UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF WISCONSIN

UNITED STATES OF AMERICA and the STATE OF WISCONSIN Plaintiffs, v. P. H. GLATFELTER COMPANY and WTM I COMPANY (f/k/a Wisconsin Tissue Mills Inc.), Defendants.	CIVIL ACTION NO.

CONSENT DECREE
FOR REMEDIAL DESIGN AND REMEDIAL ACTION AT OPERABLE UNIT 1 OF THE LOWER FOX RIVER AND GREEN BAY SITE

TABLE OF CONTENTS

I. BACKGROUND 1
II. JURISDICTION 4
III. PARTIES BOUND 4
IV. DEFINITIONS 5
V. GENERAL PROVISIONS 13
VI. ESTABLISHMENT AND USE OF CERTAIN SITE-SPECIFIC ACCOUNTS . . . 15
VII. PERFORMANCE OF THE RESPONSE WORK BY SETTLING DEFENDANTS 19
VIII. POST-REMEDY RESPONSE WORK AND REMEDY REVIEW 26
IX. QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS 28
X. ACCESS AND INSTITUTIONAL CONTROLS 30
XI. REPORTING REQUIREMENTS 36
XII. RESPONSE AGENCIES' APPROVAL OF PLANS AND OTHER SUBMISSIONS 40
XIII. PROJECT COORDINATORS 43
XIV. CERTIFICATION OF COMPLETION 44
XV. EMERGENCY RESPONSE 47
XVI. NATURAL RESOURCE RESTORATION EFFORTS 48
XVII. PAYMENTS TO PLAINTIFFS 51
XVIII. INDEMNIFICATION AND INSURANCE 58
XIX. FORCE MAJEURE EVENTS 61
XX. DISPUTE RESOLUTION 63
XXI. STIPULATED PENALTIES 68
XXII. COVENANTS NOT TO SUE BY PLAINTIFFS 75
XXIII. COVENANTS BY SETTLING DEFENDANTS 81
XXIV. CONSENT DECREE FUNDING LIMITATION AND SPECIAL RESERVATION OF RIGHTS 84
XXV. EFFECT OF SETTLEMENT AND CONTRIBUTION PROTECTION 89
XXVI. ACCESS TO INFORMATION 92
XXVII. RETENTION OF RECORDS 94
XXVIII. NOTICES AND SUBMISSIONS 95
XXIX. EFFECTIVE DATE 98
XXX. RETENTION OF JURISDICTION 98
XXXI. APPENDICES 99
XXXII. COMMUNITY RELATIONS 99
XXXIII. MODIFICATIONS 100
XXXIV. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT 100
XXXV. SIGNATORIES/SERVICE 101
XXXVI. FINAL JUDGMENT 102

TABLE OF APPENDICES

Appendix A	Trustee Council Resolution relating to this Consent Decree
Appendix B	Appendix addressing Management of the Disbursement Special Account
Appendix C	Appendix addressing Escrow Account Management
Appendix D	Form of Escrow Agreement
Appendix E	Appendix addressing Special Procedures for Restoration Work
Appendix F	Administrative Order on Consent between WTM I Company, EPA, and WDNR, captioned In the matter of the Lower Fox River and the Green Bay Site, Docket No. V-W-'03-C-745 (including the Statement of Work for Remedial Design)
Appendix G	Map of Operable Unit 1
Appendix H	Record of Decision for Operable Units 1 and 2
Appendix I	Statement of Work for the Remedial Action

CONSENT DECREE
FOR REMEDIAL DESIGN AND REMEDIAL ACTION AT OPERABLE UNIT 1 OF THE LOWER FOX RIVER AND GREEN BAY SITE

I. BACKGROUND

A. The United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), and the State of Wisconsin (the "State"), on behalf of the Wisconsin Department of Natural Resources ("WDNR"), filed a Complaint in this matter pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9606 and 9607.

B. The Plaintiffs' Complaint seeks, inter alia: (i) reimbursement of certain costs incurred by the United States and the State for response actions at the Lower Fox River and Green Bay Site (the "Site," as defined below) in Northeastern Wisconsin, together with accrued interest; and (ii) performance of response work by the defendants at Operable Unit 1 ("OU1," as defined below) of the Site consistent with the National Contingency Plan, 40 C.F.R. Part 300 (as amended) (the "NCP").

C. In accordance with the NCP and Section 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), the State was notified of negotiations with potentially responsible parties regarding the implementation of the remedial design and the remedial action for OU1. The State has been an active participant in such negotiations and is a party to this Consent Decree.

D. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA has notified the appropriate natural resource trustees (the "Trustees"), as represented by the Fox River/Green Bay Natural Resource Trustee Council, of negotiations with potentially responsible parties regarding the releases of hazardous substances that may have resulted in injuries to

natural resources under Federal, State, and Tribal trusteeship at the Site. The Trustees have participated in the negotiation of this Consent Decree, and support this Consent Decree, as indicated by the Trustee Council Resolution attached to this Consent Decree as Appendix A.

E. EPA, WDNR, and the Trustees are parties to several Site-specific Memoranda of Agreement, as "Inter-Governmental Partners" sharing a "mutual goal of remediating and/or responding to hazardous substances releases and threats of releases to, and restoring injured and potentially injured natural resources in, [the Site area]." The Inter-Governmental Partners' founding Memorandum of Agreement recognized that WDNR would have "a leadership role, in full partnership with EPA, in exercising response authority" at the Site, and the Plaintiffs intend to continue that cooperative relationship as to actions required under this Consent Decree.

F. The defendants that have entered into this Consent Decree ("Settling Defendants," as defined below) do not admit any liability to the Plaintiffs, to the Trustees, or to any other party arising out of the transactions or occurrences alleged in the Complaint, nor do they acknowledge that the release or threatened release of hazardous substance(s) at or from the Site constitutes an imminent or substantial endangerment to the public health or welfare or the environment.

G. In response to a release or a substantial threat of a release of a hazardous substance(s) at or from the Site, WDNR in 1998 commenced a Remedial Investigation and Feasibility Study ("RI/FS") for the Site pursuant to 40 C.F.R. § 300.430, with funding and technical assistance from EPA. In December 2002, WDNR completed a Remedial Investigation ("RI") Report and a Final Feasibility Study ("FS") for the Site.

H. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, notice of the completion of the FS and of the proposed plan for remedial action was published in major local newspapers of general circulation in the Fox River Valley. WDNR and EPA provided an opportunity for

written and oral comments from the public on the proposed plan for remedial action. A copy of the transcript of the public meeting is available to the public as part of the administrative record upon which WDNR and EPA based the selection of the response action.

I. The decision by WDNR and EPA on the remedial action to be implemented at OU1 at the Site is embodied in a final Record of Decision ("ROD"), executed by WDNR and EPA in December 2002. The ROD includes an explanation of significant differences between the final remedial action plan and the proposed plan as well as a responsiveness summary to the public comments. Notice of the final plan was published in accordance with Section 117(b) of CERCLA.

J. Based on the information presently available to EPA and WDNR, EPA and WDNR believe that the Response Work (as defined below) will be properly and promptly conducted by the Settling Defendants if conducted in accordance with the requirements of this Consent Decree and its appendices.

K. Solely for the purposes of Section 113(j) of CERCLA, the remedial action selected by the ROD and the Response Work to be performed by the Settling Defendants shall constitute a response action taken or ordered by the President.

L. The Parties recognize, and the Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith and implementation of this Consent Decree will expedite the cleanup of OU1 and will avoid prolonged and complicated litigation between the Parties, and that this Consent Decree is fair, reasonable, and in the public interest.

NOW, THEREFORE, it is hereby Ordered, Adjudged, and Decreed:

II. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1345, and 42 U.S.C. §§ 9606, 9607, and 9613(b). This Court also has personal jurisdiction over the Settling Defendants. Solely for the purposes of this Consent Decree and the underlying Complaint, Settling Defendants waive all objections and defenses that they may have to jurisdiction of the Court or to venue in this District. Settling Defendants shall not challenge the terms of this Consent Decree or this Court's jurisdiction to enter and enforce this Consent Decree.

III. PARTIES BOUND

2. This Consent Decree applies to and is binding upon the United States and the State and upon Settling Defendants and their successors and assigns. Any change in ownership or corporate status of a Settling Defendant including, but not limited to, any transfer of assets or real or personal property, shall in no way alter such Settling Defendant's responsibilities under this Consent Decree.

3. Settling Defendants shall provide a copy of this Consent Decree to each contractor hired to perform the Response Work required by this Consent Decree and to each person representing any Settling Defendant with respect to OU1 or the Response Work and shall condition all contracts entered into hereunder upon performance of the Response Work in conformity with the terms of this Consent Decree. Settling Defendants or their contractors shall provide written notice of the Consent Decree to all subcontractors hired to perform any portion of the Response Work required by this Consent Decree. Settling Defendants shall nonetheless be responsible for ensuring that their contractors and subcontractors perform the Response Work contemplated herein in accordance with this Consent Decree. With regard to the activities

undertaken pursuant to this Consent Decree, each contractor and subcontractor shall be deemed to be in a contractual relationship with the Settling Defendants within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3).

IV. DEFINITIONS

4. Unless otherwise expressly provided herein, terms used in this Consent Decree which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Decree or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601-9675.

"Consent Decree" shall mean this Decree and all appendices attached hereto (listed in Section XXXI). In the event of conflict between this Decree and any appendix, this Decree shall control.

"Day" shall mean a calendar day unless expressly stated to be a working day. "Working day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of business of the next working day.

"Date of Lodging" shall mean the day on which this Consent Decree is lodged with the Court.

"DOI" shall mean the United States Department of the Interior and any successor departments or agencies of the United States.

"DOI Past Cost Payments" shall mean the payments to be made to the DOI NRDAR Fund under Subparagraph 52.a.(ii) (Initial Payments to the United States) of this Consent Decree to reimburse DOI for a portion of its past natural resource damage assessment costs related to the Site.

"DOJ" shall mean the United States Department of Justice and any successor departments or agencies of the United States.

"Effective Date" shall be the effective date of this Consent Decree as provided by Section XXIX.

"EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

"EPA Past Cost Payments" shall mean the payments to be made to the Fox River Site Special Account within the EPA Hazardous Substance Superfund under Subparagraph 52.a.(i) (Initial Payments to the United States) of this Consent Decree to reimburse EPA for a portion of its past response costs related to the Site.

"Force Majeure Event," for purposes of this Consent Decree, shall mean any event arising from causes beyond the control of the Settling Defendants, of any entity controlled by Settling Defendants, or of Settling Defendants' contractors or subcontractors, that delays or prevents the performance of any obligation under this Consent Decree despite Settling Defendants' best efforts to fulfill the obligation. The requirement that the Settling Defendants exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential Force Majeure Event and best efforts to address the effects of any potential Force Majeure Event (i) as it is occurring and (ii) following the potential Force Majeure Event, such that the delay is minimized to the greatest extent possible.

"Fox River OU1 Disbursement Special Account" or the "Disbursement Special Account" shall mean the disbursement special account established for OU1 by EPA pursuant to Section 122(b)(3) of CERCLA, 42 U.S.C. §9622(b)(3), and this Consent Decree.

"Fox River Site Special Account" shall mean the special account established for the Site by EPA pursuant to Section 122(b)(3) of CERCLA, 42 U.S.C. § 9622(b)(3) .

"Fox River OU1 Escrow Account" or the "Escrow Account" shall mean the escrow account trust fund established for OU1 by the Settling Defendants pursuant to this Consent Decree.

"Institutional Controls" shall mean all response activities to implement institutional controls requirements under the ROD.

"Interest" shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

"Interest Earned" shall mean interest earned on amounts in the Disbursement Special Account, which shall be computed monthly at a rate based on the annual return on investments of the Hazardous Substance Superfund. The applicable rate of interest shall be the rate in effect at the time the interest accrues.

"July 2003 AOC" shall mean the Administrative Order on Consent between WTM I Company, EPA, and WDNR, captioned In the matter of the Lower Fox River and the Green Bay Site, Docket No. V-W-'03-C-745 (the "July 2003 AOC"). The July 2003 AOC is attached hereto as Appendix F.

"Long Term Monitoring" shall mean all response activities to implement long term monitoring requirements under the ROD.

"National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

"NRD Commitment" shall mean the $3,000,000 committed to natural resource restoration efforts under Paragraph 52 (Initial Payments to Plaintiffs) and Paragraph 53 (Subsequent Payments for Natural Resource Restoration).

"NRDAR Fund" shall mean DOI's Natural Resource Damage Assessment and Restoration Fund.

"Operation and Maintenance" or "O & M" shall mean all activities required to maintain the effectiveness of the Remedial Action as required under the Operation and Maintenance Plan approved or developed by the Response Agencies pursuant to this Consent Decree and the Statements of Work.

"Operable Unit 1" or "OU1" shall mean the Little Lake Butte des Morts reach of the Lower Fox River, as delineated by the Record of Decision signed by WDNR and EPA in December 2002. More specifically, OU1 is the portion of the Lower Fox River (and the underlying River sediment) starting at the outlet of Lake Winnebago at the Neenah Dam and the Menasha Dam downstream to the Upper Appleton Dam, including sediment deposits A through H and POG. As so defined, OU1 is depicted in Figure 7-9 of the December 2002 Final Feasibility Study for the Site, a copy of which is attached hereto as Appendix G.

"Paragraph" shall mean a portion of this Consent Decree identified by an arabic numeral or an upper case letter.

"Parties" shall mean the United States, the State of Wisconsin, and the Settling Defendants.

"Performance Standards" shall mean the selected remedy requirements, contingent remedy requirements, and cleanup standards for measuring the achievement of the goals of the Remedial Action, as set forth in Sections 13.1, 13.3.1, and 13.4 through 13.6 of the ROD and Section II of the SOW for Remedial Action.

"Plaintiffs" shall mean the United States and the State of Wisconsin.

"Post-Remedy Institutional Controls Work" shall mean all response activities to implement institutional controls requirements under the ROD and the Institutional Controls Plan after Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b.

"Post-Remedy Monitoring" shall mean all response activities to implement Long Term Monitoring requirements under the ROD and the Final Operation and Maintenance Plan after Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b.

"RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901 et seq. (also known as the Resource Conservation and Recovery Act).

"Record of Decision" or "ROD" shall mean the Record of Decision relating to OU1 at the Site signed in December 2002 by the Deputy Administrator of the Water Division of WDNR and by the Director of the Superfund Division of EPA Region 5, and all attachments thereto. A copy of the ROD (excluding the ROD Appendices) is attached as Appendix H.

"Remedial Action" shall mean those activities (except for Operation and Maintenance, Post-Remedy Institutional Controls Work, and Post-Remedy Monitoring), to be undertaken by the Settling Defendants to implement the ROD requirements for OU1, in accordance with the SOW, the final Remedial Design Work Plan, the final Remedial Action Work Plan, and other

plans approved by the Response Agencies. For the purpose of this Consent Decree, Remedial Action shall not include any response action required solely under Section XV (Emergency Response).

"Remedial Action Work Plan" shall mean the document developed pursuant to Paragraph 14 of this Consent Decree and approved by the Response Agencies, and any amendments thereto.

"Remedial Design" shall mean those activities to be undertaken by Settling Defendant WTM I Company to conduct predesign investigations and to develop the final plans and specifications for the Remedial Action for OU1 pursuant to the July 2003 AOC and the Remedial Design Work Plan.

"Remedial Design Work Plan" shall mean the document described by Paragraph 12 of this Consent Decree and approved by the Response Agencies, and any amendments thereto.

"Response Agencies" shall mean WDNR and EPA.

"Response Work" shall mean all activities Settling Defendants are required to perform under this Consent Decree, except those required by Section XVI (Natural Resource Restoration Efforts) and Section XXVII (Retention of Records).

"Section" shall mean a portion of this Consent Decree identified by a roman numeral.

"Settling Defendants" shall mean P. H. Glatfelter Company and WTM I Company.

"Settling Defendants' Related Parties" shall mean: (i) Settling Defendants' successors, but only to the extent that the alleged liability of such person is based on the alleged liability of a Settling Defendant; (ii) Settling Defendants' former or current officers, directors, employees, or shareholders, but only to the extent that the alleged liability of such person is based on acts

and/or omissions which occurred in the scope of the person's employment or capacity as an officer, director, employee, or shareholder of a Settling Defendant.

"Site" shall mean the Lower Fox River and Green Bay Site in Northeastern Wisconsin.

"Specified Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States and the State incur after July 1, 2003 in reviewing or developing plans, reports and other items pursuant to the July 2003 AOC and this Consent Decree, in verifying the Response Work, in implementing O&M, Institutional Controls, and Long Term Monitoring requirements required under the ROD and the SOW, or in otherwise implementing, overseeing, or enforcing this Consent Decree, including, but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Paragraph 19 of Section VIII, Section X (including, but not limited to, the cost of attorney time and any monies paid to secure access and/or to secure or implement Institutional Controls including, but not limited to, the amount of just compensation), Section XV, and Paragraph 90 of Section XXII.

"State" shall mean the State of Wisconsin.

"State Past Cost Payments" shall mean the $10,000 payment to be made to the State under Subparagraph 52.b (Initial Payments to the State) of this Consent Decree to reimburse the State for a portion of its past response costs related to the Site.

"Statements of Work" or "SOW" shall mean: (i) the statement of work for implementation of the Remedial Design, as set forth at Appendix F to this Consent Decree, and any modifications made in accordance with the July 2003 AOC and this Consent Decree; and/or (ii) the statement of work for implementation of the Remedial Action, Institutional Controls,

Long Term Monitoring, and Operation and Maintenance at the Site, as set forth in Appendix I to this Consent Decree and any modifications made in accordance with this Consent Decree.

"Supervising Contractor" shall mean the principal contractor retained by the Settling Defendants to supervise and direct the implementation of the Response Work under this Consent Decree.

"United States" shall mean the United States of America.

"Unresolved DOI Past Costs" shall mean the unreimbursed natural resource damage assessment costs that the United States has paid at or in connection with the Site (or any portion of the Site) through July 1, 2003.

"Unresolved EPA Past Costs" shall mean the unreimbursed response costs, including, but not limited to, direct and indirect costs, that the United States has paid at or in connection with the Site (or any portion of the Site) through July 1, 2003.

"Unresolved State Past Costs" shall mean the unreimbursed response costs, including, but not limited to, direct and indirect costs, that the State has paid at or in connection with the Site (or any portion of the Site) through July 1, 2003.

"Waste Material" shall mean: (i) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (ii) any pollutant or contaminant under Section 101(33), 42 U.S.C. § 9601(33); (iii) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27); and (iv) any "hazardous substance" under Wis. Stat. § 292.01.

"WDOJ" shall mean the Wisconsin Department of Justice and any successor departments or agencies of the State.

"WDNR" shall mean the Wisconsin Department of Natural Resources and any successor departments or agencies of the State.

V. GENERAL PROVISIONS

5. Objectives of the Parties. The objectives of the Parties in entering into this Consent Decree are to protect public health and welfare and the environment by the design and implementation of certain response actions at OU1 by the Settling Defendants, to reimburse a portion of the EPA and State past costs and to reimburse all Specified Future Response Costs, to provide partial compensation for natural resource damages, and to resolve the claims of Plaintiffs against Settling Defendants as provided in this Consent Decree.

6. Commitments by Settling Defendants.

a. Settling Defendants shall finance and perform the Response Work in accordance with this Consent Decree, the ROD, the SOW, and all work plans and other plans, standards, specifications, and schedules set forth herein or developed by Settling Defendants and approved by the Response Agencies pursuant to this Consent Decree. Settling Defendants shall also reimburse EPA and the State for a portion of their past response costs and shall reimburse EPA and the State for future response costs, as provided by this Consent Decree. Settling Defendants shall also provide partial compensation for natural resource damages, as provided herein.

b. Settling Defendants need not perform Response Work under this Consent Decree unless: (i) the Disbursement Special Account and/or the Escrow Account described by Section VI and Appendices B and C contain funds to finance the work; or (ii) this Consent Decree specifically requires the Settling Defendants to fund or to perform the work without reimbursement from, or recourse to, the Disbursement Special Account and/or the Escrow Account.

7. Compliance With Applicable Law. All activities undertaken by Settling Defendants pursuant to this Consent Decree shall be performed in accordance with the requirements of all applicable federal and state laws and regulations. Settling Defendants must also comply with all applicable or relevant and appropriate requirements of all Federal and state environmental laws as set forth in the ROD and the SOW, unless the Response Agencies determine that there are grounds for invoking a waiver under 40 C.F.R. § 300.430(f)(1)(ii)(C). The activities conducted pursuant to this Consent Decree, if approved by the Response Agencies, shall be considered to be necessary and consistent with the NCP.

8. Permits.

a. As provided in Section 121(e) of CERCLA and Section 300.400(e) of the NCP, no permit shall be required for any portion of the Response Work conducted entirely on-site (i.e., within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Response Work). Where any portion of the Response Work that is not on-site requires a federal or state permit or approval, Settling Defendants shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals.

b. The Settling Defendants may seek relief under the provisions of Section XIX (Force Majeure Events) of this Consent Decree for any delay in the performance of the Response Work resulting from a failure to obtain, or a delay in obtaining, any permit required for the Response Work.

c. This Consent Decree is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

VI. ESTABLISHMENT AND USE OF CERTAIN SITE-SPECIFIC ACCOUNTS

9. Generally. As provided by this Section and Appendices B and C, two separate Site-specific accounts – to be known as the Fox River OU1 Disbursement Special Account (the "Disbursement Special Account") and the Fox River OU1 Escrow Account (the "Escrow Account") – shall be established and managed to provide sources of funds for payment and reimbursement of particular categories of Site-related response costs and natural resource restoration costs, as specified by Paragraphs 10 and 11. The Escrow Account may be established as several accounts or sub-accounts to address the different sources and uses of the funds paid into the Escrow Account. The response costs to be paid and reimbursed from the Disbursement Special Account and the Escrow Account are expected to include, but will not be limited to, certain costs incurred by the Settling Defendants that are defined herein as "Allowable RD/RA Costs." The natural resource restoration costs to be paid and reimbursed from the Escrow Account may include, but will not be limited to, certain costs incurred by the Settling Defendants that are defined herein as "Allowable Restoration Work Costs."

a. Allowable RD/RA Costs. Solely for the purpose of this Consent Decree, the term "Allowable RD/RA Costs" is defined as necessary response costs incurred and paid by Settling Defendants for the Remedial Design and the Remedial Action, excluding the following costs that shall not be eligible for payment or reimbursement as Allowable RD/RA Costs:

(1) any costs exceeding $2 million for the contaminant delineation investigation and Remedial Design components of the Response Work, as provided by Subparagraph 8.a of Appendix C;

(2) response costs incurred or paid by the Settling Defendants pursuant to Section XV (Emergency Response);

(3) any other payments made by Settling Defendants to the Plaintiffs pursuant to this Consent Decree, including, but not limited to: (i) any direct payments to Plaintiffs under Section XVII; and (ii) any interest, stipulated penalties, or stipulated damages paid pursuant to Section XXI;

(4) attorneys' fees and costs;

(5) costs of any response activities Settling Defendants perform that are not required under, or approved by the Response Agencies pursuant to this Consent Decree;

(6) costs related to Settling Defendants' litigation, settlement, development of potential contribution claims or identification of defendants;

(7) internal costs of Settling Defendants, including but not limited to, salaries, travel, or in-kind services, except for those costs that represent the work of employees of Settling Defendants directly performing the Remedial Design or the Remedial Action;

(8) any costs incurred by Settling Defendants prior to the Effective Date, except for: (i) Remedial Design or Remedial Action work approved by the Response Agencies; or (ii) other costs of Response Work required by this Consent Decree after the Date of Lodging; or

(9) any costs incurred by Settling Defendants pursuant to Section XX (Dispute Resolution).

b. Allowable Restoration Work Costs. Solely for the purpose of this Consent Decree, the term "Allowable Restoration Costs" is defined as necessary restoration costs incurred and paid by Settling Defendants for Approved Restoration Work (as defined by Paragraph 48),

excluding the following costs that shall not be eligible for payment or reimbursement as Allowable Restoration Work Costs:

(1) any costs for work other than Approved Restoration Work;

(2) any costs exceeding the pre-approved cost ceiling set by the Statement of Work for Approved Restoration Work;

(3) any other payments made by Settling Defendants to the Plaintiffs pursuant to this Consent Decree, including, but not limited to: (i) any direct payments to Plaintiffs under Section XVII; and (ii) any interest, stipulated penalties, or stipulated damages paid pursuant to Section XXI;

(4) attorneys' fees and costs;

(5) costs of any restoration activities Settling Defendants perform that are not required under, or approved by the Plaintiffs pursuant to, this Consent Decree;

(6) costs related to Settling Defendants' litigation, settlement, development of potential contribution claims or identification of defendants;

(7) internal costs of Settling Defendants, including but not limited to, salaries, travel, or in-kind services, except for those costs that represent the work of employees of Settling Defendants directly performing Approved Restoration Work;

(8) any costs incurred by Settling Defendants prior to the Effective Date, except for Approved Restoration Work completed pursuant to this Consent Decree; or

(9) any costs incurred by Settling Defendants pursuant to Section XX (Dispute Resolution).

10. Establishment and Management of the Disbursement Special Account. In accordance with the procedures and requirements established by the December 2001 Consent Decree in the matter captioned United States and the State of Wisconsin v. Appleton Papers Inc. and NCR Corporation, Case No. 01-C-0816 (E.D. Wis.) (the "API/NCR Decree"), the Plaintiffs shall use their best efforts to have $10 million available for funding response action projects under the API/NCR Decree deposited in the Disbursement Special Account after the Effective Date. EPA shall establish the Disbursement Special Account as a new special account within the EPA Hazardous Substance Superfund. Subject to the terms and conditions set forth in this Consent Decree, EPA agrees to make those funds in the Disbursement Special Account, including Interest Earned on those funds in the Special Account, available for disbursement to the Escrow Account as partial reimbursement of certain Allowable RD/RA Costs. The Disbursement Special Account shall be managed as set forth in Appendix B to this Consent Decree, which is incorporated herein by reference

11. Establishment and Management of the Escrow Account. By no later than March 31, 2004, the Settling Defendants shall establish and maintain financial security in the form of the Escrow Account trust fund, from which funds shall be disbursed for payment and reimbursement of particular categories of Site-related response costs and natural resource restoration costs. The Settling Defendants shall establish the Escrow Account with the funds required to be paid pursuant to Section XVII (Payments) below. The Escrow Account shall be managed as set forth in Appendix C to this Consent Decree, which is incorporated herein by reference. The escrow agreement establishing the Escrow Account shall be in substantially the

form attached hereto as Appendix D and shall identify the manager for the Escrow Account (the "Escrow Agent"). The Settling Defendants may establish the Escrow Account (or an account or sub-account within the Escrow Account) as a Qualified Settlement Fund (or "QSF") within the meaning of 468B-1 of the Treasury Regulations.

VII. PERFORMANCE OF THE RESPONSE WORK BY SETTLING DEFENDANTS

12. OU1 Remedial Design.

a. Settling Defendant WTM I Company shall perform the Remedial Design components of the Response Work (including predesign investigations) in accordance with the July 2003 AOC. A copy of the July 2003 AOC is attached as Appendix F to this Consent Decree, is incorporated herein by this reference, and all requirements under the July 2003 AOC are hereby made enforceable requirements of this Consent Decree, but only as to Settling Defendant WTM I Company.

b. Settling Defendant WTM I Company shall submit the following plans and reports to the Response Agencies pursuant to the July 2003 AOC and this Paragraph: (i) a Pre-Design Sampling Work Plan; (ii) a Remedial Design Work Plan; (iii) a Basis of Design Report; (iv) a Preliminary (50%) Design; (v) a Pre-Final (90%) Design; and (vi) a Final (100%) Design. Upon approval by the Response Agencies, all submittals required by the July 2003 AOC and this Paragraph 12 shall be incorporated into and become enforceable under this Consent Decree.

c. Settling Defendant WTM I Company shall provide Settling Defendant P. H. Glatfelter Company with copies of the plans and reports identified in the preceding Subparagraph contemporaneously with their submission to the Response Agencies. Within 15 days of the date of submission, Settling Defendant P. H. Glatfelter may submit written comments

on the relevant plan or submission; provided, however, that nothing in this Paragraph shall be construed as affording Settling Defendant P. H. Glatfelter Company a right to invoke or participate in any dispute resolution process under Section XX (Dispute Resolution) concerning any submittal under the July 2003 AOC.

13. Selection of Supervising Contractor.

a. All Remedial Design components of the Response Work to be performed by Settling Defendant WTM I Company pursuant to Paragraph 12 of this Consent Decree shall be under the direction and supervision of WTM I Company's Project Coordinator designated pursuant to the July 2003 AOC. All other aspects of the Response Work to be performed by Settling Defendants pursuant to Sections VII (Performance of the Response Work by Settling Defendants), VIII (Post-Remedy Response Work and Remedy Review), IX (Quality Assurance, Sampling and Data Analysis), and XV (Emergency Response) of this Consent Decree shall be under the direction and supervision of the Settling Defendants' Supervising Contractor, the selection of which shall be subject to disapproval by the Response Agencies. Within 10 days after Settling Defendant WTM I Company's submittal of the Pre-Final (90%) Design, Settling Defendants shall notify the Response Agencies in writing of the name, title, and qualifications of any contractor proposed to be the Supervising Contractor. The Response Agencies will issue a notice of disapproval or an authorization to proceed. If at any time thereafter, Settling Defendants propose to change a Supervising Contractor, Settling Defendants shall give such notice to the Response Agencies and must obtain an authorization to proceed from the Response Agencies before the new Supervising Contractor performs, directs, or supervises any Response Work under this Consent Decree.

b. If the Response Agencies disapprove a proposed Supervising Contractor, the Response Agencies will notify Settling Defendants in writing. Settling Defendants shall submit to the Response Agencies a list of contractors, including the qualifications of each contractor, that would be acceptable to them within 30 days of receipt of the Response Agencies' disapproval of the contractor previously proposed. The Response Agencies will provide written notice of the names of any contractors that they disapprove and an authorization to proceed with respect to any of the other contractors. Settling Defendants may select any contractor from that list that is not disapproved and shall notify the Response Agencies of the name of the contractor selected within 21 days of the Response Agencies' authorization to proceed.

c. If the Response Agencies fail to provide written notice of their authorization to proceed or disapproval as provided in this Paragraph and this failure prevents the Settling Defendants from meeting one or more deadlines in a plan approved by the Response Agencies pursuant to this Consent Decree, Settling Defendants may seek relief under the provisions of Section XIX (Force Majeure Events).

14. OU1 Remedial Action. Subject only to the funding limitations of this Consent Decree and the special reservations of rights specified in Section XXIV, the Settling Defendants shall perform all requirements under this Paragraph 14 until the Performance Standards are achieved and for so long thereafter as is otherwise required under this Consent Decree.

a. The requirements under this Paragraph 14 shall be performed by Settling Defendants with funding from the following sources:

(1) To the extent such funds are available in the Disbursement Special Account, the Settling Defendants shall be entitled to seek disbursement from the Disbursement Special Account for reimbursement of Allowable RD/RA Costs.

(2) To the extent such funds are available in the Escrow Account and not earmarked or disbursed for other purposes under this Consent Decree, the Settling Defendants shall be entitled to seek disbursements from the Escrow Account for payment or reimbursement of Allowable RD/RA Costs.

b. Within 90 days after the approval of the Final Design submittal described by the Statement of Work appended to the July 2003 AOC, but no earlier than 30 days after the Effective Date, the Settling Defendants shall submit to the Response Agencies a work plan for the performance of the Remedial Action (the "Remedial Action Work Plan"). The Remedial Action Work Plan shall provide for construction and implementation of the remedy set forth in the ROD such that the Performance Standards will be achieved, in accordance with this Consent Decree, the ROD, the SOW, and the design plans and specifications developed by Settling Defendant WTM I Company under Paragraph 12 and approved by the Response Agencies. Upon its approval by the Response Agencies, the Remedial Action Work Plan shall be incorporated into and become enforceable under this Consent Decree.

c. The Remedial Action Work Plan shall include the following: (i) an updated schedule for implementing all Remedial Action tasks identified in the final design submittal, incorporating any refinements to the Final Project Schedule submitted under the July 2003 AOC and Paragraph 12; (ii) any refinements to the Final Health and Safety Plan, the Final Contingency Plan, the Final Sediment Removal Verification Plan, and the Capital and Operation and Maintenance Cost Estimate submitted under the July 2003 AOC and Paragraph 12; (iii) a Final Construction Quality Assurance Project Plan; (iv) an Institutional Controls Plan; (v) a Final Operation and Maintenance Plan (including a plan for Long Term Monitoring); (vi) a schedule for submitting any other Remedial Action Plans; and (vii) the initial formulation of the Settling

Defendants' Remedial Action Project Team (including, but not limited to, the Supervising Contractor).

d. Upon approval of the Remedial Action Work Plan by the Response Agencies, Settling Defendants shall perform the activities required under the Remedial Action Work Plan. The Settling Defendants shall submit to the Response Agencies all plans, submittals, or other deliverables required under the approved Remedial Action Work Plan in accordance with the approved schedule for review and approval pursuant to Section XII (Response Agencies' Approval of Plans and Other Submissions). Unless otherwise directed by the Response Agencies, Settling Defendants shall not commence physical Remedial Action activities at OU1 prior to approval of the Remedial Action Work Plan. Subject only to the funding limitations of this Consent Decree and the special reservations of rights specified in Section XXIV, the Settling Defendants shall implement the Remedial Action as set forth in the approved Remedial Action Work Plan until the Performance Standards are achieved.

e. Notwithstanding the funding limitations of this Consent Decree, after Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b, the Settling Defendants shall continue to implement the Institutional Controls Plan and the Final Operation and Maintenance Plan for so long as required by those plans.

15. Modification of the SOW or Related Work Plans.

a. Subject to Subparagraph 15.c below, if the Response Agencies determine that modification to the work specified in the SOW and/or in work plans developed pursuant to the SOW is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the ROD, the Response Agencies may require that such modification be incorporated in the SOW and/or such work plans; provided,

however, that a modification may only be required pursuant to this Paragraph to the extent that it is consistent with the scope of the remedy selected in the ROD.

b. For the purposes of this Paragraph 15 and Paragraph 44 only, the "scope of the remedy selected in the ROD" is, as described by Sections 13.1 and 13.3 of the ROD: (i) removal of sediment in OU1 with PCB concentrations greater than the 1 ppm remedial action level ("RAL") or achieving a surface weighed average concentration ("SWAC") of 0.25 ppm or less after removal of sediment; (ii) dewatering of the sediment that is removed; (iii) treatment of the water collected during the dewatering process; (iv) off-Site disposal of the removed sediment after dewatering; (v) demobilization and site restoration; and (vi) Institutional Controls and Long Term Monitoring. The "scope of the remedy selected in the ROD" may also include partial capping or supplemental capping of contaminated sediments in certain areas of OU1, if specified requirements are met, as described by Sections 13.4 through 13.7 of the ROD.

c. If Settling Defendants object to any modification determined by the Response Agencies to be necessary pursuant to this Paragraph, they may seek dispute resolution pursuant to Section XX (Dispute Resolution), Paragraph 65 (record review). The SOW and/or related work plans shall be modified in accordance with final resolution of the dispute.

d. Subject only to the funding limitations of this Consent Decree and the special reservations of rights specified in Section XXIV, Settling Defendants shall implement any work required by any modifications incorporated in the SOW and/or in work plans developed pursuant to the SOW in accordance with this Paragraph.

e. Nothing in this Paragraph shall be construed to limit the Response Agencies' authority to require performance of further response actions as otherwise provided in this Consent Decree.

16. Settling Defendants acknowledge and agree that nothing in this Consent Decree, the SOW, the Remedial Design Work Plan, or Remedial Action Work Plan constitutes a warranty or representation of any kind by Plaintiffs that compliance with the work requirements set forth in the SOW and the Work Plans will achieve the Performance Standards.

17. Settling Defendants shall, prior to any off-Site shipment of Waste Material from the Site to an out-of-state waste management facility, provide written notification to the appropriate state environmental official in the receiving facility's state and to the Response Agencies' Project Coordinators of such shipment of Waste Material. However, this notification requirement shall not apply to any off-Site shipments when the total volume of all such shipments will not exceed 10 cubic yards.

a. The Settling Defendants shall include in the written notification the following information, where available: (i) the name and location of the facility to which the Waste Material is to be shipped; (ii) the type and quantity of the Waste Material to be shipped; (iii) the expected schedule for the shipment of the Waste Material; and (iv) the method of transportation. The Settling Defendants shall notify the state in which the planned receiving facility is located of major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

b. The identity of the receiving facility and state will be determined by the Settling Defendants following the award of the contract for Remedial Action construction. The Settling Defendants shall provide the information required by Subparagraph 17.a as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

VIII. POST-REMEDY RESPONSE WORK AND REMEDY REVIEW

18. O&M and Post-Remedy Institutional Controls. After Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b, Settling Defendants shall perform O&M and Post-Remedy Institutional Controls Work as required by the ROD, the Final Operation and Maintenance Plan, and the Institutional Controls Plan. In the event that Settling Defendants fail to perform O&M and Post-Remedy Institutional Controls Work as required by this Paragraph, and EPA or, as appropriate, the State takes such action instead, Settling Defendants shall reimburse EPA and the State for all costs of the response action not inconsistent with the NCP pursuant to Paragraph 54 (Payment of Specified Future Response Costs).

19. Periodic Remedy Review and Post-Remedy Monitoring. Settling Defendants shall conduct any studies and investigations as requested by the Response Agencies, in order to permit the Response Agencies to conduct reviews of whether the Remedial Action is protective of human health and the environment at least every five years as required by Section 121(c) of CERCLA and any applicable regulations. Such studies and investigations shall include, but shall not be limited to, Post-Remedy Monitoring after Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b. In the event that Settling Defendants fail to conduct such studies and investigations as required by this Paragraph, and EPA or, as appropriate, the State takes such action instead, Settling Defendants shall reimburse EPA and the State for all costs of the response action not inconsistent with the NCP pursuant to Paragraph 54 (Payment of Specified Future Response Costs).

20. Further Response Actions.

a. If the Response Agencies determine, at any time, that the Remedial Action is not protective of human health and the environment, the Response Agencies may select further response actions for OU1 in accordance with the requirements of CERCLA and the NCP.

b. Settling Defendants and, if required by Sections 113(k)(2) or 117 of CERCLA, the public, will be provided with an opportunity to comment on any further response actions proposed by the Response Agencies as a result of the review conducted pursuant to Section 121(c) of CERCLA and to submit written comments for the record during the comment period.

c. Notwithstanding Paragraph F of Section I (Background), Settling Defendants hereby agree and covenant that the Plaintiffs shall not have to prove and that Settling Defendants shall not contest the following facts with respect to OU1 in response to any administrative order or in any judicial proceeding relating to any further response action the Response Agencies select for OU1 to the extent that the reopener conditions in Paragraph 86 or Paragraph 87 (United States' reservations of liability based on unknown conditions or new information) are satisfied:

(i) Each Settling Defendant is a person who at the time of disposal of a hazardous substance owned or operated a facility from which such hazardous substances were disposed of, and from which there have been releases of hazardous substances which caused the incurrence of response costs for OU1; and

(ii) Each Settling Defendant is a person who by contract, agreement, or otherwise arranged for the disposal or treatment of hazardous substances owned or possessed by the Settling Defendant, by another party or entity, at a facility owned

or operated by another party or entity and containing such hazardous substances, from which there have been releases of hazardous substances which caused the incurrence of response costs for OU1.

d. Except as provided by Subparagraph 20.c, nothing herein shall constitute a waiver of any claim or defense by any Party with respect to any such further response action.

IX. QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS

21. Settling Defendants shall use quality assurance, quality control, and chain of custody procedures for all treatability, design, compliance and monitoring samples in accordance with "EPA Requirements for Quality Assurance Project Plans (QA/R5)" (EPA/240/B-01/003, March 2001), "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/600/R-98/018, February 1998), and subsequent amendments to such guidelines upon notification by the Response Agencies to Settling Defendants of such amendment. Amended guidelines shall apply only to procedures conducted after such notification. Prior to the commencement of any monitoring project under this Consent Decree, Settling Defendants shall submit to the Response Agencies for approval a Quality Assurance Project Plan ("QAPP") that is consistent with the SOW, the NCP and applicable guidance documents. If relevant to the proceeding, the Parties agree that validated sampling data generated in accordance with the QAPP(s) and reviewed and approved by the Response Agencies shall be admissible as evidence, without objection, in any proceeding under this Decree. Settling Defendants shall ensure that the Response Agencies' personnel and their authorized representatives are allowed access at reasonable times to all laboratories utilized by Settling Defendants in implementing this Consent Decree. In addition, Settling Defendants shall ensure that such laboratories shall analyze all samples submitted by the Response Agencies pursuant to the QAPP for quality assurance monitoring. Settling Defendants

shall ensure that the laboratories they utilize for the analysis of samples taken pursuant to this Decree perform all analyses according to accepted EPA methods. Accepted EPA methods consist of those methods which are documented in the "Contract Lab Program Statement of Work for Inorganic Analysis" and the "Contract Lab Program Statement of Work for Organic Analysis," dated February 1988, and any amendments made thereto during the course of the implementation of this Decree; however, upon approval by the Response Agencies, Settling Defendants may use other analytical methods which are as stringent as or more stringent than the CLP-approved methods. Settling Defendants shall ensure that all laboratories they use for analysis of samples taken pursuant to this Consent Decree participate in an EPA or EPA-equivalent QA/QC program. Settling Defendants shall only use laboratories that have a documented Quality System which complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995), and "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by the Response Agencies. The Response Agencies may consider laboratories accredited under the National Environmental Laboratory Accreditation Program ("NELAP") as meeting the Quality System requirements. Settling Defendants shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this Decree will be conducted in accordance with the procedures set forth in the QAPP approved by the Response Agencies.

22. Upon request, the Settling Defendants shall allow split or duplicate samples to be taken by the Response Agencies or their authorized representatives. Settling Defendants shall notify the Response Agencies not less than 15 days in advance of any sample collection activity

unless shorter notice is agreed to by the Response Agencies. In addition, the Response Agencies shall have the right to take any additional samples that the Response Agencies deem necessary. Upon request, the Response Agencies shall allow the Settling Defendants to take split or duplicate samples of any samples they take as part of the Plaintiffs' oversight of the Settling Defendants' implementation of the Response Work.

23. Settling Defendants shall submit to the Response Agencies copies of the results of all sampling and/or tests or other data obtained or generated by or on behalf of Settling Defendants with respect to OU1 and/or the implementation of this Consent Decree unless the Response Agencies agree otherwise.

24. Notwithstanding any provision of this Consent Decree, the United States and the State hereby retain all of their information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA and any other applicable statutes or regulations.

X. ACCESS AND INSTITUTIONAL CONTROLS

25. If any property where access and/or land/water use restrictions are needed to implement this Consent Decree is owned or controlled by any of the Settling Defendants, such Settling Defendants shall:

a. commencing on the date of lodging of this Consent Decree, provide the Plaintiffs and their representatives, including the Response Agencies and their contractors, with access at all reasonable times to such property, for the purpose of conducting any activity related to this Consent Decree including, but not limited to, the following activities:

(1) monitoring the Response Work;

(2) verifying any data or information submitted to the Plaintiffs;

(3) conducting investigations relating to contamination at or near the Site;

(4) obtaining samples;

(5) assessing the need for, planning, or implementing additional response actions at or near the Site;

(6) implementing the Response Work pursuant to the conditions set forth in Paragraph 90 of this Consent Decree;

(7) inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Settling Defendants or their agents, consistent with Section XXVI (Access to Information);

(8) assessing Settling Defendants' compliance with this Consent Decree; and

(9) determining whether the Site or other property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to this Consent Decree;

b. commencing on the date of lodging of this Consent Decree, refrain from using the Site, or such other property, in any manner that would interfere with or adversely affect the integrity or protectiveness of the remedial measures to be implemented pursuant to this Consent Decree.

c. if requested in writing by the Response Agencies, execute and record in the appropriate County land records office, an easement, running with the land, that: (i) grants a right of access for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 25.a of this Consent Decree, and

(ii) grants the right to enforce the land/water use restrictions listed in Paragraph 25.b of this Consent Decree, or other restrictions that the Response Agencies determine are necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Consent Decree. Such Settling Defendants shall grant the access rights and the rights to enforce the land/water use restrictions to: (i) the United States, on behalf of EPA, and its representatives, (ii) the State, on behalf of WDNR, and its representatives, (iii) the other Settling Defendants and their representatives, and/or (iv) other appropriate grantees identified by the Response Agencies. Such Settling Defendants shall, within 45 days after receiving a written request from the Response Agencies, submit to the response Agencies for review and approval with respect to such property:

(i) a draft easement that is enforceable under the laws of the State of Wisconsin, free and clear of all prior liens and encumbrances (except as approved by EPA), and acceptable under the Attorney General's Title Regulations promulgated pursuant to 40 U.S.C. § 255; and

(ii) a current title commitment or report prepared in accordance with the U.S. Department of Justice's Title Standards 2001 (the "Standards").

Within 15 days of EPA's approval and acceptance of the easement, such Settling Defendants shall update the title search and, if it is determined that nothing has occurred since the effective date of the commitment or report to affect the title adversely, take the steps necessary to record the easement with the appropriate County land records office. Within 30 days of recording the easement, such Settling Defendants shall provide EPA with final title evidence acceptable under the Standards, and a certified copy of the original recorded easement showing the clerk's recording stamps.

26. If any property where access and/or land/water use restrictions are needed to implement this Consent Decree is owned or controlled by persons other than any of the Settling Defendants, Settling Defendants shall use best efforts to secure from such persons:

a. an agreement to provide access thereto for Settling Defendants, as well as for the Plaintiffs, on behalf of the response Agencies, as well as their representatives (including contractors), for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 25.a of this Consent Decree;

b. an agreement, enforceable by the Settling Defendants and the Plaintiffs, to abide by the obligations and restrictions established by Paragraph 25.b of this Consent Decree, or that are otherwise necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Consent Decree; and

c. if requested in writing by the Response Agencies, the execution and recordation in the appropriate County land records office, of an easement, running with the land, that: (i) grants a right of access for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 25.a of this Consent Decree, and (ii) grants the right to enforce the land/water use restrictions listed in Paragraph 25.b of this Consent Decree, or other restrictions that the Response Agencies determine are necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Consent Decree. The access rights and/or rights to enforce land/water use restrictions shall be granted to: (i) the United States, on behalf of EPA, and its representatives, (ii) the State, on behalf of WDNR, and its representatives, (iii) the other Settling Defendants and their representatives, and/or (iv) other appropriate grantees. Settling

Defendants shall, within 45 days after receiving a written request from the Response Agencies, submit to the Response Agencies for review and approval with respect to such property:

(i) a draft easement that is enforceable under the laws of the State of Wisconsin, free and clear of all prior liens and encumbrances (except as approved by the Response Agencies), and acceptable under the Attorney General's Title Regulations promulgated pursuant to 40 U.S.C. § 255; and

(ii) a current title commitment or report prepared in accordance with the U.S. Department of Justice's Title Standards 2001 (the "Standards").

Within 15 days of EPA's approval and acceptance of the easement, Settling Defendants shall update the title search and, if it is determined that nothing has occurred since the effective date of the commitment or report to affect the title adversely, take the steps necessary to record the easement with the appropriate County land records office. Within 30 days of the recording of the easement, Settling Defendants shall provide EPA with final title evidence acceptable under the Standards, and a certified copy of the original recorded easement showing the clerk's recording stamps.

27. For purposes of Paragraph 26 of this Consent Decree, "best efforts" includes the payment of reasonable sums of money in consideration of access, access easements, land/water use restrictions, and/or restrictive easements. If any access or land/water use restriction agreements required by Paragraphs 26.a or 26.b of this Consent Decree are not obtained within 45 days of the Effective Date of this Consent Decree, or if any access easements or restrictive easements required by Paragraph 26.c of this Consent Decree are not submitted to the Response Agencies in draft form within 45 days of receipt of a written request by the Response Agencies, then Settling Defendants shall promptly notify the United States in writing, and shall include in

that notification a summary of the steps that Settling Defendants have taken to attempt to comply with Paragraph 26 of this Consent Decree. The United States and the State may, as they deem appropriate, assist Settling Defendants in obtaining access or land/water use restrictions, either in the form of contractual agreements or in the form of easements running with the land. Settling Defendants shall reimburse the United States and the State, as Specified Future Response Costs, for all costs incurred, direct or indirect, by the United States or the State in obtaining such access and/or land/water use restrictions including, but not limited to, the cost of attorney time and the amount of monetary consideration paid or just compensation.

28. If any property where access and/or land/water use restrictions are needed to implement this Consent Decree is owned or controlled by the Plaintiffs, the Plaintiffs shall use best efforts to assist the Settling Defendants in securing necessary access and/or land/water use restrictions.

29. If the Response Agencies determine that land/water use restrictions in the form of state or local laws, regulations, ordinances or other governmental controls are needed to implement the remedy selected in the ROD, ensure the integrity and protectiveness thereof, or ensure non-interference therewith, Settling Defendants shall cooperate with the Response Agencies' efforts to secure such governmental controls.

30. Notwithstanding any provision of this Consent Decree, the United States and the State retain all of their access authorities and rights, as well as all of their rights to require land/water use restrictions, including enforcement authorities related thereto, under CERCLA, RCRA and any other applicable statute or regulations.

XI. REPORTING REQUIREMENTS

31. Monthly RD/RA Progress Reports.

a. In addition to any other requirement of this Consent Decree, starting with the first month after the Date of Lodging, Settling Defendants shall submit two copies of written Monthly RD/RA Progress Reports to each of the Response Agencies that shall: (i) describe the actions which have been taken toward achieving compliance with this Consent Decree during the previous month; (ii) include a summary of all results of sampling and tests and all other data received or generated by Settling Defendants or their contractors or agents in the previous month; (iii) identify all work plans, plans and other deliverables required by this Consent Decree completed and submitted during the previous month; (iv) describe all actions, including, but not limited to, data collection and implementation of work plans, which are scheduled for the next month and provide other information relating to the progress of construction, including, but not limited to, critical path diagrams, Gantt charts and Pert charts; (v) include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Response Work, and a description of efforts made to mitigate those delays or anticipated delays; (vi) include any modifications to the work plans or other schedules that Settling Defendants have proposed to the Response Agencies or that have been approved by the Response Agencies; and (vii) describe all activities undertaken in support of the Community Relations Plan during the previous month and those to be undertaken in the next month. Settling Defendants shall submit these progress reports to the Response Agencies by the tenth day of every month following the Date of Lodging until Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b. During performance of the Remedial Design, the Monthly RD/RA Progress Reports shall include all information required by

Paragraph 38 of the July 2003 AOC and shall thereby satisfy the requirement to submit a monthly progress report under the July 2003 AOC and this Consent Decree. If requested by the Response Agencies, Settling Defendants shall also provide briefings for the Response Agencies to discuss the progress of the Response Work.

b. The Settling Defendants shall notify the Response Agencies of any change in the schedule described in the Monthly RD/RA Progress Report for the performance of any activity, including, but not limited to, data collection and implementation of work plans, no later than seven days prior to the performance of the activity.

32. Quarterly Reports. Starting with the second quarter of 2004, the Settling Defendants shall submit Quarterly Reports under this Paragraph to assist the Plaintiffs in monitoring the funding and budgeting of the Response Work and any Approved Restoration Work.

a. The Settling Defendants shall submit Quarterly Reports on a quarterly basis for so long as the Remedial Action continues under this Consent Decree, until Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b. For a given calendar year, the Report for the first calendar quarter shall be submitted by no later than May 1 of that calendar year, the Report for the second calendar quarter shall be submitted by no later than August 1 of that calendar year, the Report for the third calendar quarter shall be submitted by no later than November 1 of that calendar year, and the Report for the fourth calendar quarter shall be submitted by no later than February 1 of the next calendar year.

b. Each Quarterly Report shall:

(1) provide a complete and accurate written cost summary of all Allowable RD/RA Costs submitted to the Escrow Agent for payment from the

Escrow Account during the reporting period, certified in accordance with Subparagraph 32.c;

(2) specify any amount requested as a periodic disbursement from the Disbursement Special Account to the Escrow Account pursuant to Paragraph 10 and Appendix B;

(3) provide a complete and accurate written cost summary of all Allowable Restoration Work Costs submitted to the Escrow Agent for payment from the Escrow Account during the reporting period, certified in accordance with Subparagraph 32.c;

(4) list and total all amounts requested and/or disbursed during the reporting period as payments or reimbursements from the Escrow Account pursuant to Paragraph 11 and Appendix C;

(5) indicate the approximate balance of the Escrow Account at the end of the reporting period;

(6) summarize all Response Work and all Approved Restoration Work funded and performed under the Consent Decree during the reporting period; and

(7) project whether the total balance remaining in the Disbursement Special Account and the Escrow Account is likely to be sufficient to fund the completion of the Remedial Action, after making all other payments and reimbursements from those Accounts that are required under the Consent Decree.

c. Each Quarterly Report shall contain the following certification signed by the Chief Financial Officer of a Settling Defendant or by an Independent Certified Public Accountant retained by the Settling Defendants:

> "To the best of my knowledge, after thorough investigation and review of Settling Defendants' documentation of unreimbursed costs incurred and paid for the work summarized in this report that was performed pursuant to the Consent Decree, I certify that the information contained in or accompanying this Quarterly Report is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

Each Quarterly Report shall include a list of the cost documents that the certifying individuals reviewed in support of the Quarterly Cost Summary Report. Upon request by the Plaintiffs, Settling Defendants shall provide the Plaintiffs any additional information that the Plaintiffs deem necessary for review of a Quarterly Report.

d. If the Plaintiffs find that a Quarterly Report includes a mathematical error, an accounting error, costs that are not Allowable Response Work Costs or Allowable Restoration Work Costs, costs that are inadequately documented, or costs covered by a prior Quarterly Report, the Plaintiffs will notify Settling Defendants and the Settling Defendants shall cure the deficiency by submitting a revised Quarterly Report.

33. Release Reporting.

a. Upon the occurrence of any event during performance of the Response Work that Settling Defendants are required to report pursuant to Section 103 of CERCLA or Section 304 of the Emergency Planning and Community Right-to-Know Act ("EPCRA"), Settling Defendants shall within 24 hours of the onset of such event orally notify the Response Agencies' Project Coordinators or the Response Agencies' Alternate Project Coordinators (in the event of the unavailability of the Project Coordinator). If neither the EPA Project Coordinator nor the EPA Alternate Project Coordinator is available, oral notification notice shall be given to the Emergency Response Section, Region 5, United States Environmental Protection Agency.

These reporting requirements are in addition to the reporting required by CERCLA Section 103 or EPCRA Section 304.

b. Within 20 days of the onset of such an event, Settling Defendants shall furnish to Plaintiffs a written report, signed by the Settling Defendants' Project Coordinator, setting forth the events which occurred and the measures taken, and to be taken, in response thereto. Within 30 days of the conclusion of such an event, Settling Defendants shall submit a report to Plaintiffs setting forth all actions taken in response thereto.

34. Submission and Certification of Reports.

a. Settling Defendants shall submit two hard copies of all plans, reports, and data required by the SOW, the Remedial Design Work Plan, the Remedial Action Work Plan, or any other approved plans to each of the Response Agencies in accordance with the schedules set forth in such plans. At the same time, the Settling Defendants shall submit an additional copy to each of the Response Agencies in electronic format.

b. All reports and other documents submitted by Settling Defendants to the Response Agencies (other than the monthly progress reports referred to above) which purport to document Settling Defendants' compliance with the terms of this Consent Decree shall be signed by an authorized representative of the Settling Defendants, including but not limited to the Settling Defendants' Project Coordinator.

XII. RESPONSE AGENCIES' APPROVAL OF PLANS AND OTHER SUBMISSIONS

35. After review of any plan, report or other item which is required to be submitted for approval by the Response Agencies pursuant to this Consent Decree, the Response Agencies shall: (i) approve, in whole or in part, the submission; (ii) approve the submission upon specified conditions; (iii) modify the submission to cure the deficiencies; (iv) disapprove, in whole or in

part, the submission, directing that the Settling Defendants modify the submission; or (v) any combination of the above. However, the Response Agencies shall not modify a submission without first providing Settling Defendants at least one notice of deficiency and an opportunity to cure within 30 days, except where to do so would cause serious disruption to the Response Work or where previous submission(s) have been disapproved due to material defects and the deficiencies in the submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.

36. In the event of approval, approval upon conditions, or modification by the Response Agencies, pursuant to Paragraph 35(i), (ii), or (iii), Settling Defendants shall proceed to take any action required by the plan, report, or other item, as approved or modified by the Response Agencies subject only to their right to invoke the Dispute Resolution procedures set forth in Section XX (Dispute Resolution) with respect to the modifications or conditions made by the Response Agencies. In the event that a submission has a material defect and the Response Agencies modify the submission to cure the deficiencies pursuant to Paragraph 35(i), the Response Agencies retain their right to seek stipulated penalties, as provided in Section XXI (Stipulated Penalties).

37. Resubmission of Plans.

a. Upon receipt of a notice of disapproval pursuant to Paragraph 35(iv), Settling Defendants shall, within 30 days or such longer time as specified by the Response Agencies in such notice, correct the deficiencies and resubmit the plan, report, or other item for approval. Any stipulated penalties applicable to the submission, as provided in Section XXI, shall accrue during the 30-day period or otherwise specified period but shall not be payable

unless the resubmission is disapproved or modified due to a material defect as provided in Paragraphs 38 and 39.

b. Notwithstanding the receipt of a notice of disapproval pursuant to Paragraph 35(iv), Settling Defendants shall proceed, at the direction of the Response Agencies, to take any action required by any non-deficient portion of the submission. Implementation of any non-deficient portion of a submission shall not relieve Settling Defendants of any liability for stipulated penalties under Section XXI (Stipulated Penalties).

38. In the event that a resubmitted plan, report or other item, or portion thereof, is disapproved by the Response Agencies, the Response Agencies may again require the Settling Defendants to correct the deficiencies, in accordance with the preceding Paragraphs. The Response Agencies also retain the right to modify or develop the plan, report or other item. Settling Defendants shall implement any such plan, report, or item as modified or developed by the Response Agencies, subject only to their right to invoke the procedures set forth in Section XX (Dispute Resolution).

39. If upon resubmission, a plan, report, or item is disapproved or modified by the Response Agencies due to a material defect, Settling Defendants shall be deemed to have failed to submit such plan, report, or item timely and adequately unless the Settling Defendants invoke the dispute resolution procedures set forth in Section XX (Dispute Resolution) and the response Agencies' action is overturned pursuant to that Section. The provisions of Section XX (Dispute Resolution) and Section XXI (Stipulated Penalties) shall govern the implementation of the Response Work and accrual and payment of any stipulated penalties during Dispute Resolution. If the Response Agencies' disapproval or modification is upheld, stipulated penalties shall accrue

for such violation from the date on which the initial submission was originally required, as provided in Section XXI.

40. All plans, reports, and other items required to be submitted to the response Agencies under this Consent Decree shall, upon approval or modification by the Response Agencies, be enforceable under this Consent Decree. In the event the Response Agencies approve or modify a portion of a plan, report, or other item required to be submitted to the Response Agencies under this Consent Decree, the approved or modified portion shall be enforceable under this Consent Decree.

XIII. PROJECT COORDINATORS

41. Within 10 days after Settling Defendant WTM I Company's submittal of the Pre-Final (90%) Design, Settling Defendants, WDNR, and EPA will notify each other, in writing, of the name, address and telephone number of their respective designated Project Coordinators and Alternate Project Coordinators. If a Project Coordinator or Alternate Project Coordinator initially designated is changed, the identity of the successor will be given to the other Parties at least 5 working days before the changes occur, unless impracticable, but in no event later than the actual day the change is made. The Settling Defendants' Project Coordinator shall be subject to disapproval by the Response Agencies and shall have the technical expertise sufficient to adequately oversee all aspects of the Response Work. The Settling Defendants' Project Coordinator shall not be an attorney for any of the Settling Defendants in this matter. He or she may assign other representatives, including other contractors, to serve as a representative for oversight of performance of daily operations during remedial activities at OU1.

42. Plaintiffs may designate other representatives, including, but not limited to, EPA and WDNR employees, and federal and State contractors and consultants, to observe and monitor

the progress of any activity undertaken pursuant to this Consent Decree. EPA's Project Coordinator and Alternate Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager ("RPM") and an On-Scene Coordinator ("OSC") by the National Contingency Plan, 40 C.F.R. Part 300. In addition, the Response Agencies' Project Coordinators or Alternate Project Coordinators shall have authority, consistent with the National Contingency Plan, to halt any Response Work required by this Consent Decree and to take any necessary response action when s/he determines that conditions at the Site constitute an emergency situation or may present an immediate threat to public health or welfare or the environment due to release or threatened release of Waste Material.

43. The Response Agencies' Project Coordinators and the Settling Defendants' Project Coordinator will meet, at a minimum, on a monthly basis.

XIV. CERTIFICATION OF COMPLETION

44. Certification of Completion of the Remedial Action for OU1.

a. Within 90 days after Settling Defendants conclude that the Remedial Action has been fully performed such that the Performance Standards have been achieved, Settling Defendants shall schedule and conduct a pre-certification inspection to be attended by Settling Defendants and the Response Agencies. If, after the pre-certification inspection, the Settling Defendants still believe that the Remedial Action has been fully performed such that the Performance Standards have been achieved, they shall submit a written report to the Response Agencies requesting certification pursuant to Section XII (Response Agencies' Approval of Plans and Other Submissions) within 60 days of the inspection. In the report, a registered professional engineer and the Settling Defendants' Project Coordinator shall state that the Remedial Action has been completed in full satisfaction of the requirements of this Consent Decree. The written

report shall include as-built drawings signed and stamped by a professional engineer. The report shall contain the following statement, signed by a responsible corporate official of a Settling Defendant or the Settling Defendants' Project Coordinator:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If, after completion of the pre-certification inspection and receipt and review of the written report, EPA, after reasonable opportunity to review and comment by the State, determines that the Remedial Action or any portion thereof has not been completed in accordance with this Consent Decree such that the Performance Standards have not been achieved, EPA will notify Settling Defendants in writing of the activities that must be undertaken by Settling Defendants pursuant to this Consent Decree to complete the Remedial Action such that the Performance Standards are achieved; provided, however, that EPA may only require Settling Defendants to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the "scope of the remedy selected in the ROD," as that term is defined in Paragraph 15.b. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require the Settling Defendants to submit a schedule to EPA for approval pursuant to Section XII (Response Agencies' Approval of Plans and Other Submissions). Settling Defendants shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to their right to invoke the dispute resolution procedures set forth in Section XX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion and after a reasonable opportunity for review and comment by the State, that the Remedial Action has been performed in accordance with this Consent Decree such that the Performance Standards have been achieved, EPA will so certify in writing to Settling Defendants. This certification shall constitute the Certification of Completion of the Remedial Action for purposes of this Consent Decree, including, but not limited to, Section XXII (Covenants Not to Sue by Plaintiffs). Except as expressly provided by this Consent Decree, Certification of Completion of the Remedial Action shall not affect Settling Defendants' obligations under this Consent Decree.

45. Certification of Completion of the Response Work for OU1.

a. Within 90 days after Settling Defendants conclude that all phases of the Response Work (including O&M, Post-Remedy Institutional Controls Work, and Post-Remedy Monitoring) have been fully performed, Settling Defendants shall schedule and conduct a pre-certification inspection to be attended by Settling Defendants and the Response Agencies. If, after the pre-certification inspection, the Settling Defendants still believe that the Response Work has been fully performed, Settling Defendants shall submit a written report by a registered professional engineer stating that the Response Work has been completed in full satisfaction of the requirements of this Consent Decree. The report shall contain the following statement, signed by a responsible corporate official of a Settling Defendant or the Settling Defendants' Project Coordinator:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If, after review of the written report, EPA, after reasonable opportunity to review and comment by the State, determines that any portion of the Response Work has not been completed in accordance with this Consent Decree, EPA will notify Settling Defendants in writing of the activities that must be undertaken by Settling Defendants pursuant to this Consent Decree to complete the Response Work; provided, however, that EPA may only require Settling Defendants to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the "scope of the remedy selected in the ROD," as that term is defined in Paragraph 15.b. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require the Settling Defendants to submit a schedule to EPA for approval pursuant to Section XII (Response Agencies' Approval of Plans and Other Submissions). Settling Defendants shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to their right to invoke the dispute resolution procedures set forth in Section XX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent request for Certification of Completion by Settling Defendants and after a reasonable opportunity for review and comment by the State, that the Response Work has been performed in accordance with this Consent Decree, EPA will so notify the Settling Defendants in writing.

XV. EMERGENCY RESPONSE

46. In the event of any action or occurrence during the performance of the Response Work which causes or threatens a release of Waste Material at or from OU1 that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Settling Defendants shall, subject to Paragraph 47, immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately

notify the Response Agencies' Project Coordinators, or, if a Response Agency Project Coordinator is unavailable, the Response Agency's Alternate Project Coordinator. If neither the EPA Project Coordinator nor the EPA Alternate Project Coordinator is available, the Settling Defendants shall notify the EPA Emergency Response Unit, Region 5. Settling Defendants shall take such actions in consultation with the EPA's Project Coordinator or other available authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plans, the Contingency Plans, and any other applicable plans or documents developed pursuant to the SOW. In the event that Settling Defendants fail to take appropriate response action as required by this Section, and EPA or, as appropriate, the State takes such action instead, Settling Defendants shall reimburse EPA and the State for all costs of the response action not inconsistent with the NCP pursuant to Paragraph 54 (Payment of Specified Future Response Costs).

47. Nothing in the preceding Paragraph or in this Consent Decree shall be deemed to limit any authority of the United States, or the State, to: (i) take all appropriate action to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, or (ii) direct or order such action, or seek an order from the Court, to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material at or from the Site, subject to Section XXII (Covenants Not to Sue by Plaintiffs).

XVI. NATURAL RESOURCE RESTORATION EFFORTS

48. Settling Defendants' Performance of Approved Restoration Work. As provided by the following Subparagraphs, the Settling Defendants may propose to the Plaintiffs or the Plaintiffs may propose to the Settling Defendants that the Settling Defendants perform certain

natural resource restoration work under this Consent Decree, with the costs to be paid or reimbursed from the Escrow Account.

a. Any restoration work that the Parties agree will be performed by one or both of the Settling Defendants under this Paragraph shall be performed in accordance with a written Project Implementation Plan, jointly approved by the Plaintiffs and by the other Trustees, as represented by the Trustee Council ("Approved Restoration Work"). The Project Implementation Plan shall: (i) describe the restoration work to be performed by one or both of the Settling Defendants; (ii) establish a schedule for performance of the work; and (iii) establish a project budget and a pre-approved cost ceiling for the work. The Project Implementation Plan (including the project budget and the pre-approved cost ceiling) may be revised during the course of the work by a written amendment approved by the Parties to this Consent Decree and by the other Trustees.

b. All Approved Restoration Work shall be consistent with the Trustees' Joint Restoration Plan and Environmental Assessment for the Lower Fox River and Green Bay (the "Restoration Plan").

c. All of the Settling Defendants' Allowable Restoration Work Costs (as defined by Subparagraph 9.b) for Approved Restoration Work shall be paid or reimbursed from the Escrow Account in accordance with Paragraph 11 of this Consent Decree and Appendix C. Dispute resolution provisions and force majeure provisions for Approved Restoration Work are set forth in Appendix E, which is incorporated herein by reference.

d. As provided by Paragraph 32, each Quarterly Report submitted to the Plaintiffs under this Consent Decree shall include, among other things, a complete and accurate written cost summary of all Allowable Restoration Work Costs for the reporting period, and a

summary of all Approved Restoration Work funded and performed under this Paragraph during the reporting period.

e. Within 60 days after completing all Approved Restoration Work under a particular Project Implementation Plan, the Settling Defendants shall submit a Final Project Report to DOI and WDNR summarizing: (i) all Approved Restoration Work performed under the Plan; and (ii) the total Allowable Restoration Work Costs for the Approved Restoration Work performed under the Plan. DOI and WDNR shall in turn provide the other Trustees copies of each Final Project Report.

49. Trustee-Sponsored Natural Resource Restoration Efforts.

a. All funds paid and disbursed to a Site-specific sub-account within the NRDAR Fund under Paragraph 53 shall be managed by DOI for the joint benefit and use of the Trustees to pay for Trustee-sponsored natural resource restoration efforts in accordance with the Restoration Plan. Consistent with the Restoration Plan, all such funds shall be applied toward the costs of restoration, rehabilitation, or replacement of injured natural resources at the Site, and/or acquisition of equivalent resources, including but not limited to any administrative costs and expenses necessary for, and incidental to, restoration, rehabilitation, replacement, and/or acquisition of equivalent resources planning, and any restoration, rehabilitation, replacement, and/or acquisition of equivalent resources undertaken.

b. Decisions regarding any dedication or expenditure of funds under this Paragraph shall be made by the Trustees, acting through the Trustee Council. Settling Defendants shall not be entitled to dispute – under Section XX (Dispute Resolution) or in any other forum or proceeding – any decision relating to funds or restoration efforts under this Paragraph.

XVII. PAYMENTS

50. Payments Into the Escrow Account.

a. Timing and Amount of Payments. Each Settling Defendant shall pay a total of $26,250,000 into the Escrow Account in accordance with the following schedule: (i) each Settling Defendant shall deposit $10,500,000 into the Escrow Account by no later than March 31, 2004; and (ii) each Settling Defendant shall deposit an additional $15,750,000 into the Escrow Account by no later than June 30, 2004. The payment requirements of this Paragraph are several obligations only, not joint obligations.

b. Nature of the Payments. Each Settling Defendant's payment under this Paragraph includes the following: (i) $25,000,000 to fund the Remedial Action; and (ii) $1,250,000 to fund a portion of the NRD Commitment.

51. Disbursements from the Escrow Account

a. As provided by this Consent Decree and Appendix C, certain funds from the Escrow Account shall be disbursed to the United States and the State as payment of sums due under this Consent Decree, and certain other funds from Escrow Account shall be disbursed to the Settling Defendants for payment or reimbursement of Allowable RD/RA Costs and/or Allowable Restoration Work Costs.

b. It is anticipated that certain funds may be disbursed from the Escrow Account for payment of certain Allowable RD/RA costs and/or Allowable Restoration Work Costs even before the Effective Date. In the event the Plaintiffs withdraw or withhold consent to this Consent Decree before entry, or the Court declines to enter the Consent Decree, the unexpended balance of the Escrow Account shall be disbursed to the Settling Defendants at their request.

52. Initial Payments to Plaintiffs.

a. Initial Payments to the United States. Within 30 days after the Date of Lodging, the Settling Defendants shall pay a total of $1,040,000 directly to the United States, with each Settling Defendant being responsible for paying one-half of that total amount ($520,000 each). The $1,040,000 paid to the United States under this Subparagraph shall be applied as follows: (i) $740,000 shall be directed to the Fox River Site Special Account within the EPA Hazardous Substance Superfund, as the EPA Past Cost Payments, and shall be retained and used to conduct or finance response actions at or in connection with the Site, or transferred by EPA to the EPA Hazardous Substance Superfund; and (ii) $300,000 shall be directed to the DOI NRDAR Fund, as the DOI Past Cost Payments.

b. State Past Cost Payments. Within 30 days after the Date of Lodging, the Settling Defendants shall pay a total of $10,000 directly to the State, as the State Past Cost Payments, with each Settling Defendant being responsible for paying one-half of that total amount ($5,000 each).

c. The payment requirements of this Paragraph are several obligations only, not joint obligations.

53. Subsequent Payments and Disbursements for Natural Resource Restoration. As provided by this Paragraph and by Appendix C, a total of $3,000,000 shall be paid and disbursed as the NRD Commitment.

a. By no later than January 31, 2004, the Settling Defendants shall pay a total of $500,000 of the NRD Commitment directly to a Site-specific sub-account within the DOI NRDAR Fund, with each Settling Defendant being responsible for paying one-half of that total amount ($250,000 each), to finance Trustee-sponsored natural resource damage restoration

efforts under Paragraph 49. The payment requirements of this Subparagraph are several obligations only, not joint obligations.

b. The remaining $2,500,000 of the NRD Commitment shall be disbursed from the Escrow Account in accordance with the schedule and requirements of Appendix C: (i) for payment or reimbursement of Allowable Restoration Work Costs incurred for Approved Restoration Work to be performed by the Settling Defendants under Paragraph 48; and/or (ii) for payment to a Site-specific sub-account within the DOI NRDAR Fund, to finance Trustee-sponsored natural resource damage restoration efforts under Paragraph 49.

54. Reimbursement of Specified Future Response Costs.

a. EPA Reimbursement. All Specified Future Response Costs incurred by the United States shall be reimbursed as follows:

(1) Except for costs under Section XV (Emergency Response) that are payable under Subparagraph 54.a.(2), all Specified Future Response Costs incurred and billed by the United States before Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b shall be reimbursed from the Escrow Account as provided by Appendix C, to the extent that such costs are not inconsistent with the National Contingency Plan.

(2) The Settling Defendants shall make direct payments to EPA for any Specified Future Response Costs incurred by the United States under Section XV (Emergency Response) and for any Specified Future Response Costs incurred and/or billed by the United States after Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b, to the extent such costs are not inconsistent with the National Contingency Plan. On a periodic basis, the United States will send Settling Defendants a bill requiring payment that includes an EPA cost summary, showing direct and indirect costs incurred by EPA

and its contractors, and a DOJ cost summary, showing costs incurred by DOJ and its contractors, if any. Settling Defendants shall make all payments within 30 days of Settling Defendants' receipt of each bill requiring payment, except as otherwise provided by Paragraph 68.

(3) All payments and disbursements received by EPA under this Subparagraph 54.a shall be deposited in the Fox River Site Special Account within the EPA Hazardous Substance Superfund, and shall be retained and used to conduct or finance response actions at or in connection with the Site, or transferred by EPA to the EPA Hazardous Substance Superfund.

b. State Reimbursement. All Specified Future Response Costs incurred by the State shall be reimbursed as follows:

(1) Except for costs under Section XV (Emergency Response) that are payable under Subparagraph 54.b.(2), all Specified Future Response Costs incurred and billed by the State before Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b shall be reimbursed from the Escrow Account as provided by Appendix C, to the extent that such costs are not inconsistent with the National Contingency Plan.

(2) The Settling Defendants shall make direct payments to the State for any Specified Future Response Costs incurred by the State under Section XV (Emergency Response) and for any Specified Future Response Costs incurred and/or billed by the State after Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b, to the extent such costs are not inconsistent with the National Contingency Plan. On a periodic basis, the State will send Settling Defendants a bill requiring payment that includes a WDNR cost summary, showing direct and indirect costs incurred by WDNR and its contractors, and a WDOJ cost summary, showing costs incurred by WDOJ and its contractors, if any. Settling Defendants

shall make all payments within 30 days of Settling Defendants' receipt of each bill requiring payment, except as otherwise provided by Paragraph 68.

c. The payment requirements of this Paragraph are joint obligations of both Settling Defendants, not several obligations.

55. Payment Instructions.

a. Payments to the United States.

(1) Initial Payments to the United States. The Initial Payments to the United States under Subparagraph 52.a shall be paid by FedWire Electronic Funds Transfer ("EFT") to the U.S. Department of Justice account in accordance with current EFT procedures, referencing the Lower Fox River and Green Bay Site and DOJ Case Number 90-11-2-1045/2. Payment shall be made in accordance with instructions to be provided by the Financial Litigation Unit of the United States Attorney's Office for the Eastern District of Wisconsin after the Date of Lodging. Any payments received by the Department of Justice after 4:00 p.m. (Eastern Time) will be credited on the next business day. At the time of payment, Settling Defendants shall ensure that notice that payment has been made is sent to DOJ, DOI, and EPA in accordance with Section XXVIII (Notices and Submissions) and to:

Financial Management Officer
U.S. Environmental Protection Agency, Region 5
Mail Code MF-10J
77 W. Jackson Blvd.
Chicago, IL 60604

Of the $1,040,000 total amount paid to the United States under Subparagraph 52.a: (i) $740,000 shall be deposited in the Fox River Site Special Account, to be retained and used to conduct or finance response actions at or in connection with the Site, or transferred by EPA to the EPA Hazardous Substance Superfund; and (ii) $300,000 shall be deposited in the DOI NRDAR Fund.

(2) All Other Payments to EPA. Except as provided by Subparagraph 55.a.(1), all payments to EPA under this Section or under Appendix C shall: (i) be made by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund, Fox River Site Special Account;" (ii) reference the Lower Fox River and Green Bay Site, EPA Site/Spill ID Number A565, and DOJ Case Number 90-11-2-1045/2; and (iii) indicate that the payment is for Specified Future Response Costs payable pursuant to this Consent Decree. All payments to EPA under Section XXI (Stipulated Penalties and Stipulated Damages) shall: (i) be made by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund;" (ii) reference the Lower Fox River and Green Bay Site, EPA Site/Spill ID Number A565, and DOJ Case Number 90-11-2-1045/2; and (iii) indicate that the payment is for stipulated penalties payable pursuant to this Consent Decree. All payments under this Subparagraph 55.a.(2) shall be sent to:

U.S. Environmental Protection Agency, Region 5
Program Accounting and Analysis Branch
P.O. Box 70753
Chicago, IL 60673

At the time of payment, Settling Defendants shall ensure that notice that payment has been made is sent to DOJ and EPA in accordance with Section XXVIII (Notices and Submissions) and to:

Financial Management Officer
U.S. Environmental Protection Agency, Region 5
Mail Code MF-10J
77 W. Jackson Blvd.
Chicago, IL 60604

(3) All Other Payments to the DOI NRDAR Fund. Except as provided by Subparagraph 55.a.(1), all payments to the DOI NRDAR Fund under this Section or under Appendix C shall: (i) be made by an electronic funds transfer transaction in accordance with

transfer instruction to be provided by the United States; (ii) reference the Lower Fox River and Green Bay Site and DOJ Case Number 90-11-2-1045/2; and (iii) indicate that the payment is being made pursuant to this Consent Decree with WTM I Company and P. H. Glatfelter Company. At the time of payment, Settling Defendants shall ensure that notice that payment has been made is sent to DOI, DOJ, WDNR, and WDOJ in accordance with Section XXVIII (Notices and Submissions) and to:

Department of the Interior
Natural Resource Damage Assessment and Restoration Program
Attn: Restoration Fund Manager
1849 C Street, N.W.
Mailstop 4449
Washington, DC 20240

DOI shall in turn notify the other Trustees that a payment to the DOI NRDAR Fund has been received under this Subparagraph.

(4) Payments to the United States for Stipulated Damages Under Paragraph 74. All payments to the United States under Paragraph 74 (Stipulated Damages Amounts - NRD Commitment) shall: (i) be made by a certified or cashier's check or checks made payable to "Treasurer, United States of America;" (ii) be tendered to the Financial Litigation Unit of the Office of the United States Attorney for the Eastern District of Wisconsin; and (iii) be accompanied by a letter referencing the Lower Fox River and Green Bay Site and indicating that the payment is for stipulated damages payable pursuant to Paragraph 74 of this Consent Decree with WTM I Company and P. H. Glatfelter Company. At the time of payment, Settling Defendants shall ensure that notice that payment has been made is sent to DOI and DOJ in accordance with Section XXVIII (Notices and Submissions).

b. Payments to the State. All payments to the State under this Section or under Section XXI (Stipulated Penalties and Stipulated Damages) shall: (i) be made by a certified or cashier's check or checks made payable to "Wisconsin Department of Natural Resources;" (ii) reference the Lower Fox River and Green Bay Site; (iii) indicate that the payment is being made pursuant to this Consent Decree with WTM I Company and P. H. Glatfelter Company; and (iv) be sent to:

Wisconsin Department of Natural Resources
Attn: Greg Hill, State Project Coordinator
101 S. Webster St.
Madison, WI 53703

At the time of payment, Settling Defendants shall ensure that notice that payment has been made is sent to the State in accordance with Section XXVIII (Notices and Submissions).

XVIII. INDEMNIFICATION AND INSURANCE

56. Settling Defendants' Indemnification of the United States and the State.

a. The United States and the State do not assume any liability by entering into this agreement or by virtue of any designation of Settling Defendants as EPA's authorized representatives under Section 104(e) of CERCLA. Settling Defendants shall indemnify, save and hold harmless the United States, the State, and their officials, agents, employees, contractors, subcontractors, or representatives for or from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Settling Defendants, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Consent Decree, including, but not limited to, any claims arising from any designation of Settling Defendants as EPA's authorized representatives under Section 104(e) of CERCLA. Further, the Settling Defendants

agree to pay the United States and the State all costs they incur including, but not limited to, attorneys fees and other expenses of litigation and settlement arising from, or on account of, claims made against the United States or the State based on negligent or other wrongful acts or omissions of Settling Defendants, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Consent Decree. Neither the United States nor the State shall be held out as a party to any contract entered into by or on behalf of Settling Defendants in carrying out activities pursuant to this Consent Decree. Neither the Settling Defendants nor any such contractor shall be considered an agent of the United States or the State.

b. The United States and the State shall give Settling Defendants notice of any claim for which the United States or the State plans to seek indemnification pursuant to Paragraph 56, and shall consult with Settling Defendants prior to settling such claim.

c. Nothing contained in this Consent Decree is intended to limit Settling Defendants' potential for insurance coverage.

57. Settling Defendants waive all claims against the United States and the State for damages or reimbursement or for set-off of any payments made or to be made to the United States or the State, arising from or on account of any contract, agreement, or arrangement between any one or more of Settling Defendants and any person for performance of Response Work on or relating to OU1 or any Approved Restoration Work, including, but not limited to, claims on account of construction delays. In addition, Settling Defendants shall indemnify and hold harmless the United States and the State with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between any one or more of Settling Defendants and any person for performance of Response Work on or

relating to OU1 or any Approved Restoration Work, including, but not limited to, claims on account of construction delays.

58. No later than 15 days before commencing any on-site Remedial Design work under this Consent Decree, Settling Defendant WTM I Company shall secure, and shall maintain throughout the Remedial Design, comprehensive general liability insurance with limits of 1 million dollars, combined single limit, and automobile liability insurance with limits of 1 million dollars, combined single limit, naming the United States and the State as additional insureds. No later than 15 days before commencing any on-site Remedial Action work under this Consent Decree, Settling Defendants shall secure, and shall maintain until the first anniversary of EPA's Certification of Completion of the Remedial Action pursuant to Subparagraph 44.b, comprehensive general liability insurance with limits of 5 million dollars, combined single limit, and automobile liability insurance with limits of 2 million dollars, combined single limit, naming the United States and the State as additional insureds. In addition, for the duration of this Consent Decree, Settling Defendants shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Response Work on behalf of Settling Defendants in furtherance of this Consent Decree. Prior to commencement of the Response Work under this Consent Decree, Settling Defendants shall provide the Response Agencies certificates of such insurance and a copy of each insurance policy. Settling Defendants shall resubmit such certificates and copies of policies each year on the anniversary of the Effective Date. If Settling Defendants demonstrate by evidence satisfactory to the Response Agencies that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then, with respect to that contractor or

subcontractor, Settling Defendants need provide only that portion of the insurance described above which is not maintained by the contractor or subcontractor. Costs incurred by Settling Defendants to comply with this paragraph shall be considered Allowable RD/RA Costs.

XIX. FORCE MAJEURE EVENTS

59. Except as provided by Paragraph 2 of Appendix E, if any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a Force Majeure Event, the Settling Defendants or their contractors shall orally notify the Response Agencies' Project Coordinators or, in a Response Agency's Project Coordinator's absence, the response Agency's Alternate Project Coordinator or, in the event both of EPA's designated representatives are unavailable, Superfund Division Director for EPA Region 5, within 5 working days of when Settling Defendants first knew that the event might cause a delay. Within 10 working days thereafter, Settling Defendants shall provide the Response Agencies a written explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; the Settling Defendants' rationale for attributing such delay to a Force Majeure Event if they intend to assert such a claim; and a statement as to whether, in the opinion of the Settling Defendants, such event may cause or contribute to an endangerment to public health, welfare or the environment. The Settling Defendants shall include with any notice all available documentation supporting their claim that the delay was attributable to a Force Majeure Event. Failure to comply with the above requirements shall preclude Settling Defendants from asserting any claim of a Force Majeure Event for that event for the period of time of such failure to comply, and for any additional delay caused by such failure. Settling Defendants shall be

deemed to know of any circumstance of which Settling Defendants, any entity controlled by Settling Defendants, or Settling Defendants' contractors knew or should have known.

60. If EPA, after a reasonable opportunity for review and comment by WDNR, agrees that the delay or anticipated delay is attributable to a Force Majeure Event, the time for performance of the obligations under this Consent Decree that are affected by the Force Majeure Event will be extended by EPA, after a reasonable opportunity for review and comment by WDNR, for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the Force Majeure Event shall not, of itself, extend the time for performance of any other obligation. If EPA, after a reasonable opportunity for review and comment by WDNR, does not agree that the delay or anticipated delay has been or will be caused by a Force Majeure Event, EPA will notify the Settling Defendants in writing of its decision. If EPA, after a reasonable opportunity for review and comment by WDNR, agrees that the delay is attributable to a Force Majeure Event, EPA will notify the Settling Defendants in writing of the length of the extension, if any, for performance of the obligations affected by the Force Majeure Event.

61. If the Settling Defendants elect to invoke the dispute resolution procedures set forth in Section XX (Dispute Resolution), they shall do so no later than 15 days after receipt of EPA's notice. In any such proceeding, Settling Defendants shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a Force Majeure Event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Settling Defendants complied with the requirements of Paragraphs 57 and 58, above. If Settling Defendants carry this burden, the delay at issue shall be

deemed not to be a violation by Settling Defendants of the affected obligation of this Consent Decree identified to EPA and the Court.

XX. DISPUTE RESOLUTION

62. Except as provided by Paragraph 3 of Appendix E, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes between Settling Defendants and the Plaintiffs arising under or with respect to this Consent Decree. However, the procedures set forth in this Section shall not apply to actions by the Plaintiffs to enforce obligations of the Settling Defendants that have not been disputed in accordance with this Section. The dispute resolution procedures of this Section shall not apply to any disputes between Settling Defendants and the Plaintiffs not arising under or with respect to this Consent Decree.

63. Informal Dispute Resolution. Any dispute which arises under or with respect to this Consent Decree shall in the first instance be the subject of informal negotiations between the parties to the dispute. The period for informal negotiations shall not exceed 20 days from the time the dispute arises, unless it is modified by written agreement of the parties to the dispute. The dispute shall be considered to have arisen when one party sends the other parties a written Notice of Dispute.

64. Formal Dispute Resolution.

a. Except as provided by Paragraph 3 of Appendix E, in the event that the parties cannot resolve a dispute by informal negotiations under Paragraph 63, then the position advanced by EPA shall be considered binding unless, within 10 days after the conclusion of the informal negotiation period, Settling Defendants invoke the formal dispute resolution procedures of this Section by serving on the Plaintiffs a written Statement of Position on the matter in

dispute, including, but not limited to, any factual data, analysis or opinion supporting that position and any supporting documentation relied upon by the Settling Defendants. The Statement of Position shall specify the Settling Defendants' position as to whether formal dispute resolution should proceed under Paragraph 65 or Paragraph 66.

b. Within 30 days after receipt of Settling Defendants' Statement of Position, EPA will serve on Settling Defendants its Statement of Position, including, but not limited to, any factual data, analysis, or opinion supporting that position and all supporting documentation relied upon by EPA. EPA's Statement of Position shall include a statement as to whether formal dispute resolution should proceed under Paragraph 65 or 66. Within 10 days after receipt of EPA's Statement of Position, Settling Defendants may submit a Reply.

c. If there is disagreement between EPA and the Settling Defendants as to whether dispute resolution should proceed under Paragraph 65 or 66, the parties to the dispute shall follow the procedures set forth in the paragraph determined by EPA to be applicable. However, if the Settling Defendants ultimately appeal to the Court to resolve the dispute, the Court shall determine which paragraph is applicable in accordance with the standards of applicability set forth in Paragraphs 65 and 66.

65. Formal dispute resolution for disputes pertaining to the selection or adequacy of any response action, any disputes under Paragraph 98, and all other disputes that are accorded review on the administrative record under applicable principles of administrative law shall be conducted pursuant to the procedures set forth in this Paragraph. For purposes of this Paragraph, the adequacy of any response action includes, without limitation: (i) the adequacy or appropriateness of plans, procedures to implement plans, or any other items requiring approval by the Response Agencies under this Consent Decree; and (ii) the adequacy of the performance

of response actions taken pursuant to this Consent Decree. Nothing in this Consent Decree shall be construed to allow any dispute by Settling Defendants under this Consent Decree regarding the validity of the ROD's provisions.

a. An administrative record of the dispute shall be maintained by EPA and shall contain all statements of position, including supporting documentation, submitted pursuant to this Section. Where appropriate, EPA may allow submission of supplemental statements of position by the parties to the dispute.

b. The Superfund Division Director for EPA Region 5 will issue a final administrative decision resolving the dispute based on the administrative record described in Subparagraph 65.a. This decision shall be binding upon the Settling Defendants, subject only to the right to seek judicial review pursuant to Subparagraphs 65.c and d.

c. Any administrative decision made by EPA pursuant to Subparagraph 65.b shall be reviewable by this Court, provided that a motion for judicial review of the decision is filed by the Settling Defendants with the Court and served on all Parties within 20 days of receipt of EPA's decision. The motion shall include a description of the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of this Consent Decree. The United States and the State may file a response to Settling Defendants' motion.

d. In proceedings on any dispute governed by this Paragraph, Settling Defendants shall have the burden of demonstrating that the decision of the Superfund Division Director for EPA Region 5 is arbitrary and capricious or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the administrative record compiled pursuant to Subparagraph 65.a.

66. Formal dispute resolution for disputes that neither pertain to the selection or adequacy of any response action nor are otherwise accorded review on the administrative record under applicable principles of administrative law, shall be governed by this Paragraph.

a. Following receipt of Settling Defendants' Statement of Position submitted pursuant to Paragraph 64, and after service of EPA's Statement of Position and any Reply, the Superfund Division Director for EPA Region 5 will issue a final decision resolving the dispute. The Superfund Division Director's decision shall be binding on the Settling Defendants unless, within 20 days of receipt of the decision, the Settling Defendants file with the Court and serve on the parties a motion for judicial review of the decision setting forth the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Decree. The United States may file a response to Settling Defendants' motion.

b. Notwithstanding Paragraph K of Section I (Background) of this Consent Decree, judicial review of any dispute governed by this Paragraph shall be governed by applicable principles of law.

67. The invocation of formal dispute resolution procedures under this Section shall not extend, postpone or affect in any way any obligation of the Settling Defendants under this Consent Decree, not directly in dispute, unless EPA or the Court agrees otherwise. Stipulated penalties with respect to the disputed matter shall continue to accrue but payment shall be stayed pending resolution of the dispute as provided in Paragraph 79. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Consent Decree. In the event that the Settling Defendants do not

prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XXI (Stipulated Penalties).

68. Disputes Regarding Specified Future Response Costs. Settling Defendants may contest payment of any Specified Future Response Costs under Paragraph 54 if they determine that the United States or the State has made an accounting error or if they allege that a cost item that is included represents costs that are inconsistent with the NCP. For any such costs incurred and billed before Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b, notice of any such objection shall be submitted in writing as provided by Subparagraph 5.c of Appendix C. For any such costs incurred and billed after Certification of Completion of Remedial Action by EPA pursuant to Subparagraph 44.b, notice of any such objection shall be given in writing within 30 days of receipt of the bill. A copy of any notice of objection shall be sent to the United States (if the United States' accounting is being disputed) or to the State (if the State's accounting is being disputed) pursuant to Section XXVIII (Notices and Submissions). Any such notice of objection shall specifically identify the contested Specified Future Response Costs and the basis for objection. In the event of an objection, all uncontested Specified Future Response Costs shall immediately be paid to the United States or the State in the manner described in Paragraph 54. Upon submitting a notice of objection, the Settling Defendants shall initiate the Dispute Resolution procedures in Section XX (Dispute Resolution). If the United States or the State prevails in the dispute, within 10 days of the resolution of the dispute, all sums due (with accrued Interest) shall be paid to EPA (if the United States' cost are disputed) or to the State (if the State's costs are disputed) in the manner described in Paragraph 54. If the Settling Defendants prevail concerning any aspect of the contested costs, the portion of the costs (plus associated accrued interest) for which they did not prevail shall be

disbursed to EPA or the State, as appropriate, in the manner described in Paragraph 54; and the amount that was successfully contested need not be paid to EPA or to the State. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XX (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding reimbursement of the United States and the State for their Specified Future Response Costs.

XXI. STIPULATED PENALTIES AND STIPULATED DAMAGES

69. Settling Defendants shall be liable for stipulated penalties and/or stipulated damages in the amounts set forth in this Section for failure to comply with the requirements of this Consent Decree specified below, unless excused under Section XIX (Force Majeure Events) or Paragraph 2 (Force Majeure Events for Restoration Work) of Appendix E. "Compliance" by Settling Defendants shall include completion of the activities under this Consent Decree or any work plan or other plan approved under this Consent Decree identified below in accordance with all applicable requirements of law, this Consent Decree, the SOW, and any plans or other documents approved by the Plaintiffs pursuant to this Consent Decree and within the specified time schedules established by and approved under this Consent Decree.

70. Stipulated Penalty Amounts - Failure to Make Payments. A Settling Defendant shall be liable for stipulated penalties in the amounts set forth below for each day of violation for that Settling Defendant's failure to make payments as required under this Consent Decree:

VIOLATION	PENALTY PER DAY		
	UP TO 10 DAYS	11-30 DAYS	OVER 30 DAYS
Failure to deposit funds in the Escrow Account as required by Subparagraph 50.a:	$10,000	$15,000	$25,000
Failure to make any Initial Payments to Plaintiffs as required by Paragraph 52:	$1,000	$2,500	$5,000
Failure to make any payment of Specified Future Response Costs as required by Subparagraphs 54.a.(2) or 54.b.(2):	$1,000	$2,500	$5,000

Any stipulated penalties for failure to deposit funds in the Escrow Account shall be divided evenly between EPA and the State. Any stipulated penalties for failure to make any Initial Payments to Plaintiffs shall be divided between the United States and the State in proportion to the amounts that are unpaid or overdue. Any stipulated penalties for failure to make payment of Specified Future Response Costs shall be paid to the Party that rendered the bill involved.

71. Stipulated Penalty Amounts - Response Work. Settling Defendants shall be liable for stipulated penalties in the amounts set forth below for each day of violation for failure to perform Response Work as required under this Consent Decree:

VIOLATION	PENALTY PER DAY		
	UP TO 10 DAYS	11-30 DAYS	OVER 30 DAYS
Failure to perform the Remedial Action in accordance with the schedule and requirements established by the Remedial Action Work Plan, as mandated by Paragraph 14:	$2,000	$5,000	$10,000
Failure to perform O&M or Long Term Monitoring in accordance with the schedule and requirements established by the Final Operation and Maintenance Plan, as mandated by Paragraph 14, Paragraph 18, and Paragraph 19:	$1,000	$2,500	$5,000
Failure to perform Institutional Controls requirements in accordance with the schedule and requirements established by the Institutional Controls Plan, as mandated by Paragraph 14 and Paragraph 18:	$1,000	$2,500	$5,000
Failure to undertake response action as required by Section XV (Emergency Response):	$5,000	$10,000	$20,000

Any stipulated penalties under this Paragraph shall be divided evenly between EPA and the State.

72. Stipulated Penalty Amount - Response Work Takeover. In the event that the Response Agencies assume performance of a portion or all of the Response Work pursuant to Paragraph 90 of Section XXII (Covenants Not to Sue by Plaintiffs), Settling Defendants shall be liable for a stipulated penalty in the amount of $250,000. Any stipulated penalties under this Paragraph shall be divided evenly between EPA and the State.

73. Stipulated Penalty Amounts - Response Work Reports and Submissions. Settling Defendants shall be liable for stipulated penalties in the amounts set forth below for each day of violation for failure to comply with Response Work reporting and submission requirements under this Consent Decree:

VIOLATION	PENALTY PER DAY		
	UP TO 10 DAYS	11-30 DAYS	OVER 30 DAYS
Failure to submit a Remedial Action Work Plan or any other Remedial Action Plan as Required by Paragraph 14:	$2,000	$4,000	$5,000
Failure to submit any Monthly RD/RA Progress Report as required by Paragraph 31:	$1,000	$2,000	$2,500
Failure to submit any Quarterly Report as required by Paragraph 32:	$1,000	$2,000	$2,500
Failure to comply with the Release Reporting requirements under Paragraph 33:	$1,000	$2,000	$2,500

Any stipulated penalties under this Paragraph shall be divided evenly between the United States and the State.

74. Stipulated Damages Amounts - NRD Commitment. A Settling Defendant shall be liable for stipulated damages in the amounts set forth below for each day of violation for that Settling Defendant's failure to comply with requirements under this Consent Decree relating to the NRD Commitment:

VIOLATION	DAMAGES PER DAY		
	UP TO 10 DAYS	11-30 DAYS	OVER 30 DAYS
Failure to make the Subsequent Payment for Natural Resource Restoration as required by Subparagraph 53.a:	$1,000	$2,500	$5,000
Failure to perform Approved Restoration Work in accordance with an approved Project Implementation Plan, as required by Paragraph 48:	$500	$1,000	$1,500
Failure to submit a Final Project Report on Approved Restoration Work, as required by Subparagraph 48.e:	$500	$1,000	$2,000

Any stipulated damages under this Paragraph shall be divided evenly between the United States and the State.

75. All stipulated penalties and/or stipulated damages shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: (i) with respect to a deficient submission under Section XII (Response Agencies' Approval of Plans and Other Submissions), during the period, if any, beginning on the 31st day after the response Agencies' receipt of such submission until the date that the Response Agencies notify Settling Defendants of any deficiency; (ii) with respect to a decision by the Plaintiffs under Paragraph 3 (Dispute Resolution for Restoration Work) of Appendix E, during the period, if any, beginning on the 21st day after the date that Settling Defendants' Statement of Position is received until the date that the Plaintiffs issue a final administrative decision regarding such dispute; (iii) with respect to a decision by the Superfund Division Director for Region 5 under Subparagraph 65.b or 66.a of Section XX

(Dispute Resolution), during the period, if any, beginning on the 21st day after the date that Settling Defendants' reply to EPA's Statement of Position is received until the date that the Superfund Division Director issues a final decision regarding such dispute; or (iv) with respect to judicial review by this Court of any dispute under Section XX (Dispute Resolution) or Paragraph 3 of Appendix E, during the period, if any, beginning on the 31st day after the Court's receipt of the final submission regarding the dispute until the date that the Court issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous accrual of separate stipulated penalties and/or stipulated damages for separate violations of this Consent Decree.

76. Following the Plaintiffs' determination that Settling Defendants have failed to comply with a requirement of this Consent Decree, the Plaintiffs may give Settling Defendants written notification of the same and describe the noncompliance. The Plaintiffs may send the Settling Defendants a written demand for the payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether the Plaintiffs have notified the Settling Defendants of a violation.

77. Settling Defendants shall pay any stipulated penalties or stipulated damages accruing under this Section directly to the Plaintiffs, and shall not be entitled to seek payment or reimbursement of such penalties or damages from the Disbursement Special Account or from the Escrow Account under Paragraph 10, Paragraph 11, Appendix B, or Appendix C. All penalties or damages accruing under this Section shall be due and payable to the United States and the State within 30 days of the Settling Defendants' receipt of a demand for payment by the Plaintiffs, unless Settling Defendants invoke the Dispute Resolution procedures under Paragraph 3 of Appendix E or Section XX (Dispute Resolution). All payments under this

Section shall be paid by certified or cashier's check(s), shall indicate that the payment is for stipulated penalties or stipulated damages, and shall be submitted to EPA, to the State, and/or to the DOI NRDAR Fund, as appropriate, in the manner specified by Paragraph 55 (Payment Instructions).

78. The payment of penalties or damages under this Section shall not alter in any way Settling Defendants' obligation to complete the performance of the Response Work or any Approved Restoration Work required under this Consent Decree.

79. Penalties and/or damages shall continue to accrue as provided in Paragraph 75 during any dispute resolution period, but need not be paid until the following:

a. If the dispute is resolved by agreement or by an administrative decision that is not appealed to this Court, accrued penalties and/or damages determined to be owing shall be paid to within 15 days of the agreement or the receipt of the administrative decision;

b. If the dispute is appealed to this Court and the Plaintiffs prevail in whole or in part, Settling Defendants shall pay all accrued penalties and/or damages determined by the Court to be owed to the Plaintiffs within 60 days of receipt of the Court's decision or order, except as provided in Subparagraph c below;

c. If the District Court's decision is appealed by any Party, Settling Defendants shall pay all accrued penalties and/or damages determined by the District Court to be owing to the United States or the State into an interest-bearing escrow account within 60 days of receipt of the Court's decision or order. Penalties and/or damages shall be paid into this account as they continue to accrue, at least every 60 days. Within 15 days of receipt of the final appellate court decision, the Escrow Agent shall pay the balance of the account to the Plaintiffs or to Settling Defendants to the extent that they prevail.

80. If Settling Defendants fail to pay stipulated penalties and/or stipulated damages when due, the United States or the State may institute proceedings to collect the penalties and/or damages, as well as interest. Settling Defendants shall pay Interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 77.

81. Nothing in this Consent Decree shall be construed as prohibiting, altering, or in any way limiting the ability of the United States or the State to seek any other remedies or sanctions available by virtue of Settling Defendants' violation of this Decree or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Section 122(l) of CERCLA; provided, however, that the United States shall not seek civil penalties pursuant to Section 122(l) of CERCLA for any violation for which a stipulated penalty is provided herein, except in the case of a willful violation of the Consent Decree.

82. Notwithstanding any other provision of this Section, the United States may, in its unreviewable discretion, waive any portion of stipulated penalties or stipulated damages payable to the United States that have accrued pursuant to this Consent Decree. Similarly, notwithstanding any other provision of this Section, the State may, in its unreviewable discretion, waive any portion of stipulated penalties or stipulated damages payable to the State that have accrued pursuant to this Consent Decree.

XXII. COVENANTS NOT TO SUE BY PLAINTIFFS

83. General Scope of Covenants

a. As specified by the covenants not to sue contained in Paragraphs 84 and 85, and subject to the reservations contained in Paragraphs 86, 87, 89, and 98, this Consent Decree is intended to addresses the Settling Defendants' alleged liability under Sections 106 and

107(a) of CERCLA for "OU1 Response Activities and Costs," as that term is defined by the following Subparagraph 83.b.

b. For the purpose of this Consent Decree, the term "OU1 Response Activities and Costs" is defined as all response activities for Operable Unit 1 performed or to be performed after July 1, 2003, as well as all costs for response activities for Operable Unit 1 incurred after July 1, 2003. The "OU1 Response Activities and Costs" shall therefore include, but shall not be limited to, all Response Work performed or to be performed after July 1, 2003 and all Specified Future Response Costs.

84. United States' Covenant Not To Sue. In consideration of the actions that will be performed by the Settling Defendants pursuant to this Consent Decree and the payments that will be made to the Plaintiffs under the terms of the Consent Decree, and except as specifically provided by Paragraphs 86, 87, 89, and 98, the United States covenants not to sue or to take administrative action against Settling Defendants for OU1 Response Activities and Costs pursuant to: (i) CERCLA Sections 106 and 107, 42 U.S.C. §§ 9606 and 9607; (ii) RCRA Section 7003, 42 U.S.C. § 6973; (iii) Clean Water Act Section 311, 33 U.S.C. § 1321; (iv) Toxic Substances Control Act Section 7, 15 U.S.C. § 2606; or (v) Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. § 403. Except with respect to future liability, these covenants not to sue shall take effect upon the receipt by Plaintiffs of the payments required by Paragraph 52 (Initial Payments to Plaintiffs). With respect to future liability, these covenants not to sue shall take effect upon Certification of Completion of Remedial Action by EPA pursuant to Paragraph 44.b. These covenants not to sue are conditioned upon the satisfactory performance by Settling Defendants of their obligations under this Consent Decree. These covenants not to sue extend only to the Settling Defendants and do not extend to any other person; provided, however that

these covenants not to sue (and the reservations thereto) shall also apply to Settling Defendants' Related Parties.

85. State's Covenant Not To Sue. In consideration of the actions that will be performed by the Settling Defendants and the payments that will be made to the Plaintiffs under the terms of the Consent Decree, and except as specifically provided by Paragraphs 86, 87, 89, and 98, the State covenants not to sue or to take administrative action against Settling Defendants for OU1 Response Activities and Costs pursuant to: (i) CERCLA Section 107, 42 U.S.C. § 9607; (ii) RCRA Section 700, 42 U.S.C. § 6972; (iii) Clean Water Act Section 505, 33 U.S.C. § 1365; (iv) Toxic Substances Control Act Section 20, 15 U.S.C. § 2619; or (v) Wisconsin statutory or common law. Except with respect to future liability, these covenants not to sue shall take effect upon the receipt by Plaintiffs of the payments required by Paragraph 52 (Initial Payments to Plaintiffs). With respect to future liability, these covenants not to sue shall take effect upon Certification of Completion of Remedial Action by EPA pursuant to Paragraph 44.b. These covenants not to sue are conditioned upon the satisfactory performance by Settling Defendants of their obligations under this Consent Decree. These covenants not to sue extend only to the Settling Defendants and do not extend to any other person; provided, however that these covenants not to sue (and the reservations thereto) shall also apply to Settling Defendants' Related Parties.

86. Pre-certification Reservations. Notwithstanding any other provision of this Consent Decree, the United States and the State reserve, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Settling Defendants (i) to perform further response

actions relating to OU1 or (ii) to reimburse the United States or the State for additional costs of response if, prior to Certification of Completion of the Remedial Action:

(1) conditions relating to OU1, previously unknown to EPA, are discovered, or

(2) information, previously unknown to EPA, is received, in whole or in part,

and these previously unknown conditions or information together with any other relevant information indicates that the Remedial Action is not protective of human health or the environment.

87. Post-certification Reservations. Notwithstanding any other provision of this Consent Decree, the United States and the State reserve, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Settling Defendants (i) to perform further response actions relating to OU1 or (ii) to reimburse the United States or the State for additional costs of response if, subsequent to Certification of Completion of the Remedial Action:

(1) conditions relating to OU1, previously unknown to EPA, are discovered, or

(2) information, previously unknown to EPA, is received, in whole or in part,

and these previously unknown conditions or this information together with other relevant information indicate that the Remedial Action is not protective of human health or the environment.

88. For purposes of Paragraph 86, the information and the conditions known to EPA shall include only that information and those conditions known to EPA as of the date the ROD was signed and set forth in the Record of Decision and the administrative record supporting the Record of Decision. For purposes of Paragraph 87, the information and the conditions known to EPA shall include only that information and those conditions known to EPA as of the date of Certification of Completion of the Remedial Action and set forth in the Record of Decision, the administrative record supporting the Record of Decision, the post-ROD administrative record, or in any information received by EPA pursuant to the requirements of this Consent Decree prior to Certification of Completion of the Remedial Action.

89. General Reservations of Rights. The covenants not to sue set forth above do not pertain to any matters other than those expressly specified in Paragraphs 84 and Paragraph 85. The United States and the State reserve, and this Consent Decree is without prejudice to, all rights against Settling Defendants with respect to all other matters, including but not limited to, the following:

a. claims based on a failure by Settling Defendants to meet a requirement of this Consent Decree;

b. liability for performance of response activities or for response costs falling outside the definition of the OU1 Response Activities and Costs, including but not limited to: (i) liability arising from the past, present, or future disposal, release, or threat of release of Waste Materials outside of the Site; (ii) liability for operable units at the Site other than OU1; and (iii) liability for response costs for OU1 incurred by the United States or by the State before the Date of Lodging (specifically including, but not limited to, any additional liability for Unresolved EPA Past Costs or for Unresolved State Past Costs);

c. liability for future disposal of Waste Material at OU1, other than as provided in the ROD, the Response Work, or otherwise ordered by EPA;

d. liability, prior to Certification of Completion of the Remedial Action, for additional response actions at OU1 that EPA determines are necessary to achieve Performance Standards, but that cannot be required pursuant to Paragraph 15 (Modification of the SOW or Related Work Plans);

e. liability for damages for injury to, destruction of, or loss of natural resources at the Site, and for the costs of any natural resource damage assessments relating to the Site (specifically including, but not limited to, any additional liability for natural resource damages beyond the NRD Commitment or for Unresolved DOI Past Costs);

f. liability for violations of federal or state law which occur during or after implementation of the Remedial Action; and

g. criminal liability.

90. Response Work Takeover In the event EPA, in consultation with WDNR, determines that Settling Defendants have ceased implementation of any portion of the Response Work, are seriously or repeatedly deficient or late in their performance of the Response Work, or are implementing the Response Work in a manner which may cause an endangerment to human health or the environment, EPA and/or WDNR may assume the performance of all or any portions of the Response Work as EPA determines necessary. Settling Defendants may invoke the procedures set forth in Section XX (Dispute Resolution), Paragraph 65, to dispute EPA's determination that takeover of the Response Work is warranted under this Paragraph. Subject to the funding limitations and special reservations of rights specified in Section XXIV, costs

incurred by the United States and/or the State in performing the Response Work pursuant to this Paragraph shall be considered Specified Future Response Costs.

91. Notwithstanding any other provision of this Consent Decree, the United States and the State retain all authority and reserve all rights to take any and all response actions authorized by law.

XXIII. COVENANTS BY SETTLING DEFENDANTS

92. Settling Defendants' Covenant Not to Sue. Subject to the reservations in Paragraph 93 and Paragraph 98, Settling Defendants hereby covenant not to sue and agree not to assert any claims or causes of action against the United States or the State with respect to the EPA Past Cost Payments, the State Past Cost Payments, the DOI Past Cost Payments, the NRD Commitment, the OU1 Response Activities and Costs, or this Consent Decree, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund (established pursuant to the Internal Revenue Code, 26 U.S.C. § 9507) through CERCLA Sections 106(b)(2), 107, 111, 112, 113 or any other provision of law;

b. any claims against the United States (including any department, agency or instrumentality of the United States) or State (including any department, agency or instrumentality of the States) under CERCLA Sections 107 or 113, 42 U.S.C. §§ 9607 or 9613, related to the EPA Past Cost Payments, the State Past Cost Payments, the DOI Past Cost Payments, the NRD Commitment, or the OU1 Response Activities and Costs;

c. any claims against the United States (including any department, agency or instrumentality of the United States) or State (including any department, agency or instrumentality of the States) under the United States Constitution, the Wisconsin Constitution,

the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law, related to the EPA Past Cost Payments, the State Past Cost Payments, the DOI Past Cost Payments, the NRD Commitment, or the OU1 Response Activities and Costs;

d. any direct or indirect claim for disbursement from the Disbursement Special Account (established pursuant to this Consent Decree), except as provided by Paragraph 10; or

e. any direct or indirect claim for disbursement from the Fox River Site Special Account.

Except as provided in Paragraph 95 (Waiver of Claims Against De Micromis Parties) and Paragraph 105 (Waiver of Claim-Splitting Defenses), these covenants not to sue shall not apply in the event that the United States or the State brings a cause of action or issues an order pursuant to the reservations set forth in Paragraph 86, Paragraph 87, or Subparagraphs 89.b to 89.e, but only to the extent that Settling Defendants' claims arise from the same response action, response costs, or damages that the United States or the State is seeking pursuant to the applicable reservation.

93. The Settling Defendants reserve, and this Consent Decree is without prejudice to, claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States while acting within the scope of his office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, any such claim shall not include a claim for any

damages caused, in whole or in part, by the act or omission of any person, including any contractor, who is not a federal employee as that term is defined in 28 U.S.C. § 2671; nor shall any such claim include a claim based on EPA's selection of response actions, or the oversight or approval of the Settling Defendants' plans or activities. The foregoing applies only to claims which are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in a statute other than CERCLA;

94. Nothing in this Consent Decree shall be deemed to constitute preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

95. Waiver of Claims Against De Micromis Parties.

a. Settling Defendants agree not to assert any claims and to waive all claims or causes of action that they may have for all matters relating to the Site, including for contribution, against any person where the person's liability to Settling Defendants with respect to the Site is based solely on having arranged for disposal or treatment, or for transport for disposal or treatment, of hazardous substances at the Site, or having accepted for transport for disposal or treatment of hazardous substances at the Site, if the materials contributed by such person to the Site contained less than 2.0 kilograms of polychlorinated biphenyls (which amounts to 0.002% of the total mass of polychlorinated biphenyls remaining at the Site, as estimated by the December 2002 Remedial Investigation Report).

b. This waiver shall not apply to any claim or cause of action against any person meeting the above criteria if EPA has determined that the materials contributed to the Site by such person contributed or could contribute significantly to the costs of response at the Site. This waiver also shall not apply with respect to any defense, claim, or cause of action that a

Settling Defendant may have against any person if such person asserts a claim or cause of action relating to the Site against such Settling Defendant.

XXIV. CONSENT DECREE FUNDING LIMITATION AND SPECIAL RESERVATIONS OF RIGHTS

96. Generally. The Parties currently anticipate that the funds to be deposited in the Escrow Account and the Disbursement Special Account under this Consent Decree (together with the interest earned on such deposits) will be sufficient to fund the completion of the Response Work, after all other payments and reimbursements from those Accounts have been made as required under this Consent Decree. This Section addresses the anticipated risk of a future determination that those funds may not be sufficient for that purpose. If that determination is made, the Parties' rights and obligations shall be governed by this Section, and the insufficiency shall not be considered a change in circumstances or a basis for seeking non-consensual relief from this Consent Decree pursuant to Fed. R. Civ. P. 60(b).

97. Funding Limitation. Except as expressly provided by Subparagraph 98.f.(3), this Consent Decree is not intended to impose any obligation on Settling Defendants to finance the Remedial Action with funding sources other than the Disbursement Special Account and the Escrow Account, or to deposit funds in those Accounts other than as required by Subparagraph 50.a.

98. Special Reservations of Rights Based on Costs of the Remedial Action.

a. EPA Insufficiency Determination. EPA, in consultation with WDNR, shall periodically evaluate and project whether the total aggregated balance in the Escrow Account and the Disbursement Special Account is likely to be sufficient to fund the completion of the Response Work, after all other payments and reimbursements from those two Accounts

have been made as required under this Consent Decree. EPA's evaluations shall include an assessment of the timing and projected costs of the Remedial Action, the O&M, the Post-Remedy Institutional Controls Work, and the Post-Remedy Monitoring. In making such evaluations, EPA shall consider the information and projections contained in Settling Defendants' Quarterly Reports submitted under Paragraph 32 and any other information deemed relevant by EPA. If EPA determines that the total aggregated balance in the Escrow Account and the Disbursement Special Account is likely to be insufficient to fund the completion of the Response Work, after all other payments and reimbursements from the Accounts have been made as required under this Consent Decree, then EPA, in consultation with WDNR, may provide the Settling Defendants formal written notice of that determination (an "Insufficiency Determination") in the manner provided by Section XXVIII (Notices and Submissions).

b. Timing. EPA may make an Insufficiency Determination under this Paragraph: (i) at any time after the Response Agencies' approval of the Remedial Action Work Plan under Paragraph 14; but (ii) not after Certification of Completion of Remedial Action by EPA pursuant to Paragraph 44.b.

c. Request for an Insufficiency Determination. A Settling Defendant may request that EPA make an Insufficiency Determination under this Paragraph if: (i) the determination would be timely under Subparagraph 98.b; (ii) the total aggregated balance in the Escrow Account and the Disbursement Special Account is less than $6 million; and (iii) the Settling Defendant can demonstrate that the total aggregated balance in the Escrow Account and the Disbursement Special Account is likely to be insufficient to fund the completion of the Response Work, after all other payments and reimbursements from those two Accounts have been made as required under this Consent Decree. Any such request shall be made in writing,

shall include all information supporting the request, and shall be provided to all Parties as provided by Section XXVIII (Notices and Submissions).

d. Advance Notice. At least 30 days before issuing formal written notice of an Insufficiency Determination under this Paragraph, or within a longer time period agreed to in writing by the Parties, EPA shall send the Settling Defendants a written communication affording the Settling Defendants an opportunity, within that time period, to: (i) provide EPA additional information relevant to whether the total aggregated balance in the Accounts is likely to be sufficient or insufficient; (ii) deposit additional funds in the Escrow Account, in order to avoid an Insufficiency Determination; and (iii) have informal negotiations to attempt to resolve any dispute.

e. Termination of Certain Consent Decree Rights and Obligations. As specified by this Subparagraph, certain rights and obligations of the Parties under this Consent Decree shall terminate if an Insufficiency Determination is not disputed pursuant to Subparagraph 98.f, or if a dispute under Subparagraph 98.f is resolved in EPA's favor.

(1) For the purpose of this Subparagraph 98.e, the "Termination Date" shall be defined as: (i) 10 days after an Insufficiency Determination, if the Insufficiency Determination is not disputed in accordance with Subparagraph 98.f; (ii) 10 days after the time expires for seeking appellate court review, if this Court resolves a dispute under Subparagraph 98.f in EPA's favor and if this Court's decision is not appealed; or (iii) 10 days after any final appellate court decision resolving a dispute under Subparagraph 98.f in EPA's favor.

(2) Upon the Termination Date, the Settling Defendants' Consent Decree obligation to perform the Remedial Action under Paragraph 14 (OU1 Remedial Action) shall cease.

(3) Upon the Termination Date, the Settling Defendants' Consent Decree obligation to perform the response actions under Paragraph 18 (O&M and Post-Remedy Institutional Controls) shall cease.

(4) Upon the Termination Date, the Settling Defendants' Consent Decree obligation to perform the response actions under Paragraph 19 (Periodic Remedy Review and Post-Remedy Monitoring) shall cease.

(5) Upon the Termination Date, the Consent Decree obligation to reimburse Plaintiffs' Specified Future Response Costs under Paragraph 54 shall cease for costs incurred after the Termination Date.

(6) Upon the Termination Date, the covenants not to sue under Paragraph 84 (United States' Covenant Not to Sue) and Paragraph 85 (State's Covenant Not To Sue) shall cease to apply to Settling Defendants and shall terminate as to all OU1 Response Activities and Costs. Even after the Termination Date, the provisions of Paragraph 102 (Credit for Payments Made and Work Performed) shall continue to apply.

(7) Upon the Termination Date, the covenants not to sue under Paragraph 92 (Settling Defendants' Covenant Not to Sue) shall cease to apply to OU1 Response Activities and Costs after the Termination Date, such as: (i) any response activities for OU1 performed or to be performed after the Termination Date; and (ii) any costs of response activities for OU1 to the extent that such costs are incurred after the Termination Date. Even after the Termination Date, the covenants not to sue under Paragraph 92 (Settling Defendants' Covenant Not to Sue) shall continue to apply to the EPA Past Cost Payments, the State Past Cost Payments, the DOI Past Cost Payments, the NRD Commitment, and any OU1 Response Activities and Costs before the Termination Date, such as: (i) any response activities for OU1

performed before the Termination Date; any (ii) any costs of response activities for OU1 to the extent that such costs were incurred before after the Termination Date.

(8) Upon the Termination Date, Paragraph 101 shall cease to apply to Settling Defendants and shall terminate, and the OU1 Response Activities and Costs shall not be considered "matters addressed" by this Consent Decree.

(9) Settling Defendants specifically reserve any rights they may have to seek review of the remedial action selected in the ROD as authorized by CERCLA Section 113(h), 42 U.S.C. § 9613(h), at any time after the Termination Date, other than in an action brought by the United States or the State to enforce this Consent Decree.

f. Insufficiency Determination Disputes.

(1) Settling Defendants shall not be entitled to dispute – under Section XX (Dispute Resolution) or in any other forum or proceeding – EPA's failure to make an Insufficiency Determination or EPA's discretionary election to delay or defer issuance of formal written notice of an Insufficiency Determination.

(2) Within 10 days after EPA's issuance of formal written notice of an Insufficiency Determination, the Settling Defendants may dispute the Insufficiency Determination in accordance with Paragraph 64 (Formal Dispute Resolution) and Paragraph 65 (record review).

(3) Until a dispute under this Subparagraph 98.f is resolved, Settling Defendants shall continue to perform all Response Work required under this Consent Decree, specifically including all work to implement the Remedial Action under Paragraph 14, with the continuation of the Response Work being financed either by: (i) any funds remaining in the Disbursement Special Account or the Escrow Account; or (ii) any additional funds that Settling

Defendants may need to commit or provide under this Subparagraph, as necessary to finance the continuation of the Response Work.

99. Nothing in this Consent Decree shall be construed as limiting or precluding Plaintiffs' right to issue an administrative order or to institute a judicial proceeding relating to OU1 after the Termination Date, including but not limited any administrative order or judicial proceeding seeking continuation or completion of the Response Work after the Termination Date. Notwithstanding Paragraph F of Section I (Background), Settling Defendants hereby agree and covenant that the Plaintiffs shall not have to prove and that Settling Defendants shall not contest the following facts with respect to OU1 in response to any administrative order or in any judicial proceeding relating to OU1 after the Termination Date:

(i) Each Settling Defendant is a person who at the time of disposal of a hazardous substance owned or operated a facility from which such hazardous substances were disposed of, and from which there have been releases of hazardous substances which caused the incurrence of response costs for OU1; and

(ii) Each Settling Defendant is a person who by contract, agreement, or otherwise arranged for the disposal or treatment of hazardous substances owned or possessed by the Settling Defendant, by another party or entity, at a facility owned or operated by another party or entity and containing such hazardous substances, from which there have been releases of hazardous substances which caused the incurrence of response costs for OU1.

XXV. EFFECT OF SETTLEMENT AND CONTRIBUTION PROTECTION

100. Except as provided in Paragraph 95 (Waiver of Claims Against De Micromis Parties), nothing in this Consent Decree shall be construed to create any rights in, or grant any

cause of action to, any person not a Party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this decree may have under applicable law. Except as provided in Paragraph 95 (Waiver of Claims Against De Micromis Parties), each of the Parties expressly reserves any and all rights (including, but not limited to, any right to contribution), defenses, claims, demands, and causes of action which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto.

101. Statutory Contribution Protection. The Parties agree, and by entering this Consent Decree this Court finds, that the Settling Defendants are entitled, as of the Effective Date, to protection from contribution actions or claims as provided by CERCLA Section 113(f)(2), 42 U.S.C. § 9613(f)(2) for matters addressed in this Consent Decree. Settling Defendants' Related Parties are also entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Section 113(f)(2) of CERCLA, 42 U.S.C. § 9613(f)(2), for "matters addressed" in this Consent Decree. For the purpose of this Paragraph 101, and except as provided by Subparagraph 98.e.(8), the "matters addressed" by this Consent Decree are the OU1 Response Activities and Costs.

102. Credit for Payments Made and Work Performed.

a. The Parties agree and acknowledge that the Plaintiffs shall recognize that the Settling Defendants are entitled to full credit, applied against their liabilities for response costs and natural resource damages at the Site, for: (i) the EPA Past Cost Payments, (ii) the State Past Cost Payments; (iii) the DOI Past Cost Payments; (iv) the NRD Commitment; (v) all Specified Future Response Costs reimbursed under Paragraph 54; (vi) all response costs incurred and paid by the Settling Defendants in performing the Remedial Design under the July 2003

AOC and this Consent Decree; and (vii) the Allowable RD/RA Costs paid or reimbursed from the Escrow Account under Paragraph 11 of this Consent Decree and Appendix C; provided, however, that the credit ultimately recognized shall take into account and shall not include the amount of any recoveries by Settling Defendants of any portion of such payments from other liable persons, such as through a recovery under Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 9607 and 9613. With respect to the Allowable RD/RA Costs, the recognized credit shall take into account and shall not include the amount of any disbursements from the Disbursement Special Account to the Escrow Account pursuant to Paragraph 10 of this Consent Decree and Appendix B. With respect to the NRD Commitment, the recognized credit may take into account, as appropriate, the value of restoration projects funded by the NRD Commitment.

b. As provided by Paragraph 30 of the API/NCR Consent Decree, the Plaintiffs shall recognize that Appleton Papers Inc. and NCR Corporation are entitled to full credit, applied against their liabilities for response costs at the Site, for the funds deposited in and disbursed from the Disbursement Special Account pursuant to Paragraph 10 of this Consent Decree and Appendix B. In addition, the Settling Defendants hereby agree and acknowledge that they shall recognize that Appleton Papers Inc. and NCR Corporation are entitled to full credit, applied against their liabilities for response costs at the Site, for the funds deposited in and disbursed from the Disbursement Special Account pursuant to Paragraph 10 of this Consent Decree and Appendix B.

103. The Settling Defendants agree that with respect to any suit or claim for contribution brought by them for matters related to this Consent Decree they will notify the United States and the State in writing no later than 20 days prior to the initiation of such suit or claim.

104. The Settling Defendants also agree that with respect to any suit or claim for contribution brought against them for matters related to this Consent Decree they will notify in writing the United States and the State within 20 days of service of the complaint on them. In addition, Settling Defendants shall notify the United States and the State within 20 days of service or receipt of any Motion for Summary Judgment and within 20 days of receipt of any order from a court setting a case for trial.

105. Waiver of Claim-Splitting Defenses. In any subsequent administrative or judicial proceeding initiated by the United States or the State for injunctive relief, recovery of response costs, or other appropriate relief relating to the Site, Settling Defendants 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 the United States or the State 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 not to sue set forth in Section XXII (Covenants Not to Sue by Plaintiffs).

XXVI. ACCESS TO INFORMATION

106. Settling Defendants shall provide to the Response Agencies, upon request, copies of all documents and information within their possession or control or that of their contractors or agents relating to activities at OU1 or to the implementation of this Consent Decree, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Response Work. Settling Defendants shall also make available to the Response Agencies, for purposes of investigation, information gathering, or testimony, their employees, agents, or

representatives with knowledge of relevant facts concerning the performance of the Response Work.

107. Business Confidential and Privileged Documents.

a. Settling Defendants may assert business confidentiality claims covering part or all of the documents or information submitted to Plaintiffs under this Consent Decree to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when they are submitted to EPA and the State, or if EPA has notified Settling Defendants that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA, the public may be given access to such documents or information without further notice to Settling Defendants.

b. The Settling Defendants may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If the Settling Defendants assert such a privilege in lieu of providing documents, they shall provide the Plaintiffs with the following: (i) the title of the document, record, or information; (ii) the date of the document, record, or information; (iii) the name and title of the author of the document, record, or information; (iv) the name and title of each addressee and recipient; (v) a description of the contents of the document, record, or information: and (vi) the privilege asserted by Settling Defendants. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.

108. No claim of confidentiality shall be made with respect to any data generated pursuant to the requirements of this Consent Decree, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at or around the Site.

XXVII. RETENTION OF RECORDS

109. Until 10 years after the Settling Defendants' receipt of EPA's notification of Certification of Completion of the Response Work pursuant to Paragraph 45.b, each Settling Defendant shall preserve and retain all records and documents now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Response Work or liability of any person for response actions conducted and to be conducted at the Site, regardless of any corporate retention policy to the contrary. Until 10 years after the Settling Defendants' receipt of EPA's notification of Certification of Completion of the Response Work pursuant to Paragraph 45.b, Settling Defendants shall also instruct their contractors and agents to preserve all documents, records, and information of whatever kind, nature or description relating to the performance of the Response Work. At any time more than 5 years after Certification of Completion of Remedial Action by EPA pursuant to Consent Decree Subparagraph 44.b, the Settling Defendants may request Plaintiffs' assent to terminate the document retention period earlier for specified categories of records and documents. If Plaintiffs assent to any such request, the Plaintiffs assent shall be given in writing.

110. At the conclusion of this document retention period, Settling Defendants shall notify the United States and the State at least 90 days prior to the destruction of any such records or documents, and, upon request by the United States or the State, Settling Defendants shall deliver any such records or documents to EPA or WDNR. The Settling Defendants may assert

that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If the Settling Defendants assert such a privilege, they shall provide the Plaintiffs with the following: (i) the title of the document, record, or information; (ii) the date of the document, record, or information; (iii) the name and title of the author of the document, record, or information; (iv) the name and title of each addressee and recipient; (v) a description of the subject of the document, record, or information; and (vi) the privilege asserted by Settling Defendants. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.

111. Each Settling Defendant hereby certifies individually that, to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information relating to its potential liability regarding the Site since notification of potential liability by the United States or the State or the filing of suit against it regarding the Site and that it has fully complied with any and all requests for information pursuant to Section 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927.

XXVIII. NOTICES AND SUBMISSIONS

112. Whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other 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. All notices and submissions shall be considered effective upon receipt, unless otherwise provided. Written notice as specified

herein shall constitute complete satisfaction of any written notice requirement of the Consent Decree with respect to the United States, the State, and the Settling Defendants, respectively.

As to the United States:

As to DOJ:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice (DJ # 90-11-2-1045Z)

P.O. Box 7611
Washington, D.C. 20044-7611

1425 New York Avenue, NW – 13th Floor
Washington, DC 20005

As to EPA:

Director, Superfund Division
U.S. Environmental Protection Agency
Region 5
77 West Jackson Blvd.
Chicago, IL 60604

As to DOI:

Office of the Solicitor
Division of Parks and Wildlife
U.S. Department of the Interior
1849 C Street, N.W.
Washington, DC 20240

As to the State:

As to WDOJ:

Jerry L. Hancock
Assistant Attorney General
Wisconsin Department of Justice

P.O. Box 7857
Madison, WI 53707-7857

17 West Main Street
Madison, WI 53702

As to WDNR:

Greg Hill
State Project Coordinator
Wisconsin Department of Natural Resources

P.O. Box 7921
Madison, WI 53707-7921

101 S. Webster St.
Madison, WI 53703

As to the Settling Defendants:

As to the P. H. Glatfelter Company

Patrick H. Zaepfel
Environmental Counsel
P. H. Glatfelter Company
96 South George St., Suite 420
York, PA 17401

with a copy to:

David G. Mandelbaum
Ballard Spahr Andrews & Ingersoll, LLP
1735 Market Street, 51st Floor
Philadelphia, PA 19103-7599

As to WTM I Company:

J.P. Causey Jr.
Vice President & Corporate Secretary/WTM I Company
c/o Chesapeake Corporation
1021 E. Cary Street
Box 2350
Richmond, VA 23218-2350

with a copy to:

Nancy K. Peterson
Quarles & Brady LLP
411 East Wisconsin Avenue, Suite 2040
Milwaukee, Wisconsin 53202-4497

XXIX. EFFECTIVE DATE

113. The effective date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court; provided, however, that the Settling Defendants hereby agree that they shall be bound upon the Date of Lodging to comply with obligations of the Settling Defendants specified in this Consent Decree as accruing upon the Date of Lodging. In the event the Plaintiffs withdraw or withhold consent to this Consent Decree before entry, or the Court declines to enter the Consent Decree, then the preceding requirement to comply with requirements of this Consent Decree upon the Date of Lodging shall terminate; provided, however, that the parties hereby agree that even after any such termination: (i) the Plaintiffs shall be entitled to retain any and all payments already made to Plaintiffs under this agreement, and the provisions of Section XVII (Payments) concerning Plaintiffs' retention and use of such payments shall survive termination; and (ii) Plaintiffs shall continue to recognize that the Settling Defendants are entitled to full credit for payments already made and work already performed under this agreement as provided by Subparagraph 102.a. In the event the Plaintiffs withdraw or withhold consent to this Consent Decree before entry, or the Court declines to enter the Consent Decree, the Parties agree that the unexpended balance of the Escrow Account shall be disbursed to the Settling Defendants at their request.

XXX. RETENTION OF JURISDICTION

114. This Court retains jurisdiction over both the subject matter of this Consent Decree and the Settling Defendants for the duration of the performance of the terms and provisions of this Consent Decree for the purpose of enabling any of the Parties to apply to the Court at any time for such further order, direction, and relief as may be necessary or appropriate for the

construction or modification of this Consent Decree, or to effectuate or enforce compliance with its terms, or to resolve disputes in accordance with Section XX (Dispute Resolution) hereof.

XXXI. APPENDICES

115. The following appendices are attached to and incorporated into this Consent Decree:

"Appendix A" is the Trustee Council Resolution relating to this Consent Decree.

"Appendix B" is the Appendix addressing Management of the Disbursement Special Account.

"Appendix C" is the Appendix addressing Escrow Account Management.

"Appendix D" is the form of Escrow Agreement.

"Appendix E" is the Appendix addressing Special Procedures for Restoration Work.

"Appendix F" is the July 2003 AOC (including the SOW for Remedial Design).

"Appendix G" is the map of OU1.

"Appendix H" is the ROD.

"Appendix I" is the Statement of Work for the Remedial Action.

XXXII. COMMUNITY RELATIONS

116. Settling Defendants shall propose to the Response Agencies the Settling Defendants' participation in the community relations plan to be developed by the Response Agencies. The Response Agencies will determine the appropriate role for the Settling Defendants under the Plan. Settling Defendants shall also cooperate with the Response Agencies in providing information regarding the Response Work to the public. As requested by the Response Agencies, Settling Defendants shall participate in the preparation of such information

for dissemination to the public and in public meetings which may be held or sponsored by the Response Agencies to explain activities at or relating to OU1.

XXXIII. MODIFICATION

117. Schedules specified in this Consent Decree for completion of the Response Work may be modified by agreement of the Response Agencies and the Settling Defendants. All such modifications shall be made in writing.

118. Except as provided in Paragraph 15 ("Modification of the SOW or related Work Plans"), no material modifications shall be made to the SOW without written notification to and written approval of the United States, the State, Settling Defendants, and the Court. Modifications to the SOW that do not materially alter that document may be made by written agreement between the Response Agencies and the Settling Defendants.

119. Nothing in this Decree shall be deemed to alter the Court's power to enforce, supervise or approve modifications to this Consent Decree.

XXXIV. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

120. This Consent Decree shall be lodged with the Court for a period of not less than thirty (30) days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C. § 9622(d)(2), and 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations which indicate that the Consent Decree is inappropriate, improper, or inadequate. Settling Defendants consent to the entry of this Consent Decree without further notice.

121. If for any reason the Court should decline to approve this Consent Decree in the form presented, this agreement is voidable at the sole discretion of any Party and the terms of the agreement may not be used as evidence in any litigation between the Parties.

XXXV. SIGNATORIES/SERVICE

122. The undersigned representatives of each Settling Defendant, the undersigned representatives of the State, and the Assistant Attorney General for the Environment and Natural Resources Division of the United States Department of Justice each certify that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind such Party to this document.

123. Each Settling Defendant hereby agrees not to oppose entry of this Consent Decree by this Court or to challenge any provision of this Consent Decree unless the United States has notified the Settling Defendants in writing that it no longer supports entry of the Consent Decree.

124. Each Settling Defendant shall identify, on the attached signature page, the name, address and telephone number of an agent who is authorized to accept service of process by mail on behalf of that Party with respect to all matters arising under or relating to this Consent Decree. Settling Defendants hereby agree to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited to, service of a summons.

XXXVI. FINAL JUDGMENT

125. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment between and among the United States, the State, and the Settling Defendants. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

SO ORDERED THIS __ DAY OF _____, 200__.

_____

United States District Judge

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.), relating to Operable Unit 1 of the Lower Fox River and Green Bay Site.

FOR THE UNITED STATES OF AMERICA

9.5.03
Date

Tom Sansonetti
THOMAS L. SANSONETTI
Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice
Washington, D.C. 20530

9/5/2003
Date

Randall M. Stone
RANDALL M. STONE, Trial Attorney
JEFFREY A. SPECTOR, Trial Attorney
DANIEL C. BECKHARD, Senior Counsel
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611

STEVEN M. BISKUPIC
United States Attorney

MATTHEW V. RICHMOND
Assistant United States Attorney
Eastern District of Wisconsin
U.S. Courthouse and Federal Building
Room 530
517 E. Wisconsin Avenue
Milwaukee, WI 53202

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.), relating to Operable Unit 1 of the Lower Fox River and Green Bay Site.

9/5/03
Date

for
THOMAS V. SKINNER
Regional Administrator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604

9/02/03
Date

ROGER M. GRIMES
Associate Regional Counsel
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.), relating to Operable Unit 1 of the Lower Fox River and Green Bay Site.

FOR THE STATE OF WISCONSIN

9/2/03
Date

P. SCOTT HASSETT
Secretary
Wisconsin Department of Natural Resources
101 South Webster Street
Madison, WI 53703

9/3/03
Date

JERRY L. HANCOCK
Assistant Attorney General
Wisconsin Department of Justice
17 West Main Street
Madison, WI 53702

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.), relating to Operable Unit 1 of the Lower Fox River and Green Bay Site.

FOR P. H. GLATFELTER COMPANY

08/26/03
Date

Signature: George H. Glatfelter II
Name (print): George H. Glatfelter II
Title: Chairman & C.E.O.
Address: 96 S. George St., Suite 500
York, PA 17401

Agent Authorized to Accept Service on Behalf of Above-signed Party:

Name (print): Patrick H. Zaepfel
Title: Environmental Counsel
Address: 96 South George St., Suite 420
York, PA 17401

Ph. Number: (717) 225-2778

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.), relating to Operable Unit 1 of the Lower Fox River and Green Bay Site.

FOR WTM I COMPANY

August 26, 2003
Date

Signature:
Name (print): J.P. Causey Jr.
Title: Vice President
Address: 1021 East Cary St., 22d Floor
Box 2350
Richmond, Virginia 23218

Agent Authorized to Accept Service on Behalf of Above-signed Party:

Name (print): J.P. Causey Jr.
Title: Vice President
Address: c/o Chesapeake Corporation
1021 East Cary Street, 22d Floor
Box 3350, Richmond, VA 23218
Ph. Number: 804 697-1166

Consent Decree Appendix A

Trustee Council Resolution relating to this Consent Decree

Fox River/Green Bay Natural Resource Trustee Council
Resolution No. 4

Resolution Regarding the Proposed Consent Decree in United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.)

WHEREAS, the undersigned members of the Fox River/Green Bay Natural Resource Trustee Council ("collectively the "Trustees") acknowledge that the Trustees were informed of negotiations with potentially responsible parties regarding the releases of hazardous substances that resulted in injuries to natural resources under Federal, State, and Tribal Trusteeship at the Lower Fox River and Green Bay Site;

WHEREAS, the Trustees are aware that the negotiations have resulted in a proposed Consent Decree in the case captioned United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.);

WHEREAS, the Trustees participated in the negotiations concerning the provisions of the Consent Decree relating to natural resource damages and natural resource restoration efforts at the Site;

WHEREAS, the Trustees understand that, under the Consent Decree, Settling Defendants P. H. Glatfelter Company ("Glatfelter") and WTM I Company ("WTM") would each: (1) pay $150,000 to the U.S. Department of the Interior ("DOI") to reimburse a portion of DOI's past natural resource damage assessment costs (collectively the $300,000 "DOI Past Cost Payments"); and (2) pay an additional $1,500,000 to finance natural resource restoration efforts at the Site (collectively the $3,000,000 "NRD Commitment");

WHEREAS; the Trustees agree to cooperate and participate, as appropriate, in the natural resource restoration efforts prescribed by Section XVI of the Consent Decree;

WHEREAS; the Trustees agree to cooperate and participate, as appropriate, in the special procedures for restoration work prescribed by Consent Decree Appendix E;

WHEREAS, the Trustees acknowledge and agree that under Paragraph 48 of the Consent Decree, a portion of the NRD Commitment may be used to fund Approved Restoration Work that would be performed by Glatfelter and/or WTM, if the Trustees jointly approve a Project Implementation Plan for such Work;

WHEREAS, the Trustees acknowledge and agree that under Paragraph 49 of the Consent Decree, the remainder of the NRD Commitment will be disbursed to a Site-specific sub-account within the DOI NRDAR Fund and will be managed by DOI for the joint benefit and use of the Trustees to pay for Trustee-sponsored natural resource restoration efforts;

WHEREAS, the Trustees acknowledge and agree that all funds disbursed to the DOI NRDAR Fund under Paragraph 49 of the Consent Decree shall be used in a manner consistent

with the Trustees' Joint Restoration Plan, and shall be applied toward the costs of restoration, rehabilitation, or replacement of injured natural resources at the Site, and/or acquisition of equivalent resources, including but not limited to any administrative costs and expenses necessary for, and incidental to, restoration, rehabilitation, replacement, and/or acquisition of equivalent resources planning, and any restoration, rehabilitation, replacement, and/or acquisition of equivalent resources undertaken;

WHEREAS, the Trustees acknowledge Subparagraph 102.a of the Consent Decree and agree that the Trustees shall recognize that Glatfelter and WTM are entitled to full credit for the NRD Commitment, applied against their liabilities for natural resource damages relating to the Site; provided, however, that the credit ultimately recognized shall take into account and shall not include the amount of any recoveries by Glatfelter and WTM of any portions of such payments from other liable persons, such as through a recovery under Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 9607 and 9613; the Trustees also acknowledge and agree that the recognized credit may take into account, as appropriate, the value of restoration projects funded by the NRD Commitment;

WHEREAS, the Trustees recognize and acknowledge that the Consent Decree does not include a covenant not to sue Glatfelter or WTM for natural resource damages, and recognize and acknowledge that the Consent Decree expressly reserves all rights against Glatfelter and WTM for liability for natural resource damages relating to the Site; and

WHEREAS, the Trustees understand that Glatfelter and WTM, by entry into the Consent Decree, have not admitted any liability for natural resource damages relating to the Site.

NOW THEREFORE BE IT RESOLVED that the Trustees support the proposed Consent Decree and agree to act in accordance with the Consent Decree, as specified by this Resolution.

Fox River/Green Bay Natural Resource Trustee Council
Resolution No. 4

Resolution Regarding the Proposed Consent Decree in United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.)

FOR THE UNITED STATES DEPARTMENT OF THE INTERIOR

Charlie Wooley

DATE: 9/16/03

Charlie Wooley, Assistant Regional Director
U.S. Fish and Wildlife Service, Region 3
in Consultation with NOAA

Fox River/Green Bay Natural Resource Trustee Council
Resolution No. 4

Resolution Regarding the Proposed Consent Decree in United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.)

FOR THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES

_____ DATE: 8/18/03

Bruce Baker, Deputy Administrator
Water Division

August 14, 2003

Fox River/Green Bay Natural Resource Trustee Council
Resolution No. 4

Resolution Regarding the Proposed Consent Decree in United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.)

FOR THE MENOMINEE INDIAN TRIBE OF WISCONSIN

Gary Besaw, Vice-Chair

DATE: 8-28-03

Fox River/Green Bay Natural Resource Trustee Council
Resolution No. 4

Resolution Regarding the Proposed Consent Decree in United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.)

FOR THE ONEIDA TRIBE OF INDIANS OF WISCONSIN

Paul Ninham, Council Member

DATE: Aug 22, 2003

Fox River/Green Bay Natural Resource Trustee Council
Resolution No. 4

Resolution Regarding the Proposed Consent Decree in United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.)

FOR THE MICHIGAN TRUSTEES

Michigan Department of Environmental Quality

William Creal

DATE: 8-18-2003

William Creal

Michigan Department of Attorney General

DATE: 8-18-03

Kathleen Cavanaugh, Assistant Attorney General

Consent Decree Appendix B

Management of the Disbursement Special Account

1. Background.

a. The API/NCR Decree. Pursuant to the Consent Decree in United States and the State of Wisconsin v. Appleton Papers Inc. and NCR Corporation, Case No. 01-C-0816 (E.D. Wis.), Appleton Papers Inc. and NCR Corporation (collectively "API/NCR") are obligated to provide the Plaintiffs up to $10 million per year over the four-year term of that Decree (up to $40 million in total), to be applied toward response action projects and natural resource damage restoration projects relating the Site. A separate Memorandum of Agreement among the Plaintiffs and other Inter-Governmental Partners provides that approximately one-half of the $40 million payable under the API/NCR Decree shall be used to implement response action projects and that the remainder shall be used to implement natural resource restoration projects. Funds under that Decree can also be used as partial funding for larger projects. As set forth in detail in the API/NCR Decree, within 21 days after the Plaintiffs provide API/NCR a good faith written estimate of additional funds required for projects to be performed over the next six months, API/NCR are obligated to provide the requests funds, subject to the $10 million annual funding limitation. Funding provided for response action projects under the API/NCR Decree can be deposited in a Site-specific Superfund Special Account within the EPA Hazardous Substance Superfund, to be retained and used to conduct or finance response action projects at or in connection with the Site. As recognized by the API/NCR Decree, funds paid under that Decree can provide partial funding for projects that are also funded in part from other funding sources.

b. Plaintiffs' Intention to Devote $10 Million From the API/NCR Decree for Designated Response Projects in OU1. The Plaintiffs intend to devote up to $10 million payable under the API/NCR Decree for one or more projects that will be performed as part of the OU1 Remedial Action (hereinafter "Designated Response Projects"), as permitted by the API/NCR Decree. Consistent with that intention, the Plaintiffs shall use their best efforts to have $10 million available for funding response action projects under the API/NCR Decree deposited in the Fox River OU1 Disbursement Special Account (the "Disbursement Special Account"), so that such funds can be used for Designated Response Projects.

(1) The Plaintiffs and the Settling Defendants will jointly identify Designated Response Projects, and the Settling Defendants will assist the Plaintiffs in preparing a good faith estimate of costs required for the Projects over the next six months.

(2) The Plaintiffs will then make an appropriate request for the funds from API/NCR and will have such funds deposited in the Disbursement Special Account, as permitted by the API/NCR Decree.

(3) Allowable RD/RA Costs for Designated Response Projects shall be paid initially from the Escrow Account described by Consent Decree Paragraph 11 and Appendix C. Approximately every three months, the Escrow Account shall then be replenished pursuant to this Appendix B, through a disbursement from the Disbursement Special Account to the Escrow Account.

2. Use of the Disbursement Special Account, Generally. Any funds deposited in the Disbursement Special Account pursuant to Consent Decree Paragraph 10 shall be managed and disbursed as provided by this Appendix B. This Appendix shall not apply to any funds other than those deposited in the Disbursement Special Account pursuant to Consent Decree Paragraph 10, or to any account other than the Disbursement Special Account.

3. Special Account Disbursements to the Escrow Account. Approximately once every three months, for so long as a balance remains in the Disbursement Special Account, the Settling Defendants may request that the Escrow Account be reimbursed for Allowable RD/RA Costs already paid from the Escrow Account for Designated Response Projects. Any such request shall be made in a Quarterly Report submitted to Plaintiffs pursuant to Consent Decree Paragraph 32. Settling Defendants shall not include in any Quarterly Report costs included in a previous Quarterly Report if those costs have been previously reimbursed pursuant to this Appendix. Within 60 days of EPA's receipt of a Quarterly Report requesting reimbursement of the Escrow Account under this Paragraph, or if EPA has requested additional information under Consent Decree Subparagraph 32.c or a revised Quarterly Report under Consent Decree Subparagraph 32.d, within 60 days of receipt of the additional information or the revised Quarterly Report, and subject to the conditions set forth in this Appendix, EPA shall disburse the funds from the Disbursement Special Account to the Escrow Account as reimbursement of the Allowable RD/RA Costs for the Designated Response Projects. If the Settling Defendants fail to cure a deficiency in a Quarterly Report that has been identified by the Response Agencies within 15 business days after being notified of, and given the opportunity to cure, the deficiency, EPA will recalculate the Allowable RD/RA Costs eligible for reimbursement and will disburse the corrected amount to the Escrow Account in accordance with the procedures in this Appendix. The Settling Defendants may dispute EPA's recalculation under this Paragraph pursuant to Consent Decree Section XX (Dispute Resolution). In no event shall funds be disbursed from the Disbursement Special Account in excess of amounts properly documented in a Quarterly Report accepted or modified by EPA.

4. Procedure for Special Account Disbursements to Settling Defendants. EPA shall disburse the funds from the Disbursement Special Account to the Escrow Account in accordance with written instructions that the Settling Defendants shall provide EPA after the Effective Date.

5. Termination of Disbursements from the Special Account. EPA's obligation to disburse funds from the Disbursement Special Account under this Consent Decree shall terminate upon EPA's determination that Settling Defendants: (i) have knowingly submitted a materially false or misleading Quarterly Report; (ii) have submitted a materially inaccurate or incomplete Quarterly Report, and have failed to correct the materially inaccurate or incomplete Quarterly Report within 15 business days after being notified of, and given the opportunity to cure, the deficiency; or (iii) failed to submit a Quarterly Report as required by Consent Decree Paragraph 32 within 15 business days (or such longer period as EPA agrees) after being notified that EPA intends to terminate its obligation to make disbursements pursuant to this Appendix because of Settling Defendants' failure to submit the Quarterly Report as required by Consent Decree Paragraph 32. EPA's obligation to disburse funds from the Disbursement Special Account shall also terminate upon EPA's assumption of performance of any portion of the Response Work pursuant to Consent Decree Paragraph 90, when such assumption of performance of the Response Work is not challenged by Settling Defendants or, if challenged, is

upheld under Consent Decree Section XX (Dispute Resolution). Settling Defendants may dispute EPA's termination of special account disbursements under Consent Decree Section XX (Dispute Resolution).

6. Recapture of Special Account Disbursements. Upon termination of disbursements from the Disbursement Special Account under Paragraph 5 of this Appendix, if EPA has previously disbursed funds from the Disbursement Special Account for activities specifically related to the reason for termination (*e.g.*, discovery of a materially false or misleading submission after disbursement of funds based on that submission), EPA shall submit a bill to Settling Defendants for those amounts already disbursed from the Disbursement Special Account specifically related to the reason for termination, plus Interest on that amount covering the period from the date of disbursement of the funds by EPA to the date of repayment of the funds by Settling Defendants. Within 30 days of receipt of EPA's bill, Settling Defendants shall reimburse the Hazardous Substance Superfund for the total amount billed by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund" referencing the name and address of the party making payment, EPA Site/Spill Identification Number A565, and DOJ Case Number 90-11-2-1045/2. Settling Defendants shall send the check(s) to:

U.S. Environmental Protection Agency, Region 5
Program Accounting and Analysis Branch
P.O. Box 70753
Chicago, IL 60673

At the time of payment, Settling Defendants shall send notice that payment has been made to the to DOJ and EPA in accordance with Consent Decree Section XXVIII (Notices and Submissions) and to:

Financial Management Officer
U.S. Environmental Protection Agency, Region 5
Mail Code MF-10J
77 W. Jackson Blvd.
Chicago, IL 60604

Upon receipt of payment, EPA may deposit all or any portion thereof, in the Hazardous Substance Superfund, in the Fox River OU1 Disbursement Special Account, in the Fox River Site Special Account, or in another Site-specific special account within the Hazardous Substance Superfund. The determination of where to deposit or how to use the funds shall not be subject to challenge by Settling Defendants pursuant to the dispute resolution provisions of the Consent Decree or in any other forum or proceeding. Settling Defendants may dispute EPA's determination as to recapture of funds pursuant to Consent Decree Section XX (Dispute Resolution).

7. Balance of Special Account Funds. After Certification of Completion of Remedial Action by EPA pursuant to Consent Decree Subparagraph 44.b, and after EPA completes all disbursements to the Escrow Account in accordance with this Appendix, if any funds remain in the Disbursement Special Account, EPA may transfer such funds to the Hazardous Substance Superfund, to the Fox River Site Special Account, or to another Site-specific special account within the Hazardous Substance Superfund. Upon any Termination Date

under Consent Decree Paragraph 98, and after EPA completes all disbursements to the Escrow Account in accordance with this Appendix, if any funds remain in the Disbursement Special Account, EPA may transfer such funds to the Hazardous Substance Superfund, to the Fox River Site Special Account, or to another Site-specific special account within the Hazardous Substance Superfund. Any transfer of funds to the Hazardous Substance Superfund, to the Fox River Site Special Account, or to another Site-specific sub-account within the Hazardous Substance Superfund shall not be subject to challenge by Settling Defendants pursuant to the dispute resolution provisions of the Consent Decree or in any other forum or proceeding.

Consent Decree Appendix C

Escrow Account Management

1. Escrow Account Establishment. Pursuant to Consent Decree Paragraph 11, the Settling Defendants shall establish an escrow account trust fund — to be known as the Fox River OU1 Escrow Account (the "Escrow Account") — with a duly-chartered federally-insured bank (the "Escrow Agent"). The funds in the Escrow Account shall be held in trust for the performance of certain requirements of this Consent Decree, and the United States and the State shall be beneficiaries of the Escrow Account. The Escrow Account may be established and managed as several accounts or sub-accounts to address the different sources and uses of the funds paid into the Escrow Account.

2. Escrow Agreement Form and Requirements. The final escrow agreement shall be provided to the Plaintiffs for approval primarily to ensure that the escrowed funds will be handled in accordance with this Consent Decree. The escrow agreement shall instruct and authorize the Escrow Agent to apply, retain, or use the funds in the Escrow Account (and all interest or other income earned on funds deposited in the Escrow Account) in order to finance response actions taken or to be taken at or in connection with OU1 of the Site, but only in accordance with, and to the extent required by, the governing provisions of the Consent Decree.

3. Monthly Financial Reports. The escrow agreement shall require that the Escrow Agent prepare and submit to the Response Agencies' Project Coordinators designated under the Consent Decree statements every month detailing money received and disbursed in the preceding month, and the balance in the Escrow Account on the date of the statement.

4. Disbursements from the Escrow Account, Generally. The Escrow Agent shall disburse certain funds from the Escrow Account to the United States and the State as payment of sums due under this Consent Decree and shall disburse certain other funds from the Escrow Account to the Settling Defendants for reimbursement of Allowable RD/RA Costs and/or Allowable Restoration Work Costs. In addition, the Settling Defendants may direct the Escrow Agent to pay Allowable RD/RA Costs directly to a contractor or subcontractor responsible for the performance of the Response Work, or to pay Allowable Restoration Work Costs directly to a contractor or subcontractor responsible for the performance of Approved Restoration Work.

5. Disbursements from the Escrow Account.

a. Disbursements shall be made from the Escrow Account only for:

(1) payment of amounts due under Consent Decree Subparagraph 53.b (Subsequent Payments and Disbursements for Natural Resource Restoration);

(2) payment or reimbursement of Allowable RD/RA Costs under Consent Decree Paragraph 12 (OU1 Remedial Design) and Consent Decree Paragraph 14 (OU1 Remedial Action);

(3) payment of Specified Future Response Costs payable to Plaintiffs under Consent Decree Paragraph 54 (Payment of Specified Future Response Costs);

(4) a payment of any or all unexpended funds remaining in the Escrow Account to the Fox River Site Special Account within the EPA Hazardous Substance Superfund, to be retained and used to conduct or finance response actions at or in connection with the Site, or transferred by EPA to the EPA Hazardous Substance Superfund, in the event EPA and/or WDNR assume performance of all or any portions of the Response Work under Consent Decree Paragraph 90 (Response Work Takeover);

(5) payment or reimbursement of Allowable Restoration Work Costs for Approved Restoration Work under Consent Decree Paragraph 48;

(6) a partial refund payment to the Settling Defendants after Certification of Completion of Remedial Action by EPA pursuant to Consent Decree Subparagraph 44.b, if requested by the Settling Defendants and approved by EPA, after a determination by EPA that the partial refund will leave a balance in the account that will be sufficient to fund the completion of the Response Work;

(7) a refund payment to the Settling Defendants of any and all unexpended funds remaining in the Escrow Account, after a determination by the Plaintiffs that all required disbursements from Escrow Account have been made, after a Termination Date under Consent Decree Paragraph 98;

(8) a refund payment of any and all unexpended funds remaining in the Escrow Account, after a determination by the Plaintiffs that all required disbursements from Escrow Account have been made, in the event the Plaintiffs withdraw or withhold consent to the Consent Decree before entry, or the Court declines to enter the Consent Decree;

(9) a final payment of any and all unexpended funds remaining in the Escrow Account, after Certification of Completion of the Response Work by EPA pursuant to Consent Decree Subparagraph 45.b, either: (i) as a final refund payment to the Settling Defendant, if a final refund payment is requested by the Settling Defendants within 180 days after Certification of Completion of the Response Work; or (ii) as a payment to the Fox River Site Special Account within the EPA Hazardous Substance Superfund, to be retained and used to conduct or finance response actions at or in connection with the Site, or transferred by EPA to the EPA Hazardous Substance Superfund, if a final refund payment is not requested by Settling Defendants within 180 days after Certification of Completion of the Response Work; and

(10) payment of fees, taxes, and expenses under Section 5.3 of the Escrow Agreement.

b. A disbursement from the Escrow Account shall only be made by the Escrow Agent after receipt of a duly executed escrow disbursement certificate in substantially the form attached hereto at Consent Decree Appendix D, Exhibit A (Form of Escrow Disbursement Certificate for Trustee-Sponsored Natural Resource Restoration Efforts), Exhibit B (Form of Escrow Disbursement Certificate for Payment or Reimbursement of Allowable RD/RA Costs),

Exhibit C (Form of Escrow Disbursement Certificate for Payment of Specified Future Response Costs), Exhibit D (Form of Escrow Disbursement Certificate for Response Work Takeover), Exhibit E (Form of Escrow Disbursement Certificate for Payment or Reimbursement of Allowable Restoration Costs), Exhibit F (Form of Escrow Disbursement Certificate for Refund Payment to Settling Defendants), or Exhibit G (Form of Escrow Disbursement Certificate for Final Payment to Fox River Site Special Account).

c. Copies of any escrow disbursement certificate submitted to the Escrow Agent shall be submitted to all other Parties to this Consent Decree in accordance with Consent Decree Section XXVIII (Notices and Submissions), and shall be submitted to the other Parties in the same manner and on the same day that the escrow disbursement certificate is submitted to the Escrow Agent. No disbursement from the Escrow Account shall be made in response to an escrow disbursement certificate unless: (i) at least 10 business day have elapsed since the Escrow Agent received the escrow disbursement certificate; and (ii) the Escrow Agent has not received written notice within those 10 business days that a Party to this Consent Decree objects to the requested disbursement and has invoked the dispute resolution procedures under Consent Decree Section XX (Dispute Resolution) to resolve the objection.

6. Disbursements for Natural Resource Restoration. Beyond the $500,000 initial payment for Trustee-sponsored natural resource damage restoration efforts required by Consent Decree Subparagraph 53.a, an additional $2,500,000 deposited in the Escrow Account shall be earmarked and dedicated for natural resource restoration relating to the Site, as the remainder of the NRD Commitment. That $2,500,000 shall be disbursed from the Escrow Account as set forth in the following Subparagraphs: (i) for payment or reimbursement of Allowable Restoration Work Costs incurred for Approved Restoration Work to be performed by the Settling Defendants under Consent Decree Paragraph 48; and/or (ii) for payment to a Site-specific sub-account within the DOI NRDAR Fund, to finance Trustee-sponsored natural resource damage restoration efforts under Consent Decree Paragraph 49.

a. Disbursements shall be made from the Escrow Account in accordance with Consent Decree Paragraph 11 and Consent Decree Paragraph 48 for payment or reimbursement of Allowable Restoration Work Costs incurred for Approved Restoration Work to be performed by the Settling Defendants.

b. By no later than December 1, 2004, the following additional amount shall be disbursed from the Escrow Account to a Site-specific sub-account within the NRDAR Fund: $1,250,000 less the total amount of all disbursements from the Escrow Account for Allowable Restoration Work Costs through September 30, 2004.

c. By no later than December 1, 2005, the following additional amount shall be disbursed from the Escrow Account to a Site-specific sub-account within the NRDAR Fund: $1,250,000 less the total amount of all disbursements from the Escrow Account for Allowable Restoration Work Costs between October 1, 2004 and September 30, 2005.

7. Disbursements for Specified Future Response Costs. Except for costs under Consent Decree Section XV (Emergency Response) that are payable under Consent Decree Subparagraph 54.a.(2), all Specified Future Response Costs incurred and billed by the United States and/or the State before Certification of Completion of Remedial Action by EPA pursuant

to Consent Decree Subparagraph 44.b shall be reimbursed from the Escrow Account, to the extent that such costs are not inconsistent with the National Contingency Plan. The procedures to be used for billing and reimbursing such Specified Future Response Costs are specified by the following Subparagraphs.

a. EPA Reimbursement. On a periodic basis, the United States will send Settling Defendants a cost summary that includes an EPA cost summary, showing direct and indirect costs incurred by EPA and its contractors, and a DOJ cost summary, showing costs incurred by DOJ and its contractors, if any. At any time after the bill has been sent to the Settling Defendants, the United States may submit a duly executed escrow disbursement certificate requesting that the Escrow Agent disburse the billed amount to EPA, subject to the dispute procedures established by pursuant to Consent Decree Paragraph 68 and Section XX (Dispute Resolution) of the Consent Decree.

b. State Reimbursement. On a periodic basis, the State will send Settling Defendants a cost summary that includes a WDNR cost summary, showing direct and indirect costs incurred by WDNR and its contractors, and a WDOJ cost summary, showing costs incurred by WDOJ and its contractors, if any. At any time after the bill has been sent to the Settling Defendants, the State may submit a duly executed escrow disbursement certificate requesting that the Escrow Agent disburse the billed amount to the State, subject to the dispute procedures established by Consent Decree Paragraph 68 and Section XX (Dispute Resolution) of the Consent Decree.

8. Disbursements for the Remedial Design

a. Settling Defendant WTM I Company shall be entitled to seek disbursements from the Escrow Account for payment or reimbursement up to $2 million in response costs incurred in performing its obligations under the July 2003 AOC and Consent Decree Paragraph 12, as Allowable RD/RA Costs. If the costs of performing the work required under the June 2003 AOC and Consent Decree Paragraph 12 exceed $2 million, then Settling Defendant WTM I Company shall continue to perform and shall complete such work at its own expense, without additional reimbursement from the Escrow Account.

b. The Plaintiffs shall be entitled to seek disbursements from the Escrow Account for payment of all response costs incurred by Plaintiffs in overseeing the components of the Response Work performed under the July 2003 AOC and Consent Decree Paragraph 12, as Specified Future Response Costs.

Consent Decree Appendix D

FORM OF
ESCROW AGREEMENT
for the Fox River OU1 Escrow Account

THIS ESCROW AGREEMENT for the Fox River OU1 Escrow Account (the "Escrow Account") is effective as of _____, _____, by and among P. H. Glatfelter Company ("Glatfelter") and WTM I Company ("WTM") and _____ (the "Escrow Agent"). The following parties are the beneficiaries of this Escrow Agreement and the Escrow Account established and managed hereunder (collectively the "Beneficiaries"): (i) the United States of America (the "United States") (on behalf of the U.S. Environmental Protection Agency ("EPA") and the U.S. Department of the Interior ("DOI")); and (ii) the State of Wisconsin (the "State") (on behalf of the Wisconsin Department of Natural Resources ("WDNR")).

WHEREAS, the United States and the State have filed an action, captioned United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.) (the "Litigation"), pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9606 and 9607;

WHEREAS, the Plaintiffs' Complaint in the Litigation seeks, inter alia: (i) reimbursement of certain response costs incurred and to be incurred by the United States and the State for response actions at Operable Unit 1 ("OU1") of the Lower Fox River and Green Bay Site (the "Site") in Northeastern Wisconsin, together with accrued interest; and (ii) performance of response work by the defendants at OU1 of the Site, consistent with the National Contingency Plan, 40 C.F.R. Part 300 (as amended);

WHEREAS, the United States, the State, Glatfelter, and WTM have negotiated a Consent Decree in the Litigation memorializing a settlement of claims on specified terms;

WHEREAS, the appropriate natural resource trustees (the "Trustees"), as represented by the Fox River/Green Bay Natural Resource Trustee Council, participated in the negotiation of the Consent Decree, and support the Consent Decree, as indicated by the Trustee Council Resolution attached as Appendix A to the Consent Decree;

WHEREAS, the Consent Decree requires that Glatfelter and WTM establish an interest-bearing escrow account trust fund – to be known as the Fox River OU1 Escrow Account – and make specified payments into the Escrow Account as financial assurance for certain obligations under the Consent Decree, including for performance of response activities and natural resource restoration efforts;

WHEREAS, the United States and the State will benefit from the funding and performance of response activities and natural resource restoration efforts to be funded and performed under the Consent Decree;

NOW, THEREFORE, in consideration of the promises and of other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the parties hereto agree as follows:

Section 1. Establishment and Funding of Escrow Account.

The terms "Fox River OU1 Escrow Account" and "Escrow Account" shall mean escrow account established by this Escrow Agreement to receive, hold, and disburse funds to be used for payment and reimbursement of particular categories of Site-related response costs and natural resource restoration costs under the Consent Decree. The Escrow Account may be established and managed as several accounts or sub-accounts to address the different sources and uses of the funds paid into the Escrow Account. Glatfelter and WTM shall each pay a total of $26,250,000 into the Escrow Account in accordance with the schedule specified by Consent Decree Subparagraph 50.a. In addition, EPA will use best efforts in seeking to have an additional $10,000,000 deposited in the Escrow Account pursuant to Consent Decree Paragraph 10 and Consent Decree Appendix B. Finally, Glatfelter and WTM may elect to deposit additional funds in the Escrow Account pursuant to Consent Decree Paragraph 98.d.(ii), but they have no obligation to do so under the Consent Decree. Glatfelter and WTM hereby absolutely and irrevocably assign, convey, and transfer to the Escrow Account and its successors and assigns, for the benefit of the Beneficiaries, all funds deposited in the Escrow Account (as well as all interest and income earned on the funds deposited in the Escrow Account), subject only to certain provisions of this Escrow Agreement (namely Subsections 4.a.(2), 4.a.(5), and 4.a.(6)) and certain provisions of the Consent Decree (namely Subparagraph 14.a.(2), Subparagraph 48.c, Paragraph 51, Paragraph 113, and Consent Decree Appendix C).

Section 2. Purpose.

The purpose of the Escrow Account is to receive and hold funds in an interest-bearing account, and to disburse those funds for payment and reimbursement of particular categories of Site-related response costs and natural resource restoration costs under the Consent Decree. The Escrow Agent shall hold, invest, and reinvest all funds deposited in the Escrow Account under this Escrow Agreement and shall disburse funds only as provided by this Escrow Agreement.

Section 3. Beneficial Interest.

All funds deposited into the Escrow Account shall be held in trust for the benefit of the Beneficiaries, subject to disbursement as provided by Section 4 of this Escrow Agreement.

Section 4. Disbursements from the Escrow Account.

a. The Escrow Agent shall only make disbursements from the Escrow Account for:

(1) Payments to a Site-specific sub-account within the DOI Natural Resource Damage and Restoration Fund under the Consent Decree for Trustee-sponsored natural resource damage restoration efforts, after receipt of a duly-executed escrow disbursement

certificate in substantially the form attached hereto as Exhibit A (Form of Escrow Disbursement Certificate for Trustee-Sponsored Natural Resource Restoration Efforts);

(2) Payments to Glatfelter, to WTM, and/or to their designated contractors or subcontractors, for payment or reimbursement of Allowable RD/RA Costs under the Consent Decree, after receipt of a duly-executed escrow disbursement certificate in substantially the form attached hereto as Exhibit B (Form of Escrow Disbursement Certificate for Payment or Reimbursement of Allowable RD/RA Costs);

(3) Payments to the United States and/or to the State for payment of Specified Future Response Costs under the Consent Decree, after receipt of a duly-executed escrow disbursement certificate in substantially the form attached hereto as Exhibit C (Form of Escrow Disbursement Certificate for Payment of Specified Future Response Costs);

(4) In the event EPA and/or WDNR assume performance of all or any portions of the Response Work under Consent Decree Paragraph 90 (Response Work Takeover), payment of any or all unexpended funds remaining in the Escrow Account to the Fox River Site Special Account within the EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Site, or transferred by EPA to the EPA Hazardous Substance Superfund, after receipt of a duly-executed escrow disbursement certificate in substantially the form attached hereto as Exhibit D (Form of Escrow Disbursement Certificate for Response Work Takeover);

(5) Payments to Glatfelter, to WTM, and/or to their designated contractors or subcontractors, for payment or reimbursement of Allowable Restoration Work Costs under the Consent Decree, after receipt of a duly-executed escrow disbursement certificate in substantially the form attached hereto as Exhibit E (Form of Escrow Disbursement Certificate for Payment or Reimbursement of Allowable Restoration Work Costs);

(6) Payments to Glatfelter and/or to WTM for any refund payments to the Settling Defendants under Subparagraphs 5.a.(6) through 5.a.(9).(i) of Consent Decree Appendix C, after receipt of a duly-executed escrow disbursement certificate in substantially the form attached hereto as Exhibit F (Form of Escrow Disbursement Certificate for Refund Payment to Settling Defendants);

(7) A payment of any and all unexpended funds remaining in the Escrow Account to the Fox River Site Special Account within the EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Site, or transferred by EPA to the EPA Hazardous Substance Superfund, for any final payment under Subparagraph 5.a.(9).(ii) of Consent Decree Appendix C, after receipt of a duly executed escrow disbursement certificate in substantially the form attached hereto as Exhibit G (Form of Escrow Disbursement Certificate for Final Payment to Fox River Site Special Account); and

(8) payments of fees, taxes, and expenses under Section 5.3 of this Escrow Agreement.

b. Any Party to the Consent Decree that submits an escrow disbursement certificate to the Escrow Agent shall submit copies of the escrow disbursement certificate to all other Parties to the Consent Decree in accordance with Consent Decree Section XXVIII (Notices and Submissions) and Section 6.6 of this Escrow Agreement. The escrow disbursement certificate shall be submitted to the other Parties to the Consent Decree in the same manner and on the same day that the escrow disbursement certificate is submitted to the Escrow Agent.

c. The Escrow Agent shall not make any disbursement from the Escrow Account in response to an escrow disbursement certificate unless: (i) at least 10 business day have elapsed since the Escrow Agent received the escrow disbursement certificate; and (ii) the Escrow Agent has not received written notice within those 10 business days that a Party to the Consent Decree objects to the requested disbursement and has invoked the dispute resolution procedures under Consent Decree Section XX (Dispute Resolution) to resolve the objection.

Section 5. Escrow Agent.

Section 5.1. Duties. The Escrow Agent's obligations and duties in connection herewith are limited to those specifically enumerated in this Escrow Agreement. The Escrow Agent shall at all times hold and invest the assets of the Escrow Account in a manner designed to achieve the maximum investment return possible, but to preserve the principal of the Escrow Account. Consistent with that capital-preservation objective, the Escrow Agent shall invest and reinvest the principal and income of the Escrow Account in securities of the United States Government or an agency thereof, obligations secured or insured by the United States Government, common trust funds or money market funds investing in investment grade short-term municipal bonds or annuities purchased from insurance companies having assets greater than $10 billion, or mutual funds investing exclusively in such securities or obligations. The Escrow Agent shall render a written statement every month identifying each financial instrument in which the Escrow Agent has invested any portion of the Escrow Account, the amount of each such investment, any change in the amount in the Escrow Account since the date of the previous statement, and all transactions entered by the Escrow Agent since the last statement (including investments, reinvestments, or disbursements) involving funds of the Escrow Account. Monthly statements shall be delivered to the persons identified in Section 6.6 below.

Section 5.2. Receipt. The Escrow Agent shall acknowledge its receipt of amounts deposited into the Escrow Account by sending written notice, within 5 business days of such receipt, to the persons identified in Section 6.6 below.

Section 5.3. Fees, Taxes, and Expenses. The Escrow Agent's fees, if any, shall be paid solely out of the Escrow Account. Interest earned on all funds in the Escrow Account shall first be applied to defray any account fees. The fees agreed to be paid are intended as full compensation for the Escrow Agent's services as contemplated by this Escrow Agreement; provided, however, that if the conditions of this Escrow Agreement are not fulfilled or the

Escrow Agent renders any material service not contemplated in this Escrow Agreement, or there is any assignment of interest in the subject matter of this Escrow Agreement, or any material modification hereof, or if any material controversy arises hereunder, or the Escrow Agent is made a party to or justifiably intervenes in any litigation pertaining to this Escrow Agreement, to the subject matter hereto, the Escrow Agent shall be reasonably compensated out of the Escrow Account for such extraordinary services and reimbursed for all costs and expenses, including reasonable attorneys' fees, occasioned by any delay, controversy, litigation, or event. The Escrow Agent shall notify the persons identified in Section 6.6 below, in writing, of Escrow Agent's fees or expenses at least 45 days prior to the reimbursement of such extraordinary fees or expenses from the Escrow Account; in the event Glatfelter, WTM, or the Beneficiaries dispute the amount of the Escrow Agent's fees or expenses within 30 days of receipt of notice, the disputed fees or expenses shall not be paid unless all parties agree in writing. Any taxes due on interest earned on Escrow Account deposits , and any tax preparation fees, shall be paid from the Escrow Account. Glatfelter, WTM, and the Beneficiaries shall have the right to comment on any tax returns prepared on behalf of the Escrow Agent for the Escrow Account at least 30 days prior to the filing deadline.

Section 5.4. Successor Escrow Agent. The Escrow Agent shall have the right to resign as escrow agent hereunder by delivering at least 30 days' prior notice in writing to the parties identified in Section 6.6. Glatfelter, WTM, and the Beneficiaries shall have the right to remove the Escrow Agent at any time by joint written notice delivered to the Escrow Agent. If the Escrow Agent resigns or is removed, a successor escrow agent shall be appointed by mutual agreement of Glatfelter, WTM, and the Beneficiaries, and such resignation or removal shall take effect no later than the effective date of the resignation or removal of the Escrow Agent who resigns or is being removed. Any successor escrow agent at any time serving hereunder shall be entitled to all rights, powers, and indemnities granted to the Escrow Agent hereunder as if originally named herein.

Section 5.5. Liability of Escrow Agent. So long as it acts in good faith and in the exercise of its best judgment, the Escrow Agent shall not be in any manner liable or responsible for the sufficiency, correctness, genuineness, or validity of any instruments deposited with it or with reference to the form of execution thereof, or the identity, authority, or rights of any person executing or depositing same, and the Escrow Agent shall not be liable for any loss that may occur by reason of forgery, false representation, or the exercise of its discretion in any particular manner or for any other reason, except for its own negligence, gross negligence, willful misconduct, bad faith, or breach of this Escrow Agreement. Except in instances of the Escrow Agent's own negligence, gross negligence or willful misconduct, Glatfelter and WTM shall indemnify, defend, and hold the Escrow Agent harmless from any demands, suits or causes of action arising out of this Escrow Agreement.

Section 6. Miscellaneous.

Section 6.1. Binding Effect. This Escrow Agreement shall be binding upon Glatfelter, WTM, and the Escrow Agent and their respective successors and assigns.

Section 6.2. Severability. If any section of this Escrow Agreement, or portion thereof, shall be adjudged illegal, invalid, or unenforceable, such illegality, invalidity, or unenforceability shall not affect the legality, validity, or enforceability of this Escrow Agreement, as a whole, or of any other section or portion thereof not so adjudged.

Section 6.3. Effective Date. This Escrow Agreement shall become effective upon the execution of this Escrow Agreement by Glatfelter, WTM, and the Escrow Agent.

Section 6.4. Governing Law. This Escrow Agreement shall be governed by and construed and enforced in accordance with the laws of the State of Wisconsin.

Section 6.5. Interpretation. As used in this Escrow Agreement, words in the singular include the plural and words in the plural include the singular; the masculine and neuter genders shall be deemed to include the masculine, feminine and neuter. The section headings contained in this Escrow Agreement are for reference purposes only and shall not affect in any way the meaning or interpretation of this Escrow Agreement.

Section 6.6. Notices. Any notice, request, instruction, or other document to be given hereunder by a party hereto or by any or all of the Beneficiaries shall be in writing, shall be given to all other parties hereunder and to the Beneficiaries, and shall be deemed to have been given: (i) when received if given in person, (ii) on the date of transmission if sent by confirmed telex, facsimile, or other wire transmission, or (iii) four business days after being deposited in the United States mail postage prepaid:

<u>If to the Beneficiaries, addressed as follows</u>:

[Name, address, facsimile, and e-mail]

and

[Name, address, facsimile, and e-mail]

<u>If to Glatfelter and WTM, addressed as follows</u>:

[Name, address, facsimile, and e-mail]

and

[Name, address, facsimile, and e-mail]

<u>If to the Escrow Agent, addressed as follows</u>:

[Name, address, facsimile, and e-mail]

or to such other individual or address as a party hereto or the Beneficiaries may designate for itself by notice given as herein provided.

Section 6.7. No Limitation. The parties hereto agree that the rights and remedies of the parties hereunder shall not operate to limit any other rights and remedies otherwise available to the parties.

Section 6.8. Counterparts. This Escrow Agreement may be executed in two or more counterparts, each of which shall be deemed to be an original but all of which together shall constitute one and the same instrument.

Section 6.9. Modification. This Escrow Agreement may be modified only by a written instrument signed by each of the parties hereto, and approved in writing by the Beneficiaries.

Section 6.10. Termination. If not sooner terminated pursuant to the terms hereof, this Escrow Agreement shall terminate upon disbursement of all of the funds held in the Escrow Account, and may be terminated prior to that date by written mutual consent signed by Glatfelter, WTM, and the Beneficiaries.

IN WITNESS WHEREOF, the parties hereto have executed their Escrow Agreement as of the date first written above.

P. H. Glatfelter Company

By: _____

Its: _____

WTM I Company

By: _____

Its: _____

_____

By: _____

Its: _____

EXHIBIT A TO ESCROW AGREEMENT: Form of Escrow Disbursement Certificate for Trustee-Sponsored Natural Resource Restoration Efforts

ESCROW DISBURSEMENT CERTIFICATE
UNDER ESCROW AGREEMENT SUBSECTION 4.a.(1)

Reference is made to that certain Escrow Agreement for the Fox River OU1 Escrow Account (the "Escrow Account"), dated _____, by and among P. H. Glatfelter Company, WTM I Company, and _____ (the "Escrow Agent'), with the following beneficiaries (collectively the "Beneficiaries"): (i) the United States of America (the "United States") (on behalf of the U.S. Environmental Protection Agency ("EPA") and the U.S. Department of the Interior ("DOI")); and (ii) the State of Wisconsin (the "State") (on behalf of the Wisconsin Department of Natural Resources ("WDNR")).

DOI and WDNR hereby certify as follows:

This Escrow Disbursement Certificate is submitted pursuant to Subsection 4.a.(1) of the Escrow Agreement and Appendix C of the Consent Decree in the case captioned United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.). This disbursement is sought for Trustee-sponsored natural resource restoration efforts under Consent Decree Paragraph 49.

No sooner than 10 business days after your receipt of this Certificate, you are instructed to disburse $_____ to the Fox River Site Account within DOI's Natural Resource Damage Assessment and Restoration Fund. The disbursement should be made in accordance with the payment instructions attached hereto.

You are instructed not to disburse any funds pursuant to this Certificate if you receive written notice within 10 business days of your receipt of this Certificate that Glatfelter and/or WTM dispute the disbursement request contained in this Certificate, as provided by Escrow Agreement Subsection 4.c and Consent Decree Section XX (Dispute Resolution).

This Certificate constitutes DOI Disbursement Certificate No. _____ (with a separate sequential number to be assigned to each separate Certificate).

BY:

_____		_____
Assistant Regional Director U.S. Fish and Wildlife Service, Region 3	and	Deputy Administrator, Division of Water Wisconsin Department of Natural Resources
DATE: _____		DATE: _____

EXHIBIT B TO ESCROW AGREEMENT: Form of Escrow Disbursement Certificate for Payment or Reimbursement of Allowable RD/RA Costs

ESCROW DISBURSEMENT CERTIFICATE
UNDER ESCROW AGREEMENT SUBSECTION 4.a.(2)

Reference is made to that certain Escrow Agreement for the Fox River OU1 Escrow Account (the "Escrow Account"), dated _____, by and among P. H. Glatfelter Company ("Glatfelter"), WTM I Company (WTM"), and _____ (the "Escrow Agent'), with the following beneficiaries (collectively the "Beneficiaries"): (i) the United States of America (the "United States") (on behalf of the U.S. Environmental Protection Agency ("EPA") and the U.S. Department of the Interior ("DOI")); and (ii) the State of Wisconsin (the "State") (on behalf of the Wisconsin Department of Natural Resources ("WDNR")).

Glatfelter and WTM hereby certify as follows:

This Escrow Disbursement Certificate is submitted pursuant to Subsection 4.a.(2) of the Escrow Agreement and Appendix C of the Consent Decree in the case captioned United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.). This disbursement is sought for payment or reimbursement of Allowable RD/RA Costs under the Consent Decree.

No sooner than 10 business days after your receipt of this Certificate, you are instructed to disburse the amounts specified below to Glatfelter, to WTM, and/or to their designated contractors or subcontractors, as specified below:

Disburse $_____ to _____.

Disburse $_____ to _____.

The disbursements should be made in accordance with the payment instructions attached hereto.

You are instructed not to disburse any funds pursuant to this Certificate if you receive written notice within 10 business days of your receipt of this Certificate that the United States and/or the State dispute the disbursement request contained in this Certificate, as provided by Escrow Agreement Subsection 4.c and Consent Decree Section XX (Dispute Resolution).

This Certificate constitutes Glatfelter/WTM Disbursement Certificate No. _____ (with a separate sequential number to be assigned to each separate Certificate).

BY:

_____		_____
[ ]	and	[ ]
For P. H. Glatfelter Company		For WTM I Company
DATE: _____		DATE: _____

EXHIBIT C TO ESCROW AGREEMENT: Form of Escrow Disbursement Certificate for Payment of Specified Future Response Costs

ESCROW DISBURSEMENT CERTIFICATE
UNDER ESCROW AGREEMENT SUBSECTION 4.a.(3)

Reference is made to that certain Escrow Agreement for the Fox River OU1 Escrow Account (the "Escrow Account"), dated _____, by and among P. H. Glatfelter Company ("Glatfelter"), WTM I Company (WTM"), and _____ (the "Escrow Agent'), with the following beneficiaries (collectively the "Beneficiaries"): (i) the United States of America (the "United States") (on behalf of the U.S. Environmental Protection Agency ("EPA") and the U.S. Department of the Interior ("DOI")); and (ii) the State of Wisconsin (the "State") (on behalf of the Wisconsin Department of Natural Resources ("WDNR")).

The party submitting this Certificate hereby certifies as follows:

This Escrow Disbursement Certificate is submitted pursuant to Subsection 4.a.(3) of the Escrow Agreement and Appendix C of the Consent Decree in the case captioned United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.). This disbursement is sought for payment of Specified Future Response Costs under the Consent Decree.

No sooner than 10 business days after your receipt of this Certificate, you are instructed to disburse the amount specified below to EPA or to WDNR, as specified below:

__ **Disburse $_____ to the Fox River Site Special Account within the EPA Hazardous Substance Superfund.** This Certificate constitutes EPA Disbursement Certificate No. _____ (with a separate sequential number to be assigned to each separate Certificate).

__ **Disburse $_____ to the WDNR.** This Certificate constitutes WDNR Disbursement Certificate No. _____ (with a separate sequential number to be assigned to each separate Certificate).

The disbursement should be made in accordance with the payment instructions attached hereto.

You are instructed not to disburse any funds pursuant to this Certificate if you receive written notice within 10 business days of your receipt of this Certificate that Glatfelter and/or WTM dispute the disbursement request contained in this Certificate, as provided by Escrow Agreement Subsection 4.c and Consent Decree Section XX (Dispute Resolution).

BY:

_____		_____
Director, Superfund Division, Region 5 U.S. Environmental Protection Agency	or	Deputy Administrator, Division of Water Wisconsin Department of Natural Resources
DATE: _____		DATE: _____

EXHIBIT D TO ESCROW AGREEMENT: Form of Escrow Disbursement Certificate for Response Work Takeover

ESCROW DISBURSEMENT CERTIFICATE
UNDER ESCROW AGREEMENT SUBSECTION 4.a.(4)

Reference is made to that certain Escrow Agreement for the Fox River OU1 Escrow Account (the "Escrow Account"), dated _____, by and among P. H. Glatfelter Company ("Glatfelter"), WTM I Company (WTM"), and _____ (the "Escrow Agent'), with the following beneficiaries (collectively the "Beneficiaries"): (i) the United States of America (the "United States") (on behalf of the U.S. Environmental Protection Agency ("EPA") and the U.S. Department of the Interior ("DOI")); and (ii) the State of Wisconsin (the "State") (on behalf of the Wisconsin Department of Natural Resources ("WDNR")).

EPA hereby certifies as follows:

This Escrow Disbursement Certificate is submitted pursuant to Subsection 4.a.(4) of the Escrow Agreement and Appendix C of the Consent Decree in the case captioned United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.). This disbursement is sought because EPA and/or the State have assumed performance of all or any portions of the Response Work under Consent Decree Paragraph 90 (Response Work Takeover).

No sooner than 10 business days after your receipt of this Certificate, you are instructed to disburse $_____ from the Escrow Account to the Fox River Site Special Account within the EPA Hazardous Substance Superfund. The disbursement should be made in accordance with the payment instructions attached hereto.

You are instructed not to disburse any funds pursuant to this Certificate if you receive written notice within 10 business days of your receipt of this Certificate that Glatfelter and/or WTM dispute the disbursement request contained in this Certificate, as provided by Escrow Agreement Subsection 4.c and Consent Decree Section XX (Dispute Resolution).

This Certificate constitutes EPA Disbursement Certificate No. _____ (with a separate sequential number to be assigned to each separate Certificate).

BY:

_____
Director, Superfund Division, Region 5
U.S. Environmental Protection Agency

DATE: _____

EXHIBIT E TO ESCROW AGREEMENT: Form of Escrow Disbursement Certificate for Payment or Reimbursement of Allowable Restoration Work Costs

ESCROW DISBURSEMENT CERTIFICATE
UNDER ESCROW AGREEMENT SUBSECTION 4.a.(5)

Reference is made to that certain Escrow Agreement for the Fox River OU1 Escrow Account (the "Escrow Account"), dated _____, by and among P. H. Glatfelter Company ("Glatfelter"), WTM I Company (WTM"), and _____ (the "Escrow Agent'), with the following beneficiaries (collectively the "Beneficiaries"): (i) the United States of America (the "United States") (on behalf of the U.S. Environmental Protection Agency ("EPA") and the U.S. Department of the Interior ("DOI")); and (ii) the State of Wisconsin (the "State") (on behalf of the Wisconsin Department of Natural Resources ("WDNR")).

Glatfelter and WTM hereby certify as follows:

This Escrow Disbursement Certificate is submitted pursuant to Subsection 4.a.(5) of the Escrow Agreement and Appendix C of the Consent Decree in the case captioned United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.). This disbursement is sought for payment or reimbursement of Allowable Restoration Work Costs under the Consent Decree.

No sooner than 10 business days after your receipt of this Certificate, you are instructed to disburse the amounts specified below to Glatfelter, to WTM, and/or to their designated contractors or subcontractors, as specified below:

Disburse $_____ to _____.

Disburse $_____ to _____.

The disbursements should be made in accordance with the payment instructions attached hereto.

You are instructed not to disburse any funds pursuant to this Certificate if you receive written notice within 10 business days of your receipt of this Certificate that the United States and/or the State dispute the disbursement request contained in this Certificate, as provided by Escrow Agreement Subsection 4.c and Consent Decree Section XX (Dispute Resolution).

This Certificate constitutes Glatfelter/WTM Disbursement Certificate No. _____ (with a separate sequential number to be assigned to each separate Certificate).

BY:

_____		_____
[ ]	and	[ ]
For P. H. Glatfelter Company		For WTM I Company
DATE: _____		DATE: _____

EXHIBIT F TO ESCROW AGREEMENT: Form of Escrow Disbursement Certificate for Refund Payments to Settling Defendants

ESCROW DISBURSEMENT CERTIFICATE
UNDER ESCROW AGREEMENT SUBSECTION 4.a.(6)

Reference is made to that certain Escrow Agreement for the Fox River OU1 Escrow Account (the "Escrow Account"), dated _____, by and among P. H. Glatfelter Company ("Glatfelter"), WTM I Company (WTM"), and _____ (the "Escrow Agent'), with the following beneficiaries (collectively the "Beneficiaries"): (i) the United States of America (the "United States") (on behalf of the U.S. Environmental Protection Agency ("EPA") and the U.S. Department of the Interior ("DOI")); and (ii) the State of Wisconsin (the "State") (on behalf of the Wisconsin Department of Natural Resources ("WDNR")).

Glatfelter and WTM hereby certify as follows:

This Escrow Disbursement Certificate is submitted pursuant to Subsection 4.a.(6) of the Escrow Agreement and Appendix C of the Consent Decree in the case captioned United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.). This disbursement is sought for a refund payment of some or all funds remaining in the Escrow Account, as permitted by the Consent Decree.

No sooner than 10 business days after your receipt of this Certificate, you are instructed to disburse the amounts specified below to Glatfelter and/or to WTM, as specified below:

__ **Disburse $_____ to Glatfelter and disburse $_____ to WTM as partial refund payments under Subparagraph 5.a.(6) of Consent Decree Appendix C; or**

__ **Disburse $_____ to Glatfelter and disburse $_____ to WTM as refund payments under Subparagraph 5.a.(7), 5.a.(8), or 5.a.(9).(i) of Consent Decree Appendix C.**

The disbursements should be made in accordance with the payment instructions attached hereto.

You are instructed not to disburse any funds pursuant to this Certificate if you receive written notice within 10 business days of your receipt of this Certificate that the United States and/or the State dispute the disbursement request contained in this Certificate, as provided by Escrow Agreement Subsection 4.c and Consent Decree Section XX (Dispute Resolution).

This Certificate constitutes Glatfelter/WTM Disbursement Certificate No. _____ (with a separate sequential number to be assigned to each separate Certificate).

BY:

_____		_____
[ ]	and	[ ]
For P. H. Glatfelter Company		For WTM I Company
DATE: _____		DATE: _____

EXHIBIT G TO ESCROW AGREEMENT: Form of Escrow Disbursement Certificate for Final Payment to Fox River Site Special Account

ESCROW DISBURSEMENT CERTIFICATE
UNDER ESCROW AGREEMENT SUBSECTION 4.a.(7)

Reference is made to that certain Escrow Agreement for the Fox River OU1 Escrow Account (the "Escrow Account"), dated _____, by and among P. H. Glatfelter Company ("Glatfelter"), WTM I Company (WTM"), and _____ (the "Escrow Agent'), with the following beneficiaries (collectively the "Beneficiaries"): (i) the United States of America (the "United States") (on behalf of the U.S. Environmental Protection Agency ("EPA") and the U.S. Department of the Interior ("DOI")); and (ii) the State of Wisconsin (the "State") (on behalf of the Wisconsin Department of Natural Resources ("WDNR")).

EPA hereby certifies as follows:

This Escrow Disbursement Certificate is submitted pursuant to Subsection 4.a.(7) of the Escrow Agreement and Appendix C of the Consent Decree in the case captioned United States and the State of Wisconsin v. P. H. Glatfelter Company and WTM I Company (E.D. Wis.). This disbursement is sought for payment of Specified Future Response Costs under the Consent Decree.

No sooner than 10 business days after your receipt of this Certificate, you are instructed to disburse any and all funds unexpended remaining in the Escrow Account to the Fox River Site Special Account within the EPA Hazardous Substance Superfund. The disbursement should be made in accordance with the payment instructions attached hereto.

You are instructed not to disburse any funds pursuant to this Certificate if you receive written notice within 10 business days of your receipt of this Certificate that Glatfelter and/or WTM dispute the disbursement request contained in this Certificate, as provided by Escrow Agreement Subsection 4.c and Consent Decree Section XX (Dispute Resolution).

This Certificate constitutes EPA Disbursement Certificate No. _____ (with a separate sequential number to be assigned to each separate Certificate).

BY:

_____
Director, Superfund Division, Region 5
U.S. Environmental Protection Agency

DATE: _____

Consent Decree Appendix E

Special Procedures for Restoration Work

1. Claims of a Force Majeure Event and Disputes Relating to Approved Restoration Work and Allowable Restoration Work Costs. Claims of a Force Majeure Event and any disputes relating to Approved Restoration Work and Allowable Restoration Work Costs shall be resolved in accordance with this Appendix E. The Plaintiffs shall consult with the other members of the Trustee Council in taking and advancing positions and in making decisions under this Appendix E.

2. Force Majeure Events for Restoration Work

a. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree to perform Approved Restoration Work, whether or not caused by a Force Majeure Event, the Settling Defendants shall notify the Plaintiffs in writing within 10 working days of when Settling Defendants first knew that the event might cause a delay. The Settling Defendants' written notice shall include an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; and the Settling Defendants' rationale for attributing such delay to a Force Majeure Event if they intend to assert such a claim. The Settling Defendants shall include with any notice all available documentation supporting their claim that the delay was attributable to a Force Majeure Event. Failure to comply with the above requirements shall preclude Settling Defendants from asserting any claim of a Force Majeure Event for that event for the period of time of such failure to comply, and for any additional delay caused by such failure. Settling Defendants shall be deemed to know of any circumstance of which Settling Defendants, any entity controlled by Settling Defendants, or Settling Defendants' contractors knew or should have known.

b. If the Plaintiffs agree that the delay or anticipated delay is attributable to a Force Majeure Event, the time for performance of the obligations under this Consent Decree that are affected by the Force Majeure Event will be extended by the Plaintiffs for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure event shall not, of itself, extend the time for performance of any other obligation. If the Plaintiffs do not agree that the delay or anticipated delay has been or will be caused by a Force Majeure Event, the Plaintiffs will notify the Settling Defendants in writing of their decision. If the Plaintiffs agree that the delay is attributable to a Force Majeure Event, the Plaintiffs will notify the Settling Defendants in writing of the length of the extension, if any, for performance of the obligations affected by the Force Majeure Event.

c. If the Settling Defendants elect to invoke the dispute resolution procedures set forth in Paragraph 3 (Dispute Resolution for Restoration Work) of this Appendix, they shall do so no later than 15 days after receipt of the Plaintiffs' notice. In any such proceeding, Settling Defendants shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a Force Majeure Event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Settling Defendants

complied with the requirements of the preceding Subparagraphs. If Settling Defendants carry this burden, the delay at issue shall be deemed not to be a violation by Settling Defendants of the affected obligation of this Consent Decree identified to the Plaintiffs and the Court.

3. Dispute Resolution for Restoration Work.

a. Informal Dispute Resolution. Any dispute under this Paragraph shall in the first instance be the subject of informal negotiations between the parties to the dispute. The period for informal negotiations shall not exceed 20 days from the time the dispute arises, unless it is modified by written agreement of the parties to the dispute. The dispute shall be considered to have arisen when one party sends the other parties a written Notice of Dispute.

b. Formal Dispute Resolution. In the event that the parties cannot resolve any dispute under this Paragraph by informal negotiations under the preceding Subparagraph, the formal dispute procedures outlined by this Subparagraph shall apply.

(1) The position advanced by the Plaintiffs shall be considered binding unless, within fifteen working days after the conclusion of the informal negotiation period, the Settling Defendants invoke formal dispute resolution procedures by serving on the Plaintiffs, in accordance with Section XXVIII (Notices and Submissions), a written Statement of Position on the matter in dispute which shall include or attach any factual data, analysis, opinion or documentation that the Settling Defendants rely upon in support of their position.

(2) Following receipt of Settling Defendants' Statement of Position, the Plaintiffs will issue an administrative decision resolving the dispute which shall include or attach any factual data, analysis, opinion, or documentation supporting the decision. The Plaintiffs shall compile and maintain an administrative record of the dispute containing the Settling Defendants' Statement of Position and the Plaintiffs administrative decision. The Plaintiffs' administrative decision shall be binding on the Settling Defendants unless, within 10 days of receipt of the decision, the Settling Defendants file with the Court and serve on the parties a motion for judicial review of the Plaintiffs' administrative decision, based on the administrative record compiled and maintained by the Plaintiffs. Any such motion filed by the Settling Defendants' shall setting forth the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Decree. The Plaintiffs shall provide the Court a copy of the administrative record of the dispute, and may file a response to Settling Defendants' motion.

c. Effect of Invoking Dispute Resolution. The invocation of dispute resolution procedures under this Paragraph shall not extend, postpone, or affect in any way any obligation of Settling Defendants under this Consent Decree, not directly in dispute, unless the Plaintiffs agree otherwise or unless the Court determines otherwise. Stipulated damages with respect to the disputed matter shall continue to accrue from the first day of noncompliance, but payment shall be stayed pending resolution of the dispute as provided in Consent Decree Paragraph 79 (Penalty Accrual During Dispute Resolution). In the event that the Settling Defendants do not prevail on the disputed issue, stipulated damages shall be assessed and paid as provided in Consent Decree Section XXI (Stipulated Penalties and Stipulated Damages).

Consent Decree Appendix F

Administrative Order on Consent between WTM I Company, EPA, and WDNR, captioned In the matter of the Lower Fox River and the Green Bay Site, Docket No. V-W-'03-C-745 (including the Statement of Work for Remedial Design)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:	)	ADMINISTRATIVE ORDER ON CONSENT
Lower Fox River and Green Bay Site	)	U.S. EPA Region 5 CERCLA Docket No. V-W- '03-C-745
Respondent:	)	Proceedings Under Sections 104, 106, 122(a), and 122(d)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act, as Amended, 42 U.S.C. §§ 9604, 9606, 9622(a), and 9622(d)(3).
WTM I Company	)	
(f/k/a Wisconsin Tissue Mills Inc.)	)	

I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Order on Consent ("Consent Order") is entered into voluntarily by the United States Environmental Protection Agency ("EPA"), the State of Wisconsin ("State") through the Wisconsin Department of Natural Resources ("WDNR"), and WTM I Company ("Respondent"). The mutual objectives of EPA, WDNR, and Respondent in entering into this Consent Order are: (i) to have Respondent perform the Pre-design Sampling for Operable Unit 1 ("OU1") of the Lower Fox River and Green Bay Site (also known as the Fox River NRDA PCB Releases Site) ("Site"), located in the State of Wisconsin; and (ii) to have the Respondent perform all other Remedial Design activities needed for implementation of the Response Agencies' (EPA and WDNR) December 2002 selected remedy (and/or contingent remedy, as necessary) for OU1 at the Site.

2. This Consent Order is issued pursuant to the authority vested in the President of the United States by Sections 104, 106, 122(a), and 122(d)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9604, 9606, 9622(a), and 9622(d)(3), as amended ("CERCLA"). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order 12580, 52 Fed. Reg. 2926 (1987), and further delegated to EPA Regional Administrators as of January 16, 2002, by EPA Delegation Nos. 14-1 and 14-2, and to the Director, Superfund Division, EPA Region 5, by Regional Delegation Nos. 14-1 and 14-2.

3. The activities conducted pursuant to this Consent Order are subject to approval by EPA and WDNR, as provided herein, and shall be consistent with CERCLA, the National Contingency Plan, 40 C.F.R. Part 300, and all other applicable laws.

4. EPA, WDNR, and Respondent recognize that this Consent Order has been negotiated in good faith and that the actions undertaken by Respondent in accordance with this

Consent Order do not constitute an admission of any liability. Nothing in this Consent Order is intended by the Parties to be, nor shall it be construed as, an admission of fact or law, an estoppel, or a waiver of defenses or claims by Respondent for any purpose. The Parties agree that the provisions of this Consent Order are not based on any views or assumptions regarding Respondent's appropriate share of liability or costs relating to the Site. Participation in this Consent Order by Respondent is not intended by the Parties to be, and shall not be, an admission of any fact or opinion developed by EPA, the State, or any other person or entity.

5. Respondent agrees to comply with and be bound by the terms of this Consent Order. Respondent consents to and agrees not to contest the authority or jurisdiction of the Regional Administrator of EPA Region 5 and the Secretary of the Wisconsin Department of Natural Resources or their delegatees to issue or enforce this Consent Order, and also agrees not to contest the basis or validity of this Consent Order or its terms in any action to enforce its provisions. The Respondent does not, by signing this Consent Order, waive any rights it may have to assert claims under CERCLA against any person, as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21), except as precluded by Section XXI (Other Claims).

II. PARTIES BOUND

6. This Consent Order applies to and is binding upon and inures to the benefit of EPA, WDNR, Respondent, and their successors and assigns. Respondent agrees to instruct its officers, directors, employees and agents involved in the performance of the Work required by this Consent Order to take all necessary steps to accomplish the performance of said Work in accordance with this Consent Order. Any change in ownership or corporate status of Respondent, including but not limited to any transfer of assets or real or personal property, shall not alter Respondent's responsibilities under this Consent Order. Respondent shall provide a copy of this Consent Order to any subsequent owners or successors before ownership rights or stock or assets in a corporate acquisition are transferred. The signatories to this Consent Order certify that they are authorized to execute and legally bind the Parties they represent to this Consent Order.

7. Respondent shall provide a copy of this Consent Order to all contractors, laboratories, and consultants which are retained to conduct any work performed under this Consent Order, within fourteen (14) days after the Effective Date of this Consent Order or the date of retaining their services, whichever is later. Respondent shall condition any such contracts upon satisfactory compliance with this Consent Order. Notwithstanding the terms of any contract, Respondent is responsible for compliance with this Consent Order and for ensuring that its subsidiaries, employees, contractors, consultants, subcontractors, agents and attorneys comply with this Consent Order.

III. DEFINITIONS

8. Unless otherwise specified, terms used in this Consent Order which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Order or in the attachments hereto, the following definitions shall apply:

a. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601 et seq.

b. "Consent Order" shall mean this Administrative Order on Consent and all attachments hereto. In the event of conflict between this Consent Order and any attachment, this Consent Order shall control.

c. "Day" shall mean a calendar day unless expressly stated to be a working day. "Working day" shall mean a day other than a Saturday, Sunday, or federal holiday. In computing any period of time under this Consent Order, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the close of business of the next working day.

d. "Effective Date" shall mean the effective date of this Consent Order as provided by Section XXVI of this Consent Order (Effective Date).

e. "EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

f. "Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States and the State incur after the Effective Date in reviewing or developing plans, reports and other items pursuant to this Consent Order, in verifying the Work, or in otherwise implementing, overseeing, or enforcing this Consent Order, including, but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Section XIV (including, but not limited to, the cost of attorney time and any monies paid to secure access including, but not limited to, the amount of just compensation) and Paragraph 71 of Section XIX.

g. "Interest" shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

h. "National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

i. "Operable Unit 1" or "OU1" shall mean the Little Lake Butte des Morts reach of the Lower Fox River, as delineated by the Record of Decision signed by WDNR and EPA in December 2002. More specifically, OU1 is the portion of the Lower Fox River (and the underlying River sediment) starting at the outlet of Lake Winnebago at the Neenah Dam and the Menasha Dam downstream to the Upper Appleton Dam, including sediment deposits A through H and POG. As so defined, OU1 is depicted in Figure 7-9 of the December 2002 Final Feasibility Study, a copy of which is attached hereto as Attachment B.

j. "Paragraph" shall mean a portion of this Consent Order identified by an Arabic numeral.

k. "Parties" shall mean all signatories to this Consent Order.

l. "Record of Decision" or "ROD" for purposes of this Consent Order shall mean the WDNR/EPA Record of Decision relating to the Remedial Action planned for Operable Units 1 and 2 of the Site, signed on December 18, 2002, by the WDNR and on December 20, 2002 by the Superfund Division Director, EPA Region 5, and all attachments.

m. "Remedial Design" or "RD" shall mean those activities, including pre-design sampling, investigations, and analyses, preparation of the basis for design report, preliminary and final plans and specifications, and bid documents for the Remedial Action for Operable Unit 1 pursuant to the Record of Decision, the Statement of Work, the Pre-design Sampling Plan, and the Remedial Design Work Plan (the documents submitted by Respondent pursuant to Section IX of this Consent Order (Work to be Performed)).

n. "Respondent" shall mean WTM I Company.

o. "Response Agencies" shall mean the United States Environmental Protection Agency (EPA) and the Wisconsin Department of Natural Resources (WDNR).

p. "Section" shall mean a portion of this Consent Order identified by a Roman numeral.

q. "Site" shall mean the Lower Fox River and Green Bay Site (also known as the Fox River NRDA PCB Releases Site), or any relevant portion thereof.

r. "State" shall mean the State of Wisconsin, including its departments, agencies, and instrumentalities.

s. "Statement of Work" or "SOW" shall mean the statement of work for implementation of Remedial Design as set forth in Attachment A to this Consent Order and any modifications made in accordance with this Consent Order.

t. "United States" shall mean the United States of America, including its departments, agencies, and instrumentalities.

u. "WDNR" shall mean the Wisconsin Department of Natural Resources and any successor departments or agencies of the State of Wisconsin.

v. "Work" shall mean all activities Respondent is required to perform under this Consent Order, except those required by Section XXIV (Record Preservation).

IV. STATEMENT OF PURPOSE

9. The mutual objective of EPA, WDNR and Respondent in entering into this Consent Order is to protect human health, welfare and the environment at Operable Unit 1 by producing a Remedial Design for remedial action in accordance with this Consent Order.

10. The activities conducted pursuant to this Consent Order are subject to approval by the Response Agencies. Respondent shall employ sound scientific, engineering, and construction practices and all activities undertaken shall be consistent with CERCLA, the NCP, and other applicable laws.

V. FINDINGS OF FACT

11. Based on available information, including the Administrative Record in this matter, EPA and WDNR hereby find that:

a. At certain times in the past, primarily in the 1950's and 1960's, certain paper companies located along the Fox River engaged in the manufacture or recycling of carbonless copy paper. Polychlorinated biphenyls (PCBs), which are hazardous substances, were used in the production of carbonless copy paper and were contained in wastepaper that entered the paper recycling operations.

b. As a result of the paper mills' production or recycling of carbonless copy paper an estimated 690,000 pounds of PCBs were likely released to the Fox River. An estimated 66,000 pounds of these PCBs remain in the lower 39 miles of the Fox River.

c. As a result of this contamination, fish consumption advisories have been in effect on the Fox River and Green Bay since 1976.

d. A Remedial Investigation and Feasibility Study (RI/FS) under the technical lead of WDNR, and a proposed remedial action plan, was issued for public comment on October 5, 2001.

e. On January 7, 2003, the Response Agencies made public a Record of Decision for Operable Units 1 and 2 of the Site.

VI. CONCLUSIONS OF LAW AND DETERMINATIONS

12. Based on the Findings of Fact set forth above, and the Administrative Record, EPA and WDNR have determined that:

a. The Site is a "facility" as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9). Respondent's former Menasha paper mill is also a "facility" as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

b. The contamination found at the Site, as identified in the Findings of Fact above, includes "hazardous substances" as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

c. Respondent is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

d. Respondent WTM I Company is a responsible party under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), as: (i) the "owner" or "operator" of a facility at the time of disposal of a hazardous substance there; and/or (ii) as a person who arranged for disposal or transport for disposal of a hazardous substance at a facility from which there was a release of a hazardous substance.

e. The conditions described in the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance from the facility into the "environment" as defined by Sections 101(8) and (22) of CERCLA, 42 U.S.C. §§ 9601(8) and (22).

f. The conditions present at the Site may present a threat to public health, welfare, or the environment based upon the factors set forth in Section 300.415(b)(2) of the National Contingency Plan, as amended, 40 C.F.R. § 300.415(b)(2).

g. The actual or threatened release of hazardous substances from the Site may present an imminent and substantial endangerment to the public health, welfare, or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

h. The response actions required by this Consent Order are necessary to protect the public health, welfare, or the environment and if carried out in compliance with the terms of this Consent Order, shall be deemed necessary and consistent with the NCP.

VII. ORDER

13. Based upon the foregoing Findings of Fact, Conclusions of Law and Determinations, and the Administrative Record for this Site, it is hereby Ordered and Agreed that Respondent shall comply with all provisions of this Consent Order. Respondent shall promptly and properly take appropriate response action at Operable Unit 1 of the Site by conducting a Remedial Design.

VIII. DESIGNATION OF CONTRACTORS AND PROJECT COORDINATORS

14. Selection of Contractors, Personnel. All Work performed by Respondent pursuant to this Consent Order shall be under the direction and supervision of qualified personnel. Within forty-five (45) days of the Effective Date of this Consent Order, and before the Work outlined below begins, Respondent shall notify the Response Agencies in writing of the names, titles, and qualifications of the key personnel, including contractors, subcontractors, consultants and laboratories to be used in carrying out such Work. With respect to any proposed contractor, the Respondent shall demonstrate that the proposed contractor has a quality system which complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. The qualifications of the key personnel

undertaking the work for Respondent shall be subject to the Response Agencies' review, for verification that such persons meet minimum technical background and experience requirements. This Consent Order is contingent on Respondent's demonstration to the Response Agencies' satisfaction that Respondent's personnel are qualified to perform properly and promptly the actions set forth in this Consent Order.

15. If EPA or WDNR disapprove in writing of any contractor proposed by Respondent, Respondent shall notify the Response Agencies of the identity and qualifications of the replacement within thirty (30) days of the written notice. If EPA or WDNR subsequently disapprove of the replacement, EPA reserves the right to terminate this Consent Order and to conduct a complete Remedial Design, and to seek reimbursement for costs and penalties from Respondent. During the course of the Remedial Design, Respondent shall notify the Response Agencies in writing of any changes or additions in the key personnel used to carry out such work, providing their names, titles, and qualifications. The Response Agencies shall have the same right to approve changes and additions to key personnel as they have hereunder regarding the initial notification. Replacement of any of Respondent's personnel shall not delay performance of the work under this Consent Order.

16. On or before the Effective Date of this Consent Order, Respondent shall designate a Project Coordinator who shall be responsible for administration of all Respondent's response actions required by the Consent Order. Respondent shall submit to the Response Agencies the designated Project Coordinator's name, address, telephone number, and qualifications. EPA and WDNR retain the right to disapprove of any Project Coordinator named by Respondent. If either Response Agency disapproves a selected Project Coordinator, Respondent shall retain a different Project Coordinator and shall notify the Response Agencies of that person's name and qualifications within seven (7) business days of the Response Agency's disapproval.

17. Receipt by Respondent's Project Coordinator of any notice or communication from the Response Agencies relating to this Consent Order shall constitute receipt by Respondent. To the maximum extent possible, communications between the Respondent and the Response Agencies shall be directed to the Project Coordinators by mail, with copies to such other persons as EPA, the State, and Respondent may respectively designate. Communications include, but are not limited to, all documents, reports, approvals, and other correspondence submitted under this Consent Order.

18. Respondent's Project Coordinator, or his/her designee, shall be on-site during all hours of work when field work is ongoing in Operable Unit 1, and shall be available at all reasonable times throughout the pendency of this Consent Order. If Respondent or its agents become aware of any conditions at Operable Unit 1 which may present an imminent and substantial endangerment to human health or welfare or the environment, it shall immediately notify the EPA and WDNR Project Coordinators. The absence of the EPA Project Coordinator and/or the WDNR Project Coordinator from the area under study pursuant to this Consent Order shall not be cause for the stoppage or delay of work, unless specifically directed by the EPA Project Coordinator in consultation with the WDNR Project Coordinator.

19. The EPA Project Coordinator shall be responsible for overseeing the implementation of this Consent Order, in consultation with the WDNR Project Coordinator.

EPA has designated James Hahnenberg (SR-6J) as the EPA Project Coordinator. The EPA Project Coordinator shall have the same authority as that vested in an On-Scene Coordinator and Remedial Project Manager by the NCP, including the authority to halt, conduct, or direct any response action required by this Consent Order, or to direct any other response action undertaken by EPA or Respondent at the Site. Except as otherwise provided in this Consent Order, Respondent shall direct all submissions required by this Consent Order to the EPA Project Coordinator in accordance with Section XXV (Notices and Submissions).

20. The State designates Gregory Hill as the WDNR Project Coordinator. Except as otherwise provided in this Consent Order, Respondent shall direct all submissions required by this Consent Order to the WDNR Project Coordinator in accordance with Section XXV (Notices and Submissions).

21. The Response Agencies and Respondent shall have the right to change their respective designated Project Coordinator. The Response Agencies shall notify Respondent, and Respondent shall notify the Response Agencies, as early as possible before such a change is made, but in no case less than twenty-four (24) hours before such a change. The initial notification may be made orally, but it shall be promptly followed by a written notice.

IX. WORK TO BE PERFORMED

22. Activities. Respondent shall conduct activities and submit deliverables as provided by the SOW (Attachment A) for performance of the RD, which is incorporated by reference. All such work shall be conducted in accordance with CERCLA, the NCP, and EPA guidance referenced in the SOW, as may be amended or modified by the Response Agencies. The tasks that Respondent must perform are described in the SOW and guidance. All work performed under this Consent Order shall be in accordance with the schedules herein, and in full accordance with the standards, specifications, and other requirements of the work plan and sampling and analysis plan, as initially approved or modified by the Response Agencies, and as may be amended or modified by the Response Agencies from time to time.

23. Respondent's compliance with the Work requirements shall not foreclose the Response Agencies from seeking compliance with all terms and conditions of this Consent Order.

24. To the extent that EPA informs Respondent that particular information is confidential, Respondent and its representatives and consultants shall treat and maintain such information as confidential.

25. Additional Work. In the event EPA, WDNR or the Respondent determine that additional work, not otherwise included in the SOW, including remedial investigatory work and engineering evaluation, is necessary to accomplish the objectives of this Consent Order, notification of additional work shall be provided to all Parties.

26. Additional work determined to be necessary by Respondent shall be subject to the written approval of the Response Agencies.

27. Additional work determined to be necessary by Respondent and approved by the Response Agencies, or determined to be necessary by EPA or WDNR and requested of Respondent, shall be completed by Respondent in accordance with the standards and specifications determined or approved by the Response Agencies. Respondent shall propose a schedule for additional work for approval by the Response Agencies. The Response Agencies may jointly modify or determine the schedule for additional work. Additional work shall be performed in a manner consistent with the purposes and objectives of this Consent Order, and conform with the requirements of this Section.

28. Supplemental Investigations. The Parties acknowledge that Respondent may implement a voluntary, supplemental, investigation of conditions in and upstream of Operable Unit 1. These investigations shall be conducted using methods consistent with those identified in the Pre-design Sampling Plan. The Response Agencies agree to review and comment promptly on work generated by Respondent during such supplemental investigation activities.

29. Out-of-State Shipments. In the event of out-of-state shipments of hazardous substances, Respondent shall provide written notification to the Response Agencies and the appropriate environmental official of the state receiving hazardous substances prior to shipment of hazardous substances in quantities greater than ten (10) cubic yards from the Site to an out-of-state location. The notification shall include:

a. The name and location of the facility receiving the hazardous substances;

b. The type and quantity of the hazardous substances, including the Department of Transportation shipping code, if any;

c. The schedule for shipment of the hazardous substances;

d. The method of transportation; and

e. Any special procedures necessary to respond to an accidental release of the substances during transportation.

Respondent shall promptly notify the Response Agencies and the appropriate environmental official for the receiving state of any changes to the shipment plan.

X. PLANS AND SUBMISSIONS

30. Respondent shall submit the Pre-design Sampling Plan for OU1, Remedial Design Work Plan ("RD Work Plan") and all documents required by the SOW, the RD Work Plan, or this Consent Order to the Response Agencies according to the schedule contained in the SOW and RD Work Plan, and when feasible shall submit both a hard copy and an electronic copy of such documents.

31. The Response Agencies shall review all documents specified as requiring approval in the SOW, RD Work Plan, or this Consent Order. The Response Agencies shall respond to each submission in writing with a single integrated response. As a result of their review of a submission, the Response Agencies may: (a) approve the submission; (b) approve

the submission with minor modifications; (c) disapprove the submission and direct Respondent to re-submit the document after incorporating the Response Agencies' comments; or (d) if a re-submission, disapprove the re-submission and the Response Agencies may assume responsibility for performing all or any part of the response action.

32. In the event of approval or approval with minor modifications by the Response Agencies, Respondent shall proceed to take any action required by the submittal, as approved or modified by the Response Agencies.

33. Upon receipt of a notice of disapproval, Respondent shall, within thirty (30) days or such longer time as specified by the Response Agencies in their notice of disapproval, correct the deficiencies and resubmit the submittal for approval. Notwithstanding the notice of disapproval, Respondent shall proceed, if so directed by the Response Agencies, to take any action required by any non-deficient portion of the submission that remains unaffected by the notice of disapproval and can be reasonably implemented in the interim.

34. If any re-submission is not approved by the Response Agencies, they may determine that Respondent is in violation of this Consent Order, unless Respondent invokes the procedures set forth in Section XV (Dispute Resolution) and the Response Agencies' determination is revised pursuant to that Section. Issues previously resolved pursuant to the procedures set forth in Section XV may not be re-disputed.

35. Neither failure of the Response Agencies to expressly approve or disapprove of Respondent's document within the specified time period nor the absence of comments shall be construed as approval of the document. In the event of subsequent disapproval of a revised document, the Response Agencies retain the right to terminate this Consent Order and perform additional studies or conduct a complete or partial Remedial Design.

36. For any document required to be submitted by the Respondent to the Response Agencies, within forty-five (45) days of receipt of the document, the Response Agencies shall provide written notification to Respondent of their approval, approval with minor modifications or disapproval, of the submission or any part thereof. If the Response Agencies require a longer review period, the Response Agencies shall so notify Respondent within thirty (30) days of receipt of the submitted document.

37. The Project Coordinators shall hold progress report meetings / telephone conferences twice a month unless such a meeting is deemed unnecessary by the Response Agencies. By mutual agreement the Project Coordinators may hold meetings or telephone conferences at more frequent intervals.

38. Respondent shall provide written monthly progress reports to the Response Agencies. These monthly progress reports shall include the following information:

a. A description of the actions which have been taken to comply with this Consent Order during the past month and work planned for the coming month;

b. All results of sampling and tests, including raw data and validated data, and all other investigation results received by the Respondent during the month, in the format prescribed by the Response Agencies;

c. Target and actual completion dates of each element of the RD, including project completion, with schedules relating such work to the overall project schedule for RD completion, and an explanation of any schedule deviation or anticipated deviation from the RD Work Plan schedule, and proposed method of mitigating such deviation;

d. A description of all problems encountered and any anticipated problems during the reporting period, any actual or anticipated delays, and solutions developed and implemented to address any actual or anticipated problems or delays; and,

e. Changes in key personnel.

39. Respondent shall submit the monthly progress reports, as both electronic files and hard copy files, to the Response Agencies by the tenth (10th) day of every month following the Effective Date of this Consent Order.

XI. QUALITY ASSURANCE AND DATA AVAILABILITY

40. Quality Assurance. Respondent shall consult with the Response Agencies' Project Coordinators in planning all sampling and analysis detailed in the Pre-design Sampling Plan and RD Work Plan. Respondent shall assure that work performed, samples taken and analyses conducted conform to the requirements of the SOW, the Quality Assurance Project Plan ("QAPP") and guidance identified therein.

41. Respondent shall prepare preliminary and final QAPPs for submittal to EPA according to the schedule in the SOW. Respondent shall participate in a pre-QAPP meeting with EPA prior to submission of the preliminary QAPP to discuss its contents.

42. The QAPPs shall be subject to review, modification, and approval by EPA in accordance with Section X (Plans and Reports).

43. Data Availability. All results of sampling, tests, modeling or other data (including raw data) generated by Respondent, or on Respondent's behalf, pursuant to this Consent Order, shall be submitted in the format prescribed by the Response Agencies and made available to and submitted to the Response Agencies in the monthly progress reports described in Section X of this Consent Order. The Response Agencies will make available to Respondent validated data generated by the Response Agencies relating to Lake Winnebago and OU1 unless it is exempt from disclosure by any federal or state law or regulation.

44. Respondent will verbally notify the Response Agencies at least fifteen (15) days prior to conducting significant field events (including any sampling, tests and other data generation) as described in the SOW, Pre-design Sampling Plan, or RD Work Plan or conducted under any other provision in this Consent Order. Respondent shall allow split or duplicate

samples to be taken by the Response Agencies (and their authorized representatives) of any samples collected by the Respondent in implementing this Consent Order. All split samples of Respondent's shall be analyzed by the methods identified in the EPA-approved QAPP.

45. Respondent may assert a claim of business confidentiality covering part or all of the information submitted to the Response Agencies pursuant to the terms of this Consent Order under 40 C.F.R. § 2.203, provided such claim is allowed by Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7). This claim shall be asserted in the manner described by 40 C.F.R. § 2.203(b) and substantiated at the time the claim is made. Information determined to be confidential by EPA will be given the protection specified in 40 C.F.R. Part 2. If no such claim accompanies the information when it is submitted to the Response Agencies, it may be made available to the public by EPA or the State without further notice to the Respondent. Respondent agrees not to assert confidentiality claims with respect to any data related to Operable Unit 1 conditions, sampling, or monitoring.

46. In entering into this Consent Order, Respondent waives any objections to the quality of any data gathered, generated, or evaluated by EPA, the State or Respondent in the performance or oversight of the work that has been verified according to the quality assurance/quality control (QA/QC) procedures required by the Consent Order or any Work Plan approved by the Response Agencies. If Respondent objects to any data relating to the RD, Respondent shall submit to the Response Agencies a report that identifies and explains its objections, describes the acceptable uses of the data, if any, and identifies any limitations to the use of the data. The report must be submitted to the Response Agencies within thirty (30) days of the monthly progress report or such other report as may contain the data.

47. Respondent may assert that certain documents, records and other information are privileged under the attorney-client privilege or the work product doctrine. If Respondent asserts such a privilege, in lieu of providing documents, it shall inform the Response Agencies that it is claiming certain documents as privileged and shall, upon request, provide the Response Agencies with the following:

a. The title of the document;

b. The date of the document, record, or information;

c. The name and title of the author of the document, record, or information;

d. The name and title of each addressee and recipient;

e. A description of the contents of the document, record, or information; and

f. The privilege asserted by the Respondent.

48. Failure to challenge Respondent's assertion of privilege by EPA or WDNR during the implementation of the RD does not waive the Response Agencies' right to challenge the assertion during the implementation of the Remedial Action.

XII. ACCESS

49. To the extent that Operable Unit 1 or other on-site and off-site areas where work is to be performed is presently owned by parties other than Respondent, Respondent shall obtain, or use its best efforts to obtain, access agreements from the present owners within sixty (60) days of approval of the RD Work Plan. For purposes of this Paragraph, "best efforts" includes the payment of reasonable sums of money in consideration of access. Access agreements shall provide access for the Response Agencies and all authorized representatives of the Response Agencies. Respondent shall immediately notify the Response Agencies if, after using its best efforts, it is unable to obtain such agreements. Respondent shall describe in writing its efforts to obtain access. The Response Agencies may then assist Respondent in gaining access, to the extent necessary to effectuate the activities required by this Consent Order, using such means as the Response Agencies deem appropriate. All costs incurred, direct or indirect, by the United States or the State in obtaining such access including, but not limited to, the cost of attorney time and the amount of monetary consideration paid or just compensation shall be considered Future Response Costs. In accordance with Paragraph 53 (Liability for Future Response Costs), Respondent may be required to reimburse the United States and the State for all such Future Response Costs.

50. At all reasonable times the Response Agencies and their authorized representatives shall have the authority to enter and freely move about all property owned by Respondent at Operable Unit 1 and at any other on-site and off-site areas where work, if any, is being performed, for the purposes of inspecting conditions, activities, the results of activities, records, operating logs, and contracts related to Operable Unit 1 pursuant to this Consent Order; reviewing Respondent's progress in carrying out the terms of this Consent Order; conducting tests as the Response Agencies or their authorized representatives deem necessary; using a camera, sound recording device or other documentary type equipment for purposes of documenting the Work; and verifying the data submitted to the Response Agencies by Respondent. Respondent shall allow these persons to inspect and copy all records, files, photographs, documents, sampling and monitoring data, and other writings related to work undertaken in carrying out this Consent Order, subject to Paragraph Nos. 43-48. Nothing herein shall be interpreted as limiting or affecting the Response Agencies' right of entry or inspection authority under federal law or state law. All individuals with access to Operable Unit 1 under this paragraph shall comply with all approved health and safety plans.

XIII. COMPLIANCE WITH APPLICABLE LAWS

51. Respondent shall perform all Work under this Consent Order in compliance with applicable federal, state and local laws, ordinances, or regulations. In the event a conflict arises between these laws, ordinances, or regulations, Respondent shall comply with the more stringent law, ordinance, or regulation, unless otherwise approved by EPA.

52. Respondent shall be responsible for obtaining state and local permits necessary for the performance of any off-site work, and for complying with the substantive provisions of state and local permit regulations for any on-site work. The standards and provisions of Section XVI (Force Majeure) shall govern delays in obtaining such permits. The Response

Agencies shall cooperate with Respondent and endeavor to expedite the issuance of permits for off-site work within their respective jurisdictions.

XIV. FUTURE RESPONSE COSTS

53. Liability for Future Response Costs. If a Consent Decree addressing Remedial Action in OU1 is not entered by the U.S. District Court for the Eastern District of Wisconsin (the "Court") within one year of the Effective Date or such additional time as agreed by the Parties in writing, Respondent shall be liable for Future Response Costs (as defined in this Consent Order) and Respondent shall make direct payments to EPA and the State for any Future Response Costs incurred by the United States or the State, to the extent such costs are not inconsistent with the National Contingency Plan. If, however, the Court does enter such a Consent Decree within one year of the Effective Date (or such additional time as agreed by the Parties in writing), this Section shall be deemed null and void.

54. Payment of Future Response Costs.

a. Payments to EPA. On a periodic basis, the United States will send Respondent a bill requiring payment that includes an EPA cost summary, which includes direct and indirect costs incurred by EPA and its contractors, and a DOJ cost summary, which reflects costs incurred by DOJ and its contractors, if any. Respondent shall make all payments within forty-five (45) days of Respondent's receipt of each bill requiring payment, except as otherwise provided by Paragraph 55.

b. Payments to the State. On a periodic basis, the State will send Respondent a bill requiring payment that includes a WDNR cost summary, which includes direct and indirect costs incurred by WDNR and its contractors, and a WDOJ cost summary, which reflects costs incurred by WDOJ and its contractors, if any. Respondent shall make all payments within forty-five (45) days of Respondent's receipt of each bill requiring payment, except as otherwise provided by Paragraph 55.

55. Disputes Regarding Future Response Costs. Respondent may contest payment of any Future Response Costs under Paragraph 54 if it determines that the United States or the State has made an accounting error or if it alleges that a cost item that is included represents costs that are inconsistent with the NCP. Notice of any such objection shall be made in writing within forty-five (45) days of receipt of the bill and must be sent to the United States (if the United States' accounting is being disputed) or to the State (if the State's accounting is being disputed) pursuant to Section XXV (Notices and Submissions). Any such notice of objection shall specifically identify the contested Future Response Costs and the basis for objection. In the event of an objection, all uncontested Future Response Costs shall immediately be paid to the United States or the State in the manner described in Paragraph 56. Upon submitting a notice of objection, Respondent shall initiate the Dispute Resolution procedures in Section XV (Dispute Resolution). If the United States or the State prevails in the dispute, within ten (10) days of the resolution of the dispute, all sums due (with accrued Interest) shall be paid to EPA (if the United States' cost are disputed) or to the State (if the State's costs are disputed) in the manner described in Paragraph 56. If Respondent prevails concerning any aspect of the contested costs, the portion of the costs (plus associated accrued Interest) for which they did not prevail shall be

disbursed to EPA or the State, as appropriate, in the manner described in Paragraph 56; and the amount that was successfully contested need not be paid to EPA or to the State. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XV (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding reimbursement of the United States and the State for their Future Response Costs.

56. Payment Instructions.

a. Payments to EPA. All payments to EPA under this Section or under Section XVII (Stipulated Penalties) shall: (1) be made by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund;" (2) reference the Lower Fox River and Green Bay Site, EPA Site/Spill ID Number A565, and DOJ Case Number 90-11-2-1045/2; (3) indicate that the payment is being made pursuant to this Consent Order with WTM I Company; and (4) be sent to:

U.S. Environmental Protection Agency, Region 5
Program Accounting and Analysis Branch
P.O. Box 70753
Chicago, IL 60673

At the time of payment, Respondent shall ensure that notice that payment has been made is sent to DOJ and EPA in accordance with Section XXV (Notices and Submissions) and to:

Financial Management Officer
U.S. Environmental Protection Agency, Region 5
Mail Code MF-10J
77 W. Jackson Blvd.
Chicago, IL 60604

b. Payments to the State. All payments to the State under this Section or under Section XVII (Stipulated Penalties) shall: (1) be made by a certified or cashier's check or checks made payable to "Wisconsin Department of Natural Resources;" (2) reference the Lower Fox River and Green Bay Site; (3) indicate that the payment is being made pursuant to this Consent Order with WTM I Company; and (4) be sent to:

Gregory Hill
WDNR Project Coordinator
Wisconsin Department of Natural Resources

P.O. Box 7921	101 S. Webster St.
Madison, WI 53707-7921	Madison, WI 53703
(Regular Mail)	(Over-Night Mail)

At the time of payment, Respondent shall ensure that notice that payment has been made is sent to the State in accordance with Section XXV (Notices and Submissions).

XV. DISPUTE RESOLUTION

57. The parties to this Consent Order shall attempt to resolve, expeditiously, informally, and in good faith, any disagreements concerning this Consent Order.

58. Any disputes concerning activities or deliverables required under this Consent Order for which Dispute Resolution has been expressly provided for, shall be resolved as follows: Respondent shall notify the Response Agencies in writing of its objection(s) within fourteen (14) calendar days of such action, unless the objection(s) has (have) been informally resolved. This written notice shall include a statement of the issues in dispute, the relevant facts upon which the dispute is based, all factual data, analysis or opinion supporting Respondent's position, and all supporting documentation on which Respondent relies. The Response Agencies shall submit their Statement of Position, including supporting documentation, no later than fourteen (14) calendar days after receipt of Respondent's written notice of dispute. Respondent may submit a response to the Response Agencies' Statement of Position within five (5) business days after receipt of the Statement. During the five (5) business days following receipt of the Response Agencies' Statement of Position, the parties shall attempt to negotiate, in good faith, a resolution of their differences. The time periods for exchange of written documents may be extended by agreement of all parties.

59. An administrative record of any dispute under this Section shall be maintained by EPA and shall contain the notice of objections and accompanying materials, the Statement of Position, any other correspondence between the Response Agencies and Respondent regarding the dispute, and all supporting documentation. The administrative record shall be available for inspection by all parties. If the Response Agencies do not concur with the position of Respondent, the Division Director for the Office of Superfund, EPA Region V, in consultation with the Secretary of the WDNR, shall resolve the dispute based upon the administrative record and consistent with the terms and objectives of this Consent Order, and shall provide written notification of such resolution to Respondent.

60. Respondent's obligations under this Consent Order, other than the obligations affected by the dispute, shall not be tolled by submission of any objection for dispute resolution under this Section. Elements of Work and/or obligations not affected by the dispute shall be completed in accordance with the schedule contained in the Statement of Work. Following resolution of the dispute, as provided by this Section, Respondent shall fulfill the requirement that was the subject of the dispute in accordance with the agreement reached or with EPA's decision, whichever occurs.

XVI. FORCE MAJEURE

61. Respondent agrees to perform all requirements under this Consent Order within the time limits established under this Consent Order, unless the performance is delayed by a *force majeure*. For purposes of this Consent Order, a *force majeure* is defined as any event arising from causes beyond the control of Respondent or of any entity controlled by Respondent, including but not limited to its contractors and subcontractors, that delays or prevents performance of any obligation under this Consent Order despite Respondent's best efforts to

fulfill the obligation. *Force majeure* does not include financial inability to complete the response actions or increased cost of performance.

62. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Order, whether or not caused by a *force majeure* event, Respondent shall notify the Response Agencies orally within seven (7) business days of when Respondent first knew that the event might cause a delay. Within fourteen (14) calendar days thereafter, Respondent shall provide to the Response Agencies in writing an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Respondent's rationale for attributing such delay to a *force majeure* event if it intends to assert such a claim; and a statement as to whether, in Respondent's opinion, such event may cause or contribute to an endangerment to public health, welfare or the environment. Failure to comply with the above requirements shall preclude Respondent from asserting any claim of *force majeure* for that event for the period of time of such failure to comply and for any additional delay caused by such failure.

63. If EPA, following consultation with the State, agrees that the delay or anticipated delay is attributable to a *force majeure* event, the time for performance of the obligations under this Consent Order that are affected by the *force majeure* event will be extended by the Response Agencies for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the *force majeure* event shall not, of itself, extend the time for performance of any other obligation. If EPA, following consultation with the State, does not agree that the delay or anticipated delay has been or will be caused by a *force majeure* event, EPA will notify Respondent in writing of its decision. If EPA, following consultation with the State, agrees that the delay is attributable to a *force majeure* event, EPA will notify Respondent in writing of the length of the extension, if any, for performance of the obligations affected by the *force majeure* event.

XVII. STIPULATED PENALTIES

64. Respondent shall be liable for payment into the Hazardous Substances Superfund administered by EPA of the sums set forth below as stipulated penalties for each week or part thereof that Respondent fails to comply with a work schedule or payment schedule in accordance with the requirements contained in this Consent Order, unless the Response Agencies determine that such a failure or delay is attributable to *force majeure* as defined in Section XVI or is otherwise approved by EPA. Such sums shall be due and payable within thirty (30) days of receipt of written notification from EPA specifically identifying the noncompliance and assessing penalties, unless Respondent invokes the procedures of Section XV (Dispute Resolution). For failure to submit the final RD Work Plan on schedule, stipulated penalties shall accrue in the amount of $1,000 per day for the first 7 days and $2,500 per day for each day thereafter. Stipulated penalties for all other matters shall accrue in the amount of $1,000.00 for the first week or part thereof, and $1,500.00 for each week or part thereof thereafter. Stipulated penalties shall begin to accrue on the day that performance is due or a violation occurs and extends through the period of correction.

65. The stipulated penalties set forth herein shall not preclude the Agencies from electing to pursue any other remedy or sanction because of Respondent's failure to comply with any of the terms of this Consent Order, including a suit to enforce the terms of this Consent Order. Said stipulated penalties shall not preclude the EPA from seeking statutory penalties up to the amount authorized by law if Respondent fails to comply with any requirements of this Consent Order. Provided, however, that the United States shall not seek civil penalties pursuant to Section 122(1) of CERCLA for any violation for which a stipulated penalty is provided herein, except in the case of a willful violation of this Consent Order.

66. Upon receipt of written demand from EPA, Respondent shall make payment to EPA within thirty (30) days and interest shall accrue on late payments. Payments shall be made in accordance with instructions provided by EPA in the written demand. If Respondent fails to pay stipulated penalties when due, EPA may institute proceedings to collect the penalties, as well as interest.

67. Even if violations are simultaneous, separate penalties shall accrue for separate violations of this Consent Order. Penalties shall accrue regardless of whether EPA has notified Respondent of a violation or act of noncompliance. The payment of penalties shall not alter in any way Respondent's obligation to complete the performance of any work required under this Consent Order. Stipulated penalties shall accrue during any dispute resolution period concerning the particular penalties at issue, but need not be paid until fifteen (15) days after the dispute is resolved by agreement or by receipt of EPA's decision. If Respondent prevails upon resolution, Respondent shall pay only such penalties as the resolution requires. In its unreviewable discretion, EPA may waive its rights to demand all or a portion of the stipulated penalties due under this Section.

XVIII. COVENANT NOT TO SUE BY EPA

68. In consideration of the actions that will be performed under the terms of this Consent Order, and except as otherwise specifically provided in this Consent Order, EPA covenants not to sue or to take administrative action against Respondent pursuant to Sections 106 and 107(a) of CERCLA, 42 U.S.C. §§ 9606 and 9607(a), for performance of the Work. This covenant not to sue shall take effect upon the Effective Date and is conditioned upon the complete and satisfactory performance by Respondent of all obligations under this Consent Order. This covenant not to sue extends only to Respondent and does not extend to any other person.

XIX. RESERVATIONS OF RIGHTS BY EPA AND WDNR

69. Except as specifically provided in this Consent Order, nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing herein shall prevent EPA or WDNR from seeking legal or equitable relief to enforce the terms of this Consent Order, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring Respondent in the future to perform additional activities pursuant to CERCLA or any other applicable law.

70. The covenant not to sue set forth in Section XVIII above does not pertain to any matters other than those expressly identified therein. EPA and WDNR reserve, and this Consent Order is without prejudice to, all rights against Respondent with respect to all other matters, including, but not limited to:

a. claims based on a failure by Respondent to meet a requirement of this Consent Order;

b. liability for past or future response costs incurred or paid by the United States or the State for OU1 or for the Site (except for any Future Response Costs paid pursuant to this Consent Order);

c. liability for performance of response action other than the Work;

d. criminal liability;

e. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

f. liability arising from the past, present, or future disposal, release or threat of release of Waste Materials outside of the Site; and

g. liability for costs incurred or to be incurred by EPA for costs of the Agency for Toxic Substances and Disease Registry related to the Site.

71. Work Takeover. In the event EPA, in consultation with WDNR, determines that Respondent has ceased implementation of any portion of the Work, is seriously or repeatedly deficient or late in its performance of the Work, or is implementing the Work in a manner which may cause an endangerment to human health or the environment, EPA or WDNR may assume the performance of all or any portion of the Work as the Response Agencies determine necessary. Costs incurred by the United States or the State in performing the Work pursuant to this Paragraph shall be considered Future Response Costs. In accordance with Paragraph 53 (Liability for Future Response Costs), Respondent may be required to reimburse the United States and the State for all such Future Response Costs. Respondent may invoke the procedures set forth in Section XV (Dispute Resolution) to dispute EPA's determination that takeover of the Work is warranted under this Paragraph. Notwithstanding any other provision of this Consent Order, EPA and WDNR retain all authority and reserve all rights to take any and all response actions authorized by law.

XX. COVENANT NOT TO SUE BY RESPONDENT

72. Respondent covenants not to sue and agrees not to assert any claims or causes of action against the United States or the State, or their contractors or employees, with respect to the Work or this Consent Order, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund established by 26 U.S.C. § 9507, based on Sections 106(b)(2), 107, 111,

112, or 113 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, or 9613, or any other provision of law;

b. any claim arising out of the Work, including any claim under the United States Constitution, the Constitution of the State of Wisconsin, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law; or

c. any claim against the United States or the State pursuant to Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 9607 and 9613, relating to the Work.

73. These covenants not to sue shall not apply in the event the United States brings a cause of action or issues an order pursuant to the reservations set forth in Paragraphs 70(b), (c), and (e) – (g), but only to the extent that Respondent's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

74. Nothing in this Agreement shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

XXI. OTHER CLAIMS

75. Respondent waives all claims or demands for compensation under Sections 106, 111 and 112 of CERCLA, 42 U.S.C. §§ 9606, 9611 and 9612 against the United States or the Hazardous Substances Superfund established by Section 9507 of Title 26 of the United States Code arising from activity performed pursuant to this Consent Order. This Consent Order does not constitute any decision on preauthorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2). Respondent further waives all other statutory and common law claims against the Response Agencies, including, but not limited to, contribution and counterclaims, relating to or arising out of conduct of the Work.

76. Nothing in this Consent Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person, firm, partnership, subsidiary or corporation not a signatory to this Consent Order for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, pollutants, or contaminants found at, taken to, or taken from Operable Unit 1.

77. Respondent specifically reserves all rights and defenses that it may have, including but not limited to any rights to contest any Findings of Fact and Conclusions of Law and Determinations set forth in Sections V and VI of this Consent Order in any proceeding other than an action brought by EPA or the State to enforce this Consent Order. Under this Consent Order, Respondent specifically reserves any right it may have to seek review of the remedial action selected in the ROD as authorized by CERCLA Section 113(h), 42 U.S.C. § 9613(h), other than in an action brought by EPA or the State to enforce this Consent Order.

78. Each party to this Consent Order shall bear its own costs and attorneys fees.

XXII. CONTRIBUTION PROTECTION AND EFFECT OF SETTLEMENT

79. The Parties agree that Respondent is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), for "matters addressed" in this Consent Order. The "matters addressed" in this Consent Order are the Work. Nothing in this Consent Order precludes the United States, the State, or Respondent from asserting any claims, causes of action, or demands against any person not parties to this Consent Order for indemnification, contribution, or cost recovery.

80. The Parties agree and acknowledge that the Response Agencies shall recognize that Respondent is entitled to full credit for all response costs incurred in performance of the Remedial Design and all future response costs paid under this Consent Order, with such credit to be applied against Respondent's liabilities for response costs at the Site; provided, however, that the credit ultimately recognized shall take into account the amount of any recoveries by Respondent of any portion of such payments from other liable persons such as through a recovery under Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 96707 and 9613.

XXIII. INDEMNIFICATION

81. Respondent shall indemnify, save and hold harmless the United States, the State, and their officials, agents, contractors, subcontractors, employees and representatives from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, or subcontractors, in carrying out actions pursuant to this Consent Order. In addition, Respondent agrees to pay the United States and/or the State all costs incurred by the United States and/or the State, including but not limited to attorneys fees and other expenses of litigation and settlement, arising from or on account of claims made against the United States and/or the State based on negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, subcontractors and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Consent Order. Neither the United States nor the State shall be held out as a party to any contract entered into by or on behalf of Respondent in carrying out activities pursuant to this Consent Order. Neither Respondent nor any such contractor shall be considered an agent of the United States or the State.

82. The United States and/or the State shall give Respondent notice of any claim for which the United States and/or the State plan to seek indemnification pursuant to this Section and shall consult with Respondent prior to settling such claim.

83. Respondent waives all claims against the United States and the State for damages or reimbursement or for set-off of any payments made or to be made to the United States and/or the State, arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of response actions on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Respondent shall indemnify and hold harmless the United States and the State with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or

arrangement between Respondent and any person for performance of response actions on or relating to the Site, including, but not limited to, claims on account of construction delays.

XXIV. RECORD PRESERVATION

84. Respondent shall preserve all records and documents which relate to implementation of the RD at Operable Unit 1 for a minimum of ten (10) years following completion of Remedial Action construction. Respondent shall acquire and retain copies of all documents that relate to Remedial Design for Operable Unit 1 and are in the possession of its employees, agents, accountants, contractors, or attorneys. After this 10-year period, Respondent shall notify the Response Agencies at least ninety (90) days before the documents are scheduled to be destroyed. If EPA or WDNR request that the documents be saved, Respondent shall, at no cost to the Response Agencies, give the Response Agencies the documents or copies of the documents.

XXV. NOTICES AND SUBMISSIONS

85. Documents, including but not limited to reports, approvals, disapprovals, and other correspondence which must be submitted under this Consent Order, shall be sent by overnight delivery or certified mail, return receipt requested, to the following addressees or to any other addressees which the Respondent, EPA, and WDNR designate in writing:

As to the United States:

James Hahnenberg
EPA Project Coordinator
United States Environmental Protection Agency
77 West Jackson Blvd., mail code: SR-6J
Chicago, Illinois 60604-3590
Phone: (312) 353-4213
FAX: (312) 886-4071
E-mail: Hahnenberg.James@epa.gov

with a copy to:

Roger Grimes (C-14J)
Assistant Regional Counsel
U.S. Environmental Protection Agency
Region 5
77 West Jackson Blvd.
Chicago, IL 60604
Phone: (312) 886-6595
FAX: (312) 886-0747
E-mail: grimes.roger@epa.gov

As to the State:

Gregory Hill
WDNR Project Coordinator
Wisconsin Department of Natural Resources

P.O. Box 7921
Madison, WI 53707-7921
(Regular Mail)
Phone: (608) 267-9352
FAX: (608) 267-2800
E-mail: hillg@dnr.state.wi.us

101 S. Webster St.
Madison, WI 53703
(Over-Night Mail)

As to the Respondent:

J.P. Causey Jr.
Vice President & Secretary / WTM I Company
c/o Chesapeake Corporation
1021 E. Cary Street
Box 2350
Richmond, VA 23218-2350
Phone: (804) 697-1166
FAX: (804) 697-1192
E-mail: jp.causey@cskcorp.com

with a copy to:

Nancy K. Peterson
Quarles & Brady LLP
411 E. Wisconsin Ave.
Milwaukee, WI 53202-4497
Phone: (414) 277-5515
Fax: (414) 203-0190
E-mail: nkp@quarles.com

XXVI. EFFECTIVE DATE OF CONSENT ORDER

86. This Consent Order shall become effective upon receipt by Respondent of the Consent Order signed by the Director of the Superfund Division, EPA, Region 5 and the Secretary of the WDNR.

XXVII. COMMUNITY RELATIONS

87. Respondent shall cooperate with the Response Agencies in providing RD information to the public. If requested by the Response Agencies, Respondent shall participate in the preparation of all RD information disseminated to the public pertaining to Operable Unit 1.

XXVIII. MODIFICATION OF CONSENT ORDER

88. In addition to the procedures set forth in Section VIII (Project Coordinators), Section IX (Work to be Performed), Section XV (Dispute Resolution) and Section XVI (Force Majeure), this Consent Order may be amended by mutual agreement of the Parties. Amendments shall be in writing and shall become effective on the date of execution by the Response Agencies. Project Coordinators do not have the authority to sign amendments to the Consent Order.

89. No informal advice, guidance, suggestions, or comments by the Response Agencies regarding reports, plans, specifications, schedules, and any other writing submitted by the Respondent will be construed as relieving Respondent of its obligation to obtain such formal approval as may be required by this Consent Order. Any deliverables, plans, technical memoranda, reports (other than progress reports), specifications, schedules and attachments required by this Consent Order are, upon approval by the Response Agencies, incorporated into this Consent Order.

XXIX. NOTICE OF COMPLETION

90. At the request of Respondent, the Response Agencies shall promptly determine whether all actions have been performed in accordance with this Consent Order, except for certain continuing obligations required by this Consent Order (e.g., record retention). Any request shall demonstrate in writing that such actions have been performed in accordance with this Consent Order and shall be accompanied by the following attestation by a responsible official for the Respondent: "I certify that the information contained in or accompanying this certification is true, accurate, and complete." Upon such determination by the Response Agencies, the Response Agencies will promptly provide written notice to Respondent. Such notice will not be unreasonably withheld. If the Response Agencies determine that any required response activities have not been completed in accordance with this Consent Order, they will notify Respondent, provide a list of the deficiencies, and require that Respondent correct such deficiencies.

IN THE MATTER OF:
Administrative Order by Consent

Lower Fox River and Green Bay Site

AGREED AS STATED ABOVE:

WTM I Company
(f/k/a Wisconsin Tissue Mills Inc.)

BY:_____ DATE: June 23, 2003

Name: J.P. Causey Jr.
Title: Vice President

IN THE MATTER OF:
Administrative Order by Consent

Lower Fox River and Green Bay Site

IT IS SO ORDERED AND AGREED:

U.S. ENVIRONMENTAL PROTECTION AGENCY

BY: _____ DATE: 7/1/03
William E. Muno, Director
Superfund Division
U.S. Environmental Protection Agency

Region 5

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

BY: _____ DATE: 6/23/03
Scott Hassett, Secretary

STATEMENT OF WORK

FOR THE REMEDIAL DESIGN FOR

OPERABLE UNIT 1 AT THE

LOWER FOX RIVER AND GREEN BAY SITE

BROWN, OUTAGAMIE, AND WINNEBAGO COUNTIES, WISCONSIN

I. PURPOSE

This Statement of Work (SOW) sets forth the requirements for the Remedial Design (RD) for all components of the remedial action set forth in the Record of Decision (ROD) for Operable Unit 1 (OU1) of the Lower Fox River and Green Bay Site (Site).[1] This ROD encompasses Operable Unit 1 and Operable Unit 2 and was signed by the Deputy Administrator, Water Division, Wisconsin Department of Natural Resources (WDNR) and the Superfund Director of EPA Region 5 on December 18, 2002 and December 20, 2002, respectively.[2] This SOW addresses only the Remedial Design for OU1. The Respondent shall develop the Remedial Design consistent with the ROD, the Consent Order to which this SOW is attached (AOC), EPA Superfund Remedial Design and Remedial Action Guidance, and any additional guidance provided by the Response Agencies in submitting deliverables for designing a remedial action for the Site. This SOW does not include implementation of the remedy.

II. DESCRIPTION OF THE REMEDIAL ACTION / PERFORMANCE STANDARDS

The Respondent shall design the remedy necessary to meet the Performance Standards and specifications set forth in the ROD for OU1, as discussed below (Alternative C2). The Remedial Design shall address the timing and sequencing of the remedial action to account for the multifaceted and multi-year components of the remedy. Appropriate consideration of the provisions of the contingent ROD, and such other work as proposed by Respondent under the AOC, may also be incorporated into the Remedial Design process.

---

1 "Operable Unit 1" or "OU1" shall mean the Little Lake Butte des Morts reach of the Lower Fox River, as delineated by the Record of Decision signed by WDNR and EPA in December 2002. More specifically, OU1 is the portion of the Lower Fox River (and the underlying River sediment) starting at the outlet of Lake Winnebago at the Neenah Dam and the Menasha Dam downstream to the Upper Appleton Dam, including sediment deposits A through H and POG. As so defined, OU1 is depicted in Figure 7-9 of the December 2002 Final Feasibility Study, a copy of which is attached to the Consent Order as Attachment B.

2 Operable Units 3, 4, and 5 of the Lower Fox River and Green Bay Site will be addressed in a separate Record of Decision.

OPERABLE UNIT 1 – LITTLE LAKE BUTTE DES MORTS, ALTERNATIVE C2 - Alternative C2 includes the removal of sediment with PCB concentrations greater than the 1 ppm remedial action level (RAL), followed by dewatering and off-site disposal of the sediment

- **Site Mobilization and Preparation.** The staging area for OU1 will be determined during the design stage. Site preparation at the staging area will include collecting soil samples, securing the onshore property area for equipment staging, and constructing the sediment dewatering facility, water treatment facilities, and sediment storage and truck loading areas

- **Sediment Removal.** Sediment removal will be conducted using a dredge (e.g., cutterhead or horizontal auger or other method) or other suitable sediment removal equipment.

- **Sediment Dewatering.** Sediment that is removed will require dewatering.

- **Water Treatment.** Unless other arrangements can be made, water treatment will consist of flocculation, clarification, sand filtration, and treatment through activated carbon filters.

- **Sediment Disposal.** Sediment disposal includes the loading and transportation of the sediment to an NR 500 landfill with Toxic Substances Control Act (TSCA) approval, if needed.

- **Demobilization and Site Restoration.** Demobilization and site restoration will involve removing all equipment from the staging and work areas and restoring the site to, at a minimum, its original condition before construction of the staging area commenced.

- **Institutional Controls and Monitoring.** Baseline monitoring will include pre- and post-remedial sampling of water, sediment, and biological tissue. Monitoring during implementation will include air and surface water sampling. Plans for monitoring during and after construction will be developed during the Remedial Design and modified during and after construction, as appropriate. Institutional controls may include access restrictions, land use or water use restrictions, dredging moratoriums, fish consumption advisories, and domestic water supply restrictions. Land and water use restrictions and access restrictions may require local or state legislative action to prevent inappropriate use or development of contaminated areas.

- **Achievement of Remedial Action Level Objective.** The mass and volume to be remediated will be determined by (1) establishing a dredge elevation based on a RAL of 1 ppm or, if sampling conducted after dredging is completed shows that the 1 ppm RAL has not been achieved, (2) by achieving a Surface Weighted Average Concentration (SWAC) of 0.25 ppm.[3]

III. SCOPE OF REMEDIAL DESIGN

The Remedial Design shall be consistent with the ROD for OU1. Specific tasks are described below.

Task 1: Remedial Design Work Plan

Within 60 days of receiving Notice of Authorization to proceed with Remedial Design, Respondent shall submit a complete Remedial Design Work Plan (RD Work Plan) to EPA and WDNR for their review and approval. The RD Work Plan shall discuss how each component of the OU1 remedy will be addressed, identify tasks necessary for completing the pre-design investigations and design work required by the ROD for OU1, and provide an overall management strategy for completion of such tasks. The RD Work Plan shall also include a project schedule for each major activity and submission of deliverables to be generated during the Remedial Design. The plan shall document the responsibility and authority of all organizations and key personnel involved with the design and shall include a description of qualifications of key personnel directing the Remedial Design, including contractor personnel. Respondent shall submit the RD Work Plan in accordance with Section X of the Consent Order and Section IV of this SOW. Once EPA and WDNR approve the RD Work Plan, Respondent shall implement the plan in accordance with the approved schedule therein.

Task 2: Pre-Design Phase

On or before July 21, 2003, Respondent shall submit a Pre-design Sampling Plan for OU1 to WDNR and EPA for their review and approval. Among other things, the Pre-design Sampling Plan will describe necessary field and analytical evaluations of sediment in OU1 required for completion of the Remedial Design. The Pre-design Sampling Plan will consist of the Quality Assurance Project Plan, Sampling and Analysis Plan, and Health and Safety Plan. The Plan will not address baseline bathymetric and related surveys, which have been or will be

[3] The Parties recognize that an Explanation of Significant Differences or ROD Amendment issued by the Response Agencies could result in an alternative RAL or SWAC.

performed by WDNR and/or EPA. Respondent shall submit any necessary modifications to these documents for review and approval prior to implementing the pre-design investigation.

Validated sample results shall be submitted in accordance with provisions in Section X of the AOC. Following completion of sampling and validation of data, Respondent shall submit a Basis of Design Report for approval by the Response Agencies which shall include all information collected during the pre-design investigation, as well as appropriate literature and design references. The Basis of Design report shall include the basis for designation of specific sediment deposits in OU1 for remediation. The designation of sediment deposits for removal will be subject to approval by the Response Agencies and be consistent with the Record of Decision for OU1. Presentation of alternative remedial measures may be made for Response Agencies' approval under the provisions of the contingent ROD.

Task 3: Remedial Design Phases

Following completion of the Pre-Design Phase, Respondent shall prepare construction plans and specifications to implement the Remedial Action at OU1 as described in the ROD and this SOW. Such plans and specifications shall be submitted in accordance with the schedule set forth in Section IV below. Subject to approval by EPA and WDNR, Respondent may submit more than one set of design submittals reflecting different components of the Remedial Action. All design plans and specifications shall be developed consistent with EPA's Superfund Remedial Design and Remedial Action Guidance (OSWER Directive No. 9355.0-4A), except as otherwise specified in this SOW, and shall demonstrate that the Remedial Action based on the final Remedial Design will meet all Performance Standards. Respondent shall meet regularly with EPA and WDNR to discuss design issues.

If Respondent, consistent with the ROD capping contingency, proposes to leave any capped area in place as part of the final remedy either based on recharacterization and/or other information, Respondent shall provide a detailed submittal with technical justification supporting such a proposal to WDNR and EPA for review and approval. This submittal shall be consistent with ROD Sections 13.4 and 13.5 and all appropriate EPA Guidance, and in accordance with a schedule established in the approved RD Work Plan.

If Respondent, based on investigation activities and assessments conducted during the design phase, proposes that alternative remedial measures be designated by the Response Agencies for any portion of OU1, Respondent shall provide a detailed submittal with technical justification supporting such a proposal to WDNR and EPA for review

and approval. The submittal shall be consistent with all appropriate EPA Guidance. Approval of the proposal will require either an Explanation of Significant Differences or a ROD Amendment by EPA and WDNR before it becomes effective. The submittal shall be in addition to all other submittals required by this SOW, and shall not delay the submittal of other design documents. Respondent may make a submittal proposing alternate remedial measures, and EPA and WDNR will consider the submittal, either during design or after the Final Design is completed, but before remedial action commences in the portion(s) of OU1 addressed by the submittal.

A. Preliminary Design (50%)

Respondent shall submit the Preliminary Design for OU1 to EPA and WDNR for review and approval when the design effort is approximately 50% complete. The Preliminary Design submittal shall include or discuss, at a minimum, the following:

- Preliminary plans, drawings, and sketches, including design calculations;
- Results of studies and additional field sampling and analysis, if any, conducted after the Pre-Design Phase;
- Design assumptions and parameters, including design restrictions, process performance criteria, appropriate unit processes for the treatment train, and expected removal or treatment efficiencies for both the process and waste (concentration and volume), as applicable;
- Sediment Removal Verification Plan (in appropriate phase), including the proposed cleanup verification methods (i.e., probing methods) and compliance with Applicable or Relevant and Appropriate Requirements (ARARs);
- Outline of required specifications;
- Proposed siting/locations of processes/construction activity;
- Mitigation Plan to restore habitats that have been physically impacted by sediment removal equipment or soil excavation equipment (not including the soft sediment deposits themselves);
- Expected long-term monitoring and operation requirements;
- Real estate, easement, and permit requirements;

- Preliminary construction schedule, including contracting strategy.

B. Pre-Final Design (90%)

The Respondent shall submit the Pre-Final Design when the design effort is 90% complete. The Pre-Final Design shall fully incorporate all Response Agency comments made to the Preliminary Design.

The Pre-Final Design submittals shall include those elements listed for the Preliminary Design, as well as the following:

- Draft Construction Quality Assurance Project Plan;
- Final Health and Safety Plan;
- Final Contingency Plan;
- Final Sediment Removal Verification Plan;
- Draft Operation and Maintenance Plan;
- Capital and Operation and Maintenance Cost Estimate. This cost estimate shall refine the Feasibility Study cost estimate to reflect the detail presented in the Pre-Final Design;
- Final Project Schedule for the construction and implementation of the Remedial Action addressed in this SOW which identifies timing for initiation and completion of all critical path tasks. The final project schedule submitted as part of the Final Design shall include specific dates for completion of the project and major milestones. Specific dates will assume and be dependant upon, a defined start date.

C. Final Design (100%)

The Respondent shall submit the Final Design when the design effort is 100% complete. The Final Design shall fully incorporate all Response Agency comments made to the Pre-Final Design and shall include reproducible drawings and specifications suitable for bid advertisement. The Final Design submittals shall include those elements listed for the Pre-Final Design.

D. Content of Supporting Plans

1. Health and Safety Plan (HSP)

Respondent shall develop and submit to EPA / WDNR for review and comment a site-specific HSP which is designed to protect construction personnel and area residents from physical, chemical, and other hazards posed by any work at the Site during the RA. The Health and Safety Plan shall follow OSHA requirements as outlined in 29 CFR §§ 1910 and 1926.

2. Contingency Plan

Consistent with the Consent Order, Respondent shall develop and submit to EPA / WDNR for approval a Contingency Plan that describes the mitigation procedures it will use in the event of an accident or emergency at the Site. The Contingency Plan may be incorporated into the HSP. The final Contingency Plan shall be submitted prior to the start of construction, in accordance with the approved construction schedule. The Contingency Plan shall include, at a minimum, the following:

a. Name of the person or entity responsible for responding in the event of an emergency incident;

b. Plan and date to meet with the local community, including local, State and Federal agencies involved in the Remedial Action, as well as local emergency squads and hospitals; and,

c. First aid medical information

3. Construction Quality Assurance Project Plan (CQAPP)

Respondent shall develop and submit to EPA / WDNR for review and approval a draft CQAPP which describes the site specific components of the quality assurance program that the Respondent shall use to ensure that the completed project meets or exceeds all design criteria, plans, and specifications. The final CQAPP shall be submitted in accordance with the approved RA Work Plan schedule. The CQAPP shall contain, at a minimum, the following elements:

a. Responsibilities and authorities of all organizations and key personnel involved in the construction of the Remedial Action.

b. Qualifications of the Quality Assurance Official to demonstrate that he/she possesses the training and experience necessary to fulfill his/her identified responsibilities.

c. Protocols for sampling and testing used to monitor the remedial action.

d. Identification of proposed quality assurance sampling activities including the sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation.

e. Reporting requirements for CQAPP activities shall be described in detail in the CQAPP. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, and design acceptance reports, and final documentation. Provisions for the final storage of all OU1 cleanup records shall be presented in the CQAPP.

4. Sediment Removal Verification Plan

Respondent shall develop and submit a Sediment Removal Verification Plan to EPA / WDNR for review and approval. The purpose of the Sediment Removal Verification Plan is to provide a mechanism to ensure that Performance Standards for the Remedial Action are met. Once approved, the Sediment Removal Verification Plan shall be implemented on the approved schedule. The Sediment Removal Verification Plan shall include, at a minimum:

a. Quality Assurance Project Plan (may be part of RA QAPP);

b. Health and Safety Plan (may be part of RA HSP); and

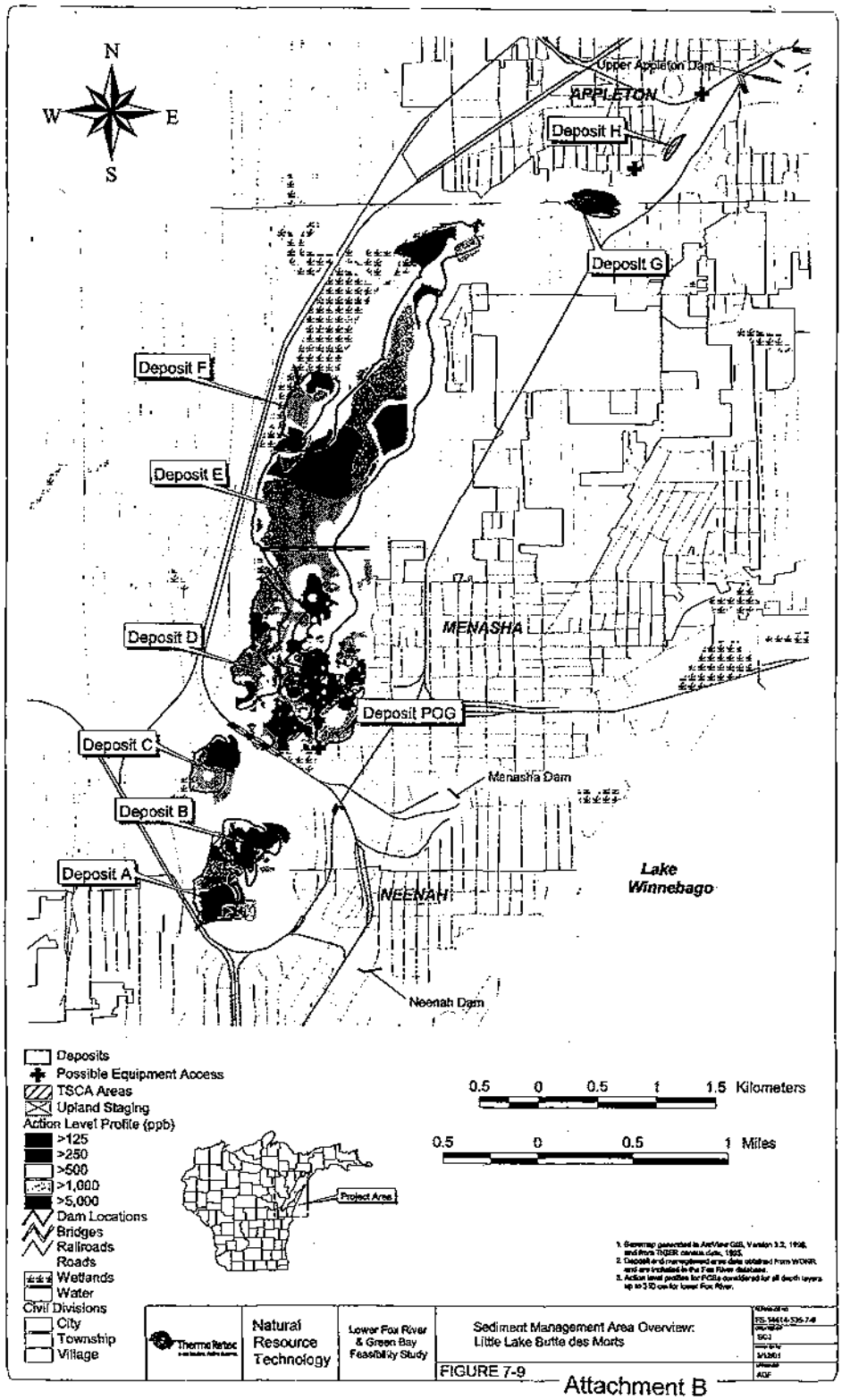
c. Field Sampling Plan.

IV. SUMMARY OF MAJOR DELIVERABLES / SCHEDULE

A summary of the project schedule and reporting requirements for each phase of the OU1 Remedial Action contained in this OU1 RD SOW is presented below. The draft Pre-design Sampling Plan will sequence the work so that samples are first collected and analyzed from Deposit A/B. The portion of the design necessary to commence construction of the remedial action in 2004 will be expedited on a schedule to be specified in the RD Work Plan.

Unless modified by the final RD Work Plan or otherwise approved in writing by the Project Coordinators, the project schedule will be as follows:

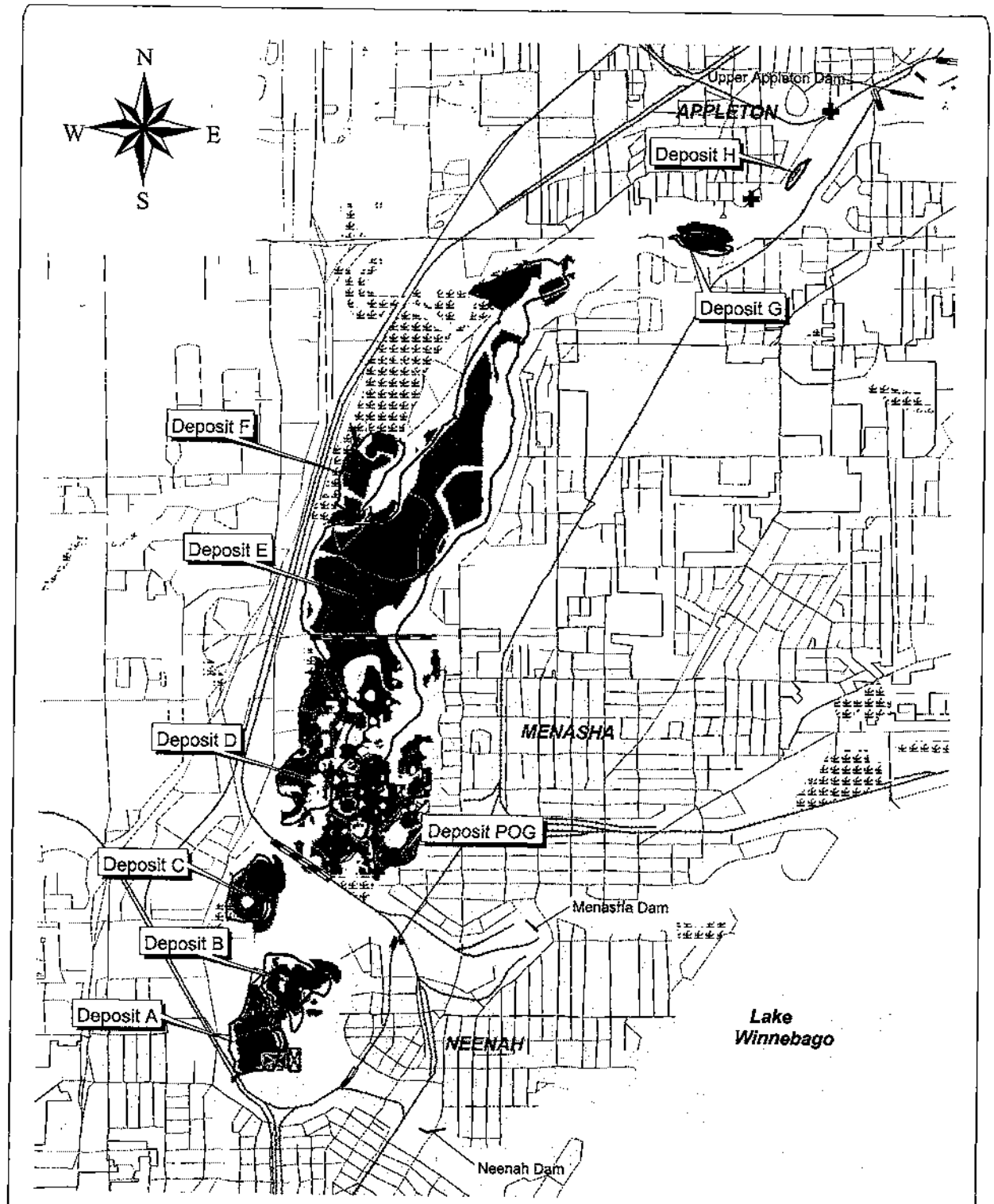
Deliverable / Milestone	Due Date (calendar days)
Draft Pre-design Sampling Plan	July 21, 2003
Draft RD Work Plan	Sixty (60) days after receiving Notice of Authorization to proceed with RD.
Final RD Work Plan	Thirty (30) days after the receipt of comments.
Monthly Progress Reports	As described in the Consent Order and SOW.
Pre-design Sampling	Initiate within thirty (30) days after receipt of Notice of Authorization to proceed with pre-design investigation approved in Pre-design Sampling Plan, but no earlier than August 4, 2003.
Basis of Design Report	Ninety (90) days after receipt of validated data from the pre-design investigation.
Preliminary Design (50%)	One hundred and eighty (180) days after receipt of validated data from the pre-design investigation or sixty (60) days after approval of the Basis of Design, whichever is later..
Pre-Final Design (90%)	Ninety (90) days after receipt of comments from EPA and WDNR on the Preliminary Design for that phase.
Final Design (100%)	Thirty (30) days after receipt of comments from EPA and WDNR on the Pre-Final Design for that phase.



Attachment B

Consent Decree Appendix G

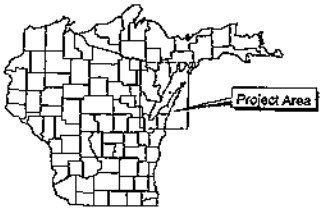
Map of Operable Unit 1



Deposits
Possible Equipment Access
TSCA Areas
Upland Staging
Action Level Profile (ppb)
>125
>250
>500
>1,000
>5,000
Dam Locations
Bridges
Railroads
Roads
Wetlands
Water
Civil Divisions
City
Township
Village

0.5 0 0.5 1 1.5 Kilometers

0.5 0 0.5 1 Miles



1. Basemap generated in ArcView GIS, Version 3.2, 1996, and from TIGER census data, 1995
2. Deposit and management area data obtained from WDNR, and are included in the Fox River database.
3. Action level profiles for PCBs considered for all depth layers up to 350 cm for lower Fox River.

ThermoRetec	Natural Resource Technology	Lower Fox River & Green Bay Feasibility Study	Sediment Management Area Overview: Little Lake Butte des Morts	FS-14414-535-7-6
			FIGURE 7-9	SCJ
				3/12/01
				AGF

Consent Decree Appendix H

Record of Decision for Operable Units 1 and 2

Record of Decision
Operable Unit 1 and Operable Unit 2

Lower Fox River and Green Bay Site
Wisconsin

December 2002

SUPERFUND RECORD OF DECISION (ROD)
for Operable Units I and 2
Wisconsin DNR and U.S. EPA

Lower Fox River
Brown, Outagamie, and Winnebago Counties, Wisconsin,
WID000195481
December 2002

Table of Contents

Executive Summary

Part 1: Declaration for the Record of Decision

Part 2: The Record of Decision

1. SITE NAME, LOCATION, AND BRIEF DESCRIPTION 1
   1.1 Site Name and Location 1
   1.2 Brief Description 2
   1.3 Lead Agency 3
2. SITE HISTORY AND ENFORCEMENT ACTIVITIES 3
   2.1 Site History 3
   2.2 Actions to Date 4
   2.3 Enforcement Activities 8
3. COMMUNITY PARTICIPATION 8
   3.1 Public Participation 8
4. SCOPE AND ROLE OF RESPONSE ACTION 10
5. PEER REVIEW 11
6. SITE CHARACTERISTICS 12
   6.1 Conceptual Site Model 12
   6.2 Results of the Remedial Investigation 14
      6.2.1 Site Overview 14
      6.2.2 Summary of Sampling Results 14
      6.2.3 Nature of Contamination 14
      6.2.4 Geochemistry and Modeling Conclusions 19
7. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES 19
   7.1 Current and Reasonably Anticipated Future Land Use 19
   7.2 Surface Water Uses 20
8. SUMMARY OF SITE RISKS 20
   8.1 Identification of Chemicals of Concern 21
   8.2 Human Health Risk Assessment 21
      8.2.1. Summary Of Site Risks 21
      8.2.2 Data Collection and Analysis 21
      8.2.3 Exposure Assessment 23
      8.2.4 Toxicity 24
      8.2.5 Risk Characterization 25
      8.2.6 Cancer Risks 25
      8.2.7 Non-Cancer Health Hazards 26
      8.2.8 Probabilistic Analysis 27
      8.2.9 Uncertainty 28
   8.3 Ecological Risk Assessment 29

8.3.1 Screening Ecological Risk Assessment 30
8.3.2 Baseline Ecological Risk Assessment 31
8.4 Derivation of SQTs 49
8.5 Basis for Action 50
9. REMEDIAL ACTION OBJECTIVES 50
9.1 Remedial Action Objectives 50
9.2 Applicable or Relevant and Appropriate Requirements (ARARs) 52
10. DESCRIPTION OF ALTERNATIVES 53
10.1 Description of Alternative Components 55
10.2 Key/Common Elements 57
11. COMPARATIVE ANALYSIS OF ALTERNATIVES 59
11.1 Operable Unit 1 (Little Lake Butte des Morts) 60
11.1.1 Threshold Criteria for Operable Unit 1 61
11.1.2 Balancing Criteria for Operable Unit 1 65
11.1.3 Agency and Community Criteria for Operable Unit 74
11.2 Operable Unit 2 (Appleton to Little Rapids) 74
11.2.1 Threshold Criteria for Operable Unit 2 75
11.2.2 Balancing Criteria for Operable Unit 2 77
11.2.3 Agency and Community Criteria for Operable Unit 2 79
12. PRINCIPAL THREAT WASTES 79
13. SELECTED REMEDY 80
13.1 The Selected Remedy 80
13.2 Summary of the Estimated Costs of the Selected Remedy 82
13.3 Cleanup Standards and Outcomes for the Selected Remedy 82
13.3.1 Achieving Cleanup Standards 83
13.3.2 Expected Outcomes of Selected Remedy and RAL Rationale 83
13.4 Contingent Remedy - In Situ Capping (i.e., "Partial Capping" or "Supplemental Capping") 89
13.5 Basis for Implementing the Contingent Remedy (OU 1) 90
13.6 Description of Contingent Remedy 90
13.7 Estimated Costs of the Contingent Remedy 91
14. STATUTORY DETERMINATIONS 91
14.1 Protection of Human Health and the Environment 91
14.2 Compliance with ARARs 91
14.2.1 Potential Chemical-Specific ARARs 91
14.2.2 Potential Action- and Location-Specific ARARs 93
14.2.3 Additional To Be Considered Information 94
14.3 Cost-Effectiveness 96
14.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable 96
14.5 Preference for Treatment as a Principal Element 96
14.6 Five-Year Review Requirements 97
15. DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN 97

TABLES

Table 1	PCB Distribution in the Lower Fox River OUs 1 and 2
Table 2	Predominant Land Use by Operable Unit
Table 3	Summary of PCB Data and Medium-Specific Human Exposure Point Concentrations for OU 1
Table 4	Summary of PCB Data and Medium-Specific Human Exposure Point Concentrations for OU 2
Table 5	Cancer Risk from Fish Ingestion – Summary for OU 1
Table 6	Cancer Risk from Fish Ingestion – Summary for OU 2
Table 7	Non-Cancer Health Hazard from Fish Ingestion – Summary for OU 1
Table 8	Non-Cancer Health Hazard from Fish Ingestion – Summary for OU 2
Table 9	Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Water Column Invertebrates
Table 10	Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Benthic Invertebrates
Table 11	Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Fish
Table 12	Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Birds
Table 13	Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Mammals
Table 14	Ecological Risk Summary
Table 15	Years to Human Health and Ecological Thresholds for Lower Fox River at 1 ppm PCB Action Level and No Action in OU 1
Table 16	Human Health Sediment Quality Threshold (SQT) Values
Table 17	Ecological Sediment Quality Threshold (SQT) Values
Table 18	Operable Unit 1. Little Lake Butte des Morts Alternatives
Table 19	Post-Remediation Sediment and Surface Water Concentrations in OU 1
Table 20	Time Achieve Acceptable Fish Tissue Concentrations for Walleye in OU 1
Table 21	Time Required to Achieve Protective Levels in Sediments for Representative Ecological Receptors in OU 1
Table 22	Operational Components for OU 1 Alternatives
Table 23	Final Disposition of Contaminated Sediments in OU 1
Table 24	Comparison of Present Worth Costs for OU 1 Alternatives at the 1 ppm RAL
Table 25	Operable Unit 2. Appleton to Little Rapids Alternatives
Table 26	Post-Remediation Sediment and Surface Water Concentrations in OU 2
Table 27	Time to Achieve Acceptable Fish Tissue Concentrations for Walleye in OU 2 at 1 ppm
Table 28	Time to Protective Levels in Sediments for Representative Ecological Receptors in OU 2.
Table 29	Comparison of Present Worth Costs for OU 2 Alternatives at a 1 ppm RAL
Table 30	Estimated Years to Reach Human Health and Ecological Thresholds to Achieve Risk Reduction for the Operable Unit 1 at a RAL of 1.0 ppm
Table 31	Fox River ARARs

FIGURES

Figure 1 Lower Fox River PCB Contaminated Sediment Deposits and Operable Units
Figure 2 Human Health Site Conceptual Model
Figure 3 Ecological Site Conceptual Model
Figure 4 Relationship of Models Used for Risk Projections in the Lower Fox River and Green Bay
Figure 5 Remedial Action Levels and Estimated SWACS for Evaluated RALs for OU 1 (from FS Table 5-4)
Figure 6 Estimates of Surface Water PCB Concentrations for the Evaluated RALs 30 Years After Completion of Remedial Activities for OU 1
Figure 7 Time to Achieve Acceptable Fish Tissue Concentrations for OU 1
Figure 8 Time to Safe Fish Consumption by Birds in OU 1
Figure 9 RALs and Downstream Loadings in OU 1

APPENDICES

Appendix A – Responsiveness Summary
Appendix B – White Papers
Appendix C – Administrative Record Index

LIST OF ACRONYMS AND ABBREVIATIONS

API/NCR -	Appleton Papers Inc./NCR Corp.
ARAR -	applicable or relevant and appropriate requirement
AR -	administrative record
AOC -	Administrative Order on Consent or Area of Concern
BTAG -	Biological Technical Assistance Group
BLERA -	Baseline Ecological Risk Assessment
BLRA -	Baseline Human Health and Ecological Risk Assessment
CERCLA -	Comprehensive Environmental Response, Compensation, and Liability Act
cfs -	cubic feet per second
CWA -	Clean Water Act
cy -	cubic yard
CIP -	Community Involvement Plan
CWAC -	Clean Water Action Council
COC -	Chemical of Concern
CT -	central tendency
CTE -	central tendency exposure
CSF -	Cancer Slope Factor
CDI -	Chronic Daily Intake
COPC -	Chemical of Potential Concern
CDF -	Confined Disposal Facility
CAD -	Confined Aquatic Disposal
DDT -	dichlorodiphenyltrichloroethane
DDD -	dichlorodiphenyldichloroethane
DDE -	Dieldrin
DO -	dissolved oxygen
EPA -	Environmental Protection Agency
ESD -	Explanation of Significant Difference
ERA -	Ecological Risk Assessment
FS -	Feasibility Study
FRFOOD -	Fox River Food Chain Model
FRC -	Fox River Coalition
FRG -	Fox River Group
FRDB -	Fox River Data Base
GBRAP -	Green Bay Remedial Action Plan
GBMBS -	Green Bay Mass Balance Study
GFT	Glass Furnace Technology
GLNPO -	Great Lakes National Program Office
HHRA -	Human Health Risk Assessment
HI -	Hazard Index
HQ -	Hazard Quotient
HTTD -	High-temperature Thermal Desorption
IRIS -	Integrated Risk Information System
IC -	institutional control
ISC -	in situ capping
IGP -	Intergovernmental Partnership
kg -	kilogram
LLBdM -	Little Lake Butte des Morts
LMMBS -	Lake Michigan Mass Balance Study
LOAEL -	Lowest Observed Adverse Effects Level
LOAEC -	Lowest Observed Adverse Effects Concentration
MNR -	Monitored Natural Recovery
mg/kg -	milligrams per kilogram
mg/kg/day -	milligrams per kilogram per day
NPL -	National Priorities List
NCP -	National Contingency Plan
NAS -	National Academies of Science
NOAA -	National Oceanographic and Atmospheric Administration

NCR -	National Cash Register Corp.
NRDA -	Natural Resource Damages Assessment
ng/L -	nanograms per liter
NOAEL -	No Observed Adverse Effects Level
NOAEC -	No Observed Adverse Effects Concentration
NPDES -	National Pollutant Discharge Elimination System
NHPA -	National Historic Preservation Act
OU -	Operable Unit
OSWER -	Office of Solid Waste and Emergency Response
PCB -	Polychlorinated Biphenyl
ppm -	parts per million
PRP -	potentially responsible party
POTW -	publicly owned treatment works
ppb -	parts per billion
ppt -	parts per trillion
PAL -	preventive action limit
PEL -	probable exposure limit,
QA -	quality assurance
QA/QC -	quality assurance/quality control
RAL -	Remedial Action Level
RAP -	Remedial Action Plan
RI/FS -	Remedial Investigation/Feasibility Study
ROD -	Record of Decision
RI -	Remedial Investigation
RME -	Reasonable Maximum Exposure
RfD -	Reference Dose
RAO -	Remedial Action Objective
RCRA -	Resource Conservation and Recovery Act
SMU -	Sediment Management Unit
SERA -	Screening Ecological Risk Assessment
SMDP -	Scientific Management Decision Point
SLRA -	Screening Level Risk Assessment
SQT -	Sediment Quality Threshold
SWAC -	Surface Weighted Average Concentration
TAG -	Technical Assistance Grant
TEF -	toxic equivalency factor
TEL -	threshold exposure limit.
TRV -	toxicity reference values
TBC -	to be considered
TSCA -	Toxic Substances Control Act
TMDL -	Total Maximum Daily Load
USACE -	United States Army Corps of Engineers
USFWS -	United States Fish and Wildlife Service
USGS -	United States Geological Survey
UCL -	Upper Confidence Limit
WDNR -	Wisconsin Department of Natural Resources
WLA -	Waste Load Allocation
wLFRM -	whole Lower Fox River Model
WAC -	Wisconsin Administrative Code
WPDES -	Wisconsin Pollutant Discharge Elimination System
WDOT -	Wisconsin Department of Transportation

EXECUTIVE SUMMARY

Record of Decision (ROD) for Operable Units I and 2 Wisconsin DNR & U.S. EPA

The Lower Fox River and Green Bay Site includes an approximately 39-mile stretch of the Lower Fox River as well as the bay of Green Bay. The river portion of the Site extends from the outlet of Lake Winnebago and continues downstream to the mouth of the River at Green Bay, Wisconsin. The Bay portion of the Site includes all of Green Bay from the city of Green Bay to the point where Green Bay enters Lake Michigan. This Record of Decision (ROD) addresses some of the human health and ecological risks posed to people and ecological receptors associated with polychlorinated biphenyls (PCBs) that have been released to the Site. Presently these PCBs reside primarily in the sediments in the River and in the Bay, and this ROD outlines a remedial plan to address a certain portion of PCB contaminated sediments.

The Site has been divided into certain discrete areas (Operable Units or OUs) for ease of management and administration. The River has been divided into Operable Units 1 through 4 and Green Bay constitutes Operable Unit 5. These Operable Units are:

Operable Unit 1 – Little Lake Butte des Morts
Operable Unit 2 – Appleton to Little Rapids
Operable Unit 3 – Little Rapids to De Pere
Operable Unit 4 – De Pere to Green Bay
Operable Unit 5 – Green Bay

This ROD selects a remedial action for Operable Units 1 and 2, and it is anticipated that a second ROD addressing Operable Units 3 through 5 will be issued in the future.

For many years along the Lower Fox River there have been and continue to be located an intense concentration of paper mills. Some of these mills operated de-inking facilities in connection with the recycling of paper. Others manufactured carbonless copy paper. In both the de-inking operations and the manufacturing of carbonless copy paper, these mills handled polychlorinated biphenyls (PCBs), which were used in the emulsion that coated carbonless copy paper. In the de-inking process and in the manufacturing process, PCBs were released from the mills to the River directly or after passing through local water treatment works. PCBs have a tendency to adhere to sediment and they have contaminated the River sediments. In addition, the PCBs and contaminated sediments were carried down river and released into Green Bay.

Presently, it is estimated that Operable Unit 1 contains approximately 4100 pounds of PCBs in 2,200,400 cubic yards of sediment. This ROD provides for the removal by hydraulic dredging 784,000 cubic yards of contaminated sediments from Operable Unit 1. The dredged material will be mechanically "dewatered" and taken to a landfill for permanent disposal. This ROD establishes an "action level" of 1 part per million (ppm) for this cleanup effort. In other words, any sediment found in Operable Unit 1 which has a concentration of PCBs of 1 ppm or greater will be targeted for removal. The goal of the remedial action in Operable Unit 1 is to reach a surface weighted average concentration (SWAC) of less than 0.25 ppm after dredging is completed. This means that the concentration of PCBs averaged over the Operable Unit will not exceed 0.25 ppm when the cleanup is complete. By removing the contaminated sediment, it is presently estimated that Operable Unit 1 will reach a surface weighted average concentration of 0.19 parts per million, well below the goal. By reducing the concentration of PCBs in

Operable Unit 1 to the SWAC level or below will dramatically reduce the human health and ecological risk.

Operable Unit 2, which is about 20 miles in length, contains approximately 240 pounds of PCBs in 339,200 cubic yards (cy) of sediment. A significant portion of the PCBs contained in this Operable Unit has already been removed through the sediment removal demonstration project at Deposit N. The result is that in Operable Unit 2 there remain no significant (i.e., greater than 10,000 cubic yards) contaminated sediment deposits with concentrations of PCBs above the action level. Moreover, it is contemplated that the farthest downstream deposit in Operable Unit 2 (Deposit DD) may be remediated in connection with the remedial action to be undertaken in Operable Unit 3 at a later time. Without active remediation, the SWAC for Operable Unit 2 is only 0.61ppm. Therefore for Operable Unit 2 the ROD selects a remedy of monitored natural recovery (MNR). This remedy does not involve sediment removal. Rather, it consists of a comprehensive monitoring program designed in part to monitor the levels of PCBs in various environmental compartments as the natural recovery processes work. Coupling this MNR with the substantial upstream dredging remedy in Operable Unit 1 should result in reduced human health or ecological risk in Operable Unit 2.

The estimated cost for the remedial action in Operable Unit 1 is $66.2 million and for Operable Unit 2 it is $9.9 million.

Declaration for the Record of Decision (ROD) for Operable Units I and 2 Wisconsin DNR & U.S. EPA

Lower Fox River
Brown, Outagamie, and Winnebago Counties, Wisconsin
WID000195481
December 2002

Part 1: Declaration for the Record of Decision

The Lower Fox River and Green Bay Site ("the Site" or "the Fox River Site") includes an approximately 39 mile section of the Lower Fox River, from Lake Winnebago down river to the mouth of the Fox River and all of Green Bay (approximately 2700 square miles in area). This stretch of the Fox River and Green Bay flows through or borders Brown, Door, Kewaunee, Marinette, Oconto, Outagamie, and Winnebago Counties, in Wisconsin, and, Delta and Menominee Counties in Michigan. The River portion of the Site has been divided into "Operable Units" (OUs) OU 1 through OU 4, and the Green Bay portion of the Site is designated OU 5 for purposes of Site management. The OUs were selected based, at least in part, on stretches of the River that have similar characteristics. They are OU 1 from the Lake Winnebago outlet to Appleton dam; OU 2 from the Appleton dam to Little Rapids dam; OU 3 from Little Rapids dam to the De Pere dam; OU 4 from the De Pere dam to the mouth of the River at Green Bay; and OU 5 Green Bay.

This Record of Decision ("this ROD") addresses the risks to people and ecological receptors associated with polychlorinated biphenyls (PCBs) in OUs 1 and 2; Little Lake Butte des Morts and Appleton to Little Rapids, respectively. PCBs are the primary risk driver, contained in sediment deposits located in the River and the Bay. The implementation of the remedy selected in this ROD will result in reduced risks to humans and ecological receptors living in and near the Site.

With the exception of continuing releases of PCBs from contaminated sediments, it is believed that the original PCB sources are now essentially controlled. PCBs in the River were from historical discharges, primarily related to carbonless copy paper manufacturing and recycling.

STATEMENT OF BASIS AND PURPOSE

In June 1997, the United States Environmental Protection Agency (EPA) announced its intent to list the Fox River and portions of Green Bay on the National Priorities List (NPL), a list of the nation's hazardous waste sites eligible for investigation and cleanup under the federal Superfund program, and formally proposed listing of the Site to the NPL in a *Federal Register* publication on July 28, 1998. By agreement with EPA, the Wisconsin Department of Natural Resources (WDNR) is the "lead agency" with respect to the Site. This decision document was developed by WDNR for OUs 1 and 2 of the Fox River Site, pursuant to WDNR's authority under Ch. 292, Wisconsin Statutes. EPA has concurred and has adopted this ROD for the Fox River Site, as provided for in 40 CFR § 300.515(e).

This ROD was written in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), in a manner not inconsistent with the requirement of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part

300. This decision is based on information contained in the Administrative Record for this Site. This ROD is consistent with the findings of the National Academy of Sciences' (NAS) National Research Council report entitled *A Risk Management Strategy for PCB-Contaminated Sediments* and EPA policy.

ASSESSMENT OF THE SITE

The response action selected in this ROD is necessary to protect the public health, welfare, or the environment from an imminent and substantial endangerment from actual or threatened releases of hazardous substances into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The objectives of the response actions for this Site are to protect public health, welfare and the environment and to comply with applicable federal and state laws. The selected remedy specifies response actions that will address PCB contaminated sediment in the Site's OUs 1 and 2. The WDNR and EPA (Agencies) believe the remedial actions outlined in this ROD, if properly implemented, will result in the cleanup of contaminated sediments in OUs 1 and 2 and will protect human health and the environment. Among the goals for the selected remedy are the removal of fish consumption advisories and the protection of the fish and wildlife that use the Fox River and Green Bay, and to reduce the transport of PCBs from the Fox River to Green Bay.

The major components of the selected remedy include:

- Removal of a total of approximately 784,000 cubic yards (cy) of contaminated sediment containing over 1715 kilograms (kg) or 3770 pounds of PCBs from OU 1 using environmental dredging techniques that minimize adverse environmental impacts. The selected remedy calls for de-watering and stabilizing the dredged sediment and disposing of it off site at existing licensed facilities and/or new facilities yet to be constructed and licensed in the Fox River Valley. In conducting the design of this remedy, WDNR and EPA may utilize vitrification of dredged contaminated sediment, as an alternative to off-site disposal at a licensed facility, if this is determined to be practicable and cost effective.
- The use of natural recovery processes and monitoring for OU 2, with the possible exception of deposit DD. A final decision on deposit DD will be made when the ROD for OU 3 is issued.
- Monitored Natural Recovery (MNR) of the residual PCB contamination remaining in dredged areas and undisturbed areas until the concentrations of PCBs in fish tissue are reduced to an acceptable level. Fish consumption advisories and fishing restrictions will remain in place until acceptable PCB levels are achieved.
- A long term monitoring program (water, sediment and tissue) throughout the OU 1 and 2 to determine the effectiveness of the remedy.

STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in Section 121 of CERCLA, 42 USC § 9621. It is protective of human health and the environment, complies with federal and state applicable or relevant and appropriate requirements, and is cost effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. It does not completely satisfy the statutory preference for treatment as a principal element of the remedy, because PCB-contaminated sediment may not be treated prior to disposal.

With respect to the portions of the Fox River addressed in this Record of Decision, some PCB concentrations create a risk in the range of 10^{-3} or more, thus "qualifying" those sediments to be a principal threat waste. The preference for treatment applies to these particular sediments. However, it would be wholly impracticable to closely identify, isolate and treat these principal threat wastes differently than the other PCB sediments identified for removal and disposal. Typical dredging technology that may be employed may not be capable of distinguishing among such fine gradations of PCB concentrations. Nevertheless, at the conclusion of the OU 1 remedy the principal threat wastes will have been removed from OU 1 and deposited in a landfill. In so doing, the mobility of the principal threat wastes will have been greatly reduced.

Because the selected remedy will result in hazardous substances remaining on the Site above levels that allow unlimited use and unrestricted exposure, five-year reviews will be conducted.

DATA CERTIFICATION CHECKLIST

The following information is in the *Decision Summary* section of this ROD. Additional information is in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations - Sections 6 and 8
- Baseline risk presented by the chemicals of concern - Section 8
- Cleanup levels established for the chemical of concern and the basis for these levels - Section 13.3
- How source materials constituting principal threats are addressed - Section 12
- Surface water and land use assumptions used in the baseline risk assessments and ROD - Sections 7 and 8
- Potential land and ground water use that will be available at the Site as a result of the Selected Remedy - Section 7
- Estimated capital, operation and maintenance and total present-worth costs; and the time to implement each of the various remedial alternatives - Sections 11 and 13.2
- Key factors that led to selecting the remedy (i.e., best balance of trade-offs with respect to the balancing and modifying criteria) - Sections 11 and 14

12/18/02
Date

Bruce Baker, Deputy Administrator
Water Division
Wisconsin DNR

Declaration for the Record of Decision
Fox River and Green Bay OU 1 and OU 2

By signing this ROD, U.S. EPA Regions 5 concurs with the selected remedy.

12/20/02
Date

Wm. E. Muno
William E. Muno, Director
Superfund Division
U.S. EPA – Region 5

SUPERFUND RECORD OF DECISION (ROD)
for Operable Units I and 2
Wisconsin DNR and U.S. EPA

Lower Fox River
Brown, Outagamie, and Winnebago Counties, Wisconsin,
CERCLIS ID: WID000195481
December, 2002

Part 2: Superfund Record of Decision

1. SITE NAME, LOCATION, AND BRIEF DESCRIPTION

1.1 Site Name and Location

The Lower Fox River and Green Bay Site is located in Northeast Wisconsin (in Brown, Door, Marinette, Oconto, Outagamie, Kewaunee, and Winnebago Counties), and the Eastern portion of Upper Peninsula of Michigan, (in Delta and Menominee Counties). The Lower Fox River flows northeast from Lake Winnebago for 39 miles where it discharges into Green Bay. Green Bay is approximately 119 miles long and is an average of 23 miles wide (Figure 1).

The Lower Fox River and Green Bay have been divided into 5 Operable Units (OU) by WDNR and EPA. For purposes of the RI/FS, the River was divided into four River reaches and Green Bay was divided into three major zones on the basis of physical features and information generated in previous investigations. Each of the River reaches has been deemed a separate Operable Unit (OU 1 through OU 4), while all of Green Bay has been designated a single Operable Unit (OU 5). An Operable Unit is a geographical area designated for the purpose of analyzing and implementing remedial actions. OUs are defined on the basis of similar physical and geographic properties and characteristics. The River reaches, Green Bay zones, and corresponding Operable Units are:

1. OU 1 – Little Lake Butte des Morts River reach
2. OU 2 – Appleton to Little Rapids River reach
3. OU 3 – Little Rapids to De Pere River reach
4. OU 4 – De Pere to Green Bay River reach
5. OU 5 – Green Bay

This ROD addresses Operable Units 1 and 2. For OU 1, active remediation (dredging, dewatering, stabilization or vitrification and on-site or off-site disposal) of in-place sediment has been selected. For OU 2, a monitoring program has been selected to evaluate the effectiveness of natural processes that are expected to reduce risk over time. Risk reduction will occur more quickly in OU 1 due to active remediation of that Operable Unit.

The remedial action selected herein is to remove and isolate, or otherwise ameliorate the threats to human health and the environment in OU 1 and OU 2 caused by the release of PCBs into the upper part of the Lower Fox River. While the release of PCBs to the environment occurred between 1954 and the late 1970s, the PCB contamination in the sediments continues to act as a source to the water, biota, and air.

1.2 Brief Description

The study area comprises two distinctly different water bodies, the Lower Fox River and Lake Michigan's Green Bay (Figure 1). The Lower Fox River flows northeast approximately 39 miles from Lake Winnebago to the River mouth at the southern end of Green Bay. Green Bay's watershed drains approximately 15,625 square miles. Two-thirds of the Green Bay basin is in Wisconsin; the remaining one-third is in Michigan's Upper Peninsula.

Figure 1 Lower Fox River PCB Contaminated Sediment Deposits and Operable Units

The Lower Fox River is the primary tributary to Green Bay, draining approximately 6,330 miles^2. The River's elevation drops approximately 168 ft between Lake Winnebago and Green Bay. Twelve dams and 17 locks accommodate this elevation change and allow navigation between Lake Winnebago and Green Bay. While the entire Lower Fox River still has a federally authorized navigation channel and is navigable by recreational boats, the Rapide Croche lock is permanently closed to restrict upstream migration of the sea lamprey.

The Lower Fox River is generally less than 1,000 ft wide over much of its length and is up to approximately 20 ft deep in some areas. Where the River widens significantly, the depth generally decreases to less than 10 ft, and, in the case of Little Lake Butte des Morts (LLBdM), water depths range between 2 and 5 ft except in the main channel. The main channel of the River ranges from approximately 6 to 20 ft in depth.

Since 1918, flow in the Lower Fox River has been monitored at the Rapide Croche Dam, midway between Lake Winnebago and the River mouth. Mean annual discharge is approximately 4,237 cubic feet per second (cfs). The recorded maximum daily discharge of 24,000 cfs occurred on April 18, 1952; the minimum daily discharge of 138 cfs occurred on August 2, 1936. Flow in the River between Appleton and the Little Rapids Dam averages 0.78 f/s.

OU 1 is identified primarily as Little Lake Butte des Morts and extends from Lake Winnebago to the Appleton dam for a distance of approximately 6 miles. This reach includes sediment deposits A though H and POG. OU 2 extends from the Appleton dam to Little Rapids dam for a distance of approximately 32 km (20mi). This reach includes sediment deposits I through DD.

1.3 Lead Agency

The Wisconsin Department of Natural Resources (WDNR) is the lead agency for this project. The United States Environmental Protection Agency (EPA), the support agency, has worked jointly with WDNR in the development of this ROD and concurs with the decision described herein.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Site History

The Fox River Valley is one of the largest urbanized regions in the state of Wisconsin, with a population of approximately 400,000. The Fox River Valley has a significant concentration of pulp and paper industries, with 20 mills located along or near the Lower Fox River. Other important regional industries include metal working, printing, food and beverages, textiles, leather goods, wood products, and chemicals. In addition to heavy industrial land uses, the region also supports a mixture of agricultural, residential, light industrial, and conservancy uses, as well as wetlands. For investigative purposes, the Site is defined as the 39 river miles of the Lower Fox River and Green Bay to a line that extends between Washington Island, Wisconsin, and the Garden Peninsula of Michigan.

Problems related to water quality have been noted and measured in the Lower Fox River and lower Green Bay almost since the area was settled. Water quality studies were initiated in the early 1900s and have been conducted almost annually since. Between the early 1930s and mid-1970s, the population of desirable fish and other aquatic organisms in the system was poor. Recorded fish kills and the increasing predominance of organisms able to tolerate highly polluted conditions were found throughout the Lower Fox River and lower Green Bay. Few people used the River or lower Green Bay for recreation because of the poor water quality and the lack of a sport fishery. During this same time period, dissolved oxygen levels were often very low (2 milligrams per liter [mg/L] or less). The poor water quality was attributed to many sources such as the effluent discharged from pulp and paper mills and municipal sewage treatment plants.

In large part because of the federal Clean Water Act (1972), over time improved waste treatment systems began operations. As part of this effort, WDNR developed and implemented a Waste Load Allocation system to regulate the discharge of oxygen-demanding pollutants from wastewater treatment plants. Fish and aquatic life in the Lower Fox River and Green Bay have responded dramatically to the improved water quality conditions. Fishery surveys conducted from 1973 to the present indicate a sharp increase in the sport fish population. Species sensitive to water quality, such as lake trout, which were absent since the late 1800s or early 1900s, have been found in the River since 1977. These improvements resulted in a large part from a substantial reduction in organic wastes discharged into the River.

With the return of the sport fishery, human use of the River and Green Bay has also returned. Recognizing concerns about potential health impacts of PCBs in the environment and their bioaccumulative properties, WDNR began routinely monitoring contamination in fish in the early

1970s. Significantly elevated levels of PCBs were detected in all species of fish and all OUs. Measured concentrations of PCBs in fish were (and remain) above levels that have been shown to be harmful to human health. As a result, fish consumption advisories for the Site were first issued in 1976 and 1977 by WDNR and the state of Michigan, respectively. Fish consumption advisories remain in effect today. WDNR has continued to collect data on contaminant concentrations in fish tissue since that time.

PCB Use in the Lower Fox River Valley

The principal source of Polychlorinated Biphenyls (PCBs) in the Lower Fox River and Green Bay is from the manufacture and recycling of carbonless copy paper. The former National Cash Register Company (NCR) is credited with inventing carbonless copy paper. The method used microcapsules of a waxy material to enclose a colorless dye dissolved in PCBs. This material was manufactured as an emulsion and could be coated onto the back of a sheet of paper. A second reactive coating was then applied to the front of a second sheet of paper. When the two sheets were joined, an impact on the front sheet would rupture the capsules and allow the dye to react with the coating on the second sheet, leaving an identical image.

PCB discharges to the Lower Fox River resulted from the production and recycling of carbonless copy paper made with PCB-containing coating emulsions. Manufacturing carbonless paper using the PCB containing emulsion began in the Fox River Valley in 1954 and continued until 1971. The production of carbonless copy paper increased during the 1950s and 1960s and by 1971, approximately 7.5 percent of all office forms were printed on carbonless copy paper. With increased production of carbonless copy paper, PCBs began to appear in many types of paper products made using recycled carbonless copy paper. As documented in an EPA report, nearly all paper products contained detectable levels of PCBs by the late 1960s. During this time period, other Fox River Valley paper mills also began recycling wastepaper laden with PCBs. Evidence of PCBs in paper products includes studies conducted by the Institute of Paper Chemistry to determine the rate at which PCBs migrated from paper container materials to the food products contained in them.

The production of carbonless copy paper was discontinued after 1971 because of increased concern about PCBs in the environment. During the period of use (1954 – 1971) an estimated 13.6 million kg (30 million lbs.) of emulsion were estimated to be used in the production of carbonless copy paper produced in the Fox River Valley. PCBs were released into the Lower Fox River in discharge water from several facilities. By analyzing purchase, manufacturing, and discharge records, conservative estimates have shown that approximately 313,600 kg (690,000 lbs.) of PCBs were released to the Fox River environment during this time. Ninety-eight percent of the total PCBs released into the Lower Fox River had been released by the end of 1971. Ceasing production of carbonless copy paper and the wastewater control measures put in place by the Clean Water Act were effective in eliminating point sources. Non-point sources, such as PCB contaminated groundwater plumes, are not known to exist from any of the potentially responsible parties' sites.

2.2 Actions to Date

To date seven companies have been identified and formally notified by the governmental agencies as potentially responsible parties (PRPs) with respect to the PCB contamination. These companies include Appleton Paper Company, NCR, P.H. Glatfelter Company, Georgia Pacific (formerly Fort James), WTM1 (formerly Wisconsin Tissue), Riverside Paper Co., and U.S. Paper Co. This group is commonly referred to as the Fox River Group (FRG).

EPA's proposed inclusion of the Lower Fox River and Green Bay Site on the National Priorities List (NPL) defines the Site as the Lower Fox River from the outlet of Lake Winnebago to a point

in Green Bay 27 miles from the River mouth. That Site is officially called the Fox River NRDA PCB Releases Site in the proposed NPL listing. This Site, for the purpose of the RI/FS and Proposed Plan, includes the 39 miles of the Lower Fox River and all of Green Bay. The federal trustees conducting a Natural Resource Damage Assessment (NRDA) have defined the Site somewhat differently from the proposed listing to include all of Green Bay and nearby areas of Lake Michigan.

With the finding that PCBs released into the Lower Fox River were appearing at harmful levels to human health and the environment, several cooperative efforts were initiated to document residual PCBs in the sediments, and the fate, transport, and risks of PCBs within the Lower Fox River and Green Bay. In 1989/90, following recommendations made in the Green Bay Remedial Action Plan, EPA and WDNR began a comprehensive sampling program of sediment, water, and biota in the Lower Fox River and Green Bay for use in the *Green Bay Mass Balance Study* (GBMBS).

The GBMBS was a pilot project to test the feasibility of using a mass balance approach for assessing the sources and fates of toxic pollutants spreading throughout the food chain. The objectives of the GBMBS were to:

1. Inventory and map PCB mass and contaminated sediment volume;
2. Calculate PCB fluxes into and out of the Lower Fox River and Green Bay by evaluating Lake Winnebago, point sources, landfills, groundwater, atmospheric contributions, and sediment resuspension;
3. Increase understanding of the physical, chemical, and biological processes that affect PCB fluxes;
4. Develop, calibrate, and validate computer models for the River and Bay systems; and,
5. Conduct predictive simulations using computer models to assist in assessing specific management scenarios and selecting specific remedial actions.

The GBMBS confirmed that the primary source (more than 95 percent) of the PCBs moving within the Lower Fox River is the river sediment itself. The contribution of PCBs from wastewater discharges, landfills, groundwater, and the atmosphere is insignificant in comparison to the PCBs originating from the sediment. Furthermore, the GBMBS showed that PCBs released from the sediments were directly linked to the levels of PCBs measured throughout the biological food chain, including fish, birds, and mammals that depend on the River for food.

Inventory and mapping activities showed that PCBs are distributed throughout the entire Lower Fox River. Thirty-five discrete sediment deposits were identified between Lake Winnebago and the De Pere Dam. One relatively large, continuous sediment deposit exists downstream of the De Pere Dam. Water column sampling indicated that the water entering the Lower Fox River from Lake Winnebago contains relatively low PCB concentrations. However, upon exposure to the contaminated river sediment in Little Lake Butte des Morts, water in the River exceeds state water quality standards. During the GBMBS, the lowest water column concentration (5 nanograms per liter [ng/L]) of PCBs measured in any River sample still exceeded the state water quality standard by a factor of more than 1,500. As expected, water column concentrations also increased as River flow increased and PCBs attached to River sediment were resuspended into the water column. These higher flows resulted in PCB concentrations that exceeded standards by a factor of almost 40,000. The GBMBS also documented that more than 60 percent of PCB transport occurs during the relatively short time when River flows are above normal. Movement of PCBs in the water column extends throughout Green Bay, with some PCBs from the Lower Fox River ultimately entering Lake

Michigan proper. The GBMBS also documented that a considerable amount of PCB is lost to the atmosphere from the surface of the water in the River and Bay.

EPA's Great Lakes National Program Office (GLNPO) initiated a similar mass balance study for all of Lake Michigan, the *Lake Michigan Mass Balance Study* (LMMBS). To accomplish the objectives of this study, which were similar to those of the GBMBS but on a larger scale, pollutant loading (including PCBs) from 11 major tributaries flowing into Lake Michigan was measured. The Lake Michigan Tributary Monitoring Program confirmed the magnitude and significance of the Lower Fox River contribution to pollutant loading in Lake Michigan. It is estimated that each day, up to 70 percent of the PCBs entering Lake Michigan via its tributaries are from the Lower Fox River.

In 1993, a group of paper mills approached WDNR to establish a cooperative process for resolving the contaminated sediment issue. The outcome was formation of the Fox River Coalition, a private-public partnership of area businesses, state and local officials, environmentalists, and others committed to improving the quality of the Lower Fox River. The Coalition focused on the technical, financial, and administrative issues that would need to be resolved to achieve a whole River cleanup.

The Coalition's first project was an RI/FS of several sediment deposits upstream of the De Pere Dam. The sediment deposits targeted for the Coalition's RI/FS were selected after all the deposits had been prioritized based on their threat and contribution to the contaminant problems. Previous studies on the River had focused only on the nature and extent of contamination. The Coalition's RI/FS first confirmed the nature and extent of the contamination within each deposit, then evaluated remedial technologies for cleaning up two of the deposits.

The Coalition also undertook a project to more thoroughly inventory and map sediment contamination in the River downstream of the De Pere Dam, collecting sediment cores from 113 locations. The sampling was completed in 1995 with technical and funding assistance from both WDNR and EPA. The resulting data led to a revised estimate of PCB mass and the volume of contaminated sediment in this River reach. The expanded database also made it possible to prioritize areas of sediment contamination, much as had previously been done for areas upstream of the De Pere Dam.

Following completion of the Coalition's RI/FS for the upstream sites, the Coalition selected Deposit N as an appropriate site for a pilot project to evaluate remedial design issues. The primary objectives were to determine requirements for implementing a cleanup project and to generate site-specific information about cleanup costs. Although the Coalition initiated the effort, WDNR, with funding from EPA, was responsible for implementing the Deposit N pilot project.

In 1994, the U.S. Department of the Interior acting through the U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce, the Menominee Indian Tribe of Wisconsin, and the Oneida Tribe of Indians of Wisconsin initiated a Natural Resources Damage Assessment (NRDA) for the Site. The State, federal and Tribal Trustees are working together to determine what is necessary to address natural resource injuries caused to-date by releases of PCBs. This is a separate, but related process to the remediation consideration discussed herein.

In January 1997, the WDNR and the FRG signed an agreement dedicating $10 million to fund demonstration projects on the River and other work to evaluate various methods of restoration. This collaborative effort, however, was not completely successful and did not resolve technical issues as was initially hoped. At about this same time, USFWS issued a formal Notice of Intent to sue the paper companies. In June 1997, the U.S. EPA announced its intent to list the Lower

Fox River and portions of Green Bay on the NPL, a list of the nation's hazardous waste sites eligible for investigation and cleanup under the federal Superfund program. The state indicated its opposition to listing the River as a Superfund site. Federal, state, and tribal officials subsequently signed an agreement on July 11, 1997 to share their resources in developing a comprehensive cleanup and restoration plan for the Lower Fox River and Green Bay. EPA formally proposed listing of the Site to the National Priorities List in the *Federal Register* on July 28, 1998.

In October 1997, the FRG submitted an offer to conduct an RI/FS on the Lower Fox River. An RI/FS is the first step in the federal process initiated by EPA to assess current health risks and evaluate potential remediation methods. Following unsuccessful attempts to negotiate this work activity with the FRG, EPA delegated the lead role for the Site to WDNR and helped craft a scope of work and cooperative agreement with WDNR for completing the RI/FS. WDNR, EPA, USFWS, NOAA, and the Menominee and Oneida Tribes worked in close cooperation to guide, review and issue the RI/FS. Two draft documents were released for public comment (1999, 2001). Comments received from the PRPs, the public, and independent peer review committees were incorporated into the Final RI/FS.

Deposit N

In 1998 and 1999, the WDNR and EPA-GLNPO sponsored a project to remove PCB-contaminated sediment from Deposit N in the Lower Fox River. This project was successful at meeting its primary objective by demonstrating that dredging of PCB-contaminated sediment can be performed in an environmentally safe and cost-effective manner. Other benefits of the project included the opportunity for public outreach and education on the subject of environmental dredging, as well as the actual removal of PCBs from the River system. Deposit N, located near Little Chute and Kimberly, Wisconsin, covered approximately 3 acres and contained about 11,000 cubic yards (cy) of sediment. PCB concentrations were as high as 186 milligrams per kilogram (mg/kg). Of the 11,000 cy in Deposit N, about 65 percent of the volume was targeted for removal.

Approximately 8,200 cy of sediment were removed, generating 6,500 tons of dewatered sediment that contained 112 total pounds of PCBs. The total included about 1,000 cy of sediment from Deposit O, another contaminated sediment deposit adjacent to Deposit N. Monitoring data showed that the River was protected during the dredging and that wastewater discharged back to the River complied with all permit conditions. The project met the design specifications for the removal, such as the volume of sediment removed, sediment tonnage, and allowed thickness of residual sediment. It should be noted that the project's goals were to test and meet the design specifications and focus on PCB mass removal, not to achieve a concentration-based cleanup, i.e., removal of all PCB-contaminated sediment above a certain cleanup level. A cost analysis of this project indicated that a significant portion of the funds was expended in pioneering efforts associated with the first PCB cleanup project on the Lower Fox River, for the winter construction necessary to meet an accelerated schedule, and for late season work in 1998.

Fox River Group Demonstration Project

As part of the January 1997 agreement between the FRG and the State of Wisconsin, the FRG agreed to make available a total of $10 million for a number of projects. One of these was a sediment remediation project for which the objective was to design, implement, and monitor a project downstream of the De Pere Dam. The project was intended to yield important information about large-scale sediment restoration projects in the Lower Fox River. The project, as described in the agreement, had a pre-defined financial limit of $8 million. The FRG and

WDNR agreed on Sediment Management Units 56 and 57 (SMU 56/57) as the project site. Contractors and consultants, under contract to the FRG, designed and implemented the project. Dredging at SMU 56/57 began on August 30, 1999. Dewatered sediment was trucked to a landfill owned and operated by Fort James Corporation (now Georgia Pacific). Because of cold weather and ice, dredging ceased on December 15, 1999, after approximately 31,350 cy of contaminated sediment containing more than 1,400 pounds of PCBs were removed from the River.

At the time this project was halted for the first year, SMU 56/57 had not met the project's dredging objective of removal of 80,000 cy of material. This resulted in unacceptably high concentrations of PCBs in surface sediment in portions of the dredged area. Despite this, the project provided instructive experience concerning hydraulic dredging. Building on the successes of this project, Fort James (now Georgia Pacific) worked cooperatively with WDNR and EPA in the spring of 2000 to complete the SMU 56/57 project. (See description of this enforcement agreement in Section 2.3, below). The sediment volume targeted for removal in 2000 was 50,000 cy. The additional volume of sediment removed from SMU 56/57 in 2000 was 50,316 cy, which was transported to the same Fort James landfill following dewatering. Approximately 670 pounds of PCBs were removed from SMU 56/57 during the 2000 project phase. Overall, the 1999 and 2000 efforts at SMU 56/57 resulted in the removal of approximately 2,070 pounds of PCBs from the River. The 2000 project phase met all goals set forth in the Administrative Order By Consent, and also met or exceeded the project's operational goals for removal rates, dredge slurry solids, filter cake solids, and production rates that were set forth for the original 1999 FRG project.

In February 1999, WDNR released a draft RI/FS for public review and comment. The draft RI/FS was released to solicit public comment early in the planning process, to better evaluate public acceptance, and to assist WDNR and U.S. EPA in selecting a cleanup alternative having the greatest public acceptance. Comments were received from other governmental agencies, the public, environmental groups, and private sector corporations. These comments were used to revise and refine the scope of work that led to the RI/FS and Proposed Remedial Action Plan (PRAP) released for public comment in October 2001.

2.3 Enforcement Activities

The work described above on SMU 56/57 was conducted from July to November 2000, under an Administrative Order By Consent (Docket No. V-W-00-C-596), that was entered into by Fort James, EPA, and the State of Wisconsin. Under its terms, Fort James funded and managed the project in 2000 with oversight from both WDNR and EPA.

An interim Consent Decree settlement was reached with Appleton Papers/NCR (API/NCR), with the Court entering the Decree on December 10, 2001. Under this agreement, API/NCR agrees to provide $10 million a year for both remediation and restoration work (under the NRD process), with projects determined by the Intergovernmental Partnership. In return, the Intergovernmental Partnership agree to not order API/NCR to do remediation or restoration work on the River for the 4-year life of the agreement.

3. COMMUNITY PARTICIPATION

3.1 Public Participation

The community/public participation activities to support selection of the remedy were conducted in accordance with CERCLA § 117 and the NCP § 300.430(f)(3).

More than 100 people were interviewed in late 1998 and early 1999 to develop the Site's community involvement plan (CIP). Residents, tribal members, elected officials, business organizations, local health staff, and environmental groups from the affected communities discussed their concerns and those discussions are included in the CIP. In addition, an extensive profile of each municipality and reservation, as well as history of the River, was completed for the CIP. The CIP was placed in the information repositories for the Site in 2001.

The information repositories are located at the Appleton Public Library; Oshkosh Public Library; Brown County Library in Green Bay; Door County Library in Sturgeon Bay; and Oneida Community Library. Five additional locations, at the Kaukauna, Little Chute, Neenah, De Pere and Wrightstown Public Libraries, still maintain a fact sheet file, although they are no longer information repositories.

EPA awarded a $50,000 Technical Assistance Grant to the Clean Water Action Council (CWAC) in 1999 and another $50,000 grant was provided in 2001. The council has used its TAG to inform the community about the Lower Fox River investigations. To fulfill its obligations, CWAC developed a web site, printed flyers and bumper stickers, paid for newspaper ads and paid technical advisors to review EPA and WDNR-generated documents.

WDNR and EPA held numerous public meetings and availability sessions beginning in summer 1997 to explain how and why the Site was proposed for the Superfund NPL. In February 1999, a draft RI/FS (which did not identify a specific selected remedy) was released with a 45-day public comment period, which was extended an additional 60 days. Prior to and after the release of the draft RI/FS, WDNR and EPA provided for extensive community and public participation, and kept residents, local government officials, environmental organizations and other interest groups apprised of the steps of the process. Well-attended public meetings, small group discussions, meetings and presentations for local officials, and informal open houses continued through 2001.

The public meetings and proposed plan availability were announced to the public at a press conference on October 5, 2001, and received extensive coverage through TV, radio and newspapers news stories. The draft RI/FS and proposed plan were formally presented at public meetings held on October 29, 2001 in Appleton and October 30, 2001 in Green Bay. Additionally, WDNR and EPA mailed meeting reminders and proposed plan summaries to the 10,000 name Fox River mailing list. Press releases pertaining to the proposed plan, comment period, and public meetings were sent to newspapers and TV and radio stations throughout the Fox Valley. Display ads announcing the proposed plan, comment period and public meetings were also placed in Green Bay and Appleton newspapers. The presentations and question and answer sessions at the public meetings, and all public comments taken at the meetings, were recorded and transcribed. The written transcripts of the public meetings are available in the information repositories, the administrative record and on the WDNR Lower Fox River web page.

More than 20 public meetings and availability sessions have been held regarding the project. Cleanup and restoration activities, the status of pilot projects, fish consumption advisories, and the February 1999 draft RI/FS released by WDNR have been among the topics on which these meetings focused. Additionally, over 15 small group and one-on-one interview sessions have been held. Project staff have also made more than 60 presentations to interested organizations and groups. In addition, WDNR, EPA and their intergovernmental partners publish a bimonthly newsletter, the *Fox River Current*, which is mailed to over 10,000 addresses. To date, 23 issues of the *Fox River Current* have been published.

Copies of the various supporting reports and the proposed plan were made available to the public during a public comment period that began on October 5, 2001 and concluded on January 22, 2002. Approximately 4,800 written comments were received via letter, fax and e-mail. A copy of the Responsiveness Summary for these comments is attached to this ROD. Originally, the comment period was for 60 days, ending on December 7, 2001. The announcement of the extension until January 22 was published through newspaper advertisements and news releases on October 25, 2001. Newspaper advertisements were placed in the Green Bay Press Gazette and the Appleton Post Crescent announcing the availability of the plan and its supporting documents, and a brief summary of the plan in the information repositories. The proposed plan, the RI/FS and other supporting documents containing information upon which the proposed alternative was based were also made available on the Internet at www.dnr.state.us/org/water/wm/lowerfox/index.html and at the EPA Region 5 web site. All documents were also available as part of the Administrative Record housed at WDNR offices in Madison, Wisconsin and Green Bay, Wisconsin and at the EPA Region 5 office in Chicago, Illinois.

4. SCOPE AND ROLE OF RESPONSE ACTION

As with many Superfund sites, the problems at the Lower Fox River and Green Bay Site are complex. As a result, WDNR and EPA organized the Site into five OUs described in Section 1.1, above.

The Proposed Plan, issued October 2001, recommended a cleanup plan for all five Operable Units at the Site. However, at this time, WDNR and EPA are issuing a ROD for the Fox River OUs 1 and 2 only. WDNR and EPA expect to issue a ROD for OUs 3, 4 and 5 at a later date.

The reasons for issuing a ROD at this time for only OUs 1 and 2, and not for OUs 3, 4 and 5, are as follows:

- OU 1 and 2 represent a smaller portion of the area within the Fox River where remediation is necessary. These two Operable Units represent approximately 6.5 percent of the PCB mass and 18 percent of the sediment volume in the Lower Fox River. Consequently, these two Operable Units represent a more manageable project than conducting all of the remediation at one time.
- Provide a phased approach to the remedial work. Work on upstream areas, OUs 1-2 can start before the downstream areas, OUs 3, 4, and 5. This is consistent with the EPA policy Memorandum by Marianne Horinko, "OSWER Directive 8258.6-08, Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites," dated February 12, 2002. Principles described in this memorandum include, "Control Sources Early," and "Use an Iterative Approach in a Risk Based Framework." Additionally, the NCP states at 300 CFR Section 430(a)(1)(ii):

  > *"Program Management Principles.* EPA generally should consider the following general principles of program management during the remedial process:
  >
  > Sites should generally be remediated in Operable Units when....phased analysis and response is necessary or appropriate given the size or complexity of the site...."

- Planning for OUs 3, 4, and 5 may benefit from knowledge gained on the OUs 1 and 2 project.

The primary objective of this response action is to address the risks to human health and the environment due to PCBs in the in-place sediments of OUs 1 and 2 in the Lower Fox River. PCB concentrations remain elevated in Fox River sediments, in the water column and in the fish. Removal of the PCB-contaminated sediments will result in reduced PCB concentrations in fish tissue, thereby accelerating the reduction in future human health and ecological risks. In addition, by addressing the sediments, the remediation will control a source of PCBs to the water column, which contributes to fish tissue concentrations and transports PCBs into downstream reaches of the River, Green Bay, and eventually to Lake Michigan.

5. PEER REVIEW

To ensure the credibility of the scientific work conducted during the Remedial Investigation/Feasibility Study (RI/FS), EPA conducted both forms of peer involvement: peer input and peer review. Peer input was conducted through internal Agency reviews, and reviews by other agencies and Tribes. Peer review was also conducted, in accordance with EPA guidance outlined in the Peer Review Handbook (dated December 1998, updated December 2000). The peer review was conducted by independent experts who were unaffiliated with EPA, WDNR, the FRG or other Site stakeholders, and was undertaken on some of the major scientific aspects that form the basis for this decision.

Two separate EPA-sponsored peer review panels were convened. The review process consisted of each panel conducting an independent review by three panel members, with technical and administrative support by an EPA-contractor. The EPA contractor was responsible for convening the panels, consistent with the "charge" given by EPA for the panel review. This peer review was undertaken without influence by EPA, WDNR, the FRG or other interested parties. This was to provide an independent analysis and comment on key documents and issues related to development of a proposed remedy. Specifically, the panels were asked to evaluate:

- Adequacy of data considered in the 1999 Draft Lower Fox River Remedial Investigation, relative to quality and quantity (RI Panel), and
- Natural recovery and environmental transformation, i.e., biological breakdown of PCBs (FS Panel). Natural recovery was defined by the panel as naturally occurring physical, chemical, or biological processes that reduce the risks associated with contaminants in sediments over time.

Each peer review panel was asked to address specific questions (i.e., the "charge") regarding the report being reviewed, including key controversial issues identified by EPA. The RI and FS panels issued reports October 7, 1999, and September 28, 1999, respectively.

The following summarizes the major findings of each of the panels:

- Data are adequate to determine the distribution of contaminants (i.e., it can be decided where cleanups should take place), if all data sources are considered (i.e., the RI does not provide a complete record).
- Data from all available sources are adequate to support identification and selection of a remedy for those technologies (e.g., dredging and capping) that have been used on a large scale at other, similar sites. Data are insufficient for developing in situ bio-technologies that may be applicable to the Site.
- Substantial improvements or additions to the existing data set are not indicated.

- The Draft FS should more fully evaluate natural recovery of sediments as a remedial alternative in comparison with other remedial options.
- The technical basis of the natural recovery analysis needs to be described in more detail to permit a review of the methodology used and to assess confidence in natural recovery predictions.

In the 2001 draft RI and FS and the Proposed Plan, WDNR and EPA considered the recommendations by the peer review panels, and on that basis made modifications to draft documents upon which the proposed plan was based.

In addition to EPA-sponsored peer reviews, the FRG sponsored peer reviews that were technically consistent with EPA peer review policy, although they may not have conformed to all aspects of the peer review process and documentation. These reviews consisted of the following analysis for the Fox River:

- Fate and transport and bio-uptake modeling evaluations by WDNR and the FRG;
- Human Health Risk Assessments by WDNR and the FRG
- Ecological Risk Assessments by WDNR and the FRG.

Recommendations by both EPA-sponsored peer reviews as well as those by the FRG were considered and incorporated into the 2001draft RI/FS, which was a significant part of the basis for the Proposed Plan.

6. SITE CHARACTERISTICS

6.1 Conceptual Site Model

The conceptual site model for the Fox River PCBs Site describes the source to receptor succession in simple terms and identifies the major contamination sources, contaminant release mechanisms, secondary sources, pathways and receptors of concern (see Figures 2 and 3). Figures 2 and 3 show both human and ecological site models. The design of field investigations and human and ecological risk assessments reflect the basic components of the conceptual site model.

In the conceptual site model, historical PCB releases were from paper manufacturing and recycling facilities that discharged into the Fox River. Although current releases are insignificant, historical releases were from discharge of wastewater containing PCBs. Contaminated sediment "hotspots" contribute to the overall PCB load in the Fox River and Green Bay.

Once introduced into the River, the PCBs adhere to sediments, with some fraction being carried in the water column. Physical, chemical and biological release mechanisms allow PCBs in the sediment to become available for redistribution and a source of PCB contamination to the water column. The sediments will continue to release contamination to the water column and biota, through aquatic and benthic food chains, as well as other not easily modeled processes such as boat scour, ice rafting, and bioturbation, unless they are managed or remediated in some manner. In addition, scour from water flowing over sediments during high flow events will continue to redistribute sediments and re-expose contaminants.

Because the River is a dynamic system with varying energy regimes, generally PCB-laden sediments are not sequestered or stable. Some PCB-contaminated sediment is buried by deposition of cleaner sediments at times, but in other places and at other times contaminants

are redistributed. This redistribution may be local or more regional depending on the energy of flow events and/or physical type or size of the sediment particles. The redistributed sediments release contamination to the water column and high flow events (e.g., floods) further increase the bioavailability of contaminants to organisms in the water column. Although scour during high flow events is an important release mechanism PCBs in the surface water are also routinely observed during periods of lower flows (see Section 6.2.3, "Water Column," below). The conceptual site model shows that the fish ingestion pathway is a completed exposure route for the Site. Receptors include humans (e.g., anglers and their families), piscivorous (i.e., fish eating) fish, piscivorous birds (including threatened and endangered species) and mammals. Additional information on the human and ecological receptor populations is provided in the risk section (Section 8) of this document.

Figure 2 Human Health Site Conceptual Model

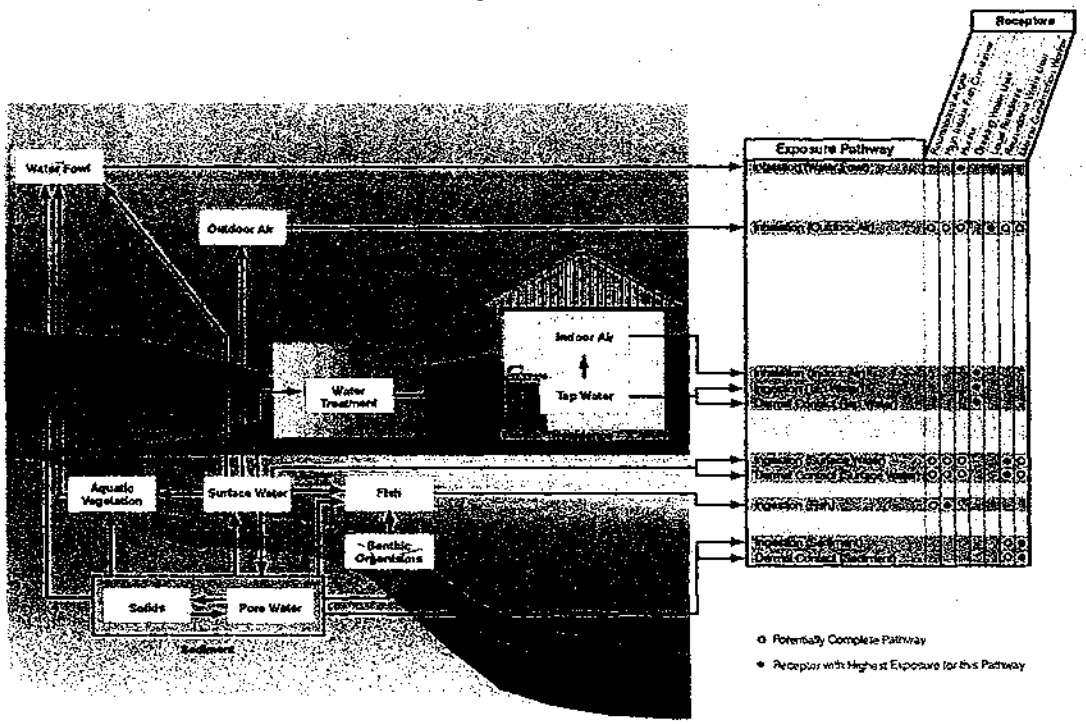
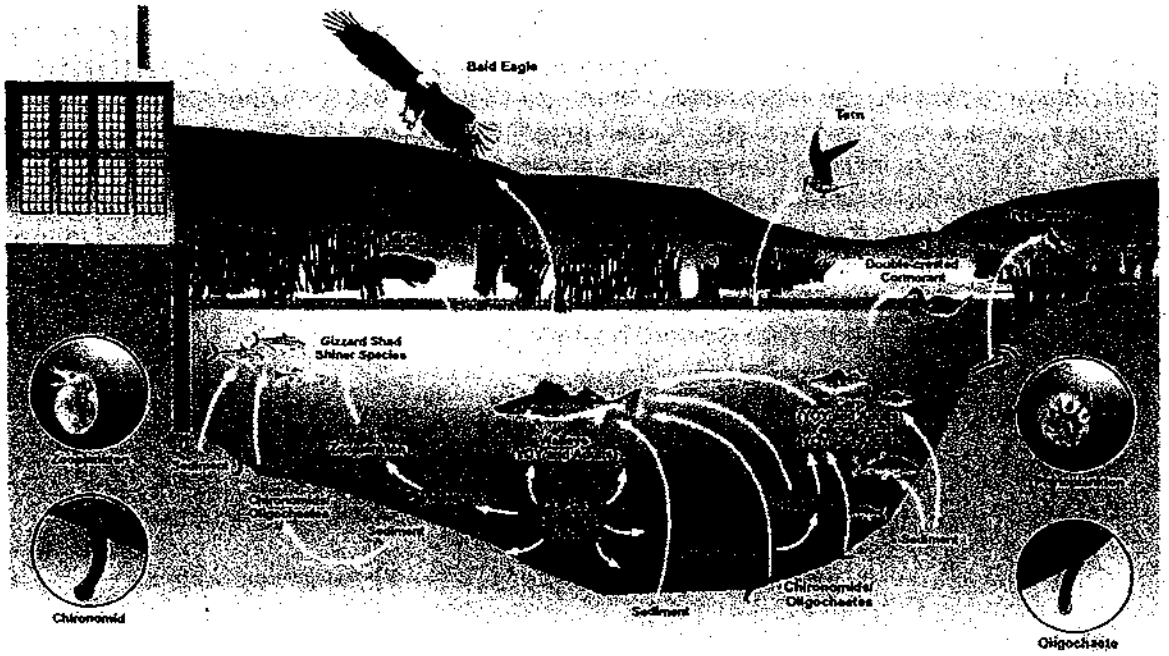


Figure 3 Ecological Site Conceptual Model



6.2 Results of the Remedial Investigation

6.2.1 Site Overview

The Lower Fox River is a large freshwater river that has been contaminated with PCBs for nearly 50 years. The contaminated portions of the Lower Fox River include variations in hydrology and river bed geology, which create complex environmental setting with varying levels of PCB contamination.

6.2.2 Summary of Sampling Results

WDNR's RI/FS evaluated data from numerous prior investigations conducted since 1971. These data have been incorporated into a single Fox River Database, available at WDNR's Lower Fox River Web page. The data received as part of the comments on the proposed plan have been added to the database. The current database contains in excess of 500,000 analytical records captured from every major substantial data collection activity since 1989 up until the time the proposed plan was released and covers analysis of sediment, water, air, and biota (e.g., fish and wildlife tissues).

6.2.3 Nature of Contamination

Contaminants representing the primary risk driver studied in the RI/FS are, by definition, polychlorinated biphenyls. PCBs consist of a group of 209 distinct chemical compounds, known as congeners, that contain one to ten chlorine atoms attached to a biphenyl molecule, with the generic formula of $C12H_{(10-x)}Cl_x$, where x is an integer from one to ten. Homologue groups are identified based on the number of chlorine atoms present. For example, monochlorobiphenyls contain one chlorine atom, dichlorobiphenyls contain two chlorine atoms, and trichlorobiphenyls contain three chlorine atoms. Some PCB congeners are structurally and toxicologically similar to dioxin (sometimes called dioxin-like PCBs).

Commercially manufactured PCBs consisted of complex mixtures of congeners, known under various trade names. These PCBs were marketed under the general trade name "Aroclors." About 140 to 150 different congeners have been identified in the various commercial Aroclors, with about 60 to 90 different congeners present in each individual Aroclor.

The polychlorinated biphenyls (PCBs) used in the production of carbonless copy paper by paper manufacturing facilities on the Fox River from 1954 to 1971, consisted largely of the Aroclor identified as "1242." Carbonless copy paper produced during this time contained approximately 3.4 percent PCBs by weight.

Other contaminants of potential concern (e.g., mercury, lead, arsenic, dieldrin, DDT/DDE/DDD, furan, and dioxin) are also present, but are not significant risk drivers due to relatively low concentrations.

Sources

Twenty paper mills are located along the portion of the Fox River included in the Site. Among that group of companies, six engaged in the production or de-inking of carbonless copy paper containing PCBs. As a result of those processes, these mills discharged PCBs to the Lower Fox River. It is estimated that the wastewater discharged by the paper mills either directly or indirectly (through publicly owned treatment works) into the Fox River released an estimated 690,000 pounds of PCBs into the Lower Fox River.

Contaminated Media

Sediment

Much of the volume of PCBs discharged into the Lower Fox River in the past has already been transported throughout the system and is now concentrated in sediment within specific areas. In general, the upper three River reaches can be characterized as having discrete soft sediment deposits within inter deposit areas that have little or no soft sediment. In contrast, the last River reach from De Pere to Green Bay is essentially one large, continuous soft sediment deposit. Because there were several points of PCB discharge along the entire length of the Lower Fox River, PCB concentrations and mass distributions are highly variable. Table 1 summarizes the distribution of PCBs within OU 1 and OU 2 sediments.

Table 1 PCB Distribution in the Lower Fox River OUs 1 and 2

River Reaches	Sediment Volume (cy)	PCB Mass (kg)	PCB Mass in Top 100 cm (%)
OU 1- Little Lake Butte des Morts	2,200,400	1,849	98%
OU 2 - Appleton to Little Rapids	339,200	109	100%

Transport of PCBs in Fox River

Contaminant fate and transport in the Lower Fox River and Green Bay are largely a function of deposition, suspension, and redeposition of the Chemicals of Concern (COC) that are bound to sediment particles. The organic COCs (PCBs, pesticides) exhibit strong affinities for organic material in the sediment. The ultimate fate and transport of these organic compounds depends significantly on the rate of flow and water velocities through the River and Bay. More sediment becomes suspended and transported downstream during high-flow events like storms and spring snowmelt. High-flow events occur approximately 15 to 20 percent of the time, but can transport more than 50 to 60 percent of the PCB mass that moves annually. In any event, less than 1 kilogram/year enters Little Lake Butte des Morts from Lake Winnebago and 40 kilograms (88 pounds)/year are resuspended and transported from Little Lake Butte des Morts to OU 2

(Little Rapids Reach). An estimated 64 kilograms (141 pounds)/year migrate from OU 2 downstream. This estimate does not consider removal of the Deposit N or for possible actions for Deposit DD. Other modes of contaminant transport, such as volatilization, atmospheric deposition, and point source discharges, are negligible when compared to sediment resuspension.

Changes in Sediment Bed Elevation

The Lower Fox River is an alluvial river that exhibits significant changes in bed elevations over time in response to changing volumes of flow during annual, seasonal, and storm events, changes in sediment load, and changes in its base level, which is determined by Lake Michigan. Sediment in the riverbed is dynamic and does not function as discrete layers. River sediment movement is in marked contrast to the sediment dynamics found in a large quiescent body of water, such as deep lakes, or the deeper portions of Green Bay. Scouring of the sediment bed plays a significant role in the quantity of sediment and contaminants transported through the River system. In response to comments received from the FRG on the 1999 draft RI/FS to the effect that less than one inch of sediment would be resuspended from the riverbed as a result of a 100-year storm event, WDNR and EPA investigated changes in sediment bed elevation for the De Pere to Green Bay River reach (OU 4). This work is partially relevant to OU 1 and OU 2, but is informative regarding movement of Fox River sediments generally. This work (see Technical Memo 2g of the Model Documentation Report) was completed by a group called the FRG/WDNR Model Evaluation Workgroup as part of the 1997 agreement between the FRG and WDNR. Additional evaluation by EPA was consistent with changes documented in Technical Memo 2g.

Results of these analyses indicate that sediment bed elevation changes occur in the Lower Fox River over both short- and long-term time frames. Changes in sediment bed elevation were observed both across the channel and downstream profiles. These changes show little continuity. Since River flows have not significantly changed in recent years, the complexity of these sediment bed elevation changes reflects the prevailing hydrologic and sediment conditions that occurred over a 22-year period from 1977 through 2000. The wide range of discharges and sediment loads continuously reshapes the Lower Fox River sediment bed. Short-term (e.g., annual and sub-annual) changes in average net sediment bed elevations range from a decrease or scour of over 11 inches to an increase or deposition of over 14 inches. Long-term (e.g., over several years) changes in average net elevations range from a decrease of more than 39 inches to an increase of nearly 17 inches. The changes documented are well supported by U.S. Army Corps of Engineers (USACE) sediment volume calculations from pre- and post-dredge sediment bed elevation surveys, as well as by results of a U.S. Geological Survey (USGS) analysis of bed surveys performed at intermediate time scales (e.g., 8 months to 45 months).

Surveys of the River bottom, conducted by several different groups, show significant changes in sediment bed elevation. On average, sediment bed elevation data from throughout the De Pere to Green Bay reach suggest that this River reach is a net depositional zone. However, when examined at a finer scale, the data show areas of sediment scour up to 14 ft. It should be noted that during the survey period, there were no large storm events of a 10-year or greater magnitude. It is unknown what the scour would be during larger events.

For OUs 1 and 2, PCBs are often high in surficial sediments. This is indicative that higher concentrations of PCBs continue to be exposed or re-exposed.

The Potential for Natural Biodegradation of PCBs

Responding to comments received from the EPA's peer review panel concerning natural recovery, the viability of natural degradation as a potential remedial action for the sediment-bound PCBs in the Lower Fox River and Green Bay was evaluated. Two basic processes, both anaerobic (without oxygen) and aerobic (in the presence of oxygen) degradation, must occur to completely decompose PCBs. Based on evidence in the literature, anaerobic PCB degradation was demonstrated to have occurred under field conditions at almost all the sites studied. However, a reduction in PCB concentrations through anaerobic processes is site-dependent. In the Lower Fox River, University of Wisconsin researchers found only a 10 percent reduction that could be attributed to anaerobic degradation processes in deposits with average PCB concentrations greater than 30 mg/kg. More importantly, no PCB reductions resulting from anaerobic processes could be accounted for in deposits with average concentrations less than 30 mg/kg.

Other active treatment options might possibly promote dechlorination of the sediment, making the PCBs more amenable to biological destruction. However, a pilot-scale experiment conducted at the Sheboygan River, another site with PCB-contaminated sediment, yielded inconclusive results regarding the viability of enhanced biodegradation. In that study, PCB-contaminated sediment was removed from the River and placed into a specially engineered treatment facility. The sediment was seeded with microorganisms and nutrients and the sediment was manipulated between aerobic and anaerobic conditions to optimize biological degradation. Even under these conditions, the data were insufficient to conclude that PCB decomposition was enhanced.

Effects of Time

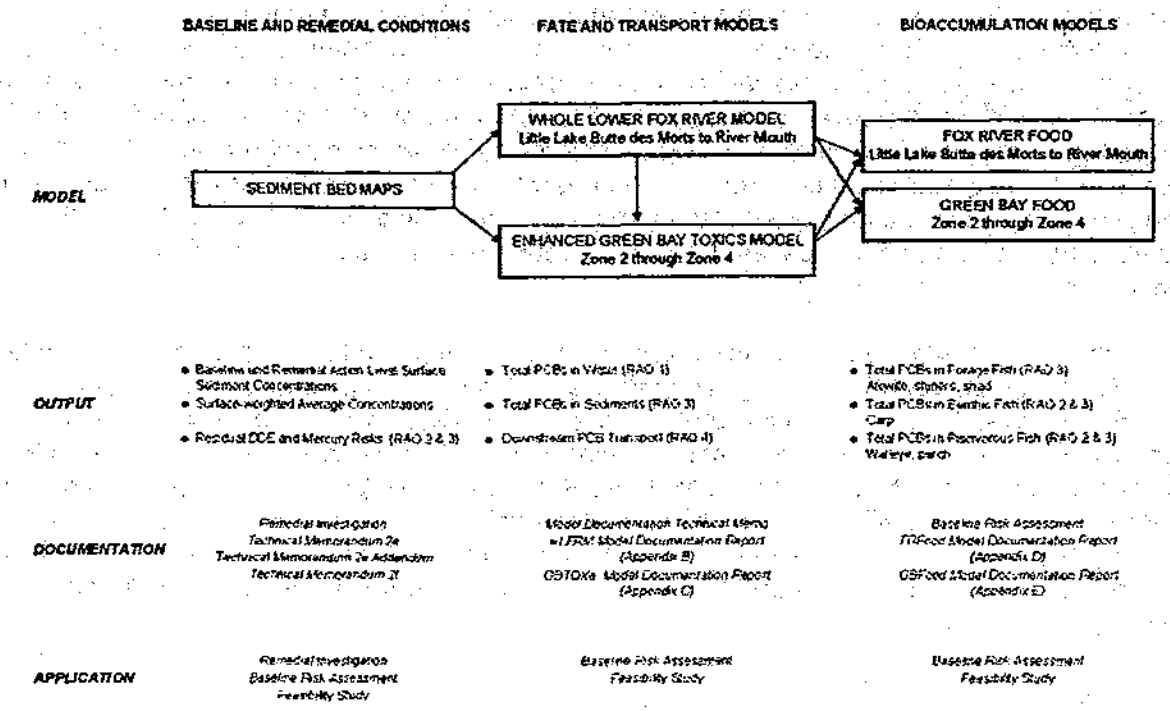
The Fox River Database includes sediment and water test results for tissue samples collected since 1971. During the 1970s, after PCB use in the manufacturing of carbonless copy paper had ceased, PCB concentrations in fish tissue showed significantly declining concentrations. Since the mid-1980s, however, changes in PCB levels in fish have slowed, remained constant, or, in some cases, increased.

Trends in PCB concentrations in the surface layer (i.e., top four inches) of River sediment are not consistent, but concentrations generally appear to be decreasing over time as more PCB mass is transported downstream. However, the time trends showed that concentrations in the subsurface sediments do not appear to be declining. This indicates that a considerable amount of PCB mass remains within the sediments of the Lower Fox River. Any changes made to the current lock and dam configuration on the River could result in increased scour and resuspension of those underlying sediments, which could in turn result in increases in fish tissue concentrations. In addition, soil eroded from the watershed mixes with and may further dilute PCB concentrations in the sediment.

Modeling Effort for the Lower Fox River

Four interrelated models were used in the RI/FS to simulate the fate and transport of PCBs in the Lower Fox River and Green Bay (Figure 4). They are mathematical representations of the transport and transfer of PCBs between the sediment, the water, and uptake into the River and Bay food webs. The models are intended not only to provide information on the fate and transport of PCBs in an unremediated River system, but also to compare the potential remedial alternatives in the FS. The models tend to estimate concentrations lower than the concentrations actually observed in the River. The relative differences predicted by the model are considered to be reliable.

Figure 4 Relationship of Models Used for Risk Projections in the Lower Fox River and Green Bay



The modeling effort included:

- Bed mapping of the Lower Fox River to define sediment thickness, sediment physical properties (such as total organic carbon and bulk density), and total PCB concentrations;
- Use of the whole Lower Fox River Model (wLFRM) to simulate the movement of PCBs in the water column and sediment of the Lower Fox River from Little Lake Butte des Morts to the mouth of the River at Green Bay; and,
- Use of the Fox River Food Chain Model (FRFOOD) to simulate the uptake and accumulation of PCBs in the aquatic food chain in the Lower Fox River using model results from wLFRM.

Bed mapping provided the foundation for the modeling inputs. Total PCB concentrations in surface sediment for the baseline and action levels serve as inputs to wLFRM . This model projects total PCB concentrations in water and sediment. The output from this model is in turn used in the bioaccumulation model, FRFood, to project whole fish tissue concentrations of PCBs (Figure 4). The output from all of the models is then compared to the remedial action levels specified in the FS. This information is used in the FS to estimate the length of time it would take for a receptor to achieve the acceptable fish tissue concentration in response to a given action level.

Taken together, these models provide a method for evaluating the long-term effects of different remedial alternatives and different action levels on PCB concentrations in water, sediment, and aquatic biota in the Lower Fox River. The models are then used to predict PCB concentrations in the aquatic environment over a 100-year period under different remedial alternatives and action levels. The modeling results are discussed in the FS, and a more detailed discussion on modeling can be found in the Model Documentation Report. A complete copy of that report is available on the WDNR's Lower Fox River Web page.

Water Column
The dominant current PCB source to the water column is sediments. Average River surface water total concentrations are 54.6 parts per trillion (ppt), with particulates and dissolved concentrations, 40.0 ppt and 14.6 ppt, respectively. There are significant seasonal variations, particularly when the water temperature drops below 40° F. For example during the winter months of December 1994 and February 1995, total PCB concentrations dropped to about 10 percent of the average concentration. Average Green Bay concentrations range from 18.5 ppt for zone 2 to non-detect in zone 4.

Fish and Other Biota
PCB concentrations in fish are a result of the fish's exposure to PCBs in water and surface sediment, through an aquatic food chain and/or a benthic food chain, respectively. WDNR continues to collect and analyze fish tissue data from locations in the Fox River and Green Bay.

A wide variety of fish and other species have been collected and analyzed for the Fox River and Green Bay from 1971 to present. Generally, concentrations in biota have been declining, although the rate of decline varies depending upon the location and time.

Air
PCBs can enter the air via volatilization from PCB-contaminated water and soil although volatilization of PCBs is generally considered to be limited. Air monitoring during the 1999 SMU 56/57 dredging project demonstrated that even under "worst case" conditions (i.e., when sediments are excavated and exposed to the air) that volatilization of PCBs do not pose a significant risk to humans or wildlife.

6.2.4 Geochemistry and Modeling Conclusions

In the RI/FS, EPA evaluated PCB contamination at the Site using a number of tools. These tools include geochemical analyses of the water and sediment, "time trends" (i.e., statistical) analyses, and analysis of biological monitoring data, and synthesis of the data by the application of a set of complex mathematical (i.e., computer) models. PCB physical/chemical transport and fate and PCB bioaccumulation models were applied to predict future levels of PCBs in the Fox River and Green Bay sediment, water and fish.

7. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

As one of Wisconsin's great rivers, the Lower Fox River has played and will continue to play a major role in the history, culture, and economy of the area. The Fox River has played an important role in defining regional history and culture. Current and reasonably anticipated future land use and surface water use are described below.

7.1 Current and Reasonably Anticipated Future Land Use

Current land use includes a variety of residential, commercial, agricultural, and industrial activities. Use of the River and lands surrounding the River are projected to remain the same. At this time, no changes in future land use are known, nor are any new uses expected. Table 2 below summarizes current land use for OUs 1 and 2.

Table 2 Predominant Land Use by Operable Unit

Operable Unit	Predominant Land Use
1 - Little Lake Butte des Morts	Residential, industrial, and commercial
2 - Appleton to Little Rapids	Residential, industrial, commercial, and agricultural

Other uses of the River include parks, woodlands, and recreational. OUs 1 and 2 pass through Winnebago, Outagamie and Brown Counties.

7.2 Surface Water Uses

- *Industrial and commercial purposes:* Uses include generation of electrical power and industrial/commercial purposes.
- *Residential/Domestic:* Due to historic problems in the Lower Fox River, the main surface water sources for human consumption for the areas surrounding OU 1 and 2 is Lake Winnebago and groundwater (i.e., not the Fox River).
- *Recreation:* The Fox River supports a variety of water-based recreational activities including sport fishing, waterfowl hunting, swimming and boating. Boating (both power and non-power) is available on the River, particularly in Little Lake Butte des Morts. Tourism is popular and important to the local economy.
- *Ecological Resources:* The Fox River and Green Bay support many species of birds (e.g., tree swallow, Forsters and Common Tern, Double-crested Cormorants, Bald Eagles) fish (Rainbow Smelt, Alewife, Gizzard Shad, Shiner, Yellow Perch, Carp, Brown Trout and Walleye), and mammals (e.g., mink), including sixteen (16) species of State or federally listed Threatened or Endangered species.

The Lower Fox River provides diverse habitats for all trophic levels of the River and Bay ecosystem. Plants, plankton, aquatic invertebrates, fish, amphibians, reptiles, birds and mammals use the Fox River for feeding, reproduction and shelter. In addition to the aquatic communities associated with the River, animals living in wetlands, floodplains and upland communities are also dependent on the River.

Both federal and state freshwater wetlands exist in the Fox River region, providing valuable habitat.

8. SUMMARY OF SITE RISKS

Baseline human health and ecological risk assessments were conducted to evaluate the potential for current and future impacts of site-related contaminants on receptors visiting, utilizing or inhabiting the Fox River and Green Bay in the Baseline Human Health and Ecological Risk Assessment (BLRA). The BLRA for the Lower Fox River and Green Bay was prepared as a companion document to the RI/FS and was finalized in December 2002.

In the portion of the report covering Human Health Risk Assessment (HHRA), cancer risks and non-cancer health hazards were evaluated for the Lower Fox River and Green Bay. In the Ecological Risk Assessment (ERA) portion of the report, ecological risks were evaluated for Lower Fox River and Green Bay. The BLRA supports the selected remedy.

The BLRA concludes that:

- Human health and ecological receptors are at risk in each Operable Unit.
- Fish consumption is the exposure pathway representing the greatest level of risk for human and ecological receptors, other than the direct risks posed to benthic invertebrates via direct exposure to contaminated sediments.
- The primary contaminant of concern is PCBs.

8.1 Identification of Chemicals of Concern

The Site includes the contaminated sediment found within the Lower Fox River and Green Bay. A Screening Level Risk Assessment (SLRA) was conducted to evaluate which chemicals in the system pose the greatest degree of risk to people and animals. Identified Chemicals of Concern (COCs) include PCBs, dioxins/furans, the pesticide DDT and its metabolites (DDD and DDE), the pesticide dieldrin, and arsenic, lead, and mercury.

8.2 Human Health Risk Assessment

8.2.1. Summary Of Site Risks

The site-specific HHRA evaluated both cancer risks and non-cancer health hazards from exposure to PCBs in the Fox River and Green Bay, as documented in the Remedial Investigation and Feasibility Study (RI/FS). This discussion emphasizes cancer risks and non-cancer health hazards due to PCBs in the Fox River and Green Bay that exceed EPA's goals for protection. For cancer, regulatory decisions are made ranging from risk levels of one in a million (10^{-6}) to one in 10,000 (10^{-4}). A one in a 100,000 cancer risk level is commonly used in federal and state regulatory decisions. For non-cancer, a hazard index (HI) of 1 is the most frequent basis for risk management decisions. Cancer risks and non-cancer hazard indices in Green Bay were calculated to be generally similar to the Fox River. The cancer risk and non-cancer hazard indices in the Fox River and Green Bay are above EPA's levels of concern for fish consumption. Consistent with Superfund policy and guidance, the Human Health Risk Assessment (HHRA) is a baseline risk assessment and therefore assumes no actions (i.e., remediation) to control or mitigate hazardous substance releases and no institutional controls, such as the fish consumption advisories and fishing restrictions that are currently in place, which are intended to control exposure to hazardous substances. Cancer risks and non-cancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the Site. The RME is defined as an upper end exposure that is reasonably expected to occur at a Site. EPA also estimated cancer risks and non-cancer hazard indices based on central tendency (CT), or average, exposures at the Site. For both the RME and CT exposures, average contaminant (e.g., PCBs) levels in fish were exceeded. The following discussion summarizes the HHRA with respect to the basic steps of the Superfund HHRA process: 1) Data Collection and Analysis, 2) Exposure Assessment, 3) Toxicity Assessment and 4) Risk Characterization.

8.2.2 Data Collection and Analysis

The HHRA utilizes documents relating to the nature and extent of PCB contamination at the Site developed as part of the RI/FS. These RI/FS documents provide both current and projected future concentrations of PCBs in air, fish, sediments and river water. To calculate cancer risks and non-cancer hazard indices, the information on concentrations in these media (Tables 3 and 4) are combined with other information on exposure (see Section 8.2.3) and toxicity (see Section 8.2.4).

Table 3 Summary of PCB Data and Medium-Specific Human Exposure Point Concentrations for OU 1

Exposure Point	Chemical of Concern		Concentration Detected		Frequency of Detection	Exposure Point Concentration (ppm)	Statistical Measure
			Min.	Max.			
Sediments	Total PCBs		0.002 ppm	222.7 ppm*	539/661	3.70	mean
Surface Water Direct Contact	Total PCBs	particulate	0.13 ng/L	40.16 ng/L	34/41	1.66E-05	mean
		dissolved	1.4 ng/L	19 ng/L	40/46	1.11E-05	
Fish Tissue (Walleye)	Total PCBs		0.0989 ppm	3.8 ppm	11/13	1.16	mean

ng/L - nannograms/Liter
ppm - parts per million
**data submitted with comments from the responsible parties included data from LLBdM in excess of 360 ppm PCB.*

Data sources:
Concentrations and detections for surface water -- RI Tables, 5-1, 5-16 and RA Table 6-14.
Point of exposures -- RA Table 5-31, 6-8.

Table 4 Summary of PCB Data and Medium-Specific Human Exposure Point Concentrations for OU 2

Exposure Point	Chemical of Concern		Concentration Detected		Frequency of Detection	Exposure Point Concentration (ppm)	Statistical Measure
			Min.	Max.			
Sediments	Total PCBs		0 ppm	77.44 4 ppm	188/263	1.40	mean
Surface Water Direct Contact	Total PCBs	particulate	0.01 ng/L	52.17 ng/L	34/41	1.19E-05	mean
		dissolved	0.026 ng/L	18.86 ng/L	84/85	4.84E-06	
Fish Tissue (Walleye)	Total PCBs		1.431 ppm	3.90 ppm	4/4	2.74	mean

ng/L - nannograms/Liter
ppm - parts per million
Data sources:
Concentrations and detections for surface water -- RI Tables, 5-1, 5-16 and RA Table 6-14.

Fish at the Site have been collected by the WDNR for approximately 35 years, with fish advisories in effect since 1976. Fish samples have been analyzed for PCBs (both total PCBs and selected congeners), Dioxins/furans (specifically, 2,3,7,8-TCDD and 2,3,7,8-TCDF), DDT (dichlorodiphenyltrichloroethane), a pesticide, and its metabolites (DDD and DDE) Dieldrin (pesticide), arsenic, lead and mercury. These non-PCB contaminants were found to present substantially less risk compared to PCBs. Additionally, some of the other contaminants identified in sediment have similar fate and transport properties, and are generally found with PCBs. For this reason, a remedy that effectively addresses PCB exposure will also address the other COCs (with lesser toxicities) in the sediment.

The conceptual site model identifies potential receptors for COCs and exposure pathways. As discussed above, determination of PCB exposure provides a sound basis for characterizing significant human health risks at the Site. Estimates of the exposures allow a quantitative risk evaluation. This was done for fish, sediment, drinking/river water, and air. Most Site risks were determined to relate to fish consumption, with only minimal risk associated with other potential exposures (e.g., inhalation, direct contact). Thus the discussion below focuses on risks and exposures related to fish consumption.

Specifically, these quantitative risk calculations from fish consumption were based on wet-weight PCB concentrations in fish fillets, as generated by WDNR's bioaccumulation models, Fox River Food (FRFOOD) and Green Bay Food (GBFOOD). The fillet represents the portion of the fish most commonly consumed. The fish exposures were derived by weighting the model output by reported angler preference for species consumption (i.e., weighting the modeled PCB concentrations in fish to reflect the species caught and consumed by anglers) and by averaging over location within the study area.

8.2.3 Exposure Assessment

The exposure assessment evaluates exposure pathways by which people are or can be exposed to the contaminants of concern in different media (e.g., fish, water, and sediment). Factors relating to the exposure assessment include, but are not limited to, the concentrations that people are or can be exposed to and the potential frequency and duration of exposure.

Conceptual Site Model

Human exposure to PCBs through consumption of fish presented the greatest risk. Other human exposure pathways such as inhalation, drinking contaminated water or direct exposure presented no significant risk. The human health conceptual site model is shown in Figure 2.

Exposed Populations

Recreational and high intake (i.e., subsistence) fish consumers are the most likely population to have significant PCB exposures. Populations that may have portions of their members engaged in subsistence fishing include Native Americans, and Hmong (Laotians). Sensitive populations that were qualitatively evaluated include highly exposed (i.e., subsistence) anglers and their families as well as infants of mothers who ingest fish that are exposed *in utero* and/or through consumption of breast milk. With respect to subsistence or highly exposed angler populations in Wisconsin, review of the literature suggests that these populations are likely to be adequately represented in the HHRA. With respect to infants (less than one year old), exposure to PCBs *in utero* and via ingestion of breast milk are known exposure routes that pose risks to fetal development in the infant. Several ongoing studies are determining if it is possible to develop quantitative relationships between fetal/infant PCB exposure and developmental effects. Standard EPA default factors were used for angler body weight [e.g., 72 (kilograms (kgs) for an adult].

Fish Ingestion Rate
Several fish consumption surveys were used to evaluate fish intake rates for both recreational and high intake fish consumers. Specific studies included: West (1989, 1993) conducted in Michigan; Fiore (1989) conducted in Wisconsin; Hutchinson and Kraft conducted in Wisconsin (1994) and Hutchinson (1999) conducted in Wisconsin. The RME fish ingestion rate was determined to be 59 grams per day from the West studies while 81 grams was determined for high intake fishes, using the findings from Hutchinson and Kraft (1994).

Exposure Duration
Values of 30 years for Central Tendency Exposure (CTE) and 50 years for the RME scenario were established based on EPA published estimates of the years persons live in the Lower Fox River and Green Bay area.

PCB Cooking Loss
PCB losses during cooking were assumed to be 50 percent, based on studies reported in the literature. Potential PCB loss mechanisms include removing skin and fat, draining cooking fluids from the fish and grilling to allow oil to drip away from the fish.

Probabilistic Analysis
In addition to the point estimate (i.e., deterministic) analyses, a probabilistic analysis was performed to provide a range of estimates of the cancer risks and non-cancer health hazards associated with the fish ingestion pathway. The probabilistic analysis helps to evaluate variability in exposure parameters (e.g., differences within a population's fish ingestion rates, number of years anglers are exposed, body weight, etc.) and uncertainty (i.e., lack of complete knowledge about specific variables). The deterministic risk analyses using point estimates to generate RME exposures and risks was found to compare favorably to findings from the probabilistic approach.

8.2.4 Toxicity

The toxicity assessment determines the types of adverse health effects associated with PCB exposures and the relationship between the magnitude of exposure (dose) and severity of adverse effects (response). Potential health effects for PCBs include the risk of developing cancer over a lifetime. Other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system), are also associated with PCB exposure. Some of the 209 PCB congeners are considered to be structurally and mechanistically similar to dioxin and exert dioxin-like effects.

Sources of Toxicity Information.
The HHRA used the current consensus toxicity values for PCBs from EPA's Integrated Risk Information System (IRIS) in evaluating the cancer risk and non-cancer health effects of PCBs. IRIS provides the primary database of chemical-specific toxicity information used in Superfund risk assessments. More recent toxicity data are provided in Appendix D of the BLRA. These data do not change EPA's use of IRIS values. For the dioxin-like PCBs, the HHRA used toxicity information for dioxin (2,3,7,8-TCDD) provided in EPA's 1997 Health Effects Assessment Summary Tables.

Cancer
EPA has determined that PCBs cause cancer in animals and probably cause cancer in humans (B2 classification or likely to cause cancer in humans). EPA's cancer slope factors (CSFs) for PCBs represent plausible upper bound estimates, which means that EPA is reasonably confident that the actual cancer risks will not exceed the estimated risks calculated using the

CSFs. For fish ingestion, the pathway determined to be of greatest concern, CSFs of 2 (mg/kg day)$^{-1}$ and 1 (mg/kg-day)$^{-1}$ were used for the RME and CT (average) exposure, respectively. For dermal and inhalation exposures, a CSF of 2 (mg/kg-day)$^{-1}$ was used with a dermal absorption fraction of 14 percent, consistent with the IRIS chemical file. For inhalation, a CSF of 0.4 (mg/kg-day)$^{-1}$ was used. For the dioxin-like PCBs, the CSF for 2,3,7,8-TCDD of 150,000 (mg/kg-day) was used.

Non-Cancer Health Effects

Serious non-cancer health effects have been observed in animals exposed to PCBs. Studies of Rhesus monkeys exposed through ingestion of PCBs (i.e., Aroclors 1016 and 1254) indicate a reduced ability to fight infection and reduced birth weight in offspring exposed *in utero*. Studies of non-cancer health effects, including neurobehavioral effects observed in children of mothers who consume PCB-contaminated fish were summarized in the baseline risk assessment and, are being evaluated by EPA as part of the Agency's IRIS process. The toxicity assessment is an evaluation of the chronic (e.g., 7 years or more) adverse health effects from exposure to PCBs. The chronic Reference Dose (RfD) represents an estimate (with uncertainty spanning an order of magnitude or greater) of a daily exposure level for the human population, including sensitive populations (e.g., children), which is likely to be without an appreciable risk of deleterious effects during a lifetime. Chemical exposures exceeding the RfD do not predict specific disease. For the fish ingestion pathway, the oral RfD for Aroclor 1254 of 2 x 10^{-5} mg/kg-day was used for the RME and CT (average) exposures, because the congener analysis of fish samples more closely resembled Aroclor 1254 rather than 1016. For the sediment and water ingestion pathways, the oral RfD for Aroclor 1016 of 7 x 10^{-5} mg/kg-day was used because analyses of sediment and water samples most closely resemble Aroclor 1016. For the dermal contact pathway, dermal RfDs were extrapolated from the oral RfD for Aroclor 1016.

8.2.5 Risk Characterization

This final step in the HHRA combines the exposure and toxicity information to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk for developing cancer and the potential for non-cancer health hazards.

8.2.6 Cancer Risks

Cancer risk is expressed as a probability. For example, a 10^{-4} cancer risk means a one in 10,000 excess cancer risk, or an increased risk of an individual developing cancer of one in 10,000 as a result of exposure to site contaminants under the conditions used in the Exposure Assessment. Under Superfund, acceptable exposures RME cancer risk must be defined with the range of 10^{-4} to 10^{-6} (corresponding to a one in 10,000 to a one in 1,000,000 excess cancer risk). Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{CSF}$$

where: Risk = a unit less probability (e.g., 1 x 10^{-3} of an individual developing cancer)

CDI = Chronic Daily Intake averaged over 70 years (mg/kg-day)
CSF = Cancer Slope Factor, expressed as (mg/kg-day)$^{-1}$

At this Site, cancer risks to the RME individual associated with ingestion of fish are above EPA's generally acceptable levels, as shown below in Tables 5 and 6. In addition, cancer risks to the average (CT) individual associated with ingestion of fish are above EPA's goal for protection. Tables 5 and 6 below summarize key cancer risks from Tables 5-82 and 5-86 from the Human Health Risk Assessment for the Site. Cancer risks from exposure to dioxin-like PCBs were

comparable to the cancer risks from the non-dioxin-like PCBs presented below for fish ingestion.

Table 5 Cancer Risk from Fish Ingestion – Summary for OU 1

Pathway	RME Cancer Risk	CT (Average) Cancer Risk
Recreational Angler		
All Fish	5.2×10^{-4} (5.2 in 100,000)	7.8×10^{-5} (7.8 in 100,000)
Walleye	1.5×10^{-4} (1.5 in 10,000)	2.2×10^{-5} (2.2 in 100,000)
High Intake (i.e., Subsistence) Angler		
All Fish	7.2×10^{-4} (7.2 in 10,000)	1.1×10^{-4} (1.1 in 10,000)
Walleye	2.0×10^{-4} (2.0 in 10,000)	3.2×10^{-5} (3.2 in 100,000)

Table 6 Cancer Risk from Fish Ingestion – Summary for OU 2

Pathway	RME Cancer Risk	CT (Average) Cancer Risk
Recreational Angler		
All Fish	4.9×10^{-4} (4.9 in 10,000)	7.4×10^{-5} (7.4 in 100,000)
Walleye	1.6×10^{-4} (1.6 in 10,000)	2.4×10^{-5} (2.4 in 100,000)
High Intake (i.e., Subsistence Angler)		
All Fish	6.8×10^{-4} (6.8 in 10,000)	1.1×10^{-4} (1.1 in 10,000)
Walleye	2.3×10^{-4} (2.3 in 10,000)	3.5×10^{-5} (3.5 in 100,000)

8.2.7 Non-Cancer Health Hazards

The potential for non-cancer health effects is evaluated by comparing an exposure level over a specified time period (e.g., 7 years) with Reference Dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a Hazard Quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic non-carcinogenic effects from that chemical are unlikely. A Hazard Index (HI) represents the sum of the individual exposure levels for different chemicals and different media (e.g., fish, water, sediment) compared to their corresponding RfDs (i.e., HI is the sum of HQs for an individual). The key concept of a non-cancer HI is that a threshold level (measured as an HI of 1) exists below which non-cancer health effects are not expected to occur. Under the federal Superfund program, EPA's goal for protection for non-cancer health hazards is an HI equal or less than 1 for the RME individual.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD}$$

where: CDI = Chronic daily intake (mg/kg-day)
RfD = Reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic).

At this Site, all non-cancer RME hazard indices from the consumption of PCBs in fish are above EPA's generally acceptable levels, as shown below (see also Table 6). Risk to children is

particularly elevated. Tables 7 and 8 below summarize key non-cancer risks from Tables 5-84, 5-85, from the Human Health Risk Assessment for the Site. In addition, non-cancer hazard indices to the average (CT) individual are above EPA's generally acceptable levels. Non-cancer hazard indices for dioxin-like PCBs were not evaluated quantitatively due to EPA's ongoing evaluation of dioxin toxicity.

Table 7 Non-Cancer Health Hazard from Fish Ingestion – Summary for OU 1

Pathway	RME Non-Cancer HI	CT (Average) Non-Cancer HI
Recreational Angler		
All Fish	20	5
Walleye	5.5	1.4
High Intake (i.e., subsistence) Angler		
All Fish	27	7
Walleye	8	2
High Intake Recreational Child		
All Fish	47	12
Walleye	13	3
High Intake Subsistence Child		
All Fish	65	17
Walleye	19	5

Table 8 Non-Cancer Health Hazard from Fish Ingestion – Summary for OU 2

Pathway	RME Non-Cancer HI	CT (Average) Non-Cancer HI
Recreational Angler	84	21
High Intake (i.e., subsistence) Angler	115	30

8.2.8 Probabilistic Analysis

In addition to the deterministic calculations discussed above, EPA calculated risks for ingestion of fish in the Fox River and Green Bay using a probabilistic analysis, consistent with EPA guidance on probabilistic risk assessments (EPA, 1999). This analysis supports and complements the point estimates of risks and hazard indices calculated in evaluations of exposure to PCBs in fish.

Deterministic RME estimates of risk and hazard index provided in the probabilistic evaluation are generally consistent within the 90th to 95th percentiles of the respective probability distributions of risk and hazard indices. This is consistent with the interpretation provided by EPA (EPA, 1999) of the RME as a plausible high-end risk or hazard index for the exposed population.

Deterministic CTE estimates of risk and hazard index are generally close to the means of probability distributions of risk and hazard index. This is consistent with the interpretation of the CTE as the average risk or hazard index for the exposed population.

8.2.9 Uncertainty

The process of evaluating human health cancer risks and non-cancer hazard indices involves multiple steps. Inherent in each step of the process are uncertainties that ultimately affect the final cancer risks and non-cancer hazard indices. Important sources of uncertainty in the HHRA are discussed below:

The use of a bioaccumulation model to generate future concentrations of PCBs in fish if no action occurs were used in the HHRA calculations. WDNR minimized this uncertainty to the extent possible by developing a bioaccumulation model specifically for the Fox River Fox River and Green Bay (i.e., "FRFOOD" and "GBFOOD", respectively), calibrating the model to the extensive database for the Fox River and Green Bay. Additionally the model was revised based on a peer review sponsored by the Fox River Group. Based on the model calibration (i.e., the ability of the fish bioaccumulation model to capture the historical observed lipid-normalized PCB measurements in fish), and the feedback received from the peer review, the model uncertainty is not sufficient to change the overall conclusion of the HHRA that cancer risks and non-cancer hazard indices due to ingestion of fish are above acceptable levels.

Time Trends
Although concentrations in fish may be decreasing over time for some fish species in OU 1 and OU 2 these trends were not consistent with all species. In addition, trends in the surficial sediment layer are not consistent and concentrations in deeper sediments are not decreasing. Additionally, events that may scour sediments may cause declining trends currently observed to either slow or reverse.

Fish Ingestion Rate
This uncertainty in the fish ingestion rate was minimized by relying on a number of surveys. These included Michigan angler surveys for recreational anglers by West *et al.*, 1989 and 1993, and a Wisconsin angler survey by Fiore, 1989. For high intake fish consumers, surveys by West *et al.*, 1993, Peterson, 1994 and Hutchison and Kraft, 1994, Hutchison, 1994, and Hutchison, 1999 were also considered. In addition, the sensitivity/uncertainty analysis conducted for the probabilistic analysis showed that, despite the use of different fish, the overall conclusion of the HHRA -- that cancer risks and non-cancer hazard indices due to ingestion of fish are above levels of concern, essentially remains the same.

PCB Toxicity
EPA describes the uncertainty in the cancer toxicity values as extending in both directions (i.e., contributing to possible underestimation or overestimation of cancer slope factors (CSF)). However, the CSFs were developed to represent plausible upper bound estimates, which means that EPA is reasonably confident that the actual cancer risk will not exceed the estimated risk calculated using the CSF. The CSFs used in the HHRA were externally peer reviewed and supported by the panel of expert scientists and are the most current values recommended by EPA in IRIS. Non-cancer toxicity values also have uncertainty. The current oral RfDs for Aroclor 1016 and 1254, which were used in the HHRA, have uncertainty factors of 100 and 300, respectively in order to provide for protection of public health. The RfD for Aroclor 1016 was externally peer-reviewed and supported by the panel of scientists. The RfD for Aroclor 1254 was developed using the same methodology as Aroclor 1016 and was internally peer-reviewed. Since these RfDs were developed, a number of recent national and international studies have reported possible associations between developmental and neurotoxic effects in children from prenatal or postnatal exposures to PCBs. In light of these new studies, the current RfDs are currently being evaluated as part of the IRIS process. It would be inappropriate to prejudge the results of the IRIS evaluation at this time.

PCB Body Burden
The fact that any previous exposures (either background or past consumption of PCB-contaminated fish) may still be reflected in an individual's body burden today is an additional source of uncertainty and may result in an underestimate of non-cancer hazard indices and cancer risks.

PCB Bioaccumulation Modeling
The use of a bioaccumulation model to generate estimations of future concentrations of PCBs in fish if no action occurs were used in the HHRA calculations. WDNR minimized this uncertainty to the extent possible by developing a bioaccumulation model specifically for the Fox River and Green Bay (i.e., FRFOOD and GBFOOD, respectively), calibrating the model to the extensive database for the Fox River and Green Bay. Additionally the model was revised based on a peer review sponsored by the Fox River Group. Based on the model calibration (i.e., the ability of the fish bioaccumulation model to capture the historical observed lipid-normalized PCB measurements in fish), and the feedback received from the peer review, the model uncertainty is not sufficient to change the overall conclusion of the HHRA that cancer risks and non-cancer hazard indices due to ingestion of fish are above acceptable levels.

8.3 Ecological Risk Assessment

The Lower Fox River and Green Bay provide habitat function for a variety of invertebrates, fish, birds, and mammals that inhabit or use this watershed for foraging, reproducing, rearing young and other life cycle requirements. The Lower Fox River basin and Green Bay varies considerably in its potential to provide and support different kinds of wildlife habitat and this variability affects the wildlife diversity and populations. The BLRA focuses primarily on aquatic, or aquatic-dependent species. Aquatic habitats within the area are wetland (e.g., Lower Fox River and Southern Green Bay), and riverine (e.g., Lower Fox River).

The significant groups of wildlife found within these habitats include the following:

- Both pelagic and benthic aquatic invertebrate species form the primary prey in the food webs of the River and Bay. Species of oligochaetes and chironomids (e.g., worms and midges) are typically most abundant and are found throughout the Lower Fox River and Green Bay. Amphipods, crayfish, snails, and mussels are also present in the River and Bay. Zebra mussels, an exotic species, are present throughout Green Bay and the River.
- Fish of the region include salmon/trout; game fish, including walleye, yellow perch, and northern pike; and pelagic and benthic non-game fish. A discussion of the significant fish species within the study area is presented later in this section.
- Birds of the region include raptors, gulls/terns, diving birds, migratory waterfowl, passerines, shorebirds, and wading birds. A listing of the significant bird species within the study area is presented later in this section. These animals are found nesting, feeding, and living in both terrestrial and aquatic habitat environments.
- Mammals of the region include large and small game animals that generally live in open or wooded habitat, as well as fur-bearing animals that may forage or live within or near aquatic environments. The small and large game animals include rabbits, squirrels, and deer. The fur-bearing animals include beaver, red fox, mink, raccoon, muskrat, and otter. Additionally, bats feed on insects in the vicinity of Lake Winnebago and near the communities along the Fox River. Few of the mammals will be discussed in detail within this document. Mink are the principal species discussed in the BLRA.

- Reptiles and amphibians, including snakes, turtles, frogs, and toads are present in the region (Exponent, 1998). Typically, the frogs and turtles confine themselves to the wetland and near shore areas while several snake species and toads are found in association with both terrestrial and aquatic habitats. Frogs and toads that dwell in wetlands or near shore areas are fed upon by wading birds of the region.

Through the mid-1970s the population levels of fish species, such as walleye and perch, were low within the Lower Fox River and southern Green Bay ecosystems. Contaminants, along with low dissolved oxygen (DO) conditions brought about by uncontrolled and untreated wastewater dumped into the River, were believed to be a contributing factor causing low population levels. Principal species found within the system were those that could tolerate these conditions, especially bullhead and carp.

With the institution of water quality controls in the mid-1970s, contaminants and DO conditions improved. The WDNR undertook a program to reintroduce walleye into the River and Bay through a stocking program beginning in 1973. That program was very successful; self-sustaining populations of walleye now exist within the River and Bay. Recent electro-fishing catch data for walleye from De Pere dam to the mouth of the Lower Fox River are shown on Figure 2-15 of the BLRA.

In addition to walleye, a number of other species were reestablished in the Lower Fox River and Green Bay, including white and yellow perch, alewife, shad, bass, and other species. Historical anecdotal data from the Oneida tribe and more recent creel survey data from the WDNR indicate that Duck Creek and Suamico tributaries to southern Green Bay were used by numerous fish species (Nelson, 1998).

The WDNR has completed extensive fish surveys in the Lower Fox River and inner Green Bay. However, due to the numerous factors that may effect fish populations, simply reviewing and comparing the population survey results from various years is not valid. Year-to-year fish populations do not necessarily indicate whether conditions within the River/Bay are degraded or improving because other environmental, physical, or biological factors may be impacting select fish species at any given time. Selected fish surveys for the Lower Fox River have been reviewed to provide data on the types of fish present within the system at given points in time. However, no in-depth analysis of whether these population surveys indicate declining or improving conditions is included. No Green Bay fish surveys are included in this discussion. Rather, the personal observations from WDNR and MDNR personnel familiar with both the commercial and sport fisheries of Green Bay are used.

8.3.1 Screening Ecological Risk Assessment

The Screening Ecological Risk Assessment (SERA) for the Lower Fox River and Green Bay focused on the potential for ecological risks associated with chemicals in sediments, surface waters, and biota. The SERA was conducted using conservative exposure and effects scenarios in an effort to identify which of the over 300 contaminants previously identified potentially posed risks to ecological receptors. Data from 16 separate comprehensive studies conducted on the Fox River and Green Bay by state, federal, university, and private parties were used to assess risk. The objective of the screening was to identify a smaller list of contaminants that would be carried through to the baseline risk assessment.

As defined in the Superfund Risk Assessment Guidance (EPA, 1997a), following the completion of the SERA, a Scientific Management Decision Point (SMDP) was necessary to review the results of the SERA. The technical team of risk managers and risk assessors, collectively

referred to as the Biological Technical Assistance Group (BTAG), were assembled during the SERA process to specifically address SMDPs and provide technical review.

The SMDP was formalized in a memo from WDNR dated August 3, 1998 (Appendix A - RA). The memo identified and justified which chemicals should be carried forward into the RA, based on the potential for either human health or ecological risk. Of the 75 chemicals that were above screening level risk criteria, only those with the most potential for adverse risk were carried forward as BLRA contaminants of potential concern (COPCs).

The retained COPCs include: PCBs (expressed as total and PCB coplanar congeners), dioxin and furan congeners, DDT and its metabolites DDE, and DDD, dieldrin, arsenic, lead, and mercury. Sediment HQs were greatest for PCBs based on both human heath and ecological risk-based screening levels.

8.3.2 Baseline Ecological Risk Assessment

The overall ecological goals of the Baseline Risk Assessment (BLRA) for the Lower Fox River and Green Bay were to:

- Examine how the contaminants of potential concern (COPCs) carried forward from the Screening Level Risk Assessment (SLRA) (RETEC, 1998b) move from the sediment and water into ecological receptors within the Lower Fox River and Green Bay.
- Quantify the current (or baseline) ecological risk associated with the COPCs.
- Distinguish those COPCs, which pose the greatest potential for risk to the environment and should be carried forward as contaminants of concern (COCs) in the FS.
- Determine which exposure pathways lead to the greatest risks.
- Support the selection of a remedy, which eliminates, reduces, and/or controls identified risks by calculating sediment quality thresholds (SQTs).

Consistent with Superfund policy and guidance, the BLRA is a baseline risk assessment and, therefore, assumes no actions (remediation) to control or mitigate hazardous substance releases. The following discussion summarizes the BLRA with respect to the four basic steps of the Superfund Ecological Risk Assessment process: 1) Problem Formulation, 2) Exposure Assessment, 3) Effects Assessment, and 4) Risk Characterization.

Problem Formulation

Chemicals of Concern

PCBs were carried forward in the BLRA as the primary COPC because SLRA-calculated sediment hazard quotients (HQs) ranged from 1,514 to 5,872, generally several orders of magnitude greater than HQs for other COPCs. Although 2,3,7,8-TCDD is the most toxic dioxin congener, all structurally related dioxin and furan congeners were evaluated for toxicity based on the toxicity equivalency method, further described in Section 6.3.2 of the BLRA. The dioxin and furan congeners that will be evaluated are those that have been measured in Site media and those that have toxic equivalency factors (TEFs). The only PCB congeners that were evaluated for dioxin-like toxicity are those that most structurally resemble dioxin and have the greatest potential for bioaccumulation: congeners 77, 81, 105, 118, 126, and 169, as further discussed in Section 6.3.3 of the BLRA.

The electronic Fox River Database (FRDB) currently contains more than 500,000 records representing contaminant data from sediment, water, and tissue data. Total PCBs are the most frequently found analyte in the database. 1989 was used as a cut-off date for inclusion of data for the evaluation of risk for several reasons: 1) the contribution of these data towards assessing risk was considered to be less advantageous than the greater accuracy obtained by evaluating risk based on more current data; 2) no data collected prior to 1989 were validated, and 3) although data collected in 1989 were not validated, the total number of samples collected in this year is more than 30 percent of all samples collected.

Complete Exposure Pathways

Currently, the principal source for COPCs is the contaminated sediment deposits found throughout the system. The principal transport mechanism is sediment resuspension, with transport occurring by downstream currents in the Lower Fox River, and by discrete resuspension transport and deposition events within Green Bay (WDNR, 1998b, 1998c). The fate of these contaminants, following their release into the water column, depends on the chemical properties of the contaminant, abiotic factors within the receiving environment (e.g., organic carbon in sediments, pH, surface water hardness), and interaction with the biotic environment. This interaction can result in degradation, transformation, or bioconcentration of the contaminant. The fate of a contaminant is not fixed, and the degree of contaminant exchange between surface water, sediment, sediment pore water, and biota varies.

Aquatic organisms can be exposed to COPCs through the water column, through ingesting sediments, and through consumption of contaminated prey. Water column organisms are exposed to dissolved and particulate-based COPCs through respiration, ingestion and direct contact. Benthic invertebrates are exposed through direct contact and ingestion of contaminated sediments. Benthic fish, carnivorous birds and carnivorous mammals can incidentally ingest sediments during feeding on prey species. All of the COPCs have the potential to biomagnify up the food chain except for lead and arsenic, which can bioconcentrate. Therefore, benthic invertebrates, fish, birds and mammals are all exposed to COPCs by consuming contaminated food.

PCBs in the environment are stable and persistent; cycling rather than degradation represents the predominant fate. PCBs are highly lipophilic and, therefore, more readily bind to sediments or accumulate in tissues rather than remain in the water column. Aquatic organisms can be exposed to PCBs through the water column, through ingesting sediments, and through consuming prey. For invertebrates, both aquatic and benthic, exposure to PCBs through contact with the water column or pore water contributes significantly to the total body burden of total PCBs. For most species, however, particularly those at high trophic levels, prey consumption is likely the primary route of exposure. Biological uptake of PCBs by aquatic organisms appears to be species-specific. Rates of accumulation vary depending on species, age, sex, and size. Generally, when equally exposed, fish accumulate two to three times more PCBs than aquatic invertebrates.

Bioaccumulation of non-polar organic compounds occurs as a result of uptake by a receptor, followed by partitioning of the compounds into the receptor's organic carbon compartment-the lipids. Once chemicals are accumulated within an organism's lipid fraction, biomagnification may occur when organisms at lower trophic levels are preyed upon by receptors higher in the food chain. The net result is an aggregate increase in tissue body burdens of the chemicals at higher trophic levels.

Animals and plants living in or near the River, such as invertebrates, fish, amphibians, and water-dependent reptiles, birds, and mammals, are or can be exposed to PCBs directly and/or indirectly through the food chain. Ecological exposure to PCBs is primarily an issue of bioaccumulation through the food chain rather than direct toxicity, because PCBs bioaccumulate

in the environment by bioconcentrating (i.e., being absorbed from water and accumulated in tissue to levels greater than those found in surrounding water) and biomagnifying (i.e., increasing in tissue concentrations as they go up the food chain through two or more trophic levels). As a result, the ecological risk assessment emphasizes indirect exposure at various levels of the food chain to address PCB-related risks at higher trophic levels. The ecological conceptual model is provided in Figure 3.

Assessment Endpoints

Appropriate selection and definition of assessment endpoints, which focus the risk assessment design and analysis, are critical to the utility of risk assessment. It is not practical, nor possible, to directly evaluate risks to all of the individual components of the ecosystem at the Site. Assessment endpoints were selected for the risk assessment based on particular components of the ecosystem that could be adversely affected by the contaminants present. Eight assessment endpoints were developed to evaluate the risk of contaminants in the Lower Fox River and Green Bay. They include the functioning of water column and benthic invertebrate populations, benthic and pelagic fish survival and reproduction, insectivorous, piscivorous, and carnivorous bird survival and reproduction, and piscivorous mammal survival and reproduction. By evaluating and protecting these assessment endpoints, it is assumed that this ecosystem as a whole would also be protected.

Conceptual Model

The biological conceptual model identifies where contaminant interactions with biota can occur, describes the uptake of Site contaminants into the biological system (in this case, the water and sediments of the Lower Fox River and Green Bay), and diagrams key receptor contaminant exposure pathways. Due to the large area being assessed for risk, more than one conceptual model was necessary. The Lower Fox River, from the mouth of Lake Winnebago to the De Pere dam, was evaluated using the same conceptual model (Figure 3).

Measurement Endpoints

Risk questions are assessed using measurement endpoints. Types of measurement endpoints used in the risk assessment process fall generally into four categories: 1) comparison of estimated or measured exposure levels of COPCs to levels known to cause adverse effects, 2) bioassay testing of site and reference media, 3) in-situ toxicity testing of Site and reference media, and 4) comparison of observed effects on-site with those observed at a reference site. Measurement endpoints selected for assessment endpoint evaluation in this risk assessment consistently fell in to the first category of measurement endpoints and are presented in Table 6-2 from BLRA. Only existing data were evaluated as part of this assessment. As such, the measurement endpoints were fashioned around the existing data. Where the data did not already exist to fulfill the measurement endpoint, it was modeled based on the existing data.

Exposure Assessment

The exposure assessment includes a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure parameters; and measurement or estimation of exposure point concentrations. Complete exposure pathways and exposure parameters (e.g., body weight, prey ingestion rate, home range) used to calculate the concentrations or dietary doses to which the receptors of concern may be exposed were obtained from EPA references, the scientific literature and directly from researchers. In the FRDB, data were generally lacking for piscivorous and carnivorous birds, and no data were available for piscivorous mammals, therefore, ecological modeling was used to estimate COPC exposure to these receptors.

Description of Groups of Key Species

Invertebrate communities constitute a vast portion of the basis of the food chain in aquatic ecosystems. Since invertebrates process organic material and are prey items for other invertebrates, fish, and birds, they are important in nutrient and energy transfer in an aquatic ecosystem. Alterations in invertebrate functions may consequently affect nutrient and energy transfer, and bird and fish populations. Also, COPCs in invertebrates may be passed along through the food chain. Therefore, upper trophic levels can be affected not only by reduced prey abundance, but also by trophic transfer of accumulated contaminants in invertebrate prey. Examples of important benthic invertebrates in the Lower Fox River system include chironomids (e.g., midges) and oligochaetes (e.g., segmented worms).

Fish have many roles in the aquatic ecosystem, including the transfer of nutrients and energy, and are prey for mammals, birds, and predatory fish. In fact, several predators rely solely, or primarily, on fish for survival. Fish typically constitute a large proportion of the biomass in aquatic systems. Additionally, fish have social and economic value; impaired fish communities would adversely affect commercial and recreational fishing. Benthic fish are those fish that live in contact with and forage for food directly in the sediments. As such, they represent a unique exposure pathway because of their foraging behavior (i.e., high exposure to sediments) and prey items (i.e., predominately benthic invertebrates). Examples of benthic fish in the Lower Fox River include carp, catfish, and bullhead. Pelagial fish are those species that live and feed principally in the water column (as opposed to being in direct contact with sediment). Pelagial fish represent many trophic levels with prey items predominately in the water column (e.g., zooplankton and other fish). Examples of important pelagial fish in the Lower Fox River include shiners, shad, alewife, perch, and walleye. Pelagial fish important to Green Bay include the same species as are found in the River, in addition to lake trout and other salmonids in the upper Bay.

Bird populations, in general, present one of the most significant biological components of the River/Bay system and occupy several trophic levels. Given the potential for some contaminants to biomagnify, birds, as upper trophic level receptors, may concentrate, and be affected by, contaminants in their tissues to a greater degree than lower trophic level species. In addition to their ecological importance, birds are socially valued because of recreational activities and aquatic aesthetics. Insectivorous birds rely predominately on insects (e.g., benthic invertebrates) for food. Examples of insectivorous birds in the Lower Fox River and Green Bay region include swallows and blackbirds. Piscivorous birds rely primarily on fish for food. Of the bird populations present at the Site, piscivorous birds represent a high trophic level and, therefore, are more at risk than insectivores from contaminants transferred through the food chain. Examples of piscivorous birds on the Lower Fox River and Green Bay include cormorants and terns. Carnivorous birds were selected for evaluation because of their diverse forage, which can include consumption of fish, piscivorous birds, or even small mammals. Examples of carnivorous birds on the Lower Fox River and Green Bay include eagles, osprey, and other raptors.

Piscivorous mammals represent the upper trophic level of the riverine corridor ecosystem and, therefore, are potentially highly exposed to contaminants that bioaccumulate or biomagnify. Piscivorous mammals rely primarily on fish as food, but may also consume amphibians, invertebrates, crayfish, clams, and mussels. The foraging behavior of these mammals represents a pathway through which energy is transferred from the aquatic to terrestrial ecosystem. Mink are piscivorous mammals found in the Lower Fox River and Green Bay area.

A number of different animals have been or are currently on the Wisconsin, Michigan, or Federal Endangered and Threatened Species lists. Listed animals which have historically been found in the vicinity of the Lower Fox River or Green Bay include: osprey, common tern, Forsters tern, Caspian tern, and great egret (Matteson *et al.*, 1998). The osprey, common tern,

and Forsters tern have nested along the Lower Fox River as well as at upstream locations in Lake Winnebago, Little Lake Butte des Morts, and Lake Poygan. Osprey have been sighted near Kaukauna and have attempted to nest in the vicinity of Combined locks, while terns have been observed farther upstream. Additionally, Caspian tern and great egret have nested on some of the islands located in Green Bay. Very few nesting pairs have been observed over the past few years and recovery of these populations is slow (Matteson *et al.*, 1998).

In addition to these birds, the WDNR reported a bed of clams or mussels, which may be threatened. The sediment bed, which these clams/mussels inhabit, is approximately 6 meters (20 feet) wide and 30.5 meters (100 feet) long and is located near the mouth of Mud Creek in the Lower Fox River (Szymanski, 1998, 2000).

As mentioned above, populations of both eagles and the double crested cormorants have recovered to the point where both birds have been removed from the Wisconsin endangered species list. Other populations, specifically, wild mink and otter, have been found to be declining around the Lower Fox River and Green Bay, yet they are not currently listed by state or federal agencies. The endangered and threatened fish and birds of the region were listed on Tables 2-11 and 2-12 of the BLRA. The endangered and threatened mammals of the region are listed in Table 2-14 of the BLRA.

Derivation of Exposure Point Concentrations

All COPCs

Tables 9 through 13 show the exposure point concentrations for chemicals where risk was indicated. For calculation of exposure values, one-half of the sample quantitation limit was used for undetected values (EPA, 1991b). The 95 percent UCL of the mean is the value that a mean, calculated repeatedly from subsamples of the data population, will not exceed 95 percent of the time. Therefore, there is a 95 percent probability that the true mean of the population does not exceed the 95 percent UCL. The 95 percent UCL was calculated from the sample values depending on whether the data were normally, log-normally, or not normally distributed. When the data distribution fit neither a normal nor log-normal distribution pattern, the 95 percent UCL selected was the greater of the two calculated 95 percent UCLs (normal and log-normal). In cases where data was limited, or where the variability in the data was high, the calculated 95 percent UCL can exceed the maximum detected concentration. The RME is defined as the lesser of the calculated 95 percent UCL, or the maximum detected value.

As an estimate of risk, both the arithmetic mean concentration and the RME concentration are used as exposure point concentrations. The RME is an estimate of the highest average exposure expected to occur at a Site. The intent of the RME is to provide an estimate of exposure that is above average, yet still within the range of most exposures. The RME thus provides a degree of protectiveness that encompasses the individual receptors that have a higher likelihood of exposure.

Table 9 Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Water Column Invertebrates

Scenario Time Frame:	**Current**
Medium:	**Water**
Exposure Medium:	**Surface water**

Exposure Point	Chemical of Concern	Concentration Detected (ng/l)		Frequency of Detection	Exposure Point Concentration (ng/l)	Statistical Measure
		Min.	Max.			
Surface Water (OU 1)	Mercury (unfiltered)	0.2	7140	5/6	7140	max
					2237	mean
	Total PCBs (filtered)	1.4	19	40/46	15.3	95% UCL
					11.1	mean
	Total PCBs (unfiltered)	na	na	0/6		
	Total PCBs (particulates)	0.1	40.2	34/41	40.2	max
Surface water (OU 2)	Total PCBs (particulate)	0.01	52.2	82/86	52.2	max
					11.9	mean
					16.6	mean

na = not applicable

Table 10 Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Benthic Invertebrates

Scenario Time Frame:	Current					
Medium:	Sediment					
Exposure Medium:	Sediment					
Exposure Point	Chemical of Concern	Concentration Detected		Frequency of Detection	Exposure Point Concentration	Statistical Measure
		Min	Max			
Sediments (OU 1)	Lead (mg/kg)	3.8	522	27/27	172	mean
					522	max
	Mercury (mg/kg)	0.2	3.3	71/86	1.4	95 %UCL
					1	mean
	2,3,7,8-TCDD (µg/kg)	1.80e-03	5.40e-03	4/5	4.30e-03	95% UCL
					2.50e-03	mean
	Total PCBs (µg/kg)	25	130,000		22,848	95% UCL
					10,724	mean
	DDD (µg/kg)	4.7	19	4/23	19	max
					17.8	mean
	DDT (µg/kg)	13	50	2/20	50	max
Sediments (OU 2)	Lead (mg/kg)	44	130	10/10	88.9	95% UCL
					75.6	mean
	Mercury (mg/kg)	0.2	2.1	10/10	1.7	95% UCL
					0.8	mean
	Total PCBs (µg/kg)	3.50e+01	7.42e+04	122/131	1.53e+04	95% UCL
					6.75e+03	mean

Table 11 Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Fish

Scenario Time Frame:	Current
Medium:	Fish
Exposure Medium:	Fish

Exposure Point	Chemical of Concern	Concentration Detected		Frequency of Detection	Exposure Point Concentration	Statistical Measure
		Min	Max			
OU 1						
whole fish tissue (carp)	PCBs (µg/kg)	245	11,400	30/30	2957	95% UCL
					1992	mean
whole fish tissue (gizzard shad)	PCBs (µg/kg)	54	530	4/4	530	max
					296	mean
whole fish tissue (golden shiner)	PCBs (µg/kg)	845	1140	2/2	1140	max
					993	mean
whole fish tissue (yellow perch)	PCBs (µg/kg)	363	na	1/1	363	max
whole fish tissue (walleye)	PCBs (µg/kg)	98.9	3800	11/13	3800	max
					1159	mean
OU 2						
whole fish tissue (carp)	PCBs (µg/kg)	160	6600	12/12	3606	95% UCL
					2581	mean
whole fish tissue (yellow perch)	PCBs (µg/kg)	425	1298	4/4	1219	95% UCL
					779	mean
whole fish tissue (walleye)	PCBs (µg/kg)	1431	3900	4/4	3900	max
					2737	mean

na = not applicable

Table 12 Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Birds

Scenario Time Frame:	**Current**
Medium:	**Prey Items**
Exposure Medium:	**Prey Items**

Exposure Point	Chemical of Concern	Concentration Detected		Frequency of Detection	Exposure Point Concentration	Statistical Measure
		Min	Max			
OU 1						
Tree swallow egg	PCBs (µg/kg)	1790	4030	5/5	3732	95% UCL
					2924	mean
Tree swallow whole body	PCBs (µg/kg)	79	7400	24/24	5254	95% UCL
					2135	mean
Common tern ingestion	mercury (µg/kg)	na	na	na	1.5	mean
					1.6	RME
	mercury (µg/kg -BW/day)	na	na	na	12.5	mean
					13.1	RME
	total PCBs (µg/day)	na	na	na	17.4	mean
					31.2	RME
	total PCBs (µg/kg-BW/day)	na	na	na	145	mean
					260	RME
Forster's tern ingestion	mercury (µg/kg)	na	na	na	1.8	mean
					1.9	RME
	mercury (µg/kg-BW/day)	na	na	na	11.5	mean
					12.1	RME
	total PCBs (µg/kg)	na	na	na	21.2	mean
					37.9	RME
	total PCBs (µg/kg-BW/day)	na	na	na	134	mean
					240	RME
Double Crested Cormorant ingestion	mercury (µg/kg)	na	na	na	8.1	mean
					8.6	RME

Table 12 Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Birds

Scenario Time Frame:	Current
Medium:	Prey Items
Exposure Medium:	Prey Items

Exposure Point	Chemical of Concern	Concentration Detected		Frequency of Detection	Exposure Point Concentration	Statistical Measure
		Min	Max			
	mercury (µg/kg-BW/day)	na	na	na	4.8	mean
					5.1	RME
	total PCBs (µg/kg)	na	na	na	94.1	mean
					168	RME
	total PCBs (µg/kg-BW)	na	na	na	56	mean
					100	RME
bald eagle	total PCBs (µg/kg)	na	na	na	963	mean
					1647	RME
	total PCBs (µg/kg-BW)	na	na	na	207	mean
					354	RME
OU 2						
common tern ingestion	mercury (µg/kg)	na	na	na	1.5	mean
					1.5	RME
	mercury (µg/kg-BW/day)	na	na	na	12.3	mean
					12.3	RME
	total PCBs (µg/kg)	na	na	na	45.8	mean
					71.6	RME
	total PCBs (µg/kg-BW/day)	na	na	na	382	mean
					597	RME
Forster's tern ingestion	mercury (µg/kg)	na	na	na	1.8	mean
					1.8	RME
	mercury (µg/kg-BW/day)	na	na	na	11.3	mean
					11.3	RME
	total PCBs (µg/kg)	na	na	na	55.6	mean
					87	RME

Table 12 Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Birds

Scenario Time Frame:	**Current**					
Medium:	**Prey Items**					
Exposure Medium:	**Prey Items**					
Exposure Point	**Chemical of Concern**	**Concentration Detected**		**Frequency of Detection**	**Exposure Point Concentration**	**Statistical Measure**
		Min	**Max**			
	total PCBs (µg/kg-BW/day)	na	na	na	352	mean
					551	RME
double crested cormorant	mercury (µg/kg)	na	na	na	8	mean
					8	RME
	mercury (µg/kg-BW/day)	na	na	na	4.7	mean
					4.7	RME
	total PCBs (µg/kg)	na	na	na	249	mean
					388	RME
	total PCBs (µg/kg-BW/day)	na	na	na	148	mean
					231	RME
bald eagle ingestion	mercury (µg/kg)	na	na	na	40	mean
					67.4	RME
	mercury (µg/kg-BW/day)	na	na	na	8.6	mean
					14.5	RME
	total PCBs (µg/kg)	na	na	na	1376	mean
					1930	RME
	total PCBs (µg/kg-BW/day)	na	na	na	296	mean
					415	RME
bald eagle egg	total PCBs (µg/kg)	na	36000	1/1	36000	max

na = not applicable

RME = reasonable maximum exposure

BW = body weight

Table 13 Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations for Mammals

Scenario Time Frame:	**Current**
Medium:	**Prey items**
Exposure Medium:	**Prey items**

Exposure Point	Chemical of Concern	Concentration Detected		Frequency of Detection	Exposure Point Concentration	Statistical Measure
		Min	Max			
Mammal ingestion (OU 1)	total PCBs (µg/day)	na	na	na	348	mean
					544	RME
	total PCBs (µg/kg-BW/day)	na	na	na	435	mean
					680	RME
Mammal ingestion (OU 2)	total PCBs (µg/day)	na	na	na	422	mean
					613	RME
	total PCBs (µg/kg-BW/day)	na	na	na	527	mean
					766	RME

na = not applicable

RME = reasonable maximum exposure

BW = body weight

PCB-Specific Exposure Point Concentrations

Water
Filtered and particulate concentrations of PCBs were detected in all River reaches and Green Bay zones and these concentrations were summed to estimated total water concentrations of total PCBs. Estimated mean, 95 percent UCL, and maximum total PCB concentrations in water are presented on Figure 6-6 of the BLRA. Estimated mean total PCB concentrations were greatest in Green Bay Zone 1 (60.9 µg/L) and represented an increase of 2.2 times over the estimated mean total PCB concentrations in Little Lake Butte des Morts (27.6 µg/L).

Sediment
Total PCBs were detected frequently in all River reaches and Green Bay zones. Measured concentrations are reported in three different ways: non-interpolated, interpolated (I_0), and interpolated (I_d) for all of the River reaches, but, as discussed in Section 6.4.1 of the BLRA, I_0 concentrations are not presented for zones 2, 3A, 3B, or 4 of Green Bay. In contrast to metals, PCB concentrations generally decreased moving down the River and into the Bay. The mean total PCB concentration ranged from 82.9 µg/kg (Green Bay Zone 4) to 10,724 µg/kg (Little Lake Butte des Morts). Mean, 95 percent UCL, and maximum concentrations of PCBs are presented on Figure 6-8 of the BLRA.

Fish
Total PCBs were detected frequently in all River reaches and Green Bay zones. The range of detection frequency was 85 to 100 percent. The mean total PCB concentration ranged from 79.8 µg/kg (yellow perch from Green Bay Zone 4) to 6,637 µg/kg (carp from Green Bay zones 1 and 2). Mean, 95 percent UCL, and maximum total PCB concentrations in yellow perch, carp, and walleye are presented on Figure 6-11 of the BLRA. Mean, 95 percent UCL, and maximum total PCB concentrations in forage fish species (gizzard shad, alewife, shiner species, and rainbow smelt) are presented on Figure 6-12 of the BLRA.

Birds
Where they were analyzed, total PCBs were detected at a frequency of 100 percent, except for Green Bay Zone 3B where they were detected at a frequency of 95 percent. The mean total PCB concentration ranged from 2,135 µg/kg (whole tree swallow from Little Lake Butte des Morts) to 11,026 µg/kg (whole double-crested cormorants from Green Bay Zone 2). Measured total PCB concentrations in birds are presented on Figure 6-15 of the BLRA. As indicated by this figure, the area where the most bird species were sampled was Green Bay Zone 2. This area also contained the highest concentrations of total PCBs, found in double-crested cormorants.

Mammals
LLBdM: The mean estimated exposure concentration for total PCBs (N), total PCBs (I_0), and total PCBs (I_d) were 435, 397, and 400 µg/kg-BW/day, respectively.
Appleton-LR: The mean estimated exposure concentration for total PCBs (N), total PCBs (I_0), and total PCBs (I_d) were 527, 494, and 501 µg/kg-BW/day, respectively.

Summary of Field Studies
Within the Lower Fox River and Green Bay system, there have been numerous field studies on a variety of different species. Many of the species studied were also evaluated in the BLRA as receptor species that represented the assessment endpoints in the BLRA. While not specifically included in the risk characterization, the studies are presented in BLRA Section 6.5.4 to provide the risk managers with an integrated tool for decision-making.

Effects Assessment

Toxic effects of all COPCs were evaluated in the BLERA. Section 6.3 of the BLRA provides details of the effects of all the COPCs on the assessment endpoints. The rest of the discussion below focuses on effects of PCBs only.

PCBs have been shown to cause lethal and sub-lethal reproductive, developmental, immunological and biochemical effects. The risk assessment limited its focus to adverse impacts on survival, growth and reproduction. The ecological effects assessment includes literature reviews, field studies and toxicity tests that correlate concentrations of PCBs to effects on ecological receptors. Toxic equivalency factors, based on the toxicity of dioxin, have been developed for the dioxin-like PCB congeners. The effects of PCBs on Great Lakes fish and wildlife have been extensively documented. PCB-induced reproductive impairment has been demonstrated for several fish species (Mac, 1988; Ankley *et al.*, 1991; Walker and Peterson, 1991; Walker *et al.*, 1991a, 1991b; Williams and Giesy, 1992), a number of insectivorous and piscivorous birds (Kubiak *et al.*, 1989; Gilbertson *et al.*, 1991; Tillitt *et al.*, 1992) and mink (Aulerich *et al.*, 1973, Aulerich and Ringer, 1977; Bleavins *et al.*, 1980; Wren, 1991; Giesy *et al.*, 1994c; Heaton *et al.*, 1995a, 1995b; Tillitt *et al.*, 1996).

Derivation of TRVs

In order to derive toxicity reference values (TRVs), a comprehensive literature search was performed for all COPCs. A variety of databases were searched for literature references containing toxicological information. Some of these literature sources included Biological Abstracts, Applied Ecology Abstracts, Chemical Abstract Services, Medline, Toxline, BIOSIS, ENVIROLINE, Current Contents, Integrated Risk Information System (IRIS), the Aquatic Information Retrieval Database (AQUIRE) maintained by the EPA, and the Environmental Residue Effects Database (ERED) maintained by the EPA and U.S. Army Corps of Engineers. The TRVs selected for this assessment were discussed with and agreed upon by BTAG members. Importantly, the consensus on the TRVs are for site-specific use only and are not intended to be used at other sites (Table 6-5 of the BLRA).

TRVs were used to estimate the potential for ecological risk at the Site. The selected TRVs were either Lowest Observed Adverse Effects Levels (LOAELs) and/or No Observed Adverse Effects Levels (NOAELs) from laboratory and/or field based studies reported in the scientific literature. LOAELs are the lowest values at which adverse effects have been observed, and NOAELs are the highest values at which adverse effects were not observed.

The PCB and dioxin-like PCB congener TRVs for fish, birds and mammals are based on effects on survival, growth, and reproduction of fish and wildlife species in the Fox River. Reproductive effects (e.g., egg maturation, egg hatchability and survival of juveniles) were generally the most sensitive endpoints for animals exposed to PCBs.

Risk Characterization

<u>Hazard Quotient Calculations</u>

Risk characterization for each assessment endpoint was based upon the calculated HQs and, as available, population or field study data. Hazard quotients calculated based on literature values, provide one line of evidence for characterizing ecological effects. Field studies were evaluated, where appropriate, as a supplement to the risk evaluation, particularly when the contamination has a historical basis (EPA, 1994b, 1997a).

While HQs and other lines of evidence (i.e., field studies and other data types) cannot be quantitatively combined, each can inform risk managers on the presence of risk and how these risks may be reduced. Therefore, this risk characterization process did not result in the distillation of a single conclusive statement regarding overall risk to each assessment endpoint. Consideration of the magnitude of uncertainty, discussed in Section 6.6 of the BLRA, is also a key component of the risk interpretation process.

For this risk assessment it was agreed by BTAG that degree of risk would be determined based on three categories: "no" risk was concluded when both the NOAEC and LOAEC HQs evaluated were less than 1.0, "potential" risk was concluded when the NOAEC HQ exceeded 1.0 but the LOAEC HQ was less than 1.0, and risk ("yes") was concluded when both the NOAEC and LOAEC HQs evaluated were greater than 1.0. When constituents were analyzed but not detected, it was concluded that no risk existed.

OU 1 - Little Lake Butte des Morts Summary. In summary, the results suggest that only measured or estimated concentrations of total PCBs are at sufficient levels to cause risk to benthic invertebrates, and piscivorous mammals. Potential risks from total PCBs are indicated for water column invertebrates, benthic and pelagic fish, and insectivorous, piscivorous, and carnivorous birds. Measured or estimated concentrations of mercury are found to be at sufficient concentrations to cause or potentially cause risk to water column and benthic invertebrates, and piscivorous birds. Concentrations of 2,3,7,8-TCDD, DDD, and DDT are only sufficient to be of risk to benthic invertebrates. Sediment concentrations of elevated PCBs are widespread and persistent throughout the reach. Concentrations of arsenic, dieldrin, and all o,p'- isomers of DDT and its metabolites are not found to pose risk to any assessment endpoint.

OU 2 - Appleton to Little Rapids Summary. In summary, the results taken in total suggest that measured or estimated concentrations of total PCBs are at sufficient levels to cause risk to benthic invertebrates, carnivorous birds, and piscivorous mammals. Potential risks are indicated for all other receptors except insectivorous birds, for which there are no data. Measured or estimated concentrations of mercury were found to be at sufficient concentrations to cause risk to benthic invertebrates, piscivorous birds, and carnivorous birds. Concentrations of lead are only of risk to benthic invertebrates. Concentrations of all chlorinated pesticides are not found to pose risk to any assessment endpoint. Surface sediment concentrations of elevated PCBs indicate reach-wide effects, but are likely limited to specific deposits.

Major Findings

A summary of the risk to each assessment endpoint in each reach and zone is presented in Table 6-134 of the BLRA. OU 1 and OU 2 are discussed below and summarized in Table 14. Risk assessment summaries will be provided for OU 3, OU 4 and OU 5 in subsequent RODs.

The principle findings of the ecological risk assessment are:

- Total PCBs cause, or potentially cause risk to all identified receptors. The exception is insectivorous birds where the weight of evidence suggests that these receptors are not at risk from PCB concentrations. Not all receptors at risk or potentially at risk from PCBs are at risk in all River reaches or Bay zones.
- Mercury poses a risk in all River reaches and zones, but not to all receptors. Mercury was not identified as a risk for benthic fish, insectivorous birds, or piscivorous mammals.
- DDT or its metabolites poses a risk to benthic invertebrates in OU 1 (i.e., Little Lake Butte des Morts Reach).

Table 14 Ecological Risk Summary

OU	Water Column Invertebrates		Benthic Invertebrates		Benthic Fish		Pelagic Fish		Insectivorous Bird		Piscivorous Bird		Carnivorous Bird		Piscivorous Mammal	
1	• ☼	Mercury PCBs	•	PCBs, lead, mercury, DDD,DDT, 2,3,7,8TCDD	☼	PCBs	☼	PCBs		PCBs	☼	mercury, PCBs		PCBs	•	PCBs
2	☼	PCBs	•	lead, mercury, PCBs	☼	PCBs	☼	PCBs		NA	☼	mercury, PCBs		PCBs, mercury	•	PCBs

Notes:

NA = no data available

Risk conclusions based on HQs

= No risk

• = Risk

☼ = Potential Risk

Risk Conclusions based on weight of evidence

= Site specific receptor data suggest that there is no risk

= Because of the Federal listing of the bald eagle as threatened, it is concluded that potential risk is actual risk

Uncertainty

The goal of this uncertainty analysis is to both qualitatively, and quantitatively to the degree possible, define the degree of confidence that exists with the estimations of effects from exposure to hazardous chemicals in toxic amounts. Bounding the certainty of risk estimates is a developing science. EPA's Superfund Ecological Risk Assessment Guidance (EPA, 1997a) and the Guidelines for Ecological Risk Assessment (EPA, 1998b) provide general instructions on what should be addressed in an uncertainty analysis.

Conceptual Site Model

Qualitatively, there is a high degree of certainty that factors (such as fate and distribution, downstream transport, biological uptake, effects on field populations, habitat and life histories of important fish, birds, and mammals within the River and Bay) are well understood and adequately characterized in the conceptual site model. There remains, however, some uncertainty as to whether the receptors identified within the conceptual site model adequately represent the ecosystem and other species potentially at risk within the Lower Fox River. The selection of the important receptor species was done in consultation with biologists both within the WDNR and the USFWS. In addition, input on the receptor species was given by biologists and resource managers within EPA, NOAA, and the Oneida and Menominee Nations through the USEPA Biological and Technical Assistance Group (BTAG) process. However, despite this, there remains a class of organisms and a threatened species that was not addressed in this BLRA. Reptile and amphibian species were not evaluated for risk because there are no data within the FRDB to evaluate this receptor group, and there are no uptake models to estimate risk for frogs or other amphibians. For the fish species sturgeon, listed as a threatened species in Michigan, but not in Wisconsin, there are also too few data points within the FRDB to evaluate potential risks.

Data

The FRDB represents numerous separate data collection efforts with over 500,000 discrete data records of air, water, sediments, and tissue, from throughout the Lower Fox River and Green Bay. A rigorous evaluation of the quality of the data was undertaken, and only data for which at least partial QA packages could be reviewed were placed into the FRDB. Of the studies between 1971 and 1991, only partial packages could be reviewed, and so those data were used

as supporting evidence within the BLRA. There have been several studies completed on the Fox River in the 1990s. All studies conducted after 1992 have fully validated data packages. Given the temporal and spatial density of the data within the Lower Fox River, there are good reasons to assume that the overall quality of the data is high, and thus the related degree of data uncertainty is low. There were no significant biases or gaps observed within the sediment, fish, or bird sample data.

Another data gap within the BLRA is that there are limited measurements of metals and the organochlorine pesticides in the surface water. However, this impacts only the ability to assess risks to pelagic invertebrate communities, and the remaining assessment endpoints could be addressed through the other media (e.g., bird tissues) for which data were judged adequate. Finally, there are relatively too few data on all PCB congeners for all media within the Lower Fox River and Green Bay to make conclusive assessments or predictions of risk. While the FRDB contains numerous congener-specific data points, until relatively recently all of the dioxin-like congeners have not been adequately assessed. For example, while PCB congener 169 has been detected in the fish and birds of the River and Bay, there have been too few measurements taken in sediments or water.

Temporal

A time trends analysis was undertaken to specifically address the question of losses or gains in PCB concentrations over time in sediments and fish. For sediments, a large fraction of analyses provided little useful information for projecting future trends because of the lack of statistical significance and the wide confidence limits observed. This is especially true for sediments below the top 4 inches; changes in the sediment PCB concentrations cannot be distinguished from zero-or no change. Generally over time, however, the surface sediment concentrations (i.e., top 10 cm) of PCBs have been steadily decreasing, but the rate of change in surface sediments is both reach- and deposit-specific. The change averages an annual decrease of 15 percent, but ranges from an increase of 17 percent to a decrease of 43 percent. Given these conditions, the sediment data used may over- or under-evaluate the risks dependent upon how much older data were used in the point estimates or interpolated bed maps.

Like sediment PCB concentrations, fish tissue PCB concentrations showed a significant but slow rate of change throughout the Lower Fox River and Green Bay. In all of the reaches of the River and in Zone 2, there were steep declines in fish tissue PCB concentrations from the 1970s, but with significant breakpoints in declines beginning around 1980. After the breakpoint, depending upon the fish species, the additional apparent declines were either not significantly different from zero, or were relatively low (i.e., 5 to 7 percent annually). In addition, there are some increases in fish tissue PCB concentrations. Walleye in Little Lake Butte des Morts show a non-significant increase of 22 percent per year since 1987. Likewise, gizzard shad in Zone 2 show a non-significant increase of 6 percent per year into 1999. These data, taken collectively, suggest that since the breakpoint for tissue declines occurred in the early 1980s and the changes in fish tissue concentrations were no greater than 4 to 7 percent annually, aggregating fish tissue from 1989 does not likely result in any significant biasing of the risk estimations. At worst, the tissue point estimates might overestimate risks by 50 percent (i.e., average of 5 percent per year over 10 years), but given that at least some fish tissue concentrations increased, it is reasonable to suggest that some risks were underestimated by at least an equivalent amount.

Spatial Variability

Uncertainty in the spatial variability refers principally to where sediment samples were collected from within the Lower Fox River and Green Bay. Within the River, most sampling efforts are concentrated in areas where there were thick sediment deposits (e.g., A, POG, N, GG/HH, and

the SMUs below De Pere). There were no systematic sampling efforts to define PCB concentrations throughout the River. Within the Bay, systematic grid sampling was employed, but the spatial uncertainty is higher because of the large distance between sampling points. Sediment concentrations used in the risk assessment were based on both non-interpolated and interpolated concentration estimation methods so that the differences in risk estimates could be compared. The calculations demonstrate that in general, using the interpolated sediment yields a lower estimation of sediment-based risk than use of the non-interpolated data.

Toxic Exposure

Point estimates of exposure concentrations were compared in the BLRA to point estimates of toxicity in the literature to yield the hazard quotients. While the rationale used to select the most representative value from the literature was presented in Section 6.3, there remain uncertainties associated with effects concentrations above or below the selected TRV, selection of TRVs from one species and applying to another, interpretation between NOAECs and LOAECs based on application of uncertainty factors, or application of different sets of toxicity equivalent factors from the literature. For PCBs, risk estimation uncertainty was reduced by determining risk potential on a total PCB basis and a PCB congener basis for receptors where both exposure and effects data were available (i.e., fish and birds).

Alternative Exposure Points

The principle exposure point concentration used for risk evaluation in the BLRA was the RME (i.e., the lower of either the 95 percent UCL or the maximum concentration) for all media and receptors evaluated. In order to determine the degree to which risk may have been under or overestimated, 90th percentile concentrations were estimated and evaluated for risk for two representative species; walleye and double crested cormorants.

For walleye, results of this comparison indicated that risk evaluation of the 90th percentile concentrations would result in only two changes to the risk conclusions. Hazard quotients for the total PCB NOAEL for walleye in Green Bay Zone 1 increase from 10 to 14 using the 90th percentile. The risk determination for walleye from total PCBs would change from "potential risk" to "likely risk" in Green Bay zones 1 and 2, and risk from mercury in Green Bay Zone 4 would change from "no risk" to "potential risk". The net conclusions of the ecological risk assessment for piscivorous fish would be negligibly affected by using the 90th percentile.

For double-crested cormorants, risk evaluation of the 90th percentile concentrations would result in only one change to the risk conclusions. Risk to double-crested cormorants from p,p'-DDE would change from "potential risk" to "likely risk" in Green Bay Zone 3B. Because of the limited 90th percentile data in fish appropriate as prey for double-crested cormorants, dietary concentrations could not be modeled. However, use of the 90th percentile would not appreciably affect the risk determinations for piscivorous birds.

Population Data

As noted previously, while population level endpoints can be an appropriate tool to assess risk, the population data discussed in the BLRA were not collected specifically for risk assessment. There is some uncertainty introduced given the potential for other confounding environmental factors that may affect the absence or abundance of receptors within the Lower Fox River and Green Bay. These can include such things as immigration, emigration, food availability, habitat suitability and availability, species competition, predation, and weather. For example, while the risk assessment concludes that PCBs are at sufficient concentrations to affect mink reproduction within the River and Bay, Section 2 documented that there is limited habitat for mink, especially along the River. While contaminant conditions exist that potentially would jeopardize mink health along the River corridor, the absence of mink due to absence of habitat must be considered.

Likewise, the apparent increase in populations of walleye and cormorants suggest little or no current risks to these species. Increases in walleye populations have occurred since the 1980s, and are directly linked to improvement in water quality and habitat in the Lower Fox River, and not necessarily to decreases in contaminants. Evidence that some risks persist is evidenced in the apparent presence of pre-cancerous lesions. Cormorant population increases may be related to decreases in contaminant concentrations, but are also likely tied to increases in available prey (fish). Like walleye, sublethal conditions appear to persist within the cormorant population. Given a shift in food or habitat conditions, those risks could be potentially of greater concern.

Quantitative Analysis

Only the data for benthic infauna for the Lower Fox River were thought to be amenable to a quantitative analysis. This analysis involved *using* of a range of toxicity values as listed in the literature rather than the single point estimate for toxicity that was used in the main body of the BLRA. This re-analysis was done for each River reach and Green Bay zone.

- LLBdM: There is a high probability (70 to 80 percent) that PCBs are widely distributed throughout the reach at sufficiently high concentrations to moderately effect benthic infaunal populations, and at least a 40 to 50 percent probability of encountering PCB concentrations associated with extreme effects.
- Appleton-LR: For this reach, the probability of infaunal organisms encountering levels of PCBs associated with toxic effects is low (5 to 10 percent).

Concluding Statement

The evaluation of uncertainties did not change the general conclusions drawn from the BLRA, which are that:

- Fish consumption by other fish, birds and mammals is the exposure pathway that represents the greatest level of risk for receptors (other than direct risk to benthic invertebrates).

The primary COC is PCBs, and other COCs carried forward for remedial evaluation and long-term monitoring are mercury and DDE.

8.4 Derivation of SQTs

Sediment Quality Thresholds (SQTs) are sediment concentrations that have been linked to a specific magnitude of risk. SQTs were developed for each pathway and receptor identified as important in the BLRA by the response agencies of the Lower Fox River and Green Bay (e.g., sport fishing consumption, bald eagles). The SQTs themselves are not cleanup criteria, but were used to evaluate levels of PCBs in the Feasibility Study. The final selection of the remedial action levels is a policy decision left to the response agencies.

SQTs were estimated for PCBs with the assumption that a remedy that reduces PCB exposure would also address the other co-located COCs. Risk-based concentrations in fish for human and ecological receptors were determined based on:

- Human health cancer risk levels of 10^{-4}, 10^{-5}, and 10^{-6}, and a noncancer hazard index of 1.0 for risk in recreational anglers and high-intake fish consumers
- The NOAECs and LOAECs for species of benthic invertebrates, fish, birds, and riverine mammals found in the River and Bay.

8.5 Basis for Action

The excess cancer risk and non-cancer health hazards associated with human ingestion of fish, as well as the ecological risks associated with ingestion of fish by birds, fish and mammals, are above acceptable levels under baseline conditions. The response action selected in this ROD is necessary to protect the public health or welfare and the environment from actual releases of hazardous substances into the environment.

9. REMEDIAL ACTION OBJECTIVES

Consistent with the NCP and RI/FS Guidance, WDNR and EPA developed remedial action objectives (RAOs) for the protection of human health and the environment. The RAOs specify the contaminants and media of concern, exposure routes and potential receptors, and an acceptable concentration limit or range for each contaminant for each of the various media, exposure routes and receptors. RAOs were then used to establish specific Remedial Action Levels (RAL) for the Site. Action Levels were established after review of both the preliminary chemical-specific ARARs and risk-based concentrations and serve to focus the development of alternatives or remedial technologies that can achieve the remedial goals. Although this ROD only addresses remediation of OUs 1 and 2, the RAOs were developed for the entire Lower Fox River and Green Bay and are therefore discussed here. Additional activities as they relate to these RAOs for OUs 3 through 5 will be discussed in a subsequent ROD or RODs.

The FS brought together the four major components used to evaluate risk, remedial goals, and alternative technologies in its analysis of remedial options. These components are briefly described below, then discussed in more detail on the following pages.

- **Remedial Action Objectives.** RAOs are site-specific goals for the protection of human and ecological health. Five RAOs were developed; all five apply to the River, while RAOs 1, 2, 3, and 5 apply to Green Bay.
- **Remedial Action Levels.** A range of action levels were considered for the River and Bay; action levels were chosen based in part on Sediment Quality Thresholds (SQTs), which link risk in humans, birds, mammals, and fish with safe threshold concentrations of PCBs in sediment. The SQTs were developed in the human health and ecological risk assessments.
- **Operable Units.** The four reaches (OU 1 through OU 4) and Green Bay (OU 5) were identified based on geographical similarities for the purpose of analyzing remedial actions.
- **Remedial Alternatives.** Following a screening process detailed in the FS, six remedial alternatives (A-F) were retained for the Lower Fox River and seven (A-G) were retained for Green Bay.

For each River reach, six possible remedial alternatives were applied to each of five possible action levels and evaluated against each of five remedial action objectives. For each Green Bay zone, seven possible remedial alternatives were applied to each of three possible action levels and evaluated against each of four remedial action objectives. The steps in this process are described in more detail below. Cost estimates were also prepared for each combination of River reach/Bay zone, remedial alternative, and action level.

9.1 Remedial Action Objectives

RAOs address the protection of human health and protection of the environment. The following five RAOs have been established for the Fox River and Green Bay Site.

- **RAO 1. Achieve, to the extent practicable, surface water quality criteria throughout the Lower Fox River and Green Bay.** This RAO is intended to reduce PCB concentration in surface water as quickly as possible. The current water quality criteria for PCBs are 0.003 ng/L for the protection of human health and 0.012 ng/L for the protection of wild and domestic animals. Water quality criteria incorporate all routes of exposure assuming the maximum amount is ingested daily over a person's lifetime.
- **RAO 2. Protect humans who consume fish from exposure to COCs that exceed protective levels.** This RAO is intended to protect human health by targeting removal of fish consumption advisories as quickly as possible. DNR and EPA defined the expectation for the protection of human health as the likelihood for recreational anglers and high-intake fish consumers to consume fish within 10 years and 30 years, respectively, at an acceptable level of risk or without restrictions following completion of a remedy.
- **RAO 3. Protect ecological receptors from exposure to COCs above protective levels.** RAO3 is intended to protect ecological receptors like invertebrates, birds, fish, and mammals. DNR and EPA defined the ecological expectation as the likelihood of achieving safe ecological thresholds for fish-eating birds and mammals within 30 years following remedy completion. Although the FS did not identify a specific time frame for evaluating ecological protection, the 30-year figure was used as a measurement tool.
- **RAO 4. Reduce transport of PCBs from the Lower Fox River into Green Bay and Lake Michigan.** The objective of this RAO is to reduce the transport of PCBs from the River into Green Bay and Lake Michigan as quickly as possible. DNR and EPA defined the transport expectation as a reduction in loading to Green Bay and Lake Michigan to levels comparable to the loading from other Lake Michigan tributaries. This RAO applies only to River reaches.
- **RAO 5. Minimize the downstream movement of PCBs during implementation of the remedy.** A remedy is to be completed within 10 years.

No numeric cleanup standards have been promulgated by the federal government or the State of Wisconsin for PCB-contaminated sediment. Therefore, site-specific RAOs to protect human and ecological health were developed based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to be considered non-promulgated guidelines (TBC), and risk-based levels established using the human and ecological RAs. The following RAOs were established for the Site:

Remedial Action Levels - PCB remedial action levels were developed based on the Sediment Quality Thresholds (SQTs) derived in the RA for the Lower Fox River and Green Bay. SQTs are estimated concentrations that link risk in humans, birds, mammals, and fish with safe threshold concentrations of PCBs in sediment. The PCB RALs considered are 0.125, 0.25, 0.5, 1.0, and 5.0 parts per million (ppm) for the Lower Fox River and 0.5, 1.0, and 5.0 ppm for Green Bay.

A range of RALs was considered in order to balance the feasibility as determined by implementability, effectiveness, duration, and cost of removing PCB-contaminated sediment down to each action level against the residual risk to human and ecological receptors after remediation. For each River reach or Bay zone, all of the sediment with PCB concentrations greater than the selected RAL is to be remediated. One of the outcomes of applying a specific RAL to a suite of active remedial alternatives is the recognition that Monitored Natural Recovery (MNR) may also be a component of the remedy. This was considered because when sediment is removed to a specific action level, some sediment with PCB concentrations above the SQTs will likely be left in place. MNR can also be a stand-alone remedy if it is determined to achieve sufficient protection within a reasonable time frame. As a result, each action level and each remedial alternative has an MNR component.

9.2 Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d) of CERCLA requires that Superfund remedial actions meet ARARs. In addition to applicable requirements, the ARARs analysis that was conducted considered criteria, and relevant and appropriate standards that were useful in evaluating remedial alternatives. These non-promulgated guidelines and criteria are known as To Be Considered (TBCs). In contrast to ARARs, which are promulgated cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations; TBCs are guidelines and other criteria that have not been promulgated.

Location-specific ARARs establish restrictions on the management of waste or hazardous substances in specific protected locations, such as wetlands, floodplains, historic places, and sensitive habitats.

Action-specific ARARs are technology-based or activity-based requirements or limitations on actions taken with respect to remediation. These requirements are triggered by particular remedial activities that are selected to accomplish the remedial objectives. The action-specific ARARs indicate the way in which the selected alternative must be implemented as well as specify levels for discharge. See table 4-2 of the FS. Chemical specific ARARs are health- or risk-based numerical values or methodologies that establish concentration or discharge limits, or a basis for calculating such limits, for particular substances, pollutants or contaminants.

In addition to the water quality criteria, substantive requirements of National Pollutant Discharge Elimination System (NPDES), as implemented under Wisconsin administrative rules, would also be applicable to wastewaters that are planned to be discharged to the Fox River, which will require treatment. These wastewaters include liquids generated during construction activities such as dewatering liquids, excavation area liquids, and liquids generated during construction of any on-site consolidation area. Discharges to Publicly Owned Treatment Works (POTWs) may be pursued as an alternative discharge location. However, such discharges must also comply with limitations to ensure acceptable discharge from the POTW after treatment. The specific discharge levels will be determined during the design stage in coordination with WDNR.

Sediments removed from the Fox River may contain PCBs equal to or greater than 50 ppm. PCB sediment with concentrations less than 50 ppm will be managed as a solid waste in accordance with statutes and rules governing the disposal of solid waste in Wisconsin. PCB sediment with concentrations equal to or greater than 50 ppm will be managed in accordance with the Toxic Substances Control Act (TSCA) of 1976 (Appendix E of the Feasibility Study). The determination that material is subject to regulation under TSCA will be made post-removal but pre-disposal. Presently TSCA compliance would be achieved through the extension of the January 24, 1995 approval issued by EPA to WDNR pursuant 40 CFR 761.60(a)(5) under the authority of TSCA. This TSCA approval, granted by EPA Region 5, states that the disposal of PCB-contaminated sediment with concentrations equal to or greater than 50 ppm into an NR 500, WAC landfill that is also in compliance with the conditions of the TSCA approval, provides adequate protection to human health and the environment as required by 40 CFR 761.60(a)(5); and, will provide the same level of protection required by EPA, Region 5 and therefore is no less restrictive than TSCA. However, should other administrative rules pertaining to disposal under TSCA be in effect at the time that TSCA compliance decisions are made for the Fox River sediment, then compliance with those rules will be achieved.

10. DESCRIPTION OF ALTERNATIVES

Following development of the RAOs, WDNR conducted a rigorous screening and evaluation process in accordance with CERCLA and the NCP. First, potentially applicable remedial technologies or process options for addressing PCB-contaminated sediments in the Fox River and Green Bay were identified and screened (evaluated) based on effectiveness and technical implementability at the Site. Retained technologies were then evaluated in a second screening based on effectiveness, implementability and cost. After the second screening, the following four technologies were retained for consideration in the analysis of remedial alternatives: 1) no action, evaluation of which is required by the NCP; 2) Monitored Natural Recovery (MNR); 3) capping to the maximum extent practicable with dredging in areas where capping was not appropriate; and 4) removal/dredging (i.e., environmental dredging) followed by MNR.

Process options for treatment and disposal that were retained include dehalogenation, physical separation and solidification, vitrification and high-pressure oxidation.

After the technology screening, WDNR and EPA developed and screened remedial alternatives. A specified "cleanup value" or "action level" for PCBs in sediment was not developed for purposes of evaluating remedial alternatives. Because consumption of fish is the major pathway of concern, WDNR and EPA developed remedial goals based on PCB concentrations in fish (see Section 9). Therefore, remedial alternatives were evaluated based on their ability to reduce PCB concentrations in fish. PCB concentrations in fish are controlled by PCB concentrations in both the sediment and the water column and, therefore, sediment cleanup is considered the means to the goal of protecting human health and the environment.

For the capping alternative, locations where it was feasible were considered in determining where this technology could be applied based on criteria identified in section 6.4.4 of the Feasibility Study. For excavation alternatives, WDNR and EPA evaluated the following action levels for the Fox River: PCB concentrations of 0.125 ppm, 0.25 ppm, 0.5 ppm, 1.0 ppm, 5.0 ppm, and no action. These results were then compared to the RAOs, particularly RAOs 2 and 3, which deal with protection of human health and the environment. On the basis of that analysis and to achieve the risk reduction objectives using a consistent action level, 1.0 ppm was agreed upon as the appropriate remedial action level. In making this determination, the agencies relied on projections of the time necessary to achieve the risk reduction, the post-remediation surface-weighted average concentration (SWAC), and cost.

Table 15 shows that for the selected Action Level of 1.0 ppm, time to acceptable fish tissue concentrations for walleye, would be achieved within one year in OU 1. This compares to more than 50 years under a No Action alternative also shown in the table.

Table 15 Years to Human Health and Ecological Thresholds for Lower Fox River at 1 ppm PCB Action Level and No Action in OU 1

Fish	Risk Level	Receptor	Estimated Years (for 1.0 ppm Action Level)	Estimated Years (for No Action)
Walleye[1]	RME[2] hazard index of 1.0	Recreational Angler	<1	51
Walleye	RME hazard index of 1.0	High-intake fish consumer	4	65
Walleye	RME 10^{-5} cancer risk level	Recreational Angler	9	84
Walleye	RME 10^{-5} cancer risk level	High-intake fish consumer	14	100
Carp	NOAEC[3]	Carnivorous bird deformity	14	100
Carp	NOAEC	Piscivorous mammal	29	100+

1. Shaded row represents removal of fish advisories.

2. RME indicates the reasonable maximum exposure.

3. NOAEC is the no observed adverse effect concentration.

It is estimated that it would take 40 years to remove fish advisories for OU 2, under the selected remedy, Monitored Natural Recovery. However, the removal of Deposit N (completed in a dredging demonstration project during 1998 and 1999) and Deposit DD (under consideration for remediation in the ROD for OU s 3-5) is not considered in the modeling upon which this estimate was made.

The SWAC is a measure of the surface (upper 10 cm) concentration against a given area. In terms of the Lower Fox River, this would be the average residual contaminant concentration in the upper 10 cm divided by the area of the Operable Unit. The SWAC calculation includes interdeposit areas. The estimated post-removal SWAC value for OU 1 at an action level of 1 ppm is 185 µg/kg.

The SWAC value provides a number that can be compared to the SQTs developed in the RA. SQTs are estimated concentrations that link risk in humans, birds, mammals, and fish with safe threshold concentrations of PCBs in sediment. Human health and ecological SQTs for carp and walleye are listed in Tables 16 and 17, respectively.

Table 16 Human Health Sediment Quality Threshold (SQT) Values

		Recreational Angler		High-Intake Fish Consumer	
		RME[1] µg/kg	CTE[2] µg/kg	RME µg/kg	CTE µg/kg
Cancer Risk at 10^{-5}					
Carp		16	180	11	57
Walleye		21	143	14	75
Non-Cancer Risk (HI =1)					
Carp		44	180	28	90
Walleye		58	238	37	119

1. RME indicates the reasonable maximum exposure;

2. CTE is the central tendency exposure.

Table 17 Ecological Sediment Quality Threshold (SQT) Values

	NOAEC (µg/kg)
Carp – fry growth and mortality	363
Walleye – fry growth and mortality	176
Common Tern – hatching success	3,073
Common Tern – deformity	523
Cormorant – hatching success	997
Cormorant – deformity	170
Bald Eagle – hatching success	339
Bald Eagle – deformity	58
Mink – reproduction and kit survival	24

The volume of sediment and PCB mass that would be removed, as well as the cost to implement the remedy at the 1.0 ppm action level, were also considered. For OU 1 an estimated 784,200 cubic yards and 1,715 kilograms of PCBs would be removed. The cost for remediation of OU 1 is estimated to be $66.2 million.

WDNR and EPA selected six remedial alternatives for detailed analysis: No Action, Monitored Natural Recovery and Institutional Controls, Dredge and Off-Site Disposal, Dredge to a Confined Disposal Facility (CDF), Dredge and Vitrification, and In-situ Capping. These alternatives cover the range of viable approaches to remedial action and include a no-action alternative, as required by the NCP.

10.1 Description of Alternative Components

Remedial Alternatives - WDNR and U.S. EPA evaluated several alternatives to address contamination in the Lower Fox River and Green Bay. Because the level of contamination and size of the OUs vary, a specific proposed cleanup plan was developed for each OU. The FS outlines the process used to develop and screen appropriate technologies and alternatives for addressing PCB-contaminated sediment and provides detailed descriptions of the remedial alternatives. The suite of remedial alternatives is intended to represent the remedial alternatives that are available, not to be inclusive of all possible approaches. The proposed alternative for an Operable Unit may consist of any combination of the alternatives described below. Other implementable and effective alternatives could theoretically be used; however, a ROD amendment or Explanation of Significant Difference (ESD) would be required before another alternative could be substituted for the selected remedy.

Alternative A: No Action - A No Action alternative is included for all River reaches and Bay zones. This alternative involves taking no action. The No Action alternative is required by the National Contingency Plan, because it provides a basis for comparison with the alternatives for active remediation.

Alternative B: Monitored Natural Recovery - Similar to Alternative A, the MNR alternative relies on naturally occurring degradation, dispersion, and burial processes to reduce the toxicity, mobility, and volume of contaminants. However, the MNR option also includes a 40-year, long-term monitoring program for measuring PCB and mercury levels in water, sediment, invertebrates, fish, and birds to effectively determine achievement of and progress toward the RAOs. Until the RAOs are achieved, institutional controls are necessary to prevent exposure of human and biological receptors to contaminants. Land and water use restrictions, fishing restrictions and access restrictions may require local or state legislative action to prevent development or inappropriate usage of contaminated areas of the River. Institutional controls

include measures that restrict access to or uses of a site. They typically consist of some combination of physical restraints (such as fences to limit access), legal restrictions (such as local ordinances and restrictive covenants that limit land development), and outreach activities (such as public education programs and health advisories).

Alternative C: Dredge and Off-Site Disposal - Alternative C includes the removal of sediment having PCB concentrations greater than the remedial action level using a hydraulic or mechanical dredge, dewatering the sediment either passively or mechanically, treating the water before discharging it back to the River, and then disposing of the sediment off site, transporting it by truck. Sediment disposal would be at a local landfill in compliance with the requirements of NR 500 Wisconsin Administrative Code (WAC), which regulates the disposal of waste and the WDNR's TSCA approval issued by EPA. EPA issued this approval under the authority of the federal TSCA. This approval allows for the disposal of PCB-contaminated sediment with concentrations equal to or greater than 50 mg/kg (ppm) in landfills that are licensed under the NR 500 rule series, WAC provided that certain requirements are met.

Alternative D: Dredge to a Confined Disposal Facility (CDF) - Alternative D includes the removal of sediment having PCB concentrations greater than the remedial action level to an on-site CDF for long-term disposal. A CDF is an engineered containment structure that provides both dewatering and a permanent disposal location for contaminated sediment. A CDF can be located in the water adjacent to the shore or at an upland location near the shore. Sediment with PCB concentrations equal to or greater than 50 mg/kg would not be disposed of in a CDF. Such sediments would be mechanically dredged for solidification and disposal at a solid waste landfill conforming to requirements defined by the state in the NR 500 rule series and WDNR's TSCA approval. Conceptual near-shore CDF locations were identified in OU 1.

Alternative E: Dredge and Vitrification - This alternative is similar to Alternative C except that all the dewatered sediment would be thermally treated using a vitrification process. Alternative E assumes that the residual material would be available for possible beneficial reuse after vitrification. Vitrification has been used as a representative thermal treatment process option and was included as an alternative due to a recently completed pilot-scale evaluation.

Alternative F: In-situ (In-place) Capping - Alternative F includes primarily sand capping to the maximum extent possible. The maximum extent of the capping action was defined in each River reach on the basis of site specific conditions such as water depth, average river current, river current under flood conditions, wave energy, ice scour, and boat traffic. Using these criteria, it was determined that capping alone is not a viable option to achieve the site RAOs. Where capping is viable, a 20-inch sand cap overlaid by 12 inches of graded armor stone was selected. Sediment that is not capped but still exceeds the action level would be hydraulically dredged to an on-site CDF, similar to Alternative D. In the FS, several cap designs were retained for possible application; design factors that influence the final selection of an in-situ cap include an evaluation of capping materials and cap thickness when applied in the field. In general, sandy sediment is a suitable capping material, with the additional option of armoring at locations with the potential for scouring and erosion. Laboratory tests developed in the past indicate that a minimum in-situ cap thickness of 12 inches (30 cm) is required to isolate contaminated sediment, as indicated in FS Section 7.1, page 7-4 to 7-5. Full-scale design would require consideration of currents during storm events, wave energy, and ice scour. A minimum river depth of 6 feet would be required (FS Section 7.1.1, page 7-5) for any location where a cap is proposed. Institutional controls and monitoring and maintenance are also components of this alternative. Institutional controls may be necessary to ensure the long-term integrity of the cap. Monitoring and maintenance would be required in perpetuity to ensure the integrity of the cap and the permanent isolation of the contaminants. Alternative F was determined not feasible for OU 2.

In evaluating the alternatives, WDNR and EPA considered the level of protection that would satisfy the concern of the natural resource trustees that future natural resource injuries be minimized. Many of the natural resource trustees cooperated in the development of the proposed plan and agreed with the combination of active remediation to a proposed cleanup level of 1.0 ppm PCBs and the use of Monitored Natural Recovery in areas where active remediation will not occur.

10.2 Key/Common Elements

The following discussion applies primarily to the dredging or dredging and capping alternatives.

Phasing - The first construction season of remedial dredging will include an extensive monitoring program of all operations. Monitoring data will be compared to performance standards developed during remedial design. Performance standards are likely to address (but may not be limited to) resuspension rates during dredging, production rates, and residuals after dredging, and community impacts (e.g., noise, air quality, odor, navigation). Data gathered will enable WDNR to determine if adjustments are needed to operations in the succeeding phase of dredging, or if performance standards need to be reevaluated. WDNR will make the data, as well as its final report evaluating the work with respect to the performance standards, available to the public.

Institutional Controls - Institutional controls (fish consumption advisories and fishing restrictions) would be utilized with the Monitored Natural Recovery, capping and removal alternatives. Institutional Controls are considered to be limited action alternatives, and therefore are not included in the No Action alternative.

Source Control - Point sources of contaminants to the Fox River have been effectively addressed by water discharge permits for the Fox River. Thus, no additional actions related to source control are necessary.

Monitored Natural Recovery - Natural recovery refers to the beneficial effects of natural processes that reduce surface sediment concentrations of PCBs. These processes include biodegradation, diffusion, dilution, sorption, volatilization, chemical and biochemical stabilization of contaminants, and burial by natural deposition of cleaner sediments. The primary mechanisms for natural recovery in the Fox River and Green Bay are desorption and dispersion in the water column (i.e., as a dissolved constituent), burial, and sediment resuspension and transport. Biodegradation is a negligible contributor to the lowering of PCB concentrations and is not a factor for mercury. The relative importance of each of these mechanisms in reducing PCB concentrations in the Fox River and Green Bay is not easily estimated based on available data. Some or all of these processes may be occurring at varying rates at any given time and location within the River or Bay. During the design phase, a monitoring program will be developed to measure the net effects of the natural attenuation processes after remedial activities are completed until the remediation goals are reached.

Sediment Concentrations - Sediments that may significantly contribute to the PCB levels in fish, both now and in the future, are considered principal threats. The determination of the significance of the sediment contribution to fish is based primarily on model projections, in conjunction with geochemical and statistical analyses. The model projections indicate that the significance of the sediment contribution to PCB fish tissue levels varies by Operable Unit; therefore, the sediment levels that are considered principal threats will correspondingly vary by Operable Unit.

Treatment - Conventional treatment technologies, such as thermal desorption, are technically feasible; however, the associated costs would be substantially greater than off-site landfill disposal. However, vitrification of sediments is feasible and as such is considered a possible alternative to the current plans for conventional disposal in an approved, licensed landfill. Materials that would be processed using vitrification technology could be beneficially re-used.

Sediment Processing/Transfer Facilities - It is expected that sediment processing/transfer facilities would be established to handle materials from the environmental dredging process. The locations of these facilities will be determined during the remedial design phase of the remedy considering engineering issues (such as those associated with the type of dredging selected), property issues, noise, air impacts and other appropriate factors. Although it is projected that these facilities would be land-based, water-based facilities will also be evaluated.

Dredged sediments will be mechanically dewatered and loaded onto trucks for transport to disposal facilities.

Water that is separated from the dredged sediment will undergo treatment to remove fine sediment particles and dissolved PCBs. Ultimately, the water will be discharged back into the Fox River in compliance with the substantive requirements of the State of Wisconsin Pollutant Discharge Elimination System, which is an ARAR for this Site.

Transportation - Dredged materials will be transported from the dredging site to the sediment processing/transfer facilities by barge or in-river pipeline. Transportation from the sediment processing/transfer facilities to disposal facilities will be by truck.

Disposal - Disposal of PCB contaminated sediment from OU 1 will be to either an existing upland landfill or into a newly constructed or modified landfill designed to receive the dewatered sediment. ARARs/TBCs specific to the landfill option include the siting requirements for a landfill (Chapter 289, Wisconsin Statutes) and the technical requirements for construction, operation, and closure of a landfill in the NR 500 rule series, WAC.

Sediments removed from the Fox River may contain PCBs equal to or greater than 50 ppm. PCB sediment with concentrations less than 50 ppm will be managed as a solid waste in accordance with statutes and rules governing the disposal of solid waste in Wisconsin. PCB sediment with concentrations equal to or greater than 50 ppm will be managed in accordance with the Toxic Substances Control Act of 1976 (Appendix E of the Feasibility Study). Presently TSCA compliance would be achieved through the extension of the January 24, 1995 approval issued by EPA to WDNR pursuant 40 CFR 761.60(a)(5) under the authority of TSCA. This TSCA approval, granted by EPA Region 5, states that the disposal of PCB-contaminated sediment with concentrations equal to or greater than 50 ppm into an NR 500, WAC landfill that is also in compliance with the conditions of the TSCA approval, provides adequate protection to human health and the environment as required by 40 CFR 761.60(a)(5); and, will provide the same level of protection required by EPA, Region 5 and therefore is no less restrictive than TCSA. However, should other administrative rules pertaining to disposal under TSCA be in effect at the time that TSCA compliance decisions are made for the Fox River sediment, then compliance with those rules will be achieved.

Therefore, this disposal method meets the TSCA regulatory requirement 40 CFR 761.61(c) that the risk-based method for disposal of PCB remediation waste does not pose an unreasonable risk of injury to health and the environment.

Although off-site landfilling is anticipated, vitrification and beneficial re-use of dredged excavated sediments will be evaluated during the design phase. Value engineering to reduce waste

volumes (that will also reduce costs) will be explored and, if appropriate, finalized during remedial design.

Monitoring - Short- and long-term (i.e., pre-, during, and post-construction) monitoring programs will be developed to ensure compliance with performance standards and protection of human health and the environment. The types and frequency of pre-construction monitoring will be developed during remedial design. Plans for monitoring during and after construction will be developed during the remedial design and modified during and after construction as appropriate. This approach is consistent with the NRC Report recommendation that long-term monitoring evaluate the effectiveness of the remedial action as well as ensure protection of public health and the environment.

11. COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy for a site, WDNR and EPA consider the factors set forth in CERCLA § 121, 42 U.S.C. § 9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR § 300.430(e)(9), EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies, OSWER Directive 9355.3-01, and EPA's 'A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, OSWER 9200.1-23.P. The detailed analysis consists of an assessment of the individual alternatives against each of nine evaluation criteria (two threshold, five primary balancing and two modifying criteria) and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

Threshold Criteria

1. **Overall Protection of Human Health and the Environment** addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced or controlled through treatment, engineering, or institutional controls. The selected remedy must meet this criterion.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** addresses whether a remedy will meet applicable or relevant and appropriate federal and state environmental laws and/or justifies a waiver from such requirements. The selected remedy must meet this criterion or a waiver of the ARAR must be attained.

Primary Balancing Criteria

3. **Long-Term Effectiveness and Permanence** refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met.
4. **Reduction of Toxicity, Mobility, or Volume Through Treatment** addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances as their principal element. This preference is satisfied when treatment is used to reduce the principal threats at the site through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media.
5. **Short-Term Effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed, until cleanup levels are achieved.

6. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. **Cost** includes estimated capital costs, annual operation and maintenance costs (assuming a 30-year time period), and net present value of capital and operation and maintenance costs.

Modifying Criteria

8. **Agency Acceptance** considers whether the support agency, EPA in this instance, concurs with the lead agency's remedy selection and the analyses and recommendations of the RI/FS and the proposed plan.

9. **Community Acceptance** addresses the public's general response to the remedial alternatives and proposed plan. The ROD includes a responsiveness summary that presents public comments and the WDNR and EPA responses to those comments. The level of community acceptance of the selected alternative is outlined in the Responsiveness Summary (see Appendix A).

11.1 Operable Unit 1 (Little Lake Butte des Morts)

Table 18 summarizes the evaluation for OU 1 alternatives and how each alternative meets, or does not meet requirements for each of the nine criteria described above. A detailed comparative analysis for all alternatives follows.

Table 18 Operable Unit 1. Little Lake Butte des Morts Alternatives

Yes = Fully meets criteria Partial = Partially meets criteria No = Does not meet criteria	Alternative A No Action	Alternative B Monitored Natural Recovery	Alternative C1 Dredge with off site disposal	**Selected Alternative** Alternative C2 Dredging with off site disposal	Alternative D Dredge to a Confined Disposal Facility	Alternative E Dredge and Vitrification	Alternative F In Situ Capping
1. Overall protection of human health and the environment	No	No	Yes	Yes	Yes	Yes	Yes
2. Compliance with Applicable or Relevant & Appropriate Requirements	No	Partial	Yes	Yes	Yes	Yes	Yes
3. Long-term Effectiveness and Permanence	No	No	Yes	Yes	Yes	Yes	Partial
4. Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment	No	No	Yes	Yes	Yes	Yes	Partial
5. Short-term Effectiveness	No	No	Yes	Yes	Partial	Partial	Partial

Yes = Fully meets criteria Partial = Partially meets criteria No = Does not meet criteria	Alternative A No Action	Alternative B Monitored Natural Recovery	Alternative C1 Dredge with off site disposal	**Selected Alternative** Alternative C2 Dredging with off site disposal	Alternative D Dredge to a Confined Disposal Facility	Alternative E Dredge and Vitrification	Alternative F In Situ Capping
6. Implementability	Yes	Yes	Yes	Yes	Partial	Partial	Partial
7. Cost (millions of $)	$ 4.5	$ 9.9	$ 116.7	$ 66.2	$ 68.0	$ 63.6.0	$ 90.5
8. Agency Acceptance	The WDNR has been the lead agency in developing the RI/FS and the ROD. Both WDNR and EPA support the selected alternative for this OU at the 1.0 ppm action level.						
9. Community Acceptance	The level of community acceptance of the selected alternative is outlined in the Responsiveness Summary.						

11.1.1 Threshold Criteria for Operable Unit 1

Protection of Human Health and the Environment

The primary risk to human health associated with the contaminated sediment is consumption of fish. The primary risk to the environment is the bioaccumulation of PCBs from the consumption of fish or, for invertebrates, the direct ingestion/consumption of sediment. Protection of human health and the environment were evaluated by residual risk in surface sediment using five lines of evidence:

- Residual PCB concentrations in surficial sediment using surface-weighted averaging after completion of a remedy;
- Average PCB concentrations in surface water;
- The projected number of years required to reach safe consumption of fish;
- The projected number of years required to reach a surface sediment concentration protective of fish or other biota, and
- PCB loadings to downstream areas and total mass contained or removed.

Each of these is discussed below.

Residual PCB concentrations in surficial sediment and surface water

As shown in Table 19 below, substantial reductions in the average concentration of surficial sediment and in surface water for OU 1 is achieved by all active remediation alternatives (C1, C2, D, E and F) when compared to the No Action and MNR alternatives (A and B). The implementation of active remediation alternatives results in a 95 percent reduction in residual PCB concentrations in surface sediment using surface-weighted averaging after completion of the Alternatives C1, C2, D, E or F, when compared to the No Action or MNR Alternatives, respectively (i.e., 3.699 versus 0.185 ppm, respectively -- see Table 19). Similarly, the estimated surface water concentrations 30-years after remediation is reduced 94 percent for active remediation alternatives (B, C1, C2, D, E and F), relative to No Action and Monitored Natural Recovery (A, and B, respectively) – i.e., 2.99 versus 0.18 ppm, respectively -- see Table 19.

Table 19 Post-Remediation Sediment and Surface Water Concentrations in OU 1

Alternative	Average PCB Concentrations in Surficial Sediments (ppm)	Estimated Surface Water Concentrations 30-years after Remediation (ng/L)
A, B	3.699	2.99
C1, C2, D, E, F	0.185	0.18

Data is from FS Tables 5-4, and 8-5B.

Time to reach acceptable fish tissue concentrations

Substantial reductions in the time when humans could safely consume fish are achieved by active remediation alternatives (C1, C2, D, E, and F), when compared to the No Action and Monitored Natural Recovery (MNR) alternatives (A and B). The implementation of active remediation alternatives results in an 86 percent to 99 percent reduction in the time required to reach acceptable fish tissue concentrations in walleye when compared to the No Action or MNR alternatives (i.e., 1 to 14 years for active remediation versus 51 to 100 years for No Action or MNR – see Table 20). Recovery times for additional human health receptors are presented the FS, Chapter 8, Table 8-6.

Table 20 Time Achieve Acceptable Fish Tissue Concentrations for Walleye in OU 1

Fish	Receptor	Risk Level Goal	Estimated Years to Achieve	
			Alternatives C1, C2, D, E, F	Alternatives A, B
Walleye	Recreational Angler	RME Hazard Index of 1.0	<1	51
Walleye	High Intake Fish Consumer	RME Hazard Index of 1.0	4	65
Walleye	Recreational Angler	RME 10^{-5} cancer risk level	9	84
Walleye	High Intake Fish Consumer	RME 10^{-5} cancer risk level	14	100

Data is from FS Table 8-14.

Time required to achieve surface sediment concentration protective of fish or other biota

Substantial reductions in the time required to reach protective levels for ecological receptors are achieved by all active remediation alternatives (C1, C2, D, E, and F) relative to the No Action and MNR alternatives. For receptors representative of fish or other biota, implementation of active remediation alternatives results in a 40 percent to 86 percent reduction relative to No Action or MNR (i.e., 14 to 60 years for active remediation versus 100 years or more for No Action and MNR, shown in Table 21, below). Recovery times for additional ecological receptors are presented in the FS, Chapter 8, Table 8-6.

Table 21 Time Required to Achieve Protective Levels in Sediments for Representative Ecological Receptors in OU 1

Fish	Receptor	Risk Level Goal	Estimated years to achieve	
			Alternatives C1, C2, D, E, F	Alternatives A, B
Carp	Carnivorous bird	NOAEC	14	100
Carp	Piscivorous mammal	NOAEC	29	>100
Sediment	Sediment invertebrate	TEL	60	>100

Data is from FS Table 8-16.

PCB loadings to downstream areas and total mass contained or removed
Reduction of the PCB load transported over the Appleton Dam into the downstream areas of the Fox River is a measure of the overall protection of human health and the environment. Reduced PCB loading from OU 1 will ultimately contribute to downstream reduction of concentrations of PCBs in sediment, water and fish, and thereby reduce risk to humans and ecological receptors in the Fox River. After implementation of active remedial alternatives (C1, C2, D, E, and F) estimates for releases over the Appleton Dam would be reduced from 88 pounds/year presently to 1.5 pounds/year 30 years after completion of remediation, compared to 25 pounds for the No Action and MNR alternatives (also after 30 years). Thus the active remedial alternatives would give a 94 percent reduction in loadings relative to No Action and MNR.

Summary

The active remediation alternatives provide a substantially more protective remedy than the No Action and MNR alternatives. The No Action and MNR Alternatives are not protective of human health and the environment.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
Section 121 (d) of CERCLA and NCP §300.430(f)(1)(ii)(B) requires that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

The ARAR discussion, below, is divided by the different operational components of the alternatives (Table 22, and discussion below), as various components are utilized in an essentially the same manner for some alternatives and apply equally to those alternatives with a common component. There is also additional discussion of ARARs in Section 14.2.

Table 22 Operational Components for OU 1 Alternatives

		Alternatives						
		A	B	C1	C2	D	E	F
Removal				X	X	X	X	X
Dewatering	Mechanical				X			
	Passive			X		X	X	X
Sediment Treatment				*	*		X	*
Water Treatment				X	X	X	X	X
Trucking or Rail Transportation				X	X	X	X	X
Disposal	Upland			X	X	X**	(residuals)	X
	In-water CDF					X		
Capping								X

X: Required activity for alternative.
** Possible supplement.*
*** Upland disposal for this alternative would only be for sediments with PCB concentrations equal to or greater than 50 ppm (16,165 cubic yards of 800,357). Sediments with concentrations less than 50 ppm (784,192 cubic yards) would be disposed in an in-water CDF.*

A description of the components listed in Table 22, above follows:

- **Removal.** The removal technology utilized for active remedial alternatives Alternatives C1, C2, D, E, and F is dredging (although Alternative F also includes capping). The ARARs that directly relate to the removal of sediment from the Lower Fox River and Green Bay concern the protection of surface water (NR 322, 200, and 220 through 297). The surface water ARARs limit the discharge of PCBs into the receiving water bodies so that water quality is not adversely affected. These ARARs will be achieved by all active remedial alternatives.
- **Dewatering and Water Treatment.**
  - Mechanical dewatering would be utilized for Alternative C2. Discharge requirements (NR 200 and 220 through 297, WAC) are set forth for the discharge of water to publicly owned treatment works (POTWs) and to navigable waters such as the Lower Fox River (NR 105 and 106, WAC). Discharges from prior remedial activities on the Lower Fox River provide an indication of the treatment requirements for discharging effluent water to the Lower Fox River or to a POTW. Another requirement covers stormwater discharge. A potentially important ARAR (NR 108, WAC) relates to the construction of a wastewater treatment facility specifically to treat water from remedial activities.
  - Passive dewatering ponds would be part of Alternative C2, D, E and F and would be constructed under the wastewater ARAR (NR 213, WAC), which associated with wastewater treatment lagoons. Based on previous experience gained during the SMU 56/57 pilot dredging project, ARARs associated with passive dewatering lagoons are achievable.
- **Ex-Situ (Off-site) Treatment.** ARARs specific to vitrification technology (Alternative E) relate to the air emission and permitting requirements of thermal treatment units (40 CFR 701 and NR 400 through 499). In addition, the thermal unit must meet performance requirements in NR 157 for the efficient treatment of PCB sediment. These ARARs would be met.
- **Transportation.** The likely method for transporting PCB sediment to upland disposal locations for Alternatives C1, C2, and F is by trucking to the disposal facility, although other transportation methods could be used if it is determined during design that there are better methods. ARARs and TBCs important to this process option include the requirements to prevent spills and releases of PCB materials (NR 140 and 157, WAC). Two ARARs applicable only to the trucking method include Wisconsin Department of Transportation (WDOT) requirements for the shipping of PCB materials and NR 157 shipping requirements. ARARs and TBCs related to in-water transportation activities (i.e., piping) include the protection of surface water (NR 322, 200, and 220 through 297,WAC). Alternatives C1, C2 and F will comply with these ARARs.
- **Disposal.** For Alternatives C1, C2, and F, disposal of contaminated sediment removed (i.e., dredged) from OU 1 will be disposed at either an existing upland landfill or in a newly constructed or modified landfill designed to receive the dewatered sediment. ARARs specific to this process option include the siting requirements for a landfill (Chapter 289, Wisconsin Statutes) and the technical requirements for construction, operation, and closure of a landfill in the NR 500 rule series, WAC. For contaminated sediments with PCB concentrations equal to or greater than 50 ppm, disposal will comply with the Toxic Substances Control Act, 40CFR Part 761. Alternative D would also have a relatively small portion (i.e., 2 percent) of dredged materials with concentrations equal to or greater than 50 ppm that would also be disposed at a TSCA compliant upland landfill. General disposal requirements for PCB-containing sediments are simplified by the EPA's current approval requirements for placing TSCA-level PCB-containing material in a state-licensed landfill. In

all cases, for sediment to be disposed of at a local landfill, the landfill must be in compliance with the requirements of the NR 500 WAC series regulating the disposal of waste and WDNR's TSCA approval issued by EPA. This EPA approval currently allows for the disposal of PCB-contaminated sediment with concentrations equal to or greater than 50 mg/kg in landfills licensed under the NR 500 rule series, WAC, provided that certain technical and administrative requirements are met. These ARARs will be met by alternatives C1, C2 and F.

- **Capping.** For Alternative F, some sediments would be capped in-place, primarily in the central (deeper water) portions of OU 1. This would require compliance with Section 10 of the Rivers and Harbor Act of 1899 (22 CFR 403), and may require compliance with the Wisconsin Statutes Chapter 30 (defining riparian rights of upland owners which extend to the center of a stream). If the capping area is considered to be located in a lake, then the State, through the Board of Commissioners of Public Lands, may lease "rights of the beds of lakes and rights to fill in beds of lakes or navigable streams." It is expected that these ARARS would be met.

11.1.2 Balancing Criteria for Operable Unit 1

Long-Term Effectiveness and Permanence

Reduction of Residual Risk
The No Action and MNR alternatives result in a continuation of the degraded condition of the sediments and surface water quality of Little Lake Butte des Mort (OU 1), for at least several decades. The No Action and MNR Alternatives do not eliminate PCBs from the River and do not reduce PCB levels in fish to acceptable levels for the foreseeable future.

Alternatives C1, C2, D, E and F reduce residual risk through removal or containment of 800,357 cubic yards of sediments containing approximately 1715 kg (about 3800 pounds) of PCBs over an area of 526 acres. The reduction in the time required to reach acceptable fish tissue concentrations ranges from 86 percent to 99 percent (i.e., 1 to 14 years for active remediation and 51 to 100 years for No Action/MNR – see Table 20).

Adequacy of Controls
The No Action and MNR alternatives do not produce reduction in human risk and exposure in the foreseeable future, unlike active engineering controls. Additionally, fish consumption surveys indicate that 50 percent of anglers do not follow fish advisories. Therefore, existing institutional controls do not adequately reduce human exposure to PCBs from consumption of contaminated fish. In addition, institutional controls are not protective for ecological receptors (e.g., the birds, mammals and fish). Given the survey data, it is unlikely that sole reliance on these types of controls would be reliable in the long term to ensure human health and ecological protection.

The active remediation alternatives (C1, C2, D, and E) provide for the removal of most of the PCB-contaminated sediments in OU 1. Alternative F also removes a large portion of PCB-contaminated sediments and provides for an engineered cap over approximately 20 percent of contaminated deposits in OU 1. Like the MNR alternative, Alternative F also requires institutional controls such as Site use restrictions in capped areas (e.g., prohibition of sediment disturbance activities). Although institutional controls would still be required for the two removal alternatives, the risk to consumers of fish would be greatly reduced by these alternatives.
All alternatives would require institutional controls, such as the fish consumption advisories and fishing restrictions until remedial action objectives were met at a future date, but they are unlikely to require additional Site use restrictions after removal activities are completed.

All alternatives will require some degree of monitoring. Monitoring programs will be developed, as appropriate, for all phases of the project.

Alternatives C1, C2, D and F rely on engineering controls at the disposal facility. Properly designed and managed landfills provide proven, reliable controls for long-term disposal for Alternatives C1, C2 and F (which have off-site landfill disposal). Alternative F would also require a long-term operation and maintenance plan to ensure containment of PCBs in perpetuity. Alternative D would require on-site engineering controls at an in-water disposal facility. Long-term monitoring and maintenance are included in operation of the landfill and confined disposal facility. The final disposition of contaminated sediments is listed in the following table.

Table 23 Final Disposition of Contaminated Sediments in OU 1

	Alternatives (cubic yards)					
	A	B	C1/C2	D	E	F
Treated and residual disposal	0	0	0	0	784,192	0
Removed and disposed at upland landfill	0	0	784,192	16,165	0	16,645
Removed and disposed at in-water CDF (on-site)	0	0	0	768,027	0	619,381
Capped in-place	0	0	0	0	0	148,646

Data is from FS Table 7-2.

Reliability of Controls

For the active remedies (Alternatives C1, C2, D, E and F), and MNR, fish consumption advisories and fishing restrictions will continue to provide some protection of human health until PCB concentrations in fish are reduced to the point where the fish consumption advisories and fishing restrictions can be relaxed or lifted. However, in the interim, these controls will only provide an uncertain measure of protection. Among the active alternatives, sediment capping, sediment removal (dredging and excavation), and off-site disposal/treatment of removed sediments are all established technologies.

The capping portion of Alternative F relies upon proper design, placement and maintenance of the cap in perpetuity for its effectiveness, continued performance and reliability. A cap integrity monitoring and maintenance program would provide reasonable reliability, although there are inherent challenges in monitoring and maintaining a cap in the Fox River riverine environment. The capping portion of Alternative F (see Table 23, above for the volume of capped contaminated sediments) may not be as reliable as the removal alternatives due to the unknown potential for damage to the cap, potentially exposing PCBs. In addition, the capping component of Alternative F is vulnerable to a catastrophic flow event, such as might be seen during a 500-year flood or a dam failure. However, with proper design and maintenance, these risks can be minimized.

In general, Alternatives C1 and C2, D and E are the most reliable, as there is little or no long-term additional on-site maintenance associated with the remedial work. These Alternatives permanently remove the greatest amount of contaminated sediment and PCBs from the River, and achieve the greatest reduction of the potential scour-driven resuspension of PCB-contaminated sediments. However, Alternative F is also considered to be sufficiently reliable.

Summary

Based on the above analysis of reduction in residual risk and adequacy and reliability of controls, the five active remediation alternatives (C1, C2, D, E and F) are superior to the No Action and MNR alternatives due to the greater risk reduction and mass of PCBs removed from the River. The five active remediation alternatives are similar to each other in terms of risk reduction with C1, C2, and E being the most effective over time. EPA's analysis of residual risk for each alternative is consistent with the National Research Council (NRC) report recommendation to consider options to reduce risk and to consider residual risks associated with material left behind.

Reduction of Toxicity, Mobility, and Volume

Reduction in Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment and the amount of contamination present.

The No Action and MNR alternatives do not involve any containment or removal of contaminants from Little Lake Butte des Morts sediments. The No Action and MNR alternatives rely on natural attenuation processes such as burial by cleaner sediments, biodegradation, bioturbation and dilution to reduce concentrations of PCBs in sediments and surface water.

Natural degradation processes were not found to be effective in reducing PCB concentrations or toxicity in Fox River sediments (FS Appendix F, "Dechlorination Memorandum"). Nevertheless, concentrations of PCBs in fish populations will respond slowly over time to slow natural decreases in concentrations in sediments and surface water due primarily to dilution and the burial of contaminated sediments by cleaner sediments.

For Alternative F, the mobility of the PCBs in capped areas (approximately 135 acres) would be reduced because these PCBs are sequestered under the cap. However, capping does not satisfy the CERCLA statutory preference for treatment. In addition, there is no reduction in the toxicity or volume of the PCBs under the cap. Under this alternative, the mass of PCBs and the volume of contaminated sediments within Little Lake Butte des Morts are permanently reduced because approximately 620,000 cubic yards of sediment would be removed, and approximately 150,000 cubic yards would be contained under a cap in OU 1. A total of approximately 1715 kg (about 3770 lbs) of total PCBs would be removed or isolated from the ecosystem by this alternative. In addition, after construction of the remedy is completed, natural attenuation processes could provide additional reductions in PCB concentrations in the remaining sediments and surface water.

For Alternatives C1, C2, D, and E, the mass of PCBs and volume of contaminated sediments in Little Lake Butte des Morts are permanently reduced because sediment volumes of approximately 784,000 cubic yards of contaminated sediment, containing a mass of total PCBs of approximately 1715 kg (about 3770 lbs) would be removed from the ecosystem. Also, as stated for Alternative F, after construction of the remedy is completed, natural attenuation processes would provide additional reductions in PCB concentrations in the remaining sediments and surface water.

While the active remedial alternatives (Alternatives C1, C2, D and F) would permanently remove large volumes of PCBs from the River (thereby reducing their mobility), they do not satisfy the statutory preference for treatment as a principal element of the remedy. Given the volume of material to be removed, treatment of the dredged material prior to off-site disposal may not be cost-effective, other than the stabilization of the sediments for handling purposes. During remedial design, WDNR will further consider the cost-effectiveness of vitrification for dredged material. Alternative E in the FS has been revised to consider vitrification. Vitrification would

reduce toxicity, mobility, and volume, and the glass aggregate product would be available for beneficial re-use.

Short-Term Effectiveness

Short-term Effectiveness relates to the length of time needed to implement an alternative and the risks the alternative poses to workers, residents and the environment during implementation up until the time that remediation levels are achieved.

Length of Time Needed to Implement the Remedy

The implementation times for the active alternatives are approximately 6 years for Alternatives C1 and C2, D, E and approximately 5 years for Alternative F. This represents the estimated time required for mobilization, operation and demobilization of the remedial work, but does not include the time required for long-term monitoring or O&M. The No Action and MNR alternatives do not involve any active remediation and therefore require no time to implement.

Protection of the Community and Workers During Remedial Action

No construction activities are associated with the remediation of sediments for the No Action and MNR alternatives, so neither alternative increases or decreases the short-term potential for direct contact with or ingestion and inhalation of PCBs from the surface water and sediments.

Community Protection. Access to sediment processing/transfer facilities and process and treatment areas under the active remediation alternatives (C1, C2, D, E and F) will be restricted to authorized personnel. Controlling access to the dredging locations and sediment processing/transfer facilities along with monitoring and engineering controls developed during the design phase will minimize potential short-term risks to the community. The design will also provide for appropriate control of air emissions, noise and light through the use of appropriate equipment that meets all applicable standards. Compliance with these design provisions will be monitored during construction, operation and demobilization. Vehicular traffic will increase due to workers and supply deliveries at the sediment processing and transfer facilities. These effects are likely to be minimal, in part because the transportation of sediments for disposal will take place within the Fox River area. If a beneficial use of some portion of the dredged material is arranged, then an appropriate transportation method will be determined (e.g, rail, truck, or barge).

For the active remediation alternatives (Alternative C1, C2, D, E and F), work in the River will also be designed with provisions for control of air emissions, noise and light. Work areas will be isolated (access-restricted), with an adequate buffer zone so that pleasure craft can safely avoid these areas. Environmental dredging in the River will be conducted at times and in ways to minimize disruption to river traffic. Targeted dredging will be sequenced and directed to ensure minimal impacts to navigation within the River. To help ensure that navigation is not impeded, WDNR and EPA will consult with the local authorities during remedial design and construction phases on issues related River usage, and other remedy-related activities within Little Lake Butte des Morts. Discrete areas of the River will be subject to dredging and related activities only over short periods of time; once an area is dredged, dredging equipment will move to another area, thereby minimizing locational impacts.

Based on air monitoring for the SMU 56/57 demonstration project, air emissions at dredging sites and at land-based facilities are expected to be minimal. Action levels will be established, monitoring conducted as required, and appropriate engineering control measures employed to ensure that any air releases do not exceed acceptable levels.

Vehicles used for the transportation of hazardous waste will be designed and operated in conformance with State and local regulations. WDNR and EPA will provide the community and

local government the opportunity to have input on plans related to the off- Site transportation of hazardous wastes. This approach is consistent with the NRC recommendation to involve the local communities in risk management decisions.

WDNR and EPA believe that implementation of any of the active remediation alternatives (C1, C2, D, E and F) will have little if any adverse impact on local businesses or recreational opportunities. Indeed, WDNR and EPA believe that the remedy will have substantial positive economic impacts on local communities and will facilitate enhanced recreational activities in and along the River. To the extent that any adverse local impacts do occur, WDNR and EPA expect that they will be short-term and manageable. Moreover, the Agencies believe that any such impacts will far outweigh the long-term benefits of the remediation on human health and the environment.

Worker Protection. For the No Action and MNR alternatives, occupational risks to persons performing the sampling activities (for the 5-year reviews) will be unchanged from current levels. There is some minimal increase in occupational risk associated with the MNR alternative due to the greater degree of sampling involved in the River.

For the five active remediation alternatives (C1, C2, D, E and F), potential occupational risks to Site workers from direct contact, ingestion and inhalation of PCBs from the surface water and sediments, as well as routine physical hazards associated with construction work and working on water, are higher than for the No Action and MNR alternatives. For these alternatives, as well as the No Action and MNR alternatives, personnel will follow a site-specific health and safety plan and OSHA health and safety procedures and wear the necessary personal protective equipment; thus, no unacceptable risks would be posed to workers during the implementation of the remedies.

In summary, the active remedial alternatives would not pose significant risk to the nearby communities. A short-term risk to the community and site workers may be possible as a result of potential air emissions and noise from construction equipment, dewatering operations, and hauling activities. However, as successfully shown during the Lower Fox River demonstration dredging projects, these risks can be effectively managed/minimized by: (1) coordinating with and involving the community; (2) limiting work hours; and (3) establishing buffer zones around the work areas; as well as through (4) using experienced contractors who would assist project design.

Environmental Impacts of Remedy and Controls

Environmental impacts consist of PCB releases from removed sediment into the air and water. As successfully shown during the Lower Fox River demonstration dredging projects, environmental releases will be minimized during remediation by (1) treating water prior to discharge; (2) controlling storm water run-on and runoff from staging and work areas; and (3) utilizing removal techniques that minimize losses; as well as through (4) the possible use of silt curtains where necessary to reduce the potential downstream transport of PCBs.

Habitat impacts from active remedial activities (Alternatives C1, C2, D, E and F) are expected to be minimal, as the benthic community should recover relatively quickly (see White Paper Number 8 for details) from dredging activities. Additionally, dredging remediation can result in collateral benefits in the course of mitigation, including removal of nuisance species, reintroduction of native species, aeration of compacted and anaerobic soils and other enhancements of submerged habitats. For the capping portion of Alternative F, there could be similar effects on aquatic vegetation and benthic invertebrate and fish communities, but recovery of benthic invertebrate communities would likely be slower (relative to recovery from

dredging) due to changes in the sub aqueous habitat to sand and rock as well as decreases in organic content of the sediment decreasing the organic content of the sediment.

Potential Adverse Environmental Impacts During Construction

No construction activities associated with the River sediments are conducted for the No Action and MNR alternatives. Neither continuation of the existing limited sampling activities for the No Action alternative nor the increased monitoring program for the MNR alternative is anticipated to have any adverse effect on the environment, beyond that already caused by the PCB contamination of the sediments and the ongoing releases of PCBs from those sediments in Little Lake Butte des Morts. For the five active remediation alternatives (C1, C2, D, E and F), the release of PCBs from the contaminated sediments into the surface water during construction (dredging and cap placement), will be controlled by operational practices (e.g., control of sediment removal rates, use of environmental dredges and possible use of sediment barriers). Although precautions to minimize resuspension will be taken, it is likely that there could be a localized temporary increase in suspended PCB concentrations in the water column and possibly in fish PCB body burdens. Analysis of results from projects on Deposit N and SMU 56/57, and comparison to yearly sediment resuspension rates, as well as resuspension quantities during yearly high flow events, shows the expected resuspension due to dredging to be well within the variability that normally occurs on a yearly basis. Analysis of results from other dredging projects indicates that releases from environmental dredging are relatively insignificant (substantially less than 1 percent of the mass of contaminants). The performance standards and attendant monitoring program developed during design will ensure that dredging operations are performed consistent with the environmental and public health goals of the project. This was readily achieved on the Deposit N and SMU 56/57 projects and is expected to be feasible for other River dredging activities.

Dredging activities may result in short-term temporary impacts to aquatic and wildlife habitat of the Little Lake Butte des Morts, but as discussed below, and in White Paper 8, "Habitat and Ecological Considerations as a Remedy Component for the Lower Fox River", it is expected that recovery would be rapid.

For the active remediation alternatives (C1, C2, D, E and F), there is the potential transient impact from the temporary exposure of deeper, more highly contaminated sediments during excavation activities. This impact would be minimized by the quick completion of removal activities, and (if needed) placement of a post-dredging sand cover as soon as practicable after the removal operations are complete.

Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility and coordination with other governmental entities are also considered.

Technical Feasibility

Both the No Action and MNR alternatives are technically feasible because no active measures other than continued sampling would be taken. Technical feasibility for the active remediation alternatives is discussed below in terms of the main components of the alternatives. Additional information is provided in the FS.

Sediment Processing/Transfer Facilities. Alternatives C1, C2, D, E and F require sediment processing/transfer facilities. At these facilities, the transfer, dewatering and stabilization of dredged material would be conducted. Each of these activities is considered a readily

implementable, commonly engineered activity. Design of sediment processing/transfer facilities will include requirements for the control of light, noise, air emissions, and water discharges.

WDNR and EPA have not determined the location of the sediment processing/transfer facilities. Preliminary criteria were utilized to establish a list of preliminary candidate sites to allow for the preparation of a cost estimate. In preparing the cost estimate in the Feasibility Study, WDNR and EPA assumed upland staging area in the vicinity of Arrowhead Park, at the southern end of Little Lake Butte des Morts. This facility (wherever located) would be temporary and removed after completion of the active remedial activities.

Removal. Alternatives C1, C2, D, E, and F require the dredging of contaminated sediments. Dredging of sediments is a readily implementable and environmentally effective engineering activity. Two concerns are relevant to whether sediments can be dredged effectively: 1) resuspension and releases during dredging and, 2) resulting residual contaminant concentrations that may remain in sediments after dredging is completed. Regarding resuspension, as discussed above environmental dredges have been shown to generally not release significant quantities of contaminants during removal operations. The type of dredging equipment (mechanical and/or hydraulic) will be selected during the remedial design, using the most appropriate equipment for the specific conditions in the River. The use of silt screens or other barriers, as appropriate, could further assist in limiting downstream migration of PCBs and may be used as well. Regarding post-dredging residual contaminant concentrations comparable projects indicate that achieving the 1 ppm Action Level in remaining sediments is readily achievable. The Fox River SMU 56/57 dredging project achieved a 96 percent reduction in the average concentration of contaminated sediments targeted for removal in that project. This is consistent with results for other dredging projects having similar site conditions (see Appendix B of the FS, and Hudson River White Paper ID 312663, "Post-Dredging PCB Residuals).

Dewatering. Alternatives C1, C2, D, E and F would require removal of excess water from dredged sediments. Either mechanical or passive dewatering would be used for this purpose. These are conventional, commonly utilized proven technologies, and are readily implementable and effective.

Water Treatment. Conventional water treatment technologies for dredge water have been proven commonly reliable, and are readily implementable and effective.

Capping. Alternative F includes some capping of areas that meet the criteria for areas that are acceptable for capping. The placement of capping materials is a readily implementable engineering activity. Sand, gravel and/or fine materials may be utilized for capping. Clean sand could be placed over contaminated deposits to give a surficial concentration in the capped areas that is essentially without contamination. The type (e.g., texture/size and sorting) of cap material will be determined on a location specific basis.

Post-Dredging Sand Cover. The selected alternative envisions an option of limited backfilling if required. The placement of backfill is a readily implementable engineering activity. Sand or other materials, as appropriate may be utilized for backfill.

Transportation. Dredged materials may be transported in-river to sediment processing / transfer facilities using barges or pipelines. These are considered readily implementable engineering activities. Transportation via pipeline is limited to certain distances because of pumping and right-of-way limitations. Consequently, in some areas of the River, pipelines may not be implementable.

Off-site transportation of dredged materials to disposal facilities will be by truck, rail and/or barge. These forms of transportation are routine engineering activities that have been employed at many Superfund sites and are technically implementable. WDNR and EPA will comply with all legal regulatory requirements for transporting both hazardous and non-hazardous wastes.

Disposal. Off-site disposal is a common activity at many Superfund sites. The number and location of off-site disposal facilities will be based on dredged material volume, transportation and cost considerations. It is expected that appropriate disposal will be in the Fox Valley area.

Alternatives C1, C2 and F all include disposal options. Alternative D uses an in-water confined disposal facility for disposal. These are conventional technologies and readily implementable. Under Alternative F, approximately 20 percent of the sediments will be capped in-situ (see Table 23, above). For the areas that will be capped, it is considered technically achievable. It should be noted that certain areas are not amenable to capping and are thus "off limits" for capping. This is because these areas fail to meet certain criteria for capping (e.g., sufficient water depth).

An ex-situ treatment alternative (Alternative E), vitrification, was determined to be technically feasible. This does require reuse of residual materials after treatment.

Treatment. Alternative E includes thermal treatment by vitrification, and is technically implementable to meet cleanup goals.

Administrative Feasibility

Both No Action and MNR require no active measures. All alternatives, except No Action include an administrative requirement for fish consumption advisories. Since fish consumption advisories are already in place, this alternative requirement is already met and would continue even under the No Action alternative. The active remedial measures are somewhat more difficult to implement from an administrative feasibility perspective due to the need for siting the sediment processing/transfer facilities and addressing the associated real property issues, and the need to make arrangements to utilize the River with minimal interruption of boat traffic.

Sediment Processing/Transfer Facilities. For the active remediation alternatives (Alternatives C1, C2, D, E and F), the transfer facilities, constructed on land adjacent to the River, or in-river, are considered "on-site" for the purposes of the permit exemption under CERCLA Section 121(e), although any such facilities will comply with the substantive requirements of any otherwise necessary Federal or State permits.

Removal. Operations under these alternatives will have to be performed in conformance with the substantive requirements of regulatory programs implemented by the U.S. Army Corps of Engineers under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. In addition, discharges during remediation will conform to Wisconsin Statutes and substantive WDNR regulations related to dredging and maintaining water quality.

Disposal. Identifying a local landfill for disposal of sediments dredged from Little Lake Butte des Morts is feasible. This would have to be coordinated with local authorities, consistent with appropriate ARARs.

Capping and CDF. For Alternative D and F, a lake bed grant would likely be required from the Wisconsin legislature to construct a cap or in-water CDF. If riparian rights exist, agreements with landowners with riparian rights would be required. These considerations would be addressed during design.

Treatment. Alternative E is administratively feasible. Air emissions permits would be required if sediments are treated off-site.

Availability of Services and Materials. For the No Action and MNR alternatives, all needed services and materials are available. For the active remediation alternatives (Alternatives C1, C2, D, E and F), equipment and personnel related to dredging and materials handling (e.g., sediment dewatering) are commercially available. Technology and associated goods and services for capping or a post-dredging sand cover, upland landfill or CDF construction are locally available.

Cost

Cost includes estimated capital and annual operation and maintenance costs, as well as total capitol cost. Present worth cost is the total capital cost and operation and maintenance costs of an alternative over time in today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent. (This is a standard assumption in accordance with EPA CERCLA guidance.)

The net present worth of the remedial alternatives range from $4.5 million for No Action to $116.7 million for Alternative C1. For the active remedial alternatives, the present worth of the capital and present worth of operation and maintenance costs which range from approximately $63.6 million for Alternative E to $116.7 million for Alternative C1. Capital costs, present worth of operation and maintenance costs, and the total costs are listed in Table 24, below.

Table 24 Comparison of Present Worth Costs for OU 1 Alternatives at the 1 ppm RAL

	Estimated Volume Removed or Contaminated (cubic yards)	Estimated PCB Mass Remediated (pounds)	Capital Costs ($ millions)	O&M Cost ($ millions)	Present Worth Total Cost ($ Millions)
A – No Action	0	0	0	4.5	4.5
B – Monitored Natural Recovery	0	0	0	9.9	9.9
C1 – Dredging/passive dewatering/off-site disposal	784,000	3770	112.2	4.5	116.7
C2 – Dredging/mechanical dewatering/off-site disposal	784,000	3770	61.7	4.5	66.2
D – Dredge to a Confined Disposal Facility	784,000	3770	63.5	4.5	68.0
E – Dredge and Vitrification	784,000	3770	59.1	4.5	63.6
F – Dredging and Capping to Maximum extent practicable	635,500	3770	86.0	4.5	90.5

From Section 7 and Appendix H of the FS.

11.1.3 Agency and Community Criteria for Operable Unit

Agency Acceptance
The State of Wisconsin has been actively involved in managing the resources of the Lower Fox River since before there was a federal Superfund law. These efforts have led to significant state knowledge and understanding of the River and Bay and of the contamination problems within those areas. As a result of this expertise, WDNR has served as the lead agency responsible for assessing risks and conducting the RI/FS, which forms the basis for the Proposed Plan and Record of Decision (ROD). As the lead agency, WDNR has worked closely with EPA to cooperatively develop this ROD. Both WDNR and EPA support the selection of this remedy as is evidenced by the joint issuance of this ROD by both WDNR and EPA.

Community Acceptance
Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance. Community acceptance of the Proposed Plan was evaluated based on comments received at the public meetings and during the public comment period. There were more than 4800 comments concerning the Proposed Plan. This ROD includes a responsiveness summary, Appendix B, which addresses public comments.

11.2 Operable Unit 2 (Appleton to Little Rapids)

Table 25 below summarizes the comparative analysis for OU 2 alternatives and how each alternative meets, or does not meet requirements for each of the nine criteria, described above.

A detailed comparative analysis for four of the nine criteria, Protection of Human Health and the Environment, Long-term Effectiveness and Permanence, Implementability and Cost are discussed below for all alternatives. A comparison for five of the nine criteria (Compliance with Applicable or Relevant and Appropriate Requirements, Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment, Short-term Effectiveness, Agency Acceptance and Community Acceptance) is substantially the same as Alternatives discussed in OU 1 and are therefore not repeated. Similar to the OU 1, Alternatives C and E for OU 2 are also considered "Active Remediation Alternatives."

The major differences between OU 1 and OU 2 that relate to this comparative analysis of alternatives are the following:

1) Mass of PCB contaminants in OU 2 is relatively small and potential for downstream release proportionally less, and result in a relatively faster time to recovery,
2) Bedrock immediately underlies contaminated sediment in the upper portion of the OU 2, where most of the deposits are located; this makes complete removal of contaminated materials impracticable,
3) Locks, dams, and the urban/residential setting of a considerable portion of OU 2 make access more difficult than in OU 1.

Table 25 Operable Unit 2. Appleton to Little Rapids Alternatives

		Selected Alternative		
Yes = Fully meets criteria Partial = Partially meets criteria No = Does not meet criteria	Alternative A No Action	Alternative B Monitored Natural Recovery	Alternative C Dredge with off site disposal	Alternative E Dredge and Virtification
1. Overall protection of human health and the environment	No	Partial	Partial	Partial
2. Compliance with Applicable or Relevant & Appropriate Requirements	No	Partial	Yes	Partial
3. Long-term Effectiveness and Permanence	No	Partial	Yes	Yes
4. Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment	No	No	Yes	Yes
5. Short-term Effectiveness	No	Partial	Partial	Partial
6. Implementability	Yes	Yes	Partial	Partial
7. Cost (millions of $)	$ 4.5	$ 9.9	$ 16.5 to 38.3	$ 15.2 to 26.2
8. Agency Acceptance	The WDNR has been the lead agency in developing the RI/FS and the ROD. Both WDNR and EPA support the selected alternative of Monitored Natural Recovery for this OU.			
9. Community Acceptance	The level of community acceptance of the selected alternative is outlined in the Responsiveness Summary.			

11.2.1 Threshold Criteria for Operable Unit 2

Protection of Human Health and the Environment

The primary risk to human health associated with the contaminated sediment is consumption of fish. The primary risk to the environment is the bioaccumulation of PCBs from the consumption of fish or, for invertebrates, the direct ingestion/consumption of sediment. Similar to the evaluation for OU 1, protection of human health and the environment was evaluated using five lines of evidence:

- Residual PCB concentrations in surficial sediment using surface-weighted averaging after completion of a remedy;
- Average PCB concentrations in surface water,
- The projected number of years required to reach safe consumption of fish;
- The projected number of years required to reach a surface sediment concentration protective of fish or other biota, and
- PCB loadings to downstream areas and total mass contained or removed.

These are discussed below.

Residual PCB concentrations in surficial sediment and surface water

Alternatives C and E for OU 2 could achieve greater reductions in average concentration of contaminants in surficial sediment and in surface water relative to the No Action and MNR Alternatives (Alternatives A and B, respectively) – see Table 26 below. Alternatives C and E produce a reduction in residual PCB concentrations in surface sediment using surface-weighted averaging after completion, when compared to the No Action or MNR Alternatives. The estimated surface water concentrations 30-years after remediation is reduced 93 percent for Alternatives C or E relative to No Action and Monitored Natural Recovery (i.e., 0.19 ng/L versus 2.76 ng/L in Table 26, below). It should be noted that these estimates do not take into account the already completed removal of Deposit N that occurred during 1998-1999. Deposit N comprised 32 percent of the mass (i.e., 65 pounds) of PCBs in OU 2. More recent calculation estimated the average SWAC for OU 2 is 0.61 ppm with the PCB mass from Deposit N and O removed.

Table 26 Post-Remediation Sediment and Surface Water Concentrations in OU 2

Alternative	Average PCB Concentrations in Surficial Sediments (ppm)	Estimated Surface Water Concentrations 30-years after Remediation (ng/L)[3]
A, B	0.61[1]	2.76
C, E	0.066[2]	0.19

1. Value is from November 14, 2002 email from RETEC to WDNR on SWAC values in OUs 1 – 4
2. Value is from FS Tables 5-4
3. Values are from Table 8-5 B

Time to Reach Acceptable Fish Tissue Concentrations

Reductions in the time required to reach levels safe for human consumption of fish after implementation of Alternatives C and E relative to the No Action and Monitored Natural Recovery (MNR) alternatives are listed in Table 27 below. Recovery times for other human health receptors are presented in the FS, Chapter 8, Table 8-7. Again, these calculations do not consider the removal of Deposit N, completed by WDNR during 1998-1999.

Table 27 Time to Achieve Acceptable Fish Tissue Concentrations for Walleye in OU 2 at 1 ppm

Fish	Receptor	Risk Level Goal	Estimated Years to Achieve	
			Alternatives C, E	Alternatives A, B
Walleye	Recreational Angler	RME Hazard Index of 1.0	4*	40
Walleye	High Intake Fish Consumer	RME Hazard Index of 1.0	7*	55
Walleye	Recreational Angler	RME 10^{-5} cancer risk level	70*	42
Walleye	High Intake Fish Consumer	RME 10^{-5} cancer risk level	89*	65

** Does not consider removal of Deposit N.*
Data is from FS Table 8-14.

Time to Surface Sediment Concentration Protective of Fish or Other Biota

Alternatives C and E would achieve rreductions in the time required to reach protective levels for ecological receptors, relative to the No Action and MNR alternatives. For representative receptors, implementation of active remediation alternatives results in time reduction relative to

No Action or MNR as is shown in Table 28, below. Recovery times for additional ecological receptors and recovery times are presented in the FS, Chapter 8, Table 8-7. These calculations do not consider removal of Deposit N that occurred during 1998-1999.

Table 28 Time to Protective Levels in Sediments for Representative Ecological Receptors in OU 2.

Fish	Receptor	Risk Level Goal	Estimated years to achieve	
			Alternatives C, E	Alternatives A, B
Carp	Carnivorous bird	NOAEC	17*	71
Carp	Piscivorous mammal	NOAEC	34*	100
Sediment	Sediment invertebrate	TEL	28*	81

** Does not consider removal of Deposit N.*
Data is from FS Table 8-16.

PCB loadings to downstream areas and total mass contained or removed
Reduction of the PCB load transported over the Little Rapids Dam into the downstream areas of the Fox River is a measure of the overall protection of human health and the environment. Reduced PCB loading from OU 2 will ultimately contribute to reduction of concentrations of PCBs in sediment, water and fish, and thereby reduce risk to humans and ecological receptors in the Fox River. Alternatives C or E provide for improvement relative to No Action and MNR.

Summary
No Action and MNR may take 40 to 70 years to reach acceptable fish tissue concentrations for recreational anglers and may take more than 80 years to reach safe ecological levels for carp. Surface water WQS will not be met in 100 years. However, the recovery times may be overestimated, as these estimates do not consider the removal of Deposit N, which occurred during 1998-1999. Finally, although Alternatives C or E provide a more protective remedy than the No Action and MNR alternatives, risks would only be moderately reduced.

The comparative analysis for compliance with Applicable or Relevant and Appropriate Requirements is substantially the same as discussed for the OU 1 evaluation and is not repeated.

11.2.2 Balancing Criteria for Operable Unit 2

Long-term Effectiveness and Permanence

Reduction of Residual Risk
The No Action and MNR alternatives result in a continuation of the degraded condition of the sediments and surface water quality of OU 2, for at least several decades. Nevertheless, modeling demonstrates that OU 2 will eventually recover, due to slow natural decreases in PCB concentrations, primarily due to burial and dilution.

Alternatives C and E would reduce residual risk through removal of 46,200 cubic yards of sediments containing approximately 92 kg (about 200 pounds) of PCBs over an area of 34 acres at the 1 ppm RAL for OU 1. This does result in a reduction in time required to reach safe human fish consumption rates when compared to the No Action and MNR Alternatives. However, based on results already achieved at the Deposit N project with conditions representative of those present in the remainder of OU 2 (bedrock underlying contaminated

sediments), it may not be possible to consistently meet the RAL of 1 ppm. The Deposit N pilot project demonstrated that a significant percentage of PCB contaminated sediment could be removed, although it did not nor was it designed to, demonstrate that a consistent reduction in contaminant concentration in residual sediments was feasible. This is especially true for the portions of OU 2 where there is bedrock underlying contaminated sediments.

Reliability of Controls

For Alternatives C and E, No Action and MNR, fish consumption advisories and fishing restrictions can provide limited protection to humans until PCB concentrations in fish are reduced to the point where the fish consumption advisories and fishing restrictions can be relaxed or discontinued entirely.

Alternatives C and E permanently remove contaminated sediment from the River, and can achieve risk reduction as well as reduce the potential of releases by scour of PCB-contaminated sediments. Alternatives C and E utilize established technologies and are considered in part to be sufficiently reliable. As discussed below, dredging does not work well with bedrock underlying shallow sediment deposits (as is present for most of the sediment deposits in OU 2).

Summary

Based on the above analysis of reduction in residual risk and adequacy and reliability of controls, Alternatives C and E are marginally better than the No Action and MNR alternatives but are likely to have difficulty in consistently achieving the 1 ppm RAL.

Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility and coordination with other governmental entities are also considered.

Both the No Action and MNR alternatives are technically feasible, as no active measures would be taken for the PCB-contaminated sediments.

Technical feasibility for the active remediation alternatives is discussed below for operational aspects of the alternatives that differ from OU 1.

Sediment Processing/Transfer Facilities – WDNR and EPA have not determined the location of the sediment processing/transfer facilities for Alternatives C and E. Preliminary criteria were utilized to establish a list of preliminary candidate sites to allow for the preparation of a cost estimate. This analysis indicates that several access locations would be required due to navigation impediments by numerous dams and locks between the Appleton dam and Little Rapids dam. For cost purposes, access locations were assumed in Kimberly, near Wrightstown and near the Little Rapids dam. Due to the number of access locations required and the physical barriers presented by the many locks and dams in this Operable Unit, access limitations would make implementation more difficult or could require modifications to conventional dredging technologies.

Removal - Alternatives C and E require the dredging of contaminated sediments. For the majority of OU 2, bedrock underlying contaminated sediments may make complete removal of contaminated sediment and achieving the Action Level objective of 1 ppm impracticable. Additionally, due to higher water velocities for this Operable Unit, a post-dredging sand cover would likely not be effective in reliably covering post-dredging high concentrations of residual PCBs due to the greater water velocities.

Summary
Alternatives C and E may be difficult to effectively implement due to site conditions with bedrock underlying contaminated sediments, and the large number of locks and dams which would limit river access and navigation. Administrative implementability would be consistent with OU 1.

Cost
Cost includes estimated capital and annual operation and maintenance costs, as well as total capitol cost. Present worth cost is the total capital cost and operation and maintenance costs of an alternative over time in today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent. (This is a standard assumption in accordance with EPA CERCLA guidance.)

The net present worth of the remedial alternatives range from $4.5 million for No Action to $20.1 million for Alternative C (see Table 29, below).

The comparative analysis for Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment, and Short-term Effectiveness is substantially the same as for the OU 1 evaluation and are not repeated.

11.2.3 Agency and Community Criteria for Operable Unit 2

The comparative analysis for Agency Acceptance and Community Acceptance is substantially the same as discussed for the OU 1 evaluation and is not repeated.

Table 29 Comparison of Present Worth Costs for OU 2 Alternatives at a 1 ppm RAL

	Estimated Volume Removed or contained (cubic yards)	Estimated PCB Mass Remediated (pounds)	Capital Costs ($ millions)	O&M Cost ($ millions)	Present-Worth Total Cost ($ millions)
A – No Action	0	0	0	4.5	4.5
B – Monitored Natural Recovery	0	0	0	9.9	9.9
C – Dredging/passive dewatering/off-site disposal	46,200	200	33.8	4.5	20.1
E – Dredge and Vitrification	46,200	200	21.7	4.5	17.1

From Section 7 and Appendix H of the FS.

12. PRINCIPAL THREAT WASTES

The National Contingency Plan (NCP) establishes an expectation that treatment will be used to address the principal threats at a site whenever practical. Engineering controls, such as on-site or off-site containment, may be used for wastes that pose a relatively low long-term threat or where treatment is impractical (NCP Section 300.430(a)(1)(iii) and Superfund Publication 9380.3-06FS, November 1991 "A Guide to Principal Threat and Low Level Threat Wastes").

The concept of principal threat and low-level threat wastes is applied on a site-specific basis when characterizing source material. Source material is defined as material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, to surface water, to air, or acts as a source for direct

exposure. In the Lower Fox River and Green Bay Site, the contaminated sediment are source materials.

Principal threat wastes are those source materials considered to be highly toxic or highly mobile which cannot be reliably contained or that would present a significant risk to human health or the environment should exposure occur. The manner in which principal threats are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied. Although USEPA has not established a threshold level of toxicity/risk to identify a principal threat waste, generally where toxicity and mobility of source material combine to pose a potential risk of 10^{-3} or greater the source material is considered principal threat waste.

With respect to the Fox River sediments in OU 1, some PCB concentrations create a risk in the range of 10^{-3} or more. The preference for treatment outlined above applies to these particular sediments. However, it would be impracticable to closely identify, isolate and treat these principal threat wastes differently than the other PCB sediments in OU 1. The dredging technology that will be employed to accomplish the OU 1 remedy does not distinguish among gradations of contamination in source materials. Nevertheless, at the conclusion of the OU 1 remedy the source materials (and principal threat wastes) will have been removed from the River, dewatered, and deposited in a landfill. In so doing the mobility of the principal threat wastes will have been greatly reduced.

13. SELECTED REMEDY

13.1 The Selected Remedy

The selected remedy for OU 1 is alternative C2. This remedy includes removal, dewatering, and off-site disposal of an estimated 784,200 cubic yards of PCB-contaminated sediment from OU 1 (Little Lake Butte des Morts) with PCB concentrations greater than 1 ppm. These sediments are estimated to contain approximately 1,715 kg (about 3,770lbs) of PCBs, or approximately 90 percent of the total PCB mass in OU 1.

The selected remedy for OU 2 is Alternative B, Monitored Natural Recovery and Institutional Controls.

Summary and Description of the Rationale for the Selected Remedy

The summary of the rationale for the selected remedy will be addressed for each Operable Unit. The following sections discuss specifics of how the selected alternative would be implemented at each OU. Five-year reviews will be conducted of remedial activities at each OU to determine remedy effectiveness.

Operable Unit 1 – Little Lake Butte des Morts, Alternative C2 - Alternative C2 includes the removal of sediment with PCB concentrations greater than the 1.0 ppm remedial action level (RAL) using an environmental dredge, followed by dewatering and off-site disposal of the sediment. The total volume of sediment to be dredged in this alternative is approximately 784,200 cy.

- **Site Mobilization and Preparation.** The staging area for this OU will be determined during the design stage. Site preparation at the staging area will include collecting soil samples, securing the onshore property area for equipment staging, and constructing the mechanical sediment dewatering facility, water treatment facilities, and sediment storage and truck loading areas. A docking facility for dredging may need to be constructed. Assuming a

staging area can be found south of the railroad bridge, a separate staging area for the dredge when operating north of the railroad bridge may be needed. This facility would be used solely for the purpose of docking dredging equipment—any dredge slurry will be pumped to southern staging area.

- **Sediment Removal.** Sediment removal will be conducted using a dredge (e.g., cutterhead or horizontal auger or other method). Given the volumes and operating assumptions described in the FS, completing the removal effort is estimated to take approximately six years for OU 1. For a dredging removal, in-water pipelines will carry the slurry from the dredging area to the staging area for dewatering. For longer pipeline runs, it would be necessary to utilize in-line booster pumps to pump the slurry to the dewatering facility. If necessary, silt curtains around the dredging area may be used to minimize sediment resuspension downstream of the dredging operation. Buoys and other waterway markers will be installed around the perimeter of the work area. Other activities associated with sediment removal will be water quality monitoring, post-removal sediment surveys, and site restoration.
- **Sediment Dewatering.** Removal using dredging technologies will require mechanical dewatering requiring land purchase or access, site clearing, and possibly construction of temporary holding ponds. Dewatering techniques would likely be similar to the mechanical processes used for both Lower Fox River demonstration projects, including a series of shaker screens, hydrocyclones, and belt filter presses.
- **Water Treatment.** Water treatment will require the purchase of equipment and materials for flocculation, clarification, and sand filtration. Water treatment will be conducted 24 hours per day, 7 days per week during the dredging season. Discharge water for hydraulic dredging is estimated at 570,000 gallons per day. Daily discharge water quality monitoring is included in the cost estimate. Treated water will be sampled and analyzed to verify compliance with the appropriate discharge requirements. Carbon filtration will likely be necessary.
- **Sediment Disposal.** Sediment disposal includes the loading and transportation of the sediment to an NR 500 landfill with TSCA approval (needed for sediment if concentrations are over 50 mg/kg PCB) after mechanical dewatering. The sediment will be loaded using a front-end loader into tractor-trailer end dumps fitted with bed liners or sealed gates. Each load will be manifested and weighed. The haul trucks will pass through a wheel wash prior to leaving the staging area to prevent the tracking of soil onto nearby streets and highways.
- **Demobilization and Site Restoration.** Demobilization and site restoration will involve removing all equipment from the staging and work areas and restoring the site to, at a minimum, its original condition.
- **Institutional Controls and Monitoring.** Baseline monitoring will include pre- and post-remedial sampling of water, sediment, and biological tissue. Monitoring during implementation will include air and surface water sampling. Verification monitoring to confirm that PCB contamination has been removed to the RAL may include surface and subsurface sediment sampling. Long-term monitoring will include surface water, biological tissue, and possibly surface sediment sampling. The types and frequency of pre-construction monitoring will be developed during remedial design. Plans for monitoring during and after construction will be developed during the remedial design and modified during and after construction as appropriate. Institutional controls may include access restrictions, land use or water use restrictions, dredging moratoriums, fish consumption advisories, and domestic water supply restrictions. Land and water use restrictions and access restrictions may require local or state legislative action to prevent inappropriate use or development of contaminated areas.

- **Achievement of Remedial Action Level Objective.** The mass and volume to be remediated will be based on setting a dredge elevation based on a RAL of 1 ppm while achieving a SWAC of 0.25 ppm for OU 1. The success of the selected remedy for OU 1 will be evaluated based on a SWAC of 0.25 ppm with samples taken from 0-10 cm depth. This is discussed further in section 13.3.

Operable Unit 2 – Appleton to Little Rapids, Alternative B - The MNR alternative will include a 40-year monitoring program as is discussed in the FS for measuring PCB and mercury levels in water, sediment, invertebrates, fish, and birds. The monitoring program will be developed to effectively measure achievement of and progress toward the RAOs. In summary, the monitoring program will include:

- Surface water quality sampling to determine the downstream transport of PCB mass into Green Bay;
- Fish and waterfowl tissue sampling to determine the residual risk of PCB and mercury consumption to human receptors;
- Fish, bird, and zebra mussel tissue sampling to determine the residual risk of PCB uptake to environmental receptors;
- Population studies of bald eagles and double-crested cormorants to assess the residual effects of PCBs and mercury on reproductive viability; and
- Possible surface sediment sampling in MNR areas to assess potential recontamination from upstream sources and the status of natural recovery.

The types and frequency of pre-construction monitoring will be developed during MNR long term monitoring plan design. Plans for monitoring will be developed during the remedial design and modified during and after the upstream construction in OU 1, as appropriate.

Until the RAOs have been achieved, existing institutional controls will have to be maintained to help prevent exposure of human receptors to contaminants. Institutional controls may include access restrictions, land use or water use restrictions, dredging moratoriums, fish consumption advisories, and domestic water supply restrictions. Land and water use restrictions and access restrictions may require local or state legislative action to prevent inappropriate use or development of contaminated areas. Deposit DD, an area in OU 2 of greater contamination, will be addressed as part of the active remediation at adjacent OU 3.

13.2 Summary of the Estimated Costs of the Selected Remedy

The total estimated present-worth cost of the selected remedy is $76.1 million. This is an engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost (based on year 2001 dollars). Changes in the cost elements are likely to occur as a result of new information and data collected during the remedial design. Major changes may be documented in a memorandum in the administrative record, an Explanation of Significant Difference (ESD), or a ROD amendment.

13.3 Cleanup Standards and Outcomes for the Selected Remedy

The selection of a remedy was accomplished through the evaluation of the nine criteria as specified in the NCP. A remedy selected for a site must be protective of human health and the environment, comply with ARARs (or justify a waiver) and offer the best balance of tradeoffs with respect to the balancing and modifying criteria in the NCP.

Through the analyses conducted for the RI/FS, WDNR and EPA have determined that there is an unacceptable risk to human health and the environment from the consumption of fish from the Fox River. It has also been determined that the unacceptable risk will continue for many decades without active remediation of the PCB-contaminated sediments in OU 1.

13.3.1 Achieving Cleanup Standards

WDNR and EPA believe the removal of sediments with PCB concentrations greater than the 1.0 ppm RAL in OU 1 is important to achieving the timely reduction of risks to an acceptable level. WDNR and EPA envision that all sediment contaminated at concentrations above the RAL in OU 1 will be removed. Therefore, this ROD provides that under certain circumstances a sand cover may be used to supplement the primary dredging remedy in order to reach the risk reduction targets. Pre-remediation sampling and characterization efforts will define a spatial "footprint" (both horizontally and vertically) of the sediment in OU 1 that has a concentration of PCBs greater than 1 ppm. It is this footprint that is targeted for removal by dredging. If dredging is able to achieve this result (i.e., remove all sediments with PCB concentrations greater than 1 ppm), the active remediation portion of the OU 1 remedy will be complete.

However, if after dredging is completed for OU 1, sampling shows that the 1 ppm RAL has not been achieved, a SWAC of 0.25 ppm may be used to assess the effectiveness of PCB removal. If that SWAC of 0.25 ppm has not been achieved for OU 1, then the remedy provides certain options to further reduce risk. The first option is that additional dredging may be undertaken to ensure that all sediments with PCB concentrations greater than the 1 ppm RAL are removed throughout the particular deposit. A second option would be to place a sand cover on dredged areas to reduce surficial concentrations such that a SWAC of 0.25 ppm for OU 1 is achieved.

13.3.2 Expected Outcomes of Selected Remedy and RAL Rationale

RAOs were developed to provide relative comparisons for different remedial alternatives. RAO 1 relates to achieving surface water quality standards. RAOs 2 and 3 relate to protectiveness for human and ecological receptors. RAO 4 evaluates long-term relative releases to Green

Explanation of Remedial Action Level, Surface Weighted Average Concentration and Sediment Quality Threshold.

The term Remedial Action Level ("RAL") refers to a PCB concentration in sediment used to define an area or volume of contaminated sediment that is targeted for remediation. In other words, this ROD calls for the removal by dredging of all sediment in OU 1 that has a PCB concentration of greater than1 ppm. If all sediment with a concentration greater than the 1 ppm RAL is removed, then it is expected that the residual Surface Weighted Average Concentration ("SWAC") of sediment will be 0.19 ppm in OU 1. The SWAC in this instance is less than the RAL because the SWAC is calculated as an average concentration over the entire OU 1, after the removal of sediment from discrete areas ("deposits") which are above the RAL and includes averaging over areas in which there are surface concentrations less that the RAL. SWAC calculations are discussed in section 5 of the FS.

The term "Sediment Quality Threshold" (SQT) refers to the PCB concentration in the sediment that is protective of specified human and ecological receptors. SQTs vary depending on the sensitivity of the particular receptor (e.g., recreational anglers, "high intake" fish consumers, walleye, mink, etc.). Put another way, if the remediation called for in this ROD results in a sediment concentration at or below the SQT, then the risk to specified human and ecological receptors will have been reduced to a safe level. It is important to understand that immediately upon the completion of the dredging, it is not expected that the SQT will be achieved. Instead, it is contemplated that the SQT will be met only after the river is allowed a certain amount of time to "recover" through natural processes following active dredging.

Bay and Lake Michigan, and RAO 5 considers short term releases from potential remedies themselves.

RAO 1 may not be achieved in the foreseeable future due to the very stringent goals for PCBs acceptable in surface waters, but nevertheless significant risk reduction will occur (Table 13). Recovery times estimated for RAOs 2 (i.e., protection of human health) and 3 (i.e., protection of ecological receptors) indicate that they will be met well within the defined goals. RAO4 relates to loading of Green Bay and Lake Michigan and indirectly relate to OUs 1 and 2. However, reductions of loadings from removal of contaminants in OU 1 will significantly reduce contaminant migration downstream and will therefore contribute to achieving RAO4. RAO5 is achievable with conventional removal environmental removal technologies for OU 1 and does not apply to OU 2.

RAOs 2 and 3 are evaluated in the alternative-specific Risk Assessment in the FS by estimating the time required to reach the protectiveness criteria for human health (i.e., removal of fish advisories) and the time required to reach the protectiveness criteria for ecological receptors for no removal and for different remedial action levels for contaminant removal.

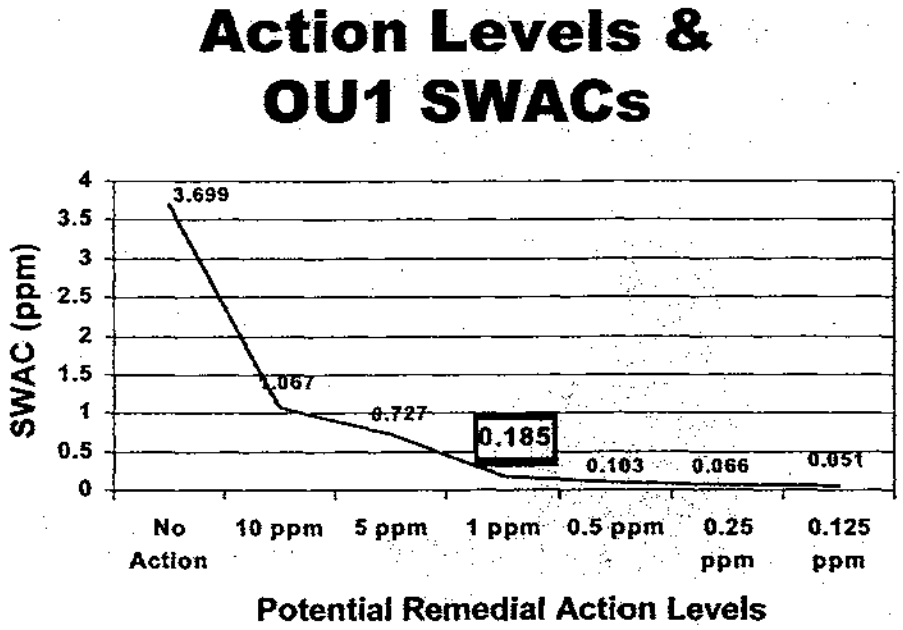
A PCB concentration of 1 ppm has been selected as the appropriate Remedial Action Level based on the its ability to achieve Remedial Action Objectives (RAOs) in surface water and for human health and ecological receptors within a reasonable timeframe relative to the anticipated costs. Exposures to PCB sediment concentrations above 1 ppm must be eliminated in order to achieve a protective Surface Weighted Average Concentration (SWAC) within a reasonable timeframe. This RAL will also reduce and minimize surface water concentrations and the release of contaminants to downstream areas of the Fox River. Studies conducted as part of the Lower Fox River and Green Bay RI/FS indicate that a 1 ppm RAL shows the greatest decrease in projected surface water concentrations relative to the other action levels.

PCB RALs of No Action, 5.0 ppm, 0.5 ppm, 0.25 ppm, and 0.125 ppm were also evaluated. However, those RALs greater than 1 ppm would require a significant amount of additional time to achieve the RAOs for the Site. For those RALs less than 1 ppm: the RAOs would not necessarily be achieved sooner than the 1 ppm RAL. The RAOs considered in determination of the RAL are discussed below for Operable Units 1 and 2. It is important to note that the absolute numbers have uncertainty inherent with model predictions, however relative differences among the RALs are reliable

<u>Justification for Operable Unit 1 Remedial Action Level of 1.0 ppm</u>

Figure 5 shows our modeling analysis of sediment RALs in comparison with the Surface Weighted Average Concentrations (SWACs) which will result from the cleanup at the selected 1 ppm RAL. Modeling suggests that a 1 ppm RAL can achieve an estimated 0.185 ppm PCB SWAC for OU 1 (Figure 5 below). Selecting a sediment RAL of 1 ppm clearly stands out as the most effective RAL because the risk declines significantly in a reasonable time period (see figures 6 and figure 7). This will result in reaching risk reductions in the years estimated in Table 30, below.

Figure 5 Remedial Action Levels and Estimated SWACS for Evaluated RALs for OU 1 (from FS Table 5-4)



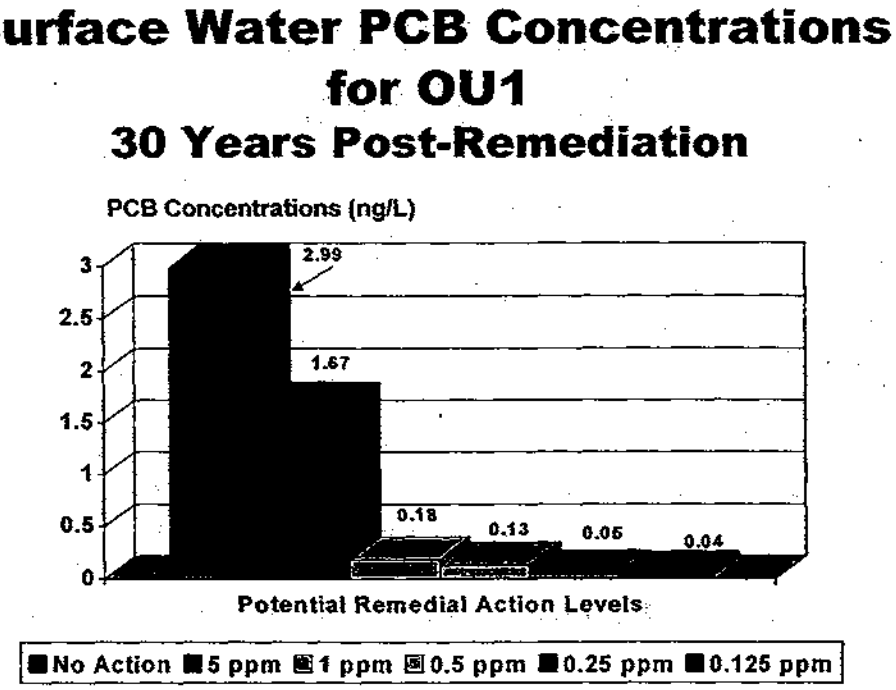
As shown in Table 30 below, modeling suggests that a sediment RAL of 1.0 ppm, and a SWAC of 0.185 ppm will lead to fairly rapid declines in PCB fish tissue concentrations. Using the 1 ppm RAL, Table 30 projects the number of years until the risk of fish ingestion/consumption declines to acceptable levels for different consumers.

Table 30 Estimated Years to Reach Human Health and Ecological Thresholds to Achieve Risk Reduction for the Operable Unit 1 at a RAL of 1.0 ppm

Fish	Receptor	Risk Level Goal	Estimated Years
Walleye	Recreational Angler	RME Hazard Index of 1.0	<1
Walleye	High Intake Fish Consumer	RME Hazard Index of 1.0	4
Walleye	Recreational Angler	RME 10^{-5} cancer risk level	9
Walleye	High Intake Fish Consumer	RME 10^{-5} cancer risk level	14
Carp	Carnivorous bird	NOAEC	14
Carp	Piscivorous mammal	NOAEC	29

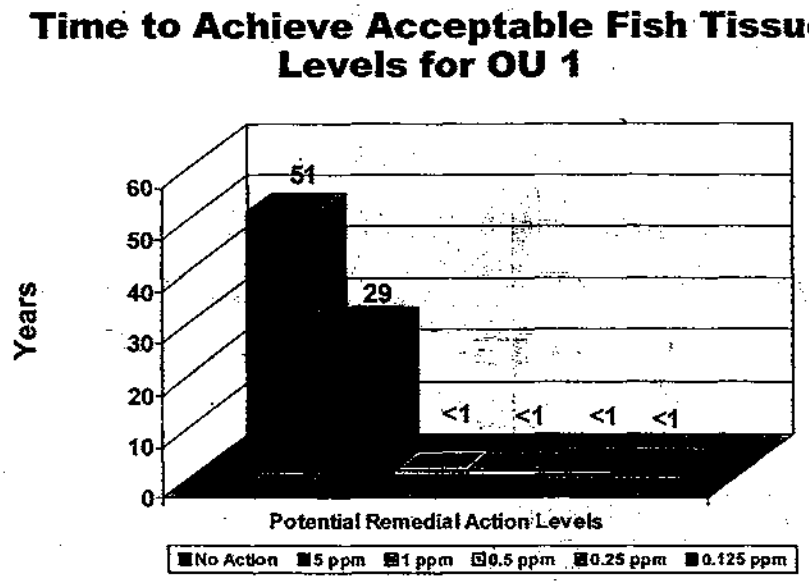
A 1 ppm RAL shows the greatest decrease in projected surface water concentrations. Figure 6 shows model estimates for PCB surface water concentration 30 years after remediation are 2.99 ng/L for No Action, 1.67 ng/L for 5 ppm, and 0.18 ng/L for 1 ppm, which is the largest relative drop. Additional declines for projected surface water concentrations for RAL less than 1 ppm are relatively minimal: 0.13 ng/L, 0.05 ng/L and 0.04 ng/L, respectively for 0.5 ppm, 0.25 ppm and 0.125 ppm RALs. In other words, selection of an RAL less than 1 ppm would only marginally reduce the SWAC and would only marginally reduce surface water concentrations. Thus, a comparison of various RALs shows the 1 ppm RAL has the greatest relative post-remediation decrease in surface water concentrations.

Figure 6 **Estimates of Surface Water PCB Concentrations for the Evaluated RALs 30 Years After Completion of Remedial Activities for OU 1**



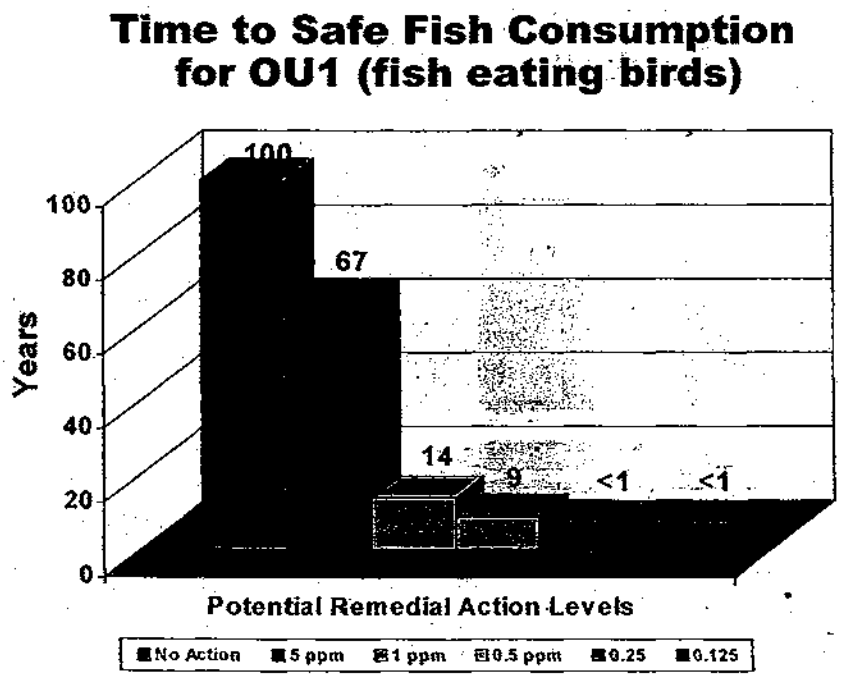
As shown in Figure 7, a 1 ppm RAL shows similar relative decreases in relation to acceptable fish tissue concentrations for walleye. Figure 7 shows that for RAL concentrations greater than 1 ppm, significantly more years will elapse before the risk of fish consumption declines to acceptable levels. The time that it would take to acceptable fish tissue concentrations are 51 years for No Action, 29 years at a RAL of 5 ppm and less than 1 year for a RAL of 1 ppm. The time needed to reach acceptable fish tissue concentrations for RALs less than 1 ppm (0.5 ppm, 0.25 and 0.125 ppm) are almost indistinguishable from the 1 ppm level. Other species of fish show similar reductions and are discussed in detail in the Feasibility Study Chapter 8. Figure 7 clearly shows that there is limited risk reduction achieved by selecting an RAL of less than 1 ppm.

Figure 7 Time to Achieve Acceptable Fish Tissue Concentrations for OU 1



Safe fish consumption by birds showed similar relative reductions for 1 ppm versus other potential cleanup levels (Figure 8). For fish eating birds, the time needed to reach safe fish consumption is 100 years for No Action, 67 years for a 5 ppm RAL, 14 years for a 1 ppm RAL (the greatest relative reduction in time), and 9 years for 0.5 ppm RAL. Thus, similar to the earlier figures, the 1 ppm RAL provides the greatest relative reduction of time to ecosystem recovery.

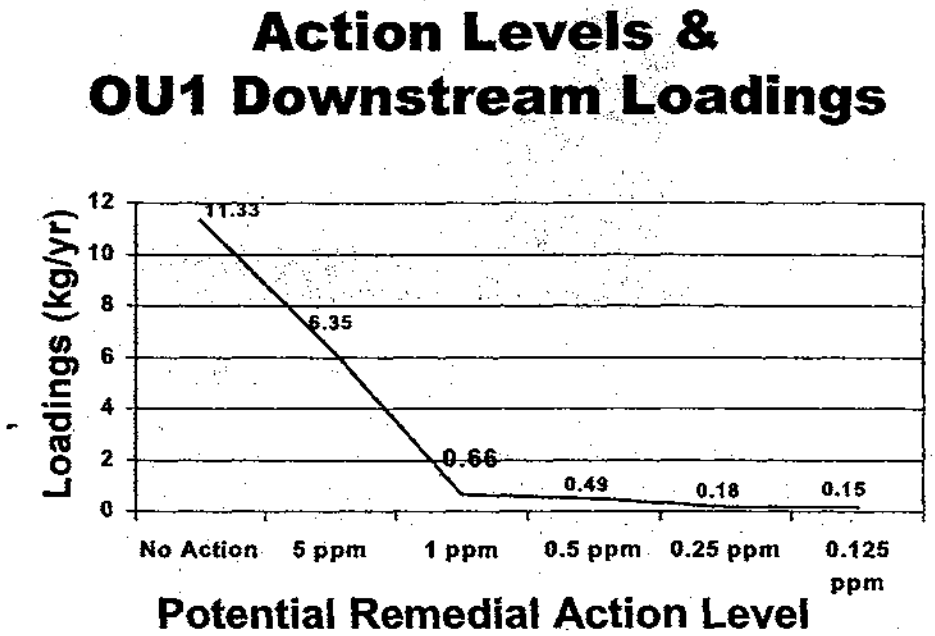
Figure 8 Time to Safe Fish Consumption by Birds in OU 1



A 1 ppm RAL is also the most protective based on estimates of downstream loadings (i.e., movement and migration of PCBs into other areas of the River and eventually Green Bay). Downstream loadings of PCBs from OU 1 relative to remedial activities, are as follows: No

Action - 11.33 kg/year, 5 ppm - 6.35 kg/year, 1 ppm – 0.66 kg/year, 0.5 ppm – 0.49 kg/year, 0.25 ppm – 0.18 kg/year, 0.125 ppm – 0.15 kg/year (Figure 9). The RAL of 1 ppm provides the greatest decrease in downstream loadings relative to the other RALs. Like earlier Figures, Figure 9 shows clearly that, with respect to downstream loadings, the 1 ppm RALs level achieves the most reduction.

Figure 9 RALs and Downstream Loadings in OU 1



In summary, the 1 ppm RAL shows the greatest relative improvement for all the pertinent RAOs resulting in a protective and cost effective cleanup level for OU 1.

Justification for Monitored Natural Recovery for OU 2

WDNR and EPA have determined that Monitored Natural Recovery (MNR) for OU 2 is sufficiently protective of human health and the environment. However, because of Deposit DD proximately to OU 3, the decision on whether to remediate this deposit will be deferred until the ROD for OU 3 is prepared.

The mass of PCBs and volume of contaminated sediments in OU 2 is approximately 109 kg and 339,200 cubic yards, respectively, for all deposit and interdeposit sediments. This is a small portion (2.4 percent) of the PCB mass and sediment volume in the entire 39 miles of the Lower Fox River, which includes 29,855 kg (66,050 pounds) and 14,061,100 cy, respectively. The 20-miles River reach of OU 2 is a relatively long stretch of the River and includes 22 deposits with relatively small sediment volume and PCB mass. Within OU 2, the deposits with the two largest masses are Deposit N (30 kg [65 pounds]) and Deposit DD (34 kg [74 pounds]). These two deposits account for 58 percent of the total PCB mass in this reach; a majority of the PCB mass at Deposit N was removed during the pilot project at that location, and the agencies will evaluate the feasibility of remediating Deposit DD as part of the OU 3 ROD. Because the removal of all the material from Deposit N is not reflected in the volume estimates in the RI/FS, risk for this reach may be overestimated. An evaluation of sediment volumes within individual deposits in OU 2 shows there are no deposits with a sediment volume greater than 10,000 cy having a PCB concentration above the 1.0 ppm action level. This demonstrates that the areas within this Operable Unit needing remediation are relatively few and that the risk of exposure from one of

these areas with higher concentration is low. In addition, the SWAC for OU 2, with no active remediation, is 0.61 ppm. This existing SWAC is close to the 0.25 ppm SWAC goal of OU 1.

In addition to the small physical size and the small quantity of PCB mass within the deposits in this reach, there are numerous impediments, such as the presence of several dams, the physical characteristics of the River in this reach, and the lack of good staging areas, that would cause difficulties in implementation and in mobilizing and operating dredging equipment. These same features also limit the ability to effectively cap the areas within this reach. These impediments would necessitate multiple staging areas. The cost estimate for dredging within this reach at the 1.0 ppm action level is $20.2 million to remove 46,200 cy of contaminated sediment. The cost to remediate this river sediment would be almost $440 /cy.

In addition to the above practical considerations, achieving of contaminant concentration (i.e., risk) reductions would be more difficult for dredging areas where bedrock immediately underlies contaminated sediment. Results on projects such as Deposit N or projects with similar conditions (e.g., Manistique River/Harbor) support the idea that achieving reductions in contaminant concentrations would be difficult. Thus, a dredging remedy for a large portion of this reach would be expected to be less effective and could be more costly for likely only modest risk reduction.

13.4 Contingent Remedy - In Situ Capping (i.e., "Partial Capping" or "Supplemental Capping")

WDNR and EPA have selected alternative C as identified in the proposed plan and the RIFS as the *selected* alternative. However, during the RIFS public comment period, the Agencies received numerous comments relating to the viability of capping as a possible remedy. Based on these public comments, WDNR and EPA have developed this contingent remedy that may supplement the selected remedy in certain circumstances. This contingent remedy may only be implemented if it meets the following requirements:

1. The contingent remedy, consisting of a combination of dredging and capping, shall provide the same level of protection to human health and the environment as the selected remedy,
2. This contingent remedy must be less costly than the selected remedy to be implemented,
3. This contingent remedy shall not take more time to implement than the selected remedy,
4. This contingent remedy shall comply with all necessary regulatory, administrative and technical requirements discussed below, and
5. The capping contemplated in this contingent remedy will not be permitted in certain areas of OU 1:
    - No capping in areas of navigation channels (with an appropriate buffer zone).
    - No capping in areas of infrastructure such as pipelines, utility easements, bridge piers, etc (with appropriate buffer zone).
    - No capping in areas with PCB concentrations exceeding TSCA levels.
    - No capping in shallow water areas (bottom elevations which would result in a cap surface at elevation greater than –3 ft chart datum for OU 1 without prior dredging to allow for cap placement.

13.5 Basis for Implementing the Contingent Remedy (OU 1)

Use of this contingent remedy may be employed in OU 1 to supplement the selected dredging remedy if one or both of the following criteria are demonstrated. The decision as to whether one or both of the criteria below have been met will be determined solely by the EPA and WDNR.

1) Based on sampling results taken after a sufficient amount of OU 1 dredging of contaminated sediment deposits (e.g., dredging of deposits A/B, C, and POG), it can be predicted with a high degree of certainty that a PCB SWAC of 0.25 ppm would not be achieved for OU 1 by dredging alone, or

2) Capping would be less costly than dredging in accordance with the protectiveness provisions and the nine criteria in the National Contingency Plan (40 CFR 300.430).

In addition to capping areas of OU 1 the selected dredging remedy would still be completed in areas not capped. Based on estimates in the Feasibility Study, and due to limitations on where capping could be done, capping would be limited to less than 25 percent of the total volume of contaminated sediments in OU 1. Selection and implementation of this contingency would be documented in an Explanation of Significant Differences (ESD).

It should be noted that if dredging alone achieves cleanup standards, and the contingent remedy is not shown to be more cost-effective than dredging alone, then capping would not be implemented.

13.6 Description of Contingent Remedy

The Contingent Remedy which may supplement the selected remedy, consists of the following components:

- **Cap Design.** Cap construction specifications would be determined during design. Although the Feasibility Study envisioned a cap composed of 20 inches of sand overlain with 12 inches of large cobble "armor" to provide erosion protection, the final cap design would be based on predicted performance. The final cap design must have sufficient thickness to ensure containment of contaminants, resistance to burrowing organisms, and "armoring" to provide sufficient permanence and resistance to erosion and scour.
- **Demobilization and Site Restoration.** Demobilization and Site restoration would require removing all capping-related equipment, fencing, facilities, etc., from staging and work areas.
- **Monitoring.** Operation and maintenance monitoring would be required to ensure proper placement, maintenance of cap integrity, and isolation and containment of contaminants. For this type of capping, monitoring would be performed to ensure that the cap is placed as intended, necessary capping thickness is maintained, and contaminants are contained and do not become bioavailable. In addition to other dredging-related monitoring, cap monitoring would include bathymetric or side-scan sonar profiling, sediment and cap sampling, and capture and analysis of pore water that may migrate through the cap, as well as diver inspections to ensure that the cap is intact and containing contaminants.
- **Institutional Controls.** Institutional controls may include deed restrictions, Site access and anchoring limitations, and continuation of fish and waterfowl consumption advisories as appropriate. Access restrictions could include limitation on the use or development of capped areas, possibly requiring local or State legislative action. These controls and limitations are intended to ensure the permanence of the cap and to minimize re-exposure and/or migration of contaminants.

13.7 Estimated Costs of the Contingent Remedy

Costs would be determined prior to implementation of capping. Estimates of capping costs would be documented in an Explanation of Significant Difference (ESD).

14. STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the remedies that are selected for Superfund sites must be protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), be cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

14.1 Protection of Human Health and the Environment

Implementation of the selected remedy will adequately protect human health and the environment through the removal and off-site disposal of PCB-contaminated sediment and the monitoring of the natural recovery of PCB contaminated sediment that is left in place. The selected remedy will target a sediment clean up level of 1.0 ppm in OU 1. This residual risk posed by this action level in OU 1 in years to reach human health and ecological thresholds are presented in Table 30 above. This table indicates that for the selected Action Level of 1.0 ppm, fish advisories for acceptable fish tissue concentrations in walleye would be achieved in 1 to 14 years.

The SWAC value in OU 2 will be 0.61 ppm. Implementation of the selected alternative in OU 1 and OU 2 will result in PCB concentrations within acceptable risk ranges over time. The selected remedy does not pose unacceptable short-term risk.

14.2 Compliance with ARARs

Section 121(d) of CERCLA requires that Superfund remedial actions meet ARARs. The selected remedy will comply with the ARARs listed in Table 31.

14.2.1 Potential Chemical-Specific ARARs

Toxic Substances Control Act (TSCA)
TSCA establishes requirements for the handling, storage, and disposal of PCB-containing materials equal to or greater than 50 ppm. TSCA is an ARAR at the Site with respect to any PCB-containing materials with PCB concentrations equal to or greater than 50 ppm that are removed from the Site.

Clean Water Act
Federal surface water quality standards are adopted under Section 304 of the Clean Water Act where a state has not adopted standards. These federal standards, if any, are ARARs for point discharges to the River. Related to these standards are the federal ambient water quality criteria. These criteria are non-enforceable guidelines that identify chemical levels for surface

waters and generally may be related to a variety of assumptions such as use of a surface water body as a water supply. These criteria may be TBCs for this Site.

Ground-water Quality Standards

State ground-water quality standards for various substances are set forth in chapter NR 140, Wisconsin Administrative Code (WAC). In general, sections NR 140.24 and NR 140.26 require preventive action limits (PALs) to be achieved to the extent it is technically and economically feasible to do so. In the remediation context, the NR 140 groundwater quality standards are to be achieved within a reasonable timeframe. Natural attenuation is allowed as a remedial method where source control activities have been undertaken and where groundwater quality standards will be achieved within a reasonable period of time. The ground-water quality standards constitute an ARAR.

Soil Cleanup Standards

The State of Wisconsin has adopted generic, site-specific, and performance-based soil cleanup standards. These regulations allow the party conducting the remedial action to select which approach to apply. The generic soil standards are divided into those necessary to protect the ground-water quality and those necessary to prevent unacceptable, direct contact exposure. Generic soil standards, based on conservative default values and assumptions, have been adopted only for a few substances, none of which are relevant to the Site. Site-specific soil standards depend upon a variety of factors, including local soil conditions, depth to groundwater, type of chemical, access restrictions, and current and future use of the property. These site-specific soils standards also may be adjusted based on an assessment of the site-specific risk presented by the chemical constituents of concern. With respect to the Site, the soil standards constitute an ARAR.

Surface Water Quality Standards

The State of Wisconsin has promulgated water quality standards that are based on two components: 1) use designation for the water body; and, 2) water quality criteria. These standards, designations, and criteria are set forth in chapters NR 102 to NR 105, WAC. The state also has rules for applying the water quality standards when establishing water-quality-based effluent limits (chapters NR 106 and NR 207, WAC). The state water quality standards are used in making water management decisions and controlling municipal, business, land development, and agricultural activities (section NR 102.04, WAC). In the remediation context, surface water quality standards are applicable to point source discharges that may be part of the remedial action. Further, to the extent that the remedial work is conducted in or near a water body, such work is to be conducted so as to prevent or minimize an exceedance of a water quality criterion (in chapters NR 102 to 105, WAC).

As recognized in the WDNR's sediment guidance (1995), the water quality standards are goals to be used in guiding the development of the sediment remediation work. As a goal, but not a legal requirement, the water quality standards as applied to the remediation of sediment contamination constitute a TBC.

In addition, the NCP states that, in establishing Remedial Action Objectives (RAOs), water quality criteria established under the Clean Water Act (WQSs in Wisconsin), shall be attained where "relevant and appropriate under the circumstances of the release." 40 CFR 300.430(e)(2)(I)(E).

WDNR and EPA have determined that WQSs, while relevant to sediment clean up RAOs, are not appropriate for direct application at this time. Calculating a site-specific sediment quality standard from a WQS using current scientific methods such as equilibrium partitioning is very uncertain. Moreover, the EPA 's 1996 Superfund PCB clean up guidance directly addresses

sediment clean up targets using water quality criteria. The guidance suggests using equilibrium partitioning to develop a sediment criteria and then compare it to risk based clean up numbers for establishing an RAO. If the guidance considered a derived sediment quality number to be an ARAR, it would be directly applied to each alternative as a threshold criteria. Therefore, WQSs are not ARARs and are not a threshold criteria for selecting an alternative for the Site.

14.2.2 Potential Action- and Location-Specific ARARs

Wisconsin Statutes Chapter 30

Chapter 30 of the Wisconsin Statutes requires permits for work performed in navigable waterways, or on or near the bank of such a waterway. For remediation that is conducted under CERCLA, only the substantive provisions set forth in Chapter 30 (but not the procedural requirements for obtaining a permit) must be satisfied. In general, the substantive provisions address minimizing any adverse effects on the waterway that may result from the work. This includes chapter NR 116, Wisconsin's Floodplain Management Program. The substantive provisions are action-specific ARARs.

Section 10 - Rivers and Harbors Act; Section 404

Clean Water Act. Section 404 of the Clean Water Act requires approval from the USACE for discharges of dredged or fill material into waters of the United States, and Section 10 of the Rivers and Harbors Act requires approval from the USACE for dredging and filling work performed in navigable waters of the United States. As the Fox River is a water of the United States, these statutes might implicate action-specific ARARs for dredging/filling work that may be conducted in the River. Under the Fish and Wildlife Coordination Act, the USACE must coordinate with the Fish and Wildlife Service regarding minimization of effects from such work. The work would be subject to the substantive environmental law aspects of permits under these statutes, which would be ARARs. Permits are not required for remediation that is implemented under the authority of CERCLA.

Floodplain and Wetland Regulations and Executive Orders 11988 and 11990

The requirements of 40 CFR § 264.18 (b) and Executive Order 11988, Protection of Flood Plains, are relevant and appropriate to action on the Site. Executive Order 11990 (Protection of Wetlands) is an applicable requirement if there are any wetlands present in the areas to be remediated.

National Historic Preservation Action (NHPA), 16 U.S.C. 470 et seq

The National Historic Preservation Act (NHPA) provides protections for historic properties (cultural resources) on or eligible for inclusion on the National Historic Register of Historic Places (see 36 CFR Part 800). In selecting a remedial alternative, adverse effects to such properties are to be avoided. If any portion of the Site is on or eligible for the National Historical Register, the NHPA requirements would be ARARs.

Endangered Species

Both State and Federal law have statutory provisions that are intended to protect threatened or endangered species [i.e., Endangered Species Act (Federal) and Fish and Game (State)]. In general, these laws require a determination as to whether any such species (and its related habitat) reside within the area where an activity under review by governmental authority may take place. If the species is present and may be adversely affected by the selected activity, where the adverse effect cannot be prevented, the selected action may proceed. If threatened or endangered species exist in certain areas of the Fox River, these laws may constitute an action-specific ARAR. At the Site, the queen snake as well as several plant species were noted by WDNR to be endangered/rare resources occurring within or near the Site.

Management of PCBs and Products Containing PCBs
Wisconsin regulations (i.e., Chapter NR 157, WAC, "Management of PCBs and Products Containing PCBs" that was adopted pursuant to section 299.45 Wisconsin Statutes) which establish procedures for the storage, collection, transport, and disposal of PCB-containing materials also apply to remedial actions taken at the Site.

Solid Waste Management Statutes and Rules (Chapter 289, Wisconsin Statutes and chapters NR 500-520 & NR 600-685, WAC) establish standards that apply to the collection, transportation, storage and disposal of solid and hazardous waste.

It is not expected that federal Resource Conservation and Recover Act (RCRA) or state regulations governing hazardous waste management will be applicable at this Site.

TSCA – Disposal Approval
TSCA regulations for the disposal of PCB remediation waste (40 CFR 761.61) are applicable to the selection of the clean up alternative for remediation of PCBs in sediments at the Lower Fox River Site, and to the disposal of removed sediments at a State licensed landfill. These regulations provide cleanup and disposal options for PCB remediation waste. The three options include self-implementing, performance-based and risk-based disposal approvals. The risk-based disposal approval option is allowed if it will not pose an unreasonable risk of injury to health and the environment.

The current situation in the Lower Fox River, as identified in RA conducted as part of the RI/FS, is that PCB contaminated sediment pose an unacceptable level of risk in the River at this time. Remediation of PCB contaminated sediment via the selected remedy will reduce risks to human health and the environment.

Sediments removed from the Fox River may contain PCBs equal to or greater than 50 ppm. PCB sediment with concentrations less than 50 ppm will be managed as a solid waste in accordance with statutes and rules governing the disposal of solid waste in Wisconsin. PCB sediment with concentrations equal to or greater than 50 ppm will be managed in accordance with the Toxic Substances Control Act of 1976 (Appendix E of the Feasibility Study). Presently TSCA compliance would be achieved through the extension of the January 24, 1995 approval issued by EPA to WDNR pursuant 40 CFR 761.60(a)(5) under the authority of TSCA. This TSCA approval, granted by EPA Region 5, states that the disposal of PCB-contaminated sediment with concentrations equal to or greater than 50 ppm into an NR 500, WAC landfill that is also in compliance with the conditions of the TSCA approval, provides adequate protection to human health and the environment as required by 40 CFR 761.60(a)(5); and, will provide the same level of protection required by EPA, Region 5 and therefore is no less restrictive than TSCA. However, should other administrative rules pertaining to disposal under TSCA in effect at the time that TSCA compliance decisions are made for the Fox River sediment, then compliance with those rules will be achieved.

14.2.3 Additional To Be Considered Information

Section 303(d), Clean Water Act
Under Section 303(d) of the Federal Clean Water Act, states are required, on a periodic basis, to submit lists of "impaired waterways" to EPA. In December 1996, WDNR submitted its first list of impaired waters under Section 303(d). The Fox River was included on the initial list. WDNR has taken no further action with respect to the listing, nor has it developed a total maximum daily load (TMDL) for the River. Currently, a State-wide watershed committee is advising WDNR on the steps to be taken in this process, and the listing process is being reviewed by the

Wisconsin Natural Resources Board. The listing of the Fox River under Section 303(d) is a TBC.

Great Lakes Water Quality Initiative, Part 132, Appendix E

The Great Lakes Water Quality Initiative set forth guidance to the states bordering the Great Lakes regarding their wastewater discharge programs. For remedial actions, the guidance states that any remedial action involving discharges should, in general, minimize any lowering of water quality to the extent practicable. The concepts of the guidance have been incorporated into chapters NR102 to NR 106, WAC. The Great Lakes Water Quality Initiative constitutes a TBC.

Sediment Remediation Implementation Guidance

Part of the Strategic Directions Report of WDNR approved by Secretary Meyer in 1995 addressed the sediment remediation approach to be followed by WDNR. This approach includes meeting water quality standards as a goal of sediment remediation projects. In developing a remedial approach, the guidance calls for use of a complete risk management process in consideration of on-site and off-site environmental effects, technological feasibility, and costs. The guidance constitutes a TBC.

Great Lakes Water Quality Agreement

The Great Lakes Water Quality Agreement calls for the identification of "Areas of Concern" in ports, harbors, and River mouths around the Great Lakes. Remedial goals to improve water quality are to be established in conjunction with the local community. In the case of the Fox River, a Remedial Action Plan (RAP) has been prepared and finalized. The RAP lists a series of recommendations ranging from addressing contaminated sediments to controlling non-point source runoff. This RAP is a TBC.

Fox River Basin Water Quality Management Plan

This plan was developed by WDNR and lists management objectives for improving water quality in the Fox River Basin. The Fox River Basin Water Quality Management Plan is a TBC.

Table 31 Fox River ARARs

Act / Regulation	Citation
Federal Chemical-Specific ARARs	
TSCA	40 CFR 761.60(a)(5)-761.79 and U.S. EPA Disposal Approval
Clean Water Act – Federal Water Quality Standards	40 CFR 131 (if no Wisconsin regulation) and 33 CFR 323
Federal Action-/Location - Specific ARARs	
Fish and Wildlife Coordination Act	16 USC 661 *et seq.* 33 CFR 320-330-Rivers and Harbors Act 40 CFR 6.304
Endangered Species Act	16 USC 1531 *et seq.* 50 CFR 200 50 CFR 402
Rivers and Harbor Act	33 USC 403; 33 CFR 322, 323
National Historic Preservation Act	15 USC 470; *et seq.* 36 CFR Part 800
Floodplain and Wetlands Regs & Executive Orders	40 CFR 264.18 (b) and Executive Order 11988

Act / Regulation	Citation
State Chemical-Specific ARARs	
TSCA-Disposal Approval	U.S. EPA Approval
Surface Water Quality Standards	NR 102, 105 and 207 NR 722.09 1-2
Ground-Water Quality Standards	NR 140
Soil Cleanup Standards	NR 720 and 722
Hazardous Waste Statutes and Rules	NR 600 - 685
State Action- / Location-Specific ARARs	
Management of PCBs and Products Containing PCBs	NR 157
Wisconsin's Floodplain Management Program	NR 116
Solid Waste Management	NR 500-520
Navigable Waters, Harbors, and Navigation	Chapter 30 - Wisconsin Statutes
Fish and Game	Chapter 29.415 - Wisconsin Statutes

14.3 Cost-Effectiveness

WDNR and EPA have determined that the selected remedy is cost effective. Section 300.430 (f)(1)(ii)(D) of the NCP requires that all the alternatives that meet the threshold criteria (protection of human health and the environment and compliance with ARARs) must be evaluated by comparing their effectiveness to the three balancing criteria (long-term effectiveness and permanence, reduction of toxicity, mobility or volume through treatment, and short-term effectiveness). The selected remedies meet these criteria by achieving a permanent protection of human health and the environment at low risk to the public, and provide for overall effectiveness in proportion to their cost.

The Superfund program does not mandate the selection of the least costly cleanup alternative. The least costly effective remedy is not necessarily the remedy that provides the best balance of tradeoffs with respect to the remedy selection criteria nor is it necessarily the least-costly alternative that is both protective of human health and the environment and ARAR-compliant. Cost effectiveness is concerned with the reasonableness of the relationship between the effectiveness afforded by each alternative and its costs compared to other available options.

The total net present worth of the selected remedy for OU 1 and OU 2 is $76.5 million.

14.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

WDNR and EPA believe that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the Fox River Site. The selected remedy does not pose excessive short-term risks. There are no special implementability issues that set the selected remedy apart from the other alternatives evaluated.

14.5 Preference for Treatment as a Principal Element

Based on current information, WDNR and EPA believe that the selected remedy is protective of human health and the environment and utilizes permanent solutions to the maximum extent

possible. The remedy, however, does not satisfy the statutory preference for treatment of the hazardous substances present at the Site as a principal element because such treatment was not found to be practical or cost effective.

14.6 Five-Year Review Requirements

The NCP, at 40 CFR § 300.430(f)(4)(ii), requires a five-year review if the remedial action results in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure. Because this remedy will result in hazardous contaminants remaining on site above levels that allow for unlimited exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

15. DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN

To fulfill the requirements of CERCLA 117(b) and NCP [40 CFR § 300.430(f)(5)(iii)(B) and 300.430(f)(3)(ii)(A)], a ROD must document and discuss the reasons for any significant changes made to the Proposed Plan.

The Proposed Plan was released for public comment in October 2001. It identified a PCB sediment clean up target of 1.0 ppm in OU 1 with monitored natural recovery in OU 2.

In the selection of the remedy for OU 1 and OU 2, the WDNR and EPA considered information submitted during the public comment period re-evaluated portions of the proposed alternative.

<u>New Information obtained during the Public Comment Period</u>
WDNR and EPA considered alternative proposals for OU 1 submitted as comments. As a result of consideration of these comments, the following were incorporated into this Record of Decision: 1) If dredging is unable to reduce exposed contaminants PCB concentrations, a sand cover will be employed to further reduce risks, rather than continue with dredging removal operations (Section 13.3); and 2) if it is predicted, based on results from partial completion of dredging OU 1, that concentrations may not sufficiently reduce risks, or if capping is shown to be less costly than complete dredging, then capping may be employed for some areas not yet dredged (Section 13.4).

These proposals may be given further consideration prior to implementation of remedial actions. However if these proposals cause a fundamental change to the alternatives described in this decision (e.g., changing the remedy from removal to containment), then WDNR and EPA would issue a new, revised Proposed Plan and would have a public comment period after which a ROD Amendment would be finalized. If the change is not "fundamental," but "significant" (e.g., modification of volumes to be removed), then an Explanation of Significant Difference would be issued, and there would be limited public comment.

Consent Decree Appendix I

STATEMENT OF WORK FOR REMEDIAL ACTION, INSTITUTIONAL CONTROLS, OPERATION & MAINTENANCE, AND LONG TERM MONITORING
Lower Fox River and Green Bay Site
Operable Unit 1 (Little Lake Butte des Morts), Winnebago and Outagamie County

I. PURPOSE

1. This Statement of Work ("SOW") sets forth the requirements for the Remedial Action ("RA"), Institutional Controls, and Operation & Maintenance ("O&M") and Long Term Monitoring for the selected remedy and the contingent remedy set forth in the Record of Decision ("ROD") for Operable Unit 1 ("OU1") of the Lower Fox River and Green Bay Site (the "Site").[1] While the ROD addresses both OU1 and Operable Unit 2 at the Site, this SOW addresses only OU1, and, more specifically, only the RA and the other Response Work required for OU1, aside from the Remedial Design ("RD").[2] The RD for OU1 is addressed in the Administrative Order on Consent between WTM I Company, EPA, and WDNR, captioned In the matter of the Lower Fox River and the Green Bay Site, Docket No. V-W-'03-C-745 (the "July 2003 AOC") and in the RD SOW attached to the July 2003 AOC.

2. The Settling Defendants are required to implement the RA and the other Response Work subject to the funding limitations and special reservations of rights provided in the Consent Decree to which this SOW is attached. The Settling Defendants shall perform the RA and the other Response Work in accordance with the Consent Decree, the ROD, the RD approved by the Response Agencies, and this SOW. The Settling Defendants shall also comply with EPA Superfund Remedial Design and Remedial Action Guidance and any additional relevant guidance provided by the Response Agencies in implementing and submitting deliverables for the RA and the other Response Work.

II. DESCRIPTION OF THE REMEDIAL ACTION AND THE OTHER RESPONSE WORK

1. Subject to the funding limitations and special reservations of rights provided in the Consent Decree, the Settling Defendants shall implement the RA such that the Performance

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[1] "Operable Unit 1" or "OU1" shall mean the Little Lake Butte des Morts reach of the Lower Fox River, as delineated by the Record of Decision signed by WDNR and EPA in December 2002. More specifically, OU1 is the portion of the Lower Fox River (and the underlying River sediment) starting at the outlet of Lake Winnebago at the Neenah Dam and the Menasha Dam downstream to the Upper Appleton Dam, including sediment deposits A through H and POG. As so defined, OU1 is depicted in Figure 7-9 of the December 2002 Final Feasibility Study, a copy of which is attached to the Consent Decree as Attachment G.

[2] Operable Units 3, 4, and 5 of the Lower Fox River and Green Bay Site have been addressed in a separate Record of Decision.

Standards are achieved. As defined by Paragraph 4 of the Consent Decree, "Performance Standards" shall mean the selected remedy requirements, contingent remedy requirements, and cleanup standards for measuring the achievement of the goals of the RA, as set forth in Sections 13.1, 13.3.1, and 13.4 through 13.6 of the ROD and Section II this SOW. OU1 is a multi-deposit aquatic environment and the RA will stretch over a number of years, so this SOW is intended to provide flexibility concerning the approach to be taken to achieve the Performance Standards and to implement the RA and the other Response Work, consistent with legal and administrative requirements. The RA may therefore be conducted in phases, may incorporate features of the contingent remedy as permitted by the ROD, and may include other refinements proposed by the Settling Defendants, if such refinements are approved by the Response Agencies.

2. The selected remedy (ROD Alternative C2) includes the removal of sediment with PCB concentrations greater than the 1 ppm remedial action level ("RAL"), followed by dewatering and off-site disposal of the sediment.

- **Site Mobilization and Preparation.** The staging area(s) for OU1 will be determined during the RD. Site preparation at the staging area(s) will include collecting soil samples, securing the onshore property area for equipment staging, and constructing the sediment dewatering facility, water treatment facilities, and sediment storage and truck loading areas.

- **Sediment Removal.** Sediment removal will be conducted using a dredge (e.g., cutterhead or horizontal auger or other method) or other suitable sediment removal equipment.

- **Sediment Dewatering.** Sediment that is removed will require dewatering.

- **Water Treatment.** Unless other arrangements can be made, water treatment will consist of flocculation, clarification, sand filtration, and treatment through activated carbon filters.

- **Sediment Disposal.** Sediment disposal includes the loading and transportation of the sediment to an NR 500 landfill with Toxic Substances Control Act ("TSCA") approval, if needed.

- **Demobilization and Site Restoration.** Demobilization and site restoration will involve removing all equipment from the staging and work areas and restoring the site to, at a minimum, its original condition before construction of the staging area commenced.

- **Institutional Controls and Long Term Monitoring.** Baseline monitoring will include pre-and post-remedial sampling of water, sediment, and biological tissue. Monitoring during implementation will include air and surface water sampling. Plans for monitoring during and after construction will be developed during the Remedial Design and modified during and after construction, as appropriate. Institutional controls may include access restrictions, land use or water use restrictions, dredging moratoriums, fish consumption advisories, and domestic water supply restrictions. Land and water use restrictions and

access restrictions may require local or state legislative action to prevent inappropriate use or development of contaminated areas.

- **Achievement of RAL Objective.** As more precisely described in Paragraph II.3 of this SOW, the mass and volume of contaminated sediment to be removed will be determined by (1) establishing a removal elevation based on the 1 ppm RAL or, (2) if sampling conducted after sediment removal is completed shows that the 1 ppm RAL has not been achieved, by achieving a Surface Weighted Average Concentration ("SWAC") of 0.25 ppm.

3. Pre-remediation sampling and characterization efforts will define spatial "footprint(s)" (both horizontally and vertically) of OU1 sediment that contains PCBs at concentrations in excess of the 1 ppm RAL. The RD will specify those footprints to be removed during the RA, and any areas where supplemental capping is appropriate under the contingent remedy specified by ROD Sections 13.4 through 13.6 and approved by the Response Agencies. After completion of all sediment removal and any supplemental capping specified by the RD, the Settling Defendants shall sample the footprints to determine whether the 1 ppm RAL has been achieved. If the sampling demonstrates that those sediments with PCB concentrations in excess of 1 ppm have been removed or capped, the active remediation portion of the OU1 RA will be complete. If the sampling shows that those sediments with PCB concentrations in excess of 1 ppm have not been removed or capped, then an OU1 SWAC of 0.25 ppm may be used to assess the effectiveness of the work. If the 0.25 ppm SWAC has not been achieved for OU1, then the ROD provides several options. One option is that additional sediment removal may be undertaken to remove remaining sediments with PCB concentrations in excess of the 1 ppm RAL. Another option would be to place a cap on certain areas to reduce surficial concentrations such that the 0.25 ppm SWAC can be achieved. SWAC contribution from a properly placed cap or sand cover would be 0.0 ppm, if installed as part of the contingent remedy or as part of a SWAC reduction effort. As specified by ROD Section 13.5, selection and implementation of the supplemental capping contingent remedy would be documented in an Explanation of Significant Differences issued by the Response Agencies. Capping as part of any SWAC reduction effort also would require the Response Agencies' approval.

III. SCOPE OF REMEDIAL ACTION AND RESPONSE WORK

The RA to be conducted by the Settling Defendants shall include five major tasks, which are detailed below. Each task shall be completed by the Settling Defendants in accordance with the schedules set forth in the Section V of this SOW (Summary and Compliance Schedule). All plans are subject to approval by the Response Agencies, as provided by the Consent Decree.

Task I: Remedial Action Work Plan ("RA Work Plan"). The RA Work Plan submittals fall into three categories based on the particular submittal's status in the remedial design phase. The first category of submittals will be approved in final form as part of the Final (100%) Design. The RA Work Plan is to include refinements, if any, to these submittals. The second category of submittals will be in draft form for the approved Final

(100%) Design and will be submitted in final form in the RA Work Plan. The third category of RA Work Plan submittals are not included with the RD submittals.

Category 1:

- Final Health & Safety Plan
- Final Contingency Plan
- Final Sediment Removal Verification Plan
- Capital and Operation & Maintenance Cost Estimate
- Final Project Schedule

Category 2:

- Final Construction Quality Assurance Project Plan ("CQAPP")
- Final Operation & Maintenance Plan (including a plan for long-term monitoring)

Category 3:

- Quality Assurance Project Plan for Operation & Maintenance Plan
- Institutional Controls Plan
- Schedule for submitting any other RA plans
- Identification of initial RA Project Team

Task II: Other Reports and Submissions

Task III: Remedial Action Construction

Task IV: Completion of the Remedial Action for OU1

Task V: Completion of Response Work for OU1

Task I: Remedial Action Work Plan

Within 90 days after the Response Agencies approve the Final (100%) Design (the final Remedial Design deliverable under the July 2003 AOC), the Settling Defendants shall submit the RA Work Plan for construction and implementation of the remedy such that the Performance Standards will be achieved. The RA Work Plan shall outline the overall management strategy for performing the construction, operation, maintenance and monitoring of the RA. The RA Work Plan shall include a project schedule for each major activity and submission of deliverables generated during the RA as well as a schedule for completion of the RA. Settling Defendants shall thoroughly review the approved RD and shall, as part of their proposed RA Work Plan, provide to the Response Agencies a list of any questions or concerns requiring clarification of the design requirements and specifications.

1.1 The RA Work Plan shall include refinements, if any, to the following components of the approved Final (100%) Design:

(a) Final Health and Safety Plan. The Settling Defendants shall review and modify, if necessary, the Health and Safety Plan developed during the RD to address the activities to be performed at the Site during the RA.

(b) Final Contingency Plan. The Final Contingency Plan shall describe mitigation procedures to be used in the event of an accident or emergency.

(c) Final Sediment Removal Verification Plan.

(d) Capital and Operation & Maintenance Cost Estimate.

(e) Final Project Schedule. The Final Project Schedule shall identify timing for initiation and completion of all critical path tasks, and shall specify dates for completion of all phases of the project and major interim milestones. The Final Project Schedule shall be consistent with and designed to achieve the deadlines contained in Section V of this SOW (Summary and Compliance Schedule).

1.2 The RA Work Plan shall include the following documents which will be submitted in draft form in the approved Final (100%) Design:

(a) Final Construction Quality Assurance Project Plan. The CQAPP is a site-specific document that must be submitted to the Response Agencies for approval prior to the start of the construction. The CQAPP outlined in the RD shall be used as a basis for preparation of the CQAPP required under this SOW. Upon EPA approval of the CQAPP, the Settling Defendants shall construct and implement the RA in accordance with the RD, the Final Project Schedule, and the CQAPP. At a minimum, the CQAPP shall include the following elements:

1. The responsibility and authority of each organization (i.e., technical consultants, construction firms, etc.) and key personnel involved in the construction of the RA shall be described fully in the CQAPP. The Settling Defendants shall also identify a joint CQA officer and the necessary supporting inspection staff.

2. The qualifications of the CQA officer and supporting inspection personnel shall be presented in the CQAPP to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities. If EPA finds that the qualifications of any of the CQA personnel are not suitable to the performance of the RA, the Settling Defendants shall submit qualifications for new personnel prior to EPA approval of the CQAPP.

3. Protocols for sampling and testing used to monitor the RA and determine post-sediment removal PCB concentrations in residual sediments, including identification of proposed quality assurance sampling activities including the sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation.

4. Reporting requirements for CQAPP activities shall be described in detail in the CQAPP. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, and design acceptance reports, and final documentation. Provisions for the final storage of all OU1 cleanup reports shall be presented in the CQAPP.

(b) Final O&M Plan. The Final O&M Plan shall include a plan for O&M and Long Term Monitoring.

1.3 The following new submittals shall be included in the RA Work Plan:

(a) QAPP for Final O&M Plan. In addition to submitting the Final Operation & Maintenance Plan (which is to include a plan for long-term monitoring), the Settling Defendants shall submit a QAPP to cover sampling, analysis and data handling for samples collected under the Final O&M Plan. Within 21 days after approval of the Final (100%) Design, Settling Defendants shall contact the Response Agencies to arrange a pre-QAPP meeting to identify all monitoring and data quality objectives for the O&M QAPP. The QAPP shall be consistent with the requirements of the EPA Contract Laboratory Program (CLP) for laboratories proposed outside CLP.

1. At a minimum, the QAPP shall include the following:

- Statement of Purpose
- Project Description
- Project Organization and Responsibility
- Sampling Procedures and Objectives
- Sample Custody and Document Control
- Calibration Procedures and Frequency
- Analytical Procedures, Data Reduction, Validation, Assessment, and Reporting
- Internal Quality Control Checks and Frequency
- Performance System Checks and Frequency
- Preventive Maintenance Procedures and Frequency

- Data Precision, Accuracy and Completeness Assessment Procedures
- Corrective Action
- Quality Assurance Reporting

2. The QAPP shall also include the following information:

- Description of sampling/O&M monitoring tasks required under the Final O&M Plan
- Description of required laboratory tests and their interpretation
- Required data collection
- Location of sampling/O&M monitoring points
- Schedule of sampling/O&M monitoring frequency and date(s), if appropriate, when monitoring frequency may change or cease.

(b) Institutional Controls Plan.

(c) Schedule for submitting any other RA plans.

(d) Identification of the initial RA Project Team. The RA Work Plan shall also include a description of qualifications of key personnel directing the RA, including contractor personnel.

Task II: Other Reports and Submissions

Unless otherwise specified by the Response Agencies, two (2) copies of all submittals shall be provided by Settling Defendants to the EPA and two (2) copies of all submittals shall be provided to the WDNR for review. One copy of each submittal sent to EPA and the WDNR must be an unbound copy that is suitable for reproduction on standard 8 ½" x 11" paper, or, as necessary, 11" x 17" paper. At the same time, the Settling Defendants shall submit an additional copy to each of the Response Agencies in electronic format. In addition, two (2) copies of all documents are to be submitted to the Response Agencies' oversight contractor identified by EPA and/or WDNR.

2.1 Monthly RD/RA Progress Reports. The Settling Defendants shall provide the Response Agencies with progress reports no later than the tenth day of each month covering the previous calendar month, starting with the first month after the Date of Lodging of the Consent Decree, and until issuance of Certification of Completion of the RA by EPA. The Monthly RD/RA Progress Reports to be submitted pursuant to this paragraph shall be signed by the Project Coordinator for the Settling Defendants and shall, at a minimum:

(a) describe the actions which have been taken toward achieving compliance with the Consent Decree during the previous month;

(b) include a summary of all results of sampling and tests and all other data received or generated by Settling Defendants or their contractors or agents in the previous month;

(c) identify all work plans, plans and other deliverables required by the Consent Decree completed and submitted during the previous month;

(d) describe all actions, including, but not limited to, data collection and implementation of work plans, which are scheduled for the next month and provide other information relating to the progress of construction, including, but not limited to, critical path diagrams, Gantt charts and Pert charts;

(e) include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Response Work, and a description of efforts made to mitigate those delays or anticipated delays;

(f) include any modifications to the work plans or other schedules that Settling Defendants have proposed to the Response Agencies or that have been approved by the Response Agencies; and

(g) describe all activities undertaken in support of the Community Relations Plan during the previous month and those to be undertaken in the next month.

During the performance of the Remedial Design, the Monthly RD/RA Progress Reports shall include all information required by Paragraph 38 of the July 2003 AOC and shall satisfy the monthly progress report requirements of the July 2003 AOC, the Consent Decree and this SOW.

2.2 Quarterly Reports. The Settling Defendants shall submit Quarterly Reports on a quarterly basis starting with the second quarter of 2004 and continuing until Certification of Completion of the RA by EPA. For a given calendar year, the report for the first calendar quarter shall be submitted by no later than May 1 of that calendar year, the report for the second calendar quarter shall be submitted by no later than August 1 of that calendar year, the report for the third calendar quarter shall be submitted by no later than November 1 of that calendar year, and the report for the fourth calendar quarter shall be submitted by no later than February 1 of the next calendar year. Each Quarterly Report shall:

(a) provide a complete and accurate written cost summary of all Allowable RD/RA Costs submitted to the Escrow Agent for payment from the Escrow Account during the reporting period;

(b) specify any amount requested for the reporting period as a quarterly reimbursement from the Disbursement Special Account;

(c) provide a complete and accurate written cost summary of all Allowable Restoration Work Costs submitted to the Escrow Agent for payment from the Escrow Account during the reporting period;

(d) list and total all amounts requested and/or disbursed during the reporting period as payments or reimbursements from the Escrow Account;

(e) indicate the approximate balance of the Escrow Account at the end of the reporting period;

(f) summarize all Response Work and all Approved Restoration Work funded and performed under the Consent Decree during the reporting period;

(g) project whether the total balance remaining in the Disbursement Special Account and, the Escrow Account is likely to be sufficient to fund the completion of the RA, after making all other payments and reimbursements from those Accounts that are required under the Consent Decree; and

(h) contain the following certification signed by the Chief Financial Officer of a Settling Defendant or by an Independent Certified Public Accountant retained by the Settling Defendants:

> "To the best of my knowledge, after thorough investigation and review of Settling Defendants' documentation of unreimbursed costs incurred and paid for the work summarized in this report that was performed pursuant to the Consent Decree, I certify that the information contained in or accompanying this Quarterly Report is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

and include a list of the cost documents that the certifying individuals reviewed in support of the Quarterly Cost Summary Report. Upon request by the Plaintiffs, Settling Defendants shall provide the Plaintiffs any additional information that the Plaintiffs deem necessary for review of a Quarterly Report.

Task III: Remedial Action Construction

After approval of the RA Work Plan (including the CQAPP) by the Response Agencies and the Pre-Construction Inspection required below, and within 10 calendar days after receipt of notice of authorization to proceed from the Response Agencies, the Settling Defendants shall construct and implement the RA in accordance with the RD, the Final Project Schedule, the RA

Work Plan and the CQAPP, subject to the funding limitations and special reservations of rights provided in the Consent Decree. Unless otherwise directed by the Response Agencies, Settling Defendants shall not commence physical RA activities at OU1 prior to approval of the RA Work Plan, the Pre-Construction Inspection, or receipt of notice of authorization to proceed.

3.1 Pre-Construction Inspection. Before commencing the on-site construction work, the Settling Defendants shall conduct a Pre-Construction Inspection with the Response Agencies to: (1) review methods for documenting and reporting inspection data; (2) review methods for distributing and storing documents and reports; (3) review work area security and safety protocol; (4) discuss any appropriate modifications of the CQAPP to ensure that site-specific considerations are addressed; and (5) conduct a site tour. The Pre-Construction Inspection and meeting shall be documented by a designated person and minutes shall be transmitted to all parties.

3.2 Oversight by the Response Agencies. The Response Agencies shall monitor and oversee the Settling Defendants' construction of the RA, and the Settling Defendants shall provide briefings and information concerning their progress, as requested by the Response Agencies.

3.3 Monitoring During RA Construction. Specific plans for monitoring during construction will be developed during the RD and modified during construction, as appropriate.

3.4 Pre-Completion Inspection. At least 90 days before the anticipated completion of all phases of construction specified by the RD, and before final demobilization and site restoration efforts, the Settling Defendants shall conduct a Pre-Completion Inspection with the Response Agencies. The Pre-Completion Inspection should consist of a site tour by the Settling Defendants and the Response Agencies and a discussion regarding the Settling Defendants' plans for: (1) completing construction of the RA; (2) conducting post-construction sampling to determine whether the 1 ppm RAL and/or the 0.25 ppm SWAC have been achieved; (3) demobilizing and restoring the site; (4) performing O&M, Long Term Monitoring, and Institutional Controls; and (4) taking any other steps required to ensure completion of the RA such that the Performance Standards are achieved.

Task IV: Completion of the Remedial Action for OU1

4.1 Construction Completion Inspection. Within 90 days after completion of all phases of construction specified by the RD and after conducting post-construction sampling to determine whether the 1 ppm RAL and/or the 0.25 ppm SWAC have been achieved, the Settling Defendants shall send the Response Agencies written notice for the purpose of scheduling and conducting a Construction Completion Inspection. The Construction Completion Inspection should consist of a site tour by the Settling Defendants and the Response Agencies, a review of the post-construction sampling data, and a discussion regarding the Settling Defendants' plans for: (1) performing O&M, Long Term Monitoring, and Institutional Controls; and (2) taking any additional steps required to ensure completion of the RA such that the Performance Standards are achieved.

4.2 RA Completion Plan. If the Performance Standards have not been achieved by the time of the Construction Completion Inspection, then the written notice sent to the Response Agencies shall indicate that the Construction Completion inspection will not serve as a Pre-Certification Inspection under Consent Decree Subparagraph 44.a. Within 60 days after confirmation at the Construction Completion Inspection that the Performance Standards have not been achieved, Settling Defendants shall submit an RA Completion Plan. The RA Completion Plan shall include a description of the characteristics of areas that do not comply with the Performance Standards and a detailed description (e.g., map, data tables and location information) showing areas in compliance or not in compliance with Performance Standards. Sampling and locational information should be provided in both hardcopy and EPA Superfund's designated digital format (i.e., Superfund Electronic Data Deliverable, Specification Manual 1.05, website address: http://www.epa.gov/region5superfund/edman/). In addition to describing noncompliance areas, the RA Completion Plan shall outline any additional RA construction work required to achieve Performance Standards, a schedule for completing any additional RA construction work, and a proposed date for a Construction Completion Re-Inspection. The Settling Defendants shall implement the RA Completion Plan as approved by the Response Agencies.

4.3 RA Pre-Certification Inspection. If the Settling Defendants believe that the RA has been fully performed such that the Performance Standards have been achieved, then the written notice sent to the Response Agencies shall indicate that the Construction Completion Inspection will also serve as an RA Pre-Certification Inspection under Consent Decree Subparagraph 44.a. If, after the RA Pre-Certification Inspection, the Settling Defendants still believe that the RA has been fully performed such that the Performance Standards have been achieved, Settling Defendants shall submit an RA Certification of Completion Report within 60 days after the RA Pre-Certification Inspection. In the RA Certification of Completion Report, a registered professional engineer and the Project Coordinator of the Settling Defendants shall certify that the RA has been completed in full satisfaction of the requirements of the Consent Decree. The Report shall also contain the following statement, signed by a responsible corporate official of each Settling Defendant or Settling Defendants' Project Coordinator:

> "To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

The Report shall document that the RA has been performed such that the Performance Standards have been achieved. The Report shall include, but shall not be limited to, the following elements:

(a) Introduction;
(b) Chronology of events;
(c) Summary of construction activities;

(d) Summary of the RA Pre-Certification Inspection;
(e) Record drawings signed and stamped by a professional engineer;
(f) Explanation of any modifications to the plans and why these were necessary for the project;
(g) Verification that the RA has been completed such that the Performance Standards have been achieved;
(h) Listing of the criteria, established before the construction was initiated, for judging the functioning of the RA and also explaining any modification to these criteria;
(i) Results of site monitoring, indicating that the RA meets or exceeds the Performance Standards;
(j) Explanation of the O&M taking place at the site and any changes in the Final O&M Plan that were required based on modification of site plans during construction; and
(k) Summary of project costs.

4.4 EPA Response to RA Certification of Completion Report.

(a) If, after completion of the RA Pre-Certification Inspection and receipt and review of the RA Certification of Completion Report, EPA, after reasonable opportunity to review and comment by the State, determines that the RA or any portion thereof has not been completed in accordance with the Consent Decree such that the Performance Standards have not been achieved, EPA will notify Settling Defendants in writing of the activities that must be undertaken by Settling Defendants pursuant to Consent Decree Subparagraph 44.a to complete the RA such that the Performance Standards are achieved. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and this SOW or require the Settling Defendants to submit an RA Completion Plan pursuant to Task IV, Subparagraph 4.2.

(b) If EPA concludes, based on the RA Pre-Certification Inspection and the RA Certification of Completion Report, and after a reasonable opportunity for review and comment by the State, that the RA has been performed in accordance with the Consent Decree such that the Performance Standards have been achieved, EPA will so certify in writing to Settling Defendants. This certification shall constitute the Certification of Completion of the RA for purposes of the Consent Decree.

Task V: Completion of Response Work for OU1

5.1. Response Work Pre-Certification Inspection. Within 90 days after Settling Defendants conclude that all phases of the Response Work have been fully performed, Settling Defendants shall send written notice to the Response Agencies for the purpose of scheduling and conducting a Response Work Pre-Certification Inspection to be attended by Settling Defendants

and the Response Agencies. The purpose of the inspection is to determine whether the O&M, the Long Term Monitoring, and the Institutional Controls have been fully performed, as required by the Institutional Controls Plan and the Final O&M Plan.

5.2 Continuation of Response Work. If, after the Response Work Pre-Certification Inspection, EPA determines (after a reasonable opportunity for review and comment by the State) that the Response Work or any portion thereof has not been fully performed, the Settling Defendants shall continue to perform O&M, Institutional Controls, and Long Term Monitoring as required by the Institutional Controls Plan and the Final O&M Plan. The Settling Defendants shall continue the Response Work pursuant to a schedule approved by EPA, after reasonable opportunity for review and comment by the State.

5.3 Response Work Certification of Completion Report. If, after the Response Work Pre-Certification Inspection, the Settling Defendants believe that the Response Work has been fully performed, the Settling Defendants shall submit a Response Work Certification of Completion Report within 60 days after the Response Work Pre-Certification Inspection. In the Response Work Certification of Completion Report, a registered professional engineer and the Project Coordinator of the Settling Defendants shall certify that the Response Work has been completed in full satisfaction of the requirements of the Consent Decree. The Report shall also contain the following statement, signed by a responsible corporate official of each Settling Defendant or Settling Defendants' Project Coordinator:

> "To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

The report shall document that the Response Work has been fully performed. The report shall include, but not be limited to, the following elements:

(a) Introduction;
(b) Chronology of events beginning with the Certification of Completion of the RA;
(c) Summary of inspections for completion of Response Work;
(d) Record drawings signed and stamped by a professional engineer for any additional work completed since the Certification of Completion of the RA;
(e) Explanation of any modifications to the plans and why these were necessary for the project;
(f) Verification that the Response Work is complete;
(g) Listing of the criteria, established before the construction was initiated, for judging the functioning of the RA and also explaining any modification to these criteria;

(h) Results of site monitoring, indicating that the Response Work is complete;
(i) Explanation of any changes in the Final O&M Plan after the Certification of Completion of the RA;
(j) Summary of project costs after the Certification of Completion of the RA.

5.4 EPA Response to Response Work Certification of Completion Report.

(a) If, after completion of the Response Work Pre-Certification Inspection and receipt and review of the Response Work Certification of Completion Report, EPA, after reasonable opportunity to review and comment by the State, determines that the Response Work or any portion thereof has not been fully performed, EPA will notify Settling Defendants in writing of the activities that must be undertaken by Settling Defendants pursuant to Consent Decree Subparagraph 45.a to complete the Response Work. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and this SOW or require the Settling Defendants to submit an a schedule for continuation of the Response Work pursuant to Task V, Subparagraph 5.2.

(b) If EPA concludes, based on the Response Work Pre-Certification Inspection and the Response Work Certification of Completion Report, and after a reasonable opportunity for review and comment by the State, that the Response Work has been fully performed in accordance with the Consent Decree, EPA will so certify in writing to Settling Defendants. This certification shall constitute the Certification of Completion of the Response Work for purposes of the Consent Decree.

IV. MISCELLANEOUS REQUIREMENTS

1. Community Relations Support. The Response Agencies shall implement a community relations program. The Settling Defendants shall cooperate with the Response Agencies and at the request of the Response Agencies, shall participate in the preparation of appropriate information to be disseminated by the Response Agencies to the public. At the request of the Response Agencies, Settling Defendants shall participate in public meetings that may be held or sponsored by the Response Agencies to explain activities at or concerning OU1. Community relations support will be consistent with Superfund community relations policy, as stated in the "Guidance for Implementing the Superfund Program" and Community Relations in Superfund - A Handbook.

2. Access. If any property where access is needed to implement the Consent Decree is owned or controlled by any of the Settling Defendants, such Settling Defendants shall provide the Response Agencies and their contractors with access at all reasonable times to such property as provided by Consent Decree Paragraph 25. If any property where access is needed to implement the Consent Decree is owned or controlled by persons other than the Settling

Defendants, the Settling Defendants shall use best efforts to secure access from such persons as provided by Consent Decree Paragraph 26.

V. SUMMARY AND COMPLIANCE SCHEDULE

A summary of the due dates for major deliverables and milestones under this SOW is presented below. The due dates may be adjusted with the Response Agencies' advance written approval to account for changes arising from the nature of the RA and the other Response Work.

Deliverable/Milestone	Due Date
Pre-QAPP meeting to identify all monitoring and data quality objectives for the O&M QAPP	Within 21 calendar days after approval of Final (100%) Design, Settling Defendants shall contact the Response Agencies to arrange pre-QAPP meeting
RA Work Plan	Within 90 calendar days after approval of Final (100%) Design
Revised RA Work Plan	Within 30 calendar days after receipt of the Response Agencies' comments on the RA Work Plan
Pre-Construction Inspection	Within 21 calendar days after the Response Agencies' approval of the RA Work Plan
Initiate Remedial Action Construction	Within 10 calendar days after receipt of notice of authorization to proceed from the Response Agencies, to be issued after the Pre-Construction Inspection
Pre-Completion Inspection	At least 90 days before the anticipated completion of all phases of construction specified by the RD, and before final demobilization and site restoration efforts
Complete Remedial Action Construction	Within 6 calendar years after receipt of notice of authorization to proceed from the Response Agencies, or as approved by the Response Agencies in the Final Project Schedule
Construction Completion Inspection/ RA Pre-Certification Inspection	Within 90 days after completion of all phases of construction specified by the RD and after conducting post-construction sampling to determine whether the 1 ppm RAL and/or the 0.25 ppm SWAC have been achieved; a Construction Completion Inspection will also serve as an RA Pre-Certification Inspection if the Settling Defendants believe that the RA has been performed such that the Performance Standards have been achieved
RA Certification of Completion Report	Within 60 days after an RA Pre-Certification Inspection, provided Settling Defendants still believe Performance Standards have been achieved
Revised RA Certification of Completion Report	30 calendar days after receipt of the Response Agencies' comments on the Report

Certification of Completion of the RA	Upon EPA's approval of the RA Certification of Completion Report
Response Work Pre-Certification Inspection	Within 90 days after Settling Defendants conclude that all phases of Response Work are completed
Response Work Certification of Completion Report	Within 60 days after Response Work Pre-Certification Inspection, provided Settling Defendants believe Response Work has been fully performed
Revised Response Work Certification of Completion Report	30 calendar days after receipt of the Response Agencies' comments on the Report
Issuance of Certification of Completion of Response Work	Upon EPA's approval of the Response Work Certification of Completion Report
Monthly Progress Reports	By the 10th of each month from the Date of Lodging of the Consent Decree for so long as the RA continues, until Certification of Completion of the RA
Quarterly Reports	Quarterly basis for so long as the RA continues under the Consent Decree, until Certification of Completion of the RA