

Site Status Summary – Grand Calumet River (Gary, IN)
(MCSS Database Project 05-07)

General Project Overview

The target area is a five-mile stretch of the Grand Calumet River (east branch and a small segment of the west branch) located primarily on active U.S. Steel Gary Works property, the only participating PRP, and to the south of the steel mill site. The river width varies between 35 feet (headwaters) to 170 feet downstream, and before dredging varied in depth between 0 to 4 feet. Identified contaminants were PAHs, PCBs (primarily Aroclor 1254), and heavy metals. Sources of the contamination are numerous along the length of the river. The river is listed as one of 43 Great Lakes Areas of Concern (AOCs) and is the only AOC in which all fourteen beneficial uses are impaired. Up to 70% of the sediment in certain areas along the river was iron, deposited from wastewater discharged from the U.S. Steel Gary Works Plant. Sediments within the five-mile stretch of river along and downstream of the U.S. Steel Gary Works site reportedly contained an average PCB concentration of 17 ppm (350 ppm max.) and an estimated total PCB mass of 6.6 tons. Other identified constituents of concern (COCs) included total BTEX, benzene, total PAHs, carcinogenic PAHs, total heavy metals, cyanide, and iron.

Dredging was proposed in 1998 to address sediment in the five miles of river closest to the U.S. Steel Gary Works facility as a result of the elevated PAHs and PCBs detected in this section of river. The ingestion of PCB-contaminated fish is considered the primary human health risk at the site.

The site is being addressed under a revised 1998 Clean Water Act Consent Decree and 1998 Facility-wide RCRA Corrective Action Order.

Remedy Implementation

The Statement of Work attached to the 1998 Corrective Action Order specified five miles of river was to be dredged of an estimated 687,000 cy of sediment that would be landfilled within a 40-acre Corrective Action Management Unit (CAMU) constructed by U.S. Steel (a subsidiary of USX Corporation) on the U.S. Steel Gary Works property. The dredging plan proposed the use of cofferdams and flow diversion in the first mile and floating dredges for the remaining four miles. The design targeted the removal of “non-native sediment” down to 20-foot depth, maximum, consistent with design cut-lines.

Planning for the project spanned approximately 12 years. In 2001, the targeted sediment removal volume was increased to 750,000 cy (including non-native sediment, a six-inch over-dredge allowance, and removal of soft side slough material) and included use of three cofferdam areas (each one-half mile long) in the most heavily contaminated upper 1½ miles of river, and open water dredging in the remaining 3½ miles of river. The five miles of river were further divided into 36 transects with spacing that varied from 500 to 1,000 feet.

Earth Tech served as the Prime Contractor for the project, and subcontracted J.F. Brennan Company as the dredge contractor. J.F. Brennan performed all in-water work and Earth Tech performed the water treatment and other land-based operations. Site preparation began in January 2002 and construction of the CAMU began in March 2002 and was completed in

February 2003. The water treatment system was constructed and the three cofferdams installed in the upper 1½ miles of river during this same period. The water treatment system began operation in March 2003 following the start of open water dredging. Additionally, sheetpile was installed within the cofferdam areas to increase bank stabilization during and following dredging in these areas.

Dredging was performed in the upper 1½ mile using an 8-inch hydraulic cutterhead dredge and in the lower 3½ miles using a 12-inch hydraulic cutterhead dredge. Dredging began with the removal of 11,000 cy of sediment from Transect 17 Horizon 1 (a localized area of sediment with elevated levels of contaminants in the lower 3½ miles of river) from December 4 to 18, 2002. Open water dredging in the remaining lower 3½ miles of river was performed February 25, 2003 to approximately the end of October 2003. Dredging in the cofferdam areas was performed from March 20, 2003, following the installation of sheetpile, to approximately the end of November 2003. Water monitoring was performed during dredging at four locations, a fixed upstream location for background, a fixed location downstream of the dredge area, a variable upstream location at approximately 200 yards upstream of the dredge, and a variable downstream at approximately 200 yards downstream of the dredge. Reportedly, water quality criteria were exceeded only once, for the compounds fluorine and fluoranthene.

Dredging was performed 24 hours per day, 6 days per week using two 12-hour shifts. There was no dredge downtime during shift changes. Dredging was the only operation that occurred during night shift; dredge support operations (i.e., routine equipment maintenance, refueling, discharge pipe assembly/disassembly) were scheduled for day shift only. There were as many as 125 persons working on the site at any one time.

The total volume of sediment removed was 788,000 cy at a cost of \$50.9 million (total for 13 years; includes design, permitting, construction, WTP operation and dredging) (\$65/cy). Total dredging time was approximately 9½ months equating to an average production rate of 144 cy/hr.

Sediment verification samples collected following dredging indicated that surface sediment remained in the upper 1¼ miles of river that contained approximately 50 ppm PCBs. A follow-up bathymetric survey in the same stretch of river indicated that a significant amount of non-native sediment remained in the river. As a result of the post-dredging monitoring results, EPA requested that U.S. Steel re-dredge an approximate 6,300-foot stretch of river located adjacent to and downstream of the U.S. Steel Gary Works property to remove an additional 24,000 cy of non-native sediment.

J.F. Brennan was contracted to perform the additional dredging and the dredging was performed intermittently from January 2007 to early December 2007. The dredging was performed using a single horizontal auger dredge similar to the previous dredging. Dredging was stopped twice, for one month from late January to late February due to cold weather conditions and from the late July to early October due to mechanical failure of the dredge. An estimated 38,000 cy of sediment was removed at a cost of \$9 million (\$237/cy). Dredging occurred 4 days/wk, 8 hrs/day equating to an average production rate of 49 cy/hr.

Post-Remediation Monitoring

Sediment removal verification in the lower 3½ miles of river was completed primarily by comparing pre- and post-dredge bathymetry data taken from the same river station. The

collection of verification samples was only required in specific areas of the dredged area; a sediment removal target level of 50 ppm PCBs had been established in the areas of heaviest contamination located within the upper 1½ miles of cofferdam areas, and in four transects within the lower 3½ miles. A total of 48 verification samples were collected for laboratory analysis.

Within of the three cofferdam areas, three verification samples were collected at each of four transects that were equally spaced along the length of the river sector (12 samples total). An additional three samples were collected from a transect located within each of the four downstream PCB contaminated areas. Each verification sample was analyzed for PCBs and compared to the target level of 50 ppm PCBs. If any sample within a sample group (e.g., 12 samples within a cofferdam area or three samples along each of the four transects in the lower 3½ miles of river) exceeded the target level of 50 ppm PCBs, then the mean and 95% Upper Confidence Limit (“UCL”) were calculated for comparison to the 50 ppm PCB removal target level. The results of these evaluations indicated that elevated concentrations of PCBs remained in the non-native surface sediment that remained within the upper 1½ miles of river. As a result of the presence of non-native sediment containing elevated PCB concentrations in the 6,300-foot stretch of river located adjacent to and downstream of the U.S. Steel Gary Works, EPA requested that further dredging be performed in this area of the river in 2007 to remove these sediments.

Following the 2007 dredging, verification samples were collected and a bathymetric survey was performed in the areas dredged. The verification sample results indicated that surface sediments remaining in the area dredged contained less than 50 ppm PCBs and the results of the bathymetric survey indicated that the physical target of removing additional non-native sediment was satisfactorily achieved.

Project Schedule and Current Status

Based on the results of the verification sampling and bathymetric survey results following the 2007 dredging, EPA is not requiring any additional sediment removal from the originally targeted five-mile stretch of the river. U.S. Steel is continuing to address the remainder of the U.S. Steel Gary Works property under the RCRA Corrective Action process. EPA reported that U.S. Steel should submit a draft Dredge Completion Report to the agency in Spring 2008.

An additional stretch of the Grand Calumet River, in Hammond, IN, is targeted for the removal of an additional 130,000 cy of sediment reportedly contaminated with PCBs, pesticides, phenols, mercury, and lead. Design of the project is to begin in 2008 and the project cost is estimated to be \$20 million, of which \$13 million is being sought through the federal Great Lakes Legacy Act.

References

Fact Sheet - Community Involvement Team Effort (CITE) Meeting, U.S. Steel Gary Works, February 22, 2007, <http://www.uss.com/corp/rcra/facts.htm>.

Personal communications with Tamara Ohl, Remedial Project Manager, EPA.

Scientists have formula for river cleanup, June 26, 2007, www.nwi.com.