

**Hudson River PCBs Superfund Site**  
**Administrative Settlement Agreement and Order**  
**on Consent for Testing/Investigation**  
**Lower Hudson River**  
**Index Number CERCLA-02-2022-2011**

**Appendix B**

**Statement of Work**

**September 2022**

## 1. Background

### 1.1 Introduction

The Hudson River PCBs Superfund Site (Site) includes a nearly 200 river-mile stretch of the Hudson River primarily in eastern New York State. An approximately 20-mile portion of the Site at the southern end is also partly located in New Jersey. The Site encompasses approximately the lower two thirds of the generally southerly flowing Hudson River, from the Village of Hudson Falls (Washington County) in the north to the Battery in New York City (New York County) in the south. The Site has traditionally been divided into Upper Hudson River (Upper River) and Lower Hudson River (Lower River) segments based on physical characteristics. Reference is also made to a Mid-Hudson River segment (Troy to just south of Poughkeepsie) in a number of Site reports. This Statement of Work (SOW) is Attachment B to the Administrative Settlement Agreement and Order on Consent for Testing/Investigation, Index Number CERCLA-02-2022-2011 (Agreement). The focus of this SOW is the Lower River, which includes the Mid-Hudson River segment and extends from the Federal Dam in Troy to the southern tip of Manhattan at the Battery in New York City.

Prior to 1977, the General Electric Company (GE) Hudson Falls and Fort Edward plants used PCBs in the manufacturing of transformers for over three decades. PCBs accumulated on-Site and entered the river, accumulating behind the Fort Edward Dam (Dam). PCBs were also released downstream over the Dam when it was removed in 1973. Sediments that accumulated behind the Dam moved into the Lower River. In addition, sources other than GE contributed PCBs to the Lower Hudson River.

In 1984, the U.S. Environmental Protection Agency (EPA) issued a Record of Decision (ROD) for the Site, which included a selection of No Action for the in-river sediments. In 2000, a Reassessment Remedial Investigation and Feasibility Study (RI/FS) identified unacceptable risk to human and ecological health in the Upper and Lower (Mid-Hudson) River. In 2002, a second ROD (2002 ROD) was issued, selecting a dredging and subsequent natural recovery remedy for the Upper River. Pursuant to a Consent Decree with EPA (2005 Consent Decree), GE performed the dredging work. Following the completion of that dredging, the amount of PCBs that continue to transport downstream from the Upper Hudson River to the Lower Hudson River has been substantially reduced. Nonetheless, elevated PCB levels in fish are still present throughout the Site, and consumption advisories, as identified by the New York State Department of Health, remain in place throughout the Upper and Lower River.

The Lower River has been designated as Operable Unit (OU) 5 of the Site. To date, the evaluation of the Lower River has been limited. Under the 2005 Consent Decree, monitoring was and continues to be conducted in the Lower River as it relates to assessing the effectiveness and recovery of the Upper River remedy described in the 2002 ROD.

Based on the limited data available in the Lower River, it appears that fish in the Lower River are not recovering as rapidly as fish in the Upper Hudson River with respect to PCB concentrations in tissue, and this is particularly true in the southern portion of the

Lower River. Therefore, the additional testing and investigations described below are necessary to better understand and evaluate conditions in the Lower River.

## **1.2 Purpose of the Lower River Supplemental Studies**

The supplemental studies described in this SOW will involve sampling and investigation of water column, sediment, and fish in support of EPA's decision making and planning next steps to evaluate PCB contamination in the Lower River. The supplemental studies work in this SOW will be conducted using a phased approach to allow for adjustments to the SOW necessary to collect the appropriate data needed to meet project objectives and to overcome any challenges associated with water, sediment and fish collection and analysis.

Once the sampling described in this SOW has been completed and evaluated, EPA and GE will discuss whether any additional data need to be collected to support the objectives and purpose of the sampling work as described in this SOW. Pursuant to Paragraph 113 of the Agreement, EPA may modify this SOW or the Sampling and Analysis Plan (SAP) submitted hereunder so long as the modification does not materially expand the scope of activities specified herein. However, if both parties agree, additional data collection not consistent with the scope of the work described in this SOW may be conducted by GE. If such agreement is reached, GE will submit work plans for the collection of the additional data for EPA approval.

EPA does not anticipate that the iterative, data-driven multi-phase approach in the SOW will result in any material expansion of the work, in part because the SOW requires consultation and collaboration after each phase of the work. If EPA proposes a modification to the SOW or SAP that EPA believes is consistent with the nature of the work described in this SOW and does not materially expand the scope of this SOW, and GE does not agree to conduct such work, the matter will be governed by Section XV (Dispute Resolution) in the Agreement.

## **2. Testing**

### **2.1 Water Column Testing**

Water column samples will be collected monthly for PCB analysis and other field parameters at five (5) locations throughout the Lower River. Water sampling will begin once the SAP is approved by EPA and the areas are accessible. Based on data review, EPA (after consultation with NYSDEC) and GE may adjust the approach to sample collection, analysis, frequency, or locations of the water sampling programs. For the purpose of this agreement, sampling shall be conducted at the stations and frequencies specified for one full year, subject to weather constraints. At the end of the first full year, GE shall review the data collected under this program and propose an approach (including frequency and locations) for additional water column sampling. EPA will review the proposed approach (including as it relates to the project objectives) and, in accordance with Section 1.2, discuss with GE the scope of such additional sampling. It should be noted that, given the presence of PCBs in the water column, some degree

of Lower River monitoring will be needed for the foreseeable future and will be conducted under GE's Long-Term Operation, Maintenance, and Monitoring Plan for Water, Fish, and Sediment, submitted in February 2022, or, to the extent that GE agrees, under the present Agreement.

### **Data Quality Objectives**

Supplemental studies water column collection will evaluate spatial and temporal conditions for PCBs and additional water quality parameters throughout the Lower River. Water column data will also be used to inform EPA's understanding of the relationship between water, fish, and sediment.

Water column data will be collected on a monthly basis at 5 locations, targeting 3 freshwater and 2 brackish or saline areas. Water sampling locations include Albany/Troy, Catskill, Poughkeepsie, Newburgh, and Tappan Zee. Samples at freshwater locations (Albany/Troy, Catskill, and Poughkeepsie) will be collected as composite samples at various depths from the middle of the river channel. Samples at brackish water locations (Newburgh and Tappan Zee) will be collected as discrete samples near the surface and river-bottom. The specific location of sampling in the vicinity of Tappan Zee will be determined during further discussions between EPA and GE. In addition, water sampling at the southern end of the Site may be needed to better understand conditions in this area, including tidal flow upstream in the Lower River. EPA and GE will discuss the appropriate scope of sampling in this area once one year of water data have been collected (as described in this section). Those data and other research will inform the scope of future sampling in this area. Scope decisions between EPA and GE regarding that sampling will be made in accordance with Section 1.2.

In general, water column locations should be proximate to corresponding fish and sediment sampling locations. Additionally, water collection locations should consider the effects of tributaries and changes across the salinity gradient. Water samples will be analyzed for Total Suspended Solids (TSS), Particulate Organic Matter (POC) (if commercially available), Dissolved Organic Matter (DOC) and PCBs via Congener Method 1668. Other field parameters such as salinity, temperature, conductivity and pH will also be measured. GPS coordinates will also be recorded at each sample location.

## **2.2 Fish Testing**

Fish collection will begin after approval of the SAP. Fish samples will initially be collected at five locations, identified below as primary locations, distributed approximately 30 miles apart throughout the length of the Lower River. In the following year, EPA and GE will review the results from the sampling of forage fish and pumpkinseed at the primary stations and will consider the need for collection of such fish at some or all of the secondary locations identified below; and in accordance with Section 1.2, if additional sampling is needed, fish samples will be collected at those secondary locations. The primary and secondary fish collection locations listed below are considered approximate and may need to be adjusted based on the number and availability of the targeted species. The five primary locations below include a list

of various species representing the area. The secondary locations, if sampled, are intended to provide more spatial resolution to the program and focus on species with small local home range. The secondary locations may be used as alternate locations for the sport fish collection in the event that finding or collecting sufficient numbers of sport fish at the primary locations is not feasible. The following are the fish collection locations planned (upstream to downstream):

Albany/Troy (RM 152): Primary location - Freshwater - Striped bass, pumpkinseed, black bass, forage fish (spottail shiner), channel catfish, perch, carp

Coeymans (RM131): Secondary location - Freshwater - Pumpkinseed

Catskill (RM 113): Primary location - Freshwater - Striped bass, pumpkinseed, black bass, forage fish (spottail shiner), channel catfish, bullhead, perch, hogchoker or carp\*

Red Hook (RM 98): Secondary location - Fresh/brackish water - Pumpkinseed

Poughkeepsie (RM 75): Primary location - Fresh/brackish water - Striped bass, pumpkinseed, black bass, forage fish (spottail shiner), channel catfish, bullhead, perch, bluefish, hogchoker or carp

Newburg (RM 60): Secondary location - Fresh/brackish water – Local forage fish species (TBD)

Hudson Highlands (RM 45): Secondary location - Fresh/brackish water – Local forage fish species (TBD)

Haverstraw/Tappan Zee/Piermont (RM 32-27): Primary location - Fresh/brackish water - Striped bass, channel catfish, perch, bluefish, blue crab, hogchoker or carp, American eel, forage fish (silverside)

George Washington Bridge (RM 11): Primary location – Saline water - Striped bass, channel catfish, perch, bluefish, blue crab, hogchoker, forage fish (silverside)

New York Harbor (RM 5): Secondary location - Saline water – Local species (TBD) including forage fish (silverside)

Fish collection locations will be selected based on existing data such as anticipated species range, salinity conditions, submerged aquatic vegetation, sediment environment, angling reports, and historic fish sampling. For certain species such as bass and catfish, it is anticipated that subspecies will not be mixed at a given location (i.e., all largemouth or all smallmouth bass should be collected at a location for the sample round).

### **Data Quality Objectives**

The Lower River fish sampling program should provide sufficient spatial resolution to assess the condition of PCB contamination among various fish species in the Lower River.

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\*At primary locations where hogchoker or carp is listed, one or the other of those species will be collected, but not both. It is intended that hogchoker will be collected where it is present.

The fish sampling program should provide sufficient data across the main ecological segments of the Lower River, spanning the full spatial extent as well as various turbidity and salinity conditions that occur throughout the estuary. The fish data will be used to gain a better understating of human and ecological risk associated with fish consumption in the Lower River portion of the Site.

### **Sampling Methodology**

Electroshocking will be used at the freshwater locations where appropriate. For the brackish and saline locations (where electrofishing is not viable), a combination of angling, net fishing, seining net, or other appropriate methods will be used. The approach for collection in the brackish and saline portion of the Lower River will need to be coordinated with EPA in consultation with NYSDEC. EPA anticipates that NYSDEC's prior experience with fish collection in the Lower River will be shared with EPA and GE for this project. Due to seasonal fish migration patterns, availability of certain species at certain times of the year may be limited. Therefore, certain collection efforts may need to be done at another time of year other than spring (summer or fall). EPA (in consultation with NYSDEC) and GE will coordinate on the timing of the fish collections.

Collected fish samples will be sent to a laboratory, where large predatory fish species (black bass, striped bass, bullhead, perch, catfish, carp, eel etc.) will be scaled and filleted bone-in according to NYSDEC methodology (including the NYSDEC standard fillet) and homogenized prior to analysis. Individual whole-body samples will be analyzed for pumpkinseed and bluefish. Hogchoker will be analyzed as whole-body samples (as appropriate given size). Forage fish will be analyzed as whole-body composites. Blue crabs will be de-shelled and have legs and thoracic muscles, as well as hepatopancreas, removed for lab processing, consistent with NYSDEC methodology. All fish will be prepared for analysis following NYSDEC protocol.

Collected samples will be analyzed via Aroclor evaluation Method 8082A, assigning 5% of samples for additional matched-pair analysis via Congener Method 1668. GE will coordinate with EPA on the selection of the 5% of fish that will also be analyzed by Method 1668. The target goal will be to collect ten (10) fish per species per location, except for those target collection counts associated with the existing monitoring program.

Fish samples may be selected for additional analytes. Future analysis will be determined by EPA (in consultation with NYSDEC) and discussed with GE; and if EPA and GE agree, such additional analysis may be conducted under the present Agreement and this SOW. GPS coordinates will be recorded for each fish collected. Samples will be frozen and archived for potential future analysis.

### **2.3 Beryllium-7 Bearing Sediment Testing**

Beryllium-7 (Be-7) bearing samples will be collected in 2023 or such other time as is agreed to between GE and EPA. Be-7 surface sediment sampling will be implemented to evaluate concentrations of PCBs in recent active transported and deposited sediments throughout the Lower River.

### **Data Quality Objectives**

Data collected from the Be-7 bearing program will be used to evaluate spatial variation of PCB concentrations in recently suspended and actively depositing sediment in the Lower River, in its main stem, as well as from its main tributaries.

Be-7 sediments will be used to evaluate near surface sediment recovery, by comparing results to the 1992 Be-7 sediment data collected from EPA high-resolution core top sections.

EPA's and GE's experience with Be-7 sampling in the Upper Hudson River in 2021 will be considered in this sampling effort.

### **Sampling Methodology**

GE will collect sediment samples to be analyzed for Be-7 from 150 locations in the main stem of the river and 100 locations in the 12 major tributaries of the Lower River, with the locations to be determined through discussions between GE and EPA. It is anticipated that, of these locations, approximately 30 to 50 locations in the main section of the Lower River and at least three locations in each of the 12 main tributaries (for a total of about 36 locations) will successfully yield Be-7-bearing sediments. Samples will be collected to a depth of 2 centimeters (cm) using an Ekman dredge sampling device. GPS coordinates will be recorded for each sediment sample collected.

Sampling target polygons will be generated using GIS, combining sediment thickness, sediment type/environment, and bathymetric data. The polygons will assist in siting the locations. Previous successful sample areas will inform future sampling.

Be-7 samples that are identified as recently deposited sediment will be analyzed for PCBs, which will be via Congener Method 1668.

## **2.4 Supplemental Sediment Testing**

It is anticipated that the exploratory sediment program will be implemented following the fish, water column, and Be-7 sediment programs. Sediment samples will be collected in the main section of the Lower River to evaluate spatial variation of PCB concentrations throughout the Lower River. These data are expected to provide information about the relationship among fish, water and sediment in the Lower River.

### **Data Quality Objectives**

Supplemental sediment samples will examine local and river-wide spatial variations of PCBs in the Lower River upper sediments. These sediment samples will be collected in the general area of fish collection locations to support EPA's understanding of the relationship between fish and sediment with respect to PCB concentrations.

### **Sampling Methodology**

Ten sampling grids of approximately 20 cores (200 total cores) will be distributed along the main section of the Lower River, with similar spacing to the primary and secondary fish collection locations (approximately every 15-20 miles). The spatial dimensions of

grids will be adjusted so that they are comparable to fish sampling areas, to the extent possible.

The supplemental sediment program will provide information about the spatial variability of PCBs in Lower River sediments. Data collected from this program will focus on establishing the relationship among PCBs in sediment, water and fish in the Lower River. These sediments will target a variety of sediment environments that could affect PCB exposures in fish.

Cores will be collected to a depth of up to three feet where achievable. The top 0-6 inches will be analyzed separately for PCBs via Congener Method 1668. The 6- to 12-inch segments and the bottom 2-foot sections will be archived for potential future analysis. At a minimum, the top 6 inches of sediment must be sampled at each location for the core to be successful. Other information such GPS coordinates, rate of recovery and approach for adjusting location if core collection is not successful will need to be established consistent with other past project coring work in the Hudson River. Future analysis will be determined by EPA (in consultation with NYSDEC) and discussed with GE. If EPA and GE agree, additional sample analysis may be conducted under the present Agreement and SOW.

## **2.5 High-Resolution Sediment Coring Program**

The high-resolution sediment coring program will be initiated in 2023 (once data are available from the other coring programs described above) and will provide data necessary to further evaluate the history of PCB sediment deposition in the Lower River. The sediment deposition period since 1992 will be of particular interest, representing the time elapsed between the previous high-resolution core program and the current conditions.

### **Data Quality Objectives**

The high-resolution coring program associated with these Supplemental Studies will provide data to evaluate the trend in recovery of the Lower River sediment over time with respect to PCBs. The spatial variation of PCB concentrations and recovery rates will be evaluated as part of this program.

### **Sampling Methodology**

Six locations will be initially targeted. The total number of cores needed will be informed by this initial effort. These locations will be spread out through the Lower River. It is anticipated that four of the six cores will be collected at the four successful 1992 core locations where dateable cores were previously obtained, one will be collected at a location that yielded a dateable core in pre-1992 studies, and one will be collected at an additional location to be agreed upon by EPA and GE. Once the data have been evaluated from the initial six locations, EPA will evaluate (in consultation with NYSDEC) in discussions with GE whether additional cores are needed. Decisions between EPA and GE related to the scope of this work regarding the collection of additional cores will be in accordance with Section 1.2.

High-resolution core target locations will be based on successful Be-7 collection sites and previous/historical data. GE will submit the proposed locations of the six initial cores to EPA for approval. It should be assumed that approximately one-third of the planned/attempted sampling locations will produce dateable cores.

Sediment cores will be collected by Vibracore, or by weight-driven direct push methods where feasible. Cores will be driven to a nominal depth of 4 to 8 feet. PCBs will be analyzed along the length of the core in 2 cm segments in the top foot and at approximate 4 cm segments for the rest of the core. PCB analyses will be conducted using Congener Method 1668. A combination of lead-210 and Cesium-137 radionuclide analyses will be used to assign dates to sediment horizons. EPA and GE will discuss the need for analysis of metals and Thorium-237 to provide further lines of evidence regarding the dating. Specific attention will be paid to the 1992-to-present time interval in order to evaluate PCB recovery over that period. These horizons are expected to be encountered in the first three feet of sediment, although actual depths can vary based on sediment deposition and erosion rates over time. The bottom segments of the sediment cores from prior to 1992 may be frozen (or potentially dried) and archived for potential later analysis. EPA and GE will discuss the need for PCB analysis of archived samples once the other sample results have been evaluated. EPA in coordination with GE will use a stepwise process to determine which samples require laboratory PCB analysis with the goal to focus the analysis on samples that are yielding a supportable pattern for dating. Further discussion is needed between EPA and GE regarding the specific details of the archiving approach and method for these samples.

### **3. Reporting**

GE will provide the data from the water column, sediment, and fish programs to EPA in monthly progress reports per Paragraph 40 of the Agreement and monthly database updates, or separately at different applicable timeframes agreed upon by GE and EPA. Data should be kept and submitted separately from any programs associated with the Upper River monitoring programs.

### **4. Other Considerations**

Previous studies have indicated that certain Lower River sediment PCB patterns are attributed to GE releases at least as far south as RM 50 (south of Poughkeepsie). Limited data exist on the extent of GE's PCBs in the Lower River. This SOW focuses on PCBs believed to be from the GE facilities in Fort Edwards and Hudson Falls. Sampling data collected pursuant to this SOW and the Agreement may identify other contaminants of concern including PCBs linked to other parties. It is anticipated that GE-related contamination may be proximate to other contaminants of concern (including PCBs from other sources). In addition, if, during sampling, contaminants other than PCBs are suspected based on observation, odor, known/suspected releases, etc., GE will notify EPA, and EPA will assess the need for additional analysis on the samples collected. It is anticipated that analysis for constituents other than PCBs will be conducted under the present terms of this Agreement if agreed upon by EPA and GE. EPA and GE plan to discuss this matter further.

The disposition of samples will be conducted consistent with the sample disposition provisions included in GE's Long-Term Operation, Maintenance, and Monitoring Plan for Water, Fish,

and Sediment, submitted in February 2022. That plan includes requirements for the length of time for holding samples. Before fish or sediment samples are disposed of by GE, the Natural Resource Trustees (including NYSDEC) shall be given an opportunity to take possession of the samples.

GE will submit the SAP for the sampling described in Sections 2.1, 2.2, and 2.3 within 60 calendar days of the Effective Date of the Agreement. GE will submit the other components of the SAP as addenda for the remaining work within 180 days of EPA approval of the initial SAP or as otherwise agreed to by EPA and GE.

Proposed modification or additions to this SOW will be presented to EPA in the form of a letter. Once approved, the changes/additions will be detailed in an addendum to the SAP.