

**SITE STATUS SUMMARY**  
**FOX RIVER OU1 – LITTLE LAKE BUTTE DES MORTS**

**Site Description**

The Little Lake Butte Des Morts (LLBdM) site is designated Operable Unit (OU) 1 within the Lower Fox River and Green Bay site (the Site). LLBdM extends from Lake Winnebago downstream to the Appleton Dam, a distance of approximately 6 miles, and averages approximately one-half mile wide. Water depths in LLBdM typically range from 2 to 5 feet except in the main channel where the depth is maintained at 6 to 20 feet.

**Site History**

The majority of PCB-containing waste discharged to the Fox River was reportedly from paper recycling and the use of "paper broke," and occurred prior to the 1970s.

The 2002 ROD for the Site estimates that LLBdM contains 2,200,400 cy of sediment with a PCB mass of 1,850 kg (4,080 lbs) and that PCB concentrations in sediment range from 0.002 to 223 ppm (avg. 3.7 ppm). The 2002 ROD for LLBdM specified the removal of 784,200 cy of sediment containing 1 ppm or greater PCBs (the ROD-stated Remedial Action Level [RAL]) while meeting a surface-weighted average concentration (SWAC) of 0.25 ppm PCBs. The ROD also allows for use of a six-inch sand cap to meet the RAL where the RAL is not met by dredging alone. The estimated project cost in the ROD is between \$61 and \$65 million for dredging and \$4.5 million for long-term monitoring.

**Project Parties**

The LLBdM Cleanup Team includes GW Partners, LLC and its contractors. GW Partners, LLC consists of two companies: WTM I Company (formerly Wisconsin Tissue Mills in Menasha) and Glatfelter (owner of the Bergstrom Mill in Neenah). The contractors are CH2M Hill (supervising contractor), J.F. Brennen (dredging), Foth & Van Dyke, and STS Consultants. Oversight is provided by Wisconsin Department of Natural Resources (WDNR) and the U.S. Environmental Protection Agency (EPA).

**Cleanup Approach and Remedial Activities**

Sediment removal in LLBdM began as a pilot study in September of 2004. Actual remedial dredging began on July 8, 2005 with approximately 88,000 cy removed prior to termination of operations for the winter. In 2006, an estimated 100,000 cy of sediment was removed. In 2007, the dredging productivity is about 1,140 cy per day on average (about 50 cy per hour). The goal for overall volume removal in 2007 is also 100,000 cy.

During the 2007 dredge season, two eight-inch swinging ladder dredges equipped with articulated cutterheads and Real Time Kinetic (RTK) Global Positioning Systems are operating concurrently, with Dredge 1 removing sediment along the west shoreline. Dredge 1 began removal operations in early April, starting south of the Highway 441 bridge and moving northward, this unit is currently (early August) working in proximity to the Highway 441 bridge. Dredge 1 is scheduled to continue work in a northerly direction through October. Dredge 2 began operations in early April in the southwestern corner of LLBdM. As of early August, the dredge is currently north of the Friendship Trail near the navigational channel. Dredge 2 is scheduled to continue work in the navigational channel just north of the Friendship Trail through October. According to EPA's Mr. Jim Hahnenberg, installation of a 6" sand cover began in early August in areas where the cleanup standard of 1.0 ppm PCBs has not been achieved. The sand cover is being placed in a slurry form using a spreader barge.

On the eastern side of LLBdM, a thin layer of sediment rests on top of hardpan clay in some areas. It is difficult to collect the thin layer of sediment using the cutterhead dredge heads, so since 2006 a new dredge head model, the Vic Vac, is being used interchangeably with the cutterhead in these areas. The Vic Vac is a suction device that "vacuums" the thin sediment off the hard substrate. It has reportedly (Foth & Van Dyke memo) reduced contamination levels to <1 ppm PCBs in areas where it has been used. The Vic Vac utilizes the articulating ladder, and has a wheel that is attached to the head in order for it to pass over the lakebed while remaining about 6 inches above the sediment. What appears to be a propeller inside the Vic Vac headpiece is used to keep large debris out of the unit to prevent clogging. The propeller device is reportedly more effective at keeping out large debris than if small bars were placed across the headpiece.

Dredging operations continue to occur 5 days per week (dpw), 24 hours per day (hpd) with two operators manning each dredge. If necessary due to schedule and production requirements, operations could be extended to 6 dpw. Both dredges feed into a single pipeline with an average discharge rate of 2,400 gallons per minute (gpm).

### **Land-based Operations**

The land-based operations occur at a 5.2 acre staging area (or sediment processing area) located just south of the Highway 10/441 bridge and east of N. Lake Street in the Town of Menasha. This staging area includes a water treatment building, a boat dock and a flat, gravel dewatering area for sediment dewatering. Sediment is typically pumped from the dredges in a slurry of 5 to 10% solids, with levels occasionally as high as 15% (according to EPA's Project Manager) through pipelines back to the staging area. The land-based facility is typically operated 24 hpd, 5 dpw.

Dewatering has been accomplished primarily using geotubes. In 2007, two clarification units, each equipped with a trommel screen, were added upstream of the geotubes to remove plus-1/8-inch debris for subsequent disposal. This configuration allows filtering of solids larger than sand, allows concentration of sediment prior to discharge to the geotubes and allows overflow

water from the clarifiers to be sent straight to the water treatment facility. This process reportedly reduces the amount of water, large sediment and stones entering the bags, reduces labor and time required for dewatering, maximizes the solids loading and dewatering abilities of the geotubes, and enhances polymer process control.

Dewatering using geotubes has previously resulted in achieving percent solids of between 40 and 50% after approximately two months post-filling. For sediment containing mostly fine-grained silts, the resulting solids content were as low as 35%.

Decant water drained from the geotubes is collected in a central sump and pumped to the water treatment system, which is housed in a building adjacent to the geotube laydown area. The decant water is being treated using sand and then carbon filters. The treated water is being discharged back to the river.

Dewatered non-TSCA sediment is hauled by trucks to Onyx Hickory Meadows Landfill, LLC located in the Town of Chilton. Each truck has a plastic liner and a sealed gate, and is covered with special tarps. The Hickory Meadow site can dispose of sediment containing up to 50 ppm of PCBs. PCB concentration is determined within each geotube prior to disposal, in accordance with the landfills operating permit. The 660-acre facility has more than seven million cy of permitted disposal space. The facility landfill has a 60 mil HDPE liner over a four-foot engineered clay layer.

### **Project Schedule and Current Status**

Dredging activities are scheduled through October of this year and are projected to continue for an additional five years at current production rates.

### **References**

*Record of Decision, OUI and OU2, Lower Fox River and Green Bay, Wisconsin*, USEPA, December 2002.

Personal communications with Bill Hartman, GW Partners, LLC Project Manager and Jim Hahnenburg, USEPA Project Manager.

Little Lake Cleanup website <http://www.littlelakecleanup.com/whoweare.html>

Foth & Van Dyke Memorandum to Bill Hartman, GW Partners, LLC *Vic Vac Dredge Test Area Results and Evaluation*; August 2006

AEM memo “*Reconnaissance of Fox River Little Lake Butte des Morts Dredging*” to S. Blaha dated October 20, 2005.

“Clarifiers Maximize Geotextile Tube Efficiency”, Carol Wsson, International Dredging Review, May/June 2007.