



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
WASHINGTON, D.C. 20460

OFFICE OF  
SOLID WASTE AND EMERGENCY  
RESPONSE

November 18, 2014

**MEMORANDUM**

**SUBJECT:** CSTAG Recommendations on OU 5 of the Kalamazoo River  
Contaminated Sediment Superfund Site

**FROM:** Stephen J. Ells, Chair  
Contaminated Sediments Technical Advisory Group

**TO:** James Saric, Remedial Project Manager  
Region 5

**Background**

OSWER Directive 9285.6-08, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (February 12, 2002), established the Contaminated Sediments Technical Advisory Group (CSTAG) as a technical advisory group to "monitor the progress of and provide advice regarding a small number of large, complex, or controversial contaminated sediment Superfund sites." One purpose of the CSTAG is to guide site project managers to appropriately manage their sites throughout the Superfund process in accordance with the 11 risk management principles set forth in the OSWER Directive and with the recommendations in the 2005 *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*. CSTAG membership consists of one representative per Region, two from the Office of Research and Development, two from the U.S. Army Corps of Engineers Engineer Research Development Center, and three from the Office of Superfund Remediation and Technology Innovation. The CSTAG toured the site and the site manager provided an update on progress at the site on September 25, 2014.

**Site Description**

The Site is located in both Allegan and Kalamazoo Counties of Michigan. The Site includes disposal areas, paper mill properties, 77 miles of the Kalamazoo River (from Morrow Lake Dam to Lake Michigan), adjacent river banks and floodplains, as well as a 3-mile stretch of Portage Creek. EPA placed the Site on the National Priorities List on August 30, 1990. The Site is primarily contaminated

with polychlorinated biphenyls (PCBs) from former paper mills, although other former industrial operations also used PCBs along the Kalamazoo River. The former paper mills recycled and/or de-inked and re-pulped carbonless copy waste paper which, between the 1950s and 1970s, contained PCBs as an ink carrier. The wastewater from the paper manufacturing as well as paper waste were historically discharged to the Kalamazoo River.

The Michigan Department of Natural Resources (MDNR, predecessor to Michigan Department of Environmental Quality or MDEQ) first became concerned about the presence of PCBs in the Kalamazoo River in 1971, after routine surface water and biota sampling at the mouth of the river indicated that PCBs were discharging to Lake Michigan via the Kalamazoo River and that the PCBs were widely bioavailable for uptake by fish and aquatic organisms. The Site comprises six OUs:

- OUI - Allied Paper, Inc./Bryant Mill Pond,
- OU2 - Willow Boulevard/A-Site Landfill,
- OU3 - King Highway Landfill,
- OU4 - 12th Street Landfill,
- OU5 - 77 miles of the Kalamazoo River and a 3-mile stretch of Portage Creek, and
- OU7 - Former Plainwell Paper Mill Property.

OU5 includes 77 miles of the Kalamazoo River that has been further divided into seven areas. This review focuses on Area 1, which is the uppermost 22-mile stretch from Morrow Dam to the former Plainwell Dam. Area 1 was further sub-divided into eight sections based on physical and chemical characteristics. Most of Area 1 has a depth of 2.4 to 6.2 feet with bed slopes of about 2 to 6 feet/mile, which result in a relatively rapidly flowing river. CSTAG used the June 2014 draft version of the FS report for Area 1 to evaluate the alternatives.

Four time critical removals have been completed in this Area: the Former Plainwell Impoundment, the Plainwell No. 2 Dam Area, Bryant Mill Pond, and Portage Creek.

### **Recommendations**

The CSTAG commends the coordination among the Region, State, and other stakeholders and encourages the Region to continue this coordination. Based on the information provided, the Region has addressed our previous recommendations and will continue to address the 11 risk management principles throughout the remedy evaluation and selection process. Based on this most recent site visit and update on September 25, 2014, the CSTAG offers the following new recommendations.

#### *Site Characterization Recommendation*

1. The CSTAG recommends that the Proposed Plan discuss the background levels of sediment and fish tissue PCB concentrations in context of the risk-based PRGs and in light of what can be achieved realistically.

### *Alternative Analysis Recommendations*

2. CSTAG is concerned with the structural integrity and stability of the Otsego Township Dam downstream from Area 1. The Region should consider an early action to remove or contain sediments and PCB mass entrapped behind the dam before a partial breach or failure occurs.
  
3. The contaminant concentrations expected to be achieved by the remedy are unclear. More specifically, the bullets describing RAO 1 (Protect people who consume Area 1 Kalamazoo River fish from exposure to PCBs that exceed protective levels) include two different values for smallmouth bass tissue PCB concentration, 0.11 mg/kg and another concentration relating to the  $10^{-5}$  risk or HI of 1.0. Please clarify what the target number is for  $10^{-5}$  risk and which of these two smallmouth bass targets is expected to be achieved at the end of the 30-year evaluation period. Please also clarify the PCB surface weighted average concentration (SWAC) at the time of construction completion and as expected at the end of the 30-year evaluation period. Please specify the expected PCB SWAC for both the Remediation Reach (section 3 and parts of 2 and 4) and for all of Area 1.
  
4. CSTAG notes that Alternative 5 was the most aggressive and most expensive remedial alternative evaluated in the Feasibility Study. Remedial alternative 5 (area-wide removal) removes much more sediment than Alternatives 2 and 3 (*i.e.*, more than 300,000 cubic yards versus 19,500 and 63,900 cubic yards, respectively). However, the time to achieve smallmouth bass tissue PRGs was approximately 20 years longer (*i.e.*, 54 vs. 33 or 35) than the other less extensive remedial alternatives. CSTAG recommends that the Region re-evaluate the assumptions used to calculate the time required for Alternative 5 to meet fish tissue PRGs.
  
5. The descriptions of remedial alternatives 3 (hot spot removal) and 4 (hot spot and edge removal) include estimates of the reduction in the sediment SWAC in the Remediation Reach resulting from excavation and the estimated time required for PCB levels in smallmouth bass to decrease to the targeted risk level ( $10^{-5}$ ). The SWAC reductions in the surface sediment (0 - 6") are 1.76 to 1.09 mg/kg for remedial alternative 3, and 1.76 to 0.60 mg/kg for remedial alternative 4. The time estimates are 35 years for remedial alternative 3, and 33 years for remedial alternative 4. Please clarify why the time estimates for Alternatives 3 and 4 are similar despite the much lower post-excavation SWAC for remedial Alternative 4.
  
6. CSTAG recommends that the Region more clearly explain how the geomorphic PCB analysis presented in Figure 3-6 of the FS is used to identify areas within Area 1 for remediation. Based on Figure 3-6, it appears that the geomorphic analysis can be used to exclude areas from further consideration even when SWACs exceed the sediment PRG (0.33 mg/kg) or a remediation action level (RAL) of 1 mg/kg. If this process does not directly affect whether areas for further evaluation of remedial alternatives are included, the process should be omitted. If areas are excluded on the basis of the geomorphic analysis, those areas should be identified and the rationale should be described.

7. CSTAG recommends that the Region more clearly describe how future fish tissue concentrations were predicted with specific emphasis on the effect of remediation. Please clarify how biota-sediment accumulation factors (BSAFs) were used to predict future fish tissue concentrations. In the current description, BSAFs appear to change over time. For example, from Section 4.3.2.1: “BSAFs were adjusted downward using a percent difference based on the change in SWAC so that negative or unrealistic fish tissue concentration step downs would not be generated.” If BSAFs change over time, the scientific basis for this change should be provided.

8. The alternatives presented in the FS leave varying amounts of contaminated sediments in place, including some alternatives that may leave sediments with concentrations greater than 50 ppm in the river. In its analysis of the tradeoffs associated with each alternative, CSTAG recommends that the Region clarify the nature and extent of the contaminated sediment that will remain in Area 1 under each alternative. The concentrations of individual samples, SWACs, and areal extent of the contaminated sediment that will remain (*i.e.*, not dredged or capped) should be described.

9. The Region described that their process for identifying areas for potential remedial action relies on using SWACs as a key input parameter. The Region further indicated that they also evaluate and consider discrete data points (*i.e.*, the individual data points used to calculate the SWAC) when making such determinations. The CSTAG recommends that the Region clarify how they use both SWAC and discrete sample location data in making these determinations.

#### *Monitoring Recommendations*

10. CSTAG commends the robust, consistent, and long-term nature of the fish tissue contaminant concentrations that have been collected by the State of Michigan. That data set was essential in monitoring the effectiveness of the Portage Creek removal action and it will also be critical in defining the effect and effectiveness of future actions. In the ROD, describe the elements of the long-term monitoring plan (LTM) (*i.e.*, species, sampling time points, and locations) and explain how remedy effectiveness will be measured.

11. The Region should consider, possibly as part of the LTM, a measurement technique to address RAO 4 (reduce transport of PCBs from Area 1 to the downstream Kalamazoo River and Lake Michigan). If a measurement technique cannot be specified, the Region should more clearly explain how progress in addressing this RAO will be evaluated.

12. The Region should continue the long term monitoring period (*i.e.*, 30 years), until the projected timeframe to achieve acceptable values. Smallmouth bass PRGs were not expected to be reached for at least 33 years, and carp, for 115 years, The LTM should continue past 30 years if RAO 1 PRGs have not been achieved at that time.

13. The CSTAG commends the Region and MDEQ on working together to develop a comprehensive LTM for the site. Consider adding a stationary biological (*e.g.*, caged or indigenous bivalves) or chemical (*e.g.*, SPMEs) method to evaluate contaminant reductions over time.

14. When referring to total PCB in written analysis, tables, and graphs, please clarify whether the data are total PCB by Aroclor or by congener analysis. CSTAG understands that the Region is finalizing a LTM for the site. The Region should consider using total congener analysis for PCB measurements for the long term monitoring samples, or for a subset of those samples. Total congener analysis can provide greater analytical precision, lower detection limits, and improved laboratory consistency.

15. The Region should ensure that all laboratories analyzing for lipid content in fish are consistently using the same lipid extraction method.

### **Regional Response**

Please provide a written response to each recommendation within 60 days. If you have any questions or would like a clarification of any recommendation, please call me.

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