



Technical Assistance Services *for Communities* Hudson River PCBs Floodplain Work Plan Technical Comments

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Site Name: Hudson River PCBs Superfund Site
Site Location: Near Fort Edward, New York
Date: October 1, 2015

Section 1: Introduction

The Hudson River PCBs Superfund Site Community Advisory Group (CAG) requested a review of the Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Upper Hudson River Floodplain by the U.S. Environmental Protection Agency's (EPA's) Technical Assistance Services for Communities (TASC) program. TASC has provided this summary and technical comments to the CAG. Independent technical and environmental consultants implement the TASC program. The summary's contents do not necessarily reflect the policies, actions or positions of EPA.

The summary is organized into four sections:

1. Introduction
2. Background
3. General TASC Comments
4. Section-by-Section Summary

TASC comments are embedded throughout the document so that readers can understand the context for the comments.

Section 2: Background¹

Between 1947 and 1977, an estimated 1.3 million pounds of PCBs entered the Hudson River from two General Electric (GE) capacitor manufacturing plants in Fort Edward and Hudson Falls, New York. The PCB contamination led to EPA listing 200 miles of the Hudson River on

¹ From EPA information resources, available online at <http://www.epa.gov/udson/plans.html>.

the Superfund program's National Priorities List in 1984. Fish consumption advisories, which affect both commercial and recreational fishing, were also put in place. Elevated levels of PCBs have been found in wildlife, including birds that live along the river's shoreline.

The 2015 season marks the sixth year of dredging; it is expected to be the last. About 250,000 cubic yards of contaminated sediment is targeted for removal in 2015. As part of the Hudson River cleanup, the floodplains (low-lying shoreline areas) of the Upper Hudson River are also being evaluated for the presence of PCBs. In October 2014, EPA announced that GE has agreed to conduct a comprehensive study (remedial investigation/feasibility study) of PCB contamination in the floodplains. Under the agreement, GE will investigate PCB contamination in a 40-mile stretch of the Hudson River floodplain from Hudson Falls to Troy, New York. The study will include an evaluation of human and ecological risks and potential long-term cleanup solutions.

Since 2000, EPA, the National Oceanic and Atmospheric Administration (NOAA), and GE have collected over 7,000 soil samples from more than 500 properties. GE also has installed soil or stone covers to prevent exposure to PCBs and/or installed warning signs on several properties under a 2008 legal agreement with EPA. These measures are temporary, pending completion of the comprehensive study and selection of a final cleanup plan for the floodplains. EPA will decide on the final cleanup plan with input from the public.

Section 3: General TASC Comments

Overall, the Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Upper Hudson River Floodplain is consistent with similar work plans at other Superfund sites. There is quite a lot of flexibility in the work plan, which will affect the selection of areas to be cleaned up and PCB levels to remain in floodplain soils and sediments. These pending decisions will be reported in draft and final work products associated with the RI/FS.

TASC Comment

The CAG may want to consider scheduling periodic reviews of pending decisions with EPA. This will allow the CAG to provide input to EPA before final RI decision making. It will also keep CAG members up to date on decisions made during the execution of the work plan.

Key Terms

Polychlorinated biphenyls (PCBs): a group of man-made organic chemicals. PCBs were domestically manufactured from 1929 to 1979, when they were banned. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids.

Flood Frequency Unit (FFU): term used to describe the division of property into areas representing the finest resolution of PCB concentrations in the floodplain.

Exposure Area (EA): area within which an exposed person may reasonably be assumed to move at random and be equally exposed to the soil in each part of that area.

Exposure Point Concentration (EPC): contaminant concentration in soil or sediment in the EA used for risk calculations. The EPC may be a maximum detected value or a calculated "average" value.

The work plan indicates that an initial screening-level analysis of tax parcels in the affected area will determine if tax parcels are further evaluated or excluded from the floodplain cleanup. This initial screening is appropriately conservative to protect human health. The maximum detected PCBs concentration found within any flood frequency unit (FFU) that extends onto a tax parcel will be screened against EPA's regional screening level for PCBs in residential soils. Regional screening levels are chemical-specific concentrations for individual contaminants in air, drinking water and soil that may warrant further investigation or cleanup. Screening levels are not cleanup standards.

Following the screening-level analysis, a data gap analysis will be completed and additional data collected, if needed.

For tax parcels retained for further evaluation in a Phase 1 human health risk assessment, current and future use will be key inputs for the assessment. Possible land use scenarios are residential, recreational, agricultural and commercial/industrial uses. School properties will be assigned to the residential category for Phase 1 if the areas in the floodplain are maintained areas of the school yard or associated playing fields. If the area in the floodplain is an area that is unlikely to be used regularly by students, it will be evaluated as a recreational EA for Phase 1.

TASC Comment

Community members and property owners may want to proactively provide input to EPA regarding current and future uses for any particular tax parcels of concern.

The Phase 1 human health risk assessment will rely on existing data. Tax parcels may be evaluated based on areas with different types of land uses. For example, a garden area and a wooded area within a tax parcel would have different exposure risks. Tax parcels will either be retained for a Phase 2 risk assessment or excluded from the floodplain cleanup. Risk criteria for excluding a tax parcel will be a one in a million extra risk of cancer in a lifetime and a noncancer hazard index (HI) of 1. A noncancer HI of 1 means no expectation of adverse health effects. Properties that meet these criteria are available for unlimited use and unrestricted exposure (UU/UE).

For tax parcels retained for further evaluation in a Phase 2 human health risk assessment, a second data gap analysis will follow; additional data may be collected. Use of floodplain areas within each tax parcel will be further scrutinized. Specific exposure factors will be developed for each tax parcel used for schools or agricultural purposes.

The work plan states that estimated potential risks from the Phase 2 assessment for each of the areas retained and evaluated will be compared with a cancer risk range of one in a million to one in ten thousand and a noncancer HI of 1.

TASC Comment

Community members and property owners may want to provide input to EPA on the level of cancer risk acceptable to them for specific tax parcels or for different types of property. A cancer risk goal of one in a million is typical for residential property. Cancer risk for other types of properties tends to vary within EPA's acceptable range of one in a million to one in ten thousand.

The CAG may want to ask EPA if deed restrictions will be placed on any properties cleaned up to levels that are not protective for unrestricted use.

Section 4: Section-by-Section Summary

1. Introduction

This section of the Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Upper Hudson River Floodplain covers the purpose and objectives of the work plan, defines the study area, explains that the floodplain RI/FS focuses solely on PCBs because the floodplain is affected by river sediments contaminated with PCBs, and explains the work plan's organization.

A substantial amount of work in the floodplain of the Upper Hudson River has already taken place, including prior investigations by NOAA, EPA, New York State and GE. The RI/FS described in the work plan will build on that prior work.

The study area for the floodplain RI/FS includes areas where flooding events could have transported PCBs within the boundaries and areas below:

- Northern boundary – the pool at the base of Bakers Falls (at approximate River Mile [RM] 197.0).
- Southern boundary – the Federal Dam at Troy (at approximate RM 153.9).
- Outer boundaries (eastern and western) – the 100-year floodplain as mapped by the Federal Emergency Management Agency or the extent of the highest-flow event in 2011 as mapped by GE, whichever extends further from the river.
- Inner boundary – the elevation along the river at lower river flows of about 2,000 cubic feet per second (CFS) that typically occur during the summer. [*Note: near-shore sediments (areas between the waterline when the river is flowing high at 5,000 gallons per second and when it is flowing low at about 2,000 gallons per second) are considered a separate sub-area of the floodplain. This sub-area will be evaluated separately from the remainder of the floodplain. Near-shore sediment areas are temporarily exposed during lower river flows and could present potential points of exposure for intermittent recreational users.*]
- The area between the Bakers Falls pool and the former dam at Fort Edward. GE may request an alternative approach to the approach described in the work plan.
- Islands in the river located within the boundaries described above.

Areas excluded from the floodplain RI/FS because they are being addressed separately are:

- Shorelines – Upper Hudson River shoreline areas that are dredged (or will be dredged).
- Portions of Dredge Spoil Site Areas that are being investigated and/or remediated by the New York State Department of Environmental Conservation (NYSDEC). [*Note: areas where existing data or data collected pursuant to this RI/FS indicate that the PCBs have been deposited by flooding will be included in the floodplain RI/FS.*]

- Remnant Sites – capped areas of Remnant Deposit Sites 2 through 5 cleaned up pursuant to EPA’s 1984 Record of Decision for the Hudson River PCBs site.

TASC Comment

Floodplain boundaries are not shown on a map or well defined in the work plan. EPA explained to TASC that specific floodplain boundaries are still being determined by the Agency and GE. In the future, a map showing specific boundaries will be made available to the public. It will also be part of the RI/FS Report.

2. Additional Remedial Investigation Activities

This section of the RI/FS Work Plan for the Upper Hudson River Floodplain provides an overview of EPA’s current understanding of the distribution of PCBs in floodplain soils (based on previous data collection and investigation activities). It also outlines the approach for estimating PCB concentrations for use in the risk assessments, and identifies RI tasks – including additional data collection – and deliverables (apart from those related to the risk assessments).

Deliverables will include:

1. An initial Floodplain Characterization Report.
2. Plans for additional remedial investigation data collection, including Field Sampling Plan, Quality Assurance Project Plan, and Health and Safety Plan.
3. An RI Data Summary Report.
4. The revised Floodplain Characterization Report, which will incorporate additional data collected during the RI and identify near-shore sediment areas that have a reasonable potential for human use and availability of PCB data for the near-shore areas.
5. The final Floodplain Characterization Report (following receipt of all data from the risk assessments).
6. Work plans and reports on cultural resources survey work.
7. An RI Report, which will document all RI work (including the risk assessments).

The work plan notes that certain patterns in the distribution of PCB within the floodplain have been determined based on data already collected. PCB levels are typically highest close to the river and decrease further out into the floodplain. PCB levels generally decrease downstream of Fort Edward. PCB levels in floodplain soils are greatly affected by the frequency of flooding and the ground surface elevation. Higher elevations are less frequently flooded and typically have lower PCB levels.

TASC Comment

PCBs mostly stick to soil and sediment particles. The described patterns of PCB contamination are typical of how contaminants attached to soil and sediment move in the environment.

According to the work plan, additional work will divide the floodplain into smaller areas of investigation that have common features (e.g., frequency of flooding, type of flooding, local regional characteristics). Each of these areas is called a flood frequency unit, or FFU. An exposure point concentration (EPC) for total PCBs will be developed for each FFU. An EPC is the PCBs concentration in soil or sediment in the exposure area (EA) used for risk calculations.

An exposure area (EA), as defined in risk assessment, is an area within which an exposed person may reasonably be assumed to move at random and be equally exposed to the soil in every part of the EA. An EA may be a portion of a tax parcel, a tax parcel or more than one tax parcel, depending on how the land is used and who has access to it.

For the screening-level analysis, the EPC for each tax parcel will be set as the maximum detected concentration of PCBs in the top 12 inches of soil. For a more refined risk analysis, the EPC for a tax parcel will be an area-weighted average of the EPCs calculated for each FFU within the tax parcel. The work plan indicates that the most conservative method of either the upper 95th percentile confidence limit on the mean concentration (95% UCL) or the upper 95th percentile prediction limit (95% UPL) will be used to calculate EPCs, depending on EPA approval.

TASC Comment

TASC has prepared a 95% UCL fact sheet and provided it to the CAG.

The data gap analysis plan indicates that an EPC for each FFU will be calculated from at least six samples. Additional data will be collected in FFUs having less than a total of six samples or having a relative precision that exceeds 1. Relative precision is calculated by dividing the 95% UCL-average divided by the mean (average). The relative precision threshold will not be applied in FFUs whose maximum PCB concentration is less than 0.1 milligram per kilogram (mg/kg). Also, additional sampling will not occur in FFUs with a sample density greater than or equal to eight samples per acre. Standing water areas will be evaluated separately. Therefore, these data sufficiency requirements may not be applicable to such areas.

TASC Comment

TASC agrees that dividing the floodplain into FFUs that each have consistent flooding and other physical characteristics is a good plan. EPCs developed for each FFU based on a small number of samples are more likely to represent the average exposure for people who live, work or recreate within each FFU.

For EAs not excluded from cleanup during the screening-level analysis or the Phase 1 risk assessment, a Phase 2 risk assessment will follow. During Phase 2, additional samples will be collected, as needed, to complete the risk assessment for each EA.

3. Baseline Human Health Risk Assessment

This section of the RI/FS Work Plan for the Upper Hudson River Floodplain describes the approach to assessing potential risks to human health from exposure to PCBs in floodplain soils, including the three phases of that assessment. It also summarizes inputs and procedures for each phase, data collection activities associated with the baseline human health risk assessment, and deliverables to be submitted to EPA.

Key major steps and deliverables in the baseline human health risk assessment process are, in chronological order:

1. Screening-level assessment (SLA)
2. Pathway Analysis Report (PAR)

3. Phase 1 of the baseline human health risk assessment
4. Proposal for collection of additional data
5. Phase 2 of the baseline human health risk assessment
6. Final Baseline Human Health Risk Assessment Report

The work plan indicates that for tax parcels not excluded in the screening-level analysis or the Phase 1 risk assessment, GE will provide two sets of risk calculations. One set will use EPA default exposure values. The other set will use modified exposure factors to take climatic conditions in upstate New York that affect potential soil exposures during colder months into account, as well as certain other modified factors based on potential exposures of different populations.

TASC Comments

The baseline human health risk assessment appropriately starts with a conservative screening analysis, followed by refinements meant to assess more realistic risk scenarios. As discussed in the general comments (Section 3 above), the CAG may want to review and provide input on use scenarios and acceptable risk limits for different tax parcels and/or types of property.

The CAG may want more information about the modified factors to be developed for the Phase 2 risk assessment and how EPA intends to use the two sets of risk calculations to make cleanup decisions.

4. Ecological Risk Assessment

This section of the RI/FS Work Plan for the Upper Hudson River Floodplain describes the approach to assessing potential risks to plants and animals from exposure to PCBs in the floodplain, including identifying the phases of the ecological risk assessment. It also describes inputs and procedures for each phase, data collection activities, and deliverables to be submitted to EPA.

Key major steps and deliverables in the ecological risk assessment process are, in chronological order:

1. Screening-level assessment
2. Baseline ecological risk assessment work plan
3. Phase 1 data collection
4. Phase 1 of the baseline ecological risk assessment
5. Phase 2 data collection
6. Phase 2 of the baseline ecological risk assessment and final report

As with the human health risk assessment, the ecological risk assessment begins with a screening-level analysis using conservative assumptions. The goal of the screening-level analysis is to separate populations of plants/animals and areas that do not require further evaluation from plant/animal populations and areas that do require further evaluation during the baseline ecological risk assessment. For populations and areas retained for further evaluation, a baseline ecological risk assessment work plan will follow. Table 4-1 in the RI/FS Work Plan for the Upper Hudson River Floodplain lists species for evaluation and the measures that may be used.

The work plan indicates that the screening-level ecological risk assessment may use either measured or modeled data. The baseline ecological risk assessment work plan will include Phase 1 and Phase 2 activities. It will be written after completion of the screening-level ecological risk assessment.

TASC Comments

The work plan does not clearly state whether the screening-level ecological risk assessment will use modeled or measured data. The CAG may want to ask EPA for additional information. For example, how will EPA decide if modeled data is an acceptable substitute for tissue and egg samples from floodplain animals? How will EPA decide if existing sampling data is adequate or determine the need for collection of additional tissue and egg samples?

The CAG may want to review and comment on the Screening-Level Ecological Risk Assessment Report and Baseline Ecological Risk Assessment Work Plan when they are available.

5. Feasibility Study

This section of the RI/FS Work Plan for the Upper Hudson River Floodplain describes the approach for development of remedial action objectives (RAOs) and preliminary remediation goals (PRGs). It also discusses the development and evaluation of remedial alternatives for the floodplain as well as deliverables to be submitted to EPA as part of the FS.

The FS will consider the types and number of EAs identified. EAs may be grouped (e.g., multiple residential property EAs may be grouped together) for the purposes of developing and evaluating remedial alternatives and selecting a remedial action.

TASC Comment

The work plan describes the typical steps of an FS. The description is not very detailed; information from the RI will determine the work needed to complete the FS. For example, the number of EAs and nature of the EAs is not yet determined. The CAG may want to ask EPA to review each FS deliverable as it is developed. For example, the CAG may want to review and comment on the RAO/PRG Proposal Report before completion of the FS Screening Report.

6. Schedule

This section of the RI/FS Work Plan for the Upper Hudson River Floodplain describes the schedule for the activities outlined in the work plan. No dates are given for the RI/FS schedule. The work plan states that “because the schedule for several tasks is contingent upon activities that are not within GE’s control (e.g., seasonal constraints, access, USEPA review/approvals, the extent of data gaps, etc.), the schedule is provided relative to key milestones and other conditions.”

TASC Comment

This is a common approach to scheduling RI/FS activities. As work progresses, the CAG may want to ask EPA to provide estimated or target dates for completing RI/FS tasks.

7. References

This section lists literature references that support the work plan.

Appendix A. Selection of Exposure Areas for Human Health Risk Assessment

The baseline human health risk assessment for the floodplains will focus on privately and publicly owned tax parcels as primary areas of potential exposure. However, there are situations where an entire parcel may not be an appropriate approximation of the likely use or EA. This appendix presents the approach developed for identifying EAs.

Appendix B. Phase 1 Exposure Parameters for Human Health Risk Assessment

Phase 1 of the baseline human health risk assessment for the floodplains will evaluate the current and reasonably anticipated future use of each EA. Phase 1 will evaluate one of four general use categories for each EA. The category to be evaluated will be selected based on the current or reasonably anticipated future use of the EA expected to result in the highest potential for exposure to soil. The four general use categories are: (1) residential; (2) agricultural; (3) commercial/industrial; and (4) recreational. In addition, a construction worker scenario will be evaluated for all identified EAs during Phase 1. This appendix presents tables containing default exposure factors that will be used for Phase 1 of the baseline human health risk assessment.

Appendix C. Phase 2 Exposure Scenarios and Parameters for Human Health Risk Assessment

This appendix describes the exposure scenarios to be evaluated during Phase 2 of the baseline human health risk assessment. It also includes tables with default exposure factors.

Phase 2 will evaluate the current and reasonably anticipated future uses of each EA. For most exposure scenarios, there will be two separate analyses: a Phase 2 default analysis using EPA default exposure values and a Phase 2 site-specific analysis using modified exposure values determined using site conditions.

The Phase 2 default analysis will be limited to the default scenarios requested by EPA. These scenarios will evaluate residential, recreational, commercial and construction worker exposures and the consumption of garden produce. They will use the reasonable maximum exposure (RME) exposure assumptions provided in EPA guidance or otherwise EPA-approved assumptions.

The Phase 2 site-specific analysis will evaluate a larger set of site-specific exposure scenarios than were evaluated in Phase 1 to reflect more refined usage patterns, including varying types, intensities and durations of exposure. The use of this wider array of exposure scenarios allows for the diversity of land uses located in the floodplain to be taken into account by the risk assessment. The analysis will evaluate both RME and central tendency exposure (CTE) risks and hazards. The RME is the maximum exposure reasonably expected to occur at a site. The CTE is a more likely average exposure expected to occur at the site.

Appendix D. Process for Selecting Toxicity Reference Values for Ecological Risk Assessment

This appendix describes the process that will be used to select toxicity reference values for the floodplain ecological risk assessment. A toxicity reference value is the exposure concentration or dose of a chemical of interest (in this case, total PCBs) associated with a defined level of effect or lack of effect on an ecosystem or selected sensitive species.

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