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

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

June 7, 2010

MEMORANDUM

SUBJECT: CSTAG Update Recommendations for the Nyanza Chemical Waste Dump Site, Operable Unit 4 – Sudbury River

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

TO: Daniel Keefe, Remedial Project Manager
U.S. Environmental Protection Agency, Region I

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…." The main purpose of the CSTAG is to assist regional project managers in managing their sites in accordance with the eleven risk management principles set forth in the OSWER Directive. CSTAG membership consists of scientists and engineers with technical expertise in various areas dealing with contaminated sediments. Ten are from EPA regional offices; two from the Office of Research and Development; two from the Engineer Research and Development Center, US Army Corps of Engineers; and two from the Office of Superfund Remediation and Technology Innovation (OSRTI). The Directive also stated that the CSTAG should follow these sites until a remedy is selected and periodically thereafter until all remedial action objectives have been met.

CSTAG Recommendations

Based on our review of the information available to the CSTAG before and during a conference call on April 28, 2010 with the EPA site team, the CSTAG offers the following recommendations for the site team to consider as they select the remedy and prepare a ROD for the site. These recommendations supplement those made on July 12, 2006 after the CSTAG's

initial visit to the site. The site project manager should send a response to these recommendations to the CSTAG chair within 60 days.

#4 – Develop and Refine a Conceptual Site Model that Considers Sediment Stability.

The CSTAG reiterates and expands on a couple of the recommendations it made in 2006. The fates of mercury (Hg) and methyl mercury (MeHg) are very complex, but understanding the relationship between these is critical to understanding the exposures resulting in uptake of MeHg by fish. The generic figure portraying mercury cycling within the environment is not adequate to explain the relationship between the high total mercury concentrations in the surface sediments in segment 5 of Reach 3 and the concentrations of dissolved MeHg in the surface water and the concentrations of MeHg in fish fillets. The ROD should carefully describe a conceptual site model that explains these relationships at this site.

#6 – Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models.

Based on the review of the WASP modeling information, the CSTAG believes there is significant uncertainty in the predicted level of risk reduction attributed to placing a 6" layer of sand in the 84 acres of segment 5, one of the alternatives considered for the site. The sensitivity analysis that quantifies the changes in output predictions based on changes in key input parameters should be presented in the ROD. The level of certainty or uncertainty associated with the bioaccumulation factor (BAF) of 7.8×10^6 should also be described in the ROD. Since there is limited empirical data to support the modeling predictions, the CSTAG cautions that there is an over-reliance on the model predictions for remedial decision-making. As stated in Principle #6 of Highlight 2-15 in the 2005 *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites:* "Modeling results should generally not be relied upon exclusively as the basis for cleanup decisions."

The ROD needs to explain why the model used 2 and 10 ppm Hg in sediments as the basis for the evaluation of remedial alternatives. CSTAG is concerned that none of the alternatives evaluated were shown to achieve the target fish tissue concentrations. The model description in the ROD should also clarify whether the model assumed that contributions of mercury from atmospheric deposition would continue over the life of the alternatives evaluated.

The ROD should more fully describe the locations where the fish, sediment and surface water samples were collected in segment 5 of Reach 3; a map would be helpful.

#7 – Select Site-specific, Project-Specific, and Sediment-Specific Risk Management Approaches That Will Achieve Risk-Based Goals.

Both the modeling results and the trend analyses performed with historical data indicate that after the source control actions were taken at the site, there has been little reduction in fish tissue concentrations. As a result, it is difficult to state that naturally occurring processes will

result in significant risk reduction at the site or that MNR is an important component of any proposed alternative.

As recommended in 2006, rates of methylation, especially in Reach 3, should be provided. This is a critical component of understanding the site and expected changes in fish tissue concentrations as a result of any active remediation.

#8 – Ensure That Sediment Cleanup Levels are Clearly Tied to Risk Management Goals.

One alternative considered is the placement of 6" of sand in segment 5 of reach 3. The hypothesis is that significant fish tissue reductions will occur as a direct result of this active remediation alternative. The ROD should justify this hypothesis and provide supporting information on the relationship between total mercury in sediment, MeHg in water, and MeHg in fish. The Region should not rely solely on a surface water and sediment transport model with unquantified levels of uncertainty, and a BAF based on one set of fish tissue samples to support a high-cost remedy decision.

The ROD should include a table listing the predicted final sediment cleanup level, the final fish tissue concentrations, the risk-based protective fish tissue remediation goal, and the corresponding risk levels for Hg and MeHg.

9. Maximize the Effectiveness of Institutional Controls and Recognize their Limitations.

The ROD should include a comparison of the input parameters used by EPA in the Human Health Risk Assessment (HHRA) with the information used by the Massachusetts Department of Health to establish the State-wide fish advisory for mercury in fish. It should also clearly explain whether maternal exposures were evaluated in each, or if the exposures are based on direct ingestion of fish by children.

#11 – Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness.

Based on the CSTAG's understanding of the limited number of fish samples used to calculate baseline fish tissue concentrations, and the apparent large variation among individual fish, the CSTAG believes it may not be possible to collect after remediation a sufficient number of similar sized bass in segment 5 of Reach 3 to determine whether the 15% reduction in risk predicted by the model occurred. More fish should be sampled to decrease the variance in baseline concentrations and increase the likelihood that future small reductions can be discerned in post-remediation sampling.

The site team stated that post-remediation monitoring will be conducted and will likely consist of the collection of a single species (bass) every five years and three species (bass, perch and catfish) every 10 years to allow for the reassessment of human health risk. The first round of monitoring activities (excluding any pre-design studies) would be performed five years after the

ROD is issued. As discussed in the *Sediment Assessment and Monitoring Sheets (SAMS #1): Using Fish Tissue Data to Monitor Remedy Effectiveness*, at least two species should be collected, and a small non-game fish with high site fidelity should also be considered. Fish should be collected in late summer or early fall, as this is typically the time of most active Hg methylation. The CSTAG recommends that if an active remedy is chosen for this site, a more aggressive monitoring program for fish should be established initially and modified based on the evaluation of the results. It is recommended that at least two rounds of fish tissue data be collected and evaluated before the preparation of the second five-year review.

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