**By Electronic and Regular Mail**

September 28, 2015

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Subject: Comments on the Phase 2 Sediment Processing Facility Demobilization and Restoration Plan Hudson River PCBs Superfund Site, Revised September 2015

**Summary:** The Federal Hudson River Natural Resource Trustees recommend that EPA postpone action on the demobilization plan until a new Five-Year Review is conducted to ensure that the remedy is protective of human health and the environment. Recent analyses indicate that fish in the Lower Hudson River won't achieve EPA's protective goals until decades later than predicted in the 2002 ROD. This is because data collected after the 2002 ROD demonstrate that pre-remedial sediment concentrations in the Upper River were 2-3 times higher and decay rates were greatly overestimated relative to values generated by models used to support remedy selection. These result in 3-5 times higher estimates of post-remedy PCB sediment concentrations and Lower River fish that will remain unacceptably contaminated for decades longer. Upper river fish will also take much longer to achieve protective goals of the ROD.

On behalf of the Federal Natural Resource Trustees for the Hudson River, the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Fish and Wildlife Service (USFWS) are submitting comments on GE's Phase 2 Sediment Processing Facility Demobilization and Restoration Plan (Plan).

Under federal Superfund law, the General Electric Company (GE) is responsible for both the remediation -- cleanup -- of the PCB contamination, and the restoration of the natural resources harmed by PCBs. The State and Federal Hudson River Natural Resource Trustees are conducting a natural resource damage assessment (NRDA) and will seek to recover damages to restore the natural resources of the Hudson River on behalf of the public.

The Federal Trustees believe that action on the Plan should be postponed to allow EPA time to conduct a thorough review of new information to ensure that the Hudson River remedy protects human health and the environment consistent with EPA's Comprehensive Five Year Review Guidance (USEPA 2001). Although the next five-year review is not scheduled until 2017, USEPA (2001) states, "Five-year reviews may be conducted earlier or more frequently than every five years, if needed, to ensure the protection of human health and the environment."

The Federal Trustees' comments on the Plan reflect our overarching concern about the protectiveness of the remedy, the extended time it will take our trust resources to recover, as well as the impacts demobilization might have on restoration opportunities under the Hudson River natural resource damage assessment (NRDA). Our comments will first address the protectiveness issue followed by implications for the NRDA.

Protectiveness of the Remedy

Over 8,000 sediment cores were collected between 2002 and 2005 and analyzed as part of a systematic sampling program to support remedial design following issuance of the 2002 Record of Decision (EPA 2002). Between 2009 and 2015, NOAA conducted various analyses of the remedial design and fish baseline and remedial monitoring data. Below is a summary of those findings and other relevant information used to inform our conclusions that: 1) attainment of the Remedial Action Objectives (RAOs) for fish[1] in the Lower Hudson River will take in many instances decades longer than predicted; and 2) additional sediment removal of PCB-contaminated sediment in the Upper Hudson River is needed to achieve the reductions in Hudson River fish[2] predicted by the 2002 ROD.

- Surface sediment Tri+ PCBs are 2-3 times higher in pre-remediation sediment than original EPA mechanistic model predictions.[3]

- The exponential decay rate of Tri+ PCBs in surface sediment is much lower (mean of 1.3%, upper 95% Confidence Interval 2.6%) than the decay rate derived from EPA and GE models (~8%)[4] used to select the current remedy (See Attachment 1, Table 1)
    - Baseline PCBs loads from the Upper Hudson River to the Lower Hudson River measured prior to 2009 were 2.5-3 times higher than predicted by EPA's mechanistic models and showed little evidence of decline.[5]

[1] The RAOs address the protection of human health and the environment. One of the five RAOs established in the 2002 ROD for the Hudson River is *"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."*, where three thresholds and consumption quantities were specified as follows: 0.05 mg/kg PCBs in fish fillet consumption of one half-pound meal per week, 0.2 mg/kg PCBs in fish fillet, one half-pound meal per month, and 0.4 mg/kg PCBs in fish fillet, one half-pound meal every 2 months.
[2] *"…the Remediation Goal of 0.05 mg/kg also is expected to be attained in the majority of the Lower Hudson River, due to the lower initial concentration of Site-related PCBs in the Lower Hudson compared to the Upper Hudson."* (USEPA 2002, page 103).
[3] Field et al 2009, Field et al. 2015a. Note pre-remediation surface sediment Tri+ PCBs exceeded the upper bound of the original EPA model predictions in all river subsections.
[4] Field et al. 2015a
[5] USEPA 2010 pg I-52

- PCB concentrations measured in white perch as part of the monitoring program support the lower decay rate.[6]

- Tri+ PCBs will be 3-5 times higher in post-remediation sediment than the original EPA mechanistic model predicted.[7]

- The estimated time to achieve predicted 0.4 mg/kg PCB[8] and 0.2 mg/kg PCB thresholds in largemouth bass in the lower Hudson (e.g., Albany/Troy RM 152) is delayed to 52 and 76 years, respectively, assuming the updated sediment surface and a 3% decay rate, compared to EPA's original mechanistic model recovery with the original decay rate and sediment concentrations.[9] There will be also be substantial delays in achieving thresholds for other Lower Hudson River fish species and locations (see Attachment 1, Tables 2 and 3).

- Significant reduction in time to reach the 0.4 ppm PCB threshold for Lower Hudson River fish can be achieved through additional sediment removal. Reductions of approximately 20 years to reach 0.2 ppm PCB threshold for Lower Hudson River fish can also be achieved through additional sediment removal, but recovery is more protracted than original model estimates (see Attachment 1, Tables 2 and 3). Significant delays in attainment of Upper River fish thresholds are expected given the elevated concentrations of PCBs remaining, particularly in River Sections 2 and 3.

EPA's basis for remedial protectiveness is their original model output (EPA 2002) and subsequent predictions (EPA 2012). Their 2010 effort incorporated post-ROD updated sediment surface data (EPA 2012), but neither EPA assessment incorporated the updated lower sediment decay rate over the modeling period (Field et al. 2015a).

In the 2002 ROD, EPA stated:

> "All of the three active remediation alternatives, REM- 3/10/Select, CAP-3/10/Select, and REM-0/0/3, would be protective of human health and the environment as they permanently remove large volumes of PCBs from the river, which will result in significant reductions in risk from consumption of fish from the Hudson. REM-0/0/3 would provide the greatest degree of protectiveness, because it removes the largest volume of PCB-contaminated sediment and addresses the largest area. However, the predicted difference in fish tissue concentrations between REM-0/0/3 and REM-3/10/Select, and correspondingly, the difference in risk, is small. Therefore, the lesser cost associated with REM-3/10/Select makes REM-3/10/Select more cost effective." [10]

Using an updated decay rate of 3% improves the ability to discriminate between remedial alternatives and demonstrates substantial benefits in recovery of Lower River fish from additional

[6] Field et al. 2015c
[7] Field et al. 2009, Field et al. 2015a
[8] PCBs in fish 98-100% Tri+ PCBs (EPA 2002)
[9] Application of the 1.3% mean decay rate in the model emulation instead of the 3% decay rate (upper 95% confidence interval) would further increase the time until fish attain the respective RAO thresholds.
[10] ROD pg 102

removal of PCB contaminated sediment in the Upper Hudson (Field et al. 2015a) (see Attachment 1, Tables 2 and 3).

In addition, fish processing protocols did not adhere to the New York State standard fillet method. For several years, GE used a "rib out" instead of "rib in" fillet method to prepare fish tissue samples for contaminant analysis (USEPA 2015). A comparison study for black bass (GE 2014, 2015) demonstrates that wet weight and, to a lesser degree, lipid-normalized PCB concentrations in those fish were under-reported. For example, wet-weight PCBs were 75% lower in rib-out than in rib-in bass analyzed. (Davis 2015). The change in protocol requires a thorough analysis and report out of conclusions from that study, including suggested wet weight and lipid normalized correction factors for black bass. Verification of when the standard fillet protocol was dropped and the alternative protocol was substituted is also needed. Comparison studies between rib-in and rib-out fillet method in brown bullhead, yellow perch, white perch and striped bass are also necessary to understand the impacts the change in the processing protocol had on wet weight and lipid normalized PCBs for these four species, which are analyzed as part of the baseline monitoring and remedial action monitoring program to determine remedy effectiveness.

This information is critical for updating Tables 3 and 4 (wet and lipid normalized fish PCBs) of the First Five Year Review (EPA 2012) and for EPA to reassess remedial protectiveness. On the basis of new information about the higher pre-remedial concentrations, decreased rate of natural recovery in Hudson River sediments, measured concentrations of PCBs in white perch supporting the lower decay rate, decades of delay in achieving RAO fish objectives, and the issues surrounding changes in fish filleting protocol, the Federal Trustees believe such a review is justified, and that until it is completed, any action on the Plan must be put on hold.

Implications of the Plan for the NRDA

Demobilization of the Facility also has potential implications for the Hudson River NRDA. GE's PCBs have caused injury to the Hudson River. Injuries to the public's natural resources extend for over 200 miles (from the Hudson Falls plant site to the Battery in New York City and beyond), have occurred for decades, and will continue for decades after the cleanup is completed. The Trustees seek to recover damages to restore the natural resources of the Hudson River injured by PCBs. Feasibility, cost and efficacy are among the considerations of the Trustees in evaluating and selecting restoration alternatives. Demobilizing the Facility could have a potential adverse impact on the Trustees' restoration options, particularly restoration dredging and navigational dredging, if the existing facility would no longer be in service for such work.

The Trustees seek a timely resolution with GE to restore natural resources harmed by GE's PCBs. Now is the time for GE to thoroughly address their PCB contamination of the Hudson River.

Companies across the nation have responsibly addressed the need to restore natural resources harmed by their contamination. Some companies clean up contamination and address restoration through the NRDA process simultaneously, saving money and time, reducing public losses and future harm to the environment. The Federal Trustees recognize that procedurally the demobilization of the Phase 2 sediment processing facility is defined by a consent decree between EPA and GE. However, GE and EPA could suspend the demobilization process and GE could

begin, at this time, additional restoration and navigational dredging to accelerate the environmental and economic recovery of the Hudson River.

Sincerely,

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Attachment 1

Table 1. Empirical Estimate of Natural Recovery Rate of Surface Sediment PCBs

| | Average Tri+ PCB (mg/kg) in Surface Sediment | | |
|---|---|---|---|
| Model Subsection | Cohesive Sediment 1991[1] | Remedial Design Sediment Data 2002-2005[2] (sample size) | Exponential Decay Rate (%) |
| 1 | 20 | 16.9 (3414) | 1.4 |
| 2 | 18 | 14.7 (1540) | 1.7 |
| 3A | 4.3 | 3.4 (2129) | 2.0 |
| 3B | 5.7 | 5.6 (685) | 0.1 |
| Mean | | | 1.3 |
| 95% CI | | | -0.1 to 2.6 |

[1] O'Brien and Gere Engineers, Inc. 1993
[2] Includes cohesive and non-cohesive sediments in River Section 1 and cohesive only in River Sections 2 and 3. Data collected 2002-2005, considered to represent concentrations in 2003.

Table adapted from Field et al. 2015a

Table 2. Estimated number of years to reach human health risk based threshold of 0.4 ppm PCB by fish species at Albany/Troy (River Mile 152)

| | Years to 0.4 ppm PCB Threshold | | |
|---|---|---|---|
| Fish Species | EPA Original Model* | NOAA 2015 Emulation Model** | NOAA 2015 Emulation Model** REM3/3/3*** |
| White Perch | 0 | 44 | 11 |
| Largemouth Bass | 1 | 52 | 17 |
| Brown Bullhead | 0 | 21 | 5 |
| Yellow Perch | 0 | 16 | 2 |

* Selected remedy REM3/10/S with 8% decay rate, original pre-ROD sediment surface

** Selected remedy REM3/10/S with 3% decay rate, and sediment surface updated with 2002-2005 remedial design core data

*** REM3/3/3: Alternative remedial scenario evaluated with emulated model. Assumes River Section 1 cleanup triggers for surface sediment (10 ppm Tri+ PCBs) and mass (3 $g/m^2$ mass) applied to River Sections 2 and 3

Field, Kern and Rosman 2015b. unpublished analyses

Table 3. Estimated number of years to reach human health risk based threshold of 0.2 ppm PCB by fish species at Albany/Troy (River Mile 152)

| | Years to 0.2 ppm PCB Threshold | | |
|---|---|---|---|
| Fish Species | EPA Original Model* | NOAA 2015 Emulation Model** | NOAA 2015 Emulation Model** REM3/3/3*** |
| White Perch | 5 | 67 | 46 |
| Largemouth Bass | 8 | 76 | 54 |
| Brown Bullhead | 1 | 54 | 18 |
| Yellow Perch | 0 | 48 | 14 |

* Selected remedy REM3/10/S with 8% decay rate, original pre-ROD sediment surface

** Selected remedy REM3/10/S with 3% decay rate and sediment surface updated with 2002-2005 remedial design core data

*** REM3/3/3: Alternative remedial scenario evaluated with emulated model. Assumes River Section 1 cleanup triggers for surface sediment (10 ppm Tri+ PCBs) and mass (3 $g/m^2$ mass) applied to River Sections 2 and 3

Field, Kern and Rosman 2015b unpublished analyses

References

Davis, J 2015. Personal communication, NYS Department of Law, comments during Hudson River Community Advisory Group meeting, Schuylerville, NY, August 20, 2015, as reported by Moore, K 2015 In Official: GE incorrectly sampled PCB-laden fish for a decade. Glens Falls Post Star, August 20, 2015, http://poststar.com/news/local/epa-ge-incorrectly-sampled-pcb-laden-fish-for-a-decade/article_43a5712b-83d3-56ad-ae0d-f74887e51aff.html

Field, J, J Kern and L Rosman 2009. Evaluation of Natural Recovery Models for Sediment in the Upper Hudson River. Poster Presentation, Battelle Contaminated Sediment Conference, February 2-5 2009, Jacksonville, FL, https://casedocuments.darrp.noaa.gov/northeast/hudson/pdf/Battelle09_Field_NatRecovery_508.pdf

Field, J, J Kern and L Rosman 2015a. Re-Visiting Model Projections of Lower Hudson River Fish PCBs Using Model Emulation and Recent Data, Hudson River Foundation Seminar, May 19, 2015, New York City. https://casedocuments.darrp.noaa.gov/northeast/hudson/pdf/HRF2015_MAY19_LHR_Fish_DIST.pdf

Field, Kern and Rosman 2015b unpublished analyses

Field et al. 2015c. Revisiting Model Projections of Lower Hudson River Fish PCBs, Jay Field and John Kern presentation to the Contaminated Sediment Forum, August 20, 2015. https://casedocuments.darrp.noaa.gov/northeast/hudson/pdf/CSF2015_AUG20_LHR_Fish_final_dist.pdf

GE 2014. Letter from Adam Ayers (GE) to Gary Klawinski (USEPA), RE; Hudson River PCBs Superfund Site – Consent Decree (Civil Action No. 1:05-CV-1270) – Remedial Action Monitoring Program, Fish Fillet Special Study, April 23, 2014.

GE 2015. 2014 Data Summary Report, Hudson River PCBs Superfund Site, Prepared for the General Electric Company, Albany, New York, Prepared by Anchor QEA in conjunction with Environmental Standards, Inc., March 2015.

O'Brien and Gere Engineers, Inc. 1993. 1991 Data Summary Report, Hudson River Project Sediment Sampling and Analysis Program. Prepared for General Electric Company Corporate Environmental Programs. 1993. O'Brien and Gere Engineers, Inc., Syracuse, New York.

USEPA 2001. Comprehensive Five-Year Review Guidance, Office of Emergency and Remedial Response, EPA 540-R-01-007, OSWER No. 9355.7-03B-P, June 2001, http://www.epa.gov/oerrpage/superfund/accomp/5year/guidance.pdf

USEPA 2002. Hudson River PCBs Site New York Record of Decision, December 2002, http://www.epa.gov/hudson/RecordofDecision-text.pdf

USEPA 2010. Hudson River PCBs Site EPA Phase 1 Evaluation Report , Prepared for: US Environmental Protection Agency, Region 2 and US Army Corps of Engineers, Kansas City

District, Prepared by: The Louis Berger Group, Inc., March 2010, http://www.epa.gov/hudson/pdf/2010-03-15_Phase_1_Evaluation_Report_Text.pdf

USEPA 2012. First Five-Year Review Report for Hudson River PCBs Superfund Site, US. EPA Region 2, New York, NY, June 1, 2012, http://www.epa.gov/hudson/pdf/Hudson-River-FYR-6-2012.pdf

USEPA 2015. Letter from Judith Enck (Regional 2 Regional Administrator) to Ned Sullivan (President, Scenic Hudson), September 10, 2015