquake sensing, previously identified as "to be developed", has been developed and the two subsections merged.

## INSTRUCTIONS

1. **Please insert the enclosed Post-Closure Care and Inspection Plan into the Support Plans binder as Tab 9.**
2. **A Table of Contents page for the Support Plans binder is enclosed for assistance.**

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**OSDF**  
**REMEDIAL ACTION PROJECT**

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<b>Borrow Area Management and Restoration Plan (20100-PL-003)</b>	<b>2</b>
<b>Surface Water Management and Erosion Control Plan (20100-PL-004)</b>	<b>3</b>
<b>Cultural Resource Unexpected Discovery Plan (20100-PL-005)</b>	<b>4</b>
<b>Construction Quality Assurance Plan (20100-PL-006)</b>	<b>5</b>
<b>Impacted Material Placement Plan (20100-PL-007)</b>	<b>6</b>
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**REMEDIAL ACTION WORK PLAN APPENDICES**

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<b>Air Monitoring Plan (20100-PL-002)</b>	<b>10</b>

FOR  
INFORMATION  
ONLY

**POST-CLOSURE CARE AND INSPECTION  
PLAN**

**ON-SITE DISPOSAL FACILITY**

**20100-PL-010  
Revision G  
September 1996**

**United States Department of Energy  
Fernald Environmental Management Project  
Fernald, Ohio**

*Prepared by*

**Fernald Environmental Restoration Management Corporation  
P.O. Box 538704  
Fernald, Ohio**

**Under Contract DE-AC05-920R21972**

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LIST OF ACRONYMS

ACA	Amended Consent Agreement	2
ACM	asbestos containing materials	3
a.k.a.	also known as	4
ARARs	applicable or relevant and appropriate requirements	5
BSL	Biodenitrification Surge Lagoon	6
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended	7
CFR	Code of Federal Regulations	8
CQA	Construction Quality Assurance Plan	9
CRP	Community Relations Plan	10
DCP	Design Criteria Package	11
DOE	United States Department of Energy	12
EPA	United States Environmental Protection Agency	13
FEMP	Fernald Environmental Management Project	14
FFCA	Federal Facility Compliance Agreement	15
FS	feasibility study	16
IEMP	Integrated Environmental Monitoring Plan	17
IMP	Impacted Materials Placement Plan	18
LCS	Leachate Collection System	19
LDS	Leak Detection System	20
LTS	Leachate Transmission System	21
NESHAPs	National Emission Standards for Hazardous Air Pollutants	22
NPL	National Priorities List	23
OAC	Ohio Administrative Code	24
OEPA	Ohio Environmental Protection Agency	25
ODNR	Ohio Department of Natural Resources	26
OSDF	On-Site Disposal Facility	27
OU	operable unit, as numbered	28
pCi	picoCurie(s)	29
PPE	personal protective equipment	30
PVC	polyvinyl chloride	31
PTI	permit to install	32
RCRA	Resource Conservation and Recovery Act, as amended	33
RI/FS	remedial investigation/feasibility study	34
RDWP	remedial design work plan	35
ROD	Record of Decision	36
SARA	Superfund Amendments and Reauthorization Act of 1986, as amended	37
SWMEC	Surface Water Management and Erosion Control Plan	38
TBCs	to be considered criteria	39
WAC	Waste Acceptance Criteria	40

Fernald Environmental Mgt Project  
7400 Willey Road  
Fernald, OH 45030  
USEPA ID No: OH6890008976

OSDF Post-Closure Care and Inspection Plan  
20100-PL-010  
(Rev. G, Sept. 18, 1996)

**PROLOGUE**

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This plan has been developed with a specific focus on the FEMP On-Site Disposal Facility. However, many aspects of post-closure care are common regardless of the characteristics of the facility for which it is implemented. Hence, this plan could be revised as needed to expand the scope of coverage to encompass the entire FEMP site. This plan has been specifically developed in such a manner to facilitate such a potential.

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**1.0 INTRODUCTION**

This Post-Closure Care and Inspection (PCCI) Plan covers the Fernald Environmental Management Project (FEMP) On-site Disposal Facility (OSDF) and its associated buffer area after the last cell of the OSDF has been closed and covered. As such, the period of coverage of this PCCI Plan begins at the cessation of the period covered by the *OSDF Systems Plan*.

This plan has been developed to address reasonably expected circumstances which may arise during the post-closure care period. Other relevant key concepts addressed by this PCCI Plan are: ownership; access controls and restrictions; deed and/or use restrictions; environmental monitoring; leachate management; inspections (of three types — scheduled, unscheduled, and contingency); custodial maintenance; contingency repair; corrective actions; emergency notification and reporting; modifications to this plan; and public involvement. These concepts are addressed in subsequent sections of this plan.

**1.1 Plan Scope and Duration**

This PCCI Plan establishes the inspection, monitoring, and maintenance activities necessary to ensure the continued proper performance of the OSDF. The period covered by this PCCI Plan begins after the last cell of the OSDF has been closed and covered — *i.e.*, at the cessation of the period covered by the *OSDF Systems Plan*. Many of the activities under this PCCI Plan are carried over from the *OSDF Systems Plan*. The facilities and structures covered under this PCCI Plan include:

- Security system (*e.g.*, fences, gates, warning signs)
- Permanently surveyed benchmarks
- OSDF run-on/run-off controls
- OSDF final cover
- Leachate collection system (LCS)
- Leak detection system (LDS)
- Leachate transmission system (LTS)
- Other appurtenances as necessary

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, as discussed in Section 12.0) [Ohio solid waste rule OAC 3745-27-14(A) in lieu of federal solid waste regulation 40 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].

**1.2 Plan Organization**

The remainder of this plan is organized as follows:

- a description of the parties responsible for this plan and the plans related to this plan are presented in the remainder of Section 1.0;
- the requirements pertinent to this plan are addressed in Section 2.0;

- o final site conditions at closure of the OSDF are addressed in Section 3.0; 1
- o institutional controls and points of contact are addressed in Section 4.0; 2
- o environmental monitoring is addressed in Section 5.0; 3
- o leachate management is addressed in Section 6.0; 4
- o routine scheduled inspections are addressed in Section 7.0; 5
- o unscheduled inspections are addressed in Section 8.0; 6
- o custodial maintenance and contingency repair are addressed in Section 9.0; 7
- o corrective actions are addressed in Section 10.0; 8
- o emergency notification and reporting are addressed in Section 11.0; 9
- o modifications to this plan are addressed in Section 12.0; 10
- o public involvement is addressed in Section 13.0; and 11
- o references are presented in Section 14.0. 12

### 1.3 Related Plans 13

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 impacted 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. 14  
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- o *Permitting Plan and Substantive Requirements for the On-Site Disposal Facility* [DOE, 1996c]: identifies the administrative and substantive requirements for the NPDES Permit, and the substantive requirements for all of the FEMP's operable units' on-site disposal needs for the Wetlands Nationwide Permit, the Ohio Solid Waste Permit to Install (PTI), 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. 18  
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- o *OSDF Construction Quality Assurance (CQA) Plan* [GeoSyntec, 1996c]: contains procedures used to evaluate soils and other features of the OSDF liner and final cover system. 27  
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- *OSDF Impacted Materials Placement (IMP) Plan* [GeoSyntec, 1996d]: outlines waste acceptance criteria (WAC) for the OSDF, and contains procedures used to place the impacted materials into the OSDF. 1  
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- *OSDF Surface-Water Management and Erosion Control (SWMEC) Plan* [GeoSyntec, 1996e]: provides details of permanent erosion and sediment controls and surface-water controls for the OSDF, including maintenance requirements for channels and sediment controls. 4  
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- *OSDF Systems Plan* [GeoSyntec, 1996f]: contains procedures used to inspect and maintain the OSDF — including the leachate management system, cover system, and temporary facilities — during the active remediation phase of activities which includes construction, impacted material placement, and closure of individual cells or phases of the OSDF until closure of the final cell/phase of the OSDF. 8  
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- *OSDF Ground Water Monitoring Plan* [FERMCO, 1996]: provides details on the leak detection monitoring program for the OSDF, addressing monitoring both within the OSDF — in the leachate collection system and leak detection — and the underlying groundwater — in the glacial till immediately underneath the OSDF and the groundwater in the Great Miami Aquifer. 13  
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- *Integrated Environmental Monitoring Plan (IEMP)*: sets the schedule for reporting monitoring results. In regards to the OSDF, one or more future revisions are anticipated to assume the air monitoring program and monitoring for additional environmental media other than groundwater during the OSDF post-closure period. 18  
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- *Community Relations Plan for the Fernald Environmental Management Project, Fernald, Ohio (CRP)* [DOE, 1995a]: provides details on how the DOE will involve the public in decisions related to the site. 23  
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2.0 **PERTINENT REQUIREMENTS**

2.1 **Overview**

Regulatory and other requirements pertinent to this plan primarily take the form of applicable or relevant and appropriate requirements (ARARs) and to be considered criteria (TBCs) as determined by the record of decision for each of the various FEMP operable units, functional requirements, and general design criteria. These are addressed in the following subsections.

2.2 **Pertinent Requirements**

ARARs and TBCs that should be addressed by this plan are provided here, as obtained from the *Final Record of Decision for Remedial Actions at Operable Unit 2 (OU2 ROD)* [DOE, 1995b], and the *Final Record of Decision for Remedial Actions at Operable Unit 5 (OU5 ROD)* [DOE, 1996a], as identified by the checkmark (✓) 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 a checkmark in the *Permitting Plan and Substantive Requirements for the On-site Disposal Facility (OSDF Permitting Plan)* [DOE, 1996c] column but no checkmark in the previous columns.

#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan
<b>PLANS</b>					
1	Ohio Municipal Solid Waste Rules—Sanitary Landfill Facility Permit to Install Application OAC 3745-27-06(C)(7)	<ul style="list-style-type: none"> <li>• Prepare a post-closure plan as detailed in OAC 3745-27-11(B).</li> <li>• Prepare a leachate monitoring plan to ensure compliance with OAC 3745-27-19(M)(4).</li> <li>• Prepare a leachate contingency plan as required by OAC 3745-27-19(K)(6).</li> <li>• 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.</li> </ul>		✓	✓
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: <ul style="list-style-type: none"> <li>• The name and location of the facility and unit(s) included in the plan.</li> <li>• A description of the post-closure activities.</li> <li>• 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 EPA shall be notified of any changes.</li> </ul>		✓	✓

#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan
3	Ohio Hazardous Waste Interim Standards Rules—Post-closure Plan; Amendment of Plan OAC 3745-66-18(A) & (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: <ul style="list-style-type: none"> <li>◦ a description of the planned monitoring activities and frequencies at which they will be performed;</li> <li>◦ 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; and</li> <li>◦ 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.</li> </ul>			✓
<b>CLOSURE AND POST-CLOSURE OBJECTIVES</b>					
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: <ul style="list-style-type: none"> <li>◦ 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.</li> <li>◦ A groundwater monitoring system shall be designed and installed in accordance with OAC 3745-27-10, if a system is not already in place.</li> </ul>	✓		✓
5	Ohio Municipal Solid Waste Rules—Final Closure of a Sanitary Landfill Facility OAC 3745-27-11(O)	Closure of the sanitary landfill facility must be completed in a manner that minimizes the need for further maintenance and minimizes post-closure formation and release of leachate...to surface water to the extent necessary to protect human health and the environment.	✓		✓
6	Ohio Hazardous Waste Interim Standards Rules—Closure Performance Standard OAC 3745-66-11	The owner shall close his facility in a manner that: <ul style="list-style-type: none"> <li>◦ minimizes the need for further maintenance;</li> <li>◦ controls, minimizes, or eliminates to the extent necessary to protect public health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the groundwater, or surface waters, or to the atmosphere; and</li> <li>◦ complies with closure requirements.</li> </ul>		✓	✓

#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan		
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: <ul style="list-style-type: none"> <li>• provide long-term minimization of migration of liquids through the closed landfill;</li> <li>• function with minimum maintenance;</li> <li>• promote drainage and minimize erosion or abrasion of the cover;</li> <li>• accommodate settling and subsidence so that the cover's integrity is maintained; and</li> <li>• have a permeability less than or equal to the permeability of any bottom liner system or natural subsoil present.</li> </ul>		✓	✓	1	
8	Ohio Municipal Solid Waste Rules—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19(J)(1) & (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 run-off 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 has been deposited, action will be taken to correct the conditions causing the ponding or erosion.	✓	✓	✓	2	
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.	✓	✓	✓	3	
<b>DURATION OF POST-CLOSURE CARE PERIOD</b>							4
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.	✓	✓	✓	5	
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 closure of the unit and continue for 30 years after that date, unless shortened or extended by the Director [of the OEPA, a.k.a. 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 HWMUs.		✓		6	

#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan
<b>DESCRIPTION OF POST-CLOSURE CARE</b>					
12	Ohio Municipal Solid Waste Rules—Post-closure Care of Sanitary Landfill Facilities OAC 3745-27-14(A)(1) & (2) (in lieu of RCRA Subtitle D)	<p>Post-closure care activities for all sanitary landfill facilities shall include, but are not limited to:</p> <ul style="list-style-type: none"> <li>◦ continuing operation and maintenance of the leachate management system, surface water management system...and the groundwater monitoring system; and</li> <li>◦ 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 run-off from eroding or otherwise damaging the cap system.</li> </ul>	✓	✓	✓
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))	<p>Post-closure care...must consist of at least the following:</p> <ul style="list-style-type: none"> <li>◦ monitoring and reporting; and</li> <li>◦ maintenance and monitoring of waste containment systems.</li> </ul> <p>NOTE: Identified in OUS ROD as applicable only to existing HWMUs.</p>		✓	
14	Ohio Hazardous Waste Landfill Rules—Closure and Post-closure OAC 3745-68-10(B) (in lieu of 40 CFR § 265.310(b))	<p>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:</p> <ul style="list-style-type: none"> <li>◦ 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;</li> <li>◦ <i>continue to operate the leachate collection and removal system until leachate is no longer detected;</i></li> <li>◦ <i>maintain and monitor the leak detection system;</i></li> <li>◦ <i>maintain and monitor the groundwater monitoring system;</i></li> <li>◦ prevent run-on and run-off from eroding or otherwise damaging the final cover; and</li> <li>◦ protect and maintain surveyed benchmarks.</li> </ul>		✓	✓

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#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan
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: <ul style="list-style-type: none"> <li>• maintain the function and integrity (integrity and effectiveness) of the final cover;</li> <li>• maintain and monitor the leachate collection, removal and treatment system...to prevent excess accumulation of leachate in the system; and</li> <li>• protect and maintain surveyed benchmarks.</li> </ul>		✓	✓
<b>LEACHATE MANAGEMENT</b>					
16	Ohio Municipal Solid Waste Rules—Sanitary Landfill Facility Construction OAC 3745-27-08(C)(5)	If required by the Director [of the OEPA, a.k.a. Ohio Director of Environmental Protection], leachate storage structures are to be monitored.	✓	✓	✓
17	Ohio Municipal Solid Waste Rules—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19(K)(1)	If leachate is detected on the surface of the landfill facility, then the outbreak(s) shall be repaired and: <ul style="list-style-type: none"> <li>• leachate shall be contained and properly managed at the sanitary landfill facility;</li> <li>• if necessary, leachate shall be collected and disposed in accordance with OAC 3745-27-19(K)(5) &amp; (6); and</li> <li>• actions shall be taken to minimize, control, or eliminate the conditions which contribute to the production of leachate.</li> </ul>	✓	✓	✓
18	Ohio Municipal Solid Waste Rules—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19(K)(3)	The collection pipe network of the leachate management system shall be inspected...annually [after placement of the initial lift of waste]...to ensure that clogging has not occurred.	✓	✓	✓
19	Ohio Municipal Solid Waste Rules—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19(K)(4)	If authorized by the Director [of the OEPA, a.k.a. Ohio Director of Environmental Protection], leachate may be temporarily stored within the limits of solid waste placement until the leachate can be treated and disposed.	✓	✓	✓
20	Ohio Municipal Solid Waste Rules—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19(K)(5)	The owner shall treat and dispose of collected leachate in accordance with the following: <ol style="list-style-type: none"> <li>(a) treat and dispose of collected leachate on site at the sanitary landfill facility; or</li> <li>(b) pre-treat collected leachate on-site and dispose of collected leachate off-site of the sanitary landfill facility; or</li> <li>(c) treat and dispose of collected leachate off-site of the sanitary landfill facility.</li> </ol>		✓	✓

#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan
21	Ohio Municipal Solid Waste Rules—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19(K)(6)	The owner...shall prepare a contingency plan for the storage and disposal of leachate...The plan shall describe the immediate and long-term steps, including the setting aside of land for the construction and operation of an on-site treatment facility, to be taken for leachate management in the event that collected leachate cannot be managed in accordance with the management option selected in OAC 3745-27-19(K)(5).		✓	✓
22	Ohio Municipal Solid Waste Rules—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19(M)(4) & (5)	The owner annually shall report: <ul style="list-style-type: none"> <li>◦ a summary of the quantity of leachate collected for treatment and disposal on a monthly basis during the year;</li> <li>◦ location of leachate treatment and/or disposal;</li> <li>◦ verification that the leachate management system is operating in accordance with this rule; and</li> <li>◦ results of analytical testing of an annual grab sample from the leachate management system.</li> </ul>		✓	✓
23	Federal Criteria for Municipal Solid Waste Landfills—Closure and Post-closure Care 40 CFR §258.61	The Director [of the OEPA, a.k.a. Ohio Director of Environmental Protection] may allow the owner or operator to stop managing leachate if the owner or operator demonstrates that leachate no longer poses a threat to human health and the environment.	✓	✓	✓
MODIFICATIONS TO POST-CLOSURE CARE PLAN OR PERIOD					
24	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.			✓
25	Ohio Hazardous Waste Interim Standards Rules—Post-closure Plan; Amendment of Plan OAC 3745-66-18(G)	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 the specified period of suspension, the Director [of the OEPA, a.k.a. the Ohio Director of Environmental Protection] would then determine whether the requirements should be permanently discontinued or reinstated to prevent threats to human health and the environment.			✓

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#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan
<b>PROPERTY USE RESTRICTIONS</b>					
26	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 Director [of the OEPA, a.k.a., 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.		✓	
27	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.		✓	✓
<b>POST-CLOSURE NOTICE/SURVEY PLAT</b>					
28	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 Director [of OEPA, a.k.a. 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.			✓
29	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 Director [of the OEPA, a.k.a. 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).			✓

#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan
30	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 Director [of the OEPA, a.k.a. 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.			✓
<b>DEED NOTATION</b>					
31	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: <ul style="list-style-type: none"> <li>◦ the land has been used as a sanitary landfill facility;</li> <li>◦ includes information describing acreage, exact location, depth, volume, and nature of solid waste deposited in the sanitary landfill facility.</li> </ul>	✓		✓
32	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 on 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: <ul style="list-style-type: none"> <li>◦ the land has been used to manage hazardous wastes;</li> <li>◦ its use is restricted under the Ohio Administrative Code closure and post-closure rules; and</li> <li>◦ 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 Director [of the OEPA, a.k.a. the Ohio Director of Environmental Protection].</li> </ul>			✓

#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan
33	Ohio Hazardous Waste Interim Standards Rules—Post-closure Notices OAC 3745-66-19(C)	<p>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 Director [of the OEPA, a.k.a. the Ohio Director of Environmental Protection] approve either:</p> <ul style="list-style-type: none"> <li>• the removal of the notation on the deed to the facility property or other instrument normally examined during title search; or</li> <li>• the addition of a notation to the deed or instrument indicating the removal of the hazardous waste.</li> </ul>			✓
<b>OTHER DOE CRITERIA</b>					
34	Disposal Site Closure/Post-closure DOE Order 5820.2A, Chapter III(3)(j)	<ul style="list-style-type: none"> <li>• During post-closure, residual radioactivity levels for surface soil shall comply with existing DOE decommissioning guidelines.</li> <li>• Inactive disposal facilities, disposal sites, and disposal units shall be managed in conformance with RCRA, CERCLA, and SARA.</li> <li>• 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].</li> <li>• 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.</li> </ul>	✓	✓	
35	Environmental Monitoring DOE Order 5820.2A, Chapter III(3)(k)	<p>Each non-operational low-level waste disposal facility shall be monitored by an environmental monitoring program that conforms with DOE Order 5484.1 and, at a minimum, meets the requirements listed below:</p> <ul style="list-style-type: none"> <li>• The environmental monitoring program shall be designed to measure: (a) operational effluent releases; (b) migration of radionuclides; (c) disposal units subsidence; (d) changes in disposal facility and disposal site parameters which may effect long-term site performance.</li> <li>• Based on the characteristics of the facility monitored, the environmental monitoring program may include, but not necessarily be limited to, monitoring: (a) surface soil; (b) air; (c) surface water; and (d) subsurface soil and water, both in the saturated and unsaturated zones.</li> </ul>	✓	✓	

#	Title	Requirement	OU2 ROD	OU5 ROD	OSDF Permitting Plan
		<ul style="list-style-type: none"> <li>The monitoring program shall be capable of detecting changes in trends in performance far enough in advance to allow application of necessary corrective action before exceeding performance objectives. The monitoring program shall be able to ascertain whether or not effluents from each treatment or disposal facility or disposal site meets the requirements of applicable DOE Orders.</li> </ul>			

2.3 Functional Requirements

The *Design Criteria Package (OSDF DCP)* [GeoSyntec, 1996b] contains a variety of functional requirements that have been established for the OSDF. The functional requirements pertinent to this plan are:

- protect the OSDF from damage caused by precipitation and stormwater run-on and run-off;
- route run-on and run-off to designated diversion channels locations for appropriate management; and
- 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 closure of the OSDF). The system should prevent stormwater run-on to the OSDF and uncontrolled stormwater run-off 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 DCP* [GeoSyntec, 1996b] 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); and
- long-term run-on/run-off 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.

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**2.5 Other Requirements**

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In addition to the requirements contained in the *OSDF DCP* [GeoSyntec, 1996b], other requirements that have been incorporated into this plan are:

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- disturbed areas should be stabilized (*i.e.*, vegetated) after the area has been reconstructed to final grade; and
- general practices for inspection and maintenance of erosion and sediment control features should be as recommended by the Ohio Department of Natural Resources (ODNR) Division of Soil and Water Conservation document entitled *Rainwater and Land Development* [ODNR, 1996] or its most current revision.

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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, the DOE and the Environmental Protection Agency (EPA) signed a *Federal Facilities Compliance Agreement (FFCA)*, addressing impacts to the environment associated with the federally operated site known as the FEMP. The DOE agreed to conduct the FFCA investigation as a remedial investigation/feasibility study (RI/FS) in accordance with guidelines of CERCLA. In November 1989, the FEMP site was included on the National Priorities List (NPL) of the EPA. 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 (ACA)*, EPA approved and signed the *OU2 ROD* [DOE, 1995b] on June 8, 1995; and similarly, the *OU5 ROD* [DOE, 1996a] on January 31, 1996. The *Operable Unit 3 Record of Decision for Final Remedial Action (OU3 ROD)* [DOE, 1996b] is anticipated in 1996. The design approach for the OSDF is presented in the *Final Remedial Design Work Plan for Remedial Actions at Operable Unit 2 (OU2 RDWP)* [DOE, 1995c], which was submitted to the EPA in August 1995 and subsequently approved in November 1995. The design of the OSDF, as currently developed, is presented in the *Pre-final Design Package, On-Site Disposal Facility* [GeoSyntec, 1996a]. Ohio EPA (OEPA), which has been actively participating throughout the CERCLA response process, also has concurred with the documentation and decisions to date.

The FEMP OSDF is being/was constructed to permanently contain impacted materials derived from the remediation of the operable units at the FEMP. All material emplaced in the OSDF will be/was required to meet OSDF waste acceptance criteria (WAC). The *OU2 ROD* [DOE, 1995b] established a radiological waste acceptance criteria of 346 picoCuries/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* [DOE, 1996a] established additional radiological and chemical waste acceptance criteria for OU5 soils destined for the OSDF. The *OU3 ROD* [DOE, 1996b] established radiological waste acceptance criteria for debris materials destined for the OSDF of 105 grams technetium-99. These radiological/chemical waste acceptance criteria (WAC) have been compiled and presented in Table 3-1. The impacted materials sent to the OSDF from OU3 may also include small material contributions from OUs 1 and 4. Any material from these latter operable units destined for the OSDF met the OU3 waste acceptance criteria. In addition to the radiological/chemical waste acceptance criteria discussed above, the *OSDF Impacted Materials Placement (IMP) Plan* [GeoSyntec, 1996d] presents physical waste acceptance criteria for the OSDF.

The volume of this impacted material destined for disposal in the OSDF is estimated as 2.5 million cubic yards (1.9 million cubic meters) bank/unbulked. Approximately 80 percent of this volume is expected to consist of impacted soil, with the remainder being 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 FEMP former production area is expected to constitute the largest volume of impacted material for OSDF disposal. The *OU3 ROD* [DOE, 1996b] indicates that impacted debris can be assigned to one of ten material categories. Only material from seven of these categories are to be/were disposed 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 <sup>a</sup>		Debris <sup>b</sup>
		OU2	OU5 <sup>d</sup>	OU3
	<b>Radionuclides:</b>			
1	Neptunium-237		3.12 x 10 <sup>9</sup> pCi/g	
2	Strontium-90		5.67 x 10 <sup>10</sup> pCi/g	
3	Technetium-99		29.1 pCi/g	105 g
4	Uranium-238	346 pCi/g		
	Total Uranium	1,030 mg/kg	1,030 mg/kg	
	<b>Inorganics:</b>			
5	Boron		1.04 x 10 <sup>3</sup> mg/kg	
6	Mercury <sup>c</sup>		5.66 x 10 <sup>4</sup> mg/kg	
	<b>Organics:</b>			
7	Bromodichloromethane		9.03 x 10 <sup>-1</sup> mg/kg	
8	Carbazole		7.27 x 10 <sup>4</sup> mg/kg	
9	Alpha-chlordane		2.89 mg/kg	
10	Bis(2-chlorisopropyl)ether		2.44 x 10 <sup>-2</sup> mg/kg	
11	Chloroethane		3.92 x 10 <sup>5</sup> mg/kg	
12	1,1-Dichloroethene <sup>c</sup>		11.4 mg/kg	
13	1,2-Dichloroethene <sup>c</sup>		11.4 mg/kg	
14	4-Nitroaniline		4.42 x 10 <sup>-2</sup> mg/kg	
15	Tetrachloroethene <sup>c</sup>		128 mg/kg	
16	Toxaphene <sup>c</sup>		1.06 x 10 <sup>5</sup> mg/kg	
17	Trichloroethene <sup>c</sup>		128 mg/kg	
18	Vinyl chloride <sup>c</sup>		1.51 mg/kg	

NOTES:

<sup>a</sup>maximum concentration

<sup>b</sup>maximum total mass

<sup>c</sup>RCRA-based constituent of concern

<sup>d</sup>constituents which have established maximums which serve as Waste Acceptance Criteria; other compounds which will not exceed designated Great Miami Aquifer action levels within 1000-year performance period, regardless of starting concentration in the OSDF, are not listed.

SOURCES:

OU2 ROD [DOE, 1995b]

OU5 ROD [DOE, 1996a]

OU3 ROD [DOE, 1996b]

**Table 3-2**  
**OU3 Material Categories/Descriptions**

Category A Accessible Metals	Category B Inaccessible Metals	Category D Painted Light-Gauge Metals	Category E Concrete	Category G Non-Regulated ACM	Category H Regulated ACM	Category I Miscellaneous Materials
Structural & miscellaneous steel	<ul style="list-style-type: none"> <li>•Doors</li> <li>•Conduit/wire/cable tray</li> <li>•Electrical wiring &amp; fixtures</li> <li>•Electrical transformers</li> <li>•Miscellaneous electrical items</li> <li>•HVAC equipment</li> <li>•Material handling equipment</li> <li>•Process equipment</li> <li>•Miscellaneous equipment</li> <li>•Piping</li> </ul>	<ul style="list-style-type: none"> <li>•Ductwork</li> <li>•Lead flashing</li> <li>•Louvers</li> <li>•Metal wall &amp; roof panels</li> </ul>	<ul style="list-style-type: none"> <li>•Asphalt</li> <li>•Slabs</li> <li>•Columns</li> <li>•Beams</li> <li>•Foundations</li> <li>•Walls</li> <li>•Masonry</li> <li>•Clay piping</li> </ul>	<ul style="list-style-type: none"> <li>•Ceiling demolition</li> <li>•Feeder cable</li> <li>•Fire brick</li> <li>•Floor tile</li> <li>•Transite wall &amp; roof panels</li> </ul>	<ul style="list-style-type: none"> <li>•Ductwork insulation</li> <li>•Piping insulation</li> <li>•Personal protective equipment</li> <li>•Copper scrap metal pile</li> </ul>	<ul style="list-style-type: none"> <li>•PVC conduit</li> <li>•Basin liners</li> <li>•Fabric</li> <li>•Drywall</li> <li>•Building insulation</li> <li>•Miscellaneous debris</li> <li>•Personal protective equipment</li> <li>•PVC piping</li> <li>•Roofing build-up</li> <li>•Process trailers</li> <li>•Non-process trailers</li> <li>•Windows</li> <li>•Wood</li> </ul>

**SOURCE:** Table 4-2, OU3 Material Categories/Description, *OU3 ROD* [DOE, 1996b].  
**NOTE:** Only those seven material categories allowed for on-site disposal per the *OU3 ROD* are presented.

The quantities presented above are best current estimates, and are expected to change as actual remediation progresses. Therefore, this subsection is anticipated to be revised after closure of the final phase/cell of the OSDF to present updated actual volumes (see Section 12.0), as well as to correct to past tense.

**3.2 Location and Description of On-Site Disposal Facility Area**

A Predesign Investigation was performed to define the most suitable location for the OSDF within an identified best area at the FEMP based on the OU2 and OU5 RI/FSs. The results of that investigation are presented in the *Predesign Investigation and Site Selection Report for the On-site Disposal Facility* [DOE, 1995e]. That report, its objectives, and its results are summarized below.

The identified best area is located on the east side of the FEMP property and measures approximately 2000 feet east to west by 5300 feet north to south. This location is considered the best location for an on-site disposal facility 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 FSs have shown that a disposal facility in this area, based on a feasible facility design and a 12-foot 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 OEPA siting requirements (buffer from property line and water supply wells). The western boundary incorporates areas with greater than 12 feet 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.

Based on planning meetings between DOE, EPA and OEPA, the Predesign Investigation had the three objectives as identified in Table 3-3. Results of the Predesign Investigation served as the basis for selecting the location within the identified best area for siting the OSDF. The selected location, measuring 800 feet east to west

**Table 3-3  
 PREDESIGN INVESTIGATION OBJECTIVES AND FIELD COMPONENTS**

#	Objective	Field Components
1	Identify the most suitable hydrogeology within the identified best area	<ul style="list-style-type: none"> <li>o Verification of the gray clay thickness</li> <li>o Identification of interbedded granular material</li> </ul>
2	Verify protection of human health and the environment	<ul style="list-style-type: none"> <li>o Verification of existing vertical and horizontal uranium contamination</li> <li>o Actual uranium solubility</li> <li>o Uranium retardation</li> <li>o Lateral and vertical gradients</li> <li>o Background concentrations of uranium in water in the vadose zone</li> </ul>
3	Develop field information for the design of the OSDF	<ul style="list-style-type: none"> <li>o Location and extent of interbedded granular material</li> <li>o Obtain geotechnical information in the footprint of the OSDF</li> </ul>

by 4300 feet north to south, provides suitable space for the anticipated 2.5 million cubic yards of impacted materials and meets applicable OEPA siting requirements. The gray clay thickness is greater than the minimum 12-foot thickness established in the *OU2 ROD* [DOE, 1995b] for protection of the Great Miami Aquifer; the gray clay is actually greater than 15 feet thick within the selected location and approximately 75 percent of the selected location has a 20-50 foot thickness of gray clay. The investigation identified minimal amounts of interbedded granular material and none that would offer a rapid migration pathway through the gray till.

### 3.3 OSDF As Built

The design approach for the OSDF is presented in the document *Final Remedial Design Work Plan for Remedial Actions at Operable Unit 2* [DOE, 1995c]. The design approach of the OSDF, as currently developed, is presented in the document *Pre-final Design Criteria Package, On-Site Disposal Facility* [GeoSyntec, 1996a]. 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.

After closure of the final cell/phase of the OSDF, as-built conditions will be documented with a set of as-built record drawings (and possibly photographs). These drawings will be developed by DOE or its contractor, and will be used to prepare the topographic map discussed in the next paragraph. This information will illustrate baseline conditions for comparison to future conditions during the post-closure period. These drawings may 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 final FEMP OSDF site map will be compiled from a final topographic map of the FEMP. The final topographical survey will be conducted in accordance with the standards of the *Manual of Photogrammetry* [ASP, 1980]. It is anticipated that the following specifications will be 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 feet (1 mm = 2.4 m)
- a contour interval of 5 ft (1.5 m)
- a coverage area of the FEMP OSDF disposal site and a distance of 1,000 ft
- north arrow displayed

In addition to existing topography, it is anticipated that the maps will define the following:

- property lines of the land owned by the 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 stormwater run-off and -on 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, as per 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 2000 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

These as-built drawings will be submitted to the EPA and OEPA as part of the first pre-planned revision of this PCCI Plan (see Section 12.2.2). The map will serve as the base map for site inspections. A new, separate site map will be prepared for field use during a site inspection. The map will be revised as needed to indicate changes noted after each inspection; at a minimum, the map will be revised as part of the 5-year review. Note that DOE plans to update the information under the last bullet above regarding water supply wells only during the 5-year reviews. When the FEMP OSDF map is updated, the revised map will include the year of revision, the revision number, and the type of the activity or event which triggered the need for the revision.

All drawings, disposal site map, and photographs will be archived by the Fernald Environmental Management Project document control center. The DOE will be responsible for maintaining and archiving these maps, drawings, and photographs, as part of the FEMP OSDF permanent file.

### 3.4 FEMP OSDF Baseline Photographs

A photographic record of the final conditions after closure of the final cell of the OSDF will be included and maintained in the FEMP OSDF permanent site file. This record is anticipated to consist of a series of aerial and ground photographs that will 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 is anticipated to provide a permanent record of site conditions, enabling future inspectors to monitor changes in site conditions (e.g., erosion patterns, vegetation changes, and land use) over time. The need for new aerial photographs will be evaluated at 5-year intervals, beginning with the first 5-year review. Table 3-4 summarizes the anticipated specifications for the aerial photographs.

### 3.5 Site Inspection Photographs

Photographs will be taken during site inspections to document conditions at the OSDF and its surrounding permanent features. These photographs will 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 will be recorded individually on 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

**Table 3-4**  
**AERIAL PHOTOGRAPHY SPECIFICATIONS**

Area to be photographed	Final disposal site plus a minimum of 0.25 mi (0.4 km) beyond its boundaries unless site conditions require otherwise.
Products to be delivered	One (1) set of vertical color, infrared stereo contact prints; glossy, double weight, not trimmed; 9-in x 9-in (230-mm x 230 mm); Scale: 1 in = 200 ft (1 mm = 2.4 m) (1:2,400)  Index map showing flight lines and frame numbers; Scale: 1 in = 1,000 ft (1:12,000)  One (1) set of natural color, low oblique photographs taken from a minimum of two (2) different angles with 90 degree rotation. If 35mm or 70mm film used, glossy double-weight 8-inch x 10-inch enlargements; if 9-inch x 9-inch format 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 x 9-inch (230- x 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)

such as a survey monument, boundary monument, site marker, or monitor well.

For specific areas where a photograph is used to monitor change over time, the distance from the feature 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. This information will be provided on the inspection checklist and photo log.

Copies of the site inspection photographs and the photo log will be included in the annual site inspection report. All site inspection photographs taken, as well as all corresponding photo log forms, will be maintained in the permanent FEMP OSDF file.

**FEATURES TO BE PHOTOGRAPHED**



The following site features should be documented with photographs every scheduled inspection of the FEMP OSDF site: 2  
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- o permanent site surveillance features 4
- o fences, gates, access roads, perimeter roads, and paths 5
- o toe drains 6
- o the OSDF (top, sides, buffer area, surrounding area) — panoramic sequences of photographs from selected vantage points may be used for this purpose 7  
8
- o any evidence of erosion (e.g., gullies, rivulets, rills) that the inspector considers significant and includes in the text of the inspection log book 9  
10
- o any off-OSDF features that may affect the OSDF in the future and that the inspector considers significant and includes in the text of the inspection log book 11  
12
- o vegetation (OSDF topslope and sideslope, and buffer area) 13
- o OSDF topslope and sideslope 14
- o erosion protection material (riprap) 15
- o survey control points for local coordinate system. 16

Any new or potential problem areas identified during a site inspection will be documented with photographs. 17  
Photographs will 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. 18



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4.0 INSTITUTIONAL CONTROLS AND POINTS OF CONTACT

4.1 Introduction

This section will discuss the institutional controls that will be in place for the OSDF and its buffer area during the post-closure care period. Table 4-1 presents a compilation of the institutional controls for the OSDF and its buffer area as identified in the *OU2 ROD* [DOE, 1995b], and in the *OU5 ROD* [DOE, 1996a]. Environmental monitoring (Item 5), inclusive of groundwater monitoring (Item 4), is discussed in Section 5 of this plan. This plan, in total, addresses the maintenance program (Item 6). The following sections discuss the remaining items.

**Table 4-1  
 INSTITUTIONAL CONTROLS AS KEY COMPONENTS IN THE FEMP RODs**

#	Component	OU2 ROD	OU5 ROD
<b>INSTITUTIONAL CONTROLS</b>			
		The selected remedy will include the following as institutional controls:	"Institutional controls, such as ..."5a
1	Ownership	"continued federal ownership of the [OSDF] site"2a	"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 restrictions/ 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 FEMP 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
<b>OTHER KEY COMPONENTS OF THE SELECTED REMEDY</b>			
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

2aDeclaration, Description of the Selected Remedy, p. D-2, *OU2 ROD* [DOE, 1995b]  
 2bDecision Summary, Section 9.1 Key Components, p. 9-2, *OU2 ROD* [DOE, 1995b]  
 2cResponsiveness Summary, Section 3.0 Summary of Issues and Responses, Issue 7 — Future Use/Ownership, p. RS-3-33, *OU2 ROD* [DOE, 1995b]  
 5aDeclaration Statement, Description of the Selected Remedy, p. D-ii, *OU5 ROD* [DOE, 1996a]  
 5bDecision 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 FEMP 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 primary point of contact (entry 1), a backup point of contact (entry 2), and an emergency contact number that is accessible 24 hours each day (entry 3). 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 emergency. An updated copy of this plan will be maintained at each of the locations identified in Table 4-2.

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 PCCI Plan, likely as change pages to this section (see Section 12.0).

4.3 Ownership

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

Table 4-2  
 POINTS OF CONTACT

	Title of contact	Telephone	Address	
			Mailing	Shipping
1	DOE FEMP Site Manager	(513) 648-3101	DOE Fernald Area Office P.O. Box 538704 Cincinnati, OH 45253-8704	DOE Fernald Area Office 7400 Willey Road Fernald, OH 45030
2	DOE Ohio Field Office Contact	(513) 865-3862	DOE Ohio Field Office P.O. Box 3020 Miamisburg, OH 45343-3020	Not applicable
3	DOE Headquarters Emergency Operations Center 24-HOUR NUMBER	(202) 586-8100	Not applicable	Not applicable

Refer to the Fernald Environmental Management Project On-Site Disposal Facility

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**4.4 Access Controls/Restrictions and Security Measures**

As long as the federal government maintains property ownership, access to the FEMP 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 is anticipated to be limited to personnel for inspection, custodial maintenance, or corrective actions. The fences, gates, and warning signs are covered by the inspection and custodial maintenance components of the post-closure care program implemented under this PCCI Plan (see Sections 7.0 and 9.0, respectively).

To provide additional security, a warning sign with the following information will be/was 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, and a DOE 24-hour telephone number (entry 3 in Table 4-2); this same 24-hour telephone number will be recorded in agreements with local agencies to notify the DOE in the event of an emergency or breach of site security or integrity.

In addition to the entrance sign, signs mounted on fence posts at approximately equal spacing around the OSDF perimeter will display the following information — the international symbol indicating the presence of radioactive material, and a notice that trespassing is forbidden on this U. S. Government property.

The effectiveness of site security measures (e.g., fence condition, locked gate, etc.) will be monitored through routine scheduled site inspections (see Section 7.0).

**4.5 Deed Restrictions/Use Restrictions**

If ownership of a portion or portions of the FEMP is transferred in the future, restrictions will be included in the deed, and proper notifications will be provided as required by the appropriate rules and regulations. A preliminary draft of such notice in deed is provided below in Table 4-3, along with information extracted from the appropriate rules and regulations presented side by side to facilitate understanding of development of that notice. Note that specifics and the exact language appropriate to the specific parcel(s) of property will need to be developed and inserted at the time of such recording of deed notice.

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(B) and 3745-68-10 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.

Table 4-3  
 NOTICE IN DEED OR OTHER TRANSFER INSTRUMENT

Ohio Solid Waste Rules	Ohio Hazardous Waste Rules	CERCLA	FEMP
<p>[OAC 3745-27-11(H)(5)]</p> <p>The owner is required to submit — to the local zoning authority, or the authority with jurisdiction over local land use, and to the board of health having jurisdiction, and to the Director — a survey plat showing the units(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.</p> <p>The owner is required to record a notation on the deed to the sanitary landfill property, or on some other instrument which is normally examined during title search, that will notify in perpetuity any potential purchaser that the land has been used as a sanitary landfill facility. The notation shall include information as described above regarding the requirement for filing the survey plat.</p>	<p>[OAC 3745-66-16 &amp; -19 and 3745-68-10(B)]</p> <p>The owner is required to submit — to the local zoning authority, or the authority with jurisdiction over local land use, and to the Director — 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).</p> <p>The owner is required to record a notation on the deed to the facility property, or on some other instrument which is normally examined during title search, that will notify in perpetuity the potential purchasers that: (a) the land has been used to manage hazardous wastes; (b) its use is restricted under OAC closure and post-closure rules; and (c) the survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each cell or hazardous waste disposal unit of the facility has been filed as per above.</p>	<p>[CERCLA §120(h)]</p> <p>Whenever any agency, department, or instrumentality of the United States enters into any contract for the sale or other transfer (e.g., lease) of real property owned by the United States and on which any hazardous substance was stored for one year or more, known to have been released, or disposed of, that agency, department or instrumentality shall include in such contract or instrument — to the extent such information is available on the basis of a complete search of agency files —</p> <ul style="list-style-type: none"> <li>(i) notice of the type and quantity of such hazardous substances,</li> <li>(ii) notice of the time at which such storage, release, or disposal took place, and</li> <li>(iii) a description of the remedial action taken, if any.</li> </ul>	

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Table 4-3 NOTICE IN DEED OR OTHER TRANSFER INSTRUMENT			
Ohio Solid Waste Rules	Ohio Hazardous Waste Rules	CERCLA	FEMP
NOTICE IN DEED	SAMPLE NOTICE IN DEED	NOTICE IN TRANSFER INSTRUMENT	SAMPLE NOTICE IN TRANSFER INSTRUMENT
	<p>TO WHOM IT MAY CONCERN:</p> <p>I, <i>(owner or operator)</i>, the undersigned, of <i>(street address)</i>, City of <i>(city)</i>, County of <i>(county)</i>, State of <i>(state)</i>, hereby give the following notice, as required by Ohio Administrative Code hazardous waste rules 3745-66-19(A) &amp; (B) and 3745-68-10(B) — in lieu of 40 CFR §§265.119(b)(1) and 264.119(b)(1), respectively.</p>		<p>TO WHOM IT MAY CONCERN:</p> <p>I, <i>(owner or operator)</i>, the undersigned, of <i>(street address)</i>, City of <i>(city)</i>, County of <i>(county)</i>, State of <i>(state)</i>, hereby give the following notice, as required by Ohio Administrative Code solid waste rule 3745-27-11(H)(5), and as required by Ohio Administrative Code hazardous waste rules 3745-66-19(B) and 3745-68-10(B) — in lieu of 40 CFR §§264.119(b)(1) and 265.119(b)(1), respectively — and as required by CERCLA §120(h).</p>
	<p>1 I am, and since <i>(month, day, year)</i>, have been in possession of the following described lands <i>(legal description)</i>.</p>		<p>1 I am, and since <i>(month, day, year)</i>, have been in possession of the following described lands <i>(legal description)</i>.</p>
	<p>2 Since <i>(month, day, year)</i>, I have disposed of hazardous chemical wastes on/in the above described land under the terms of the Ohio Administrative Code rules, and regulations promulgated by the United States Environmental Protection Agency.</p>		<p>2 Between <i>(month, year)</i> and <i>(month, year)</i>, remedial actions have been conducted on the property which have disposed of materials consisting primarily of soils and building debris containing asbestos containing materials, chemical hazardous substances &amp; radiological hazardous substances, under the terms of regulations promulgated by the United States Environmental Protection Agency on/in the above described land.</p>

Table 4-3  
 NOTICE IN DEED OR OTHER TRANSFER INSTRUMENT

Ohio Solid Waste Rules	Ohio Hazardous Waste Rules	CERCLA	FEMP
	<p>3 The future use of the above-described land is restricted under the terms of Ohio Administrative Code hazardous waste rules 3745-66-17(C) and 3745-68-10 — in lieu of 40 CFR §§265.117(c) and 264.117(c); the post-closure use of the identified property must never be allowed to disturb the integrity of either the containment system or the facility's monitoring system, unless the EPA Regional Administrator or the Director of OEPA [a.k.a. the Ohio Director of Environmental Protection] determines that the proposed use:</p> <ul style="list-style-type: none"> <li>◦ will not increase the potential threat to human health or the environment, or</li> <li>◦ is necessary to reduce the threat to human health or the environment.</li> </ul>		<p>3 The future use of the above-described land used for disposal is restricted under the terms of Ohio Administrative Code hazardous waste rules 3745-66-17(C) and 3745-68-10 — in lieu of federal hazardous waste regulations 40 CFR §§265.117(c) and 264.117(c). The post-closure use of such property must never be allowed to disturb the integrity of either the On-Site Disposal Facility's containment system or monitoring system, unless the EPA Regional Administrator and/or the Ohio Director of Environmental Protection determines that the proposed use:</p> <ul style="list-style-type: none"> <li>◦ will not increase the potential threat to human health or the environment, or</li> <li>◦ is necessary to reduce the threat to human health or the environment.</li> </ul>
	<p>4 Any &amp; all future users of the land shall inform themselves of the requirements of the regulations and ascertain the amount &amp; nature of wastes disposed of on/in the above-described property.</p>		<p>4 Any &amp; all future users of the land shall inform themselves of the requirements of the regulations and ascertain the amount &amp; nature of remediation wastes/ impacted materials disposed of on/in the above-described property.</p>

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**Table 4-3  
 NOTICE IN DEED OR OTHER TRANSFER INSTRUMENT**

Ohio Solid Waste Rules	Ohio Hazardous Waste Rules	CERCLA	FEMP
<p>File a survey plat with each of the following, showing 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:</p> <ul style="list-style-type: none"> <li>• <i>name &amp; address of local zoning authority, or authority with jurisdiction over local land use</i></li> </ul>	<p>5 I have filed a survey plat with each of the following, showing the location and dimensions of the disposal facility and its individual units, and a record of the type, location and quantity of waste material disposed within each unit of the disposal facility:</p> <ul style="list-style-type: none"> <li>• <i>name &amp; address of local zoning authority, or authority with jurisdiction over local land use</i></li> </ul>		<p>5 I have filed a survey plat with each of the following, showing the location &amp; dimensions of the On-Site Disposal Facility &amp; its individual cells/phases, and a record of the type, location &amp; quantity of remediation waste/ impacted material disposed within the On-Site Disposal Facility:</p> <ul style="list-style-type: none"> <li>• Butler County Recorder's Office                      130 High Street                      Hamilton, Ohio 45001                      (513-887-3409)                      AND                      Hamilton County Recorder's Office                      ATTN: Registered Land Recordings                      138 E. Court Street,                      Cincinnati, Ohio 45202                      (513-632-8336)</li> </ul>
<ul style="list-style-type: none"> <li>• <i>name &amp; address of the board of health having jurisdiction</i></li> </ul>			<ul style="list-style-type: none"> <li>• Butler County Health Department                      ATTN: Environmental                      202 S. Monument Street                      Hamilton, Ohio 45001                      (513-887-5228)                      AND                      Hamilton County Environmental Health Division                      11499 Chester Road,                      Suite 1500                      Sharonville, Ohio                      (513-326-4500)                      AND                      Director, Ohio Department of Health                      ATTN: Contaminated Sites Group                      36 E. Chestnut St.                      Columbus, Ohio 43216                      (800) 527-4439</li> </ul>
	<ul style="list-style-type: none"> <li>• Regional Administrator of EPA Region 5</li> </ul>		<ul style="list-style-type: none"> <li>• EPA Region 5 Administrator                      77 W. Jackson Blvd                      Chicago, Illinois,                      60604-3590</li> </ul>

**Table 4-3  
 NOTICE IN DEED OR OTHER TRANSFER INSTRUMENT**

Ohio Solid Waste Rules	Ohio Hazardous Waste Rules	CERCLA	FEMP
<ul style="list-style-type: none"> <li>◦ Ohio Director of Environmental Protection</li> </ul>	<ul style="list-style-type: none"> <li>◦ Ohio Director of Environmental Protection</li> </ul>		<ul style="list-style-type: none"> <li>◦ Ohio Director of Environmental Protection            1800 Watermark Drive            P.O. Box 1049            Columbus, Ohio            43266-0149</li> </ul>
		<p>A covenant warranting that—</p> <ul style="list-style-type: none"> <li>◦ all remedial action necessary to protect the human health &amp; the environment with respect to any such hazardous substances remaining on the property has been taken before the date of such transfer, and</li> <li>◦ any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States.</li> </ul>	<p>A covenant warranting that—</p> <ul style="list-style-type: none"> <li>◦ all remedial action necessary to protect the human health &amp; the environment with respect to any such hazardous substances remaining on the property has been taken before the date of such transfer, and</li> <li>◦ any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States.</li> </ul>

## 5.0 ENVIRONMENTAL MONITORING

### 5.1 Introduction

Two primary elements of environmental monitoring are associated with the FEMP OSDF post-closure care period, namely air monitoring and groundwater monitoring. This section describes the focus and scope of the plans for monitoring these two primary environmental media. Leachate collection system and leak detection system flow rate monitoring are addressed in Section 6.

### 5.2 Air Monitoring

Air monitoring for the OSDF post-closure care period must be compatible with the FEMP site air monitoring program(s) conducted during the active remediation phase of the FEMP OSDF remedial action project in order to provide readily comparable information and data. Hence, the existing site air emissions monitoring program(s) will support the OSDF remedial action project: the Fernald sitewide Environmental Monitoring Program (EMP) (and, as necessary, the Occupational Air Monitoring Program). The air emission monitoring program for the FEMP OSDF during the post-closure care period — the air monitoring stations, analytical parameters, sampling frequency, equipment, procedures, and analytical methods — will be presented in a future revision to the *Integrated Environmental Monitoring Plan (IEMP)* in order to provide data for annual 40 CFR Part 61 National Emissions Standards for Hazardous Air Pollutants (NESHAPs) Subpart H reporting and for other annual site environmental reporting.

It is anticipated that data will be collected under that ongoing program during at least a portion of the OSDF post-closure care period from air monitoring stations located on-property in the vicinity of the OSDF, near the FEMP property fence line, and at several off-property locations in nearby communities. That monitoring program has been developed in response to DOE Orders 5400.1 and 5400.5 and is currently presented in the *IEMP*. Some air monitoring locations may require relocation to accommodate changes in site conditions due to FEMP remediation activities. Any such location-based modifications will be addressed in the *IEMP*.

### 5.3 Groundwater Monitoring

Groundwater monitoring for the OSDF is currently presented in the *OSDF Ground Water Monitoring Plan* [FERMCO, 1996]. The focus of that plan is the leak detection monitoring program for the OSDF, addressing monitoring both within the OSDF (in the leachate collection system and leak detection) and the underlying groundwater (in the glacial till immediately underneath the OSDF and the groundwater in the Great Miami Aquifer). Although the temporal coverage of that plan begins in part prior to the placement of impacted material/remediation waste into the OSDF, its coverage is anticipated to extend through the active phase of the OSDF, when remediation wastes are being emplaced in the individual cells of the OSDF, and into the post-closure phase after the last cell of the OSDF has been covered and closed. It is anticipated that the *OSDF Ground Water Monitoring Plan* might be revised over time to fine tune the monitoring strategy and its individual components; any such revisions are anticipated to be done in a consultative manner between the DOE, EPA, and OEPA.

If a leak is detected from the OSDF, DOE will consult with the EPA and OEPA to formulate an appropriate path forward for evaluating the nature and extent of the release, and determining an appropriate response.

5.4 Monitoring of Other Media

It is anticipated that monitoring of selected additional media — *e.g.*, surface water, vegetation — during the OSDF post-closure care period might also be addressed in a future revision to the *IEMP* focusing on the OSDF post-closure care period. See the second (2nd) bullet under DOE Order 5820.2A, Chapter III(3)(k) (entry 35 ) in the table presented in Section 2.0.

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**6.0 LEACHATE MANAGEMENT SYSTEM**

**6.1 Introduction**

This section covers the leachate collection system (LCS) and leak detection system (LDS), and will address:

- Procedures for collecting, handling, and disposing of leachate, if any, during the post-closure period in order to prevent excess accumulation of leachate in the system [federal solid waste regulation 40 CFR §§258.61(a)(2) and 258.40, and Ohio hazardous waste rule OAC 3745-68-10(D)(2) in lieu of federal hazardous waste landfill regulations 40 CFR §§264.301(c) and 265.301(a)]
- E.g., if leachate is to be collected in a tank for periodic removal, the plan should estimate the quantity of leachate per time period, and specify the frequency of removal and how it will be treated or disposed [federal hazardous waste landfill regulations 40 CFR §§264.301(c) and 265.301(a)]
- Such procedures are to remain in effect until leachate is no longer detected [federal hazardous waste landfill regulation 40 CFR §§264.310(b)(2)]
- The Ohio Director of Environmental Protection may allow the management of leachate to cease if it is demonstrated that leachate no longer poses a threat to human health or the environment [federal solid waste regulation 40 CFR §258.61].

Note that leachate flow monitoring, sampling and analysis, and notification and response actions for leachate are addressed in the OSDF Ground Water Monitoring Plan, as is stated in Section 1.3 of this plan.

**6.2 Leachate Management System**

The following discussions in large part have been reproduced with minor modification from Section 3 of OSDF Systems Plan [GeoSyntec, 1996f].

**6.2.1 Overview**

The double liner system of each OSDF cell contains a leachate collection system (LCS) and leak detection system (LDS). These systems are designed to convey any liquids that enter the system through pipes (i.e., the LCS pipes and LDS pipes) to manholes located outside each cell. After closure of the OSDF, liquids that enter the LCS are leachate generated in the emplaced impacted material which infiltrates through the impacted material into the LCS. Liquid that collects in the LDS manhole primary containment vessel of a cell will be pumped to the adjacent LCS manhole. In turn, the LCS manholes are connected by a leachate transmission system (LTS) gravity line which conveys leachate from the LCS pipe outlets in the LCS manholes via gravity flow to a permanent lift station. From the permanent lift station, leachate is pumped through a permanent double-wall forcemain to the Bionitrification Surge Lagoon (BSL).

The locations of the LCS, LDS and LTS pipes, manholes, and gravity lines are shown in the (as-built) Construction Drawings. 

### 6.2.2 Basic System Operation

The basic operation of the OSDF leachate management systems is described below.

- The LCS and LDS pipes from liner system to the LCS and LDS manholes for each cell consist of double-wall HDPE pipes (*i.e.*, inner carrier pipes and outer containment pipes). Each pipe drains by gravity from the OSDF cell and terminates in an LDS or LCS manhole.
- The LDS manhole allows for direct discharge of flow from the LDS carrier pipe into a primary containment vessel located inside the manhole. The LDS manhole serves as a secondary containment structure for the primary containment vessel. The LDS manhole has provisions for the monitoring of liquid in the primary containment vessel component of the manhole. The primary containment vessel has a 2-in. (50-mm) diameter liquid level pipe, a 2-in. (50-mm) diameter suction pipe, and a 2-in. (50-mm) diameter discharge pipe. The discharge pipe is connected to the LTS gravity line in the adjacent LCS manhole. The LDS containment pipe has a monitoring port and fixed end seal within the LDS manhole to verify the absence of liquid in the annular space between the carrier pipe and containment pipe.
- Each LDS manhole has a cleanout adjacent to the manhole for maintaining the LDS carrier pipe.
- The LCS manhole allows for direct discharge of flow from the LCS carrier pipe into the LTS gravity line that passes through the manhole. Prior to final closure of the OSDF, the LCS carrier pipe has temporary valves for regulating leachate flow into the gravity line during OSDF construction, impacted material placement, and periods of gravity line maintenance, extension, repair, etc. These valves shall be removed (and replaced with a solid-wall HDPE spool) from the LCS carrier pipe prior to final closure of the OSDF (so that, for the long term post-closure period, there are no obstructions in the pipe). The LCS carrier pipe in each LCS manhole also has a sampling port for obtaining leachate samples. Each LCS manhole has an inlet for a redundant LCS carrier pipe. The redundant carrier pipe has a valve (secured in a closed position) and monitoring port (for periodically confirming the absence of liquid in the pipe). The redundant carrier pipe valve is configured so that it can be opened to allow flow to the LTS gravity line at any time in the event of a failure due to clogging of the primary LCS carrier pipe. This valve will also be removed (and replaced with solid-wall HDPE spool) after final closure of the entire OSDF. Both the primary and redundant LCS containment pipes have monitoring ports and fixed end seals within the LCS manholes to verify the absence of liquid in the annular space between the carrier pipe and the containment pipe.
- LCS manholes are equipped with liquid level alarms, consisting of a submersible liquid level sensor, logic controller, and alarm light. The liquid level sensor shall be calibrated such that the alarm is activated when the liquid level in the LCS manhole exceeds 2 in. (50 mm). The

LCS and LDS manholes have pipe supports for the LTS gravity line and the LDS carrier pipe, respectively.

- The LTS gravity line and LCS and LDS manholes will be/were installed in stages, progressively advancing from north to south in conjunction with the progressive development of the OSDF. Each stage may involve the installation of manholes and LTS gravity line for several cells. At a given stage, the LTS gravity line will run/ran through all of the manholes previously installed and those installed for a given stage to the southernmost manhole installed in that stage.
- The LTS gravity line consists of a double-wall HDPE pipe with a 6-in. (150-mm) diameter inner carrier pipe and a 10-in. (150-mm) diameter outer containment pipe. The inner carrier pipe of the LTS gravity line will be/is continuous over its entire length (*i.e.*, from its upgradient to its discharge point). The outer containment pipe will be/is continuous between the LCS manholes and joined to the manhole walls.
- The LTS gravity line will be/is equipped with a vent and 4-in. (100-mm) diameter quick-connect hose connection at its northern end. The purpose of the vent is to prevent pressure buildup in the systems. The quick-connect hose allows pressure testing of the systems and jetting water in the line to clean it. The gravity line will have/has cleanouts on the upgradient end of each LCS manhole for maintenance.
- The permanent lift station is provided with secondary containment which is designed so that it can be monitored for the presence of leakage.
- The permanent lift station is capable of storing the quantity of leachate generated during a one-week period using design assumptions simulating final closure of the OSDF.
- Prior to the discharge of liquid into the permanent lift station, the liquid passes through a motor-operated inflow valve which closes automatically in the event of power failure or if liquid levels in the lift station rises above the high level alarm setpoint or any level that would cause an electrical short or damage to equipment in the lift station). In the event of a power failure, or high level alarm, the outlet valve for the leachate transmission systems will close automatically. The lift station also has a manual means for closing the lift station motor-operated inflow valve. Therefore, this valve can be closed manually, if needed, until appropriate maintenance activities can be implemented.
- The permanent lift station will be/is equipped with a pumping system to transfer liquids in the lift station to the BSL.

Each major component of the leachate management systems will be/were identified (*i.e.*, numbered) during installation. Manufacturer's equipment operating and maintenance instructions provided by the OSDF Construction Subcontractor as part of Construction Acceptance Testing, which served during the life of the *OSDF Systems Plan*, will be carried over for this PCCI Plan. Construction Acceptance Testing is the performance of all necessary

testing to demonstrate that subcontractor supplied or installed equipment and system are installed satisfactorily and safely in accordance with the Construction Drawings and Specifications.

### 6.3 LDS and LCS Operation Procedures

The LDS and LCS of each OSDF cell shall be operated in conformance with the requirements of this section. All alarm levels and response timeframes are preliminary.

- The level transmitter for the primary containment vessel of the LDS manholes shall be maintained at the setting from the *OSDF Systems Plan* to activate the alarm (strobe light and radio signal) for a liquid level 6 in. (150 mm) below the top of the vessel.
- Similarly, the level transmitter for the secondary containment vessel of the LCS manhole shall be maintained at the setting from the *OSDF Systems Plan* to activate the alarm for a liquid level 2 in. (50 mm) above the bottom of the vessel.
- The valve on the redundant LCS carrier pipe shall be maintained closed at all times, unless overridden by conditions dictated by Section 6.4.
- In order to allow discharge to the LTS gravity line, the butterfly valve on the LCS carrier pipe shall be maintained open at all times during the post-closure period of the OSDF, except for those periods where the valve needs to be closed for systems maintenance and repair or in the event of an operational emergency.
- The LCS manholes are designed as closed system; liquids should not accumulate in these manholes. If the alarms are activated, personnel shall respond within one hour to assess the problem and to take appropriate corrective actions.

All Occupational Safety and Health Administration (OSHA), DOE, and FEMP site requirements for confined space entry shall be followed when performing monitoring and inspection activities in the LDS and LCS manholes.

### 6.4 LDS and LCS Inspection and Maintenance Activities

The LCS and LDS shall be inspected and maintained in accordance with the schedule and activity requirements outlined in Table 6-1, or until leachate is no longer generated and an alternative activity schedule has been approved (see Sections 6.11 and 12.0). Specific details of the required inspection and maintenance activities are given below.

According to appropriate regulations [OAC 3745-27-19(k)(3)], the LCS and LDS pipe network shall be inspected annually to ensure that clogging has not occurred. Clogging can occur by deposition of particles within the pipe or by biological growth inside the pipe. This pipe network shall be inspected between the manhole and the first 100 ft (30 m) of subdrain pipe inside the cell. The portion of the pipe beyond this point inside the cell is considered to be redundant because gradation for the LCS granular drainage material is designed to limit the level of leachate on the geomembrane liner to less than 1 ft (0.3 m) without need for a subdrain pipe.

**Table 6-1  
 LEACHATE COLLECTION AND LEAK DETECTION SYSTEMS  
 INSPECTION AND MAINTENANCE ACTIVITIES**

Component	Inspection Frequency	Conditions to Check	Remedy
LDS	To be determined based upon observations from the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>condition of submersible level transmitter and appurtenances</li> <li>leakage from primary containment vessel</li> <li>liquid in LDS containment pipe</li> </ul>	<ul style="list-style-type: none"> <li>check level transmitter operations (e.g., operating temperature range, accuracy, etc.), electrical connections, and alarm light.</li> <li>check for source of leak; if source identified then take appropriate corrective measures (i.e., spot-seal vessel, replace vessel, etc.)</li> <li>keep monitoring port drained; perform video inspection of pipe and attempt to identify source of leakage; develop plan to mitigate effects</li> </ul>
LCS	To be determined based upon observations from the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>condition of submersible level transmitter and appurtenances</li> <li>condition of shutoff valve</li> <li>liquid in LCS containment pipe</li> <li>liquid in redundant LCS carrier pipe</li> </ul>	<ul style="list-style-type: none"> <li>check level transmitter operations (e.g., operating temperature range, accuracy, etc.), electrical connections, strobe light, and radio transmission</li> <li>check valve operability; correct any deficiencies</li> <li>keep monitoring port drained; perform video inspection of pipe and attempt to identify source of leakage; develop plan to mitigate effects</li> <li>drain pipe into LTS gravity line</li> </ul>
LDS & LCS Pipes	Annually	Video inspect for: <ul style="list-style-type: none"> <li>crushing of pipe</li> <li>clogging of pipe</li> </ul>	<ul style="list-style-type: none"> <li>flush clogged pipe with water or mechanically clean</li> <li>insert small diameter pipe in crushed pipe, if possible</li> <li>replace crushed pipe if crushed portion is outside of the cell</li> <li>utilize redundant LCS pipe</li> </ul>

**NOTES:**

- Frequencies of inspection and maintenance activities are preliminary.
- Leachate collection and leak detection systems shall be inspected after the occurrence of major earthquakes (see Section 11.3).

Access to the LCS and LDS pipes for inspection shall be through HDPE cleanouts located adjacent to the LDS or LCS manholes. Inspections shall be performed using a video camera or any other appropriate inspection equipment or other appropriate inspection equipment. The inspection equipment shall have the ability to monitor its location (e.g., distance counter), be sized to fit within the LCS and LDS inner carrier pipes indicated on Construction Drawings and be capable of being pushed the length to be inspected.

If an inspection indicates that a LCS or LDS pipe is obstructed, the pipe shall be flushed by pumping fresh water from a water truck through a hose inserted in the pipe cleanout. If flushing does not remove the obstruction, other methods shall be used to clean the pipe. These other methods may include blowing the obstruction out with air, vacuuming, jet rodding, or inserting a snake, fish tape, or other suitable device. If air or water pressure is used, the working pressure inside the pipe shall not exceed the rated pressure for the pipe.

The specific pipe maintenance procedures (other than flushing) to use to remove a pipe obstruction should be selected by DOE on a case by case basis.

In the event that LCS or LDS pipe obstruction cannot be dislodged, or in the very unlikely event that a pipe has undergone partial or total crushing, the following procedures should be considered:

- o for the LCS, activate the redundant LCS pipe;
- o for the LCS or LDS, insert a new small diameter pipe within the obstructed or collapsed pipe; and
- o for the LCS or LDS pipe, if the obstruction or collapse is outside of the disposal facility containment systems, replace the pipe.

All equipment inserted into the LCS or LDS line for inspection and/or maintenance shall be decontaminated prior to removal from the OSDF battery limits.

In addition to the foregoing requirements, all mechanical and electrical equipment shall be calibrated, operated, maintained, and serviced in accordance with the manufacturer's instructions for that equipment. Manufacturer's instructions are those contained in Attachment A of the *OSDF Systems Plan*, which will be carried over to an attachment or appendix to this PCCI Plan as part of one of its first planned revisions (see Section 12.0).

### 6.5 LTS Operation Procedures

[To be inserted later, after installation]

### 6.6 LTS Inspection and Maintenance Activities

The leachate transmission systems (LTS) shall be inspected and maintained in accordance with the schedule and activity requirements outlined in Table 6-2, or until leachate is no longer generated and an alternative activity schedule has been approved (see Sections 6.11 and 12.0). Specific details of the required inspection and maintenance activities are given below.

**Table 6-2  
 LDS/LCS MANHOLES AND LTS GRAVITY LINE  
 INSPECTION AND MAINTENANCE ACTIVITIES**

Component	Inspection Frequency	Conditions to Check	Remedy
LDS Manholes	To be determined based upon observations during the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>confirm all required signage is visible</li> <li>cracked, broken manhole cover</li> <li>leaking seal on manhole cover</li> <li>general structural condition of containment vessel</li> <li>odors, bacterial growth (containment vessel)</li> </ul>	<ul style="list-style-type: none"> <li>repair and/or replace as necessary</li> <li>replace manhole cover</li> <li>replace seal</li> <li>check for structural integrity; if problems are found, take appropriate measures (i.e., spot seal vessel, replace vessel, etc.) and implement permanent solution</li> <li>flush and/or spray sodium hypochlorite into containment vessel</li> </ul>
LCS Manholes	To be determined based upon observations during the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>confirm all required signage is visible</li> <li>cracked, broken manhole cover</li> <li>leaking seal on manhole cover</li> <li>completion of OSDF construction</li> <li>general structural condition of manhole</li> </ul>	<ul style="list-style-type: none"> <li>repair and/or replace as necessary</li> <li>replace manhole cover</li> <li>replace seal</li> <li>remove designated valves and replace with pipe spool piece</li> <li>check for structural integrity; if damage is observed, assess extent and make repair recommendations</li> </ul>
LTS Gravity Line	To be determined based upon observations during the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>liquid in LTS gravity line containment pipe</li> <li>inspection of pipe for clogging or crushing (annual only)</li> </ul>	<ul style="list-style-type: none"> <li>keep containment pipe drained; perform video inspection of pipe and attempt to identify source of leakage; if leakage is minor, continue to operate; if leakage is significant, evaluate repair options</li> <li>flush clogged pipe with water, or mechanically clean; repair as necessary</li> </ul>

**NOTES:**

- (1) Frequencies of inspection and maintenance activities are preliminary.
- (2) LDS/LCS manholes and LTS gravity line shall be inspected after the occurrence of major earthquakes (see Section 11.3).

The manholes, leachate transmission system, valves, connections, sampling ports, monitoring ports, pumps, etc., shall be routinely inspected and maintained to provide for proper OSDF operation. All mechanical and electrical equipment shall be calibrated, operated, maintained, and serviced in accordance with the manufacturer's instructions for that equipment. Manufacturer's instructions are those contained in Attachment A of the *OSDF Systems Plan*, which will be carried over to an attachment or appendix to this PCCI Plan as part of its first planned revision (see Section 12.0).

In addition, the inspection and maintenance activities for the LTS shall include the following:

- confirm that appropriate warning signs are visible (e.g., confined spaced);
- check instruments/valves (e.g., note sticking or jammed devices, corrosion, leaks, and misalignments);
- note any temperature extremes which may exist inside the manhole (e.g., equipment-specific operating temperature ranges);
- verify instrument systems status (e.g., elevation and location of automatic level switch in the lift station manhole),
- monitor flow for pulsating, over pressure, or under pressure;
- check for the presence of liquids in all secondary containment system;
- confirm pump operation/priming;
- check hoses for physical wear and poor connections prior to each use;
- repair or replace damaged manhole covers;
- note condition of concrete slab.

## 6.7 Leachate Management

### 6.7.1 During AWWT Operational Life

Liquids collected from the leachate collection system (LCS) and leak detection system (LDS) will initially be treated on-site in the Advanced Wastewater Treatment (AWWT) facility, as long as that facility is operational.

### 6.7.2 After Cessation of AWWT Operational Life

Prior to cessation of operation of the AWWT, alternatives for treatment of the liquids collected from the leachate collection system (LCS) and leak detection system (LDS) will be evaluated. In accordance with Ohio solid waste rule OAC 3745-27-19(K)(5), those alternatives are expected to consist of:

- on-site pre-treatment of collected liquids with off-site disposal, and
- off-site treatment and disposal of collected liquids.

Various options may exist for the off-site portion of either of these alternatives. A modification to this PCCI Plan would be required prior to implementing such a change (see Section 12.0).

It is anticipated that off-site treatment and/or disposal would likely require that collection of leachate in the sump or another accumulation tank while awaiting periodic removal. Any modification to this PCCI Plan involving such accumulation in a tank would need to estimate the quantity of leachate per time period, in order

to specify the frequency of removal, and how it will be treated or disposed [federal hazardous waste landfill regulations 40 CFR §§264.301(c) and 265.301(a)].

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**6.8 Cessation or Temporary Suspension of Leachate Management**

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The procedures presented above in this section are anticipated to remain in effect until leachate is no longer detected [federal hazardous waste regulation 40 CFR §§264.310(b)(2)], or until it is demonstrated that leachate no longer poses a threat to human health or the environment. Rather than complete cessation or permanent deletion of one or more of these leachate management requirements, temporary suspension may also be considered, in accordance with appropriate regulations [Ohio hazardous waste interim status rule OAC 3745-66-18(G)]. A modification to this PCCI Plan would be required prior to implementing such a change (see Section 12.0).

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## 7.0 ROUTINE SCHEDULED INSPECTIONS

### 7.1 Introduction

This section will establish inspection techniques and frequency as required by the appropriate regulations [Ohio hazardous waste rules OAC 3745-66-18(A) & (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 run-off control system(s)
- Surveyed benchmarks— at least three (3) third-order benchmarks on separate sides of the On-Site Disposal Facility (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)]

### 7.2 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 during routine scheduled site inspections.

#### 7.2.1 Preliminary Considerations

##### *FREQUENCY AND TIMING OF INSPECTIONS*

Routine scheduled inspections will be conducted at the FEMP OSDF during years 1, 2, 3, 4, 5, 7, and 9 following closure of the final cell of the OSDF. The objective of these inspections is to establish and record physical modifications to the site through many seasonal cycles and to provide a basis for decisions regarding future inspections. At the 5-year point and subsequent 5 year increments, as part of the CERCLA 5-year review, the DOE will evaluate all inspection and maintenance reports and records for the FEMP OSDF for the period under review, and may specify a new routine scheduled inspection frequency, to be approved by EPA and concurred on by OEPA, via a modification to this plan (see Section 12.0).

Timing of these routine scheduled inspections, as determined by DOE, will take into consideration such factors as:

- Inability to reach the site due to snow cover, run-off, or impassible roads.
- Inability to inspect due to snow cover.
- Climatic cycles most likely to adversely impact the site such as periods of heavy precipitation, run-off, or wind.
- Need to acquire data to confirm aerial photography data or reports from local officials or concerned citizens.

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

#### *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 engineer/geologist, and the second will be a civil engineer. Inspection team size will be specified by the DOE or its contractor prior to each inspection.

The chief inspector will have a degree in civil engineering or soil mechanics, and at least five (5) years' experience (or an equivalent amount of experience/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's as appropriate for the expected site conditions. Assistants will have a minimum of three (3) years experience (or an equivalent amount of experience/education) in their field. The chief inspector and assistant(s) will be designated by the DOE or its contractor prior to each inspection.

#### *FAMILIARIZATION WITH SITE CHARACTERISTICS*

The site inspection team will become familiar with the site by reviewing this PCCI Plan, and the most recent previous inspection report.

#### *PREPARATIONS FOR CONDUCTING SITE INSPECTIONS*

After site familiarization, preparations must be made 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 camera(s) and film, binoculars, tape measure, optical ranging devices, Brunton compass, photo scale stick, erasable board, additional signs, etc.

#### **7.2.2 Site Inspection**

The primary objective of the routine scheduled site 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 which 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 checklist will include the following:

- Security of fences, gates, and locks, as well as the condition of applicable warning signs 1
- General health and density of the vegetative cover 2
- Evidence of burrowing by animals on the cover 3
- Presence, depth, and extent of erosion or surface cracking, indicating possible cap deterioration 4
- Visibly noticeable subsidence, either localized or over a large area 5
- Presence and extent of visible settlement, including a determination of whether observed settlement is sufficient to pond water 6
- Presence and extent of any leachate seeps 7
- Integrity of run-on and run-off control features 8
- Integrity of benchmarks 9

*FIELD PROCEDURES* 12

*Adjacent Off-site Features* 13

A reconnaissance of the adjacent area within approximately 0.25 mi of the FEMP property line (in no case shall this property line be smaller than the OSDF and its buffer zone) will usually be the first stage of a site inspection. Any evidence of a change in land use will be described. The development of inadequately engineered roads and trails may, because they concentrate run-off, lead to initiation of gully erosion; increased use in any form is likely to bring about a reduction in vegetative cover and, therefore, an acceleration of erosion. In general, any increase of human activity in the vicinity increases the probability of either inadvertent or purposeful intrusion into the site. 14-20

Evaluation will be made of whether the natural drainage courses in the immediate vicinity of the FEMP OSDF pose any threat to the continued integrity of the OSDF. An "overview" 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. 21-24

Reaches of adjacent natural drainage courses will then be walked for approximately one thousand (1000) feet and notes made of unusual or changed sediment deposits, large debris accumulations, man-made 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. 25-28

Similarly, any gullies or locations which 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. 29-32

*Access Roads, Fences, Gates and Signs*

The FEMP OSDF area is anticipated to be accessible via automobile. The condition of the on-property roads will be described, and if the need for maintenance is indicated, the location and type of work will be recommended. Roads and associated grading are frequently points of gully initiation, and near the FEMP OSDF particular care will be taken in looking for evidence of recent erosion associated with the roads.

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 perimeter fence or conditions which might lead to a break will be described. Signs will be evaluated for legibility and proper location and spacing. 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 FEMP OSDF. Missing, badly damaged, or defaced signs will be replaced during the inspection.

*Monuments*

Each survey monument, boundary marker and site 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.

*Crest*

The crest of the FEMP 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 checklist and on the overlay. Examples of such features that might be observed include: changes in soil color; distressed vegetation patterns; trails; and patterns of erosion.

A walk around the edge and diagonal transects of the crest will be made. Additional transects, at approximately 50-yard intervals, will be walked along the sideslopes. 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 which 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. As the FEMP

OSDF will be vegetated as part of the closure activities, careful examination will be made to determine areas of distressed or sparse vegetation, or the presence of deep-rooted species.

*Slopes*

Changes to the FEMP 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, and one (or more, dependent on findings) additional traverse on the upper slopes will be made.

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

Any localized change in color (e.g., "stained" vegetation) or concentration of vegetation will be described and examined for evidence of seepage. Continuity and density of the vegetative cover will be noted, and areas where the vegetative cover has been stressed — i.e., areas with sparse vegetation or without vegetation, or areas with dead (not just dormant) vegetation — or destroyed will be mapped and described. Undesirable invader species, particularly woody species such as large shrubs and trees, will be identified if present.

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 run-off and encourage erosion; any such trails observed will be mapped and described. Any signs of small animal trails or burrows will be noted and photographed, and an effort will be made to tentatively identify the species. If animal burrows have been observed during previous inspection, the burrow site(s) 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.

Inadvertent or casual intrusion by humans is not of great concern, but evidence of removal of the cover, extensive vandalism to signs and monuments, or the presence of well-established trails will be described in detail.

*Periphery*

The area adjacent to the FEMP 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.

*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 sideslopes will be examined for evidence of erosion or sedimentation, slides or incipient erosion channels, debris, or growing vegetation. The sideslopes 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.

The portion of the channel that has 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 which 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 cover density.

## 8.0 UNSCHEDULED INSPECTIONS

### 8.1 Introduction

An unscheduled inspection may be triggered by reports or information that the 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.

### 8.2 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 and/or repair or corrective action.

Because of the standards to which the FEMP OSDF has been designed, it is considered unlikely that problems will occur. However, some of the situations which may require a follow-up inspection include:

- unforeseen subsidence of the OSDF slopes or its foundation
- gullyng which has cut through or is threatening to cut through the outer cover
- slides on the slopes of the FEMP OSDF
- seepage
- change in the position of an adjacent stream channel
- indications of rapid headward cutting of a nearby gully
- cracks which extend deeply (greater than six (6) inches) into the slopes
- presence of animal burrows on the FEMP OSDF or in its diversion channels
- invasion of trees or shrubs onto the vegetative cover of the FEMP OSDF
- removal of some of the material from the FEMP OSDF cover

Follow-up inspections should be made by technical specialists in a discipline appropriate to the problem that has been recognized. That is, if erosion is a problem, the inspector(s) will be individuals knowledgeable in evaluating erosion, presumably 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 custodial maintenance or repair or corrective action is warranted, the DOE will notify the EPA, OEPA, appropriate local officials, and other appropriate local stakeholders.

### 8.2.1 Objectives and Procedures

These investigations include all additional investigations or studies necessary to evaluate the continued effectiveness of the FEMP OSDF for containment of the impacted materials therein. The procedures used will be those required in the judgement of the DOE and will depend upon the nature and severity of the problem. Representative and appropriate responses for several possible problems are listed in Table 8-1.

### 8.2.2 Schedule and Reporting

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

### 8.3 Contingency Inspections

Contingency inspections are unscheduled, situation-unique inspections ordered by the 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.

A report of each contingency inspection triggered by such an unusual event will be submitted to the EPA and OEPA within 90 days of the initial report that damage or disruption has occurred at the FEMP OSDF site. At a minimum, this report will include:

- o problem/event description
- o preliminary assessment of the custodial maintenance or repair or corrective action required
- o conclusions and recommendations
- o assessment data, including field and inspection data and photographs
- o 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. The quarterly report submitted to the EPA and OEPA in accordance with the Integrated Environmental Monitoring Plan (IEMP) will contain the results of these inspections. The annual site report to the EPA and OEPA submitted in accordance with the IEMP will also include the results of these contingency inspection reports.

**Table 8-1**  
**POSSIBLE PROBLEM SITUATIONS AND RESPONSES**

<b>Situation</b>	<b>Representative Response</b>
Gullying on slopes	<p>Measurement or mapping not done as part of routine scheduled inspection will be done.</p> <p>The primary objective is to determine the factors which 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 preventative measures, if required.</p>
Headward gully erosion	<p>Procedures to determine the rate of headcutting will be established and implemented.</p> <p>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 the why dissection is occurring and any limiting conditions will be sought. The product will be a recommendation for maintenance and preventative measures, if required.</p>
Invasive vegetation	<p>Species identification and abundance determination will be conducted if/when large trees or shrubs invade the vegetative cover of the FEMP OSDF.</p> <p>If deep-rooted species are present, analysis of plant material for radionuclides and heavy metals might be done. An eradication program might be recommended; if so, cover repair would also be undertaken.</p>
Creep	<p>The occurrence of creep can be determined by setting rows of stakes parallel to contours on the sideslopes, 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.</p>
Landslides	<p>Upon evidence of a slide or debris flow, an additional investigation will be made.</p> <p>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.</p>

After EPA and OEPA have reviewed the preliminary inspection/assessment report, the 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 via consultation between DOE, EPA and OEPA. Based on the findings of these reports, the DOE will implement the corrective action.

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**9.0 CUSTODIAL MAINTENANCE AND CONTINGENCY REPAIR**

**9.1 Introduction**

This section explains the procedures to be used by the DOE to determine when maintenance or contingency repairs are needed at the FEMP 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 (see Section 8.0 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) & (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 as summarized below.

**SECURITY SYSTEM**

- Repair/replacement of sections of fence(s) and gates due to normal wear, severe weather conditions, vandalism
- Replacement of warning signs for similar reasons

**IMPACTED MATERIALS CONTAINMENT SYSTEM**

- Maintain 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
- Maintaining surface water run-on and run-off 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]
- Control of burrowing animals

**9.2 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 repair will be needed. The DOE, in conjunction with EPA and

OEPA, will decide whether or not 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 be dependent upon 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 which may require custodial maintenance or which may trigger contingency repair are outlined in Table 9-1, along with the appropriate action(s).

When compared with contingency repair, 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 work force and technical skills required for repairs.

### 9.3 Maintenance and Repair

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

#### 9.3.1 Security System

The security system established for the FEMP OSDF includes fencing, gates, locks, and warning signs. Routine custodial maintenance or repair of the security systems includes visual inspection and repair or replacement of the affected components. Possible problems include deterioration, erosion, or frost heave of fence post anchors resulting in fence damage. Normal wear, deterioration, and vandalism is also possible on fencing, gates, locks, and signs. Table 9-2 presents the inspection and maintenance activities for these features. These activities will be performed as needed as identified during the routine inspections (see Section 7.0).

#### 9.3.2 Cap and Final Cover System

Routine custodial and preventative maintenance of the cap and final cover includes visual inspection of benchmark integrity, upkeep of the vegetative cover, general mowing, clearing of debris, removal of woody weeds and seedlings, and reseeding. These activities will be performed as needed as identified during the routine inspections (see Section 7.0). Table 9-3 presents the custodial maintenance schedule for these features. When excessive settlement is indicated by water ponding to a depth exceeding one (1) foot, repair will be performed.

Note that the need for, and frequency of, grass cutting will depend on the final seed mix selected for the OSDF final cover systems. Mowing shall occur at least once annually (in the late fall) at a time when the final cover system is reasonably dry. Mowing equipment shall not cause rutting or disturbance of topsoil. More frequent mowing will be specified, if needed, in a subsequent modification to this PCCI Plan (see Section 12.0).



**Table 9-1**  
**EXAMPLES OF CONDITIONS WHICH MAY REQUIRE**  
**CUSTODIAL MAINTENANCE OR CONTINGENCY REPAIR**

Condition	Appropriate Actions
<b>CUSTODIAL MAINTENANCE</b>	
1. Damage due to normal wear, severe weather conditions, or vandalism to survey control monuments.	<ul style="list-style-type: none"> <li>• Re-establish survey control monument(s).</li> </ul>
2. Growth of woody species such as deep-rooted shrubs or trees on the cover.	<ul style="list-style-type: none"> <li>• Remove deep-rooted shrubs or trees from the cover.</li> <li>• Backfill root hole with soil, compact to re-establish grade, and re-establish the regular vegetative cover via seeding and mulching.</li> </ul>
3. Development of animal burrows on the cover or in the diversion channels.	<ul style="list-style-type: none"> <li>• Control or eradication of burrowing animals.</li> <li>• Backfill burrow hole with soil, compact to re-establish grade, and re-establish the regular vegetative cover via seeding and mulching.</li> <li>• If the problem becomes extensive, the services of a professional exterminator will be retained.</li> </ul>
<b>CONTINGENCY REPAIR</b>	
4. Development of rills or gullies deeper than 6 inches with near vertical walls and no vegetative cover.	<ul style="list-style-type: none"> <li>• Fill in gullies or rills with soil, compact to re-establish grade, and re-establish the regular vegetative cover via seeding and mulching<sup>1, 2</sup>.</li> </ul>
5. Surface rupture where the dimensions of the cracks are larger than 1 inch wide by 10 feet long by 1 foot deep, which would indicate severe shrinkage of cover materials or differential settlement.	<ul style="list-style-type: none"> <li>• Reconstruction of slope segments where slumping, mass wasting, liquefaction, or other severe events have occurred<sup>1</sup>.</li> <li>• Root cause analysis, evaluate corrective and preventive measures/actions, implement recommended actions<sup>1, 2</sup>.</li> </ul>
6. Instability of the slopes to the point where mass wasting or liquefaction has occurred due to earthquakes, differential settlement, or other causes.	<ul style="list-style-type: none"> <li>• Reconstruction of slope segments where slumping, mass wasting, liquefaction, or other severe events have occurred<sup>1</sup>.</li> <li>• Root cause analysis, evaluate corrective and preventive measures/actions, implement recommended actions<sup>1, 2</sup>.</li> </ul>
7. Encroachment of stream channels or gullies into the disposal facility or its buffer area.	<ul style="list-style-type: none"> <li>• Reconstruction of cover or other features<sup>1</sup>.</li> <li>• Root cause analysis, evaluate corrective and preventive measures/actions, implement recommended actions<sup>1, 2</sup>.</li> </ul>
8. Flood damage to the site in the form of new channels, or debris deposits.	<ul style="list-style-type: none"> <li>• Reconstruction of cover or other features<sup>1</sup>.</li> <li>• Root cause analysis, evaluate corrective and preventive measures/actions, implement recommended actions<sup>1, 2</sup>.</li> </ul>
9. Intrusion by man whereby cover materials have been removed.	<ul style="list-style-type: none"> <li>• Reconstruction of cover or other features<sup>1</sup>.</li> <li>• Root cause analysis, evaluate corrective and preventive measures/actions, implement recommended actions<sup>1, 2</sup>.</li> </ul>

<sup>1</sup> This might involve general regrading in the area to modify drainage and/or the use of temporary drainage structures and controls to reduce run-off velocities until vegetation has been re-established.  
<sup>2</sup> Severe or repetitive occurrences might best be addressed via a corrective action (see Section 10.0).

Table 9-2  
 SITE SECURITY SYSTEM  
 INSPECTION AND MAINTENANCE ACTIVITIES

Component	Inspection Frequency	Condition	Remedy	Maintenance
Fence	To be determined based upon observations during the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>◦ damaged fence fabric or posts</li> <li>◦ under fence erosion</li> </ul>	<ul style="list-style-type: none"> <li>◦ repair or replace as necessary</li> <li>◦ repair erosion or extend fence as necessary</li> </ul>	<ul style="list-style-type: none"> <li>◦ repair or replace as necessary</li> <li>◦ provide erosion and sedimentation control</li> </ul>
Gates	To be determined based upon observations during the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>◦ tampering or damage to locks</li> </ul>	<ul style="list-style-type: none"> <li>◦ repair or replace as necessary</li> </ul>	<ul style="list-style-type: none"> <li>◦ install proper lock</li> </ul>
Warning Signs	To be determined based upon observations during the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>◦ damaged or missing warning signs</li> </ul>	<ul style="list-style-type: none"> <li>◦ repair or replace as necessary</li> </ul>	<ul style="list-style-type: none"> <li>◦ install or re-attach warning signs to fence or gates</li> </ul>

NOTES:  
 (1) Frequencies of inspection and maintenance activities are preliminary.  
 (2) Site security system shall be inspected after the occurrence of major earthquakes (see Section 11.3).

**Table 9-3  
CUSTODIAL MAINTENANCE SCHEDULE**

Each April/May	<ul style="list-style-type: none"><li>• Implement treatments or repairs as indicated by September inspection.</li><li>• Re-seed, lime and fertilize on 3-year cycles, as needed.</li></ul>
Each September	<ul style="list-style-type: none"><li>• Inspect site to determine adequacy of perennial vegetative (grass) cover, and to delineate erosion problems.</li></ul>
Each October	<ul style="list-style-type: none"><li>• Mow area inside fence to control invasion by woody species.</li><li>• Evaluate options for less frequent mowing, and/or use of herbicides which affect only woody species.</li></ul>

Woody reproduction that develops on the OSDF final cover systems shall be eliminated mechanically, chemically, or by fire. Many woody species maintain the root systems when cut and 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. The most effective method for managing woody species vegetation will be evaluated for the OSDF by DOE based on available equipment, expertise, and cost.

Corrective maintenance or contingency repair of the final 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; or
- destruction of a portion of the final 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 in order 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 rooting soil layers. Segregate as necessary.
4. Clay can be added to the existing clay portion of the cover or the existing clay (or portions thereof) can be excavated and appropriate fill placed to bring the area to acceptable grades. Adding clay is preferred since the geosynthetic layer is not exposed and tie-in to adjacent clay is not necessary.
5. Document clay placement and compaction in accordance with the original construction quality assurance program (see *OSDF CQA Plan* [GeoSyntec, 1996c]).
6. Replace rooting and topsoil layers and revegetate. Care should be taken during final grading to assure the area is tracked perpendicular to the slope to minimize channelization of surface water.

Progressive deterioration of the cover caused by erosion will likely be addressed by reconstruction of the cover in that area and by amelioration of the erosion problem. This may involve some general regrading in the area to modify drainage and/or the use of temporary drainage structures and controls to reduce run-off velocities until vegetation has been re-established.

### 9.3.3 Run-on and Run-off Drainage Features

Diversion and drainage channels surrounding the OSDF function to collect run-off and divert run-on. The channels may require mowing and, from time to time, reshaping to control the run-off in a controlled manner. Vegetative 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 (see Section 9.3.2) 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 (see Section 7.0), the drainage channel(s) 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 recurring.

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/or recontouring channels, repair of banks, and unplugging of culverts. Table 9-4 presents the

**Table 9-4  
 DRAINAGE CHANNEL SYSTEM  
 INSPECTION AND MAINTENANCE ACTIVITIES**

Component	Inspection Frequency	Condition	Remedy	Maintenance
Drainage Channels	To be determined based upon observations during the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>• free-flowing</li> <li>• clogging by sediment or debris</li> <li>• scouring, other evidence of erosion, or other damage</li> </ul>	<ul style="list-style-type: none"> <li>• None — desired condition</li> <li>• remove accumulated debris or sediment</li> <li>• repair damage</li> </ul>	<ul style="list-style-type: none"> <li>• None — desired condition</li> <li>• remove accumulated debris or sediment</li> <li>• maintain as-built or undertake corrective action</li> </ul>
Grade control structures	To be determined based upon observations during the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>• free-flowing</li> <li>• clogging by sediment or debris</li> <li>• scouring, undermining, other evidence of erosion, or other damage</li> </ul>	<ul style="list-style-type: none"> <li>• None — desired condition</li> <li>• remove accumulated debris or sediment</li> <li>• repair damage</li> </ul>	<ul style="list-style-type: none"> <li>• None — desired condition</li> <li>• remove accumulated debris or sediment</li> <li>• remove emergent vegetation</li> <li>• maintain as-built or undertake corrective action</li> </ul>
Culverts	To be determined based upon observations during the period governed by the OSDF Systems Plan	<ul style="list-style-type: none"> <li>• free-flowing</li> <li>• clogging by sediment or debris</li> <li>• other damage</li> </ul>	<ul style="list-style-type: none"> <li>• None — desired condition</li> <li>• remove accumulated debris or sediment</li> <li>• repair damage</li> </ul>	<ul style="list-style-type: none"> <li>• None — desired condition</li> <li>• remove accumulated debris or sediment</li> <li>• maintain as-built or undertake corrective action</li> </ul>

**NOTES:**

- (1) Frequencies of inspection and maintenance activities are preliminary.
- (2) Drainage system shall be inspected after the occurrence of major earthquakes (see Section 11.3).

Fernald Environmental Mgt Project  
7400 Willey Road  
Fernald, OH 45030  
USEPA ID No: OH6890008976

OSDF Post-Closure Care and Inspection Plan  
20100-PL-010  
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inspection and custodial maintenance schedule for these features.



**10.0 POST-CLOSURE CORRECTIVE ACTIONS**

**10.1 Introduction**

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

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

**10.2 Future Corrective Actions/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 FEMP has been listed on the National Priorities List (NPL)
- "Response actions" under CERCLA are being/have been conducted at the FEMP to remediate the threats (or potential threats) to public health and the environment from past releases and potential releases at the FEMP
- Regardless of whether the FEMP is deleted from the NPL in the future, any future corrective actions/response actions needed for the FEMP also 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 elsewhere 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 OEPA whenever it identifies a situation believed worthy of more significant attention.

In that situation, 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 public 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 [NCP, 40 CFR Part 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 vs. remedial action — will be decided.

Regardless of removal vs. 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 timeframes. The embodying document would vary depending on the course of CERCLA response action identified as appropriate:

- (1) if a time-critical removal action, this would be a removal action work plan;
- (2) if a non-time-critical removal action, an engineering evaluation/cost analysis; and
- (3) if a remedial action, a work plan for a focused feasibility study.

For the last two of the above, the process would address the remainder of the bullets stated above, which are repeated below for clarity:

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

11.0 EMERGENCY NOTIFICATION AND REPORTING

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11.1 Introduction

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The FEMP OSDF was designed to comply with EPA and OEPA 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, the 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 disposal facility. Such notification would trigger a contingency inspection, as discussed in Section 8.3.

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11.2 Agency Agreements

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The DOE will negotiate/has negotiated notification agreements with the Butler and Hamilton County Sheriff's Departments, and the National Weather Service. Copies of the agreements, once completed, will be presented in an appendix to this PPCI Plan. The designated point of contact for emergency notification is the 24-hour phone line recorded as entry #3 in Table 4-2, as/will be recorded in these agreements and as/will be posted on the site signage so that the public can notify the DOE if problems are discovered.

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In accordance with the agreements, the DOE (entry #3 in Table 4-2) will be the designated facility emergency contact.

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Contact lists and telephone numbers for all agencies with whom DOE has entered into agreements will be updated in conjunction with the site inspection, for inclusion in the site inspection report, and for inclusion into an appendix of this PCCI Plan as change pages as necessary.

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11.3 Unusual Occurrences and Earthquakes

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As the majority of the FEMP OSDF is within Hamilton County, the DOE has requested the Hamilton County Sheriff's Department notify the DOE (entry #3 in Table 4-2) of any unusual occurrences in the area of the FEMP 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.

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Because the FEMP and its OSDF are (1) not in an active seismic zone, and (2) not constructed of or in lithified earth materials, the probability of occurrence of seismic events which could damage the OSDF are slim. If they did occur, seismic events that could potentially damage the OSDF would manifest themselves in numerous ways in the area, the most apparent of which are:

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- rupture of potable water supply lines.

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- o rupture of natural gas supply lines,
- o rupture of natural gas transmission lines, etc.

These and other consequences of seismic events in the area of the FEMP would be readily discerned by an untrained observer without the aid of seismic monitoring equipment. The local sheriff's departments, which are tied in to emergency response mutual aid networks in the area, would be aware of the occurrence of any such seismic event in the area. Therefore, DOE will rely on notification from the sheriff's departments of any such potentially damaging seismic events in the FEMP area. Such notification would trigger a contingency inspection (see Section 8.3) that at a minimum would encompass the LCS (Table 6-1), LDS (Table 6-2), site security system (Table 9-2), and drainage systems (Table 9-4).

#### 11.4 Meteorological Events

The National Weather Service, located [location to be determined], has agreed to notify the DOE (entry #1 in Table 4-2) within [to be determined] hours of issuing a flash flood or tornado warning in Hamilton or Butler Counties, Ohio. [NOTE: these are to be determined prior to closure of the last cell of the OSDF.]

## 12.0 MODIFICATIONS OF POST-CLOSURE PLAN

### 12.1 Introduction

This section will identify conditions under which this plan may need to be modified/amended, and the mechanism/process by which to modify this plan. In accordance with appropriate regulations, modifications to the post-closure plan are allowed in recognition of the need to preserve flexibility during the post-closure care period in order to incorporate changes in conditions [Ohio hazardous waste rule OAC 3745-66-18(G), in lieu of federal hazardous waste regulations at 40 CFR §265.118(d) and (g), and §264.118(d)]. These subjects are discussed in the following subsections.

### 12.2 Conditions Triggering Potential Need for Modification

Currently anticipated conditions which might trigger a need to modify this plan include, but are not necessarily limited to, the following:

- At closure of the final cell of the OSDF — In order to incorporate as-built drawings of the OSDF and its permanent features, as well as to incorporate lessons learned to that point from the inspections and performance of the OSDF cells/phases that have been covered/closed.
- Change in any of the points of contact.
- Cessation of management of leachate [federal solid waste regulation 40 CFR §258.61(a)(2)], or change in the on-site vs. off-site management of leachate treatment/disposal [OAC municipal solid waste rules 3745-27-19(K)(5) & (6)].
- Changes in post-closure inspection or maintenance activities (*e.g.*, a more extensive erosion control program is needed).
- Reduction in inspection frequency — After the first 5-year review after completion of OSDF closure activities, and no less frequently than subsequent 5-year increments, DOE will evaluate the need to continue the pre-established inspection frequency, basing its recommendation on an evaluation of annual reports and any other reports filed for maintenance or unscheduled events.
- Changes in surrounding land use (*e.g.*, an increase in population density surrounding the facility may warrant increased security provisions during the post-closure care period).
- Temporary suspension or permanent deletion of one or more post-closure care requirements [Ohio hazardous waste interim standards rule OAC 3745-66-18(G)].

- Extension or reduction in length of post-closure care period — The post-closure care period may be extended or reduced at the discretion of the regulatory agency(ies), based on whether an extended period is necessary, or a reduced period is sufficient, to protect public health and the environment. Changes to the duration of the post-closure care period are allowable in accordance with appropriate regulations [federal solid waste regulation 40 CFR §258.61(b), and Ohio hazardous waste rule OAC 3745-66-18(G) in lieu of federal hazardous waste regulations 40 CFR §§265.117(a)(2) and (g), and §§264.117(a)(2) and (g)]. The justification for adjustment of period must make the demonstrations required by appropriate regulations [federal solid waste regulation 40 CFR §258.61(b), and OAC hazardous waste rule 3745-66-18(G) in lieu of federal hazardous waste regulations 40 CFR §§265.118(g)(1)(i) and 264.118(g)(1)(i)].
  
- Implementation of a corrective action or other response action.

12.3 Mechanism

If it is determined that a modification to the plan is necessary or warranted, DOE will modify this PCCI Plan (or sections or pages as appropriate) and submit the revision to the regulatory agency(ies) (EPA and OEPA, as appropriate per the regulations and enforceable agreements in effect at that time) for review and approval/concurrence. At present, the regulations and enforceable agreements in effect require that EPA review and approve any such modification, while OEPA receives the opportunity for review but not approval. It is currently anticipated that the regulatory agency(ies) may first review and comment on such proposed modification, in which case DOE would revise the proposed modification to address the review comments and then resubmit the proposed modification for further consideration.

DOE anticipates that substantive modifications (*e.g.*, those beyond change sheets to update points of contact, changes to specifications for photographs, changes to inspection checklists, *etc.*) will be accompanied by appropriate public involvement opportunities, as discussed in Section 13.0.

13.0 COMMUNITY RELATIONS

The *Community Relations Plan for the U.S. Department of Energy Fernald Environmental Management Project, Fernald Ohio (CRP)* [DOE, 1995a] was revised in September/October 1994, and approved by Ohio EPA in December 1994 and by EPA in January 1995. The *CRP* complies with the public participation requirements of all applicable laws and regulations, including CERCLA, FFCA, NEPA, and the NCP, and also reflects EPA guidance in *Community Relations in Superfund: A Handbook* (January 1992).

The *CRP* provides details about how DOE will involve the public in decisions related to the site during the remedial activities phase of CERCLA response action at the FEMP. Supplemental activities identified in that plan pertinent to the post-closure care and inspection phase are summarized in Table 13-1. When practicable, the DOE will continue to offer public involvement opportunities — surpassing regulatory requirements — throughout the site cleanup.

The remedial action phase also is presented in Table 13-1 because it is similar to any corrective action/response action that might have to be undertaken during the post-closure period. In the event that a non-emergency corrective action/response action is required, the DOE would conduct public involvement activities *similar* to those during the CERCLA selection of remedy phase (remedial investigation, feasibility study, proposed plan) — an opportunity for public involvement relative to the findings on the condition(s), alternatives evaluated, the alternative recommended by the DOE to the regulatory agency(ies), *etc.* In the event that an emergency corrective action/response action is required, DOE's priority will be on addressing the emergency situation, with public involvement to follow.

Throughout the duration of FEMP remediation activities, the *CRP* may be revised to reflect changing community concerns, as well as changes in the law, regulations or regulatory agreements.

Table 13-1  
PUBLIC INVOLVEMENT ACTIVITIES  
DURING REMEDIAL ACTIVITIES

CERCLA Remedial Action	CERCLA Operations & Maintenance/ Post-Closure Care
<b>REQUIRED PUBLIC INVOLVEMENT ACTIVITIES</b>	
Publish in a local newspaper of general distribution a <i>Notice of Availability</i> of documents submitted to the EPA under the remedial action [DOE commitment/directive].	Publish in a local newspaper of general distribution a <i>Notice of Availability</i> of any proposed substantive modification of this Plan submitted to the EPA for review [DOE commitment/directive].
Notify public prior to beginning of remedial action [40 CFR §300.435] <sup>1</sup> .	Publish in a local newspaper of general distribution a <i>Notice of Availability</i> for public comment of any proposed substantive modification of this Plan submitted to the EPA that has been approved for public comment; the public comment period shall be a minimum of 30 days [federal hazardous waste regulations 40 CFR §§ 265.112(c)(3) and 265.118(d)(4) and Ohio hazardous waste rule 30AC 745-66-12(D)(4)].

**SUPPLEMENTAL PUBLIC INVOLVEMENT ACTIVITIES<sup>3</sup>**

- Maintain public involvement and dialogue.
- Offer availability sessions, public workshops, and public meetings.
- Conduct site tours.
- Provide briefings at township and community meetings.
- Issue fact sheets and newsletters to provide periodic updates describing cleanup activities.
- Conduct press briefings and issue news releases.
- Review/revise CRP.

**NOTES:**

<sup>1</sup> These activities are required by CERCLA under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 CFR Part 300].

<sup>2</sup> These activities, although not specifically required by CERCLA or the NCP for the CERCLA operations & maintenance phase, are required by the solid and/or hazardous waste regulations and rules as identified for the analogous post-closure care period.

<sup>3</sup> Not all supplemental tools will be used as part of each public involvement process. DOE will work with the community to establish what tools will be used.

**SOURCE:**

Appendix B—Required and Supplemental Community Relations Activities, and Figure 5.1—Technical Milestones and Associated Required and Supplemental Public Involvement Activities, *Community Relations Plan for the U.S. Department of Energy Fernald Environmental Management Project, Fernald, Ohio (CRP)*, [DOE, 1995a].

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