UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
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MEMORANDUM

DATE: March 4, 2015

SUBJECT: Response to Contaminated Sediments Technical Advisory Group Recommendations for the Tittabawassee River, Saginaw River & Bay Site

FROM: Mary P. Logan, Remedial Project Manager Mary P. Logan

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

On September 23 and 24, 2014, the U.S. Environmental Protection Agency's (EPA's) Contaminated Sediments Technical Advisory Group (CSTAG) conducted a review of the Tittabawassee River, Saginaw River & Bay Superfund Site. During the visit, CSTAG toured part of Operable Unit 1 (OU 1), which is comprised of 24 miles of the lower Tittabawassee River and the upper 5 miles of the Saginaw River. CSTAG reviewed and commented on the Region's process for addressing OU 1 and evaluating residual risk and remedy effectiveness. CSTAG also heard and/or read feedback from some of the site stakeholders. In a memorandum dated December 11, 2014, CSTAG provided recommendations for the overall cleanup of the site as well as for OU 1. Each recommendation is provided below, followed by Region 5's response.

The Region appreciates CSTAG's interest in the site and, as appropriate, will continue to engage CSTAG as the cleanup continues at the Tittabawassee River, Saginaw River & Bay site.

Recommendations and Responses

1. *The CSTAG supports the Region's strategy to use removal authorities, including non-time critical removal actions (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 remedial investigation/ feasibility study (RI/FS) for OU 1 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.*

   Region 5 Response
   Region 5 appreciates CSTAG's support of the site management strategy that is currently using removal authorities to reduce exposure to and/or transport of contaminated media that

may contribute to current or future unacceptable human health and/or ecological risks. Region 5 agrees that this early focus on NTCRAs may prolong the development of the RI/FS reports for OU 1, but the Region believes that the site strategy will reduce risks and exposure more quickly, and that the overall site completion is likely to be accelerated, because of site-specific circumstances.

The site management principles were first articulated in the Statement of Work (SOW) appended to a January 2010 Administrative Settlement Agreement and Order on Consent between EPA, the Michigan Department of Environmental Quality (MDEQ), and the Dow Chemical Company (Dow). The SOW states "As needed, exposure and risk reduction will also be achieved best at this Site by ensuring that the remediation/response objectives are used in an adaptive management approach. An adaptive management approach requires making response decisions, implementing response decisions, monitoring results, and informing future response decisions by the results." Region 5 believes that the use of removal authorities, including NTCRAs is consistent with these objectives.

In order for EPA to make a determination that a removal action is warranted, there must be an actual or potential unacceptable risk to human health or the environment from the release or threatened release of hazardous substances, pollutants, or contaminants. Before using NTCRA authorities, the Region must develop an Engineering Evaluation/Cost Analysis Approval Memorandum. Selection of removal actions is documented in an Action Memorandum. Both the Engineering Evaluation/Cost Analysis Approval Memorandum and the Action Memorandum document how the removal is expected to be consistent with the expected final remedy to be selected under the RI/FS process and how the removals are expected to contribute to risk reduction. Criteria established in *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*, OSWER 9360.0-32, August 1993, and *Use of Non-Time Critical Removal Authority in Superfund Response Actions*, OSWER 9360.0-40P, February 2000, and other considerations are evaluated and documented for each NTCRA at the site.

As CSTAG knows, the first of EPA's 11 risk management principles for contaminated sediment sites is "Control sources early." Many of the NTCRAs selected and implemented to date focus on in-channel sediment deposits and river bank stretches that contain dioxin/furans at levels that could act as secondary sources if they were to erode and distribute downstream. Region 5 believes that the use of removal authorities, including NTCRAs is consistent with this risk management principle.

Task 8 of the SOW requires that for every response action, general response objectives be formulated that focus on reducing exposures to and/or transport of contaminated media for the purposes of achieving acceptable levels of human health and ecological risks. Dow is required to conduct a post-construction, residual risk assessment (Task 10 of the SOW). To more effectively monitor and demonstrate the risk reductions from the NTCRAs, the Region is considering completing the residual risk assessment at some point prior to completion of the work within the Tittabawassee River. This will help to ensure that the removals are contributing to overall site goals.

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.*

   Region 5 Response

   The project team, including EPA, MDEQ, the natural resource Trustees, and Dow, understand that response actions in one area may inadvertently affect another area. As discussed in response to comment 3, below, a Site-Wide Monitoring Plan is in effect that evaluates sediment and contaminant transport. The evaluation includes assessment of potential impacts from response actions, such as unexpected erosion of prioritized sediment deposits and banks elsewhere. Additionally, the project team is trying to use the most natural, least "hardened" bank stabilization techniques, to lessen the potential transfer of energy to other areas in the site. Potential impacts from already implemented response actions will be further evaluated, as appropriate, 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.*

   Region 5 Response

   Region 5 expects to rely on the baseline evaluations (e.g., sediment chemistry, fish tissue levels, fate and transport evaluations, etc.) and the data obtained under the Site-Wide Monitoring Plan to evaluate risk reduction and protectiveness over time. The SOW established a requirement for a Site-Wide Monitoring Plan that has three major elements: 1) contaminant uptake into biota; 2) sediment and contaminant transport; and, 3) post-response monitoring. The Site-Wide Monitoring Plan was initially submitted in early 2011, and evolves and changes over time to reflect changing data quality objectives and information needs. As discussed below, the project team is considering some CSTAG recommendations for inclusion in the Site-Wide Monitoring Plan.

   Each removal action identifies specific Remedial Action Objectives (RAOs). The project team recognizes that there are short-term RAOs, which are expected to be met shortly after construction, and long-term RAOs, which may require a longer time until the RAOs are attained and/or that may require response actions in other segments or throughout the OU before the RAOs are attained. For example, consumption risks associated with the chemical residues in fish, and whether the residues decline to acceptable levels is a long-term RAO. As each removal action is selected, the Site-Wide Monitoring Plan is reviewed (and modified, as needed) to ensure that the appropriate data is being collected to see if the RAOs are met.

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.

Region 5 Response

Region 5 agrees that it is important to document the effectiveness of response actions. Therefore, as discussed in response to comment 3, contaminant uptake into biota (fish) is an element of the ongoing site-wide monitoring. However, Region 5 believes that CSTAG may have misunderstood the current fish monitoring program. Smallmouth bass and walleye are included as sentinel fish, while catfish are used for trend monitoring. The program includes: 12 catfish composites every 2 years (4 composites from 3 different locations); 6 smallmouth bass composites every 4 years (3 composites from 2 locations); and, 3 walleye composites every 4 years from 1 location. The composites will include 3 fish each. Additionally, as more sampling events take place, we expect to be able to see a smaller difference. So by the 6th event, we could detect a 40% difference, and so on.

As noted by CSTAG, the current design is statistically supportable. As discussed above, declines in fish tissue levels is a long-term RAO. Therefore, the plan was designed, in part, to consider potential trends over the time period during which OU 1 remediation is expected to occur. Because OU 1 remediation is expected to require at least a decade, the project team felt that the initial sampling approach was supportable, but could be evaluated and modified, as needed, as the cleanup progressed. It is important to note that Dow also conducts fish monitoring as part of their water discharge permit, and these data will also be evaluated. Based on CSTAG comments, the project team will discuss the addition of samples to the current fish monitoring program.

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.*

Region 5 Response

Region 5 appreciates CSTAG's suggestion to consider using a stationary monitoring device or passive samplers or biological organisms in addition to fish for long term monitoring. This appears to be consistent with the objectives of the Site-Wide Monitoring Plan. Therefore, Region 5 has proposed to the project team that this type of sampling be included in the site-wide monitoring on a routine basis and the topic is under discussion.

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.*

Region 5 Response

Region 5 does not believe this is time critical, considering the expected duration of the cleanup. However, the project team will work to address this issue, but has not yet determined how best to link sediment concentrations to desired fish tissue residues. Region 5 believes that the data from the fish monitoring program (e.g., chemistry, lipids) combined with the proposed routine incremental composite sampling per quarter mile discussed in comment 8 (e.g., chemistry, total organic carbon) would provide lines of evidence to assess the relationship between fish tissue levels and sediment concentration. The project team will discuss what additional studies or information may be needed to understand this question, and will develop an approach to filling data gaps, if any.

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.*

Region 5 Response

Region 5 appreciates CSTAG's commendation for the use of ICS. The Region agrees with CSTAG that this should be a useful analytical method for this site. The project team is working to optimize the ICS methodology. We are currently working with statisticians, laboratory analysts and other experts to establish decision rules and to optimize the approach for the Tittabawassee River floodplain cleanup. Lessons learned from the floodplain will be extrapolated to the rest of the site.

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.*

Region 5 Response

Dow has already conducted TEQ analysis using this surface sediment composite sampling methodology in Segment 2 in 2012 and in Segments 3 through 7 in 2014. Region 5 strongly agrees that repeating this type of sampling at routine intervals over time could be a useful tool to assess SWAC, measure progress toward RAOs, and to evaluate the effectiveness of response actions and/or the need for additional action. Therefore, Region 5 has proposed to the project team that this type of sampling be included in the Site-Wide Monitoring Plan and conducted on a routine basis.