Draft

Lower Fox River Operable Unit 1 — Institutional Control Implementation and Assurance Plan

Prepared for

WTM I Company

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List of Acronyms and Abbreviations

A/OT	Agencies/Oversight Team
BRRTS	Bureau for Remediation and Redevelopment Tracking System
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
cy	cubic yard
Foth	Foth Infrastructure & Environment, LLC
GIS	geographic information system
IC	institutional control
ICIAP	Institutional Control Implementation and Assurance Plan
LTMP	Long Term Monitoring Plan
MOA	Memorandum of Agreement
OU	Operable Unit
PCB	polychlorinated biphenyl
ppm	part per million
RA	remedial action
RAL	remedial action level
RAO	Remedial Action Objective
RD	remedial design
ROD	Record of Decision
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
WAC	Wisconsin Administrative Code
WDNR	Wisconsin Department of Natural Resources

SECTION 1

1.0 Introduction and Background

As part of the *Integrated Pre-Final Design and Draft Remedial Action Work Plan for Post-2009 Response Work* (CH2M HILL and Foth) (the Post-2009 Response), this document presents the Institutional Control Implementation and Assurance Plan (ICIAP) for remediation of polychlorinated biphenyls (PCBs) in Operable Unit (OU) 1 of the Lower Fox River and Green Bay Site (Site). An Amended Record of Decision for OU1 (USEPA and WDNR 2008) (ROD Amendment) was approved by the U.S. Environmental Protection Agency (USEPA) and the Wisconsin Department of Natural Resources (WDNR) (collectively, the "Response Agencies") in June 2008. As described in the ROD Amendment, the ICIAP is an integral element of the overall remedial design (RD). The purpose of the ICIAP is to ensure the long-term protectiveness of remedial action (RA) to address contaminated sediments in OU1. The requirement to implement the ICIAP in OU1 is set forth in the 2008 Amended Consent Decree for Remedial Design and Remedial Action at Operable Unit 1 of the Lower Fox River and Green Bay Site ("Amended Consent Decree") and the accompanying Amended Statement of Work (USEPA 2008). The respondents to the Amended Consent Decree ("Respondents") include P.H. Glatfelter and WTM I Company (formerly known as Wisconsin Tissue Mills, Inc.).

The objective of the RA is to protect human health and the environment. The in-water RA in OU1 began in September 2004 with dredging and was completed with the final cap placement in May 2009. With dredging, capping, and associated actions at the Site complete, fish consumption advisories and contaminated sediments contained beneath engineered caps are the subject of this ICIAP. Cap areas in OU1 are described in the *Lower Fox River Operable Unit 1 – Final OU1 Cap Design Report* ("Final OU1 Cap Design Report") (Foth 2008a). As-built surveys of each engineered cap area are described in the *Lower Fox River Operable Unit 1 2007 Cap Placement Test Summary Report* (Foth 2008b), the *Lower Fox River Operable Unit 1 2008 Remedial Action Summary Report* (Foth 2009), and the *Lower Fox River Operable Unit 1 2009 Remedial Action Summary Report* (Foth 2010).

1.1 Background on Institutional Controls

As defined in OSWER No. 9355.0-106, *Strategy to Ensure Institutional Control Implementation at Superfund Sites*, (EPA 2004), the ROD Amendment, and the Amended Statement of Work, institutional controls are non-engineered instruments – such as administrative and legal controls – that may be included as part of the RA to minimize the potential for human health or ecological exposure to sediment contamination and to ensure the long-term integrity of the remedy. The term "institutional control" generally refers to measures intended to affect human activities in such a way as to reduce exposure to hazardous substances, such as by limiting certain uses that might compromise the remedy or result in exposure to contaminated sediment. USEPA guidance on institutional controls is provided in OSWER Directive 9355.0-74FS-P, *Institutional Controls: A Site Manager's Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups* (USEPA 2000).

Institutional controls are typically grouped into the following categories:

- Proprietary land use restrictions and maintenance agreements that may involve legal instruments
- Enforcement and permit devices
- Governmental controls including permit conditions for future actions
- Informational devices including signage and fish consumption advisories that may be required until remedial action objectives (RAOs) are met.

Institutional controls help assure long-term protectiveness for those areas that do not allow for unlimited and unrestricted exposure. Long-term protectiveness requires compliance with applicable ICs, so applicable ICs must be monitored and maintained on a long-term basis.

1.2 The Lower Fox River OU1 Remedial Action

The PCB cleanup remedy for LLBdM was originally set forth in the ROD for OU1 issued in December 2002 by the Response Agencies under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, 42 U.S.C. §§ 9601-9675 (USEPA and WDNR 2002). In order to support detailed RD analyses consistent with the ROD, intensive data collection was performed at the Site from 2003 to 2007. In June 2008, the Response Agencies issued a ROD Amendment that made changes to parts of the remedy described in the original ROD in response to new information collected since 2003 and experience gained during the 2004 through 2007 remediation activities at the Site (USEPA and WDNR 2008). The final remedy consisted of dredging, engineered capping of sediments in areas with an average PCB concentration between 2.0 ppm and 10 ppm in the top 8-inch interval and a post-cap water depth of 6 feet or greater, and sand cover of sediment (i) in areas with PCB concentrations of 2.0 ppm or less in the top 8-inch interval and less than 1.0 ppm on average in any other 8-inch interval or (ii) for post-dredging residuals management.

The ROD Amendment outlined the following types of institutional controls to be considered during RD:

- Regulated Navigation Area where water use restrictions are required (e.g., limitations on anchoring, dredging, spudding, or dragging limitations, conducting salvage operations, establishment of "no wake" areas and other operating restrictions for vessels which could potentially disturb the riverbed or the engineered remedy limitations);
- Construction limitations (e.g., restrictions on utilities such as laying cable, new bridges or dredging limitations for marina expansion or maintenance);
- Monitoring and maintenance requirements for all areas including dams; and
- Providing additional information to the public to assure protectiveness of the remedy (e.g., fish consumption advisories).

SECTION 2

2.0 Institutional Controls to Protect Engineered Caps

This section describes the institutional controls that will be used to protect engineered caps. As discussed above, institutional controls are used to help assure the long-term protectiveness of the remedy. They serve as a supplement to other methods of maintaining long-term protectiveness, such as design features.

Section 2.1 summarizes the design of the engineered caps to maintain their long-term integrity. Section 2.2 discusses the various potential risks to the engineered caps. Section 2.3 discusses institutional controls to protect the engineered caps. Section 2.4 describes monitoring and maintenance activities for the caps.

2.1 Engineered Cap Design

A Response Agency-approved design for engineered sediment caps in OU1 was developed as described in more detail in the *Final OU1 Cap Design Report* (Foth 2008a). The OU1 engineered cap was designed for sediment containing less than 10 parts per million (ppm) of PCBs in the top 8 inches of sediment. The OU1 engineered cap consists of a minimum of 3 inches of sand overlain with a minimum of 4 inches of armor stone. With a 3-inch overplacement allowance for each of the cap layers, the nominal design cap thickness is 13 inches.

Consistent with the ROD Amendment, engineered caps were constructed only in areas where the post-cap water depth would be 6 feet or greater. They were installed as summarized in Table 2-1.

Attached as Figure 2-1 is a map reflecting the location of areas with engineered caps. Shape files showing the location and coordinates of areas with engineered caps in a NAD 83 GIS format are attached as electronic files in Appendix A.

Engineered Caps were placed in the vast majority of the areas planned for capping within LLBdM. However, caps were not placed in localized areas, including around in-water structures and utilities, where it could not be safely placed. See *Lower Fox River Operable Unit 1 – 2008-2009 Final Design and Remedial Action Work Plan* (Foth et al., 2008).

TABLE 2-1
Summary of Engineered Cap Placement

Sub-Area	Total Acreage Capped
D1	0.06
E1	37.30
E2	64.90
E3 North	0.40
E3 South	8.05
E4	0.29
E5	2.00
POG2	0.02
POG3	0.01
POG4	0.90
Total	113.9

2.2 Relationship Between Design of Caps and Potential Risks to Caps

As discussed above, the ROD Amendment outlined certain types of institutional controls that should be considered during RD. In particular, the ROD Amendment discussed the following institutional controls that could be used for protecting the engineered caps (see Section 1.2 for more detail):

- Water use restrictions
- Construction limitations
- Monitoring and maintenance requirements
- Information provided to the public

This section describes potential risks and whether institutional controls are necessary to protect the integrity of the remedy. Most potential risks were addressed by the design of the engineered caps. The OU1 engineered cap was designed to maintain its integrity and environmental protection even when subjected to worst-case hydrodynamic forces including 100-year floods, wind waves, boat wakes, propeller wash, and ice scour (see Foth 2008a). The cap's armor layer was developed to resist worst-case shear stresses with an appropriate factor of safety, concurrently providing both an erosion protection and a bioturbation layer.

2.2.1 Riparian Activities

The potential exists for riparian owners to conduct activities that are exempt from NR Chapter 30.12 permit requirements. These exempt activities may include installation of seasonal dock structures, piers, wharfs, or piling for ice control or watercraft pivoting. Even so, these activities are not expected to have any impact on the integrity of the caps, which are located not in shoreline areas, but in areas with a post-cap placement depth greater that 6 feet.

Even if piles were required in capped areas, such piles are likely to be small diameter (typically less than 4 to 5 inches) pipe piles driven in place. The act of mechanically driving the piles is not expected to have a significant negative impact on the integrity of the caps since the cap material within the immediate footprint of the pile would either be driven down or pushed aside by the pile (Boudreau et al. 2003). Although some temporary, minor disturbance of the cap could be created through the removal of a pile, cap material from immediately adjacent to a pile would be expected to fill the void created by the removal of a pile almost instantaneously. In addition, the area of impact (typically less than 0.2 square feet per pile) is insignificant relative to the area of any capping area. Therefore, no significant exposure to underlying contaminated sediments is expected as a result of exempt pile removal activities.

If dredging of material, including cap material, in excess of 2 cubic yards (cy) were necessary for the installation or removal of a pile and other anchor device, approval of a Dredging – Waterway & Wetland Permit under Chapter 30 would be required as described in Section 2.3 below. Therefore, the current Wisconsin statutes provide protection of engineered caps against disturbance from these activities.

2.2.2 Limitations on Navigation or Vessel Speed

Based on the engineering evaluations performed as part of the OU1 cap design (Foth 2008), there is no need to establish no-wake or restricted vessel speed zones to protect the OU1 engineered caps.

2.2.3 Limitations on Anchoring, Dragging, or Salvage Operations

Anchoring, spudding, dragging, and salvage operations are sometimes restricted in sediment capping areas if such restrictions are necessary to provide protection against activities that could potentially compromise the integrity of the armor layer (USEPA 2005). Considering the range of recreational and commercial anchor types for vessels that operate within the Lower Fox River, and also considering the bearing strength of the designed armor layer, vessel anchors as may be deployed in capped areas will rarely penetrate through the relatively coarse-grained armor layer. Moreover, should an anchor or other disturbance penetrate through the armor layer, the "self-healing" behavior of the cap upon withdrawal of the structure maintains the integrity of the cap (e.g., see Palermo et al. 1998 and Boudreau et al. 2003). Long-term cap monitoring will be performed to verify the continued protectiveness of the caps. (See the Cap Maintenance and Monitoring Plan [CMMP]).

Prohibitions on the anchoring of vessels within capping areas of OU1 are not necessary to maintain the effectiveness of the remedy, and would unduly burden local recreational use of LLBdM without a concomitant environmental benefit.

2.2.4 Limitations on Dredging

In order to protect the engineered caps, any future dredging operations in capped areas must be performed in a manner that does not remove the capping material. In OU1, however, maintenance dredging in or near areas with engineered caps is not anticipated or routine. Privately-sponsored dredging in excess of 2 cy would require a Dredging – Waterway & Wetland Permit under Chapter 30 as described in greater detail in Section 2.3.

2.2.5 Limitations on Construction Activities

The OU1 engineered cap can withstand a limited range of minor construction-related disturbances. Boudreau et al. (2003) present engineering analyses and case studies of pile driving through engineered caps, and conclude that pile driving or other similar disturbances do not compromise the integrity or effectiveness of engineered caps that are designed following USEPA and USACE guidelines. The cap designs described in the *Final OU1 Cap Design Report* (Foth 2008a) conform to these guidelines, and are protective of a range of physical disturbances including pile driving. The "self-healing" behavior of caps upon entry or withdrawal of a range of structures maintains the integrity of the cap (*see* Palermo et al. 1998).

To protect the long-term integrity of caps, a review and approval process for in-water development activities is necessary. While the OU1 cap design can address a range of minor physical disturbances, larger construction activities can unacceptably damage the engineered cap. The intent of restricting construction activities that would damage the cap is to limit the exposure of the contaminated sediment below the cap so that the OU1 surficial weighted average concentration (SWAC) does not exceed the OU1 goal of 0.25 ppm PCBs.

2.3 Institutional Controls to Protect Engineered Caps

Existing state and federal laws regulate activities that could impact cap integrity in OU1. For example, Chapter 30 of the Wisconsin Statutes, Sections 401 and 404 of the Clean Water Act (CWA), and Sections 9 and 10 of the Rivers and Harbors Act give WDNR and USACE the authority and responsibility to enforce prohibitions on activities that would threaten the integrity of the engineered cap. To the extent existing regulatory authorities do not fully address these potential risks, this subsection includes the additional institutional controls that will be used to address the potential risks. Table 2-2 provides a list of applicable institutional controls that will be used for engineered caps in OU1.

2.3.1 WDNR's Institutional Control Authority and Regulatory Responsibilities

Wisconsin's authority to regulate activities in waterways predates the Wisconsin Constitution and has its origins in the "public trust doctrine" of the Northwest Ordinance of 1787. In essence, the public trust doctrine provides that the State of Wisconsin holds all natural navigable waters in trust for the public. The State's property rights in navigable waters are paramount, and the property rights of riparian landowners are qualified and subordinate to the State's rights.

TABLE 2-2
Institutional Controls for Engineered Caps in OU1

	Engineered Caps in OU1
Objectives of Institutional Control	Ensure that no activity, such as dredging, impacts engineered cap integrity
Informational Devices	WDNR BRRTS Registry Governmental Notices such as fish advisories and navigational maps Utility notification Diggers Hotline
Governmental Controls (Including Enforcement and Permit Devices)	WDNR Chapter 30 requirements Sections 10 and 401/404 USACE permit requirements
Proprietary Controls	None anticipated

Chapter 30 of the Wisconsin Statutes provides a permitting program that will effectively protect the integrity of the capping element of the selected remedy:

1. Section 30.12, Wis. Stat. makes it unlawful to place a structure on the bed of a navigable waterway unless a permit has been granted by WDNR or the structure is otherwise authorized by statute.
2. Section 30.20 makes it unlawful to remove material from the bed of a navigable waterway unless a permit has been granted by WDNR or the removal is otherwise authorized by statute.

2.3.2 Implementation of Chapter 30 Institutional Controls

The Chapter 30 regulatory framework is administered by WDNR through exemptions, general permits, and individual permits. A summary of exempt activities is provided in Appendix B. None of the activities that have been classified as exempt are able to threaten the integrity of the caps. Both general and individual permits otherwise require notice to WDNR of activities that could threaten the caps. Chapter 30 gives WDNR the authority to restrict any activity that is detrimental to the public interest, so the permitting process itself stands as a barrier to activities that may pose a realistic threat to the integrity of the engineered caps.

2.3.3 Existing Federal Regulatory Authorities

While Chapter 30 will be the primary existing regulatory authority to be used as an institutional control, there are also a range of federal laws that place restrictions on and require permits to be obtained for dredging, filling, or other construction activities in the aquatic environment. These include Section 404 of the CWA; 33 U.S.C. § 1344; and Sections 9 and 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. §§ 401 and 403, which require federal permitting for any construction that would impact the course, capacity, or condition of navigable waters of the U.S. The 401/404 regulations are typically implemented by USACE, but may also be implemented by USEPA. Under the Section 404(b)(1) guidelines, 40 C.F.R. § 230.10(b), no discharge (i.e., excavation of caps) shall be allowed if it:

- Causes or contributes to violations of water quality standards, pursuant to Section 401 of the CWA, after consideration of local dilution and dispersion; or
- Violates any applicable toxic effluent standard or discharge prohibition under Section 307 of the CWA.

Thus, existing federal programs offer other alternatives to restrict activities that might threaten the integrity of the cap.

2.3.4 Dredging

The locations of engineered cap in OU1 do not overlay areas subject to navigational dredging. As noted in Section 2.2.4, privately-sponsored dredging activities are subject to permitting under WDNR's Chapter 30 program. The only exception is for manual dredging, which involves the use of a hand-held device without power. Manual dredging could not be undertaken at a scale necessary to impact engineered caps of the magnitude placed in OU1. Such activities, therefore, do not pose a threat to the integrity of the cap.

2.3.5 Construction Activities

As discussed in Section 2.2.5, existing permitting and regulatory programs sufficiently restrict construction activities in the vicinity of engineered caps so as to protect cap integrity.

2.4 Monitoring and Maintenance

As discussed in the Cap Monitoring and Maintenance Plan (CMMP), monitoring and maintenance will be performed to support the physical integrity of the cap and the permanent containment of underlying contaminants. Geophysical monitoring events will occur at a predetermined schedule, and as soon as possible following particular events that could cause cap damage such as major storm events.

Fish consumption advisories are already in place in the Lower Fox River. The Lower Fox River Long-Term Monitoring Plan (LTMP) presents an extensive program for monitoring the post-remediation recovery of surface water and biota in OU1. The provisions of the LTMP that are relevant and applicable to OU1 are set forth in Appendix E to the *Pre-Final Design and Remedial Action Work Plan for Post-2009 Response Work* (CH2M HILL and Foth). Long-term monitoring will be performed to assess progress toward achieving the remedial action objectives (RAOs) specified in the Record of Decision (ROD) and the ROD Amendment. The long-term monitoring

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program will provide data for the continued use or modification of the fish consumption advisories.

SECTION 3

3.0 Dams

Additional institutional controls with respect to the Neenah, Menasha and Appleton dams are not necessary to ensure the protectiveness of the remedy in OU1. Given the regular inspection and maintenance of the Neenah, Menasha and Appleton dams by USACE, no basis currently exists to anticipate that the dams will fail or be removed. There are already a number of compelling reasons for USACE and others to continue to maintain the dams, such as existing regulatory requirements, safety, providing hydropower capability, water supplies, and recreational use.

According to EPA guidance, an institutional control may be deemed to be in place already if a governmental agency has responsibility for conducting an activity or enforcing a prohibition and existing laws or regulations require an environmental review before that program is changed (USEPA 2005). USACE and WDNR currently oversee operation and maintenance of dams that are part of the Fox River Navigational System. White Paper 4, issued with the 2003 ROD, describes Wisconsin regulatory and environmental review requirements associated with proposals for dam removal. Moreover, a considerable amount of infrastructure and residential development along OU1 depends on continued operation of the dams. For the foregoing reasons, institutional controls to prevent the removal of the dams are not necessary to ensure the long-term protectiveness of the remedy in OU1.

SECTION 4

4.0 Public Information and Advisories

WDNR maintains a comprehensive and accessible GIS database known as the BRRTS Registry. The Respondents will create and provide data reflecting the location of caps so that the location of caps can be registered on the BRRTS database. Additionally, maps showing the location of caps will be provided for the mapping system maintained by Winnebago County. Because the capping activity in OU1 is confined to Winnebago County, WDNR and the Respondents will coordinate with Winnebago County in the development and maintenance of the database to ensure consistency between Winnebago County's and WDNR's mapping databases. WDNR and the Respondents will also make the database available to other nearby municipalities such as the Cities of Neenah and Appleton and the Town of Menasha.

Information on engineered cap ICs will be available to the public through WDNR's website and through Winnebago County's mapping system. In addition, maps will be provided to the Neenah Public Library, Menasha Public Library, and Appleton Public Library.

Fish consumption advisories are informational devices. Existing joint Wisconsin Departments of Health & Family Services (WDHFS) and WDNR fish consumption advisories are already in place in the Lower Fox River. General fish consumption advisories are currently in effect for seven species of fish located in the Lower Fox River from Little Lake Butte des Morts to the De Pere Dam.

The fish consumption advisory program is expected to continue in the future. Thus, an independent advisory program as part of the OU1 RA would be redundant and could create a risk of contradictory advice to the public. Therefore, no changes are proposed to the existing fish consumption advisory program.

SECTION 5

5.0 Annual Certification

An annual certification regarding the status and effectiveness of ICs will be submitted to USEPA and WDNR. As part of the CERCLA 5-year review, USEPA will review the status and effectiveness of the institutional controls related to OU1. ICs will be updated as necessary to ensure the long-term protectiveness of the OU1 RA.

SECTION 6

6.0 References

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Appendix A
Location and Coordinates of Engineered Caps (NAD 83 GIS files)

NAVD 83 GIS Format Shape Files

A disk will be provided

Appendix B
Exemptions from Sections 30.12 and 30.20 Permit Requirements

Exemptions from Section 30.12 Permit Requirements

1. A deposit of sand, gravel, or stone that totals less than 2 cubic yards and that is associated with any activity or project that is exempt from an individual permit or a general permit under this subchapter.
2. A structure, other than a pier or a wharf, that is placed on a seasonal basis in accordance with rules promulgated by the department.
3. A fish crib, spawning reef, wing deflector, or similar device that is placed on the bed of navigable waters for the purpose of improving fish habitat.
4. A bird nesting platform, wood duck house, or similar structure that is placed on the bed of a navigable water for the purpose of improving wildlife habitat.
5. A boat shelter, boat hoist, or boat lift that is placed on a seasonal basis adjacent to the riparian owner's pier or wharf or to the shoreline on the riparian owner's property, in accordance with rules promulgated by the department.
6. A pier or wharf that is no more than 6 feet wide, that extends no further than to a point where the water is 3 feet at its maximum depth, or to the point where there is adequate depth for mooring a boat or using a boat hoist or boat lift, whichever is farther from the shoreline, and that has no more than 2 boat slips for the first 50 feet of riparian owner's shoreline footage and no more than one additional boat slip for each additional 50 feet of the riparian owner's shoreline. Notwithstanding the width limitation in this paragraph, a pier may have an area as a loading platform that is more than 6 feet wide if the platform is not more than 8 feet wide, it extends perpendicular to one or both sides of the pier, and it is located at the lakeward end of the pier or at the end of the pier that extends into a stream.
7. An intake structure and pipe that is placed on the bed of a navigable water for the purpose of constructing a dry fire hydrant to supply water for fire protection.
8. A piling that is driven into the bed of a navigable water adjacent to the owner's property for the purpose of deflecting ice, protecting an existing or proposed structure, or providing a pivot point for turning watercraft.
9. Riprap in an amount not to exceed 100 linear feet that is placed to replace existing riprap located in an inland lake or Great Lakes water body and that includes the replacement of filter fabric or base substrate.
10. Riprap in an amount not to exceed 300 linear feet that is placed to repair existing riprap located in an inland lake or Great Lakes water body, and that consists only of the placement of additional rock or the redistribution of existing rock within the footprint of the existing riprap.
11. A biological shore erosion control structure, as defined by rule by the department.

12. An intake or outfall structure that is less than 6 feet from the water side of the ordinary High-water mark and that is less than 25 percent of the width of the channel in which it is placed.
13. Dry Fire Hydrants.
14. Swimming Rafts.
15. Water Ski Platforms and Jumps.

Exemption from Section 30.20 Permit Requirement

Section NR 325.04(1)(d) establishes an exemption for manual dredging. Manual dredging is defined at NR 345.03(8) as follows:

(8) "Manual dredging" means removal or disturbance of bottom material by hand or using a hand-held device without the aid of external or auxiliary power. Manual dredging is often associated with the collection of aquatic insects for bait, removal of nuisance vegetation or debris and the panning for gold or other material. For the purpose of ch. 30, Stats., manual dredging does not include "de minimis" activities as defined in sub. (2).