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

July 12, 2006

MEMORANDUM

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

FROM: Stephen J. Ells **/s/ Stephen J. Ells**
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TO: Cheryl Carver-Sprague, Remedial Project Manager
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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 site project managers manage their sites throughout the Superfund process in accordance with the eleven risk management principles set forth in the OSWER Directive. CSTAG membership consists of nine regional representatives, two from the Office of Research and Development, and two from the Office of Superfund Remediation and Technology Innovation (OSRTI).

Brief Description of the Site

The Nyanza Chemical Waste Dump Superfund Site (hereafter Nyanza Site) was occupied from 1917 through 1978 by several companies that manufactured textile dyes and dye intermediates. Additional products manufactured on-site included various colloidal solids and acrylic polymers. During the period of operation, large volumes of chemical waste were disposed in burial pits, below ground containment structures, and various lagoons scattered throughout the "Hill" section of the site. Wastes contained in these disposal areas included partially treated process water, chemical sludge, solid process wastes (chemical precipitate and filter cakes), solvent recovery distillation

residue, numerous organic and inorganic chemicals (including mercury), and off-specification products. Process chemicals that could not be reused or recycled, such as phenol, nitrobenzene, and mercuric sulfate, were also disposed on-site or discharged into the Sudbury River mainly through a small stream referred to as Chemical Brook. Mercury and chromium were used as catalysts in the production of textile dyes from 1917 to 1978. Approximately 2.3 metric tons (2,300 kg) of mercury were used per year from 1940 to 1970, with approximately 45 to 57 metric tons of mercury released to the Sudbury River during this period. From 1970 until the facility closed in 1978, wastes were treated on-site and wastewater was discharged to Ashland's town sewer system. These revised treatment practices reduced the quantity of mercury released to the Sudbury River to between 23 and 30 kg per year or about 0.2 metric tons during that eight-year period.

To expedite remediation, the RI/FS for the Nyanza Site was originally divided into the following Operable Units (OUs):

- OU I - addressed on-site surficial soil, sediment and sludges.

- OU II, Nyanza II Groundwater Study - addressed groundwater contamination from the site and evaluated the presence of off-site migration.

- OU III, Nyanza III Sudbury River - originally addressed contamination of the Sudbury River from discharges of wastewater and sludge; OU III focused on addressing mercury contamination in soils and surface water in the continuing source areas (Eastern Wetlands, Trolley Brook, Outfall Creek, and the Lower Raceway).

- OU IV, Sudbury River Proper - As a result of the findings in the OU III RI, EPA determined that the potential continuing risk to both human health and ecological receptors could be attributed principally to mercury contamination of the Sudbury River. To further evaluate the nature, extent, and potential impacts of chemical contamination in the river, EPA established Operable Unit IV - Sudbury River to specifically address mercury contamination within the river proper. OU IV was subdivided into 10 Reaches in order to more fully characterize the extent of mercury contamination and the associated risks to human and ecological receptors.

The CSTAG visited the site and met with the RPM and the site team on May 31, 2006 and June 1, 2006. Twelve stakeholder groups associated with the Superfund site were invited to present their ideas and concerns about the project to the CSTAG. No one opted to present, but written comments were submitted by the National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service, the SuAsCo Watershed Community Council, and Malcolm Smart (resident of Ashland).

CSTAG Recommendations

Based upon our site visit and review of the site information provided to us, the CSTAG offers the following recommendations to the site manager to more fully address the 11 sediment management principles. The CSTAG expects that the site project manager will consider these recommendations as the site characterization continues, as the conceptual site model is refined, and as remedial alternatives are developed and evaluated. The site manager is asked to submit, within 60 days, a written response to these recommendations to the CSTAG co-chairs.

Principle #1: Control Sources Early.

- CSTAG commends the project team for controlling known upstream sources of mercury to the Sudbury River.

Principle #2: Involve the Community Early and Often.

- Continue community outreach and share site information as it becomes available.
- Consider specialized outreach to non-English speakers and potential subsistence fishers. For example, distribute written materials in appropriate languages, and go to community meetings to explain risks from the consumption of mercury contaminated fish.
- When discussing EPA's risk assessment results with the community, explain the differences between State health advisories and EPA's human health risk assessments and their limitations (*e.g.*, risk to men/children's health).
- Replace fish consumption advisory signs that are sun-damaged and no longer readable.

Principle #3: Coordinate with States, Local Governments, Tribes, and Natural Resource Trustees.

- Consider hosting a meeting with the trustees to share data and update them on site progress before the draft Baseline Ecological Risk Assessment is issued.
- Talk with the Massachusetts Department of Conservation & Recreation (DCR) about the operation and maintenance of the sluice gates and any sediment flushing at the three dams.
- If EPA determines remedial action is necessary at this site:
    - Coordinate remediation activities with possible trustee restoration activities.
    - Coordinate with DCR if any proposed remedy would impact reservoir capacity.
    - Talk with DCR about the enforcement of institutional controls required to maintain remedy protectiveness (*e.g.*, dam maintenance and management, use of reservoir).

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

- Consider using the Pb210 data to refine the sediment stability analyses.
- Evaluate whether increased or changed use of the reservoirs would increase the transport of mercury contaminated sediments and thereby increase potential risks to human health and the environment.
- Determine what device and methodology was used to measure resuspension critical shear stress and erosion rate. Depending on the device and methodology used, additional sediment erodibility testing may be necessary.
- Previous sediment transport modeling performed in Reservoirs 1 and 2 is of limited use to evaluate potential transport and fate of contaminated sediment to make a remedy decision. These sediment transport models had the following limitations, among others: a) minimal level of calibration and no validation was performed for either the hydrodynamic or sediment transport models; b) site specific settling velocities for cohesive sediments were apparently not measured; c) only cohesive sediment, and not non-cohesive sediment, was modeled; and d) upstream suspended sediment concentration boundary conditions were set equal to a constant. Calibration and validation of sediment transport models should be performed using simulations of runoff events when the majority of sediment is transported. CSTAG recommends that the following tasks be performed:
    - Use the Conceptual Site Model to determine if additional sediment transport modeling should be performed in any of the reaches. This decision should be made after consulting the *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites.* The project team may also consult with Earl Hayter for assistance in making this decision.
    - If additional transport modeling is deemed necessary, decide what level of analysis (*e.g.*, 2D depth-averaged or 3D) is needed, what reaches need to be modeled, and what site-specific data need to be collected to perform this modeling.
    - If additional modeling is necessary, a modeling work plan should be developed. This work plan should describe the following: i) the modeling framework (see aforementioned guidance document), ii) the model to be used to perform the hydrodynamic and sediment transport modeling, iii) the data collection plan, and iv) the methodology to be followed in performing the modeling study.
- Evaluate the extent of chemical transport caused by bioturbation and groundwater flux.
- Update the Conceptual Site Model to include methylation and atmospheric deposition of mercury.
- Explain the relationship between total mercury (tHg) and methylmercury (MeHg) in various reaches and, if possible, explain why the relationship is not constant throughout all of the reaches.

Principle #5: Use an Iterative Approach in a Risk-Based Framework.

- CSTAG commends the site team for a thorough and systematic analysis of the ecological risks.
- Consider using a dietary approach to assess risks to raptors.
- Consider conducting a sensitivity analysis for the human health risk assessment with respect to the proportion of fish species eaten from the Nyanza site versus other sources.

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

- Ensure that Spreadsheet-based Ecological Risk Assessment for the Fate of Mercury (SERAFM) answers the following questions: Do the reservoirs export mercury? Is mercury cycling out of the wetlands? Are there other inputs of mercury?
- The SERAFM modeling effort should include a detailed sensitivity and uncertainty analysis. Ensure that the limitations of SERAFM are clearly described and considered in decision-making.
- If Monitored Natural Recovery (MNR) is evaluated as a potential remedy, ensure that future risks from the ingestion of contaminated fish are characterized.

Principle #7: Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals.

- Consider the contribution of mercury from continuing background sources when selecting remediation goals (consider using State monitoring data to help with this evaluation).
- If MNR will be evaluated in a Feasibility Study, ensure that adequate data exist to evaluate natural recovery processes, including estimates of methylation and sediment deposition rates.
- Clarify how the downstream boundary of the site was selected and whether site-related mercury contamination is transported downstream of Reach 10. If site-related mercury is transported into the Concord River, ensure that this is considered in the risk management plans for the site.

Principle # 8: Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals.

- CSTAG will evaluate this later in the RI/FS.

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

- Consider working with MDPH to provide greater public outreach to improve awareness of and compliance with fish consumption advisories (*e.g.*, public education programs, brochures, postings in bait/tackle shops and fishing license proprietors).

Principle #10: Design Remedies to Achieve Long-term Protection and to Minimize Short-term Risks.

- If EPA determines that a remedial action such as capping is necessary at this site, evaluate relative performance of reactive caps versus traditional caps. Consider contacting ORD to conduct a pilot study regarding reactive caps (*e.g.*, bauxite, iron, AquaBlok, apatite).

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

- Consider sediment chemistry (tHg and MeHg) analyses in the eastern wetland in addition to the revegetation monitoring.

Regional Response

Please send a written response to these recommendations within 60 days. If you have any questions or would like a clarification to any of these recommendations, please call either Steve Ells at (703) 603-8822, or Leah Evison at (703) 603-9022.

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