Stoller
Fernald Office

established 1959

November 29, 2006

Task Order ST07-110
Control Number 1000-T07-0202

Ms. Jane Powell
Office of Legacy Management
U.S. Department of Energy
11003 Hamilton-Cleves Hwy.
Harrison, OH 45030

Dear Ms. Powell:

SUBJECT: Contract No. DE-AC01-02GJ79491, Stoller
Task Order Number ST07-110, LM-40 Fernald Site Transition
Transmittal of Change Pages to the Comprehensive Legacy Management and Institutional Controls Plan, Revision 1

Reference: Letter, J. Reising to J. Saric, T. Schneider, D. Duvalt, "Transmittal of the Revised Comprehensive Legacy Management and Institutional Controls Plan, Revision 1, Final and Responses to U.S. and Ohio Environmental Protection Agency Comments on the Legacy Management and Institutional Controls Plan, Final, Revision 0", dated June 29, 2006

This letter transmits to the U.S. Department of Energy (DOE) the change pages to the approved Comprehensive Legacy Management and Institutional Controls Plan (LMICP), Revision 1. As indicated in the June submittal (Reference 1), necessary updates to address further post-closure refinements will be made through change pages or document re-submittals as necessary. Attachment A to this letter includes a summary of all change pages.

In general, refinements consist of the following:

- Updating maps/figures and text to reflect current post-closure conditions
- Updating well locations to address wells that have been added or removed from the programs
- Updating references with current documents.

For the most part these change pages do not substantially affect the content of the LMICP. One exception to this is Volume II, Attachment C, Appendix D, "Leachate Management System for the On-site Disposal Facility (OSDF)" in that the Leachate Management Contingency Plan has been updated and included. The Contingency Plan has been updated at this time to reflect changing conditions as a result of final OSDF closure and capping of the last cell, Cell 8. The last revision of the Contingency Plan was issued in January 2001 and was applicable to the time prior to final capping, when leachate flows were highly variable due to the influence of precipitation.

It should also be noted that the five surface water locations to be added to Volume II, Attachment D, "Integrated Environmental Monitoring Plan (IEMP)" are not included in these change pages. As indicated in the June LMICP submittal, the Residual Risk Assessment data would be needed to determine these additional monitoring locations. At this time, data is continuing to be collected and reviewed for this effort; therefore, the additional surface water locations are not identified in the IEMP. As soon as the five locations are determined, the information will be conveyed to the agencies for their approval.

Upon your concurrence, please forward on to the United States Environmental Protection Agency, the Ohio Environmental Protection Agency, and the United States Fish and Wildlife Service. If you have any questions regarding this matter, please contact me at 513-648-3105.

Sincerely,

Michele L. Miller
Fernald Site Project Manager

MLM:CT/dsm

Enclosures

cc: <u>With enclosure</u>
A. Cooney, DOE/EMCBC
W. A. Hertel, Stoller
J. J. Homer, Stoller
F. L. Johnston, Stoller
L. M. McHenry, Stoller
G. Stegner, DOE-OH
C. L. Tabor, Stoller
S. Walpole, Stoller
AR Coordinator, Fluor Fernald (2 copies)
File Record Subject – Comprehensive Legacy Management and Institutional Control Plan
Administrative File (Thru D. Metzler)

<u>Without enclosure</u>
J. S. Brown, DOE/EMCBC
J. Desormeau, DOE-OH/FCP
Correspondence Control File (Thru C. Weston)

ATTACHMENT A

CHANGE PAGES FOR THE
COMPREHENSIVE LEGACY MANAGEMENT AND INSTITUTIONAL CONTROLS PLAN
REV. 1, FINAL

ATTACHMENT A

COMPREHENSIVE LEGACY MANAGEMENT AND INSTITUTIONAL CONTROLS PLAN CHANGE PAGE CROSS REFERENCE LIST

Section	Change Pages (Additional Pages Included)[a]	Reason for Update
	Volume I	
Section 2	Page 11 (Page 12)	Updated current site conditions.
	Figure 2	Updated Land Use based on current information.
	Page 18 (Page 17)	Updated information on certified areas. Also added that MUEF will be completed in fall 2007.
	Figure 3	Updated certified areas based on current information.
	Page 21 (Page 22)	Updated to explain topsoil was removed from 10 acres of area for use for restoration.
Section 5	Page 29	Updated internet site information.
	Page 30	Changed MUEF completion dated from "summer" to "fall".
References	Page 35 (Page 36)	Added reference to GeoSyntec Work Plan for abandonment of OSDF Cell 1 monitors.
	Volume II	
Section 1	Page 3, Figure 1	Updated for accuracy.
Section 2	Page 9	Updated prohibited activities list and information pertaining to residual risk assessment.
	Page 10, Table 2-1	Revised reference in item number 3 from App. B to App. D.
	Page 13, Figure 2	Updated site configuration based on current information.

Section	Change Pages (Additional Pages Included)[a]	Reason for Update
Section 2 continued	Page 18 (Page 17)	Updated information pertaining to OSDF corner monuments and cell markers.
	Page 21 (Page 22)	Added reference to letter sent to Hamilton County Health Department
Section 5	Pages 35 and 36	Updated information pertaining to the FCAB. The organization has disbanded. The last meeting was in September 2006.
References	Page 38 (Page 39)	Updated reference to Site Safety Plan. Added another reference.
Appendix C	In entirety	Updated contact information.
	Attachment A- OMMP	
Section 3	Page 3-11	Added Extraction Well 33334 (EW-28A) and Extraction Well 33347 (EW-33A) to Table 3-1.
	Figure 3-3 (Figure 3-2)	Deleted Extraction Well 33330 (EW-33). Added Extraction Well 33347 (EW-33A). Labeled Extraction Well 33334 (EW-28A). Updated the plume footprint to second half of 2005.
	Figure 3-4 (Figure 3-5)	Deleted Extraction Well 33330 (EW-33) and added Extraction Well 33347 (EW-33A).
Section 4	Page 4-2 (Page 4-1)	Deleted Extraction Well 33330 (EW-33) from Table 4-1 and added Extraction Well 33347 (EW-33A).
Section 5	Page 5-2 (Page 5-1)	Text revisions made to clarify groundwater treatment strategy
	Page 5-3 (Page 5-4)	Text revisions made to clarify operational objectives and operational maintenance priorities.
Section 6	Page 6-7 (Page 6-8)	Deleted Extraction Well 33330 (EW-33) and added Extraction Well 33347 (EW-33A).
	Figure 6-2	Added specifications for Extraction Well 33334 (EW-28A) and Extraction Well 33347 (EW-33A).

Section	Change Pages (Additional Pages Included)[a]	Reason for Update
	Attachment B- PCCIP	
Section 1	Page 1-1	Revised "granite" monuments to "concrete and brass" monuments.
	Page 1-2	Changed MUEF completion dated from "summer" to "fall".
	Page 1-3	Added the GeoSyntec work plan for abandoning the cell 1 monitors to the related plans list.
Section 4.2, Table 4-2	Page 4-2 (Page 4-1)	Updated contact information.
References	Page13-1 (Page 13-2)	Added reference to GeoSyntec Work Plan for abandonment of OSDF Cell 1 monitors.
	Attachment C- GWLMP	
Appendix B	Page 4 (Page 3)	Identified that 1,1-dichloroethene was added to the Cell 3 LDS based on results from the Cell 3 annual LCS sample in May 2006.
	Page 14 (Page 13)	Updated Safety Plan reference from 2005 to 2006.
	Page 15	Updated various LM references to reflect current documents.
Appendix D	Table of Contents	Added Section 5.0 and Figure 5-1
	Pages D-8 through D-10, Figure 5-1	Added Section 5.0 Leachate Contingency Plan and associated Figure 5-1.
Appendix E	Page 16, Table 4-1 (Page 15)	Added 1,1-dichloroethene to the Cell 3 LDS based on results from the Cell 3 annual LCS sample in May 2006.
	Attachment D- IEMP	
Table of Contents, Acronyms	In entirety	Update acronym EMCAP (DOE-EM Consolidated Audit Program) to DOECAP (Department of Energy Consolidated Audit Program).

Section	Change Pages (Additional Pages Included)[a]	Reason for Update
Section 1	Page 1-6 (Page 1-5)	Updated reference to Geospatial Environmental Mapping System (GEMS) to the Office of Legacy Management Internet Site, which will provide downloadable files and query files (link to GEMS).
Section 2	Figure 2-1	Updated GEMS to Office of Legacy Management Internet Site.
	Figure 2-2	Updated certified areas based on current information.
	Figure 2-3	Updated site configuration based on current information.
Section 3	Page 3-4 (Page 3-3)	Changed "Stage II" to "Stage III" to correct a typo.
	Page 3-15, Figure 3-3 (Page 3-16)	Deleted Extraction Well 33330 (EW-33) from Figure 3-3 and added Extraction Well 33347 (EW-33A).
	Page 3-20 (Page 3-19)	Deleted Extraction Well 33330 (EW-33) and added Extraction Well 33347 (EW-33A).
	Page 3-32 (Page 3-31)	Deleted "be" to correct a typo in Footnote d in Table 3-4.
	Page 3-34 (Page 3-33)	Updated Safety Plan reference from 2005 to 2006.
	Page 3-39 (Pages 3-40 through 3-64)	• Removed requirement to sample direct-push location 12371 annually because it is located outside of the 30 ug/L total uranium plume footprint. • Deleted Extraction Well 33330 (EW-33) and added Extraction Well 33347 (EW-33A). • Added text prescribing that direct-push sampling in the Waste Storage Area will include the Waste Storage Area semiannual constituents, excluding the organics.

Section	Change Pages (Additional Pages Included)[a]	Reason for Update
Section 3 continued	Page 3-47	• Text changes made to differentiate between the filtering of groundwater samples at monitoring wells and the filtering of groundwater samples at direct-push locations. • Updated laboratory information to also include the on-site laboratory and changed reference from EMCAP to DOECAP.
	Page 3-48	Added text to address the filtering of groundwater samples at direct-push sampling locations.
	Page 3-54	Added reference to validation practices, which was inadvertently left out of the June version.
	Page 3-59	Updated residual analysis to address OEPA Comment 3, issued as a consideration for incorporation into future LMIC and SER documents. (Letter, Thomas A. Schneider, OEPA to Mr. Johnny Reising, USDOE, dated August 10, 2006.
	Page 3-64	Updated GEMS to Office of Legacy Management Internet Site.
Section 4	Page 4-5 (Page 4-6, Table 4-2)	Removed August 2006 date for Residual Risk Assessment.
	Page 4-7, Table 4-2 (Page 4-8, Table 4-2)	Updated Total Uranium Background which was inadvertently reported in the wrong unit previously.
	Page 4-19, Figure 4-5 (Page 4-20)	Removed the Stormwater Retention Basin Overflow as a sampling point.
	Page 4-21 (Page 4-22, Table 4-4)	Updated laboratory information to also include the on-site laboratory and changed reference from EMCAP to DOECAP.
	Page 4-25 (Page 4-26)	The phrase Operational Procedures was made lower-case.
	Pages 4-30 and 4-31 (Page 4-29, Figure 4-6)	Updated GEMS to Office of Legacy Management Internet Site.

Section	Change Pages (Additional Pages Included)[a]	Reason for Update
Section 5	Page 5-5 (Page 5-6, Table 5-2)	Updated laboratory information to also include the on-site laboratory and changed reference from EMCAP to DOECAP.
	Pages 5-11	Updated GEMS to Office of Legacy Management Internet Site.
Section 6	Page 6-12 (Page 6-11)	Changed reference from EMCAP to DOECAP.
	Page 6-15 (Page 6-16)	Removed TLD information that references the on-site laboratory process (inadvertently left in from previous revision).
	Pages 6-20 and 6-21 (Page 6-19, Figure 6-3)	Updated GEMS to Office of Legacy Management Internet Site.
Section 7	Pages 7-3 through 7-5, Table 7-1	Updated GEMS to Office of Legacy Management Internet Site.
References	Pages R-1 and R-2	Updated various LM references to reflect current documents.
Appendix A	Figure A-18 (Figure A-17)	Removed Monitoring Well 2648 because it has been plugged and abandoned.
Appendix D	Page D-5 (Page D-6, Figure D-1)	Changed date for DPC.
	Page D-8 (Page D-7)	Changed reference date for Storm Water Pollution Prevention Plan. Revised wording pertaining to rail trestle.
	Pages D-13 and D-14	Revised wording for clarification.
	Page D-16 (Page D-15)	Updated reference information.
Appendix D, Attachment D.1	Page D.1-5 (Page D.1-4, Figure D.1-2)	Changed reference date for Storm Water Pollution Prevention Plan.
	Page D.1-9 (Page D.1-8)	Updated reference information.

Section	Change Pages (Additional Pages Included)[a]	Reason for Update
	Attachment E- CIP	
Upfront Text	Page 1 (Page 2)	Changed date for MUEF due to timeline change (summer 2007 to fall 2007).
	Page 6 (Page 5)	Changed date for MUEF due to timeline change (summer 2007 to fall 2007).
	Page 7 (Page 8)	Updated FCAB status which changed at the fiscal year.
	Page 10 (Page 9)	Deleted extra period.
	Pages 11 and 12	The emergency response supplier has changed. Beginning December 1 Ross Township will have the EMS contract. All references to who will respond are deleted, but the numbers to call remain the same.
Appendix A	Page A-1	Placed DOE-LM contact (Jane Powell) information in front of DOE-EM contact (Johnny Reising) since LM has taken over the site.
	Page A-2	Removed Mark Mallory and replaced with Bill Seitz who is now the Fernald State Representative.
	Page A-4 (Page A-3)	Changed the names of the chair of the Ross and Morgan Township Trustees – new appointments.
	Page A-5	Changed the names of two reporters to reflect personnel changes.
	Page A-6	See Page 11 change.

Note: Change pages are double-sided.

[a]When change page updates effected subsequent and previous pages (based on text being moved up or moved backed), then additional pages are included, as necessary.

VOLUME I

that took place at the Fernald site 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 up to 1,000,000 pounds of uranium were released to the environment, resulting in 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, the DOE and the U.S. EPA signed a Federal Facilities Compliance Agreement (FFCA), addressing impacts to the environment associated with the site. The DOE agreed to conduct the FFCA investigation as a remedial investigation/feasibility study (RI/FS) in accordance with the guidelines of CERCLA. 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 U.S. EPA National Priorities List. In 1991, the site was renamed the Fernald Environmental Management Project (FEMP) and the site was officially closed as a production facility. The 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 the AEC and DOE. The Westinghouse Environmental Management Company became the site's prime contractor in 1986. In 1992, after conversion of the site's mission to environmental cleanup, DOE awarded an Environmental Restoration Management Contract to the Fernald Environmental Restoration Management Corporation, now known as Fluor Fernald, Inc. DOE awarded a new contract to Fluor Fernald in November 2000 to complete the remediation of the facility. In 2003, DOE changed the site name to the Fernald Closure Project. The site-wide remediation effort was conducted pursuant to CERCLA. Waste management was conducted according to RCRA.

2.2.3 Current Conditions and Forecast Completion

The Declaration of Physical Completion occurred on October 29, 2006. All accessible areas of the site are certified, the OSDF is complete, all required groundwater infrastructure is installed, operational and secured, and restoration activities are complete.

For the June 2006 submittal, each document (attachment/support plan) included as part of the LMICP was written to address post-closure activities. During November 2006, necessary updates to address further post-closure refinements are being made through change pages or document re-submittals as necessary. Upon U.S. EPA and OEPA approval, it is anticipated that the LMICP will be FINAL each year by January to correspond with calendar year monitoring and reporting (between October and January, U.S. EPA and OEPA comments will be addressed).

The future LMICP schedule will be as follows:

- Each June, the annual site environmental reports will be submitted and will include recommendations based on the previous year's monitoring information.
- Each October, an annual review of the LMICP will occur to identify updates as necessary.
- Each January the revised LMICP will be submitted to correspond with the monitoring and reporting schedule.

After submittal of the full document in June 2006, the next full revision will occur in October 2007. Additionally, pertinent information associated with the CERCLA five-year reviews will be included in the LMICP revisions as needed.

2.3 REMEDIATION PROCESS

2.3.1 Summary of Remediation Efforts

CERCLA is the primary driver for environmental remediation of the Fernald site. 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.

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

The remedy for OU1 included removing all material from the waste pits, stabilizing the material by drying, and shipping it off site for disposal. This process was completed in summer 2005. The remedy for OU2 includes removing material from the various units, disposing of material that meets the on-site waste acceptance criteria (WAC) in the OSDF, and shipping all other material off-site for disposal. WAC were developed by DOE and regulators, in consultation with the stakeholders, to strictly control the type of waste disposed on site. The OU3 remedy included decontaminating and decommissioning all contaminated structures and buildings, recycling waste materials if possible, disposing of material that met the on-site WAC in the OSDF, and shipping all other material off site for disposal. The OU4 remedy included removal and treatment of all material from the silos, dismantling of the silos, and shipping the waste materials and silos debris off site for disposal.

OU5 includes all environmental media, including soil, sediment, surface water, groundwater and vegetation. The Site-wide Excavation Plan (SEP) (DOE 1998d) describes the remediation of soils. First, material exceeding the WAC for the OSDF was dispositioned by one of the following: 1) transporting material to an off-site disposal facility for treatment and disposal; (2) treating material on site and transporting to an off-site disposal facility; or (3) treating material on site and disposing of it in the OSDF. Details and exceptions for the above are outlined in the SEP.

FERNALD LEGACY MANAGEMENT
Future Use

LAND USE

- 395 acres of Woodlots
- 332 acres of Prairie
- 120 acres of OSDF
- 81 acres of Wetlands
- 60 acres of Open Water
- 33 acres of Savanna
- 29 acres of Infrastructure

Figure 2

Fluor Fernald

Graphic # 8131.23-2 11/06

Following are brief summaries of the habitat restorations. Details of the actual projects and further details on the restored areas are described in the NRRP (DOE 2002).

Upland Forest: Upland forest areas existed in a northern portion, a southern portion and the western perimeter of the site. Restoration activities were conducted to expand these forested areas. The Site-wide Characterization Report (DOE 1993) describes the Fernald site 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 southwest Ohio. Forest communities at the Fernald site would gradually move toward one of these forest types, depending on site-specific factors such as topography and hydrology. Therefore, restoration of upland forests at the Fernald site focused on the establishment of this Beech-Maple, Oak-Hickory transition zone. The trees 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 re-vegetation. The trees species selected were those that can withstand periodic inundation, and they are listed in the NRRP. The Paddies Run floodplain was expanded as part of the long-term management plan for Paddys Run.

Tallgrass Prairie/Savanna: The waste pit, production, OSDF, and borrow (east field) areas were restored as a contiguous prairie. Some prairie/savanna was established along the western perimeter of the site but concentration was primarily in formerly disturbed areas. Prairie restoration involved amending soil, if necessary, and seeding of grasses and forbs (wildflowers). All grasses and forbs seeded 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 on site, the OSDF, located adjacent to both the Former Production Area and the Borrow Area, is also being 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/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 will be 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 re-vegetation in various areas were designed to restore wet woods. Details and drivers for wetland mitigation are described in the NRRP.

2.4.3 Groundwater

Operation of some portions of the groundwater extraction system will continue into legacy management. Groundwater remediation and monitoring will continue until the FRL of 30 ppb for uranium has been achieved. Groundwater monitoring will be required following completion of remediation to ensure continued protectiveness of the remedy and to support the CERCLA five-year reviews. The exact frequency and approach to monitoring to support the five-year reviews has not been specifically determined at this time. The OMMP (DOE 2006a) is included as Attachment A to the LMICP and describes the groundwater extraction system (well fields, treatment facility, etc.) 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 continuously refined with input from the stakeholders and regulators.

2.4.4 Uncertified Areas

Several sub-grade utility corridors were not certified at closure. Most of the corridors contain utilities (e.g., water lines) used to support the continuing groundwater remediation. These corridors exist below certified areas. However, there are two facilities that exist, under which the soils have yet to be certified; the CAWWT facility and the south Field Valve House. Figure 3 identifies the location of these facilities.

The certification of the sub-grade utility corridors will occur following the completion of groundwater remediation when these systems are no longer needed and are removed. Certification of the soils within the foot-prints of the CAWWT and South Field Valve House will occur when these facilities are no longer needed, are removed from service, and are decommissioned and dismantled (D&D). Due to the uncertainty of the groundwater remediation end date, no firm schedule for the soil certification in the corridors can be established now. However, based on current projects, treatment requirements will end in September 2011 such that the CAWWT can be removed from service. Soil certification could conceivably be conducted in 2012 following D&D. It is currently estimated that the south field infrastructure can be removed in 2026. Therefore, soil certification can not occur until 2026 or 2027.

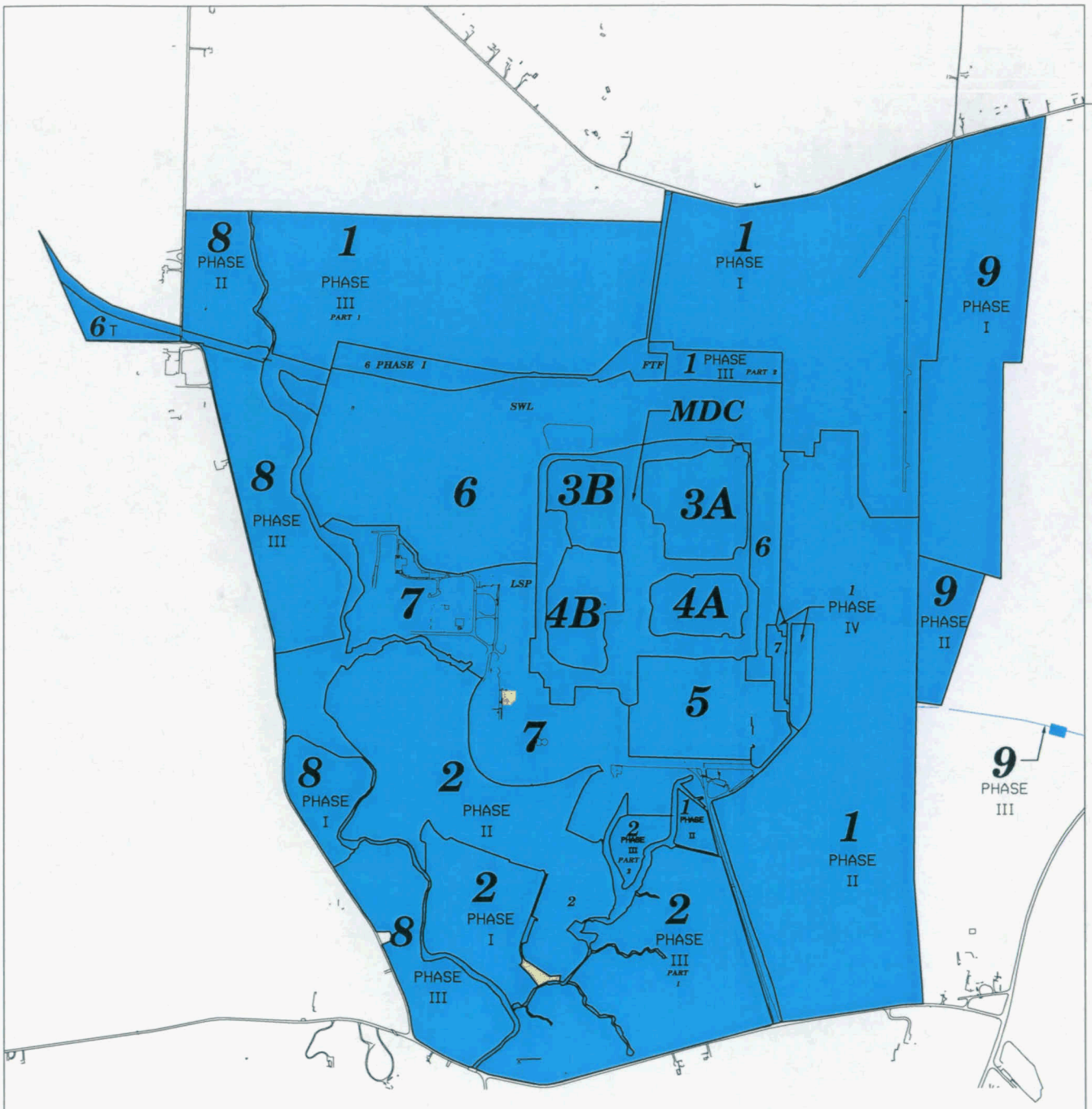
In the case of the existing paved roads, the roadways themselves cannot be certified, however the soil beneath them is certified.

2.4.5 Existing Infrastructure and Facilities

A few facilities remain on site. These include the CAWWT and supporting infrastructure, extraction wells and associated piping and utilities, the outfall line to the Great Miami River, the Restoration storage shed, the former Communications Building, and the Silos Warehouse.

DOE will establish a MUEF on site (anticipated completion is in fall 2007). The Silos Warehouse will be refurbished for use as the MUEF. The MUEF will contain information and context on the remediation of the Fernald site, including information on site restrictions, ongoing maintenance and monitoring, and residual risk information. The MUEF will also provide a storage location for historical information and photographs, a reading room, a meeting place and other education information as appropriate. A primary goal of the MUEF is to fulfill an informational and educational function within the surrounding community. The information made available at the MUEF serves as an institutional control. The MUEF will serve to maintain awareness of site history and conditions and help prevent unsafe disturbances and uses of the site.

Remodeling work and installation of educational materials and information will occur after site closure in coordination with the Office of Legacy Management. The MUEF will be maintained and operated under the direction of the Office of Legacy Management. DOE will evaluate the use of the MUEF and the programming provided by the MUEF on a periodic basis with Stakeholder input. The design of the MUEF will include the development of specific evaluation criteria for successful operation of the MUEF. Design of the MUEF will be completed with input from Stakeholders. Upon completion of the MUEF, DOE will obtain Stakeholder input on decisions regarding changes to the MUEF or ongoing operation of the MUEF.



YELLOW DESIGNATES AREAS NOT CERTIFIED

BLUE DESIGNATES CERTIFIED AREAS

NOTE: THERE ARE EXISTING, UNDERTIFIED GROUNDWATER PIPING CORRIDORS BENEATH THE CERTIFIED SURFACE (SEE MAP #2)

SCALE

1100 550 0 1100 FEET

FIGURE 3. UNCERTIFIED AREAS

V:\CJ3\DGN\BA...LMICP2.DGN

STATE PLANAR COORDINATE SYSTEM 1983

16-NOV-2005

Twenty-three acres of the DOE property were identified for potential community use, as described in the Environmental Assessment on Final Land Use (DOE 1998c). The area has been certified. No additional ecological restoration was planned for this area. However, since the environmental assessment was issued, there has been no interest or commitment from any entity outside of DOE for its development or use. In the National Environmental Protection Act (NEPA) Finding of No Significant Impact, issued in 1999, DOE deferred a decision on the 23 acres until 2004 because there was no further interest in use of the property. DOE is no longer considering any development of the 23 acres. In the fall of 2006, topsoil was removed from 10 of the 23 acres for restoration purposes in various areas of the site. The 10 acre area was re-seeded with prairie seed mix. The area will be included in the surveillance and maintenance of the site during legacy management.

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5.0 RECORDS MANAGEMENT

The retention of records and dissemination of information over the long-term is another critical aspect of legacy management. Records that are needed for legacy management purposes will be managed by the Office of Legacy Management. Records will be dispositioned in accordance with DOE requirements at the National Archives and Records Administration (NARA) or a federal records center for their required retention period or destroyed once they have reached the required retention. Copies of selected records documenting past remedial activities (e.g. CERCLA Administrative Record) will be retained by the Office of Legacy Management for legacy management purposes on the site at the MUEF. In addition, newly acquired CERCLA Administrative Record (AR) records will be available to stakeholders. Frequently requested documents will also be available on the Fernald LM website.

Stewards and stakeholders, whether located in the surrounding community or in remote locations, will require easy access to copies of the CERCLA AR. It is anticipated that the MUEF will house computing facilities for acquisition and access. With regard to electronic data, all data required to support legacy management will be identified and transferred to the Office of Legacy Management. The Office of Legacy Management will make the data available to the public through a variation of the existing Geospatial Environmental Mapping System (GEMS) computer system, currently in use at the Office of Legacy Management, at http://www.lm.doe.gov.to track legacy management progress at sites like Weldon Spring. Fernald site data will be available through the following link: http://www.lm.doe.gov/land/sites/oh/fernald/fernald.htm. The system to support legacy management addresses the following:

- On-site data transmission, telecommunications, and computing resources requirements
- Data acquisition standards and protocols for newly collected data, and for historical data and images to be transferred to the repository
- Analysis tools, integration with other data sources, and notification services to assist remotely located users
- Electronic data storage requirements
- Data management and validation practices sufficient to ensure defensible information
- Plans for periodic storage infrastructure reviews and upgrades to ensure electronic information is continually available as technology advances
- Integration with any DOE or federally mandated central repository for electronic records or data, as appropriate
- Web based retrieval, search, and reporting capabilities.

Examples of electronic data include environmental sampling and monitoring data, OSDF monitoring data, and soil certification data as well as electronic images, design drawings, and electronic records. This information is required for the purposes of generating required reports, including the CERCLA five-year review, for efficient management of the data collection process, and for public use.

The Fernald LM website will be updated within 60 days of the date of approval of this LMICP by the U.S. EPA to include the most recent version of the LMICP, the Fernald Site Transition Plan and other transition related documents.

5.1 TYPES OF DATA REQUIRED FOR LEGACY MANAGEMENT

Data determined critical for legacy management purposes have been divided into four categories: historical data, RI/FS process and results, remediation data, and post-site closure data. Table 5-1 presents the types of information that fall into each category.

Based on the four categories, DOE personnel at the Fernald Site and Fluor Fernald, Inc. personnel have initiated the process of working with stakeholders to identify any records considered critical for legacy management. Interface with stakeholder groups was initiated in the fall of 2002 to ensure that the appropriate types of information and records are being retained to support legacy management. Formal recommendations from the FCAB (FCAB 2002) and ongoing interface with stakeholders will allow DOE to retain the appropriate information to support future legacy management needs.

5.2 LEGACY MANAGEMENT RECORDS CUSTODIAN

The Office of Legacy Management assumed custodianship of the Fernald records when the site was transitioned to Legacy Management. Site records fall under the DOE retention schedules and will remain in the custody of the DOE for the required, pre-established retention period.

5.3 RECORDS STORAGE LOCATION

Fernald records will be stored at the National Archives, Great Lakes Region in Dayton, OH. The website is http://www.archives.gov/great-lakes/dayton/. Records will be transferred to a facility located in Morgantown, West Virginia when construction is completed. Additional information regarding the Morgantown facility will be available once the facility is completed which is scheduled for July 2008.

A copy of the CERCLA AR records collection will be stored at the MUEF.

5.4 PUBLIC ACCESS REQUIREMENTS

Documents are made available to the public. A public reading room is currently located at the Delta Building, 10995 Hamilton-Cleves Highway, Harrison, OH 45030, but will be relocated on site at the MUEF, which is scheduled for completion in fall 2007. A copy of the CERCLA AR will be stored at this location. The CERCLA AR will be available in both paper copy and digitized formats. The electronic version of the AR will be available on the Fernald LM website by September 2007.

Administrative Record documents for the Fernald closure site will be scanned into industry-standard searchable Adobe Acrobat portable document file (PDF) format for viewing over the Internet. Document meta-data is stored in a FileMaker Pro database. The database also contains pointers to the PDF images of the documents.

Features of the pubic access website include a search engine that allows the user to search by document number, document date, document type, document title, description and site. Additionally, the user can search for text contained within the document. Search results can be sorted by document number, document date or document type. Document content is displayed using the Adobe Acrobat Reader software. The CERCLA AR will be updated as new documents are created.

REFERENCES

Fernald Citizens Advisory Board (FCAB), 2002, "Telling the Story of Fernald – Community-Based Stewardship and Public Access to Information," The Perspectives Group, Alexandria, VA, October.

Florida International University (FIU), 2002, "2006 and Beyond: Defining Long-Term Stewardship Requirements at Fernald," Florida International University, Miami, FL, November.

GeoSyntec, 2006, "Work Plan for Removal and In-place Abandonment of the OSDF Cell 1 Final Cover Monitoring system", prepared for Fernald Closure Project, Doe , Fernald Area Office, Cincinnati, OH, March.

GeoSyntec, 1997, "Final Design Calculation Package; On-site Disposal Facility," Volume I, Revision 0, prepared for Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, May.

ICF Kaiser Consulting Group, 1998, "Managing Data for Long-Term Stewardship," Working Draft, prepared for Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, March.

U.S. Department of Energy (DOE), 2006a, "Operations and Maintenance Master Plan for the Aquifer Restoration and Wastewater Project," 2505-OM-001, Revision 3, Final, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006b, "Post-Closure Care and Inspection Plan; On-site Disposal Facility," 20100-PL-010, Revision 3, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006c, "Groundwater/Leak Detection and Leachate Monitoring Plan; On-site Disposal Facility," 20100-PL-009, Revision 2, Final, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006d, "Integrated Environmental Monitoring Plan," 2505-WP-0022, Revision 4, Final, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006e, "Community Involvement Plan", Office of Legacy Management, June2006.

U.S. Department of Energy (DOE), 2005a, "Use of Institutional Controls," DOE P 454.1, Washington, D.C., October.

U.S. Department of Energy (DOE), 2005b, "Environmental Protection Program," DOE Order 450.1, Change 1, Washington, D.C., January.

U.S. Department of Energy (DOE), 2003, "Radiation Protection of the Public and the Environment," DOE Order 5400.5, Change 2, Washington, D.C., January.

U.S. Department of Energy (DOE), 2002, "Natural Resources Restoration Plan," Draft Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH.

U.S. Department of Energy (DOE), 2001a, "Radioactive Waste Management" DOE Order 435.1, Chg. 1, Washington, D.C., August.

REFERENCES
(Continued)

U.S. Department of Energy (DOE), 2001b, "A Report to Congress on Long-Term Stewardship," Volumes I and II, R-01-025, DOE, Office of environmental Management, Office of Long-Term Stewardship, January.

U.S. Department of Energy (DOE), 2001c, "Explanation of Significant Differences for Operable Unit 5," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, October.

U.S. Department of Energy (DOE), 2000a, "Long-Term Stewardship Study," Volumes I and II, Final Study, DOE, Office of Environmental Management, Office of Long-Term Stewardship, October.

U.S. Department of Energy (DOE), 2000b, "Memorandum: Long-Term Stewardship 'Guiding Principles,'" DOE, Ohio Field Office, Miamisburg, OH.

U.S. Department of Energy (DOE), 2000c, "Institutional Controls in RCRA and CERCLA Response Actions at Department of Energy Facilities," DOE/EH-413-0004, DOE, Office of Environmental Policy and Guidance, August.

U.S. Department of Energy (DOE), 1999a, "From Cleanup to Stewardship – A Companion to 'Accelerating Cleanup: Path to Closure' and Background Information to Support the Scoping Process Required for the 1998 PEIS Settlement Study," DOE, Office of Environmental Management, October.

U.S. Department of Energy (DOE), 1999b, "The Long-Term Control of Property: Overview of Requirements in Orders DOE 5400.1 and DOE 5400.5," Information Brief, EH-412-0014/1099, DOE, Office of Environmental Policy and Guidance, October.

U.S. Department of Energy (DOE), 1998a, "Historical Documentation of the Fernald Site and Its Role within the U.S. Department of Energy's Weapon Complex," Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH.

U.S. Department of Energy (DOE), 1998b, "Historical Documentation of Facilities and Structures at the Fernald Site," 20900-RP-0002, Revision 0, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, January

U.S. Department of Energy (DOE), 1998c, "Environmental Assessment for Proposed Final Land Use at the Fernald Environmental Management Project," Revision 1, DOE, Fernald Area Office, Cincinnati, OH, July.

U.S. Department of Energy (DOE), 1998d, "Site-wide Excavation Plan," 2500-WP-0028, Revision 0, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, July.

U.S. Department of Energy (DOE), 1996a, "Information Management Program," DOE Order 200.1, Washington, D.C., September.

U.S. Department of Energy (DOE), 1996b, "Land and Facility Use Planning," DOE Policy 430.1, Washington, D.C., July.

U.S. Department of Energy (DOE), 1996c, "Final Record of Decision for Remedial Actions at Operable Unit 5," 7478 U-007-501.4, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, January.

VOLUME II

FERNALD LEGACY MANAGEMENT
Future Use

LAND USE

- 395 acres of Woodlots
- 332 acres of Prairie
- 120 acres of OSDF
- 81 acres of Wetlands
- 60 acres of Open Water
- 33 acres of Savanna
- 29 acres of Infrastructure

Figure 1

Fluor Fernald

Graphic # 8131.23-1 11/06

2.0 CONTROLS TO ELIMINATE DISTURBANCE AND MONITOR USE OF THE FERNALD SITE

2.1 FERNALD SITE

The primary institutional controls for disturbance and use of the general Fernald site include continued federal ownership, real estate restrictions (if necessary), and preventing unauthorized use of the Fernald site with access controls and inspections. The institutional controls for disturbance and use of the Fernald site are summarized in Table 2-1.

2.1.1 Proprietary Controls and Points of Contact

Proprietary controls are those controls that originate from the responsibilities associated with the ownership of property. These controls are established to ensure that the Fernald site remains in a configuration consistent with the designated land use and ensuring unauthorized uses do not occur. In the case of the Fernald site, the federal government will maintain ownership, as stated in the OU2 ROD (DOE 1995). Primary and secondary points of contact have been established for emergency purposes, to ensure authorized access, and to ensure open communication (refer to Appendix C). In the event of an on-site emergency, the observance of unacceptable behavior, or if someone has questions, the points of contact should be contacted.

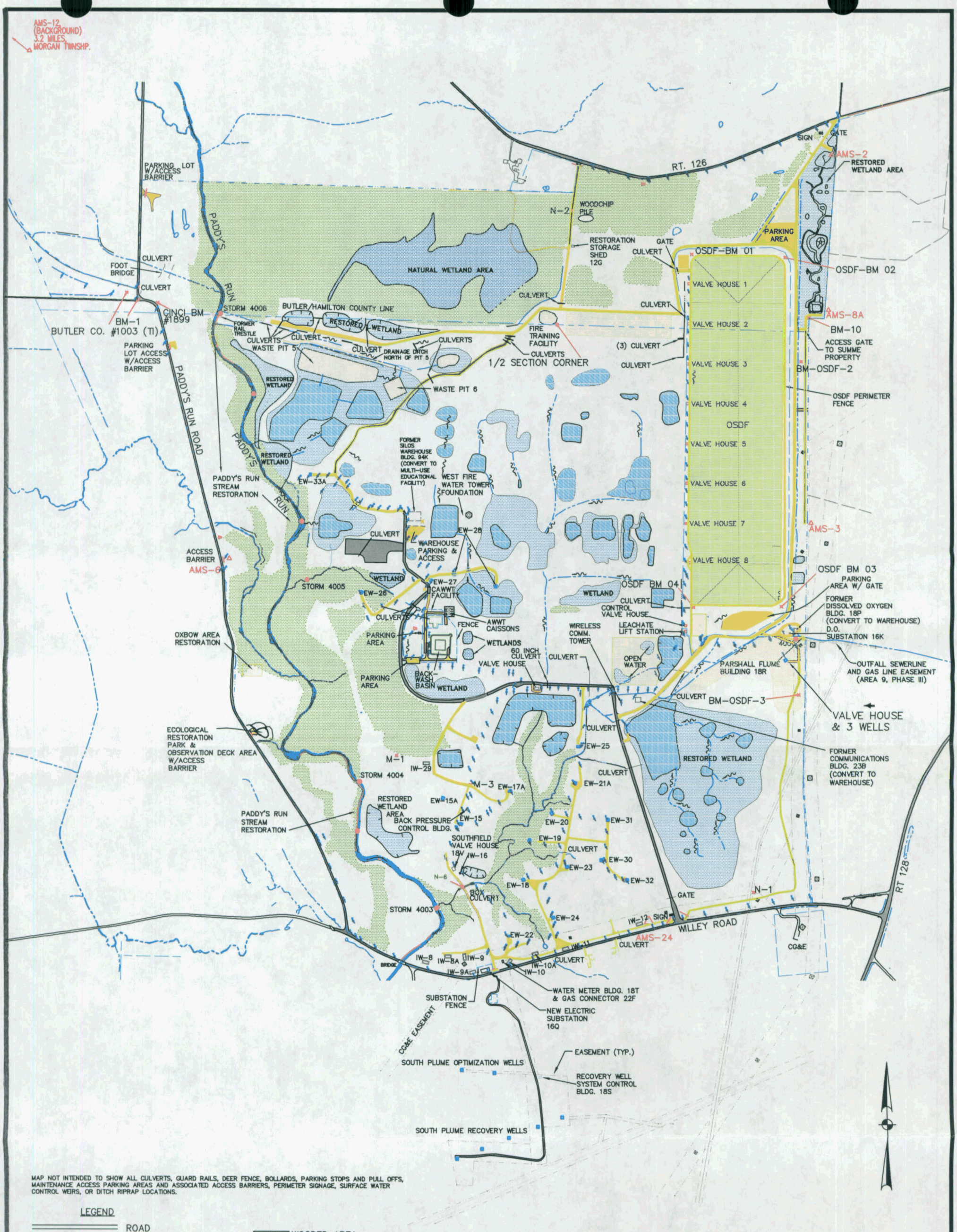
The following list of actions are prohibited to ensure ongoing protection of the site and for anyone using the site. Prohibited actions will be clearly posted at site access points. The following list applies to all unauthorized personnel.

- No alcohol or illegal drugs.
- No firearms
- No removal or intentional damage of plants.
- No mushroom gathering.
- No soil excavation.
- No removal or intentional damage of archaeological materials.
- No swimming or wading.
- No camping.
- No hunting, trapping, or fishing.
- No dumping.
- No smoking in prohibited areas, fires or other open flames.
- No tampering, manipulating or damage of structures, fences, signs, water control devices, or other federal property.
- Stay on designated roadways.

An interim residual risk assessment is being performed to evaluate post-closure risks associated with the site. The risk assessment has two phases. Phase I focuses on the development of a GIS based risk assessment tool to evaluate the final land use receptors identified in the OU5 ROD (i.e., undeveloped park user, expanded trespasser, and off-site farm resident) using certification data presently available and updated caner slope factors (CSFs) and reference doses (RfDs). Additionally recreational scenarios, such as hunting, fishing and camping, may be examined as an information only exercise, but there is no requirement to include these additional scenarios in the interim residual risk assessment report produced under Phase II. The risk tool will be used by Legacy Management to evaluate future risk scenarios at the site as groundwater remediation continues and, ultimately, to perform the final risk assessment when the OU5 remedial actions are complete.

TABLE 2-1
CONTROLS ON DISTURBANCE AND USE OF THE FERNALD SITE

CONTROL	REQUIREMENT	FREQUENCY	SCOPE
PROPRIETARY CONTROLS 1. Establish points of contact	1. DOE legacy management guidance	1. Initially and when updates are needed	1. Provide primary and backup points of contact for emergencies. Points of contact will be updated in the Legacy Management Plan as needed. The Office of Legacy Management 24-hour emergency line is 877-695-5322.
2. Ownership	2. OU2 ROD OU5 ROD DOE legacy management guidance	2. NA	2. Federal government will maintain ownership of site property. Management will transition from the DOE Office of Environmental Management to the DOE Office of Legacy Management.
GOVERNMENTAL CONTROLS 1. Notations on land records or real estate restrictive license	1. OU2 ROD OU5 ROD	1. Annual verification	1. If management of portions of the Fernald site (outside of the disposal facility area) is transferred to another federal entity at any time, all zoning and real estate restrictions will be communicated to the appropriate parties, and proper notifications will be provided as required.
PREVENTING UNAUTHORIZED USE OF THE FERNALD SITE 1. Informational devices	1. OU2 ROD OU5 ROD	1. NA	1. Information Devices • A MUEF will provide information on site remediation, site restrictions, ongoing maintenance and monitoring, and residual risk information. • In order to maintain the integrity of the site, access may need to be limited or restricted in some areas. Signs indicating restricted access will require monitoring and maintenance to ensure their legibility and integrity.
2. Security of the site	2. OU2 ROD OU5 ROD	2. Daily	2. Security • There will be routine patrols of the Fernald site and perimeter postings to prevent unauthorized access and use of the site. • Site facilities and structures will be locked when personnel are not present during non-business hours. • Some site facilities and structures will be fenced and locked at all times and only authorized access will be permitted
3. Routine Site Inspections	3. OU2 ROD OU5 ROD	3. Quarterly	3. Formal inspections will be conducted to ensure infrastructure, signs/posting, fences/gates, perimeter areas, and access points are in a secure and safe configuration per Fernald Site Areas Post-Closure Inspections Checklist (refer to Appendix D).



MAP NOT INTENDED TO SHOW ALL CULVERTS, GUARD RAILS, DEER FENCE, BOLLARDS, PARKING STOPS AND PULL OFFS, MAINTENANCE ACCESS PARKING AREAS AND ASSOCIATED ACCESS BARRIERS, PERIMETER SIGNAGE, SURFACE WATER CONTROL WEIRS, OR DITCH RIPRAP LOCATIONS.

LEGEND

- ROAD
- PROPERTY LINE
- WET LANDS
- EDGE OF CREEK
- FENCE LINE
- EASEMENT
- WATER FLOW
- PONDS/WETLANDS
- TRANSMISSION TOWER
- TREE LINE
- EXTRACTION WELL HOUSE
- POLE
- AIR MONITORING STATION
- N-1 GPS BENCH MARK
- STORM 4006 REGULATED STORMWATER OUTFALLS
- IW-11 INJECTION WELL (WELL & CASING ONLY TO REMAIN)
- EMERGENCY WARNING SIREN
- ACCESS BARRIER
- FIRE HYDRANT

- WOODED AREA
- PONDED WATER
- GRAVEL ROADS/PARKING AREAS
- ASPHALT ROADS
- UNIMPROVED "PATH-LIKE" ROADS
- ON SITE DISPOSAL FACILITY
- NATURAL WETLAND AREA
- RESTORED WETLAND AREA
- CLEAN FOUNDATIONS LEFT IN PLACE
- ADDITIONAL AREAS WHERE BALLAST AND STONE IS SUBSURFACE WITH VEGETATIVE COVER EXCEPT IN RAPARIAN AREAS

400 200 0 800

400 800

SCALE: 1"=400'

GPS BENCH MARK LOCATION PLAN

MONUMENT	DESCRIPTION	NORTHING	EASTING	ELEVATION	SURVEY
BM-1	(ESTAB.) SITE ORIGIN (0,0)	482813.982	1345109.041	579.83	WOOLPERT
M-1	FLY AS PILE	478237.93	1347705.20	573.62	WOOLPERT
M-3	FLY AS PILE	477948.929	1348451.099	577.41	WOOLPERT
N-1	ALUMINUM CAPPED PIN	476876.20	1351301.43	607.88	WOOLPERT
N-6	ALUMINUM CAPPED PIN	476926.55	1348369.88	551.99	WOOLPERT
BM 1003	BUTLER CO.	482867.97	1345001.20	579.93	WOOLPERT
BM 1899	CITY OF CINCINNATI	482781.79	1345309.62	579.06	WOOLPERT
1/2 SECTION CORNER	HAMILTON COUNTY				
1/2 SECTION CORNER	HAMILTON COUNTY				
BM-10	U.S. AEC	482637.962	1351857.178	615.88	WOOLPERT
BM-OSDF-2	ON-SITE DISPOSAL FAC.	482199.937	1351779.165	615.82	B.L. PAYNE
BM-OSDF-3	ON-SITE DISPOSAL FAC.	478850.416	1351749.328	595.61	B.L. PAYNE
BM-OSDF-5	ON-SITE DISPOSAL FAC.	483297.439	1351145.734		

FIGURE 2
FERNALD LEGACY MANAGEMENT SITE CONFIGURATION

SCALE: 1"=400'
DATE: 9-9-2004
REVISED: 11-29-2006

TECUMSEH SURVEYING, INC.
4948 CINCINNATI-BROOKVILLE ROAD SHANNON, OHIO 45013
TELEPHONE: 513.738-2134, FAX: 513.738-2756

TABLE 2-2
CONTROLS ON DISTURBANCE AND USE OF THE OSDF

CONTROL	REFERENCE	REQUIREMENT	FREQUENCY	SCOPE
PROPRIETARY CONTROLS				
1. Establish points of contact	1. PCCIP	1. OAC 3745-27-11(B)(3) OAC 3745-66-18(c)(3) OAC 3745-68-10 40 CFR Sec. 258.61(c)(2) 40 CFR Sec. 265.118(c)(3) 40 CFR Sec. 264.118(b)(3)	1. Initially and when updates are needed	1. Provide primary and backup points of contact to ensure authorized and emergency access. Points of contact are provided in Table 4-2 of the PCCIP. Updates will be provided as needed. The Office of Legacy Management 24-hour emergency number is 877-695-5322.
2. Ownership	2. PCCIP	2. OU2 ROD OU5 ROD	2. NA	2. The federal government will maintain property ownership of the area comprising the OSDF and associated buffer areas. Management will transition from the DOE Office of Environmental Management to the DOE Office of Legacy Management.
GOVERNMENTAL CONTROLS				
1. Notations on land records or real estate restrictive license	1. PCCIP	1. OU2 ROD OU5 ROD	1. Annual review	1. If in place, verify on an annual basis real estate restrictions are still in place. Restrictions will be provided in the deed, and proper notifications will be provided as required.
PREVENTING UNAUTHORIZED ACCESS TO THE OSDF				
1. Informational devices	1. PCCIP	1. OU2 ROD	1. Quarterly	1. Signs and postings will include information on restrictions, access information, contact information, and emergency information.
2. Engineered barriers	2. PCCIP	2. OU2 ROD	2. Quarterly	2. Access to the OSDF will be physically restricted by means of fences, gates, and locks.

Signs on the access gates to the OSDF contain slightly different information. The gate signs contain the following information:

- 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 local DOE telephone number and a 24-hour DOE emergency telephone number (this same 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).

Final configuration for the OSDF includes monuments installed at the corners of the engineered disposal facility, and markers placed on the top and the east and west toes of the cell caps indicating the boundaries between the cells. The corner monuments consist of concrete cylinders 12" in diameter and 48" long. They will be installed to a depth of 42" with 6" of concrete remaining above the surface. A brass plate with pertinent identification and location information will be flush-mounted to the top surface of the concrete. The individual cell markers will be brass plates with pertinent identification and location information attached to a brass rod and flush-mounted to the ground surface.

3.1.3 Groundwater Remedy and Monitoring

The Institutional Controls to preclude the use of groundwater in the off-property area where groundwater contamination is greater than the 30 ppb uranium final remediation level consist of:

1) The DOE funded public water system, which provided an alternate water supply for residents in the areas affected by groundwater contamination from the Fernald Site.
2) The Hamilton County water well permitting process. Drinking water wells cannot be installed until a permit has been obtained from the Hamilton County Health Department. DOE will ensure that the Health Department is aware of the off-property areas where groundwater contamination is greater than 30 ppb uranium. DOE has sent a letter and map documenting the contaminated area to the Hamilton County Health Department and request that no permits be issued in this area given the contamination and the ongoing aquifer remediation (DOE 2006i). Additionally, the letter requests that DOE be notified of any proposed drilling activities in the vicinity of the plume. If DOE is made aware of any drilling activities in the area of the off-site plume the Regulators must be notified.
3) Daily well field operational inspections and routine groundwater sampling. Operational personnel will be making daily rounds of the South Plume well field and will be instructed to notify management of any unusual activity in the area (e.g. well drilling). Groundwater sampling personnel will also be in area of the South Plume for routine groundwater monitoring and will also be instructed to notify management of any unusual activities.

Aquifer restoration operations and maintenance activities are part of an ongoing remedial action governed by the OU5 ROD. The requirements for the operations and maintenance activities are outlined in the OMMP (DOE 2006a) (refer to Attachment A). The OMMP, as originally written, defines the operating philosophy for the extraction and re-injection treatment systems (re-injection is not being used at this time); establishment of operational constraints and conditions for given systems; and the establishment of the process for reporting and instituting corrective measures to address exceedances in discharge limits. How to address exceptional operating conditions is also addressed.

Section 2.0 of the OMMP discusses the general commitments of the aquifer restoration. Provided are details regarding the aquifer cleanup levels, discharge limits, groundwater treatment capacity, groundwater treatment decisions, extraction rates and injection rate and quality (although injection is no longer used).

Section 3.0 of the OMMP goes into more specific detail about the design of the groundwater remediation systems, well field designs, and pump details. Section 4.0 discusses the projected flow during remediation activities. Section 5.0 discusses the Operations Plan, Section 6.0 discusses Operations and Maintenance, and Section 7.0 discusses Roles and Responsibilities. Sections 6.0 and 7.0 provide information that pertains directly to institutional controls.

Groundwater will be treated to help meet uranium discharge limits specified in the OU5 Record of Decision until discharge limits can be achieved by blending untreated water alone. Eliminating groundwater treatment will not be pursued: 1) at the expense of compromising mass removal; or (2) if significant deviation from desired aggressive pumping rates is required. The CAWWT will undergo D&D once it has been documented to EPA and OEPA that the facility is no longer needed to meet uranium discharge limits.

When the groundwater remedy has been certified complete by the DOE (which is defined in the Fernald Groundwater Certification Plan (DOE 2006g)) and approved by the U.S. EPA, well field infrastructure will be decommissioned and dispositioned. All needed soil excavation and certification associated with

the D&D of the CAWWT and removal of well field infrastructure will be in accordance to Site Wide Excavation Plan Requirements.

Post-remedy long-term groundwater monitoring will be conducted. Requirements are defined in the Fernald Groundwater Certification Plan and will be implemented through the IEMP (Attachment D of the LMICP). Post remedy long term groundwater monitoring will be evaluated as part of the CERCLA five-year reviews.

3.2 OSDF

Institutional controls are necessary for the OSDF and its buffer area to ensure the prevention of human and environmental exposure to residual contaminants. Further details about these controls are discussed below and are included in Table 3-2. Details regarding OSDF inspection and maintenance are included in the PCCIP (Attachment B). The OSDF was constructed to permanently contain impacted materials derived from the remediation of the OUs at the Fernald site. All material placed in the OSDF was required to meet pre-established WAC. The WAC are presented in Table 3-1 of the PCCIP. Table 3-2 of the PCCIP provides a description of the types of material or material categories that were allowed in the OSDF. The design and construction of the OSDF is described in Section 3.0. Section 4.0 of the PCCIP discusses the institutional controls for the OSDF, which have been included and summarized in this IC Plan. Table 4-1 of the PCCIP shows institutional controls for the OSDF as they were identified in the OU2 and OU5 RODs.

Section 5.0 of the PCCIP discusses environmental monitoring activities that are necessary to continue during the post-closure care period, including air monitoring, groundwater monitoring, and other media (i.e., surface water, vegetation, etc.).

Section 6.0 addresses routine inspections, which are important institutional controls. Section 3.2.1 of this IC Plan addresses these inspections in detail.

Also addressed in the PCCIP are unscheduled inspections (Section 7.0), custodial monitoring and contingency repairs (Section 8.0), and emergency notifications (Section 10.0).

3.2.1 OSDF Inspection and Maintenance

DOE will conduct inspections and maintenance on the cap and cover system. Inspections will be conducted on a quarterly basis for a period of two years following the completion of cells 7 and 8. The frequency of inspections will be re-evaluated following the two years of quarterly monitoring. Custodial and preventative maintenance and unscheduled inspections will be conducted as needed. Table 3-2 of this IC Plan provides current details on the required inspection and maintenance.

Routine inspections include monitoring the health of the vegetative cover; the presence of deep-rooted woody species; the existence of burrowing animals; the extent of surface erosion or cracking; subsidence, if any; extent of any leachate seeps; integrity of runoff controls; and integrity of benchmarks. If determined necessary or appropriate, the frequency of the routine inspections may be revised through the CERCLA five-year reviews. Routine custodial maintenance includes upkeep of the vegetative cover; general mowing; clearing of debris and woody plants, and reseeding.

Under CERCLA, a review of the remedy at sites where some level of contaminants is left such that use of the site is limited is required every five years. The CERCLA five-year reviews at the Fernald site will focus on the protectiveness of the remedies associated with each of the five OUs. Also included will be summaries of the inspections conducted for the OSDF, the CAWWT facility, the groundwater restoration system, and the active outfall line to the Great Miami River. To facilitate the review, a report addressing the ongoing protectiveness of the remedies will be prepared and will be submitted to the U.S. EPA and OEPA. The institutional controls portion of the report will include the data collected from monitoring and sampling; summaries of the inspections conducted of the Fernald site and OSDF site and cap during the five-year period; and a discussion on 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.

5.2 PUBLIC INVOLVEMENT

The public played a very important role in the remediation process at the Fernald site and stakeholders remain very involved in legacy management. DOE has written the CIP (Attachment E) to document how DOE will ensure the public's continued involvement in a wide variety of site related decisions and activities, including post-closure monitoring. The CIP is a CERCLA required document, replacing the current Community Relations Plan, also required under CERCLA. Although the CIP contains all of the requirements for public involvement under CERCLA, it also includes DOE's policy for public involvement, which extends beyond CERCLA requirements. Therefore, the CIP clearly identifies those elements that are not enforceable elements.

Various stakeholder groups meet on a regular basis with Fernald site employees for updates on the latest activities at the site. DOE also holds regularly scheduled meetings with these groups and the public to share current site information (progress updates). The stakeholders and the public will remain involved in legacy management activities, and will continue to play an active role in helping DOE make critical legacy management decisions.

5.2.1 Current Public Involvement via Groups and Organizations

Several groups followed the remediation and cleanup process at the Fernald site, including the Fernald Citizens Advisory Board (FCAB), Fernald Residents for Environmental Safety and Health (FRESH), and the Fernald Living History Project. The FCAB was formed to formulate cleanup policy and to help guide the cleanup activities at the site. Representatives, including local residents, governments, businesses, universities, and labor organizations, comprised the advisory board membership. In 1995, the FCAB issued recommendations to DOE on remedial action priorities, cleanup levels, waste disposition alternatives, and future uses for the Fernald site property. The FCAB was actively involved in the final remediation and restoration activities for the Fernald site with monthly full board meetings and meetings of the FCAB Stewardship Committee.

The FCAB had co-sponsored (with FRESH, the Community Re-use Organization, and the Fernald Living History Project) four "Future of Fernald" workshops. The workshops were open to the public and gave stakeholders the opportunity to provide input on the final public-use decisions as described in the Master

Plan for Public Use of the FEMP (DOE 2002). The later workshops led to the recommendation for a Multi-use Education Facility at the site.

The FCAB also worked with the Natural Resource Trustees and DOE to assist in the development of the Legacy Management Plan. As mentioned in previous sections, the future use and amenities at the site are directly tied to the degree of legacy management that will be necessary. DOE worked closely with the FCAB, until September 2006 when the FCAB held their final meeting.

FRESH was formed by local residents in 1984 and has played an important role in providing community input on the characterization and remediation of the Fernald site.

A list of other stakeholders considered to be critical for legacy management planning at the Fernald site is given below. Additional stakeholders may be identified in the future.

- Local government and enforcement agencies
- Local volunteer organizations
- Local residents
- Universities
- Local school groups
- Environmental organizations
- Native American Tribes
- Native American organizations
- NRTs – Natural Resource Trustees
- Regulatory Agencies
- Fernald Living History, Inc.
- Crosby Township Historical Society
- Local businesses

5.2.2 On-going Decisions and Public Involvement

The following decisions will receive ongoing consideration during legacy management as appropriate.

- Continued evaluation of the regulatory requirements that drive legacy management activities at the Fernald site. The database developed by Florida International University (FIU 2002) is a starting point in the identification of applicable requirements, but additional review and decision-making is still required.
- The design of the MUEF and its contents needed to provide site information to the public and support institutional controls.

Input on future legacy management planning decisions will occur through formal document reviews, community meetings, roundtables, workshops, and other forums. Currently, DOE holds quarterly briefings for interested stakeholders. DOE anticipates continuing these updates using a similar forum/format throughout legacy management. The CIP (Attachment E) also discusses methods of reporting to the public.

REFERENCES

Florida International University (FIU), 2002, "2006 and Beyond: Defining Long-Term Stewardship Requirements at Fernald," Florida International University, Miami, FL, November.

U.S. Department of Energy (DOE), 2006a, "Operations and Maintenance Master Plan for the Aquifer Restoration and Wastewater Project," 2505-OM-001, Revision 3, Final, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006b, "Post-Closure Care and Inspection Plan; On-site Disposal Facility," 20100-PL-010, Revision 4, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006c, "Groundwater/Leak Detection and Leachate Monitoring Plan; On-site Disposal Facility," 20100-PL-009, Revision 3, Final, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006d, "Integrated Environmental Monitoring Plan," 2505-WP-0022, Revision 5A, Draft Final, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006e, "Community Involvement Plan," Office of Legacy Management, Final, Revision 2, June.

U.S. Department of Energy (DOE), 2006f, "Second Five-Year Review Report for the FCP," 2500-RP-0044, Revision B, Draft, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, March.

U.S. Department of Energy (DOE), 2006g, "Fernald Groundwater Certification Plan," Fluor Fernald, DOE Fernald Area Office, Cincinnati, OH, April.

U.S. Department of Energy (DOE), 2006h, "Fernald Project Health and Safety Plan," DOE-LM/1324-2006, Revision 1, S.M. Stoller Corporation, Grand Junction, CO, September.

U.S Department of Energy (DOE), 2006i, DOE-0184-06, Letter to Hamilton County General Health District, August

U.S. Department of Energy (DOE), 2002, "Master Plan for Public Use of the Fernald Environmental Management Project," 20900-PL-0002, Revision A, Draft, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, February

U.S. Department of Energy (DOE), 2001a, "Explanation of Significant Differences for Operable Unit 5," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, October.

U.S. Department of Energy (DOE), 2000, "Institutional Controls in RCRA and CERCLA Response Actions at Department of Energy Facilities," DOE/EH-413-0004, DOE, Office of Environmental Policy and Guidance, August.

U.S. Department of Energy (DOE), 1998a, "Waste Acceptance Criteria Attainment Plan for the On-site Disposal Facility," 20100-PL-0014, Revision 0, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH June.

U.S. Department of Energy (DOE), 1998b, "Site-wide Excavation Plan," 2500-WP-0028, Revision 0, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, July.

U.S. Department of Energy (DOE), 1996, "Final Record of Decision for Remedial Action at Operable Unit 5," 7478 U-007-501.4, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, January.

U.S. Department of Energy (DOE), 1995, "Final Record of Decision for Remedial Actions at Operable Unit 2," 7021 U-004-501.3, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, May.

U.S. Environmental Protection Agency (EPA), 2000, "Institutional Controls: A Site Manager's Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups," U.S. EPA 540-F-00-005, OSWER 9355.0-784FS-P, U.S. EPA, Office of Solid Waste and Emergency Response, September.

APPENDIX C

FERNALD SITE CONTACT INFORMATION

FERNALD SITE CONTACT INFORMATION

EMERGENCY CONTACT

Grand Junction 24-hour Monitored Security Telephone Number
877-695-5322

Fernald Site Emergency Telephone Number
911 or 877-695-5322

Fernald OSDF Emergency Telephone Number
911 or 877-695-5322

OFFICE OF LEGACY MANAGEMENT – FERNALD

Site Manager
Jane Powell
Department of Energy
Office of Legacy Management
513-648-3148
www.lm.doe.gov

OFFICE OF ENVIRONMENTAL MANAGEMENT – FERNALD

Director
Johnny Reising
Department of Energy
Office of Environmental Management
Fernald Field Office
513-648-3139
www.fernald.gov

ENVIRONMENTAL AGENCIES

Remedial Project Manager
United States Environmental Protection Agency
Region V, SR-6J
77 West Jackson Boulevard
Chicago, IL 60604-3590
(312) 886-0992

Fernald Project Coordinator
Ohio Environmental Protection Agency
401 East Fifth Street
Dayton, OH 45402-2911
(937) 285-6357
www.epa.state.oh.us

United States Fish and Wildlife Service
Suite H
6950 American Parkway
Reynoldsburg, OH 43068

FERNALD SITE COMMUNITY INVOLVEMENT COORDINATOR

Stakeholder Relations Specialist
Susan Walpole
S.M. Stoller, Corp.
513-648-4026

LOCAL POLICE AUTHORITY

Crosby Township/Hamilton County Police
Administration Office
513-825-1500

Morgan Township/Butler County Police
Administration Office
513-887-3010

Note: This information will be updated as necessary.

ATTACHMENT A
OMMP

TABLE 3-1
WELL FIELD OPERATING STATUS

Module	Operations Identification	SED Identification	Date of Initial Operation	Current Status	Notes
South Plume	RW-1	3924	08/27/93	Active	
South Plume	RW-2	3925	08/27/93	Active	
South Plume	RW-3	3926	08/27/93	Active	
South Plume	RW-4	3927	08/27/93	Active	
South Plume	RW-5	3928	08/27/93	Inactive	Turned off 9/11/94, not needed
South Plume	RW-6	32308	08/09/98	Active	
South Plume	RW-7	32309	08/09/98	Active	
SouthField	EW-13	31565	07/13/98	Inactive	Turned off 5/22/01
SouthField	EW-14	31564	07/13/98	Inactive	Turned off 12/19/01
SouthField	EW-15	31566	07/13/98	Inactive	Turned off 8/7/98, replaced by EW-15A
SouthField	EW-15a	33262	07/26/03	Active	
SouthField	EW-16	31563	07/13/98	Inactive	Turned off 12/19/02, Converted to IW16
SouthField	EW-17	31567	07/13/98	Inactive	Turned off 9/6/05, replaced by EW-17A
SouthField	EW-17a	33326	09/13/05	Active	
SouthField	EW-18	31550	07/13/98	Active	
SouthField	EW-19	31560	07/13/98	Active	
SouthField	EW-20	31561	07/13/98	Active	
SouthField	EW-21	31562	07/13/98	Inactive	Turned off 3/13/03, replaced by EW-21A
SouthField	EW-21a	33298	07/29/03	Active	
SouthField	EW-22	32276	07/13/98	Active	
SouthField	EW-23	32447	02/02/00	Active	
SouthField	EW-24	32446	02/02/00	Active	
SouthField	EW-25	33061	05/07/02	Active	
SouthField	EW-30	33264	07/25/03	Active	
SouthField	EW-31	33265	07/25/03	Active	
SouthField	EW-32	33266	07/25/03	Active	
WSA	EW-26	32761	05/08/02	Active	
WSA	EW-27	33062	05/08/02	Active	
WSA	EW-28	33063	05/08/02	Inactive	Turned off 7/1/05. P&Ad
WSA	EW-28a	33334	06/29/06	Active	
WSA	EW-33	33330		Inactive	Never Installed, Location Moved
WSA	EW-33a	33347	10/05/06	Active	
Re-Injection	IW-8	22107	09/02/98	Inactive	Turned off 12/31/01
Re-Injection	IW-8A	33253	11/07/02	Inactive	Turned off 9/25/04
Re-Injection	IW-9	22108	09/02/98	Inactive	Turned off 3/1/02
Re-Injection	IW-9A	33254	11/07/02	Inactive	Turned off 9/25/04
Re-Injection	IW-10	22109	09/02/98	Inactive	Turned off 9/25/04
Re-Injection	IW-10A	33255	5/22/03	Inactive	Turned off 9/25/04
Re-Injection	IW-11	22240	09/02/98	Inactive	Turned off 9/25/04
Re-Injection	IW-12	22111	09/02/98	Inactive	Turned off 9/25/04
Re-Injection	IW-16	31563	07/27/03	Inactive	Turned off 9/25/04
Re-Injection	IW-29	33263	07/27/03	Inactive	Turned off 9/25/04
Re-Injection	Inj. Pond		07/27/03	Inactive	Turned off 9/25/04

FIGURE 3-2

ARWWT TIMELINE

Aquifer Restoration		Wastewater Treatment	
		1952	STP
		1986	BSL / HNT
		1988	SWRB
		1992	IAWWT Facility
South Plume Extraction Wells	1993		
		1994	SPIT Facility
		1995	AWWT Phases I/II
		1996	SDF
Injection Demonstration Module South Plume Optimization Module South Field Extraction Module (Phase I)	1998	1998	AWWT Resin Regeneration System New STP Operational AWWT Expansion
		1999	BSL Pump and Piping Modifications / Sludge Removal System
Waste Storage Area Module (Phase I)	2002		
South Field Extraction Module (Phase II)	2003		
Shut down well-based reinjection	2004	2004	Shut down AWWT Expansion for conversion to CAWWT – 9/04
		2005	Re-route to Leachate to SWRB – 3/05 Re-route WSA Storm Water to SWRB – 3/05 BSL is shutdown for D&D and Excavation – 3/05 Begin full-scale operation of CAWWT – 3/05 Shut down Sewage Treatment Plant for D&D and Excavation – 3/05 Shut down SDF for D&D and excavation – 3/05 Shutdown AWWT Phases I & II for selective D&D and excavation – 3-4/05 Shut down SPIT/IAWWT for D&D and excavation – 7/05 Re-route WSA Storm Water to CAWWT – 10/05 Shutdown West SWRB for D&D and excavation – 10/05
Waste Storage Area Module (Phase II) Pilot Plant Replacement Well	2006	2006	Shutdown East SWRB for D&D and excavation – 2/06 Re-route of OSDF leachate/storm water directly to CAWWT – 2/06 CAWWT Backwash Basin Operational – 2/06 OSDF capped sufficiently such that OSDF storm water can be routed to free release – 2006
		----	Transfer of site from DOE-EM to DOE-LM
		2007	Groundwater Treatment to Meet Discharge Limits Projected to End Between 2007 and 2011
		2011	
South Plume Module – Stop P&T Operations*	2015		
South Plume Module – Certified Clean	2018		
South Field Module – Stop P&T Operations*	2022		
Waste Storage Area – Stop P&T Operations*	2023		
South Plume Module – Remove Infrastructure South Field Module – Certified Clean	2025		
South Field Module – Remove Infrastructure Waste Storage Area – Certified Clean Waste Storage Area – Remove Infrastructure	2026		
Long Term Monitoring ends	2031		

Note: Certified clean dates assume best case (3.25 years)

* Stop P&T operations dates are based on modeling reported in the WSA (Phase II) design report (Approach C).

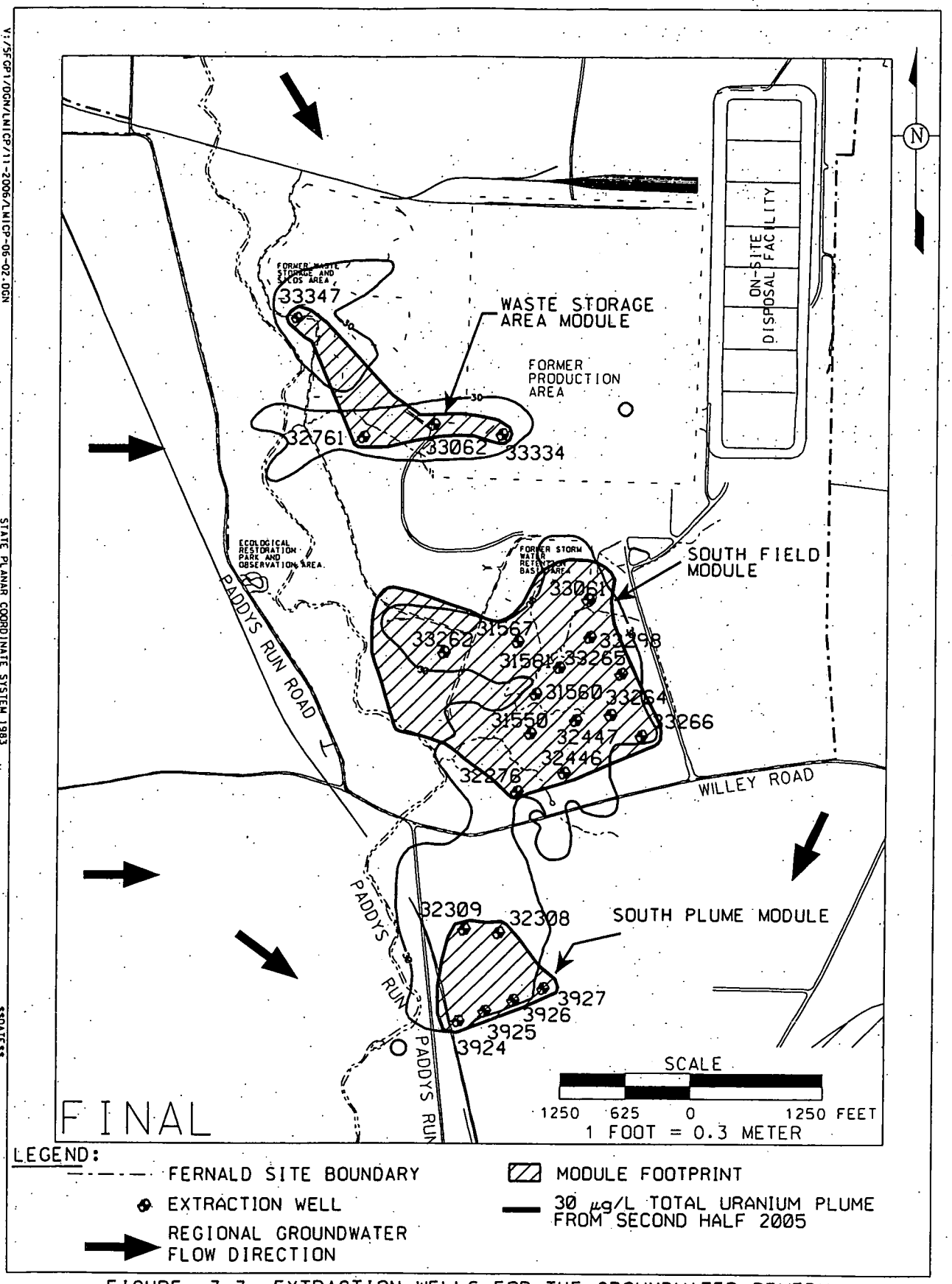


FIGURE 3-3. EXTRACTION WELLS FOR THE GROUNDWATER REMEDY

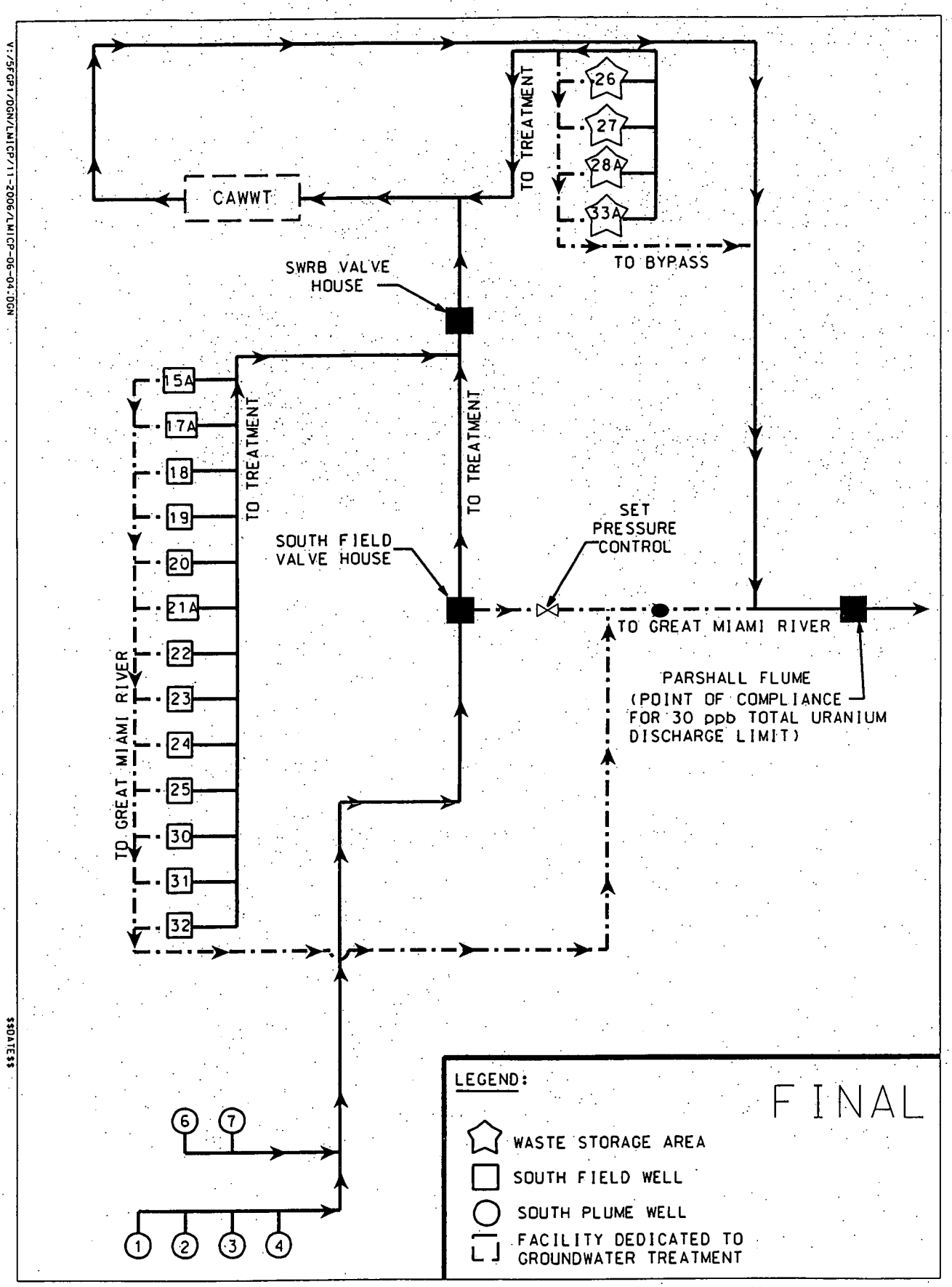
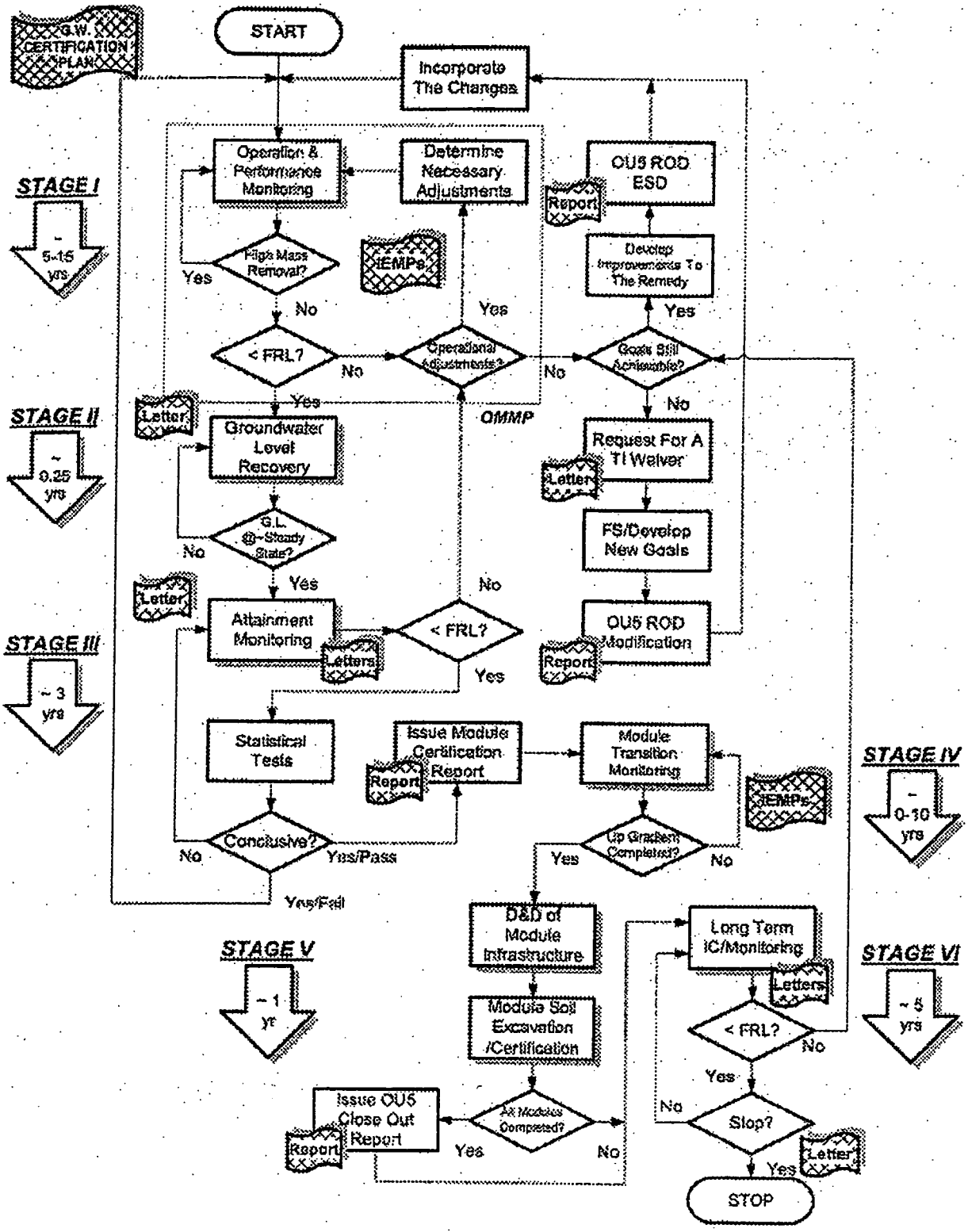


FIGURE 3-4. CURRENT GROUNDWATER REMEDIATION/TREATMENT SCHEMATIC

FIGURE 3-5 GROUNDWATER CERTIFICATION PROCESS AND STAGES



4.0 PROJECTED FLOWS

This section addresses the latest understanding of flows for groundwater and OSDF leachate.

4.1 GROUNDWATER

Extracted groundwater is the only wastewater flow requiring treatment. Groundwater extraction rates can be controlled. Groundwater flows are defined such that discharge limits at the Parshall Flume, and capture of the 30 µg/L uranium plume are achieved. The objective is to pump as aggressively as possible, without exceeding discharge limits. The individual groundwater remediation modules currently comprising the aquifer remedy are presented in Section 3.1. Figure 3-3 depicts the locations of all existing extraction wells. Table 4-1 provides the target extraction rate schedule for each of the wells currently operating. The combined modeled pumping rate is approximately 4,775 gpm.

Throughout the duration of groundwater remediation the pumping rates may be modified within system design and operational constraints, as necessary. These rate modifications will be made to maintain, to the degree possible, the aquifer restoration objectives outlined in the remedy design. An operational rate of 10% over the modeled pumping rates is being targeted to provide for anticipated and unanticipated downtime.

4.1.1 On-Site Disposal Facility (OSDF) Leachate

Leachate flow from the OSDF Project is estimated to be approximately 1 to 5 gallons per minute initially. Based on leachate yield from the Cells 1, and 2, which have been capped for more than 2 years, the total leachate flow from the entire facility is anticipated to decline to less than 1 gallon per minute by 2008. The leachate collects in the Permanent Lift Station (PLS) pump sump and from there is pumped to CAWWT for treatment.

TABLE 4-1

TARGET EXTRACTION RATE SCHEDULE

System ID	Location	Ops. Well ID	SED Well ID	Target Extraction Rates (gpm) * to 04/01/15	Target Extraction Rates (gpm) 4/01/15 to End
I	Waste Pits	WSA-1	32761	300	500
I	Waste Pits	WSA-2	33062	200	200
I	Waste Pits	WSA-4	33334	200	200
I	Waste Pits	WSA-5	33347	300	300
	System Totals	Pumped		1000	1200
II	South Field	EW-15a	33262	200	300
II	South Field	EW-17	31567	175	175
II	South Field	EW-18	31550	100	100
II	South Field	EW-19	31560	100	100
II	South Field	EW-20	31561	100	400
II	South Field	EW-21a	33298	200	300
II	South Field	EW-22	32276	300	400
II	South Field	EW-23	32447	300	400
II	South Field	EW-24	32446	300	300
II	South Field	EW-25	33061	100	100
II	South Field	EW-30	33264	200	400
II	South Field	EW-31	33265	300	400
II	South Field	EW-32	33266	200	200
	System Totals	Pumped		2575	3575
IV	South Plume	RW-1	3924	200	0
IV	South Plume	RW-2	3925	200	0
IV	South Plume	RW-3	3926	200	0
IV	South Plume	RW-4	3927	200	0
IV	South Plume	RW-6	32308	200	0
IV	South Plume	RW-7	32309	200	0
	System Totals	Pumped		1200	0
	Total Extraction *			4775	4775

*** Beginning when site transfers from DOE-EM to DOE-LM**

5.0 OPERATIONS PLAN

This section contains the operations philosophy, treatment priorities, hierarchy of decisions, management and flow of operations information, and management of treatment residuals necessary to successfully operate the groundwater extraction and treatment systems in order to achieve regulatory requirements and commitments.

5.1 WASTEWATER TREATMENT OPERATIONS PHILOSOPHY

The primary goals of wastewater treatment operations and maintenance are to: 1) meet effluent discharge requirements; 2) provide sufficient treatment capacity such that the desired groundwater pumping rates can be maintained; and 3) provide for leachate treatment. In keeping with the principles of as low as reasonably achievable, correct decisions in applying treatment are required to maximize the quantity of uranium removed from wastewater prior to its discharge to the Great Miami River. Maximizing uranium removal should result in compliance uranium discharge limits. Other regulatory discharge requirements, such as NPDES, must also be met. Influent streams to treatment and effluent streams from treatment as well as other process control sampling around specific unit operations (e.g., ion exchangers,) is completed for uranium and other appropriate constituents as necessary to provide information needed to help ensure that the goals are met. Sampling under the NPDES permit and the IEMP is performed to verify requirements and effluent limits for discharges to the Great Miami River are met.

5.2 CAWWT OPERATION

As discussed in Section 3, the only remaining treatment system is CAWWT. The effluent from this system, along with bypassed (untreated) groundwater, combine at the Parshall Flume to form the Fernald site's regulated discharge to the Great Miami River.

The priority for treatment will always be OSDF leachate and the extraction wells with the highest uranium concentrations. Groundwater sent to treatment typically contains a uranium concentration of 60 to 70 ppb. Groundwater is fed to two treatment systems at CAWWT. The 1200 gpm system treats only groundwater. The 600-gpm system treats groundwater, leachate from OSDF and water from the CAWWT Backwash Basin.

The CAWWT Backwash Basin collects backwash from all CAWWT ion exchange vessels and multimedia filters, water from the CAWWT Sump and miscellaneous water from well rehabilitations. Water from the Basin will be pumped to the 600 gpm treatment system at a flow rate adequate to ensure that the Basin level does not reach five feet. Groundwater flow to the 600 gpm system is reduced as

necessary to maintain a low level in the Basin. The Basin will maintain at least six inches of freeboard at all times.

Shift supervision is provided 12 hours per day, seven days per week, 365 days per year. As the supervisor of all operations and maintenance activities that occur on a particular shift, the shift supervisors are responsible for ensuring that treatment and monitoring equipment is operated, maintained and repaired as necessary so that maximum prioritized treatment throughput is achieved at all times. Operations and maintenance are performed in accordance with all appropriate standard operating procedures, standards, and specifications. Additionally, process engineering support personnel are on-call to provide assistance in problem solving.

5.2.1 Ion Exchange Vessel Rotation

The CAWWT ion exchange system has trains of two ion exchange vessels operating in series, lead and lag. When the ion exchange resin in both vessels is new, the majority of uranium is removed in the lead vessel. As the lead vessel becomes loaded with uranium, more passes through into the lag vessel. As the lag vessel becomes loaded, more uranium passes into the discharge stream. When the uranium concentration in the discharge from a particular ion exchange train causes the uranium concentration at the Parshall Flume to approach or exceed 30 ppb, the resin will be removed from the lead vessel and replaced with new resin. The lag vessel is moved into lead and the vessel containing new resin is place in lag

5.3 GROUNDWATER TREATMENT

CAWWT provides up to 1800 gpm treatment for groundwater. Wells are pumped to treatment or bypass as described in the next section. The setpoints at which the wells are pumped are typically set to approximately ten percent more than the target setpoint in the groundwater remedy to account for downtime.

5.3.1 Groundwater Treatment Prioritization vs. Bypassing

Treatment of groundwater well discharges are prioritized in order of uranium concentration, with the highest uranium concentration wells routed to treatment until the treatment capacity necessary to maintain the site's uranium discharge limits is utilized. Remaining well discharges are bypassed around treatment to the Parshall Flume. As shown schematically in Figure 3-4, treatment/bypass decisions for the Southfield extraction wells are made on a well-by-well basis. The existing four South Plume off-property, leading-edge wells combined with the two wells of the South Plume Optimization Project are routed as a group either for treatment, full bypass, or partial bypass since piping does not exist for well-by-well treatment/bypass decision. The off-property South Plume wells are typically routed directly to bypass at the South Field Valve House since their combined uranium concentration is very near or less than 30 ppb uranium.

5.4 WELL FIELD OPERATIONAL OBJECTIVES

Several objectives must be considered when well field operational decisions are made. These objectives are listed in Table 5-1 along with the anticipated actions required to achieve each objective. At times the objectives conflict; therefore, operational decisions are generally made by Aquifer Restoration/Wastewater Project management. Decisions from these meetings that affect wellfield operations are communicated to the EPA and OEPA in the IEMP reports. Changes in groundwater restoration well pumping set points are transmitted to shift supervisors by the ARWWP manager.

In addition to the objectives listed in Table 5-1, an annual measure of uranium concentration rebound will be conducted each year. Uranium contamination bound to aquifer sediments in the unsaturated portion of the Great Miami Aquifer has been identified under some source areas at the site. Uranium contamination bound to unsaturated aquifer sediments will remain bound unless water levels rise and saturate the sediments allowing the contamination to dissolve into the groundwater.

Annual exercises are being planned to shut down all extraction wells (with the exception of the 4 leading edge South Plume Recovery Wells) from June 15 to July 15 each year to allow water levels within the aquifer to rise. Based on evaluation of aquifer water levels collected since 1988, during June and July seasonal water levels are usually at their highest level. Shutting down the extraction wells during the same time period that seasonal water levels are high will maximize the saturation of as much of the aquifer sediments as possible. Water levels will be measured at key locations (by hand and downhole transducer/data logger) before, during and after the shutdown to record the resulting water level change. Uranium concentration in the pumped groundwater immediately after the wells are re-started will be compared to pre-shutdown concentrations to determine the amount of concentration re-bound that occurred. Shut down times are subject to change based on results of the exercise.

The well-field downtime period will also be utilized to conduct well field and water treatment system maintenance.

5.5 OPERATIONAL MAINTENANCE PRIORITIES

Maintaining the treatment facilities on line includes ensuring that all equipment is operating properly, that adequate personnel are assigned to operate the treatment systems safely, and that the combined treatment and bypassing systems are utilized to maintain uranium concentrations below 30 ppb as measured in the site effluent at the Parshall Flume. Following is a list of operational maintenance priorities in their order of importance

- Keep the Parshall Flume discharge point and sampling system on line. If the discharge monitoring system were to become non-operational, discharge monitoring of effluent to the river from the Fernald site would have to be collected manually. The sampling system must be operational so that accurate reports of uranium and NPDES contaminant levels can be made.

- Keep the CAWWT treatment trains operating at the capacity necessary to maintain compliance with the site's uranium discharge limits.

- Keep South Plume Wells 1–4 operating at desired setpoints.
- Keep all extraction wells operating at the desired setpoints.
- More specific details of managing equipment operation and maintenance are contained in Section 6.

5.6 OPERATIONS CONTROLLING DOCUMENTS

Operations at the wastewater treatment facilities are controlled directly by Standing Orders and Standard Operating Procedures contained in the Legacy Management Fernald Operating Procedures, Revision 0 (DOE 2006c). Standing Orders translate the DOE Orders, conduct of operations principles, guidelines, and procedures into performance requirements for personnel involved in operating the wastewater treatment facilities. The Standing Orders were written to ensure that all operations are conducted in full conformance with DOE conduct of operations requirements.

A more extensive discussion of Standard Operating Procedures and Standing Orders is contained in Section 6.1.2. Standing Orders and Standard Operating Procedures implement the requirements of this plan. The OMMP is not intended to replace Standing Orders or Standard Operating Procedures.

5.7 MANAGEMENT AND FLOW OF OPERATIONS INFORMATION

Samples are taken from each of the CAWWT trains on a regular basis to ensure uranium is still being removed by the resin. The results of the sample analysis are reviewed daily by project personnel to review system performance and determine if any of the treatment system ion exchange vessels need to be removed from service for resin replacement.

The project issues weekly operations reports that summarize flow rates and flow totals as well as uranium concentrations from CAWWT and the wells. Information on required well pumping rates is communicated from the manager of the Aquifer Restoration/Wastewater Project to the operations personnel via the operating orders, as specified in the Standing Orders.

5.8 MANAGEMENT OF TREATMENT RESIDUALS

Treatment residuals consist of exhausted ion exchange resin and used multimedia filter media. These materials will be disposed of offsite using a subcontractor qualified to handle radioactive materials.

South Field and Waste Storage Area Extraction Wells

The South Field and Waste Storage Area (WSA) Modules include thirteen and four wells, respectively, that are used to pump groundwater from the Great Miami Aquifer to the Fernald Site water treatment facilities or to the Great Miami River if treatment is not required to achieve discharge limitations. These wells are as follows:

Extraction Well ID	Common Well ID	Formal Site Well ID
Extraction Well 15A	EW-15A	33262
Extraction Well 17A	EW-17A	31567
Extraction Well 18	EW-18	31550
Extraction Well 19	EW-19	31560
Extraction Well 20	EW-20	31561
Extraction Well 21A	EW-21A	31562
Extraction Well 22	EW-22	32276
Extraction Well 23	EW-23	32447
Extraction Well 24	EW-24	32446
Extraction Well 25	EW-25	33061
Extraction Well 30	EW-30	33264
Extraction Well 31	EW-31	33265
Extraction Well 32	EW-32	33266
WSA Well 26	EW-26	32761
WSA Well 27	EW-27	33062
WSA Well 28A	EW-28A	33334
WSA Well 33A	EW-33A	33347

Each of the thirteen South Field and four Waste Storage Area extraction wells is of similar design with the exception of the well depth, screen length, and screen slot size. Each contains a submersible pump/motor assembly. Groundwater is pumped from the below grade pump to the wellhead at the ground surface via the vertical discharge piping. At the wellhead, this piping is routed horizontally through a magnetic flow meter and into the individual well houses. All of the individual well control components are located at these well houses.

The flow control system for each of the seventeen extraction wells is identical; flow is controlled by a flow control loop consisting of a magnetic flow meter, a process control station (PCS) and a variable frequency drive (VFD). Each extraction well can be controlled locally by the PCS or remotely by the computerized control system located at CAWWT (HMI). The normal operational mode is to have the wells operated remotely from the CAWWT computer control system, via the local PCS. Additionally, a local set point is input to the PCS so that the well can automatically revert to local control if communication with the CAWWT computer control is interrupted.

The desired flow rate set point for each extraction well is entered into the HMI and PCS at the CAWWT and the individual well houses, respectively. This value is compared continuously to the actual flow rate

measured by the magnetic flow meter. When required, the CAWWT HMI or PCS adjusts the pump motor speed via the VFD to maintain the desired flow. Pump "Start" and "Stop" can be controlled by the CAWWT HMI or the PCS and can also be controlled at the VFD.

In addition, each extraction well is equipped with isolation valves, a check valve, air releases, and a pressure-indicating transmitter. Routine water level monitoring within the well is performed during regularly scheduled performance monitoring and more frequently if required.

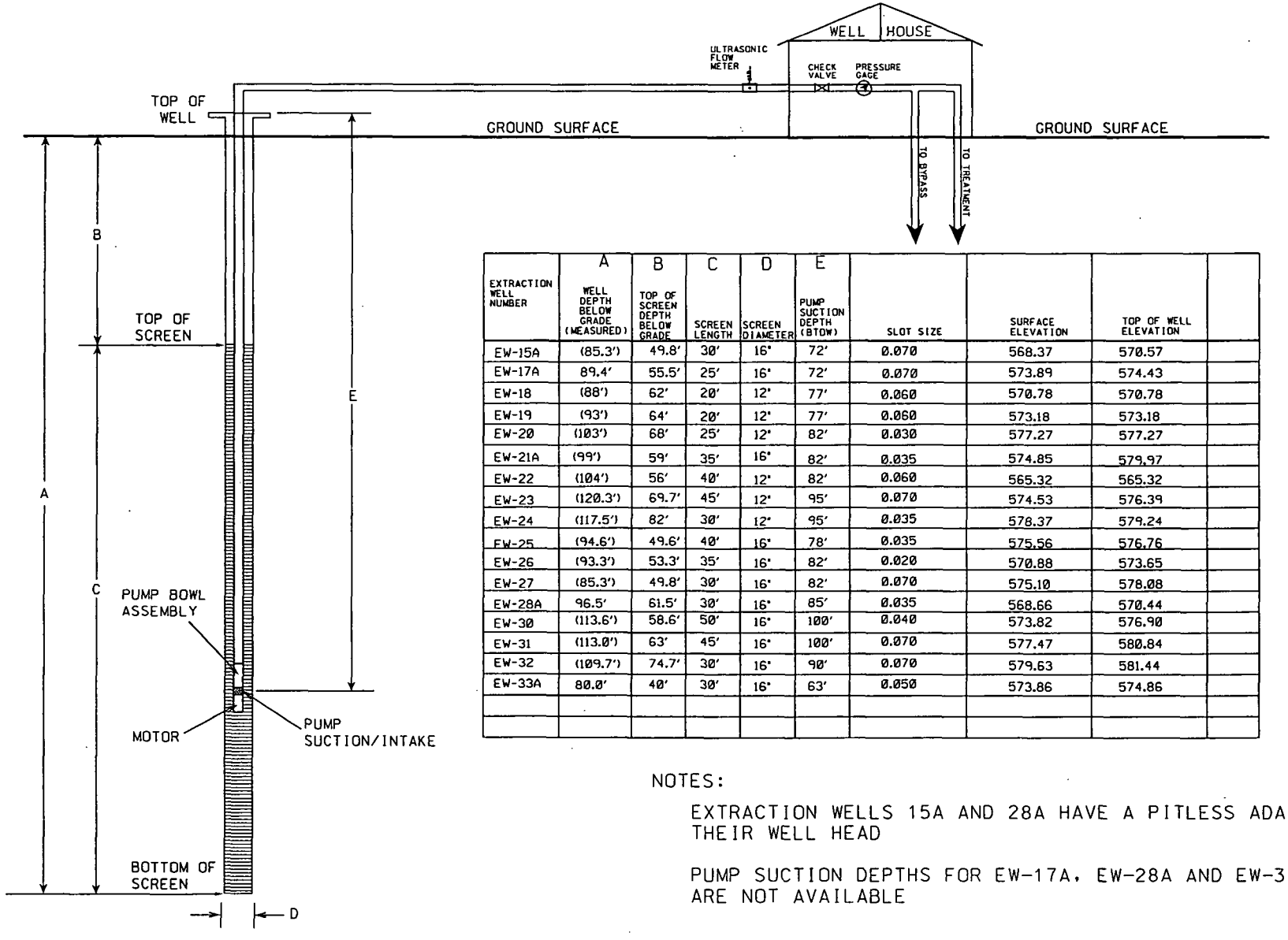
Installation details of the South Field Extraction Wells and Waste Storage Area Wells are shown in Figure 6-2.

6.2.2 Factors Affecting System Operation

The original 5 extraction wells comprising the South Plume groundwater restoration module began operating in August 1993, as part of the Operable Unit 5 South Plume Removal Action. In the intervening time period, valuable operational experience and knowledge has been gained that is being used to optimize long-term operation of extraction wells site wide. This experience base has resulted in identification of factors affecting operation life and efficiency, some of which were unknown at the start of pumping operations. These factors have either already been addressed or are incorporated into planned maintenance.

In order to better understand the factors affecting large-scale groundwater pumping operations, Moody's of Dayton, a water well maintenance and installation contractor, was consulted. Moody's has served the water well industry throughout the Great Miami Aquifer for more than 30 years and has extensive experience maintaining large-capacity wells for a number of major water supply systems. Frequencies for routine maintenance and monitoring activities were selected using input received from their evaluation of the South Plume Extraction well system and based on their experience working with systems of similar magnitude in the regional aquifer.

Several factors affect the performance of the extraction wells. In addition, a number of other specific requirements of the Fernald Site's system complicate these factors. All of these factors and requirements were considered in developing this plan. First, all the Fernald Site's extraction wells are placed in and are extracting water from the upper most portions of the Great Miami Aquifer. This fact complicates both pump/motor cooling and iron fouling of the extraction well screen. Normal water well practice would place the screened section of the well deeply in the aquifer and the pump/motor assembly would



EXTRACTION WELL NUMBER	A WELL DEPTH BELOW GRADE (MEASURED)	B TOP OF SCREEN DEPTH BELOW GRADE	C SCREEN LENGTH	D SCREEN DIAMETER	E PUMP SUCTION DEPTH (BTOW)	SLOT SIZE	SURFACE ELEVATION	TOP OF WELL ELEVATION	
EW-15A	(85.3')	49.8'	30'	16"	72'	0.070	568.37	570.57	
EW-17A	89.4'	55.5'	25'	16"	72'	0.070	573.89	574.43	
EW-18	(88')	62'	20'	12"	77'	0.060	570.78	570.78	
EW-19	(93')	64'	20'	12"	77'	0.060	573.18	573.18	
EW-20	(103')	68'	25'	12"	82'	0.030	577.27	577.27	
EW-21A	(99')	59'	35'	16"	82'	0.035	574.85	579.97	
EW-22	(104')	56'	40'	12"	82'	0.060	565.32	565.32	
EW-23	(120.3')	69.7'	45'	12"	95'	0.070	574.53	576.39	
EW-24	(117.5')	82'	30'	12"	95'	0.035	578.37	579.24	
EW-25	(94.6')	49.6'	40'	16"	78'	0.035	575.56	576.76	
EW-26	(93.3')	53.3'	35'	16"	82'	0.020	570.88	573.65	
EW-27	(85.3')	49.8'	30'	16"	82'	0.070	575.10	578.08	
EW-28A	96.5'	61.5'	30'	16"	85'	0.035	568.66	570.44	
EW-30	(113.6')	58.6'	50'	16"	100'	0.040	573.82	576.90	
EW-31	(113.0')	63'	45'	16"	100'	0.070	577.47	580.84	
EW-32	(109.7')	74.7'	30'	16"	90'	0.070	579.63	581.44	
EW-33A	80.0'	40'	30'	16"	63'	0.050	573.86	574.86	

NOTES:

EXTRACTION WELLS 15A AND 28A HAVE A PITLESS ADAPTER AT THEIR WELL HEAD

PUMP SUCTION DEPTHS FOR EW-17A, EW-28A AND EW-33A ARE NOT AVAILABLE

FINAL

NOT TO SCALE

V:/5FGP1/DGN/LMICP/11-2006/LMICP-06-06.DGN 14-NOV-2006

FIGURE 6-2. SOUTH FIELD MODULE AND WASTE STORAGE, AREA EXTRACTION WELL INSTALLATION DETAILS

ATTACHMENT B
PCCIP

1.0 INTRODUCTION

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

1.1 PLAN SCOPE AND DURATION

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

- security system (e.g., fences, gates, warning signs),
- permanently surveyed benchmarks,
- OSDF runon/runoff controls,
- OSDF final cover (referred to as the "cap"), and
- concrete and brass corner monuments.

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 11.0 (Ohio solid waste rule Ohio Administrative Code (OAC) 3745-27-14(A) in lieu of federal solid waste regulation 40 Code of Federal Regulations (CFR) §258.61(a), and Ohio hazardous waste rules OAC 3745-66-17 and 3745-68-10 in lieu of federal hazardous waste regulations 40 CFR §§265.117(a)(1) and 264.117(a)(1), respectively). Care and maintenance of the OSDF will continue in perpetuity.

1.2 PLAN ORGANIZATION

The remainder of this plan is organized as follows:

- 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;
- final site conditions at closure of the OSDF are addressed in Section 3.0;
- institutional controls and points of contact are addressed in Section 4.0;
- environmental monitoring is addressed in Section 5.0;

- routine scheduled inspections are addressed in Section 6.0;
- unscheduled inspections are addressed in Section 7.0;
- custodial maintenance and contingency repair are addressed in Section 8.0;
- corrective actions are addressed in Section 9.0;
- emergency notification and reporting are addressed in Section 10.0;
- modifications to this plan are addressed in Section 11.0;
- public involvement is addressed in Section 12.0; and
- references are presented in Section 13.0.

1.3 RESPONSIBLE PARTIES

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

1.4 RELATED PLANS

Several other support plans have been prepared for the OSDF remedial action project and should be used in conjunction with this plan, or referred to for information on how 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. These plans will be accessible, either electronically or in hard copy, on site in the Multi-Use Educational Facility (MUEF) when it is completed (fall 2007).

- Permitting Plan and Substantive Requirements for the On-site Disposal Facility (DOE 1998): identifies the administrative and substantive requirements for the National Pollutant Discharge Elimination System Permit, and the substantive requirements for all of the operable units' (OUs') on-site disposal needs for the Wetlands Nationwide Permit, the Ohio Solid Waste Permit to Install, and the Resource Conservation and Recovery Act (RCRA) Permit; additionally, discusses how the requirements relate to the OSDF, presents the plan for compliance with the requirements, and discusses additional applicable or relevant and appropriate requirements (ARARs) that are not related to the issuance of a specific permit.

- OSDF Construction Quality Assurance Plan (GeoSyntec 2001a): contains procedures used to evaluate soils and other features of the OSDF liner and final cover system.

- Final Design Criteria Package; On-site Disposal Facility (GeoSyntec 1997): provides the design of the OSDF and includes the Final Remedial Design Work Plan, which presents the design approach for the OSDF.

- OSDF Impacted Materials Placement Plan (GeoSyntec 2005): outlines waste acceptance criteria (WAC) for the OSDF, and contains procedures used to place the impacted materials into the OSDF.

- OSDF Surface Water Management and Erosion Control Plan (GeoSyntec 2001b): provides details of permanent erosion and sediment controls and surface water controls for the OSDF, including maintenance requirements for channels and sediment controls.

- OSDF Groundwater/Leak Detection and Leachate Monitoring Plan (DOE 2006a): provides details on the leak detection monitoring program for the OSDF, addressing monitoring both within the OSDF in the leachate collection system (LCS) and leak detection system (LDS), and the underlying groundwater in the till immediately underneath the OSDF and the groundwater in the Great Miami Aquifer (included as Attachment C to the LMICP).

- Systems Plan, Collection and Management of Leachate for the On-site Disposal Facility (DOE 2001): describes the inspection, monitoring, and maintenance activities that will be undertaken at the Fernald site to collect and manage leachate collected from the OSDF.

- Integrated Environmental Monitoring Plan (IEMP) (DOE 2006b): defines the environmental monitoring and reporting requirements, including those required post-closure (included as Attachment D to the LMICP).

- Work Plan for Removal and In-Place Abandonment of the OSDF Cell 1 Final Cover Monitoring System (GeoSyntec 2006): explains the process used to remove and abandon in place the Cell 1 final cover monitoring system.

In addition, this PCCIP is used as a support document for the Comprehensive Legacy Management and Institutional Controls Plan (LMICP). The LMICP describes the long-term operations and maintenance of the Fernald site during legacy management and discusses the institutional controls that are in place to help ensure the protectiveness of the remedy, thus ensuring the protectiveness of human health and the environment.

4.0 INSTITUTIONAL CONTROLS AND POINTS OF CONTACT

4.1 INTRODUCTION

As indicated in Sections 1.1 and 1.2 of the Institutional Controls Plan (IC Plan), this section, Section 4.0, discusses the institutional controls that will be in place for the OSDF and its buffer area during the post-closure care period (legacy management). The IC Plan is the enforceable governing document for institutional controls for the Fernald site and the PCCIP provides supporting details for the OSDF. Table 4-1 below presents a compilation of the institutional controls for the OSDF and its buffer area, as identified in the OU2 and OU5 RODs. Environmental monitoring (item 5 on Table 4-1), inclusive of groundwater monitoring (item 4 on Table 4-1), is discussed in Section 5.0 of this PCCIP. This PCCIP, in general, addresses the maintenance program (item 6 on Table 4-1).

TABLE 4-1

INSTITUTIONAL CONTROLS AS KEY COMPONENTS IN THE RODs

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

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

The remainder of Section 4.0 discusses the remaining items (items 1, 2, and 3 on Table 4-1).

4.2 POINTS OF CONTACT

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

TABLE 4-2

POINTS OF CONTACT

	Title of Contact	Telephone	Mailing Address
1	Director of DOE Office of Environmental Management	(513) 648-3139	11003 Hamilton-Cleves Hwy Harrison, OH 45030-9728
2	DOE Office of Legacy Management	(513) 648-3148	11003 Hamilton-Cleves Hwy Harrison, OH 45030-9728
3	DOE Grand Junction 24-hour number	(877) 695-5322	NA

Due to the duration of the post-closure period, DOE anticipates that the points of contact are likely to change over time. DOE will notify the regulatory agencies of any changes to the points of contact via modification to this PCCIP, likely as change pages to this section (refer to Section 11.0).

4.3 OWNERSHIP

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

4.4 ACCESS CONTROLS/RESTRICTIONS AND SECURITY MEASURES

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

13.0 REFERENCES

American Society of Photogrammetry and Remote Sensing (ASPRS), 1980, "Manual of Photogrammetry," Fourth Edition, Falls Church, VA.

GeoSyntex, 2006, "Work Plan for Removal and In-place Abandonment of the OSDF Cell 1 Final Cover Monitoring System", prepared for Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, OH, March

GeoSyntec, 2001a, "Construction Quality Assurance Plan; On-site Disposal Facility, 20100-PL-0006, Revision 1, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, May.

GeoSyntec, 2001b, "Surface Water Management and Erosion Control Plan; On-site Disposal Facility," 20100-PL-0004, Revision 1, Fluor Fernald , DOE, Fernald Area Office, Cincinnati, OH, August.

GeoSyntec, 1997, "Final Design Criteria Package; On-site Disposal Facility," Revision 0, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, May.

GeoSyntec, 2005, "Impacted Materials Placement Plan; On-site Disposal Facility," 20100-PL-007, Revision 4, PCN 2, prepared for Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, June.

Ohio Department of Natural Resources (ODNR), 1996, "Rainwater and Land Development: Ohio's Standards for Storm Water Management, Land Development, and Urban Stream Protection," Second Edition, ODNR Division of Soil and Water Conservation, Columbus, OH, 1996. (Formerly: U.S. Department of Agriculture Soil Conservation Service (USDA-SCS), 1987, "Water Management and Sediment Control in Urbanizing Areas," USDA-SCS, Washington, D.C.)

U.S. Department of Energy (DOE), 2006a, "Groundwater/Leak Detection and Leachate Monitoring Plan; On-site Disposal Facility," 20100-PL-0009, Revision 2, Final, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006b, "Integrated Environmental Monitoring Plan," 2505-WP-0022, Revision 5A, Draft Final, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2001, "Systems Plan; Collection and Management of Leachate for the On-site Disposal Facility," 20111-PL-0001, Revision 0, Fluor Fernald, DOE, Fernald Area Office, Cincinnati, OH.

U.S. Department of Energy (DOE), 1998, "Permitting Plan and Substantive Requirements for the On-site Disposal Facility," 20100-PL-0001, Revision 0, PCN 1, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 1996a, "Final Record of Decision for Remedial Actions at Operable Unit 5," 7478 U-007-501.4, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, January.

U.S. Department of Energy (DOE), 1996b, "Final Record of Decision for Final Remedial Action at Operable Unit 3," Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, August.

U.S. Department of Energy (DOE), 1995a, "Final Record of Decision for Remedial Actions at Operable Unit 2," 7021 U-004-501.3, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, May.

U.S. Department of Energy (DOE), 1995b, "Final Remedial Design Work Plan for Remedial Actions at Operable Unit 2," Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH, December.

U.S. Department of Energy (DOE), 1995c, "Pre-design Investigation and Site Selection Report for the On-site Disposal Facility," Fernald Environmental Management Project, DOE, Fernald Field Office, Cincinnati, OH, July.

ATTACHMENT C
GWLMP

2.0 SAMPLING PROGRAM

As noted in Section 3.0 of the GWLMP, the Ohio Solid Waste regulations require that, for detection monitoring, at least four independent samples from each well will be taken during the first 180 days after implementation of the groundwater detection monitoring program and at least eight independent samples in the first year to determine the background (baseline) water quality (Ohio Administrative Code [OAC] 3745-27-10(D)(5)(a)(ii)(a)). The requirement to collect eight independent samples is only applicable to those wells installed after August 15, 2003, because that is the date that the code became effective. Current sampling frequencies are based on the following: HTWs and GMA wells are sampled bimonthly after waste placement until 12 samples are collected for statistical evaluation. These frequencies are selected to develop an appropriate statistical procedure, to address OSDF construction schedules, and to compensate for the varying temporal conditions and seasonal fluctuations. After sufficient samples are collected for statistical analysis, samples are collected quarterly from the HTWs and the GMA.

Specific monitoring requirements for each cell are provided in Sections 2.1, 2.2, and 2.3, with the specific analytical parameters listed in Tables 2-1, 2-2, and 2-3. Analytical detection limits, at a minimum, will meet the applicable final remediation levels identified in the Integrated Environmental Monitoring Plan (IEMP) (DOE 2006c and DOE 2006d). A summary of sampling requirements for each OSDF cell is presented in Table 2-4.

2.1 SAMPLING AT CELLS 1 THROUGH 7

Sampling will be as follows:

- Annual samples will be collected from the LCS for the parameters listed in Table 2-2.
- Annual samples will be collected from the LDS for the parameters listed in Table 2-1.
- Quarterly samples will be collected from the LCS, LDS, HTW, and GMA for the parameters listed in Table 2-3.

If an analyte is detected in the annual samples from either the LDS or LCS, then confirmatory sampling will be conducted for that constituent for three quarterly consecutive events from the horizon in which it was detected. Depending on the magnitude and persistence of the constituent detected, sampling of the next lower horizon may be considered. The requirements for this confirmatory sampling will be documented and approved through the established variance process.

Note: As indicated in the IEMP Mid-Year Data Summary Report for 2005 (DOE 2005a), 1,1-dichloroethene was detected in the annual Cell 3 LCS sample collected in May 2005 at a concentration of 9.2 micrograms per liter (µg/L) with an associated detection limit and groundwater FRL of 1.0 µg/L and 7.0 µg/L, respectively. Confirmatory sampling of 1,1-dichloroethene in the Cell 3 LCS was initiated in the fourth quarter of 2005 (November). As indicated in the 2005 Site Environmental Report, the November 2005 results were 13.1 µg/L and 12.8 µg/L, respectively for the normal and duplicate samples (DOE 2006a). Confirmatory sampling continues in 2006. The addition of 1,1-dichloroethene is further documented in Appendix E, Table 4-1 of the GWLMP. Additionally, 1,1-dichloroethene was added to the Cell 3 LDS for three sampling rounds after it was detected in the Cell 3 LCS annual sample collected in May 2006. This is also documented in Appendix E, Table 4-1 of the GWLMP.

2.2 SAMPLING AT CELL 8

Sampling will be as follows:

- Quarterly sampling of the LCS and LDS began immediately after waste placement and continued during through cell closure and during post-closure for the parameters listed on Table 2-1.
- One sample per year will be collected from each LCS following the start of waste placement in each cell and will be analyzed for the parameters listed on Tables 2-2.
- Quarterly sampling of HTW and GMA (Up and Downgradient) will continue quarterly (beginning in November 2006) after 12 bimonthly samples are collected for parameters listed on Table 2-1.
- Bimonthly samples (refer to Table 2-1) will be collected from GMA (SE and SW) until 12 sample rounds are completed at a sufficient data quality. Following collection of the 12 samples, sampling will continue on a quarterly basis. Note: 22216 was replaced by 22217 and date will be statistically evaluated for comparison purposes.

Note: Based on the current understanding of pre-existing levels of contaminants in the OSDF subsurface, the Fernald site is electing to perform up to 12 rounds of initial baseline sampling for both the perched system and the GMA for all initial site-specific leak detection monitoring parameters.

2.3 COMMON ION MONITORING

Common ions will be monitored from each cell's LCS, LDS, and HTW for eight sampling rounds. Constituents to be monitored are calcium, iron, magnesium, manganese, phosphorus, potassium, silicon, sodium, alkalinity, chloride, fluoride, nitrate/nitrite, and oxidation reduction potential (ORP).

2.4 ADDITIONAL SAMPLING REQUIREMENTS

All horizons for a particular cell will be sampled during the same time frame to enhance the comparability of the data. In the event insufficient volume is available for collection of the entire analytical suite, the sample sets shall be collected in accordance with the priority listed in Tables 2-1, 2-2, and 2-3. Samples will be collected from the HTWs, GMA wells, LCS, and LDS in accordance with the Sampling and Analysis Plan for United States Department of Energy Office of Legacy Management Sites (OLM SAP) (DOE 2006f) and the Legacy Management CERCLA Sites Quality Assurance Project Plan (LM QAPP) (DOE 2006e), which references the Sitewide CERCLA Quality Assurance Project Plan (SCQ) as the primary document that describes procedures and protocols for monitoring the Fernald site (DOE 2003).

3.0 ADDITIONAL SAMPLING PROGRAM REQUIREMENTS

3.1 QUALITY ASSURANCE REQUIREMENTS

Quality assurance requirements are consistent with those identified in the LM QAPP. Self-assessment and independent assessments of work processes and operations will be conducted to assure quality of performance. Self-assessments will evaluate sampling procedures and/or paperwork associated with the sampling effort. Independent assessments will be performed by a Quality Assurance representative by conducting surveillances. Surveillances will be performed at least twice per year at any time during the project and will consist of monitoring/observing ongoing project activity and work areas to verify conformance to specified requirements.

3.2 CHANGES TO THE PROJECT-SPECIFIC PLAN

Prior to the implementation of field changes, the Project Manager and Field Sampling Lead shall be informed of the proposed changes. Once the Field Sampling Lead has approved and obtained approval from the Project Manager, Data Management Lead, and Quality Assurance Contact for the field changes to the plan, the field changes may be implemented. Field changes to the plan shall be noted on a Variance/Field Change Notice (V/FCN). The V/FCN shall be approved by the Project Manager, Field Sampling Lead, Data Management Lead, and Quality Assurance Contact prior to implementation of the changes.

3.3 QUALITY CONTROL SAMPLES

Quality Control (QC) sample analyses are required as part of the GWLMP for the OSDF. A minimum of one set of field QC samples is required for each sampling event. A "sampling event" shall be defined as one cycle or round of sample collection from various locations occurring within a short time frame (i.e., several days). Duplicate and rinsate samples will be collected at a rate of one per sampling event or one per 20, whichever is more frequent. Trip blanks will be collected one per day per team when samples are collected for volatile organic analysis. Field blank samples are collected one per day. A rinsate sample will not be required for those locations with dedicated sample collection equipment. One matrix spike/matrix spike duplicate will be analyzed at a frequency of one per sampling event or one per 20, whichever is more frequent. QC samples will be analyzed for the same analytes as the normal samples.

3.4 EQUIPMENT DECONTAMINATION

All non-dedicated sampling equipment shall be decontaminated per the OLM SAP, prior to sample collection at each sample location. Sampling equipment shall also be decontaminated per the OLM SAP upon completion of sampling activities, unless equipment has been dedicated to the sample location.

3.5 DISPOSITION OF WASTES

During sampling activities, waste will be generated in various forms; disposition of all waste will be in accordance with site requirements and procedures. The various forms of waste expected to be encountered during this program are contact waste, purge water, and decontamination wastewater.

Contact waste will be minimized by limiting contact with the sample media, and by using disposable materials, whenever possible. Contact waste shall be placed into plastic garbage bags and disposed to a dumpster on site. If contact waste is determined to be radiologically contaminated, the assigned radiological control technician/engineer shall survey, contain, label, and disposition the waste according to radiological control requirements.

All decontamination wastewater and purge water will be containerized and disposed through the converted advanced wastewater treatment (CAWWT) facility for treatment. The point of entry into the CAWWT will either be via the CAWWT backwash basin or the OSDF permanent lift station.

3.6 HEALTH AND SAFETY

Health and Safety requirements are addressed in the Fernald Project Health and Safety Plan (DOE 2006g). Fernald site-specific requirements are identified in this plan.

3.7 DATA MANAGEMENT

Information collected as a part of this monitoring program will be managed according to the guidelines below to ensure availability of documentation for verification and reference and to ensure regulatory compliance.

Field documentation, as required by the OLM SAP for this sampling program (e.g., Chain of Custody forms), will be carefully maintained in the field. To ensure appropriate documentation was completed during field activities and that documentation was completed correctly, required documentation shall be verified by Environmental Monitoring personnel. One hundred percent of the analytical data shall be validated in accordance to the ASL specified in Tables 2-1, 2-2, and 2-3. Information is stored in the Site Environmental Evaluation for Projects (SEEPro) database and the hard copy original field documentation packages shall be stored in controlled file storage cabinets, and eventually a long-term archive environment. Per regulatory guidance, these records must be maintained for a minimum of 30 years.

REFERENCES

(Tasks associated with this plan are performed under the most current revision of plans, procedures, and documents)

American Public Health Association (APHA), 1989, "Standard Methods for Analysis of Water and Wastewater, 17th edition.

U.S. Department of Energy (DOE), 2006a, "2005 Site Environmental Report, Final, Fluor Fernald, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006b, "Fernald Site Data Quality Objectives: Monitoring Program for the On-Site Disposal Facility," GW-024, Revision 9, Fluor Fernald, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006c, "Integrated Environmental Monitoring Plan," 2505-WP-0022, Revision 4B, Final, Fluor Fernald, Cincinnati, OH, January

U.S. Department of Energy (DOE), 2006d, "Integrated Environmental Monitoring Plan," 2505-WP-0022, Revision 5A, Draft Final, Fluor Fernald, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006e, "Legacy Management CERCLA Sites Quality Assurance Project Plan," DOE-LM/GJ1232-2006, Revision 1, S.M. Stoller Corporation, Grand Junction, CO, July.

U.S. Department of Energy (DOE), 2006f, "Sampling Analysis Plan for U.S. Department of Energy Office of Legacy Management Site," DOE-LM/GJ1197-2006, Revision 1, S.M. Stoller Corporation, Grand Junction, CO, October.

U.S. Department of Energy (DOE), 2006g, "Fernald Project Safety Plan," DOE-LM/1324-2006, Revision 1, S.M. Stoller Corporation, Grand Junction, CO, September.

U.S. Department of Energy (DOE), 2005a, "IEMP Mid-Year Data Summary Report for 2005," 51350-RP-0027, Revision 0, Final, Fernald Closure Project, Cincinnati, OH, November.

U.S. Department of Energy (DOE), 2003, "Sitewide CERCLA Quality Assurance Project (SCQ)" FD-1000, Revision 3, Final, Fernald Closure Project, Cincinnati, OH, November.

U.S. Environmental Protection Agency (EPA), 2004, "Superfund Analytical Services Contract Laboratory Program/Statement of Work: Multi-Media, Multi-Concentration Inorganic Analysis," ILM05.3, March.

U.S. Environmental Protection Agency (EPA), 2003, "Superfund Analytical Services Contract Laboratory Program/Statement of Work: Multi-Media, Multi-Concentration Organics Analysis," OLM04.3, March.

U.S. Environmental Protection Agency (EPA), 1998, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition, Office of Solid Waste, Washington, D.C., April.

U.S. Environmental Protection Agency (EPA), 1983, "Methods for Chemical Analysis of Water and Wastes," EPA600/4-79-020, Environmental Monitoring and Support Laboratory, Cincinnati, OH, March.

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Figure 5-1 Schematic Leachate Management System D-11

It is anticipated that off-site treatment and/or disposal would likely require collection of leachate in the sump or another accumulation tank while awaiting periodic removal. Any modification 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.

The processes presented above are anticipated to remain in effect until leachate is no longer detected (refer to federal hazardous waste regulation 40 Code of Federal Regulations [CFR] 264.310[b][2]), or until it is demonstrated that leachate no longer poses a threat to human health or the environment. If leachate volumes decrease below anticipated levels and the leachate toxicity decreases, the DOE may choose to petition the Director of the Ohio Environmental Protection Agency (OEPA) to modify or temporarily suspend some of the leachate management requirements. OAC 3745-66-18(G) gives the Director of OEPA authority to extend or reduce the post-closure care period based on cause. Note that a draft Leachate Management Contingency Plan for the OSDF (DOE 2001b) was submitted to the Environmental Protection Agency (EPA) and OEPA that specifies the measures to be taken and associated deliverables in the event of a leachate management system failure. Eventually the leachate management system will be placed into its final, long-term configuration with the valve houses and contents being removed and replaced with straight lengths of pipes connecting the LDS and LCS to the EPLTS line. The decision regarding when the long-term configuration can be implemented will be made in conjunction with EPA and OEPA. This decision will be based on criteria developed in conjunction with EPA and OEPA. The criteria will include factors such as asymptotic leachate flows; a past history of no problems with plugging of the LCS or LDS lines; no recent activity to repair or revegetate the cap and the absence of similar conditions which argue for maintaining the ability to inspect and repair the LCS and LDS lines.

Information associated with leachate monitoring (e.g., annual grab sample of leachate per Appendix I parameters and polychlorinated biphenyl [PCB] analysis) will be reported through the annual site environmental reports as identified in the upfront sections of the OSDF Groundwater/Leak Detection and Leachate Monitoring Plan.

5.0 LEACHATE CONTINGENCY PLAN

By the Summer of 2006, the flows from the OSDF LCS and LDS systems had decreased significantly due to the filling and capping of cells. The previous Leachate Management Contingency Plan was written in January 2001 for failure of the LDS, LCS or EPLTS lines. The plan contained detailed operating modes for each line failure, including failure of the line downstream of the PLS that required using a tanker to

transport water from the PLS to the treatment system. A review of the plan indicated that the most of the actions detailed in the plan are no longer applicable. For a failure of the EPLTS or the line downstream of the PLS, the preferred option is to close the valves from the LDS and LCS for each cell, allow the water to accumulate in the cells and repair the line as necessary.

To determine if this option was feasible, calculations were performed for each cell to determine how much water could be allowed to accumulate in each cell without exceeding one foot of head on the primary liner. (Reference: OSDF Design Calculation Package, Section 9.5, Leachate Management – Leak Detection System – Action Leakage Rate and 40 CFR 264.302 Action Leakage Rate). Information from Geosyntec indicated that the one-foot level would be reached in each after when 8623 gallons had accumulated. Daily flow from the cells was compared to that volume to determine the number of days required for each cell to accumulate 8623 gallons. The table below shows the data used to determine the number of days.

Tank	Dates	Water Vol. (gal.)	Change in Time (days)	Gallons per Day	Gal/Acre/Day	# Days to accumulate 8623 gal.
LCS 1	8/28-8/30	120.87	2.13	60.6	9.48	142
LCS 2	8/24-8/26	157.40	2.0	82.7	12.93	104
LCS 3	8/26-8/29	291.52	2.9	103.4	16.16	83
LCS 4	8/27-8/29	253.33	1.83	123.4	19.28	70
LCS 5	8/27-8/29	293.00	1.92	136.0	21.25	63
LCS 6	8/27-8/29	252.47	1.92	135.9	21.23	63
LCS 7	8/26-8/28	288.08	1.96	146.8	22.94	59
LCS 8	8/24	118.57	0.33	376.7	40.83	23

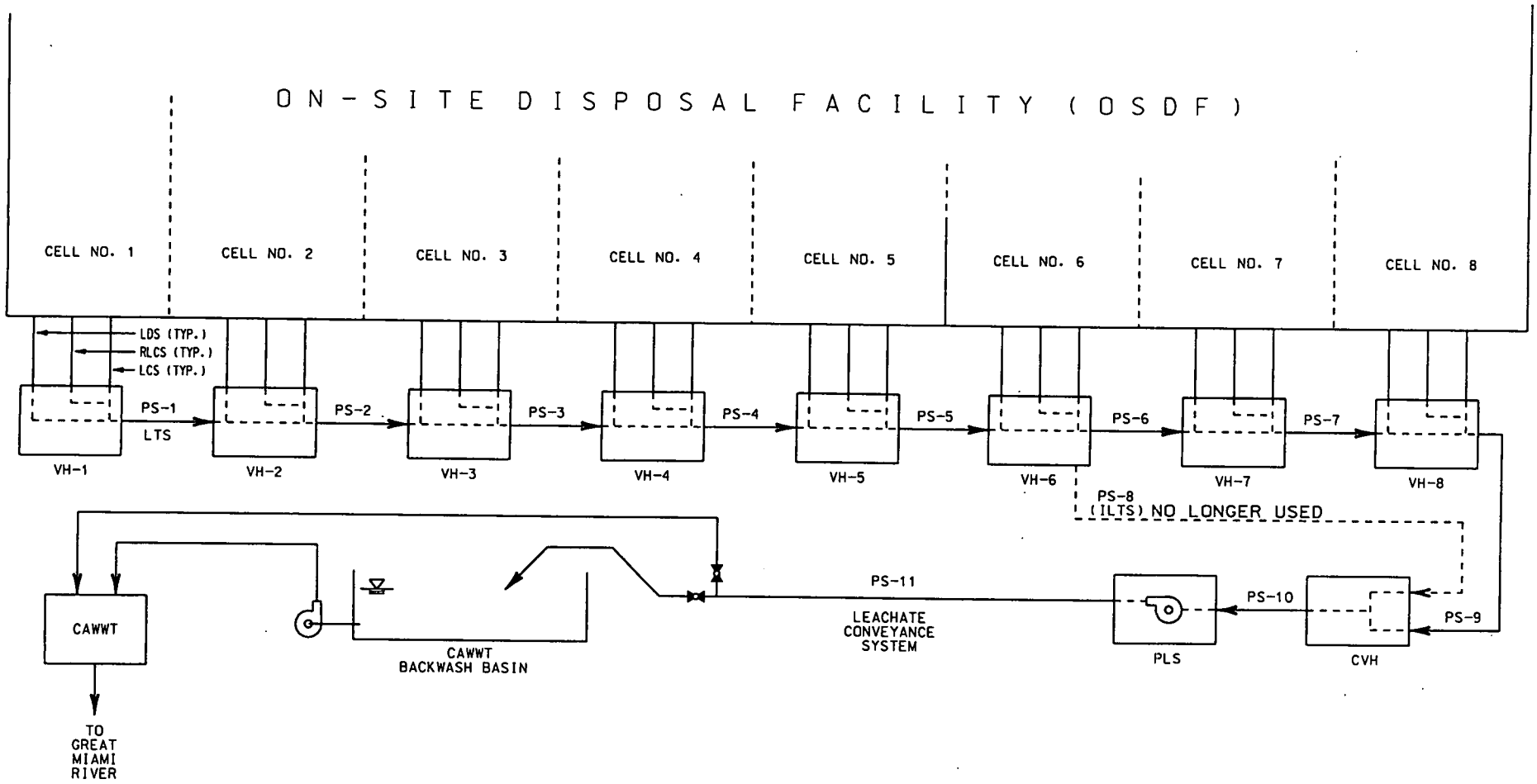
Since the minimum number of days required to reach the accumulation limit is twenty-three days and the number of days will increase as the flow from Cell 8 decreases, it was determined that transporting leachate water by tanker to the treatment system in the event of a line failure will not be necessary. If any of the lines in the leachate system fail, the valves from the affected cells LDS and LCS will be closed and water will be allowed to accumulate in the cells while repairs are performed. The new Contingency Leachate Plan for the EPLTS or the line downstream of the PLS is to develop a repair plan and repair the line(s) before any of the affected cells accumulate 8623 gallons. If repairs are anticipated to take longer than the time it would take to accumulate one foot of head on the primary liner, leachate would be transferred to CAWWT via a rental tanker truck or other portable tank.

Monitoring of the LDS, LCS, RLCS and LTS containment pipes will continue on a regular basis. Refer to Figure 5-1 for a schematic of the Leachate Management System. The actions levels listed in the table below were derived from the January 2001 Leachate Management Contingency Plan for the OSDF and apply on a weekly basis. When the period between monitoring events is extended, the weekly action levels will be multiplied by the number of weeks between monitoring events to yield the applicable periodic action levels.

Action levels for Containment Pipe Monitoring

	LDS	LCS	RLCS	LTS in each Valve House (PS – 1 through 7)	LTS at port V1007 (PS-9)	LTS at port V1006 (PS-10)	LTS at port V1008 (PS-8)
Weekly Maximum milliliters	2270	2650	2650	5300	18,900	370	No Maximum

If the water collected from any monitoring port exceeds the action level for the period, the port will be checked again in one week. If the amount of water collected again exceeds the action level, an investigation of the pipe segment in question will be performed and corrective actions taken as needed. Note that Pipe Segment 8 (PS-8) on Figure 5-1 is no longer monitored because the ILTS is no longer used as a contingency pipeline.



LEGEND

VH	VALVE HOUSE	RLCS	REDUNDANT LCS
PS	LCS PIPELINE SEGMENT	ILTS	INTERIM LTS
CVH	CONTROL VALVE HOUSE	CAWWT	CONVERTED ADVANCED WASTE WATER TREATMENT FACILITY
LTS	LEACHATE TRANSMISSION SYSTEM		PUMP
PLS	PERMANENT LIFT STATION		

FIGURE 5-1
SCHEMATIC
LEACHATE MANAGEMENT SYSTEM

FILENAME: /RES4136/BILLONE.DGN 2-9-06
REV: 11-07-06

4.0 PARAMETER LIST MODIFICATIONS

The sections above identify the process for selecting parameters for initial baseline sampling and analysis (i.e., site-specific leak detection indicator parameters, which are the proposed primary parameters in Table 3-4 and the supplemental indicator parameters listed in Section 3.2 of this appendix). It is anticipated that during the data collection process for OSDF, recommended refinements to the monitoring lists will be made periodically. The following subsections describe some of the considerations of future additions and deletions to the parameter lists and Table 4-1 identifies modifications that have been made to date. All modifications have been and will be identified to EPA and OEPA and approved prior to implementation. Variances and revisions will be made as necessary. Currently, recommendations for parameter list modifications have been made through the Cells 1, 2, and 3 Technical Memorandum, the annual review process (which is documented in the annual site environmental reports), and through DOE, OEPA, and EPA agreements.

4.1 ELIMINATING MONITORING PARAMETERS

An indicator parameter will be considered for elimination from the long-term leak detection monitoring parameters list if it is not detected in the LCS leachate samples collected during active waste placement. Any constituents not detected in the LCS leachate samples after waste placement are likely to be absent, insoluble, or of insignificant abundance in the OSDF.

An indicator parameter will be eliminated from the long-term leak detection monitoring program if not detected more than 25 percent of the time during the initial baseline period. This approach will be implemented on a cell-by-cell basis. Another reason parameters will be eliminated for monitoring is through agreements between DOE, OEPA, and EPA.

4.2 ADDING MONITORING PARAMETERS

Based on the analytical results of the annual grab sample of leachate collected in the LCS for the Appendix I and polychlorinated biphenyl (PCB) parameters specified in OAC 3745-27-10 and 19, detected constituents will be evaluated to determine whether the original indicator parameters list is sufficient for leak detection purposes. As mentioned before, most of the Appendix I constituents have already been detected in perched groundwater under the Fernald site and were considered when selecting the initial leak detection indicator parameters. It is expected that these constituents will also be detected in future OSDF leachate samples. However, they will not necessarily be adequate indicators of a release. Therefore, constituents detected in the annual OSDF LCS samples will not be automatically added to the leak detection indicator parameters list, unless they meet the criteria discussed below.

TABLE 4-1
OSDF GWLMP PARAMETER LIST MODIFICATIONS

	CELL 1	CELL 2	CELL 3	CELL 4	CELL 5	CELL 6	CELL 7	CELL 8
LCS (Initial Baseline)	(02/1998)	(11/1998)	(10/1999)	(11/2002)	(11/2002)	(10/2003)	(09/2004)	(10/2004)
Parameter	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**
Reason[a]	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]
Sampling Period	02/2003–indefinitely	02/2003–indefinitely	02/2003–indefinitely	09/2003–indefinitely	02/2003–indefinitely	10/2003–indefinitely	09/2004–indefinitely	10/2004–indefinitely
Parameter	**PCBs**	**PCBs**	**Technetium-99**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**
Reason[a]	3[c]	3[c]	2	3[c]	3[c]	3[c]	3[c]	3[c]
Sampling Period	05/2004–indefinitely	05/2004–indefinitely	02/2004–08/2004	05/2004–indefinitely	05/2004–indefinitely	05/2004–indefinitely	09/2004–indefinitely	10/2004–indefinitely
Parameter	**COD**	**COD**	**PCBs**	**COD**	**COD**	**COD**	**COD**	**COD**
Reason[a]	6[c]	6[c]	3[c]	6[c]	6[c]	6[c]	6[c]	6[c]
Sampling Period	05/2004–indefinitely	05/2004–indefinitely	05/2004–indefinitely	05/2004–indefinitely	05/2004–indefinitely	05/2004–indefinitely	09/2004–indefinitely	10/2004–indefinitely
Parameter	**Common Ions**	**Common Ions**	**COD**	**TDS & NO_3/NO_2**	**TDS & NO_3/NO_2**	**TDS & NO_3/NO_2**	**TDS & NO_3/NO_2**	**TDS & NO_3/NO_2**
Reason[a]	3	3	6[c]	7[d]	7[d]	7[d]	7[d]	7[d]
Sampling Period	Initiated 05/2005 (8 rounds)	Initiated 05/2005 (8 rounds)	05/2004–indefinitely	02/2005-indefinitely	02/2005-indefinitely	02/2005-indefinitely	02/2005-indefinitely	02/2005-indefinitely
Parameter	**Toxaphene**	**Toxaphene**	**Common Ions**	**Common Ions**	**Common Ions**	**Common Ions**	**Common Ions**	**Common Ions**
Reason[a]	3[c]	5[c]	3	3	3	3	3	3
Sampling Period	08/2005	08/2005	Initiated 05/2005 (8 rounds)	Initiated 05/2005 (8 rounds)	Initiated 05/2005 (8 rounds)	Initiated 05/2005 (8 rounds)	Initiated 05/2005 (8 rounds)	Initiated 05/2005 (8 rounds)
Parameter			**Toxaphene**	**Toxaphene**	**Toxaphene**	**Toxaphene**	**Toxaphene**	**Toxaphene**
Reason[a]	–	–	5[c]	5[c]	5[c]	5[c]	5[c]	5[c]
Sampling Period			08/2005	08/2005	08/2005	08/2005	08/2005	08/2005
Parameter			**1,1-Dichloroethene**					
Reason[a]	–	–	2	–	–	–	–	–
Sampling Period			11/2005–05/2006					
LDS (Initial Baseline)	(02/1998)	(02/1998)	(08/2002)	(11/2002)	(11/2002)	(10/2003)	(09/2004)	(10/2004)
Parameter	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**	**Sulfate**
Reason[a]	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]
Sampling Period	02/2003–indefinitely	02/2003–indefinitely	05/2003–indefinitely	05/2003–indefinitely	05/2003–indefinitely	10/2003–indefinitely	09/2004–indefinitely	10/2004–indefinitely
Parameter	**Common Ions**	**Common Ions**	**Common Ions**	**Common Ions**	**Common Ions**	**Common Ions**	**PCBs**	**PCBs**
Reason[a]	3	3	3	3	3	3	3[c]	3[c]
Sampling Period	Initiated 05/2005 (8 rounds)	Initiated 11/2005 (8 rounds)	Initiated 05/2005 (8 rounds)	Initiated 05/2005 (8 rounds)	Initiated 05/2005 (8 rounds)	Initiated 05/2005 (8 rounds)	09/2004-indefinitely	10/2004-indefinitely
Parameter			**1,1-Dichloroethene**				**Common Ions**	**Common Ions**
Reason[a]	–	–	2	–	–	–	3	3
Sampling Period			08/2006-02/2007				Initiated 05/2005 (8 rounds)	Initiated 08/2005 (8 rounds)

ATTACHMENT D
IEMP

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LIST OF ACRONYMS

ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ARAR	applicable or relevant and appropriate requirement
ASL	analytical support level
BAT	best available technology
BTV	benchmark toxicity value
CAWWT	converted advanced wastewater treatment facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMT	continuous multi-channel tubing
COC	constituent of concern
D&D	decontamination and dismantling
DCF	dose conversion factors
DFM	data fusion modeling
DOE	U.S. Department of Energy
DOECAP	Department of Energy Consolidated Audit Program
DOE-EM	U.S. Department of Energy Office of Environmental Management
EMP	Fernald Site Environmental Monitoring Program
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
FFCA	Federal Facility Compliance Agreement
FRL	final remediation level
GEMS	Geospatial Environmental Mapping System
GPMPP	Groundwater Protection Management Program Plan
GWLMP	Groundwater/Leak Detection and Leachate Monitoring Plan
IEMP	Integrated Environmental Monitoring Plan
LM	Legacy Managment
LMICP	Comprehensive Legacy Management and Institutional Controls Plan
LM QAPP	Legacy Management CERCLA Sites Quality Assurance Project Plan
MCL	maximum contaminant level
MS/MSD	matrix spike/matrix spike duplicate
NEPA	National Environmental Policy Act

LIST OF ACRONYMS
(Continued)

NESHAP	National Emissions Standards Hazardous Air Pollutant
NPDES	National Pollutant Discharge Elimination System
NRMP	National Resource Monitoring Plan
NRRP	Natural Resource Restoration Plan
NRRDP	Natural Resource Restoration Designs Plan
NTU	nephelometric turbidity units
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
OLM SAP	Office of Legacy Management Sampling Analysis Plan
OMMP	Operations and Maintenance Master Plan
ORC	Ohio Revised Code
OSDF	on-site disposal facility
PRG	preliminary remediation goal
PRRS	Paddys Run Road Site
RCRA	Resource Conservation and Recovery Act
SSOD	Storm Sewer Outfall Ditch
SWIFT	Sandia Waste Isolation Flow and Transport
TLD	thermoluminescent dosimeter
U.S.C.	United States Code
VAM3D	Variability Saturated Analysis Model in 3 Dimensions

LIST OF MEASUREMENT ABBREVIATIONS

cm	centimeter
cfm	cubic feet per minute
m^3	cubic meters
Ci/g	Curies per gram
gpm	gallons per minute
µg/L	micrograms per liter
mg/L	milligrams per liter
m/min	meters per minute
mrem	millirem
pCi/m^3	picoCuries per cubic meter
pCi/g	picoCuries per gram
pCi/kg	picoCuries per kilogram
pCi/L	picoCuries per liter
$pCi/m^2/sec$	picoCuries per square meter per second

1.4.1 Management Decisions

The IEMP supports the following key management decisions:

- From an environmental media perspective, are environmental restoration activities complete such that cleanup standards are achieved and monitoring can be ceased or reduced?
- From a sitewide perspective, is the Fernald site maintaining compliance with its various regulatory requirements for emission control and environmental monitoring?
- Are there any trends in the sitewide environmental monitoring data that indicate the potential for an unacceptable future condition?
- In the event of a regulatory non-compliance situation or potentially unacceptable cumulative trend, what activities or projects are the principal contributors to the situation? What specific response actions must be taken to address the situation?
- What communication with regulatory agencies or other concerned stakeholders is necessary as a result of the situation and/or decisions made?

As discussed in the next subsection, Legacy Management decision makers will be conducting ongoing evaluations of the data generated at the site to ensure satisfactory conditions are maintained during continued remedy implementation and through post-closure.

1.4.2 Who is Responsible for Making the Decisions?

The environmental data are used by Legacy Management personnel to monitor the acceptability of the site activities underway. The bulk of the day-to-day planning and routine operating decisions will be internal to the Fernald site, with process adjustments implemented on a situation-specific, as-needed basis.

In the majority of cases, the data evaluation will conclude that all regulatory requirements are being met and that no unacceptable cumulative trends in the monitoring data are present. The evaluation and conclusions will be documented for regulatory agency concurrence through the normal reporting mechanisms described in this plan.

Legacy Management will notify the U.S. Environmental Protection Agency (EPA) and the OEPA immediately (prior to taking an action internally) if an evaluation indicates that attainment of a regulatory schedule milestone is in jeopardy because of the mitigative actions necessary to address an adverse cumulative situation

Legacy Management personnel will: (1) identify the root cause of the unacceptable situation; (2) determine the options for addressing the problem; and (3) communicate with EPA and OEPA to arrive at a mutually acceptable decision concerning the follow-up actions to be taken. Immediate notification to the EPA and OEPA will be made via telephone followed by written communication. For all remaining

situations (i.e., those involving the Fernald site's responses to undesirable data trends for any of the environmental media), Legacy Management personnel will identify and implement appropriate actions internally, and will document the decisions and resultant response actions via telephone, or in the annual site environmental reports.

Subject matter experts are responsible for the ongoing review of media–specific monitoring data and the identification of any related environmental compliance issues. If the potential for an unacceptable future situation is identified, then alternatives for addressing the problem will be identified. The alternatives will be assessed with respect to their implications and communicate the results of the evaluations as necessary to the Fernald site's stakeholders, EPA, and OEPA.

1.4.3 What are the General Criteria for the Decisions?

The IEMP establishes, on a medium-specific basis, the types of data and thresholds or regulatory limits required to support the management decisions described above. Each set of medium-specific criteria is handled uniquely because of the varying medium-specific locations where the regulatory criteria are applied. For example, the Fernald site's most restrictive air monitoring criterion (the 10 millirem NESHAP requirement discussed in Section 6.0) is applied at locations at the site's fenceline, near the location of actual receptors.

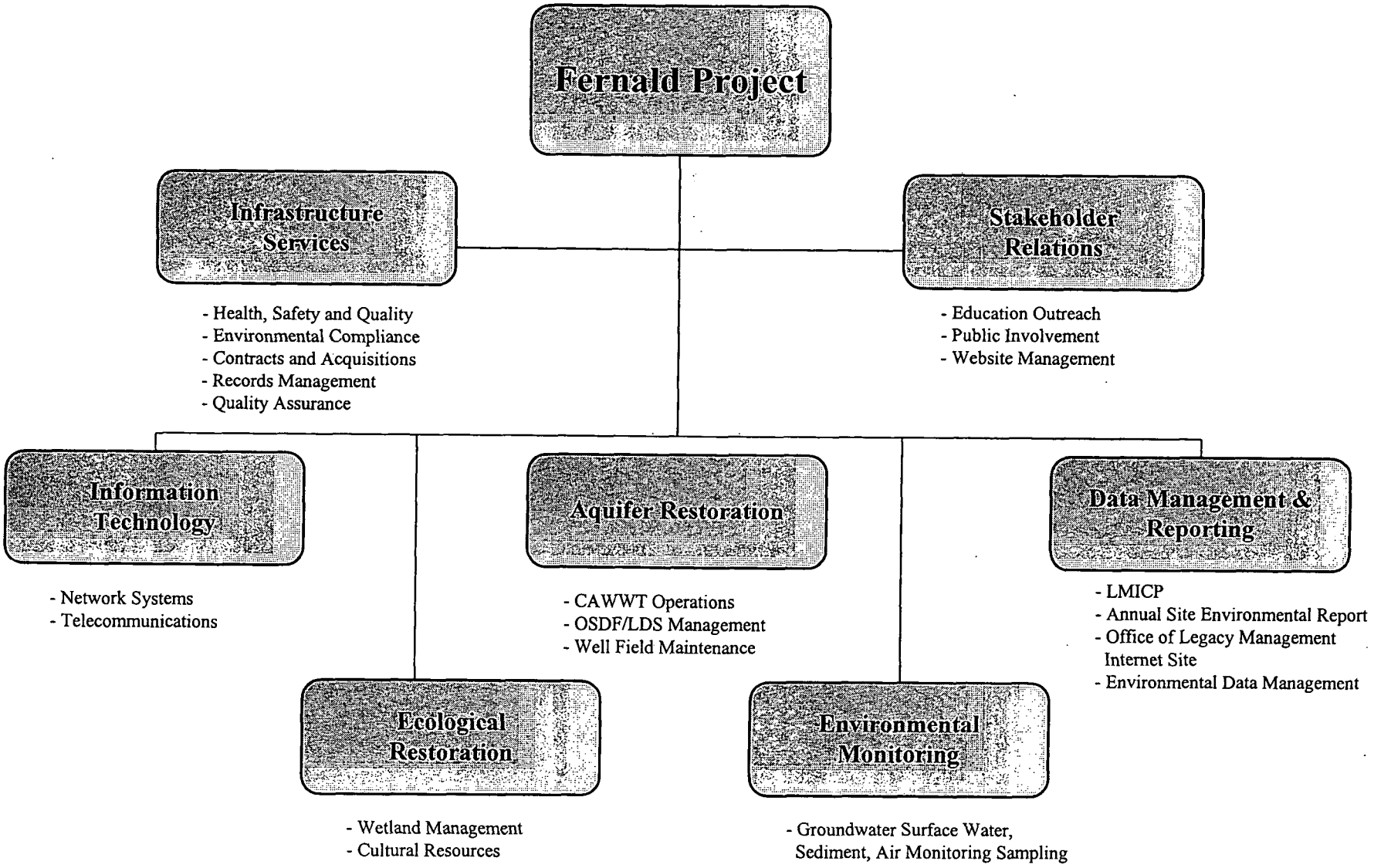
The medium-specific sections of this plan identify monitoring requirements and ARARs for each environmental medium with the applicable compliance locations. Additionally, the medium-specific sections define the criteria to be used to identify trends in the data that could indicate an imminent unacceptable situation. Each of the medium-specific sections specifies the frequency of the data evaluations to satisfy the Fernald site's overall planning and decision-making requirements. DOE will evaluate the data accordingly, and will report the results according to the approach summarized below.

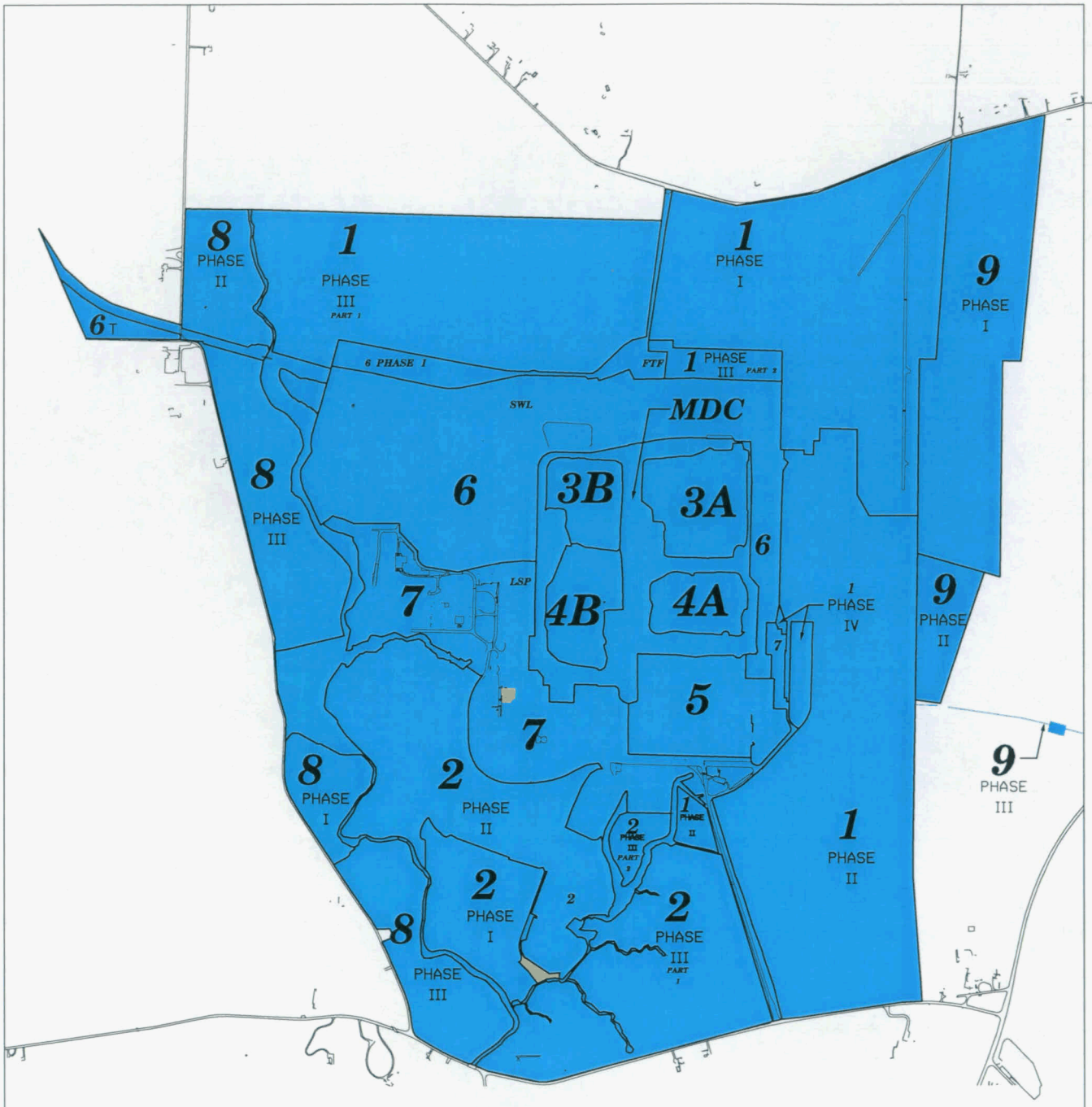
1.4.4 How Will IEMP Decisions Be Communicated?

Each medium section of this IEMP (Sections 3.0 through 6.0) present medium-specific reporting components, and Section 7.0 summarizes the overall reporting strategy for the IEMP. Legacy Management information is available on the Office of Legacy Management Internet Site (http://www.lm.doe.gov/). The Fernald data will be made available to the regulatory agencies on an ongoing basis in the form of electronic data files through this site at the following link: http://www.lm.doe.gov/land/sites/oh/fernald/fernald.htm. Fernald specific information will continue to be available in query form through the Geospatial Environmental Mapping System (GEMS) and through downloadable files (both types of data are accessible through the above referenced link). GEMS is an Internet web-based application that provides access to data queries upon completion of data review. The annual site environmental reports will also be issued as part of the IEMP program. The report will provide a reporting mechanism for IEMP data to meet regulatory compliance requirements pertinent to sitewide interpretation.

FIGURE 2-1 FERNALD SITE ORGANIZATION

POST-CLOSURE





YELLOW DESIGNATES AREAS NOT CERTIFIED

BLUE DESIGNATES CERTIFIED AREAS

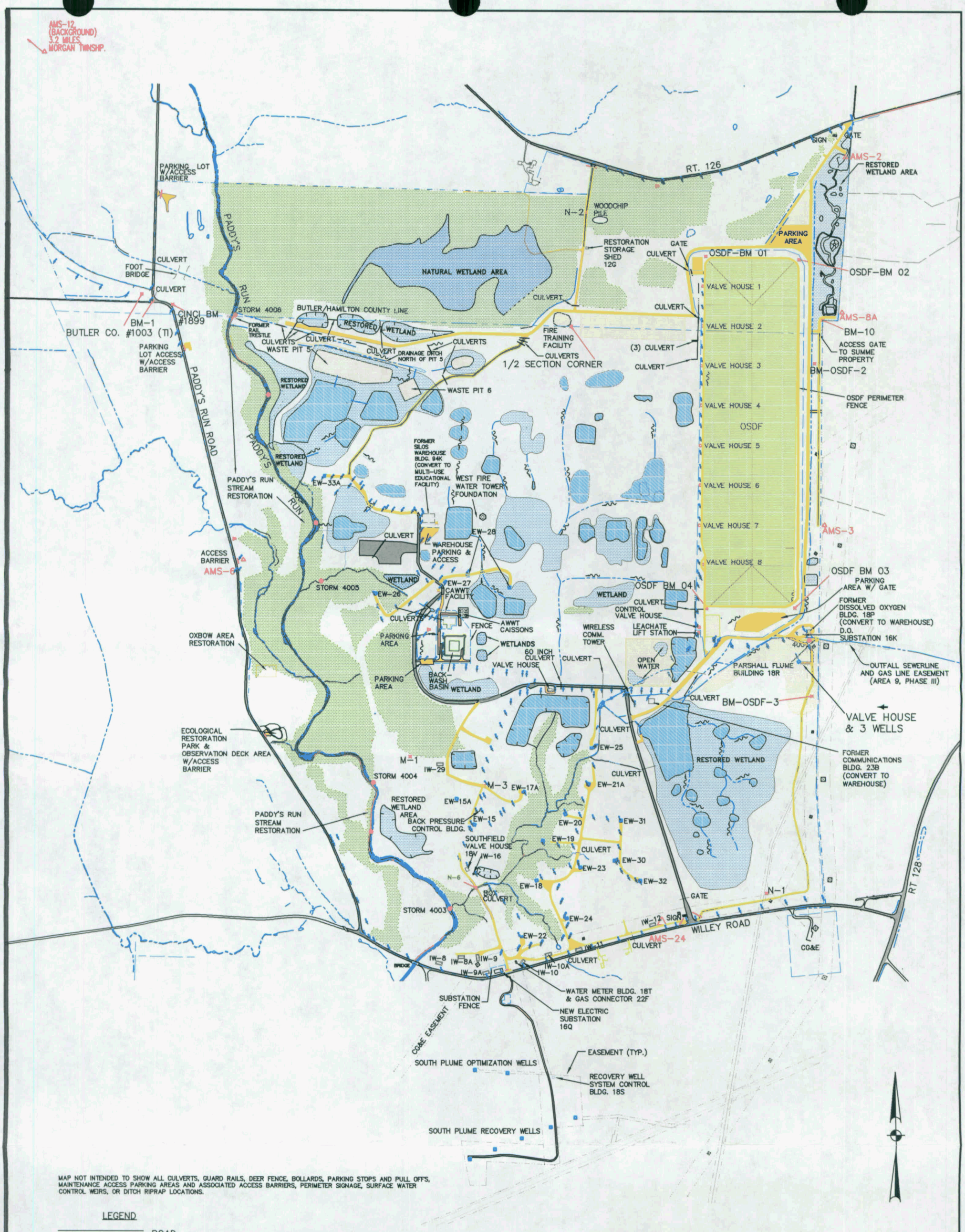
NOTE: THERE ARE EXISTING, UNDERTIFIED GROUNDWATER PIPING CORRIDORS BENEATH THE CERTIFIED SURFACE (SEE MAP #2)

SCALE

1100 550 0 1100 FEET

FIGURE 2-2. UNCERTIFIED AREAS

v:\gis\DGN\E...P_LMICP.DGN
STATE PLANAR COORDINATE SYSTEM 1983
16-NOV-2005



MAP NOT INTENDED TO SHOW ALL CULVERTS, GUARD RAILS, DEER FENCE, BOLLARDS, PARKING STOPS AND PULL OFFS, MAINTENANCE ACCESS PARKING AREAS AND ASSOCIATED ACCESS BARRIERS, PERIMETER SIGNAGE, SURFACE WATER CONTROL WEIRS, OR DITCH RIPRAP LOCATIONS.

LEGEND

- ROAD
- PROPERTY LINE
- WET LANDS
- EDGE OF CREEK
- FENCE LINE
- EASEMENT
- WATER FLOW
- PONDS/WETLANDS
- TRANSMISSION TOWER
- TREE LINE
- EXTRACTION WELL HOUSE
- POLE
- AIR MONITORING STATION
- N-1 GPS BENCH MARK
- STORM 4006 REGULATED STORMWATER OUTFALLS
- IW-11 INJECTION WELL (WELL & CASING ONLY TO REMAIN)
- EMERGENCY WARNING SIREN
- ACCESS BARRIER
- FIRE HYDRANT
- WOODED AREA
- PONDED WATER
- GRAVEL ROADS/PARKING AREAS
- ASPHALT ROADS
- UNIMPROVED "PATH-LIKE" ROADS
- ON SITE DISPOSAL FACILITY
- NATURAL WETLAND AREA
- RESTORED WETLAND AREA
- CLEAN FOUNDATIONS LEFT IN PLACE
- ADDITIONAL AREAS WHERE BALLAST AND STONE IS SUBSURFACE WITH VEGETATIVE COVER EXCEPT IN RAPARIAN AREAS

400 200 0 800
400 1200

GPS BENCH MARK LOCATION PLAN

MONUMENT	DESCRIPTION	NORTHING	EASTING	ELEVATION	SURVEY
BM-1	(ESTAB.) SITE ORIGIN (0,0)	482813.982	1345109.041	579.83	WOOLPERT
M-1	FLY AS PILE	478237.93	1347705.20	573.82	WOOLPERT
M-3	FLY AS PILE	477948.929	1348451.099	577.41	WOOLPERT
N-1	ALUMINUM CAPPED PIN	476876.20	1351301.43	607.88	WOOLPERT
N-6	ALUMINUM CAPPED PIN	476928.55	1348369.68	551.99	WOOLPERT
BM 1003	BUTLER CO.	482887.97	1345001.20	579.93	WOOLPERT
BM 1899	CITY OF CINCINNATI	482781.79	1345309.62	579.06	WOOLPERT
1/2 SECTION CORNER	HAMILTON COUNTY				
1/2 SECTION CORNER	HAMILTON COUNTY				
BM-10	U.S. AEC	482637.962	1351857.178	615.88	WOOLPERT
BM-OSDF-2	ON-SITE DISPOSAL FAC.	482199.937	1351779.165	615.82	B.L. PAYNE
BM-OSDF-3	ON-SITE DISPOSAL FAC.	478850.416	1351749.328	595.61	B.L. PAYNE
BM-OSDF-5	ON-SITE DISPOSAL FAC.	483297.439	1351145.734		

FIGURE 2-3
FERNALD LEGACY MANAGEMENT SITE CONFIGURATION

SCALE: 1"=400'
DATE: 9-9-2004
REVISED: 11-29-2006

TECUMSEH SURVEYING, INC.
4948 CINCINNATI-BROOKVILLE ROAD SHANDON, OHIO 45013
TELEPHONE: 513 738-2134, FAX: 513 738-2756

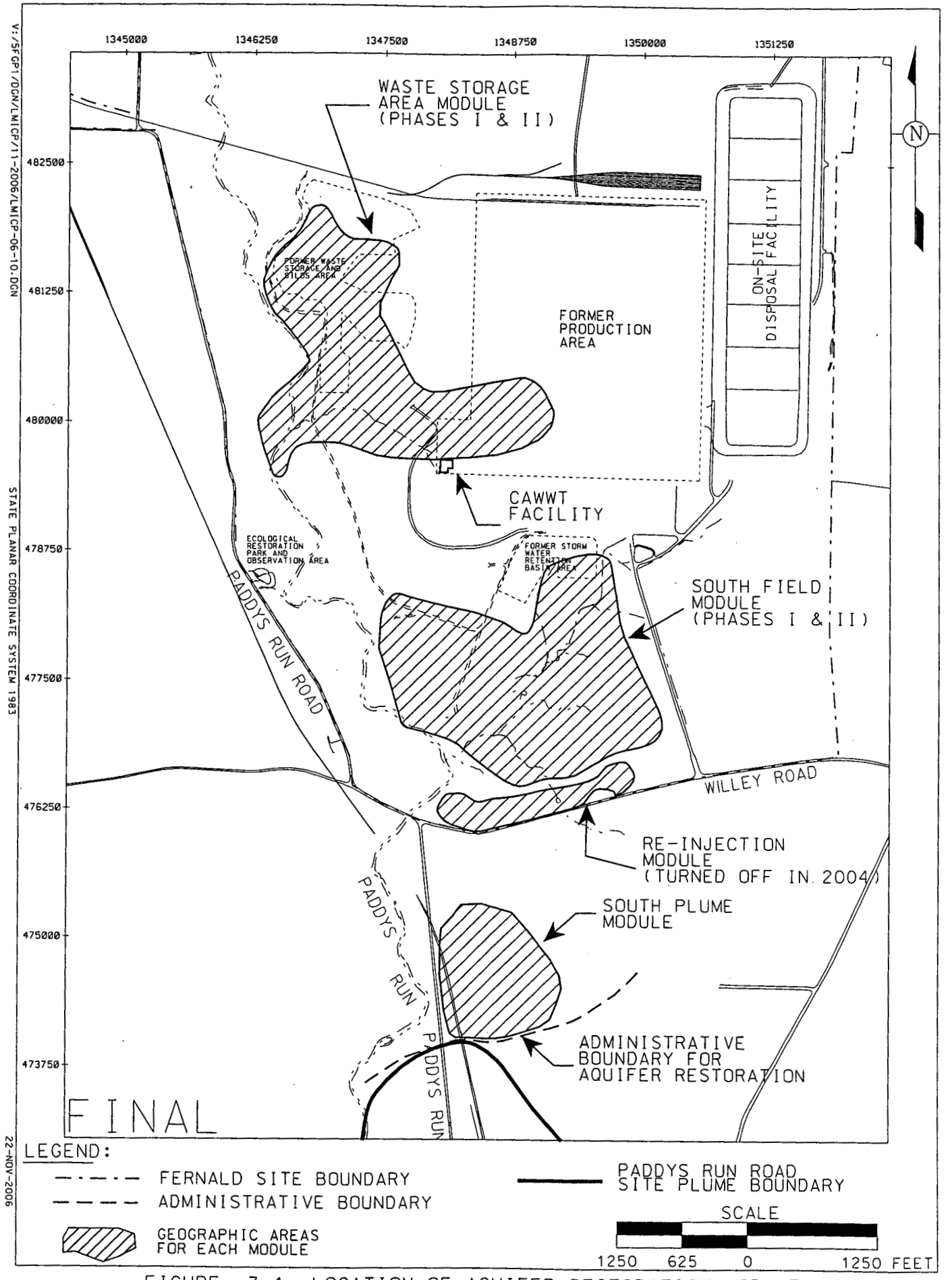


FIGURE 3-1. LOCATION OF AQUIFER RESTORATION MODULES

FRL constituent concentrations will also be routinely measured. If uranium concentrations rebound to levels above the groundwater FRL during the steady-state assessment, then pumping operations would resume. If uranium concentrations remain below the groundwater FRL during the steady-state assessment and do not appear to be trending up toward the groundwater FRL, then the certification process will proceed to Stage III, Certification/Attainment Monitoring. It is anticipated that Stage II monitoring will take approximately three months.

Stage III – Certification/Attainment Monitoring

Certification/attainment monitoring will also be module-specific. Data collected during Stage III will be used to document that remediation goals have been met, and that the goals will continue to be maintained in the future. Statistical tests will be used to predict the long-term ability to maintain below-FRL constituent concentrations.

Stage IV – Declaration and Transition Monitoring

Because certification is being approached on a module-specific basis, efforts need to be taken to ensure that upgradient plumes do not migrate into and re-contaminate downgradient areas where remediation goals have been achieved. A few monitoring wells will be positioned at the upgradient edge of the clean areas and will be monitored to document that the upgradient plume is not impacting the clean area. It is anticipated that Stage IV monitoring could be conducted for as long as 10 years, essentially the time when the groundwater model predicts that cleanup goals will be achieved in the South Plume Module versus the Waste Storage Area Module.

Stage V – Demobilization

Stage V identifies that all structures, trailers, liners, pipes (except the outfall line), and utilities dedicated for aquifer restoration and wastewater treatment will need to be properly decontaminated and dismantled in order to be protective of the environment. With the exception of the water treatment facility, the decontamination and dismantling (D&D) of infrastructure will not take place until the entire aquifer has been certified clean. This will provide the means to re-initiate pumping in any area of the aquifer that may require additional pumping prior to achieving final certification.

Stage VI – Long-Term Monitoring

Long-term monitoring will be conducted in former source areas after the last groundwater module is certified clean. If the water table rises to an elevation that exceeds what was previously recorded for a former source area, then groundwater monitoring beneath the former source area will be initiated to determine if any new sources have dissolved into the groundwater.

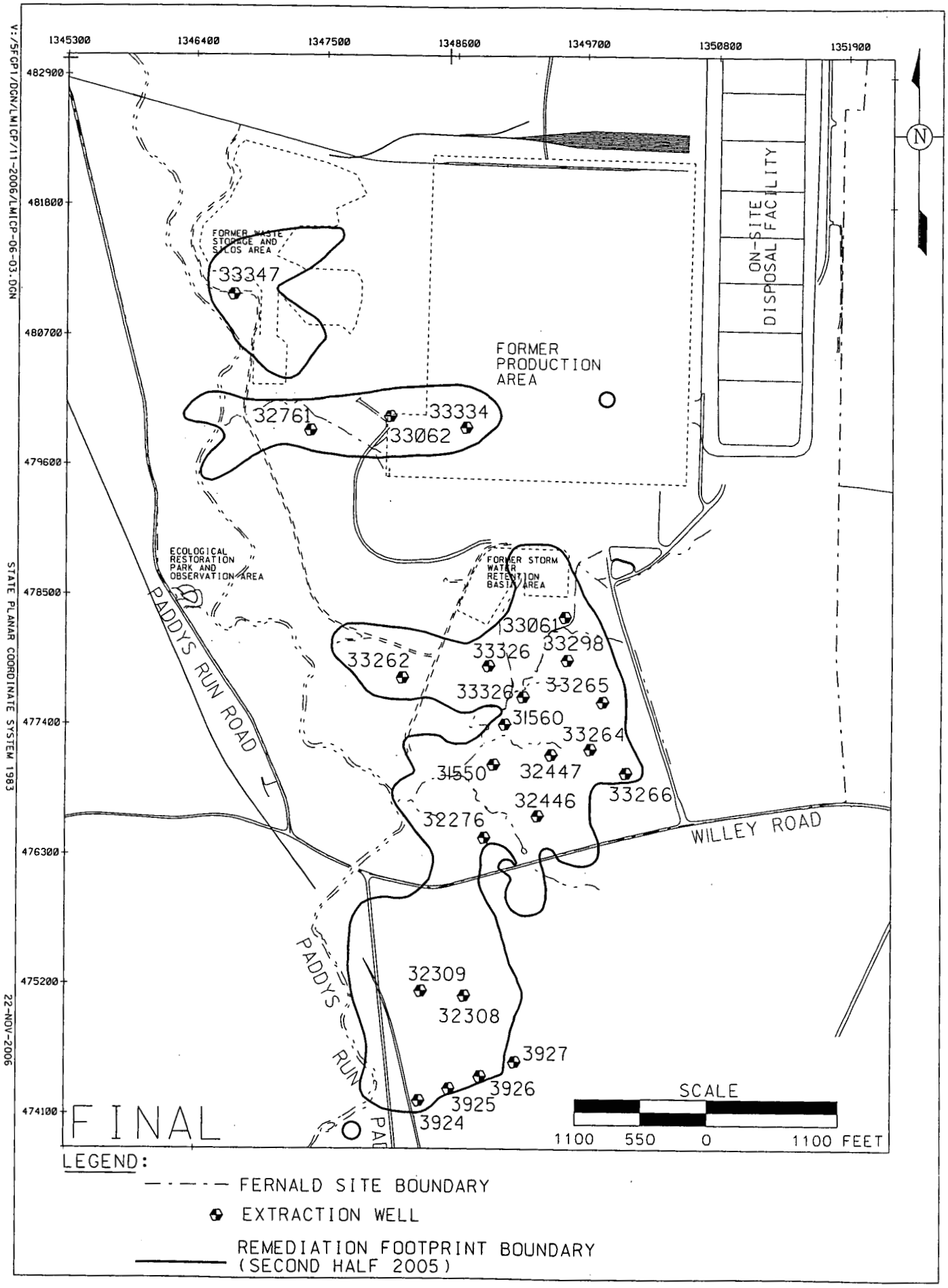


FIGURE 3-3. EXTRACTION WELL LOCATIONS

to pursue technological advances that might decrease the remediation time. A technology that was pursued was treated groundwater re-injection. Groundwater modeling was conducted to determine if adding re-injection wells to the remediation would facilitate a quicker cleanup. The groundwater modeling showed that a faster cleanup could be realized by using re-injection if several other actions were also realized. These other actions included:

- Other operable units completing their accelerated cleanup objectives so that surface access is available for aquifer remediation wells
- The accelerated removal of sources to allow extraction wells to be located closer to the center of uranium plumes
- Modeled geochemical and hydraulic parameters being consistent with aquifer conditions.

An aquifer remediation design, which included re-injection, was presented in the Baseline Remedial Strategy Report, Remedial Design for Aquifer Restoration. This design called for 37 pumping wells and 10 re-injection wells. The predicted cleanup time was modeled at 10 years. The pumping and re-injection wells were subdivided into five area specific restoration modules:

- The South Plume Module
- The South Field Module
- The Waste Storage Area Module
- The Plant 6 Module
- The Re-Injection Demonstration Module

Although groundwater modeling showed that re-injection expedited the cleanup, the technology was unproven at the Fernald site. Of concern was the cost of keeping the wells operational (industry experience showed that these wells tend to plug). A demonstration was needed to prove that the re-injection wells could be operated efficiently at the Fernald site. The decision was made to tie the demonstration into the remedy design presented in the Baseline Remedial Strategy Report. If successful, the impact to the remedy would be immediate.

In the summer of 1998, the first wells for the aquifer remediation became operational and marked implementation of the aquifer remedy design presented in the Baseline Remedial Strategy Report. Implementation of the Baseline Remedial Strategy Report design included a groundwater re-injection demonstration that was conducted from September 2, 1998, to September 2, 1999. At the request of the Fernald site, the evaluation of re-injection technology at the Fernald site was sponsored by DOE's Office of Science and Technology Subsurface Contaminants Focus Area. The re-injection demonstration was successful and re-injection was incorporated into the aquifer remedy.

was feasible (DOE 2005d). As reported in the Groundwater Remedy Evaluation and Field Verification Plan (DOE 2004) infiltration through the SSOD at a rate of 500 gpm was predicted to decrease the clean up time by one year. The study concluded though that the operation would not be cost effective. Subsequent discussions in 2006 with the EPA and OEPA led to an agreement to proceed with a scaled down version of the operation. Clean groundwater is being pumped into the SSOD to supplement natural storm water runoff in an attempt to accelerate remediation of the South Plume. Three existing wells on the east side of the sill are being utilized to deliver as much clean groundwater as is needed to maintain a flow of approximately 500 gpm into the SSOD. This supplemental pumping will continue until the existing wells, pumps, or motors are no longer serviceable. At that time the operation will be suspended, pending a determination that the remedy is benefiting from the operation.

3.4.2.2 The Modular Approach to Aquifer Restoration

Restoration of the Great Miami Aquifer is being accomplished by using three area-specific groundwater restoration modules (South Plume Module, South Field Module, and Waste Storage Area Module) and a centralized water treatment facility (refer to Figure 3-1). Figure 3-3 shows the location of the extraction wells that comprise these modules.

South Plume Module

Six extraction wells (3924, 3925, 3926, 3927, 32308, and 32309) are operating in the South Plume Module. Extraction Wells 3924, 3925, 3926, and 3927, which were originally called the South Plume Module, have been in operation since 1993 as part of a removal action. Located at the southern edge of the total uranium plume, the initial South Plume Module, as reported in the Work Plan for the South Contaminated Plume Removal Action (DOE 1992), was installed to create a hydraulic barrier and to prevent further southern migration of the uranium plume. In 1998, two additional extraction wells (32308 and 32309) became operational just north of the four original South Plume Module wells. These two wells were installed under a project known as the South Plume Optimization Module. The term "South Plume Module" is used to refer to both the original extraction wells installed under the South Plume Module and those installed under the South Plume Optimization Module.

South Field Module

Thirteen extraction wells (31550, 31560, 31561, 32276, 32446, 32447, 33061, 33262, 33264, 33265, 33266, 33298, and 33326) are operating in the South Field Module. Restoration of the aquifer in the South Field area began in 1998 when 10 extraction wells (31550, 31560, 31561, 31562, 31563, 31564, 31565, 31566, 31567, and 32276) began pumping around the excavation area near the SSOD ditch (South Field

Extraction [Phase I] Module). Six of the original ten extraction wells (31562, 31563, 31564, 31565, 31566, and 31567) are no longer operating:

- Extraction Well 31562 was shut down in 2003 and replaced by a new well (33298)
- Extraction Well 31563 was shut down in 2002 and converted to a re-injection well as part of the South Field (Phase II) project
- Extraction Wells 31564 and 31565 were shut down in 2001 so that additional soil remediation could be conducted in the area. The decision was made not to re-start pumping at these wells because they are no longer situated in locations that will provide a pumping benefit to the aquifer remedy.
- Extraction Well 31566 was shut down in 1998 to minimize the potential for pulling contamination into a region of the aquifer with finer grain sediment
- Extraction Well 31567 was shut down in 2005 due to excessive plugging of the well screen; it was replaced by a new well (33326).

The South Field Module was expanded in 1999 and 2002. In 1999, Extraction Wells 32446 and 32447 were added and began operating in 2000. Extraction Well 33061 was added and became operational in 2002. In 2003, the module was modified again, this time as part of Phase II. Four new extraction wells (33262, 33264, 33265, and 33266), one replacement well (33298), two re-injection wells (33263 and 31563), and one injection basin became operational. Because of the decision in 2004 to stop well-based re-injection, the two re-injection wells (33263 and 31563) are no longer operating. Also, the injection basin has become a passive feature in that water is not being actively pumped to the basin. Figure 3-3 shows the location of the extraction wells that are operational.

Waste Storage Area Module

Four extraction wells (32761, 33062, 33334, and 33347) are operating in the Waste Storage Area Module. Two of the extraction wells (32761 and 33062) were installed as part of the Waste Storage Area (Phase I) Module. A third extraction well (33063) installed as part of the Waste Storage Area (Phase I) Module was plugged and abandoned in 2004 to facilitate surface excavation activities. A replacement well (33334) has been installed. Extraction Well 33347 is part of the Waste Storage Area (Phase II) Design. It became operational in 2006.

The groundwater monitoring program is designed to track remedy performance of the modules presented above. For monitoring purposes, the aquifer is divided into five zones referred to as "aquifer zones" (refer to Figure 3-4). These aquifer zones are used to evaluate the predicted performance (both individually and collectively) at the aquifer restoration modules. Aquifer Zones 1, 2, and 4 contain aquifer remediation modules. Aquifer Zone 0 (the fifth zone) is the area outside the other four aquifer zones.

TABLE 3-4
(Continued)

Number[a]	Total Uranium Monitoring	Property/Plume Boundary Monitoring: Monitor FRL Exceedances	Monitor OSDF Constituents[b]	Monitor PRRS Constituents[c]	Waste Storage Area Monitoring - FRL Exceedances	South Field Monitoring - FRL Exceedances
81	6015					
82	6880					
83	6881					
84	21033					
85	21063	21063				
86	21192					
87	22198	22198	22198			
88	22199	22199	22199			
89	22204	22204	22204			
90	22205	22205	22205			
91	22208	22208	22208			
92	22210	22210	22210			
93	22211	22211	22211			
94	22214	22214	22214			
95	23064					
96	23118					
97	23271					
98	23272					
99	23273					
100	23274					
101	23275					
102	23276					
103	23277					
104	23278					
105	23279					
106	23280					
107	23281					
108	23282					
109	31217	31217				
110	32766					
111	32768					
112	62408					
113	62433					
114	63116					
115	63119					
116	63283					
117	63284					
118	63285					
1190	63286					
120	63287					
121	63288					
122	63289					
123	63290					
124	63291					

TABLE 3-4
(Continued)

Number[a]	Total Uranium Monitoring	Property/Plume Boundary Monitoring: Monitor FRL Exceedances	Monitor OSDF Constituents[b]	Monitor PRRS Constituents[c]	Waste Storage Area Monitoring - FRL Exceedances	South Field Monitoring - FRL Exceedances
125	63292					
126	82433					
127	83117					
128	83124					
129	83293					
130	83294					
131	83295					
132	83296					
133	83335					
134	83336					
135	83337				83337[d]	
136	83338				83338[d]	
137	83339				83339[d]	
138	83340				83340[d]	
139	83341				83341[d]	
140	83346				83346[d]	

[a]The number in Column 1 is used to identify the number of wells in the program. The individual monitoring well identification numbers are provided in Columns 2-7 as appropriate.
[b]List of total uranium monitoring wells and Property/Plume Boundary monitoring wells that overlap with OSDF monitoring wells.
[c]List of total uranium monitoring wells and Property/Plume Boundary monitoring wells that overlap with Paddys Run Road Site monitoring wells
[d]Volatile organics are not sampled in Type 8 wells

TABLE 3-5
MONITORING REQUIREMENTS[a]

1. TOTAL URANIUM

2. WASTE STORAGE AREA

General Chemistry	Inorganic	Radionuclide	Organic
Nitrate/Nitrite	Manganese	Technetium-99	Carbon Disulfide
	Molybdenum	Total Uranium[b]	Trichloroethene
	Nickel		

3. SOUTH FIELD

General Chemistry	Inorganic	Radionuclide	Organic
NA[c]	Boron	Total Uranium[b]	NA[c]

4. PROPERTY/PLUME BOUNDARY FOR FRL EXCEEDANCES

General Chemistry	Inorganic	Radionuclide	Organic
Fluoride	Antimony	Total Uranium[b]	NA[c]
	Arsenic		
	Lead		
	Manganese		
	Nickel		
	Zinc		

5. PROPERTY/PLUME BOUNDARY FOR PRRS

General Chemistry	Inorganic	Radionuclide	Organic
Phosphorous	Arsenic[d]	NA[c]	Benzene
	Potassium		Ethyl benzene
	Sodium		Isopropyl benzene
			Toluene
			Total xylene

[a]Monitoring will be conducted semiannually.
[b]Total uranium is monitored as part of the sitewide uranium monitoring.
[c]NA = not applicable
[d]Arsenic is also monitored with respect to FRL exceedances as part of the Property/Plume Boundary.

3.6.1 Project Organization

A multi-disciplined project organization has been established to effectively implement and manage the project planning, sample collection and analysis, and data management activities directed in this medium-specific plan. The key positions and associated responsibilities required for successful implementation are as follows:

The project team leader will have full responsibility and authority for the implementation of this medium-specific plan in compliance with all regulatory specifications and sitewide programmatic requirements. Integration and coordination of all medium-specific plan activities defined herein with other project groups are also key responsibilities. All changes to these activities must be approved by the team leader or designee.

Health and safety are the responsibility of all individuals working on this project scope. Qualified health and safety personnel shall participate on the project team to assist in preparing and obtaining all applicable permits. In addition, safety specialists shall periodically review and update the specific health and safety documents and operating procedures; conduct pertinent safety briefings; and assist in evaluation and resolution of all safety concerns. All activities will be conducted according to the Fernald Site Safety Plan (DOE 2006h).

Quality assurance personnel will participate on the project team, as necessary, to review project procedures and activities ensuring consistency with the requirements of the LM QAPP or other referenced standards, and assist in evaluating and resolving all quality related concerns.

3.6.2 Sampling Program

The information derived from the groundwater monitoring program should produce a clear understanding of groundwater quality in the Great Miami Aquifer. The groundwater sampling process will be controlled so that collected samples are representative of groundwater quality. All procedures for monitoring well development, sample collection, and shipment will be performed in accordance with directives established in the Sampling and Analysis Plan for United States Department of Energy Office of Legacy Management Sites (OLM SAP) (DOE 2006f) and the LM QAPP.

3.6.2.1 Total Uranium Monitoring

Approximately 140 monitoring wells will be sampled semiannually for total uranium. Approximately 50 of these wells will be sampled for additional constituents as described in Sections 3.6.2.2 through 3.6.2.4. A list of the wells to be sampled for total uranium only is provided in Table 3-6 and shown in Figure 3-5. The wells extend across all aquifer zones and provide monitoring coverage in all restoration module areas. Figure 3-5 shows the locations of the monitoring wells.

Direct-push sampling has been conducted annually at seven locations (12367, 12368, 12369, 12370, 12371, 12372, and 12373) along and south of Willey Road since the Re-injection Demonstration. Figure 3-7 shows these locations. This annual direct-push sampling will continue at six of the locations in order to track remediation progress. Direct –push sampling at Location 12371 will not continue. This location is outside of the uranium plume. At each direct-push location, a groundwater sample will be collected at 10-foot intervals beneath the water table, and analyzed for uranium only until it can be verified that the entire thickness of the 30-µg/L total uranium plume has been sampled.

3.6.2.3 Waste Storage Area Monitoring

The waste storage area is located in Aquifer Zone 1 (refer to Figure 3-4). Four extraction wells (32761, 33062, 33347, and 33334) will be operating in the waste storage area in the beginning of 2007. Figure 3-3 shows the locations of these four wells.

In addition to the monitoring wells being sampled in the waste storage area for total uranium only (refer to Section 3.6.2.1), the eleven wells listed below will be sampled semiannually (refer to Figure 3-6 for the locations of these eleven wells).

MONITORING WELLS TO BE MONITORED SEMIANNUALLY IN THE WASTE STORAGE AREA

2010	2649	2821	3821	
83337	83338	83339	83340	83341
83346				

The four Type 2 and Type 3 wells will be sampled semiannually for the constituents listed in the table below. The rationale for the selection of these wells and these constituents is presented in Section 3.4 and Appendix A. The six Type 8 wells will also be sampled for the constituents listed in the table below, with the exception of the organics. Type 8 wells will not be used to sample for organics. The six Type 8 wells listed above for the waste storage area are three channel CMT wells. All three channels will be sampled semiannually.

Locations may also be sampled in the Waste Storage Area utilizing a direct-push sampling tool. Direct-push sampling will provide vertical profile concentration data. The vertical profile data will be used to supplement the fixed monitoring well data in order to produce more robust plume interpretations. Direct-push locations in the Waste Storage Area will be sampled for the Waste Storage Area Monitoring Semiannual constituents listed below, excluding the organic constituents.

A direct –push sample will be collected prior to any filtering, and analyzed for nitrate/nitrite. The

remainder of the samples (manganese, molybdenum, nickel, total uranium, and technetium-99) will, at a minimum, be filtered through a 5-micron filter. Samples filtered through a 5-micron filter will be identified as "unfiltered" on the Chain-of-Custody.

If the turbidity of the 5-micron filter direct-push sample is below 5-NTUs, the remaining five constituents will be sampled. If the turbidity of the 5-micron filtered direct-push sample is above 5-NTUs, the sample will be further filtered through a 0.45-micron filter. Both the 5-micron and the 0.45 micron filtered sample will be analyzed for total uranium and the four remaining constituents will be analyzed from the 0.45-micron filtered sample only. All samples filtered with a 0.45-micron filter, will be identified as "filtered" on the Chain-of-Custody.

WASTE STORAGE AREA MONITORING TABLE
SEMIANNUAL SAMPLING FREQUENCY

General Chemistry	Inorganic	Radionuclide	Organic
Nitrate/Nitrite	Manganese	Technetium-99	Carbon Disulfide
	Molybdenum	Total Uranium	Trichloroethene
	Nickel		

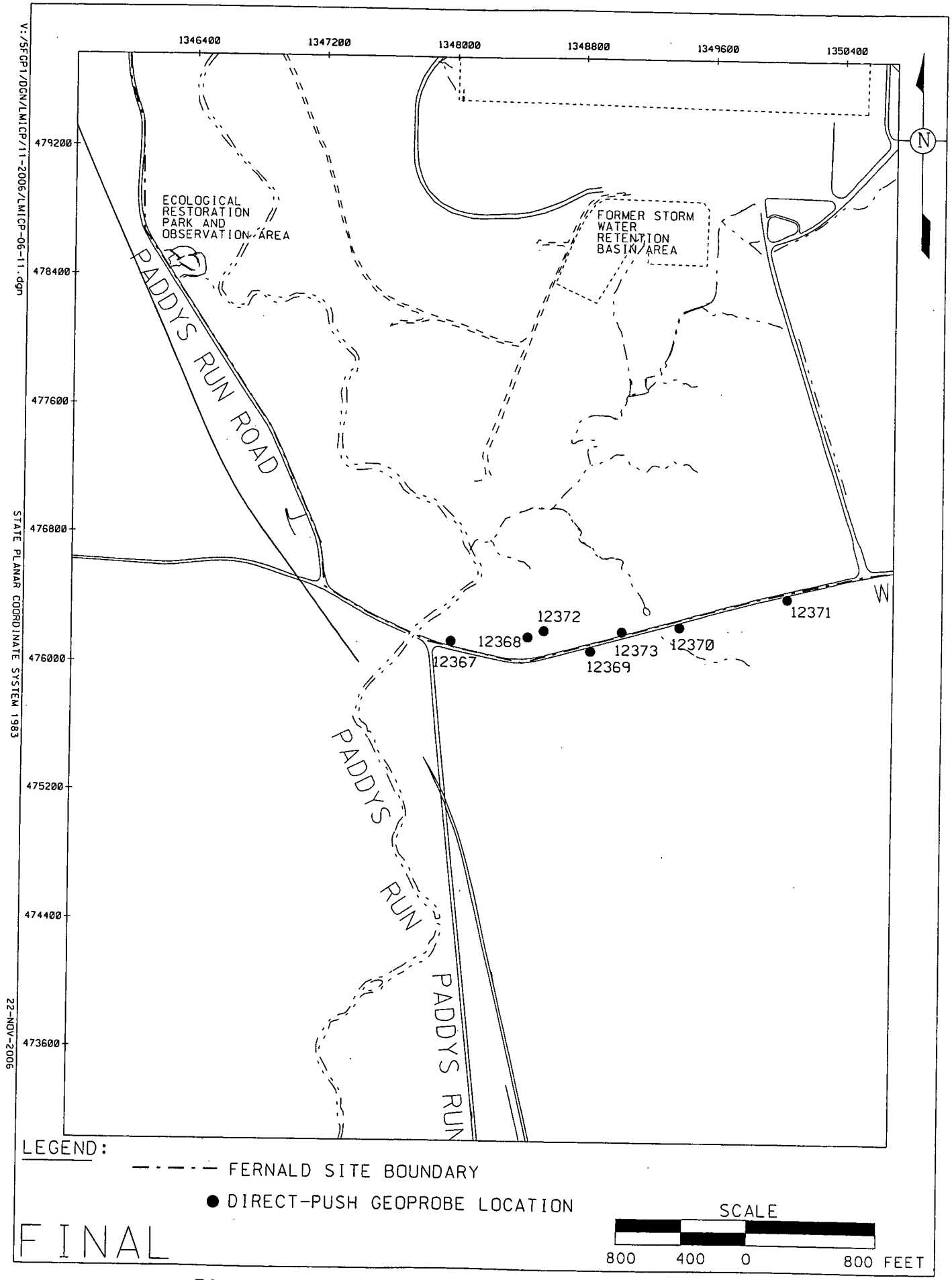


FIGURE 3-7. DIRECT-PUSH SAMPLING LOCATIONS

3.6.2.4 Property/Plume Boundary Monitoring

The focus of the Property/Plume Boundary Groundwater Monitoring activity is to detect and assess potential changes in groundwater conditions along the eastern property boundary and downgradient of the leading edge of the 30-µg/L total uranium plume south of the Fernald site property.

Monitoring will be conducted along the property boundary and downgradient uranium plume boundary for FRL exceedances; the influence (or lack of influence) that pumping is having on the Paddys Run Road Site Plume will be documented. Monitoring will also reduce redundancy with on-site disposal facility monitoring.

Property/Plume Boundary Monitoring for FRL Exceedances

Twenty-five monitoring wells along the eastern property boundary and the leading edge of the off-site total uranium plume will be sampled semiannually (refer to the table that follows). Figure 3-6 is a map showing the locations of the wells.

PROPERTY/PLUME BOUNDARY MONITORING WELLS TO BE MONITORED FOR FRL EXCEEDANCES ONLY

2093	3424	22198
2398	3426	22199
2431	3429	22204
2432	3431	22205
2733	3432	22208
3070	3733	22211
3093	4398	22214
3398	21063	22210
		31217

The 25 monitoring wells will be sampled semiannually for the constituents listed below. All of these constituents have had FRL exceedances. The rationale for the selection of these constituents and the monitoring schedule are presented in Section 3.4 and Appendix A.

PROPERTY PLUME BOUNDARY MONITORING TABLE FOR FRL EXCEEDANCES SEMIANNUAL SAMPLING FREQUENCY

General Chemistry	Inorganic	Radionuclide	Organic
Fluoride	Antimony Arsenic Lead Manganese Nickel Zinc	Total Uranium	NA

Eight of the 25 monitoring wells (22204, 22205, 22208, 22198, 22211, 22214, 22210, and 22199) are also sampled for on-site disposal facility constituents.

Property/Plume Boundary Monitoring for Paddys Run Road Site Constituents

Groundwater is being pumped from the aquifer immediately north of the Paddys Run Road Site (Extraction Wells 3924, 3925, 3926, and 3927); it remains important to document the influence (of lack of influence) that the pumping has on the Paddys Run Road Site plume. Groundwater samples will be collected semiannually from 11 monitoring wells (refer to Figure 3-6).

The 11 wells are:

2128	2899	3898
2625	2900	3899
2636	3128	3900
2898	3636	

These 11 wells will be analyzed for Paddys Run Road Site constituents as well as for IEMP FRL exceedance constituents. The Paddys Run Road Site constituent listed below are the constituents to be monitored:

PROPERTY PLUME BOUNDARY MONITORING TABLE FOR FRL EXCEEDANCES AND PADDYS RUN ROAD SITE CONSTITUENTS SEMIANNUAL SAMPLING FREQUENCY

General Chemistry	Inorganic	Radionuclide	Organic
Fluoride	Antimony	Total Uranium	Benzene
Phosphorous	Arsenic		Ethyl benzene
	Lead		Isopropyl benzene
	Manganese		Toluene
	Nickel		Total Xylene
	Potassium		
	Sodium		
	Zinc		

If pumping rates of wells in the South Plume Module are increased above rates established in 1998 (maximum pumping rates listed in Table 5-1 of the OMMP under the objective of minimizing the impact to the Paddys Run Road Site plume) then arsenic sampling will be conducted weekly in Monitoring Wells 2128, 2625, 2636, 2900, and in Extraction Wells 3924 and 3925. The arsenic sampling will be used to determine if the increased pumping rates have adversely impacted the Paddys Run Road Site plume. The weekly sampling will be done for a minimum of three weeks after a pumping rate increase; if no changes in arsenic concentration trends are observed, the increased arsenic sampling will be discontinued. Figure 3-6 identifies the locations of these monitoring wells.

3.6.2.5 Monitoring Non-Uranium Groundwater FRL Constituents without IEMP FRL Exceedances

Monitoring for non-uranium groundwater FRL constituents that have not had an FRL exceedance since the inception of the IEMP, will be addressed during Stage III, Certification/Attainment Monitoring, as necessary.

3.6.2.6 Routine Water Level Monitoring

The water table in the Great Miami Aquifer and its response to seasonal fluctuations has been well characterized in the Remedial Investigation Report for Operable Unit 5. Water level data have been routinely collected at the Fernald site since 1988. Water level data are used to evaluate seasonal variations and interpret groundwater flow directions. This is accomplished by preparing hydrographs and maps of the water table in the Great Miami Aquifer. During the remediation phase of the CERCLA process, water levels will be monitored across the site to assess the effects of extraction operations on the water table and flow conditions within the Great Miami Aquifer.

The Great Miami Aquifer is an unconfined aquifer and responds rapidly to recharge events. Data collected at the Fernald site and reported in the Operable Unit 5 Remedial Investigation Report document that no strong vertical gradients exist in the area of the Fernald site. Water level monitoring will rely mostly on data from Type 2 wells, which will be supplemented as necessary with data from Type 3, Type 6, and Type 8 wells. Type 8 wells will have water level measurements taken in the top and bottom channels. If the top channel is dry, a measurement will be collected from the next deeper channel that is not dry.

Approximately 180 monitoring wells were selected for water level monitoring; they are shown in Figure 3-8 and listed below. Groundwater elevation monitoring locations were selected to provide areal coverage across the Fernald site with an increasing density of wells in areas surrounding active aquifer restoration wells. Groundwater elevations will be measured quarterly in these wells to provide data for construction of water table elevation maps. These maps will be used to interpret the location of flow divides, capture zones, and stagnation zones created by the operation of remediation wells. Additional monitoring wells and more frequent measurement intervals may be used near aquifer remediation modules as they become operational and as sensitive capture zones or stagnation zones are identified, or if unpredicted fluctuations in contaminant concentrations are observed.

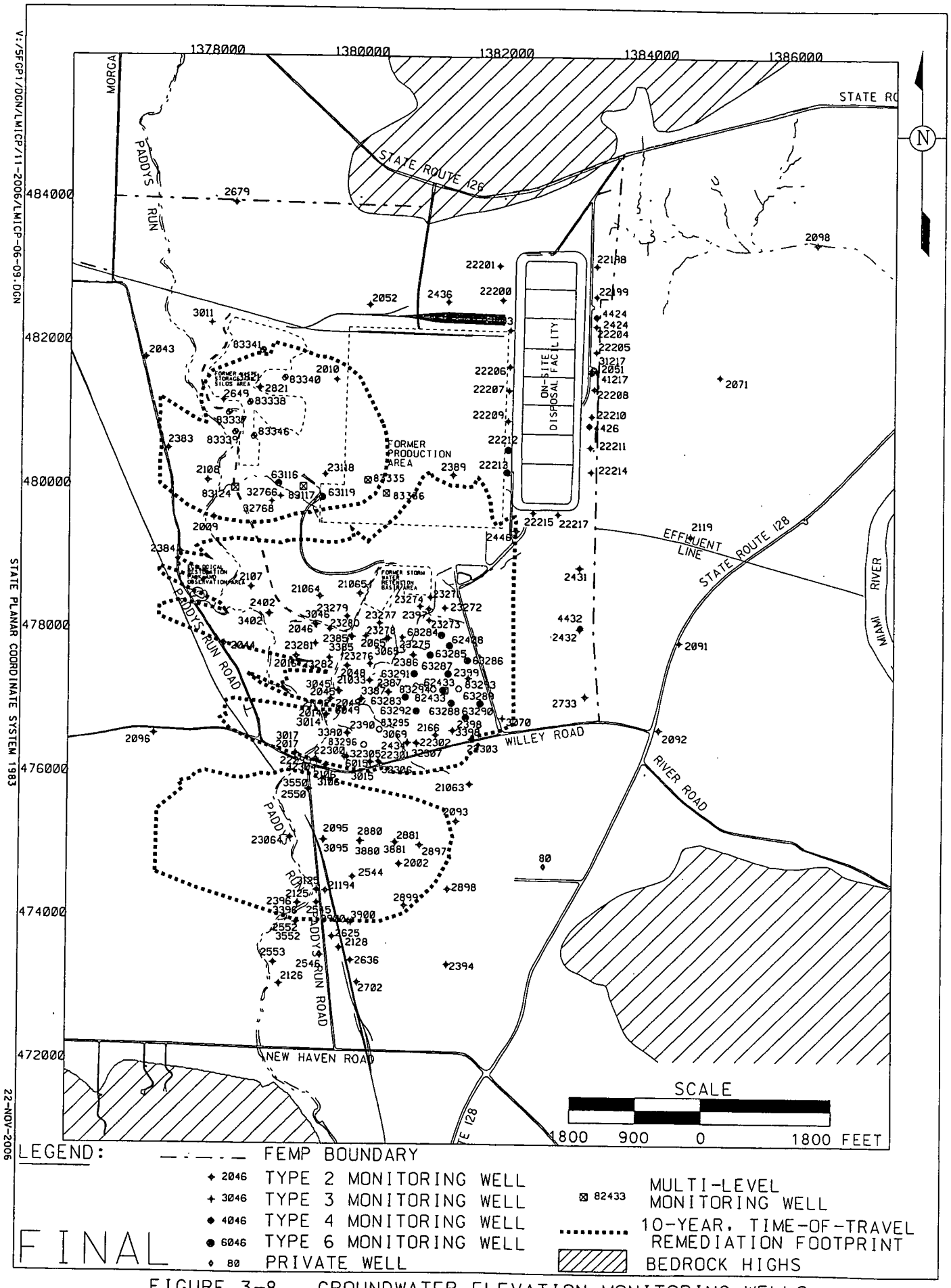


FIGURE 3-8. GROUNDWATER ELEVATION MONITORING WELLS

LIST OF GROUNDWATER ELEVATION MONITORING WELLS

80	2389	3017	22203	32306
2002	2390	3045	22204	32307
2009	2394	3046	22205	32766
2010	2396	3049	22206	32768
2014	2397	3065	22207	41217
2016	2398	3069	22208	62408
2017	2399	3070	22209	62433
2043	2402	3095	22210	63116
2044	2424	3106	22211	63119
2045	2431	3125	22212	63283
2046	2432	3385	22213	63284
2048	2434	3387	22214	63285
2049	2436	3390	22215	63286
2051	2446	3396	22217	63287
2052	2544	3398	22299	63288
2065	2545	3402	22300	63289
2071	2546	3550	22301	63290
2091	2550	3552	22302	63291
2092	2552	3821	22303	63292
2093	2553	3880	23064	82433
2095	2625	3881	23118	83117
2096	2636	3900	23271	83124
2098	2649	4424	23272	83293
2106	2679	4426	23273	83294
2107	2702	4432	23274	83295
2108	2733	6015	23275	83296
2119	2821	21033	23276	83335
2125	2880	21063	23277	83336
2126	2881	21064	23278	83337
2128	2897	21065	23279	83338
2166	2898	21192	23280	83339
2383	2899	21194	23281	83340
2384	2900	22198	23282	83341
2385	3011	22199	31217	83346
2386	3014	22200	32304	
2387	3015	22201	32305	

3.6.2.7 Sampling Procedures

Sample analysis will be performed either on-site or at off-site contract laboratories, depending on specific analyses required, laboratory capacity, turnaround time, and performance of the laboratory. The laboratories used for analytical testing have been audited to ensure that Department of Energy Consolidated Audit Program (DOECAP) or equivalent process requirements have been met as specified in the Legacy Management CERCLA Sites Quality Assurance Project Plan (LM QAPP). These criteria include meeting the requirements for performance evaluation samples, pre-acceptance audits, performance audits, and an internal quality assurance program.

All monitoring wells will be purged and sampled using the guidelines specified in the Office of Legacy Management Sampling Analysis Plan (OLM SAP) and the LM QAPP, which have been incorporated into the standard operating procedures used for conducting groundwater sampling. Table 3-7 summarizes the field sampling information by analytical constituent groups and includes the analytical support level (ASL), holding time, preservative, container requirement, and analytical method. The volume of purge water to be removed from monitoring and extraction wells is specified in OLM SAP.

An objective of the IEMP groundwater monitoring program is to collect and analyze representative groundwater samples. The sample analysis for metals and radionuclides should quantify species that are dissolved, occur as mobile precipitates, or are adsorbed onto mobile particles. If immobile particles to which metals are bound are allowed to remain in field-acidified samples, then the laboratory analysis will overstate the true concentration of mobile species present in the sample because acidification dissolves precipitates or causes adsorbed metals to desorb. Turbidity readings and the use of filtration to obtain a representative sample are therefore important field concerns for collection of groundwater samples.

Consistent with OEPA guidelines, 5 nephelometric turbidity units (NTU) will serve as the cut-off for a representative groundwater sample collected from a monitoring well and for determining when filtration of the sample to be analyzed for metals/radionuclides is required. Routine filtration of samples collected from monitoring wells will be avoided at the Fernald site whenever possible. Proper well construction and maintenance will be practiced in order to help keep the turbidity of unfiltered groundwater samples at or below 5 NTU. If, after properly purging a monitoring well, the sample turbidity is greater than 5 NTU, then the sample will be filtered through a 5-micron filter. If the turbidity of the 5-micron filtered sample is still above 5 NTU, then the 5-micron filtered sample will be additionally filtered through a 0.45-micron filter. Both the unfiltered and final filtered uranium sample will be analyzed. The final filtered sample will be analyzed for metals and radionuclides only.

Due to the temporary nature of direct-push sampling locations and the smaller amount of development that

takes place compared to a monitoring well, direct-push samples are often turbid. Therefore, direct-push groundwater samples are routinely filtered through a 5-micron filter. Measured uranium concentrations in direct-push samples collected in 2001 were consistently similar regardless of whether or not the sample was filtered using a 5-micron filter or a 0.45 micron filter. Therefore, direct-push samples for uranium analysis are routinely filtered through a 5-micron filter only. Exceptions to this filtering procedure include the collection of Waste Storage Parameters as discussed in Section 3.6.2.3.

3.6.2.8 Quality Control Sampling Requirements

Field quality control samples will be collected to assess the accuracy and precision of field and laboratory methods as outlined in OLM SAP and LM QAPP. These samples will be collected and analyzed in order to evaluate the possibility that some controllable practice, such as decontamination, sampling technique, or analytical method may be responsible for introducing bias in the analytical results. The following types of quality control samples will be collected: sampling equipment rinsates, trip blanks, and duplicate samples. Each quality control sample is preserved using the same method for groundwater samples. The quality control sample frequencies will be tracked to ensure the proper frequency requirements are met as follows:

- Trip blanks will be prepared for each sampling team on each day of sampling when organic compounds are included in the respective analytical program. They will be prepared before entering the field, and will be taken into the field and handled along with the collected samples. Trip blanks will not be opened in the field.
- Equipment rinsates will be collected for every 20 groundwater samples that are collected using reusable sampling equipment. If a specific sampling activity consists of less than 20 groundwater samples, then a rinsate sample will still be required. Rinsates are not required when dedicated well equipment or disposable sampling equipment is used.
- Field duplicates will be collected for every 20 groundwater samples (or fraction thereof) if the specific sampling program consists of fewer than 20 samples.

The groundwater samples associated with each quality control sample also will be tracked to ensure traceability in the event that contaminants are detected in the quality control samples.

TABLE 3-7

ANALYTICAL REQUIREMENTS FOR THE GROUNDWATER MONITORING PROGRAM

Constituent	Method	Sample Type	ASL[a]	Holding Time[b]	Preservative[b]	Container[b,c]
General Chemistry:						
Fluoride	300.0[d], 340.2[d], or 4500C[e]	Grab	B	28 days	None	Plastic
Nitrate/Nitrite	353.1[d], 353.2[d], 4500D[e], or 4500E[e]	Grab	B	28 days	Cool to 4EC, H_2SO_4 to pH <2	Plastic or glass
Phosphorus	365.(all)[d] or 4500E[e]	Grab	B	28 days	Cool to 4EC, H_2SO_4 to pH <2	Plastic or glass
Inorganics:						
Metals	6020[f], 7000A[f], or 6010B[f]	Grab	B	6 months	HNO_3 to pH <2	Plastic or glass
Radionuclides: (All Radiological)	DOE-EML HASL 300[g]	Grab	B	Six months or 5x half-life, whichever is less	HNO_3 to pH <2	Plastic or glass
Volatile Organics:	8260B[f]	Grab	B	7 days	Cool to 4EC	Glass vial with Teflon-lined septum cap
		Grab	B	14 days	Cool to 4EC H_2SO_4, HCl, or solid $NaHSO_4$ to pH <2	Glass vial with Teflon-lined septum cap
Field Parameters[h]:	OLM SAP & LM QAPP[i]	Grab	A	NA[j]	NA[j]	NA[j]

Note: The analytical site-specific contract identifies the specific method.

[a]The ASL may become more conservative if it is necessary to meet detection limits or data quality objectives.
[b]Appropriate preservative, holding time, and container will be used for the corresponding method.
[c]Container size is left to the discretion of the individual laboratory.
[d]Methods for Chemical Analysis of Water and Wastes (EPA 1983)
[e]Standard Methods for the Examination of Water and Wastewater (APHA 1989)
[f]Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA 1998)
[g]Procedures Manual of the Environmental Measurements Laboratory (DOE 1997b)
[h]Field parameters include dissolved oxygen, pH, specific conductance, temperature, and turbidity.
[i]The OLM SAP and LM QAPP provide field analytical methods.
[j]NA = not applicable

3.6.2.9 Decontamination

In general, decontamination of equipment is minimized due to limited use of reusable equipment during sample collection. However, if decontamination is required, then equipment will be cleaned between sample locations. The decontamination is identified in the LM QAPP and more specifically outlined in the OLM SAP.

3.6.2.10 Waste Disposition

Wastes that will be generated during sampling activities are purge water and decontamination solutions, and contact wastes. The following subsections provide the proposed disposition methodology for each type of waste generated.

Purge Water and Decontamination Solutions: All decontamination wastewater and purge water will be containerized and disposed through the CAWWT for treatment. The point of entry into the CAWWT will either be via the CAWWT back wash basin or the OSDF permanent lift station.

Contact Wastes: Contact wastes, such as personal protective equipment, paper towels, and other solid, wastes, will be placed in plastic bags and placed in dumpsters.

3.6.2.11 Monitoring Well Maintenance

Monitoring wells at the Fernald site will be maintained in order to keep them in a condition that is protective of the subsurface environment and to ensure that representative groundwater samples can be obtained. Two types of activities are recognized; well maintenance inspections and well evaluations.

Well Maintenance Inspections

Routine inspections of Great Miami Aquifer groundwater monitoring wells will be conducted during sampling or collection of water levels (at a minimum of once a year if the well is not being routinely sampled) to determine if the well is protective of the environment based on the inspection criteria below. Wells may be inspected more frequently if they are located in an area of active surface restoration. All assessment and maintenance activities will be recorded on applicable field data forms. The inspections include, but are not limited to, the following:

- Ensuring that the well identification number is painted or welded on the top of the lid
- Inspecting the ground surrounding the well for depressions and channels that allow surface water to collect and flow toward the wellhead; and for debris and foreign material that could leach contaminants into the subsurface or otherwise interfere with well sampling

- Ensuring visibility and accessibility to the well
- Inspecting locking lids and padlocks to check for rust and ease of operation
- Inspecting the exposed (protective) well casing to ensure that it is free of cracks and signs of corrosion; it is reasonably plumb with the ground surface; it is painted bright orange; the drain hole is clear; it is free of debris; and the well casing has no sharp edges
- Removing and inspecting the well cap to ensure that it is free of debris, fits securely, and the vent hole is clear; and if equipped with a ground-flush cap, ensuring that it is water-tight to prevent surface water from entering the well
- Inspecting concrete surface seals for settling and cracking
- If exterior guards are used to protect the well, then periodically inspecting the guards for visibility and damage and repaint, if necessary.

Well Evaluation

A monitoring well evaluation will be initiated if there is an indication that the monitoring well may no longer by yielding a representative groundwater sample. A monitoring well may no longer be yielding a representative groundwater sample for several reasons. The well's integrity may be compromised, as determined through the well maintenance inspections discussed above. The downhole integrity of the monitoring well may be compromised as evidenced through an increase in the turbidity of the collected sample or the amount of sediment measured in the bottom of the monitoring well. The bioaccumulation of metals around the monitoring well may be occurring as evidenced by the cloudiness or coloration of the collected water sample or the odor of the collected sample. If a problem is suspected then the following work may be performed to evaluate the cause:

- Review existing well installation documentation
- Review well history and historical water quality data to identify whether it produces consistently clear or turbid samples
- Review groundwater sampling field records
- Conduct a downhole camera survey to inspect the integrity of the screen and casing.

At least once a year, an assessment will be made of wells that are sampled as to whether or not the well is yielding a representative sample. This assessment includes, but is not limited to, the following:

- Determining how much sediment has entered the well screen and accumulated in the well; and review historical depth records. This will be done by measuring the depths of those wells that do not have dedicated packers.
- Determining if any foreign material is present in the well (e.g., bentonite grout)
- Determining if the groundwater color has changed over time (e.g., due to iron bacteria)
- Evaluating turbidity within the sample

- Noting if an odor that could be associated with biofouling (i.e., rotten egg smell or fish smell) is present.

Well Maintenance Corrective Actions

Corrective actions to address problems identified in the well maintenance inspections will be conducted as soon as feasible. Corrective maintenance to address excessive turbidity will include removal of sediment from the well through redevelopment of the well.

It is possible that minerals can precipitate on well screens or that metals can bioaccumulate around well screens. If it is determined that minerals have precipitated in the well or on the well screen or that metals have bioaccumulated around the well screen and the representativeness of the groundwater sample is being impacted, then the limited use of chemicals (e.g. chlorine, hydrochloric acid, etc.) to remove the mineral build-up or alleviate the biofouling may be considered. It should be noted that CMT wells could probably not be rehabilitated due to the small diameters of the sampling channels. It is understood that chemicals have a very limited application in the rehabilitation of monitoring wells because the chemicals can cause changes such that the well will no longer yield a representative sample (EPA 1991). Changes resulting from the use of chemicals could last for a short time or could be permanent. Therefore, if chemical rehabilitation is attempted, it will only be attempted as a last resort. Water quality parameters (such as Eh [(redox potential], pH, temperature, and conductivity) will be measured prior to the application of the chemicals and following the use of the chemicals. These measurements will serve as values for comparison of water quality before and after well maintenance.

If a groundwater monitoring well has been damaged in such a way that it is no longer protective of the subsurface environment and it cannot be repaired, then the well will be plugged and abandoned. If it is determined that the well is not yielding a representative groundwater sample and rehabilitation efforts are not effective in correcting the condition, then the well will be considered for plugging and abandonment. If the well is still protective of the subsurface environment, then it might be used for the collection of water level data even though it does not yield representative groundwater samples. Wells designated for plugging and abandonment may be sampled one last time for a subset of water quality parameters listed in Table 3-5.

The exact parameter list selected for the sampling will be based on the location of the well. CMT wells being plugged and abandoned may have each available channel sampled for total uranium (or any groundwater FRL constituent) prior to being plugged and abandoned, as deemed appropriate. A replacement monitoring well will only be installed if the monitoring well that was plugged and abandoned was being actively monitored for either water quality or water levels. Any preliminary decision not to replace a monitoring well will be discussed with the EPA and OEPA prior to finalizing the decision.

3.6.3 Change Control

Changes to the medium-specific plan will be at the discretion of the project team leader. Prior to implementation of field changes, the project team leader or designee shall be informed of the proposed changes and circumstances substantiating the changes. Any changes to the medium-specific plan must have written approval by the project team leader or designee, Quality Assurance representative, and the field manager prior to implementation. If a Variance/Field Change Notice is required, it will be completed in accordance with LM QAPP. The Variance/Field Change Notice form shall be issued as controlled distribution to team members and will be included in the field data package to become part of the project record. During revisions to the IEMP, Variance/Field Change Notices will be incorporated to update the medium-specific plan.

3.6.4 Health and Safety Considerations

The Fernald site's Health and Safety personnel are responsible for the development and implementation of health and safety requirements for this medium-specific plan. Hazards (such as physical, radiological, chemical, and biological) typically encountered by personnel when performing the specified field work will be addressed during team briefings. Health and Safety requirements are addressed in the Fernald Site Project Safety Plan.

All involved personnel will receive adequate training to the health and safety requirements prior to implementation of the field work required by this medium-specific plan. Safety meetings will be conducted prior to beginning field work to address specific health and safety issues.

3.6.5 Data Management

Field documentation and analytical results will meet the IEMP data reporting and quality objectives, comply with the LM QAPP, LM Standard Practice for Validation of Laboratory Data (DOE 2006i), and the OLM SAP. Data documentation and validation requirements for data collected for the IEMP fall into two categories depending upon whether the data are field- or laboratory-generated. Field data validation will consist of verifying medium-specific plan compliance and appropriate documentation of field activities. Laboratory data validation will consist of verifying that data generated are in compliance with ASLs specified in the medium-specific plan. Specific requirements for field data documentation and validation, and laboratory data documentation and validation will be in accordance with the LM QAPP, the Standard Practice for Validation of Laboratory Data, and the OLM SAP.

There are five analytical levels (ASL A through ASL E) defined for use at the Fernald site. For groundwater, field data documentation will be at ASL A, and laboratory data documentation, in general, will be at ASL B. A more conservative ASL may be required for laboratory data in order to meet required detection limits or in

order to ensure data quality objectives. ASL B is appropriate for laboratory-generated data because the data are being used for surveillance during site restoration. ASL B provides qualitative, semi-qualitative, and quantitative data with some quality assurance/quality control checks.

At a minimum, 10 percent of the IEMP field and analytical data will undergo validation to ensure that analytical data are in compliance with the ASL method criteria being requested and in order to meet data quality objectives. The percentage of data validated could increase in order to meet data quality objectives.

Data will be entered into a controlled database using a double-key or other verification method to ensure accuracy. The hard copy data will be managed in the project file according to LM record keeping requirements and DOE Orders.

3.6.6 Quality Assurance

Assessments of work processes shall be conducted to verify quality of performance, and may include audits, surveillances, inspections, tests, data verification, field validation, and peer reviews. Assessments shall include performance-based evaluation of compliance to technical and procedural requirements and corrective action effectiveness necessary to prevent defects in data quality. Assessments may be conducted at any point in the life of the project. Assessment documentation shall verify that work was conducted in accordance with IEMP, OLM SAP, and LM QAPP requirements.

Recommended semiannual quality assurance assessments or surveillances shall be performed on tasks specified in the medium-specific plan. These assessments may be in the form of independent assessments or self-assessments, with at least one independent assessment conducted annually. Independent assessments are the responsibility of quality assurance personnel. The project team leader and quality assurance personnel will coordinate assessment activities and comply with the LM QAPP. The project or quality assurance personnel shall have "stop work" authority if significant adverse effects to quality conditions are identified or work conditions are unsafe.

3.7 IEMP GROUNDWATER MONITORING DATA EVALUATION AND REPORTING

This section provides the methods to be used in analyzing the data generated by the IEMP groundwater sampling program. It summarizes the data evaluation process and actions associated with various monitoring results. The planned reporting structure for IEMP-generated groundwater data, including specific information to be reported in the annual site environmental report, is also provided.

3.7.1 Data Evaluation

Data resulting from the IEMP groundwater program will be evaluated to meet the program expectations identified in Section 3.4.1. Data evaluation will look at both the operational efficiency and the operational

effectiveness of the groundwater remediation system (EPA 1992). Operational efficiency refers to implementing the most efficient remedy possible. The objectives are to minimize downtimes, conduct stable operations, meet planned performance goals, and operate a cost-effective system. Operational efficiency will be assessed by tracking the following:

- Pumping rates for individual wells and modules
- Gallons of water pumped
- Extraction well total hours of operation during the year
- The volume of treated water
- Planned versus actual gallons of water pumped.

Operational effectiveness refers to the evaluation of the degree of contamination cleanup achieved. Operational effectiveness will be assessed by tracking the following:

- Planned versus actual pounds of uranium removed from the Great Miami Aquifer
- Pounds of uranium removed per million gallons of water pumped (uranium removal index)
- Running cumulative pounds of uranium removed from the Great Miami Aquifer versus predicted running cumulative pounds of uranium removed from the Great Miami Aquifer
- Total uranium concentration data collected from extraction wells
- Total uranium concentration data collected from monitoring wells
- Water level data collected from monitoring wells
- Interpretations of capture zones
- Regression curves of uranium concentration data at extraction wells
- Regression curves of uranium concentration data at groundwater monitoring wells started every five years. Regression curves of uranium concentration data at groundwater monitoring wells will be prepared every five years because only two data points a year will be added to the database used to generate the curves.

Most of the data will be tabulated, presented in graphs, or presented in maps and evaluated in the following manner:

- Concentration versus time plots for specific constituents
- Tables identifying wells with constituents above FRL concentrations
- Mann-Kendall trend analyses for specific constituents
- Concentration contour maps.

Large quantities of data will be collected and evaluated each year. In order to evaluate the results of the sampling, the data collected for the IEMP will be presented and evaluated using the formats above. The

findings of data evaluations will be shared with project personnel. The EPA and OEPA have identified that this is a successful method of evaluating and presenting the data. Groundwater monitoring program data will be evaluated to:

- Assess progress in capturing and restoring the area containing the >30-µg/L total uranium plume
- Assess progress in capturing and restoring the areas affected by non-uranium FRL exceedances
- Assess water quality at the downgradient Fernald site property boundary
- Assess model predictions
- Assess the impact that the aquifer restoration is having on the Paddys Run Road Site plume
- Meet other monitoring commitments
- Address community concerns.

The aquifer restoration system is designed to reduce the concentration of uranium and non-uranium FRL constituents in the aquifer to concentrations that are at or below their FRL. Because uranium is the principal COC, the aquifer restoration system has been designed to capture the 30-µg/L total uranium plume, with the understanding that the system may need to be modified in the future to capture and remediate non-uranium FRL constituents.

Extraction wells have been positioned within each restoration module to capture the uranium plume. Operational decisions and pumping changes will focus on the capture of the uranium plume. Operational changes to meet non-uranium FRL concentrations are considered to be a secondary objective. However, evaluation of the need for an operational change to address non-uranium FRL constituents will be ongoing throughout aquifer remediation and is expected to gain in importance as the achievement of the uranium objective approaches.

Following is a discussion of how each of the groundwater program expectations are intended to be met through evaluation of IEMP groundwater data.

Capturing and Restoring the Area Containing the >30-µg/L Total Uranium Plume

Capture and restoration of the area containing the >30-µg/L total uranium plume will be evaluated using groundwater elevation data and the most current maximum total uranium plume interpretation. Groundwater elevation maps with capture zone and flow divide interpretations will be prepared to evaluate the extent of capture.

Remediation of the 30-µg/L total uranium plume will be assessed by monitoring total uranium concentrations over time. The 30-µg/L maximum total uranium plume will be mapped and compared to previous maps to determine how the plume has changed in response to remediation. Direct-push sampling

data will be used throughout the remedy to supplement fixed monitoring well location data by providing vertical profile concentration data.

If a new total uranium FRL exceedance is detected in the aquifer, then an attempt will be made to determine the cause of the exceedance. Considerations will include:

- Movement of known total uranium contamination in response to pumping, or natural migration
- New contamination reaching the aquifer as a result of restoration activity
- Previously undetected uranium contamination that has now moved into a monitoring zone as a result of pumping, or natural migration.

When a new extraction well begins operating, water levels will be collected more frequently until conditions have stabilized. Once conditions have stabilized, monitoring will fall back to the regular IEMP monitoring schedule. Individual start-up plans will provide specifics on the frequency of water level and water quality data collection during the start-up time period.

Capturing and Restoring the Areas Affected by Non-uranium FRL Exceedances

The Operable Unit 5 Record of Decision identifies 49 FRL constituents, other than total uranium, that also need to be tracked as part of the aquifer restoration. These 49 constituents are collectively referred to as the non-uranium FRL constituents. During the aquifer restoration, groundwater monitoring will take place for the non-uranium FRL constituents. Constituents that have been detected in the aquifer above their respective FRL will be monitored semiannually.

Non-uranium FRL concentration trends in the Great Miami Aquifer will be assessed through trend analysis when sufficient data have been obtained. The Mann-Kendall statistical test for trend will be used to facilitate the trending interpretation. Concentrations versus time plots may be used to illustrate how the concentrations are trending.

If a new non-uranium FRL exceedance is detected in the aquifer, then an attempt will be made to determine the cause of the exceedance. Considerations will include:

- Movement of known contamination in response to pumping or natural migration
- New contamination reaching the aquifer as a result of restoration activity
- Previously undetected contamination that has now moved into a monitoring zone as a result of pumping or natural migration.

Any FRL exceedance detected at a property boundary/plume boundary well location will be evaluated using the same data evaluation protocol that was approved for the Restoration Area Verification Sampling Program, Project-Specific Plan (DOE 1997c) in order to determine if additional action is required. The constituent concentration data over time will be graphed. If two or more sampling events following an FRL exceedance indicate that the concentrations are below the FRL, then the location will not be considered for remediation or further monitoring above and beyond what is already prescribed by the IEMP. If sampling following the initial FRL exceedance indicates that the exceedance was not just a one-time occurrence, and the exceedance is judged to be the result of Fernald site activities (either historical or current), then action will be taken to address the exceedance.

Meeting Other Monitoring Commitments

Other groundwater monitoring commitments that need to be addressed are private well sampling, property boundary monitoring, and fulfillment of DOE Order 450.1 requirements to maintain an environmental monitoring program for groundwater.

Total uranium data collected at private wells will be graphed to illustrate changes and will be used in the preparation of total uranium contour maps. Data collected from the Fernald site property/plume boundary monitoring system will be compared to FRLs. This will facilitate the detection and monitoring of FRL exceedances and will determine if interim actions are warranted, in addition to implementing the sitewide aquifer restoration. Lastly, this groundwater monitoring program presented in the IEMP, along with the groundwater data reporting in IEMP annual integrated site environmental reports, fulfills DOE Order 231.1 requirements.

Groundwater Modeling

Groundwater uranium concentration data and water level data obtained through the life of the remedy will be compared against model-predicted concentrations and water levels to evaluate how reasonable the predictions are over the long term. Individual well residuals (model-predicted concentration versus actual measured concentrations) will be determined without running the model. A mean residual calculation for each monitoring event will also be determined. Monitoring wells in the remediation footprint of the aquifer will be included in the residual exercise. Results of the first assessment were provided in the 2005 Site Environmental Report. A brief summary of background information on the groundwater model follows.

Since modeling was conducted for the Remedial Investigation/Feasibility Study and Baseline Remedial Strategy reports, the model has undergone several changes in order to improve its capability for making

water level and uranium concentration predictions. DOE has changed from the Sandia Waste Isolation Flow and Transport (SWIFT) groundwater modeling code to the Variably Saturated Analysis Model in 3 Dimensions (VAM3D) modeling code for all site groundwater modeling operations. This transition has been documented in detail in Development and Verification of VAM3DF, a Numerical Flow and Transport Modeling Code (HydroGeologic 1998).

The groundwater modeling grid used in the SWIFT model was retained for the VAM3D model. However, vertical discretization of the model was increased in the VAM3D model to 12 vertical layers instead of the six layers used in the SWIFT model.

The groundwater model was recalibrated for flow to address observed changes in water level conditions and to address seasonal changes in water levels prior to it being used to support the design of the Waste Storage Area Module in 2001, the South Field (Phase II) Module in 2002, and the Waste Storage Area (Phase II) Module in 2005. The 12-layer VAM3D model was recalibrated to current groundwater elevations in May 2000 with calibration activities detailed in the Great Miami Aquifer VAM3D Flow Model Recalibration Report (DOE 2000b). With increased vertical resolution in the VAM3D ZOOM model (14 layers compared to 12 layers in the original VAM3D model), predicted wellhead concentrations for total uranium more closely match observed wellhead concentrations. Wellhead concentration decline curves were published in the 2004 Site Environmental Report (DOE 2005f) comparing modeled versus observed wellhead concentrations for total uranium. These comparisons continue to be provided in annual site environmental reports.

In the past, initial conditions in the fate and transport portion of the groundwater model have been routinely updated. Until recently, the update of initial conditions was considered necessary to incorporate additional characterization data collected during the design of the planned groundwater restoration modules (South Plume Module, South Field [Phases I and II] Module, and Waste Storage Area [Phases I and II] Module). Without the update of initial conditions, the module designs would not have reflected the most up-to-date plume conditions. Because the last planned aquifer restoration module design was recently completed (Waste Storage Area [Phase II] Design), the process of routinely updating initial conditions in the fate and transport portion of the groundwater model has stopped.

Because of significant seasonal changes in Great Miami Aquifer groundwater elevations, three sets of steady-state flow model boundary conditions were developed for the VAM3D model as a result of the recalibration effort. These three steady-state flow model boundary conditions correspond to nominal groundwater elevations, and minimum and maximum groundwater elevations observed during the wet and dry seasons of the year, respectively. The wet and dry boundary condition data sets will be used in future groundwater modeling activities to predict aquifer remedy performance under those conditions.

To facilitate computational efficiency, a local VAM3D ZOOM model was designed covering a smaller area than the 12-layer VAM3D model. The VAM3D ZOOM model contains 14 layers and covers an area just large enough to encompass the total uranium plume and the extraction wells in the aquifer remedy. The VAM3D ZOOM model design is documented in Integration of Data Fusion Modeling (DFM) with VAM3DF Contaminant Transport Code (HydroGeologic 2000).
Because the ZOOM model boundaries are near some of the aquifer remedy extraction wells, ZOOM model steady-state flow boundaries must be derived from the larger 12-layer VAM3D model to avoid model boundary effects impacting flow model predictions of remedy performance. For all current and future operational flow modeling activities, aquifer remedy pumping scenarios are first run to steady state in the large 12-layer VAM3D model then ZOOM model boundary values are derived from the output of the 12-layer flow model run. This technique is described in more detail in Design for Remediation of the Great Miami Aquifer, South Field (Phase II) Module.

It is understood that the groundwater model may need to be recalibrated for flow if measured water levels and model predictions are not adequate for managing the remedy. If future flow model calibration efforts are performed, the large 12-layer VAM3D model will be recalibrated to observed groundwater elevation data; then VAM3D ZOOM model boundary conditions will be derived from the larger 12-layer VAM3D model. Calibration standards will be the same as those used to calibrate the SWIFT model.

The basic strategy for assessing flow predictions will be as follows:

- Model-predicted water level values will be compared to actual field measured values. The decision to recalibrate the groundwater model will be based on how close the model predictions are to field measured values.
- The difference between the maximum and minimum measured groundwater elevation over time will be used to define a water level elevation range for a particular well. The water level range is the result of seasonal variations and long-term water level trends within the aquifer. A range of water levels over time has been established for each water level monitoring well identified in the IEMP.
- If the difference between measured elevations and modeled predictions is greater than 5 feet for more than one-third of the monitoring wells within the capture zone of the extraction system, or for a significant local area of the model domain, then the need to implement model recalibration for the affected area of the model will be evaluated. All relevant groundwater data acquired since the previous flow model calibration will be considered in future flow model calibrations. Comparisons will recognize that modeled predictions represent average conditions within a model block and monitoring wells are not usually located at the center of a model block. One solution might be to compare the surrounding eight model blocks to the actual measured elevation.

Assess the Impact that the Aquifer Restoration Has on the Paddys Run Road Site Plume

As was done since 1997, concentration data collected for key Paddys Run Road Site constituents will be evaluated using trend analysis. Water level maps will be produced to determine where capture is occurring due to pumping in the South Plume Module.

Adequately Address Community Concerns

The IEMP fulfills the informational needs of the Fernald community by preparing groundwater environmental results in the annual site environmental report. DOE makes these reports available to the public at the Public Environmental Information Center. Comments received over the life of the IEMP program regarding the IEMP groundwater program will be considered for future revisions to the IEMP.

Groundwater Certification Process and Stages

A Groundwater Certification Plan has been prepared for the Groundwater Remedy. The objective of the Certification Plan is to document the process that will be followed to certify the aquifer remedy objectives have been met. As explained below, pump-and-treat operations are currently in progress at the Fernald site. The IEMP is the controlling document for remedy performance monitoring during the pump-and-treat operational period. The IEMP will continue to be the controlling document for all groundwater monitoring needed to support the certification process following completion of pump-and-treat operations.

Figure 3-9 illustrates the groundwater certification process. Six stages have been identified for the certification process:

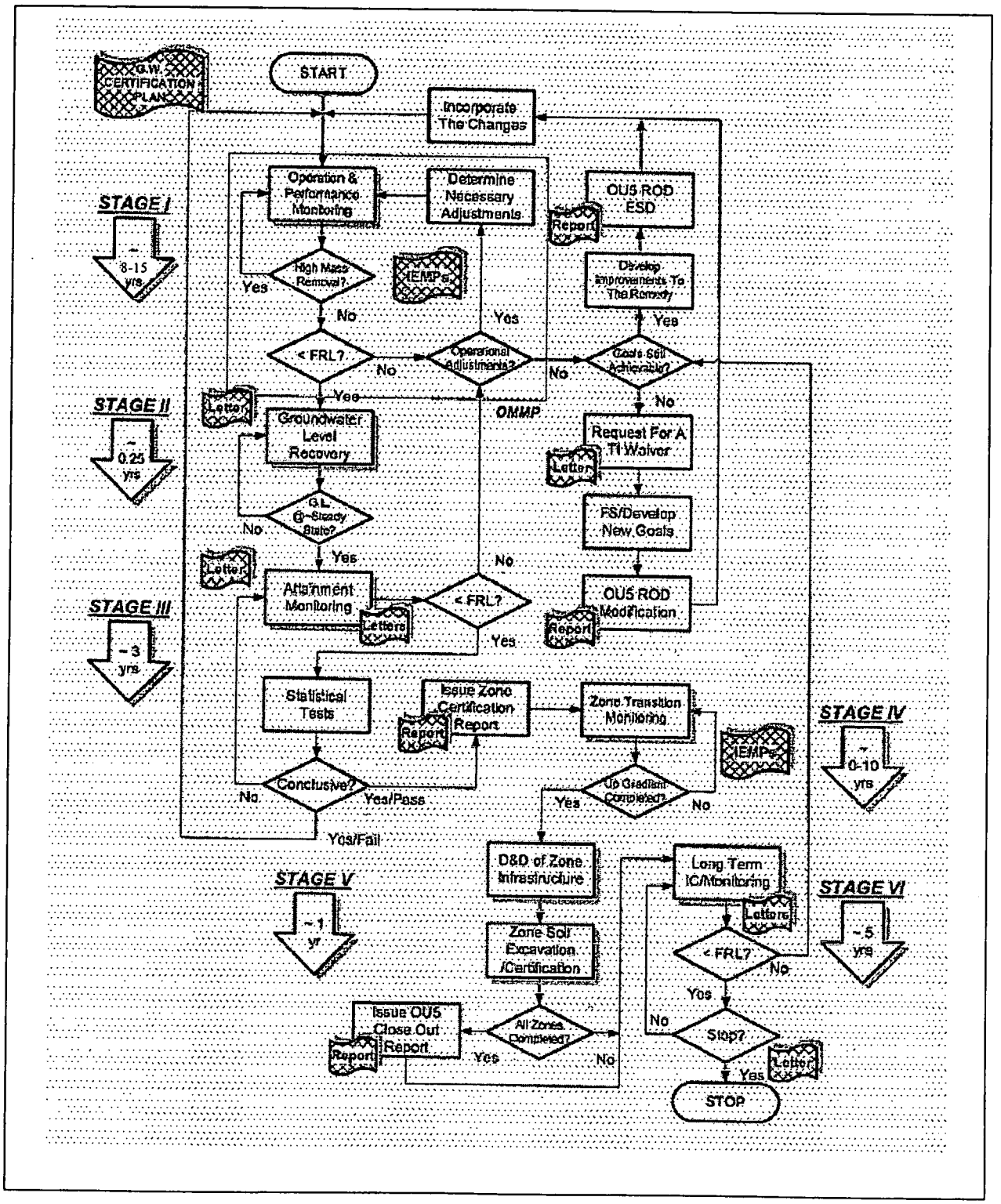
- Stage I: Pump-and-Treat Operations
- Stage II: Post Pump-and-Treat Operations/Hydraulic Equilibrium State
- Stage III: Certification/Attainment Monitoring
- Stage IV: Declaration and Transition Monitoring
- Stage V: Demobilization
- Stage VI: Long-Term Monitoring.

Remedy performance monitoring is currently supporting pump-and-treat operations. As illustrated in Figure 3-9, remedy performance monitoring is conducted to assess the efficiency of mass removal and to gauge performance in meeting FRL objectives. If it is determined that high mass removal is not being maintained, or FRL goals are not being achieved, then the need for operational adjustment will be evaluated and implemented if deemed appropriate. A change to the operation of the aquifer restoration system would be implemented through the OMMP. A groundwater monitoring change, if found to be necessary, would be implemented through the IEMP. If additional characterization data are needed beyond the current scope of the IEMP then a separate sampling plan will be prepared. Additional sampling activities may use other sampling techniques, such as a direct-push sampling tool, which has been
successfully used at the Fernald site to obtain groundwater samples without the use of a permanent monitoring well.

The IEMP will be used to document the approach for determining when various modules can be removed from service and groundwater monitoring can focus on subsequent stages of the groundwater certification process.

FIGURE 3-9

GROUNDWATER CERTIFICATION PROCESS AND STAGES



3.7.2 Reporting

The IEMP groundwater program data will be reported on the Office of Legacy Management Internet Site and in the annual site environmental report. Groundwater data that support the On-site Disposal Facility Groundwater/Leak Detection and Leachate Monitoring Plan will be provided in the same manner. Additional information on IEMP data reporting is provided in Section 7.0.

Data pertaining to the groundwater program will be provided on the Office of Legacy Management Site. The data will be in the format of searchable data sets and/or downloadable data files. This site will be updated every 2 to 4 weeks, as data become available.

The annual site environmental report will be issued each June for the previous calendar year. This comprehensive report discusses a year of IEMP data previously reported on the Office of Legacy Management Site. The report includes the following:

Operational Assessment

- The set point pumping rates for each extraction well during the year
- The uranium removal rate of individual wells
- Extraction well total hours of operation during the year
- The volume of treated groundwater
- Extraction well operating time expressed as a percentage of total available operating time
- The volume of water pumped from each extraction well during the year
- Planned versus actual gallons of water pumped
- The net water balance
- Total pounds of uranium removed during the year
- Total pounds of uranium removed from the aquifer since the start of remediation
- Planned versus actual pounds of uranium removed from the Great Miami Aquifer
- Running cumulative pounds of uranium removed from the Great Miami aquifer versus predicted running cumulative pounds of uranium removed from the Great Miami Aquifer
- Total uranium concentration data collected from extraction wells
- Total uranium concentration data collected from monitoring wells
- Water level data collected from monitoring wells
- The maximum, minimum, and average uranium concentration sent to treatment during the last year
- The monthly average uranium concentration in water discharged to the Great Miami River during

the year

- Pumping rate figures for each extraction well
- Regression curves of uranium concentration data at extraction wells
- Regression curves of uranium concentration data at groundwater monitoring wells (every 5 years).

Aquifer Conditions

- The area of capture during the year
- A description of the geometry of the total uranium plume during the year
- The effect that restoration had (i.e., pumping) on the Paddys Run Road Site plume during the year
- The status of non-uranium FRL exceedances, including any newly detected FRL exceedances
- Identification of any new areas of FRL exceedances
- A comparison of groundwater restoration performance with respect to model predictions established in the Baseline Remedial Strategy Report
- Any changes that may have been made to the operation or design.

Data that Support the On-site Disposal Facility Groundwater/Leak Detection and Leachate Monitoring Plan

- Status information pertaining to the on-site disposal facility wells along with baseline data summaries
- Leachate volumes and concentrations from the leachate collection system and from the leak detection system for the on-site disposal facility
- Results of quarterly groundwater sampling initiated after waste is placed in a cell of the on-site disposal facility.

In addition, the annual site environmental report will include trend analysis of the data collected from the on-site disposal facility.

Because the IEMP is a living document, annual reviews and five-year revisions have been instituted. The annual review cycle provides the mechanism for identifying and initiating any groundwater program modifications (e.g., changes in constituents, locations, or frequencies) that are necessary to align the IEMP with the current activities. Any program modifications that may be warranted prior to the annual review would be communicated to EPA and OEPA.

4.3.2 Design Considerations

4.3.2.1 Constituents of Concern

A comprehensive listing of COCs has been developed and provides the suite of parameters that have been evaluated for monitoring. Table 4-2 presents this information. The following is a description of each of the columns in Table 4-2.

- Column 1, Constituent: This column represents the suite of constituents considered for monitoring in the surface water pathway as a result of the remedial investigation/feasibility study process at the Fernald site. It represents the constituents for which a FRL was established in the Operable Unit 5 Record of Decision.
- Column 2, Final Remediation Levels: This column represents the human/health protective remediation levels for surface water that were established in the Operable Unit 5 Record of Decision.
- Column 3, FRL Basis: This column is the basis for establishment of the FRL as defined in the Operable Unit 5 Feasibility Study.
- Column 4, Background Values in Surface Water: This column represents updated background values for Paddys Run and the Great Miami River based on data collected for the IEMP through 2003. The IEMP provides this information for purposes of comparison.

4.3.2.2 Surface Water Cross-Medium Impact

To assess the cross-medium impact that contaminated surface water has on the underlying Great Miami Aquifer, the following design considerations are necessary:

- Samples should be collected at those points near where the glacial overburden has been breached by site drainages. As described in the Operable Unit 5 Remedial Investigation, the majority of the Fernald site is underlain by clay-rich glacial overburden. Where present, this glacial overburden provides a measure of protection to the underlying sand-and-gravel aquifer. However, the glacial overburden has been eroded by site drainages primarily in the lower reaches of Paddys Run and in the Storm Sewer Outfall Ditch (refer to Figure 4-1). Pre-design groundwater characterization activities in the waste storage and Plant 6 areas confirmed that an area in the Pilot Plant drainage ditch adjacent to Paddys Run should be considered as a primary source of infiltration. At these locations, a direct pathway exists for surface water and associated contaminants to reach the underlying sand-and-gravel Great Miami Aquifer.
- Additionally remediation and restoration efforts have created new wetlands and ponds within the site perimeter. Some of these water bodies have little or no underlying glacial overburden (e.g. former Waste Pit 3 area – refer to Figure 4-1). These newly created water bodies were sampled during remediation and as part of the Residual Risk Assessment Analysis. Sampling results from this effort will be used to refine locations (at least five) to assess the possible impacts of surface water infiltrating into the aquifer. Sampling at these locations will occur semiannually for uranium for two years to evaluate potential impacts. Data will be evaluated to determine the need for further sampling.
- Constituents analyzed should represent those area-specific COCs identified in the Operable Unit 5 Feasibility Study and subsequent fate-and-transport modeling as having the potential for cross-medium impact to groundwater via the surface water pathway.

TABLE 4-2
SURFACE WATER SELECTION CRITERIA SUMMARY

			95th Percentile Background Level in Surface Water[c,d]			
			Paddys Run		Great Miami River	
Constituent[a]	FRL[b]	FRL Basis[b]	Original	Revised	Original	Revised
General Chemistry (mg/L)						
Fluoride	2.0	A	0.22	0.272	0.9	0.503
Nitrate/Nitrite	2400	R	1.7	4.47	6.6	8.28
Inorganics (mg/L)						
Antimony	0.19	A	ND	0.0012	ND	0.00175
Arsenic	0.049	R	ND	0.00651	0.0036	0.00826
Barium	100	R	0.053	0.0546	0.1	0.101
Beryllium	0.0012	A	ND	0.0003	ND	0.0009
Cadmium	0.0098	B	ND	0.00087	0.01	0.00375
Chromium (VI)[e]	0.010	D	ND	0.00744	ND	0.010401
Copper	0.012	A	ND	0.00841	0.012	0.0147
Cyanide	0.012	A	ND	0.003	0.005	0.00412
Lead	0.010	B	ND	0.00623	0.010	0.01
Manganese	1.5	R	0.035	0.195	0.08	0.115
Mercury	0.00020	D	ND	0.000186	ND	0.000175
Molybdenum	1.5	R	ND	0.00356	0.02	0.00942
Nickel	0.17	A	ND	0.00844	0.023	0.0131
Selenium	0.0050	A	ND	0.0026	ND	0.00293
Silver	0.0050	D	ND	0.000664	ND	0.000348
Vanadium	3.1	R	ND	0.0204	ND	0.00886
Zinc	0.11	A	ND	0.0447	0.045	0.0486

TABLE 4-2
(Continued)

Constituent[a]	FRL[b]	FRL Basis[b]	95th Percentile Background Level in Surface Water[c,d]			
			Paddys Run		Great Miami River	
			Original	Revised	Original	Revised
Radionuclides (pCi/L)						
Cesium-137	10	R	3.1	4.74	ND	3.88
Neptunium-237	210	R	-	0.054	ND	0.0858
Lead-210	11	R	-	2.97	-	2.01
Plutonium-238	210	R	ND	ND	ND	0.038
Plutonium-239/240	200	R	0.09	0.093	ND	0.01
Radium-226	38	R	0.35	0.954	0.41	0.976
Radium-228	47	R	2.1	3.49	2.2	4.17
Strontium-90	41	R	0.96	3.34	ND	1.14
Technetium-99	150	R	ND	4.65	ND	11.3
Thorium-228	830	R	ND	0.238	0.62	0.180
Thorium-230	3500	R	ND	0.483	0.36	0.638
Thorium-232	270	R	ND	0.133	ND	0.178
Uranium, Total (µg/L)	530	R	1.0	1.52	1.0	2.13
Pesticide/PCBs (µg/L)						
Alpha-Chlordane	0.31	R	-	ND	-	ND
Aroclor-1254	0.20	D	-	ND	-	ND
Aroclor-1260	0.20	D	-	ND	-	ND
Dieldrin	0.020	D	-	ND	-	0.0095
Semi-Volatiles (µg/L)						
Benzo(a)anthracene	1.0	D	-	ND	-	ND
Benzo(a)pyrene	1.0	D	-	ND	-	ND
bis(2-Chloroisopropyl)ether	280	R	-	ND	-	ND
bis(2-Ethylhexyl)phthalate	8.4	A	-	2	-	2.5
Dibenzo(a,h)anthracene	1.0	D	-	ND	-	ND

TABLE 4-2
(Continued)

Constituent[a]	FRL[b]	FRL Basis[b]	95th Percentile Background Level in Surface Water[c,d]			
			Paddys Run		Great Miami River	
			Original	Revised	Original	Revised
Semi-Volatiles (µg/L) (Cont.)						
3,3'-Dichlorobenzidine	7.7	R	-	ND	-	ND
Di-n-butylphthalate	6000	R	-	5.09	-	5.5
Di-n-octylphthalate	5.0	D	-	1.75	-	ND
p-Methylphenol	2200	R	-	ND	-	ND
4-Nitrophenol	7,400,000	R	-	ND	-	ND
Volatiles (µg/L)	280	R				
Benzene	280	R	-	ND	-	0.35
Bromodichloromethane	240	R	-	ND	-	ND
Bromomethane	1300	R	-	ND	-	ND
Chloroform	79	A	-	0.782	-	0.3
1,1-Dichloroethene	15	R	-	ND	-	ND
Methylene chloride	430	A	-	1	-	ND
Tetrachloroethene	45	R	-	0.367	-	ND
1,1,1-Tricholoroethane	1.0	D	-	ND	-	ND
1,1,2-Tricholoroethane	230	R	-	ND	-	ND
Other Constituents						
Ammonia			-	0.14	-	0.178
Carbon disulfide			-	ND	-	0.35
Cobalt			-	-	-	0.0123
Trichloroethene			-	0.2	-	ND

[a]Shaded text indicates constituents selected for IEMP surface water analysis at locations other than background and NPDES Permit sample locations.
[b]Derived from Operable Unit 5 Record of Decision, Table 9-5.
A = ARAR values
B = background concentrations
D = analytical detection limit
R = human health risk
[c]ND = non-detected result
- = not applicable/not available
[d]For small data sets (less than or equal to seven samples), the maximum detected concentration is used as the 95th percentile.
[e]FRL based on chromium (VI); however, the analytical results are for total chromium.

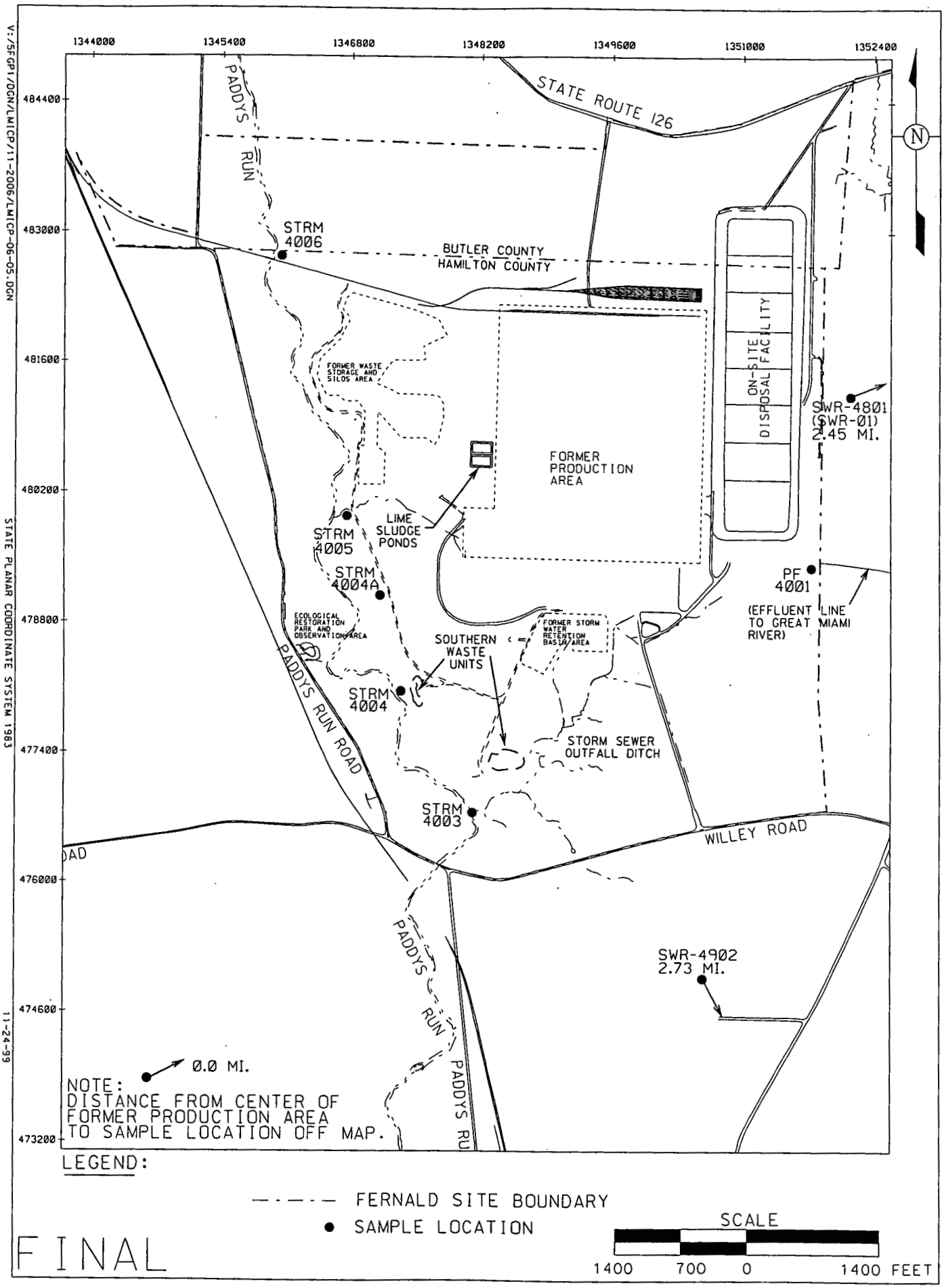


FIGURE 4-5. NPDES PERMIT SAMPLE LOCATIONS

4.3.3 Program Design

This section provides the IEMP surface water and treated effluent sampling program for 2007 through 2011 developed from the design considerations provided in Section 4.3.2. Table 4-3 summarizes the program design by providing the sample locations, the frequency, and the constituents to be sampled for at each location. This table also provides the basis for the locations and constituents with respect to program expectations identified in Section 4.3.1. To simplify the presentation of the surface water and treated effluent program, IEMP characterization consists of the first four "Basis for Selection of Constituent" columns of Table 4-3. This terminology is consistent with the approach used for reporting through the IEMP.

The non-radiological discharge monitoring and reporting related to the NPDES Permit has been incorporated into the IEMP. The radiological discharge monitoring related to the FFCA and Operable Unit 5 Record of Decision has been incorporated into the IEMP. Near the completion of site remediation, sampling will occur to certify that the surface water pathway at the Fernald site is meeting the obligations set forth in the Operable Unit 5 Record of Decision.

4.4 MEDIUM-SPECIFIC PLAN FOR SURFACE WATER AND TREATED EFFLUENT SAMPLING

This section serves as the medium-specific plan for implementation of the sampling, analytical, and data management activities associated with the IEMP surface water and treated effluent sampling program. The activities described in this medium-specific plan were designed to provide surface water and treated effluent data of sufficient quality to meet the program expectations as stated in Section 4.3.1. The program expectations, along with the design considerations presented in Section 4.3.2, were used as the framework for developing the monitoring approach presented in this plan. All sampling procedures and analytical protocols described or referenced herein are consistent with the requirements of the LM QAPP.

Subsequent sections of this medium-specific plan define the following:

- Project organization and associated responsibilities
- Sampling program
- Change control
- Health and safety
- Data management
- Project quality assurance.

4.4.1 Project Organization

A multi-discipline project organization has been established and assigned responsibility to effectively implement and manage the project planning, sample collection and analysis, and data management activities directed in this medium-specific plan. Following are the key positions and associated responsibilities required for successful implementation.

The project team leader will have full responsibility and authority for the implementation of this medium-specific plan in compliance with all regulatory specifications and sitewide programmatic requirements. Integration and coordination of all medium-specific plan activities defined herein with other project groups is also a key responsibility. All changes to project activities must be approved by the project team leader or designee.

Health and safety are the responsibility of all individuals working on this project scope. Qualified Health and Safety personnel shall participate on the project team to assist in preparing and obtaining all applicable permits. In addition, safety specialists shall periodically review and update the project-specific health and safety documents and operating procedures, conduct pertinent safety briefings, and assist in evaluation and resolution of all safety concerns.

Quality Assurance personnel will participate on the project team, as necessary, to review project procedures and activities ensuring consistency with the requirements of the LM QAPP or other referenced standard and assist in evaluating and resolving all quality related concerns.

4.4.2 Sampling Program

To fulfill the requirements of the integrated surface water and treated effluent program, surface water and treated effluent samples shall be collected from locations shown in Figures 4-3, 4-5, and 4-6. Table 4-3 summarizes the surface water and treated effluent sampling frequency and location-specific analytical suites. Tables 4-4 and 4-5 provide the sample collection and analytical method information for these locations and constituents.

Sample analysis will be performed either on-site at off-site contract laboratories, depending on specific analyses required, laboratory capacity, turnaround time, and performance of the laboratory. The laboratories used for analytical testing have been audited to ensure that DOECAP or equivalent process requirements have been met as specified in LM QAPP. These criteria include meeting the requirements for performance evaluation samples, pre-acceptance audits, performance audits, and an internal quality assurance program.

4.4.2.1 Sampling Procedures

Specific sampling procedures associated with surface water and treated effluent will be performed in accordance with directives established in the OLM SAP and the LM QAPP.

TABLE 4-4

SURFACE WATER ANALYTICAL REQUIREMENTS FOR CONSTITUENTS AT SAMPLE LOCATIONS SWD-02, SWD-03, SWP-01[a], SWP-03, AND SWR-01[a]

Constituent	Analytical Method	ASL[b]	Holding Time	Preservative	Container
Inorganics:					
Beryllium Cadmium Chromium, Total Copper Manganese Silver Zinc	7000A[c], 3500[d], 6020[c], or 6010B[c]	B	6 months	HNO_3 to pH <2	Plastic or glass
Mercury	7470A[c]	B	28 days	HNO_3 to pH <2	Plastic or glass
Cyanide, Total	9010B[c], 9012[c], 335.2[e], or 335.3[e]	B	14 days	Cool 4°C, NaOH to pH >12	Plastic or glass
Radionuclides:					
Radium-226 Radium-228 Strontium-90 Technetium-99 Thorium-228 Thorium-230 Thorium-232 Uranium, Total	DOE-EML HASL 300[f]	B	6 months	HNO_3 to pH <2	Plastic or glass
Field Parameters[g]:	OLM SAP & LM QAPP[h]	A	NA[i]	NA[i]	NA[i]

Note: The analytical site-specific contract identifies the specific method.

[a]Only sample locations SWP-01 and SWR-01 are analyzed for all constituents listed in this table. The remaining sample locations are analyzed for a subset of these constituents (summarized in Table 4-3). Note that at least five additional locations not included in the table title will be sampled for uranium. Locations will be chosen based on results from the Residual Risk Assessment Analysis.
[b]The ASL may become more conservative if it is necessary to meet detection limits or data quality objectives.
[c]Test Methods for Evaluating Solid Waste, Physical/Chemical Methods [d]Standard Methods for the Examination of Water and Wastewater
[e]Methods for Chemical Analysis of Water and Wastes
[f]Procedures Manual of the Environmental Measurements Laboratory .
[g]Field parameters include temperature, specific conductance, pH, and dissolved oxygen.
[h]The OLM SAP & LM QAPP provide field methods.
[i]NA = not applicable

Surface Water Sampling

Surface water samples will be collected from locations in Paddys Run, drainage ditches to Paddys Run, and the Great Miami River. A qualitative assessment of flow conditions (i.e., base flow, storm flow, or between storm and base flow) will be documented at the time of sample collection at each of these locations. Sampling personnel will ensure that access to the sample locations will not result in the inadvertent introduction of foreign materials into the water sample. Additional precautions will be taken to avoid the introduction of floating organic material such as leaves or twigs during sample collection. Samples will be collected without disturbing bottom sediment. Sample technicians shall approach sample locations from downstream of the location; if sample locations are accessed by way of a bridge, samples shall be collected on the upstream side of the bridge.

Samples will be collected using the methods outlined in the OLM SAP including the collection method, container, preservative, and documentation. Tables 4-4 and 4-5 identify the sample preservative, volume, and container requirements for each constituent.

Treated Effluent Sampling

Treated effluent will be collected by means of flow-proportional samplers at the Parshall Flume. Sampling will be conducted according to the OLM SAP and the Legacy Management Fernald operational procedures (DOE 2006g).

After every 24 hours of operation, the collected liquid is removed from the automatic sampler to provide a daily flow-weighted sample of the treated effluent. A portion of each daily sample is analyzed to determine the estimate of total uranium discharged to the Great Miami River for the day. The Parshall Flume will be analyzed for the constituents listed in Table 4-3 for the respective locations. Table 4-5 lists the sample preservative, volumes, container requirements, and analytical methods for each constituent.

4.4.2.2 Quality Control Sampling Requirements

Quality control samples will be taken according to the frequency recommended in the OLM SAP and LM QAPP. These samples will be collected and analyzed in order to evaluate the possibility that some controllable practice, such as sampling technique, may be responsible for introducing bias in the project's analytical results. Quality control samples will be collected as follows:

- A duplicate sample shall be collected each quarter at a randomly selected sample location
- Trip blanks will be prepared and placed in coolers containing samples for volatile organic compound analysis and shall accompany the samples from collection to receipt at the laboratory.

4.4.2.3 Decontamination

In general, decontamination of equipment is minimized because reusable equipment is not used during sample collection. However, if decontamination is required, then equipment will be cleaned between sample locations. The decontamination is identified in the LM QAPP and more specifically outlined in the OLM SAP. Sampling bailers used in sampling for mercury at NPDES Permit locations will be decontaminated at a contract laboratory.

4.4.2.4 Waste Dispositioning

Contact waste that is generated by the field technicians during field sampling activities are collected, maintained, and dispositioned, as necessary.

4.4.3 Change Control

Changes to the medium-specific plan will be at the discretion of the project team leader. Prior to implementation of field changes, the project team leader or designee shall be informed of the proposed changes and circumstances substantiating the changes. Any changes to the medium-specific plan must have written approval by the project team leader or designee, Quality Assurance representative, and the Field Manager prior to implementation. If a Variance/Field Change Notice is required, it will be completed in accordance with the LM QAPP. The Variance/Field Change Notice form shall be issued as controlled distribution to team members and will be included in the field data package to become part of the project record. During revisions to the IEMP, Variance/Field Change Notices will be incorporated to update the medium-specific plan.

4.4.4 Health and Safety Considerations

The Fernald site's Health and Safety personnel are responsible for the development and implementation of health and safety requirements for this medium-specific plan. Hazards (physical, radiological, chemical, and biological) typically encountered by personnel when performing the specified fieldwork will be addressed during team briefings. Health and Safety requirements are addressed in the Fernald Site Project Safety Plan.

All involved personnel will receive adequate training to the health and safety requirements prior to implementation of the fieldwork required by this medium-specific plan. Safety meetings will be conducted prior to beginning fieldwork to address specific health and safety issues.

4.4.5 Data Management

Field documentation and analytical results will meet the IEMP data reporting and quality objectives, comply with the LM QAPP, the LM Standard Practice for Validation of Laboratory Data, and the OLM SAP.

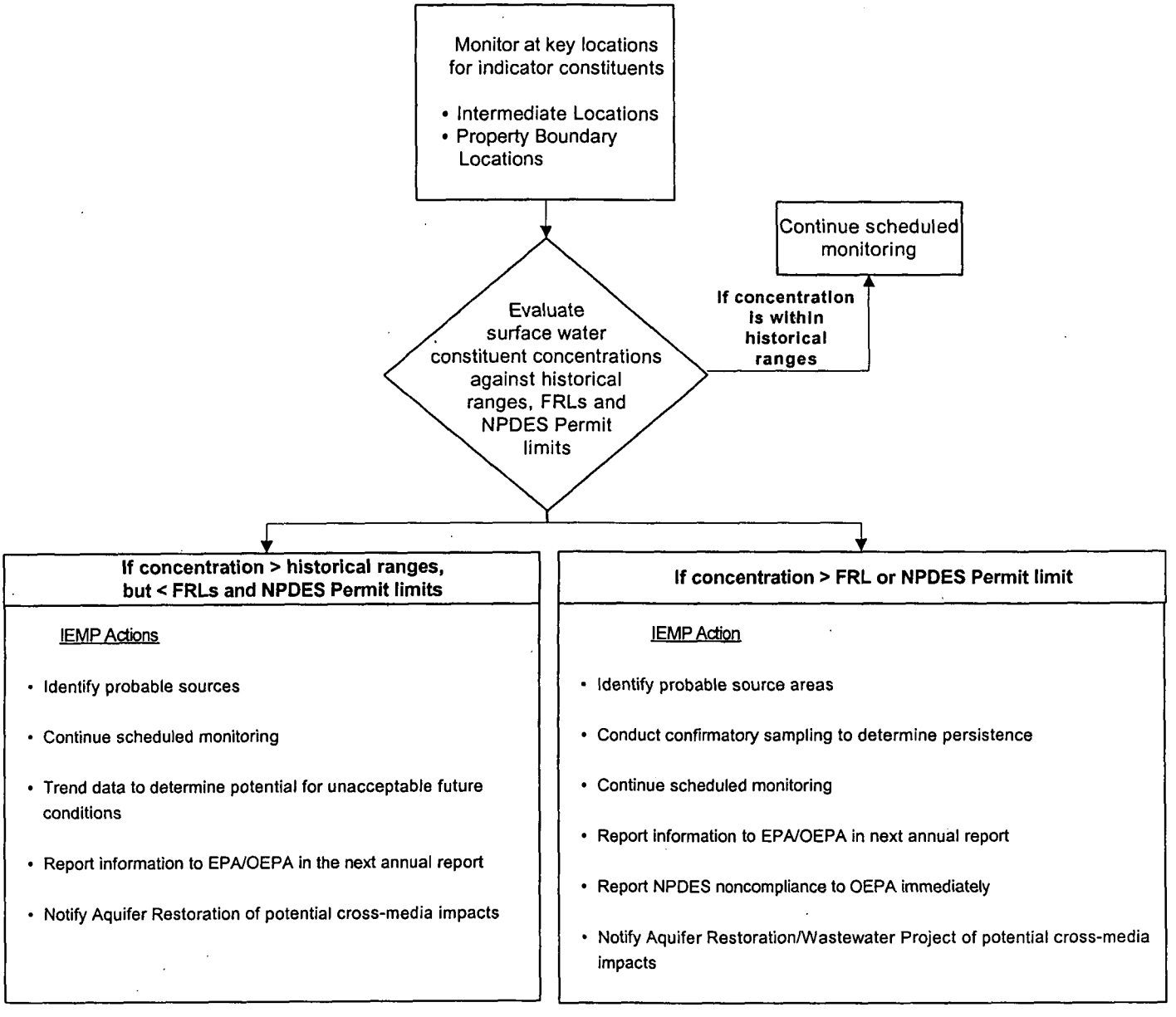


FIGURE 4-6. IEMP SURFACE WATER DATA EVALUATION AND ASSOCIATED ACTIONS

- Are the requirements of the NPDES Permit being fulfilled?

Data collected to fulfill the site NPDES Permit requirements will be evaluated for compliance with the NPDES Permit provisions. This evaluation will serve to identify if immediate reporting of noncompliances to OEPA is necessary, and to determine the appropriate corrective action to address the noncompliance.

- Are the FFCA and Operable Unit 5 Record of Decision reporting requirements being fulfilled?

Radiological discharges to the Great Miami River and Paddys Run are regulated by the FFCA and Operable Unit 5 Record of Decision. Reporting for these requirements have been incorporated into the IEMP reporting structure and include a cumulative summary of pounds of total uranium discharged, the number of treatment bypass days per reporting period, and the monthly average total uranium concentration discharged to the Great Miami River.

- Are the program and reporting requirements of DOE Order 450.1 being met?

DOE Order 450.1 requires that DOE implement and report on an environmental protection program for the Fernald site. The surface water and treated effluent monitoring program is one component of the sitewide IEMP monitoring program. This IEMP and the annual site environmental report fulfill the requirements of this DOE Order.

- Are community concerns being met through the surface water and treated effluent IEMP program?

The IEMP fulfills the needs of the Fernald community by preparing surface water and treated effluent environmental results in the annual site environmental report. DOE makes these reports available to the public at the Public Environmental Information Center. The specific community concern of the magnitude of Fernald site discharges to Paddys Run and the Great Miami River is addressed in the annual site environmental report in the surface water and treated effluent section.

4.5.2 Reporting

The IEMP surface water and treated effluent program meets the reporting requirements for the NPDES Permit and the FFCA and Operable Unit 5 Record of Decision. The IEMP surface water and treated effluent data will be reported on the Office of Legacy Management Internet Site and in the annual site environmental report. The quarterly FFCA reporting requirement is met through the Office of Legacy Management Internet Site where the pertinent FFCA-required data are posted as they become available. Additional information on IEMP data reporting is provided in Section 7.0.

Data pertaining to the surface water and treated effluent program will be provided on the Office of Legacy Management Site. The data will be in the format of searchable data sets and/or downloadable data files. This site will be updated as data become available.

The annual site environmental report will be issued each June. This comprehensive report will discuss a year of IEMP data previously reported on the Office of Legacy Management Site. The annual site environmental report will include the following:

- An annual summary of data from the IEMP surface water and treated effluent monitoring program
- Constituent concentrations for each sample location
- Statistical analysis summary for constituents, as warranted by data evaluation
- Status of FFCA and Operable Unit 5 Record of Decision Great Miami River effluent limits, to be presented graphically showing status of compliance with the 30-µg/L and 600-pound total uranium limits as well as indicating the allowable storm water and maintenance related bypass days
- Status of regulatory compliance of the NPDES Permit
- Actions taken to mitigate unacceptable surface water conditions revealed by the IEMP surface water sampling program
- Observed trends and results of the data comparison to FRLs.

Because the IEMP is a living document, a structured schedule of annual reviews and five-year revisions has been instituted. The annual review cycle provides the mechanism for identifying and initiating any surface water and treated effluent program modifications (i.e., changes in constituents, locations, or frequencies) that are necessary. Any program modifications that may be warranted prior to the annual review would be communicated to EPA and OEPA.

5.4.1 Project Organization

The project team leader will have full responsibility and authority for the implementation of this medium-specific plan, in compliance with all regulatory specifications and sitewide programmatic requirements. All changes to project activities must be approved by the project team leader or designee.

Health and safety are the responsibility of all individuals working on this project scope. Qualified Health and Safety personnel shall participate on the project team to assist in preparing and obtaining all applicable permits. In addition, safety specialists shall periodically review and update the project-specific health and safety documents and operating procedures, conduct pertinent safety briefings, and assist in evaluation and resolution of all safety concerns.

Quality Assurance personnel will participate on the project team, as necessary, to review project procedures and activities ensuring consistency with the requirements of the LM QAPP or other referenced standards, and to assist in evaluating and resolving all quality related concerns.

5.4.2 Sampling Program

During 2007 through 2011, sediment samples will be collected from two locations on the Great Miami River, typically in the summer or fall. Sampling is usually performed in this time period in order to take advantage of the abundance of fresh sediment deposited during flood conditions that commonly occur after the winter and spring seasons, and to enable sampling during low-flow or dry conditions. Sampling at other times of the year is also acceptable although sample collection may be more difficult due to water flow.

Figure 5-1 depicts the two IEMP sediment sample locations. Table 5-2 summarizes the field sample collection information for each of the locations. Sample analysis will be performed either at the on-site laboratory or a contract laboratory dependent on specific analyses required, laboratory capacity, turnaround time, and performance of the laboratory. The laboratories used for analytical testing have been audited to ensure that DOECAP or equivalent process requirements have been met as specified in the LM QAPP. These criteria include meeting the requirements for performance evaluation samples, pre-acceptance audits, performance audits, and an internal quality assurance program.

TABLE 5-2

SEDIMENT SAMPLING PROGRAM DESIGN AND ANALYTICAL REQUIREMENTS

Location *Expectation*	Number of Locations	Sample Frequency	Constituent[a]	ASL[b]	Container	Holding Time	Preservative
Great Miami River (G4) *Measure the impact of site effluent*	1	Annually	Uranium, Total	B	500 mL glass or plastic jar	6 months	None
Great Miami River background (G2) *Establish range of background concentration in Great Miami River*	1	Annually	Uranium, Total	B	500 mL glass or plastic jar	6 months	None

[a]Analytical Methods are from Procedure Manual of the Environmental Measurements Laboratory.
[b]A more conservative ASL may be required for laboratory data in order to meet required detection limits or in order to ensure data quality objectives.

5.5.2 Reporting

The IEMP sediment program data will be reported on the Office of Legacy Management Internet Site and in the annual site environmental report. Data on the Office of Legacy Management Site will be in the format of searchable data sets and/or downloadable data files. The Office of Legacy Management Site will be updated when sediment data become available. Additional information on IEMP data reporting is provided in Section 7.0.

The annual site environmental report will supplement the Office of Legacy Management Site by providing a summary and assessment of the data results, and identifying notable results and/or events related to those data.

The IEMP annual site environmental report will be issued each June and will include the following:

- An annual summary of data from the IEMP sediment monitoring program (Great Miami River sample locations); graphical presentation of data trends over time for the Great Miami River locations
- Statistical summary (i.e., minimum, maximum, and mean) by constituent for Great Miami River locations
- Summary-level information on the effectiveness of the project-specific sediment control structures (to include sediment control efficiency data, if necessary for interpretation of sitewide impacts).

If necessary, sediment results will be presented prior to the submittal of annual site environmental report to the EPA and OEPA if significant changes in sediment contaminant concentrations are evident.

Because the IEMP is a living document, a schedule of annual reviews and five-year revisions has been instituted. The annual review cycle provides the mechanism for identifying and initiating any sediment program modifications (i.e., changes in constituents, locations, or frequencies) that are necessary. Any program modifications that may be warranted prior to the annual review will be communicated to EPA and OEPA.

Meteorological data are used in the evaluation and interpretation of environmental data collected from air, and radon. Meteorological data is obtained from a local weather station through the National Weather Service, as necessary.

6.4 MEDIUM-SPECIFIC PLAN FOR SITEWIDE ENVIRONMENTAL AIR MONITORING

This section serves as the medium-specific plan for implementation of the sampling, analytical, and data management activities associated with the sitewide environmental air monitoring program. The program expectations and design presented in Section 6.3 were used as the framework for developing the monitoring approach presented in this section. The activities described herein were designed to provide environmental data of sufficient quality to meet the intended data use as described in the program design in Section 6.3.2. All sampling procedures and analytical protocols described or referenced in this medium-specific plan are consistent with the requirements of the LM QAPP and OLM SAP.

The subsections of this medium-specific plan define the following:

- Program organization and associated responsibilities
- Sampling programs (radiological air particulate, radon, and direct radiation)
- Change control
- Health and safety
- Data management
- Project quality assurance.

6.4.1 Project Organization

A multi-disciplined project organization has been established and assigned responsibility to effectively implement and manage the project planning, sample collection and analysis, and data management activities directed in this medium-specific plan. The key positions and associated responsibilities required for successful implementation are described as follows.

The project team leader will have full responsibility and authority for the implementation of this medium-specific plan in compliance with all regulatory specifications and sitewide programmatic requirements. Integration and coordination of all medium-specific plan activities defined herein with other project groups are also key responsibilities. All changes to project activities must be approved by the project team leader or designee.

Health and safety are the responsibility of all individuals working on this project scope. Qualified Health and Safety personnel shall participate on the project team to provide radiation protection and industrial hygiene support, and assist in preparing and obtaining all applicable permits. In addition, safety

personnel shall periodically review and update the project-specific health and safety documents and operating procedures; conduct pertinent safety briefings; and assist in evaluation and resolution of all safety concerns.

Quality Assurance personnel will participate on the project team as necessary to review project procedures and activities ensuring consistency with the requirements of the LM QAPP or other referenced standards and assist in evaluating and resolving all quality related concerns.

6.4.2 Sampling Program

Sample analysis will be performed at off-site contract laboratories, depending on specific analyses required, laboratory capacity, turnaround time, and performance of the laboratory. The laboratories used for analytical testing meet DOECAP requirements as specified in LM QAPP. These criteria include meeting the requirements for performance evaluation samples, pre-acceptance audits, performance audits, and an internal quality assurance program.

6.4.2.1 Sampling Procedures

Specific sampling procedures associated with air monitoring will be performed in accordance with directives established in the OLM SAP and the LM QAPP and the requirements of the Environmental Regulatory Guide for Radiological Effluent Monitoring.

Air Particulate

Table 6-5 provides the technical specifications for radiological air particulate monitoring using high-volume air monitoring equipment and filter media.

TABLE 6-5

TECHNICAL SPECIFICATIONS FOR RADIOLOGICAL AIR PARTICULATE MONITORING

Monitor Type	Flow Rate	Filter Type	Gauge/Meters	Indicator
High-volume continuous	45 cfm	Multi-ply polypropylene	Hours Flow Rate Set Point	Low Flow Warning Light

Sample collection is accomplished by using high-volume air monitoring stations that continuously collect samples of airborne particulates. Any changes in flow rate are accounted for by the automatic flow controller in the monitor and are documented on a flow chart recorder that continuously records flow

outside the three standard deviation control limit, then that instrument will not be used again until it is examined, repaired, and calibrated, if necessary.

Direct Radiation (TLDs)

Quality control samples will be collected and analyzed in order to evaluate the possibility that some controllable practice, such as sampling or analytical practice, may be responsible for introducing bias in the project's analytical results. Quarterly data from the three TLDs at each location must agree within 15 percent or will be considered suspect and invalid data.

6.4.2.3 Decontamination

Decontamination of sampling equipment will be performed between sample locations to prevent the introduction of contaminants or cross contamination into the sampling process. The decontamination is identified in the LM QAPP and more specifically outlined in the OLM SAP.

6.4.2.4 Waste Dispositioning

Contact wastes that are generated by the field technicians during field sampling activities are collected, maintained, and dispositioned as necessary, depending upon the location of waste generation.

6.4.3 Change Control

Changes to the medium-specific plan will be at the discretion of the project team leader. Prior to implementation of field changes, the project team leader or designee shall be informed of the proposed changes and circumstances substantiating the changes. Any changes to the medium-specific plan must have written approval by the project team leader or designee, Quality Assurance representative, and the Field Manager prior to implementation. If a Variance/Field Change Notice is required, then it will be completed according to the LM QAPP. The Variance/Field Change Notice form shall be issued as controlled distribution to team members and will be included in the field data package to become part of the project record.

6.4.4 Health and Safety Considerations

The Fernald site's Health and Safety personnel are responsible for the development and implementation of health and safety requirements for this medium-specific plan. Hazards (physical, radiological,

chemical, and biological) typically encountered by personnel when performing the specified fieldwork will be addressed during team briefings. Health and Safety requirements are also addressed in the Fernald Site Project Safety Plan. Fernald site specific requirements are identified in this plan.

All involved personnel will receive adequate training to the health and safety requirements prior to implementation of the field work required by this medium-specific plan. Safety meetings will be conducted prior to beginning field work to address specific health and safety issues. All Fernald employees and subcontractor personnel who will be performing field work required by this medium-specific plan are required to have completed applicable training.

For areas that are subject to more restrictive radiological controls where the potential for exposure is greater, radiation work permits are necessary and will be obtained prior to the field work being performed in those areas. A radiological control technician will be assigned to each field crew performing any activities in an area requiring a radiation work permit.

6.4.5 Data Management

Field documentation and analytical results will meet the IEMP data reporting and quality objectives, comply with the LM QAPP, the LM Standard Practice for Validation of Laboratory Data, and the OLM SAP.

Data documentation and validation requirements for data collected in 2007 for the IEMP fall into two categories, depending upon whether the data are field- or laboratory-generated. Field data validation will consist of verifying medium-specific plan compliance and appropriate documentation of field activities. Laboratory data validation will consist of verifying that data generated are in compliance with medium-specific plan ASLs. Specific requirements for field data documentation and validation and laboratory data documentation and validation are in accordance with the LM QAPP, the Standard Practice for Validation of Laboratory Data, and the OLM SAP.

There are five analytical levels (ASL A through ASL E) defined for use at the Fernald site. For 2006, field data documentation will be at ASL A and laboratory data documentation will be at ASL B. For some air programs, a more conservative ASL is required for laboratory data to meet regulatory commitments in order to meet required detection limits, or to ensure data quality objectives are met. The specific air monitoring ASL requirements are detailed in the sampling programs subsections above and in Appendix C.

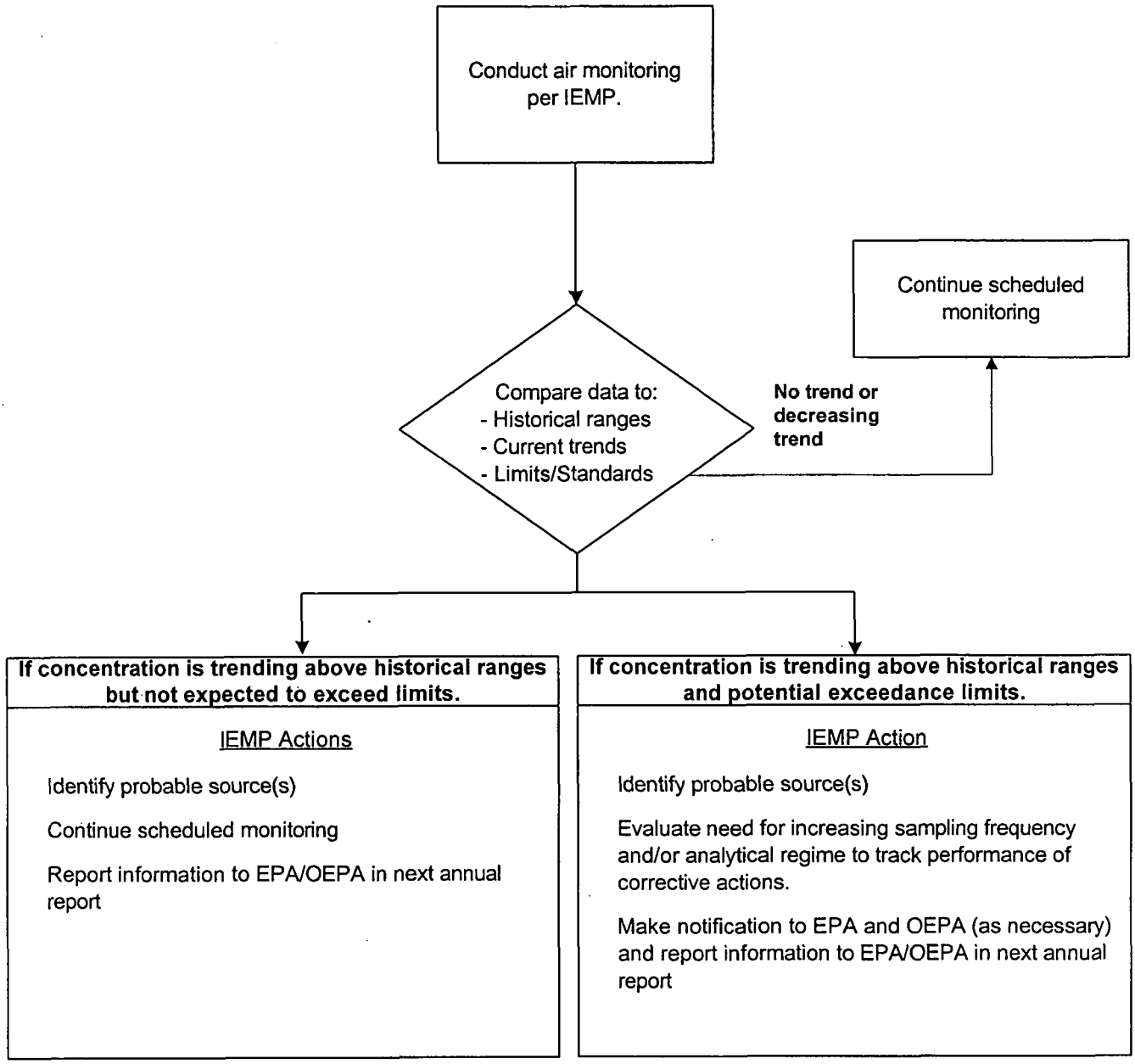


FIGURE 6-3. IEMP AIR DATA EVALUATION AND ASSOCIATED ACTIONS

Radon Data Evaluation

Data resulting from the radon monitoring program will be evaluated with respect to the program expectations identified in Section 6.3.1 and radon monitoring design summary in Section 6.3.2.2. Based on these expectations, the following questions will be answered through the radon data evaluation processes indicated by the text following each of the questions:

- Are radon concentrations below the limits set in DOE Order 5400.5 and 10 CFR 834?

Data from the alpha scintillation continuous radon monitoring locations will be compared to the annual limits (0.5 pCi/L above background at the site fenceline and 30 pCi/L sitewide), and short-term (100 pCi/L) limits of DOE Order 5400.5. The data generated from individual sampling events will be trended by sample location over time via statistical methods (when sufficient data have been generated).

If historical data are available from or near a particular IEMP sample location, then the IEMP-generated trends will be evaluated with respect to the historical trends in order to assess whether current conditions are similar to the past, increasing or decreasing.

Direct Radiation Monitoring Data Evaluation

Data resulting from the direct radiation monitoring program will be evaluated with respect to the program expectations identified in Section 6.3.1 and direct radiation monitoring design summary in Section 6.3.2.3. Based on these expectations, the following questions will be answered through the direct radiation data evaluation processes indicated by the text following each of the questions:

- Do direct radiation levels indicate a significant increase that could contribute to an exceedance of the 100-mrem/year, all pathway dose limit from DOE Order 5400.5?

The data generated from individual TLD locations will be trended over time. Historic TLD monitoring data will be used to assess whether current trends are similar to the past, increasing, or decreasing.

6.5.2 Reporting

The IEMP air monitoring program will meet the reporting requirements for the NESHAP Subpart H, 10 CFR 834, and the FFA compliance, as follows:

- The NESHAP Subpart H report has been incorporated into the annual site environmental report.
- The quarterly FFA reporting is being fulfilled via the Office of Legacy Management Internet Site
- Monthly trending of the annual limit of 0.5 pCi/L above background

IEMP air program data will be reported on the Office of Legacy Management Site in the form of electronic files and in the annual site environmental report. Additional information on IEMP data reporting is provided in Section 7.0.

Data on the Office of Legacy Management Site is in the form of searchable data sets and/or downloadable data files. This site will be updated every four weeks, as data become available.

The annual site environmental report will be issued each June for the previous year. This comprehensive report will discuss a year of IEMP data previously reported on the Office of Legacy Management Site. The air monitoring portion of the annual site environmental report will consist of the following:

- An annual summary of data from the IEMP air monitoring program
- Constituent concentrations for each sample location
- Statistical analysis summary for each constituent, as warranted by data evaluation
- Status of regulatory compliance with NESHAP Subpart H
- Summary of FFA radon information
- Information that indicates the exceedance of an ARAR at an on-site location
- Information that is relevant to explaining significant changes in the data from the IEMP air monitoring network.

Air data will continue to be provided to the EPA and OEPA electronically via the Office of Legacy Management Site as the data become available.

7.3 REPORTING

As stated in Section 1.0, a primary objective of the IEMP is to successfully integrate the numerous routine environmental reporting requirements under a single comprehensive framework. The IEMP centralizes, streamlines, and focuses sitewide environmental monitoring and associated reporting under a single controlling document.

7.3.1 Regulatory Drivers for Reporting Monitoring Data

An analysis of regulatory drivers and policies was conducted by examining ARARs within each operable unit's record of decision, Fernald site compliance agreements, and DOE Orders applicable to monitoring each medium. These regulatory drivers are identified in Sections 3.0 through 6.0 of the IEMP and were evaluated for reporting requirements. The following reporting drivers are in the IEMP reporting strategy:

- DOE Orders 450.1/231.1, Environmental Protection Program Requirements/Environment, Safety and Health Reporting Manual, which requires DOE facilities to submit annual site environmental reports that summarize the environmental monitoring data results
- The September 7, 2000, OEPA Director's Findings and Orders (OEPA 2000), which requires continuation of the groundwater monitoring program as specified in this IEMP to meet RCRA/Ohio hazardous waste regulations for groundwater monitoring
- The current NPDES Permit for the Fernald site, which requires monthly reports to demonstrate compliance with provisions in the NPDES Permit
- The 1986 FFCA, which requires, per an agreement made with the EPA and OEPA in January 1996, submittal of quarterly data reports. Note that this requirement is being fulfilled through the posting of data to the Office of Legacy Management Site as the data becomes available.
- NESHAP 40 Code of Federal Regulations 61, Subpart H, which requires submittal of an annual NESHAP report to demonstrate compliance with emission standards for radionuclides other than radon
- The Federal Facility Agreement (FFA), Control and Abatement of Radon-222 Emissions, signed November 19, 1991, which requires, per an agreement made with EPA and OEPA in January 1996, submittal of the continuous air monitoring data in selected on-site areas in a quarterly progress report. Note that this requirement is being fulfilled through the posting of data to the Office of Legacy Management Site as the data becomes available.

7.3.2 IEMP Reporting

The IEMP reporting frequency will be annual with a continued emphasis on timely data reporting in the form of electronic files (i.e., Office of Legacy Management Site). The annual site environmental report will continue to be submitted by June 1 to provide a comprehensive evaluation of IEMP data for both the regulatory agencies and the public and electronic data will be made available to the regulatory agencies as soon as data has been reviewed.

Office of Legacy Management Internet Site

Office of Legacy Management Site allows the regulatory agencies access to Fernald data in a timely manner (http://www.lm.doe.gov/land/sites/oh/fernald/fernald.htm). The data are available after analysis, analytical validation, entry into SEEPro, and review by environmental media personnel. These data are provided in downloadable files; in some cases, user-defined queries for specific data sets are available. The use of the Office of Legacy Management Site for reporting IEMP data provides the agencies with access to IEMP data sooner than through the annual reports. In addition to the environmental media addressed in the IEMP, water quality and water accumulation rate data from the on-site disposal facility are included on the Office of Legacy Management Site.

Annual Site Environmental Reports

The annual site environmental report will continue to be submitted to EPA and OEPA on June 1 of each year. It will continue to document the technical monitoring approach, to summarize the data for each environmental medium, and to summarize CERCLA, RCRA, and waste management activities. The report will also include water quality and water accumulation rate data from the on-site disposal facility monitoring program. The summary report serves the needs of both the regulatory agencies and the public. The accompanying detailed appendices compile the information reported on the Office of Legacy Management Site and are intended for a more technical audience including the regulatory agencies.

Table 7-1 identifies the media that are being reported under the IEMP and the associated reporting schedule. Any program modifications that may be warranted prior to the annual review will be communicated to EPA and OEPA.

TABLE 7-1
IEMP REPORTING SCHEDULE FOR 2007

	2007 through 2011											
	First Quarter			Second Quarter			Third Quarter			Fourth Quarter		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
GROUNDWATER/OSDF[a]	*	*	*	*	*	* •	*	*	*	*	*	*
SURFACE WATER[b]	*	*	*	*	*	* •	*	*	*	*	*	*
NPDES Permit Compliance	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
SEDIMENT[c]						•					*	
AIR[d]				*		•	*			*		

*=Office of Legacy Management Site Data Reporting
•=Annual Reporting
♦=Monthly Reporting

[a]Encompasses aquifer restoration operational assessment, aquifer conditions, and on-site disposal facility groundwater monitoring.
[b]Encompasses NPDES, FFCA, and IEMP characterization monitoring.
[c]Sediment data will be collected annually at the Great Miami River.
[d]Encompasses all air monitoring programs including FFA and NESHAP Subpart H.

REFERENCES

American Public Health Association (APHA), 1989, "Standard Methods for the Examination of Water and Wastewater," 17th edition, Washington, D.C.

Fluor Fernald, Inc., 2004, "Discharge Changes — National Pollutant Discharge Elimination System Permit Number 1IO00004*GD Fernald Closure Project," letter #C:SP:2004-0036 from Dennis J. Carr of Fluor Fernald, Inc., to Thomas A. Winston of OEPA, Fernald Closure Project, Cincinnati, OH, June 3.

HydroGeologic, Inc., 2000, "Integration of Data Fusion Modeling (DFM) with VAM3DF Contaminant Transport Code," Final, Herndon, VA.

HydroGeologic, Inc., 1998, "Development and Verification of VAM3DF, a Numerical Flow and Transport Modeling Code," Final, Herndon, VA.

Ohio Environmental Protection Agency (OEPA), 2000, "Ohio EPA Director's Final, Findings and Orders, in the Matter of: U.S. Department of Energy, Fernald Environmental Management Project, P.O. Box 398704, Cincinnati, OH 45239," Columbus, OH, September 7.

Ohio Environmental Protection Agency (OEPA), 1993, "Ohio EPA Director's Final, Findings and Orders, in the Matter of: U.S. Department of Energy, Fernald Environmental Management Project, P.O. Box 398704, Cincinnati, OH 45239," Columbus, OH, September 10.

U.S. Department of Energy (DOE), 2006a, "Comprehensive Management and Institutional Controls Plan," 20013-PL-0001, Revision 1, Final, Fluor Fernald, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006b, "Fernald Groundwater Certification Plan," 51900-PL-0002, Revision 1, Final, Fluor Fernald, Cincinnati, OH, April

U.S. Department of Energy (DOE), 2006c, "Operations and Maintenance Master Plan for Aquifer Restoration and Wastewater Treatment," 2505-OM-001, Revision 4, Final, Fluor Fernald, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006d, "Groundwater/Leak Detection and Leachate Monitoring Plan, On-Site Disposal Facility," 20100-PL-0009, Revision 2, Final, Fernald Closure Project, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2006e, "Legacy Management CERCLA Sites Quality Assurance Project Plan," DOE-LM/GJ1232-2006, Revision 1, S.M. Stoller Corporation, Grand Junction, CO, July.

U.S. Department of Energy (DOE), 2006f, "Sampling Analysis Plan for U.S. Department of Energy Office of Legacy Management Site," DOE-LM/GJ1197-2006, Revision 1, S.M. Stoller Corporation, Grand Junction, CO, October.

U.S. Department of Energy (DOE), 2006g, " Legacy Management Fernald Operating Procedures," Revision 0, S.M. Stoller Corporation, Grand Junction, CO, October (Converted Advanced Wastewater Treatment Facility, Wastewater Treatment Outside Systems, Standing Orders for Wastewater Treatment Operations).

U.S. Department of Energy (DOE), 2006h, "Fernald Project Health and Safety Plan," DOE-LM/1324-2006, Revision 1, S.M. Stoller Corporation, Grand Junction, CO, September.

REFERENCES
(Continued)

U.S. Department of Energy (DOE), 2006i, "Environmental Procedure Catalog; Standard Practice for Validation of Laboratory Data," GT-9, Revision 1, S.M. Stoller Corporation, Grand Junction, CO, October.

U.S. Department of Energy (DOE), 2005a, "National Emissions Standards for Hazardous Air Pollutants – Subpart H," 60200-RP-0009, Revision 0, Final, Fernald Closure Project, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2005b, "Waste Storage Area (Phase II) Design Report," 52424-RP-0004, Revision A, Draft Final, Fernald Closure Project, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2005c, "Addendum to the Waste Storage Area (Phase II) Design Report," 52424-RP-0004, Revision A, Draft Final, Fernald Closure Project, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2005d, "Storm Sewer Outfall Ditch," Revision 0, Final, Fernald Closure Project, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2005f, "2004 Site Environmental Report," 51350-RP-0024, Fernald Closure Project, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2004, "Groundwater Remedy Evaluation and Field Verification Plan," Fernald Closure Project, Cincinnati, OH, June.

U.S. Department of Energy (DOE), 2003a, "Remedial Design Work Plan and DOE order 450.1," Fernald Closure Project, Cincinnati, OH.

U.S. Department of Energy (DOE), 2003b, "Comprehensive Groundwater Strategy Report", Revision A, Draft, Fernald Closure Project, Cincinnati, OH.

U.S. Department of Energy (DOE), 2003c, "Sitewide CERCLA Quality (SCQ) Assurance Project Plan," FD-1000, Revision 3, Final, Fluor Fernald, Cincinnati, OH, November 14.

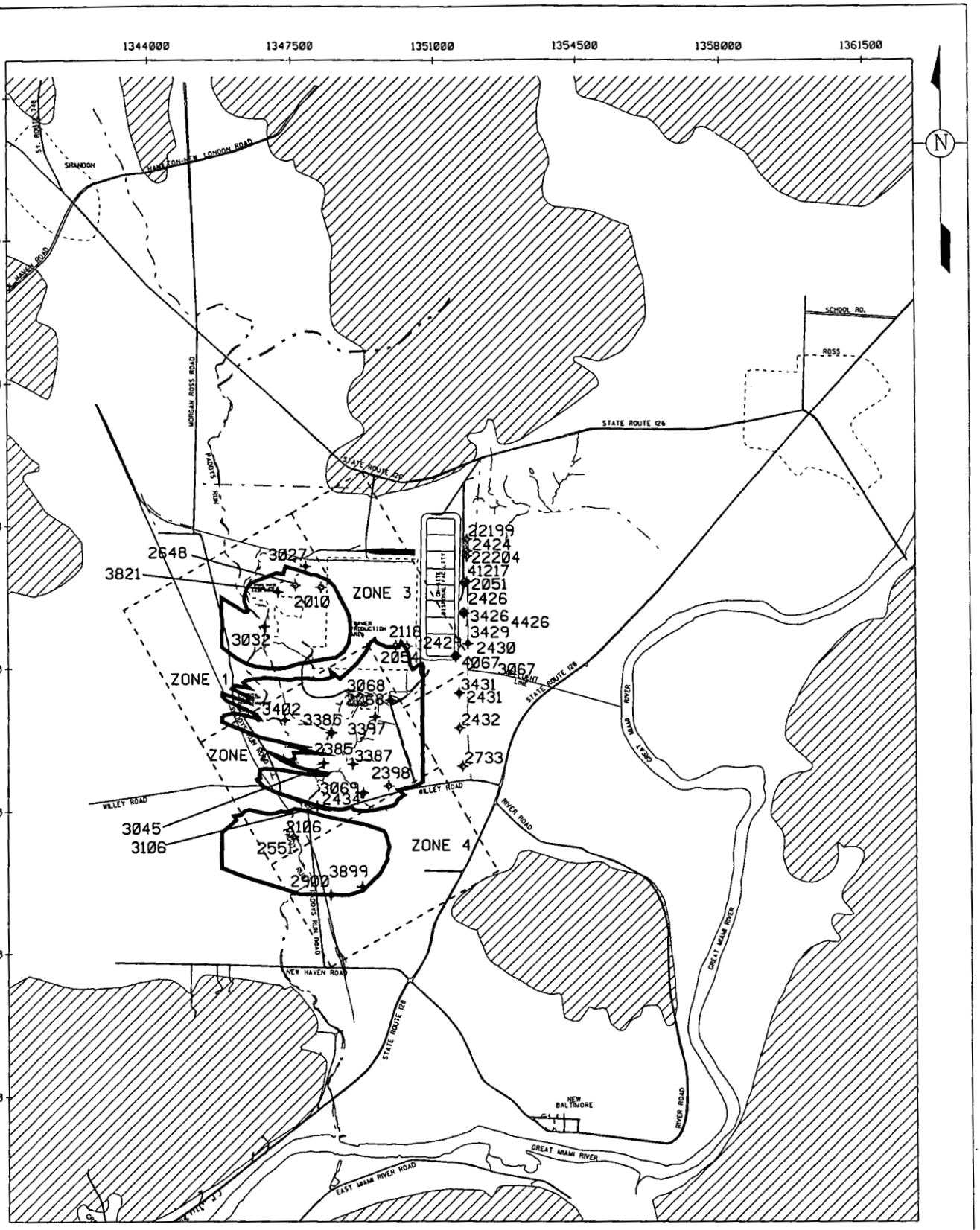
U.S. Department of Energy (DOE), 2002, "Design for Remediation of the Great Miami Aquifer, South Field (Phase II) Module," Revision A, Draft Final, Fernald Environmental Management Project, Cincinnati, OH, May.

U.S. Department of Energy (DOE), 2001a, "Radioactive Waste Management Manual," DOE Manual 435.1, Change 1, Washington, D.C., June 19.

U.S. Department of Energy (DOE), 2001b, "Design for Remediation of the Great Miami Aquifer in the Waste Storage and Plant 6 Areas," Revision A, Draft Final, Fernald Environmental Management Project, Cincinnati, OH, April.

U.S. Department of Energy (DOE), 2000a, "Conceptual Design for Remediation of the Great Miami Aquifer in the Waste Storage and Plant 6 Areas," Final, Fernald Environmental Management Project, Cincinnati, OH.

U.S. Department of Energy (DOE), 2000b, "The Great Miami Aquifer VAM3D Flow Model Recalibration Report," Fernald Environmental Management Project, Cincinnati, OH.



LEGEND:

FEMP BOUNDARY

3120 ✦ MONITORING WELL

10-YEAR, URANIUM-BASED RESTORATION FOOTPRINT

BEDROCK HIGHS

NOTE: ZONE 0 INCLUDES EVERYTHING OUTSIDE OF ZONES 1 - 4

SCALE

3500 1750 0 3500 FEET

FINAL

FIGURE A-17. MONITORING WELL LOCATIONS WITH CONCENTRATIONS ABOVE THE FRL FOR ZINC

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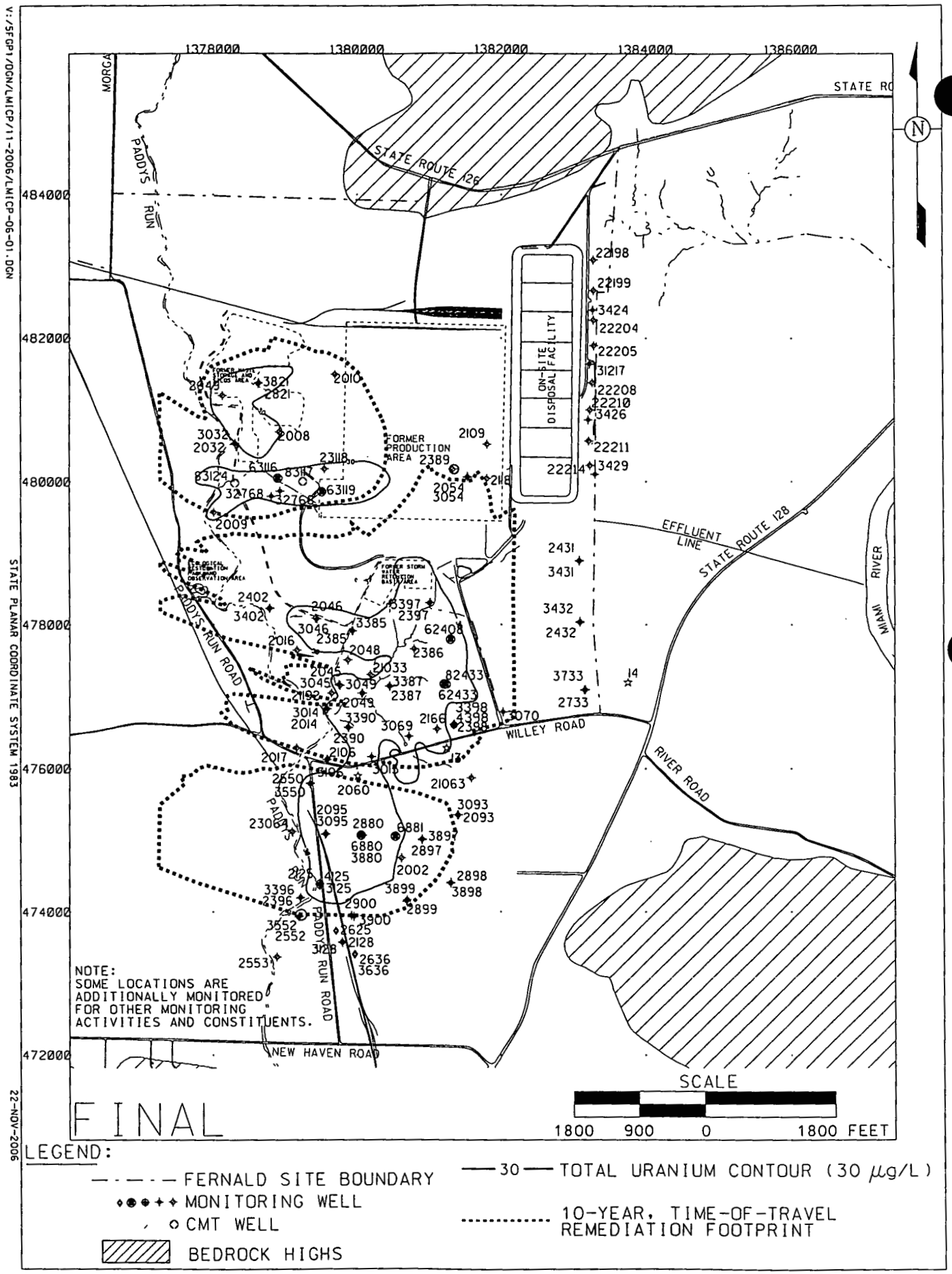

FIGURE A-18. LOCATIONS FOR SEMIANNUAL TOTAL URANIUM MONITORING

D.2.6 Natural Resource Restoration Design Plans

NRRDPs were written for each ecological restoration project completed on site. The design documents were submitted to EPA and the Fernald Natural Resource Trustees prior to the commencement of restoration activities in a given area. In addition to describing the restoration activities, they also outline the monitoring requirements for each project area once restoration activities were completed. Following is a list of the NRRDPs that are associated with the areas that require monitoring following closure of the site (i.e., physical completion was declared on October 29, 2006).

- Weltand Mitigation Project (Phase II) NRRDP (Area 6, Phase I)
- Borrow Area NRRDP Wetland Mitigation (Phase III)
- Area 8, Phase III NRRDP (Paddys Run West)
- Paddys Run East NRRDP
- Silos NRRDP
- Former Production Area NRRDP
- Waste Pits Area and Paddys Run NRRDP

D.3 PROGRAM EXPECTATIONS AND DESIGN CONSIDERATIONS

The expectations of the monitoring and reporting as outlined in the NRMP are as follows:

- Provide a mechanism to monitor the status of the Fernald site's natural resources to remain in compliance with applicable laws and regulations

- Monitor restored areas to ensure requirements of the NRRDPs are being met and restored areas continue to develop and function as designed.

The results of the monitoring outlined in this NRMP will be compiled and reported to the EPA and OEPA. Results will be reviewed to ensure that ecologically restored areas are performing as designed. In the event that results indicate that a restored area is not functioning as intended, decisions will need to be made by the DOE Office of Legacy Management in consultation with the EPA, OEPA, and Natural Resource Trustees regarding appropriate corrective actions.

D.4 NATURAL RESOURCE MONITORING PLAN

Monitoring was implemented during remediation activities to identify impacts to natural resources at the Fernald site with particular emphasis placed on meeting regulatory requirements for NEPA, threatened and endangered species, wetlands/floodplains, and cultural resources. To accommodate natural resource monitoring, priority natural resource areas have been established across the Fernald site (refer to Figure D-1). Fernald site personnel conducted all natural resource monitoring during remediation, with

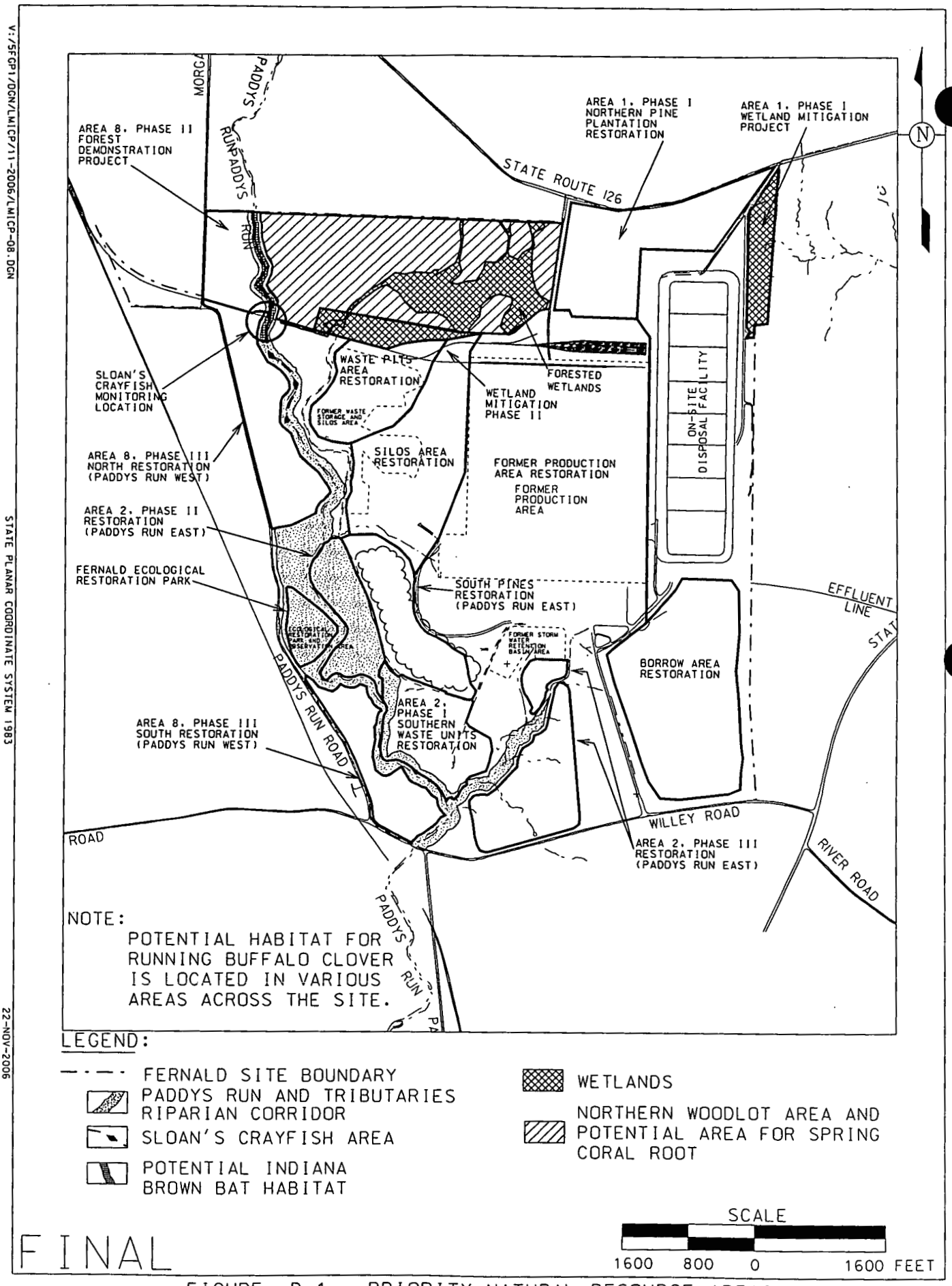

FIGURE D-1. PRIORITY NATURAL RESOURCE AREAS

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STATE PLANAR COORDINATE SYSTEM 1983

22-NOV-2006

oversight from the DOE Office of Environmental Management. Monitoring will continue during post-closure, but will be carried out under the DOE Office of Legacy Management.

Outside expertise may be used in limited circumstances depending on the type of monitoring to be conducted. A description of the monitoring strategies to be implemented at the Fernald site is provided below.

D.4.1 Threatened and Endangered Species

The state-listed threatened Sloan's crayfish (*Orconectes sloanii*) and the federally endangered Indiana brown bat (*Myotis sodalis*) are the only threatened or endangered species to have a known population at the Fernald site. However, there is the potential for other state-listed and federally listed threatened and endangered species to have habitat ranges that encompass and/or occupy the Fernald site. Therefore, monitoring will continue to track the status of the Sloan's crayfish and Indiana brown bat populations and their habitats as well as several other listed species that potentially could use the Fernald site.

D.4.1.1 Sloan's Crayfish

The state-listed threatened Sloan's crayfish is a small crayfish found in the streams of southwest Ohio and southeast Indiana. It prefers streams with constant (though not necessarily fast) current flowing over rocky bottoms. A large, well-established population of Sloan's crayfish is found at the Fernald site in the northern reaches of Paddys Run. In dry periods, the crayfish retreat to the deeper pools that remain, primarily upstream of the former rail trestle, located approximately at the boundary between Hamilton and Butler counties. A significant population of Sloan's crayfish also resides in an off-property section of Paddys Run at New Haven Road. The Sloan's Crayfish Management Plan, which is included as Attachment D.1 to this appendix, provides additional information on the Sloan's crayfish population at the Fernald site.

This species resides with one other competing species of crayfish (*Orconectes rusticus*) that is generally considered more aggressive. In addition, the Sloan's crayfish is sensitive to siltation in streams.

Impacts on Sloan's crayfish are similar to those on other aquatic organisms in Paddys Run. Impacts of concern would include excavation and alteration of the streambed along with increased siltation and runoff into Paddys Run. Visual field observations after every storm event were conducted from August 1996 through December 1997 to identify any impact of sediment loading on the Sloan's crayfish population in Paddys Run from Fernald site activities. Visual observations of Sloan's crayfish populations were resumed in September 1998 when construction activities began in the vicinity of the waste storage area. In general, site activities have not impacted the Paddys Run crayfish population. However, on several occasions an

elevated amount of sediment runoff was observed in the northern drainage ditch following rain events. Because the instances were of short duration (less than 24 hours), no impacts to the Sloan's crayfish occurred. The source of the elevated sediment was traced to the rail yard sedimentation basin. Several corrective measures were implemented, including repair of eroding fill around an inlet pipe and seeding of exposed soil. As a result of these corrective actions, incidents of increased turbidity into Paddys Run were reduced to one or two times a year. Because of this, OEPA agreed to suspend visual observations unless remediation activities in the immediate vicinity of the northern drainage ditch had the potential to adversely impact turbidity.

Additionally, as a condition of the Fernald site's National Pollutant Discharge Elimination System (NPDES) permit, visual observations of sediment controls must be carried out weekly and after any storm event pursuant to the Fernald site's Storm Water Pollution Prevention Plan (DOE 2006). A storm event is defined as "any event in which more than 0.5 inch of rainfall occurs in a 24-hour period." An inspection form is completed after each visual observation to ensure that sediment controls are properly functioning. Fernald site natural resource personnel worked with the personnel conducting the visual observations of sediment controls to ensure controls remain in place.

The Sloan's crayfish population in Paddys Run was surveyed several times to monitor trends in the long-term status of the population. A survey in the summer of 2001 revealed a significant population of Sloan's crayfish in Paddys Run. The survey involved the use of nets to capture and identify species in Paddys Run. This survey, coupled with the results from several previous population surveys, demonstrated that Sloan's crayfish populations were not impacted by site activities. Researchers have observed a slight reduction in the number of Sloan's crayfish over the years. However, the reduction was attributed to the regional trend of increased competition from *Orconectes rusticus* rather than site-specific activities. Currently, no additional surveys for Sloan's crayfish are planned.

Attachment D-1, the Sloan's Crayfish Management Plan, describes in greater detail the requirements listed above. A contingency plan is also included which calls for the upstream relocation of affected crayfish populations, if necessary. Requirements of the Sloan's Crayfish Monitoring Plan will be followed should disturbance of the stream occur in the future.

D.4.1.2 Indiana Brown Bat

Good-to-excellent summer habitat for the federally listed endangered Indiana brown bat (*Myotis sodalis*) has been identified north of the former rail trestle along Paddys Run. The habitat provides an extensive mature canopy from older trees and the presence of water throughout the year. In 1999, one adult female was captured along Paddys Run and released. Potential impacts to Indiana brown

For seeded areas within a restoration project, the Natural Resource Trustees agreed to a 90 percent cover survival rate for cover crops (necessary for slope stabilization and erosion control) and 50 percent survival rate for native species at the end of the implementation monitoring period as a goal.

All seeded areas are evaluated within each restoration project. Depending on the size of the restoration project, seeded areas may be grouped into habitat-specific sub-areas. For each distinct area, at least three one-meter square quadrats are randomly distributed and surveyed. Field personnel will estimate the total cover and list all species present within each quadrat. The data collected will be used to determine total cover, percent native species composition, and relative frequency of native species, as described below.

For total cover, the quadrat-specific cover estimates will be averaged. Percent native species composition will be calculated by dividing the total number of species surveyed into the total number of native species present. The relative frequency of native species will be determined as follows. First, DOE will record the number of times each species appears in a quadrat. To obtain the frequency, the number of times a species appears in a quadrat will be divided by the total number of quadrats surveyed. Next, the frequencies of all native species will be summed and divided by the total of all frequencies within a given area.

By collecting the information described above, DOE will evaluate implementation phase success of seeded areas based on two criteria. First, 90 percent cover must be met by the end of the first growing season. Second, the goal of 50 percent native species composition or relative frequency must be obtained by the end of the implementation monitoring period. These criteria address both erosion control and native community establishment, which are the two primary goals of seeding in restored areas.

Projects completed by the spring of 2005 were monitored in the summer of 2005, the results of which were reported in the 2005 Consolidated Monitoring Report issued by the DOE Office of Environmental Management. Projects completed since then will need to be monitored beyond site closure. That monitoring will be carried out under direction of the DOE Office of Legacy Management.

D.4.5.2 Implementation Monitoring for Mitigation Wetlands

There are two wetland mitigation projects that will require implementation monitoring, the Borrow Area and Area 6, Phase I. The requirements for the wetland areas are for three years following completion, instead of just one as with the other restoration areas. The monitoring requirements are also more extensive. Monitoring includes water level measurements, water quality sampling, soil sampling, and

wetland plant (herbaceous cover) surveys. Implementation monitoring for mitigation wetlands will be carried out under the DOE Office of Legacy Management.

Table D-2 shows projects that require implementation monitoring after site closure (i.e., physical completion). Implementation monitoring requirements are spelled out in the NRRDPs for each project (refer to Section D.2.6).

TABLE D-2
REQUIRED IMPLEMENTATION MONITORING

PROJECT	MONITORING	YEAR
Area 6, Phase I; Wetland Mitigation, Phase II	Implementation – water levels, water quality, wetland plant survey, soil	2006, 2007
Borrow Area; Wetland Mitigation, Phase III – subareas 3, 4, and 8	Implementation – water levels, water quality, wetland plant survey, soil	2006, 2007, 2008
Borrow Area – remainder	Implementation – mortality counts and percent cover	2006
Paddys Run West (Area 8, Phase III)	Implementation – mortality counts and percent cover	2006
Paddys Run East	Implementation – mortality counts and percent cover	2006
Silos	Implementation – mortality counts and percent cover	2006
Former Production Area – 4B, 5, 6, 7; Main Drainage Corridor; and the Storm Water Retention Basin	Implementation – mortality counts and percent cover	2006
Waste Pits Area	Implementation – mortality counts and percent cover	2006

D.4.5.3 Functional Monitoring

Currently, negotiations are still ongoing for the Natural Resource Damage Settlement. The negotiations include functional monitoring requirements. At this time, no further functional monitoring is scheduled for any restoration area. However, the outcome of the settlement may require that functional monitoring be resumed. In that case, details of the functional monitoring methodology and the areas that require functional monitoring would be included in the next revision of the Comprehensive Legacy Management and Institutional Controls Plan and this IEMP. If functional monitoring of restored areas is resumed at the Fernald site, the monitoring activities would be carried out under the DOE Office of Legacy Management.

D.4.6 Natural Resource Data Evaluation and Reporting

The results of natural resource monitoring will be integrated with the annual reporting, a commitment in the IEMP. Annual site environmental reports will provide appropriate updates on unexpected impacts to natural resources and the results of specific natural resource monitoring that have been implemented (e.g., monitoring of crayfish, cultural resources, etc.). Significant findings as a result of natural resource monitoring will be communicated to EPA and OEPA as needed.

REFERENCES

U.S. Department of Energy (DOE), 2006, "Storm Water Pollution Prevention Plan," PL-3083, Revision 4, Fernald Closure Project, Cincinnati, OH, March.

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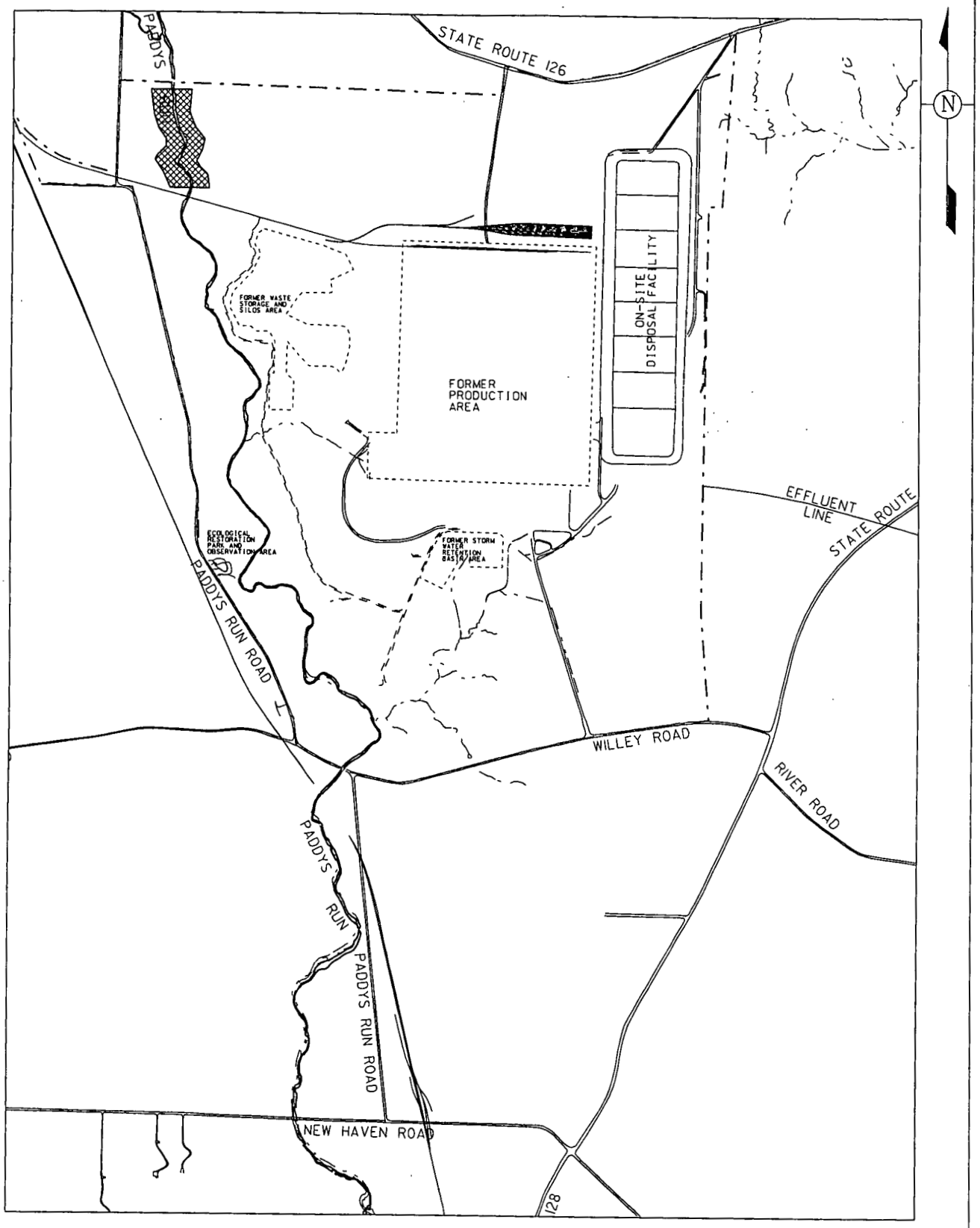

LEGEND:

FERNALD SITE BOUNDARY

REFUGE AREA FOR SLOAN'S CRAYFISH

SCALE

1500 750 0 1500 FEET

FINAL

FIGURE D.1-2. REFUGE AREA FOR SLOAN'S CRAYFISH

Between now and site closure, large-scale earthmoving activities associated with the remedial actions for Operable Units 1, 2, and 5 are planned within several watershed basins in the northern of the site that ultimately drain to Paddys Run through the northern drainage ditch described above. Erosion control devices will conform to the requirements of the site NPDES Permit, the Fernald site's Storm Water Pollution Prevention Plan (DOE 2006), and various applicable or relevant and appropriate requirements (ARARs) identified in the Operable Units 1, 2, and 5 Records of Decision. Specifications for sedimentation and erosion control devices are being incorporated into the remedial design packages for these activities in an effort to avoid or minimize erosion and sedimentation to the northern drainage ditch and Paddys Run. As part of CERCLA Remedial Design packages for Operable Units 1, 2, and 5, these erosion and sedimentation designs are subject to review and approval by the EPA and OEPA. Once established in the field, DOE will inspect these controls, at a minimum, weekly to ensure their effectiveness in accordance with the requirements of the Storm Water Pollution Prevention Plan. Given that the extensive erosion and sedimentation controls described above will be established, adverse impacts to Sloan's crayfish habitat in Paddys Run will be avoided and minimized to the maximum extent practicable.

D.2.2 Refuge Preservation

The area of Paddys Run immediately north of the train trestle and the confluence of the northern drainage ditch to the Fernald site property line will be preserved as a refuge for Sloan's crayfish to the maximum extent practicable (refer to Figure D.1-2). Appropriate habitat exists in this area, as evidenced by several studies that have identified Sloan's crayfish upstream of the northern drainage ditch (St. John 1993, 1996, and 1999).

St. John reported in the Addendum to the Report on the Status of the Sloan's Crayfish (St. John 1994) that Sloan's crayfish repopulation within Paddys Run is governed by downstream migration rather than upstream migration or repopulation in situ.

The preservation of the upstream portion of Paddys Run is also the primary protection effort for the Indiana brown bat (*Myotis sodalis*), a federally listed endangered species for which suitable habitat exists within the riparian areas north of the train trestle. This area will be considered a priority natural resource area, and a maximum effort will be made to preserve the stream and its associated habitat in its present state.

D.4.2 Frequency

Crayfish will be relocated as appropriate, up to a frequency of every two months, depending on stream conditions. If visual observations of the Paddys Run tributary indicate increased turbidity into Paddys Run for several consecutive days, then the crayfish will be relocated. If turbid tributary conditions persist two months after the initial relocation, then the crayfish will be relocated again.

D.4.3 Methods

Crayfish will be obtained by seining Paddys Run with a minnow seine (1.2 x 1.8 meters; 0.64 centimeter mesh). Pools and riffles will be seined several times in an effort to capture as many individuals as possible. Upon capture, crayfish will be placed in a plastic container containing existing stream water and transported upstream for free release. The location selected for release will be pre-determined based on the suitability of habitat.

D.5 REPORTING

Sloan's crayfish monitoring activities will be reported through the Integrated Environmental Monitoring Plan annual site environmental reports, which will provide an update on Sloan's crayfish population surveys and contingency actions.

REFERENCES

St. John, F.L., 1999, "Fernald Site Crayfish Survey at Paddys Run," prepared for the Fernald Environmental Management Project, The Ohio State University, Newark, OH, June 9.

St. John, F.L., 1996, "Fernald Site Crayfish Survey at Paddys Run," prepared for the Fernald Environmental Management Project, The Ohio State University, Newark, OH, September 18.

St. John, F.L., 1994, "Addendum to the Report on the Status of the Sloan's Crayfish, *Orconectes sloanii* (Bundy 1876) at the Fernald Environmental Management Project," Purchase Order #JM-69471, prepared for the Fernald Environmental Management Project, The Ohio State University, Newark, OH, June 24.

St. John, F.L., 1993, "Report on the Sloan's Crayfish, (*Orconectes sloanii* Bundy) at the Fernald Environmental Management Project," prepared for the Fernald Environmental Management Project, The Ohio State University, Newark, OH, November 5.

U.S. Department of Energy (DOE), 2006, "Storm Water Pollution Prevention Plan," PL-3083, Revision 4, Fluor Fernald, Cincinnati, OH, March 7.

ATTACHMENT E
CIP

INTRODUCTION

The Fernald Site (Fernald), located northwest of Cincinnati, Ohio, is currently managed by the U.S. Department of Energy (DOE) Office of Legacy Management (LM). DOE established the Office of Legacy Management effective December 2003 to allow for optimum management of DOE's legacy responsibilities. The mission of LM is to effectively and efficiently manage the environmental and human legacy issues related to the U.S. Government's Cold War nuclear weapons program for current and future generations.

Since the early 1990's, DOE has made it a priority to gather community opinion as part of its decision-making process. Involvement by stakeholders who possess local knowledge and diverse areas of expertise has been instrumental to the success of the cleanup project. Stakeholders have been involved in site cleanup activities, have assisted in addressing technical and management challenges, and have guided the decision-making process. The Fernald cleanup, including plans for long-term management of the site, has benefited from early dialogue among state and federal regulators, stakeholder organizations, elected officials, and members of the general public. Long-term site management goals include informing future generations and new residents about the site, ensuring the effectiveness of institutional controls, and maintaining community support for the site remedy. DOE will have a Multi-Use Education Facility (MUEF) on site and will cooperate to the extent possible in helping the community make this a viable entity. The anticipated completion date for the MUEF is fall 2007

This Community Involvement Plan is a follow-on document to existing public affairs plans for the site and public involvement efforts described in the Federal Facilities Compliance Agreement (FFCA). All community relations activities, including this Community Involvement Plan, continue to follow United States Environmental Protection Agency (U.S. EPA) and DOE guidance on public participation and comply with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) public participation requirements, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. This Community Involvement Plan documents how DOE will ensure the public appropriate opportunities for involvement in post-closure site monitoring and maintenance.

This Community Involvement Plan outlines the methods of communication and addresses plans for public involvement after site closure. The plan will be updated as appropriate to address post-closure public involvement activities. Updates will be made as needed, but no more frequent than annually. Significant changes in public participation activities, changes in land reuse plans, and remedy failures are examples of scenarios under which updates would be considered. DOE will collaborate with stakeholder organizations in effect at that time to update the plan. Notification of any changes to the Legacy Management and Institutional Controls Plan (LMICP) or the Community Involvement Plan will be through regularly scheduled quarterly meetings and the website.

SITE DESCRIPTION AND BACKGROUND

In 1951, construction of the uranium processing plant began on a 1,050-acre parcel of land near Cincinnati, Ohio. During the Cold War, the Fernald plant, originally named the Feed Materials Production Center, produced 500 million pounds of high-purity uranium metal products for the nation's weapons production program. The products were shipped to other sites within the nuclear weapons complex. Some sites used the products as fuel for nuclear reactors to produce plutonium.

In the late 1980s, when Fernald shut down because of declines in demand for Fernald's product and increasing environmental concerns, 31 million net pounds of nuclear product, 2.5 billion pounds of waste and 2.5 million cubic yards of contaminated soil and debris remained on site. The uranium metal production mission shifted to focus on environmental restoration and waste management issues.

To manage the cleanup more effectively, the entire site was organized into five distinct study areas called operable units. Each operable unit had similar physical characteristics, waste inventories, regulatory requirements, and/or anticipated remedial action technologies. The operable units were as follows:

- Operable Unit 1 (OU1) included six waste pits, a Burn Pit and Clearwell.
- Operable Unit 2 (OU2) included a solid waste landfill, lime sludge ponds, inactive flyash pile, active flyash pile and the South field area.
- Operable Unit 3 (OU3) included all processing facilities located in a 136-acre area.
- Operable Unit 4 (OU4) included K-65 Silos 1 and 2, which contained radium-bearing radioactive wastes dating back to the 1940s; Silo 3 which contained dried uranium-bearing wastes; and Silo 4 which was always empty.
- Operable Unit 5 (OU5) encompassed the environmental media on the Fernald property and surrounding areas that were impacted by the facility. Environmental media included the groundwater, surface water, soils, sediments, vegetation and wildlife throughout the Fernald facility and surrounding areas. OU5 also included the South Plume, an area of off-property groundwater contamination.

Cleanup of Operable Units 1-4 was a requirement for site closure. Aquifer restoration in Operable Unit 5 will continue under LM.

area by Native Americans. DOE agreed to make land available for the reinterment of Native American remains with the following understandings:

1. The land remains under federal ownership.
2. DOE will not take responsibility for, or manage, the re-interment process. Maintenance and monitoring will not be funded or implemented by DOE.
3. The remains must be culturally affiliated with a modern day tribe. The National Park Service had no objections to the re-interment process as long as the "repatriation associated with the reburials comply with the Native American Graves Protection and Repatriation Act as applicable."
4. Records must be maintained for all repatriated items re-interred 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 re-interment purposes. To date, only one response has been received 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 use of the site. No other responses from modern day tribes have been received and DOE is no longer pursuing the effort. The proposal may be reconsidered in the future if other modern day tribes with repatriated remains come forward.

DOE consulted with appropriate stakeholders, including site labor unions, retirees, other former employees, Crosby Township Historical Society, and Fernald Living History, Inc. to create a Cold War Garden located on the Fernald property. To facilitate cleanup activities, this memorial was dismantled and placed in storage. The final location for the memorial will be near the MUEF on the Fernald site.

Highlights of Community Involvement

During most of the production era, not much thought was given to public participation or community involvement. When public concerns about contamination problems peaked in the 1980s, site management was unprepared to handle these concerns. There were no public forums to discuss concerns and issues and there were no site contacts for people to call if they had questions. In 1985, the first public relations professional was hired at Fernald. During the first few years, the new Public Affairs department focused primarily on creating public information channels so people could learn about the site operations and on establishing contacts with the community. DOE opened several reading rooms to make site documents available to the public and management started holding community meetings to begin a dialogue with the public.

Within a few years, a new strategy for public participation was developed, exceeding the textbook style found in the regulations. In November 1993, Fernald adopted its public involvement program. The basic precepts of this program were:

- People have a fundamental desire to participate in decisions that affect their lives.
- Many people working together can often find better solutions to difficult problems.
- Fernald management is responsible for including public involvement in decision-making.

With the new emphasis on public involvement, the public became more aware of the scope of the site's contamination and changes began to occur. The public insisted on a greater role in cleanup decisions and project managers began to realize that the public could help them find answers to difficult questions, such as, "How clean is clean?" Citizen groups such as the Fernald Citizens Advisory Board, the Fernald Community Reuse Organization, the Fernald Health Effects Subcommittee, Fernald Living History, Inc., and Fernald Residents for Environmental Safety and Health were formed to provide avenues for citizen participation in the two-way communication path that was established. Stakeholders have been instrumental to the cleanup progress at Fernald.

The Public Environmental Information Center located at the Delta Building, 10995 Hamilton-Cleves Highway, Harrison, OH 45030 provides easy public access to documents about the cleanup and is a resource center for anyone who wants to conduct research on the Fernald site. The public reading room will eventually be moved to the MUEF, once it is completed (Fall 2007).

Fernald also established support programs for both charitable causes and for education. Created in 1996, the Fernald Community Involvement Team was a volunteer task force composed of employees, their family members, and friends who are active in social service projects within the local community. In addition, Fernald sponsored educational programs for local students and teachers by establishing strong partnerships with area schools.

Now that site activities have shifted to the long-term surveillance and maintenance phase, so too has the community involvement focus shifted. Community awareness of the remaining contamination is vital to the continued protection of human health and the environment at Fernald. Ensuring community awareness of the site's history and maintaining environmental controls will require outreach to new residents and future generations. DOE remains committed to its public involvement program.

Interested Community Members, Local, City, and State Elected Officials

DOE recognizes that stakeholders may be any affected or interested party, including, but not limited to:

- Local elected officials
- Fernald Citizens Advisory Board (FCAB)
- Fernald Residents for Environmental Safety and Health (FRESH)
- Fernald Living History, Inc. (FLH)
- Fernald Community Health Effects Committee (FCHEC)
- Current and retired Fernald contractor employees
- Citizens of Hamilton and Butler Counties
- State and local government agencies, including Ohio EPA
- Elected State of Ohio officials
- Federal agencies, including U.S. EPA
- Congressional delegations for Ohio and part of Indiana
- Local media
- Local elementary and secondary schools
- Environmental organizations
- Business owners
- Service organizations
- Other interested individuals.

The **FCAB** was originally established in August 1993 as the Fernald Citizens Task Force. In 1997, the task force changed its name to the Fernald Citizens Advisory Board to coincide with citizen advisory boards at other DOE sites. The FCAB is a DOE Site Specific Advisory Board chartered by the Federal Advisory Committee Act to advise DOE on activities pertaining to the remediation and future use of the Fernald site. The board consists of 13 members of the public, including local residents, labor representatives, local government officials, academia, business representatives, and ex-officio members from DOE, U.S. EPA, Ohio EPA, and the Agency for Toxic Substances and Disease Registry. The FCAB continues to be actively involved in the legacy management activities for the Fernald site. September 2006 the FCAB held their final meeting. Members of the board are still active and plan to be involved in the Fernald site.

FRESH is an environmental activist group that was formed in 1984 to monitor Fernald activities. The stated purposes of the organization are to ensure the Fernald site is cleaned up, to communicate and educate the surrounding communities about the site, and to advocate for responsible environmental restoration and public health and safety. FRESH is a member of the Alliance for Nuclear Accountability (formerly known as the Military Production Network) and the Ohio Environmental Council and Environmental Community Organization. The group's motto is "Making a Difference Since 1984". The group holds regularly scheduled meetings and invites speakers to present on various aspects of the Fernald cleanup.

FLH is dedicated to ensuring that the history of Fernald, its importance to the Cold War effort, the facilities that existed at the site, and its cultural significance, are available for future generations. This organization has played an important role in establishing institutional controls as a means of protecting the cleanup remedy at Fernald.

The organizations described above have played integral roles in the cleanup and legacy management planning of Fernald. The Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 includes language that specifies the development of **Local Stakeholder Organizations (LSOs)** at three closure sites, including Fernald. The purpose of the LSOs is to provide a formal mechanism for local communities to continue to be involved in DOE's decision-making process as it relates to the sites post-closure. LM met with stakeholder groups representing each of these three closure sites to gather input on the potential LSO membership and transition to LSOs. LM has developed policies and processes for establishing and managing these organizations and has secured funding for the creation and maintenance of a Fernald LSO.

Public meetings to discuss the formation of a Fernald LSO were held on August 31, 2005, November 16, 2005 and February 8, 2006. Local stakeholders decided to defer formation of an LSO at this time.

Roles and Responsibilities

EM was responsible for completing cleanup and closure of Fernald. This cleanup and closure included the decontamination and decommissioning of 255 former production plants, support structures and associated components; the shipment of all nuclear waste offsite; the remediation of five operable units; the removal of waste from three silos; the extraction and treatment of contaminated ground water; the transfer of excess government property to state and local agencies; and the preparation of the property for long-term management by LM.

LM is responsible for the long-term care of legacy liabilities at former nuclear weapons production sites, following completion of the EM cleanup effort. The primary goals are to:

- Protect human health and the environment through effective and efficient long-term surveillance and maintenance
- Manage legacy land assets, emphasizing safety, reuse, and disposition.
- Maintain the remedy, including the continuing groundwater remediation.
- Mitigate community impacts resulting from the cleanup of legacy waste and changing departmental missions.
- Administer post-closure benefits for former contractor employees.
- Manage site records.

Following the cleanup and closure of Fernald, as an EM site, responsibility for maintaining the CERCLA remedies transferred to LM. LM is responsible for compliance with the legacy management requirements and protocols that are documented in the site specific LMICP. At other DOE sites, the LMICP is known as the Long-Term Surveillance and Maintenance (LTS&M) Plan. Fernald's post-closure LTS&M requirements fall into three categories: operation and maintenance of the remedy, legacy management in restored areas, and public involvement.

Legacy management activities related to the maintenance of the remedy include monitoring and maintaining the on-site disposal facility, ensuring that site access and use restrictions are enforced, the continuing groundwater remediation, and managing records. Maintaining institutional controls, safeguards that effectively protect human health and the environment, will be a fundamental component of LTS&M at Fernald, and will include ensuring no residential, agricultural, hunting, swimming, camping, fishing or any other prohibited activity occur on the property. In addition, appropriate wildlife management techniques and processes may also be necessary.

Legacy management in restored areas will include ensuring that natural and cultural resources will be protected in accordance with applicable laws and regulations. Wetlands and threatened and endangered species are examples of natural resources that will be monitored.

Legacy management activities related to public involvement include continued communication with the public regarding the continuing groundwater remediation, legacy management activities and the future of the Fernald site. Emphasis will also be placed on education of the public regarding the site's former production activities, the site's remediation and land use restrictions. Education will include displays and programs at the MUEF and outreach programs at local schools and organizations.

Public Participation Activities

Public participation is an important part of the CERCLA process. As a testament to that fact, the Community Involvement Plan is included in Volume II, the enforceable portion of the LMICP. DOE will offer opportunities for public involvement beyond those required by regulations. Public participation activities are conducted in support of the DOE goal of actively informing the public about the FCP and site transition and to provide opportunities for open, ongoing, two-way communication between DOE and the public.

DOE has been conducting public participation activities to meet citizen expectations for involvement in the decision-making process for areas not specified by statutes and regulations. In such cases, DOE has successfully used the consultative process by inviting the general public, special interest groups, and the local government to participate early in the decision-making process and the prioritization of Fernald activities. The consultative process supplements the public involvement activities required by law. By engaging the community early in decision-making processes, DOE is better able to integrate community values into its decisions and build trust among stakeholders.

The following are general descriptions of post-closure, public participation activities LM planned. As activities at the site decrease, DOE anticipates a corresponding reduction in topics that warrant communication to stakeholders. Table 1 shows the public participation activities anticipated.

Meetings

DOE provides briefings, workshops, and presentations on site activities in a variety of public forums.

Public Meetings

LM has an on-site manager as of January 2006. LM will hold public meetings quarterly for the first year post-closure and at least annually thereafter to address post-closure issues of importance to stakeholders. These meetings will provide information about long-term surveillance and maintenance activities being conducted at the site and will present the results of annual site inspections.

Briefings for Local, State, and Federal Elected Officials

LM will brief elected officials as needed to discuss new data trends or the evaluation of post-ROD changes.

Meetings with Citizens Groups

LM will meet with post-closure stakeholder groups to discuss topics of interest and concern.

Administrative Record and Public Reading Room

DOE will establish a Multi-Use Educational Facility (MUEF) on site. The MUEF will contain information and documents about remediation of the Fernald site, including information on site restrictions, ongoing maintenance and monitoring, and residual risk data. The MUEF will provide storage for historical information and photographs, other educational information, a reading room, and meeting accommodations. A primary goal of the MUEF is to fulfill an informational and educational function within the surrounding community. The information made available at the MUEF serves as an institutional control for the site.

On-Site Education Facility

LM will continue to work with interested stakeholders who desire to preserve and tell the story of Fernald. The established MUEF will serve as an on-site education facility for school and community groups. DOE will support community efforts to develop and provide historical preservation programs and complete installation of the Cold War Garden.

Internet Website

LM will maintain a web page for Fernald post-closure, will post site documents created after closure, and will make available online key documents associated with the cleanup and remedy. When the Administrative Record is available electronically, these documents will be accessible through the Internet. CERCLA documents prepared post-closure will be posted on the LM website soon after they are released.

Site Tours

Tours provide an important forum to help the community understand post-closure site conditions and the controls in place to protect human health and the environment. Official visits or tours are scheduled based on specific requests and can focus on environmental restoration activities and ongoing operations. Access to the On-Site Disposal Facility (OSDF) is limited to authorized personnel only. Because of their value, LM will continue stakeholder and media tours as requested.

Documents for Public Review and Comment

LM will provide opportunities for stakeholders to review and comment on post-closure documents as required by CERCLA regulations, including 5-year reviews. For documents not specified by statutes and regulations, LM will consult with stakeholders to address citizen expectations for involvement in public reviews and comments. DOE anticipates the number of documents developed post-closure to be minimal.

The LMICP explains how DOE will fulfill its surveillance and maintenance obligation at the site. The public has been provided an opportunity to comment on the LMICP and will continue to have the opportunity to comment on revisions to the plan. Changes required post-closure to significant site documents will be discussed with stakeholders.

News Releases and Editorials

LM will continue to issue news releases and/or community advisories to announce public meetings regarding LM documents or significant post-closure activities.

Publications

LM will prepare fact sheets and newsletters as needed to describe LM post-closure activities. These fact sheets will be provided to stakeholders on the mailing list and will be posted on the LM website.

Public Outreach Presentations

LM will continue with public outreach presentations on Fernald as requested.

Emergency Contacts

In the event of an emergency, LM will make notifications to established points of contact, regulators, local elected officials, and community officials. Congressional offices will be informed promptly if an emergency situation arises. The 911 service will be used when reporting an emergency on or near the site. Signs with a toll-free number for citizens to register concerns about the site will be posted at visible locations around the site. The public may use the 24-hour security telephone numbers monitored at the DOE Office at Grand Junction, Colorado, to notify LM of site concerns. The 24-hour security telephone numbers will be posted at site access points and other key locations on the site. The 24-hour emergency number is 970-248-6070 or 877-695-5322.

Mailing Lists

LM maintains a contact database of all stakeholders associated with any LM site. LM is responsible for maintaining the list of Fernald stakeholders post-closure.

Table 1. Matrix of Public Participation Activities

Activity	Post-Closure
Meetings	
Public Meetings	• LM placed an on-site manager January 2006 • Quarterly public meeting for the first year post-closure and annually thereafter • Address post-closure issues, including LTS&M activities and annual inspection results
Briefings for Elected Officials	• Continue briefings • Discuss new data trends or evaluation of post-ROD changes
Meetings With Citizens Groups	• LM will meet with stakeholders • Establishment of a Fernald LSO will provide forum for stakeholders to continue dialogue with DOE
Administrative Record and Public Reading Room	• Maintain the Public Reading Room at least 2 years • Future location will be in the Multi-Use Education Facility on the Fernald site
On-Site Education Facility	• A Multi-Use Education Facility will be located on site • The educational and information function serves an institutional control • Complete installation of Cold War Memorial
Internet Website	• LM will maintain web page for Fernald and will include CERCLA documents prepared post-closure • Administrative Record will be available electronically through the Internet
Site Tours	• LM will conduct site tours as requested
Documents for Public Review and Comment	• CERCLA requirements will be followed for public comment • Stakeholders will be consulted on review of non-regulatory documents • Anticipate minimal number of documents created • Changes required post-closure to significant cleanup documents will be discussed with stakeholders
News Releases and Editorials	• LM will continue to issue news releases post-closure
Publications	• LM will prepare fact sheets as needed • Distributed through mailings and posted on website
Public Outreach Presentations	• Public outreach presentations will be given as requested
Emergency Contacts	• In case of an emergency dial 911 • Established contacts will be notified in emergency situations • Signs with toll-free number will be posted around site • 24-hour Emergency Number is 970-248-6070 or 877-695-5322
Mailing Lists	• LM is responsible for maintaining Fernald contacts

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DOE Office of Legacy Management	
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DOE Office of Environmental Management	
Johnny Reising Director DOE Fernald Closure Project 11003 Hamilton-Cleves Highway Harrison, OH 45030-9728 (513) 648-3139 Email: johnny.reising@fernald.gov	
U.S. Environmental Protection Agency	***Ohio Environmental Protection Agency***
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The Honorable Patricia Clancy Senator Ohio Senate Senate Building Room 143 Columbus, OH 43215 (614) 466-8068 Email: SD08@mailr.sen.state.oh.us	The Honorable Bill Seitz Representative Ohio House of Representatives 77 S. High Street 14th Floor Columbus, OH 43215-6111 (614) 466-8258 Email: District30@ohr.state.oh.us
The Honorable Gary Cates Senator Ohio Senate Senate Building Room 042 Columbus, OH 43215 (614) 466-8072 Email: SD04@mailr.sen.state.oh.us	The Honorable Steve Driehaus Representative Ohio House of Representatives 1157 Overlook Avenue Cincinnati, OH 45238 (513) 921-6511 or (614) 466-5786 Email: district31@ohr.state.oh.us
The Honorable Tom Brinkman, Jr. Representative Ohio House of Representatives 3215 Hardisty Avenue Cincinnati, OH 45208 (513) 321-6591 or (614) 644-6886 Email: district34@ohr.state.oh.us	The Honorable Tyrone Yates Representative Ohio House of Representatives 77 S. High Street, 11th Floor Columbus, OH 43215-6111 (614) 466-1308 Email: district33@ohr.state.oh.us

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The Honorable Shawn Webster Representative Ohio House of Representatives 333 Sir Lawrence Dr. Hamilton, OH 45013 (513) 868-6221 or (614) 466-5094 Email: district53@ohr.state.oh.us	The Honorable Jim Raussen Representative Ohio House of Representatives 77 S. High Street, 11th Floor Columbus, OH 43215-6111 (614) 466-8120 Email: district28@ohr.state.oh.us
The Honorable Louis W. Blessing Representative Ohio House of Representatives 77 S. High Street, 13th Floor Columbus, OH 43215-6111 (614) 466-9091 Email: district29@ohr.state.oh.us	
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The Honorable Mitch Daniels Governor of Indiana Statehouse Indianapolis, IN 46204 (317) 232-4567 www.state.in.us/gov/contact	

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Mr. Warren Strunk President Crosby Township 9129 New Haven Road Harrison, OH 45030 (513) 367-6556 No email address available	Ms. Nancy Poe Chairman Morgan Township Trustees P.O. Box 189 Okeana, OH 45053 513-738-2270 No email address available
Mr. Dennis Conrad, Jr. Chairman Reily Township 6376 Peoria-Reilly Oxford, OH 45056 (513) 757-4113 No email address available	Mr. Tom Willsey President Ross Township 2941 Layhigh Road Hamilton, OH 45013 (513) 738- 2543 Email: rosstwp@aol.com
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Hamilton County General Health District 250 William Howard Taft, 2nd Floor Cincinnati, OH 45219 (513) 946-7800	Butler County Health Department 301 South 3rd Street Hamilton, OH 45011-2913
Environmental/Interest Groups	
Fernald Citizens Advisory Board Jim Bierer Chair P.O. Box 538704 M.S. 76 Cincinnati, OH 45253-8704 (513) 648-6478 Email: jcbierer@fuse.net	**Fernald Residents for Environmental Safety and Health** Lisa Crawford President 10206 Crosby Road Harrison, OH 45030 (513) 738-1688 Email: lecrawford@earthlink.net
Fernald Living History, Inc. Joyce Bentle President 1724 Jamison Road West Harrison, IN 47060 (812) 637-6365 Email: joycebentle@lycos.com	**Fernald Community Health Effects Committee** Sue Verkamp Chair 7763 Willey Road Harrison, OH 45030 (513) 738-8020 No email address available

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WKRC – Channel 12 (CBS) Contact: Julia Tullos 1906 Highland Avenue Cincinnati, OH 45219 (513) 421-6872 (513) 421-3820 - fax jtullos@wkrc.com	WLW-AM (700) Contact: Jeff Henderson 1111 St. Gregory Street Cincinnati, OH 45207 (513) 421-6397 – phone (513) 333-4240 - fax jeffhenderson@clearchannel.com
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