UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
New England Office – Region I
One Congress Street, Suite 1100
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MEMORANDUM

DATE: August 12, 2009

SUBJECT: CSTAG Recommendations on the Housatonic River Rest of River Contaminated Sediment Superfund Site: Region I Response

FROM: Susan C. Svirsky, Project Manager /s/ ***Susan C. Svirsky***
GE/Housatonic River Rest of River Site
EPA New England

TO: Stephen J. Ells, Chair
Contaminated Sediments Technical Advisory Group (CSTAG)
Office of Superfund Remediation & Technology Innovation

Thank you for your June 15, 2009 memorandum, including the comments and recommendations of the Contaminated Sediments Technical Advisory Group (CSTAG) with respect to the Rest of River portion of the GE/Housatonic River Site. Your recommendations, as well as the discussions at our April 21-22, 2009 meeting, are appreciated.

To assist the reader, the Region's response to the CSTAG recommendations below has been written in a format that includes each CSTAG recommendation followed by the corresponding EPA New England response. Please contact me if you have any questions or additional comments, or if you would like further detail and/or clarification on any of our responses.

CSTAG Recommendations and EPA New England Responses:

Principle 1. Control Sources Early.

CSTAG Recommendation:
Continue to monitor the effectiveness of the upstream source control efforts (i.e., remediation of the first two miles) and present data describing the current and predicted future PCB input to the Rest of River (ROR).

EPA New England Response:
The EPA New England GE/Housatonic River Site Project Team (the Project Team) agrees that monitoring the effectiveness of sediment remediation conducted from 1999 to

2006 in the East Branch is important for evaluating both the success of the remediation and also to predict future PCB loadings to downstream areas. Under the terms of the Consent Decree, monitoring has been conducted in the ½-Mile and 1 ½-Mile Reaches by both EPA and GE, and the series of monitoring reports is available on the Housatonic River Project web site (www.epa.gov/region01/ge/index.html). Under the terms of the Consent Decree, in 2008 GE assumed responsibility for monitoring the 1 ½ Mile Reach; the 2008 Annual Monitoring Report is available at www.epa.gov/region01/ge/thesite/1andhalfmile/reports/450682.pdf. The predicted future PCB inputs from the East and West Branches to ROR are summarized in Section 3.2.2.4 of the March 2008 Corrective Measures Study. The Project Team will continue to review the data resulting from these monitoring programs and will make use of the data as appropriate, including to estimate and evaluate PCB input to the ROR.

CSTAG Recommendation:
Continue to work with the Massachusetts Department of Environmental Protection (MDEP) on the stormwater permit from the GE facility to ensure that it meets its source control objectives, the objectives of the Consent Decree permit, and the eleven sediment management principles.

EPA New England Response:
The NPDES permit for the GE Pittsfield Facility is distinct and separate from the Consent Decree and the Reissued RCRA Permit that define the roles and responsibilities of EPA and GE at the site. Data collected by EPA as part of the ROR investigations have been made available by the Project Team to the EPA NPDES program and MassDEP for their use in developing the revised NPDES Permit. Although the Project Team has provided assistance for clarification of technical issues such as locations of outfalls, any formal interaction between EPA and MassDEP with regard to NPDES permitting is handled by the NPDES program in the Region, pursuant to its regulatory responsibilities, and is outside the responsibilities of the Project Team.

Principle 2. Involve the Community Early and Often.

CSTAG Recommendation:
Consider holding informational sessions or workshops with the public, state, and other federal agencies to discuss remedial options for the ROR. Topics could include:

a) the findings of the risk assessment (i.e., harm to human health and the environment from PCB contamination);
b) the short-term damage to the environment from remediation and how these impacts can be minimized; and
c) examples of what the river might look like after remediation and after habitat restoration/re-creation and how long recovery might take based on completed habitat restoration/re-creation projects at other locations.

EPA New England Response:
The Project Team agrees that informational fact sheets, sessions, and workshops involving various stakeholders are important mechanisms for obtaining input on the

project. Such activities have been and will continue to be an important component of the project. Both formal and informal meetings (including quarterly Citizens Coordination Council meetings) and comment periods have been held at various points throughout the project to communicate the results of the studies, share other information on the project with stakeholders and other interested parties, and to obtain stakeholder input. It is anticipated that similar informational sessions, fact sheets, and workshops will continue throughout the conduct of the project, including discussion of remediation and restoration goals and objectives with the stakeholders.

CSTAG Recommendation:
Consider hiring a consulting firm and using a mediator to assist in organizing and leading workshops or other public involvement activities.

EPA New England Response:
The Project Team has received ongoing support from Regional public relations staff since the inception of the project and does have a consulting firm providing facilitation services at community meetings. As the project moves forward, the Project Team will continue to work with Regional public relations staff to ensure that we continue a robust public involvement program, and will consider supplementing our in-house capabilities in the future, if needed.

Principle 3. Coordinate with States, Local Governments, Tribes, and Natural Resources Trustees.

CSTAG Recommendation:
CSTAG encourages the Site Team to continue its cooperative efforts to work with the State to decide how to address the Area [of] Critical Environmental Concern (ACEC) designation when comparing remedial alternatives.

EPA New England Response:
The ACEC designation provides the project with increased visibility that leads to enhanced opportunities to receive valuable input from the State and other stakeholders, particularly with the anticipated formation of the Stewardship Committee for the ACEC. Accordingly, the Project Team looks forward to continuing cooperative efforts with the State and other interested parties in reaching appropriate solutions.

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

CSTAG Recommendation:
Update the conceptual site model to more clearly depict the PCB mass flux among the floodplain soils, banks, and ROR sediments within and among river reaches. Such a depiction will be useful in demonstrating how various remedial actions can lessen or eliminate contaminant exposures.

EPA New England Response:

The Project Team views the conceptual site model (CSM) as representing an evolving understanding of the river and its interactions with surrounding ecosystems and incorporates revisions and/or new information into the CSM as they become available. PCB mass flux between various compartments in the system was evaluated extensively and quantified by reach as part of the modeling study. These fluxes were presented and discussed in Section 4 of the Final Model Documentation Report (http://www.epa.gov/region01/ge/thesite/restofriver/reports/model_documentation/FMD_TOC_CD.pdf). Such an evaluation will continue during the Project Team's evaluation of different remedial alternatives. Further revisions to the CSM will be included in the package with the proposed plan submitted for review by the Remedy Review Board.

CSTAG Recommendation:
CSTAG supports the Site Team in its consultation with experts in river geomorphology and habitat restoration/re-creation to ensure that remedial alternatives adequately address bank and sediment stability in an environmentally sensitive manner (i.e., bioengineering to armor banks) and account for resulting changes in flow velocities and energies.

EPA New England Response:
The Project Team appreciates CSTAG's support in its efforts to involve outside experts as necessary to ensure that the project achieves its goals.

CSTAG Recommendation:
Any action in the in-stream sediments/riverbanks, or floodplains will likely affect sediment and PCB transport and exposure in other components. When the Site Team proposes a remedy, they need to clearly describe how the combination of alternatives affects exposures and PCB transport between in-stream sediments/river banks and floodplains.

EPA New England Response:
The Project Team concurs with this comment. The river and its floodplain form a complex integrated system, and any remediation and restoration must be designed and conducted to enable the relationship between all system components to be sustainable. In GE's March 2008 CMS the analysis of the impacts of remediation for river sediment and floodplain alternatives were performed separately. In the Supplement to the CMS, GE will be evaluating a number of combinations of sediment, bank, and floodplain alternatives together, which should provide further information regarding relationship between the components of the river system and the overall risk reduction and PCB-transport control provided by these combinations. At the time of proposing a remedy, the documentation of these relationships, particularly how they could potentially be affected by the remedy, will be part of the Statement of Basis for the site.

Principle 5. Use an Iterative Approach in a Risk-based Framework.

CSTAG Recommendation:
Consider conducting early restoration/re-creation demonstration studies to inform the design of subsequent remediation and restoration efforts at this site. These studies should

include monitoring of recovery and function of vernal pools and stream bank habitats at these pilot remediated locations.

EPA New England Response:
The conduct of the ½ Mile Removal and subsequent 1½-Mile Removal provided opportunities to take an iterative approach to designing and implementing the remedy using "lessons learned" at each phase of the project, (e.g. dewatering techniques, capping methods, community involvement). Continuing this philosophy, the restoration efforts conducted following the remediation of the 2 miles of the East Branch between the GE facility and the Confluence (the upstream end of Rest of River), which includes the restoration of a vernal pool, are providing valuable site-specific information that informs the restoration that may be necessary for the ROR. The same will be done in implementation of a remedy for ROR.

The Project Team will continue to review and discuss restoration success and failure at other similar sites with restoration experts, and will consider discussing with GE their implementation of appropriate pilot and demonstration studies as part of the remedy selection for ROR.

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

CSTAG Recommendation:
CSTAG recognizes that there is inherent uncertainty associated with the use of any complex model and encourages the Site Team to summarize and describe the results of the sensitivity analyses performed for this site model and explain how this information was considered when evaluating remedies for the ROR.

EPA New England Response:
Detailed model sensitivity and uncertainty analyses were conducted as part of the modeling effort and are presented and discussed in the Model Validation Report and the Final Model Documentation Report. There is no generally accepted means of incorporating sensitivity and uncertainty information into the results of modeling studies, particularly in projecting the response to various alternatives, however the Project Team agrees that a discussion of modeling sensitivity/uncertainty is appropriate for inclusion in the Statement of Basis.

CSTAG Recommendation:
CSTAG believes that it is not appropriate to use the model in a smaller resolution or spatial scale than it was originally designed (*i.e.*, 0.25 to 0.50 mile). Specifically, the use of the cross-sectionally averaged bed shear stresses to estimate flow-induced stresses applied to the toe and face of banks is not appropriate.

EPA New England Response:
The Project Team agrees that GE's use of the model in the Response to Comments on the Corrective Measures Study for estimating cross-sectionally averaged shear stresses at a

resolution smaller than the approximately 0.25- to 0.5-mile spatial bins used by EPA in the model calibration and validation was inappropriate and technically invalid.

CSTAG Recommendation:
CSTAG expects that a key factor used for decision-making at the site will be the modeled fish tissue concentrations and the predicted timeframes for achieving various risk reduction metrics such as cancer and non-cancer benchmarks and the Interim Media Protection Goals. CSTAG recommends that new fish residue data from the on-going monitoring program be compared to the modeling predictions in order to further assess the model's validity and accuracy.

EPA New England Response:
The Project Team agrees that the time frame for reduction in modeled fish tissue concentrations is an important metric for evaluating remedial alternatives for the Rest of River. It is anticipated that biannual monitoring of fish tissue concentrations will continue to be conducted by GE in the future, and the results of the monitoring program will be routinely compared with model predictions as one way of evaluating the accuracy of model predictions going forward. It is important to consider, however, that the model was not designed to simulate changes in fish tissue contaminant concentrations over periods as short as a single sampling event, so any comparisons with the data must be made with caution and using statistically valid techniques. In addition, there is considerable scatter in the existing tissue concentration data, reflecting both inter- and intra-annual variability in such factors as lipid content, and this must also be considered when comparing the data to model predictions.

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

CSTAG Recommendation:
A description of all remedial action objectives (RAOs) should be presented. How and when each alternative will meet each of the RAOs should be clearly described. This will help clarify that while the ultimate fish consumption goals may take many years to achieve, other RAOs may be met more quickly.

EPA New England Response:
The reissued RCRA Permit, which along with the Consent Decree dictates how the remedy selection process for ROR will proceed, does not specify that RAOs guide the selection of a remedy. However, because one of the General Standards for evaluation of remedial alternatives requires an assessment of how such measures would provide Overall Protection of Human Health and the Environment, GE chose to specify two RAOs in the Corrective Measures Study Proposal (CMSP). EPA, in its conditional approval of the CMSP, directed GE to modify the language of these two RAOs, and to add a third RAO to reflect the General Standard of Control of Sources of Releases. Accordingly, three RAOs were included in GE's CMS. The three RAOs describe overall goals and desired outcomes for the ROR, but will not be used as specific comparison criteria for evaluation of alternatives.

Because the RAOs are not discrete risk-based goals, it is not possible to describe how and when each alternative will satisfy them. For example, the first RAO states (in summary) that the remediation should eliminate unacceptable risks to humans from exposure to dietary items, floodplain soil, and/or sediment. Because different media in different sub-areas may satisfy components of the RAO at different times under each of the various remediation alternatives, it is not possible to simply compare the various alternatives using the RAO. Notwithstanding, the degree to which alternatives meet the various Interim Media Protection Goals (IMPGs) e.g. the different risk levels for fish consumption, as well as other measures such as downstream PCB loadings are important metrics that the Region will use in evaluating cleanup options. Special Conditions II.G.1 and II.G.2, respectively, of the Reissued RCRA Permit, specify the three General Standards and six Selection Decision Factors that are to be used to conduct the comparative evaluation of alternatives and selection of a remedy.

CSTAG Recommendation:
When proposing a remedy for the ROR, present the fish tissue levels that would be achieved based on food web model predictions, discuss how realistically achievable they are and explain why EPA believes these levels of risk are acceptable.

EPA New England Response:
The Project Team concurs with this recommendation.

CSTAG Recommendation:
Because of the potentially long time frames associated with achieving safe fish tissue goals, consider establishing interim remediation goals for PCBs in fish tissue. Interim goals (*i.e.*, those less than concentrations considered safe) can be acceptable objectives and have been used at other sites.

EPA New England Response:
The Project Team agrees that interim goals for fish tissue concentrations can be acceptable objectives. The emphasis in GE's March 2008 Corrective Measures Study on achieving tissue concentrations that would allow unrestricted fish consumption serves only to divert attention from the significant public and ecosystem health benefits of reducing PCB concentrations in fish tissue to levels that, although they may not allow complete removal of consumption advisories, would allow the potential relaxation of the terms of the advisories, as well as provide greater protection for those individuals who choose to ignore the advisories and to ecological receptors. Interim remediation goals, as well as metrics to monitor achievement of the interim goals, will be considered at the time of remedy selection.

CSTAG Recommendation:
The CSTAG believes that it is appropriate to include alternatives that do not meet the most protective IMPGs. The revised Corrective Measures Study (CMS) should not discount the benefits of risk reduction associated with each alternative evaluated.

EPA New England Response:
The Project Team agrees with the comment, and notes that, in a manner similar to that discussed in the preceding response, the range of alternatives proposed in the CMSP and evaluated in the CMS includes alternatives that do not meet the most protective IMPGs. However, the discussion of how alternatives achieve IMPGs in GE's March 2008 Corrective Measures Study often is unclear as to what IMPGs are being attained and where, and sometimes implies that alternatives that otherwise provide substantial risk reduction should not be considered.

Please note that the next submittal from GE is a Supplement to the March 2008 CMS and not a revised CMS.

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

CSTAG Recommendation:
Consider emphasizing the potential benefits from reducing PCB loading from the upper ten miles in addition to achieving significant risk reduction in these upper reaches of the ROR. It may also be helpful to explain the anticipated benefits of the proposed action to ecological resources and water quality in the Housatonic River downstream of any locations proposed [for] remedial action.

EPA New England Response:
The decrease in PCB loadings to the Rest of River from remedial actions already implemented on the GE Pittsfield facility and in the 2 miles of the East Branch between the facility and the ROR has been significant. Further decreases of varying magnitudes are expected with the different remedial alternatives being evaluated and the decrease in downstream loadings is a metric that will be evaluated as a component of considering an alternative's success in meeting the General Standard for Control of Sources of Releases. Controlling sources of releases is one of the three General Standards specified in the Reissued RCRA permit as a criterion by which alternatives are to be evaluated. The Project Team agrees that a solid understanding among the public and other stakeholders of the achievements to date is important, and will continue to provide information on the successes resulting from these actions. In addition, through continuing discussions with the State of Connecticut and other downstream stakeholders, the Team understands that one of the primary concerns of these stakeholders is downstream transport of PCBs from upstream more-contaminated areas.

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

CSTAG Recommendation:
CSTAG encourages the Site Team to work with the Massachusetts Department of Public Health to improve the effectiveness of the fishing advisories.

EPA New England Response:

The Project Team remains committed to working with MDPH in any way possible to ensure that any fishing advisories are based on the latest data and are implemented in an effective manner.

CSTAG Recommendation:
The CSTAG recommends that the CMS expand the description of the institutional controls that will be required to protect the public from wastes left in place after remedial action.

EPA New England Response:
The Project Team agrees that institutional and other controls to protect the public from residual contaminant concentrations are an important component of the evaluation and implementation of any potential remedial alternatives and will request that GE expand the description of such controls in the Supplement to the CMS.

Principle 10. Design Remedies to Minimize Short-term Risks while Achieving Long-term Protection.

CSTAG Recommendation:
While some stakeholders appear very concerned about potential adverse habitat effects associated with remediation and with compliance with the Massachusetts Endangered Species Act, CSTAG believes that these concerns do not obviate the need to consider alternatives that will address the unacceptable risks from the presence of high levels of PCBs in the ROR floodplain soils, banks and sediments. Instead, the alternatives should be reconfigured to minimize effects on ecological habitats during construction and to mitigate, replace, and reconstruct habitats, as necessary, after remediation.

EPA New England Response:
The Project Team concurs with this observation and recommendation and has directed GE to provide a more thorough consideration of avoidance, minimization, mitigation, and restoration for each of the combinations of alternatives that will be evaluated in the Supplement to the CMS. In addition, EPA has made it clear to GE that the combinations of alternatives in the Supplement to the CMS are to be evaluated on equal footing with regard to an ecologically sensitive approach to implementation.

CSTAG Recommendation:
CSTAG supports the Site Team's efforts to consider remedies that optimize the Housatonic River's inclination to return to its geomorphologic origin over the long-term while concomitantly minimizing costs.

EPA New England Response:
The Project Team appreciates CSTAG's support and is continuing to work with river geomorphologists and restoration experts to understand the conditions in the river and to achieve this goal.

CSTAG Recommendation:

CSTAG supports the Site Team's efforts to include long-term maintenance of remediated areas to minimize invasive species encroachment as part of the CMS.

EPA New England Response:
The Project Team appreciates CSTAG's support and considers minimization of invasive species to be an important maintenance component for any areas remediated/restored as part of the cleanup.

CSTAG Recommendation:
In light of the recent ACEC designation for the Upper Housatonic River, we encourage the EPA and GE restoration teams to begin a dialogue, on the ecological "trade-offs" of the various remedial options that were outlined in the March 2008 CMS and expected in the Fall 2009 CMS revision.

EPA New England Response:
The Project Team agrees with the recommendation and views the ACEC designation as an opportunity to expand the dialogue among EPA, GE, various State agencies, members of the public, and other stakeholders.

CSTAG Recommendation:
The CSTAG does not consider "Thin Layer Capping" as described in the CMS to be a viable containment remedy. As discussed in EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (OSWER 9355.0-85, December 2005), thin layer capping (which is more accurately called thin layer placement) is not an isolation remedy and should not be considered a cap. It should be evaluated solely as a means to enhance natural recovery.

EPA New England Response:
The Project Team agrees with the CSTAG assessment of thin-layer capping and has discussed this point with GE in the past. Unfortunately, the term "capping" vs. "placement" is well established in the technical vernacular at this point and EPA has therefore chosen not to take issue with its continued use by GE. The Project Team, however, is cognizant of the fact that thin-layer capping is not intended to isolate contamination and has commented to GE that some of their documents improperly confuse this issue.

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

CSTAG Recommendation:
CSTAG recommends the continued collection of fish tissue (bi-annual adult and young of year fish collections) and surface water data in order to maintain a strong baseline for future comparisons. The long-term time series data will inform analysis of the ROR's fish tissue contaminant dynamics, the achievement of risk-based metrics, and the relationship between fish contaminant concentrations and remedial actions.

EPA New England Response:
EPA will encourage GE to continue to collect fish tissue and surface water samples. The Project Team agrees that these data provide a valuable baseline and can be used to answer a number of questions, including those noted above, concerning the effectiveness of remedial actions to be implemented in the future.

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