June 21, 2011

John G. Haggard
General Electric Corporation
Project Coordinator
320 Great Oaks Office Park, Suite 319
Albany, NY 12203

Dear Mr. Haggard:

The Federal natural resource trustee agencies, the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Department of the Interior (DOI) communicated with you in two prior letters (November 7, 2005 and August 14, 2006) about the Phase 1 remediation and habitat replacement and reconstruction project for the Hudson River PCB Site. These letters informed you of our concerns about the potential for natural resource injury that could result from implementing these remedial measures and provided recommendations about the Phase 1 Intermediate Design Report (IDR) and the Phase 1 Final Design Report (FDR), respectively. In December 2010, GE agreed to conduct the Phase 2 remediation that EPA identified.

After reviewing General Electric's draft Phase 2 IDR, the U.S. Environmental Protection Agency's (EPA) June 23, 2009 approval letter, the Phase 1 Peer Review Report, and the December 2010 15(b) Phase 2 decisional documents (Engineering Performance Standards, Critical Design Elements, Performance Standards Compliance Plan Scope, Remedial Action Monitoring Scope, and Operation, Monitoring and Maintenance), we continue to be concerned about the injury that will result from the remedy as designed and stress to you the need for modifications that will reduce that injury and accelerate recovery of the ecosystem. These changes focus broadly on three major areas of benefit that could be achieved by integrating remediation and restoration:

- Additional removal of sediments in River Sections 2 and 3 to reduce post-remediation surface PCBs and future injury,
- Enhancements to the habitat replacement and reconstruction program to reduce the amount of unmitigated remedy-caused injury to natural resources expected based on the Phase 2 Final Design Report, and
- Improvements to the adaptive management plan and post-construction monitoring consistent with sound scientific principles.

Additional Sediment Removal

We continue to have significant concerns regarding the level of PCBs that will remain in surface sediments post-remediation which will likely delay recovery of the river. Our analysis of remedial design data indicates that:

- Average surface PCB contamination in River Sections 2 and 3 are higher and sediment natural recovery is much slower (verging on negligible) than what was believed when the Record of Decision (ROD) was originally issued in 2002 (Figure 1, Field et al., 2009). Average surface (maximum in top 12 inches) PCB concentrations in River Sections 1 and 2 are equally elevated (>100 ppm total PCBs), but the surface clean up trigger in River Sections 2 and 3 (~90 ppm) is about 3 times higher than in River Section 1 (~30 ppm total PCBs).

- Few (five, or 9%)) of the especially sensitive or unique habitat (ESUH) areas are likely to attain <1 ppm total PCBs in post-remediation surface sediments unless additional removal is performed (Rosman et al., 2009)

- Given these facts, following remedy implementation, approximately 5 times higher concentrations of bioavailable PCBs will be left behind in surface sediments in River Sections 2 and 3 than the ROD envisioned in 2002 (Figure 2, Field et al., 2009). This includes 136 acres outside of the dredge footprint, where surface levels will exceed 25-30 ppm total PCBs (Field et al., 2011).

- Elevated post-remedy levels of PCBs in surface sediments in River Sections 2 and 3, including in ESUHs, represent a long-term exposure pathway and injury to the public's resources, including aquatic invertebrates, fish, birds and wildlife.

- Therefore, we believe that the projected recovery of the river ecosystem will likely be protracted well beyond the multi-decadal time frame forecast in the ROD.

- As we have noted previously, future injury can be reduced through supplemental removal coordinated with the EPA remedy.

The federal Trustees therefore urge GE to achieve the original risk-based goals of the ROD by dredging sufficient river bottom to attain surface sediment concentrations closer to what the ROD envisioned. In part this can be accomplished by applying River Section 1 surface criteria to River Sections 2 and 3. This enhancement to the design would result in the additional removal of approximately 136 acres of PCB-contaminated sediment from River Sections 2 and 3. Our recommendation of a uniform surface criterion across all three River Sections would significantly reduce bioavailable PCBs, reduce ongoing injury and promote recovery of the river. Additional removal using a lower PCB trigger in ESUH areas could further enhance recovery and reduce injury.

Habitat Replacement and Reconstruction

As stewards of natural resources, the Federal Trustees' concerns with the Phase 2 design for habitat reconstruction parallel those previously expressed in letters to General Electric on the Phase 1 design. These concerns focus on the stability of the river bottom, the quality of the habitats that will be reconstructed, and the degree to which both structure and function of the disrupted habitats will be restored to pre-remedy conditions.

A high quality design for habitat replacement and reconstruction linked with further PCB reduction are the first stages in recovering unconsolidated river bottom (UCB), aquatic vegetation (SAV), shoreline (SHO) and riverine fringing wetland (RFW) habitats that will be harmed by the remedy. Given the numerous problems encountered during the 2010 Phase 1 habitat reconstruction season and the problems encountered with the SAV planting and RFW seeding effort, we recommend significant improvements to the Phase 2 habitat replacement and reconstruction, increased flexibility in habitat reconstruction approaches, and strengthening adaptive management during the construction phase to minimize future problems.

Our on-going concerns with the habitat replacement and reconstruction plans in the draft Phase 2 FDR and Phase 2 Remedial Action Work Plan (RAWP) include:

- Insufficient volume of backfill is being proposed to restore SAV beds to optimal elevation for successful outcome;
- Excessive capping/hardening of the river bottom and potential for hardening of the shoreline;
- Lack of a habitat layer in addition to, and on top of, the isolation and armored layers for all constructed caps;
- Backfill material that could be low in organic carbon and nutrients;
- No consideration of the use of upland dredge spoil material as backfill source material;
- Side slopes that are constructed too steeply, i.e., 3:1,which decreases river bottom stability, instead of a 6:1 to 10:1 slope;
- Backfill and cap tolerances that are too broad and do not target creation of optimum elevations for plant reestablishment;
- Reconstruction of insufficient amounts of_SAV, RFW, and SHO habitat ($\leq$ 1:1 instead of >1:1);
- Plant and seed stock that are not solely derived from local Hudson River or its watershed phenotype and genotype;
- Reliance on seeding in RFW Zone A rather than planting;
- Over-reliance on natural recovery of aquatic vegetation beds without adequate measures in place to assure corrective actions if necessary;
- Use of shoreline treatment designs that lead to unnecessary hardening, lower plant diversity, loss of woody debris, and overall loss of habitat;
- Lack of special design treatments to augment recovery of especially sensitive or unique habitats that receive no special design treatments to augment recovery of these designated areas;

- No consideration for harvesting and reseeding adult freshwater mussels to promote recovery of a keystone species, which will otherwise be dredged and disposed of during remediation;
- Restrictions on depth of removal in nearshore areas and elevated PCBs in surface sediments outside dredge prisms immediately after dredging will provide a continuing pathway of PCBs to ecological receptors.
- Insufficient redundancies, backup capacity, and flexibility to allow problem solving and adaptive approaches within habitat construction phase; and
- Insufficient reporting to and coordination with the trustees.

The federal Trustees believe that many of the natural resource injuries related to remedy implementation can be avoided or minimized through improvements to the Phase 2 Final Design Report for 2011 and subsequent years, and potentially to aspects of the Phase 1 Design that would be implemented in 2011 or beyond. This can be achieved by modifying the Final Design so that it is more consistent with restoration principles (Williams et al. 2009), and strives to maximize reconstruction of the habitats harmed by the remedy and by residual PCBs. For example:

<u>Incorporation of a Separate Habitat Layer in Cap Design</u>: Construction of a habitat layer on top of and in addition to the isolation and armor layers is consistent with EPA's (2005) Contaminated Sediment Remediation Guidance for Hazardous Waste Sites and EPA's (2010) Critical Phase 2 Design Elements . A habitat layer would enhance the physical isolation of indigenous benthos from the residual PCBs and minimize bioturbation of the residual sediments and would provide substrate for rooting plants, burrowing organisms and nesting fish, thereby reducing remedial injury from cap construction. Site specific habitat layers have been incorporated into cap design/construction at the Onondaga Lake and Reynolds Metal Co. Superfund Sites. The proposed "habitat layer backfill" is not equivalent to a habitat layer that is integral to a cap design. The "habitat layer backfill" is solely for SAV bed reconstruction within the elevation restrictions set forth in the 2010 Critical Phase 2 Design Elements and is the same as the Phase 1 15% allocation backfill, but for the volume restriction.

<u>Mussel Beds</u>: The federal Trustees are concerned about the destruction of freshwater mussel beds in remediation areas, as mussels are one of the more threatened classes of organisms in North America. The number and biomass of Hudson River freshwater mussels will be reduced significantly during sediment removal. Subsequent capping and backfill have the potential to further degrade their habitat. Freshwater mussels are long-lived organisms that have a unique life history. Larvae of freshwater mussels (glochidia) utilize fish hosts that are specific to a given mussel species before settling onto substrate. Removal of large beds of mussels and increased spacing between remaining beds increases the time that is required for mussels to naturally recolonize dredged areas and may promote recolonization by non-indigenous mussels, reducing habitat value and contributing to increased natural resource injury. Mussels are considered keystone species in the environment because they support a number of ecosystem services, e.g., sediment stability,

nutrient cycling, increased biogenic structure, increased periphyton abundance, and increased abundance and richness of invertebrates. One solution to reducing the harm caused to mussels in the Upper Hudson from remedial actions is to collect a portion of the adults being removed, hold them in a hatchery until remediation is completed in that area of the river, and then transplant them into remediated areas. These mussels will provide the foundation for future generations. A field survey documenting the species inhabiting the Upper Hudson and the habitats where they are found would also inform the habitat reconstruction efforts.

Use of Upland Dredge Spoils: During Phase 1, GE argued that it could encounter issues with insufficient backfill quantities to meet contract specifications. Given that removal of contaminated sediments is very likely deeper than previously estimated and sufficient backfill will be required to restore SAV and RFW to design elevations in all certification units, the use of readily-available upland dredge spoils may become more advantageous during Phase 2 remediation. We would welcome further discussion with GE about this possibility.

Adaptive Management, Success Criteria, and Long-Term Monitoring

We are also concerned that the development of Phase 2 success criteria be completed prior to Phase 2 implementation to ensure that appropriate baseline data have been collected. Performance-based criteria should assess habitat replacement and reconstruction efforts and demonstrate the successful recovery of the structure, function, quality, sustainability, and resilience of all reconstructed habitats. Adaptive management should be based on an understanding of system functions using effective monitoring and models to adjust management approaches to improve outcomes (Williams et al. 2009) The Phase 2 Adaptive Management Plan should be flexible and responsive to anticipated and unanticipated problems. The plan should trigger implementation of timely and appropriate corrective actions that will set the reconstruction efforts for each of the four habitat types back on the recovery trajectory toward attainment of success.

Integrating sediment and habitat restoration with remediation would be the most efficient way of restoring resources to baseline conditions and reducing future injury, and would reduce costs and time to implementation. General Electric, in its 2001[1] comments to EPA on the Proposed Plan for the Hudson River PCB Site, expressed significant concern about the adverse consequences of remedy implementation on Hudson River habitats and the species they support, and submitted an assessment of EPA's Habitat Replacement Program and the probable effects of the in-river remedy on fish populations. These documents highlight General Electric's concern for environmental impacts to natural resources during remedy selection that should be reflected in its remedial design and remedial action phases of the Hudson River cleanup.

The federal Trustees urge reconsideration of the issues highlighted in our two prior letters to General Electric on the Phase 1 design and in this letter on the Phase 2 design. These

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[1] GE comment letter to EPA on the Proposed Plan is dated Dec 2000, but the referenced attachment is dated April 2001.

include maximizing the benefits of the habitat reconstruction component of the remedial design, incorporating primary restoration into the remedy, and strengthening the adaptive management and monitoring program to increase the likelihood of successful recovery. This can be achieved by modifying the Final Design to be more sensitive to the environment, more consistent with restoration principles, and more directed at maximizing restoration of the habitats harmed by the remedy and by residual PCBs.

Ultimately, a restored Hudson River benefits all including the natural resources that comprise this ecosystem, the economies that benefit from the services derived from the river and those that live and work along the shores and in neighboring communities and who have expressed their concern for the restoration of this historic and nationally important river.

We suggest that we use this opportunity to discuss these issues in a timely fashion. If you agree, please contact me (Tom Brosnan) at (301) 713-3038 ext.186 or Robert Foley at (413) 253-8732.

Sincerely,

Thomas Brosnan
Hudson River Trustee
National Oceanic and Atmospheric Administration

Robert Foley
Hudson River Case Manager
Department of the Interior

References

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