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**MEMORANDUM**

To: Susan Svirsky, Remedial Project Manager  
U. S. Environmental Protection Agency

From: Susan J. Steenstrup, Project Coordinator, Special Projects  
DEP, Bureau of Waste Site Cleanup, Springfield

Cc: Anna Symington, Deputy Regional Director (*electronic copy*)  
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Subject: Site No. GECD850; Housatonic River Rest of River; Comments on *Interim Media Protection Goals Proposal for the Housatonic River, Rest of River*.

Date: November 10, 2005

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The Department of Environmental Protection (the Department) has reviewed the document titled: *Interim Media Protection Goals Proposal for the Housatonic River, Rest of River* (the IMPG Proposal) submitted by the General Electric Company (GE) and dated September 6, 2005. Under the reissued RCRA permit, IMPGs consist of preliminary goals that will be used in the Corrective Measures Study (CMS) in evaluating potential remedial alternatives for the Rest of the River. The IMPG Proposal presents a combination of numerical concentration values and narrative descriptive goals for the protection of both human health and ecological receptors, taking into account EPA's risk assessment. From a human health standpoint, the IMPG Proposal addresses direct human contact with sediments and floodplain soil, and human consumption of fish, waterfowl, and agricultural products from the Rest of the River Area. From an ecological standpoint, the IMPG addresses several groups of ecological receptors, including benthic invertebrates, amphibians, fish, and several species of birds and mammals. The IMPG Proposal presents numerical concentrations in sediments, floodplain soil, fish tissue, and/or other biota tissue relevant to these human and ecological receptors. The IMPG Proposal does not present single-number IMPGs, instead, it presents a range of Risk-based Media Concentrations (RMCs). Furthermore, the IMPG

Proposal contains two separate sets of RMCs, one set based primarily (but not exclusively) on EPA's risk assessments and a second set based on alternative exposure assumptions, toxicity values and data interpretations that GE "believes are more supportable and consistent with actual site conditions" than the values and interpretations that EPA used in its risk assessments (the latter are referred to as Alternative RMCs).

The comments provided below represent a compilation of comments by staff from the Department's Office of Research and Standards and the Western Regional Office. The Department did not check the accuracy of all of the calculations presented in the IMPG Proposal. However, in reviewing the IMPG Proposal and formulating these comments, the Department did reexamine portions of the Human Health Risk Assessment (HHRA), the Ecological Risk Assessment (ERA), comments by the Peer Review Panels, and the U.S. Environmental Protection Agency's (EPA's) Responsiveness Summaries. For the reasons specified in these comments, the Department recommends that the current document be rejected and GE be required to resubmit this document with a number of modifications.

## SPECIFIC COMMENTS

**PCB Cleanup Levels for Other Pittsfield Sites Not Covered by the RCRA Permit.** The Department has previously derived cleanup levels for total polychlorinated biphenyls (PCBs) in soil to be used at sites near the Housatonic River that are not covered under the Consent Decree. These levels appear in the table below.

MassDEP Total PCB Cleanup Levels in Soil for Non-Consent Decree Sites				
Land Use	Receptor	Risk-Based Concentration (mg/kg)	Depth (feet)	Most Sensitive Endpoint
Recreational	Child 8-15 years	23	0-3	Chronic non-cancer
Recreational	Child 1-8 years	6	0-3	Chronic non-cancer
Residential (gardening)	Resident	4	0-15 0-3	Subchronic and chronic non-cancer
Industrial/ Commercial Surface	Groundskeeper	28	0-1	Cancer
Industrial/ Commercial Subsurface	Utility Worker	257	1-6	Cancer
Industrial/ Commercial Subsurface	Construction Worker	18	0-15	Subchronic non-cancer

In the IMPG Proposal, RMCs are presented for human health cancer risks ranging from  $10^{-6}$  to  $10^{-4}$ . The Massachusetts Contingency Plan uses a  $10^{-5}$  cancer risk level and a non-cancer Hazard Index of 1.0 to define no significant risk, and the above-listed, risk-based concentrations were based on those levels. Therefore, the Department believes that the RMCs should at least be protective of a  $10^{-5}$  human health cancer risk and a Hazard Index of 1.0. In addition, Appendix D to the Consent Decree contains a memo titled *Protectiveness of Cleanup Levels for Removal Actions Outside the River – Protectiveness of Human Health*. For the similar exposure scenarios evaluated there, cleanup levels have been determined to address similar levels of cancer and non-cancer risks. Therefore, the Department believes that the RMCs for floodplain soil and for other media addressed in the Human Health Risk Assessment should provide a level of protectiveness similar to the levels that have already been determined for Consent Decree and non-Consent Decree sites.

**Central Tendency Exposure versus Reasonable Maximum Exposure Estimates.** The Department believes that IMPGs used in selecting remedies should be based on Reasonable Maximum Exposure (RME) assumptions rather than Central Tendency Exposure (CTE) assumptions. CTE assumptions are not sufficiently protective of human health. Furthermore, the presence of fish consumption advisories and the stigma associated with contamination at the site have likely reduced use of the river and its floodplain well below what it would be if the site were not contaminated, both in terms of numbers of people using the Rest of River and in terms of the frequency and intensity of use. Therefore, the Department believes that, under future conditions, the RME assumptions that were used in the HHRA will likely characterize a large proportion of the public using the Rest of River Area and, therefore, IMPGs should be based on RME assumptions to be fully protective of future site uses.

**EPA Responsiveness to Peer Review Panel Comments.** In the IMPG Proposal, GE often argues that EPA was not sufficiently responsive to the Peer Review Panel Comments on both the human health and ecological risk assessments and that GE's alternative rationales were supported by the comments of some of the peer reviewers. GE uses this as a basis for offering alternative assumptions and interpretations that are used to derive the RMCs. For example, to justify its use of RMC ranges, at the top of page 11, GE states that "the use of such ranges is consistent with the fact that there is a wide range of scientific opinion on most of the inputs and interpretations in the HHRA and ERA, as evidenced by the substantial divergence of peer reviewers on such issues." The Department strongly disagrees with GE's statement and believes that most reviewers on both panels gave both risk assessments overall excellent ratings for being well conceived, comprehensive, scientifically sound relative to current accepted practices and methodologies, and consistent with EPA policies and guidance. A number of the peer reviewers' comments focused on slight modifications to the text and figures to enhance transparency and clarity. It was clear that some peer reviewers had differences of opinion and in professional judgment with EPA and its technical consultants over which input parameters and statistical analyses and approaches were best to use in particular aspects of the risk assessments. However, often these comments reflected issues that a panel member had with EPA's (agency-wide) risk assessment methodology, in general, rather than anything that was specific to the Rest of the River risk evaluation. The opinions of the various peer reviewers sometimes covered a wide spectrum, with some reviewers disagreeing with one another and concluding that risks for particular receptors were either underestimated or overestimated, while the majority of others remained silent on the same issues. In other cases, nearly all reviewers did not comment on an issue that was considered important to a sole reviewer. In cases where there was a sole comment or where the comments were in conflict, the Department believes that it would be difficult for EPA to justify making changes to those portions of the documents against its professional judgment in the absence of more compelling evidence to do so. It is clear from EPA's Responsiveness Summaries and from the changes that were made to the final risk assessments, that the comments by both Peer Review Panels were all fully evaluated and seriously considered. The Department believes that EPA did an excellent job of assimilating into the risk assessments much of the new information that was provided during the peer

review process. The final risk assessments addressed those areas where EPA believed that the peer reviewers had raised valid points and concerns that could be addressed by making the requested changes to the text and analyses and did not require acquisition of additional data. All reviewers seemed to agree that EPA had undertaken monumental, ground-breaking work in both risk assessments and that the acquisition of additional data was unnecessary and would not add to the risk assessments. In cases where specific peer reviewers' comments did not result in changes to the risk assessments, EPA clearly explained why the recommended changes were not being made. The Department believes that EPA did a commendable job in balancing all of these factors and made changes to the risk assessments based on Peer Review Comments wherever it was appropriate and possible.

**RMCs Based Primarily on EPA's Risk Assessments.** In the Introduction, Section 2.0 is described as the section where RMCs are derived specifically from EPA's risk assessments. However, GE incorporates information into the Section 2.0 RMCs that make them less protective than they would be if they were based solely on information from the risk assessment. For example, Section 2.4 presents RMCs based on the ERA. This section presents not only RMCs based on maximum allowable threshold concentrations (MATCs) but also a range of RMCs reflecting various other thresholds from studies used in the ERA. Section 2.4.3, includes an RMC for Northern short-tailed shrews of 43.5 mg/kg PCBs based on a GE study. EPA had performed a supplemental analysis on this GE study and determined an MATC of 21.1 mg/kg, and had disregarded the GE value of 43.5 mg/kg. Therefore, the Department believes it is inappropriate to use this higher value of 43.5 mg/kg as an RMC.

As another example, Section 2.4.6 calculates proposed RMCs for fish tissue based on consumption by ospreys. The risk estimates from the ERA assume 100% exposure of ospreys within the Rest of the River. GE argues that most ospreys would be transient, and applies an exposure assumption of 3 days per year compared to EPA's assumption of 365 days per year. The RMCs should be protective of anticipated, more intensive future uses by species that may not presently use the river full-time, due to a number of possible reasons, despite the presence of adequate habitat. Furthermore, since it is infeasible to evaluate every single species in the risk assessment, a small subset of the species that would actually occur in the Rest of the River were actually evaluated in the ERA. Therefore, the RMCs should be protective of piscivorous species that would spend 100% of their time in the Rest of the River Area. GE should not be adding less protective assumptions to RMCs in Section 2.0 than those used in EPA's risk assessment. RMCs should be based solely on MATC values, whenever possible. Higher effects levels, such as EC20 or EC50 values, are not sufficiently protective.

After presenting its proposed RMCs in several subsections of Section 2.0 (bald eagles, osprey, and wood ducks), GE comments on the uncertainty of the derived values. The Department believes that such comments are inappropriate in this document, since they have already been made during the peer review process. Furthermore, if GE acknowledges that uncertainties exist, then more conservative assumptions should be made in the derivations of all RMCs, rather than the less conservative assumptions that GE proposes throughout the document.

**Alternative RMCs.** In Section 3.0, GE disregarded much of the content of the risk assessments to derive the Alternative RMCs, because "GE believes that many of those assumptions, values, and interpretations overstate exposures and risks to human and ecological receptors in the Rest of the River." GE uses many outside sources of data and reinterpretation of data used in the risk assessments to derive RMCs that are far less protective of human health and the environment than the assumptions used in EPA's risk assessments. Much of the information used in deriving these Alternative RMCs was previously presented to EPA and to the Peer Review Panel and, after careful consideration, EPA chose not to include this information in the risk assessments. For example, Section 3.1.1.1 presents soil ingestion rates for derivation of Alternative RMCs. These rates are not based on standard EPA assump-

tions, but instead on data presented by Stanek and Calabrese. GE had hired Calabrese as a consultant, and he had presented soil ingestion data to EPA and the Department. EPA had carefully considered this data, but ultimately rejected it (as did one of the member of the Peer Review Panel) and used the established EPA soil ingestion rates.

Furthermore, the Final HHRA and ERA were revised based on comments from the Peer Review Panels. The Department believes that both of these risk assessments adequately reflect the comments of the Peer Review Panels and represent appropriate levels of protectiveness. Given that the risk assessments reflect the consensus opinions of the Peer Review Panels, the Department believes that it is inappropriate to include RMCs based on new information or information that was previously rejected by EPA, or that are not based entirely on the risk estimates from the HHRA and ERA.

Previously, the Department has submitted comments on the two risk assessments that form the basis of many of the RMCs. A number of these previous comments concerned areas where the Department thought that some of the assumptions used in the risk assessments were not as conservative as they might have been. For example, there is a great deal of spatial heterogeneity for both contaminated sediment and soil. Some of the very large exposure areas in the HHRA (some greater than 100 acres in the floodplain) may tend to average away highly contaminated subareas within these exposure areas. Therefore, since many of GE's Alternative RMCs are orders of magnitude less protective than those based on the risk assessments, the Department believes that these will result in less cleanup of contaminated areas and a cleanup that is not protective of human health or the environment. For all of the above reasons, the Department recommends that Section 3 (Alternative RMCs) of the IMPG Proposal be completely rejected.

**Narrative Descriptive Goals.** The Department believes that the narrative IMPGs should be rewritten. As currently written, they are subject to a tremendous range of interpretation. For example, language such as "do not present significant risk of harm," "edible portion of fish and waterfowl," and "actual and reasonably foreseeable frequency of consumption" could be subject to a considerable range of interpretation, especially when one considers that some of these parameters may vary both between segments of the population and over time, and may be difficult to determine and/or predict in the future, if no constraints or assumptions have been established ahead of time. By contrast, the numerical IMPGs are based on assumptions and parameters that have been clearly defined as being representative of actual and/or potential future-use scenarios. In addition to containing similar vague and subjective language, the narrative RMC for agricultural products consumption on page 36 also neglects to discuss persons who consume fruits and vegetables, since it only discusses persons "who consume such animal products."

For ecological receptors, language such as "diverse and abundant communities," "sustainable and reproducing populations," "healthy and self-sustaining populations," and "adverse reproductive effects" is equally broad and open to a wide range of interpretation. In the case of wood ducks, the language is even less specific: contaminant concentrations will be reduced so that "they do not prevent the presence of a population of wood ducks." No reference is made to whether this population is healthy, or reproducing or self-sustaining. Furthermore, whereas the numerical IMPGs constitute actual cleanup numbers that can be shown to be achieved upon the completion of remediation, the narrative descriptive goals do not provide equal levels of certainty. In order to ensure that the narrative descriptive goals have been achieved following remediation, the Department believes that extensive long-term monitoring and additional sampling and studies will be required in order to evaluate the populations under consideration.

The Department is also concerned about the inclusion in the narrative descriptive goals of language such as "consistent with habitat limitations," "to the extent that such a population can be supported by available habitat," "in areas of appropriate habitat," "taking into account the home range," and "that use the

*MEMORANDUM*

*Susan Svirsky*

*Comments on "Interim Media Protection Goals Proposal for the Housatonic River, Rest of River"*

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river as part of their home range." It is not clear from the Ecological Characterizations that were performed by Woodlot Alternatives as part of the ERA that there are many current habitat limitations for a number of species that would preclude their presence in the Rest of River. However, even if there were, there is no reason to assume that similar limitations would necessarily exist in the future after portions of the river have been cleaned and restored. Habitat enhancements have been an integral part of remedial work on the 0.5-Mile and 1.5-Mile Reaches, so one could reasonably assume that similar habitat improvements might be made in the Rest of River. Furthermore, if certain portions of the river are cleaned up, these may provide improved habitat for species that may not currently use those portions of the river. The narrative goals are unclear as to the time frame (present or future) over which attainment of these goals will be evaluated.

The time period for assessing the achievement of these goals also becomes important relative to the discussion of home ranges. Some species, such as osprey and bald eagles may not currently have a year-round home range in the Rest of River, due to PCB contamination or to a number of other causes, but may be present in the future, particularly if efforts are made to reintroduce breeding pairs, as has been done in other parts of the Northeast. When such species are present, not all home ranges will be the same size and/or some home ranges might occupy greater portions of the river and floodplain than others for the same species, depending on the segment of the river under consideration, intraspecies competition, etc. In such cases, it is not clear which home ranges will be taken into account or when they will be evaluated in a temporal sense. In other words, it might be easier to attain one of the goals under present conditions than it might in the future after certain river segments have been remediated, and if remedial decisions are based on the narrative goals that are based on present conditions, then less remediation could be required.

In addition, the ERA selected species that are representative of particular groups of animals (piscivorous birds, piscivorous mammals, etc.). However, the habitat requirements and home ranges of the selected species may differ considerably from those of the other species in those groups. Therefore, it seems inappropriate to include in any narrative descriptive goals any species-specific requirements relative to habitat and home ranges. The Department recommends removing such language concerning habitat and home ranges from the narrative descriptive goals. Consideration of habitats and home ranges seems more appropriate during the CMS, when evaluating the feasibility of attaining various IMPGs at particular locations within the Rest of River will be done.

Furthermore, the use of "as necessary" throughout the narrative descriptive goals seems inappropriate, since this implies that a value judgment may be made to determine whether any remedial actions need to be taken. Use of such language just serves to expand the range of interpretation of these goals.

In conclusion, the Department believes that the narrative IMPGs should be more narrowly focused, so that the agencies can readily determine if a remedial goal has been achieved. Even after these narrative descriptive goals are rewritten to be less vague, the Department recommends that they be used to supplement but never substitute for numerical goals.