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Potential Remediation Approaches to the GE-Pittsfield-Housatonic River Site "Rest of River" PCB Contamination

THE RIVER *The Housatonic River is contaminated with polychlorinated biphenyls (PCBs) and other hazardous substances released from the General Electric Company (GE) facility in Pittsfield, MA. The entire site consists of the 254-acre GE facility; the Housatonic River and its banks and floodplains from Pittsfield, MA, to Long Island Sound; and other contaminated areas. Under a federal Consent Decree, GE is required to address contamination throughout the site, including in the River.*

INTRODUCTION:

EPA and the states of Massachusetts and Connecticut (collectively, the "Parties") have been working cooperatively for the last several months to discuss potential approaches to clean up the Rest of River portion of the GE Housatonic site. These discussions have focused, in part, on the need to address the risks from polychlorinated biphenyls (PCBs) to humans, fish, wildlife and other organisms while avoiding, mitigating or minimizing the impacts of the cleanup on the unique ecological character of the Housatonic River. This summary document reflects the current status of the Parties' preliminary, good faith efforts to discuss and identify potential remedial approaches for the Rest of River in light of the Parties' shared goals and interests. The Parties recognize that no remedy decisions have yet been made, EPA will consider all relevant information, and any remedy proposal and all other information in the administrative record, including this status report, will be subject to public comment at the time that EPA issues a proposed cleanup plan.

In areas of the Housatonic River and its floodplain, PCBs in the sediment, soil and surface water pose an unacceptable risk to human health and/or the environment. The governmental agencies are considering a cleanup plan consisting of a combination of targeted soil and sediment removal, riverbed capping, and monitored natural recovery as a potential means of addressing the PCBs posing the greatest threat and achieving goals such as the following:

- reduce risks to children and adults from direct contact with soil and sediment;
- reduce soil contamination in the floodplain to levels which allow continued recreational use without unacceptable risk;
- reduce PCB concentrations in fish to levels that allow increased consumption of fish caught from the River in Massachusetts and Connecticut and reduce impact to affected communities relying on the fish for economic considerations or cultural practices;
- reduce the potential movement of PCBs from the river onto the floodplain, from the banks into the River, and from upstream to downstream locations, including the downstream transport into Connecticut;
- reduce contamination to acceptable risk for ecological receptors (fish, wildlife, and other organisms) in the river, floodplain, and vernal pools;
- reduce PCB surface water and sediment concentrations by addressing PCB sources in sediment and soil to advance future compliance with water quality standards in Massachusetts and Connecticut and attainment of the highest possible use of the River consistent with the Clean Water Act; and,
- protect and preserve the unique ecological characteristics of the Upper Housatonic Watershed in conducting remedial efforts.

Based upon those discussions, and EPA's ongoing analysis of the nine criteria in the RCRA permit (subject to further information and analysis as EPA continues to review

continued >

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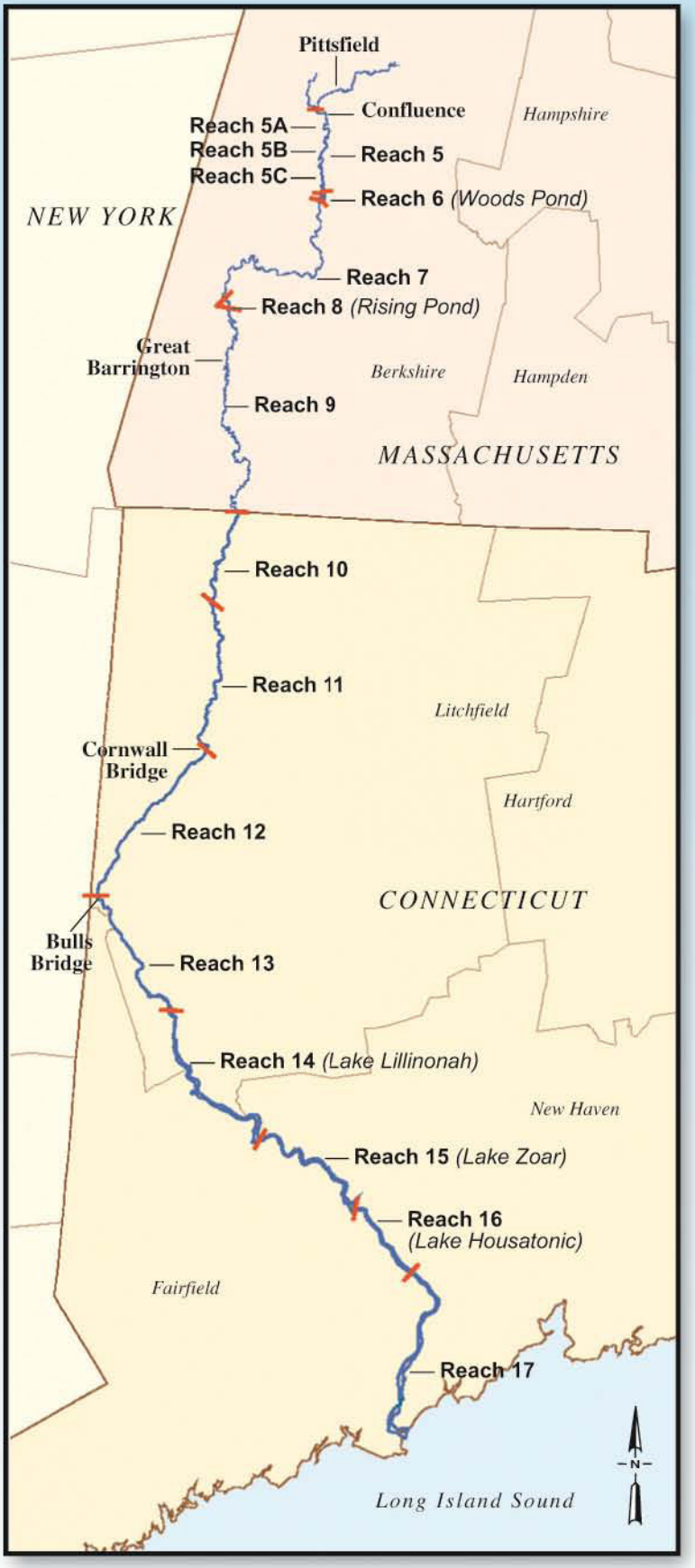
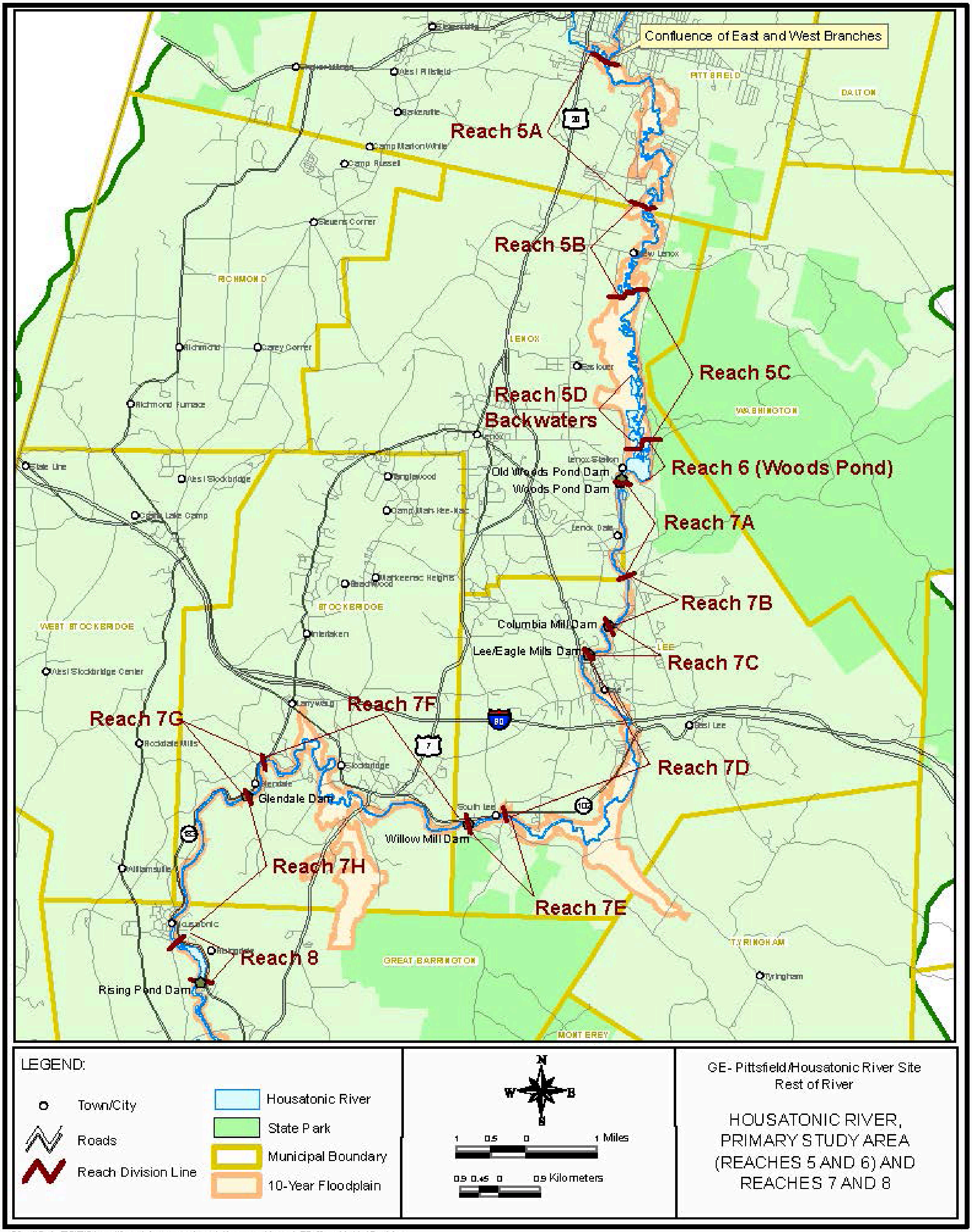


GE-Pittsfield/Housatonic River Site

HOUSATONIC RIVER, REACHES 5 THROUGH 17

11D-0379



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the CMS and other information), a potential framework for a remedy tentatively would include the following elements:

- Removing PCB-contaminated bed sediment and containing residual PCB contamination in some reaches in the Housatonic River using a combination of excavation/dredging and capping.
- Removing PCB-contaminated soil from some areas in the 10-year floodplain adjacent to the river.
- Minimizing bank erosion and PCB transport downstream through the use of natural channel design, sediment trapping measures, and/or other engineering controls, while preserving the dynamic River habitat.
- Avoiding, minimizing or mitigating impacts to state-listed species of concern, including targeting of floodplain remediation to avoid certain critical core state-listed species habitat.
- Employing an adaptive management approach to ensure that the cleanup is performed using the best available technologies and methods.
- Taking advantage of existing rail infrastructure, transporting of contaminated soils and sediment to existing licensed off-site disposal facilities.
- Providing for long-term monitoring, maintenance, and institutional controls as well as reviewing the remedy every five years to evaluate the effectiveness and adequacy of the cleanup.

Rough volumetric estimates for a cleanup plan meeting these goals could range from 750,000 cubic yards to 1 million cubic yards (yd3) of removal, in addition to containment of residual PCBs and monitored natural recovery. Actual volumes would certainly vary based on the performance criteria and design, which are yet to be decided, and the removal volumes could be reduced below this range. To put this in perspective, some estimates show that there are over 4 million cubic yards of contaminated soil and sediment exceeding 1 part per million PCBs in the River and floodplain.

STATE INVOLVEMENT MOVING FORWARD

We expect these discussions to continue as EPA develops the proposed permit modification in consultation with the states. EPA will propose a remedial approach for the Rest of River for public comment, and the Parties reserve judgment on the appropriate remedy until after the comment period closes. The approach set forth in this document is only preliminary and tentative, subject to further information that will be reviewed as part of the consideration of the CMS, and intended to provide the public with information about these joint governmental discussions. The Parties reserve all rights available under the Consent Decree, CERCLA, RCRA, CWA or other applicable law.

EPA, Massachusetts and Connecticut commit to a long-term effort to work cooperatively in reviewing comments on the to-be-proposed cleanup plan, finalizing the cleanup plan, reviewing the details of the Remedial Design, and overseeing the remedy's implementation and long-term monitoring. EPA expects to work closely with the States on the development of the performance standards, corrective measures and on identification of ARARs for the draft permit before it is issued for public comment. EPA sees an organized, on-going and inclusive partnership with the states as essential to successful implementation of the final remedy.

There will be an opportunity for review and comment by Massachusetts and Connecticut on key GE deliverables, including the draft Statement of Work, work plans, design submittals, and other documents submitted during design, construction, and long-term monitoring. We look forward to a cooperative approach to moving this project forward and ensuring that issues of importance to the states are addressed at each step of the process.

EPA will work with the states to develop a structured process for interagency engagement prior to finalization of the Permit as well as during design and implementation of the remedy. In addition, the states and EPA will develop an interagency process as a means to address issues that may arise.

PRELIMINARY THOUGHTS ON POTENTIAL REMEDY COMPONENTS

The following pages provide a brief analysis of various elements of a potential proposed cleanup plan. This plan represents the preliminary thinking at this stage of the technical discussions among the States and EPA

NOTE: The assumptions contained in this document are based on current data and modeling; current data and monitoring are very useful to compare various alternatives and actions to assess relative effects of different choices. However, more deliberations will occur prior to the proposal or selection of corrective measures for Rest of River. In addition, following selection of the corrective measures for Rest of River, remedial design activities will include additional investigations and sampling of the river, floodplains and vernal pools. The data and refined information gathered during that investigation and sampling will include data on concentrations of PCBs, the presence of MESA species, and other parameters. The refined information on appropriate parameters will be used to determine the final scope, location, and volumes of the final corrective measures.

ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS	Corrective Measures Study
CWA	Clean Water Act
IMPGs	Interim Media Protection Goals
MassDFG/DFW	Massachusetts Department of Fish and Game / Division of Fishieries & Wildlife
PCBs	polychlorinated biphenyls
RCRA	Resource Conservation and Recovery Act

I. REACH 5 RIVER BED AND BANKS

Area of the river

For the purpose of current deliberations, the government agencies have examined a 10-mile long section of the river which includes Reaches 5A, 5B, and 5C from the confluence of the East and West Branches of the Housatonic River to the headwaters of Woods Pond.

A potential approach to cleanup

At this stage of deliberations, the government agencies are discussing remediation of River Bed in Reaches 5A and 5C. There have been tentative discussions of removing contaminated sediment from the river bed to a depth sufficient to place a multi-layered engineered cap to sequester remaining contamination. Current thinking is that the cap would be expected to consist of, at a minimum, an isolation layer with organic carbon, a protective layer, and a habitat layer. This may, of course, change as further information is developed, such as during design.

Remediation of erodible river banks in Reach 5A. At present, the preliminary thinking is that any bank remediation/restoration approach would follow a hierarchy of most preferred to least preferred:

1. Leave banks intact (no disturbance/excavation)
2. Reconstruct disturbed banks with bio-engineering "soft" restoration techniques
3. Reconstruct disturbed banks with a cap layer extending into the river bank placed under a bio-engineering/"soft" layer
4. Place rip-rap cap or hard armoring on surface of banks (only for protection of adjacent infrastructure)

This potential approach being considered by the government agencies would, based on current data, entail the disturbance of one third of the Reach 5A riverbanks (or 3.5 miles), recognizing that minimizing the length of affected bank could require capping into the riverbanks throughout that area in order to achieve sufficient bank stabilization. This potential remediation approach would follow the hierarchy of bank stabilization options outlined above, and following this hierarchy may result in the disturbance of less than one-third. This potential approach would minimize impacts to species listed under MESA and help preserve the dynamic character of the river. The government agencies will continue to evaluate these and the other goals on page 1 above throughout the design of any response action.

Hot spot remediation of River Bed and Banks in Reach 5B. The government agencies are currently looking at an approach under which a limited amount of work in Reach 5B would be conducted in order to address surface sediment or riverbank soil exceeding 50 ppm PCBs. Under such a potential approach, any excavated Reach 5B riverbanks could be restored using bioengineering "soft" restoration techniques. EPA could also explore the potential addition of activated carbon to surface sediment in the Reach 5B riverbed to further sequester residual contamination in that sub-reach. If such an option were to be pursued, EPA estimates this hot spot remediation would be limited to less than 5% of the river banks and 5% of the river bed, likely less than 1,000 cubic yards.

Cleanup goals associated with this potential approach

As part of the agencies' deliberations, EPA modeled the potential approach above, and believe that it would be expected to result in reductions in fish tissue concentrations to allow increased consumption of fish caught from the river a short time after remediation is completed in these Reaches. That is, the approach would achieve acceptable cancer and non-cancer residual risks for EPA's "Central Tendency" exposure scenario, representing the average person's fish consumption rates. Remediation of sediment in Reaches 5A and 5C, erodible river banks in Reach 5A, and hot spots in Reach 5B would also reduce the transport of contamination into downstream reaches (thus improving overall water quality). This cleanup approach would achieve human health benchmarks for children and adults for direct contact with sediment and reduces contamination to acceptable levels for ecological receptors (fish, wildlife, and other organisms) over the long term in much of this stretch of the river.

Preliminary estimates of this approach indicate that it is expected to greatly reduce the contribution to downstream transport of contamination. The potential approach could also include long-term monitoring, to evaluate if downstream transport is being minimized. Early analyses indicate that reducing downstream transport would help continue the reduction of PCB levels in fish tissue in Massachusetts and throughout Connecticut, which, over time, should allow the consumption of additional fish meals and revision or potential elimination of fish consumption advisories in parts of the river in the future.as determined by each state through application of its state-specific fish consumption goals.

Estimated volumes

If cap thickness were assumed to have an average excavation depth of 2 ½ feet in Reach 5A and 2 feet in Reach 5C, the agencies estimate that this component of the above potential remedial approach could entail the excavation of approximately 380,000 yd^3 of contaminated bank soil and

sediment or approximately one third of the total remediation volume estimated for this potential remedial approach. Of this amount, approximately 25,000 yd^3 would be expected to be riverbank soil, a small percentage (2 to 3%) of the remediation volume under this potential approach.

Cap thickness could be a major driver of excavation volumes. In any proposed remedial approach, EPA would tend to specify certain cap design principles and performance standards, but not a particular material thickness. Thus, during Remedial Design, GE would likely look to optimize cap designs in order to lower the amount of sediment requiring excavation. For instance, if the designed cap thickness was reduced by one foot in Reaches 5A and 5C, this could result in more than a 40% reduction in volume to approximately 220,000 yd^3.

This potential approach would provide specificity on the options for removal so as to minimize impacts to the many species covered under the Massachusetts Endangered Species Act (MESA) which would also help preserve the dynamic nature of the river.

II. WOODS POND

Area of the River at issue

Woods Pond is Reach 6 of the Rest of River study area and covers approximately 54 acres from the end of Reach 5 to the Woods Pond Dam.

A potential approach to cleanup

Excavation and Capping. At this stage of deliberations, the government agencies are discussing a proposed approach for the removal of contaminated sediment from the pond prior to placement of an engineered cap to sequester the remaining contamination. The proposed approach under consideration would involve the removal of sediment that would result in a final average water depth of at least six feet in the pond after placement of a one-foot thick cap. Current thinking is that the cap would be expected to consist of, at a minimum, an isolation layer with organic carbon coupled with a protective layer and a habitat layer.

EPA, in consultation with the states, is also considering additional deepening and/or placement of structures within the pond to further promote sedimentation as well as the use of activated carbon before and/or after final cap placement to sequester residual PCBs and minimize the potential for downstream migration of PCBs. The agencies are looking at possible designs for the final contours of the pond bathymetry that would support a functioning littoral zone. Final removal depths, structures, and engineered cap configurations would, of course, be determined during remedial design.

Cleanup goals associated with this potential approach

As part of their deliberations, the government agencies have modeled a variety of potential approaches, and based on that, believe that this approach would be expected to result in reductions in fish tissue concentrations to allow increased consumption of fish caught from the river shortly after remediation is completed. The agencies are further considering removal of additional mass of contamination from Woods Pond which, combined with capping, might also help to reduce the transport of contamination into downstream reaches and further control a potential source of downstream release in the unlikely event of dam failure. If downstream transport can be reduced, it should help continue the reduction of PCB levels in fish tissue in Massachusetts and throughout Connecticut, which, over time, should allow the consumption of additional fish meals and revision or potential elimination of fish consumption advisories in parts of the river in the future, as determined by each State through application of its state-specific fish consumption goals. Preliminary estimates of this potential cleanup approach indicate that it is expected to achieve human health benchmarks for children and adults for direct contact with sediment and reduce contamination to acceptable levels for ecological receptors (fish, wildlife, and other organisms) over the long term in Woods Pond. Any remedy component that is ultimately proposed and selected by EPA would, of course, be implemented to be consistent with ARARs, including by avoiding, minimizing and mitigating impacts to state-listed species.

This option would potentially increase the sediment retention of Woods Pond and the retention of residual PCB contamination. This retention of sediment from the river and floodplains may be expected to have the benefit of further decreasing the movement of PCBs downstream. Under any remedial option, Woods Pond would be monitored over the long term and if substantial PCBs accumulate in the pond, removal of the residual PCBs would be evaluated. As noted above, EPA would also explore the use of activated carbon before and/or after final cap placement to sequester residual PCBs and minimize potential for downstream migration of PCBs.

Estimated volumes

The agencies estimate that if the excavation and capping of Woods Pond were carried out as described in the potential approach outlined above, it would entail the excavation of approximately 285,000 yd3 or 29% of the total remediation volume. Under that scenario, the major factor behind the excavation volumes would be the deepening of the pond. Pond deepening may be advantageous in some ways, as it can result in (a) removing mass of PCBs from the Pond and (b) potentially enhancing the Pond's ability to trap solids and PCBs, thus reducing downstream transport.

III. DOWNSTREAM IMPOUNDMENTS (REACHES 7 AND 8)

Area of the River at issue

For the purpose of current deliberations, the government agencies have examined a potential remedy that would address the impounded areas behind several dams located in the River south of Woods Pond. These include four dams in Reach 7 (Columbia Mill Dam, Eagle Mill Dam, Willow Mill Dam and Glendale Dam (subreaches 7B, 7C, 7E, and 7G, respectively) and Rising Pond (Reach 8). Each of the four Reach 7 Impoundments ranges from 8 to 12 acres each, while Rising Pond comprises approximately 45 acres.

A potential approach to cleanup

Excavation and Capping. At this stage of deliberations, the government agencies are discussing a proposed approach for the removal of contaminated sediment from the river bed prior to placement of a multi-layered cap to sequester remaining contamination. Conceptually, this approach would include excavation of an estimated 1 to 1 ½ foot (at least) of contaminated sediment, followed by placement of a 1 to 1 ½ foot cap. Also under active consideration by EPA is the possibility of establishing a secondary or "contingency" remedy allowing for the excavation of the impoundment behind Columbia Mill Dam or other Reach 7 or Reach 8 impoundments to a level of 1 ppm PCBs to better dovetail the remedy with any potential dam removal projects by others.

Cleanup goals associated with this potential approach

As part of their deliberations, the government agencies have modeled the potential approach above, and believe that it would be expected to result in reductions in fish tissue concentrations to allow increased consumption of fish caught from the river after remediation is completed. The agencies are further considering removal of additional mass of contamination from these impoundments which, combined with capping, might also help to reduce the transport of contamination into downstream reaches and further control a potential source of downstream release in the event of dam failure. If downstream transport can be reduced, it should help continue the reduction of PCB levels in fish tissue in Massachusetts and throughout Connecticut, which, over time, should allow the consumption of additional fish meals and revision or potential elimination of fish consumption advisories in parts of the river in the future as determined by each State through application of its state-specific fish consumption goals. Preliminary estimates of this potential cleanup approach indicate that it is expected to also achieve human health benchmarks for children and adults for direct contact with sediment and reduce contamination to acceptable levels for ecological receptors (fish, wildlife, and other organisms) over the long term in this stretch of the river.

Estimated volumes

The agencies estimate that if excavation and capping of the Reach 7 impoundments and Rising Pond were carried out as described in the potential approach outlined above, it would entail the excavation of approximately 155,000 yd^3 or 15% of the total remediation volume.

Under this type of remedial approach, GE could, as part of the design phase, evaluate whether volume can be reduced in Reach 7 Impoundments by excavating sufficient sediment to meet a level of 1 ppm PCBs as opposed to excavating and capping the entire area behind each impoundment. Such an approach may also be considered as an alternative approach in conjunction with a dam removal project. For example, such an approach at Columbia Mill Dam would likely entail the excavation of approximately 2 feet of sediment to meet the 1 ppm standard, potentially increasing the volume excavated by approximately 10,000 cubic yards. Institutional controls may need to be part of the remedy for these and other downstream areas, including those in Connecticut, to ensure that GE remains responsible for any PCB contaminated sediment generated as part of dam maintenance or any other permitted activities along the River.

IV. FLOODPLAINS, VERNAL POOLS, AND RIVER BACKWATERS

Area of the River at issue

The floodplain study area in the vicinity of Reaches 5 and 6 (roughly equivalent to the 10-year flood elevation) consists of approximately 1,000 acres. Within that area there are 66 vernal pools identified by EPA comprising 18 acres. There are 85 acres of river backwaters.

A potential approach to cleanup

Excavation and backfill. At this stage of deliberations, the government agencies are discussing a proposed approach for the excavation of 1 foot of floodplain soil to generally meet Human Health risk target of 10-5 or Hazard Index =1. In certain "frequently used subareas", the agencies are discussing the option of excavating to

a depth of 3 feet rather than 1 foot. The agencies' current thinking, would be to avoid the highest priority habitat areas (Core Area I) except as needed to meet to meet 10-4 and HI=1. Such an approach would be expected to avoid, minimize, or mitigate impact to other priority habitat areas, as long as residual risk is at or below 10-4 and HI=1, and also address other factors such as downstream transport of PCBs. The option currently under consideration would attempt to remediate vernal pools but avoid those that are within the highest priority habitat areas (Core Area I), and employ a phased, adaptive management approach to vernal pool remediation. An example of how this approach might work in the field is provided in the attached Appendix.

As part of the River sediment cleanup, the potential approach under consideration would also (a) call for removal of 1 foot of bed sediment followed by capping in backwater areas (River Reach 5D), and (b) generally avoid backwaters, or portions thereof, located in highest priority endangered species habitat areas ("Core Area I"), except in discrete areas with PCB concentrations greater than 50ppm.

Cleanup goals associated with this potential approach

The government agencies believe that the potential approach discussed above could be designed to achieve human health benchmarks for children and adults for direct contact under a variety of area-specific exposure scenarios. It is further estimated that removal of contaminated soil from the floodplain, especially in areas near the river banks, could prevent these materials from becoming a potential future source of contamination to the River, and might also benefit ecological receptors (fish, wildlife, and other organisms) in the primary study area. The agencies believe that remediation in the backwater areas is an important component of the overall River sediment remediation, as it would likely contribute to allowing increased consumption of fish caught from the river after remediation is completed.

Preliminary estimates of the potential remedial approach currently under consideration indicate that over the long term this option would meet the long term ecological goals in a reasonable time frame, while providing protection for state-listed species.

Estimated volumes

The agencies estimate that if excavation and backfill in the floodplain and vernal pools were carried out as described in the potential remedial approach outlined above, then it would involve the removal of approximately 75,000 yd3 of contaminated material in approximately 45 acres of the floodplain (which represents only 5% of the entire floodplain area), and backwater remediation involving an additional 95,000 yd^3 and 61.5 acres while excluding approximately 8.5 acres in Core Area I (it is estimated that less than 0.5 acres of Core Area I would be remediated due to concentrations greater than 50 ppm). Together, these two aspects of the potential remedial approach would account for about 17% of the remedy's total volume.

CONCLUSION

This status report is intended to provide the public with a summary of the status of the governmental discussions prior to a decision on a remedy proposal. This status report represents a conceptual approach, and is not intended to provide a detailed written analysis of elements considered in the discussions. Nor does this status report affect or waive any privilege of the governments. Further discussion and analysis will be done prior to EPA issuing a proposed set of corrective measures. EPA's discussions with the states will be considered in responding to GE's draft corrective measures study, in any dispute resolution process under the Consent Decree concerning the corrective measures study, and in the issuance of the proposed set of corrective measures.

APPENDIX

[Caveat: The approach to remediation set out in this appendix reflects an option that is currently under review by EPA and the State agencies, and which is believed to exhibit a number of promising attributes. No decision has been made, and EPA will continue to deliberate until it has made a decision on the CMS and remedy proposal.]

FLOODPLAIN/VERNAL POOL – POTENTIAL REMEDIATION APPROACH UNDER REVIEW WITH EXAMPLES OF FIELD WORK PROTOCOLS

FLOODPLAINS

Set the Cleanup Levels: Primary: based on Human Health Benchmarks 10-5/H1=1
Secondary: based on Human Health Benchmarks 10-4/H1=1

Note 1: Any areas exceeding 2 ppm (unrestricted use standard) after remediation may require Institutional Controls to restrict certain future uses.

Note 2: Primary Cleanup levels presumed to be protective of Ecological Receptors in Floodplain.

Approach during Pre-Design/Remedial Design:

1. GE conducts additional sampling of floodplain soil (as needed).
2. GE designs excavation plan based on meeting Primary Cleanup Levels.
3. GE conducts additional field reconnaissance as needed to quantify potential state-listed species impacts of proposed excavation.
4. Evaluate impacts on state-listed species and their habitats, formulate approach to avoid, minimize, or mitigate any such adverse impacts in accordance with the substantive requirements of a "Conservation and Management Plan" under MESA, including providing a long-term Net Benefit for the conservation of the affected state-listed species. All evaluations to be conducted in consultation with MassDFG/DFW, following the above referenced MESA regulatory standards. In conducting this evaluation, the following approach would be used:
    a. remediation in Frequently Used Sub-Areas to maintain Primary cleanup goals in these sub-areas
    b. "avoidance" of "Core I" habitat areas, except limited areas to meet Secondary Cleanup Level
    c. "minimization or mitigation" for "Core Area II"
    d. Case-by-case determination for "Core Area III"
5. Based on #4 above, identify any areas to be avoided, and recalculate exposure point concentration (EPC) to ensure that resultant excavation plan meets, at a minimum, Secondary Cleanup Levels.
6. To the extent that Secondary Cleanup Levels are not met, propose additional areas to be excavated in order to meet this threshold (repeating Steps 4 and 5 as needed).
7. In conjunction with the evaluation of the scope of river bed and bank remediation, evaluate presence of any areas of remaining PCB concentrations in floodplain soils for erosion potential and the likelihood of future downstream transport at levels that could result in unacceptable downstream contamination. Reevaluate, as needed, any area of proposed floodplain soil remediation, considering the erosion potential and steps 3 through 6 above, proposing further action as necessary to reduce downstream transport of PCBs.

[1] For example, MassDFG/DFW has identified a portion of Exposure Area (EA) 10 as a Core I area that should be avoided, while portions of Core I areas in EAs 19, 37a, and 62 could be excavated to meet Secondary Cleanup Goals.

VERNAL POOLS

Approach during Pre-Design/Remedial Design:

1. GE conducts site visit with MassDFG/DFW personnel to confirm presence of vernal pool (as opposed to backwater or wetland)
2. GE conducts additional sampling and characterization of vernal pools, as needed, to generate baseline data on the concentrations of PCBs and health/abundance of animal species, including but not limited to state-listed species. GE also conducts additional field reconnaissance as needed to quantify the likely effects of potential remediation of the vernal pools on any state-listed species.
3. GE determines vernal pools requiring cleanup to meet Vernal Pool-specific Cleanup Level.
4. Consistent with the adaptive management approach described below, for vernal pools identified as requiring cleanup solely to meet ecological remediation goals, EPA will consult with MassDFG/DFW to make case-specific remedial decisions (including traditional excavation/restoration, alternative remedial strategies, deferment of remediation, and preservation of existing conditions) weighing field evidence of species health/abundance with applicable ecological IMPGs.
5. For those vernal pools selected for remediation, evaluate impacts on state-listed species and their vernal pool habitat, formulate approach to avoid,

minimize, or mitigate any such adverse impacts in accordance with the substantive requirements of a "Conservation and Management Plan" under MESA, including providing a long-term Net Benefit for the conservation of the affected state-listed species. All evaluations to be conducted in consultation with MassDFG/DFW, following the above referenced MESA regulatory standards. In conducting this evaluation, the following approach would be used:

a "avoidance" of Core I Areas",
b. "minimization or mitigation" for "Core Area II"
c. Case-by-case determination in "Core Area III"

6. Develop strategy for vernal pool remediation based upon evaluations conducted above plus considerations of contamination levels and accessibility and the adaptive management approach outlined below.
7. In consultation with MassDFG/DFW and MassDEP, EPA identifies performance metrics and evaluation criteria for evaluation of success and potential adaptive management measures (see below).
8. Pilot the use of activated carbon in a downstream, easily accessible pool and monitor the performance and any potential negative impacts.

An Adaptive Management Approach for Vernal Pools outside of Core Area I:

1. Identify first phase of vernal pools to be addressed, in consultation with MassDEP and MassDFG/DFW:
   a. Select initial number (8 to 10) of pools for remediation by traditional means (excavation and reconstruction)
   b. Select additional pools for pilot testing of activated carbon addition in lieu of excavation
   c. Select additional pools for pilot testing by a third remediation method to be proposed by GE for EPA approval in consultation with MassDEP and MassDFG/DFW and/or additional pools to be monitored concurrently with remediated pools as a "control" group for comparison purposes.
2. In consultation with MassDFG/DFW and MassDEP, EPA identifies performance metrics and evaluation criteria for comparison of the various remediation approaches
3. Complete first round of vernal pool remediation and conduct evaluation of each method
4. Determine preferred method/approach to remediation of subsequent vernal pools

Acreage Assumptions for potential approach (based on GE's CMS Alternative FP4):

Initial Acreage (pre MESA evaluation) for Floodplains	57 acres
Area of Overlap with Core Areas I, III, IV	35 acres
Assume net 50% avoidance of Core Areas from "step 4" processes above	17.5 acres
Net Potential Acreage of Floodplain Remediation	40 acres (approx)
Assuming Vernal Pool approach outlined above	5 acres (approx)
Total assumed potential Floodplain/Vernal Pool acreage	**45 acres (+-10%)**

STATE AND LOCAL RESOURCES

Berkshire Athenaeum Public Library
Reference Department
Pittsfield, MA 01201
(413) 499-9480

Cornwall Public Library
Cornwall, CT 06796
(860) 672-6874

Kent Memorial Library
(Kent Library Association)
Kent, CT 06757
(860) 927-3761

Housatonic Valley Association
Cornwall Bridge, CT 06754
(860) 672-6678

Massachusetts Department
of Environmental Protection
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(413) 784-1100

Connecticut Department of
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