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

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

December 11, 2014

MEMORANDUM

SUBJECT: CSTAG Recommendations on OU1 of the Tittabawassee River, Saginaw River and Bay Superfund Site

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

TO: Mary Logan, Site 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) 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 eleven risk management principles described 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 team provided an update on progress at the site on September 23, 2014.

Site Description

The Dow Chemical Company began operation in Midland, MI, in 1897. The facility is located on the Tittabawassee River near its confluence with the Chippewa River. The Superfund site extends downstream from the facility to the Saginaw River and into Saginaw Bay. During its 117 years of operation, this facility produced thousands of organic and inorganic chemicals. Dioxins and furans, which are the primary contaminant of concern in the Tittabawassee River, Saginaw River, and

Saginaw Bay, were byproducts formed by the manufacture of chlorine-based products. Much of the dioxin and furan contamination present in the rivers, banks, and floodplains is furan-contaminated graphitic particles that originated from the breakdown of carbon anodes used in the chloralkali process. These were released to the rivers through the discharge of stored brines and untreated, or partially treated, process wastewaters. Over time, changes in waste management practices included the installation and operation of a modern wastewater treatment plant.

Under the current Resource Recovery and Conservation Act license for the Dow facility, issued by Michigan Department of Environmental Quality (MDEQ), Dow has been conducting Corrective Actions. In January, 2010, the U.S. EPA signed an Administrative Order on Consent (AOC) under Superfund authority with MDEQ and Dow requiring Dow to perform investigations, and to develop and design cleanup options to be selected by the U.S. EPA. Work under this AOC is on-going. Operable Unit 1 (OU1) includes 24 miles of the Tittabawassee River and the upper 4.8 miles of the Saginaw River. OU2 is the rest of the Saginaw River downstream and Saginaw Bay. OU1 has been divided into eight segments, which are addressed from upstream to downstream using non-time critical removal actions (NTCRAs). The cleanup of the first segment (Segment 1) has been completed (dioxins/furans were not the risk driver here), and the cleanup for Segment 2 is ongoing. According to the AOC, Dow will also complete a Remedial Investigation and Feasibility Study (RI/FS) for OU1 that will include post-construction human health and ecological risk assessments and an evaluation of any unacceptable residual risks warranting additional response actions. Floodplain cleanups are being conducted separately, but parallel to, the sediment and bank cleanups.

Recommendations

The CSTAG commends the positive working relationship among the Region, State, and other stakeholders. We understand that this cleanup requires a large coordination effort and encourage the Region to continue. During the visit, CSTAG reviewed and commented on the Region's process for addressing OU1 and evaluating residual risk and remedy effectiveness. Based on the information presented and the site tour, the CSTAG offers the following recommendations.

1 - The CSTAG supports the Region's strategy to use removal authorities, including NTCRAs, in a segment-by-segment "rolling" removal action strategy to quickly control in-stream sediment and bank contaminant releases to the river. We recognize, however, that focusing on these NTCRAs may prolong the development of the RI/FS for OU1 and the rest of the site. We recommend that the Region explain how these NTCRAs will be consistent with the final remedy selected under the RI/FS process and how these NTCRAs are expected to reduce risks and provide long-term protection of human health and the environment.

2 - Bank stabilization, as part of this series of NTCRAs, will alter the natural conditions in the river and may cause unexpected erosion of contaminated sediments and banks elsewhere. These potential impacts should be evaluated as part of the RI/FS.

3 - It is unclear what metrics and what data the Region will rely upon to evaluate risk reduction and protectiveness after completion of all the removal actions. The CSTAG recommends the Region

develop the approach soon that it will use to evaluate the effectiveness of the "rolling" removal action strategy described in recommendation 1.

4 - Since it is critical to document remedy effectiveness and the expected success of these removal actions, CSTAG recommends collection and analysis of additional fish samples in the fish monitoring program. The current plan is based upon a power analysis using variances in residues from 2007-2009 fish collections, with the ability to detect a 50% difference with 80% power and alpha of 5%. Although statistically supportable, the design of four catfish, three smallmouth bass, and three walleye composite samples at three locations (with three fish per composite and collection of the composites on two, four and four year intervals, respectively) is likely to be the bare minimum for the sampling design. The success of the removal actions should be determined based upon the consumption risks associated with the chemical residues in fish, and whether the residues decline to acceptable levels that meet Remedial Action Objective (RAO) 2. The results from additional composite samples would strengthen the ability to document changes in both the risks to fish consumers and declines in chemical residues at the site.

5 - The Region should consider using a stationary monitoring device or passive samplers (e.g., semi-permeable membrane device, solid phase micro-extraction.) or biological organisms (indigenous or caged bivalves) in addition to fish for long term monitoring. These data help evaluate whether trends in contaminant concentration levels exist, which may be a cost-effective and useful line of evidence to assess the effectiveness of the removal actions.

6 - In order to address RAO 2, any studies or information needed to refine the Biota Sediment Accumulation Factor or to develop another food chain model to predict future fish tissue levels for residual sediment concentrations should be designed and performed soon.

7 - The CSTAG commends the Region for using Incremental Composite Sampling (ICS), which can be a useful analytical method for reducing the nugget effect. The preparation procedures used to composite, mix and/or manipulate the samples can significantly impact the effectiveness of ICS in minimizing the nugget effect. CSTAG recommends that the Region assess and optimize the compositing method and ensure consistent application of the optimized sample preparation procedures. The CSTAG also recommends the Region develop a decision tree that clearly bounds what level of duplicate analysis, divergence, or segment outliers are acceptable and when re-analysis is required.

8 - The Region described sediment monitoring efforts that included surface sediment composite sampling from 30 locations per quarter mile of river. This methodology will help evaluate the dioxin toxicity equivalence (TEQ) surface weighted average concentration (SWAC) in sections of the river. The dioxin TEQ SWAC is a primary determinant of achieving the RAOs and a metric that will be directly affected by sediment management and bank management actions. Thus, CSTAG recommends expanding this sampling throughout the river system and conducting the sampling at routine intervals over time to measure progress toward RAOs and to evaluate the effectiveness of response actions or the need for additional action.

Regional Response

Please provide a written response to each recommendation within 90 days. If you would like a clarification of any recommendation, please call me at (703) 603 -8822.

cc: Tim Prendiville, Region 5
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