

IN THE UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF OHIO
WESTERN DIVISION

STATE OF OHIO, ex rel.	:	CASE NO. C-1-86-0217
NANCY HARDIN ROGERS	:	
ATTORNEY GENERAL OF OHIO,	:	JUDGE S. ARTHUR SPIEGEL
	:	
Plaintiff,	:	
	:	
v.	:	
	:	
UNITED STATES DEPARTMENT OF	:	
ENERGY, et al.	:	
	:	
Defendants.	:	

NOTICE OF LODGING

Plaintiff, the State of Ohio (“State”), and Defendant, United States Department of Energy (“DOE”), hereby lodge a proposed Partial Consent Decree in this action (See Attachment 1).

This Partial Consent Decree would resolve DOE’s liability for natural resource damages at the Fernald site, as alleged in Count Two of the State’s Complaint. As agreed by the State and DOE in the proposed Partial Consent Decree, the Decree will be subject to public comment before it is entered by the Court. Accordingly, the Court should refrain from entering the proposed Partial Consent Decree at this time.

The State will publish notice of the Partial Consent Decree in the Cincinnati Enquirer, and Hamilton Journal News. Public comments will be solicited for a period of no less than thirty days. After receiving public comments, the State and DOE will consider whether the comments disclose facts or considerations which indicate that the proposed Partial Consent Decree is

inappropriate, improper, or inadequate. If so, the State and/or DOE may choose to withdraw consent to the Partial Consent Decree or propose mutually agreed amendments to the Partial Consent Decree as lodged for the Court's consideration. If not, the State and DOE will move the Court for entry of the proposed Partial Consent Decree.

Respectfully submitted,

NANCY HARDIN ROGERS
Attorney General of Ohio

GREGORY G. LOCKHART
United States Attorney

By: /s/ Timothy J. Kern
TIMOTHY J. KERN
Assistant Attorney General
Environmental Enforcement Section
Public Protection Division
30 East Broad Street-25th Floor
Columbus, Ohio 43215-3400
(614) 466-5261
tkern@ag.state.oh.us

DONETTA D. WIETHE (0028212)
Assistant United States Attorney
221 East Fourth Street, Suite 400
Cincinnati, Ohio 45202
(513) 684-3711
Donetta.Wiethe@usdoj.gov

RONALD J. TENPAS
Assistant Attorney General

Counsel for State of Ohio

By: /s/ Daniel R. Dertke
DANIEL R. DERTKE
U.S. Department of Justice
Environment & Natural Resources Division
Environmental Defense Section
P.O. Box 23986
Washington, DC 20026-3986
(202) 514-0994
daniel.dertke@usdoj.gov

Counsel for Dept. of Energy

CERTIFICATE OF SERVICE

The undersigned certifies that a copy of the foregoing Notice of Lodging was filed electronically on July 7, 2008. Notice of this filing will be sent by operation of the Court's electronic filing system to all parties indicated on the electronic filing receipt.

/s/ Timothy J. Kern
Assistant Attorney General
Timothy J. Kern

IN THE UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF OHIO
WESTERN DIVISION

STATE OF OHIO, ex rel.	:	CASE NO. C-1-86-0217
NANCY HARDIN ROGERS	:	
ATTORNEY GENERAL OF OHIO,	:	JUDGE S. ARTHUR SPIEGEL
	:	
Plaintiff,	:	
	:	
v.	:	
	:	
UNITED STATES DEPARTMENT OF	:	
ENERGY, et al.	:	
	:	
Defendants.	:	

PARTIAL CONSENT DECREE

WHEREAS, on March 11, 1986, the State of Ohio filed a Complaint in the above-captioned case against the United States Department of Energy ("DOE"), NLO, Inc. ("NLO"), and NL Industries, Inc. ("NLI");

WHEREAS, Ohio alleged that DOE, NLO, and NLI have violated various provisions of Federal and Ohio laws and regulations, which DOE, NLO, and NLI have denied;

WHEREAS, on December 2, 1988, the Court entered a Consent Decree (Doc. 95) ("1988 Consent Decree") which resolved Count One and Counts Three through Twenty Seven of the Complaint;

WHEREAS, the 1988 Consent Decree was amended by the January 22, 1993 entry of the Stipulated Amendment to Consent Decree entered December 2, 1988, and Settlement of Charges in Contempt;

WHEREAS, paragraph 8.2 of the 1988 Consent Decree reserves Count Two of the Complaint, concerning Ohio's claim for natural resource damages pursuant to Section 107(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9607(a) ("CERCLA");

WHEREAS, Ohio and DOE agree, and the Court by entering this Partial Consent Decree finds, that this Partial Consent Decree has been negotiated by the Parties in good faith and is entered into without the admission or adjudication of any issues of fact or law, that settlement of this matter will avoid further litigation between the Parties, and that this Partial Consent Decree is fair, reasonable, consistent with CERCLA and in the public interest; and

WHEREAS, Ohio and DOE agree, and the Court by entering this Partial Consent Decree finds, that the restoration actions and other compensatory activities and damages payments set forth in this Partial Consent Decree constitute appropriate actions to restore, replace, or acquire the equivalent of the natural resources allegedly injured by releases or threatened releases of hazardous substances at the Fernald Preserve.

NOW, THEREFORE, it is hereby ORDERED, ADJUDGED and DECREED as follows:

I. DEFINITIONS

1.1 "DOE" means the United States Department of Energy and any predecessor or successor agency or department of DOE.

1.2 "DOI" means the United States Department of the Interior.

1.3 "Fernald Preserve" means the approximately 1050 acre tract of real property located at 7400 Willey Road, in Hamilton and Butler counties, Ohio, as shown

in Appendix A, and formerly known as the Fernald Closure Project, the Fernald Environmental Management Project, and the Feed Materials Production Center.

1.4 “Future Oversight Costs” means internal costs incurred by Ohio EPA after the Effective Date of this Partial Consent Decree in implementing the Natural Resource Restoration Plan provided for in paragraph 3.1, below.

1.5 “Natural Resources” shall have the meaning provided in CERCLA section 101(16), 42 U.S.C. § 9601(16).

1.6 “Natural Resource Damages” means any damages recoverable by Ohio on behalf of the public, for injury to, destruction of, or loss or impairment of Natural Resources as set forth in CERCLA Section 107(a)(4)(C), 42 U.S.C. § 9607(a)(4)(C), at and in the vicinity of the Fernald Preserve as a result of a release of hazardous substances, including but not limited to: (i) Natural Resource Damage Assessment Costs; (ii) the costs of restoration, rehabilitation, or replacement of injured or lost natural resources or of acquisition of equivalent resources; (iii) compensation for injury, destruction, loss, impairment, diminution in value, or loss of use of natural resources; and (iv) each of the categories of recoverable damages described in 43 C.F.R. § 11.15 and applicable state law.

1.7 “Natural Resource Damage Assessment Costs” means the costs Ohio has incurred prior to the Effective Date of this Partial Consent Decree in connection with the assessment of the Natural Resource Damages at and in the vicinity of the Fernald Preserve, including but not limited to: (i) the costs of assessing injury, destruction, or loss or impairment arising from or relating to a release of hazardous substances; (ii) the costs of planning past restoration activities including, but not limited to, internal costs incurred

by Ohio EPA prior to the Effective Date of this Partial Consent Decree and costs associated with the development of the Natural Resource Restoration Plan provided for in paragraph 3.1, below; and (iii) the costs of assessing the damages resulting from injury, destruction, or loss or impairment arising from or relating to a release of hazardous substances.

1.8 “Ohio” means the State of Ohio by and through its Attorney General, on behalf of the Ohio Environmental Protection Agency.

1.9 “Ohio EPA” means the Ohio Environmental Protection Agency.

1.10 “Parties” means DOE and Ohio.

1.11 “Trustees” means Ohio EPA, DOE, and DOI.

1.12 “United States” means the United States of America, including all of its departments, agencies, and instrumentalities.

II. STATEMENT OF PURPOSE

2.1 By entering this Partial Consent Decree, the mutual objectives of the Parties are: (a) to resolve DOE’s alleged liability under Count Two of the Complaint by implementing the Natural Resource Restoration Plan, by making a one time cash payment to fund additional natural resource restoration projects and to provide for the reimbursement by DOE of Natural Resource Damage Assessment Costs incurred by Ohio, and by executing and recording Environmental Covenants which apply to the Fernald Preserve; and (b) to avoid further transaction costs and protracted litigation.

2.2 If for any reason the Court should decline to enter this Partial Consent Decree in the form presented, or if entry of this Partial Consent Decree is subsequently vacated, this Partial Consent Decree and the Parties’ agreement to it is voidable at the

sole discretion of either Party, and its terms may not be used as evidence in this or any other litigation between the Parties.

III. NATURAL RESOURCE RESTORATION PLAN

3.1 The Natural Resource Restoration Plan (“Restoration Plan”) for the Fernald Preserve is Appendix B, incorporated in and an enforceable part of this Partial Consent Decree. The Restoration Plan outlines the approach for ecological restoration of the Fernald Preserve. Restoration of the Fernald Preserve will transition the majority of the site from post-remediation conditions to the selected final land use, an undeveloped park with an emphasis on wildlife habitat. As set forth in section 2.1 of the Restoration Plan, the ecological goals of the Restoration Plan are to: 1) enhance and restore, as feasible given post-excavation land forms and soils, vegetative communities similar to native communities present in pre-settlement southwestern Ohio; 2) enhance the natural dynamic stream characteristics and aquatic systems of Paddys Run; 3) enhance and restore ecological systems that promote the habitation of wildlife populations native to southwestern Ohio; and 4) integrate mitigation requirements into natural resource restoration planning.

3.2 DOE shall implement all requirements in the Restoration Plan, which includes the identified restoration projects and the monitoring and maintenance requirements of the restoration projects.

IV. PAYMENTS BY THE UNITED STATES

4.1 As soon as reasonably practicable after the Effective Date of this Partial Consent Decree, the United States on behalf of DOE shall pay Ohio Thirteen Million, Seven Hundred Fifty Thousand Dollars (\$13,750,000) to restore, replace, or acquire the

equivalent of injured Natural Resources at and in the vicinity of the Fernald Preserve, in a manner consistent with the Restoration Plan, and to reimburse Ohio's Natural Resource Damage Assessment Costs.

4.2 Ohio and the United States on behalf of DOE agree that in any judicial proceeding to enforce the terms of this Partial Consent Decree and/or to find DOE in contempt for failure to comply or delay in compliance with such terms, the United States on behalf of DOE may raise as a defense that such failure or delay was caused by circumstances beyond its control or that such failure or delay was caused by the unavailability of appropriated funds. While Ohio disagrees that such defenses exist, Ohio and the United States on behalf of DOE agree and stipulate that it is premature at this time to raise and adjudicate the existence of such defenses.

4.3 If payment pursuant to paragraph 4.1 is not made in full within 120 days after the Effective Date of this Partial Consent Decree, then interest on the unpaid balance shall be paid, and shall begin to accrue commencing on the 121st day after the Effective Date and shall continue to accrue through the date of payment. Interest shall accrue at the same rate as is specified for interest on investments of the Hazardous Substances Superfund established under subchapter A of Chapter 98 of Title 26 of the U.S. Code.

4.4 Payment to Ohio pursuant to paragraph 4.1 and 4.3 shall be in the form of an Electronic Funds Transfer into an interest-bearing escrow account in the Registry of the United States District Court for the Southern District of Ohio ("Fernald Natural Resource Damages Court Registry Escrow Account," hereinafter "Escrow Account"). Pursuant to this Partial Consent Decree, and in accordance with 28 U.S.C. § 2041, the

Clerk of the Court for the United States District Court for the Southern District of Ohio will accept payment from the United States on behalf of DOE and shall place said payment in the Registry of the Court in an interest-bearing account. The Clerk of the Court shall disburse money from the Escrow Account (less 10% of interest earned, which is the Registry fee) pursuant to orders of this Court in accordance with paragraphs 4.5 through 4.8 of this Partial Consent Decree. The Parties may request waiver of the Registry fee from the Director of the Administrative Office of the United States Courts pursuant to Section 2.7.2 of the Guide to Judicial Policies and Procedures.

4.5 Applications for orders for disbursements from the Escrow Account to transfer funds or to use funds, as set forth in paragraphs 4.6 through 4.8 of this Partial Consent Decree, shall be made by joint motion of counsel for Ohio and the United States.

4.6 The money in the Escrow Account, including interest earned, may be transferred to an account designated by Ohio and acceptable to the United States. Any transferred funds shall be applied toward the costs of restoration, replacement, or acquisition of the equivalent of injured Natural Resources at and in the vicinity of the Fernald Preserve, as set forth in the Restoration Plan, and to reimburse Ohio for its Natural Resource Damage Assessment Costs pursuant to paragraph 4.8 of this Partial Consent Decree, and shall not be borrowed or used for any other purposes.

4.7 All decisions regarding expenditures from the Escrow Account, and all decisions regarding the implementation of and any amendment to the Restoration Plan, shall be made pursuant to and consistent with the terms of the Trustees' July 2001 Memorandum of Understanding, which is Appendix C to this Partial Consent Decree, and which requires the unanimous agreement of the Trustees. The Trustees shall expend the

funds in the Escrow Account to implement the plan developed pursuant to Section 1.5 of the Restoration Plan.

4.8 A portion of the money in the Escrow Account shall be used to reimburse Ohio for its Natural Resource Damage Assessment Costs. Within 30 days after the Effective Date of this Partial Consent Decree, Ohio shall submit an itemized statement of such costs to DOE and DOI. The Trustees shall jointly determine the amount of Ohio's Natural Resource Damage Assessment Costs and shall make their determination pursuant to and consistent with the terms of their July 2001 Memorandum of Understanding, Appendix C; provided however, that in no event shall the reimbursed amount of Ohio's Natural Resource Damage Assessment Costs be less than \$275,000 or more than \$500,000.

4.9 Future Oversight Costs shall continue to be paid by DOE pursuant to the federal facilities grant process created in order to implement Section 7 of the 1988 Consent Decree.

4.10 Future Oversight Costs for the development and implementation of the plan to be developed pursuant to section 1.5 of the Restoration Plan shall be capped at \$50,000 per year and shall be limited to the four years after the Effective Date of this Partial Consent Decree, unless otherwise agreed by DOE and Ohio EPA.

V. ENVIRONMENTAL COVENANTS

5.1 Within 60 days after the Effective Date of this Partial Consent Decree, DOE shall submit to Ohio executed Environmental Covenants, in the form attached as Appendix D, to be recorded in the Hamilton and Butler County Recorders' Offices. Within 30 days of receipt of the Environmental Covenants executed by Ohio EPA, DOE

shall record in the Hamilton and Butler County Recorders' Offices the executed Environmental Covenants.

VI. COVENANTS BY OHIO

6.1 Except as provided in paragraphs 7.1, 7.2, and 7.3, Ohio releases, covenants not to sue and not to bring any civil action, or issue administrative findings and orders, against the United States or any department or agency thereof, or any past or present official, employee, agent, or contractor (and any past or present official, officer, director, employee, agent or sub-contractor of such contractor) of the United States, with respect to the claims for Natural Resource Damages contained in Count Two of the Complaint. These covenants shall take effect upon receipt of the payment pursuant to paragraph 4.1 or 4.3 of this Partial Consent Decree, and are conditioned upon the satisfactory performance by DOE of its obligations under this Partial Consent Decree.

6.2 The covenants in paragraph 6.1 extend only to the United States and any past or present official, employee, agent, or contractor (and any past or present official, officer, director, employee, agent or sub-contractor of such contractor) of the United States and do not extend to any other person.

VII. RESERVATIONS OF RIGHTS

7.1 General Reservation of Rights. This Partial Consent Decree is without prejudice to any rights Ohio may have against the United States with respect to all other matters not expressly included within paragraph 6.1 of this Partial Consent Decree or paragraph 8.1 of the 1988 Consent Decree.

7.2 Specific Reservations of Rights. Notwithstanding any other provision of this Partial Consent Decree, Ohio reserves all rights against DOE with respect to:

a) claims based upon a failure by DOE to meet a requirement of this Partial Consent Decree;

b) liability for any damages or any other costs incurred or to be incurred by Ohio that are not within the definition of Natural Resource Damages and have not been resolved by the 1988 Consent Decree;

c) liability for failure to comply with any CERCLA Record of Decision pertaining to the Fernald Preserve as of the date of lodging this Partial Consent Decree;

d) liability arising from injury to Natural Resources after the date of lodging of this Partial Consent Decree resulting from any disposal of hazardous substances at the Fernald Preserve; and

(e) criminal liability, if any, including criminal liability for past actions by Defendants.

7.3 Notwithstanding any other provision of this Partial Consent Decree, Ohio also reserves the right to institute proceedings against DOE in this action or in a new action seeking recovery of Natural Resource Damages, based on: (i) conditions with respect to the Fernald Preserve, unknown to Ohio as of the date of lodging of this Partial Consent Decree, that result in releases of hazardous substances that cause or contribute to injury to, destruction of, or loss of Natural Resources (“Unknown Conditions”); or (ii) information received by Ohio after the date of lodging of this Partial Consent Decree which indicates that there is injury to, destruction of, or loss of Natural Resources of a type that was unknown to Ohio as of the date of lodging of this Partial Consent Decree (“New Information”). For the purpose of this paragraph, the information and conditions known to Ohio shall include any information or conditions listed or identified in records

or documents relating to the Fernald Preserve that were in the possession or under the control of Ohio as of the date of lodging this Partial Consent Decree, or that are in the administrative records of the response actions taken pursuant to the 1988 Consent Decree.

7.4 DOE reserves any and all defenses it may have to the claims reserved in paragraphs 7.1, 7.2, and 7.3, except that in any subsequent administrative or judicial proceeding initiated by Ohio for injunctive relief, or Natural Resource Damages or other relief related to the Fernald Preserve, DOE shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, *res judicata*, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by Ohio in the subsequent proceeding were or should have been brought in the instant case; provided however, that nothing in this paragraph affects the enforceability of the covenants by Ohio set forth in Section VI. Nothing in paragraphs 7.1, 7.2, or 7.3 shall limit or otherwise affect the provisions of paragraph 8.1 of the 1988 Consent Decree.

VIII. COVENANTS BY DOE

8.1 DOE hereby agrees not to assert against Ohio any direct or indirect claim for reimbursement of any payment for Natural Resource Damages based on Sections 107 or 113 of CERCLA, 42 U.S.C. §§ 9607 or 9613, and covenants not to sue Ohio under Section 107 or 113 of CERCLA, 42 U.S.C. §§ 9607 or 9613, with respect to Natural Resource Damages, including payments made under Section IV of this Partial Consent Decree. These covenants shall not apply in the event Ohio brings a claim and/or administrative action against DOE pursuant to the reservations set forth in paragraphs

7.1, 7.2, and 7.3, above, but only to the same extent and for the same matters, transactions, or occurrences as are raised in the claims or actions brought by Ohio pursuant to such reservations.

IX. EFFECT OF SETTLEMENT/CONTRIBUTION PROTECTION

9.1 Nothing in this Partial Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Partial Consent Decree, and each Party expressly reserves any and all rights (including, but not limited to, any right to contribution), defenses, claims, demands, and causes of action which that Party may have with respect to any matter, transaction, or occurrence relating in any way to the Fernald Preserve against any person not a Party to this Partial Consent Decree.

9.2 The Parties agree, and by entering this Partial Consent Decree this Court finds, that DOE is entitled, as of the Effective Date of this Partial Consent Decree, to protection from actions or claims as provided by CERCLA Section 113(f)(2), 42 U.S.C. § 9613(f)(2), or other applicable law, for “matters addressed” in this Partial Consent Decree. The “matters addressed” in this Partial Consent Decree are Natural Resource Damages.

9.3 The Parties agree, and by entering this Partial Consent Decree this Court finds, that DOE resolves its liability for Natural Resource Damages at the Fernald Preserve within the meaning of CERCLA section 113(f)(3), 42 U.S.C. § 9613(f)(3).

X. NOTICES AND SUBMISSIONS

10.1 Whenever, under the terms of this Partial Consent Decree, notice is required to be given or a document is required to be sent by one Party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or

their successors give notice of a change to the other Parties in writing. Written notice as specified herein shall constitute complete satisfaction of any written notice requirement of this Partial Consent Decree with respect to Ohio and DOE, respectively.

As to DOE:

- a. Chief, Environmental Defense Section
Re: DJ # 90-7-5-13
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 23986
Washington, D.C. 20026-3986

Or, if sent by courier or overnight delivery service:

Chief, Environmental Defense Section
Re: DJ # 90-7-5-13
Environment and Natural Resources Division
U.S. Department of Justice
Suite 8000
601 D Street, N.W.
Washington, D.C. 20004

- b. Office of Legal Services
Environmental Management Consolidated Business Center
U. S. Department of Energy
250 E. 5th Street, Suite 500
Cincinnati, OH 45202
- c. Office of General Counsel
U.S. Department of Energy
Room 6A-245
1000 Independence Avenue, SW
Washington, D.C. 20585

As to Ohio:

- a. Chief, Environmental Enforcement Section
Ohio Attorney General's Office
30 E. Broad Street, 25th Floor
Columbus, Ohio 43215

- b. Thomas A. Schneider (or his successor)
Federal Facilities Program
Ohio EPA, Southwest District Office
401 East Fifth Street
Dayton, Ohio 54502-2911

As to DOI:

- a. Mary Knapp
U.S. Fish and Wildlife Service
Reynoldsburg Ecological Services Field Office
690 Americana Parkway, Suite H
Reynoldsburg, Ohio 43068

XI. EFFECTIVE DATE AND RETENTION OF JURISDICTION

11.1 This Partial Consent Decree shall take effect upon entry by the Court (“Effective Date”). The Parties recognize that certain obligations under this Partial Consent Decree may be performed before this Partial Consent Decree is entered by the Court.

11.2 The Court shall retain jurisdiction to modify and enforce the terms and conditions of this Partial Consent Decree and to resolve disputes arising hereunder as may be necessary or appropriate for the construction or execution of this Partial Consent Decree.

XII. MODIFICATIONS

12.1 Any material modification of this Partial Consent Decree shall be made by agreement of the Parties and in writing, and shall not take effect unless approved by the Court. Any non-material modification of this Partial Consent Decree shall be made by agreement of the Parties and in writing, and shall not take effect until filed with the Court. Any modification of the Restoration Plan (Appendix B to this Partial Consent Decree), the July 2001 Memorandum of Understanding (Appendix C to this Partial

Consent Decree), or the Environmental Covenants (Appendix D to this Partial Consent Decree) shall be made by agreement of the Parties and in writing, and shall not take effect until filed with the Court. Nothing in this Partial Consent Decree shall be deemed to alter the Court's power to enforce, supervise, or approve modifications of this Partial Consent Decree or the 1988 Consent Decree, as previously amended.

12.2 The provisions of this Partial Consent Decree are not severable. The Parties' consent hereto is conditioned upon the entry of this Partial Consent Decree in its entirety without modification, addition, or deletion, except as agreed to by the Parties.

12.3 Unanticipated or increased costs or expenses associated with the implementation, oversight, or monitoring of actions called for by this Partial Consent Decree shall not serve as a basis for modifications of this Partial Consent Decree.

XIII. SIGNATORIES

13.1 The undersigned representatives of Ohio and DOE each certify that he or she is fully authorized to enter into the terms and conditions of this Partial Consent Decree and to execute and legally bind such Party to this document. This Partial Consent Decree may be executed in multiple counterparts, each of which shall be deemed an original, but all of which, taken together, shall constitute one and the same instrument.

XIV. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

14.1 This Partial Consent Decree shall be lodged with the Court for a period of not less than 30 days for public notice and comment. The Parties reserve the right to withdraw or withhold their consent if comments regarding the Partial Consent Decree disclose facts or considerations which indicate that this Partial Consent Decree is inappropriate, improper, or inadequate.

14.2 As soon as reasonably practicable after expiration of the public comment period in paragraph 14.1, the Parties shall jointly inform the Court of the substance of any comments received regarding the Partial Consent Decree, and of the Parties' responses to such comments, and shall move the Court to enter the Partial Consent Decree if the Parties do not withdraw or withhold their consent pursuant to paragraph 14.1.

XV. FINAL JUDGMENT

15.1 This Partial Consent Decree and its appendices constitute the final, complete, and exclusive understanding among the Parties with respect to the settlement embodied herein. The Parties acknowledge that there are no representations, agreements, or understandings relating to the settlement of Count Two other than those expressly contained in this Partial Consent Decree.

15.2 The terms of the 1988 Consent Decree, as previously amended, shall be unaltered and shall remain in full force and effect.

15.3 Upon approval and entry of this Partial Consent Decree by the Court, this Partial Consent Decree together with the 1988 Consent Decree, as previously amended, shall constitute a final judgment between and among Ohio and DOE in this case. The Court finds that there is no reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54(b) and 58.

15.4 Except as set forth in Section IV, each Party shall bear its own costs and attorneys' fees.

NANCY HARDIN ROGERS
Attorney General of Ohio

By: _____
TIMOTHY J. KERN
Assistant Attorney General
Environmental Enforcement Section
Public Protection Division
30 East Broad Street-25th Floor
Columbus, Ohio 43215-3400
(614) 466-5261
TKern@ag.state.oh.us

Counsel for State of Ohio
_____, 2008

Respectfully submitted,

GREGORY G. LOCKHART
United States Attorney

DONETTA D. WIETHE (0028212)
Assistant United States Attorney
221 East Fourth Street, Suite 400
Cincinnati, Ohio 45202
(513) 684-3711
Donetta.Wiethe@usdoj.gov

RONALD J. TENPAS
Assistant Attorney General

By: _____
DANIEL R. DERTKE
U.S. Department of Justice
Environment & Natural Resources Division
Environmental Defense Section
P.O. Box 23986
Washington, DC 20026-3986
(202) 514-0994
daniel.dertke@usdoj.gov

Counsel for Dept. of Energy
_____, 2008

SO ORDERED this ____ day of _____, 2008

S. ARTHUR SPIEGEL
United States District Judge

15.4 Except as set forth in Section IV, each Party shall bear its own costs and attorneys' fees.

NANCY HARDIN ROGERS
Attorney General of Ohio

By: Timothy J. Kern
TIMOTHY J. KERN
Assistant Attorney General
Environmental Enforcement Section
Public Protection Division
30 East Broad Street-25th Floor
Columbus, Ohio 43215-3400
(614) 466-5261
TKern@ag.state.oh.us

Counsel for State of Ohio

July 7, 2008

Respectfully submitted,

GREGORY G. LOCKHART
United States Attorney

DONETTA D. WIETHE (0028212)
Assistant United States Attorney
221 East Fourth Street, Suite 400
Cincinnati, Ohio 45202
(513) 684-3711
Donetta.Wiethe@usdoj.gov

RONALD J. TENPAS
Assistant Attorney General

By: /s/ Daniel R. Dertke
DANIEL R. DERTKE
U.S. Department of Justice
Environment & Natural Resources Division
Environmental Defense Section
P.O. Box 23986
Washington, DC 20026-3986
(202) 514-0994
daniel.dertke@usdoj.gov

Counsel for Dept. of Energy

July 7, 2008

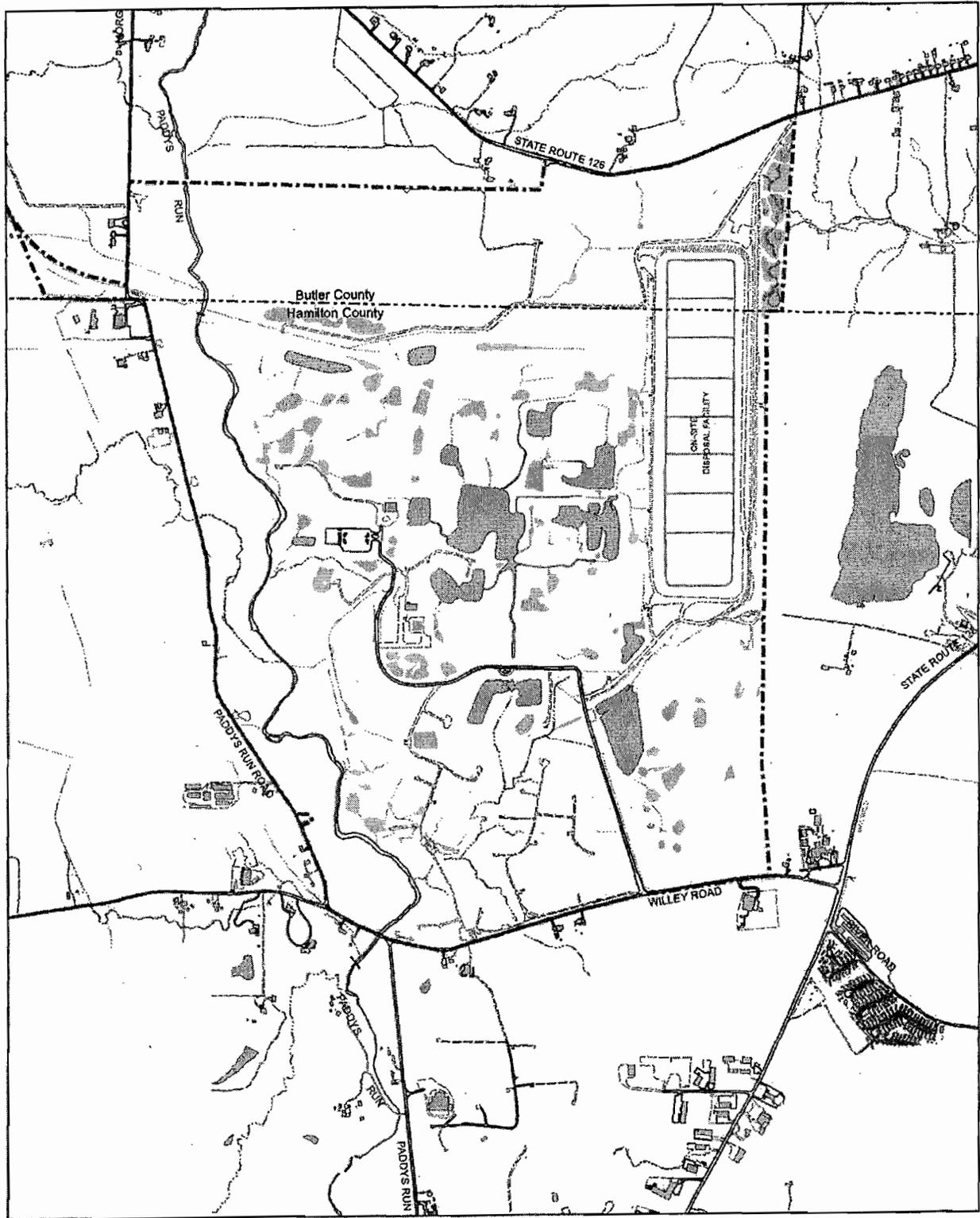
SO ORDERED this _____ day of _____, 2008

S. ARTHUR SPIEGEL
United States District Judge

Appendix A to Partial Consent Decree

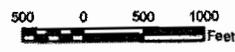
Fernald Preserve site map

X:\GIS\Bioscience\MapDocs\Fernald\Project\MapDocs\Fernald\MapDocs\MapDocs_2008.mxd



Legend

- | | | |
|---------------------------------|--------------|---------------------------|
| --- Fernald Preserve Boundary | ■ Building | — Creek |
| --- Butler-Hamilton County Line | ■ Open Water | --- Intermittent Drainage |
| --- Road-gravel | ■ Wetland | |
| — Road-paved | | |



FERNALD PRESERVE

Appendix B to Partial Consent Decree

Natural Resource Restoration Plan

NATURAL RESOURCE RESTORATION PLAN

**FERNALD PRESERVE
FERNALD, OHIO**



July 2008

**U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE**

**212E-PL-0003
REVISION 0B
FINAL**

TABLE OF CONTENTS

List of Tables iii

List of Figures iii

List of Acronyms iv

1.0 Introduction 1

 1.1 Administrative Goals of the NRRP 1

 1.2 Natural Resource Restoration Strategy 2

 1.3 Summary of Natural Resource Impact Assessment 4

 1.4 Summary of Habitat Equivalency Analysis 4

 1.5 Settlement of Groundwater Issues 5

2.0 Restoration Planning 7

 2.1 Ecological Restoration Goals 7

 2.1.1 Restoration of Native Vegetation 7

 2.1.2 Paddys Run Restoration 7

 2.1.3 Wildlife Promotion 8

 2.1.4 Meet Mitigation Requirements 8

 2.2 Integration with Sitewide Excavation Plan 8

 2.2.1 Sitewide Excavation Plan 8

 2.2.2 Postexcavation Strategy 9

 2.2.3 Sitewide Sequencing Plan 9

 2.2.4 Acceleration of Restoration 9

 2.2.5 Implementation of Construction 9

 2.3 Uncertainties and Considerations During Restoration 10

 2.3.1 Potential for Cross-Contamination During Phasing of Excavation 10

 2.3.2 Ecological Risk Factors 10

3.0 General Ecological Restoration Plan 11

 3.1 Sitewide Restoration Considerations 11

 3.1.1 Soil Balance and Pre-FCP Topography (i.e., Cut and Fill Maps) 11

 3.1.2 Sequence of Natural Resource Restoration Projects 11

 3.1.3 Available Watershed 12

 3.1.4 Restoration Plan for Paddys Run 12

 3.1.5 Future Public Use 13

 3.1.6 Soil Preparation 15

 3.1.7 Use of Plants and Seeds and Invasive Plant Species Management 15

 3.1.8 Long-Term Maintenance 15

 3.1.9 Institutional Controls 16

 3.2 Habitat-Specific Restoration Plans 16

 3.2.1 Upland Forest 16

 3.2.2 Riparian Forest 17

 3.2.3 Tallgrass Prairie/Savanna 17

 3.2.4 Wetlands/Open Water 23

4.0 Natural Resource Restoration Projects 26

 4.1 Aesthetic Barrier Along Willey Road 26

 4.2 Wetland Mitigation - Phase I 26

 4.3 Area 8, Phase II Revegetation 28

4.4	Southern Waste Units Restoration (Area 2, Phase I).....	30
4.5	North Woodlot.....	31
4.5.1	Northern Pine Plantation Enhancement (Area 1, Phase I).....	31
4.5.2	Northern Woodlot Enhancement	32
4.5.3	Wetland Mitigation - Phase II (Area 1, Phase III)	33
4.6	Paddy Run Corridor.....	34
4.6.1	Paddys Run Corridor Expansion East (Area 2, Phase II).....	34
4.6.2	Paddys Run Corridor Expansion West (Area 8, Phase III).....	35
4.7	Borrow Area Restoration (Area 1, Phase II)	37
4.8	OSDF Perimeter Buffer Restoration (Area 1, Phases I and II)	38
4.9	Silos Area (Area 7).....	39
4.10	Production/Waste Pit Area	39
4.10.1	Former Production Area Restoration (Areas 3, 4, and 5)	39
4.10.2	Waste Pit Area Restoration (Area 6)	41
4.11	Paddys Run Restoration Approach.....	42
5.0	Monitoring & Maintenance	43
5.1	Monitoring	43
5.1.1	Implementation Monitoring	43
5.1.2	Functional Phase Monitoring.....	46
5.2	Maintenance of Restored Areas	48
5.2.1	Watering.....	49
5.2.2	Deer Control.....	49
5.2.3	Mowing and Weed Control.....	50
5.2.4	Waterways and Water Bodies.....	50
5.3	Adaptive Management.....	50
6.0	Stakeholder Involvement	52
	References.....	

LIST OF TABLES

- Table 3-1 Master List of Trees and Shrubs used in Natural Resource Restoration at the Fernald Preserve
- Table 3-2 Seed Mix Used in Wet and Dry Areas for Permanent Vegetation

LIST OF FIGURES

- Figure 1-1 Fernald Conceptual Final Land Use
- Figure 4-1 Restoration Project Areas

LIST OF ADDENDA

- Addendum 1 Memorandum of Understanding Between the Ohio Environmental Protection Agency, the United States Department of Energy, and the United States Department of the Interior (July 2001)

LIST OF ACRONYMS AND ABBREVIATIONS

BTV	benchmark toxicity value
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRO	Community Reuse Organization
DOE	U.S. Department of Energy
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FCAB	Fernald Citizens Advisory Board
FCP	Fernald Closure Project
FONSI	Finding of No Significant Impact
FPA	Former Production Area
FRL	final remediation level
gpm	gallons per minute
HEA	Habitat Equivalency Analysis
IRDP	Integrated Remedial Design Package
LMICP	Comprehensive Legacy Management and Institutional Control Plan
MCL	maximum contaminant level
µg/L	micrograms per liter
NEPA	National Environmental Policy Act
NRDA	Natural Resource Damage Assessment
NRIA	Natural Resource Impact Assessment
NRRDP	Natural Resource Restoration Design Plan
NRRP	Natural Resource Restoration Plan
NRTs	Natural Resource Trustees
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
OU	Operable Unit
PAHs	polyaromatic hydrocarbons
PEIC	Public Environmental Information Center
pls	pure live seed
ROD	Record of Decision
SCS	Soil Conservation Service
SEP	Sitewide Excavation Plan
SER	Society for Ecological Restoration
SSOD	Storm Sewer Outfall Ditch
SWU	Southern Waste Unit
USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION

This Natural Resource Restoration Plan (NRRP) outlines the approach for ecological restoration (hereafter referred to as “restoration”) of the Fernald Preserve (Preserve). Restoration of the Preserve will transition the majority of the site from post-remediation conditions to the selected final land use, an undeveloped park with an emphasis on wildlife habitat. The NRRP presents the strategy for site restoration based on a series of restoration projects. The NRRP also outlines the plan for integrating restoration with the sitewide remediation process including the excavation plans outlined in the Sitewide Excavation Plan (SEP; DOE 1998a). In addition, the NRRP outlines the plan for public use of the Preserve.

The Natural Resource Trustees (NRTs) for the Preserve are the Ohio Environmental Protection Agency (OEPA), the U.S. Department of Energy (DOE), and the U.S. Department of Interior (DOI). The NRTs are responsible for overseeing and ensuring the implementation of the NRRP, and in July 2001 agreed to coordinate their efforts through a Trustee Council, which consists of a representative from each of the NRTs and which makes decisions by unanimous agreement. The NRTs’ Memorandum of Understanding (Addendum 1) explains in greater detail the NRTs’ duties, responsibilities, and decision-making procedures. Where the NRRP calls for joint or collective action or decision-making by the NRTs, the NRTs shall act through the Trustee Council and pursuant to the Memorandum of Understanding.

The NRTs support public accessibility to the site as outlined in Section 3.1.5. Restoration projects implemented at the Preserve are driven by terrestrial impacts as outlined in Sections 1.3 and 1.4. The NRRP also includes the NRTs’ agreement for resolving groundwater injuries (Section 1.5).

1.1 ADMINISTRATIVE GOALS OF THE NRRP

The ultimate goal of the NRRP is to resolve past, present and future natural resource impacts at the Preserve while meeting regulatory commitments and addressing stakeholder concerns. The NRRP reflects the discussions between the NRTs and stakeholders (see Section 6.0) regarding restoration of the Preserve. Prior drafts of the NRRP were used as the basis for the development of project-specific restoration designs. The specific administrative goals that guided the development of the NRRP are as follows:

- Establish a restoration plan that is satisfactory to the NRTs;

- Ensure the Preserve is transitioned to the selected final land use for the FCP site and considers the interests of stakeholders to the degree possible and will accommodate future public use as determined appropriate;
- Ensure that restoration of the Preserve is conducted in a manner that is consistent with the established risk levels and decisions reached in the various operable unit records of decision;
- Establish a restoration plan that is fully integrated with the remedial design and remedial action processes at the site.

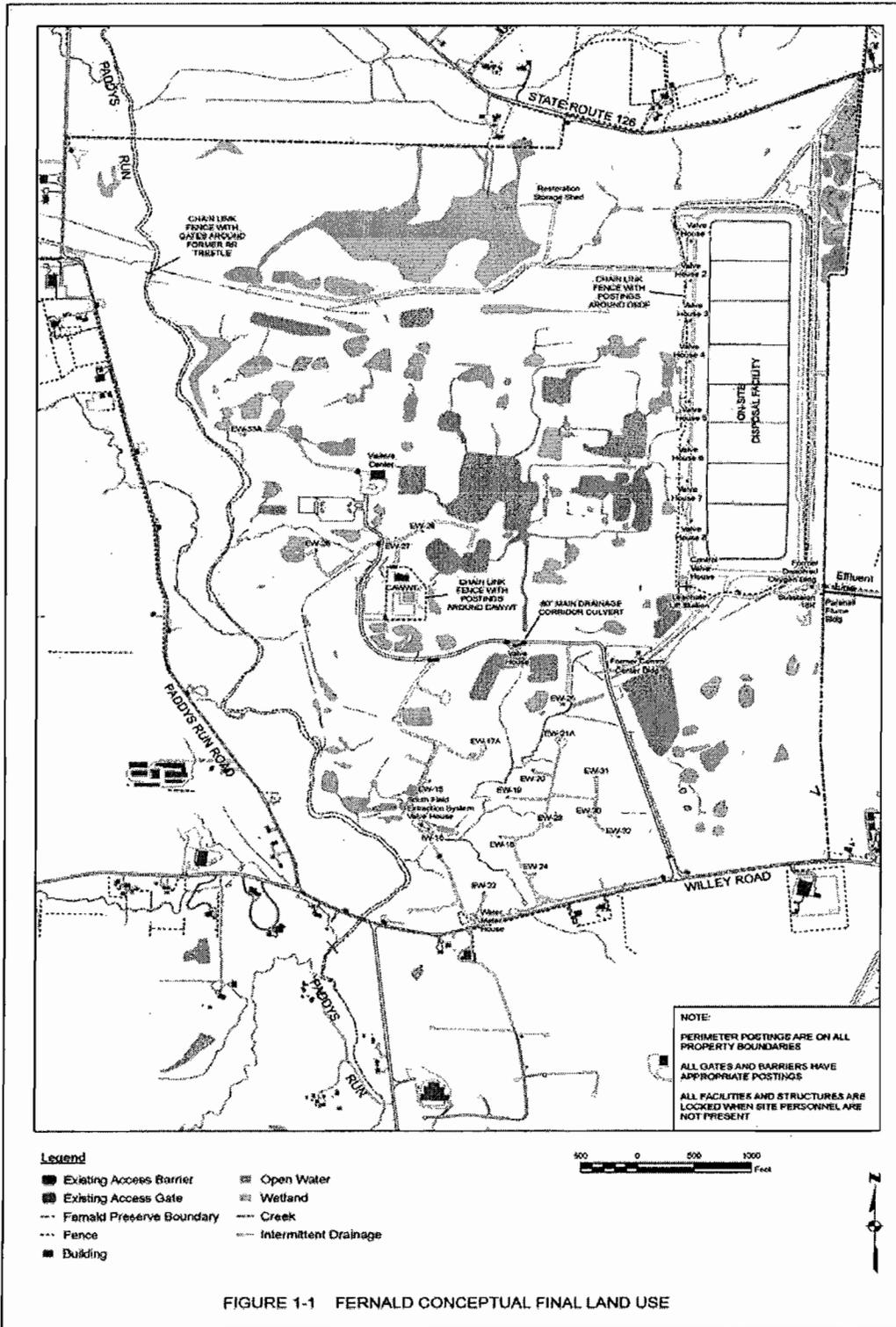
1.2 NATURAL RESOURCE RESTORATION STRATEGY

The natural resource restoration strategy for the Preserve is to implement a series of specific projects fully integrated with the completion of site remediation. The strategy includes:

- Utilize grading activities at the end of remedial actions to prepare areas for restoration to the degree possible.
- Stabilize remediated areas immediately in a manner that supports future restoration work to the degree possible.
- Utilize excavated areas to support open water, wetland or vernal pool features whenever possible to avoid the need to backfill.

The strategy for natural resource restoration at the site was to begin restoration projects in parallel with site remediation activities. The remediation schedule dictated the timing and sequence of restoration work. Impacted areas requiring excavation were given priority for restoration and non-impacted areas not requiring excavation were restored as the schedule permitted. Ecological restoration projects are discussed in Section 4.0. The conceptual final land use of the Preserve, once all ecological restoration projects have been implemented, is shown in Figure 1-1.

The NRRP strategy also incorporates the restoration goals of the NRTs and the input of other stakeholders in establishing an acceptable final land use for the Preserve. Institutional controls for the site are outlined in a separate document, the Comprehensive Legacy Management and Institutional Control Plan (LMICP) Rev. 2 Final May 2008, and in an Environmental Covenant with OEPA.



1.3 SUMMARY OF NATURAL RESOURCE IMPACT ASSESSMENT

The Natural Resource Impact Assessment (NRIA) (DOE, 1998) identified the impacts (i.e., injuries) at the site resulting from past contamination, and those impacts expected to occur as part of remedial actions. The 1998 NRIA identified impacts to the extent possible on an acreage basis sorted by habitat type. Groundwater impacts were identified on both an acre and volumetric basis, as groundwater does not constitute a "habitat." In general, impacts were quantified using existing remedial investigation/feasibility study information. Past impacts were measured using the soil excavation footprint, which included soils that were considered a risk to human receptors [i.e., soil concentrations exceeding final remediation levels (FRLs)]. Future impact acreage was identified in cases where physical disturbances would result from the destruction of or reduction in the quality of a particular habitat.

The purpose of the 1998 NRIA was to establish a "baseline" level of impact from which appropriate restoration activities can be developed. The NRIA was designed to function in a manner analogous to an Injury Determination in the formal Natural Resource Damage Assessment (NRDA) process [43 Code of Federal Regulations (CFR) 11]. Since the intent of the NRTs is to pursue a more streamlined evaluation and assessment process and not to conduct a formal NRDA, the 1998 NRIA and this NRRP were designed to meet the substantive aspects of the formal NRDA process to the extent practicable.

The level of impacts identified in the 1998 NRIA was used to assess a required level of natural resource restoration as presented in this NRRP. Habitat Equivalency Analysis (HEA), described in Section 1.4 was used to determine the amount of restoration required to compensate for impacts to terrestrial habitats. The Fernald NRTs have negotiated other projects to compensate for groundwater impacts as discussed in Section 1.5 of this plan. The results of the HEA and NRT negotiations were used to establish the restoration activities outlined in Section 4.0 of this plan. The progress of restoration at the Preserve will be tracked by the NRTs to ensure proper implementation of the NRRP.

1.4 SUMMARY OF 1998 HABITAT EQUIVALENCY ANALYSIS (HEA)

The HEA process was utilized to ensure that the level of natural resource restoration outlined in this NRRP is commensurate with the level of impact identified in the 1998 NRIA. HEA methodology provides a means of compensating for natural resource impacts through the calculation of habitat restoration acreage. By linking estimates of service loss over time to service gains through restoration projects, potentially contentious dollar damage estimates may be avoided.

From the information presented in the 1998 NRIA, conservative assumptions and qualitative judgments were used to develop the HEA calculations. This process allowed for an "order of magnitude" justification for on-property restoration. Also, as described in Section 1.5, HEA was used to calculate terrestrial and surface water habitats only. A separate approach is required for groundwater. Compensation for groundwater is described in Section 1.5 below.

1.5 SUMMARY OF GROUNDWATER ISSUES

The HEA process is appropriate for estimating restoration acreage when impacts are associated with ecological functions and habitat loss. Service losses to humans, such as contamination of a drinking water supply, cannot easily be equated to habitat restoration. Restoration activities must be conducted to replace, restore, or acquire the equivalent of the impacted natural resource. Therefore, it is difficult to compensate for groundwater impacts through ecological restoration.

The Great Miami Aquifer is a significant natural resource and a major focus of remediation activities at the Preserve. As discussions regarding compensation for groundwater impacts have progressed, the NRTs have recognized that many actions have been taken to date. The Operable Unit (OU) 5 Record of Decision (ROD),(DOE 1996) committed DOE to pump and treat contaminated groundwater in order to reach the 20-micrograms per liter ($\mu\text{g/L}$) total uranium FRL. Originally, this effort called for the installation of 28 extraction wells pumping at a combined rate of 4,000 gallons per minute (gpm) for approximately 27 years. An enhanced groundwater remedy was approved as part of the Baseline Remedial Strategy Report. This approach called for the installation of additional extraction wells and the use of groundwater re-injection technology. By implementing this revised strategy, the time to complete groundwater remediation could be shortened by as much as 17 years. Groundwater extraction actually started before the OU5 ROD was finalized, with the implementation of the OU5 South Plume Removal Action. Additionally, the FRL has since been revised in accordance with promulgation of federal drinking water standards for uranium. The 20- $\mu\text{g/L}$ uranium FRL was not risk based, but rather was based on the proposed maximum contaminant level (MCL) for uranium established by U.S. Environmental Protection Agency (EPA) under the Safe Drinking Water Act. Since the signing of the OU5 ROD, EPA has established a final MCL for uranium at 30 $\mu\text{g/L}$. Because of this change, in 2001 an Explanation of Significant Differences (ESD) was approved, which revised the OU5 ROD (2001 ESD) and established the revised FRL as 30 $\mu\text{g/L}$.

In addition to groundwater remediation activities, DOE has undertaken several other efforts to address groundwater contamination. An alternate water supply was provided to several local industries as part of the South Plume Removal Action. Also, in the late 1980s, DOE began providing bottled water to local residents potentially affected by uranium-contaminated groundwater. This program was discontinued when a public water supply was installed in the Fernald area in 1996. DOE contributed \$6.4 million towards the installation of the public water supply for residents near the Preserve.

Because the NRTs originally agreed to focus on habitat restoration as compensation for all impacts, an attempt was made to calculate restoration acreage due to groundwater impact. Several scenarios for using HEA were proposed, but the NRTs were not satisfied that justification was adequate. As a result, the NRTs agreed to abandon the use of HEA for groundwater compensation. Instead, the NRTs agreed to ensure that all available on-property areas are ecologically restored. The majority of the specific ecological restoration projects described in Section 4.0 of the NRRP contributes to the protection of groundwater recharge areas (e.g., erosion control, increased infiltration, and decreased runoff).

To further address groundwater issues, the United States of America on behalf of DOE shall pay \$13,750,000 into a separate restoration account, which shall be administered jointly by the NRTs. The NRTs agree that funds from this restoration account may be used for habitat enhancements on site at the Preserve. The NRTs agree that funds from this restoration account may be used to acquire additional land or interests in land, to make ecological improvements to that land to enhance habitats and protect water quality in Paddys Run and the Great Miami Aquifer in the vicinity of the Preserve. Any future additional expenses that are the result of the purchase of additional land will be paid from the restoration account.

Within 120 days after this payment, the NRTs will jointly develop a plan for the use of the funds in the restoration account. This plan will address the selection and implementation of projects to be paid for from the restoration account, the acquisition, ownership, and maintenance of any land purchased using the funds from the restoration account, and annual reports on the use of the restoration account and on the progress of the selected fund projects.

By implementation of this NRRP and by completion of remedial activities, the NRTs agree the DOE adequately compensates for impacts to natural resources (including groundwater) associated with the Preserve.

2.0 RESTORATION PLANNING

The ecological restoration projects described in this NRRP were developed by considering the extent of excavation and grading and the sequence of remediation activities so that restoration and establishment of the future land use could be expedited. In addition, consideration was given to uncertainties and a variety of other regulatory and technical considerations. This section provides the basis for the ecological restoration projects and conceptual final land use outlined in this plan.

2.1 ECOLOGICAL RESTORATION GOALS

Ecological restoration goals form the foundation from which conceptual restoration planning decisions are made. They also provide the basis for monitoring to determine the progress of restoration. The ecological restoration goals are stated and described below.

2.1.1 Restoration of Native Vegetation

Goal: *Enhance and restore, as feasible given postexcavation landforms and soils, vegetative communities similar to native communities present in presettlement southwestern Ohio.*

Ecological restoration at the Preserve will promote the native flora of southwestern Ohio. This primarily involves the restoration of contiguous tracts of upland and riparian forest and tallgrass prairie interspersed with open water and/or wetland systems. Section 3.0 provides a more detailed description of habitat types that existed at the Preserve prior to industrial and agricultural development. The intent of this restoration plan is to use the natural dynamics of ecological systems to the extent possible. The vegetative species mix depends on many factors, including soil, elevation, slope, drainage, adjacent existing vegetation, cost, and availability.

2.1.2 Paddys Run Restoration

Goal: *Enhance the natural dynamic stream characteristics and aquatic systems of Paddys Run, as necessary and feasible.*

Just as most other streams in southwestern Ohio, Paddys Run has been significantly altered due to channeling, erosion control, and removal of sand and gravel. In most instances, existing development prevents the restoration of a natural stream function. However, since undeveloped land is available at the

Preserve, the potential exists to enhance the Paddys Run floodplain and subsequent natural stream habitat. Section 3.1.4 provides additional information regarding Paddys Run stream restoration.

2.1.3 Wildlife Promotion

Goal: *Enhance and restore ecological systems that promote the habitation of wildlife populations native to southwestern Ohio.*

Wildlife use will be considered when selecting flora. Wildlife structures and cover (i.e., bird boxes, brush piles) may be included in ecological restoration designs.

2.1.4 Meet Mitigation Requirements

Goal: *Integrate regulatory mitigation requirements into natural resource restoration plans.*

DOE is required by various laws and regulations to mitigate certain impacts to natural resources. These include commitments under the National Environmental Policy Act (NEPA) and wetland mitigation under Section 404 of the Clean Water Act. To the extent possible, these actions have been conducted on-property and combined with adjacent restoration projects to allow for the contiguous restoration of the Preserve. Similar constraints as outlined in Section 2.1.1 were taken into consideration during design and implementation.

2.2 INTEGRATION WITH SITEWIDE EXCAVATION PLAN

The sequencing of the implementation of the restoration projects was coordinated with the timing and sequencing of soil excavation. In addition, the final restoration of the site is a function of the extent of excavation and final grading required during soil remediation. This section addresses how implementation of the projects outlined in the NRRP is integrated with the guidelines established in the SEP and its appendices.

2.2.1 Sitewide Excavation Plan

The NRRP is fully integrated into the SEP. Many issues identified in the SEP apply directly to the NRRP, such as:

- Restoration strategy,
- Regulatory drivers,
- Certification and benchmark toxicity values (BTVs),
- Restoration grading guidelines,
- Environmental monitoring, and
- Quality assurance/quality control.

2.2.2 Postexcavation Strategy

A key component of the proposed future land use is a series of interconnected open water and wetland habitats. A fundamental assumption was that excavations required for soil remediation would be utilized for natural resource restoration to the maximum extent possible. There have been a variety of excavations in and adjacent to the Former Production Area that accommodated wetland and open water habitat. The specific locations and sizes of the open water/wetland areas were based on the requirements for excavation. In addition, the general pattern of site drainage for proposed final land use was established through the utilization of excavations formed through removal of site utilities.

2.2.3 Sitewide Sequencing Plan

The Sitewide Sequencing Plan, which is Appendix B in the SEP, dictates the sequence and timing of soil remediation activities which dictate the schedule for implementation and completion of long-term restoration projects. For example, revegetation of the Former Production Area was delayed until the certification process was complete for the area-specific constituents of concern of a remediation area. The near-term restoration projects have been designed to be implemented in tandem with soil remediation. However, the certification of certain areas to below-FRL concentrations occurred prior to the implementation of on-site, near-term restoration projects.

2.2.4 Acceleration of Restoration

Efforts were made throughout the remediation process to accelerate completion of both cleanup and restoration projects. The completion of cleanup and restoration work is defined by the "Site Completion Date" under DOE's closure contract with Fluor Fernald, which was October 29, 2006. The NRTs supported efforts to accelerate restoration of the Preserve, but acknowledged the difficulties in completing all restoration work under an accelerated remediation scenario. The NRTs agreed that monitoring work not completed prior to the site completion date would be completed during the first years of long-term stewardship at the Preserve. Monitoring requirements are defined in Section 5.0.

2.2.5 Implementation of Construction

Implementation of Construction, which is Appendix F of the SEP, provided the transition from the excavated areas resulting from soil remediation to the appropriate grades to support natural resource restoration. The final grading designs established in the Integrated Remedial Design Plans (IRDPs)

ensured that appropriate drainage was established, slopes were stabilized, and appropriate surface water diversion and retention were established to support open water/wetland habitats. These designs also ensured that the floodplain of Paddys Run was not restricted as result of soil remediation. The grading required to transition from remediation-driven excavation to a restoration configuration was termed "interim restoration". Seeding to stabilize bare soil was also carried out as part of "interim restoration".

2.3 UNCERTAINTIES AND CONSIDERATIONS DURING RESTORATION

There are several aspects of the NRRP and the natural resource restoration process that involve uncertainties that must be addressed through careful consideration in the project specific design processes. These issues are discussed in the following sections.

2.3.1 Potential for Cross-Contamination During Phasing of Excavation

The potential for cross-contamination is a concern that was addressed during the excavation and grading processes. The overall excavation and grading processes required that particular areas of the site be excavated and graded before or in parallel with other areas. Appropriate administrative and engineering controls were put in place so that cross-contamination was avoided. The specific projects outlined in this plan were not implemented until the certification process was complete for each respective project area and appropriate controls were established to ensure the risk of cross-contamination was minimized.

2.3.2 Ecological Risk Factors

A process was established to ensure that the proposed projects were not implemented in areas that contain contaminants posing a risk to ecological receptors. The process was designed to effectively address the impact of potential contaminants to ecological receptors.

Appendix C of the SEP contains the sitewide review of contaminants of ecological concern. The results of this review indicate that antimony, cadmium, lead, molybdenum, silver, and several polycyclic aromatic hydrocarbons (PAHs) may be a concern in certain areas of the site. Remedial activities addressed any ecological concerns, and the presence of these constituents was verified during the certification process.

3.0 GENERAL ECOLOGICAL RESTORATION PLAN

The purpose of this section is to present the general plans for restoring specific habitats at the Preserve. This section also presents the factors that were considered during the ecological restoration design of specific areas.

3.1 SITEWIDE RESTORATION CONSIDERATIONS

This section outlines other considerations that were factored into the establishment of the specific restoration projects and the final land use outlined in this plan in addition to the issues outlined in Section 2.0. Natural Resource Design Plans (NRRDPs) were developed for each ecological restoration project established in this plan.

The NRRDPs for projects that have been implemented and completed will be reviewed and evaluated by the NRTs to determine whether there are any outstanding issues.

3.1.1 Soil Balance and Pre-FCP Topography (i.e., Cut and Fill Maps)

Topographic maps for the site prior to the construction of the Fernald Plant have been utilized to construct a profile of the topography and drainage in the years prior to 1952. In designing the natural resource restoration projects, every effort was made to re-establish original drainage patterns by restoring pre-site topography and elevations to the extent possible. The premise for this approach is that the site, over the long term, will tend to erode back to conditions that existed prior to construction of the site. Therefore, reestablishing the "natural" drainage patterns should facilitate restoration projects (i.e., wetlands and open water) in the long term.

3.1.2 Sequence of Natural Resource Restoration Projects

The long-term restoration projects were implemented as soil remediation was completed and areas could be graded to support restoration. Sequencing in conjunction with remediation of individual excavation areas required that some areas undergo interim restoration. Interim restoration involves grading to stabilize slopes and seeding with native grasses pursuant to guidelines established in the SEP. These actions were required when an area was excavated and certified clean, but could not undergo final restoration until project activities were completed, such as the possible need for borrow material within the area and sequencing with adjacent projects.

3.1.3 Available Watershed

A Water Availability Study provided quantitative modeling results regarding the surface water routing involving four open water areas under post-remediation conditions at the Preserve. The modeling results indicate that four on-property open water areas can be established in the Former Production Area and its vicinity as a result of soil excavation activities.

The size and configuration of open water areas are not limited by this study and were determined during natural resource restoration design. Average water depths were determined by dividing the pond storage capacity by the surface water area. The average water depths in the four primary open water areas are projected to be 8.2, 10.5, 4.5, and 14.8 feet respectively. The acreage associated with the four open water areas under normal conditions at the minimum stage are 10, 12.5, 6.1, and 3.3 acres, respectively. This evaluation concludes that the post-remediation topography can support the establishment of open water/wetland systems.

3.1.4 Restoration Plan for Paddys Run

Within certain reaches of the property, Paddys Run is characterized by extremely high banks and a stream bed that is deeply cut into the surrounding topography. These features result from both the natural geology and stream dynamics of Paddys Run, and historic activities at the site (i.e., stream relocation, dredge of materials). Consequently, the current floodplain of Paddys Run has been greatly reduced from its previous extent, and undissipated flow is carried downstream during storm events. This increased downstream flow works to further cut existing stream banks, causing accelerated loss of riparian habitat, and lowering the elevation of the stream bed.

To counter this process, DOE implemented a restoration strategy that creates additional floodplain along the Paddys Run corridor. This effort involved using remediated areas to increase the amount of floodplain created during restoration activities. Remediation activities resulted in increased floodplain in the Waste Pit Area and the Southern Waste Units. Additional Floodplain can be created in the "Oxbow Area" of Area 8, Phase III north with minimal excavation. Interim management strategies were also established to ensure that these long-term restoration goals are considered when immediate erosion measures are required.

As much floodplain as possible was created in these areas to absorb the flows generated by 1 to 2-year storm events. Flows from 1 to 2-year storm events are considered the channel-forming flows because of their increased frequency over time when compared to larger, more powerful, but infrequent storm events (Leopold 1994, Rosgen 1996). This information was used to support specific restoration design decisions, as summarized below.

Specific restoration activities, in addition to the creation of additional floodplain, will increase the riparian corridor along Paddys Run generally enhancing the quality of habitat along the stream corridor. Restoration Design Plans include vegetation that stabilized the expanded floodplain and enhanced habitat along the stream. Also, bioengineering principles and techniques were used to prevent unwanted bank erosion whenever feasible.

The NRTs, with input from outside organizations with applicable expertise (e.g., Army Corps of Engineers, Ohio Department of Natural Resources (ODNR)), are also committed to evaluating the rate of incision in the streambed of Paddys Run. The NRTs will take appropriate steps (e.g., input from outside consultants) to determine if incision in Paddys Run could create problems with the long-term stability of the stream and/or threaten restored areas of the stream. Two gradient control structures were installed within the Paddys Run channel. One was installed near the waste pit area and the second adjacent to the southern waste unit area.

3.1.5 Future Public Use

In the Fall of 1998, DOE released the Environmental Assessment on Final Land Use at the FCP (DOE 1998b). During the same timeframe the draft NRRP was also made available for public review (see Section 6.0). The public review of the EA was supplemented by a public meeting to obtain input. The EA proposed that the majority of the site (904 acres) be committed to natural resource restoration (i.e., an Undeveloped Park), the OSDF (123 acres) remain committed for its intended land-use, and that a 23-acre area be set aside for potential economic development in the future. Public comments on the EA were generally supportive of the proposed Land Use and DOE issued its final decision in June of 1999 in the form of a Finding of No Significant Impact (FONSI). There has been no further interest in the development or community use of the 23-acre set aside area since the EA was issued in 1998; therefore, DOE is no longer considering any development or community use of the 23 acres. Figure 1-1 presents the most current version of the conceptual final land use.

The public input process in the Fall of 1998 also generated a great deal of input regarding future public use of the Preserve. DOE requested that the Fernald Citizens Advisory Board (FCAB) take a lead role in evaluating the public's desires regarding future public use of the Preserve and make specific recommendations to DOE. The FCAB held three public workshops during 1999 and 2000 regarding future public use of the Preserve and made several recommendations to DOE. The recommendations and feedback provided to DOE as a result of the public workshops include the following:

1. Recommendation to proceed forward as soon as possible with the re-interment of Native American Remains on the Fernald Site (Recommendation #00-3).
2. A collective vision of the future of the Fernald Site was developed that included the Fernald Site being a regional educational center, with a focus on environmental, cultural and other historical information related to the site (Recommendation #00-4).
3. Additional recommendations were made regarding the establishment of trails and a multi-use educational facility (Recommendation #2001-02 and 2001-03).

All of the FCAB recommendations can be found on their web site at www.fernaldcab.org. The NRTs agree that future public use of the site for educational and research purposes, including the construction of interpretive trails and an educational facility, is consistent with the goals of the NRTs. Reburial of Native American remains can occur within restored areas with no impact on the restoration plans outlined in this plan.

The NRTs agree that low-impact trails should be integrated in select restored areas to further educational and interpretive use of the Preserve. The NRTs agree that at least three miles of mulched trails (or suitable alternative) should be included on the Preserve. Cleared or mowed trails may be adequate. Trails should focus on the Paddys Run stream corridor, portions of the Borrow Area, and the Southern Waste Units. Trails should provide viewing areas for the OSDF, Former Production Area and Northern Woodlot, but should limit entry into these areas. Boardwalks of one-half mile or less should be incorporated into the trail design for restored areas to provide viewing of wetlands if necessary. Interpretive signs/displays should be installed at appropriate locations on the trails and overlooks should be constructed at various points on the trail as jointly determined by the NRTs. The NRTs support trails providing handicap access to the restored areas of the Preserve, as determined appropriate by DOE. The

NRTs do not support any use of trails that will result in an activity destructive to restored areas of the Preserve. The NRTs do not support trails for biking or off-road vehicles.

3.1.6 Soil Preparation

Specific ecological restoration designs took into consideration the types of soil present when determining vegetation plans. In general, the restoration design process included a predesign investigation that evaluated the condition of soils present to determine if soil amendment/fertilization was required to establish the desired vegetation. For undisturbed areas, Hamilton and Butler County soil survey maps were used as a preliminary guide [Soil Conservation Service (SCS) 1982a, 1982b]. Where necessary, analysis was conducted to determine the specific characteristics of the soil, such as moisture and organic content.

For excavated areas, the remaining subsoils may not be amenable to revegetation. The NRRP addresses nutrient deficient excavated areas by considering native prairie grasses and pioneer tree and shrub species that survive in nutrient-poor soil conditions. Nevertheless, soil amendments were necessary. Research has been conducted on site to assist in determining the optimal amendment strategy for the restoration of native prairie grasses. The results of this effort were used to guide soil preparation activities in excavated areas.

3.1.7 Use of Plants and Seeds and Invasive Plant Species Management

All plants and seeds used for ecological restoration at the FCP are native to southwest Ohio. To preserve regional genotypes, an effort was made to obtain plants and seeds from local sources. However, because of the scope and scale of restoration projects at the Preserve, non-local plants and seeds were also needed. When feasible, restored areas were interseeded with seeds collected on-property. Invasive species control was incorporated into applicable NRRDPs. For example, the NRRDP for the North Woodlot included the plan for large-scale removal of bush honeysuckle.

3.1.8 Long-Term Maintenance

Long-term maintenance is aimed at facilitating progress of restored areas to achieving the restoration goals and maintaining the function of the ecosystems. For example, supporting canopy closure in forested areas and achieving wetland status in wetland areas. Adaptive management has been used during implementation monitoring and will continue to be relied upon during the long-term maintenance phase

of the project. Long-term maintenance will generally be focused upon the following areas:

- Invasive species control
- Water level and control structure maintenance
- Erosion control
- Wildlife structures
- Herbivory control
- Burning/mowing & dethatching
- Trails, interpretive signs/display, overlooks

A maintenance plan will be developed and submitted for review and approval to the NRTs within 120 days of the effective date of a consent decree which resolves past, present, and future natural resource impacts at the Preserve. The NRTs will jointly review and approve the maintenance plan.

3.1.9 Institutional Controls

Institutional controls are required under the OU5 Record of Decision and are further defined in the LMICP and in the Environmental Covenant.

3.2 HABITAT-SPECIFIC RESTORATION PLANS

The majority of ecological restoration at the Preserve consists of a combination of upland forest, riparian forest, tallgrass prairie/savanna and wetland/open water systems, as well as enhancement of existing habitats such as pine plantations. The individual restoration projects set forth in Section 4.0 specify each habitat and describe the area-specific factors that were considered in the design. The descriptions below provide the basis for restoration of these specific habitats.

3.2.1 Upland Forest

Prior to settlement of the area, the land now occupied by the Preserve probably consisted of forest. The sitewide characterization report describes the Preserve as existing in a transition zone between the Oak-Hickory and Beech-Maple sections of the Eastern Deciduous Forest province (DOE 1993). Braun (1989) describes the area slightly differently, as a transition from Beech-Maple to Western Mesophytic forest. Regardless, these forests share many similar species, such as American beech (*Fagus grandifolia*), sugar maple (*Acer saccharinum*), tulip poplar (*Liriodendron tulipifera*), white ash (*Fraxinus americana*),

northern red oak (*Quercus rubra*), Ohio buckeye (*Aesculus glabra*), and shagbark hickory (*Carya ovata*). Therefore, restoration of upland forests at the Preserve focused on the establishment of this Beech-Maple, Oak-Hickory transition zone.

Specific planting plans were detailed in individual NRRDPs. Each NRRDP specified soil preparation, species mix, planting density, planting instructions, cover, short-term maintenance, herbivore control, and monitoring requirements. Other revegetation design methodologies were used as well, depending on the specific needs identified in individual NRRDPs. Revegetation of each area depends on a variety of factors, including soils, topography, hydrology, existing vegetation, cost, and relationship to other restoration projects. Most trees and shrubs were selected from the tree and shrub guide established for the Preserve (Table 3-1). Considerations were given to mimic natural successional processes. Pioneer tree species were planted in disturbed areas, while late successional species were used to enhance existing woodlots.

Table 3-1 has been established as a guide for the NRRDPs. The trees listed are all native to southwestern Ohio, as described by Braun (1989). The master list has been divided into general categories of upland and riparian trees and shrubs. However, site-specific conditions dictate the species mix within each NRRDP. To assist in these decisions, supplemental information is included in Table 3-1. This information was used in determining species mixes for specific ecological restoration projects. Further information is included in the Comments section of Table 3-1.

3.2.2 Riparian Forest

The Paddys Run floodplain was expanded as part of the long-term management plan for Paddys Run. Within these floodplain areas, the corridor of Paddys Run and the Storm Sewer Outfall Ditch (SSOD) was expanded through revegetation as described above for upland forests. The trees species chosen from Table 3-1 were those that can withstand periodic inundation. Wetland indicator status was used as a guide for specific planting designs. Typical species that were planted in floodplain areas include eastern cottonwood (*Populus deltoides*), swamp white oak (*Quercus bicolor*), black willow (*Salix nigra*), American sycamore (*Platanus occidentalis*), and green ash (*Fraxinus pennsylvanica*). As with the upland forest revegetation, individual NRRDPs established planting plans based on a variety of site-specific factors.

3.2.3 Tallgrass Prairie/Savanna

The Preserve is generally located east of the range where tallgrass prairies and savannas were predominant, but prairie remnants did exist in Ohio prior to European settlement [Society for Ecological Restoration (SER 1997)]. At one point, at least 300 prairies were present across Ohio (Gordon 1969).

TABLE 3-1
Master List of Trees and Shrubs used in Natural Resource Restoration at the Fernald Preserve

Scientific Name	Common Name	Form	Function	Use	Comments
<i>Acer nigrum</i>	black maple	canopy tree	cover	B	Similar to <i>Acer saccharum</i> , but likes slightly moister conditions.
<i>Acer rubrum</i>	red maple	canopy tree	cover	H R W	Tolerates a wide variety of conditions. Can pioneer disturbed sites
<i>Acer saccharinum</i>	silver maple	canopy tree	cover	R W	Fast growing. Pioneers disturbed banks following <i>Populus deltoides</i>
<i>Acer saccharum</i>	sugar maple	canopy tree	cover, mast	B H	Co-dominant in beech-maple forest
<i>Aesculus glabra</i>	ohio buckeye	understory tree	diversity	R W	Tolerates a wide variety of conditions. Avoided by deer
<i>Aesculus octandra</i>	yellow buckeye	understory tree	diversity	O	Generally found east of FEMP in unglaciated portions of Ohio
<i>Alnus serrulata</i>	brookside alder	shrub	cover	R W	Obligate wetland species
<i>Amelanchier arborea</i>	downy serviceberry	shrub	fruit, diversity	H R W	Found mostly east of FEMP. Associated with <i>Acer rubrum</i>
<i>Amelanchier laevis</i>	allegheny serviceberry	shrub	cover	O	Not common in Ohio. Abundant in southern Appalachian highlands
<i>Amorpha fruticosa</i>	false indigo-bush	shrub	cover	W	Fast growing. Avoided by deer. Facultative wetland species
<i>Aronia melanocarpa</i>	black chokeberry	shrub	aesthetics	O	Found in wet areas and dry ledges/slopes. Found mostly east of FEMP
<i>Asimina triloba</i>	paw paw	understory tree	fruit, diversity	B R	Forms clustered stands in forest understory. Tap root
<i>Campsis radicans</i>	trumpet creeper	vine	aesthetics	R E	Showy. Naturalized in Ohio
<i>Carpinus caroliniana</i>	hornbeam	understory tree	diversity, mast	B R	Very shade tolerant. Found in moist and mesophytic woods
<i>Carya cordiformis</i>	bitternut hickory	canopy tree	cover	B H R	Common <i>Carya</i> spp. at FEMP. Tap root
<i>Carya laciniata</i>	shellbark hickory	canopy tree	cover, mast	R	Found in moist to wet sites and along streams
<i>Carya ovata</i>	shagbark hickory	canopy tree	cover, mast	H R W	Similar to <i>Carya laciniata</i> , but found in drier areas as well
<i>Castanea dentata</i>	chestnut	canopy tree	diversity, mast	O	Rare due to chestnut blight. Historically found mostly east of FEMP
<i>Ceanothus americanus</i>	new jersey tea	shrub	diversity	H R W	Found mostly east of FEMP
<i>Celastrus scandens</i>	bittersweet	vine	diversity	R	Drought and flood tolerant
<i>Celtis occidentalis</i>	hackberry	canopy tree	diversity	R E	Common at FEMP in a variety of habitats
<i>Cephalanthus occidentalis</i>	buttonbush	shrub	cover	W	Emergent species that forms pure stands
<i>Cercis canadensis</i>	redbud	understory tree	aesthetics	H E	Showy edge species
<i>Cornus alternifolia</i>	alternate-leaved dogwood	understory tree	diversity, cover	B R	Found mostly east of FEMP
<i>Cornus amomum</i>	silky dogwood	shrub	cover	R W	Can reproduce by dormant live cuttings. Suitable for erosion control
<i>Cornus drummondii</i>	roughleaf dogwood	shrub	cover	H E	Edge species
<i>Cornus florida</i>	flowering dogwood	understory tree	aesthetics	H	Showy shade tolerant species
<i>Cornus racemosa</i>	grey dogwood	shrub	cover	H	Seems to compete well with <i>Lonicera mackii</i>

Scientific Name	Common Name	Form	Function	Use	Comments
<i>Cornus stolonifera</i>	red-osier dogwood	shrub	cover	R W	Can reproduce by dormant live cuttings. Suitable for erosion control
<i>Corylus americana</i>	hazel nut	shrub	diversity	R W	Found in a variety of habitats. Can form large patches
<i>Crataegus crus-galli</i>	cockspur hawthorne	shrub	diversity	E	Thorny edge species
<i>Crataegus mollis</i>	downy hawthorne	understory tree	cover	B	Thorny
<i>Crataegus phaenopyrum</i>	Washington hawthorne	understory tree	diversity	E	Thorny
<i>Decodon verticillatus</i>	water willow	shrub	diversity	W	Emergent species
<i>Diospyros virginiana</i>	persimmon	understory tree	fruit	O	Edible fruit. Found mostly east of FEMP in unglaciated areas
<i>Euonymus atropurpureus</i>	eastern wahoo	understory tree	aesthetics	R	Showy
<i>Fagus grandifolia</i>	beech	canopy tree	cover, mast	B	Co-dominant in beech-maple forest
<i>Fraxinus americana</i>	white ash	canopy tree	cover	B H	Common at FEMP in a variety of habitats
<i>Fraxinus nigra</i>	black ash	canopy tree	cover, diversity	R W	Can tolerate standing water. Smaller than <i>Fraxinus americana</i>
<i>Fraxinus pennsylvanicum</i>	green ash	canopy tree	cover	R	Flood tolerant bottomland species
<i>Fraxinus quadrangulata</i>	blue ash	canopy tree	cover, diversity	H	Most drought-resistant <i>Fraxinus</i> spp.
<i>Gymnocladus dioica</i>	kentucky coffeetree	canopy tree	diversity	H	Most common in southwestern portion of Ohio
<i>Hamamelis virginiana</i>	witch hazel	understory tree	cover	B	Found in a variety of habitats singularly or in groups
<i>Hydrangea arborescens</i>	wild hydrangea	shrub	aesthetics	O	Found in ravines and shaded bluffs
<i>Hypericum spathulatum</i>	shrubby st. john's wort	shrub	diversity	W	Showy species that can form large patches
<i>Ilex verticallata</i>	winterberry	shrub	aesthetics	W	Found mostly east of FEMP
<i>Juglans cinerea</i>	butternut	canopy tree	mast, diversity	O	Rare Ohio species
<i>Juglans nigra</i>	black walnut	canopy tree	mast, diversity	B R	Allelopathic. Can form pure stands
<i>Juniperus virginiana</i>	eastern red cedar	understory tree	cover	E	Only coniferous species native to FEMP
<i>Lindera benzoin</i>	spicebush	shrub	cover	B	Common shrub of beech-maple forest
<i>Liquidambar styraciflua</i>	sweetgum	canopy tree	diversity	O	Southern tree found mostly east and south of FEMP
<i>Liriodendron tulipifera</i>	tulip poplar	canopy tree	cover, aesthetics	B H	Tallest deciduous species in the eastern U.S.
<i>Lonicera sempervirens</i>	trumpet honeysuckle	vine	aesthetics	O	Southern species uncommon in Ohio
<i>Morus rubra</i>	red mulberry	understory tree	fruit	E	Fast growing. Shade tolerant
<i>Nyssa sylvatica</i>	black gum	canopy tree	diversity, aesthetics	H R	Found in a variety of habitats
<i>Ostrya virginiana</i>	hop-hornbeam	understory tree	diversity	B R W	Found in a variety of habitats
<i>Parthenocissus quinquefolia</i>	Virginia creeper	vine	diversity	H	Showy in autumn
<i>Physocarpus opulifolius</i>	ninebark	shrub	diversity	E	Plant in open areas
<i>Platanus occidentalis</i>	sycamore	canopy tree	cover	R E	Fast growing streamside spp. Can also pioneer old fields

Scientific Name	Common Name	Form	Function	Use	Comments
<i>Populus deltoides</i>	cottonwood	canopy tree	cover	R E	Fast growing streamside spp. Can also pioneer old fields
<i>Prunus americana</i>	American plum	understory tree	diversity, fruit	E	Forms large patches
<i>Prunus serotina</i>	black cherry	canopy tree	fruit	B	Found in a variety of habitats. Largest <i>Prunus</i> spp. In Ohio
<i>Prunus virginiana</i>	choke cherry	shrub	cover	O	Found mostly north of FEMP
<i>Quercus alba</i>	white oak	canopy tree	cover, mast	H	Found in a variety of habitats.
<i>Quercus bicolor</i>	swamp white oak	canopy tree	cover, mast	R W	Flood tolerant bottomland spp.
<i>Quercus coccinea</i>	scarlet oak	canopy tree	cover, mast	H	Found mostly east of FEMP
<i>Quercus inbricaria</i>	shingle oak	canopy tree	diversity	H	Found in a variety of habitats
<i>Quercus macrocarpa</i>	bur oak	canopy tree	diversity, mast	R S	Burn resistant woody dominant of savanna habitat
<i>Quercus muehlenbergii</i>	chinquapin oak	canopy tree	diversity, mast	H	Most common in southwestern portion of Ohio
<i>Quercus palustris</i>	pin oak	canopy tree	cover	R W	Can form pure stands in bottomlands
<i>Quercus prinus</i>	chestnut oak	canopy tree	diversity	O	Found mostly east of FEMP in unglaciated areas
<i>Quercus rubra</i>	red oak	canopy tree	cover, mast	B H	Found in a variety of upland habitats
<i>Quercus shumardii</i>	shumard oak	canopy tree	diversity, mast	H	Southern tree found in southwest Ohio
<i>Quercus velutina</i>	black oak	canopy tree	cover, mast	H	Similar to <i>Quercus rubra</i>
<i>Rhus aromatica</i>	fragrant sumac	shrub	cover, aesthetics	H	Prefers dry, gravelly, rocky banks
<i>Rhus glabra</i>	smooth sumac	shrub	aesthetics	E	Showy species. Most abundant <i>Rhus</i> spp. In Ohio
<i>Rhus typhina</i>	staghorn sumac	shrub	aesthetics	E	Similar to <i>Rhus glabra</i>
<i>Ribes americanum</i>	black currant	shrub	diversity	O	Found mostly north of FEMP
<i>Rosa caroliniana</i>	carolina rose	shrub	aesthetics	E S	Prefers dry open areas
<i>Rosa palustris</i>	swamp rose	shrub	aesthetics	R W	Prefers wet areas and banks of slow-flowing stream
<i>Rosa setigera</i>	prairie rose	shrub	aesthetics	E S	Can form large stands
<i>Rubus allegheniensis</i>	blackberry	shrub	fruit	E	Thorny. Edible fruit
<i>Rubus occidentalis</i>	black raspberry	shrub	fruit	E	Thorny. Edible fruit
<i>Salix amygdaloides</i>	peach-leaf willow	understory tree	cover	R	Can reproduce by dormant live cuttings. Suitable for erosion control
<i>Salix discolor</i>	pussy willow	shrub	cover	R W	Can reproduce by dormant live cuttings. Suitable for erosion control
<i>Salix eriocephala</i>	heart-leaved willow	shrub	diversity	R W	Can reproduce by dormant live cuttings. Suitable for erosion control
<i>Salix exigua</i>	sandbar willow	understory tree	cover	R	Can reproduce by dormant live cuttings. Suitable for erosion control
<i>Salix humila</i>	prairie willow	shrub	cover	S	Can reproduce by dormant live cuttings.
<i>Salix nigra</i>	black willow	understory tree	cover	R W	Can reproduce by dormant live cuttings. Suitable for erosion control
<i>Salix sericea</i>	silky willow	shrub	cover	R W	Can reproduce by dormant live cuttings. Suitable for erosion control

Scientific Name	Common Name	Form	Function	Use	Comments
<i>Sambucus canadensis</i>	elder	shrub	fruit	R W	Can reproduce by dormant live cuttings. Suitable for erosion control
<i>Sassafras albidum</i>	sassafras	understory tree	diversity	H E	Can form pure stands
<i>Smilax rotundifolia</i>	greenbriar	shrub	diversity	O	Thorny.
<i>Spiraea alba</i>	meadow sweet	shrub	aesthetics	W	Found mostly north of FEMP
<i>Spiraea tomentosa</i>	steeple bush	shrub	aesthetics	O	Found mostly north and east of FEMP
<i>Staphylea trifolia</i>	bladdernut	shrub	diversity	B H R	Prefers shaded banks
<i>Symphoricarpos orbiculatus</i>	coral berry	shrub	diversity	E	Can form large patches in disturbed areas
<i>Tilia americana</i>	basswood	canopy tree	cover, aesthetics	B	Common in glaciated portion of Ohio
<i>Ulmus americana</i>	american elm	canopy tree	cover	O	Found in a variety of habitats. Impacted by dutch elm disease
<i>Ulmus rubra</i>	slippery elm	canopy tree	cover	H R	Found in a variety of habitats
<i>Vaccinium corymbosum</i>	highbush blueberry	shrub	fruit	O	Boreal relic found in wet areas within glaciated portion of Ohio
<i>Viburnum acerifolium</i>	mapleleaf viburnum	shrub	diversity	B	Associated with <i>Fagus grandifolia</i>
<i>Viburnum dentatum</i>	arrowwood	shrub	cover	O	Found mostly east of FEMP
<i>Viburnum lentago</i>	nannyberry	shrub	cover	O	Found mostly north of FEMP
<i>Viburnum prunifolium</i>	blackhaw viburnum	understory tree	cover	B H	Found in a variety of habitats singularly or in groups
<i>Zanthoxylum americanum</i>	prickly ash	understory tree	diversity	E	Thorny. Can form large stands

Use Key:

- B = beech-maple forest template
- H = oak-hickory forest template
- R = riparian template
- W = wetland template
- E = edge habitat template
- S = savanna template
- O = other species

Remnant wet meadow has appeared as part of a wetland restoration several miles west of the Preserve (Klein 1996). Also, since prairie grasses and forbs are tolerant of nutrient-poor soils, they are potentially ideal for re-establishing vegetation in excavated areas. A tallgrass prairie restoration has been successfully completed on an interstate borrow pit outside of Dayton, Ohio (Geiger 1997). This effort involved similar sub-soil conditions that will be present in several deep excavations at the Preserve. For these reasons, tallgrass prairie and savanna restoration was undertaken at the Preserve, primarily in disturbed areas.

Prairie restoration involves application of soil amendments (as needed), seeding of grasses and forbs, and maintenance through mowing and/or controlled burns. Research was conducted to determine the optimal use of soil amendments for prairie grass establishment. Results of the research and area-specific soil sampling guided NRRDP specifications for each area. After required soil preparation, seeding of grasses and forbs was primarily conducted with a Truax seed drill. The specific seed mix for each restoration area is specified in individual NRRDPs. The forbs interseeded into established grasses were native to southwest Ohio as described in previous NRRDPs (e.g., Area 8, Phase II Restoration Project) and by the SER (1997). Table 3-2 presents general seeding lists for wet and dry areas at the Preserve. Area specific modifications to the list were made based upon availability, local conditions and other factors.

Where specified, savannas were established by planting a sparse mix of bur oak (*Quercus macrocarpa*), along with white oak (*Quercus alba*) and shrubs such as gray dogwood (*Cornus racerosa*), hazelnut (*Corylus americana*), and smooth sumac (*Rhus glabra*) and seeding the area with the grass mix described above.

3.2.4 Wetlands/Open Water

Prior to the rise of agriculture in the region, much of the Preserve and surrounding area may have consisted of wetlands. Several areas of poorly drained soils are located on the property (DOE 1993). High-quality forested wetlands are also located just west of the Preserve (Davis 1994). In addition, DOE has a responsibility to provide approximately 17.2 acres of mitigated wetlands under Section 404 of the Clean Water Act, as described in more detail below. For these reasons, wetland mitigation was pursued in appropriate areas of the Preserve. Some open water areas were also established as a result of deep excavations within the Former Production Area. These areas will provide additional wildlife habitat.

**TABLE 3-2
SEED MIX USED IN WET AND DRY AREAS FOR PERMANENT VEGETATION***

Species Name	
Dry Areas	Wet Areas
Big Bluestem (<i>Andropogon gerardii</i>)	Big Bluestem (<i>Andropogon gerardii</i>)
Little Bluestem (<i>Schizachyrium scoparius</i>)	Canada Wild-Rye (<i>Elymus canadensis</i>)
Side-Oats Grama (<i>Bouteloua curtipendula</i>)	Switch Grass (<i>Panicum virgatum</i>)
Indian Grass (<i>Sorghastrum nutans</i>)	Blue Joint Grass (<i>Calamagrostis canadensis</i>)
Canada Wild-Rye (<i>Elymus canadensis</i>)	Porcupine Sedge (<i>Carex hystericina</i>)
Switch grass (<i>Panicum virgatum</i>)	Fox Sedge (<i>Carex vulpinoidea</i>)
Annual Rye (<i>Lolium multiflorum</i>)	Dark Green Bulrush (<i>Scirpus atrovirens</i>)
Wildflowers:	Annual Rye (<i>Lolium multiflorum</i>)
	Prairie Cordgrass (<i>Spartina pectinata</i>)
Butterflyweed (<i>Asclepias tuberosa</i>)	Wildflowers:
New England Aster (<i>Aster novae-angliae</i>)	Red Milkweed (<i>Asclepias incarnata</i>)
Smooth Aster (<i>Aster laevis</i>)	New England Aster (<i>Aster novae-angliae</i>)
Canada Milkvetch (<i>Astragalus Canadensis</i>)	Wild Senna (<i>Cassia hebecarpa</i>)
Purple Prairie Clover (<i>Petalostemum purpureum</i>)	Canada Tick Trefoil (<i>Desmodium canadense</i>)
Ox-eye Sunflower (<i>Heliopsis helianthoides</i>)	Prairie Blazingstar (<i>Liatris pycnostachya</i>)
Bergamot (<i>Monardella fistulosa</i>)	Great Blue Lobelia (<i>Lobelia siphilitica</i>)
Purple Coneflower (<i>Echinacea purpurea</i>)	Bergamot (<i>Monardella fistulosa</i>)
Yellow Coneflower (<i>Ratibida pinnata</i>)	Yellow Coneflower (<i>Ratibida pinnata</i>)
Black-Eyed Susan (<i>Rudbeckia hirta</i>)	Branched Coneflower (<i>Rudbeckia hirta</i>)
Spiderwort (<i>Tradescantia ohioensis</i>)	Blue Vervain (<i>Verbena hastata</i>)
Blue Vervain (<i>Verbena hastata</i>)	Angelica (<i>Angelica atropurpurea</i>)
Hoary Vervain (<i>Verbena stricta</i>)	Sweet Joe-Pye Weed (<i>Eupatorium purpureum</i>)
Beardtongue (<i>Penstemon grandiflorus</i>)	
Cupplant (<i>Silphium perfoliatum</i>)	
Sweet Joe Pye-Weed (<i>Eupatorium purpureum</i>)	
White False Indigo (<i>Baptisia leucantha</i>)	
Blue False Indigo (<i>Baptisia australis</i>)	
Partridge Pea (<i>Cassia fasciculata</i>)	
Rattlesnake Master (<i>Eryngium yuccifolium</i>)	
Round-headed Bush Clover (<i>Lespedeza Capitata</i>)	
Stiff Goldenrod (<i>Solidago risida</i>)	

*Substitutions were made based upon availability and localized conditions.

More than 10 acres of jurisdictional wetlands have been dredged or filled as a result of remedial activities at the Preserve. In June 1995, DOE met with EPA, OEPA, USFWS, and ODNR to discuss mitigation of the impacted wetlands. DOE agreed to mitigate wetlands at a 1.5 to 1 ratio, replacing 1.5 acres of wetlands for every 1 acre dredged or filled. DOE also agreed to implement the mitigation on property if possible. Because wetland design is area-specific, conceptual design details are described in the area-specific descriptions (Sections 4.2, 4.5.3, and 4.7) (Phases I, II, and II of the mitigation). Approximately 20 acres of wetlands have been established at the Preserve. In addition, approximately 26 acres of forested jurisdictional wetlands in the Northern Pines (Section 4.5) have been preserved with an appropriate legal mechanism in place to ensure continued preservation. This combination of newly created wetlands and preserved existing wetlands satisfies DOE's wetland mitigation responsibility, subject to any requirements in Section 5.0.

In addition to the wetland mitigation process, upland and riparian forest revegetation in various areas can restore wet woods. Soil characteristics and hydrology were considered when planting areas with wetland trees and shrubs. Detailed analyses was conducted and presented in NRRDPs to determine specific planting schemes.

4.0 NATURAL RESOURCE RESTORATION PROJECTS

This section describes the restoration projects that have been completed at the Preserve. These descriptions provided conceptual components required for each project. These restoration projects are discussed below in the sequence of implementation. All of the restoration projects have been implemented consistent with their respective NRRDPs. Figure 4-1 shows the various restoration project areas on the Preserve.

4.1 AESTHETIC BARRIER ALONG WILLEY ROAD

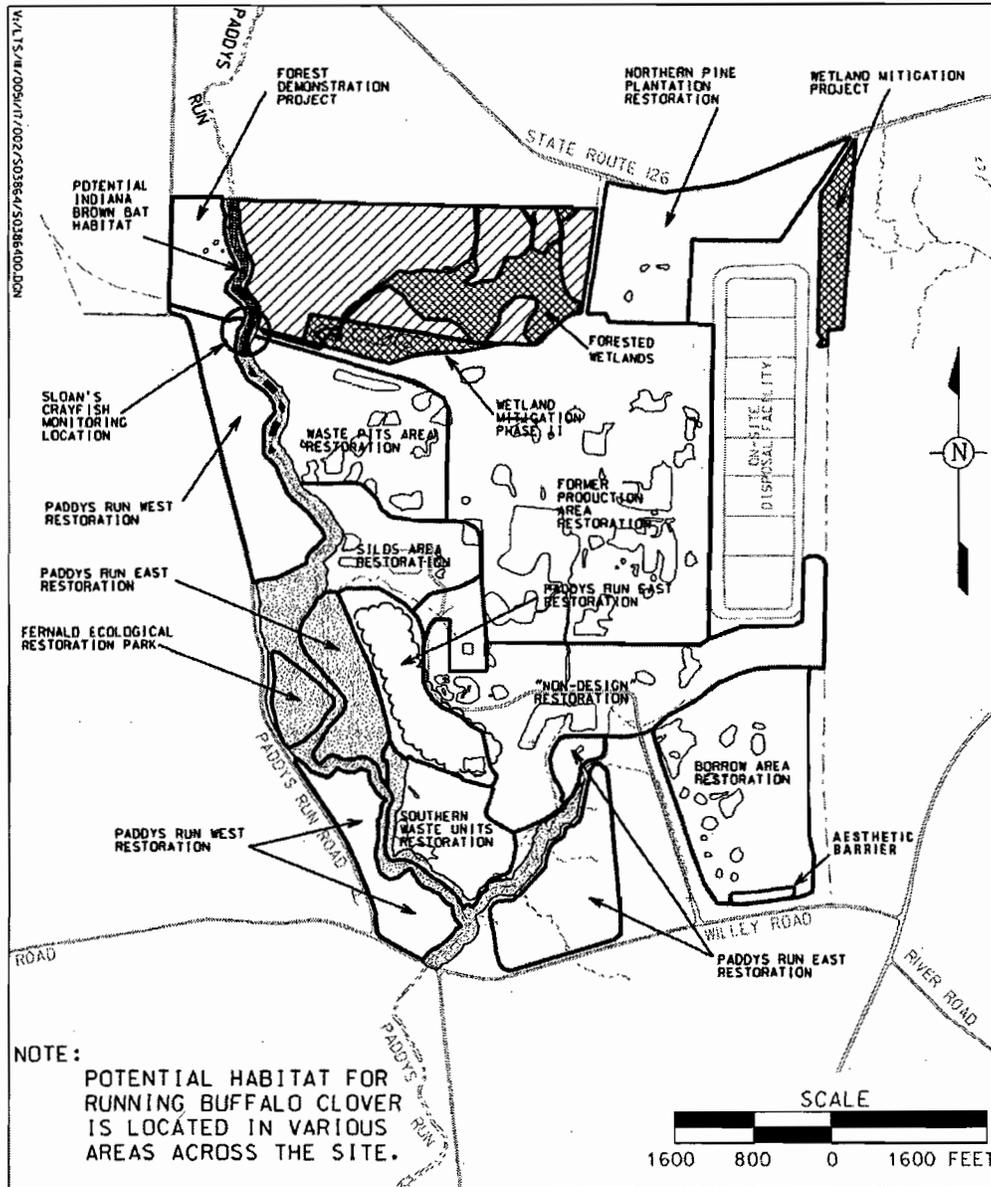
This restoration project involved establishment of an aesthetic barrier, approximately 50 feet wide, using densely planted trees to provide a visual screen and aesthetic appeal between Willey Road and construction activities. The FCAB recommended that DOE provide screening of remedial activities as feasible and appropriate (Recommendation #97-1). Immediate, effective visual screening was achieved through dense planting of evergreens (eastern white pine, Norway spruce) and deciduous trees (red maple, green ash, American crabapple, tulip poplar, hawthorn, oak, and redbud). Aesthetic appeal is provided by using spring flowering trees (e.g., American crabapple, redbud) and trees with vivid yellow and red foliage (e.g., red maple). By designing the barrier to include a mixture of evergreens and deciduous trees, the barrier will provide year-round screening and quality habitat for wildlife species.

Safety hazards that can be created by restricting visibility or creating additional deer habitat too close to the road were considered during the design. As a result, the barrier was set back 50 feet from the road. This project was implemented and completed in the fall of 1998.

4.2 WETLAND MITIGATION – PHASE I

This restoration project was conducted in approximately 12 acres of Area 1, Phase I, from March 1999 to November 1999. As a result of remedial activities at the Preserve, approximately 10 acres of jurisdictional wetlands were dredged or filled. As stated in Section 3.2.4, DOE negotiated a 1.5 to 1 wetland mitigation ratio with regulatory agencies (EPA, OEPA, ODNR, and USFWS). Phase I wetland mitigation was performed to address a portion of the required mitigated acres of wetlands.

The Phase I wetland mitigation performed in Area 1, Phase I was designed to produce more than 6 acres of constructed wetlands, with the remaining portions of the site functioning as upland forest and



LEGEND:

- | | |
|---|--|
| ----- FERNALD SITE BOUNDARY | ▨ NORTHERN WOODLOT AREA AND POTENTIAL AREA FOR SPRING CORAL ROOT |
| ▨ PADDY'S RUN AND TRIBUTARIES RIPARIAN CORRIDOR | ☁ PINES |
| ▨ SLOAN'S CRAYFISH AREA | ○ OPEN WATER |
| ▨ POTENTIAL INDIANA BROWN BAT HABITAT | |
| ▨ WETLANDS | |

FIGURE 4-1 RESTORATION PROJECT AREAS

grassland. The plantings consisted of native plant vegetation of sufficient species diversity to provide a variety of food and habitat for various species of wildlife.

Design considerations included grading, hydrology, planting, wildlife features and erosion control. Grading was performed using naturally occurring curves and shapes to provide a natural appearance and considered specification and details related to topsoil requirements and placement. Some earth moving was necessary to create the eight depressions and berms over the 12-acre project. Earth moving occurred from March to May 1999. Topsoil, supplemented with wood chips, was applied across 8 acres of the project area.

The hydrologic regime of the mitigation site and the surrounding landscape was assessed to efficiently use available water sources to maximize wetland conditions. Outfall structures with stop boards were required between three of the basins. Open water areas have specified depths designed for specific biological needs and choices of habitat.

The planting of vegetation included species native to Hamilton, Butler, and/or nearby counties and was conducted during the months of April and May, and October and November 1999. All woody plants were mulched with wood chips following planting. Various wildlife habitat requirements and features for species of birds, mammals, reptiles, and amphibians were also included. A total of 17 wildlife structures are located within the project area. To the extent possible, herbaceous and woody plant species were selected and specified based on their ability to provide food or cover for selected wildlife species. Natural materials (coconut logs and coconut fiber matting) were used to control erosion as part of the planting specifications.

4.3 AREA 8, PHASE II REVEGETATION

This demonstration project involved the creation of native forest cover in the grazed pasture located in the northwestern corner of the Preserve, west of Paddys Run. The purpose of this project was to provide an area of finished reforestation early in the overall restoration process that would effectively demonstrate to the public the feasibility and advantages of restoring natural habitats. The demonstration forest provides upland and riparian forest, wetland, and prairie habitats and various habitats for many forms of wildlife. In addition, the flood storage capacity of Paddys Run may be increased. The grazing lease for this area was terminated as part of the continued phase-out of grazing lease agreements at the Preserve. The

project was implemented in fiscal year 2000.

This project consists of both upland and riparian forest. The upland forest is located along a portion of the north property boundary and the west property boundary, extending southward to the rail spur. The riparian forest extends along the existing riparian corridor of the west bank of Paddys Run from the northern property line southward to the rail spur. This project is part of the required restoration for impacts to the Paddys Run Corridor. It consists of approximately 20 acres of restored vegetative community.

Earthwork was carried out in the fall of 1999 to create a new gravel access roadway and turnaround area. Approximately 2 acres of the project area are used as a handling area for organic material, such as wood chips. Drainage channels, leading to a small catch basin, were cut around both sides of the material handling area. The catch basin feeds a filter wetland before the water is discharged toward Paddys Run. The basin and filter wetland was sized to meet storm water requirements. Approximately 4 acres of the project area along Paddys Run has existing, mid-early successional trees that can contribute to a beneficial riparian corridor.

The upland forest is typical of a mid-western upland successional forest, consisting of a canopy and shrub layer by randomly planting hardwood trees and shrubs. Within Area 8, Phase II, a large number of native trees already exist. The existing vegetation was taken into consideration while designing the planting plan for Area 8, Phase II. Approximately 8 acres of the area were restored as a Beech-Maple, Oak-Hickory or Mesophytic forest community, planted at a target density of approximately 450 plants per acre. The plantings included 160 saplings, 90 shrubs (in half of the patches), and 400 seedlings, per acre, assuming only 50 percent survival of the seedlings. The upland and riparian forests were planted, in a random patch design, toward the goal of 450 plants per acre within a specified area. The existing riparian corridor was enhanced with additional understory and shrub species at a density of approximately 60 plants per acre (i.e., 40 trees and 20 shrubs). The pasture areas that were established as forest plots were sprayed with roundup to kill existing vegetation in the fall of 1999 and again in the spring of 2000. The forest plots were seeded with a prairie seed mix after the planting was complete.

The riparian forest is typical of a plant community found in somewhat poorly drained soils, consisting of a canopy and shrub layer of plant materials that have root systems that are tolerant of prolonged moisture.

Sections 3.2.1 and 3.2.2 provide characteristics of upland and riparian forest. Wetland creation/restoration was also integrated into the riparian forest design, as described in Section 3.2.4.

Approximately 2.5 acres were planted as savanna with a total of 84 trees, 74 shrubs (five saplings and 30 shrubs per acre). The savanna also required a specific seed mix for native prairie grass and forbs that were seeded after the plantings were completed.

4.4 SOUTHERN WASTE UNITS RESTORATION (AREA 2, PHASE I)

The Southern Waste Units (SWU) encompasses approximately 30 acres. The remediation of Area 2, Phase I significantly changed in the topography of this area. The Inactive Flyash Pile and Active Flyash Pile have been removed, resulting in a decrease in the existing elevation. The primary restoration objective for the SWU was to expand the riparian corridor by creating several open water areas and an upland forest. Enhancement of the riparian corridor provides a native vegetative community, terrestrial wildlife habitat, increased water quality, and reduced erosion. In low-order streams such as Paddys Run, riparian vegetation provides shading that reduces water temperature, discourages eutrophication, and provides organic material in the form of detritus, which is important for the health of the stream. Higher elevation areas will be restored to an upland forest and tied into existing adjacent vegetation. This effort will meet the ecological restoration goals of restoring native vegetative communities and promoting wildlife habitat.

Restoration of the SWU was initiated in 2001 and completed in 2002. Grading of the SWU was completed in a manner designed to promote flooding of the SWU by Paddys Run during a two-year storm event or greater.

Installation of outfall structures was completed at the discharge point to Paddys Run and at a second discharge point into a groundwater infiltration basin adjacent to Paddys Run. An emergency overflow was also constructed into Paddys Run. Berms of depressions were stabilized with coir fabric and willow staking during interim restoration to stabilize areas prior to final restoration.

Soil in the project area was amended through a mechanical application of wood chips on the soil surface. Revegetation of upland and riparian areas was conducted pursuant to Section 3.2.1 and 3.2.2. Planting in the project area included patches of Beech-Maple, Oak-Hickory, mesophytic, and riparian forest plots. Total plant material installed in the project included 2,805 saplings, 1,564 shrubs, and 6,800 seedlings.

Three acres of the project consists of restored retention basins. The "southern portion" of the project referred to as the "Carolina" area remained largely undisturbed after remediation. The remaining project area was seeded with permanent prairie seed mix and cover crop during restoration. All areas designated as prairie were seeded with the seed drill in combination with the appropriate application of organic matter and soil inoculants. Approximately 20 wildlife structures were installed in the project area as determined appropriate.

4.5 NORTH WOODLOT

The North Woodlot was divided into three separate projects: the Northern Pine Plantation Enhancement, the Northern Woodlot Enhancement, and the Wetland Mitigation, Phase II. Restoration activities were initiated in the winter of 2001 and completed in the fall of 2005. The primary objective of the North Woodlot Restoration Project was to increase wetland acreage, expand native woodlots and improve the quality of existing woodlots.

4.5.1 Northern Pine Plantation Enhancement (Area 1, Phase I)

The project area covers approximately 70 acres. The pine plantation covers approximately 50 acres and the existing deciduous forest covers approximately 20 acres. This restoration project was initiated in the winter of 2001 and completed in the spring of 2003. Restoration included the enhancement of the Northern Pine Plantation by interplanting deciduous trees and shrubs among thinned pines. The existing stand of deciduous trees in the northern portion of Area 1 remained unchanged other than the removal of invasive species (e.g., honeysuckle). Deciduous planting sites were formed by complete removal of the Austrian pine (*Pinus nigra*), and removal of blocks of the White pine (*Pinus strobus*). In total, approximately 20 acres of Austrian and White Pines were removed from the project area. Upland forest species were interplanted among the remaining pines. In addition, openings were made to diversify habitat and allow brush piles and snags to be created in the Area 1, Phase I woodlots. Openings were enhanced with brush piles using cut trees.

Due to the hydrology of the project area, seven new wetland areas were constructed as part of the project. In some cases, drain tiles present in the project area were broken or plugged to promote the development of wetlands. In other cases, minor changes in drainage patterns were made through fine grading to support new wetland areas. Wetland vegetation was installed in the basins and associated drainage channels in the form of native plant plugs and dormant willow cuttings. Pond muck was added to each wetland basin to introduce aquatic species and additional wetland plant seeds.

The early stages of the forest communities were established by interplanting the pine plantation into an upland forest association, which will transition into the existing upland forest to the north. Plant species selected for planting among the pines were typical of those found in gently sloping areas with deep, rich, mesic soils. Plant species selected for the transition portion were typical of drier slopes and ridges. Planting was completed over 18 acres of the site and included Beech-Maple and Oak-Hickory plots. The total plants installed in the project area include 2,970 saplings, 1,656 shrubs, and 7,200 seedlings.

A deer exclusion fence was constructed in a portion of the Northern Pine Restoration Project as a test case. The installation and maintenance of the exclusion fence has proven to be minimal. The fence has proven to be extremely effective in keeping deer away from planted vegetation. Initial monitoring results show a significant increase in plant survival and general health inside the fence when compared to areas outside the fence. Deer exclusion fence was integrated into all subsequent restoration designs.

4.5.2 Northern Woodlot Enhancement

This restoration project included the removal of invasive species from existing woodlots and the conversion of former pasture to native grasses to promote additional habitat diversity. The Northern Woodlot is nearly 100 acres in size. Approximately 30 acres of the woodlot is former pasture and the remainder is early to mid-successional forest.

Seeding of the Northern Woodlot was initiated in the Fall of 2003 and completed in the Spring of 2004. Herbicide applications occurred before and after seeding to reduce competition for the native grasses. The 30 acres of former pasture was seeded with native grasses using a seed drill.

The removal of invasive species primarily focused on bush honeysuckle, but also included multiflora rose and wild grape vines. Mechanical removal using a bobcat with a sheer attachment was initiated in the

Fall of 2003 and continued through the winter of 2004. Removal was resumed in the Fall of 2004 and completed by the end of the calendar year. In total, approximately four months were spent removing invasive species from the project area. It is estimated that approximately 20,000 cubic yards of invasive plants were removed, staged on the old North Construction access road and chipped by subcontractors using a tub grinder on two separate occasions. All areas where invasive plants were removed were reseeded with a native woodland mix.

Approximately 20 wildlife structures were installed throughout the project area during the winter of 2005.

4.5.3 Wetland Mitigation Phase II (Area 1, Phase III)

A wetlands system was developed on 10 acres of the southern portion of the project area. Grading on the wetland was initiated in the Fall 2003 and was completed in the Spring of 2004. As stated in Section 3.2.4, DOE agreed to mitigate wetlands at a 1.5 to 1 ratio, replacing 1.5 acres of wetlands for every 1 acre dredged or filled. DOE also agreed to implement the mitigation on property if possible. To partially meet those two commitments, DOE proposed the expansion of the northern forested wetland (Area 1, Phase III). The 1996 watershed study indicated that some wetland expansion is possible, contributing to a portion of the required wetland mitigation.

The objective for the Wetland Mitigation - Phase II Project included the creation of new shallow marsh wetland system with surrounding, diverse upland habitat across the 8-acre site. The Wetland Mitigation Phase II Project created approximately four additional acres of wetlands required under the June 1995 DOE mitigation agreement with the OEPA, USFWS, and ODNR.

Construction activities included the creation of three depressions with berms over 4 – 5 acres of the 8-acre project area. Topsoil was reapplied to the project area or imported to the project area as needed in approximately 7 of the 8 acres. Water control structures were installed at three locations in the project area. The water control structures installed have the ability to increase and decrease the water levels in each of the three basins.

Approximately 750 wetland grass and forb plugs were planted around the perimeter of the wetland basins at approximately the normal water level. The project area was seeded with species that are indigenous to wet meadow habitats and provide value to wildlife as specified in the NRRDP. A total of 1,155 Saplings

and 644 shrubs were planted with the intent to establish forest cover and add species diversity. Water collection areas were inoculated with pond muck from healthy ponds. Approximately 20 wildlife structures were installed in the wetland project.

4.6 PADDYS RUN CORRIDOR

Restoration of the Paddys Run Corridor involves the expansion and enhancement of the riparian (i.e., wooded) corridor along Paddys Run Stream. Restoration activities include a combination of planting woody vegetation and seeding former pastures with native grasses. Restoration activities were initiated in Paddys Run West in the spring of 2004 and were completed in the fall of 2005.

4.6.1 Paddys Run Corridor Expansion East (Area 2, Phase II)

The corridor east of Paddys Run is located in Area 2, Phase II. The Paddys Run riparian corridor was restored pursuant to the long-term management plan for Paddys Run, as described in Section 2.3.4. Also included with Paddys Run East is the expansion of the riparian corridor along the SSOD.

Part of this project involved clearing 40 percent (approximately 20 acres) of the Southern Pine Plantation and converting it to an upland forest. The clearing will promote pine canopy openings for the planting of hardwoods, as described for the Northern Pine Plantation. Upland forest species were planted among the remaining pines.

The first restoration objective for the east corridor of Paddys Run is to expand the riparian corridor along Paddys Run. This objective was accomplished by clearing approximately 40 percent of the southern pines to convert the area to an upland forest. The edges of wooded areas were seeded to prairie. This objective meets the Paddys Run restoration and native vegetation goals established in Section 2.1.

The second objective for this project is to expand the riparian corridor along the SSOD. Revegetation of both of these corridors will promote habitats typical of southwest Ohio. This meets the goal of enhancing wildlife habitat by establishing a contiguous corridor along the length of both Paddys Run and the SSOD.

This project will compensate for impacts to the Paddys Run corridor and the Great Miami Aquifer. Restoration of the Paddys Run corridor protects an important recharge area for the Great Miami Aquifer. The ecological restoration of the corridor east of Paddys Run encompasses approximately 80 acres of

restored vegetative communities, 50 acres of which include the southern pines. The riparian corridor along the SSOD encompasses approximately 36 additional acres.

Clearing focused on the rows of Austrian pines with some select cutting of the White pines. Approximately 40 percent of the pine plantation was cleared starting in the winter of 2005. Two large open areas, approximately 3 to 5 acres in size, were created after the removal of the pines. Roughly 5 percent of the trees were used to create brush piles. The remaining trees were chipped and stockpiled in open areas to be used as mulch during restoration. Surplus wood chips were transported to the Wetland Mitigation Area south of the Northern Woodlot and stockpiled for use in soil amendments and mulch during restoration. Any surplus wood chips were moved to Area 8, Phase II for storage or transported to an upcoming restoration project for use as soil amendment and mulch. A vernal pool was installed in each of the two open areas. The open areas were seeded with prairie grass.

Any drain tiles from past agricultural activity were broken and/or crushed in an effort to retain more water in the restored area.

Planting of forest plots along Paddys Run occurred over 14 acres and included Beech-Maple and Oak-Hickory plots starting in 2006. Section 3.2.2 provides further detail regarding the selection of plant species for floodplain areas. Total plant material required included 2,240 saplings, 1,260 shrubs, and 5,600 seedlings.

A vernal pool, approximately 0.25 acre in size, was installed in each of the two open areas in the southern pines. Open areas are approximately 5 acres in size and were seeded with prairie grass after vernal pools are created and wood chips were removed.

The riparian corridor along the SSOD in Area 2, Phase III was planted with an additional 1,584 saplings, 828 shrubs and 4,000 seedlings. Approximately 38 acres of riparian corridor remnants along the SSOD were restored with a lower density of trees and shrubs to enhance existing vegetation. All disturbed areas were seeded with wet meadow or prairie seed mix as appropriate.

4.6.2 Paddys Run Corridor Expansion West (Area 8, Phase III)

Expansion of the corridor west of Paddys Run occurred in Area 8 Phase III. This project is similar in

scope to the eastern corridor expansion described above, with the exception of a few additional considerations. Area 8 is a perimeter area addressed under Appendix E in the SEP, and limited excavation was required. The project consisted of three distinct components: the restoration of a forest/savanna community in the northern portion of Area 8, Phase III; restoration of a forest community in the southern portion; and restoration of floodplain in the former Paddys Run stream channel. Restoration of Paddys Run West resulted in 15 acres of new forest and approximately 11 acres of savanna. The remainder of former pastures in the Paddys Run corridor was converted to prairie through seeding.

A primary objective of this project is to expand the riparian corridor along Paddys Run through forest restoration plantings. A secondary objective is to convert grazed pasture to early stages of a forest with wet prairie, upland prairie, and savanna interspersed. A third objective is to restore the floodplain in the former Paddys Run stream channel by removing an existing soil berm, that was installed when the stream channel was altered in the past, to allow flooding of the floodplain during a two year storm event.

In an effort to retain more water in the area that was to be restored, any drain tiles from past agricultural activities were broken and/or crushed. Some drain tiles in the Northern portion of Paddys Run West were broken in the summer of 2004.

Approximately 200 feet of an existing soil berm was removed starting in 2005. The soil berm is approximately 15 feet high by 25 feet wide. Soil removed from the berm was used to create a stable, gradually sloping berm that will allow overflow from Paddys Run during a two- to four-year storm event. Coir matting and aggregate (as needed) was used to stabilize approximately 250 feet of relocated stream bank to control erosion of the newly created berm. Approximately 50 feet of soil berm in the southern portion of the stream channel was removed to allow storm water to flow out of the former stream channel. Bioengineering techniques were implemented in other areas on the west bank of Paddys Run where erosion is problematic.

The northern portion of Area 8, Phase III was restored in 2005 in the following manner. Herbicide was applied to the existing grass in the pasture. Planting included 12 acres of Beech-Maple and Oak-Hickory plots. The total number of plants required was 1,920 saplings, 1,080 shrubs, and 4,800 seedlings. Approximately 8 acres in a lower pasture of Area 8, Phase III was restored as an oak savanna with a total

of 324 saplings and 167 shrubs. The remaining acres were seeded as wet meadow or prairie.

The southern portion of Area 8, Phase III was restored in the following manner. Herbicide was applied to the existing grass in the pasture. Planting included 3 acres of Beech-Maple and Oak-Hickory plots. Total plants required were 466 saplings, 270 shrubs, and 1,200 seedlings. The remaining acres were seeded as wet meadow or prairie.

Approaches for seeding and installation of trees and shrubs were modified in areas where seeps are present or wetland conditions were encountered. Planting approaches were also modified in areas where soil conditions were consistently sandy.

Approximately 20 wildlife structures were added as appropriate throughout the project area.

4.7 BORROW AREA RESTORATION (AREA 1, PHASE II)

Excavation of the Area 1, Phase II borrow area was used to form a wetland system, with upgradient areas revegetated as a tallgrass prairie transitioning to areas of savanna. Approximately 90 acres were restored. Grading and seeding to support restoration of Subareas 1 & 2 of the Borrow Area were completed in the fall of 2002. Planting activities in Subareas 1&2 and on the perimeter of Borrow Area were completed in the fall of 2005. The remainder of the restoration work in the Borrow Area was completed in 2005.

Restoration work in Subareas 3, 4, and 8 was also completed in 2005. Subareas 3, 4, and 8 were completed as the third phase of Wetland Mitigation Projects.

The main restoration objective for this area is to restore the borrow area, in phases, to a predominantly wet prairie, marsh and upland prairie ecosystem with a surrounding buffer of upland savannas. Open water will also remain in the northwest corner of the project.

The restoration project will meet ecological restoration goals by restoring native vegetative communities and protecting wildlife habitat. Wildlife habitat was provided by establishing a variety of ecosystems and edge habitat. Wetland construction may be used to partially fulfill regulatory wetland mitigation requirements. This restoration project provides compensation for impacts to grasslands.

Final grading and seeding of the borrow area occurred in a phased approach as sections of borrow activities were completed. Each phase of the borrow area was graded using excess soil so that depressions are created near the center of each phase. Drainage channels move water from the depressions during storm events or high flow conditions toward an open water feature in the northwest corner of the borrow area (former sedimentation basin). As grading in each phase was completed, some excavated areas required the addition of wood chips to increase organic matter in the existing soil. A layer of chips were spread across the soil and tilled in as the final step in interim restoration.

Seeding was conducted using a combination of wet prairie and prairie mix. The wetland features created in the borrow area were planted with approximately 1,530 shrubs in and around water features during 2005. The vegetation of seasonally inundated wetlands consists of vegetation typical of pond/edge habitats tolerant of regular to permanent inundation that are indigenous to southwestern Ohio in shallow open waters 3 feet in depth. These plant species include a mixture of species that produce submerged growth, emergent growth, and floating leaves that will maximize habitat diversity. Pond muck was placed in open water areas to establish flora and fauna within the water. An additional 165 saplings were planted around the perimeter of the borrow area to establish a savanna community. Approximately 30 acres have been established as an Oak savanna.

4.8 OSDF PERIMETER BUFFER RESTORATION (AREA 1, PHASES I AND II)

A buffer has been established around the OSDF with appropriate topography and vegetation, including areas of native grasses and nest boxes for wildlife species. This project was completed in 2006 and compensates for required restoration for impacts to grasslands. The OSDF buffer encompasses approximately 100 acres of restored wildlife habitat.

The primary restoration goal of this project is to restore the perimeter of the OSDF as a predominantly prairie area. The perimeter buffer accommodates OSDF storm water drainage, monitoring wells and access, all of which were considered during the design.

The project includes primarily seeding areas around the perimeter of the OSDF. The 80 acres receiving 1-inch of wood chips (or suitable alternative) were seeded with a seed drill. The seeded areas around the OSDF will provide restored prairie habitat that will function as a buffer to the OSDF. Trees and shrubs will not be planted adjacent to the OSDF to minimize introduction of woody vegetation on the OSDF cap.

4.9 SILOS AREA (AREA 7)

The Silos Area was restored similar to the corridor east of Paddys Run. Interim restoration at the conclusion of remediation established several acres of new floodplain along Paddys Run. Approximately 5 acres along the Pilot Plant Drainage Ditch transition into an upland forest. The total project encompasses approximately 10 acres and was completed in 2006.

The primary restoration objective for this area is to restore the riparian corridor along the eastern edge of the Paddys Run and along the Pilot Plant Drainage Ditch.

Wetland/pond habitat was established in excavated areas by grading to encourage water retention. Drainage patterns were adjusted to support the creation of wetlands and vernal pools. Disturbed areas around the silos required soil amendment and tilling prior to planting and seeding. Project areas that are prone to erosion required the installation of coir matting or jute.

Trees and shrubs were planted to expand the wooded corridors along the Pilot Plant Drainage Ditch and Paddys Run in 2005. The remaining areas were seeded with native prairie grasses and forbs that are contiguous with the prairie areas established in the Former Production Area and the Waste Pit Area. Total number of plant material for the Silos area includes 825 saplings, 450 shrubs, and 2,000 seedlings.

Pond muck was placed in open water areas that were created to establish flora and fauna within the water. Willow cuttings were placed in the matting adjacent to the streams. Wildlife structures were installed as appropriate.

4.10 PRODUCTION/WASTE PIT AREA

The Production and Waste Pit Area was restored in phases. The Production Area was restored starting with Area 3B. The first phase of the Production Area Grading was initiated in the fall of 2004. Restoration of the remaining portions of the Production Area continued throughout 2005. Restoration of the Waste Pit Area was addressed as an independent design and was completed in 2006.

4.10.1 Former Production Area Restoration (Areas 3, 4 and 5)

Restoration of the Former Production Area utilized the postexcavation topography to establish a series of

open water/wetland systems surrounded by tallgrass prairie. A transition to upland forest and connection with the expanded riparian corridor occurs in the west portion of the Former Production Area. The restored Former Production Area encompasses approximately 160 acres of restored wildlife habitat and was completed in 2006.

This project involved the formation of wetlands and open water areas and as such required an assessment to determine the type of aquatic habitats. A water availability study has been conducted. This study showed that the formation of open water and/or wetlands is feasible. Also, soil types were assessed to characterize the soil profile underlying the proposed final grade. The properties of these soils were examined to support the design of a topsoil and soil amendment program. Specific sources of suitable topsoil or other amendments were identified.

The primary restoration objective of this project is to convert the remediated production area into a combination of open water, wetland and prairie ecosystems with some perimeter forest buffer. The Former Production Area now consists of several deep excavations and areas of exposed subsoil. The postexcavation topography has been converted to open water and/or wetland habitat to meet the goal of providing wildlife habitat. This approach minimized the amount of backfill and regrading, resulting in cost savings. Prairie revegetation stabilized the exposed soil.

Restoration of the Former Production Area compensates for impacts to grassland and to the Great Miami Aquifer. Since this area contributes to the Paddys Run watershed, restoration activities provide protection of an aquifer recharge zone.

At the conclusion of remediation of an excavation area, interim restoration took place to establish stable slopes and topography to support potential wetland and open water areas and to establish appropriate prairie grasses. Slopes of the deep excavations were graded to 5 to 1 from top to bottom during interim restoration. Slopes of 5 to 1 allow for the formation of a littoral zone on the waters' edge and provide a safe configuration for people who may need to access the area. The gentle slopes facilitate revegetation, reduce the likelihood of gully erosion, and are more compatible with the surrounding landscape. The perimeter of the deep excavations was graded to establish depressions, and compacted to ensure water retention in areas where the topography and clay material was suitable.

Approximately 88 acres surrounding the deep excavations, designated for a prairie community, was covered with a 1-inch thick layer of wood chips (or suitable alternative) that was tilled into the top layer of soil. Clay liners at least 3 feet thick were installed in the bottom of the deep excavations as part of interim restoration. The deep excavations cover approximately 35 acres of the project area. The above process was repeated as remediation was completed in each portion of the Former Production Area.

If hydrological conditions permit, certain depressions may contain a transition from shallow open water to seasonally inundated wetlands. The vegetation of seasonally inundated wetlands will consist of vegetation typical of pond edge habitats and tolerant or regular to permanent inundation up to 1 foot.

Non-persistent plant species selected were noninvasive plant species that are indigenous to southwestern Ohio in shallow open waters 3 feet in depth. These plant species include a mixture of species that produce submerged growth, emergent growth, and floating leaves, which maximize habitat diversity.

The tallgrass prairie and upland forest restoration around the open water areas was conducted in accordance with Section 3.2.1 and 3.2.3. Although prairie grasses and forbs are tolerant of the poor soil conditions after excavation, additional amendments were needed to optimize growth. On-site research as part of the OU4 Ecological Research Grant Program provided further information as to the type of amendment for optimal plant growth.

Planting in the Former Production Area includes the installation of 1,631 shrubs. Shrub patches are concentrated in and around wetland and open water features. The remaining areas were seeded with prairie mix. Approximately 30 wildlife boxes were installed throughout the project area as appropriate.

4.10.2 Waste Pit Area Restoration (Area 6)

The Waste Pit Area was restored similar to the corridor east of Paddys Run. The results of the Paddys Run floodplain modeling determined the extent of riparian habitat that was established. Interim restoration at the conclusion of remediation established several acres of new floodplain along Paddys Run. The riparian habitat transitions into an upland forest. This project encompasses approximately 30 acres. Five acres were restored as forest to enhance the riparian corridor.

The primary restoration objective of this project is to expand the floodplain of Paddys Run and restore the riparian corridor along the eastern edge of the stream channel and floodplain. Floodplain restoration meets the goals of native vegetation, Paddys Run restoration, and wildlife habitat. Other portions of the Waste Pit Area were restored as a prairie ecosystem.

Deep excavations were graded to retain water and establish stable side slopes and seeded to establish native prairie vegetation. Clay liners and drainage control structures were installed. If necessary, drainage patterns may be adjusted to support the creation of wetlands and vernal pools. Remediated areas required soil amendment and tilling prior to planting or seeding. Coir matting or jute was installed in areas that are prone to erosion.

Wetland features were established over 5 acres in shallow depressions around the deep excavations to the degree possible. Wetland and wet prairie vegetation was established along the waters edge and swales. Native prairie grasses and forbs were established in both wet and upland portions of the project area. The total number of plants included approximately 825 saplings, 450 shrubs, and 2,000 seedlings. Pond muck was placed in open water areas to begin the establishment of flora and fauna in the water. Willow cuttings were placed in the matting that was placed along the stream.

Expansion of the floodplain on the western side of the Waste Pits area (eastside of Paddys Run) occurred to the degree possible. Wildlife structures were installed as appropriate.

4.11 PADDYS RUN RESTORATION APPROACH

Floodplain expansion occurred in the Waste Pit Area and the Southern Waste Units as a result of remediation activities. Additional floodplain expansion also occurred in the former stream channel in Area 8, Phase III. The concept for floodplain expansion in all three areas is to provide a combination of additional floodplain with open water/wetland components in combination with surrounding riparian forest.

5.0 MONITORING AND MAINTENANCE

5.1 MONITORING

Monitoring of restored areas has taken place within all restoration projects at the Preserve. For most projects, it has involved two phases. First, Implementation Phase Monitoring has been conducted to ensure that restoration projects are completed pursuant to their NRRDPs. The second phase of monitoring is termed Functional Phase Monitoring or Functional Monitoring. This effort considers projects in terms of their system-specific contribution to sitewide ecological communities. The text below describes the specific requirements that have been or will be evaluated for each phase.

5.1.1 Implementation Monitoring

The main focus of Implementation Phase Monitoring primarily involves vegetation survival and herbaceous cover. The NRTs agree that 80 percent survival of planted saplings and shrubs must be achieved. In addition, seeded areas must obtain sufficient cover for erosion control, as further defined below. Plant survival rates will usually be calculated on an individual "patch by patch" basis. A patch is a planting unit about 0.25 acre in size that consists of a specific habitat template. This design approach has been used for most of the NRRDPs developed at the Preserve. Implementation monitoring has been conducted for one or two years as described below.

To determine vegetation survival, mortality counts were conducted at the end of each growing season. Each balled and burlap or container-grown tree and shrub was inspected and assigned one of three categories: alive, re-sprout, or dead. Trees and shrubs were considered "alive" when their main stem and/or greater than 50 percent of the lateral stems are viable. "Re-sprout" trees and shrubs had a dead main stem, with one or more new shoots growing from the stem or the root mass. Plants were also categorized as "re-sprout" when less than 50 percent of its lateral branches are alive. Dead trees were those that have no signs of vitality at all.

All seeded areas were also 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 were randomly distributed and surveyed. Field personnel estimated the total cover and listed all species present within each quadrat. The data collected were 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 were evaluated with non-parametric statistics. Percent native species composition was calculated by dividing the total number of species surveyed into the total number of native species present. The relative frequency of native species was determined as follows. First, DOE recorded the number of times each species appears in a quadrat. This value was then divided by the number of quadrats surveyed to obtain a frequency. Next, the frequencies of all native species were summed and divided by the total of all frequencies within a given area.

By collecting the information described above, DOE evaluated implementation phase success of seeded areas based on two criteria. First, 90 percent herbaceous ground cover should be met by the end of the first growing season. Second, a target of trending toward a 50 percent native species composition or relative frequency will be used to evaluate seeded areas at 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.

Specific NRRDPs imposed additional Implementation Phase Monitoring requirements, depending upon the specific habitat. For instance, water quality and depths have been evaluated for wetland mitigation projects. Wetland mitigation requirements must be evaluated for three to five years depending on the specific criteria being evaluated. Wetland monitoring requirements were further defined in the NRRDPs.

For areas that do not meet the 90% cover requirements for seeded areas, the NRTs will jointly determine if additional reseeded is required. For areas that do not meet the 80% vegetation survival requirement or the 50% native goal, the NRTs will jointly develop a replanting strategy consistent with the Adaptive Management approach outlined in Section 5.3.

A number of completed restoration projects have had one year of Implementation Phase Monitoring pursuant to the 2002 draft NRRP. Implementation Phase Monitoring for all the projects is complete. The NRTs will collectively conduct field evaluations of these completed projects within 90 days of the effective date of a consent decree which resolves past, present, and future natural resource impacts at the Preserve, and will collectively agree on the current status of vegetation and design implementation in the areas. Available design and monitoring data will be utilized in these field evaluations. Based on the results of the field evaluations, the NRTs will jointly determine if additional replanting, repair or restoration work is required in the areas. The NRTs will jointly develop an acceptable schedule to

address the required activities, taking into consideration DOE's available current year funding and budget cycle and other relevant factors. All rework required as a result of the field evaluations will be completed by DOE.

As part of this evaluation process, the NRTs will have the latitude to consider additional factors in assessing implementation phase success. For instance, 80% planted vegetation survival may not be achieved within a given forest restoration patch. However, if a large number of volunteer recruits and/or resprouting vegetation are present, the NRTs can decide that no replanting activities are required. For herbaceous cover, the implementation phase 90% total cover requirement has proven to be very difficult to meet using the conventional native seed mixes, especially in prairie restoration areas. The NRTs may determine to modify the total cover requirement and promote native prairie establishment in relatively level areas. On sloped areas, the NRTs may consider alternative seeding approaches that maximize slope stabilization in the near term. Thus, for areas where erosion is a concern, project goals may be revised to focus on total cover as opposed to native vegetation.

NRRP-driven restoration projects are intended to satisfy all outstanding wetland mitigation requirements. As stated above, wetland mitigation NRRDPs established additional monitoring requirements in order to evaluate the effectiveness of site wetland mitigation efforts. Section 4 summarizes the three projects that have been constructed to address compensatory mitigation requirements. These projects have taken place since 1999. The project-specific monitoring primarily dealt with vegetation and water quality. In 2004, OEPA published monitoring protocols and performance standards for wetland mitigation projects. Performance standards include acceptable ranges for mitigation project size, morphology, hydrology, biogeochemistry, vegetation, and wildlife use (e.g., amphibians), as compared to the type of wetland that was impacted.

The NRTs may use these monitoring protocols and performance standards as a framework for developing a path forward for mitigation wetlands as the Preserve. The NRTs will use the 1993 site wetland delineation to derive a baseline impacted wetland class and category. From there, performance standards can be compared. The NRTs will assess the current status of mitigated wetlands onsite during the 2008 field walkdown of restored areas. In addition, the NRTs can evaluate existing data collected for specific projects and determine what additional data needs and timeframes for monitoring will be needed for each area. However, the NRTs will also consider, in the context of compensatory mitigation, the preservation

of wetlands and upland areas before recommending any additional projects or additional performance monitoring. During the field evaluation of completed projects, potential additional wetland mitigation areas may also be identified. Several restoration projects included a component of wetland creation, but were not monitored as part of the compensatory mitigation acreage. The revision of the monitoring approach provides an opportunity to add these areas into the wetland mitigation program.

Within 120 days of the effective date of a consent decree which resolves past, present, and future natural resource impacts at the Preserve, DOE will develop and submit to the NRTs a monitoring plan to address wetlands proposed as mitigation commitments. The NRTs will jointly review and approve these modified wetland monitoring plans.

5.1.2 Functional Phase Monitoring

Functional Monitoring focuses on an entire habitat (e.g., prairie, wetland, forest) instead of an individual project. Functional Monitoring helps determine if restored habitats at the Preserve are progressing when compared to baseline conditions and established reference sites. Functional Monitoring has a longer duration (2003 to 2011) and a lower frequency of data collection (e.g., every three years). Functional Monitoring will quantitatively evaluate progress of restored habitat against a baseline and towards an established reference site.

Functional Monitoring is not a pass/fail determination like Implementation Phase Monitoring. Instead, Functional Monitoring is a means of evaluating the progress of the restored community against pre-restoration baseline conditions and target reference sites already achieving high ecological function. Vegetation indices will be used for comparisons, as well as several wildlife-based evaluations. Evaluation of woody and herbaceous vegetation is the main focus of Functional Monitoring. Floristic Quality Assessment Index (FQAI) is the primary monitoring parameter that has been and will continue to be used in Functional Monitoring.

Baseline conditions were measured at the Preserve in 2001 and 2002. To establish the needed reference site data, DOE teamed with the University of Dayton and collected the data outlined above from reference sites agreed upon by the NRTs in 2002. Restored habitats on the FCP were grouped together as wetlands, prairies/savannas, or forest/riparian. Functional Monitoring data

on site wetlands were collected in 2003, data on prairies/savannas were collected in 2004, and data on woodlands were collected in 2005.

Information collected during baseline and reference site characterizations include species richness, density, and frequency. Woody vegetation size was also recorded. From these parameters, sites are evaluated through FQAI, the extent of native species present, and the extent of hydrophytic species present (for wet areas).

DOE teamed with the University of Dayton to conduct reference site characterizations and refine sampling methodologies. From these efforts, the NRTs agreed that the final monitoring parameters summarized above will best represent the extent of native species establishment, development of hydric conditions, and quality of vegetative communities restored at the Preserve.

Several wildlife evaluations have been conducted in addition to vegetation surveys. These include amphibian and macroinvertebrate sampling, and migratory waterfowl observations. Casual wildlife observations have also been recorded in each study area. Amphibian and macroinvertebrate sampling was conducted by the OEPA and is outside the scope of the Consolidated Monitoring Report.

Specific parameters measured include species richness, density, and frequency. Woody vegetation size is also recorded. From these parameters, sites are evaluated through FQAI, the extent of native species present, and the extent of hydrophytic species present (for wet areas). The success of Functional Monitoring depends on the collection of the same data on baseline sites, reference sites and restored areas of the Preserve so that progress of the restoration can be evaluated.

The schedule for Functional Monitoring at the Preserve is as follows:

- | | | |
|------------------------------------|-----------|-----------|
| • Baseline Data Collection - | 2001/2002 | Completed |
| • Reference Site Data Collection - | 2002 | Completed |
| • Wetlands - | 2003 | Completed |
| • Prairies/Savannas - | 2004 | Completed |
| • Woodlands - | 2005 | Completed |
| • Wetlands - | 2009 | Planned |

- Prairies/Savannas - 2010 Planned
- Woodlands - 2011 Planned

The data collected during Functional Monitoring will provide a comparison of restored habitats with baseline and reference sites. Wetland data collected in 2003 demonstrate that restored wetlands on the Preserve are approaching the diversity and quality of the wetlands evaluated during the reference site evaluation. Prairies/Savannas data collected at the Preserve in 2004 suggests a positive trajectory toward the diversity and quality of the Prairies/Savannas evaluated during the reference site evaluation. Woodlands data collected in 2005 at the Preserve suggests a positive trajectory toward the diversity and quality of the Woodlands evaluated during the reference site. Functional Monitoring data will be evaluated by the NRTs to determine if any corrective action is needed. Any corrective actions identified by the NRTs will be jointly agreed upon using the "Adaptive Management" concept outlined in section 5.3 below.

The results of the implementation monitoring and of the Functional Monitoring reports issued through 2005 were reported in the annual Consolidated Monitoring reports issued between 2002 and 2006. The results of future monitoring will be reported in the annual Consolidated Monitoring report as an appendix to the annual Site Environmental Reports. Following completion of the Functional Monitoring in 2011, the NRTs will jointly determine whether to continue further monitoring.

5.2 MAINTENANCE OF RESTORED AREAS

Maintenance is critical to the success of site restoration projects. Maintenance activities that will be required include activities such as watering, deer control, invasive and noxious species control, maintenance of access points and other infrastructure and the maintenance of habitat enhancement structures. The following sections describe some maintenance to be carried out by DOE during restoration of the site and post closure. As stated in Section 3.1.8, a maintenance plan will also be developed and submitted to the NRTs.

Following approval of the maintenance plan described in Section 3.1.8, DOE will implement that maintenance plan for ten years after which time the NRTs will jointly evaluate and decide whether to continue maintenance requirements covered by the NRRP.

5.2.1 Watering

Each plant will be watered at the time of installation. Watering will also be carried out as needed during the first weeks following plant installation as required per Specification #2940. Watering of planted trees and shrubs will occur in the first growing season following project completion if persistent drought conditions occur.

For seeded areas, the planting window restrictions in Specification #2930 help to ensure that sufficient soil moisture exists for germination and survival of seeds. Weather patterns will be a contributing factor in timing of seed application. Some watering may be needed the first season if drought conditions threaten the survival of germinated seed.

5.2.2 Deer Control

Installed trees and shrubs must be protected from deer browsing and rubbing in order for forest restoration efforts to be successful. Experience from past restoration projects at the Preserve shows that enclosure fencing is the most effective means of protecting against white tail deer impacts. Shrub plantings and some tree plantings will be arranged in order to maximize the effectiveness of fencing. Field personnel will then install welded wire or deer exclusion fencing around plant material. In the event that fencing is not practical, the use of tree tubes and repellent sprays will be employed to protect trees and shrubs.

Deer fencing and individual plant enclosures will be maintained for the first four years following closure. This will include repair and replacement to maintain integrity and function of the fencing and/or enclosures. Beyond four years, fencing and enclosures will be maintained until repairs become excessive per the discretion of DOE. After four years, when maintenance has become excessive, fencing will be removed by DOE. At that point, the majority of planted material will have at least five growing seasons of protection and should be well established.

The DOE land manager at the site will have the discretion to consider a reduction of the deer population as a management tool. Any culling of the deer population on the site will require consultation and coordination with appropriate regulatory agencies and stakeholder groups.

5.2.3 Mowing and Weed Control

The forest restoration concept developed in the NRRP depends on ecological succession as the primary component. A diverse mix of native species was planted at appropriate densities so that the natural succession process will, over time, establish natural woodlots or wooded corridors. Without some control, invasive and aggressive species may impede or prevent the natural succession process by out-competing native plants and alter the intended course of maturation for restored areas. Therefore, a very important component of restoration of the site involves the removal or extirpation of invasive and aggressive species to the degree practicable. Mechanical removal or the application of glyphosate herbicide to species such as Bush Honeysuckle, Multiflora Rose, Thistle varieties, Typha spp., and Phragmites spp. will be undertaken. Weed species on the Ohio Noxious weed list will be given priority with respect to herbicide application. For example, thistle species that may impact the pastures of adjacent landowners will be given highest priority for herbicide application. The control of species such as bush honeysuckle in the understory of site woodlots will be controlled to the degree practicable to maximize the establishment of native understory plants.

Designated areas of the site will be mowed on a routine basis. The setback from Willey Road and the buffer strip in the southeast corner of the site will continue to be mowed after closure. Access points and buffer zones around facilities and structures will also be mowed and maintained in a safe and functional configuration as determined appropriate by DOE.

Restored prairies will also be managed to optimize growth of prairie grasses. Burning will be the preferred method of management for restored prairies. In the event that burning is not possible, mowing and thatch removal will be utilized as a management tool, along with the application of selective herbicides.

5.2.4 Waterways and Water Bodies

Invasive species and noxious weeds will be controlled as described in section 5.2.3. Excessive erosion and changes that create safety hazards or effect ecological function will be controlled and/or repaired. Water control structures will be maintained to retain their functionality.

5.3 ADAPTIVE MANAGEMENT

The concept of "Adaptive Management" will be used in making decisions regarding needed maintenance and management of restored areas. Adaptive Management is defined as, "a continuing process of

planning, monitoring and adjusting with the objective of improving the project implementation and outcomes.” Adaptive management will allow the NRTs flexibility in making decisions regarding needed maintenance and management of restored areas. Restored areas will be very dynamic in nature and set standards or rules may not always apply to all situations in the field. The goal of restored area monitoring and the use of adaptive management will be to optimize the progress of restored areas towards functional success and eventual trending towards a mature ecosystem through the natural succession process.

6.0 STAKEHOLDER INVOLVEMENT

Stakeholder involvement has been essential to the development and implementation of this restoration plan. All meeting summaries generated from Natural Resource Trustee Meetings are made available to the public in the Public Environmental Information Center (PEIC). Stakeholders have had several opportunities to provide input. On September 21, 1998, the NRIA, NRRP and the Final Land Use Environmental Assessment were made available to the public for a 30-day review and comment period. On September 23, 1998, the NRTs conducted a public workshop to discuss the NRIA and NRRP and the proposed settlement of natural resource trusteeship issues. A separate DOE-sponsored public hearing on final land use was held at the October 13, 1998 Cleanup Progress Briefing. A fact sheet explaining the relationship of final land use, the NRTs, and the NRRP was made available to the public on September 8, 1998.

The NRRP was updated in January 2002 and made available to the public. A public meeting held in February 2002 on public use at Fernald included a discussion on the NRRP and the status of settlement negotiations. The 2002 NRRP was also made available in the PEIC at that time. In May 2003, a Fernald Citizens Advisory Board Roundtable was held specifically on natural resource impacts and restoration. The FCAB has been briefed on natural resource restoration activities at the majority of their meetings. DOE has also continuously provided updates on natural resource restoration at public meetings and has instituted a session termed the "nature Niche" at each of their public meetings during which specific plants and animals of the site are highlighted and discussed.

The 1998 NRIA and NRRP and associated attachments (e.g., HEA analysis, Water Availability Study) have been made available to the public as described above (DOE, 1998c). The NRIA and attachments do not require updating with this version of the NRRP. The final NRRP will be made available for stakeholders, and the NRTs will jointly hold an informational public meeting to discuss it. The NRRDPs are also available in the PEIC. In addition, any of the NRTs can be contacted with any questions or comments regarding restoration of the Preserve.

REFERENCES

- Braun, E.L., 1989, The Woody Plants of Ohio, The Ohio State University Press, Columbus, Ohio.
- Davis, J., 1994, "Report on the Status of the Cave Salamander (*Eurycea lucifuga*) at the Fernald Environmental Management Project," DOE, Fernald Area Office, Cincinnati, OH.
- Geiger, D., 1997, Personal Communication. Holtzman, 1997, ODNR, Division of Wildlife, Personal Communication.
- Gordon, R.B., 1969, The Natural Vegetation of Ohio in Pioneer Days, Bulletin of the Ohio Biological Survey, Ohio State University Press, Columbus, Ohio.
- Klein, J., 1996, Personal Communication.
- Leopold, L.B., 1994, A View of the River, Harvard University Press, Cambridge, Massachusetts.
- Munro, J.W., 1997, Restoration Planning, The New Academy for Ecological Restoration, Society for Ecological Restoration.
- Rosgen, D., 1996, Applied River Morphology, Wildlands Hydrology, Pagosa Springs, Colorado.
- Society for Ecological Restoration, 1997, The Tallgrass Restoration Handbook, Island Press, Washington, D.C.
- U.S. Department of Energy, 1993, A Sitewide Characterization Report, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH.
- U.S. Department of Energy, 1996, A Record of Decision for Remedial Actions at Operable Unit 5, Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.
- U.S. Department of Energy, 1998a, "Sitewide Excavation Plan," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH.
- U.S. Department of Energy, 1998b, "Environmental Assessment for Final Land Use at the Fernald Environmental Management Project," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH.
- U.S. Department of Energy, 1998c, "Natural Resource Impact Assessment and Natural Resource Restoration Plan," Draft, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, OH.
- U.S. Department of Energy, 2003, "Consolidated Monitoring Report for Restored Areas at the FCP," Fernald Closure Project, DOE, Cincinnati, OH.
- U.S.D.A. NRCS, 2001, "The Plants Database," Version 3.1, (<http://plants.usda.gov>), National Plant Data Center, Baton Rouge, LA.
- U.S.D.A. Soil Conservation Service (SCS), 1982a, "Soil Survey of Butler County, Ohio."
- U.S.D.A. Soil Conservation Service (SCS), 1982b, "Soil Survey of Hamilton County, Ohio."

Addendum 1

MEMORANDUM OF UNDERSTANDING

BETWEEN

THE OHIO ENVIRONMENTAL PROTECTION AGENCY,

THE UNITED STATES DEPARTMENT OF ENERGY,

AND

THE UNITED STATES DEPARTMENT OF THE INTERIOR

I. INTRODUCTION and AUTHORITY

This Memorandum of Understanding (MOU) by and between the Ohio Environmental Protection Agency (OEPA), the United States Department of Energy (DOE), and the United States Department of the Interior (DOI), collectively referred to as the Natural Resource Damage Trustees (Trustees), is entered into to oversee and to assure implementation of the Natural Resource Restoration Plan (Restoration Plan) in order to restore, replace and rehabilitate natural resources injured by releases of hazardous substances at and from the Fernald Environmental Management Project (FEMP), located near Fernald, Ohio, owned by the United States of America and currently administered by DOE. The Trustees enter into this MOU pursuant to the authorities of the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. 9601 *et seq.* and other federal and state laws and authorities including, but not limited to, the Federal Water Pollution Control Act, 33 U.S.C. 1251 *et seq.*, as amended, and to the extent appropriate and selected for use by the Trustees, the Natural Resource Damage Assessment Regulations, 43 C.F.R., Part 11, as amended. The MOU is intended to facilitate coordination and cooperation among the Trustees regarding their responsibilities in implementing the Restoration Plan for the FEMP.

The Trustees' main responsibility is to oversee and to assure implementation of the Restoration Plan in order to restore, replace and rehabilitate natural resources injured by releases of hazardous substances at and from the FEMP. In overseeing and assuring implementation of the Restoration Plan, Trustees' activities include, but are not limited to, (1) the assessment, recovery, and administration of natural resources damages for injury to, destruction of, or loss of natural resources and natural resource services (hereinafter "injury" or "injured natural resources"); (2)

additional restoration planning; (3) oversight of the funding for the costs of restoration, replacement, rehabilitation, and/or acquisition of the equivalent (hereinafter "restoration" or "restore") of the injured natural resources; and (4) coordination of Trustee concerns and activities associated with removal, remedial or corrective actions, or other response actions being carried out at the FEMP in an effort to abate and/or minimize continuing and residual injury, and to achieve or enhance restoration of injured natural resources.

II. PARTIES and ADVISORS

The Trustees specified in Section I have trusteeship over certain natural resources at, or related to the FEMP pursuant to Subpart G of the National Contingency Plan (NCP), 40 C.F.R. 300.600, as amended, and other applicable laws. The Trustees have authority to act on behalf of the public to bring claims for natural resource damages against potentially responsible parties and to assure and/or undertake restoration activities. The following officials are parties to this MOU and act on behalf of the public as trustees for natural resources under this MOU:

A. Natural Resource Trustee Parties:

Director, Ohio Environmental Protection Agency or his delegated representative;

Secretary of Energy or his delegated representative;

and

Secretary of the Interior or his delegated representative(s) including:
Director, Office of Environmental Policy & Compliance (OEPIC)
Regional Director, Region 3, U.S. Fish and Wildlife Service

B. Advisors:

United States Department of Justice (DOJ), the Department of the Interior Office of the Solicitor (SOL), the Ohio Attorney General (OAG), the United States Environmental Protection Agency (USEPA), and Ohio Department of Natural Resources (ODNR).

III. FEMP SITE DEFINITION

The FEMP, for purposes of this MOU, includes all areas within the property boundary of the FEMP and any other areas where natural resources have been injured by releases of hazardous substances at and from the FEMP.

IV. PURPOSE

The Trustees recognize the importance of integrating and coordinating their responsibilities regarding implementation of the Restoration Plan in order to restore injured FEMP natural resources. The purpose of this MOU is to provide a framework for coordination and cooperation between the Trustees, and for the implementation of the activities of the Trustees in furtherance of their responsibilities as trustees for natural resources.

V. ORGANIZATION OF THE TRUSTEE COUNCIL

The Trustees recognize the importance of coordinating their efforts in order to meet their respective natural resource trustee responsibilities effectively and efficiently. Accordingly, there is hereby created to implement this MOU, a Trustee Council, whose membership shall include the Secretary of Energy or his designated representative, the Secretary of the Interior or his designated representative, and the Director of the Ohio Environmental Protection Agency or his designated representative. Each Trustee shall designate a representative to the Trustee Council and shall also designate an alternate (See Appendix). Representatives to the Trustee Council shall fully coordinate Trustee activities among themselves and may seek advisory participation from the DOJ, the SOL, the OAG or other legal advisors, as well as other trustees or governmental entities such as the USEPA and the ODNR.

VI. DUTIES AND RESPONSIBILITIES OF THE TRUSTEE COUNCIL

The Trustee Council representatives shall coordinate and authorize all Trustee activities and matters under this MOU in accordance with the decision-making requirements contained in Section VII. The Trustees through their representatives may take whatever actions they determine are necessary to fulfill their responsibilities under applicable federal and state laws and policies. It is expected that the representatives, in accordance with applicable laws and policies, may take the following actions, inter alia, to address the Trustees' natural resource responsibilities.

A. Conduct scientific and technical studies, sampling, and other activities relating to trust natural resources. These activities may include, but are not limited to, the assessment of natural resources damages for injury to trust natural resources that may have been lost, injured, or destroyed and the monitoring of the progress of restoration of injured natural resources.

B. Arrange for necessary contracts with professional consultants, technical or otherwise, that the Trustees determine are best qualified to provide services to the Trustees, in accordance with applicable law.

C. Coordinate and integrate, to the extent practicable, natural resource trustee concerns and activities with removal, remedial or corrective actions, or other response actions being carried out at the FEMP in an effort to abate and/or minimize continuing and residual injury, and to achieve or enhance restoration of injured natural resources.

D. Coordinate, arrange, and participate in stakeholder involvement activities throughout the restoration process.

The duties of the Trustees' representatives to the Trustee Council shall include, but are not limited to, reviewing and participating in restoration project design, oversight and monitoring of the implementation of the Restoration Plan; scheduling meetings and preparing agendas for those meetings; acting as central contact point for their respective agencies (if applicable); and establishing and maintaining records and relevant documents. Each Trustee Council representative will be responsible for informing the other Trustee Council representatives of all pertinent developments on a timely basis.

VII. DECISION MAKING BY THE TRUSTEE COUNCIL

The Trustees agree that decisions implementing this MOU shall require unanimous approval. In the event that unanimous agreement cannot be reached by the Trustee Council representatives, the matter in dispute will be elevated to the Trustees to resolve the dispute or to establish a dispute resolution mechanism by which the dispute may be resolved. The Trustees further agree that decision making deliberations will focus upon the Trustees' mutual goal of assessing, restoring, rehabilitating, replacing and/or acquiring the equivalent of the injured natural resources, rather than upon control of respective trusteeship over those resources.

VIII. RESERVATION OF RIGHTS

The Trustees understand that this MOU is not intended to create any further legal rights or obligations between the Trustees or any other persons not party to this MOU.

IX. MODIFICATION OF MOU

Modification of this MOU must be in writing and approved by all Trustees currently parties to the MOU.

X. TERMINATION

This MOU shall be in effect from the date of execution until termination by agreement of the Trustees. In the event that any Trustee withdraws from the MOU, written notice of such withdrawal shall be submitted to the other Trustees at least thirty days in advance of the withdrawal. In the event of such withdrawal, this MOU remains in full force and effect for the remaining parties.

XI. LIMITATION

Nothing in this MOU shall be construed as obligating the Trustees to expend any funds in excess of appropriations authorized by law. Nothing in this Section or the MOU shall be construed to alter DOE's and the State of Ohio's respective positions regarding the appropriation of funding for the compliance requirements set forth in Section IX of the December 2, 1988 Consent Decree, Case No. C-1-86-0217 (U.S. District Court, Southern District of Ohio, Western Division).

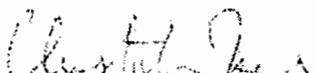
XII. THIRD PARTY CHALLENGES OR APPEALS

This MOU is not intended to create or authorize a basis for any third party claims, challenges or appeals to the actions of the Trustees.

XIII. EXECUTION: EFFECTIVE DATE

This MOU may be executed in counterparts. A copy with all original executed signature pages affixed shall constitute the original MOU. The effective date of this MOU shall be the date of the signature of the Trustee who is last to sign.

OHIO ENVIRONMENTAL PROTECTION AGENCY



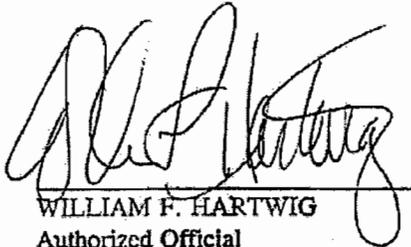
CHRISTOPHER JONES
Director

6-7-01
Date

03:42 FAX

002

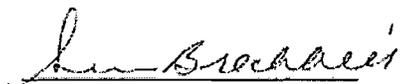
U.S. DEPARTMENT OF THE INTERIOR



WILLIAM F. HARTWIG
Authorized Official
U.S. Department of Interior

7/12/01
Date

U.S. DEPARTMENT OF ENERGY



SUSAN BRECHBILL
Manager
DOE, Ohio Field Office

4/7/01
Date

APPENDIX

Section V of this MOU establishes the Trustee Council whose membership includes the Secretary of Interior or his designated representative (and alternate), Secretary of Energy or his designated representative (and alternate), and the Director of Ohio Environmental Protection Agency or his designated representative (and alternate). The designated representative and alternate of each agency are the following:

Secretary of Interior

Designated representative for U.S. Fish and Wildlife Service: appointed by the Field Supervisor, Reynoldsburg, Ohio Field Office (presently William Kurey)

Designated (alternate) representative for U.S. Fish and Wildlife Service: Field Supervisor, Reynoldsburg, Ohio Field Office

Secretary of Energy

Manager of the Ohio Field Office (currently Susan Brochbill) designates Fernald Project Director (currently Steve McCracken) as the primary representative for the Trustee Council. The Fernald Project Director is authorized to appoint a member of his staff to serve as the primary representative under this MOU.

Director of Ohio Environmental Protection Agency

Designated representative for the Director Ohio Environmental Protection Agency: Fernald Project Manager, Office of Federal Facilities Oversight (presently Thomas Schneider)

Designated (alternate) representative for the Director Ohio Environmental Protection Agency: Chief, Office of Federal Facilities Oversight (presently Graham Mitchell)

Appendix C to Partial Consent Decree

Trustees' July 2001 Memorandum of Understanding

FILE

MEMORANDUM OF UNDERSTANDING

BETWEEN

THE OHIO ENVIRONMENTAL PROTECTION AGENCY,

THE UNITED STATES DEPARTMENT OF ENERGY,

AND

THE UNITED STATES DEPARTMENT OF THE INTERIOR

I. INTRODUCTION and AUTHORITY

This Memorandum of Understanding (MOU) by and between the Ohio Environmental Protection Agency (OEPA), the United States Department of Energy (DOE), and the United States Department of the Interior (DOI), collectively referred to as the Natural Resource Damage Trustees (Trustees), is entered into to oversee and to assure implementation of the Natural Resource Restoration Plan (Restoration Plan) in order to restore, replace and rehabilitate natural resources injured by releases of hazardous substances at and from the Fernald Environmental Management Project (FEMP), located near Fernald, Ohio, owned by the United States of America and currently administered by DOE. The Trustees enter into this MOU pursuant to the authorities of the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. 9601 *et seq.* and other federal and state laws and authorities including, but not limited to, the Federal Water Pollution Control Act, 33 U.S.C. 1251 *et seq.*, as amended, and to the extent appropriate and selected for use by the Trustees, the Natural Resource Damage Assessment Regulations, 43 C.F.R., Part 11, as amended. The MOU is intended to facilitate coordination and cooperation among the Trustees regarding their responsibilities in implementing the Restoration Plan for the FEMP.

The Trustees' main responsibility is to oversee and to assure implementation of the Restoration Plan in order to restore, replace and rehabilitate natural resources injured by releases of hazardous substances at and from the FEMP. In overseeing and assuring implementation of the Restoration Plan, Trustees' activities include, but are not limited to, (1) the assessment, recovery, and administration of natural resources damages for injury to, destruction of, or loss of natural resources and natural resource services (hereinafter "injury" or "injured natural resources"); (2)

additional restoration planning; (3) oversight of the funding for the costs of restoration, replacement, rehabilitation, and/or acquisition of the equivalent (hereinafter "restoration" or "restore") of the injured natural resources; and (4) coordination of Trustee concerns and activities associated with removal, remedial or corrective actions, or other response actions being carried out at the FEMP in an effort to abate and/or minimize continuing and residual injury, and to achieve or enhance restoration of injured natural resources.

II. PARTIES and ADVISORS

The Trustees specified in Section I have trusteeship over certain natural resources at, or related to the FEMP pursuant to Subpart G of the National Contingency Plan (NCP), 40 C.F.R. 300.600, as amended, and other applicable laws. The Trustees have authority to act on behalf of the public to bring claims for natural resource damages against potentially responsible parties and to assure and/or undertake restoration activities. The following officials are parties to this MOU and act on behalf of the public as trustees for natural resources under this MOU:

A. Natural Resource Trustee Parties:

Director, Ohio Environmental Protection Agency or his delegated representative;

Secretary of Energy or his delegated representative;

and

Secretary of the Interior or his delegated representative(s) including:

Director, Office of Environmental Policy & Compliance (OEPC)

Regional Director, Region 3, U.S. Fish and Wildlife Service

B. Advisors:

United States Department of Justice (DOJ), the Department of the Interior Office of the Solicitor (SOL), the Ohio Attorney General (OAG), the United States Environmental Protection Agency (USEPA), and Ohio Department of Natural Resources (ODNR).

III. FEMP SITE DEFINITION

The FEMP, for purposes of this MOU, includes all areas within the property boundary of the FEMP and any other areas where natural resources have been injured by releases of hazardous substances at and from the FEMP.

IV. PURPOSE

The Trustees recognize the importance of integrating and coordinating their responsibilities regarding implementation of the Restoration Plan in order to restore injured FEMP natural resources. The purpose of this MOU is to provide a framework for coordination and cooperation between the Trustees, and for the implementation of the activities of the Trustees in furtherance of their responsibilities as trustees for natural resources.

V. ORGANIZATION OF THE TRUSTEE COUNCIL

The Trustees recognize the importance of coordinating their efforts in order to meet their respective natural resource trustee responsibilities effectively and efficiently. Accordingly, there is hereby created to implement this MOU, a Trustee Council, whose membership shall include the Secretary of Energy or his designated representative, the Secretary of the Interior or his designated representative, and the Director of the Ohio Environmental Protection Agency or his designated representative. Each Trustee shall designate a representative to the Trustee Council and shall also designate an alternate (See Appendix). Representatives to the Trustee Council shall fully coordinate Trustee activities among themselves and may seek advisory participation from the DOJ, the SOL, the OAG or other legal advisors, as well as other trustees or governmental entities such as the USEPA and the ODNR.

VI. DUTIES AND RESPONSIBILITIES OF THE TRUSTEE COUNCIL

The Trustee Council representatives shall coordinate and authorize all Trustee activities and matters under this MOU in accordance with the decision-making requirements contained in Section VII. The Trustees through their representatives may take whatever actions they determine are necessary to fulfill their responsibilities under applicable federal and state laws and policies. It is expected that the representatives, in accordance with applicable laws and policies, may take the following actions, inter alia, to address the Trustees' natural resource responsibilities.

A. Conduct scientific and technical studies, sampling, and other activities relating to trust natural resources. These activities may include, but are not limited to, the assessment of natural resources damages for injury to trust natural resources that may have been lost, injured, or destroyed and the monitoring of the progress of restoration of injured natural resources.

B. Arrange for necessary contracts with professional consultants, technical or otherwise, that the Trustees determine are best qualified to provide services to the Trustees, in accordance with applicable law.

C. Coordinate and integrate, to the extent practicable, natural resource trustee concerns and activities with removal, remedial or corrective actions, or other response actions being carried out at the FEMP in an effort to abate and/or minimize continuing and residual injury, and to achieve or enhance restoration of injured natural resources.

D. Coordinate, arrange, and participate in stakeholder involvement activities throughout the restoration process.

The duties of the Trustees' representatives to the Trustee Council shall include, but are not limited to, reviewing and participating in restoration project design, oversight and monitoring of the implementation of the Restoration Plan; scheduling meetings and preparing agendas for those meetings; acting as central contact point for their respective agencies (if applicable); and establishing and maintaining records and relevant documents. Each Trustee Council representative will be responsible for informing the other Trustee Council representatives of all pertinent developments on a timely basis.

VII. DECISION MAKING BY THE TRUSTEE COUNCIL

The Trustees agree that decisions implementing this MOU shall require unanimous approval. In the event that unanimous agreement cannot be reached by the Trustee Council representatives, the matter in dispute will be elevated to the Trustees to resolve the dispute or to establish a dispute resolution mechanism by which the dispute may be resolved. The Trustees further agree that decision making deliberations will focus upon the Trustees' mutual goal of assessing, restoring, rehabilitating, replacing and/or acquiring the equivalent of the injured natural resources, rather than upon control of respective trusteeship over those resources.

VIII. RESERVATION OF RIGHTS

The Trustees understand that this MOU is not intended to create any further legal rights or obligations between the Trustees or any other persons not party to this MOU.

IX. MODIFICATION OF MOU

Modification of this MOU must be in writing and approved by all Trustees currently parties to the MOU.

X. TERMINATION

This MOU shall be in effect from the date of execution until termination by agreement of the Trustees. In the event that any Trustee withdraws from the MOU, written notice of such withdrawal shall be submitted to the other Trustees at least thirty days in advance of the withdrawal. In the event of such withdrawal, this MOU remains in full force and effect for the remaining parties.

XI. LIMITATION

Nothing in this MOU shall be construed as obligating the Trustees to expend any funds in excess of appropriations authorized by law. Nothing in this Section or the MOU shall be construed to alter DOE's and the State of Ohio's respective positions regarding the appropriation of funding for the compliance requirements set forth in Section IX of the December 2, 1988 Consent Decree, Case No. C-1-86-0217 (U.S. District Court, Southern District of Ohio, Western Division).

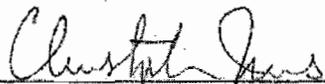
XII. THIRD PARTY CHALLENGES OR APPEALS

This MOU is not intended to create or authorize a basis for any third party claims, challenges or appeals to the actions of the Trustees.

XIII. EXECUTION: EFFECTIVE DATE

This MOU may be executed in counterparts. A copy with all original executed signature pages affixed shall constitute the original MOU. The effective date of this MOU shall be the date of the signature of the Trustee who is last to sign.

OHIO ENVIRONMENTAL PROTECTION AGENCY



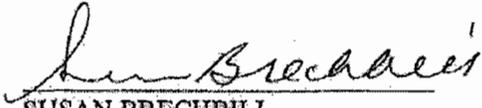
CHRISTOPHER JONES

Director

6-2-01

Date

U.S. DEPARTMENT OF ENERGY



SUSAN BRECHBILL

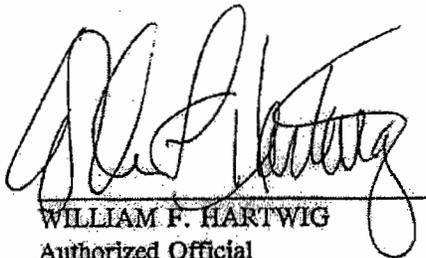
Manager

DOE, Ohio Field Office

6/7/01

Date

U.S. DEPARTMENT OF THE INTERIOR



WILLIAM F. HARTWIG
Authorized Official
U.S. Department of Interior

7/12/01
Date

APPENDIX

Section V of this MOU establishes the Trustee Council whose membership includes the Secretary of Interior or his designated representative (and alternate), Secretary of Energy or his designated representative (and alternate), and the Director of Ohio Environmental Protection Agency or his designated representative (and alternate). The designated representative and alternate of each agency are the following:

Secretary of Interior

Designated representative for U.S. Fish and Wildlife Service: appointed by the Field Supervisor, Reynoldsburg, Ohio Field Office (presently William Kurey)

Designated (alternate) representative for U.S. Fish and Wildlife Service: Field Supervisor, Reynoldsburg, Ohio Field Office

Secretary of Energy

Manager of the Ohio Field Office (currently Susan Brechbill) designates Fernald Project Director (currently Steve McCracken) as the primary representative for the Trustee Council. The Fernald Project Director is authorized to appoint a member of his staff to serve as the primary representative under this MOU.

Director of Ohio Environmental Protection Agency

Designated representative for the Director Ohio Environmental Protection Agency: Fernald Project Manager, Office of Federal Facilities Oversight (presently Thomas Schneider)

Designated (alternate) representative for the Director Ohio Environmental Protection Agency: Chief, Office of Federal Facilities Oversight (presently Graham Mitchell)

Appendix D to Partial Consent Decree

Environmental Covenants form

To be recorded with Deed
Records - ORC § 317.08

ENVIRONMENTAL COVENANT

This Environmental Covenant is entered into by the United States of America, acting through the United States Department of Energy ("Owner" or "USDOE"), and the Ohio Environmental Protection Agency ("Ohio EPA"), pursuant to Ohio Revised Code ("ORC") §§ 5301.80 to 5301.92, and the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), as amended, 42 U.S.C. §§ 9601-9675, for the purpose of subjecting the Property to the activity and use limitations set forth herein.

This Environmental Covenant is created in furtherance of the EPA Superfund Record of Decision: Feed Materials Production Center (USDOE), EPA ID: OH6890008976, OU5, Fernald, OH, dated January 31, 1996, and the Natural Resource Restoration Plan, Fernald Preserve, Fernald, Ohio, U.S. Department of Energy, Fernald Area Office, 212E-PL-003, dated, July, 2008. These documents, along with Volume II of the Comprehensive Legacy Management and Institutional Controls Plan, Fernald Closure Project, Fernald, Ohio, dated May 2008, and the administrative record for the EPA Superfund Record of Decision are located in the Fernald Public Environmental Information Center, currently located at 10995 Hamilton-Cleves Highway, Harrison, Ohio 45030.

Now therefore, Owner and Ohio EPA agree to the following:

1. Environmental Covenant. This instrument is an environmental covenant developed and executed pursuant to ORC §§ 5301.80 to 5301.92.
2. Property. This Environmental Covenant concerns an approximately 1050 acre tract of real property located at 7400 Willey Road, near Fernald, in [*Hamilton or Butler**] County, Ohio ("Property") and more particularly described in Exhibit A attached hereto and incorporated by reference herein. [*attach legal description; *note: two ECs, one for Hamilton County, one for Butler County, will be needed*]
3. Owner. The United States of America, acting through the United States Department of Energy, is the owner of the Property.
4. Holder. The United States Department of Energy, headquartered at 1000 Independence Avenue SW, Washington, DC 20585, is the holder of this Environmental Covenant.
5. Activity and Use Limitations. Owner hereby agrees to comply with the following activity and use limitations:

A. Land Activity and Use Limitations. Pursuant to the EPA Superfund Record of Decision: Feed Materials Production Center (USDOE), EPA ID: OH6890008976, OU5, Fernald, OH, dated January 31, 1996, the Property shall not be used for any residential or agricultural purposes, and shall only be used in a manner consistent with the Natural Resource Restoration Plan, Fernald Preserve, Fernald, Ohio, U.S. Department of Energy, Fernald Area Office, 212E-PL-003, dated July, 2008, Section 2.1.1 of Volume II of the Comprehensive Legacy Management and Institutional Controls Plan, Fernald Closure Project, Fernald, Ohio, dated May 2008, and the EPA Superfund Record of Decision: Feed Materials Production Center (USDOE), EPA ID: OH6890008976, OU5, Fernald, OH, dated January 31, 1996.

B. Groundwater Activity and Use Limitations. Pursuant to the EPA Superfund Record of Decision: Feed Materials Production Center (USDOE), EPA ID: OH6890008976, OU5, Fernald, OH, dated January 31, 1996, the groundwater underlying all or any portion of the Property shall not be withdrawn or used as a drinking water supply.

The foregoing documents shall be publicly available in the Fernald Public Environmental Information Center,

6. Running with the Land. This Environmental Covenant shall be binding upon the Owner and all assigns and successors in interest, including any Transferee, and shall run with the land, subject to amendment or termination as set forth herein. The term "Transferee," as used in this Environmental Covenant, shall mean any future owner of any interest in the Property or any portion thereof, including, but not limited to, owners of an interest in fee simple, mortgagees, easement holders, and/or lessees.

7. Compliance Enforcement. Compliance with this Environmental Covenant may be enforced pursuant to ORC § 5301.91, to the extent consistent with applicable Federal law. Failure to timely enforce compliance with this Environmental Covenant or the activity and use limitations contained herein by any party shall not bar subsequent enforcement by such party and shall not be deemed a waiver of the party's right to take action to enforce any non-compliance. Nothing in this Environmental Covenant shall restrict the Director of Ohio EPA from exercising any authority under applicable law, nor shall anything in this Environmental Covenant limit any of Owner's defenses under applicable law.

8. Rights of Access. Owner hereby grants to Ohio EPA, its agents, contractors, and employees, the right of access to the Property for implementation or enforcement of this Environmental Covenant.

9. Compliance Reporting. The Comprehensive Legacy Management and Institutional Controls Plan requires the Owner to submit to Ohio EPA on a quarterly basis a site inspection report, verifying that the activity and use limitations remain in place and are being complied with.

10. Notice upon Conveyance. Each instrument hereafter conveying any interest in the Property or any portion of the Property shall contain a notice of the activity and use limitations set forth in this Environmental Covenant, and provide the recorded location of this Environmental Covenant. The notice shall be substantially in the following form:

THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL COVENANT, DATED _____, 2008, RECORDED IN THE DEED OR OFFICIAL RECORDS OF THE [HAMILTON OR BUTLER] COUNTY RECORDER ON _____, 2008, IN [DOCUMENT ____, or BOOK ____, PAGE ____].

Owner shall notify Ohio EPA within sixty (60) days after each conveyance of an interest in any portion of the Property. Owner's notice shall include the name, address, and telephone number of the Transferee, a copy of the deed or other documentation evidencing the conveyance, and a survey map that shows the boundaries of the property being transferred.

11. Representations and Warranties. Owner hereby represents and warrants to the other signatories hereto:

- A. that the Owner is the sole owner of the Property;
- B. that the Owner holds fee simple title to the Property which is free, clear and unencumbered;
- C. that the Owner has the power and authority to enter into this Environmental Covenant, to grant the rights and interests herein provided and to carry out all obligations hereunder;
- D. that the Owner has identified all other persons that own an interest in or hold an encumbrance on the Property and notified such persons of the Owner's intention to enter into this Environmental Covenant; and
- E. that this Environmental Covenant will not materially violate or contravene or constitute a material default under any other agreement, document or instrument to which Owner is a party or by which Owner may be bound or affected.

12. Amendment or Termination. This Environmental Covenant may be amended or terminated by consent of all of the following: the Owner or a Transferee; and the Ohio EPA, pursuant to ORC § 5301.90 and other applicable law. The term "Amendment," as used in this Environmental Covenant, shall mean any changes to the Environmental Covenant, including the activity and use limitations set forth herein, or the elimination of one or more activity and use limitations when there is at least one limitation remaining. The term "Termination," as used in this Environmental Covenant, shall mean the elimination of all activity and use limitations set forth herein and all other obligations under this Environmental Covenant.

This Environmental Covenant may be amended or terminated only by a written instrument duly executed by the Director of Ohio EPA and the Owner or Transferee of the Property or portion thereof, as applicable. Within thirty (30) days of signature by all requisite parties on any amendment or termination of this Environmental Covenant, the Owner or Transferee shall file such instrument for recording with the [*Hamilton or Butler*] County Recorder's Office, and shall provide a file- and date-stamped copy of the recorded instrument to Ohio EPA.

13. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

14. Governing Law. This Environmental Covenant shall be governed by and interpreted in accordance with the laws of the State of Ohio and applicable Federal law.

15. Recordation. Within thirty (30) days after the date of the final required signature upon this Environmental Covenant, Owner shall file this Environmental Covenant for recording, in the same manner as a deed to the Property, with the [*Hamilton or Butler*] County Recorder's Office.

16. Effective Date. The effective date of this Environmental Covenant shall be the date upon which the fully executed Environmental Covenant has been recorded as a deed record for the Property.

17. Distribution of Environmental Covenant. The Owner shall distribute a file- and date-stamped copy of the recorded Environmental Covenant to Ohio EPA and to the Board of County Commissioners of [*Hamilton or Butler*] County, Ohio.

18. Notice. Unless otherwise notified in writing by or on behalf of the Owner or Transferee of the Property or portion thereof, as applicable, or Ohio EPA, any document or communication required by this Environmental Covenant shall be submitted to:

Site Coordinator, Fernald Site
Division of Emergency and Remedial Response
Ohio EPA, Southwest District Office
401 East 5th Street
Dayton, Ohio 45402

Site Manager, DOE
Fernald Preserve
7400 Willey Road
Hamilton, Ohio 45013-9402

The undersigned representative of Owner represents and certifies that [he/she] is authorized to execute this Environmental Covenant.

IT IS SO AGREED:

United States Department of Energy

Signature

Printed Name and Title

Date

State of _____)

) ss:

County of _____)

Before me, a notary public, in and for said county and state, personally appeared [add NAME], a duly authorized representative of Owner, who acknowledged to me that [he/she] did execute the foregoing instrument on behalf of Owner.

IN TESTIMONY WHEREOF, I have subscribed my name and affixed my official seal this ____ day of _____, 2008.

Notary Public

OHIO ENVIRONMENTAL PROTECTION AGENCY

Chris Korleski, Director

Date

State of Ohio)
) ss:
County of Franklin)

Before me, a notary public, in and for said county and state, personally appeared Chris Korleski, the Director of Ohio EPA, who acknowledged to me that he did execute the foregoing instrument on behalf of Ohio EPA.

IN TESTIMONY WHEREOF, I have subscribed my name and affixed my official seal this ____ day of _____, 2008.

Notary Public

This instrument prepared by:

Mark Navarre, Ohio EPA
Office of Legal Services
50 West Town Street
Columbus, Ohio 43216-1049

Daniel R. Dertke, U.S. DOJ
Environment & Natural Resources Division
Environmental Defense Section
P.O. Box 23986
Washington, DC 20026-3986

EXHIBIT A

Legal Description

Situate in the Sections 5, 6, 7 and 8, Town 2, Range 2, Crosby Township, Hamilton County, State of Ohio, and being all those parcels conveyed to THE UNITED STATES OF AMERICA as recorded in Registered Land Certificate # 20726 ½ Hamilton County, Deed Book 2480 page 325, Deed Book 2480 page 327, Deed Book 2481 page 136, Deed Book 2485 page 575, Deed Book 2491 page 607, Deed Book 2492 page 545, and Deed Book 2497 page 82, in the Hamilton County Records and being more particularly described as follows:

Beginning at a concrete monument found at the northwest corner of said Section 6, and being on the County line of Butler and Hamilton Counties;

Thence with the north line of said section and being said County line, S 88°24'30" E for a distance of 182.52 feet to a monument found at the intersection of said section line and the centerline of Paddys Run Road (60' right of way) and being the **True Point of Beginning**;

Thence continuing with the north line of said section 6 and said County line, S 88°24'30" E for a distance of 4048.94 feet to the south corner of said sections 5 and 6;

Thence with the south line of said section 5 and continuing with said County line, S 88°40'28" E for a distance of 2518.99 feet to a monument found at the northwest corner of a 1.000 acre parcel of land conveyed to Carl and Sarah Summe as recorded in Deed Book 5887 page 585, of the Hamilton County Records;

Thence with the west line of said 1.000 acre parcel and becoming the west line of a 53.75 acre parcel of land conveyed to Carl and Sarah Summe as recorded in Deed Book 4381 page 1564, of the Hamilton County Records and the west line of a 8.213 acre parcel of land conveyed to Welch Sand and Gravel, Inc as recorded in Deed Book 5172 page 666, of the Hamilton County Records, S 00°29'56" W for a distance of 2016.57 feet to a 3/8" iron pin found;

Thence continuing with the west line of said 8.213 acre parcel and becoming the west line of a 23.610 acre parcel of land conveyed to Welch Sand and Gravel, Inc as recorded in Deed Book 5696 page 917, of the Hamilton County Records, S 00°59'42" W for a distance of 806.05 feet to a monument found;

Thence continuing with the west line of said 23.610 acre parcel and becoming the west line of a 56.250 acre parcel of land conveyed to Knollman Farm, Inc as recorded in Deed Book 4244 page 817, of the Hamilton County Records, S 00°58'20" W for a distance of 1621.73 feet to a monument found;

Thence continuing with the west line of said 56.250 acre parcel, S 00°56'17" W for a distance of 224.15 feet to a monument found at the northwest corner of a 96 acre parcel of land conveyed to Knollman Farm, Inc as recorded in Deed Book 3272 page 589, of the Hamilton County Records;

Thence with the west line of said 96 acre parcel, S 03°58'37" E, passing a monument found at a distance of 1153.99 feet, for a total distance of 1204.12 feet to a Mag spike set on the centerline of Willey Road (right of way varies);

Thence with the centerline of said Willey Road the following 6 courses;

S 81°51'08" W for a distance of 219.61 feet to Mag spike set;

S 81°23'08" W for a distance of 1146.15 feet to Mag spike set, witness a monument found N 56°50'51" W at a distance of 69.39 feet;

S 77°03'08" W for a distance of 532.88 feet to Mag spike set;

S 74°58'51" W for a distance of 199.94 feet to a Mag nail found on the line between said Sections 7 and 8, witness a monument found N 15°23'08" E at a distance of 50.00 feet and a concrete monument found S 6°47'12" E at a distance of 30.68 feet;

S 74°15'36" W for a distance of 1438.29 feet to a Mag spike set, witness a monument found N 1°26'18" W at a distance of 51.60 feet;

N 77°07'28" W for a distance of 580.86 feet to Mag spike set at the intersection of the centerline of said Willey Road and the centerline of Paddys Run Road (60' right of way), witness a monument found N 18°36'09" E at a distance of 50.84 feet;

Thence continuing with the centerline of said Willey Road the following 2 courses;

N 66°45'13" W for a distance of 356.39 feet to Mag spike set, witness a monument found N 26°39'38" E at a distance of 50.09 feet;

N 59°55'01" W for a distance of 381.07 feet to a railroad spike found at the intersection of the centerline of said Willey Road and the centerline of said Paddys Run Road, witness a monument found N 57°32'13" E at a distance of 56.35 feet;

Thence with the centerline of said Paddys Run Road the following 2 courses;

N 04°59'50" W for a distance of 271.30 feet a railroad spike found, witness a monument found N 75°53'04" E at a distance of 50.63 feet;

N 23°13'22" W for a distance of 629.90 feet to a Mag spike set at the southwesterly corner of a 0.281 acre parcel of land conveyed to Cincinnati Gas and Electric Company as recorded in Deed Book 1414 page 59, of the Hamilton County Records;

Thence with the lines of said 0.281 acre parcel the following 3 courses;

N 66°17'11" E for a distance of 132.35 feet to a monument set;

N 23°42'49" W for a distance of 79.76 feet to a concrete monument found;

N 87°53'12" W for a distance of 145.68 feet to a railroad spike found on the centerline of said Paddys Run Road, witness a monument found N 61°51'35" E at a distance of 50.15 feet;

Thence with the centerline of said Paddys Run Road the following 7 courses;

N 33°19'42" W for a distance of 1464.12 feet to a 5/8" iron pin found, witness a monument found N 68°19'26" E at a distance of 50.90 feet;

N 09°59'09" W for a distance of 172.10 feet to a Mag spike set, witness a monument found N 86°12'15" E at a distance of 50.28 feet;

N 02°20'21" E for a distance of 501.21 feet to a railroad spike found, witness a monument found N 82°22'49" E at a distance of 30.74 feet;

N 17°33'23" W for a distance of 267.88 feet to a Mag spike set, witness a monument found N 81°07'12" E at a distance of 51.35 feet;

N 02°04'00" W for a distance of 505.12 feet to railroad spike found, witness a monument found N 81°44'10" E at a distance of 50.52 feet;

N 14°48'45" W for a distance of 779.29 feet railroad spike found, witness a monument found N 75°04'00" W at a distance of 49.46 feet;

N 13°39'24" W for a distance of 2012.00 feet to the point of beginning.

Containing 436.632 acres in section 6 (3.893 acres in Right of Way), 272.903 acres in section 5, 79.312 acres in section 7 (2.544 acres in Right of Way), and 41.882 acres in section 8 (2.701 acres in Right of Way) for a total of 830.730 acres more or less and being subject to all legal highways, right of ways, easements and restrictions of record

Bearings in this description are based on NAD83 State Plane coordinates, Ohio South, Hamilton County Benchmark System, monument 1814 to monument 1810 bearing N 69°07'45" E.

This description is based on a field survey performed by Tecumseh Surveying Inc. in October 2007 under my supervision.

Lynn E. Hirsch
P.S. 5738

The above description contains Registered Land in Hamilton County, Certificate Number 20726 ½, being further described as follows:

The following described real estate situate in Crosby Township, Hamilton County, Ohio, in Sections five and six (5 & 6) Township two (2) Range two (2) east of the meridian line drawn from the mouth of the Great Miami River, viz:

Beginning at a stone in the county line between Hamilton and Butler Counties, at the northeast corner of said section six (6) Crosby Township, thence in the County line south eighty-nine degrees west (S. 89° W.) twenty-one hundred and fourteen and 8/10 (2114.8) feet, thence south two degrees and fifteen minutes east (S. 2°15' E.) twenty-six hundred and sixty (2660.00) feet, thence north eighty-nine degrees east (N 89° E) twenty-three hundred and thirty-four and 4/10 (2334.4) feet to a point in the section line between said sections five and six of Crosby Township, thence in said section line north six degrees and fifty-eight minutes west (N. 6°58' W.) eight hundred and eighty-two and 73/100 (882.73) feet, thence north eighty-eight degrees and forty-eight minutes east (N. 88°48' E.) fifteen hundred and seventy-seven and 7/10 (1577.7) feet, thence north two degrees and eight minutes west (N. 2°08' W.) eight hundred and eighty-four and 24/100 (884.24) feet, thence eighty-eight degrees and sixteen minutes east (N. 88°16' W.) seven hundred and ninety-two and 10/100 (792.10) feet, thence north two degrees and six minutes west (N. 2°06' W.) eight hundred and ninety-one and 71/100 (891.71) feet to a point in the County line, thence in said County line south eighty-eight degrees and forty-seven minutes west (S. 88°47' W.) twenty-five hundred and twenty and 25/100 (2520.25) feet to the place of beginning, containing two hundred and nineteen and 716/1000 (219.716) acres of land.

Legal Description

Situate in the southeast quarter of Section 36, Town 3, Range 1, Morgan Township, the south half of Section 31, and the southwest quarter of section 32, Town 3, Range 2, Ross Township, Butler County, State of Ohio, and being all those parcels conveyed to THE UNITED STATES OF AMERICA as recorded in Deed Book 526 page 222, Deed Book 526 page 421, and Deed Book 530 page 513, Registered Land Book 1 page 11, in the Butler County Records, and being more particularly described as follows:

Beginning at a concrete monument found at the south corner of said Sections 36 and 31;

Thence with the south line of said Section 36 and being the County line of Butler and Hamilton Counties, N 88°30'28" W for a distance of 864.45 feet to a monument set on the easterly right of way line of the CSX Railroad;

Thence with said right of way line, N 23°42'03" W for a distance of 1039.62 feet to a 2" iron pipe found at the northwest corner of a 11.739 acre parcel of land conveyed to Curtis and Sandra Butterfield as recorded in Deed Book 7867 page 515, of the Butler County Records;

Thence with the southerly line of said 11.739 acre parcel the following 2 courses;

On a curve to the left, with a radius of 1349.69 feet, and a delta angle of 49°14'27", for an arc distance of 1159.94 feet to a monument set, chord for said curve bears S 50°13'30" E, for a chord distance of 1124.57 feet;

S 74°50'43" E, passing a monument set at a distance of 385.03 feet, for a total distance of 436.50 feet to a Mag spike set on the east line of said Section 36, and being the west line of said Section 31, and being the centerline of Morgan-Ross Road (60' right of way);

Thence with the centerline of said Morgan-Ross Road and the line of said sections 36 and 31, N 01°27'17" E for a distance of 1066.35 feet to a railroad spike found at the southwest corner of a 51.35 acre parcel of land conveyed to Anthony J and Dorothy J Nieman, TRS, as recorded in OR Book 5434 page 369, of the Butler County Records;

Thence with the south line of said 51.35 acre parcel and becoming the south line of 38.816 acre parcel of land conveyed to Anthony J and Dorothy J Nieman, TRS, as recorded in OR Book 5434 page 369, of the Butler County Records and the south line of a 10.794 acre parcel of land conveyed to David and Sally A Nieman, TRS, as recorded in Deed Book 7533 page 2090, of the Butler County Records, S 88°24'37" E, passing a monument found at a distance of 50.00 feet and a set monument at a distance of 4347.28 feet, for a total distance of 4357.28 feet the east line of said Section 31 and being the west line of said Section 32;

Thence with the line of said Sections 31-and 32 and being the east line of said 10.794 acre parcel, N 07°24'21" E, passing a monument found at a distance of 280.00 feet, for a total distance of 328.08 feet to a Mag spike set on the centerline Cincinnati-Brookville Road (State Route 126, 60' right of way);

Thence with the centerline of said Cincinnati-Brookville Road the following 5 courses:

S 73°55'42" E for a distance of 647.75 feet to a Mag spike set, witness a monument found S 17°09'05" E at a distance of 64.56 feet;

S 89°46'42" E for a distance of 93.15 feet to a Mag spike set, witness a monument found S 50°23'37" W at a distance of 96.19 feet;

N 80°29'18" E for a distance of 612.00 feet to a Mag spike set, witness a monument found S 65°40'02" E at a distance of 88.67 feet;

N 72°37'18" E for a distance of 198.19 feet to a Mag spike set, witness a monument found S 48°32'15" W at a distance of 144.58 feet;

N 67°49'18" E for a distance of 1200.00 feet to a Mag spike set at the northwest corner of a 12.62 acre parcel of land conveyed to Carl and Sarah Summe as recorded in OR Book 6096 page 1300, of the Butler County Records;

Thence with the west line of said 12.62 acre parcel and becoming the west line of a 67.23 acre parcel of land conveyed to Carl and Sarah Summe as recorded in Deed Book 1583 page 282, of the Butler County Records, S 04°10'51" W, passing a monument found at a distance of 48.96 feet, for a total distance of 2029.69 feet to the south line of said section 32 and being the aforesaid County line of Butler and Hamilton Counties;

Thence with the south line of said section 32 and said County line, N 88°40'28" W, passing monuments found at distances of 9.88 feet and 152.00 feet, for a total distance of 2670.99 feet to the south corner of said sections 31 and 32;

Thence with the south line of said section 31 and continuing with said County line, N 88°24'30" W, passing a monument found at a distance of 4048.94 feet, for a total distance of 4231.45 feet to the point of beginning.

Containing 6.968 acres in section 36 (0.100 acres in Right of Way), 119.025 acres in section 31 (0.956 acres in Right of Way), and 95.710 acres in section 32 (1.895 acres in Right of Way), for a total of 221.703 acres more or less and being subject to all legal highways, right of ways, easements and restrictions of record

Bearings in this description are based on NAD83 State Plane coordinates, Ohio South, Hamilton County Benchmark System, monument 1814 to monument 1810 bearing N 69°07'45" E.

This description is based on a field survey performed by Tecumseh Surveying Inc. in October 2007 under my supervision.

Lynn E. Hirsch
P.S. 5738

The above description contains Registered Land in Butler County, Registered Land Book I page 11, being further described as follows:

The following described real estate situate in Ross Township, Butler County, Ohio, in Section Thirty Two (32), Township Three (3) Range Two (2), east of the meridian line drawn from the mouth of the Great Miami River, viz:

Beginning at a stone in the county line between Hamilton and Butler Counties, at the southwest corner of said Section Thirty two (32) in Ross Township, thence in the County line north eighty-eight degrees and forty-seven minutes east (N. 88°47' E.) twenty six hundred and seventy one and 85/100 (2671.85) feet, thence north one degree and thirty eight minutes east (N. 1°38' E.) Two thousand and twenty nine and 78/100 (2029.78) feet to a point in the center of the Colerain, Oxford and Brookville Pike, thence along the center of said pike the following courses and distances, to wit: south Sixty five degrees and eighteen minutes west (S. 65°18' W.) Twelve hundred (1200) feet; south seventy degrees and six minutes west (S. 70°06' W.) One hundred and ninety eight and 19/100 (198.19) feet; south seventy seven degrees and fifty eight minutes west (S. 77°58' W.) Six hundred and twelve (612.00) feet; south eighty seven degrees and forty two minutes west (S. 87°42' W.) ninety three and 15/100 (93.15) feet; north seventy six degrees and twenty seven minutes west (N. 76°27' W.) Six hundred and forty seven and 13/100 (647.13) feet to a point in the west of said section thirty two (32); thence in said section line south four degrees and fifty three minutes west (S. 4°53' W.) fifteen hundred and forty one and 63/100 (1541.63) feet to the place of beginning; containing ninety five and 769/1000 (95.769) acres of land.