

LOWER FOX RIVER AND GREEN BAY SITES – OUs 2 - 5 (APPLETON TO GREEN BAY, WI)
(MCSS DATABASE PROJECT 05-43)

Site Description

The entire Lower Fox River is approximately 39 miles long with an average flow of about 4,300 cubic feet per second (“cfs”), a five-year maximum flow of about 17,000 cfs, and a mean discharge into Green Bay of 5,000 cfs. The Lower Fox River is generally less than 1,000 ft wide and ranges in depth between six and 20 feet in its main channel. The river drops in elevation about 168 feet from Lake Winnebago to Green Bay and contains 12 dams and 17 locks. The USACE currently dredges only the lower 3 miles of the river to maintain a navigational channel depth of between 20 ft and 24 ft. The mean depth of Green Bay is approximately 65 ft; the maximum depth is 176 ft.

For remedial purposes the Lower Fox River has been divided into four reaches, each one designated as a separate operable unit (“OU”), and Green Bay is designated a separate OU. OU 1, the uppermost river reach known as Little Lake Butte des Morts, is being addressed under a remedy separate from the remainder of the river and is described in a separate summary (MCSS Database Project 05-27). The Lower Fox River site (“the Site”) that is described in this summary includes three river OUs extending from Appleton, about six miles north of the outlet of Lake Winnebago, the downstream end of Little Lake Butte des Morts, downstream to the mouth of the River at Green Bay and all of Green Bay (from the city of Green Bay to the confluence of Green Bay and Lake Michigan). OU 2 consists of the 20-mile stretch of river from Appleton to Little Rapids dam, OU 3 consists of the six-mile stretch of river from Little Rapids dam to De Pere dam, OU 4 consists of the six to seven-mile stretch of river from De Pere dam to the mouth of the river at Green Bay and OU 5 comprises the 1,600 square miles of Green Bay.

The Site historically was addressed under a negotiated agreement between the State of Wisconsin and the Fox River Group. In July 1998 EPA recommended the Site for placement on the National Priorities List (“NPL”). Although not officially on the NPL, a number of federal, state and tribal agencies have joined efforts to address the site through multiple regulatory avenues including Superfund, the Natural Resource Damage Assessment, and state spill authorities. These actions in turn have been sufficient to keep the site from being officially listed on the NPL.

Site History

Potential sources of PCBs to the river include, but are not limited to, 14 paper mills and 6 major municipal wastewater treatment facilities discharging directly to the 39 miles of Fox River from Lake Winnebago to Green Bay (Lower Green Bay RAP, 1993). The great majority of PCB-containing waste discharged to the Fox River was reportedly from paper recycling and use of “paper broke” and occurred prior to the 1970s. The Wisconsin Department of Natural Resources (“WDNR”) has estimated the cumulative release of PCBs discharged into the river from about 1954 until the early 1970s to be about 691,370 pounds, with a possible range between 278,775 and 880,640 pounds. Approximately 91 percent of this mass is present in OU 4.

The site has been investigated by EPA, WDNR, and various private entities and PRP groups since the late 1980s. The 1989-1990 Lower Fox River/Green Bay Mass Balance Study quantified PCB contamination in the 39 miles of the Lower Fox River and began seven years of data gathering and water and fish quality model development. In 1997, the State of Wisconsin reached agreement with the Fox River Group (seven paper companies) providing for a moratorium on litigation and a \$10

million lump sum to fund several projects in the river including sediment removal demonstration projects, additional modeling, and habitat restoration. This resulted in the implementation of two sediment removal demonstration projects, Deposit N in 1998-1999 and SMU 56/57 in 1999-2000 (MCSS Database Projects 05-20 and 05-06, respectively). In December 2002, a Record of Decision ("ROD") was issued for OUs 1 and 2 that specified the hydraulic dredging of 2.2 million cubic yards (cy) of sediments from OU 1 and monitored natural recovery ("MNR") for OU 2 to eventually reach a Remedial Action Level ("RAL") of 1 ppm. MNR for OU 2 was recommended since OU 2 was estimated to only contain approximately 240 pounds of PCBs in 339,200 cy of sediment which corresponded to a surface weighted average concentration (SWAC) of only 0.61 ppm. It was determined that a significant portion of the PCBs in this OU had been removed through the Deposit N removal project and as a result, no significant (i.e., greater than 10,000 cy) deposits of contaminated sediment remain in OU 2. The ROD also specified Remedial Action Objectives ("RAOs") to be met, specifically:

- Achieve, to the extent practicable, surface water quality criteria throughout the Lower Fox River and Green Bay.
- Protect humans who consume fish from exposure to Contaminants of Concern (COCs) that exceed protective levels.
- Protect ecological receptors from exposure to COCs above protective levels.
- Reduce transport of PCBs from the Lower Fox River into Green Bay and Lake Michigan.
- Minimize the downstream movement of PCBs during implementation of the remedy.

In June 2003, a second ROD was issued for the Site covering OUs 3, 4 and 5. The 2003 ROD called for dredging and disposal of sediments from OU 3 and OU 4, and MNR for OU 5. Additionally, this ROD included the dredging of sediment from Deposit DD in OU 2 which would be performed as part of the dredging in OU 3. The ROD called for the removal of all sediments with PCB concentrations greater than the RAL of 1 ppm and resulted in the need to dredge approximately 7.1 million cy of sediments, piping the removed sediment to settling basins to dewater, and then disposing of the dewatered sediment in a licensed landfill. The ROD allowed for the capping of certain areas to meet the remedy if specific conditions were met. The EPA estimated the cost of the 2003 ROD efforts at \$325 million (the most recent estimate for implementing the 2003 ROD remedy is \$580 million).

In March 2004, EPA and WDNR entered into an Administrative Order on Consent with two PRPs - NCR Corporation and Fort James Operating Company, Inc. - to implement the remedy specified in the 2003 ROD. As part of the remedial design process, the two PRPs implemented extensive in-river investigations that included the collection of approximately 10,000 sediment samples from 1,400 sediment core locations within OUs 2 through 5 during the Fall 2004 and Spring 2005. The results of these investigations and preliminary design considerations were presented in a June 2006 Basis of Design Report ("BODR") that was submitted to EPA and the WDNR for review. The BODR concluded that:

- PCBs are not uniformly distributed throughout the Site but tend to be concentrated in smaller, definable areas.
- A 20-acre area, with PCB concentrations in near-surface sediments as high as 3,000 ppm, was found just downstream and west of the De Pere Dam. (This area is currently being

addressed as the Phase 1 remediation project; a separate Summary [Fox River (De Pere)] has been provided).

- Some contaminated sediments in OU 4 are buried under 6 to 13 feet of relatively cleaner sediments. To remove the more highly contaminated sediment and to maintain a stable river bottom in these areas, a significant volume of relatively uncontaminated sediment would also have to be removed and disposed.
- Approximately 210 acres of the total 1,170 acres of the PCB contaminated sediment (roughly 18% by area and 0.5% of the PCB mass) have a relatively thin layer (i.e., less than six inches) of contamination, with relatively low PCB concentrations (between 1 and 2 ppm).
- Recent experience with dredging in OU 1 and other projects has shown that dredging equipment cannot completely remove contaminated sediment from dredged areas. Thus, residual contaminant concentrations often remain after dredging is completed in an area. For that and related reasons, the dredging remedy selected by the 2003 ROD probably would not achieve the PCB SWAC goals established by the 2003 ROD.
- Dredging probably cannot be used to remove contaminated sediment in some areas near shoreline facilities and in-water structures because removal of the sediment could undermine and destabilize those facilities and structures.

The BODR further indicated that there is limited landfill space in the surrounding area, and that no regional landfill has enough space to accept the sediment volume proposed in the 2003 ROD.

Potentially Responsible Parties (PRPs)

The PRPs identified by EPA for OUs 2 through 5 are: Appleton Papers Inc., CBC Coating, Inc. (formerly Riverside Paper Corporation), Georgia-Pacific Consumer Products, LP (formerly Fort James Operating Company), Menasha Corporation, NCR Corporation, P.H. Glatfelter Company, U.S. Paper Mills Corp., and WTMi Company (formerly Wisconsin Tissue Mills, Inc.).

In November 2007, P.H. Glatfelter Company filed a civil lawsuit in US District Court asking that it not be included in the order. Glatfelter is arguing that they are not responsible for PCBs in the Fox River below OU 1.

Threats and Contaminants

The principal contaminants are PCBs (primarily Aroclor 1242); however, dieldrin, DDT/DDE/DDD, furan and dioxin, and heavy metals (arsenic, lead and mercury) are also present, but are not considered significant risk drivers due to their low concentrations. Thirty-five individual PCB-contaminated sediment deposits have been identified in the 32 miles between Lake Winnebago and De Pere, containing about 2 million cy of sediment with an overall average PCB concentration of roughly 1 to 1.5 ppm. For the remaining seven miles, from the De Pere Dam downstream to Green Bay, there is reportedly a continuous layer of contaminated sediment, representing an estimated 8 million cy of sediment with an overall average PCB concentration of roughly 2 to 2.5 ppm. As a result of the identified contamination, fish advisories have been in effect in the Lower Fox River and Green Bay since 1976.

Selected Remedy

In June 2007 the WDNR and EPA issued a ROD Amendment for OUs 2 through 5 based on the information and recommendations presented in the BODR. WDNR and EPA determined that it was appropriate to modify the remedy specified in the 2003 ROD by selecting an amended remedy. The substantive changes proposed by the 2007 ROD Amendment are:

- The RAL remains at 1.0 ppm PCBs and the goal remains to reach a SWAC of 0.25 ppm PCBs following remedial action (however, the estimated SWAC for OU 3 is now 0.28-0.49 ppm and for OU 4 is now 0.25-2.9 ppm).
- Dredging 3.5 to 3.7 million cy of contaminated sediment from OUs 2 through 5 that would result in the removal of an estimated 10,000 kilograms of PCBs from 510 acres of riverbed sediment. Following dredging, post-removal sampling and surveying will be performed to determine if sediment removal objectives were met or if post-removal residual management measures are necessary (generally re-dredging if PCB concentration is greater than 10 ppm, or capping if less than 10 ppm or other criteria are met).
- Mechanical dewatering, separating the sand from the sediment, and using the separated sand on and off the site to further reduce the amount of material placed in a landfill (an estimated 225,000 cy of sand fraction may be recovered, washed and beneficially reused; the PCB concentration of the recovered sand would generally need to be less than 0.25 ppm; beneficial use might be for partial fill at staging areas, road fill or landfill daily cover).
- Using a combination of capping and dredging in Green Bay near the mouth of the river.
- Using engineered caps (an estimated 450 acres or less) in selected areas such as; a) where dredging could cause damage to riverbanks, b) where contaminated sediment is deeply buried, c) in the navigational channel in OU 4 as long as the cap is at least 2 feet below the authorized level of the bottom of the navigational channel, and d) near utilities when dredging in those areas could pose a risk to those facilities. Engineered caps of at least 33 inches in thickness would consist of 15 inches of clean sand covered by 18 inches of relatively large angular stone (4-8 inch quarry spall). Engineered caps of at least 13 or 16 inches would consist of 6 or 9 inches of clean sand and 7 inches of gravel.
- Using sand covers (an estimated 210 acres or less) as an alternative to dredging in areas where the maximum PCB level is less than or equal to 2 ppm and where the contaminated sediment layer is no thicker than 6 inches. The sand cover would consist of at least 6 inches of clean sand from an offsite source.
- Allows for either mechanical or hydraulic dredging, while the 2003 ROD had specified mechanical dredging only.
- Long-term monitoring of the caps and covers to verify that contamination is not being released since contamination will be left in place. If monitoring finds the caps or covers are not working, additional actions will be taken. Long term monitoring will continue until acceptable PCB levels are reached in surface water and fish.

The estimated cost for the revised plan is \$390 million and is projected to be completed in nine years as opposed to the 15 years projected for the 2003 ROD remedy.

In September 2007, the US Senate approved a \$21 billion water projects bill which included a provision to change the authorized depth of the Fox River channel from the Georgia-Pacific turning

basin to the De Pere dam from 18 feet to 6 feet. This shallower depth will make implementing a capping remedy in certain areas more feasible.

In November 2007, the EPA issued a Unilateral Administrative Order that ordered the PRPs to issue a work plan that would allow the PRPs to meet a pair of deadlines for implementing the remedy in two phases. The first phase was to begin in December 2007 and required the PRPs to submit a design plan that would allow them to begin preparatory work for the cleanup including procurement of equipment, establishment of staging facilities, landfill disposal arrangements, appropriate site surveys and property access agreements. The second phase is the start of dredging and in-river capping activities beginning no later than August 2009.

On December 31, 2007, Georgia-Pacific, Appleton Papers, NCR Corporation and U.S. Paper Mills issued a design plan to EPA and WDNR in which the PRPs indicate that dredging will not be able to begin until 2010 due to a 16 to 17 month lead time to procure, deliver and install the filter presses specified for dewatering the removed sediment. The design plan also specifies utilizing two shore areas near the Georgia-Pacific Broadway Mill for its land-based operations of sediment dewatering, water treatment, and sediment offloading. A third property near the Little Rapids dam north of Wrightstown is being considered as well for land-based operations. The design plan also proposes the development of a landfill site where treated non-TSCA dredge sediment can be transported. Two available regional disposal sites are the town of Holland landfill owned by Brown County and the Veolia, WI (Onyx) Hickory Meadows landfill in Calumet County. TSCA sediments would reportedly be transported to landfills in either Michigan or Illinois.

Future Activities

The EPA and WDNR are both currently reviewing the design plan and have expressed concern with the potential delay of in-river activities until 2010 as well as other design deficiencies. The agencies have recently requested the companies resubmit a revised plan by January 31, 2008, according to a January 17, 2008 article in the Gannett Wisconsin newspapers.

Additionally, to-date the PRPs have been unable to reach agreement on each one's financial share of the cleanup costs, according to a January 3, 2008 article in the Green Bay Post Gazette.

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