

Hudson River PCBs Superfund Site
Draft Engineering Performance Standards - Peer Review Copy
Briefing Meeting October 15-16, 2003

Charge for Peer Review

In February 2002, the United States Environmental Protection Agency (EPA) issued a Record of Decision (ROD) for the nearly 200-mile long Hudson River PCBs Superfund site. The remedial action objectives identified for the site are as follows (see, ROD, pp. 49-51):

- 1) reduce the cancer risks and non-cancer health hazards for people eating fish from the Hudson River by reducing the concentration of PCBs in fish;
- 2) reduce the risks to ecological receptors by reducing the concentration of PCBs in fish;
- 3) reduce PCB levels in sediments in order to reduce PCB concentrations in river (surface) water that are above surface water standards set for other environmental laws (applicable and relevant requirements, or ARARs);
- 4) reduce the inventory (mass) of PCBs in sediments that are or may be bioavailable; and
- 5) minimize the long-term downstream transport of PCBs in the river.

EPA's cleanup decision calls for, among other things, environmental dredging and off-site disposal of about 2.65 million cubic yards of PCB-contaminated sediments to remove some 150,000 pounds of PCBs from the 40-mile long Upper Hudson. The ROD also calls for Monitored Natural Attenuation of PCB contamination that remains in the river after dredging. The dredging will occur in two phases over six years and is scheduled to begin in 2006. The first phase will be the first year of dredging and the second phase will be the remaining five years of dredging. Phase 1 will occur at a reduced rate of dredging that will allow comparisons of operations with pre-established performance standards and evaluation of necessary adjustments to dredging operations in the succeeding phase or to the standards.

EPA's cleanup decision requires performance standards for dredging resuspension, PCB residuals after dredging, and dredging production rates as well as the attendant monitoring program (collectively, the Engineering Performance Standards). The ROD requires that these performance standards be developed in the remedial design phase of the project with input from the public and in consultation with state and federal natural resource trustees. The performance standards will be based on objective environmental and scientific criteria. Beginning in Phase 1 and continuing throughout the project, EPA will conduct extensive monitoring. EPA will use the monitoring data, as well as the Agency's ongoing evaluation of the dredging operations with respect to the performance standards, to evaluate the project to determine whether it is achieving its objectives to protect human health and the environment.

The ROD further requires two independent external peer reviews related to the Engineering Performance Standards. This peer review, on the October 2003 Draft Engineering Performance Standards – Peer Review Copy, is the first peer review. The Engineering Performance Standards that are finalized after this first peer review will be applied during the first dredging season (i.e., Phase 1). EPA will then prepare a report that evaluates the Phase 1 dredging with respect to the Engineering Performance Standards, which will be the subject of the second peer review. Following the second peer review, EPA

will finalize the Engineering Performance Standards that will be applied during Phase 2.

Consistent with EPA's Peer Review Handbook, the peer reviewers are asked to determine whether the October 2003 Draft Engineering Performance Standards - Peer Review Copy is technically adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically valid and credible conclusions. The reviewers are not being asked to determine whether they would have conducted the work in a similar manner.

It is important to keep in mind that the Engineering Performance Standards do not encompass other important aspects of the project, such as:

- the quality-of-life performance standards being developed by EPA (e.g., limits on noise, odor, lights);
- the substantive water quality certification requirements for the dredging project being developed by New York State pursuant to the federal Clean Water Act;
- the community health and safety plan for Remedial Action (e.g., community notification of ongoing health and safety issues), which will be developed by General Electric Company (GE) pursuant to an EPA Administrative Order on Consent for Remedial Design (RD AOC);
- the engineering design being developed by GE pursuant to the RD AOC, including the pre-dredging baseline monitoring program, the habitat delineation and assessment work, and the environmental monitoring program for the dredging project;
- specifications in the construction contract for the dredging operations, including the specific means and methods, and
- the long-term monitoring program that will be conducted after the dredging project is completed, to help evaluate the Monitored Natural Attenuation component of EPA's 2002 cleanup decision for the Site.

Documents

Peer Review Documents

The following documents are being provided to the peer reviewers as the focus of the peer review:

- Draft Engineering Performance Standards - Peer Review Copy, October 2003 (4 volumes)
 - Part 1: Performance Standard for Dredging Resuspension
 - Part 2: Performance Standard for Dredging Residuals
 - Part 3: Performance Standard for Dredging Productivity
 - Appendix: Case Studies of Environmental Dredging Projects; and
- This Charge for peer review.

Background Information

EPA also is providing the peer reviewers with electronic copies of the documents listed below, which contain background information relevant to EPA's development of the October 2003 Draft Engineering Performance Standards – Peer Review Copy. The reviewers are not being asked to peer review any of the background information.

- EPA's October 10, 2003 responses to public comments received during the public comment period (May 14 to July 14, 2003), as well as the comments themselves
- Suggested charge questions submitted to EPA from interested parties (General Electric Company, the National Oceanic and Atmospheric Administration, Saratoga County Environmental Management Council, and Scenic Hudson, Inc.)
- EPA's February 2002 Record of Decision; and
- Excerpts from Responsiveness Summary (Part 3 of ROD), specifically:
 - White Paper - Resuspension of PCBs During Dredging
 - White Paper - Relationship Between PCB Concentrations in Surface Sediments and Upstream Sources
 - White Paper - Metals Contamination
 - White Paper - Dredging Productivity and Schedule
 - White Paper - Delays and Downtime
 - White Paper - Model Forecasts for Additional Simulations in the Upper Hudson River
 - White Paper - Rail Operations
 - White Paper - Post Dredging PCB residuals
 - White Paper – Example Sediment Processing/Transfer Facilities
 - White Paper – Relationship between Tri+ and Total PCBs

The background information listed above, as well as other documents related to the Site, are available on EPA's website for the Hudson River PCBs Site (www.epa.gov/hudson) or by request.

CHARGE QUESTIONS FOR PEER REVIEWERS

Dredging Resuspension Standard

1. Framework: The Resuspension Standard was developed with a routine (i.e., baseline condition) water quality monitoring plan and three tiered action levels (Evaluation, Concern, and Control) leading up to a maximum allowable concentration of PCBs in river water. Exceedence of an action level would trigger additional monitoring requirements beyond the routine monitoring, as well as operational or engineering steps (studies and operational or engineering improvements and, if necessary, temporary halting of operations). The Resuspension Standard was developed with this framework to accommodate the project need for both protection and production (i.e., upon an exceedence of an action level, appropriate steps can be taken to identify and address remediation-related problems before dredging operations would need to be halted temporarily) (see, for example, Section 2.3: Rationale for the Standard).

Please comment on whether this framework provides a reasonable approach for developing the Resuspension Standard.

2. Near-Field Analyses: Development of the Resuspension Standard considered the potential effects of resuspension in the near-field and in the far-field¹ (see, Section 2.1.2: Definitions). The near-field work was performed to help identify the locations of the near-field water column monitoring stations, to estimate the loss from the dredge, to estimate the nature of the release (i.e., dissolved vs. suspended), to provide an estimate of the solids transported into the far-field, and to estimate the effects of settled material on PCB concentrations in near-field sediment. Relevant sections of the document include, but are not limited to, Section 2.2.7: Near-Field Modeling, Section 2.2.8: Relationship Among the Resuspension Production, Release and Export Rates, and Attachment D: Modeling Analysis.

Please comment on the technical adequacy of the near-field analyses, in particular the linkage from the resuspension production rate (at the site of dredging), to the resuspension release rate (reflecting PCB transport in the water column in the immediate vicinity of the dredging operations) and finally to the resuspension export rate (essentially equilibrium conditions reflecting long-distance transport of PCBs in the water column).

3. Evaluation Level: The Evaluation Level of the Resuspension Standard can be reached by exceeding criteria for net (i.e., over baseline) PCB load (mass loss) measured at far-field locations or criteria for net suspended solids concentrations measured at either near-field or far-field locations (see, Table 1-1). The Evaluation Level was developed specifically for Phase 1 to provide the site-specific information necessary to understand the mechanisms of PCBs release due to dredging in the Upper Hudson, which in turn is needed to guide the selection of appropriate engineering controls, as necessary. As stated in the Resuspension Standard, EPA anticipates that sufficient data may be collected in Phase 1 to justify eliminating the Evaluation Level in Phase 2. Also, the Evaluation Level is well above the best estimate of dredging release alone. Some of the public comments that EPA received suggested that the dredging operations should not be allowed to increase PCB concentrations in the water column above baseline conditions (i.e., that the Evaluation Level should be the threshold level that results in the temporary halting of dredging). Other comments suggested that the requirements of the Evaluation Level and Concern Level should be reduced and combined into one level prior to the Phase 1 dredging. Relevant sections of the document include, but are not limited to Section 3.1.1: Evaluation Level).

Please comment on the appropriateness of the Evaluation Level as a component of the standard applied to Phase 1.

4. Resuspension Threshold: Under the Resuspension Standard, the maximum allowable concentration (i.e., threshold) in the water column is 500 ng/L Total PCBs, which is the maximum contaminant level (MCL)

¹ The far-field work was performed to evaluate the long-term effects of dredging on PCB concentrations in the water column and in fish tissue of the Upper and Mid-Hudson. The linked fate and transport and bioaccumulation models of the Upper Hudson (HUDTOX and FISHRAND, respectively), which were used to evaluate far-field effects, as well as the input parameters used to evaluate the long-term effects on human health and ecological receptors, were the subject of prior peer reviews. As such, they are not the subjects of this peer review.

for potable water under the federal Safe Drinking Water Act. This threshold concentration was selected in consideration of the goals of the cleanup, which include protecting downstream public water supplies that draw from the river, and minimizing the long-term transport of PCBs in the river, both from one section of the Upper Hudson to another and from the Upper Hudson to the Lower Hudson. Relevant sections of the document include, but are not limited to, Section 2.2.9: Review of Applicable or Relevant and Appropriate Requirements, Section 2.3.1: Development of Basic Goals and Resuspension Criteria. The threshold addresses the *resuspension export rate*, which describes the rate of PCB mass transported in the water column when particle settling is unlikely to further reduce the level of PCBs in the water column (see, Section 2.1.2: Definitions). The Resuspension Standard requires that the threshold be applied to the nearest far-field sampling station that is at least 1 mile away. Moreover, to reduce the possibility that a short-duration anomalous “spike” or laboratory error could temporarily halt the dredging operations, the standard requires that the concentration be confirmed by an average of four samples collected the next day with 24-hour laboratory turnaround time.

Please comment on the reasonableness of the 500 ng/L Total PCBs threshold concentration developed for the Resuspension Standard.

5. Monitoring Program: The 2002 ROD states (see, p. iii), “Beginning in phase 1 and continuing throughout the life of the project, EPA will conduct an extensive monitoring program.” Section 3.3: Monitoring Plan and Attachment G (and related tables and figures) describe the attendant monitoring program for the Resuspension Standard.

Please comment on whether the monitoring program reasonably can be expected to provide adequate data in Phase 1 that will allow EPA to evaluate necessary adjustments to dredging operations in Phase 2 or to the Resuspension Standard. Also, please identify any necessary improvements to the monitoring program.

Dredging Residuals Standard

6. Framework: EPA’s 2002 ROD calls for removal of all PCB-contaminated sediments (i.e., to non-detection levels) in areas targeted for dredging, with an anticipated residual of approximately 1 mg/kg Tri+ PCBs prior to backfilling (Tri+ PCBs are the subset of PCBs with 3 or more chlorine atoms). The Residuals Standard builds on the requirements in EPA’s 2002 ROD as well as case studies and regulatory guidance (see, Section 2.1: Background and Approach). It requires comparison of PCB concentrations in post-dredging sediment samples within a given area (i.e., ~ 5-acre certification unit) to statistically-based PCB concentrations (i.e., action levels), which then guide appropriate actions (see, for example, Figure 1-1). The Residuals Standard was developed with this framework to accommodate the project need for both protection and production, in that post-dredging sampling can proceed directly upon EPA verification that the design cutlines have been attained and the options for appropriate next steps are known and, to the extent possible, pre-approved during design.

Please comment on whether this framework provides a reasonable approach for developing the Residuals Standard.

7. Statistical Analyses: The supporting analyses for the Residuals Standard, in particular the statistical analyses of site-specific sediment data collected in the Upper Hudson and the sediment data from case studies of environmental dredging projects, are presented in Section 2.2 (and associated tables and figures) and in Attachment A of the Residuals Standard.

Please comment on whether the statistical analyses are technically adequate and properly documented.

8. Post-dredging Confirmatory Sampling Program: Section 2.2.9 and Section 3.0 of the Residuals Standard present an evaluation of available sampling techniques and describe the procedures for establishing the post-dredging confirmatory sampling grid, collecting and managing the samples, and evaluating the sample data and required actions. In certain circumstances identified in the Residual Standard, a certification unit can be evaluated by considering the sediment data in three previously dredged certification units within 2 miles (i.e., a 20-acre evaluation).

Please comment on the adequacy of these aspects of the Residuals Standard, in particular the concept of a 20-acre evaluation area for Phase 1.

9. Re-dredging and Engineering Contingencies: Consistent with the 2002 ROD, the Residuals Standard is clear in describing EPA's preference for dredging over capping as a means of sequestering PCB inventory (mass). The standard also addresses the expectation that some targeted areas of the Upper Hudson river bottom may be difficult to dredge effectively, such as rocky areas. For these special circumstances, the standard addresses re-dredging and the number of additional re-dredging attempts, how the extent of the non-compliant area is to be determined, and the use of engineering contingencies to address recalcitrant residuals (e.g., alternative dredge, cap). Relevant sections of the document include Section 2.3.5: Determining the Number of Re-Dredging Attempts, Section 2.3.6: Engineering Contingencies for the Residuals Standard, Section 3.5.1: Re-dredging and Required Number of Re-dredging Attempts, Section 3.5.2: Determining the Extent of the Non-Compliant Area, and Section 3.6: Engineering Contingencies.

Please comment on the reasonableness of the Residuals Standard with respect to re-dredging and engineering contingencies.

Productivity Standard

10. Framework: The requirements of the 2002 ROD inform the overall parameters of the Productivity Standard (e.g., dredging of an estimated 2.65 million cubic yards in 6 years, with the first dredging season [Phase 1] at a reduced rate of dredging) (see, Section 2.1: Background and Approach and Section 2.3: Rationale for the Development of the Performance Standard). Within this context, the Productivity Standard requires compliance with minimum cumulative volumes of sediment for each dredging season and targets larger cumulative volumes for the first five dredging seasons. In requiring cumulative annual volumes, the standard accounts for the expectation that some areas will be faster to dredge than others, and thus provides an opportunity to carry over the benefit of this faster dredging

from one year to the next as a “cushion” against when dredging more difficult areas. In setting targeted cumulative annual volumes, the standard provides for the dredging to be designed to attain a somewhat faster rate of dredging, so that a reduced volume remains in the sixth (final) dredging season and additional time is available to address any unexpected difficulties. The Productivity Standard was developed with this framework to ensure that the dredging design and implementation meet the schedule called for in the ROD.

Please comment on whether this framework provides a reasonable approach for developing the Productivity Standard.

11. Example Production Schedule: As part of the development of the Productivity Standard, an Example Production Schedule was developed based on site-specific information and case studies of other environmental dredging projects to demonstrate that the Productivity Standard can be met. Relevant sections of the document include Section 2.2: Supporting Analyses, Attachment 1: Productivity Schedule, Attachment 2: Productivity Schedule Backup, and Attachment 3: Evaluation of Applicable Dredge Equipment for the Upper Hudson River.

Please comment on the reasonableness of the Example Production Schedule, including the reasonableness of the underlying assumptions for equipment selection and efficacy, as well as the time necessary to deploy, use, and move equipment.

12. Action Levels: The Productivity Standard includes two tiered action levels (Concern and Control) prior to any determination of non-compliance with the standard, as well as their respective required actions and monitoring and recordkeeping requirements. Relevant sections of the document are Section 1.1: Implementation and Section 3.3: Monitoring, Record Keeping and Reporting Requirements.

Please comment on the appropriateness of the action levels and the required actions, as well as the reasonableness of the monitoring and record keeping requirements.

Questions Related to All Three Engineering Performance Standards

13. Interactions Among the Standards: Because the Engineering Performance Standards for Resuspension, Residuals and Productivity will be applied in conjunction with one another, the standards must be considered as a whole as well as individually. In developing the standards, their points of interaction were balanced to allow flexibility during design and implementation, while ensuring that human health and the environment are adequately protected. Thus, the standards contain self-correcting features (e.g., the requirements for additional re-dredging attempts in the Residuals Standard must consider the requirements for dredging production in the Productivity Standard). The interactions among the standards are discussed in the Executive Summary, Introduction, and Section 3.2 of the Productivity Standard.

Please comment on whether the main interactions among the standards are properly documented and taken into account.

14. Section 4.0 presents the plans for refinement of each standard.

Please comment on whether there are any additional aspects to effectively accomplish the refinement that EPA should consider in evaluating the Phase 1 data.

15. Please provide any other comments, concerns or suggestions, involving both strengths and weaknesses, with respect to the October 2003 Draft Engineering Performance Standards – Peer Review Copy that may not be fully covered by the above charge questions.