

CHARGE FOR THE MODEL VALIDATION REPORT PEER REVIEW

Revised March 7, 2006 for Model Validation Report

Background

After negotiations between the General Electric Company (GE) and the US Environmental Protection Agency (EPA), Commonwealth of Massachusetts, State of Connecticut, City of Pittsfield, the Department of Interior, and the National Oceanic and Atmospheric Administration (Agencies), these parties executed a Consent Decree for the remediation, restoration, and revitalization of the General Electric facility located in Pittsfield, MA and other properties contaminated with PCBs from the facility, including the Housatonic River. This Consent Decree was approved by the federal court in Springfield in October 2000.

As part of the agreement embodied in the Consent Decree, EPA is developing a quantitative model of the fate, transport, and bioaccumulation of polychlorinated biphenyls (PCBs) in the Housatonic River system. This model and its predictions will be used by EPA, together with other information, in making decisions regarding potential remedial actions for river sediments and associated floodplains soils for the portion of the Housatonic River beginning at the confluence of the East and West branches of the river (approximately two miles downstream from GE's facility in Pittsfield) and continuing downstream. In general, the model will be used to quantify and compare the amount of time that it will take for PCB concentrations in environmental media (e.g., water column, sediments, biota) in that stretch of the river to reach particular PCB concentrations under various scenarios, including naturally occurring processes and numerous other potential remedial options.

In the Consent Decree, GE and the Agencies agreed that EPA's modeling activities would be subject to Peer Review by a Peer Review Panel at appropriate intervals during the modeling process. Specifically, the Consent Decree provides that the Peer Review Panel will review three documents developed by EPA: a report on the modeling framework and a description of the data needs for the model; a report on the model calibration; and a report on the final model validation. The first two reports have previously been reviewed by the Peer Review Panel. This document presents the charge for the Peer Review Panel's review of the EPA report on Model Validation.

In addition, as provided in the Consent Decree, an opportunity will be provided for General Electric and other members of the public to submit written comments to the Peer Review Panel which are relevant to the charge for the Panel members' consideration.

Upon completion of the Peer Review for Model Validation, EPA is to provide the model and all inputs and outputs to GE for its use in evaluating alternatives in the Corrective Measures Study (CMS). Neither the Consent Decree nor the associated Reissued RCRA Permit (Permit) specifies

the alternatives to be considered; rather, these documents specify that the alternatives will be proposed by GE after receipt of the model in GE's submittal of the CMS Proposal. In addition to considering natural processes, various forms of active remediation may be considered, including dredging/excavation, capping, and various combinations of these techniques.

In using the model to evaluate different remedial alternatives, inputs to the model must be set to reasonably anticipated future conditions. Because no reliable long-term estimates of future boundary conditions are available, the use of the model to predict future concentrations of contaminants necessarily must be based on a projection of the boundary conditions (flow, solids, and PCBs) over a period of decades. This will necessarily introduce uncertainty into the model results.

Recognizing that a degree of uncertainty is inherent in these types of studies, the goal of the modeling study is to develop a tool that will:

- Predict future concentrations in various media (e.g., sediment, fish, and water);
- Assess relative performance among remedial alternatives against baseline conditions; and,
- Be the best estimate available of the potential magnitude of the expected reductions in exposure and, thereby, provide useful information in evaluating the performance of remedial alternatives.

Objectives of the Modeling Approach

The overall objectives for the modeling effort include the following:

1. Quantify future spatial and temporal distributions of PCBs (both dissolved and particulate forms) within the water column and the bed sediment;
2. Quantify the historical and current relative contributions of various PCB sources to PCB concentrations in water and bed sediment;
3. Quantify the historical and current relative contribution of various PCB sources to bioaccumulation in target species;
4. Estimate the time required for PCB-laden sediment to be effectively sequestered by the deposition of uncontaminated material (i.e. natural recovery);
5. Estimate the time required for PCB concentrations in fish tissue to be reduced to levels established during the risk assessment process, that no longer pose either a human health or ecological risk, based upon various response and restoration scenarios;
6. Quantify the relative risk(s) of extreme storm events(s) contributing to the resuspension of sequestered sediment or the redistribution of PCB-laden sediment in the study area.

Summary of Charge

The Consent Decree requires that the Peer Review Panel be convened to review the modeling exercise (including the hydrodynamics component, the sediment transport component, the PCB fate and transport component, and the bioaccumulation component) at three points during the modeling process: model construction, calibration, and validation. At this time, the first two peer reviews have been completed. The Peer Review Panel shall address the questions specified below during peer review of the Model Validation Report; if a Panelist believes that EPA's approach does not adequately address the question, the Panelist shall describe the alternative approach that, in their opinion, would be sufficient to answer the question and achieve the goal of the modeling study.

Questions for the Model Validation Report

1. Considering the changes implemented in the Phase 2 Calibration, does the model as calibrated and validated, based on your technical judgment, reasonably account for the relevant processes affecting PCB fate, transport, and bioaccumulation in the Housatonic River to a degree consistent with achieving the goal of the modeling study?
2. Are the comparisons of the model predictions with data sufficient to evaluate the capability of the model on the spatial and temporal scales of the final calibration and validation?
3. Is there evidence of bias in the models, as indicated by the distribution of residuals of model/data comparisons.
4. Have the sensitivities of the models to the parameterization of the significant state and process variables been adequately characterized?
5. Are the uncertainties in model output(s) acknowledged and described?
6. Upon review of the model projections of changes in PCB concentrations in environmental media in the example scenarios, are such projections reasonable, using your technical judgment, and are they plausible given the patterns observed in the data?
7. Is the final model framework, as calibrated and validated, adequate to achieve the goal of the modeling study to simulate future conditions 1) in the absence of remediation and 2) for use in evaluating the effectiveness of remedial alternatives?