U.S. Department of Energy Office of Legacy Management

Variance Report

Variance No.: LMS-FER-S03496-7.0-01 **Significant:** ☐ Yes ☒ No

Document No.: S03496-7.0 **Page:** 1 of 1

Document Title: Comprehensive Legacy Management and Institutional Controls Plan (LMICP), Rev. 7.0 **Date:** 5/19/2014

Variance
(Include Justification)

Requirements: In Volume II, Attachment D - Integrated Environmental Monitoring Plan, Section 3.6.1.6 groundwater elevations are measured at 179 monitoring wells. Of these, 102 wells are measured in the first, third, and fourth quarters. All 179 wells are measured in the second quarter when seasonal water levels are high. Wells 2045, 2396, 2880, 2881, 21194, 22301, and 23274, along with other wells, are measured during the second quarter, only.

Variance: Water levels were measured in these seven wells (2045, 2396, 2880, 2881, 21194, 22301, and 23274) during the first quarter of 2014.

Justification: Groundwater elevations are measured at least one time at 179 wells each year. Of these wells, elevations are measured every quarter at 102 wells. Seven wells (80, 2544, 2545, 2546, 2636, 2702, and 2898) are included in the list of 102 wells that elevations are measured every quarter. Access to these seven wells was not available for the first quarter of 2014. In order to compensate for the loss of access and provide data to ensure interpretation of groundwater capture, the seven afformentioned wells (2045, 2396, 2880, 2881, 21194, 22301, and 23274) from the annual list were added to the quarterly list for the first quarter 2014.

Requested By: Charles White **Date:** 5/19/2014

Variance Approvals						Variance Approvals			
Required Yes	Required No				Required Yes	Required No			
☒	☐	M Hoge	Michael B Hoge	5/19/14	☐	☒			
			Quality Assurance	Date				Environmental Compliance	Date
☒	☐	W. Hertel	William G Hertel	5/20/14	☒	☐	D Foster	Don Foster	5-19-14
			Project Manager	Date				Environmental Monitoring	Date
☒	☐	C White	Charles White	5/19/2014	☒	☐	K Broberg	Ken Broberg	5-19-14
			Laboratory Technical Representative	Date				Aquifer Restoration	Date
☒	☐	K Voisard	KV	5/19/2014	☐	☐			
			Data Management and Reporting	Date				Other	Date

Revision Required ☐ Yes ☒ No **Document No. and Title:**

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Variance Report

Variance No.: LMS-FER-S03496-7.0-02 **Significant:** ☒ Yes ☐ No

Document No.: S03496-7.0 **Page:** 1 of 2

Document Title: Comprehensive Legacy Management and Institutional Controls Plan (LMICP), Rev. 7.0 **Date:** 5/27/2014

Variance
(Include Justification)

Requirements: Section 3.6.1.1 (Page 40) of the Integrated Environmental Monitoring Plan (IEMP) (LMICP, Attachment D) states that; "Up to 27 locations will also be sampled each year for total uranium using a direct-push sampling tool."

Variance: Continuous soil cores will be collected at all Geoprobe locations planned within the watershed of a closed basin that is located west of Former Waste Pit 3 (referred to as the Swale Area). Soil descriptions (using Unified Soil Classification Protocols) will be completed for the purpose of refining subsurface soil interpretations. The attached map shows the location of the watershed area and two Geoprobe locations currently planned in the area (Location 13467 and 13480).

Continuous soil cores will be collected in accordance with the "Fernald Preserve and Mound, Ohio, Sites Environmental Monitoring Procedures" using a dual tube sampler. Continuous soil cores will be collected from the surface to three feet below the contact of the fill/glacial till and the sand and gravel of the Great Miami Aquifer. The outside of the core tubes will be scanned by a radiological technician using a beta/gamma frisker prior to moving the cores from the sample site, for occupational radiological protection purposes.

(Continued on second page)

Justification: Core descriptions will be used to refine subsurface soil interpretations and the conceptual model that was used to design the ongoing groundwater remediation.

Requested By: Ken Broberg **Date:** 5/27/2014

Variance Approvals						Variance Approvals			
Required Yes	Required No				Required Yes	Required No			
☒	☐	M Hoge	Michael B Hoge	5/28/14	☐	☐			
		Quality Assurance		Date			Environmental Compliance		Date
☒	☐	W Hertel	William G. Hertel	5/28/14	☒	☐	D Foster	Dan Foster	5-28-14
		Project Manager		Date			Environmental Monitoring		Date
☒	☐	C White	Charles White	5/28/14	☒	☐	K Broberg	Ken Broberg	5/28/14
		Laboratory Technical Representative		Date			Aquifer Restoration		Date
☒	☐	K Voisard	KV	5/28/14	☐	☐			
		Data Management and Reporting		Date			Other		Date

Revision Required ☐ Yes ☒ No **Document No. and Title:** S03496/LMICP, Rev. 7.0

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Variance Report (continued)

Variance LMS-FER S03496-7.0-02 (Continued):

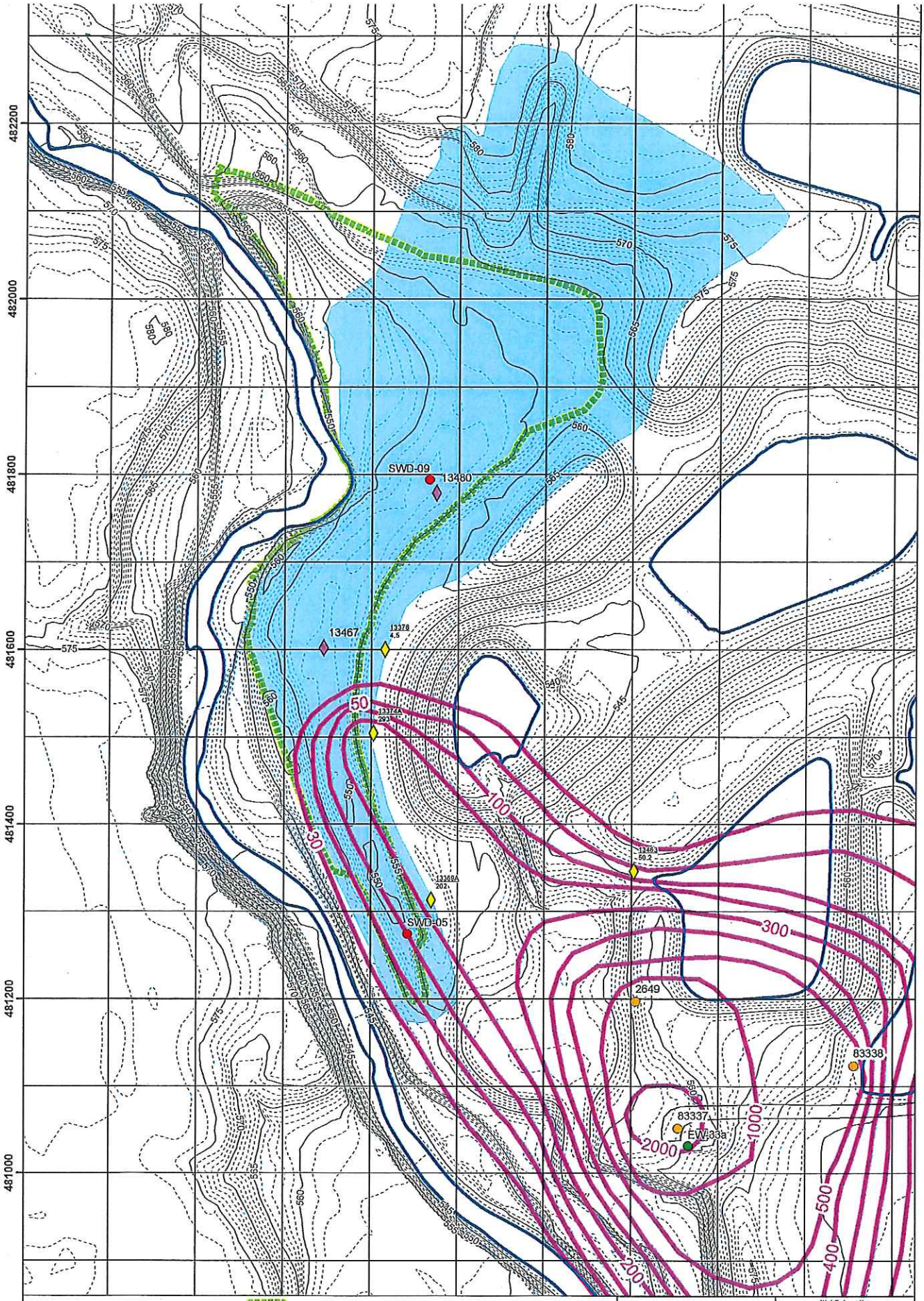
Immediately following opening of the cores, the radiological technician will radiologically screen the soil cores using a beta/gamma frisker. The core depth interval, each one foot interval, and any important contacts will be clearly marked and the core will be photographed. The core will be described per "Fernald Preserve and Mound, Ohio, Sites Environmental Monitoring Procedures." Of importance is the thickness of glacial till or fill present beneath the ground surface, and the contact between the overlying fill and/or glacial till and the underlying sand and gravel of the Great Miami Aquifer.

Sample intervals displaying above background beta/gamma readings will be documented in the "Visual Classification of Soils" (LMS 3020FER). A representative sample of the above-background interval will be shipped to an off-site laboratory for analysis of total uranium in accordance with the table below.

After the cores have been described, remaining soil will be archived in plastic sample containers for six months from the date of sampling. Any additional radiological analyses required from the archived samples at a later date will be detailed in a separate variance. After the six-month archived period, the cores will be disposed of by scattering on the ground at the sample location, with concurrence from a radiological technician.

IEMP – Soil Cores				
Parameter	**Holding Time**	**Chemical Preservative**	**Sample Container & Volume (Weight)**	**Lab QC Sample Container & Volume (Weight)***
Total Uranium (single analyte) **MET-A-028**	6 months	None	1 – 500 ml plastic (at least 50 mg)	1 – 500 ml plastic (at least 50 mg)

* For Laboratory QC samples denote in the special instructions of the Chain of Custody:
"Sample designated for laboratory QC."



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U.S. Department of Energy Office of Legacy Management

Variance Report

Variance No.: LMS-FER-S03496-7.0-03 **Significant:** ☐ Yes ☒ No

Document No.: S03496-7.0 **Page:** 1 of 1

Document Title: Comprehensive Legacy Management and Institutional Controls Plan (LMICP), Rev. 7.0 **Date:** 5/28/2014

Variance
(Include Justification)

Requirements: Section 2.1, Table 2 (Pages 7 and 8), footnote "f" of Appendix B (Project-Specific Plan for the On-Site Disposal Facility Monitoring Progrom) of the Groundwater Leak Detection and Leachate Monitoring Plan, (GWLMP) (LMICP, Attachment C) states; "Cadmium is monitored at Cell 8 only."

Variance: The text for footnote "f" will be changed to "Cadmium is monitored at the Cell 8 LDS only."

Justification: The "Fernald Preserve 2012 Site Environmental Report" (May 2013), indicated that cadmium is analyzed in the Cell 8 Leak Detection System (LDS) on a quarterly basis. It did not include analysis for cadmium in the other horizons, except for the annual analysis where it is monitored in all Leachate Collection Systems. That cadmium only needs to be monitored in the Cell 8 LDS can be verified by a review of the 2012 SER Attachment A.5, Sub-attachment A.5.8, Section A.5.8.5, page 5.

Requested By: Chuck White **Date:** 5/28/2014

Variance Approvals						Variance Approvals			
Required					Required				
Yes	No				Yes	No			
☒	☐	M Hoge	Quality Assurance	5/28/14 Date	☐	☒	Environmental Compliance	Date
☒	☐	W Hertel	Project Manager	5/28/14 Date	☒	☐	D Foster Environmental Monitoring	5.28.14 Date
☒	☐	C White	Laboratory Technical Representative	5/28/14 Date	☒	☐	K Broberg Aquifer Restoration	5-28-14 Date
☒	☐	K Voisard	Data Management and Reporting	Date	☐	☒	Other	Date

Revision Required ☒ Yes ☐ No **Document No. and Title:** S03496/LMICP, Rev. 7.0

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U.S. Department of Energy Office of Legacy Management

Variance Report

Variance No.: LMS-FER-S03496-7.0-04 **Significant:** ☐ Yes ☒ No

Document No.: S03496-7.0 **Page:** 1 of 1

Document Title: Comprehensive Legacy Management and Institutional Controls Plan (LMICP), Rev. 7.0 **Date:** 3/10/2015

Variance
(Include Justification)

Requirements: In Volume II, Attachment D - Integrated Environmental Monitoring Plan, Section 3.6.1.6 groundwater elevations are measured at 179 monitoring wells. Of these, 102 wells are measured in the first, third, and fourth quarters. All 179 wells are measured in the second quarter when seasonal water levels are high.

Variance: For the third and fourth quarter Wells 2544, 2545, 2546, 2625, 2636, and 2702 were not measured and 2396 was measured to provide additional coverage.

Justification: Groundwater elevations are measured at least one time at 179 wells each year. Of these wells, elevations are measured every quarter at 102 wells. Access to several wells was not available at various times during 2014. In order to compensate for the loss of access and provide data to ensure interpretation of groundwater capture, replacement wells were chosen from the annual list and were added to the quarterly list for the third and fourth quarter during 2014.

Requested By: Charles White **Date:** 3/10/2015

Variance Approvals						Variance Approvals			
Required					Required				
Yes	No				Yes	No			
☒	☐	M Hoge	Quality Assurance	3/10/15 Date	☐	☒		Environmental Compliance	Date
☒	☐	W. Hertel	Project Manager	3/23/15 Date	☒	☐	D Foster	Environmental Monitoring	3-10-15 Date
☒	☐	C White	Laboratory Technical Representative	3/10/15 Date	☒	☐	K Broberg	Aquifer Restoration	3/10/15 Date
☒	☐	K Voisard	Data Management and Reporting	3/10/15 Date	☐	☐		Other	Date

Revision Required ☐ Yes ☒ No **Document No. and Title:**

Distribution		
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U.S. Department of Energy Office of Legacy Management

Variance Report

Variance No.: LMS-FER-S03496-7.0-05 **Significant:** ☐ Yes ☒ No

Document No.: S03496-7.0 **Page:** 1 of 1

Document Title: Comprehensive Legacy Management and Institutional Controls Plan (LMICP), Rev. 7.0 **Date:** 3/10/2015

Variance
(Include Justification)

Requirements: There are numerous citations in the Integrated Environmental Monitoring Plan (LMICP, Attachment D) that indicate what wells are to be monitored under the Property/Plume Boundary Monitoring for Paddys Run Road Site (PRRS):

Section 3.4.2.4, Figure 7 (Page 31);

Section 3.5, Table 5 (Pages 33-34);

Section 3.6.1.4 (Page 44-45).

Eleven monitoring wells are included in the semiannual sampling.

Variance: Monitoring Wells 2625, 2636, and 3636 were not monitored for the second semiannual sampling round.

Justification: Access to these three wells was not available for the second sampling round.

Requested By: Chuck White **Date:** 3/10/2015

Variance Approvals				Variance Approvals			
Required Yes	Required No			Required Yes	Required No		
☒	☐	M Hoge — Quality Assurance	Date 3/10/15	☐	☐	Environmental Compliance	Date
☒	☐	W Hertel — Project Manager	Date 3/23/15	☒	☐	D Foster — Environmental Monitoring	Date 3-10-15
☒	☐	C White — Laboratory Technical Representative	Date 3/10/15	☒	☐	K Broberg — Aquifer Restoration	Date 3/10/15
☒	☐	K Voisard — Data Management and Reporting	Date 3/10/15	☐	☐	Other	Date 3/23/15

Revision Required ☐ Yes ☒ No **Document No. and Title:**

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LMS/FER/S03496-7.0
Revision 7.0 Final

Fernald Preserve, Fernald, Ohio

Comprehensive Legacy Management and Institutional Controls Plan

Volumes I and II

January 2014

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LMS/FER/S03496-7.0

Comprehensive Legacy Management and Institutional Controls Plan

Volumes I and II

Fernald Preserve
Fernald, Ohio

January 2014

Revision 7
Final

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Volume I

Legacy Management Plan

January 2014

U.S. Department of Energy

Revision 7
Final

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Emergency Contact

Legacy Management 24-hour
Monitored Security Telephone Number

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Abbreviations

AEC	U.S. Atomic Energy Commission
AR	Administrative Record
CAWWT	converted advanced wastewater treatment facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FFCA	Federal Facilities Compliance Agreement
FMPC	Feed Materials Production Center
FRL	final remediation level
ft	feet/foot
IC Plan	Institutional Controls Plan
LCS	leachate collection system
LDS	leak detection system
LM	U.S. Department of Energy Office of Legacy Management
LMICP	*Comprehensive Legacy Management and Institutional Controls Plan*
LMS	Legacy Management Support
NRRP	*Natural Resources Restoration Plan*
OMMP	Operations and Maintenance Master Plan
OSDF	On-Site Disposal Facility
OU	Operable Unit
PCCIP	Post-Closure Care and Inspection Plan
PDF	portable document file
ppb	parts per billion
RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
ROD	record of decision
SEP	Sitewide Excavation Plan
UF_4	uranium tetrafluoride
UNH	uranyl nitrate hexahydrate
UO_3	uranium trioxide
WAC	waste acceptance criteria
WCS	Waste Control Specialists, LLC

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Executive Summary

This *Comprehensive Legacy Management and Institutional Controls Plan* (LMICP) was developed to document the planning process and the requirements for the long-term care, or legacy management, of the Fernald Preserve. The LMICP is a two-volume document with supporting documents included as attachments to Volume II. Volume I provides the planning details for the management of the Fernald Preserve that go beyond those identified as institutional controls in Volume II. Primarily, Volume II is a requirement of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), providing institutional controls that will ensure that cleanup remedies implemented at the Fernald Preserve will protect human health and the environment. The format and content of Volume II follows U.S. Environmental Protection Agency (EPA) requirements for institutional controls. Volume II is enforceable under CERCLA authority.

Volume I is the Legacy Management Plan. This plan is not a required document under the CERCLA process, and it is not a legally enforceable document. It provides the U.S. Department of Energy (DOE) Office of Legacy Management (LM) with a plan for managing the Fernald Preserve and fulfilling DOE's commitment to maintain the Fernald Preserve following closure. The plan discusses how DOE, specifically LM, will approach the legacy management of the Fernald Preserve. It describes the surveillance and maintenance of the entire site, including the On-Site Disposal Facility (OSDF). It explains how the public will continue to participate in the future of the Fernald Preserve. Also included in the Legacy Management Plan is a discussion of records and information management. The plan concludes with a discussion on funding for legacy management of the site.

Volume II is the Institutional Controls Plan (IC Plan). The IC Plan is required under the CERCLA remediation process when a physical remedy does not allow for full, unrestricted use or when hazardous materials are left onsite. The plan is a legally enforceable CERCLA document and is part of the remedy for the site (an EPA requirement). The plan outlines the institutional controls that are established for and enforced across the entire site, including the OSDF, to ensure that human health and the environment continue to be protected following the completion of the remedy. The IC Plan has five attachments that lend support to and provide details regarding the established institutional controls. The attachments provide further information on the continuing groundwater remediation (pump-and-treat) system (Attachment A); the OSDF cap and cover system (Attachment B); the leak detection and leachate management systems for the OSDF (Attachment C); the environmental monitoring that will continue following closure (Attachment D), and the CERCLA-required Community Involvement Plan (Attachment E). The Community Involvement Plan explains in detail how DOE will ensure that the public has appropriate opportunities for involvement in post-closure activities.

The LMICP was first approved in August 2006. It is anticipated that the LMICP revisions will be finalized by January each year to correspond with calendar-year monitoring and reporting. EPA and Ohio Environmental Protection Agency comments will be addressed between October and January.

The future LMICP schedule will be as follows:

- Each June, the annual Site Environmental Report will be submitted. It will make recommendations based on the previous year's monitoring information.
- Each September, an annual review of the LMICP will be submitted. It will identify updates as necessary.
- Each January, the LMICP will be finalized to correspond with the monitoring and reporting schedule.

1.0 Introduction

Legacy management is required at the Fernald Preserve to ensure that the remedial actions implemented at the site continue to be effective and protective of human health and the environment following site closure. This *Comprehensive Legacy Management and Institutional Controls Plan* (LMICP) outlines the U.S. Department of Energy's (DOE's) approach to, and documents the requirements for, the long-term care of the Fernald Preserve. The LMICP serves the same function as the Long-Term Surveillance and Maintenance Plan used at other DOE sites. It is DOE's intent to continue to review and refine the LMICP, with the involvement of the local community and the regulators, to ensure that legacy management activities meet stakeholder and regulatory requirements. All revisions will be subject to regulatory agency review and will be made available to the community. Revisions can always be made as needed if the results of the site inspections, the On-Site Disposal Facility (OSDF) inspections, or monitoring require them. The term "legacy management" is used throughout this LMICP and is intended to encompass all activities defined as such in DOE policy and guidance. Legacy management activities were formerly referred to as "stewardship" activities, a term that this LMICP uses interchangeably.

The DOE Office of Legacy Management (LM) is responsible for ensuring that DOE's post-closure responsibilities are met and for providing DOE programs for long-term surveillance and maintenance, records management, workforce restructuring and benefits continuity, property management, land-use planning, and community assistance. Additional information regarding LM can be found at http://www.lm.doe.gov.

DOE policy and guidance clearly identify protectiveness of the remedies carried out at the Fernald Preserve (e.g., groundwater, OSDF, institutional controls) as the top priority for legacy management. Specifically, the OSDF requires regular monitoring and maintenance to ensure its integrity and performance. The restored areas of the site also require monitoring to ensure that applicable laws and regulations are followed. DOE policy and funding priorities regarding legacy management emphasize supporting the remedies as described in the Fernald Preserve's records of decision (RODs).

1.1 Purpose and Organization of the LMICP

The LMICP provides an overview of the defined end-state maintenance and monitoring requirements as well as the contingencies that are in place to address any changes made to the end state.

The LMICP has been developed as a two-volume set. Volume I is the Legacy Management Plan, which outlines DOE's approach to legacy management, including such issues as community involvement, records management, and funding. Volume II, the Institutional Controls Plan (IC Plan), outlines the specific surveillance and maintenance requirements for the Fernald Preserve.

Five support plans are included in the LMICP as attachments:

- Attachment A—Operations and Maintenance Master Plan for Aquifer Restoration and Wastewater Treatment (OMMP)
- Attachment B—Post-Closure Care and Inspection Plan (PCCIP)
- Attachment C—Groundwater/Leak Detection and Leachate Monitoring Plan
- Attachment D—Integrated Environmental Monitoring Plan
- Attachment E—Community Involvement Plan

These support plans outline the operational requirements associated with the ongoing groundwater remedy (Attachment A); the surveillance and maintenance requirements for the OSDF (Attachment B); surveillance and maintenance for the leachate and groundwater associated with the OSDF (Attachment C); the environmental monitoring requirements necessary to ensure the completion and effectiveness of the remedies (Attachment D); and the methods DOE will use to maintain communication with the public and involve the public in legacy management activities at the Fernald Preserve (Attachment E).

DOE is required to conduct legacy management activities at facilities that have completed site remediation (refer to Section 1.2). The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Title 42 *United States Code* Section 9601 et seq.) requires that institutional controls be part of selected remedies where land-use restrictions are placed on the property. The Fernald Preserve remedies include use restriction, waste disposal (the OSDF), and continuing groundwater extraction and treatment. DOE has followed U.S. Environmental Protection Agency (EPA) guidance on institutional controls (refer to Section 1.2). Existing laws, regulations, policies, and directives provide broad requirements for DOE to conduct legacy management activities. These activities include monitoring, reporting, record keeping, and long-term surveillance and maintenance for various facilities and media, including engineered waste disposal units, surface water, and groundwater.

The PCCIP (Attachment B) includes detailed information about the OSDF, and the OMMP (Attachment A) includes detailed information about the monitoring and maintenance of the converted advanced wastewater treatment facility (CAWWT), groundwater restoration systems, and the outfall line. Legacy management activities covered in the PCCIP and OMMP also include ensuring that restrictions on access to and use of the Fernald Preserve are enforced (for example, through records management and education). Surveillance and maintenance in restored areas focuses on protecting natural and cultural resources in accordance with applicable laws and regulations. Legacy management activities related to public involvement include maintaining communication with the public and providing the public with information about the site's former production activities, its historical remediation, site restoration, continuing groundwater remediation, land-use restrictions, public use and the future of the Fernald Preserve. Displays and programs at the Visitors Center (former Silos Warehouse) and outreach programs at local schools and organizations will help LM meet this objective.

This Legacy Management Plan describes planned legacy management activities at the Fernald Preserve as well as issues related to stewardship and is organized into the following sections:

Section 1.0 (Introduction): Provides an introduction to this plan and discusses the purpose and necessity of legacy management at DOE facilities.

Section 2.0 (Site Background): Provides the history of the Fernald Preserve, beginning with the site's construction in the 1950s, and presents a discussion of production activities, remediation, and site conditions at the time of closure.

Section 3.0 (Scope of Legacy Management at the Fernald Preserve): Discusses the scope of legacy management at the Fernald Preserve, including the management of site property, legacy management of the OSDF, and surveillance and maintenance of restored areas.

Section 4.0 (Oversight of Legacy Management at the Fernald Preserve): Describes the breakdown of responsibilities for legacy management activities at the Fernald Preserve, including LM, contractors, regulators, the CERCLA 5-year review, and reporting requirements.

Section 5.0 (Records Management): Describes the importance of records management and preservation and how they apply to legacy management. This section also describes various avenues for records management during legacy management.

Section 6.0 (Funding): Discusses the funding needed to implement and sustain a legacy management program at the Fernald Preserve.

The LMICP will be finalized by January each year to correspond with calendar-year monitoring and reporting. Comments from EPA, Ohio EPA, and the community will be addressed between October and January.

The future LMICP schedule will be as follows:

- Each June, the annual Site Environmental Report will be submitted and will include recommendations based on the previous year's monitoring information.
- Each September, an annual review of the LMICP will take place, and updates will be identified as necessary.
- Each January, the revised LMICP will be submitted to correspond with the monitoring and reporting schedule.

Pertinent information associated with the CERCLA 5-year reviews is included in the LMICP revisions as appropriate. The first CERCLA 5-year review was in 2001 and occurs every 5 years thereafter.

1.2 Purpose of Legacy Management

In recent years, DOE has increased its focus on the need for legacy management following completion of remediation. DOE orders and policies that provide the framework for legacy management include the documents listed below.

- DOE Order 144.1, *Department of Energy American Indian Tribal Government Interactions and Policy*, requires DOE sites to consult with potentially affected tribes concerning the effects of proposed DOE actions (including real property transfers), and to avoid unnecessary interference with traditional religious practices.
- DOE Order 200.1A, *Information Management Program*, provides a framework for managing information, information resources, and information technology investment.
- DOE Order 430.1B, *Real Property Asset Management*, identifies the requirements and establishes reporting mechanisms and responsibilities for real property asset management.
- DOE Order 435.1, *Radioactive Waste Management*, requires DOE radioactive waste management activities to be systematically planned, documented, executed, and evaluated in a manner that protects workers and the public as well as the environment.
- DOE Order 450.1A, *Environmental Protection Program*, requires the implementation of sound stewardship practices that are protective of the air, the land, water, and other natural and cultural resources affected by DOE operations.
- DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, establishes acceptable levels for the release of property on which any radioactive substances or residual radioactive material was present.
- DOE Policy 454.1, *Use of Institutional Controls*, establishes a consistent framework for the use of institutional controls throughout the DOE complex.
- Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, establishes goals in the areas of energy efficiency, acquisition, renewable energy, toxics reduction, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation.
- Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance,* enhances Executive Order 13423, which requires agencies to reduce energy and water intensity and achieve other sustainability goals.

Below are other documents and reports that address legacy management issues across the DOE complex and help to better define the activities that may be required for legacy management purposes.

- *From Cleanup to Stewardship* (DOE 1999a) addresses the nature of long-term stewardship at DOE sites, anticipated long-term stewardship at DOE sites, and planning for long-term stewardship.
- *The Long-Term Control of Property: Overview of Requirements in Orders DOE 5400.1 and DOE 5400.5* (DOE 1999b) summarizes DOE requirements for radiation protection of the public and environment, with the intent of assisting DOE elements in planning and implementing programs for the long-term control (or stewardship) of property.

- *Institutional Controls in RCRA and CERCLA Response Actions at Department of Energy Facilities* (DOE 2000a) provides DOE environmental restoration project managers with the information on institutional controls that they need to make environmental restoration remedy decisions under the Resource Conservation and Recovery Act (RCRA) and CERCLA.
- *Memorandum: Long-Term Stewardship Guiding Principles* (DOE 2000b) identifies broad concepts pertaining to stewardship and elements that Ohio stakeholders identified as critical to the success of stewardship planning.
- *A Report to Congress on Long-Term Stewardship* (DOE 2001a), required by the fiscal year 2000 National Defense Authorization Act, represents the most comprehensive compilation of DOE's expected long-term stewardship obligations to date, and it provides summary information for site-specific, long-term stewardship scopes, costs, and schedules. The report provides a snapshot of DOE's current understanding of stewardship activities and highlights areas where significant uncertainties still remain.
- *Long-Term Stewardship Study* (DOE 2001c) describes and analyzes several significant national or crosscutting issues associated with long-term stewardship and, where possible, options for addressing these issues. The principal purposes are to promote the exchange of information and to provide information on the decision-making processes at the national level and at individual sites.
- *Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups* (EPA 2000) provides an overview of the types of institutional controls that are commonly available, including their relative strengths and weaknesses. It also provides a discussion of the key factors to consider when evaluating and selecting institutional controls in CERCLA and RCRA corrective-action cleanups.
- *Managing Data for Long-Term Stewardship* (ICF 1998) represents a preliminary assessment of how successfully information about the hazards that remain at DOE sites will be preserved and made accessible for the duration of long-term stewardship.

DOE defines stewardship as "all activities required to protect human health and the environment from hazards remaining after remediation is completed" (DOE 1999a). Three categories, or levels, of stewardship are recognized: "active," "passive," and "no stewardship required." Active stewardship is defined as "the direct performance of continuous or periodic custodial activities such as controlling access to the site; preventing releases from a site; performing maintenance operations; or monitoring performance parameters." Passive stewardship is defined as "the long-term responsibility to convey information warning about the hazards at a site or limiting access to, or use of, a site through physical or legal mechanisms." No stewardship is required "where cleanup has been completed to levels that will allow for unrestricted or residential future use" (DOE 1999a). The Fernald Preserve will have a combination of active and passive measures during the legacy management of the site. This plan describes both active and passive measures, ranging from regular monitoring and maintenance to land use restrictions and postings.

The implementation of the LM Environmental Management System (EMS) ensures that sound stewardship practices protective of the air, land, water, and other natural and cultural resources potentially affected by operations are employed throughout the project. EMS is a systematic process for reducing the environmental impacts that result from LM and contractor work

activities, products, and services and for directing work to occur in a manner that protects workers, the public, and the environment. The process adheres to Plan-Do-Check-Act principles, mandates environmental compliance, and integrates green initiatives into all phases of work, including scoping, planning, construction, subcontracts, and operations. Proposed site maintenance activities will be assessed for opportunities to improve environmental performance and sustainable environmental practices. Some areas for consideration include reusing and recycling products or wastes, using environmentally preferable products (i.e., products with recycled content, such as office furniture, concrete, asphalt; products with reduced toxicity; and energy-efficient products), using alternative fuels, using renewable energy, and making environmental habitat improvements.

The fundamental components of the long-term care of the Fernald Preserve include input from the regulators and the public, and public access to site information. Public involvement and access to information during legacy management are emphasized in all DOE policy and guidance, and this Legacy Management Plan is intended to clearly outline DOE's commitment to those aspects of legacy management.

1.3 Approach to Legacy Management at the Fernald Preserve

At the Fernald Preserve, completing remediation to levels acceptable for unrestricted use was not feasible. As a result, legacy management is necessary to ensure that all remedial efforts continue to be effective and protective of human health and the environment. The OSDF was constructed to contain waste materials that will remain on the Fernald Preserve. This facility must be monitored and maintained to ensure its integrity and the public's safety.

1.3.1 Inspections According to IC Plan Requirements

Site inspections include inspections of the OSDF cap, the leachate collection system (LCS) and the leak detection system (LDS), the CAWWT, extraction wells and associated piping, the outfall line, signs, fencing, trails, overlooks, and restored areas of the site. Inspections can be scheduled or unscheduled as needed. These inspections are further defined in the IC Plan.

1.3.2 Increase Monitoring as Needed

LM has the option of increasing monitoring at any time, as needed. However, any proposed decrease in the frequency of monitoring activities included in the IC Plan will require EPA approval.

1.3.3 DOE Management of the Legacy Management Program

The LM mission includes (1) providing sustained human and environmental protection through the mitigation of residual risks and (2) protecting natural and cultural resources at DOE facilities. LM provides overall departmental policy, direction, and program guidance on matters affecting legacy management.

2.0 Site Background

2.1 Site Description

2.1.1 Fernald Preserve Description

The Fernald Preserve is on a 1,050-acre tract of land, approximately 18 miles northwest of Cincinnati, Ohio, and near the unincorporated communities of Ross, Fernald, Shandon, New Haven, and New Baltimore (Figure 1). The former production area occupies approximately 136 acres in the center of the site. The former waste pit area and the former silos area were located adjacent to the western edge of the production area. Paddys Run, an intermittent stream, flows from north to south along the Fernald Preserve's western boundary and empties into the Great Miami River approximately 1.5 miles south of the site. The Fernald Preserve lies on a terrace that slopes gently between vegetated bedrock outcrops to the north, southeast, and southwest. Soil beneath the site is glacial overburden, consisting primarily of clay and silt with minor amounts of sand and gravel, that overlies the Great Miami Aquifer. Paddys Run and the Storm Sewer Outfall Ditch, which empties into Paddys Run, have eroded the glacial overburden, exposing the sand and gravel that make up the Great Miami Aquifer.

2.1.2 Fernald Preserve and Surrounding Area

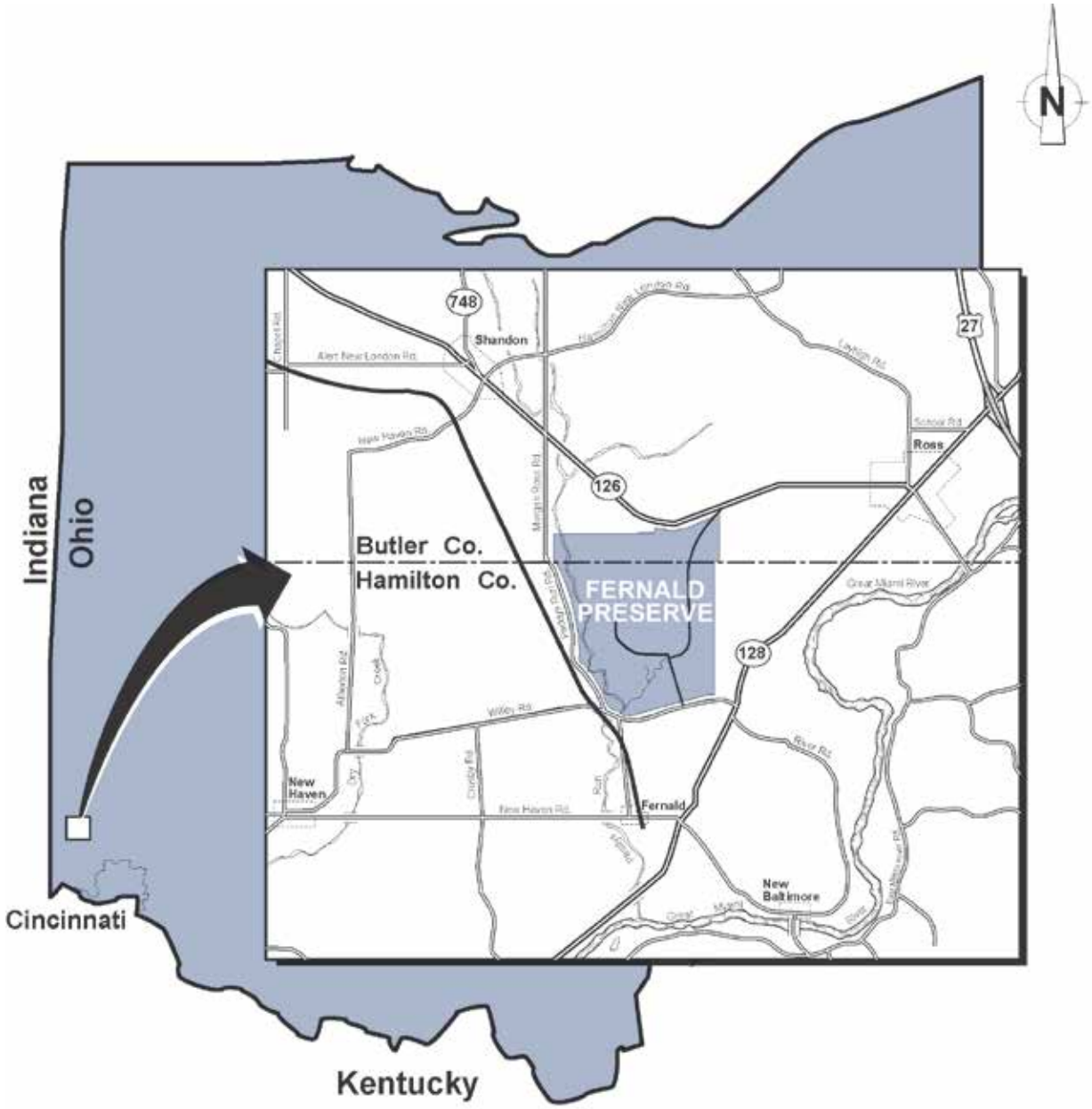
In the vicinity of the Fernald Preserve are the communities of Shandon (northwest), Ross (northeast), New Baltimore (southeast), Fernald (south), and New Haven (southwest) (Figure 1). Land use in the area consists primarily of residential use, farming, and gravel excavation operations. Some land in the vicinity of the Fernald Preserve is dedicated to housing development, light industry, and parkland. The Great Miami River is located to the east, and, like Paddys Run and the Storm Sewer Outfall Ditch, it has eroded significant portions of the glacial overburden, exposing the sand and gravel of the Great Miami Aquifer.

2.2 Site History

2.2.1 Feed Materials Production Center

The Feed Materials Production Center (FMPC) was the original name given to what is now the Fernald Preserve. The U.S. Atomic Energy Commission (AEC) constructed the FMPC in the early 1950s for the purpose of producing high-purity uranium metal from ores and process residues for use at other government facilities involved in the production of nuclear weapons for the nation's defense.

A variety of materials were used throughout the production process, including ore concentrates and recycle materials that were dissolved in nitric acid to produce a uranyl nitrate hexahydrate (UNH) feed solution. The UNH was then concentrated and thermally denitrated to uranium trioxide (UO_3), or orange oxide. The orange oxide was either shipped to the gaseous diffusion plant in Paducah, Kentucky, or was converted to uranium tetrafluoride (UF_4), also known as green salt. The green salt was blended with magnesium-metal granules and placed in a closed reduction pot to produce a mass of uranium metal called a derby. Some derbies were shipped to other facilities, but the remainder were melted and poured into preheated graphite molds to form ingots.



The Fernald site covers about 1,050 acres (425 hectares).

Figure 1. Fernald and Vicinity

Some ingots were rolled or extruded to form billets. Small amounts of thorium were also produced at the site from 1954 to 1975. The site then served as a thorium repository for DOE. Two reports that explain in greater detail the role of the Fernald Preserve within the DOE complex and the processes that took place at the Fernald Preserve are *Historical Documentation of the Fernald Site and Its Role within the U.S. Department of Energy; Weapons Complex* (DOE 1998a), and *Historical Documentation of Facilities and Structures at the Fernald Site* (DOE 1998b).

High-purity uranium metal was produced at the site from 1952 through 1989. During that time, more than 500 million pounds of uranium metal products were shipped from Fernald to other sites. During these production operations, uranium was released into the environment, resulting in the contamination of soil, surface water, sediment, and groundwater on and around the site.

2.2.2 Change in Site Mission from Production to Remediation

In July 1986, DOE and EPA signed a Federal Facilities Compliance Agreement (FFCA), addressing impacts to the environment that were associated with the site. DOE agreed to conduct the FFCA investigation as a remedial investigation/feasibility study (RI/FS) in accordance with CERCLA guidelines. In 1989, production ceased at the FMPC due to a decrease in the demand for the feed materials and an increase in environmental restoration efforts. The site was subsequently included on the EPA National Priorities List. In 1991, the site was renamed the Fernald Environmental Management Project, and it was officially closed as a production facility. DOE's management of the site switched from the Defense Programs division to the Environmental Restoration and Waste Management division. The National Lead Company of Ohio operated the site during most of the production years under contracts with AEC and DOE. The Westinghouse Environmental Management Company became the site's prime contractor in 1986. In 1992, after the conversion of the site's mission to environmental cleanup, DOE awarded an Environmental Restoration Management Contract to the Fernald Environmental Restoration Management Corporation, which later became known as Fluor Fernald, Inc. DOE awarded a new contract to Fluor Fernald, Inc. in November 2000 to complete the facility's remediation. In 2003, DOE changed the site name to the Fernald Closure Project. The sitewide remediation effort was conducted pursuant to CERCLA. Waste management was conducted according to RCRA.

2.2.3 Conditions at Declaration of Physical Completion

The Declaration of Physical Completion occurred on October 29, 2006. Contaminated soils detected above final remediation levels (FRLs) were excavated and appropriately disposed. Remaining soils were certified to meet FRLs (with the exception of certain areas associated with utility corridors and groundwater infrastructure discussed in Section 2.4.4); all excavated areas were graded and restored; the OSDF was closed, capped, and covered; all required groundwater infrastructure was installed, operational, and secured.

2.3 Remediation Process

2.3.1 Summary of Remediation Efforts

CERCLA is the primary driver for the environmental remediation of the Fernald Preserve. The site was divided into five operable units (OUs) as follows:

- OU1—Waste Pits Area
- OU2—Other Waste Units
- OU3—Production Area
- OU4—Silos 1 through 4
- OU5—Environmental Media

An RI/FS was conducted for each of the five OUs listed above. Based on the results of the RI/FS, RODs outlining the selected remedy for each OU were issued. A summary of the remedies follows.

The remedy for OU1 included removing all material from the waste pits, stabilizing the material by drying it, and shipping it offsite for disposal. This process was completed in summer 2005.

The remedy for OU2 included removing material from the various units, disposing of material that met the onsite waste acceptance criteria (WAC) in the OSDF, and shipping all other material offsite for disposal. DOE and regulators, in consultation with the local community, developed the WAC to strictly control the type of waste disposed of onsite.

The OU3 remedy included decontaminating and decommissioning all contaminated structures and buildings, recycling waste materials if possible, disposing of material that met the onsite WAC in the OSDF, and shipping all other material offsite for disposal.

The OU4 remedy included removing and treating all material from the silos, dismantling the silos, and shipping the waste materials and silo debris offsite for disposal.

Pneumatic retrieval, conditioning, and packaging of Silo 3 material was initiated March 23, 2005. A total of 1,416 containers were filled via pneumatic retrieval through October 21, 2005, when mechanical retrieval was initiated. Retrieval and packaging of Silo 3 material was completed March 21, 2006. A total of 2,297 containers were filled (including 50 containers of material generated during safe shutdown of the facility) and transported to Envirocare of Utah for disposal.

Bulk processing in the Silos 1 and 2 Remediation Facility was completed March 19, 2006. A total of 3,776 containers of treated material from Silo 1 and 2 (including 80 containers produced through direct loadout in support of the safe shutdown of the facility) were packaged and shipped to the Waste Control Specialists facility in Andrews, Texas, for disposal. On May 29, 2008, the State of Texas granted a byproduct license to Waste Control Specialists, LLC (WCS), which allowed the canisters of Silos 1 and 2 waste to be permanently disposed of at WCS. Final permanent disposal of Silos 1 and 2 treated waste materials began on October 7, 2009. The last container was placed on November 2, 2009.

OU5 includes all environmental media, such as soil, sediment, surface water, groundwater, and vegetation. The *Site-wide Excavation Plan* (SEP) (DOE 1998c) describes the remediation of soils. First, material exceeding the WAC for the OSDF was disposed of by one of the following methods: (1) transporting material to an offsite disposal facility for treatment and disposal, (2) treating material onsite and transporting it to an offsite disposal facility, or (3) treating material onsite and disposing of it in the OSDF. Details and exceptions for the methods listed above are outlined in the SEP.

Soils and sediments with contaminants in concentrations that exceeded FRLs, which are defined in the SEP but were below the OSDF WAC, were excavated and placed in the OSDF. Several subgrade utility corridors that are being used to support the continuing groundwater remediation

were not certified at closure, but they will be certified following the completion of remediation and discontinuation of their use (see Section 2.4.4).

The OU5 ROD (DOE 1996) describes the approved remediation method of pump-and-treat for groundwater. The OU5 ROD also committed to continual evaluation of remediation technologies to allow for the improvement of the remedy with new technologies. As a result, an enhanced groundwater remedy, which could reduce groundwater remediation by 10 years, was suggested and subsequently approved. The enhanced remedy includes additional extraction wells.

The primary constituent of concern for groundwater is uranium. Other constituents have been identified and will be removed during remediation of the uranium. The OU5 ROD provides a complete list of all of the constituents identified in groundwater. The FRL for uranium in groundwater is 30 parts per billion (ppb). In the original ROD, the FRL for uranium in groundwater was 20 ppb. After EPA changed the drinking water standard, and after EPA and Ohio EPA approved of the *Explanation of Significant Differences for Operable Unit 5* (DOE 2001b), the FRL was raised to 30 ppb. DOE and regulators based the target cleanup levels for groundwater on the use of the aquifer as a potable water supply and incorporated Safe Drinking Water Act standards (or proposed standards) for all constituents for which these standards were available.

Ecological restoration followed remediation and was the final step in completing the site's cleanup. The goal for ecological restoration of the Fernald Preserve was to enhance, restore, and construct (as feasible, given post-excavation landforms and soils) the early stages of vegetation communities native to pre-settlement southwestern Ohio.

Figure 2 illustrates the ecological restoration of the Fernald Preserve. The restoration involved four major components:

- Expanding and enhancing the riparian corridor along Paddys Run.
- Expanding and enhancing the wooded areas in the northern portion of the Fernald Preserve.
- Restoring a contiguous prairie in the central and eastern portions of the Fernald Preserve (including the OSDF).
- Creating open water areas and wetlands throughout the site as topography and hydrology allow.

2.3.2 Completion of Site Remediation

In January 2003, the site's name was changed to the Fernald Closure Project. DOE's closure contract with Fluor Fernald Inc. outlined the scope of remediation activities required for closure. The process of legacy management or long-term stewardship began immediately following DOE's Determination of Reasonableness, or acceptance, of Fluor Fernald Inc.'s Declaration of Physical Completion (the point commonly referred to as "closure"). The Declaration of Physical Completion occurred on the day that remediation of the site (with the exception of groundwater) as outlined in Fluor Fernald Inc.'s Comprehensive Exit Transition Plan was completed. LM assumed legacy management responsibilities for the site on October 29, 2006.

2.4 Site Conditions at Closure

Sections 2.4.1 through 2.4.5 provide an overview of conditions of the OSDF, restored areas, groundwater remediation, uncertified areas, and existing infrastructure and facilities.

2.4.1 OSDF

A predesign investigation determined that the most suitable location for the OSDF was on the eastern side of the Fernald Preserve (Figure 2). Details of the investigation are in the *Pre-design Investigation and Site Selection Report for the On-site Disposal Facility* (DOE 1995a). This location was considered the best because of the thickness of the gray clay layer that overlies the Great Miami Aquifer.

Construction of the OSDF began with Cell 1 in December 1997, and ended with the completion of the permanent cap for Cell 8 in late 2006. The OSDF consists of eight individual cells covered by a continuous permanent cap. The final dimensions are approximately 950 feet (ft) east to west and 3,600 ft north to south, with a maximum height of 65 ft. The footprint of the actual disposal facility is approximately 75 acres. A perimeter fence surrounds the disposal facility. The OSDF, including the fenced area, covers approximately 98 acres. Institutional controls are described in greater detail in Volume II of this plan (the IC Plan), and additional details are included in the PCCIP (Attachment B), OU2 ROD (DOE 1995b), and OU5 ROD (DOE 1996). Approximately 2.96 million cubic yards of impacted materials were placed in the facility. The PCCIP (Attachment B) provides a summary of the materials permitted to be placed in the OSDF. The design approach for the OSDF is described in both the OU2 ROD (DOE 1995b) and the *Final Design Calculation Package; On-site Disposal Facility* (GeoSyntec 1997). The design includes a liner system, impacted-materials placement, a final cover system, a leachate management system, a surface water management system, and other ancillary features.

2.4.2 Restored Areas

Approximately 900 acres of the Fernald Preserve were ecologically restored. Restored areas are those parts of the site that have been graded following remedial excavation, amended, planted, or enhanced to create the early stages of ecosystems comparable to native pre-settlement southwestern Ohio. The specific habitats restored include upland forest, riparian forest, tallgrass prairie and savanna, and wetlands and open water (Figure 2). In addition, previously existing habitats such as the pine plantations were enhanced.

The following are brief summaries of the habitat restorations. Details of the actual projects and further information on the restored areas are described in the *Natural Resource Restoration Plan* (NRRP), which is Appendix B of the *Consent Decree Resolving Ohio's Natural Resource Damage Claim against DOE* (State of Ohio 2008).

Figure 2. Fernald Land Use

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Upland Forest: Upland forest areas existed in a northern portion, in a southern portion, and on the western perimeter of the site. Restoration activities expanded these forested areas. The *Site-wide Characterization Report* (DOE 1993) describes the Fernald Preserve as existing in a transition zone between the Oak–Hickory and Beech–Maple sections of the Eastern Deciduous Forest province. That is, a mosaic of both Oak–Hickory and Beech–Maple forest types can be found in southwestern Ohio. Forest communities at the Fernald Preserve would gradually move toward one of these forest types, depending on site-specific factors such as topography and hydrology. Therefore, the restoration of upland forests at the Fernald Preserve focused on the establishment of this Beech–Maple/Oak–Hickory transition zone. The trees and shrubs used are native to southwestern Ohio and are listed in the NRRP, Table 3–1.

Riparian Forest: Riparian corridors existed along Paddys Run and the Storm Sewer Outfall Ditch. Restoration activities were conducted to expand these corridors through revegetation. The selected species of trees were those that can withstand periodic inundation, and they are listed in the NRRP. The Paddys Run floodplain was expanded as part of the long-term management plan for Paddys Run.

Tallgrass Prairie and Savanna: The former waste pit, former production area, OSDF, Lodge Pond, and south field areas were restored as a contiguous prairie. Some prairies and savannas were established along the western perimeter of the site, but the concentration was primarily in formerly disturbed areas. Prairie restoration involved amending soil, if necessary, and seeding grasses and forbs (wildflowers). All seeded grasses and forbs were native to the area. Savannas were established by planting a sparse mix of trees and shrubs, and seeding the area with native grasses.

While not considered a part of the restored prairies onsite, the OSDF, located adjacent to both the former production area and the borrow area, was seeded with native prairie grasses to provide vegetative cover. The native grasses are being used because of their ecological benefits, drought tolerance, and ability to provide soil stability.

Wetlands and Open Water: Wetlands and open water areas were established throughout the site where topography permitted. The former production area has open water areas as a result of deep excavations, and wetlands are established throughout the site. DOE is responsible for providing 17.8 acres of mitigated wetlands under Section 404 of the Clean Water Act. In addition to mitigating wetlands, upland and riparian forest revegetation in various areas was designed to restore wet woods. Details and drivers for wetland mitigation are described in the NRRP. As a condition of the natural resource damage settlement with the State of Ohio, an enhanced wetland mitigation monitoring program was undertaken from 2009 to 2011. Results are presented in the *Fernald Preserve Wetland Mitigation Monitoring Report* (DOE 2012). Approximately 31.3 acres of jurisdictional wetlands have been created at the site.

2.4.3 Groundwater

Groundwater remediation and monitoring will continue until the FRL of 30 ppb for uranium has been achieved. Groundwater monitoring will be required following the completion of remediation to ensure continued protectiveness of the remedy and to support the CERCLA 5-year reviews. The OMMP is included as Attachment A to the LMICP and describes the groundwater extraction system (e.g., well fields, treatment facility) used to complete the remedy.

Additional information is included in Section 3.1.3 of the IC Plan. Long-term monitoring of groundwater will be required around the OSDF. The exact approach to groundwater monitoring has been continually refined, with input from the local community and regulators.

2.4.4 Uncertified Areas

Soils have yet to be certified at two facilities onsite: the CAWWT and the South Field Valve House (Figure 3). There are also subgrade utility corridors that were not certified at closure (Figure 3). These facilities and utilities primarily support the ongoing groundwater remedy and are located below certified areas.

The 60-inch Main Drainage Corridor culvert and an adjacent 18-inch culvert were left in place even though fixed contamination remains within the culverts. Both culverts are located directly below the OSDF leachate conveyance system and the main effluent line running between the CAWWT and the Great Miami River. Because of their locations, these culverts could not be removed without potentially impacting ongoing CAWWT and OSDF operations. The 18-inch culvert is completely buried, and grating was installed on the ends of the 60-inch culvert to prevent access.

The subgrade utility corridors will be certified following the completion of groundwater remediation, when these systems are no longer needed and are removed. Soils within the footprints of the CAWWT and South Field Valve House will be certified when these facilities are no longer needed, are removed from service, and are decommissioned and dismantled. Because the groundwater remediation end date is uncertain, no firm schedule for soil certification in the corridors can be established at this time.

The existing paved roadways themselves cannot be certified; however, the soil beneath them is certified.

2.4.5 Existing Infrastructure and Facilities

A few facilities remain onsite. These include the CAWWT and supporting infrastructure; extraction wells, associated piping, and utilities; the outfall line to the Great Miami River; the restoration storage shed; the former Communications Building; and the Visitors Center.

DOE refurbished the former Silos Warehouse for use as an onsite Visitors Center, which was completed in summer 2008. The Visitors Center contains information and context on the remediation of the Fernald Preserve, including information on site restrictions, ongoing maintenance and monitoring, and residual risk. It also provides historical information and photographs, a meeting place, and other educational resources. A primary goal of the Visitors Center is to fulfill an informational and educational function within the surrounding community. The information made available at the center also serves as an institutional control.

The Visitors Center is maintained and operated under the direction of LM. DOE will periodically evaluate the use of the Visitors Center and the programming provided there and will obtain community input on decisions regarding changes to and the ongoing operation of the Visitors Center.

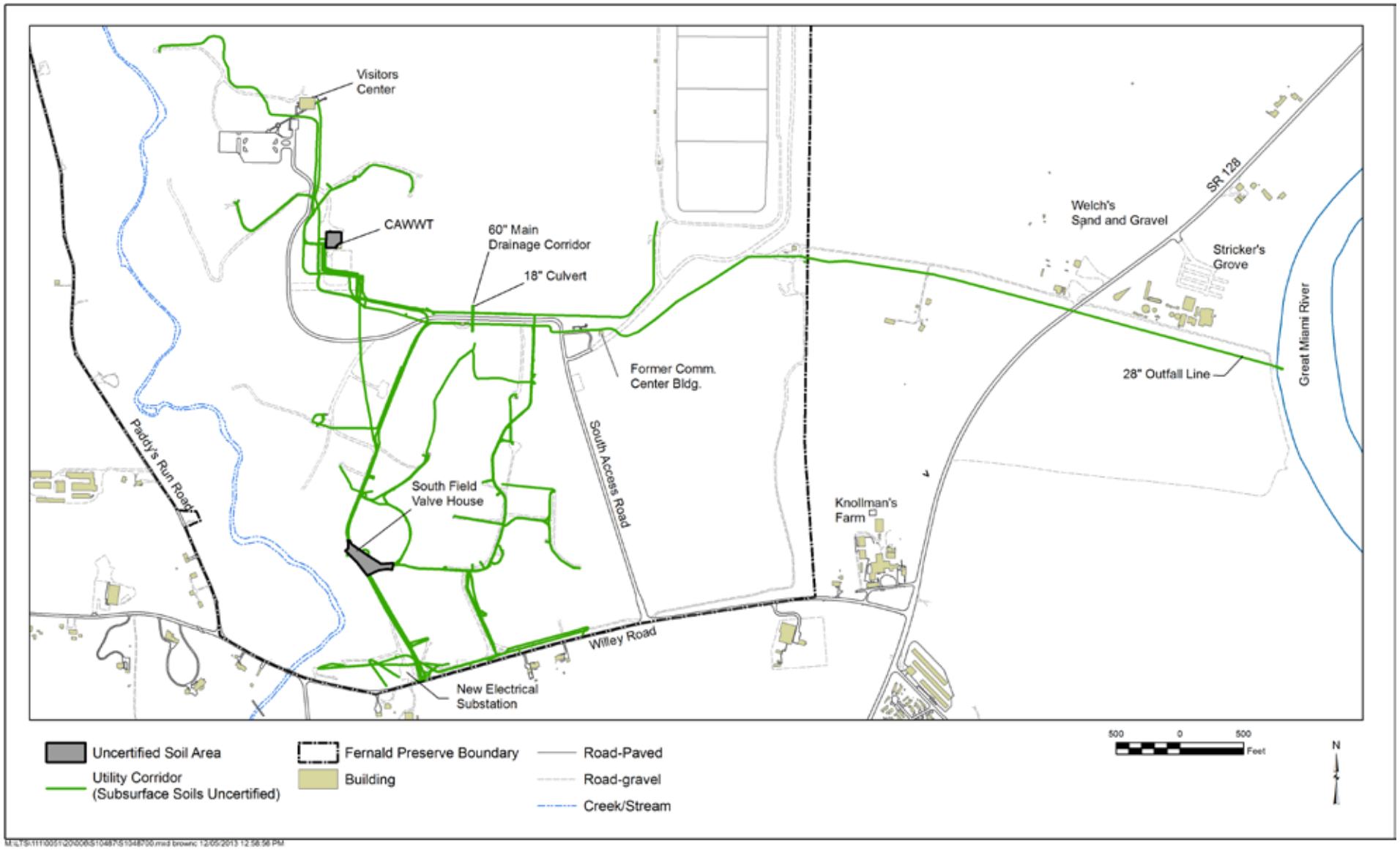

Figure 3. Uncertified Areas and Subgrade Utility Corridors

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3.0 Scope of Legacy Management at the Fernald Preserve

Post-closure requirements include maintaining the remedies and ensuring the protectiveness of human health and the environment. Other post-closure activities include monitoring and maintaining the Fernald Preserve property, facilities, and structures that remain. Post-closure requirements at the Fernald Preserve are the responsibility of LM. Within LM, the Office of Site Operations (LM-20) is responsible for ongoing surveillance and maintenance at the Fernald Preserve and the continuation of the groundwater remedy.

The commitments in the RODs relevant to legacy management include the following:

- DOE will achieve the FRLs for all contamination attributed to the Fernald Preserve. Sitewide cleanup levels for soil are documented in the OU2 ROD (DOE 1995b) and in the OU5 ROD (DOE 1996) based on a recreational use and undeveloped park (i.e., green space) scenario. The FRLs do not allow unrestricted use of the Fernald Preserve, and institutional controls are required.
- According to the OU2 ROD, the Fernald Preserve will remain under federal ownership. Therefore, any final land-use alternative and legacy management planning must include DOE's commitment to continued federal ownership.
- Commitments for other environmental monitoring will be carried out as long as appropriate according to the existing RODs.

Maintaining institutional controls at the Fernald Preserve is a fundamental component of legacy management and includes ensuring that no residential or agricultural uses and only limited recreational uses occur on the property. Activities such as swimming, hunting, fishing, and camping are prohibited. Additional information regarding prohibited activities is included in the IC Plan, Section 2.1. The intent of this Legacy Management Plan is to provide an overview of institutional controls required for the Fernald Preserve to support legacy management. The separate IC Plan is required for the Fernald Preserve according to DOE's commitment to EPA in the OU5 ROD (DOE 1996). DOE and EPA guidance were used to identify planned institutional controls at the Fernald Preserve. The IC Plan will continue to be updated annually, as necessary, based on changing site conditions and input from the community and regulators. Section 4.4 of this Legacy Management Plan discusses the 5-year review process and how it relates to legacy management, including institutional controls.

The scope of legacy management activities at the Fernald Preserve can be divided into three categories: (1) the operation and maintenance of the remedies, (2) surveillance and maintenance in restored areas, and (3) public involvement. Legacy management activities related to the maintenance of the remedies include monitoring and maintaining the OSDF, the CAWWT and supporting infrastructure, the extraction wells and associated piping, and the outfall line to the Great Miami River. Also included is the decontamination and dismantling of the aquifer remediation infrastructure (CAWWT, well system, etc.). The OMMP includes the details of the monitoring and maintenance of the CAWWT, groundwater restoration systems, and the outfall line. Legacy management activities also include ensuring that remedy-driven restrictions on access to and use of the Fernald Preserve are enforced, that aquifer remediation is continued, and that information is properly managed.

Legacy management in restored areas includes ensuring that natural and cultural resources are protected in accordance with applicable laws and regulations. Any amenities supporting access to and use of the Fernald Preserve will be kept in a safe configuration. The cleanup levels established for the Fernald Preserve ensured that the site was remediated to a level consistent with recreational use.

DOE and Ohio EPA signed a Consent Decree in November 2008 that settles a long-standing natural resource damage claim under Section 107 of CERCLA. As a result, the Fernald Natural Resource Trustees (DOE, Ohio EPA, and the U.S. Department of Interior) finalized the NRRP, which is Appendix B of the *Consent Decree Resolving Ohio's Natural Resource Damage Claim against DOE* (State of Ohio 2008). The NRRP specifies an enhanced monitoring program for ecologically restored areas at the site. Monitoring activities include a comprehensive wetland mitigation monitoring program and resumption of ecosystem-based functional monitoring. In addition, the Natural Resource Trustees conducted field walkdowns of all restored areas in 2009, and developed a path forward for several repair and enhancement projects. The Natural Resource Monitoring Plan, which is included as part of the Integrated Environmental Monitoring Plan (Attachment D of the LMICP Volume II), describes the Natural Resource Trusteeship process at the Fernald Preserve and the monitoring activities that have been agreed to by the Trustees.

In addition to the monitoring and repair activities discussed above, several new ecological restoration projects have been undertaken by the Trustees. A vernal pool and forest restoration project was constructed in 2012, and approximately 4 acres of mesic tall grass prairie were seeded. Additionally, a wetland swale was constructed to enhance wetland habitat within the footprint of the former Silos Area. Restoration projects and associated monitoring activities are described in annual Site Environmental Reports.

The potential reburial of Native American remains is another initiative that has been considered at the Fernald Preserve since 1999. DOE agreed to make land available for the reinterment of Native American remains with the following understandings:

- The land remains under federal ownership.
- DOE will not take responsibility for, or manage, the reinterment process. DOE will neither fund nor implement maintenance and monitoring.
- The remains must be culturally affiliated with a modern-day tribe. The National Park Service had no objections to the reinterment process as long as the "repatriations associated with the reburials comply with the Native American Graves Protection and Repatriation Act as applicable."
- Records must be maintained for all repatriated items reinterred under this process. DOE is not responsible for these records.

Thus far, several federally recognized tribes have been contacted regarding this offer of land for reinterment purposes. To date, DOE has received only one response from a modern-day tribe with repatriated remains under the Native American Graves Protection and Repatriation Act. The Miami Tribe of Oklahoma has informed DOE that they are not interested in using the site. DOE has received no other responses from modern-day tribes and is no longer pursuing the effort. The proposal may be reconsidered in the future if other modern-day tribes with repatriated remains come forward.

Legacy management activities related to public involvement include ongoing communication with the public regarding continuing groundwater remediation, legacy management activities, ecological restoration, public use, and the future of the Fernald Preserve. Emphasis will also be placed on educating the public about the site's former production activities, its remediation, and its land use restrictions. Displays and programs at the Visitors Center and outreach programs at local schools and organizations will help LM meet this objective.

3.1 Legacy Management of the OSDF

The OU2 ROD (DOE 1995b) states that the Fernald Preserve will remain under federal ownership. DOE has committed to the goal of ensuring legacy management activities of the OSDF in perpetuity. The PCCIP (Attachment B) for the OSDF outlines the routine legacy management activities for the initial 30 years. The activities include routine inspections and ongoing monitoring of the LCS, the LDS, and groundwater in the vicinity of the OSDF. DOE will conduct a CERCLA review every 5 years and will issue a report summarizing the results of the review to the appropriate regulatory agencies. Periodic monitoring and maintenance of the LCS and the vegetative cap of the OSDF will be necessary, as will the occasional maintenance of signs, fencing, and the buffer zone around the OSDF. The inspections and monitoring are discussed in greater detail in the IC Plan.

The extent of legacy management activities will continue to be defined on the basis of regulatory requirements, community and regulatory input, and agreements between DOE, EPA, and Ohio EPA. More information about the maintenance and monitoring requirements for the LCS, the capping and cover system, and the support systems for the OSDF are included in the IC Plan and supporting documents.

3.2 Surveillance and Maintenance of Restored Areas

According to the OU5 ROD (DOE 1996), DOE will protect the existing natural resources at the Fernald Preserve. The monitoring and maintenance of restored areas focus on ensuring that natural resources are protected in accordance with appropriate laws and regulations, such as the Clean Water Act and the Endangered Species Act. Wetlands and threatened or endangered species are examples of natural resources that are monitored. Maintenance of ecologically restored areas is further detailed as part of the NRRP (State of Ohio 2008). The NRRP requires long-term maintenance of restored areas in order to ensure that restoration goals are met.

Restored areas will be inspected to ensure that protected natural resources are maintained in accordance with applicable laws and regulations. The physical disturbance of restored areas will not be permitted unless it is authorized by LM (if necessary, in consultation with EPA). Soil and vegetation will not be removed from the Fernald Preserve unless LM, with EPA and Ohio EPA concurrence, authorizes their removal.

Existing cultural resource areas, including the reinterment area that resulted from the public water supply project, are a part of the undeveloped park and require inspections to ensure their preservation, and to determine if natural forces, vandalism, or looting are affecting the resources. Corrective actions will be implemented if there is evidence that natural forces or human activities threaten the integrity of a site.

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4.0 Oversight of Legacy Management at the Fernald Preserve

4.1 Office of Legacy Management Responsibilities

LM is responsible for the oversight of the Fernald Preserve during legacy management and will ensure that all legacy management activities are conducted as required. LM makes the decisions regarding changes in surveillance, maintenance, engineering, access, public use, and other issues. LM also manages any contractors hired to perform work required for legacy management purposes and ensures that the contractors have the skills necessary to perform the work. Additionally, LM is responsible for communicating with regulators and the public regarding the legacy management of the Fernald Preserve.

4.2 Role of the Site Contractor and Use of Subcontracts

A site contractor, or contractors, will support LM under the Legacy Management Support (LMS) contract, will work closely with and communicate regularly with LM, and will be the physical presence at the site. LMS contractor personnel will be responsible for operating the groundwater remediation systems; conducting inspections, monitoring, and sampling; collecting all data; developing the reports; and making those reports available to the public. Maintenance activities for the OSDF and ecologically restored areas are the LMS contractor responsibility as well. The LMS contractor will notify LM in the event of an emergency and will take action to prevent damage to the site.

Subcontractor services may be used to conduct a variety of operation and maintenance tasks, such as minor repairs to fencing, gates, signs, or components of the groundwater infrastructure. Repairs that require earthwork, erosion control, seeding, mowing, clearing, herbicide application, or repair to pumps and piping may also be completed by subcontractors.

The LMS contractor will procure goods and services according to DOE-approved procurement policies and procedures. These procedures use the best commercial practices and are in compliance with the requirements and intent of the Federal Acquisition Regulations and DOE acquisition regulations. The terms and conditions in subcontracts incorporate the required flow-down clauses from the prime contract.

As technical leads identify site requirements, contractor staff will develop a scope of work and initiate a solicitation package. The package will generally include statements of work, health and safety requirements, estimated costs, and required approvals. The written contracts will also include the appropriate restrictions and prohibited activities for the work to be performed onsite. In cases where similar existing subcontracts were issued, the existing work scope may be used as a framework for a new subcontract. New subcontracts may be developed through a competitive bid process or through the negotiation of a sole-source procurement. The type of procurement will be determined by analyzing the nature of the work scope, the critical nature of the services, and the importance of historical information known only by the previous contractor. Although LM intends to maximize the use of new subcontracts for most services, there may be a need to request the assignment of an existing subcontract in unique circumstances to ensure continuation of a service.

4.3 Role of Regulators

LM is required to implement the requirements outlined in the IC Plan subject to enforcement by EPA. While both Ohio EPA and EPA have a role in enforcing ICs, those ICs identified through the CERCLA process are primarily enforceable under the consent agreement with EPA and the ICs identified with the Ohio Consent Decree (State of Ohio 2008) are primarily enforceable by Ohio EPA.

The need for institutional controls is described in the OU2 and OU5 RODs (Appendix B); and in the Environmental Covenant, which is Appendix D of the *Consent Decree Resolving Ohio's Natural Resource Damage Claim against DOE* (State of Ohio 2008). The OU5 ROD states: "One element of the selected remedy that will be used to ensure protectiveness is institutional controls, including continued access controls at the site during the remediation period, alternative water supplies to affected residential and industrial wells, continued federal ownership of the disposal facility and necessary buffer zones, and deed restrictions to preclude residential and agricultural uses of the remaining regions of the Fernald Environmental Management Project (FEMP) property." These requirements are further defined in the environmental covenant where it states: "...the Property shall not be used for any residential or agricultural purposes, and shall only be used in a manner consistent with the Natural Resource Restoration Plan, Fernald Preserve..." and "...the groundwater underlying all or any portion of the Property shall not be withdrawn or used as a drinking water supply." The intent of the IC Plan is to describe the institutional controls, both physical and administrative, used at the Fernald Preserve.

The regulators will ensure that DOE is performing the required legacy management operations, surveillance, and maintenance activities at the Fernald Preserve, as agreed upon by DOE and EPA, in consultation with Ohio EPA, in the LMICP. Both EPA and Ohio EPA will be provided with all reporting on the legacy management activities at the Fernald Preserve. Both EPA and Ohio EPA will be notified of any institutional control breaches as outlined in Section 4.0 of the IC Plan. Both EPA and Ohio EPA will be involved in overseeing the legacy management activities at the Fernald Preserve.

4.4 CERCLA 5-Year Reviews

Under CERCLA, if use of a site is limited because a certain level of contamination remains, a review of the remedy at that site is required every 5 years. CERCLA 5-year reviews at the Fernald Preserve will focus on the protectiveness of the remedies associated with each of the five OUs. Summaries of the inspections conducted for the OSDF, the CAWWT, the groundwater restoration system, and the outfall line to the Great Miami River will also be included. To facilitate the review, a report addressing the ongoing protectiveness of the remedies will be prepared and submitted to EPA and Ohio EPA. The institutional controls portion of the report will include the data collected from monitoring and sampling; summaries of inspections of the Fernald Preserve, the OSDF site, and the OSDF cap conducted during the 5-year period; and a discussion of the effectiveness of the institutional controls. If it is determined that a particular control is not meeting its objectives, then required corrective actions will be included. The review may lead to revisions to the monitoring and reporting protocols. The last CERCLA 5-year review was completed in September 2011. Therefore, the next review is due in 2016.

4.5 Reporting Requirements

The annual Site Environmental Report will be submitted to EPA and Ohio EPA, and distributed to key stakeholders on June 1 of each year. It will provide information on institutional controls, monitoring, maintenance, site inspections, and corrective actions while continuing to document the technical approach and summarizing the data for each environmental medium, along with summarizing CERCLA, RCRA, and waste management activities. The report will also include water quality and water accumulation rate data from the OSDF monitoring program. The summary report serves the needs of both the regulatory agencies and other key stakeholders. The detailed appendixes accompanying the Site Environmental Report are intended for a more technical audience, including the regulatory agencies. Additionally, other reporting, such as the National Pollutant Discharge Elimination System monthly discharge reports, will continue as required under other regulatory programs and will be addressed outside the annual Site Environmental Reports.

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5.0 Records Management

The long-term retention of records and dissemination of information is another critical aspect of legacy management. LM will manage records that are needed for legacy management purposes. Records will be dispositioned in accordance with DOE requirements at the National Archives and Records Administration or a federal records center for their required retention period. Records that have reached the end of the scheduled retention period will be reviewed and approved by management for final destruction or rescheduled for additional retention. Within 60 days of EPA's approval of this LMICP, the LM website will be updated to include the most recent version of the Fernald Preserve LMICP.

5.1 Types of Data Required for Legacy Management

Data considered critical for legacy management purposes have been divided into four categories: historical data, RI/FS process and results, remediation data, and post-closure data. Table 1 presents the types of information that fall into each category.

In fall 2002, DOE personnel began working with stakeholder groups to identify critical records in the four categories and ensure that the appropriate types of information and records were being retained to support legacy management. The ongoing interface with stakeholders will allow DOE to retain the appropriate information to support future legacy management needs.

5.2 Legacy Management Records Custodian

LM assumed custodianship of the Fernald records when the site transitioned from DOE's Office of Environmental Management to LM in fiscal year 2007. Site records fall under the DOE retention schedules and will remain in DOE custody for the required, pre-established retention period.

5.3 Records Storage Location

Fernald records are currently stored at two locations: the National Archives, Great Lakes Region, in Chicago, Illinois, and the Department of Energy/Office of Legacy Management, Business Center located at Morgantown, West Virginia. Their respective websites are http://www.archives.gov/frc/chicago/ and http://www.lm.doe.gov/Office_of_Business_Operations/Records_Management.aspx.

Table 1. Types of Data Needed to Support Legacy Management Activities

Data Category	Summary of Information Required
Historical Data	· Real estate records · Information pertaining to the acquisition of property · Process documents/reports (summary level) · Cultural resource records · Photographs (significant for legacy management purposes)
RI/FS Process and Results	· Risk assessments · Public comments · RI/FS reports for each OU · RODs for each OU · ROD amendment documents
Remediation Data	**For Soil:** · Design and excavation plans · Documentation of the certification process for each area/phase · Certification reports* **For Groundwater:** · Pump-and-treat system design documents · Groundwater monitoring data · Groundwater extraction data · Design and monitoring data for the CAWWT **For Environmental Monitoring:** · Integrated Environmental Monitoring Plan reports* · Regular updates* **For Buildings and Structures:** · Plans for decommissioning and dismantling buildings and structures **For the OSDF:** · Design, construction, material placement and closure documentation · Leak detection/leachate monitoring data* · Cover/cap monitoring data **For Restoration:** · Design plans · Implementation documentation · Completion reports · Monitoring data* **General:** · Remedial Design/Remedial Action Reports · Aerial photographs taken during remediation processes
Post-Closure Data	· Decision documents on land use · Documents on public-use decisions · All monitoring and maintenance data for the OSDF · All monitoring and maintenance data for the restored areas* · All institutional control data · Drawings of remaining facilities (including the OSDF)
*Will require retention of electronic data.	

5.4 Public Access Requirements

Stewards and stakeholders, whether located in the surrounding communities or in remote locations, will require easy access to copies of the Fernald Preserve CERCLA Administrative Record (AR). The Visitors Center houses computing facilities for acquisition and access to electronic copies of the CERCLA AR. The CERCLA AR documents for the Fernald Preserve were scanned into industry-standard searchable Adobe Acrobat Portable Document Format (PDF) files for viewing over the Internet. The AR documents are available to the public on the LM website (http://www.lm.doe.gov/CERCLA_Home.aspx). The documents are searchable by document number, document date, and document title, and by searching the text of the document. Additionally, key document indexes were created and posted on the LM website for each operable unit. The Fernald Preserve records staff can be contacted by phone at (513) 648-4449 for assistance in searching for a document in the CERCLA AR. The CERCLA AR will be updated as new documents are created.

Fernald Preserve environmental data are available to the public through LM's Geospatial Environmental Mapping System (http://www.lm.doe.gov/Fernald/Sites.aspx). Examples of the electronic data include environmental sampling and monitoring data, OSDF monitoring data, and site inspection photographs.

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6.0 Funding

Currently, legacy management activities at the various DOE facilities are funded through the annual appropriations process. Funding for sites in the long-term surveillance and maintenance program is maintained in a separate line item in the LM budget. For the time being, this process for funding legacy management will continue; however, DOE will continue to investigate other funding and management options.

It is anticipated that LM funds will be available for monitoring and maintaining the OSDF, managing leachate, remediating the aquifer, and ensuring that applicable laws and regulations are adhered to in restored areas. DOE will keep the public informed of its plans to fund legacy management activities as new information becomes available.

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