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FINAL RECORD OF DECISION AMENDMENT FOR OPERABLE UNIT 1 REMEDIAL ACTIONS

U.S. DEPARTMENT OF ENERGY

FERNALD CLOSURE PROJECT
FERNALD, OHIO

OCTOBER 2003

10500-RP-0018
Revision 0, Final

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AMENDMENT TO THE OPERABLE UNIT 1 ROD DECLARATION

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SITE NAME AND LOCATION

U.S. Department of Energy
Fernald Environmental Management Project, Operable Unit 1
Hamilton and Butler Counties, Ohio
Cincinnati, Ohio

STATEMENT OF BASIS AND PURPOSE

This decision document amends the selected remedial action for the Fernald Environmental Management Project – Operable Unit 1 in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) (hereinafter jointly referred to as CERCLA), 42 USC §9617(c), and 40 CFR§300.435(c)(2)(ii). This Amendment has been prepared to document the nature of the change made to the selected remedy identified in the January 1995 Final Operable Unit 1 Record of Decision (ROD).

This Amendment to the Record of Decision (ROD Amendment) does not make "fundamental changes" (within the meaning of the Environmental Protection Agency's Office of Solid Waste and Emergency Response Directive 9355.3-02FS-4, 'Guide to Addressing Pre-ROD and Post ROD Changes", April 1992) to the key components of the remedial action. However, the ROD Amendment does document disposition of contaminated cap materials; provides for adjustment of soil remediation levels as allowed for in the original ROD; modifies the final cover and provides clarification on terminology.

The ROD Amendment will be incorporated into the Fernald Environmental Management Project Administrative Record which is available at the Public Environmental Information Center (PEIC), located in Trailer 210 at the Fernald Closure Project, 7400 Willey Road, Hamilton, Ohio, 45013-9402, (513) 648-7480.

The State of Ohio, through the Ohio Environmental Protection Agency (Ohio EPA), has concurred with the amended remedy.

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ASSESSMENT OF THE SITE

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Actual or threatened releases of hazardous substances from this operable unit, if not addressed by implementing the response action selected in the Operable Unit 1 ROD and this ROD Amendment, may present an imminent and substantial endangerment to the public health, welfare, and/or the environment.

DESCRIPTION OF THE 1995 OPERABLE UNIT 1 ROD REMEDY

The Operable Unit 1 remedy is: removal, treatment, and off-site disposal at a permitted commercial disposal facility. The Operable Unit 1 ROD consists of the following key components:

1. Construction of waste processing and loading facilities and equipment.
2. Removal of water from open waste pits for treatment at the site's wastewater treatment facility.
3. Removal of waste pit contents, caps and liners, and excavation of surrounding contaminated soil.
4. Confirmation sampling of waste pit excavations to verify achievement of remediation levels.
5. Pretreatment (sorting/crushing/shredding) of waste.
6. Treatment of the waste by thermal drying as required to meet the waste acceptance criteria of the disposal facility.
7. Waste sampling and analysis prior to shipment to ensure that the waste acceptance criteria of the disposal facility are met.
8. Off-site shipment of waste for disposal at a permitted commercial waste disposal facility. It was estimated that over 600,000 cubic yards of waste material will be excavated and disposed as low-level radioactive waste.
9. As a contingency, shipment of any waste that fails (due to radiological concentrations) to meet the waste acceptance criteria of the permitted commercial waste disposal facility (up to 10 percent of the total waste volume) for disposal at the Nevada Test Site.
10. Decommissioning and removal of the drying treatment unit and associated facilities, as well as miscellaneous structures and facilities within the operable unit. Oversized material that is amenable to the selected alternative for Operable Unit 3 would be segregated from Operable Unit 1 waste, decontaminated, and forwarded to Operable Unit 3 to be managed as construction rubble.
11. Disposition of remaining Operable Unit 1 residual contaminated soils, as amenable, consistent with selected remedies for contaminated process area soils as documented in the Operable Unit 5 ROD. Any materials not consistent with the Operable Unit 5 remedy will be disposed as waste pit materials (i.e., shipped off-site).
12. Placement of backfill into excavations and construction of cover system.

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This remedy addresses the principal threats posed by Operable Unit 1 by removing waste materials and contaminated soils to health-based levels, and treating waste materials and soils to facilitate waste handling. These actions reduce the potential for contaminant migration and will ensure disposal facility waste acceptance criteria are met. The waste will then be disposed at a permitted off-site disposal facility in accordance with applicable requirements. By implementing this remedy, the waste material will not be available for direct human or ecological contact or for migration into the underlying Great Miami Aquifer.

Initiation of the selected remedy began in April 1996. As of September 2003, approximately 75% of waste and waste-like materials have been excavated, processed, and shipped offsite for permanent disposal.

EXPLANATION OF REMEDY CHANGES

The remedy changes addressed in this ROD Amendment include:

1. Aligning the surface and subsurface soil final remediation levels (FRLs) found in the Operable Unit 1 ROD with the approved FRLs for soil in the Operable Unit 5 ROD.
2. Placement of Pit 4 soil cover materials meeting on-site waste acceptance criteria into Fernald's On-site Disposal Facility for permanent disposal.
3. Aligning the final cover design for the waste pit area as originally designated in the Operable Unit 1 Feasibility Study and ROD, with the current design from the July 1998 "Draft Final Natural Resource Impact Assessment and Natural Resource Restoration Plan" for the site.
4. Along with these changes, the ROD Amendment also provides clarification to terminology.

Adjustment of Soil Remediation Levels

In the early 1990s soil cleanup levels were established individually for source control operable units (Operable Units 1, 2, and 4) along with the site-wide environmental media unit (Operable Unit 5). The decision documents for each of the source control operable units acknowledged that final soil cleanup levels established through Operable Unit 5 would be reexamined for applicability to the source control units once the Operable Unit 5 process was complete.

During the Operable Unit 1 and 5 ROD development process, it was also acknowledged that a formal public review process (i.e., a ROD Amendment) would be utilized if future realignments resulted in the raising of any Operable Unit 1 soil cleanup levels to match

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higher Operable Unit 5 values. As directed through the earlier ROD agreements, all lower Operable Unit 5 levels must be utilized to guide soil cleanup in the Operable Unit 1 area, and no decision-document changes are necessary to automatically move to these lower levels for the constituents affected.

Therefore, the realignment to the higher Operable Unit 5 technetium-99 level is being accomplished through this ROD Amendment.

Disposition of Pit 4 Cap Materials

This change allows for the disposal of approximately 8,155 cubic yards (out of an estimated total of 14,600 cubic yards) of soil materials used to construct the surface layers of the Pit 4 cap. These soils have been shown to:

- Meet the waste acceptance criteria for the On-site Disposal Facility, as demonstrated through a comprehensive sampling and analysis program performed under the February 24, 2002 Project Specific Plan for the Waste Pits Remedial Action Project Investigation of Waste Pit 4 Cap Material. The results were then documented in the August 15, 2002 Waste Pit 4 Cap Excavation Implementation Plan.
- No longer be needed as blending stock to meet Department of Transportation (DOT) shipping and/or Envirocare waste acceptance requirements, or as construction materials for roads and embankments within the Waste Pit project area.

While this change has no impact on the overall protectiveness of the Operable Unit 1 remedy, it does represent a significant cost savings to the government. Savings in processing, shipping, and disposal costs of approximately $4.52 million will be realized through this change.

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Updating of Final Cover

The final element of the Operable Unit 1 remedy described in the 1995 ROD, was "placement of backfill into excavations and construction of cover system." Based on all ROD decisions considered collectively, as long as the Operable Unit 1 soil cleanup activities are completed to the point where the health-protective Operable Unit 5 cleanup levels are achieved, then a specially designed cover system will no longer be technically necessary. Once the waste pit and subsurface soil excavations are complete, and remediation certification has been accomplished to satisfy the Operable Unit 5 soil cleanup levels, the Operable Unit 1 project area will be re-graded and restored consistent with the July 1998 Draft Final Natural Resource Impact Assessment and Natural Resource Restoration Plan. As conveyed in this plan, re-seeding and re-vegetation of the final graded area will take place consistent with the Soil Conservation Service and Ohio Department of Natural Resources "Rainwater and Land Development" guidance.

Clarification of Terminology

This ROD Amendment also provides additional detail for certain terminology used in waste-pits project planning and implementation documents. The intent of these clarifications is to provide clearer definitions of the individual remediation elements comprising the Operable Unit 1 scope. These clarifications will assist in defining the endpoints of the project, and the work scope handoffs between the Waste Pits Project (i.e., Operable Unit 1) and the Soil and Disposal Facility Project (i.e., Operable Unit 5) that will perform the final step of soil remediation beneath the pits.

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STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces contaminant toxicity, mobility, or volume as a principal element.

In accordance with CERCLA 121(c) and Section XXX of the Amended Consent Agreement between the U.S. Environmental Protection Agency (EPA) and the Department of Energy, EPA will review this remedial action, from a site-wide perspective, no less often than each five years after the implementation of final remedial actions to assure that human health and the environment are being protected by the remedial actions.

Robert Warther, Manager
United States Department of Energy – Ohio Field Office

11/14/03
Date

William E. Muno, Director
Superfund Division
United States Environmental Protection Agency – Region V

11/24/03
Date

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1.0 INTRODUCTION

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Site Name:	**Fernald Environmental Management Project, Operable Unit 1**
Site Location:	Hamilton and Butler Counties
Lead Agency:	U.S. Environmental Protection Agency, Region V (USEPA)
Support Agency:	Ohio Environmental Protection Agency (Ohio EPA)

1.1 BACKGROUND

A Record of Decision (ROD) for the Fernald Environmental Management Project (now known as the Fernald Closure Project), Operable Unit 1 was signed on January 24, 1995 by the U.S. Department of Energy (DOE) and on March 1, 1995 by the USEPA. This Amendment to the ROD (ROD Amendment) has been prepared to document the nature of the change made to the selected remedy identified in the 1995 Final Operable Unit 1 ROD. This Amendment is issued in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) (hereinafter jointly referred to as CERCLA), 42 USC §9617(c), and 40 CFR§300.435(c)(2)(ii).

This ROD Amendment does not make "fundamental changes" (within the meaning of the Environmental Protection Agency's Office of Solid Waste and Emergency Response Directive 9355.3-02FS-4, 'Guide to Addressing Pre-ROD and Post ROD Changes", April 1992) to the key components of the remedial action. The ROD Amendment documents disposition of contaminated cap materials; provides for adjustment of soil remediation levels as allowed for in the original ROD; and provides clarification on terminology. The ROD Amendment will be incorporated into the Fernald Environmental Management Project Administrative Record which is available at the Public Environmental Information Center (PEIC), located in Trailer 210 at the Fernald Closure Project, 7400 Willey Road, Hamilton, Ohio, 45013-9402, (513) 648-7480.

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2.0 SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

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The 1,050-acre Fernald Closure Project site is located in southwestern Ohio, about 18 miles northwest of the city of Cincinnati, Ohio, and is situated on the boundary between Hamilton and Butler counties. Former uranium processing operations at the Fernald Closure Project were limited to a fenced, 136-acre tract, closed to public access, known as the former Production Area. The remaining Fernald Closure Project site areas consist of forest and pasture lands, a portion of which is leased for grazing livestock.

Operable Unit 1 is a well-defined, 37.7-acre area located in the northwest quadrant of the Fernald Closure Project site. Large quantities of liquid and solid wastes were generated by various chemical and metallurgical processing operations and these wastes were stored or disposed in six waste pits and the Clearwell, or burned in the Burn Pit. These pits are located in a portion of the Fernald Closure Project Waste Storage Area and are contained within the boundaries of Operable Unit 1.

The USEPA is the lead agency and the Ohio EPA is the supporting agency with regard to the remedial action at the Fernald Closure Project. On March 1, 1995, USEPA signed a ROD for Operable Unit 1 that had been approved by the Ohio EPA. The remedy presented in the 1995 ROD is removal, treatment, and off-site disposal at a permitted commercial disposal facility. The remedy consists of the following key components:

1. Construction of waste processing and loading facilities and equipment.
2. Removal of water from open waste pits for treatment at the site's wastewater treatment facility.
3. Removal of waste pit contents, caps and liners, and excavation of surrounding contaminated soil.
4. Confirmation sampling of waste pit excavations to verify achievement of remediation levels.
5. Pretreatment (sorting/crushing/shredding) of waste.
6. Treatment of the waste by thermal drying as required to meet the waste acceptance criteria of the disposal facility.
7. Waste sampling and analysis prior to shipment to ensure that the waste acceptance criteria of the disposal facility are met.
8. Off-site shipment of waste for disposal at a permitted commercial waste disposal facility. It is estimated that over 600,000 cubic yards of waste material will be excavated and disposed as low-level radioactive waste.

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9. As a contingency, shipment of any waste that fails (due to radiological concentrations) to meet the waste acceptance criteria of the permitted commercial waste disposal facility (up to 10 percent of the total waste volume) for disposal at the Nevada Test Site.
10. Decommissioning and removal of the drying treatment unit and associated facilities, as well as miscellaneous structures and facilities within the operable unit. Oversized material that is amenable to the selected alternative for Operable Unit 3 would be segregated from Operable Unit 1 waste, decontaminated, and forwarded to Operable Unit 3 to be managed as construction rubble.
11. Disposition of remaining Operable Unit 1 residual contaminated soils, as amenable, consistent with selected remedies for contaminated process area soils as documented in the Operable Unit 5 Record of Decision. Any materials not consistent with the Operable Unit 5 remedy will be disposed as waste pit materials (i.e., shipped off-site).
12. Placement of backfill into excavations and construction of cover system.

This remedy addresses the principal threats posed by Operable Unit 1 by removing waste materials and contaminated soils to health-based levels, and treating waste materials and soils to facilitate waste handling. These actions reduce the potential for contaminant migration and will ensure disposal facility waste acceptance criteria are met. The waste is being disposed at a permitted off-site disposal facility (Envirocare) in accordance with applicable requirements. By implementing this remedy, the waste material will not be available for direct human or ecological contact or for migration into the underlying Great Miami Aquifer.

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3.0 BASIS FOR AMENDING THE 1995 ROD

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Site preparation activities for implementing the Operable Unit 1 ROD were initiated on April 1, 1996. These activities satisfied the criteria for commencement of substantial continuous physical on-site remediation no later than 15 months after the signing of the ROD. On September 20, 1996, the contract for disposal of Operable Unit 1 wastes was awarded to Envirocare of Utah. On October 20, 1997, IT Corporation (now Shaw E&I) was awarded the contract for the design, construction, operation, and D&D of processing facilities necessary to treat the pit waste and load into railcars for transportation to, and disposal at, Envirocare.

Initiation of operations began on February 22, 1999, with the processing of waste soils destined for off-site disposal by Operable Unit 1. Actual excavation and processing of pit waste began in September 1999. Through September 2003, a majority of Pits 1 and 3, as well as approximately half of Pit 2 and 60% of Pits 4 and 5 have been excavated, totaling approximately 615,000 tons of material that has been loaded into railcars and shipped to Envirocare for disposal. With a total of approximately 810,000 tons to be shipped to Envirocare for disposal, remediation is approximately 75% complete.

The remedy changes addressed in this ROD Amendment include:

1. Aligning the surface and subsurface soil FRLs from the Operable Unit 1 ROD with the approved soil FRLs found in the Operable Unit 5 ROD.
2. Placement of Pit 4 soil cover material meeting on-site waste acceptance criteria into the On-Site Disposal Facility for permanent disposal.
3. Aligning the final cover design for Operable Unit 1 with the current design from the July 1998 "Draft Final Natural Resource Impact Assessment and Natural Resource Restoration Plan".

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4.0 DESCRIPTION OF REMEDY CHANGES

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4.1 Adjustment of Soil Remediation Levels

Back in the early 1990s soil cleanup levels were established individually for the source control operable units (Operable Units 1, 2, and 4) along with the site-wide environmental media unit (Operable Unit 5). While this created redundancy, it helped assure that each of the source control units was allowed to address all aspects of cleanup within the operable unit boundary, independent of the site-wide cleanup activities under Operable Unit 5. This step allowed the various operable units to individually develop cleanup plans even though the various RODs trailed one another by a year or more.

As part of this approach, the decision documents for each of the source control operable units acknowledged that final soil cleanup levels established through Operable Unit 5 would be reexamined for applicability to the source control units once the Operable Unit 5 process was complete. For Operable Unit 1, the following statement was placed in the 1995 ROD to accommodate this approach: "The Operable Unit 1 remediation levels in this Record of Decision will be reexamined by the Operable Unit 5 Feasibility Study and ROD, based upon available Operable Unit 5 Feasibility Study conclusions, recommendations from the Fernald Citizen's Advisory Task Force, and public comment".

Later, the Operable Unit 5 ROD brought closure to this process by including the following requirement: "Where the final soil remediation level for a specific constituent established through the Operable Unit 5 decision process is more restrictive (i.e., lower) than that defined in an individual ROD for Operable Units 1, 2, or 4, the final Operable Unit 5 remediation level will serve as the soil cleanup criteria within the boundary of the source operable unit."

Soil Cleanup Level Comparisons – In 2003, major portions of the Waste Pits Project are nearing completion of waste excavation and processing activities. As such, it is appropriate that the project address the realignment of the soil cleanup levels since the focus will soon turn to final soil remediation within the project boundary. Once pit wastes and contaminated liners are removed, surface and subsurface soils will be remediated to the extent necessary to provide long-term protection of the underlying Great Miami Aquifer and to achieve the intended "undeveloped park" future land use adopted by Operable Unit 5.

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Consistent with this remediation objective, a review was performed to compare the Operable Unit 1 surface and subsurface soil cleanup levels with the corresponding soil cleanup levels from Operable Unit 5. The review showed that the Operable Unit 5 soil cleanup levels are lower than those adopted for Operable Unit 1 for all constituents and all cases, with the exception of one constituent: technetium-99 in subsurface soil. As shown in Table 1, the final level selected for technetium-99 as a site-wide level in Operable Unit 5 (30 pCi/g) is higher than the pit-specific subsurface levels calculated for Operable Unit 1 (0.26 to 9.9 pCi/g).

During the Operable Unit 1 and 5 ROD development process, it was acknowledged that a formal public review process (i.e., a ROD Amendment) would be utilized if future realignments resulted in the raising of any Operable Unit 1 soil cleanup levels to match higher Operable Unit 5 values. As directed through the earlier ROD agreements, all lower Operable Unit 5 levels must be utilized to guide soil cleanup in the Operable Unit 1 area, and no decision-document changes are necessary to automatically move to these lower levels for the constituents affected.

Table 1
Technetium-99 Soil Cleanup Level Comparison

Operable Unit 1 Subsurface Cleanup Levels (pCi/g)	
Pit 1	Not Present as a Constituent of Concern
Pit 2	5.5
Pit 3	0.75
Pit 4	0.26
Pit 5	1.4
Pit 6	7.3
Burn Pit	14
Clearwell	9.9
Operable Unit 5 Cleanup Level (pCi/g)	
On-Property Final Remediation Level for the Undeveloped Park Land Use	30

The realignment to the higher Operable Unit 5 technetium-99 level is being accomplished through this ROD Amendment.

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The original 1995 Operable Unit 1 technetium-99 subsurface soil cleanup levels were developed via a screening-level environmental model. In the screening approach, it was conservatively assumed that groundwater contaminant concentrations – derived from the leaching of residual soil contamination – would need to achieve the lower-bound 10^{-6} incremental lifetime cancer risk (ILCR) target within the acceptable 10^{-4} to 10^{-6} range adopted by the Superfund program. The lower-bound 10^{-6} groundwater risk target was conservatively utilized to guide the setting of Operable Unit 1 soil cleanup levels because the Operable Unit 5 process had not yet established approved site-wide groundwater cleanup risk targets and corresponding cleanup levels. At that point in time, Operable Unit 5 trailed Operable Unit 1 by about 18 months in the decision-making schedule.

Similarly, individual pit-specific technetium-99 cleanup levels were then set from the screening model under the conservative assumption that the entire thickness of pit wastes (which vary from pit to pit) would be available to leach into the aquifer over the long term. In other words, it was assumed for modeling purposes that the pit wastes would hypothetically remain in place as a continuing source term at their present day pit thickness.

These conservative assumptions and decisions were carried forward for inclusion in the Operable Unit 1 ROD, pending the outcome of the Operable Unit 5 site-wide decision-making process.

As part of the Operable Unit 5 decision-making, site-wide groundwater risk targets were subsequently set based on Federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs), or a 10^{-5} risk target in the absence of MCLs. This is in contrast to the more conservative 10^{-6} value adopted in Operable Unit 1. The 10^{-5} risk target is within the U.S. EPA's target risk range of 10^{-4} to 10^{-6} and therefore is an acceptable risk level. Using the MCL/10^{-5} groundwater target, the Operable Unit 5 cross-media soil cleanup levels were developed using a comprehensive model that included a detailed, realistic consideration of the residual quantity of material available to leach to the aquifer at any given location over the long term. For the Waste Pits Project, the Operable Unit 5 model realistically assumes that the pit contents are removed and are therefore not a continuing leachable source that needs to be represented in the model.

All of the Operable Unit 5 cross-media modeling parameters and inputs were developed in concert with USEPA under a decision-making process that occurred approximately 18 months after the signing of the Operable Unit 1 ROD. 8270

Based on the detailed modeling analyses conducted to evaluate technetium-99 mobility and residual leaching potential, the Operable Unit 5 soil cleanup level was found to be protective of the Great Miami Aquifer at the approved MCL/10^{-5} risk target for all residual contaminant conditions evaluated. Therefore, in consideration of this finding, it is appropriate that it be adopted to guide final soil cleanup in the Operable Unit 1 footprint once the pit wastes are fully removed such that they can no longer serve as a continuing source term.

Table 2 summarizes the principal differences in assumptions or approach between the earlier screening-level environmental modeling conducted for Operable Unit 1 and the more comprehensive fate and transport modeling conducted for assessing cross-media impacts under Operable Unit 5.

Table 2
Comparison of Modeling Approach and Assumptions Used to Develop the Operable Unit 1 and 5 Technetium-99 Soil Cross-Media Cleanup Levels

Approach/Assumption	Operable Unit 1	Operable Unit 5
Modeling Approach	"Screening level" spreadsheet model	Comprehensive Fate and Transport model used to develop the health-protective Operable Unit 5 cross-media soil cleanup levels
Range of Applicability	The screening-level modeling needed to address the full range of Operable Unit 1 remedial alternatives that were under consideration in the Feasibility Study prior to the ROD. The alternatives under consideration included capping the pit wastes in place, as well as full removal of the wastes for off-site disposal.	Able to incorporate the actual ROD-based remedy decisions reached for Operable Units 1, 2, 3 and 4. For Operable Unit 1, the final decision – full waste pit removal and off-site disposal – was incorporated into the model to set the subsequent health protective cross-media soil cleanup levels.
Target Great Miami Aquifer Risk Level Used In Decision-making	10^{-6} Incremental Lifetime Cancer Risk (ILCR) level. The 10^{-6} risk level was used pending the final risk target selected for Operable Unit 5.	The final selected risk targets for Operable Unit 5 were the Federal Safe Drinking Water Act MCLs for each constituent of concern, or 10^{-5} ILCR in the absence of MCLs. (For technetium-99, the 10^{-5} ILCR target was used.)
How Waste-Pit Material Source Term Was Accounted For in the Model	Represented as a continuing source based on full pit waste thicknesses in place (needed to encompass the capping alternatives during the Feasibility Study). This resulted in the need to establish pit-specific cleanup levels, since each pit has a different geometry and waste thickness. Pit 1 did not have technetium-99 present as a constituent of concern, so a pit-specific value was not required.	The modeling specifically acknowledged that the full thickness of waste-pit materials would be removed per the final Operable Unit 1 ROD. The only remaining source would be the underlying residual soils, which were accounted for as a finite source in the Operable Unit 5 cross-media impact model.
Fate and Transport Parameters used in the Model	Literature values in the absence of site-specific data under development by Operable Unit 5.	Site-specific geochemical data developed directly through the Operable Unit 5 Remedial Investigation.

4.2 On-Site Disposal of Pit 4 Cap Materials

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This second proposed change permits the on-site disposal of a portion of the Pit 4 soil cap material in the On-site Disposal Facility, rather than shipping the soil off site for disposal as stated in the 1995 Operable Unit 1 ROD.

Specifically, this change would allow the disposal of approximately 8,155 cubic yards (out of an estimated total of 14,600 cubic yards in the Pit 4 cap) of soil materials used to construct the surface layers of the cap. These soils have been shown to:

- Meet the waste acceptance criteria for the On-site Disposal Facility, as demonstrated through a comprehensive sampling and analysis program performed under the February 24, 2002 Project Specific Plan for the Waste Pits Remedial Action Project Investigation of Waste Pit 4 Cap Material. The results were then documented in the August 15, 2002 Waste Pit 4 Cap Excavation Implementation Plan.
- No longer be needed as blending stock to meet DOT shipping and/or Envirocare waste acceptance requirements, or as construction materials for roads and embankments within the Waste Pit project area.

While this change has no impact on the overall protectiveness of the Operable Unit 1 remedy, it does represent a significant cost savings to the government. Savings in processing, shipping, and disposal costs of approximately $4.52 million will be realized through this change.

The Pit 4 cap was constructed in 1988 and 1989 from soil materials obtained from various locations on-site. The cap was constructed in three layers, with each layer constructed of materials obtained from different on-site locations. The upper two layers of the cap, representing the top 3 to 3.5 feet of material, were identified for potential placement in the On-site Disposal Facility based on the following:

- These materials originated from areas of the site having little impact from plant operations, and therefore a high potential for meeting the On-site Disposal Facility waste acceptance criteria. Specifically, the soil materials used to construct the surface layers originated from the excavation of the east stormwater retention basin and from an undisturbed area located north of Pit 5.
- Historical analytical data from earlier sampling events in the Pit 4 cap confirmed low contaminant concentration levels within the surface layers (i.e., below the acceptance criteria limits for the On-site Disposal Facility).
- Sufficient blend and construction materials from other Waste Pit Project sources were determined to be available to meet future project needs.

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To confirm that the targeted cap materials meet the On-site Disposal Facility waste acceptance criteria, a comprehensive sampling and excavation plan was developed and executed consistent with the requirements defined in the site's approved Site-wide Excavation Plan and On-site Disposal Facility Waste Acceptance Criteria Attainment Plan. The sampling process employed a combination of soil borings and real-time scanning technology to develop a three dimensional profile of contaminant concentrations within the Pit 4 cap. The results of this sampling process were documented in the August 15, 2002 Waste Pit 4 Cap Excavation Implementation Plan. This Plan also documented an excavation approach that targeted only those materials that meet the On-site Disposal Facility waste acceptance criteria. This included maintaining a safety margin during the excavation process between the above- and below-waste- acceptance-criteria materials to ensure that only waste-acceptance-criteria compliant materials would be removed for disposal in the On-site Disposal Facility.

As stated previously, the resultant volume of waste-acceptance-criteria compliant material removed from the Pit 4 cap was approximately 8,155 cubic yards. This material is currently stockpiled and segregated awaiting a final determination on this proposed change. The remaining volume of cap material left for off-site disposal and potential blending stock (if needed) is approximately 6,445 cubic yards.

Since initiation of operations, various planning or implementation constraints originally on the project have been modified, thereby making this proposed change possible. Three modifications in particular provide necessary relief with respect to blending requirements:

- DOE was granted an exemption by the Department of Transportation to ship material with a higher radiological content in closed top gondola cars; for the Waste Pits Project, this means the project requires less blend material to achieve shipping based radiological constraints.

- Due to additional engineering improvements at their rail car rollover facility, Envirocare was able to raise the radiological limits for thorium-230 associated with emptying railcars at the facility from 5,000 pCi/g to 10,000 pCi/g for Fernald's waste-pit materials. Again this increased flexibility results in the need for less blending stock to achieve the Envirocare disposal criteria.

- Envirocare has provided additional flexibility on the range of acceptable moisture contents for the waste-pit material received at the facility. This particular change reduces the need for soil based blending stock for the higher moisture content pit wastes.

In addition to these modifications, the Waste Pits Project has received sufficient quantities of soil destined for off-site disposal from other site projects that can – along with the remaining Pit 4 cap soils – meet the needs for construction of various working ramps and corridors within the waste pit excavation area.

And lastly, the projections for future soil volumes that are destined for off-site disposal through the Waste Pits Project further demonstrate that sufficient soil will be available to meet the remaining blending needs for the final segments of the project. As a result of these cumulative modifications and operational flexibilities, the amount of blending material originally believed necessary to satisfy implementation constraints has decreased to a readily manageable quantity.

The amendment to the Operable Unit 1 ROD to permit placement of the Pit 4 soil cover material into the On-site Disposal Facility will complete the documentation process.

4.3 Updating of Final Cover

The final element of the Operable Unit 1 remedy described in the 1995 ROD, "placement of backfill into excavations and construction of cover system", requires a technical modification to make the originally designated cover system from the 1994 Feasibility Study and the 1995 ROD consistent with the final natural resource restoration plan and design approach that is being adopted site wide as part of Operable Unit 5. Change No.3 is therefore included in this ROD Amendment to formally adopt this modification.

In reviewing the document history and decision trail for Operable Unit 1 (the Feasibility Study, ROD, and Remedial Design Work Plan) to track the origin and intent of the Operable Unit 1 cover system, it became clear that the cover system – which is a multi-layer 6.5-foot thick infiltration barrier similar in composition and function to the On-site Disposal Facility cap – was first put into the Operable Unit 1 remedy at the time of the Feasibility Study (and carried forward to the ROD) because final land-use based decision making under Operable Unit 5 was not yet complete and final health protective soil cleanup levels (that would not need a multi-layer infiltration barrier) had not yet been formally approved.

Based on all of the ROD decisions considered collectively, as long as the Operable Unit 1 soil cleanup activities are completed to the point where the health-protective Operable Unit 5 cleanup levels are achieved, then the 6.5-foot thick multi-layer infiltration barrier will no longer be technically necessary. It is also clear from the decision trail that by the time the July 1995 Operable Unit 1 Remedial Design Work Plan was developed and approved, Operable Unit 5 decision making had been finalized to the point where the Operable Unit 1 Remedial Design Work Plan was able to acknowledge the site-wide decisions on restoration that were emerging from the Operable Unit 5 decision process, and that installation of the 6.5-foot thick infiltration barrier cover system would not be necessary.

This was recognized on Page 2-8 of the July 1995 Work Plan which states, "The backfilling and final covering of the waste pit area will be performed in a manner which is consistent with the future land-use strategy determined by the approved Operable Unit 5 Record of Decision." This has remained as the technical planning and design case ever since.

As the final step of the site-wide integration process, the July 1998 Draft Final Natural Resource Impact Assessment and Natural Resource Restoration Plan formally adopted a consistent restoration design approach within the source-control operable units (1, 2 and 4) once the health-protective Operable Unit 5 soil cleanup levels are achieved site wide across all areas.

In light of this decision trail, as with all other areas of the site, once the waste pit and subsurface soil excavations are complete, and remediation certification has been accomplished to satisfy the Operable Unit 5 soil cleanup levels, the Operable Unit 1 project area will be re-graded and restored consistent with the July 1998 Draft Final Natural Resource Impact Assessment and Natural Resource Restoration Plan. As conveyed in this plan, re-seeding and re-vegetation of the final graded area will take place consistent with the Soil Conservation Service and Ohio Department of Natural Resources "Rainwater and Land Development" guidance.

For administrative reasons, this ROD Amendment formally acknowledges that the 6.5-foot thick cover system is no longer necessary, since the cover system was included in the 1995 Operable Unit 1 ROD as a recognized component. This administrative step will allow the Operable Unit 1 decision documents (the ROD and ROD Amendment) to stay current with the approved approaches for site-wide re-grading and restoration that were developed later through the design process.

Clarification on Terminology – This ROD Amendment also provides additional detail for certain terminology used in waste-pits project planning and implementation documents. The intent of these clarifications is to provide clearer definitions of the individual remediation elements comprising the Operable Unit 1 scope.

These clarifications will assist in defining the endpoints of the project, and the work scope handoffs between the Waste Pits Project (i.e., Operable Unit 1) and the Soil and Disposal Facility Project (i.e., Operable Unit 5) that will perform the final step of soil remediation beneath the pits.

Contaminated Liners: During the original pit construction, the liners for pits 1, 2, 3 and 4, the Burn Pit, and the Clearwell were constructed from on-site native clay. The liners were either "dug into" existing clay, or constructed from clay brought in from another area of the site. In contrast, the liners for pits 5 and 6 were constructed of a synthetic barrier over the in-place clay.

Chapter 10 of the 1995 Operable Unit 1 ROD contains the statutory determinations that must be met by the selected remedy in order for it to be declared protective of human health and the environment. Page 10-1 states that the selected remedy is considered protective by: "(1) removing the sources of contamination to health based levels; (2) treating (by thermal drying) the materials causing the principal threats from Operable Unit 1; (3) disposing of treated materials at an off-site location which provides the appropriate level of long-term protectiveness; and (4) remediating residual contaminated soils to levels which are protective". Page 10-2 goes on to state that the remedy is protective because it requires that the "waste pit contents, contaminated liners, and grossly contaminated cover materials and residual soils as required, be excavated, treated by thermal drying and disposed of off site at a permitted commercial disposal facility".

The ROD, however, then remained silent on the technical definition of "contaminated liners" and the accompanying threshold levels of liner contamination that would trigger the need for off-site disposal to maintain the health-protective status of the remedy. That technical threshold was subsequently established approximately 18 months later by the 1996 Operable Unit 5 ROD, which set in motion the health-protective WAC limits for soil and soil-like materials contemplated for disposal on site, and the attendant contaminant concentration levels that would require such materials to be sent off site for disposal.

Recognizing that the Operable Unit 5 ROD has established the appropriate health-based levels for on-site disposal, this section of the ROD Amendment clarifies the process by which the contaminated liners will be addressed and subsurface soils underlying the pits will be characterized to support subsequent health-based disposal decisions. The characterization approach will follow the agency approved protocols defined in the Site-wide Excavation Plan (SEP), the OSDF WAC Attainment Plan, and the individual excavation control Project-Specific Plans (PSPs) developed to identify above-WAC materials in the individual soil remediation areas across the site. These protocols are designed to support the on- and off-site disposal decisions for contaminated soils within the Operable Unit 5 area and in the affected soils beneath the other four source operable units.

The protocols employ a comprehensive sampling strategy involving a combination of real-time radiological scanning and discrete physical sampling to determine the depth and areal extent of materials that are ineligible for on-site disposal based on contaminant concentration levels. In general, the characterization protocols for contaminated liners and subsurface materials will be applied as described below.

For those pits constructed with native clay liners (i.e., Pits 1, 2, 3, and 4), the first six inches of clay liner material below the waste/liner interface will be removed for disposal off site. This step provides an added level of assurance that any potential waste material that may have become commingled within the surface horizon of the native clay liners will be adequately removed for off-site disposal. In addition, visual reconnaissance walk-downs will be performed after removal of the six inches to further assure that visible waste materials have been adequately removed.

These two efforts provide a working "base level" condition to then begin application of the comprehensive real-time and physical sampling protocols. From the sampling, all materials that are found through analytical measurement to be contaminated above the OSDF WAC concentration thresholds will be sent off-site for disposal. Similarly, those materials found to meet the OSDF WAC concentration thresholds will be eligible for disposal on site. Together, these three implementation steps (removal of the top six inch surface horizon for off-site disposal, follow-up visual reconnaissance and removal of any identified remaining commingled waste material, and the follow-on comprehensive sampling protocols) define the technical approach that will be used for identifying and dispositioning "contaminated liners" in a health-protective manner as envisioned by the statutory determinations summarized on pages 10-1 and 10-2 of the 1995 ROD.

Note that for those two pits that employed synthetic liners rather than native clay liners (Pits 5 & 6), the synthetic liner will also be shipped off-site for disposal, at which point the follow-on steps described above (removal of the top six inch surface horizon of native material for off-site disposal, follow-up visual reconnaissance and removal of any identified remaining commingled waste material, and the follow-on comprehensive sampling protocols) will be implemented to complete the process for these two pits.

The actual details of the process (sampling frequencies, depths, analytical parameters, detection levels, etc.) for application to the subsurface conditions beneath the pits will be defined in future Project Specific Plans that are subject to approval by the agencies.

Caps: For each of the waste pits, the type of material used for capping the pit varies. Similar to liners, cap material for each pit is defined as material that is readily distinguishable from waste material. Other than the decision in this ROD Amendment to permit a portion of the Pit 4 cap soil to be disposed of in the On-site Disposal Facility, the remaining cap materials will be (or have been) shipped off site for disposal along with the waste materials.

5.0 COMPARATIVE ANALYSIS

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The modified remedy addresses threats to the public health, safety, welfare and the environment by contamination at and around the site. Comparative evaluations of the three proposed changes described in this plan with the 1995 and 1996 Operable Unit 1 and 5 RODs were conducted employing the nine evaluation criteria defined in the National Contingency Plan as the framework for identifying technical and administrative differences for consideration.

The first two evaluation criteria – overall protection of human health and the environment and compliance with ARARs – are considered threshold criteria that must be attained by the selected remedial action.

The next five criteria include short-term protectiveness, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, implementability, and cost.

These criteria are considered primary balancing criteria, which are looked at collectively to arrive at the best overall solution that offers the best balance of tradeoffs among the criteria.

The final two criteria, state and community acceptance, are evaluated following receipt of comments, if any, during the formal public comment period. The State of Ohio has concurred with the modified remedy in this ROD Amendment. No comments were received from the public during the comment period.

Table 3 provides a summary of the comparative evaluations for the three proposed changes using the nine CERCLA National Contingency Plan criteria as the guiding framework.

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Table 3
CERCLA Nine-Criteria Summaries for the ROD Amendment Changes

National Contingency Plan Criteria and Original Operable Unit 1 and 5 Decisions	Change No. 1 – Adjustment of Soil Remediation Levels	Change No. 2 – On-site Disposal of Pit 4 Cap Materials	Change No. 3 – Updating of Final Cover
1. Overall protection of human health and the environment. The selected remedies in the Operable Unit 1 and 5 RODs are considered health protective as they will achieve EPA-approved risk based levels at remedy completion.	The Operable Unit 5 ROD soil cleanup levels were developed to be protective of human health consistent with the target land use as an undeveloped park. They are also protective of the Great Miami Aquifer at the target risk level. A decision to align the Operable Unit 1 levels with the Operable Unit 5 site-wide levels continues to achieve the threshold criteria of a remedy that is protective of human health and the environment.	The Waste Acceptance Criteria for the On-site Disposal Facility were developed to ensure protection of human health and the environment. Therefore, a decision to place Pit 4 cap material that has been demonstrated to meet the onsite waste acceptance criteria results in a remedy that continues to achieve the threshold criteria of a remedy that is protective of human health and the environment.	The Operable Unit 5 ROD soil cleanup levels were developed to be protective of human health consistent with the target land use as an undeveloped park. They are also protective of the Great Miami Aquifer at the target risk level. Therefore, achieving the health protective Operable Unit 5 soil cleanup levels within the Operable Unit 1 footprint eliminates the need for the installation of a 6.5 foot multi-layer infiltration barrier as originally envisioned.
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs). Both the Operable Unit 1 and 5 remedies achieve compliance with all ARARs or have been granted the necessary EPA-approved waivers and/or exemptions.	The Operable Unit 1 and 5 RODs provide a list of the ARARs the selected remedy and associated soil cleanup levels must attain. A decision to adopt the Operable Unit 5 cleanup levels for soils within the Operable Unit 1 boundary is consistent with and does not alter the original ARARs for either ROD.	The Operable Unit 1 and 5 RODs provide a list of the ARARs the selected remedy and associated soil cleanup levels must attain. A decision to place the waste-acceptance-criteria-compliant Pit 4 cap soils into the On-site Disposal Facility is consistent with and does not alter the original ARARs for either ROD.	A decision to update the design of the Operable Unit 1 cover system to reflect the sitewide restoration approach presented in the Natural Resource Impact Assessment and Natural Resource Restoration Plan is consistent with and does not alter the original ARARs for Operable Unit 1.
3. Long-Term Effectiveness and Permanence. The Operable Unit 5 selected remedy reduces the residual risks associated with contaminated soil by leaving no contaminated material above health-based remediation levels, and therefore provides a remedy that is effective and permanent.	A decision to adopt the Operable Unit 5 cleanup levels for soils within the Operable Unit 1 boundary will continue to provide a remedy that achieves long-term effectiveness and permanence.	The On-site Disposal Facility relies on engineering measures and institutional controls (waste acceptance criteria) to ensure the long-term performance of the facility for waste acceptance criteria-compliant materials. A decision to place the compliant Pit 4 cap material into the On-site Disposal Facility does not compromise the effectiveness or permanence of the facility.	A decision to adopt the Operable Unit 5 cleanup levels for soils within the Operable Unit 1 boundary will continue to provide a remedy that achieves long-term effectiveness and permanence without the installation of a 6.5 foot multi-layer infiltration barrier.
4. Reduction of Contaminant Toxicity, Mobility, or Volume Through Treatment. Neither the Operable Unit 1 or 5 ROD remedies employ treatment as a principal element to further reduce contaminant toxicity, mobility, or volume. The statutory preference for treatment was considered adequately satisfied by the selected actions considering the waste forms, contaminant types, and disposal options.	As documented in the Operable Unit 1 and 5 RODs, treatment of contaminated soil was not adopted as a main component of the remedy. This change remains consistent with the earlier decision.	As documented in the Operable Unit 1 and 5 RODs, treatment of contaminated soil was not adopted as a main component of the remedy. This change remains consistent with the earlier decision.	As documented in the Operable Unit 1 and 5 RODs, treatment of contaminated soil was not adopted as a main component of the remedy. This change remains consistent with the earlier decision.
5. Short-Term Effectiveness. The selected remedies in the Operable Unit 1 and 5 RODs considered the short-term risks associated with remedy implementation during the original trade-off analyses. While the risks can never be fully eliminated, they can be effectively controlled through application of mitigative measures and reduction of haul distances and excavation volumes to the minimum health-protective levels.	Short-term risks associated with cleanup to the revised technetium-99 level will likely be the same or less than the original Operable Unit 1 remedy, because less soil volume may require excavation compared to original estimates. The preponderance of short-term risks are derived from construction-related injuries which are in turn directly linked to the amount of material handled.	Disposition of cap material in the On-site Disposal Facility could reduce the short-term risks by decreasing the potential for injuries associated with transporting the material off-site. Short-term risks in this instance are linked to not only the amount of material handled, but also the haul distance involved. In this case, for this material the haul distances have been shortened by nearly 1800 miles.	Updating the design of the Operable Unit 1 cover system to reflect the sitewide restoration approach presented in the Natural Resource Impact Assessment and Natural Resource Restoration Plan would likely reduce the short-term risks by decreasing the potential for construction related injuries associated with building a complex, multi-layer cover system.
6. Implementability. The selected remedies in the Operable Unit 1 and 5 RODs were considered implementable at the time of the original decisions. More than 5 years of history has been gained for each remedy that has proven their overall implementability and effectiveness.	This change does not alter the physical implementation methods of the original remedies. Therefore this factor is not materially affected by the change proposed in this plan.	The physical implementation of this proposed change eliminates the need for rail loadout and transportation. These elements are replaced by truck transport to the On-site disposal facility, which has been demonstrated to be implementable over 5 years of operations.	The restoration approach presented in the Natural Resource Impact Assessment and Natural Resource Restoration Plan for the Operable Unit 1 footprint is similar in scope to other areas of the site that have already been restored and therefore proven to be implementable.
7. Cost. The original Operable Unit 1 and 5 ROD remedies were found to have costs that were proportionate to the effectiveness achieved.	While the soil volume impacts associated with this change cannot be accurately defined (since the materials reside beneath the pits), it is projected that the savings will be significant and can help support other high-priority cleanup initiatives. Since the proposed change is targeted to still achieve health-based levels at completion, effectiveness is not reduced.	Cost savings from disposing of Pit 4 Cap material in On-site Disposal Facility as an alternative to off-site disposal at Envirocare is approximately $4.5 million. Since the Pit 4 cap material has been demonstrated to meet the On-site disposal Facility Waste Acceptance Criteria, health-based requirements will continue to be achieved and therefore effectiveness will not be reduced.	Updating the Operable Unit 1 cover system design to reflect natural resource restoration rather than a complex multi-layer infiltration barrier will result in a significant savings in construction costs. These savings can help support other high-priority cleanup initiatives. Since the proposed change is targeted to still achieve health-based levels at completion, effectiveness is not reduced.
8. State Acceptance. The Ohio EPA had an opportunity to review and participate in the original Operable Unit 1 and 5 ROD decisions and concurred with the original remedies that were selected.	The Ohio EPA has had an opportunity to review and participate in the proposed change, and has indicated that they concur with the recommendation.	The Ohio EPA has had an opportunity to review and participate in the proposed change, and has indicated that they concur with the recommendation.	The Ohio EPA has had an opportunity to review and participate in the proposed change, and has indicated that they concur with the recommendation.
9. Community Acceptance. As prescribed under CERCLA, the original Operable Unit 1 and 5 RODs provided formal opportunities for gaining community acceptance. Community concerns were addressed in the formal Responsiveness Summaries attached to the RODs.	No comments were received during the public comment period.	No comments were received during the public comment period	No comments were received during the public comment period

ARARs Identified for the Modified Remedy – The selected remedy and the fundamental changes described in this ROD Amendment meet all applicable or relevant and appropriate requirements (ARARs), as identified in the Operable Unit 1 and OU5 RODs, of Federal and State statutes pursuant to CERCLA Section 121 (d)(1), except where waivers of Federal or State law are necessary. The fundamental changes identified in this ROD Amendment will not require waivers of Federal or state statutes.

Implementation of the changes will meet the ARARs as described in the original Operable Unit 1 and Operable Unit 5 RODs and is not affected by new ARARs.

Summary of Support Agency Comments on the ROD Amendment – The State of Ohio has concurred with the modified remedy in this ROD Amendment.

Statutory Determinations – In accordance with Section 121 of CERCLA, 42 U.S.C. § 9621, the modified remedy satisfies statutory requirements, listed as follows:

- Protection of human health and the environment
- Compliance with ARARs
- Cost effectiveness
- Utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable; and
- Satisfies the preference for treatment as a principal element or provide an explanation as to why this preference is not satisfied.

The first five-year review report for the site was issued in March 2001. For sites with multiple operable units, the five-year review is triggered by the onset of construction for the first operable unit remedial action that will result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure. Site Preparation for the Waste Pit Remedial Action Project, which began on April 1, 1996, was the initial triggering action. This ROD Amendment will not change the site goal for a five-year review every five years.

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Public Participation Compliance – In compliance with Section 117 of CERCLA, and the NCP Section 300.435(c)(2)(ii), the Proposed Amended Plan highlighting the modified remedy was published, notice was issued, and a public meeting held on September 30, 2003, to explain the ROD Amendment and receive comments. The public comment period commenced on September 17, 2003, and closed on October 17, 2003. Although members of the public attended the public meeting and were involved in discussions of the changes identified in this ROD Amendment, no comments were received from the public.

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ATTACHMENT A.1

TRANSCRIPT OF SEPTEMBER 30, 2003 PUBLIC HEARING

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PROPOSED PLAN FOR AN AMENDMENT
TO THE OU1 RECORD OF DECISION
SEPTEMBER 30, 2003

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TRANSCRIPT OF PROCEEDINGS

- - -

The above-styled cause came on for hearing at 6:30 p.m. on Tuesday, September 30, 2003 at Fluor Fernald, Inc., Trailer 214, Fernald Conference Room, 7400 Willey Road, Cincinnati, Ohio.

- - -

MR. STEGNER: Let's go ahead and open the formal public hearing portion. I'll remind you that you have until the 17th of October to get your comments on the record. If no one wants to speak tonight, one, twice, okay, thank you all for coming.

- - -

PROCEEDINGS CONCLUDED

- - -

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C E R T I F I C A T E

I, BRITNEY L. FISHER, the undersigned, a notary public-court reporter, do hereby certify that at the time and place stated herein, I recorded in stenotypy and thereafter had transcribed with computer-aided transcription the within (2), two pages, and that the foregoing transcript of proceedings is a complete and accurate report of my said stenotypy notes.

MY COMMISSION EXPIRES:
JULY 3, 2005.

BRITNEY L. FISHER
NOTARY PUBLIC-STATE OF
KENTUCKY

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